RENAULT

1 Engine and peripherals

10A ENGINE AND CYLINDER BLOCK ASSEMBLY

11A TOP AND FRONT OF ENGINE

12A FUEL MIXTURE

12B TURBOCHARGING

13A FUEL SUPPLY

13B DIESEL INJECTION

13C PREHEATING

14A ANTIPOLLUTION

16A STARTING - CHARGING

17A IGNITION

17B PETROL INJECTION

X91

AUGUST 2009 EDITION ANGLAISE

"The repair procedures given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The procedures may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which the vehicles are constructed".

All rights reserved by Renault.

Copying or translating, in part or in full, of this document or use of the service part reference numbering system is forbidden without the prior written authority of Renault.

© Renault s.a.s 2007

19A COOLING

19B EXHAUST

19C TANK

19D ENGINE MOUNTING

X91

AUGUST 2009 **EDITION ANGLAISE**

"The repair procedures given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The procedures may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which the vehicles are constructed".

All rights reserved by Renault.

Copying or translating, in part or in full, of this document or use of the service part reference numbering system is forbidden without the prior written authority of Renault.

© Renault s.a.s 2007

LAGUNA III - Section 1

Contents

Pages

10A ENGINE AND CYLINDER BLOCK ASSEMBLY

Engine - gearbox assembly: Removal - Refitting 10A-1

Engine oil: Draining - Refilling 10A-100

Oil filter: Removal - Refitting 10A-117

Oil filter unit: Removal - Refitting 10A-130

Crankshaft seal on timing end: Removal - Refitting 10A-134

Crankshaft seal, gearbox end: Removal - Refitting 10A-153

Lower cover: Removal - Refitting 10A-180

Conrod bearing shell: Removal - Refitting 10A-206

Oil-coolant heat exchanger: Removal - Refitting 10A-214

Oil pressure sensor: Removal - Refitting 10A-227

Oil level sensor: Removal - Refitting 10A-237

Oil pump: Removal - Refitting 10A-245

Oil pressure: Check 10A-262

Multifunction support: Removal - Refitting 10A-265

10A ENGINE AND CYLINDER BLOCK ASSEMBLY

Flywheel: Removal - Refitting 10A-277

Drive plate: Removal - Refitting 10A-287

11A TOP AND FRONT OF ENGINE

Pressure at end of compression: Check 11A-1

Accessories belt: Removal - Refitting 11A-13

Crankshaft accessories pulley: Removal - Refitting 11A-33

Timing belt: Removal - Refitting 11A-50

Timing chain: Removal - Refitting 11A-88

Rocker cover: Removal - Refitting 11A-139

Cylinder head: Removal - Refitting 11A-181

Camshaft: Removal - Refitting 11A-245

Camshaft dephaser: Removal - Refitting 11A-275

Camshaft dephaser: Function 11A-280

Camshaft dephaser solenoid valve: Removal - Refitting 11A-282

Contents

11A TOP AND FRONT OF ENGINE

Camshaft seal, timing end: Removal - Refitting 11A-287

Valves: Adjustment 11A-304

Oil decanter: Removal - Refitting 11A-307

Lifting eyes: Removal - Refitting 11A-318

12A FUEL MIXTURE

Air inlet: Description 12A-1

Air filter: Removal - Refitting 12A-7

Air filter unit: Removal - Refitting 12A-13

Air resonator: Removal - Refitting 12A-28

Air flowmeter: Removal - Refitting 12A-33

Damper valve: Removal - Refitting 12A-39

Throttle valve: Removal - Refitting 12A-49

Throttle valve: Cleaning 12A-59

Front inlet distributor: Removal - Refitting 12A-61

Rear inlet distributor: Removal - Refitting 12A-68

Inlet distributor: Removal - Refitting 12A-75

Injector holder shim: Removal - Refitting 12A-93

Exhaust manifold: Removal - Refitting 12A-98

Front exhaust manifold: Removal - Refitting 12A-122

Rear exhaust manifold: Removal - Refitting 12A-129

12B TURBOCHARGING

Turbocharging: Precautions for the repair 12B-1

Turbocharger: Removal - Refitting 12B-4

Turbocharger oil pipe: Removal - Refitting 12B-35

Intercooler: Removal - Refitting 12B-59

13A FUEL SUPPLY

Manual priming pump: Removal - Refitting 13A-1

Fuel filter: Removal - Refitting 13A-12

Electric diesel fuel heater: Removal - Refitting 13A-17

Fuel pressure: Check 13A-19

Fuel flow: Check 13A-24

13B DIESEL INJECTION

Diesel injection: Precautions for the repair 13B-1

Diesel injection: List and location of components 13B-15

Diesel injection computer: Removal - Refitting 13B-36

Camshaft position sensor: Removal - Refitting 13B-42

Crankshaft position sensor: Removal - Refitting 13B-51

High pressure pump leak flow: Check 13B-55

High pressure pump: Removal - Refitting 13B-62

Fuel pressure regulator: Removal - Refitting 13B-91

Contents

13B DIESEL INJECTION

Diesel return pipe: Removal - Refitting 13B-98

Diesel injector fuel return rail: Removal - Refitting 13B-108

Injector rail protector: Removal - Refitting 13B-126

High pressure pipe: Check 13B-134

High pressure pipe between pump and rail: Removal - Refitting 13B-140

High pressure pipe between rail and injector: Removal - Refitting 13B-161

High pressure pipe between rails: Removal - Refitting 13B-184

Injector rail: Removal - Refitting 13B-189

Rail pressure sensor: Removal - Refitting 13B-206

Fuel temperature sensor: Removal - Refitting 13B-214

Injector leak flow: Check 13B-219

Diesel injector: Removal - Refitting 13B-229

13C PREHEATING

Pre-postheating unit: Removal - Refitting 13C-1

Heater plugs: Removal - Refitting 13C-3

14A ANTIPOLLUTION

Oil vapour rebreathing circuit: Description 14A-1

Oil vapour rebreathing circuit: Operating diagram 14A-3

14A ANTIPOLLUTION

Exhaust gas recirculation: Operating diagram 14A-6

Fuel vapour recirculation circuit: Operating diagram 14A-7

Fuel vapour recirculation circuit: Check 14A-8

Fuel vapour absorber: Removal - Refitting 14A-9

Fuel vapour absorber: Check 14A-10

Exhaust gas recirculation solenoid valve: Removal - Refitting 14A-11

Exhaust gas cooler: Removal - Refitting 14A-33

Exhaust gas recirculation mounting: Removal - Refitting 14A-49

Exhaust gas recirculation assembly: Removal - Refitting 14A-52

Exhaust gas recirculation rigid pipe: Removal - Refitting 14A-62

16A STARTING - CHARGING

Alternator: Removal - Refitting 16A-1

Alternator pulley: Removal - Refitting 16A-24

Starter: Removal - Refitting 16A-31

17A IGNITION

Coils: Removal - Refitting 17A-1

Plugs: Removal - Refitting 17A-10

Contents

17B PETROL INJECTION

Petrol injection: List and location of components 17B-1

Oxygen sensors: Removal - Refitting 17B-17

Accelerator pedal potentiometer: Removal - Refitting

Petrol injection computer: Removal - Refitting 17B-30

Crankshaft position sensor: Removal - Refitting 17B-34

Injector rail - Injectors: Removal - Refitting 17B-39

19A COOLING

Engine cooling system: Operating diagram 19A-1

Engine cooling: Parts and consumables for the repair 19A-11

Engine cooling: Precautions for the repair 19A-12

Engine cooling system: Specifications 19A-13

Engine cooling system: Check 19A-14

Cooling system: Draining - Refilling 19A-16

Cooling radiator: Removal - Refitting 19A-28

Coolant pump: Removal - Refitting 19A-66

Thermostat: Removal - Refitting 19A-89

Water chamber: Removal - Refitting 19A-100

Engine cooling fan assembly: Removal - Refitting 19A-121

Thermoplunger unit: Removal - Refitting 19A-135

19A COOLING

Coolant pump inlet pipe: Removal - Refitting 19A-139

Expansion bottle: Removal - Refitting 19A-152

Electric coolant pump: Removal - Refitting 19A-159

Coolant temperature sensor: Removal - Refitting 19A-167

19B EXHAUST

Exhaust: List and location of components 19B-1

Exhaust: Precautions for the repair 19B-18

Catalytic pre-converter: Removal - Refitting 19B-22

Catalytic converter: Removal - Refitting 19B-32

Expansion chamber: Removal - Refitting 19B-47

Intermediate pipe: Removal - Refitting 19B-56

Silencer: Removal - Refitting 19B-64

Particle filter: Parts description 19B-70

Particle filter: Removal - Refitting 19B-71

Exhaust gas temperature sensor: Removal - Refitting 19B-85

Exhaust gas pressure sensor: Removal - Refitting 19B-93

Particle filter pressure sensor: Removal - Refitting 19B-103

Particle filter temperature sensors: Removal - Refitting 19B-111

Exhaust fuel injector solenoid valve: Removal - Refitting 19B-118

Contents

19B EXHAUST

Exhaust fuel injector: Removal - Refitting 19B-121

Exhaust fuel injector cooler: Removal - Refitting 19B-125

Particle filter: Cleaning 19B-129

Connecting hose: Removal - Refitting 19B-135

19C TANK

Sender: Removal - Refitting 19C-1

Pump - sender - filter: Removal - Refitting 19C-4

Fuel tank: Draining 19C-7

Fuel tank: Removal - Refitting 19C-11

Filler neck: Removal - Refitting 19C-31

19D ENGINE MOUNTING

Left-hand suspended engine mounting: Removal - Refitting 19D-1

Right-hand suspended engine mounting: Removal - Refitting 19D-51

Lower engine tie-bar: Removal - Refitting 19D-85

Engine - gearbox assembly: Removal - Refitting

F4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station

Tightening torques ▽	
suspended engine mounting rubber pad on the gearbox	**105 N.m**
central nut of the left-hand suspended engine mounting rubber pad	**62 N.m**
engine tie-bar bolt on the subframe	**115 N.m**
engine tie-bar bolt on the engine tie-bar mounting	**190 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **Steering: Precautions for the repair**) (36A, Steering assembly),
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

IMPORTANT

Wear protective gloves during the operation.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

Keep the pipe unions away from contaminated areas.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery).

F4R

123344

❑ Unclip:

- the clip (**1**) on each of the turbocharging pressure regulation pipes,
- the clip (**2**) on the anti-pumping valve pipe.

❑ Disconnect:

- the turbocharging pressure regulation pipes,
- the anti-pumping valve pipe,
- the connector (**3**) from the turbocharging pressure regulation solenoid valve,
- the connector (**4**) from the double non-return valve on the brake servo.

124751

❑ Undo the clip (**5**) for the air pipe at the outlet of the air filter box on the turbocharger side.

❑ Disconnect the air filter unit air outlet pipe on the turbocharger side.

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the engine, if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

PK4

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the air outlet pipe of the air filter unit,
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the engine undertray bolts,
- the engine undertray,

F4R

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

123177

❑ Remove:

- the engine tie-bar bolt (**6**) on the engine tie-bar support,
- the engine tie-bar bolt (**7**) from the subframe,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

PK4

❑ the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

124125

❑ Remove:

- the nuts (**8**) from the exhaust flange,
- the exhaust flange seal.

123161

❑ Unclip the Protection and Switching Unit cover (**9**) .

F4R

124138

❑ Disconnect the connectors (**10**) from the Protection and Switching Unit.

123952

❑ Disconnect the connector (**11**) from the electric coolant pump.

❑ Remove the bolt (**12**) from the electric coolant pump on the body.

123036

❑ Remove the bolt (**13**) from the max fuse box.

❑ Move the max fuse box to one side.

124543

❑ Remove the cover (**14**) from the max fuse box.

F4R

123714

123712

❑ Remove:

- the fuses (**15**) from the max fuse box,
- the fuse-holders (**16**) from the max fuse box,
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the upper radiator cover,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

142916

❑ Use a flat-blade screwdriver (**17**) to unclip the power-assisted steering fluid reservoir.

❑ Move the power steering reservoir to one side.

142912

❑ Separate the clip (**18**) of the expansion bottle cooling pipe on the expansion bottle using the tool **(Mot. 1448)**.

❑ Disconnect the cooling pipe from the expansion bottle.

F4R

123730

- Separate the clip (**19**) of the expansion bottle cooling pipe on the cooling radiator side using the tool **(Mot. 1448)**.

- Disconnect the expansion bottle cooling pipe on the cooling radiator side.

123479

- Disconnect the pressure sensor connector (**20**) from the « condenser - expansion valve » connecting pipe.

- Disconnect the pressure sensor wiring from the « condenser - expansion valve » connecting pipe.

123467

- Disconnect:
  - the engine cooling fan assembly connector (**21**) ,
  - the engine cooling fan assembly resistor connector (**22**) .
- Unclip:
  - the engine cooling fan assembly wiring,
  - the engine cooling fan assembly resistor wiring.
- Move aside the engine cooling fan assembly:
  - the pipe of the coolant pump inlet pipe,
  - the expansion bottle pipe.

123738

❑ Pull the clip (**23**) on the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

123739

❑ Pull the clip (**24**) on the intercooler air outlet pipe.

❑ Disconnect the intercooler air outlet pipe.

123728

123730

❑ Remove:

- the « condenser - expansion valve » connecting pipe bolt (**25**) ,
- the « compressor - condenser » connecting pipe bolt (**26**) .

WARNING
To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

F4R

❑ Disconnect:

- the « condenser - expansion valve » connecting pipe,
- the « compressor - condenser » connecting pipe.

❑ Insert the blanking plugs.

123730

❑ Separate the clip (**27**) of the upper cooling pipe on the cooling radiator side using the tool **(Mot. 1448)**.

❑ Disconnect the upper cooling pipe on the cooling radiator side.

142917

❑ Remove the bolt (**28**) of the air conditioning pipe on the compressor.

❑ Disconnect the air conditioning hose on the compressor.

❑ Insert the blanking plugs.

123729

❑ Remove:

- the cooling radiator air scoops (**29**) ,
- the « engine cooling fan unit - cooling radiator - condenser - intercooler » assembly,

F4R

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front upper structure).

123884

❑ Remove the earth wiring nuts (**30**) from the front left-hand side member.

❑ Disconnect the earth wiring from the front left-hand side member.

AJ0

123959

118388

❑ Disconnect:

- the automatic gearbox computer connector (**31**) ,

- the automatic gearbox connector (**32**) .

❑ Remove the earth cable on the gearbox.

F4R

142913

❑ Disconnect the supply connectors (**33**) from the battery disconnection unit.

123709

❑ Unpick the engine wiring (**34**) from the engine harness channel.

❑ Remove:

- the engine wiring from the engine,
- the engine harness channel.

123154

❑

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect:

- the inlet distributor fuel supply union (**35**) ,
- the inlet distributor oil vapour rebreather pipe union (**36**) ,
- the inlet distributor vacuum pipe union (**37**) .

F4R

142914

123706

❑ Disconnect the heater matrix pipes (**38**) by pressing each side of the quick-release union.

122865

❑ Separate the clip (**39**) on the pipe of the power-assisted steering pump using the tool **(Mot. 1448)**.

❑ Disconnect the pipe from the power-assisted steering pump.

AJ0

124139

❑ Remove the nut (**40**) from the power-assisted steering oil pipe.

F4R

120202

❑

> Note:
>
> Be prepared for fluid to drain from the power-assisted steering. Position the oil recovery tray.

❑ Remove the bolt (**41**) from the power-assisted steering oil pipe bracket on the steering box.

❑ Remove the lower power-assisted steering pipe.

❑ Insert the blanking plugs.

AJ0

122725

❑ Remove the gearbox control cable:

- by unclipping it at (**42**) using an open-jawed spanner,
- by unclipping it from its support at (**43**) .

F4R

PK4

113919

134244

- ❑ Disconnect the rigid clutch pipe from the clutch thrust bearing by lifting the retaining clip (**44**) .
- ❑ Fit blanking plugs on the clutch pipe and on the slave cylinder.
- ❑ Unclip the clutch rigid pipe from the gearbox.
- ❑ Disconnect the reversing connector.
- ❑ Unclip:
  - the gearbox control cables from the ball joints (**45**) ,
  - the gearbox control cables from their supports (**46**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

17765

- ❑ Position the **(Mot. 1390)** under the engine.

AJ0

124140

- ❑ Remove the central nut (**47**) from the rubber pad on the left-hand suspended engine mounting.

F4R

PK4

123457

❑ Remove:

- the central nut (**48**) from the suspended engine mounting rubber pad shaft on the gearbox,
- the nuts (**49**) from the suspended engine mounting rubber pad on the gearbox.

❑ Slightly lower the engine until the rubber pad detaches from the suspended engine mounting on the gearbox.

❑ Remove the rubber pad of the suspended engine mounting from the gearbox.

> Note:
>
> If necessary, use a copper hammer to strike the threaded rod of the left-hand suspended engine mounting to separate the engine from the body.

❑ Remove:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the « engine and gearbox » assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ For standard replacements (see **Engine: Standard replacement**) (Technical Note 6027A, 10A, Engine and cylinder block assembly).

❑ **parts always to be replaced: seal between catalytic converter and exhaust downpipe hose (10, 08,02,21)**,

parts always to be replaced: exhaust downpipe hose stud on the catalytic converter (if loosened) (10,08,02,15),

parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04),

parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the « engine and gearbox » assembly,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

AJ0

❑ Refit the central nut of the left-hand suspended engine mounting rubber pad.

PK4

❑ Refit:

- the suspended engine mounting rubber pad from the gearbox,
- the central nut from the suspended engine mounting rubber pad shaft on the gearbox.

❑ Torque tighten the **suspended engine mounting rubber pad on the gearbox (105 N.m)**.

❑ Torque tighten the **central nut of the left-hand suspended engine mounting rubber pad (62 N.m)**.

❑ Remove the tool **(Mot. 1390)**.

F4R

III - FINAL OPERATION

PK4

❏ Clip:

- the gearbox control cables onto their supports,
- the gearbox control cables onto their ball joints.

❏ Connect:

- the reverse gear connector,
- the rigid clutch pipe to the clutch thrust bearing.

AJ0

❏ Fit the gearbox control cable.

❏ Clip the gearbox control cable onto the gear lever.

❏ Refit:

- the power-assisted steering oil pipe,
- the power-assisted steering oil pipe bracket bolt on the steering box.

AJ0

❏ Refit the nut of the power-assisted steering oil pipe on the left-hand suspended engine mounting.

❏ Connect the power-assisted steering pump pipe.

❏ Fit the clip for the power-assisted steering pump using the tool **(Mot. 1448)**.

❏ Connect the heater matrix pipes.

❏ Remove the blanking plugs.

❏ Connect:

- the vacuum pipe union to the inlet distributor,
- the oil vapour rebreather pipe union to the inlet distributor,
- the inlet distributor fuel supply union.

❏ Fit:

- the engine wiring channel,
- the engine wiring.

❏ Attach the engine harness to the engine harness channel.

❏ Clip:

- the petrol injection computer wiring,
- the feed wiring on the battery disconnection unit.

AJ0

❏ Refit the earth cable on the gearbox.

❏ Connect:

- the gearbox connector,
- the gearbox computer connector.

❏ Refit the earth wiring nuts to the front left-hand side member.

❏ Refit:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front upper structure),
- the « engine cooling fan unit - cooling radiator - condenser - intercooler » assembly,
- the cooling radiator air scoops.

❏ Remove the blanking plugs.

❏ Refit the air conditioning pipe on the compressor.

❏ Connect the upper cooling pipe to the cooling radiator.

❏ Remove the blanking plugs.

❏ Fit:

- the clip of the upper cooling pipe on the cooling radiator side using the tool **(Mot. 1448)**,
- the « compressor - condenser » connecting pipe,
- the « condenser - expansion valve » connecting pipe.

❏ Refit:

- the « compressor - condenser » connecting pipe bolt,
- the « condenser - expansion valve » connecting pipe bolt.

❏ Refit:

- a new seal to the intercooler air outlet pipe,
- a new seal to the intercooler air inlet pipe.

❏ Push:

- the clip of the intercooler air outlet pipe,
- the clip of the intercooler air inlet pipe.

F4R

- ❑ Connect:
  - the intercooler air outlet pipe,
  - the intercooler air inlet pipe.
- ❑ Fit the following components onto the cooling radiator:
  - the expansion bottle cooling pipe,
  - the cooling pipe of the coolant pump inlet pipe.
- ❑ Clip:
  - the engine cooling fan assembly resistor wiring,
  - the engine cooling fan assembly wiring.
- ❑ Connect:
  - the engine cooling fan assembly resistor connector,
  - the engine cooling fan assembly connector.
- ❑ Attach the pressure sensor wiring to the « condenser - expansion valve » connecting pipe.
- ❑ Connect:
  - the pressure sensor connector to the « condenser - expansion valve » connecting pipe,
  - the expansion bottle cooling pipe on the cooling radiator.
- ❑ Fit the clip of the expansion bottle cooling pipe on the cooling radiator using the tool **(Mot. 1448)**.
- ❑ Connect the cooling pipe to the expansion bottle.
- ❑ Fit the clip of the expansion bottle cooling pipe on the expansion bottle using the tool **(Mot. 1448)**.
- ❑ Clip on the power steering reservoir.
- ❑ Refit:
  - the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
  - the upper radiator cover,
  - the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
  - the fuse holders on the max fuse box,
  - the fuses on the max fuse box,
  - the max fuse box cover,
  - the max fuse box,
  - the electric coolant pump.
- ❑ Connect:
  - the electric coolant pump connector,
  - the Protection and Switching Unit connectors.
- ❑ Clip on the Protection and Switching Unit cover.
- ❑ Refit:
  - a new exhaust flange seal,
  - the exhaust flange nuts.

PK4

- ❑ Refit new differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

- ❑ Refit:
  - the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine tie-bar bolt from the subframe,
  - the engine tie-bar bolt on the engine tie-bar mounting.
- ❑ Torque tighten:
  - the **engine tie-bar bolt on the subframe (115 N.m)**,
  - the **engine tie-bar bolt on the engine tie-bar mounting (190 N.m)**.
- ❑ Refit:
  - the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
  - the air outlet pipe of the air filter unit,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .
- ❑ Connect:
  - the air filter unit air outlet pipe to the turbocharger,
  - the brake servo double non-return valve connector,
  - the turbocharging pressure regulation solenoid valve connector,
  - the anti-pumping valve pipe,

F4R

- the turbocharging pressure regulation pipes.

❑ Clip on:

- the clip on the anti-pumping valve pipe,
- the clip on each of the turbocharging pressure regulation pipes.

❑ Refit:

- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

PK4

❑ Fill the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Perform the following operations:

- fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- refill the engine if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- fill the power-assisted steering oil circuit (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Bleed the power-assisted steering circuit (see **Power-assisted steering circuit: Bleeding**) (36B, Power-assisted steering).

❑ Refit:

- the engine cover,
- the engine undertray.

M4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station

Tightening torques ▽	
left-hand suspended engine mounting rubber pad central nut	**62 N.m**
left-hand suspended engine mounting rubber pad nuts	**105 N.m**
engine tie-bar bolts	**190 N.m**
exhaust flange bolts	**21 N.m**
starter excitation connector nut	**5 N.m**
starter power supply connector nut	**9 N.m**
alternator nut	**21 N.m**
"expansion valve - compressor" connecting pipe union bolt on the compressor	**8 N.m**
"condenser - compressor" connecting pipe union bolt on the compressor	**8 N.m**
air filter unit air outlet pipe clip on the throttle valve	**5.5 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Petrol injection: Precautions for the repair**) .

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

IMPORTANT
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

❑ Remove the engine undertray.

❑ Drain:

- the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the engine, if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

WARNING
To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

123380

❑ Undo the clip (**1**) of the air filter unit air outlet pipe on the throttle valve.

❑ Disconnect the air filter unit air outlet pipe:

- of the rocker cover,
- from the throttle valve.

❑ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the air outlet pipe of the air filter unit ***(2)*** ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Attach the "radiator - condenser - fan unit" assembly to the radiator upper cross member.

❑ Remove the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

123403

❑ Unclip the fuel supply pipe (**3**) :

- the expansion bottle,
- from the engine mounting cover.

❑ Disconnect the fuel supply pipe (**4**) from the injector rail.

> **WARNING**
> Prepare for the flow of fluid, and protect the surrounding components.

❑ Fit blanking plugs on the fuel supply pipe.

M4R

123402

❑ Remove the bolt (**5**) from the expansion bottle.

123403

❑ Unclip the expansion bottle by:

- pushing the expansion bottle at (**X**) ,
- pulling the expansion bottle at (**Y**) .

❑ Remove the expansion bottle.

124084

❑ Remove the bolts (**6**) from the "expansion valve - compressor" and "condenser - compressor" connecting pipe unions on the compressor.

❑ Disconnect the unions (**7**) from the "expansion valve - compressor" and "condenser - compressor" connecting pipes on the compressor.

❑ Move aside the "expansion valve - compressor" and "condenser - compressor" connecting pipes on the compressor.

M4R

124087

- ❑ Unclip the clutch control pipe from the left-hand suspended engine mounting at (**8**) .
- ❑ Disconnect the clutch control pipe (**9**) by pressing on the clip.
- ❑ Fit blanking plugs to the clutch control pipe openings.

123458

- ❑ Unclip the control cables from the manual gearbox:
  - from the anchoring ball joints at (**10**) ,
  - from the cable sleeve stops at (**11**) .
- ❑ Move the gearbox control cables aside.

123376

- ❑ Disconnect the following from the inlet distributor:
  - the brake servo pipe union (**12**) ,
  - the fuel return pipe union (**13**) .
- ❑ Fit blanking plugs on:
  - the brake servo pipe union,
  - the fuel return pipe union.
- ❑ Disconnect the inlet pressure sensor connector (**14**) .
- ❑ Unclip the wiring from the inlet pressure sensor.
- ❑ Move the wiring away from the inlet pressure sensor.

M4R

124088

❑ Disconnect the petrol vapour rebreathing solenoid valve connector (**15**) .

123381

❑ Disconnect the connector (**16**) from the throttle valve.

124085

❑ Disconnect the connector from:

- the coil wiring (**17**) ,
- the injector wiring (**18**) ,
- the camshaft sensor (**19**) ,
- the coolant temperature sensor (**20**) ,
- the gearbox sensor (**21**) ,
- the upstream oxygen sensor (**22**) .

M4R

115097

- ❑ Remove the earth wiring nut (**23**) .
- ❑ Disconnect the connector from:
  - the pinking sensor (**24**) ,
  - the oil pressure sensor (**25**) ,
  - the oil level sensor (**26**) .

123371

- ❑ Disconnect the alternator connector (**27**) .
- ❑ Remove the nut (**28**) from the alternator.
- ❑ Move aside the alternator wiring.

123452

- ❑ Remove the bolt (**29**) from the wiring bracket on the gearbox.
- ❑ Move aside the wiring bracket on the gearbox.
- ❑ Remove:
  - the starter excitation connector nut (**31**) ,
  - the starter power supply connector nut (**30**) .
- ❑ Move the starter wiring aside.

124083

- ❑ Disconnect the connectors (**32**) from the air conditioning compressor.
- ❑ Unpick the wiring on the multifunction support.

M4R

124081

❑ Remove the earth strap bolt (**33**) .

❑ Unpick the wiring (**34**) on the gearbox bracket.

123356

❑ Remove:

- the bolt (**35**) from the right-hand side underbody protector,
- the nut (**36**) from the right-hand side underbody protector.

❑ Remove:

- the right-hand side underbody protector,
- the heat shield behind the right-hand side underbody protector.

123355

❑ Unclip the downstream oxygen sensor connector (**37**) .

❑ Disconnect the downstream oxygen sensor connector.

123545

❑ Remove:

- the bolts (**38**) from the crankshaft position sensor protector,
- the crankshaft position sensor protector (**39**) .

M4R

123546

❑ Disconnect the crankshaft position sensor connector (**40**) .

124079

❑ Move aside the engine wiring (**41**) .

124077

❑ Separate the clip (**42**) on the coolant pipe between the water chamber and the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect the coolant pipe between the water chamber and the cooling radiator.

124076

❑ Separate the clip (**43**) on the coolant pipes between the water chamber and the water chamber heater matrix using the tool **(Mot. 1448)**.

❑ Disconnect the coolant pipes between the water chamber and the water chamber heater matrix.

124078

❑ Remove using the **(Mot. 1448)** :

- the clip (**44**) from the coolant pipe between the thermostat unit and the thermostat unit cooling radiator,
- the clip (**45**) on the coolant pipe of the multifunction support.

❑ Disconnect:

- the coolant pipe between the thermostat unit and the thermostat unit cooling radiator,
- the coolant pipe from the multifunction support.

123358

❑ Remove:

- the bolts (**46**) from the exhaust flange,
- the exhaust flange springs,
- the exhaust flange seal.

123522

❑ Remove the bolt (**47**) from the wiring bracket of the power-assisted steering pump on the gearbox.

M4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123347

❑ Remove:

- the lower linkage bolts (**47**) ,
- the lower linkage (**48**) .

144207

❑ Support the engine and gearbox assembly on **(Mot. 1390)**.

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

123457

❑ Remove:

- the central nut (**49**) from the left-hand suspended engine mounting rubber pad,
- the nuts (**50**) from the left-hand suspended engine mounting rubber pad,
- the left-hand suspended engine mounting rubber pad.

M4R

123542

❑ Lift the vehicle to remove the "engine and gearbox" assembly.

> Note:
>
> Check no component obstructs the movement of the body around the engine - gearbox assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ For standard replacement (see **Engine: Standard replacement**) (Technical Note 6020A, 10A, Engine and peripherals).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the "engine and gearbox" assembly in the body.

❑ Refit:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting rubber pad,
- the nuts for the left-hand suspended engine mounting rubber pad,
- the left-hand suspended engine mounting rubber pad central nut.

❑ Torque tighten:

- the **left-hand suspended engine mounting rubber pad central nut (62 N.m)**,
- the **left-hand suspended engine mounting rubber pad nuts (105 N.m)**.

❑ Remove the tool **(Mot. 1390)**.

❑ Refit the engine tie-bar.

❑ Torque tighten the **engine tie-bar bolts (190 N.m)**.

III - FINAL OPERATION

❑ Refit the bolt for the wiring bracket of the power-assisted steering pump on the gearbox.

❑ Refit:

- the new exhaust flange seal,
- the exhaust flange springs.

❑ Torque tighten the **exhaust flange bolts (21 N.m)**.

❑ Connect:

- the coolant pipe between the thermostat unit and the cooling radiator on the thermostat unit,
- the coolant pipe on the multifunction support,
- the coolant pipes between the water chamber and the heater matrix on the water chamber,
- the coolant pipe between the water chamber and the cooling radiator on the water chamber.

❑ Using the **(Mot. 1448)**, fit:

- the coolant pipe clip between the thermostat unit and the cooling radiator on the thermostat unit,
- the coolant pipe clip on the multifunction support,
- the coolant pipe clip between the water chamber and the heater matrix on the water chamber,
- the coolant pipe clip between the water chamber and the cooling radiator on the water chamber.

❑ Fit the engine wiring.

❑ Connect the crankshaft position sensor connector.

❑ Refit the crankshaft position sensor protector.

❑ Connect the downstream oxygen sensor connector.

❑ Clip the downstream oxygen sensor connector.

❑ Fit:

- the heat shield behind the right-hand side underbody protector,
- the right-hand side underbody protector.

M4R

- Refit:
  - the bolt on the underbody protector on the right-hand side,
  - the nut on the underbody protector on the right-hand side.
- Clip the wiring onto the gearbox bracket.
- Refit the earth strap bolt.
- Clip the wiring onto the multifunction support.
- Connect the compressor connectors.

M4R

- ❏ Fit the starter wiring.
- ❏ Torque tighten:
  - the **starter excitation connector nut (5 N.m)**,
  - the **starter power supply connector nut (9 N.m)**.
- ❏ Fit the wiring bracket on the gearbox.
- ❏ Refit the wiring bracket bolt on the gearbox.
- ❏ Position the alternator wiring.
- ❏ Torque tighten the **alternator nut (21 N.m)**.
- ❏ Connect the following connectors:
  - the alternator,
  - the pinking sensor,
  - the oil pressure sensor,
  - the oil level sensor.
- ❏ Refit the earth wiring nut.
- ❏ Connect the following connectors:
  - the coil wiring,
  - the injector wiring,
  - the camshaft sensor,
  - the coolant temperature sensor,
  - the gearbox sensor,
  - the upstream oxygen sensor,
  - the throttle valve,
  - the petrol vapour rebreathing solenoid valve.
- ❏ Fit the wiring of the inlet pressure sensor.
- ❏ Clip on the inlet pressure sensor wiring.
- ❏ Connect the inlet pressure sensor connector.
- ❏ Remove the blanking plugs from:
  - the brake servo pipe union,
  - the fuel return pipe union.
- ❏ Connect the following to the inlet distributor:
  - the brake servo pipe union,
  - the fuel return pipe union.
- ❏ Fit the gearbox control cables.
- ❏ Clip the manual gearbox control cables onto:
  - the anchoring ball joints,
  - the cable sleeve stops.
- ❏ Remove the blanking plugs from the clutch control pipe openings.
- ❏ Connect the clutch control pipe by pressing on the clip.
- ❏ Clip the clutch control pipe onto the left-hand suspended engine mounting.
- ❏ Fit the "expansion valve - compressor" and "condenser - compressor" connecting pipes on the compressor.
- ❏ Connect the "expansion valve - compressor" and "condenser - compressor" connecting pipe unions to the compressor.
- ❏ Torque tighten:
  - the **"expansion valve - compressor" connecting pipe union bolt on the compressor (8 N.m)**,
  - the **"condenser - compressor" connecting pipe union bolt on the compressor (8 N.m)**.
- ❏ Position the expansion bottle.
- ❏ Refit the expansion bottle bolt.
- ❏ Remove the blanking plugs from the fuel supply pipe.
- ❏ Connect the fuel supply pipe to the injector rail.
- ❏ Clip the fuel supply pipe onto:
  - the expansion bottle,
  - the engine mounting cover.
- ❏ Refit the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).
- ❏ Detach the "radiator - condenser - fan unit" assembly from the radiator upper cross member.

M4R

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air outlet pipe of the air filter unit,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Connect:

- the air filter unit air outlet pipe to the rocker cover,
- the air filter unit air outlet pipe on the throttle valve.

❑ Torque tighten the **air filter unit air outlet pipe clip on the throttle valve (5.5 N.m)**.

❑ Refit:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the engine cover.

❑ Refill:

- the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the engine if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit the engine undertray.

M9R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Ms. 583	Pipe clamps.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station
oil recovery tray
tweezers

Tightening torques ▽	
earth cables on the side members	**8 N.m**
air conditioning hose bolt on the compressor	**8 N.m**
air conditioning hose nuts on the condenser	**8 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

❑ Remove the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

❑ Remove:

- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),

M9R

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

❏ Disconnect:

- the pressostat connector,
- the engine cooling fan resistor connector,
- the engine cooling fan connector.

❏ Unpick and move aside the engine cooling fan wiring.

123003

❏ Remove the cooling radiator bottom hose clip (**1**) using the tool **(Mot. 1448)**.

❏ Disconnect the bottom hose from the cooling radiator.

123005

❏ Remove the clip (**2**) from the hose between the cooling radiator and the expansion bottle using the tool **(Mot. 1448)**.

❏ Disconnect the hose between the cooling radiator and the expansion bottle on the cooling radiator side.

123004

❏ Remove the clip (**3**) from the cooling radiator top hose using the tool **(Mot. 1448)**.

❏ Disconnect the cooling radiator top hose.

M9R

123698

- Rotate the clip (**4**) of the intercooler air inlet pipe at the intercooler end.
- Disconnect the air-air intercooler air inlet pipe at the air-air intercooler end.

123699

- Pull the clip (**5**) from the intercooler air outlet pipe at the intercooler end.
- Disconnect the intercooler air outlet pipe at the intercooler end.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123954

- Release the clips (**6**) on the thermoplunger unit hoses using the tool **(Mot. 1448)**.
- Disconnect the hoses from the thermoplunger unit.

123010

- Remove air deflectors (**7**) .

122867

122869

❑

WARNING
To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

WARNING
In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Remove the nuts (**8**) from the air conditioning hoses on the condenser.

❑ Disconnect the air conditioning hoses on the condenser.

❑ Insert the blanking plugs.

122876

❑ Remove the nut (**9**) from the air conditioning hose on the compressor.

❑ Disconnect the air conditioning hose on the compressor.

❑ Insert the blanking plugs.

123002

❑ Remove the cooling assembly.

123716

❑ Remove:

- the fuse holder cover (**10**) ,
- the strut nuts (**11**) ,
- the strut from the left-hand suspended engine mounting.

123949

❑ Remove:

- the fuse holder bolt (**12**) ,
- the fuse holder clip (**13**) .

123714

❑ Remove the main supply fuses (**14**) .

123713

❑ Cut the fuse holder unit wiring clip.

❑ Move aside the fuse holder unit (**15**) .

❑ Remove the fuse holder unit.

M9R

123712

❑ Separate the fuse holder (**16**) from the fuse holder plate.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123952

❑ Disconnect the connector (**17**) from the electric coolant pump.

❑ Remove the bolt (**18**) from the electric coolant pump on the body.

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

112671

❑ Unclip:

- the gearbox control cables from the gear selector ball joints (**19**) ,
- the control cables from their support (**20**) .

❑ Disconnect the reverse gear sensor connector.

❑ Fit the tool **(Ms. 583)** on the clutch pipe.

❑ Unclip the clutch rigid pipe from the gearbox.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

❑ Disconnect the clutch rigid pipe from the clutch thrust bearing.

❑ Fit blanking plugs onto the clutch pipe union and clutch thrust bearing union.

Note:

Do not damage the rigid clutch pipe.

❑ Remove:

- the gear control cables,
- the rigid clutch pipe.

M9R

M9R, and 805 or 809 or 845 or 849

101027

123959

❑ Unclip:

- the automatic transmission control cable from the multifunction switch (**21**) ,
- the control cable from its support (**22**) .

❑ Disconnect the connector (**23**) from the automatic transmission computer.

123711

❑ Unclip:

- the computer wiring (**24**) from the engine wiring mounting,
- the supply unit wiring (**25**) from the engine wiring mounting.

M9R

123884

123883

❑ Remove the nuts (**26**) from the earth wires on the side members.

❑ Move aside the earth wires.

123709

❑ Attach the engine wiring mounting (**27**) onto the engine.

❑ Disconnect:

- the fuel heater connector,
- the windscreen washer pump connector.

M9R

123708

123706

❑ Disconnect:

- the cooling hoses (**28**) from the heater matrix by pressing each side of the quick-release union,
- the fuel return pipe quick-release union from the tank return pipe,
- the fuel supply pipe quick-release union from the fuel filter unit.

❑ Insert the blanking plugs.

❑ Remove the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

123570

❑ Remove:

- the connecting hose nuts (**29**) ,
- the connecting hose seal.

M9R

116152

❑

> Note:
>
> Prepare for the flow of power-assisted steering fluid. Fit a **oil recovery tray**.

❑ Remove the bolt (**30**) from the power-assisted steering pipes on the power-assisted steering box.

❑ Remove the lower power-assisted steering pipe.

❑ Insert the blanking plugs.

123703

117255

117256

❑ Position the engine and the gearbox against the rubber pads of the tool **(Mot. 1390)** (**31**) .

M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the engine - gearbox assembly.

❑ Raise the vehicle.

❑ Move aside the « engine - gearbox » assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**

parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)

115068

❑ Remove:

- the intercooler air outlet pipe seal at the intercooler end using a **tweezers**,
- the intercooler air inlet pipe seal at the intercooler end using a **tweezers**.

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seals are fitted the right way round.

❑ Refit:

- a new seal for the intercooler air outlet pipe at the intercooler end,
- a new seal for the intercooler air inlet pipe at the intercooler end.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the « engine - gearbox» assembly under the vehicle.

❑ Lower the vehicle.

❑ Refit:

- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

III - FINAL OPERATION

❑ Remove:

- the **(Mot. 1390)**,

M9R

- the blanking plugs from the power-assisted steering pipes and from the power-assisted steering box.

❏ Fit the lower power-assisted steering pipe.

❏ Fit the lower power-assisted steering pipe into the steering box.

❏ Refit:

- the power-assisted steering pipe bolt,
- the exhaust connecting hose seal,
- the exhaust connecting hose bolts.

❏ Refit the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

❏ Remove the blanking plugs from the fuel pipes.

❏ Connect:

- the fuel supply pipe quick-release union to the fuel filter,
- the fuel return pipe quick-release union to the tank fuel return pipe,
- the heater matrix hoses,
- the fuel heater connector,
- the windscreen washer pump connector.

❏ Refit the **earth cables on the side members (8 N.m)**.

❏ Fit:

- the supply unit wiring on the engine wiring mounting,
- the computer wiring on the engine wiring mounting.

❏ Clip:

- the supply unit wiring on the engine wiring mounting,
- the computer wiring on the engine wiring mounting.

M9R, and 805 or 809 or 845 or 849

❏ Connect the automatic transmission computer connector.

❏ Clip:

- the automatic transmission control cable onto its mounting,
- the automatic transmission control cable onto the multifunction switch.

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

❏ Fit:

- the rigid clutch pipe,
- the gear control cables.

❏ Remove the blanking plugs from the rigid clutch pipe and the clutch thrust bearing union.

❏ Connect the clutch rigid pipe to the clutch thrust bearing.

❏ Clip:

- the rigid clutch pipe onto the gearbox,
- the gear selector cables onto their mounting,
- the gear control cables onto the gear selector ball joints.

❏ Remove the tool **(Ms. 583)** from the clutch pipe.

❏ Bleed the clutch circuit (see **Clutch circuit: Bleed**) (37A, Mechanical component controls).

❏ Connect the reversing sensor connector.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❏ Refit the electric coolant pump on the body.

❏ Connect the electric coolant pump connector.

❏ Refit:

- the fuse holders on the fuse holder plate,
- the fuse holder unit.

❏ Fit the fuse holder unit.

❏ Refit:

- a new hose clip onto the fuse holder plate wiring,
- the main supply fuses,
- the fuse holder unit clip,
- the fuse holder unit bolt.

❏ Refit:

- the cover of the fuse holder unit,
- the left-hand suspended engine mounting strut,
- the cooling assembly.

M9R

❑ Remove the blanking plugs from the air conditioning hoses.

WARNING
To avoid any leaks, check that the pipe surface is sound before positioning the new seal. The surface must be clean and scratch free.

❑ Connect the air conditioning hose onto the compressor.

❑ Refit the air conditioning hose bolt on the compressor.

❑ Torque tighten the **air conditioning hose bolt on the compressor (8 N.m)**.

❑ Connect the air conditioning hoses to the condenser.

❑ Refit the air conditioning hose nuts on the condenser.

❑ Torque tighten the **air conditioning hose nuts on the condenser (8 N.m)**.

❑ Refit the air deflectors.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Connect the thermoplunger unit hoses.

❑ Position the clips on the thermoplunger unit hoses using the tool **(Mot. 1448)**.

❑ Push down on the intercooler air outlet pipe clip at the intercooler end.

❑ Fit the intercooler air outlet pipe on the intercooler.

Note:
Check that the intercooler air outlet pipe is correctly clipped onto the intercooler by checking that a click can be heard.

❑ Clip the intercooler air outlet pipe onto the intercooler.

❑ Rotate the intercooler air inlet pipe clip at the intercooler end so that the clip fits into the neck of the air pipe.

❑ Fit the intercooler air inlet pipe on the intercooler.

Note:
Check that the intercooler air inlet pipe is correctly clipped onto the intercooler by checking that a click can be heard.

❑ Clip the intercooler air inlet pipe onto the intercooler.

❑ Connect:

- the cooling radiator top hose to the cooling radiator,
- the cooling radiator bottom hose to the cooling radiator.

❑ Fit:

- the cooling radiator top hose clip using the tool **(Mot. 1448)**,
- the cooling radiator bottom hose clip using the tool **(Mot. 1448)**.

❑ Connect the hose between the cooling radiator and the expansion bottle on the cooling radiator side.

❑ Fit the clip onto the hose between the cooling radiator and the expansion bottle on the cooling radiator side using the tool **(Mot. 1448)**.

❑ Clip on the engine cooling fan wiring.

❑ Connect:

- the engine cooling fan connectors,
- the engine cooling fan resistor connector.
- the pressure switch connector.

❑ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

❑ Refit new differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

M9R

❑ Refit:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

❑ Fill the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M9R, and 742 or 744 or 746 or 748 or 754

❑ Fill the pump assembly reservoir with power-assisted steering fluid (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Fill the power-assisted steering fluid reservoir with power-assisted steering fluid (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑

WARNING

To prevent damaging the power-assisted steering system, do not keep the steering at full lock.

❑ Bleed the power-assisted steering circuit:

- lift the vehicle so that the wheels are off the ground,
- turn the steering wheel so the wheels lock left then right (repeat this operation three times).

Note:

Monitor the fluid level in the reservoir during the power-assisted steering circuit bleed operation.

❑ Top up the power-assisted steering fluid level if necessary.

❑ Check that there are no leaks.

❑ Refit:

- the engine undertray,
- the engine cover.

K9K

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station
indelible pencil

Tightening torques ▽	
lower engine tie-bar bolts	**190 N.m**
compressor connecting pipe bolts	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the left-hand headlight (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray.

❑ Drain:

- the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox),
- the engine, if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

124544

❑ Remove the clip (**1**) from the max fuse box.

K9K

124562

❑ Remove the bolt (**2**) from the max fuse box.

❑ Remove the max fuse box (**3**) from its housing.

124543

❑ Remove the max fuse box cover by pressing on the clips (**4**) .

124542

❑ Remove the fuses (**5**) from the max fuse box.

124541

❑ Unclip the max fuse box fuse mountings (**6**) .

❑ Cut the max fuse box wiring clip.

❑ Move the max fuse box to one side.

124545

❑ Remove the feed wiring from the engine wiring channel by pressing on the clip (**7**) .

124546

❑ Unpick (**8**) the engine wiring channel body wiring.

124548

❑ Remove the nut (**9**) from the left-hand side member earth.

124549

❑

> Note:
>
> Ensure that the injector wiring is correctly detached from the channel to prevent damaging the wiring.

❑ Unpick the injector wiring (**10**) from the engine wiring channel.

K9K

123523

- ❑ Fit the **(Ms. 583)** on the clutch pipe hose on the brake fluid reservoir outlet.
- ❑ Disconnect the clutch control pipe (**11**) .
- ❑ Insert the blanking plugs.

123529

101743

- ❑ Unclip the control cables from the manual gearbox:
  - from the anchoring ball joints at (**12**) ,
  - from the cable sleeve stops at (**13**) .
- ❑ Move the gearbox control cables aside.

K9K

122876

❑ Remove the bolts (**14**) from the compressor connecting pipes.

❑ Uncouple the connecting pipes from the compressor.

WARNING
To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

❑ Insert the blanking plugs.

K9K, and 780

124555

❑

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Disconnect:

- (**15**) the high pressure pump supply pipes,
- (**16**) the pipes from the diesel injector fuel return rail.

K9K

K9K, and 782

139055

❑

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Disconnect:

- (**39**) the high pressure pump supply pipes,
- (**40**) the pipes from the diesel injector fuel return rail.

❑ Insert the correct blanking plugs.

❑ Detach the fuel pipes.

123972

123706

❑ Disconnect the engine cooling hoses (**17**) from the heater matrix by pressing each side of the union.

K9K

112621

❑ Disconnect the brake servo pipe from the vacuum pump (**18**) .

124551

❑ Move the cooling radiator top hose clip (**19**) to one side using the **(Mot. 1448)**.

❑ Disconnect the cooling radiator top hose.

123520

❑ Unclip the fuel pipes at (**20**) .

123402

❑ Remove the bolt (**21**) from the expansion bottle.

K9K

123181

❑ Move aside the expansion bottle using the lugs (**22**) .

123479

❑ Disconnect the following connectors:

- (**24**) from the air conditioning pressostat,
- the fan assembly,
- the fan assembly resistor,
- the diesel heater,
- on the diesel filter mounting.

❑ Unpick the wiring:

- from the air conditioning pressostat,
- the fan assembly,
- the fan assembly resistor,
- the diesel heater,
- on the diesel filter mounting.

❑ Move aside the fan assembly wiring.

❑ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

123787

❑ Remove:

- the bolts (**25**) from the lower engine tie-bar,
- the lower engine tie-bar.

K9K

123526

- ❑ Rotate the clip (**26**) on the intercooler air inlet pipe.
- ❑ Disconnect the intercooler air inlet pipe from the intercooler.

123527

- ❑ Pull the clip (**27**) of the intercooler air outlet pipe.
- ❑ Disconnect the intercooler air outlet pipe from the intercooler.

K9K, and 780

123779

- ❑ Remove the bolts (**28**) from the exhaust bracket.
- ❑ Move the exhaust pipe to one side.
- ❑ Remove the exhaust flange seal.

K9K

K9K, and 782

139188

144213

❑ Remove the nuts (**36**) from the exhaust flange.

❑ Move the exhaust pipe to one side.

❑ Remove the exhaust flange seal.

❑ Disconnect:

- the particle filter temperature sensor connector (**37**) ,
- the particle filter pressure sensor connector (**38**) .

122859

❑ Disconnect the power-assisted steering pump assembly connectors (**29**) .

❑ Unpick the power-assisted steering pump assembly connector wiring.

❑ Move aside the power-assisted steering pump assembly connector wiring.

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED

112813

112814

❑

> Note:
>
> Ensure that the **(Mot. 1390)** is correctly positioned under the multifunction support at (**33**) .

❑ Position the **(Mot. 1390)** under the “engine - gearbox” assembly.

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

123788

❑ Remove the left-hand suspended engine mounting shaft nut (**34**) .

❑ Remove the left-hand suspended engine mounting shaft rubber pad with a copper hammer.

❑ Mark the position of the left-hand suspended engine mounting rubber pad on the left-hand suspended engine mounting support using a **indelible pencil**.

❑ Remove:

- the nuts (**35**) from the left-hand suspended engine mounting rubber pad,
- the rubber pad from the left-hand suspended engine mounting

❑ Remove the “engine - gearbox” assembly from the engine compartment using the **(Mot. 1390)**.

❑ Strap up the engine - gearbox assembly using the **(Mot. 1390)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the exhaust flange seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Detach the engine - gearbox assembly from the **(Mot. 1390)**.

K9K

❑ Fit:

- the “engine - gearbox” assembly in the engine compartment using the **(Mot. 1390)**,
- the rubber pad from the left-hand suspended engine mounting

❑ Position the left-hand suspended engine mounting rubber pad according to the marks made during removal.

❑ Refit the rubber pad nuts on the left-hand suspended engine mounting.

❑ Tighten the rubber pad nuts on the left-hand suspended engine mounting.

❑ Refit the left-hand suspended engine mounting shaft nut.

❑ Tighten the left-hand suspended engine mounting shaft nut.

❑ Refit the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Remove the **(Mot. 1390)** from the engine - gearbox assembly.

III - FINAL OPERATION

❑ Attach the power-assisted steering pump assembly connector wiring.

❑ Connect the power assisted steering pump assembly connectors.

K9K, and 780

❑ Refit a new exhaust flange seal.

❑ Fit the exhaust pipe.

❑ Refit the exhaust bracket bolts.

K9K, and 782

❑ Connect:

- the particle filter pressure sensor connector,
- the particle filter temperature sensor connector.

❑ Refit a new exhaust flange seal.

❑ Fit the exhaust pipe.

❑ Refit the exhaust flange nuts.

❑ Fit:

- the clip on the intercooler inlet air pipe in its original position,
- the clip on the intercooler outlet air pipe in its original position.

❑ Clip the intercooler air pipes onto the intercooler.

❑ Refit:

- the lower engine tie-bar,
- the lower engine tie-bar bolts.

❑ Torque tighten the **lower engine tie-bar bolts (190 N.m)**.

❑ Refit:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fit the fan assembly wiring.

❑ Attach the following wiring to:

- the diesel filter holder,
- the diesel heater,
- the fan assembly resistor,
- the fan assembly,
- the air conditioning pressostat.

❑ Connect the connectors of:

- the diesel filter holder,
- the diesel heater,
- the fan assembly resistor,

K9K

- the fan assembly,
- the air conditioning pressostat.

❏ Position the expansion bottle.

❏ Refit the expansion bottle bolt.

❏ Tighten the expansion bottle bolt.

❏ Clip on the fuel pipes.

❏ Connect the cooling radiator top hose.

❏ Refit the cooling radiator top hose clip using the **(Mot. 1448)**.

❏ Connect the brake servo pipe:

- to the vacuum pump,
- to the brake servo.

❏ Clip the engine cooling hoses onto the heater matrix.

❏ Remove the blanking plugs.

❏ Connect the following pipes:

- the high pressure pump supply pipes,
- the pipes from the diesel injector fuel return rail.

❏ Clip on the fuel pipes.

❏ Remove the blanking plugs.

❏ Connect the compressor connecting pipes.

❏ Refit the bolts to the compressor connecting pipes.

❏ Torque tighten the **compressor connecting pipe bolts (8 N.m)**.

❏ Fit the gearbox control cables.

❏ Attach the manual gearbox control cables:

- on the sleeve stops,
- on the anchoring ball joints.

❏ Remove the blanking plugs.

❏ Connect the clutch control pipe.

❏ Remove the **(Ms. 583)** from the clutch pipe hose on the brake fluid reservoir outlet.

❏ Bleed the hydraulic clutch control (see **Clutch circuit: Bleed**) (37A, Mechanical component controls).

❏ Clip the injector wiring onto the engine harness channel.

❏ Refit the earth nut on the left-hand side member.

❏ Tighten the earth nut on the left-hand side member.

❏ Clip the body wiring onto the engine wiring channel.

❏ Clip the feed wiring onto the engine harness channel.

❏ Refit a new clip to the max fuse box wiring.

❏ Clip the fuse holders onto the max fuse box.

❏ Refit the max fuse box fuses.

❏ Clip on the max fuse box cover.

❏ Fit the max fuse box into its housing.

❏ Refit the max fuse box bolt.

❏ Tighten the max fuse box bolt.

❏ Refit the clip of the max fuse box.

❏ Refill:

- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the engine, if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❏ Refit:

- the engine undertray,
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the left-hand headlight (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the engine cover.

❏ Adjust the headlights (see **Headlight: Adjustment**) (80B, Headlights).

K4M

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station

Tightening torques ▽	
nut on the left-hand suspended engine mounting shaft on the gearbox	**62 N.m**
nuts on the left-hand suspended engine mounting rubber pad shaft on the gearbox	**105 N.m**
engine tie-bar bolts	**190 N.m**
exhaust bracket nuts	**21 Nm**
earth wiring bolt on the gearbox	**21 N.m**
nut on the starter excitation connector	**5 N.m**
nut on the starter power supply connector	**9 N.m**
alternator nut	**21 N.m**
power-assisted steering high pressure pipe union	**21 N.m**
power-assisted steering high pressure pipe bracket nut	**8 N.m**
power-assisted steering high pressure pipe bracket bolt	**8 N.m**

Tightening torques ▽	
"expansion valve - compressor" connecting pipe union bolt on the compressor	**8 N.m**
"condenser - compressor" connecting pipe union bolt on the compressor	**8 N.m**

IMPORTANT

Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the engine, if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

WARNING

To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Disconnect the oil vapour rebreathing pipe from the intake distributor.

K4M

❑ Remove:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the air outlet pipe to the air filter box,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- differential output seals (see **Differential output seal: Removal - Refitting**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

128451

❑ Disconnect the fuel supply pipe (**1**) from the injector rail.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

❑ Fit blanking plugs on the fuel supply pipe.

K4M

128379

❑ Remove from the compressor:

- the expansion valve - compressor connecting pipe union bolt (**2**) ,
- the condenser - compressor connecting pipe union bolt (**3**) .

❑ From the air conditioning compressor, disconnect:

- the expansion valve - compressor connecting pipe union,
- the condenser - compressor connecting pipe union.

❑ Move aside the following from the compressor:

- the expansion valve - compressor connecting pipe,
- the condenser - compressor connecting pipe.

128380

❑ Fit the **(Ms. 583)** (**4**) on the low pressure pipe of the power-assisted steering pump.

❑ Separate the low pressure pipe clip (**5**) using the tool **(Mot. 1448)**.

❑ Disconnect the low pressure pipe (**6**) from the power-assisted steering pump.

128382

❑ Remove:

- the power-assisted steering pump high pressure pipe bracket bolt (**7**) ,
- the power-assisted steering pump high pressure pipe bracket nut (**8**) ,

- the union (**9**) from the power-assisted steering pump high pressure pipe.

131083

❑ Remove the bolt (**10**) from each bracket of the power-assisted steering high pressure pipe on the gearbox.

❑ Remove the power-assisted steering high pressure pipe.

130537

❑ Unclip the clutch control pipe from the left-hand suspended engine mounting shaft of the manual gearbox at (**11**) .

130531

❑ Disconnect:

- the pipe:
  - by pressing on the clip (**12**) ,
  - by pulling the hydraulic clutch control.
- the reversing sensor connector (**13**) .

❑ Fit blanking plugs on the hydraulic clutch control pipe openings.

K4M

130532

❑ Unclip the manual gearbox control cables:

- from the anchoring ball joints at (**14**) ,
- from the cable sleeve stops at (**15**) .

❑ Move the gearbox control cables to one side.

128405

❑ Disconnect:

- the air pressure sensor connector (**16**) ,
- the brake servo pipe union (**17**) on the intake distributor.

128263

❑ Disconnect:

- the fuel rebreathing pipe union (**18**) ,
- the throttle valve connector (**19**) .

128446

❑ Disconnect:

- the petrol vapour rebreathing solenoid valve connector (**20**) ,
- the camshaft dephaser solenoid valve connector (**21**) .

K4M

128632

❑ Disconnect the connector (**22**) from the camshaft position sensor.

128276

❑ Disconnect:

- the injector wiring connector (**23**) ,
- the connector of each coil (**25**) ,
- the air temperature sensor connector (**24**) .

❑ Unclip the coil wiring (**26**) .

❑ Move aside the coil wiring.

128370

❑ Disconnect the upstream oxygen sensor connector (**27**) .

128373

❑ Disconnect the crankshaft position sensor connector (**28**) .

128282

❑ Disconnect:

- the connector (**29**) from the oil pressure sensor,
- the pinking sensor connector (**30**) .

128366

❑ Disconnect the connector (**31**) from the oil level sensor.

128385

❑ Disconnect the alternator connector (**32**) .

❑ Remove the nut (**33**) from the alternator positive terminal.

❑ Move aside the alternator wiring.

128279

❑ Remove:

- the nut (**34**) on the starter excitation connector,
- the nut (**35**) on the starter power supply connector.

❑ Move aside the starter wiring.

K4M

122879

❑ Disconnect the connectors (**36**) of the air conditioning compressor.

❑ Unclip the wiring on the multifunction support.

> Note:
>
> Before removing the earth terminal, mark its position using an indelible marker by drawing a line on the earth terminal and on the gearbox casing.
>
> When reassembling, improper positioning of the earth terminal on the gearbox casing could result in damage to the earth terminal or earth wiring.

130501

❑ Remove the gearbox earth cable bolt (**37**) .

123356

❑ Remove:

- the bolt (**38**) on the right-hand side underbody protector,
- the nut (**39**) on the right-hand side underbody protector.

❑ Remove:

- the right-hand side underbody protector,
- the heat shield behind the right-hand side underbody protector.

123355

- Unclip the downstream oxygen sensor connector (**40**) .
- Disconnect the downstream oxygen sensor connector.

130536

- Unclip the downstream oxygen sensor cable from the subframe at (**41**) .
- Move the engine wiringaside.

128454

- Remove the clip (**42**) from the cooling hose between the coolant outlet unit and the cooling radiator using the **(Mot. 1448)**.
- Disconnect the cooling hose between the coolant outlet unit and the cooling radiator.

124076

- Disconnect the cooling hoses (**43**) from the heater matrix.
- Remove the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) .

K4M

128374

❑ Remove:

- the nuts (**44**) from the exhaust flange,
- the exhaust bracket ring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128259

❑ Remove:

- the rear suspended engine mounting bolts (**45**) ,
- the rear suspended engine mounting (**46**) .

❑ Support the engine and gearbox assembly on **(Mot. 1390)**.

❑ Remove:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

123457

❑ Remove:

- the left-hand suspended engine mounting shaft nut (**47**) from the gearbox,
- the nuts (**48**) from the left-hand suspended engine mounting rubber pad on the gearbox,
- the left-hand suspended engine mounting rubber pad from the gearbox.

123542

❑ Lift the vehicle to remove the "engine-gearbox" assembly.

> Note:
>
> Check to ensure that there are no components obstructing the movement of the body around the "engine-gearbox" assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ For standard replacements (see **standard replacement**) (Technical Note 6020A, 10A, Engine and peripherals).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the "engine-gearbox" assembly into the body.

❑ Refit:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting rubber pad.

❑ Tighten to torque:

- the **nut on the left-hand suspended engine mounting shaft on the gearbox (62 N.m)**,

- the **nuts on the left-hand suspended engine mounting rubber pad shaft on the gearbox (105 N.m)**.

❑ Remove the **(Mot. 1390)**.

❑ Refit the engine tie-bar.

❑ Torque tighten the **engine tie-bar bolts (190 N.m)**.

III - FINAL OPERATION.

❑ Refit:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- a new exhaust bracket ring.

❑ Torque tighten the **exhaust bracket nuts (21 Nm)**.

❑ Connect:

- the coolant hose between the coolant outlet unit and the cooling radiator to the coolant outlet unit,
- the cooling hoses to the heater matrix.

❑ Use the **(Mot. 1448)** to fit the clip of the coolant hose between the coolant outlet unit and the cooling radiator on the coolant outlet unit.

❑ Fit the engine wiring.

❑ Connect the downstream oxygen sensor connector.

❑ Clip the downstream oxygen sensor connector.

❑ Refit:

- the heat shield behind the right-hand side underbody protector,
- the right-hand side underbody protector.

❑ Tighten the **earth wiring bolt on the gearbox (21 N.m)**.

❑ Clip the wiring onto the multifunction support.

❑ Connect the compressor connectors.

K4M

- ❑ Fit the starter wiring harness.
- ❑ Tighten to torque:
  - the **nut on the starter excitation connector (5 N.m)**,
  - the **nut on the starter power supply connector (9 N.m)**.
- ❑ Fit the alternator wiring.
- ❑ Torque tighten the **alternator nut (21 N.m)**.
- ❑ Connect the connectors for the following:
  - the alternator,
  - to the oil level sensor,
  - the oil pressure sensor.
  - the pinking sensor,
  - the crankshaft position sensor,
  - the upstream oxygen sensor,
  - the air temperature sensor,
  - every coil,
  - the injector wiring,
  - the camshaft position sensor,
  - the camshaft dephaser solenoid valve,
  - the fuel vapour rebreather solenoid valve.
- ❑ Connect:
  - the fuel rebreathing pipe union on the throttle valve,
  - the throttle valve connector,
  - air pressure sensor connector,
  - the brake servo pipe union on the intake distributor.
- ❑ Fit the gearbox control cables.
- ❑ Clip the manual gearbox control cables onto:
  - the anchoring ball joints,
  - the cable sleeve stops.
- ❑ Remove the blanking plugs from the hydraulic clutch control pipe openings.
- ❑ Connect:
  - the reversing sensor connector,
  - the hydraulic clutch control pipe.
- ❑ Clip the clutch control pipe on to the left-hand suspended engine mounting shaft of the gearbox.
- ❑ Fit the high pressure pipe of the power-assisted steering pump.
- ❑ Tighten to torque:
  - the **power-assisted steering high pressure pipe union (21 N.m)**,
  - the **power-assisted steering high pressure pipe bracket nut (8 N.m)**,
  - the **power-assisted steering high pressure pipe bracket bolt (8 N.m)**.
- ❑ Connect the low pressure pipe on the power-assisted steering pump.
- ❑ Refit the low pressure pipe clip on the power-assisted steering pump using the **(Mot. 1448)**.
- ❑ Remove the **(Ms. 583)** from the power-assisted steering pump low pressure pipe.
- ❑ Fit on the compressor:
  - the expansion valve - compressor connecting pipe,
  - the condenser - compressor connecting pipe.
- ❑ Connect to the air conditioning compressor:
  - the expansion valve - compressor connecting pipe union,
  - the condenser - compressor connecting pipe union.
- ❑ Tighten to torque:
  - the **"expansion valve - compressor" connecting pipe union bolt on the compressor (8 N.m)**,
  - the **"condenser - compressor" connecting pipe union bolt on the compressor (8 N.m)**.
- ❑ Remove the blanking plugs from the fuel supply pipe.
- ❑ Connect the fuel supply pipe to the injector rail.

K4M

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- differential output seals (see **Differential output seal: Removal - Refitting**) ,
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air outlet pipe to the air filter box,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Connect the air filter box air outlet pipe to the throttle valve.

❑ Refit:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the engine cover.

❑ Refill:

- the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the engine if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using the **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit the engine undertray.

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station
safety strap(s)

Tightening torques ▽	
central nut of the left-hand suspended engine mounting rubber pad	**62 N.m**
lower engine tie-bar bolts	**180 N.m**
tie rod bolts	**44 Nm**
earth nuts on the front left-hand side member and on the left-hand scuttle reinforcement	**8 N.m**
air filter box air outlet pipe clips	**6 Nm**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Petrol injection: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

IMPORTANT
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

133473

❑ Disconnect the fuel supply quick-release unions (**1**) .

IMPORTANT
Wear goggles with side protectors for this operation.

❑ Fit blanking plugs on the fuel pipe openings.

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,

V4Y

- the engine undertray,
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

133471

❑ Disconnect the vacuum pipe from the brake servo (**2**) .

❑ Move the brake servo vacuum pipe to one side.

❑ Undo the clips on the air outlet pipe of the air filter unit.

❑ Move aside the oil vapour rebreathing pipe clip using the **(Mot. 1448)**.

❑ Disconnect the oil vapour rebreathing pipe.

❑ Remove the air outlet pipe from the air filter box (**3**) .

❑ Remove:

- the injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

134208

❑ Remove the air scoops (**4**) from the cooling radiator.

> **WARNING**
> Consult the device's operating manual to avoid incorrect use.

❑ Drain:

- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

> **WARNING**
> In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Remove:

- the « cooling radiator - condenser - motor-driven fan » assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),

V4Y

- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit).

134198

❑ Disconnect the connector (**5**) from the engine wiring.

❑ Remove the earth wire nut (**6**) .

❑ Move the earth wire away from the left-hand scuttle reinforcement.

134197

❑ Remove:

- the max fuse box cover,
- all of the fuses (**7**) ,
- all of the fuse holders from the max fuse box,
- the bolt (**8**) from the max fuse box,
- the max fuse box.

134196

❑ Remove the earth wire nuts (**9**) .

❑ Move the earth wires away from the front left-hand side member.

❑ Disconnect the automatic transmission computer connector (**10**) .

❑ Unclip the automatic transmission computer wiring.

V4Y

134195

- ❑ Disconnect the connector of the automatic transmission computer wiring (**11**) .
- ❑ Remove the bolt (**12**) from the power-assisted steering pipe support.
- ❑ Move aside the power-assisted steering pipe support.

134514

- ❑ Move aside the clip of the power-assisted steering lower hose using the **(Mot. 1448)**.
- ❑ Drain the power-assisted steering circuit by disconnecting the power-assisted steering lower hose (**13**) .

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

V4Y

134194

- Move aside the clips (**14**) of the power-assisted steering fluid reservoir hoses using the **(Mot. 1448)**.
- Disconnect the hoses from the power-assisted steering fluid reservoir.

134192

134193

- Remove:
  - the power-assisted steering pipe bolts (**15**) ,
  - the power-assisted steering pipe.

V4Y

134191

134190

❑ Remove the tie rod bolts (**16**) .

❑ Move aside the tie-rods.

❑ Remove:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the front catalytic pre-converter (see **Front catalytic pre-converter: Removal - Refitting**) ,
- the rear catalytic pre-converter (see **Rear catalytic pre-converter: Removal - Refitting**) .

Note:

In order to limit the stresses on the exhaust pipe, strap the catalytic converter onto the body using a **safety strap(s)**.

134187

❑ Move aside the clips (**18**) of the heater matrix hoses at the outlet of the coolant outlet unit using the **(Mot. 1448)**.

❑ Disconnect the heater matrix hoses from the outlet of the coolant outlet unit.

❑ Move the hoses away from the outlet of the coolant outlet unit.

❑ Move aside the clip of the cooling hose from the expansion bottle outlet using the **(Mot. 1448)**.

❑ Disconnect the cooling hose from the expansion bottle outlet.

V4Y

134184

❑ Unclip the gearbox control (**19**) .

❑ Disconnect the gearbox control (**20**) .

134186

❑ Remove the bolts (**21**) of the wiring protective sheaths on the automatic transmission.

❑ Move aside the automatic transmission wiring.

134188

❑ Remove:

- the bolts (**22**) from the lower engine tie-bar,
- the lower engine tie-bar

II - OPERATION FOR REMOVAL OF PART CONCERNED

22860

❑ Support the « engine-gearbox» assembly on the **(Mot. 1390)** at (**23**) .

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

V4Y

134185

❑ Raise the engine slightly.

❑ Remove the central nut (**24**) from the rubber pad on the left-hand suspended engine mounting.

❑ Use a copper hammer to strike the threaded rod of the left-hand suspended engine mounting to separate the engine from the body.

> Note:
>
> The pads of the **(Mot. 1390)** should almost be in contact with the engine; when struck with the copper hammer, the engine comes to rest on the support.

❑ Lift the vehicle to remove the «engine-gearbox» assembly.

> Note:
>
> Check that no component obstructs the movement of the body around the «engine - gearbox» assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ For standard replacement (see **Engine: Standard replacement**) (Technical Note 6046A, 10A, Engine and peripherals).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the « engine - gearbox» assembly in the vehicle.

❑ Refit:

- the central nut of the left-hand suspended engine mounting rubber pad,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Torque tighten the **central nut of the left-hand suspended engine mounting rubber pad (62 N.m)**.

❑ Remove the tool **(Mot. 1390)**.

III - FINAL OPERATION

❑ Refit the lower engine tie-bar.

❑ Torque tighten the **lower engine tie-bar bolts (180 N.m)**.

❑ Fit the automatic transmission wiring.

❑ Refit the bolts of the wiring protective sheath on the automatic transmission.

❑ Connect the gearbox control.

❑ Clip on the gearbox control.

❑ Connect the cooling hose at the expansion bottle outlet.

❑ Fit the clip of the cooling hose at the expansion bottle outlet using the **(Mot. 1448)**.

❑ Connect the heater matrix hoses to the outlet of the coolant outlet unit.

❑ Fit the heater matrix hose clips using the tool **(Mot. 1448)**.

❑ Remove the **safety strap(s)** from the catalytic converter.

❑ Refit:

- the rear catalytic pre-converter (see **Rear catalytic pre-converter: Removal - Refitting**) ,
- the front catalytic pre-converter (see **Front catalytic pre-converter: Removal - Refitting**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,

V4Y

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

❏ Fit the right-hand and left-hand tie rods.

❏ Torque tighten the **tie rod bolts (44 Nm)**.

❏ Refit:

- the power-assisted steering pipe,
- the power-assisted steering pipe bolts.

❏ Connect the power-assisted steering hoses to the outlet of the power-assisted steering fluid reservoir.

❏ Fit the clips of the power-assisted steering hoses on the power-assisted steering fluid reservoir using the **(Mot. 1448)**.

❏ Connect the power-assisted steering lower pipe.

❏ Fit the clip of the power-assisted steering lower pipe using the **(Mot. 1448)**.

❏ Fit the power-assisted steering pipe support on the automatic transmission.

❏ Refit the bolt of the power-assisted steering pipe support on the automatic transmission.

❏ Connect the connector of the automatic transmission computer wiring.

❏ Clip on the automatic transmission computer wiring.

❏ Connect the automatic transmission computer connector.

❏ Fit the earth wires on the front left-hand side member and on the left-hand scuttle reinforcement.

❏ Torque tighten the **earth nuts on the front left-hand side member and on the left-hand scuttle reinforcement (8 N.m)**.

❏ Refit:

- the max fuse box,
- all of the fuse holders from the max fuse box,
- all of the fuses,
- the max fuse box cover.

❏ Connect the engine wiring connector.

❏ Refit:

- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) ,
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) ,
- the « cooling radiator - condenser - motor-driven fan » assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the cooling radiator air scoops,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air outlet pipe of the air filter unit.

❏ Fit the air outlet pipe of the air filter unit on the air filter unit and on the damper valve.

❏ Torque tighten the **air filter box air outlet pipe clips (6 Nm)**.

❏ Fit the brake servo vacuum pipe.

❏ Connect the brake servo vacuum pipe.

❏ Connect the oil vapour rebreathing pipe.

❏ Fit the clip onto the oil vapour rebreathing pipe using the **(Mot. 1448)**.

❏ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the engine undertray,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Remove the blanking plugs from the fuel pipe openings.

❏ Connect:

- the fuel supply quick-release unions,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

- Perform the following operations:
  - fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
  - a leak test (see **Refrigerant circuit: Check**) (62A, Air conditioning),
  - fill and bleed the power-assisted steering circuit (see **Power-assisted steering circuit: Bleeding**) (36B, Power-assisted steering).
- Check that the air conditioning system is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).
- Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).
- Refit the engine cover.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station
tweezers

Tightening torques ▽	
air conditioning pipe nut	**8 N.m**
air conditioning pipe bolt	**8 N.m**
earth wire bolt	**21 N.m**
earth wire nuts	**8 N.m**
earth nuts on the front left-hand side member	**8 N.m**
clip of the air filter unit air outlet pipe	**6 N.m**
nut of the intercooler air inlet pipe	**21 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

IMPORTANT
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) .

WARNING
Consult the device's operating manual to avoid incorrect use.

V9X

❏ Drain:

- the refrigerant circuit using a **refrigerant charging station** (62A, Air conditioning),
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

WARNING
In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❏ Remove:

- the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
- the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure).

134228

❏ Rotate the clip (**1**) on the intercooler air inlet pipe.

❏ Disconnect the intercooler air inlet pipe.

❏ Remove the intercooler inlet air pipe.

137888

❏ Remove:

- the nut (**2**) on the intercooler air inlet pipe,
- the intercooler air inlet pipe.

133887

- ❑ Loosen the clip (**3**) of the air outlet pipe on the air filter unit.
- ❑ Unclip the vacuum pipes (**4**) of the turbocharger control solenoid valve.
- ❑ Disconnect the oil vapour rebreathing pipe (**5**) from the air pipe.
- ❑ Remove:
  - the air outlet pipe to the air filter unit,
  - the pre-postheating unit (see **13C**, **Preheating**, **Pre-postheating unit: Removal - Refitting**, page **13C-1**) ,
  - the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
  - the additional radiator (see **Additional radiator: Removal - Refitting**) ,
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

116152

- ❑ Remove the bolt (**6**) of the power-assisted steering bracket.

> **WARNING**
> Prepare for the flow of fluid, and protect the surrounding components.

- ❑ Drain the power-assisted steering circuit by disconnecting the lower power-assisted steering pipe.
- ❑ Remove the lower power-assisted steering pipe.
- ❑ Unclip the lower power-assisted steering pipe from the subframe.

V9X

128450

❑ Unclip the power-assisted steering reservoir (**7**) .

❑ Move the power-assisted steering reservoir to one side.

135270

❑ Move aside the clip (**8**) of the power-assisted steering hose using the **(Mot. 1448)**.

❑ Disconnect the power-assisted steering hose.

❑ Remove the power-assisted steering hose.

❑ Move aside the clip (**9**) of the power-assisted steering hose using the **(Mot. 1448)**.

❑ Disconnect the power-assisted steering hose.

❑ Remove:

- the power assisted steering fluid reservoir,
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit).

137883

❑ Remove:

- the cover (**10**) from the max fuse box,
- the bolt (**11**) from the max fuse box.

137882

- ❑ Remove the max fuse box clip (**12**) .
- ❑ Move the max fuse box to one side.
- ❑ Unclip the max fuse box from its support.
- ❑ Remove the max fuse box support.

134197

- ❑ Remove the fuse assembly (**13**) .

138346

- ❑ Unclip the fuse holder assembly (**14**) .
- ❑ Move the max fuse box to one side.
- ❑ Remove the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) .

138345

- ❑ Disconnect the connector (**15**) from the gearbox computer.
- ❑ Unclip the gearbox computer wiring (**16**) .
- ❑ Move aside the gearbox computer wiring.

138114

- ❑ Remove the earth nuts (**17**) from the front left-hand side member.
- ❑ Move the earth wiring away from the front left-hand side member.
- ❑ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) .

124316

- ❑ Disconnect the xenon bulb computer connector (**18**) .
- ❑ Unclip the xenon bulb computer wiring.

138344

- ❑ Unclip the engine wiring connector (**19**) from the front left-hand wing panel.
- ❑ Disconnect the engine wiring connector.
- ❑ Move aside the engine wiring.
- ❑ Remove the earth wire nuts (**20**) .
- ❑ Move aside the earth wires.
- ❑ Remove the earth wire bolt (**21**) .
- ❑ Move aside the earth wire.

138343

- ❑ Disconnect the connectors (**22**) of the engine harness.
- ❑ Move aside the engine wiring.

138342

❑ Unclip the wiring (**23**) from the protective sheath of the gearbox wiring.

123479

❑ Disconnect:

- the connector (**24**) from the air conditioning pressure sensor,
- the connector from the water detection sensor on the diesel filter.

137873

❑ Disconnect the connector (**25**) from the electric diesel heater.

❑ Unclip the wiring of the electric diesel heater.

❑ Move aside the wiring of the electric diesel heater.

138115

❑ Remove:

- the bolt (**26**) of the protective sheath of the gearbox wiring,
- the nut (**27**) of the protective sheath of the gearbox wiring.

❑ Unclip the supply wiring (**28**) of the battery disconnection unit.

❑ Remove:

- the supply wiring of the battery disconnection unit,
- the protective sheath of the gearbox wiring.

138341

❑ Disconnect:

- the turbocharger control solenoid valve connector (**29**) .
- the connector (**30**) from the exhaust gas temperature sensor,
- the connector (**31**) from the exhaust gas pressure sensor.

❑ Unclip the engine wiring (**32**) .

❑ Move aside the engine wiring.

136263

❑ Disconnect the inlet cooling hose (**33**) of the heater matrix.

134093

❑ Remove:

- the nut (**34**) of the rigid cooling pipes,
- the bolt (**35**) of the rigid cooling pipes.

❑ Move aside the rigid cooling pipes.

133899

❑ Disconnect the quick-release unions (**36**) of the fuel supply and return pipes.

137874

❑ Disconnect the fuel temperature sensor connector (**37**) .

❑ Unclip (**38**) the fuel return pipes from their supports.

❑ Move the fuel pipesto one side.

138343

❑ Remove the air conditioning pipe bolt (**39**) .

❑ Disconnect the air conditioning pipe.

❑ Insert the blanking plugs.

❑ Remove the seal of the air conditioning pipe.

❑ Unclip the air conditioning pipes at (**40**) .

138347

- ❑ Remove:
  - the air conditioning pipe nut (**41**) ,
  - the air conditioning pipe,
  - the seal of the air conditioning pipe.
- ❑ Insert the blanking plugs.
- ❑ Move aside the clip of the outlet cooling hose of the heater matrix using the **(Mot. 1448)**.
- ❑ Disconnect the outlet cooling hose of the heater matrix.

134226

- ❑ Disconnect the inlet cooling hose (**42**) of the exhaust cooler.
- ❑ Move aside the inlet cooling hose of the exhaust cooler.

138356

- ❑ Disconnect the brake servo vacuum pipe union (**43**) .
- ❑ Move the brake servo vacuum pipe to one side.
- ❑ Remove the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

133904

❑ Remove the nuts (**44**) from the connecting hose on the catalytic pre-converter.

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) on the studs between the connecting hose and the catalytic pre-converter to avoid breaking the studs while loosening the nuts.

124147

❑ Remove the particle filter bolt (**45**) on the rubber mounting bush.

❑ Move aside the « connecting hose - particle filter » assembly.

❑ Remove the seal between the connecting hose and the particle filter.

137916

❑ Disconnect the fuel supply pipe union (**46**) of the exhaust fuel injector.

❑ Move aside the fuel pipe of the exhaust fuel injector.

❑ Unclip the particle filter pressure sensor wiring.

124144

- ❑ Remove the exhaust heat shield clip (**47**) .
- ❑ Move aside the exhaust heat shield.

124145

- ❑ Disconnect the particle filter temperature sensor connector (**48**) .
- ❑ Unclip the particle filter temperature sensor wiring from the heat shield.
- ❑ Move aside the particle filter temperature sensor wiring.

137921

- ❑ Unclip the gearbox control from its support by pushing on the union (**49**) .
- ❑ Unclip the gearbox control (**50**) .
- ❑ Move aside the gearbox control.

137055

- ❑ Disconnect the inlet cooling hose (**51**) from the coolant outlet unit.

V9X

138359

❑ Move the cooling hose clip (**52**) away from the rigid cooling pipe using the **(Mot. 1448)**.

❑ Disconnect the cooling hose from the rigid cooling pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

138355

❑ Support the « engine-gearbox» assembly on the **(Mot. 1390)** at (**53**) .

❑ Remove:

- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Lift the vehicle to remove the « engine-gearbox» assembly.

> Note:
>
> Check that no component obstructs the movement of the body around the « engine - gearbox » assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: refrigerant pipe seal (30,02,02,52)**.

❑ Always replace:

- the seal between the connecting hose and the particle filter,
- the nuts between the connecting hose and the particle filter,
- the studs between the connecting hose and the particle filter if they were loosened,
- the turbocharger air outlet pipe seal.

❑ For standard replacement (see **Engine: Standard replacement**) (Technical Note 6035A, Engine and peripherals).

V9X

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

> Note:
>
> Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the « engine - gearbox » assembly in the vehicle.

❑ Refit:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) .

❑ Remove the tool **(Mot. 1390)**.

III - FINAL OPERATION

❑ Connect the cooling hose to the rigid cooling pipe.

❑ Fit the cooling hose clip on the rigid cooling pipe using the **(Mot. 1448)**.

❑ Connect the inlet cooling hose of the coolant outlet unit.

❑ Fit the gearbox control.

❑ Clip on the gearbox control.

❑ Fasten the gearbox control onto its support.

❑ Fit the particle filter temperature sensor wiring.

❑ Clip the particle filter temperature sensor wiring on the heat shield.

❑ Connect the particle filter temperature sensor connector.

❑ Fit the exhaust heat shield.

❑ Refit the clip of the exhaust heat shield.

❑ Clip on the particle filter pressure sensor wiring.

❑ Fit the fuel pipe of the exhaust fuel injector.

❑ Connect the fuel supply pipe union of the exhaust fuel injector.

❑ Refit a new seal between the connecting hose and the particle filter.

❑ Fit the « connecting hose - particle filter » assembly.

❑ Refit:

- the « connecting hose - particle filter » assembly,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Fit the brake servo vacuum pipe.

V9X

- ❑ Connect the union of the brake servo vacuum pipe.
- ❑ Fit the inlet cooling hose of the exhaust cooler.
- ❑ Connect:
  - the inlet cooling hose of the exhaust cooler,
  - the outlet cooling hose of the heater matrix.
- ❑ Fit the clip of the outlet cooling hose of the heater matrix using the **(Mot. 1448)**.
- ❑ Remove the blanking plugs.
- ❑ Refit:
  - new seals for the air conditioning pipe,
  - the air conditioning pipe.
- ❑ Torque tighten the **air conditioning pipe nut (8 N.m)**.
- ❑ Clip on the air conditioning pipes.
- ❑ Torque tighten the **air conditioning pipe bolt (8 N.m)**.
- ❑ Position the fuel pipes.
- ❑ Fasten the fuel return pipes on their supports.
- ❑ Connect:
  - the fuel temperature sensor connector,
  - the quick-release unions of the fuel supply and return pipes.
- ❑ Fit the rigid cooling pipes.
- ❑ Refit:
  - the bolt of the rigid cooling pipes,
  - the nut of the rigid cooling pipes.
- ❑ Connect the inlet cooling hose of the heater matrix.
- ❑ Fit the engine wiring.
- ❑ Clip on the engine wiring.
- ❑ Connect:
  - the exhaust gas pressure sensor connector,
  - the exhaust gas temperature sensor connector,
  - the turbocharger control solenoid valve connector.
- ❑ Fit:
  - the protective sheath of the gearbox wiring,
  - the supply wiring of the battery disconnection unit.
- ❑ Clip on the supply wiring of the battery disconnection unit.
- ❑ Refit:
  - the nut of the protective sheath of the gearbox wiring,
  - the bolt of the protective sheath of the gearbox wiring.
- ❑ Position the electric diesel heater wiring.
- ❑ Clip on the electric diesel heater wiring.
- ❑ Connect:
  - the electric diesel heater connector,
  - the connector of the water detection sensor on the diesel filter,
  - the connector of the air conditioning pressure sensor.
- ❑ Clip the wiring onto the protective sheath of the gearbox wiring.
- ❑ Fit the engine wiring.
- ❑ Connect the engine harness connectors.
- ❑ Fit the earth wire.
- ❑ Torque tighten the **earth wire bolt (21 N.m)**.
- ❑ Fit the earth wires.
- ❑ Torque tighten the **earth wire nuts (8 N.m)**.
- ❑ Fit the engine wiring.
- ❑ Connect the engine wiring connector.
- ❑ Clip:
  - the engine wiring connector on the front left-hand wing panel,
  - the xenon bulb computer wiring.
- ❑ Connect the xenon bulb computer connector.
- ❑ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) .
- ❑ Fit the earth wiring on the front left-hand side member.
- ❑ Torque tighten the **earth nuts on the front left-hand side member (8 N.m)**.
- ❑ Fit the gearbox computer wiring.
- ❑ Clip on the gearbox computer wiring.
- ❑ Connect the gearbox computer connector.
- ❑ Refit the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) .
- ❑ Fit the max fuse box.
- ❑ Clip on the fuse holder assembly.
- ❑ Refit:
  - the fuse assembly,
  - the max fuse box support.

V9X

- ❑ Clip the max fuse box on its support.
- ❑ Fit the max fuse box.
- ❑ Refit:
  - the max fuse box clip,
  - the max fuse box bolt,
  - the max fuse box cover,
  - the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
  - the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
  - the power-assisted steering fluid reservoir.
- ❑ Connect the power-assisted steering hose.
- ❑ Fit the power-assisted steering hose clip using the **(Mot. 1448)**.
- ❑ Refit the power-assisted steering hose.
- ❑ Connect the power-assisted steering hose.
- ❑ Fit the power-assisted steering hose clip using the **(Mot. 1448)**.
- ❑ Fit the power-assisted steering reservoir.
- ❑ Clip:
  - the power assisted steering fluid reservoir,
  - the lower power-assisted steering pipe on the subframe.
- ❑ Fit the lower power-assisted steering pipe.
- ❑ Connect the lower power-assisted steering pipe.
- ❑ Refit:
  - the bolt of the power-assisted steering bracket,
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
  - the additional radiator (see **Additional radiator: Removal - Refitting**) ,
  - the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
  - the pre-postheating unit (see **13C**, **Preheating**, **Pre-postheating unit: Removal - Refitting**, page **13C-1**) ,
  - the air outlet pipe of the air filter unit.
- ❑ Connect the oil vapour rebreathing pipe to the air filter box air outlet pipe.
- ❑ Clip on the vacuum pipes of the turbocharger control solenoid valve.
- ❑ Torque tighten the **clip of the air filter unit air outlet pipe (6 N.m)**.
- ❑ Refit the intercooler air inlet pipe.
- ❑ Fit the intercooler air inlet pipe.
- ❑ Connect the intercooler air inlet pipe.
- ❑ Fit the clip of the intercooler air inlet pipe.
- ❑ Torque tighten the **nut of the intercooler air inlet pipe (21 N.m)**.
- ❑ Refit:
  - the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
  - the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
  - the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
  - the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
  - the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
  - the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Perform the following operations:
  - fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

V9X

- a leak test (see **Refrigerant circuit: Check**) (62A, Air conditioning).

❏ Check that the air conditioning system is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).

❏ Fill and bleed the power-assisted steering circuit (see **Power-assisted steering circuit: Bleeding**) (36B, Power-assisted steering).

❏ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❏ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

❏ Refit the engine cover.

M9R

Equipment required
oil recovery tray
oil change wrench
oil change end piece with an 8 mm square drive

Tightening torques ▽	
drain plug (with a rolled copper seal)	**44 N.m**
drain plug (with a flat copper seal)	**50 N.m**

Engine	Suffix	Average oil capacity (check and adjust with dipstick) (l)	
		Draining	Oil change plus oil filter replacement
M9R	742	6.2	6.6
	744		
	746		
	748		
	754		
	802		
	808		
	806		
	816	7	7.4
	800		
	805		
	809		
	849		
	845		

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

I - PARTS AND CONSUMABLES FOR THE REPAIR WORK

❏ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**

II - DRAINING

122398

❏ Remove the "filler cap - dipstick" assembly (**1**) .

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the engine undertray.

M9R

122486

- ❑ Place the **oil recovery tray** under the engine oil drain plug (**2**) .
- ❑ Remove the drain plug (**2**) from the engine oil sump using the **oil change wrench**.
- ❑ Let the engine oil run into the **oil recovery tray**.

Copper seal

113764

- ❑

> Note:
>
> There are two types of drain seals for this engine:
>
> - rolled copper seal (with direction of fitting),
>
> - flat copper seal (no direction of fitting).

- ❑ Fit:
  - the new seal on the drain plug (**3**) (if the seal is rolled, orient the groove (**4**) towards the plug),
  - the drain plug on the engine oil sump.
- ❑ Using a **oil change end piece with an 8 mm square drive**, torque tighten the:
  - **drain plug (with a rolled copper seal) (44 N.m)**,
  - **drain plug (with a flat copper seal) (50 N.m)**.
- ❑ Refit the engine undertray.

M9R

III - FILLING

❏

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

Prevent oil outflow on the engine to avoid damaging the surrounding components.

❏ Use a funnel to fill the engine with engine oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

Note:

When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking the level on the dipstick

❏ Check the oil level with the dipstick.

❏ Refit the « oil filler cap - dipstick » assembly.

M4R

Equipment required
oil recovery tray

Tightening torques ▽	
drain plug	**34 Nm**

Engine	Average oil capacity (test with dipstick) (l)	
	Oil change without filter replacement	**Oil change with filter replacement**
M4R Without removal - refitting of the sump	3.3	3.5
M4R With removal - refitting of the sump	4.2	4.4

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

PARTS AND CONSUMABLES FOR THE REPAIR WORK

❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**

❑ **Consumable** :

- Engine oil (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

I - OIL SERVICE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

125554

❑ Remove:

- the engine oil filler cap (**1**) ,
- the dipstick (**2**) ,
- the engine undertray bolts,
- the engine undertray.

M4R

123348

- ❑ Remove the engine oil sump drain plug (**3**) .
- ❑ Let the oil run into a **oil recovery tray**.

115040

- ❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**
- ❑ Refit the new seal onto the drain plug, respecting the direction indicated in the diagram.
- ❑ Tighten to torque the **drain plug (34 Nm)**.
- ❑ Clean the traces of oil around the drain plug so that any possible leaks can be detected.

II - FILLING

- ❑ **Consumable** :
  - Engine oil (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).
- ❑ Fill the engine with oil, observing the recommended amount.
- ❑ Wait at least **10 minutes**.
- ❑ Check the oil level using the dipstick.
- ❑ Top up the engine oil level if necessary.
- ❑ Refit:
  - the engine oil filler cap,
  - the dipstick,
  - the engine undertray,
  - the engine undertray bolts.
- ❑ Tighten the engine undertray bolts.

F4R

Equipment required
oil recovery tray
oil change wrench
oil change end piece with an 8 mm square drive

Tightening torques ▽	
drain plug	**20 N.m**

Engine	Average oil capacity (adjusting using dipstick) (l)	
	Oil change without filter replacement	**Oil change with filter replacement**
F4R	5.2	5.4

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

PARTS AND CONSUMABLES FOR THE REPAIR WORK

❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**

I - OIL SERVICE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

123137

❑ Remove:

- the filler cap (**1**) ,
- the dipstick (**2**) ,
- the engine undertray.

123178

❑ Place the **oil recovery tray** under the engine.

❑ Remove:

- the drain plug (**3**) from the engine oil sump using a **oil change wrench**
- the engine oil sump drain plug seal.

❑ Let the engine oil run into the **oil recovery tray**.

F4R

113765

❑ Fit:

- the new seal on the drain plug (no direction of fitting),
- the drain plug on the sump.

❑ Torque tighten the **drain plug (20 N.m)** using a **oil change end piece with an 8 mm square drive**.

❑ Clean the traces of oil around the drain plug so that any possible leaks can be detected.

❑ Refit the engine undertray.

II - FILLING

❑

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

Prevent oil outflow on the engine to avoid damaging the surrounding components

Fill the engine with engine oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

Note:

When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking the level on the dipstick

❑ Adjust the engine oil level if necessary.

❑ Refit:

- the filler cap,
- the dipstick.

K9K

Equipment required
oil recovery tray
oil change wrench
oil change end piece with an 8 mm square drive

Tightening torques ▽	
drain plug	**20 N.m**

Engine	Average oil capacity (adjusting using dipstick) (l)	
	Oil change without filter replacement	**Oil change with filter replacement**
K9K	4.4	4.5

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

PARTS AND CONSUMABLES FOR THE REPAIR WORK

❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**

I - OIL SERVICE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

123535

❑ Remove:

- the filler cap (**1**) ,
- the dipstick (**2**) ,
- the engine undertray.

101533

❑ Fit the **oil recovery tray** under the engine.

❑ Remove:

- the drain plug (**3**) from the engine oil sump using a **oil change wrench**,
- the engine oil sump drain plug seal.

❑ Allow the engine oil to flow into the oil recovery container.

K9K

113765

❑ Fit:

- the new seal on the drain plug (no direction of fitting),
- the drain plug on the sump.

❑ Torque tighten the **drain plug (20 N.m)** using a **oil change end piece with an 8 mm square drive**.

❑ Wipe away any traces of oil from around the drain plug so that any possible leaks can be detected.

❑ Refit the engine undertray.

II - FILLING

❑

> **WARNING**
> Always check the oil level using the dipstick.
>
> Do not exceed the maximum level on the dipstick (could destroy the engine).
>
> Correct the engine oil level if necessary before delivering the vehicle to the customer.

> Note:
>
> Prevent oil outflow on the engine to avoid damaging the surrounding components.

❑ Position the vehicle back on the ground.

❑ Use a funnel to fill the engine with oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013A, 04, Lubricants).

> Note:
>
> When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking the level on the dipstick

❑ Check the engine oil level if necessary.

❑ Refit:

- the filler cap,
- the dipstick.

K4M

Equipment required
oil recovery tray
oil change wrench
oil change end piece with an 8 mm square drive

Tightening torques ▽	
drain plug	**20 N.m**

Engine	Average oil capacity (adjusting using dipstick) (l)	
	Oil change without filter replacement	**Oil change with filter replacement**
K4M	4.9	5

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

PARTS AND CONSUMABLES FOR THE REPAIR WORK

❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**

I - OIL SERVICE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

128255

❑ Remove:

- the engine cover,
- the filler cap (**1**) ,
- the dipstick (**2**) ,
- the engine undertray.

K4M

128256

- ❑ Place the **oil recovery tray** under the engine.
- ❑ Remove:
  - the drain plug (**3**) from the engine oil sump using a **oil change wrench**,
  - the engine oil sump drain plug seal.
- ❑ Allow the engine oil to flow into the oil recovery container.

113765

- ❑ Refit:
  - a new seal (**4**) on the sump drain plug,
  - the drain plug on the sump.
- ❑ Torque tighten the **drain plug (20 N.m)** using a **oil change end piece with an 8 mm square drive**.
- ❑ Clean the traces of oil around the drain plug so that any possible leaks can be detected.
- ❑ Refit the engine undertray.

II - FILLING

❑

> **WARNING**
>
> Always check the oil level using the dipstick.
>
> Do not exceed the maximum level on the dipstick (could destroy the engine).
>
> Correct the engine oil level if necessary before delivering the vehicle to the customer.

> Note:
>
> Prevent oil outflow on the engine to avoid damaging the surrounding components

K4M

- Use a funnel to fill the engine with engine oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013, 04A, Lubricants).

> Note:
>
> When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking the level on the dipstick

- Check the engine oil level if necessary.
- Refit:
  - the filler cap,
  - the dipstick,
  - the engine cover.

Engine oil: Draining - Refilling

V4Y

Equipment required
oil recovery tray

Tightening torques ▽	
drain plug	**35 N.m**

Engine	Average oil capacity (adjust with dipstick) (l)	
	Oil change without oil filter replacement	**Oil change plus oil filter replacement**
V4Y	5.2	5.5

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (as this could damage the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

I - DRAINING

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

133473

❏ Remove:

- the engine cover,
- the oil filler cap (**1**) ,
- the dipstick,
- the engine undertray bolts,
- the engine undertray.

V4Y

22307

- ❑ Fit a **oil recovery tray** under the engine oil drain plug.
- ❑ Remove the drain plug (**2**) .
- ❑ Let the oil run into the **oil recovery tray**.
- ❑ Remove the seal from the drain plug.
- ❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:
  - the drain plug,
  - the engine oil sump.
- ❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**.

116952

- ❑ Refit:
  - a new seal on the drain plug,
  - the drain plug.
- ❑ Torque tighten the **drain plug (35 N.m)**.
- ❑ Clean the traces of oil around the drain plug so that any possible leaks can be detected.
- ❑ Remove the **oil recovery tray**.

II - FILLING

- ❑ Consumable:
  - engine oil (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).
- ❑ Position the vehicle back on the ground.
- ❑ Fill the engine with oil, observing the recommended amount.

> Note:
>
> When topping up the engine oil, always allow **10 minutes** before checking the oil level with the dipstick.

- ❑ Check the oil level using the dipstick.
- ❑ Adjust the engine oil level if necessary.
- ❑ Refit:
  - the engine undertray,
  - the dipstick,
  - the engine oil filler cap,

V4Y

- the engine cover.

Engine oil: Draining - Refilling

V9X

Equipment required
oil recovery tray
oil change wrench
torque wrench
oil change end piece with an 8 mm square drive

Tightening torques ▽	
engine oil sump drain plug	**44 N.m**

Engine	Average oil capacity (adjust with dipstick) (l)	
	Draining	**Oil change plus oil filter replacement**
V9X	**6.5**	**6.8**

I - RECOMMENDATIONS FOR REPAIR

❑ Direction of fitting for a drain plug seal.

129066

❑ There is no direction of fitting for a seal fitted with a rubber lip.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

II - PARTS AND CONSUMABLES FOR THE REPAIR WORK

❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)**.

❑ Consumable:

- engine oil (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

V9X

III - DRAINING

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

133894

❑ Remove:

- the engine oil filler cap (**1**) ,
- the dipstick (**2**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Place the **oil recovery tray** under the engine.

133896

❑ Remove the drain plug (**3**) from the engine oil sump using the **oil change wrench**.

❑ Let the engine oil run into the **oil recovery tray**.

❑ Remove the drain plug seal.

❑ Fit a new seal onto the engine oil drain plug.

❑ Torque tighten the **engine oil sump drain plug (44 N.m)** using a **torque wrench** and a **oil change end piece with an 8 mm square drive**.

❑ Wipe the oil drips on the sump using a cloth.

❑ Remove the **oil recovery tray**.

❑ Refit the engine undertray.

IV - FILLING

❑ Position the vehicle back on the ground.

❑ Fill the engine with oil, observing the recommended amount.

❑ Wait at least **10 minutes**.

❑ Check the oil level using the dipstick.

❑ Top up the engine oil level if necessary.

❑ Refit:

- the dipstick,
- the engine oil filler cap.

Note:

Lubricate the seal of the engine oil filler cap before refitting it.

M9R

Equipment required
oil recovery tray

Tightening torques ▽	
oil filter unit cover	**25 Nm**

❑

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking with a dipstick.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove the engine undertray.

❑ Place the **oil recovery tray** under the oil filter.

II - REMOVAL OPERATION

118717

❑ Undo the oil filter unit cover (**1**) until oil flows through the opening (**2**) .

❑ Allow the oil contained in the oil filter unit to flow.

113320

❑ Remove:

- the cover (**3**) - oil filter (**4**) assembly,
- the cover seal (**5**) .

M9R

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ **parts always to be replaced: Oil filter cartridge (10,05,05,04)**.

parts always to be replaced: Oil filter cover seal (10,05,05,10).

❑ Clean the oil filter unit cover.

113869

❑ Fit:

- a new cover seal (**5**) ,
- a new filter element in the cover.

II - REFITTING OPERATION

❑ Manually tighten the “cover - oil filter” assembly.

❑ Torque tighten the **oil filter unit cover (25 Nm)**.

III - FINAL OPERATION.

❑ Refit the engine undertray.

❑ Start the engine and let it run until the oil pressure warning light goes off.

❑ Adjust the engine oil level (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

❑ Refit the « filler cap - dipstick » assembly.

M4R

Special tooling required	
Mot. 1654	Oil filter removing tool (64 mm diameter).

Equipment required
oil recovery tray

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Fit a **oil recovery tray** under the engine.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

114954

❑ Remove the oil filter using the **(Mot. 1654)** (**1**) .

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ **parts always to be replaced: Oil filter (10,05,05, 03)**.

❑ Lubricate the oil filter seal with new engine oil.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Tighten the oil filter until it makes contact.

❑ Tighten the oil filter by **3/4** of a turn by hand.

III - FINAL OPERATION.

❑ Remove the **oil recovery tray**.

❑ Wipe away any excess oil.

❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

> **WARNING**
> Always check the oil level using the dipstick.
>
> Do not exceed the maximum level on the dipstick (could destroy the engine).
>
> Correct the engine oil level if necessary before delivering the vehicle to the customer.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

F4R

Special tooling required	
Mot. 1329	Oil filter removing tool (76 mm diameter)

Equipment required
oil recovery tray

IMPORTANT
Wear latex gloves during the operation.

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

When removing the oil filter, check that the oil filter seal is not still stuck to the cylinder block or oil filter mounting.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Place the **oil recovery tray** under the engine.

II - OPERATION FOR REMOVAL OF PART CONCERNED

120178

❑ Remove the oil filter using the **(Mot. 1329)** (**1**) .

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the oil-water heat exchanger joint face.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ **parts always to be replaced: Oil filter (10,05,05, 03)**.

❑ Lubricate the new oil filter seal with new engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the new oil filter.

❑ Tighten the oil filter until it makes contact.

❑ Tighten the oil filter by 3/4 of a turn.

III - FINAL OPERATION.

❑ Wipe any oil run-off with a cloth.

F4R

- ❑ Top up the engine oil level with oil recommended by the manufacturer (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).
- ❑ Start the engine and wait until the oil pressure warning light goes out on the instrument panel.
- ❑ Check for leaks from the oil filter.
- ❑ Remove the **oil recovery tray**.
- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts.
- ❑ Tighten the engine undertray bolts.
- ❑ Wait at least **10 minutes**.
- ❑ Check the oil level using the dipstick.
- ❑ Adjust the engine oil level if necessary.

K9K

Special tooling required	
Mot. 1329	Oil filter removing tool (76 mm diameter)

Equipment required
oil recovery tray

IMPORTANT
Wear latex gloves during the operation.

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Fit a **oil recovery tray** under the engine.

II - OPERATION FOR REMOVAL OF PART CONCERNED

97160

124554

❑ Remove the oil filter (**1**) using **(Mot. 1329)** (**2**) .

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ **parts always to be replaced: Oil filter (10,05,05, 03)**.

❑ Lubricate the new oil filter seal with engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the new oil filter by hand until the seal makes contact with the mounting.

K9K

- Tighten the new oil filter 3/4 of a turn by hand or using the **(Mot. 1329)**.

III - FINAL OPERATION.

- Wipe any oil run-off with a cloth.
- Top up the engine oil in accordance with the quantity recommended by the manufacturer (see **Engine oil: Specifications**) (MR 415, 04A, Lubricants).
- Start the engine and leave it running for 30 seconds.
- Check there are no leaks from the oil filter.
- Remove the **oil recovery tray**.
- Refit:
  - the engine undertray,
  - the engine undertray bolts.
- Wait at least **10 minutes**.
- Check the oil level using the dipstick.
- Adjust the engine oil level if necessary.

Note:

The engine oil level must be between the “minimum” and “maximum” marks on the dipstick.

K4M

Special tooling required	
Mot. 1329	Oil filter removing tool (76 mm diameter)

Equipment required
oil recovery tray

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

When removing the oil filter, check that the oil filter seal does not remain attached to the cylinder block or to the oil filter support.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Place the **oil recovery tray** under the engine.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128281

❑ Remove the oil filter using tool **(Mot. 1329)** (**1**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the cylinder block joint faces.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ **parts always to be replaced: Oil filter (10,05,05, 03)**.

❑ Lubricate the new oil filter seal with new engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit a new oil filter.

❑ Tighten the oil filter until it makes contact.

❑ Tighten the oil filter by 3/4 of a turn.

III - FINAL OPERATION.

❑ Remove the **oil recovery tray**.

❑ Wipe any oil run-off with a cloth.

K4M

- ❑ Top up the engine oil with oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).
- ❑ Start the engine until the oil pressure warning light goes out on the instrument panel.
- ❑ Check that there are no leaks around the oil filter.
- ❑ Refit the engine undertray.
- ❑ Wait at least **10 minutes**.
- ❑ Check the oil level using the dipstick.
- ❑ Adjust the engine oil level if necessary.

V4Y

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine oil filler cap,
- the dipstick,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

134920

❑ Remove:

- the clips (**1**) of the oil filter protector,
- the oil filter protector.

❑ Place an **oil recovery container** under the oil filter.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134189

❑ Remove the oil filter (**2**) using.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Oil filter (10,05,05, 03)**.

❑ Check that the used oil filter seal does not remain attached to the engine.

❑ Lubricate the new oil filter seal with new engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Tighten the oil filter until it comes into contact with the oil filter seal on the engine.

❑ Tighten the oil filter three-quarters of a turn by hand.

III - FINAL OPERATION

❑ Wipe any oil run-off with a cloth.

V4Y

- Top up the oil with oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

> Note:
>
> When topping up the engine oil, always allow **10 minutes** for the oil to settle before checking the oil level with the dipstick.

- Start the engine and wait until the oil pressure warning light goes out on the instrument panel.
- Check for leaks from the oil filter.
- Refit:
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine oil filler cap,
  - the dipstick,
  - the vehicle on its wheels.

V9X

Special tooling required	
Mot. 1280-01	Oil filter removing tool (86 mm diameter).

Equipment required
oil recovery tray

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

When removing the oil filter, check that the oil filter seal is not still stuck to the cylinder block or oil filter mounting.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Position **oil recovery tray** under the engine.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134116

❑ Remove the oil filter (**1**) using **(Mot. 1280-01)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the cylinder block joint faces.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ **parts always to be replaced: Oil filter (10,05,05, 03)**.

❑ Lubricate the oil filter seal with new engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit a new oil filter.

❑ Tighten the oil filter until it makes contact.

❑ Tighten the oil filter three-quarters of a turn using the **(Mot. 1280-01)**.

III - FINAL OPERATION

❑ Remove the **oil recovery tray**.

V9X

- Wipe any oil run-off with a cloth.

> **WARNING**
>
> Always check the oil level using the dipstick.
>
> Do not exceed the maximum level on the dipstick (could destroy the engine).
>
> Correct the engine oil level if necessary before delivering the vehicle to the customer.

- Top up the engine oil with oil recommended by the manufacturer (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- Start the engine and wait until the oil pressure warning light goes out on the instrument panel.
- Check for leaks from the oil filter.
- Refit the engine undertray.
- Wait at least **10 minutes**.
- Check the oil level using the dipstick.
- Adjust the engine oil level if necessary.

> Note:
>
> Lubricate the seal of the engine oil filler cap before refitting it.

M9R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
oil filter unit bolts (initial torque)	**5 N.m**
oil filter unit bolts	**25 N.m**
alternator positive terminal nut	**8 N.m**
intercooler air outlet pipe clip on the damper valve side	**5.5 N.m**

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray.

❑ Drain the engine cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

M9R, and 742 or 744 or 746 or 748 or 754

122372

❑ Remove the turbocharger pressure sensor (**1**) .

122374

❑ Undo the clip (**3**) of the intercooler air outlet pipe on the damper valve.

❑ Disconnect the intercooler air outlet pipe on the side of the damper valve.

❑ Remove the pin from the intercooler air outlet pipe at the intercooler end.

❑ Disconnect the intercooler air outlet pipe at the intercooler end.

❑ Remove the intercooler air outlet pipe.

M9R

113296

- ❑ Remove the alternator positive terminal nut.
- ❑ Disconnect:
  - the alternator connector (**4**) ,
  - the wiring from the positive terminal on the alternator (**5**) ,
  - the oil pressure sensor connector (**6**) .
- ❑ Move aside the alternator wiring.

116380

- ❑ Remove the oil filter unit coolant outlet union bolts (**6**) .
- ❑ Remove the clip (**7**) from the oil filter unit coolant inlet union hose using the tool **(Mot. 1448)**.

> Note:
>
> Prepare for the outflow of coolant.

- ❑ Disconnect the oil filter unit coolant inlet union hose.

M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

116381

❑ Remove:

- the oil filter unit bolts (**8**) ,
- the oil filter unit.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Consumables for repair:

- **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ **parts always to be replaced: Oil filter cover seal (10,05,05,10)**

parts always to be replaced: Intercooler air outlet pipe (10,09,04,03)

parts always to be replaced: coolant-engine oil heat exchanger coolant outlet union seal (10,06, 01,20)

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** to clean and degrease:

- the cylinder block gasket face,
- the oil filter unit seal housings and gasket faces,
- the oil filter unit coolant outlet union gasket face.

1 - If reusing the oil filter unit

❑ **parts always to be replaced: Oil filter cartridge (10,05,05,04)**

2 - If replacing the oil filter unit

❑ Remove the oil pressure sensor from the old oil filter unit (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) .

❑ Refit the oil pressure sensor on the new oil filter unit (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) .

II - REFITTING OPERATION FOR PART CONCERNED

116381

❑ Refit:

- the oil filter unit,
- the oil filter unit bolts.

❑ Tighten to torque and in order:

- the **oil filter unit bolts (initial torque) (5 N.m)** (**2**) and (**4**) ,
- the **oil filter unit bolts (25 N.m)**.

III - FINAL OPERATION

❑ Connect the oil filter unit coolant inlet union hose.

M9R

- ❑ Fit a new seal on the oil filter unit coolant outlet union.
- ❑ Refit the oil filter unit coolant outlet union bolts on the oil filter.
- ❑ Fit the clip for the oil filter unit coolant inlet union hose using the tool **(Mot. 1448)**.
- ❑ Tighten the oil filter unit coolant outlet union bolts.
- ❑ Fit the alternator electrical wiring.
- ❑ Connect:
  - the oil pressure sensor connector,
  - the alternator connector.
- ❑ Fit the alternator positive terminal wiring.
- ❑ Torque tighten the **alternator positive terminal nut (8 N.m)**.
- ❑ Fit the new intercooler air outlet pipe.
- ❑ Connect the intercooler air outlet pipe at the intercooler end.

> Note:
>
> Check that the pin is in the locked position.

- ❑ Connect the intercooler air outlet pipe on the side of the damper valve.
- ❑ Torque tighten the **intercooler air outlet pipe clip on the damper valve side (5.5 N.m)**.

M9R, and 742 or 744 or 746 or 748 or 754

- ❑ Move aside the turbocharging pressure sensor.

- ❑ Refit:
  - the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
  - the engine undertray,
  - the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Adjust the engine oil level (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).
- ❑ Fill and bleed the engine cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

F4R

Special tooling required	
Mot. 990-03	Tool for fitting crankshaft seals (timing end).

Tightening torques ▽	
engine tie-bar bolt on the subframe	**115 Nm**
engine tie-bar bolt on the sump	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray.
- the engine undertray bolts,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

123177

❑ Remove:

- the bolt (**1**) from the engine tie-bar on the sump,
- the engine tie-bar bolt (**2**) from the subframe,
- the engine tie-bar.

124125

❑ Remove:

- the nuts (**3**) from the exhaust clamp,
- the exhaust bracket gasket,

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

120219

❑ Remove the crankshaft timing sprocket (**4**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the crankshaft seal on the timing end.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the crankshaft seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the crankshaft joint face,

- the cylinder block gasket face.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

120220

❑ Refit the new crankshaft seal on the timing end using the **(Mot. 990-03)**.

III - FINAL OPERATION.

❑ Refit:

- the crankshaft timing sprocket,

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,

- the new exhaust bracket seal,

- the exhaust flange nuts,

- the engine tie-bar,

- the engine tie-bar bolt from the subframe,

- the engine tie-bar bolt on the sump.

❑ Torque tighten:

- the **engine tie-bar bolt on the subframe (115 Nm)**,

- the **engine tie-bar bolt on the sump (190 Nm)**.

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,

F4R

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

M4R

Special tooling required	
Mot. 1790	Crankshaft seal fitting tool (timing end)

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

118586

❑ Remove the crankshaft seal on the timing end (**1**) with a screwdriver.

> Note:
>
> Mark the crankshaft seal's direction of fitting.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the crankshaft seal on the timing end.

❑ Clean and degrease the crankshaft joint face with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

M4R

II - REFITTING OPERATION FOR PART CONCERNED

118584

❑ Fit the new crankshaft seal on the timing end (**2**) on the **(Mot. 1790)** (**3**) .

118585

❑ Position the **(Mot. 1790)** (**3**) fitted with a crankshaft seal on the timing end.

> Note:
>
> Align the neck ***(4)*** of the **(Mot. 1790)** with the crankshaft collet.

❑ Refit the old crankshaft accessories pulley bolt (**5**) .

❑ Tighten the crankshaft accessories pulley bolt until the mating face of the **(Mot. 1790)** comes into contact with the timing cover.

❑ Remove:

- the crankshaft accessories pulley bolt,
- the **(Mot. 1790)**.

❑ Check that the crankshaft seal on the timing end is correctly fitted.

III - FINAL OPERATION.

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),

M4R

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

M9R

Tightening torques ▽	
crankshaft seal	**47 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

II - REMOVAL OPERATION FOR PART CONCERNED

113659

❑ Remove the crankshaft seal (**1**) using the tool supplied in the spare parts kit for the new seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the crankshaft seal on the timing end.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Use surface cleaner (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the mating face of the crankshaft seal.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

M9R

113656

113661

❑ Position the lugs (**2**) of the new crankshaft seal opposite the timing cover notches (**3**) .

113662

❑ Engage the new crankshaft seal lugs in the timing cover notches.

❑ Manually tighten the crankshaft seal using the tool supplied in the spare parts kit for the new crankshaft seal.

113663

❑ Torque tighten the **crankshaft seal (47 Nm)** using the (**4**) supplied in the spare parts kit for the new crankshaft seal.

M9R

III - FINAL OPERATION.

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

K4M

Special tooling required	
Mot. 1385	Tool for fitting the crankshaft seal, timing end (35 x 47 x 7).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

130542

❑ Remove the crankshaft seal (**1**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the crankshaft seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the crankshaft seal mating face,
- the cylinder block seal housing.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

K4M

II - REFITTING OPERATION FOR PART CONCERNED

14523

❑ Refit a new crankshaft seal using the **(Mot. 1385)** (**2**) .

III - FINAL OPERATION.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

V4Y

Special tooling required	
Mot. 1706	Tool for fitting crankshaft seal (timing end)

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the timing end crankshaft seal using a screwdriver.

> Note:
>
> Mark the crankshaft seal direction of fitting.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft seal on timing end (10,03,03,04)**.

❑ Clean and degrease the crankshaft mating face with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

> **WARNING**
>
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

120118

❑ Position the seal (**1**) on the **(Mot. 1706)** (**2**) .

V4Y

120120

- Position the **(Mot. 1706)** with the seal.
- Tighten the **(Mot. 1706)** using the crankshaft accessories pulley bolt (**3**) .
- Bring the **(Mot. 1706)** into contact with the engine.
- Remove:
  - the crankshaft accessories pulley bolt,
  - the **(Mot. 1706)**.
- Check that the crankshaft seal is correctly positioned.

III - FINAL OPERATION

- Refit:
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
  - the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Special tooling required	
Mot. 1577	Lip seal extractor (shaft diameter 28 mm to 42 mm).
Mot. 1912	Adapter for seal extractor Mot.1577 (shaft diameter 36 mm to 60 mm)
Mot. 1905	Crankshaft seal fitting tool (timing end)

Tightening torques ▽	
right-hand engine tie-bar bolts	**180 N.m**
left-hand engine tie-bar bolts	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray.

133896

❑ Remove:

- the bolts (**1**) of the lower engine tie-bars,
- the left-hand lower engine tie-bar (**2**) ,
- the right-hand lower engine tie-bar (**3**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

137931

❑ Remove the end piece (**4**) of the tool **(Mot. 1577)** from the extractor.

137932

❑ Remove the circlips **(Mot. 1577)** from the tool (**5**) using **circlip pliers**.

137933

❑ Remove the shaft (**6**) from the tool **(Mot. 1577)**.

137934

❑ Remove the cup **(Mot. 1577)** from the tool (**7**) .

V9X

137935

❑ Fit the cup (**8**) of the tool **(Mot. 1912)** on the tool **(Mot. 1577)**.

137936

❑ Fit the shaft (**9**) of the tool **(Mot. 1577)** on the tool **(Mot. 1577)**.

137937

❑ Fit the circlips (**10**) on the tool **(Mot. 1577)** using **circlip pliers**.

137938

❑ Fit the end piece (**11**) onto the tool **(Mot. 1577)**.

137939

❑ Position the claws of the tool **(Mot. 1577)** on the inner face of the seal.

137939

❑ Push on the claws following the arrows to position the tool as at (**12**) .

137939

❑ Tighten the nut (**13**) to separate the tool claws and grip the seal.

137939

❑ Extract the crankshaft seal by screwing the threaded rod (**14**) of the tool.

III - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft seal on timing end (10,03,03,04)**.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the mating face of the seal on the timing sprocket and the lower timing cover.

137928

❑ Fit the protector (**15**) equipped with the seal (**16**) on the timing sprocket.

> Note:
>
> This type of seal is extremely fragile. When handling, it is essential to grip protective piece. It is strictly forbidden to touch the seal, in order to prevent any oil leaks once the seal is fitted to the engine.

137929

❑ Fit the bell housing (**17**) of the tool **(Mot. 1905)**.

137930

❑ Position the crankshaft pulley bolt (**18**) .

❑ Tighten the crankshaft pulley bolt until the bell housing of the tool **(Mot. 1905)** comes into contact with the lower timing cover.

❑ Remove:

- the crankshaft pulley bolt,
- the **(Mot. 1905)**,
- the protector from the crankshaft seal at the timing end.

IV - FINAL OPERATION

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the right-hand engine tie-bar,
- the left-hand engine tie-bar.

V9X

133896

❑ Torque tighten:

- the **right-hand engine tie-bar bolts (180 N.m)** (**1**) ,
- the **left-hand engine tie-bar bolts (105 N.m)** (**2**) .

❑ Refit:

- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

M4R

Special tooling required	
Mot. 1791	Crankshaft seal fitting tool (flywheel end)

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray.

❑ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).

❑ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (MR 415, 31A, Front axle components),
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the clutch (see **Pressure plate - Disc: Removal - Refitting**) (MR 415, 20A, Clutch),
- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-277**) (MR 415, 20A, Clutch).

II - OPERATION FOR REMOVAL OF PART CONCERNED

124075

❑ Remove the crankshaft seal (**1**) using a screwdriver and a wooden block to avoid damaging the crankshaft mating face.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the crankshaft seal.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Clean and degrease the crankshaft joint face seal with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

M4R

II - REFITTING OPERATION FOR PART CONCERNED

118578

❑ Fit the centring device (**2**) of the **(Mot. 1791)**.

❑ Tighten the bolts (**3**) on the centring device of the **(Mot. 1791)**.

118579

❑ Fit the new crankshaft seal (**4**) on the centring device of the **(Mot. 1791)**.

118580

❑ Fit the tappet (**5**) of the **(Mot. 1791)**.

❑ Tighten the bolt (**6**) on the tappet of the **(Mot. 1791)**.

❑ Remove:

- the tappet of the **(Mot. 1791)**,
- the bolts from the centring device of the **(Mot. 1791)**,
- the centring device of the **(Mot. 1791)**.

❑ Check that the crankshaft seal on the gearbox side is correctly fitted.

III - FINAL OPERATION.

❑ Refit:

- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-277**) (MR 415, 20A, Clutch),
- the clutch (see **Pressure plate - Disc: Removal - Refitting**) (MR 415, 20A, Clutch),
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (MR 415, 31A, Front axle components),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),

M4R

- the differential output seals (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts).

❑ Fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).

❑ Refit:

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

Tightening torques ▽	
crankshaft cover bolts (initial torque)	**5 N.m**
crankshaft cover bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) .

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-277**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

114068

❑

> Note:
>
> The crankshaft seal on the gearbox side cannot be separated from the crankshaft cover.

❑ Remove:

- the crankshaft cover bolts,
- the crankshaft "seal - cover" assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
>
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the joint face of the crankshaft cover on the cylinder block,
- the crankshaft seal mating face.

❑ Always replace the crankshaft "seal - cover" assembly.

II - REFITTING OPERATION FOR PART CONCERNED

114414

❑

> Note:
>
> Touching the lip of the seal is strictly forbidden. Any contact with it will result in the lip being permanently damaged, which will cause an oil leak.

❑ Fit:

- the new « seal protector - seal - cover » assembly on the crankshaft,
- the bolts (**1**) (**M6 - 90 mm long**) to guide the crankshaft "seal - cover" assembly.

❑ Move the "seal - cover" assembly evenly by hand until it makes contact with the cylinder block.

114413

❑ Remove:

- the seal protector (**2**) ,
- the guide bolts (**3**) .

114068

❑ Pretighten in order and to torque the **crankshaft cover bolts (initial torque) (5 N.m)** (**4**) and (**7**) .

❑ Torque tighten in order the **crankshaft cover bolts (10 N.m)**.

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

III - FINAL OPERATION

❑ Refit:

- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-277**) ,
- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Fill and top up the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Special tooling required	
Mot. 991-01	Crankshaft seal fitting tool (flywheel end) (85 x 105 x 8 seal).

Equipment required
refrigerant charging station

Tightening torques ▽	
starter upper bolts	**38 Nm**
starter lower bolt	**38 Nm**
catalytic converter downstream strut nut on the cylinder block	**21 Nm**
catalytic converter upstream strut bolt on the catalytic converter	**11 Nm**
catalytic converter bracket bolt on the catalytic converter	**11 Nm**
lifting bracket bolt on the timing end	**33 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the radiator upper cover,
- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure),
- the engine cooling assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Upper front structure),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

120206

❑ Disconnect the upstream oxygen sensor connector (**1**) .

❑ Remove:

- the lifting bracket bolt on the timing end,
- the lifting bracket on the timing end,
- the heat shield clips on the bulkhead,
- the heat shield on the bulkhead.

124125

❑ Remove:

- the nuts (**2**) from the exhaust clamp,
- the exhaust harness seal,

21926

❑ Remove:

- the bolt (**3**) from the catalytic converter bracket on the catalytic converter,
- the bolt (**4**) from the upstream strut of the catalytic converter on the catalytic converter,
- the catalytic converter downstream strut bolt on the catalytic converter.

❑ Unpick the wiring (**5**) from the downstream oxygen sensor on the gearbox.

❑ Disconnect the downstream oxygen sensor connector.

❑ Remove:

- the catalytic converter nuts (**6**) ,
- the catalytic converter,
- the seal between the catalytic converter and the turbocharger.

F4R

120228

❑ Remove:

- the nuts (**7**) from the starter heat shield,
- the starter heat shield.

120231

❑ Remove:

- the nut (**8**) from the catalytic converter downstream strut on the cylinder block,
- the catalytic converter downstream strut.

21921

❑ Remove:

- the nut (**9**) from the starter excitation terminal,
- the nut (**10**) from the starter supply terminal.

❑ Move the starter electrical wiring aside.

❑ Remove:

- the starter bolts (**11**) ,
- the starter,
- the gearbox (see **Automatic gearbox: Removal - Refitting**) (MR 415, 23A, Automatic transmission),
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) (MR 415, 23A, Automatic transmission).

F4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

124127

❑ Remove the crankshaft seal on the gearbox side using a screwdriver and a wooden block to avoid damaging the crankshaft mating face.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the crankshaft seal,
- the seal between the catalytic converter and the turbocharger,
- the exhaust bracket gasket,
- the studs if they have become loose.

> **WARNING**
> All damaged heat shields must be replaced.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the crankshaft joint face,
- the cylinder block gasket face.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

21935

❑ Check that the starter centring dowel (**12**) is in place.

II - REFITTING OPERATION FOR PART CONCERNED

124128

❑ Refit the new crankshaft seal using the **(Mot. 991-01)** (**13**) .

F4R

III - FINAL OPERATION.

❏ Refit:

- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) (MR 415, 23A, Automatic transmission), (see **Automatic gearbox: Removal - Refitting**)
- the gearbox (see **Automatic gearbox: Removal - Refitting**) (MR 415, 23A, Automatic transmission),
- the starter,
- the starter bolts.

❏ Torque tighten:

- the **starter upper bolts (38 Nm)** from above the vehicle,
- the **starter lower bolt (38 Nm)** from under the vehicle.

❏ Fit the starter wiring.

❏ Refit:

- the nut on the starter supply terminal,
- the nut on the starter excitation terminal.

❏ Refit:

- the catalytic converter downstream strut,
- the catalytic converter downstream strut nut.

❏ Torque tighten the **catalytic converter downstream strut nut on the cylinder block (21 Nm)**.

❏ Refit:

- the heat shield to the starter,
- the starter heat shield nuts,
- the new seal between the turbocharger and the catalytic converter,
- the catalytic converter,
- the catalytic converter nuts.

❏ Tighten the catalytic converter nuts.

❏ Connect the downstream oxygen sensor connector.

❏ Clip the downstream oxygen sensor wiring onto the gearbox.

❏ Refit:

- the catalytic converter downstream strut bolt on the catalytic converter,
- the catalytic converter upstream strut bolt on the catalytic converter,
- the catalytic converter bracket bolt on the catalytic converter.

❏ Torque tighten:

- the **catalytic converter upstream strut bolt on the catalytic converter (11 Nm)**,
- the **catalytic converter bracket bolt on the catalytic converter (11 Nm)**.

❏ Refit:

- the new exhaust bracket seal,
- the exhaust flange nuts,
- the heat shield on the bulkhead,
- the heat shield clips on the bulkhead,
- the lifting bracket on the timing end,
- the lifting bracket bolt on the timing end.

❏ Torque tighten the **lifting bracket bolt on the timing end (33 Nm)**.

❏ Connect the upstream oxygen sensor connector.

❏ Refit:

- the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Upper front structure).
- the engine cooling assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure),
- the radiator upper cover,
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),

F4R

- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

❏ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❏ Refit the engine cover.

M9R, and 805 or 809 or 845 or 849

Tightening torques ▽	
crankshaft cover bolts (initial torque)	**5 N.m**
crankshaft cover bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the automatic transmission (see **Automatic gearbox oil: Draining - Filling**) (23A, Automatic transmission),
- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the automatic transmission (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission),
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) .

M9R, and 805 or 809 or 845 or 849

II - OPERATION FOR REMOVAL OF PART CONCERNED

114068

❑

> Note:
>
> The crankshaft seal on the gearbox side cannot be separated from the crankshaft cover.

❑ Remove:

- the crankshaft cover bolts,
- the crankshaft "seal - cover" assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the joint face of the crankshaft cover on the cylinder block,
- the crankshaft seal mating face.

❑ Always replace the crankshaft "seal - cover" assembly.

II - REFITTING OPERATION FOR PART CONCERNED

114414

❑

> Note:
>
> Touching the lip of the seal is strictly forbidden. Any contact with it will result in the lip being permanently damaged, which will cause an oil leak.

❑ Fit:

- the "seal protector - seal - new cover" assembly on the crankshaft,
- the bolts (**1**) (**M6** - **90 mm** long) to guide the crankshaft "seal - cover" assembly.

❑ Move the "seal - cover" assembly evenly by hand until it makes contact with the cylinder block.

M9R, and 805 or 809 or 845 or 849

114413

❑ Remove:

- the seal protector (**2**) ,
- the guide bolts (**3**) .

114068

❑ Pretighten to torque and in order the **crankshaft cover bolts (initial torque) (5 N.m)**.

❑ Torque tighten in order the **crankshaft cover bolts (10 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,
- the automatic transmission (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission),
- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,

M9R, and 805 or 809 or 845 or 849

- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refill:

- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the automatic transmission (see **Automatic gearbox oil: Draining - Filling**) (23A, Automatic transmission).

❑ Refit:

- the engine undertray,
- the engine cover.

K4M

Special tooling required	
Mot. 1129-01	Tool for fitting the crankshaft seal, flywheel end (80 x 100 x 8 seal).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray.

❑ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-277**) (20A, Clutch).

II - OPERATION FOR REMOVAL OF PART CONCERNED

131093

❑ Remove the crankshaft seal (**1**) using a screwdriver.

> Note:
>
> Take care not to damage the crankshaft mating face.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the crankshaft seal.

K4M

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the crankshaft seal mating face,
- the cylinder block seal housing.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

131094

❑ Refit the crankshaft seal using the **(Mot. 1129-01)** (**2**) .

III - FINAL OPERATION.

❑ Refit:

- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-277**) (20A, Clutch),
- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the engine undertray,
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the engine cover.

V4Y

Special tooling required	
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
bolts of the "crankshaft seal support on the gearbox side - crankshaft seal on the gearbox side" assembly	**9 N.m**
central nut of the left-hand suspended engine mounting rubber pad	**62 N.m**

IMPORTANT
Wear protective gloves during the operation.

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

Note:

The crankshaft seal support on the gearbox side cannot be separated from the crankshaft seal on the gearbox side.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❏ Drain:

- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the "cooling radiator - condenser - fan" assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),

V4Y

- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) .

22860

❑ Position the pads of the **(Mot. 1390)** under areas (**A**) .

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

134185

❑ Remove the central nut (**1**) from the rubber pad on the left-hand suspended engine mounting.

❑ Use a copper hammer to strike the threaded rod of the left-hand suspended engine mounting to separate the engine from the body.

> Note:
>
> The pads of the **(Mot. 1390)** should almost be in contact with the engine; when struck with the copper hammer, the engine comes to rest on the support.

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Fit the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Remove:

- the accessories belt of the air conditioning compressor (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

V4Y

- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,
- the cylinder block base plate (see **Cylinder block base plate: Removal - Refitting**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

103181

❑ Remove:

- the bolts on the support of the crankshaft seal on the gearbox side,
- the "crankshaft seal support on the gearbox side - crankshaft seal on the gearbox side" assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the "crankshaft seal support on the gearbox side - crankshaft seal on the gearbox side" assembly.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the crankshaft seal support on the gearbox side,
- of the cylinder block.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** part number **77 01 405 943**.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Use a **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the crankshaft seal support on the gearbox side,
- of the cylinder block,
- the crankshaft seal mating face.

V4Y

103151

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **2.5 to 3.5 mm** on the crankshaft seal support on the gearbox side.

II - REFITTING OPERATION FOR PART CONCERNED

103181

❑ Refit a new "crankshaft seal support on the gearbox side - crankshaft seal on the gearbox side" assembly.

❑ Torque tighten the **bolts of the "crankshaft seal support on the gearbox side - crankshaft seal on the gearbox side" assembly (9 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the cylinder block base plate (see **Cylinder block base plate: Removal - Refitting**) ,
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the accessories belt of the air conditioning compressor (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the **component support** (see **Engine support equipment: Use**) .

❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Remove the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Refit:

- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the left-hand suspended engine mounting rubber pad central nut,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Torque tighten the **central nut of the left-hand suspended engine mounting rubber pad (62 N.m)**.

❑ Remove the tool **(Mot. 1390)** from the "engine - gearbox" assembly.

❑ Refit:

- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) ,

V4Y

- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the "cooling radiator - condenser - fan" assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) .

❑ Refill:

- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
crankshaft cover bolts (initial torque)	**5 Nm**
crankshaft cover bolts	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

> **IMPORTANT**
> To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

> **WARNING**
>
> It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:
>
> - blocking the strainer,
> - raising the oil level above maximum, with a risk of engine racing.

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the air conditioning circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
- the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the additional radiator (see **Additional radiator: Removal - Refitting**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the pipe between the reservoir and the steering box (see **Power-assisted steering pipes: Removal - Refitting**) (36B, Power-assisted steering),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) ,
- the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,

- the « intermediate pipe - compressor » connecting pipe (see **Compressor - intermediate pipe connecting pipe: Removal - Refitting**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Position the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Remove the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

135626

❑

> Note:
>
> The crankshaft seal on the gearbox side cannot be separated from the crankshaft cover.

❑ Remove:

- the crankshaft cover bolts (**1**) ,
- the « seal - crankshaft cover » assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the joint face of the crankshaft cover on the cylinder block,
- the crankshaft seal mating face.

❑ **parts always to be replaced: Crankshaft seal on gearbox end (10,03,03,05)**.

V9X

II - REFITTING OPERATION FOR PART CONCERNED

135729

❑

> Note:
>
> Touching the lip of the seal is strictly forbidden. Any contact with it will result in the lip being permanently damaged, which will cause an oil leak.

❑ Fit:

- the new « seal protector - seal - cover » assembly (**2**) on the crankshaft,
- the bolts (**3**) (**M6** - **90 mm long**) to guide the crankshaft "seal - cover" assembly.

❑ Move the "seal - cover" assembly evenly (**4**) by hand until it makes contact with the cylinder block.

135728

❑ Remove:

- the seal protector (**5**) ,
- the guide bolts .

135626

❑ Pretighten to torque and in order the **crankshaft cover bolts (initial torque) (5 Nm)**.

❑ Torque tighten in order the **crankshaft cover bolts (12 N.m)**.

V9X

III - FINAL OPERATION

❏ Refit the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) .

❏ Remove the engine from **component support** (see **Engine support equipment: Use**) .

❏ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❏ Refit:

- Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the « intermediate pipe - compressor » connecting pipe (see **Compressor - intermediate pipe connecting pipe: Removal - Refitting**) ,
- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,
- the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) ,
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the pipe between the reservoir and the steering box (see **Power-assisted steering pipes: Removal - Refitting**) (36B, Power-assisted steering),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the additional radiator (see **Additional radiator: Removal - Refitting**) ,
- the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Refill:

- and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the air conditioning circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❏ Check that there are no leaks using the electronic sensor (see **Refrigerant circuit: Check**) (62A, Air conditioning).

❏ Check that the air conditioning is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).

❏ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❏ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

V4Y

Special tooling required	
Mot. 1716	Removes housing with silicone seals.

Tightening torques ▽	
sump bolts	**9 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

22307

❑ Remove the bolts (**1**) from the lower cover.

❑ Detach the sump using the **(Mot. 1716)**.

❑ Remove the sump.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Degrease and clean the joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

101397

❑ Following the drawing, apply a bead (**2**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), of a thickness between **4.5** and **5.5 mm**.

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

V4Y

II - REFITTING OPERATION FOR PART CONCERNED

22307

- ❑ Refit the sump.
- ❑ Torque tighten in order the **sump bolts (9 N.m)**.

III - FINAL OPERATION

- ❑ Fill up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .
- ❑ Refit the engine undertray.

M4R

Special tooling required	
Mot. 1716	Removes housing with silicone seals.

Tightening torques ▽	
sump bolts	**10 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

115241

❑ Remove the sump bolts in order.

115038

❑ Detach the sump using the **(Mot. 1716)**.

❑ Remove the sump.

> Note:
>
> Note the quantity of oil in the sump.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Apply **SUPER CLEANER FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to the parts to be cleaned.

> **IMPORTANT**
>
> Wear latex gloves during the operation.

❑ Leave for approximately ten minutes.

❑ Remove the residue using a wooden spatula.

❑ Finish cleaning the parts with an **ABRASIVE PAD**.

❑ Degrease and clean the joint faces with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

M4R

❏ Check that the sump is not:

- scratched,
- deformed.

If this is the case, replace the sump.

❏ Check that the base plate is not scratched.

116046

❏ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) with a diameter of approximately **5 mm** at a distance of approximately **8 mm** from the inner edge of the sump to ensure correct sealing.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Fit the lower cover.

115241

❏ Manually tighten the sump bolts until they make contact.

❏ Tighten to torque and in order the **sump bolts (10 Nm)**.

III - FINAL OPERATION.

❏ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

F4R

Tightening torques ▽	
sump bolts on the gearbox	**44 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

116821

❑

> Note:
> Prepare for the engine oil to drain out.

❑ Remove:

- the sump bolts (**1**) on the gearbox,
- the sump bolts from the cylinder block,
- the lower cover,
- the sump seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the sump joint face if it is to be reused,
- the cylinder block gasket face.

> **WARNING**
> Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Always replace the sump gasket.

15159

❑ Apply a bead of **MASTIXO** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products):

- at (**A**) each side of bearing no.1,
- at (**B**) at the joint between the cylinder block and crankshaft closure panel.

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new sump gasket,
- the lower cover,
- the sump bolts on the cylinder block,
- the sump bolts on the gearbox.

15195

❑ Torque tighten and in order:

- **sump bolts (8), (15), (4), (19), (11) and (12) (18 Nm)**,
- **sump bolts (10, (13), (9), (14), (8), (15), (7), (16), (6), (17), (5), (18), (3), (20), (2), (21), (1) and (22) (15 Nm)**,
- the **sump bolts on the gearbox (44 Nm)**.

III - FINAL OPERATION.

❑ Fill up the engine oil, observing the quantity recommended by the manufacturer (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Check the oil level using the dipstick.

❑ Adjust the engine oil level if necessary.

M9R

Special tooling required	
Mot. 1716	Removes housing with silicone seals.

Tightening torques ▽	
sump bolts (initial torque)	**5 Nm**
sump bolts	**16 Nm**

IMPORTANT
Wear goggles with side protectors for this operation.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123704

❑ Remove the sump bolts (**1**) .

114263

❑ Cut the silicone seal on the sump using the **(Mot. 1716)** from (**A**) to (**B**) .

M9R

114264

❑ Cut the rest of the silicone seal by removing the sump.

> Note:
>
> Gradually detach the sump with small alternating movements to prevent damaging the sump.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑

> **WARNING**
>
> Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

> **WARNING**
>
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and a wooden spatula to clean the joint faces:

- of the sump,

- of the cylinder block.

114410

❑ Apply a bead of **SILICONE ADHESIVE SEAL** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) with a diameter of **5 mm ± 2 mm** to the sump in order to provide a good seal.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

123704

- ❑ Refit the lower cover.
- ❑ Pre-tighten in order and to torque the **sump bolts (initial torque) (5 Nm)**.
- ❑ Torque tighten in order the **sump bolts (16 Nm)**.

III - FINAL OPERATION.

- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts.
- ❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

K9K

Tightening torques ▽	
sump bolts on the gear-box	**44 N.m**
sump bolts on the cylin-der block	**14 N.m**
lower engine tie-bar bolts	**180 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

123838

❑ Remove:

- the bolts (**1**) from the front right-hand wheel drive-shaft relay bearing,
- the front right-hand wheel driveshaft relay bearing.

123832

❑ Remove the lower bolt (**2**) from the multifunction support.

K9K, and 780

123815

❑ Remove:

- the catalytic converter upstream strut bolts (**3**) ,
- the catalytic converter upstream strut.

K9K

❑ Unclip the rail protector drain pipe from:

- the gearbox,
- the sump.

❑ Move the rail protector drain pipe away from the sump.

1 - If the sump is to be reused

123834

❑ Disconnect the connector (**4**) from the oil level sensor.

123787

❑ Remove:

- the bolts (**5**) from the lower engine tie-bar,
- the lower engine tie-bar.

2 - If replacing the sump

❑ Remove:

- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED

109153

20171

❑ Remove:

- the gearbox sump bolts (**6**) ,
- the cylinder block sump bolts (**7**) ,
- the sump,
- the sump seal.

Note:

If the sump cannot be extracted because it is in contact with the oil pump strainer, do not force the removal of the sump as this may damage the oil splash plate.

Loosen the oil pump bolts by a few turns (the tip of your finger should pass between the bolt head and the oil pump casing) using 10 mm and 13 mm open-jawed spanners and while tilting the sump towards the front of the vehicle.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the oil pump strainer with a cloth.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING

The joint faces must be clean, dry and free from grease (avoid finger marks).

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Clean the cylinder block gasket face using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **GREY ABRASIVE PADS** :

- apply the product to the joint face,
- wait for about ten minutes to dissolve the part of the seal which remains attached,
- remove the residue with a wooden spatula,
- use **GREY ABRASIVE PADS**.

K9K

❑ Degrease the joint face using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS**.

❑ **parts always to be replaced: engine oil sump seal (10,03,01,09)**

20166

20167

❑ Apply:

- two beads (**8**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **5 mm** and a length of **12 mm**,
- four drops (**9**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **5 mm**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit:

- a new sump seal to the sump,
- the sump fitted with its new seal.

> Note:
>
> If the oil pump was loosened beforehand in order to extract the sump, position the sump in order to pass the oil pump strainer into the oil splash plate of the sump.
>
> Position a component jack to support the sump.
>
> Tilt the sump towards the front of the vehicle, in order to facilitate access to the oil pump bolts.
>
> Torque tighten the oil pump bolts (**25 N.m**) using the small torque wrench **77 11 226 888**.
>
> Fit the sump and then follow the following instructions.

> Note:
>
> Before pressing the sump on the cylinder block, check that the sump seal is still in place and that it has not come out of the grooves on the sides.

❑ Fit without tightening:

- the bolts from the sump on the gearbox,
- the sump bolts on the cylinder block.

❑ Tighten to torque the **sump bolts on the gearbox (44 N.m)**.

K9K

20171

❑ Torque tighten in order the **sump bolts on the cylinder block (14 N.m)**.

1 - If replacing the sump

❑ Refit:

- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

2 - If the sump is to be reused

❑ Refit the lower engine tie-bar.

❑ Torque tighten the **lower engine tie-bar bolts (180 N.m)**.

❑ Connect the connector to the oil level sensor.

III - FINAL OPERATION

❑ Clip the rail protector drain pipe onto:

- the sump,
- the gearbox.

K9K, and 780

❑ Refit the catalytic converter upstream strut.

❑ Refit the relay bearing of the front right-hand wheel driveshaft.

❑ Fill the engine with oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Refit:

- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K4M

Tightening torques ▽	
sump bolts	**14 N.m**
sump bolts on the gear-box	**44 N.m**
sump bolt on the multi-function support	**21 N.m**
relay bearing bolts on the sump	**44 N.m**
right-hand transmission bracket bolt on the relay bearing	**21 N.m**

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

128800

❑ Remove:

- the right-hand driveshaft bracket bolt (**1**) on the relay bearing,
- the bolts (**2**) from the relay bearing,
- the relay bearing,
- the sump bolts from the multifunction support.

K4M

II - OPERATION FOR REMOVAL OF PART CONCERNED

115584

❑

Note:

Prepare for the engine oil to drain out.

❑ Remove:

- the sump bolts (**3**) on the gearbox,
- the cylinder block sump bolts,
- the sump,
- the sump seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the sump joint face if it is to be re-used,
- the cylinder block gasket face.

WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING

The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Alwyas replace the sump gasket.

20167

20166

❑ Apply using **MASTIXO** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products):

- a bead at (**A**) ,
- a drop at (**B**) at the joint between the cylinder block and crankshaft closure panel.

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new seal on the sump,
- the sump.

20171

❑ Tighten to torque and in order:

- the **sump bolts (14 N.m)**,
- the **sump bolts on the gearbox (44 N.m)**,
- the **sump bolt on the multifunction support (21 N.m)**.

III - FINAL OPERATION.

❑ Refit the relay bearing.

❑ Tighten to torque:

- the **relay bearing bolts on the sump (44 N.m)**,
- the **right-hand transmission bracket bolt on the relay bearing (21 N.m)**.

K4M

- Refit:
  - the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) .
- Fill up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .
- Refit the engine undertray.

V9X

Special tooling required	
Mot. 1431	Flywheel locking tool.

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
sump bolts	**32 N.m**
oil pump pinion bolts	**10 N.m**
bolts of the coolant - oil heat exchanger support	**32 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the air conditioning circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
- the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the additional radiator (see **Additional radiator: Removal - Refitting**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the pipe between the reservoir and the steering box (see **Power-assisted steering pipes: Removal - Refitting**) (36B, Power-assisted steering),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),

- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),

- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) ,

- the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,

- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,

- the « intermediate pipe - compressor » connecting pipe (see **Compressor - intermediate pipe connecting pipe: Removal - Refitting**) ,

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,

- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,

- the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Position the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,

- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering).

135623

❑

> Note:
>
> Fit the flywheel locking tool **(Mot. 1431)** using a spacer of approximately **18 mm**.

❑ Fit the flywheel locking tool **(Mot. 1431)** (**1**) .

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,

- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,

- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,

- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,

- the coolant-oil heat exchanger (see **10A**, **Engine and cylinder block assembly**, **Oil-coolant heat exchanger: Removal - Refitting**, page **10A-214**) ,

- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,

- the crankshaft seal on the gearbox side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal, gearbox end: Removal - Refitting**, page **10A-153**) .

135606

❑ Remove:

- the bolts (**2**) of the coolant - oil heat exchanger support,
- the coolant - oil heat exchanger support,
- the seal of the coolant - oil heat exchanger support.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134883

❑ Remove:

- the bolts (**3**) on the lower timing cover,
- the lower timing cover,
- the lower timing cover seal.

136258

❑ Remove:

- the oil pump pinion bolts (**4**) ,
- the pinion of the oil pump chain.

V9X

138134

❑ Remove:

- the bolts (**5**) from the sump,
- the sump,
- the sump seals (**6**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: engine oil sump seal (10,03,01,09)**

❑ Always replace:

- the lower timing cover seal,
- the seal of the coolant - oil heat exchanger support.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the sump,
- of the cylinder block,
- of the lower timing cover.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint face of the sump on the cylinder block,
- the joint faces of the lower timing cover on the cylinder block,
- the sump,
- the lower timing cover.

If replacing the sump

❑ Remove from the used sump:

- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the oil pump (see **10A**, **Engine and cylinder block assembly**, **Oil pump: Removal - Refitting**, page **10A-245**) .

❑ Refit on the new sump:

- the oil pump (see **10A**, **Engine and cylinder block assembly**, **Oil pump: Removal - Refitting**, page **10A-245**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) .

V9X

II - REFITTING OPERATION FOR PART CONCERNED

138669

- ❑ Refit:
  - new sump seals.
  - the sump.
- ❑ Torque tighten in order the **sump bolts (32 N.m)**.
- ❑ Refit:
  - the oil pump pinion on the oil pump chain,
  - the « pinion - chain » assembly on the oil pump shaft.
- ❑ Torque tighten the **oil pump pinion bolts (10 N.m)**.
- ❑ Refit a new lower timing cover seal.

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

V9X

138126

❑ Apply drops of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) at (**7**) on the new the lower timing cover seal.

134883

❑ Fit the lower timing cover.

❑ Fit the lower timing cover bolts without tightening them.

❑ Tighten the lower timing cover bolts in the correct order.

III - FINAL OPERATION

❑ Refit:

- a new seal of the coolant - oil heat exchanger support,
- the coolant - oil heat exchanger support.

135606

❑ Torque tighten in order the **bolts of the coolant - oil heat exchanger support (32 N.m)**.

❑ Refit:

- the crankshaft seal on the gearbox side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal, gearbox end: Removal - Refitting**, page **10A-153**) ,
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,
- the coolant-oil heat exchanger (see **10A**, **Engine and cylinder block assembly**, **Oil-coolant heat exchanger: Removal - Refitting**, page **10A-214**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

V9X

- ❑ Fit the flywheel locking tool **(Mot. 1431)** on the drive plate.
- ❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .
- ❑ Remove the flywheel locking tool **(Mot. 1431)**.
- ❑ Refit:
  - the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),
  - the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .
- ❑ Remove the engine from **component support** (see **Engine support equipment: Use**) .
- ❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).
- ❑ Refit:
  - Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the « intermediate pipe - compressor » connecting pipe (see **Compressor - intermediate pipe connecting pipe: Removal - Refitting**) ,
  - the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,
  - the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
  - the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) ,
  - the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
  - the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
  - the pipe between the reservoir and the steering box (see **Power-assisted steering pipes: Removal - Refitting**) (36B, Power-assisted steering),
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
  - the additional radiator (see **Additional radiator: Removal - Refitting**) ,
  - the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
  - the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
  - the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
  - the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
  - the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Refill:
  - the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**)
  - and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - the air conditioning circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- ❑ Check that there are no leaks using the electronic sensor (see **Refrigerant circuit: Check**) (62A, Air conditioning).
- ❑ Check that the air conditioning is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).

V9X

❏ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❏ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

Conrod bearing shell: Removal - Refitting

K9K

Special tooling required	
Mot. 1914	Tool for fitting G9 con rod bearing shells
Mot. 1920	Tool for fitting F9 / K9 con rod bearing shells

Equipment required
component jack
indelible pencil
torque wrench
Diagnostic tool

Tightening torques ▽	
con rod cap bolts	**20 N.m + 45° ± 6°**
oil pump bolts	**25 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Vehicle: Precautions for the repair**) .

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the engine undertray.

❑ Drain the oil from the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

❑ Remove the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

123838

❑ Remove the relay bearing of the front right-hand wheel driveshaft.

K9K

123834

❑ Disconnect the oil level sensor connector (if equipped) (**2**) .

112328

❑ Remove the catalytic converter upstream stay (**3**) .

140940

❑

WARNING

Failure to observe the following procedure may damage the oil pump strainer.

Undo the bolts of the engine oil sump.

❑ Fit a **component jack** to support the engine oil sump.

❑ Remove the bolts from the engine oil sump.

❑ Detach the engine oil sump, while supporting it with the **component jack**.

K9K

140917

- Tilt the engine oil sump forwards in order to access the oil pump bolts.
- Partially loosen the oil pump bolts **3 mm** to **5 mm**.
- Detach the oil pump from its position in order to remove the engine oil sump.
- Remove:
  - the engine oil sump,
  - the engine oil sump seal,
  - the oil pump.

II - REMOVAL OPERATION FOR THE CON ROD BEARING SHELLS NO.2

139306

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the big ends.
- Mark the position of the con rod cap in relation to the con rod body using a **indelible pencil**.
- Position the crankshaft at Top Dead Centre.

K9K

139300

❑ Remove:

- the con rod bolts,
- the con rod cap,
- the lower con rod bearing shell.

> Note:
>
> If reusing the con rod bearing shells, mark the position of the lower con rod bearing shell in relation to the con rod cap.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - products) to clean the bearing mating face on the con rod cap.

139310

❑ Fit the tie rod of the tool **(Mot. 1914)** on the con rod body.

❑ Push the con rod upwards to release the con rod from the crankpin.

❑ Turn the crankshaft **90°** clockwise (timing end).

K9K

139315

❑

WARNING

Failure to observe the following procedure may damage the piston base cooling jets.

Pull the con rod - piston assembly using the tie rod of the tool **(Mot. 1914)**, taking care not to allow the piston to touch the piston base cooling jets.

❑ Remove the upper con rod bearing shell.

Note:

If reusing the con rod bearing shells, mark the position of the upper con rod bearing shell in relation to the con rod body.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - products) to clean the bearing mating face on the con rod body.

REFITTING

I - REFITTING OPERATION FOR THE CON ROD BEARING SHELLS ON CYLINDER NO.2

❑ **parts always to be replaced: con rod cap bolts (10,03,02,10)**

❑

Note:

Always replace con rod bearing shells with a width of **20 mm** by con rod bearing shells with a width of **18 mm**.

If the set of con rod bearing shells only includes con rod bearing shells which are **18mm** wide, only use the head of the tool **(Mot. 1920)** with the marking " **K9K SUP** ".

Fit the head of the tool **(Mot. 1920)** with the marking " **K9K INF** " on the threaded sleeve of the tool **(Mot. 1914)**.

❑ Position the lower con rod bearing shell on the tool **(Mot. 1920)**.

K9K

133814

133815

❑

Note:

The contact surface between the bearing shell and the con rod must be dry and free of grease.

Fit the lower con rod bearing shell on the con rod cap using the tool **(Mot. 1920)**.

❑ Position the lower con rod bearing shell so that the ends do not protrude beyond the con rod cap.

❑ Lubricate the surface of the con rod bearing shell (crankshaft end) using new engine oil.

139318

❑ Remove the tool head with the marking " **K9K INF** " and fit the head with the marking " **K9K SUP** ".

❑ Position the upper con rod bearing shell on the tool **(Mot. 1920)**.

❑ Fit the upper con rod bearing shell on the con rod body using the tool **(Mot. 1920)**.

❑ Position the upper con rod bearing shell so that the ends do not protrude beyond the con rod body.

❑ Lubricate the surface of the con rod bearing shell (crankshaft end) using new engine oil.

❑ Push the con rod - piston assembly back up into place.

❑ Turn the crankshaft **90°** anticlockwise.

❑ Lubricate the crankpin with new engine oil.

❑ Pull the con rod - piston assembly to position the con rod on the crankshaft.

❑

Note:

Before refitting the con rod cap, ensure that there are no impurities (filings, cloth lint, etc.) on the con rod body or cap surfaces.

Refit:

- the con rod cap according to the mark made during removal,
- the new con rod bolts.

❑ Torque and angle tighten the **con rod cap bolts (20 N.m + 45° ± 6°)**.

K9K

II - REMOVAL - REFITTING OPERATIONS FOR THE CON ROD BEARING SHELLS ON CYLINDERS NO.3, 1 AND 4

❑ Perform the same removal - refitting operations as for the con rod bearing shells on cylinder no. 2.

> Note:
>
> For removing and refitting the con rod bearing shells on cylinders no. 1 and no. 4, position the pistons at Bottom Dead Centre before perfoming the same removal and refitting operations as for the con rod bearing shells on cylinder no. 2.

III - FINAL OPERATION

❑ **parts always to be replaced: engine oil sump seal (10,03,01,09)**

parts always to be replaced: Oil filter (10,05,05, 03)

parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)

> **WARNING**
>
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
>
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use a wooden spatula or an **ABRASIVE PAD** to clean the joint face of the cylinder block and engine oil sump.

❑ Refit the oil pump.

❑ Fit without tightening the oil pump bolts, while keeping a clearance of **3 mm** to **5 mm**.

❑ Fit the engine oil sump seal.

> **WARNING**
>
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

20166

20167

❑ Apply **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) :

- four beads with a diameter of **5 mm** at (**A**) ,
- two drops with a diameter of **5 mm** at (**B**) .

❑ Fit the engine oil sump while supporting it using a **component jack**.

140918

- ❑ Tilt the engine oil sump forwards in order to access the oil pump bolts.
- ❑ Torque tighten the **oil pump bolts (25 N.m)** using the **torque wrench** PROSTEEL, part number **77 11 226 888** starting with the **13 mm** bolt.
- ❑

> Note:
>
> Check that the engine oil sump seal is definitely in place before tightening the engine oil sump bolts.

- ❑ Refit the engine oil sump bolts.
- ❑ Torque tighten in order the engine oil sump bolts (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .
- ❑ Refit the catalytic converter upstream stay (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .
- ❑ Connect the connector to the oil level sensor.
- ❑ Refit the relay bearing of the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) .
- ❑ Refit the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

123824

- ❑ Disconnect the crankshaft position sensor (**4**) to prevent the engine from starting.
- ❑ Refit the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**)
- ❑ Fill up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .
- ❑ Start the engine using the starter until the engine oil warning light goes out.
- ❑ Connect the crankshaft position sensor.
- ❑ Refit the engine undertray.
- ❑ Clear the present faults using the **Diagnostic tool**.

M9R

- The oil-water heat exchanger is not sold separately in the Parts Department; to replace it, it is necessary to replace the oil filter unit (see **10A**, **Engine and cylinder block assembly**, **Oil filter unit: Removal - Refitting**, page **10A-130**) (MR 415, 10A, Engine and peripherals).

M4R

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
oil-water heat exchanger nipple	**49 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

115096

❑ Fit the **(Ms. 583)** on the oil-water heat exchanger cooling hoses (**1**) .

❑ Remove the clips (**2**) from the oil-water heat exchanger cooling hoses using the **(Mot. 1448)**.

❑ Disconnect the oil-water heat exchanger cooling hoses.

115096

❑ Remove:

- the nipple (**3**) from the oil-water heat exchanger,
- the oil cooler.

M4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

- Clean and degrease the oil-water heat exchanger joint faces with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).
- Always replace the oil-water heat exchanger seal.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the oil cooler,
  - the oil-coolant heat exchanger fitting.
- Torque tighten the **oil-water heat exchanger nipple (49 Nm)**.
- Connect the cooling hoses to the coolant-oil heat exchanger.
- Fit the cooling hose clips on the oil-water heat exchanger using the **(Mot. 1448)**.
- Remove the **(Ms. 583)** from the oil-water heat exchanger cooling hoses.

III - FINAL OPERATION.

- Refit the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .
- Perform the following operations:
  - top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
  - top up of the coolant level,
  - bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- Refit:
  - the engine undertray,
  - the engine undertray bolts.
- Tighten the engine undertray bolts.

F4R

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
oil cooler nipple	**60 Nm**

IMPORTANT
Wear latex gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

116811

❑ Disconnect the pinking sensor connector (**3**) .

❑ Remove the oil filter (**1**) (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

❑ Fit the **(Ms. 583)** on the oil-water heat exchanger cooling hoses (**2**) .

❑ Remove the clip from each oil-water heat exchanger cooling hose **(Mot. 1448)**.

Note:
Be prepared for the outflow of coolant.

❑ Disconnect the oil-water heat exchanger cooling hoses.

F4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

120225

- It is essential to mark the position of the coolant-oil heat exchanger.
- Remove:
  - the nipple (**3**) from the oil-water heat exchanger,
  - the coolant-oil heat exchanger (**4**) ,
  - the oil-water heat exchanger seal.

> Note:
> Watch out for the outflow of engine oil.

REFITTING

I - REFITTING PREPARATIONS OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:
  - the oil-water heat exchanger joint face if it is to be reused,
  - the cylinder block gasket face.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

- Always replace the oil-water heat exchanger seal.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the new oil-water heat exchanger seal,
  - the oil cooler,
  - the oil-coolant heat exchanger fitting.
- Torque tighten the **oil cooler nipple (60 Nm)**.

III - FINAL OPERATION.

- Connect the cooling hoses to the coolant-oil heat exchanger.
- Fit a clip on each oil-water heat exchanger cooling hose using the **(Mot. 1448)**.
- Remove the **(Ms. 583)** from the oil-water heat exchanger cooling hoses.
- Refit the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .
- Connect the pinking sensor connector.
- Perform the following operations:
  - top up of the coolant level,
  - bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- Refit:
  - the engine undertray,
  - the engine undertray bolts.
- Tighten the engine undertray bolts.

K9K

Tightening torques ▽	
oil-water heat exchanger bolt	**39 N.m**
oil filter holder bolt	**28 N.m**

IMPORTANT
Wear latex gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

IMPORTANT
The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K, and 780

123293

123299

❑ Remove:

- the bolt (**1**) on the intercooler air inlet pipe,
- the nut (**2**) on the intercooler air inlet pipe.

❑ Pull the clip (**3**) of the intercooler air inlet pipe.

K9K

K9K, and 782

138389

138390

❑ Remove:

- the nut (**4**) on the intercooler air inlet pipe,
- the bolt (**5**) on the intercooler air inlet pipe,
- the clip (**6**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move aside the intercooler air inlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123835

❑ Disconnect the oil pressure sensor connector (**7**) .

123965

❑ Remove:

- the bolt (**8**) from the oil filter support,
- the oil filter holder.

K9K

123966

❑ Remove:

- the bolt (**9**) from the oil-coolant heat exchanger,
- the oil-water heat exchanger.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using a clean cloth, clean up any oil and coolant runs on the cylinder block and on the oil filter support.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease the seal mating face on the cylinder block where it meets the coolant-oil heat exchanger.

❑ **parts always to be replaced: coolant-engine oil heat exchanger seal on the cylinder block (10,05, 05,12)**

107306

❑ Refit new seals (**10**) and (**11**) on the oil-water heat exchanger.

❑ Apply soapy water to the two seals (**10**) in contact with the coolant pump inlet pipe.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Apply two drops of **HIGH STRENGTH THREAD LOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the oil-coolant heat exchanger bolt.

❑ Refit the coolant-oil heat exchanger with its bolt.

❑ Torque tighten the **oil-water heat exchanger bolt (39 N.m)**.

❑ Refit the oil filter holder.

❑ Torque tighten the **oil filter holder bolt (28 N.m)**.

❑ Connect the oil pressure sensor connector.

III - FINAL OPERATION

❑ Fit:

- the intercooler air inlet pipe,
- the clip of the intercooler air inlet pipe.

❑ Clip the intercooler air inlet pipe on the turbocharger.

❑ Refit:

- the nut on the intercooler air inlet pipe,
- the bolt on the intercooler air inlet pipe.

K9K

- ❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

V4Y

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
oil filter nipple	**49 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Remove the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

119615

❑ Fit hose clamps **(Ms. 583)** (**1**) on the cooling hoses.

❑ Separate the clips (**2**) on the cooling hoses using the tool **(Mot. 1448)**.

> Note:
>
> Prepare for the outflow of coolant.

❑ Disconnect the cooling hoses from the oil-water heat exchanger.

II - OPERATION FOR REMOVAL OF PART CONCERNED

119615

❑ Remove:

- the oil filter nipple (**3**) ,
- the oil-water heat exchanger,
- the oil-water heat exchanger seal.

> Note:
>
> Prepare for the engine oil to drain out.

V4Y

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: coolant-engine oil heat exchanger seal on the cylinder block (10,05, 05,12)**.
- Clean and degrease the joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - a new oil-water heat exchanger seal,
  - the oil-water heat exchanger,
  - the oil filter nipple.
- Torque tighten the **oil filter nipple (49 N.m)**.

III - FINAL OPERATION

- Connect the cooling hoses to the oil-water heat exchanger.
- Fit the cooling hose clips onto the oil-water heat exchanger using the tool **(Mot. 1448)**.
- Remove the hose clamps **(Ms. 583)** from the cooling hoses of the oil-water heat exchanger.
- Refit the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .
- Wipe any oil run-off with a cloth.
- Top up the oil with oil recommended by the manufacturer (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

> Note:
>
> When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

- Start the engine and wait until the oil pressure warning light goes out on the instrument panel.
- Check that there are no leaks.
- Refit:
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray,
  - the engine cover.
- Bleed the cooling system (see **Cooling system: Bleed**) .

V9X

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
oil-water heat exchanger bolts	**32 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

134117

❑ Fit the tool **(Ms. 583)** onto the oil-water heat exchanger cooling hoses.

❑ Remove the clips (**1**) from the oil-water heat exchanger cooling hoses using the tool **(Mot. 1448)**.

> Note:
>
> Be prepared for the outflow of coolant.

❑ Disconnect the oil-coolant heat exchanger cooling hoses.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134117

❑ Remove:

- the bolts (**2**) from the oil-water heat exchanger,
- the oil-coolant heat exchanger,
- the oil-coolant heat exchanger seal.

> Note:
>
> Watch out for the outflow of engine oil.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the oil-coolant heat exchanger seal face if it is to be reused,
- the cylinder block gasket face.

> **WARNING**
>
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ **parts always to be replaced: coolant-engine oil heat exchanger seal on the cylinder block (10,05, 05,12)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal to the oil-water heat exchanger,
- the oil-water heat exchanger.

❑ Torque tighten the **oil-water heat exchanger bolts (32 N.m)**.

III - FINAL OPERATION

❑ Connect the oil-water heat exchanger cooling hoses.

❑ Fit the cooling hose clips on the oil-water heat exchanger using the tool **(Mot. 1448)**.

❑ Remove the tool **(Ms. 583)** from the oil-water heat exchanger cooling hoses.

❑ Perform the following operations:

- bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- top up the engine oil.

> Note:
>
> Lubricate the seal of the engine oil filler cap before refitting it.

❑ Refit the engine undertray.

> **WARNING**
>
> Always check the oil level using the dipstick.
>
> Do not exceed the maximum level on the dipstick (could destroy the engine).
>
> Correct the engine oil level if necessary before delivering the vehicle to the customer.

M4R

Tightening torques ▽	
oil pressure sensor	**15 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

115097

❑ Remove the cooling hose (**1**) between the multifunction support and the oil-water heat exchanger.

❑ Disconnect the oil pressure sensor connector (**2**) .

❑ Remove the oil pressure sensor (**3**) .

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Coat the threading of the oil pressure sensor with **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to ensure correct sealing.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil pressure sensor.

❑ Tighten to torque the **oil pressure sensor (15 Nm)**.

❑ Connect the oil pressure sensor connector.

❑ Fit the cooling hose between the multifunction support and the oil-water heat exchanger.

III - FINAL OPERATION.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Refit the engine cover.

M9R

Equipment required
refrigerant charging station

Tightening torques ▽	
oil pressure sensor	**40 Nm**
bracket bolt for the "intermediate pipe-compressor" connecting pipe on the compressor	**8 Nm**

❏

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair work (see **Air conditioning: Precautions for the repair**) (MR 415, 62A, Air conditioning).

Note:
Use blanking plugs for the fuel circuits with part numbers **77 01 208 229** or **77 01 476 857** to plug any openings exposed to the open air. They must be clean. Do not use any which have already been used to plug a fuel circuit.

WARNING
To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

WARNING
In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Remove the front engine cover.

❏ Drain the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

122876

❏ Remove the bolt (**1**) from the "intermediate pipe-compressor" connecting pipe on the compressor.

❏ Insert the blanking plugs.

❏ Move the "intermediate pipe-compressor" connecting pipe to one side.

❏ Disconnect the oil pressure sensor connector.

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

114061

❑ Remove:

- the protective ring on the oil pressure sensor,
- the oil pressure sensor (**2**) using a **22 mm long socket** fitted with a small extension piece by inserting it between the air conditioning compressor and the alternator.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑ Always replace the "intermediate pipe-compressor" connecting pipe seal at the compressor end.

❑ Remove the "intermediate pipe-compressor" connecting pipe seal at the compressor end.

❑ Refit the new seal for the "intermediate pipe-compressor" connecting pipe at the compressor end.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil pressure sensor to the oil filter unit using a **22 mm long socket**.

❑ Torque tighten the **oil pressure sensor (40 Nm)**.

❑ Refit the oil pressure sensor protective ring.

III - FINAL OPERATION.

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Remove the blanking plugs.

❑ Lubricate the seals using air conditioning oil to make fitting easier.

❑ Connect the "intermediate pipe-compressor" connecting pipe to the compressor.

❑ Refit the "intermediate pipe-compressor" connecting pipe bracket bolt to the compressor.

❑ Torque tighten the **bracket bolt for the "intermediate pipe-compressor" connecting pipe on the compressor (8 Nm)**.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Fill the refrigerant circuit using the **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Use the sensor to check that there are no leaks (see **Refrigerant circuit: Check**) (MR 415, 62A, Air conditioning).

❑ Check that the air conditioning system is operating correctly (see **Air conditioning: Check**) (MR 415, 62A, Air conditioning).

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the engine cover.

F4R

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

Tightening torques ▽	
oil pressure sensor	**35 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

120169

❑ Undo the intercooler air inlet pipe clip (**1**) .

❑ Remove the intercooler air inlet pipe bolt (**2**) .

❑ Move the intercooler inlet air pipe to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123139

❑ Disconnect the oil pressure sensor connector (**3**) .

123138

❑ Remove the oil pressure sensor (**4**) using the **(Mot. 1495-01)**.

F4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

- Coat the threading of the oil pressure sensor with **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

- Refit the oil pressure sensor using the **(Mot. 1495-01)**.
- Torque tighten the **oil pressure sensor (35 Nm)**.
- Connect the oil pressure sensor connector.

III - FINAL OPERATION.

- Fit the intercooler air inlet pipe.
- Refit the intercooler inlet air pipe bolt.
- Tighten:
  - the intercooler air inlet pipe bolt,
  - the intercooler air inlet pipe clamp.
- Refit the engine cover.

K9K

Special tooling required	
Mot. 1495	22 mm socket for removal - refitting of oxygen sensors - 1/2" square drive and 24 mm hexagonal ext.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123835

❑ Disconnect the oil pressure sensor connector (**1**) .

❑ Remove the oil pressure sensor using the **(Mot. 1495)**.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Wipe any oil run-off with a cloth.

❑ Always replace the oil pressure sensor.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the new oil pressure sensor.

❑ Tighten the new oil pressure sensor using the **(Mot. 1495)**.

❑ Connect the new oil pressure sensor connector.

III - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

K4M

Tightening torques ▽	
oil pressure sensor	**32 N.m**

REMOVAL

OPERATION FOR REMOVAL OF PART CONCERNED

128282

❑ Disconnect the oil pressure sensor connector (**1**) .

128283

❑ Remove the oil pressure sensor (**2**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Coat the threading of the oil pressure sensor with **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Torque tighten the **oil pressure sensor (32 N.m)**.

❑ Connect the oil pressure sensor connector.

V4Y

Tightening torques ▽	
oil pressure sensor	**15 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine oil filler cap,
- the dipstick,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❏ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

135520

❏ Cut the oil pressure sensor connector plastic clip.

❏ Remove the rubber protector (**1**) from the oil pressure sensor connector.

❏ Disconnect the oil pressure sensor connector (**2**) .

❏ Remove the oil pressure sensor using a **26 mm** long socket.

> Note:
>
> Prepare for the engine oil to drain out.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the oil pressure sensor.

❏ Tighten to torque the **oil pressure sensor (15 N.m)**.

❏ Connect the oil pressure sensor connector.

❏ Fit the rubber protector to the oil pressure sensor connector.

V4Y

❏ Refit a new plastic clip to the oil pressure sensor connector.

> Note:
>
> Ensure that the wiring of the oil pressure sensor connector passes underneath the connector and does not come into contact with the driveshaft.

II - FINAL OPERATION

❏ Refit:

- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts)
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❏ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❏ Refit:

- the engine oil filler cap,
- the dipstick.

V9X

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

Tightening torques ▽	
engine oil pressure sensor	**40 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Disconnect the engine oil pressure sensor connector.

134118

❑ Remove the engine oil pressure sensor (**1**) using the **(Mot. 1495-01)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the joint face of the engine oil pressure sensor.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the engine oil pressure sensor.

❑ Torque tighten the **engine oil pressure sensor (40 N.m)**.

❑ Connect the engine oil pressure sensor connector.

III - FINAL OPERATION

❑ Start the vehicle.

❑ Check the sealing between the engine oil pressure sensor and the engine.

❑ Switch off the engine.

❑ Refit the engine undertray.

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

M4R

Tightening torques ▽	
oil level sensor	**20 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

II - REMOVAL OPERATION FOR PART CONCERNED

115097

❏ Disconnect the connector (**1**) from the oil level sensor.

❏ Remove the oil level sensor (**2**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the oil level sensor.

❏ Tighten to torque the **oil level sensor (20 Nm)**.

❏ Connect the connector to the oil level sensor.

II - FINAL OPERATION.

❏ Refit the engine cover.

M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

II - REMOVAL OPERATION FOR PART CONCERNED

123627

❑ Move the heat insulating material (**1**) away from the oil level sensor.

❑ Disconnect the connector from the oil level sensor.

❑ Remove the oil level sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil level sensor.

❑ Tighten the oil level sensor.

❑ Connect the connector to the oil level sensor.

❑ Fit the heat insulating material around the oil level sensor.

II - FINAL OPERATION.

❑ Refit:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

F4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123139

❑ Disconnect the connector (**1**) for the oil level sensor from below.

123140

❑ Remove the oil level sensor (**2**) from below.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil level sensor.

❑ Tighten the oil level sensor.

❑ Connect the connector to the oil level sensor.

II - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION FOR PART CONCERNED

123834

❑ Disconnect the connector (**1**) from the oil level sensor.

❑ Remove the oil level sensor.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Wipe any oil run-off with a cloth.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil level sensor.

❑ Tighten the oil level sensor.

❑ Connect the connector to the oil level sensor.

III - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

K4M

Tightening torques ▽	
oil level sensor	**25 N.m**

REMOVAL

OPERATION FOR REMOVAL OF PART CONCERNED

128366

❑ Disconnect the connector (**1**) from the oil level sensor.

123464

128368

❑ Remove the oil level sensor using a "Crowfoot" type end piece (**2**) .

REFITTING

REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil level sensor.

❑ Tighten to torque the **oil level sensor (25 N.m)**.

❑ Connect the connector to the oil level sensor.

V4Y

Tightening torques ▽	
oil level sensor bolts	**8 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

II - OPERATION FOR REMOVAL OF PART CONCERNED

133479

❑ Disconnect the connector (**1**) from the oil level sensor.

❑ Remove the bolts (**2**) from the oil level sensor.

> Note:
>
> Prepare for oil to drain out when removing the oil level sensor.

❑ Remove the oil level sensor .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil level sensor.

❑ Torque tighten the **oil level sensor bolts (8 Nm)**.

❑ Connect the connector to the oil level sensor.

II - FINAL OPERATION

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

Oil level sensor: Removal - Refitting

V4Y

- ❏ Check the engine oil level.
- ❏ Adjust the engine oil level if necessary.

V9X

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Disconnect the connector from the oil level sensor.

134119

❑ Remove the oil level sensor (**1**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil level sensor.

❑ Connect the connector to the oil level sensor.

II - FINAL OPERATION

❑ Refit:

- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the engine undertray.

❑ Check the engine oil level.

❑ Adjust the engine oil level if necessary.

Oil pump: Removal - Refitting

M4R

- The engine and gearbox assembly must be removed to remove/refit the oil pump (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- For the oil removal and refitting method (see **Cylinder block: Stripping**) and (see **Cylinder block: Rebuilding**) (Technical Note 6020A, 10A, Engine and peripherals).

F4R

Tightening torques ▽	
oil pump bolts	**25 Nm**
oil splash plate bolt	**25 Nm**

IMPORTANT
Wear latex gloves during the operation.

REMOVAL

I - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123721

❑ Remove:

- the oil splash plate bolt (**1**) ,
- the anti-emulsion plate.

123720

❑ Remove:

- the oil pump bolts (**2**) ,
- the oil pump.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Position the oil pump pinion on the chain.

❑ Refit:

- the oil pump,
- the oil pump bolts.

❑ Torque tighten the **oil pump bolts (25 Nm)**.

❑ Refit the oil splash plate.

Note:
Check that the oil splash plate is positioned correctly.

❑ Refit the oil splash plate bolt.

❑ Torque tighten the **oil splash plate bolt (25 Nm)**.

F4R

II - FINAL OPERATION.

❏ Refit:

- the lower cover (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

M9R

Tightening torques ▽	
oil pump bolts on the cylinder block	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

122398

❑ Remove:

- the dipstick (**1**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the lower cover (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124168

❑ Remove:

- the oil pump strainer bolts (**2**) ,
- the oil pump strainer.

124170

❑ Remove the bolt (**3**) from the oil splash plate on the oil pump.

M9R

124171

❑ Remove:

- the oil pump bolts (**4**) from the cylinder block,
- the oil pump.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the seal on the oil pump strainer.

124169

❑ Remove the seal (**5**) from the oil pump strainer.

❑ Fit the new seal (**5**) in place on the oil pump strainer.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil pump.

> Note:
>
> If necessary, use a locally produced hook to fit the oil pump chain to the oil pump pinion.

❑ Refit:

- the oil pump bolts on the cylinder block,
- the bolt for the oil splash plate on the oil pump.

❑ Tighten:

- to torque the **oil pump bolts on the cylinder block (25 N.m)**.
- the bolt for the oil splash plate on the oil pump.

❑ Refit:

- the oil pump strainer fitted with its new seal,
- the oil pump strainer bolts.

❑ Tighten the oil pump strainer bolts.

III - FINAL OPERATION.

❑ Refit:

- the lower cover (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the engine undertray,
- the engine undertray bolts,
- the dipstick.

❑ Fill the engine with oil and check the engine oil level (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Start the engine and run it until the engine oil warning light goes off.

❑ Check the engine oil level.

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray.

❑ Drain:

- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).

❑ Remove:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

II - REMOVAL OPERATION FOR PART CONCERNED

23224

❑ Remove:

- the oil pump bolts (**1**) ,
- the oil pump.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the right-hand differential output seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the oil pump.

❑ Refit the oil pump bolts.

❑ Tighten the oil pump bolts.

III - FINAL OPERATION.

❑ Refit:

- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts).

❑ Refill:

- the gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox),
- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

K4M

Tightening torques ▽	
oil pump bolts	**25 N.m**

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

REMOVAL

I - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

128799

❑ Remove:

- the oil pump bolts (**1**) ,
- the oil pump.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Position the oil pump pinion on the chain.

❑ Refit the oil pump.

❑ Torque tighten the **oil pump bolts (25 N.m)**.

II - FINAL OPERATION.

❑ Refit:

- the lower cover (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) .

❑ Fill up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

K4M

❑ Refit the engine undertray.

V4Y

Special tooling required	
Mot. 1390	Support for removal - refitting of engine - gearbox assembly
Mot. 919-02	Flywheel locking tool.

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
oil pump bolts	**8 N.m**
central nut of the left-hand suspended engine mounting rubber pad	**62 N.m**

IMPORTANT
Wear protective gloves during the operation.

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Drain:

- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the "cooling radiator - condenser - fan" assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,

V4Y

- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) .

22860

❑ Position the pads of the **(Mot. 1390)** under areas (**A**) .

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**)

134185

❑ Remove the central nut (**1**) from the rubber pad on the left-hand suspended engine mounting.

❑ Use a copper hammer to strike the threaded rod of the left-hand suspended engine mounting to separate the engine from the body.

> Note:
>
> The pads of the **(Mot. 1390)** should almost be in contact with the engine; when struck with the copper hammer, the engine comes to rest on the support.

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Fit the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Remove:

- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),

V4Y

- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)** (**2**) .

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,
- the cylinder block base plate (see **Cylinder block base plate: Removal - Refitting**) .

II - REMOVAL OPERATION FOR THE OIL PUMP

103186

❑ Remove:

- the oil pump bolts (**3**) ,
- the oil pump.

REFITTING

I - REFITTING OPERATION FOR THE OIL PUMP

❑ Refit the oil pump.

❑ Torque tighten the **oil pump bolts (8 N.m)**.

II - FINAL OPERATION

❑ Refit:

- the cylinder block base plate (see **Cylinder block base plate: Removal - Refitting**) ,
- the drive plate (see **10A**, **Engine and cylinder block assembly**, **Drive plate: Removal - Refitting**, page **10A-287**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,

V4Y

- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)**.

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the flywheel locking tool **(Mot. 919-02)**.

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the **component support** (see **Engine support equipment: Use**) .

❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Remove the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Refit:

- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the central nut of the left-hand suspended engine mounting rubber pad,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Torque tighten the **central nut of the left-hand suspended engine mounting rubber pad (62 N.m)**.

❑ Remove the tool **(Mot. 1390)** from the "engine - gearbox" assembly.

❑ Refit:

- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the "cooling radiator - condenser - fan" assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) .

V4Y

❏ Refill:

- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❏ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Tightening torques ▽	
oil pump bolts	**25 N.m**
oil pump pinion bolts	**10 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Drain:

- the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) .

134883

❑ Remove:

- the timing cover bolts (**1**) ,
- the timing cover,
- the timing cover seal.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

136258

❑ Remove:

- the oil pump pinion bolts (**2**) ,
- the oil pump pinion.

❑ Move aside the oil pump chain.

136257

❑ Remove:

- the oil pump bolts (**3**) ,
- the oil pump.

136291

❑ Remove:

- the oil pump cover bolts (**4**) ,
- the oil pump cover.

136290

❑ Remove the driven gear (**5**) for the oil pump.

❑ Place the cover of the oil pump in a vice equipped with protective jaws.

V9X

136289

❑ Remove:

- the locking pin (**6**) of the oil pump discharge valve,
- the "valve - spring - valve centring device" assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the oil pump body,
- the oil pump cover,
- the "valve - spring - valve centring device" assembly,
- the cylinder block joint faces,
- the joint faces of the lower timing cover,
- the sump joint face.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Always replace the timing cover seal.

II - OPERATION FOR REBUILDING THE OIL PUMP

❑ Refit:

- the "valve - spring - valve centring device" assembly,
- the locking pin of the oil pump discharge valve,
- the oil pump driven gear,
- the oil pump cover.

> Note:
> Place the long axis of the driven gear on the oil pump body side.
> Align the two dowels of the oil pump cover with the two centring holes.

❑ Check that the oil pump pinions turn freely.

III - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the oil pump.

❑ Torque tighten the **oil pump bolts (25 N.m)**.

❑ Fit:

- the pinion on the oil pump chain,
- the "pinion - chain" assembly on the oil pump shaft.

❑ Torque tighten the **oil pump pinion bolts (10 N.m)**.

IV - FINAL OPERATION

❑ Refit:

- a new timing cover seal,
- the timing cover,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,

V9X

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- fill and bleed the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Oil pressure: Check

F4R or K4M or K9K or M4R or M9R or V4Y or V9X

Special tooling required	
Mot. 836-05	Oil pressure gauge kit.
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.
Mot. 1658	Union for oil pressure measurement

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

I - PARTS AND CONSUMABLES FOR THE REPAIR WORK

❑ **parts always to be replaced: Drain plug seal on engine oil sump (10,03,01,04)** (in the event of an oil change).

parts always to be replaced: Oil filter (10,05,05, 03) (in the event of removal).

❑ Consumable:

- engine oil (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

II - CHECK

❑ Remove the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) .

87363

❑ In place of the oil pressure sensor, fit the **(Mot. 836-05)** with suitable adapters using the **(Mot. 1495-01)** or a **22 mm** long socket.

❑ Engine + End pieces:

- M4R: **(Mot. 1658)** + (**F**) ,
- F4R: (**B**) + (**F**) ,
- K9K: (**E**) + (**C**) + (**F**) ,
- M9R: (**C**) + (**F**) ,
- K4M: (**E**) + (**C**) + (**F**) ,
- V9X: (**E**) + (**C**) + (**F**) ,
- V4Y: **(Mot. 1658)** + (**F**) .

F4R or K4M or K9K or M4R or M9R or V4Y or V9X

M9R

122879

❑ Disconnect the air conditioning compressor connectors (**1**) .

K4M

132033

❑ In place of the oil pressure sensor, fit the tool **(Mot. 836-05)** ***(F)*** equipped with end pieces ***(E)*** and ***(C)*** using the tool **(Mot. 1495-01)**.

❑ Start the vehicle.

❑ Monitor the engine oil pressure as the oil temperature rises (approximately **80°C** or the first time the engine cooling fan is activated); it should not be less than the pressure at idle speed.

❑ If the oil pressure is lower than the pressure at idle speed, check that:

- the oil filter is not clogged,
- dirt or swarf is not present in the engine oil,
- the oil pump is in good condition and being correctly driven.

M4R

❑ Oil pressure values:

- idle speed: **0.8 bar**,
- 2000 rpm: **4.5 bar**.

F4R or K4M or K9K or M4R or M9R or V4Y or V9X

F4R

❏ Oil pressure values:

- idle speed: **0.4 bar**,
- 4000 rpm: **2 to 4 bar**.

K9K

❏ Oil pressure values:

- idle speed: **1.2 bar**,
- 3000 rpm: **3.5 bar**.

M9R, and 742 or 744 or 746 or 748 or 754

❏ Oil pressure values:

- idle speed: **1.4 bar**,
- 3000 rpm: **4.7 to 6.4 bar**.

M9R, and 800 or 802 or 805 or 806 or 808 or 816

❏ Oil pressure values:

- idle speed: **1.5 bar**,
- 3000 rpm: **4.7 to 6.2 bar**.

V9X

❏ Oil pressure values:

- idle speed: **0.7 bar**,
- 3000 rpm: **4.5 to 6.2 bar**.

V4Y

❏ Oil pressure values:

- idle speed: **0.8 bar**,
- 2000 rpm: **2.5 bar**,
- 6000 rpm: **5.65 bar**.

❏ Switch off the engine.

M9R

❏ Connect the air conditioning compressor connectors.

❏ Remove the **(Mot. 836-05)** with the end pieces.

❏ Refit the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) .

❏ Wipe any oil run-off with a cloth.

❏ Wait at least **10 minutes**.

❏ Check the oil level using the dipstick.

❏ Top up the oil level if necessary (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

❏ Start the vehicle and check that there are no oil leaks at the oil pressure sensor.

M4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
multifunction support bolts	**50 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) .

124083

❏ Disconnect the connectors (**1**) from the air conditioning compressor.

❏ Remove the bolt (**2**) from the air conditioning compressor connector support.

❏ Move the air conditioning compressor connector support to one side.

115088

❏ Move aside the cooling hose clips (**3**) using tool **(Mot. 1448)**.

❏ Disconnect the cooling hoses from the multifunction support.

M4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

115089

❑ Remove:

- the multifunction support bolts (**4**) ,
- the multifunction support,
- the multifunction support seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the multifunction support seal.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Clean and degrease the joint faces of the multifunction support using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the multifunction support.

❑ Fit the multifunction support bolts without tightening them.

❑ Torque tighten the **multifunction support bolts (50 Nm)**.

III - FINAL OPERATION.

❑ Connect the cooling hoses to the multifunction support.

❑ Fit:

- the cooling hose clips using tool **(Mot. 1448)**,
- the air conditioning compressor connector support.

❑ Refit the bolt on the air conditioning compressor connector support.

❑ Tighten the bolt on the air conditioning compressor connector support.

❑ Connect the air conditioning compressor connectors.

❑ Refit:

- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **Cooling system: Bleed**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

M9R

Tightening torques ▽	
multifunction support bolts	**44 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Remove:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning).

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Unclip the fuel pipe on the multifunction support.

114065

❑ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

REFITTING

I - REFITTING PREPARATION OPERATION

114065

❑ Refit the multifunction support.

❑ Torque tighten in order the **multifunction support bolts (44 N.m)**.

M9R

II - FINAL OPERATION

❑ Refit:

- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Refit the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Equipment required
refrigerant charging station

Tightening torques ▽	
multifunction support bolts	**44 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) .

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (MR 415, 36B, Power-assisted steering).

II - REMOVAL OPERATION FOR PART CONCERNED

120222

❑

> Note:
>
> The multifunction support bolts are not the same length; mark their positions.

❑ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the multifunction support,
- the multifunction support bolts.

❑ Torque tighten the **multifunction support bolts (44 Nm)**.

II - FINAL OPERATION.

❑ Refit:

- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (MR 415, 36B, Power-assisted steering),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,

- the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Refit the engine cover.

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

❑ Drain the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning).

II - REMOVAL OPERATION FOR PART CONCERNED

123832

❑ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the multifunction support,
- the multifunction support bolts.

K9K

123832

❑ Tighten the multifunction support bolts in order.

II - FINAL OPERATION.

❑ Refit:

- the compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray,
- the engine undertray bolts,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

❑ Fill the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Adjust the headlights (see **Headlight: Adjustment**) (MR 415, 80B, Headlights).

K4M

Equipment required
refrigerant charging station

Tightening torques ▽	
multifunction support bolts	**44 Nm**
multifunction support bolt on the cylinder block	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

115449

❑ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

K4M

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

115449

- ❑ Refit the multifunction support.
- ❑ Tighten to torque and in order:
  - the **multifunction support bolts (44 Nm)**,
  - the **multifunction support bolt on the cylinder block (25 N.m)**.

II - FINAL OPERATION.

- ❑ Refit:
  - the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
  - the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
  - the compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

V9X

Tightening torques ▽	
multifunction support bolts	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

136256

❑ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the multifunction support.

❑ Torque tighten the **multifunction support bolts (25 N.m)**.

II - FINAL OPERATION

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,

V9X

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and TL4

Special tooling required	
Mot. 582	Flywheel locking tool.

Tightening torques ▽	
new flywheel bolts (initial torque)	**5 N.m**
new flywheel bolts	**20 N.m + 36°**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Clutch: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (21A, Manual gearbox).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123517

❑ Remove:

- the flywheel bolts (**1**) ,
- the **(Mot. 582)** or (**2**) ,
- the flywheel.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the bearing face of the flywheel on the crankshaft,
- the flywheel bolt threads on the crankshaft.

❑ Always replace the bolts of the flywheel.

K9K, and TL4

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the flywheel.

❑ Fit the new flywheel bolts without tightening them.

❑ Fit the **(Mot. 582)** or.

123517

❑ Pretighten to torque and in order the **new flywheel bolts (initial torque) (5 N.m)**.

❑ Angle tighten to torque and in order the **new flywheel bolts (20 N.m + 36°)**.

III - FINAL OPERATION.

❑ Refit:

- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (21A, Manual gearbox),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fill up the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

Special tooling required	
Mot. 1431	Flywheel locking tool.

Tightening torques ▽	
engine flywheel bolts	**25 N.m + 45° ± 6°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) (12A, Fuel mixture),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch).

II - OPERATION FOR REMOVAL OF PART CONCERNED

114913

❑ Lock the flywheel using the **(Mot. 1431)**.

❑ Remove:

- the flywheel bolts,
- the flywheel,
- the **(Mot. 1431)**.

Note:
The engine flywheel is of the dual-mass type.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Flywheel bolts (10, 03,03,14)**.

❑ Clean the engine flywheel bolt thread holes on the crankshaft using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Degrease the engine flywheel bearing faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

II - REFITTING OPERATION FOR PART CONCERNED

114913

- ❑ Refit the flywheel.
- ❑ Fit the new flywheel bolts without tightening them.
- ❑ Lock the flywheel using the **(Mot. 1431)**.
- ❑ Tighten to torque and in order the **engine flywheel bolts (25 N.m + 45° ± 6°)**.

III - FINAL OPERATION

- ❑ Refit:
  - the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
  - the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
  - the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) (12A, Fuel mixture),
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R, and PK4

Special tooling required	
Mot. 1677	Flywheel locking tool.

Tightening torques ▽	
new flywheel bolts	**30 N.m + 62° ± 6°**

REMOVAL

I - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) .

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (21A, Manual gearbox).

II - OPERATION FOR REMOVAL OF PART CONCERNED

128672

❑ Remove:

- the flywheel bolts (**1**) ,
- the **(Mot. 1677)** (**2**) ,
- the flywheel.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the flywheel bolts.

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing face of the flywheel on the crankshaft.

F4R, and PK4

II - REFITTING OPERATION FOR PART CONCERNED

128672

- ❑ Fit the flywheel.
- ❑ Fit the **(Mot. 1677)** (**3**) .
- ❑ Torque and angle tighten in order the **new flywheel bolts (30 N.m + 62° ± 6°)**.

III - FINAL OPERATION

- ❑ Refit:
  - the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (21A, Manual gearbox),
  - the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
  - the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
  - the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
  - the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Fill the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).
- ❑ Refit the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) .
- ❑ Bleed the clutch control circuit (see **Clutch circuit: Bleed**) (37A, Mechanical component controls).
- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Special tooling required	
Mot. 1677	Flywheel locking tool.

Tightening torques ▽	
flywheel bolts	**70 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

❏ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❏ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).
- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (21A, Manual gearbox).

II - OPERATION FOR REMOVAL OF PART CONCERNED

131092

❏ Remove:

- the flywheel bolts (**1**) ,
- the **(Mot. 1677)** (**2**) ,
- the flywheel.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the flywheel bearing face if reusing,
- the crankshaft bearing face.

❏ Always replace the flywheel bolts.

K4M

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the flywheel.

❑ Fit the new flywheel bolts without tightening them.

❑ Position the **(Mot. 1677)**.

131092

❑ Tighten to torque and in order the **flywheel bolts (70 N.m)**.

III - FINAL OPERATION.

❑ Refit:

- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) (21A, Manual gearbox),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the differential output seals (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the engine undertray,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the engine cover.

M4R, and TL4

Special tooling required	
Mot. 1677	Flywheel locking tool.

Tightening torques ▽	
new flywheel bolts	**108 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Clutch: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the front engine cover
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray.

❑ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the differential output seals (see **Differential output seal: Removal - Refitting**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).
- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

117579

❑ Lock the flywheel using the **(Mot. 1677)** (**1**) .

❑ Remove:

- the flywheel bolts,
- the **(Mot. 1677)**,
- the flywheel.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Flywheel bolts (10, 03,03,14)**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the flywheel pressure face on the crankshaft,

M4R, and TL4

- the flywheel bolt threading on the crankshaft.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the flywheel.

❑ Fit the new flywheel bolts without tightening them.

❑ Lock the flywheel using the **(Mot. 1677)**.

117512

❑ Tighten to torque and in order the **new flywheel bolts (108 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the « pressure plate - disc » assembly (see **Pressure plate - Disc: Removal - Refitting**) ,
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).
- the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the differential output seals (see **Differential output seal: Removal - Refitting**)
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fill up the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the engine undertray,
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the engine cover.

M9R, and 805 or 809 or 845 or 849

Special tooling required	
Mot. 1316	Engine flywheel immobiliser tool.

Equipment required
Diagnostic tool

Tightening torques ▽	
drive plate bolts (initial torque)	**30 N.m**
drive plate bolts	**35 N.m + 40° ± 6°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) or (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the automatic transmission (see **Automatic gearbox oil: Draining - Filling**) (23A, Automatic transmission),
- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the automatic transmission (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

M9R, and 805 or 809 or 845 or 849

II - OPERATION FOR REMOVAL OF PART CONCERNED

122092

❑ Fit the **(Mot. 1316)** (**1**) on the starter upper bolt.

122091

❑ Remove:

- the drive plate bolts,
- the **(Mot. 1316)** (**2**) .
- the drive plate (**3**) ,

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Visually inspect the condition of the crown wheel and the drive plate.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the drive plate,
- the drive plate bearing face on the crankshaft,
- the drive plate thread holes on the crankshaft.

❑ Systematically replace the drive plate bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the drive plate.

122091

❑ Refit the new drive plate bolts.

❑ Fit the bolts onto the drive plate without tightening them.

❑ Position the **(Mot. 1316)**.

❑ Pre-tighten to torque and in order the **drive plate bolts (initial torque) (30 N.m)**.

❑ Torque tighten in order the **drive plate bolts (35 N.m + 40° ± 6°)**.

❑ Remove the tool **(Mot. 1316)**.

M9R, and 805 or 809 or 845 or 849

III - FINAL OPERATION

❑ Refit:

- the automatic transmission (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission),
- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) or (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refill:

- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the automatic transmission (see **Automatic gearbox oil: Draining - Filling**) (23A, Automatic transmission).

❑ Apply the after repair procedure using the **Diagnostic tool** :

- Connect the **Diagnostic tool**,
- Select "Gearbox computer",
- Go to repair mode,
- Display the « Before/after repair » procedure for the gearbox computer,
- Carry out the operations described in the « After repair procedure » section.

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the engine cover.

F4R, and AJ0

Special tooling required	
Mot. 582-01	Flywheel locking tool.

Equipment required
refrigerant charging station
Diagnostic tool

Tightening torques ▽	
drive plate bolts	**60 N.m**

WARNING
Keep the pipe unions away from contaminated areas.

IMPORTANT
When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery).

❑ Drain:

- the engine, if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the air pipe at the air filter box outlet,
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the engine undertray bolts,
- the engine undertray,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,

F4R, and AJ0

- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the « engine-gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the automatic gearbox (see **Automatic gearbox: Removal - Refitting**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

126794

❑ Fit the **(Mot. 582-01)** (**1**) on the starter upper bolt.

126795

❑ Remove:

- the drive plate bolts,
- the **(Mot. 582-01)** (**1**) ,
- the drive plate.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Visually inspect the condition of the crown wheel and the drive plate.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the drive plate,
- the drive plate bearing face on the crankshaft,
- the drive plate thread holes on the crankshaft.

❑ Systematically replace the drive plate bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the drive plate,
- the new drive plate bolts.

❑ Screw on the drive plate bolts without tightening them.

❑ Fit the **(Mot. 582-01)** on the starter upper bolt.

F4R, and AJ0

126795

❑ Tighten to torque and in order the **drive plate bolts (60 N.m)**.

❑ Remove the **(Mot. 582-01)**.

III - FINAL OPERATION.

❑ Refit:

- the automatic gearbox (see **Automatic gearbox: Removal - Refitting**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the « engine-gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air pipe at the air filter box outlet,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Apply the after repair procedure using the **Diagnostic tool** :

-connect the **Diagnostic tool**,

-select the « gearbox computer » ,

-go to repair mode,

-display the « after repair procedure » for the selected computer,

-carry out the operations described in the « after repair procedure » section.

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the engine cover.

V4Y

Special tooling required	
Mot. 1390	Support for removal - refitting of engine - gearbox assembly
Mot. 919-02	Flywheel locking tool.

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
drive plate bolts	**88 N.m**
central nut of the left-hand suspended engine mounting rubber pad	**62 N.m**

IMPORTANT
Wear protective gloves during the operation.

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Drain:

- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the "radiator - condenser - fan assembly" assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) .

V4Y

22860

- Position the pads of the **(Mot. 1390)** under areas (**A**) .
- Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

134185

- Remove the central nut (**1**) from the rubber pad on the left-hand suspended engine mounting.
- Use a copper hammer to strike the threaded rod of the left-hand suspended engine mounting to separate the engine from the body.

> Note:
>
> The pads of the **(Mot. 1390)** should almost be in contact with the engine; when struck with the copper hammer, the engine comes to rest on the support.

- Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .
- Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).
- Fit the engine on the **component support** (see **Engine support equipment: Use**) .

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

133842

- Position the **(Mot. 919-02)** (**2**) .
- Remove:
  - the drive plate bolts (**3**) ,
  - the washer,
  - the drive plate.
- Remove the **(Mot. 919-02)**.

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: Drive plate bolt (12, 07,02,24)**.
- Visually inspect the condition of the crown wheel and the drive plate.
- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:
  - the drive plate,
  - the drive plate bearing face on the crankshaft,
  - the drive plate thread holes on the crankshaft.

II - REFITTING OPERATION FOR PART CONCERNED

102813

127607

- Refit the drive plate (**4**) , positioning the washer (**5**) in the pin (**6**) of the drive plate.

V4Y

133842

❑ Position the **(Mot. 919-02)**.

❑ Tighten to torque and in order the **drive plate bolts (88 N.m)**.

❑ Remove the **(Mot. 919-02)**.

III - FINAL OPERATION

❑ Remove the engine from the **component support** (see **Engine support equipment: Use**) .

❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Remove the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Refit:

- the engine and gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the central nut of the left-hand suspended engine mounting rubber pad,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Torque tighten the **central nut of the left-hand suspended engine mounting rubber pad (62 N.m)**.

❑ Remove the tool **(Mot. 1390)** from the "engine - gearbox" assembly.

❑ Refit:

- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the "radiator - condenser - fan assembly" assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) .

❑ Refill:

- the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),

V4Y

- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Special tooling required	
Mot. 1431	Flywheel locking tool.

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
drive plate bolts	**25 N.m + 55° ± 6°**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the air conditioning circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
- the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the additional radiator (see **Additional radiator: Removal - Refitting**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the pipe between the reservoir and the steering box (see **Power-assisted steering pipes: Removal - Refitting**) (36B, Power-assisted steering),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) ,
- the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,

- the « intermediate pipe - compressor » connecting pipe (see **Compressor - intermediate pipe connecting pipe: Removal - Refitting**) (62A, Air conditioning),
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❏ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❏ Position the engine on the **component support** (see **Engine support equipment: Use**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

135623

❏

> Note:
>
> Fit the flywheel locking tool **(Mot. 1431)** with an approximately **18 mm** spacer.

❏ Fit the flywheel locking tool **(Mot. 1431)** (**1**) .

❏ Remove:

- the drive plate bolts using a **Torx T55 Plus** socket,
- the drive plate.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Visually inspect the condition of the crown wheel and the drive plate.

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the drive plate,
- the drive plate bearing face on the crankshaft,
- the drive plate thread holes on the crankshaft.

❏ **parts always to be replaced: Drive plate bolt (12, 07,02,24)**.

V9X

II - REFITTING OPERATION FOR PART CONCERNED

135624

❑ Fit the drive plate by positioning the pin (**2**) of the crankshaft in the hole (**3**) of the drive plate.

❑ Fit the new drive plate bolts without tightening them.

135623

❑ Fit the flywheel locking tool **(Mot. 1431)**.

❑ Torque tighten to angle in order the **drive plate bolts (25 N.m + 55° ± 6°)**.

❑ Remove the flywheel locking tool **(Mot. 1431)**.

III - FINAL OPERATION

❑ Remove the engine from **component support** (see **Engine support equipment: Use**) .

❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Refit:

- the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the left-hand suspended engine mounting (see **19D**, **Engine mounting**, **Left-hand suspended engine mounting: Removal - Refitting**, page **19D-1**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the « intermediate pipe - compressor » connecting pipe (see **Compressor - intermediate pipe connecting pipe: Removal - Refitting**) (62A, Air conditioning),
- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,
- the electric coolant pump of the turbocharger (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-28**) ,
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the pipe between the reservoir and the steering box (see **Power-assisted steering pipes: Removal - Refitting**) (36B, Power-assisted steering),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the additional radiator (see **Additional radiator: Removal - Refitting**) ,
- the electric coolant pump of the exhaust cooler (see **19A**, **Cooling**, **Electric coolant pump: Removal - Refitting**, page **19A-159**) ,

- the « cooling radiator - condenser - intercooler » (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) assembly,
- the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the front impact cross member (see **Front impact cross member: Removal - Refitting**) (41A, Front lower structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refill:

- and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the air conditioning circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Check that there are no leaks using the electronic sensor (see **Refrigerant circuit: Check**) (62A, Air conditioning).

❑ Check that the air conditioning is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❑ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

M4R

Equipment required
petrol compression gauge
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) .

123469

❑ Connect a **petrol compression gauge** (**1**) .

❑ Run command with **Diagnostic tool** :

- **RZ009: "VEHICLE FUNCTIONS PROGRAMMING"**,
- **VP036: "INHIBIT FUEL SUPPLY"**.

❑ Put the vehicle under starting conditions:

- gear lever in neutral position for manual gearbox,
- brake pedal depressed.

II - TEST OPERATION

❑ Press the vehicle start button to trigger the engine starting phase.

> Note:
>
> The engine will be driven by the starter for **20 seconds**, without being started.

❑ Measure the cylinder compressions, cylinder by cylinder.

> Note:
>
> It is necessary to wait for at least **10 seconds** before starting the engine each time (the starter will not run due to its thermal protection).

III - FINAL OPERATION.

❑ Disconnect the **petrol compression gauge**.

❑ Refit:

- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

❑ Run command **VP037: "STOP INHIBIT FUEL SUPPLY"** using the **Diagnostic tool**.

❑ Press the vehicle start button to start the engine.

> Note:
>
> If the engine does not start, run command **VP037: "STOP INHIBIT FUEL SUPPLY"** using the **Diagnostic tool** or switch off the ignition and wait **1 minute** and restart the engine.

M9R

Special tooling required	
Mot. 1772	Flexible end piece for taking end of compression pressure measurements.

Equipment required
diesel compression gauge
Diagnostic tool

I - PREPARATION OPERATION FOR CHECK

❑ Remove:

- the engine cover,
- heater plugs (see **13C**, **Preheating**, **Heater plugs: Removal - Refitting**, page **13C-3**) .

124163

❑ Fit the hose end piece **(Mot. 1772)** (**1**) in place of one of the removed plugs.

❑ Moderately tighten the hose end piece **(Mot. 1772)** (**1**) using an open-jawed spanner.

124164

❑ Screw the **diesel compression gauge** hose end piece adapter **(Mot. 1772)** (**2**) onto the hose.

❑ Moderately tighten the end piece onto the hose **(Mot. 1772)**.

M9R

124162

- Connect the **diesel compression gauge** (**3**) to the tool **(Mot. 1772)**.
- Open the discharge valve (**4**) of the **diesel compression gauge** to release the pressure.
- Close the discharge valve (**4**) of the **diesel compression gauge**.
- Run command with **Diagnostic tool** :
  - **RZ009: VEHICLE FUNCTION PROGRAMMING**,
  - **VP036: FUEL SUPPLY INHIBITION**.
- Put the vehicle in the engine starting condition:
  - gear lever in neutral for a manual gearbox,
  - brake pedal applied.

II - TEST OPERATION

- Connect a self-contained starter or an automatic battery charger.

> Note:
>
> The engine will be under the action of the starter motor for **20 s**, without starting.

- Press the vehicle start button to carry out an engine starting phase.

> Note:
>
> A minimum period of **10 s** must be observed between each starting phase (the starter will not start as it is in thermal protection mode).

- Open the discharge valve to release all of the pressure in the **diesel compression gauge**.
- Make progress with the diagram sheet.
- Take the same measurement for the other cylinders.
- Compare the results obtained.

III - FINAL OPERATION.

- Remove:
  - the **diesel compression gauge**,
  - the hose end piece **(Mot. 1772)**.
- Refit:
  - the heater plugs (see **13C**, **Preheating**, **Heater plugs: Removal - Refitting**, page **13C-3**) ,
  - the engine cover.
- Perform the command **VP037: STOP FUEL SUPPLY INHIBITION** using the **Diagnostic tool**.

> Note:
>
> If the engine does not start, run command **VP037: STOP FUEL SUPPLY INHIBITION** using the **Diagnostic tool** or switch off the ignition and wait **3 minutes** before starting the engine again.

F4R

Equipment required
petrol compression gauge
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove:

- the engine cover,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) .

124911

❑ Connect a **petrol compression gauge** (**1**) .

❑ Run command with **Diagnostic tool** :

- **RZ009: "VEHICLE FUNCTIONS PROGRAMMING"**,
- **VP036: "INHIBIT FUEL SUPPLY"**.

❑ Put the vehicle under starting conditions:

- gear lever in neutral for manual gearbox or position P ("Park") for automatic gearbox.
- brake pedal depressed.

II - TEST OPERATION

❑ Press the vehicle start button to trigger the engine starting phase.

> Note:
>
> The engine will be driven by the starter for **20 seconds**, without being started.

❑ Measure the cylinder compressions, cylinder by cylinder.

> Note:
>
> It is necessary to wait for at least **10 seconds** before starting the engine each time (the starter will not run due to its thermal protection).

III - FINAL OPERATION.

❑ Disconnect the **petrol compression gauge**.

❑ Refit:

- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the engine cover.

❑ Run command **VP037: "STOP INHIBIT FUEL SUPPLY"** using the **Diagnostic tool**.

❑ Press the vehicle start button to start the engine.

> Note:
>
> If the engine does not start, run command **VP037: "STOP INHIBIT FUEL SUPPLY"** using the **Diagnostic tool** or switch off the ignition and wait **1 minute** and restart the engine.

K9K

Special tooling required	
Mot. 1592	Flexible end piece for taking end of compression pressure measurements.

Equipment required
diesel compression gauge
self-contained starter
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove the heater plugs (see **13C**, **Preheating**, **Heater plugs: Removal - Refitting**, page **13C-3**) .

123846

❑ Disconnect:

- the pressure regulation solenoid valve connector (**1**) ,
- the flow control solenoid valve connector (**2**) ,

II - TEST OPERATION

124556

❑ Use an open-jawed spanner to moderately tighten:

- the hose end piece **(Mot. 1592)**,
- the adapter of the **diesel compression gauge** on the **(Mot. 1592)**.

124559

❑ Moderately tighten the unions of the **diesel compression gauge** using an open-jawed spanner.

❑ Connect a **self-contained starter**.

❑ Force the vehicle's + after ignition feed.

❑ Connect the **Diagnostic tool**.

K9K

- Run the following commands:
  - RZ009 "Vehicle functions programming",
  - VP036 "Inhibit fuel supply".
- Operate the starter for **15 seconds** until the needle of the **diesel compression gauge** stabilises to obtain the maximum value.
- Open the discharge valve to release all of the pressure in the **diesel compression gauge**.
- Make progress with the diagram sheet.
- Carry out the same procedure for the other cylinders.
- Check that the cylinder compression values are all approximately equal.

> Note:
>
> The pressure value after compression must be at least **18 bars**.

- Run command VP037 "Stop inhibit fuel supply".
- Disconnect the **self-contained starter**.
- Undo:
  - the **diesel compression gauge** on the hose end piece **(Mot. 1592)**,
  - the flexible end piece **(Mot. 1592)** using an open-jawed spanner.
- Remove the flexible end piece **(Mot. 1592)** which was fitted in place of one of the removed plugs.

III - FINAL OPERATION.

- Connect:
  - the pressure regulation solenoid valve connector,
  - the flow control solenoid valve connector,
- Refit the heater plugs (see **13C**, **Preheating**, **Heater plugs: Removal - Refitting**, page **13C-3**) .

K4M

Equipment required
petrol compression gauge
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove:

- the engine cover,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) .

128448

❑ Connect a **petrol compression gauge** (**1**) .

❑ Run command with **Diagnostic tool** :

- **RZ009: VEHICLE FUNCTION PROGRAMMING**,
- **VP036: FUEL SUPPLY INHIBITION**.

❑ Put the vehicle in the engine starting condition:

- gear lever in neutral position for a manual gearbox,
- brake pedal depressed.

II - TEST OPERATION

❑ Press the vehicle start button to carry out an engine starting phase.

> Note:
>
> The engine will be under the action of the starter motor for **20 s**, without starting.

❑ Measure the engine compressions, cylinder by cylinder.

❑ Depress the accelerator pedal fully in order to open the throttle valve during the compression measurements.

> Note:
>
> A minimum period of **10 s** must be observed between each starting phase (the starter will not start as it is in thermal protection mode).

III - FINAL OPERATION.

❑ Disconnect the **petrol compression gauge**.

❑ Refit:

- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the engine cover.

❑ Perform the command **VP037: STOP FUEL SUPPLY INHIBITION** using the **Diagnostic tool**.

❑ Press the vehicle start button in order to start the engine.

> Note:
>
> If the engine does not start, run command **VP037: STOP FUEL SUPPLY INHIBITION** using the **Diagnostic tool** or switch off the ignition and wait **1 min** before starting the engine again.

V4Y

Equipment required
petrol compression gauge
self-contained starter
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove:

- the engine cover,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) .

133615

❑ Connect the **petrol compression gauge** available from the **Garage equipment catalogue**.

❑ Open the discharge valve (**2**) of the petrol compression gauge to release the pressure.

❑ Close the discharge valve (**2**) of the petrol compression gauge.

❑ Connect a **self-contained starter** available from the **Garage equipment** catalogue.

❑ Switch on the forced + after ignition.

❑ Connect the **Diagnostic tool**.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select erase mode,
- select reset programming mode,
- run command **RZ009: VEHICLE FUNCTIONS PROGRAMMING**,
- select other configurations mode,
- run command **VP036: FUEL SUPPLY INHIBITION**,

❑ Put the vehicle under starting conditions:

- gear lever position P (Park),
- brake pedal depressed.

II - TEST OPERATION

❑ Press the vehicle start button to trigger the engine starting phase.

V4Y

❑ Follow the start-up cycle until the compression gauge needle stabilises to obtain the maximum value.

> Note:
>
> The engine is operated by the starter for **20 seconds maximum**, without starting.

> Note:
>
> It is necessary to wait for at least **10 seconds** before starting the engine each time (the starter will not run due to its thermal protection).

❑ Open the discharge valve to release all of the pressure in the compression gauge.

❑ Make progress with the diagram sheet.

❑ Carry out the same procedure for the other cylinders.

❑ Pressure value at compression end:

- Standard: 12.75 bar
- Minimum: 9.8 bar
- Maximum difference between the cylinders: 0.98 bar

❑ If the pressure at compression end on one or more cylinders is low:

- pour a small quantity of engine oil into the cylinders via the ignition plug holes,
- measure the pressure at compression end again on all cylinders,
- 1 - if the pressure at compression end increases on one or more cylinders then the piston rings may be damaged. In this case, check the pistons concerned (see **Piston - Con rod: Check**) and replace the defective piston rings (see **Piston - Con rod: Removal - Refitting**) .
- 2 - if the pressure at compression end remains low then the valves may be damaged. In this case, check the valves (see **Valve: Check**) and replace the defective parts (see **Valve: Removal - Refitting**) .
- 3 - if the pressure at compression end remains low on two or more cylinders that are next to one another, then the cylinder head gasket may be at fault (leakage) or the two cylinders concerned may have suffered valve damage. Check and repair as required.

III - FINAL OPERATION

❑ Remove the **petrol compression gauge**.

❑ Refit:

- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select other configurations mode,
- Run command **VP037: STOP FUEL SUPPLY INHIBITION**,

❑ Press the vehicle start button to start the engine.

> Note:
>
> If the engine does not start, run command **VP037: STOP FUEL SUPPLY INHIBITION** using the **Diagnostic tool** or switch off the ignition and wait **1 minute** before starting the engine again.

❑ Remove the **self-contained starter**.

V9X

Equipment required
diesel compression gauge
self-contained starter
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove:

- the engine cover,
- the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) ,
- the heater plugs (see **13C**, **Preheating**, **Heater plugs: Removal - Refitting**, page **13C-3**) .

138336

❑ Fit the hose end piece (**1**) in place of one of the removed plugs.

❑ Moderately tighten the hose end piece (**1**) using an open-jawed spanner.

138337

❑ Screw the conversion hose end piece (**2**) of the **diesel compression gauge** onto the hose.

❑ Moderately tighten the end piece onto the hose.

138338

❑ Connect the **diesel compression gauge** (**3**) available in the **Garage equipment** catalogue to the tool.

❑ Open the discharge valve (**4**) of the **diesel compression gauge** to release the pressure.

❑ Close the discharge valve (**4**) of the **diesel compression gauge**.

❑ Connect a **self-contained starter** available from the **Garage equipment** catalogue.

❑ Switch on the forced + after ignition.

❑ Connect the **Diagnostic tool**.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select erase mode,
- select reset programming mode,
- run command **RZ009: VEHICLE FUNCTIONS PROGRAMMING**,
- select other configurations mode,
- run the command **VP036: FUEL SUPPLY INHIBITION**,

❑ Put the vehicle under starting conditions:

- gear lever position P (Park),
- brake pedal depressed.

II - TEST OPERATION

1 - Automatic mode

❑ Connect the **Diagnostic tool**.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- Run command **SC031: OPERATIONAL FAULT FINDING OF THE CYLINDERS**.

> Note:
>
> If a fault was detected during the check, perform the check in manual mode.

2 - Manual mode

❑ Press the vehicle start button to trigger the engine starting phase.

❑ Follow the start-up cycle until the compression gauge needle stabilises to obtain the maximum value.

> Note:
>
> The engine is operated by the starter for **20 seconds maximum**, without starting.

> Note:
>
> It is necessary to wait for at least **10 seconds** before starting the engine each time (the starter will not run due to its thermal protection).

❑ Open the discharge valve to release all of the pressure in the **diesel compression gauge**.

❑ Make progress with the diagram sheet.

❑ Carry out the same procedure for the other cylinders.

III - FINAL OPERATION

❑ Remove:

- the **diesel compression gauge**,
- the hose end piece.

❑ Refit:

- the heater plugs (see **13C**, **Preheating**, **Heater plugs: Removal - Refitting**, page **13C-3**) ,

V9X

- the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) ,
- the engine cover.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select other configurations mode,
- Run command **VP037: STOP FUEL SUPPLY INHIBITION**,

❏ Press the vehicle start button to start the engine.

> Note:
>
> If the engine does not start, run command **VP037: STOP FUEL SUPPLY INHIBITION** using the **Diagnostic tool** or switch off the ignition and wait **1 minute** before starting the engine again.

❏ Remove the **self-contained starter**.

M9R

Equipment required
brush with non abrasive bristles

Tightening torques ▽	
fixed roller bolt	**44 N.m**
tensioning roller bolt	**25 N.m**
right-hand side member tie-rod bolts	**44 N.m**

REMOVAL

❑

IMPORTANT
Wear protective gloves during the operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),

122377

❑ Remove the right-hand side member tie-rod bolts (**1**) .

❑ Move aside the right-hand side member tie-rod.

Note:
Do not damage the rigid brake pipe.

M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

114854

- ❑ Place a **3 mm** Allen key in the tensioning roller hole (**2**) .
- ❑ Rotate the tensioning roller clockwise and push on the key at the same time until the tensioning roller locks.
- ❑ Remove the accessories belt.
- ❑ Turn the tensioning roller slightly in a clockwise direction.
- ❑ Remove the **3 mm** Allen key.
- ❑ Turn the tensioning roller anti-clockwise until it locks.

114021

- ❑ Remove:
  - the tensioning roller bolts (**3**) ,
  - the tensioning roller.

114022

- ❑ Remove:
  - the fixed roller protector (**4**) ,
  - the fixed roller bolt (**5**) ,
  - the fixed roller.

M9R

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Accessories belt (10,10,01,03)**,

parts always to be replaced: Accessories belt tensioning roller (10,10,01,04),

parts always to be replaced: Accessories fixed roller (10,10,01,06),

Note:

The Parts Department supplies the tensioning roller with a pin in the locked position.

WARNING

Only use brushes with plastic or non-corrosive metal (brass) bristles.

Note:

Clean the V-grooves on all accessories pulleys using a **brush with non abrasive bristles**.

II - REFITTING OPERATION FOR PART CONCERNED

M9R, and 746 or 809 or 849

127406

❑ Check that the fixed roller anti-dust deflector (**6**) is correctly positioned.

❑ Refit:

- the new fixed roller,
- the fixed roller bolt.

❑ Torque tighten the **fixed roller bolt (44 N.m)**.

❑ Refit:

- the fixed roller protector
- the new tensioning roller,
- the tensioning roller bolts.

❑ Torque tighten the **tensioning roller bolt (25 N.m)**.

❑ Refit the new accessories belt.

❑ Remove the tensioning roller locking pin.

❑ Turn the crankshaft twice.

❑ Check that the accessories belt V-grooves are correctly fitted in the accessories pulley V-grooves.

III - FINAL OPERATION

❑ Refit:

- the right-hand side member tie-rod,

M9R

- the right-hand side member tie-rod bolts.

❏ Torque tighten the **right-hand side member tie-rod bolts (44 N.m)**.

❏ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Tightening torques ▽	
fixed roller bolt	**25 Nm**
tensioning roller bolt	**50 Nm**

IMPORTANT
Wear protective gloves during the operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection).

II - REMOVAL OPERATION FOR PART CONCERNED

124137

❑ Turn the tensioning roller (**1**) clockwise using a **16 mm** spanner.

❑ Remove the accessories belt.

124136

❑ Remove

- the tensioning roller bolt (**2**) ,
- the tensioning roller,
- the fixed roller bolt (**3**) ,
- the fixed roller.

F4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ **parts always to be replaced: Accessories belt (10,10,01,03)**,

- **parts always to be replaced: Accessories belt tensioning roller (10,10,01,04)**,
- **parts always to be replaced: Accessories fixed roller (10,10,01,06)**,
- **parts always to be replaced: Accessories tensioning roller bolt (10,10,01,09)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new fixed roller,
- the new fixed roller bolt,
- the new tensioning roller,
- the new tensioning roller bolt.

❑ Torque tighten:

- the **fixed roller bolt (25 Nm)**,
- the **tensioning roller bolt (50 Nm)**.

❑ Refit the accessories belt, turning the tensioning roller clockwise using a **16 mm** spanner.

❑ Rotate the crankshaft twice to position the accessories belt correctly.

III - FINAL OPERATION.

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

M4R

Special tooling required	
Mot. 1368	Tool for tightening eccentric tensioning roller bolt. 8 mm Torx wrench and 12.7 mm square.

Tightening torques ▽	
tensioning roller bolt	**40 Nm**

WARNING
The tensioning roller must be replaced when the belt is replaced.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection).

II - REMOVAL OPERATION FOR PART CONCERNED

115082

115083

❑ Turn the accessories belt tensioning roller clockwise using a **14 mm** spanner.

❑ Lock the tensioning roller using a **6 mm** Allen key (**1**) .

❑ Remove the accessories belt.

M4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use a brush to remove any deposits from the crankshaft pulley v-grooves.

❑ **parts always to be replaced: Accessories belt (10,10,01,03)**,

parts always to be replaced: Accessories belt tensioning roller (10,10,01,04),

parts always to be replaced: Accessories tensioning roller bolt (10,10,01,09).

Replacing the auto tensioner

❑

> Note:
>
> Before removing the tensioning roller, always retrieve the **6 mm** Allen key.

115084

❑ Loosen the tensioning roller bolt using the **(Mot. 1368)** (**2**) .

❑ Remove the tensioning roller with the tensioning roller bolt from above.

115092

❑ Refit the new tensioning roller with the new tensioning roller bolt by placing the lug (**3**) in its housing (**4**) .

M4R

124915

124914

❑

> Note:
>
> Before torque tightening the tensioning roller, always adjust the junior torque wrench to **22 Nm** to obtain a tightening torque of **40 Nm** on the tensioning roller bolt.

❑ Torque tighten the **tensioning roller bolt (40 Nm)** using:

- the **(Mot. 1368)** (**5**) ,
- a **15 mm** (**6**) socket,
- a **125 mm** (**7**) extension piece,
- a **junior** (**8**) torque wrench.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Turn the accessories belt tensioning roller clockwise using a **14 mm** spanner.

❑ Lock the tensioning roller using a **6 mm** Allen key.

❑ Refit the new accessories belt.

❑ Retrieve the **6 mm** Allen key and gradually release the tensioning roller using a **14 mm** spanner.

❑ Rotate the crankshaft clockwise twice to balance the accessories belt tension on every pulley.

III - FINAL OPERATION.

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection).

II - REMOVAL OPERATION FOR PART CONCERNED

123818

❑ Rotate the accessories belt tensioning roller clockwise at (**1**) using a **16 mm** offset spanner.

❑ Remove the accessories belt.

123817

❑ Remove:

- the accessories belt tensioning roller bolt (**2**) ,
- the accessories belt tensioning roller.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑

WARNING
Only use brushes with plastic or non-corrosive metal (brass) bristles.

❑ Clean the accessories pulley V-grooves.

❑ **parts always to be replaced: Accessories belt (10,10,01,03)**,

❑ **parts always to be replaced: Accessories belt tensioning roller (10,10,01,04)**,

❑ **parts always to be replaced: Accessories tensioning roller bolt (10,10,01,09)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new accessories belt tensioning roller,
- the new accessories belt tensioning roller bolt.

❑ Tighten the accessories belt tensioning roller bolt.

❑ Refit the accessories belt.

K9K

❏ Turn the crankshaft twice.

III - FINAL OPERATION.

❏ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

K4M

Tightening torques ▽	
tensioning roller bolts	**25 N.m**
fixed roller bolt	**25 N.m**

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).
- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

14494-4

❑ Turn the accessories belt tensioning roller clockwise using a **13 mm** spanner (**1**) .

❑ Lock the tensioning roller using a **6 mm** Allen key (**2**) .

❑ Remove the accessories belt.

K4M

14494-2

❑

> Note:
> Before removing the tensioning roller, always retrieve the **6 mm** Allen key.

❑ Remove

- the fixed roller bolt (**3**) ,
- the idler pulley,
- the tensioning roller bolts (**4**) ,
- the tensioning roller.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use a brush to remove any deposits from the crankshaft pulley V-grooves.

❑ **parts always to be replaced: Accessories belt (10,10,01,03)**,

parts always to be replaced: Accessories belt tensioning roller (10,10,01,04),

parts always to be replaced: Accessories fixed roller (10,10,01,06),

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new tension wheel,
- a new fixed roller.

❑ Tighten to torque:

- the **tensioning roller bolts (25 N.m)**,
- the **fixed roller bolt (25 N.m)**.

❑ Turn the accessories belt tensioning roller clockwise using a **13 mm** spanner.

❑ Lock the tensioning roller using a **6 mm** Allen key.

❑ Refit the new accessories belt.

❑ Retrieve the **6 mm** Allen key and gradually unlock the tensioning roller using a **13 mm** spanner.

❑ Rotate the crankshaft clockwise twice to balance the accessories belt tension on every pulley.

III - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

V4Y

Special tooling required	
Mot. 1715	Belt tension checking tool (frequency indicator).

Tightening torques ▽	
tensioner bolt	**28 N.m**
automatic tensioner bolts	**22 N.m**
coolant pipe mountings	**17 N.m**

IMPORTANT
Wear protective gloves during the operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

1 - Power-assisted steering accessories belt

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

2 - Alternator and air conditioning compressor accessories belt

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

133864

❑ Disconnect the connector (**1**) from the oil level sensor.

❑ Remove the coolant pipe mountings (**2**) .

❑ Move aside the coolant pipe.

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Power-assisted steering accessories belt

22321

❑ Slacken the tensioning roller bolt (**3**) .

❑ Tighten the bolt (**4**) on the power-assisted steering belt tensioning system to loosen the accessories belt.

2 - Alternator and air conditioning compressor accessories belt

133862

❑ Turn the accessories belt automatic tensioner anti-clockwise using a **14 mm** offset wrench.

133863

❑ Lock the auto tensioner using a **6 mm** Allen key.

V4Y

133865

❑ Remove the accessories belt (**5**) .

❑ Remove the power-assisted steering accessories belt.

133866

❑ Remove:

- the automatic tensioner bolts (**6**) ,
- the auto tensioner.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ In case of reuse, clean the crankshaft accessories V-pulley using a brush to get rid of any deposit.

> **WARNING**
> Only use brushes with plastic or non-corrosive metal (brass) bristles.

> **WARNING**
> The belt must be replaced with a new one if it has been removed.

❑ **parts always to be replaced: Accessories belt (10,10,01,03)**.

❑ **parts always to be replaced: Accessories belt tensioning roller (10,10,01,04)**.

II - REFITTING OPERATION FOR PART CONCERNED

1 - Power-assisted steering accessories belt

❑ Refit a new power-assisted steering accessories belt.

V4Y

22321

- ❑ Tighten the power-assisted steering accessories belt by loosening the belt tensioning bolt (**7**) .
- ❑ Adjust the tension of the power-assisted steering accessories belt using the tool **(Mot. 1715)** by fitting the tool at (**A**) .

  The power-assisted steering belt tension must be between **219** and **243 Hz**.
- ❑ Refit the tensioner bolt (**8**) .
- ❑ Torque tighten the **tensioner bolt (28 N.m)**.

2 - Alternator and air conditioning compressor accessories belt

- ❑ Refit a new automatic tensioner.
- ❑ Torque tighten the **automatic tensioner bolts (22 N.m)**.
- ❑ Turn the new accessories belt automatic tensioner anti-clockwise using a **14 mm** offset wrench.
- ❑ Lock the auto tensioner using a **6 mm** Allen key.
- ❑ Refit a new accessories belt.
- ❑ Gradually release the tensioning roller using a **14 mm** offset wrench and remove the **6 mm** Allen key.

III - FINAL OPERATION

- ❑ Turn the crankshaft twice.

1 - Power-assisted steering belt

- ❑ Refit:
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.

2 - Alternator and air conditioning compressor accessories belt

- ❑ Fit the coolant pipe.
- ❑ Refit the coolant pipe mountings.
- ❑ Torque tighten the **coolant pipe mountings (17 N.m)**.
- ❑ Connect the connector to the oil level sensor.
- ❑ Refit:
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.

V9X

Equipment required
brush with non abrasive bristles

Tightening torques ▽	
fixed roller bolts	**50 Nm**
tensioning roller bolt	**62 N.m**

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

133908

❑ Remove the bolts (**1**) from the rigid cooling pipe.

❑ Move aside the rigid cooling pipe.

138354

❑ Remove:

- the power-assisted steering pipe bolt (**2**) ,
- the power-assisted steering pipe nut (**3**) .

❑ Remove the power-assisted steering pipe.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

133909

- ❑ Fit a **4 mm** Allen key in the tensioning roller hole (**4**) .
- ❑ Turn the tensioning roller clockwise and push on the key at the same time until the tensioning roller locks.
- ❑ Remove the accessories belt.
- ❑ Turn the tensioning roller slightly in a clockwise direction.
- ❑ Remove the **4 mm** Allen key.
- ❑ Turn the tensioning roller anti-clockwise until it locks.
- ❑ Remove:
  - the tensioning roller bolt (**5**) ,
  - the tensioning roller.

133907

- ❑ Remove:
  - the guards (**6**) from the fixed rollers,
  - the fixed roller bolts,
  - the fixed rollers.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ **parts always to be replaced: Accessories fixed roller (10,10,01,06)**.
- ❑ **parts always to be replaced: Accessories belt tensioning roller (10,10,01,04)**.
- ❑ **parts always to be replaced: Accessories belt (10,10,01,03)**.

WARNING
Only use brushes with plastic or non-corrosive metal (brass) bristles.

Note:
Clean the V-grooves on all accessories pulleys using a **brush with non abrasive bristles**.

Note:
The Parts Department supplies the tensioning roller with a pin in the locked position.

V9X

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit new fixed rollers.
- ❑ Torque tighten the **fixed roller bolts (50 Nm)**.
- ❑ Refit:
  - the guards for the fixed rollers,
  - a new tensioning roller.
- ❑ Torque tighten the **tensioning roller bolt (62 N.m)**.
- ❑ Refit a new accessories belt.
- ❑ Turn the tensioning roller slightly in a clockwise direction.
- ❑ Remove the tensioning roller locking pin.
- ❑ Turn the crankshaft twice.
- ❑ Check that the accessories belt V-grooves are correctly fitted in the accessories pulley V-grooves.

III - FINAL OPERATION

- ❑ Fit the power-assisted steering pipe.
- ❑ Refit:
  - the power-assisted steering pipe nut,
  - the power-assisted steering pipe bolt.
- ❑ Refit:
  - the rigid cooling pipe,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the engine undertray,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Tightening torques ▽	
crankshaft accessories pulley bolt	**40 Nm + 110° ± 10°**

IMPORTANT
Wear protective gloves during the operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123719

❑ Lock the engine flywheel using a screwdriver at (**1**) .

124135

❑ Remove:

- the crankshaft accessories pulley bolt (**2**) ,
- the crankshaft accessories pulley.

F4R

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Parts always to be replaced:

- the crankshaft accessories pulley bolt,
- the crankshaft accessories pulley.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the new crankshaft accessories pulley,
- the new crankshaft accessories pulley bolt, locking the engine flywheel using a screwdriver.

❏ Torque tighten the **crankshaft accessories pulley bolt (40 Nm + 110° ± 10°)**.

III - FINAL OPERATION.

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

❏ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

M4R

Special tooling required	
Mot. 1789	Tool for immobilising the crankshaft pulley, timing end

Equipment required
two-claw extractor for exterior socket

Tightening torques ▽	
crankshaft accessories pulley bolt (initial torque)	**68 Nm**
crankshaft accessories pulley bolt	**30 Nm + 60**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123465

❑ Position the **(Mot. 1789)** (**1**) to lock the crankshaft accessories pulley.

❑ Tighten the bolt (**2**) of the **(Mot. 1789)** on the cylinder block.

❑ Undo:

- the crankshaft accessories pulley bolt (**3**) ,
- the bolt of the **(Mot. 1789)** on the cylinder block.

❑ Remove:

- the **(Mot. 1789)**,
- the crankshaft accessories pulley bolt,
- the crankshaft accessories pulley using a **two-claw extractor for exterior socket**.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ **parts always to be replaced: Crankshaft accessories pulley (10,03,03,07)**,

parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the crankshaft accessories pulley,

M4R

- the crankshaft accessories pulley bolt,
- the **(Mot. 1789)**.

❏ Tighten:

- the bolt of the **(Mot. 1789)** on the cylinder block,
- to torque the **crankshaft accessories pulley bolt (initial torque) (68 Nm)**.

❏ Loosen the crankshaft accessories pulley bolts.

❏ Torque and angle tighten the **crankshaft accessories pulley bolt (30 Nm + 60)**.

❏ Loosen the bolt of the **(Mot. 1789)** on the cylinder block.

❏ Remove the **(Mot. 1789)**.

III - FINAL OPERATION.

❏ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

M9R

Special tooling required	
Mot. 1770	Crankshaft pulley locking tool.

Tightening torques ▽	
crankshaft accessories pulley bolt	**50 Nm + 85° ± 6°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124167

❑ Immobilise the crankshaft accessories pulley using the **(Mot. 1770)** (**1**) .

❑ Remove the crankshaft accessories pulley bolt.

124165

❑ Remove:

- the crankshaft accessories pulley washer (**2**) ,
- the crankshaft accessories pulley (**3**) .

M9R

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the crankshaft accessories pulley bolt.

WARNING
Only use brushes with plastic or non-corrosive metal (brass) bristles.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

❑ In case of reuse, clean the crankshaft accessories V-pulley using a brush to get rid of any deposit.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the crankshaft accessories pulley by inserting it into the two crankshaft flat surfaces,
- the crankshaft accessories pulley washer,
- the new crankshaft accessories pulley bolt.

❑ Position the **(Mot. 1770)**.

❑ Torque tighten the **crankshaft accessories pulley bolt (50 Nm + 85° ± 6°)**.

III - FINAL OPERATION.

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

K4M

Special tooling required	
Mot. 1489	TDC locating pin.
Mot. 1496	Camshaft timing tool.
Mot. 1750	Additional tool to support the camshaft adjusting tool, Mot. 1496.
Mot. 1487	Tool for refitting camshaft covers (57 mm diameter).
Mot. 1488	Tool for refitting camshaft covers (43 mm diameter).

Tightening torques ▽	
new bolt on the crankshaft accessories pulley	**40 N.m + 115° ± 10°**
TDC setting pin plug	**20 N.m**

IMPORTANT
Wear protective gloves during the operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray.
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

128455

❑ Unclip the heater matrix hose from the lifting eye.

❑ Unclip:

- the gearbox breather pipe from the lifting eye,
- the engine wiring connector (**1**) from the lifting eye.

❑ Move the engine wiringaside.

K4M

103271

❑ Remove the lifting eye bolts (**2**) .

14491

❑ Remove the engine lifting eye (**3**) on the flywheel side.

❑ Pierce the centre of the plugs (**4**) at the camshaft ends with a screwdriver.

❑ Remove:

- the plugs from the camshaft ends with a screwdriver,
- the TDC setting pin plug (**5**) .

14491-1

❑ Position the camshaft grooves (**6**) almost horizontally and offset towards the bottom turning the crankshaft in the operating direction (clockwise at timing end).

❑ Screw in the TDC setting pin (**7**) **(Mot. 1489)**.

14489

❑ Turn the crankshaft in its operating direction (clockwise at timing end), until the crankshaft presses against the TDC setting pin **(Mot. 1489)**.

K4M

14490

- The camshaft grooves (**8**) must be horizontal and offset downwards.
- Remove the TDC setting pin **(Mot. 1489)**.
- Lock the flywheel using a screwdriver.

II - OPERATION FOR REMOVAL OF PART CONCERNED

14487

- Remove:
  - the crankshaft accessories pulley bolt (**9**) ,
  - the crankshaft accessories pulley.

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10)**

  parts always to be replaced: Crankshaft accessories pulley (10,03,03,07)

108873

- Fit:
  - the timing tool **(Mot. 1496)** (**10**) fitted with the **(Mot. 1750)** (**11**) ,
  - a lifting eye bolt (**12**) to secure the timing tool **(Mot. 1496)** fitted with the **(Mot. 1750)**.

K4M

14489-2

❑ Screw in the TDC setting pin **(Mot. 1489)**.

> **WARNING**
> Check that the crankshaft is pressing against the TDC setting pin **(Mot. 1489)**.
>
> The crankshaft groove must be upwards.

130493

❑ If the crankshaft is not pressing against the TDC setting pin, bring the crankshaft back by turning the flywheel using a screwdriver (**13**) .

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the new crankshaft accessories pulley.

❑ Torque tighten the **new bolt on the crankshaft accessories pulley (40 N.m + 115° ± 10°)**.

III - FINAL OPERATION.

❑ Remove:

- the TDC setting pin **(Mot. 1489)**,
- the lifting eye bolt from the timing tool **(Mot. 1496)** fitted with the **(Mot. 1750)**,
- the timing tool **(Mot. 1496)** fitted with the **(Mot. 1750)**.

❑ Refit:

- the inlet camshaft plug using the **(Mot. 1487)**,
- the exhaust camshaft plug using the **(Mot. 1488)**,
- the lifting eye.

❑ Fit the engine wiring.

❑ Clip onto the lifting eye:

- the engine wiring connector,
- the breather pipe on the gearbox.

❑ Clip the heater matrix hose onto the lifting eye.

❑ Place a drop of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) on the thread of the TDC setting pin plug.

❑ Refit the TDC setting pin plug.

❑ Torque tighten the **TDC setting pin plug (20 N.m)**.

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

V4Y

Tightening torques ▽	
crankshaft accessories pulley bolt	**44 N.m + 90°**

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

119604

❑ Fit a screwdriver in the starter hole to prevent the engine from rotating.

II - OPERATION FOR REMOVAL OF PART CONCERNED

119607

❑ Remove:

- the crankshaft accessories pulley bolt,
- the crankshaft accessories pulley (**1**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ In case of reuse, clean the crankshaft accessories V-pulley using a brush to get rid of any deposit.

WARNING
Only use brushes with plastic or non-corrosive metal (brass) bristles.

❑ **parts always to be replaced: Crankshaft accessories pulley bolts (10,10,01,11)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the crankshaft accessories pulley,
- a new crankshaft accessories pulley bolt.

❑ Torque tighten the **crankshaft accessories pulley bolt (44 N.m + 90°)**.

V4Y

III - FINAL OPERATION

❏ Remove the screwdriver from the starter hole.

❏ Refit:

- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

V9X

Tightening torques ▽	
crankshaft accessories pulley bolt	**50 Nm + 85° ± 6°**

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124167

❑ Immobilise the crankshaft accessories pulley using the (**1**) .

❑ Remove the crankshaft accessories pulley bolt.

124165

❑ Remove:

- the crankshaft accessories pulley washer (**2**) ,
- the crankshaft accessories pulley (**3**) .

V9X

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10)**.
- In case of reuse, clean the crankshaft accessories V-pulley using a brush to get rid of any deposit.

> **WARNING**
> Only use brushes with plastic or non-corrosive metal (brass) bristles.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the crankshaft accessories pulley by inserting it into the two crankshaft flat surfaces,
  - the crankshaft accessories pulley washer,
  - a new crankshaft accessories pulley bolt.
- Position the.
- Tighten to torque the **crankshaft accessories pulley bolt (50 Nm + 85° ± 6°)**.

III - FINAL OPERATION

- Refit:
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the engine undertray,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Special tooling required	
Mot. 1489	TDC locating pin.

Tightening torques ▽	
the crankshaft accessories pulley bolt	**120 N.m + 95° ± 15°**
TDC setting pin plug	**25 N.m**

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front section of the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

135405

❑ Lock the flywheel using a screwdriver (**1**) .

135491

❑ Remove:

- the crankshaft accessories pulley bolt (**2**) ,
- the crankshaft accessories pulley (**3**) .

K9K

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10)**.

> **WARNING**
> Only use brushes with plastic or non-corrosive metal (brass) bristles.

❑ If reusing the crankshaft accessories pulley, clean the crankshaft accessories pulley V-grooves with a brush to eliminate any deposits.

107272

❑ Refit the old crankshaft accessories pulley bolt (**4**) with a spacer (**5**) .

❑ Turn the crankshaft clockwise (timing end) using the old bolt of the crankshaft accessories pulley, until the collet of the crankshaft timing pinion (**6**) is almost vertical and facing upwards.

135472

❑ Remove the TDC setting pin plug (**7**) .

135471

❑ Screw tool **(Mot. 1489)** into the cylinder block.

❑ Remove the old bolt from the crankshaft accessories pulley fitted with its spacer.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the crankshaft accessories pulley,
- a new crankshaft accessories pulley bolt.

14489

- Turn the crankshaft clockwise (timing end) smoothly using the bolt of the crankshaft accessories pulley, until the crankshaft presses against the tool **(Mot. 1489)** (**8**) .

- Torque tighten **the crankshaft accessories pulley bolt (120 N.m + 95° ± 15°)**.

III - FINAL OPERATION

- Remove the **(Mot. 1489)** from the cylinder block.

- Apply a drop of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the thread of the TDC setting pin plug.

- Torque tighten the **TDC setting pin plug (25 N.m)**.

- Refit:

  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

  - the engine undertray,

  - the front section of the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),

  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

  - the engine cover.

F4R

Special tooling required	
Mot. 1054	TDC setting pin.
Mot. 1496	Camshaft timing tool.
Mot. 1801	Camshaft sprocket locking tool F4 engines.
Mot. 1509-01	Adapter kit for tool Mot.1509 or Mot.1801
Mot. 1487	Tool for refitting camshaft covers (57 mm diameter).
Mot. 1488	Tool for refitting camshaft covers (43 mm diameter).

Tightening torques ▽	
toothed sprocket nuts	**80 Nm**
fixed roller bolt	**50 Nm**
tensioning roller nut (initial torque)	**7 Nm**
tensioning roller nut	**28 Nm**
new inlet camshaft pulley nut	**30 Nm**
new exhaust camshaft pulley nut	**30 Nm**
inlet camshaft pulley nut	**86° ± 6°**
exhaust camshaft pulley nut	**86° ± 6°**
crankshaft accessories pulley bolt	**40 Nm + 110° ± 10°**
engine tie-bar bolt on the subframe	**115 Nm**
engine tie-bar bolt on the engine tie-bar mounting	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray.

123177

❑ Remove:

- the engine tie-bar bolt (**1**) on the engine tie-bar mounting,
- the engine tie-bar bolt (**2**) on the subframe,
- the lower linkage.

F4R

124125

❑ Remove:

- the nuts (**3**) from the exhaust flange,
- the exhaust harness seal,

❑ Remove:

- the accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the breather pipe on the gearbox,
- the breather pipe clip on the gearbox.

120211

❑ Remove the TDC pin plug (**4**) .

123146

❑ Remove the camshaft plugs (**5**) (drill out the centre of the plugs and remove them using a screwdriver).

F4R

21878

❑ Remove:

- the upper timing cover bolts (**6**) ,
- the upper timing cover nuts (**7**) ,
- the upper timing cover,
- the lower timing cover bolts (**8**) ,
- the lower timing cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - SETTING THE TIMING

❑ Refit:

- the crankshaft accessories pulley,
- the crankshaft accessories pulley bolt.

15106

❑ Rotate the engine clockwise (timing end) so that the camshaft grooves are offset below the centre line and almost horizontal.

F4R

Position of the TDC pin before the setting point

15163-2

Position of the TDC pin at the setting point

15163-1

❑ Insert the TDC setting pin **(Mot. 1054)** and rotate the engine slightly clockwise (timing end) until the setting point is reached.

15106-1

❑ At the setting point the camshaft grooves must be horizontal and offset below the centre line.

123147

❑ Position the tool **(Mot. 1496)** (**9**) on the ends of the camshafts.

❑ Lock the tool **(Mot. 1496)** using a bolt (**10**) .

❑ Remove:

- the crankshaft accessories pulley bolt,

- the crankshaft accessories pulley.

F4R

2 - Removing the timing belt

21877-1

- ❑ Slacken the timing belt by undoing the tensioning roller nut (**11**) .
- ❑ Remove:
  - the tensioning roller nut,
  - the tensioning roller,
  - the fixed roller bolt (**12**) ,
  - the fixed roller fitted with its spacer,
  - the timing belt,
  - the crankshaft timing sprocket.

3 - Unlocking camshaft pulleys

123141

- ❑ Fit the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)** (**13**) .
- ❑ Bring the toothed sprockets of the tool **(Mot. 1801)** into contact with the camshaft pulleys.
- ❑ Torque tighten the **toothed sprocket nuts (80 Nm)**.
- ❑ Undo:
  - the old inlet camshaft pulley nut (**14**) by one turn,
  - the old exhaust camshaft pulley nut (**15**) by one turn.
- ❑ Remove the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ **parts always to be replaced: Timing belt (10,02, 04,02)**,
  - **parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10)**
  - **parts always to be replaced: Inlet camshaft cap (10,02,02,11)**,
  - **parts always to be replaced: Exhaust camshaft cap (10,02,02,12)**,
  - **parts always to be replaced: Exhaust camshaft pulley nut (10,02,02,13)**,
  - **parts always to be replaced: Timing belt tensioning roller (10,02,04,04)**,

F4R

- **parts always to be replaced: Timing fixed roller (10,02,04,05)**,
- the exhaust harness seal,

II - REFITTING OPERATION FOR PART CONCERNED

1 - Adjusting the timing

123147

❑ Check that camshaft setting tool **(Mot. 1496)** is still in place.

Position of the TDC pin at the setting point

15163-1

❑ Check that the TDC pin **(Mot. 1054)** is still in place and that the crankshaft is set.

F4R

104703

❑

WARNING

Always degrease:

- the end of the crankshaft (timing end),
- the timing sprocket bore and contact surfaces,
- the bearing faces of the crankshaft accessories pulley.

This is to avoid timing slippage.

This slippage causes engine damage.

2 - Operation for refitting the timing belt

❑ Refit the timing sprocket on the crankshaft.

15201

❑ Refit:

- the new tensioning roller, ensuring that the lug (**16**) is positioned in the groove (**17**) ,
- the tensioning roller nut.

Note:

Ensure that the tool **(Mot. 1496)** is correctly fitted and that the inlet camshaft pulley and the exhaust camshaft pulley can rotate freely so that the timing belt tension is correct.

❑ Refit:

- the new timing belt,
- the new fixed roller fitted with its spacer,
- the fixed roller bolt.

❑ Torque tighten the **fixed roller bolt (50 Nm)**.

F4R

3 - Timing belt tension

15256

❑

> Note:
>
> When tightening the tensioning roller, use a 6 mm Allen key to stop the roller moving during the procedure.

❑ Align the marks (**18**) and (**19**) of the tensioning roller using a **6 mm** Allen key at (**A**) .

❑ Torque tighten the **tensioning roller nut (initial torque) (7 Nm)**.

123141

❑ Fit the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**.

❑ Bring the toothed sprockets of the tool **(Mot. 1801)** into contact with the camshaft pulleys.

❑ Tighten to torque:

- the **toothed sprocket nuts (80 Nm)**,
- the **old inlet camshaft pulley nut (30 Nm)**,
- the **old exhaust camshaft pulley nut (30 Nm)**.

❑ Remove:

- the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**,
- the TDC setting pin **(Mot. 1054)**,
- the camshaft setting tool **(Mot. 1496)**.

4 - Checking the setting and the tension of the timing belt

a - Checking the timing

❑ Refit:

- the crankshaft accessories pulley,
- the new crankshaft accessories pulley bolt.

F4R

Position of the TDC pin before the setting point

15163-2

Position of the TDC pin at the setting point

15163-1

❑ Rotate the crankshaft clockwise by two turns (timing end), and before the end of the two turns, insert the TDC pin **(Mot. 1054)** then move the crankshaft to its setting point.

15106-1

❑ Fit the camshaft setting tool **(Mot. 1496)** (without forcing it).

b - Checking the tension

15256

❑ After the engine has been rotated twice, check that the tensioning roller marks are correctly aligned; if they are not aligned return to the timing belt tension step.

❑ Torque tighten the **tensioning roller nut (28 Nm)**.

F4R

123141

- ❑ Fit the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**.
- ❑ Bring the toothed sprockets of the tool **(Mot. 1801)** into contact with the camshaft pulleys.
- ❑ Torque tighten the **toothed sprocket nuts (80 Nm)**.
- ❑ Undo:
  - the old inlet camshaft pulley nut,
  - the old exhaust camshaft pulley nut.
- ❑ Fit without tightening:
  - the new inlet camshaft pulley nut,
  - the new exhaust camshaft pulley nut.
- ❑ Tighten to torque:
  - the **new inlet camshaft pulley nut (30 Nm)**,
  - the **new exhaust camshaft pulley nut (30 Nm)**.

123147

- ❑ Remove:
  - the bolt (**20**) on the tool **(Mot. 1496)**,
  - the camshaft setting tool **(Mot. 1496)**.
- ❑ Angle tighten:
  - the **inlet camshaft pulley nut (86° ± 6°)**,
  - the **exhaust camshaft pulley nut (86° ± 6°)**.
- ❑ Remove:
  - the **(Mot. 1801)** fitted with the **(Mot. 1509-01)**,
  - the TDC setting pin **(Mot. 1054)**.
- ❑ Refit:
  - the new cap at the inlet camshaft end using the tool **(Mot. 1487)**,
  - the new cap at the exhaust camshaft end using the tool **(Mot. 1488)**.

III - FINAL OPERATION.

- ❑ Refit:
  - the crankshaft TDC pin plug by applying a drop of **MASTIXO** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to the thread,
  - the lower timing cover,
  - the lower timing cover bolts.
- ❑ Tighten the lower timing cover bolts.
- ❑ Refit:
  - the upper timing cover,

- the upper timing cover nuts,
- the upper timing cover.

❑ Tighten:

- the upper timing cover nuts,
- the upper timing cover.

❑ Refit the breather pipe clip on the gearbox.

❑ Clip the breather pipe to the gearbox.

❑ Refit the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Torque tighten the **crankshaft accessories pulley bolt (40 Nm + 110° ± 10°)**.

❑ Refit:

- the new exhaust bracket seal,
- exhaust bracket nuts .

❑ Tighten the exhaust bracket nuts.

❑ Refit:

- the lower linkage,
- the engine tie-bar bolt on the subframe,
- the engine tie-bar bolt on the engine tie-bar mounting.

❑ Tighten to torque:

- the **engine tie-bar bolt on the subframe (115 Nm)**,
- the **engine tie-bar bolt on the engine tie-bar mounting (190 Nm)**.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K

Special tooling required	
Mot. 1489	TDC locating pin.
Mot. 1430	Set of 5 crankshaft and camshaft pulley timing pins.

Tightening torques ▽	
crankshaft accessories pulley bolt	**120 N.m + 95° ± 15°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

1 - First timing cover assembly type

123844

❑ Remove:

- the upper timing cover by pressing the clips (**1**) ,
- the upper timing cover,
- the lower timing cover bolt (**2**) ,
- the lower timing cover by pressing the clips (**3**) .

K9K

2 - Second timing cover assembly type

135495

135494

135493

135492

K9K

135475

135476

❑ Remove:

- the upper timing cover (**4**) by pressing on the clips (**5**) ,
- the bolt (**6**) from the intermediate timing cover (**7**) ,
- the intermediate timing cover (**7**) by pressing on the clips (**8**) ,
- the lower timing cover (**9**) by pressing on the clips (**10**) .

3 - Both continued in the same way for removal

123845

❑ Remove the bolts (**11**) from the right-hand suspended engine mounting support.

❑ Turn the timing belt slightly to remove the right-hand suspended engine mounting support.

❑ Remove the right-hand suspended engine mounting support.

123841

❑ Remove the TDC setting pin plug (**12**) .

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED

107270

❑ Turn the crankshaft to position the hole in the camshaft pulley hub almost opposite the hole in the cylinder head.

123843

❑ Screw tool **(Mot. 1489)** (**15**) into the cylinder block.

14489-1

❑ Turn the crankshaft clockwise (timing end) smoothly until the crankshaft comes in to contact with the tool **(Mot. 1489)**.

109049

❑ Insert the tool **(Mot. 1430)** (**16**) in the holes of the camshaft pulley hub and of the cylinder head.

109046

- Undo the timing belt tensioning roller bolt (**17**) .
- Remove:
  - the timing belt,
  - the timing belt tensioning roller bolt,
  - the timing belt tensioning roller.

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: Timing belt (10,02, 04,02)**,
- **parts always to be replaced: Timing belt tensioning roller (10,02,04,04)**,
- **parts always to be replaced: Crankshaft accessories pulley (10,03,03,07)**,
- **parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10)**.

K9K

II - REFITTING OPERATION FOR PART CONCERNED

109042

109043

- ❑ Refit a new timing belt tensioning roller.
- ❑ Fit the timing belt tensioning roller lug (**18**) in the cylinder head groove (**19**) .
- ❑ Refit the timing belt tensioning roller bolt.
- ❑ Engage the tool **(Mot. 1430)** (**20**) in the holes of the camshaft pulley hub and of the cylinder head using an **18 mm** offset wrench, if necessary.
- ❑ Check that:
  - the mark (**21**) on the high pressure pump is offset by one tooth to the right of the vertical axis (**22**) ,
  - the crankshaft is properly resting against the TDC setting pin (with the crankshaft timing sprocket collet (**23**) at the top).

109049

- ❑ Remove the lower bolt (**24**) from the camshaft pulley hub.
- ❑ Loosen the two other camshaft pulley wheel bolts by one turn.

K9K

109044

- ❑ Fit a new timing belt starting with the crankshaft sprocket.
- ❑ Align the timing belt marks with the marks:
  - of the crankshaft timing sprocket,
  - of the camshaft pulley,
  - of the high pressure pump pulley.

> Note:
>
> There should be 19 belt tooth grooves between the marks on the camshaft pulley and the high pressure pump pulley and 51 belt tooth grooves between the marks on the crankshaft timing sprocket and the high pressure pump pulley.

19658

- ❑ Bring the timing belt tensioning roller adjustable index (**25**) opposite the lug (**26**) using a **6 mm** Allen key, turning it anti-clockwise.
- ❑ Tighten the timing belt tensioning roller bolt.

K9K

109047

❑ Check that the camshaft pulley hub bolts are not fully up against the camshaft pulley wheel.

109045

❑ Tighten the camshaft pulley hub bolts.

❑ Remove:

- the **(Mot. 1489)**,

- the **(Mot. 1430)**.

107272

❑ Refit the old crankshaft accessories pulley bolt with a spacer (**28**) (which does not cover the crankshaft timing sprocket mark) on the crankshaft.

107270

❑ Rotate the crankshaft twice in a clockwise direction (timing end) before the camshaft pulley hub hole is opposite the cylinder head hole.

❑ Screw tool **(Mot. 1489)** into the cylinder block.

❑ Turn the crankshaft clockwise (timing end) smoothly until the crankshaft comes in to contact with the tool **(Mot. 1489)**.

109049

❑ Set the camshaft pulley using the **(Mot. 1430)**.

109048

❑ If the tool **(Mot. 1430)** does not engage correctly:

- loosen the camshaft pulley hub bolts by one turn,
- turn the hub using an **18 mm** offset wrench to set the camshaft pulley hub timing,
- do not retighten the camshaft pulley hub bolts.

K9K

109045

❑ Check that the crankshaft timing sprocket collet (**29**) is positioned vertically at the top.

> Note:
>
> After the two turns, the adjustable index of the tensioning roller may be in two different positions.
>
> The rotation of the tension wheel eccentric depends on the position.

K9K

First position of the timing tension wheel adjustable index

111083

111081

- ❑ Undo the timing tension wheel bolt by up to one turn, holding the adjustable index with a **6 mm** Allen key.
- ❑ Gradually position the timing tensioning roller adjustable index, turning the key anti-clockwise to the middle of the timing window.

Second position of the timing tensioning roller adjustable index

111082

111081

- ❑ Undo the timing tension wheel bolt by up to one turn, holding the adjustable index with a **6 mm** Allen key.
- ❑ Gradually position the timing tensioning roller adjustable index, turning the key clockwise to the middle of the timing window.
- ❑ Tighten the bolts:
  - of the timing tension wheel,
  - of the camshaft pulley hub.
- ❑ Remove:
  - the **(Mot. 1489)**,

- the **(Mot. 1430)**.

❑ Rotate the crankshaft twice in a clockwise direction (timing end) before the camshaft pulley hub hole is opposite the cylinder head hole.

❑ Screw tool **(Mot. 1489)** into the cylinder block.

❑ Turn the crankshaft clockwise (timing end) smoothly until the crankshaft comes in to contact with the tool **(Mot. 1489)**.

109049

❑ Set the camshaft pulley using the **(Mot. 1430)**.

❑ If it is not possible to set the camshaft pulley, repeat the timing belt refitting operation.

❑ Check that the timing tension wheel adjustable index is correctly positioned in the middle of the timing window, otherwise repeat the timing belt tension operation.

123839

❑ Refit the lower timing cover by positioning the lower timing cover tab (**30**) in the inner cover opening (**31**) .

❑ Clip on the lower timing cover.

1 - First timing cover assembly type

❑ Refit the lower timing cover bolt.

2 - Second timing cover assembly type

❑ Refit the intermediate timing cover.

❑ Clip on the intermediate timing cover.

❑ Refit the intermediate timing cover bolt.

3 - Both continued in the same way for refitting

❑ Refit the upper timing cover.

❑ Clip on the upper timing cover.

123840

- ❑ Refit the new accessories crankshaft pulley with a new bolt.
- ❑ Tighten to torque and angle the **crankshaft accessories pulley bolt (120 N.m + 95° ± 15°)**.
- ❑ Remove:
  - the **(Mot. 1489)**,
  - the **(Mot. 1430)**.

III - FINAL OPERATION

- ❑ Coat the TDC pin plug threading with **SILICONE ADHESIVE SEAL** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- ❑ Refit the TDC pin plug.
- ❑ Tighten the TDC pin plug.
- ❑ Fit the right-hand suspended engine mounting support.
- ❑ Refit the right-hand suspended engine mounting support bolts.
- ❑ Tighten the right-hand suspended engine mounting support bolts.
- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .
  - the engine undertray,
  - the engine undertray bolts,
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Special tooling required	
Mot. 799-01	Timing gear wheel immobiliser.
Mot. 1496	Camshaft timing tool.
Mot. 1750	Additional tool to support the camshaft adjusting tool, Mot. 1496.
Mot. 1489	TDC locating pin.
Mot. 1490-01	For locking and adjusting the camshaft pulleys.
Mot. 1487	Tool for refitting camshaft covers (57 mm diameter).
Mot. 1488	Tool for refitting camshaft covers (43 mm diameter).

Tightening torques ▽	
timing tensioning roller nut	**27 N.m**
timing fixed roller bolt	**50 N.m**
lower timing cover bolts	**12 N.m**
new crankshaft accessories pulley bolt	**40 N.m + 145° ± 15°**
exhaust camshaft sprocket nut	**30 N.m + 84° ± 4**
camshaft dephaser bolt	**100 N.m**
flywheel end lifting eye bolts	**10 N.m**
TDC pin plug	**20 N.m**
upper timing cover bolts	**46 N.m**
upper timing cover nuts	**46 N.m**
rear suspended engine mounting bolt on the rear suspended engine mounting support	**180 N.m**
rear suspended engine mounting bolt on the subframe	**180 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

128259

❑ Remove:

- the rear suspended engine mounting bolt (**1**) from the subframe,
- the rear suspended engine mounting bolt (**2**) from the rear suspended engine mounting support,

- the rear suspended engine mounting.

14487

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the upper timing cover bolts,
- the upper timing cover nuts,
- the upper timing cover (**3**) ,
- the lower timing cover bolts (**4**) ,
- the lower timing cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

103268

❑ Loosen the nut (**5**) of the timing tensioning roller.

> Note:
>
> Do not drop the crankshaft timing sprocket when removing the timing belt.

❑ Remove:

- the timing fixed roller bolt,
- the timing fixed roller,
- the timing belt,
- the timing tensioning roller nut,
- the timing tensioning roller,
- the crankshaft timing sprocket.

K4M

REFITTING - PROCEDURE 1

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Timing belt (10,02, 04,02)**,

parts always to be replaced: Timing belt tensioning roller (10,02,04,04),

parts always to be replaced: Timing fixed roller (10,02,04,05),

parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10),

parts always to be replaced: Inlet camshaft cap (10,02,02,11),

parts always to be replaced: Exhaust camshaft cap (10,02,02,12).

II - REFITTING OPERATION FOR PART CONCERNED

❑ The first procedure applies to replacing any timing face component which has a crankshaft timing sprocket without a collet and which does not require the exhaust camshaft sprocket or camshaft dephaser to be loosened.

1 - Adjusting the timing

❑

WARNING

Be sure to degrease:

- the end of the crankshaft (timing end),
- the timing sprocket pressure faces and bore of the crankshaft,
- the crankshaft accessories pulley bearing faces,
- the camshaft ends (timing end),
- the camshaft sprocket bores and bearing faces.

This is to avoid timing slippage.

This slippage leads to engine damage.

❑ Set the camshaft grooves horizontally and below the centre line by turning the camshafts with the **(Mot. 799-01)** if necessary.

111337

❑ Fit the **(Mot. 1496)** with the **(Mot. 1750)** (**6**) .

111336

❑ Fit:

- the **(Mot. 1496)** (**7**) fitted with the **(Mot. 1750)** on the end of the camshaft,
- a lifting eye bolt (**8**) to secure the tool **(Mot. 1496)** equipped with the tool **(Mot. 1750)**.

K4M

103268

❑ Check that the mark (**9**) on the camshaft dephaser is vertical and pointing upwards.

❑ Make a mark (**10**) with a pencil between the camshaft dephaser gear and the rocker cover.

2 - Refitting

108879

❑ Refit a new timing tensioning roller by positioning the lug of the timing tensioning roller in the groove (**11**) .

❑ Screw on the timing tensioning roller nut without tightening it.

103268

❑ Refit:

- the crankshaft timing sprocket (**12**) ,
- a new timing belt,
- a new timing fixed roller (**13**) .

103268

❑ Torque tighten the **timing fixed roller bolt (50 N.m)** (**14**) .

K4M

3 - Timing belt tension

103263

- ❑ Position the adjustable index (**15**) opposite the mark (**16**) , by turning the eccentric (**17**) clockwise using a **6 mm** Allen key.
- ❑ Torque tighten the **timing tensioning roller nut (7 N.m)**.
- ❑ Refit:
  - the tool **(Mot. 1489)** in the cylinder block,
  - the lower timing cover.
- ❑ Tighten to torque the **lower timing cover bolts (12 N.m)**.
- ❑ Refit a new crankshaft accessories pulley.

130493

14489

- ❑ Use a screwdriver (**18**) to check that the flywheel does not turn (clockwise at the timing end), otherwise bring the crankshaft back into contact with the tool **(Mot. 1489)** (**19**) using the screwdriver; the crankshaft groove should be at the top.
- ❑ Torque and angle tighten a **new crankshaft accessories pulley bolt (40 N.m + 145° ± 15°)** (crankshaft in contact with the tool **(Mot. 1489)**).

K4M

109052

❑ Remove:

- the timing flap from the lower timing cover,
- the lifting eye bolt from the **(Mot. 1496)**,
- the timing tool **(Mot. 1496)** fitted with the **(Mot. 1750)**,
- the **(Mot. 1489)** from the cylinder block.

4 - Checking the tension

❑ Rotate the crankshaft twice clockwise at the timing end and before aligning the marks made previously by the operator (on the camshaft dephaser), screw the tool **(Mot. 1489)** into the cylinder block.

❑ Move the crankshaft slowly and smoothly until it comes into contact with the tool **(Mot. 1489)**.

❑ Remove the tool **(Mot. 1489)** from the cylinder block.

109051

103263

❑ Check through the lower timing cover window that the adjustable index (**20**) is opposite the notch (**21**) , if this is not the case:

- loosen the timing tensioning roller nut by up to one turn while holding the eccentric with a **6 mm** Allen key,
- gradually move the adjustable index marker (**20**) opposite the mark (**21**) turning the eccentric cam (**22**) clockwise.

❑ Torque tighten the **timing tensioning roller nut (27 N.m)**.

K4M

5 - Checking the timing

❑ Ensure that the index and the notch on the timing tensioning roller are in the correct position before checking the timing.

❑ Screw tool **(Mot. 1489)** into the cylinder block.

❑ Move the crankshaft slowly and smoothly until it comes into contact with the tool **(Mot. 1489)**.

14490

❑ Position (without forcing) the camshaft setting tool **(Mot. 1496)** fitted with the **(Mot. 1750)** (the camshaft end grooves must be horizontal and offset towards the bottom).

> Note:
>
> The timing adjustment and tensioning operation must be repeated if the camshaft setting tool does not engage.

❑ Remove:

- the timing tool **(Mot. 1496)** fitted with the **(Mot. 1750)**,
- the **(Mot. 1489)** from the cylinder block.

109052

❑ Refit the lower timing cover flap, checking that the locating pin (**23**) fits properly in the notch (**24**) .

REFITTING -PROCEDURE 2

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Timing belt (10,02, 04,02)**,

parts always to be replaced: Timing belt tensioning roller (10,02,04,04),

parts always to be replaced: Timing fixed roller (10,02,04,05),

parts always to be replaced: Crankshaft accessories pulley (10,03,03,07),

parts always to be replaced: Crankshaft accessories pulley bolts (10,03,03,10),

parts always to be replaced: Inlet camshaft cap (10,02,02,11),

parts always to be replaced: Exhaust camshaft cap (10,02,02,12).

II - REFITTING OPERATION FOR PART CONCERNED

❑ The second procedure is used when replacing any timing face component which has a crankshaft timing sprocket with or without a collet, that requires the exhaust camshaft sprocket or camshaft dephaser to be loosened.

K4M

❑ Remove the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) .

1 - Adjusting the timing

❑

Note:

If the stud loosens with the nut (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) (Technical Note 3887A,11A, Top and front of engine).

WARNING

Always degrease:

- the end of the crankshaft (timing end),
- the timing sprocket pressure faces and bore of the crankshaft,
- the crankshaft accessories pulley bearing faces,
- the camshaft ends (timing end),
- the camshaft sprocket bores and bearing faces.

This is to avoid timing slippage.

This slippage leads to engine damage.

14490

103261

❑ Position the camshaft grooves horizontally and below the centre line, by turning the camshafts with the **(Mot. 1496)** if necessary.

K4M

111337

❑ Fit the **(Mot. 1496)** with the **(Mot. 1750)** (**25**) .

111336

❑ Fit:

- the **(Mot. 1496)** (**26**) fitted with the **(Mot. 1750)** on the end of the camshaft,
- a lifting eye bolt (**27**) to secure the tool **(Mot. 1496)** equipped with the tool **(Mot. 1750)**.

❑ Refit:

- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the crankshaft timing sprocket.

130493

14489

❑ Refit the tool **(Mot. 1489)** on the cylinder block.

❑ Use a screwdriver (**28**) to check that the flywheel does not turn (clockwise at the timing end), otherwise bring the crankshaft back into contact with the tool **(Mot. 1489)** (**29**) using the screwdriver; the crankshaft groove should be at the top.

K4M

130492

❑ Position:

- the RENAULT badge (**30**) etched on the stem of the exhaust camshaft sprocket vertically and pointing upwards,
- the camshaft dephaser mark (**31**) vertically and pointing upwards.

❑ Make a mark (**32**) with a pencil between the camshaft dephaser gear and the rocker cover.

2 - Refitting

108879

❑ Refit a new timing tensioning roller by positioning the lug of the timing tensioning roller in the groove (**33**) .

❑ Screw on the timing tensioning roller nut without tightening it.

K4M

130495

- Refit a new timing belt starting with the sprocket of each camshaft (without moving the sprocket of each camshaft).
- Fit the tool **(Mot. 1490-01)** (**34**) on the camshaft sprockets (use the bolt and nut of the upper timing cover to fit the tool **(Mot. 1490-01)**).

> Note:
>
> Take care to properly tighten the timing belt between the two camshaft sprockets.

> Note:
>
> If the engine is equipped with a crankshaft timing sprocket with a collet, take care to properly tighten the timing belt between the exhaust camshaft sprocket and the crankshaft timing sprocket.

130497

- Refit a new timing fixed roller (**35**) .
- Torque tighten the **timing fixed roller bolt (50 N.m)**.

3 - Timing belt tension

103263

- Position the adjustable index (**36**) opposite the mark (**37**) , by turning the eccentric (**38**) clockwise using an Allen key.
- Torque tighten the **timing tensioning roller nut (7 N.m)**.

K4M

130497

- ❑ Refit the lower timing cover (**39**) .
- ❑ Tighten to torque the **lower timing cover bolts (12 N.m)**.
- ❑ Refit a new crankshaft accessories pulley.
- ❑ Torque tighten:
  - and angle tighten a **new crankshaft accessories pulley bolt (40 N.m + 145° ± 15°)**,
  - and angle tighten the **exhaust camshaft sprocket nut (30 N.m + 84° ± 4)**,
  - the **camshaft dephaser bolt (100 N.m)**.
- ❑ Refit the camshaft dephaser plug.

109052

- ❑ Remove:
  - the timing flap from the lower timing cover,
  - the lifting eye bolt from the **(Mot. 1496)**,
  - the **(Mot. 1496)** fitted with the **(Mot. 1750)**,
  - the tool **(Mot. 1489)** from the cylinder block,
  - the **(Mot. 1490-01)**.

4 - Checking the tension

- ❑ Rotate the crankshaft twice clockwise at the timing end and before aligning the marks made previously by the operator (on the camshaft dephaser), screw the tool **(Mot. 1489)** into the cylinder block.
- ❑ Move the crankshaft slowly and smoothly until it comes into contact with the tool **(Mot. 1489)**.
- ❑ Remove the tool **(Mot. 1489)**.

K4M

109051

103263

❑ Check through the lower timing cover window that the adjustable index (**40**) is opposite the notch (**41**) , if this is not the case:

- loosen the timing tensioning roller nut by up to one turn while holding the eccentric with an Allen key,

- gradually move the adjustable index marker (**40**) opposite the mark (**41**) turning the eccentric cam (**42**) clockwise.

❑ Torque tighten the **timing tensioning roller nut (27 N.m)**.

5 - Checking the timing

❑ Ensure that the index and the notch on the timing tensioning roller are in the correct position before checking the timing.

❑ Screw tool **(Mot. 1489)** into the cylinder block.

❑ Move the crankshaft slowly and smoothly until it comes into contact with the tool **(Mot. 1489)**.

14490

❑ Position (without forcing) the tool **(Mot. 1496)** equipped with the tool **(Mot. 1750)** (the camshaft end grooves must be horizontal and offset downwards).

> Note:
>
> If the tool **(Mot. 1496)** equipped with the tool **(Mot. 1750)** cannot be engaged, readjust the timing and the tension.

❑ Remove:

- the timing tool **(Mot. 1496)** fitted with the **(Mot. 1750)**,

- the **(Mot. 1489)** from the cylinder block.

K4M

109052

❑ Refit the lower timing cover flap, checking that the locating pin (**43**) fits properly in the notch (**44**) .

III - FINAL OPERATION

❑ Refit:

- a new inlet camshaft plug using the **(Mot. 1487)**,
- a new exhaust camshaft plug using the **(Mot. 1488)**,
- the lifting eye.

❑ Torque tighten the **flywheel end lifting eye bolts (10 N.m)**.

❑ Fit the engine wiring.

❑ Clip:

- the engine wiring connector onto the lifting eye,
- the gearbox breather pipe onto the lifting eye.

❑ Clip the heater matrix cooling hose onto the lifting eye.

❑ Apply a drop of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the thread of the TDC pin plug.

❑ Tighten to torque the **TDC pin plug (20 N.m)**.

❑ Refit the upper timing cover.

❑ Torque tighten:

- the **upper timing cover bolts (46 N.m)**,
- the **upper timing cover nuts (46 N.m)**.

❑ Refit:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the rear suspended engine mounting.

❑ Torque tighten:

- the **rear suspended engine mounting bolt on the rear suspended engine mounting support (180 N.m)**,
- the **rear suspended engine mounting bolt on the subframe (180 N.m)**.

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- the engine cover,

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M9R

Special tooling required	
Mot. 1431	Flywheel locking tool.
Mot. 1716	Removes housing with silicone seals.
Mot. 1766	Top dead centre locating pin.
Mot. 1769	Camshaft adjusting tool

Tightening torques ▽	
timing chain guide bolts (initial torque)	**5 N.m**
timing chain guide bolts	**25 N.m**
bolt of the timing chain tensioner guide	**25 N.m**
timing hydraulic tensioner bolts	**10 N.m**
timing sprocket bolts on the exhaust side of the camshaft	**10 N.m + 40° ± 6°**
TDC setting pin hole plug	**25 N.m**
timing cover bolts (initial torque)	**5 N.m**
M6 bolts on the timing cover	**16 N.m**
M8 bolt on the timing cover	**18 N.m**
side bolts of the engine mounting on the cylinder head	**30 N.m + 54° ± 6°**
upper bolt of the engine mounting on the cylinder head	**25 N.m**
engine mounting reinforcement bolts	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

WARNING
Applying pressure to the engine oil sump is strictly forbidden. Any damage to the sump may also damage the engine.

Note:

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) .

M9R

115738

❑ Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

114025

❑ Remove the engine mounting reinforcement (**1**) .

114026

❑ Remove:

- the engine mounting bolts (**2**) and (**3**) ,
- the engine mounting.

M9R

II - REMOVING THE TIMING BELT

114031

- ❑ Remove the bolts from the timing cover, around the rim and in the hole (**4**) .
- ❑ Cut the silicone seal from the rim of the timing cover using the **(Mot. 1716)**.
- ❑ Remove the timing cover.

> Note:
>
> Remove the timing cover carefully by hand, with small movements, to prevent damaging it.

115515

- ❑ Remove the tool **(Mot. 1431)**.
- ❑ Align the groove (**5**) on the crankshaft with the hole (**6**) on the cylinder block (pistons at mid-stroke).

114426

- ❑ Remove the top dead centre setting plug.
- ❑ In place of the plug, manually tighten the top dead centre pin **(Mot. 1766)** (**7**) .
- ❑ Turn the crankshaft anti-clockwise until it makes contact with the pin.

M9R

114030

- ❑ Loosen the bolts (**8**) of the timing sprocket (exhaust side).
- ❑ Compress the hydraulic tensioner piston (**9**) with the timing chain tensioner guide (**10**) .
- ❑ Lock the hydraulic tensioner piston (**9**) in the "compressed" position using a **3 mm** Allen key (**11**) .
- ❑ Remove:
  - the hydraulic tensioner bolts (**12**) ,
  - the timing hydraulic tensioner (**9**) ,
  - the chain tensioner guide bolt (**13**) ,
  - the timing chain tensioner guide (**10**) .

114032

- ❑ Remove:
  - the bolts (**8**) from the timing sprocket,
  - the timing sprocket washer (**14**) ,
  - the "sprocket (**17**) - timing chain - sprocket (**15**) " assembly,
  - the timing chain guide bolts (**16**) ,
  - the timing chain guide,
  - the top dead centre pin **(Mot. 1766)** (**7**) .

M9R

REFITTING

I - REFITTING PREPARATION

❏ Clean the joint faces of the timing cover using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) .

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❏ Remove the residue using a plastic spatula.

❏ Finish cleaning the joint faces using a **GREY ABRASIVE PAD**.

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:

- the joint face of the timing cover on the cylinder block and on the cylinder head,
- the timing cover.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

> **WARNING**
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❏ Parts always to be replaced:

- Timing chain.
- Timing hydraulic tensioner.
- Crankshaft timing sprocket.
- Timing sprocket (driven by the chain) on the camshaft (exhaust side).
- Timing sprocket washer on the camshaft, exhaust side.
- Timing sprocket bolt on the camshaft, exhaust side.
- Timing chain guide
- Timing chain guide bolt.
- Timing chain tensioner guide.
- Timing chain tensioner guide bolt.

II - REFITTING THE TIMING CHAIN

❏ Set the engine at top dead centre.

❏ Fit the top dead centre setting pin **(Mot. 1766)**.

115737

❏ Check that:

- the mark (**18**) on the wear compensation pinion is opposite the boss (**19**) on the rocker cover,
- the groove on the camshaft (exhaust side) is horizontal (large offset (**20**) facing upwards).

M9R

114429

❑ Fit the new timing chain guide (**21**) .

❑ Torque tighten:

- the **timing chain guide bolts (initial torque) (5 N.m)** (**22**) .
- the **timing chain guide bolts (25 N.m)** (**22**) .

❑ Fit the new timing sprocket (**23**) onto the crankshaft.

> Note:
>
> The timing chain does not have a direction of fitting.

❑ Position:

- the new timing chain on the sprocket (**23**) (align the mark on the sprocket with the copper chain links),
- the new timing sprocket (**24**) on the chain (align the mark on the sprocket with the copper chain links).

❑ Refit the timing sprocket (**24**) onto the camshaft on the exhaust side.

114430

❑ Place the new washer (**26**) of the timing sprocket (**25**) .

❑ Finger tighten the new bolts (**27**) of the sprocket.

> Note:
>
> Allow the timing sprocket (**25**) to rotate freely.

114431

- Fit the new timing chain tensioner guide (**28**) .
- Torque tighten the **bolt of the timing chain tensioner guide (25 N.m)** (**29**) .
- Fit the new timing hydraulic tensioner (**30**) with its locking pin (**32**) .

> Note:
>
> Check that the hydraulic tensioner (**30**) is in contact with the cylinder block before tightening the bolts.

- Torque tighten the **timing hydraulic tensioner bolts (10 N.m)** (**31**) .
- Remove the locking pin (**32**) .

M9R

114432

114433

❑ Engage the collet (**34**) of the tool **(Mot. 1769)** (**33**) into the camshaft groove.

> Note:
>
> Do not fit the pins (**37**) of the tool into the holes on the wear compensation pinion.

❑ Turn the tool to align the shafts on the spacer (**35**) and the hole (**36**) .

❑ Detach the collet (**34**) of the tool from the camshaft groove.

❑ Fit the pins (**37**) of the tool into the wear compensation pinion holes.

> Note:
>
> Do not fit the collet (**34**) of the tool into the groove on the exhaust side of the camshaft.

❑ Turn the tool to align the shafts on the spacer (**35**) and the hole (**36**) .

❑ Fit the collet (**34**) of the tool into the groove on the camshaft, without forcing it (if necessary, start the previous operations again).

114434

❑ Fit the bolt (**38**) (M6 - 50 mm long) onto the tool.

❑ Torque tighten the **timing sprocket bolts on the exhaust side of the camshaft (10 N.m + 40° ± 6°)**.

❑ Remove:

- the bolt (**38**) ,

- the **(Mot. 1769)**,

- the tool **(Mot. 1766)** (TDC locating pin).

❑ Put two drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) on the threading of the TDC setting pin hole plug.

❑ Torque tighten the **TDC setting pin hole plug (25 N.m)**.

M9R

114905

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) to the timing face:

- 1 bead of∅ **5 ± 2 mm**.:
  - on the outline of the rocker cover, from (**1**) to (**6**) passing by the points (**2**) , (**3**) , (**4**) and (**5**) .
- 1 bead of∅ **11 ± 2 mm** for a length of **10 to 15 mm**.
  - on the points (**1**) , (**2**) , (**3**) , (**4**) , (**5**) , (**6**) .
- 1 bead of∅ **3.5 ± 1 mm**.
  - on the outline of the cylinder head and of the cylinder block, from (**6**) to (**1**) ,
  - on the edge (**7**) .

114031

❑ Refit the timing cover.

❑ Finger tighten the timing cover bolts in order from (**1**) to (**23**) until they make contact.

❑ Tighten to torque and in order:

- the **timing cover bolts (initial torque) (5 N.m)** from (**1**) to (**23**) ,
- the **M6 bolts on the timing cover (16 N.m)** from (**1**) to (**22**) ,
- the **M8 bolt on the timing cover (18 N.m)** (**23**) .

M9R

114026

- ❑ Refit the engine mounting.
- ❑ Finger tighten the engine mounting bolts in order (**1**) to (**6**) until they make contact.
- ❑ Tighten to torque and in order:
  - the **side bolts of the engine mounting on the cylinder head (30 N.m + 54° ± 6°)** from (**1**) to (**5**) .
  - the **upper bolt of the engine mounting on the cylinder head (25 N.m)** (**6**) .

114025

- ❑ Refit the engine mounting reinforcement (**39**) .
- ❑ Finger tighten the reinforcement bolts in order (**1**) to (**4**) until they make contact.
- ❑ Torque tighten the **engine mounting reinforcement bolts (25 N.m)** from (**1**) to (**4**) .

III - FINAL OPERATION

- ❑ Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.
- ❑ Refit:
  - the new crankshaft seal on the timing end (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .
- ❑ Remove the tool **(Mot. 1431)**.

M9R

- Refit:
  - the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
  - the new accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .
- Remove the engine from the component support (see **Engine support equipment: Use**) .
- Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- Fill up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

V4Y, and 713

Special tooling required	
Mot. 919-02	Flywheel locking tool.
Mot. 1716	Removes housing with silicone seals.

Equipment required
component support

Tightening torques ▽	
bolts of the new secondary timing chain tensioners	**9 N.m**
bolts of the inlet camshaft dephasers	**103 N.m**
exhaust camshaft sprocket bolts	**123 N.m**
bolts of the primary chain shoe	**21 N.m**
bolt of the new primary timing chain tensioner guide	**16 N.m**
new primary chain upper guide bolts	**8 N.m**
new primary chain hydraulic tensioner bolts	**9 N.m**
upper bolts of the camshaft bearing no.1 (initial torque)	**2 N.m**
upper bolts of camshaft bearing no.1	**6 N.m**
lower bolts of camshaft bearing no.1	**13 N.m**
bolts of the upper guide of the primary timing chain	**8 N.m**
M6 bolts on the timing cover	**13 Nm**
M8 bolts on the timing cover	**29 N.m**
lower bolts of the timing cover	**19 Nm**

Tightening torques ▽	
M10 bolts of the suspended engine mounting support	**65 N.m**
M12 bolts of the suspended engine mounting support	**120 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump may also damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

❑ Remove the engine-gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Fit the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

V4Y, and 713

- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

133868

❑ Remove:

- the right-hand suspended engine mounting support bolts (**1**) ,
- the right-hand suspended engine mounting support,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the camshaft position sensors (see **Camshaft position sensor: Removal - Refitting**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)**.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

V4Y, and 713

II - REMOVING THE TIMING CHAIN

133827

❑ Remove:

- the camshaft dephaser cover bolts (**2**) ,
- the camshaft dephaser covers.

101403

134075

❑ Remove:

- the timing cover bolts (**3**) ,
- the timing cover.

❑ Remove the timing cover using the **(Mot. 1716)**.

❑ Remove the timing cover.

V4Y, and 713

22937

❑ Loosen the hydraulic tensioner of the primary chain:

- lower the lever to unlock the piston,
- lock the lever by inserting a **4 mm** Allen key or an iron wire in the housing.

22941

❑ Push on the chain guide until the piston is completely depressed.

❑ Keep pressing on the chain guide.

22938

❑ Lock the tensioner by locking the lever using a **4 mm** Allen key or an iron wire.

22941

❑

> Note:
>
> Be careful not to unlock the hydraulic tensioner when it is removed.

❑ Remove:

- the hydraulic tensioner bolts (**4**) ,
- the hydraulic tensioner,

V4Y, and 713

- the upper guide bolts (**5**) ,
- the upper guide,
- the tensioner guide bolt (**6**) ,
- the tensioner guide,
- the bolts (**7**) of the primary chain shoe,
- the primary chain shoe,
- the primary chain,
- the crankshaft sprocket.

133828

❑ Compress the hydraulic tensioners of the secondary chains by pressing at (**8**) .

❑ Fit a spatula (**9**) between the hydraulic tensioner of the secondary chain and the secondary chain to guide the secondary chain.

❑ Lock the hydraulic tensioners of the secondary chains using an iron wire (**10**) .

22920

❑ Release the bolts of the inlet and exhaust camshaft pulleys.

V4Y, and 713

133850

133851

❑ Remove:

- the bolts (**10**) of the caps of camshaft bearing no.1,
- the caps of camshaft bearing no.1,
- the bolts of the dephasers of the inlet camshafts,
- the bolts of the exhaust pulleys.

127847

127848

❑ Remove:

- the "camshaft sprocket - secondary chain" assemblies, taking care not to remove the iron wires of the tensioners,
- the bolts (**11**) of the tensioners of the secondary chains,
- the secondary chain tensioners,
- the flywheel locking tool **(Mot. 919-02)**.

V4Y, and 713

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the gasket faces:

- of the timing cover,
- of the inner timing cover,
- of the caps of camshaft bearing no.1,
- of the camshaft dephaser covers.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

133834

❏ Remove the residue using a plastic spatula.

❏ Finish cleaning using **GREY ABRASIVE PADS**, part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❏ Use a **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the timing cover,
- of the inner timing cover,
- of the caps of camshaft bearing no.1,
- of the camshaft dephaser covers.

❏ Parts always to be replaced:

- primary timing chain,
- secondary timing chains,
- primary chain hydraulic tensioner,
- bolts of the primary chain hydraulic tensioner,
- secondary chain hydraulic tensioners,
- bolts of the secondary chain hydraulic tensioners,
- upper guide of the primary chain,
- bolts of the upper guide of the primary chain,
- primary chain tensioner guide,
- bolts of the primary chain tensioner guide,
- crankshaft sprocket,
- camshaft dephaser cover seals,
- camshaft dephaser cover O-rings,
- camshaft bearing cap O-rings.

II - REFITTING THE TIMING CHAIN

127846

❏ Refit a new crankshaft sprocket.

❏ Check that the collet (**12**) of the crankshaft is aligned with the mark (**13**) on the oil pump.

V4Y, and 713

23020

- Check that the spigots of the inlet camshaft (**14**) and exhaust camshaft (**15**) are facing upwards and directly in line with the cylinders (**16**) .
- Refit the new hydraulic tensioners of the secondary chains equipped with new bolts.

V4Y, and 713

Fitting the secondary chain for the front row

101401

❑ Fit:

- the line (**17**) of the inlet dephaser sprocket opposite the painted link (**18**) of the chain,
- the two lines (**19**) of the exhaust sprocket opposite the two painted (**20**) links of the chain.

V4Y, and 713

Fitting the secondary chain of the back row

101402

❑ Fit:

- the point (**21**) of the sprocket of the inlet dephaser opposite the painted link (**22**) of the chain,
- the two points (**23**) of the exhaust sprocket opposite the two painted links (**24**) of the chain.

❑ Refit the "camshaft sprockets - secondary chain" assemblies, taking care not to unlock the secondary timing chain tensioners and using a spatula.

❑ Torque tighten the **bolts of the new secondary timing chain tensioners (9 N.m)**.

❑ Fit the primary timing chain, aligning the marks of the camshaft dephasers and of the crankshaft sprocket with the marks of the primary timing chain.

22920

❑ Tighten to torque:

- the **bolts of the inlet camshaft dephasers (103 N.m)**,
- the **exhaust camshaft sprocket bolts (123 N.m)**.

V4Y, and 713

- ❑ Unlock the tensioners for the secondary timing chains.
- ❑ Refit:
  - the primary chain shoe,
  - a new primary chain tensioner guide equipped with new bolts,
  - a new primary chain upper guide equipped with new bolts,
  - a new primary chain hydraulic tensioner equipped with new bolts.
- ❑ Tighten to torque:
  - the **bolts of the primary chain shoe (21 N.m)**,
  - the **bolt of the new primary timing chain tensioner guide (16 N.m)**,
  - the **new primary chain upper guide bolts (8 N.m)**,
  - the **new primary chain hydraulic tensioner bolts (9 N.m)**.
- ❑ Unlock the tensioner of the primary timing chain.
- ❑ Perform two crankshaft turns to check the timing adjustment.
- ❑ Remove:
  - the bolts of the upper guide of the primary timing chain,
  - the upper guide of the primary timing chain.

101400

- ❑ Apply beads of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **2.6 to 3.6 mm** to the inner timing cover.

22930

- ❑ Refit:
  - the new O-rings (**25**) of camshaft bearing no.1,
  - the new upper O-rings of the tensioners for the secondary timing chains.

V4Y, and 713

101399

- Apply beads of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **2 to 3 mm** to camshaft bearing no.1.

133850

133851

- Refit the no. 1 camshaft bearings.
- Tighten to torque:
  - the **upper bolts of the camshaft bearing no.1 (initial torque) (2 N.m)** (**26**) ,
  - the **upper bolts of camshaft bearing no.1 (6 N.m)** (**26**) ,
  - the **lower bolts of camshaft bearing no.1 (13 N.m)** (**27**) .
- Refit the upper guide of primary timing chain.
- Torque tighten the **bolts of the upper guide of the primary timing chain (8 N.m)**.

V4Y, and 713

101398

❑ Apply beads of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **2.6 to 3.6 mm** to the timing cover.

134075

❑ Refit the timing cover.

❑ Tighten to torque and in order:

- the **M6 bolts on the timing cover (13 Nm)**,
- the **M8 bolts on the timing cover (29 N.m)**.

134074

❑ Refit:

- the new dephaser cover seals,
- the dephaser covers equipped with new seals,
- in order, the bolts of the dephaser covers.

101403

❑ Refit the lower (**28**) bolts of the timing cover.

❑ Torque tighten the **lower bolts of the timing cover (19 Nm)**.

V4Y, and 713

III - FINAL OPERATION

❑ Refit:

- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)** (**29**) .

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the flywheel locking tool **(Mot. 919-02)**.

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the camshaft position sensors (see **Camshaft position sensor: Removal - Refitting**) ,
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

133868

❑ Refit the right-hand suspended mounting support.

❑ Tighten to torque:

- the **M10 bolts of the suspended engine mounting support (65 N.m)** (**30**) ,
- the **M12 bolts of the suspended engine mounting support (120 N.m)** (**31**) .

❑ Refit:

- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the engine from **component support** (see **Engine support equipment: Use**) .

❑ Couple the engine to the gearbox (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Remove the engine lifting eye at the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Refit the engine-gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

V9X

Special tooling required	
Mot. 1874	TDC locating pin
Mot. 1880	Camshaft timing tool

Equipment required
indelible pencil

Tightening torques ▽	
bolts of the hydraulic timing chain tensioner	**10 N.m**
bolts for the front row timing chain sprocket	**10 N.m + 45° ± 10°**
vacuum pump mounting bolts	**10 N.m**
oil pump pinion bolts	**10 N.m**
bolts of the hydraulic timing chain tensioner for the back row	**10 N.m**
bolts for the back row timing chain sprocket	**10 N.m + 45° ± 10°**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) .

134883

❑ Remove:

- the bolts (**1**) on the lower timing cover,
- the lower timing cover.

137034

- At (**2**) , unclip the fuel pipes from the engine wiring support.
- Disconnect the connector (**3**) from the exhaust gas recirculation solenoid valve.
- Remove the bolt (**4**) from the engine wiring support on the back row upper timing cover.
- Separate the engine wiring support from the back row upper timing cover.

134884

- Loosen the air inlet pipe clips (**5**) of the damper valve.
- Remove the air inlet pipe of the damper valve.

134885

- Remove the bolts (**6**) from the coolant pipe at the outlet of the exhaust gas recirculation solenoid valve.
- Separate the coolant pipe at the outlet of the exhaust gas recirculation solenoid valve from the back row upper timing cover.

134886

- Remove the timing end lifting eye bolts (**7**) .
- Separate the timing end lifting eye from the back row upper timing cover.

134887

❑ Remove:

- the bolts (**8**) from the back row upper timing cover,
- the back row upper timing cover,
- the seal from the back row upper timing cover.

133891

❑ Disconnect the turbocharger pressure sensor connector (**9**) .

138354

❑ Loosen the clip (**10**) for the intercooler air outlet pipe on the front row upper timing cover.

❑ Disconnect the intercooler air outlet pipe from the front row upper timing cover.

134888

❑ Remove:

- the oil filler cap (**11**) ,
- the bolts (**12**) from the front row upper timing cover,
- the front row upper timing cover,
- the seal from the front row upper timing cover.

V9X

II - TIMING CHAIN REMOVAL OPERATION

134889

❑ Draw a line (**13**) level with the crankshaft mark (**14**) using a **indelible pencil**.

134890

❑ Align the previously made line with the bolt (**15**) of the oil pump chain tensioner.

134891

❑ Remove the Top Dead Centre (TDC) pin plug (**16**) .

134892

❑ Screw the Top Dead Centre (TDC) timing pin **(Mot. 1874)** (**17**) onto the cylinder block by hand.

❑ Turn the crankshaft clockwise until contact is made with the Top Dead Centre timing pin.

V9X

1 - Removal of the back row timing chain

134894

❑ Loosen the bolts (**18**) of the back row timing sprocket.

134895

❑ Push (**19**) on the back row timing chain tensioner guide in order to compress the hydraulic tensioner piston.

❑ Maintain pressure on the back row tensioner guide.

134896

❑ Lock the back row timing chain hydraulic tensioner using a **3 mm Allen key** (**20**) .

❑ Remove:

- the bolts (**21**) from the back row timing chain hydraulic tensioner,
- the back row timing chain hydraulic tensioner, taking care not to unlock it.

134897

❑ Remove:

- the bolts (**22**) from the back row timing chain tensioner guide,
- the tensioner guide for the back row timing chain,

- the bolts (**23**) from the back row timing chain side guide,
- the side guide for the back row timing chain.

134898

❑ Remove:

- the bolts (**24**) from the back row timing chain sprocket,
- the washer (**25**) from the back row timing chain sprocket,
- the timing chain sprocket - timing chain assembly for the back row (**26**) .

2 - Removal of the oil pump chain

134899

❑ Turn the oil pump chain tensioner in the direction of the arrow (**27**) .

❑ Remove:

- the bolt (**28**) from the oil pump chain tensioner,
- the oil pump chain tensioner.

134900

❑ Remove:

- the bolts (**29**) from the oil pump pinion,
- the oil pump pinion - oil pump chain assembly (**30**) .

V9X

3 - Removal of the front row timing chain

134901

❑ Remove:

- the vacuum pump drive stud mounting bolts (**31**) ,
- the vacuum pump drive stud.

❑ Loosen the bolts (**32**) of the front row timing sprocket.

134902

❑ Push (**33**) on the front row timing chain tensioner guide in order to compress the hydraulic tensioner piston.

❑ Maintain the pressure on the front row timing chain tensioner guide.

134903

❑ Lock the front row timing chain hydraulic tensioner using a **3 mm Allen key** (**34**) .

❑ Remove:

- the bolts (**35**) from the front row timing chain hydraulic tensioner,
- the front row timing chain hydraulic tensioner, taking care not to unlock it.

134904

❑ Remove:

- the bolt (**36**) from the front row timing chain tensioner guide,
- the tensioner guide for the front row timing chain,

- the bolts (**37**) from the front row timing chain side guide,
- the side guide for the front row timing chain.

135593

❑ Remove:

- the bolts (**38**) from the front row timing chain sprocket,
- the washer (**39**) from the front row timing chain sprocket,
- the timing chain sprocket - timing chain assembly for the front row.

134906

❑ Remove:

- the timing sprocket on the crankshaft (**40**) ,
- the TDC setting pin **(Mot. 1874)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) clean the joint faces of the timing covers and the cylinder block.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** part number **77 01 405 943**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint face of the timing covers on the cylinder block and on the cylinder head,
- the timing covers.

❑ **parts always to be replaced: Timing chain (10,02, 04,03)**.

V9X

❑ Parts always to be replaced:

- timing chain hydraulic tensioners,
- timing sprocket on the crankshaft,
- timing chain sprockets,
- timing chain sprocket bolts,
- timing chain side guides,
- timing chain side guide bolts,
- timing chain tensioner guides,
- timing chain tensioner guide bolts,
- oil pump chain tensioner,
- oil pump chain tensioner bolts.
- lower timing cover seal,
- seal on the front row upper timing cover,
- seal on the back row upper timing cover.

II - OPERATION FOR REFITTING THE TIMING CHAIN

❑ Refit a new crankshaft sprocket.

❑ Insert TDC setting pin **(Mot. 1874)**.

1 - Refitting the front row timing chain

137994

❑ Check that:

- the mark (**41**) on the free play take up pinion for the front row is aligned with the core plug (**42**) on the front row cylinder head,
- the groove (**43**) , fitted horizontally (big offset (**44**) upwards).

135591

❑ Fit a new front row timing sprocket - timing chain assembly, by aligning:

- the mark (**45**) on the timing sprocket in the centre of the two copper links (**46**) of the timing chain
- the mark (**47**) on the crankshaft sprocket opposite the copper link (**48**) of the timing chain.

❑ Refit the washer for the front row timing chain sprocket.

❑ Screw on the new bolts for the front row timing chain, without tightening.

> Note:
>
> Allow the timing chain sprocket to rotate freely.

❑ Refit:

- a new tensioner guide for the front row timing chain,
- a new side guide for the front row timing chain.

❑ Refit a new hydraulic tensioner for the front row timing chain.

❑ Torque tighten the **bolts of the hydraulic timing chain tensioner (10 N.m)**.

❑ Remove the locking pin from the new hydraulic tensioner.

V9X

137045

137047

❑

> Note:
>
> Do not fit the pins of the tool **(Mot. 1880)** into the holes on the free play take up pinion.

❑ Engage the collet (**49**) of the tool **(Mot. 1880)** into the camshaft groove.

❑ Turn the tool **(Mot. 1880)** to align the shaft of the spacer (**50**) with the hole (**51**) on the rocker cover.

❑ Detach the collet of the tool **(Mot. 1880)** from the camshaft groove.

❑ Fit the pins (**52**) of the tool **(Mot. 1880)** into the free play take up pinion holes.

❑ Turn the tool **(Mot. 1880)** to align the shaft of the spacer (**50**) with the hole (**51**) on the rocker cover.

❑ Fit the collet (**49**) of the tool **(Mot. 1880)** into the groove on the camshaft, without forcing it (if necessary, start the previous operations again).

135594

❑ Refit a bolt to the upper timing cover of the front row in order to secure the tool **(Mot. 1880)**.

❑ Torque and angle tighten the **bolts for the front row timing chain sprocket (10 N.m + 45° ± 10°)**.

❑ Remove the tool **(Mot. 1880)** from the front row timing gear.

❑ Refit the vacuum pump drive stud.

❑ Torque tighten the **vacuum pump mounting bolts (10 N.m)**.

2 - Refitting the oil pump chain

❑ Refit a new oil pump pinion - oil pump chain assembly.

❑ Torque tighten the **oil pump pinion bolts (10 N.m)**.

135596

❑ Check that the new oil pump tensioner spring is in the correct position.

135595

❑ Fit a new oil pump chain tensioner by fitting the spring (**53**) in the groove (**54**) .

❑ Refit a new oil pump chain tensioner bolt.

❑ Tighten the oil pump chain tensioner bolt.

❑ Remove the locking pin from the new oil pump chain tensioner.

3 - Refitting the back row timing chain

137995

❑ Check that:

- the mark (**55**) on the free play take up pinion is aligned with the centring pin (**56**) on the upper timing cover of the back row,
- the groove (**57**) , fitted horizontally (big offset (**58**) upwards).

135590

❑ Fit a new back row timing sprocket - timing chain assembly, by aligning:

- the mark (**59**) on the timing sprocket in the centre of the two copper links (**60**) of the timing chain

- the mark (**61**) on the crankshaft sprocket opposite the copper link (**62**) of the timing chain.

❏ Refit the washer for the back row timing chain sprocket.

❏ Screw on the new bolts for the back row timing chain, without tightening.

> Note:
>
> Allow the timing chain sprocket to rotate freely.

❏ Refit:

- a new tensioner guide for the back row timing chain,
- a new side guide for the back row timing chain.

❏ Refit a new hydraulic tensioner for the back row timing chain.

❏ Torque tighten the **bolts of the hydraulic timing chain tensioner for the back row (10 N.m)**.

❏ Remove the locking pin from the new hydraulic tensioner.

135592

❏ Position the **(Mot. 1880)**.

❏ Fit the tool **(Mot. 1880)** using a bolt (**63**) **M8x125** approximately **82 mm** in length.

❏ Torque and angle tighten the **bolts for the back row timing chain sprocket (10 N.m + 45° ± 10°)**.

❏ Remove the following tools:

- **(Mot. 1880)**,
- . **(Mot. 1874)**

III - FINAL OPERATION

134888

❏ Refit a new upper timing cover seal for the front row on the cylinder block.

❏ Fit the upper timing cover for the front row.

❏ Fit the front row upper timing cover bolts without tightening them.

❏ Tighten the front row upper timing cover bolts in sequence.

❏ Refit the oil filler cap.

134887

❏ Refit a new upper timing cover seal for the back row on the cylinder block.

V9X

- ❑ Fit the upper timing cover for the back row.
- ❑ Fit the back row upper timing cover bolts without tightening them.
- ❑ Tighten the back row upper timing cover bolts in sequence.
- ❑ Fit the lifting eye on the timing end.
- ❑ Refit the timing end lifting eye mounting bolts.
- ❑ Fit the coolant pipe at the outlet of the exhaust gas recirculation solenoid valve to the upper timing cover of the back row.
- ❑ Refit the bolts for the cooling pipe at the outlet of the exhaust gas recirculation solenoid valve to the upper timing cover of the back row.
- ❑ Refit the air inlet pipe of the damper valve.
- ❑ Tighten the clips of the damper valve air inlet pipe.
- ❑ Fit the engine wiring support to the upper timing cover of the back row.
- ❑ Refit the bolt for the engine wiring support on the upper timing cover of the back row.
- ❑ Connect the exhaust gas recirculation solenoid valve connector.
- ❑ Clip the fuel lines onto the engine wiring support.
- ❑ Refit a new lower timing cover seal.

138126

- ❑ Apply drops of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) at (**64**) on the new the lower timing cover seal.

134883

- ❑ Fit the lower timing cover.
- ❑ Fit the lower timing cover bolts without tightening them.
- ❑ Tighten the lower timing cover bolts in the correct order.
- ❑ Refit:
  - the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
  - the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
  - the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
  - the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
  - the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
  - the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
  - the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),

V9X

- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❏ Remove the engine from the component support (see **Engine support equipment: Use**) .

❏ Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❏ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- fill and bleed the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M4R

Special tooling required	
Mot. 919-02	Flywheel locking tool.
Mot. 1716	Removes housing with silicone seals.

Tightening torques ▽	
timing chain guide bolts	**25 N.m**
bolt of the timing chain tensioner pad	**25 N.m**
timing chain tensioner bolts	**10 N.m**
timing cover M5 bolts	**7 N.m**
timing cover M6 bolts	**25 N.m**
timing cover M10 bolts	**55 N.m**
timing cover M12 bolts	**75 N.m**
camshaft dephaser solenoid valve bolt	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING
Applying pressure to the engine oil sump is strictly forbidden. Any damage to the sump may also damage the engine.

❑ Remove the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

M4R, and 704

❑ Disconnect the manual gearbox from the engine (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

115889

❑ Disconnect the wiring (**1**) from the camshaft dephaser solenoid valve.

M4R

115881

❑ Remove:

- the bolt (**2**) from the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve (**3**) .

M4R, and 704

115928

❑ Fit the flywheel locking tool **(Mot. 919-02)** (**4**) onto the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

II - TIMING CHAIN REMOVAL OPERATION

115879

❑ Remove the bolts from the timing cover, marking the position of the bolts.

M4R

115880

- ❑ Remove the timing cover using the **(Mot. 1716)** (**5**) .
- ❑ Remove the timing cover (**6**) .
- ❑ Tighten the crankshaft accessories pulley bolt fitted with a spacer (which does not cover the timing sprocket mark) onto the crankshaft.
- ❑ Remove the tool **(Mot. 919-02)**.

116040

- ❑ With a smooth action, turn the crankshaft clockwise (timing end) so that marks (**7**) of the camshaft sprockets are aligned with marks (**8**) on the cylinder head cover, and ensure that mark (**9**) on the crankshaft sprocket is in the lower vertical position.
- ❑ Position the **(Mot. 919-02)**.
- ❑ Remove the crankshaft accessories pulley bolt.

M4R

115877

❑ Engage the timing chain tensioner.

❑ Put a metal rod (**10**) into the tensioner to keep the chain loose.

115878

❑ Remove:

- the timing chain tensioner bolts (**11**) ,
- the timing chain tensioner (**12**) .

115873

❑ Remove:

- the bolt (**13**) of the timing chain tensioner pad,
- the timing chain tensioner pad (**14**) .

M4R

115874

❑ Remove:

- the timing chain guide bolts (**15**) ,
- the timing chain guide (**16**) .

115875

❑ Remove the timing chain (**17**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Clean the joint faces of the timing cover using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Remove the residue using a plastic spatula.

M4R

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD**, part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint face of the timing cover on the cylinder block and on the cylinder head,
- the timing cover.

❑ Parts always to be replaced:

- the crankshaft accessories pulley bolt,
- the timing chain tensioner pad,
- the timing chain tensioner,
- the timing chain,
- the crankshaft seal on the timing side,
- the timing chain guide.

II - OPERATION FOR REFITTING THE TIMING CHAIN

116040

❑ Check that:

- the marks (**18**) on the cylinder head cover are aligned with those on the camshaft sprockets,
- the mark on the crankshaft sprocket (**19**) is in the lower vertical position.

❑ Set the engine at top dead centre.

M4R

115875

116041

❑ Fit the new timing chain (**20**) so that the marks on the timing chain (**21**) are aligned with the marks on each of the sprockets.

M4R

115874

- Refit:
  - the new timing chain guide (**22**) ,
  - the timing chain guide bolts (**23**) .
- Torque tighten the **timing chain guide bolts (25 N.m)**.

115873

- Refit:
  - the new timing chain tensioner pad (**24**) ,
  - the bolts (**25**) of the timing chain tensioner pad.
- Torque tighten the **bolt of the timing chain tensioner pad (25 N.m)**.

M4R

115878

❑ Refit:

- the new timing chain tensioner (**26**) ,
- the timing chain tensioner bolts (**27**) .

❑ Torque tighten the **timing chain tensioner bolts (10 N.m)**.

115877

❑ Remove the metal rod (**28**) in order to release the timing chain tensioner.

❑ Tighten the old crankshaft accessories pulley bolt fitted with a spacer (which does not cover the timing sprocket mark) onto the crankshaft.

❑ Remove the tool **(Mot. 919-02)**.

❑ Rotate the crankshaft clockwise through two revolutions (timing end).

M4R

116040

❑ Check that:

- the marks on the camshaft sprockets are correctly aligned with the marks on the cylinder head cover (**29**) ,
- the crankshaft sprocket mark is in the lower vertical position (**30**) .

❑ Immobilise the flywheel or the drive plate using the tool **(Mot. 919-02)**.

❑ Remove the old crankshaft pulley bolt and spacer.

❑ Remove the tool **(Mot. 919-02)**.

116044

❑

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Ingredients - Products) **4 mm** in diameter on the perimeter of the timing cover joint face (**31**) .

115879

❑ Refit:

- the timing cover,
- the timing cover bolts.

❑ Torque tighten in order:

- the **timing cover M5 bolts (7 N.m)**,
- the **timing cover M6 bolts (25 N.m)**,
- the **timing cover M10 bolts (55 N.m)**,
- the **timing cover M12 bolts (75 N.m)**.

III - FINAL OPERATION

❑ Refit the crankshaft seal on the timing end (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

❑ Immobilise the flywheel or the drive plate using the tool **(Mot. 919-02)**.

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the tool **(Mot. 919-02)**.

115881

❑ Refit:

- the camshaft dephaser solenoid valve (**32**) ,
- the bolt (**33**) of the camshaft dephaser solenoid valve.

❑ Torque tighten the **camshaft dephaser solenoid valve bolt (10 N.m)**.

115889

❑ Connect the wiring (**34**) of the camshaft dephaser solenoid valve.

❑ Refit the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

M4R

- Remove the engine from the component support (see **Engine support equipment: Use**) .

M4R, and 704

- Connect the manual gearbox to the engine (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

- Refit the « engine and gearbox» assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

F4R

Special tooling required	
Mot. 1716	Removes housing with silicone seals.

Equipment required
roll pin punch

Tightening torques ▽	
rocker cover bolts (22), (23), (20), (13)	**8 Nm**
rocker cover bolts (1) to (12), (14) to (19), (21), (24)	**12 Nm**
rocker cover bolts (22), (23), (20), (13)	**12 Nm**

IMPORTANT
Wear latex gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft seals on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) .

123144

❑ Disconnect the connector (**3**) from the fuel vapour absorber solenoid valve.

❑ Unclip:

- the fuel vapour absorber solenoid valve wiring at (**4**) ,
- the fuel vapour rebreathing hose.

❑ Disconnect the fuel supply union on the injector rail.

❑ Insert the blanking plugs.

F4R

123145

❑ Unclip:

- the injector wiring on the gearbox side lifting eye,
- the throttle valve wiring on the gearbox side lifting eye.

❑ Remove:

- the bolts (**5**) from the lifting eye on the gearbox side,
- the gearbox side lifting eye.

II - REMOVAL OPERATION FOR PART CONCERNED

120210

❑ Remove the rocker cover bolts.

> Note:
>
> The rocker cover bolts are not the same length; mark their positions.

> Note:
>
> Place a cloth on the intake distributor and exhaust manifold to recover the rocker cover centring devices.

123149

❑ Remove the rocker cover centring devices using a **roll pin punch** and a hammer to knock them out from above.

F4R

123148

❑ Press a flat-blade screwdriver between the cylinder head and the rocker cover and use it to gently release the rocker cover.

123150

❑ Remove the rocker cover using the **(Mot. 1716)**.

❑ Remove the rocker cover.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the joint faces:

- on the rocker cover if it is being reused,

- on the cylinder head.

WARNING

Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

WARNING

The joint faces must be clean, dry and free from grease (avoid finger marks).

14517

❑ Use a stipple roller to apply **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to the rocker cover joint face until it is well covered.

> **WARNING**
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

> Note:
> Use a cloth to remove any **RESIN ADHESIVE** in the rocker cover bearings.

❑ Refit the rocker cover centring devices using a **roll pin punch** and a hammer.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the rocker cover.

❑ Fit without tightening the rocker cover bolts.

120210

❑ Torque tighten:

- the **rocker cover bolts (22), (23), (20), (13) (8 Nm)**,
- the **rocker cover bolts (1) to (12), (14) to (19), (21), (24) (12 Nm)**,
- the **rocker cover bolts (22), (23), (20), (13) (12 Nm)**.

III - FINAL OPERATION.

❑ Refit:

- the lifting ring on the gearbox side,
- the gearbox side lifting eye bolts.

❑ Tighten the gearbox side lifting eye bolts.

❑ Clip:

- the injector wiring on the gearbox side lifting eye,
- the throttle valve wiring on the gearbox side lifting eye.

❑ Remove the blanking plugs.

❑ Connect:

- the fuel supply union to the injector rail,
- the fuel vapour absorber solenoid valve connector.

❑ Clip:

- the fuel vapour rebreathing pipe,
- the fuel vapour absorber solenoid valve wiring.

❑ Refit:

- the camshaft seals on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**)
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Refit the engine cover.

M4R

Tightening torques ▽	
rocker cover bolts (initial torque)	**2 Nm**
rocker cover bolts	**8 Nm**
oil vapour rebreathing valve	**2.5 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) .

115789

❑ Remove:

- the bolt (**1**) from the retaining bracket on the injection-ignition wiring connectors,
- the retaining bracket (**2**) from the injection-ignition wiring connectors.

123370

❑ Remove:

- the oil vapour rebreathing valve (**3**) ,
- the oil vapour rebreathing valve seal.

II - REMOVAL OPERATION FOR PART CONCERNED

123370

❑ Remove:

- the rocker cover bolts in order,
- the rocker cover,
- the rocker cover seal.

M4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the rocker cover seal,
- the oil vapour rebreathing valve seal.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

> **WARNING**
> Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

❑ Clean and degrease the joint faces with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the rocker cover fitted with a new seal,
- the rocker cover bolts.

123370

❑ Pretighten in order and to torque the **rocker cover bolts (initial torque) (2 Nm)**.

❑ Torque tighten in order the **rocker cover bolts (8 Nm)**.

III - FINAL OPERATION.

❑ Refit the oil vapour rebreathing valve with a new seal.

❑ Torque tighten the **oil vapour rebreathing valve (2.5 Nm)**.

❑ Refit:

- the retaining bracket on the injection-ignition wiring connectors,
- the retaining bracket bolt on the injection-ignition wiring connectors.

❑ Tighten the retaining bracket bolt on the injection-ignition wiring connectors.

❑ Refit:

- the spark plugs (see **17A**, **Ignition**, **Plugs: Removal - Refitting**, page **17A-10**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

K9K, and 780

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

123532

❏ Undo the clip (**1**) from the intercooler outlet pipe.

❏ Disconnect the intercooler outlet air pipe from the damper valve.

❏ Move the intercooler outlet air pipe away from the damper valve.

123533

❏ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❏ Unpick the electrical wiring from the injector rail protector cover.

❏ Move the electrical wiringto one side.

123293

❏ Remove:

- the intercooler air inlet pipe bolt (**4**) ,
- the nut (**5**) from the intercooler inlet air pipe.

K9K, and 780

123299

❑ Remove the clip (**6**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

123526

❑ Rotate the intercooler air inlet pipe clip (**7**) .

❑ Disconnect the intercooler air inlet pipe from the intercooler.

❑ Remove the intercooler air inlet pipe.

123296

❑ Unclip (**8**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**9**) ,
- the injector rail protector cover nut (**10**) ,
- the injector rail protector cover,

123778

❑ Disconnect the oil vapour rebreathing pipe (**11**) on the rocker cover.

K9K, and 780

123846

❑ Disconnect the diesel injector connectors (**12**) .

❑ Unpick the diesel injector wiring on the rocker cover.

❑ Move aside the diesel injector wiring.

113475

❑ Remove:

- the rail protector cover bracket bolts (**13**) ,
- the rail protector cover bracket.
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) .

123844

❑ Remove the upper timing cover by pressing the clips (**14**) .

K9K, and 780

II - OPERATION FOR REMOVAL OF PART CONCERNED

113476

❑ Remove:

- the rocker cover bolts (**15**) ,
- the rocker cover.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Clean the cylinder head joint face using **ABRASIVE PADS**.

❑ Degrease the cylinder head joint face using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and **CLEAN CLOTHS**.

19712-1

❑

> **WARNING**
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply beads (**16**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) with a diameter of **2 mm** and **10 mm** long.

❑ Always replace the rocker cover seal.

If replacing the rocker cover

❑ Remove the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) .

❑ Refit the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) .

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the rocker cover,
- the rocker cover bolts.

K9K, and 780

113476

❑ Tighten the rocker cover bolts in order.

III - FINAL OPERATION

❑ Clip on the upper timing cover.

❑ Refit:

- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the rail protector cover bracket.
- the rail protector cover bracket bolt.

❑ Tighten the rail protector cover bracket bolt.

❑ Clip the diesel injector wiring onto the rocker cover.

❑ Connect the diesel injector connectors.

❑ Connect the oil vapour recirculation pipe onto the rocker cover.

❑ Refit:

- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❑ Tighten:

- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❑ Clip on the injector rail protector cover.

❑ Fit:

- the intercooler air inlet pipe,
- the clips to the intercooler inlet air pipe in their original position.

❑ Clip the intercooler air inlet pipe onto the turbocharger and intercooler.

❑ Refit:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❑ Tighten:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❑ Clip the electrical wiring to the injector rail protector cover.

❑ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler outlet air pipe to the damper valve.

❑ Tighten the intercooler air outlet pipe clip.

❑ Refit the engine cover.

K4M

Tightening torques ▽	
rocker cover bolts 1 to 13, 16 to 20, 23 to 24	**12 N.m**
rocker cover bolts 14, 15, 21 and 22	**14 N.m**
camshaft sensor bolt	**10 N.m**
camshaft dephaser solenoid valve sensor bolt	**10 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- every camshaft seal (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) .

128632

❑ Disconnect the camshaft sensor connector (**1**) .

❑ Remove:

- the camshaft sensor bolt (**2**) ,
- the camshaft sensor,
- the camshaft sensor seal.

K4M

128634

❑ Disconnect the camshaft dephaser solenoid valve connector (**3**) .

❑ Remove:

- the camshaft dephaser solenoid valve sensor bolt (**4**) ,
- the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve seal.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128636

❑ Remove the rocker cover bolts.

> Note:
>
> The rocker cover bolts do not have the same length, mark their positions.

❑ Detach the rocker cover using a screwdriver.

❑ Remove the rocker cover.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the camshaft sensor seal,
- the camshaft dephaser solenoid valve seal.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the rocker cover joint face if it is to be re-used,
- the cylinder head joint face.

K4M

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the rocker cover joint face if it is to be re-used,
- the cylinder head joint face.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

14517

❑ Apply **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) using a stipple roller on the joint face of the rocker cover until the joint face is completely coated.

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

126216

❑ Use a cloth to remove any **RESIN ADHESIVE** in the rocker cover bearings (**5**) .

K4M

II - REFITTING OPERATION FOR PART CONCERNED

14497

❑ Refit the rocker cover.

❑ Tighten to torque and in order:

- **rocker cover bolts 1 to 13, 16 to 20, 23 to 24 (12 N.m)**,
- **rocker cover bolts 14, 15, 21 and 22 (14 N.m)**.

III - FINAL OPERATION.

❑ Refit the camshaft sensor fitted with a new seal.

❑ Torque tighten the **camshaft sensor bolt (10 N.m)**.

❑ Connect the camshaft sensor connector.

❑ Refit the camshaft dephaser solenoid valve equipped with a new seal.

❑ Torque tighten the **camshaft dephaser solenoid valve sensor bolt (10 N.m)**.

❑ Connect the camshaft dephaser solenoid valve connector.

❑ Refit:

- every camshaft seal (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),

K4M

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M9R

Special tooling required	
Mot. 1431	Flywheel locking tool.
Mot. 1766	Top dead centre locating pin.

Equipment required
component support

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump may also damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

Note:

Consult the safety and cleanliness advice and operation recommendations before carrying out any operation (see **Engine: Precautions for the repair**) .

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Position the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) .

115738

❑ Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the flywheel locking tool **(Mot. 1431)**,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

❑ Remove:

- the vacuum pump (see **Vacuum pump: Removal - Refitting**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,

M9R

- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the diesel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) .

114042

❑ Remove the bolts (**1**) and (**2**) of the fuel collector outlet pipe of the cylinder head.

❑ Disconnect the fuel collector outlet pipe from the cylinder head at (**3**) .

❑ Move aside the fuel collector outlet pipe from the cylinder head.

II - REMOVAL OF THE ROCKER COVER

114051

❑ Remove the rocker cover bolts.

114053

❑ Position a protective shim on the cylinder head.

❑ Detach the rocker cover using a flat-blade screwdriver, using the shim for leverage.

❑ Remove the rocker cover - camshafts assembly.

M9R

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint face on the rocker cover,
- the joint face on the cylinder head.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> Clean the cylinder head carefully to avoid any foreign bodies entering the oil return and supply pipes.
>
> Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint face on the rocker cover,
- the joint face on the cylinder head.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

> **WARNING**
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

II - REFITTING THE ROCKER COVER

114421

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **1.5 ± 1 mm** to the cylinder head at (**4**) , (**5**) , (**6**) .

❑ Fit two studs (M6 - length 60 mm) into the holes (**7**) and (**8**) on the cylinder head to guide the rocker cover.

127872

❑ Position:

- the groove on the exhaust side of the camshaft (**9**) horizontally (large clearance (**10**) facing upwards),
- the groove on the inlet side of the camshaft (**11**) facing towards the rocker cover boss (**12**) .

❑ Check that cylinders 1 and 4 are at Top Dead Centre using the **(Mot. 1766)** (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

❑ Refit the rocker cover - camshafts assembly.

M9R

114904

- ❑ Tighten in order and successively, the rocker cover bolts **(12), (15),(18)** and **(21)** to gradually fit the rocker cover on the cylinder head.
- ❑ Remove the two rocker cover guide studs.
- ❑ Fit without tightening the remaining rocker cover bolts.
- ❑ Loosen bolts **(12), (15), (18)** and **(21)**.
- ❑ Fit without tightening bolts **(12), (15), (18)** and **(21)**.
- ❑ Tighten the rocker cover bolts in order.
- ❑ Clean the excess silicone adhesive sealant on the timing and coupling faces using a plastic spatula.

III - FINAL OPERATION

- ❑ Connect the fuel collector outlet pipe of the cylinder head.
- ❑ Tighten the bolts of the fuel collector outlet pipe of the cylinder head.
- ❑ Refit:
  - the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
  - the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
  - the diesel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
  - the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
  - the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
  - the vacuum pump (see **Vacuum pump: Removal - Refitting**) .

M9R

M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- Refit the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

- Refit:
  - the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
  - the new crankshaft seal on the timing end (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .
- Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.
- Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .
- Remove the flywheel locking tool **(Mot. 1431)**.
- Refit:
  - the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
  - the new accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .
- Remove the engine from the component support (see **Engine support equipment: Use**) .
- Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

V4Y

Tightening torques ▽	
rocker cover bolts (initial torque)	**2 N.m**
rocker cover bolts (tightening torque)	**8 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

119616

❑ Unclip:

- the electrical wiring (**1**) of the rocker cover,
- the fuel pipes (**2**) .

❑ Disconnect:

- the oil vapour rebreathing pipe (**3**) from the rocker covers,
- the fuel supply union (**4**) ,
- the camshaft position sensor connector.

133613

❑ Remove:

- the fuel pipe support bolts (**5**) ,
- the fuel pipe support.

II - OPERATION FOR REMOVAL OF PART CONCERNED

119616

❑ Remove:

- the rocker cover bolts (**6**) on the front and rear rows,

- the rocker covers on the front and rear rows.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑

> Note:
>
> The rocker cover is sealed by a composite seal that can withstand being removed and refitted a number of times. If the seal is damaged, it may be partially repaired with **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

> **WARNING**
>
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.)

II - REFITTING OPERATION FOR PART CONCERNED

133826

❑ Refit the rocker covers on the front and back rows.

❑ Pretighten to torque and in order the **rocker cover bolts (initial torque) (2 N.m)**.

❑ Tighten to torque and in order the **rocker cover bolts (tightening torque) (8 N.m)**.

III - FINAL OPERATION

❑ Refit the fuel pipe support.

❑ Connect:

- the camshaft position sensor connector,
- the fuel supply union,
- the oil vapour rebreathing pipe on the rocker covers.

❑ Clip:

- the fuel pipes,
- the electrical wiring on the rocker cover,

❑ Refit:

- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,

V4Y

- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1716	Removes housing with silicone seals.

Equipment required
component support

Tightening torques ▽	
rocker cover bolts	**5 N.m**
rocker cover bolts	**12 N.m**
high pressure pump upper bolt	**30 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Position the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
- the injector rail protectors (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the diesel injector fuel return rail unions (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,

- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the injector rails (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) .

II - REMOVAL OF THE ROCKER COVER

1 - Front row

136282

❑ Remove the bolt (**1**) from the left-hand engine wiring support.

❑ Remove the left-hand engine wiring support.

136281

❑ Remove the bolt (**2**) from the right-hand engine wiring support.

❑ Remove the right-hand engine wiring support.

136283

❑ Remove the engine wiring bolts (**3**) from the front panel.

❑ Separate the engine wiring from the front panel.

V9X

137884

❑ Remove the nut (**4**) for the engine wiring.

❑ Move aside the engine wiring.

❑ Remove:

- the bolts (**5**) from the engine wiring support at the flywheel end,
- the engine wiring support at the flywheel end.

❑ Separate the engine wiring from the front row rocker cover.

136284

❑ Unclip (**6**) the wiring for the gas recirculation thermal regulation solenoid valve on the rocker cover.

138625

❑ Remove:

- the lifting eye at the flywheel end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**)
- the upper bolt (**7**) for the high pressure pump.

❑ Disconnect the fuel discharge hose.

V9X

2 - Back row

137041

- ❑ Disconnect the hose at the inlet of the heater matrix (**8**) on the cylinder head outlet intermediate coolant duct.
- ❑ Move aside the clip (**9**) for the hose at the inlet of the exhaust fuel injector cooler on the cylinder head outlet intermediate coolant duct using the tool **(Mot. 1448)**.
- ❑ Disconnect the hose at the inlet of the exhaust fuel injector cooler to the cylinder head outlet intermediate duct.
- ❑ Remove the bolt (**10**) for the intermediate duct at the cylinder head outlet on the rocker cover of the back row.
- ❑ Remove:
  - the cylinder head outlet intermediate coolant duct,
  - the O-ring for the cylinder head outlet intermediate coolant duct.
- ❑ Disconnect the fuel discharge hose.

3 - Front and back row

138624

138623

- ❑ Remove the rocker cover bolts (**11**) .

V9X

Back row

136285

136286

Front row

136287

136288

❑ Very carefully detach the rocker cover concerned:

- using a screwdriver in the notches,
- using the tool **(Mot. 1716)**.

V9X

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the gasket faces:

- of the rocker covers,
- on the cylinder head.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> Clean the cylinder head carefully to avoid any foreign bodies entering the oil return and supply pipes.
>
> Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the rocker covers,
- on the cylinder head.

❑ Always replace the O-ring for the cylinder head outlet intermediate coolant duct.

❑ Check that the rocker cover centring dowels are fitted to the cylinder heads.

135112

135111

❑ Fit:

- the notches (**12**) at an angle of **45°**,
- the groove (**13**) , fitted horizontally (big offset (**14**) upwards).

V9X

II - REFITTING THE ROCKER COVER

❑

> **WARNING**
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

138135

138136

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **1.5 ± 1 mm** to the cylinder head at (**15**) , (**16**) , (**17**) and (**18**) .

138623

138624

❑ Refit the rocker covers.

❑ Pre-tighten to torque and in order the **rocker cover bolts (5 N.m)**.

❑ Torque tighten in order the **rocker cover bolts (12 N.m)**.

1 - Front row

❑ Disconnect the fuel discharge hose.

❑ Refit:

- the lifting eye on the flywheel end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) ,
- the upper bolt for the high pressure pump.

❑ Torque tighten the **high pressure pump upper bolt (30 N.m)**.

❑ Clip the wiring for the recirculated gases thermal regulation solenoid valve onto the rocker cover.

❑ Refit the bolts for the engine wiring support at the flywheel end.

- ❑ Fit the engine wiring onto the engine wiring support at the flywheel end.
- ❑ Refit the nut for the engine wiring onto the engine wiring support at the flywheel end.
- ❑ Fit the engine wiring onto the front panel.
- ❑ Refit the engine wiring mounting bolts on the front panel.
- ❑ Fit the right-hand engine wiring support.
- ❑ Refit the bolt for the right-hand engine wiring support.
- ❑ Fit the left-hand engine wiring support.
- ❑ Refit the bolt for the left-hand engine wiring support.

2 - Back row

- ❑ Disconnect the fuel discharge hose.
- ❑ Refit:
  - a new O-ring to the cylinder head outlet intermediate coolant duct,
  - the cylinder head outlet intermediate coolant duct.
- ❑ Connect the hose at the inlet of the exhaust fuel injector cooler to the cylinder head outlet intermediate duct.
- ❑ Refit the clip for the hose at the inlet of the exhaust fuel injector cooler to the cylinder head outlet intermediate coolant duct using the tool **(Mot. 1448)**.
- ❑ Connect the hose at the inlet of the heater matrix to the cylinder head outlet intermediate coolant duct.

III - FINAL OPERATION

- ❑ Refit:
  - the injector rails (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
  - the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
  - the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
  - the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
  - the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
  - the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
  - the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) ,
  - the diesel injector fuel return rails (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
  - the injector rail protectors (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
  - the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
  - the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
  - the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
  - the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
  - the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
  - the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
  - the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
  - the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
  - the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
  - the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),

V9X

- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

❏ Remove the engine from the component support (see **Engine support equipment: Use**) .

❏ Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❏ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- fill and bleed the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K, and 782

Special tooling required	
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.
Mot. 1453-01	Additional handle nut for engine lifting support tool Mot. 1453.

Equipment required
tweezers

Tightening torques ▽	
rocker cover bolts	**11 N.m**
exhaust gas recirculation assembly bolts	**25 N.m**
timing end lifting eye bolts	**25 N.m**
tie rod rear bolts	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) on the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

- ❑ Disconnect the turbocharger pressure sensor connector (**4**) .
- ❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.
- ❑ Pull the clip (**6**) of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

138551

- ❑ Unclip the wiring (**7**) of the damper valve.

138550

- ❑ Unclip the injector rail protector cover at (**8**) .
- ❑ Remove:
  - the bolts (**9**) from the injector rail protector cover,
  - the injector rail protector cover,

138549

- ❑ Disconnect the connector (**10**) from the camshaft position sensor.

K9K, and 782

138540

- ❑ Unclip the diesel injector wiring (**23**) .
- ❑ Disconnect the diesel injector connectors (**24**) .
- ❑ Move aside the diesel injector wiring.
- ❑ Remove:
  - the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

135494

135495

- ❑ Remove the upper timing cover by pressing the clips (**11**) .

K9K, and 782

128247

❑ Remove the tie rod rear bolts (**12**) .

128245

❑ Remove the radiator mounting cross member bolts (**13**) .

128246

❑ Fit the **(Mot. 1720)** (**14**) fitted with the **(Mot. 1672)** (**15**) .

❑ Remove the **(Mot. 1453)** fitted with the **(Mot. 1453-01)**.

138426

❑ Disconnect the exhaust gas temperature sensor connector (**16**) .

K9K, and 782

138427

❑ Unclip the connector (**17**) of the exhaust gas temperature sensor on the air inlet metal tube.

138428

❑ Unclip the exhaust gas temperature sensor wiring (**18**) from the lifting eye on the timing end.

139198

❑ Remove:

- the bolts (**19**) from the lifting eye at the timing end,
- the lifting eye on the timing end,
- the air inlet metal tube,
- the air inlet metal tube seals.

139178

❑ Loosen the bolts (**20**) of the exhaust gas recirculation assembly by a few turns.

❑ Move aside the exhaust gas recirculation assembly.

K9K, and 782

II - OPERATION FOR REMOVAL OF PART CONCERNED

139189

❑ Remove:

- the rocker cover bolts (**21**) ,
- the rocker cover,
- the rocker cover seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: rocker cover seal (10,02,01,12)**.

❑ **parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)**.

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

❑ Always replace the seals on the air inlet metal tube.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Clean the cylinder head gasket face using **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease:

- the cylinder head joint face,
- the housing of the rocker cover seal, if reusing,
- the housing of each air inlet metal tube seal,
- the housing of the air inlet metal tube seal in the cylinder head,
- the housing of the air inlet metal tube seal in the exhaust gas cooler mounting.

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

K9K, and 782

115069

❑

Note:

Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round.

❑ Refit:

- a new intercooler air outlet pipe seal,
- a new intercooler air inlet pipe seal.

19712-1

❑

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply four beads (**22**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) **2 mm** in diameter and **10 mm** long.

If replacing the rocker cover

❑ Remove:

- the bolt from the camshaft position sensor,
- the camshaft position sensor.

❑ Refit the camshaft position sensor onto the new rocker cover.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the rocker cover, fitted with a new gasket.

K9K, and 782

135489

❑ Tighten to torque and in order the **rocker cover bolts (11 N.m)**.

III - FINAL OPERATION

❑ Fit the exhaust gas recirculation assembly.

❑ Torque tighten the **exhaust gas recirculation assembly bolts (25 N.m)**.

❑ Refit:

- the air inlet metal tube fitted with its new seal,
- the lifting eye on the timing end.

❑ Torque tighten the **timing end lifting eye bolts (25 N.m)**.

❑ Clip:

- the wiring of the exhaust gas temperature sensor on the lifting eye on the timing end,
- the connector of the exhaust gas temperature sensor on the air inlet metal tube.

❑ Connect the exhaust gas temperature sensor connector.

❑ Fit the **(Mot. 1453)** fitted with the **(Mot. 1453-01)**.

❑ Remove the **(Mot. 1720)** fitted with the **(Mot. 1672)**.

❑ Refit:

- the radiator mounting cross member bolts,
- the tie rod rear bolts.

❑ Torque tighten the **tie rod rear bolts (105 N.m)**.

❑ Refit:

- the upper timing cover,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

❑ Connect the diesel injector connectors.

❑ Clip on the diesel injector wiring.

❑ Connect the camshaft position sensor connector.

❑ Refit the injector rail protector cover.

❑ Clip on the damper valve wiring.

❑ Fit the clip for the intercooler air outlet pipe.

❑ Clip the intercooler air outlet pipe on the damper valve.

❑ Clip on the wiring of the turbocharging pressure sensor.

❑ Connect the turbocharger pressure sensor connector.

❑ Refit the clip of the intercooler air inlet pipe.

❑ Clip on the intercooler air inlet pipe.

❑ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1202-01	Clip pliers for hose clips (large size).
Mot. 1202-02	Clip pliers for hose clips (small size)
Mot. 1054	TDC setting pin.

Tightening torques ▽	
cylinder head bolts	**30 Nm**
cylinder head bolts	**30 Nm**
cylinder head bolts	**180° ± 25°**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Clean the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the engine cover,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger supply pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft seals (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the timing end camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) .

F4R

14499

❑ Remove:

- the valve rockers (**1**) ,
- the hydraulic tappets (**2**) .

> Note:
>
> To prevent any risk of unpriming the hydraulic tappets make sure that they are vertical.

124751

123165

❑ Undo the air filter unit air outlet pipe clips (**3**) .

F4R

123344

❑ Unclip:

- the clip (**4**) of each turbocharging pressure regulation hose,
- the clip (**5**) of the anti-surge valve hose.

❑ Disconnect:

- the turbocharging pressure regulation hoses,
- the anti-surge valve hose,
- the turbocharging pressure regulation solenoid valve connector (**6**) ,
- the brake servo double non-return valve connector (**7**) .

❑ Unclip the hoses on the air filter unit air outlet pipe.

❑ Remove the air filter box air outlet pipe.

123343

❑ Disconnect the coolant temperature sensor connector (**8**) .

❑ Move aside the clip ***(9)*** of each water chamber cooling hose using tool **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)**.

❑ Disconnect the water chamber cooling hoses.

❑ Remove the engine wiring bolt from the cylinder head.

123154

❑ Disconnect the connector (**10**) from the air pressure sensor.

❑ Unclip the wiring from the air inlet pressure sensor.

F4R

❏ Disconnect:

- the oil vapour rebreather solenoid valve connector ***(11)*** ,
- the injector connectors ***(12)*** ,
- the throttle valve connector ***(13)*** ,
- the brake servo vacuum pipe union ***(14)*** on the intake distributor,
- the petrol vapour rebreather pipe union ***(15)*** on the intake distributor.

❏ Move the injector wiring to one side.

❏ Unclip the petrol vapour rebreather pipe on the injector rail.

123726

123724

❏ Remove the intercooler air outlet pipe bolts (**16**) .

❏ Disconnect the intercooler outlet air pipe.

F4R

123153

❑ Remove:

- the oil dipstick,
- the dipstick well bolt (**17**) ,
- the dipstick well.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123152

❑ Remove:

- the cylinder head bolts,
- the cylinder head,
- the cylinder head gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the cylinder head bolts.

1 - CLEANING THE CYLINDER HEAD

❑ Clean the cylinder head.

> **IMPORTANT**
> Wear goggles with side protectors for this operation.

> **IMPORTANT**
> Wear latex gloves during the operation.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

> **WARNING**
> Do not allow this product to drip onto the paintwork.
>
> Clean the cylinder head carefully to prevent foreign bodies from entering the oil supply and return galleries.
>
> Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

❑ Clean the joint faces using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B,

Consumables - Products) to dissolve the part of the seal that is still attached to the cylinder head and the cylinder block.

❏ Apply the product to the part to be cleaned, wait approximately ten minutes then remove the residue with a wooden spatula.

❏ Check for gasket face deformation using a ruler and a set of shims.

the maximum deformation is **0.05 mm**.

> **WARNING**
> No regrinding of the cylinder head is permitted.

❏ Strip down the cylinder head (see **Cylinder head: Stripping**) (Technical Note 6027A, 10A, Engine and peripherals).

❏ Test the cylinder head for any cracks with the cylinder head testing kit (see **Garage Equipment catalogue**).

❏ Rebuild the cylinder head (see **Reassembling the cylinder head**) (Technical Note 6027A, 10A, Engine and peripherals).

2 - PREPARING TO FIT THE CYLINDER HEAD

❏ Remove the TDC setting pin **(Mot. 1054)**.

❏ Refit:

- the crankshaft sprocket,
- the crankshaft accessories pulley,
- the crankshaft accessories pulley bolt.

123151

❏ Place the pistons at half stroke.

❏ Check that the centring devices (**18**) are present and in good condition on the cylinder block.

> **WARNING**
> In order to ensure that the bolts are correctly tightened, use a syringe to remove any oil which may be in the cylinder head mounting holes.

❏ Refit the new cylinder head gasket.

F4R

II - REFITTING OPERATION FOR PART CONCERNED

123152

- ❑ Refit the cylinder head.
- ❑ Refit the new cylinder head bolts.
- ❑ Screw in the cylinder head bolts in order, without tightening them.
- ❑ Firstly, torque tighten in order the **cylinder head bolts (30 Nm)**.
- ❑ Again torque tighten in order the **cylinder head bolts (30 Nm)**.
- ❑ Angle tighten in order the **cylinder head bolts (180° ± 25°)**.

> **WARNING**
> Do not retighten the cylinder head mounting bolts after applying this procedure.

III - FINAL OPERATION.

- ❑ Refit:
  - the dipstick well,
  - the dipstick well bolt,
  - the dipstick.
- ❑ Connect the intercooler air outlet pipe.
- ❑ Refit the intercooler air outlet pipe bolts.
- ❑ Clip the petrol vapour rebreather pipe on the injector rail.
- ❑ Position the injector wiring.
- ❑ Connect:
  - the petrol vapour rebreather pipe union on the intake distributor,
  - the brake servo vacuum pipe union on the intake distributor,
  - the throttle valve connector,
  - the injector connectors,
  - the oil vapour rebreather solenoid valve connector,
- ❑ Clip the wiring of the air inlet pressure sensor.
- ❑ Connect the air inlet pressure sensor connector.
- ❑ Refit the engine wiring bolt on the cylinder head.
- ❑ Connect the cooling hoses to the water chamber.
- ❑ Position the clips of the water chamber cooling hoses using tool **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)**.
- ❑ Connect the coolant temperature sensor connector.
- ❑ Refit the air filter box air outlet pipe.
- ❑ Connect:
  - the brake servo double non-return valve connector,
  - the turbocharging pressure regulation solenoid valve connector,
  - the anti-surge valve hose,
  - the turbocharging pressure regulation hoses
- ❑ Clip:
  - the clip of the anti-surge valve hose,
  - the clip of each turbocharging pressure regulation hose.
- ❑ Clip:
  - the hoses on the air filter unit air outlet pipe,
  - the turbocharger regulation solenoid valve wiring,
  - the brake servo vacuum pipe on the air filter unit air outlet pipe.
- ❑ Tighten the clips on the air filter unit air outlet pipe.

F4R

14499

❑ To check whether the hydraulic tappets need re-priming, press the top of each tappet with your thumb. If the tappet piston can be pressed in, immerse the tappet in a container filled with diesel fuel.

❑ Press on the top of the tappet to expel air bubbles.

❑ Refit:

- the hydraulic tappets.
- the valve rockers,
- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**)
- the camshaft seals on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the turbocharger supply pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**)
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the engine cover.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K, and 780

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
Diagnostic tool
cylinder head testing tools

Tightening torques ▽	
new cylinder head bolts (initial torque)	**20 N.m**
new cylinder head bolts	**25 N.m**
new cylinder head bolts	**270° ± 10°**

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

Note:

The plugs are single-use. Do not reuse them, and discard the whole kit once opened.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

K9K, and 780

123532

❑ Undo the clip (**1**) from the intercooler outlet pipe.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

123527

❑ Pull the intercooler air outlet pipe clip (**2**) .

❑ Disconnect the intercooler air outlet pipe from the intercooler.

❑ Remove the intercooler outlet air pipe.

111748

❑ Remove:

- the dipstick,
- the dipstick well bolts (**3**) ,
- the dipstick well.

112621

❑ Disconnect the braking assistance pipe (**4**) from the vacuum pump.

121514

- ❑ Undo the air filter box air outlet pipe clip (**5**) on the turbocharger.
- ❑ Disconnect the air filter box air outlet pipe from the turbocharger.
- ❑ Remove the breather pipe on the cylinder head.
- ❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

123836

- ❑ Unclip the water chamber hose (**6**) .
- ❑ Remove the clips (**7**) from the water chamber hoses using the **(Mot. 1448)**.
- ❑ Disconnect the hoses (**8**) from the water chamber.

114341

- ❑ Remove the clips (**9**) from the intercooler cooling system cover hoses using the **(Mot. 1448)**.
- ❑ Disconnect the intercooler cooling system cover hoses (**10**) .

124555

- ❑ Disconnect:
  - (**12**) the high pressure pump supply pipes,
  - (**11**) the pipes from the diesel injector fuel return rail.
- ❑ Insert the correct blanking plugs.

K9K, and 780

II - OPERATION FOR REMOVAL OF PART CONCERNED

19712

❑

> Note:
>
> The operation to remove the cylinder head requires two people.

❑ Remove:

- the cylinder head bolts,
- the cylinder head from the cylinder block,
- the cylinder head gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **IMPORTANT**
>
> Wear goggles with side protectors for this operation.

> **IMPORTANT**
>
> Wear latex gloves during the operation.

> **WARNING**
>
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
>
> Do not allow this product to drip onto the paintwork.
>
> Clean the cylinder head carefully to avoid any foreign bodies entering the oil return and supply pipes.
>
> Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Always replace:

- the cylinder head bolts,
- the cylinder head gasket.

1 - Cleaning the cylinder head joint face

❑

> **WARNING**
>
> Protect the oilway so that foreign bodies do not enter the oil pipes in the cylinder head.
>
> Failure to follow this instruction could lead to the blocking of the oilways, resulting in a rapid deterioration of the camshaft.

❑ Clean the joint faces of the cylinder head and cylinder block using the **ABRASIVE PADS**.

K9K, and 780

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** degrease the cylinder head and cylinder block gasket faces.

2 - Checking the gasket face

❑ Check for gasket face bow using a ruler and a feeler gauge.

> **WARNING**
> No regrinding of the cylinder head is permitted.

❑ The maximum deformation is **0.05 mm**.

> Note:
> If the cylinder head is faulty:
> - strip down the cylinder head (see **Cylinder head: Stripping**) (Technical Note 6006A, 10A, Engine and peripherals),
> - test the cylinder head to detect any possible cracks using **cylinder head testing tools**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Bring the pistons to mid-stroke position to prevent any risk of contact with the valves when tightening the cylinder head.

> Note:
> The operation to refit the cylinder head requires two people.

> Note:
> The cylinder head gasket has a foolproofing device which must be positioned on the cylinder block inlet side.

❑ Fit:

- the new cylinder head gasket, centred by two dowels,
- the cylinder head on the cylinder block.

> **WARNING**
> In order to ensure that the bolts are correctly tightened, use a syringe to remove any oil which may be in the cylinder head mounting holes.

> **WARNING**
> Do not oil the new bolts. Be sure to oil bolts being reused.

19712

❑

> **WARNING**
> Do not retighten the cylinder head bolts after applying this procedure.

❑ Refit in order the new cylinder head bolts.

❑ Pretighten to torque and in order the **new cylinder head bolts (initial torque) (20 N.m)**.

❑ Tighten to torque and in order the **new cylinder head bolts (25 N.m)**.

❑ Check that all of the new cylinder head mounting bolts are tightened to the correct torque **(25 N.m)**.

❑ Angle tighten in order the **new cylinder head bolts (270° ± 10°)**.

III - FINAL OPERATION

❑ Remove the blanking plugs.

❑ Connect the following pipes:

- the high pressure pump supply pipes,

K9K, and 780

- the pipes from the diesel injector fuel return rail.

❑ Connect the intercooler cooling system cover hoses.

❑ Refit the intercooler cooling system cover hose clips using the **(Mot. 1448)**.

❑ Connect the water chamber hoses.

❑ Refit the water chamber hose clips using the **(Mot. 1448)**.

❑ Clip the hose onto the water chamber.

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit the breather pipe on the cylinder head.

❑ Connect the air filter box air outlet pipe to the turbocharger.

❑ Tighten the air filter box air outlet pipe clip on the turbocharger.

❑ Connect the brake servo pipe to the vacuum pump.

❑ Refit:

- the dipstick well,
- the dipstick well bolts.

❑ Tighten the dipstick well bolts.

❑ Refit the dipstick.

❑ Fit:

- the intercooler air inlet pipe,
- the intercooler outlet air pipe,
- the clips to the intercooler inlet air pipe in their original position,
- the intercooler air outlet pipe clip in its original position.

❑ Clip on:

- the intercooler air inlet pipe to the intercooler,
- the intercooler air inlet pipe on the turbocharger,
- the intercooler air outlet pipe to the intercooler.

❑ Connect the intercooler air outlet pipe to the damper valve.

❑ Tighten the intercooler air outlet pipe clip.

❑ Refit:

- the intercooler air inlet pipe bolt,
- the intercooler air inlet pipe nut.

❑ Tighten:

- the intercooler air inlet pipe bolt,
- the intercooler air inlet pipe nut.

❑ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1202-01	Clip pliers for hose clips (large size).
Mot. 1202-02	Clip pliers for hose clips (small size)

Tightening torques ▽	
cylinder head bolts (initial torque)	**20 N.m**
cylinder head bolts	**240° ± 6°**
exhaust manifold stay bolt	**44 N.m**
exhaust manifold stay nut44 N	**.m**
exhaust bracket bolts	**22 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Clean the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- every camshaft seal (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) .

K4M

128376

❑ Remove:

- the dipstick (**1**) ,
- the bolts (**2**) from the dipstick guide tube,
- the dipstick guide.

128374

❑ Remove:

- the bolts (**3**) from the exhaust bracket,
- the ring between the exhaust manifold and the catalytic converter.

128618

❑ Remove:

- the nut (**4**) from the exhaust manifold stay,
- the bolt (**5**) from the exhaust manifold stay,
- the exhaust manifold stay.

128370

❑ Disconnect the upstream oxygen sensor connector (**6**) .

K4M

128616

❑ Using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)** remove:

- the cooling radiator top hose clip (**7**) on the water chamber,
- the heater matrix inlet hose clip (**8**) on the water chamber.

❑ Disconnect:

- the cooling radiator top hose from the water chamber.
- the heater matrix inlet hose from the water chamber,
- the connector (**9**) from the coolant temperature sensor.

II - OPERATION FOR REMOVAL OF PART CONCERNED

103259

❑ Remove:

- the cylinder head bolts,
- the cylinder head.

128614

❑ Remove the cylinder head seal (**10**) .

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the cylinder head bolts,
- the ring between the exhaust manifold and the catalytic converter,
- the cylinder head gasket.

K4M

CLEANING THE CYLINDER HEAD

❑

IMPORTANT
Wear goggles with side protectors for this operation.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

WARNING
Do not allow this product to drip onto the paintwork.

Clean the cylinder head carefully to prevent foreign bodies from entering the oil supply and return galleries.

Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

❑ Clean using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products):

- the cylinder head joint face if being reused,
- the cylinder block gasket face.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the cylinder head joint face if being reused,
- the cylinder block gasket face.

❑ Check for gasket face deformation using a ruler and a set of shims.

the maximum deformation is **0.05 mm**.

WARNING
No regrinding of the cylinder head is permitted.

❑ Strip the cylinder head (see **Cylinder head: Stripping**) (Technical Note 6023A, 10A, Engine and peripherals).

❑ Test the cylinder head for any cracks with the cylinder head testing kit (see **Garage Equipment catalogue**).

❑ Rebuild the cylinder head (see **Reassembling the cylinder head**) (Technical Note 6023A, 10A, Engine and peripherals).

128611

❑ Place the pistons at half stroke.

❑ Check that the centring dowel (**11**) is on the cylinder block.

❑ Refit a new cylinder head gasket.

K4M

II - REFITTING OPERATION FOR PART CONCERNED

103259

❑ Refit:

- the cylinder head,
- the new cylinder head bolts.

> **WARNING**
> In order to ensure that the bolts are correctly tightened, use a syringe to remove any oil which may be in the cylinder head mounting holes.

> **WARNING**
> Do not lubricate the new bolts. Be sure to oil bolts being reused.

❑ Screw in the cylinder head bolts in order, without tightening them.

❑ Pretighten to torque and in order the **cylinder head bolts (initial torque) (20 N.m)**.

❑ Check that all of the new cylinder head bolts are tightened to the correct torque **(20 N.m)**.

❑ Angle tighten in order the **cylinder head bolts (240° ± 6°)**.

> **WARNING**
> Do not retighten the cylinder head mounting bolts after applying this procedure.

III - FINAL OPERATION.

❑ Connect:

- the cooling radiator top hose to the water chamber,
- the heater matrix inlet hose to the water chamber,
- the coolant temperature sensor connector,

❑ Using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)** fit:

- the cooling radiator top hose clip on the water chamber,
- the heater matrix inlet hose clip on the water chamber.

❑ Refit the exhaust manifold stay.

❑ Connect the upstream oxygen sensor connector.

❑ Tighten to torque:

- the **exhaust manifold stay bolt (44 N.m)**,
- the **exhaust manifold stay nut44 N (.m)**.

❑ Refit a new ring between the exhaust manifold and the catalytic converter.

❑ Torque tighten the **exhaust bracket bolts (22 N.m)**.

❑ Refit:

- the dipstick guide,
- the dipstick,
- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- every camshaft seal (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,

K4M

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .
- the engine cover.

❏ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M9R

Special tooling required	
Mot. 1431	Flywheel locking tool.

Equipment required
component support

Tightening torques ▽	
cylinder head bolts (initial torque)	**5 N.m**
cylinder head bolts (final torque)	**30 N.m + 300° ± 6°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

Note:

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

❑ Remove:

- the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- the EGR pipe at the EGR cooler inlet (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

❑ Position the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) .

115738

❑ Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the flywheel locking tool **(Mot. 1431)**,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

M9R

❑ Remove:

- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- Depending on the version, the catalytic pre-converter or the catalytic converter at the turbocharger outlet (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) or (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the diesel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

114042

❑ Disconnect the high pressure pump fuel collection pipe (**1**) from the fuel collector outlet pipe (**2**) of the cylinder head.

❑ Remove the fuel collector outlet pipe (**2**) from the cylinder head.

M9R, and 742 or 744 or 746 or 748

114035

❑ Remove:

- the « oil filler cap - dipstick » assembly (**3**) ,
- the dipstick guide bolt (**4**) ,

M9R

- the dipstick guide.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

124522

❑ Remove:

- the oil filler cap - dipstick assembly (**5**) ,
- the dipstick tube bolts (**6**) ,
- the upper and lower dipstick tube assembly (**7**) .

M9R, and 742 or 744 or 746 or 748

114037

❑ Remove:

- the bolts (**8**) of the EGR pipe at the EGR cooler outlet, applying a maximum loosening torque of **40 N.m** to avoid the breaking the bolts,
- the EGR pipe at the EGR cooler outlet,
- the seals of the EGR pipe at the EGR cooler outlet.

Note:

If the bolts do not loosen:

- apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- wait **10 minutes**,
- apply a maximum torque of **40 N.m** until the bolt loosens.

M9R

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

124516

❑ Remove:

- the bolts (**9**) of the EGR pipe at the EGR cooler outlet, applying a maximum loosening torque of **40 N.m** to avoid the breaking the bolts,
- the EGR pipe at the EGR cooler outlet.

Note:

If the bolts do not loosen:

- apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- wait **10 minutes**,
- apply a maximum torque of **40 N.m** until the bolt loosens.

114038

❑ Remove the air pipe (**10**) between the EGR cooler control solenoid valve and the EGR cooler.

II - REMOVAL OF CYLINDER HEAD

114054

❑ Remove:

- the cylinder head bolts,
- the cylinder head,
- the cylinder head gasket.

M9R

114253

❑ Remove the hydraulic tappet - valve rocker assemblies.

Note:

Mark each hydraulic tappet - valve rocker assembly in relation to the cylinder head.

Immerse the hydraulic tappets in a bath of engine oil to ensure no air enters.

M9R

REFITTING

I - REFITTING PREPARATION OPERATION

❑

WARNING
Protect the oilway so that foreign bodies do not enter the oil pipes in the cylinder head.

Failure to follow this instruction could lead to the blocking of the oilways, resulting in a rapid deterioration of the camshaft.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the cylinder block gasket face,
- the cylinder head joint face.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Clean the joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products):

- the EGR pipe at the cooler outlet,
- the EGR solenoid valve,
- the EGR cooler.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ **parts always to be replaced: cylinder head bolts (10,02,01,14)**

parts always to be replaced: Cylinder head gasket (10,02,01,04)

parts always to be replaced: exhaust gas recirculation pipe bolt (11,07,01,18)

M9R, and 742 or 744 or 746 or 748

❑ **parts always to be replaced: Exhaust gas recirculation pipe seal (11,07,01,15)**

❑ Always replace the seal of the dipstick tube.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ **parts always to be replaced: Exhaust gas recirculation rigid pipe (11,07,01,08)**

II - OPERATION FOR REFITTING THE CYLINDER HEAD

❑ Check that the cylinder head seal matches the cylinder head (see **Cylinder head: Check**) .

114873

❑ Check that the centring dowels of the cylinder head (**11**) are present. If removed, refit them.

❑ Apply two "drops" of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) (∅ **5 to 7 mm**) to the cylinder block at (**12**) (timing end).

M9R

114874

- Fit the new cylinder head gasket (**13**) on the cylinder block.
- Place two small drops of **SILICONE ADHESIVE SEALANT** measuring **∅ 5 to 7 mm** on the cylinder head gasket at (**14**) (timing end).

115515

- Position the pistons at mid-stroke by turning the crankshaft in a clockwise direction.

114054

- Refit the cylinder head.
- Tighten to torque and in order:
  - the **cylinder head bolts (initial torque) (5 N.m)**,
  - the **cylinder head bolts (final torque) (30 N.m + 300° ± 6°)**.
- Clean any excess **SILICONE ADHESIVE SEALANT** from the timing face using a plastic spatula.

M9R

124701

- ❑ Press the heads of the hydraulic tappets to check that they are filled with oil before refitting them.
- ❑ If the piston pushes in, immerse the hydraulic tappet in a container of diesel fuel to reprime it.
- ❑ Check that the valve rocker clips (**15**) are in place.
- ❑ Lubricate the hydraulic tappet housings on the cylinder head with engine oil.
- ❑ Refit the hydraulic tappet - valve rocker assemblies in the cylinder head.

> Note:
>
> Check that the valve rockers are correctly positioned on the valves.

III - FINAL OPERATION

- ❑ Refit the air pipe between the EGR cooler control solenoid valve and the EGR cooler.

M9R, and 742 or 744 or 746 or 748

- ❑ Refit:
  - the new seals on the EGR pipe at the EGR cooler outlet,
  - the EGR pipe at the EGR cooler outlet,
  - the bolts of the EGR pipe at the EGR cooler outlet.
- ❑ In order, fit (without tightening):
  - the bolts of the EGR pipe on the EGR solenoid valve end,
  - the bolts of the EGR pipe on the EGR cooler end.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Refit:
  - the new EGR pipe at the EGR cooler outlet (check for the seal on the EGR solenoid valve end),
  - the bolts of the EGR pipe at the EGR cooler outlet.
- ❑ In order, fit (without tightening):
  - the bolts of the EGR pipe on the EGR solenoid valve end,
  - the bolts of the EGR pipe on the EGR cooler end.

114875

- ❑ Tighten the following in order:
  - if removed, the bolts of the EGR solenoid valve (see **Cylinder head: Stripping - Rebuilding**) ,
  - the bolts of the EGR pipe on the EGR solenoid valve end,
  - the bolts of the EGR pipe on the EGR cooler end.

M9R

M9R, and 742 or 744 or 746 or 748

❑ Fit a new seal on the dipstick guide tube.

❑ Lubricate the seal with engine oil.

❑ Fit the dipstick guide tube in the cylinder block without rotating the guide tube.

Note:

Check that the seal has not come out of its housing.

❑ Tighten the dipstick tube bolts.

❑ Refit the filler cap - dipstick assembly.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Refit the upper and lower dipstick tube assembly on the cylinder block.

❑ Tighten the bolts of the upper dipstick tube.

❑ Refit the filler cap - dipstick assembly.

❑ Fit the fuel collector outlet pipe of the cylinder head.

❑ Connect the high pressure pump fuel collection pipe onto the fuel collector outlet pipe of the cylinder head.

❑ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- Depending on the version, the catalytic pre-converter or the catalytic converter at the turbocharger outlet (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) or (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Refit the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

❑ Refit:

- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the new crankshaft seal on the timing end (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

❑ Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the flywheel locking tool **(Mot. 1431)**.

❑ Refit:

- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the new accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the component support (see **Engine support equipment: Use**) .

M9R

- Refit:
  - the EGR pipe at the EGR cooler inlet (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
- Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

V4Y, and 713

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 919-02	Flywheel locking tool.

Equipment required
component support
indelible pencil

Tightening torques ▽	
cylinder head bolts (initial tightening)	**98 Nm**
cylinder head bolts (second tightening)	**40 Nm**
cylinder head bolts	**93° ± 3°**
cylinder head bolts on the inner timing cover	**13 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Fit the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),

133867

❑ Remove the clips (**1**) of the water-oil exchanger pipe using the tool. **(Mot. 1448)**

❑ Remove:

- the oil-water exchanger pipe,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the camshaft position sensors (see **Camshaft position sensor: Removal - Refitting**) ,

V4Y, and 713

- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

133843

133844

❑ Disconnect:

- the injector connectors (**2**) ,
- the oil pressure sensor (**3**) .

❑ Remove the engine wiring bolts (**4**) .

❑ Unclip:

- the engine wiring connector (**5**) ,
- the engine wiring.

❑ Remove:

- the engine wiring,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)** (**6**) .

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the injector rail - injectors (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-39**) ,
- the injector holder shim (see **12A**, **Fuel mixture**, **Injector holder shim: Removal - Refitting**, page **12A-93**) ,
- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) .

V4Y, and 713

127894

❑ Mark the position of the camshaft tappets using a **indelible pencil**.

❑ Remove:

- the camshaft tappets using a magnet,
- the dipstick (**6**) .

127842

❑ Remove:

- the bolts (**7**) of the rigid cooling pipes,
- the rigid cooling pipes,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

127892

❑ Remove:

- the bolts (**8**) of the inner cover on the cylinder heads,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) .

V4Y, and 713

Back row cylinder head

23010

Front row cylinder head

23011

❑ Remove:

- the cylinder head bolts (**9**) ,
- the cylinder heads,
- the cylinder head gaskets.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Protect the oilway so that foreign bodies do not enter the oil pipes in the cylinder head.
>
> Failure to follow this instruction could lead to the blocking of the oilways, resulting in a rapid deterioration of the camshaft.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the cylinder block gasket face,
- the cylinder head gasket faces on the cylinder block.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the gasket faces using a **GREY ABRASIVE PAD**, part number **77 01 405 943**.

❑ **parts always to be replaced: cylinder head bolts (10,02,01,14)**.

parts always to be replaced: Cylinder head gasket (10,02,01,04).

127759

❑ Check that the centring dowels (**10**) are in place.

❑ Remove the flywheel locking tool **(Mot. 919-02)**.

❑ Position the pistons at mid-stroke.

V4Y, and 713

- Clean the gasket faces of the inner timing cover and cylinder heads on the inner timing cover using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

- Remove the residue using a plastic spatula.
- Finish cleaning the gasket faces using a **GREY ABRASIVE PAD**, part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

- Degrease the gasket faces of the inner timing cover and cylinder heads on the inner timing cover using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and clean cloths.

101396

- Apply beads of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **2.6 to 3.6 mm** to the inner timing cover.
- Identify the cylinder head gaskets (see **Cylinder head: Check**) .

127891

- Refit new cylinder head gaskets.

II - REFITTING OPERATION FOR PART CONCERNED

22930

- Refit the cylinder heads equipped with new O-rings (**11**) .

V4Y, and 713

Front row cylinder head

23011

Back row cylinder head

23010

❑

> **WARNING**
> In order to ensure that the bolts are correctly tightened, use a syringe to remove any oil which may be in the cylinder head mounting holes.

❑ Tighten to torque and in order the **cylinder head bolts (initial tightening) (98 Nm)**.

❑ Loosen the bolts of the cylinder heads.

❑ Tighten to torque and in order the **cylinder head bolts (second tightening) (40 Nm)**.

❑ Perform in order and to angle:

- a first tightening of the **cylinder head bolts (93° ± 3°)**,
- a second tightening of the **cylinder head bolts (93° ± 3°)**.

> Note:
> Do not retighten the cylinder head bolts after this procedure has been applied.

127892

❑ Refit:

- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the cylinder head bolts (**12**) on the inner timing cover.

❑ Torque tighten the **cylinder head bolts on the inner timing cover (13 N.m)**.

V4Y, and 713

III - FINAL OPERATION

127842

❑ Refit:

- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the rigid cooling pipes (**13**) .

127894

❑ Refit:

- the dipstick (**14**) ,
- the tappets in the position marked at the time of removal.

❑ Refit:

- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) ,
- the injector holder shim (see **12A**, **Fuel mixture**, **Injector holder shim: Removal - Refitting**, page **12A-93**) ,
- the injector rail - injectors (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-39**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)**.

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the flywheel locking tool **(Mot. 919-02)**.

❑ Refit the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

V4Y, and 713

133843

133844

❑ Fit the engine wiring.

❑ Clip:

- the engine wiring,
- the engine wiring connector (**15**) .

❑ Refit the engine wiring bolts (**16**) .

❑ Connect:

- the connector (**17**) from the oil pressure sensor,
- the connectors (**18**) from the injectors.

❑ Refit:

- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .
- the camshaft position sensors (see **Camshaft position sensor: Removal - Refitting**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

133867

❑ Refit:

- the oil-water exchanger pipe,
- the clips (**19**) of the oil-water exchanger pipe using the tool **(Mot. 1448)**,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the engine from **component support** (see **Engine support equipment: Use**) .

❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

V4Y, and 713

- Remove the engine lifting eye at the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .
- Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

V9X

Special tooling required	
Mot. 1431	Flywheel locking tool.

Tightening torques ▽	
cylinder head bolts	**30 N.m + 300° ± 6°**
front row cylinder head bolts on the timing end	**20 N.m**
dipstick well bolt	**10 N.m**
bolts for the cylinder head outlet intermediate duct on the cylinder heads	**12 N.m**
bolt for the cylinder head outlet intermediate duct on the coolant pump outlet pipe	**10 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
- the injector rail protectors (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the diesel injector fuel return rail unions (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,

- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the injector rails (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the lifting eye on the flywheel end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) ,
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

137039

❑ Remove the hydraulic tappet - valve rocker assemblies.

❑ Remove:

- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the high pressure pump (see **13B**, **Diesel injection**, **High pressure pump: Removal - Refitting**, page **13B-62**) .

135583

135581

❑ Remove:

- the bolts (**1**) from the cylinder head outlet intermediate coolant duct on the cylinder heads,
- the bolt (**2**) from the cylinder head outlet intermediate coolant duct on the coolant pump outlet pipe,
- the cylinder head outlet intermediate coolant duct,
- the seals from the cylinder head outlet intermediate coolant duct,

- the O-ring for the coolant pump outlet pipe on the cylinder head outlet intermediate coolant duct side.

135580

❑ Remove:

- the bolts (**3**) from the inter-intake distributors pipe on the gearbox side,
- the inter-intake distributors pipe on the gearbox side,
- the seal from the inter-intake distributors pipe on the gearbox side,
- the O-ring from the inter-intake distributors pipe on the gearbox side.

135579

❑ Remove:

- the bolts (**4**) from the inter-intake distributors pipe on the timing side,
- the inter-intake distributors pipe on the timing side,
- the seal from the inter-intake distributors pipe on the timing side,
- the O-ring from the inter-intake distributors pipe on the timing side.

IMPORTANT
Wear protective gloves during the operation.

V9X

1 - Front row

137887

❑ Remove the engine wiring nut (**5**) from the fuel discharge pipe support.

❑ Remove the engine wiring from the fuel discharge hose support.

134908

❑ Remove:

- the dipstick (**6**) ,
- the bolts (**7**) from the dipstick well.

134910

❑ Remove the nuts (**8**) from the front row exhaust manifold heat shield.

❑ Disconnect the diesel fuel discharge hose from the front row cylinder head at (**9**) .

❑ Remove:

- the engine wiring support - fuel discharge hose assembly,
- the exhaust manifold heat shield on the front row,
- the dipstick well,
- the O-ring from the dipstick well.

V9X

2 - Back row

134912

❑ Remove:

- the bolts (**10**) from the exhaust manifold heat shield on the back row,
- the exhaust manifold heat shield on the back row.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134911

❑ Remove the front row cylinder head bolts (**11**) on the timing end.

135577

135578

❑ Remove:

- the cylinder head bolts (**12**) ,
- the cylinder heads,
- the cylinder head gaskets.

V9X

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Protect the oilway so that foreign bodies do not enter the oil pipes in the cylinder head.
>
> Failure to follow this instruction could lead to the blocking of the oilways, resulting in a rapid deterioration of the camshaft.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the cylinder block gasket face,
- the cylinder head gasket faces on the cylinder block.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the gasket faces using a **GREY ABRASIVE PAD**, part number **77 01 405 943**.

❑ **parts always to be replaced: cylinder head bolts (10,02,01,14)**.

parts always to be replaced: Cylinder head gasket (10,02,01,04).

❑ Always replace:

- the O-ring for the dipstick well,
- the seals for the inter-intake distributor pipes,
- the O-rings for the inter-intake distributor pipes,
- the seals from the cylinder head outlet intermediate coolant duct,
- the O-ring for the coolant pump outlet pipe on the cylinder head outlet intermediate coolant duct side.

135106

❑ Check that the cylinder head centring dowels (**13**) are present.

❑ Remove the flywheel locking tool **(Mot. 1431)**.

❑ Position the pistons at mid-stroke.

❑ Identify the cylinder head gaskets (see **Cylinder head: Check**) .

V9X

Front row

138139

Back row

138137

❑ At (**14**) , apply beads of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **5 mm** to the joint faces of the cylinder block.

135104

❑ Refit new cylinder head gaskets.

V9X

Front row

138140

Back row

138138

- At (**15**) , apply beads of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **5 mm** to the joint faces of the cylinder heads.

II - REFITTING OPERATION FOR PART CONCERNED

135578

135577

-

WARNING

In order to ensure that the bolts are correctly tightened, use a syringe to remove any oil which may be in the cylinder head mounting holes.

V9X

❑ Torque tighten and angle tighten the **cylinder head bolts (30 N.m + 300° ± 6°)** in order.

> Note:
>
> Do not retighten the cylinder head bolts after this procedure has been applied.

❑ Refit the front row cylinder head bolts on the timing end.

❑ Torque tighten the **front row cylinder head bolts on the timing end (20 N.m)**.

❑ Clean off any excess **SILICONE ADHESIVE SEALANT** from the timing face using a plastic spatula.

III - FINAL OPERATION

1 - Front row

❑ Refit:

- a new O-ring to the dipstick well,
- the dipstick well,
- the exhaust manifold heat shield on the front row,
- the engine wiring support - fuel discharge hose assembly.

❑ Connect the diesel fuel discharge hose to the front row cylinder head.

❑ Refit the nuts for the front row exhaust manifold heat shield.

❑ Refit:

- the bolt for the dipstick well,
- the dipstick.

❑ Torque tighten the **dipstick well bolt (10 N.m)**.

❑ Fit the engine wiring onto the fuel discharge hose support.

❑ Refit the engine wiring nut onto the fuel discharge hose support.

2 - Back row

❑ Refit the exhaust manifold heat shield on the back row.

3 - Front and back row

❑ Refit:

- a new seal to the inter-intake distributors pipe on the timing side,
- a new O-ring to the inter-intake distributors pipe on the timing side,
- the inter-intake distributors pipe on the timing side,
- a new seal to the inter-intake distributors pipe on the gearbox side,
- a new O-ring to the inter-intake distributors pipe on the gearbox side,
- the inter-intake distributors pipe on the gearbox side,
- a new O-ring for the coolant pump outlet pipe on the cylinder head outlet intermediate coolant duct side,
- new seals for the cylinder head outlet intermediate coolant duct on the cylinder heads,
- the cylinder head outlet intermediate coolant duct.

❑ Torque tighten:

- the **bolts for the cylinder head outlet intermediate duct on the cylinder heads (12 N.m)**,
- the **bolt for the cylinder head outlet intermediate duct on the coolant pump outlet pipe (10 N.m)**.

❑ Refit:

- the high pressure pump (see **13B**, **Diesel injection**, **High pressure pump: Removal - Refitting**, page **13B-62**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

124701

- Press on the head of the hydraulic tappets to check that they are correctly filled with oil before refitting them.
- If the piston pushes in, immerse the hydraulic tappet in a container of diesel fuel to reprime it.
- Check that the valve rocker clips (**16**) are in place.
- Using engine oil, lubricate the housings of the hydraulic tappets on the cylinder head.
- Refit:
  - the hydraulic tappet - valve rocker assemblies,
  - the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
  - the lifting eye on the flywheel end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) ,
  - the injector rails (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
  - the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
  - the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
  - the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
  - the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
  - the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
  - the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) ,
  - the diesel injector fuel return rails (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
  - the injector rail protectors (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
  - the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
  - the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
  - the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
  - the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
  - the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
  - the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
  - the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
  - the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,

V9X

- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the component support (see **Engine support equipment: Use**) .

❑ Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- fill and bleed the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M4R

Special tooling required	
Mot. 919-02	Flywheel locking tool.

Equipment required
1/2" female torx socket (12.7 mm square drive)

Tightening torques ▽	
cylinder head bolts (1st tightening)	**40 N.m**
cylinder head bolts (2nd tightening)	**100°**
cylinder head bolts (3rd tightening)	**100°**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

M4R, and 704

❑ Disconnect the manual gearbox from the engine (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

M4R, and 704

115928

❑ Immobilise the flywheel by fitting the tool **(Mot. 919-02)** (**1**) on the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the **(Mot. 919-02)**,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,

M4R

- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the injector rail (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) .

II - REMOVAL OF CYLINDER HEAD

115777

❑ Remove the cooling hose (**3**) .

115772

❑ Remove:

- the cylinder head bolts using a **1/2" female torx socket (12.7 mm square drive)**,
- the cylinder head.

115909

❑ Remove the cylinder head gasket (**4**) from the cylinder block.

M4R

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Protect the oilway so that foreign bodies do not enter the oil pipes in the cylinder head.
>
> Failure to follow this instruction could lead to the blocking of the oilways, resulting in a rapid deterioration of the camshaft.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the cylinder block gasket face,
- the cylinder head joint face.

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the cylinder block gasket face,
- the cylinder head joint face.

❑ Parts always to be replaced:

- the cylinder head gasket,
- the cylinder head bolts.

II - OPERATION FOR REFITTING THE CYLINDER HEAD

❑ Position piston 1 at Top Dead Centre.

❑ Check for the cylinder head centring dowels on the cylinder block.

❑ Refit:

- the new cylinder head gasket on the cylinder block,
- the cylinder head,
- the new cylinder head bolts.

115772

❑

> Note:
> Do not retighten the cylinder head bolts after applying this procedure.

❑ Tighten in order and to torque the cylinder head bolts **(40 N.m)**.

❑ Tighten to angle and in order the cylinder head bolts **(100°)**.

❑ Loosen all the cylinder head bolts.

❑ Tighten in order and to torque the **cylinder head bolts (1st tightening) (40 N.m)**.

❑ Tighten to angle and in order the **cylinder head bolts (2nd tightening) (100°)**.

❑ Retighten to angle and in order the **cylinder head bolts (3rd tightening) (100°)**.

❑ Refit the cooling hose ***(3)*** .

❑ Oil the camshaft bearings.

III - FINAL OPERATION

❑ Refit:

- the camshafts (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) ,
- the injector rail (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,

M4R

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

❑ Immobilise the flywheel or the drive plate using the tool **(Mot. 919-02)**.

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the tool **(Mot. 919-02)**.

❑ Refit the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the component support (see **Engine support equipment: Use**) .

M4R, and 704

❑ Connect the manual gearbox to the engine (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

❑ Refit the « engine and gearbox» assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

K9K, and 782

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1430	Set of 5 crankshaft and camshaft pulley timing pins.

Equipment required
cylinder head rule
set of feeler gauges

Tightening torques ▽	
cylinder head bolts (initial torque)	**20 N.m**
cylinder head bolts	**25 N.m**
cylinder head bolts	**270° ± 10°**
alternator bolts	**25 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,

K9K, and 782

- the dipstick.

138538

❑ Remove the dipstick guide bolts (**1**) .

❑ Move aside the dipstick guide.

139199

❑ Disconnect the turbocharging pressure regulation pipe (**2**) on the turbocharger.

138817

❑ Disconnect:

- the exhaust gas recirculation solenoid valve connector (**3**) ,
- the vacuum pipe (**4**) of the exhaust gas recirculation valve solenoid valve,
- the connector (**5**) of the exhaust gas recirculation valve solenoid valve.

139187

❑ Remove the bolt (**6**) from the bracket of the exhaust gas recirculation solenoid valve wiring.

K9K, and 782

139158

❑ Unclip the heater matrix cooling pipe at (**7**) .

139157

❑ Use the tool **(Mot. 1448)** to separate the clip (**8**) on the cooling pipe of the exhaust gas cooler.

❑ Disconnect the cooling pipe from the exhaust gas cooler.

139156

❑ Use the tool **(Mot. 1448)** to separate the clips (**9**) on the water chamber cooling pipes.

❑ Disconnect the water chamber cooling pipes.

K9K, and 782

138813

❑ Unclip the alternator wiring (**10**) on the rail protector.

❑ Disconnect:

- all heater plug connectors,
- the connector (**11**) from the injector rail pressure sensor,
- the connector (**12**) for the fuel pressure regulation solenoid valve,
- the connector (**13**) from the fuel flow regulating solenoid valve.

❑ Unclip the injection wiring at (**14**) .

❑ Move aside the injection wiring.

139192

❑ Remove:

- the alternator protector bolt (**15**) ,
- the alternator protector.

138816

❑ Disconnect the fuel supply pipe union (**16**) from the high pressure pump.

❑ Fit a suitable blanking plug to:

- the fuel supply pipe union opening,
- the high pressure pump opening.

K9K, and 782

138812

❑ Disconnect:

- the fuel supply pipe union (**17**) from the exhaust fuel injector solenoid valve,
- the fuel supply pipe union (**18**) from the exhaust fuel injector.

❑ Fit blanking plugs on:

- each opening of the exhaust fuel injector solenoid valve,
- the fuel supply pipe opening of the exhaust fuel injector solenoid valve,
- the fuel supply pipe opening of the exhaust fuel injector.

139190

❑ Disconnect the fuel drain pipe (**19**) on the injector rail protector.

139161

❑ Remove the alternator upper bolt (**20**) .

❑ Loosen the alternator lower bolt (**21**) .

❑ Tilt the alternator slightly towards the front of the vehicle.

❑ Remove:

- the inner timing cover bolts (**22**) ,
- the inner timing cover.

K9K, and 782

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑

> Note:
>
> The operation to remove the cylinder head requires two people.

❑ Remove the tool **(Mot. 1430)**.

> Note:
>
> Turn the camshaft slightly to facilitate the removal of the cylinder head bolt on the camshaft position sensor target.

❑ Insert the tool **(Mot. 1430)** in the holes of the camshaft pulley hub and the hole of the cylinder head.

19712

❑ Remove:

- the cylinder head bolts,
- the cylinder head from the cylinder block,
- the cylinder head gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **IMPORTANT**
>
> Wear goggles with side protectors for this operation.

> **WARNING**
>
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
>
> Do not allow this product to drip onto the paintwork.
>
> Clean the cylinder head carefully to avoid any foreign bodies entering the oil return and supply pipes.
>
> Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

> **WARNING**
>
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ **parts always to be replaced: cylinder head bolts (10,02,01,14)**

❑ **parts always to be replaced: Cylinder head gasket (10,02,01,04)**

1 - Cleaning the cylinder head joint face

❑

> **WARNING**
>
> Protect the oilway so that foreign bodies do not enter the oil pipes in the cylinder head.
>
> Failure to follow this instruction could lead to the blocking of the oilways, resulting in a rapid deterioration of the camshaft.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- the cylinder head,
- the cylinder block.

K9K, and 782

❑ Use a **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the joint faces:

- the cylinder head,
- the cylinder block.

2 - Checking the gasket face

❑ Check with a **cylinder head rule** and a **set of feeler gauges** to determine if the joint face has been deformed.

> **WARNING**
> No regrinding of the cylinder head is permitted.

❑ The maximum deformation is **0.05 mm**.

> Note:
> If the cylinder head is faulty:
> - strip down the cylinder head (see **Stripping the cylinder head**) (Technical Note 6006A, 10A, Engine and peripherals),
> - test the cylinder head for possible cracks using the cylinder head test kit,
> - rebuild the cylinder head (see **Reassembling the cylinder head**) (Technical Note 6006A, 10A, Engine and peripherals).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Bring the pistons to mid-stroke position to prevent any risk of contact with the valves when tightening the cylinder head.

> Note:
> The operation to refit the cylinder head requires two people.

> Note:
> The cylinder head gasket has a foolproofing device which must be positioned on the cylinder block inlet side.

❑ Fit:

- the new cylinder head gasket on the cylinder block,
- the cylinder head on the cylinder block.

> **WARNING**
> In order to ensure that the bolts are correctly tightened, use a syringe to remove any oil which may be in the cylinder head mounting holes.

> **WARNING**
> Do not oil the new bolts. Be sure to oil bolts being reused.

❑ Refit new cylinder head bolts.

19712

❑ Pretighten to torque and in order the **cylinder head bolts (initial torque) (20 N.m)**.

❑ Tighten to torque and in order the **cylinder head bolts (25 N.m)**.

❑ Check that all the cylinder head bolts are correctly torque tightened **25 N.m**.

❑ Angle tighten in order the **cylinder head bolts (270° ± 10°)**.

III - FINAL OPERATION

❑ Refit the inner timing cover.

❑ Fit the alternator in place.

❑ Refit the alternator upper bolt.

❑ Torque tighten the **alternator bolts (25 N.m)**.

❑ Connect the fuel drain pipe to the injector rail protector.

❑ Remove the blanking plugs on:

- each opening of the exhaust fuel injector solenoid valve,

K9K, and 782

- the fuel supply pipe opening of the exhaust fuel injector solenoid valve,
- the fuel supply pipe opening of the exhaust fuel injector.

❑ Connect:

- the fuel supply pipe union of the exhaust fuel injector solenoid valve,
- the fuel supply pipe union of the exhaust fuel injector.

❑ Remove the blanking plugs on:

- the fuel supply pipe union opening,
- the high pressure pump opening.

❑ Connect the fuel supply pipe union on the high pressure pump,

❑ Refit the alternator protector.

❑ Fit the injection wiring.

❑ Clip on the injection wiring.

❑ Connect:

- the connector for the fuel flow regulation solenoid valve,
- the connector for the fuel pressure regulation solenoid valve,
- injector rail pressure sensor connector,
- all heater plug connectors.

❑ Clip the alternator wiring to the rail protector.

❑ Connect the cooling pipes to the water chamber.

❑ Fit the clips on the water chamber cooling pipes using the tool **(Mot. 1448)**.

❑ Connect the cooling pipe to the exhaust gas cooler.

❑ Fit the cooling pipe clip on the exhaust gas cooler using the tool **(Mot. 1448)**.

❑ Clip on the heater matrix cooling pipe.

❑ Refit the bolt of the exhaust gas recirculation solenoid valve wiring bracket.

❑ Connect:

- the connector of the exhaust gas recirculation valve solenoid valve,
- the vacuum pipe of the exhaust gas recirculation valve solenoid valve,
- the exhaust gas recirculation solenoid valve connector,
- the turbocharging pressure regulation pipe on the turbocharger.

❑ Refit:

- the dipstick guide,
- the dipstick,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K, and 782

F4R

Tightening torques ▽	
engine tie-bar bolt on the engine tie-bar mounting	**190 Nm**
engine tie-bar bolt on the subframe	**115 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

123177

❑ Remove:

- the engine tie-bar bolt (**1**) on the subframe,
- the bolt (**2**) from the engine tie-bar on the engine tie-bar mounting,
- the lower linkage,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft seals on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

F4R

II - REMOVAL OPERATION FOR PART CONCERNED

123155

❑ Remove the camshafts (**3**) .

14499

❑ Remove:

- the valve rockers (**4**) ,
- the hydraulic tappets (**5**) .

Note:

To prevent any risk of unpriming the hydraulic tappets make sure that they are vertical.

F4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

Camshaft marking

14518

125579

❑ The camshafts can be identified by a marking at (**6**) .

The mark (**A**) corresponds to the engine type.

Marking (**B**) serves to distinguish the inlet camshaft from the exhaust camshaft:

- A: Inlet,
- E: Exhaust.

The mark (**C**) is for the supplier's use only.

> Note:
>
> It is essential to reprime the hydraulic tappets as these may become drained if removed for a long time.

❑ To check if re-priming is necessary, press the top of the tappet with your thumb. If the tappet piston sinks, dip the tappets in a container filled with diesel fuel then reprime them.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the hydraulic thrust bearings,
- the valve rockers,
- the inlet camshaft, lubricating the bearings,
- the exhaust camshaft, lubricating the bearings.

III - FINAL OPERATION.

❑ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the camshaft seals on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower linkage,
- the engine tie-bar bolt on the engine tie-bar mounting,
- the engine tie-bar bolt on the subframe.

❑ Torque tighten:

- the **engine tie-bar bolt on the engine tie-bar mounting (190 Nm)**,
- the **engine tie-bar bolt on the subframe (115 Nm)**.

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,

- the engine undertray,
- the engine undertray bolts,

❑ Tighten the engine undertray bolts.

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) MR 415, 35A, Wheels and tyres),
- the engine cover.

K9K

Special tooling required	
Mot. 1606	High pressure pump pulley support tool.

Tightening torques ▽	
camshaft pulley nut	**30 N.m + 86° ± 6°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls).

II - OPERATION FOR REMOVAL OF PART CONCERNED

118982

❑ Increase the hole (**1**) of the **(Mot. 1606)** (**2**) using an **8.5 mm** drill bit.

K9K

118983

- ❑ Undo the camshaft pulley hub bolts (**3**) .
- ❑ Fit the **(Mot. 1606)** on the cylinder head to lock the camshaft pulley wheel.
- ❑ Tighten the camshaft pulley hub bolts (**3**) .
- ❑ Remove:
  - the nut (**4**) from the camshaft pulley,
  - the **(Mot. 1606)**,
  - the camshaft pulley.

113563

113565

- ❑ Mark the position of the camshaft bearings.
- ❑ Remove:
  - the camshaft bearing bolts,
  - the camshaft bearings,
  - the camshaft,
  - the timing end camshaft seal.

K9K

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

> **WARNING**
> Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces of the camshaft bearings.

❑ Degrease the load-bearing surfaces of the camshaft bearings using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and a **CLEAN CLOTH**.

20064-1

❑ Apply four beads (**5**) of **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) **7 mm** in diameter on the cylinder head.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the camshaft by positioning the timing end camshaft groove vertically.

❑ Refit the camshaft bearings.

113563

❑ Refit the camshaft bearing bolts in order.

❑ Tighten the camshaft bearing bolts in order.

❑ Refit the camshaft seal (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) .

❑ Fit the camshaft pulley.

❑ Refit a new camshaft pulley nut.

❑ Undo the camshaft pulley hub bolts.

❑ Fit the **(Mot. 1606)** on the cylinder head to lock the camshaft pulley wheel.

❑ Tighten:

- the camshaft pulley hub bolts
- to torque and angle the **camshaft pulley nut (30 N.m + 86° ± 6°)**

❑ Remove the tool **(Mot. 1606)**.

III - FINAL OPERATION

❑ Refit:

- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the seal of each camshaft on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

128685

❑ Remove the camshafts (**1**) .

14499

❑ Remove:

- the valve rockers (**2**) ,
- the hydraulic tappets (**3**) .

> Note:
>
> To prevent any risk of unpriming the hydraulic tappets make sure that they are vertical.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

Camshaft markings

15152

(**4**)	Exhaust camshaft
(**5**)	Inlet camshaft

❑

> Note:
>
> The camshafts are identified by the pulley mountings

❑ Always replace the exhaust camshaft stud (**6**) if the stud loosens at the same time as the exhaust camshaft nut (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) (Technical Note 3887A, 11A, Top and front of engine).

> Note:
>
> It is essential to reprime the hydraulic tappets as these may become drained if removed for a long time.

❑ To check if re-priming is necessary, press the top of the tappet with your thumb. If the tappet piston depresses, immerse the tappets in a container full of diesel then reprime them.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the hydraulic tappets,
- the valve rockers,
- the inlet camshaft, by lubricating the inlet camshaft bearings,
- the exhaust camshaft, by lubricating the exhaust camshaft bearings.

III - FINAL OPERATION.

❑ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the seal of each camshaft on the timing end (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-287**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,

K4M

- the engine cover.

M9R

Special tooling required	
Mot. 1431	Flywheel locking tool.
Mot. 1573	Cylinder head support

Equipment required
component support

Tightening torques ▽	
high pressure pump drive pinion bolt	**40 N.m + 34° ± 6°**
camshaft bearing cap bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

Note:

Consult the safety and cleanliness advice and operation recommendations before carrying out any operation (see **Engine: Precautions for the repair**) .

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Position the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) .

115738

❑ Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the flywheel locking tool **(Mot. 1431)**.
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) .

M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

M9R

❑ Remove:

- the vacuum pump (see **Vacuum pump: Removal - Refitting**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the diesel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

II - CAMSHAFT REMOVAL OPERATION

114274

❑ Fit the rocker cover on the **(Mot. 1573)**.

❑ Remove:

- the camshaft bearing cap bolts,
- the camshaft bearing caps,
- the camshaft (**1**) on the inlet side,
- the camshaft (**2**) on the exhaust side.

> Note:
>
> The bearing caps are marked at the factory.

Removal of the high pressure pump drive pinion

❑ Carry out this operation only when replacing the exhaust side camshaft or the high pressure pump drive pinion.

M9R

114279

- ❑ Immobilise the high pressure pump drive pinion (**3**) using a vice with jaws.
- ❑ Remove the bolt (**5**) from the pinion, holding the camshaft (**4**) steady by hand.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:
  - the camshafts,
  - the camshaft bearing caps,
  - the bearings on the rocker cover.
- ❑ Check that the teeth of the high pressure pump drive pinion are not chipped, flaked, or scratched.
- ❑ **parts always to be replaced: camshaft timing sprocket bolt (10,02,02,16)**

Refitting the high pressure pump pinion

- ❑ Carry out this operation only when replacing the exhaust side camshaft or the high pressure pump drive pinion.
- ❑ Immobilise the high pressure pump drive pinion in a vice with jaws.
- ❑ Without tightening, fit the new bolt of the pinion whilst holding the camshaft (exhaust side).
- ❑ Torque and angle tighten the **high pressure pump drive pinion bolt (40 N.m + 34° ± 6°)**.

M9R

II - CAMSHAFT REFITTING OPERATION

114274

❑ Fit the rocker cover on the **(Mot. 1573)**.

❑ Lubricate the camshaft bearings on the rocker cover with engine oil.

❑ Refit:

- the camshaft, inlet side (**6**) ,
- the camshaft, exhaust side (**7**) .

❑ Lubricate the camshafts around the bearing caps with engine oil.

❑ Refit:

- the camshaft bearing cap (**8**) (part marking: ADM1),
- the camshaft bearing cap (**9**) (part marking: ADM2),
- the camshaft bearing cap (**10**) (part marking: ECH1),
- the camshaft bearing cap (**11**) (part marking: ECH2).

> Note:
>
> Check that the camshaft bearing caps are in contact with the rocker cover before refitting the bolts.

❑ Fit the camshaft bearing cap bolts, without tightening them.

❑ Torque tighten the **camshaft bearing cap bolts (10 N.m)**.

❑ Remove the rocker cover from the **(Mot. 1573)**.

127872

❑ Position:

- the groove (**12**) on the exhaust side camshaft horizontally (large segment (**13**) facing upwards),
- the groove on the inlet side of the camshaft (**14**) facing towards the rocker cover boss (**15**) .

III - FINAL OPERATION

❑ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) .

M9R

M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- Refit the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

- Refit:
  - the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
  - the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
  - the new crankshaft seal on the timing end (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .
- Fit the flywheel locking tool **(Mot. 1431)** onto the cylinder block.
- Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .
- Remove the flywheel locking tool **(Mot. 1431)**.
- Refit:
  - the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
  - the new accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .
- Remove the engine from the component support (see **Engine support equipment: Use**) .
- Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

V4Y, and 713

Special tooling required	
Mot. 919-02	Flywheel locking tool.

Equipment required
component support
indelible pencil

Tightening torques ▽	
bolts of the camshaft bearing caps (initial torque)	**6 N.m**
bolts of the camshaft bearing caps	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Fit the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the camshaft position sensors (see **Camshaft position sensor: Removal - Refitting**) .
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

V4Y, and 713

133843

133844

❑ Disconnect:

- the injector connectors (**1**) ,
- the oil pressure sensor (**2**) .

❑ Remove the engine wiring bolts (**3**) .

❑ Unclip:

- the engine wiring connector (**4**) ,
- the engine wiring.

❑ Remove:

- the engine wiring,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

133842

❑ Fit the flywheel locking tool **(Mot. 919-02)** (**5**) .

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

V4Y, and 713

II - CAMSHAFT REMOVAL OPERATION

133831

❑ Remove:

- the bolts (**5**) of the camshaft sensor mountings,
- the camshaft mountings.

❑ Mark the position of the camshaft bearing caps using a **indelible pencil**.

23001

❑ Remove:

- the camshaft bearing cap bolts (**6**) ,
- the camshaft bearing caps (**6**) .

127893

❑ Remove the camshafts.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the camshafts,
- the camshaft bearing caps,
- the camshaft bearings on the cylinder heads.

II - CAMSHAFT REFITTING OPERATION

❑ Lubricate with engine oil:

- the camshaft bearings on the cylinder heads,
- the camshaft journals.

V4Y, and 713

127893

23020

❑ Fit the camshafts:

- by positioning them correctly (see **Camshaft: Check**) ,
- by positioning the camshaft lugs (**7**) in the cylinder shafts (**8**) .

23001

❑ Refit the camshaft bearing caps (**9**) .

22934

❑ Tighten to torque and in order:

- the **bolts of the camshaft bearing caps (initial torque) (6 N.m)**,
- the **bolts of the camshaft bearing caps (12 N.m)**.

133831

❑ Refit the camshaft position sensor mountings.

III - FINAL OPERATION

❑ Refit:

- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the oil level sensor (see **10A**, **Engine and cylinder block assembly**, **Oil level sensor: Removal - Refitting**, page **10A-237**) ,
- the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-180**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the flywheel locking tool **(Mot. 919-02)**.

❑ Refit the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

133843

133844

❑ Fit the engine wiring.

❑ Clip:

- the engine wiring,
- the engine wiring connector (**10**) .

❑ Refit the engine wiring bolts (**11**) .

❑ Connect:

- the connector (**12**) from the oil pressure sensor,
- the connectors (**13**) from the injectors.

V4Y, and 713

- Refit:
  - the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
  - the camshaft position sensors (see **Camshaft position sensor: Removal - Refitting**) .
  - the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
  - the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
  - the accessories belts (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .
- Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .
- Remove the engine from **component support** (see **Engine support equipment: Use**) .
- Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).
- Remove the engine lifting eye at the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .
- Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

V9X

Special tooling required	
Mot. 1573	Cylinder head support

Equipment required
indelible pencil

Tightening torques ▽	
high pressure pump drive pinion bolt	**40 N.m + 34° ± 6°**
camshaft bearing cap bolts	**10 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
- the injector rail protectors (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the diesel injector fuel return rails (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,

- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the injector rails (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

II - CAMSHAFT REMOVAL OPERATION

❏ Fit the rocker cover on the tool **(Mot. 1573)** or on a cylinder head support.

Rocker cover back row

135048

Rocker cover front row

135049

❏ Mark the position of the camshaft bearing caps using a **indelible pencil**.

❏ Remove:

- the camshaft bearing cap bolts (**1**) ,
- the camshaft bearing caps,
- the camshafts on the inlet side (**2**) ,
- the camshafts on the exhaust side (**3**) .

V9X

Removal of the high pressure pump drive pinion

❑ Carry out this operation only when replacing the camshaft on the exhaust side of the front row or the high pressure pump drive pinion.

Camshaft on the exhaust side of the front cylinder bank

114279

❑ Lock the high-pressure pump drive pinion using a vice with jaws.

❑ Remove the bolt (**4**) from the pinion, while supporting the camshaft by hand.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the camshafts,
- the camshaft bearing caps,
- the camshaft bearings on the rocker cover.

❑ Check that the teeth of the high pressure pump drive pinion are not chipped, flaked, or scratched.

❑ Always replace the bolt for the high pressure pump drive pinion.

Refitting the high pressure pump pinion

❑ Carry out this operation only when replacing the exhaust side camshaft or the high pressure pump drive pinion.

❑ Immobilise the high pressure pump drive pinion in a vice with jaws.

❑ Fit a new high pressure pump drive pinion bolt without tightening and while supporting the camshaft (exhaust side).

❑ Torque and angle tighten the **high pressure pump drive pinion bolt (40 N.m + 34° ± 6°)**.

II - CAMSHAFT REFITTING OPERATION

❑ Fit the rocker cover on the **(Mot. 1573)**.

❑ Using engine oil, lubricate the camshaft bearings on the rocker covers.

> Note:
>
> Do not hit the camshaft side stops when fitting them to the rocker covers.

❑ Fit the camshafts onto the rocker covers.

> Note:
>
> Check that the centring dowels are fitted to the rocker covers before refitting the bearing caps.

❑ Refit the camshaft bearing caps.

❑ Torque tighten the **camshaft bearing cap bolts (10 N.m)**.

❑ Remove the rocker cover from the tool **(Mot. 1573)** or from the cylinder head support.

III - FINAL OPERATION

❑ Refit:

- the rocker covers (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the injector rails (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the diesel injectors (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) ,
- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,

- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-42**) ,
- the diesel injector fuel return rails (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the injector rail protectors (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36A, Power-assisted steering),
- the coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-66**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the component support (see **Engine support equipment: Use**) .

❑ Refit the engine - gearbox assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) ,
- fill and bleed the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M4R

Special tooling required	
Mot. 919-02	Flywheel locking tool.
Mot. 1716	Removes housing with silicone seals.

Tightening torques ▽	
cylinder head cover bolts (first initial torque)	**2 N.m**
cylinder head cover bolts (second initial torque)	**6 N.m**
cylinder head cover bolts	**10 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

M4R, and 704

❑ Disconnect the manual gearbox from the engine (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

❑ Place the engine on the component support (see **Engine support equipment: Use**) .

❑ Drain the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Remove the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

M4R, and 704

115928

❑ Immobilise the flywheel by fitting the tool **(Mot. 919-02)** (**1**) on the cylinder block.

❑ Remove:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the **(Mot. 919-02)**,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,

- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the injector rail (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) .

II - CAMSHAFT REMOVAL OPERATION

115773

❑ Remove the cylinder head cover bolts.

115774

❑ Detach the cylinder head cover using the tool **(Mot. 1716)** (**3**) .

❑ Remove the cylinder head cover (**4**) .

115775

❑ Remove the camshafts (**5**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Clean the joint faces of the cylinder head cover with **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Remove the residue using a plastic spatula.

❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD**, part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the cylinder head cover,
- the camshafts.

M4R

II - CAMSHAFT REFITTING OPERATION

115775

116209

❑ Refit the camshafts (**6**) (see **Camshaft: Check**) , placing the lugs (**7**) upwards.

116043

❑

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** with a diameter of **4 mm** (**8**) around the edge of the joint face of the cylinder head cover and the plug wells.

115773

❑ Refit:

- the cylinder head cover,
- the cylinder head cover bolts.

❑ Pretighten to torque and in order:

- the **cylinder head cover bolts (first initial torque) (2 N.m)**,
- the **cylinder head cover bolts (second initial torque) (6 N.m)**.

❑ Torque tighten in order the **cylinder head cover bolts (10 N.m)**.

M4R

III - FINAL OPERATION

❑ Refit:

- the injector rail (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the timing sprockets (see **Timing sprocket: Removal - Refitting**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) ,
- the crankshaft seal on the timing side (see **10A**, **Engine and cylinder block assembly**, **Crankshaft seal on timing end: Removal - Refitting**, page **10A-134**) .

❑ Immobilise the flywheel or the drive plate using the tool **(Mot. 919-02)**.

❑ Refit the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❑ Remove the tool **(Mot. 919-02)**.

❑ Refit the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Remove the engine from the component support (see **Engine support equipment: Use**) .

M4R, and 704

❑ Connect the manual gearbox to the engine (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

❑ Refit the « engine and gearbox» assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

Camshaft dephaser: Removal - Refitting

M4R

- The engine and gearbox assembly must be removed to remove/refit the camshaft dephaser (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .
- For the camshaft dephaser removal-refitting procedure (see **Timing - cylinder head: Removal**) (Technical Note 6020A, 10A, Engine and peripherals) and (see **Timing - cylinder head: Refitting**) (Technical Note 6020A, 10A, Engine and peripherals).

K4M

Special tooling required	
Mot. 1490-01	For locking and adjusting the camshaft pulleys.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

103265

❑ Position the **(Mot. 1490-01)**.

❑ Remove the inlet camshaft dephaser blanking cover (**1**) .

103264

❑ Remove:

- the bolt (**2**) from the inlet camshaft pulley dephaser,
- the exhaust camshaft pulley nut (**3**) ,
- the **(Mot. 1490-01)**,
- the inlet camshaft dephaser.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the exhaust camshaft pulley nut,
- the inlet camshaft pulley dephaser bolt.

> **WARNING**
> Failure to adhere to the following procedure may cause the timing belt to be incorrectly timed.

❑ If fitting a new inlet camshaft dephaser, check that it is locked by following the procedure described below:

❑ Fit a bolt to the inlet camshaft dephaser hub and tighten it.

111339

❑ Place the inlet camshaft dephaser in a vice fitted with jaws.

111340

❑ Mechanically lock the dephaser by rotating it to the left or to the right using a tubular hexagon box spanner.

❑ Check that the inlet camshaft dephaser is correctly locked (no rotation of the hub in relation to the wheel to the left or right).

❑ If there is a rotation of the hub in relation to the wheel, the camshaft dephaser is faulty and must be replaced.

❑ Grease the end of the inlet camshaft (timing end) and clean the bores and bearing faces of the inlet camshaft dephaser.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the inlet camshaft dephaser.

III - FINAL OPERATION.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,

K4M

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

- Removal - refitting of the camshaft dephaser is included in the removal - refitting of the timing chain (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

M4R

I - SPECIAL NOTES

The camshaft dephaser modifies the valve timing.

115873

To improve cylinder filling at all engine speeds, the engine is fitted with an inlet camshaft dephaser (**1**) .

Dephasing at the moment when the inlet valves close optimises filling according to engine speed. Torque at midrange engine speed and output at high engine speed are improved.

Leaving the inlet valves open for longer at high engine speed allows the mixture to be continually admitted thanks to its high speed.

However, at lower engine speeds the gases do not have a high level of inertia. It is therefore preferable to close the inlet valves earlier to avoid incorrect filling and a loss of torque due to the reflux of fresh gases.

The higher the engine speed, the later the inlet valves must be closed.

II - OPERATION AND PROGRAMMING

115496

The oil is supplied to the dephaser by a solenoid valve (**2**) located on the timing cover.

Supply by a variable opening cyclic ratio signal enables oil to be distributed to the mechanism and the dephaser angle to be adjusted.

The operation of the camshaft dephaser varies continuously.

The computer supplies the solenoid valve with a variable opening cyclic ratio proportional to the desired dephasing.

101814

The camshaft dephaser control solenoid valve is controlled if the following conditions are met:

- no engine speed sensor fault

- no camshaft position sensor fault,

- no injection system faults,

M4R

- after the engine has started,
- outside idling speed and no load,
- threshold of mapping reached according to load and engine speed reached,
- threshold of mapping reached according to the coolant temperature.

M4R

Tightening torques ▽	
camshaft dephaser solenoid valve bolt	**10 N.m**
engine tie-bar bolts	**190 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

123347

❑ Remove:

- the engine tie-bar bolts (**1**) ,
- the engine tie-bar (**2**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

115496

❑ Disconnect the connector (**3**) of the camshaft dephaser solenoid valve equipped with a new seal.

❑ Remove:

- the bolt (**4**) from the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the camshaft dephaser solenoid valve seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the camshaft dephaser solenoid valve equipped with a new seal,
- the camshaft dephaser solenoid valve bolt.

❑ Torque tighten the **camshaft dephaser solenoid valve bolt (10 N.m)**.

M4R

III - FINAL OPERATION.

❏ Refit:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the engine cover,
- the engine tie-bar,
- the engine tie-bar bolts.

❏ Torque tighten the **engine tie-bar bolts (190 N.m)**.

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

K4M

Tightening torques ▽	
camshaft dephaser solenoid valve bolt	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128446

❑ Disconnect the connector (**1**) from the camshaft dephaser solenoid valve.

128447

❑ Remove:

- the bolt (**2**) from the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the camshaft dephaser solenoid valve.

❑ Torque tighten the **camshaft dephaser solenoid valve bolt (10 N.m)**.

❑ Connect the camshaft dephaser solenoid valve connector.

II - FINAL OPERATION.

❑ Refit the engine cover.

V4Y

Tightening torques ▽	
camshaft dephaser solenoid valve bolt	**9 N.m**
anti-roll bar linkage upper nut	**44 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

1 - Front row camshaft dephaser solenoid valve

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt from the alternator and from the air conditioning compressor (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) .

2 - Back row camshaft dephaser solenoid valve

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the anti-roll bar linkage upper nut.

❑ Separate the linkage from the anti-roll bar.

133841

❑ Remove the timing cover bolt (**1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Front row camshaft dephaser solenoid valve

❑ Disconnect the camshaft dephaser solenoid valve connector.

133840

❑ Remove:

- the bolt (**2**) from the camshaft dephaser solenoid valve,

- the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve seal.

2 - Back row camshaft dephaser solenoid valve

❑ Disconnect the camshaft dephaser solenoid valve connector.

133841

❑ Remove:

- the bolt (**3**) from the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve,
- the camshaft dephaser solenoid valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: camshaft dephaser solenoid valve seal (10,02,02,14)**.

II - REFITTING OPERATION FOR PART CONCERNED

1 - Front row camshaft dephaser solenoid valve

❑ Refit:

- a new camshaft dephaser solenoid valve seal,
- the camshaft dephaser solenoid valve.

❑ Torque tighten the **camshaft dephaser solenoid valve bolt (9 N.m)**.

❑ Connect the camshaft dephaser solenoid valve connector.

2 - Back row camshaft dephaser solenoid valve

❑ Refit:

- a new camshaft dephaser solenoid valve seal,
- the camshaft dephaser solenoid valve.

❑ Torque tighten the **camshaft dephaser solenoid valve bolt (9 N.m)**.

❑ Connect the camshaft dephaser solenoid valve connector.

III - FINAL OPERATION

1 - Front row camshaft dephaser solenoid valve

❑ Refit:

- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the accessories belt from the alternator and from the air conditioning compressor (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine cover.

2 - Back row camshaft dephaser solenoid valve

❑ Fit the anti-roll bar linkage.

❑ Torque tighten the **anti-roll bar linkage upper nut (44 N.m)**.

❑ Refit:

- the timing cover bolt,
- the engine undertray.

F4R

Special tooling required	
Mot. 1801	Camshaft sprocket locking tool F4 engines.
Mot. 1509-01	Adapter kit for tool Mot.1509 or Mot.1801
Mot. 1517	Tool for fitting inlet camshaft seal.
Mot. 1512	Tool for fitting exhaust camshaft seals (28 x 47).

Tightening torques ▽	
toothed sprocket nuts	**80 Nm**
camshaft pulley nuts	**30 Nm + 86° ± 6°**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123141

❑ Fit the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)** (**1**) .

❑ Torque tighten the **toothed sprocket nuts (80 Nm)**.

❑ Remove:

- the nuts (**2**) from the camshaft pulleys,
- the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**,
- the camshaft pulleys,
- the camshaft seals.

F4R

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products), clean and degrease the joint faces of the following:

- of the cylinder head,
- of the rocker cover.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Always replace the camshaft seals.

II - REFITTING OPERATION FOR PART CONCERNED

123142

❑ Refit the new inlet camshaft seal using the tool **(Mot. 1517)** (**3**) .

123143

❑ Refit:

- the new exhaust camshaft seal using the tool **(Mot. 1512)** (**4**) ,
- the camshaft pulleys,
- the camshaft pulley nuts.

❑ Screw on the camshaft pulley nuts without tightening them.

❑ Fit the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**.

❑ Tighten to torque:

- the **toothed sprocket nuts (80 Nm)**,
- the **camshaft pulley nuts (30 Nm + 86° ± 6°)**.

❑ Remove the tool **(Mot. 1801)** fitted with **(Mot. 1509-01)**.

III - FINAL OPERATION.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

❑ Refit:

- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

❏ Refit the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K

Special tooling required	
Mot. 1606	High pressure pump pulley support tool.
Mot. 1577	Lip seal extractor (shaft diameter 28 mm to 42 mm).
Mot. 1632	Tool for fitting camshaft PTFE seal

Tightening torques ▽	
camshaft pulley nut	**30 N.m + 86° ± 6°.**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

118982

❑ Increase the hole (**1**) of the **(Mot. 1606)** (**2**) using an **8.5 mm** drill bit.

118983

❑ Undo the camshaft pulley hub bolts (**3**) .

❑ Fit the **(Mot. 1606)** on the cylinder head to lock the camshaft pulley wheel.

❑ Tighten the camshaft pulley hub bolts (**3**) .

❑ Remove:

- the nut (**4**) from the camshaft pulley,
- the **(Mot. 1606)**,

- the camshaft pulley.

123970

105257

❑

> Note:
>
> The timing end camshaft seal is removed using the tool **(Mot. 1577)**.

❑ Remove the camshaft seal from the timing end (**5**) , making sure that the end piece (**6**) of the tool **(Mot. 1577)** is always removed.

❑ Loosen bolts (**7**) and (**8**) fully from the **(Mot. 1577)**.

105270

❑ Position the claws of the **(Mot. 1577)** on the camshaft.

105271

❑ Push the tool **(Mot. 1577)** until contact is made between the ends (**9**) of the claws and the camshaft seal.

K9K

105272

❑ Separate the claws by turning the bolt (**10**) clockwise using an open-jawed spanner.

105273

❑ Remove the camshaft seal by turning the bolt (**11**) clockwise.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Degrease the camshaft seal bearing face on the timing end using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and a **CLEAN CLOTH**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ **parts always to be replaced: Camshaft seal on timing end (10,02,02,02)**.

parts always to be replaced: Exhaust camshaft pulley nut (10,02,02,13).

K9K

II - REFITTING OPERATION FOR PART CONCERNED

105531

21687

❑ Screw the stud (**12**) of the **(Mot. 1632)** onto the camshaft.

❑ Fit a new camshaft seal on the camshaft at the timing end.

Note:

For camshaft seals delivered fitted to a protective sleeve:

- do not remove the camshaft seal from its protective sleeve,
- fit the sleeve fitted with the camshaft seal on the camshaft,
- push the protective sleeve towards the cylinder head until the camshaft seal reaches its limit on the cylinder head,
- fit the seal on the camshaft by following the recommendations below.

1 - First fitting of the camshaft seal

21687-2

❑ Fit the cover (**13**) and the collar nut (**14**) of the **(Mot. 1632)**.

K9K

21687-3

❑ Screw on the collar nut until the cover touches the cylinder head.

❑ Remove:

- the collar nut from the **(Mot. 1632)**,
- the cover from the **(Mot. 1632)**,
- the stud of the **(Mot. 1632)**,
- the protective sleeve.

2 - Second fitting of the camshaft seal

123076

❑ Depending on the case, the Parts Department delivers seals (**15**) equipped with a spacer (**16**) amongst other things.

123075

❑

Note:

The spacer (**17**) is used to fit the seal (**18**) and is used in addition to the tool **(Mot. 1632)** (**19**) .

123073

❑ Position the bell (**20**) fitted with the spacer on the camshaft seal side and then position the collared nut (**21**) of the tool **(Mot. 1632)**.

> Note:
> The spacer fits on the bell of the tool **(Mot. 1632)** so that the internal edge of the spacer is on the side of the camshaft seal.

123074

❑ Tighten the collar nut until the spacer fitted on the cover touches the cylinder head.

3 - Continued for both methods

❑ Fit the camshaft pulley.

❑ Refit a new camshaft pulley nut.

❑ Undo the camshaft pulley hub bolts.

❑ Fit the **(Mot. 1606)** on the cylinder head to lock the camshaft pulley wheel.

❑ Tighten:

- the camshaft pulley hub bolts,
- to torque and angle the **camshaft pulley nut (30 N.m + 86° ± 6°.)**

❑ Remove the tool **(Mot. 1606)**.

III - FINAL OPERATION

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the engine undertray,
- the engine undertray bolts,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Special tooling required	
Mot. 1577	Lip seal extractor (shaft diameter 28 mm to 42 mm).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the exhaust camshaft pulley.

II - OPERATION FOR REMOVAL OF PART CONCERNED

105257

❑

> Note:
>
> The camshaft seal is removed using the **(Mot. 1577)**.

❑ Completely unscrew the nut (**1**) and the bolt **(Mot. 1577)** of the (**2**) .

K4M

1 - Removing the exhaust side seal

130548

❑ Position the claws of the **(Mot. 1577)** on the camshaft.

130548

❑ Push the **(Mot. 1577)** until contact is made between the ends of the claws and the camshaft seal.

130550

❑ Separate the claws by turning the nut (**3**) clockwise using an open-jawed spanner.

130551

❑ Remove the camshaft seal by turning the bolt clockwise using a spanner (**4**) .

K4M

2 - Removing the inlet side seal

130552

❑ Position the claws of the **(Mot. 1577)** on the camshaft.

130552

❑ Push the **(Mot. 1577)** until contact is made between the ends of the claws and the camshaft seal.

130553

❑ Separate the claws by turning the nut (**5**) clockwise using an open-jawed spanner.

130554

❑ Remove the camshaft seal by turning the bolt (**6**) clockwise.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the seal mating face of each camshaft,
- the cylinder head seal housings.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Always replace every camshaft seal.

II - REFITTING OPERATION FOR PART CONCERNED

18687

❑

> Note:
> Always hold the camshaft seal with the protector (**7**) when handling, as this type of camshaft seal is very FRAGILE. Touching the camshaft seal (**8**) is strictly forbidden in order to avoid any oil leaks once the camshaft seal is fitted on the engine.

1 - Refitting the exhaust side seal

130555

❑ Position the protector fitted with a new seal (**9**) on the camshaft (taking care not to touch the seal).

K4M

105531

130556

❑ Screw the stud (**10**) of theonto the camshaft.

130557

❑ Fit the cover (**11**) and the collar nut (**12**) of the.

130558

❑ Screw on the collar nut until the cover touches the cylinder head.

❑ Remove:

- the collar nut from the tool,
- the cover from the,
- the stud of the,
- the camshaft seal protector.

K4M

2 - Refitting the inlet side seal

130559

❑ Position the protector fitted with a new seal (**13**) on the camshaft (taking care not to touch the seal).

❑ Remove the camshaft seal protector.

105531

130561

❑ Screw the stud (**14**) of theonto the camshaft.

K4M

130562

❑ Fit the cover (**15**) and the collar nut (**16**) of the.

130563

❑ Screw on the collar nut until the cover touches the cylinder head.

❑ Remove:

- the collar nut from the tool,
- the cover from the,
- the stud from the tool.

III - FINAL OPERATION.

❑ Refit:

- the exhaust camshaft pulley.
- the camshaft dephaser (see **11A**, **Top and front of engine**, **Camshaft dephaser: Removal - Refitting**, page **11A-275**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

K9K

Special tooling required	
Mot. 856-02	Dial gauge support.
Mot. 252-01	Pressure plate for measuring piston liner protrusion.

Equipment required
indelible pencil
Dial gauge
magnetic holder

ADJUSTMENT

I - ADJUSTMENT PREPARATION STAGE

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

II - ADJUSTMENT OPERATION

86911

❑ Set the cylinder valves (**1**) in the end of exhaust, beginning of inlet position.

❑ Check the valve clearance (**X**) of the cylinder (**4**) using a set of feeler gauges:

- inlet valve clearance of **0.20 mm**,
- exhaust valve clearance of **0.40 mm**.

❑ Note the clearance values.

❑ Repeat the previous operation on the other cylinders.

- position cylinder n°3 at TDC and adjust cylinder n°2 clearance,
- position cylinder n°2 at TDC and adjust cylinder n°3 clearance,
- position cylinder n°4 at TDC and adjust cylinder n°1 clearance.

❑ Compare the values noted with the specified values.

❑ Remove:

- the camshaft (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) ,
- the valve tappet(s) which are outside the permitted tolerance values by marking their position using a **indelible pencil**.

14274

14678

- ❑ Fit the extension piece (**2**) of the **(Mot. 856-02)** on a **Dial gauge** (**5**) .
- ❑ Fix the **Dial gauge** (**5**) on a **magnetic holder** (**6**) .
- ❑ Fit the « dial gauge - magnetic holder » assembly on the **(Mot. 252-01)**.
- ❑ Calibrate the **Dial gauge**.

14678-1

- ❑ Lift the rod (**7**) of the **Dial gauge** (without changing the position of the « dial gauge - holder » assembly).
- ❑ Mount the valve tappet (**8**) to be measured on the plate of the **(Mot. 252-01)**.

86911

- ❑ Take the measurement (**Y**) .
- ❑ Repeat the previous operations for the other tappets to be measured.
- ❑ Refit:
  - the new valve tappet(s),
  - the camshaft (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-245**) .

K9K

III - FINAL OPERATION.

❑ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) ,
- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R

Tightening torques ▽	
oil separator bolts	**10 Nm**
turbocharger bracket bolt	**11 Nm**

IMPORTANT
Wear latex gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

120169

❑ Undo the intercooler air inlet pipe clip (**1**) .

❑ Remove the intercooler air inlet pipe bolt (**2**) .

❑ Disconnect the intercooler air inlet pipe.

❑ Move the intercooler inlet air pipe to one side.

❑ Remove the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

❑ Unclip:

- the coil wiring,
- the upstream oxygen sensor wiring.

123171

123166

❑ Disconnect the oil vapour rebreathing pipes (**3**) from the oil decanter.

❑ Remove the bolt (**4**) from the turbocharger bracket.

F4R

123170

❑ Remove:

- the bolts (**5**) from the turbocharger heat shield,
- the turbocharger heat shield.

II - REMOVAL OPERATION FOR PART CONCERNED

123167

❑ Remove:

- the bolts (**6**) from the oil decanter,
- the oil separator.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the oil decanter bolts.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the joint faces:

- of the oil decanter in case of reuse,
- of the rocker cover.

WARNING
When cleaning parts, it is essential that the parts do not impact on each other, otherwise their mating faces may be damaged and therefore their adjustments may be altered, which could damage the engine.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

WARNING
Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to the oil decanter joint face using a stipple roller.

F4R

II - REFITTING OPERATION FOR PART CONCERNED

120209

- ❑ Refit:
  - the oil decanter,
  - the new oil decanter bolts.
- ❑ Tighten to torque and in order the **oil separator bolts (10 Nm)**.

III - FINAL OPERATION.

- ❑ Refit:
  - the turbocharger heat shield,
  - the turbocharger heat shield bolts.
- ❑ Tighten the turbocharger heat shield bolts.
- ❑ Fit the intercooler air inlet pipe.
- ❑ Connect the intercooler air inlet pipe.
- ❑ Refit the intercooler air inlet pipe bolt.
- ❑ Tighten the intercooler air inlet pipe bolt.
- ❑ Tighten the intercooler air inlet pipe clip.
- ❑ Refit the turbocharger bracket bolt.
- ❑ Torque tighten the **turbocharger bracket bolt (11 Nm)**.
- ❑ Connect the oil vapour rebreathing pipes to the oil decanter.
- ❑ Refit the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .
- ❑ Clip:
  - the upstream oxygen sensor wiring,
  - the coil wiring.
- ❑ Refit the engine cover.

Oil decanter: Removal - Refitting

M4R

- The oil decanter is integrated into the rocker cover.

  To remove the oil decanter (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-139**) .

M9R

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the front engine cover.

122430

❏ Remove the nut (**1**) from the cooling radiator top hose.

❏ Move aside the cooling radiator top hose.

❏ Remove the air pipe bolts (**2**) at the intercooler inlet.

113282

❏ Rotate the clip (**3**) on the intercooler air inlet pipe.

❏ Disconnect the intercooler air inlet pipe.

❏ Move aside the intercooler air inlet pipe.

❏ Remove the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

116412

❏ Unpick the exhaust gas temperature sensor wiring (**4**) from the heat shield.

123798

- Disconnect:
  - the oil vapour rebreathing pipe to the oil separator,
  - the injector connector for cylinder 1, timing end.
- Unpick the injector wiring (**5**) on the oil separator.
- Remove:
  - the oil decanter bolts,
  - the « oil separator - heat shield » assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

  parts always to be replaced: Oil decanter seal (11,04,06,24).
- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the joint faces of the cylinder head cover and the oil separator.

> Note:
> Do not mark the gasket faces.

115068

- Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

- Refit a new intercooler air inlet pipe seal at the turbocharger end, positioning the lips (**6**) of the seal facing the inside of the intercooler air inlet pipe.

II - REFITTING OPERATION FOR PART CONCERNED

- Fit the new seals on the oil separator.
- Refit:
  - the « oil separator - heat shield » assembly,

M9R

- the oil separator bolts.

123583

❑ Fit the oil separator bolts in order and without tightening them.

❑ Tighten the oil separator bolts in order.

❑ Clip the injector wiring onto the oil separator.

❑ Connect:

- the connector to cylinder injector no.1,
- the oil vapour rebreathing pipe on the oil separator.

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Clip the exhaust gas temperature sensor wiring onto the heat shield.

III - FINAL OPERATION

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

❑ Connect the intercooler air inlet pipe on the turbocharger.

❑ Refit the bolts of the intercooler air inlet pipe on the air inlet distributor.

❑ Tighten the bolts of the intercooler air inlet pipe on the air inlet distributor.

❑ Fit the cooling radiator top hose onto the intercooler air inlet pipe.

❑ Refit the nut of the cooling radiator top hose on the intercooler air inlet pipe.

❑ Tighten the nut of the cooling radiator top hose on the intercooler air inlet pipe.

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
new oil separator bolts	**15 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the three coils on the flywheel end (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

128402

❑ Remove:

- the bolts (**1**) from the oil separator,
- the oil decanter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the oil separator filter.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
When cleaning parts, it is essential that the parts do not impact on each other, otherwise their mating faces may be damaged and therefore their adjustments may be altered, which could damage the engine.

❑ Clean using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products):

- the oil separator joint face if it is to be re-used,
- the rocker cover joint face.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the oil separator joint face if it is to be re-used,
- the rocker cover joint face.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

K4M

102738

❑ Apply **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) using a stipple roller on the joint face of the oil separator until the joint face is completely coated.

II - REFITTING OPERATION FOR PART CONCERNED

101820

❑ Refit the oil separator.

❑ Torque tighten in order the **new oil separator bolts (15 N.m)**.

III - FINAL OPERATION.

❑ Refit:

- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the three coils on the flywheel end (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the engine cover.

V9X

Tightening torques ▽	
oil separator bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the engine cover,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the front intake distributor (see **12A**, **Fuel mixture**, **Front inlet distributor: Removal - Refitting**, page **12A-61**) ,
- the rear intake distributor (see **12A**, **Fuel mixture**, **Rear inlet distributor: Removal - Refitting**, page **12A-68**) ,
- the water pump inlet pipe (see **19A**, **Cooling**, **Coolant pump inlet pipe: Removal - Refitting**, page **19A-139**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

136274

❑ Remove:

- the bolts (**1**) from the oil separator,
- the oil separator,
- the oil separator seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Oil decanter seal (11,04,06,24)**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the oil separator and the cylinder block joint face.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

V9X

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new oil separator seal,
- the oil separator.

136274

❑ Tighten to torque and in order the **oil separator bolts (10 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the water pump inlet pipe (see **19A**, **Cooling**, **Coolant pump inlet pipe: Removal - Refitting**, page **19A-139**) ,
- the rear intake distributor (see **12A**, **Fuel mixture**, **Rear inlet distributor: Removal - Refitting**, page **12A-68**) ,
- the front intake distributor (see **12A**, **Fuel mixture**, **Front inlet distributor: Removal - Refitting**, page **12A-61**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
lifting eye bolts	**55 N.m**
lifting eye bolt	**8 N.m**
lifting eye bolts	**28 N.m**
air filter box air outlet pipe clips	**6 Nm**

Note:

The lifting ring fitted to the timing cover is located inside the front right-hand wheel arch.

REMOVAL OF THE LIFTING EYE INSIDE THE FRONT RIGHT-HAND WHEEL ARCH

I - REMOVAL PREPARATION OPERATION FOR THE TIMING END LIFTING EYE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

II - REMOVAL OPERATION FOR THE TIMING END LIFTING EYE

133479

❑ Remove:

- the bolt (**1**) from the lifting eye,
- the lifting eye (**2**) .

V4Y

FITTING THE TIMING END LIFTING EYE ONTO THE TIMING COVER

FITTING OPERATION FOR THE LIFTING EYE

134518

❑ Fit the lifting eye onto the timing cover.

❑ Refit the lifting eye bolts (**3**) .

❑ Torque tighten the **lifting eye bolts (55 N.m)**.

REMOVAL OF THE TIMING END LIFTING EYE FROM THE TIMING COVER

I - REMOVAL OPERATION FOR THE LIFTING EYE

❑ Remove:

- the lifting eye bolts,
- the lifting eye.

II - FINAL OPERATION

❑ Refit the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

REFITTING THE LIFTING EYE INSIDE THE FRONT RIGHT-HAND WHEEL ARCH

I - REFITTING OPERATION FOR THE LIFTING EYE INSIDE THE FRONT RIGHT-HAND WHEEL ARCH

❑ Refit the lifting eye.

❑ Torque tighten the **lifting eye bolt (8 N.m)**.

II - FINAL OPERATION

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

REMOVING THE GEARBOX SIDE LIFTING EYE

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

V4Y

133471

❑ Undo:

- the clip (**4**) for the throttle valve air inlet pipe,
- the clip for the air filter unit air outlet pipe.

❑ Remove the clip from the oil vapour rebreathing pipe using the tool **(Mot. 1448)**.

❑ Disconnect:

- the oil vapour rebreathing pipe,
- the brake servo vacuum pipe (**5**) .

❑ Move the brake servo vacuum pipe to one side.

❑ Remove the air outlet pipe from the air filter box.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the engine wiring support nuts.

❑ Unclip the engine wiring.

❑ Remove the engine wiring supports.

❑ Move aside the engine wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134934

❑ Remove:

- the lifting eye bolts (**6**) ,
- the lifting eye.

REFITTING THE GEARBOX END LIFTING EYE

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the lifting eye.

❑ Torque tighten the **lifting eye bolts (28 N.m)**.

II - FINAL OPERATION

❑ Fit the engine wiring.

❑ Refit the engine wiring supports.

❑ Clip on the engine wiring.

❑ Refit:

- the engine wiring support nuts,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

❑ Refit the air outlet pipe onto the air filter unit.

❑ Torque tighten the **air filter box air outlet pipe clips (6 Nm)**.

❑ Connect:

- the oil vapour rebreathing pipe,

V4Y

- the vacuum pipe from the brake servo.

❏ Fit the clip onto the oil vapour rebreathing pipe using the **(Mot. 1448)**.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the engine undertray,
- the engine cover.

V9X

REMOVING THE TIMING END LIFTING EYE

I - REMOVAL PREPARATION OPERATION FOR THE LIFTING EYE

133890

❑ Remove:

- the engine cover,
- the bolt (**1**) from the rigid cooling pipe at the outlet of the exhaust gas recirculation solenoid valve.

❑ Unclip the fuel return pipe.

II - REMOVAL OPERATION FOR THE LIFTING EYE

133890

❑ Remove:

- the bolts (**2**) from the lifting eye at the timing end,
- the lifting eye on the timing end.

REFITTING THE TIMING END LIFTING EYE

I - REFITTING OPERATION FOR THE LIFTING EYE

❑ Refit the engine lifting eye at the timing end.

II - FINAL OPERATION

❑ Clip on the fuel return pipe.

❑ Refit:

- the bolt for the rigid cooling pipe at the outlet of the exhaust gas recirculation solenoid valve,
- the engine cover.

REMOVING THE GEARBOX SIDE LIFTING EYE

I - REMOVAL PREPARATION OPERATION FOR THE LIFTING EYE

❑ Remove the front engine cover.

137942

❑ Unclip the engine wiring (**3**) from the lifting eye.

❑ Separate the engine wiring from the lifting eye.

137943

❑ Disconnect the fuel supply pipe (**4**) from the high pressure pump.

❑ Fit blanking plugs onto the fuel supply unions of the high pressure pump.

❑ Disconnect the fuel return pipe (**5**) from the high pressure pump.

❑ Fit the blanking plugs onto the fuel return unions of the high pressure pump.

II - REMOVAL OPERATION FOR THE LIFTING EYE

137944

❑ Remove:

- the gearbox side lifting eye bolts (**6**) ,

- the gearbox side lifting eye.

REFITTING THE LIFTING EYE ON THE GEARBOX END

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the gearbox side lifting eye.

II - FINAL OPERATION

❑ Remove the blanking plugs from the high pressure pump fuel return pipe.

❑ Connect the fuel return pipe to the high pressure pump.

❑ Remove the blanking plugs from the high pressure pump fuel supply pipe unions.

❑ Connect the high pressure pump fuel supply pipe.

❑ Fit the engine wiring on the lifting eye.

❑ Clip the engine wiring onto the lifting eye.

❑ Refit the engine cover.

M4R

Air inlet circuit

123973

(**1**)	Air resonator air inlet pipe
(**2**)	Air resonator
(**3**)	Air filter box air inlet pipe
(**4**)	Air filter unit
(**5**)	Air flowmeter
(**6**)	Air filter box outlet air pipe
(**7**)	Air resonator
(**8**)	Throttle valve
(**9**)	Inlet manifold
(**10**)	Air resonator on inlet manifold

K9K, and 780

Diagram of the air inlet circuit

123800

(**1**)	Air resonator
(**2**)	Air filter unit
(**3**)	Air flowmeter
(**4**)	Air filter box outlet air pipe
(**5**)	Turbocharger
(**6**)	Intercooler air inlet pipe
(**7**)	Air-to-air intercooler
(**8**)	Intercooler air outlet pipe
(**9**)	Air inlet valve
(**10**)	Metal air inlet tube

F4R

AIR INLET CIRCUIT DIAGRAM

125427

(**1**)	Air inlet
(**2**)	Air resonator
(**3**)	Air filter box air inlet pipe
(**4**)	Air filter box
(**5**)	Air filter box air outlet pipe
(**6**)	Turbocharger
(**7**)	Intercooler air inlet pipe
(**8**)	Air-to-air intercooler
(**9**)	Intercooler air outlet pipe
(**10**)	Throttle valve
(**11**)	Inlet manifold

K4M

Air inlet circuit

128001

(**1**)	Air resonator air inlet pipe
(**2**)	Air resonator
(**3**)	Air inlet pipe of the air filter box
(**4**)	Air filter unit
(**5**)	Air filter unit air outlet pipe
(**6**)	Air resonator
(**7**)	Throttle valve
(**8**)	Inlet manifold

V9X

Diagram of the air inlet circuit

136255

(**1**)	Air resonator
(**2**)	Air filter unit
(**3**)	Air flowmeter
(**4**)	Air filter unit air outlet pipe
(**5**)	Turbocharger
(**6**)	Turbocharger air outlet pipe
(**7**)	Intercooler
(**8**)	Intercooler air outlet pipe
(**9**)	Damper valve air inlet pipe
(**10**)	Damper valve
(**11**)	Inter-cylinder head intake distributor, on the gearbox side
(**12**)	Intake distributor
(**13**)	Inter-cylinder head intake distributor, timing end

K9K, and 782

Diagram of the air inlet circuit

144358

(**1**)	Air resonator
(**2**)	Air filter unit
(**3**)	Air flowmeter
(**4**)	Air filter outlet air pipe
(**5**)	Turbocharger air inlet pipe
(**6**)	Turbocharger
(**7**)	Intercooler air inlet pipe
(**8**)	Intercooler
(**9**)	Intercooler air outlet pipe
(**10**)	Damper valve
(**11**)	Metal air inlet tube

K4M or M4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

M4R

123390

❑ Unclip the air filter unit cover at (**1**) .

K4M

128272

❑ Unclip the air filter unit cover at (**1**) .

K4M or M4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

M4R

123389

❑ Raise the air filter unit cover.

❑ Remove the air filter from the air filter unit.

K4M

128271

❑ Raise the air filter unit cover.

❑ Remove the air filter from the air filter unit.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter housing.

> **WARNING**
> If the air filter is fitted incorrectly in the air filter unit, unfiltered air may enter the engine.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air filter in the air filter unit.

III - FINAL OPERATION.

❑ Clip on the air filter unit cover.

K9K or M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

122424

❑ Move the turbocharger control solenoid valve (**1**) away from its mounting on the air filter box.

122993

❑ Unclip the air filter box cover at (**2**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

122994

❑ Move aside the air filter cover.

❑ Remove the filter element.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter box.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
> If the air filter is fitted incorrectly in the air filter box, unfiltered air may enter the engine.

❑ Refit the filter element correctly in the air filter box.

❑ Refit the air filter box cover.

III - FINAL OPERATION.

❑ Clip on the air filter unit cover.

❑ Refit the turbocharger control solenoid valve onto its mounting.

F4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

127605

❑ Unclip the air filter box cover at (**1**) .

❑ Move the « air filter box air outlet pipe - air filter box cover » assembly to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123163

❑ Remove the air filter (**2**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter housing.

> **WARNING**
> If the air filter is fitted incorrectly in the air filter box, unfiltered air may enter the engine.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air filter.

III - FINAL OPERATION.

❑ Fit the « air filter box air outlet pipe - air filter box cover » assembly.

❑ Clip on the air filter box cover.

V4Y

REMOVAL

I - REMOVAL PREPARATION OPERATION

133465

❑ Remove:

- the injection computer protector,
- the battery disconnection unit cover (**1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

133470

❑ Loosen the air filter unit cover bolts (**2**) .

❑ Move aside the air filter cover.

❑ Remove the air filter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter housing.

> **WARNING**
> If the air filter is fitted incorrectly in the air filter unit, unfiltered air may enter the engine.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air filter in the air filter unit.

❑ Fit the air filter unit cover.

❑ Tighten the air filter box cover bolts.

III - FINAL OPERATION

❑ Refit:

- the battery disconnection unit cover,
- the injection computer protector.

V9X

REMOVAL

I - REMOVAL PREPARATION OPERATION

134095

❑ Remove the injection computer protector (**1**) by pushing it in the direction of the arrow.

137265

❑ Turn the clip (**2**) of the battery disconnection unit cover a quarter of a turn.

❑ Remove the battery disconnection unit cover by pressing on the clip.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134096

❑ Loosen the air filter unit cover bolts (**3**) .

❑ Move aside the air filter cover.

❑ Remove the air filter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter housing.

> **WARNING**
> If the air filter is fitted incorrectly in the air filter unit, unfiltered air may enter the engine.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air filter in the air filter unit.

❑ Fit the air filter unit cover.

❑ Tighten the air filter box cover bolts.

III - FINAL OPERATION

❑ Refit:

- the injection computer protector,
- the battery disconnection unit cover.

K9K or M9R

Tightening torques ▽	
air filter box air outlet pipe clip on the air flowmeter side	**5.5 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

122397

❑ Undo the air filter unit air outlet pipe clip on the air flowmeter side.

❑ Disconnect:

- the air flow sensor connector (**1**) ,
- the air filter box outlet air pipe.

❑ Unpick the air flowmeter electrical wiring on the air filter air outlet pipe.

❑ Remove the turbocharger control solenoid valve (**2**) from its mounting.

123290

❑ Pull the red handle of the Protection and Switching Unit cover in the direction of the arrow.

123289

❑ Push the red handle in the direction of the arrow.

K9K or M9R

123288

❑ Remove the cover (**3**) from the Protection and Switching Unit.

122989

❑ Unclip the protection and switching unit (**4**) from its mounting.

122990

❑ Disconnect the connectors (**5**) from the Protection and Switching Unit.

❑ Move aside the Protection and Switching Unit.

122991

❑ Remove the mounting (**6**) from the Protection and Switching Unit.

K9K or M9R

II - REMOVAL OPERATION FOR PART CONCERNED

122992

❑ Remove the air filter box.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

> Note:
>
> Ensure that the air filter unit is correctly clipped onto the air resonator.

❑ Refit the air filter box.

II - FINAL OPERATION.

❑ Refit the turbocharger control solenoid valve onto its mounting.

❑ Clip the air flowmeter electrical wiring onto the air filter air outlet pipe.

❑ Fit the air filter unit air outlet pipe onto the air filter unit.

❑ Torque tighten the **air filter box air outlet pipe clip on the air flowmeter side (5.5 Nm)**.

❑ Connect the air flowmeter connector.

❑ Position the Protection and Switching Unit mounting.

❑ Connect the Protection and Switching Unit connectors.

❑

> Note:
>
> When fitting the Protection and Switching Unit wiring, ensure that the sealing grommets are correctly positioned.

❑ Position and clip the Protection and Switching Unit into its mounting.

❑ Refit the Protection and Switching Unit cover.

❑ Pull down the red Protection and Switching Unit cover handle.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

M4R

Tightening torques ▽	
air flowmeter bolts on the air filter box	**4 Nm**
air filter box air outlet pipe clip on the air flowmeter	**5.5 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

123390

❑ Remove the front engine cover.

❑ Loosen the air filter box air outlet pipe clip (**1**) on the air flowmeter.

❑ Disconnect the air flowmeter connector (**2**) .

123391

❑ Disconnect the air filter box air outlet pipe (**3**) from the air flowmeter.

M4R

123393

123394

❑ Remove:

- the battery tray upper cover (**4**) ,
- the battery tray right-hand side section (**5**) .

123396

123398

❑ Remove the Protection and Switching Unit housing bolt (**6**) .

❑ Remove the Protection and Switching Unit housing.

M4R

II - REMOVAL OPERATION FOR PART CONCERNED

❏ Unclip the air filter box.

> Note:
>
> Take care not to break the air filter box pins during removal.

❏ Disconnect the air filter box air inlet pipe.

❏ Remove the air filter box with the air flowmeter.

REFITTING

I - REFITTING PREPARATIONS OPERATION

If replacing the air filter box

123400

❏ Remove:

- the bolts (**7**) from the air flowmeter,
- the air flowmeter (**8**) from the air filter box.

❏ Always replace the air flowmeter seal.

❏ Refit:

- the air flowmeter on the air filter box,
- the air flowmeter bolts on the air filter box.

❏ Torque tighten the **air flowmeter bolts on the air filter box (4 Nm)**.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the air filter box.

❏ Connect the air filter box air inlet pipe.

❏ Clip on the air filter box.

III - FINAL OPERATION.

❏ Refit:

- the Protection and Switching Unit housing,
- the Protection and Switching Unit housing bolt,
- the battery tray right-hand side section,
- the battery tray upper cover.

❏ Connect the air filter box air outlet pipe to the air flowmeter.

❏ Torque tighten the **air filter box air outlet pipe clip on the air flowmeter (5.5 Nm)**.

❏ Refit the engine cover.

F4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

123165

❑ Undo the air filter box air outlet pipe clip (**1**) .

❑ Disconnect the air filter box air outlet pipe.

123162

❑ Remove the Protection and Switching Unit box bolt (**2**) .

❑ Move the Protection and Switching Unit box to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123395

❑ Remove the battery tray side cover.

❑ Disconnect the air filter box inlet air pipe (**3**) .

❑ Remove the air filter unit.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air filter box.

❑ Connect the air filter unit air inlet pipe.

❑ Refit the battery tray side cover.

II - FINAL OPERATION.

❑ Fit the Protection and Switching Unit box.

❑ Refit the Protection and Switching Unit box bolt.

❑ Tighten the Protection and Switching Unit box bolt.

❑ Connect the air filter box outlet air pipe.

❑ Tighten the air filter unit air outlet pipe clip.

K4M

Tightening torques ▽	
clip of the air filter unit air outlet pipe on the throttle valve	**5.5 N.m**
clip of the air filter unit air outlet pipe on the air filter unit	**5.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

128266

❑ Undo:

- the clip (**1**) of the air filter unit air outlet pipe at the throttle valve,
- the clip (**2**) of the air filter unit air outlet pipe at the air filter unit.

❑ Disconnect the air filter unit air outlet pipe:

- from the air filter unit,
- from the throttle valve.

❑ Move the air filter unit air outlet pipe (**3**) to one side.

128264

❑ Remove the battery cover.

❑ Unclip the wiring (**4**) of the Protection and Switching Unit box from the right-hand side section of the battery tray.

❑ Remove the right-hand side section (**5**) of the battery tray.

128265

❑ Disconnect the air inlet pipe (**6**) from the air filter unit.

K4M

128269

128270

❑ Remove the Protection and Switching Unit box bolt (**7**) .

❑ Move the Protection and Switching Unit box to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Unclip the air filter unit.

> Note:
>
> Be careful not to break the air filter unit mountings when removing.

❑ Remove the air filter unit.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air filter unit.

❑ Connect the air filter unit air inlet pipe on the air filter unit.

❑ Clip on the air filter unit.

II - FINAL OPERATION.

❑ Refit:

- the Protection and Switching Unit box,
- the right-hand side section of the battery tray.

❑ Clip the wiring of the Protection and Switching Unit box on the right-hand side section of the battery tray.

K4M

127389

- ❑ Refit the battery cover at the front, ensuring that the clips are unlocked by a quarter of a turn.
- ❑ Ensure that the clips are properly fitted into the notches (**8**) .
- ❑ Align the back of the battery cover on the battery tray.

127391

- ❑ Ensure that the battery cover is properly fitted into the battery tray at (**9**) .
- ❑ Clip on the back of the battery cover.
- ❑ Lock the battery cover clips by a quarter of a turn.
- ❑ Fit the air filter unit air outlet pipe.
- ❑ Connect the air filter unit air outlet pipe onto:
  - the air filter unit,
  - the throttle valve.
- ❑ Tighten to torque:
  - the **clip of the air filter unit air outlet pipe on the throttle valve (5.5 N.m)**,
  - the **clip of the air filter unit air outlet pipe on the air filter unit (5.5 N.m)**.

V4Y

Tightening torques ▽	
clip of the air filter unit air outlet pipe	**5.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

133466

❑ Remove:

- the battery disconnection unit protector (**1**) ,
- the Protection and Switching Unit cover (**2**) .

134198

❑ Remove the Protection and Switching Unit nut (**3**) .

❑ Unclip:

- the wiring (**4**) of the Protection and Switching Unit from the battery disconnection unit upper mounting,
- the Protection and Switching Unit from its mounting.

❑ Move aside the Protection and Switching Unit.

❑ Remove:

- the Protection and Switching Unit mounting unit,
- the battery disconnection unit upper mounting nut (**5**) ,
- the upper mounting,
- the injection computer protector,
- the injection computer bolts.

❑ Move the injection computer aside.

❑ Loosen the clip of the air filter unit air outlet pipe.

❑ Move the air outlet pipe of the air filter unit to one side.

❑ Disconnect the air flowmeter connector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Unclip:

- the gearbox breather pipe from the air filter unit,
- the injection computer wiring from the air filter unit.

V4Y

❏ Remove:

- the air filter unit,
- the air filter unit air inlet pipe.

If replacing the air filter unit

❏ Remove the air flowmeter (see **12A**, **Fuel mixture**, **Air flowmeter: Removal - Refitting**, page **12A-33**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the air pipe at the air filter unit inlet,
- the air filter unit.

❏ Clip:

- the injection computer wiring on the air filter unit,
- the gearbox breather pipe on the air filter unit.

II - FINAL OPERATION

❏ Connect the air flowmeter connector.

❏ Fit the air filter unit air outlet pipe.

❏ Align the air flowmeter mark with that of the air pipe (see **12A**, **Fuel mixture**, **Air flowmeter: Removal - Refitting**, page **12A-33**)

❏ Torque tighten the **clip of the air filter unit air outlet pipe (5.5 N.m)**.

❏ Position the injection computer.

❏ Refit:

- the injection computer bolts,
- the injection computer protector,
- the battery disconnection unit upper mounting,
- the nut of the battery disconnection unit upper mounting on the front left-hand side member,
- the Protection and Switching Unit mounting unit.

❏ Position the Protection and Switching Unit on its mounting.

❏ Clip the protection and switching unit wiring on the battery disconnection unit upper mounting.

❏ Refit:

- the Protection and Switching Unit nut,
- the Protection and Switching Unit cover,
- the battery disconnection unit protector.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Tightening torques ▽	
clip of the air filter unit air outlet pipe	**6 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

137265

❑ Turn the clip (**1**) of the battery disconnection unit cover a quarter of a turn.

❑ Remove the battery disconnection unit cover by pressing on the clip.

124323

❑ Unlock the push-button (**2**) by pulling it upwards.

124322

❑ Unclip the Protection and Switching Unit cover by pressing at (**3**) on the push-button.

136271

❑ Remove the Protection and Switching Unit nut (**4**) .

❑ Unclip:

- the wiring of the Protection and Switching Unit from the upper mounting of the battery disconnection unit,
- the Protection and Switching Unit from its mounting.

❑ Move aside the Protection and Switching Unit.

❑ Remove:

- the Protection and Switching Unit mounting unit,
- the battery disconnection unit upper mounting nut (**5**) ,
- the battery disconnection unit upper mounting,
- the injection computer protector,
- the injection computer bolts.

❑ Move the injection computer aside.

❑ Loosen the clip of the air filter unit air outlet pipe.

❑ Move the air outlet pipe of the air filter unit to one side.

136272

❑ Unclip:

- the turbocharger vacuum control valve wiring,
- the turbocharger vacuum control valve (**6**) from the air filter unit.

❑ Move aside the turbocharger vacuum control valve.

136273

❑ Disconnect the air flowmeter connector (**7**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the air filter unit.

V9X

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the air filter unit

- ❑ Remove the air flowmeter (see **Air flowmeter: Removal - Refitting**) .
- ❑ Refit the air flowmeter on the new air filter unit (see **12A**, **Fuel mixture**, **Air flowmeter: Removal - Refitting**, page **12A-33**) .

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the air filter unit.

III - FINAL OPERATION

- ❑ Connect the air flowmeter connector.
- ❑ Fit the turbocharger vacuum control valve.
- ❑ Clip:
  - on the turbocharger vacuum control valve,
  - on the turbocharger vacuum control valve wiring.
- ❑ Fit the air filter unit air outlet pipe.
- ❑ Torque tighten the **clip of the air filter unit air outlet pipe (6 N.m)**.
- ❑ Position the injection computer.
- ❑ Refit:
  - the injection computer,
  - the injection computer protector,
  - the battery disconnection unit upper mounting,
  - the Protection and Switching Unit mounting unit.
- ❑ Position the Protection and Switching Unit on its mounting.
- ❑ Clip:
  - the Protection and Switching Unit onto its mounting,
  - the wiring of the Protection and Switching Unit onto the battery disconnection unit upper mounting.
- ❑ Refit:
  - the Protection and Switching Unit cover,
  - the battery disconnection unit cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R or K4M or K9K or M4R or M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

123393

❑ Remove the battery cover (**1**) .

123394

❑ Remove the right-hand side section (**2**) of the battery tray.

123395

❑ Remove the air pipe at the air filter unit inlet (**3**) .

F4R or K4M or K9K or M4R or M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123368

❑ Unclip the air resonator air inlet pipe (**4**) from the body.

123367

❑ Remove:

- the air resonator nut (**5**) ,
- the air resonator.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air resonator.

❑ Clip the air resonator air inlet pipe on the body.

II - FINAL OPERATION.

❑ Refit:

- the air pipe at the air filter unit inlet,
- the right-hand side section of the battery tray.

127389

❑ Refit the battery cover at the front, ensuring that the clips are unlocked by a quarter of a turn.

❑ Ensure that the clips are properly fitted into the notches (**6**) .

❑ Align the back of the battery cover on the battery tray.

F4R or K4M or K9K or M4R or M9R

127391

- ❑ Ensure that the battery cover is properly fitted into the battery tray at (**7**) .
- ❑ Clip on the back of the battery cover.
- ❑ Lock the battery cover clips by a quarter of a turn.
- ❑ Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

V4Y

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123367

❑ Unclip the air resonator air inlet pipe (**1**) from the body.

❑ Remove:

- the air resonator nut (**2**) ,
- the air resonator.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air resonator.

❑ Clip the air resonator air inlet pipe on the body.

II - FINAL OPERATION

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

V9X

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

138117

❑ Remove the battery disconnection unit bolts (**1**) .

❑ Move aside the "support - battery disconnection unit" assembly.

II - OPERATION FOR REMOVAL OF PART CONCERNED

136269

❑ Unclip the air resonator (**2**) .

❑ Remove the air resonator .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the air resonator.

❑ Clip on the resonator.

II - FINAL OPERATION

❑ Fit the "support - battery disconnection unit" assembly.

❑ Refit:

- the battery disconnection unit mounting bolts.
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

Tightening torques ▽	
air flowmeter bolts	**4 Nm**
air filter box air outlet pipe clip on the air flowmeter	**5.5 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

123390

❏ Loosen the air filter box air outlet pipe clip (**1**) on the air flowmeter.

❏ Disconnect the air filter box air outlet pipe to the air flowmeter.

❏ Remove the air pipe.

❏ Disconnect the air flowmeter connector (**2**) .

123390

❏ Unclip the air filter box cover at (**3**) .

❏ Remove the air filter cover with the air flowmeter.

II - REMOVAL OPERATION FOR PART CONCERNED

123400

❏ Loosen the air flowmeter bolts (**4**) on the air filter box cover.

❏ Remove the air flowmeter.

M4R

123401

❑ Remove the air flowmeter seal (**5**) .

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the air flowmeter seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the air flowmeter on the air filter box cover,
- the air flowmeter bolts.

❑ Torque tighten the **air flowmeter bolts (4 Nm)**.

III - FINAL OPERATION.

❑ Refit the air filter box cover with the air flowmeter.

❑ Clip on the air filter box cover.

❑ Connect the air filter box air outlet pipe to the air flowmeter.

❑ Torque tighten the **air filter box air outlet pipe clip on the air flowmeter (5.5 Nm)**.

❑ Connect the air flowmeter connector.

❑ Refit the engine cover.

K9K or M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

123690

❑ Disconnect the air flowmeter connector (**1**) .

❑ Loosen the air outlet pipe clip (**2**) on the air filter box.

❑ Move aside the air filter box air outlet pipe.

II - REMOVAL OPERATION FOR PART CONCERNED

123691

❑ Remove:

- the bolts (**3**) from the air flowmeter,

- the air flowmeter.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the air flowmeter seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the air flowmeter, fitted with a new seal,

- the air flowmeter bolts.

❑ Tighten the air flowmeter bolts.

III - FINAL OPERATION.

❑ Connect the air filter box outlet air pipe.

❑ Tighten the air filter box air outlet pipe clip.

❑ Connect the air flowmeter connector.

V4Y

Equipment required
Diagnostic tool

Tightening torques ▽	
air flowmeter bolts	**4 Nm**
clip of the air filter unit air outlet pipe	**6 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

133465

❑ Remove the injection computer protector.

133468

❑ Remove the injection computer bolts (**1**) .

❑ Move the injection computer aside.

❑ Loosen the clip of the air filter unit air outlet pipe.

❑ Move the air outlet pipe of the air filter unit to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Disconnect the air flowmeter connector.

V4Y

133614

❑ Remove:

- the air flowmeter (**2**) bolts on the air filter box,
- the air flowmeter,
- the air flowmeter seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Air flowmeter seal (11,04,06,26)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new air flowmeter seal,
- the air flowmeter on the air filter box.

❑ Torque tighten the **air flowmeter bolts (4 Nm)**.

❑ Connect the air flowmeter connector.

III - FINAL OPERATION

❑ Fit the air filter unit air outlet pipe.

❑ Align the mark of the air filter unit air outlet pipe with that of the air flowmeter.

> Note:
>
> If the marks are not aligned, the air filter unit air outlet pipe risks getting damaged when in contact with other parts (coolant outlet unit).

❑ Torque tighten the **clip of the air filter unit air outlet pipe (6 N.m)**.

❑ Position the injection computer on the air filter unit.

❑ Refit:

- the injection computer bolts,
- the injection computer protector.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Air flowmeter » in the « List of components stored by the computer » section,
- carry out the operations described in the « After repair procedure » section.

V9X

Tightening torques ▽	
air flowmeter bolts	**4 Nm**
clip of the air filter unit air outlet pipe	**6 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

133887

❑ Loosen the clip (**1**) of the air outlet pipe on the air filter unit.

❑ Move aside the clip of the air filter unit air outlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

136273

❑ Disconnect the air flowmeter connector (**2**) .

❑ Remove:

- the bolts (**3**) from the air flowmeter,
- the air flowmeter,
- the air flowmeter seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Air flowmeter seal (11,04,06,26)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new air flowmeter seal,
- the air flowmeter.

❑ Torque tighten the **air flowmeter bolts (4 Nm)**.

❑ Connect the air flowmeter connector.

III - FINAL OPERATION

❑ Fit the air filter unit air outlet pipe.

❑ Torque tighten the **clip of the air filter unit air outlet pipe (6 N.m)**.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Equipment required
Diagnostic tool

Tightening torques ▽	
intercooler outlet air pipe clip	**5.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the engine undertray.

123699

❑ Move the clip (**1**) on the intercooler air outlet pipe to one side.

❑ Disconnect the intercooler air outlet pipe on the intercooler.

❑ Remove the front engine cover.

123692

❑ Undo the clip (**2**) from the intercooler outlet pipe.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

❑ Remove:

- the intercooler outlet air pipe,
- the bolts (**3**) from the oil filler neck,
- the engine oil filler neck.

❑ Disconnect the connector (**4**) from the damper valve.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - OPERATION FOR REMOVAL OF PART CONCERNED

123693

❑ Disconnect the turbocharger pressure sensor connector (**5**) .

❑ Remove:

- the damper valve mountings (**6**) ,
- the damper valve strut,
- the damper valve upper stud,
- the damper valve,
- the damper valve seal.

123694

❑ Remove:

- the air inlet spacer (**7**) ,
- the air inlet spacer seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- the damper valve and the air inlet spacer,
- the air inlet spacer and the exhaust gas recirculation solenoid valve.

❑ Always replace:

- the air inlet spacer seal,
- the damper valve seal,
- the intercooler air outlet pipe.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new air inlet spacer seal,
- the air inlet spacer,
- the damper valve seal,
- the damper valve.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Refit the damper valve strut.
- ❑ Connect the turbocharger pressure sensor connector.

III - FINAL OPERATION

- ❑ Connect the damper valve connector.
- ❑ Refit the engine oil filler neck.
- ❑ Refit the new intercooler air outlet pipe.
- ❑ Connect the intercooler outlet air pipe on the damper valve.
- ❑ Torque tighten the **intercooler outlet air pipe clip (5.5 N.m)**.

> Note:
>
> The intercooler air outlet pipe is securely clipped onto the intercooler when the clip is attached to the intercooler neck.

- ❑ Clip the intercooler air outlet pipe onto the intercooler.
- ❑ Refit:
  - the engine undertray,
  - the engine cover.
- ❑ Apply the after repair procedure using the **Diagnostic tool** :
  - connect the **Diagnostic tool**,
  - select « Injection computer » ,
  - go to repair mode,
  - display the « before/after repair procedure » for the computer selected,
  - select « Damper valve» in the « List of components stored by the computer » section,
  - carry out the operations described in the « After repair procedure » section.

M9R, and 742 or 744 or 746 or 748 or 754

Equipment required
Diagnostic tool

Tightening torques ▽	
intercooler air outlet pipe clip on the damper valve side	**5.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

122372

❑ Disconnect the turbocharger pressure sensor connector (**1**) .

122373

❑ Remove:

- the turbocharger pressure sensor nut (**2**) ,
- the turbocharging pressure sensor,
- the engine undertray bolts,
- the engine undertray.

123699

123700

❑ Pull the intercooler air outlet pipe clip (**3**) using a flat-blade screwdriver.

❑ Disconnect the intercooler air outlet pipe from the intercooler.

M9R, and 742 or 744 or 746 or 748 or 754

122374

❑ Undo the intercooler outlet air pipe clip (**4**) on the damper valve side.

❑ Disconnect the intercooler outlet air pipe from the damper valve.

❑ Remove the intercooler outlet air pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123006

❑ Disconnect the connector (**5**) from the damper valve.

❑ Unclip the damper valve fuel pipe.

❑ Remove the damper valve strut bolts (**6**) on the intake distributor.

123006

❑ Remove:

- the damper valve strut bolts (**7**) on the damper valve,
- the damper valve strut,
- the damper valve,
- the damper valve seal.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Parts always to be replaced:

- the intercooler outlet air pipe,
- the seal between the exhaust gas recirculation solenoid valve and the damper valve,

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the bearing faces between the damper valve and the EGR solenoid valve.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new damper valve seal,
- the damper valve,
- the damper valve strut,
- the damper valve strut bolts on the damper valve,

M9R, and 742 or 744 or 746 or 748 or 754

- the damper valve strut bolts on the intake distributor.

❏ Tighten:

- the damper valve strut bolts on the damper valve,
- the damper valve strut bolts on the intake distributor.

III - FINAL OPERATION

❏ Refit the new intercooler air outlet pipe.

❏ Clip the intercooler air outlet pipe onto the intercooler.

❏ Push the intercooler air outlet pipe clip.

> Note:
>
> Check that the pipe is correctly clipped on.

❏ Refit the intercooler air outlet pipe on the damper valve.

❏ Torque tighten the **intercooler air outlet pipe clip on the damper valve side (5.5 N.m)**.

❏ Fit the turbocharging pressure sensor.

❏ Refit the turbocharging pressure sensor nut.

❏ Tighten the turbocharger pressure sensor nut.

❏ Connect the turbocharger pressure sensor connector.

❏ Refit:

- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « damper valve » in the « list of components controlled by this computer » section,
- carry out the operations described in the « after repair procedure » section.

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

123532

❏ Undo the clip (**1**) from the intercooler outlet pipe.

❏ Disconnect the intercooler outlet air pipe on the damper valve.

II - OPERATION FOR REMOVAL OF PART CONCERNED

113853

❏ Remove:

- the bolts (**2**) from the damper valve strut,
- the damper valve stay.

112810

❏ Disconnect the connector (**3**) from the damper valve.

❏ Remove:

- the damper valve nuts (**4**) ,
- the damper valve.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❏ Always replace the damper valve seal.

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the pressure faces:
  - of the exhaust gas recirculation mounting on the gearbox side,
  - the air inlet valve,

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the new damper valve seal,
  - the damper flap with a new seal,
  - the damper valve nuts.
- Tighten the damper valve nuts.
- Connect the damper valve connector.
- Refit:
  - the damper valve strut,
  - the damper valve strut bolts.
- Tighten the damper valve strut bolts.

III - FINAL OPERATION.

- Connect the intercooler outlet air pipe on the damper valve.
- Tighten the intercooler air outlet pipe clip.
- Refit the engine cover.

V9X

Equipment required
Diagnostic tool

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

136268

❏ Loosen the air inlet pipe clips (**1**) of the damper valve.

❏ Remove the air inlet pipe of the damper valve.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134035

❏ Disconnect the connector (**2**) from the damper valve.

❏ Remove:

- the damper valve bolts (**3**) ,
- the damper valve,
- the damper valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Damper valve seal (11,01,10,04)**.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- a new damper valve seal,
- the damper valve.

❏ Connect the damper valve connector.

III - FINAL OPERATION

❏ Refit the air inlet pipe of the damper valve.

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,

V9X

- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Damper valve» in the « List of components stored by the computer » section,
- carry out the operations described in the « After repair procedure » section.

❏ Refit the engine cover.

M4R

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
throttle valve bolts	**10 Nm**
air filter box air outlet pipe clip on the throttle valve	**5.5 Nm**

IMPORTANT
Wear latex gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123380

❑ Loosen the air filter box outlet air pipe clip (**1**) on the throttle valve.

❑ Disconnect:

- the air filter box air outlet pipe on the throttle valve,
- the oil vapour rebreathing hose (**2**) on the rocker cover.

❑ Move the air filter box air outlet pipe (**3**) away from the throttle valve.

M4R

II - REMOVAL OPERATION FOR PART CONCERNED

123381

❑ Disconnect the connector (**4**) from the throttle valve.

123383

❑

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

Fit the (**5**) **(Ms. 583)** to the throttle valve coolant hoses.

❑ Remove the clip (**6**) from the throttle valve coolant hoses using the **(Mot. 1448)** on the throttle valve.

❑ Disconnect the throttle valve coolant hoses on the throttle valve.

M4R

123384

❑ Remove:

- the throttle valve bolts (**7**) ,
- the throttle valve.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the throttle valve seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the throttle valve,
- the throttle valve bolts.

❑ Torque tighten the **throttle valve bolts (10 Nm)**.

❑ Connect the coolant hoses to the throttle valve.

❑ Fit the throttle valve coolant hose clips using the **(Mot. 1448)** to the throttle valve.

❑ Remove the **(Ms. 583)** from the throttle valve coolant hoses.

❑ Connect the throttle valve connector.

III - FINAL OPERATION.

❑ Fit the air filter box air outlet pipe.

❑ Connect:

- the oil vapour rebreathing hose on the rocker cover,
- the air filter box air outlet pipe on the throttle valve.

❑ Tighten the **air filter box air outlet pipe clip on the throttle valve (5.5 Nm)**.

❑ Refit the engine cover.

❑ Perform the following operations:

- top up the cooling system,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

F4R

Tightening torques ▽	
throttle valve bolts	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

123724

123726

❑ Remove the intercooler air outlet pipe bolts (**1**) .

❑ Remove the bolt of the air pipe retaining bracket on the inlet distributor.

❑ Move the intercooler outlet air pipe to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123725

❑ Disconnect the connector (**2**) from the throttle valve.

❑ Remove:

- the throttle valve bolts (**3**) ,
- the throttle valve,
- the throttle valve seal.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑ Always replace the throttle valve seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new throttle valve seal,
- the throttle valve,
- the throttle valve bolts.

❑ Fit without tightening the throttle valve bolts.

❑ Torque tighten the **throttle valve bolts (12 N.m)**.

❑ Connect the throttle valve connector.

F4R

III - FINAL OPERATION

- ❑ Fit the intercooler outlet air pipe.
- ❑ Refit the intercooler air outlet pipe bolts.
- ❑ Tighten the intercooler outlet air pipe bolts.
- ❑ Refit the bolt of the air pipe retaining bracket on the inlet distributor.
- ❑ Tighten the bolt of the air pipe retaining bracket on the inlet distributor.

K4M

Tightening torques ▽	
throttle valve bolts	**10 N.m**
clip of the air filter unit air outlet pipe on the throttle valve	**5.5 N.m**
clip of the air filter unit air outlet pipe on the air filter unit	**5.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

128267

❑ Undo:

- the clip (**1**) of the air filter unit air outlet pipe at the throttle valve,
- the clip (**2**) of the air filter unit air outlet pipe at the air filter unit.

❑ Disconnect the air filter unit air outlet pipe:

- from the air filter unit,
- from the throttle valve.

❑ Move the air filter unit air outlet pipe (**3**) to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128263

❑ Disconnect the union (**4**) of the fuel vapour recirculation solenoid valve pipe from the throttle valve.

128262

❑ Disconnect the connector (**5**) from the throttle valve.

K4M

128261

❑ Remove:

- the throttle valve bolts (**6**) ,
- the throttle valve.

128260

❑ Remove the throttle valve seal (**7**) .

REFITTING

I - REMOVAL PREPARATION OPERATION

❑ Always replace the throttle valve seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the throttle valve joint face if it is to be re-used,
- the inlet manifold seal housing.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

II - REFITTING OPERATION FOR PART CONCERNED

128261

❑ Refit:

- a new seal on the intake distributor,
- the throttle valve.

❑ In order, torque tighten the **throttle valve bolts (10 N.m)**.

III - FINAL OPERATION.

❑ Connect to the throttle valve:

- the union of the fuel vapour recirculation solenoid valve pipe,
- the throttle valve connector.

K4M

- ❑ Fit the air filter unit air outlet pipe.
- ❑ Connect the air filter unit air outlet pipe onto:
  - the air filter unit,
  - the throttle valve.
- ❑ Torque tighten:
  - the **clip of the air filter unit air outlet pipe on the throttle valve (5.5 N.m)**,
  - the **clip of the air filter unit air outlet pipe on the air filter unit (5.5 N.m)**.

V4Y

Equipment required
Diagnostic tool

Tightening torques ▽	
throttle valve bolts	**8 N.m**
air pipe clip on the throttle valve	**6 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

133471

❑ Disconnect the brake servo non-return valve (**1**) from the intake distributor.

❑ Unclip the brake servo non-return valve pipe on the air filter unit air outlet pipe.

❑ Loosen the clip (**2**) on the air filter unit air outlet pipe on the throttle valve.

❑ Move aside the air filter unit air outlet pipe on the throttle valve.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133472

❑ Disconnect the connector (**3**) from the throttle valve.

❑ Remove:

- the throttle valve bolts (**4**) ,
- the throttle valve,
- the throttle valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Throttle valve seal (11,04,06,25)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new throttle valve seal,
- the throttle valve.

V4Y

133472

- In order, torque tighten the **throttle valve bolts (8 N.m)**.
- Connect the throttle valve connector.

III - FINAL OPERATION

- Fit the air filter unit air outlet pipe on the throttle valve.
- Torque tighten the **air pipe clip on the throttle valve (6 N.m)**.
- Clip the brake servo non-return valve pipe on the air filter unit air outlet pipe.
- Connect the brake servo non-return valve to the intake distributor.
- Refit the engine cover.
- Apply the after repair procedure using the **Diagnostic tool** :
  - connect the **Diagnostic tool**,
  - select « Injection computer » ,
  - go to repair mode,
  - display the « before/after repair procedure » for the computer selected,
  - select the « Throttle valve » in the « List of components controlled by this computer section » ,
  - carry out the operations described in the « After repair procedure » section.

F4R or K4M or M4R or V4Y

Equipment required
compressed air nozzle

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Always wear protective gear (gloves, goggles and breathing masks).

Note:
Be sure to work in a clean environment so as not to allow any contamination of the throttle valve.

CLEANING

I - CLEANING PREPARATION OPERATION

❑ Remove the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) .

II - CLEANING THE PART CONCERNED

❑

Note:
The **CARBURETTOR CLEANING** product damages the seals.

❑ Remove the seal(s) of the throttle valve.

124736

❑ Hold the throttle valve flap open manually.

Note:
Do not spray any cleaning product onto the outside of the cylinder, inside the spring housing or onto the connector.

❑ Spray **CARBURETTOR CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) into the air vent until all traces of clogging have disappeared.

F4R or K4M or M4R or V4Y

124737

❑ Remove the residues of **CARBURETTOR CLEANER** and the residual dirt using a **LINT-FREE CLOTH** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

124738

❑ Use a **compressed air nozzle** to blast the throttle valve edges and the air vent.

parts always to be replaced: Throttle valve seal (11,04,06,25)

> Note:
>
> If the throttle valve is dropped or receives any other impact, it will need to be replaced.

III - FINAL OPERATION

❑ Refit the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) .

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
intake distributor bolts on the front row	**32 N.m**
oil vapour rebreathing diaphragm bolts	**10 N.m**
inter-cylinder head cooling pipe bolts	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

134026

❑ Remove:

- the bolts (**1**) from the exhaust manifold heat shield,
- the exhaust manifold heat shield.

136263

❑ Unclip the heater matrix outlet cooling hose (**2**) .

❑ Disconnect the heater matrix outlet cooling hose.

136264

❑ Remove the cooling hose clip (**3**) from the exhaust fuel injector cooler using the **(Mot. 1448)**.

❑ Disconnect the cooling hose from the exhaust fuel injector cooler.

136261

❑ Move aside the cooling hose clip (**4**) between the expansion bottle and the inter-cylinder head pipe using the **(Mot. 1448)**.

❑ Disconnect the cooling hose clip between the expansion bottle and the inter-cylinder head pipe.

136259

❑ Remove:

- the rigid cooling pipe bolt (**5**) at the inter-cylinder head cooling pipe outlet,
- the rigid cooling pipe (**6**) at the inter-cylinder head cooling pipe outlet,
- the rigid cooling pipe seal at the inter-cylinder head cooling pipe outlet.

V9X

136260

❑ Disconnect the coolant temperature sensor connector (**7**) .

❑ Remove:

- the bolts (**8**) from the rigid inter-cylinder head cooling pipe,
- the inter-cylinder head cooling pipe,
- the inter-cylinder head cooling pipe seals.

136262

❑ Remove the support bolts (**9**) from the cooling pipe at the expansion bottle outlet.

❑ Move aside the cooling pipe support at the expansion bottle outlet.

136265

❑ Remove:

- the inter-cylinder head intake distributor bolts (**10**) on the gearbox side,
- the inter-cylinder head intake distributor on the gearbox side,
- the inter-cylinder head intake distributor seals on the gearbox side.

V9X

138335

❑ Unclip:

- the diesel return pipe (**11**) ,
- the wiring from the heater plugs (**12**) on the back row.

❑ Remove:

- the diesel return pipe,
- the wiring from the heater plugs on the back row.

134033

❑ Remove the support bolts (**13**) from the exhaust gas intercooler control solenoid valve.

❑ Move aside the support from the exhaust gas intercooler control solenoid valve.

137920

❑ Remove:

- the inter-cylinder head intake distributor bolts (**14**) , timing end,
- the inter-cylinder head intake distributor, timing end,
- the inter-cylinder head intake distributor seals, timing end.

136266

❑ Remove the high-pressure pipe bolt (**15**) between the rails.

134028

❑ Remove the bolts (**16**) from the oil vapour rebreathing diaphragm.

❑ Separate the oil vapour rebreathing hose clip from the oil vapour rebreathing diaphragm.

❑ Disconnect the oil vapour rebreathing hose from the oil vapour rebreathing diaphragm.

❑ Remove the oil vapour rebreathing diaphragm.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137919

❑ Remove:

- the intake distributor bolts (**17**) on the front row,
- the intake distributor on the front row,
- the intake distributor seal on the front row.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: inlet distributor seal (10,07,01,07)**.

❑ Always replace:

- the inter-cylinder head intake distributor seals, timing end,
- the inter-cylinder head intake distributor seals on the gearbox side,
- the inter-cylinder head cooling pipe seals,
- the rigid cooling pipe seal at the inter-cylinder head cooling pipe outlet.

❑ Clean and degrease using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) the joint face between the intake distributor and the cylinder head.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new intake distributor seal on the front row,
- the intake distributor on the front row.

137919

❑ Torque tighten in order the **intake distributor bolts on the front row (32 N.m)**.

III - FINAL OPERATION

❑ Refit the oil vapour rebreathing diaphragm.

❑ Connect the oil vapour rebreathing hose to the oil vapour rebreathing diaphragm.

❑ Fit the oil vapour rebreathing hose clip on to the oil vapour rebreathing diaphragm.

❑ Torque tighten the **oil vapour rebreathing diaphragm bolts (10 N.m)**.

❑ Refit:

- the high-pressure pipe bolt between the rails,
- new seals on the inter-cylinder head intake distributor, timing end,
- the inter-cylinder head intake distributor, timing end.

❑ Position the support on the exhaust gas cooler control solenoid valve.

❑ Refit the support on the exhaust gas cooler control solenoid valve.

❑ Fit:

- the wiring from the heater plugs on the back row,
- the diesel return pipe.

❑ Clip:

- the wiring from the heater plugs on the back row,
- the diesel return pipe.

❑ Refit:

- new seals on the inter-cylinder head intake distributor, on the gearbox side,
- the inter-cylinder head intake distributor, on the gearbox side.

❑ Refit the cooling pipe support at the expansion bottle outlet.

❑ Refit:

- the cooling pipe support at the expansion bottle outlet,
- new inter-cylinder head cooling pipe seals,
- the inter-cylinder head cooling pipe.

❑ Torque tighten the **inter-cylinder head cooling pipe bolts (12 N.m)**.

❑ Connect the coolant temperature sensor connector.

❑ Refit:

- a new rigid cooling pipe seal at the inter-cylinder head cooling pipe outlet,
- the rigid cooling pipe at the inter-cylinder head cooling pipe outlet.

❑ Connect the cooling hose between the expansion bottle and the inter-cylinder head pipe.

❑ Fit the cooling hose clip between the expansion bottle and the inter-cylinder head pipe using the **(Mot. 1448)**.

❑ Connect the cooling hose to the exhaust fuel injector cooler.

❑ Fit the clip on the cooling hose of the exhaust fuel injector cooler using the **(Mot. 1448)**.

❑ Connect the heater matrix outlet cooling hose.

❑ Clip on the heater matrix outlet cooling hose.

❑ Refit:

- the exhaust manifold heat shield,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the engine undertray,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,

V9X

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
intake distributor bolts on the back row	**32 N.m**
oil vapour rebreathing diaphragm bolts	**10 N.m**
inter-cylinder head cooling pipe bolts	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

134026

❑ Remove:

- the bolts (**1**) from the exhaust manifold heat shield,
- the exhaust manifold heat shield.

136263

❑ Unclip the heater matrix outlet cooling hose (**2**) .

❑ Disconnect the heater matrix outlet cooling hose.

V9X

136264

❑ Remove the cooling hose clip (**3**) from the exhaust fuel injector cooler using the **(Mot. 1448)**.

❑ Disconnect the cooling hose from the exhaust fuel injector cooler.

136261

❑ Move aside the cooling hose clip (**4**) between the expansion bottle and the inter-cylinder head pipe using the **(Mot. 1448)**.

❑ Disconnect the cooling hose between the expansion bottle and the inter-cylinder head pipe.

136259

❑ Remove:

- the rigid cooling pipe bolt (**5**) at the inter-cylinder head cooling pipe outlet,
- the rigid cooling pipe (**6**) at the inter-cylinder head cooling pipe outlet,
- the rigid cooling pipe seal at the inter-cylinder head cooling pipe outlet.

V9X

136260

❑ Disconnect the coolant temperature sensor connector (**7**) .

❑ Remove:

- the bolts (**8**) from the inter-cylinder head cooling pipe,
- the inter-cylinder head cooling pipe,
- the inter-cylinder head cooling pipe seals.

136262

❑ Remove the support bolts (**9**) from the cooling pipe at the expansion bottle outlet.

❑ Move aside the cooling pipe support at the expansion bottle outlet.

136265

❑ Remove:

- the inter-cylinder head intake distributor bolts (**11**) on the gearbox side,
- the inter-cylinder head intake distributor on the gearbox side,
- the inter-cylinder head intake distributor seals on the gearbox side.

V9X

138335

❑ Unclip:

- the diesel return pipe (**12**) ,
- the wiring from the heater plugs (**13**) on the back row.

❑ Remove:

- the diesel return pipe,
- the wiring from the heater plugs on the back row.

134033

❑ Remove the support bolts (**14**) from the exhaust gas intercooler control solenoid valve.

❑ Move aside the support from the exhaust gas intercooler control solenoid valve.

137920

❑ Remove:

- the inter-cylinder head intake distributor bolts (**15**) timing end,
- the inter-cylinder head intake distributor, timing end,
- the inter-cylinder head intake distributor seals, timing end.

V9X

136266

❑ Remove the high-pressure pipe bolt (**16**) between the rails.

136267

❑ Remove the fuel pipe support bolt (**17**) .

❑ Move aside the fuel pipe support.

134028

❑ Remove the bolts (**18**) from the oil vapour rebreathing diaphragm.

❑ Separate the oil vapour rebreathing hose clip from the oil vapour rebreathing diaphragm.

❑ Disconnect the oil vapour rebreathing hose from the oil vapour rebreathing diaphragm.

❑ Remove the oil vapour rebreathing diaphragm.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

137918

❑ Remove:

- the intake distributor bolts (**19**) on the back row,
- the intake distributor on the back row,
- the intake distributor seal on the back row.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: inlet distributor seal (10,07,01,07)**.

❑ Always replace:

- the inter-cylinder head intake distributor seals, timing end,
- the inter-cylinder head intake distributor seals on the gearbox side,
- the inter-cylinder head cooling pipe seals,
- the rigid cooling pipe seal at the inter-cylinder head cooling pipe outlet.

❑ Clean and degrease using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) the joint face between the intake distributor and the cylinder head.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new intake distributor seal on the back row,
- the intake distributor on the back row.

137918

❑ Torque tighten in order the **intake distributor bolts on the back row (32 N.m)**.

III - FINAL OPERATION

❑ Refit the oil vapour rebreathing diaphragm.

❑ Connect the oil vapour rebreathing hose to the oil vapour rebreathing diaphragm.

❑ Fit the oil vapour rebreathing hose clip on to the oil vapour rebreathing diaphragm.

❑ Torque tighten the **oil vapour rebreathing diaphragm bolts (10 N.m)**.

❑ Refit the fuel pipe support.

❑ Refit:

- the fuel pipe support,
- the high-pressure pipe bolt between the rails,
- new seals on the inter-cylinder head intake distributor, timing end,
- the inter-cylinder head intake distributor, timing end.

❑ Position the support on the exhaust gas cooler control solenoid valve.

V9X

- ❑ Refit the support on the exhaust gas cooler control solenoid valve.
- ❑ Fit:
  - the wiring from the pre-heater plugs on the back row,
  - the diesel return pipe.
- ❑ Clip:
  - the wiring from the pre-heater plugs on the back row,
  - the diesel return pipe.
- ❑ Refit:
  - new seals on the inter-cylinder head intake distributor, on the gearbox side,
  - the inter-cylinder head intake distributor on the gearbox side,
  - the cooling pipe support at the expansion bottle outlet,
  - new inter-cylinder head cooling pipe seals,
  - the inter-cylinder head cooling pipe.
- ❑ Torque tighten the **inter-cylinder head cooling pipe bolts (12 N.m)**.
- ❑ Connect the coolant temperature sensor connector.
- ❑ Refit:
  - a new rigid cooling pipe seal at the inter-cylinder head cooling pipe outlet,
  - the rigid cooling pipe at the inter-cylinder head cooling pipe outlet.
- ❑ Connect the cooling hose clip between the expansion bottle and the inter-cylinder head pipe.
- ❑ Fit the cooling hose clip between the expansion bottle and the inter-cylinder head pipe using the **(Mot. 1448)**.
- ❑ Connect the cooling hose to the exhaust fuel injector cooler.
- ❑ Fit the clip onto the cooling hose at the exhaust fuel injector cooler using the **(Mot. 1448)**.
- ❑ Connect the heater matrix outlet cooling hose.
- ❑ Clip on the heater matrix outlet cooling hose.
- ❑ Refit:
  - the exhaust manifold heat shield,
  - the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
  - the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
  - the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
  - the engine undertray,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

Tightening torques ▽	
intake distributor lower bolts	**27 Nm**
intake distributor upper bolts	**20 Nm**
throttle valve bolts	**10 Nm**
air filter box air outlet pipe clip on the throttle valve	**5.5 Nm**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, plugs must be fitted to the openings of all the fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123380

❑ Loosen the air filter box outlet air pipe clip (**1**) on the throttle valve.

❑ Disconnect:

- the oil vapour rebreathing hose (**2**) on the rocker cover,
- the air filter box air outlet pipe on the throttle valve.

❑ Remove the air filter box air outlet pipe from the throttle valve.

M4R

123381

❑ Remove the bolts (**3**) from the throttle valve.

❑ Move the throttle valve to one side.

❑ Remove the throttle valve seal.

❑ Unclip:

- the fuel return pipe on the intake distributor,
- the oil vapour rebreathing hose on the intake distributor.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

❑ Disconnect:

- the oil vapour rebreathing hose on the intake distributor,
- the brake servo pipe union from the inlet manifold,
- the fuel return pipe union on the intake distributor.

❑ Fit blanking plugs on the fuel return pipe.

❑ Remove the dipstick.

II - REMOVAL OPERATION FOR PART CONCERNED

123378

❑ Remove the upper bolt (**4**) from the intake distributor.

123375

❑ Remove the upper bolt (**5**) from the intake distributor.

M4R

123379

❑ Remove:

- in order the inlet manifold bolts,
- the intake distributor,
- the intake distributor seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the intake distributor seal,
- the throttle valve seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the inlet manifold.

❑ Without tightening, fit:

- the inlet manifold bolts,
- the intake distributor upper bolts.

123379

❑ Tighten to torque and in order the **intake distributor lower bolts (27 Nm)**.

❑ Torque tighten the **intake distributor upper bolts (20 Nm)**.

III - FINAL OPERATION.

❑ Refit the dipstick.

❑ Remove the blanking plugs.

❑ Connect:

- the fuel return pipe union on the intake distributor,
- the brake servo pipe union on the intake distributor,
- the oil vapour rebreathing hose on the intake distributor.

❑ Clip:

- the fuel return pipe on the intake distributor,
- the oil vapour rebreathing hose on the intake distributor.

❑ Fit the throttle valve.

❑ Refit the throttle valve bolts.

❑ Torque tighten the **throttle valve bolts (10 Nm)**.

❑ Connect:

- the air filter box air outlet pipe on the throttle valve,
- the oil vapour rebreathing hose on the rocker cover.

❑ Torque tighten the **air filter box air outlet pipe clip on the throttle valve (5.5 Nm)**.

M4R

❑ Refit the engine cover.

F4R

Tightening torques ▽	
injector rail bolts	**10 Nm**
intake distributor bolts	**25 Nm**
right-hand suspended engine mounting on the intake distributor	**62 Nm**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123154

❑ Disconnect:

- the petrol vapour rebreather pipe union (**1**) from the intake distributor,
- the brake servo vacuum pipe union (**2**) from the intake distributor,
- the oil vapour rebreathing pipe union from the oil vapour heater.

❑ Remove the oil vapour rebreathing pipe.

❑ Disconnect:

- the oil vapour heater connector (**3**) ,
- the inlet air pressure sensor connector (**4**) .

❑ Unpick the wiring from the air inlet pressure sensor.

❑ Disconnect the fuel supply pipe union from the injector rail at (**5**) .

❑ Fit anti-contamination caps.

F4R

123154

❑ Disconnect:

- the fuel injector connectors (**6**) ,
- the upstream oxygen sensor connector.

❑ Remove the fuel injector wiring.

123153

❑ Remove:

- the dipstick guide tube bolt (**7**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) .

II - REMOVAL OPERATION FOR PART CONCERNED

120218

❑

> Note:
>
> The intake distributor bolts are not the same length, mark their position.

❑ Remove:

- the cylinder head support bolt (**8**) on the intake distributor,
- the intake distributor bolts (**9**) ,
- the right-hand suspended engine mounting bolt (**10**) on the intake distributor,
- the intake distributor,
- the intake distributor seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the inlet manifold seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the cylinder head gasket face,
- the intake distributor joint face if reused.

When replacing the intake distributor

❑ Remove:

- the oil vapour heater bolt,
- the oil vapour heater,
- the oil vapour heater seals,

- the air inlet pressure sensor clip,
- the inlet air pressure sensor,
- the injector rail bolts,
- the injector rail,
- the injector seals.

❏ Always replace:

- the injector seals,
- the oil vapour heater seals.

❏ Refit:

- the new seal to the injectors,
- the injector rail on the new intake distributor,
- the injector rail bolts.

❏ Torque tighten the **injector rail bolts (10 Nm)**.

❏ Refit:

- the air inlet pressure sensor,
- the air inlet pressure sensor clip,
- the new oil vapour heater seals of the oil vapour heater,
- the oil vapour heater,
- the oil vapour heater bolt.

❏ Tighten the oil vapour heater bolt.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the new intake distributor seal,
- the intake distributor.

❏ Without tightening, fit:

- the intake distributor bolts,
- the cylinder head support bolt on the intake distributor,
- the right-hand suspended engine mounting bolt on the intake distributor.

120218

❏ Tighten to torque and in order the **intake distributor bolts (25 Nm)**.

❏ Tighten the cylinder head support bolt on the intake distributor.

❏ Torque tighten the **right-hand suspended engine mounting on the intake distributor (62 Nm)**.

III - FINAL OPERATION.

❏ Refit:

- the throttle valve on the intake distributor (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the dipstick guide tube bolt.

❏ Position the petrol injection wiring.

❏ Connect:

- upstream oxygen sensor connector,
- the petrol injector connectors.

❏ Remove the blanking plugs.

❏ Connect the fuel supply pipe union to the injector rail.

❏ Clip the air inlet pressure sensor wiring.

❏ Connect:

- the air inlet pressure sensor connector,
- the oil vapour heater connector.

❏ Fit the oil vapour rebreathing pipe.

❏ Connect:

- the petrol vapour rebreather pipe union on the intake distributor,
- the brake servo vacuum pipe union on the intake distributor,

F4R

- the oil vapour rebreathing pipe union on the oil vapour heater.

❏ Refit the engine cover.

M9R

Equipment required
refrigerant charging station
roller-type stud removal tool

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Drain the refrigerant fluid circuit using the **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the nut of the cooling radiator top hose on the intercooler air inlet pipe,
- the bolts of the intercooler air inlet pipe on the inlet distributor.

113282

❑ Rotate the clip (**1**) on the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Rotate the clip for the intercooler air inlet pipe at the intercooler end.

❑ Disconnect the intercooler air inlet pipe from the intercooler.

❑ Remove:

- the intercooler air inlet pipe,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Remove:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning).

M9R

M9R, and 742 or 744 or 746 or 748 or 754

123009

❑ Remove:

- the turbocharging pressure sensor support bolts (**2**) ,
- the turbocharging pressure sensor support,
- the dipstick guide tube bolt,
- the dipstick guide.

❑ Remove the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-265**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123609

❑ Remove:

- the inlet distributor bolts (**4**) ,
- the inlet distributor nuts (**5**) ,
- the inlet distributor,
- the inlet distributor seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the bearing face between the inlet distributor and the cylinder head,
- the bearing face between the inlet distributor and the EGR solenoid valve.

❑ **parts always to be replaced: inlet distributor stud on cylinder head (if loosened) (10,07,01,08)**

parts always to be replaced: inlet distributor seal (10,07,01,07)

❑ Parts always to be replaced:

- the dipstick guide seal.

If replacing the inlet distributor studs

❑ Refit the new studs using a **roller-type stud removal tool**.

M9R

❑ Tighten the new studs using a **roller-type stud removal tool**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the inlet distributor seal,
- the inlet distributor.

123609

❑ Tighten the inlet distributor mountings in order.

III - FINAL OPERATION

❑ Refit the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-265**) .

M9R, and 742 or 744 or 746 or 748 or 754

❑ Refit:

- a new dipstick guide seal,
- the dipstick guide,
- the turbocharging pressure sensor support.

❑ Refit:

- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Refit the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

❑ Fit the intercooler air inlet pipe.

❑ Clip on:

- the intercooler air inlet pipe on the turbocharger,
- the intercooler air inlet pipe on the intercooler.

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger and the intercooler.

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill the refrigerant fluid circuit using the **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

K4M

Tightening torques ▽	
bolts 1 to 5 of the inlet manifold	**9 N.m**
bolts 6 to 8 of the inlet manifold	**12 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, plugs must be fitted to the openings of all the fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove:

- the engine cover,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) .

128403

❏ Disconnect:

- all coil connectors (**1**) ,
- the air temperature sensor connector (**2**) .

128404

❏ Unclip the coil wiring.

❏ Move the coil wiring (**3**) to one side.

K4M

128405

❑ Disconnect the following from the inlet manifold:

- the intake distributor pressure sensor connector (**4**) ,
- the brake servo pipe union (**5**) ,
- the oil vapour rebreathing hose.

128406

❑ Unclip the following from the inlet manifold:

- the engine wiring (**6**) ,
- the petrol vapour recirculation pipe (**7**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

128408

❑ Remove:

- the intake distributor bolts (**8**) ,
- the intake distributor,
- the inlet manifold seals.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the housing of each inlet manifold seal,
- the seal face of the injector holder shim.

❑ Always replace the inlet manifold seals.

❑ Fit new seals to the inlet manifold.

❑ When replacing the inlet manifold, remove from the inlet manifold:

- the air temperature sensor,
- the inlet manifold pressure sensor.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the intake distributor.

K4M

128408

❑ Tighten to torque and in order:

- **bolts 1 to 5 of the inlet manifold (9 N.m)**,
- **bolts 6 to 8 of the inlet manifold (12 N.m)**.

III - FINAL OPERATION.

❑ Connect the following to the inlet manifold:

- the brake servo pipe union,
- the oil vapour rebreathing hose,
- the inlet manifold pressure sensor.

❑ Clip the following onto the inlet manifold:

- the engine wiring,
- the petrol vapour recirculation pipe,
- the coil wiring.

❑ Connect:

- all coil connectors,
- the air temperature sensor connector.

❑ Refit:

- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the engine cover.

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Ms. 583	Pipe clamps.

Tightening torques ▽	
inlet manifold mountings(initial torque)	**7 N.m**
inlet manifold mountings(torque)	**13 N.m**
support bolt of the ignition coil connector on the inlet manifold	**25 N.m**
fuel vapour recirculation solenoid valve bolts	**9 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

❑ Remove the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) .

133473

❑ Disconnect the damper valve control solenoid valve connector (**1**) .

❑ Remove the damper valve control solenoid valve bolt (**2**) .

❑ Disconnect:

- the air pipe (**3**) from the inlet manifold,
- the air pipe (**4**) from the control diaphragm.

❑ Remove:

- the vacuum canister bolt (**5**) ,
- the vacuum canister,
- the damper valve control solenoid valve.

V4Y

133474

- ❑ Disconnect the connector (**6**) from the fuel vapour recirculation solenoid valve.
- ❑ Remove the bolts (**7**) from the fuel vapour recirculation solenoid valve.
- ❑ Unclip the hose from the fuel vapour recirculation solenoid valve.
- ❑ Separate the clip (**8**) from the fuel vapour recirculation solenoid valve using the **(Mot. 1448)**.
- ❑ Disconnect the hose from the fuel vapour recirculation solenoid valve.
- ❑ Remove:
  - the fuel vapour recirculation solenoid valve,
  - the engine cover mounting bolt (**9**) .
- ❑ Remove the engine cover mounting.
- ❑ Fit the tool **(Ms. 583)** on the cooling hoses of the inlet manifold.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

134539

- ❑ Separate the clips (**10**) on the cooling hoses using the tool **(Mot. 1448)**.
- ❑ Disconnect the cooling hoses.

134538

- ❑ Remove the bolt (**11**) from the ignition coil connector mounting.
- ❑ Move aside the ignition coil connector mounting.

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

133475

❑ Remove:

- the inlet manifold bolts (**12**) ,
- the inlet manifold,
- the inlet manifold seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: inlet distributor seal (10,07,01,07)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal on the inlet manifold,
- the inlet manifold,
- the intake distributor bolts.

133475

❑ Pretighten to torque and in order the **inlet manifold mountings(initial torque) (7 N.m)**.

❑ Tighten to torque and in order the **inlet manifold mountings(torque) (13 N.m)**.

III - FINAL OPERATION

❑ Fit the support of the ignition coil connector on the inlet manifold.

❑ Torque tighten the **support bolt of the ignition coil connector on the inlet manifold (25 N.m)**.

❑ Connect the cooling hoses to the inlet manifold.

❑ Fit the cooling hose clips using the tool **(Mot. 1448)**.

❑ Remove the tool **(Ms. 583)** from the cooling hoses.

❑ Fit the engine cover support.

❑ Refit:

- the engine cover support bolt,
- the fuel vapour recirculation solenoid valve.

❑ Connect the fuel vapour recirculation solenoid valve hose.

❑ Fit the fuel vapour recirculation hose clip using the tool **(Mot. 1448)**.

❑ Clip on the fuel vapour recirculation hose.

❑ Torque tighten the **fuel vapour recirculation solenoid valve bolts (9 N.m)**.

❑ Connect the connector of the fuel vapour recirculation solenoid valve.

V4Y

- ❑ Refit:
  - the damper valve control solenoid valve,
  - the vacuum canister.
- ❑ Connect:
  - the air pipe to the control diaphragm.
  - the air pipe to the inlet manifold,
  - the damper valve control solenoid valve connector.
- ❑ Refit the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) .
- ❑ Fill the cooling system (see **Cooling system: Filling**) .
- ❑ Bleed the cooling system (see **Cooling system: Bleed**) .
- ❑ Refit the engine cover.

Injector holder shim: Removal - Refitting

K4M

Equipment required
refrigerant charging station

Tightening torques ▽	
bolts 1 and 2 on the injector holder shim	**30 N.m**
bolts 3, 4, 5, 6, 7, 8, 9 and 10 on the injector holder shim	**25 N.m**
upper timing cover bolt	**40 N.m**
right-hand pendulum suspension bolt	**62 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-265**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the « injector rail - injector» assembly (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-39**) .

128376

❑ Remove:

- the dipstick (**1**) ,
- the bolts (**2**) from the dipstick well,
- the dipstick well.

K4M

II - OPERATION FOR REMOVAL OF PART CONCERNED

128396

❑ Remove:

- the right-hand pendulum suspension bolt (**3**) ,
- the bolt (**4**) from the upper timing cover,
- the injector holder shim bolts,
- the injector holder shim,
- the injector holder shim gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ The injector holder shim seal must always be replaced.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the cylinder head gasket face,
- the gasket face of the injector holder shim, in case of reuse.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal on the injector holder shim,
- the injector holder shim.

128396

❑ Tighten to torque and in order:

- **bolts 1 and 2 on the injector holder shim (30 N.m)**,
- **bolts 3, 4, 5, 6, 7, 8, 9 and 10 on the injector holder shim (25 N.m)**.

❑ Tighten to torque:

- the **upper timing cover bolt (40 N.m)**,

- the **right-hand pendulum suspension bolt (62 Nm)**.

III - FINAL OPERATION.

❑ Refit:

- the dipstick well,
- the dipstick,
- the « injector rail - injector» assembly (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-39**) ,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-265**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

Tightening torques ▽	
nuts and bolts of the injector holder shim (initial torque)	**8 N.m**
nuts and bolts of the injector holder shim (torque)	**25 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the injector rail (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-39**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

116548

❑ Remove:

- the nuts and bolts (**1**) of the injector holder shim,
- the injector holder shim,
- the injector holder shim seals.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Inlet shim seal (11, 04,04,09)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new seals on the injector holder shim,
- the injector holder shim.

V4Y

116548

- Pretighten in order and to torque the **nuts and bolts of the injector holder shim (initial torque) (8 N.m)**.
- Tighten in order and to torque the **nuts and bolts of the injector holder shim (torque) (25 N.m)**.

III - FINAL OPERATION

- Refit:
  - the injector rail (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-39**) ,
  - the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

Tightening torques ▽	
exhaust manifold studs	**8 Nm**
exhaust manifold nuts	**33 Nm**
exhaust manifold stay bolts	**43 Nm**
exhaust clamp bolts	**21 Nm**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

124798

❑ Remove:

- the exhaust manifold stay bolts (**1**) ,
- the exhaust manifold stay.

124799

❑ Remove the bolts (**2**) from the exhaust clamp.

115095

❑ Remove:

- the bolts (**3**) from the exhaust manifold heat shield,
- the exhaust manifold heat shield.

M4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

115094

❑ Remove:

- the exhaust manifold nuts in order,
- the exhaust manifold,
- the exhaust manifold gasket.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Clean the exhaust manifold joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Vehicle: Parts and consumables for repair).

109399

❑ Always replace:

- the ring (**4**) between the exhaust manifold and the catalytic converter,
- the exhaust manifold gasket.

> Note:
>
> If a stud loosens during the operation, coat it with **frein de vis haute resistance** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Vehicle: Parts and consumables for repair).

❑ Tighten to torque the **exhaust manifold studs (8 Nm)**.

M4R

II - REFITTING PART CONCERNED

115094

- ❑ Screw on the exhaust manifold nuts without tightening them.
- ❑ Tighten to torque and in order the **exhaust manifold nuts (33 Nm)**.

III - FINAL OPERATION.

- ❑ Refit:
  - the exhaust manifold heat shield,
  - the exhaust manifold heat shield bolts.
- ❑ Tighten the exhaust manifold heat shield bolts.
- ❑ Refit:
  - the exhaust manifold stay,
  - the exhaust manifold stay bolts,
  - the exhaust bracket bolts.
- ❑ Torque tighten:
  - the **exhaust manifold stay bolts (43 Nm)**,
  - the **exhaust clamp bolts (21 Nm)**.
- ❑ Refit:
  - the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R

Tightening torques ▽	
exhaust manifold nuts	**25 Nm**

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the relay bearing bolts,
- the relay bearing,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

II - REMOVAL OPERATION FOR PART CONCERNED

21936

❑ Remove:

- the nuts (**1**) from the exhaust manifold,
- the exhaust manifold,
- the exhaust manifold gasket.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the exhaust manifold joint face if reused,
- the cylinder head gasket face.

❑ Always replace the exhaust manifold gasket.

Note:
If a stud loosens during this operation, coat it with **HIGH STRENGTH THREADLOCK** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

❑ Tighten the exhaust manifold studs.

F4R

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new exhaust manifold gasket,
- the exhaust manifold,
- the exhaust manifold nuts.

21936

❑ Tighten to torque and in order the **exhaust manifold nuts (25 Nm)**.

III - FINAL OPERATION.

❑ Refit:

- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the relay bearing,
- the relay bearing bolts.

❑ Tighten the relay bearing bolts.

❑ Refit:

- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Refit the engine cover.

M9R, and 742 or 744 or 746 or 748 or 754

Equipment required
roller-type stud removal tool

Tightening torques ▽	
exhaust manifold nuts (initial torque)	**18 N.m**
exhaust manifold nuts	**30 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

123600

❑ Remove the bolts (**1**) from the rigid EGR pipe heat shield.

❑ Move the heat shield away from the exhaust gas recirculation solenoid valve.

M9R, and 742 or 744 or 746 or 748 or 754

123601

123602

❑

Note:

If the bolt does not loosen:

- apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),

- wait **10 minutes**,

- apply a maximum loosening torque of **40 N.m** until the bolt loosens.

❑ Remove:

- the rigid EGR pipe bolts (**2**) on the exhaust manifold by applying a maximum loosening torque of **40 N.m** to avoid breaking the bolts,

- the bolt (**3**) securing the exhaust gas recirculation rigid pipe on the cylinder head,

- the rigid EGR pipe bolts (**4**) on the intercooler by applying a maximum loosening torque of **40 N.m** to avoid breaking the bolts,

❑ Move the rigid exhaust gas recirculation pipe to one side.

❑ Remove the exhaust gas recirculation rigid pipe seals.

II - OPERATION FOR REMOVAL OF PART CONCERNED

113279

❑ Remove:

- the exhaust manifold nuts,

- the exhaust manifold,

- the exhaust manifold gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- the cylinder head,

- of the rigid pipe,

- the exhaust manifold, if it is to be reused.

❑ Parts always to be replaced:

- the studs if they have been loosened during the removal procedure,

M9R, and 742 or 744 or 746 or 748 or 754

- the exhaust manifold nuts,
- the exhaust manifold gasket,
- the exhaust gas recirculation rigid pipe seals,
- the EGR rigid pipe bolts.

❑ Refit the exhaust manifold studs using a **roller-type stud removal tool**.

❑ Tighten the exhaust manifold studs using a **roller-type stud removal tool**.

II - REFITTING OPERATION FOR PART CONCERNED

113279

❑ Refit:

- a new exhaust manifold seal,
- the exhaust manifold,
- new exhaust manifold nuts.

❑ Pretighten to torque and in order the **exhaust manifold nuts (initial torque) (18 N.m)**.

❑ Torque tighten in order the **exhaust manifold nuts (30 N.m)**.

III - FINAL OPERATION

❑ Refit new seals for the exhaust gas recirculation rigid pipe.

❑ Fit the exhaust gas recirculation rigid pipe.

123602

123601

❑ Refit the new rigid exhaust gas recirculation pipe bolts.

❑ Fit without tightening:

- the new rigid EGR pipe bolts (**1**) and (**2**) ,
- the new rigid EGR pipe bolts (**3**) and (**4**) ,
- the bolts (**5**) from the exhaust gas recirculation rigid pipe.

❑ Tighten the rigid exhaust gas recirculation pipe bolts in order.

❑ Position the heat shield for the exhaust gas recirculation rigid pipe.

M9R, and 742 or 744 or 746 or 748 or 754

- ❑ Refit the rigid EGR pipe heat shield bolts.
- ❑ Tighten the rigid EGR pipe heat shield bolts.
- ❑ Refit:
  - the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
  - the turbocharger oil pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
  - the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
  - the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
  - the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).
- ❑ Fill and top up the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).
- ❑ Refit:
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the engine undertray,
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Exhaust manifold: Removal - Refitting

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Tightening torques ▽	
exhaust manifold nuts (initial torque)	**18 N.m**
exhaust manifold nuts	**30 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray.
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

M9R, and 800 or 802 or 806 or 808 or 816

❑ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

M9R, and 805 or 809 or 845 or 849

❑ Remove the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Remove:

- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the catalytic pre-converter (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123929

123928

❑ Remove:

- the bolts (**1**) on the heat shield of the rigid exhaust gas recirculation pipe on the exhaust side,
- the heat shield on the rigid exhaust gas recirculation pipe on the exhaust side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123889

❑

Note:

If the bolts do not loosen:

- apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- wait **10 minutes**,
- apply a maximum loosening torque of **(40 N.m)** until the bolts are loosened.

Note:

After removing the exhaust manifold bolts, avoid putting any stress on the EGR pipe so as not to damage the pipe.

❑ Remove the bolts (**2**) from the EGR rigid pipe on the exhaust manifold by applying a maximum loosening torque of **(40 N.m)**.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

113279

❑ Remove:

- the exhaust manifold nuts,
- the exhaust manifold studs,
- the exhaust manifold,
- the exhaust manifold gasket,
- the exhaust gas recirculation pipe rigid seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- the cylinder head,
- the rigid exhaust gas recirculation pipe,
- of the exhaust manifold.

❑ **parts always to be replaced: exhaust manifold stud on cylinder head (if loosened) (10,07,02,10)**

parts always to be replaced: exhaust manifold nut (10,07,02,08)

parts always to be replaced: exhaust gas recirculation pipe bolt (11,07,01,18)

parts always to be replaced: exhaust manifold seal (10,07,02,07)

parts always to be replaced: Exhaust gas recirculation pipe seal (11,07,01,15)

II - REFITTING OPERATION FOR PART CONCERNED

113279

❑ Refit:

- a new seal for the exhaust gas recirculation rigid pipe,
- a new exhaust manifold gasket,
- the exhaust manifold.

❑ Pretighten to torque and in order the **exhaust manifold nuts (initial torque) (18 N.m)**.

❑ Torque tighten in order the **exhaust manifold nuts (30 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the heat shield from the exhaust gas recirculation solenoid valve,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic pre-converter (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) ,
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

M9R, and 800 or 802 or 806 or 808 or 816

❏ Refit:

- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❏ Fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

M9R, and 805 or 809 or 845 or 849

❏ Refit the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❏ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- the engine undertray,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 780

Tightening torques ▽	
exhaust manifold nuts	**26 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

123532

❑ Loosen the clip on the intercooler air outlet pipe.

❑ Disconnect the intercooler outlet air pipe on the damper valve.

113853

❑ Remove:

- the bolts (**2**) from the damper valve strut,
- the damper valve strut.

112810

❑ Disconnect the connector (**3**) from the damper valve.

❑ Remove:

- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the turbocharger oil supply pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the engine undertray bolts,
- the engine undertray,

K9K, and 780

- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

112329

❑ Remove:

- the bolts (**4**) of the « timing end lifting eye - air inlet metal tube » assembly,
- the lifting eye on the timing end (**5**) ,
- air inlet metal tube (**6**) .

113475

❑ Remove:

- the rail protector cover bracket bolts (**7**) ,
- the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

.

123837

❑ Loosen, but do not remove, the bolts (**8**) of the exhaust gas recirculation assembly.

❑ Move aside the exhaust gas recirculation assembly.

K9K, and 780

II - OPERATION FOR REMOVAL OF PART CONCERNED

113561

❑ Remove:

- the nuts (**9**) from the exhaust manifold,
- the exhaust manifold.

❑ Mark the position of the exhaust manifold gasket.

❑ Remove the exhaust manifold gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the exhaust manifold gasket.

❑ Clean the bearing faces using **ABRASIVE PADS** on:

- the cylinder head,
- of the exhaust manifold.

❑ Degrease these bearing faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS**.

II - REFITTING OPERATION FOR PART CONCERNED

114532

❑ Refit:

- a new exhaust manifold gasket in the position marked during removal,
- the exhaust manifold.

❑ Torque tighten in order the **exhaust manifold nuts (26 N.m)**.

III - FINAL OPERATION

❑ Fit the exhaust gas recirculation assembly.

❑ Refit the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

❑ Refit:

- the air inlet metal tube,
- the lifting eye on the timing end.

❑ Refit:

- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the engine undertray,
- the turbocharger oil supply pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,

K9K, and 780

- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

❏ Connect the damper valve connector.

❏ Refit the damper valve strut.

❏ Connect the intercooler air outlet pipe on the damper valve.

❏ Tighten the clip on the intercooler outlet pipe.

❏ Refit the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Exhaust manifold: Removal - Refitting

K4M

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

Tightening torques ▽	
exhaust manifold studs	**9 Nm**
upstream oxygen sensor	**44 Nm**
bolts of the lower heat shield12 N	**m**
exhaust manifold nuts	**26 Nm**
exhaust manifold stay bolt	**44 Nm**
exhaust manifold stay nut44 N	**m**
exhaust bracket bolts	**22 Nm**
heater matrix hose bracket bolt	**10 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine undertray bolts,
- the engine undertray.

128374

❑ Remove:

- the bolts (**1**) from the exhaust bracket,
- the ring between the exhaust manifold and the catalytic converter.

128618

❑ Remove:

- the nut (**2**) from the exhaust manifold stay,
- the bolt (**3**) from the exhaust manifold stay,
- the exhaust manifold stay.

K4M

126381

❑ Disconnect the upstream oxygen sensor connector (**4**) .

128455

❑ Unclip the heater matrix hoses from the heater matrix hose bracket.

❑ Remove:

- the bolt (**5**) from the heater matrix hose bracket,
- the heater matrix hose bracket.

126380

❑ Remove:

- the bolts (**6**) from the upper heat shield,
- the upper heat shield.

II - OPERATION FOR REMOVAL OF PART CONCERNED

126382

❑ Remove:

- the exhaust manifold nuts,
- the exhaust manifold,
- the exhaust manifold gasket.

K4M

When replacing the exhaust manifold

126617

❑ Remove:

- the lower heat shield bolts (**7**) ,
- the lower heat shield,
- the upstream oxygen sensor using the **(Mot. 1495-01)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the exhaust manifold joint face if it is to be re-used,
- the cylinder head joint face.

109399

❑ Always replace:

- the ring (**8**) between the exhaust manifold and the catalytic converter,
- the exhaust manifold gasket.

> Note:
>
> If a stud comes loose during removal, smear it with **HIGH RESISTANCE THREADLOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Torque tighten the **exhaust manifold studs (9 Nm)**.

K4M

When replacing the exhaust manifold

126617

- ❑ Refit the upstream oxygen sensor using the **(Mot. 1495-01)**.
- ❑ Torque tighten the **upstream oxygen sensor (44 Nm)**.
- ❑ Refit the lower heat shield.
- ❑ Tighten in order and to torque the **bolts of the lower heat shield12 N (m)**.

II - REFITTING OPERATION FOR PART CONCERNED

126382

- ❑ Refit:
  - a new exhaust manifold seal,
  - the exhaust manifold.
- ❑ Torque tighten in order the **exhaust manifold nuts (26 Nm)**.

III - FINAL OPERATION.

- ❑ Refit:
  - the upper heat shield,
  - the exhaust manifold stay.
- ❑ Tighten to torque:
  - the **exhaust manifold stay bolt (44 Nm)**,
  - the **exhaust manifold stay nut44 N (m)**,
- ❑ Refit a new ring between the exhaust manifold and the catalytic converter.
- ❑ Torque tighten the **exhaust bracket bolts (22 Nm)**.
- ❑ Refit the heater matrix hose bracket.
- ❑ Torque tighten the **heater matrix hose bracket bolt (10 N.m)**.
- ❑ Clip the heater matrix hoses onto the heater matrix hose bracket.
- ❑ Connect the upstream oxygen sensor connector.

Exhaust manifold: Removal - Refitting

K4M

- Refit:
  - the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the engine undertray.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 782

Tightening torques ▽	
exhaust manifold nuts	**26 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
- the exhaust gas temperature sensor (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

139182

❑ Remove:

- the nuts (**1**) from the exhaust manifold,
- the exhaust manifold,
- the exhaust manifold gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust manifold seal (10,07,02,07)**.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint face:

- of the cylinder head,
- of the exhaust manifold, if it is to be reused.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to clean and degrease the joint faces:

- the cylinder head,
- of the exhaust manifold, if it is to be reused.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new exhaust manifold gasket,
- the exhaust manifold.

K9K, and 782

139182

❑ Torque tighten in order the **exhaust manifold nuts (26 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the exhaust gas temperature sensor (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the engine undertray,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Front exhaust manifold: Removal - Refitting

V4Y

Equipment required
refrigerant charging station

Tightening torques ▽	
exhaust manifold studs	**15 Nm**
exhaust manifold nuts	**31 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front catalytic pre-converter (see **Front catalytic pre-converter: Removal - Refitting**) .

134206

❑ Disconnect the front row upstream oxygen sensor connector (**1**) .

❑ Unclip the front row upstream oxygen sensor from its support.

II - OPERATION FOR REMOVAL OF PART CONCERNED

22345

❑ Remove:

- the nuts (**2**) from the front exhaust manifold,
- the front exhaust manifold,
- the front exhaust manifold gasket.

V4Y

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: exhaust manifold seal (10,07,02,07)**.
- Always replace the seal between the front exhaust manifold and the front catalytic pre-converter.
- Always replace the studs, if they were loosened during the removal operation.
- Clean the joint faces of the exhaust manifold using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- Torque tighten the **exhaust manifold studs (15 Nm)**.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - a new front exhaust manifold seal,
  - the front exhaust manifold.

22345

- Torque tighten in order the **exhaust manifold nuts (31 N.m)**.

III - FINAL OPERATION

- Clip the front row upstream oxygen sensor onto its support.
- Connect the front row upstream oxygen sensor connector.
- Refit:
  - the front catalytic pre-converter (see **Front catalytic pre-converter: Removal - Refitting**) ,
  - the engine undertray,
  - the engine cover.
- Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Tightening torques ▽	
front exhaust manifold nuts (initial torque)	**18 N.m**
front exhaust manifold nuts (torque)	**32 N.m**
front exhaust manifold clip	**9 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the engine undertray bolts,
- the engine undertray,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

137887

❑ Remove the engine wiring support nut (**1**) from the multifunction support.

❑ Separate the engine wiring from the multifunction support.

V9X

137886

❑ Remove:

- the air conditioning pipe support bolt (**2**) from the multifunction support,
- the dipstick guide support bolt (**3**) from the multifunction support.

137945

❑ Remove:

- the nuts (**4**) of the multifunction support,
- the multifunction support.

❑ Unclip the fuel drain hose from the front row multifunction support.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

134026

❑ Remove:

- the front exhaust manifold side heat shield bolts (**5**) ,
- the front exhaust manifold side heat shield.

137945

❑ Remove:

- the front exhaust manifold heat shield nut (**6**) .

- the front exhaust manifold heat shield.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134114

❑ Remove the clip (**7**) between the front exhaust manifold and the turbocharger.

137946

❑

Note:

Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) before loosening the nuts of the exhaust manifold.

❑ Remove:

- the nuts (**8**) from the front exhaust manifold,
- the front exhaust manifold spacers,
- the front exhaust manifold gasket,
- the seal between the front exhaust manifold and the turbocharger.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust manifold seal (10,07,02,07)**.

❑ **parts always to be replaced: exhaust manifold stud on cylinder head (if loosened) (10,07,02,10)**.

❑ **parts always to be replaced: exhaust manifold nut (10,07,02,08)**.

❑ **parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)**.

❑ Always replace:

- the clip between the turbocharger and the front exhaust manifold,

- the heat shield studs of the front exhaust manifold, if they have become loose.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the cylinder head surface,
- the exhaust manifold joint faces if they are being reused,
- the turbocharger joint face.

❑ Refit new exhaust manifold studs, if they were loosened during the removal operation.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new front exhaust manifold seal,
- a new clip on the turbocharger front exhaust manifold,
- a new seal between the front exhaust manifold and the turbocharger,
- the front exhaust manifold starting with the turbocharger then the cylinder head.

❑ Without tightening, fit the rear exhaust manifold onto the turbocharger.

❑ Refit the front exhaust manifold spacers.

❑ Fit without tightening the new front exhaust manifold nuts.

137946

❑ Torque tighten in order the:

- **front exhaust manifold nuts (initial torque) (18 N.m)**,
- **front exhaust manifold nuts (torque) (32 N.m)**.

❑ Torque tighten the **front exhaust manifold clip (9 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the front exhaust manifold heat shield,
- the multifunction support,
- the front exhaust manifold shield nuts,
- the front exhaust manifold side heat shield.
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

❑ Clip the front row fuel drain hose onto the multifunction support.

❑ Refit:

- the dipstick guide support bolt on the multifunction support,
- the air conditioning pipe support bolt onto the multifunction support.

❑ Place the engine wiring onto the multifunction support.

❑ Refit:

- the engine wiring support nut onto the multifunction support,

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,

- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,

- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,

- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,

- the engine undertray,

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),

- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),

- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),

- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Perform the following operations:

- fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,

- adjust the headlights (see **Headlight: Adjustment**) (80B, Headlights).

❑ Refit the engine cover.

Rear exhaust manifold: Removal - Refitting

V4Y

Equipment required
refrigerant charging station

Tightening torques ▽	
exhaust manifold studs	**15 N.m**
rear exhaust manifold bolts	**31 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front catalytic pre-converter (see **Front catalytic pre-converter: Removal - Refitting**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the rear catalytic pre-converter (see **Rear catalytic pre-converter: Removal - Refitting**) .

133477

❑ Disconnect the rear row upstream oxygen sensor connector (**1**) .

❑ Unclip the rear row upstream oxygen sensor from its support.

II - OPERATION FOR REMOVAL OF PART CONCERNED

22334

❑ Remove:

- the nuts (**2**) from the rear exhaust manifold,
- the rear exhaust manifold,
- the rear exhaust manifold gasket .

V4Y

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ **parts always to be replaced: exhaust manifold seal (10,07,02,07)**.
- ❑ Always replace the seal between the rear exhaust manifold and the rear catalytic pre-converter.
- ❑ Always replace the studs, if they have been loosened during the removal operation.
- ❑ Clean the joint faces of the exhaust manifold using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- ❑ Torque tighten the **exhaust manifold studs (15 N.m)**.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - a new rear exhaust manifold seal,
  - the rear exhaust manifold.

22334

- ❑ Torque tighten in order the **rear exhaust manifold bolts (31 N.m)**.

III - FINAL OPERATION

- ❑ Clip the back row upstream oxygen sensor onto its support.
- ❑ Connect the back row upstream oxygen sensor connector.
- ❑ Refit:
  - the rear catalytic pre-converter (see **Rear catalytic pre-converter: Removal - Refitting**) ,
  - the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the front catalytic pre-converter (see **Front catalytic pre-converter: Removal - Refitting**) ,
  - the engine undertray,
  - the engine cover.
- ❑ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Rear exhaust manifold: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
rear exhaust manifold nuts (initial torque)	**18 N.m**
rear exhaust manifold nuts (torque)	**32 N.m**
rear exhaust manifold clip	**9 N.m**
catalytic pre-converter studs on the turbo-charger	**21 N.m**
studs of the turbo-charger heat shield, if they were loosened during the removal operation	**13 N.m**
studs of the catalytic pre-converter stay on the cylinder block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut	**21 N.m**
nuts of the lower stay on the upper bracket	**21 N.m**
nuts of the lower stay on the cylinder block and on the gearbox	**21 N.m**
lower stay nuts on the catalytic pre-converter	**21 N.m**
turbocharger heat shield nuts	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

V9X

134225

- ❑ Remove the clip (**1**) from the turbocharger cooling hose using the **(Mot. 1448)**.
- ❑ Disconnect the turbocharger cooling hose.
- ❑ Remove:
  - the nut (**2**) on the turbocharger rigid cooling pipe,
  - the turbocharger heat shield nuts (**3**) .
- ❑ Loosen the nut (**4**) on the turbocharger heat shield.
- ❑ Remove the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

138351

- ❑ Unclip the wiring (**5**) from the crankshaft position sensor of the catalytic pre-converter strut.
- ❑ Remove the nuts (**6**) from the catalytic pre-converter lower stay.

V9X

138360

134229

❑ Remove:

- the catalytic pre-converter lower stay studs (**7**) ,
- the catalytic pre-converter lower stay nuts (**8**) ,
- the catalytic pre-converter strut.

138353

❑ Loosen the nut (**9**) on the catalytic pre-converter upper stay.

❑ Remove the catalytic pre-converter upper stay.

137925

❑ Remove the nut (**10**) on the rigid cooling pipes of the exhaust fuel injector cooler.

❑ Move aside the rigid cooling pipes of the exhaust fuel injector cooler.

V9X

❏ Remove the turbocharger heat shield.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

138352

❏ Remove the catalytic pre-converter nuts (**11**) .

❏ Move aside the catalytic pre-converter.

❏ Remove:

- the catalytic pre-converter seal,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

134226

❏ Unclip the cooling hose at the inlet of the exhaust gas cooler from the back row rail protector.

❏ Disconnect the cooling hose (**12**) at the inlet of the exhaust gas cooler.

134106

❏ Disconnect:

- the vacuum hose (**13**) of the exhaust gas cooler diaphragm control,
- the fuel discharge hose (**14**) on the back row.

134107

- ❑ Move aside the clip (**15**) of the cooling hose at the exhaust gas recirculation solenoid valve outlet using the **(Mot. 1448)**.
- ❑ Disconnect the cooling hose at the exhaust gas recirculation solenoid valve outlet.
- ❑ Remove the bolts (**16**) from the exhaust gas recirculation solenoid valve.

134104

- ❑ Remove:
  - the bolts (**17**) from the exhaust gas cooler,
  - the nuts (**18**) from the turbocharger exhaust gas cooler.
- ❑ Move aside the « exhaust gas cooler - exhaust gas recirculation solenoid valve » assembly.
- ❑ Remove the seal between the exhaust gas cooler and the turbocharger.

137953

- ❑ Remove the clip (**19**) on the cooler hose at the exhaust fuel injector cooler inlet using the **(Mot. 1448)**.
- ❑ Disconnect the cooler hose at the exhaust fuel injector cooler inlet.
- ❑ Remove the « exhaust gas cooler - exhaust gas recirculation solenoid valve » assembly.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

137947

❑ Remove:

- the bolts (**20**) from the rear exhaust manifold heat shield,
- the rear exhaust manifold heat shield.

134113

❑ Remove the clip (**21**) between the rear exhaust manifold and the turbocharger.

137948

❑

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) before loosening the nuts of the exhaust manifold.

❑ Remove:

- the nuts (**22**) from the rear exhaust manifold,
- the rear exhaust manifold spacers,
- the rear exhaust manifold gasket,
- the seal between the rear exhaust manifold and the turbocharger.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust manifold seal (10,07,02,07)**.

❑ **parts always to be replaced: exhaust manifold stud on cylinder head (if loosened) (10,07,02,10)**.

❑ **parts always to be replaced: exhaust manifold nut (10,07,02,08)**.

❑ **parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)**.

❑ **parts always to be replaced: exhaust gas cooler seal (11,07,01,17)**.

❑ Always replace:

- the seal between the catalytic pre-converter and the turbocharger,
- the studs between the turbocharger and the catalytic pre-converter on the turbocharger, if they were loosened during the removal operation,

- the nuts between the turbocharger and the catalytic pre-converter,
- the catalytic pre-converter stay studs,
- the clip between the turbocharger and the rear exhaust manifold,
- the nuts on the turbocharger exhaust gas cooler,
- the studs on the turbocharger exhaust gas cooler, if they were loosened during the removal operation,
- the turbocharger heat shield nuts,
- the studs on the heat shield of the turbocharger, if they were loosened during the removal operation.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the cylinder head joint face,
- the exhaust manifold joint faces if they are being reused,
- the turbocharger joint faces,
- the exhaust gas cooler joint face.

❑ Refit new exhaust manifold studs, if they were loosened during the removal operation.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new rear exhaust manifold seal,
- a new clip on the turbocharger rear exhaust manifold,
- a new seal between the rear exhaust manifold and the turbocharger,
- the rear exhaust manifold starting with the turbocharger then the cylinder head.

❑ Without tightening, fit the rear exhaust manifold onto the turbocharger.

❑ Refit the rear exhaust manifold spacers.

❑ Without tightening, fit the new rear exhaust manifold nuts.

137948

❑ Torque tighten in order the:

- **rear exhaust manifold nuts (initial torque) (18 N.m)**,
- **rear exhaust manifold nuts (torque) (32 N.m)**.

❑ Torque tighten the **rear exhaust manifold clip (9 N.m)**.

❑ Refit the rear exhaust manifold heat shield.

III - FINAL OPERATION

❑ Refit new studs on the turbocharger exhaust gas cooler, if they were loosened during the removal operation.

❑ Fit the « exhaust gas cooler - exhaust gas recirculation solenoid valve » assembly.

❑ Connect the cooler hose at the exhaust fuel injector cooler inlet.

❑ Fit the clip on the cooler hose at the exhaust fuel injector cooler inlet using the **(Mot. 1448)**.

❑ Refit:

- a new seal between the exhaust gas cooler and the turbocharger,
- the « exhaust gas cooler - exhaust gas recirculation solenoid valve » assembly.

❑ Fit without tightening:

- the new nuts on the turbocharger exhaust gas cooler,
- the exhaust gas cooler bolts on the back row rocker cover,
- the bolts to the exhaust gas recirculation solenoid valve.

V9X

- ❑ Tighten the following in order:
  - the bolts on the exhaust gas recirculation solenoid valve,
  - the nuts on the turbocharger exhaust gas cooler,
  - the exhaust gas cooler bolts on the back row rocker cover.
- ❑ Connect the cooling hose at the exhaust gas recirculation solenoid valve outlet.
- ❑ Refit the clip on the cooling hose at the exhaust gas recirculation solenoid valve outlet using the **(Mot. 1448)**.
- ❑ Connect:
  - the fuel drain hose to the back row rocker cover,
  - the vacuum hose to the exhaust gas cooler diaphragm control,
  - the cooling hose at the inlet of the exhaust gas cooler.
- ❑ Clip on the cooling hose at the inlet of the exhaust gas cooler on the back row rail protector.
- ❑ Refit:
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the new catalytic pre-converter studs on the turbocharger, if they have been loosened during the removal procedure.
- ❑ Torque tighten the **catalytic pre-converter studs on the turbocharger (21 N.m)**.
- ❑ Refit a new catalytic pre-converter seal on the turbocharger.
- ❑ Fit the catalytic pre-converter on the turbocharger.
- ❑ Torque tighten the **studs of the turbocharger heat shield, if they were loosened during the removal operation (13 N.m)**.
- ❑ Refit the turbocharger heat shield.
- ❑ Fit the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter and the turbocharger.
- ❑ Refit:
  - the nut of the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter,
  - the catalytic pre-converter upper stay.
- ❑ Without tightening, fit the nut of the catalytic pre-converter upper stay.
- ❑ Refit the catalytic pre-converter lower stay.
- ❑ Without tightening, fit the nuts of the lower stay onto the upper bracket.
- ❑ Torque tighten the **studs of the catalytic pre-converter stay on the cylinder block and on the gearbox (8 N.m)**.
- ❑ Fit without tightening:
  - the nuts of the lower stay on the cylinder block and on the gearbox,
  - the lower stay nuts on the catalytic pre-converter.
- ❑ Tighten to torque:
  - the **catalytic pre-converter upper stay nut (21 N.m)**,
  - the **nuts of the lower stay on the upper bracket (21 N.m)**,
  - the **nuts of the lower stay on the cylinder block and on the gearbox (21 N.m)**,
  - the **lower stay nuts on the catalytic pre-converter (21 N.m)**.
- ❑ Clip the crankshaft position sensor wiring on to the catalytic pre-converter stay.
- ❑ Refit:
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the nut of the rigid cooling pipe on the turbocharger.
- ❑ Torque tighten the **turbocharger heat shield nuts (8 N.m)**.
- ❑ Connect the cooling hose onto the rigid cooling pipe of the turbocharger.
- ❑ Fit the turbocharger cooling hose clip using the **(Mot. 1448)**.
- ❑ Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

V9X

- Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- Refit the engine cover.

F4R or K9K or M9R or V9X

Equipment required
parts washer

I - TURBOCHARGER: GENERAL INSTRUCTIONS

For the turbocharging pressure regulator check (see **Fault finding - Tests**) (Technical Note 3419A, 12B, Turbocharging).

WARNING
The turbocharger pressure regulator rod must not be adjusted.

II - TURBOCHARGER CIRCUIT DIAGRAM

112666

(**1**)	Air filter unit
(**2**)	Air flowmeter
(**3**)	Compressor wheel
(**4**)	Intercooler
(**5**)	Inlet distributor
(**6**)	Exhaust manifold
(**7**)	Turbine wheel
(**8**)	Bearing system (bearing + wheel shaft)
(**A**)	Air filter box air outlet pipe
(**B**)	Turbocharger air outlet pipe
(**C**)	Intercooler air outlet pipe

III - APPLICATION CONDITIONS OF INSTRUCTIONS

The instructions below must be followed when replacing a turbocharger due to mechanical damage:

- damage to the bearing system,
- broken shaft or turbine wheel,
- compressor wheel rubbing against the turbocharger casing,
- broken or damaged compressor wheel,
- extensive clogging of the turbine wheel casing (hard deposits).

FOR THE AIR CIRCUIT:

- Consequences:
  - swarf or metal objects in the turbocharger inlet and outlet pipes,
  - oil in the air circuit (collected in the intercooler).
- Risks (after replacing the turbocharger):
  - metal objects sucked in by the compressor wheel (destruction of the turbocharger).

FOR THE LUBRICATION CIRCUIT:

- Consequences:
  - swarf found in the engine oil circuit,
  - circulation of swarf within the circuit.
- Risks (after replacing the turbocharger):
  - premature wear on the bearing system (destruction of turbocharger).

WARNING
Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to follow the INSTRUCTIONS listed will lead to the turbocharger breaking again.

INSTRUCTIONS:

- Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**)
- Replace the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .
- Replace the seals and fittings,
- Carry out the following only if the compressor wheel is broken or rubbing against the turbocharger casing:
  - Drain the intercooler,

F4R or K9K or M9R or V9X

• Clean the turbocharger air pipes.

Note:

When carrying out an operation on the air or lubrication circuit, it is necessary to plug the open holes to prevent any risk of foreign bodies entering the system.

IV - AIR CIRCUIT*: INSTRUCTIONS FOLLOWING MECHANICAL DAMAGE TO THE TURBOCHARGER

Note:

(*) These instructions for the air circuit are only to be followed in the case of:

- broken compressor wheel,
- compressor wheel rubbing against the turbocharger casing.

Remove the intercooler if fitted to the vehicle (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-59**) .

Turn the intercooler over and allow the oil inside to drain out.

110738

Note:

If the compressor wheel (**9**) is damaged, metal objects are ejected inside the air pipes.

Check that there are no metal objects inside the air flowmeter ***(2)*** .

Remove:

- the air pipe(between the air filter unit and the turbocharger) ***(A)*** ,
- the air pipe ***(B)*** (between the turbocharger and the intercooler).

112772

For air pipes comprising several components:

- mark (**10**) the fitting position of each component,
- separate all the components.

112770

F4R or K9K or M9R or V9X

One by one, clean the pipes removed with the **parts washer** :

- brush as much of the inside of the pipe as possible (only use brushes with plastic bristles),
- wash plenty of cleaning product from the cleaning station through the pipe,
- allow the cleaned pipe to drain by standing it upright,
- ensure the cleaning product has drained out completely (check areas where liquid may be retained, e.g. gaiters, resonators etc.).

112771

Dry the pipes one by one using a compressed air spray gun.

For pipes comprising several components:

- assemble the components, taking note of their correct fitting position ***(10)*** .

Refit:

- the air pipe(between the air filter unit and the turbocharger) ***(A)*** ,
- the air pipe ***(B)*** (between the turbocharger and the intercooler).

Refit the intercooler, if fitted to the vehicle (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-59**) .

V - LUBRICATION CIRCUIT: INSTRUCTIONS FOLLOWING MECHANICAL DAMAGE TO THE TURBOCHARGER**

Note:

(**) These instructions relating to the lubrication circuit must always be followed in all cases of mechanical damage as listed above.

Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

Replace the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

Only fill the engine with a suitable oil type (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

VI - GENERAL INSTRUCTIONS TO BE FOLLOWED WHEN REMOVING A TURBOCHARGER

Always replace:

- the oil supply pipe:
  - if the pipe is blocked, even partially (due to scale, carbonised oil etc.),
  - if the pipe is fitted with self-retaining seals.
- the oil return pipe:
  - if the pipe is blocked, even partially (due to scale, carbonised oil etc.),
  - if the pipe is fitted with self-retaining seals.
- all seals that have been removed,
- all fittings that have been removed.

WARNING
Failure to observe the following procedure may lead to destruction of the turbocharger.

When starting the engine:

- do not accelerate,
- allow the engine to run for **1 minute**,the time taken for the oil circuit pressure to increase (until the oil pressure warning light on the instrument panel goes out),
- accelerate several times at no load,
- check the air circuit and the oil circuit for leaks.

M9R, and 742 or 744 or 746 or 748 or 754

Equipment required
roller-type stud removal tool
tweezers

Tightening torques ▽	
turbocharger studs	**15 N.m**
exhaust manifold stud	**9 N.m**
turbocharger strut bolt on the flywheel end	**25 N.m**
turbocharger lower nuts (initial torque)	**12 N.m**
turbocharger upper nut (initial torque)	**12 N.m**
turbocharger lower nuts	**21 N.m**
turbocharger upper nut	**21 N.m**
turbocharger transversal bolt	**25 N.m**
turbocharger strut bolt on the timing end	**25 N.m**
air filter box air outlet pipe clips	**5.5 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

122425

❑ Remove the front engine cover.

❑ Disconnect the air flowmeter connector (**1**) .

127624

❑ Disconnect the turbocharging pressure regulator pipe (**2**) on the turbocharger.

❑ Unclip the turbocharging pressure regulator pipe and the flowmeter wiring from the air filter unit air outlet pipe.

❑ Undo the clips on the air filter box outlet air pipe.

❑ Remove the air filter box air outlet pipe.

M9R, and 742 or 744 or 746 or 748 or 754

122430

❑ Remove the nut (**3**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the intercooler air inlet pipe bolts (**4**) .

113282

❑ Rotate the intercooler air inlet pipe clip (**5**) on the turbocharger side.

❑ Disconnect and remove the intercooler air inlet pipe.

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),

❑ Move aside the exhaust hose pipe.

❑ Remove:

- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

M9R, and 742 or 744 or 746 or 748 or 754

II - OPERATION FOR REMOVAL OF PART CONCERNED

113277

❑

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the catalytic converter nuts are loosened.

❑ Remove:

- the turbocharger lower nuts (**7**) on the exhaust manifold,
- the turbocharger upper nut (**8**) on the exhaust manifold,
- the transversal bolt (**9**) from the turbocharger.

❑ Undo the turbocharger strut bolt (**10**) .

❑ Remove:

- the turbocharger from underneath the vehicle.
- the turbocharger seal.

114471

❑ Remove:

- the bolts (**11**) from the strut,
- the strut,
- the exhaust manifold stud using a **roller-type stud removal tool**,
- the turbocharger studs using a **roller-type stud removal tool** if the turbocharger is being reused.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the bearing faces:

- the exhaust manifold,
- the turbocharger.

❑ Parts always to be replaced:

- the intercooler air inlet pipe seal,
- the turbocharger and catalytic converter nuts,
- the turbocharger oil pipes and their seals,
- the turbocharger strut.
- the turbocharger transversal bolt,
- the turbocharger seal,
- the catalytic converter seal,
- the exhaust manifold stud,

M9R, and 742 or 744 or 746 or 748 or 754

- the turbocharger studs.

❏ Refit the new turbocharger studs using a **roller-type stud removal tool**.

❏ Torque tighten the **turbocharger studs (15 N.m)** using a **roller-type stud removal tool** or using the stud recesses.

❏ Refit the new stud on the exhaust manifold.

❏ Torque tighten the **exhaust manifold stud (9 N.m)**.

115068

❏ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❏

Note:

Check that the intercooler air inlet pipe seal is fitted in the right direction on the turbocharger side.

❏ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

M9R, and 742 or 744 or 746 or 748 or 754

II - REFITTING OPERATION FOR PART CONCERNED

114471

❑ Refit:

- the new turbocharger strut,
- the strut bolts (**12**) and (**13**) .

❑ Fit the turbocharger strut bolts without tightening them.

❑ Refit the turbocharger (without its seal) on the exhaust manifold, passing it under the vehicle.

❑ Fit the turbocharger against the exhaust manifold.

❑ Press the stay up against the turbocharger on the flywheel end.

❑

> Note:
>
> Do not tighten the bolt too quickly to prevent the turbocharger strut from rotating.

❑ Tighten the turbocharger strut bolt (**12**) slightly.

❑ Move the turbocharger to one side in the engine compartment.

❑ Tighten to torque the **turbocharger strut bolt on the flywheel end (25 N.m)** (**13**) .

❑ Refit:

- the new turbocharger seal,
- the turbocharger onto the exhaust manifold.

115739

❑ In order, fit (without tightening):

- the transversal bolt (**14**) ,
- the nuts (**15**) ,
- the nut (**16**) .

❑ Pretighten to torque the **turbocharger lower nuts (initial torque) (12 N.m)**.

❑ Pretighten to torque the **turbocharger upper nut (initial torque) (12 N.m)**

❑ Torque tighten the **turbocharger lower nuts (21 N.m)**.

❑ Torque tighten the **turbocharger upper nut (21 N.m)**.

❑ Undo the turbocharger strut bolt (**17**) .

❑ Torque tighten:

- the **turbocharger transversal bolt (25 N.m)** (**14**) ,
- the **turbocharger strut bolt on the timing end (25 N.m)** (**17**) .

III - FINAL OPERATION

❑ Refit:

- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,

M9R, and 742 or 744 or 746 or 748 or 754

- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Refit:

- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fill and top up the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❑ Fit the intercooler air inlet pipe on the turbocharger side.

❑

> Note:
>
> The intercooler air inlet pipe is correctly clipped on when the clip fits into the turbocharger recess.

❑ Clip the intercooler air inlet pipe to the turbocharger.

❑ Refit the intercooler air inlet pipe bolts on the inlet distributor.

❑ Tighten the intercooler air inlet pipe bolts on the inlet distributor.

❑ Fit the cooling radiator top hose on the intercooler air inlet pipe.

❑ Refit the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Refit the air filter unit air outlet pipe.

❑ Torque tighten the **air filter box air outlet pipe clips (5.5 N.m)**.

❑ Connect:

- the air flowmeter connector,
- the turbocharging pressure regulator pipe .

❑ Clip the following onto the air filter unit air outlet pipe:

- the air flowmeter wiring,
- the turbocharging pressure regulator pipe .

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Tightening torques ▽	
turbocharger studs	**5 Nm**
turbocharger oil return pipe bolts	**12 Nm**
oil return pipe retaining bolt on the turbocharger	**12 Nm**
turbocharger upper nut	**15 Nm + 75° ± 6°**
turbocharger lower nuts	**15 Nm + 75° ± 6°**
turbocharger bracket bolt	**11 Nm**

IMPORTANT
Wear heat protective gloves during the operation.

WARNING
The turbocharger pressure regulator rod must not be adjusted.

WARNING
Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to observe the following instructions will lead to the turbocharger breaking again.

WARNING
Following a turbocharger fault, check that the intercooler and air circuit assembly are not full of oil. If they are, remove them and clean them with a cleaning tray or station and dry them with a compressed air gun.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

120169

❑ Undo the intercooler air inlet pipe sleeve clip (**1**) .

❑ Remove the intercooler air inlet pipe bolt (**2**) .

❑ Move the intercooler inlet air pipe to one side.

123166

❑ Remove the bolt (**3**) from the turbocharger bracket.

F4R

124751

❑ Undo the air filter unit air outlet pipe clip (**4**) on the turbocharger side.

123344

❑ Undo the air filter box air outlet pipe clip (**5**) at the air filter box end.

❑ Disconnect:

- the oil vapour rebreathing pipe union on the air filter box air outlet pipe.
- the connector (**6**) on the turbocharging pressure regulation valve solenoid valve.
- the connector (**7**) on the braking assistance double non-return valve.

❑ Unclip:

- the anti-surge valve hose clip (**8**) ,
- the turbocharging pressure regulation valve hose clip (**9**) ,
- the turbocharging pressure regulation hose clip (**10**) on the turbocharger.

❑ Disconnect:

- the anti-surge valve hose,
- the turbocharging pressure regulation valve hose,
- the turbocharging pressure regulation hose on the turbocharger.

❑ Unclip:

- the turbocharger cooling hose on the air filter box air outlet pipe,
- the brake servo vacuum pipe on the air filter box air outlet pipe.

F4R

❑ Unclip the wiring for the turbocharging pressure regulation valve control solenoid valve and the braking assistance double non-return valve from the air filter box air outlet pipe

❑ Remove:

- the air filter box air outlet pipe,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

21933

❑ Remove the turbocharger lower nuts (**11**) .

124130

❑ Remove:

- the turbocharger upper nut (**12**) ,
- the turbocharger,
- the turbocharger seal on the exhaust manifold.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the exhaust manifold joint face,
- the turbocharger joint face if it is to be re-used.

F4R

❑ Always replace:

- the seal between the turbocharger and the exhaust manifold,
- the turbocharger oil return pipe seal,
- the turbocharger nuts.

Note:

If a stud comes loose during removal, smear it with **HIGH RESISTANCE THREADLOCK** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

Torque tighten the **turbocharger studs (5 Nm)**.

WARNING

Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

If replacing the turbocharger

124573

124574

❑ Remove:

- the bolts (**13**) from the turbocharger oil return pipe,
- the retaining bolt (**14**) for the turbocharger oil return pipe,
- the turbocharger oil return pipe,
- the turbocharger oil return pipe seal.

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products), clean and degrease the turbocharger oil return pipe joint face.

F4R

❏ Refit:

- the new turbocharger oil return pipe seal to the turbocharger oil return pipe,
- the turbocharger oil return pipe to the new turbocharger.
- the turbocharger oil return pipe bolts
- the oil return pipe retaining bolt on the turbocharger.

❏ Tighten to torque:

- the **turbocharger oil return pipe bolts (12 Nm)**,
- the **oil return pipe retaining bolt on the turbocharger (12 Nm)**.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the new seal between the turbocharger and the exhaust manifold,
- the turbocharger,
- the new turbocharger upper nut,
- the new lower nuts of the turbocharger.

❏ Tighten to torque:

- the **turbocharger upper nut (15 Nm + 75° ± 6°)**,
- the **turbocharger lower nuts (15 Nm + 75° ± 6°)**.

III - FINAL OPERATION.

❏ Refit:

- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

❏ Refit the air filter box air outlet pipe.

❏ Clip:

- the turbocharger cooling hose onto the air filter box air outlet pipe,
- the brake servo vacuum pipe onto the air filter box air outlet pipe.

❏ Clip the wiring for the turbocharging pressure regulation valve control solenoid valve and the braking assistance double non-return valve onto the air filter box air outlet pipe

❏ Connect:

- the anti-surge valve hose,
- the turbocharging pressure regulation valve hose,
- the turbocharging pressure regulation hose to the turbocharger.

❏ Clip:

- the anti-surge valve hose clip,
- the turbocharging pressure regulation valve hose clip,
- the turbocharging pressure regulation hose clip on the turbocharger.

❏ Connect:

- the oil vapour rebreathing pipe union on the air filter box air outlet pipe.
- the connector on the turbocharging pressure regulation valve solenoid valve,
- the connector on the braking assistance double non-return valve.

❏ Tighten the clips on the air filter box outlet air pipe.

❏ Refit the turbocharger bracket bolt.

❏ Torque tighten the **turbocharger bracket bolt (11 Nm)**.

❏ Fit the intercooler air inlet pipe.

❏ Refit the intercooler air inlet pipe bolt.

❏ Tighten the intercooler air inlet pipe sleeve clip.

❏ Refit the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
roller-type stud removal tool
tweezers

Tightening torques ▽	
bolts of the turbocharger rigid cooling pipe strut	**10 N.m**
turbocharger studs	**15 N.m**
exhaust manifold stud	**9 N.m**
turbocharger strut bolt on the flywheel end	**25 N.m**
turbocharger lower nuts (initial torque)	**12 N.m**
turbocharger upper nut (initial torque)	**12 N.m**
turbocharger lower nuts	**21 N.m**
turbocharger upper nut	**21 N.m**
turbocharger transversal bolt	**25 N.m**
turbocharger strut bolt on the timing end	**25 N.m**
air filter unit air outlet pipe clips	**5.5 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

122425

❑ Disconnect the air flowmeter connector (**1**) .

127624

❑ Disconnect the turbocharging pressure regulator pipe (**2**) on the turbocharger.

❑ Unclip the turbocharging pressure regulator pipe and the flowmeter wiring from the air filter unit air outlet pipe.

❑ Undo the clips on the air outlet pipe of the air filter unit.

❑ Remove the air outlet pipe from the air filter box.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

122430

❑ Remove the nut (**3**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the air pipe bolts (**4**) at the intercooler inlet.

113282

❑ Rotate the intercooler air inlet pipe clip (**5**) on the turbocharger side.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

M9R, and 800 or 802 or 806 or 808 or 816

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

M9R, and 800 or 802 or 806 or 808 or 816

❑ Remove the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

❑ Remove:

- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
- the exhaust gas temperature sensor (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123926

❑ Clamp the turbocharger cooling pipe hoses (**6**) using the tool **(Ms. 583)**.

❑ Move the clips (**7**) on the turbocharger cooling hoses to one side, using the tool **(Mot. 1448)**.

❑ Disconnect the turbocharger cooling hoses.

❑ Remove:

- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the catalytic pre-converter (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

113277

❑

Note:

Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

❑ Remove:

- the turbocharger lower nuts (**8**) on the exhaust manifold,
- the upper nut (**9**) from the turbocharger on the exhaust manifold,
- the transversal bolt (**10**) from the turbocharger,

❑ Undo the strut bolt (**11**) .

❑ Remove:

- the turbocharger from underneath the vehicle.
- the turbocharger seal.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

114471

❑ Remove:

- the bolts (**12**) from the turbocharger strut,
- the turbocharger strut.
- the exhaust manifold stud (**13**) using a **roller-type stud removal tool**,
- the turbocharger studs using a **roller-type stud removal tool** if they are to be re-used.

If replacing the turbocharger:

116297

❑ Remove:

- the turbocharger rigid cooling pipe bolts (**14**) ,
- the turbocharger rigid cooling pipes,
- the turbocharger rigid cooling pipe seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- the exhaust manifold,
- of the turbocharger,
- the turbocharger rigid cooling pipes if they are to be re-used.
- **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**,
- **parts always to be replaced: Turbocharger nut (10,09,01,03)**,
- **parts always to be replaced: Turbocharger strut (10,09,01,05)**,
- **parts always to be replaced: turbocharger bolt on the turbocharger strut (10,09,01,06)**,
- **parts always to be replaced: turbocharger oil supply pipe (10,09,03,01)**,

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- **parts always to be replaced: Turbocharger oil return pipe (10,09,03,02)**,
- **parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)**,
- **parts always to be replaced: turbocharger rigid cooling pipe seal (10,09,01,09)**,
- **parts always to be replaced: seal between turbocharger and catalytic converter (10,09,01,08)**,
- **parts always to be replaced: exhaust manifold stud on the turbocharger (if loosened) (10,09, 01,11)**,
- **parts always to be replaced: catalytic converter stud on the turbocharger (if loosened) (10,09, 01,04)**

❑ Parts always to be replaced:

- the turbocharger oil pipes and their seals,
- the turbocharger seal,
- the turbocharger rigid cooling pipe seal if the turbocharger is to be replaced,
- the catalytic pre-converter seal,
- the exhaust manifold stud,
- the turbocharger studs, if the turbocharger is being reused.

1 - Refitting preparation operation if the turbocharger is to be replaced:

❑ Refit:

- a new seal on the turbocharger rigid cooling pipes,
- the turbocharger rigid cooling pipes.

❑ Torque tighten the **bolts of the turbocharger rigid cooling pipe strut (10 N.m)**.

2 - Refitting preparation operation if the turbocharger is to be re-used:

❑ Torque tighten the **turbocharger studs (15 N.m)** using a **roller-type stud removal tool** or using the stud recesses.

3 - Refitting preparation operation for all methods

❑ Torque tighten the **exhaust manifold stud (9 N.m)** using a **roller-type stud removal tool**.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

> Note:
>
> Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - REFITTING OPERATION FOR PART CONCERNED

114471

❑ Refit:

- the turbocharger strut.
- the turbocharger strut bolts (**15**) and (**16**) .

❑ Screw on the strut bolts without tightening them.

❑ Fit the turbocharger in the engine compartment from underneath the vehicle.

❑ Refit the turbocharger without its seal and hold the turbocharger in contact against the exhaust manifold.

❑ Tighten the turbocharger strut bolt (**15**) on the timing end slightly.

> Note:
>
> Do not tighten the bolt too quickly to prevent the turbocharger strut from rotating.

❑ Move the turbocharger to one side in the engine compartment.

❑ Tighten to torque the **turbocharger strut bolt on the flywheel end (25 N.m)** (**15**) .

❑ Refit:

- a new turbocharger seal,
- the turbocharger onto the exhaust manifold.

115739

❑ Fit without tightening and in order the transversal bolt (**17**) , nuts (**18**) and (**19**) on the turbocharger.

❑ Pre-tighten to torque:

- the **turbocharger lower nuts (initial torque) (12 N.m)** (**18**) ,
- the **turbocharger upper nut (initial torque) (12 N.m)** (**19**) .

❑ Torque tighten:

- the **turbocharger lower nuts (21 N.m)** (**18**) ,
- the **turbocharger upper nut (21 N.m)** (**19**) .

❑ Undo the turbocharger strut bolt (**20**) .

❑ Torque tighten:

- the **turbocharger transversal bolt (25 N.m)** (**17**) ,
- the **turbocharger strut bolt on the timing end (25 N.m)** (**20**) .

III - FINAL OPERATION

❑ Refit:

- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic pre-converter (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) ,
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❏ Connect the turbocharger cooling hoses.
- ❏ Refit the turbocharger cooling hose clips using the tool **(Mot. 1448)**.
- ❏ Remove the tools **(Ms. 583)** from the turbocharger cooling hoses.
- ❏ Refit:
  - the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
  - the exhaust gas temperature sensor (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) ,
  - the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

M9R, and 800 or 802 or 806 or 808 or 816

- ❏ Refit a right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).
- ❏ Refit the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**)

M9R, and 800 or 802 or 806 or 808 or 816

- ❏ Fill the gearbox (see **Manual gearbox oils: Draining - Filling**) .
- ❏ Refit:
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- ❏ Fit the intercooler air inlet pipe.

> Note:
>
> The intercooler air inlet pipe is correctly clipped to the turbocharger if the clip is engaged in the neck of the turbocharger.

- ❏ Clip the intercooler air inlet pipe on the turbocharger.
- ❏ Fit the cooling radiator top hose onto the intercooler air inlet pipe.
- ❏ Refit the air outlet pipe onto the air filter unit.
- ❏ Torque tighten the **air filter unit air outlet pipe clips (5.5 N.m)**.
- ❏ Connect:
  - the air flowmeter connector,
  - the turbocharging pressure regulator pipe to the turbocharger.
- ❏ Clip onto the air filter unit air outlet pipe:
  - the air flowmeter wiring,
  - the turbocharging pressure regulator pipe .
- ❏ Refit the engine cover.
- ❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❏ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K, and 780

Equipment required
Diagnostic tool

Tightening torques ▽	
new studs of the turbocharger on the manifold, manifold side	**9 N.m**
new stud of the turbocharger on the manifold, turbocharger side	**9 N.m**
nuts of the turbocharger	**28 N.m**

IMPORTANT
Wear protective gloves during the operation.

WARNING
Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to observe the following instructions will lead to the turbocharger breaking again.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

123293

❑ Remove:

- the bolt (**1**) on the intercooler air inlet pipe,
- the nut (**2**) on the intercooler air inlet pipe.

123299

❑ Pull the clip (**3**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move aside the intercooler air inlet pipe.

❑ Remove the turbocharger oil supply pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

K9K, and 780

123823

❑ Remove:

- the turbocharger upper nuts (**4**) ,
- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Disconnect the hose from the pressure regulator valve on the pressure regulator valve side.

123823

❑ Remove:

- the turbocharger lower nut (**5**) ,
- the turbocharger,
- the turbocharger seal on the exhaust manifold.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.
>
> Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

> **WARNING**
> Following a turbocharger fault, check that the intercooler and air circuit assembly are not full of oil. If they are, remove them and clean them with a cleaning tray or station and dry them with a compressed air gun.

❑ **parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)**

❑ Clean the bearing faces using **ABRASIVE PADS** on:

- the turbocharger on the exhaust manifold,

- the exhaust manifold on the turbocharger.

❏ Next, degrease these bearing faces using **SURFACE CLEANER** and **CLEAN CLOTHS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❏ Torque tighten

- the **new studs of the turbocharger on the manifold, manifold side (9 N.m)**,
- the **new stud of the turbocharger on the manifold, turbocharger side (9 N.m)**.

❏ Refit:

- the turbocharger seal on the exhaust manifold,
- the turbocharger,
- the turbocharger lower nut.

❏ Use an open-jawed spanner to fit the turbocharger lower nut without tightening it (the turbocharger must be in contact with the manifold and the spanner should no longer turn without effort).

❏ Put a paint mark on the turbocharger coinciding with a lower nut crest of the turbocharger.

❏ Tighten the lower nut of the turbocharger until the next nut crest coincides with the paint mark made on the turbocharger (the angle achieved corresponds to 60˚).

❏ Torque tighten the other two **nuts of the turbocharger (28 N.m)**.

❏ Connect the pressure regulator valve hose on the pressure regulator valve side.

III - FINAL OPERATION

❏ Refit:

- the turbocharger oil return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

❏ Refit:

- the turbocharger oil supply pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Oil repriming procedure

123824

❏ Disconnect the connector of the crankshaft position sensor (**6**) , on the gearbox.

❏ Run the starter motor until the oil warning light goes out (do this for a few seconds).

❏ Switch off the ignition.

❏ Connect the crankshaft position sensor.

❏ Start the engine.

❏ Let the engine idle then depress the accelerator several times with no load.

❏ Switch off the ignition.

❏ Check:

- that the turbocharger is operating correctly,
- that there are no oil leaks from the turbocharger.

❏ Connect the **Diagnostic tool** and deal with any present fault(s).

❏ Refit:

- the engine undertray.
- the engine undertray bolts.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
tweezers

Tightening torques ▽	
turbocharger studs	**10 N.m**
new turbocharger nuts	**62 N.m**
turbocharger strut bolts	**25 N.m**
new turbocharger strut nuts	**25 N.m**
exhaust gas recirculation solenoid valve bolts	**10 N.m**
nut of the intercooler air inlet pipe	**21 N.m**
clip on the turbocharger air inlet pipe	**6 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the engine cover,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

133888

❑ Disconnect:

- the vacuum pipes of the turbocharger control solenoid valve at (**1**) ,
- the oil vapour rebreathing pipe (**2**) .

❑ Loosen the turbocharger air inlet pipe clip (**3**) .

❑ Remove:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the oil supply pipe and the lower oil return pipe of the turbocharger (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the turbocharger air inlet pipe.

V9X

134228

❑ Rotate the intercooler air inlet pipe clip (**4**) on the turbocharger.

❑ Disconnect the intercooler air inlet pipe on the turbocharger.

137888

❑ Remove the nut (**5**) of the intercooler air inlet pipe support.

❑ Remove the intercooler inlet air pipe.

134107

❑ Remove:

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the bolts (**6**) on the exhaust gas recirculation solenoid valve.

137921

❑ Unclip the gearbox control from its support as indicated by the arrow.

V9X

137922

❑ Remove the bolts (**7**) of the gearbox control support.

❑ Move aside the gearbox control support.

134104

❑ Remove:

- the exhaust gas cooler nuts (**8**) on the turbocharger,
- the bolts (**9**) from the intercooler.

❑ Move aside the « exhaust gas recirculation solenoid valve - exhaust gas cooler » assembly.

❑ Remove the exhaust gas cooler seal.

134093

❑ Remove:

- the nut (**10**) of the rigid cooling pipes,
- the bolt (**11**) of the rigid cooling pipes.

❑ Move aside the rigid cooling pipes.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134101

❑

Note:

Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

❑ Remove:

- the turbocharger strut nuts (**12**) ,
- the bolts (**13**) from the turbocharger strut,
- the turbocharger strut.

134113

134114

❑ Move aside the clip (**16**) of the turbocharger cooling hose using the **(Mot. 1448)**.

❑ Disconnect the turbocharger cooling hose.

❑ Remove:

- the clip (**14**) between the turbocharger and the back row exhaust manifold,
- the clip (**15**) between the turbocharger and the front row exhaust manifold.

V9X

134115

❑ Disconnect:

- the exhaust gas pressure sensor connector,
- the exhaust gas temperature sensor connector .

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

❑ Remove:

- the turbocharger nuts (**17**) ,
- the turbocharger washers,
- the turbocharger,
- the seals between the turbocharger and the front and back exhaust manifolds,
- the turbocharger studs.

If replacing the turbocharger

134090

❑ Remove:

- the turbocharger coolant pipe (**18**) (see **Turbocharger coolant pipe: Removal - Refitting**) ,
- the connector support bolts (**19**) ,
- the exhaust gas temperature sensor (**20**) (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) ,
- the exhaust gas pressure sensor (**21**) (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the turbocharger upper oil pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust gas cooler seal (11,07,01,17)**.

❑ **parts always to be replaced: Turbocharger nut (10,09,01,03)**.

❑ **parts always to be replaced: seal between exhaust manifold and turbocharger (10,09,01,07)**.

❑ Always replace:

- the turbocharger studs,
- the clips between the turbocharger and the exhaust manifolds,

V9X

- the turbocharger washers,
- the turbocharger air outlet pipe seal,
- the exhaust gas cooler studs on the turbocharger, if they were loosened during the removal operation,
- the exhaust gas cooler nuts on the turbocharger.

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- the exhaust manifolds,
- the turbocharger,

115068

❑ Remove the turbocharger air outlet pipe seal using a **tweezers**.

115069

❑

> Note:
>
> Check that the turbocharger air outlet pipe seal is fitted the correct way round.

❑ Refit a new seal for the turbocharger air outlet pipe.

If replacing the turbocharger

❑ Refit:

- the turbocharger upper oil pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the exhaust gas temperature sensor (see **19B**, **Exhaust**, **Exhaust gas temperature sensor: Removal - Refitting**, page **19B-85**) ,
- the turbocharger coolant pipe (see **Turbocharger coolant pipe: Removal - Refitting**) .

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit new turbocharger studs.

❑ Torque tighten the **turbocharger studs (10 N.m)**.

❑ Refit:

- new seals of the front and back exhaust manifolds,

- new clips between the turbocharger and the exhaust manifolds,
- the turbocharger,
- the turbocharger strut.
- new turbocharger washers.

❏ Tighten to torque:

- the **new turbocharger nuts (62 N.m)**,
- the **turbocharger strut bolts (25 N.m)**,
- the **new turbocharger strut nuts (25 N.m)**.

❏ Connect:

- the exhaust gas pressure sensor connector,
- the exhaust gas temperature sensor connector,
- the turbocharger cooling hose.

❏ Fit the turbocharger cooling hose clip using the **(Mot. 1448)**.

III - FINAL OPERATION

❏ Refit:

- the rigid cooling pipes,
- a new exhaust gas cooler seal,
- new exhaust gas cooler studs on the turbocharger, if they were loosened during the removal operation.

❏ Fit the « exhaust gas recirculation solenoid valve - exhaust gas cooler » assembly.

❏ Fit without tightening:

- new exhaust gas cooler nuts on the turbocharger,
- the exhaust gas cooler bolts on the back row rocker cover,
- the bolts to the exhaust gas recirculation solenoid valve.

❏ Tighten the following in order:

- the bolts of the exhaust gas recirculation solenoid valve,
- the exhaust gas cooler nuts on the turbocharger,
- the exhaust gas cooler bolts on the back row rocker cover.

134107

❏ Torque tighten the **exhaust gas recirculation solenoid valve bolts (10 N.m)** (**23**) .

137922

❏ Refit the gearbox control support.

❏ Tighten in order the gearbox control bolts.

❏ Clip the gearbox control on its support.

❏ Refit the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

❏ Fit the intercooler air inlet pipe.

❏ Connect the intercooler air inlet pipe on the turbocharger.

V9X

- ❑ Fit the clip of the intercooler air inlet pipe on the turbocharger
- ❑ Torque tighten the **nut of the intercooler air inlet pipe (21 N.m)**.
- ❑ Refit the air filter unit outlet pipe.
- ❑ Torque tighten the **clip on the turbocharger air inlet pipe (6 N.m)**.
- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the oil supply pipe and the lower oil return pipe of the turbocharger (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the engine undertray.
- ❑ Connect:
  - the vacuum pipes of the turbocharger control solenoid valve,
  - the oil vapour rebreathing pipe .
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine cover.

K9K, and 782

Tightening torques ▽	
new turbocharger studs on the turbocharger	**9 N.m**
new turbocharger stud on the exhaust manifold	**9 N.m**
turbocharger nuts	**28 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

139199

❑ Disconnect the turbocharging pressure regulation control pipe from the turbocharger.

139180

❑ Remove:

- the turbocharger nuts (**2**) ,
- the turbocharger.

K9K, and 782

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.
>
> Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

> **WARNING**
> Following a turbocharger fault, check that the intercooler and air circuit assembly are not full of oil. If they are, remove them and clean them with a cleaning tray or station and dry them with a compressed air gun.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint face:

- of the exhaust manifold,
- of the turbocharger if reused.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to clean and degrease the joint faces:

- the exhaust manifold,
- of the turbocharger if reused.

❑ When replacing the turbocharger studs, torque tighten:

- the **new turbocharger studs on the turbocharger (9 N.m)**,
- the **new turbocharger stud on the exhaust manifold (9 N.m)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the turbocharger.

❑ Torque tighten the **turbocharger nuts (28 N.m)**.

❑ Connect the turbocharging pressure regulation control pipe to the turbocharger.

III - FINAL OPERATION

❑ Refit:

- the turbocharger oil pipes (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the engine undertray,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Turbocharger oil pipe: Removal - Refitting

F4R

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1202-01	Clip pliers for hose clips (large size).
Mot. 1202-02	Clip pliers for hose clips (small size)

Tightening torques ▽	
turbocharger oil supply pipe hollow bolt on the cylinder block	**45 N.m**
turbocharger oil supply pipe union on the turbocharger	**25 N.m**
turbocharger oil supply pipe bolt on the cylinder block	**25 N.m**
turbocharger cooling pipe hollow bolts on the turbocharger	**12 N.m**
turbocharger cooling pipe heat shield bolt on the turbocharger	**10 N.m**
turbocharger oil return pipe bolts on the turbocharger	**8 N.m**
turbocharger oil return pipe bolt on the cylinder block	**25 N.m**

IMPORTANT

Wear protective gloves during the operation.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

Note:

This procedure deals with removing and refitting the turbocharger oil supply pipe and the turbocharger oil return pipe.

REMOVING THE TURBOCHARGER OIL SUPPLY PIPE

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

❑ Disconnect the cooling hoses from the heater matrix.

F4R

124133

- ❑ Remove the bolt (**1**) from the turbocharger cooling pipe heat shield.
- ❑ Position the **(Ms. 583)** on the turbocharger cooling hoses.
- ❑ Move the clip away from the turbocharger cooling hose using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)**.
- ❑ Disconnect the turbocharger cooling hoses.

121264

- ❑ Remove the hollow bolts (**2**) on the turbocharger cooling pipe.

124132

- ❑ Remove:
  - the nuts (**3**) from the starter heat shield,
  - the starter heat shield.
- ❑ Move aside the turbocharger cooling pipe heat shield.

F4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

121266

- ❑ Undo the turbocharger oil supply pipe union (**4**) on the turbocharger using the.
- ❑ Remove:
  - the turbocharger oil supply pipe hollow bolt (**5**) on the cylinder block,
  - the bolt (**6**) on the turbocharger oil supply pipe on the cylinder block,
  - the turbocharger oil supply pipe,
  - the turbocharger oil supply pipe seals.

REFITTING THE TURBOCHARGER OIL SUPPLY PIPE

I - REFITTING PREPARATION OPERATION

- ❑ Always replace:
  - the turbocharger cooling pipe seals,
  - the turbocharger oil supply pipe seals.
- ❑ Remove the turbocharger cooling pipe seals.
- ❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:
  - the cylinder block joint face around the turbocharger oil supply pipe hollow bolt,
  - the turbocharger joint face around the turbocharger cooling pipe hollow bolt.
- ❑ Refit the new turbocharger cooling pipe seals.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the turbocharger oil supply pipe.
- ❑ Fit without tightening:
  - the turbocharger oil supply pipe union on the turbocharger,
  - the turbocharger oil supply pipe hollow bolt onto the cylinder block,
  - the turbocharger oil supply pipe bolt on the cylinder block.
- ❑ Torque tighten the **turbocharger oil supply pipe hollow bolt on the cylinder block (45 N.m)**.
- ❑ Torque tighten the **turbocharger oil supply pipe union on the turbocharger (25 N.m)** using the.
- ❑ Torque tighten the **turbocharger oil supply pipe bolt on the cylinder block (25 N.m)**.

III - FINAL OPERATION

- ❑ Fit the turbocharger cooling pipe heat shield.
- ❑ Refit:
  - the heat shield to the starter,
  - the starter heat shield nuts,
  - the turbocharger cooling pipe hollow bolts on the turbocharger.
- ❑ Torque tighten the **turbocharger cooling pipe hollow bolts on the turbocharger (12 N.m)**.
- ❑ Connect the turbocharger cooling hoses.
- ❑ Fit the turbocharger cooling hose clip using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)**.
- ❑ Refit the turbocharger cooling pipe heat shield bolt.
- ❑ Torque tighten the **turbocharger cooling pipe heat shield bolt on the turbocharger (10 N.m)**.
- ❑ Clip the cooling hoses onto the heater matrix.
- ❑ Refit:
  - the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
  - the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Refit the engine cover.

REMOVING THE TURBOCHARGER OIL RETURN PIPE

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

21931

❑ Remove:

- the turbocharger oil return pipe bolts (**1**) on the turbocharger,
- the bolt (**2**) from the turbocharger oil return pipe on the cylinder block,
- the turbocharger oil return pipe.

REFITTING THE TURBOCHARGER OIL RETURN PIPE

I - REFITTING PREPARATION OPERATION

❑ Always replace the turbocharger oil return pipe seals.

❑ Remove the turbocharger oil return pipe seals.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the turbocharger oil return pipe joint face if it is being reused,
- the intermediate oil return pipe joint face.

❑ Refit the new seals on the turbocharger oil return pipe.

❑ Oil the turbocharger oil return pipe O-ring.

F4R

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Fit the turbocharger oil return pipe, first positioning it in the cylinder block.
- ❑ Refit the turbocharger oil return pipe bolts on the turbocharger.
- ❑ Torque tighten the **turbocharger oil return pipe bolts on the turbocharger (8 N.m)**.
- ❑ Refit the turbocharger oil return pipe bolt on the cylinder block.
- ❑ Tighten to torque the **turbocharger oil return pipe bolt on the cylinder block (25 N.m)**.

III - FINAL OPERATION

- ❑ Refit:
  - the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
  - the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
  - the engine undertray,
  - the engine undertray bolts.
- ❑ Tighten the engine undertray bolts.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

M9R

Tightening torques ▽	
turbocharger oil pipe bolts	**10 N.m**
turbocharger oil supply pipe hollow bolt on the cylinder block	**16 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove:

- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

M9R, and 742 or 744 or 746 or 748 or 754

❑ Remove the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the catalytic pre-converter (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123625

❑ Remove:

- the turbocharger oil pipe bolt (**1**) on the cylinder block,
- the turbocharger oil pipe bolts (**2**) on the turbocharger,
- the turbocharger oil supply pipe hollow bolt (**3**) on the cylinder block,
- the turbocharger oil pipes.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Parts always to be replaced:

- the turbocharger oil pipes.

❑ Lubricate the new turbocharger oil pipe O-ring, cylinder block end.

❑ Remove the protective plug on the oil supply union, cylinder block end.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

114470

❑

> Note:
>
> Do not rotate the turbocharger oil pipe O-ring at the cylinder block end when fitting.
>
> After fitting, check that the turbocharger oil pipe O-ring at the cylinder block end has not come out of its housing.
>
> Check that the two copper seals are fitted to the oil supply union, cylinder block end.

❑ Fit the turbocharger oil pipe, first positioning it in the cylinder block at (**4**) .

❑ Fit without tightening:

- the oil pipe bolts on the turbocharger,
- the intermediate bolt for the turbocharger oil pipes on the cylinder block,
- the turbocharger oil supply pipe hollow bolt on the cylinder block.

❑ Torque tighten the **turbocharger oil pipe bolts (10 N.m)**.

❑ Tighten the intermediate bolt for the turbocharger oil pipes on the cylinder block.

❑ Torque tighten the **turbocharger oil supply pipe hollow bolt on the cylinder block (16 N.m)**.

III - FINAL OPERATION

M9R, and 742 or 744 or 746 or 748 or 754

❑ Refit the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Refit the catalytic pre-converter (see **19B**, **Exhaust**, **Catalytic pre-converter: Removal - Refitting**, page **19B-22**) .

❑ Refit:

- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Fill and top up the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Refit:

- the engine protector,
- the engine protector bolts.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Turbocharger oil pipe: Removal - Refitting

K9K, and 780

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.
Mot. 1746	Offset wrench for tightening High Pressure pump pipes.

Equipment required
Diagnostic tool

Tightening torques ▽	
turbocharger oil supply pipe nut on the cylinder head	**35 N.m**
turbocharger oil supply pipe hollow bolt	**14 N.m**
turbocharger oil return pipe bolts	**12 N.m**

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear protective gloves during the operation.

WARNING

Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

WARNING

Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to observe the following instructions will lead to the turbocharger breaking again.

Note:

This procedure deals with removing and refitting the oil return pipe and oil supply pipe.

REMOVING THE TURBOCHARGER OIL SUPPLY PIPE

I - REMOVAL PREPARATION OPERATION

- ❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Remove the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

K9K, and 780

122425

122424

❑ Disconnect:

- the air flow sensor connector (**1**) ,
- the turbocharging regulation solenoid valve connector (**2**) .

123812

❑ Unclip the electric wiring (**3**) from the air filter unit air outlet pipe.

❑ Undo the clips (**4**) for the air filter unit air outlet pipe.

❑ Remove the air outlet pipe from the air filter box.

K9K, and 780

II - OPERATION FOR REMOVAL OF PART CONCERNED

123811

- ❑ Remove the turbocharger oil supply pipe hollow bolt (**5**) .
- ❑ Loosen the turbocharger oil supply pipe nut (**6**) on the cylinder head.
- ❑ Remove the turbocharger oil supply pipe nut (**6**) on the cylinder head.
- ❑ Remove the turbocharger oil supply pipe.
- ❑ Wipe away any oil run-off.

REFITTING THE TURBOCHARGER OIL SUPPLY PIPE

I - REFITTING PREPARATION OPERATION

- ❑ **parts always to be replaced: turbocharger oil supply pipe (10,09,03,01)**
- ❑ **parts always to be replaced: Turbocharger oil supply pipe bolt (10,09,03,04)**

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Fit a new turbocharger oil supply pipe.
- ❑ Fit the turbocharger oil supply pipe nut on the cylinder head, without tightening it.
- ❑ Refit a new hollow bolt on the turbocharger oil supply pipe.
- ❑ Torque tighten:
  - the **turbocharger oil supply pipe nut on the cylinder head (35 N.m)** using the tool **(Mot. 1566)** or the tool **(Mot. 1746)**,
  - the **turbocharger oil supply pipe hollow bolt (14 N.m)**.

III - FINAL OPERATION

- ❑ Fit the air filter unit air outlet pipe.
- ❑ Tighten the clips on the air outlet pipe of the air filter unit.
- ❑ Clip the electric wiring onto the air filter unit air outlet pipe.
- ❑ Connect:
  - the turbocharging regulation solenoid valve connector,
  - the air flowmeter connector.
- ❑ Refit the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Disconnect the high pressure pump flow and pressure regulator connectors to prevent the engine from starting.
- ❑ Run the starter motor until the oil warning light goes out (do this for a few seconds).
- ❑ Switch off the ignition.
- ❑ Connect the high pressure pump flow and pressure regulator connectors.
- ❑ Start the engine.
- ❑ Let the engine idle then depress the accelerator several times with no load.
- ❑ Switch off the ignition.
- ❑ Check:
  - that the turbocharger is operating correctly,
  - that there are no oil leaks from the turbocharger.
- ❑ Connect the **Diagnostic tool** and deal with any present fault(s).

K9K, and 780

REMOVING THE TURBOCHARGER OIL RETURN PIPE

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123810

123814

❏ Remove the turbocharger oil return pipe bolts (**7**) .

❏ Rotate the turbocharger oil return pipe to facilitate its removal.

❏ Remove the turbocharger oil return pipe (**8**) from the cylinder block.

K9K, and 780

REFITTING THE TURBOCHARGER OIL RETURN PIPE

I - REFITTING PREPARATION OPERATION

❏ Always replace:

- the turbocharger oil return pipe flat seal,
- the turbocharger oil return pipe O-ring.

❏ Lubricate the turbocharger oil return pipe O-ring with engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Fit the turbocharger oil return pipe on the cylinder block.

❏ Refit the turbocharger oil return pipe bolts.

❏ Torque tighten the **turbocharger oil return pipe bolts (12 N.m)**.

III - FINAL OPERATION

❏ Refit:

- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the engine undertray,
- the engine undertray bolts.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Turbocharger oil pipe: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
tweezers

Tightening torques ▽	
oil supply pipe hollow bolt on the cylinder block	**16 N.m**
oil supply pipe hollow bolt on the turbocharger	**16 Nm**
turbocharger oil supply pipe bolt on the water chamber	**25 N.m**
lower oil return pipe bolts	**10 N.m**
catalytic pre-converter nuts on the turbo-charger	**21 Nm**
flexible connection pipe nuts on the catalytic pre-converter	**21 Nm**
turbocharger heat shield studs, if they were loos-ened during the removal operation	**13 N.m**
catalytic pre-converter stay studs on the cylin-der block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut	**21 N.m**
lower stay nuts on the upper stay	**21 N.m**
lower stay nuts on the cylinder block and on the gearbox	**21 N.m**
lower stay nuts on the catalytic pre-converter	**21 N.m**

Tightening torques ▽	
turbocharger heat shield nuts	**8 N.m**
upper oil return pipe bolts	**10 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this opera-tion.

IMPORTANT
Wear protective gloves during the operation.

WARNING
Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

WARNING
Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to observe the following instructions will lead to the turbocharger breaking again.

Note:

This method describes the removal and refitting of the turbocharger oil supply pipe, the turbocharger lower oil return pipe and the turbocharger upper oil return pipe.

REMOVING THE OIL SUPPLY PIPE AND THE LOWER OIL RETURN PIPE OF THE TURBOCHARGER

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Re-fitting**) (80A, Battery).

V9X

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

134225

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Move aside the clip (**1**) of the turbocharger cooling hose using the **(Mot. 1448)**.

❑ Disconnect the turbocharger cooling hose.

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

❑ Remove:

- the nut (**2**) of the turbocharger cooling hose on the catalytic pre-converter,
- the turbocharger heat shield nuts (**3**) .

❑ Loosen the turbocharger heat shield nut (**4**) .

❑ Remove the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

138351

❑ Unclip the crankshaft position sensor wiring (**5**) from the catalytic pre-converter stay.

❑ Remove the nuts (**6**) of the catalytic pre-converter stay

V9X

138360

134229

❑ Remove:

- the catalytic pre-converter lower stay studs (**7**) ,
- the catalytic pre-converter lower stay nuts (**8**) ,
- the catalytic pre-converter lower stay.

138353

❑ Loosen the nut (**9**) of the catalytic pre-converter upper stay.

❑ Remove the catalytic pre-converter upper stay.

137925

❑ Remove the nut (**10**) of the rigid cooling pipes of the exhaust fuel injector cooler.

❑ Move aside the rigid cooling pipes of the exhaust fuel injector cooler.

V9X

❏ Remove the turbocharger heat shield.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

133904

❏ Remove the nuts (**11**) from the connecting hose on the catalytic pre-converter.

Note:

Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the studs of the catalytic pre-converter and turbocharger to prevent the studs from breaking when the nuts are undone.

❏ Remove the connecting hose from the catalytic pre-converter.

❏ Remove the catalytic pre-converter seal.

138352

❏ Remove the catalytic pre-converter nuts (**12**) from the turbocharger.

❏ Move aside the catalytic pre-converter.

❏ Remove the seal between the catalytic pre-converter and the turbocharger.

134228

❏ Rotate the clip (**13**) on the intercooler air inlet pipe.

❏ Disconnect the intercooler air inlet pipe.

❏ Remove the intercooler inlet air pipe.

❏ Unclip the turbocharger control solenoid valve.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Removing the turbocharger oil supply pipe

134112

134111

❑ Remove:

- the turbocharger oil supply pipe bolt (**14**) on the water chamber,
- the turbocharger oil supply pipe hollow bolt (**15**) on the turbocharger,
- the turbocharger oil supply pipe hollow bolt (**16**) on the cylinder block,
- the turbocharger oil supply pipe,
- the turbocharger oil supply pipe seals.

2 - Removing the lower oil return pipe

134110

❑ Remove:

- the lower oil return pipe bolts (**17**) ,
- the lower oil return pipe,
- the lower oil pipe seals.

REFITTING THE OIL SUPPLY PIPE AND THE LOWER OIL RETURN PIPE OF THE TURBOCHARGER

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger oil supply pipe (10,09,03,01)**.

❑ **parts always to be replaced: turbocharger oil pipe seal (10,09,03,05)**.

❑ Always replace:

- the catalytic pre-converter stay studs,
- the turbocharger heat shield nuts,
- the turbocharger heat shield studs if they were loosened during the removal operation,
- the nuts between the catalytic pre-converter and the connecting hose,
- the turbocharger air outlet pipe seal,
- the catalytic pre-converter seals,

V9X

- the catalytic pre-converter stay nuts if they were loosened during the removal operation,
- the catalytic pre-converter studs if they were loosened during the removal operation.

❑ Use engine oil to lubricate the new O-ring of the turbocharger oil return pipe on the cylinder block side.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

> Note:
>
> Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

1 - Refitting the oil supply pipe

❑ Refit:

- new seals on the turbocharger oil supply pipe,
- a new turbocharger oil supply pipe.

❑ Tighten to torque:

- the **oil supply pipe hollow bolt on the cylinder block (16 N.m)**,
- the **oil supply pipe hollow bolt on the turbocharger (16 Nm)**,
- the **turbocharger oil supply pipe bolt on the water chamber (25 N.m)**.

2 - Refitting the lower oil return pipe

❑ Refit:

- new seals for the lower oil return pipe,
- the lower oil return pipe.

V9X

❏ Torque tighten the **lower oil return pipe bolts (10 N.m)**.

III - FINAL OPERATION

❏ Clip on the turbocharger control solenoid valve.

❏ Connect the intercooler air inlet pipe.

❏ Fit the clip of the intercooler air inlet pipe.

❏ Refit:

- a new seal between the catalytic pre-converter and the turbocharger,
- the catalytic pre-converter.

❏ Torque tighten the **catalytic pre-converter nuts on the turbocharger (21 Nm)**.

❏ Refit a new seal between the connecting hose and the catalytic pre-converter.

❏ Position the connecting hose on the catalytic pre-converter.

❏ Tighten to torque:

- the **flexible connection pipe nuts on the catalytic pre-converter (21 Nm)**,
- the **turbocharger heat shield studs, if they were loosened during the removal operation (13 N.m)**.

❏ Refit the turbocharger heat shield.

❏ Fit:

- the rigid cooling pipe of the exhaust fuel injector cooler on the catalytic pre-converter,
- the rigid cooling pipe of the exhaust fuel injector cooler on the turbocharger.

❏ Refit:

- the nut of the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter,
- the catalytic pre-converter upper stay.

❏ Fit without tightening the nut of the catalytic pre-converter upper stay.

❏ Refit the catalytic pre-converter lower stay.

❏ Fit without tightening the lower stay nuts on the upper stay.

❏ Torque tighten the **catalytic pre-converter stay studs on the cylinder block and on the gearbox (8 N.m)**.

❏ Fit without tightening:

- the lower stay nuts on the cylinder block and on the gearbox,
- the lower stay nuts on the catalytic pre-converter.

❏ Tighten to torque:

- the **catalytic pre-converter upper stay nut (21 N.m)**,
- the **lower stay nuts on the upper stay (21 N.m)**,
- the **lower stay nuts on the cylinder block and on the gearbox (21 N.m)**,
- the **lower stay nuts on the catalytic pre-converter (21 N.m)**.

❏ Clip the crankshaft position sensor wiring onto the catalytic pre-converter stay.

❏ Refit:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the rigid cooling pipe nut on the turbocharger.

❏ Torque tighten the **turbocharger heat shield nuts (8 N.m)**.

❏ Connect the cooling hose to the turbocharger rigid cooling pipe.

❏ Fit the turbocharger cooling hose clip using the **(Mot. 1448)**.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

REMOVING THE UPPER OIL RETURN PIPE

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

V9X

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the oil supply pipe and the lower oil return pipe of the turbocharger (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

134092

❑ Remove:

- the upper oil return pipe bolt (**18**) ,
- the upper oil return pipe bolts (**19**) ,
- the upper oil return pipe,
- the upper oil return pipe seal.

REFITTING THE UPPER OIL RETURN PIPE

I - REFITTING PREPARATION OPERATION

❑ Always replace the seal of the upper oil return pipe.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal of the upper oil return pipe,
- the upper oil return pipe.

❑ Torque tighten the **upper oil return pipe bolts (10 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,

V9X

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the oil supply pipe and the lower oil return pipe of the turbocharger (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 782

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.
Mot. 1746	Offset wrench for tightening High Pressure pump pipes.

Tightening torques ▽	
nut of the turbocharger oil supply pipe	**35 N.m**
turbocharger oil supply pipe hollow bolt	**14 N.m**
turbocharger oil return pipe bolts on the turbocharger	**12 N.m**
turbocharger oil return pipe bolt on the cylinder block	**12 N.m**

REMOVING THE TURBOCHARGER OIL SUPPLY PIPE

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

139203

❑ Remove the turbocharger oil supply pipe hollow bolt (**1**) .

❑ Loosen the nut (**2**) of the turbocharger oil supply pipe, using the tool **(Mot. 1566)** or the tool **(Mot. 1746)**.

❑ Remove the nut (**2**) for the turbocharger oil supply pipe from the cylinder head.

❑ Remove the turbocharger oil supply pipe.

❑ Wipe away any oil run-off.

REFITTING THE TURBOCHARGER OIL SUPPLY PIPE

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger oil supply pipe (10,09,03,01)**.

❑ **parts always to be replaced: Turbocharger oil supply pipe bolt (10,09,03,04)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit a new turbocharger oil supply pipe.

❑ Fit the turbocharger oil supply pipe nut on the cylinder head, without tightening it.

❑ Refit a new hollow bolt on the turbocharger oil supply pipe.

K9K, and 782

❑ Torque tighten:

- the **nut of the turbocharger oil supply pipe (35 N.m)** using the tool **(Mot. 1566)** or the tool **(Mot. 1746)**,

- the **turbocharger oil supply pipe hollow bolt (14 N.m)**.

III - FINAL OPERATION

❑ Remove:

- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,

- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,

- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,

- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,

- the engine undertray,

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

REMOVING THE TURBOCHARGER OIL RETURN PIPE

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

139181

❑ Remove the turbocharger oil return pipe bolts (**1**) on the turbocharger.

139179

❑ Remove the bolt (**2**) from the turbocharger oil return pipe on the cylinder block.

❑ Remove:

- the turbocharger oil return pipe,

- the turbocharger oil return pipe gaskets.

K9K, and 782

REFITTING THE TURBOCHARGER OIL RETURN PIPE

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: turbocharger oil pipe seal (10,09,03,05)**.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the new seals onto the turbocharger oil return pipe.

❏ Lubricate the turbocharger oil return pipe O-ring with clean engine oil.

❏ Refit the turbocharger oil return pipe.

❏ Torque tighten:

- the **turbocharger oil return pipe bolts on the turbocharger (12 N.m)**,
- the **turbocharger oil return pipe bolt on the cylinder block (12 N.m)**.

III - FINAL OPERATION

❏ Refit the engine undertray.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

Equipment required
safety strap(s)

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection).

124572

❑ Fit a **safety strap(s)** to the « engine cooling fan - condenser - cooling radiator » assembly.

❑ Remove:

- the power-assisted steering fluid pipe bolts (**1**) ,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123738

❑ Pull out the intercooler air inlet pipe clip (**2**) .

❑ Disconnect the intercooler air inlet pipe.

123739

❑ Pull out the intercooler air outlet pipe clip (**3**) .

❑ Disconnect the intercooler outlet air pipe.

F4R

123740

123741

❑ Remove the intercooler by:

- pinching the intercooler tabs (**A**) ,
- tilting the intercooler towards the engine,
- pulling the intercooler downwards.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the intercooler air inlet pipe seal,
- the intercooler air outlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the intercooler by:

- fitting it into the notch for the « engine cooling fan - condenser - cooling radiator» assembly mountings,
- clipping it into the « engine cooling fan - condenser - cooling radiator » assembly mountings.

❑ Refit a new seal on the intercooler air outlet pipe.

❑ Connect the intercooler air outlet pipe.

❑ Push the intercooler air outlet pipe clip.

❑ Refit a new seal on the intercooler air inlet pipe.

❑ Connect the intercooler air inlet pipe.

❑ Push the intercooler air inlet pipe clip.

> Note:
>
> Check that the air pipes are correctly clipped onto the intercooler.

III - FINAL OPERATION.

❑ Refit:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),
- the power-assisted steering fluid pipe bolts.

❑ Tighten the power-assisted steering fluid pipe bolts.

❑ Remove the **safety strap(s)** from the « engine cooling fan - condenser - cooling radiator » assembly.

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Refit the engine cover.

M9R

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure).

123698

123701

❑ Rotate the intercooler air inlet pipe clip (**1**) .

❑ Disconnect and remove the intercooler air inlet pipe from the intercooler.

123699

123700

❑ Pull the intercooler air outlet pipe clip (**2**) using a flat-blade screwdriver.

❑ Disconnect and remove the intercooler air outlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Unclip the lower section of the engine cooling radiator deflectors on the intercooler.

122999

❑ Press on the intercooler pads (**3**) .

❑ Rotate the intercooler (**4**) .

❑ Separate the intercooler from the cooling radiator.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> Note:
>
> Check that the intercooler is not full of oil. If it is, clean it using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and leave to dry.

❑ Always replace the seals for the intercooler air inlet and outlet pipes.

M9R

115068

❑ Remove the following using a **tweezers** :

- the intercooler air inlet pipe seal,
- the intercooler air outlet pipe seal.

115069

❑

Note:

Check that the seal is fitted the right way round.

❑ Fit the new seal, taking care to observe the fitting direction.

II - REFITTING OPERATION FOR PART CONCERNED

122999

❑ Clip:

- the intercooler at (**5**) ,
- the intercooler at (**6**) ,
- the engine cooling radiator deflectors onto the intercooler.

M9R

III - FINAL OPERATION.

123701

- ❑ Rotate the intercooler air inlet pipe clip into the Locked position.
- ❑ Connect the pipe to the intercooler until you hear a **CLICK** from the clip.
- ❑

> Note:
>
> Check that the clip is correctly fitted inside the neck of the intercooler.

- ❑ Clip on the intercooler air inlet pipe.
- ❑

> Note:
>
> Check that the clip is correctly pushed on.

- ❑ Clip on the intercooler air outlet pipe.
- ❑ Refit:
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 415, 41A, Front lower structure),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
  - the engine undertray,
  - the engine undertray bolts.

K9K

Equipment required
cleaning trough
parts washer
compressed air nozzle

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123526

❑ Pivot the turbocharger air outlet pipe clip (**1**) .

❑ Disconnect the turbocharger air outlet pipe on the intercooler.

123527

❑ Pull out the intercooler air outlet pipe clip (**2**) using a screwdriver.

❑ Disconnect the intercooler air outlet pipe from the intercooler.

❑ Unclip the lower section of the intercooler engine cooling radiator deflectors.

122999

❑ To remove the intercooler:

- press on the intercooler pads (**3**) ,
- pivot the intercooler upwards,

- separate the intercooler from the engine cooling assembly at (**4**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> Note:
>
> Following a turbocharger fault, check that the intercooler and the air circuit assembly are not full of oil.
>
> If this is the case, remove and clean them with a **cleaning trough** or a **parts washer**.
>
> Then dry them off:
>
> - using a **compressed air nozzle**,
> - leaving the assembly in a vertical position.

II - REFITTING OPERATION FOR PART CONCERNED

122999

❑ Clip:

- the intercooler at (**5**) and then at (**6**) ,
- the lower section of the intercooler engine cooling radiator deflectors.

❑ Fit the intercooler air outlet pipe clip in its original position.

❑ Clip the intercooler air outlet pipe onto the intercooler.

123701

❑ Fit the turbocharger air outlet pipe clip (**7**) in its original position.

❑ Clip the turbocharger air outlet pipe to the intercooler.

III - FINAL OPERATION.

❑ Remove:

- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),
- the engine undertray,
- the engine undertray bolts,
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

V9X

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure).

137898

❑ Remove the left-hand air scoop (**1**) from the radiator.

137899

❑ Remove the right-hand air scoop (**2**) from the radiator.

❑ Unclip the cooling hose from the intercooler.

❑ Separate the cooling hose from the intercooler.

137893

❑ Unclip the air conditioning pipe (**3**) from the intercooler.

❑ Move the air conditioning pipe away from the intercooler.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

138350

- ❑ Loosen the clip (**4**) on the intercooler outlet air pipe.
- ❑ Disconnect the intercooler air outlet pipe.
- ❑ Move the intercooler outlet air pipe to one side.

138349

123701

- ❑ Rotate the clip (**5**) on the intercooler air inlet pipe.
- ❑ Disconnect the intercooler air inlet pipe.
- ❑ Remove the intercooler inlet air pipe.

V9X

137890

137891

❑ Press on the intercooler tabs (**6**) .

❑ Rotate the intercooler.

❑ Disconnect the intercooler from the radiator.

❑ Remove the intercooler from the radiator.

When replacing the intercooler

137890

❑ Remove:

- the bolt (**7**) of the air conditioning pipe support,
- the air conditioning pipe support,
- the cooling hose support from the intercooler.

❑ Refit on the new intercooler:

- the cooling hose support on the intercooler,
- the air conditioning pipe support,
- the bolts of the air conditioning pipe support.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

❑

> Note:
>
> Check that the intercooler is not full of oil; if so clean it using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and leave it to dry.

V9X

115068

❑ Use a **tweezers** to remove the seal from the intercooler air inlet pipe.

115069

❑ Refit a new seal on the intercooler air inlet pipe.

> Note:
>
> Check that the new seal of the intercooler air inlet pipe is fitted the right way round.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the intercooler on the radiator.

❑ Clip the intercooler onto the radiator.

123701

❑ Rotate the intercooler air inlet pipe clip into its « locked » position.

❑ Fit the intercooler air inlet pipe.

❑ Connect the intercooler air inlet pipe until the clip **CLICKS** into place.

❑ Fit the intercooler air outlet pipe on the intercooler.

❑ Connect the intercooler air outlet pipe on the intercooler.

❑ Tighten the clip on the intercooler outlet pipe.

III - FINAL OPERATION

❑ Fit the air conditioning pipe on the intercooler.

❑ Clip the air conditioning pipe on the intercooler.

❑ Fit the cooling hose on the intercooler.

❑ Clip the cooling hose on the intercooler.

❑ Refit:

- the radiator air scoops,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (41A, Front lower structure),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),

V9X

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

M9R

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

123780

❑ Remove:

- the right and left-hand subframe protector bolts (**1**) ,
- the right and left-hand subframe protectors.

123417

❑ Undo the clip (**2**) for the intermediate pipe on the silencer.

❑ Disconnect the intermediate pipe and the silencer.

M9R

M9R, and 742 or 744 or 746 or 748 or 754

123418

❑ Remove the intermediate pipe bolt (**3**) on the intermediate pipe mounting.

123570

❑ Remove:

- the intermediate pipe nuts (**4**) on the catalytic converter,
- the connector pipe seal.

❑ Lower the intermediate pipe and place it on the front and rear axles.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

123781

❑ Remove:

- the intermediate pipe heat shield clips (**6**) ,
- the intermediate pipe heat shield.

M9R

123637

❑ Remove the bulkhead heat shield clips (**7**) .

❑ Separate the heat shield from the bulkhead without damaging it.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123782

❑ Unclip the fuel pipe filler neck (**8**) from the body.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the priming pump union (**9**) from the fuel supply pipe.

❑ Insert the blanking plugs.

M9R

123571

- ❑ Disconnect the manual priming pump union (**10**) from the fuel heater.
- ❑ Insert the blanking plugs.
- ❑ Unclip the manual priming pump (**11**) from the body.
- ❑ Remove the manual priming pump.

REFITTING

I - REFITTING PREPARATION OPERATION

M9R, and 742 or 744 or 746 or 748 or 754

- ❑ **parts always to be replaced: seal between catalytic converter and exhaust downpipe hose (10, 08,02,21)**.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the manual priming pump.
- ❑ Clip on the manual priming pump.
- ❑ Connect:
  - the manual priming pump union to the fuel heater,
  - the manual priming pump union to the fuel supply pipe.
- ❑ Clip on the fuel pipe filler neck.

III - FINAL OPERATION

- ❑ Fit the bulkhead heat shield.
- ❑ Refit:
  - the bulkhead heat shield clips,
  - the intermediate pipe heat shield,
  - the intermediate pipe heat shield clips.

M9R, and 742 or 744 or 746 or 748 or 754

- ❑ Fit the intermediate pipe.
- ❑ Refit a new intermediate pipe seal.
- ❑ Refit the intermediate pipe clip to the silencer.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Refit the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

- ❑ Refit:
  - the subframe protectors,
  - the engine undertray,

K9K

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

K9K, and 782

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

123780

❑ Remove:

- the right and left-hand subframe protector bolts (**1**) ,
- the right and left-hand subframe protectors.

K9K

K9K, and 780

123417

123779

❑ Undo the clip (**2**) for the intermediate pipe on the silencer.

❑ Disconnect the intermediate pipe and the silencer.

❑ Remove the intermediate pipe bolts (**3**) on the catalytic converter.

❑ Lower the intermediate pipe and place it on the front and rear axles.

K9K, and 782

❑ Remove the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

123781

❑ Remove:

- the clips (**4**) of the exhaust pipe heat shield,
- the exhaust pipe heat shield.

K9K

123637

❑ Remove the bulkhead heat shield clips (**5**) .

❑ Separate the heat shield from the bulkhead without damaging it.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123782

❑ Unclip the fuel pipe filler neck (**6**) from the body.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the priming pump union (**7**) from the fuel supply pipe.

❑ Insert the blanking plugs.

K9K

K9K, and 780

123571

- ❑ Disconnect the manual priming pump union (**8**) from the fuel heater.
- ❑ Insert the blanking plugs.
- ❑ Unclip the manual priming pump (**9**) from the body.
- ❑ Remove the manual priming pump.

K9K, and 782

122996

- ❑ Disconnect the manual priming pump union (**10**) from the fuel filter.
- ❑ Insert the blanking plugs.
- ❑ Unclip the manual priming pump from the body.
- ❑ Remove the manual priming pump.

REFITTING

I - REFITTING PREPARATION OPERATION

K9K, and 780

- ❑ Always replace:
  - the intermediate pipe sealing ring on the catalytic converter,
  - the silencer clip.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the manual priming pump.
- ❑ Clip on the manual priming pump.
- ❑ Remove the blanking plugs.

K9K

K9K, and 780

❑ Connect:

- the manual priming pump union to the fuel heater,
- the manual priming pump union to the fuel supply pipe.

K9K, and 782

❑ Connect:

- the manual priming pump union to the fuel filter,
- the manual priming pump union to the fuel supply pipe.

❑ Clip on the fuel pipe filler neck.

III - FINAL OPERATION

❑ Fit the bulkhead heat shield.

❑ Refit:

- the bulkhead heat shield clips,
- the exhaust pipe heat shield.

K9K, and 780

❑ Refit:

- the new sealing ring on the catalytic converter,
- the intermediate pipe bolts on the catalytic converter.

❑ Fit the intermediate pipe bolts on the catalytic converter without tightening them.

❑ Refit the intermediate pipe clip onto the silencer.

❑ Tighten:

- the intermediate pipe clip nut on the silencer,
- the intermediate pipe bolts on the catalytic converter.

K9K, and 782

❑ Refit:

- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Refit:

- the subframe protectors,
- the engine undertray.

V9X

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Wear goggles with side protectors for this operation.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

137873

❑ Disconnect the electric diesel fuel heater fuel inlet union (**1**) .

❑ Fit blanking plugs on the fuel unions.

V9X

138308

❑ Cut the pipe at the mark (**X**) , this mark is located **100 mm** before the offset of the manual priming pump (see **Fuel pipes: Repair**) (Technical Note 3969A, Repairing plastic fuel pipes).

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the manual priming pump.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Cut the pipe of the new manual priming pump at the same level as the previous cut (see **Fuel pipes: Repair**) (Technical Note 3969A, Repairing plastic fuel pipes).

❑ Refit a new manual priming pump.

❑ Fit a union to the new manual priming pump pipe.

❑ Remove the blanking plugs from the fuel unions.

❑ Connect the fuel inlet union to the electric diesel fuel heater.

III - FINAL OPERATION

❑ Refit:

- the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) ,
- the engine undertray.

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refit the engine cover.

K9K or M9R

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

II - OPERATION FOR REMOVAL OF PART CONCERNED (1ST FITTING)

❏ Clean the fuel pipe unions before disconnecting the pipes (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

122996

❏ Remove the fuel filter clip nut (**1**) .

❏ Move aside the fuel filter, taking care not to pull on the fuel pipes.

122997

❏

WARNING

Keep the pipe unions away from contaminated areas.

❏ Disconnect the fuel pipes (**2**) from the fuel filter.

K9K or M9R

❑ Remove the fuel filter.

> Note:
>
> If the fuel filter is to be re-used, fit blanking plugs.

III - OPERATION FOR REMOVAL OF PART CONCERNED (2ND FITTING)

❑ Clean the fuel pipe unions before disconnecting the pipes (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

144362

❑ Disconnect the connector (**3**) from the electric diesel heater.

144361

❑ Remove the fuel filter clip nut (**4**) .

❑ Move aside the fuel filter, taking care not to pull on the fuel pipes.

144359

❑

> **WARNING**
>
> Keep the pipe unions away from contaminated areas.

❑ Disconnect the fuel pipes (**5**) from the fuel filter.

K9K or M9R

❑ Remove the fuel filter.

> Note:
> If the fuel filter is to be re-used, fit blanking plugs.

❑ Remove the electric diesel fuel heater (see **13A**, **Fuel supply**, **Electric diesel fuel heater: Removal - Refitting**, page **13A-17**) when replacing the fuel filter.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED (1ST FITTING)

❑ Refit the fuel filter onto the mounting.

❑ Connect the fuel supply pipes.

❑ Refit the fuel filter clip nut.

122997

❑ Open the air bleed screw (**3**) on the fuel filter.

❑ Position a hose on the air bleed screw and a container to recover the fuel when priming the system.

❑ Prime the fuel supply circuit using the manual priming pump until fuel runs into the container.

❑ Tighten the bleed screw.

❑ Remove the hose from the air bleed screw.

II - REFITTING OPERATION FOR PART CONCERNED (2ND FITTING)

❑ Refit the electric diesel fuel heater (see **13A**, **Fuel supply**, **Electric diesel fuel heater: Removal - Refitting**, page **13A-17**) when replacing the fuel filter.

❑ Refit the fuel filter onto the mounting.

❑ Connect the fuel supply pipes.

❑ Refit the fuel filter clip nut.

❑ Connect the electric diesel fuel heater connector.

❑ Open the air bleed screw on the fuel filter.

❑ Position a hose on the air bleed screw and a container to recover the fuel when priming the system.

❑ Prime the fuel supply circuit using the manual priming pump until fuel runs into the container.

❑ Tighten the bleed screw.

❑ Remove the hose from the air bleed screw.

III - FINAL OPERATION

❑ Check that there are no fuel leaks.

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

IV - DRAIN THE WATER IN THE FUEL FILTER

❑ Drain the water in the fuel filter periodically

❑ For filters without a water presence sensor:

- open the drain plug,
- let the water flow out,
- close the plug.

❑ For filters with a water presence sensor:

- disconnect the water presence sensor offset connector,
- unclip the water presense sensor connector,
- loosen the water presence sensor by one turn,
- let the water flow out,
- tighten the water presence sensor.

Fuel filter: Removal - Refitting

F4R or K4M or M4R

- The fuel filter is located in the tank and built into the “pump - sender - filter” assembly. To remove the filter, remove the “pump - sender - filter” assembly (see **19C**, **Tank**, **Pump - sender - filter: Removal - Refitting**, page **19C-4**) .

Fuel filter: Removal - Refitting

V4Y

- The fuel filter is located in the tank and integrated into the « pump - sender - filter » assembly. To remove the filter, remove the « pump - sender - filter » assembly (see **19C**, **Tank**, **Pump - sender - filter: Removal - Refitting**, page **19C-4**) .

K9K or M9R or V9X

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

Keep the pipe unions away from contaminated areas.

REMOVAL (1ST FITTING)

I - REMOVAL PREPARATION OPERATION

❑ Remove the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

137873

❑ Disconnect the fuel unions (**1**) at the inlet and outlet of the electric diesel fuel heater.

❑ Fit blanking plugs at the inlet and outlet of the fuel unions of the electric diesel fuel heater.

❑ Disconnect the connector (**2**) from the electric diesel heater.

❑ Unclip the electric diesel fuel heater from its mounting.

❑ Remove the electric diesel fuel heater.

REMOVAL (2ND FITTING)

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the fuel filter (see **13A**, **Fuel supply**, **Fuel filter: Removal - Refitting**, page **13A-12**) .

K9K or M9R or V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

144360

❑ Remove the electric diesel fuel heater from the diesel filter.

REFITTING (1ST FITTING)

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the electric diesel fuel heater.

❑ Clip the electric diesel fuel heater onto its mounting.

❑ Connect the electric diesel fuel heater connector.

❑ Remove the blanking plugs at the inlet and outlet of the fuel unions of the electric diesel fuel heater.

❑ Connect the fuel unions at the inlet and outlet of the electric diesel fuel heater.

III - FINAL OPERATION

❑ Refit the expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-152**) .

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Prime the fuel circuit using the manual priming pump.

❑ Start the engine then let it run for a few minutes to check that it starts properly and to check that there are no leaks.

REFITTING (2ND FITTING)

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the electric diesel fuel heater on the fuel filter.

III - FINAL OPERATION

❑ Refit:

- the fuel filter (see **13A**, **Fuel supply**, **Fuel filter: Removal - Refitting**, page **13A-12**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Prime the fuel circuit using the manual priming pump.

❑ Start the engine then let it run for a few minutes to check that it starts properly and to check that there are no leaks.

F4R or K4M or M4R

Special tooling required	
Mot. 1311-01	Pressure gauges and petrol pressure measuring unions.
Mot. 1311-08	Union for taking fuel pressure measurements.

CHECK

❑

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT
Wear goggles with side protectors for this operation.

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

I - PREPARATION OPERATION FOR CHECK

116887

❑ Ensure you have a checking tool **(Mot. 1311-01)** and a “T” union **(Mot. 1311-08)**.

❑ Remove the front engine cover.

F4R or K4M or M4R

II - TEST OPERATION

M4R

124361

❑ Disconnect fuel supply pipe union on the injector rail.

❑ Connect:

- the pipe (**1**) fitted with a test pressure gauge **(Mot. 1311-01)**, with the "T" union **(Mot. 1311-08)** (**2**) ,
- the "T" union **(Mot. 1311-08)** (**2**) on the injector rail,
- the injector rail fuel supply union (**3**) on the "T" union **(Mot. 1311-08)**.

F4R

124575

❑ Disconnect fuel supply pipe union on the injector rail.

❑ Connect:

- the pipe (**1**) fitted with a test pressure gauge **(Mot. 1311-01)**, with the "T" union **(Mot. 1311-08)** (**2**) ,
- the "T" union **(Mot. 1311-08)** (**2**) on the injector rail,
- the injector rail fuel supply union (**3**) on the "T" union **(Mot. 1311-08)**.

F4R or K4M or M4R

K4M

128621

- ❑ Disconnect fuel supply pipe union on the injector rail.
- ❑ Unclip the fuel pipe from the right-hand suspended engine mounting.
- ❑ Connect:
  - the pipe (**1**) fitted with a test pressure gauge **(Mot. 1311-01)**, with the "T" union **(Mot. 1311-08)** (**2**) ,
  - the "T" union **(Mot. 1311-08)** (**2**) on the injector rail,
  - the injector rail fuel supply union (**3**) on the "T" union **(Mot. 1311-08)**.

- ❑ Start the engine.
- ❑ Record the pressure; this should be constant at **3.5 bar**.

> Note:
>
> It may take a few seconds to obtain a correct injector rail pressure reading.

- ❑ Switch off the engine.

III - FINAL OPERATION

- ❑ Disconnect the "T" union **(Mot. 1311-08)** from the injector rail.
- ❑ Connect the fuel supply pipe union on the injector rail.

K4M

- ❑ Clip the fuel pipe on the right-hand suspended engine mounting.

- ❑ Refit the engine cover.

V4Y

Special tooling required	
Mot. 1311-01	Pressure gauges and petrol pressure measuring unions.
Mot. 1311-08	Union for taking fuel pressure measurements.

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- beware of fuel splashes when disconnecting the union,
- protect sensitive areas from fuel outflow.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

CHECK

I - PREPARATION OPERATION FOR CHECK

116887

❑ Ensure you have a checking tool **(Mot. 1311-01)** and a **T** union **(Mot. 1311-08)**.

❑ Remove the front engine cover.

V4Y

II - TEST OPERATION

134869

- ❑ Disconnect the quick-release union (**1**) from the fuel supply pipe.
- ❑ Connect:
  - the pipe (**2**) fitted with the test pressure gauge **(Mot. 1311-01)** with the **T** unions **(Mot. 1311-08)** (**3**) ,
  - the **T** union **(Mot. 1311-08)** (**3**) on the pipe of the injector rail,
  - the fuel supply pipe quick-release union (**1**) to the **T** union **(Mot. 1311-08)**.
- ❑ Start the vehicle to run the fuel pump.
- ❑ Read the pressure, which should be constant.

> Note:
>
> The pressure value read should be **3.5 bars ± 0.2**.

- ❑ Switch off the engine.

III - FINAL OPERATION

- ❑ Disconnect:
  - the fuel pipe quick-release union on the **T** union **(Mot. 1311-08)**,
  - the **T** union **(Mot. 1311-08)** on the pipe on the injector rail side,
  - the pipe fitted with a test pressure gauge **(Mot. 1311-01)** with the **T** union **(Mot. 1311-08)**.
- ❑ Connect the quick-release union of the fuel supply pipe to the injector rail.
- ❑ Refit the engine cover.

F4R or K4M or M4R

Special tooling required	
Mot. 1311-01	Pressure gauges and petrol pressure measuring unions.
Mot. 1311-08	Union for taking fuel pressure measurements.

Equipment required
graduated measuring cylinder

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

I - PREPARATION OPERATION FOR CHECK

❏ Remove the front engine cover.

❏ Ensure you have a checking tool **(Mot. 1311-01)** and a “T” union **(Mot. 1311-08)**.

❏ Assemble the long hose for the checking tool **(Mot. 1311-01)** and the "T" union **(Mot. 1311-08)**.

❏ Disconnect the fuel supply union from the injector rail.

F4R

124693

❏ Connect:

- the "T" union **(Mot. 1311-08)** (**1**) to the injector rail,
- the fuel supply union to the "T" union **(Mot. 1311-08)**.

F4R or K4M or M4R

M4R

124362

❑ Connect:

- the "T" union **(Mot. 1311-08)** (**1**) to the injector rail,
- the fuel supply union to the "T" union **(Mot. 1311-08)**.

K4M

128622

❑ Unclip the fuel pipe from the right-hand suspended engine mounting.

❑ Connect:

- the "T" union **(Mot. 1311-08)** (**1**) to the injector rail,
- the fuel supply union to the "T" union **(Mot. 1311-08)**.

II - FUEL FLOW CHECK

❑ Immerse the hose in a **2000 ml graduated measuring cylinder**.

❑ Unclip the Protection and Switching Unit cover.

F4R or K4M or M4R

124138

❑ Disconnect the brown 12 track connector (**2**) .

109752

❑ Connect the terminal (**3**) of the brown connector to the battery + to operate the fuel pump.

> Note:
>
> The flow reading should be **80 to 120 l/h**.

❑ Remove the brown connector terminal ***(3)*** from the battery +.

III - FINAL OPERATION.

❑ Connect the brown 12 track connector.

❑ Clip the Protection and Switching Unit cover back on.

❑ Disconnect:

- the fuel supply union on the "T" union **(Mot. 1311-08)**,
- the "T" union **(Mot. 1311-08)** on the injector rail.

❑ Connect the fuel supply pipe union on the injector rail.

❑ Detach the checking tool **(Mot. 1311-01)** from the "T" union **(Mot. 1311-08)**.

K4M

❑ Clip the fuel pipe on the right-hand suspended engine mounting.

❑ Refit the engine cover.

V4Y

Special tooling required	
Mot. 1311-01	Pressure gauges and petrol pressure measuring unions.
Mot. 1311-08	Union for taking fuel pressure measurements.

Equipment required
graduated measuring cylinder

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

Note:

The fuel flow must always be checked with a full fuel tank, the fuel level may affect the fuel flow measurement.

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove the front engine cover.

❑ Ensure you have a checking tool **(Mot. 1311-01)** and a quick-release **T** union **(Mot. 1311-08)**.

❑ Assemble the long hose of the test tool **(Mot. 1311-01)** and the **T** quick-release union **(Mot. 1311-08)**.

134929

❑ Disconnect the quick-release union (**1**) from the fuel supply pipe.

❑ Connect the quick-release union of the fuel supply pipe (**1**) to the **T** union **(Mot. 1311-08)** (**3**) .

❑ Connect the **T** pipe **(Mot. 1311-08)** (**3**) to the fuel supply pipe on the injector rail side.

II - FUEL FLOW CHECK

❑ immerse the pipe in a **200 ml graduated measuring cylinder**.

❑ Unclip:

- the Protection and Switching Unit cover,
- the Protection and Switching Unit.

V4Y

124138

❑ Disconnect brown 12 track connector (**4**) .

109752

❑ Fit the terminal (**5**) of the brown connector to the positive battery terminal to run the fuel pump.

> Note:
>
> The flow reading should be **80 to 120 l/h**.

❑ Remove the + battery feed from the terminal (**5**) of the brown connector.

III - FINAL OPERATION

❑ Connect the 12-track brown connector to the Protection and Switching Unit.

❑ Clip:

- the Protection and Switching Unit,
- the Protection and Switching Unit cover.

❑ Disconnect:

- the fuel supply pipe quick-release union from the **T** union **(Mot. 1311-08)**,
- the quick-release **T** union **(Mot. 1311-08)** from the fuel pipe on the injector rail side.

❑ Connect the fuel supply pipe quick-release union to the pipe on the injector rail side.

❑ Disconnect the test tool long hose **(Mot. 1311-01)** from the quick-release **T** union **(Mot. 1311-08)**.

❑ Refit the engine cover.

Diesel injection: Precautions for the repair

K9K or M9R or V9X

I - RISKS RELATING TO CONTAMINATION

The high-pressure direct injection system is highly sensitive to contamination. The risks caused by contamination are:

- damage to or destruction of the high pressure injection system,
- a component seizing,
- a component not being properly sealed.

All After-Sales operations must be performed under very clean conditions. Having carried out an operation in good conditions means that no impurities (particles a few microns in size) have penetrated the system during dismantling.

The cleanliness principle must be applied from the filter to the injectors.

What are the sources of contamination?

- metal or plastic swarf,
- paint,
- fibres:
  - cardboard,
  - brushes,
  - paper,
  - clothing,
  - cloth,
- foreign bodies such as hair,
- ambient air,
- etc.

WARNING

Do not clean the engine with a high pressure cleaner to prevent damaging the connections.

1 - Cleaning cloths

Use lint-free cleaning cloths (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

It is prohibited to use cloths or ordinary paper towels: these produce lint and lose fibres, which then contaminate the fuel circuit.

Each cloth must only be used once.

2 - Blanking plugs

The blanking plugs are used to cap the fuel circuit once it is opened and to therefore prevent contaminants from entering.

A set of blanking plugs should be used once only and used plugs must be discarded after use: once used, the plugs are soiled and cleaning them is not sufficient to make them reusable.

Unused plugs must also be discarded and must not be used when carrying out work on an injection system.

Part number for set of blanking plugs: (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

Note:

There is no specific set of blanking plugs for S9U and S9W engines. In order to comply with the cleanliness recommendations, use plugs that are compatible with the blanking plug sets for F9Q, G9U, G9T or ZD3 engines.

3 - Protective bags

Use hermetically-resealable plastic bags, using adhesive tape, for example, to store components which will be refitted and reused. Stored parts will therefore be less subject to the risk of contamination.

These are single-use bags: after use they must be discarded.

4 - Cleaning products

Two cleaning products can be used:

- an injector cleaner (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- an aerosol spray brake cleaner (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

To use the injector cleaner, be sure to have a clean brush in good condition (the brush must not lose any bristles) as well as a clean container which has no impurities in it.

Note:

Use a new injector cleaner each time work is carried out (a used cleaning agent will contain impurities).

K9K or M9R or V9X

II - ADVICE TO BE FOLLOWED BEFORE ANY OPERATION

1) Carry out the work in a clean working area and take care to protect removed components from dust using plastic bags which are hermetically-resealable, for example.

2) Always order the following from the Parts Department before carrying out work:

- **a new set of blanking plugs**, specific to the engine,
- enough lint-free **cleaning cloths**.
- one of the two **cleaning products** for fuel pipe unions,
- **the parts that are always to be replaced** after each removal operation, mentioned in the operational procedures specific to the vehicle (see related Workshop Repair Manual).

3) Wear safety goggles fitted with side shields to prevent the cleaning product from splashing the eyes.

4) Wear leaktight protective gloves (Nitrile type) to avoid prolonged contact with the skin.

> Note:
>
> When using leather protective gloves, wear a pair of leaktight protective gloves (Nitrile type) over the top.

5) Before carrying out work on the injection system, use plastic bags or clean rags, for example, to protect:

- the accessories and timing belts,
- the electrical accessories (starter, alternator, power-assisted steering pump, sensors and electrical connectors),
- the flywheel face.

III - INSTRUCTIONS TO BE FOLLOWED DURING THE OPERATION

Wash your hands before and while carrying out the work.

Replace leaktight protective gloves (Nitrile type) when they are soiled or damaged.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been capped.

Reseal the bag hermetically, for example using adhesive tape, even if the bag must be opened shortly afterwards: ambient air can be a source of impurities.

After opening the fuel circuit, the use of brushes, cleaning agents, air blow guns, rifle-type brushes or standard cloths is strictly prohibited: these items are likely to allow impurities to enter the system.

When replacing a component with a new one or when refitting it after storing it in a plastic bag, do not unpack it until it is time to fit it on the vehicle.

IV - CLEANING

There are currently two procedures for cleaning the fuel circuit before opening it in order to carry out work in the workshop.

These procedures enable the fuel circuit to be cleaned to prevent contamination from entering: they both have the same end result and neither is preferred over the other.

1 - Cleaning using injector cleaner

Clear the access to the unions that need opening, following the work procedures specific to the vehicle (see the relevant Workshop Repair Manual).

Protect sections which are sensitive to fuel leaks.

Pour the injector cleaning agent into a container which is free from impurities.

> **IMPORTANT**
>
> Wear leaktight gloves (Nitrile type) for this operation.

Dip a clean brush, which is not shedding bristles, into the container of injector cleaning agent.

> **IMPORTANT**
>
> Wear goggles with side protectors for this operation.

Clean the unions carefully using the brush and the injector cleaning agent.

Blast the components that have been cleaned with compressed air (tools, workbench, and also parts, unions and around the injection system). Check that no bristles from the brush have come away and that the area is clean.

Wipe the sections that were cleaned with fresh cleaning cloths.

Open the circuit at the unions and immediately fit the relevant blanking plugs.

WARNING

To prevent impurities from entering, once the fuel circuit is opened, it must not be blasted with compressed air. Use cleaning cloths only, if necessary.

2 - Using the brake cleaner

Clear the access to the unions that need opening, following the work procedures specific to the vehicle (see the relevant Workshop Repair Manual).

Protect sections which are sensitive to fuel leaks.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

Spray the brake cleaner onto the unions to be opened.

Clean the unions carefully using fresh cleaning cloths.

Blast the components that have been cleaned with compressed air (tools, workbench, and also parts, unions and around the injection system). Check that no bristles from the brush have come away and that the area is clean.

Open the circuit at the unions and immediately fit the relevant blanking plugs.

WARNING

To prevent impurities from entering, once the fuel circuit is opened, it must not be blasted with compressed air. Use cleaning cloths only, if necessary.

K9K or M9R or V9X

K9K

K9K or M9R or V9X

Set of plugs for DELPHI injection:

K9K or M9R or V9X

20977

K9K or M9R or V9X

Set of plugs for SIEMENS injection:

K9K or M9R or V9X

113430

K9K or M9R or V9X

M9R

K9K or M9R or V9X

Set of plugs:

K9K or M9R or V9X

113737

K9K or M9R or V9X

V9X

K9K or M9R or V9X

Set of plugs:

K9K or M9R or V9X

138585

Diesel injection: List and location of components

M9R, and 742 or 744 or 746 or 748 or 754

122423

(**1**)	Manual priming pump
(**2**)	Fuel pressure regulator on the injector rail
(**3**)	Diesel injectors
(**4**)	Rail pressure sensor
(**5**)	Fuel temperature sensor
(**6**)	High pressure pump
(**7**)	Air flowmeter
(**8**)	Diesel injection computer
(**9**)	Turbocharger control solenoid valve
(**10**)	EGR cooling control solenoid valve
(**11**)	Camshaft position sensor
(**12**)	EGR solenoid valve
(**13**)	Damper valve
(**14**)	Turbocharger pressure sensor
(**15**)	Fuel filter

113130

(**2**)	Pressure regulator on the fuel injector rail
(**4**)	Rail pressure sensor

M9R, and 742 or 744 or 746 or 748 or 754

122432

(**5**) Fuel temperature sensor

M9R, and 742 or 746

113291

(**6**) High pressure pump

M9R, and 744 or 748 or 754

124534

(**6**) High pressure pump

122425

(**7**) Air flowmeter

M9R, and 742 or 744 or 746 or 748 or 754

122399

(**8**) Diesel injection computer

122431

(**10**) Camshaft position sensor

122424

(**9**) Turbocharger control solenoid valve

122427

(**11**) EGR solenoid valve

M9R, and 742 or 744 or 746 or 748 or 754

122426

(**12**) Damper valve

(**13**) Turbocharger pressure sensor

122429

(**16**) Preheating unit

Diesel injection: List and location of components

K9K

123286

(**1**)	Manual priming pump
(**2**)	High-pressure pump
(**3**)	Exhaust gas recirculation solenoid valve
(**4**)	Diesel injectors
(**5**)	Camshaft position sensor
(**6**)	Turbocharging air pressure sensor
(**7**)	Air flowmeter
(**8**)	Protection and Switching Unit
(**9**)	Diesel injection computer
(**10**)	Coolant temperature sensor
(**11**)	Rail pressure sensor
(**12**)	Fuel temperature sensor

123520

(**1**) Manual priming pump

K9K

111748

(**2**) High-pressure pump

111746

(**4**) Diesel injectors

121888

(**5**) Camshaft position sensor

122399

(**9**) Diesel injection computer

K9K

123827

(**10**) Coolant temperature sensor

114076

(**11**) Rail pressure sensor

111747

(**12**) Fuel temperature sensor

123846

(**13**) Flow regulation solenoid valve

(**14**) Pressure regulation solenoid valve

K9K

123824

(**15**) Crankshaft position sensor

122429

(**16**) Pre-postheating unit

Diesel injection: List and location of components

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

124141

(**1**)	Manual priming pump
(**2**)	Injection rail pressure regulator
(**3**)	Injectors
(**4**)	Rail pressure sensor
(**5**)	Diesel temperature sensor
(**6**)	High pressure pump
(**7**)	Air flowmeter
(**8**)	Injection computer
(**9**)	Turbocharger control solenoid valve
(**10**)	EGR cooler control solenoid valve
(**11**)	Camshaft position sensor
(**12**)	EGR solenoid valve
(**13**)	Turbocharger pressure sensor
(**14**)	Damper valve
(**15**)	Fuel filter

113130

(**2**)	Injection rail pressure regulator
(**4**)	Rail pressure sensor

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

122432

(**5**) Diesel temperature sensor

122425

(**7**) Air flowmeter

124534

(**6**) High pressure pump

122399

(**8**) Diesel injection computer

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

122424

(**9**) Turbocharger control solenoid valve

122431

(**11**) Camshaft position sensor

123692

(**12**) EGR solenoid valve

(**13**) Turbocharger pressure sensor

(**14**) Damper valve

122429

(**16**) Preheating unit

Diesel injection: List and location of components

V9X

133906

(**1**)	Manual priming pump
(**2**)	Injectors
(**3**)	Fuel temperature sensor
(**4**)	High pressure pump
(**5**)	Air flowmeter
(**6**)	Injection computer
(**7**)	Turbocharger control solenoid valve
(**8**)	Exhaust gas cooler control solenoid valve
(**9**)	Camshaft position sensor
(**10**)	Exhaust gas recirculation solenoid valve
(**11**)	Air inlet valve
(**12**)	Turbocharger pressure sensor
(**13**)	Fuel filter

137911

(**14**)	Exhaust gas pressure sensor

V9X

137913

(**15**) Exhaust gas temperature sensor

137873

(**17**) Electrical diesel fuel reheater

137863

(**16**) Rail pressure sensor

137954

(**18**) Crankshaft position sensor

V9X

137917

(**19**) Exhaust fuel injector

133892

(**20**) Fuel pressure regulator

133903

(**21**) Particle filter pressure sensor

133905

(**22**) Particle filter temperature sensor

136260

(**23**) Coolant temperature sensor

137878

(**24**) Pre-postheating unit

K9K, and 782

123520

(**1**) Manual priming pump

138816

(**2**) High pressure pump

138817

(**3**) Exhaust gas recirculation solenoid valve

138545

(**4**) Diesel injectors

K9K, and 782

138549

(**5**) Camshaft position sensor

143758

(**7**) Air flowmeter

138399

(**6**) Turbocharging pressure sensor

122399

(**8**) Diesel injection computer

K9K, and 782

114213

(**9**) Coolant temperature sensor

138544

(**10**) Rail pressure sensor

138897

(**11**) Fuel temperature sensor

138394

(**12**) Damper valve

K9K, and 782

139195

(**13**) Exhaust fuel injector solenoid valve

144222

(**14**) Thermoplunger unit

144362

(**15**) Electric diesel fuel heater

138541

(**16**) Flow regulation solenoid valve

(**17**) Pressure regulation solenoid valve

K9K, and 782

123824

(**18**) Crankshaft position sensor

139171

(**20**) Exhaust gas temperature sensor

122429

(**19**) Pre-postheating unit

139201

(**21**) Exhaust gas pressure sensor

K9K, and 782

139172

(**22**) Exhaust fuel injector

M9R

Equipment required
Diagnostic tool

REMOVAL

I - REFITTING PREPARATIONS OPERATION

❑ Apply the procedure before repair using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « diesel injection computer » ,
- go to repair mode,
- display the « procedure before repair » on the selected computer,
- carry out the operations described in the « procedure before repair » section.

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery).

II - OPERATION FOR REMOVAL OF PART CONCERNED

122399

❑ Disconnect the diesel injection computer connectors.

122400

❑ Remove:

- the diesel injection computer mounting nut (**2**) ,
- the diesel injection computer mounting with the diesel injection computer.

122401

❑ Remove:

- the diesel injection computer nuts,
- the diesel injection computer from its mounting.

M9R

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the diesel injection computer on its mounting.
- ❑ Tighten the diesel injection computer mounting nuts.
- ❑ Fit the diesel injection computer and its mounting into the engine compartment.
- ❑ Tighten the injection computer mounting nut.
- ❑ Connect the diesel injection computer connectors.

II - FINAL OPERATION.

- ❑ Refit:
  - the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery)
- ❑ Apply the after repair procedure using the **Diagnostic tool** :
  - Connect the **Diagnostic tool**,
  - select the « diesel injection computer » ,
  - go to repair mode,
  - display the « procedure after repair » on the selected computer,
  - carry out the operations described in the « after repair procedure » section.

K9K

Equipment required
Diagnostic tool

REMOVAL

I - REFITTING PREPARATIONS OPERATION

❑ Apply the procedure before repair using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « diesel injection computer » ,
- go to repair mode,
- display the « procedure before repair » on the selected computer,
- carry out the operations described in the « procedure before repair » section.

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery).

II - REMOVAL OPERATION FOR PART CONCERNED

122399

❑ Disconnect the connectors (**1**) from the diesel injection computer.

122400

❑ Remove:

- the diesel injection computer mounting nut (**2**) ,
- the diesel injection computer mounting with the diesel injection computer.

122401

❑ Remove:

- the diesel injection computer nuts (**3**) ,
- the diesel injection computer from its mounting.

K9K

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the diesel injection computer on its mounting.
- ❑ Tighten the diesel injection computer mounting nuts.
- ❑ Fit the diesel injection computer and its mounting into the engine compartment.
- ❑ Tighten the injection computer mounting nut.
- ❑ Connect the diesel injection computer connectors.

II - FINAL OPERATION.

- ❑ Refit:
  - the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).
- ❑ Apply the after repair procedure using the **Diagnostic tool** :
  - Connect the **Diagnostic tool**,
  - select the « diesel injection computer » ,
  - go to repair mode,
  - display the « procedure after repair » on the selected computer,
  - carry out the operations described in the « after repair procedure » section.

V9X

Equipment required
Diagnostic tool

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice causes the oxygen sensor to malfunction and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair**) (Technical Note 6015A, 88A, Wiring).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Apply the procedure before repair using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Diesel injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- carry out the operations described in the « Before repair procedure » section.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

134095

❑ Disconnect the connectors (**1**) from the diesel injection computer.

❑ Remove the protector cover (**2**) of the diesel injection computer.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134096

❑ Remove:

- the diesel injection computer bolts (**3**) ,
- the diesel injection computer.

V9X

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the diesel injection computer.

II - FINAL OPERATION

❏ Refit the protector cover of the diesel injection computer.

❏ Connect the diesel injection computer connectors.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Diesel injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- carry out the operations described in the « After repair procedure » section.

M9R

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

122430

❏ Remove:

- the nut (**1**) from the cooling radiator top hose on the intercooler air inlet pipe,
- the bolts (**2**) from the intercooler air inlet pipe on the intake distributor.

113282

❏ Rotate the intercooler air inlet pipe clip (**3**) on the turbocharger side.

❏ Remove:

- the cooling radiator top hose,
- the intercooler inlet air pipe.

II - REMOVAL OPERATION FOR PART CONCERNED

122431

❏ Disconnect the connector (**4**) from the camshaft position sensor.

115736

❏ Remove:

- the nut (**5**) from the camshaft position sensor,
- the camshaft position sensor,
- the camshaft position sensor seal.

M9R

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the camshaft sensor seal.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seal is fitted in the right direction on the turbocharger side.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the camshaft position sensor seal.

❑ Lubricate the camshaft position sensor seal with engine oil.

❑ Refit:

- the camshaft position sensor,
- the camshaft position sensor bolt.

❑ Tighten the camshaft position sensor bolt.

III - FINAL OPERATION.

❑ Fit the intercooler air inlet pipe.

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Clip the intercooler air inlet pipe to the turbocharger.

❑ Fit the cooling radiator top hose on the intercooler air inlet pipe.

M9R

- Refit:
  - the intercooler air inlet pipe bolts on the intake distributor,
  - the cooling radiator top hose nut on the intercooler air inlet pipe.
- Tighten:
  - the intercooler air inlet pipe bolts on the intake distributor,
  - the cooling radiator top hose nut on the intercooler air inlet pipe.
- Refit the engine cover.

K9K, and 780

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123532

❑ Undo the clip (**1**) from the intercooler air outlet pipe on the damper valve.

❑ Disconnect the intercooler air outlet pipe on the damper valve.

❑ Move aside the intercooler air outlet pipe from the damper valve.

II - REMOVAL OPERATION FOR PART CONCERNED

121889

❑ Disconnect the connector (**2**) from the camshaft position sensor.

121888

❑ Remove:

- the bolt (**3**) from the camshaft position sensor,
- the camshaft position sensor,
- the camshaft position sensor seal.

K9K, and 780

REFITTING

I - REFITTING PREPARATIONS OPERATION

- ❑ Always replace the camshaft position sensor seal.
- ❑ Lubricate the camshaft position sensor seal.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - the new camshaft position sensor seal,
  - the camshaft position sensor,
  - the camshaft position sensor bolt.
- ❑ Tighten the camshaft position sensor bolt.
- ❑ Connect the camshaft position sensor connector.

III - FINAL OPERATION.

- ❑ Connect the intercooler air outlet pipe on the damper valve.
- ❑ Tighten the intercooler air outlet pipe clip on the damper valve.
- ❑ Refit the engine cover.

V9X

Tightening torques ▽	
camshaft position sensor bolt	**10 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133893

❑ Disconnect the connector (**1**) from the camshaft position sensor.

❑ Remove:

- the bolt (**2**) from the camshaft position sensor,
- the camshaft position sensor,
- the camshaft position sensor seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: camshaft sensor seal (11,11,04,02)**.

❑ Lubricate the camshaft position sensor seal with engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new camshaft position sensor seal,
- the camshaft position sensor.

❑ Tighten to torque the **camshaft position sensor bolt (10 Nm)**.

❑ Connect the camshaft position sensor connector.

III - FINAL OPERATION

❑ Refit the engine cover.

K9K, and 782

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

138399

❑ Disconnect the turbocharger pressure sensor connector (**4**) .

❑ Unclip the wiring (**5**) from the turbocharging pressure sensor.

❑ Pull the clip (**6**) of the intercooler air outlet pipe.

❑ Move the intercooler air outlet pipe to one side.

138551

❑ Unclip the wiring (**7**) from the damper valve.

K9K, and 782

138550

❑ Unclip the injector rail protector cover at (**8**) .

❑ Remove:

- the bolts (**9**) of the injector rail protector cover,
- the injector rail protector cover,

II - OPERATION FOR REMOVAL OF PART CONCERNED

138549

❑ Disconnect the connector (**10**) from the camshaft position sensor.

❑ Remove:

- the bolt (**11**) from the camshaft position sensor,
- the camshaft position sensor,
- the camshaft position sensor seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: camshaft sensor seal (11,11,04,02)**.

❑ **parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)**.

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the housing of the camshaft position sensor seal on the camshaft position sensor in case of reuse,
- the housing of the camshaft position sensor seal in the rocker cover.

K9K, and 782

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

115069

❑

> Note:
>
> Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round.

❑ Refit:

- a new intercooler air outlet pipe seal,
- a new intercooler air inlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit a new camshaft position sensor seal.

❑ Lubricate the camshaft position sensor seal with new engine oil.

❑ Refit the camshaft position sensor.

❑ Connect the camshaft position sensor connector.

III - FINAL OPERATION

❑ Refit the injector rail protector cover.

❑ Clip on the damper valve wiring.

❑ Fit the clip for the intercooler air outlet pipe.

❑ Clip the intercooler air outlet pipe on the damper valve.

❑ Clip on the wiring of the turbocharging pressure sensor.

❑ Connect the turbocharger pressure sensor connector.

❑ Refit the clip of the intercooler air inlet pipe.

❑ Clip on the intercooler air inlet pipe.

❑ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

M9R

Tightening torques ▽	
crankshaft position sensor bolt	**10 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION FOR PART CONCERNED

123626

❏ Move the crankshaft position sensor connector heat insulation (**1**) to one side.

❏ Disconnect the crankshaft position sensor connector.

123628

❏ Remove:

- the crankshaft position sensor bolt (**2**) ,
- the crankshaft position sensor,
- the crankshaft position sensor O-ring.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❏ Always replace:

- the crankshaft position sensor O-ring.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the crankshaft position sensor O-ring.

❏ Lubricate the crankshaft position sensor O-ring with engine oil.

❏ Refit:

- the crankshaft position sensor,
- the crankshaft position sensor bolt.

❏ Torque tighten the **crankshaft position sensor bolt (10 Nm)**.

❏ Connect the crankshaft position sensor connector.

❏ Fit the crankshaft position sensor connector heat insulation

M9R

III - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION FOR PART CONCERNED

123824

❑ Disconnect the crankshaft position sensor connector (**1**) .

❑ Remove:

- the crankshaft position sensor bolt (**2**) ,
- the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the crankshaft position sensor,
- the crankshaft position sensor bolt.

❑ Tighten the crankshaft position sensor bolt.

❑ Connect the crankshaft position sensor connector.

II - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

V9X

Tightening torques ▽	
crankshaft position sensor bolt	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133895

❑ Disconnect the crankshaft position sensor connector (**1**) .

❑ Remove:

- the crankshaft position sensor bolt (**2**) ,
- the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the crankshaft position sensor.

❑ Torque tighten the **crankshaft position sensor bolt (10 N.m)**.

❑ Connect the crankshaft position sensor connector.

II - FINAL OPERATION

❑ Refit the engine undertray.

K9K, and 780

Special tooling required	
Mot. 1771	Kit for measuring SIEMENS injector leakage flow rate.

Equipment required
graduated measuring cylinder
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove the front engine cover.

123532

❑ Undo the clip (**1**) from the intercooler air outlet pipe on the damper valve.

❑ Disconnect the intercooler outlet air pipe from the damper valve.

❑ Move the intercooler outlet air pipe away from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❑ Detach (**4**) the electrical wiring from the injector rail protector cover.

❑ Move the electrical wiringto one side.

123293

❑ Remove:

- the intercooler air inlet pipe bolt (**5**) ,
- the nut (**6**) from the intercooler inlet air pipe.

123299

❑ Remove the clip (**7**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

123296

❑ Unclip (**8**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**9**) ,
- the injector rail protector cover nut (**10**) ,
- the injector rail protector cover,
- the dipstick.

❑ Remove the dipstick well bolts.

❑ Move the dipstick well to one side.

124555

❑ Detach the fuel return pipe (**11**) .

❑ Disconnect the diesel injector fuel return rail from the high pressure pump.

> **WARNING**
> To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Fit a blanking plug on the diesel injector fuel return rail opening.

❑ Connect the **8 mm** diameter angled union fitted with its hose contained in the **(Mot. 1771)** on the high pressure pump union.

❑ Immerse this hose in the500 ml. **graduated measuring cylinder**

❑ Fit the dipstick well.

❑ Refit:

- the dipstick well bolts,

- the dipstick.

❏ Fit:

- the intercooler air inlet pipe,
- the intercooler inlet air pipe clip in its original position.

❏ Clip the intercooler air inlet pipe to the turbocharger.

❏ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler outlet air pipe to the damper valve.

❏ Tighten the intercooler air outlet pipe clip.

II - CHECKING OPERATION FOR PART CONCERNED

❏ Force the vehicle's + after ignition feed.

❏ Connect the **Diagnostic tool**.

❏ Run commands:

- RZ009 Program vehicle functions,
- VP036 Inhibit fuel supply.

❏ Run the starter for **15 seconds**.

❏ Check that the minimum flow is **25 ml** for **15 seconds**.

❏ Run command VP037 Stop fuel supply inhibition.

III - FINAL OPERATION

❏ Undo the intercooler air outlet pipe clip on the damper valve.

❏ Disconnect the intercooler outlet air pipe from the damper valve.

❏ Move the intercooler outlet air pipe away from the damper valve.

❏ Disconnect:

- the damper valve connector,
- the camshaft position sensor connector.

❏ Pull the intercooler air inlet pipe clip.

❏ Disconnect the intercooler air inlet pipe from the turbocharger.

❏ Move the intercooler inlet air pipe to one side.

❏ Remove:

- the dipstick,
- the dipstick well bolts.

❏ Move the dipstick well to one side.

❏ Disconnect the **8 mm** diameter angled union fitted with its hose contained in the **(Mot. 1771)** from the high pressure pump union.

❏ Remove the blanking plug from the diesel injector fuel return rail opening.

❏ Connect the diesel injector fuel return rail to the high pressure pump.

❏ Clip on the fuel return pipe.

❏ Fit the dipstick well.

❏ Refit:

- the dipstick well bolts,
- the dipstick,
- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❏ Tighten:

- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❏ Clip on the injector rail protector cover.

❏ Fit:

- the intercooler air inlet pipe,
- the intercooler inlet air pipe clip in its original position.

❏ Clip the intercooler air inlet pipe to the turbocharger.

❏ Refit:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❏ Tighten:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❏ Clip the electrical wiring to the injector rail protector cover.

❏ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler outlet air pipe to the damper valve.

❏ Tighten the intercooler air outlet pipe clip.

❏ Refit the engine cover.

K9K, and 782

Special tooling required	
Mot. 1771	Kit for measuring SIEMENS injector leakage flow rate.

Equipment required
graduated measuring cylinder
self-contained starter
Diagnostic tool
tweezers

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

CHECK

I - PREPARATION OPERATION FOR CHECK

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

- ❑ Disconnect the turbocharger pressure sensor connector (**4**) .
- ❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.
- ❑ Pull the clip (**6**) of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

138551

- ❑ Unclip the wiring (**7**) of the damper valve.

138550

- ❑ Unclip the injector rail protector cover at (**8**) .
- ❑ Remove:
  - the bolts (**9**) from the injector rail protector cover,
  - the cover of the injector rail protector.

135009

- ❑ Disconnect the diesel injector fuel return rail (**10**) on the high pressure pump.
- ❑ Fit a blanking plug onto the opening of the diesel injector fuel return rail.
- ❑ Connect the **8 mm** angled union fitted with its pipe contained in the tool **(Mot. 1771)** to the high pressure pump union.

K9K, and 782

- ❑ Insert this pipe in the **500 ml graduated measuring cylinder**.
- ❑ Fit the clip for the intercooler air outlet pipe.
- ❑ Clip the intercooler air outlet pipe on the damper valve.
- ❑ Connect the turbocharger pressure sensor connector.
- ❑ Refit the clip of the intercooler air inlet pipe.
- ❑ Clip the intercooler air inlet pipe onto the turbocharger air outlet pipe.

II - CHECKING OPERATION FOR PART CONCERNED

- ❑ Connect a **self-contained starter**.
- ❑ Force the vehicle's + after ignition feed.
- ❑ Connect the **Diagnostic tool**.
- ❑ Run commands:
  - **RZ009** Program vehicle functions,
  - **VP036** Inhibit fuel supply.
- ❑ Run the starter for **15 seconds**.
- ❑ Check that the minimum flow is **25 ml** for **15 seconds**.
- ❑ Run command **VP037** Stop fuel supply inhibition.
- ❑ Disconnect:
  - the **Diagnostic tool**,
  - the **self-contained starter**.

III - FINAL OPERATION

- ❑ Remove the clip from the intercooler air inlet pipe.
- ❑ Disconnect the intercooler air inlet pipe.
- ❑ Move aside the intercooler air inlet pipe.
- ❑ Disconnect the turbocharging pressure sensor connector.
- ❑ Pull the clip of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

115068

- ❑ Use a **tweezers** to remove:
  - the intercooler air outlet pipe seal,
  - the intercooler air inlet pipe seal.

115069

- ❑

> Note:
>
> Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round

- ❑ Refit:
  - a new intercooler air outlet pipe seal,

- a new intercooler air inlet pipe seal.

❏ Disconnect the **8 mm** angled union fitted with its pipe contained in the tool **(Mot. 1771)** from the high pressure pump union.

❏ Remove the blanking plug from the diesel injector fuel return rail opening.

❏ Connect the diesel injector fuel return rail to the high pressure pump.

❏ Refit the injector rail protector cover.

❏ Clip on the damper valve wiring.

❏ Fit the clip for the intercooler air outlet pipe.

❏ Clip the intercooler air outlet pipe on the damper valve.

❏ Clip on the wiring of the turbocharging pressure sensor.

❏ Connect the turbocharger pressure sensor connector.

❏ Refit the clip of the intercooler air inlet pipe.

❏ Clip the intercooler air inlet pipe onto the turbocharger air outlet pipe.

❏ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

M9R, and 742 or 744 or 746

Tightening torques ▽	
high pressure pump pinion	**90 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the intercooler air inlet pipe bolts (**2**) .

113282

❑ Rotate the intercooler air inlet pipe clip (**3**) .

❑ Move the intercooler inlet air pipe to one side.

❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

M9R, and 742 or 744 or 746

123577

❑

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the quick-release unions (**4**) from the fuel supply pipes on the high pressure pump.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123579

❑ Remove:

- the high pressure pump bolts (**5**) ,
- the high pressure pump,
- the high pressure pump O-ring.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the high pressure pump O-ring,
- the high pressure pump bolts,
- the intercooler air inlet pipe seal.

If replacing the high pressure pump

❑ Secure the high pressure pump pinion in a vice's protective jaws.

❑ Remove:

- the high pressure pump pinion nut,
- the pinion from the vice.

M9R, and 742 or 744 or 746

115699

❑ Fit a separator (**6**) under the high pressure pump pinion (**7**) .

115700

❑ Fit an arm (**8**) on the separator.

❑ Remove:

- the high pressure pump pinion,
- the separator and the arm.

❑ Refit the pinion to the new high pressure pump.

❑ Secure the high pressure pump pinion in a vice's protective jaws.

❑ Torque tighten the **high pressure pump pinion (90 N.m)**.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a .

M9R, and 742 or 744 or 746

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seal is fitted in the right direction on the turbocharger side.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

123578

❑ Refit the new O-ring (**9**) .

❑ Lubricate the new high-pressure pump seal with engine oil.

❑

> Note:
>
> Do not apply pressure to the high-pressure pump gear teeth.
>
> Check that the high pressure pump is in contact with the cylinder head before positioning the high pressure pump bolts.

❑ Refit:

- the high pressure pump,
- the high pressure pump bolts.

M9R, and 742 or 744 or 746

123579

❑ Tighten the high pressure pump bolts in order.

III - FINAL OPERATION

❑ Connect the fuel pipe quick-release union between the fuel filter and the high pressure pump.

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the new high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the intercooler inlet air pipe temporarily.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Check that there are no leaks.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Connect the intercooler air inlet pipe to the turbocharger.

❑ Refit the bolts for the intercooler inlet air pipe on the intake distributor.

❑ Tighten the intercooler air inlet pipe bolts on the intake distributor.

❑ Fit the cooling radiator top hose to the intercooler air inlet pipe.

❑ Refit the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Refit the engine cover.

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Equipment required
tweezers

Tightening torques ▽	
high pressure pump pinion nut	**90 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the radiator top hose on the intercooler air inlet pipe.

❑ Remove the radiator top hose.

❑ Remove the bolts (**2**) from the intercooler air inlet pipe on the inlet distributor.

113282

❑ Rotate the intercooler air inlet pipe clip (**3**) at the turbocharger end.

❑ Disconnect the intercooler air inlet pipe on the turbocharger side.

❑ Move the intercooler inlet air pipe to one side.

❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - OPERATION FOR REMOVAL OF PART CONCERNED

124534

❑

> **WARNING**
> To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect:

- the regulator connector (**5**) on the high pressure pump.
- the fuel pipes (**6**) on the high pressure pump,

124537

124538

❑ Remove:

- the high pressure pump bolts (**7**) ,
- the high pressure pump,
- the high pressure pump O-ring.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the high pressure pump O-ring,

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- the high pressure pump bolts,
- the intercooler air inlet pipe seal on the turbocharger side.

115068

❑ Remove the intercooler air inlet pipe seal at the turbocharger end using a **tweezers**.

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seal is fitted in the right direction in its groove.

❑ Refit a new seal to the intercooler air inlet pipe at the turbocharger end.

❑ Rotate the intercooler air inlet pipe clip in order to refit it in its groove.

If replacing the high pressure pump

❑ Secure the high pressure pump pinion in a vice's protective jaws.

❑ Remove:

- the high pressure pump pinion nut,
- the pinion from the vice.

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

115699

❑ Fit a separator (**8**) under the high pressure pump pinion (**9**) .

115700

❑ Fit an arm (**10**) on the separator.

❑ Remove:

- the high pressure pump pinion,
- the separator and the arm.

❑ Refit:

- the pinion to the new high pressure pump,
- the high pressure pump nut.

❑ Secure the high pressure pump pinion in a vice's protective jaws.

❑ Torque tighten the **high pressure pump pinion nut (90 N.m)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Lubricate the new high-pressure pump seal with engine oil.

> Note:
>
> Do not apply pressure to the high-pressure pump gear teeth.
>
> Check that the high pressure pump is in contact with the cylinder head before positioning the high pressure pump bolts.

❑ Refit:

- the new high pressure pump O-ring.
- the high pressure pump,
- new high pressure pump bolts,

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

124538

- ❑ Tighten the high pressure pump bolts in order.
- ❑ Connect:
  - the fuel pipes to the high pressure pump,
  - the regulator connector to the high pressure pump.

III - FINAL OPERATION

- ❑ Refit:
  - the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .
- ❑ Fit the intercooler air inlet pipe.

> Note:
>
> The intercooler air inlet pipe is correctly clipped onto the turbocharger when the clip is fitted into the turbocharger groove.

- ❑ Clip the intercooler air inlet pipe on the turbocharger side.
- ❑ Refit the intercooler air inlet pipe bolts on the inlet distributor.
- ❑ Tighten the intercooler air inlet pipe bolts on the inlet distributor.
- ❑ Fit the radiator top hose on the intercooler air inlet pipe.
- ❑ Refit the radiator top hose nut on the intercooler air inlet pipe.
- ❑ Tighten the radiator top hose nut on the intercooler air inlet pipe.
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 780

Special tooling required	
Mot. 799-01	Timing gear wheel immobiliser.
Mot. 1525	Gear extractor for tapered hub injection pump.
Mot. 1768	Injection pump pulley extraction claws.

Equipment required
offset spanner
Diagnostic tool

Tightening torques ▽	
lower engine tie-bar bolts	**190 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray bolts,
- the engine undertray.

123787

❑ Remove

- the bolts (**1**) from the lower engine tie-bar,
- the lower engine tie-bar,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

K9K, and 780

123532

❑ Loosen the clip (**2**) on the intercooler air outlet pipe.

❑ Disconnect the intercooler air outlet pipe on the damper valve.

❑ Move the intercooler air outlet pipe away from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**3**) ,
- the connector (**4**) from the camshaft position sensor.

❑ Unpick the electrical wiring from the injector rail protector cover.

❑ Move the electrical wiringto one side.

123293

❑ Remove:

- the bolt (**5**) on the intercooler air inlet pipe,
- the nut (**6**) on the intercooler air inlet pipe.

123299

❑ Pull the clip (**7**) of the intercooler air inlet pipe on the turbocharger.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move aside the intercooler air inlet pipe.

K9K, and 780

123296

❑ Unclip (**8**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**9**) ,
- the injector rail protector cover nut (**10**) ,
- the injector rail protector cover,
- the dipstick,
- the dipstick well bolts (**11**) ,
- the dipstick well.

124555

❑ Clean the high pressure pump supply (**12**) and (**13**) fuel return rail unions (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

❑ Disconnect:

- (**12**) the high pressure pump supply pipes,
- (**13**) the pipes from the diesel injector fuel return rail.

❑ Fit suitable blanking plugs on:

- the fuel pipes,
- the high pressure pump.

K9K, and 780

123294

❑ Disconnect the heater plug connectors (**14**) .

123846

❑ Disconnect:

- the diesel injector connectors (**15**) ,
- the flow regulation solenoid valve connector (**16**) ,
- the pressure regulation solenoid valve connector (**17**) ,
- the fuel temperature sensor connector (**18**) .

❑ Unclip the injection wiring clip (**19**) .

❑ Remove the nut (**20**) from the injection wiring bracket.

❑ Move aside the rail protector injection wiring.

111748

❑ Remove:

- the rail protector drain pipe,
- the rail protector nuts (**21**) ,
- the rail protector bolt (**22**) ,
- the rail protector,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

K9K, and 780

111747

❑ Clean the diesel return union (**23**) on the high pressure pump (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

> **WARNING**
> To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Disconnect the diesel return union (**23**) from the high pressure pump.

❑ Fit suitable blanking plugs on the diesel return pipe and on the high pressure pump.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123971

❑ Remove:

- the high pressure pump bolts (**24**) ,
- the high pressure pump.

K9K, and 780

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the high pressure pump

a - Remove the high pressure pump pulley

111743

❑

> Note:
>
> If the high pressure pump is replaced, retain the high pressure pump pulley and refit it to the new high pressure pump.

❑ Hold the high pressure pump in a vice with jaws, by the lower mounting on the pulley side.

❑ Immobilise the high pressure pump pulley using a **offset spanner**.

> Note:
>
> The high pressure pump pulley can also be held with a **(Mot. 799-01)**.

❑ Remove the nut from the high-pressure pump pulley.

❑ Fit the **(Mot. 1525)** equipped with the **(Mot. 1768)** to extract the high pressure pump pulley.

> Note:
>
> Be sure not to mark the high pressure pump pulley when extracting using the **(Mot. 1525)** equipped with the **(Mot. 1768)**.

❑ Protect the contact zones between the **(Mot. 1525)** and **(Mot. 1768)** and the high pressure pump pulley.

❑ Extract the high pressure pump pulley.

❑ A damaged high pressure pump pulley must always be replaced.

b - Refitting the high pressure pump pulley

❑ Remove the injector rail from its plastic bag.

❑ Place the high pressure pump in a vice with jaws, securing it by the lower mounting on the pulley side.

❑ Refit:

- the high pressure pump pulley,
- the high pressure pump pulley nut.

❑ Immobilise the high pressure pulley using a **offset spanner** or with the **(Mot. 799-01)**.

❑ Tighten the high pressure pump pulley nut.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the high pressure pump,
- the high pressure pump bolts.

❑ Tighten the high pressure pump bolts.

III - FINAL OPERATION

❑ Remove the blanking plugs.

❑ Connect the fuel return union to the high pressure pump.

❑ Refit:

- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the rail protector,
- the rail protector bolt,
- the rail protector nuts.

K9K, and 780

- ❑ Tighten:
  - the rail protector bolt,
  - the rail protector nuts.
- ❑ Refit the rail protector drain pipe.
- ❑ Fit the injection wiring on the rail protector.
- ❑ Refit the injection wiring bracket nut.
- ❑ Tighten the injection wiring bracket nut.
- ❑ Clip on the injection wiring clip.
- ❑ Connect:
  - the fuel temperature sensor connector,
  - the flow regulation solenoid valve connector,
  - the pressure regulation solenoid valve connector,
  - the diesel injector connectors,
  - the heater plug connectors.
- ❑ Remove and discard the blanking plugs from:
  - the fuel pipes,
  - the high pressure pump.
- ❑ Connect the following pipes:
  - the diesel injector fuel return rail pipes,
  - for the high pressure pump supply.
- ❑ Refit:
  - the dipstick well,
  - the dipstick well bolts.
- ❑ Tighten the dipstick well bolts.
- ❑ Refit:
  - the dipstick,
  - the injector rail protector cover,
  - the injector rail protector cover nut,
  - the injector rail protector cover bolt.
- ❑ Tighten:
  - the injector rail protector cover nut,
  - the injector rail protector cover bolt.
- ❑ Clip on the injector rail protector cover.
- ❑ Fit:
  - the intercooler air inlet pipe,
  - the clip on the intercooler inlet air pipe in its original position.
- ❑ Clip the intercooler air inlet pipe on the turbocharger.
- ❑ Refit:
  - the nut on the intercooler air inlet pipe,
  - the bolt on the intercooler air inlet pipe.
- ❑ Tighten:
  - the nut on the intercooler air inlet pipe,
  - the bolt on the intercooler air inlet pipe.
- ❑ Clip the electrical wiring to the injector rail protector cover.
- ❑ Connect:
  - the camshaft position sensor connector,
  - the damper valve connector,
  - the intercooler air outlet pipe to the damper valve.
- ❑ Tighten the clip on the intercooler outlet pipe.
- ❑ Refit:
  - the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the lower engine tie-bar,
  - the lower engine tie-bar bolts.
- ❑ Torque tighten the **lower engine tie-bar bolts (190 N.m)**.
- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts,
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Refit the engine cover.

K9K, and 780

- ❑ Reprime the fuel circuit using the manual priming pump.
- ❑ Using the **Diagnostic tool**, clear any faults stored in the diesel injection computer.
- ❑ Check that there are no diesel leaks:
  - check the sealing after repair (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) ,
  - run the engine at idling speed until the engine cooling fan starts to operate,
  - accelerate several times in neutral,
  - carry out a road test,
  - check that there are no diesel leaks.
- ❑ Use the **Diagnostic tool** to check that there are no stored faults; clear them if necessary.

V9X

Special tooling required	
Mot. 1906	High pressure pump pinion locking tool

Equipment required
Diagnostic tool

Tightening torques ▽	
high pressure pump pinion nut	**90 N.m**
high pressure pump bolts	**30 N.m**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the front row injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

V9X

133892

❑ Disconnect the fuel pressure regulator connector (**1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

134024

❑ Disconnect:

- the fuel return union (**2**) on the high pressure pump,
- the fuel supply union (**3**) on the high pressure pump.

❑ Fit blanking plugs on the fuel supply and return unions.

❑ Remove:

- the high pressure pump bolts (**4**) ,
- the high pressure pump,
- the high pressure pump O-ring.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Injection pump seal (11,05,04,12)**.

V9X

If replacing the high pressure pump

136244

❑ Put the high pressure pump in a vice with jaws.

136242

❑ Fit the **(Mot. 1906)** (**5**) on the high pressure pump pinion.

136241

❑ Fit:

- the washers of the **(Mot. 1906)** on the high pressure pump,
- the nuts (**6**) of the **(Mot. 1906)** on the high pressure pump.

❑ Tighten the nuts (**6**) on the high pressure pump.

136242

❑ Remove:

- the high pressure pump pinion nut (**7**) ,
- the nuts of the **(Mot. 1906)** from the high pressure pump,

V9X

- the washers of the **(Mot. 1906)** from the high pressure pump,
- the **(Mot. 1906)**.

115699

❑ Fit a separator (**8**) under the high pressure pump pinion (**9**) .

115700

❑ Fit an arm (**10**) on the separator.

❑ Remove:

- the high pressure pump pinion,
- the separator and the arm.

❑ Refit:

- the pinion to the new high pressure pump,
- the high pressure pump nut,

❑ Put the high pressure pump in a vice with jaws.

❑ Fit:

- the **(Mot. 1906)**,
- the washers of the **(Mot. 1906)** on the high pressure pump,
- the nuts of the **(Mot. 1906)** on the high pressure pump.

❑ Tighten the nuts on the high pressure pump.

❑ Torque tighten the **high pressure pump pinion nut (90 N.m)**.

❑ Remove:

- the nuts of the **(Mot. 1906)** from the high pressure pump,

- the washers of the **(Mot. 1906)** from the high pressure pump,
- the **(Mot. 1906)**.

II - REFITTING OPERATION FOR PART CONCERNED

❏

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❏ Lubricate the new high-pressure pump seal with engine oil.

> Note:
> Do not apply pressure to the high-pressure pump gear teeth.
> Check that the high pressure pump is in contact with the cylinder head before positioning the high pressure pump bolts.

❏ Refit:

- a new high pressure pump O-ring.
- the high pressure pump.

❏ Torque tighten the **high pressure pump bolts (30 N.m)**.

❏ Remove the blanking plugs from the fuel supply and return unions.

❏ Connect:

- the fuel return union onto the high pressure pump,
- the fuel supply union onto the high pressure pump.

III - FINAL OPERATION

❏ Connect the fuel pressure regulator connector.

❏ Refit:

- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the front row injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❏ Prime the diesel circuit using the manual priming pump.

❏ Switch on the forced + after ignition feed.

❏ Connect the **Diagnostic tool**.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select the command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❏ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❏ Refit the engine cover.

K9K, and 782

Special tooling required	
Mot. 1768	Injection pump pulley extraction claws.
Mot. 1525	Gear extractor for tapered hub injection pump.

Equipment required
offset spanner

Tightening torques ▽	
high pressure pump pulley nut	**70 N.m**
high pressure pump bolts	**23 N.m**
alternator bolts	**25 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

139192

❑ Remove:

- the alternator protector bolt (**1**) ,
- the alternator protector.

K9K, and 782

139161

- ❑ Remove the alternator bolt (**2**) .
- ❑ Loosen the alternator bolt (**3**) .
- ❑ Tilt the alternator slightly towards the front of the vehicle.
- ❑ Remove:
  - the inner timing cover bolts (**4**) ,
  - the inner timing cover.

138816

- ❑ Disconnect the fuel supply pipe union (**5**) from the high pressure pump.
- ❑ Fit a suitable blanking plug on the opening of:
  - the fuel supply pipe union,
  - the high pressure pump.

138897

- ❑ Disconnect the diesel injector return rail union (**6**) on the high pressure pump.
- ❑ Fit a suitable blanking plug on the opening of:
  - the diesel injector fuel return rail union,
  - the high pressure pump.

K9K, and 782

II - FINAL OPERATION

139160

❑ Remove:

- the high pressure pump bolts (**7**) ,
- the high pressure pump.

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the high pressure pump

140879

❑ Remove:

- the bolt (**8**) from the high pressure pump protector,
- the high pressure pump protector.

K9K, and 782

140880

- ❑ Disconnect the union (**9**) of the exhaust fuel injector solenoid valve supply pipe on the high pressure pump.
- ❑ Fit a suitable blanking plug on the opening of:
  - the union of the exhaust fuel injector solenoid valve supply pipe.
  - the high pressure pump.

a - Remove the high pressure pump pulley

111743

- ❑

> Note:
>
> If the high pressure pump is replaced, retain the high pressure pump pulley and refit it to the new high pressure pump.

- ❑ Place the high pressure pump in a vice with jaws, securing it at the lower mounting on the high pressure pump pulley side.
- ❑ Immobilise the high pressure pump pulley using a **32 mm offset spanner**.
- ❑ Remove the nut from the high-pressure pump pulley.

K9K, and 782

135002

- ❑ Fit tool **(Mot. 1768)** (**10**) on the tool **(Mot. 1525)** (**11**) .
- ❑ Remove the end piece (**12**) from the tool **(Mot. 1525)** (**11**) .
- ❑ Fit the tool **(Mot. 1525)** fitted with the tool **(Mot. 1768)** on the high pressure pump pulley.
- ❑ Protect the contact zones between the tools **(Mot. 1525)**, **(Mot. 1768)** and the high pressure pump pulley.

> Note:
>
> Be sure not to mark the high pressure pump pulley when extracting it using the **(Mot. 1525)** equipped with the **(Mot. 1768)**.

- ❑ Extract the high pressure pump pulley.
- ❑ A damaged high pressure pump pulley must always be replaced.

b - Refitting the high pressure pump pulley

- ❑ Place the new high pressure pump in a vice with jaws, securing it at the lower mounting on the high pressure pump pulley side.
- ❑ Refit the high pressure pump pulley.
- ❑ Immobilise the high pressure pump pulley using a **32 mm offset spanner**.
- ❑ Torque tighten the **high pressure pump pulley nut (70 N.m)**.
- ❑ Remove the blanking plug from the opening of:
  - the high pressure pump,
  - the union of the exhaust fuel injector solenoid valve supply pipe.
- ❑ Connect the union of the exhaust fuel injector solenoid valve supply pipe onto the high pressure pump.
- ❑ Refit the high pressure pump protector.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the high pressure pump.
- ❑ Torque tighten the **high pressure pump bolts (23 N.m)**.

III - FINAL OPERATION

- ❑ Remove the blanking plugs from the opening of:
  - the high pressure pump,
  - the diesel injector fuel return rail union.
- ❑ Connect the diesel injector fuel return rail union on the high pressure pump.
- ❑ Remove the blanking plugs from the opening of:
  - the high pressure pump,
  - from the fuel supply pipe union.
- ❑ Connect the fuel supply pipe union to the high pressure pump.
- ❑ Refit the inner timing cover.
- ❑ Fit the alternator in place.
- ❑ Refit the alternator upper bolt.
- ❑ Torque tighten the **alternator bolts (25 N.m)**.
- ❑ Refit the alternator protector.
- ❑ Refit:
  - the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
  - the engine undertray,
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

K9K, and 782

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

❑ Reprime the fuel circuit using the manual priming pump.

❑ Check that there are no diesel leaks.

M9R, and 742 or 744 or 746

Equipment required
compressed air nozzle

Tightening torques ▽	
fuel pressure regulator bolts	**6 Nm**
clip on the air filter box air outlet pipe at the turbocharger end	**5.5 Nm**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Loosen the air filter unit air outlet pipe clip on the turbocharger side.

❑ Unclip:

- the air flowmeter wiring on the air filter box air outlet pipe,
- the turbocharging pressure regulator control pipe of the turbocharger on the air filter unit air outlet pipe.

❑ Remove the air filter box air outlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123572

❑ Disconnect the fuel pressure regulator connector (**1**) .

M9R, and 742 or 744 or 746

123573

❑

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

❑ Disconnect the fuel return pipe quick release union (**2**) on the high pressure pump.

❑ Move the fuel return pipe on the high pressure pump to one side.

❑ Move the engine wiring aside.

123574

❑

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

❑ Remove:

- the fuel pressure regulator bolts,

- fuel pressure regulator.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the fuel pressure regulator seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean:

- the fuel pressure regulator bearing faces.

❑ Wipe the bearing face of the fuel pressure regulator on the high pressure pump using a **compressed air nozzle** (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

❑ Remove:

- the blanking plug of the fuel pressure regulator,

- the fuel pressure regulator seal.

❏ Refit the new fuel pressure regulator seal.

❏ Lubricate the fuel pressure regulator seal.

❏ Remove the blanking plug on the high pressure pump.

❏ Flush the fuel pressure regulator housing by activating the manual priming pump.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the fuel pressure regulator by gently rotating it clockwise and gently pushing it until it is fully engaged,
- the fuel pressure regulator bolts.

❏ Torque tighten the **fuel pressure regulator bolts (6 Nm)**.

❏ Connect the fuel pressure regulator connector.

III - FINAL OPERATION.

❏ Fit the engine wiring.

❏ Remove the blanking plug.

❏ Connect the fuel return pipe quick release union to the high pressure pump.

❏ Refit the air filter box air outlet pipe.

❏ Clip:

- the turbocharging pressure regulator control pipe of the turbocharger on the air filter box air outlet pipe,
- the air flowmeter wiring to the air filter box air outlet pipe.

❏ Connect the oil vapour rebreathing pipe.

❏ Torque tighten the **clip on the air filter box air outlet pipe at the turbocharger end (5.5 Nm)**.

❏ Refit:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

Fuel pressure regulator: Removal - Refitting

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Equipment required
compressed air nozzle

Tightening torques ▽	
fuel pressure regulator bolts	**6 N.m**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Unclip:

- the air flowmeter wiring on the air filter box air outlet pipe,
- the turbocharging pressure regulator control pipe on the air filter box air outlet pipe.

❑ Loosen the air filter box air outlet pipe clip on the turbocharger side.

❑ Remove the air filter box air outlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124534

❑ Disconnect the fuel pressure regulator connector (**1**) .

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

124533

❑

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Remove:

- the bolts (**2**) from the fuel pressure regulator,
- fuel pressure regulator.

❑ Insert the blanking plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the fuel pressure regulator seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces of the fuel pressure regulator.

❑ Wipe the bearing face of the fuel pressure regulator on the high pressure pump using a **compressed air nozzle** (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

❑ Remove:

- the blanking plug from the fuel pressure regulator,
- the fuel pressure regulator seal.

❑ Refit the new fuel pressure regulator seal.

❑ Lubricate the fuel pressure regulator seal.

❑ Remove the blanking plug on the high pressure pump.

❑ Flush the fuel pressure regulator housing by activating the manual priming pump.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the fuel pressure regulator, rotating it slightly in a clockwise direction while pushing it gently down until fully engaged,
- the fuel pressure regulator bolts.

❑ Torque tighten the **fuel pressure regulator bolts (6 N.m)**.

❑ Connect the fuel pressure regulator connector.

III - FINAL OPERATION

❑ Refit the air filter box air outlet pipe.

❑ Tighten the air filter box air outlet pipe clip on the turbocharger side.

❑ Clip:

- the turbocharging pressure regulator control pipe onto the air filter box air outlet pipe,
- the air flowmeter wiring onto the air filter box air outlet pipe,

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Fuel pressure regulator: Removal - Refitting

V9X

Equipment required
compressed air nozzle
Diagnostic tool

Tightening torques ▽	
fuel pressure regulator bolts	**6 N.m**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

WARNING

Once the warranty period for the high pressure pump has expired, only the pressure regulator can be replaced separately.

Whilst the warranty period for the high pressure pump is still running, the high pressure pump should be replaced as a whole if the pressure regulator displays a fault.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133892

❑ Disconnect the fuel pressure regulator connector (**1**) .

❑ Remove:

- the bolts (**2**) from the fuel pressure regulator,
- the fuel pressure regulator,
- the fuel pressure regulator seal.

❑ Insert the blanking plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **part always to be replaced: fuel pressure regulator seal on the injection pump (11,05,10,20).**

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces of the fuel pressure regulator.

❑ Wipe the bearing face of the fuel pressure regulator on the high pressure pump using a **compressed air nozzle** (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

V9X

❏ Prepare the fuel pressure regulator by:

- removing the protective plug,
- checking the seal position,
- lubricating the new O-ring with clean diesel fuel.

> Note:
>
> Lubrication is very important to avoid external leakage.

❏ Remove the protective plug from the opening in the high pressure pump.

❏ Flush the fuel pressure regulator housing by activating the manual priming pump.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit a new seal on the fuel pressure regulator.

❏ Fit the new fuel pressure regulator by gently rotating it clockwise and gently pushing it until it is completely in.

❏ Torque tighten the **fuel pressure regulator bolts (6 N.m)**.

❏ Connect the fuel pressure regulator connector.

III - FINAL OPERATION

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Switch on the forced + after ignition feed.

❏ Connect the **Diagnostic tool**.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❏ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❏ Refit the engine cover.

M9R, and 742 or 744 or 746

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the intercooler air inlet pipe bolts (**2**) .

113282

❑ Rotate the intercooler air inlet pipe clip (**3**) .

❑ Remove the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123584

❑ Unclip the fuel return pipe (**4**) .

M9R, and 742 or 744 or 746

123573

❑

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the fuel return pipe (**5**) on the quick-release union on the high pressure pump side.

❑ Fit a blanking plug on the quick-release union on the high pressure pump side.

❑ Disconnect the fuel return pipe from the injector rail.

❑ Fit a blanking plug on the injector rail.

123585

❑ Disconnect the fuel return pipe (**6**) from the injector return rail.

❑ Fit a blanking plug on the injector return rail.

❑ Disconnect the diesel return pipe from the fuel return pipe leading to the tank.

❑ Fit a blanking plug on the fuel return pipe leading to the tank.

❑ Remove the fuel return pipe.

M9R, and 742 or 744 or 746

REFITTING

I - REFITTING PREPARATION OPERATION

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a .

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seal is fitted in the right direction on the turbocharger side.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Keep the pipe unions away from contaminated areas.

> Note:
>
> During this operation it is essential to correctly position the fuel return pipes.

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Fit the fuel return pipe.

❑ Remove the blanking plugs.

M9R, and 742 or 744 or 746

- Connect the fuel return pipe:
  - to the fuel return pipe leading to the tank,
  - to the injector rail,
  - to the injector return rail,
  - the high pressure pump.

III - FINAL OPERATION

- Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

- Connect the intercooler air inlet pipe to the turbocharger.
- Refit the bolts for the intercooler inlet air pipe on the intake distributor.
- Tighten the intercooler air inlet pipe bolts on the intake distributor.
- Fit the cooling radiator top hose to the intercooler air inlet pipe.
- Refit the cooling radiator top hose nut on the intercooler air inlet pipe.
- Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.
- Refit the engine cover.

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Equipment required
tweezers

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

122430

❏ Remove the nut (**1**) from the radiator top hose on the intercooler air inlet pipe.

❏ Remove the radiator top hose.

❏ Remove the bolts (**2**) from the intercooler air inlet pipe on the inlet distributor.

113282

❏ Rotate the intercooler air inlet pipe clip (**3**) at the turbocharger end.

❏ Disconnect the intercooler air inlet pipe on the turbocharger side.

❏ Move the intercooler inlet air pipe to one side.

❏ Remove the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - OPERATION FOR REMOVAL OF PART CONCERNED

124697

❑ Unclip the fuel return pipe.

> **WARNING**
> To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the fuel return pipe (**4**) .

❑ Fit blanking plugs.

124534

❑ Disconnect the fuel return pipe (**5**) on the high pressure pump.

❑ Fit a blanking plug.

❑ Remove the fuel return pipe.

REFITTING

I - REFITTING PREPARATION OPERATION

115068

❑ Remove the intercooler air inlet pipe seal at the turbocharger end using a **tweezers**.

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seal is fitted in the right direction in its groove.

❑ Refit a new seal to the intercooler air inlet pipe at the turbocharger end.

❑ Rotate the intercooler air inlet pipe clip in order to refit it in its groove.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

> **WARNING**
>
> Keep the pipe unions away from contaminated areas.

> Note:
>
> During this operation it is essential to correctly position the fuel return pipes.

❑ Fit the fuel return pipe.

❑ Remove the blanking plugs.

❑ Connect the fuel return pipe:

- to the fuel return pipe leading to the tank,
- to the injector rail,
- to the injector return rail,
- to the high pressure pump.

III - FINAL OPERATION

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

❑ Fit the intercooler air inlet pipe.

> Note:
>
> The intercooler air inlet pipe is correctly clipped onto the turbocharger when the clip is fitted into the turbocharger groove.

❑ Clip the intercooler air inlet pipe on the turbocharger side.

❑ Refit the intercooler air inlet pipe bolts on the inlet distributor.

❑ Tighten the intercooler air inlet pipe bolts on the inlet distributor.

❑ Fit the radiator top hose on the intercooler air inlet pipe.

❑ Refit the radiator top hose nut on the intercooler air inlet pipe.

❑ Tighten the radiator top hose nut on the intercooler air inlet pipe.

❑ Refit the front engine cover.

Diesel return pipe: Removal - Refitting

V9X

Equipment required
Diagnostic tool

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

Keep the pipe unions away from contaminated areas.

REMOVAL

I - REFITTING PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the front engine cover.

137867

❏ Unclip the cover of the front row injector rail protector at (**1**) .

❏ Remove the cover of the front row injector rail protector.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

133899

- ❑ Clean the fuel return pipe unions (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .
- ❑ Disconnect the fuel return pipe union (**2**) on the diesel injector fuel return rail.
- ❑ Fit a blanking plug on the fuel return pipe union on the diesel injector fuel return rail.
- ❑ Disconnect the fuel return pipe union (**3**) from the injector rail.
- ❑ Fit a blanking plug on the fuel return pipe union on the front row injector rail.
- ❑ Disconnect the fuel return pipe union (**4**) from the high pressure pump.
- ❑ Fit a blanking plug on the fuel return pipe union on the high pressure pump.
- ❑ Disconnect the fuel return pipe union (**5**) .
- ❑ Fit a blanking plug on the fuel return pipe union.
- ❑ Unclip:
  - the fuel return pipe from its support,
  - the fuel return pipe from the fuel supply pipe.
- ❑ Remove the fuel return pipe.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the fuel return pipe.
- ❑ Clip:
  - the fuel return pipe on the fuel supply pipe,
  - the fuel return pipe on its support.
- ❑ Remove the blanking plug from the fuel return pipe union.
- ❑ Connect the fuel return pipe union.
- ❑ Remove the blanking plug from the fuel return pipe union of the high pressure pump.
- ❑ Connect the fuel return pipe union on the high pressure pump.
- ❑ Remove the blanking plug from the fuel return pipe union of the injector rail.
- ❑ Connect the fuel return pipe union on the injector rail.
- ❑ Remove the blanking plug from the fuel return pipe union of the diesel injector fuel return rail.
- ❑ Connect the fuel return pipe union on the diesel injector fuel return rail.

III - FINAL OPERATION

- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Switch on the forced + after ignition feed.
- ❑ Connect the **Diagnostic tool**.
- ❑ In the **Diagnostic tool** :
  - select the repair mode,
  - select the programming mode,
  - select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

V9X

- ❏ Check:
  - the correct operation of the high pressure fuel circuit,
  - that there are no leaks.
- ❏ Refit the cover of the front row injector rail protector.
- ❏ Clip on the cover of the front row injector rail protector.
- ❏ Refit the engine cover.

M9R

Equipment required
tweezers

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the intercooler air inlet pipe bolts (**2**) .

113282

❑ Rotate the intercooler air inlet pipe clip (**3**) .

❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) .

M9R

II - REMOVAL OPERATION FOR PART CONCERNED

123585

❑

> **WARNING**
> To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the quick-release union between the fuel return pipe and the injector fuel return rail.

❑ Place blanking plugs:

- on the fuel return pipe,
- on the injector fuel return rail.

123587

114880

❑ Remove the bolt (**2**) from the injector fuel return rail union.

❑ Lift up the clips (**3**) between the fuel return rail and the injectors using a flat-blade screwdriver.

❑ Disconnect the injector fuel return rail.

❑ Remove the injector fuel return rail.

❑ Fit blanking plugs onto the injectors.

M9R

REFITTING

I - REFITTING PREPARATION OPERATION

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe seal is fitted in the right direction on the turbocharger side.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Remove the blanking plugs.

❑ Refit the injector fuel return rail.

❑ Clip on the injector fuel return rail unions.

❑ Connect the injector fuel return rail quick-release union.

❑ Refit the injector fuel return rail bolt on the rocker cover.

❑ Tighten the injector fuel return rail bolt on the rocker cover.

M9R

III - FINAL OPERATION.

- ❑ Refit the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) .
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).
- ❑ Refit the intercooler air inlet pipe on the turbocharger temporarily.
- ❑ Prime the fuel circuit using the manual pump.
- ❑ Start the engine.
- ❑ Accelerate several times under no load.
- ❑ Check that there are no fuel leaks.
- ❑ Move the intercooler inlet air pipe to one side.
- ❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

- ❑ Connect the intercooler air inlet pipe to the turbocharger.
- ❑ Refit the bolts for the intercooler inlet air pipe on the intake distributor.
- ❑ Tighten the intercooler air inlet pipe bolts on the intake distributor.
- ❑ Fit the cooling radiator top hose on the intercooler air inlet pipe.
- ❑ Refit the cooling radiator top hose nut on the intercooler air inlet pipe.
- ❑ Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.
- ❑ Refit the engine cover.

Diesel injector fuel return rail: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
Diagnostic tool

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,

- the engine undertray bolts,

- the engine undertray,

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),

- the front row injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

- the high pressure pipe between injector 1 and the injector rail (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

Diesel injector fuel return rail: Removal - Refitting

V9X

134226

- ❑ Unclip:
  - the wiring of the exhaust gas recirculation solenoid valve at (**1**) ,
  - the cooling hose at (**2**) .
- ❑ Unclip the cover of the back row injector rail protector at (**3**) .
- ❑ Remove the cover (**4**) of the back row injector rail protector.
- ❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

134107

- ❑ Separate the clip (**5**) of the exhaust gas recirculation solenoid valve cooling hose using the tool **(Mot. 1448)**.
- ❑ Disconnect the exhaust gas recirculation solenoid valve cooling hose.
- ❑ Separate the clip (**6**) of the exhaust gas recirculation solenoid valve outlet hose.
- ❑ Disconnect the exhaust gas recirculation solenoid valve outlet hose.

V9X

134103

❑ Remove the bolts (**7**) of the back row injector rail protector.

❑ Raise the back row injector rail protector.

134109

❑ Undo:

- the clamp (**8**) on the intercooler air outlet pipe,
- the clip (**9**) of the intercooler air outlet pipe on the damper valve.

❑ Remove the intercooler air outlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134102

114880

❑ Lift up the clips (**10**) between the fuel return rail and the injectors using a flat-blade screwdriver.

V9X

133899

❑ Remove:

- the bolt (**11**) of the injector fuel return rail,
- the injector fuel return rail.

❑ Fit blanking plugs onto the injectors.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the blanking plugs.

❑ Refit the injector fuel return rail.

❑ Clip on the injector fuel return rail unions.

III - FINAL OPERATION

❑ Refit the intercooler air outlet pipe.

❑ Fit the back row injector rail protector.

❑ Connect the exhaust gas recirculation solenoid valve outlet hose.

❑ Fit the clip of the exhaust gas recirculation solenoid valve outlet hose using the tool **(Mot. 1448)**.

❑ Connect the exhaust gas recirculation solenoid valve cooling hose.

❑ Fit the clip of the exhaust gas recirculation solenoid valve cooling hose using the tool **(Mot. 1448)**.

❑ Refit the cover of the back row injector rail protector.

❑ Clip on the cover of the back row injector rail protector.

❑ Clip:

- the wiring of the exhaust gas recirculation solenoid valve,
- the cooling hose.

❑ Refit:

- the high pressure pipe between injector 1 and the injector rail (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the front row injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Switch on the forced + after ignition feed.

❑ Connect the **Diagnostic tool**.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

V9X

- Check:
  - the correct operation of the high pressure fuel circuit,
  - that there are no leaks.
- Refit the engine cover.

K9K, and 780

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123532

❑ Loosen the clip (**1**) on the intercooler air outlet pipe.

❑ Disconnect the intercooler outlet air pipe on the damper valve.

❑ Move the intercooler air outlet pipe away from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❑ Unpick the electrical wiring from the injector rail protector cover.

❑ Move the electrical wiring to one side.

123293

❑ Remove:

- the bolt (**4**) on the intercooler air inlet pipe,
- the nut (**5**) on the intercooler air inlet pipe.

K9K, and 780

123299

❑ Pull the clip (**6**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move aside the intercooler air inlet pipe.

123296

❑ Unclip (**7**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**8**) ,
- the injector rail protector cover nut (**9**) ,
- the injector rail protector cover,
- the dipstick,
- the dipstick well bolts (**10**) ,
- the dipstick well.

II - OPERATION FOR REMOVAL OF PART CONCERNED

111747

❑ Disconnect the fuel temperature sensor connector (**11**) .

❑ Clean the diesel injector fuel return rail unions (**12**) on the high pressure pump (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

> **WARNING**
> To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Disconnect the diesel injector fuel return rail unions (**12**) on the high pressure pump.

❑ Fit suitable blanking plugs on the diesel injector fuel return rail and on the high pressure pump.

❑ Clean the unions (**13**) of the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

K9K, and 780

First step for removing the fuel return rail unions from the diesel injectors

111749

❑

WARNING

Ensure that the clip is not completely removed from its housing, otherwise it may be damaged when the diesel return union is removed.

In the case where a clip has been completely removed from its housing, remove the injector concerned and replace the clip with a new clip (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) .

❑ Using a fine, flat screwdriver, push the lower sections of the diesel injector fuel return rail unions (**14**) towards the rocker cover to unlock them and position them fully up against the rocker cover.

Second step for removing the fuel return rail unions from the diesel injectors

120940

❑

Note:

With sufficient force applied to the clip while pressing continuously with the screwdriver, the diesel injector fuel return rail unions will come out effortlessly.

WARNING

Do not use the screwdriver as a lever on the injector fuel return unions.

❑ Use a thin, flat-blade screwdriver to push down (**15**) on the lower tabs of the clips previously in contact with the rocker cover, without fully removing the clips from their diesel injectors.

❑ Manually remove the diesel injector fuel return rail unions (**16**) , while pressing (**15**) on the lower tabs of the clips using a thin, flat-blade screwdriver.

❑ Fit suitable blanking plugs on:

- the diesel injector fuel return rail unions,

- the diesel injector openings.

K9K, and 780

111747

❑ Unclip the diesel injector fuel return rail from the rocker cover at (**17**) .

> Note:
>
> If the diesel injector fuel return rail is to be re-used, keep it in a sealed plastic bag during the removal operation.

❑ Remove the diesel injector fuel return rail.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Check the condition of the seals on the fuel return unions on the injectors. Check that they are not cut or crushed, and have not come out of their grooves. Replace the entire diesel return pipe if one of the components is damaged

❑ Push the diesel injector fuel return rail union clips towards the front of the vehicle to place them in their initial position.

❑ Take the diesel injector fuel return rail pipe out of its packaging.

❑ Remove the blanking plugs on:

- the diesel injector fuel return rail unions,

- the diesel injector openings.

❑ Lubricate the unions of the diesel injector fuel return rail using **SILICONE-FREE LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) so that the seals are completely covered with product.

111747

❑ Position the unions of the diesel injector fuel return rail in front of the opening of each diesel injector, starting with injector number 4 (**18**) .

K9K, and 780

- ❑ Clip the unions of the diesel injector fuel return rail onto the opening of each diesel injector, starting with injector number 4.

> Note:
>
> Check that the diesel injector fuel return unions are correctly clipped on.

- ❑ Connect:
  - the diesel injector fuel return rail union on the high pressure pump,
  - the fuel temperature sensor connector.
- ❑ Clip the diesel injector return rail on the rocker cover.

III - FINAL OPERATION

- ❑ Refit:
  - the dipstick well,
  - the dipstick,
  - the injector rail protector cover,
- ❑ Clip on the injector rail protector cover.
- ❑ Fit:
  - the intercooler air inlet pipe,
  - the clip on the intercooler inlet air pipe in its original position.
- ❑ Clip the intercooler air inlet pipe on the turbocharger.
- ❑ Refit:
  - the nut on the intercooler air inlet pipe,
  - the bolt on the intercooler air inlet pipe.
- ❑ Clip the electrical wiring to the injector rail protector cover.
- ❑ Connect:
  - the camshaft position sensor connector,
  - the damper valve connector,
  - the intercooler air outlet pipe on the damper valve.
- ❑ Tighten the clip on the intercooler outlet pipe.
- ❑ Refit the engine cover.
- ❑ Check the high pressure circuit sealing (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) .

Diesel injector fuel return rail: Removal - Refitting

K9K, and 782

Equipment required
tweezers

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

- ❑ Disconnect the turbocharger pressure sensor connector (**4**) .
- ❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.
- ❑ Pull the clip (**6**) of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

138551

- ❑ Unclip the wiring (**7**) of the damper valve.

138550

- ❑ Unclip the injector rail protector cover at (**8**) .
- ❑ Remove:
  - the bolts (**9**) from the injector rail protector cover,
  - the cover of the injector rail protector.

138899

- ❑ Disconnect the connector (**10**) for each diesel injector.

K9K, and 782

II - OPERATION FOR REMOVAL OF PART CONCERNED

138901

❑ Disconnect:

- the fuel temperature sensor connector (**11**) ,
- the diesel return pipe union (**12**) .

❑ Insert the blanking plugs.

138900

❑ Disconnect the fuel return rail from the diesel injectors (**13**) .

❑ Insert the blanking plugs.

138897

❑ Disconnect the union (**14**) of the diesel injector fuel return rail.

❑ Insert the blanking plugs.

138898

❑ Unclip the diesel injector fuel return rail (**15**) .

❑ Remove the diesel injector fuel return rail.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)**.

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**

❑ **parts always to be replaced: Diesel injector fuel return rail (11,05,02)**.

K9K, and 782

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

115069

❑

> Note:
>
> Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round.

❑ Refit:

- a new intercooler air outlet pipe seal,
- a new intercooler air inlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit a new diesel injector fuel return rail.

❑ Clip on the diesel injector fuel return rail.

❑ Remove the blanking plugs from:

- the opening of the high pressure pump union,
- the opening of the diesel injector fuel return rail.

❑ Connect the union of the diesel injector fuel return rail.

❑ Remove the blanking plugs from the opening of each diesel injector.

❑ Connect the diesel injector fuel return rail to the diesel injectors.

❑ Remove the blanking plugs from:

- the opening of the diesel fuel return pipe union,
- the opening of the diesel injector fuel return rail.

❑ Connect:

- the diesel return pipe,
- the fuel temperature sensor connector.

III - FINAL OPERATION

❑ Connect the connector for each diesel injector.

❑ Refit the injector rail protector cover.

❑ Clip on the damper valve wiring.

❑ Fit the clip for the intercooler air outlet pipe.

❑ Clip the intercooler air outlet pipe onto the damper valve.

❑ Clip on the wiring of the turbocharging pressure sensor.

❑ Connect the turbocharger pressure sensor connector.

❑ Refit the clip of the intercooler air inlet pipe.

❑ Clip on the intercooler air inlet pipe.

❑ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

❑ Check that there are no diesel leaks (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) .

M9R

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Remove the front engine cover.

122430

❏ Remove:

- the nut (**1**) from the cooling radiator top hose on the intercooler air inlet pipe,
- the bolts (**2**) from the intercooler air inlet pipe on the intake distributor.

❏ Move aside the cooling radiator top hose.

113282

❏ Rotate the intercooler air inlet pipe clip (**3**) on the turbocharger side.

❏ Move the intercooler inlet air pipe to one side.

II - REMOVAL OPERATION FOR PART CONCERNED

115705

❏ Remove the injector rail protector panel.

M9R

123582

❑ Remove:

- the bolts (**5**) from the injector rail protector,
- the injector rail protector.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the intercooler air inlet pipe seal.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑ Refit the new intercooler air inlet pipe seal.

> Note:
>
> Check that the seal on the intercooler air inlet pipe is fitted correctly and the right way round.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the injection rail protector,
- the injector rail protector bolts.

❑ Tighten the injector rail protector bolts.

❑ Refit the injector rail protector panel.

III - FINAL OPERATION.

❑

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Clip the intercooler air inlet pipe to the turbocharger.

❑ Refit:

- the intercooler air inlet pipe bolts on the air intake distributor,
- the cooling radiator top hose nut.

M9R

- Tighten:
  - the intercooler air inlet pipe bolts on the air intake distributor,
  - the cooling radiator top hose nut.
- Refit the engine cover.

Injector rail protector: Removal - Refitting

V9X

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

Note:

This method describes the removal and refitting of the front row injector rail protector and the back row injector rail protector.

REMOVING THE FRONT ROW INJECTOR RAIL PROTECTOR

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

137867

❑ Unclip the cover of the front row injector rail protector at (**1**) .

❑ Remove the cover of the front row injector rail protector.

133899

- ❑ Clean the fuel return pipe unions (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .
- ❑ Disconnect the fuel return pipe union (**2**) on the diesel injector fuel return rail.
- ❑ Fit blanking plugs on the fuel return pipe union on the diesel injector fuel return rail.
- ❑ Disconnect the fuel return pipe union (**3**) on the injector rail.
- ❑ Fit blanking plugs on the fuel return pipe union on the injector rail.

133897

- ❑ Disconnect the diesel injector connectors (**4**) .
- ❑ Move aside the diesel injector wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133886

- ❑ Unclip the vacuum pipe from the rail protector at (**5**) .
- ❑ Remove:
  - the bolts (**6**) of the front row injector rail protector,
  - the front row injector rail protector,
  - the seal of the front row injector rail protector.

REFITTING THE FRONT ROW INJECTOR RAIL PROTECTOR

I - REFITTING PREPARATION OPERATION

- ❑ Always replace the seal of the front row injector rail protector.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - a new seal of the front row injector rail protector,
  - the front row injector rail protector.
- ❑ Clip the vacuum pipe onto the injector rail protector.

III - FINAL OPERATION

- ❑ Position the diesel injector wiring.
- ❑ Connect the diesel injector connectors.

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

V9X

- ❑ Remove the blanking plugs from the fuel return pipe on the diesel injector fuel return rail.
- ❑ Connect the fuel return pipe union on the diesel injector fuel return rail.
- ❑ Remove the blanking plugs from the fuel return pipe on the injector rail.
- ❑ Connect the fuel return pipe union to the injector rail.
- ❑ Refit the cover of the front row injector rail protector.
- ❑ Clip on the cover of the front row injector rail protector.
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

REMOVING THE BACK ROW INJECTOR RAIL PROTECTOR

I - OPERATION FOR REMOVAL OF PART CONCERNED

- ❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Remove:
  - the engine cover,
  - the engine undertray bolts,
  - the engine undertray.
- ❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Remove:
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).
- ❑ Remove:
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

134106

- ❑ Unclip the vacuum pipe from the rail protector at (**7**) .

V9X

134226

❑ Unclip:

- the wiring of the exhaust gas recirculation solenoid valve at (**8**) ,
- the cooling hose at (**9**) .

❑ Unclip the cover of the back row injector rail protector at (**10**) .

❑ Remove the cover of the back row injector rail protector.

❑ Disconnect the diesel injector connectors.

❑ Move aside the diesel injector wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134103

❑ Remove:

- the bolts (**11**) of the back row injector rail protector,
- the back row injector rail protector,
- the seal of the back row injector rail protector.

REFITTING THE BACK ROW INJECTOR RAIL PROTECTOR

I - REFITTING PREPARATION OPERATION

❑ Always replace the seal of the back row injector rail protector.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal of the back row injector rail protector,
- the back row injector rail protector.

III - FINAL OPERATION

❑ Position the diesel injector wiring.

❑ Connect the diesel injector connectors.

❑ Refit the cover of the back row injector rail protector.

❑ Clip on the cover of the back row injector rail protector.

V9X

- Clip:
  - the cooling hose,
  - the wiring of the exhaust gas recirculation solenoid valve.
- Clip the vacuum pipe onto the injector rail protector.
- Refit:
  - the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .
- Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray,
  - the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 780

Equipment required
Diagnostic tool

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT
Wear latex gloves during the operation.

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove the front engine cover.

123532

❑ Undo the clip (**1**) from the intercooler air outlet pipe on the damper valve.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

❑ Move aside the intercooler air outlet pipe from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❑ Detach the electrical wiring from the injector rail protector cover.

❑ Move aside the electrical wiring.

123293

❑ Remove:

- the intercooler air inlet pipe bolt (**4**) ,
- the intercooler air inlet pipe nut (**5**) .

123299

❑ Pull the intercooler air inlet pipe clip (**6**) .

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler air inlet pipe to one side.

123296

❑ Detach the injector rail protector cover (**7**) .

❑ Remove:

- the injector rail protector cover bolt (**8**) ,
- the injector rail protector cover nut (**9**) ,
- the injector rail protector cover,

❑ Fit:

- the intercooler air inlet pipe,
- the intercooler air inlet pipe clip in its original position.

❑ Clip the intercooler air inlet pipe to the turbocharger.

❑ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler air outlet pipe on the damper valve.

❑ Tighten the intercooler air outlet pipe clip.

II - CHECKING OPERATION FOR PART CONCERNED

❑ Apply the checking procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « diesel injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « high pressure pipe » in the « list of components controlled by this computer » section,
- carry out the operations described in the « after repair procedure » section.

III - FINAL OPERATION.

❑ Undo the intercooler air outlet pipe clip on the damper valve.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

❑ Move aside the intercooler air outlet pipe from the damper valve.

❑ Disconnect:

- the damper valve connector,
- the camshaft position sensor connector.

❑ Pull the intercooler air inlet pipe clip.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler air inlet pipe to one side.

❑ Refit:

- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

K9K, and 780

- ❑ Tighten:
  - the injector rail protector cover nut,
  - the injector rail protector cover bolt.
- ❑ Clip on the injector rail protector cover.
- ❑ Fit:
  - the intercooler air inlet pipe,
  - the intercooler air inlet pipe clip in its original position.
- ❑ Clip the intercooler air inlet pipe to the turbocharger.
- ❑ Refit:
  - the nut to the intercooler air inlet pipe,
  - the intercooler air inlet hose bolt.
- ❑ Tighten:
  - the nut to the intercooler air inlet pipe,
  - the intercooler air inlet hose bolt.
- ❑ Clip the electrical wiring on the injector rail protector cover.
- ❑ Connect:
  - the camshaft position sensor connector,
  - the damper valve connector,
  - the intercooler air outlet pipe on the damper valve.
- ❑ Tighten the intercooler air outlet pipe clip.
- ❑ Refit the engine cover.

K9K, and 782

Equipment required
Diagnostic tool
tweezers

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

CHECK

I - PREPARATION OPERATION FOR CHECK

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

- ❑ Disconnect the turbocharger pressure sensor connector (**4**) .
- ❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.
- ❑ Pull the clip (**6**) of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

138551

- ❑ Unclip the wiring (**7**) of the damper valve.

138550

- ❑ Unclip the injector rail protector cover at (**8**) .
- ❑ Remove:
  - the bolts (**9**) from the injector rail protector cover,
  - the cover of the injector rail protector.
- ❑ Fit the clip for the intercooler air outlet pipe.
- ❑ Clip the intercooler air outlet pipe on the damper valve.
- ❑ Connect the turbocharger pressure sensor connector.
- ❑ Refit the clip of the intercooler air inlet pipe.
- ❑ Clip the intercooler air inlet pipe onto the turbocharger air outlet pipe.

II - CHECKING OPERATION FOR PART CONCERNED

- ❑ Apply the checking procedure using the **Diagnostic tool** :
  - connect the **Diagnostic tool**,
  - select the « Diesel injection computer » ,
  - go to repair mode,
  - display the « Before/after repair procedure » for the computer selected,
  - select « High pressure pipe » in the « List of components controlled by this computer » section,
  - carry out the operations described in the « After repair procedure » section.

K9K, and 782

III - FINAL OPERATION

❏ Remove the clip from the intercooler air inlet pipe.

❏ Disconnect the intercooler air inlet pipe.

❏ Move aside the intercooler air inlet pipe.

❏ Disconnect the turbocharging pressure sensor connector.

❏ Pull the clip of the intercooler air outlet pipe.

❏ Move the intercooler air outlet pipe to one side.

115068

❏ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

115069

❏

> Note:
>
> Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round

❏ Refit:

- a new intercooler air outlet pipe seal,
- a new intercooler air inlet pipe seal.

❏ Refit the injector rail protector cover.

❏ Clip on the damper valve wiring.

❏ Fit the clip for the intercooler air outlet pipe.

❏ Clip the intercooler air outlet pipe on the damper valve.

❏ Clip on the wiring of the turbocharging pressure sensor.

❏ Connect the turbocharger pressure sensor connector.

❏ Refit the clip of the intercooler air inlet pipe.

❏ Clip the intercooler air inlet pipe onto the turbocharger air outlet pipe.

❏ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

M9R, and 742 or 744 or 746

Tightening torques ▽	
nut of the high pressure pipe between the pump and the rail on the high pressure pump side	**32 N.m**
nut of the high pressure pipe between the pump and the rail on the injector rail side	**32 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the air pipe bolts (**2**) at the intercooler inlet.

113282

❑ Rotate the clip (**3**) on the intercooler air inlet pipe.

❑ Remove the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

M9R, and 742 or 744 or 746

II - OPERATION FOR REMOVAL OF PART CONCERNED

123575

❑ Remove the protector (**4**) from the nut on the high pressure pipe between the pump and the rail on the high pressure pump side.

123588

❑ Disconnect the connector from the camshaft sensor.

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Remove:

- the retaining bolt (**5**) from the high pressure pipe between the pump and the rail on the rocker cover,
- the bolt (**6**) from the high pressure pipe mounting between the pump and the rail,
- the high pressure pipe mounting between the pump and the rail,
- the nut (**7**) of the high pressure pipe between the pump and the rail on the high pressure pump using the tool, part number **77 11 223 720**,
- the nut (**8**) of the high pressure pipe between the pump and the rail on the injector rail using the "prosteel" tool, part number **77 11 223 721**,
- the high pressure pipe between the pump and the rail.

❑ Fit blanking plugs on the high pressure pump and the injector rail.

❑ Remove the rubber pad between the high pressure pipe and the rocker cover.

M9R, and 742 or 744 or 746

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the high pressure pipe between the pump and the rail,
- the intercooler air inlet pipe seal.

WARNING

Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a .

115069

❑

Note:

Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Refit the new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the high pressure pipe between the high pressure pump and the injector rail.

❑ Position:

- the high pressure pipe olive between the pump and the rail on the injector rail,
- the high pressure pipe olive between the pump and the rail on the high pressure pump.

❑ Correctly position the pad between the high pressure pipe and the rocker cover.

❑ Fit, without tightening, the nuts on the high pressure pipe between the pump and the rail, starting with the nut on the injector rail side.

❑ Tighten to torque:

- the **nut of the high pressure pipe between the pump and the rail on the high pressure pump side (32 N.m)** using the tool, part number **77 11 223 720**,

M9R, and 742 or 744 or 746

- the **nut of the high pressure pipe between the pump and the rail on the injector rail side (32 N.m)** using the "prosteel" tool, part number **77 11 223 721**.

❑ Refit the protector for the high pressure pipe nut between the pump and the rail on the high pressure pump side.

❑ Refit:

- the high pressure pipe mounting between the pump and the rail,
- the high pressure pipe mounting bolt between the pump and the rail.

❑ Tighten the high pressure pipe mounting bolt between the pump and the rail.

❑ Refit the bolt to the high pressure pipe between the pump and the rail on the rocker cover.

❑ Tighten the bolt on the high pressure pipe between the pump and the rail on the rocker cover.

III - FINAL OPERATION

❑ Temporarily refit the intercooler air inlet pipe.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Start the engine.

❑ Accelerate several times under no load.

❑ Check for any fuel leaks.

❑ Move aside the intercooler air inlet pipe.

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Connect the intercooler air inlet pipe on the turbocharger.

❑ Refit the bolts of the intercooler air inlet pipe on the air intake distributor.

❑ Tighten the bolts of the intercooler air inlet pipe on the air intake distributor.

❑ Fit the cooling radiator top hose onto the intercooler air inlet pipe.

❑ Refit the nut of the cooling radiator top hose on the intercooler air inlet pipe.

❑ Tighten the nut of the cooling radiator top hose on the intercooler air inlet pipe.

❑ Refit the engine cover.

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Equipment required
tweezers

Tightening torques ▽	
nut of the high pressure pipe between the pump and the rail on the high pressure pump side	**32 N.m**
nut on the high pressure pipe between the pump and the rail on the injector rail side	**32 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the radiator top hose on the intercooler air inlet pipe.

❑ Move aside the radiator top hose.

❑ Remove the bolts (**2**) from the intercooler air inlet pipe on the intake distributor.

113282

❑ Rotate the intercooler air inlet pipe clip (**3**) on the turbocharger side.

❑ Disconnect the intercooler air inlet pipe on the turbocharger side.

❑ Move aside the intercooler air inlet pipe.

❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124535

❑ Remove the protector (**4**) from the nut on the high pressure pipe between the pump and the rail on the high pressure pump side.

124539

❑ Disconnect the connector (**5**) from the camshaft position sensor.

❑ Unclip the diesel temperature sensor (**6**) .

124536

❑

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Undo:

- the nut (**7**) of the high pressure pipe between the pump and the rail on the injector rail using the tool, part number **77 11 223 721**.
- the nut (**8**) of the high pressure pipe between the pump and the rail on the high pressure pump using the tool, part number **77 11 223 720**,

❑ Mark the position of the rubber pad (**9**) on the high pressure pipe between the pump and the rail on the rocker cover.

❑ Remove:

- the bolts (**10**) securing the high pressure pipe between the pump and the rail on the rocker cover,
- the high pressure pipe between the pump and the rail.

❑ Fit blanking plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the high pressure pipe between the pump and the rail,

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- the air pipe seal at the intercooler inlet on the turbocharger side.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

Note:

Check that the intercooler air inlet pipe seal is fitted in its groove the right way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

❑ Turn the clip for the intercooler air inlet pipe in order to refit it in its groove.

WARNING

Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

M9R, and 744 or 748 or 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - REFITTING OPERATION FOR PART CONCERNED

❏ Fit a new high pressure pipe between the pump and the rail.

❏ Position:

- the high pressure pipe olive between the pump and the rail on the injector rail,
- the high pressure pipe olive between the pump and the rail on the high pressure pump.

❏ Refit the rubber pad of the high pressure pipe between the pump and the rail on the rocker cover in its position marked during the removal operation.

❏ Fit, without tightening, the nuts on the high pressure pipes between the pump and the rail, starting with the nut on the injector rail side.

❏ Tighten to torque:

- the **nut of the high pressure pipe between the pump and the rail on the high pressure pump side (32 N.m)** using the tool, part number **77 11 223 720**,
- the **nut on the high pressure pipe between the pump and the rail on the injector rail side (32 N.m)** using the tool, part number **77 11 223 721**.

❏ Refit:

- the protector for the nut on the high pressure pipe between the pump and the rail on the high pressure pump side,
- the bolts for the high pressure pipe between the pump and the rail on the rocker cover.

❏ Tighten the bolts for the high pressure pipe between the pump and the rail on the rocker cover.

❏ Clip on the diesel temperature sensor.

❏ Connect the camshaft position sensor connector.

III - FINAL OPERATION

❏ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

❏ Fit the intercooler air inlet pipe.

> Note:
>
> The intercooler air inlet pipe is correctly clipped onto the turbocharger if the clip is engaged in the neck of the turbocharger.

❏ Clip the intercooler air inlet pipe on the turbocharger side.

❏ Refit the bolts of the intercooler air inlet pipe on the intake distributor.

❏ Tighten the bolts of the intercooler air inlet pipe on the intake distributor.

❏ Fit the radiator top hose on the intercooler air inlet pipe.

❏ Refit the radiator top hose nut on the intercooler air inlet pipe.

❏ Tighten the radiator top hose nut on the intercooler air inlet pipe.

❏ Refit the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 780

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.
Mot. 1746	Offset wrench for tightening High Pressure pump pipes.

Tightening torques ▽	
yellow high pressure pipe unions between the pump and the rail	**24 Nm**
silver high pressure pipe unions between the pump and the rail	**28 Nm**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

IMPORTANT

Wear latex gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

123532

❑ Undo the clip (**1**) from the intercooler outlet pipe.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

❑ Move aside the intercooler air outlet pipe from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❑ Detach the electrical wiring from the injector rail protector cover.

K9K, and 780

❏ Move aside the electrical wiring.

123293

❏ Remove:

- the intercooler air inlet pipe bolt (**4**) ,
- the intercooler air inlet pipe nut (**5**) .

123299

❏ Pull the intercooler air inlet pipe clip (**6**) .

❏ Disconnect the intercooler air inlet pipe from the turbocharger.

❏ Move the intercooler air inlet pipe to one side.

123296

❏ Detach the injector rail protector cover (**7**) .

❏ Remove:

- the injector rail protector cover bolt (**8**) ,
- the injector rail protector cover nut (**9**) ,
- the injector rail protector cover,
- the dipstick,
- the dipstick well bolts (**10**) ,
- the dipstick well.

123294

❏ Disconnect the heater plug connectors (**11**) .

K9K, and 780

123846

❑ Disconnect:

- the diesel injector connectors (**12**) ,
- the pressure regulation solenoid valve connector (**13**) ,
- the (**14**) flow regulation solenoid valve connector,
- the fuel temperature sensor connector (**15**) .

❑ Unclip the injection wiring clip (**16**) .

❑ Remove the nut (**17**) from the injection wiring bracket.

❑ Move aside the rail protector injection wiring.

111748

❑ Remove:

- the rail protector drain pipe,
- the rail protector nuts (**18**) ,
- the rail protector bolt (**19**) ,
- the rail protector,

II - REMOVAL OPERATION FOR PART CONCERNED

❑

> **WARNING**
> To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Remove the high pressure pipe between the high pressure pump and the injector rail and dispose of it in a bin.

> Note:
> It is essential to use a spanner to hold the high pressure pump intermediate union when loosening the high pressure pipe.

❑ Fit the correct blanking plugs on:

- the high pressure pump opening,
- the injector rail opening.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the high pressure pipe between the pump and the rail.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Take the new high pressure pipe out of its plastic bag.

❑ Remove and dispose of the blanking plugs.

❑ Fit the new high pressure pipe between the injector rail and the high pressure pump.

> Note:
> If the new pipes kit does not contain an applicator, do not lubricate the pipe threads (as they are self-lubricating pipes).

❑ Manually fit and finger tighten the high pressure pipe nuts, starting with the injector rail side.

❑ Torque tighten using the **(Mot. 1566)** or **(Mot. 1746)** :

- the **yellow high pressure pipe unions between the pump and the rail (24 Nm)**,

K9K, and 780

- the **silver high pressure pipe unions between the pump and the rail (28 Nm)**.

III - FINAL OPERATION.

❏ Refit:
- the rail protector,
- the rail protector bolt,
- the rail protector nuts.

❏ Tighten:
- the rail protector bolt,
- the rail protector nuts.

❏ Refit the rail protector drain pipe.

❏ Fit the injection wiring on the rail protector.

❏ Refit the injection wiring bracket nut.

❏ Tighten the injection wiring bracket nut.

❏ Clip on the injection wiring clip.

❏ Connect:
- the fuel temperature sensor connector,
- the flow regulation solenoid valve connector,
- the pressure regulation solenoid valve connector,
- the diesel injector connectors,
- the heater plug connectors.

❏ Refit:
- the dipstick well,
- the dipstick well bolts.

❏ Tighten the dipstick well bolts.

❏ Refit the dipstick.

❏ Refit:
- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❏ Tighten:
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❏ Clip on the injector rail protector cover.

❏ Fit:
- the intercooler air inlet pipe,
- the intercooler air inlet pipe clip in its original position.

❏ Clip the intercooler air inlet pipe to the turbocharger.

❏ Refit:
- the nut to the intercooler air inlet pipe,
- the intercooler air inlet hose bolt.

❏ Tighten:
- the nut to the intercooler air inlet pipe,
- the intercooler air inlet hose bolt.

❏ Clip the electrical wiring on the injector rail protector cover.

❏ Connect:
- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler air outlet pipe on the damper valve.

❏ Tighten the intercooler air outlet pipe clip.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Refit the engine cover.

❏ Reprime the fuel circuit using the manual priming pump.

❏ Check that there are no diesel leaks (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) .

V9X

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.

Equipment required
Diagnostic tool

Tightening torques ▽	
nut of the high pressure pipe between the high pressure pump and the injector rail, on the high pressure pump side	**30 N.m**
nut of the high pressure pipe between the high pressure pump and the injector rail, on the injector rail end	**30 N.m**
camshaft position sensor bolt	**10 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,

- the injector rail protector from the front row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

133893

❑ Remove the bolt (**1**) from the camshaft position sensor.

❑ Move aside the camshaft position sensor.

❑ Remove the camshaft position sensor seal.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134024

❑ Remove the protector (**2**) for the nut of the high pressure pipe between the high pressure pump and the injector rail, on the high pressure pump side.

133900

❑ Undo:

- the nut (**3**) of the high pressure pipe between the high pressure pump and the injector rail on the high pressure pump using the tool **(Mot. 1566)** while holding the high pressure union using a spanner,

- the nut (**4**) of the high pressure pipe between the high pressure pump and the injector rail on the injector rail using the tool **(Mot. 1566)** while holding the high pressure union using a spanner.

❑ Remove:

- the bolt (**5**) of the high pressure pipe between the high pressure pump and the injector rail on the rocker cover,

- the high pressure pipe between the high pressure pump and the injector rail.

❑ Insert the blanking plugs.

❑ Remove the rubber pad between the high pressure pipe and the rocker cover.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: camshaft sensor seal (11,11,04,02)**.

V9X

❏ **parts always to be replaced: High pressure pipe between the pump and rail (11,05,03,02)**.

> **WARNING**
> Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.
>
> Be careful not to allow oil into the high pressure pipe.
>
> Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Remove the blanking plugs.

❏ Fit a new high-pressure pipe between the injection rail and the high-pressure pump.

❏ Position:

- the olive of the high pressure pipe between the high pressure pump and the injector rail on the injector rail,
- the olive of the high pressure pipe between the high pressure pump and the injector rail on the high pressure pump.

❏ Correctly position the pad between the high pressure pipe and the rocker cover.

❏ Fit without tightening the nuts of the high pressure pipe between the high pressure pump and the injector rail, starting with the nut on the injector rail end.

❏ Torque tighten:

- the **nut of the high pressure pipe between the high pressure pump and the injector rail, on the high pressure pump side (30 N.m)** using the tool **(Mot. 1566)**,
- the **nut of the high pressure pipe between the high pressure pump and the injector rail, on the injector rail end (30 N.m)** using the tool **(Mot. 1566)**.

❏ Refit:

- the bolt of the high pressure pipe between the high pressure pump and the injector rail on the rocker cover,
- the protector for the nut of the high pressure pipe between the high pressure pump and the injector rail, on the high pressure pump side.

III - FINAL OPERATION

❏ Refit a new camshaft position sensor seal.

❏ Position the camshaft position sensor.

❏ Tighten to torque the **camshaft position sensor bolt (10 N.m)**.

❏ Refit the front row injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Prime the diesel circuit using the manual priming pump.

❏ Switch on forced + after ignition.

❏ Connect the **Diagnostic tool**.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❏ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❏ Refit the engine cover.

K9K, and 782

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.

Equipment required
tweezers

Tightening torques ▽	
high pressure pipe nut between the pump and the rail on the high pressure pump	**28 N.m**
high pressure pipe nut between the pump and the rail on the injector rail	**28 N.m**
injector rail protector nuts	**21 N.m**
dipstick guide bolts	**8 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

- ❑ Disconnect the turbocharger pressure sensor connector (**4**) .
- ❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.
- ❑ Pull the clip (**6**) of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

138551

- ❑ Unclip the wiring (**7**) of the damper valve.

138550

- ❑ Unclip the injector rail protector cover at (**8**) .
- ❑ Remove:
  - the bolts (**9**) from the injector rail protector cover,
  - the cover of the injector rail protector,
  - the dipstick.

138538

- ❑ Remove the dipstick guide bolts (**10**) .
- ❑ Move aside the dipstick guide.

K9K, and 782

138539

- ❑ Disconnect the injector rail pressure sensor connector (**11**) .
- ❑ Unclip the diesel drain pipe (**12**) from the injector rail protector.
- ❑ Unclip the alternator wiring (**13**) from the injector rail protector.
- ❑ Disconnect the supply pipe union (**14**) of the exhaust fuel injector solenoid valve.
- ❑ Fit blanking plugs:
  - on the opening of the exhaust fuel injector solenoid valve,
  - on the opening of the union of the exhaust fuel injector solenoid valve supply pipe.

138540

- ❑ Unclip the diesel injector wiring (**15**) .
- ❑ Disconnect:
  - the diesel injector connectors (**16**) ,
  - the heater plug connectors.

138541

- ❑ Disconnect:
  - the diesel temperature sensor connector (**17**) ,
  - the connector (**18**) for the fuel pressure regulation solenoid valve,
  - the connector (**19**) from the fuel flow regulating solenoid valve.
- ❑ Unclip the diesel injection wiring at (**20**) .
- ❑ Remove the nut (**21**) from the diesel injection wiring.
- ❑ Move the diesel injection wiring aside.

K9K, and 782

139190

❑ Remove:

- the nuts (**22**) from the injector rail protector,
- the injector rail protector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

138543

❑

> Note:
>
> It is essential to use a spanner to hold the intermediate union of the high pressure pump when loosening the high pressure pipe.

❑ Remove:

- the nut (**23**) of the high pressure pipe between the pump and the rail on the high pressure pump,
- the nut (**24**) of the high pressure pipe between the pump and the rail on the injector rail,
- the high pressure pipe between the pump and the rail.

❑ Fit blanking plugs on:

- the high pressure pump opening,
- the injector rail opening.

K9K, and 782

REFITTING

I - REFITTING PREPARATION OPERATION

20960

❑

> **WARNING**
>
> Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.
>
> Be careful not to allow oil into the high pressure pipe.
>
> Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

❑ **parts always to be replaced: High pressure pipe between the pump and rail (11,05,03,02)**.

❑ **parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)**.

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

115069

❑

> Note:
>
> Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round.

❑ Refit:

- a new intercooler air outlet pipe seal,

K9K, and 782

- a new intercooler air inlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Remove the blanking plugs.

❏ Fit a new high pressure pipe between the pump and the rail.

❏ Fit without tightening the high pressure pipe nuts by hand until they make contact between the pump and the rail, starting at the injector rail end.

❏ Torque tighten:

- the **high pressure pipe nut between the pump and the rail on the high pressure pump (28 N.m)** using the tool **(Mot. 1566)**,
- the **high pressure pipe nut between the pump and the rail on the injector rail (28 N.m)** using the tool **(Mot. 1566)**.

III - FINAL OPERATION

❏ Refit the injector rail protector.

❏ Torque tighten the **injector rail protector nuts (21 N.m)**.

❏ Fit the diesel injection wiring.

❏ Refit the nut of the diesel injection wiring.

❏ Clip on the diesel injection wiring.

❏ Connect:

- the connector for the fuel flow regulation solenoid valve,
- the connector for the fuel pressure regulation solenoid valve,
- the diesel temperature sensor connector.
- the heater plug connectors,
- the connectors of the diesel injectors.

❏ Clip on the diesel injector wiring.

❏ Remove the blanking plugs from:

- the opening of the union of the exhaust fuel injector solenoid valve supply pipe,
- the opening of the exhaust fuel injector solenoid valve.

❏ Connect the supply pipe union of the exhaust fuel injector solenoid valve.

❏ Clip the alternator wiring onto the injector rail protector.

❏ Clip the diesel drain pipe onto the injector rail protector.

❏ Connect the injector rail pressure sensor connector.

❏ Fit the dipstick guide tube.

❏ Torque tighten the **dipstick guide bolts (8 N.m)**.

❏ Refit:

- the dipstick,
- the injector rail protector cover,

❏ Clip on the damper valve wiring.

❏ Fit the clip for the intercooler air outlet pipe.

❏ Clip the intercooler air outlet pipe onto the damper valve.

❏ Clip on the wiring of the turbocharging pressure sensor.

❏ Connect the turbocharger pressure sensor connector.

❏ Refit the clip of the intercooler air inlet pipe.

❏ Clip on the intercooler air inlet pipe.

❏ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Check that there are no diesel leaks (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) .

M9R

Equipment required
tweezers

Tightening torques ▽	
nuts on the high pressure pipes between the rail and the injectors on the injector rail side	**32 N.m**
nuts on the high pressure pipes between the rail and the injectors on the injector side	**32 N.m**

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the air pipe bolts (**2**) at the intercooler inlet.

113282

❑ Rotate the clip (**3**) on the intercooler air inlet pipe.

❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,

- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) .

M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123589

❑

Note:

Loosen the nuts pipe by pipe.

❑ Loosen using the tool, part number **77 11 223 721** :

- the nuts on the high pressure pipes between the rail and the injectors on the injector side,
- the nuts on the high pressure pipes between the rail and the injectors on the injector rail side.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Remove the high pressure pipes (**4**) between the rail and the injectors one by one.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the high pressure pipes between the rail and the injectors,
- the intercooler air inlet pipe seal.

❑

WARNING

Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

M9R

115069

❑

> Note:
>
> Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Refit the new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the blanking plugs.

❑ Fit the high pressure pipes between the rail and the injectors.

❑ Position:

- the high pressure pipe olives between the rail and the injectors in the injector rail tapers,
- the high pressure pipe olives between the rail and the injectors in the injector tapers.

❑ Fit without tightening the nuts on the high pressure pipes between the rail and the injectors, starting with the nuts on the injector rail side.

❑ Torque tighten using the tool, part number **77 11 223 721** :

- the **nuts on the high pressure pipes between the rail and the injectors on the injector rail side (32 N.m)**.
- the **nuts on the high pressure pipes between the rail and the injectors on the injector side (32 N.m)**,

III - FINAL OPERATION

❑ Refit:

- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) .

❑ Temporarily refit the intercooler air inlet pipe.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Start the engine.

❑ Accelerate several times under no load.

❑ Check for any fuel leaks.

❑ Remove the intercooler inlet air pipe.

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Connect the intercooler air inlet pipe on the turbocharger.

❑ Refit the bolts of the intercooler air inlet pipe on the air intake distributor.

❑ Tighten the bolts of the intercooler air inlet pipe on the air intake distributor.

❑ Fit the cooling radiator top hose onto the intercooler air inlet pipe.

❑ Refit the nut of the cooling radiator top hose on the intercooler air inlet pipe.

❑ Tighten the nut of the cooling radiator top hose on the intercooler air inlet pipe.

❑ Refit the engine cover.

K9K, and 780

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.
Mot. 1746	Offset wrench for tightening High Pressure pump pipes.

Tightening torques ▽	
yellow high pressure pipe unions between the rail and the injector	**24 N.m**
silver high pressure pipe unions between the rail and the injector	**28 N.m**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

IMPORTANT

Wear latex gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

123532

❑ Undo the clip (**1**) from the intercooler outlet pipe.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

❑ Move the intercooler outlet air pipe away from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❑ Unpick the electrical wiring from the injector rail protector cover.

K9K, and 780

❑ Move the electrical wiringto one side.

123293

❑ Remove:

- the intercooler air inlet pipe bolt (**4**) ,
- the nut (**5**) from the intercooler inlet air pipe.

123299

❑ Remove the clip (**6**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

123296

❑ Unclip (**7**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**8**) ,
- the injector rail protector cover nut (**9**) ,
- the injector rail protector cover,
- the dipstick,
- the dipstick well bolts (**10**) ,
- the dipstick well.

❑ Clean the high pressure pipe unions between the rail and the injectors (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

K9K, and 780

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Removing one, two or three high pressure pipes

1327

❑

WARNING

The injector intermediate union (**11**) must be held using a spanner while the high pressure pipes are loosened (**12**) .

Do not damage the injector return nozzle.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Undo the high pressure pipe nuts between the rail and the injector using the **(Mot. 1566)**.

❑ Remove:

- the high pressure pipe nut between the rail and the injector on the rail side,
- the nut for the high pressure pipe between the rail and the injector at the injector end,
- the high pressure pipe between the rail and the injector concerned.

❑ Insert the correct blanking plugs.

2 - Removing the four high pressure pipes

123294

❑ Disconnect the heater plug connectors (**13**) .

K9K, and 780

123846

❑ Disconnect:

- the diesel injector connectors (**14**) ,
- the pressure regulation solenoid valve connector (**15**) ,
- the (**16**) flow regulation solenoid valve connector,
- the fuel temperature sensor connector (**17**) .

❑ Unclip the injection wiring clip (**18**) .

❑ Remove the nut (**19**) from the injection wiring bracket.

❑ Move aside the rail protector injection wiring.

111748

❑ Remove:

- the rail protector drain pipe,
- the rail protector nuts (**20**) ,
- the rail protector bolt (**21**) ,
- the rail protector,

111745

❑ Loosen the injector rail nuts (**22**) by a few turns.

K9K, and 780

1327

❑

WARNING
The injector intermediate union (**23**) must be held using a spanner while the high pressure pipes are loosened (**24**) .

Do not damage the injector return nozzle.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Undo the high pressure pipe nuts between the rail and the injector using the **(Mot. 1566)**.

❑ Remove:

- the high pressure pipe nuts between the rail and the injector on the rail side,
- the high pressure pipe nuts between the rail and the injector on the injector side,
- the high pressure pipes between the rail and the injector.

❑ Insert the correct blanking plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

WARNING
Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Always replace the high pressure pipe between the rail and the injector concerned.

II - REFITTING OPERATION FOR PART CONCERNED

1 - Refitting one, two or three high pressure pipes

❑ Remove and dispose of the blanking plugs.

❑ Remove the high pressure pipe between the rail and the injector from its packaging.

❑ Manually fit without tightening the high pressure pipe nuts between the rail and the injector, starting with the injector rail side.

❑ Using the **(Mot. 1746)**, tighten to torque:

- the **yellow high pressure pipe unions between the rail and the injector (24 N.m)**,
- the **silver high pressure pipe unions between the rail and the injector (28 N.m)**.

2 - Refitting the four high pressure pipes

❑ Remove and dispose of the blanking plugs.

❑ Remove the new high pressure pipes between the rail and the injector from their packaging.

❑ Manually fit without tightening the high pressure pipe nuts between the rail and the injector, starting with the injector rail side.

❑ Using the **(Mot. 1746)**, tighten to torque:

- the **yellow high pressure pipe unions between the rail and the injector (24 N.m)**,
- the **high pressure pipe unions between the rail and the silver injector(28 N.m)**.

❑ Tighten the injector rail nuts.

❑ Refit:

- the rail protector,
- the rail protector bolt,

K9K, and 780

- the rail protector nuts.

❏ Tighten:

- the rail protector bolt,
- the rail protector nuts.

❏ Refit the rail protector drain pipe.

❏ Fit the injection wiring on the rail protector.

❏ Refit the injection wiring bracket nut.

❏ Tighten the injection wiring bracket nut.

❏ Clip on the injection wiring clip.

❏ Connect:

- the fuel temperature sensor connector,
- the flow regulation solenoid valve connector,
- the pressure regulation solenoid valve connector,
- the diesel injector connectors,
- the heater plug connectors.

III - FINAL OPERATION

❏ Refit:

- the dipstick well,
- the dipstick well bolts.

❏ Tighten the dipstick well bolts.

❏ Refit:

- the dipstick,
- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❏ Tighten:

- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❏ Clip on the injector rail protector cover.

❏ Fit:

- the intercooler air inlet pipe,
- the intercooler inlet air pipe clip in its original position.

❏ Clip the intercooler air inlet pipe to the turbocharger.

❏ Refit:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❏ Tighten:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❏ Clip the electrical wiring to the injector rail protector cover.

❏ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler outlet air pipe to the damper valve.

❏ Tighten the intercooler air outlet pipe clip.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Refit the engine cover.

❏ Check that there are no diesel leaks (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) .

V9X

Special tooling required	
Mot. 1566	Tool for removing high pressure pipes.
Mot. 1746	Offset wrench for tightening High Pressure pump pipes.

Equipment required
Diagnostic tool

Tightening torques ▽	
nuts on the high pressure pipes between the injector rail and the injectors on the injector rail side	**30 N.m**
nuts on the high pressure pipes between the injector rail and the injectors on the injector side	**30 N.m**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

Note:

This method describes the removal - refitting operation of the high pressure pipes between the rail and the injector of the front row and back row.

REMOVING THE HIGH PRESSURE PIPES BETWEEN THE INJECTOR RAIL AND THE INJECTORS OF THE FRONT ROW

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

137867

❑ Unclip the injector rail protector cover at (**1**) .

❑ Remove the injector rail protector cover.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

133885

❑ Using the tool **(Mot. 1566)** or **(Mot. 1746)**, undo:

- the nuts on the high pressure pipes between the injector rail and the injectors on the injector side,
- the nuts on the high pressure pipes between the injector rail and the injectors on the injector rail side.

> Note:
>
> Loosen the nuts pipe by pipe.

❑ Remove the high pressure pipes (**2**) between the injector rail and the injectors one by one.

❑ Fit blanking plugs into openings.

REFITTING THE HIGH PRESSURE PIPES BETWEEN THE INJECTOR RAIL AND THE INJECTORS ON THE FRONT ROW

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: High pressure pipe between the rail and injector (11,05,03,01)**.

> **WARNING**
>
> Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.
>
> Be careful not to allow oil into the high pressure pipe.
>
> Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the blanking plugs.

❑ Fit the new high pressure pipes between the injector rail and the injectors.

❑ Position:

- the high pressure pipe olives between the injector rail and the injectors in the injector rail tapers,
- the high pressure pipe olives between the injector rail and the injectors in the injector tapers.

❑ Fit the nuts of the high pressure pipes between the injector rail and the injectors without tightening, starting with the nuts on the injector rail side.

❑ Using the **(Mot. 1746)**, tighten to torque:

- the **nuts on the high pressure pipes between the injector rail and the injectors on the injector rail side (30 N.m)**,
- the **nuts on the high pressure pipes between the injector rail and the injectors on the injector side (30 N.m)**.

V9X

III - FINAL OPERATION

- ❑ Refit the injector rail protector cover.
- ❑ Clip the injector rail protector cover into place.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Prime the diesel circuit using the manual priming pump.
- ❑ Switch on forced + after ignition.
- ❑ Connect the **Diagnostic tool**.
- ❑ In the **Diagnostic tool** :
  - select the repair mode,
  - select the programming mode,
  - select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.
- ❑ Check:
  - the correct operation of the high pressure fuel circuit,
  - that there are no leaks.
- ❑ Refit the engine cover.

REMOVING THE HIGH PRESSURE PIPES BETWEEN THE INJECTOR RAIL AND THE INJECTORS ON THE BACK ROW

I - REMOVAL PREPARATION OPERATION

- ❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Remove the front engine cover.

134226

- ❑ Unclip:
  - the wiring of the exhaust gas recirculation solenoid valve at (**1**) ,
  - the cooling hose at (**2**) .
- ❑ Unclip the injector rail protector cover at (**3**) .
- ❑ Remove the injector rail protector cover.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134030

❑ Using the tool **(Mot. 1566)** or **(Mot. 1746)**, undo:

- the nuts on the high pressure pipes between the injector rail and the injectors on the injector side,
- the nuts on the high pressure pipes between the injector rail and the injectors on the injector rail side.

> Note:
>
> Loosen the nuts pipe by pipe.

❑ Remove the high pressure pipes (**3**) between the injector rail and the injectors one by one.

❑ Fit blanking plugs into openings.

REFITTING THE HIGH PRESSURE PIPES BETWEEN THE INJECTOR RAIL AND THE INJECTORS ON THE BACK ROW

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: High pressure pipe between the rail and injector (11,05,03,01)**.

> **WARNING**
>
> Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.
>
> Be careful not to allow oil into the high pressure pipe.
>
> Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the blanking plugs.

❑ Fit the new high pressure pipes between the injector rail and the injectors.

❑ Position:

- the high pressure pipe olives between the injector rail and the injectors in the injector rail tapers,
- the high pressure pipe olives between the injector rail and the injectors in the injector tapers.

❑ Fit the nuts of the high pressure pipes between the injector rail and the injectors without tightening, starting with the nuts on the injector rail side.

❑ Torque tighten using the tool **(Mot. 1746)** or **(Mot. 1566)** :

- **the nuts on the high pressure pipes between the injector rail and the injectors on the injector rail side (30 N.m),**
- **the nuts on the high pressure pipes between the injector rail and the injectors on the injector side (30 N.m).**

V9X

III - FINAL OPERATION

- ❑ Refit the injector rail protector cover.
- ❑ Clip the injector rail protector cover into place.
- ❑ Clip:
  - the cooling hose,
  - the wiring of the exhaust gas recirculation solenoid valve.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Prime the diesel circuit using the manual priming pump.
- ❑ Switch on forced + after ignition.
- ❑ Connect the **Diagnostic tool**.
- ❑ In the **Diagnostic tool** :
  - select the repair mode,
  - select the programming mode,
  - select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.
- ❑ Check:
  - the correct operation of the high pressure fuel circuit,
  - that there are no leaks.
- ❑ Refit the engine cover.

K9K, and 782

Special tooling required	
Mot. 1746	Offset wrench for tightening High Pressure pump pipes.
Mot. 1566	Tool for removing high pressure pipes.

Equipment required
tweezers

Tightening torques ▽	
nuts on the high pressure pipes between the rail and the injector on the injector rail side	**28 N.m**
nuts on the high pressure pipes between the rail and the injector on the diesel injector side	**28 N.m**
injector rail nuts	**28 N.m**
injector rail protector nuts	**21 N.m**
dipstick guide bolts	**8 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

- ❑ Disconnect the turbocharger pressure sensor connector (**4**) .
- ❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.
- ❑ Pull the clip (**6**) of the intercooler air outlet pipe.
- ❑ Move the intercooler air outlet pipe to one side.

138551

- ❑ Unclip the wiring (**7**) of the damper valve.

138550

- ❑ Unclip the injector rail protector cover at (**8**) .
- ❑ Remove:
  - the bolts (**9**) from the injector rail protector cover,
  - the cover of the injector rail protector.

K9K, and 782

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Removing one, two or three high pressure pipes between the injector rail and the injector:

1327

❑

WARNING

The injector intermediate union (**10**) must be held using a spanner while the high pressure pipes are loosened (**11**) .

Do not damage the injector return nozzle.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

138542

❑ Loosen the nuts of the high pressure pipe(s) between the rail and injectors.

❑ Remove the high pressure pipe(s) between the injector rail and the injectors.

❑ Fit blanking plugs:

- on the opening(s) of the injector rail,
- on the opening(s) of the injector(s).

2 - Removing four high pressure pipes between the injector rail and the injector:

❑ Remove the dipstick.

K9K, and 782

138538

- ❑ Remove the dipstick guide bolts (**12**) .
- ❑ Move aside the dipstick guide.

138539

- ❑ Disconnect the injector rail pressure sensor connector (**13**) .
- ❑ Unclip the diesel drain pipe (**14**) from the injector rail protector.
- ❑ Unclip the alternator wiring (**15**) from the injector rail protector.
- ❑ Disconnect the union (**16**) of the exhaust fuel injector solenoid valve supply pipe.
- ❑ Fit blanking plugs:
  - on the opening of the exhaust fuel injector solenoid valve,
  - on the opening of the union of the exhaust fuel injector solenoid valve supply pipe.

K9K, and 782

138540

❑ Unclip the diesel injector wiring (**17**) .

❑ Disconnect:

- the diesel injector connectors (**18**) ,
- the heater plug connectors.

138541

❑ Disconnect:

- the diesel temperature sensor connector (**19**) ,
- the connector (**20**) for the fuel pressure regulation solenoid valve,
- the connector (**21**) from the fuel flow regulating solenoid valve.

❑ Unclip the diesel injection wiring at (**22**) .

❑ Remove the nut (**23**) from the diesel injection wiring.

❑ Move the diesel injection wiring aside.

139190

❑ Remove:

- the nuts (**24**) from the injector rail protector,
- the injector rail protector.

K9K, and 782

1327

❑

WARNING

The injector intermediate union (**25**) must be held using a spanner while the high pressure pipes are loosened (**26**) .

Do not damage the injector return nozzle.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

138542

❑ Undo the nuts securing the high pressure pipes between the injector rail and the injectors.

❑ Remove the high pressure pipes between the rail and the injectors.

❑ Fit blanking plugs:

- on the injector rail openings,

- on the injector openings.

K9K, and 782

REFITTING

I - REFITTING PREPARATION OPERATION

20960

❑

> **WARNING**
>
> Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.
>
> Be careful not to allow oil into the high pressure pipe.
>
> Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

❑ **parts always to be replaced: High pressure pipe between the rail and injector (11,05,03,01)**

❑ **parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)**

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

115069

❑

> Note:
>
> Check that the seals on the intercooler air inlet and outlet pipes are fitted the right way round.

❑ Refit:

- a new intercooler air outlet pipe seal,

K9K, and 782

- a new intercooler air inlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

1 - Refitting four high pressure pipes between the injector rail and the injector:

138544

❑ Undo the injector rail nuts (**27**) .

❑ Remove the blanking plugs from:

- the injector rail openings,
- the injector openings.

❑ Refit the high pressure pipes between the new injector rail and the injector.

❑ Fit without tightening the high pressure pipe nuts between the rail and the injector by hand.

❑ Torque tighten:

- the **nuts on the high pressure pipes between the rail and the injector on the injector rail side (28 N.m)** using the tool **(Mot. 1746)**,
- the **nuts on the high pressure pipes between the rail and the injector on the diesel injector side (28 N.m)** using the tool **(Mot. 1566)**,
- the **injector rail nuts (28 N.m)**.

❑ Refit the injector rail protector.

❑ Torque tighten the **injector rail protector nuts (21 N.m)**.

❑ Fit the diesel injection wiring.

❑ Refit the nut of the diesel injection wiring.

❑ Clip on the diesel injection wiring.

❑ Connect:

- the connector for the fuel flow regulation solenoid valve,
- the connector for the fuel pressure regulation solenoid valve,
- the diesel temperature sensor connector.
- the heater plug connectors,
- the connectors of the diesel injectors.

❑ Clip on the diesel injector wiring.

❑ Remove the blanking plugs from:

- the opening of the union of the exhaust fuel injector solenoid valve supply pipe,
- the opening of the exhaust fuel injector solenoid valve.

❑ Connect the union of the exhaust fuel injector solenoid valve supply pipe.

❑ Clip the alternator wiring onto the injector rail protector.

❑ Clip the diesel drain pipe onto the injector rail protector.

❑ Connect the injector rail pressure sensor connector.

❑ Fit the dipstick guide tube.

❑ Torque tighten the **dipstick guide bolts (8 N.m)**.

❑ Refit the dipstick.

2 - Refitting one, two or three high pressure pipes between the injector rail and the injector:

❑ Remove the blanking plugs from:

- the injector rail opening(s),
- the opening(s) of the injector(s).

❑ Refit the high pressure pipe(s) between the new injector rail and injectors.

❑ Fit without tightening the high pressure pipe nuts between the rail and the injector by hand.

❑ Torque tighten:

- the **nut(s) of the high pressure pipe(s) between the rail and the injector on the injector rail side (28 N.m)** using the tool **(Mot. 1746)**,
- the **nut(s) of the high pressure pipe(s) between the rail and the injector on the diesel injector side (28 N.m)** using the tool **(Mot. 1566)**.

III - FINAL OPERATION

❑ Refit the injector rail protector cover.

❑ Clip on the damper valve wiring.

❑ Fit the clip for the intercooler air outlet pipe.

K9K, and 782

- ❑ Clip the intercooler air outlet pipe on the damper valve.
- ❑ Clip on the wiring of the turbocharging pressure sensor.
- ❑ Connect the turbocharger pressure sensor connector.
- ❑ Refit the clip of the intercooler air inlet pipe.
- ❑ Clip on the intercooler air inlet pipe.
- ❑ Refit:
  - the bolt on the intercooler air inlet pipe,
  - the nut on the intercooler air inlet pipe.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Check that there are no diesel leaks (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-134**) .

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1566	Tool for removing high pressure pipes.

Equipment required
Diagnostic tool

Tightening torques ▽	
nut of the high pressure pipe between the rails on the front row rail	**30 N.m**
nut of the high pressure pipe between the rails on the back row rail	**30 N.m**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

V9X

134226

❑ Unclip:

- the wiring of the exhaust gas recirculation solenoid valve at (**1**) ,
- the cooling hose at (**2**) .

❑ Unclip the injector rail protector cover from the back row at (**3**) .

❑ Remove:

- the injector rail protector cover from the back row,
- the injector rail protector from the front row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

134107

❑ Separate the clip (**4**) on the exhaust gas recirculation solenoid valve cooling hose using the tool **(Mot. 1448)**.

❑ Disconnect the exhaust gas recirculation solenoid valve cooling hose.

134103

❑ Remove the bolts (**5**) from the injector rail protector on the back row.

❑ Lift the injector rail protector on the back row.

V9X

134109

❑ Undo:

- the clip (**6**) on the intercooler air outlet pipe,
- the clip (**7**) of the intercooler air outlet pipe on the damper valve.

❑ Remove the intercooler air outlet pipe.

134029

❑ Disconnect the heater plug connectors (**8**) .

❑ Move aside the heater plug wiring.

134033

❑ Remove the bolts (**9**) from the exhaust gas cooler control solenoid valve.

❑ Separate the support from the exhaust gas cooler control solenoid valve.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134034

134099

❑ Undo:

- the nut (**11**) of the high pressure pipe between the rails on the back row rail using the tool **(Mot. 1566)**,
- the nut (**12**) of the high pressure pipe between the rails on the front row rail using the tool **(Mot. 1566)**.

❑ Mark the position of the rubber pads between the high pressure pipe and the rocker covers.

❑ Remove the bolts (**10**) from the high pressure pipe between the rails.

❑ Remove the high pressure pipe between the rails.

❑ Insert the blanking plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: High pressure pipe between rails (11,05,03,05)**.

> **WARNING**
>
> Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.
>
> Be careful not to allow oil into the high pressure pipe.
>
> Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the blanking plugs.

❑ Fit a high pressure pipe between the new rails.

❑ Position:

- the olive of the high pressure pipe between the rails on the front row rail,
- the olive of the high pressure pipe between the rails on the back row rail,
- the rubber pads correctly between the high pressure pipe and the rocker covers.

❑ Fit the high pressure pipe nuts between the rails without tightening them.

❑ Tighten to torque:

- the **nut of the high pressure pipe between the rails on the front row rail (30 N.m)** using the tool **(Mot. 1566)**,
- the **nut of the high pressure pipe between the rails on the back row rail (30 N.m)** using the tool **(Mot. 1566)**.

V9X

- ❑ Refit the bolts of the high pressure pipe between the rails.

III - FINAL OPERATION

- ❑ Refit the vacuum solenoid valve support.
- ❑ Fit the wiring for the heater plugs.
- ❑ Connect the heater plug connectors.
- ❑ Refit the intercooler air outlet pipe.
- ❑ Fit the injector rail protector on the back row.
- ❑ Refit the bolts of the injector rail protector on the back row.
- ❑ Connect the exhaust gas recirculation solenoid valve cooling hose.
- ❑ Fit the exhaust gas recirculation solenoid valve hose clip **(Mot. 1448)** using the tool.
- ❑ Refit:
  - the injector rail protector on the front cylinder bank (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
  - the injector rail protector cover on the back row.
- ❑ Clip the injector rail protector cover on the back row.
- ❑ Clip:
  - the cooling hose,
  - the wiring of the exhaust gas recirculation solenoid valve.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- ❑ Prime the diesel circuit using the manual priming pump.
- ❑ Switch on forced + after ignition.
- ❑ Connect the **Diagnostic tool**.
- ❑ In the **Diagnostic tool** :
  - select the repair mode,
  - select the programming mode,
  - select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.
- ❑ Check:
  - the correct operation of the high pressure fuel circuit,
  - that there are no leaks.
- ❑ Refit the engine cover.

M9R

Equipment required
tweezers

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove the front engine cover.

122430

❏ Remove the nut (**1**) from the cooling radiator top hose.

❏ Move aside the cooling radiator top hose.

❏ Remove the intercooler air inlet pipe bolts (**2**) .

113282

❏ Rotate the intercooler air inlet pipe clip.

❏ Move the intercooler inlet air pipe to one side.

❏ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the fuel return pipe (see **13B**, **Diesel injection**, **Diesel return pipe: Removal - Refitting**, page **13B-98**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

M9R

II - REMOVAL OPERATION FOR PART CONCERNED

123617

❑ Disconnect:

- the rail pressure regulator connector (**4**) ,
- the heater plug connectors (**5**) .

123620

❑ Disconnect the rail pressure sensor connector (**6**) .

❑ Remove the engine harness mounting bolts on the cylinder head.

❑ Move aside the engine harness mounting and the engine harness.

123621

❑ Remove:

- the injector rail bolts (**7**) ,
- the injector rail,
- the injector rail seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ always replace the intercooler air inlet pipe seal.

M9R

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

> Note:
>
> Check that the intercooler air inlet pipe on the turbocharger side is fitted the right way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the injector rail seal,
- the injector rail,
- the injector rail bolts.

❑ Fit the engine harness mounting and the engine harness.

❑ Refit the engine harness mounting bolts on the cylinder head.

❑ Connect:

- the rail pressure sensor connector,
- the rail pressure regulator connector,
- the heater plug connectors.

III - FINAL OPERATION.

❑ Refit:

- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the fuel return pipe (see **13B**, **Diesel injection**, **Diesel return pipe: Removal - Refitting**, page **13B-98**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) .

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Connect the intercooler air inlet pipe to the turbocharger.

M9R

- ❑ Refit the bolts for the intercooler inlet air pipe on the intake distributor.
- ❑ Tighten the intercooler air inlet pipe bolts on the intake distributor.
- ❑ Fit the cooling radiator top hose on the intercooler air inlet pipe.
- ❑ Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K, and 780

Equipment required
Diagnostic tool

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

111745

❏ Remove:

- the nuts (**1**) from the injector rail,
- the injector rail.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace:

- the high pressure pipe between the pump and the rail,
- the high pressure pipes between the rail and the injector.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Take the injector rail out of its packaging.

❏ Fit the injector rail.

❏ Fit the injector rail nuts without tightening them.

III - FINAL OPERATION.

❏ Refit:

- the new high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,

K9K, and 780

- a new high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

❏ Tighten the injector rail nuts.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Refit the engine cover.

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « injector rail pressure sensor » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
Diagnostic tool

Tightening torques ▽	
oil vapour recirculation diaphragm bolts	**10 N.m**
injector rail bolts on the front row	**25 N.m**
injector rail bolts on the back row	**25 N.m**
turbocharger studs	**13 N.m**
studs of the catalytic pre-converter stay on the cylinder block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut	**21 N.m**
lower stay nuts on the upper stay	**21 N.m**
lower stay nuts on the cylinder block and on the gearbox	**21 N.m**
nuts of the lower stay on the catalytic pre-converter	**21 N.m**
turbocharger heat shield nuts	**8 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Be careful when removing the injectors or the injection rail as there will be a quantity of fuel in the rail and the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVING THE INJECTOR RAIL ON THE FRONT ROW

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,

- the engine undertray bolts,

- the engine undertray,

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the injector rail protector on the front row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the high pressure pipes between the rail and injector of the front row (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) .

134028

❑ Remove the bolts (**1**) from the oil vapour recirculation diaphragm.

❑ Remove the oil vapour recirculation diaphragm.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137861

❑ Disconnect the connector (**2**) from the fuel pressure regulator of the injector rail on the front row.

❑ Move aside the fuel pressure regulator wiring from the injector rail of the front row.

137862

❑ Remove:

- the bolts (**3**) from the injector rail on the front row,
- the injector rail on the front row,
- the seals from the injector rail on the front row.

V9X

OPERATION FOR REFITTING THE INJECTOR RAIL ON THE FRONT ROW

I - REFITTING PREPARATION OPERATION

❑ Always replace the seals of the injector rail on the front row.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new injector rail seals,
- the injector rail on the front row.

❑ Fit the bolts for the injector rail on the front row, without tightening them.

❑ Position the fuel pressure regulator wiring for the injector rail on the front row.

❑ Connect the connector for the fuel pressure regulator to the injector rail on the front row.

III - FINAL OPERATION

❑ Fit the oil vapour recirculation diaphragm.

❑ Torque tighten the **oil vapour recirculation diaphragm bolts (10 N.m)**.

❑ Refit:

- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the high pressure pipes between the rail and injector of the front row (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❑ Torque tighten the **injector rail bolts on the front row (25 N.m)**.

❑ Refit:

- the injector rail protector on the front row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Prime the diesel circuit using the manual priming pump.

❑ Switch on forced + after ignition.

❑ Connect the **Diagnostic tool**.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select the command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❑ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❑ Refit the engine cover.

REMOVING THE INJECTOR RAIL ON THE BACK ROW

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,

- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the injector rail protector on the back row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the high pressure pipes between the rail and injector on the back row (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

134225

❏ Separate the clip (**1**) on the turbocharger cooling hose using the tool **(Mot. 1448)**.

❏ Disconnect the turbocharger cooling hose.

❏ Remove:

- the nut (**2**) from the turbocharger rigid cooling pipe,
- the nuts (**3**) from the turbocharger heat shield.

❏ Undo the nut (**4**) of the turbocharger heat shield.

V9X

138351

❑ Unclip the crankshaft position sensor wiring (**5**) from the catalytic pre-converter lower stay.

❑ Remove the nuts (**6**) from the lower stay of the catalytic pre-converter.

138360

134229

❑ Remove:

- the studs (**7**) from the lower stay of the catalytic pre-converter,
- the nuts (**8**) from the lower stay of the catalytic pre-converter,
- the catalytic pre-converter lower stay.

V9X

138353

❑ Undo the nut (**9**) of the upper stay of the catalytic pre-converter.

❑ Remove the catalytic pre-converter upper stay.

137925

❑ Remove the nut (**10**) from the rigid cooling pipes of the exhaust fuel injector cooler.

❑ Remove the rigid cooling pipes from the exhaust fuel injector cooler.

❑ Remove the turbocharger heat shield.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

134101

❑ Remove:

- the nuts (**11**) from the turbocharger strut,
- the bolts (**12**) from the turbocharger strut,
- the turbocharger strut.
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

V9X

137864

❑ Remove:

- the bolts (**13**) from the damper valve strut,
- the nut (**14**) from the damper valve strut.

❑ Unclip the fuel supply and return pipes (**15**) from the damper valve strut.

❑ Separate the fuel supply and return pipes from the damper valve strut.

❑ Remove the damper valve strut.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137863

❑ Disconnect the injector rail pressure sensor connector (**16**) from the back row.

❑ Separate the injector rail pressure sensor wiring from the back row.

137866

❑ Remove:

- the bolts (**17**) from the injector rail on the back row,
- the injector rail on the back row,
- the seals from the injector rail for the rear cylinder bank.

V9X

OPERATION FOR REFITTING THE INJECTOR RAIL ON THE BACK ROW

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the injector rail seals on the back row,
- the catalytic pre-converter stay studs,
- the turbocharger heat shield nuts,
- the turbocharger heat shield studs if they have loosened during removal.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new injector rail seals,
- the injector rail on the back row.

❑ Fit the injector rail bolts on the back row, without tightening them.

❑ Fit the injector rail pressure sensor wiring on the back row.

❑ Connect the injector rail pressure sensor connector on the back row.

III - FINAL OPERATION

❑ Refit:

- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the high pressure pipes between the rail and injector on the back row (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❑ Torque tighten the **injector rail bolts on the back row (25 N.m)**.

❑ Refit:

- the injector rail protector on the front row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the damper valve strut.

❑ Position the fuel supply and return pipes on the damper valve strut.

❑ Clip the fuel supply and return pipes onto the damper valve strut.

❑ Refit the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

❑ Torque tighten the new **turbocharger studs (13 N.m)** if they were loosened during removal.

❑ Refit:

- the turbocharger strut.
- the turbocharger heat shield.

❑ Fit:

- the rigid cooling pipe of the exhaust fuel injector cooler to the catalytic pre-converter,
- the rigid cooling pipe of the exhaust fuel cooler to the turbocharger.

❑ Refit:

- the nut for the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter,
- the upper stay of the catalytic pre-converter.

❑ Fit the nut of the catalytic pre-converter upper stay without tightening it.

❑ Refit the lower stay of the catalytic pre-converter.

❑ Fit the nuts of the lower stay to the upper stay without tightening them.

❑ Torque tighten the **studs of the catalytic pre-converter stay on the cylinder block and on the gearbox (8 N.m)**.

❑ Fit without tightening:

- the nuts of the lower stay on the cylinder block and on the gearbox,
- the nuts of the lower stay on the catalytic pre-converter.

❑ Tighten to torque:

- the **catalytic pre-converter upper stay nut (21 N.m)**,
- the **lower stay nuts on the upper stay (21 N.m)**,
- the **lower stay nuts on the cylinder block and on the gearbox (21 N.m)**,
- the **nuts of the lower stay on the catalytic pre-converter (21 N.m)**.

❑ Clip the crankshaft position sensor wiring onto the lower stay of the catalytic pre-converter.

V9X

- ❑ Refit the nut for the rigid cooling pipe on the turbocharger.
- ❑ Torque tighten the **turbocharger heat shield nuts (8 N.m)**.
- ❑ Connect the cooling hose to the turbocharger rigid cooling pipe.
- ❑ Fit the turbocharger cooling hose clip using the tool **(Mot. 1448)**.
- ❑ Refit:
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Prime the diesel circuit using the manual priming pump.
- ❑ Switch on forced + after ignition.
- ❑ Connect the **Diagnostic tool**.
- ❑ In the **Diagnostic tool** :
  - select the repair mode,
  - select the programming mode,
  - select the command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.
- ❑ Check:
  - the correct operation of the high pressure fuel circuit,
  - that there are no leaks.
- ❑ Refit the engine cover.

K9K, and 782

Equipment required
Diagnostic tool

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) ,
- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

138544

❑ Remove:

- the nuts (**1**) from the injector rail,
- the injector rail.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the injector rail.

II - FINAL OPERATION

❑ Refit:

- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the high pressure pipe between the pump and the rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-140**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Check that there are no diesel leaks.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « After repair procedure » for the selected computer,

K9K, and 782

- select « Injector rail pressure sensor » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

K9K, and 780

114076

The injector rail pressure sensor (**1**) cannot be separated from the injector rail.

In the event of a fault on the rail pressure sensor, replace the “rail pressure sensor - injector rail and high pressure pipes” assembly (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) .

M9R

Tightening torques ▽	
rail pressure sensor	**80 Nm**

IMPORTANT

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

WARNING

Once the warranty period for the injector rail has expired, only the pressure sensor can be replaced.

During the injector rail warranty period, the injector rail should be completely replaced if the pressure sensor fails.

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

122430

❏ Remove:

- the nut (**1**) from the cooling radiator top hose,
- the bolts (**2**) from the intercooler air inlet pipe on the intake distributor.

❏ Move aside the cooling radiator top hose.

113282

❏ Rotate the intercooler air inlet pipe clip (**3**) on the turbocharger side.

❏ Move the intercooler inlet air pipe to one side.

118569

❑ Remove the injector rail protector panel using the tabs (**4**) .

❑ Unclip the fuel supply pipes to access the sensor.

II - REMOVAL OPERATION FOR PART CONCERNED

118571

❑

> **WARNING**
> To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❑ Disconnect the rail pressure sensor connector.

❑ Remove the rail pressure sensor (**5**) .

❑ Fit a blanking plug.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Remove the blanking plug.

> Note:
>
> The rail pressure sensor is fitted without a seal.

M9R

- ❑ Refit the rail pressure sensor.
- ❑ Torque tighten the **rail pressure sensor (80 Nm)**.
- ❑ Connect the rail pressure sensor.

II - FINAL OPERATION.

- ❑ Refit the rail protector.
- ❑ Clip the intercooler air inlet pipe to the turbocharger.

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped on.

- ❑ Fit the cooling radiator top hose.
- ❑ Refit:
  - the intercooler air inlet pipe bolts on the intake distributor,
  - the cooling radiator top hose nut on the intercooler air inlet pipe.
- ❑ Tighten:
  - the intercooler air inlet pipe bolts on the intake distributor,
  - the cooling radiator top hose nut on the intercooler air inlet pipe.
- ❑ Refit the engine cover.

Rail pressure sensor: Removal - Refitting

V9X

Equipment required
Diagnostic tool

Tightening torques ▽	
rail pressure sensor	**80 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Be careful when removing the injectors or the injection rail as there will be a quantity of fuel in the rail and the union.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING
Once the warranty period for the injector rail has expired, only the pressure sensor can be replaced.

During the injector rail warranty period, the injector rail should be completely replaced if the pressure sensor fails.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,

- the engine undertray bolts,

- the engine undertray,

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),

- the injector rail protector on the front row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

- the high pressure pipes between the rail and injector of the back row (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,

- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,

- the injector rail on the back row (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

137865

❑ Remove the rail pressure sensor (**1**) .

❑ Fit a blanking plug.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the blanking plug from the injector rail.

❑ Torque tighten the **rail pressure sensor (80 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the injector rail on the back row (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the high pressure pipe between the rails (see **13B**, **Diesel injection**, **High pressure pipe between rails: Removal - Refitting**, page **13B-184**) ,
- the high pressure pipes between the rail and injector of the back row (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the injector rail protector on the back row (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Prime the diesel circuit using the manual priming pump.

❑ Switch on forced + after ignition.

❑ Connect the **Diagnostic tool**.

❑ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❑ Check:

- the correct operation of the high pressure fuel circuit,

V9X

- that there are no leaks.

❑ Refit the engine cover.

K9K

114076

The injector rail pressure sensor cannot be separated from the injector rail.

In the event of a fault on the rail pressure sensor, replace the "rail pressure sensor - injector rail" assembly (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-189**) .

M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove:

- the nut (**1**) from the cooling radiator top hose,
- the bolts (**2**) from the intercooler air inlet pipe on the intake distributor.

113282

❑ Rotate the intercooler air inlet pipe clip (**3**) on the turbocharger side.

❑ Move the intercooler inlet air pipe to one side.

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection).

II - REMOVAL OPERATION FOR PART CONCERNED

❑

> Note:
>
> The temperature sensor is integrated into the fuel pipe between the fuel filter and the high pressure pump; these two components cannot be separated.

123577

❑

WARNING

To prevent impurities from entering the circuit, plugs must be fitted to the openings of all the fuel circuit components exposed to the open air.

❑ Disconnect the fuel pipe quick-release union (**4**) between the fuel filter and the high pressure pump on the high pressure pump.

122432

❑ Disconnect the fuel temperature sensor connector (**5**) .

122996

❑

WARNING

To prevent impurities from entering the circuit, plugs must be fitted to the openings of all the fuel circuit components exposed to the open air.

❑ Disconnect the fuel pipe quick-release union between the fuel filter and the high pressure pump on the fuel filter.

❑ Unclip the pipe between the fuel filter and the high pressure pump.

❑ Remove the pipe between the fuel filter and the high pressure pump.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Fit the pipe between the fuel filter and the high pressure pump.

❑ Clip on the pipe between the fuel filter and the high pressure pump.

M9R

❑ Connect:

- the pipe between the fuel filter and the high pressure pump to the fuel filter,
- the pipe between the fuel filter and the high pressure pump to the high pressure pump.

❑ Connect the temperature sensor connector.

II - FINAL OPERATION.

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

❑ Clip the intercooler air inlet pipe to the turbocharger.

> Note:
>
> Check that the intercooler air inlet pipe is correctly clipped on.

❑ Fit the cooling radiator top hose.

❑ Refit:

- the intercooler air inlet pipe bolts on the intake distributor,
- the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Tighten:

- the intercooler air inlet pipe bolts on the intake distributor,
- the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

Fuel temperature sensor: Removal - Refitting

V9X

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

II - OPERATION FOR REMOVAL OF PART CONCERNED

137874

❑ Disconnect the fuel temperature sensor connector (**1**) .

❑ Unclip the fuel temperature sensor from the fuel return pipe using a screwdriver.

❑ Remove the fuel temperature sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the fuel temperature sensor.

❑ Clip the fuel temperature sensor onto the fuel return pipe.

❑ Connect the fuel temperature sensor connector.

II - FINAL OPERATION

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refit the engine cover.

K9K

- The fuel temperature sensor cannot be separated from the diesel injector fuel return rail. In the event of a fault on the fuel temperature sensor, replace the « diesel injector fuel return rail - fuel temperature sensor » assembly (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) .

K9K, and 780

Special tooling required	
Mot. 1771	Kit for measuring SIEMENS injector leakage flow rate.
Mot. 1711	Kit for measuring the injector fuel flow rate.

Equipment required
graduated measuring cylinder
self-contained starter
Diagnostic tool

IMPORTANT
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT
Wear latex gloves during the operation.

CHECK

I - PREPARATION OPERATION FOR CHECK

❑ Remove the front engine cover.

123532

❑ Undo the clip (**1**) from the intercooler outlet pipe.

❑ Disconnect the intercooler air outlet pipe from the damper valve.

❑ Move the intercooler outlet air pipe away from the damper valve.

123533

❑ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❑ Unpick the electrical wiring from the injector rail protector cover.

❑ Move the electrical wiringto one side.

K9K, and 780

123293

❑ Remove:

- the intercooler air inlet pipe bolt (**4**) ,
- the nut (**5**) from the intercooler inlet air pipe.

123299

❑ Remove the clip (**6**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

123296

❑ Unclip (**7**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**8**) ,
- the injector rail protector cover nut (**9**) ,
- the injector rail protector cover,
- the dipstick,
- the bolts (**10**) from the dipstick well.

❑ Move the dipstick well to one side.

K9K, and 780

111747

❑ Clean the unions (**11**) on the injector fuel return (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

First step for removing the fuel return rail unions from the diesel injectors

111749

❑

WARNING

Ensure that the clip is not completely removed from its housing otherwise it may be damaged when the diesel return union is removed.

Note:

Any clip completely disengaged from a diesel injector that has not been removed must be replaced: to do this, the diesel injector concerned must be removed (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-229**) .

❑ Use a fine, flat-blade screwdriver to push the lower brackets (**12**) on the injector fuel return union clips towards the rocker cover to unlock them and position them fully up against the rocker cover.

K9K, and 780

Second step for removing the fuel return rail unions from the diesel injectors

120940

❑

Note:

If the force exerted on the retaining clip is sufficient when applied continuously using the screwdriver, the injector diesel return unions are released easily.

WARNING

Do not use the screwdriver to lever the injector diesel return unions directly.

❑ Use a thin, flat-blade screwdriver to push down (**13**) on the lower tabs of the clips previously in contact with the rocker cover, without fully removing the clips from their injectors.

❑ Manually extract the injector diesel return unions at (**14**) , while **maintaining pressure (13) on the lower brackets of the retaining clips using a fine, flat-blade screwdriver.**

❑ Fit the appropriate blanking plugs on the diesel fuel return rail unions.

107637

❑ Connect the four transparent hoses of the tool **(Mot. 1771)** to the injectors instead of the injector fuel return pipes.

❑ Immerse the hoses into the four **graduated measuring cylinder** (**15**) of the tool **(Mot. 1711)**.

❑ Refit:

- the dipstick well,
- the dipstick well bolts.

❑ Tighten the dipstick well bolts.

❑ Refit the dipstick.

❑ Fit:

- the intercooler air inlet pipe,
- the intercooler inlet air pipe clip in its original position.

❑ Clip the intercooler air inlet pipe to the turbocharger.

❑ Refit:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❑ Tighten:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❑ Refit the air inlet duct onto the damper flap.

❑ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler outlet air pipe to the damper valve.

❑ Tighten the intercooler air outlet pipe clip.

K9K, and 780

II - TEST OPERATION

❑

> Note:
>
> Do not leave any object (tools or other) on the side of the engine housing during the entire operation.
>
> Position the tools so that they do not fall during the « engine running » phase of the test.

❑ Connect a **self-contained starter**.

❑ Force the vehicle's + after ignition feed.

❑ Connect the **Diagnostic tool**.

❑ Run commands:

- RZ009 Program vehicle functions,
- VP036 Inhibit fuel supply.

❑ Run the starter for **15 seconds**.

❑ Check that the injector return volume is equal to or above **20 ml**.

❑ Repeat the starting phase twice, allowing an interval of **30 seconds** between each starting phase.

❑ Run command VP037 "Stop fuel supply inhibition".

❑ Disconnect the **self-contained starter**.

III - FINAL OPERATION

❑ Undo the intercooler air outlet pipe clip on the damper valve.

❑ Disconnect the intercooler outlet air pipe from the damper valve.

❑ Move the intercooler outlet air pipe away from the damper valve.

❑ Disconnect:

- the damper valve connector,
- the camshaft position sensor connector.

❑ Pull the intercooler air inlet pipe clip.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

❑ Remove:

- the dipstick,
- the dipstick well bolts.

❑ Move the dipstick well to one side.

❑ Disconnect the four transparent pipes from the **(Mot. 1771)**.

❑ Push the injector diesel return union clips towards the front of the vehicle to place them into their original positions.

❑ Remove the blanking plugs from the injector diesel return openings and discard them.

❑ Lubricate the injector diesel return unions with **SILICONE FREE LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) until the seals are completely covered.

111747

❑ Position the injector diesel return unions in front of the injector diesel return openings, starting with injector number 4 (**16**) .

❑ Clip the injector diesel return unions on the injectors, starting with injector number 4.

> Note:
>
> Check that the diesel return unions are properly fitted.

❑ Fit the dipstick well.

❑ Refit the dipstick well bolts.

❑ Tighten the dipstick well bolts.

❑ Refit:

- the dipstick,
- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

K9K, and 780

- ❑ Tighten:
  - the injector rail protector cover nut,
  - the injector rail protector cover bolt.
- ❑ Clip on the injector rail protector cover.
- ❑ Fit:
  - the intercooler air inlet pipe,
  - the intercooler inlet air pipe clip in its original position.
- ❑ Clip the intercooler air inlet pipe to the turbocharger.
- ❑ Refit:
  - the nut to the intercooler inlet air pipe,
  - the intercooler air inlet hose bolt.
- ❑ Tighten:
  - the nut to the intercooler inlet air pipe,
  - the intercooler air inlet hose bolt.
- ❑ Clip the electrical wiring to the injector rail protector cover.
- ❑ Connect:
  - the camshaft position sensor connector,
  - the damper valve connector,
  - the intercooler outlet air pipe to the damper valve.
- ❑ Tighten the intercooler air outlet pipe clip.
- ❑ Refit the engine cover.

K9K, and 782

Special tooling required	
Mot. 1711	Kit for measuring the injector fuel flow rate.

Equipment required
self-contained starter
Diagnostic tool
tweezers

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

CHECK

I - PREPARATION OPERATION FOR CHECK

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

❑ Disconnect the turbocharger pressure sensor connector (**4**) .

❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.

❑ Pull the clip (**6**) of the intercooler air outlet pipe.

❑ Move the intercooler air outlet pipe to one side.

138551

❑ Unclip the wiring (**7**) of the damper valve.

138550

❑ Unclip the injector rail protector cover at (**8**) .

❑ Remove:

- the bolts (**9**) from the injector rail protector cover,
- the cover of the injector rail protector.

138900

❑ Disconnect the fuel return rail (**10**) from each injector.

K9K, and 782

107637

❑ Connect the four transparent hoses of the tool **(Mot. 1711)** on the diesel injectors in place of each union of the diesel injector fuel return rail.

> Note:
>
> The hose must be fitted with force on the diesel injector fuel return nipple.
>
> If a hose of the tool **(Mot. 1711)** fits too easily onto the diesel injector fuel nipple, due to hose defomation, cut off the widened section of this hose in order to obtain a smaller diameter and to ensure that the hose is secure on the injector during the pressurised test phase.

❑ Insert these pipes in the four graduated measuring cylinders (**11**) of the tool **(Mot. 1711)**.

❑ Fit the clip for the intercooler air outlet pipe.

❑ Clip the intercooler air outlet pipe on the damper valve.

❑ Connect the turbocharger pressure sensor connector.

❑ Refit the clip of the intercooler air inlet pipe.

❑ Clip the intercooler air inlet pipe onto the turbocharger air outlet pipe.

II - CHECKING OPERATION FOR PART CONCERNED

❑ Connect a **self-contained starter**.

❑ Force the vehicle's + after ignition feed.

❑ Connect the **Diagnostic tool**.

❑ Run commands:

- **RZ009** Program vehicle functions,
- **VP036** Inhibit fuel supply.

❑ Run the starter for **15 seconds**.

❑ Check that the diesel injector return volume is greater than or equal to **20 ml**.

❑ Repeat the starting phase twice, allowing an interval of **30 seconds** between each starting phase.

❑ Run command **VP037** Stop fuel supply inhibition.

❑ Disconnect:

- the **Diagnostic tool**,
- the **self-contained starter**.

III - FINAL OPERATION

❑ Remove the clip from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

❑ Disconnect the turbocharging pressure sensor connector.

❑ Pull the clip of the intercooler air outlet pipe.

❑ Move the intercooler air outlet pipe to one side.

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

K9K, and 782

115069

❑

Note:

Check that the seals of the intercooler air inlet and outlet pipes are fitted the right way round

❑ Refit:

- a new intercooler air outlet pipe seal,
- a new intercooler air inlet pipe seal.

❑ Disconnect the four transparent pipes of the tool **(Mot. 1711)** on the diesel injectors.

❑ Connect the diesel injector fuel return rail unions to the diesel injectors.

Note:

Check that the unions of the fuel return rail are correctly connected.

Note:

If the diesel injector fuel return rail pipe does not hold when pulled upwards after it was fitted, cut off a small piece of it and refit it.

❑ Refit the injector rail protector cover.

❑ Clip on the damper valve wiring.

❑ Fit the clip for the intercooler air outlet pipe.

❑ Clip the intercooler air outlet pipe on the damper valve.

❑ Clip on the wiring of the turbocharging pressure sensor.

❑ Connect the turbocharger pressure sensor connector.

❑ Refit the clip of the intercooler air inlet pipe.

❑ Clip the intercooler air inlet pipe onto the turbocharger air outlet pipe.

❑ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

Diesel injector: Removal - Refitting

M9R

Special tooling required	
Mot. 1817	Injector well cleaning kit

Equipment required
indelible pencil
tweezers
Diagnostic tool

Tightening torques ▽	
injector clamp bolts35	**N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

Note:

It is strictly forbidden to disconnect an injector connector with the engine running.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

122430

❑ Remove the nut (**1**) from the cooling radiator top hose.

❑ Move aside the cooling radiator top hose.

❑ Remove the air pipe bolts (**2**) at the intercooler inlet.

113282

❑ Rotate the clip (**3**) on the intercooler air inlet pipe.

❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,

- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,

- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,

M9R

- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

123590

❏

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

❏ Insert the blanking plugs.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123591

❏ Mark the injectors in relation to the cylinders using a **indelible pencil**.

Note:

Cylinder number 1 is located on the timing end.

❏ Remove:

- the injector clamp bolts (**4**) ,
- the injector clamps.
- the injectors one by one.

❏ Remove the heat protection washer.

Note:

If the heat protection washer is stuck at the bottom of the well, use the **(Mot. 1817)** (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

M9R

REFITTING

I - REFITTING PREPARATION OPERATION

Cleaning parts

113158

❑

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

❑ Always clean the well of the removed injector (see **Injector well cleaning tool: Use**) (Technical Note 6040, 13B, Diesel injection).

❑ If reusing the removed injector:

- clean the injector using a cloth soaked in product **nettoyant injecteur** or **nettoyant frein**,
- if necessary, leave the injector nozzle to soak in the product **nettoyant injecteur**,
- wipe the injector with a new wipe,
- (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

❑ Always replace:

- the heat protection washer,
- the intercooler air inlet pipe seal.

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

> Note:
>
> Position the lip of the seal (**5**) towards the inside of the intercooler air inlet pipe.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ Fit new seals on the injectors.

❑ Refit:

- the injectors following the marks made when they were removed,
- the injector clamps.
- the bolts on the injector clamps.

❑ Torque tighten the **injector clamp bolts35 (N.m)**.

125085

❑ If an injector is replaced, note the injector IMA code and the corresponding cylinder number.

> Note:
> IMA codes are from X1 to XN.
>
> After connecting the battery, program the injectors using the **Diagnostic tool**.

III - FINAL OPERATION

❑ Refit:

- the high pressure pipes between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel injector fuel return rail (see **13B**, **Diesel injection**, **Diesel injector fuel return rail: Removal - Refitting**, page **13B-108**) ,
- the oil separator (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-307**) ,
- the intercooler air inlet pipe temporarily.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Prime the diesel circuit using the manual priming pump.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the « Before/After repair procedure » for the computer selected,
- select « Injector » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

❑ Check that there are no leaks.

❑ Disconnect the intercooler air inlet pipe.

❑ Remove the intercooler air inlet pipe.

❑ Refit the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) .

> Note:
> Check that the intercooler air inlet pipe is correctly clipped onto the turbocharger.

❑ Connect the intercooler air inlet pipe on the turbocharger.

❑ Refit the bolts of the intercooler air inlet pipe on the air intake distributor.

❑ Fit the cooling radiator top hose on the intercooler air inlet pipe.

M9R

- ❑ Refit the nut of the cooling radiator top hose on the intercooler air inlet pipe.
- ❑ Refit the engine cover.

K9K, and 780

Special tooling required	
Mot. 1817	Injector well cleaning kit

Equipment required
Diagnostic tool

Tightening torques ▽	
diesel injector bolts	**30 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Apply the procedure before repair using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « diesel injection computer » ,
- go to repair mode,
- display the « before repair procedure » on the selected computer,
- select « injectors » in the « list of components controlled by this computer » section,
- carry out the operations described in the « procedure before repair » section.

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the high pressure pipe between the rail and injector from the injector concerned (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the diesel return pipe from the injectors (see **13B**, **Diesel injection**, **Diesel return pipe: Removal - Refitting**, page **13B-98**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

111746

❑ Remove:

- the bolt (**1**) from the diesel injector clamp concerned,
- the diesel injector clamp concerned,
- the spacer from the diesel injector clamp concerned,
- the diesel injector concerned,
- the heat protection washer.

Note:

If the heat protection washer is stuck at the bottom of the well, use the **(Mot. 1817)** (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

K9K, and 780

114010

❑

> Note:
>
> If a diesel injector is stuck in its well and does not come out, turn the diesel injector at the flat surface of the diesel injector clamp using a **13 mm** open-ended spanner.

❑ Remove the diesel injector from its well.

> Note:
>
> If reusing the diesel injector(s) keep them in a hermetically sealed bag throughout the removal operation.

❑ Fit an appropriate blanking plug on the diesel injector nose.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: High pressure pipe between the rail and injector (11,05,03,01)**.

❑ Always replace the heat protection washer of the diesel injector concerned.

Cleaning parts

❑

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

> **IMPORTANT**
>
> Wear leaktight gloves (Nitrile type) for this operation.

❑ Always clean the well of the removed injector (see **Injector well cleaning tool: Use**) (Technical Note 6040, 13B, Diesel injection).

❑ If reusing the removed injector:

- clean the injector using a wipe soaked in injector cleaning product or brake cleaner,
- if necessary, leave the injector nozzle to soak in injector cleaning product,
- wipe the injector with a new wipe,
- (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

II - REFITTING OPERATION FOR PART CONCERNED

❑ Remove the new diesel injector from its packaging.

❑ Remove the blanking plug from the diesel injector nose and discard it.

❑ Refit:

- a new heat protection washer,
- the diesel injector,
- the diesel injector clamp spacer,
- the diesel injector clamp,
- the diesel injector clamp bolt.

❑ Torque tighten the **diesel injector bolts (30 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the diesel return pipe for the diesel injectors (see **13B**, **Diesel injection**, **Diesel return pipe: Removal - Refitting**, page **13B-98**) ,

K9K, and 780

- the high pressure pipe between the rail and injector on the injector concerned (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Refit the engine cover.

Diesel injector: Removal - Refitting

V9X

Special tooling required	
Mot. 921-01	Injector holder extraction tool.
Emb. 880	Pin extractor tool.
Mot. 1817	Injector well cleaning kit

Equipment required
indelible pencil
Diagnostic tool

Tightening torques ▽	
injector clamp bolts	**35 N.m**

22157

(**A**) Front row

(**B**) Back row

Cylinder no. 1 is located on the timing end back row.

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

IMPORTANT

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,

- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

Note:

It is strictly forbidden to disconnect an injector connector with the engine running.

Note:

This method describes the removal - refitting operation for the front row injectors, injectors 3 and 5 of the back row and injector 1 of the back row.

REMOVING THE FRONT ROW INJECTORS

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,

- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

114880

❑ Lift up the clips (**7**) between the fuel return rail and the injectors using a flat-blade screwdriver.

❑ Disconnect the injector fuel return rail.

❑ Move aside the fuel return rail.

❑ Insert the blanking plugs.

133897

❑ Disconnect the injector connectors (**2**) .

❑ Mark the injectors in relation to the cylinders using a **indelible pencil**.

❑ Remove:

- the injector clamp bolts (**4**) ,
- the injector clamps,
- the injectors.

> Note:
>
> If the injectors are seized, remove the injectors using the tool **(Mot. 921-01)** and the tool **(Emb. 880)**.

❑ Remove the heat protection washers.

> Note:
>
> If the heat protection washer is stuck at the bottom of the well, use the **(Mot. 1817)** (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

V9X

REFITTING THE FRONT ROW INJECTORS

I - REFITTING PREPARATION OPERATION

Cleaning parts

113158

❑ Always replace the heat protection washers.

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

❑ Always clean the well of the removed injector (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

❑ If reusing the removed injector:

- clean the injector using a cloth soaked in **INJECTOR CLEANER** or **BRAKE CLEANER**,
- if necessary, leave the injector nozzle to soak in **INJECTOR CLEANER**,
- wipe the injector with a new wipe,
- (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ When replacing an injector, note the IMA code of the new injector and the number of the corresponding cylinder.

> Note:
>
> IMA codes are from X1 to XN.
>
> After connecting the battery, program the injectors using the **Diagnostic tool**.

❑ Position the new heat protection washers on the injectors.

❑ Refit:

- the injectors following the marks made when they were removed,
- the injector clamps.

❑ Torque tighten the **injector clamp bolts (35 N.m)**.

❑ Connect the injector connectors.

❑ Remove the blanking plugs from the injectors.

❑ Position the fuel return rail on the injectors.

❑ Connect the fuel return rail to the injectors.

❑ Clip the fuel return rail unions onto the injectors.

III - FINAL OPERATION

❑ Refit the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Prime the diesel circuit using the manual priming pump.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,

- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Injector » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

❏ Check that there are no leaks.

❏ Switch on forced + after ignition.

❏ Connect the **Diagnostic tool**.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❏ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❏ Refit the engine cover.

REMOVING INJECTORS 3 AND 5 ON THE BACK ROW

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

114880

❏ Lift up the clips (**1**) between the fuel return rail and the injectors using a flat-blade screwdriver.

❏ Disconnect the injector fuel return rail.

❏ Move aside the fuel return rail.

❏ Insert the blanking plugs.

V9X

134100

- Disconnect the injector connectors.
- Mark the injectors in relation to the cylinders using a **indelible pencil**.
- Remove:
  - the injector clamp bolts (**2**) ,
  - the injector clamps,
  - the injectors.

> Note:
>
> If the injectors are seized, remove:
>
> - the bonnet (see **Bonnet: Removal - Refitting**) (48A, Non-side opening elements),
> - the injectors using the tool **(Mot. 921-01)** and the tool **(Emb. 880)**.

- Remove the heat protection washers.

> Note:
>
> If the heat protection washer is stuck at the bottom of the well, use the **(Mot. 1817)** (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

V9X

REFITTING INJECTORS 3 AND 5 ON THE BACK ROW

I - REFITTING PREPARATION OPERATION

Cleaning parts

113158

❑ Always replace the heat protection washers.

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

❑ Always clean the well of the removed injector (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

❑ If reusing the removed injector:

- clean the injector using a cloth soaked in **INJECTOR CLEANER** or **BRAKE CLEANER**,
- if necessary, leave the injector nozzle to soak in **INJECTOR CLEANER**,
- wipe the injector with a new wipe,
- (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ When replacing an injector, note the IMA code of the new injector and the number of the corresponding cylinder.

> Note:
>
> IMA codes are from X1 to XN.
>
> After connecting the battery, program the injectors using the **Diagnostic tool**.

❑ Fit new seals to the injectors.

❑ Refit:

- the injectors following the marks made when they were removed,
- the injector clamps.

❑ Torque tighten the **injector clamp bolts (35 N.m)**.

❑ Connect the injector connectors.

❑ Remove the blanking plugs.

❑ Position the fuel return rail on the injectors.

❑ Connect the fuel return rail to the injectors.

❑ Clip the fuel return rail unions onto the injectors.

III - FINAL OPERATION

❑ Refit the high pressure pipes between the rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Prime the diesel circuit using the manual priming pump.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,

- display the « before/after repair procedure » for the computer selected,
- select « Injector » in the « List of components stored by this computer » section,
- carry out the operations described in the « After repair procedure » section.

❏ Check that there are no leaks.

❏ Switch on forced + after ignition.

❏ Connect the **Diagnostic tool**.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❏ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❏ Refit the engine cover.

REMOVING INJECTOR 1 ON THE BACK ROW

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the high pressure pipe between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

114880

❏ Lift the clip (**1**) between the fuel return rail and the injector using a flat-blade screwdriver.

❏ Disconnect the fuel return rail from the injector.

❏ Move aside the fuel return rail.

❏ Fit a blanking plug.

V9X

134100

❑ Disconnect the injector connector.

❑ Remove:

- the injector clamp bolt (**2**) ,
- the injector clamp,
- the injector.

> Note:
>
> If the injector is seized, remove:
>
> - the bonnet (see **Bonnet: Removal - Refitting**) (48A, Non-side opening elements),
> - the injector using the tool **(Mot. 921-01)** and the tool **(Emb. 880)**.

❑ Remove the heat protection washer.

> Note:
>
> If the heat protection washer is stuck at the bottom of the well, use the **(Mot. 1817)** (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

V9X

REFITTING INJECTOR 1 ON THE BACK ROW

I - REFITTING PREPARATION OPERATION

Cleaning parts

113158

❑ Always replace the heat protection washer.

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

❑ Always clean the well of the removed injector (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

❑ If reusing the removed injector:

- clean the injector using a cloth soaked in **INJECTOR CLEANER** or **BRAKE CLEANER**,
- if necessary, leave the injector nozzle to soak in **INJECTOR CLEANER**,
- wipe the injector with a new wipe,
- (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) .

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ When replacing an injector, note the IMA code of the new injector and the number of the corresponding cylinder.

> Note:
>
> IMA codes are from X1 to XN.
>
> After connecting the battery, program the injector using the **Diagnostic tool**.

❑ Fit a new seal on the injector.

❑ Refit:

- the injector,
- the injector clamp,

❑ Torque tighten the **injector clamp bolts (35 N.m)**.

❑ Connect the injector connector.

❑ Remove the blanking plug.

❑ Position the fuel return rail on the injector.

❑ Connect the fuel return rail to the injector.

❑ Clip the fuel return rail unions onto the injector.

III - FINAL OPERATION

❑ Refit:

- the high pressure pipe between the rail and the injector (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) ,
- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail protector: Removal - Refitting**, page **13B-126**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit the engine undertray.

❏ Prime the diesel circuit using the manual priming pump.

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Injector » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

❏ Check that there are no leaks.

❏ Switch on forced + after ignition.

❏ Connect the **Diagnostic tool**.

❏ In the **Diagnostic tool** :

- select the repair mode,
- select the programming mode,
- select command **SC 035: HIGH PRESSURE FUEL CIRCUIT FAULT FINDING**.

❏ Check:

- the correct operation of the high pressure fuel circuit,
- that there are no leaks.

❏ Refit the engine cover.

K9K, and 782

Equipment required
compressed air nozzle
Diagnostic tool

Tightening torques ▽	
diesel injector bracket bolt	**27 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the high pressure pipe(s) between the injector rail and the diesel injector(s) (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .

138545

❏ Disconnect the diesel injector fuel return rail (**1**) from the diesel injector(s).

❏ Insert the blanking plugs.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Disconnect the connector(s) from the diesel injector or injectors concerned.

138546

❏ Remove:

- the bolt (**2**) from the bracket on the diesel injector(s) concerned,
- the bracket of the diesel injector(s) concerned.

Note:

If the diesel injector is stuck in the well and does not come out, turn the diesel injector using an open-ended spanner on the flat surface of the diesel injector bracket.

K9K, and 782

❑ Remove:

- the diesel injector(s) concerned,
- the seal at the bottom of the well of the diesel injector(s) concerned or on the nozzle of the diesel injector(s) concerned.

> Note:
>
> If reusing a diesel injector, always mark the cylinder on which it is fitted before removing it.

> Note:
>
> If reusing the diesel injector(s), keep them in a hermetically sealed bag throughout the removal operation.

❑ Fit an appropriate blanking plug on the diesel injector nose.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

❑ **parts always to be replaced: injector seal (11,11, 02,02)**.

Cleaning the diesel injector well(s) and the diesel injector(s)

❑

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

❑ Soak the diesel injector in **INJECTOR CLEANING PRODUCT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Clean the nozzle of the diesel injector(s):

- either using **CLEANING CLOTHS** soaked in **INJECTOR CLEANING PRODUCT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- or using a small brush with plastic bristles.

❑ Wipe using **CLEANING CLOTHS**.

114994

❑ Fit an **11mm** by **1/4"** socket (**3**) (socket outer Ø = washer Ø) on an extension piece (**4**) .

❑ Wrap a **CLEANING CLOTH** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) around the "socket - extension piece" assembly.

❑ Soak a **CLEANING CLOTH** in **INJECTOR CLEANING PRODUCT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Insert the wipe-covered extension piece and end piece down into the bottom of the well.

❑ Clean the diesel injector well (pay particular attention to the mating face of the washer).

> Note:
>
> Swivel the cloth-covered socket and extension piece around inside the well.

❑ Remove the **CLEANING CLOTH** from the well.

K9K, and 782

114926

- Insert a large diameter Phillips screwdriver (Ø > **8 mm**) into the well to block the opening to the combustion chamber.
- Blast out any scale residue in the well using a **compressed air nozzle**.
- Remove the screwdriver and repeat the cleaning operation for the injector well concerned twice in succession.

II - REFITTING OPERATION FOR PART CONCERNED

- Remove the blanking plug from the nozzle of the diesel injector(s).

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

> Note:
>
> If reusing an injector, refit it on the cylinder on which it was fitted, marked during the removal operation.
>
> When replacing an injector, note the alphanumeric code of the new injector as well as the cylinder on which it is fitted.

- Refit:
  - a new seal on the diesel injector(s),
  - the diesel injector(s),
  - the diesel injector bracket.
- Torque tighten the **diesel injector bracket bolt (27 N.m)**.
- Connect the connector(s) of the diesel injector or injectors concerned.

III - FINAL OPERATION

- Remove the blanking plugs.
- Connect the diesel injector fuel return rail to the diesel injector(s).
- Refit the high pressure pipe(s) between the injector rail and the diesel injector(s) (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-161**) .
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- Check that there are no diesel leaks.
- Apply the after repair procedure using the **Diagnostic tool** :
  - connect the **Diagnostic tool**,
  - select "Injection computer",
  - go to repair mode,
  - display the "Before/after repair procedure" for the computer selected,
  - select "Injector" in the "List of components controlled by this computer" section,
  - carry out the operations described in the "After repair procedure" section.

> Note:
>
> When replacing one or more injectors, use the **Diagnostic tool** to enter the alphanumeric codes into the diesel injection computer for each injector noted during refitting.

K9K or M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION FOR PART CONCERNED

122429

❑ Disconnect the pre-postheating unit connector.

❑ Remove:

- the pre-postheating unit nut,
- the pre-postheating unit.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the pre-postheating unit,
- the pre-postheating unit nut.

❑ Tighten the pre-postheating unit nut.

❑ Connect the pre-postheating unit connector.

II - FINAL OPERATION.

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

V9X

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

II - OPERATION FOR REMOVAL OF PART CONCERNED

137878

❑ Disconnect the pre-postheating unit connector (**1**) .

❑ Remove:

- the pre-postheating unit nut (**2**) ,
- the pre/postheating unit.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the pre-postheating unit.

❑ Connect the pre-postheating unit connector.

II - FINAL OPERATION

❑ Refit:

- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 780

Equipment required
protective goggles
heater plug removal tool
hinged wrench for heater plug

Tightening torques ▽	
heater plugs	**15 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

123532

❏ Undo the clip (**1**) from the intercooler outlet pipe.

❏ Move the intercooler outlet air pipe away from the damper valve.

123533

❏ Disconnect:

- the damper valve connector (**2**) ,
- the connector (**3**) from the camshaft position sensor.

❏ Unpick the electrical wiring from the injector rail protector cover.

❏ Move aside the electrical wiring.

123293

❏ Remove:

- the intercooler air inlet pipe bolt (**4**) ,
- the nut (**5**) from the intercooler inlet air pipe.

K9K, and 780

123299

❑ Remove the clip (**6**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

123296

❑ Unclip (**7**) the cover from the injector rail protector.

❑ Remove:

- the injector rail protector cover bolt (**8**) ,
- the injector rail protector cover nut (**9**) ,
- the injector rail protector cover,

II - REMOVAL OPERATION FOR PART CONCERNED

123294

❑ Disconnect the heater plug connectors (**10**) .

> **IMPORTANT**
> Wear goggles with side protectors for this operation.

❑ Fit **protective goggles**.

❑ Clean around the outside of the heater plugs with a compressed air gun to prevent any impurities from entering the cylinders.

K9K, and 780

123295

❑

> Note:
>
> If the heater plugs stick (**11**) , use **heater plug removal tool** (see **Heater plug removal tool: Use**) (Technical Note 5197A, 06A, Tools).

❑ Unscrew the heater plugs (**11**) using a **10 mm** long radio socket connected to a universal joint or a **hinged wrench for heater plug**.

❑ Use a hose to unscrew the heater plugs completely (**11**) .

❑ Remove the preheater plugs (**11**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Without tightening, fit the heater plugs using the hose.

❑ Torque tighten the **heater plugs (15 Nm)**.

❑ Connect the heater plug connectors.

II - FINAL OPERATION.

❑ Refit:

- the injector rail protector cover,
- the injector rail protector cover nut,
- the injector rail protector cover bolt.

❑ Clip on the injector rail protector cover.

❑ Fit:

- the intercooler air inlet pipe,
- the intercooler inlet air pipe clip in its original position.

❑ Clip the intercooler air inlet pipe to the turbocharger.

❑ Refit:

- the nut to the intercooler inlet air pipe,
- the intercooler air inlet hose bolt.

❑ Clip the electrical wiring to the injector rail protector cover.

❑ Connect:

- the camshaft position sensor connector,
- the damper valve connector,
- the intercooler outlet air pipe to the damper valve.

❑ Tighten the intercooler air outlet pipe clip.

❑ Refit the engine cover.

M9R

Tightening torques ▽	
the heater plugs	**18 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123582

❑ Unclip and move aside the fuel pipe at (**1**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123617

❑ Disconnect the heater plug connectors (**2**) .

❑ Clean and blast around the heater plugs to prevent any impurities entering the cylinders.

M9R

123618

❑ Remove the heater plugs (**3**) using a **10 mm** long socket.

> Note:
>
> If the heater plugs are seized (see **Heater plug removal tool: Use**) (Technical Note 5197, 06A, Tooling).

> Note:
>
> Use a hose to unscrew the heater plugs completely.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

> Note:
>
> Ensure that no impurities enter the cylinders during the operation.

❑ Refit the heater plugs.

❑ Torque tighten **the heater plugs (18 Nm)**.

❑ Connect the heater plug connectors.

II - FINAL OPERATION.

❑ Clip on the fuel pipe.

❑ Refit the engine cover.

V9X

Tightening torques ▽	
the heater plugs	**18 N.m**

22157

(**A**) Front row

(**B**) Back row

Cylinder no. 1 is located on the timing end back row.

REMOVAL

I - REMOVAL PREPARATION OPERATION

1 - Heater plug for cylinders 2, 4, 6, 5

❑ Remove the front engine cover.

2 - Cylinder 3 heater plug

❑ Remove the front engine cover.

133899

❑ Unclip the fuel pipes from the support at (**1**) .

❑ Move the fuel pipesto one side.

3 - Cylinder 1 heater plug

❑ Remove:

- the engine cover,
- the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134029

118383

❑ Disconnect the heater plug connectors (**4**) .

❑ Clean and blast around the heater plugs to prevent any impurities entering the cylinders.

❑ Remove the heater plugs (**5**) using a **10 mm** long socket.

Note:

If the heater plugs are jammed (see **Heater plug removal tool: Use**) (Technical Note 5197A, 06A, Tooling).

Note:

Use a hose to unscrew the heater plugs completely.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

Note:

Ensure that no impurities enter the cylinders during the operation.

❑ Refit the heater plugs.

❑ Torque tighten **the heater plugs (18 N.m)**.

❑ Connect the heater plug connectors.

II - FINAL OPERATION

1 - Heater plug for cylinders 2, 4, 6, 5

❑ Refit the engine cover.

2 - Cylinder 3 heater plug

❑ Position the fuel pipes.

❑ Clip the fuel pipes onto the support.

❑ Refit the engine cover.

3 - Cylinder 1 heater plug

❑ Refit:

- the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) ,

- the engine cover.

K9K, and 782

Equipment required
compressed air nozzle
heater plug removal tool
hinged wrench for heater plug
tweezers

Tightening torques ▽	
heater plugs	**15 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

138389

138390

❑ Remove:

- the nut (**1**) on the intercooler air inlet pipe,
- the bolt (**2**) on the intercooler air inlet pipe,
- the clip (**3**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Move aside the intercooler air inlet pipe.

K9K, and 782

138399

❑ Disconnect the turbocharger pressure sensor connector (**4**) .

❑ Unclip the wiring (**5**) of the turbocharging pressure sensor.

❑ Pull the clip (**6**) of the intercooler air outlet pipe.

❑ Move the intercooler air outlet pipe to one side.

138551

❑ Unclip the wiring (**7**) of the damper valve.

138550

❑ Unclip the injector rail protector cover at (**8**) .

❑ Remove:

- the bolts (**9**) from the injector rail protector cover,

- the cover of the injector rail protector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

138548

❑ Disconnect the connector (**10**) from each heater plug.

IMPORTANT
Wear goggles with side protectors for this operation.

K9K, and 782

❑ Clean the edges of the heater plugs using a **compressed air nozzle** to avoid any impurities getting into the cylinders.

> Note:
>
> If the heater plugs are seized, use the **heater plug removal tool** (see **Heater plug removal tool: Use**) (Technical Note 5197A, 06A, Tooling).

❑ Unscrew the heater plugs using a **10 mm** long socket connected to a universal joint or a **hinged wrench for heater plug**.

❑ Use a hose to unscrew the heater plugs completely.

❑ Remove the heater plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05)**.

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

115068

❑ Use a **tweezers** to remove:

- the intercooler air outlet pipe seal,
- the intercooler air inlet pipe seal.

115069

❑

> Note:
>
> Check that the seal of the intercooler air inlet and outlet pipes are fitted the right way round.

❑ Refit:

- a new intercooler air outlet pipe seal,
- a new intercooler air inlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the heater plugs using a hose.

❑ Torque tighten the **heater plugs (15 N.m)**.

❑ Connect the connector for each heater plug.

III - FINAL OPERATION

❑ Refit the injector rail protector cover.

❑ Clip on the damper valve wiring.

❑ Fit the clip for the intercooler air outlet pipe.

❑ Clip the intercooler air outlet pipe on the damper valve.

❑ Clip on the wiring of the turbocharging pressure sensor.

❑ Connect the turbocharger pressure sensor connector.

❑ Refit the clip of the intercooler air inlet pipe.

❑ Clip on the intercooler air inlet pipe.

K9K, and 782

❑ Refit:

- the bolt on the intercooler air inlet pipe,
- the nut on the intercooler air inlet pipe.

Oil vapour rebreathing circuit: Description

F4R

Oil vapour rebreathing circuit for medium and high loads

21915

(**1**) Oil vapour rebreathing circuit for medium and high loads

Oil vapour rebreathing opening for medium and high loads

21884

(**2**) Oil vapour rebreathing opening for medium and high loads

Oil vapour rebreathing circuit for low loads

21924

(**3**) Oil vapour rebreathing circuit for low loads

Oil vapour rebreathing opening for low loads

21884

(**4**) Oil vapour rebreathing opening for low loads

F4R

Oil decanter

21883

(**5**) Oil decanter

Oil vapour rebreathing circuit: Operating diagram

M9R

124686

(**1**)	Engine
(**2**)	Oil decanter
(**3**)	Air filter box
(**4**)	Air filter box air outlet pipe
(**5**)	Turbocharger

Oil vapour rebreathing circuit: Operating diagram

K9K

A: Low load

20965

B: Medium and high load

20965-1

(**1**)	Cylinder head cover
(**2**)	Oil vapour breather pipe
(**3**)	Oil vapour rebreathing valve
(**4**)	Air inlet duct
(**5**)	Turbocharger
(**6**)	Atmospheric pressure

A: At low load, the vacuum pressure prevailing in the air inlet duct is below the spring calibration. Large quantities of oil vapour are sucked back in by the vacuum prevailing in the air inlet duct.

B: At medium or high load, the vacuum pressure prevailing in the air inlet duct pulls the valve diaphragm and small quantities of oil vapour are rebreathed in via a calibrated opening.

F4R

Operating diagram of the oil vapour rebreathing circuit for medium and high loads

101956

Operating diagram of the oil vapour rebreathing circuit for low loads

101957

(**1**)	Engine
(**2**)	Oil decanter
(**3**)	Air filter unit
(**4**)	Throttle valve
(**5**)	Inlet manifold
(**6**)	Air inlet

Exhaust gas recirculation: Operating diagram

M9R

113323

(**1**)	Engine
(**2**)	Air filter box
(**3**)	Turbocharger
(**4**)	Air-to-air intercooler
(**5**)	Air inlet valve
(**6**)	Exhaust gas recirculation solenoid valve
(**7**)	Inlet manifold
(**8**)	Exhaust manifold
(**9**)	Intercooler
(**10**)	Diesel injection computer

Fuel vapour recirculation circuit: Operating diagram

F4R or K4M or M4R

97393-1

(**1**)	Inlet manifold
(**2**)	Fuel vapour absorber bleed solenoid valve
(**3**)	Fuel vapour absorber
(**4**)	Fuel tank
(**5**)	Fresh air vent

F4R or M4R

Equipment required
Diagnostic tool

I - CHECKING THE OPERATION OF THE FUEL VAPOUR ABSORBER BLEED

❑

> Note:
>
> A fault with this system may result in rough idling or the engine stalling.

97393-1

(**1**)	Inlet manifold
(**2**)	Fuel vapour absorber bleed solenoid valve
(**3**)	Fuel vapour absorber
(**4**)	Fuel tank
(**5**)	Fresh air vent

❑ Check the condition of the pipes up to the fuel tank.

II - FUEL VAPOUR ABSORBER BLEED CONDITIONS

❑ The fuel vapour absorber bleed solenoid valve is controlled by the petrol injection computer.

During « on board diagnostic » fault finding, fuel vapour absorber bleeding is not authorised.

The opening cyclic ratio of the fuel vapour absorber bleed solenoid valve can be viewed on the **Diagnostic tool** by reading parameter « Fuel vapour absorber bleed solenoid valve OCR » .

The solenoid valve is closed for a value below **1.2%**.

F4R or K4M or M4R

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

❑ Remove:

- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) ,
- the expansion chamber (see **19B**, **Exhaust**, **Expansion chamber: Removal - Refitting**, page **19B-47**) ,
- the fuel tank (see **19C**, **Tank**, **Fuel tank: Removal - Refitting**, page **19C-11**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124801

❑ Unclip the fuel vapour absorber from the fuel tank by moving the brackets (**1**) aside.

❑ Remove the fuel vapour absorber from the fuel tank by pushing it in the direction of the arrow (**2**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the fuel vapour absorber on the fuel tank.

❑ Clip the fuel vapour absorber on the fuel tank.

II - FINAL OPERATION.

❑ Refit:

- the fuel tank (see **19C**, **Tank**, **Fuel tank: Removal - Refitting**, page **19C-11**) ,
- the expansion chamber (see **19B**, **Exhaust**, **Expansion chamber: Removal - Refitting**, page **19B-47**) ,
- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Fuel vapour absorber: Check

F4R or M4R

Special tooling required	
Mot. 1311-01	Pressure gauges and petrol pressure measuring unions.

Equipment required
Diagnostic tool

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

I - PREPARATION OPERATION FOR CHECK

❏ Raise the rear bench seat.

❏ Open the “pump - sender - filter” module access flap.

II - CHECKING THE FUEL VAPOUR ABSORBER

❏ On the fuel vapour absorber, plug the circuit coming from the fuel tank.

❏ Connect a pressure gauge of the **(Mot. 1311-01)** onto the fuel vapour absorber breather outlet.

❏ With the engine at idle speed, check that no vacuum is present at the fuel vapour absorber breather outlet. The control value read by the **Diagnostic tool** in parameter « fuel vapour absorber bleed solenoid valve OCR » remains at least **X less than or equal to 1.5 %**.

Is there a vacuum?

- YES:with the ignition off, use a vacuum pump to apply a vacuum of **500 mbar** to the solenoid valve outlet. The vacuum pressure should not vary by more than **10 mbar** over **30 seconds**.

Does the pressure vary?

Yes: the solenoid valve is faulty, replace the solenoid valve.

No: there is an electrical problem, check the circuit.

- NO: under bleed conditions (see **14A**, **Antipollution**, **Fuel vapour recirculation circuit: Check**, page **14A-8**) the vacuum must be increased. In the same time, the value of the parameter on the **Diagnostic tool** increases.

III - CHECKING THE FUEL VAPOUR ABSORBER-TANK CONNECTION

❏ Check this connection by connecting a vacuum pump to the pipe leading to the fuel vapour absorber.

IV - FINAL OPERATION.

❏ Close the “pump - sender - filter” module access flap.

❏ Refit the rear bench seat.

M9R, and 742 or 744 or 746 or 748

Equipment required
parts washer
tweezers
Diagnostic tool

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Remove the front engine cover.

122430

❏ Remove the nut (**1**) from the cooling radiator top hose on the intercooler air inlet pipe.

❏ Move aside the cooling radiator top cooling hose.

❏ Remove the bolts (**2**) from the intercooler air inlet pipe on the intake distributor.

113282

❏ Rotate the intercooler air inlet pipe clip (**3**) at the turbocharger end.

❏ Disconnect the intercooler air inlet pipe from the turbocharger.

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

❏ Rotate the intercooler air inlet pipe clip at the intercooler end.

❏ Disconnect the intercooler air inlet pipe from the intercooler.

❏ Remove:

- the intercooler air inlet pipe,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

M9R, and 742 or 744 or 746 or 748

123007

❑ Remove:

- the bolts (**4**) from the exhaust gas recirculation rigid pipe between the intercooler and the EGR solenoid valve,
- the exhaust gas recirculation rigid pipe between the intercooler and the EGR solenoid valve.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123008

❑ Disconnect the connector (**5**) from the EGR solenoid valve.

❑ Remove:

- the EGR solenoid valve strut (**6**) ,
- the EGR solenoid valve,
- the EGR solenoid valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the EGR solenoid valve (only the mechanical part) using a **parts washer** (see **Exhaust gas recirculation solenoid valve: Cleaning**) .

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the EGR solenoid valve pressure faces.

❑ Parts always to be replaced:

- the EGR solenoid valve seals,
- the seals on the exhaust gas recirculation rigid pipe between the intercooler and the EGR solenoid valve,
- the seals on the intercooler air inlet pipe.

115068

❑ Remove the intercooler air inlet pipe seals using a **tweezers**.

115069

❑

Note:

Check that the intercooler air inlet pipe seals are fitted the right way round.

❑ Refit the intercooler air inlet pipe seals.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new EGR solenoid valve seals,
- the EGR solenoid valve,
- the EGR solenoid valve bolts.

❑ Tighten the EGR solenoid valve bolts.

❑ Connect the EGR solenoid valve connector.

III - FINAL OPERATION

❑ Refit:

- the new exhaust gas recirculation pipe seals,
- the exhaust gas recirculation pipe,
- the exhaust gas recirculation pipe bolts.

❑ Tighten the exhaust gas recirculation pipe bolts.

❑ Refit:

- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the intercooler inlet air pipe.

❑ Clip:

- the intercooler air inlet pipe on the turbocharger,
- the intercooler air inlet pipe on the intercooler.

Note:

Check that the intercooler air inlet pipe is correctly clipped.

❑ Refit the intercooler air inlet pipe bolts on the intake distributor.

❑ Tighten the intercooler air inlet pipe bolts on the intake distributor.

❑ Fit the cooling radiator top hose to the intercooler air inlet pipe.

❑ Refit the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Refit the engine cover.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,

M9R, and 742 or 744 or 746 or 748

- display the « before/after repair procedure » for the computer selected,
- select the « EGR valve » in the « List of components stored by the computer section » ,
- carry out the operations described in the « After repair procedure » section.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Equipment required
parts washer
tweezers
Diagnostic tool

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine cover,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

122430

❏ Remove the nut (**1**) from the cooling radiator top hose.

❏ Move aside the cooling radiator top hose.

❏ Remove the intercooler air inlet pipe bolts (**2**) .

113282

❏ Rotate the intercooler air inlet pipe clip (**3**) at the turbocharger end.

❏ Disconnect the intercooler air inlet pipe on the turbocharger side.

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123701

123698

(**A**) the pin in the "locked" position

(**B**) the pin in the "unlocked" position

❑ Rotate the intercooler air inlet pipe clip (**4**) on the intercooler side.

❑ Disconnect the intercooler air inlet pipe on the intercooler side.

❑ Remove the intercooler air inlet pipe.

123696

❑ Remove:

- the bolts (**5**) from the exhaust gas recirculation rigid pipe at the exhaust gas cooler outlet,
- the exhaust gas recirculation rigid pipe at the exhaust gas cooler outlet.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - OPERATION FOR REMOVAL OF PART CONCERNED

113117

❑ Disconnect the connector (**6**) from the exhaust gas recirculation solenoid valve.

❑ Remove:

- the bolts (**7**) from the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the exhaust gas recirculation solenoid valve (only the mechanical part) using a **parts washer** (see **Exhaust gas recirculation solenoid valve: Cleaning**) .

❑ Clean and degrease the bearing faces of the exhaust gas recirculation solenoid valve using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Always replace:

- the seals on the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation rigid pipe at the exhaust gas cooler outlet,
- the seals on the intercooler air inlet pipe.

115068

❑ Remove the intercooler air inlet pipe seals using a **tweezers**.

115069

❑ Fit the intercooler air inlet pipe with new seals.

Note:

Position the lip of the seal (**8**) towards the inside of the intercooler air inlet pipe.

M9R, and 754 or 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new seals on the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve,
- the bolts to the exhaust gas recirculation solenoid valve.

❑ Tighten the exhaust gas recirculation solenoid valve bolts.

❑ Connect the exhaust gas recirculation solenoid valve connector.

III - FINAL OPERATION

❑ Fit:

- the new exhaust gas cooler outlet rigid pipe,
- the exhaust gas cooler outlet rigid pipe bolts.

❑ Tighten the bolts of the exhaust gas cooler outlet rigid pipe.

❑ Rotate the intercooler air inlet pipe clips to the locked position.

❑ Connect the intercooler air inlet pipe to the turbocharger and the intercooler.

> Note:
>
> Push the pipe union until the pin can be heard engaging in the neck.
>
> Gently pull the pipe union to check that the pin is properly engaged in the neck.

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the bolts on the intercooler air inlet pipe.

❑ Tighten the intercooler air inlet pipe bolts.

❑ Fit the cooling radiator top hose to the intercooler air inlet pipe.

❑ Tighten the cooling radiator top hose nut on the intercooler air inlet pipe.

❑ Refit:

- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the engine cover.

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « EGR valve» in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

K9K, and 780

Special tooling required	
Mot. 1729	Spanner for removing the EGR valve.

Equipment required
Diagnostic tool

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123778

❑ Disconnect the oil vapour rebreathing pipe (**1**) :

- from the air filter box outlet air pipe,
- from the oil vapour rebreathing valve.

❑ Remove the oil vapour rebreathing pipe.

II - REMOVAL OPERATION FOR PART CONCERNED

123813

❑ Disconnect the connector (**2**) from the exhaust gas recirculation solenoid valve.

> Note:
>
> When removing the exhaust gas recirculation solenoid valve using the **(Mot. 1729)**, slowly remove the exhaust gas recirculation solenoid valve from the exhaust gas recirculation mounting on the gearbox side.

❑ Remove:

- the bolts (**3**) from the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve using the **(Mot. 1729)** if necessary in case it is jammed,
- the exhaust gas recirculation solenoid valve seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the exhaust gas recirculation solenoid valve seal with a new one.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new exhaust gas recirculation solenoid valve seal,

K9K, and 780

- the exhaust gas recirculation solenoid valve,
- the bolts to the exhaust gas recirculation solenoid valve.

❏ Tighten the exhaust gas recirculation solenoid valve bolts.

❏ Connect the exhaust gas recirculation solenoid valve connector.

III - FINAL OPERATION.

❏ Refit the oil vapour rebreathing pipe.

❏ Connect the oil vapour rebreathing pipe:

- to the oil vapour rebreathing valve,
- on the air filter box outlet air pipe.

❏ Refit the engine cover.

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the selected computer,
- select the « EGR valve » in the « List of components stored by the computer section » ,
- carry out the operations described in the « After repair procedure » section.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
parts washer
Diagnostic tool

Tightening torques ▽	
exhaust gas recirculation solenoid valve bolts on the exhaust gas cooler	**10 N.m**
exhaust gas recirculation solenoid valve bolts	**10 N.m**
new catalytic pre-converter nuts on the turbocharger	**21 N.m**
turbocharger heat shield studs, if they were loosened during removal	**13 N.m**
studs of the catalytic pre-converter stay on the cylinder block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut21	**N.m**
lower stay nuts on the upper stay	**21 N.m**
lower stay nuts on the cylinder block and on the gearbox	**21 N.m**
lower stay nuts on the catalytic pre-converter	**21 N.m**
turbocharger heat shield nuts	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

133904

❑ Remove the nuts (**1**) from the connecting hose on the catalytic pre-converter.

V9X

124147

- ❑ Remove the bolt (**2**) from the particle filter rubber mounting bush.
- ❑ Move the exhaust pipe to one side.
- ❑ Remove:
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

134225

134227

- ❑ Remove the clip (**3**) from the turbocharger cooling hose using the tool **(Mot. 1448)**.
- ❑ Disconnect the turbocharger cooling hose.
- ❑ Remove the nut (**4**) from the turbocharger cooling pipe on the catalytic pre-converter.
- ❑ Loosen the turbocharger heat shield nut (**5**) .
- ❑ Remove the turbocharger heat shield nuts (**6**) ,

V9X

138351

❑ Unclip the crankshaft position sensor wiring (**7**) from the catalytic pre-converter lower stay.

❑ Remove the nuts (**8**) from the catalytic pre-converter lower stay.

138360

134229

❑ Remove:

- the catalytic pre-converter lower stay studs (**9**) ,
- the catalytic pre-converter lower stay nuts (**10**) ,
- the catalytic pre-converter lower stay.

V9X

138353

❏ Loosen the nut (**11**) of the catalytic pre-converter lower stay.

❏ Remove the catalytic pre-converter upper stay.

137925

❏ Remove the nut (**12**) from the exhaust fuel injector cooler rigid cooling pipes.

❏ Move aside the exhaust fuel injector cooler rigid cooling pipes.

❏ Remove the turbocharger heat shield.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

134226

❏ Disconnect:

- the exhaust gas cooler hose union (**14**) ,
- the heater matrix hose union (**13**) .

V9X

134106

❑ Disconnect:

- the fuel drain pipe (**15**) on the back row,
- the vacuum pipe (**16**) from the exhaust gas cooler control diaphragm.

❑ Separate the clip (**17**) of the exhaust gas cooler hose using the tool **(Mot. 1448)**.

❑ Disconnect the hose from the exhaust gas cooler.

❑ Move aside the exhaust gas cooler hose.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134107

❑ Separate the clip (**18**) from the exhaust gas recirculation solenoid valve hose.

❑ Disconnect the exhaust gas recirculation solenoid valve hose.

❑ Remove the bolts (**19**) from the exhaust gas recirculation solenoid valve.

134104

❑ Remove:

- the exhaust gas cooler nuts (**20**) on the turbocharger,
- the bolts (**21**) from the exhaust gas cooler.

V9X

134105

❑ Raise the « exhaust gas recirculation solenoid valve - exhaust gas cooler » assembly.

❑ Remove:

- the bolts (**22**) from the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve seals.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust gas recirculation solenoid valve seal (11,07,01,13)**.

❑ **parts always to be replaced: exhaust gas cooler seal (11,07,01,17)**.

❑ Always replace:

- the catalytic pre-converter stay studs,
- the exhaust gas cooler nuts on the turbocharger,
- the exhaust gas cooler studs on the turbocharger, if they were loosened during removal,
- the turbocharger heat shield nuts,
- the connecting hose nuts on the catalytic pre-converter,
- the catalytic pre-converter connecting hose studs, if they were loosened during removal.
- the turbocharger heat shield studs, if loosened during removal.

❑ Clean the exhaust gas recirculation solenoid valve (only the mechanical part) using a **parts washer**.

❑ Clean the bearing faces using **ABRASIVE PADS** on:

- the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation cooler.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the bearing faces:

- of the exhaust gas recirculation solenoid valve,
- of the exhaust gas recirculation cooler.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new exhaust gas recirculation solenoid valve seals,
- the exhaust gas recirculation solenoid valve on the exhaust gas cooler.

❑ Torque tighten the **exhaust gas recirculation solenoid valve bolts on the exhaust gas cooler (10 N.m)**.

❑ Refit:

- new exhaust gas cooler studs on the turbocharger, if they were loosened during removal,
- the « exhaust gas recirculation solenoid valve - exhaust gas cooler » assembly.

❑ Fit without tightening:

- new exhaust gas cooler nuts on the turbocharger,
- the exhaust gas cooler bolts on the back row rocker cover,
- the bolts to the exhaust gas recirculation solenoid valve.

❑ Tighten the following in order:

- the exhaust gas recirculation solenoid valve bolts,

V9X

- the exhaust gas cooler nuts on the turbocharger,
- the exhaust gas cooler bolts on the back row rocker cover.

134107

❑ Torque tighten the **exhaust gas recirculation solenoid valve bolts (10 N.m)** (**23**) .

❑ Connect the cooling hose to the exhaust gas recirculation solenoid valve.

❑ Fit the cooling hose clip on the exhaust gas recirculation solenoid valve using the tool **(Mot. 1448)**.

III - FINAL OPERATION

❑ Connect the exhaust gas cooler hose.

❑ Fit the clip on the exhaust gas cooler hose using the tool **(Mot. 1448)**.

❑ Connect:

- the exhaust gas cooler control diaphragm vacuum pipe,
- the fuel drain pipe on the back row,
- the heater matrix hose union,
- the exhaust gas cooler hose union.

❑ Tighten to torque:

- the **new catalytic pre-converter nuts on the turbocharger (21 N.m)**,
- the **turbocharger heat shield studs, if they were loosened during removal (13 N.m)**.

❑ Refit the turbocharger heat shield.

❑ Fit the exhaust fuel injector cooler rigid cooling pipes on:

- the catalytic pre-converter,
- the turbocharger.

❑ Refit:

- the exhaust fuel injector cooler rigid cooling pipes on the catalytic pre-converter,
- the catalytic pre-converter upper stay.

❑ Fit the nut of the catalytic pre-converter upper stay without tightening it.

❑ Refit the catalytic pre-converter lower stay.

❑ Fit the lower stay nuts on the upper stay without tightening them.

❑ Torque tighten the **studs of the catalytic pre-converter stay on the cylinder block and on the gearbox (8 N.m)**.

❑ Fit without tightening:

- the nuts of the lower stay on the cylinder block and on the gearbox,
- the lower stay nuts on the catalytic pre-converter.

❑ Tighten to torque:

- the **catalytic pre-converter upper stay nut21 (N.m)**,
- the **lower stay nuts on the upper stay (21 N.m)**,
- the **lower stay nuts on the cylinder block and on the gearbox (21 N.m)**,
- the **lower stay nuts on the catalytic pre-converter (21 N.m)**.

❑ Clip the crankshaft position sensor wiring onto the catalytic pre-converter stay.

❑ Refit the rigid cooling pipe nut on the turbocharger.

❑ Torque tighten the **turbocharger heat shield nuts (8 N.m)**.

❑ Connect the turbocharger cooling hose.

❑ Fit the turbocharger cooling hose clip using the tool **(Mot. 1448)**.

❑ Refit:

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,

V9X

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❏ Refit new connecting hose studs to the catalytic pre-converter, if loosened during removal.

❏ Fit the exhaust pipe.

❏ Refit new connecting hose nuts to the catalytic pre-converter.

❏ Tighten the stud bolt on the subframe.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the engine undertray,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « EGR valve» in the « List of components controlled by this computer section » ,
- carry out the operations described in the « After repair procedure » section.

K9K, and 782

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
Diagnostic tool

Tightening torques ▽	
exhaust gas recirculation solenoid valve bolts	**10 N.m**
turbocharger air inlet pipe bolts on the turbocharger	**8 N.m**
nut of the turbocharger air inlet pipe on the exhaust gas recirculation assembly	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

143758

❑ Unclip the air flowmeter wiring (**1**) on the air filter unit air outlet pipe.

❑ Loosen the clips (**2**) of the air filter unit air outlet pipe.

❑ Remove the air filter unit air outlet pipe.

138392

❑ Unclip the control pipe (**3**) of the turbocharging pressure regulation valve from the turbocharger air inlet pipe.

K9K, and 782

138391

❑ Disconnect the oil vapour rebreathing union (**4**) from the rocker cover.

139155

❑ Remove:

- the nut (**5**) of the turbocharger air inlet pipe on the exhaust gas recirculation assembly,
- the engine undertray.

139154

❑ Remove:

- the turbocharger air inlet pipe bolts (**6**) on the turbocharger,
- the turbocharger air inlet pipe,
- the turbocharger air inlet pipe seal.

II - OPERATION FOR REMOVAL OF PART CONCERNED

138422

❑ Disconnect the connector (**7**) from the exhaust gas recirculation solenoid valve.

K9K, and 782

138907

- Fit the tool **(Ms. 583)** (**8**) on the cooling pipe of the exhaust gas recirculation solenoid valve.
- Remove the clip (**9**) from the cooling pipe of the exhaust gas recirculation solenoid valve.
- Disconnect the cooling pipe from the exhaust gas recirculation solenoid valve.

139185

- Fit the tool **(Ms. 583)** (**10**) on the cooling pipe of the heater matrix.
- Use the tool **(Mot. 1448)** to separate the clip on the cooling pipe of the heater matrix.
- Disconnect the heater matrix cooling pipe on the exhaust gas recirculation solenoid valve.

139186

- Remove:
  - the bolts (**12**) from the exhaust gas recirculation solenoid valve,
  - the exhaust gas recirculation solenoid valve,
  - the exhaust gas recirculation solenoid valve seal.

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: exhaust gas recirculation solenoid valve seal (11,07,01,13)**.
- Always replace:
  - the clip on the cooling pipe of the exhaust gas recirculation solenoid valve,
  - the turbocharger air inlet pipe seal.
- Use a **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the sealing surfaces:
  - of the exhaust gas recirculation solenoid valve if it is being reused,
  - of the exhaust gas recirculation support.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - a new seal on the exhaust gas recirculation solenoid valve,

K9K, and 782

- the exhaust gas recirculation solenoid valve

❑ Torque tighten the **exhaust gas recirculation solenoid valve bolts (10 N.m)**.

❑ Connect the heater matrix cooling pipe to the exhaust gas recirculation solenoid valve.

❑ Fit the clip of the heater matrix cooling pipe using the tool **(Mot. 1448)**.

❑ Connect the cooling pipe to the exhaust gas recirculation solenoid valve.

❑ Refit a new clip on the cooling pipe of the exhaust gas recirculation solenoid valve.

❑ Remove the tools **(Ms. 583)**.

❑ Connect the connector for the exhaust gas recirculation solenoid valve.

III - FINAL OPERATION

❑ Refit:

- a new seal on the turbocharger air inlet pipe.
- the turbocharger air inlet pipe.

❑ Torque tighten:

- the **turbocharger air inlet pipe bolts on the turbocharger (8 N.m)**,
- the **nut of the turbocharger air inlet pipe on the exhaust gas recirculation assembly (8 N.m)**.

❑ Refit the engine undertray.

❑ Connect the oil vapour rebreathing union to the rocker cover.

❑ Clip the control pipe of the turbocharging pressure regulation valve onto the turbocharger air inlet pipe.

❑ Refit the air filter unit air outlet pipe.

❑ Clip the air flowmeter wiring onto the air filter unit air outlet pipe.

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select "Injection computer",
- go to repair mode,
- display the "Before/after repair procedure" for the computer selected,
- select "Exhaust gas recirculation solenoid valve" in the "List of components controlled by this computer" section,
- carry out the operations described in the "After repair procedure" section.

Exhaust gas cooler: Removal - Refitting

M9R, and 742 or 744 or 746 or 748

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the engine undertray bolts,
- the engine undertray,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123602

❑ Remove the bolts (**1**) from the exhaust gas recirculation rigid pipe on the intercooler side, applying a maximum loosening torque of **40 Nm**.

> Note:
>
> If the bolts do not loosen:
>
> - apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products),
>
> - wait **10 minutes**,
>
> - apply a maximum loosening torque of **40 Nm** until the bolts are loosened.

❑ Fit the **(Ms. 583)** on the intercooler coolant inlet and outlet hoses.

M9R, and 742 or 744 or 746 or 748

123610

❑ Separate the clip (**2**) from the coolant inlet hose using the **(Mot. 1448)**.

❑ Disconnect the coolant inlet hose.

123611

❑ Disconnect the vacuum pipe (**3**) from the intercooler.

123612

❑ Separate the clips (**4**) from the coolant outlet hose using the **(Mot. 1448)**.

Note:

The cooling hose is disconnected when the intercooler is removed.

123613

❑ Remove:

- the bolts (**5**) from the intercooler,
- the intercooler, disconnecting the coolant outlet hose.

M9R, and 742 or 744 or 746 or 748

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the joint faces:

- of the intercooler if it is being reused,
- of the exhaust gas recirculation rigid pipe.

❑ Parts always to be replaced:

- the seal between the exhaust gas recirculation rigid pipe and the intercooler,
- the EGR rigid pipe bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the new seal on the exhaust gas recirculation rigid pipe.

❑ Position the intercooler, connecting the coolant outlet hose.

123613

❑ Refit the new intercooler bolts.

❑ Tighten the intercooler bolts in order.

❑ Position the clips on the coolant outlet hose using the **(Mot. 1448)**.

❑ Connect:

- the intercooler vacuum pipe,
- the coolant inlet hose.

❑ Position the clip on the coolant inlet hose.

❑ Remove the **(Ms. 583)**.

❑ Refit the bolts to the exhaust gas recirculation rigid pipe on the intercooler side.

❑ Tighten the exhaust gas recirculation rigid pipe bolts on the intercooler side.

III - FINAL OPERATION.

❑ Refit:

- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

M9R, and 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123962

❑ Separate the clips (**1**) on the exhaust gas cooler cooling hoses using the tool **(Mot. 1448)**.

❑ Disconnect:

- the bottom hose (**2**) of the exhaust gas cooler,
- the vacuum pipe (**3**) from the exhaust gas cooler.

123946

❑ Remove the bolts (**4**) from the exhaust gas cooler.

❑ Disconnect the exhaust gas cooler top hose.

❑ Remove the exhaust gas cooler.

M9R, and 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the exhaust gas cooler joint faces if it is being reused.

❑ Always replace the exhaust gas recirculation rigid pipe.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Connect the exhaust gas cooler top hose.

123946

❑ Refit:

- the exhaust gas cooler,
- the exhaust gas cooler bolts.

❑ Tighten the exhaust gas cooler bolts in order.

❑ Connect:

- the exhaust gas cooler bottom cooling hose,
- the exhaust gas cooler vacuum pipe.

❑ Refit the clips on the exhaust gas cooler hoses using the tool **(Mot. 1448)**.

III - FINAL OPERATION

❑ Refit:

- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the new exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

V9X

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Remove:

- the exhaust gas cooler,
- the exhaust gas cooler seals.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: exhaust gas cooler seal (11,07,01,17)**.

❏ Clean the bearing faces using **ABRASIVE PADS** on:

- the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation cooler.

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the bearing faces:

- of the exhaust gas recirculation solenoid valve,
- of the exhaust gas recirculation cooler.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- new exhaust gas cooler seals,
- the exhaust gas cooler.

III - FINAL OPERATION

❏ Refit:

- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the engine undertray,
- the engine cover.

V9X

- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Exhaust gas cooler: Removal - Refitting

K9K, and 780

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Ms. 583	Pipe clamps.

Equipment required
tweezers

Tightening torques ▽	
exhaust gas cooler bolts on the exhaust gas cooler mounting on the flywheel end	**12 N.m**
exhaust gas recirculation cooler mounting bolts on the timing end	**12 N.m**
exhaust gas cooler bolts on the exhaust gas cooler mounting	**12 N.m**
exhaust gas recirculation rigid pipe bolts	**12 N.m**
exhaust gas cooler mounting bolts on the cylinder head on the flywheel end	**25 N.m**
exhaust gas cooler mounting bolts on the cylinder head on the timing end	**25 N.m**
exhaust gas cooler mounting bolts on the cylinder head	**25 N.m**
bolts of the exhaust gas recirculation rigid pipe bracket on the cylinder head	**25 N.m**
bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold	**36 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) .

K9K, and 780

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - First fitting

135841

135840

❑ Remove:

- the bolts (**1**) from the exhaust gas cooler mounting on the timing end,
- the exhaust gas cooler mounting on the timing end,
- the exhaust gas cooler mounting seal,
- the bolts (**2**) from the exhaust gas cooler mounting,
- the exhaust gas cooler,
- the exhaust gas cooler mounting seal on the flywheel end.

2 - Second fitting

135459

❑ Remove the following on the workbench:

- the bolts (**3**) from the exhaust gas cooler mounting on the flywheel end,
- the exhaust gas cooler,
- the exhaust gas cooler mounting seal on the flywheel end.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

K9K, and 780

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a **tweezers**.

115069

❑

Note:

Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

❑ Parts always to be replaced:

- the air inlet metal tube seals.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the seal housing of the air inlet metal tube,

- the seal housing of the air inlet metal tube in the cylinder head,

- the seal housing of the air inlet metal tube on the exhaust gas cooler mounting on the flywheel end.

WARNING
To ensure proper sealing, the joint faces must be clean, dry and not greasy (avoid any finger marks).

❑ **parts always to be replaced: exhaust gas cooler seal (11,07,01,17)**.

Note:

Take care not to damage the joint faces of the exhaust gas cooler on its mounting to prevent any coolant leaks.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the exhaust gas intercooler joint faces, if they are being reused,

- the exhaust gas cooler mounting joint face on the flywheel end.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease:

- the exhaust gas cooler joint faces, if they are being reused,

- the exhaust gas cooler mounting joint face on the flywheel end.

WARNING
To ensure proper sealing, the joint faces must be clean, dry and not greasy (avoid any finger marks).

K9K, and 780

1 - First fitting

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint face of the exhaust gas recirculation cooler mounting on the timing end.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the joint face of the exhaust gas recirculation cooler mounting on the timing end.

2 - Second fitting

❑ **parts always to be replaced: Exhaust gas recirculation rigid pipe (11,07,01,08)**.

parts always to be replaced: Exhaust gas recirculation pipe seal (11,07,01,15).

II - REFITTING OPERATION FOR PART CONCERNED

1 - First fitting

❑ On the workbench, refit the exhaust gas cooler with a new seal on the exhaust gas cooler mounting on the flywheel end.

> Note:
>
> The exhaust gas cooler must be able to move in relation to the exhaust gas recirculation mounting on the flywheel end and the exhaust gas recirculation mounting on the timing end so that it can be adjusted correctly.

❑ Fit without tightening the exhaust gas cooler bolts on the exhaust gas cooler mounting on the flywheel end.

❑ Refit the exhaust gas cooler mounting on the timing end equipped with a new seal.

❑ Fit without tightening the exhaust gas cooler mounting bolts on the timing end.

❑ Fit the exhaust gas recirculation assembly onto the cylinder head.

❑ Tighten:

- the exhaust gas cooler mounting bolts on the cylinder head on the flywheel end,
- the exhaust gas cooler mounting bolts on the cylinder head on the timing end.

❑ Tighten to torque:

- the **exhaust gas cooler bolts on the exhaust gas cooler mounting on the flywheel end (12 N.m)**,
- the **exhaust gas recirculation cooler mounting bolts on the timing end (12 N.m)**.

K9K, and 780

2 - Second fitting

❑ On the workbench, refit:

- the exhaust gas cooler with a new seal on the exhaust gas cooler mounting on the flywheel end,
- fit without tightening the exhaust gas cooler bolts on the exhaust gas cooler mounting on the flywheel end,
- a new exhaust gas recirculation rigid pipe with a new seal on the exhaust gas recirculation assembly,
- fit without tightening the bolts of the exhaust gas recirculation rigid pipe on the exhaust gas cooler.

> Note:
>
> The exhaust gas cooler must be able to move in relation to the mounting of the exhaust gas recirculation cooler and the exhaust gas cooler rigid pipe so that it can be adjusted correctly.

❑ Fit the exhaust gas recirculation assembly.

❑ Tighten:

- the bolts of the exhaust gas cooler mounting on the cylinder head,
- the bolts to the exhaust gas recirculation rigid pipe bracket on the cylinder head.

❑ Tighten to torque:

- the **exhaust gas cooler bolts on the exhaust gas cooler mounting (12 N.m)**,
- the **exhaust gas recirculation rigid pipe bolts (12 N.m)**.

III - FINAL OPERATION

1 - First fitting

❑ Loosen on the cylinder head:

- the exhaust gas cooler mounting bolts on the flywheel end,
- the exhaust gas cooler mounting bolts on the timing end.

❑ Tighten to torque:

- the **exhaust gas cooler mounting bolts on the cylinder head on the flywheel end (25 N.m)**,
- the **exhaust gas cooler mounting bolts on the cylinder head on the timing end (25 N.m)**.

2 - Second fitting

❑ Loosen on the cylinder head:

- the exhaust gas cooler mounting bolts,
- the bolts of the exhaust gas recirculation rigid pipe bracket,

❑ Tighten to torque:

- the **exhaust gas cooler mounting bolts on the cylinder head (25 N.m)**,
- the **bolts of the exhaust gas recirculation rigid pipe bracket on the cylinder head (25 N.m)**,
- the **bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold (36 N.m)**.

3 - First fitting

❑ Refit the rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

4 - The following is the same for both types of assemblies

❑ Connect the cooling hoses of the exhaust gas cooler cover.

❑ Fit the clip on each cooling hose of the exhaust gas cooler cover using the tool **(Mot. 1448)**.

❑ Remove the tool **(Ms. 583)** on each cooling hose of the exhaust gas cooler cover.

K9K, and 780

- Refit:
  - the air inlet metal tube fitted with new seals,
  - the lifting eye on the timing end,
  - the « timing end lifting eye - air inlet metal tube» assembly bolts
  - the injector rail protector bracket bolts.
- Connect the exhaust gas recirculation solenoid valve connector.
- Refit the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .
- Fit:
  - the intercooler air inlet pipe,
  - the clip on the intercooler inlet air pipe in its original position.
- Refit:
  - the nut on the intercooler air inlet pipe,
  - the bolt on the intercooler air inlet pipe,
  - the oil vapour rebreathing pipe .
- Connect the oil vapour rebreathing pipe:
  - to the oil vapour rebreathing valve,
  - on the air filter box air outlet pipe.
- Refit:
  - the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
  - the engine undertray,
  - the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K, and 782

Tightening torques ▽	
exhaust gas cooler mounting bolts at the gearbox end on the exhaust gas cooler	**12 N.m**
exhaust gas cooler mounting bolts at the timing end on the exhaust gas cooler	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

138419

❑ Remove the clip (**1**) from the cooling pipe between the exhaust gas cooler and the exhaust gas recirculation solenoid valve.

❑ Disconnect the cooling pipe between the exhaust gas cooler and the exhaust gas recirculation solenoid valve.

138420

❑ Remove:

- the bolts (**2**) from the exhaust gas cooler mounting on the timing end,
- the exhaust gas cooler mounting on the timing end,

K9K, and 782

- the exhaust gas cooler mounting seal at the timing end.

138421

❑ Remove:

- the bolts (**3**) from the exhaust gas cooler mounting on the gearbox end,
- the exhaust gas cooler,
- the exhaust gas cooler mounting seal at the gearbox end.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust gas cooler seal (11,07,01,17)**.

❑ Always replace the clip on the cooling pipe between the exhaust gas cooler and the exhaust gas recirculation solenoid valve.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the exhaust gas cooler joint faces, if they are being reused,
- the joint face of the exhaust gas cooler support on the gearbox side,
- the joint face of the exhaust gas cooler mounting at the timing end.

> Note:
>
> Take care not to damage the joint faces of the exhaust gas cooler to prevent any coolant leaks.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease:

- the joint faces of the exhaust gas cooler if it is to be reused,
- the joint face of the exhaust gas cooler support on the gearbox side,
- the joint face of the exhaust gas cooler mounting at the timing end.

> **WARNING**
>
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

❑

> Note:
>
> The exhaust gas cooler must remain mobile in relation to the exhaust gas recirculation mountings so that it can be adjusted correctly.

❑ On the workbench, refit the exhaust gas cooler mounting at the gearbox end fitted with a new exhaust gas cooler seal onto the exhaust gas cooler.

❑ Fit without tightening the exhaust gas cooler mounting bolts at the gearbox end onto the exhaust gas cooler.

❑ Refit the exhaust gas cooler mounting at the timing end fitted with a new exhaust gas cooler seal onto the exhaust gas cooler.

❑ Fit without tightening the exhaust gas cooler mounting bolts at the timing end onto the exhaust gas cooler.

K9K, and 782

- Connect the cooling pipe between the exhaust gas cooler and the exhaust gas recirculation solenoid valve.
- Refit a new clip on the cooling pipe between the exhaust gas cooler and the exhaust gas recirculation solenoid valve.
- Fit the exhaust gas recirculation assembly onto the cylinder head.
- Tighten:
  - the exhaust gas recirculation assembly bolts,
  - the exhaust gas cooler mounting bolts at the gearbox end on the exhaust gas cooler,
  - the exhaust gas cooler mounting bolts at the timing end on the exhaust gas cooler.
- Remove:
  - the exhaust gas recirculation assembly bolts,
  - the exhaust gas recirculation assembly.
- On the workbench, torque tighten:
  - the **exhaust gas cooler mounting bolts at the gearbox end on the exhaust gas cooler (12 N.m)**,
  - the **exhaust gas cooler mounting bolts at the timing end on the exhaust gas cooler (12 N.m)**.

III - FINAL OPERATION

- Refit:
  - the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
  - the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
  - the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
  - the engine undertray,
  - the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove:

- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) .

II - REMOVAL OPERATION FOR PART CONCERNED

1 - Step for removing the exhaust gas recirculation mounting on the gearbox side

123967

❏ Remove the following on the workbench:

- the bolts (**1**) from the exhaust gas recirculation mounting on the gearbox side,
- the exhaust gas recirculation mounting on the gearbox side,
- the exhaust gas recirculation mounting seal on the gearbox side.

If replacing the exhaust gas recirculation mounting on the gearbox side

❏ Remove the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

114341

❏ Remove:

- the bolts (**2**) from the exhaust gas intercooler coolant circulation cover,
- the exhaust gas intercooler coolant circulation cover,
- the exhaust gas intercooler coolant circulation cover seals.

K9K

2 - Step for removing the exhaust gas recirculation mounting on the timing end

123967

❑ Remove the following on the workbench:

- the bolts (**3**) from the exhaust gas recirculation mounting on the timing end,
- the exhaust gas recirculation mounting on the timing end,
- the exhaust gas recirculation mounting seal on the timing end.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑

> Note:
>
> Take care not to damage the exhaust gas intercooler pressure faces on their mountings to prevent any coolant leaks.

❑ Use **ABRASIVE PADS** to clean the exhaust gas intercooler pressure faces between the exhaust gas intercooler and the exhaust gas recirculation mountings.

❑ Degrease the pressure faces with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and **CLEAN CLOTHS**.

❑ Always replace:

- the rigid exhaust gas recirculation pipe,
- the rigid exhaust gas recirculation pipe seal,
- the exhaust gas recirculation rigid pipe clip.

1 - Refitting preparation operation for the exhaust gas recirculation mounting on the gearbox side

❑ Always replace the exhaust gas recirculation mounting seal on the gearbox side.

If replacing the exhaust gas recirculation mounting on the gearbox side

❑ Use **ABRASIVE PADS** to clean the pressure faces between the exhaust gas intercooler coolant circulation cover and the exhaust gas recirculation mounting on the gearbox side.

❑ Degrease the pressure faces with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and **CLEAN CLOTHS**.

❑ Always replace the exhaust gas intercooler coolant circulation cover seals.

❑ Refit:

- the new exhaust gas intercooler coolant circulation cover seals,
- the exhaust gas intercooler coolant circulation cover,
- the exhaust gas intercooler coolant circulation cover bolts.

❑ Tighten the exhaust gas intercooler coolant circulation cover bolts.

❑ Refit the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) .

2 - Refitting preparation operation for the exhaust gas recirculation mounting on the timing end

❑ Always replace the exhaust gas recirculation mounting seal on the timing end.

K9K

II - REFITTING OPERATION FOR PART CONCERNED

1 - Refitting operation for the exhaust gas recirculation mounting on the gearbox side

❏ On the workbench, refit:

- the new exhaust gas recirculation mounting seal on the gearbox side,
- the exhaust gas recirculation mounting on the gearbox side.

> Note:
>
> The cooler must be able to move in relation to its mounting so that it can be correctly adjusted.

❏ On the workbench, fit the exhaust gas recirculation mounting bolts on the gearbox side but do not tighten them.

❏ Fit the exhaust gas recirculation assembly.

❏ Refit the exhaust gas recirculation assembly bolts.

❏ Tighten the exhaust gas recirculation assembly bolts.

❏ Adjust the exhaust gas intercooler in relation to the exhaust gas recirculation mounting on the gearbox side.

> **WARNING**
>
> Ensure that the seals between the cooler and its two supports are correctly positioned to avoid any coolant leaks.

❏ Tighten the exhaust gas recirculation mounting bolts on the gearbox side.

2 - Refitting operation for the exhaust gas recirculation mounting on the timing end

❏ On the workbench, refit:

- the new exhaust gas recirculation mounting seal on the timing end,
- the exhaust gas recirculation mounting on the timing end.

> Note:
>
> The cooler must be able to move in relation to its mounting so that it can be correctly adjusted.

❏ On the workbench, fit the exhaust gas recirculation mounting bolts on the timing end but do not tighten them.

❏ Fit the exhaust gas recirculation assembly.

❏ Refit the exhaust gas recirculation assembly bolts.

❏ Tighten the exhaust gas recirculation assembly bolts.

❏ Adjust the exhaust gas intercooler in relation to the exhaust gas recirculation mounting on the timing end.

> **WARNING**
>
> Ensure that the seals between the cooler and its two supports are correctly positioned to avoid any coolant leaks.

❏ Tighten the exhaust gas recirculation mounting bolts on the timing end.

III - FINAL OPERATION.

❏ Refit:

- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
- the new exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the engine undertray,
- the engine undertray bolts.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Refit the engine cover.

K9K, and 780

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

123778

❑ Disconnect the oil vapour rebreathing pipe (**1**) :

- from the air filter box outlet air pipe,
- from the oil vapour rebreathing valve.

❑ Remove the oil vapour rebreathing pipe.

123293

❑ Remove:

- the intercooler air inlet pipe bolt (**2**) ,
- the nut (**3**) from the intercooler inlet air pipe.

123299

❑ Remove the clip (**4**) from the intercooler inlet air pipe.

❑ Disconnect the intercooler air inlet pipe from the turbocharger.

❑ Move the intercooler inlet air pipe to one side.

K9K, and 780

123813

❑ Disconnect the connector (**5**) from the exhaust gas recirculation solenoid valve.

❑ Remove the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

113475

❑ Remove the bolts (**6**) from the rail protector bracket.

112329

❑ Remove:

- the bolts (**7**) from the « timing end lifting eye - air inlet metal tube » assembly,
- the timing end lifting eye,
- the air inlet metal tube,
- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the EGR rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) .

K9K, and 780

114341

❑ Fit hose clamps **(Ms. 583)** to the exhaust gas intercooler cooling system cover hoses (**9**) .

❑ Remove the clips (**8**) from the exhaust gas intercooler cooling system cover hoses using the **(Mot. 1448)**.

> **WARNING**
> Prepare for the flow of fluid, and protect the surrounding components.

❑ Disconnect the hoses (**9**) from the exhaust gas intercooler cooling system cover.

II - REMOVAL OPERATION FOR PART CONCERNED

123837

❑ Remove:

- the bolts (**10**) from the exhaust gas recirculation assembly,
- the exhaust gas recirculation assembly.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the rigid exhaust gas recirculation pipe,
- the rigid exhaust gas recirculation pipe seal,
- the exhaust gas recirculation rigid pipe clip.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the exhaust gas recirculation assembly,
- the exhaust gas recirculation assembly bolts.

❑ Tighten the exhaust gas recirculation assembly bolts.

III - FINAL OPERATION.

❑ Connect the exhaust gas intercooler cooling system cover hoses.

❑ Remove the hose clamps **(Ms. 583)**.

K9K, and 780

- Refit:
  - the exhaust gas intercooler cooling system cover hose clips using the **(Mot. 1448)**,
  - the new exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
  - the engine undertray,
  - the engine undertray bolts,
  - the air inlet metal tube,
  - the timing end lifting eye,
  - the « timing end lifting eye - air inlet metal tube» assembly bolts.
- Tighten the « timing end lifting eye - air inlet metal tube » assembly bolts.
- Refit the rail protector bracket bolts.
- Tighten the rail protector bracket bolts.
- Refit the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .
- Connect the exhaust gas recirculation solenoid valve connector.
- Fit:
  - the intercooler air inlet pipe,
  - the intercooler inlet air pipe clip in its original position.
- Clip the intercooler air inlet pipe to the turbocharger.
- Refit:
  - the nut to the intercooler inlet air pipe,
  - the intercooler air inlet hose bolt.
- Tighten:
  - the nut to the intercooler inlet air pipe,
  - the intercooler air inlet hose bolt.
- Refit the oil vapour rebreathing pipe.
- Connect the oil vapour rebreathing pipe:
  - to the oil vapour rebreathing valve,
  - on the air filter box outlet air pipe.
- Refit the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).
- Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K, and 782

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
exhaust gas recirculation assembly bolts	**25 N.m**
timing end lifting eye bolts	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

138389

138390

❑ Remove:

- the nut (**1**) for the intermediate air pipe between the turbocharger and the intercooler,
- the bolt (**2**) of the intermediate air pipe between the turbocharger and the intercooler,
- the clip (**3**) of the intermediate air pipe between the turbocharger and the intercooler.

❑ Disconnect the intermediate air pipe between the turbocharger and the intercooler.

❑ Remove the intermediate air pipe between the turbocharger and the intercooler.

K9K, and 782

139170

❑ Remove:

- the clip (**4**) of the turbocharger air outlet pipe,
- the turbocharger air outlet pipe,
- the seals from the turbocharger air outlet pipe.

141264

❑ Disconnect the connector (**5**) from the exhaust gas recirculation solenoid valve.

138424

❑ Disconnect the pipes (**6**) from the exhaust gas recirculation valve solenoid valve.

138423

❑ Disconnect the pipe (**7**) from the exhaust gas recirculation valve.

K9K, and 782

138425

❑ Disconnect the connector (**8**) from the exhaust gas recirculation valve solenoid valve.

138426

❑ Disconnect the exhaust gas temperature sensor connector (**9**) .

138427

❑ Unclip the connector (**10**) from the exhaust gas temperature sensor on the air inlet metal tube.

138428

❑ Unclip the exhaust gas temperature sensor wiring (**11**) from the lifting eye on the timing end.

K9K, and 782

139198

- Remove:
  - the bolts (**12**) from the lifting eye at the timing end,
  - the lifting eye on the timing end,
  - the air inlet metal tube,
  - the air inlet metal tube seals,
  - the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

139197

- Fit the tools **(Ms. 583)** (**13**) on each cooling pipe of the exhaust gas cooler.
- Use the tool **(Mot. 1448)** to separate the clips (**14**) on the cooling pipes of the exhaust gas cooler.
- Disconnect the cooling pipes from the exhaust gas cooler.

K9K, and 782

II - OPERATION FOR REMOVAL OF PART CONCERNED

139178

❑ Remove:

- the bolts (**15**) from the exhaust gas recirculation assembly,
- the exhaust gas recirculation assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the air inlet metal tube seals,
- the seals from the turbocharger air outlet pipe.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the housing of each air inlet metal tube seal,
- the housing of the air inlet metal tube in the cylinder head,
- the housing of the air inlet metal tube in the exhaust gas cooler mounting on the gearbox end.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the exhaust gas recirculation assembly.

❑ Torque tighten the **exhaust gas recirculation assembly bolts (25 N.m)**.

III - FINAL OPERATION

❑ Connect the cooling pipes to the exhaust gas cooler.

❑ Fit the clips on the cooling pipes of the exhaust gas cooler using the tool **(Mot. 1448)**.

❑ Remove the tools **(Ms. 583)**.

❑ Refit:

- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- new seals on the air inlet metal tube,
- the air inlet metal tube,
- the lifting eye on the timing end.

❑ Torque tighten the **timing end lifting eye bolts (25 N.m)**.

❑ Clip:

- the wiring of the exhaust gas temperature sensor on the lifting eye on the timing end,
- the connector of the exhaust gas temperature sensor on the air inlet metal tube.

❑ Connect:

- the exhaust gas temperature sensor connector,
- the connector of the exhaust gas recirculation valve solenoid valve,
- the exhaust gas recirculation valve pipe,
- the pipes of the exhaust gas recirculation valve solenoid valve,
- the exhaust gas recirculation solenoid valve connector.

❑ Refit:

- new seals on the turbocharger air outlet pipe,
- the turbocharger air outlet pipe.

❑ Fit the turbocharger air outlet pipe clip.

❑ Clip the turbocharger air outlet pipe onto the turbocharger.

❑ Fit the intermediate air pipe between the turbocharger and the intercooler.

❑ Connect the intermediate air pipe between the turbocharger and the intercooler.

K9K, and 782

- ❑ Fit the clip on the intermediate air pipe between the turbocharger and the intercooler.
- ❑ Clip on the intermediate air pipe between the turbocharger and the intercooler.
- ❑ Refit:
  - the bolt of the intermediate air pipe between the turbocharger and the intercooler,
  - the nut of the intermediate air pipe between the turbocharger and the intercooler,
  - the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
  - the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
  - the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
  - the engine undertray,
  - the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M9R, and 742 or 744 or 746 or 748

Tightening torques ▽	
air filter box air outlet pipe clip	**5.5 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Unclip:

- the turbocharger control solenoid valve pipe on the air filter box air outlet pipe,
- the air flowmeter wiring on the air filter box air outlet pipe.

❑ Disconnect:

- the oil vapour rebreathing pipe to the oil decanter,
- the vacuum pipe to the vacuum pump.

❑ Loosen the air filter box air outlet pipe clip on the turbocharger side.

❑ Remove:

- the air filter box air outlet pipe,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

123600

❑ Remove:

- the bolts (**1**) from the exhaust gas recirculation rigid pipe heat shield,
- the heat shield from the exhaust gas recirculation solenoid valve,
- the nut from the engine wiring bracket,
- the engine wiring bracket.

M9R, and 742 or 744 or 746 or 748

II - REMOVAL OPERATION FOR PART CONCERNED

123601

123602

❑

Note:

If the bolts do not loosen:

- apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products),

- wait **10 minutes**,

- apply a maximum loosening torque of **40 Nm** until the bolts are loosened.

❑ Remove:

- the bolt (**2**) securing the exhaust gas recirculation rigid pipe on the cylinder head,

- the bolts (**3**) securing the exhaust gas recirculation rigid pipe, applying a maximum loosening torque of **40 Nm**.

❑ Remove:

- the exhaust gas recirculation rigid pipe,

- the exhaust gas recirculation rigid pipe seal.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the exhaust gas recirculation rigid pipe joint faces,

- the exhaust manifold joint face,

- the intercooler joint face.

❑ Parts always to be replaced:

- the exhaust gas recirculation rigid pipe seals,

- the EGR rigid pipe bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the news seals on the exhaust gas recirculation rigid pipe,

- the exhaust gas recirculation rigid pipe,

- the new exhaust gas recirculation rigid pipe bolts.

❑ Tighten the new exhaust gas recirculation rigid pipe bolts.

M9R, and 742 or 744 or 746 or 748

III - FINAL OPERATION.

❏ Refit:

- the engine wiring bracket,
- the engine wiring nut.

❏ Tighten the engine wiring bracket nut.

❏ Refit:

- the heat shield,
- the heat shield bolts.

❏ Tighten the heat shield bolts.

❏ Refit:

- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the air filter box air outlet pipe.

❏ Clip:

- the oil vapour rebreathing pipe,
- the air flowmeter wiring on the air filter box air outlet pipe,
- the turbocharger control solenoid valve pipe,
- the vacuum pipe to the vacuum pump.

❏ Refit the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❏ Torque tighten the **air filter box air outlet pipe clip (5.5 Nm)**.

❏ Refit:

- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

M9R, and 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Unclip:

- the turbocharger control solenoid valve pipe on the air filter unit air outlet pipe,
- the air flowmeter wiring on the air filter unit air outlet pipe.

❑ Disconnect:

- the oil vapour rebreathing pipe on the oil decanter,
- the vacuum pipe to the vacuum pump.

❑ Loosen the clip of the air filter unit air outlet pipe on the turbocharger side.

❑ Remove:

- the air filter unit air outlet pipe,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

123961

❑ Remove:

- the bolts (**1**) from the exhaust gas recirculation rigid pipe heat shield on the inlet side,
- the exhaust gas recirculation rigid pipe heat shield on the inlet side.

M9R, and 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123929

123928

❑ Remove:

- the bolts (**2**) on the heat shield of the rigid exhaust gas recirculation pipe on the exhaust side,
- the heat shield on the rigid exhaust gas recirculation pipe on the exhaust side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123960

❑ Undo the exhaust gas recirculation rigid pipe clip (**3**) on the exhaust gas cooler.

❑ Remove the bolt (**4**) securing the exhaust gas recirculation rigid pipe on the cylinder head.

M9R, and 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123889

❑

Note:

If the bolts do not loosen:

- apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- wait **10 minutes**,
- apply a maximum torque of **40 N.m** until the bolts are loosened.

❑ Remove:

- the bolts (**5**) securing the exhaust gas recirculation rigid pipe on the exhaust manifold, applying a maximum loosening torque of **40 N.m**,
- the exhaust gas recirculation rigid pipe,
- the exhaust gas recirculation rigid pipe clip,
- the exhaust gas recirculation rigid pipe seal on the exhaust manifold,

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- the exhaust manifold,
- the exhaust gas cooler.

❑ Parts always to be replaced:

- the exhaust gas recirculation rigid pipe,
- the exhaust gas recirculation rigid pipe clip,
- the rigid exhaust gas recirculation pipe seal,
- the exhaust gas recirculation rigid pipe bolts on the exhaust manifold.

❑ Refit:

- the new exhaust gas recirculation rigid pipe seal,
- the new clip to the exhaust gas recirculation rigid pipe on the exhaust gas cooler.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the new rigid exhaust gas recirculation pipe.

❑ Fit without tightening:

- the new bolts to the exhaust gas recirculation rigid pipe on the exhaust manifold,
- the bolt securing the exhaust gas recirculation rigid pipe on the cylinder head.

❑ Secure the exhaust gas recirculation rigid pipe on the exhaust gas cooler.

❑ Tighten the following in order:

- the bolt securing the exhaust gas recirculation rigid pipe on the cylinder head,
- the clip for the exhaust gas recirculation rigid pipe on the exhaust gas cooler,
- the exhaust gas recirculation rigid pipe bolts on the exhaust manifold.

III - FINAL OPERATION

❑ Refit:

- the exhaust gas recirculation rigid pipe heat shield on the exhaust side,
- the bolts to the exhaust gas recirculation rigid pipe heat shield on the exhaust side.

❑ Tighten the exhaust gas recirculation rigid pipe heat shield bolts on the exhaust side.

❑ Refit:

- the exhaust gas recirculation rigid pipe heat shield on the inlet side,
- the bolts to the exhaust gas recirculation rigid pipe heat shield on the inlet side.

❑ Tighten the exhaust gas recirculation rigid pipe heat shield bolts on the inlet side.

M9R, and 754 or 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Refit:
  - the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
  - the air filter unit air outlet pipe.
- ❑ Tighten the clip of the air filter unit air outlet pipe on the turbocharger end.
- ❑ Connect:
  - the vacuum pipe on the vacuum pump,
  - the oil vapour rebreathing pipe on the oil separator.
- ❑ Clip:
  - the air flowmeter wiring on the air filter unit air outlet pipe,
  - the turbocharger control solenoid valve pipe on the air filter unit air outlet pipe.
- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts.

K9K, and 780

Tightening torques ▽	
bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold	**36 N.m**
new clip of the exhaust gas recirculation rigid pipe	**5 N.m**
bolts of the exhaust gas recirculation rigid pipe on the exhaust gas cooler	**12 N.m**
bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold	**36 N.m**
bolts of the exhaust gas recirculation rigid pipe bracket	**25 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - First type of fitting of the exhaust gas recirculation assembly

123837

❑ Remove:

- the clip (**1**) of the exhaust gas recirculation rigid pipe,
- the bolts (**2**) from the EGR rigid pipe,
- the exhaust gas recirculation rigid pipe,
- the seal between the exhaust gas recirculation rigid pipe and the exhaust manifold,
- the exhaust gas recirculation rigid pipe clip.

K9K, and 780

2 - Second type of fitting of the exhaust gas recirculation assembly

135463

❑ Remove:

- the bolts (**3**) from the lifting eye at the timing end,
- the lifting eye on the timing end.

135462

❑ Remove:

- the bolts (**4**) of the exhaust gas recirculation rigid pipe bracket on the cylinder head,
- the bolts (**5**) of the exhaust gas recirculation rigid pipe from the exhaust manifold,
- the bolts (**6**) of the exhaust gas recirculation rigid pipe from the exhaust gas cooler rigid pipe,
- the seal between the exhaust gas recirculation rigid pipe and the exhaust gas cooler,
- the seal between the exhaust gas recirculation rigid pipe and the exhaust manifold,

REFITTING

I - REFITTING PREPARATION OPERATION

1 - Same fitting for the exhaust gas recirculation assembly

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the exhaust manifold joint face.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the joint face of the exhaust manifold.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

2 - Second type of fitting of the exhaust gas recirculation assembly

❑

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the exhaust gas cooler joint face.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the joint face of the exhaust gas cooler.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

K9K, and 780

3 - First type of fitting of the exhaust gas recirculation assembly

❑ **parts always to be replaced: Exhaust gas recirculation rigid pipe (11,07,01,08)**.

parts always to be replaced: Exhaust gas recirculation pipe seal (11,07,01,15).

parts always to be replaced: Exhaust gas recirculation pipe clip (11,07,01,14).

4 - Second type of fitting of the exhaust gas recirculation assembly

❑ **parts always to be replaced: Exhaust gas recirculation rigid pipe (11,07,01,08)**.

parts always to be replaced: Exhaust gas recirculation pipe seal (11,07,01,15).

parts always to be replaced: exhaust gas cooler seal (11,07,01,17).

II - REFITTING OPERATION FOR PART CONCERNED

1 - First type of fitting of the exhaust gas recirculation assembly

❑ Refit:

- a new clip of the exhaust gas recirculation rigid pipe,
- a new exhaust gas recirculation rigid pipe with a new seal,
- the bolts of the exhaust gas recirculation rigid pipe on the exhaust gas manifold.

❑ Tighten to torque:

- the **bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold (36 N.m)**,
- the **new clip of the exhaust gas recirculation rigid pipe (5 N.m)**.

2 - Second type of fitting of the exhaust gas recirculation assembly

❑ Refit:

- a new seal between the exhaust gas recirculation rigid pipe and the exhaust gas cooler,
- a new exhaust gas recirculation rigid pipe with a new seal,
- the bolts to the exhaust gas recirculation rigid pipe on the intercooler.
- the bolts to the exhaust gas recirculation rigid pipe on the exhaust manifold,
- the bolts of the exhaust gas recirculation rigid pipe bracket.

❑ Tighten to torque:

- the **bolts of the exhaust gas recirculation rigid pipe on the exhaust gas cooler (12 N.m)**,
- the **bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold (36 N.m)**,
- the **bolts of the exhaust gas recirculation rigid pipe bracket (25 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-32**) ,
- the engine undertray,
- the engine undertray bolts.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refit the engine cover.

V9X

Tightening torques ▽	
exhaust gas recirculation rigid pipe bolts on the exhaust gas recirculation solenoid valve	**10 N.m**
bolts for the exhaust gas recirculation rigid pipe on the inlet manifold	**25 N.m**
exhaust gas recirculation pipe bolt on the rocker cover	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

137952

❑ Disconnect:

- the exhaust gas recirculation solenoid valve connector (**1**) ,
- the fuel temperature sensor connector (**2**) .

❑ Unclip:

- the fuel return pipes (**3**) from their supports,
- the wiring (**4**) from its support.

❑ Remove:

- the fuel pipes support bolt (**5**) ,
- the fuel pipe support.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134109

134108

❑ Remove:

- the bolt (**6**) securing the exhaust gas recirculation rigid pipe on the rocker cover,
- the bolts (**7**) securing the exhaust gas recirculation rigid pipe on the inlet manifold,
- the bolts (**8**) securing the exhaust gas recirculation rigid pipe on the exhaust gas recirculation solenoid valve,
- the EGR rigid pipe.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Exhaust gas recirculation rigid pipe (11,07,01,08)**.

❑ **parts always to be replaced: Exhaust gas recirculation pipe seal (11,07,01,15)**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- of the intake distributor,
- the exhaust gas recirculation solenoid valve.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new exhaust gas recirculation rigid pipe seals,
- a new exhaust gas recirculation rigid pipe.

❑ Fit without tightening:

- the exhaust gas recirculation rigid pipe bolts on the inlet manifold,
- the bolts of the exhaust gas recirculation rigid pipe on the exhaust gas recirculation solenoid valve,
- the bolt of the exhaust gas recirculation pipe on the rocker cover.

❑ Tighten to torque and in order:

- the **exhaust gas recirculation rigid pipe bolts on the exhaust gas recirculation solenoid valve (10 N.m)**,
- the **bolts for the exhaust gas recirculation rigid pipe on the inlet manifold (25 N.m)**,
- the **exhaust gas recirculation pipe bolt on the rocker cover (10 N.m)**.

III - FINAL OPERATION

❑ Refit the fuel pipe support.

❑ Clip:

- the wiring onto its support,
- the fuel return pipes on their supports.

V9X

- ❑ Connect:
  - the fuel temperature sensor connector,
  - the exhaust gas recirculation solenoid valve connector.
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 782

Special tooling required	
Mot. 1567	Remote pliers for exhaust gas recirculation pipe clamps.

Tightening torques ▽	
clips of the rigid exhaust gas recirculation pipe	**5 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gas duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

139204

❑ Remove:

- the clips (**1**) from the exhaust gas recirculation rigid pipe using the tool **(Mot. 1567)**,
- the EGR rigid pipe.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Exhaust gas recirculation rigid pipe (11,07,01,08)**,

parts always to be replaced: Exhaust gas recirculation pipe clip (11,07,01,14).

❑ Use **ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces:

- the exhaust manifold,
- the exhaust gas cooler mounting.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease the bearing faces:

- the exhaust manifold,
- the exhaust gas cooler mounting.

K9K, and 782

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Fit a new exhaust gas recirculation rigid pipe.
- ❑ Refit new clips for the exhaust gas recirculation rigid pipe.
- ❑ Torque tighten the **clips of the rigid exhaust gas recirculation pipe (5 N.m)**.

III - FINAL OPERATION

- ❑ Refit:
  - the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
  - the engine undertray,
  - the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

Tightening torques ▽	
alternator bolts	**25 Nm**
alternator nut	**21 N.m**

IMPORTANT
Wear latex gloves during the operation.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 415, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

123403

❑ Unclip the fuel supply pipe (**1**) on the expansion bottle and on the engine mounting cover.

❑ Disconnect the fuel supply pipe (**2**) from the injector rail.

❑ Fit blanking plugs on the fuel supply pipe.

123402

❑ Remove the bolts (**3**) from the expansion bottle.

M4R

123403

❑ Unclip the expansion bottle by:

- pushing the expansion bottle at (**A**) ,
- pulling the expansion bottle at (**B**) .

❑ Remove the expansion bottle.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123371

❑ Disconnect the alternator connector (**4**) .

❑ Remove the alternator (**5**) nut.

❑ Move aside the alternator wiring.

123373

❑ Remove:

- the alternator bolts (**6**) ,
- the alternator.

REFITTING

I - REFITTING PREPARATION OPERATION

18987

❑ Compress the rings (**7**) using pliers or a vice to facilitate fitting.

M4R

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the alternator,
- the alternator bolts.

❏ Torque tighten the **alternator bolts (25 Nm)**.

❏ Fit the alternator wiring.

❏ Refit the alternator nut.

❏ Torque tighten the **alternator nut (21 N.m)**.

❏ Connect the alternator connector.

III - FINAL OPERATION.

❏ Clip on the expansion bottle by:

- inserting the expansion bottle into the holes in the body,
- pushing the expansion bottle towards the engine.

❏ Refit the expansion bottle bolt.

❏ Tighten the expansion bottle bolt.

❏ Remove the blanking plugs from the fuel supply pipe.

❏ Connect the fuel supply pipe to the injector rail.

❏ Clip the fuel supply pipe to the expansion bottle and to the engine mounting cover.

❏ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 415, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R

Equipment required
refrigerant charging station

Tightening torques ▽	
alternator bolts	**25 Nm**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 415, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❏ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❏ Remove the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning).

II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Remove the positive terminal nut on the alternator.

❏ Disconnect the alternator connector.

❏ Move aside the alternator wiring.

121613

❏ Remove the bolts (**1**) from the alternator.

❏ Move the alternator away from the multifunction support using a screwdriver.

❏ Remove the alternator.

REFITTING

I - REFITTING PREPARATION OPERATION

18987

❏ Compress the alternator rings (**2**) using pliers or a vice to facilitate fitting.

F4R

II - REFITTING OPERATION FOR PART CONCERNED

- ❏ Refit:
  - the alternator,
  - the alternator bolts.
- ❏ Torque tighten the **alternator bolts (25 Nm)**.
- ❏ Fit the alternator wiring.
- ❏ Connect the alternator connector.
- ❏ Refit the alternator positive terminal nut.

III - FINAL OPERATION.

- ❏ Refit:
  - the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning),
  - the new accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 415, 55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
  - the engine undertray,
  - the engine undertray bolts.
- ❏ Tighten the engine undertray bolts.
- ❏ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).
- ❏ Refit the engine cover.
- ❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K

Tightening torques ▽	
positive terminal nut on the alternator	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

K9K, and 780

123293

123299

❏ Remove:

- the intercooler air inlet pipe bolt (**1**) ,
- the nut (**2**) of the intercooler air inlet pipe.

❏ Pull the clip (**3**) of the intercooler air inlet pipe.

❏ Disconnect the intercooler air inlet pipe.

K9K

K9K, and 782

138389

138390

❑ Remove:

- the nut (**4**) on the intercooler air inlet pipe,
- the bolt (**5**) on the intercooler air inlet pipe,
- the clip (**6**) from the intercooler air inlet pipe.

❑ Disconnect the intercooler air inlet pipe.

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

123526

❑ Turn the clip (**7**) of the intercooler air inlet pipe on the intercooler.

❑ Disconnect the air-air intercooler air inlet pipe from the air-air intercooler.

❑ Remove the intercooler air inlet pipe.

❑ Unclip the wiring from the rail protector alternator.

K9K

K9K, and 782

139192

❑ Remove:

- the alternator protector bolt (**8**) ,
- the alternator protector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123829

❑ Remove the nut (**9**) on the alternator positive terminal.

❑ Disconnect:

- the alternator positive terminal,
- the alternator regulator connector (**10**) .

❑ Move aside the alternator wiring.

K9K

123831

❑ Remove the bolts (**11**) from the alternator.

❑ Move the alternator away from the multifunction support using a screwdriver.

❑ Remove the alternator.

REFITTING

I - REFITTING PREPARATION OPERATION

18987

❑ Compress the alternator rings (**12**) using pliers and a vice to facilitate fitting.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the alternator.

❑ Connect:

- the alternator regulator connector,
- the positive terminal on the alternator.

❑ Refit the positive terminal nut on the alternator.

❑ Torque tighten the **positive terminal nut on the alternator (8 N.m)**.

III - FINAL OPERATION

K9K, and 782

❑ Refit the alternator protector.

❑ Clip the alternator wiring to the rail protector.

❑ Fit:

- the clips of the intercooler air inlet pipe in their original positions,
- the intercooler air inlet pipe.

❑ Clip the intercooler air inlet pipe onto the intercooler.

❑ Refit the engine undertray.

❑ Clip the intercooler air inlet pipe on the turbocharger.

❑ Refit:

- the nut on the intercooler air inlet pipe,
- the bolt on the intercooler air inlet pipe.

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M9R

Tightening torques ▽	
alternator bolts	**25 N.m**
nut for the positive terminal of the alternator	**21 N.m**
intercooler air outlet pipe clip at the damper valve end	**5.5 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

M9R, and 742 or 744 or 746 or 748 or 754

122372

❑ Disconnect the turbocharger pressure sensor connector (**1**) .

❑ Remove the nut (**2**) from the turbocharging pressure sensor.

❑ Move aside the turbocharging pressure sensor (**3**) .

123692

❑ Loosen the clip (**4**) for the intercooler air outlet pipe at the damper valve end.

❑ Disconnect the intercooler air outlet pipe at the damper valve end.

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

123699

❑ Remove the clip (**5**) from the intercooler air outlet pipe at the intercooler end.

❑ Disconnect the intercooler air outlet pipe at the intercooler end.

M9R

❑ Remove:

- the intercooler air outlet pipe,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❑ Remove the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Remove:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

122376

❑ Remove:

- the alternator protector bolt (**6**) ,
- the alternator protector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

113296

❑ Disconnect the connector (**7**) from the alternator regulator.

❑ Remove the nut (**8**) from the alternator positive terminal.

❑ Remove:

- the alternator wiring,
- the cooling assembly towards the front of the vehicle.

M9R

122422

❑ Remove:

- the alternator bolts (**9**) ,
- the alternator.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Intercooler air outlet pipe (10,09,04,03)**

18987

❑ Push in the alternator rings (**10**) using a vice to facilitate fitting.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the alternator.

❑ Torque tighten the **alternator bolts (25 N.m)**.

❑ Connect the alternator regulator connector.

❑ Refit:

- the alternator positive terminal wiring,
- the alternator positive terminal nut.

❑ Torque tighten the **nut for the positive terminal of the alternator (21 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the alternator protector,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Refit the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

- ❑ Refit:
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Push down on the new intercooler air outlet pipe clip at the intercooler end.
- ❑ Refit the intercooler air outlet pipe.
- ❑ Connect the intercooler air outlet pipe to the intercooler until it clicks into place.
- ❑ Gently pull the pipe to check that the union is locked.
- ❑ Refit the engine undertray.
- ❑ Connect the intercooler air outlet pipe at the damper valve end.

> Note:
>
> Align the marks on the air pipe and air inlet flap.

- ❑ Torque tighten the **intercooler air outlet pipe clip at the damper valve end (5.5 N.m)**.

M9R, and 742 or 744 or 746 or 748 or 754

- ❑ Move aside the turbocharging pressure sensor.
- ❑ Connect the turbocharger pressure sensor connector.

- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Refit the engine cover.

K4M

Tightening torques ▽	
alternator bolts	**25 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) .

132085

❏ Remove the screen washer bottle filler neck (**1**) .

K4M

132083

132084

❑ Remove the nuts (**2**) from the brackets of the air conditioning connecting pipes.

❑ Move aside the air conditioning connecting pipes.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128385

❑ Remove the nut (**3**) on the alternator positive terminal.

❑ Disconnect the alternator connector (**4**) .

❑ Move aside the alternator wiring.

115439

❑ Remove the bolts (**5**) from the alternator.

❑ Move the alternator away from the multifunction support using a screwdriver.

❑ Remove the alternator.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

18987

❑ Compress the alternator rings (**6**) using pliers or a vice to facilitate fitting.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the alternator.

❑ Torque tighten the **alternator bolts (25 N.m)**.

❑ Position the alternator wiring.

❑ Connect the alternator connector.

III - FINAL OPERATION

❑ Position the air conditioning connecting pipes.

❑ Refit:

- the screen washer bottle filler neck,
- the fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
safety strap(s)

Tightening torques ▽	
alternator nut	**83 N.m**
alternator upper bolt	**28 N.m**
positive terminal nut on the alternator	**15 N.m**
bolts of the air conditioning compressor	**55 N.m**
bolts of the air conditioning compressor	**61 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

133870

133871

❑ Remove the bolts (**1**) from the air conditioning compressor.

❑ Move aside the air conditioning compressor.

❑ Attach the air conditioning compressor to the body using a **safety strap(s)**.

❑ Fit the tool **(Ms. 583)** between the oil-water heat exchanger rigid inlet pipe and the oil-water heat exchanger.

V4Y

❏ Remove:

- the clip for the oil-water heat exchanger rigid inlet pipe on the oil-water heat exchanger using the tool **(Mot. 1448)**,
- the oil-water heat exchanger rigid inlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134874

❏ Disconnect the alternator connector (**2**) .

❏ Remove the nut (**3**) from the alternator positive terminal.

❏ Move aside the alternator positive terminal.

133869

❏ Remove:

- the alternator mountings (**4**) ,
- the lower shaft of the alternator,
- the alternator from underneath.

V4Y

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

133869

- ❑ Refit:
  - the alternator,
  - the lower shaft of the alternator.
- ❑ Tighten to torque and in order:
  - the **alternator nut (83 N.m)**,
  - the **alternator upper bolt (28 N.m)**.
- ❑ Connect the alternator connector.
- ❑ Fit the positive terminal on the alternator.
- ❑ Refit the positive terminal nut on the alternator.
- ❑ Torque tighten the **positive terminal nut on the alternator (15 N.m)**.

II - FINAL OPERATION

- ❑ Refit the oil-water heat exchanger rigid inlet pipe.
- ❑ Fit the clip for the oil-water heat exchanger rigid inlet pipe on the oil-water heat exchanger using the tool **(Mot. 1448)**.
- ❑ Remove the tool **(Ms. 583)** between the oil-water heat exchanger rigid inlet pipe.
- ❑ Remove the **safety strap(s)**.
- ❑ Fit the air conditioning compressor.

133870

133871

- ❑ Fit the air conditioning compressor bolts without tightening them.
- ❑ Tighten to torque and in order:
  - the **bolts of the air conditioning compressor (55 N.m)** (**1**) and (**2**) ,
  - the **bolts of the air conditioning compressor (61 N.m)** (**3**) and (**4**) .
- ❑ Refit:
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

V4Y

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Perform the following operations:

- fill the cooling system (see **Cooling system: Filling**) ,
- bleed the cooling system (see **Cooling system: Bleed**) .

V9X

Equipment required
safety strap(s)

Tightening torques ▽	
alternator bolts	**25 N.m**
nut for the positive terminal of the alternator	**21 N.m**
fuel filter support bolts	**21 N.m**
air conditioning compressor bolts	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

137057

❑ Unclip the wiring (**1**) from the air conditioning compressor.

❑ Move the wiring away from the air conditioning compressor.

134122

❑ Remove:

- the air conditioning compressor bolts (**2**) ,
- the air conditioning compressor wiring support (**3**) .

❑ Move the air conditioning compressor aside.

❑ Attach the air conditioning compressor to the body using a **safety strap(s)**.

137059

❏ Remove the fuel filter support bolts (**4**) .

❏ Move aside the fuel filter support.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137885

❏ Disconnect the alternator excitation connector (**5**) .

❏ Remove the nut (**6**) from the alternator positive terminal.

❏ Move aside the alternator wiring.

134121

❏ Remove:

- the alternator bolts (**7**) ,
- the alternator through the front right-hand wheel arch.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the alternator.

❏ Torque tighten the **alternator bolts (25 N.m)**.

❏ Position the alternator wiring.

❏ Torque tighten the **nut for the positive terminal of the alternator (21 N.m)**.

❏ Connect the alternator excitation connector.

II - FINAL OPERATION

❏ Position the fuel filter support.

❏ Torque tighten the **fuel filter support bolts (21 N.m)**.

❏ Remove the **safety strap(s)**.

❏ Fit the air conditioning compressor.

❏ Refit the air conditioning compressor wiring support.

❏ Torque tighten the **air conditioning compressor bolts (25 N.m)**.

❏ Position the air conditioning compressor wiring.

V9X

- ❑ Clip on the wiring of the air conditioning compressor.
- ❑ Refit:
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray,
  - the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R, and 813

Special tooling required	
Mot. 1732	Kit for replacing the alternator idler pulleys.

Equipment required
refrigerant charging station

Tightening torques ▽	
alternator pulley	**82 N.m**

When replacing the accessories belt, it is necessary to replace the alternator free wheel pulley if it is supplied as a spare part with the accessories belt.

Parts always to be replaced:

- any belt removed,
- the accessories tensioning roller,
- the accessories fixed roller,
- the bolts of the tensioning and fixed rollers,
- the alternator free wheel pulley, if supplied with the accessories belt.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

117672

110276

❑ Place the alternator in a vice with jaws.

❑ Fit the splined socket (**1**) from the kit **(Mot. 1732)** (**2**) in the alternator pulley.

F4R, and 813

117673

❑ Using a pneumatic wrench, loosen the alternator pulley (anti-clockwise).

❑ Remove:

- the tools,
- the alternator pulley.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Screw the new alternator pulley onto the alternator rotor.

119769

❑ Set up the tools from the kit **(Mot. 1732)** :

- the torx 50 bit ***(3)*** in the alternator rotor,
- the splined socket ***(4)*** in the alternator pulley.

119770

❑ Immobilise the alternator rotor using the Torx 50 bit.

❑ Torque tighten the **alternator pulley (82 N.m)** using a torque wrench (**5**) fitted with a 15 mm open-ended spanner.

❑ Remove the tools.

❑ Clip on the new alternator pulley cap.

F4R, and 813

II - FINAL OPERATION

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning),
- a new accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Refit:

- the engine undertray,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) .

V9X

Special tooling required	
Mot. 1732	Kit for replacing the alternator idler pulleys.
Mot. 1832	Set of hexagonal sockets (10 male and female) for refitting the alternator pulley

Equipment required
pneumatic or electric wrench

Tightening torques ▽	
alternator pulley	**80 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Removing the alternator pulley using a pneumatic or electric wrench

❑ Place the alternator in a vice fitted with jaws.

136238

❑ Remove the alternator pulley cover (**1**) .

V9X

136236

❑ Fit the socket (**2**) of the **(Mot. 1732)**.

❑ Undo the alternator pulley using a **pneumatic or electric wrench**.

❑ Remove the alternator pulley.

> Note:
>
> If there is any difficulty in removing the alternator pulley, follow the procedure described below.

2 - Removing the alternator pulley using a hand wrench

❑ Place the alternator in a vice fitted with jaws.

136238

❑ Remove the alternator pulley cover (**3**) .

136236

❑ Fit the socket (**4**) of the **(Mot. 1732)**.

V9X

121826

❑ Fit the end piece (**5**) of the tool **(Mot. 1832)** which corresponds to the alternator rotor.

136234

❑ Fit the end piece holder (**6**) of the **(Mot. 1732)** on the end piece (**5**) .

136233

❑ Hold the alternator pulley in position using a **15 mm** wrench (**7**) .

❑ Pivot the ratchet (**8**) clockwise.

> Note:
>
> This operation requires two people. If necessary, use a larger lever arm.

❑ Remove the alternator pulley.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the alternator pulley.

V9X

136233

❑ Fit:

- the socket of the tool **(Mot. 1732)** on the alternator pulley,
- the « end piece and end piece holder» assembly of the tool **(Mot. 1832)** on the socket,

❑ Hold the alternator pulley in position using a **15 mm** wrench (**9**) .

❑ Pivot the ratchet (**10**) anti-clockwise.

❑ Torque tighten the **alternator pulley (80 N.m)**.

❑ Remove:

- the « end piece and end piece holder» assembly of the tool **(Mot. 1832)**,
- the socket of the tool **(Mot. 1732)**.

❑ Turn the alternator pulley by hand to check that the rotor turns easily.

❑ Refit the alternator pulley cover.

II - FINAL OPERATION

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M9R

Equipment required
tweezers

Tightening torques ▽	
starter bolts	**44 Nm**
earth strap bolt	**21 Nm**
nut on the positive terminal of the starter	**8 Nm**
nut on the excitation terminal of the starter	**5 Nm**
intercooler air inlet pipe bolts on the intake distributor	**8 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery).

122430

❑ Remove the coolant pipe nut (**1**) from the intercooler air inlet pipe.

❑ Move aside the coolant pipe (**2**) .

❑ Remove the intercooler air inlet pipe bolts (**3**) from the intake distributor.

113282

❑ Rotate the intercooler air inlet pipe clip (**4**) on the turbocharger side.

❑ Remove the engine undertray.

❑ Rotate the intercooler air inlet pipe clip on the intercooler side.

❑ Refit the intercooler air inlet pipe.

M9R

114628

❑ Remove the starter electrical connection nuts (**5**) .

❑ Detach the starter wiring.

❑ Move the starter wiring downwards.

114998

❑ Remove the earth strap bolt (**6**) .

❑ Move the earth strap to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

113312

❑ Remove the bolts (**7**) from the starter.

❑ Unpick the wiring harness.

❑ Remove the starter by passing it behind the lead bracket then remove it from above.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Part always to be replaced:

- intercooler air inlet pipe seal.

M9R

115068

❑ Remove the intercooler air inlet pipe seal using a **tweezers**.

115069

❑ Refit the new intercooler air inlet pipe seals.

> Note:
>
> Check that the seal (**9**) on the intercooler air inlet pipe is fitted the correct way round.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Refit:

- the starter,
- the starter bolts.

❑ Torque tighten the **starter bolts (44 Nm)**.

❑ Attach the starter wiring.

❑ Position the earth strap.

❑ Torque tighten the **earth strap bolt (21 Nm)**.

❑ Refit the starter connections.

114628

❑ Torque tighten:

- the **nut on the positive terminal of the starter (8 Nm)** (**10**) ,
- the **nut on the excitation terminal of the starter (5 Nm)** (**11**) .

❑ Fit the intercooler air inlet pipe.

❑ Connect:

- the intercooler air inlet pipe on the turbocharger side,
- the intercooler air inlet pipe on the intercooler side.

> Note:
>
> The pipe is correctly connected when the clip returns to its locking position (beep sounds).

❑ Refit the engine undertray.

M9R

- ❑ Torque tighten the **intercooler air inlet pipe bolts on the intake distributor (8 Nm)**.
- ❑ Fit the coolant pipe clip on the intercooler air inlet pipe.
- ❑ Refit the coolant pipe nut on the air pipe.
- ❑ Tighten the coolant pipe nut on the air pipe.
- ❑ Refit:
  - the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).
  - the engine cover,

M4R

Tightening torques ▽	
starter bolts	**62 N.m**
nut on the starter excitation connector	**5 Nm**
nut on the starter power supply connector	**9 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

115097

❏ Disconnect:

- the oil level sensor connector (**1**) ,
- the oil pressure sensor (**2**) .

123452

❏ Remove the bolt (**3**) from the wiring bracket on the gearbox.

❏ Move aside the wiring bracket on the gearbox.

❏ Remove:

- the nut (**4**) on the starter excitation connector,
- the nut (**5**) on the starter power supply connector.

❏ Move aside the starter wiring.

M4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123451

❑ Remove:

- the starter bolts (**6**) ,
- the starter.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the starter,
- the starter bolts.

❑ Torque tighten the **starter bolts (62 N.m)**.

II - FINAL OPERATION.

❑ Fit the starter wiring harness.

❑ Tighten to torque:

- the **nut on the starter excitation connector (5 Nm)**,
- the **nut on the starter power supply connector (9 Nm)**.

❑ Fit the wiring bracket to the gearbox.

❑ Refit the wiring bracket bolt to the gearbox.

❑ Tighten the wiring bracket bolt on the gearbox.

❑ Connect:

- the oil level sensor connector,
- the oil pressure sensor connector.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Refit the engine cover.

F4R

Tightening torques ▽	
nut on the positive terminal of the starter	**8 N.m**
nut on the excitation terminal of the starter	**7 N.m**
earth cable nut on the starter	**21 N.m**
catalytic converter rear strut nut	**44 N.m**
catalytic converter rear strut bolt	**8 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Unclip the cooling hoses from the heater matrix.

❑ Remove:

- the cooling hoses clip from the heater matrix,
- the downstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

120231

❑ Remove:

- the catalytic converter rear strut bolt,
- the catalytic converter rear strut nut (**1**) ,
- the catalytic converter rear strut,
- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

124125

❑ Remove,

- the nuts (**2**) from the exhaust flange,
- the exhaust pipe rubber mounting bush bolt.

❑ Move the exhaust pipe to one side.

F4R

120228

❑ Remove:

- the nuts (**3**) from the starter heat shield,
- the starter heat shield.

II - OPERATION FOR REMOVAL OF PART CONCERNED

21921

❑ Remove:

- the earth cable nut from the starter,
- the nut on the excitation terminal of the starter (**4**) ,
- the nut on the positive terminal of the starter (**5**) .

❑ Move aside the starter wiring.

❑ Remove:

- the starter bolts (**6**) ,
- the starter.

F4R

REFITTING

I - REFITTING PREPARATION OPERATION

21935

❑ Check that the centring dowel (**7**) is in place.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the starter.

❑ Fit the starter wiring harness.

❑ Tighten to torque:

- the **nut on the positive terminal of the starter (8 N.m)**,
- the **nut on the excitation terminal of the starter (7 N.m)**,
- the **earth cable nut on the starter (21 N.m)**.

❑ Refit the starter heat shield.

III - FINAL OPERATION.

❑ Fit the exhaust pipe.

❑ Refit:

- the exhaust system rubber mounting bush bolt,
- the exhaust bracket nuts,
- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) ,
- the catalytic converter rear strut,

❑ Tighten to torque:

- the **catalytic converter rear strut nut (44 N.m)**,
- the **catalytic converter rear strut bolt (8 Nm)**.

❑ Refit:

- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the downstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
- the cooling hoses clip on the heater matrix.

❑ Clip on the heater matrix cooling hoses.

❑ Refit:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Tightening torques ▽	
starter supply terminal nut	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray.

123524

123534

❏ Remove the wiring duct nut (**1**) .

❏ Unclip the wiring duct at (**2**) .

❏ Remove the wiring duct.

K9K

123530

❑ Disconnect the rail pressure sensor connector (**3**) .

123834

123835

❑ Disconnect:

- the connector (**4**) from the oil pressure sensor,
- the connector (**5**) from the oil level sensor.

❑ Move the oil pressure sensor and oil level sensor wiring aside.

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED

123833

❑ Remove:

- the starter supply terminal nut (**6**) ,
- the nut (**7**) on the starter solenoid.

❑ Disconnect the starter supply terminal.

❑ Move aside the starter wiring.

123825

❑ Remove:

- the starter bolts (**8**) ,
- the starter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check that the starter centring dowel is in place.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the starter,
- the starter bolts.

❑ Tighten the starter bolts.

❑ Reconnect the starter supply terminal.

❑ Refit:

- the nut on the starter solenoid,
- the starter supply nut.

❑ Tighten the nut on the starter solenoid.

❑ Torque tighten the **starter supply terminal nut (8 N.m)**.

III - FINAL OPERATION.

❑ Connect:

- the oil pressure sensor connector,
- the oil level sensor connector,
- the rail pressure sensor connector.

❑ Clip the wiring duct.

❑ Refit the wiring duct nut.

❑ Tighten the wiring duct nut.

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K4M

Tightening torques ▽	
starter bolts	**44 Nm**
starter supply cable nut	**8 N.m**
starter excitation cable nut	**5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

128366

❑ Disconnect the connector (**1**) from the oil level sensor.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128279

❑ Remove:

- the starter supply cable nut (**2**) ,
- the starter excitation cable nut (**3**) .

❑ Move aside the starter wiring.

128280

❑ Remove:

- the starter bolts (**4**) ,
- the starter.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Check that the centring dowelis in place.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the starter.

❏ Torque tighten the **starter bolts (44 Nm)**.

❏ Fit the starter wiring harness.

❏ Tighten to torque:

- the **starter supply cable nut (8 N.m)**,
- the **starter excitation cable nut (5 N.m)**.

III - FINAL OPERATION.

❏ Connect:

- the oil level sensor connector,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

Tightening torques ▽	
starter bolts	**44 N.m**
positive terminal nut	**8 N.m**
bolt of the starter earth strap	**21 N.m**
starter excitation terminal nut	**5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

22306

❏ Remove:

- the positive terminal nut (**1**) ,
- the excitation terminal nut (**2**) ,
- the earth strap bolt (**3**) .

❏ Move the starter wiring aside.

❏ Remove:

- the starter bolts (**4**) ,
- the starter.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Check that the centring dowel is in place.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the starter.

❏ Torque tighten the **starter bolts (44 N.m)**.

❏ Fit the starter wiring.

❏ Refit the positive terminal nut.

❏ Torque tighten the **positive terminal nut (8 N.m)**.

❏ Refit the starter earth strap.

❏ Torque tighten the **bolt of the starter earth strap (21 N.m)**.

V4Y

- ❑ Refit the nut for the starter excitation terminal.
- ❑ Torque tighten the **starter excitation terminal nut (5 N.m)**.

III - FINAL OPERATION

- ❑ Refit the engine undertray.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V9X

Equipment required
safety strap(s)

Tightening torques ▽	
starter excitation nut	**5 N.m**
starter supply nut	**8 N.m**
earth strap bolt	**21 N.m**
oil-water heat exchanger bolts	**32 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) .

134117

❑ Remove:

- the bolts (**1**) from the oil-water heat exchanger,
- the oil-water heat exchanger seal.

❑ Move aside the oil-water heat exchanger.

❑ Attach the oil-water heat exchanger to the body using a **safety strap(s)**.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

137927

❑ Remove the earth strap bolt (**2**) .

❑ Move the earth strap to one side.

❑ Remove the starter supply nut (**3**) .

❑ Move aside the starter supply cable.

❑ Undo the starter excitation nut (**4**) .

❑ Move aside the starter excitation cable.

137926

❑ Remove:

- the starter bolts (**5**) ,
- the starter,
- the sealing panel.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: coolant-engine oil heat exchanger seal on the cylinder block (10,05, 05,12)**.

❑ Check that the centring dowels are in place.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the sealing panel,
- the starter.

❑ Position the starter excitation cable.

❑ Torque tighten the **starter excitation nut (5 N.m)**.

❑ Position the starter supply cable.

❑ Torque tighten the **starter supply nut (8 N.m)**.

❑ Position the earth strap.

❑ Torque tighten the **earth strap bolt (21 N.m)**.

III - FINAL OPERATION

❑ Remove the **safety strap(s)**.

❑ Position the oil-water heat exchanger.

❑ Refit:

- a new seal to the oil-water heat exchanger,
- the oil-water heat exchanger.

❑ Torque tighten the **oil-water heat exchanger bolts (32 N.m)**.

❑ Refit:

- the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-227**) ,
- the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) ,
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

II - REMOVAL OPERATION FOR PART CONCERNED

123174

❑ Disconnect the coil connectors (**1**) .

123173

❑ Remove:

- the coil bolts (**2**) ,
- the coils.

F4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

106443

- ❑ Apply a bead of **FLUORSTAR 2L** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) with a diameter of **2 mm** to the four ignition coils on the inner edge of the high-tension caps.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - the coils,
  - the coil bolts.
- ❑ Tighten the coil bolts.
- ❑ Connect the coil connectors.

III - FINAL OPERATION.

- ❑ Refit the engine cover.

M4R

Tightening torques ▽	
ignition coil bolts	**7 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123364

❏ Disconnect the connectors (**1**) from the ignition coils.

123364

❏ Remove:

- the ignition coil bolts (**2**) ,
- the ignition coils.

M4R

REFITTING

I - REFITTING PREPARATIONS OPERATION

114955

- Apply a bead of **FLUORSTAR 2L** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) with a diameter of **2 mm** to the four ignition coils on the inner edge of the high-tension caps.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the ignition coils,
  - the ignition coil bolts.
- Torque tighten the **ignition coil bolts (7 Nm)**.
- Connect the ignition coil connectors.

III - FINAL OPERATION.

- Refit:
  - the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the engine cover.

K4M

Tightening torques ▽	
new coil bolts	**14 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128276

❑ Disconnect the connectors (**1**) from the coils.

128277

❑ Remove:

- the coil bolts (**2**) ,
- the coils.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

106443

- ❑ Put a beadof **FLUOSTAR 2L** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) **2 mm** in diameter on the internal perimeter of the high-tension caps on the four coils.
- ❑ Always replace the coil bolts.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the coils.
- ❑ Torque tighten the **new coil bolts (14 N.m)**.
- ❑ Connect the coil connectors.

III - FINAL OPERATION.

- ❑ Refit the engine cover.

V4Y

Tightening torques ▽	
ignition coil bolts on the front and back rows	**7 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

1 - Coils located on the front row

133476

❏ Remove the engine cover support bolts (**1**) .

❏ Move aside the engine cover support.

133476

❏ Disconnect the connectors (**2**) from the ignition coils.

2 - Coils located on the back row

❏ Remove the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

133477

❏ Disconnect the connectors (**3**) from the ignition coils.

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

133477

133476

❑ Remove:

- the rear and front row ignition coil bolts (**4**) ,
- the ignition coils.

V4Y

REFITTING

I - REFITTING PREPARATION OPERATION

106443

❑ Apply a bead of **FLUOSTAR** grease (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **2 mm** to the ignition coils on the inner edge (**5**) of the high tension cap.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the ignition coils.

❑ Torque tighten the **ignition coil bolts on the front and back rows (7 N.m)**.

III - FINAL OPERATION

1 - Coils located on the back row

❑ Connect the ignition coil connectors.

❑ Refit:

- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

2 - Coils located on the front row

❑ Connect the ignition coil connectors.

❑ Refit:

- the engine cover support,
- the engine cover.

F4R

Special tooling required	
Ele. 1382	Set of plug wrenches 16 & 21 mm torque 17.5 & 28 N.m + square adapter 9-9.52 for wrench Ele. 1086

Equipment required
set of feeler gauges

Tightening torques ▽	
spark plugs	**28 N.m**

Spark plug electrode gap

Type of spark plug	Gap (mm)
CHAMPION	0.90 ± 0.05
NGK	0.85 ± 0.05

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover (if fitted),
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123172

❑ Remove the spark plugs using the tool **(Ele. 1382)** with the **grey** sleeve.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check and, if necessary, correct the spark plug electrode gaps using a **set of feeler gauges**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the spark plugs.

❑ Torque tighten the **spark plugs (28 N.m)** using **(Ele. 1382)** fitted with the **grey** sleeve.

III - FINAL OPERATION

❑ Refit:

- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the engine cover (if fitted).

M4R

Special tooling required	
Ele. 1382	Set of plug wrenches 16 & 21 mm torque 17.5 & 28 N.m + square adapter 9-9.52 for wrench Ele. 1086
Ele. 1382-01	14 mm Plug spanner.

Tightening torques ▽	
spark plugs	**17.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123369

❑ Remove the spark plugs using the tool **(Ele. 1382)** with the **red** sleeve equipped with the tool **(Ele. 1382-01)**.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the spark plugs.

❑ Torque tighten the **spark plugs (17.5 N.m)** using the tool **(Ele. 1382)** with the **red** sleeve equipped with the tool **(Ele. 1382-01)**.

II - FINAL OPERATION

❑ Refit:

- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

K4M

Special tooling required	
Ele. 1382	Set of plug wrenches 16 & 21 mm torque 17.5 & 28 N.m + square adapter 9-9.52 for wrench Ele. 1086

Tightening torques ▽	
spark plugs	**28 N.m**

Spark plug electrode gap

Type of spark plug	Gap (mm)
CHAMPION	0.95 ± 0.05
EYQUEM	0.95 ± 0.05
NGK	0.95 ± 0.05

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

132449

❑ Remove the spark plugs using **(Ele. 1382)** (**1**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check and, if necessary, correct the electrode gap for each spark plug.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the spark plugs.

❑ Torque tighten the **spark plugs (28 N.m)** using **(Ele. 1382)** fitted with the **grey** sleeve.

III - FINAL OPERATION

❑ Refit the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

V4Y

Special tooling required	
Ele. 1382	Set of plug wrenches 16 & 21 mm torque 17.5 & 28 N.m + square adapter 9-9.52 for wrench Ele. 1086

Tightening torques ▽	
spark plugs	**17.5 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the rear and front row ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the windscreen wiper arms (see **Windscreen wiper arm: Removal - Refitting**) (85A, Wiping - Washing),
- the scuttle panel grille (see **Scuttle panel grille: Removal - Refitting**) (56A, Exterior equipment),
- the bolts from the wiper motor guard,
- the wiper motor guard,
- the scoop under the scuttle panel grille (see **Scoop under the scuttle panel grille: Removal - Refitting**) (56A, Exterior equipment).

II - OPERATION FOR REMOVAL OF PART CONCERNED

134868

❑ Remove the spark plugs using **(Ele. 1382)** (**1**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the spark plugs.

❑ Torque tighten the **spark plugs (17.5 N.m)** using the tool **(Ele. 1382)** with the **red** sleeve.

II - FINAL OPERATION

❑ Refit:

- the scoop under the scuttle panel grille (see **Scoop under the scuttle panel grille: Removal - Refitting**) (56A, Exterior equipment),
- the wiper motor guard,
- the scuttle panel grille (see **Scuttle panel grille: Removal - Refitting**) (56A, Exterior equipment),
- the windscreen wiper arms (see **Windscreen wiper arm: Removal - Refitting**) (85A, Wiping - Washing),
- the rear and front row ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

Petrol injection: List and location of components

M4R

124349

123390

123388

(**1**) Air flowmeter

(**2**) Throttle valve

(**3**) Camshaft position sensor

M4R

115156

(**4**) Crankshaft position sensor

115097

(**5**) Pinking sensor

(**6**) Oil pressure sensor

(**7**) Oil level sensor

115153

(**8**) Coolant temperature sensor

115496

(**9**) Camshaft dephaser solenoid valve

M4R

123376

(**10**) Fuel vapour rebreathing solenoid valve

123459

(**11**) Petrol injection computer

123364

(**12**) Injector rail - Injectors

123358

(**13**) Upstream oxygen sensor

123356

(**14**) Downstream oxygen sensor

122742

(**15**) Accelerator pedal potentiometer

Petrol injection: List and location of components

F4R

124124

(**1**)	Turbocharger
(**2**)	Upstream oxygen sensor
(**3**)	Petrol injection computer
(**4**)	Throttle valve
(**5**)	Protection and switching unit

123144

(**6**)	Fuel vapour recirculation solenoid valve

F4R

21926

(**7**) Upstream oxygen sensor

(**8**) Downstream oxygen sensor

21922

(**9**) Ignition coils

(**10**) Inlet pressure sensor

(**11**) Petrol injectors

(**12**) Injector rail

21927

(**13**) Turbocharging pressure regulation solenoid valve

(**14**) Anti-surge valve

(**15**) Turbocharging pressure regulator

21919

(**16**) Coolant temperature sensor

(**17**) Turbocharger pressure sensor

(**18**) Air temperature sensor

F4R

22804

(**19**) Crankshaft position sensor

21918

(**20**) Pinking sensor

(**21**) Oil pressure sensor

124357

(**22**) Fuel vapour absorber

122742

(**23**) Accelerator pedal potentiometer

K4M

131166

(**1**) Fuel vapour recirculation solenoid valve

(**2**) Camshaft dephaser solenoid valve

(**3**) Air inlet pressure sensor

(**4**) Coil

(**5**) Throttle valve

(**6**) Protection and Switching Unit

(**7**) Petrol injection computer

(**8**) Coolant temperature sensor

(**9**) Camshaft position sensor

(**10**) Pinking sensor

(**11**) Air temperature sensor

(**12**) Injector rail

128403

(**1**) Fuel vapour recirculation solenoid valve

(**3**) Air inlet pressure sensor

K4M

(**4**) Ignition coil

(**11**) Air temperature sensor

128263

(**5**) Throttle valve

128274

(**8**) Coolant temperature sensor

128620

(**6**) Protection and Switching Unit

123459

(**7**) Petrol injection computer

K4M

128446

(**2**) Camshaft dephaser solenoid valve

128633

(**9**) Camshaft position sensor

128400

(**12**) Injector rail

128282

(**10**) Pinking sensor

K4M

128369

(**13**) Upstream oxygen sensor

123356

(**14**) Downstream oxygen sensor

124801

(**15**) Fuel vapour absorber

128373

(**16**) Crankshaft position sensor

K4M

122742

(**17**) accelerator pedal

V4Y

134511

(**1**) Petrol injection computer
(**2**) Max fuse box
(**3**) Protection and switching unit
(**4**) Battery disconnection unit
(**5**) Airflow meter
(**6**) Motorised throttle valve

134517

(**7**) Damper valve control diaphragm
(**8**) Vacuum canister

V4Y

(**9**) Damper valve control solenoid valve

(**10**) Fuel vapour recirculation solenoid valve

134522

(**11**) Ignition coils

(**12**) Camshaft position sensor

133840

133841

(**13**) Front row camshaft dephaser solenoid valve

(**14**) Back row camshaft dephaser solenoid valve

134203

(**15**) Coolant temperature sensor

V4Y

116541

(**17**) Upstream oxygen sensor (front row)

(**16**) Downstream oxygen sensor (front row)

116545

(**18**) Upstream oxygen sensor (back row)

(**19**) Downstream oxygen sensor (back row)

134520

(**20**) Pinking sensor

134521

(**21**) Injectors

(**22**) Injector rails

(**23**) Camshaft position sensor

V4Y

134510

(**24**) Crankshaft position sensor

122742

(**25**) Accelerator pedal potentiometer

M4R

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

Tightening torques ▽	
upstream oxygen sensor	**44 Nm**
downstream oxygen sensor	**44 Nm**

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice prevents the oxygen sensor from operating correctly and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair**) (Technical Note 6015A, 88A, Wiring).

Note:

This procedure is for removal - refitting of the upstream oxygen sensor and the downstream oxygen sensor.

REMOVAL OF THE UPSTREAM OXYGEN SENSOR

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION FOR PART CONCERNED

123385

❑ Unclip the upstream oxygen sensor connector (**1**) .

❑ Disconnect the upstream oxygen sensor connector.

123357

❑ Remove the upstream oxygen sensor (**2**) using the **(Mot. 1495-01)**.

M4R

REFITTING THE UPSTREAM OXYGEN SENSOR

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the upstream oxygen sensor using the **(Mot. 1495-01)**.

❏ Torque tighten the **upstream oxygen sensor (44 Nm)**.

❏ Connect the upstream oxygen sensor connector.

❏ Clip on the upstream oxygen sensor connector.

II - FINAL OPERATION.

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

REMOVAL OF THE DOWNSTREAM OXYGEN SENSOR

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

123356

❏ Remove:

- the bolt (**1**) from the right-hand side underbody protector,
- the nut (**2**) from the right-hand side underbody protector.

❏ Remove:

- the right-hand side underbody protector,
- the heat shield behind the right-hand side underbody protector.

M4R

II - REMOVAL OPERATION FOR PART CONCERNED

123355

- ❑ Unclip the downstream oxygen sensor connector (**3**) .
- ❑ Disconnect the downstream oxygen sensor connector.

123353

- ❑ Remove the downstream oxygen sensor (**4**) using the **(Mot. 1495-01)**.

REFITTING THE DOWNSTREAM OXYGEN SENSOR

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the downstream oxygen sensor using the **(Mot. 1495-01)**.
- ❑ Torque tighten the **downstream oxygen sensor (44 Nm)**.
- ❑ Connect the downstream oxygen sensor connector.
- ❑ Clip the downstream oxygen sensor connector.

II - FINAL OPERATION.

- ❑ Fit:
  - the heat shield behind the right-hand side underbody protector,
  - the right-hand side underbody protector.
- ❑ Refit:
  - the right-hand side underbody protector nut,
  - the right-hand side underbody protector bolt.
- ❑ Tighten:
  - the right-hand side underbody protector nut,
  - the right-hand side underbody protector bolt.

F4R

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

IMPORTANT
Wear heat protective gloves during the operation.

IMPORTANT
Wear protective gloves during the operation.

WARNING
Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice causes the oxygen sensor to malfunction and results in failure to comply with the emission control standard.

WARNING
If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair)** (Technical Note 6015A, 88A, Wiring).

Note:

This procedure deals with removing and refitting the upstream oxygen sensor and the downstream oxygen sensor.

REMOVAL OF THE UPSTREAM OXYGEN SENSOR

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

123170

❑ Remove:

- the bolts (**1**) from the turbocharger heat shield,
- the turbocharger heat shield.

II - OPERATION FOR REMOVAL OF PART CONCERNED

120206

❑ Disconnect the upstream oxygen sensor connector (**2**) .

F4R

123168

❑ Remove the upstream oxygen sensor (**3**) using the **(Mot. 1495-01)**.

REFITTING THE UPSTREAM OXYGEN SENSOR

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the upstream oxygen sensor connector on the catalytic converter.

❑ Tighten the upstream oxygen sensor using the tool **(Mot. 1495-01)**.

❑ Connect the upstream oxygen sensor connector.

II - FINAL OPERATION.

❑ Refit:

- the turbocharger heat shield,
- the turbocharger heat shield bolts.

❑ Tighten the heat shield bolts.

❑ Refit the engine cover.

REMOVING THE DOWNSTREAM OXYGEN SENSOR

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

123344

❑ Unclip the clips (**4**) from the turbocharging pressure regulation hoses.

❑ Disconnect:

- the turbocharging pressure regulation hoses,
- the oil vapour rebreathing pipe to the air filter unit air outlet pipe.
- the turbocharger regulation solenoid valve connector (**5**) ,
- the brake servo connector (**6**) .

❑ Unclip the wiring harness from the air filter box air outlet pipe.

F4R

124751

❑ Loosen the clip (**7**) on the turbocharger air inlet pipe.

❑ Remove the turbocharger air inlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124752

❑ Disconnect the connector (**8**) from the downstream oxygen sensor on the gearbox.

❑ Unclip the downstream oxygen sensor connector from the gearbox.

❑ Remove the downstream oxygen sensor (**9**) using the tool **(Mot. 1495-01)**.

REFITTING THE DOWNSTREAM OXYGEN SENSOR

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the downstream oxygen sensor.

❑ Tighten the downstream oxygen sensor using the tool **(Mot. 1495-01)**.

❑ Connect the downstream oxygen sensor connector to the gearbox.

❑ Clip the downstream oxygen sensor connector to the gearbox.

II - FINAL OPERATION.

❑ Refit the turbocharger air inlet pipe.

❑ Tighten the turbocharger air inlet pipe clip.

❑ Clip the air filter box air outlet pipe wiring.

❑ Connect:

- the brake servo connector,
- the turbocharger regulation solenoid valve connector,
- the oil vapour rebreathing pipe to the air filter unit air outlet pipe.
- the turbocharging pressure regulation hoses.

❑ Clip the turbocharging pressure regulation hose clips.

❑ Refit:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

K4M

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice prevents the oxygen sensor from operating correctly and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair**) (Technical Note 6015A, 88A, Wiring).

Note:

This procedure deals with removing and refitting the upstream oxygen sensor and the downstream oxygen sensor.

REMOVAL OF THE UPSTREAM OXYGEN SENSOR

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128369

❏ Disconnect the brake servo vacuum pipe union (**1**) from the intake distributor.

❏ Unclip the upstream oxygen sensor connector (**2**) .

❏ Disconnect the upstream oxygen sensor connector.

❏ Unclip the cable from the upstream oxygen sensor at (**3**) .

128371

❏ Remove the upstream oxygen sensor (**4**) using the **(Mot. 1495-01)**.

K4M

REFITTING THE UPSTREAM OXYGEN SENSOR

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the upstream oxygen sensor using the **(Mot. 1495-01)**.

❏ Connect the upstream oxygen sensor connector.

❏ Clip:

- the upstream oxygen sensor connector,
- the upstream oxygen sensor cable.

II - FINAL OPERATION.

❏ Connect the brake servo vacuum pipe union to the intake manifold.

❏ Refit the engine cover.

REMOVAL OF THE DOWNSTREAM OXYGEN SENSOR

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

123356

❏ Remove:

- the bolt (**1**) on the right-hand side underbody protector,
- the nut (**2**) on the right-hand side underbody protector.

❏ Remove:

- the right-hand side underbody protector,
- the heat shield behind the right-hand side underbody protector.

K4M

II - OPERATION FOR REMOVAL OF PART CONCERNED

123355

- ❑ Unclip the downstream oxygen sensor connector (**3**) .
- ❑ Disconnect the downstream oxygen sensor connector.

123353

- ❑ Remove the downstream oxygen sensor (**4**) using the **(Mot. 1495-01)**.

REFITTING THE DOWNSTREAM OXYGEN SENSOR

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the downstream oxygen sensor using the **(Mot. 1495-01)**.
- ❑ Connect the downstream oxygen sensor connector.
- ❑ Clip the downstream oxygen sensor connector.

II - FINAL OPERATION.

- ❑ Fit the heat shield behind the underbody protector on the right-hand side.
- ❑ Refit the underbody protector on the right-hand side.

V4Y

Special tooling required	
Mot. 1495	22 mm socket for removal - refitting of oxygen sensors - 1/2" square drive and 24 mm hexagonal ext.

Tightening torques ▽	
front row downstream oxygen sensor	**50 N.m**
front row upstream oxygen sensor	**50 N.m**
back row downstream oxygen sensor on the catalytic pre-converter	**50 N.m**
back row upstream oxygen sensor on the exhaust manifold	**50 N.m**
alternator positive terminal nut	**15 N.m**

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice causes the oxygen sensor to malfunction and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for the repair**) (Technical Note 6015A, 88A, Wiring).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

1 - Front row downstream oxygen sensors

❏ Remove the alternator positive terminal nut.

❏ Move aside the alternator wiring.

V4Y

134206

134205

❑ Disconnect:

- the back row upstream oxygen sensor connector (**1**) .
- the back row downstream oxygen sensor connector (**2**) .

❑ Unclip:

- the front row upstream oxygen sensor connector from its mounting,
- the front row downstream oxygen sensor connector from its mounting.

❑ Cut the oxygen sensor wiring clip.

2 - Back row downstream oxygen sensors

❑ Remove the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

133477

❑ Disconnect:

- the connector (**3**) of the back row upstream oxygen sensor,
- the connector (**4**) of the back row downstream oxygen sensor.

❑ Unclip:

- the back row upstream oxygen sensor connector from its mounting,
- the back row downstream oxygen sensor connector from its mounting.

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Front row downstream oxygen sensors

116541

❑ Remove the front row upstream oxygen sensor (**5**) using the **(Mot. 1495)**.

116541

❑ Remove the front row downstream oxygen sensor (**6**) using the **(Mot. 1495)**.

2 - Back row downstream oxygen sensors

116545

❑ Remove:

- the upstream oxygen sensor (**7**) from the back row using the tool **(Mot. 1495)**,
- the downstream oxygen sensor (**8**) from the back row using the tool **(Mot. 1495)**.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

1 - Front row downstream oxygen sensors

❑ Refit the front row downstream oxygen sensor using the **(Mot. 1495)**.

❑ Torque tighten the **front row downstream oxygen sensor (50 N.m)**.

❑ Refit the front row upstream oxygen sensor using the **(Mot. 1495)**.

❑ Torque tighten the **front row upstream oxygen sensor (50 N.m)**.

2 - Back row downstream oxygen sensors

❑ Refit the back row downstream oxygen sensor to the catalytic pre-converter using the **(Mot. 1495)**.

❑ Torque tighten the **back row downstream oxygen sensor on the catalytic pre-converter (50 N.m)**.

❑ Refit the back row upstream oxygen sensor to the exhaust manifold using the **(Mot. 1495)**.

V4Y

- Torque tighten the **back row upstream oxygen sensor on the exhaust manifold (50 N.m)**.

II - FINAL OPERATION

1 - Front row oxygen sensors

- Clip the front row downstream oxygen sensor connector to its mounting.
- Connect the downstream oxygen sensor connector on the front row.
- Clip the front row upstream oxygen sensor connector to its mounting.
- Connect the front row upstream oxygen sensor connector.
- Fit:
  - a new clip on the oxygen sensor wiring,
  - the alternator wiring.
- Torque tighten the **alternator positive terminal nut (15 N.m)**.

2 - Back row oxygen sensors

- Clip the back row upstream oxygen sensor connector to its mounting.
- Connect the back row upstream oxygen sensor connector.
- Clip the back row downstream oxygen sensor connector to its mounting.
- Connect the back row downstream oxygen sensor connector.
- Refit the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

3 - Front and back row oxygen sensors

- Refit:
  - the engine undertray,
  - the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R or K4M or M4R

Equipment required
Diagnostic tool

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice prevents the oxygen sensor from operating correctly and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair)** (Technical Note 6015A, 88A, Wiring).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123459

❑ Remove the nut (**1**) from the petrol injection computer mounting.

❑ Separate the petrol injection computer mounting with the petrol injection computer.

123460

❑ Disconnect the connector (**2**) from the petrol injection computer.

F4R or K4M or M4R

123461

❑ Remove:

- the petrol injection computer mounting with the petrol injection computer.
- the nuts (**3**) from the petrol injection computer on the petrol injection computer mounting,
- the petrol injection computer.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the petrol injection computer on the petrol injection computer mounting.

❑ Connect the petrol injection computer connectors.

❑ Fit the petrol injection computer mounting with the petrol injection computer.

II - FINAL OPERATION.

❑ Refit:

- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- carry out the operations described in the « After repair procedure » section.

V4Y

Equipment required
Diagnostic tool

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice causes the oxygen sensor to malfunction and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair**) (Technical Note 6015A, 88A, Wiring).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

133465

❑ Remove the protective cover from the petrol injection computer.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133468

❑ Remove the bolts (**1**) from the petrol injection computer.

❑ Disconnect the connector (**2**) from the petrol injection computer.

❑ Remove the injection computer.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Connect the petrol injection computer connectors.

❑ Refit the petrol injection computer.

II - FINAL OPERATION

❑ Refit the protective cover on the petrol injection computer.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,

V4Y

- carry out the operations described in the « After repair procedure » section.

M4R

Tightening torques ▽	
crankshaft position sensor bolt	**10 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

123545

❑ Remove:

- the bolts (**1**) on the crankshaft position sensor protector,
- the crankshaft position sensor protector (**2**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123546

❑ Disconnect the crankshaft position sensor connector (**3**) .

❑ Remove:

- the crankshaft position sensor bolt (**4**) ,
- the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the crankshaft position sensor,
- the crankshaft position sensor bolt.

❑ Torque tighten the **crankshaft position sensor bolt (10 Nm)**.

❑ Connect the crankshaft position sensor connector.

II - FINAL OPERATION.

❑ Refit:

- the crankshaft position sensor protector,
- the bolts on the crankshaft position sensor protector.

❑ Tighten the bolts on the crankshaft position sensor protector.

M4R

- Refit:
  - the engine undertray,
  - the engine undertray bolts.
- Tighten the engine undertray bolts.

F4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

II - REMOVAL OPERATION FOR PART CONCERNED

102485

❏ Disconnect the crankshaft position sensor connector (**1**) .

❏ Remove:

- the crankshaft position sensor bolt (**2**) ,
- the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the crankshaft position sensor,
- the crankshaft position sensor bolt.

❏ Tighten the crankshaft position sensor bolt.

❏ Connect the crankshaft position sensor connector.

II - FINAL OPERATION.

❏ Refit the engine cover.

K4M

Tightening torques ▽	
crankshaft position sensor bolt	**8 N.m**

REMOVAL

OPERATION FOR REMOVAL OF PART CONCERNED

128373

❑ Disconnect the crankshaft position sensor connector (**1**) .

128372

❑ Remove:

- the crankshaft position sensor bolt (**2**) ,
- the crankshaft position sensor.

REFITTING

REFITTING OPERATION FOR PART CONCERNED

❑ Refit the crankshaft position sensor.

❑ Torque tighten the **crankshaft position sensor bolt (8 N.m)**.

❑ Connect the crankshaft position sensor connector.

V4Y

Tightening torques ▽	
crankshaft position sensor bolt	**7 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

134510

❑ Remove the protective sheath (**1**) from the crankshaft position sensor wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134510

❑ Disconnect the crankshaft position sensor connector (**2**) .

❑ Remove:

- the crankshaft position sensor bolt (**3**) ,
- the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the crankshaft position sensor.

❑ Torque tighten the **crankshaft position sensor bolt (7 N.m)**.

❑ Connect the crankshaft position sensor connector.

II - FINAL OPERATION

❑ Fit the protective sheath on the crankshaft position sensor wiring.

❑ Refit the engine undertray.

F4R

Tightening torques ▽	
injector rail bolts	**10 Nm**
clamp of the intercooler air inlet pipe on the turbocharger end	**5.5 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

129723

❏ Loosen the clip (**1**) on the air pipe at the intercooler inlet at the turbocharger end.

❏ Remove the bolt (**2**) on the intercooler air inlet pipe.

❏ Disconnect the intercooler air inlet pipe on the turbocharger side.

❏ Remove the intercooler inlet air pipe.

F4R

129721

- ❑ Disconnect the fuel supply pipe union (**3**) on the injector rail.
- ❑ Fit blanking plugs on the injector rail fuel port and on the fuel supply pipe union.
- ❑ Disconnect:
  - the oil vapour rebreathing pipe union (**4**) ,
  - the petrol vapour rebreather pipe union (**5**) .
  - the inlet air pressure sensor connector (**6**) ,
  - the oil vapour heater connector (**7**) .
- ❑ Remove:
  - the oil vapour rebreathing pipe,
  - the petrol vapour rebreather pipe.

129722

- ❑ Disconnect the connector (**8**) from each injector.
- ❑ Move the injector wiring to one side.

F4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123735

❑

IMPORTANT

Be careful when removing the injectors or the injection rail as there will be a quantity of fuel in the rail and the union.

❑ Remove:

- the injector rail bolts (**9**) ,
- the injector rail, pulling it carefully.

On the workbench

F4R, and 811

123736

❑ Remove:

- the clip (**10**) from each injector,
- the injectors (**11**) .

F4R

F4R, and 800

129719

129720

❑ Remove:

- the clip (**10**) from each injector:
  - spread apart at (**A**) ,
  - pull at (**B**) .
- the injectors (**11**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the injector seals,
- the clips of each injector.

On the workbench

❑ Refit:

- the injectors,
- new clips on each injector.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the injector rail.

❑ Torque tighten the **injector rail bolts (10 Nm)**.

III - FINAL OPERATION.

❑ Position the injector wiring.

❑ Connect the connector on each injector.

❑ Fit:

- the petrol vapour rebreather pipe,
- the oil vapour rebreathing pipe.

❑ Connect:

- the oil vapour heater connector,
- the air inlet pressure sensor connector,
- the petrol vapour rebreather pipe union,
- the oil vapour rebreathing pipe union.

❑ Remove the blanking plugs on the injector rail fuel port and on the fuel supply pipe union.

❑ connect the fuel supply pipe union on the injector rail.

❑ Fit the intercooler air inlet pipe.

❑ Connect the intercooler air inlet pipe on the turbocharger.

❑ Torque tighten the **clamp of the intercooler air inlet pipe on the turbocharger end (5.5 N.m)**.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refit the engine cover.

M4R

Equipment required
Diagnostic tool

Tightening torques ▽	
injector rail bolts	**25 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

123360

❑ Disconnect the fuel supply pipe union (**1**) on the injector rail.

❑ Insert the blanking plugs.

❑ Disconnect the connector (**2**) from each injector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123362

❑ Remove:

- the injector rail bolts (**3**) ,
- the injector rail - injector assembly (**4**) .

M4R

114943

❑ Remove:

- the injector retaining clips (**5**) ,
- the injectors (**6**) from the injector rail.

REFITTING

I - REFITTING PREPARATION OPERATION

114944

❑ Always replace:

- the injector seals,
- the injector retaining clips.

> Note:
>
> The seals are different, do not mix them up. The seal (**7**) is green and the seal (**8**) is black.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the injector rail - injector assembly,
- the injector rail bolts.

123362

- Torque tighten in order the **injector rail bolts (25 N.m)**.

III - FINAL OPERATION.

- Connect the connector on each injector.
- Remove the blanking plugs.
- connect the fuel supply pipe union on the injector rail.
- Refit:
  - the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the engine cover.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- Apply the after repair procedure using the **Diagnostic tool** :
  - connect the **Diagnostic tool**,
  - select « injection computer » ,
  - go to repair mode,
  - display the « before/after repair procedure » for the computer selected,
  - select « injector no. 1 » in the « List of components controlled by this computer » section,
  - carry out the operations described in the « After repair procedure » section.

K4M

Tightening torques ▽	
injector rail bolts	**10 N.m**

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT
Wear goggles with side protectors for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

128400

❑

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Disconnect the fuel supply pipe union (**1**) from the injector rail.

❑ Insert the blanking plugs.

K4M

II - OPERATION FOR REMOVAL OF PART CONCERNED

128399

❑

> **IMPORTANT**
> Be careful when removing the injectors or the injection rail as there will be a quantity of fuel in the rail and the union.

❑ Remove the bolts (**2**) from the injector rail.

❑ Move aside the « injector rail - injector » assembly.

128398

❑ Disconnect the connector (**3**) from each injector.

❑ Unclip the wiring on the injector rail.

❑ Remove the « injector rail - injector » assembly.

128397

❑ Remove:

- the clip (**4**) from each injector,
- the injectors (**5**) from the injector rail.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace:

- the injector seals,
- the clip of each injector.

❏ Refit:

- new seals on the injectors,
- the injectors on the injector rail,
- new clips on each injector.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Fit the « injector rail-injector » assembly.

❏ Connect the connector on each injector.

❏ Clip the wiring on the injector rail.

128399

❏ Torque tighten in order the **injector rail bolts (10 N.m)**.

III - FINAL OPERATION.

❏ Remove the blanking plugs.

❏ Connect the fuel supply pipe union on the injector rail.

❏ Refit:

- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

V4Y

Tightening torques ▽	
injector rail bolts (initial torque)	**10 N.m**
injector rail bolts (torque)	**22 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the intake distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) .

116540

❑ Disconnect:

- the petrol inlet union (**1**) ,
- the connectors (**2**) from the injectors.

❑ Fit blanking plugs on the fuel supply union.

❑ Unclip the injector wiring on the front row.

II - OPERATION FOR REMOVAL OF PART CONCERNED

116732

❑ Remove:

- the injector rail bolts (**3**) ,

- the injector rail.

22916

❑ Pull the injector clip (**4**) upwards.

❑ Remove:

- the injector clips,
- the injectors (**5**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: injector seal (11,11, 02,02)**.

❑ **parts always to be replaced: injector clip on injector rail (11,04,04,10)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new seals on the injectors,
- the injectors,
- new injector clips on the injector rail,
- the injector rail.

116732

❑ Pre-tighten to torque and in order the **injector rail bolts (initial torque) (10 N.m)**.

❑ Tighten to torque and in order the **injector rail bolts (torque) (22 N.m)**.

III - FINAL OPERATION

❑ Clip the injector wiring on the front row.

❑ Remove the blanking plugs.

❑ Connect:

- the injector connectors,
- the petrol inlet union.

❑ Refit:

- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

124800

(**1**)	Engine
(**2**)	Cooling radiator
(**3**)	Water-oil heat exchanger
(**4**)	Heater matrix
(**5**)	Cylinder head thermostat
(**6**)	Throttle body heater
(**7**)	Cylinder block thermostat
(**8**)	Expansion bottle
(**9**)	Heater matrix output bleed screw
(**10**)	Bleed screw on cooling radiator
(**11**)	Water pump

M9R

M9R, and 742 or 744 or 746 or 748 or 754, and PK4

123063

(**1**)	Engine
(**2**)	Exhaust gas cooler
(**3**)	Water pump
(**4**)	Expansion bottle
(**5**)	Cooling radiator
(**6**)	Coolant-oil heat exchanger
(**7**)	Thermostat
(**8**)	Bleed screw
(**9**)	Heater matrix
(**10**)	Bleed screw

M9R

M9R, and 800 or 802 or 806 or 816, and PK4

123062

(**1**)	Engine
(**2**)	Exhaust gas cooler
(**3**)	Water pump
(**4**)	Expansion bottle
(**5**)	Cooling radiator
(**6**)	Coolant-oil heat exchanger
(**7**)	Thermoplungers
(**8**)	Electric coolant pump
(**9**)	Bleed screw
(**10**)	Heater matrix
(**11**)	Turbocharger
(**12**)	Bleed screw
(**13**)	Thermostat

M9R

M9R, and 805 or 809 or 845 or 849, and AJ0

123061

(**1**)	Engine
(**2**)	Exhaust gas cooler
(**3**)	Water pump
(**4**)	Expansion bottle
(**5**)	Cooling radiator
(**6**)	Coolant-oil heat exchanger
(**7**)	Thermoplungers
(**8**)	Automatic transmission oil cooler
(**9**)	Electric coolant pump
(**10**)	Bleed screw
(**11**)	Heater matrix
(**12**)	Turbocharger
(**13**)	Bleed screw
(**14**)	Thermostat

F4R

125000

(**1**)	Radiator
(**2**)	Expansion bottle
(**3**)	Heater matrix
(**4**)	Electric coolant pump
(**5**)	Thermostat
(**6**)	Engine oil coolant heat exchanger
(**7**)	Turbocharger
(**8**)	Automatic transmission oil coolant heat exchanger
(**9**)	3 mm choke
(**10**)	9 mm choke
(**11**)	Automatic transmission thermostat

K9K, and 780

124157

(**1**)	Cooling radiator
(**2**)	Expansion bottle
(**3**)	Water-oil heat exchanger
(**4**)	Water pump
(**5**)	Engine
(**6**)	Thermostat
(**7**)	Coolant outlet unit
(**8**)	Heater matrix
(**9**)	Bleed screws

K4M

128623

(**1**)	Engine
(**2**)	Cooling radiator
(**3**)	Heater matrix
(**4**)	Expansion bottle
(**5**)	Water pump
(**6**)	Thermostat
(**7**)	Bleed screws
(**8**)	Choke

V4Y

134935

(**1**)	Engine
(**2**)	Cooling radiator
(**3**)	Expansion bottle
(**4**)	Heater matrix
(**5**)	Automatic gearbox oil temperature heat exchanger.
(**6**)	Coolant outlet unit
(**7**)	Choke
(**8**)	Thermostat
(**9**)	Engine oil - coolant heat exchanger
(**10**)	The hose at the engine oil - coolant heat exchanger outlet is connected to the cylinder block on the back row behind the rear exhaust manifold
(**11**)	Air heater
(**12**)	Bleed screw

The expansion bottle cap valve rating is **1.4 bar**.

V9X

137035

(**1**)	Engine
(**2**)	Cooling radiator
(**3**)	Additional radiator
(**4**)	Exhaust gas cooler electric coolant pump
(**5**)	Gearbox oil - coolant heat exchanger
(**6**)	Turbocharger electric coolant pump
(**7**)	Heater matrix
(**8**)	Turbocharger
(**9**)	Exhaust fuel injector
(**10**)	Thermostat
(**11**)	Exhaust gas cooler
(**12**)	Water pump
(**13**)	Engine oil-coolant exchanger
(**14**)	Expansion bottle
(**15**)	Bleed screw

K9K, and 782

144357

(**1**)	Cooling radiator
(**2**)	Expansion bottle
(**3**)	Coolant-oil heat exchanger
(**4**)	Water pump
(**5**)	Engine
(**6**)	Thermostat
(**7**)	Water chamber
(**8**)	Heater matrix
(**9**)	Thermoplungers
(**10**)	Exhaust gas cooler
(**11**)	Bleed screws

F4R or K9K or M4R or M9R or V9X

CONSUMABLES

Use **GLACEOL RX (TYPE D)** coolant.

Note:

Ready-to-use coolant or antifreeze must be diluted with distilled water in accordance with the guidelines marked on the container.

F4R or K9K or M4R or M9R or V9X

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

Only use GLACEOLE RX (TYPE D) coolant.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

The system must not operate using pure water.

WARNING

Drain with the engine warm.

Flush and refill with the engine cold or warm.

Never flush a warm engine (risk of major thermal shock).

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

Note:

Refer to the vehicle's Maintenance Booklet for information on cooling system service intervals.

For any further information, refer to the Workshop Repair Manual of the vehicle concerned.

When a faulty vehicle arrives, check:

- the condition and tension of the coolant pump drive belt,
- that the fan, radiator and radiator grille are not obstructed by an object which may impede the flow of air.

Vehicles in the current range have cooling systems with the following basic specifications:

- hermetically-sealed pressurised circuit (expansion chamber valve),

Note:

Reminder of the expansion bottle cap valve rating.

Expansion bottle valve with:

- **a yellow marker: 1.4 bar**.

Note:

Ready-to-use coolant or antifreeze must be diluted with distilled water in accordance with the guidelines marked on the container.

F4R or K4M or K9K or M4R or M9R or V4Y or V9X

Vehicles in the current range have cooling systems with the following basic specifications:

- hermetically-sealed pressurised circuit (expansion chamber valve),
- circuit using a “D” type coolant,
- passenger compartment heating systems equipped with a "heater matrix" type radiator located under the dashboard which helps to cool the engine.

Volume of coolant

Engine	Quantity (litres)	Grade
F4R	**7.5**	**GLACEROL RX** (type D) Only use coolant
M4R	**7.2**	
K9K	**7.2**	
M9R	**7.8**	
V4Y	**8.5**	
V9X	**9.2**	
K4M	**7.0**	

Special notes:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **- -40°C ± 2** “extreme cold” countries.

Thermostat opening temperatures

Engine	Start of opening (°C)	End of opening (°C)
F4R	**89**	**99 ± 2**
M4R	Cylinder head thermostat	
	93.5	**96.5**
	Cylinder block thermostat	
	80.5	**83.5**
K9K	**83**	**95 ± 2**
M9R	**89**	**101**
V4Y	**75**	**105**
V9X	**75**	**105**
K4M	**89**	**101**

Special tooling required	
Mot. 1700	Fault finding and filling - bleeding the cooling circuit.
Ms. 554-07	Instrument for testing the cooling circuit and the expansion bottle valve. Contains caps 554-01, 554-04, 554-06

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

Note:

There are two procedures for checking the cooling system:

- the procedure using the **(Mot. 1700)**
- the procedure using the **(Ms. 554-07)**

Expansion bottle cap valve rating:

Expansion bottle cap with ...	Valve rating
... a brown circle	**1.2 bar**
... a yellow marking	**1.4 bar**
... a white marking	**1.6 bar**
... a grey marking	**1.8 bar**

I - CHECKING THE COOLING SYSTEM USING THE TOOL (MOT. 1700)

❑

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

1 - Checking the expansion bottle cap valve

107138

❑ Use the cooling system filling and diagnostic tool **(Mot. 1700)**. Consult the user's manual for this tool (see **Cooling system filling and diagnostic tool: Use**) (Technical Note 3857A, 19A, Cooling).

2 - Checking the sealing of the cooling circuit

❑ Use the cooling system filling and diagnostic tool **(Mot. 1700)**. Consult the user's manual for this tool (see **Cooling system filling and diagnostic tool: Use**) (Technical Note 3857A, 19A, Cooling).

II - CHECKING THE COOLING SYSTEM USING THE TOOL (MS. 554-07)

❑

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

1 - Checking the expansion bottle cap valve

97871

- Fit onto the tester **(Ms. 554-07)**, the adapter **(Ms. 554-06)**.
- Fit the expansion bottle cap to the adapter **(Ms. 554-06)**.

> Note:
>
> The pressure should not drop; if it does, look for the leak.

- Pump with the **(Ms. 554-07)**, the pressure should stabilise at the expansion bottle cap valve rating with a test tolerance of ± **0.1 bar.**

2 - Checking the sealing of the cooling circuit

- Replace the expansion bottle cap with the adapter **(Ms. 554-01)**.
- Connect on the adapter **(Ms. 554-01)** the tool **(Ms. 554-07)**.
- Pump with the **(Ms. 554-07)** to put the cooling circuit under pressure.
- Stop pumping at **0.1 bar** below the valve rating for the expansion bottle cap valve with.

> Note:
>
> The pressure should not drop; if it does, look for the leak.

- Gradually unscrew the union of the **(Ms. 554-07)** to decompress the cooling system then remove the adapter **(Ms. 554-01)** and refit the expansion bottle cap.

F4R or K4M or K9K or M4R or M9R or V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Car. 1363	Set of trim removal levers.
Mot. 1700	Fault finding and filling - bleeding the cooling circuit.
Ms. 554-07	Instrument for testing the cooling circuit and the expansion bottle valve. Contains caps 554-01, 554-04, 554-06

Equipment required
coolant recovery tray
compressed air nozzle
pedal press

Tightening torques ▽	
air filter unit air outlet pipe clip on the turbocharger side	**5.5 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

I - DRAINING

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the expansion bottle cap,
- the engine undertray bolts,
- the engine undertray.

❑ Position the **coolant recovery tray** under the vehicle.

F4R or K4M or K9K or M4R

❑ Remove:

- the clip of the coolant pump inlet pipe hose using the tool **(Mot. 1448)**,
- the coolant pump inlet pipe hose.

V4Y

134513

❑ Remove:

- the bottom cooling hose clip (**1**) from the cooling radiator using the tool **(Mot. 1448)**,
- the bottom cooling hose.

F4R or K4M or K9K or M4R or M9R or V4Y

M9R

122611

❑ Remove:

- the clip (**1**) from the oil filter unit coolant outlet hose using the tool **(Mot. 1448)**,
- the oil filter coolant unit outlet hose using the tool **(Car. 1363)**.

❑ Use a **compressed air nozzle** to blow air into the system through the expansion bottle opening to remove as much coolant as possible.

II - CLEANING

❑ Fill the cooling system with water through the expansion bottle.

❑ Let the water run until the water collected by the cooling radiator bottom hose runs clear.

❑ Use a **compressed air nozzle** to blow air into the cooling system through the expansion bottle opening to remove as much water as possible.

V4Y

❑ Fit:

- the bottom cooling hose to the cooling radiator,
- the bottom cooling hose clip **(Mot. 1448)** using the tool.

F4R or K4M or K9K or M4R

❑ Fit:

- the coolant pump inlet pipe hose,
- the coolant pump inlet pipe hose clip using the tool **(Mot. 1448)**.

M9R

❑ Fit:

- the coolant outlet hose on the oil filter unit using the tool **(Car. 1363)**,
- the clip on the oil filter unit coolant outlet hose using the tool **(Mot. 1448)**.

III - FILLING

❑

Note:

There are two procedures for filling the cooling system:

- The procedure using the **(Mot. 1700)** is recommended by Renault. It saves a considerable amount of time because it does not require the cooling system bleed screws to be opened,
- The procedure without a special tool.

1 - Filling procedure using the (Mot 1700)

❑ Fill the cooling system with engine coolant recommended by the manufacturer (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) using the tool **(Mot. 1700)**. Consult the user's manual for this tool (see **19A**, **Cooling**, **Engine cooling system: Check**, page **19A-14**) (Technical Note 3857A, 19A, Cooling).

F4R or K4M or K9K or M4R or M9R or V4Y

2 - Filling method without special tools

F4R or K9K or M9R

❏

WARNING
It is essential to open all of the bleed screws to remove as much as air as possible in the cooling system. Failure to perform this procedure may prevent the cooling system from filling properly and may damage the engine.

Procedure for accessing the bleed screws on the heater matrix pipe and on the water chamber

❏

Note:
M4R and V4Y engines have a single bleed screw located on the heater matrix outlet hose.

F4R

❏ Unclip from the turbocharger:

- the turbocharging pressure regulation hose clip on the turbocharger,
- the turbocharging pressure regulation valve hose clip.

❏ Disconnect:

- the connector on the turbocharging pressure regulation valve control solenoid valve,
- the turbocharging pressure regulation hose from the turbocharger,
- the turbocharging pressure regulation valve hose from the turbocharger.

❏ Unclip the turbocharger cooling hose.

F4R or K9K or M9R

❏ Unclip the wiring from the air filter unit air outlet pipe.

M9R

❏ Unclip:

- the turbocharging pressure regulation hose on the turbocharger from the oil vapour rebreathing hose,
- the oil vapour rebreathing hose from the oil separator.

F4R or M9R

❏ Unclip the brake servo vacuum pipe from the air filter box air outlet pipe.

F4R or K9K

❏ Unclip the oil vapour rebreathing hose union from the air filter unit air outlet pipe.

K9K or M9R

❏ Unclip the turbocharging pressure regulation hose on the turbocharger from the air filter unit air outlet pipe.

F4R or K9K or M9R

❏ Undo the clip of the air filter unit air outlet pipe at the turbocharger end.

❏ Remove:

- the air outlet pipe of the air filter unit,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

F4R or K4M or K9K or M4R or M9R or V4Y

F4R

15155

❑ Remove the bleed screw (**2**) from the water chamber.

K9K

102263

❑ Remove the bleed screw (**3**) from the water chamber.

F4R or K4M or K9K or M4R or M9R or V4Y

M9R

122681

- ❑ Unclip the engine wiring (**4**) .
- ❑ Move aside the engine wiring (**4**) .
- ❑ Remove the bleed screw (**5**) from the water chamber.

K4M

128452

- ❑ Unclip the heater matrix outlet cooling hose at (**6**) .
- ❑ Move aside the heater matrix outlet cooling hose.

128454

- ❑ Remove the bleed screw (**7**) from the water chamber.

- ❑ Remove the heater matrix pipe bleed screw.

F4R or K4M or K9K or M4R or M9R or V4Y

- ❑ Fill the cooling system with engine coolant recommended by the manufacturer (see **19A**, **Cooling**, **Engine cooling system: Specifications**, page **19A-13**) and (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) via the expansion bottle until it overflows.
- ❑ Close all the bleed screws as soon as the coolant starts to flow in a continuous stream.

K4M

- ❑ Fit the heater matrix outlet cooling hose.
- ❑ Clip on the heater matrix outlet cooling hose.

M9R

- ❑ Clip on the engine wiring.

F4R or K9K or M9R

- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the air outlet pipe of the air filter unit.
- ❑ Tighten to torque the **air filter unit air outlet pipe clip on the turbocharger side (5.5 N.m)**.

K9K or M9R

- ❑ Clip the turbocharging pressure regulation hose of the turbocharger onto the air filter unit air outlet pipe.

F4R or K9K

- ❑ Clip the oil vapour rebreathing hose union onto the air filter unit air outlet pipe.

F4R or M9R

- ❑ Clip the brake servo vacuum pipe onto the air filter unit air outlet pipe.

M9R

- ❑ Clip:
  - the oil vapour rebreathing hose onto the oil decanter,
  - the turbocharging pressure regulation hose of the turbocharger onto the oil vapour rebreathing hose.

F4R or K9K or M9R

- ❑ Clip the wiring on the air filter unit air outlet pipe.

F4R

- ❑ Clip on the turbocharger cooling hose.
- ❑ Connect:
  - the turbocharging pressure regulation valve hose to the turbocharger,
  - the turbocharging pressure regulation hose to the turbocharger,
  - the connector on the turbocharging pressure regulation valve solenoid valve.
- ❑ Clip onto the turbocharger:
  - the turbocharging pressure regulation valve hose clip,
  - the turbocharging pressure regulation hose clip on the turbocharger.

- ❑ Pressurise the system using the **(Ms. 554-07)** to check that there are no leaks (see **19A**, **Cooling**, **Engine cooling system: Check**, page **19A-14**) .
- ❑ Fill the expansion bottle until it overflows.
- ❑ Tighten the expansion bottle cap.
- ❑ Clean any surfaces soiled by the coolant.

F4R or K4M or K9K or M4R or M9R or V4Y

IV - BLEEDING

❏

> **WARNING**
> Do not open the bleed screw whilst the engine is running; this would damage the engine.

❏ Deactivate the air conditioning system so that the fan assembly is not operating from the start of the operation.

❏ Start the engine.

V4Y

❏ Maintain the engine speed at **1500 rpm** using a **pedal press** for a minimum of **20 minutes**.

M9R

❏

> Note:
> Because of the layout of the cooling system, it is more difficult to prime the coolant pump on this engine. It is therefore essential to carefully follow the different steps below.

> **WARNING**
> Do not open the bleed screw whilst the engine is running; this would damage the engine.

❏ Start the engine and check that the air conditioning system is off.

❏ With the air conditioning off, let the engine run at **1500 rpm** until the engine cooling fan is triggered twice (time required for automatic degassing).

> Note:
> To check that the coolant pump has been correctly primed:
> - after **5 min** under **1500 rpm**, check that the temperature indicated on the instrument panel begins to increase,
> - each time the engine cooling fan is triggered, check that there is a return flow in the expansion bottle.

K9K

❏ Maintain the engine speed at **1500 rpm**, sharply varying the engine speed (up to the maximum) 2 to 3 times approximately every **2 minutes** until the fan assembly starts for the second time.

F4R

❏ Maintain the engine speed at **2500 rpm**, using a **pedal press**, until the fan assembly has been activated twice.

K4M or M4R

❏ Maintain the engine speed at **3000 rpm** using a **pedal press**, until the fan assembly has been activated for a third time.

❏ Check that the heating is operating correctly.

❏ Allow the engine to cool until the coolant temperature is less than **50°C**.

❏ Adjust the coolant fluid level to the « MAXIMUM » mark.

❏ Refit the expansion bottle cap.

V - FINAL OPERATION

❏ Remove the **coolant recovery tray**.

❏ Refit the engine undertray.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1700	Fault finding and filling - bleeding the cooling circuit.
Ms. 554-07	Instrument for testing the cooling circuit and the expansion bottle valve. Contains caps 554-01, 554-04, 554-06

Equipment required
coolant recovery tray
compressed air nozzle
pedal press

Tightening torques ▽	
drain screws on the cylinder block	**25 N.m**

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

I - OIL SERVICE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the expansion bottle cap,
- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Place a **coolant recovery tray** under the vehicle.

137896

❑ Separate the clip (**1**) of the radiator bottom cooling hose using the tool **(Mot. 1448)**.

❑ Disconnect the bottom cooling hose from the cooling radiator.

138349

❑ Remove the drain screw (**2**) from the cooling radiator.

137060

❑ Separate the clip (**3**) on the bottom cooling hose of the additional cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect the bottom cooling hose from the additional cooling radiator.

137924

137923

❑ Remove the drain screw (**4**) from the cylinder block.

❑ Use a **compressed air nozzle** to blow air into the cooling system through the expansion bottle opening to drain as much coolant as possible.

II - CLEANING

❑ Fill the cooling system with water through the expansion bottle.

❑ Let the water run until the water collected by the cooling radiator bottom hose runs clear.

V9X

- ❑ Use a **compressed air nozzle** to blow air into the cooling system through the expansion bottle opening to remove as much water as possible.
- ❑ Always replace the drain screws of the cylinder block.
- ❑ Refit new drain screws on the cylinder block.
- ❑ Torque tighten the **drain screws on the cylinder block (25 N.m)**.
- ❑ Refit the drain screw on the cooling radiator.
- ❑ Connect the bottom cooling hose to the additional cooling radiator.
- ❑ Fit the clip of the additional cooling radiator bottom cooling hose using the tool **(Mot. 1448)**.
- ❑ Connect the bottom cooling hose to the cooling radiator.
- ❑ Fit the bottom cooling hose clip of the cooling radiator using the tool **(Mot. 1448)**.

III - FILLING

❑

> Note:
>
> There are two procedures for filling the cooling system:
>
> - The procedure using the **(Mot. 1700)** is recommended by Renault. It saves a considerable amount of time because it does not require the cooling system bleed screws to be opened,
>
> - The procedure without a special tool.

1 - Filling procedure using the (Mot 1700)

❑ Fill the cooling system with engine coolant recommended by the manufacturer (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) using the tool **(Mot. 1700)**. Consult the user's manual for this tool (see **Cooling system filling and diagnostic tool: Use**) (Technical Note 3857A, 19A, Cooling).

2 - Filling method without special tools

❑

> **WARNING**
>
> It is essential to open all of the bleed screws to remove as much as air as possible in the cooling system. Failure to perform this procedure may prevent the cooling system from filling properly and may damage the engine.

138354

❑ Remove the bleed screw (**5**) from the exhaust gas recirculation solenoid valve outlet hose at the timing end.

134226

❑ Remove the bleed screw (**6**) from the exhaust gas cooler inlet hose with the engine running.

V9X

136263

❑ Remove the bleed screw (**7**) from the heater matrix inlet hose.

134225

❑ Remove the bleed screw (**8**) from the turbocharger inlet hose.

❑ Fill the cooling system with engine coolant recommended by the manufacturer (see **19A**, **Cooling**, **Engine cooling system: Specifications**, page **19A-13**) and (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) via the expansion bottle until it overflows.

> Note:
>
> The coolant will flow out via the bleed screw ***(8)*** only when the engine is running.

❑ Refit all the bleed screws as soon as the coolant starts to flow in a continuous stream.

❑ Pressurise the system using the **(Ms. 554-07)** to check that there are no leaks (see **19A**, **Cooling**, **Engine cooling system: Check**, page **19A-14**) .

❑ Remove the bleed screw ***(8)*** .

❑ Fill the expansion bottle until it overflows.

❑ Tighten the expansion bottle cap.

❑ Clean any surfaces soiled by the coolant.

IV - BLEEDING

❑ Deactivate the air conditioning system so that the fan assembly is not operating from the start of the operation.

❑ Start the engine.

❑ Refit the bleed screw ***(8)*** as soon as the coolant starts to flow in a continuous stream.

❑ Switch off the engine.

❑ Fill the expansion bottle until it overflows.

❑ Tighten the expansion bottle cap.

❑ Clean any surfaces soiled by the coolant.

❑ Start the engine.

❑ Maintain the engine speed at **1500 rpm** using a **pedal press**, until the fan assembly has been activated for a third time.

❑ Check that the heating is operating correctly.

❑ Allow the engine to cool until the coolant temperature is less than **50°C**.

❑ Adjust the coolant fluid level to the « MAXIMUM » mark.

❑ Refit the expansion bottle cap.

V - FINAL OPERATION

❑ Remove the **coolant recovery tray**.

❑ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),

V9X

- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

F4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
refrigerant charging station

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for very cold countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the cooling radiator upper cover,
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

123730

❑ Move aside the degassing hose clip (**1**) from the expansion bottle on the cooling radiator side using the tool **(Mot. 1448)**.

❑ Disconnect the expansion bottle degassing hose from the cooling radiator.

F4R

123479

❑ Disconnect the pressure sensor connector (**2**) .

❑ Unclip the pressure sensor wiring.

123731

❑ Disconnect:

- the engine cooling fan assembly connector (**3**) ,
- the engine cooling fan assembly resistor connector (**4**) .

❑ Unclip:

- the engine cooling fan assembly wiring,
- the engine cooling fan assembly resistor wiring.

❑ Disconnect:

- the air pressure sensor (**5**) ,
- the air temperature sensor (**6**) .

❑ Move aside the following from the engine cooling fan assembly:

- the water chamber hose,
- the expansion bottle hose.

❑ Undo:

- the air pipe clip at the intercooler inlet,
- the air pipe clip at the intercooler outlet.

❑ Disconnect:

- the air pipe at the intercooler inlet,
- the air pipe at the intercooler outlet.

F4R

123728

122550

❑ Remove:

- the bolt (**7**) on the « compressor - condenser » connecting pipe,
- the bolt (**8**) on the « compressor - intermediate pipe » connecting pipe.

❑ Remove:

- the « expansion valve - condenser » connecting pipe,
- the « compressor - intermediate pipe » connecting pipe.

123730

❑ Move aside the top cooling hose clip (**9**) from the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect the top cooling hose from the cooling radiator.

123729

❑ Remove the air scoops (**10**) from the cooling radiator.

F4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑

> Note:
>
> Take care not to damage the vanes of the cooling radiator and the condenser.

❑ Remove the « condenser - cooling radiator - engine cooling fan assembly - intercooler » assembly.

On the workbench

123738

123739

❑ Pull the air pipes' clip at the intercooler inlet and outlet (**11**) .

❑ Disconnect the intercooler air inlet and outlet pipes (**12**) .

F4R

123740

123741

❑ Unclip the intercooler at (**15**) and (**13**) .

❑ Rotate the intercooler at (**14**) and (**16**) .

❑ Remove the intercooler.

123744

❑ Unclip the engine cooling fan assembly at (**17**) .

❑ Remove the engine cooling fan assembly following the direction of the arrow.

F4R

123747

123475

❑ Unclip the condenser at (**18**) .

❑ Lift the condenser in the direction of the arrow.

❑ Remove the condenser.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the air conditioning pipe seals.

On the workbench

❑ Refit the condenser.

❑ Clip on the condenser.

❑ Refit the engine cooling fan assembly.

❑ Clip the engine cooling fan assembly in place.

❑ Refit the intercooler.

❑ Clip on the intercooler.

❑ Connect the intercooler air inlet and outlet pipes.

❑ Fit the air pipes' clip at the intercooler inlet and outlet.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the « condenser - cooling radiator - engine cooling fan assembly - intercooler » assembly.

III - FINAL OPERATION.

❑ Refit the cooling radiator air scoops.

> Note:
>
> To enable the cooling radiator to cool properly, it is essential to check that the air scoops are in the right position and correctly sealed.

❑ Connect the top cooling hose to the cooling radiator.

❑ Fit the top cooling hose clip on the cooling radiator side using tool **(Mot. 1448)**.

❑ Fit:

- the « compressor - intermediate pipe » connecting pipe,
- the « expansion valve - condenser » connecting pipe.

❑ Connect:

- the intercooler air outlet pipe,
- the air pipe at the intercooler inlet.

❑ Fit the following to the engine cooling fan assembly:

- the expansion bottle hose,
- the water chamber hose.

❑ Connect:

- the air temperature sensor,
- the air pressure sensor.

F4R

- ❑ Clip:
  - the engine cooling fan assembly resistor wiring to the engine cooling fan assembly,
  - the engine cooling fan assembly wiring to the engine cooling fan assembly,
- ❑ Connect:
  - the engine cooling fan assembly resistor connector,
  - the engine cooling fan assembly connector.
- ❑ Clip on the pressure sensor wiring harness.
- ❑ Connect the pressure sensor connector.
- ❑ Connect the expansion bottle degassing hose to the cooling radiator.
- ❑ Fit the expansion bottle degassing hose clip on the cooling radiator side using the tool **(Mot. 1448)**.
- ❑ Refit:
  - the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
  - the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
  - the cooling radiator upper cover,
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Perform the following operations:
  - fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
  - fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit the engine cover.

Cooling radiator: Removal - Refitting

K4M or M4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
refrigerant charging station

Tightening torques ▽	
bolt on the « compressor - condenser connecting pipe »	**8 N.m**
bolt on the « expansion valve - condenser »	**connecting pipe8 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for very cold countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

❑ Remove the front engine cover.

❑ Remove:

- the expansion bottle cap,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the cooling radiator upper cover,
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

❑ Drain:

- the cooling circuit using a **refrigerant charging station** (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

K4M or M4R

123467

❑ Disconnect:

- the fan assembly connector (**1**) ,
- the fan assembly resistor connector (**2**) .

K4M

128810

❑ Unclip:

- the fan assembly wiring (**3**) ,
- the fan assembly resistor wiring.

❑ Remove:

- the expansion bottle cooling hose clip (**4**) from the radiator using the tool **(Mot. 1448)**,
- the upper cooling hose clip (**5**) on the radiator using the tool **(Mot. 1448)**.

❑ Disconnect:

- the expansion bottle cooling hose on the radiator,
- the upper cooling hose from the cooling radiator.

K4M or M4R

M4R

123468

❑ Unclip:

- the fan assembly wiring (**3**) ,
- the fan assembly resistor wiring.

❑ Remove:

- the expansion bottle cooling hose clip (**4**) on the cooling radiator using the tool **(Mot. 1448)**,
- the upper cooling hose clip (**5**) on the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect:

- the expansion bottle cooling hose on the cooling radiator,
- the upper cooling hose from the cooling radiator.

123470

❑ Remove the air scoops (**6**) from the cooling radiator.

123479

❑ Disconnect the pressure sensor connector (**7**) .

❑ Remove the bolt (**8**) from the « compressor - condenser » connecting pipe.

K4M or M4R

123477

❑ Remove the bolt (**9**) from the « expansion valve - condenser » connecting pipe.

❑ Disconnect from the condenser:

- the « compressor - condenser » connecting pipe,
- the « expansion valve - condenser » connecting pipe.

❑ Fit protective plugs on the air conditioning pipe unions.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the "cooling radiator - condenser" assembly.

On the workbench

123474

❑ Unclip the condenser at (**10**) .

123475

❑ Lift up the condenser.

❑ Remove the condenser.

K4M or M4R

123471

❑ Unclip the cooling fan assembly at (**11**) .

❑ Remove the cooling fan assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the air conditioning pipe seals.

On the workbench

❑ Refit the cooling fan assembly.

❑ Clip the cooling fan assembly in place.

❑ Refit the condenser.

❑ Clip on the condenser.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the "cooling radiator - condenser" assembly.

III - FINAL OPERATION.

❑ Refit the new seals on the air conditioning pipes.

❑ Fit on the condenser:

- the « compressor - condenser » connecting pipe,
- the « expansion valve - condenser » connecting pipe.

❑ Tighten to torque:

- the **bolt on the « compressor - condenser connecting pipe » (8 N.m)**,
- the **bolt on the « expansion valve - condenser » (connecting pipe8 N.m)**.

❑ Connect the pressure sensor connector.

❑ Refit the cooling radiator air scoops.

❑ Connect:

- the expansion bottle cooling hose on the cooling radiator,
- the upper cooling hose from the cooling radiator.

❑ Fit:

- the expansion bottle cooling hose clip on the cooling radiator using the tool **(Mot. 1448)**,
- the upper cooling hose clip on the cooling radiator using the tool **(Mot. 1448)**.

❑ Clip:

- the fan assembly wiring,
- the fan assembly resistor wiring.

❑ Connect:

- the fan assembly connector,
- the fan assembly resistor connector.

❑ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the cooling radiator upper cover,
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Perform the following operations:

- fill the cooling circuit using a **refrigerant charging station** (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,

K4M or M4R

- fill the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

M4R

❑ Refit the engine cover.

M9R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
refrigerant charging station
tweezers

Tightening torques ▽	
air conditioning hose nuts on the condenser	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Drain:

- the refrigerant fluid circuit using the **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- the coolant circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

123699

❑ Pull the clip (**1**) of the intercooler air outlet pipe on the intercooler side using a flat-blade screwdriver.

❑ Disconnect the intercooler air outlet pipe from the intercooler.

M9R

123698

123701

- ❑ Rotate the clip (**2**) on the intercooler air inlet pipe.
- ❑ Disconnect the intercooler air inlet pipe from the intercooler.
- ❑ Disconnect:
  - the connector of the air conditioning pressure sensor,
  - the connector of the fan assembly resistors,

M9R, and 742 or 744 or 746 or 748 or 754

- ❑ Disconnect the fan assembly connector.
- ❑ Unclip the blower unit wiring.
- ❑ Move aside the fan assembly wiring.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Disconnect the engine cooling fan assembly connectors.
- ❑ Unclip the blower unit wiring.
- ❑ Move aside the fan assembly wiring.

123003

- ❑ Remove the cooling radiator bottom hose clip (**3**) using the tool **(Mot. 1448)**.
- ❑ Disconnect the bottom hose from the cooling radiator.

M9R

123005

❑ Remove the clip (**4**) from the hose between the cooling radiator and the expansion bottle using the tool **(Mot. 1448)**.

❑ Disconnect the hose between the cooling radiator and the expansion bottle on the cooling radiator side.

123004

❑ Remove the clip (**5**) from the cooling radiator top hose using the tool **(Mot. 1448)**.

> Note:
>
> When disconnecting the hose, pay attention to the cooling radiator top hose retaining bracket.

❑ Disconnect the cooling radiator top hose.

123010

❑ Remove air deflectors (**6**) .

M9R

122867

122869

❑ Remove the nuts (**7**) from the air conditioning hoses on the condenser.

> Note:
>
> Use blanking plugs for the fuel circuits with part numbers **77 01 208 209** or **77 01 476 857** to plug any openings exposed to the open air. They must be clean. Do not use any which have already been used to plug a fuel circuit.

> **WARNING**
>
> To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

> **WARNING**
>
> In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Disconnect the air conditioning hoses from the condenser.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123002

❑ Remove the cooling assembly.

M9R

M9R, and 742 or 744 or 746 or 748 or 754

123001

❑ Remove the fan assembly in the direction of the arrow by pressing on the retaining brackets (**8**) .

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

123753

❑ Remove the fan assembly in the direction of the arrow by pressing on the retaining brackets (**9**) .

123000

❑ Unclip the condenser by pulling it at a right angle in relation to the cooling radiator (**1**) .

❑ Pull the condenser horizontally in relation to the cooling radiator (**2**) .

M9R

122999

❑ Remove the intercooler.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean and degrease with **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) any of the following components if they are full of oil:

- the cooling radiator,
- the condenser,
- the intercooler.

❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

parts always to be replaced: turbocharger air cooler air outlet pipe seal (10,09,04,05).

115068

❑ Remove the intercooler air inlet pipe seal using a **tweezers** on the intercooler side.

115069

❑

> Note:
>
> Check that the seal of the intercooler air inlet pipe is fitted the correct way round.

❑ Refit a new seal to the intercooler air inlet pipe on the intercooler side.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the intercooler,
- the condenser,
- the fan assembly.

> Note:
> Check that the components are correctly fitted.

❏ Fit the cooling assembly.

III - FINAL OPERATION

❏ Connect the air conditioning hoses to the condenser.

❏ Torque tighten the **air conditioning hose nuts on the condenser (8 N.m)**.

❏ Connect:

- the cooling radiator top hose to the cooling radiator,
- the cooling radiator bottom hose to the cooling radiator.

❏ Fit:

- the cooling radiator top hose clip using the tool **(Mot. 1448)**,
- the cooling radiator bottom hose clip using the tool **(Mot. 1448)**.

❏ Connect the hose between the cooling radiator and the expansion bottle.

❏ Fit the clip on the hose between the cooling radiator and the expansion bottle using the tool **(Mot. 1448)**.

❏ Fit the air deflectors.

M9R, and 742 or 744 or 746 or 748 or 754

❏ Fit the fan assembly wiring.

❏ Clip the wiring onto the fan assembly nozzle.

❏ Connect the fan assembly connector.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

❏ Fit the fan assembly wiring.

❏ Clip the fan assembly wiring onto the fan assembly nozzle.

❏ Connect the fan assembly connectors.

❏ Connect:

- the connector of the fan assembly resistors,
- the connector of the air conditioning pressure sensor.

❏ Rotate the intercooler air inlet pipe clip in order to fit the clip into the neck of the intercooler air inlet pipe.

❏ Connect the intercooler air inlet pipe to the intercooler.

> Note:
> Check that the intercooler air inlet pipe is correctly clipped onto the intercooler.

❏ Connect the intercooler air outlet pipe on the intercooler.

❏ Push the clip of the intercooler air outlet pipe.

> Note:
> Check that the intercooler air outlet pipe is correctly clipped onto the intercooler.

❏ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Refill:

- the refrigerant fluid circuit using the **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M9R

❑ Refit the engine undertray.

K9K

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure).

❏ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❏ Remove the condenser (see **Condenser: Removal - Refitting**) (MR 415, 62A, Air conditioning).

123526

123527

❏ Rotate the intercooler air inlet pipe clip (**1**) .

❏ Disconnect the intercooler air inlet pipe from the intercooler.

❏ Remove the clip (**2**) from the intercooler air outlet pipe using a screwdriver.

❏ Disconnect the intercooler air outlet pipe from the intercooler.

❏ Disconnect:

- the fan unit connector,
- the fan unit resistor connector,

K9K

❏ Unclip:

- the fan assembly wiring,
- the fan assembly resistor wiring.

123479

❏ Disconnect the connector (**3**) from the air conditioning pressostat.

❏ Unclip the air conditioning pressostat wiring.

❏ Move aside the fan assembly wiring.

K9K

124551

124550

❑ Unclip the hoses from the engine cooling fan assembly.

❑ Remove:

- the expansion bottle degassing hose clip (**4**) using the **(Mot. 1448)** on the cooling radiator,
- the clip (**6**) for the top cooling hose on the cooling radiator using the **(Mot. 1448)**,
- the clip (**8**) for the bottom cooling hose on the cooling radiator using the **(Mot. 1448)**,

❑ Disconnect:

- the expansion bottle degassing hose (**5**) from the cooling radiator,
- the top cooling hose (**7**) from the cooling radiator,
- the bottom cooling hose (**9**) from the cooling radiator.

124552

❑ Remove the cooling radiator deflectors (**10**) .

II - REMOVAL OPERATION FOR PART CONCERNED

❑ Remove the « cooling radiator - engine cooling fan assembly - intercooler » assembly.

K9K

On the workbench

123001

❑ Remove the engine cooling fan assembly from the cooling radiator by working the clips (**11**) .

122999

❑ To remove the intercooler:

- press the tabs (**12**) on the intercooler,
- tilt the intercooler upwards,
- disengage (**13**) the intercooler from the cooling radiator.

REFITTING

I - REFITTING PREPARATIONS OPERATION

On the workbench

122999

❑ Clip the intercooler at (**14**) then at (**15**) .

❑ Position the engine cooling fan assembly on the cooling radiator.

❑ Clip the fan unit onto the cooling radiator.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the « cooling radiator - engine cooling fan assembly - intercooler » assembly.

III - FINAL OPERATION.

❑ Position the air deflectors on the cooling radiator.

❑ Clip the air deflectors on the cooling radiator.

❑ Connect:

- the bottom cooling hose to the cooling radiator,
- the top cooling hose to the cooling radiator,
- the radiator expansion bottle degassing hose.

❑ Refit:

- the clip for the expansion bottle degassing hose on the cooling radiator using the **(Mot. 1448)**,
- the clip for the top cooling hose on the cooling radiator using the **(Mot. 1448)**,

K9K

- the clip for the bottom cooling hose on the cooling radiator using the **(Mot. 1448)**.

❏ Clip the hoses to the engine cooling fan assembly.

❏ Clip on the pressostat wiring.

❏ Connect the air conditioning pressostat connector.

❏ Clip:

- the engine cooling fan assembly resistor wiring,
- the engine cooling fan assembly wiring connector.

❏ Connect:

- the fan unit resistor connector,
- the engine cooling fan assembly connector.

123701

❏ Place the intercooler air inlet pipe clip (**16**) in its initial position.

❏ Clip the intercooler air inlet pipe onto the intercooler.

❏ Place the intercooler air outlet pipe clip in its initial position.

❏ Clip the intercooler air outlet pipe onto the intercooler.

❏ Refit the condenser (see **Condenser: Removal - Refitting**) (MR 415, 62A, Air conditioning).

❏ Fill the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❏ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure),
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Adjust the headlights (see **Headlight: Adjustment**) (MR 415, 80B, Headlights).

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
refrigerant charging station

Tightening torques ▽	
connecting pipe bracket nut for the « compressor - condenser »	**8 N.m**
connecting pipe bracket nut for the « expansion valve - condenser »	**8 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

V4Y

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

WARNING
Consult the device's operating manual to avoid incorrect use.

134210

❑ Disconnect the connectors (**1**) from the fan assembly.

134541

134513

❑ Unclip the fan assembly wiring.

❑ Remove:

- the expansion bottle cooling hose clip (**2**) from the radiator using the tool **(Mot. 1448)**,
- the clip of the top cooling hose (**3**) on the cooling radiator using the tool **(Mot. 1448)**,
- the clip of the bottom cooling hose (**4**) on the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect:

- the expansion bottle cooling hose from the cooling radiator,

V4Y

- the top cooling hose from the cooling radiator,
- the bottom cooling hose from the cooling radiator.

134208

❑ Unclip the cooling radiator air scoops.

❑ Remove the air scoops (**5**) from the cooling radiator.

123479

❑ Disconnect the pressure sensor connector (**6**) .

134209

❑ Remove:

- the nut (**7**) from the « compressor - condenser » connecting pipe bracket on the condenser,
- the nut (**8**) from the « expansion valve - condenser » connecting pipe bracket.

WARNING
In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Disconnect the following from the condenser:

- the « compressor - condenser » connecting pipe,
- the « expansion valve - condenser » connecting pipe.

❑ Insert the blanking plugs.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the « cooling radiator - condenser - fan assembly » assembly.

V4Y

On the workbench

123474

❑ Unclip the condenser at (**9**) .

123475

❑ Lift the condenser.

❑ Remove the condenser.

134210

❑ Unclip the cooling fan assembly at (**10**) .

❑ Remove the cooling fan assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: refrigerant pipe seal (30,02,02,52)**.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

> **WARNING**
> To avoid any leaks, check that the pipe surface is sound before positioning the new seal. The surface must be clean and scratch free.

❑ Remove the blanking plugs.

❑ It is recommended to lubricate the new seals with air conditioning oil to make fitting easier (see **Air conditioning: Parts and consumables for the repair**) (62A, Air conditioning).

❑ Fit new seals to the refrigerant connecting pipes.

V4Y

On the workbench

❑ Refit the cooling fan assembly.

❑ Clip on the cooling fan assembly.

❑ Refit the condenser.

❑ Clip on the condenser.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the «cooling radiator - condenser - fan assembly » assembly.

III - FINAL OPERATION

❑ Attach the following to the condenser.

- the « compressor - condenser » connecting pipe,
- the « expansion valve - condenser» connecting pipe.

❑ Tighten to torque:

- the **connecting pipe bracket nut for the « compressor - condenser » (8 N.m)**,
- the **connecting pipe bracket nut for the « expansion valve - condenser » (8 N.m)**.

❑ Connect the pressure sensor connector.

❑ Refit the cooling radiator air scoops.

❑ Clip on the cooling radiator air scoops.

❑ Connect:

- the bottom cooling hose to the cooling radiator,
- the expansion bottle cooling hose to the cooling radiator,
- the top cooling hose to the cooling radiator.

❑ Fit:

- the clip of the bottom cooling hose on the cooling radiator using the tool **(Mot. 1448)**,
- the expansion bottle cooling hose clip on the cooling radiator using the tool **(Mot. 1448)**,
- the clip of the top cooling hose on the cooling radiator using the tool **(Mot. 1448)**.

❑ Clip the fan assembly wiring.

❑ Connect the fan assembly connectors.

❑ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Perform the following operations:

- fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- a leak test (see **Refrigerant circuit: Check**) (62A, Air conditioning),

❑ Check that the air conditioning is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).

❑ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

❑ Refit the engine cover.

Cooling radiator: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Equipment required
refrigerant charging station
tweezers

Tightening torques ▽	
connecting pipe bracket nut for the « compressor - condenser »	**8 N.m**
connecting pipe bracket nut for the « expansion valve - condenser »	**8 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

To prevent moisture from entering the system, place plugs on the cold loop components which are open to the air.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

V9X

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

> **WARNING**
> Consult the device's operating manual to avoid incorrect use.

❑ Drain the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) .

137899

❑ Remove the right-hand air scoop (**1**) from the cooling radiator.

137898

❑ Remove the left-hand air scoop (**2**) from the cooling radiator.

❑ Disconnect the pressure sensor connector.

V9X

137897

❑ Remove:

- the nut (**3**) from the « compressor - condenser » connecting pipe bracket on the condenser,
- the nut (**4**) from the «expansion valve - condenser » connecting pipe bracket.

> **WARNING**
> In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Disconnect the following from the condenser:

- the « compressor - condenser » connecting pipe,
- the « expansion valve - condenser » connecting pipe.

❑ Remove the condenser air conditioning pipe seals.

❑ Insert the blanking plugs.

137895

❑ Separate the clip of the top cooling hose (**5**) on the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect the top cooling hose from the cooling radiator.

137896

❑ Separate the clip of the bottom cooling hose (**6**) on the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect the bottom cooling hose from the cooling radiator.

V9X

138349

123701

- ❑ Rotate the clip (**7**) on the intercooler air inlet pipe.
- ❑ Disconnect the intercooler air inlet pipe.
- ❑ Remove the intercooler inlet air pipe.

138350

- ❑ Loosen the clip (**8**) on the intercooler air outlet pipe.
- ❑ Disconnect the intercooler air outlet pipe.
- ❑ Move the intercooler outlet air pipe to one side.

137893

- ❑ Unclip the air conditioning pipe (**9**) from the intercooler.
- ❑ Separate the air conditioning pipe from the intercooler.
- ❑ Unclip the cooling hose from the intercooler.
- ❑ Separate the cooling hose from the intercooler.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the «cooling radiator - condenser - intercooler » assembly.

On the workbench

137892

❑ Unclip the condenser at (**10**) .

123475

❑ Lift the condenser.

❑ Remove the condenser.

137890

137891

❑ Press on the intercooler tabs (**11**) .

❑ Rotate the intercooler.

❑ Disconnect the intercooler from the cooling radiator.

❑ Remove the intercooler from the cooling radiator.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: refrigerant pipe seal (30,02,02,52)**.

V9X

- ❑ **parts always to be replaced: turbocharger air cooler air inlet pipe seal (10,09,04,04)**.

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

> **WARNING**
> To avoid any leaks, check that the pipe surface is sound before positioning the new seal. The surface must be clean and scratch free.

- ❑ Remove the blanking plugs.
- ❑ It is recommended to lubricate the new seals with air conditioning oil to make fitting easier (see **Air conditioning: Parts and consumables for the repair**) (62A, Air conditioning).
- ❑ Fit new seals to the refrigerant connecting pipes.

115068

- ❑ Use a **tweezers** to remove the seal from the intercooler air inlet pipe.

115069

- ❑ Refit a new seal to the intercooler air inlet pipe.

> Note:
> Check that the new seal of the intercooler air inlet pipe is fitted the right way round.

On the workbench

- ❑ Fit the intercooler on the cooling radiator.
- ❑ Clip the intercooler onto the cooling radiator.
- ❑ Refit the condenser.
- ❑ Clip on the condenser.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the «cooling radiator - condenser - intercooler » assembly.

III - FINAL OPERATION

- ❑ Fit the cooling hose on the intercooler.
- ❑ Clip the cooling hose onto the intercooler.
- ❑ Fit the air conditioning pipe on the intercooler.
- ❑ Clip the air conditioning pipe onto the intercooler.
- ❑ Fit the intercooler air outlet pipe on the intercooler.
- ❑ Connect the intercooler air outlet pipe on the intercooler.
- ❑ Tighten the clip on the intercooler outlet pipe.

V9X

123701

- ❑ Rotate the intercooler air inlet pipe clip in the locked position.
- ❑ Fit the intercooler air inlet pipe.
- ❑ Connect the intercooler air inlet pipe until you hear the clip make a **clicking** sound.
- ❑ Connect the bottom cooling hose to the cooling radiator.
- ❑ Fit the clip for the bottom cooling hose on the cooling radiator using the tool **(Mot. 1448)**.
- ❑ Connect the top cooling hose to the cooling radiator.
- ❑ Fit the clip for the top cooling hose on the cooling radiator using the tool **(Mot. 1448)**.
- ❑ Remove the blanking plugs.
- ❑ Attach the following to the condenser:
  - the « compressor - condenser » connecting pipe,
  - the « expansion valve - condenser » connecting pipe.
- ❑ Tighten to torque:
  - the **connecting pipe bracket nut for the « compressor - condenser » (8 N.m)**,
  - the **connecting pipe bracket nut for the « expansion valve - condenser » (8 N.m)**.
- ❑ Connect the pressure sensor connector.
- ❑ Fit the air scoops on the cooling radiator.
- ❑ Clip on the cooling radiator air scoops.
- ❑ Refit:
  - the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-121**) ,
  - the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
  - the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
  - the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
  - the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- ❑ Perform the following operations:
  - fill the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
  - a leak test (see **Refrigerant circuit: Check**) (62A, Air conditioning),
- ❑ Check that the air conditioning is working correctly (see **Air conditioning: Check**) (62A, Air conditioning).
- ❑ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).
- ❑ Refit the engine cover.

F4R

Tightening torques ▽	
coolant pump bolts	**10 Nm**

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

WARNING
When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

IMPORTANT
When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Clean the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

F4R

II - REMOVAL OPERATION FOR PART CONCERNED

18430-1

❑

> Note:
>
> The water pump bolts are not the same length, mark their position.

❑ Remove:

- the water pump bolts (**1**) ,
- the water pump,
- the coolant pump seal,

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Clean the water pump joint faces with **SUPER DÉCAPANT CLEANER FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

> **WARNING**
>
> Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

> **WARNING**
>
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ The coolant pump seal must always be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the new seal on the coolant pump.

❑ Coat the water pump bolts with **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

❑ Refit:

- the water pump,
- the coolant pump bolts.

18430-1

❑ Tighten to torque and in order the **coolant pump bolts (10 Nm)**.

III - FINAL OPERATION.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,

F4R

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

❏ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant pump: Removal - Refitting

M4R

Tightening torques ▽	
coolant pump bolts	**25 Nm**

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

M4R

II - REMOVAL OPERATION FOR PART CONCERNED

115086

115085

❑ Remove:

- the water pump bolts (**1**) ,
- the water pump,
- the coolant pump seal,

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the coolant pump seal.

❑ Clean and degrease the water pump joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

> **WARNING**
> Do not scratch the aluminium joint faces: any surface damage to the joint faces may cause leaks.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the water pump fitted with a new seal,
- the coolant pump bolts.

❑ Torque tighten the **coolant pump bolts (25 Nm)**.

III - FINAL OPERATION.

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts,

❑ Tighten the engine undertray bolts.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M9R

Tightening torques ▽	
pump bolts	**25 N.m**
coolant pump pulley bolts	**21 N.m**
power-assisted steering pump pulley bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

114057

❑ Remove:

- the bolts (**1**) from the power-assisted steering pump pulley with an Allen key,
- the power-assisted steering pump pulley.

M9R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123622

❑ Remove:

- the coolant pump pulley bolts (**2**) ,
- the coolant pump pulley.

123623

❑ Remove:

- the coolant pump bolts (**3**) ,
- the coolant pump,
- the coolant pump seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: coolant pump seal (10,06,01,21)**.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

> **IMPORTANT**
> Wear goggles with side protectors for this operation.

> **IMPORTANT**
> Wear protective gloves during the operation.

❑ Clean the joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

M9R

II - REFITTING OPERATION FOR PART CONCERNED

123623

- ❑ Refit:
  - a new coolant pump seal,
  - the coolant pump.
- ❑ Torque tighten in order the **pump bolts (25 N.m)**.
- ❑ Refit the coolant pump pulley.
- ❑ Torque tighten the **coolant pump pulley bolts (21 N.m)**.

III - FINAL OPERATION

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- ❑ Refit the power-assisted steering pump pulley.
- ❑ Torque tighten the **power-assisted steering pump pulley bolts (10 N.m)**.

- ❑ Refit:
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the engine cover,
  - the engine undertray.

K9K

Tightening torques ▽	
coolant pump bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) .

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

1 - First fitting

123969

❏ Undo the alternator lower bolt (**1**) .

❏ Remove the alternator upper bolt (**2**) .

❏ Tip (**3**) the alternator towards the front of the vehicle.

❏ Remove:

- the inner timing cover bolts (**4**) ,
- the inner timing cover.

K9K

2 - Second fitting

139161

- ❑ Loosen the lower bolt (**6**) from the alternator.
- ❑ Remove the alternator upper bolt (**5**) .
- ❑ Tilt the alternator slightly towards the front of the vehicle.
- ❑ Remove:
  - the inner timing cover bolts (**7**) ,
  - the inner timing cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - First fitting

123968

- ❑ Remove:
  - the coolant pump bolts (**8**) ,
  - the coolant pump,
  - the coolant pump seal.

K9K

2 - Second fitting

139193

❑ Remove:

- the coolant pump bolts (**9**) ,
- the coolant pump.

140957

❑ Fold the coolant pump seal at (**10**) .

❑ Cut the coolant pump seal.

❑ Remove the coolant pump seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: coolant pump seal (10,06,01,21)**.

> **IMPORTANT**
> Wear goggles with side protectors for this operation.

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the cylinder block gasket face,
- the coolant pump gasket face if it is to be reused.

K9K

II - OPERATION FOR REFITTING PART CONCERNED

1 - First fitting

123968

❑ Refit:

- a new coolant pump seal,
- the coolant pump,
- the bolts (**2**) and (**5**) of the coolant pump.

❑ Coat the coolant pump bolt (**3**) with one or two drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Refit the bolts (**3**) , (**1**) and (**4**) of the coolant pump.

❑ Torque tighten in order the **coolant pump bolts (10 N.m)**.

2 - Second fitting

139193

❑ Refit:

- a new coolant pump seal,
- the coolant pump,
- the bolts (**2**) and (**5**) of the coolant pump.

❑ Coat the coolant pump bolt (**1**) with one or two drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Refit:

- the bolt (**1**) of the coolant pump,
- the bolts (**3**) and (**4**) of the coolant pump.

❑ Torque tighten in order the **coolant pump bolts (10 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the inner timing cover,
- the inner timing cover bolts.

❑ Tighten the timing cover bolts.

❑ Fit the alternator in place.

❑ Refit the alternator upper bolt.

❑ Tighten the alternator bolts.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,

K9K

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K4M

Tightening torques ▽	
bolts 1 to 7 of the coolant pump	**10 N.m**
bolt 8 of the coolant pump	**25 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for very cold countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front section of the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

14505

❏ Remove:

- the coolant pump bolts (**1**) ,
- the coolant pump.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑

IMPORTANT
Wear goggles with side protectors for this operation.

IMPORTANT
Wear leaktight gloves (nitrile type) for this operation.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the coolant pump joint face, in case of reuse,
- the cylinder block gasket face.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the coolant pump joint face, in case of reuse,
- the cylinder block gasket face.

10063

❑

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply a bead (**2**) of **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **0.6** to **1 mm.**

K4M

II - REFITTING OPERATION FOR PART CONCERNED

14505

❑

> Note:
>
> Apply one to two drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the coolant pump bolts (**1**) and (**8**) .

❑ Refit the water pump.

❑ Tighten to torque and in order:

- **bolts 1 to 7 of the coolant pump (10 N.m)**,
- **bolt 8 of the coolant pump (25 N.m)**.

III - FINAL OPERATION.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-50**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-33**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front section of the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-49**) ,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant pump: Removal - Refitting

V4Y

Special tooling required	
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station
component support

Tightening torques ▽	
coolant pump bolts	**9 N.m**
central nut of the left-hand suspended engine mounting rubber pad	**62 N.m**

IMPORTANT

Wear protective gloves during the operation.

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Drain:

- the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning),
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the « cooling radiator - condenser - motor-driven fan » assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
- the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
- the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
- the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,

V4Y

- the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) .

22860

❑ Position the pads of the **(Mot. 1390)** under areas (**A**) .

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .

134185

❑ Remove the central nut (**1**) from the rubber pad on the left-hand suspended engine mounting.

❑ Use a copper hammer to strike the threaded rod of the left-hand suspended engine mounting to separate the engine from the body.

> Note:
>
> The pads of the **(Mot. 1390)** should almost be in contact with the engine; when struck with the copper hammer, the engine comes to rest on the support.

❑ Remove the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) .

❑ Fit the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .

❑ Separate the gearbox from the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).

❑ Fit the engine on the **component support** (see **Engine support equipment: Use**) .

❑ Remove the accessories belt from the air conditioning compressor (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

❑ Set the engine at TDC by aligning the mark on the crankshaft accessories pulley and on the coolant pump cover.

133827

❑ Remove:

- the bolts (**2**) from the back row camshaft dephaser cover,
- the back row camshaft dephaser cover,
- the back row dephaser cover seal,
- the coolant pump cover bolts,
- the coolant pump cover (**3**) ,
- the primary chain hydraulic tensioner (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

23024

❑

> Note:
>
> Use a cloth to prevent bolts from falling or coolant from entering the timing cover.

❑ Remove the bolts (**4**) from the coolant pump.

❑ Rotate the engine anti-clockwise by **20°**.

23023

❑ Remove the coolant pump.

❑ Refit the coolant pump O-rings (**5**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the coolant pump O-rings,
- the back row camshaft dephaser cover seal.

> **IMPORTANT**
>
> Wear goggles with side protectors for this operation.

> **IMPORTANT**
>
> Wear protective gloves during the operation.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the coolant pump cover,
- of the timing cover at the coolant pump.

> **WARNING**
>
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Remove the residue using a plastic spatula.

V4Y

❑ Finish cleaning using **GREY ABRASIVE PADS**, part number **77 01 405 943**.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the coolant pump cover,
- of the back row camshaft dephaser cover,
- of the timing cover.

II - REFITTING OPERATION FOR PART CONCERNED

23023

❑

> Note:
> Before fitting the coolant pump, apply engine oil to a new brown O-ring (**6**) and coolant to a new black O-ring (**7**) .

❑ Refit new O-rings to the coolant pump.

❑ Fit the coolant pump.

❑ Rotate the engine clockwise by twenty degrees.

❑ Refit the coolant pump bolts.

❑ Torque tighten the **coolant pump bolts (9 N.m)**.

❑ Remove the cloth.

❑ Refit the primary chain hydraulic tensioner (see **11A**, **Top and front of engine**, **Timing chain: Removal - Refitting**, page **11A-88**) .

III - FINAL OPERATION

23027

❑ Apply a bead of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a width of **3 mm** to the coolant pump cover (**8**) .

134074

❑ Refit:

- the coolant pump cover,
- a new back row camshaft dephaser cover seal,
- the back row camshaft dephaser cover (**9**) .

❑ Tighten the bolts of the back row camshaft dephaser cover in order (**9**) .

❑ Refit the accessories belt of the air conditioning compressor (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

V4Y

- ❑ Remove the engine from the **component support** (see **Engine support equipment: Use**) .
- ❑ Couple the gearbox to the engine (see **Automatic gearbox: Removal - Refitting**) (23A, Automatic transmission).
- ❑ Remove the lifting eye on the timing end (see **11A**, **Top and front of engine**, **Lifting eyes: Removal - Refitting**, page **11A-318**) .
- ❑ Refit:
  - the « engine and gearbox » assembly (see **10A**, **Engine and cylinder block assembly**, **Engine - gearbox assembly: Removal - Refitting**, page **10A-1**) ,
  - the left-hand suspended engine mounting rubber pad central nut,
  - the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) .
- ❑ Torque tighten the **central nut of the left-hand suspended engine mounting rubber pad (62 N.m)**.
- ❑ Remove the **(Mot. 1390)** from the «engine - gearbox » assembly.
- ❑ Refit:
  - the front and rear catalytic pre-converters (see **Front catalytic pre-converter: Removal - Refitting**) and (see **Rear catalytic pre-converter: Removal - Refitting**) ,
  - the front row upstream oxygen sensor (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) ,
  - the inlet manifold (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-75**) ,
  - the radiator cross member mounting (see **Radiator cross member mounting: Removal - Refitting**) (41A, Front lower structure),
  - the protection and switching unit (see **Protection and Switching Unit: Removal - Refitting**) (87G, Engine compartment connection unit),
  - the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
  - the front left-hand driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - The « cooling radiator - condenser - motor-driven fan » assembly (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) .
- ❑ Refill:
  - the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - the refrigerant circuit using a **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).
- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the petrol injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-30**) ,
  - the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
  - the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
  - the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
  - the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray,
  - the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Check that the air conditioning is working correctly (see **Refrigerant circuit: Check**) (62A, Air conditioning).
- ❑ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

V9X

Tightening torques ▽	
coolant pump bolts	**25 N.m**

IMPORTANT
Wear goggles with side protectors for this operation.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

134124

❑ Remove:

- the coolant pump pulley bolts (**1**) ,
- the coolant pump pulley.

134125

❑ Remove:

- the coolant pump bolts (**2**) ,
- the coolant pump,
- the coolant pump seal.

V9X

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: coolant pump seal (10,06,01,21)**.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

> **WARNING**
> Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Clean the joint faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

134125

❑ Refit:

- a new coolant pump seal,
- the coolant pump.

❑ Tighten to torque and in order the **coolant pump bolts (25 N.m)**.

❑ Refit the coolant pump pulley.

III - FINAL OPERATION

❑ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-51**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

M4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
coolant inlet union bolts	**17 Nm**

The M4R engine has a double cooling circuit and is fitted with two thermostats: one at the coolant pump and the other on the water chamber.

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for very cold countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVING THE THERMOSTAT AT THE COOLANT PUMP

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

115513

❑ Remove the clip (**1**) from the coolant inlet union hose using the tool **(Mot. 1448)**.

❑ Disconnect the hose (**2**) from the coolant inlet union.

M4R

115098

❑ Remove:

- the coolant inlet union bolts (**3**) ,
- the coolant inlet union (**4**) ,
- the thermostat.

REFITTING THE THERMOSTAT AT THE COOLANT PUMP

I - REFITTING PREPARATION OPERATION

❑ Always replace the thermostat seal at the coolant pump.

II - REFITTING OPERATION FOR PART CONCERNED

❑

115099

❑ Refit:

- the thermostat at the coolant pump following the direction indicated in the diagram,
- the coolant inlet union,
- the coolant inlet union bolts,

❑ Torque tighten the **coolant inlet union bolts (17 Nm)**.

❑ Connect the hose to the coolant inlet union.

❑ Fit the hose clip on the coolant inlet union using the tool **(Mot. 1448)**.

III - FINAL OPERATION.

❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

M4R

REMOVING THE WATER CHAMBER THERMOSTAT

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Remove the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

116008

❑ Remove the thermostat (**5**) .

REFITTING THE WATER CHAMBER THERMOSTAT

I - REFITTING PREPARATION OPERATION

❑ Always replace the thermostat seal at the water chamber.

II - REFITTING OPERATION FOR PART CONCERNED

115157

❑ Refit:

- the water chamber thermostat following the direction indicated in the diagram,
- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

III - FINAL OPERATION.

❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

F4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123343

❑ Remove the clip (**1**) from the thermostat cover hose using the tool **(Mot. 1448)**.

❑ Disconnect the hose from the thermostat cover.

123732

❑ Remove the thermostat cover bolts (**2**) .

F4R

123733

❑ Remove:

- the thermostat (**3**) ,
- the thermostat seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products), clean and degrease the thermostat housing.

❑ The thermostat seal must be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new seal on the thermostat,
- the thermostat,
- the thermostat cover bolts.

❑ Connect the hose to the thermostat cover.

❑ Fit the clip to the thermostat cover using the tool **(Mot. 1448)**.

III - FINAL OPERATION.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Refit the engine cover.

K4M

- The thermostat cannot be separated from the water chamber.

  Replace the « water chamber - thermostat » assembly if the thermostat is faulty (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
thermostat bolts	**10 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt from the alternator (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) .

133840

❑ Disconnect the connector (**1**) from the front row camshaft dephaser solenoid valve.

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

134535

- ❑ Remove the clip (**2**) from the cooling hose using the tool **(Mot. 1448)**.
- ❑ Disconnect the cooling hose.

133840

- ❑ Remove:
  - the bolts (**3**) from the thermostat,
  - the thermostat,
  - the thermostat seal.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ **parts always to be replaced: thermostat seal (10, 06,03,03)**.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - a new thermostat seal,
  - the thermostat.
- ❑ Torque tighten the **thermostat bolts (10 N.m)**.
- ❑ Connect the cooling hose.
- ❑ Fit the cooling hose clip using the tool **(Mot. 1448)**.

III - FINAL OPERATION

- ❑ Connect the connector of the front row camshaft dephaser solenoid valve.
- ❑ Refit:
  - the alternator accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

V9X

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

134025

❑ Remove:

- the thermostat (**1**) ,
- the thermostat seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: thermostat seal (10, 06,03,03)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new thermostat seal,
- the thermostat.

III - FINAL OPERATION

❑ Refit:

- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,

V9X

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine cover.

Thermostat: Removal - Refitting

K9K

- The thermostat cannot be separated from the water chamber. It is necessary to replace the «water chamber - thermostat» assembly in the event of a thermostat fault (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) .

Water chamber: Removal - Refitting

M4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
water chamber bolts	**25 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

115153

❑ Remove the gearbox breather pipe bracket bolt (**1**) .

❑ Remove the gearbox breather pipe bracket (**2**) .

115153

❑ Move the clips (**3**) for the coolant hoses on the water chamber using the **(Mot. 1448)**.

❑ Disconnect the water chamber coolant hoses.

❑ Remove the water chamber coolant hoses.

II - REMOVAL OPERATION FOR PART CONCERNED

115154

❑ Remove:

- the water chamber bolts (**4**) ,
- the water chamber,
- the water chamber seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the water chamber seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the water chamber with a new seal,
- the water chamber bolts.

❑ Torque tighten the **water chamber bolts (25 N.m)**.

III - FINAL OPERATION.

❑ Connect the coolant hoses to the water chamber.

❑ Position the coolant hose clips on the water chamber using the **(Mot. 1448)**.

❑ Refit:

- the gearbox breather pipe bracket,
- the gearbox breather pipe bracket bolt.

❑ Tighten the gearbox breather pipe bracket bolt.

❑ Refit the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine cover,
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

F4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123343

❑ Remove the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

❑ Remove the clips (**1**) from the water chamber inlet and outlet hoses using the tool **(Mot. 1448)**.

❑ Disconnect the water chamber inlet and outlet hoses.

F4R

121701

❑

> Note:
>
> The water chamber bolts are not all the same length, note their positions.

❑ Remove:

- the water chamber bolts (**2**) ,
- the water chamber,
- the plenum chamber seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the water chamber seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the cylinder head gasket face,
- the water chamber joint face if it is being reused.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

If replacing the water chamber

121701

❑ Remove:

- the bleed screw (**3**) ,
- the metal tube (**4**) ,
- the thermostat unit bolts (**5**) ,
- the thermostat unit,
- the thermostat,
- the thermostat seal.

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products), clean and degrease the thermostat unit joint face.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Refit:

- the metal tube,
- the bleed screw.

❑ Tighten the bleed screw.

❑ Refit:

- the thermostat fitted with a new seal,
- the thermostat unit,
- the thermostat unit bolts.

❑ Tighten the thermostat unit bolts.

F4R

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the new water chamber seal,
- the water chamber,
- the water chamber bolts.

❏ Tighten the water chamber bolts.

❏ Connect the water chamber inlet and outlet hoses.

❏ Fit the water chamber inlet and outlet hose clips using the tool **(Mot. 1448)**.

❏ Refit the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

III - FINAL OPERATION.

❏ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

❏ Refit the engine cover.

M9R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123594

❑ Remove the clip (**1**) from the heater matrix inlet hose using the **(Mot. 1448)**.

❑ Disconnect the heater matrix inlet hose.

123596

❑ Remove the clip (**2**) from the radiator bottom hose using the **(Mot. 1448)**.

❑ Disconnect the radiator bottom hose.

123597

❑ Remove the clip (**3**) from the heater matrix outlet hose using the **(Mot. 1448)**.

❑ Disconnect the outlet hose from the heater matrix.

M9R

123598

❑ Move the cooling radiator top hose clip (**4**) to one side using the **(Mot. 1448)**.

❑ Disconnect the cooling radiator top hose.

123599

❑ Remove:

- the water chamber bolts (**5**) ,
- the water chamber,
- the water chamber seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease the water chamber joint face.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Part always to be replaced:

- the water chamber seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new water chamber seal,
- the water chamber,
- the water chamber bolts.

❑ Tighten the water chamber bolts.

❑ Connect the cooling radiator top hose.

❑ Fit the cooling radiator top hose clip using the **(Mot. 1448)**.

❑ Connect the heater matrix outlet hose.

❑ Fit the heater matrix outlet hose clip using the **(Mot. 1448)**.

❑ Connect the radiator bottom hose.

❑ Fit the radiator bottom hose clip using the **(Mot. 1448)**.

❑ Connect the heater matrix inlet hose.

❑ Fit the heater matrix inlet hose clip using the **(Mot. 1448)**.

III - FINAL OPERATION.

❑ Refit:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

M9R

- Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K9K

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123836

❑ Unclip the water chamber hose (**1**) .

❑ Remove the clips (**2**) from the water chamber hoses using the **(Mot. 1448)**.

❑ Disconnect the hoses (**3**) from the water chamber.

123827

❑ Disconnect the coolant temperature sensor connector (**4**) .

❑ Remove:

- the water chamber bolts (**5**) ,
- the water chamber,
- the water chamber seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Clean the pressure face on the cylinder head with **ABRASIVE PADS**.

❑ Degrease the cylinder head pressure face using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and **CLEAN CLOTHS**.

❑ Always replace the water chamber seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the new water chamber seal.
- the water chamber,
- the water chamber bolts,

❑ Tighten the water chamber bolts.

❑ Connect:

- the coolant temperature sensor connector,

K9K

- the water chamber hoses.

❏ Refit the water chamber hose clips using the **(Mot. 1448)**.

❏ Clip the hose onto the water chamber.

III - FINAL OPERATION.

❏ Refit:

- the engine undertray,
- the engine undertray bolts,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine cover.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K4M

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1202-01	Clip pliers for hose clips (large size).
Mot. 1202-02	Clip pliers for hose clips (small size)

Tightening torques ▽	
water chamber bolts (initial torque)	**4 N.m**
water chamber bolts	**12 N.m**
heater matrix hose bracket bolt	**10 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for very cold countries.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

128452

❑ Unclip:

- the engine wiring at (**1**) ,
- the heater matrix hose at (**2**) .

❑ Remove the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

K4M

128454

❑ Using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)** remove:

- the cooling radiator top hose clip (**3**) on the water chamber.
- the heater matrix hose clip (**4**) on the water chamber.

❑ Disconnect from the water chamber:

- the cooling radiator top hose,
- the heater matrix hose.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128455

❑ Remove:

- the bolt (**5**) from the heater matrix hose bracket,
- the heater matrix hose bracket.

128456

❑ Remove:

- the water chamber bolts,
- the water chamber,
- the water chamber seal.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the water chamber seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the cylinder head gasket face,
- the water chamber housing if it is being reused.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the coolant outlet unit with a new gasket.

128456

❑ Pretighten in order and to torque the **water chamber bolts (initial torque) (4 N.m)**.

❑ Torque tighten in order the **water chamber bolts (12 N.m)**.

❑ Refit the heater matrix hose bracket.

❑ Torque tighten the **heater matrix hose bracket bolt (10 N.m)**.

III - FINAL OPERATION.

❑ Refit the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

❑ Connect to the water chamber:

- the heater matrix hose,
- the cooling radiator top hose.

❑ Using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)** fit:

- the heater matrix hose clip,
- the cooling radiator top hose clip.

❑ Clip:

- the engine wiring,
- the heater matrix outlet hose.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
water chamber nuts	**25 N.m**
rigid cooling pipe bolt	**10 N.m**
rigid cooling pipe bolts	**10 N.m**
clip on the throttle valve air inlet pipe	**6 N.m**
air filter unit air outlet pipe clip	**6 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Undo:

- the clip of the air filter unit air outlet pipe,
- the clip of the throttle valve air inlet pipe.

❑ Disconnect the vacuum pipe from the brake servo.

❑ Separate the clip on the oil vapour rebreathing hose using the tool **(Mot. 1448)**.

❑ Disconnect the oil vapour rebreathing hose.

❑ Remove:

- the air outlet pipe of the air filter unit,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

134202

❑ Separate the clip (**1**) on the cooling hose between the water chamber and the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect the cooling hose.

❑ Remove the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

V4Y

134202

❑ Unclip:

- the connector (**2**) from its mounting,
- the wiring (**3**) from its mounting.

❑ Remove:

- the bolts (**4**) from the electrical wiring mounting,
- the electrical wiring mounting.

❑ Remove the bolts (**5**) from the rigid cooling pipe.

❑ Move aside the rigid cooling pipe.

134204

❑ Separate the clips (**6**) on the cooling hoses using the tool **(Mot. 1448)**.

❑ Disconnect the cooling hoses.

119886

❑ Remove the bolt (**7**) from the rigid cooling pipe.

❑ Move aside the rigid cooling pipe.

V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

134536

134537

❑ Remove:

- the water chamber nuts (**8**) ,
- the water chamber,
- the water chamber seals.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Cylinder head coolant outlet unit seal (10,06,01,19)**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the water chamber joint face,
- the cylinder head joint face.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new water chamber seals,
- the water chamber.

❑ Torque tighten the **water chamber nuts (25 N.m)**.

III - FINAL OPERATION

❑ Fit the rigid cooling pipe.

❑ Refit the rigid cooling pipe bolt.

❑ Torque tighten the **rigid cooling pipe bolt (10 N.m)**.

❑ Connect the cooling hose at the rear of the water chamber.

❑ Refit the clip of the cooling hose at the rear of the water chamber using the tool **(Mot. 1448)**.

❑ Refit the rigid cooling pipe bolts.

❑ Torque tighten the **rigid cooling pipe bolts (10 N.m)**.

❑ Connect the cooling hoses on the water chamber.

❑ Position the cooling hose clips on the water chamber using the tool **(Mot. 1448)**.

❑ Refit:

- the electrical wiring mounting,
- the coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-167**) .

❑ Clip:

- the connector to its mounting,

V4Y

- the wiring onto its mounting.

❏ Connect the cooling hose between the water chamber and the cooling radiator.

❏ Fit the cooling hose clip using the tool **(Mot. 1448)**.

❏ Refit the air outlet pipe onto the air filter unit.

❏ Tighten to torque:

- Torque tighten the **clip on the throttle valve air inlet pipe (6 N.m)**,
- the **air filter unit air outlet pipe clip (6 N.m)**.

❏ Connect the brake servo vacuum pipe.

❏ Refit the oil vapour rebreathing hose.

❏ Fit the clip onto the oil vapour rebreathing hose using the tool **(Mot. 1448)**.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the engine undertray,
- the engine cover.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
water chamber bolts	**10 N.m**
air filter box air outlet pipe clips	**6 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

133887

❑ Undo the clips (**1**) for the air filter unit air outlet pipe.

❑ Unclip the vacuum pipes (**2**) of the turbocharger control solenoid valve.

❑ Disconnect the oil vapour rebreathing pipe (**3**) from the air pipe.

❑ Remove the air outlet pipe from the air filter box.

134228

- ❑ Rotate the turbocharger air outlet pipe clip (**4**) .
- ❑ Remove the nut from the turbocharger air outlet pipe.
- ❑ Loosen the clip on the intercooler air inlet pipe.
- ❑ Remove the turbocharger outlet air pipe.

134023

- ❑ Remove the bolt (**5**) from the turbocharger oil pipe.
- ❑ Move aside the turbocharger oil pipe.

137055

- ❑ Disconnect the coolant hose (**6**) from the water chamber inlet.
- ❑ Separate the clip (**7**) of the coolant hose at the water chamber outlet using the tool **(Mot. 1448)**.
- ❑ Disconnect the coolant hose from the water chamber outlet.

137056

- ❑ Separate the clip (**8**) of the coolant hose at the water chamber inlet using the tool **(Mot. 1448)**.
- ❑ Disconnect the coolant hose from the water chamber inlet.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

134023

❑ Remove:

- the water chamber bolts (**9**) ,
- the water chamber,
- the water chamber seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Cylinder head coolant outlet unit seal (10,06,01,19)**.

❑ Always replace the seal for the turbocharger air outlet pipe.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the water chamber joint face,
- the cylinder head joint face.

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

115068

❑ Remove the intercooler air inlet pipe seal on the turbocharger side using a .

115069

❑

> Note:
> Check that the seal of the intercooler air inlet pipe on the turbocharger side is fitted the correct way round.

❑ Fit a new seal to the intercooler air inlet pipe on the turbocharger side.

V9X

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- a new water chamber seal,
- the water chamber.

❏ Torque tighten the **water chamber bolts (10 N.m)**.

III - FINAL OPERATION

❏ Connect the coolant hose to the water chamber inlet.

❏ Fit the coolant hose clip on the water chamber inlet using the tool **(Mot. 1448)**.

❏ Connect the coolant hose at the water chamber outlet.

❏ Fit the coolant hose clip on the water chamber outlet using the tool **(Mot. 1448)**.

❏ Connect the coolant hose to the water chamber inlet.

❏ Fit the turbocharger oil pipe.

❏ Refit:

- the turbocharger oil pipe bolt,
- the turbocharger air outlet pipe.

❏ Tighten the clip on the intercooler air inlet pipe.

❏ Refit the nut for the turbocharger air outlet pipe.

> Note:
>
> The intercooler air inlet pipe is correctly clipped onto the turbocharger if the clip is engaged in the neck of the turbocharger.

❏ Clip the intercooler air inlet pipe on the turbocharger.

❏ Refit the air outlet pipe onto the air filter unit.

❏ Connect the oil vapour rebreathing pipe to the air pipe.

❏ Clip on the vacuum pipes of the turbocharger control solenoid valve.

❏ Torque tighten the **air filter box air outlet pipe clips (6 N.m)**.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Refit:

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

M9R

Equipment required
indelible pencil

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

122371

❑ Remove:

- the cooling assembly protector bolts (**1**) ,
- the cooling assembly protector clips (**2**) ,
- the cooling assembly protector.

> Note:
>
> To remove the clips (**2**) , undo the head of the bolt head on the clip by a quarter of a turn then remove the clip.

❑ Disconnect the motor-driven fan assembly connectors.

❑ Unpick and remove:

- the fan assembly wiring,
- the fan assembly cooling hoses.

> Note:
>
> When disconnecting the top hose, detach the pipe from the retaining bracket on the fan assembly then detach the pipe from the cooling radiator.

❑ Remove the upper deflectors from the upper cross member.

❑ Attach the upper ends of the cooling assembly to the upper cross member with a strap.

❑ Remove:

- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the lower cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure).

❑ Remove the intercooler (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-59**) (MR 415, 12B, Turbocharging).

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑

> Note:
>
> Insert a cardboard protector between the cooling radiator and the fan assembly to protect the cooling radiator vanes.

❑ Detach the fan assembly from the cooling radiator.

❑ Remove the motor-driven fan assembly from underneath the vehicle.

M9R

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

If replacing the fan assembly

❑ Remove:

- the 3 bolts from the used fan assembly propellor,
- the fan assembly propellor,
- the 3 bolts from the fan assembly,
- the engine cooling fan.

❑ Mark the position of the new fan assembly propellor on its shaft using a **indelible pencil**.

❑ Remove:

- the 3 bolts from the new fan assembly propellor,
- the fan assembly propellor.

❑ Fit the new fan assembly.

❑ Tighten the 3 bolts on the new fan assembly.

❑ Fit the new fan assembly propellor by aligning the marks.

❑ Tighten the 3 bolts on the new fan assembly propellor.

❑ Fit a cardboard protector to the cooling radiator.

❑ Refit the fan assembly on the cooling assembly.

> Note:
>
> Always check that the fan assembly is correctly fitted on the cooling assembly.

❑ Remove the cardboard protector.

II - FINAL OPERATION.

❑ Refit the intercooler (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-59**) (MR 415, 12B, Turbocharging).

❑ Refit:

- the lower cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the upper deflectors on the upper cross member.

❑ Remove the radiator mounting straps from the upper cross member.

❑ Connect the motor-driven fan assembly connectors.

❑ Clip:

- the cooling hoses on the fan assembly,
- the fan assembly wiring.

❑ Refit:

- the cooling assembly protector,
- the cooling assembly protector clips,
- the cooling assembly protector bolts,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the upper radiator cover,
- the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
- the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure).

❑ Drain:

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Remove the cooling radiator (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123744

❑ Unclip the engine cooling fan assembly at (**1**) .

❑ Remove:

- the engine cooling fan assembly from the cooling radiator following the direction of the arrow,
- the bolts (**2**) from the « fan - motor » assembly,
- the « fan - motor » assembly from the engine cooling fan assembly base.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the « fan - motor » assembly to the engine cooling fan assembly base.
- the bolts of the « fan - motor » assembly.

❑ Tighten the bolts of the « fan - motor » assembly.

❑ Refit the engine cooling fan assembly to the cooling radiator.

❑ Clip the fan unit onto the cooling radiator.

II - FINAL OPERATION.

❑ Refit the cooling radiator (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-28**) .

F4R

- ❑ Refit:
  - the front end panel (see **Front end panel: Removal - Refitting**) (MR 416, 42A, Upper front structure),
  - the headlights (see **Headlight: Removal - Refitting**) (MR 415, 80B, Headlights),
  - the upper radiator cover,
  - the front bumper (see **Front bumper: Removal - Refitting**) (MR 416, 55A, Exterior protection),
  - the engine undertray,
  - the engine undertray bolts.
- ❑ Tighten the engine undertray bolts.
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).
- ❑ Perform the following operations:
  - fill the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning),
  - fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K4M or M4R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery).

122371

❑ Remove the cooling assembly protector bolts (**1**) .

> Note:
>
> To remove the clips (**2**) , undo the head of the bolt head on the clip by a quarter of a turn then lift it slightly as far as the stop and remove the clip.

❑ Remove:

- the cooling assembly protector clips (**2**) ,
- the cooling assembly protector,
- the engine undertray bolts,
- the engine undertray.

123479

❑ Disconnect the pressure sensor connector (**3**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123467

❑ Disconnect:

- the engine cooling fan assembly connector (**4**) ,
- the engine cooling fan assembly resistor connector (**5**) .

K4M or M4R

123468

- ❑ Unclip the engine cooling fan assembly wiring (**6**) .
- ❑ Move aside the engine cooling fan assembly wiring.
- ❑ Unclip the cooling radiator top and bottom hose (**7**) from the engine cooling fan assembly.

123471

- ❑ Unclip the engine cooling fan assembly from the radiator at (**8**) by pushing it upwards to detach the brackets holding it.
- ❑ Remove the engine cooling fan assembly downwards.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Fit the engine cooling fan assembly:
- ❑ Clip the engine cooling fan assembly to the cooling radiator.
- ❑ Fit the engine cooling fan assembly wiring.
- ❑ Clip the engine cooling fan assembly wiring.
- ❑ Connect:
  - the engine cooling fan assembly connector,
  - the engine cooling fan assembly resistor connector.
- ❑ Clip the cooling radiator top and bottom hose on the engine cooling fan assembly.

II - FINAL OPERATION.

- ❑ Connect the pressure sensor connector.
- ❑ Refit:
  - the engine undertray,
  - the cooling assembly protector,
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery)
  - the engine cover.

K9K

Equipment required
indelible pencil

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove the front engine cover.

❑ Disconnect the engine cooling fan assembly connectors.

123479

❑ Disconnect the connector (**1**) from the air conditioning pressostat.

❑ Unclip:

- the air conditioning pressostat wiring,
- the fan assembly wiring,
- the fan assembly cooling hoses.

❑ Remove:

- the fan assembly wiring,
- the fan assembly cooling hoses.

❑ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),
- the intercooler (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-59**) .

II - REMOVAL OPERATION FOR PART CONCERNED

❑

> Note:
>
> Insert a cardboard protector between the cooling radiator and the fan assembly to protect the cooling radiator vanes.

❑ Unclip the cooling fan assembly from the cooling radiator from beneath the vehicle.

❑ Remove the engine cooling fan assembly from underneath the vehicle.

K9K

REFITTING

I - REFITTING PREPARATIONS OPERATION

1 - Removing the engine cooling fan assembly fan and the engine cooling fan assembly

123603

❑ Mark the position (**2**) of the engine cooling fan assembly fan on its shaft using **indelible pencil**.

123605

❑ Remove:

- the engine cooling fan assembly fan bolts (**3**) ,
- the fan assembly propellor.

123606

❑ Remove:

- the engine cooling fan bolts (**4**) ,
- the engine cooling fan.

2 - Refitting the engine cooling fan assembly and the engine cooling fan assembly fan

123607

❑ Fit the new fan assembly.

❑ Refit the engine cooling fan assembly bolts.

❑ Tighten the engine cooling fan assembly bolts.

K9K

- ❑ Fit the new engine cooling fan assembly fan in relation to the marks made during removal.
- ❑ Refit the bolts on the new fan assembly fan.
- ❑ Tighten the bolts on the new fan assembly fan.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Fit a cardboard protector to the cooling radiator.
- ❑ Fit the engine cooling fan assembly to the cooling assembly.
- ❑ Clip the fan assembly on the cooling assembly.
- ❑ Remove the cardboard protector.

III - FINAL OPERATION.

- ❑ Refit:
  - the intercooler (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-59**) ,
  - the radiator mounting cross member (see **Radiator mounting cross member: Removal - Refitting**) (MR 416, 41A, Front lower structure),
  - the engine undertray,
  - the engine undertray bolts,
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).
- ❑ Clip:
  - the cooling hoses on the fan assembly,
  - the fan assembly wiring,
  - the air conditioning pressostat wiring.
- ❑ Connect:
  - the air conditioning pressostat connector,
  - the fan assembly connectors.
- ❑ Refit the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

123479

❑ Disconnect the pressure sensor connector (**1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

134210

❑ Disconnect the engine cooling fan assembly connectors (**2**) .

V4Y

134541

❑ Remove:

- the cooling radiator top hose clip (**3**) using the tool **(Mot. 1448)**,
- the expansion bottle outlet hose clip (**4**) from the cooling radiator using the tool **(Mot. 1448)**.

❑ Disconnect:

- the cooling radiator top hose,
- the expansion bottle outlet hose from the cooling radiator.

❑ Unclip:

- the engine cooling fan assembly wiring,
- the air conditioning pressure sensor wiring from the fan assembly.

❑ Remove:

- the engine cooling fan assembly wiring,
- the pressure sensor wiring.

❑ Unclip the cooling radiator top and bottom hose from the engine cooling fan assembly.

134210

❑ Unclip the engine cooling fan assembly from the radiator at (**5**) by pushing it upwards to detach the brackets holding it.

❑ Remove the engine cooling fan assembly upwards.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the engine cooling fan assembly:

❑ Clip the engine cooling fan assembly to the cooling radiator.

❑ Fit:

- the engine cooling fan assembly wiring,
- the air conditioning pressure sensor wiring.

❑ Clip:

- the engine cooling fan assembly wiring,
- the air conditioning pressure sensor wiring.

❑ Connect:

- the engine cooling fan assembly connectors,
- the connector of the air conditioning pressure sensor.

❑ Clip the cooling radiator top and bottom hose onto the engine cooling fan assembly.

V4Y

II - FINAL OPERATION

❑ Connect:

- the expansion bottle outlet hose to the cooling radiator,
- the top hose to the cooling radiator.

❑ Fit:

- the expansion bottle outlet hose clip on the cooling radiator using the tool **(Mot. 1448)**,
- the top hose clip on the cooling radiator using the tool **(Mot. 1448)**.

❑ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

V9X

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure).

137901

❑ Unclip the engine cooling fan assembly wiring (**1**) .

❑ Move aside the engine cooling fan assembly wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137900

❑ Disconnect the engine cooling fan assembly connectors (**2**) .

❑ Unclip the engine cooling fan assembly wiring.

❑ Move aside the engine cooling fan assembly wiring.

❑ Unclip the fuel drain pipe (**3**) .

134210

❑ Unclip the engine cooling fan assembly from the radiator at (**4**) by pushing it upwards to detach the brackets holding it.

❑ Remove the engine cooling fan assembly upwards.

V9X

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Fit the engine cooling fan assembly:

❏ Clip the engine cooling fan assembly to the cooling radiator.

❏ Clip on the fuel drain pipe.

❏ Fit the engine cooling fan assembly wiring.

❏ Clip the engine cooling fan assembly wiring.

❏ Connect the engine cooling fan assembly connectors.

II - FINAL OPERATION

❏ Position the wiring on the engine cooling fan assembly.

❏ Clip the wiring onto the engine cooling fan assembly.

❏ Refit:

- the front end panel (see **Front end panel: Removal - Refitting**) (42A, Upper front structure),
- the bonnet catch (see **Bonnet lock: Removal - Refitting**) (52A, Non-side opening element mechanisms),
- the audible warning (see **Audible warning: Removal - Refitting**) (82B, Horn),
- the headlights (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123955

❑ Clamp the heating element unit hoses using tools **(Ms. 583)** (**1**) .

❑ Release the clips (**2**) using the **(Mot. 1448)**.

❑ Disconnect the thermoplunger unit hoses.

123948

❑ Disconnect the connector (**3**) from the thermoplunger unit.

123947

❑ Remove the earth wire nut (**5**) .

❑ Remove the earth wire.

❑ Remove:

- the thermoplunger unit bolts (**6**) ,
- the thermoplunger unit.

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the thermoplunger unit

120769

❑ Remove:

- the nuts (**7**) on the thermoplunger unit wiring,
- the thermoplunger unit wiring.

❑ Fit the heating element unit wiring to the new heating element unit.

❑ Refit the heating element unit wiring nuts.

❑ Tighten the heating element unit wiring nuts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the heating element unit,
- the thermoplunger unit bolts.

❑ Tighten the thermoplunger unit bolts.

❑ Fit the earth wire.

❑ Refit the earth wire nut.

❑ Tighten the earth wire nut.

❑ Connect the thermoplunger unit hoses.

❑ Refit the clips on the heating element unit hoses using tool **(Mot. 1448)**.

❑ Remove the tools **(Ms. 583)**.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

> **WARNING**
> Before bleeding the cooling system, it is essential to deactivate the thermoplungers to avoid irreparably damaging them.

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Connect the thermoplunger unit connector.

III - FINAL OPERATION

❑ Refit:

- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 782

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

144221

❏ Pinch the pipes of the thermoplunger unit using the tools **(Ms. 583)** (**1**) .

❏ Separate the clips (**2**) on the thermoplunger unit pipes using the tool **(Mot. 1448)**.

❏ Disconnect the pipes from the thermoplunger unit.

144220

❏ Disconnect the connector (**3**) from the thermoplunger unit.

144219

❏ Remove:

- the thermoplunger unit bolts (**4**) ,
- the thermoplunger unit.

K9K, and 782

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the thermoplunger unit:

120769

❑ Remove:

- the nuts (**5**) on the thermoplunger unit wiring,
- the thermoplunger unit wiring.

❑ Refit the thermoplunger unit wiring on the new thermoplunger unit.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the thermoplunger unit.

❑ Connect:

- the thermoplunger unit connector,
- the thermoplunger unit pipes.

❑ Position the clips on the thermoplunger unit pipes using the tool **(Mot. 1448)**.

❑ Remove the tools **(Ms. 583)** from the pipes of the thermoplunger unit.

III - FINAL OPERATION

❑ Refit the engine undertray.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

> **WARNING**
> Before bleeding the cooling system, it is essential to deactivate the thermoplungers to avoid irreparably damaging them.

❑ Top up and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant pump inlet pipe: Removal - Refitting

F4R

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
coolant pump inlet pipe offset bolts on the cylinder block	**10 Nm**
coolant pump inlet pipe bracket bolt on the cylinder block	**38 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Perform the following operations:

- drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- drain the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (MR 415, 36B, Power-assisted steering),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning),
- the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-265**) .

II - REMOVAL OPERATION FOR PART CONCERNED

❑ remove the hose clip on the water pump inlet pipe using the **(Mot. 1448)**.

❑ Disconnect the hose from the coolant pump inlet pipe.

121616

❑ Remove:

- the bolt (**1**) from the coolant pump inlet pipe on the cylinder block,

- the coolant pump inlet pipe,
- the coolant pump inlet pipe seal.

121617

❑ Remove:

- the water pump inlet pipe offset bolt (**2**) on the cylinder block,
- the coolant pump inlet pipe offset,
- the coolant pump inlet pipe offset seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to clean and degrease:

- the coolant pump inlet pipe seal mating face if it is being reused,
- the coolant pump inlet pipe seal mating face if it is being reused,
- the cylinder block gasket face.

❑ Always replace:

- the coolant pump inlet pipe seal,
- the coolant pump inlet pipe offset seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the coolant pump inlet pipe offset fitted with a new seal,
- the water pump inlet pipe offset bolt on the cylinder block.

❑ Torque tighten the **coolant pump inlet pipe offset bolts on the cylinder block (10 Nm)**.

❑ Refit:

- the coolant pump inlet pipe fitted with a new seal.
- the coolant pump inlet pipe bracket bolt on the cylinder block.

❑ Torque tighten the **coolant pump inlet pipe bracket bolt on the cylinder block (38 N.m)**.

❑ Connect the hose from the coolant pump inlet pipe.

❑ Fit the hose clip on the water pump inlet pipe using the **(Mot. 1448)**.

III - FINAL OPERATION.

❑ Remove:

- the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-265**) ,
- the air conditioning compressor (see **Compressor: Removal - Refitting**) (MR 415, 62A, Air conditioning),
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the power-assisted steering pump (see **Power-assisted steering pump: Removal - Refitting**) (MR 415, 36B, Power-assisted steering),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-13**) ,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray,
- the engine undertray bolts.

❑ Tighten the engine undertray bolts.

❑ Check that there are no coolant leaks.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R

- ❑ Refit the engine cover.
- ❑ Perform the following operations:
  - fill the refrigerant circuit (see **Refrigerant circuit: Draining - Filling**) (MR 415, 62A, Air conditioning),
  - fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
  - bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant pump inlet pipe: Removal - Refitting

M9R, and 742 or 744 or 746 or 748 or 754

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
coolant pump inlet pipe bolt on the cylinder block	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Unclip the alternator wiring.

123614

❑ Remove the oil filter unit coolant outlet union bolts (**1**) .

123615

❑ Remove:

- the coolant pump inlet pipe bolt (**2**) on the cylinder block,
- the coolant pump inlet pipe with the coolant outlet union.

❑ Remove:

- the clip of the hose between the coolant outlet union and the coolant pump inlet pipe using the tool **(Mot. 1448)**,

M9R, and 742 or 744 or 746 or 748 or 754

- the hose clip between the exhaust gas cooler and the coolant pump inlet pipe using the **(Mot. 1448)**.

❑ Remove:

- the hose between the coolant outlet union and the coolant pump inlet pipe,
- the hose between the exhaust gas cooler and the coolant pump inlet pipe.

❑ Remove the coolant pump inlet pipe seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean and degrease using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) the bearing faces between the coolant outlet union and the oil filter unit.

❑ Parts always to be replaced:

- the coolant pump inlet pipe seal,
- the coolant outlet union seal.

> **WARNING**
> The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Refit:

- a new coolant pump inlet pipe seal,
- the hose between the exhaust gas cooler and the coolant pump inlet pipe,
- the hose between the coolant outlet union and the coolant pump inlet pipe.

❑ Fit:

- the hose clip between the exhaust gas cooler and the coolant pump inlet pipe using the **(Mot. 1448)**,
- the hose clip between the coolant outlet union and the coolant pump inlet pipe using the **(Mot. 1448)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Position the coolant pump inlet pipe.

❑ Refit the coolant pump inlet pipe bolt on the cylinder block.

❑ Torque tighten the **coolant pump inlet pipe bolt on the cylinder block (10 N.m)**.

❑ Refit a new coolant outlet union seal.

❑ Fit the coolant outlet union on the oil filter unit.

❑ Refit the coolant outlet union bolts on the oil filter unit.

❑ Tighten the coolant outlet union bolts on the oil filter unit.

❑ Clip the alternator wiring.

III - FINAL OPERATION

❑ Refit:

- the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant pump inlet pipe: Removal - Refitting

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
coolant pump inlet pipe bolt on the cylinder block	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,
- the exhaust cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Unclip the alternator wiring.

123957

❑ Remove the coolant outlet union bolts (**1**) on the oil filter unit.

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

119637

❑ Remove:

- the coolant pump inlet pipe bolt (**2**) on the cylinder block,
- the coolant pump inlet pipe with the coolant outlet union,
- the coolant pump inlet pipe seal,
- the coolant outlet union seal.

❑ Remove:

- the clip (**3**) of the hose between the exhaust gas intercooler and the coolant pump inlet pipe using the tool **(Mot. 1448)**,
- the clip (**4**) of the hose between the coolant outlet union and the coolant pump inlet pipe at the coolant pump inlet pipe end using the tool **(Mot. 1448)**.

❑ Remove:

- the hose between the exhaust gas cooler and the coolant pump inlet pipe,
- the hose between the coolant outlet union and the coolant pump inlet pipe.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean and degrease using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) the bearing faces between the coolant outlet union and the oil filter unit.

❑ Always replace:

- the coolant pump inlet pipe seal,
- the coolant outlet union seal,
- the EGR rigid pipe.

WARNING
The joint faces must be clean, dry and free from grease (avoid finger marks).

❑ Refit:

- a new coolant pump inlet pipe seal,
- a new coolant outlet union seal,
- the hose between the coolant outlet union and the coolant pump inlet pipe,
- the clip of the hose between the coolant outlet union and the coolant pump inlet pipe using the tool **(Mot. 1448)**,
- the hose between the exhaust gas cooler and the coolant pump inlet pipe,
- the hose clip between the exhaust gas cooler and the coolant pump inlet pipe using the tool **(Mot. 1448)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the coolant pump inlet pipe with the coolant outlet union,
- the coolant pump inlet pipe bolt on the cylinder block.

❑ Torque tighten the **coolant pump inlet pipe bolt on the cylinder block (10 N.m)**.

❑ Fit the coolant outlet union on the oil filter unit.

❑ Refit the coolant outlet union bolts on the oil filter unit.

❑ Tighten the coolant outlet union bolts on the oil filter unit.

❑ Clip the alternator wiring.

III - FINAL OPERATION

❑ Refit:

- the exhaust gas cooler (see **14A**, **Antipollution**, **Exhaust gas cooler: Removal - Refitting**, page **14A-33**) ,
- the starter (see **16A**, **Starting - Charging**, **Starter: Removal - Refitting**, page **16A-31**) ,

M9R, and 800 or 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

- a new rigid exhaust gas recirculation pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the EGR solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-11**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine undertray bolts.

Coolant pump inlet pipe: Removal - Refitting

K4M

Special tooling required	
Mot. 1202-01	Clip pliers for hose clips (large size).
Mot. 1202-02	Clip pliers for hose clips (small size)
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
coolant pump inlet pipe bolts	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

128376

❑ Remove:

- the dipstick (**1**) ,
- the bolts (**2**) from the dipstick tube,
- the dipstick tube.

128377

❑ Remove the clip (**3**) from the heater matrix cooling hose using the tool **(Mot. 1202-01)** or **(Mot. 1202-02)** or **(Mot. 1448)**.

❑ Disconnect the heater matrix cooling hose from the coolant pump inlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128378

❑ Remove:

- the bolts (**4**) from the coolant pump inlet pipe,

K4M

- the coolant pump inlet pipe.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the coolant pump inlet pipe seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the seal housing in the cylinder block,
- the coolant pump inlet pipe seal housing if it is being reused.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the coolant pump inlet pipe fitted with a new seal.

128378

❑ Torque tighten in order the **coolant pump inlet pipe bolts (25 N.m)**.

III - FINAL OPERATION.

❑ Connect the heater matrix cooling hose onto the coolant pump inlet pipe.

❑ Fit the heater matrix cooling hose clip using the tool **(Mot. 1202-01)** or **(Mot. 1202-02)** or **(Mot. 1448)**.

❑ Refit:

- dipstick guide ,
- the dipstick.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refit the engine cover.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant pump inlet pipe: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Remove:

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the lower turbocharger oil supply and return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the front inlet manifold (see **12A**, **Fuel mixture**, **Front inlet distributor: Removal - Refitting**, page **12A-61**) ,
- the rear inlet manifold (see **12A**, **Fuel mixture**, **Rear inlet distributor: Removal - Refitting**, page **12A-68**) .

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

137054

❑ Separate the expansion bottle outlet cooling hose clip (**1**) from the coolant pump inlet pipe using the tool **(Mot. 1448)**.

❑ Disconnect the expansion bottle outlet cooling hose from the coolant pump inlet pipe.

137053

❑ Remove:

- the coolant pump inlet pipe (**2**) ,
- the coolant pump inlet pipe seals.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: seal between coolant pump inlet pipe and coolant pump (10,06,01, 22)**.

❑ **parts always to be replaced: seal between coolant pump inlet pipe and coolant pump inlet union (10,06,01,23)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- new seals on the coolant pump inlet pipe,
- the coolant pump inlet pipe.

❑ Connect the expansion bottle outlet cooling hose to the coolant pump inlet pipe.

❑ Fit the expansion bottle outlet cooling hose clip on the coolant pump inlet pipe using the tool **(Mot. 1448)**.

III - FINAL OPERATION

❑ Refit:

- the rear inlet manifold (see **12A**, **Fuel mixture**, **Rear inlet distributor: Removal - Refitting**, page **12A-68**) ,
- the front inlet manifold (see **12A**, **Fuel mixture**, **Front inlet distributor: Removal - Refitting**, page **12A-61**) ,
- the thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-89**) ,
- the coolant outlet unit (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-100**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-4**) ,
- the lower turbocharger oil supply and return pipe (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-35**) ,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) .

V9X

- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the engine cover.

Expansion bottle: Removal - Refitting

F4R or K4M or K9K or M4R or M9R or V4Y

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1202-01	Clip pliers for hose clips (large size).
Mot. 1202-02	Clip pliers for hose clips (small size)

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

❑ Move the fuel pipes away from the expansion bottle.

K9K or M9R

❑ Separate the manual priming pump from the expansion bottle.

K4M – F4R – V4Y – M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849

128450

❑ Unclip the power-assisted steering reservoir (**1**) .

❑ Move the power-assisted steering reservoir to one side.

F4R or K4M or K9K or M4R or M9R or V4Y

123402

❑ Fit the tool **(Ms. 583)** at (**2**) and (**3**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123402

❑ Using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)** remove:

- the clip (**4**) from the expansion bottle bottom hose,
- the clip (**5**) from the expansion bottle top hose.

❑ Disconnect:

- the expansion bottle bottom hose,
- the expansion bottle top hose.

123402

❑ Remove the bolt (**6**) from the expansion bottle.

123404

❑ Remove the expansion bottle:

- by pulling the expansion bottle towards X.
- lifting the expansion bottle towards Y,

F4R or K4M or K9K or M4R or M9R or V4Y

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the expansion bottle.

❏ Connect:

- the expansion bottle bottom hose,
- the expansion bottle top hose.

❏ Using the **(Mot. 1448)** or **(Mot. 1202-01)** or **(Mot. 1202-02)** fit:

- the expansion bottle bottom hose clip,
- the expansion bottle top hose clip.

II - FINAL OPERATION

❏ Remove the tool **(Ms. 583)**.

K9K or M9R

❏ Fit the manual priming pump on the expansion bottle.

K4M – F4R – M9R, and 800 or 802 or 803 or 805 or 806 or 808 or 809 or 816 or 845 or 849 – V4Y

❏ Fit the power-assisted steering reservoir.

❏ Clip in the power-assisted steering reservoir.

❏ Fit the fuel pipes on the expansion bottle.

❏ Top up the coolant level in the expansion bottle.

❏ Refit the engine cover.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Ms. 583	Pipe clamps.

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

137868

❏ Remove:

- the clips (**1**) from the windscreen washer filler neck,
- the windscreen washer filler neck.

128450

❏ Unclip the power-assisted steering reservoir (**2**) .

❏ Move the power-assisted steering reservoir to one side.

V9X

137869

❑ Remove:

- the bolts (**3**) from the power steering reservoir support,
- the power steering reservoir mounting.

137870

❑ Unclip the fuel pipes (**4**) from the expansion bottle.

❑ Move the fuel pipes away from the expansion bottle.

❑ Unclip the manual priming pump from the expansion bottle at (**5**) .

❑ Remove:

- the manual priming pump from the expansion bottle,
- the expansion bottle top hose clip **(Mot. 1448)** using the tool (**6**) .

❑ Disconnect the expansion bottle top hose.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

137869

❑ Fit the tool **(Ms. 583)** on the bottom cooling hose of the expansion bottle.

❑ Separate the clip (**7**) on the bottom cooling hose of the expansion bottle.

❑ Disconnect the bottom cooling hose from the expansion bottle.

137871

❑ Remove the bolt (**8**) from the expansion bottle.

137872

❑ Remove the expansion bottle:

- by pulling the expansion bottle at (**X**) ,
- by lifting the expansion bottle at (**Y**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the expansion bottle.

❑ Connect the bottom cooling hose to the expansion bottle.

❑ Fit the bottom cooling hose clip using the tool **(Mot. 1448)**.

❑ Remove the tool **(Ms. 583)** from the bottom cooling hose.

II - FINAL OPERATION

❑ Connect the expansion bottle top hose.

❑ Fit:

- the top cooling hose clip using the tool **(Mot. 1448)**,
- the manual priming pump on the expansion bottle.

❑ Clip the manual priming pump onto the expansion bottle.

❑ Fit the fuel pipes on the expansion bottle.

❑ Clip the fuel pipes onto the expansion bottle.

❑ Refit the power-assisted steering reservoir support.

V9X

- ❏ Fit the power-assisted steering reservoir.
- ❏ Clip in the power-assisted steering reservoir.
- ❏ Refit the windscreen washer filler neck.
- ❏ Top up the coolant level in the expansion bottle.
- ❏ Refit the engine cover.

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

123949

❑ Remove:

- the bolts (**1**) from the fuse box,
- the clip (**2**) from the fuse box.

❑ Move the fuse box to one side.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123952

❑ Disconnect the connector (**3**) from the electric coolant pump.

❑ Remove the electric coolant pump mounting bolt (**4**) on the body.

123950

❑ Clamp the hoses (**5**) using tools **(Ms. 583)**.

❑ Separate the hose clips (**6**) from the electric coolant pump hoses using tool **(Mot. 1448)**.

❑ Disconnect the electric coolant pump hoses.

❑ Remove the electric coolant pump with its support

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the electric coolant pump

123951

❑ Remove:

- the clips (**7**) from the electric coolant pump on its support,
- the electric coolant pump.

❑ Refit:

- a new electric coolant pump on its support,
- the new electric coolant pump clips on its mounting.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Connect the electric coolant pump hoses.

❑ Refit the clips on the electric coolant pump hoses using tool **(Mot. 1448)**.

❑ Remove tools **(Ms. 583)** from the electric coolant pump hoses.

❑ Connect the electric coolant pump connector.

III - FINAL OPERATION

❑ Fit the fuse box.

❑ Refit:

- the fuse box clip.
- the fuse box bolt,

❑ Tighten the fuse box bolt.

❑ Refit the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

V9X

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Note:

The electric coolant pump of the turbocharger is located under the max fuse box in the engine compartment.

Note:

The electric coolant pump of the exhaust gas cooler is located in the front left-hand wheel arch.

REMOVING THE TURBOCHARGER ELECTRIC COOLANT PUMP

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

137883

❑ Remove the bolt (**1**) from the max fuse box.

137882

❑ Remove the clip (**2**) from the max fuse box.

❑ Move the max fuse box to one side.

137879

- ❑ Disconnect the connector (**3**) from the gearbox wiring.
- ❑ Unclip the gearbox connector from its support.

137881

- ❑ Unclip the gearbox wiring at (**4**) .
- ❑ Move aside the gearbox wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

- ❑ Fit the tools **(Ms. 583)** on the hoses at the electric coolant pump inlet and outlet.

137880

- ❑ Separate the cooling hose clip (**5**) at the electric coolant pump inlet using the tool **(Mot. 1448)**.
- ❑ Disconnect the cooling hose at the electric coolant pump inlet.
- ❑ Separate the cooling hose clip (**6**) at the electric coolant pump outlet using the tool **(Mot. 1448)**.
- ❑ Disconnect the cooling hose at the electric coolant pump outlet.

137881

- ❑ Disconnect the connector (**7**) from the electric coolant pump.
- ❑ Move aside the electric coolant pump wiring.
- ❑ Unclip the bonnet release cable from the electric coolant pump support.
- ❑ Remove:
  - the electric coolant pump support bolt (**8**) ,
  - the « electric coolant pump - electric coolant pump support » assembly.

138106

- ❑ Remove the clips (**9**) from the electric coolant pump:
  - by pushing the screwdriver at (**X**) ,
  - by pushing the screwdriver at (**Y**) .
- ❑ Remove the electric coolant pump.

REFITTING THE TURBOCHARGER ELECTRIC COOLANT PUMP

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - the electric coolant pump to its mounting,
  - the electric coolant pump clips,
  - the « electric coolant pump - electric coolant pump support » assembly.
- ❑ Clip the bonnet release cable engine onto the electric coolant pump support.
- ❑ Position the electric coolant pump wiring.
- ❑ Connect:
  - the electric coolant pump connector,
  - the cooling hose at the electric coolant pump outlet.
- ❑ Fit the cooling hose clip at the electric coolant pump outlet using the tool **(Mot. 1448)**.
- ❑ Connect the cooling hose at the electric coolant pump inlet.
- ❑ Fit the cooling hose clip at the electric coolant pump inlet using the tool **(Mot. 1448)**.

V9X

- ❑ Remove the tools **(Ms. 583)** from the electric coolant pump inlet and outlet hoses.

II - FINAL OPERATION

- ❑ Position the gearbox wiring.
- ❑ Clip:
  - the gearbox wiring,
  - the gearbox connector on its support.
- ❑ Connect the gearbox wiring connector.
- ❑ Fit the max fuse box.
- ❑ Refit:
  - the max fuse box,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the engine undertray,
  - the engine cover.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

REMOVING THE ELECTRIC COOLANT PUMP FROM THE EXHAUST GAS COOLER

I - REMOVAL PREPARATION OPERATION

- ❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Remove:
  - the engine undertray bolts,
  - the engine undertray,
  - the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

II - OPERATION FOR REMOVAL OF PART CONCERNED

137877

- ❑ Fit the tools **(Ms. 583)** on the cooling hoses at the electric coolant pump inlet and outlet.
- ❑ Separate the cooling hose clip (**10**) at the electric coolant pump outlet using the tool **(Mot. 1448)**.
- ❑ Disconnect the cooling hose at the electric coolant pump outlet.
- ❑ Separate the cooling hose clip (**11**) at the electric coolant pump inlet using the tool **(Mot. 1448)**.
- ❑ Disconnect the cooling hose at the electric coolant pump inlet.

V9X

137876

- ❑ Disconnect the connector (**12**) from the electric coolant pump.
- ❑ Unclip the wiring (**13**) from the pre-postheating unit.
- ❑ Move aside the wiring of the electric coolant pump and of the pre-postheating unit.

137878

- ❑ Remove the pre-postheating unit nut (**14**) .
- ❑ Remove the pre-postheating unit.

137875

- ❑ Remove:
  - the electric coolant pump support bolt (**15**) ,
  - the « electric coolant pump - electric coolant pump support » assembly.

138106

- ❑ Remove the clips (**16**) from the electric coolant pump:
  - by pushing the screwdriver at (**X**) ,
  - by pushing the screwdriver at (**Y**) .
- ❑ Remove the electric coolant pump.

V9X

REFITTING THE ELECTRIC COOLANT PUMP OF THE EXHAUST GAS COOLER

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the electric coolant pump to its mounting,
- the electric coolant pump clips,
- the « electric coolant pump - electric coolant pump support » assembly.

❏ Fit the pre-postheating unit.

❏ Refit the pre-postheating unit.

❏ Position the wiring of the electric coolant pump and of the pre-postheating unit.

❏ Clip on the wiring of the pre-postheating unit.

❏ Connect:

- the electric coolant pump connector,
- the cooling hose at the electric coolant pump inlet.

❏ Fit the cooling hose clip at the electric coolant pump inlet using the tool **(Mot. 1448)**.

❏ Connect the cooling hose at the electric coolant pump outlet.

❏ Fit the cooling hose clip at the electric coolant pump outlet using the tool **(Mot. 1448)**.

❏ Remove the tools **(Ms. 583)** from the electric coolant pump inlet and outlet cooling hoses.

II - FINAL OPERATION

❏ Refit:

- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Bleed the cooling system (see **Cooling system: Bleed**) .

M4R

Tightening torques ▽	
coolant temperature sensor	**25 Nm**

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

II - REMOVAL OPERATION FOR PART CONCERNED

123463

❑ Disconnect the coolant temperature sensor connector (**1**) .

M4R

123464

123462

❑ Remove:

- the coolant temperature sensor using a " **Crowfoot** " type adapter (**2**) ,
- the coolant temperature sensor seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the coolant temperature sensor seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the coolant temperature sensor fitted with a new seal.

❑ Torque tighten the **coolant temperature sensor (25 Nm)**.

❑ Connect the coolant temperature sensor connector.

III - FINAL OPERATION.

❑ Perform the following operations:

- top up of the coolant level,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit the engine cover.

Coolant temperature sensor: Removal - Refitting

F4R

Tightening torques ▽	
coolant temperature sensor	**33 Nm**

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123343

❑ Disconnect the coolant temperature sensor connector (**1**) .

❑ Remove the coolant temperature sensor (**2**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

> Note:
>
> Apply 1 to 2 drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to the coolant temperature sensor thread (only if the sensor is to be reused).

❑ Refit the coolant temperature sensor.

❑ Tighten to torque the **coolant temperature sensor (33 Nm)**.

❑ Connect the coolant temperature sensor connector.

II - FINAL OPERATION.

❑ Perform the following operations:

- fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) ,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

F4R

- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts.
- ❑ Tighten the engine undertray bolts.
- ❑ Refit the engine cover.

M9R

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❏ Remove the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123592

❏ Disconnect the coolant temperature sensor connector (**1**) .

123593

❏ Remove the clip (**2**) from the coolant temperature sensor.

123595

❏ Remove the coolant temperature sensor.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❏ Always replace the temperature sensor seal.

❏ Remove the temperature sensor seal.

❏ Refit the new temperature sensor seal.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the coolant temperature sensor into its housing.
- ❑ Refit the coolant temperature sensor clip.
- ❑ Connect the coolant temperature sensor connector.

III - FINAL OPERATION.

- ❑ Refit the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

K4M

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

REMOVAL

I - REMOVAL PREPARATION OPERATION

128273

❑ Unclip the heater matrix hose (**1**) .

❑ Move the heater matrix hose out of the way.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128274

❑ Disconnect the coolant temperature sensor connector (**2**) .

K4M

128275

❑ Remove:

- the coolant temperature sensor clip (**3**) ,
- the coolant temperature sensor,
- the coolant temperature sensor seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the coolant temperature sensor seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the seal housing in the water chamber,
- the seal mating face of the coolant temperature sensor if reused.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the coolant temperature sensor fitted with a new seal,
- the coolant temperature sensor clip.

❑ Connect the coolant temperature sensor connector.

III - FINAL OPERATION.

❑ Fit the heater matrix hose.

❑ Clip the heater matrix hose.

❑ Perform the following operations:

- top up of the coolant level,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

Coolant temperature sensor: Removal - Refitting

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
coolant temperature sensor	**25 N.m**
clips for the air filter unit air outlet pipe and at the inlet of the throttle valve	**6 N.m**

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

❑ Undo:

- the clip of the air filter unit air outlet pipe,
- the clip of the throttle valve inlet pipe.

❑ Disconnect the vacuum pipe from the brake servo.

❑ Remove the clip from the oil vapour rebreathing pipe using the tool **(Mot. 1448)**.

❑ Disconnect the oil vapour rebreathing pipe.

❑ Remove:

- the air outlet pipe to the air filter unit,
- the engine undertray bolts,
- the engine undertray.

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

134203

❑ Disconnect the coolant temperature sensor connector (**1**) .

❑ Remove:

- the coolant temperature sensor,

- the coolant temperature sensor seal.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑ **parts always to be replaced: coolant temperature sensor seal (10,06,01,18)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal on the coolant temperature sensor,
- the temperature sensor on the coolant outlet unit.

❑ Torque tighten the **coolant temperature sensor (25 N.m)**.

❑ Connect the coolant temperature sensor connector.

III - FINAL OPERATION

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Refit:

- the engine undertray,
- the air outlet pipe of the air filter unit.

❑ Torque tighten the **clips for the air filter unit air outlet pipe and at the inlet of the throttle valve (6 N.m)**.

❑ Connect the oil vapour rebreathing pipe.

❑ Fit the clip onto the oil vapour rebreathing pipe using the **(Mot. 1448)**.

❑ Connect the brake servo vacuum pipe.

❑ Refit the engine cover.

V9X

Tightening torques ▽	
air filter unit air outlet pipe clips	**6 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

133887

❏ Undo the clips (**1**) for the air filter unit air outlet pipe.

❏ Unclip the vacuum pipes (**2**) of the turbocharger control solenoid valve.

❏ Disconnect the oil vapour rebreathing pipe (**3**) from the air pipe.

❏ Remove the air outlet pipe from the air filter box.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

133901

- ❑ Disconnect the coolant temperature sensor connector (**4**) .
- ❑ Remove:
  - the coolant temperature sensor clip,
  - the coolant temperature sensor,
  - the coolant temperature sensor seal.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ **parts always to be replaced: coolant temperature sensor seal (10,06,01,18)**.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit:
  - a new seal on the coolant temperature sensor,
  - the coolant temperature sensor,
  - the coolant temperature sensor clip.
- ❑ Connect the coolant temperature sensor connector.

III - FINAL OPERATION

- ❑ Refit the air outlet pipe onto the air filter unit.
- ❑ Connect the oil vapour rebreathing pipe to the air pipe.
- ❑ Clip on the vacuum pipes of the turbocharger control solenoid valve.
- ❑ Torque tighten the **air filter unit air outlet pipe clips (6 N.m)**.
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

K4M or M4R

122599

(**1**)	Silencer
(**2**)	Expansion chamber
(**3**)	Catalytic converter
(**4**)	Cutting zone between the catalytic converter and the expansion chamber, marked on the pipe by two punch marks

F4R

122601

(**1**)	Silencer
(**2**)	Expansion chamber
(**3**)	Connecting hose of the exhaust pipe
(**4**)	Cutting zone between the connecting hose and the expansion chamber (from 02/04/2008), marked on the pipe by two punch marks
(**5**)	Sound insulations (version with automatic gearbox - panoramic electric sunroof)

Note:

From 02/04/2008, the exhaust pipe is no longer a single unit from the connecting hose to the clamp connection with the silencer.

The cutting zone on the exhaust pipe between the connecting hose and the expansion chamber is provided so that:

- the connecting hose and the expansion chamber can be obtained separately from the Parts Department,
- there is no need to remove the silencer in order to work on the remainder of the exhaust pipe,
- the repair procedure is facilitated by minimizing contacts with the underbody.

V4Y

133612

(**1**)	Front catalytic pre-converter
(**2**)	Rear catalytic pre-converter
(**3**)	Catalytic converters (under body)
(**4**)	Expansion chamber
(**5**)	Silencer

K9K, and 780

122598

(**1**)	Silencer
(**2**)	Cutting zone between the intermediate pipe front section and the intermediate pipe (from 02/04/2008), marked on the pipe by two punch marks
(**3**)	Intermediate pipe front section, with ball joint bracket on the catalytic converter
(**4**)	Intermediate pipe

Note:

From 02/04/2008, the exhaust pipe is no longer a single unit from the ball joint bracket at the catalytic converter outlet to the clamp connection with the silencer.

The cutting zone on the exhaust pipe between the intermediate pipe front section and the intermediate pipe is provided so that:

- there is no need to remove the silencer in order to work on the remainder of the exhaust pipe,
- the repair procedure is facilitated by minimizing contacts with the underbody.

The Parts Department supplies:

- if replacing only the intermediate pipe: an intermediate pipe to be cut for adaptation to the body,
- if replacing the intermediate pipe front section: an intermediate pipe front section and an intermediate pipe assembled together, to be cut in the cutting zone before refitting on the vehicle and to be assembled using an exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

K9K, and 782

144210

(**1**)	Connecting hose of the exhaust pipe
(**2**)	Particle filter
(**3**)	Cutting zone between the particle filter and the intermediate pipe, marked on the pipe by two punch marks
(**4**)	Intermediate pipe
(**5**)	Silencer

The Parts Department supplies:

- if replacing only the intermediate pipe: an intermediate pipe to be cut for adaptation to the body,
- if replacing the intermediate pipe front section: an intermediate pipe front section and an intermediate pipe assembled together, to be cut in the cutting zone before refitting on the vehicle and to be assembled using an exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

M9R, and 742 or 744 or 746 or 748 or 754

122600

(**1**)	Silencer
(**2**)	Connecting hose of the exhaust pipe
(**3**)	Cutting zone between the connecting hose and the intermediate pipe (from 02/04/2008), marked on the pipe by two punch marks
(**4**)	Intermediate pipe

Note:

From 02/04/2008, the exhaust pipe is no longer a single unit from the connecting hose to the clamp connection with the silencer.

A cutting zone on the exhaust pipe between the connecting hose and the intermediate pipe is provided so that:

- there is no need to remove the silencer in order to work on the remainder of the exhaust pipe,
- the repair procedure is facilitated by minimizing contacts with the underbody.

The Parts Department supplies:

- if replacing only the intermediate pipe: an intermediate pipe to be cut for adaptation to the body,
- if replacing the connecting hose: a connecting hose and an intermediate pipe assembled together, to be cut in the cutting zone before refitting on the vehicle and to be assembled using an exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

M9R, and 802 or 805 or 806 or 809 or 816 or 845 or 849

122602

(**1**)	Silencer
(**2**)	Particle filter
(**3**)	Connecting hose of the exhaust pipe
(**4**)	Cutting zone between the particle filter and the intermediate pipe (from 02/04/2008), marked on the pipe by two punch marks
(**5**)	Intermediate pipe

Note:

From 02/04/2008, the exhaust pipe is no longer a single unit from the particle filter to the clamp connection with the silencer.

A cutting zone on the exhaust pipe between the connecting hose and the intermediate pipe is provided so that:

- there is no need to remove the silencer in order to work on the remainder of the exhaust pipe,
- the repair procedure is facilitated by minimizing contacts with the underbody.

The Parts Department supplies:

- if replacing only the intermediate pipe: an intermediate pipe to be cut for adaptation to the body,
- if replacing the particle filter: a particle filter and an intermediate pipe assembled together, to be cut in the cutting zone before refitting on the vehicle and to be assembled using an exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

V9X

137052

(**1**)	Connecting hose of the exhaust pipe
(**2**)	Particle filter
(**3**)	Silencer
(**4**)	Cutting zone between the particle filter and the intermediate pipe (from 02/04/2008), marked on the pipe by two punch marks
(**5**)	Intermediate pipe

Note:

From 02/04/2008, the exhaust pipe is no longer a single unit from the particle filter to the clamp connection with the silencer.

A cutting zone on the exhaust pipe between the connecting hose and the intermediate pipe is provided so that:

- there is no need to remove the silencer in order to work on the remainder of the exhaust pipe,
- the repair procedure is facilitated by minimizing contacts with the underbody.

The Parts Department supplies:

- if replacing only the intermediate pipe: an intermediate pipe to be cut for adaptation to the body,
- if replacing the particle filter: a particle filter and an intermediate pipe assembled together, to be cut in the cutting zone before refitting on the vehicle and to be assembled using an exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

I - PARTS AND CONSUMABLES FOR THE REPAIR

1 - Parts always to be replaced:

- the exhaust sleeve (if fitted)

- the seal or sealing ring on the connection between the catalytic converter or catalytic pre-converter and the rest of the exhaust system

- the exhaust clip(s) (if fitted)

2 - Consumables (see Part number in Technical Note 5068, 04B, Consumables - Products):

- exhaust mastic

- surface cleaner

- abrasive pads

II - ADVICE TO OBSERVE

IMPORTANT
Do not park and run the engine in a place where combustible substances and materials such as grass or leaves can come into contact with the hot exhaust system.

IMPORTANT
Catalytic converters contain ceramic fibres, these are contained within a closed unit, and cannot disperse. Drilling or cutting catalytic converters is prohibited.

1 - During removal and refitting, the catalytic converter or catalytic pre-converter must not receive any knocks or impacts as this could damage it.

2 - The whole exhaust pipe is made of stainless steel.

3 - After working on the bracket between the catalytic converter or catalytic pre-converter and the rest of the exhaust system, ensure that the connection is perfectly sealed.

To do this:

- clean the pressure faces of the connection using the **ABRASIVE PADS**,

- degrease the pressure faces of the connection using **SURFACE CLEANER** and clean cloths,

- always replace the seal or sealing ring on the connection.

III - SPECIAL NOTES ON THE SINGLE UNIT EXHAUST PIPE

1 - Cutting the single unit exhaust pipe

The exhaust pipe is a « single unit type » .

To replace different parts of the exhaust system it must be cut.

To do this be sure to carry out these precautions in the following order:

- correctly identify the area to be cut, as explained below,

- use the cutting tool correctly,

- position the exhaust sleeve correctly.

2 - Identifying the area of the exhaust system to be cut

Two marks made on the exhaust system define the area to be cut (see **Exhaust: Parts and consumables for the repair**) (see MR for vehicle concerned, 19B, Exhaust).

Example of cutting area

99226

100649

Before cutting the exhaust system, draw a line (**D**) between the two marks (**P1**) and (**P2**) .

The distance between the two marks on the exhaust pipe is (**X1**) : **90 mm**.

3 - Operate tool Mot. 1199-01

14747

102118

Fit the (**1**) on the exhaust pipe.

Tighten the two bolts on the tool until they touch the pipe in order to clamp the tool onto the pipe.

Turn the cutting tool using the handle and pressing it against the pipe (as indicated in the diagram above).

Tighten the two bolts on the tool whilst cutting, until the pipe is completely cut.

> Note:
>
> Do not over-tighten the tool onto the pipe to avoid deforming it.

Once the pipe is cut, file and deburr the end of the pipe to be used on the vehicle again.

4 - Positioning the exhaust sleeve

> Note:
>
> Do not reuse an old exhaust sleeve.

Exhaust sleeve with 1 bolt

95478

Exhaust sleeve with 2 bolts

119681

Fit the exhaust sleeve onto the part of the exhaust system fitted to the vehicle.

Position the pipe onto the lugs (**2**) inside the exhaust sleeve.

Tighten the exhaust sleeve bolt(s) slightly (depending on the version).

Position the second part of the exhaust system under the vehicle, fitting it in the exhaust sleeve.

Note:

If necessary, use a workshop jack to lift and hold the heavy and bulky components of the exhaust system.

Position the second exhaust pipe onto the lugs inside the exhaust sleeve.

99227

Check that the two cut marks (**3**) are aligned (if applicable).

Position the sleeve so that there is no risk of contact between its bolt or bolts and the heat shields.

Torque tighten:

- the **exhaust sleeve nut with 1 bolt (25 N.m)** (if fitted),
- the **exhaust sleeve nuts with 2 bolts (18 N.m)** (if fitted).

Check the following and deal with if necessary:

- no underbody contact between the exhaust system and the heat shields,
- all of the heat shields are present and secure.

Note:

Any damaged heat shields must be replaced.

Start the engine.

Check that there are no leaks: deal with any leaks.

Note:

If there are leaks from the **EXHAUST SLEEVES WITH 1 BOLT**, apply **EXHAUST MASTIC** to the sleeve (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

If the application of exhaust mastic does not fix the leak:

- remove and replace the used exhaust sleeve,
- check the condition of the exhaust pipes (condition of the pipe surface, deburring of the area cut, damage to the pipes).
- fit the new sleeve in accordance with the instructions given before.

M9R, and 802 or 805 or 806 or 808 or 809 or 816

Equipment required
roller-type stud removal tool

Tightening torques ▽	
turbocharger studs15	**N.m**
turbocharger heat shield bolts	**7 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the front engine cover.

116412

❑ Detach the wiring (**1**) from the exhaust gas temperature sensor.

❑ Remove the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .

113271

❑ Remove:

- the bolts (**2**) from the turbocharger heat shield,
- the turbocharger heat shield.

Note:
Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the catalytic converter nuts are undone.

❑ Remove:

- the catalytic pre-converter nuts (**3**) on the turbocharger,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray.

M9R, and 802 or 806 or 808 or 816

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❑ Remove the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

M9R, and 802 or 805 or 806 or 808 or 809 or 816

M9R, and 802 or 806 or 808 or 816

❑ Remove the front right-hand driveshaft seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

124146

❑ Remove:

- the connecting hose nuts (**4**) ,
- the catalytic pre-converter studs using a **roller-type stud removal tool**,
- the connecting hose seal,
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124532

❑ Remove:

- the catalytic pre-converter strut bolt (**4**) ,
- the strut nuts (**5**) on the catalytic pre-converter,
- the strut nuts (**6**) on the cylinder block,
- the catalytic pre-converter strut.

113270

❑ Remove:

- the bolts (**7**) from the catalytic pre-converter half-clips,

M9R, and 802 or 805 or 806 or 808 or 809 or 816

- the catalytic pre-converter half-clips (**8**) .

114872

❑ Move the catalytic pre-converter to the right side of the vehicle to access the mounting half-clip bolts on the cylinder block.

❑ Remove:

- the mounting half-clip bolts on the cylinder block,
- the mounting half-clips.

❑ Move the engine towards the front of the vehicle using a lever.

> Note:
>
> This operation requires two people.

❑ Turn the catalytic pre-converter back by **180°** to remove it.

❑ Remove:

- the catalytic pre-converter,
- the catalytic pre-converter seal,
- the turbocharger studs using a **roller-type stud removal tool**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- of the turbocharger,
- on the exhaust pipe,
- of the catalytic pre-converter if reused.

❑ **parts always to be replaced: catalytic converter stud on the turbocharger (if loosened) (10,09,01, 04)**

parts always to be replaced: Catalytic converter nut (10,08,02,16)

parts always to be replaced: seal between turbocharger and catalytic converter (10,09,01,08)

parts always to be replaced: seal between catalytic converter and exhaust downpipe hose (10, 08,02,21)

parts always to be replaced: clip between turbocharger and catalytic converter (10,09,01,10)

parts always to be replaced: exhaust downpipe hose stud on the catalytic converter (if loosened) (10,08,02,15)

❑ Refit new studs on the turbocharger.

❑ Torque tighten the **turbocharger studs15 (N.m)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Move the engine towards the front of the vehicle using a lever.

> Note:
>
> This operation requires two people.

❑ Fit:

- a new catalytic pre-converter seal on the turbocharger,
- the catalytic pre-converter in the engine compartment, inserting the lower section first.

❑ Turn the catalytic pre-converter over once in the engine compartment.

❑ Refit:

- new mounting half-clips,
- the mounting half-clip bolts.

M9R, and 802 or 805 or 806 or 808 or 809 or 816

- ❑ Tighten the mounting half-clip bolts.
- ❑ Fit the catalytic pre-converter on the turbocharger.
- ❑ Refit:
  - new catalytic pre-converter nuts on the turbocharger,
  - the catalytic pre-converter strut,
  - the strut bolt on the catalytic pre-converter,
  - the strut nuts on the cylinder block,
  - the stay nuts on the catalytic pre-converter,
  - new catalytic pre-converter half-clips.
- ❑ Fit the catalytic pre-converter half-clip bolts without tightening them.
- ❑ Tighten the following in order:
  - the catalytic pre-converter nuts on the turbocharger,
  - the strut bolt on the catalytic pre-converter,
  - the strut nuts on the cylinder block,
  - the stay nuts on the catalytic pre-converter,
  - the catalytic pre-converter half-clip bolts.

III - FINAL OPERATION

- ❑ Refit the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .
- ❑ Position the flexible pipe.
- ❑ Refit:
  - a new seal between the connecting hose and the catalytic pre-converter,
  - new catalytic pre-converter studs.
- ❑ Tighten the catalytic pre-converter studs using a **roller-type stud removal tool**.
- ❑ Refit the connecting hose nuts.
- ❑ Tighten the connecting hose nuts on the catalytic pre-converter.

M9R, and 802 or 806 or 808 or 816

- ❑ Refit the front right-hand driveshaft seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).
- ❑ Refit the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (21A, Manual gearbox).

M9R, and 802 or 806 or 808 or 816

- ❑ Fill the gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts,
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the turbocharger heat shield,
  - the turbocharger heat shield bolts.
- ❑ Torque tighten the **turbocharger heat shield bolts (7 N.m)**.
- ❑ Refit the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) .
- ❑ Clip on the exhaust gas temperature sensor wiring.
- ❑ Refit the engine cover.

Catalytic pre-converter: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
new catalytic pre-converter studs on the turbocharger	**21 N.m**
new catalytic pre-converter nuts on the connecting hose	**21 N.m**
exhaust diesel injector cooler nuts	**21 N.m**
catalytic pre-converter studs on the turbocharger	**21 N.m**
studs of the turbocharger heat shield, if they were loosened during the removal operation	**13 N.m**
studs of the catalytic pre-converter stay on the cylinder block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut	**21 N.m**
nuts of the lower stay on the upper bracket	**21 N.m**
nuts of the lower stay on the cylinder block and on the gearbox	**21 N.m**
lower stay nuts on the catalytic pre-converter	**21 N.m**
turbocharger heat shield nuts	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

V9X

134225

- ❑ Remove the clip (**1**) from the turbocharger cooling hose using the **(Mot. 1448)**.
- ❑ Disconnect the turbocharger cooling hose.

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

- ❑ Remove:
  - the nut (**2**) on the turbocharger rigid cooling pipe,
  - the turbocharger heat shield nuts (**3**) .
- ❑ Loosen the nut (**4**) on the turbocharger heat shield.
- ❑ Remove the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

138351

- ❑ Unclip the crankshaft position sensor wiring (**5**) from the catalytic pre-converter lower stay.
- ❑ Remove the nuts (**6**) from the catalytic pre-converter lower stay.

V9X

138360

134229

❑ Remove:

- the catalytic pre-converter lower stay studs (**7**) ,
- the catalytic pre-converter lower stay nuts (**8**) ,
- the catalytic pre-converter strut.

138353

❑ Loosen the nut (**9**) on the catalytic pre-converter upper stay.

❑ Remove the catalytic pre-converter upper stay.

137925

❑ Remove the nut (**10**) on the rigid cooling pipes of the exhaust fuel injector cooler.

❑ Move aside the rigid cooling pipes of the exhaust fuel injector cooler.

V9X

❏ Remove the turbocharger heat shield.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

138352

❏ Remove the catalytic pre-converter nuts (**11**) .

❏ Move aside the catalytic pre-converter.

❏ Remove the catalytic pre-converter seal.

133895

❏ Disconnect the crankshaft position sensor connector (**12**) .

❏ Move the crankshaft position sensor wiring to one side.

137917

❏ Remove the nuts (**13**) of the exhaust fuel injector cooler.

❏ Move aside the exhaust fuel injector cooler.

❏ Remove the seal from the exhaust fuel injector cooler.

V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

133904

❑ Remove the nuts (**14**) from the connecting hose on the catalytic pre-converter.

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the catalytic pre-converter studs to prevent the studs from breaking when the nuts are loosened.

❑ Remove the connecting hose from the catalytic pre-converter.

❑ Remove:

- the catalytic pre-converter seal,
- the catalytic pre-converter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Exhaust fuel injector seal (10,08,02,14)**.

❑ Always replace:

- the seal between the catalytic pre-converter and the flexible pipe,
- the nuts between the catalytic pre-converter and the connecting hose,
- the studs between the catalytic pre-converter and the connecting hose, if they were loosened during removal,
- the seal of the exhaust fuel injector cooler,
- the seal between the catalytic pre-converter and the turbocharger,
- the studs between the turbocharger and the catalytic pre-converter on the turbocharger, if they were loosened during the removal operation,
- the nuts between the turbocharger and the catalytic pre-converter,
- the catalytic pre-converter stay studs,
- the turbocharger heat shield nuts,
- the studs on the heat shield of the turbocharger, if they were loosened during the removal operation.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the joint faces:

- on the catalytic pre-converter if reused,
- on the turbocharger,
- on the connecting hose.

❑ Torque tighten the **new catalytic pre-converter studs on the turbocharger (21 N.m)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the catalytic pre-converter,
- a new catalytic pre-converter seal.

❑ Position the connecting hose on the catalytic pre-converter.

❑ Torque tighten the **new catalytic pre-converter nuts on the connecting hose (21 N.m)**.

III - FINAL OPERATION

❑ Refit a new seal on the exhaust fuel injector cooler.

❑ Fit the exhaust fuel injector cooler.

❑ Torque tighten the **exhaust diesel injector cooler nuts (21 N.m)**.

❑ Fit the crankshaft position sensor wiring.

❑ Connect the crankshaft position sensor connector.

❑ Torque tighten the **catalytic pre-converter studs on the turbocharger (21 N.m)**.

V9X

- ❑ Refit a new catalytic pre-converter seal on the turbocharger.
- ❑ Fit the catalytic pre-converter on the turbocharger.
- ❑ Torque tighten the **studs of the turbocharger heat shield, if they were loosened during the removal operation (13 N.m)**.
- ❑ Refit the turbocharger heat shield.
- ❑ Fit the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter and the turbocharger.
- ❑ Refit:
  - the nut of the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter,
  - the catalytic pre-converter upper stay.
- ❑ Without tightening, fit the nut of the catalytic pre-converter upper stay.
- ❑ Refit the catalytic pre-converter lower stay.
- ❑ Without tightening, fit the nuts of the lower stay onto the upper bracket.
- ❑ Torque tighten the **studs of the catalytic pre-converter stay on the cylinder block and on the gearbox (8 N.m)**.
- ❑ Fit without tightening:
  - the nuts of the lower stay on the cylinder block and on the gearbox,
  - the lower stay nuts on the catalytic pre-converter.
- ❑ Tighten to torque:
  - the **catalytic pre-converter upper stay nut (21 N.m)**,
  - the **nuts of the lower stay on the upper bracket (21 N.m)**,
  - the **nuts of the lower stay on the cylinder block and on the gearbox (21 N.m)**,
  - the **lower stay nuts on the catalytic pre-converter (21 N.m)**.
- ❑ Clip the crankshaft position sensor wiring on to the catalytic pre-converter stay.
- ❑ Refit:
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the nut of the rigid cooling pipe on the turbocharger.
- ❑ Torque tighten the **turbocharger heat shield nuts (8 N.m)**.
- ❑ Connect the cooling hose onto the rigid cooling pipe of the turbocharger.
- ❑ Fit the turbocharger cooling hose clip using the **(Mot. 1448)**.
- ❑ Refit:
  - the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray,
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .
- ❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- ❑ Refit the engine cover.

F4R

Special tooling required	
Mot. 1495-01	22 mm socket for removal - refitting of oxygen sensors.

Tightening torques ▽	
catalytic converter upstream strut bolt on the catalytic converter	**11 Nm**
catalytic converter bracket bolt on the catalytic converter	**11 Nm**
lifting bracket bolt	**33 Nm**

IMPORTANT
Catalytic converters contain ceramic fibres; these are contained within a closed unit, and cannot disperse. Cutting or drilling catalytic converters is prohibited.

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the relay bearing bolts,
- the relay bearing.

120208

❑ Remove:

- the bolts (**1**) from the turbocharger heat shield,
- the turbocharger heat shield.

120206

❑ Disconnect the upstream oxygen sensor connector (**2**) .

F4R

123168

❑ Remove the upstream oxygen sensor (**3**) using the **(Mot. 1495-01)**.

❑ Remove:

- the lifting bracket bolt on the timing end,
- the lifting bracket on the timing end,
- the heat shield clips on the bulkhead,
- the heat shield on the bulkhead.

124125

❑ Remove:

- the nuts (**4**) from the exhaust flange,
- the exhaust clamp seal.

II - OPERATION FOR REMOVAL OF PART CONCERNED

21926

❑ Unclip the downstream oxygen sensor wiring (**5**) .

❑ Disconnect the downstream oxygen sensor connector.

❑ Remove:

- the bolt (**6**) securing the catalytic converter bracket on the catalytic converter,
- the bolt (**7**) securing the upstream strut of the catalytic converter on the catalytic converter,
- the bolt (**8**) securing the downstream strut of the catalytic converter on the catalytic converter,
- the nut (**9**) securing the catalytic converter downstream strut on the gearbox,
- the catalytic converter downstream strut.

❑ Remove:

- the catalytic converter elbow nuts (**10**) ,
- the catalytic converter,
- the seal between the catalytic converter and the turbocharger,
- on the workbench, the downstream oxygen sensor using tool **(Mot. 1495-01)**.

F4R

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace:

- the exhaust bracket seal,
- the seal between the catalytic converter and the turbocharger,
- the studs if they have been undone.

> **WARNING**
> All damaged heat shields must be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the studs,
- the downstream oxygen sensor,
- the new seal between the catalytic converter and the turbocharger,
- the catalytic converter,
- the catalytic converter elbow nuts,
- the catalytic converter downstream strut,
- the catalytic converter downstream strut nut on the gearbox,
- the catalytic converter downstream strut bolt on the catalytic converter,
- the catalytic converter upstream strut bolt on the catalytic converter,
- the catalytic converter bracket bolt on the catalytic converter.

❏ Tighten the catalytic converter nuts.

❏ Tighten to torque:

- the **catalytic converter upstream strut bolt on the catalytic converter (11 Nm)**,
- the **catalytic converter bracket bolt on the catalytic converter (11 Nm)**.

❏ Connect the downstream oxygen sensor connector.

❏ Attach the downstream oxygen sensor wiring.

III - FINAL OPERATION.

❏ Refit:

- the new exhaust bracket seal,
- exhaust bracket nuts .

❏ Refit:

- the heat shield on the bulkhead,
- the heat shield clips on the bulkhead,
- the lifting bracket,
- the lifting bracket bolt,

❏ Torque tighten the **lifting bracket bolt (33 Nm)**.

❏ Refit:

- the upstream oxygen sensor using the **(Mot. 1495-01)**,
- the turbocharger heat shield,
- the turbocharger heat shield bolts.

❏ Tighten the turbocharger heat shield bolts.

❏ Refit:

- the relay bearing,
- the relay bearing bolts,
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the rear suspended engine mounting (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

❏ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K4M or M4R

Tightening torques ▽	
exhaust flange bolts	**21 Nm**

IMPORTANT
Wear protective gloves during the operation.

Note:

Before carrying out work on the catalytic converter (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- upstream and downstream (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**) oxygen sensors.

❑ Cut the exhaust pipe in the marked cutting zone (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) and (see **Exhaust: Parts and consumables for the repair**) .

II - REMOVAL OPERATION FOR PART CONCERNED

123359

❑ Remove:

- the bolts (**1**) from the exhaust flange,
- the catalytic converter,
- the exhaust flange sealing ring.

IMPORTANT
Catalytic converters contain ceramic fibres; these are contained within a closed unit, and cannot disperse. Cutting or drilling catalytic converters is prohibited.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Use **ABRASIVE PADS** to clean the catalytic converter bearing faces on the exhaust manifold (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

❑ Next, degrease these bearing faces using **SURFACE CLEANER** and clean cloths (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

K4M or M4R

109399

❑ Always replace the exhaust flange sealing ring.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce bend etc.) a heat shield.

All damaged heat shields must be replaced.

❑ Position the after sales sleeve on the catalytic converter (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

IMPORTANT

Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the catalytic converter,
- the exhaust flange bolts.

❑ Torque tighten the **exhaust flange bolts (21 Nm)**.

❑ Tighten the sleeve bolts while guiding the exhaust pipe to ensure correct alignment.

❑ Check:

- that all the exhaust pipe heat shields are in place and properly attached.
- that there is no contact with the underbody,
- that there are no leaks.

III - FINAL OPERATION.

❑ Refit:

- the upstream and downstream oxygen sensors (see **17B**, **Petrol injection**, **Oxygen sensors: Removal - Refitting**, page **17B-17**)
- the engine undertray,
- the engine undertray bolts,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

M9R, and 742 or 744 or 746

Equipment required
roller-type stud removal tool

Tightening torques ▽	
turbocharger studs15	**Nm**
heat shield bolts	**7 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove the front engine cover.

113271

❑ Remove:

- the bolts (**1**) from the turbocharger heat shield,
- the turbocharger heat shield.

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the catalytic converter nuts are loosened.

❑ Remove the catalytic converter nuts (**2**) on the turbocharger.

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray.

❑ Drain the gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).

❑ Remove:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox).

M9R, and 742 or 744 or 746

123570

❑ Remove:

- the connecting hose nuts (**3**) on the catalytic converter,
- the catalytic converter studs using a **roller-type stud removal tool**,
- the seal between the connecting hose and the catalytic converter,
- the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Move aside the connecting hose to facilitate removal of the catalytic converter.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124532

❑ Remove:

- the bolt (**4**) from the catalytic converter strut,
- the strut nuts (**5**) on the catalytic converter,
- the strut nuts (**6**) on the cylinder block,
- the catalytic converter strut.

113270

❑ Remove:

- the catalytic converter half-clip bolts (**7**) ,
- the catalytic converter half-clips (**8**) .

M9R, and 742 or 744 or 746

- ❑ Move aside the catalytic converter to access the half-clip support bolts on the cylinder block.
- ❑ Remove:
  - the mounting half-clip bolts on the cylinder block,
  - the mounting half-clips.
- ❑ Move the engine towards the front of the vehicle.
- ❑ Rotate the catalytic converter by **180°** to remove it.
- ❑

> Note:
> This operation requires two people.

- ❑ Remove:
  - the catalytic converter,
  - the catalytic converter seal,
  - the turbocharger studs using a **roller-type stud removal tool** or using the stud recesses.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products), clean and degrease the bearing faces:
  - on the turbocharger,
  - on the exhaust pipe,
  - of the catalytic converter.
- ❑ Always replace:
  - the turbocharger studs,
  - the catalytic converter nuts,
  - the turbocharger seal,
  - the connecting hose seal,
  - the half-clips,
  - the support clips,
  - the catalytic converter studs.
- ❑ Refit new studs on the turbocharger.
- ❑ Torque tighten the **turbocharger studs15 (Nm)**.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑

> Note:
> This operation requires two people.

- ❑ Fit:
  - the new catalytic converter seal on the turbocharger,
  - the catalytic converter, inserting the lower part first.
- ❑ Rotate the catalytic converter in the engine compartment once in the correct direction.
- ❑ Refit:
  - the mounting half-clips,
  - the half-clip support bolts on the cylinder block.
- ❑ Tighten the mounting half-clip bolts.
- ❑ Position the catalytic converter on the turbocharger.
- ❑ Refit:
  - the catalytic converter nuts on the turbocharger,
  - catalytic converter stay ,
  - the strut nuts on the cylinder block,
  - the strut nuts on the catalytic converter,
  - the strut bolt on the catalytic converter.
- ❑ Tighten:
  - the catalytic converter nuts on the turbocharger,
  - the strut bolt on the catalytic converter,
  - the strut nuts on the catalytic converter,
  - the strut nuts on the cylinder block.

III - FINAL OPERATION

- ❑ Position the flexible pipe.
- ❑ Refit the catalytic converter studs.
- ❑ Tighten the catalytic converter studs using a **roller-type stud removal tool**.
- ❑ Refit:
  - the new seal between the flexible pipe and the catalytic converter,
  - the flexible pipe nuts.
- ❑ Tighten the connecting hose nuts on the catalytic converter.

M9R, and 742 or 744 or 746

- ❑ Refit:
  - the engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
  - the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts).
- ❑ Fill and top up the gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).
- ❑ Refit:
  - the engine undertray,
  - the engine undertray bolts,
  - the turbocharger heat shield,
  - the turbocharger heat shield bolts.
- ❑ Torque tighten the **heat shield bolts (7 Nm)**.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K, and 780

Tightening torques ▽	
lower engine tie-bar bolts	**190 N.m**

Note:

Before carrying out work on the catalytic converter (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

123787

❑ Remove:

- the bolts (**1**) from the lower engine tie-bar,
- the lower engine tie-bar.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123779

❑ Remove the intermediate pipe bolts (**2**) on the catalytic converter.

❑ Remove the intermediate pipe.

K9K, and 780

123816

123815

❑ Remove:

- the catalytic converter downstream strut bolts (**3**) ,
- the catalytic converter downstream strut nut (**4**) ,
- the catalytic converter downstream strut.

❑ Loosen but do not remove the bolt (**5**) from the catalytic converter upstream strut.

❑ Remove:

- the catalytic converter upstream strut bolts (**6**) ,
- the catalytic converter upstream stay,
- the catalytic converter nuts (**7**) ,
- the catalytic converter,
- the catalytic converter exhaust bracket sealing ring (**8**) ,
- the seal between the catalytic converter and the turbocharger.

REFITTING

I - REFITTING PREPARATION OPERATION

109399

❑ Always replace the catalytic converter exhaust bracket sealing ring.

❑ Clean the bearing faces using **ABRASIVE PADS** on:

- the intermediate pipe,
- on the catalytic converter,
- the turbocharger,

❑ Degrease these bearing faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products) and **CLEAN CLOTHS**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the seal between the catalytic converter and the turbocharger,
- the catalytic converter fitted with its new sealing ring.

K9K, and 780

❑ Refit one of the catalytic converter nuts on the turbocharger.

> Note:
>
> Check that there is no contact between the catalytic converter and the turbocharger oil return pipe during the entire catalytic converter tightening operation.

❑ Refit the following in order:

- the catalytic converter upstream strut bolts on the engine,
- the catalytic converter downstream strut bolt and nut on the gearbox,
- the catalytic converter upstream strut bolts on the catalytic converter,
- the catalytic converter downstream strut bolt on the catalytic converter,
- the catalytic converter nuts on the turbocharger,

❑ Tighten the following in order:

- the catalytic converter upstream strut bolts on the engine,
- the catalytic converter downstream strut bolt and nut on the gearbox,
- the catalytic converter upstream strut bolts on the catalytic converter,
- the catalytic converter downstream strut bolt on the catalytic converter,
- the catalytic converter nuts on the turbocharger,

❑ Refit the exhaust bracket new sealing ring on the catalytic converter.

❑ Fit the intermediate pipe.

❑ Refit the intermediate pipe bolts on the catalytic converter.

❑ Tighten the intermediate pipe bolts on the catalytic converter.

III - FINAL OPERATION.

❑ Refit:

- the lower engine tie-bar,
- the lower engine tie-bar bolts.

❑ Torque tighten the **lower engine tie-bar bolts (190 N.m)**.

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

V4Y

Tightening torques ▽	
nuts between the catalytic pre-converter and the catalytic converter	**21 N.m**
clip between the catalytic pre-converter and the expansion chamber	**21 N.m**

IMPORTANT

Catalytic converters contain ceramic fibres, these are contained within a closed unit, and cannot disperse. Drilling or cutting catalytic converters is prohibited.

IMPORTANT

Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134201

❑ Remove the clip (**1**) between the catalytic converter and the expansion chamber.

❑ Take the catalytic converter out of the expansion chamber.

❑ Remove:

- the nuts (**2**) between the catalytic pre-converter and the catalytic converter,
- the catalytic converter,
- the seals between the catalytic pre-converter and the catalytic converter.

Note:

The bracket between the front catalytic pre-converter and the catalytic converter is located on the right-hand side of the vehicle.

The bracket between the rear catalytic pre-converter and the catalytic converter is located on the left-hand side of the vehicle.

To remove the upper nuts of the catalytic pre-converters on the catalytic converter, pass through the front of the front axle subframe using a **10 mm** socket, a universal joint and a **250 mm** extension piece on the ratchet spanner used.

To remove the lower nuts of the catalytic pre-converters on the catalytic converter, pass through the back of the axle subframe, directly under the nuts, using a **10** open-jawed spanner.

V4Y

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: Catalytic converter clip (10,08,02,17)**.
- Always replace the seals between the catalytic pre-converter and the catalytic converter.
- **parts always to be replaced: Catalytic converter nut (10,08,02,16)**.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the new seals between the catalytic pre-converter and the catalytic converter,
  - the catalytic converter.
- Fit the catalytic converter on the expansion chamber.
- Refit new nuts between the catalytic pre-converter and the catalytic converter.
- Torque tighten the **nuts between the catalytic pre-converter and the catalytic converter (21 N.m)**.
- Refit a new clip between the catalytic pre-converter and the expansion chamber.
- Torque tighten the **clip between the catalytic pre-converter and the expansion chamber (21 N.m)**.

III - FINAL OPERATION

- Refit the engine undertray.
- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 782

139148

- The catalytic converter (**1**) is integrated into the particle filter.
- Replace the "particle filter - catalytic converter - connecting hose" assembly in the event of a catalytic converter fault (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

M4R

Equipment required
component jack

IMPORTANT
Wear heat protective gloves during the operation.

IMPORTANT
Wear protective gloves during the operation.

Note:

Before carrying out work on the expansion chamber (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

II - REMOVAL OPERATION FOR PART CONCERNED

❑ Cut the exhaust pipe in the marked cutting zone (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) and (see **Exhaust: Parts and consumables for the repair**) .

Note:

Place a **component jack** under the expansion chamber to prevent it from falling.

123351

❑ Remove:

- the rear silencer clip (**1**) ,
- the expansion chamber.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑

Note:

Replace the clip between the expansion chamber and the silencer if it is damaged.

WARNING
To prevent the surrounding components from overheating, do not damage (tear, pierce bend etc.) a heat shield. All damaged heat shields must be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the expansion chamber,
- the clip between the expansion chamber and the silencer.

M4R

- Fit a new sleeve between the expansion chamber and the catalytic converter (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

> **WARNING**
>
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

- Tighten the sleeve while supporting the exhaust pipe to ensure they are aligned.

III - FINAL OPERATION.

- Check:
  - that all the exhaust pipe heat shields are in place and properly attached.
  - that there is no contact with the underbody,
  - that there are no leaks.

V4Y

Tightening torques ▽	
clip between the expansion chamber and the rear silencer	**21 N.m**
clip between the catalytic converter and the expansion chamber	**21 N.m**

IMPORTANT
Wear heat protective gloves during the operation.

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

II - OPERATION FOR REMOVAL OF PART CONCERNED

134201

❑ Remove the clip (**1**) between the catalytic converter and the expansion chamber.

134200

❑ Remove the clip (**2**) between the expansion chamber and the rear silencer.

V4Y

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Catalytic converter clip (10,08,02,17)**.

❏ **parts always to be replaced: clip between expansion chamber and silencer (10,08,02,19)**.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the expansion chamber,
- a new clip between the expansion chamber and the rear silencer,
- a new clip between the catalytic converter and the expansion chamber.

❏ Tighten to torque:

- the **clip between the expansion chamber and the rear silencer (21 N.m)**,
- the **clip between the catalytic converter and the expansion chamber (21 N.m)**.

III - FINAL OPERATION

❏ Check:

- that the exhaust system does not touch the heat shield,
- that there are no leaks.

K4M

Equipment required
component jack

IMPORTANT
Wear heat protective gloves during the operation.

Note:
Before working on the expansion chamber (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Cut the exhaust pipe in the marked cutting zone (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) and (see **Exhaust: Parts and consumables for the repair**) .

Note:
Place a **component jack** under the expansion chamber to prevent it from falling.

123351

❑ Remove:

- the rear silencer clip (**1**) ,
- the expansion chamber.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: clip between expansion chamber and silencer (10,08,02,19)**.

WARNING
To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the expansion chamber,
- a new clip between the expansion chamber and the silencer.

K4M

- Fit a new sleeve between the expansion chamber and the catalytic converter (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

> **IMPORTANT**
>
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

- Tighten the sleeve while supporting the exhaust pipe to ensure they are aligned.

III - FINAL OPERATION

- Check:
  - that all the exhaust pipe heat shields are in place and properly attached.
  - that there is no contact with the underbody,
  - that there are no leaks.

F4R

Tightening torques ▽	
exhaust clamp between the expansion chamber and the silencer	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- **see Exhaust: Precautions for repair** (19B, Exhaust),
- **see Vehicle: Precautions for repair** (01D, Mechanical introduction).

REMOVAL

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) .

❑ Place a component jack under the expansion chamber.

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑

Note:

The connecting hose is integrated with the expansion chamber.

124125

❑ Remove:

- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) ,
- the engine undertray,
- the connecting hose nuts (**1**) on the catalytic converter,
- the bolt of the connecting hose suspension stud on the front axle subframe,
- the connecting hose - expansion chamber assembly,
- the connecting hose seal on the catalytic converter, then discard it.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑ Loosen the retaining clip bolts for the sound insulation between the connecting hose and the expansion chamber.

❑ Remove the four sound insulations.

❑ Separate the clips to facilitate access to the cutting zone between the connecting hose and the expansion chamber.

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the connecting hose and the expansion chamber, in

F4R

the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

123351

❑ Remove:

- the exhaust clamp (**2**) between the expansion chamber and the silencer,
- the expansion chamber.

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑ Retrieve the retaining clips for the sound insulation between the connecting hose and the expansion chamber on the connecting hose.

REFITTING

❑ Parts always to be replaced:

- the connecting hose seal on the catalytic converter (for vehicles produced before 02/04/2008)
- the exhaust clamp between the expansion chamber and the silencer

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑ Clean the bearing faces of the connecting hose and the catalytic converter using **abrasive pads** (see **Vehicle: Parts and consumables for the repair**) .

❑ Afterwards, degrease these bearing faces using **surface cleaner** (see **Vehicle: Parts and consumables for the repair**) and clean cloths.

❑ Fit:

- a new connecting hose seal on the catalytic converter,
- the connecting hose - expansion chamber assembly, using a component jack.

❑ Tighten the connecting hose nuts on the catalytic converter.

❑ Refit the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

❑ Tighten the bolt of the connecting hose suspension stud on the front axle subframe.

❑ Refit the engine undertray.

❑ Lower the vehicle on the lift.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑ Fit two retaining clips for the sound insulation between the connecting hose and the expansion chamber on the connecting house

❑ Refit the expansion chamber using a component jack.

❑ Fit a new exhaust clamp between the expansion chamber and the silencer.

❑ Fit without tightening the exhaust clamp between the expansion chamber and the silencer to keep the expansion chamber on the silencer.

❑ Fit a new exhaust sleeve between the connecting hose and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

❑ Adjust the expansion chamber in relation to the silencer in order to prevent leaks from the connection.

❑ Torque tighten the **exhaust clamp between the expansion chamber and the silencer (21 N.m)**.

F4R

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❏

Note:

Because the exhaust sleeve serves as sound insulation, only two of the four original sound insulations on the vehicle are used afterwards.

Refit two sound insulations on the pipe between the connecting hose and the exhaust sleeve.

❏ Tighten the retaining clip bolts for the sound insulation between the connecting hose and the expansion chamber.

❏ Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

Lower the vehicle on the lift.

K9K

Tightening torques ▽	
exhaust clamp between the intermediate pipe and the silencer	**21 N.m**
exhaust clamp between the intermediate pipe and the silencer	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- **see Exhaust: Precautions for repair** (19B, Exhaust),
- **see Vehicle: Precautions for repair** (01D, Mechanical introduction).

REMOVING THE INTERMEDIATE PIPE

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) .

❑ Place a component jack under the intermediate pipe.

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑

Note:

The intermediate pipe is a single unit from the catalytic converter outlet to the silencer inlet.

123779

❑ Remove:

- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) ,
- the engine undertray,
- the intermediate pipe bolts (**1**) on the catalytic converter,
- the intermediate pipe,
- the sealing ring on the catalytic converter and discard it.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the intermediate pipe front section and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

K9K

123351

❑ Remove:

- the exhaust clamp (**2**) between the intermediate pipe and the silencer,
- the intermediate pipe.

REFITTING THE INTERMEDIATE PIPE

❑ Parts always to be replaced:

- the sealing ring on the catalytic converter (for vehicles produced before 02/04/2008)
- the exhaust clamp between the intermediate pipe and the silencer

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑ Clean the bearing faces of the intermediate pipe and the catalytic converter using **abrasive pads** (see **Vehicle: Parts and consumables for the repair**) .

❑ Afterwards, degrease these bearing faces using **surface cleaner** (see **Vehicle: Parts and consumables for the repair**) and clean cloths.

❑ Fit:

- a new sealing ring on the catalytic converter,
- the intermediate pipe, using a component jack.

❑ Tighten the intermediate pipe bolts on the catalytic converter.

❑ Refit the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

❑ Refit the engine undertray.

❑ Lower the vehicle on the lift.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑ Refit the intermediate pipe, using a component jack.

❑ Fit a new exhaust clamp between the intermediate pipe and the silencer.

❑ Fit without tightening the exhaust clamp between the intermediate pipe and the silencer to keep the intermediate pipe on the silencer.

❑ Fit a new exhaust sleeve between the intermediate pipe front section and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

❑ Adjust the intermediate pipe in relation to the silencer in order to prevent leaks from the connection.

❑ Torque tighten the **exhaust clamp between the intermediate pipe and the silencer (21 N.m)**.

❑ Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

Lower the vehicle on the lift.

REMOVING THE FRONT SECTION OF THE INTERMEDIATE PIPE

❑

> Note:
>
> This method is applicable only to exhaust pipes which have a cutting zone, produced from 02/04/2008.

Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the intermediate pipe front section and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

K9K

123779

❑ Remove:

- the engine undertray,
- the bolts (**3**) of the intermediate pipe front section on the catalytic converter,
- the front section of the intermediate pipe,
- the sealing ring on the catalytic converter and discard it.

REFITTING THE FRONT SECTION OF THE INTERMEDIATE PIPE

❑

> Note:
>
> This method is applicable only to exhaust pipes which have a cutting zone, produced from 02/04/2008.

Parts always to be replaced:

- the sealing ring on the catalytic converter
- the exhaust clamp between the expansion chamber and the silencer

> Note:
>
> The Parts Department supplies the intermediate pipe front section and the intermediate pipe as an integrated assembly provided with a cutting zone.

❑ Cut the new exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the intermediate pipe front section and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

123351

❑ Remove:

- the exhaust clamp (**4**) between the intermediate pipe and the silencer,
- the intermediate pipe.

❑ Fit:

- a new exhaust clamp between the intermediate pipe and the silencer,
- the new intermediate pipe, using a component jack.

❑ Fit without tightening the exhaust clamp between the intermediate pipe and the silencer to keep the intermediate pipe on the silencer.

❑ Refit the intermediate pipe front section, fitted with a new sealing ring, on the catalytic converter.

❑ Tighten the bolts of the intermediate pipe front section on the catalytic converter.

❑ Fit an exhaust sleeve between the intermediate pipe front section and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

❑ Adjust the intermediate pipe in relation to the silencer in order to prevent leaks from the connection.

❑ Torque tighten the **exhaust clamp between the intermediate pipe and the silencer (21 N.m)**.

K9K

- ❑ Refit the engine undertray.
- ❑ Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

  Lower the vehicle on the lift.

M9R

Equipment required
component jack

Tightening torques ▽	
exhaust clamp between the intermediate pipe and the silencer	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

REMOVAL

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Place a **component jack** under the intermediate pipe.

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

❑

Note:

The intermediate pipe is integrated with the particle filter.

❑ Remove the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

M9R, and 742 or 744 or 746 or 748 or 754

123570

❑

Note:

The intermediate pipe is a single unit from the catalytic converter to the silencer.

❑ Remove:

- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) ,
- the engine undertray,
- the connecting hose nuts (**1**) on the catalytic converter,
- the bolt of the connecting hose suspension stud on the front axle subframe,
- the connecting hose - intermediate pipe assembly,
- the connecting hose seal on the catalytic converter, then discard it.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

M9R, and 742 or 744 or 746 or 748 or 754

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the connecting hose and the intermediate pipe, in

M9R

the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the particle filter and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

123351

❑ Remove:

- the exhaust clamp (**2**) between the intermediate pipe and the silencer,
- the connector pipe.

REFITTING

❑ Parts always to be replaced:

- the connecting hose seal on the catalytic converter (for vehicles produced before 02/04/2008)
- the exhaust clamp between the intermediate pipe and the silencer

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

❑ Refit the particle filter - intermediate pipe assembly (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

M9R, and 742 or 744 or 746 or 748 or 754

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces of the connecting hose and the catalytic converter.

❑ Next, degrease these bearing faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and clean cloths.

❑ Fit:

- a new connecting hose seal on the catalytic converter,
- the intermediate pipe, using a component jack.

❑ Tighten the connecting hose nuts on the catalytic converter.

❑ Refit the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

❑ Refit the engine undertray.

❑ Lower the vehicle on the lift.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑

Note:

The new intermediate pipe supplied by the Parts Department must be cut and adapted before being fitted on the vehicle.

M9R

101960

- Measuring from the pipe inlet (**A**) , cut the new intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) at a distance (**X**) of:
  - BTXX and KTXX = **125 mm** (M9R*742,744,746, 748,754),
  - DTXX = **185 mm** (M9R*742,744,746,748,754),
  - BTXX and KTXX = **159 mm** (M9R*800,802,805, 806,809,816,845,849),
  - DTXX = **219 mm** (M9R*800,802,805,806,809,816, 845,849).
- Refit the intermediate pipe on the vehicle, using a component jack.
- Fit a new exhaust clamp between the intermediate pipe and the silencer.
- Fit without tightening the exhaust clamp between the intermediate pipe and the silencer to keep the intermediate pipe on the silencer.

M9R, and 742 or 744 or 746 or 748 or 754

- Fit a new exhaust sleeve between the connecting hose and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

- Fit a new exhaust sleeve between the particle filter and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

- Adjust the intermediate pipe in relation to the silencer in order to prevent leaks from the connection.
- Torque tighten the **exhaust clamp between the intermediate pipe and the silencer (21 N.m)**.
- Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .
- Lower the vehicle on the lift.

V9X

Tightening torques ▽	
exhaust clamp between the intermediate pipe and the silencer	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- **see Exhaust: Precautions for repair** (19B, Exhaust),
- **see Vehicle: Precautions for repair** (01D, Mechanical introduction).

REMOVAL

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) .

❑ Place a component jack under the intermediate pipe.

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the particle filter and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

123351

❑ Remove:

- the exhaust clamp (**1**) between the intermediate pipe and the silencer,
- the intermediate pipe.

REFITTING

❑ Parts always to be replaced: exhaust clamp between the intermediate pipe and the silencer.

❑ Refit the intermediate pipe, using a component jack.

❑ Fit a new exhaust clamp between the intermediate pipe and the silencer.

❑ Fit without tightening the exhaust clamp between the intermediate pipe and the silencer to keep the intermediate pipe on the silencer.

❑ Fit a new exhaust sleeve between the intermediate pipe front section and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

❑ Adjust the intermediate pipe in relation to the silencer in order to prevent leaks from the connection.

❑ Torque tighten the **exhaust clamp between the intermediate pipe and the silencer (21 N.m)**.

❑ Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

Lower the vehicle on the lift.

F4R – V4Y – M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849 – V9X

Special tooling required	
Mot. 1857	Pliers for removing exhaust pipe rubber mounting bushes

Equipment required
component jack
component support

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

IMPORTANT

Wear heat protective gloves during the operation.

WARNING

Mark with a pen the position of the rubber mounting bush mountings on the vehicle body.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

II - OPERATION FOR REMOVAL OF PART CONCERNED

137905

❑ Remove the clip (**1**) between the silencer and the particle filter.

F4R – V4Y – M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849 – V9X

1 - Removal procedure using Mot. 1857

Mot. 1857 tool

133459

123416

- ❑ Place the tool **(Mot. 1857)** on the welded thread (**2**) of the silencer, with the pliers open, with the pushing shaft (**A**) of the tool against the end of the welded thread, and the fork (**B**) of the tool behind the rubber mounting bush.
- ❑ Close the pliers to extract the rubber mounting bush from the welded thread of the silencer.
- ❑ Repeat the same operations on the other rubber mounting bush of the silencer.

F4R – V4Y – M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849 – V9X

2 - Removal procedure without Mot. 1857

137903

137905

❑

Note:

Place a **component jack** under the silencer.

❑ Remove the bolts (**3**) from the silencer supports on the body.

Note:

If the rubber mounting bushes are damaged, mark the position of the support on the body, then replace the « support - rubber mounting bush » assembly.

3 - Silencer removal procedure

137904

137902

❑ Remove:

- the mounting bolts (**4**) of the silencer outlet pipes on the body,
- the silencer.

F4R – V4Y – M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849 – V9X

REFITTING

I - REFITTING PREPARATION OPERATION

If replacing the silencer

❏ Remove:

- the silencer rubber mounting bush support bolts,
- the silencer rubber mounting bush supports.

❏ Refit:

- the new silencer rubber mounting bush supports,
- the new silencer rubber mounting bush support bolts.

❏ Always replace the clip between the intermediate pipe and the silencer.

> **WARNING**
> To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield. Any damaged heat shields must be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

1 - Refitting procedure after removal using Mot. 1857

❏ Check the appearance of the rubber mounting bushes: replace them if necessary (cracks, tears, etc.).

❏ Use **BRAKE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) or a **soapy water** type solution to lubricate the holes in the rubber mounting bushes for the welded threads.

❏ Fit the silencer using the **component support**.

❏ Fit the welded threads of the silencer in the rubber mounting bushes until the conical end piece of the welded threads protrudes from the rubber mounting bushes.

2 - Refitting procedure after removal without Mot. 1857

❏ Fit the silencer using the **component support**.

❏ Tighten the bolts of the silencer supports on the body.

3 - Silencer refitting procedure

❏ Adjust the silencer in relation to the bumper in order to align the two silencer outlet pipes horizontally.

❏ Tighten the mounting bolts of the silencer outlet pipes on the body.

III - FINAL OPERATION

❏ Fit the new silencer exhaust pipe clamp.

❏ Attach the intermediate pipe and the silencer.

> **WARNING**
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

❏ Tighten the silencer exhaust pipe clamp.

❏ Make sure that there is no contact with the underbody.

K4M or K9K or M4R – M9R, and 742 or 744 or 746 or 748 or 754

Equipment required
component support

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123417

❑ Remove:

- the exhaust pipe clamp nut (**1**) ,
- the exhaust pipe clamp bolt (**1**) .

❑ Separate the intermediate pipe and the silencer.

❑ Remove the exhaust pipe clamp from the silencer.

❑ Position a **component support** under the silencer.

1 - Removal procedure using Mot. 1857

Mot. 1857 tool

133459

123416

❑ Place tool Mot. 1857 on the welded thread (**2**) of the silencer, with the pliers open, with the pushing shaft (**A**) of the tool against the end of the welded thread, and the fork (**B**) of the tool behind the rubber mounting bush.

❑ Close the pliers to extract the rubber mounting bush from the welded thread of the silencer.

❑ Repeat the same operations on the other rubber mounting bush of the silencer.

❑ Remove the silencer.

K4M or K9K or M4R – M9R, and 742 or 744 or 746 or 748 or 754

2 - Removal procedure without Mot. 1857

123416

123415

❑ Remove:

- the silencer bolts (**3**) ,
- the silencer using the **component support**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the silencer exhaust pipe clamp.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the silencer using the **component support**.

1 - Refitting procedure after removal using Mot. 1857

❑ Check the appearance of the rubber mounting bushes: replace them if necessary (cracks, tears, etc.).

❑ Use **brake cleaner** or a **soapy water** type solution to lubricate the holes in the rubber mounting bushes for the welded threads.

❑ Fit the silencer using a component jack.

❑ Fit the welded threads of the silencer in the rubber mounting bushes until the conical end piece of the welded threads protrudes from the rubber mounting bushes.

2 - Refitting procedure after removal without Mot. 1857

❑ Refit the silencer bolts.

❑ Tighten the silencer bolts.

III - FINAL OPERATION

❑ Fit the new silencer exhaust pipe clamp.

❑ Attach the intermediate pipe and the silencer.

> **WARNING**
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

❑ Tighten the silencer exhaust pipe clamp.

❑ Make sure that there is no contact with the underbody.

M9R

116419

(**1**)	Flexible pipe
(**2**)	Particle filter
(**3**)	Rubber mounting bush
(**4**)	Particle filter pressure sensor
(**5**)	Upstream pressure measurement tapping
(**6**)	Downstream pressure measurement tapping
(**7**)	Particle filter upstream temperature sensor
(**8**)	Particle filter downstream temperature sensor

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

Equipment required
component jack
Diagnostic tool

Tightening torques ▽	
adapter union of the particle filter downstream temperature sensor	**44 N.m**
particle filter downstream temperature sensor	**30 N.m**
adapter union of the particle filter downstream pressure measurement line	**44 N.m**
particle filter downstream pressure measurement line	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

Note:

Depending on the version, the particle filter may or may not be equipped with a particle filter downstream temperature sensor.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Fit a component jack under the particle filter.

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) (for vehicles produced before 02/04/2008).

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the particle filter and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) (for vehicles produced from 02/04/2008).

II - OPERATION FOR REMOVAL OF PART CONCERNED

124154

❑

Note:

Use an open-jawed spanner to keep the adapter unions in place and do not loosen them. Any adapter union that is loosened must be replaced.

❑ Remove:

- the particle filter downstream pressure measurement line (**1**) from its adapter union (**2**) ,
- the particle filter downstream temperature sensor (**3**) from its adapter union (**4**) (if equipped).

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

124144

❑ Remove the exhaust heat shield clip (**5**) .

❑ Move the exhaust heat shield to one side slightly.

124145

❑ Disconnect the particle filter downstream temperature sensor connector (**6**) .

❑ Unclip the particle filter downstream temperature sensor connector on the exhaust heat shield.

124149

❑ Unclip the downstream pressure measurement line and the downstream exhaust gas temperature sensor (**7**) from the exhaust heat shield.

124155

❑ Disconnect the particle filter upstream temperature sensor connector (**8**) .

❑ Unclip the particle filter upstream temperature sensor connector from its mounting.

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

124156

- ❑ Disconnect the particle filter pressure sensor connector (**9**) .
- ❑ Remove the particle filter pressure sensor nut (**10**) .
- ❑ Move aside the particle filter pressure sensor.
- ❑ Pass the « particle filter downstream pressure measurement line - particle filter downstream temperature sensor - clips» assembly into the engine compartment.

113315

- ❑ Remove the nuts (**11**) from the connecting hose on the catalytic pre-converter.

124147

- ❑ Remove the particle filter bolt (**12**) on the rubber mounting bush.

III - FOR VEHICLES PRODUCED BEFORE 02/04/2008

- ❑ Withdraw the exhaust pipe.
- ❑ Remove the seal between the connecting hose and the catalytic pre-converter.

124148

- ❑ Remove:
  - the particle filter nuts (**13**) from the connecting hose,

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

- the particle filter,
- the seal between the particle filter and the connecting hose,
- the connecting hose with the sensors.

IV - FOR VEHICLES PRODUCED FROM 02/04/2008

❑ Remove:

- the connecting hose - particle filter assembly,
- the seal of the connecting hose on the catalytic pre-converter, then discard it.

> Note:
>
> If replacing the particle filter, remove the connecting hose for re-use (see **19B**, **Exhaust**, **Connecting hose: Removal - Refitting**, page **19B-135**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the seal between the catalytic pre-converter and the connecting hose,
- the seal between the connecting hose and the particle filter,
- the adapter unions of particle filter pressure measurement lines if loosened or when replacing the particle filter,
- the adapter unions of particle filter temperature sensors if loosened or when replacing the particle filter.

> Note:
>
> The Parts Department supplies exhaust pipes with or without a hole for the particle filter downstream temperature sensor. If a vehicle which has an exhaust pipe with a hole for the particle filter downstream temperature sensor is brought into the workshop even though the vehicle is not equipped with this sensor, also order an appropriate exhaust pipe plug (see the spare parts catalogue).

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- between the catalytic pre-converter and the connecting hose,
- between the connecting hose and the particle filter.

II - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑ Fit the connecting hose with the sensors.

❑ Pass the « particle filter downstream pressure measurement line - particle filter downstream temperature sensor - clips » assembly into the engine compartment.

❑ Fit the particle filter using a **component jack**.

❑ Refit:

- a new seal between the particle filter and the connecting hose,
- the particle filter on the connecting hose,
- a new seal between the connecting hose and the catalytic pre-converter,
- the connecting hose on the catalytic pre-converter.

III - FOR VEHICLES PRODUCED FROM 02/04/2008

❑

> Note:
>
> If replacing the particle filter, refit the connecting hose (see **19B**, **Exhaust**, **Connecting hose: Removal - Refitting**, page **19B-135**) .

❑ Refit:

- a new seal between the connecting hose and the particle filter,
- the particle filter, using a component jack.

IV - FINAL OPERATION

❑ Fit the « particle filter downstream pressure measurement line - particle filter downstream temperature sensor - clips » assembly behind the exhaust heat shield.

❑ Clip the particle filter downstream pressure measurement line - particle filter downstream temperature sensor assembly on the exhaust heat shield.

❑ Refit the particle filter pressure sensor on its mounting.

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

- ❑ Connect the particle filter pressure sensor connector.
- ❑ Clip the particle filter upstream temperature sensor connector on its mounting.
- ❑ Connect the particle filter upstream temperature sensor connector.
- ❑ Clip the particle filter downstream temperature sensor connector on the exhaust heat shield.
- ❑ Connect the particle filter downstream temperature sensor connector.
- ❑ Fit the exhaust heat shield.
- ❑ Refit:
  - a clip on the exhaust heat shield,
  - a new adapter union of the particle filter downstream temperature sensor when replacing the particle filter or if the adapter union was loosened.
- ❑ Torque tighten the **adapter union of the particle filter downstream temperature sensor (44 N.m)** (if equipped).
- ❑ Coat the threaded union of the particle filter downstream temperature sensor with **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- ❑ Refit the particle filter downstream temperature sensor (if equipped).

> Note:
>
> Use an open-jawed spanner to keep the adapter unions in place and do not loosen them. Any adapter union that is loosened must be replaced.

- ❑ Torque tighten the **particle filter downstream temperature sensor (30 N.m)**.
- ❑ Refit a new adapter union of the particle filter downstream pressure measurement line when replacing the particle filter or if the adapter union was loosened.
- ❑ Torque tighten the **adapter union of the particle filter downstream pressure measurement line (44 N.m)**.
- ❑ Coat the threaded union of the particle filter downstream pressure measurement line with **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- ❑ Refit the particle filter downstream pressure measurement line.

> Note:
>
> Use an open-jawed spanner to keep the adapter unions in place and do not loosen them. Any adapter union that is loosened must be replaced.

- ❑ Torque tighten the **particle filter downstream pressure measurement line (21 N.m)**.
- ❑ Refit:
  - the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) (for vehicles produced before 02/04/2008),
  - a new exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the particle filter and the intermediate pipe (for vehicles produced from 02/04/2008),
  - the engine undertray.
- ❑ Apply the after repair procedure using the **Diagnostic tool** :
  - connect the **Diagnostic tool**,
  - select « Injection computer » ,
  - go to repair mode,
  - display the « before/after repair procedure » for the computer selected,
  - select « Particle filter » in the « List of components controlled by this computer » section,
  - carry out the operations described in the « After repair procedure » section.

V9X

Special tooling required	
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Equipment required
component jack
Diagnostic tool

Tightening torques ▽	
particle filter temperature sensor	**30 N.m**
particle filter pressure sensor nut	**21 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124144

❑ Remove the exhaust heat shield clip (**1**) .

❑ Move the exhaust heat shield to one side slightly.

V9X

124145

- ❑ Unclip:
  - the particle filter temperature sensor connector from the heat shield,
  - the particle filter temperature sensor wiring from the heat shield.
- ❑ Disconnect the particle filter temperature sensor connector (**2**) .
- ❑ Move aside the particle filter temperature sensor wiring.

137907

- ❑ Remove the bolt (**3**) from the particle filter pressure sensor mounting.
- ❑ Move aside the « support - particle filter pressure sensor » assembly.
- ❑ Disconnect the particle filter pressure sensor connector (**4**) .

V9X

137906

- ❑ Remove the particle filter pressure sensor nut (**5**) .
- ❑ Separate the particle filter pressure sensor from its mounting.
- ❑ Remove the particle filter pressure sensor mounting.
- ❑ Unclip the pressure measurement pipe of the particle filter pressure sensor from the heat shield.
- ❑ Separate the « particle filter pressure measurement pipe - particle filter pressure sensor » assembly.

133904

- ❑ Remove the nuts (**6**) from the connecting hose on the catalytic pre-converter.

Note:

Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) on the studs between the connecting hose and the catalytic pre-converter to avoid breaking the studs while loosening the nuts.

V9X

124147

- ❑ Remove the particle filter bolt (**7**) on the rubber mounting bush.
- ❑ Fit a **component jack** under the particle filter.
- ❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**)
- ❑ Remove:
  - particle filter.
  - the seal between the connecting hose and the catalytic pre-converter,

In the event of replacement

133904

- ❑

> Note:
>
> Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) on the studs between the connecting hose and the particle filter to avoid breaking the studs while loosening the nuts.

- ❑ Remove:
  - the connecting hose nuts (**8**) ,
  - the connecting hose,
  - the seal between the flexible pipe and the particle filter.

133903

❑ Loosen the nut using a « crow foot » type wrench.

❑ Remove the particle filter pressure sensor (**9**) .

133905

❑ Loosen the nut of the particle filter temperature sensor using the tool **(Mot. 1807)**.

❑ Remove the particle filter temperature sensor (**10**) .

❑ Coat the threaded union of the particle filter temperature sensor with **COPPER ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Torque tighten the **particle filter temperature sensor (30 N.m)** using the tool **(Mot. 1807)**.

❑ Coat the threaded union of the particle filter pressure sensor with **COPPER ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Torque tighten the **particle filter pressure sensor nut (21 N.m)** using a « crow foot » type wrench.

❑ Refit:

- new studs on the particle filter, if they were loosened during the removal procedure,
- a new seal between the connecting hose and the particle filter,
- the connecting hose.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the seal between the catalytic pre-converter and the connecting hose,
- the seal between the connecting hose and the particle filter,
- the clip of the exhaust heat shield,
- the nuts between the connecting hose and the catalytic pre-converter,
- the studs between the connecting hose and the catalytic pre-converter, if they were loosened during the removal procedure,
- the nuts between the connecting hose and the particle filter,
- the studs between the connecting hose and the particle filter if they were loosened.

❑ Using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products), clean and degrease the bearing faces of:

- between the catalytic pre-converter and the connecting hose,
- between the connecting hose and the particle filter.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the new seal between the catalytic pre-converter and the connecting hose.

❑ Fit the particle filter using a **component jack**.

V9X

❏ Refit the particle filter on the catalytic pre-converter.

> **IMPORTANT**
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

❏ Fit:

- a new sleeve on the particle filter (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) ,
- the « particle filter pressure measurement pipe - particle filter pressure sensor » assembly.

❏ Clip the pressure measurement pipe of the particle filter pressure sensor onto the heat shield.

❏ Refit the particle filter pressure sensor mounting.

❏ Fit the particle filter pressure sensor on its mounting.

❏ Refit the particle filter pressure sensor on its mounting.

❏ Connect the particle filter pressure sensor connector.

❏ Fit the « mounting - particle filter pressure sensor» assembly.

❏ Refit the particle filter pressure sensor mounting.

❏ Position the particle filter temperature sensor wiring.

❏ Connect the particle filter temperature sensor connector.

❏ Clip:

- the particle filter temperature sensor wiring,
- the particle filter downstream temperature sensor connector on the exhaust heat shield.

❏ Fit the exhaust heat shield.

❏ Refit a new exhaust heat shield clip.

III - FINAL OPERATION

❏ Refit:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the engine undertray.

❏ Apply the after repair procedure using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Particle filter » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

K9K, and 782

Special tooling required	
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Equipment required
component jack

Tightening torques ▽	
exhaust bracket nuts	**21 N.m**
particle filter pressure sensor take-off pipe	**21 N.m**
take-off pipe of the particle filter temperature sensor	**44 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the engine undertray.

144218

❑ Unclip the wiring (**1**) of the particle filter temperature sensor.

❑ Remove the take-off pipe (**2**) from the particle filter temperature sensor using the tool **(Mot. 1807)**.

144217

❑ Remove the take-off pipe (**3**) from the particle filter pressure sensor.

144215

❑ Remove the bolt (**4**) from the particle filter pressure sensor pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) (for vehicles produced from 04/02/2008).

❑ Place a **component jack** under the particle filter.

139188

❑ Remove the nuts (**5**) from the exhaust flange.

144216

❑ Remove:

- the particle filter bolt (**6**) ,
- the particle filter,
- the exhaust flange seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the exhaust flange seal.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the joint face of the turbocharger outlet exhaust gas duct,
- the joint face of the connecting hose in case of re-use.

❑ Coat the take-off pipe of the particle filter pressure and temperature sensor with **COPPER ANTI-SEIZE AGENT** or **COPPER - ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new exhaust flange seal,
- the particle filter,
- the particle filter bolt,

K9K, and 782

- the exhaust flange nuts.

❏ Torque tighten the **exhaust bracket nuts (21 N.m)**.

❏ Fit a new After-Sales sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

> **IMPORTANT**
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

III - FINAL OPERATION

❏ Fit without tightening the take-off pipe of the particle filter pressure sensor.

❏ Refit the bolt of the particle filter pressure sensor pipe.

❏ Torque tighten the **particle filter pressure sensor take-off pipe (21 N.m)**.

❏ Refit the take-off pipe of the particle filter temperature sensor using the tool **(Mot. 1807)**.

❏ Torque tighten the **take-off pipe of the particle filter temperature sensor (44 N.m)** using the tool **(Mot. 1807)**.

❏ Clip on the particle filter temperature sensor wiring.

❏ Refit the engine undertray.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Exhaust gas temperature sensor: Removal - Refitting

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Tightening torques ▽	
exhaust gas temperature sensor	**40 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

116412

❑ Disconnect the exhaust gas temperature sensor connector (**1**) .

❑ Unclip:

- the exhaust gas sensor connector from its mounting.
- the exhaust gas temperature sensor wiring (**2**) on the turbocharger heat shield.

❑ Remove the exhaust gas temperature sensor (**3**) using the tool **(Mot. 1807)**.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the exhaust gas temperature sensor.

❑ Torque tighten the **exhaust gas temperature sensor (40 Nm)** using the **(Mot. 1807)**.

❑ Clip:

- the exhaust gas temperature sensor wiring on the turbocharger heat shield,
- the exhaust gas temperature sensor connector on its mounting.

❑ Connect the exhaust gas temperature sensor connector.

II - FINAL OPERATION.

❑ Refit the engine cover.

Exhaust gas temperature sensor: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Tightening torques ▽	
exhaust gas temperature sensor nut	**32 N.m**
catalytic pre-converter stay studs on the cylinder block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut	**21 N.m**
lower stay nuts on the upper stay	**21 N.m**
lower stay nuts on the cylinder block and on the gearbox	**21 N.m**
lower stay nuts on the catalytic pre-converter	**21 N.m**
turbocharger heat shield nuts	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

134225

❑ Move aside the clip (**1**) of the turbocharger cooling hose using the **(Mot. 1448)**.

❑ Disconnect the turbocharger cooling hose.

Note:
Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

❑ Remove:

- the nut (**2**) on the turbocharger rigid cooling pipe,
- the turbocharger heat shield nuts (**3**) .

❑ Loosen the turbocharger heat shield nut (**4**) .

❑ Remove the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

V9X

138351

- ❑ Unclip the crankshaft position sensor wiring (**5**) from the catalytic pre-converter lower stay.
- ❑ Remove the nuts (**6**) from the catalytic pre-converter lower stay.

138360

134229

- ❑ Remove:
  - the catalytic pre-converter lower stay studs (**7**) ,
  - the catalytic pre-converter lower stay nuts (**8**) ,
  - the catalytic pre-converter lower stay.

V9X

138353

❑ Loosen the nut (**9**) of the catalytic pre-converter upper stay.

❑ Remove the catalytic pre-converter upper stay.

137925

❑ Remove the nut (**10**) of the rigid cooling pipes of the exhaust fuel injector cooler.

❑ Move aside the rigid cooling pipes of the exhaust fuel injector cooler.

❑

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

❑ Remove the turbocharger heat shield.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137915

❑ Disconnect the exhaust gas temperature sensor connector (**11**) .

V9X

137913

❑ Unclip:

- the exhaust gas temperature sensor connector (**12**) from its mounting.
- the wiring (**13**) from the exhaust gas temperature sensor.

❑ Loosen the nut (**14**) of the exhaust gas temperature sensor with the tool **(Mot. 1807)**.

❑ Remove the exhaust gas temperature sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the catalytic pre-converter stay studs,
- the turbocharger heat shield nuts,
- the studs on the heat shield of the turbocharger, if they were loosened during the removal operation.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the exhaust gas temperature sensor.

❑ Torque tighten the **exhaust gas temperature sensor nut (32 N.m)** using the **(Mot. 1807)**.

❑ Clip:

- the wiring of the exhaust gas temperature sensor,
- the exhaust gas temperature sensor connector on its mounting.

❑ Connect the exhaust gas temperature sensor connector.

III - FINAL OPERATION

❑ Refit the turbocharger heat shield.

❑ Fit the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter and the turbocharger.

❑ Refit:

- the nut of the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter,
- the catalytic pre-converter upper stay.

❑ Fit without tightening the nut of the catalytic pre-converter upper stay.

❑ Refit the catalytic pre-converter lower stay.

❑ Fit without tightening the lower stay nuts on the upper stay.

❑ Torque tighten the **catalytic pre-converter stay studs on the cylinder block and on the gearbox (8 N.m)**.

❑ Fit without tightening:

- the lower stay nuts on the cylinder block and on the gearbox,
- the lower stay nuts on the catalytic pre-converter.

❑ Tighten to torque:

- the **catalytic pre-converter upper stay nut (21 N.m)**,
- the **lower stay nuts on the upper stay (21 N.m)**,
- the **lower stay nuts on the cylinder block and on the gearbox (21 N.m)**,
- the **lower stay nuts on the catalytic pre-converter (21 N.m)**.

❑ Clip the crankshaft position sensor wiring onto the catalytic pre-converter stay.

❑ Refit:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the rigid cooling pipe nut on the turbocharger.

❑ Torque tighten the **turbocharger heat shield nuts (8 N.m)**.

❑ Connect the cooling hose to the turbocharger rigid cooling pipe.

❑ Fit the turbocharger cooling hose clip using the **(Mot. 1448)**.

V9X

- Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- Refit the engine cover.

Exhaust gas temperature sensor: Removal - Refitting

K9K, and 782

Special tooling required	
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Tightening torques ▽	
exhaust gas temperature sensor	**32 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) ,
- the engine undertray,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

141363

❑ Remove the exhaust gas temperature sensor (**1**) using the tool **(Mot. 1807)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ If reusing the exhaust gas temperature sensor, coat the exhaust gas temperature sensor threading with **COPPER ANTI-SEIZE AGENT** or **COPPER - ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the exhaust gas temperature sensor.

❑ Torque tighten the **exhaust gas temperature sensor (32 N.m)** using the **(Mot. 1807)**.

III - FINAL OPERATION

❑ Refit:

- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-52**) ,
- the damper valve (see **12A**, **Fuel mixture**, **Damper valve: Removal - Refitting**, page **12A-39**) ,

K9K, and 782

- the exhaust gas pressure sensor (see **19B**, **Exhaust**, **Exhaust gas pressure sensor: Removal - Refitting**, page **19B-93**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-62**) ,
- the exhaust gases duct at the turbocharger outlet (see **Turbocharger outlet exhaust gas duct: Removal - Refitting**) ,
- the engine undertray,
- the exhaust fuel injector cooler (see **19B**, **Exhaust**, **Exhaust fuel injector cooler: Removal - Refitting**, page **19B-125**) .

Exhaust gas pressure sensor: Removal - Refitting

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.

II - OPERATION FOR REMOVAL OF PART CONCERNED

116412

❑ Disconnect the exhaust gas pressure sensor connector (**1**) .

116416

❑ Remove:

- the exhaust gas pressure sensor pipe hollow bolt (**2**) on the turbocharger,
- the exhaust gas pressure sensor bolt (**3**) on the lifting eye,
- the exhaust gas pressure sensor with its pipe.

M9R, and 802 or 805 or 806 or 808 or 809 or 816 or 845 or 849

116417

- ❑ Remove the exhaust gas pressure sensor pipe clip (**4**) using the **(Mot. 1448)**.
- ❑ Remove the exhaust gas pressure sensor clip (**5**) .
- ❑ Disconnect the exhaust gas pressure sensor pipe (**6**) .
- ❑ Remove the exhaust gas pressure sensor from its mounting.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the exhaust gas pressure sensor on its mounting.
- ❑ Connect the exhaust gas pressure sensor pipe.
- ❑ Refit:
  - the exhaust gas pressure sensor clip,
  - the exhaust gas pressure sensor pipe clip using the tool **(Mot. 1448)**.
  - the exhaust gas pressure sensor with its pipe,
  - the exhaust gas pressure sensor bolt on the lifting eye,
  - the exhaust gas pressure sensor hollow bolt on the turbocharger.
- ❑ Tighten the following in order:
  - the exhaust gas pressure sensor bolt on the lifting eye,
  - the exhaust gas pressure sensor hollow bolt on the turbocharger.
- ❑ Connect the exhaust gas pressure sensor connector.

II - FINAL OPERATION.

- ❑ Refit the engine cover.

Exhaust gas pressure sensor: Removal - Refitting

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
exhaust gas pressure sensor nut	**10 N.m**
catalytic pre-converter stay studs on the cylinder block and on the gearbox	**8 N.m**
catalytic pre-converter upper stay nut	**21 N.m**
lower stay nuts on the upper stay	**21 N.m**
lower stay nuts on the cylinder block and on the gearbox	**21 N.m**
lower stay nuts on the catalytic pre-converter	**21 N.m**
turbocharger heat shield nuts	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

134225

❑ Move aside the clip (**1**) of the turbocharger cooling hose using the **(Mot. 1448)**.

❑ Disconnect the turbocharger cooling hose.

Note:
Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the turbocharger studs to prevent the studs from breaking when the nuts are undone.

❑ Remove:

- the nut (**2**) on the turbocharger rigid cooling pipe,
- the turbocharger heat shield nuts (**3**) .

❑ Loosen the turbocharger heat shield nut (**4**) .

❑ Remove the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

V9X

138351

❑ Unclip the crankshaft position sensor wiring (**5**) from the catalytic pre-converter lower stay.

❑ Remove the nuts (**6**) from the catalytic pre-converter lower stay.

138360

134229

❑ Remove:

- the catalytic pre-converter lower stay studs (**7**) ,
- the catalytic pre-converter lower stay nuts (**8**) ,
- the catalytic pre-converter lower stay.

V9X

138353

❑ Loosen the nut (**9**) of the catalytic pre-converter upper stay.

❑ Remove the catalytic pre-converter upper stay.

137925

❑ Remove the nut (**10**) of the rigid cooling pipes of the exhaust fuel injector cooler.

❑ Move aside the rigid cooling pipes of the exhaust fuel injector cooler.

❑

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

❑ Remove the turbocharger heat shield.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137914

❑ Disconnect the exhaust gas pressure sensor connector (**11**) .

V9X

137912

❑ Remove the exhaust gas pressure sensor clip (**12**) .

137911

❑ Unclip the wiring (**13**) of the exhaust gas temperature sensor.

❑ Remove the exhaust gas pressure sensor bolt (**14**) .

❑ Loosen the nut (**15**) on the exhaust gas pressure sensor using a « crow foot » type wrench.

❑ Remove the exhaust gas pressure sensor.

❑ Separate the exhaust gas pressure sensor clip.

❑ Disconnect the exhaust gas pressure sensor.

❑ Remove the exhaust gas pressure sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the catalytic pre-converter stay studs,
- the turbocharger heat shield nuts,
- the studs on the heat shield of the turbocharger, if they were loosened during the removal operation.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the exhaust gas pressure sensor.

❑ Connect the exhaust gas pressure sensor.

❑ Fit the exhaust gas pressure sensor clip.

❑ Refit:

- the exhaust gas pressure sensor,
- the exhaust gas pressure sensor clip.

❑ Fit the exhaust gas pressure sensor nut without tightening it.

❑ Refit the exhaust gas pressure sensor bolt.

❑ Torque tighten the **exhaust gas pressure sensor nut (10 N.m)** using a « crow foot » type wrench.

❑ Clip on the exhaust gas temperature sensor wiring.

❑ Connect the exhaust gas pressure sensor connector.

III - FINAL OPERATION

❑ Refit the turbocharger heat shield.

❑ Fit the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter and the turbocharger.

❑ Refit:

- the nut of the rigid cooling pipes of the exhaust fuel injector cooler on the catalytic pre-converter,
- the catalytic pre-converter upper stay.

❑ Fit without tightening the nut of the catalytic pre-converter upper stay.

❑ Refit the catalytic pre-converter lower stay.

❑ Fit without tightening the lower stay nuts on the upper stay.

❑ Torque tighten the **catalytic pre-converter stay studs on the cylinder block and on the gearbox (8 N.m)**.

V9X

- Fit without tightening:
  - the lower stay nuts on the cylinder block and on the gearbox,
  - the lower stay nuts on the catalytic pre-converter.
- Tighten to torque:
  - the **catalytic pre-converter upper stay nut (21 N.m)**,
  - the **lower stay nuts on the upper stay (21 N.m)**,
  - the **lower stay nuts on the cylinder block and on the gearbox (21 N.m)**,
  - the **lower stay nuts on the catalytic pre-converter (21 N.m)**.
- Clip the crankshaft position sensor wiring onto the catalytic pre-converter stay.
- Refit:
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the rigid cooling pipe nut on the turbocharger.
- Torque tighten the **turbocharger heat shield nuts (8 N.m)**.
- Connect the cooling hose to the turbocharger rigid cooling pipe.
- Fit the turbocharger cooling hose clip using the **(Mot. 1448)**.
- Refit:
  - the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .
- Refit the engine cover.

K9K, and 782

Tightening torques ▽	
exhaust gas pressure sensor hollow bolt	**32 N.m**
turbocharger air inlet pipe bolts on the turbocharger	**8 N.m**
nut of the turbocharger air inlet pipe on the exhaust gas recirculation assembly	**8 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

143758

❑ Unclip the air flowmeter wiring (**1**) on the air filter unit air outlet pipe.

❑ Loosen the clips (**2**) of the air filter unit air outlet pipe.

❑ Remove the air filter unit air outlet pipe.

138392

❑ Unclip the control pipe (**3**) of the turbocharging pressure regulation valve from the turbocharger air inlet pipe.

138391

❑ Disconnect the oil vapour rebreathing union (**4**) from the rocker cover.

K9K, and 782

139155

❑ Remove:

- the nut (**5**) of the turbocharger air inlet pipe on the exhaust gas recirculation assembly,
- the engine undertray.

139154

❑ Remove:

- the turbocharger air inlet pipe bolts (**6**) on the turbocharger,
- the turbocharger air inlet pipe,
- the turbocharger air inlet pipe seal.

II - OPERATION FOR REMOVAL OF PART CONCERNED

138422

❑ Disconnect the exhaust gas pressure sensor connector (**7**) .

139201

❑ Remove the exhaust gas pressure sensor clip (**8**) .

K9K, and 782

139202

❑ Remove:

- the exhaust gas pressure sensor hollow bolt (**9**) ,
- the exhaust gas pressure sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the exhaust gas pressure sensor clip,
- the turbocharger air inlet pipe seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the exhaust gas pressure sensor.

❑ Refit:

- the hollow bolt of the exhaust gas pressure sensor,
- a new clip for the exhaust gas pressure sensor.

❑ Torque tighten the **exhaust gas pressure sensor hollow bolt (32 N.m)**.

❑ Connect the exhaust gas pressure sensor connector.

III - FINAL OPERATION

❑ Refit:

- the new seal of the turbocharger air inlet pipe.
- the turbocharger air inlet pipe.

❑ Torque tighten:

- the **turbocharger air inlet pipe bolts on the turbocharger (8 N.m)**,
- the **nut of the turbocharger air inlet pipe on the exhaust gas recirculation assembly (8 N.m)**.

❑ Refit the engine undertray.

❑ Connect the oil vapour rebreathing union to the rocker cover.

❑ Clip the control pipe of the turbocharging pressure regulation valve onto the turbocharger air inlet pipe.

❑ Refit the air filter unit air outlet pipe.

❑ Clip the air flowmeter wiring onto the air filter unit air outlet pipe.

M9R

Tightening torques ▽	
particle filter upstream pressure measurement connection adapter union	**44 Nm**
particle filter upstream pressure measurement connection	**21 Nm**
particle filter upstream pressure measurement connection	**21 Nm**

WARNING
The pressure measurement circuit must never be opened except at the adapters on the exhaust pipe.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124150

❑ Detach the particle filter downstream temperature sensor (**1**) from the particle filter downstream pressure measurement connection.

M9R

124153

❑

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any loosened adapter union must be replaced.

❑ Remove:

- the particle filter upstream pressure measurement connection (**2**) from its adapter union,
- the particle filter pressure sensor with its two pipes.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑

> **WARNING**
>
> Never separate the pressure measurement pipes from the particle filter pressure sensor.
>
> Replace the «sensor - pipes - end piece» assembly, if necessary, supplied as a unit by the Parts Department.

❑ Always replace the particle filter pressure measurement connection adapter unions if they have been loosened.

❑ Refit a new particle filter upstream pressure measurement connection adapter union if the adapter union has been loosened.

❑ Torque tighten the **particle filter upstream pressure measurement connection adapter union (44 Nm)** if it has been replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Coat the particle filter upstream pressure measurement connection screw union with **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

1 - With adapter replacement

121884

❑ Refit the particle filter upstream pressure measurement connection on its screw adapter to the exhaust pipe, with the rigid section at an angle (**3**) of **+3°** in relation to the exhaust pipe.

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any loosened adapter union must be replaced.

❑ Torque tighten the **particle filter upstream pressure measurement connection (21 Nm)**.

❑ Clip the particle filter downstream temperature sensor onto the particle filter downstream pressure measurement connection, respecting the colour coding on the wiring.

M9R

2 - Without adapter replacement

124153

❑ Refit the particle filter upstream pressure measurement connection on its screw adapter to the exhaust pipe, positioning it in the groove on the indexing bracket (**4**) .

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any loosened adapter union must be replaced.

❑ Torque tighten the **particle filter upstream pressure measurement connection (21 Nm)**.

❑ Clip the particle filter downstream temperature sensor onto the particle filter downstream pressure measurement connection, respecting the colour coding on the wiring.

III - FINAL OPERATION.

❑ Refit:

- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
- the engine undertray,
- the engine undertray bolts.

V9X

Tightening torques ▽	
particle filter pressure sensor nut	**21 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

137907

❑ Remove the bolt (**1**) from the particle filter pressure sensor mounting.

❑ Move aside the « support - particle filter pressure sensor » assembly.

❑ Disconnect the particle filter pressure sensor connector (**2**) .

V9X

137906

- ❑ Remove the particle filter pressure sensor nut (**3**) .
- ❑ Separate the particle filter pressure sensor from its mounting.
- ❑ Remove the particle filter pressure sensor mounting.
- ❑ Unclip the pressure measurement pipe of the particle filter pressure sensor from the heat shield.
- ❑ Separate the « particle filter pressure measurement pipe - particle filter pressure sensor » assembly.

133903

- ❑ Loosen the nut (**4**) using a «crow foot» type wrench.
- ❑ Remove the particle filter pressure sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> Never separate the pressure measurement pipes from the particle filter pressure sensor.
>
> Replace the «sensor - pipes - end piece» assembly, if necessary, supplied as a unit by the Parts Department.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the particle filter pressure sensor.
- ❑ Coat the threaded union of the particle filter pressure sensor with **COPPER ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- ❑ Torque tighten the **particle filter pressure sensor nut (21 N.m)** using a « crow foot » type wrench.
- ❑ Fit the « particle filter pressure measurement pipe - particle filter pressure sensor » assembly.
- ❑ Clip the pressure measurement pipe of the particle filter pressure sensor onto the heat shield.
- ❑ Refit the particle filter pressure sensor mounting.
- ❑ Fit the particle filter pressure sensor on its mounting.
- ❑ Refit the particle filter pressure sensor on its mounting.
- ❑ Connect the particle filter pressure sensor connector.
- ❑ Fit the « mounting - particle filter pressure sensor » assembly.
- ❑ Refit the particle filter pressure sensor mounting.

III - FINAL OPERATION

❑ Refit:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the engine undertray.

V9X

K9K, and 782

Tightening torques ▽	
particle filter pressure sensor take-off pipe	**21 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

144217

❑ Remove the take-off pipe (**1**) from the particle filter pressure sensor.

144215

❑ Remove the bolt (**2**) from the particle filter pressure sensor pipe.

144213

❑ Disconnect the particle filter pressure sensor connector (**3**) .

K9K, and 782

144214

❑ Remove:

- the particle filter pressure sensor nut (**4**) ,
- the particle filter pressure sensor:

REFITTING

I - REFITTING PREPARATION OPERATION

❑ If reusing the particle filter pressure sensor, coat the sensor take-off pipe with **COPPER ANTI-SEIZE AGENT** or **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the particle filter pressure sensor.

❑ Connect the particle filter pressure sensor connector.

❑ Fit without tightening the take-off pipe of the particle filter pressure sensor.

❑ Refit the bolt of the particle filter pressure sensor.

❑ Torque tighten the **particle filter pressure sensor take-off pipe (21 N.m)**.

III - FINAL OPERATION

❑ Refit the engine undertray.

M9R

Equipment required
Diagnostic tool

Tightening torques ▽	
particle filter upstream temperature sensor adapter union	**44 N.m**
particle filter upstream temperature sensor	**30 N.m**
particle filter downstream temperature sensor adapter union	**44 N.m**
particle filter downstream temperature sensor	**30 N.m**

REMOVING THE PARTICLE FILTER UPSTREAM TEMPERATURE SENSOR

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

124151

❑

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any adapter union that is loosened must be replaced.

> Note:
>
> The particle filter temperature sensor adapter union is not available separately.
>
> If the sensor is being replaced, also remove the adapter union; if not, separate the sensor from its union, holding the union with a lock wrench.

❑ Remove the particle filter upstream temperature sensor (**1**) .

REFITTING THE PARTICLE FILTER UPSTREAM TEMPERATURE SENSOR

I - REFITTING PREPARATION OPERATION

❑ Torque tighten the **particle filter upstream temperature sensor adapter union (44 N.m)** if it has been replaced.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

❏ Coat the particle filter upstream temperature sensor screw union with **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).

❏ Refit the particle filter upstream temperature sensor.

❏

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any adapter union that is loosened must be replaced.

❏ Torque tighten the **particle filter upstream temperature sensor (30 N.m)**.

III - FINAL OPERATION

❏ Refit:

- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
- the engine undertray,
- the engine undertray bolts.

❏ Check that there are no faults using the **Diagnostic tool**.

REMOVING THE PARTICLE FILTER DOWNSTREAM TEMPERATURE SENSOR

❏

> Note:
>
> Depending on the version, the particle filter may or may not be equipped with a particle filter downstream temperature sensor.

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

124144

❏ Remove the exhaust heat shield retaining clip (**2**) .

❏ Move the exhaust heat shield to one side slightly.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124145

❏ Disconnect the particle filter downstream temperature sensor connector (**3**) .

M9R

124149

❑ Detach the particle filter downstream temperature wiring (**4**) from the exhaust heat shield.

124154

❑

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any adapter union that is loosened must be replaced.

> Note:
>
> The particle filter temperature sensor adapter union is not available separately.
>
> If the sensor is being replaced, also remove the adapter union; if not, separate the sensor from its union, holding the union with a lock wrench.

❑ Remove the particle filter downstream temperature sensor (**5**) .

REFITTING THE PARTICLE FILTER DOWNSTREAM TEMPERATURE SENSOR

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the exhaust heat shield retaining clip,
- the particle filter downstream temperature sensor adapter union if it has been loosened.

❑ Torque tighten the **particle filter downstream temperature sensor adapter union (44 N.m)** if it has been replaced.

M9R

II - REFITTING OPERATION FOR PART CONCERNED

- Coat the particle filter downstream temperature sensor screw union with **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (MR 415, 04B, Consumables - Products).
- Refit the particle filter downstream temperature sensor.
-

> Note:
>
> Use an open-jawed spanner to hold the adapter union in place and prevent it from loosening. Any adapter union that is loosened must be replaced.

- Torque tighten the **particle filter downstream temperature sensor (30 N.m)**.
- Clip the particle filter downstream temperature sensor wiring onto the exhaust heat shield, respecting the colour coding on the wiring.
- Connect the particle filter downstream temperature sensor connector.

III - FINAL OPERATION

- Fit the exhaust heat shield.
- Refit:
  - the new exhaust heat shield retaining clip,
  - the engine undertray,
  - the engine undertray bolts.
- Check that there are no faults using the **Diagnostic tool**.

V9X

Special tooling required	
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Tightening torques ▽	
particle filter temperature sensor	**30 N.m**

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

II - OPERATION FOR REMOVAL OF PART CONCERNED

124144

❑ Remove the exhaust heat shield clip (**1**) .

❑ Move the exhaust heat shield to one side slightly.

124145

❑ Unclip:

- the particle filter temperature sensor connector from the heat shield,
- the particle filter temperature sensor wiring from the heat shield.

❑ Disconnect the particle filter temperature sensor connector (**2**) .

❑ Move aside the particle filter temperature sensor wiring.

V9X

133905

- Loosen the nut of the particle filter temperature sensor using the tool **(Mot. 1807)**.
- Remove the particle filter temperature sensor (**3**) .

REFITTING

REFITTING OPERATION FOR PART CONCERNED

- Coat the threaded union of the particle filter temperature sensor with **COPPER ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- Torque tighten the **particle filter temperature sensor (30 N.m)** using the tool **(Mot. 1807)**.
- Position the particle filter temperature sensor wiring.
- Connect the particle filter temperature sensor connector.
- Clip:
  - the particle filter temperature sensor wiring,
  - the particle filter downstream temperature sensor connector on the exhaust heat shield.
- Fit the exhaust heat shield.
- Refit the clip of the exhaust heat shield.

Particle filter temperature sensors: Removal - Refitting

K9K, and 782

Special tooling required	
Mot. 1807	Spanner for tightening the exhaust gas temperature sensor

Tightening torques ▽	
particle filter temperature sensor	**44 N.m**

IMPORTANT
Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

144213

❑ Disconnect the connector (**1**) from the particle filter temperature sensor.

❑ Unclip the connector of the particle filter sensor.

144218

❑ Unclip the wiring (**2**) of the particle filter temperature sensor.

❑ Remove the particle filter temperature sensor (**3**) using the tool **(Mot. 1807)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ If reusing the particle filter temperature sensor, coat the sensor threading with **COPPER ANTI-SEIZE AGENT** or **COPPER-ALUMINIUM LUBRICANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the particle filter temperature sensor.

❑ Torque tighten the **particle filter temperature sensor (44 N.m)** using the tool **(Mot. 1807)**.

❑ Clip:

- the particle filter temperature sensor wiring,

- the particle filter temperature sensor connector.

❑ Connect the particle filter temperature sensor connector.

III - FINAL OPERATION

❑ Refit the engine undertray.

K9K, and 782

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

138810

❏ Remove:

- the dipstick,
- the dipstick guide bolts (**1**) .

❏ Move the dipstick guide to one side.

❏ Disconnect the injector rail pressure sensor connector (**2**) .

138811

❏ Unclip the alternator wiring (**3**) .

K9K, and 782

139190

❑ Disconnect the fuel drain pipe (**4**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

139195

❑ Disconnect:

- the connector (**5**) of the exhaust fuel injector solenoid valve,
- the fuel supply pipe (**6**) of the exhaust fuel injector solenoid valve,
- the fuel supply pipe (**7**) of the exhaust fuel injector.

❑ Fit a suitable blanking plug to:

- the openings of the exhaust fuel injector solenoid valve,
- the fuel supply pipe opening of the exhaust fuel injector solenoid valve,
- the fuel supply pipe opening of the exhaust fuel injector.

139196

❑ Remove:

- the bolt (**8**) of the exhaust fuel injector solenoid valve,
- the exhaust fuel injector solenoid valve.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the exhaust fuel injector solenoid valve.

❑ Remove the blanking plugs from:

- the openings of the exhaust fuel injector solenoid valve,
- the fuel supply pipe opening of the exhaust fuel injector solenoid valve,
- from the fuel supply pipe opening of the exhaust fuel injector.

❑ Connect the following to the exhaust fuel injector solenoid valve:

- the connector of the exhaust fuel injector solenoid valve,

K9K, and 782

- the fuel supply pipe of the exhaust fuel injector solenoid valve,
- the fuel supply pipe of the exhaust fuel injector.

II - FINAL OPERATION

❏ Connect the fuel drain pipe.

❏ Clip the alternator wiring.

❏ Connect the injector rail pressure sensor connector.

❏ Fit the dipstick guide.

❏ Refit:

- the dipstick guide bolts,
- the dipstick.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Exhaust fuel injector: Removal - Refitting

V9X

Equipment required
Diagnostic tool

Tightening torques ▽	
exhaust fuel injector bracket bolt	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Apply the before repair procedure to discharge the pressure in the system using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Exhaust fuel injection system » in the « List of components controlled by this computer » section,
- carry out the operations described in the « Before repair procedure » section.

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

137916

❑ Disconnect the fuel supply union (**1**) from the exhaust fuel injector.

❑ Insert the blanking plugs.

❑ Separate the fuel supply union from the exhaust fuel injector.

❑ Disconnect the exhaust fuel injector connector (**2**) .

Note:

Take care not to break the connector on the injector when disconnecting it.

❑ Remove:

- the bolt (**3**) from the exhaust fuel injector bracket using a Torx T45 socket,
- the exhaust fuel injector bracket,
- the exhaust fuel injector,
- the two seals from the exhaust fuel injector.

V9X

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Exhaust fuel injector seal (10,08,02,14)**.

❑

> **WARNING**
>
> Do not remove the blanking plugs from each component until the last moment.
>
> Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- two new seals for the exhaust fuel injector,
- the exhaust fuel injector,
- the exhaust fuel injector clamp.

> Note:
>
> Before tightening the injector bracket bolt, ensure that the exhaust fuel injector is positioned properly in relation to its bracket: flat surfaces to guide the bracket on the injector ensure this correct position.
>
> If the injector is incorrectly positioned, the entire particle filter will not work properly as the diesel fuel jet will not be correctly oriented.

❑ Torque tighten the **exhaust fuel injector bracket bolt (21 N.m)**.

❑ Connect the exhaust fuel injector connector.

❑ Fit the fuel supply union of the exhaust fuel injector.

❑ Remove the blanking plugs.

❑ Connect the fuel supply union to the exhaust fuel injector.

III - FINAL OPERATION

❑ Apply the after repair procedure to check system sealing using the **Diagnostic tool** :

- connect the **Diagnostic tool**,
- select « Injection computer » ,
- go to repair mode,
- display the « before/after repair procedure » for the computer selected,
- select « Exhaust fuel injection system » in the « List of components controlled by this computer » section,
- carry out the operations described in the « After repair procedure » section.

❑ Refit:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the engine undertray.

K9K, and 782

Tightening torques ▽	
exhaust fuel injector bracket bolt	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

143758

❑ Unclip the air flowmeter wiring (**1**) on the air filter unit air outlet pipe.

❑ Loosen the clips (**2**) of the air filter unit air outlet pipe.

❑ Remove the air filter unit air outlet pipe.

II - OPERATION FOR REMOVAL OF PART CONCERNED

139172

❑ Disconnect:

- the exhaust fuel injector connector (**3**) ,
- the fuel supply pipe union (**4**) of the exhaust fuel injector.

❑ Insert the blanking plugs.

139173

❑ Remove:

- the bolt (**5**) from the exhaust fuel injector bracket using a Torx T45 socket and an extension,
- the exhaust fuel injector bracket,

K9K, and 782

- the exhaust fuel injector,
- the exhaust fuel injector seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Exhaust fuel injector seal (10,08,02,14)**.

❏ Soak the exhaust fuel injector in a container of diesel fuel.

❏ Wipe the exhaust fuel injector using new cleaning cloths (part number 77 11 211 707).

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the exhaust fuel injector fitted with a new seal,
- the exhaust fuel injector bracket,
- the exhaust fuel injector bracket bolt.

❏ Torque tighten the **exhaust fuel injector bracket bolt (21 N.m)**.

❏ Remove the blanking plugs.

❏ Connect:

- the fuel supply pipe union of the exhaust fuel injector,
- the exhaust fuel injector connector.

III - FINAL OPERATION

❏ Refit the air filter unit air outlet pipe.

❏ Clip the air flowmeter wiring onto the air filter unit air outlet pipe.

Exhaust fuel injector cooler: Removal - Refitting

V9X

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
exhaust fuel injector bracket bolt	**21 N.m**
the nuts of the exhaust fuel injector cooler	**21 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Apply the discharge procedure for the exhaust injector fuel supply system (see **19B**, **Exhaust**, **Exhaust fuel injector: Removal - Refitting**, page **19B-121**) .

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

137916

❑ Disconnect:

- the exhaust fuel injector connector (**1**) ,
- the fuel supply union (**2**) of the exhaust fuel injector.

❑ Insert the blanking plugs.

❑ Separate the fuel supply union from the exhaust fuel injector.

❑ Fit the tools **(Ms. 583)** on the cooling hoses of the exhaust fuel injector cooler at (**3**) .

V9X

137917

❑ Separate the clips (**4**) on the cooling hoses of the exhaust fuel injector cooler using the tool **(Mot. 1448)**.

❑ Disconnect the cooling hoses from the exhaust fuel injector cooler.

❑ Remove:

- the nuts (**5**) of the exhaust fuel injector cooler,
- the exhaust fuel injector cooler,
- the seal on the exhaust fuel injector cooler.

In the event of replacement

❑ Remove:

- the exhaust fuel injector bracket bolt,
- the exhaust fuel injector bracket,
- the exhaust fuel injector,
- the exhaust fuel injector seal.

❑ **parts always to be replaced: Exhaust fuel injector seal (10,08,02,14)**.

❑ Refit:

- a new seal on the exhaust fuel injector,
- the exhaust fuel injector,
- the exhaust fuel injector clamp.

❑ Torque tighten the **exhaust fuel injector bracket bolt (21 N.m)**.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the seal on the exhaust fuel injector cooler.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal for the exhaust fuel injector cooler,
- the exhaust fuel injector cooler.

❑ Torque tighten **the nuts of the exhaust fuel injector cooler (21 N.m)**.

❑ Connect the cooling hoses to the exhaust fuel injector cooler.

❑ Fit the clips on the cooling hoses of the exhaust fuel injector cooler.

❑ Remove the tools **(Ms. 583)** from the cooling hoses of the exhaust fuel injector cooler.

❑ Fit the fuel supply union of the exhaust fuel injector.

❑ Remove the blanking plugs.

❑ Connect:

- the fuel supply union to the exhaust fuel injector,
- the exhaust fuel injector connector.

III - FINAL OPERATION

❑ Refit:

- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the engine undertray.

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-16**) .

❑ Apply the sealing checking procedure for the exhaust injector fuel supply system (see **19B**, **Exhaust**, **Exhaust fuel injector: Removal - Refitting**, page **19B-121**) .

Exhaust fuel injector cooler: Removal - Refitting

K9K, and 782

Tightening torques ▽	
the nuts of the exhaust fuel injector cooler	**25 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **13B**, **Diesel injection**, **Diesel injection: Precautions for the repair**, page **13B-1**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

143758

❑ Unclip the air flowmeter wiring (**1**) on the air filter unit air outlet pipe.

❑ Loosen the clips (**2**) of the air filter unit air outlet pipe.

❑ Remove the air filter unit air outlet pipe.

139172

❑ Disconnect:

- the exhaust fuel injector connector (**3**) ,
- the fuel supply pipe union (**4**) of the exhaust fuel injector.

❑ Insert the blanking plugs.

II - OPERATION FOR REMOVAL OF PART CONCERNED

139174

❑ Remove:

- the nuts (**5**) of the exhaust fuel injector cooler,

K9K, and 782

- the exhaust fuel injector cooler,
- the seal on the exhaust fuel injector cooler.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the seal on the exhaust fuel injector cooler.

❏ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces:

- of the exhaust fuel injector cooler if it is to be reused,
- of the turbocharger outlet exhaust gas duct.

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to clean and degrease the joint faces:

- of the exhaust fuel injector cooler if it is to be reused,
- of the turbocharger outlet exhaust gas duct.

When replacing the exhaust fuel injector cooler:

❏ Remove the exhaust fuel injector (see **19B**, **Exhaust**, **Exhaust fuel injector: Removal - Refitting**, page **19B-121**) from the old exhaust fuel injector cooler.

❏ Refit the exhaust fuel injector (see **19B**, **Exhaust**, **Exhaust fuel injector: Removal - Refitting**, page **19B-121**) on the new exhaust fuel injector cooler.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- a new seal for the exhaust fuel injector cooler,
- the exhaust fuel injector cooler.

❏ Torque tighten **the nuts of the exhaust fuel injector cooler (25 N.m)**.

III - FINAL OPERATION

❏ Remove the blanking plugs.

❏ Connect:

- the fuel supply pipe union of the exhaust fuel injector,
- the exhaust fuel injector connector.

❏ Refit the air filter unit air outlet pipe.

❏ Clip the air flowmeter wiring onto the air filter unit air outlet pipe.

M9R

Equipment required
particle filter kit
twin exhaust pipe kit
Diagnostic tool

❑

Note:

Forced regeneration can only be carried out after the « SERVICE » warning light has come on accompanied by the message « REGENERATE PARTICLE FILTER » or by the orange warning light « CHECK EMISSIONS » (see the relevant Driver's Handbook).

I - INSTRUCTIONS FOR CARRYING OUT A FORCED REGENERATION OF THE PARTICLE FILTER

Precautions to be taken during forced regeneration of the particle filter

❑ There are currently two additional kits for extracting exhaust gas in the workshop (see **garage equipment catalogue 2005**), both of which are approved for use at the high temperatures produced during forced regeneration of the particle filter.

The two kits approved for particle filter regeneration are:

- the **particle filter kit** for use with vehicles fitted with a single exit silencer,
- the **twin exhaust pipe kit** for use with vehicles equipped with a twin exhaust pipe on the silencer.

IMPORTANT

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

Twin exhaust pipe kit special features

116224

❑

Note:

When using a kit for a twin exhaust pipe (**1**) on a single exhaust pipe, be sure to:

- place an exhaust gas extractor over the openings (**2**) and (**3**) if the forced regeneration is carried out in the workshop,

- that the openings (**2**) and (**3**) , are positioned to direct the hot exhaust gases away from another vehicle or person, if the operation is carried out outside the workshop.

M9R

II - PARTICLE FILTER FORCED REGENERATION PROCEDURE USING THE DIAGNOSTIC TOOL

❑ Connect the **Diagnostic tool** to the vehicle.

IMPORTANT

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

Note:

To prevent engine racing, check the engine oil level using the dipstick before running the forced regeneration command.

The engine oil level must be between the « MIN » and « MAX » marks on the dipstick.

❑ For the particle filter forced regeneration procedure:

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- Display the «particle filter regeneration procedure » ,
- select the « particle filter» in the « list of components stored by the computer » section,
- carry out the operations described in the « particle filter regeneration procedure » section.

Note:

If required, the forced regeneration procedure may be stopped by pressing the engine Start button twice in succession.

Note:

Strong odours and thick smoke are to be expected during forced regeneration of the particle filter.

❑ When forced regeneration of the particle filter has finished, and using the **Diagnostic tool** :

- deal with the present faults,
- clear the stored faults.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) (MR 415, 10A, Engine and peripherals).

❑ Replace the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) (see MR 415, 10A, Engine and peripherals).

V9X

Equipment required
particle filter kit
twin exhaust pipe kit
Diagnostic tool

Note:

Forced regeneration should only be carried out after the « SERVICE » warning light has come on accompanied by the « REGENERATE PARTICLE FILTER » message or the orange « CHECK ANTI-POLLUTION SYSTEM » warning light (see driver's Handbook for vehicle concerned).

I - INSTRUCTIONS FOR CARRYING OUT A FORCED REGENERATION OF THE PARTICLE FILTER

Precautions to be taken during forced regeneration of the particle filter

❑ There are currently two additional kits for extracting exhaust gas in the workshop (see **garage equipment catalogue**), both of which are approved for use at the high temperatures produced during forced regeneration of the particle filter.

The two kits approved for particle filter regeneration are:

- the **particle filter kit** for use with vehicles fitted with a single exit silencer,
- the **twin exhaust pipe kit** for use with vehicles equipped with a twin exhaust pipe on the silencer.

IMPORTANT

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

Twin exhaust pipe kit special features

116224

❑

Note:

When using a kit for a twin exhaust pipe (**1**) on a single exhaust pipe, be sure to:

- place an exhaust gas extractor over the openings (**2**) and (**3**) if the forced regeneration is carried out in the workshop,

- that the openings (**2**) and (**3**) , are positioned to direct the hot exhaust gases away from another vehicle or person, if the operation is carried out outside the workshop.

V9X

II - PARTICLE FILTER FORCED REGENERATION PROCEDURE USING THE DIAGNOSTIC TOOL

❑ Connect the **Diagnostic tool** to the vehicle.

> **IMPORTANT**
>
> During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.
>
> Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.
>
> Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

> Note:
>
> To prevent engine racing, check the engine oil level using the dipstick before running the forced regeneration command.
>
> The engine oil level must be between the « MIN » and « MAX » marks on the dipstick.

❑ For the particle filter forced regeneration procedure:

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the «Particle filter regeneration procedure » ,
- select the « Particle filter » in the « List of components controlled by the computer » section,
- carry out the operations described in the « Particle filter regeneration procedure » section.

> Note:
>
> If required, the forced regeneration procedure may be stopped by pressing the engine Start button twice in succession.

> Note:
>
> Strong odours and thick smoke are to be expected during forced regeneration of the particle filter.

❑ When forced regeneration of the particle filter has finished, and using the **Diagnostic tool** :

- deal with the present faults,
- clear the stored faults.

❑ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-100**) .

❑ Replace the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-117**) .

K9K, and 782

Equipment required
particle filter kit
twin exhaust pipe kit
Diagnostic tool

❑

Note:

Forced regeneration can only be carried out after the « SERVICE » warning light has come on accompanied by the message « REGENERATE PARTICLE FILTER » or by the orange warning light « CHECK EMISSIONS » (see the relevant Driver's Handbook).

I - INSTRUCTIONS FOR CARRYING OUT A FORCED REGENERATION OF THE PARTICLE FILTER

Precautions to be taken during forced regeneration of the particle filter

❑ There are currently two additional kits for extracting exhaust gas in the workshop (see **garage equipment catalogue 2005**), both of which are approved for use at the high temperatures produced during forced regeneration of the particle filter.

The two kits approved for particle filter regeneration are:

- the **particle filter kit** for use with vehicles fitted with a single exit silencer,
- the **twin exhaust pipe kit** for use with vehicles equipped with a twin exhaust pipe on the silencer.

IMPORTANT

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

116224

❑

Note:

When using a kit for a twin exhaust pipe (**1**) on a single exhaust pipe, be sure to:

- place an exhaust gas extractor over the openings (**2**) and (**3**) if the forced regeneration is carried out in the workshop,

- that the openings (**2**) and (**3**) , are positioned to direct the hot exhaust gases away from another vehicle or person, if the operation is carried out outside the workshop.

K9K, and 782

II - PARTICLE FILTER FORCED REGENERATION PROCEDURE USING THE DIAGNOSTIC TOOL

❑ Connect the **Diagnostic tool** to the vehicle.

IMPORTANT

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

Note:

To prevent engine racing, check the engine oil level using the dipstick before running the forced regeneration command.

The engine oil level must be between the « MIN » and « MAX » marks on the dipstick.

❑ For the particle filter forced regeneration procedure:

- connect the **Diagnostic tool**,
- select the « injection computer » ,
- go to repair mode,
- display the «Particle filter regeneration procedure » ,
- select the « Particle filter » in the « List of components controlled by the computer » section,
- carry out the operations described in the « Particle filter regeneration procedure » section.

Note:

If required, the forced regeneration procedure may be stopped by pressing the engine Start button twice in succession.

Note:

Strong odours and thick smoke are to be expected during forced regeneration of the particle filter.

❑ When forced regeneration of the particle filter has finished, and using the **Diagnostic tool** :

- deal with the present faults,
- clear the stored faults.

V9X

IMPORTANT
Wear protective gloves during the operation.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

133904

❑

Note:
Apply **SUPER RELEASING AGENT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) on the studs between the connecting hose and the particle filter to avoid breaking the studs while loosening the nuts.

❑ Remove:

- the connecting hose nuts (**1**) ,
- the connecting hose,
- the seal between the flexible pipe and the particle filter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the seal between the connecting hose and the particle filter,
- the nuts between the connecting hose and the particle filter,
- the studs between the connecting hose and the particle filter, if they were loosened during the removal procedure.

V9X

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the bearing faces between the connecting hose and the particle filter.

II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - new studs on the particle filter, if they were loosened during the removal procedure,
  - a new seal between the connecting hose and the particle filter,
  - the connecting hose.

III - FINAL OPERATION

- Refit:
  - the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,
  - the engine undertray.

Connecting hose: Removal - Refitting

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

Tightening torques ▽	
connecting hose nuts on the particle filter	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

REMOVAL

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑ Remove:

- the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) ,
- the connecting hose,
- the connecting hose seal on the catalytic pre-converter, then discard it,
- the connecting hose seal on the particle filter, then discard it.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the particle filter and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

❑ Remove the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

116420

❑ Remove:

- the nuts (**1**) from the connecting hose on the particle filter,
- the connecting hose,
- the connecting hose seal on the catalytic pre-converter, then discard it,
- the connecting hose seal on the particle filter, then discard it.

III - FOR ALL TYPES OF FITTINGS

❑ If replacing the connecting hose, on the workbench remove from the connecting hose:

- the upstream take-off pipe of the particle filter pressure sensor (see **19B**, **Exhaust**, **Particle filter pressure sensor: Removal - Refitting**, page **19B-103**) ,
- the particle filter upstream temperature sensor (see **19B**, **Exhaust**, **Particle filter temperature sensors: Removal - Refitting**, page **19B-111**) .

REFITTING

❑ Parts always to be replaced:

- the connecting hose seal on the catalytic pre-converter,
- the connecting hose seal on the particle filter.

M9R, and 800 or 802 or 805 or 806 or 809 or 816 or 845 or 849

- If replacing the connecting hose, on the workbench refit on the new hose:
  - the upstream take-off pipe of the particle filter pressure sensor (see **19B**, **Exhaust**, **Particle filter pressure sensor: Removal - Refitting**, page **19B-103**) ,
  - the particle filter upstream temperature sensor (see **19B**, **Exhaust**, **Particle filter temperature sensors: Removal - Refitting**, page **19B-111**) .
- Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces:
  - the connecting hose and the catalytic pre-converter,
  - the connecting hose and the particle filter.
- Next, degrease these bearing faces using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and clean cloths.

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

- Refit:
  - partially the connecting hose, fitted with a new seal, on the catalytic pre-converter,
  - the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) equipped with a new seal, on the connecting hose.

II - FOR VEHICLES PRODUCED FROM 02/04/2008

- On the workbench, refit the connecting hose on the particle filter, fitted with a new seal on the particle filter.
- Torque tighten the **connecting hose nuts on the particle filter (21 N.m)**.
- Refit the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) fitted with a new seal, on the catalytic pre-converter.

III - FOR ALL TYPES OF FITTINGS

- Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .
- Lower the vehicle on the lift.

M9R, and 742 or 744 or 746 or 748 or 754

Tightening torques ▽	
exhaust clamp between the intermediate pipe and the silencer	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- **see Exhaust: Precautions for repair** (19B, Exhaust),
- **see Vehicle: Precautions for repair** (01D, Mechanical introduction).

REMOVAL

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) .

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑

Note:

The connecting hose is integrated with the intermediate pipe.

Remove the connecting hose - intermediate pipe assembly (see **19B**, **Exhaust**, **Intermediate pipe: Removal - Refitting**, page **19B-56**) .

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the connecting hose and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

123570

❑ Remove:

- the engine undertray,
- the bolt of the connecting hose suspension stud on the front axle subframe,
- the connecting hose nuts (**1**) on the catalytic converter,
- the connecting hose,
- the connecting hose seal on the catalytic converter, then discard it.

REFITTING

❑ Parts always to be replaced:

- the connecting hose seal on the catalytic converter,
- the exhaust clip.

❑ Clean the bearing faces of the connecting hose and the catalytic pre-converter using **abrasive pads** (see **Vehicle: Parts and consumables for the repair**) .

❑ Afterwards, degrease these bearing faces using **surface cleaner** (see **Vehicle: Parts and consumables for the repair**) and clean cloths.

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑ Refit the connecting hose - intermediate pipe assembly (see **19B**, **Exhaust**, **Intermediate pipe: Removal - Refitting**, page **19B-56**) .

M9R, and 742 or 744 or 746 or 748 or 754

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑

> Note:
>
> The Parts Department supplies the connecting hose and the intermediate pipe as an integrated assembly provided with a cutting zone. The assembly must be cut and adapted before being fitted on the vehicle.

Cut the new exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the connecting hose and the intermediate pipe, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

123351

❑ Remove from the vehicle and discard:

- the exhaust clamp (**2**) between the intermediate pipe and the silencer,
- the intermediate pipe.

❑ Fit:

- a new exhaust clamp between the intermediate pipe and the silencer,
- the new intermediate pipe, using a component jack.

❑ Fit without tightening the exhaust clamp between the intermediate pipe and the silencer to keep the intermediate pipe on the silencer.

❑ Refit the connecting hose, fitted with a new seal, on the catalytic converter.

❑ Tighten the connecting hose nuts on the catalytic converter.

❑ Fit a new exhaust sleeve between the connecting hose and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

❑ Adjust the intermediate pipe in relation to the silencer in order to prevent leaks from the connection.

❑ Torque tighten the **exhaust clamp between the intermediate pipe and the silencer (21 N.m)**.

❑ Tighten the bolt of the connecting hose suspension stud on the front axle subframe.

❑ Refit the engine undertray.

❑ Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

Lower the vehicle on the lift.

F4R

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- **see Exhaust: Precautions for repair** (19B, Exhaust),
- **see Vehicle: Precautions for repair** (01D, Mechanical introduction).

REMOVAL

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) .

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑

Note:

The connecting hose is integrated with the expansion chamber.

Remove the connecting hose - expansion chamber assembly (see **19B**, **Exhaust**, **Expansion chamber: Removal - Refitting**, page **19B-47**) .

II - FOR VEHICLES PRODUCED FROM 02/04/2008

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑ Loosen the retaining clip bolts for the sound insulation between the connecting hose and the expansion chamber.

❑ Remove the four sound insulations.

❑ Separate the clips to facilitate access to the cutting zone between the connecting hose and the expansion chamber.

❑ Place a component jack under the expansion chamber.

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) between the connecting hose and the expansion chamber, in the designated cutting zone (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

124125

❑ Remove:

- the engine undertray,
- the bolt of the connecting hose suspension stud on the front axle subframe,
- the connecting hose nuts (**1**) on the catalytic converter,
- the connecting hose,
- the connecting hose seal on the catalytic converter, then discard it.

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑ Retrieve the retaining clips for the sound insulation between the connecting hose and the expansion chamber on the connecting house.

REFITTING

❑ Parts always to be replaced: the connecting hose seal on the catalytic converter.

❑ Clean the bearing faces of the connecting hose and the catalytic converter using **abrasive pads** (see **Vehicle: Parts and consumables for the repair**) .

❑ Afterwards, degrease these bearing faces using **surface cleaner** (see **Vehicle: Parts and consumables for the repair**) and clean cloths.

F4R

I - FOR VEHICLES PRODUCED BEFORE 02/04/2008

❑ Refit the connecting hose - expansion chamber assembly (see **19B**, **Exhaust**, **Expansion chamber: Removal - Refitting**, page **19B-47**) .

II - FOR VEHICLES PRODUCED FROM 02/04/2008

❑

> Note:
>
> The new connecting hose supplied by the Parts Department must be adapted before being fitted on the vehicle.

Cut the pipe behind the new connecting hose (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) at a distance of **258 mm** from the pipe on the expansion chamber end.

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑ Fit two retaining clips for the sound insulation between the connecting hose and the expansion chamber on the connecting hose

❑ Refit the connecting hose, fitted with a new seal, on the catalytic converter.

❑ Tighten the connecting hose nuts on the catalytic converter.

❑ Fit a new exhaust sleeve between the connecting hose and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

❑ Tighten the bolt of the connecting hose suspension stud on the front axle subframe.

AJ0, and ELECTRICAL SUNROOF + FIXED REAR SECTION

❑

> Note:
>
> Because the exhaust sleeve serves as sound insulation, only two of the four original sound insulations on the vehicle are used afterwards.

Refit two sound insulations on the pipe between the connecting hose and the exhaust sleeve.

❑ Tighten the retaining clip bolts for the sound insulations between the connecting hose and the expansion chamber.

❑ Refit the engine undertray.

❑ Check for leaks and contact with the underbody (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

Lower the vehicle on the lift.

K9K, and 782

139148

- The connecting hose (**1**) is integrated into the particle filter.
- Replace the "particle filter - catalytic converter - connecting hose" assembly in the event of a connecting hose fault (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

K9K or M9R

Special tooling required	
Mot. 1397	Universal spanner for removing fuel gauge nuts.

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To prevent the tank from deforming, refit the fuel sender unit nut to the tank well immediately.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

❑ Raise the rear bench seat.

❑ Open the fuel sender module access flap.

II - REMOVAL OPERATION FOR PART CONCERNED

124241

❑ Disconnect:

- the fuel sender module connector (**1**) ,
- the snap-on unions (**2**) from the fuel sender module fuel pipes.

K9K or M9R

124355

❑ Remove the fuel sender module nut using the **(Mot. 1397)**.

❑ Let any fuel drain from the fuel sender module.

> **WARNING**
> To prevent the tank from deforming, refit the fuel sender unit nut to the tank well immediately.

❑ Remove:

- the fuel sender module being careful not to damage the float,
- the seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the fuel sender module nut,
- the seal.

II - REFITTING OPERATION FOR PART CONCERNED

118996

❑ Position:

- the new seal (**3**) in the neck correctly,
- the fuel sender module (**4**) on the fuel tank, a lug on the fuel sender module and a recess in the fuel tank ensure correct fitting in the fuel tank.

❑ Use a hand to press the fuel sender module to grip the seal.

❑ Refit the new nut on the fuel tank.

K9K or M9R

102470

- Tighten the fuel sender module nut using the **(Mot. 1397)** until the mark (**5**) on the nut is aligned with the mark (**6**) on the fuel tank.
- Connect:
  - the fuel sender module fuel pipe union,
  - the fuel sender module connector.

III - FINAL OPERATION.

- Close the fuel sender module access flap.
- Refit the rear bench seat.
- Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R or M4R

Special tooling required	
Mot. 1397	Universal spanner for removing fuel gauge nuts.

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent the tank from deforming, refit the fuel sender unit nut to the tank well immediately.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

❑ Raise the rear bench seat.

❑ Open the fuel sender module access flap.

II - REMOVAL OPERATION FOR PART CONCERNED

124350

❑ Disconnect:

- the fuel sender module connector (**1**) ,
- the union (**2**) from the fuel sender module fuel pipes.

F4R or M4R

124355

❑ Remove the fuel sender module nut using the **(Mot. 1397)**.

❑ Let any fuel drain from the fuel sender module.

❑ Remove:

- the fuel sender module being careful not to damage the float,
- the seal.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace:

- the fuel sender module nut,
- the seal.

WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

II - REFITTING OPERATION FOR PART CONCERNED

118996

❑ Position:

- the new seal (**3**) in the neck correctly,
- the fuel sender module (**4**) on the fuel tank, a lug on the fuel sender module and a recess in the fuel tank ensure correct fitting in the fuel tank.

❑ Use a hand to press the fuel sender module to grip the seal.

❑ Refit the new nut on the fuel tank.

F4R or M4R

102470

- Tighten the fuel sender module nut using the **(Mot. 1397)** until the mark (**5**) on the nut is aligned with the mark (**6**) on the fuel tank.
- Connect:
  - the fuel sender module fuel pipe union,
  - the fuel sender module connector.

III - FINAL OPERATION.

- Close the fuel sender module access flap.
- Refit the rear bench seat.
- Connect the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

K9K or M9R or V9X

Equipment required
pneumatic transfer pump for fuels

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

DRAINING

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

❑ Disconnect the fuel supply pipe from the fuel filter.

99641

137813

❑ Connect a **pneumatic transfer pump for fuels** to the fuel filter.

❑ Drain the fuel tank.

REFITTING

❑ Disconnect the **pneumatic transfer pump for fuels** from the fuel filter.

❑ Connect the fuel supply pipe to the fuel filter.

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K9K or M9R or V9X

- Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R or K4M or M4R or V4Y

Special tooling required	
Mot. 1311-08	Union for taking fuel pressure measurements.

Equipment required
pneumatic transfer pump for fuels

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear latex gloves during the operation.

WARNING

To prevent impurities from entering the circuit, plugs must be fitted to the openings of all the fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

DRAINING

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

❑ Disconnect the fuel supply pipe union from the injector rail.

M4R

124362

❑ Fit a « T » union **(Mot. 1311-08)** (**1**) .

F4R

124693

❑ Fit a « T » union **(Mot. 1311-08)** (**2**) .

F4R or K4M or M4R or V4Y

K4M

134928

❑ Fit a « T » union **(Mot. 1311-08)** (**3**) .

V4Y

134929

❑ Fit a « T » union **(Mot. 1311-08)** (**4**) .

99641

❑ Connect a **pneumatic transfer pump for fuels** to the « T » union outlet.

❑ Drain the fuel tank.

REFITTING

❑ Disconnect the **pneumatic transfer pump for fuels** from the « T » union outlet.

❑ Remove the « T » union **(Mot. 1311-08)**.

❑ Connect:

- the fuel supply union to the injector rail,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Refit the engine cover.

K9K or M9R or V9X

Equipment required
component support

Tightening torques ▽	
four wheel drive actuator's new nuts	**84 N.m**
earth strap nut	**8 N.m**
fuel tank bolts	**21 N.m**
electronic parking brake control unit mounting bolts	**21 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

❑ Raise the rear bench seat.

❑ Open the access flap for the fuel level sensor module.

K9K or M9R

124241

❑ Disconnect:

- the fuel level sensor module connector (**1**) ,
- the fuel pipe unions (**2**) from the fuel level sensor module.

❑ Fit blanking plugs on the fuel pipe unions.

❑ Remove the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

K9K or M9R or V9X

V9X

137811

❑ Disconnect:

- the fuel level sensor module connector (**3**) ,
- the fuel pipe unions (**4**) from the fuel level sensor module.

❑ Fit blanking plugs on the fuel pipe unions.

❑ Cut the exhaust pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) and (see **Exhaust: Parts and consumables for the repair**) .

137905

❑ Remove:

- the clip (**5**) between the connector pipe and the silencer,
- the connector pipe.

K9K, and 780

❑ Remove the intermediate pipe (see **19B**, **Exhaust**, **Intermediate pipe: Removal - Refitting**, page **19B-56**) .

M9R, and 742

❑ Remove the connecting hose (see **19B**, **Exhaust**, **Connecting hose: Removal - Refitting**, page **19B-135**) .

M9R, and 802 or 805

❑ Remove the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

K9K or M9R or V9X

ELECTRONIC PARKING BRAKE

124244

- ❑ Disconnect the connector (**6**) from the electronic parking brake control unit.
- ❑ Remove the bolts (**7**) from the electronic parking brake control unit mounting.
- ❑ Move aside the electronic parking brake control unit mounting.
- ❑ Unpick the electronic parking brake control unit mounting wiring from the fuel tank.

- ❑ Remove:
  - the rear left-hand underbody protector clip,
  - the underbody protector nuts,
  - the underbody protectors.

124246

124245

- ❑ Remove:
  - the heat shield clips (**8**) ,
  - the heat shield bolt (**9**) ,
  - the heat shield,
  - the nut (**10**) from the brake pipe mounting.
- ❑ Fit a **component support** under the fuel tank.

K9K or M9R or V9X

124352

❑ Undo the fuel tank bolts (**11**) .

4-WHEEL STEERING

❑ Mark:

- the routing of the four-wheel drive actuator wiring,
- the position of the four-wheel drive actuator linkage, on the compensator side,
- the position, head down, of the four-wheel drive actuator bolts.

128336

❑ Remove the nut (**12**) from the earth strap.

WARNING

The earth strap nut is specific. Do not swap it with other nuts.

❑ Disconnect the connectors (**13**) .

128484

❑ Unclip the wiring strap (**14**) .

❑ Unclip the wiring at (**15**) .

K9K or M9R or V9X

128340

❑ Remove the ball joint protector (**16**) .

❑ Mark the location of the bolts (**17**) on the four-wheel drive actuator.

> Note:
>
> The wiring and the actuator gaiter are areas which should not be touched. Handle the actuator by its casing.

❑ Remove:

- the bolts (**18**) from the four-wheel drive actuator,
- the four wheel steering actuator.

134925

❑ Unclip the rigid brake pipes (**19**) from their support.

K9K or M9R or V9X

V9X

134921

134922

134924

❑ Remove:

- the bolts (**20**) and (**22**) from the protective sheath of the battery disconnection unit supply wiring,
- the nut (**21**) from the protective sheath of the battery disconnection unit supply wiring.

134923

❑ Unclip the brake pipes (**23**) from their support.

❑ Separate the supply wiring sheath from the battery disconnection unit.

K9K or M9R or V9X

124248

- Remove the clip (**24**) from the « filler neck - fuel tank » connecting hose on the fuel tank side,
- Disconnect the fuel tank filler neck hose on the fuel tank side.

V9X

137812

- Disconnect the fuel filter fuel pipe union (**25**) from the exhaust fuel injector.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124243

- Unclip the fuel pipes from the fuel tank.
- Remove:
  - the fuel tank bolts (**26**) ,
  - the fuel tank.

REFITTING

I - REFITTING PREPARATION OPERATION

- **parts always to be replaced: Fuel pipe clip between the fuel tank filler neck and the fuel tank (11,08,01,05)**.

4-WHEEL STEERING

- Always replace the four wheel drive actuator nuts.
- Check the condition of the rubber bush between the rear axle and the four wheel drive actuator. If the rubber bush is damaged in the forged wrench, replace the rubber bush (see **Rear axle rubber bush - 4-wheel steering actuator: Removal - Refitting**) (33A,Rear axle components).

If the fuel tank is being replaced

- Remove the fuel level sensor module (see **Fuel level sensor module: Removal - Refitting**) .

K9K or M9R or V9X

V9X

137812

- Remove the fuel filter (**27**) of the exhaust fuel injector.

- Refit the fuel level sensor module (see **Fuel level sensor module: Removal - Refitting**) on a new fuel tank.

V9X

- Refit the fuel filter for the exhaust fuel injector.

II - REFITTING OPERATION FOR PART CONCERNED

- Fit the fuel tank in place.
- Clip the fuel supply pipes onto the fuel tank.

V9X

- Clip the fuel union onto the fuel filter of the exhaust fuel injector.

K9K or M9R or V9X

4-WHEEL STEERING

128340

128484

❑ Ensure:

- the position of the four wheel drive actuator (**28**) ,
- the routing of the wiring (**29**) ,
- the position of the actuator (**30**) linkage on the compensator,
- the position, head down, of the actuator bolts (**31**) .

❑ Refit:

- the four wheel drive actuator starting with the linkage on the rear axle side and then on the compensator side,
- new nuts on the four wheel drive actuator.

❑ Clip the wiring strap.

❑ Attach the actuator wiring on the fuel tank.

❑ Connect the connectors.

❑ Refit the earth strap.

❑ Tighten to torque:

- the **four wheel drive actuator's new nuts (84 N.m)**,
- the **earth strap nut (8 N.m)**.

❑ Refit the ball joint protector.

❑ Torque tighten the **fuel tank bolts (21 N.m)**.

III - FINAL OPERATION

❑ Remove the **component support**.

❑ Connect the fuel tank filler neck hose to the fuel tank.

❑ Refit a new clip on the fuel tank end of the « filler neck - fuel tank » connecting hose.

V9X

❑ Fit the protective sheath on the battery disconnection unit supply wiring

❑ Clip the brake pipes onto their support

❑ Refit the nut of the supply wiring protective sheath on the battery disconnection unit.

❑ Refit the protective sheath bolt on the battery disconnection unit supply wiring.

4-WHEEL STEERING

❑ Clip the rigid brake pipes onto their support.

❑ Refit:

- the brake pipe mounting nut,
- the heat shield,
- the underbody protectors.

K9K or M9R or V9X

ELECTRONIC PARKING BRAKE

- ❑ Clip the electronic parking brake control unit wiring to the fuel tank.
- ❑ Fit the electronic parking brake control unit mounting.
- ❑ Torque tighten the **electronic parking brake control unit mounting bolts (21 N.m)**.
- ❑ Connect the electronic parking brake control nut mounting connector.

M9R, and 802 or 805

- ❑ Refit the particle filter (see **19B**, **Exhaust**, **Particle filter: Removal - Refitting**, page **19B-71**) .

M9R, and 742

- ❑ Refit the connecting hose (see **19B**, **Exhaust**, **Connecting hose: Removal - Refitting**, page **19B-135**)

K9K, and 780

- ❑ Refit the intermediate pipe (see **19B**, **Exhaust**, **Intermediate pipe: Removal - Refitting**, page **19B-56**) .

V9X

- ❑ Refit the intermediate pipe.
- ❑ Fit a new sleeve between the particle filter and the intermediate pipe (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-18**) .

K9K or M9R

- ❑ Refit the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .
- ❑ Remove the blanking plugs from the fuel level sensor module.
- ❑ Connect:
  - the fuel pipe unions to the fuel level sensor module,
  - the fuel level sensor module connector.
- ❑ Refit the rear bench seat.
- ❑ Close the access flap for the fuel level sensor module.
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R or K4M or M4R or V4Y

Equipment required
component support

Tightening torques ▽	
four wheel drive actuator's new nuts	**84 N.m**
earth strap nut	**8 N.m**
fuel tank bolts	**21 N.m**
filler neck earth bolt	**21 N.m**
electronic parking brake control unit mounting bolts	**21 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

❑ Raise the rear bench seat.

❑ Open the access flap for the fuel level sensor module.

124350

❑ Disconnect:

- the fuel level sensor module connector (**1**) ,
- the fuel pipe union (**2**) from the fuel level sensor module.

❑ Fit a blanking plug on the fuel pipe union.

F4R or K4M or M4R or V4Y

124356

❑ Disconnect the union (**3**) from the fuel vapour absorber pipes.

M4R

❑ Remove the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

❑ Remove the expansion chamber (see **19B**, **Exhaust**, **Expansion chamber: Removal - Refitting**, page **19B-47**) .

ELECTRONIC PARKING BRAKE

124244

❑ Disconnect the connector (**4**) from the electronic parking brake control unit.

❑ Remove the bolts (**5**) from the electronic parking brake control unit mounting.

❑ Move aside the electronic parking brake control unit mounting.

❑ Unpick the electronic parking brake control unit wiring from the fuel tank.

❑ Remove:

- the rear left-hand underbody protector clip,
- the underbody protector nuts,
- the underbody protectors.

F4R or K4M or M4R or V4Y

124246

124245

❑ Remove:

- the heat shield clips (**6**) ,
- the heat shield bolt (**7**) ,
- the heat shield,
- the nut (**8**) from the brake pipe mounting.

124351

❑ Cut the clip (**9**) on the « filler neck - fuel tank » connecting hose on the fuel tank side.

M4R

❑ Remove the filler neck earth bolt.

❑ Disconnect the fuel tank filler neck hose on the fuel tank side.

❑ Fit a **component support** under the fuel tank.

F4R or K4M or M4R or V4Y

124352

❑ Undo the fuel tank bolts (**10**) .

❑ Unclip the fuel pipes from the fuel tank.

124357

❑ Disconnect the anti-splashback pipe from the fuel tank at (**11**) .

4-WHEEL STEERING

❑ Mark:

- the routing of the four wheel steering actuator wiring,
- the position of the four wheel steering actuator linkage, on the compensator side,
- the position, head down, of the four wheel steering actuator bolts.

128336

❑ Remove the nut (**12**) from the earth strap.

WARNING
The earth strap nut is specific. Do not swap it with other nuts.

❑ Disconnect the connectors (**13**) .

F4R or K4M or M4R or V4Y

128484

❏ Unclip the wiring strap (**14**) .

❏ Unclip the wiring at (**15**) .

128340

❏ Remove the ball joint protector (**16**) .

❏ Mark the location of the bolts (**17**) on the four wheel steering actuator.

> Note:
>
> The wiring and the actuator gaiter are areas which should not be touched. Handle the actuator by its casing.

❏ Remove:

- the bolts (**17**) of the four wheel steering actuator,
- the four wheel steering actuator (**18**) .

F4R or K4M or M4R or V4Y

134925

❑ Unclip the rigid brake pipes (**19**) from their support.

F4R or K4M or M4R or V4Y

V4Y

134921

134922

134924

❑ Remove:

- the protective sheath bolt (**20**) from the battery disconnection unit supply wiring,
- the protective sheath nut (**21**) from the battery disconnection unit supply wiring,
- the protective sheath bolt (**22**) from the battery disconnection unit supply wiring.

F4R or K4M or M4R or V4Y

134923

❑ Unclip the rigid brake pipes (**23**) from their support.

❑ Separate the protective sheath from the battery disconnection unit supply wiring.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124352

❑ Remove:

- the fuel tank bolts (**24**) ,
- the fuel tank.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Fuel pipe clip between the fuel tank filler neck and the fuel tank (11,08,01,05)**.

4-WHEEL STEERING

❑ Always replace the four wheel steering actuator nuts.

❑ Check the condition of the rubber bush between the rear axle and the four wheel steering actuator. If the rubber bush is damaged in the forged wrench, replace the rubber bush (see **Rear axle rubber bush - 4-wheel steering actuator: Removal - Refitting**) (33A,Rear axle components).

If the fuel tank is being replaced

❑ Remove:

- the fuel level sensor module (see **Fuel level sensor module: Removal - Refitting**) ,
- the fuel vapour absorber (see **14A**, **Antipollution**, **Fuel vapour absorber: Removal - Refitting**, page **14A-9**) .

❑ Refit:

- the fuel vapour absorber (see **14A**, **Antipollution**, **Fuel vapour absorber: Removal - Refitting**, page **14A-9**) on the new fuel tank,
- the fuel level sensor module (see **Fuel level sensor module: Removal - Refitting**) on the new fuel tank.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the fuel tank in place.

❑ Connect the anti-splashback pipe to the fuel tank.

❑ Clip the fuel supply pipes onto the fuel tank.

F4R or K4M or M4R or V4Y

4-WHEEL STEERING

128340

128484

❑ Ensure:

- the position of the four wheel steering actuator (**25**) ,
- the routing of the wiring (**26**) ,
- the position of the actuator linkage (**27**) on the compensator,
- the position, head down, of the actuator bolts (**28**) .

❑ Refit:

- the four wheel steering actuator starting with the linkage on the rear axle side and then on the compensator side,
- new nuts on the four wheel steering actuator.

❑ Clip the wiring strap.

❑ Attach the actuator wiring on the fuel tank.

❑ Connect the connectors.

❑ Refit the earth strap.

❑ Torque tighten:

- the **four wheel drive actuator's new nuts (84 N.m)**,
- the **earth strap nut (8 N.m)**.

❑ Refit the ball joint protector.

❑ Torque tighten the **fuel tank bolts (21 N.m)**.

III - FINAL OPERATION

❑ Remove the **component support**.

V4Y

❑ Clip the rigid brake pipes onto their support.

❑ Fit the protective sheath on the battery disconnection unit supply wiring.

❑ Refit the mountings of the supply wiring protective sheath on the battery disconnection unit.

4-WHEEL STEERING

❑ Clip the rigid brake pipes onto their support.

❑ Connect the fuel tank filler neck hose to the fuel tank.

M4R

❑ Torque tighten the **filler neck earth bolt (21 N.m)**.

F4R or K4M or M4R or V4Y

❏ Refit:

- a new clip on the fuel tank side of the « filler neck - fuel tank » connecting hose,
- the brake pipe mounting nut,
- the heat shield,
- the underbody protectors.

ELECTRONIC PARKING BRAKE

❏ Clip the electronic parking brake control unit wiring to the fuel tank.

❏ Fit the electronic parking brake control unit mounting.

❏ Torque tighten the **electronic parking brake control unit mounting bolts (21 N.m)**.

❏ Connect the electronic parking brake control unit connector.

M4R

❏ Refit the silencer (see **19B**, **Exhaust**, **Silencer: Removal - Refitting**, page **19B-64**) .

❏ Refit the expansion chamber (see **19B**, **Exhaust**, **Expansion chamber: Removal - Refitting**, page **19B-47**) .

❏ Remove the blanking plug from the fuel pipe union.

❏ Connect:

- the fuel vapour absorber pipe union,
- the fuel pipe union to the fuel level sensor module,
- the fuel level sensor module connector.

❏ Close the access flap for the fuel level sensor module.

❏ Refit the rear bench seat.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R, and 726

❏ Apply the after repair procedure using the diagnostic tool:

❏ Connect the diagnostic tool,

❏ Select "Injection computer",

❏ Go to repair mode,

❏ Display the "Before/after repair procedure" for the computer selected,

❏ Select "Alcohol level programming" in the "List of components controlled by the computer" section and perform the operations requested.

K9K or M9R or V9X

Tightening torques ▽	
filler neck earth bolt	**21 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

124242

❑ Open the fuel tank flap.

❑ Remove:

- the fuel flap filler neck bolts (**1**) ,
- the rear right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the rear right-hand wheel arch liner (see **Rear wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

K9K or M9R or V9X

II - OPERATION FOR REMOVAL OF PART CONCERNED

V9X

137810

❑ Remove the earth bolt (**2**) from the filler neck.

❑ Cut the clip (**3**) on the « filler neck - fuel tank » connecting hose on the fuel tank side.

K9K or M9R

124248

❑ Remove the filler neck earth bolt (**5**) .

❑ Remove the clip (**4**) from the « filler neck - fuel tank » connecting hose on the fuel tank side.

❑ Disconnect the filler neck hose from the fuel tank.

❑ Remove the filler neck.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Fuel pipe clip between the fuel tank filler neck and the fuel tank (11,08,01,05)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the filler neck.

❑ Connect the filler neck hose to the fuel tank.

❑ Refit a new clip on the « filler neck - fuel tank » connecting hose.

❑ Torque tighten the **filler neck earth bolt (21 N.m)**.

K9K or M9R or V9X

III - FINAL OPERATION

❏ Refit:

- the rear right-hand wheel arch liner (see **Rear wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the rear right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the filler neck bolts on the fuel tank flap.

❏ Close the fuel tank flap.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Filler neck: Removal - Refitting

F4R or K4M or M4R or V4Y

Tightening torques ▽	
fuel tank bolts	**21 N.m**
electronic parking brake control unit mounting bolts	**21 N.m**
filler neck earth bolt	**21 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear latex gloves during the operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Drain the fuel tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-7**) .

124242

❑ Open the fuel tank flap.

❑ Remove:

- the filler neck bolts (**1**) ,
- the rear right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the rear right-hand wheel arch liner (see **Rear wheel arch liner: Removal - Refitting**) (55A, Exterior protection).

F4R or K4M or M4R or V4Y

V4Y

134933

❑ Remove the earth bolt (**2**) from the filler neck.

F4R or K4M or M4R

124351

❑ Remove the earth bolt (**3**) from the filler neck.

❑ Remove:

- the rear left-hand underbody protector nuts,
- the rear left-hand underbody protector clip,
- the rear left-hand underbody protector.

F4R or K4M or M4R or V4Y

ELECTRONIC PARKING BRAKE

124244

124243

❑ Undo:

- the bolts (**4**) on the electronic parking brake control unit mounting,
- the fuel tank bolts (**5**) .

> Note:
>
> Do not remove the bolts from the fuel tank and the electronic parking brake mounting.

FOOT BRAKE MANUAL CONTROL

124352

❑ Undo the fuel tank bolts (**6**) .

> Note:
>
> Do not remove the fuel tank bolts.

F4R or K4M or M4R or V4Y

II - OPERATION FOR REMOVAL OF PART CONCERNED

124351

❑ Cut the clip (**7**) on the « filler neck - fuel tank » connecting hose on the fuel tank side.

124357

❑ Disconnect:

- the anti-splashback pipe from the filler neck at (**8**) ,
- the fuel tank filler neck hose.

❑ Remove the filler neck.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Fuel pipe clip between the fuel tank filler neck and the fuel tank (11,08,01,05)**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the filler neck.

❑ Connect:

- the filler neck hose to the fuel tank,
- the filler neck anti-splashback pipe.

❑ Refit a new clip on the fuel tank end of the « filler neck - fuel tank » connecting hose.

III - FINAL OPERATION

❑ Torque tighten the **fuel tank bolts (21 N.m)**.

ELECTRONIC PARKING BRAKE

❑ Torque tighten the **electronic parking brake control unit mounting bolts (21 N.m)**.

❑ Refit the rear left-hand underbody protector.

❑ Torque tighten the **filler neck earth bolt (21 N.m)**.

❑ Refit:

- the rear right-hand wheel arch liner (see **Rear wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the rear right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the filler neck bolts.

❑ Close the fuel tank flap.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

M4R

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
bolts from the suspended engine mounting rubber pad shaft on the gearbox	**62 Nm**
central nut of the suspended engine mounting shaft on the gearbox	**62 N.m**
nuts of the suspended engine mounting rubber pad on the gearbox	**105 N.m**
tie-rod rear bolts	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery)
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the engine undertray bolts,
- the engine undertray.

123347

❑ Remove:

- the rear suspended engine mounting bolts (**1**) ,
- the rear suspended engine mounting.

128251

❑ Remove the tie-rod rear bolts (**2**) .

M4R

128252

- Fit the short pins of the tool **(Mot. 1852)** (**3**) in place of the tie-rod rear bolts.
- Position the first retaining bar of the tool **(Mot. 1720)** (**4**) .

128250

- Remove the radiator mounting cross member bolts (**5**) .

128253

- Fit the long pins of the tool **(Mot. 1852)** (**6**) in place of the radiator mounting cross member bolts.
- Position the second retaining bar of the tool **(Mot. 1720)** (**7**) .

M4R

128249

- Fit the retaining bar of the tool **(Mot. 1672)** (**8**) perpendicular to the retaining bars of the tool **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**9**) .

M4R

128254

❑

Note:

The positioning of the retaining shoe (**10**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❑ Fit the retaining shoe **(Mot. 1672)** of the tool (**10**) under the sump.

❑ Adjust the retaining shoe of the tool **(Mot. 1672)** under the sump.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123457

❑ Remove:

- the central nut (**11**) from the suspended engine mounting rubber pad shaft on the gearbox,
- the nuts (**12**) from the suspended engine mounting rubber pad on the gearbox.

❑ Slightly lower the engine until the rubber pad detaches from the suspended engine mounting on the gearbox.

❑ Remove the rubber pad of the suspended engine mounting from the gearbox.

M4R

123456

❑ Move the electrical wiring (**13**) to one side.

❑ Remove:

- the rubber pad mounting bolts (**14**) from the suspended engine mounting on the gearbox,
- the rubber pad mounting from the suspended engine mounting on the gearbox (**15**) .

123455

❑ Unclip the clutch control pipe from the suspended engine mounting rubber pad shaft on the gearbox (**16**) .

❑ Move the clutch control pipe away from the suspended engine mounting rubber pad shaft on the gearbox.

❑ Remove:

- the bolts (**17**) from the suspended engine mounting rubber pad shaft on the gearbox,
- the suspended engine mounting rubber pad shaft from the gearbox (**18**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the suspended engine mounting rubber pad shaft on the gearbox.

❑ Torque tighten the **bolts from the suspended engine mounting rubber pad shaft on the gearbox (62 Nm)**.

❑ Fit the clutch control pipe on the suspended engine mounting rubber pad shaft on the gearbox.

❑ Clip the clutch control pipe on the suspended engine mounting rubber pad shaft on the gearbox.

❑ Refit the rubber pad mounting from the suspended engine mounting on the gearbox.

❑ Fit the electrical wiring.

M4R

- ❑ Refit the suspended engine mounting rubber pad on the gearbox.
- ❑ Slightly raise the engine until the suspended engine mounting rubber pad on the gearbox comes into contact with the suspended engine mounting rubber pad support on the gearbox.
- ❑ Tighten to torque:
  - the **central nut of the suspended engine mounting shaft on the gearbox (62 N.m)**,
  - the **nuts of the suspended engine mounting rubber pad on the gearbox (105 N.m)**,

II - FINAL OPERATION.

- ❑ Refit:
  - the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Remove the retaining shoe of the tool **(Mot. 1672)**.
- ❑ Unlock the retaining bar of the tool **(Mot. 1672)**.
- ❑ Remove:
  - the retaining bar of the tool **(Mot. 1672)**,
  - the retaining bars of the tool **(Mot. 1720)**.
  - the four pins of the tool **(Mot. 1852)**.
- ❑ Refit:
  - the radiator mounting cross member bolts,
  - the tie-rod rear bolts.
- ❑ Torque tighten the **tie-rod rear bolts (105 N.m)**.
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.
Mot. 1453-01	Additional handle nut for engine lifting support tool Mot. 1453.

Tightening torques ▽	
gearbox support bolts on the side member	**105 N.m**
gearbox support bolts on the gearbox	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) .

123709

❑ Move the wiring harness channel to one side (**1**) .

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

123414

- ❑ Fit the **(Mot. 1453)** (**2**) fitted with the **(Mot. 1453-01)**.
- ❑ Remove the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

II - OPERATION FOR REMOVAL OF PART CONCERNED

123413

❑ Remove the gearbox support nut (**3**) .

❑ Gently lower the gearbox to detach the gearbox support from the rubber pad.

❑ Remove:

- the nuts (**4**) from the rubber pad,
- the rubber pad.

123411

❑ Remove the gearbox support bolts (**5**) .

123777

❑ Remove:

- the bolts (**6**) securing the gearbox support.
- the gearbox support.

M9R, and 742 or 744 or 746 or 748 or 754 or 800 or 802 or 806 or 808 or 816

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

124217

❑ Refit:

- the gearbox support on the side member,
- the bolts (**7**) securing the gearbox support.

❑ Torque tighten the **gearbox support bolts on the side member (105 N.m)** (**7**) .

❑ Refit:

- the gearbox support ,
- the bolts (**8**) securing the gearbox support.

❑ Torque tighten the **gearbox support bolts on the gearbox (105 N.m)** (**8**) .

❑ Refit:

- the rubber pad,
- the rubber pad bolts (**9**) .

❑ Tighten the rubber pad bolts (**9**) .

❑ Refit the rubber pad nut (**10**) .

❑ Tighten the rubber pad nut (**10**) .

II - FINAL OPERATION

❑ Refit the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Remove the **(Mot. 1453)** and **(Mot. 1453-01)**.

❑ Fit the wiring harness channel.

❑ Refit:

- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the engine undertray,
- the engine undertray bolts.

K9K

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.
Mot. 1453-01	Additional handle nut for engine lifting support tool Mot. 1453.

Equipment required
safety strap(s)
indelible pencil

Tightening torques ▽	
the left-hand suspended engine mounting support bolts on the gearbox	**62 Nm**
upper engine tie-bar bolt on the body	**115 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123519

❑ Remove:

- the upper engine tie-bar bolts (**1**) ,
- the upper engine tie-bar.

K9K

123538

123539

❑ Fit the **(Mot. 1453)** fitted with **(Mot. 1453-01)** (**2**) and **safety strap(s)**.

123788

❑ Remove the left-hand suspended engine mounting shaft nut (**3**) .

❑ Detach the left-hand suspended engine mounting shaft from the rubber pad using a copper hammer.

❑ Mark the position of the left-hand suspended engine mounting rubber pad on the left-hand suspended engine mounting support using a **indelible pencil**.

❑ Remove:

- the left-hand suspended engine mounting rubber pad nuts (**4**) ,
- the rubber pad from the left-hand suspended engine mounting

❑ Mark the position of the left-hand suspended engine mounting support on the body using a **indelible pencil**.

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

K9K

123788

123777

❑ Remove:

- the mounting bolts (**5**) securing the left-hand suspended engine mounting support on the body,
- the left-hand suspended engine mounting support on the body.

123828

❑ Remove:

- the mounting bolts (**6**) from the left-hand suspended mounting on the gearbox,
- the left-hand suspended engine mounting support on the gearbox.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the left-hand suspended engine mounting support on the gearbox,
- the left-hand suspended engine mounting support bolts on the gearbox.

❑ Torque tighten the **the left-hand suspended engine mounting support bolts on the gearbox (62 Nm)**.

❑ Fit the left-hand suspended engine mounting to the body.

❑ Position the left-hand suspended engine mounting support on the body in line with the marks made when it was removed.

❑ Refit the left-hand suspended engine mounting support bolts on the body.

❑ Tighten the left-hand suspended engine mounting support bolts on the body.

K9K

- Refit:
  - the engine undertray,
  - the engine undertray bolts.
- Raise the engine using the tool **(Mot. 1453)** fitted with the tool **(Mot. 1453-01)**.
- Fit the left-hand suspended engine mounting rubber pad.
- Position the left-hand suspended engine mounting rubber pad in line with the marks made when it was removed.
- Refit the left-hand suspended engine mounting rubber pad nuts.
- Tighten the left-hand suspended engine mounting rubber pad nuts.
- Tighten the left-hand suspended engine mounting shaft of the rubber pad using the tool **(Mot. 1453)** fitted with the tool **(Mot. 1453-01)**.
- Refit the left-hand suspended engine mounting shaft nut.
- Tighten the left-hand suspended engine mounting shaft nut.
- Remove the **(Mot. 1453)** then the **(Mot. 1453-01)**.
- Refit:
  - the upper engine tie-bar,
  - the upper engine tie-bar bolt on the body,
  - the upper engine tie-bar bolt on the cylinder head.
- Torque tighten the **upper engine tie-bar bolt on the body (115 Nm)**.
- Tighten the upper engine tie-bar bolt on the cylinder head.

II - FINAL OPERATION.

- Refit:
  - the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the battery tray (see **Battery tray: Removal - Refitting**) (MR 415, 80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (MR 415, 80A, Battery).

F4R, and PK4

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
left-hand suspended engine mounting support bolts on the gearbox	**105 N.m**
upper bolts of the left-hand suspended engine mounting rubber pad on the body	**105 N.m**
left-hand suspended engine mounting rubber pad central nut	**62 N.m**
tie rod rear bolts	**105 N.m**
lower engine tie-bar bolt on the subframe	**115 N.m**
lower engine tie-bar bolt on the lower engine tie-bar support	**190 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

123949

❑ Remove:

- the bolt (**1**) from the max fuse box,
- the max fuse box clip (**2**) .

❑ Move the max fuse box to one side.

F4R, and PK4

123459

❑ Remove the injection computer mounting nut (**3**) .

❑ Remove:

- the injection computer mounting,
- the engine wiring channel.

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

123177

❑ Remove:

- the lower engine tie-bar bolt (**4**) on the lower engine tie-bar support,
- the bolt (**5**) from the lower engine tie-bar on the sub-frame,
- the lower engine tie-bar.

124125

❑ Remove the nuts (**6**) from the exhaust bracket.

❑ Move the exhaust pipe to one side.

❑ Remove the exhaust bracket seal.

128247

❑ Remove the tie rod rear bolts (**7**) .

F4R, and PK4

128248

- ❑ Fit the short pins of the tool **(Mot. 1852)** (**8**) in place of the tie rod rear bolts.
- ❑ Position the first retaining bar of the tool **(Mot. 1720)** (**9**) .

128245

- ❑ Remove the radiator mounting cross member bolts (**10**) .

128246

- ❑ Fit the long pins of the tool **(Mot. 1852)** (**11**) in place of the radiator mounting cross member bolts.
- ❑ Position the second retaining bar of the tool **(Mot. 1720)** (**12**) .

F4R, and PK4

128243

- Fit the retaining bar of the tool **(Mot. 1672)** (**13**) perpendicular to the retaining bars of the tool **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**14**) .

F4R, and PK4

128244

❑

> Note:
>
> The positioning of the retaining shoe (**15**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❑ Fit the retaining shoe **(Mot. 1672)** of the tool (**15**) under the sump.

❑ Adjust the retaining shoe of the tool **(Mot. 1672)** under the sump.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124140

❑ Remove:

- the central nut (**16**) of the left-hand suspended engine mounting rubber pad,
- the upper bolts of the left-hand suspended engine mounting rubber pad (**17**) on the body.

❑ Loosen the lower bolts of the left-hand suspended engine mounting rubber pad (**18**) on the body.

❑ Remove the rubber pad from the left-hand suspended engine mounting.

F4R, and PK4

124139

❑ Remove:

- the left-hand suspended engine mounting bolts (**19**) on the gearbox,
- the left-hand suspended engine mounting support on the gearbox.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the exhaust bracket gasket,
- the rear tie rod bolts,
- the radiator mounting cross member bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the left-hand suspended engine mounting support on the gearbox.

❑ Torque tighten the **left-hand suspended engine mounting support bolts on the gearbox (105 N.m)**.

❑ Refit the left-hand suspended engine mounting rubber pad on the body.

❑ Torque tighten the **upper bolts of the left-hand suspended engine mounting rubber pad on the body (105 N.m)**.

❑ Tighten the lower bolts of the left-hand suspended engine mounting rubber pad on the body.

❑ Slightly raise the engine until the suspended engine mounting rubber pad on the gearbox comes into contact with the suspended engine mounting rubber pad support on the gearbox.

❑ Torque tighten the **left-hand suspended engine mounting rubber pad central nut (62 N.m)**.

III - FINAL OPERATION

❑ Remove the retaining shoe of the tool **(Mot. 1672)**.

❑ Unlock the retaining bar of the tool **(Mot. 1672)**.

❑ Remove:

- the retaining bar of the tool **(Mot. 1672)**,
- the retaining bars of the tool **(Mot. 1720)**.
- the four pins of the tool **(Mot. 1852)**.

❑ Refit:

- new radiator mounting cross member bolts,
- new rear tie rod bolts.

❑ Torque tighten the **tie rod rear bolts (105 N.m)**.

❑ Refit a new exhaust flange seal.

❑ Fit the exhaust pipe.

❑ Refit:

- the exhaust flange nuts,
- the lower engine tie-bar.

❑ Tighten to torque:

- the **lower engine tie-bar bolt on the subframe (115 N.m)**,
- the **lower engine tie-bar bolt on the lower engine tie-bar support (190 N.m)**.

❑ Refit the engine undertray.

❑ Fit:

- the engine wiring channel,
- the injection computer support.

❑ Refit the injection computer mounting nut.

❑ Fit the max fuse box.

❑ Refit:

- the max fuse box bolt,
- the max fuse box clip,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),

F4R, and PK4

- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the engine cover.

M9R, and 805 or 809 or 845 or 849

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.
Mot. 1453-01	Additional handle nut for engine lifting support tool Mot. 1453.

Tightening torques ▽	
gearbox support bolts on the side member	**105 N.m**
gearbox support bolts on the gearbox	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) .

123709

❑ Move the wiring harness channel to one side (**1**) .

M9R, and 805 or 809 or 845 or 849

123414

- Fit the **(Mot. 1453)** fitted with the **(Mot. 1453-01)**.
- Remove the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123874

- Remove the rubber pad nut (**3**) .

M9R, and 805 or 809 or 845 or 849

❑ Gently lower the gearbox to detach the gearbox support from the rubber pad.

124216

❑ Remove:

- the bolts (**4**) securing the gearbox support.
- the gearbox support (**5**) ,
- the bolts (**6**) securing the gearbox support.
- the gearbox support (**7**) .

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

124216

❑ Refit:

- the gearbox support (**8**) on the side member,
- the gearbox support bolts (**9**) on the side member.

❑ Torque tighten the **gearbox support bolts on the side member (105 N.m)** (**9**) .

❑ Refit:

- the gearbox support (**10**) on the gearbox,
- the gearbox support bolts (**11**) on the gearbox.

❑ Torque tighten the **gearbox support bolts on the gearbox (105 N.m)** (**11**) .

❑ Refit the rubber pad nut.

❑ Tighten the rubber pad nut.

II - FINAL OPERATION

❑ Refit the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Remove the **(Mot. 1453)** and **(Mot. 1453-01)**.

❑ Fit the wiring harness channel.

❑ Refit:

- the diesel injection computer (see **13B**, **Diesel injection**, **Diesel injection computer: Removal - Refitting**, page **13B-36**) ,

M9R, and 805 or 809 or 845 or 849

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the engine undertray,
- the engine undertray bolts.

K4M

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.

Equipment required
safety strap(s)

Tightening torques ▽	
bolts from the suspended engine mounting rubber pad shaft on the gearbox	**62 Nm**
rubber pad mounting bolts for the suspended engine mounting on the gearbox	**62 Nm**
nuts on the suspended engine mounting rubber pad shaft on the gearbox	**105 Nm**
nut on the suspended engine mounting rubber pad shaft on the gearbox	**62 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

131081

❑ Remove the petrol injection computer mounting nut (**1**) .

❑ Move aside the wiring harness channel at (**2**) .

131080

❑ Fit:

- the **(Mot. 1453)** (**3**) ,
- a **safety strap(s)**.

❑ Mark the position of the suspended mounting on the body.

K4M

II - OPERATION FOR REMOVAL OF PART CONCERNED

131082

- ❑ Remove the nut (**4**) from the suspended engine mounting rubber pad shaft on the gearbox.
- ❑ Slightly lower the gearbox.
- ❑ Remove:
  - the nuts (**5**) from the suspended engine mounting rubber pad on the gearbox,
  - the suspended engine mounting rubber pad from the gearbox.

131079

131078

- ❑ Remove:
  - the rubber pad mounting bolts (**6**) from the suspended engine mounting on the gearbox,
  - the rubber pad mounting from the suspended engine mounting on the gearbox.

K4M

131083

- ❑ Unclip the clutch pipe (**7**) from the suspended engine mounting rubber pad shaft on the gearbox.
- ❑ Move the clutch pipe away from the suspended engine mounting rubber pad shaft on the gearbox.
- ❑ Remove the bolts (**8**) from the power-assisted steering pump high pressure pipe.
- ❑ Move the power-assisted steering pump high pressure pipe away from the suspended engine mounting rubber pad shaft on the gearbox.

131084

- ❑ Remove:
  - the bolts (**9**) from the suspended engine mounting rubber pad shaft on the gearbox,
  - the suspended engine mounting rubber pad shaft from the gearbox.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the suspended engine mounting rubber pad shaft on the gearbox.
- ❑ Torque tighten the **bolts from the suspended engine mounting rubber pad shaft on the gearbox (62 Nm)**.
- ❑ Fit the clutch pipe.
- ❑ Clip the clutch pipe on the suspended engine mounting rubber pad shaft on the gearbox.
- ❑ Refit:
  - the power-assisted steering pump high pressure pipe on the suspended engine mounting rubber pad shaft on the gearbox,
  - the rubber pad mounting from the suspended engine mounting on the gearbox.
- ❑ Torque tighten the **rubber pad mounting bolts for the suspended engine mounting on the gearbox (62 Nm)**.
- ❑ Fit the wiring channel.

K4M

- ❑ Refit the suspended engine mounting rubber pad on the gearbox.
- ❑ Tighten to torque:
  - the **nuts on the suspended engine mounting rubber pad shaft on the gearbox (105 Nm)**,
  - the **nut on the suspended engine mounting rubber pad shaft on the gearbox (62 Nm)**.

II - FINAL OPERATION

- ❑ Remove:
  - the **safety strap(s)**,
  - the **(Mot. 1453)**.
- ❑ Refit the petrol injection computer mounting bolt.
- ❑ Refit:
  - the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
  - the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
  - the battery (see **Battery: Removal - Refitting**) (80A, Battery),
  - the engine undertray.

V4Y

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
bolts of the suspended engine mounting support shaft on the gearbox	**105 N.m**
rubber pad upper bolts of the suspended engine mounting on the gearbox	**105 N.m**
central nut of the suspended engine mounting shaft on the gearbox	**62 N.m**
new tie rod rear bolts	**105 N.m**
engine tie-bar bolts	**180 N.m**
air filter box air outlet pipe clips	**6 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Undo the clips on the air outlet pipe of the air filter unit.

❏ Disconnect the vacuum pipe from the brake servo.

❏ Remove the clip from the oil vapour rebreathing pipe using the tool **(Mot. 1448)**.

❏ Disconnect the oil vapour rebreathing pipe.

❏ Remove:

- the air outlet pipe to the air filter unit,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery).

134186

❏ Remove the mountings (**1**) of the wiring protective sheath on the automatic transmission.

❏ Move aside the wiring protective sheath on the automatic gearbox.

V4Y

134185

❑ Remove:

- the bolt (**2**) from the engine wiring guide,
- the engine wiring guide.

134188

❑ Remove:

- the engine tie-bar bolts (**3**) ,
- the engine tie-bar.

134926

❑ Remove the tie rod rear bolts (**4**) .

134927

❑ Fit the short pins of the tool **(Mot. 1852)** (**5**) in place of the tie rod rear bolts.

❑ Position the first retaining bar (**6**) of the tool **(Mot. 1720)**.

V4Y

128250

❑ Remove the radiator mounting cross member bolts (**7**) .

128253

❑ Fit the long pins of the tool **(Mot. 1852)** (**8**) in place of the radiator mounting cross member bolts.

❑ Position the second retaining bar of the tool **(Mot. 1720)** (**9**) .

V4Y

128249

- Fit the retaining bar of the tool **(Mot. 1672)** (**10**) perpendicular to the retaining bars of the tool **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**11**) .

V4Y

134932

❑

Note:

The positioning of the retaining shoe (**12**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❑ Fit the retaining shoe of the tool **(Mot. 1672)** under the gearbox casing.

❑ Adjust the retaining shoe of the tool **(Mot. 1672)** under the gearbox casing.

II - OPERATION FOR REMOVAL OF PART CONCERNED

134185

134533

❑ Remove:

- the central nut (**13**) from the suspended engine mounting support shaft on the gearbox,
- the bolts (**14**) of the rubber pad of the suspended engine mounting from the gearbox.

❑ Slightly lower the engine until the support shaft detaches from the suspended engine mounting on the gearbox.

❑ Remove the rubber pad of the suspended engine mounting from the gearbox.

V4Y

134534

❑ Remove:

- the bolts (**15**) from the suspended engine mounting support shaft on the gearbox,
- the suspended engine mounting support shaft from the gearbox (**16**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the radiator mounting cross member bolts,
- the tie rod rear bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the suspended engine mounting support shaft on the gearbox.

❑ Torque tighten the **bolts of the suspended engine mounting support shaft on the gearbox (105 N.m)**.

❑ Refit the suspended engine mounting rubber pad on the gearbox.

❑ Torque tighten the **rubber pad upper bolts of the suspended engine mounting on the gearbox (105 N.m)**.

❑ Slightly raise the engine until the suspended engine mounting rubber pad on the gearbox comes into contact with the suspended engine mounting rubber pad support on the gearbox.

❑ Torque tighten the **central nut of the suspended engine mounting shaft on the gearbox (62 N.m)**.

III - FINAL OPERATION

❑ Remove the retaining shoe of the tool **(Mot. 1672)**.

❑ Unlock the retaining bar of the tool **(Mot. 1672)**.

❑ Remove:

- the retaining bar of the tool **(Mot. 1672)**,
- the retaining bars of the tool **(Mot. 1720)**.
- the four pins of the tool **(Mot. 1852)**.

❑ Refit:

- new radiator mounting cross member bolts,
- new rear tie rod bolts.

❑ Torque tighten the **new tie rod rear bolts (105 N.m)**.

❑ Refit the engine tie-bar.

❑ Torque tighten the **engine tie-bar bolts (180 N.m)**.

❑ Refit the engine wiring guide.

❑ Fit the wiring protective sheath on the automatic gearbox.

❑ Refit:

- the mountings of the wiring protective sheath on the automatic transmission,
- the battery disconnection unit (see **Battery disconnection unit: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the air outlet pipe of the air filter unit.

❑ Torque tighten the **air filter box air outlet pipe clips (6 N.m)**.

❑ Connect:

- the oil vapour rebreathing pipe,
- the vacuum pipe from the brake servo.

❑ Fit the clip onto the oil vapour rebreathing hose using the tool **(Mot. 1448)**.

❑ Refit:

- the engine undertray,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

F4R, and AJ0

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
left-hand suspended engine mounting support bolts on the gearbox	**105 N.m**
upper bolts of the left-hand suspended engine mounting rubber pad on the body	**105 N.m**
central nut of the suspended engine mounting shaft on the gearbox	**62 N.m**
tie rod rear bolts	**105 N.m**
lower engine tie-bar bolt on the subframe	**115 N.m**
lower engine tie-bar bolt on the engine tie-bar support	**190 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection).
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

123949

❑ Remove:

- the bolt (**1**) from the max fuse box,
- the max fuse box clip (**2**) .

❑ Move the max fuse box to one side.

F4R, and AJ0

123459

❑ Remove the injection computer mounting nut (**3**) .

❑ Remove:

- the injection computer mounting,
- the engine wiring channel.

123177

❑ Remove:

- the lower engine tie-bar bolt (**4**) on the engine tie-bar support,
- the bolt (**5**) from the lower engine tie-bar on the sub-frame,
- the lower engine tie-bar.

124125

❑ Remove the nuts (**6**) from the exhaust bracket.

❑ Move the exhaust pipe to one side.

❑ Remove the exhaust bracket seal.

128247

❑ Remove the tie rod rear bolts (**7**) .

F4R, and AJ0

128248

- ❑ Fit the short pins of the tool **(Mot. 1852)** (**8**) in place of the tie rod rear bolts.
- ❑ Position the first retaining bar of the tool **(Mot. 1720)** (**9**) .

128245

- ❑ Remove the radiator mounting cross member bolts (**10**) .

128246

- ❑ Fit the long pins of the tool **(Mot. 1852)** (**11**) in place of the radiator mounting cross member bolts.
- ❑ Position the second retaining bar of the tool **(Mot. 1720)** (**12**) .

F4R, and AJ0

128243

- Fit the retaining bar of the tool **(Mot. 1672)** (**13**) perpendicular to the retaining bars of the tool **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**14**) .

F4R, and AJ0

134932

❏

Note:

The positioning of the retaining shoe (**15**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❏ Fit the retaining shoe of the tool **(Mot. 1672)** under the gearbox lower casing.

❏ Adjust the retaining shoe of the tool **(Mot. 1672)** under the gearbox lower casing.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124140

❏ Remove the central nut (**16**) from the rubber pad on the left-hand suspended engine mounting.

❏ Slightly lower the engine until the shaft detaches from the suspended engine mounting on the gearbox.

❏ Remove the upper bolts of the left-hand suspended engine mounting rubber pad (**17**) on the body.

❏ Loosen the lower bolts of the left-hand suspended engine mounting rubber pad (**18**) on the body.

❏ Remove the rubber pad from the left-hand suspended engine mounting.

F4R, and AJ0

124139

❑ Remove:

- the bolts (**19**) from the gearbox mounting,
- the left-hand suspended engine mounting support from the gearbox.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the exhaust bracket gasket,
- the rear tie rod bolts,
- the radiator mounting cross member bolts.

II - OPERATION FOR REFITTING PART CONCERNED

❑ Refit the left-hand suspended engine mounting support on the gearbox.

❑ Torque tighten the **left-hand suspended engine mounting support bolts on the gearbox (105 N.m)**.

❑ Refit the left-hand suspended engine mounting rubber pad on the body.

❑ Torque tighten the **upper bolts of the left-hand suspended engine mounting rubber pad on the body (105 N.m)**.

❑ Tighten the lower bolts of the left-hand suspended engine mounting rubber pad on the body.

❑ Slightly raise the engine until the suspended engine mounting rubber pad on the gearbox comes into contact with the suspended engine mounting rubber pad support on the gearbox.

❑ Torque tighten the **central nut of the suspended engine mounting shaft on the gearbox (62 N.m)**.

III - FINAL OPERATION

❑ Remove the retaining shoe of the tool **(Mot. 1672)**.

❑ Unlock the retaining bar of the tool **(Mot. 1672)**.

❑ Remove:

- the retaining bar of the tool **(Mot. 1672)**,
- the retaining bars of the tool **(Mot. 1720)**.
- the four pins of the tool **(Mot. 1852)**.

❑ Refit:

- new radiator mounting cross member bolts,
- new rear tie rod bolts.

❑ Torque tighten the **tie rod rear bolts (105 N.m)**.

❑ Refit a new exhaust flange seal.

❑ Fit the exhaust pipe.

❑ Refit:

- the exhaust flange nuts,
- the lower engine tie-bar.

❑ Tighten to torque:

- the **lower engine tie-bar bolt on the subframe (115 N.m)**,
- the **lower engine tie-bar bolt on the engine tie-bar support (190 N.m)**.

❑ Fit:

- the engine wiring channel,
- the injection computer support.

❑ Refit the injection computer mounting nut.

❑ Fit the max fuse box.

❑ Refit:

- the max fuse box bolt,
- the max fuse box clip,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery),
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),

F4R, and AJ0

- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front left-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- the engine undertray,
- the engine cover.

V9X

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
bolts of the suspended engine mounting support shaft on the gearbox	**105 N.m**
rubber pad upper bolts of the suspended engine mounting on the gearbox	**105 N.m**
central nut of the suspended engine mounting shaft on the gearbox	**62 N.m**
tie rod rear bolts	**105 N.m**
upper engine tie-bar bolts	**115 N.m**
bolt of the upper engine tie-bar bracket	**62 N.m**
earth nuts on the front left-hand side member	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the left-hand headlight (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) .

137883

❑ Remove the bolt (**1**) from the max fuse box.

137882

❑ Remove the clip (**2**) from the max fuse box.

❑ Move the max fuse box to one side.

V9X

138117

❑ Remove the bolts (**3**) of the « support - battery disconnection unit » assembly.

138115

❑ Remove:

- the bolt (**4**) of the engine wiring protective sheath,
- the nut (**5**) of the engine wiring protective sheath.

❑ Unclip the supply wiring (**6**) of the battery disconnection unit.

138114

❑ Remove the earth nuts (**7**) from the front left-hand side member.

❑ Move the earth wiring away from the front left-hand side member.

❑ Unclip the automatic transmission computer wiring (**8**) .

❑ Move aside the engine wiring protective sheath.

V9X

138116

❑ Remove:

- the bolt (**9**) of the rigid cooling pipe support,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Move aside the rigid cooling pipes.

137040

❑ Loosen the bolt (**10**) of the upper engine tie-bar bracket.

❑ Remove:

- the bolts (**11**) of the upper engine tie-bar bracket,
- the upper engine tie-bar.

137051

❑ Remove the tie rod rear bolts (**12**) .

137050

❑ Fit the short pins of the tool **(Mot. 1852)** (**13**) in place of the tie rod rear bolts.

❑ Position the first retaining bar (**14**) of the tool **(Mot. 1720)**.

V9X

128250

❑ Remove the radiator mounting cross member bolts (**15**) .

137049

❑ Fit the long pins of the tool **(Mot. 1852)** (**16**) in place of the radiator mounting cross member bolts.

❑ Position the second retaining bar (**17**) of the tool **(Mot. 1720)**.

128249

❑ Fit the retaining bar (**18**) of the tool **(Mot. 1672)** perpendicular to the retaining bars of the tool **(Mot. 1720)**.

❑ Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**19**) .

V9X

138111

❑

Note:

The positioning of the retaining shoe (**20**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❑ Fit the retaining shoe of the tool **(Mot. 1672)** under the gearbox casing.

❑ Adjust the retaining shoe of the tool **(Mot. 1672)** under the gearbox casing.

II - OPERATION FOR REMOVAL OF PART CONCERNED

138113

❑ Remove the central nut (**21**) from the suspended engine mounting support shaft on the gearbox.

❑ Slightly lower the engine until the support shaft detaches from the suspended engine mounting on the gearbox.

V9X

138112

- ❑ Remove the upper bolts (**22**) from the suspended engine mounting rubber pad on the gearbox.
- ❑ Loosen the lower bolts (**23**) of the suspended engine mounting rubber pad on the gearbox.
- ❑ Remove the rubber pad of the suspended engine mounting from the gearbox.

138110

- ❑ Remove the bolt (**24**) from the power-assisted steering pipe support.
- ❑ Remove the power-assisted steering pipe.

138108

138109

- ❑ Remove the bolts (**25**) from the sheath of the battery disconnection unit supply wiring.
- ❑ Remove the sheath of the battery disconnection unit supply wiring.

V9X

138107

❑ Remove:

- the bolts (**26**) from the suspended engine mounting support shaft on the gearbox,
- the suspended engine mounting support shaft from the gearbox.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace:

- the radiator mounting cross member bolts,
- the tie rod rear bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the suspended engine mounting support shaft on the gearbox.

❑ Torque tighten the **bolts of the suspended engine mounting support shaft on the gearbox (105 N.m)**.

❑ Fit the protective sheath of the battery disconnection unit supply wiring.

❑ Refit the bolts for the sheath of the battery disconnection unit supply wiring.

❑ Fit the power-assisted steering pipe.

❑ Refit:

- the bolt of the power-assisted steering pipe support,
- the suspended engine mounting rubber pad from the gearbox.

❑ Torque tighten the **rubber pad upper bolts of the suspended engine mounting on the gearbox (105 N.m)**.

❑ Slightly raise the engine until the suspended engine mounting rubber pad on the gearbox comes into contact with the suspended engine mounting rubber pad support on the gearbox.

❑ Torque tighten the **central nut of the suspended engine mounting shaft on the gearbox (62 N.m)**.

III - FINAL OPERATION

❑ Remove the retaining shoe of the tool **(Mot. 1672)**.

❑ Unlock the retaining bar of the tool **(Mot. 1672)**.

❑ Remove:

- the retaining bar of the tool **(Mot. 1672)**,
- the retaining bars of the tool **(Mot. 1720)**.
- the four pins of the tool **(Mot. 1852)**.

❑ Refit:

- new radiator mounting cross member bolts,
- new rear tie rod bolts.

❑ Torque tighten the **tie rod rear bolts (105 N.m)**.

❑ Refit the upper engine tie-bar.

❑ Tighten to torque:

- the **upper engine tie-bar bolts (115 N.m)**,
- the **bolt of the upper engine tie-bar bracket (62 N.m)**.

❑ Refit the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

❑ Fit the rigid cooling pipes.

❑ Refit the bolt of the rigid cooling pipe support.

❑ Fit the engine wiring protective sheath.

❑ Clip on the automatic transmission computer wiring.

❑ Fit the earth wiring on the front left-hand side member.

❑ Torque tighten the **earth nuts on the front left-hand side member (8 N.m)**.

❑ Clip on the supply wiring of the battery disconnection unit.

❑ Refit:

- the nut of the engine wiring protective sheath,

V9X

- the bolt of the engine wiring protective sheath,
- the bolts of the « support - battery disconnection unit » assembly.

❏ Fit the max fuse box.

❏ Refit:

- the max fuse box clip,
- the max fuse box bolt,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-13**) ,
- the left-hand headlight (see **Headlight: Removal - Refitting**) (80B, Headlights),
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch liners (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Adjust the headlight beams (see **Headlight: Adjustment**) (80B, Headlights).

❏ Refit the engine cover.

F4R

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
bolts securing the engine rubber pad on the body	**62 N.m**
engine cover bolts on the engine mounting	**62 N.m**
tie-rod rear bolts	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

128247

❑ Remove the tie-rod rear bolts (**1**) .

128248

❑ Fit the short pins of the tool **(Mot. 1852)** (**2**) in place of the tie-rod rear bolts.

❑ Position the first retaining bar of the tool **(Mot. 1720)** (**3**) .

128245

❑ Remove the radiator mounting cross member bolts (**4**) .

F4R

128246

- Fit the long pins of the tool **(Mot. 1852)** (**5**) in place of the radiator mounting cross member bolts.
- Position the second retaining bar of the tool **(Mot. 1720)** (**6**) .

F4R

128243

- Fit the retaining bar of the tool **(Mot. 1672)** (**7**) perpendicular to the retaining bars of the tool **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on two sides using the tool **(Mot. 1720)** (**8**) .

F4R

128244

❏

> Note:
>
> The positioning of the retaining shoe (**9**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❏ Fit the retaining shoe **(Mot. 1672)** of the tool (**9**) under the sump.

❏ Adjust the retaining shoe of the tool **(Mot. 1672)** under the sump.

123176

❏ Unclip the fuel supply pipe at (**10**) .

123176

❏ Remove the bolts (**11**) from the expansion bottle.

123181

❏ Move aside the expansion bottle by:

- pushing the expansion bottle towards the engine at (**A**) ,
- pulling the expansion bottle at (**B**) .

F4R

II - OPERATION FOR REMOVAL OF PART CONCERNED

123175

❑ Remove:

- the upper suspended engine mounting bolts (**12**) ,
- the upper suspended engine mounting (**13**) .

123175

❑ Remove:

- the bolts (**14**) securing the engine rubber pad on the body,
- the engine cover bolts (**15**) on the engine mounting,
- the right-hand suspended engine mounting.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the right suspended engine mounting.

❑ Fit without tightening:

- the engine cover bolts on the engine mounting,
- the bolts securing the engine rubber pad on the body.

❑ Refit the upper suspended engine mounting.

❑ Tighten the upper suspended engine mounting.

❑ Tighten to torque:

- the **bolts securing the engine rubber pad on the body (62 N.m)**,
- the **engine cover bolts on the engine mounting (62 N.m)**.

II - FINAL OPERATION.

❑ Fit the expansion bottle by:

- inserting the expansion bottle into the holes in the body,
- pushing the expansion bottle away from the engine.

❑ Refit the expansion bottle bolt.

❑ Clip the fuel supply pipe on the right-hand suspended engine mounting.

❑ Remove the retaining shoe of the tool **(Mot. 1672)**.

❑ Unlock the retaining bar of the tool **(Mot. 1672)**.

❑ Remove:

- the retaining bar of the tool **(Mot. 1672)**,
- the retaining bars of the tool **(Mot. 1720)**.

❑ Remove the four pins of the tool **(Mot. 1852)**.

❑ Refit:

- the radiator mounting cross member bolts,
- the tie-rod rear bolts.

❑ Torque tighten the **tie-rod rear bolts (105 N.m)**.

❑ Refit:

- the engine undertray,
- the engine cover.

M4R

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
bolts of the suspended engine mounting rubber pad	**62 N.m**
bolts of the suspended engine mounting cover	**62 N.m**
tie-rod rear bolts	**105 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING
To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

123347

❑ Remove:

- the rear suspended engine mounting bolts (**1**) ,
- the rear suspended engine mounting.

128251

❑ Remove the tie-rod rear bolts (**2**) .

M4R

128252

- Fit the short pins of the tool **(Mot. 1852)** (**3**) in place of the tie-rod rear bolts.
- Position the first retaining bar of the tool **(Mot. 1720)** (**4**) .

128250

- Remove the radiator mounting cross member bolts (**5**) .

128253

- Fit the long pins of the tool **(Mot. 1852)** (**6**) in place of the radiator mounting cross member bolts.
- Position the second retaining bar of the tool **(Mot. 1720)** (**7**) .

M4R

128249

- Fit the retaining bar of the tool **(Mot. 1672)** (**8**) perpendicular to the retaining bars of the **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on two sides using the tool **(Mot. 1720)** (**9**) .

M4R

128254

❑

> Note:
>
> The positioning of the retaining shoe (**10**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❑ Fit the retaining shoe **(Mot. 1672)** of the tool (**10**) under the sump.

❑ Adjust the retaining shoe of the tool **(Mot. 1672)** under the sump.

123403

❑ Unclip the fuel supply pipe (**11**) :

- the expansion bottle,
- from the suspended engine mounting cover.

❑ Disconnect the fuel supply pipe (**12**) from the injector rail.

❑ Insert the blanking plugs.

123402

❑ Remove the bolts (**13**) from the expansion bottle.

M4R

123403

❑ Move aside the expansion bottle by:

- pushing the expansion bottle at (**X**) ,
- pulling the expansion bottle at (**Y**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

123405

❑ Remove the bolts (**15**) from the suspended engine mounting rubber pad.

❑ Slightly raise the engine until the rubber pad detaches from the suspended engine mounting.

❑ Remove:

- the bolts (**14**) from the suspended engine mounting cover,
- the right-hand suspended engine mounting.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the right-hand suspended engine mounting,
- the bolts of the suspended engine mounting cover.

❑ Lower the engine until the rubber pad touches the suspended engine mounting.

❑ Refit the bolts of the suspended engine mounting rubber pad.

❑ Tighten to torque:

- the **bolts of the suspended engine mounting rubber pad (62 N.m)**,
- the **bolts of the suspended engine mounting cover (62 N.m)**.

M4R

II - FINAL OPERATION.

- ❑ Fit the expansion bottle by:
  - inserting the expansion bottle into the holes in the body,
  - pushing the expansion bottle towards the engine.
- ❑ Refit the expansion bottle bolt.
- ❑ Clip the fuel supply pipe:
  - on the expansion bottle,
  - on the suspended engine mounting cover.
- ❑ Remove the blanking plugs from the fuel supply pipe.
- ❑ Connect the fuel supply pipe on the injector rail.
- ❑ Remove the retaining shoe of the tool **(Mot. 1672)**.
- ❑ Unlock the retaining bar of the tool **(Mot. 1672)**.
- ❑ Remove:
  - the retaining bar of the tool **(Mot. 1672)**,
  - the retaining bars of the tool **(Mot. 1720)**.
- ❑ Remove the four pins of the tool **(Mot. 1852)**.
- ❑ Refit:
  - the radiator mounting cross member bolts,
  - the tie-rod rear bolts.
- ❑ Torque tighten the **tie-rod rear bolts (105 N.m)**.
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

M9R

Special tooling required	
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Tightening torques ▽	
engine mounting bolts on the engine	**62 Nm**
engine mounting bolts on the body	**62 Nm**
engine tie-bar bolt on the body	**115 Nm**
engine tie-bar strut bolt on the engine	**62 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Unpick and remove:

- the expansion bottle manual priming pump,
- the expansion bottle fuel pipes,
- the engine mounting fuel pipes.

123705

❑ Remove the bolts (**1**) from the expansion bottle.

❑ Pull the expansion bottle in the direction of the arrow.

❑ Move aside the expansion bottle to access the engine mounting bolts.

❑ Mark the position of the rubber pad on the body.

M9R

17765

123703

❑

WARNING

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

❑ Support the engine on the tool **(Mot. 1390)** at (**6**) .

❑ Gently lower the vehicle to release the rubber pad.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123697

❑ Remove:

- the engine tie-bar bolts (**2**) ,
- the engine tie-bar strut bolt (**4**) ,
- the engine tie-bar strut
- the engine tie-bar,
- the engine mounting bolts (**5**) on the bodywork,
- the engine mounting bolts (**3**) on the engine,
- the engine stand.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the engine mounting,
- the engine mounting bolts on the engine.

❑ Torque tighten the **engine mounting bolts on the engine (62 Nm)**.

❑ Lower the engine and position the rubber pad according to the marks made when it was removed.

❑ Refit the engine mounting bolts on the body.

❑ Torque tighten the **engine mounting bolts on the body (62 Nm)**.

M9R

- ❏ Refit:
  - the engine tie-bar,
  - the engine tie-bar strut
  - the engine tie-bar strut bolt on the engine mounting,
  - the engine tie-bar bolts.
- ❏ Tighten the engine tie-bar bolt on the engine.
- ❏ Tighten to torque and in order:
  - the **engine tie-bar bolt on the body (115 Nm)**.
  - the **engine tie-bar strut bolt on the engine (62 Nm)**.

II - FINAL OPERATION.

- ❏ Remove the **(Mot. 1390)**.
- ❏ Position the expansion bottle.
- ❏ Tighten the expansion bottle bolt.
- ❏ Refit:
  - the fuel pipes on the expansion bottle,
  - the fuel pipes on the engine mounting,
  - the manual priming pump on the expansion bottle.

K9K

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.
Mot. 1453-01	Additional handle nut for engine lifting support tool Mot. 1453.

Equipment required
indelible pencil
safety strap(s)

Tightening torques ▽	
right-hand suspended engine mounting bolts on the body	**62 Nm**
right-hand suspended engine mounting bolts on the body	**62 Nm**
upper engine tie-bar bolt on the body	**115 Nm**
lower engine tie-bar bolts	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection).

123520

❑ Unclip the fuel pipes at (**1**) .

123402

❑ Remove the bolt (**2**) from the expansion bottle.

K9K

123181

❑ Move aside the expansion bottle using the lugs (**3**) .

123787

❑ Remove:

- the engine undertray bolts,
- the engine undertray,
- the bolts (**4**) from the lower engine tie-bar,
- the lower engine tie-bar.

II - REMOVAL OPERATION FOR PART CONCERNED

123519

❑ Remove:

- the bolt (**5**) from the upper engine tie-bar on the cylinder head,
- the bolt (**6**) from the upper engine tie-bar on the body,
- the upper engine tie-bar.

❑ Mark the position of the right-hand suspended engine mounting on the body using a **indelible pencil**.

K9K

123291

❑ Fit the **(Mot. 1453)** equipped with **(Mot. 1453-01)** (**7**) and a **safety strap(s)** (**8**) .

123519

❑ Remove the right-hand suspended engine mounting bolts (**9**) on the body.

❑ Lift the engine slightly using the **(Mot. 1453)** equipped with the **(Mot. 1453-01)** to detach the rubber pad from the body.

❑ Remove:

- the bolts (**10**) from the right-hand suspended engine mounting on the cylinder head,
- the right-hand suspended engine mounting.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Fit the right-hand suspended engine mounting on the cylinder head.

❑ Refit the right-hand suspended engine mounting bolts on the cylinder head.

❑ Torque tighten the **right-hand suspended engine mounting bolts on the body (62 Nm)**.

❑ Lower the engine using the **(Mot. 1453)** equipped with the **(Mot. 1453-01)** to bring the rubber pad in contact with the body.

❑ Position the rubber pad according to the marks made during removal.

❑ Refit the right-hand suspended engine mounting bolts on the body.

❑ Remove the **(Mot. 1453)** then the **(Mot. 1453-01)**.

❑ Torque tighten the **right-hand suspended engine mounting bolts on the body (62 Nm)**.

❑ Fit the upper engine tie-bar.

❑ Refit:

- the upper engine tie-bar bolt on the body,
- the upper engine tie-bar bolt on the cylinder head.

❑ Torque tighten the **upper engine tie-bar bolt on the body (115 Nm)**.

❑ Tighten the upper engine tie-bar bolt on the cylinder head.

II - FINAL OPERATION.

❑ Refit:

- the lower engine tie-bar,
- the lower engine tie-bar bolts.

❑ Torque tighten the **lower engine tie-bar bolts (190 Nm)**.

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the expansion bottle,
- the expansion bottle bolt.

❑ Tighten the expansion bottle bolt.

❑ Clip on the fuel pipes.

K9K

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (MR 416, 55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine cover.

K4M

Special tooling required	
Mot. 1720	Engine stand.

Tightening torques ▽	
suspended engine mounting cover bolts	**62 Nm**
suspended engine mounting rubber pad bolts	**62 N.m**
bolt on the upper timing cover	**62 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

128619

❑ Position the **(Mot. 1720)** (**1**) .

K4M

128451

❑ Unclip the fuel supply pipe at (**2**) .

128450

❑ Remove the bolts (**3**) from the expansion bottle.

❑ Unclip the expansion bottle

123181

❑ Unclip the expansion bottle by:

- pushing the expansion bottle towards the wing (**A**) ,
- pulling the expansion bottle upwards (**B**) .

❑ Remove the expansion bottle.

❑ Mark the position of the suspended engine mounting rubber pad.

K4M

II - OPERATION FOR REMOVAL OF PART CONCERNED

128449

- ❑ Remove the bolts (**4**) from the suspended engine mounting rubber pad.
- ❑ Slightly raise the engine using the **(Mot. 1720)** until the rubber pad detaches from the suspended engine mounting.
- ❑ Loosen the bolt (**5**) on the upper timing cover.
- ❑ Remove:
  - the bolts (**6**) from the suspended engine mounting cover,
  - the suspended mounting from engine.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

- ❑ Fit the suspended engine mounting.
- ❑ Torque tighten the **suspended engine mounting cover bolts (62 Nm)**.
- ❑ Lower the engine until the rubber pad touches the suspended engine mounting.
- ❑ Position the suspended engine mounting rubber pad in line with the marks made during removal.
- ❑ Tighten to torque:
  - Torque tighten the **suspended engine mounting rubber pad bolts (62 N.m)**,
  - the **bolt on the upper timing cover (62 N.m)**.

II - FINAL OPERATION.

- ❑ Clip on the expansion bottle by:
  - inserting the expansion bottle into the holes in the body,
  - pushing the expansion bottle towards the engine.
- ❑ Clip the fuel supply pipe on the right-hand suspended engine mounting.
- ❑ Remove tool **(Mot. 1720)**
- ❑ Refit:
  - the engine undertray,
  - the engine cover.

V4Y

Special tooling required	
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
right-hand suspended engine mounting bolts	**62 N.m**
engine tie-bar bolts on the right-hand suspended engine mounting	**105 N.m**
lower engine tie-bar bolts	**180 N.m**
new rear tie rod bolts	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

134188

❑ Remove:

- the engine tie-bar bolts (**1**) ,
- the engine tie-bar.

134926

❑ Remove the tie rod rear bolts (**4**) .

V4Y

134927

- Fit the short pins of the tool **(Mot. 1852)** (**5**) in place of the tie rod rear bolts.
- Position the first retaining bar (**6**) of the tool **(Mot. 1720)**.

128250

- Remove the radiator mounting cross member bolts (**7**) .

128253

- Fit the long pins of the tool **(Mot. 1852)** (**8**) in place of the radiator mounting cross member bolts.
- Position the second retaining bar of the tool **(Mot. 1720)** (**9**) .

V4Y

128249

- Fit the retaining bar of the tool **(Mot. 1672)** perpendicular to the retaining bars of the tool **(Mot. 1720)** (**10**) .
- Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**11**) .

V4Y

128254

❏

> Note:
>
> The positioning of the retaining shoe (**12**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❏ Fit the retaining shoe **(Mot. 1672)** of the tool (**12**) under the sump.

❏ Adjust the retaining shoe of the tool **(Mot. 1672)** under the sump.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Remove:

- the lower engine tie-bar bolts,
- the upper engine tie-bar.

135010

❏ Remove:

- the right-hand suspended engine mounting bolts (**13**) ,
- the right-hand suspended engine mounting.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace:

- the radiator mounting cross member bolts,
- the tie rod rear bolts.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the right suspended engine mounting.

❏ Torque tighten the **right-hand suspended engine mounting bolts (62 N.m)**.

❏ Refit the engine tie-bar.

❏ Torque tighten the **engine tie-bar bolts on the right-hand suspended engine mounting (105 N.m)**.

❏ Lower the engine until the rubber pad touches the suspended engine mounting.

III - FINAL OPERATION

❏ Remove the retaining shoe of the tool **(Mot. 1672)**.

❏ Unlock the retaining bar of the tool **(Mot. 1672)**.

V4Y

- Remove:
  - the retaining bar of the tool **(Mot. 1672)**,
  - the retaining bars of the tool **(Mot. 1720)**.
- Remove the four pins of the tool **(Mot. 1852)**.
- Refit the lower engine tie-bar.
- Torque tighten the **lower engine tie-bar bolts (180 N.m)**.
- Refit:
  - new radiator mounting cross member bolts,
  - new rear tie rod bolts.
- Torque tighten the **new rear tie rod bolts (105 N.m)**.
- Refit:
  - the engine undertray,
  - the engine cover.

V9X

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1852	Conversion support studs for Mot. 1720 tool
Mot. 1720	Engine stand.
Mot. 1672	Lower engine support.

Tightening torques ▽	
right-hand suspended engine mounting bolts on the engine	**105 N.m**
bolts of the right-hand suspended engine mounting pad on the body	**62 N.m**
upper engine tie-bar bolts	**115 N.m**
bolt of the upper engine tie-bar bracket	**62 N.m**
tie rod rear bolts	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) .

137868

❑ Remove:

- the clips (**1**) of the windscreen washer filler neck,
- the windscreen washer filler neck.

128450

❑ Unclip the power-assisted steering reservoir (**2**) .

❑ Move the power-assisted steering reservoir to one side.

V9X

137869

❑ Remove:

- the bolts (**3**) from the power steering reservoir support,
- the power steering reservoir mounting.

137870

❑ Unclip the fuel pipes (**4**) from the expansion bottle.

❑ Move the fuel pipes away from the expansion bottle.

❑ Unclip the manual priming pump from the expansion bottle at (**5**) .

❑ Remove:

- the manual priming pump from the expansion bottle,
- the expansion bottle top hose clip **(Mot. 1448)** using the tool (**6**) .

❑ Disconnect the top hose from the expansion bottle.

V9X

137871

❑ Remove the bolt (**7**) from the expansion bottle.

137872

❑ Move the expansion bottle to one side:

- by pulling the expansion bottle at (**X**) ,
- by lifting the expansion bottle at (**Y**) .

137042

❑ Unclip the fuel supply pipes (**8**) from the right-hand suspended engine mounting.

❑ Move the fuel supply pipes away from the right-hand suspended engine mounting.

137043

❑ Unclip the expansion bottle top hose (**9**) from the right-hand suspended engine mounting.

❑ Move aside the expansion bottle top hose.

V9X

137051

❑ Remove the tie rod rear bolts (**10**) .

137050

❑ Fit the short pins of the tool **(Mot. 1852)** (**11**) in place of the tie rod rear bolts.

❑ Position the first retaining bar (**12**) of the tool **(Mot. 1720)**.

128250

❑ Remove the radiator mounting cross member bolts (**13**) .

137049

❑ Fit the long pins of the tool **(Mot. 1852)** (**14**) in place of the radiator mounting cross member bolts.

❑ Position the second retaining bar (**15**) of the tool **(Mot. 1720)**.

V9X

128249

- Fit the retaining bar (**16**) of the tool **(Mot. 1672)** perpendicular to the retaining bars of the tool **(Mot. 1720)**.
- Lock the retaining bar of the tool **(Mot. 1672)** on both sides using the tool **(Mot. 1720)** (**17**) .

V9X

137044

❏

Note:

The positioning of the retaining shoe (**18**) of the tool **(Mot. 1672)** must be the same as illustrated above.

❏ Fit the retaining shoe of the tool **(Mot. 1672)** under the gearbox casing.

❏ Adjust the retaining shoe of the tool **(Mot. 1672)** under the gearbox casing.

II - OPERATION FOR REMOVAL OF PART CONCERNED

137040

❏ Loosen the bolt (**19**) of the upper engine tie-bar bracket.

❏ Remove:

- the bolts (**20**) of the upper engine tie-bar bracket,
- the upper engine tie-bar.

V9X

137038

- ❑ Remove the right-hand suspended engine mounting bolts (**21**) on the body.
- ❑ Lift the engine in order to release the suspended engine mounting.
- ❑ Remove:
  - the bolts (**22**) from the right-hand suspended engine mounting on the engine,
  - the right-hand suspended engine mounting.

REFITTING

I - REFITTING PREPARATION OPERATION

- ❑ Always replace:
  - the radiator mounting cross member bolts,
  - the tie rod rear bolts.

II - REFITTING OPERATION FOR PART CONCERNED

- ❑ Refit the right suspended engine mounting.
- ❑ Torque tighten the **right-hand suspended engine mounting bolts on the engine (105 N.m)**.
- ❑ Lower the engine until the right-hand suspended engine mounting rubber pad touches the body.
- ❑ Pretighten the bolts of the right-hand suspended engine mounting rubber pad on the body.
- ❑ Refit the upper engine tie-bar.
- ❑ Pretighten the upper engine tie-bar bolt on the body.
- ❑ Tighten to torque:
  - the **bolts of the right-hand suspended engine mounting pad on the body (62 N.m)**,
  - the **upper engine tie-bar bolts (115 N.m)**,
  - the **bolt of the upper engine tie-bar bracket (62 N.m)**.

III - FINAL OPERATION

- ❑ Remove the retaining shoe of the tool **(Mot. 1672)**.
- ❑ Unlock the retaining bar of the tool **(Mot. 1672)**.
- ❑ Remove:
  - the retaining bar of the tool **(Mot. 1672)**,
  - the retaining bars of the tool **(Mot. 1720)**.
  - the four pins of the tool **(Mot. 1852)**.
- ❑ Refit:
  - new radiator mounting cross member bolts,
  - new rear tie rod bolts.
- ❑ Torque tighten the **tie rod rear bolts (105 N.m)**.
- ❑ Fit the expansion bottle top hose.
- ❑ Clip the expansion bottle top hose onto the right-hand suspended engine mounting.
- ❑ Fit the fuel pipes on the right-hand suspended engine mounting.
- ❑ Clip the fuel pipes onto the right-hand suspended engine mounting.
- ❑ Position the expansion bottle.
- ❑ Connect the expansion bottle top hose.
- ❑ Fit:
  - the top cooling hose clip using the tool **(Mot. 1448)**,
  - the manual priming pump on the expansion bottle.
- ❑ Clip the manual priming pump onto the expansion bottle.
- ❑ Fit the fuel pipes on the expansion bottle.
- ❑ Clip the fuel pipes onto the expansion bottle.
- ❑ Refit the power-assisted steering reservoir support.
- ❑ Fit the power-assisted steering reservoir.
- ❑ Clip in the power-assisted steering reservoir.
- ❑ Refit:
  - the windscreen washer filler neck,
  - the lower engine tie-bars (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-85**) ,

V9X

- the engine undertray.

❏ Top up the coolant level in the expansion bottle.

❏ Refit the engine cover.

F4R

Tightening torques ▽	
engine tie-bar mounting bolts on the cylinder block	**62 Nm**
engine tie-bar bolt on the subframe	**115 Nm**
engine tie-bar bolt on the cylinder block mounting	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

123177

❑ Remove:

- the engine tie-bar bolt (**1**) on the engine tie-bar mounting on the sump,
- the engine tie-bar bolt (**2**) from the subframe,
- the engine tie-bar .

123179

❑ Remove:

- the rear suspended engine mounting rubber pad bolts (**3**) on the subframe,
- the rear suspended engine mounting rubber pad.

123180

❑ Remove:

- the engine tie-bar mounting bolts (**4**) on the sump,
- the engine tie-bar support,

F4R

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the engine tie-bar support,
- the engine tie-bar mounting bolts on the cylinder block.

❏ Torque tighten the **engine tie-bar mounting bolts on the cylinder block (62 Nm)**.

❏ Refit:

- the rear suspended engine mounting rubber pad,
- the rear suspended engine mounting rubber pad bolts on the subframe.

❏ Tighten the rear suspended engine mounting rubber pad bolts on the subframe.

❏ Refit:

- the engine tie-bar,
- the engine tie-bar bolt from the subframe,
- the engine tie-bar bolt on the engine tie-bar mounting.

❏ Tighten to torque:

- the **engine tie-bar bolt on the subframe (115 Nm)**,
- the **engine tie-bar bolt on the cylinder block mounting (190 Nm)**.

II - FINAL OPERATION.

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

M4R

Tightening torques ▽	
engine tie-bar mounting bolts	**62 Nm**
engine tie-bar bolts	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 408, 02A, Lifting equipment).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION FOR PART CONCERNED

123347

❏ Remove:

- the engine tie-bar bolts (**1**) ,
- the engine tie-bar (**2**) .

123466

❏ Remove:

- the bolts (**3**) from the engine tie-bar mounting on the cylinder block,
- the engine tie-bar mounting (**4**) on the cylinder block.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the engine tie-bar mounting on the cylinder block,
- the engine tie-bar mounting bolts on the cylinder block.

❏ Torque tighten the **engine tie-bar mounting bolts (62 Nm)**.

❏ Refit:

- the engine tie-bar,
- the engine tie-bar bolts.

❏ Torqu tighten the **engine tie-bar bolts (190 Nm)**.

II - FINAL OPERATION.

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

❏ Tighten the engine undertray bolts.

M9R

Tightening torques ▽	
engine tie-bar bolt on the rubber pad	**115 Nm**
engine tie-bar bolt on the engine tie-bar support	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

124159

❑ Remove:

- the engine tie-bar bolts (**1**) ,
- the engine tie-bar.

124160

❑ Remove:

- the rubber pad bolts (**2**) from the engine tie-bar,
- the rubber pad from the engine tie-bar.

124161

❑ Remove:

- the engine tie-bar support bolts (**3**) ,
- the engine tie-bar support,

M9R

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the engine tie-bar support,
- the engine tie-bar support bolts.

❏ Tighten the engine tie-bar support bolts.

❏ Refit:

- the rubber pad to the engine tie-bar,
- the engine tie-bar rubber pad bolts.

❏ Tighten the engine tie-bar rubber pad bolts.

❏ Refit:

- the engine tie-bar,
- the engine tie-bar bolts.

❏ Torque tighten:

- the **engine tie-bar bolt on the rubber pad (115 Nm)**,
- the **engine tie-bar bolt on the engine tie-bar support (190 Nm)**

II - FINAL OPERATION.

❏ Refit:

- the engine undertray,
- the engine undertray bolts.

Lower engine tie-bar: Removal - Refitting

K9K, and 780

Tightening torques ▽	
lower engine tie-bar support bolts	**62 Nm**
lower engine tie-bar bolts	**190 Nm**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (MR 415, 02A, Lifting equipment).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray.

❑ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).

❑ Remove:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox).

II - REMOVAL OPERATION FOR PART CONCERNED

123787

❑ Remove:

- the bolts (**1**) from the lower engine tie-bar,
- the lower engine tie-bar,
- the lower engine tie-bar mounting bolts (**2**) ,
- the lower engine tie-bar support.

REFITTING

I - REFITTING PREPARATIONS OPERATION

❑ Always replace the right-hand differential output seal.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the lower engine tie-bar support,
- the lower engine tie-bar support bolts.

❑ Torque tighten the **lower engine tie-bar support bolts (62 Nm)**.

❑ Refit:

- the lower engine tie-bar,
- the lower engine tie-bar bolts.

❑ Torque tighten the **lower engine tie-bar bolts (190 Nm)**.

K9K, and 780

III - FINAL OPERATION.

❑ Refit:

- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (MR 415, 21A, Manual gearbox),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (MR 415, 29A, Driveshafts).

❑ Fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (MR 415, 21A, Manual gearbox).

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (MR 415, 35A, Wheels and tyres).

K4M

Tightening torques ▽	
rear suspended engine mounting bolts	**62 Nm**
rear suspended engine mounting bolt on the rear suspended engine mounting support	**180 Nm**
rear suspended engine mounting bolt on the subframe	**180 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

128259

❑ Remove:

- the rear suspended engine mounting bolt (**1**) from the subframe,
- the rear suspended engine mounting bolt (**2**) from the rear suspended engine mounting support,
- the rear suspended engine mounting.

128258

❑ Remove:

- the rear suspended engine mounting support bolts (**3**) ,
- the rear suspended engine mounting support.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the rear suspended engine mounting support.

❑ Torque tighten the **rear suspended engine mounting bolts (62 Nm)**.

❑ Refit the rear suspended engine mounting.

❑ Tighten to torque:

- the **rear suspended engine mounting bolt on the rear suspended engine mounting support (180 Nm)**,
- the **rear suspended engine mounting bolt on the subframe (180 N.m)**.

II - FINAL OPERATION.

❑ Refit the engine undertray.

V4Y

Tightening torques ▽	
driveshaft relay bearing bolts	**62 N.m**
engine tie-bar bolts	**180 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

II - OPERATION FOR REMOVAL OF PART CONCERNED

134188

❑ Remove:

- the engine tie-bar bolts (**1**) ,
- the engine tie-bar,
- the rear suspended engine mounting bolts (**2**) on the subframe,
- the rear suspended engine mounting rubber pad.

134512

❑ Remove:

- the bolts (**3**) from the driveshaft relay bearing,
- the driveshaft relay bearing.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the driveshaft relay bearing.

❑ Torque tighten the **driveshaft relay bearing bolts (62 N.m)**.

❑ Refit:

- the rear suspended engine mounting rubber pad,
- the engine tie-bar.

❑ Torque tighten the **engine tie-bar bolts (180 N.m)**.

II - FINAL OPERATION

❑ Refit:

- the front right-hand driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

V9X

Tightening torques ▽	
bolts of the lower engine tie-bar mounting on the gearbox side	**62 N.m**
bolts of the lower engine tie-bar on the gearbox side	**105 N.m**
bolts of the lower engine tie-bar mounting on the cylinder block at the timing end	**62 N.m**
lower engine tie-bar bolts at the timing end	**180 N.m**
lower engine tie-bar bolts on the gearbox side	**105 N.m**

REMOVING THE LOWER ENGINE TIE-BAR ON THE GEARBOX SIDE

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine undertray bolts,
- the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133896

❑ Remove:

- the bolts (**1**) of the lower engine tie-bar on the gearbox side,
- the lower engine tie-bar on the gearbox side.

137046

❑ Remove:

- the bolts (**2**) of the lower engine tie-bar mounting from the cylinder block on the gearbox side,
- the lower engine tie-bar mounting on the gearbox side.

V9X

REFITTING THE LOWER ENGINE TIE-BAR ON THE GEARBOX SIDE

I - REFITTING OPERATION FOR PART CONCERNED

137046

- ❑ Refit the lower engine tie-bar mounting on the gearbox side.
- ❑ Pretighten in order the bolts of the lower engine tie-bar mounting on the gearbox side.
- ❑ Torque tighten in order the **bolts of the lower engine tie-bar mounting on the gearbox side (62 N.m)**.
- ❑ Refit the lower engine tie-bar on the gearbox side.
- ❑ Torque tighten the **bolts of the lower engine tie-bar on the gearbox side (105 N.m)**.

II - FINAL OPERATION

- ❑ Refit the engine undertray.

REMOVING THE LOWER ENGINE TIE-BAR ON THE TIMING END

I - REMOVAL PREPARATION OPERATION

- ❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ❑ Remove:
  - the engine undertray bolts,
  - the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED

133896

- ❑ Remove:
  - the bolts (**1**) of the lower engine tie-bar on the gearbox side,
  - the lower engine tie-bar on the gearbox side,
  - the bolts (**2**) from the lower engine tie-bar on the timing end,
  - the lower engine tie-bar on the timing end.

V9X

137046

❑ Remove:

- the bolts (**3**) of the lower engine tie-bar mounting from the cylinder block on the timing end,
- the lower engine tie-bar mounting on the timing end.

137048

❑ Remove:

- the bolts (**4**) of the engine tie-bar rubber pad on the subframe at the timing end,
- the engine tie-bar rubber pad on the subframe at the timing end.

REFITTING THE LOWER ENGINE TIE-BAR ON THE TIMING END

I - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the engine tie-bar rubber pad on the subframe at the timing end,
- the lower engine tie-bar mounting on the cylinder block at the timing end.

❑ Torque tighten the **bolts of the lower engine tie-bar mounting on the cylinder block at the timing end (62 N.m)**.

❑ Refit:

- the lower engine tie-bar on the timing end,
- the lower engine tie-bar on the gearbox side.

❑ Tighten to torque:

- the **lower engine tie-bar bolts at the timing end (180 N.m)**,
- the **lower engine tie-bar bolts on the gearbox side (105 N.m)**.

II - FINAL OPERATION

❑ Refit the engine undertray.

K9K, and 782

Tightening torques ▽	
lower engine tie-bar mounting bolts	**62 N.m**
lower engine tie-bar bolts	**190 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray.

❏ Drain the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).

❏ Remove:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts),
- the right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox).

II - OPERATION FOR REMOVAL OF PART CONCERNED

123787

❏ Remove:

- the bolts (**1**) from the lower engine tie-bar,
- the lower engine tie-bar,
- the lower engine tie-bar support bolts (**2**) ,
- the lower engine tie-bar support.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the lower engine tie-bar support.

❏ Torque tighten the **lower engine tie-bar mounting bolts (62 N.m)**.

❏ Refit the lower engine tie-bar.

❏ Torque tighten the **lower engine tie-bar bolts (190 N.m)**.

II - FINAL OPERATION

❏ Refit:

- a new right-hand differential output seal (see **Differential output seal: Removal - Refitting**) (21A, Manual gearbox),
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshafts).

K9K, and 782

- ❑ Fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox).
- ❑ Refit:
  - the engine undertray,
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).