Renault

LOGAN Bblnycsa C 2009 roga

SANDERO

SANDERO Stepway

с двигателями 1,4 – 1,6 (8 V) и 1,6 (16 V)

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Своими силами

RENAULT
LOGAN
since 2009
SANDERO
SANDERO Stepway

with engines 1.4-1.6 (8V) and 1.6 (16V)

DEVICE MAINTENANCE

DIAGNOSTIC REPAIR

издательство За рулем

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Renault Logan from 2009, Sandero, Sandero Stepway with engines 1.4-1.6 (8V); 1.6 (16V)

Device, service, diagnostics, repair

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P39 **Renault Logan from 2009, Sandero, Sandero Stepway with engines 1,4-1,6 (8V); 1,6 (16V). Device, maintenance, diagnostics, repair.** Illustrated manual. - Moscow: LLC "Book Publishing House "Za Rulem", 2011. - 336 p.: il. - (The series "By my own efforts").

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The book is from a series of multi-color illustrated manuals on maintenance and repair of cars by yourself. This manual provides detailed information on the design of all systems, individual components and units of cars Renault Logan from 2009, Sandero, Sandero Stepway with engines 1,4-1,6 (8V); 1,6 (16V). Possible malfunctions of cars, their causes and ways of elimination are described in detail. Maintenance and repair operations are presented in color photos and provided with detailed comments. The Appendices show tools, lamps and exclusive diagrams of electrical equipment, lubricants and operating fluids, tightening torques of threaded joints are given. The book is intended for drivers who wish to service and repair their cars themselves, as well as for service station employees.

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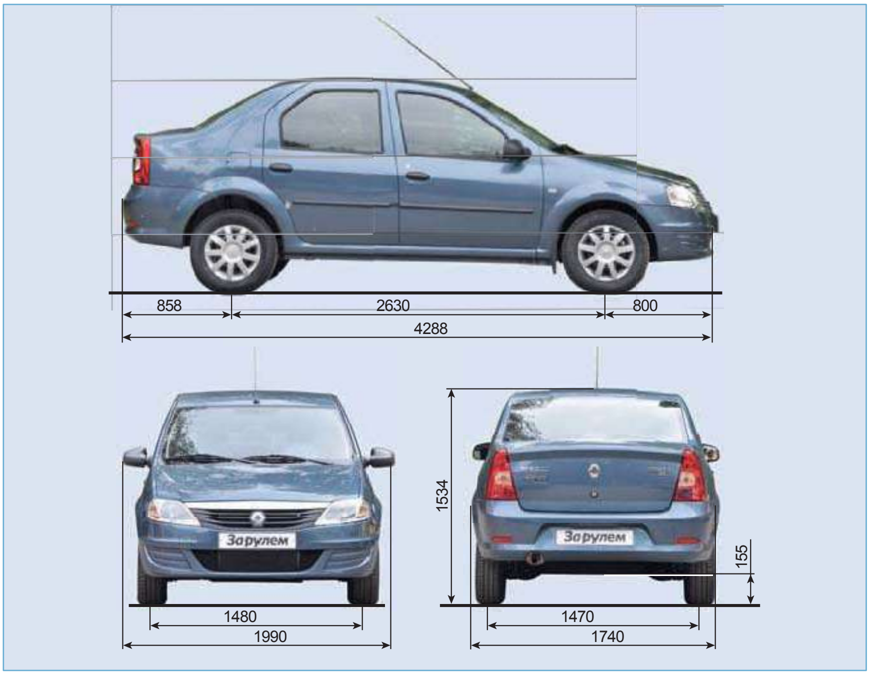
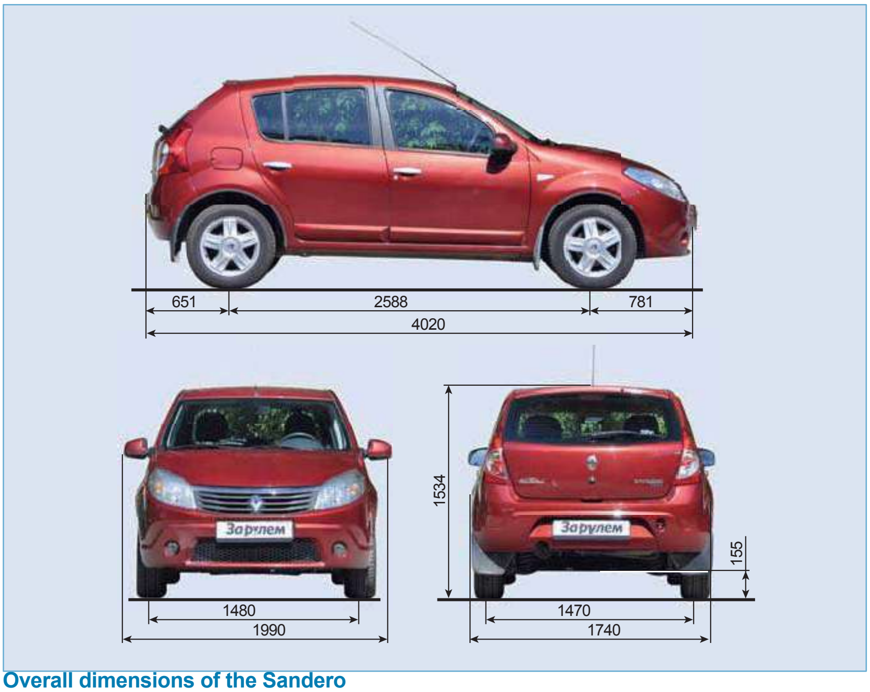
GENERAL INFORMATION

Technical description

In April 2005 in Moscow the company "Avtoframos" started production of Renault Logan cars with sedan body, and in December 2009 it started production of the updated Logan. - In December 2009, the company started producing the updated Logan. The r e s t y l e d model externally differs from the previous one in grille, bumpers, hood, trunk lid, headlights and taillights. In the interior, the design of the dashboard, steering wheel and door trim has been changed. Some vehicles were equipped with Bosch ABS of the eighth generation with the function of brake force distribution during emergency braking. Since the end of 2009, Avtoframos started production of a five-door hatchback Sandero ("Sandero") on the Logan platform. Compared to the sedan, t h e hatchback has a smaller wheelbase by 42 mm. Logan and Sandero components are unified by approximately 70%, including the cars have a common range of power units and transmission. The cars are equipped with four-cylinder 8-valve gasoline engines with a capacity of 1.4 and 1.6 liters
55 kW (75 hp)
and 62 kW (84 hp) respectively, as well as a 1.6-liter 16-valve engine with a power output of 75 kW (102 hp). All engines meet Euro-4 emission standards. Cars with a 1.6 liter engine in 16-valve version are equipped with both manual and automatic transmission.

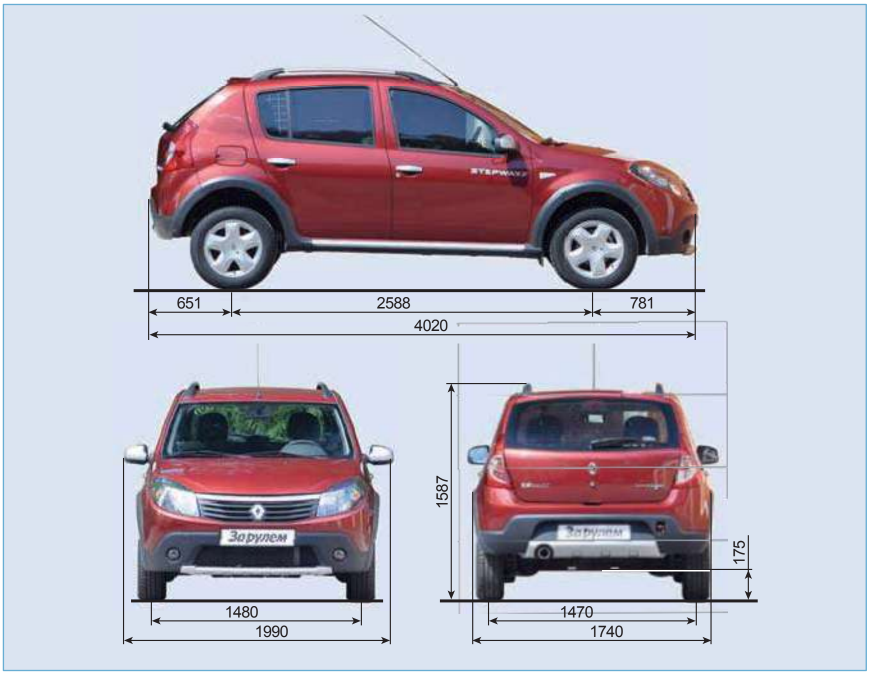


Logan dimensions



Overall dimensions of the Sandero

I'm not sure what y o u ' r e talking about.



In 2010, Avtoframos started producing an all-road version of the hatchback - Sandero Stepway. "In 2010, Avtoframos started producing a n all-road version of the hatchback - Sandero Stepway ("Sandero Stepway"). The car differs from the base model by a different gearbox and the design of the clutch actuator. Other wheel drives are used and ground clearance is increased by 20 mm (due to new shock absorbers and springs). The vehicle also differs in headlights, bumpers, roof rails and decorative sill plates a n d wheel arches. The cars are equipped with 1.6 liter engines (8 and 16-valve), manual and automatic transmissions (only with 16-valve engine).

Overall dimensions of the Sandero Stepway

Technical specifications vehicles

General data			
Parameter	**Logan**	**Sandero**	**Sandero Stepway**
Body type	sedan	hatchback	hatchback
Number of seats	5	5	5
Number of doors	4	5	5
Curb weight, kg	975-1165*	975-1172*	1062-1193*
Maximum permissible mass, kg	1535-1600*	1470-1575*	1561-1615*
Permissible gross weight of towed trailer not equipped with brakes, kg	525-580*	565-580*	565-605*
Permissible gross weight of towed trailer equipped with brakes, kg	1100	1050-1100*	1050-1100*
Permissible load on the h i t c h , kg	75	75	60
Permissible load on roof rack (including roof rack weight), kg	80	80	80
Trunk volume, l	510	320	320
Maximum speed, km/h	162-180*	162-180*	162-180*
Acceleration time to 100 km/h, s	10,5-13,0*	10,5-13,0*	12,4
Fuel consumption, l/100 km city cycle country cycle mixed cycle	9,4-11.8* 5,5-6.7* 6,9-8,4*	9,4-11.8* 5,5-6.7* 6,9-8,4*	10,2-12,1* 6,1-6,6* 7,6-8,6*
Smallest turning radius, m	5,25	5,25	5,25
Fuel tank capacity, l	50	50	50

* Depending on equipment.

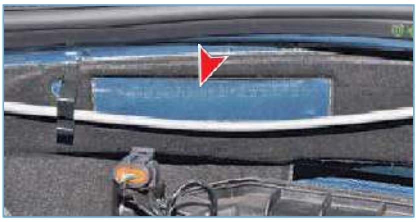
Engine			
Model	**K7J**	**K7M**	**K4M**
Type	Gasoline, four-stroke, four-cylinder, in-line engine		
Location	Front, transversely		
Working volume, cm^3	1390	1598	1598
Number of valves	8	8	16
Cylinder diameter and piston stroke, mm	79,5×70	79,5×80,5	79,5×80,5
Compression ratio	9,5	9,5	9,8
Rated power, kW (h p) at crankshaft speed, min^{-1}	55 (75) 5500	62 (84) 5500	75 (102) 5750
Maximum torque, N-m at crankshaft speed, min^{-1}	112 3000	124 3000	145 3750
Power system	Distributed fuel injection		
Fuel (octane number)	Unleaded gasoline with octane number not lower than 91		
Ignition system	Electronic, part of the engine management system		
Toxicity standards	Euro 4		

Transmission		
Clutch	Single disk, dry, diaphragm spring	
Clutch release actuator	Cable; hydraulic (Sandero Stepway)	
Transmission model	JH1(1.4); JH3(1.6); JR5 (Sandero Stepway)	
Transmission type	**mechanical**	**automatic**
Number of gears	5	4
Gearbox ratios: I transfer II transmission III transmission IV transmission V transmission Reverse gear	JH1; JH3 3.73 2,05 1,39 1,03 0,79 3,55	n.d.
Main gear ratio	4.21; 4.5 (Sandero Stepway)	
Drive wheel drive	Shafts with constant velocity joints	

Running gear	
Front suspension	Independent, McPherson type, with telescopic hydraulic shock absorber struts, coil springs, lower cross arms and stabilizer bar.
Rear suspension	Semi-independent, with coil springs, telescopic hydraulic shock absorbers and longitudinal arms, connected by a U-shaped cross beam and a torsion-type stabilizer integrated into it.
Wheels	Discs, steel or alloy wheels
Rim width	6J14 or 6J15
Tires	Radial, tubeless
Tire size	185/70R14 or 185/65R15.
Steering	
Steering mechanism	Gear - power steering rack with or without power steering
Steering drive	Two steering rods connected by ball joints to the rack and knuckle arms
Steering speed with/without power steering	3,2 /4,5
Brake system	
Service brake system	Hydraulic, two-circuit - diagonal, with vacuum booster. Some vehicles are equipped with anti-lock brakes, others with brake force regulator in the rear wheel brakes drive
Front wheel brake mechanism	Ventilated or non-ventilated disc, with single-piston floating caliper and automatic disc/pad gap adjustment
Rear wheel brake mechanism	Drum, with self-aligning pads and automatic pad-to-drum clearance adjustment
Parking brake	Manual, with cable drive to rear wheel brake shoes
Electrical equipment	
Electrical diagram	Single-wire, minus terminals of power supplies and consumers are connected to the vehicle's ground (body and powertrain).
Rated voltage, V	12
Battery pack	Starter, 70 Ah capacity
Generator	AC, three-phase with built-in rectifier unit and electronic voltage regulator
Maximum current delivered by the generator, A	70-150
Mitsubishi starter	With permanent magnet excitation, electromagnetic traction relay and freewheeling clutch
Valeo starter	With electromagnet excitation, electromagnetic traction relay and freewheeling clutch

Passport data vehicle

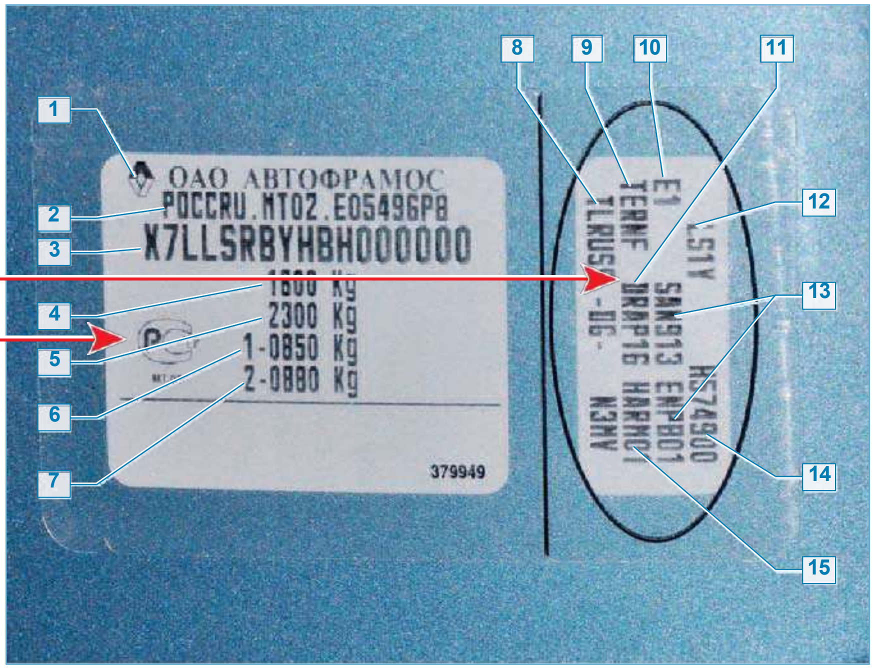
At the bottom of the front door pillar. There is a pro- the manufacturer, which contains information about the vehicle



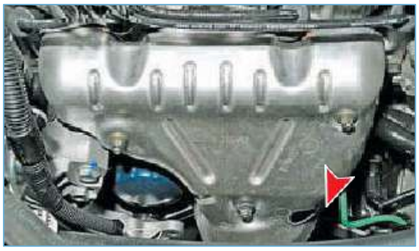
Vehicle Identification Number (VIN) located in the underhood - stamped on the air intake box shelf

Example of decoding of identification number X7LLSRBYHBH000000: X7L - according to international standards is the manufacturer's code; **L** - body type (**L** - sedan; **B** - hatchback); **SR** - car model; **B** - airbag (**A** - airbag); **B** - presence of airbag (**A** - airbag).
B - driver's s a f e t y cushion; **C** - airbag.
4 - without airbag); **YH** - engine model (**HH** - 1.6 (8V) engine; **YH** - 1.6 (16V) engine; **GH** - 1.4 engine); **B** - model year of the car (**B** - 2011; **A** - 2010); **H000000** - engine model (HH - 1.6 (8V) engine; **YH** - **1.6** (16V) engine; **GH** - 1.4 engine).
body serial number

The engine model and number are stamped on the front wall moulding of the cylinder block, next to the oil pressure alarm sensor.

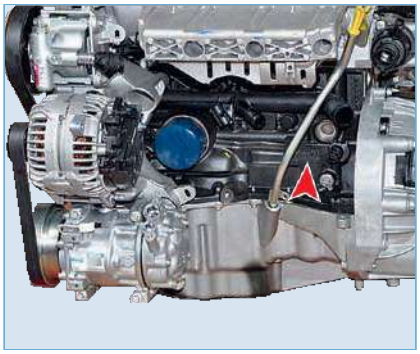


Decoding of the manufacturer's plate designations: 1 - manufacturer; **2 -** vehicle type approval number; **3 - vehicle** identification number (VIN); **4** - permissible maximum mass of the vehicle; **5** - permissible maximum mass of the vehicle with a trailer equipped with brakes; **6** - maximum permissible front axle load, kg; **7** - maximum permissible load on the rear axle, kg; **8** - code of technical characteristics of the car; **9** - code of body color (paint number); **10** - code of equipment level; **11 -** code of car type; **12** - code of interior upholstery; **13 - code of** special equipment; **14** - factory number; **15** - code of interior color scheme.



Engine number location 1.4-1.6 (8V)

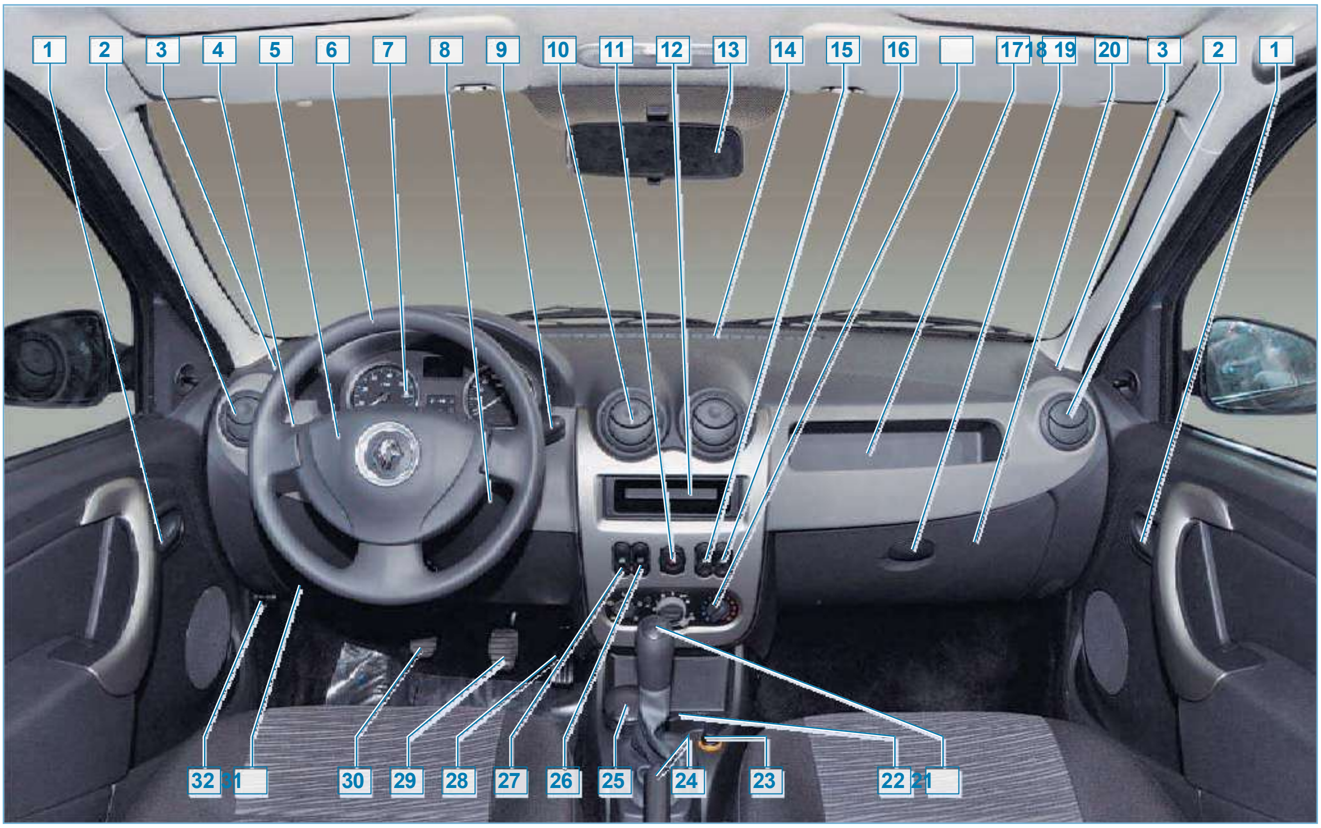
For clarity, the location of the 1.4-1.6 (8V) engine number is shown with the exhaust manifold heat shield removed.



Location of the 1.6 (16V) engine number (for clarity, shown on the dismantled power pack)

Equipment and controls

Location of controls and instruments



Controls and instruments: 1 - inner door handle; **2** - side deflector of the heating, ventilation and air conditioning system; **3** - door glass blower grille; **4** - headlight and turn signal light switch, horn switch; **5 -** airbag; **6 -** steering wheel; **7 -** instrument cluster; **8 -** ignition switch (lock); **9** - left-hand switch of the windshield wiper and washer and luggage compartment door glass (Sandero, Sandero Stepway); **10 -** central deflector of the heating, ventilation and air conditioning system; **11 - alarm** switch; **12 -** place of installation of the head unit of the sound reproduction system; **13 -** rear view mirror; **14** - windshield blower grille; **15** - door central lock switch; **16** - power window switch of the right front door; **17 -** heating, ventilation and air conditioning control unit; **18** - niche for small items or a place for passenger airbag installation; **19 -** duffel box handle; **20** - duffel box; **21** - gear lever; **22 -** cup holder; **23 -** cigarette lighter; **24 -** parking brake lever; **25 -** ashtray; **26 -** rear window heater switch; **27** - driver's door power window switch; **28 -** accelerator pedal; **29** - brake pedal; **30 -** clutch pedal; **31 -** headlight beam direction adjuster; **32 -** hood lock handle

Keys to car

The vehicle is supplied with two keys, each of which is used both to open the front door and trunk lid locks a n d to switch on the ignition. One of the keys is equipped with remote control buttons.

Keys to the vehicle: 1 - button for opening the doors; **2** - button for closing the doors

I'm not going to be able to control the central control room.

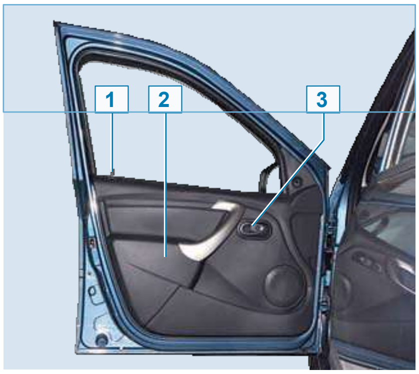
The heads of both vehicle keys contain transponders (electronic keys), the code of which is stored in the memory of the electronic immo-bilizer unit designed to block unauthorized starting of the engine.

The immobilizer consists of an alarm device, a communication coil, a key and a switching unit which acts as the immobilizer control unit.

Doors, central locking, power windows

Doors, central locking

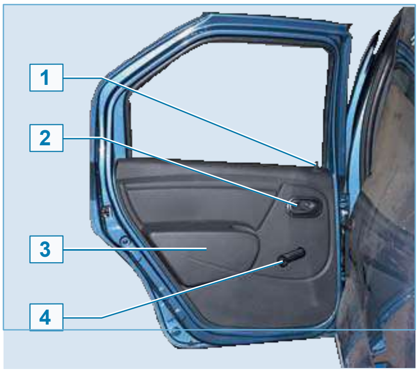
To lock all doors from outside the vehicle, turn the key clockwise in the driver's door latch, anticlockwise to unlock. Turning the key in the locking mechanism of the front passenger door and load compartment door (Sandero, Sandero Stepway) locks (unlocks) only that door. All door locks can also be locked and unlocked using the remote control of the working key (see "Vehicle keys", page 11).



Driver's door: 1 - door lock button; **2** - armrest; **3** - inside handle

From inside the vehicle, the locks on all side doors and the load compartment door (Sandero, Sandero Stepway) can be locked by pressing the upper part of the central locking switch button located in the center section of the instrument panel (see "Switches", page 17).

Press the lower part of the key to unlock all door locks.
The front door lock can be locked by pressing the door lock button.
The front door lock can only be locked and unlocked when the door is closed.



Rear door: 1 - door lock button; **2** - inside handle; **3** - armrest; **4** - window elevator handle

The tailgate lock can be locked by pressing the lock button on both open and closed doors.
The rear doors are equipped with an additional locking system which can be used when driving with children or in other cases where the conventional locking system cannot provide sufficient protection against unintentional opening of the doors.
For this purpose, additional locking levers are located on the ends of the rear doors (above the locks).

To lock the inner tailgate handle, move the lever toward the outer door panel.

In this case, the tailgate can only be opened from the outside with the lock button raised.

To deactivate the lock, return the lever to its previous position. To unlock the tailgate lock (Sandero, Sandero Stepway).

... turn the key in the lock counterclockwise.

By pressing the lock button....

... lift the load compartment door.

Door windows

The vehicle is equipped with electric front door windows and mechanical rear door windows. The vehicle can be optionally equipped with power windows on the rear doors.
The power windows on the front doors can be operated using the switches in the center section of the instrument panel (see "Switches", page 17).

The power windows of the rear doors can be operated via the switches located in the rear part of the floor tunnel liner (see "Switches", page 17). The power door windows can only be operated with the switch keys when the ignition is on (ignition key in position "M").

Switch (lock) ignition switch

The ignition switch is located on the steering column on the right-hand side. It is equipped with an anti-theft device that locks the steering shaft when the key is removed from the lock.

The key can be in one
of the four lock positions to engage the gears manually.
S" (locking), "A" (parking), "M" (ignition on) and "D" (starter).
The key can only be inserted into and removed from the ignition switch in the "S" position.
In the "S" position, whether the key is inserted or not, the following circuits are energized: parking lights, headlights, fog lights, license plate and instrument illumination; interior lighting; hazard warning lights, central locking; head unit

sound reproduction; sound
signal. When the key is removed, the key is locked.

The locking mechanism of the anti-theft locking device may be activated.

The steering wheel locking device locks the steering shaft. To lock the steering shaft, remove the key from the ignition and turn the steering wheel to either side until the locking element clicks into place. To unlock the steering shaft, turn the ignition key from "S" to "A" by gently rocking the steering wheel to the left and right.
When the key is in the position
"The cigarette lighter and the heater fan can be switched on in addition to the above-mentioned power consumers. In position "M" the ignition is switched on and voltage is supplied to all power consumers. In position "D", the starter motor is engaged. After starting the engine, release the ignition key and it automatically returns to the "M" position.

Automatic selector lever gearboxes

Some cars are equipped with an automatic transmission with electronic control.
This gearbox also allows you to shift in sequence.

Automatic transmission selector lever: 1 - button used when driving on slippery roads; **2** - lock button; **3** - selector lever; **4** - decorative selector cover

For the transmission to operate in automatic mode, the lever must be moved to the center of the gearbox.

The selector lever must be located at the right side of the slot, with four fixed lever positions:
"P (Parking), the transmission secondary shaft is locked, preventing the vehicle from moving unintentionally.
The "P" mode is used to lock the vehicle transmission while the vehicle is parked.
Do not move the lever to "P" position until the vehicle has come to a complete standstill. The key can only be removed from the ignition switch when in "P" position. The lever can only be moved out of the "P" position by first switching on the ignition and depressing the brake pedal. To move the lever out of the P position, the lock button must be pressed.
"R (Reverse) - Reverse, reverse, reverse gear engaged.
The lever can only be moved to the "R" position by pressing the lock button. This mode can only be activated when the vehicle is at a complete standstill and the engine is running
at idle.
"N (Neutral) - Neutral, no gear is engaged. In this position, the vehicle can be rolled manually and towed a short distance.

to engage the gears manually.

In "N" mode, the vehicle can be towed at a speed not exceeding 25 km/h and for a distance not exceeding 50 km. The vehicle must not be towed in reverse. The vehicle may only be towed long distances with the front wheels out.

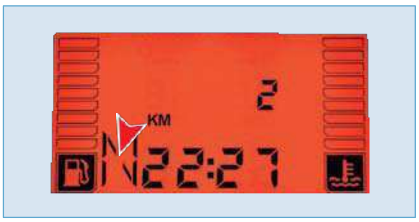
"D (Drive) - Drive forwards with automatic gearshift in sequence. This lever position is used for

of vehicle movement under normal conditions-
in the conditions. The gearbox will av-
automatically engage to
automatically engage gears depending on the driving mode.

Only start the engine of a vehicle with automatic transmission when the gear selector lever is in position "P" or "N" and the brake pedal must be depressed.

Do not start the engine of a vehicle with automatic transmission by towing or accelerating.

Before starting, depress the brake pedal and move the gear selector lever to position "D". To start driving, release the brake pedal (the vehicle will slowly accelerate on its own). Press the accelerator pedal to accelerate. As the speed increases, the gears in the gearbox will change automatically.
If you wish to leave the vehicle stationary, depress the brake pedal, apply the parking brake, move the gear selector lever to the "P" position (with the button on the lever depressed), switch off the ignition and remove the key from the ignition.
To change from automatic to manual transmission control, the selector lever must be set to position "D" and then moved to the left side of the slot. The selector lever must be pushed forward to position "+" to engage overdrive and backward to position "-" to engage underdrive.



Each position of the gear selection lever is shown in the information display in the instrument cluster, in this case "N" (neutral)

When shifting gears manually, the automatic control system may deem the selection of this ped-

The transmission display on the display will flash for a few seconds to warn you. In this case, the gear indication in the display will flash for a few seconds to warn you.
In the event of any

of the malfunction, to unlock-
The selector lever in the vehicle can be moved out of the "P" position. To do so, lift the selector lever cover a n d press the button underneath on the driver's side and the locking button on the lever.

The button for unlocking the transmission is located under the cover plate in the place indicated by the arrow.

When driving on roads with poor traction, e.g. in winter when the road is slippery, press button A....

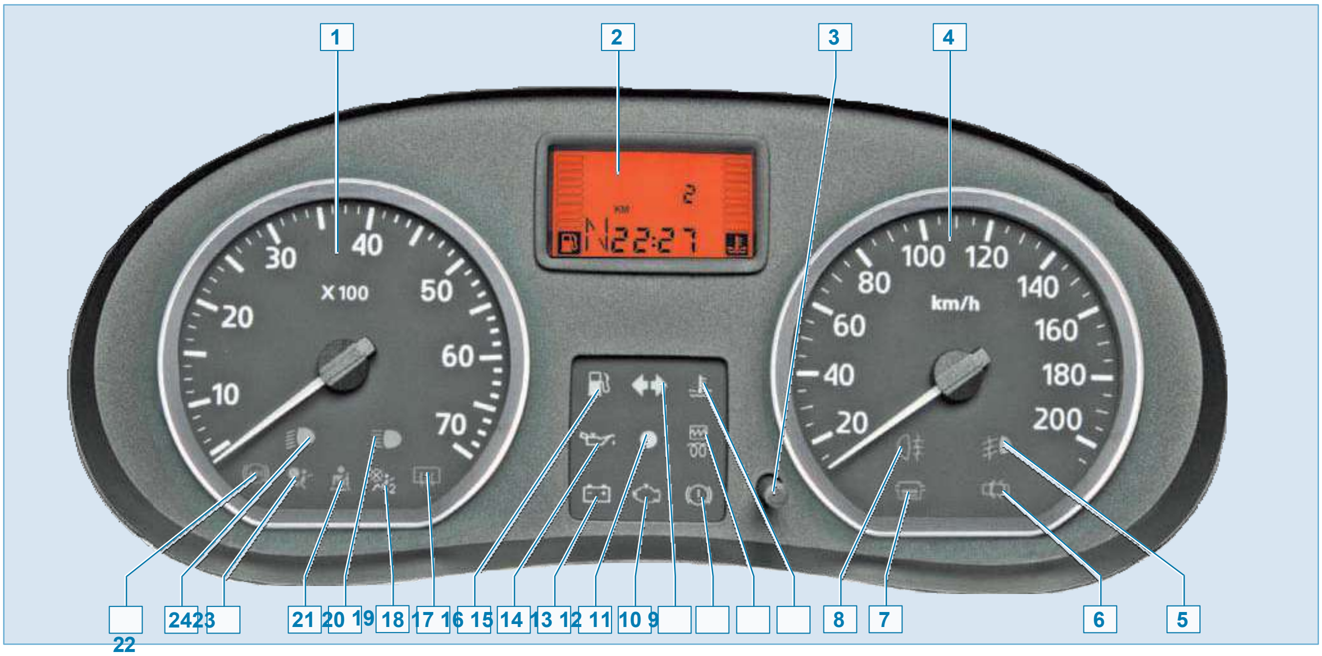
...the snowflake symbol will appear on the display

To deactivate this mode, press t h e button again.

Combination instrumentation

1 - tachometer (crankshaft speed indicator). If the indicator hand reaches 6000 $^{min-1}$,
the rev limiter is activated
and the crankshaft speed doesn't go any higher;
2 - on-board computer display;
3 - multifunction button . The multi-function button can be used to:
- control of the data output to t h e display. Press the button briefly to switch between total and trip odometer readings;
- reset the trip odometer to zero. To do this, display the trip odometer, press and hold the button for a short time;
- Set the exact time. The clock is shown in the instrument cluster display when the ignition is on.

To set the exact time with the ignition on, press button **3 repeatedly to** set "Total odometer and time" in the display.
There are two ways to set the exact time. First: pressing button **3** for a long time initially changes the hours and minutes quickly, then only the hours. Second: pressing the button briefly changes the time minute by minute;
4 - Speedometer (**speedometer**);
5 - The headlight warning light illuminates green;
6 - the unclosed door indicator lights up red when any of the doors is not closed or is loose;
7 - not being used;
8 - The rear fog lamp warning light illuminates orange;



9 - The engine overheating indicator illuminates red. After starting the engine, the warning light should go out. If the warning light remains illuminated, allow the engine to idle for one or two minutes - the temperature should decrease. If the warning light remains illuminated, stop the engine and check the cooling system;

10 - not being used;

11 - The parking brake and brake **fluid level warning** light illuminates red when the parking brake is **applied** and the brake fluid level in the reservoir is low;

12 - The turn signal lamp illuminates flashing green when the left or right turn signal lamps are illuminated and when the hazard warning flashers are activated;

13 - The engine-ECU warning lamp illuminates orange when the ignition is switched on and then goes out. If the warning lamp remains illuminated after starting the engine or illuminates briefly If the light goes out and then goes out or illuminates continuously while the engine is running, this indicates a fault in the engine control system. Have the fault diagnosed and rectified by a workshop as soon as possible;

14 - The Infotainment system status indicator illuminates red. After switching on the ignition, the indicator illuminates for three seconds without flashing and then goes out. If the indicator lamp remains illuminated or flashes after three seconds, the immobilizer is defective. In this case, have the immobilizer serviced;

15 - The battery charge failure indicator illuminates red when the ignition is switched on and goes out when the engine is started. If the warning light illuminates while the engine is running, it indicates a faulty battery charge circuit, a broken auxiliary belt, etc.;

16 - The engine oil pressure warning light illuminates red when the ignition is switched on and goes out when the engine is started. If the warning light illuminates while the engine is running. The engine oil level in the engine oil compartment must be checked. In this case, stop the engine and check the oil level in the engine oil compartment. If the level is below the minimum level, top up the oil and restart the engine. If the warning lamp remains illuminated, stop the engine. Determine the cause of the fault (see "Fault diagnosis", page 55) and rectify it. If the fault cannot be rectified, have the vehicle serviced;

17 - minimum signaling device

The fuel level in the tank illuminates orange when the engine is started and goes out after three seconds. If the warning light is illuminated, the fuel tank must be topped up;

18 - The heated rear window warning light illuminates red;

19 - the front passenger airbag deactivation **indicator** lights up orange;

20 - the high beam indicator lights up blue when the high beam is switched on;

21 - driver's unbelted belt warning light illuminates orange when it is switched on

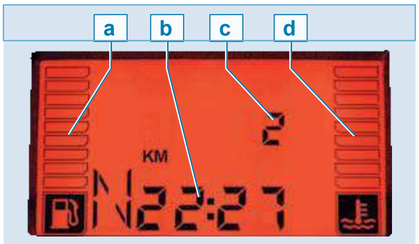
When the ignition is switched on and the vehicle speed exceeds 10 km/h if the driver's seatbelt is not fastened;

22 - The airbag warning light illuminates orange when the ignition is switched on and goes out after a few seconds. If the warning light does not illuminate after the ignition is switched on or illuminates while the vehicle is moving, there is a fault in the system. In this case, have the fault rectified by a workshop;

23 - The **dipped beam warning** light illuminates green;

24 - The Anti-lock Brake System (ABS) warning light illuminates orange when the ignition is switched on and then goes out. If the warning light illuminates when the vehicle is moving, there is a malfunction in the system. The vehicle will brake as if it were not equipped with ABS.

TRIP COMPUTER DISPLAY



Display of information on the disk: a - fuel level gauge in the fuel tank. When the fuel tank is full

All the rectangles in the tank are dark;

b - clock; **c** - on-board computer information; **d** - engine coolant temperature indicator. The four rectangles are dark during normal engine operation. Do not allow the engine to overheat

By pressing the button located at the end of the right-hand steering wheel switch (see "Steering wheel switches",

– the total odometer;

– average fuel consumption (in l/100 km) since the last reset of the on-board unit

The average fuel consumption is displayed on the display after the vehicle has traveled. The average fuel consumption is displayed on the display after the vehicle has passed through the vehicle.

400 m travel time based on the distance traveled and the amount of fuel consumed since the last reset;

– estimated driving range with fuel remaining in the tank (in km). When calculating the driving range

The average fuel consumption since the last reset of the calculated values is taken into account. The value is shown in the display after the vehicle has traveled 400 m;

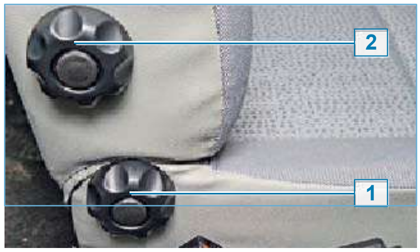
– The distance traveled (in km) since the last reset of the on-board computer;

– Average vehicle speed (in km/h) since the last reset

...hown in the display after the vehicle has traveled 400 m. The value is shown in the display after the vehicle has traveled 400 m.

Adjustment of front seats and steering wheel speakers

page 20) in sequence, the following on-board computer information is displayed:



Position of the seat adjustment knobs: 1 - seat backrest tilt adjustment knob; **2** - lumbar support adjustment knob

Location of the driver's seat adjustment levers: 1 - seat height adjustment lever; **2** - longitudinal seat adjustment lever

The driver must not adjust the position of the seat when the vehicle is moving. This could result in loss of control of the vehicle due to sudden shifting of the seat forwards or backwards.

The steering column can be adjusted to an angle of inclination for added driver comfort. Lever lock for the adjustment mechanism

is located in the recess of the arm guard

The front seats of the vehicle are adjustable so that the driver and front passenger can adjust them to a comfortable position.

To move the driver's seat forward or backward, lift lever 2 located under the front part of the cushion from below and move the seat in the desired direction.

To raise or lower the seat cushion, raise or lower lever 1.

left column.

To change the position of the steering wheel and steering column, lift the locking lever.

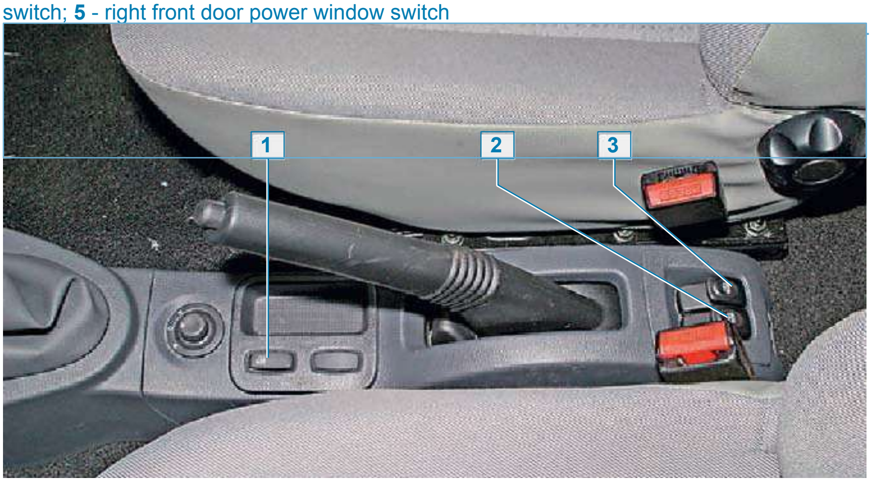
The steering column can be moved up/down. The steering column can be locked in a comfortable position by sliding the locking lever to the lower position as far as it will go.

Do not start driving with the steering column locking lever released or adjust the steering column position while driving. Doing so could result in loss of control of the vehicle.

Switches

Front door power window elevator switches. To lower the front door window, with the ignition on (key in ignition in position "M"), press the lower part of the switch button and hold it down until the window is in the desired position.
To raise the window fully or to a certain height, press the upper part of the button and hold it down until the window is in the desired position. Depending on the equipment

power window switch; **2** - rear window heater switch; **3** - alarm switch; **4** - central door lock switch; **5** - right front door power window switch



Location of switches on the floor tunnel trim: 1 - rear doors power window lock key; **2** - rear left door power window elevator switch key; **3** - rear right door power window elevator switch key

vehicles can be fitted with-
The power windows can be operated in pulse mode. In this case, a brief press of the button is sufficient to fully lower or raise the window with the engine running. Press the button again to set the window in the intermediate position.
Rear window heating switch. Pressing the upper part of the switch key activates the heated rear window element and the heated electrically operated exterior mirrors (depending on vehicle equipment), with the combination of

The instrumentation lights up accordingly
The heated rear window can only be switched on when the engine is running. The rear window heating can only be switched on when the engine is running. After
12 minutes of operation, the window and mirror heating is automatically deactivated and the warning light in the instrument cluster goes out.
Switch on the alarm switch. Press the switch to activate the hazard warning flashers. All turn signal lamps and their indicator lamp in the instrument cluster start flashing. The emergency warning system does not depend on the position of the ignition key in the ignition switch or on the turn signal indicator.

To deactivate the alarm
Press the switch button again.
Door central locking switch. Press the upper part of the key to close all door locks. The front doors, trunk lid and load compartment door (Sandero, Sandero Stepway) can be opened with the key from the outside. Pressing the lower part of the key unlocks all door locks.
Rear door power window switches. To lower the tailgate window, press and hold the corresponding switch until the window is in the down position.

to the desired position. To raise the glass completely or to a certain height, pry up the button and hold it until the glass is in the desired position.
Position.

When using the power windows, do not allow clothing or body parts to get caught in the gap between the glass and the door frame.

Rear door window elevator lock switch. If there are children in the rear seat, the window lifters must be locked to prevent unintended lowering and raising of the windows. The locking button for the rear window lifters is located on the floor tunnel trim closer to the driver.

If the rear window elevator lock button is pressed, the door windows cannot be repositioned.

The window lifters can be unlocked by pressing the lock button again.

The front seat heating switches. The heated front seats can be switched on by pressing the switch button when the ignition is on. To deactivate the heating, press the button again.

Location of the front seat heater switch key

When the parking lights are switched on, the symbols in the switch keys are illuminated.

Control unit heating, ventilation and air conditioning

Intensity of air supply to the front door windows .

The fan can be adjusted by turning the fan mode selector lever (with the ignition on). This activates one of the four fan speeds.

Turn the selector lever clockwise to increase the fan speed.

The flow distribution controller sets the following directions for the air currents in the passenger compartment:

– to the head area. The air flow through the air vents in the instrument panel enters the upper part of the passenger compartment automobile;

– to the foot and head area. The air flow enters the upper part of the vehicle interior through the air deflectors and into the head and foot area.
you know, foot placement;

– to the foot area. The airflow only reaches the foot area;

– The air flow is directed to the footwell and to the windscreen and front door windows. The air flow is directed to the footwell and also to the windscreen and front door windows.

to the windshield and front door grilles;

- The air flow is only directed to the windshield and front door windows. The air flow only enters the to the windshield air vents

Turn the air temperature control knob to change the temperature of the air entering the passenger compartment.

To increase the air temperature, turn the regulator knob clockwise to the red sector of the scale and counterclockwise to the blue sector to decrease the air temperature.

Move air recirculation control lever to the rightmost position to allow outside air to enter the passenger compartment.

To activate air recirculation mode, move the control lever to the left-most position.

It is recommended to use the air recirculation mode (disconnecting the outside air supply to the passenger compartment) when it is necessary to quickly lower or raise the passenger compartment temperature or when driving in dusty areas or in heavy traffic to avoid dust or exhaust gases entering the passenger compartment.

5 - air temperature regulator.

Use recirculation mode with the door windows up. It is not recommended to use the recirculation mode for a longer period of time, as this may result in the following
The air humidity in the passenger compartment increases and the windows mist up.

Air can be drawn into the passenger compartment via the center or side deflectors of the heating, ventilation and air conditioning system.
To bring air into the passenger compartment...

...open t h e deflector by pushing its curtain

... turn the deflector to the appropriate side.

To prevent the windscreen and door windows from misting up i n warm weather, it is sufficient to apply cold air to them. To do this, it is necessary to:

- Use the current distribution control to direct the air through the upper windscreen grille.
  of the glass and the grille are
  of the front door windows;
– Move air recirculation control lever to the rightmost position;
– turn the temperature regulator knob to the blue sector;

- Activate the appropriate fan mode.

To clear ice and snow from the windows, direct heated air at the windows by turning the air temperature control knob to red and activating the required fan operation mode.
After the windows have defrosted, select the desired direction of air flow to the passenger compartment with the air flow control.
It is recommended that the recirculation mode is switched on when the vehicle is stationary and switched off when driving to accelerate interior warm-up.

AIR CONDITIONING USE

To switch on the air conditioning, press the switch (see above) with the engine running. The indicator light in the button illuminates. Press the button again to switch on the air conditioning.
On long uphill grades or in heavy urban traffic, operating the air conditioning system may cause the engine to overheat. Therefore, if the coolant temperature exceeds the permissible value,
the air conditioner should be turned off.
If the vehicle is parked in direct sunlight, open the windows and ventilate the passenger compartment before switching on the air conditioning.
To avoid fogging of the windows in rainy weather, set the air distribution control to (with the heater off) and switch on the air conditioning.
If the air conditioner does not need to be switched on, it should be switched on every two weeks for a few minutes, even in winter operation with a small amount of air conditioning.
blown at sub-zero temperatures.
This helps to maintain lubrication on compressor parts and seals, which prolongs the service life of the air conditioning system.
When parking in the sun for long periods of time in hot weather, the temperature of the air-
The air inside the passenger compartment is much higher than outside. To cool the passenger compartment quickly, open the doors for a short time to allow the hot air to escape. Then start the engine, switch on the air conditioning in maximum cooling mode and close the doors. After boarding, the air conditioning should be set to the most favorable mode: it is recommended to maintain a temperature difference between inside and outside of 5-9 °C. The cooling air flow is best directed upwards and never towards the face. This can cause colds and inflammation of the facial nerves.
Maximum cooling mode
It is recommended to use this mode in hot weather or after the vehicle has been parked in the sun for a long period of time. This mode is operated as follows.
The air recirculation mode is activated. The air distribution control is set to one o f its positions; the air temperature control is turned to the extreme counterclockwise position; the fan mode switch is set to position
"4"; air conditioning included.

After parking the vehicle in the hot sun for a long period of time with the air conditioning on, do not direct a stream of cold air towards the windscreen to avoid cracking.

Airbag switch front passenger

The front passenger airbag switch is located on the right-hand side of the instrument panel. The right front door must be opened to access the switch.

To prevent injury to the child when the child is transported in a child safety seat installed in the front passenger seat the passenger seat vs. The front passenger airbag must be deactivated in the direction of travel.

There is a label above the airbag switch informing you when the front passenger airbag must be deactivated

When the front passenger airbag is activated, the white mark on the switch handle is in the "ON" position

The airbag must be deactivated by switching off the ignition.

...and turn the switch knob counterclockwise to the "OFF" position.

The front passenger airbag is activated with the ignition off by turning the knob to the "ON" position.

After disconnecting the air bag- When the ignition is switched on, the corresponding warning light in the instrument cluster must illuminate and remain illuminated to confirm that the airbag is deactivated.

If the front passenger airbag is deactivated or activated while the ignition is on, the airbag warning light will illuminate in the instrument cluster. To restore the airbag system to normal, the ignition must be switched off and on.

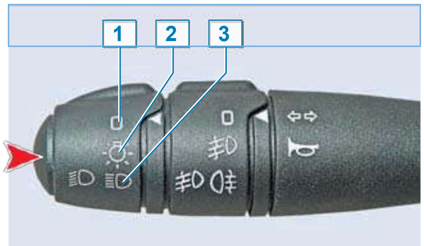
Thumbwheel switches

Left paddle switch

The left-hand combination sub-switch is mounted on the left-hand combination sub-switch:

– parking light switch;
– headlight switch;
– switch for the fog lights;
– The rear fog light switch;
– turn signal switch;
– the horn switch. To activate or deactivate the exterior lighting (independent of the ignition key position), turn the handle of the central light switch located at the end of the left-hand paddle switch.

When the exterior lighting is on and the driver's door is open (regardless of the ignition key position), a warning chime sounds,



Center light switch handle positions: 1 - exterior **lighting is** off; **2** - parking light, license plate lighting, instrument cluster and control illumination are on; **3** - parking light, license plate lighting, instrument cluster and control illumination are on, headlight is on (low beam or high beam, depending on the position of the headlight switch); the arrow indicates the horn button.

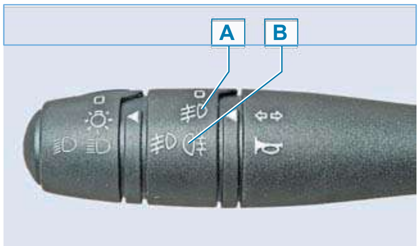
to remind you to turn off the lights.

To switch on the high beam for a short time (regardless of the position of the central light switch handle and the ignition key), pull the lever on the steering wheel switch towards yourself. When released, the lever will return to its original position.

To switch the high beam on permanently, turn the handle of the central light switch to position "3" (see above) and pull the lever further than for short-term operation. When the high beam is switched on, the corresponding warning light illuminates blue in the instrument cluster.

To switch from high beam to low beam, move the lever towards yourself once again.

To activate the fog lights, switch on the parking lights by turning the handle at the end of the switch to position "2" and turn the other handle to position "A". When the fog lights are switched on, the corresponding warning light in the instrument cluster illuminates.



Left paddleswitch lever positions when fog lights (A) and rear fog light (B) are switched on.

To activate the rear fog light, switch on the parking brake.
The light is turned on by turning the knob
The fog lights are also illuminated when the fog lights are switched on.
If the rear fog light is switched on, the corresponding warning light in the instrument cluster illuminates.
To activate the horn, press the button on the end of the left-hand paddle switch.
The turn signal indicators are switched on by moving the left-hand paddle shifter up or down as far as it will go (with ignition on).
In the upper position of the lever, the right turn signal indicator is on, in the lower position the left turn signal indicator is on.
When the steering wheel is returned to neutral, the steering wheel lever automatically resets and the turn indicators are deactivated. To switch the turn signal indicators on briefly, move the lever upwards

Right-hand steering wheel switch (Logan) (arrow indicates button for controlling the display of data on the on-board computer)

or down until they are engaged. The lever automatically returns to the neutral position after starting.

Right paddle switch

The right-hand steering wheel controls the windscreen wiper and washer and is also responsible for displaying data in the trip computer display.
The wiper and washer operate when the ignition is on. For

on wiper windshield
If the vehicle is not equipped with a power steering wheel, the vehicle is not equipped with a power steering wheel.
Windscreen wiper operating modes from top to bottom:
– the cleaner is switched off (home position);
– The purifier is operated in intermittent mode;
– The cleaner runs continuously at a low speed;
– the cleaner runs continuously at high speed.
To activate the windscreen washer, pull and hold the lever on the right-hand paddle switch and the windscreen wiper is not automatically activated.
For simultaneous operation of the windscreen wiper and windscreen washer, turn the right-hand paddle switch towards yourself and then downwards to one of the three wiper modes, thus activating the washer and wiper.

Right paddle switch (Sandero, Sandero Stepway)

On Sandero and Sandero Stepway vehicles, to activate the tailgate wiper, turn the ring on the lever end until the wiper symbol is aligned with the arrow.
To activate the tailgate washer, turn the ring to the next position until the washer symbol is aligned with the arrow. To deactivate the window washer, release the ring and it will return to the position to activate the tailgate window wiper.

If the vehicle is driven in winter, the wiper blades may freeze to the windows when parked. If the wiper is switched on at this time, the wiper motor may be damaged. The wiper blades that are frozen to the windows must be released before the wiper is switched on.

Headlight beam direction controller

The vehicle is equipped with a cable-operated mechanical headlight beam control.
The headlamp beam direction control is located on the instrument panel on the bottom left of the steering column.
Aligning the mark on the rotary knob with the numbers on the panel

Regulator knob

The headlight beams can be adjusted accordingly for the following vehicle load variants:

0 - one driver or driver and front seat passenger with an empty trunk;

1 - the driver and two or three passengers with an empty trunk;

2 - driver, three passengers and a loaded trunk;

3 - the driver and a fully loaded trunk.

Rear view mirrors

The vehicle is equipped with two exterior rearview mirrors and one interior mirror.

The mechanical mirror position adjustment lever is located on the inside of the respective door.

The exterior mirrors are located on the front doors of the vehicle. They can be equipped with mechanical adjustment or electrically operated.

Pressing this lever up, down or forwards backwards adjusts the position of the reflective element of the mirror in horizontal and vertical directions.

The mirror control on electrically operated vehicles is located in the floor tunnel trim.

Control regulator for the electric exterior rearview mirrors

To adjust the position of the left exterior rearview mirror, turn the joystick adjuster.

to the left and the right one to the right. In the middle--

The electric mirror actuators are switched off when the regulator is in this position.

The mirror is adjusted by pressing the edges of the joystick.

Regulation inner of the rearview mirror can be adjusted

The mirror housing can be rotated horizontally and vertically by pivoting the mirror housing on the hinge.

There are two internal mirror modes: day and night.

To reduce the dazzling effect of the headlights of vehicles behind, turn the mirror to the "night" position.

To that end...

...move the mirror position adjuster (shown by the arrow) toward you....

... the reflection angle of the mirror is changed and the dazzling effect is reduced.

It is not recommended to place on the shelf behind the rear seat. Remove objects that may reduce the view through the mirror.

SAFETY PRECAUTIONS FOR MAINTENANCE AND REPAIR

The room where the repair work is being carried out must be well ventilated and the door must be easy to open both inside and outside. Keep the door clear at all times. Always keep a portable fire extinguisher and first aid kit in the room.
Carbon monoxide (carbon monoxide), a poisonous, colorless and odorless gas, is emitted when the engine is running (especially when starting). Carbon monoxide (carbon monoxide) is a poisonous, colorless and odorless gas.
If the engine is not running, you can run the engine for a short period of time by placing a piece of hose on the exhaust pipe outside the garage. In the absence of a forced exhaust system, the engine can be started for a short period of time by placing a section of hose outside the garage on the exhaust pipe. The exhaust system and its connection to the hose must be sealed.
When repairing the power supply system, it is necessary to
The system pressure must be relieved by disconnecting the lead terminal from the negative terminal of the battery.
When using a cutting machine or emery wheel, make sure that there are no flammable substances in the area of sparks to avoid a fire. Also ensure that the rechargeable battery is not in the area of sparks when charging to avoid an explosion. Wear gloves (preferably leather) to protect your hands from cuts and bruises during "power" operations. Wear goggles (preferably special goggles with side shields) to protect your eyes when working with power tools. Do not use defective tools: horn wrenches with "open" jaws or crumpled jaws, screwdrivers with rounded, twisted slotted or improperly sharpened, pliers with poorly secured plastic handles, hammers with loose handles, etc.
If the vehicle is suspended using a jack, apply the parking brake.

...and place chocks under the wheels.
Work must be carried out on level ground. When jacking under the sill, use only the locations specified by the manufacturer. Only use a jack that is in good working order.

Do not work under the vehicle if it is only jacked up. Do not work under the vehicle if it is only jacked up.
Beforehand, make sure that the corresponding body components (floor reinforcements, sills) are sufficiently strong. The vehicle must not be jacked up on two or more jacks, use commercially available jack stands. Do not load or unload the vehicle while it is jacked up (get in, remove or install the engine).

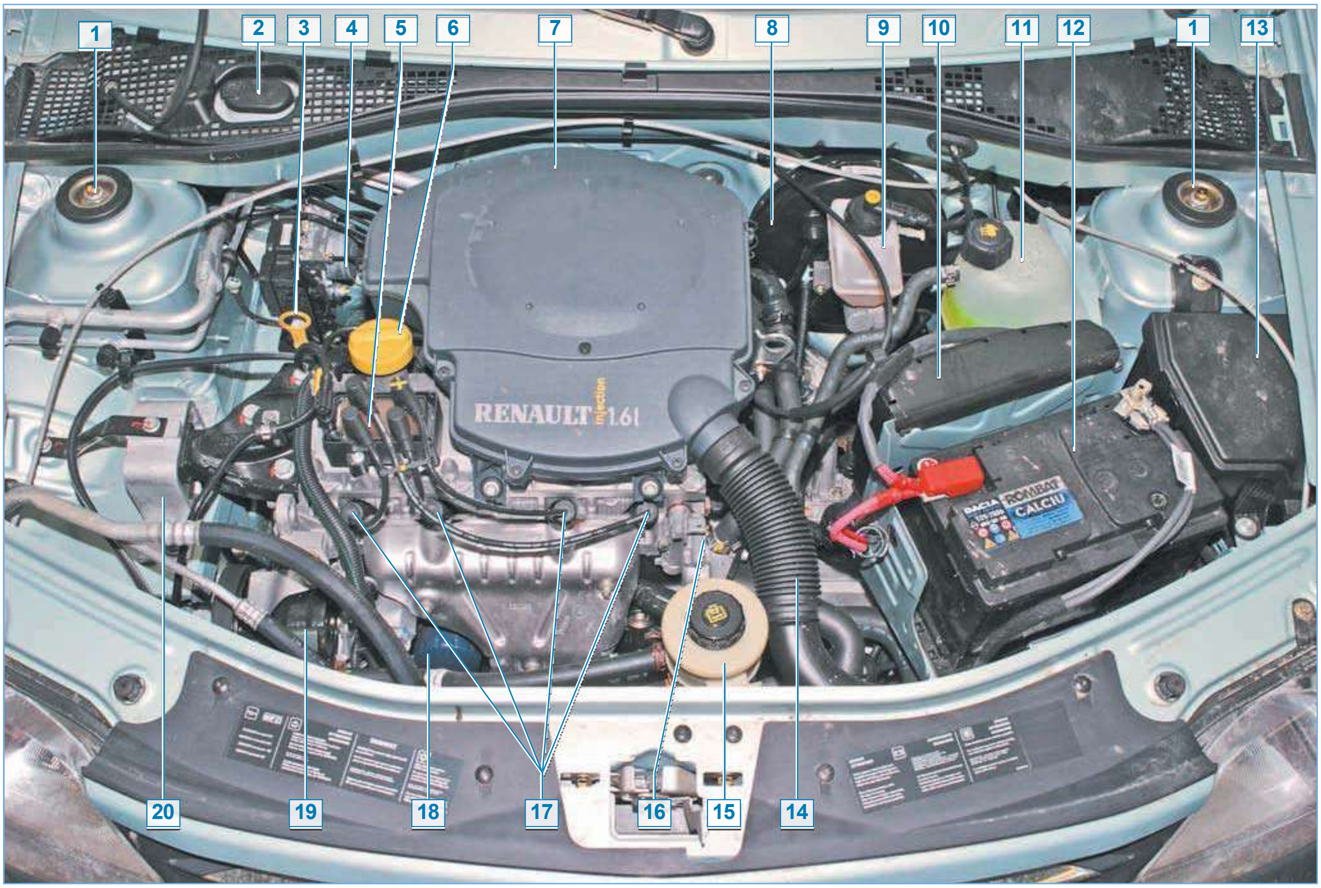
Waste oils contain contaminated compounds. If oil gets on your hands, wipe them with a rag and then clean them with a special "hand cleaner" (or sunflower oil) and wash with warm water and soap.

Do not wash hands with hot water, as harmful substances can easily pass through the skin.

If gasoline gets on your hands, also wipe them with a clean rag and then wash with soap and water. Engine coolant (antifreeze) contains ethylene glycol, which is poisonous in contact with the body and, to a lesser extent, on the skin. In case of antifreeze poisoning, vomit immediately, rinse the stomach and in severe cases take a salt laxative (e.g. Glauber's salt) and seek medical advice. In case of skin contact, wash off with plenty of water. The same applies in case of poisoning by torso fluid.
Electrolyte in contact with the co--
If the electrolyte gets on your hands or eyes, wash it off first with plenty of cold water. If the electrolyte gets on your hands or in your eyes, first wash it off with plenty of cold water. Then wash hands with baking soda or ammonia. Remember that sulphuric acid, even in small concentrations, destroys organic fibers - take care of your clothes!
Store waste materials in special containers for recycling. Gasoline, oils, brake fluid, rubber products and plastics do not decompose naturally and require industrial recycling.

MAINTENANCE SERVICE

Location of the vehicle's main assemblies and units



Location of units and assemblies in the underhood of the car with engine 1,4-1,6 (8V): 1 - upper shock absorber strut mount; **2 -** windshield washer reservoir cover; **3** - engine oil level indicator (dipstick); **4 -** ABS unit; **5 -** ignition coil; **6 -** oil filler cap; **7 -** air filter; **8 -** brake vacuum booster; **9 -** brake system hydraulic reservoir; **10 -** electronic engine control unit (ECU); **11** - cooling system expansion tank; **12 -** battery; **13 -** relay and fuse mounting block; **14 -** air intake hose; **15 -** power steering reservoir; **16 -** engine; **17 -** spark plugs; **18 -** oil filter; **19 - power steering** pump; **20** - right power unit support.

Checking vehicle

To ensure safe driving and to extend the service life of the vehicle, the exterior and interior of the vehicle must be inspected periodically.

The length of the inspection depends on how well you know your vehicle and how often you use it.

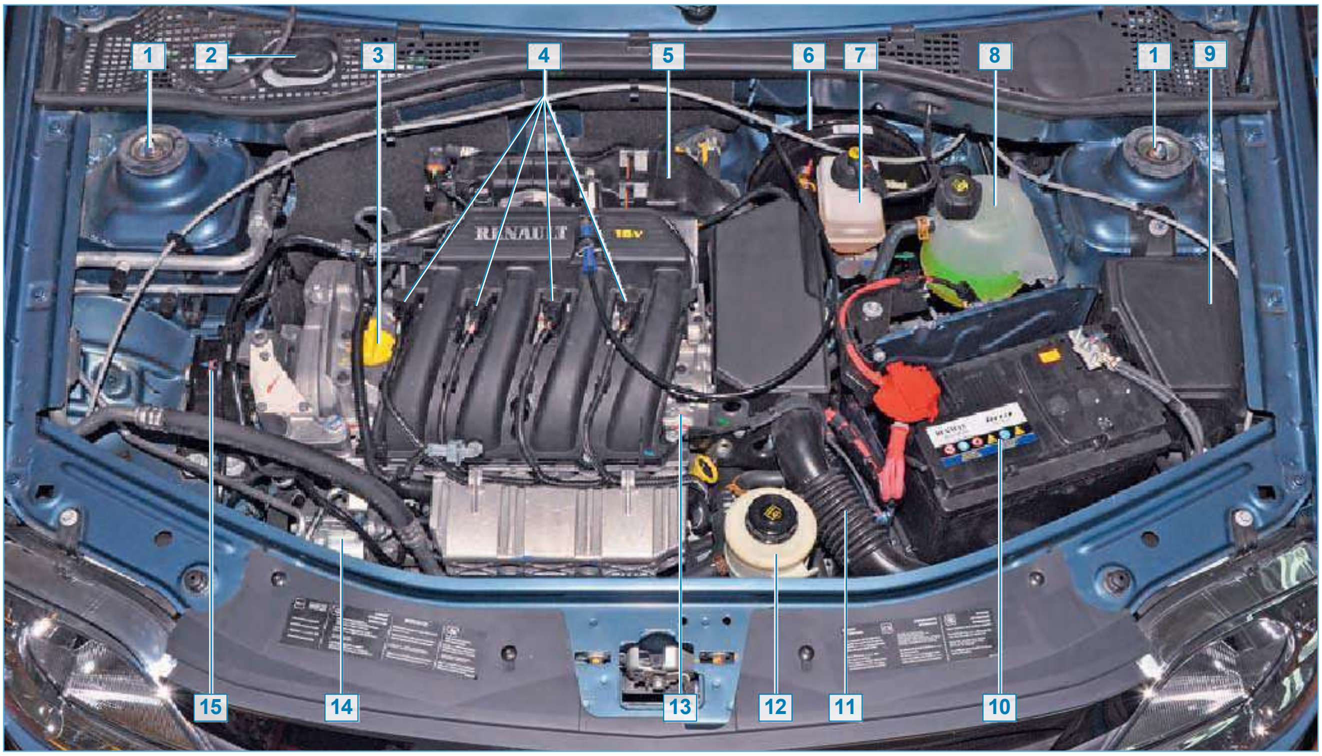
When operating your vehicle, you will learn about the rate of oil consumption in the engine and gearbox, brake and coolant fluids, and the reliability of various systems and devices. This will allow you to plan your actions and time to inspect the vehicle in the future. For example, if the engine is found to be consuming oil intensively (albeit within the normal limits), check the oil consumption of the engine and gearbox.

The oil level in the engine oil sump should be checked more frequently. If there is no visible change in the oil level after a month, you can limit yourself to monthly checks.

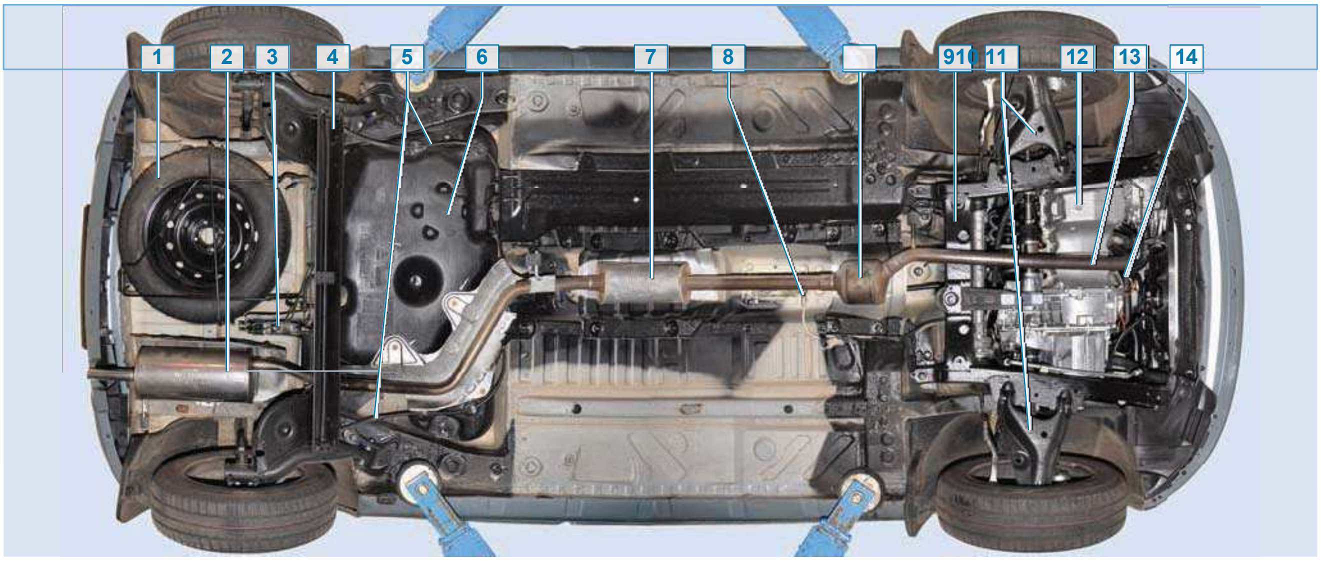
The more familiar you become with vehicle inspection activities, the less time you will spend on them.

The outside of the vehicle checks out:

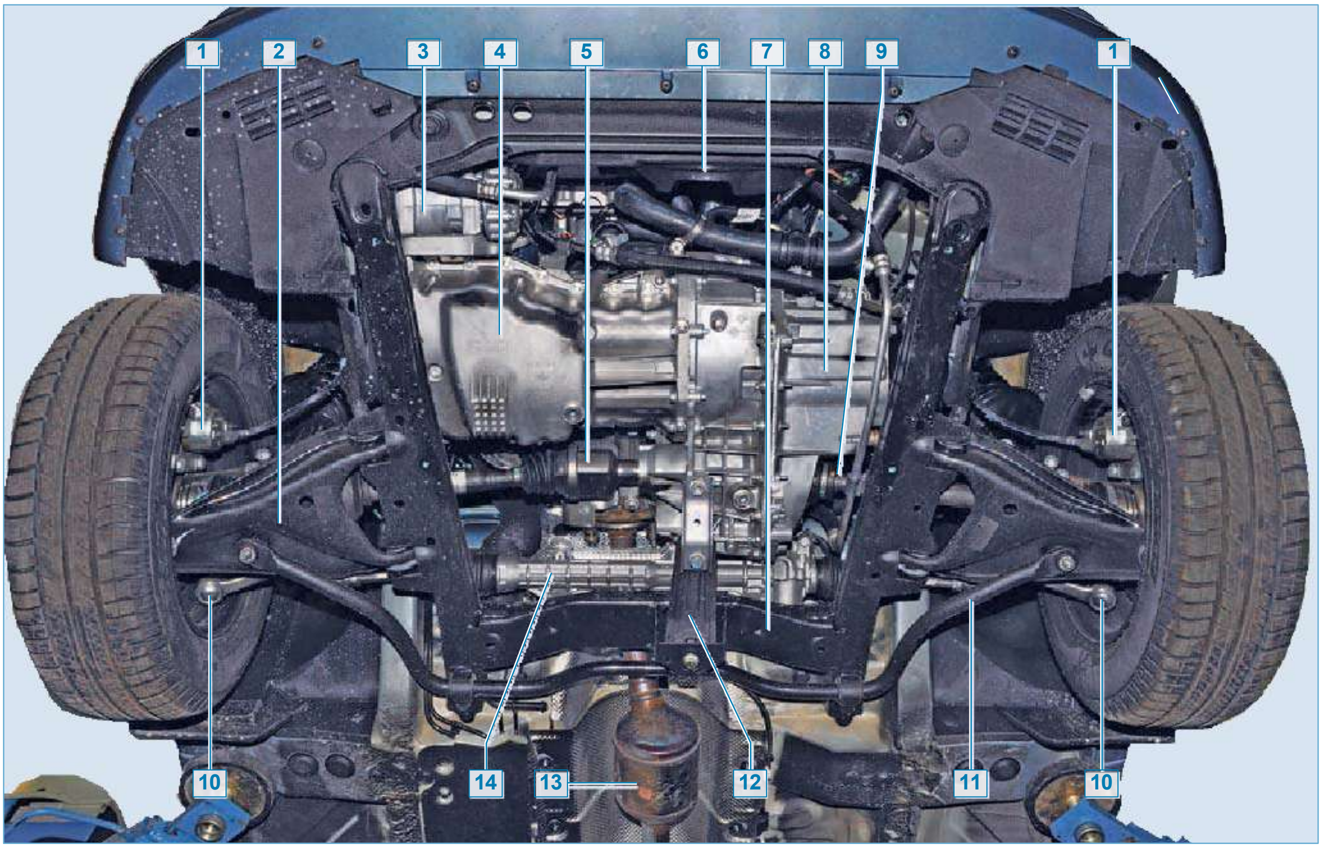
- Check tire pressure and inspect tires for damage;



Location of assemblies and units in the underhood of the car with 1.6 (16V) engine: 1 - upper mount of the amor- tizer stand; **2 -** windshield washer reservoir cover; **3 -** oil filler cap; **4 -** ignition coils; **5 -** air filter; **6** - vacuum brake booster; **7** - hydraulic brake system reservoir; **8** - expansion tank of the cooling system; **9 -** mounting block of relays and fuses; **10 -** battery; **11 -** air intake hose; **12 -** power steering reservoir; **13** - engine; **14 -** power steering pump; **15** - right support of the power unit.



Bottom view of the Sandero car (power unit protection removed for clarity): 1 - spare tire; **2 -** main exhaust silencer; **3** - pressure regulator in the hydraulic brakes of the rear wheels; **4** - rear suspension beam; **5 -** rear parking brake cable; **6** - fuel tank; **7** - additional exhaust silencer; **8** - diagnostic oxygen concentration sensor; **9** - catalytic con- troller; **10** - subframe; **11** - front suspension arm; **12** - powertrain; **13 -** exhaust gas system intake pipe; **14** - control oxygen concentration sensor.



Bottom view of the front of the car with 1.6 (16V) engine (power unit protection removed for clarity): 1 - front wheel brake mechanism; **2** - front suspension arm; **3** - air conditioner compressor; **4** - engine crankcase pan; **5** - right wheel drive; **6** - radiator fan; **7 -** subframe; **8** - transmission; **9** - left wheel drive; **10** - steering link lug; **11** - roll stabilizer bar; **12 -** rear support of power unit; **13 -** catalytic converter; **14 - steering** gear casing.

– tightening of the wheel bolts;
– the lighting and signaling equipment is in good working order. Brake signals can be checked without an assistant by depressing the brake pedal and observing the reflection of the signal light from a wall, e.g. a garage, in the rear view mirror;
– No signs of oil, coolant, fuel and brake fluid leaks.
Checking the engine compartment:
– engine oil level;
– If the vehicle is not equipped with an airbag, do not use the airbag;
– level of working fluid in the hydraulic brake reservoir;
– The operating fluid level in the power steering reservoir;
– The windshield washer fluid in the windshield washer reservoir;
– If the vehicle is not equipped with an auxiliary drive belt, the belt tension of the auxiliary units must be adjusted;
– the condition and fastening of the battery terminals.
In the interior of the car we check:
– the brake vacuum booster is in good working order;
– the operation of the clutch and gearbox actuators;
– the amount of travel of the parking brake lever;
– the horn is in good working order;
– the windscreen wiper and washer are in good working order;
– the control and measuring equipment is in good working order;
– the fuel level in the tank;
– rearview mirror adjustment;
– the locking mechanisms of the door locks are in good working order.
In the Sandero and Sandero Stepway, check the function of the tailgate window wiper and washer.

Technical Service Regulations

Name of operation	Mileage or length of service (whichever comes first)							
thousand kilometers	15	30	45	60	75	90	105	120
years	1	2	3	4	5	6	7	8
ENGINE AND ITS SYSTEMS								
Changing the oil and oil filter	+	+	+	+	+	+	+	+
Replacing the timing belt	-	-	-	+	-	-	-	+
Replacing the auxiliary drive belt	-	-	-	+	-	-	-	+
Replacing the air filter element	+	+	+	+	+	+	+	+
Spark plug replacement	-	+	-	+	-	+	-	+
Changing the coolant*	-	-	-	-	-	+	-	-
Checking the engine control unit with a diagnostic computer	+	+	+	+	+	+	+	+
Checking the tightness of the cooling, supply and exhaust systems, as well as the condition of hoses, pipes and their connections	+	+	+	+	+	+	+	+
TRANSMISSION								
Checking the clutch actuator	+	+	+	+	+	+	+	+
Check condition of front wheel drive joint protective covers	+	+	+	+	+	+	+	+
RUNNING GEAR								
Checking tire condition and tire pressure	+	+	+	+	+	+	+	+
Checking the condition of stabilizer bushings and pads transverse stability, suspension arm silent-blocks.	+	+	+	+	+	+	+	+
Checking the condition of the ball bearings	+	+	+	+	+	+	+	+
Checking the condition of front and rear shock absorbers	+	+	+	+	+	+	+	+
STEERING								
Checking the fluid level in the power steering reservoir	+	+	+	+	+	+	+	+
Checking the tightness of the power steering system	+	+	+	+	+	+	+	+
Checking the condition of steering gear covers and steering rod ends	+	+	+	+	+	+	+	+
BRAKE SYSTEM								
Check brake fluid level in the reservoir, tightness of the hydraulic system, condition of hoses and pipes	+	+	+	+	+	+	+	+
Checking the condition of front wheel brake pads and discs	+	+	+	+	+	+	+	+
Checking the condition and dusting the rear wheel brake shoes	-	-	-	+	-	-	-	+
Changing the brake fluid*	-	-	-	-	-	+	-	-
ELECTRICAL EQUIPMENT								
Checking the battery with a tester	+	+	+	+	+	+	+	+
Checking exterior and interior light bulbs	+	+	+	+	+	+	+	+
Checking the operation of the signaling devices in the instrument cluster	+	+	+	+	+	+	+	+
BODY								
Checking the condition of the windscreen and door mirrors	+	+	+	+	+	+	+	+
Checking the condition of the wiper blades	+	+	+	+	+	+	+	+
Checking the anti-corrosion coating	+	+	+	+	+	+	+	+
VENTILATION, HEATING AND AIR CONDITIONING SYSTEM								
Air conditioning system cleaning	After 2 years.							
Checking and replenishing the refrigerant	After 4 years.							

* Or in three years, whichever comes first.

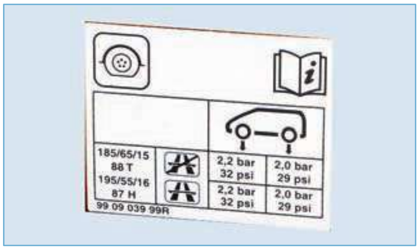
If the mileage of the vehicle exceeds 120,000 km, the maintenance schedule should be performed at the intervals specified in the table. When the vehicle is used, its technical condition changes due to wear and tear of the working surfaces of parts, adjustment parameters, ageing of plastic and rubber products. Some of the operations described above may need to be performed more frequently to keep the vehicle in good working order. If the vehicle is operated in dusty conditions, low ambient temperatures, used for trailer transportation, frequent low-speed or short-distance driving, maintenance should be carried out more frequently (see Vehicle Service Booklet).

Checking the condition of wheels and tires

For driving safety and to prolong the service life of tires it is necessary to visually check them before driving off, maintain the required pressure, check it regularly (at least once a month) and bring it up to normal.

For recommended tire pressures, refer to the label affixed to the left front door. The label indicates the front and rear tire pressures for off-road and on-road driving.

Logan and Sandero car plate.



Sandero Stepway license plate.

The tire pressure should also be checked if the ambient temperature drops or rises significantly and before driving long distances.

When the vehicle is driven for long periods of time, especially at high speeds, the tires heat up and the tire pressure increases. The air pressure should therefore be checked on cold tires before driving.

If it is not possible to measure the pressure on cold tires, a 0.2-0.3 bar increase in tire pressure due to heating must be taken into account.

Unscrew the wheel valve cap....

... and connect a tire pressure gauge or a pump with pressure gauge to the valve. If the pressure is below the required pressure, inflate the tire with a tire pump or compressor, checking the pressure on the pressure gauge.

If the pressure is higher than required...

... by pressing down with the special tab of the pressure gauge (or a suitable tool).

Press the valve spool valve with the spool valve, bleed air from the tire in small portions and check the pressure.

When operating the vehicle with a full load and a trailer, the tire pressure must be increased by 0.2 bar.

Tires must be free of blistering, tread separation and damage to the cords.

The residual tread height of the tire must be at least 1.6 mm.

The degree of wear on the tires can be determined.

... by measuring the residual depth of the tester with a caliper depth gauge.

Do not mount tires of different models on the same axle or tires that do not comply with the vehicle manufacturer's specifications.

The manufacturer does not recommend changing tires. In the event of extreme tread wear on the tires of the front wheels (which wear approximately twice as fast as the rear wheels), we recommend purchasing one wheel of the same model and mounting it on the front axle together with the spare wheel (not worn). We recommend that the least worn wheel (among the replaced wheels) be placed in place of the spare wheel.

Check the bolt tightening at regular intervals.

If the vehicle is not equipped with a wheel fastener, tighten the bolts if necessary.

If vibrations occur while driving on level roads within a limited speed range, have the wheels balanced by a tire shop. Vibration at all driving speeds may be caused by tire wear patches, tire slicks, the appearance of

If the tires or rims are damaged, replace them with new tires or rims. Replace damaged tires or rims.
Wheel rims must be kept clean and free from corrosion. Damaged areas can be sanded down with sandpaper, degreased, primed and painted.

Checking the fluid level in the washer reservoir windows

Check the fluid level in the windscreen and tailgate washer fluid reservoir periodically and top up if necessary. If the ambient temperature is +2 °C or lower, only fill the reservoir with special windscreen washer fluid. washer fluid or concentrate, diluted with water in the required proportions. Water or highly diluted washer fluid may freeze in the tank, pipes or washer nozzles. Clean water can only be used in warm weather.
The windshield washer reservoir is located
is located in the engine compartment on the right side, under the windshield trim.

Open the filler cap of the tank.
Check the fluid level visually via the filler neck.
If necessary...

... refill the reservoir. Close the washer fluid reservoir cap.

Replacing the windshield and door window wiper blades luggage compartment

Replace the wiper blades when the quality of glass cleaning deteriorates, approximately once a year - preferably before the start of the autumn/winter season. The length of both windscreen wiper blades is 510 mm and the length of the luggage compartment door wiper blade is 410 mm. The brushes should be rinsed periodically under the tap with soap and warm water. If the wiper blades are heavily soiled or covered with ice, they must be removed and cleaned.
To do this, pull back the brush lever from the glass.

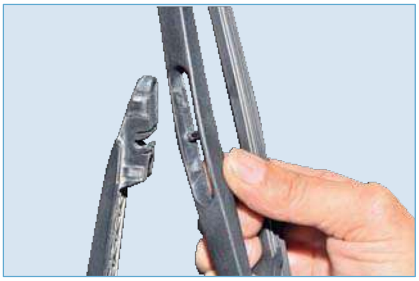
! **Be careful when removing the wiper blades: the spring-loaded lever may drop sharply onto the glass and crack it.**

To replace the windscreen wiper blade.

...press the brush retainer tab....

... and slide the brush to the base of the lever so that the brush retainer comes out of the hook on the lever.

Remove the brush from the lever.
Remove the other brush in the same way. Install wiper blades Install the windscreen wipers in reverse order.
To replace the tailgate window wiper blade.



...remove the brush from the lever.
Install the brush in reverse order.

Checking the oil level in the engine 1.4-1.6 (8V)

Check the oil level in the crankcase oil pan with the engine running and on a horizontal platform. If the engine was running before checking, stop the engine.

Wait at least three minutes (the oil should have time to drain into the engine oil pan).....

...and remove the oil level indicator (dipstick).

Wipe the pointer with a clean rag and insert it into the guide tube as far as it will go. Remove the pointer again and follow the edge of the oil line.
of the film on it to determine the level of oil in the engine oil pan.

The edge of the oil film should be between the two depressions on the indicator (marks MIN and MAX).

Operating a vehicle with a level-
not
If the oil level is below the MIN mark, the engine may be damaged, resulting in a costly engine overhaul.
If the oil level is below the MIN mark....

...turn counterclockwise and remove the oil filler cap.

Fill the engine oil in small portions through the filler neck. The difference in the volume of oil filled into the engine between the MIN and MAX marks is about 1.5 liters.
Fill with the same brand of oil that was filled into the engine.

Wait at least three minutes for the refilled oil to drain into the oil pan and check the level again. Put the level gauge back in place.
When topping up the oil, do not allow the oil level to rise above the MAX mark. Otherwise, oil will enter the combustion chambers via the crankcase ventilation system and combustion products from the oil could damage the catalytic converter.

Oil change and the oil filter engine 1.4-1.6 (8V)

Change engine oil in accordance with the maintenance schedule. The work must be carried out in an inspection trench or on a trestle. Change the oil in the engine in accordance with the maintenance schedule.
When the engine is running warm, it is best to do so immediately after a trip, before the oil has cooled down.

Use oils recommended by the manufacturer (see "Appendices", page 315).

Remove the oil filler cap. Clean dirt from underneath the vehicle at the crankcase oil pan near the oil drain plug.

Loosen the drain plug with an 8" square bar.

Place a wide container of at least 4 liters for draining the used oil and drain the oil by unscrewing the plug by hand.

Be careful - the oil is hot.

To prevent oil leakage from the crankcase pan, a thin layer of rubber is vulcanized over the surface of the washer bore.

A steel washer is installed under the plug.

Inspect the washer. If it's damaged.
restorations rubber Replace the washer with a new one. If a new standard washer is not available, a copper washer with a bore diameter of 18 mm can be installed under the plug.
The oil should be drained for at least ten minutes.
Screw in and tighten the oil drain plug. Remove any oil leaks from the engine oil pan and the engine oil pan guard
of the power unit. When changing the oil, do

It is necessary to change the oil filter.
Place a container under the oil filter.
Unscrew (counterclockwise) the oil filter.
If this cannot be done by hand....

...loosen the filter tightening with a puller.

If no puller is available, pierce the filter housing with a heavy-duty screwdriver (close to the bottom so as not to damage the engine coupling) and unscrew the filter using the screwdriver as a lever. Clean dirt and oil leaks from the filter seat on the cylinder block. Fill the filter with new oil

Apply engine oil approximately half its volume and apply engine oil to the filter O-ring. Screw in the oil filter by hand until the O-ring is in contact with the cylinder block. Turn the filter another 2/3 turn to seal the connection. Fill the engine with 3.3 liters of engine oil via the oil filler neck. Close the oil filler cap.
Start the engine for 1 to 2 minutes
The engine oil pressure warning light in the instrument cluster has gone out. Check that the engine oil pressure warning light in the instrument cluster is off and that the engine oil pressure warning light in the instrument cluster is off and that there are leaks from under the oil drain plug and filter.
tracts are missing.
Stop the engine. After a few minutes (to allow the oil to drain into the oil pan) check the oil level and bring it up to normal. If necessary, retighten the oil filter and drain plug.
holes.

Changing the engine spark plugs 1,4-1,6 (8V)

The manufacturer recommends using EYQUEM RFC58LZ2E or SAGEM RFN58LZ or CHAMPION RC87YCL spark plugs on K7J and K7M engines.
Replace spark plugs every 30,000 km in accordance with the maintenance schedule.
Do this when the engine is cold.

Remove the high-voltage wire lug from the spark plug.

Before unscrewing the spark plug, remove dirt from the well around the spark plug - it is better to blow out the well with compressed air.

Use a spark plug wrench or a 16" high torque wrench with extension to unscrew.

...and remove the spark plug.
When installing the plug, it must be bumped and screwed in by rotating the plug
a spark plug wrench or extension cord by hand,
without a collar, to avoid damage to the collar.
If the spark plug hole threads in the cylinder head are not threaded.
If the plug is not threaded, there will be a strong resistance to rotation.
In this case, unscrew the plug completely and re-tighten after cleaning the threads. Tighten the plug to the required torque.

Over tightening of the spark plug can cause
If the vehicle is not equipped with a spare wheel, the vehicle is not equipped with a spare wheel.

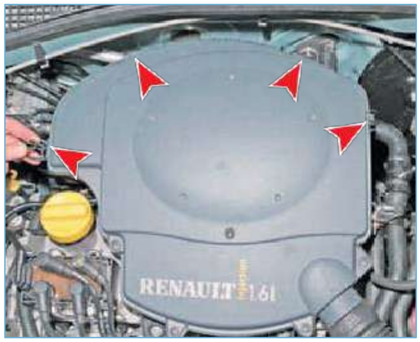
Replace the remaining plugs in the same way. Install only factory-recommended plugs or equivalent plugs from other manufacturers.

Changing the air filter element of the engine 1.4-1.6 (8V)

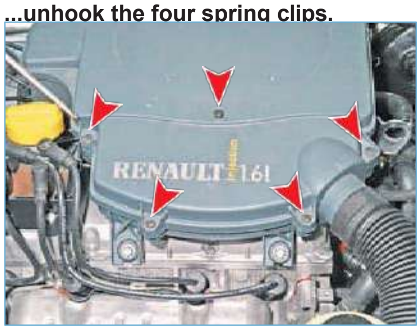
The air filter element must be replaced every 15,000 km.
If the vehicle is operated in dusty terrain, the mileage between element replacements should be reduced by 1.5 to 2 times.
A deformed or damaged component must be replaced regardless of the mileage.

A damaged or heavily soiled air filter element can cause severe wear and tear
and a reduction in engine power.

To remove the replacement element...



...unhook the four spring clips.



Use a Phillips screwdriver to loosen the five self-tapping screws securing the air filter cover.
The self-tapping screws are not removed from the cover.

Removing the cover...

... and carefully, so as not to drop dirt into the throttle body connection, remove the replacement element from the filter housing.

After cleaning the filter housing cavity of dirt, install a new replacement element and air filter cover.

Changing the auxiliary drive belt on the 1.4-1.6 (8V) engine

In accordance with the maintenance schedule, the auxiliary drive belt must be replaced every 60,000 km or after 4 years (whichever comes first) regardless of its condition. The work should be carried out on an inspection trench or on a trestle.

We recommend checking the condition of the belt at each service interval.

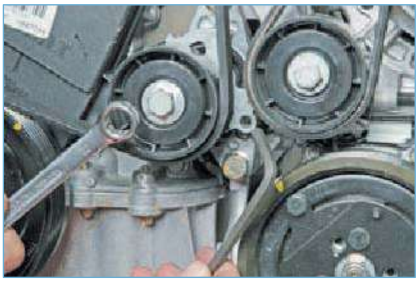
The belt must be replaced if it shows cracks, tears or separation of the rubber from the fabric backing.

Depending on the vehicle configuration, there are three different drive configurations for the auxiliary aggregates.

Option 1.

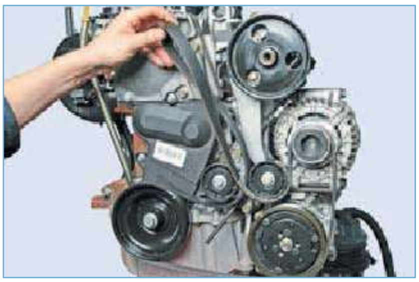
The belt tension in vehicles with power steering and air conditioning is automatically adjusted by the belt tensioner. To replace the belt, remove the right engine compartment mudguard (see "Removing the engine compartment mudguards", page 283).

To loosen the belt tension, the bottom of the vehicle...

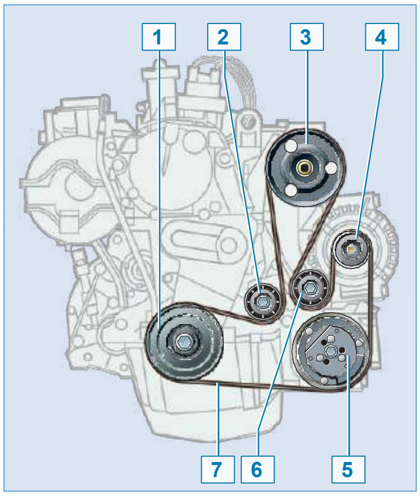


... put a ring wrench or a 13" head on the idler pulley mounting bolt and turn the idler bracket clockwise, overcoming the tensioner spring force, until the hole in the idler bracket and the recess in the idler housing are aligned (for clarity, shown with the engine removed).

Fix the roller bracket by inserting a 6 mm hexagon or a 6 mm rod into its hole and the recess in the tensioner housing.



Remove the auxiliary drive belt.



Scheme of auxiliary aggregates drive of the car with power steering and air-conditioning: 1 - pulley of auxiliary aggregates drive; **2** - idler pulley; **3 - pulley of** power steering pump; **4** - generator pulley; **5 - pulley of** air-conditioning compressor; **6 -** support roller; **7** - belt.

The designation of the auxiliary drive belt for a vehicle with power steering and air conditioning is 5K 1747 (five-strand, length 1747 mm). When replacing the belt, the support and tensioning pulleys must also be replaced.

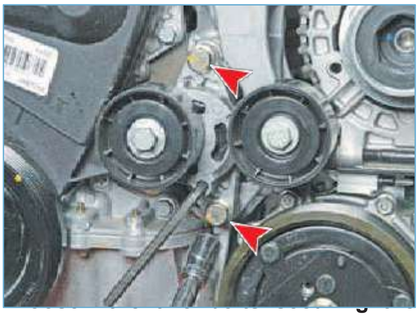
To replace the support roller...

...with a box wrench or a socket head. "unscrew the bolt securing it with a 13 mm screw....

...and remove the bolt with the roller cover plate.

Remove the support roller. Remove the idler pulley in the same way.

If the tensioner needs to be replaced (e.g. spring breakage).

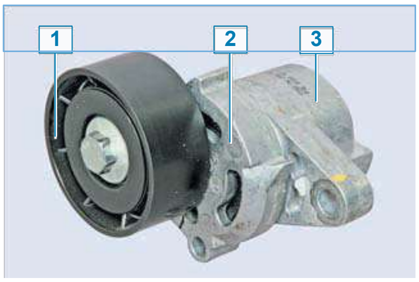


tensioner housing with a 13" head....

...and remove the tensioner assembly with roller.

Install the removed parts in the reverse order. Before installing the belt, the idler pulley bracket must be turned clockwise and secured (see above).

When installing the belt, place it on the pulleys and guide it under the tensioner and support rollers in accordance with the drive diagram.



Automatic tensioner assembly: 1 - tensioner roller; **2** - roller bracket; **3** - housing

The drive pulleys of the auxiliary units, alternator, air conditioning compressor and power steering pump are six-strand pulleys and the belt of the power steering belt is a six-strand pulley. water is five-stranded.

Place the belt on the pulleys so...

... so that it is offset to their outer edge 1 and the inner channel of the pulleys 2 remains free.

After installing the belt, turn the wrench slightly back on the tensioner pulley and remove the retainer. Then use the head

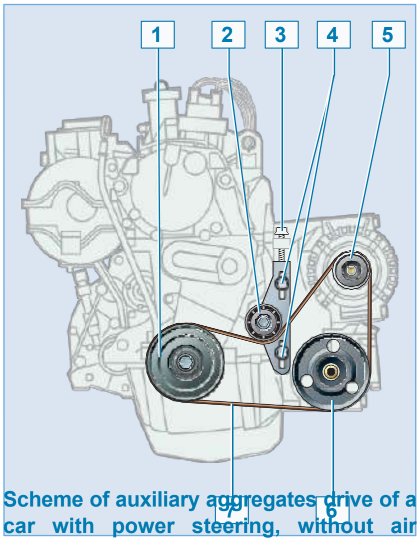
"Turn the crankshaft clockwise three turns clockwise with a ratchet by the pulley bolt to obtain the correct belt position.

Option 2.

The manufacturer recommends that the tension of the auxiliary equipment belt of a vehicle with power steering and without air conditioning be checked using a special tool (strain gauge tester) by a RENAULT dealer. Given that the belt may have to be replaced on the road (e.g. in the event of a belt break) away from the service station, we will show you how to approximate the belt tension.

Remove the right-hand mudguard.

Remove the engine compartment cover (see "Removing the engine compartment scuff plates", page 283). From underneath the vehicle, use the thumb to press the belt midway between the power steering pump and the belt pulleys. When pressing force is applied The belt deflection should be 6-8 mm at ~10 kgf. To tension the belt, loosen the two bolts 4



Scheme of auxiliary aggregates drive of a car with power steering, without air conditioning: 1 - auxiliary aggregates drive pulley; **2 - idler pulley** with bracket; **3** - adjusting bolt; **4** - bolt fixing the idler pulley bracket; **5** - alternator pulley; **6** - power steering pump pulley; **7** - belt.

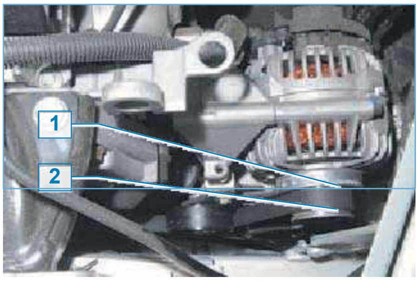
Tighten the idler pulley mounting bracket and turn the adjusting bolt 3 clockwise. Tighten the idler pulley mounting bolts after tensioning the pulley.

Excessive belt tension causes premature failure of the belt and idler pulley as well as the bearings of the auxiliary units.

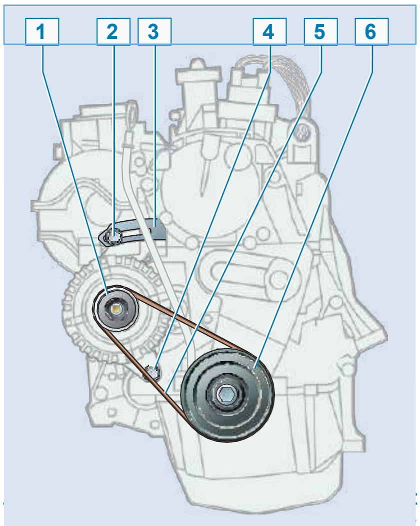
To replace the belt, turn adjusting bolt 3 counterclockwise a few turns and tighten bolts 4 securing the idler pulley bracket. After loosening the belt tension, remove it from the pulleys. Auxiliary drive belt marking for a car with power steering and without air conditioning is 5K 1110 (five-strand, length 1110 mm). When replacing the belt, the belt tensioner must also be replaced. Installing the drive belt alternator belt on a vehicle without a

The drive pulleys for the auxiliary units, alternator and power steering pump are six-strand pulleys, while the drive belt is five-strand.

Place the belt on the pulleys so...



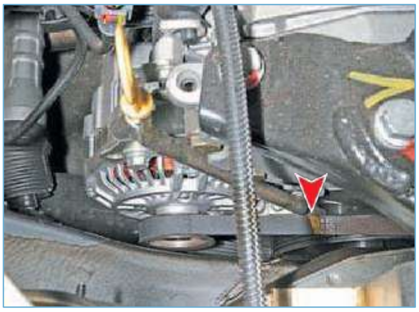
... so that it is offset against the inner edge 1 of the pulleys and the outer edge 2 of the pulleys remains free.
Adjust belt tension (see above). Have the belt tension checked accurately by a workshop.



conditioning: 1 - alternator pulley; **2** - alternator mounting bolt to the tensioning bar; **3** - tensioning bar; **4** - **alternator** lower mounting bolt; **5** - alternator drive belt; **6** - auxiliary units drive pulley.

of the auxiliary units in reverseorder
Tocheck the belt tension of the

power steering and no air conditioning- Press the belt with your thumb...



...midway between the alternator and crankshaft pulleys.
At a pressing force of ~10 kgf, the belt should bend 6-8 mm. To tension the belt, remove the right engine compartment mudguard (see "Removing the engine compartment mudguards", page 283).
Loosen bolt 4 of the lower alternator mounting bolt and bolt 2 of the alternator mounting bolt to the tensioning bar. Tighten the belt by pulling the alternator away from the engine block with a mounting tray. Tighten alternator mounting bolts.

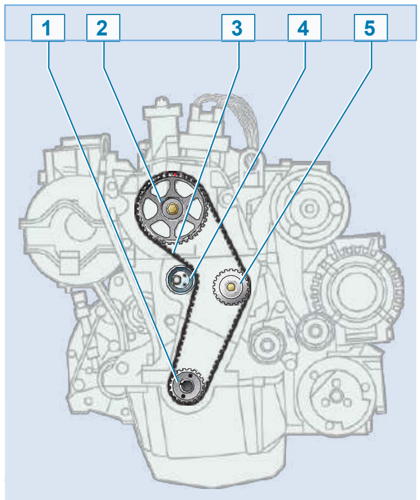
Do not overtighten the belt! Excessive belt tension causes premature failure of both the belt and the alternator bearings.

When replacing the belt, loosen the belt tension (see above) and remove the belt from the crankshaft and alternator pulleys. The marking of the alternator drive belt on a car without power steering and without air conditioning is 4RK 718 (four-strand, length 718 mm). Install the alternator drive belt in reverse order and adjust its tension. Have the belt tension checked accurately by a workshop.

Status check

and belt replacement 1.4-1.6 (8V) engine gas distributor gearbox drive

Failure of the timing belt (broken or sheared teeth) will cause the valves to jam into the pistons due to misalignment of the rotation angles of the crankshaft and camshaft and, consequently, costly engine repairs. Therefore, in accordance with the vehicle maintenance schedule, the belt should be replaced every 60 thousand kilometers or 4 years (whichever comes first) regardless of its condition. We recommend checking the condition of the belt at each service interval. The surface of the toothed part of the belt must be free of creases, cracks, tooth undercuts and delamination of the fabric from the rubber. The reverse side of the belt must be free of wear and tear exposing the cords or signs of burning.



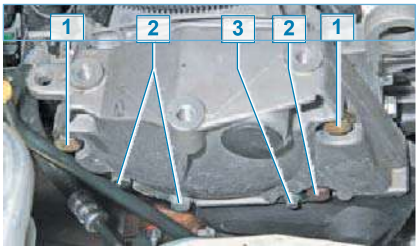
1 - toothed pulley of the crankshaft; **2** - toothed pulley of the camshaft; **3** - timing belt; **4** - idler pulley; **5** - toothed pulley of the coolant pump.

The end faces of the belt must not be delaminated or wrinkled. The belt must be replaced if it shows traces of oil.

To assess the condition and replace the timing belt, remove the right-hand support of the power unit (see "Removing the right-hand support of the power unit").

See "Replacing the power unit supports", page 96) and the right engine compartment mudguard (see "Removing the engine compartment mudguards", page 283).

Unscrew the six bolts securing the upper drive belt cover.



...two bolts 1, three bolts 2 and a bolt 3 with a head "for 16", a head "for 13" and a head "for 8".

Remove the upper timing belt cover.

Turn the crankshaft clockwise with a ratchet nut "for 18" by the auxiliary drive pulley bolt and visually assess the condition of the belt.

The manufacturer recommends checking and adjusting the timing belt tension using a special device - strain gauge tester.

Without a gauge, you can roughly estimate the belt tension.

If thumb and forefinger force is used to twist the drive belt (at the point between the toothed pulleys of the camshaft and the coolant pump) more than 60° to 70°.....

... the belt is loose and must be retightened.

The lower cover must be removed to adjust the belt tension. Unscrew the two bolts securing the lower timing belt cover with a ratchet and an 8" socket.

Bolts securing the lower timing belt cover (for clarity, shown with the engine removed)

Remove the lower timing belt cover.

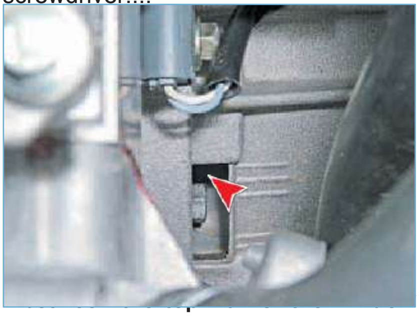
Having loosened the tensioning nut of the idler pulley mounting with a 16" wrench, use a special wrench (suitable for tensioning the timing belt of front-wheel drive VAZ cars) to turn the pulley counterclockwise, tensioning the belt.

Tighten the pulley nut in this position. Turn crankshaft clockwise by the pulley bolt two turns to check belt tension and readjust if necessary. Install the removed parts in reverse order.

To replace the timing belt, remove the auxiliary drive belt (see "Replacing the auxiliary drive belt on the 1.4-1.6 (8V) engine", page 32), the upper and lower timing belt covers (see above).

When loosening the crankshaft pulley bolt, the shaft must be secured against rotation. This can be done by using the window in the clutch housing located at the top under the thermostat housing. Turn the crankshaft (an assistant is required) and observe the movement of the clutch guard through the window. Ensure that one of the six bolts securing the hood to the flywheel appears in the window.

Stop the crankshaft from spinning by inserting the blade of a power slotted screwdriver....



in the clutch crankcase and the head of the shroud mounting bolt.

Be careful not to damage the elastic plates connecting the hood to the clutch pressure plate with a screwdriver during this operation.

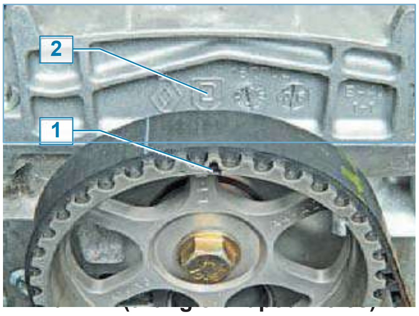
Head "on 18" unscrew the bolt securing the crankshaft pulley and remove the screwdriver from the window of the clutch crankcase.

Remove the crankshaft pulley. If it is difficult to remove the pulley, pry it up evenly from different sides with a mounting spatula.

The pulley bolt must be screwed back into place to enable the crankshaft to be turned again. To ensure that the bolt is fully threaded into the threaded hole in the crankshaft toe, install a spacer (bushing or washer set) between the bolt and the crankshaft toe.

Before removing the belt, the crankshaft and camshaft must be set to the TDC (top dead center) position of the 1st cylinder compression stroke to avoid interfering with the timing.

Turn the crankshaft clockwise by the pulley bolt until the crankshaft pulley bolt is aligned.



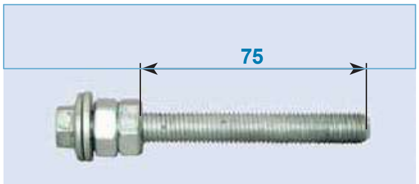
the timing pulley of the camshaft with mark 2 (logo).

"Dacia, through which the imaginary vertical axis of the pulley passes) on the cylinder head cover.

To check whether the crankshaft is in the TDC position of the 1st and 4th cylinder pistons, the cylinder block has an M10 threaded hole into which a special setting pin with a 75 mm thread length must be screwed. When the crankshaft is in the TDC position of the 1st and 4th cylinder pistons, the pin must engage in the milled area on the crankshaft cheek and block the shaft when attempting to turn it clockwise.

Using an E-14 head, unscrew the technical plug from the threaded hole in the cylinder block located on the front side of the cylinder block, near cylinder 1 - under the oil pressure alarm sensor (for clarity, shown with the engine removed).

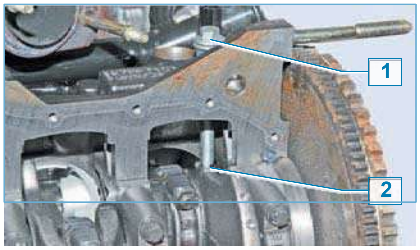
The upper gearbox mounting bolt on the cylinder block can be used as a locating pin (for clarity, shown with the power unit removed).



Screw two nuts onto the bolt and tighten them so that the length of the threaded part is 75 mm. The made device is a setting pin....

... screw into the threaded hole in the cylinder block.

When the crankshaft is at the TDC position of the 1st and 4th cylinder pistons...



... the locating pin 1 is screwed into the bore to the end of its thread and rests against the milled area 2 on the crankshaft cheek (for clarity, shown with the engine dismounted and the crankcase oil pan removed).

The crankshaft cannot be turned clockwise. If, when screwing in the locating pin, you feel that it is pushed in and the end face of the pin nut does not contact the end face of the cylinder block bore boss (there is a gap between the nut and boss), turn the crankshaft counterclockwise slightly by the pulley bolt. Then screw the locating pin into the block bore all the way in (until the faces of the pin nut and the boss of the block bore are in contact) and turn the crankshaft clockwise until the cheek flats rest against the pin.

By loosening the fastening nut tightening

Turn the tensioner roller clockwise to reduce the tension on the timing belt.

Do not turn crankshaft and camshaft after removing the belt to prevent the valves from poking into the pistons.

When replacing the belt, also replace the idler pulley.

Unscrew the nut securing it ...

... and remove the tensioner pulley.

Install new tensioner and timing belt in reverse order.

When installing the belt...

...on which the arrows are mapped.....

... orient it so that the arrows align with the direction of belt movement (clockwise).

With the belt on the crankshaft pulley, slide the belt under the idler pulley and over the camshaft and coolant pump pulleys. Tighten timing belt as shown above. With the adjusting pin removed from the hole in the cylinder block, turn the crankshaft two turns clockwise by the pulley bolt until the mark on the camshaft pulley matches the mark on the cylinder head cover. Then screw the locating pin into the cylinder block bore to check that the crankshaft is correctly positioned in the cylinder block.

TDC position of pistons 1 and 4

Remove the pin from the cylinder bore (see above) and re-install the belt if necessary. Unscrew the pin from the hole in the cylinder block and refit the screw plug. Install the removed parts in the reverse order.

sequences.

Replace the auxiliary drive pulley bolt with a new one and tighten to the prescribed torque (see "Appendices", page 315). To ensure reliable engine operation and the specified service life of the timing belt, it is better to have the belt adjustment checked by a workshop using a strain gauge.

Checking the level and topping up engine coolant 1.4-1.6 (8V)

Checking the fluid level in the cooling system expansion tank should preferably be carried out each time the vehicle is inspected before the vehicle is driven.

Before driving off and always in the event of engine overheating and consequent fluid discharge from the system. To check the fluid level, park the vehicle on a level surface.

Check the fluid level when the engine is cold.

The MAXI and MINI markings on the side of the expansion tank indicate between which the fluid level should be between when the engine is cold.

When the engine is at operating temperature, the coolant level in the coolant reservoir may be slightly above the MAXI mark.

When the engine is hot, the fluid in the cooling system is overpressurized. To avoid Do not unscrew the expansion tank cap to prevent burns.

until the engine cools down to temperatures below 60 °C.

If it is necessary to top up the system while the engine is hot, stop the engine on the road. After waiting at least ten minutes, cover the expansion tank cap with a rag and unscrew it a quarter turn to release excess pressure in the cooling system. If the fluid level is at or below the MINI mark....

... unscrew the expansion tank cap....

... and fill the coolant reservoir slightly below the MAXI mark.

Remove coolant leaks with a rag. Screw on the cap of the expansion tank.

a ust it

If the fluid level in the expansion tank drops continuously, there is a leak in the cooling system. In this case, check the tightness of the cooling system and correct the malfunction.

Engine coolant change 1.4-1.6 (8V)

In accordance with the maintenance schedule, the coolant must be replaced every 90,000 km or 3 years, whichever comes first.

Perform work on a cold engine with the vehicle on an inspection pit or trestle. If the engine is hot, allow it to cool down and then depressurize the cooling system (see "Checking the coolant level and topping up 1.4-1.6 (8V) engine c o o l a n t ", page 37).

Remove the power unit protection (see "Removing the power unit protection", page 283).

No drain plugs are provided in the radiator or cylinder block.

Place a wide container with a volume of at least 6 liters under the radiator. To reduce the rate of drainage of liquid, place a wide container with a volume of at least 6 liters under the radiator.

The expansion tank cap must be tightly closed at the initial moment.

From the bottom of the car...

...sliding pliers squeeze-

If necessary, adjust the clamp ends and slide the clamp. If necessary,

I'm hosing you down.

Disconnect the hose from the radiator connection and drain the fluid into a suitable container.

To increase the drainage rate, unscrew the reservoir cap.

... and the cap of the (cooling system venting) connector on the heater fluid hose.

After the coolant is no longer leaking, place the outlet hose on the radiator pipe and secure it with a clamp.

Fill the engine cooling system with fluid via the expansion tank until fluid starts to flow out of the outlet connection.

air inlet. Tighten the cap of the air bleed connector and the cap of the expansion tank.

Start the engine. When the engine warms up, the radiator outlet (lower) hose should be cold for some time and then warm up quickly, indicating that the fluid is circulating in a large circle. After waiting for the cooling fan to start, stop the engine. After the engine has cooled down, check the coolant level.

to normal.

Checking the oil level in the engine 1.6 (16V)

Check the oil level in the crankcase oil pan with the engine not running and the vehicle on a level, horizontal platform. If the engine was running before checking, stop the engine. Wait at least three minutes (oil should have time to drain into the engine oil pan) and remove the oil level gauge (dipstick)....

... from the guide tube. Wipe the indicator with a clean cloth and insert it into the guide tube as far as it will g o . Remove the indicator again and determine the oil level in the engine oil compartment by the edge of the oil film on the indicator. The edge of the oil film must be on the indicator.

... at the notched area. Operating the vehicle with the oil level on the gauge below the notched area may cause engine damage and consequently costly repairs. repair. If the oil level is low, turn counterclockwise.....

Fill the engine with oil in small portions through the filler neck. The oil must be of the same type as the engine oil.

Wait at least three minutes for the refilled oil to drain into the oil compartment a n d check the oil level again. Install the oil level gauge.

When topping up the oil, do not allow the oil level to rise above the oil level gauge.

of the notched area. Otherwise -

If the oil flows through the crankcase ventilation system into the combustion chambers, the oil combustion products can damage the catalytic converter.

Oil change and the oil filter 1.6 (16V)

Change the oil every 15,000 km according to the maintenance schedule.

The work is carried out on an inspection trolley or trestle.

Remove the power unit protection (see "Removing the power unit protection", page 283).

Change should be carried out when the engine is not running and warmed up, preferably immediately after a trip, before the oil cools down.

Use oils recommended by the manufacturer (see "Appendices", page 315).

Remove the oil filler cap. Clean dirt from underneath the vehicle at the crankcase oil pan near the oil drain plug.

Use an 8" square to loosen the tightening.....

... drain plug. Place a wide container of at least 5 liters for draining the used oil.

Unscrew the plug by hand and drain the oil.

Be careful - the oil is hot.

A steel washer is installed under the plug.

To prevent oil leakage from the crankcase pan, a thin layer of rubber is vulcanized over the surface of the washer.

Inspect the washer. If it's damaged.

If the rubber seal of the washer is damaged, replace the washer with a new one. If a new standard washer is not available, a copper washer with a bore diameter of 18 mm can be fitted under the plug.

Drain oil for at least ten minutes. Screw in and tighten the oil drain plug. Remove oil leaks from the engine oil sump.

The oil filter must be replaced when changing the oil.

counterclockwise. If this cannot be done manually, loosen the filter with a filter puller. In the absence of a puller, pierce the filter housing with a heavy-duty screwdriver (closer to the bottom of the filter so as not to damage the engine coupling) and unscrew the filter using the screwdriver as a lever.

Clean dirt a n d oil residue from the filter seat on the cylinder block. Apply engine oil to the filter O-ring and screw in the filter by hand until the O-ring is in contact with the cylinder block. Turn the filter further

2/3 of a turn to seal

connections. Fill the engine with 4.75 liters of engine oil via the oil filler neck. Close the oil filler cap. Run the engine for 1 to 2 minutes. Check that the combination

The engine oil pressure warning light on the instrument cluster is off and there are no oil leaks from under the drain plug and filter. Stop the engine. After a few minutes (to allow oil to drain into crankcase pan) check oil level and bring it up to normal. If necessary, retighten oil filter and oil drain plug.

Changing the spark plugs for the engine 1.6 (16V)

The manufacturer recommends

use spark plugs EYQUEM RFC58LZ2E or SAGEM RFN58LZ and CHAMPION RC87YCL.
Replace spark plugs every 30,000 km in accordance with the maintenance schedule.
The work must be carried out on a cold engine.

Press the catch to disconnect the wiring harness from the ignition coil.

Unscrew the ignition coil mounting bolt with an 8" head.

Remove the tip of the coil from the spark plug.

High "candle" head "16" with an extension to turn out- The spark plug...

Install the new plug in reverse order.
When screwing in the spark plug, turn the spark plug wrench or head extension by hand and not with a collar or ratchet to avoid damaging the threads of the spark plug hole in the cylinder head.
If the spark plug is out of alignment, there will be a strong resistance to rotation. In this case, unscrew the plug completely and re-screw after cleaning the threads. Tighten the plug with the prescribed torque (see "Appendix", page 315).

Excessive tightening of spark plugs can lead to
If the engine is running, the engine is not running until the engine is running.

Replace the remaining spark plugs in the same way.

Replacing the air filter element of the 1.6 (16V) engine

The air filter element must be replaced every 15,000 km.
If the vehicle is driven in dusty areas, halve the time between element replacements.
A deformed or damaged component must be replaced regardless of the mileage.

A damaged or heavily soiled air filter element can cause severe wear and engine power loss.

Disconnect the rubber clamp securing the resonator of the air duct.

Disconnect the resonator pipe from the air filter housing cover pipe.
...and pull the resonator to the side.

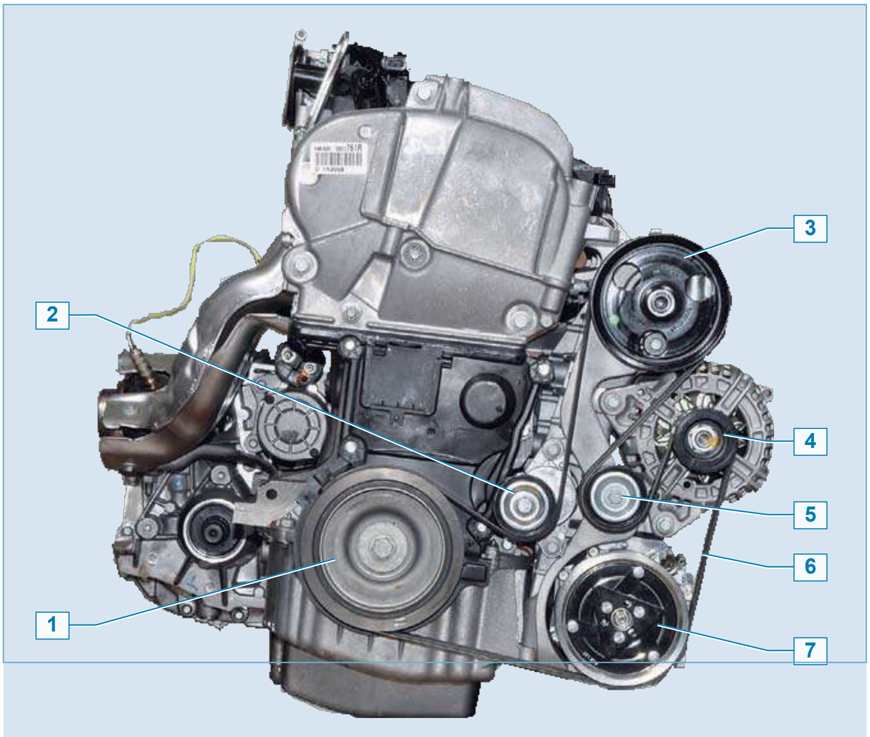
Use a Torx T-20 wrench to loosen the two screws securing the cover to the air filter housing.

Remove the air filter housing cover with the filter element.

element. Clean cavity cover Clean the air filter cover and install the new element in reverse order.

Changing the auxiliary drive belt on the 1.6 (16V) engine

In accordance with the maintenance schedule, the belt must be replaced every 60,000 km or 4 years (whichever comes first) regardless of its condition.



Scheme of auxiliary units drive of the car with air conditioner: 1 - pulley of auxiliary units drive; **2** - idler pulley; **3** - pulley of hydraulic power steering pump; **4 -** generator pulley; **5** - support roller; **6 -** belt; **7** - pulley of air conditioner compressor.

Work is carried out on an inspection duct or trestle.

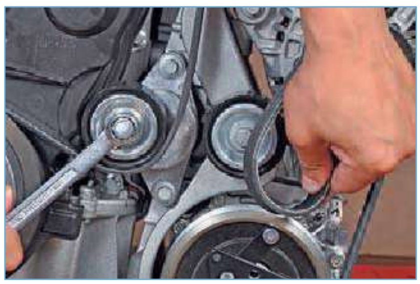
We recommend checking the condition of the auxiliary drive belt at each service. If the belt has cracks, tears or delamination of the rubber from the fabric backing, it must be replaced.

Depending on the vehicle configuration, there are two variants of the auxiliary drive diagrams (with and without air conditioning). Operation is shown on the vehicle with air conditioning.

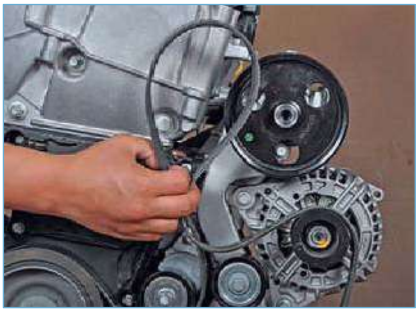
The belt tension is automatically adjusted with the tensioner. To replace the belt, remove the right-hand engine compartment mudguard (see "Removing the engine compartment mudguards", page 283).

To loosen the belt tension, use a ring wrench or a 15" head on the idler pulley mounting bolt from underneath the vehicle.

Turn the pulley bracket clockwise, overcoming the resistance of the tensioner spring (for clarity, shown with the engine removed)....



... and remove the belt from the support roller.



Remove the auxiliary drive belt from the pulleys.
Belt marking for air-conditioned auxiliary units drive belt - 6 RK 1822 (six-strand belt,

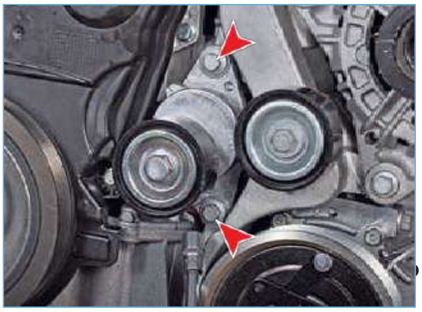
length of 1822 mm). When replacing the belt
The idler pulley and idler pulley must also be replaced.
To replace the support roller...

...screw...

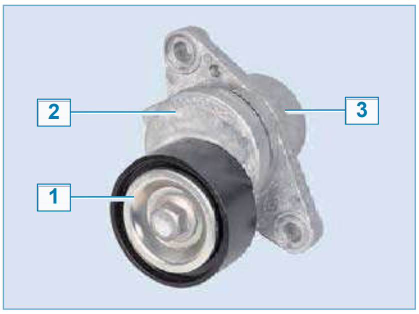
... and remove the outer cover of the rotor.

Removing the support roller ...

... and its inner cover. Remove the tensioning roller in the same way.
If it is necessary to replace the tensioning device (e.g. in the event of an accident), the tensioning device must be replaced with a new one.
spring breakage)...



...and remove the idler pulley assembly.

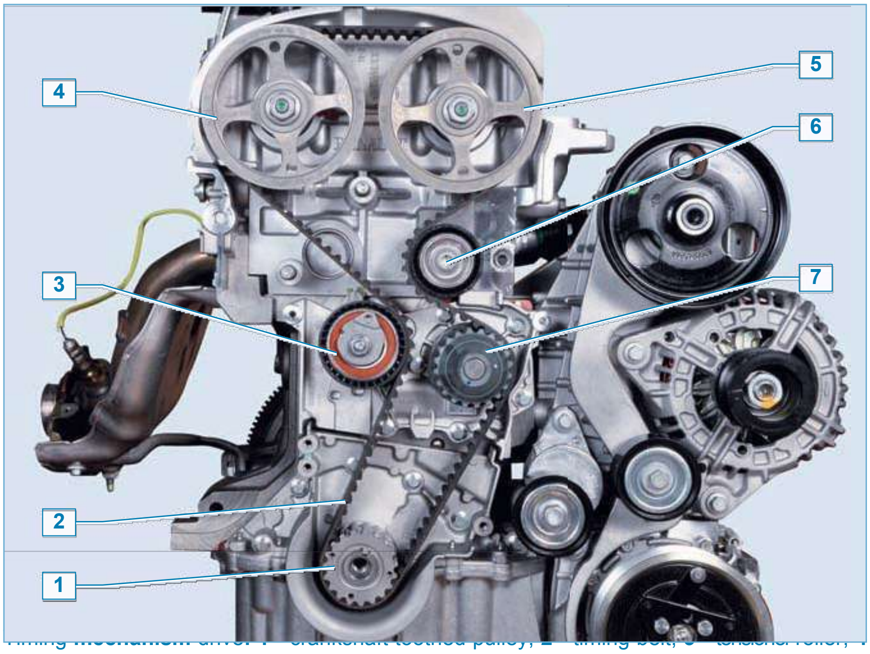


Tensioning device: 1 - tensioning roller: **2** - roller bracket; **3 -** housing

Install parts in reverse order. When installing the belt, place it on the pulleys and slide it under the idler pulley and support pulley in accordance with the diagram.

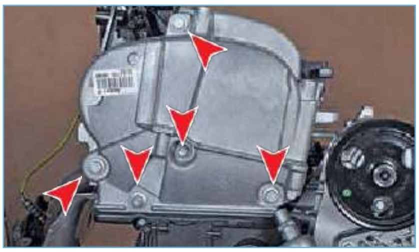
Checking the condition and replacing the engine timing belt 1,6 (16V)

The timing belt must be replaced every 60,000 km or 4 years (whichever comes first), regardless of its condition, in accordance with the maintenance schedule.
The work is carried out on an inspection trolley or trestle.
Belt failure (broken or
If the belt is not in good condition, it will cause the valves to stick into the pistons due to misalignment of the crankshaft and camshaft angles, resulting in costly engine repairs. We therefore recommend that the condition of the belt is checked at every vehicle service. The surface of the toothed part of the belt must be free of creases, cracks, tooth undercuts and delamination of the fabric from the rubber. The reverse side of the belt must be free of wear that exposes the cords and must not show signs of burning. The end faces of the belt must be free of delamination and fraying. The belt must be replaced if it shows traces of oil.
To assess the condition and replace the rem-
Remove the right power unit support (see "Replacing the power unit supports", page 145) and the right engine compartment mudguard (see "Removing the engine compartment mudguards", page 283).

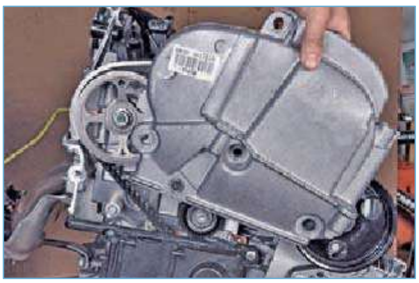


Timing mechanism drive: 1 - crankshaft toothed pulley; **2** - timing belt; **3** - tensioner roller; **4** - exhaust valve drive camshaft toothed pulley; **5 -** inlet valve drive camshaft toothed pulley; **6** - support roller; **7** - coolant pump toothed pulley

For clarity, the operations are shown with the engine dismantled.

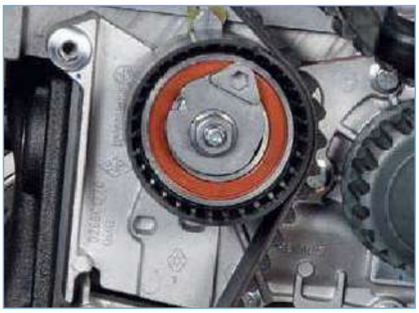


Use a 13" socket to loosen three bolts and two nuts....



... and remove the upper timing cover. Turn the crankshaft clockwise with an 18" socket by the drive pulley bolt.

Check the condition of the timing belt and visually assess the condition of the timing belt.
The belt tension can be assessed by the position of the indicators on the automatic belt tensioner.

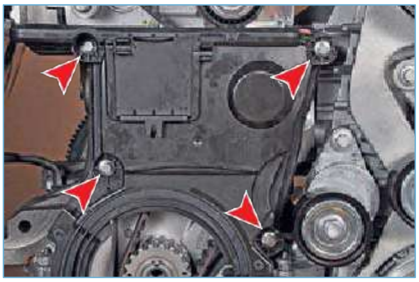


When the belt is tensioned normally, the movable pointer 1 should align with the notch in the fixed pointer 2 of the tensioner (for clarity, shown with the lower timing cover removed). If the movable pointer is displaced relative to the fixed pointer:
- counterclockwise - the belt tension is insufficient;
- Clockwise - the belt is over-tightened.
The belt tension must be adjusted in both cases.
To adjust the belt tension...

...the lower timing cover has a hatch covered with a cover (shown on the removed cover for clarity).....
Pull upwards to remove the manhole cover.

After loosening the tensioner nut with a 13 mm wrench, turn the roller clockwise with a 6 mm hexagon to tighten the belt.
Hold the roller in this position and tighten the tensioner nut. Turn crankshaft two revolutions clockwise by the auxiliary drive pulley bolt, check belt tension again and repeat adjustment if necessary. Install the removed parts in reverse order.
To replace the timing belt, remove the auxiliary drive belt (see "Replacing the auxiliary drive belt on the 1.6 (16V) engine", page 41).
Remove the upper (see above) and lower timing cover.

To remove the lower timing cover...



... Use an 8-head to loosen the four bolts securing it.....

...and remove the bottom cover.

When loosening the auxiliary drive pulley bolt, the crankshaft must be secured against rotation. To do this, the assistant must engage fifth gear and depress the brake pedal. If the pulley bolt cannot be removed due to the crankshaft turning, the crankshaft must be secured.

To do this, remove the crankshaft position sensor (see "Removing the crankshaft position sensor", page 157).

Stop the crankshaft ...

... by inserting a mounting spatula between the teeth of the flywheel crown through the window in the clutch housing.

Unscrew the bolt securing the auxiliary drive pulley using an 18 mm socket.

...and remove the bolt and washer.

Remove the auxiliary drive pulley.

If it is difficult to remove the pulley, pry it up evenly from different sides with a mounting spatula.

There are no special setting marks on the crankshaft and camshaft pulleys.

To avoid disturbing the timing, the crankshaft and camshafts must be set at TDC (top dead center) of the 1st cylinder compression stroke before removing the timing belt.

To turn the crankshaft, replace the auxiliary drive pulley bolt by placing a spacer (bushing or washer set) between the bolt washer and the shaft end.

To determine the position of the camshafts, remove the two rubber-metal plugs from the holes in the left end of the cylinder head. Remove the air line resonator (see "Changing the replacement air filter element for the 1.6 (16V) engine", page 40).

Poke a hole in the center of the plug (rubber mask) with a screwdriver and, acting with the screwdriver as a lever....

...remove the plug from the hole in the cylinder head.

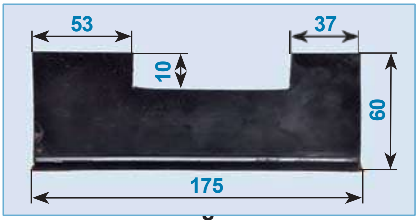
Remove the other plug in the same way.

Turn the crankshaft clockwise by the auxiliary drive pulley bolt until....

... until the grooves on the camshaft ends are in a horizontal position (parallel to the plane of the cover and cylinder head).

and will be offset downward relative to the camshaft axes.

For securing the camshafts when changing the belt, a simple device can be constructed from a 5 mm thick metal plate (see sketch).



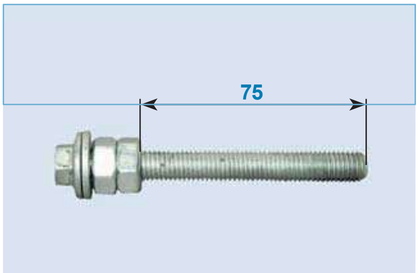
Install the fixture in the grooves of the shafts.

To check whether the crankshaft is in the TDC position of the 1st and 4th cylinder pistons, the cylinder block has an M10 threaded hole into which a special setting pin with a 75 mm thread length must be screwed. When the crankshaft is in the TDC position of the 1st and 4th cylinder pistons, the pin must engage in the milled area on the crankshaft cheek and lock the shaft if you attempt to turn it clockwise.

Use the E-14 head to unscrew the technical plug from the threaded plug.

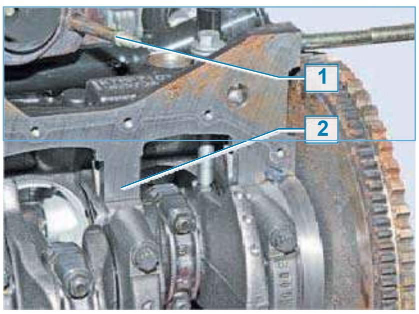
the hole in the cylinder block located on the front side of the block, in the area of cylinder 1 - under the oil pressure alarm sensor (for clarity, shown with the engine removed).

The upper gearbox mounting bolt on the cylinder block can be used as a locating pin (for clarity, shown with the power unit removed).



Screw two nuts onto the bolt and tighten them so that the length of the threaded part is 75 mm. S c r e w t h e made device - setting pin into the threaded hole of the chimney block.

When the crankshaft is at the TDC position of the 1st and 4th cylinder pistons...



…установочный палец 1 ввернется в отверстие до конца своей резьбы и упрется в отфрезерованную пло-

The crankshaft cheek 2 (for clarity, shown with the engine dismounted and crankcase oil pan removed).

The crankshaft cannot be turned clockwise.

If when screwing in the locating pin you feel that it is pushed in and the face of the pin nut does not touch the face of the cylinder block bore boss (there is a gap between the nut and boss), turn the crankshaft counterclockwise slightly by the pulley bolt. Then screw the locating pin into the block bore all the way in (until the faces of the pin nut and the boss of the block bore are in contact) and turn the crankshaft clockwise until the cheek flats rest against the pin.

By loosening the fastening nut tightening Turn the tensioner roller c l o c k w i s e to reduce the tension on the timing belt. Loosen the t e n s i o n e r mounting nut with a 13 mm wrench....

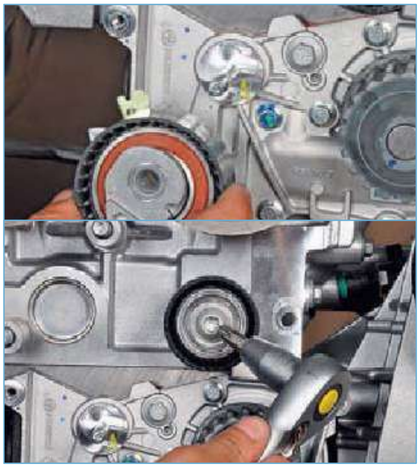
...turn the roller counterclockwise to reduce the timing belt tension.....

... and remove the belt from the idler pulley.....

... and then from the coolant pump, crankshaft and camshaft pulleys.

When replacing the belt, the belt tensioner assembly and support roller must also be replaced.

Unscrew the coupling ball bar retaining nut.



Use a Torx T-50 wrench to loosen the support roller mounting screw.

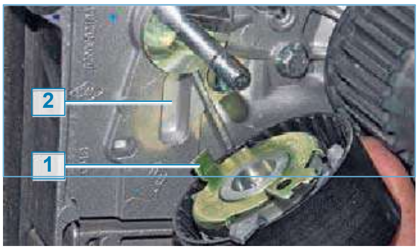
Remove the support roller and the roller bushing.

Install the new support roller in reverse order. When installing a new timing belt with arrows on it, orient it so that the arrows align with the direction of belt movement (clockwise).

Fit the belt to the toothed pulleys on the crankshaft, coolant pump and camshaft pulleys.

Then simultaneously place the belt on the idler pulley and mount the idler pulley on the stud of the coolant pump housing.

When installing a tensioning device....



... insert bent end of bracket 1 into recess 2 of coolant filler housing.

Unscrew the locating pin from the hole in the cylinder block.

Turn the crankshaft two revolutions clockwise by the auxiliary drive pulley bolt until the crankshaft can be turned to the following position.

of the groove alignment on the end faces camshafts.

Screw the adjusting pin into the cylinder block to check that the crankshaft is correctly positioned at TDC of cylinders 1 to 4. Repeat timing belt installation if necessary. Unscrew the adjusting pin from the cylinder block bore and replace the threaded plug. Install the removed parts in reverse order.

Lightly tap the new plugs into the cylinder head bores with a plastic mallet.

Further engine assembly is carried out in reverse order. Replace the auxiliary drive pulley bolt with a new one and tighten to the specified torque (see "Appendices", page 315).

Checking the level and topping up engine coolant 1.6 (16V)

Checking the coolant level and topping up is the same as for 1.4-1.6 (8V) engines (see "Checking the coolant level and topping up 1.4-1.6 (8V) engine coolant", page 37).

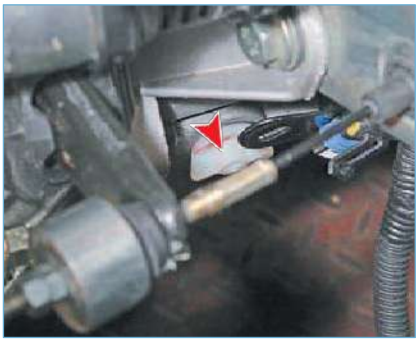
Engine coolant replacement 1,6 (16V)

Operations for changing the coolant are the same as for the 1.4-1.6 (8V) engine (see "Changing the coolant in the 1.4-1.6 (8V) engine", page 38). To bleed air from the cooling system when filling fluid, remove air line resonator (see "Changing the 1.6 (16V) engine air filter element", page 40)....

...and unscrew the plug on the thermostat housing with a 10 wrench.

Checking the oil level and topping up the oil in the manual transmission

Transmission oil in the gearbox is designed for the entire life of the vehicle and there are no oil level checks or oil changes in the maintenance schedule.
It is recommended that the oil level in the gearbox be checked at each service and always in case of oil leaks from the gearbox.
The work is carried out on an inspection trolley or trestle.
Check the oil level through the oil level plug on a cooled gearbox. The control hole is located on the front wall of the gearbox crankcase and is closed with a threaded plastic plug.



Location of the gearbox inspection plug

On vehicles with 1.4-1.6 (8V) engines, the inspection plug can be accessed from above from under the hood; on vehicles with 1.6 (16V) engines, it is easier to unscrew the plug from underneath the vehicle (with the power unit guard removed).
Clean the gearcase around the inspection hole with a rag.

Unscrew the inspection plug counterclockwise.

The oil level in the gearbox should be at the level of the lower edge of the opening, which can be checked with a finger. If necessary, the gearbox can be topped up from the bottom of the vehicle using a transmission oil filler (on vehicles with 1.4-1.6 (8V) engines, the oil can be topped up from the top of the engine compartment using a funnel and a hose inserted in the oil level plug).
Fill with the same brand of oil as was poured into the gearbox.
When topping up the oil from underneath the vehicle, remove the power pack guard (see "Removing the power pack guard", page 283).

Pour oil into the gearbox up to the lower edge of the hole (oil will start to flow out of the hole).

When excess oil has drained out, use a rag to remove any oil residue and tighten the plug.
If it is necessary to drain oil from the gearbox (e.g. when replacing the right wheel drive oil seal) clean the gearbox crankcase around the drain hole. Place a container with a capacity of at least 3.5 liters under the drain hole.

Unscrew the drain plug with an 8" square bar.

...and drain the oil into a container.
A copper washer is installed under the plug for sealing.
When draining is complete, tighten the drain plug. After completing the repair work, fill the gearbox with oil via the oil level plug and tighten the plug.

Checking the fluid level in the hydraulic brake system reservoir

The hydraulic brake fluid is stored in the reservoir on the brake master cylinder.
A sensor is installed in the reservoir cap to monitor the fluid level. If the fluid level falls below the permissible level, the parking brake activation and brake system malfunction indicator lights up in the instrument cluster. If there is no fluid leakage in the brake system, the fluid level in the reservoir is lowered due to wear of the front brake lining. Despite the presence of a sensor, it is recommended to visually check the fluid level in the reservoir before driving off, as the sensor itself or the signaling device in the instrument cluster or their electrical circuits may malfunction during operation.
To check the fluid level, set the
The vehicle is parked on a level surface.

The tank has MIN and MAX markings between which the tank should be on-
The fluid level must be at the correct level.

Do not allow the fluid level to fall below the MIN mark.

To top off the working fluid in the reservoir....

...unscrew and remove the sensor cover without disconnecting from the sensor...

to the wiring harness.
At this point, it's convenient to check the is-

The fluid level sensor is not working properly. To do this...

... position the sensor vertically on the water tank.
If the sensor is faulty, the parking brake and brake system fault indicator in the instrument cluster should illuminate when the ignition is switched on (the parking brake lever must be fully lowered during the test).

Fill the reservoir to the MAX mark.
Screw on the tank lid.

Brake fluid splashed on the paintwork, plastic parts and wires of the vehicle may cause damage. Immediately

remove it with a clean rag.

If the brake fluid level in the reservoir drops continuously, there is probably a leak in the system. In this case, check the tightness of the brake system hydraulic system and rectify the fault.

Changing the fluid in the hydraulic drive brake system

The brake fluid in the hydraulic brake system should be changed in accordance with the maintenance schedule - every 90,000 km or after three years (whichever comes first).
The work is carried out on an inspection trench or trestle.
When replacing ...

...drain the old fluid from the reservoir with a rubber bulb.....

... and fill the reservoir with new fluid. Pump the hydraulic brake system (see "Pumping the hydraulic brake system") until the new fluid (lighter in color than the old fluid) comes out of the pump connections on all working cylinders. After pumping, bring the fluid level in the hydraulic brake reservoir to the normal level.

Pumping the hydraulic drive brake system

Pump the brakes to bleed air from the hydraulic system after depressurization when replacing the master cylinder, wheel brake cylinders, hoses, tubes, brake fluid or when the brake pedal becomes soft.
The work is carried out on an inspection trench or trestle.
The system is vented when not-

When the engine is running, first from one circuit and then from the other circuit to the
in the following sequence:
– brake brake mechanism on the right rear wheel;
– Brake system of the left pedal wheel;
– Brake system of the left rear tire;
– Brake system of the right pedal wheel.

If air enters one of the circuits, it is sufficient to pump only that circuit and not the entire hydraulic system. Before pumping, check the level of fluid in the brake system reservoir and top up if necessary (see "Checking the level of fluid in the brake system reservoir", page 47).
Clean dirt from the brake pump connection on the right rear tire.

...and remove the protective cap from it.

Use a spanner wrench or an 8 mm socket to loosen the pump connection. Place a hose on the hose connector and immerse the free end of the hose in a container partially filled with operating fluid.

The assistant should vigorously depress the brake pedal to the stop 4-5 times and hold it depressed.

Unscrew the pumping unit by 1/2-3/4 turn with an 8 mm wrench.

Fluid with air bubbles will flow out of the hose and the brake pedal will move forward. As soon as the fluid stops flowing out of the hose (the pedal must reach the stop), screw in the hose connector and only then can the driver release the pedal.

Repeat pumping until no more air bubbles appear in the fluid coming out of the hose. Remove the hose, dry the pump connection and place the protective cap on it.

Pumping as described above.....

... the brake system of the left pedal wheel.

Pump the brakes of the other circuit in the same way.

When pumping, check the fluid level in the reservoir and top up if necessary. If the brake pedal feels "soft" and has a longer travel when depressed, there is air in the system. In this case, repeat pumping until the pedal becomes "stiff", i.e. it does not travel more than half the distance to the floor when depressed. If the air cannot be removed, check the tightness of connections, pipes, hoses, master and slave cylinders. Tighten leaking connections, replace defective master and slave cylinders.

Checking the fluid level in the power steering reservoir

The fluid in the power steering fluid reservoir is designed for the entire life of the vehicle. The fluid level in the power steering reservoir should be checked at each maintenance service, and also in the event of fluid leakage from the power steering system, reduced steering efficiency or foreign noise (howling) when turning the steering wheel.

It is important to locate the leak as accurately as possible, as the worn or damaged part will most likely need to be replaced.

Use the following procedure to determine the location of the leak:

– With the engine off, wipe all steering components dry;

– Check the fluid level in the booster reservoir and, if necessary, bring it up to the normal level;

– start the engine and rotate the steering wheel several times to the extreme left and extreme right positions;

– find the exact location of the leak and eliminate the cause.

When replenishing or changing the fluid in the power steering system, use the fluid recommended by the vehicle manufacturer.

The power steering reservoir is located in the engine compartment on the upper radiator frame bracket.

Check the fluid level in the reservoir on a level platform with the engine running idle and not warmed up.

The reservoir body is marked with MINI and MAXI marks between which the fluid level should be between when the engine is cold. When the engine is running, the power steering fluid heats up and the level in the reservoir may be slightly above the MAXI mark. If the fluid level falls below the MINI mark, the fluid must be topped up.

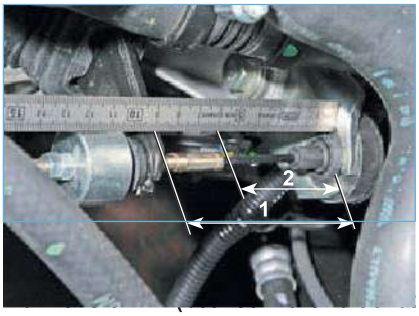
To that end...

Remove the strainer from the tank. If the strainer is clogged, clean and rinse it. Install the strainer in the tank.

Fill the reservoir to the MAXI mark. Screw the tank lid on tight.

Checking and adjustment of the clutch release actuator

The following dimensions are set in the factory when adjusting the clutch actuator.



on the gearbox and the clutch release fork), which must be 86±5 mm, and dimension 2 (between the bracket and the crimped part of the threaded cable lug), which must be 60±5 mm.

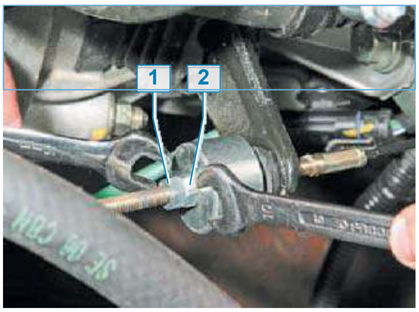
The clutch pedal is 105-110 mm from the floor - approximately level with the brake pedal.

As the vehicle is operated, the clutch discs wear, dimensions 1 and 2 increase and the pedal travel increases. The pedal becomes higher relative to the floor and the clutch starts to engage at the end of the pedal travel (too high). The clutch release actuator should therefore be checked and, if necessary, adjusted every 15,000 km during operation.

Before adjusting the metal

Clean dirt and corrosion from the clutch cable threaded end with a brush.

For adjustment on the threaded end of the cable.



...loosen lock nut 1 with a 10 mm wrench while holding adjusting nut 2 with a second wrench of the same size.

Then, with the clutch pedal released.

mm spanner, holding the cable end by the hexagon with a 7 mm spanner, until the above dimension 2.

Dimension 1 is not adjustable in operation. Depress the clutch pedal several times to check the travel again. With an adjusted clutch, the fork travel should be 28-35 mm. The reverse gear must engage with the engine running without cracking.

Repeat the adjustment if necessary.

When the adjustment is complete, tighten the lock nut.

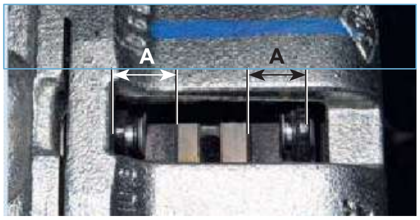
Checking the condition of the brake system

In accordance with the maintenance schedule, the manufacturer recommends checking the condition of the pads and discs of the front brake mechanisms every 15,000 km, and after 60,000 km checking the condition and dusting of the rear brake pads. However, it is advisable to check the condition of the entire brake system of the vehicle at each service.

The work is done on the inspection booth--

or an overpass.

To check condition and degree of wear of brake pads and discs, remove front wheels in turn. Check the condition of the brake pads through the caliper window.



If the thickness of the pad, including its base (dimension A), is less than 6 mm, the pads must be replaced.

Inspect the brake disc on both sides by turning the brake disk. There must be no cracks or deep grooves on the disc surfaces.

Marking on ventilated brake disc - disc thickness must not be less than 17.7 mm.

Marking on the cylindrical surface of the non-ventilated brake disc - disc thickness must not be less than 10.6 mm

To measure the disc thickness, remove the brake pads (see "Replacing the front wheel brake pads", page 226).

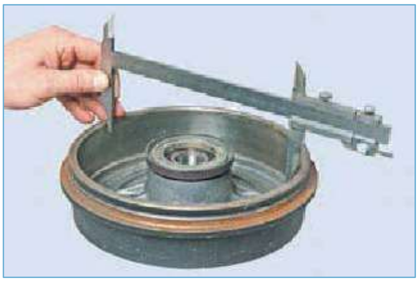
The thickness of the disk is measured with a caliper or micrometer.

Before measuring with a caliper, remove with a file or other method the lugs that have formed on the maximum diameter of the disk on both sides of the disk as a result of wear and that prevent accurate measurement.

To check the condition and degree of wear of the rear wheel brake shoes and drums, remove the drums (see "Replacing the rear wheel brake shoes", page 228).

Measure pad thickness with a caliper. If the pad thickness (lining with base) is less than 5 mm, both brake pads must be replaced. Inspect drums, there must be no cracks or crazing on The drums must be free of cracks and chips.

When the vehicle's mileage is high...



... measure the inside diameter of the drum with a caliper.

Replace the brake drum if the working surface is heavily worn (maximum permissible inner drum diameter 204.25 mm) or if there are deep grooves.

With the drums removed, check the condition of the sealing collars on the wheel cylinders.

To that end...

... slide the edge of the dust cover off the cylinder housing protrusion.

If there is brake fluid under the dust cover, indicating that the oil seals are defective, the cylinder must be replaced.

On a vehicle without ABS, inspect the rear brake pressure regulator and its actuator. The regulator and actuator must be free of damage and there must be no leakage of brake fluid from the regulator and brake pipes. The regulator piston must not be wedged - when the brake pedal is depressed, the pressure regulator piston rod must act on the pressure lever (see "Brake system", page 221).

To test the performance of the va-

When the engine is not running, press the brake pedal 5-6 times and, holding it depressed, start the engine. If the vacuum booster is in good condition, the pedal should move forward slightly after starting the engine. If this does not happen or braking is not effective enough (brake pedal has to be depressed with great force), check tightness of connections of discharge hose to vacuum booster and the booster itself.

Check the condition of the brake pipes side. The tubes must be securely fastened in the holders and must be free of dents, mechanical damage, deep corrosion and signs of brake fluid leaks. If necessary, retighten connectors or replace defective parts. The brake hoses must be free of cracks, tears and abrasions. Check the condition of each hose by pressurizing the fluid in the brake system. To do this, the assistant should press the brake pedal firmly and hold it during the inspection. The appearance of blown rubber or leaking brake fluid from the hose and its tips is not allowed. If any damage is detected, replace the hoses with a set.

Checking the function of the table of the foot brake. Full travel of the lever

The parking brake should be set between 6 and 8 clicks of the ratchet. If necessary, adjust the parking brake (see "Adjusting the parking brake actuator", page 236).

Checking the condition of the chassis and transmissions

The suspension arm and the suspension arm.

Check the condition of the chassis and transmission every 15,000 km.

On chassis components (wheels, suspension arms, stabilizer bar, front suspension sub-frame, rear suspension beam, rear suspension beam, rear suspension sub-frame, front suspension sub-frame, rear suspension sub-frame, front suspension sub-frame, rear suspension sub-frame, rear suspension sub-frame, rear suspension sub-frame, rear suspension sub-frame

suspension, shock absorbers and suspension springs) and transmission (front wheel drive shafts) must be free of deformations, cracks and other mechanical damage affecting the shape and strength of the parts. By alternately hanging the front and rear wheels (the vehicle must be securely fixed on stands), check the condition of the wheel hub bearings.

Use only factory-made stands.

The wheel should turn by hand evenly, without jamming or knocking.

Hold the wheel vertically and pull the upper part of the wheel sharply

If the knocking noise disappears, the hub bearing is defective. If the knocking noise disappears, the hub bearing is defective and if the knocking noise remains, the ball bearing is probably worn. Front and rear wheel hub bearings are not adjustable and must be replaced if there is play.

To check the ball bearing, insert a mounting spade between the lug of the steering knuckle (where the ball bearing pin enters the ball bearing) and the mounting spade.

Press lever away from steering knuckle with a large screwdriver or assembly spatula and observe the movement of the ball bearing housing relative to the lug on the steering knuckle.

If there is play in the joint, replace the ball bearing.

joint covers. Replace ball joints with torn or cracked covers. To check the front suspension arm silent-block.

and the end of the outer bushing of the silent block on one side, and the subframe and arm head on the other side of the silent block....

... and attempt to move the lever head along the bolt axis, first to one side and then to the other. If the lever head moves freely, without effort, the lever silent block is badly worn or damaged and must be replaced. Tearing, cracking and swelling of the arm cylinder block

The rubber bushing of the silent-

of the block is unacceptable. Similarly check the condition of the other lever cyl- tape block.

Inspect the cushions of the transverse stability control rod. If the rubber cushions are torn, cracked or badly deformed, they must be replaced.

Hold the stabilizer bar by hand near its attachment point to the arm.

... alternately insert the assembly spatula between the subframes.

... sharply rock the stabilizer bar up and down. If play is detected in the connection between the stabilizer bar and the front suspension arm, replace the rubber bushings of the screw securing the stabilizer bar to the arm.
To check the condition of the rear suspension beam arm silent block.

...insert the mounting spatula between the body bracket and the face of the outer hinge bushing and attempt to slide the arm head along the bolt axis.

If this reveals tears or delamination of the joint rubber, replace the silent block.

Checking the condition of the springs and shock absorbers...

...front...

...and rear suspensions.

The suspension springs must not be damaged. Tearing, cracking and severe deformation of rubber bushings, cushions and shock absorber compression buffers are not permissible. Do not leak fluid from shock absorbers. Minor

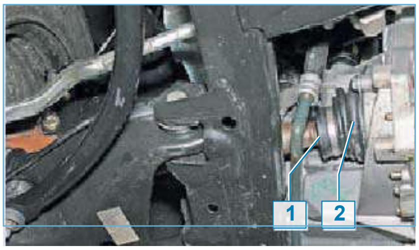
A "sweating" of the shock absorber in the upper part of the shock absorber while maintaining its characteristics is not a malfunction.

By alternately rotating and turning the front wheels....

... inspect the protective covers of the handguards....

... and inner joints of the front wheel drive shafts, check that they are securely fastened with clamps. If the covers are cracked, torn or have lost elasticity, they must be replaced.

The cover of the inner joint of the left wheel drive must be tightly secured to the gearcase.



Do not leak oil from the gearbox through cover 1 and gland 2 of the inner joint of the left wheel drive.

Checking for oil leaks from the gearbox....

... through the right wheel drive inner-joint housing gland. If there is a leak, replace the oil seal.

Checking the condition of the steering controls

Check the condition of the steering system every two years.

15,000 km of mileage. The steering components must be free of mechanical damage.

The work is carried out on an inspection trolley or trestle.

To check steering wheel clearance (steering play), set the front wheels to the straight-ahead position. Tape a long-bladed screwdriver to the instrument panel with its blade pointing towards the steering wheel. Turn the steering wheel until the wheels begin to turn (the wheels must remain stationary), first to one side and then to the other.

When the wheels start to turn, mark the limits of the steering wheel free play on the rim with a chalk or thread.

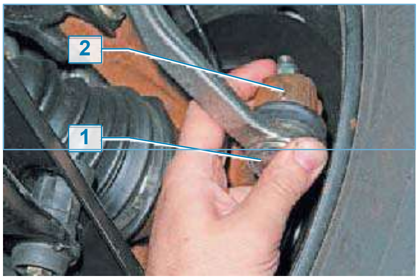
By measuring the distance between the marks...

...determine the free play of the steering wheel, which should not exceed 5° (corresponds to a 15 mm turn of the steering wheel) provided that the steering mechanism, steering rods, front wheel hub bearings and telescopic struts are in good condition.

When turning the steering wheel sharply from side to side by a small angle, check that there is no knocking noise in the steering column universal joints and steering gear. If this is not the case, retighten the axle

If the steering components are loose or faulty, replace defective parts and assemblies.
An assistant is required to assess the condition of the ball joints of the tie rod ends. Suspend the front wheels and securely fix the vehicle on the factory-made jack stands.

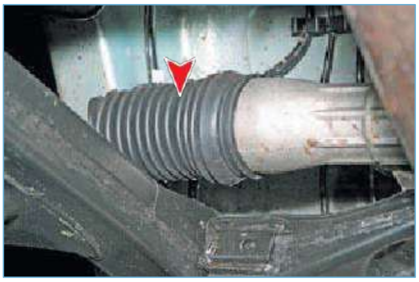
The assistant takes hold of the wheel and swings it horizontally by pulling the rear of the wheel sharply toward you and the front away from you several times in turn, and vice versa.
In doing so, putting a hand ...



... to the ball joint housing 1 of the steering linkage and the steering knuckle lever 2, assess their mutual movement.
If free play is felt in the ball joint, the steering linkage must be replaced.

Then apply a bottom-up force to the ball joint housing of the steering rod lug along the pivot pin axis.
In a serviceable steering rod lug, the joint housing should move 1.5-2.0 mm relative to the pin. This indicates that the pin insert is not wedged in the joint housing seat and moves by compressing the joint spring. A tie rod end with a wedged pin insert must be replaced. The steering link rod end must also be replaced.

...if the tip joint cover is torn, cracked or has lost elasticity.



Check the condition of the steering wheel covers.
If the covers have lost elasticity, cracked or torn, they must be replaced.

Checking the condition of the exhaust system exhaust gases

Check the condition of the exhaust system every 15,000 km.
The work is carried out on an inspection trolley or trestle.

Check and, if necessary, tighten the intake pipe mounts to the exhaust manifold....

...on 1.4-1.6 (8V) engines...

...and on the 1.6 (16V) engine. Check condition of suspension rubber pads....

...main muffler ...

...and on the pipe behind the optional muffler.
On vehicles with 1.4-1.6 engines (8V) another cushion installed before the catalytic converter
The exhaust system. Inspect the pipes and components of the exhaust system. If there is through corrosion or mechanical damage, the defective assembly must be replaced.

Fault diagnosis

Engine and its systems

List of possible faults	Diagnosis	Method of elimination
CRANKSHAFT DOES NOT TURN WITH THE STARTER MOTOR		
The battery is discharged	The voltage at the battery terminals is below 12 V when the consumers are switched off. There may be a crackling sound from under the hood when the starter is engaged	Charge the battery; if it does not charge, replace it. The engine can be started by lighting the battery of another vehicle
Decrease in battery capacity	The voltage at the battery terminals is greater than 12 V when the consumers are switched off, but drops below 6-8 V when the starter is engaged. A crackling noise may be heard from under the bonnet	Charge the battery with a low current (max. 1 A); if the capacity is still insufficient, replace the battery. The engine can be started by using the battery of another vehicle as a cigarette lighter
Oxidation of battery terminals and lead terminals, loose connections	When the starter is engaged, the voltage in the on-board network drops much more than at the battery terminals. A crackling noise may be heard from under the hood	Tighten terminals, clean contact surfaces, lubricate with petroleum jelly
Engine or attachments jamming	Check engine crankshaft, coolant pump, alternator, power steering pump pulleys for rotation	Repair the engine, replace the coolant pump, heater, power steering pump
The starter drive pinion or flywheel ring teeth are damaged	Inspection after removing the starter	Repair or replace starter, replace flywheel
The starter circuit is defective: F1 fuse (60 A) is blown, wires are damaged, ignition switch contacts do not close.	When the ignition key is turned to position "IV", the starter relay does not operate (no click under the hood). Check whether +12 V is supplied to the control output of the traction relay in this case	Replace defective: wires, fuse, ignition switch
The starter motor starter relay is defective: stuttering or breakage in the retractor cable, seizure of the relay armature (armature misalignment, dirty surfaces, corrosion, etc.).	When the key is turned to the "IV" traction relay does not operate (no click under the hood), but +12 V is supplied to the control output of the traction relay. Remove the relay, check its operation	Replace defective traction relay
Oxidized contacts of traction relay or wires, poor ground contact	When the starter is engaged, a click is heard under the hood, but the starter armature does not rotate. Check the resistance of the battery-starter circuit, including the earth lead, with an ohmmeter. If the circuits are correct, remove the starter and check the operation of the traction relay by energizing it directly from the battery.	Clean and retighten the wire lugs. Replace defective traction relay
Open or short circuit in the starter pull relay holding winding	When the starter is engaged, a crackling noise is heard from under the hood. The battery voltage is within the normal range. Open or short circuit in the starter relay holding winding can be checked with an ohm meter or by excessive heating of the starter relay	Replace the starter pull relay
Burning of the starter manifold, brush curl or excessive brush wear	The starter armature does not rotate or rotates slowly. Preliminary check that the traction relay is in good working order by supplying power to the starter contact bolt directly from the battery, bypassing the relay.	If the speed is low, replace worn components or the starter motor

List of possible faults	Diagnosis	Method of elimination
Open or short circuit in the starter armature winding	The starter armature does not rotate or rotates slowly. Beforehand, check that the traction relay is in good working order by applying power to the starter contact bolt bypassing the relay. Check the correctness of the winding with an ohmmeter or by checking the insulation darkness	Replace armature or starter
Slippage of the freewheel clutch	When the starter is engaged, the armature rotates, the flywheel is stationary	Replace clutch or starter
HIGH NOISE WHEN THE STARTER IS RUNNING		
The starter is misaligned on the coupling crankcase, its mounting is loose or the cover on the drive side is broken.	Inspection	Tighten the bolts securing the starter to the clutch housing, replace the starter if the cover is broken.
Excessive wear of bearing bushings or armature shaft journals	Inspection after disassembly of the starter	Replace the starter
The toothed ring gear rotates on the flywheel	When the starter motor is engaged, the toothed ring gear rotates, flywheel and crankshaft are stationary. A squealing noise is heard from the clutch crankcase	Replace the flywheel
The teeth of the starter drive gear or (more often) the flywheel crown are worn out	Inspection after removing the starter	Replace the drive gear, starter, or flywheel
Gear does not come out of engagement with flywheel: seizure of the drive lever, loose or broken spring of the free-wheel clutch or starter relay, seizure of the clutch on the shaft splines or starter relay armature, ignition switch failure (ignition switch contacts do not open)	Check whether voltage is removed from the starter relay control terminal when the ignition key is released and whether the key returns to position "III". The opening of the ignition switch contacts can be checked with an ohmmeter. If the voltage to the starter relay disappears when the ignition is switched off, remove and disassemble the starter for inspection	Replace starter pull relay or starter assembly, ignition switch
THE CRANKSHAFT IS TURNED BY THE STARTER, BUT THE ENGINE DOES NOT START		
There's no fuel in the tank	By fuel level indicator and fuel reserve warning lamp	Refill the fuel
The battery is discharged	The crankshaft turns very slowly with the starter. The battery output voltage is below 12 V when the consumers are switched off.	Charge the battery; if it does not charge, replace it. The engine can be started by "lighting" the battery of another vehicle
Decrease in battery capacity	The crankshaft turns very slowly. The voltage at the battery terminals is greater than 12 V when the consumers are switched off, but drops to 6-8 V when the starter is engaged	Charge the battery with a low current (max. 1 A); if the capacity is still insufficient, replace the battery. The engine can be started by using the battery of another vehicle to light the engine
Oxidation of wire terminals on battery terminals, loose terminals	The crankshaft is turned very slowly by the starter. When the starter is engaged, the voltage in the on-board network drops much more than at the battery terminals	Tighten terminals, clean contact surfaces, lubricate with petroleum jelly
Unreliable connection of electrical circuits of motor control and power supply systems	Check wiring harness electrical connectors for tightness of contacts in wire harness lug pads.	Eliminate faulty connections in the connectors

List of possible faults	Diagnosis	Method of elimination
Increased resistance to engine crankshaft rotation: scoring on shafts, bearing shells, cylinder piston group parts; shaft deformation; frozen engine oil; jammed alternator, coolant pump, power steering pump	The crankshaft turns very slowly with the starter. If the weather is cold and the engine was running smoothly and quietly the day before, frozen oil is likely to be the cause of the increased resistance to rotation. In this case, try starting the engine with another battery. After starting, do not allow the engine to run at high engine speeds and watch the oil pressure warning light: if it illuminates, stop the engine immediately for 1-2 minutes to allow the thickened oil to drain into the oil pan. If foreign noises are heard when starting or running the engine, check the free rotation of the alternator, coolant pump and power steering pulleys.	If there are noises in the area of the engine block or cylinder head, have the engine repaired Use engine oil suitable for the climate conditions. Replace alternator, coolant pump, power steering pump
Malfunction in the ignition system	Check spark formation at the plugs. If there is no spark, this may be caused by faulty low voltage (ECU, ignition coil primary winding) or high voltage (ignition coil secondary winding, high voltage wires) instrumentation and circuits.	Check ignition system circuits and instruments. Replace defective device and wiring harness. Ensure contact in the electrical circuits
The high-voltage cables are not connected to the ignition coil in the correct order; the cable is disconnected.	Inspection	Connect the wires according to the markings on the ignition coil
The timing belt is broken or the belt teeth are loose	Turn the crankshaft and check the positioning of the valve train components through the oil filler opening	Repair the engine
Defective spark plugs	Check spark formation at the plugs	Replace the plugs
Gas distribution phases are disturbed	Check the timing	Set the correct position of the shafts in relation to each other. Check compression
ECU, its circuits or crankshaft position sensor are defective	Check if +12V is supplied to ECU, crankshaft position sensor circuit, crankshaft position sensor is not damaged	Replace defective: fuse F4 (5A), ECU, sensor, wires
Engine management system fuse F3 (25A) blown	Check engine management system fuse	Remove the cause of the fuse burnout, replace it
Main relay K6, fuel pump relay K5, pump power supply circuit or the pump itself are defective	The pump does not sound when the ignition is switched on. Power the pump terminals directly from the battery	Clean contacts, crimp wiring lugs, replace defective relay, pump
Fuel filter clogged, water frozen in the supply system, fuel pipes damaged	When the crankshaft is turned with the starter, there is no gasoline smell from the exhaust pipe	Replace the fuel filter. In winter, place the vehicle in a warm garage and blow out the fuel lines.
The fuel pump does not generate the required pressure in the system	Check fuel system pressure, make sure fuel module strainer is clean	Clean the fuel module strainer. Replace defective fuel pump, pressure regulator
Nozzles or their power supply circuits are defective	Check nozzle windings and electrical circuits with an ohmmeter (no open or short circuits)	Replace defective nozzles, maintain contact in electrical circuits

List of possible faults	Diagnosis	Method of elimination
Air intake into the intake air intake tract	Inspect the joints, check the fit of the throttle assembly, absolute pressure and air temperature sensors. Disconnect brake vacuum booster during start-up and plug the receiver inlet pipe connection	Replace torn gaskets, O-rings, parts with deformed flanges, defective vacuum booster
THE ENGINE RUNS ERRATICALLY OR STALLS AT IDLE SPEED		
Unreliable connection of electrical circuits of motor control and power supply systems	Check wiring harness electrical connectors, check wiring harness lug terminals for secure connections	Eliminate faulty connections in the connectors
The gap between the plug electrodes is not normal	Check clearances	Set the correct gap or replace the plugs
Lots of carbon deposits on the spark plug electrodes; carbon particles in the gap between the electrodes	Inspection	Check and, if necessary, replace the plugs
Spark plugs defective: current leakage through cracks in the insulator or fouling on the heat cone, poor contact in the center electrode	Absence of external damage and formation between the electrodes on the unscrewed plug does not allow to conclude that the plug is functional	Replace the plugs
Damage to insulation of high-voltage devices and circuits	Use an ohmmeter to check the ignition coil windings, high-voltage cables for open or open circuit (ground fault).	Replace damaged ignition coil, high-voltage cables
Gas distribution phases are disturbed	Check the timing	Set the correct position of the shafts in relation to each other. Check compression
Low compression in the engine cylinders (less than 11.0 bar): worn or damaged valves, valve guides and seats, piston rings or broken piston rings.	Check the compression	Replace defective parts
Defective: absolute pressure and air temperature sensors defective in the inlet pipe, throttle position sensor, injectors (open or shorted windings, heavily contaminated atomizers)	Check absolute pressure and inlet air temperature sensors, throttle position sensor, injectors. Check injectors operation, electrical circuits	Replace defective sensors, wires and injectors. Contaminated injectors can be flushed on a special bench
The idle speed regulator or its circuits are defective	Replace the regulator with a known good regulator	Replace a defective regulator
Air intake into the intake air intake tract	Inspect the joints, check the fit of the throttle assembly, absolute pressure and air temperature sensors. Disconnect the brake vacuum booster during start-up by plugging the air reservoir inlet pipe connection	Replace torn gaskets, O-rings, parts with deformed flanges, defective vacuum booster
Fuel pressure regulator defective	Check the pressure in the fuel system with a pressure gauge	Replace the fuel module
Adsorber defective, fuel vapor recovery system tube connections leaking	Check adsorber for damage and tightness of connections	Replace defective adsorber and pipes. Repair leaks in the connections
The throttle valve or throttle actuator is stuck. The ECU does not regulate engine idling under these conditions	Check the ease of movement of the flap	Adjust actuator, throttle valve position. Replace the throttle assembly
The oxygen sensor is defective	The function of the oxygen concentration sensor and the reliability of its circuit connections can be assessed using diagnostic equipment.	Repair damaged electrical circuits. Replace defective sensor

List of possible faults	Diagnosis	Method of elimination
Wear of camshaft cams	Inspection after partial engine disassembly	Replace the camshaft
Valve train clearances not adjusted	Check clearances	Adjust the clearances
The hydraulic supports of the valve levers are defective	Check the hydraulic supports	Replace defective hydraulic bearings
The vehicle speed sensor is defective	After stopping the vehicle, the engine runs unevenly, but the idle speed soon stabilizes	Replace the vehicle speed sensor
THE ENGINE DOES NOT DEVELOP FULL POWER AND THE VEHICLE IS NOT SUFFICIENTLY RESPONSIVE. JERKS AND DIPS WHEN DRIVING THE VEHICLE		
Air filter cartridge is clogged	Check the condition of the air filter element	Blow out or replace the air filter cartridge
Increased resistance to gas flow in the exhaust system	Inspect the exhaust system for crumpled or damaged lines, check the condition of the catalytic con- tractor (back pressure) .	Replace any damaged exhaust system components.
Air intake into the intake air intake tract	Inspect the joints, check the fit of the throttle assembly, absolute pressure and air temperature sensors. Disconnect the brake vacuum booster briefly by plugging the air reservoir inlet pipe connection	Replace gaskets, o-rings, parts with deformed flanges, defective vacuum booster
Incomplete opening of the throttle valve	Determined visually with the engine stopped	Adjust the throttle valve actuator
Low compression in the engine cylinders (less than 11.0 bar): worn or damaged valves, valve guides and seats, piston rings or broken piston rings.	Check the compression	Replace defective parts
Gas distribution phases are disturbed	Check the timing	Set the shafts to the correct mutual position. Check compression
The gap between the plug electrodes is not normal	Check clearances	Adjust the gap by bending the side electrode or replace the plugs
Heavy carbon deposits on spark plug electrodes; penetration of carbon particles into the gap between the electrodes	Inspection	Check and, if necessary, replace the plugs
Damage to insulation of high-voltage devices and circuits	Use an ohmmeter to check the ignition coil windings, high-voltage cables for open or open circuit (ground fault).	Replace damaged ignition coil, high voltage wires
There is not enough fuel in the tank	By level indicator and fuel reserve indicator	Refill the fuel
Fuel filter clogged, water frozen in the supply system, fuel pipes damaged	Check the pressure in the fuel system	Replace the fuel filter. In winter, park the vehicle in a warm garage and blow out the fuel lines. Replace defective hoses and tubes
The fuel pump does not generate the required pressure in the system	Check fuel system pressure, make sure the fuel module strainer is clean	Clean the fuel module strainer. Replace defective fuel pump, pressure regulator
Poor contact in the fuel pump supply circuit (incl. earth wire)	Checked with an ohmmeter	Clean contacts, crimp wire lugs, replace defective wires

List of possible faults	Diagnosis	Method of elimination
Injectors or their circuits are defective	Check nozzle windings and their circuits with an ohmmeter (no open or short circuits)	Replace defective nozzles, maintain contact in electrical circuits
The air temperature sensor or its circuitry is defective	Check the sensor and its circuits	Restore contact in electrical circuits, replace defective sensor
Absolute air pressure sensor or its circuits are defective	The function of the absolute air pressure sensor can be assessed using diagnostic equipment.	Restore contact in electrical circuits, replace defective sensor
The oxygen sensor is defective	The function of the oxygen concentration sensor and the reliability of its circuit connections can be assessed using diagnostic equipment.	Repair damaged electrical circuits. Replace defective sensor
ECU or its circuits are defective	To test the ECU, replace it with a known good ECU	Replace the defective ECU
Valve train clearances not adjusted	Check valve train clearances	Adjust the valve train clearances
The hydraulic supports of the valve levers are defective	Check the hydraulic supports	Replace defective hydraulic bearings
Severe wear on camshaft cams	Engine disassembly inspection	Replace a worn camshaft
Deposition or breakage of valve springs	Engine disassembly inspection	Repair the engine
Throttle position sensor or its circuit is defective	Check the throttle position sensor	Restore contact in electrical circuits, replace defective sensor
Coolant temperature sensor is defective	Check sensor resistance at different temperatures with a tester	Restore contact in electrical circuits, replace defective sensor
POPPING IN THE INTAKE LINE		
Valve train clearances not adjusted	Check valve train clearances	Adjust the valve train clearances
The hydraulic supports of the valve levers are defective	Check the hydraulic supports	Replace defective hydraulic bearings
Inlet valves stuck in the guide sleeves: resin deposits on the surface of the valve stem or sleeve, sedimentation or breakage of the valve springs	Engine disassembly inspection	Repair the engine
Gas distribution phases are disturbed	Check the timing	Set the crankshaft and camshaft to the correct mutual position. Check compression
MUFFLER SHOTS		
Valve train clearances not adjusted	Check valve train clearances	Adjust the valve train clearances
The hydraulic supports of the valve levers are defective	Check the hydraulic supports	Replace defective hydraulic bearings
Exhaust valves sticking in their sleeves: excessive wear of the valve stem or sleeve, valve spring precipitation or breakage	Engine disassembly inspection	Repair the engine
Gas distribution phases are disturbed	Check the timing	Set the correct position of the shafts in relation to each other. Check compression

List of possible faults	Diagnosis	Method of elimination
Spark plugs are defective: current leakage through cracks in the insulator or fouling on the heat cone, poor contact of the center electrode	The spark plugs are tested on a special test bench . The absence of external damage and spark formation between the electrodes on the unscrewed plug does not allow to conclude about its operability.	Replace the plugs
Damage to insulation of high-voltage devices and circuits - interruptions in spark generation	Check the ignition coil windings, high voltage wires for open or open circuit (ground fault) with an ohmmeter.	Replace faulty ignition coil, damaged high-voltage cables (pull the cable by its tip when disconnecting it). Under severe operating conditions, it is advisable to replace the water every 3-5 years
Nozzles defective	Check the operation of the injectors	Replace defective nozzles
INCREASED FUEL CONSUMPTION		
Air filter cartridge is clogged	Check the condition of the air filter element	Blow out or replace the air filter cartridge
Leaky supply system	Gasoline odor, fuel leaks	Check fuel system connections for leaks; if found to be defective, replace the relevant components
Spark plugs are defective: current leakage through cracks in the insulator or fouling on the heat cone, poor contact of the center electrode	The spark plugs are tested on a special test bench . The absence of external damage and spark formation between the electrodes on the unscrewed plug does not allow to conclude about its operability.	Replace the plugs
Throttle actuator malfunction	Check throttle pedal travel, clearance in the water (pedal free play), check for cable and pedal jamming	Replace defective parts, lubricate the cable with engine oil
The idle speed regulator or its circuits are defective	Replace the regulator with a known good regulator	Replace the defective regulator
Throttle valve not fully closed	The gap between the throttle valve and the housing walls can be seen in the light	Replace the throttle assembly
Increased pressure in the fuel system due to malfunction of the pressure regulator	Check the pressure in the fuel system with a pressure gauge	Replace the fuel module
Leaky nozzles	Check the injectors	Replace defective nozzles
The coolant temperature sensor or its circuitry is defective	Check the resistance of the sensor at different temperatures with an ohmmeter	Restore contact in electrical circuits, replace defective sensor
The oxygen sensor is defective	The function of the oxygen concentration sensor and the reliability of its circuit connections can be assessed using diagnostic equipment.	Repair damaged electric circuits, replace defective sensor
ECU or its circuits are defective	To check, replace the ECU with a known good ECU	Replace defective ECU, repair damaged electrical circuits
Low compression in the engine cylinders (less than 11.0 bar): valve train clearances not adjusted, lever arm hydraulic supports not correct, worn or damaged valves, valve guide sleeves and seats, worn or damaged piston rings.	Check the compression	Adjust valve train clearances. Replace defective parts
Throttle position sensor, absolute pressure and inlet air temperature sensors or their circuits are defective	Check sensors and their circuits	Repair contact in electrical circuits, replace defective sensor(s)

List of possible faults	Diagnosis	Method of elimination
Increased resistance to gas flow in the exhaust system	Inspect the exhaust system for crumpled or damaged pipes and check the condition of the catalytic converter.	Replace any damaged exhaust system components.
Malfunctions of the chassis and brake system	Check chassis components and brake system	Adjust wheel angles , replace defective undercarriage parts, repair brake system faults
INCREASED OIL CONSUMPTION (MORE THAN 500 G PER 1000 KM)		
Oil leaks through: crankshaft and camshaft oil seals; crankcase oil pan gaskets, cylinder head gaskets; oil pressure sensor; oil filter O-ring.	Wash the engine, then after a short run inspect for possible leaks	Tighten the cylinder head, cylinder head cover, crankcase pan, replace worn oil seals and gaskets
Wear, loss of elasticity of oil-reflective caps (valve seals). Wear and tear of valve stems, guide bushings	Inspection of parts during engine disassembly	Replace worn parts
Worn, broken or caked (loss of mobility) piston rings. Wear of pistons, cylinders	Inspection and measurement of parts after engine disassembly	Replace worn pistons and rings. Bore and honing the cylinders
Using the wrong viscosity oil	-	Change the oil
The crankcase ventilation system is clogged	Inspection	Clean the ventilation system
DETONATION (METALLIC HIGH-PITCHED KNOCKING SOUNDS OCCURRING, USUALLY WHEN THE ENGINE IS UNDER LOAD, ESPECIALLY AT LOW SPEEDS, E.G. ACCELERATION, ETC., AND DISAPPEARS WHEN THE LOAD IS REDUCED). ETC., AND DISAPPEAR WHEN THE LOAD IS REDUCED)		
Unacceptably low octane rating of gasoline	-	Fill the vehicle with factory-approved fuel
Engine overheating	From the coolant temperature gauge	Eliminate the cause of overheating (see below "The engine is overheating.")
A lot of soot in combustion chambers, on piston bottoms, valve plates	Inspection after removing the cylinder head	Eliminate the cause of carbon deposits (see "Increased fuel consumption", "Use oils of the recommended viscosity and, if possible, low ash content.) Use oils of the recommended viscosity and, if possible, low ash content
Spark plugs with an incorrect caliber are used	-	Use plugs recommended by the manufacturer
INSUFFICIENT OIL PRESSURE (INSUFFICIENT OIL PRESSURE WARNING LAMP ILLUMINATES)		
Not enough oil in the engine	By the oil level gauge	Top up the oil
The oil filter is defective	Replace the filter with a known good filter	Replace defective oil filter
The bolt securing the auxiliary drive pulley is loose	Check bolt tightening	Tighten the bolt to the prescribed torque
Clogging of the oil inlet screen	Inspection	Clean the mesh
The oil pump pressure reducing valve is misaligned, clogged or the valve spring is loose.	Inspection when disassembling the oil pump	Clean or replace defective pressure reducing valve . Replace pump
Worn oil pump gears	Determined by measuring parts after disassembly of the oil pump	Replace the oil pump
Excessive clearance between bearing shells and crankshaft journals	Determined by measuring parts after engine disassembly	Replace worn liners. If necessary, replace or repair the crankshaft

List of possible faults	Diagnosis	Method of elimination
Insufficient oil pressure sensor defective	Unscrew the oil pressure sensor from the cylinder head bore and replace it with the correct sensor. If the warning lamp goes out while the engine is running, the removed sensor is defective	Replace defective oil pressure sensor with a new one
THE ENGINE IS OVERHEATING (ENGINE OVERHEAT INDICATOR ILLUMINATES)		
Thermostat defective	Check the thermostat for proper operation	Replace defective thermostat
Insufficient amount of coolant	Fluid level is below the MIN mark on the expansion tank	Repair any leaks. Fill up with coolant
Lots of scale in the cooling system	-	Flush the cooling system with descaling agent. Do not use hard water in the cooling system. Only dilute concentrated antifreeze with distilled water
The radiator cells are dirty	Inspection	Flush the radiator with a pressurized water jet
The coolant pump is defective	Remove the pump and inspect the assembly	Replace the pump assembly
The cooling fan does not come on	Check fan on-off circuits	Restore contact in the electrical circuits. Faulty fuse, relay, cooling fan, temperature sensor, ECU - replace
Unacceptably low octane rating of gasoline	-	Fill the vehicle with factory-approved fuel
A lot of soot in combustion chambers, on piston bottoms, valve plates	Inspection after removing the engine cylinder head	Eliminate the cause of carbon deposits (see "Increased fuel consumption", "Increased oil consumption"). Use oil of the recommended viscosity and, if possible, low ash content
Exhaust gas leaking into the cooling system through a damaged cylinder head lining	There is a smell of exhaust gases in the expansion tank and bubbles float up	Replace the cylinder head gasket. Check if the cylinder head is not flat
THE ENGINE COOLING FAN IS CONSTANTLY RUNNING (EVEN ON A COLD ENGINE)		
Open circuit in coolant temperature sensor or coolant temperature sensor circuit	The sensor and circuits are checked with an ohmmeter	Repair the contact in the electrical circuits. Replace defective sensor
The contacts of the fan switch relay do not open	Tester test	Replace defective relay
ECU or its circuits are defective	Check ECU or replace with a known faulty one	Replace the defective ECU
THE ENGINE TAKES A LONG TIME TO WARM UP TO OPERATING TEMPERATURE		
Thermostat defective	Check the thermostat for proper operation	Replace defective thermostat
Low air temperature (below -15 °C)	-	Insulate the engine: cover the slit in the front bumper with an impervious material
COOLANT LEVEL DROPS IN THE EXPANSION TANK		
Damage to radiator, expansion tank, hoses, looseness of their seating on connections	Inspection. Check radiators (engine and heater) for leaks in a water bath with compressed air at a pressure of 1 bar.	Replace damaged parts
Fluid leakage through the coolant pump oil seal	Inspection	Replace the pump

List of possible faults	Diagnosis	Method of elimination
The cylinder head gasket is damaged. Defect in the block or cylinder head	The oil level gauge shows an emulsion with a whitish tint. There may be heavy smoke from the muffler and oil stains on the surface of the coolant (in the reservoir). Coolant leaks on the engine surface	Replace damaged parts . Do not use water in the cooling system, use coolant suitable for the climate conditions
FOREIGN NOISES AND KNOCKS IN THE ENGINE		
Valve train clearances not adjusted	Check clearances	Adjust the clearances
The hydraulic supports of the valve levers are defective	Check the hydraulic supports	Replace defective hydraulic bearings
Deposition or breakage of valve springs	Engine disassembly inspection	Repair the engine
The timing belt of the gas distributor drive is worn. The idler or support rollers of the drive are defective	Inspection	Replace the belt. Replace a defective timing belt tensioner or idler pulley.
Worn bearings and cams of the camshaft, crankshaft rod and main bearings, pistons, piston pins, play or seizure in the bearings of auxiliary units	Checking	Repair or replacement of parts
One or more power unit supports have lost their elasticity or collapsed	Inspection	Replace the support
Low pressure in the oil line (at minimum crankshaft speed at idle speed, the pressure in the lubrication system of a warm engine must be at least 1.0 bar).	Check the pressure in the lubrication system. The pressure can be measured by connecting a pressure gauge to the oil line by calibrating the oil pressure sensor.	Eliminate malfunctions in the lubrication system
Oil pump drive chain wear	Checking chain tension after removing the crankcase pan	Replace the oil pump drive chain
SEVERE ENGINE VIBRATION		
Uneven compression on cylinders more than 2.0 bar: not adjusted valve train clearances, defective hydraulic supports, worn or damaged valves, seats; worn, buried or broken piston rings	Check the compression. Compression should be at least 11.0 bar	Adjust valve train clearances. Replace defective parts
Damage to the insulation of high-voltage devices and circuits - interruptions in the spark protection system	Check ignition coil windings and high-voltage cables with an ohmmeter for open or broken windings	Replace defective ignition coil, damaged high voltage wiresw
The high-voltage cables are not connected to the ignition coil in the correct order; one or more cables are disconnected	Inspection	Connect the wires according to the markings on the ignition coil
Defective spark plugs: current leakage through cracks in the insulator or carbon on the heat cone	Check the plugs	Replace defective plugs
Open or short circuit in the windings of the injector windings or their circuits	Check nozzle windings and circuits with an ohmmeter	Replace defective nozzles, maintain contact in electrical circuits
Nozzles are leaking (overflow) or their atomizers are dirty	Check leak tightness and shape of nozzle spray pattern	Contaminated injectors can be flushed on a special bench . Replace leaky or heavily contaminated injectors.

List of possible faults	Diagnosis	Method of elimination
Power unit supports have lost their elasticity or collapsed, or their mounting is loose	Inspection	Replace supports, tighten fasteners
INCREASED CONTENT OF HARMFUL SUBSTANCES IN EXHAUST GASES		
Nozzles are leaking (overflow) or their atomizers are dirty	Check leak tightness and shape of nozzle spray pattern	Contaminated injectors can be flushed on a special bench. Replace leaky or heavily contaminated injectors.
Damage to the insulation of high-voltage devices and circuits - interruptions in the spark protection system	To check the high voltage wires and the ignition coil, replace them with known good ones	Replace faulty ignition coil, damaged high-voltage cables. In severe operating conditions (salt on roads, frost alternating with thawing) it is advisable to replace the cables every 3 to 5 years.
Defective spark plugs: current leakage through cracks in the insulator or carbon on the heat cone, poor contact of the center electrode	Check the plugs	Replace defective plugs
Inlet air temperature sensor or its circuits are defective	Use a tester to check the sensor for proper operation	Repair contact in electrical circuits, replace defective sensor
The coolant temperature sensor is defective	Check the resistance of the sensor at different temperatures with an ohmmeter.	Replace the defective sensor
Throttle position sensor or its circuit is defective	Check the throttle position sensor for proper function	Repair contact in electrical circuits, replace defective sensor
The oxygen sensor or its circuitry is defective	The function of the oxygen concentration sensor and the reliability of its circuit connections can be assessed using diagnostic equipment.	Repair damaged electric circuits. Replace defective sensor
The absolute air pressure sensor and its circuits are defective	The absolute air pressure sensor can be checked with diagnostic equipment to ensure that it is functioning properly	Repair the contacts in the electrical circuits. Replace defective sensor
ECU or its circuits are defective	To check, replace the ECU with a known good ECU	Repair the contacts in the electrical circuits. Replace defective ECU
Leaks in the exhaust system between the exhaust manifold and the intake pipe	Inspection at medium crankshaft speeds	Replace defective gasket, retighten screw connections
The exhaust gas catalytic converter is defective	The exhaust gas catalytic converter can be checked with diagnostic equipment to ensure that it is in good condition	Replace the exhaust gas catalytic converter
Increased pressure in the fuel system due to a faulty pressure regulator	Inspection, check pressure in the fuel system (not more than 3.5 bar) at idle speed with a pressure gauge	Replace the defective regulator
Increased resistance to air flow in the intake air duct	Check air filter element, inlet duct (no foreign objects, leaves, etc.)	Clean the intake tract, replace contaminated air filter element
Large quantities of oil have entered the engine combustion chambers due to worn or damaged oil separator caps, valve stems, valve guides, piston rings, pistons and cylinders.	Inspection after engine disassembly	Repair the engine

Measuring compression

The compression check is used for general assessment of the technical condition of the engine's cylinder group and valve train components.
Check with the engine warmed up to operating temperature. Depressurize the engine oil system (see "Removing and disassembling the fuel module", page 114) and do not connect the engine-ECU wiring harness to the connector on the fuel module cover.
module. Unscrew spark plugs from holes in the cylinder head (see "Replacing the spark plugs in the 1.4-1.6 (8V) engine", page 31 or "Replacing the spark plugs in the 1.6 (16V) engine", page 40). Install the tip of the compression gauge in the spark plug hole in the cylinder head....

...on the 1.4-1.6 (8V) engine....

...and on the 1.6 (16V) engine. Rotate crankshaft crankshaft with the starter with the accelerator pedal fully depressed for 2-4 s (the pressure gauge should stop increasing).

Record the pressure gauge reading and depressurize the compression meter.
The battery must be fully charged for correct compression assessment - crankshaft speed must be at least 180 min-1.
Similarly check compression in other engine cylinders.
The compression of a serviceable engine must be between 11.0 and 13.0 bar and the difference between the cylinder readings must not exceed 2.0 bar.
To determine the cause of low compression, pour 10-15 cm^3 of engine oil into the cylinder through the spark plug hole and repeat the measurement. If the compression rises to more than 2.0 bar when measuring again, the most probable cause of low compression is severe wear, lodging or breakage of the piston rings. If the pressure gauge reading does not increase after filling with oil, the valve plates are most likely loose against the seats of the cylinder head. This can occur when the thermal

valve train clearances, as well as-
In the event of excessive wear, burnout or damage to valve plates or seats. The cause of the malfunction can only be determined after disassembly of the engine.

Checking the starter circuit

~~starter is used-~~

If the starter does not work when the ignition switch is turned to position "D", there may be a malfunction of both the starter and the starter circuit (if the engine and battery are in good condition).
Checking starter should be performed on an inspection ditch or trestle. On a vehicle with engine 1.4-1.6 (8V) check the starter for proper operation.

If the starter can be removed without removing the starter, on a vehicle with 1.6 (16V) engine, the starter must be removed for inspection (see "Removing and inspecting the starter", page 251).
On vehicles with 1.4-1.6 (8V) engine, remove the power train protection (see "Removing the power train protection", page 283). Set gear lever to neutral and engage parking brake. With the ignition off, disconnect the cable lug from the control terminal of the traction relay (see "Removing and inspecting the starter", page 251).

Use a screwdriver to bridge the winding output of the traction relay and the upper contact bolt.

Care must be taken when carrying out this operation, as sparks may be generated in the area where the terminals are bridged. Do not close the screwdriver on the "mass" while connecting the terminals.

If the crankshaft is boo-

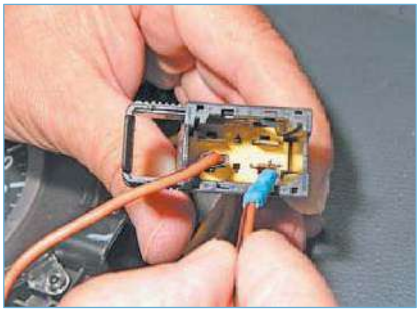
If the starter motor does not turn, the

and the cause of the malfunction is a defect in the starter circuit. Otherwise the starter or its traction relay is defective.
If it is not possible to repair a fault in the starter circuit, the engine can be started and driven to the place of repair if necessary (by switching on the ignition and shorting the terminals).

In the event of a defective starter in a manual transmission vehicle, you can drive to the place of repair by starting a serviceable engine
"by transferring rotation to the engine crankshaft from the driving wheels of the vehicle via the transmission. This operation can be performed by two people on a (safe) flat road, and even more so on a slope. Put the gear lever in neutral and switch on the ignition. An assistant at the rear pushes the vehicle and accelerates it. At this point, depress the clutch and engage gear (preferably second gear), then gently release the clutch pedal. If the control and power systems are in good condition, the engine should start, then depress the clutch and disengage the gear. The faster you accelerate the vehicle, the higher the engine speed will be and the easier it will start.
Accelerate the car to start
The engine can also be towed by another vehicle.
A malfunction in the starter switch circuit may be caused by damage to the power circuit or the traction relay control circuit, ignition switch contact group. The traction relay windings are energized by the ignition switch, which in turn is energized by the battery via fuse F1 (60 A) in the engine compartment. If this fuse blows, the starter will not engage, but most electrical consumers (power windows, power door mirrors, heated rear window, windshield wiper, heater fan) will be de-energized.
For troubleshooting in the cell-
Remove fuse F1 from the engine compartment mounting block (see "Electrical equipment", page 240).

Use a tester to check whether "+12V" to the socket (shown in the photo) of the fuse.
Connect the "minus" probe of the tester to the "minus" terminal of the battery.
If no voltage is applied to the fuse socket, the circuit from the battery to the socket is faulty (broken wire or shorted to earth). If the fuse socket is energized, then, having installed a serviceable fuse, use a tester to check the continuity of the circuit from the second fuse socket to the ignition switch. To do so, disconnect the wiring harness from the ignition switch (see "Replacing the immobilizer coil and ignition switch", page 247).

Connect the "plus" lead of the tester to pin "4" of the wiring harness, and the " minus" lead to the ground.
The tester should show the battery voltage.
Otherwise, the circuit from the second fuse socket to the ignition switch is defective (broken wire or short circuit). "to the masses").
If the ignition switch wiring harness terminal 4 is energized....



...short-circuit pins "4" and "6" of the wiring harness block with a piece of wire.
The starter relay should click to engage the starter motor's traction relay.
If the traction relay turns on, the ignition switch or its connection to the wiring harness is defective, if it does not turn on, the circuit from terminal "6" of the wiring harness to the winding terminal of the traction relay is defective (broken water or shorted to ground).

Checking the ignition coil of the 1.4-1.6 (8V) engine and its circuits

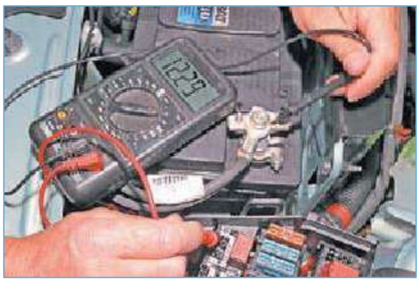
Check ignition coil and its electrical circuits if a fault is detected in the ignition system - no spark formation at the spark plugs.
The ignition coil and fuel pump are supplied from the battery via fuse F3 (25 A) and then via relay K5 (power circuit) in the engine compartment mounting block (see "Electrical equipment", page 240). The relay winding (control circuit) K5 is energized from the ignition switch via fuse F02 (5 A) located in the mounting block in the passenger compartment.
To check the coil power supply circuit-
Disconnect the ignition cables from the ignition coil (with the ignition off).

the engine-ECU wiring harness (see "Removing the ignition coil", page 110). Connect the tester probes to lead "C" of the wiring harness and the engine earth. Immediately after switching on the ignition (while the fuel pump is running)....

... the instrument should detect a voltage approximately equal to the battery voltage. If there is no voltage at terminal "C" of the wiring harness, the following may be faulty: fuses, ignition switch contact group, relay K5 or their electrical circuits.

With the ignition off, remove the K5 relay from the engine compartment mounting block and disconnect the wiring harness from the ignition coil. Connect tester probes (in ohmmeter mode) to socket "5" of the relay and to pin "C" of the ignition coil wiring harness. If the tester shows "infinity", the circuit is open.

If the circuit is OK, check whether "+12 V" is supplied from the battery to socket "3" of relay K5. To do this...



...connect the "plus" probe of the tester to the relay socket and the "minus" probe to the "-" terminal of the battery.

If there is no voltage, check fuse F3 (25 A). If the fuse is intact, check the circuit from the fuse socket to the relay socket.

To do this, remove the fuse.

...and connect the tester probes (in ohmmeter mode) to socket "S2" (as shown in the photo) of the fuse and to socket "3" of the relay.

If the tester shows infinity, the circuit is open. If the circuit is correct, check whether "+12 V" is supplied from the battery to the other fuse socket.

To that end...

...connect the "plus" probe of the tester to the "E2" socket (shown on the photo) of the fuse, and the "minus" probe to the "-" terminal of the

The tester should show the battery voltage. If this is not the case, the circuit (open circuit or short circuit to earth) from the battery to the fuse socket is faulty.

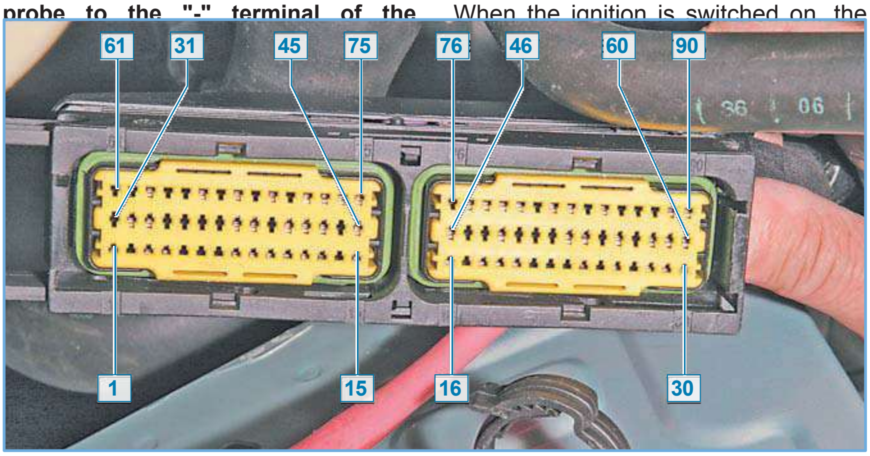
To check the K5 relay control circuits, disconnect the engine-ECU wiring harness from the ECU with the ignition off.

Connect the tester probes (in ohmmeter mode) to socket "2" of the relay and pin "67" of the ECU wiring harness. If the tester shows "no limb", it means an open circuit in the control "minus" circuit of the relay.

If the "minus" control circuit of the relay is OK, check whether "+12 V" is connected to socket "1" of the relay. To do this...

... connect the "plus" probe of the tester to the "1" socket of the relay and the "minus" probe to the "-" terminal of the battery.

When the ignition is switched on, the



Numbering of ECU wiring harness pins

Check fuse F02 in the passenger compartment wiring harness. If there is no voltage, check fuse F02 in the passenger compartment wiring harness. If the fuse is intact, check the circuit from the fuse socket to socket "1" of the relay and the circuit from the other fuse socket to pin "3" of the ignition switch wiring harness.
To check the ignition control circuits, you can use a probe with a 1 to 2 W lamp. Depressurize the engine oil system (see "Removing and disassembling the fuel module", page 114) and disconnect the engine management harness from the fuel module connector. Disconnect the harness harness from the ignition coil and connect the tester probe probes to the terminals.
"C" and "A" of the wiring harness strip.
If the probe probes do not fit into the terminal sockets of the terminal block.
If the probe probes do not fit into the sockets of the terminal block, insert pieces of bare wire (pins can be used) into the sockets.
If the power supply and control circuits are in good condition, the starter motor will turn the crankshaft.

Otherwise, check for open circuit and short circuit to ground of the wire connecting the "A" terminal of the co...

of the coil wiring harness with the coil out-
by "32" of the wiring harness block ECU.
Similarly, connect the probe probes to pins "C" and "B" of the ignition coil wiring harness, then to pin "B" of the ignition coil wiring harness and pin "1"

If the ignition coil control circuit is switched off, check the other ignition coil control circuit.
The ignition switch itself can be checked on the engine by disconnecting the wiring harness and high-voltage cables from the ignition switch.
To test one of the ignition coil primary windings, connect the tester's probes to the terminals
"C" and "A" coil.

Use an ohmmeter to check the winding for open circuits.

If the tester shows "infinity", there is a break in the winding.
Similarly, connecting the tester probes to the coil "C" and "B" terminals, check the other coil primary winding for open circuit.
To check for an open secondary winding of the ignition coil under-
connect the tester probes to the paired probes
to the high voltage coil leads (cylinder leads 1-4 or 2-3).

of about 7.0 kohm.

resistance of about 7.0 kOhm.

In case of secondary winding breakage, tes-
The tester will show "infinity". Check the other ignition coil secondary winding in the same way. Check the secondary windings of the ignition coil for breakdown.

Do not drive on the engine. Depressurize the engine supply system and do not connect the wiring harness to the fuel tank connector.
Two faulty spark plugs are required for the test.

Tie the plug housings together with a piece of bare wire ("massage").

Connect the ignition coil leads to the plugs using serviceable high-voltage cables and place the plugs on the cylinder head cover. Turn crankshaft with starter motor.

! **To avoid electric shock, do not touch the spark plugs or the high voltage cable tips.**

With the ignition coil in good condition. Sparks should regularly occur between the plug electrodes. Similarly check the other secondary coil for breakdown by connecting the lead wires to the other two paired coil leads.

Checking the engine ignition coils
16 (16V) and their circuits

To test the performance of the ca-
If the ignition switch is removed, the engine supply system is depressurized (see "Removing and disassembling the fuel module", page 114) and the wiring harness harness is not connected

engine control to the fuel module cover connector.
Remove the ignition coil and insert a spare spark plug.

Press the threaded part of the plug against the metal part of the engine.

To avoid electric shock when the starter motor is turning the starter shaft
Do not touch the spark plug with your hands.

With the ignition key in the ignition switch in position "D", the assistant turns the crankshaft with the starter motor.
If the spark plug, ignition coil and ignition coil circuit are in good condition, there should be regular sparks between the plug electrodes. If this is not the case, check the coil supply and control circuit.
To check the coil supply circuit, disconnect the engine management harness from the coil of cylinder 1 or 2....

...and connect one probe of the tester to the engine earth and the other to the output 1 of the wiring harness.

With the ignition on, the instrument should record the battery voltage.
If no voltage is present, the following may be defective: fuses, ignition switch contact group, relay K5 or their electrical circuits.
To check relay circuit K5 and fuses F3 and F02, refer to "Checking the ignition switch of the 1.4-1.6 (8V) engine and its circuits", page 67.
To check the ignition coil control circuit, use a tester with a 1.2 W lamp. Depressurize the engine supply system (see "Removing and disassembling the fuel module", page 114) and do not connect the ignition coils.

system wiring harness
Connect the engine management system to the fuel module connector. Disconnect wiring harness from ignition c o i l s 1 and 4 cylinders. Connect the tester probes to pin "1" of the ignition coil harness to the fuel module connector.
If the engine is not running, the engine must be turned off before the engine can be started.
If the ignition coil control and supply circuits are in good condition, the tester lamp should flash frequently during crankshaft rotation with the starter. If this is not the case, check the wire connecting pin "2" of the 4 cylinder coil harness to pin "32" of the ECU harness for open circuit and shorting to ground.
Similarly, check the coil circuits of cylinders 2 and 3 by connecting the tester probes to pin "2" of the coil pad of cylinder 3 and to the pin
"1" of the ECU pads.
If the ignition coil power and control circuits are correct, but the spark plug does not spark (see above), the coil itself must be checked.
To check the ignition coil, measure the resistance of the primary and secondary windings of the coil.
To test the primary winding....

...connect tester probes (in ohmmeter mode) to pins "1" and "2" of the ignition coil.

In a serviceable coil, the resistance of the primary winding should be 0.5±0.02 ohms.

... connect the tester's probes (in ohmmeter mode) to the "2" terminal and the ignition coil's output terminal.

In a serviceable coil the secondary resistance should be 7.5±1.1 kOhm.
If the coils are in good condition, check the connection circuit between the wire harnesses of the coils of cylinders 1 and 4. To do this, disconnect wire harnesses from ignition coils 1 and 4 cylinders and connect tester probes (in ohmmeter mode) to pin "2" of coil 1 cylinder wire harness and pin "1" of coil 4 cylinder wire harness. If the tester shows "infinity", the circuit is open.
Check the connection circuit in the same way.
Connect the tester probes to pin "2" of the 2 cylinder coil wiring harness and pin "1" of the 3 cylinder coil wiring harness.

Checking the engine high voltage wires 1,4-1,6 (8V)

Check high-voltage cables if the spark plugs are not sparking properly.
To check, remove the high-voltage cable from the ignition coil lead.

...and from the candle.
Connect the tester probes to the leads of the high-voltage cable.

The resistance of a serviceable wire should be within 1- 5 kOhm.
Check the spark plug leads of the other cylinders in the same way.

Checking the sensors of the engine management system

Check the engine control system sensors and their circuits in case of engine malfunctions, deterioration of dynamic and speed characteristics.

The vehicle's performance, as well as its fuel efficiency.
When troubleshooting or repairing the control system, a thorough inspection must be carried out

under the hood. When the ax-
You need to check the right-

Check that the connections of the engine-ECU wiring harness to sensors and actuators are tight and secure and look for burnt, deformed or frayed wires. Inspection may help to eliminate the fault without further checks.
The following are sensor checks that can be carried out by yourself without the use of diagnostic equipment.

Checking the crankshaft position sensor and its circuits

If the crankshaft position sensor or its circuits are defective, the engine will not start or run. With the ignition off, disconnect the wiring harness from the crankshaft position sensor.
Connect the tester probes to pin "2" of the sensor wiring harness and the engine earth. With the ignition on and the crankshaft stationary.....

... the tester should detect a voltage of approx. 2.0 V.
The same voltage must be applied between pin "1" of the co.

If the voltages are not normal, disconnect the sensor wiring harness strip (with the ignition off). If the voltages are not normal, disconnect (with ignition off) the wiring harness strip (with ignition off).
The power supply from the ECU. Check the correctness of circuits (open circuit and short-circuit on the "mass-
If there is a voltage mismatch between sensor wiring harness pin "2" and ECU wiring harness pin "24", or between sensor wiring harness pin "1" and ECU wiring harness pin "54". If the voltage values do not match and the circuits are intact, the ECU is defective. To check the resistance of the sensor winding.

...connect the tester probes to the sensor outputs (for clarity, shown on the removed sensor).
The winding resistance of the correct sensor should be 200 - 270 ohms.
To check the sensor further, remove it (see "Removing the crankshaft position sensor", page 106) and connect tester probes to the sensor terminals.
Switch the tester to AC voltage measurement mode....

...and bring the steel rod to the end of the sensor several times.
If the crankshaft position sensor is in good condition, the instrument should detect voltage spikes.

Checking the throttle position sensor and its circuits of the engine 1.4-1.6 (8V)

With the ignition off, disconnect the engine-ECU wiring harness from the throttle position sensor.
The wiring harness terminal markings "A", "B" and "C" are marked on the end of the terminal block to which the wires are connected.
To check the sensor power supply circuit, connect tester probes to pins "A" and "B" of the block.
With the ignition on...

...the instrument should detect a voltage of 4.8 -5.2 V.
If there is no voltage, disconnect (with ignition off) the wiring harness from the ECU. Then check correctness (open or shorted to ground) of the circuit ("+" sensor power supply) between lead "74" of the ECU wiring harness and lead "B" of the sensor wiring harness. Also check the circuit ("sensor mass") between terminal "75" of the ECU wiring harness and terminal "A" of the sensor wiring harness. If the circuits are correct and the voltage is not normal, the ECU is defective. In the same way, check the circuit (sensor signal) between terminal "43" ECU wiring harness pads and pin "C" of the sensor wiring harness.
To check if the throttle position sensor itself is in good working order, disconnect the throttle position sensor cable from it

Connect the tester pins to the sensor terminals "C" and "A" to measure the sensor resistance. For ease of measurement, connect uninsulated wires to the sensor terminals.

When the throttle is closed, the resistance should be 960 -1440 ohms.....

...and when the shutter is fully open it is about 2 kOhm.
If the sensor resistance is outside the specified limits, the sensor must be replaced.

Checking the throttle position sensor and its circuits of the engine 1.6 (16V)

With the ignition off, disconnect the engine-ECU wiring harness from the throttle position sensor.
The markings for the wiring harness pins "A", "B" and "C" are marked on the side of the harness.
To check the sensor power supply circuit.

...connect the "plus" probe of the tester to the " B" terminal of the block, and the "minus" probe to the "A" terminal. With the ignition switched on, the device should record a voltage of 4.8-5.2 V.
If there is no voltage, disconnect (with the ignition off) the wiring harness from the ECU. Then check the correctness (open and short circuit to "mass") of the circuit ("+" sensor power supply) between terminal "74" of the ECU wiring harness and terminal "B" of the sensor wiring harness. Also check the circuit ("mass" of the sensor) between pin "75" of the ECU wiring harness and pin "B" of the sensor wiring harness.
"A" of the sensor wiring harness harness block
If the circuits are good but the voltage is not normal, the ECU is faulty. If the circuits are correct and the voltage is not normal, the ECU is defective. In the same way check the circuit (sensor signal) between the ECU wiring harness lead "43" and the sensor wiring harness lead "C".
To check the serviceability of the throttle position sensor itself, disconnect the wiring harness and measure the resistance of the sensor with the throttle valve fully closed and then fully open between pins "A" and "C", "A" and "B" and "B" and "C".

With the throttle closed, the resistance between pins "A" and "C" should be 1245 ohms....

...and with the choke open, it's 2230 ohms.
Resistance between pins "A" and "B" both with the throttle open and closed must be 1250 ohms.
Resistance between pins "B" and "C" with the throttle open should be 2230 ohms and with the throttle closed should be 1245 ohms. If the sensor resistances differ from these values, the sensor must be replaced.

Checking the sensor temperature cooling

of the fluid and its circuits

The work is shown on For 1.4-1.6 (8V) engines, the check is the same for 1.6 (16V) engines. If the coolant temperature sensor or its circuits are damaged, the cooling fan runs continuously while the engine is running and continues to run even after the engine is turned off.

of life.
With the ignition off, disconnect the engine-ECU wiring harness from the coolant temperature sensor.
The marking of the sensor wiring harness leads "A", "B1" and "B2" is marked on its body. Connect the tester probes to the "B2" terminal of the sensor wiring harness and to the engine ground and measure the sensor supply voltage with the ignition

Control values of the resistance values of the dTOG at different coolant temperatures	
Coolant temperature, °C	Resistance, Ohm
120	87±20
110	114±3
80	280±90
50	810±38
25	2250±112
-10	12460±1121
-40	75780±6970

The instrument should detect a voltage of 4.8-5.2 V.
If there is no voltage, disconnect (with the ignition off) the wiring harness from the ECU and use a tester to check the correctness (open circuit and short circuit to ground) of the circuit (+ sensor power supply) between the sensor outputs.
by "B2" of the wiring harness block

sensor and ECU

defective.

on.

Use a tester to measure resistance between pins B1 and B2 of the sensor for two values of coolant temperature - unheated and heated engine. Compare the values obtained with the reference values (see table).
If the measured resistances do not match the reference values, the sensor must be replaced.

Checking the air temperature sensor circuits intake and its

pin "13". If
the circuit is good, the ECU is

The work is shown on 1.4-1.6 (8V) engine, check the same for 1.6 (16V) engine. With the ignition off, disconnect the wiring harness of the control system. controls
with the ignition off, disconnect the engine-ECU wiring harness from the air temperature sensor.
The marking of the pad terminals "1" and "2" is marked on the pad body.
Connect the tester probes to the "B1" terminal of the sensor wiring harness and to the engine ground, check the sensor ground circuit.
If the circuit is in good condition, the instrument should detect a resistance of less than 1 ohm. If the instrument shows "infinity", there is a break in the circuit between sensor wiring harness lead "B1" and ECU lead "73".
To check the sensor, disconnect the

engine-ECU wiring harness from the sensor.

With the ignition on...

...use a tester to measure the voltage between the pins of the pad.

Control values of DTV resistances at different inlet air temperatures	
Air temperature, °C	Resistance, Ohm
120	105±70
110	135±8
80	309±17
50	810±47
25	2050±123
-10	9540±1044
-40	49930±6790

If the sensor circuits are in good condition, the tester should show a voltage of 4.8 - 5.2V. If the voltage does not correspond to the required value, check the circuits (open or shorted to ground) between pin "1" of the sensor wiring harness and pin "49" of the ECU wiring harness and between pin "2" of the sensor wiring harness and pin "77" of the ECU wiring harness. If the circuits are correct, the ECU is defective.

To check the sensor with a thermometer

measure the temperature of the intake pipe near the sensor.....

...and with a tester, the resistance between-
between the sensor pins.

We compare the obtained value with the reference values (see table). If the measured resistance value does not match the reference value, the sensor must be replaced.

Checking injectors

Operation is shown on the 1.4-1.6 (8V) engine, on the 1.6 (16V) engine the check is performed in the same way.

With the ignition off, disconnect the wiring harness from the ignition switch. On the 1.6 (16V) engine, first remove the fuel sump guard (see "Removing the fuel sump guard", page 139).

Connect the tester probes to the injector outputs and measure the resistance of the injector winding.

The winding resistance of the correct injector must be (at 20 °C) about 12.0 ohms for the 1.4-1.6 (8V) motor and 14.5 ohms for the 1.6 (16V) motor.

To check the quality of the spray-

la и tightness injectors

Remove the fuel ramp from the injectors. (see "Removing the fuel ramp and injectors", p. 117, 164). Connect the fuel supply pipe to the ramp connector. Check each injector in turn by placing a container underneath it to collect fuel.

With the ignition switched on, use two wires to directly supply 12 V voltage from the battery to the injector terminals (it should be taken into account that after the ignition is switched on, the injector must be connected to the battery.

The fuel pump runs for 2-3 s).

The nozzle atomization test operation is a heat hazard. Do not create sparks when voltage is applied to the nozzle.

Fuel jets with a characteristic spray cone should come out of the injector nozzle.

After disconnecting wires from nozzle, check if fuel leaks through nozzle atomizer holes. Fuel leakage should not exceed one drop per minute.

Check other injectors in the same way.

If the electrical resistance of the injector is not normal, the amount of fuel injected and the spray pattern differ significantly from other injectors or the injector is not sealed, it must be replaced.

Checking the pressure in the supply system engine

The pressure in the engine supply system can be checked with an ordinary pressure gauge (e.g. from a tire pump).

Place an oil and gas resistant reinforced hose (12 mm inside diameter) on the threaded connection of the pressure gauge and secure it with a clamp.

Depressurize the engine oil system (see "Removing and disassembling the fuel module", page 114).

Disconnect the tip of the fuel pipe from the fuel module cover fitting.

Connect the wiring harness to the fuel pump cover connector.

Connect a hose with a mano-meter to the fuel module cover fitting and secure it with a clamp.

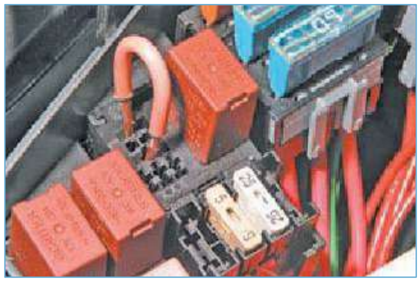
Switch on ignition, the fuel pump will be switched on for 2-3 seconds. The pressure gauge should indicate a pressure of 3±0.2 bar. If the pressure is higher than specified - the fuel pressure regulator is defective. If the pressure is lower than specified and drops after the pump is switched off, the cause may be leaky fuel module connections, faulty pressure regulator or fuel pump.

To assess the performance of the top

Connect the hose (without pressure gauge) to the fuel module cover fitting....

...and lower the other end of the hose into a container with a volume of at least 2 liters.

Remove relay K5 from the mounting block in the engine compartment.



By jumpering the relay sockets "3" and "5" with a piece of wire....

... switch on the fuel pump for 1 min. Switch off the fuel pump and measure the volume of fuel pumped into the container. If the fuel volume is less than 1.0 l, the pump must be replaced. The minimum capacity of the fuel pump is 60 l/h.

Transmission, chassis, steering and brake system

Cause of malfunction	Method of elimination
CLUTCH	
THE CLUTCH IS SLIPPING (NOT FULLY ENGAGED) WHEN THE "GAS PEDAL" PEDAL IS PRESSED SHARPLY, THE ENGINE PICKS UP SPEED, BUT THE VEHICLE HARDLY ACCELERATES; THERE MAY BE AN ODOR OF OVERHEATED FRICTION LININGS; FUEL CONSUMPTION INCREASES	
Oiling of the flywheel, pressure plate, friction lining of the driven disk	Thoroughly clean oily surfaces with white spirit or petrol and dry them. Replace a heavily oiled drive plate. Eliminate the cause of oiling (oil leakage through engine or gearbox oil seals)
Reduction of diaphragm spring force	Replace the pressure plate assembly with cover ("basket")
Severe wear or burning of the friction lining of the driven disk	Replace the driven disk assembly
Damage or seizure of the clutch actuator	Remove the seizure. If necessary, replace actuator parts
CLUTCH ENGAGEMENT (DIFFICULT TO SHIFT FORWARD GEARS, REVERSE GEAR SHIFTS NOISILY WHEN THE TRANSMISSION IS IN GOOD CONDITION)	
Improper clutch actuator adjustment (insufficient pedal travel)	Adjust the actuator. Replace defective clutch fork
Clutch actuator cable jammed	Lubricate the cable with engine oil. If this does not help (frayed cable wires, damaged sheath), replace the cable
Loose rivets or broken friction plates, warping of the drive disk (end runout more than 0.5 mm)	Replace the driven disk
Heavy and irregular wear, scoring on the working surfaces of the flywheel or pressure plate	Replace the flywheel. If the pressure plate surface is damaged, replace the clutch cover with pressure plate assembly (clutch basket).

Cause of malfunction	Method of elimination
Slave disk hub seized on the splines of the transmission primary shaft	Clean any dirt from the splines, repair minor damage with a file. If the splines are significantly worn or damaged, replace the disk and/or the transmission driveshaft. Apply fresh grease to the splines before reassembly BRAINS - 4
The pressure plate is misaligned or warped	Replace the pressure plate housing assembly ("clutch basket")
JERKS	
Clutch actuator cable jammed	Lubricate the cable with engine oil. If this does not help, replace the cable
Slave disk hub seized on the splines of the transmission primary shaft	Clean any dirt from the splines, repair minor damage with a file. If the splines are significantly worn or damaged, replace the disk and/or the transmission driveshaft. Apply fresh grease to the splines before reassembly BRAINS - 4
Deformation of the driven disk	Replace the driven disk
Loose friction lining fasteners on the inner disk, severe wear or cracks in the lining fasteners	Replace the driven disk
Loss of elasticity of the spring plates of the driven disk	Replace the driven disk
Significant settlement or breakage of torsional vibration damper springs, missing spring windows	Replace the driven disk
Scoring on the working surfaces of the handwheel or pressure plate	Replace the flywheel or clutch housing and pressure plate assembly ("clutch basket")
Oiling of the working surfaces of the friction lining of the driven disk	Thoroughly clean oily surfaces with white spirit or benzene and dry. Replace a heavily oiled drive plate. Remove the cause of oiling

* Troubleshooting of the ABS braking system must be performed at , except for checks on the condition of the electrical connections and hydraulic lines of the system, as well as wheel brakes.

Cause of malfunction	Method of elimination
RATTLING, KNOCKING OR NOISES WHEN THE CLUTCH IS ENGAGED	
Significant settlement or breakage of torsional vibration damper springs, missing spring windows	Replace the driven disk
Deformation of the driven disk	Replace the driven disk
Loose friction linings of the inner disk, heavy wear or cracks in the linings	Replace the driven disk
INCREASED CLUTCH RELEASE NOISE	
Worn, damaged or leaking clutch release bearing lubricant	Replace the bearing
GEARBOX NOISE (THE NOISE DECREASES OR DISAPPEARS WHEN THE CLUTCH IS DEPRESSED)	
Insufficient oil level in the gearbox crankcase	Check level, top up oil if necessary. Check for leaks (see "Checking for leaks"). "Oil Leak"). Blow out the breather plug
Poor oil quality. Water has entered the oil (if water has entered the oil, a whitish colored emulsion will form)	Change the oil. Drive carefully through fords and deep puddles
Worn or damaged sub studs, gear teeth	Replace worn pins, pinions and gears
GEARS ARE DIFFICULT TO ENGAGE, THERE ARE NO EXTRANEOUS NOISES	
The transmission control rod is deformed	Straighten or replace the tie rod
The bolts securing the gearshift mechanism are loose	Tighten the bolts (apply anaerobic sealant to the threads)
Breakage of the plastic parts of the control actuator	Replace parts
Improper actuator adjustment	Adjust the actuator
Gearshift springs are broken or parts of the gearshift mechanism are deformed	Replace springs, straighten deformed parts or replace the complete mechanism
Loosen gearshift fork seats on stems	Retighten the fork locks on the rods
Transmission shaft nuts are not tightened	Tighten the nuts

Cause of malfunction	Method of elimination
Clutch does not fully disengage	See "Clutch leads."
SPONTANEOUS SHIFTING	
Damaged or worn splines on the synchronizer clutch, pinion or hub	Replace defective parts
Improper actuator adjustment	Adjust the actuator
The springs in the gearshift lever are loose, the rods are worn out	Replace worn parts
Transmission shaft nuts are not tightened	Tighten the nuts
Power unit supports have lost their elasticity or collapsed	Replace the supports
GRINDING, CRACKLING, SCREECHING GEARS IN GEAR	
Clutch is not fully disengaged	See "Clutch leads."
No oil in gearbox crankcase	Refill the oil. Check for leaks (see "Oil leaks"). Blow out the breather plug
Bearings, gear teeth damaged	Replace bearings, treads
Wear of the synchronizer ring of the gear being engaged	Replace the ring
MAIN GEAR NOISE (NOISE FROM THE GEARBOX SIDE ONLY WHEN THE VEHICLE IS MOVING)	
Worn or damaged studs	Replace worn and damaged secondary shaft and differential bearings (even with minimal wear). Adjust the preload of the differential gearbox bearings
GEARBOX OIL LEAKAGE	
Transmission breather plugged	Blow out the gearbox breather plug
Worn oil seals: primary shaft, right wheel drive, bearing of the left wheel drive inner joint cover	Replace the oil seals, bearing of the left wheel drive inner ball joint cover
Heavy wear, scoring on the shaft surfaces on which the oil seals run	Clean minor damage with a fine-grained cloth and polish. Replace shafts and oil seals in case of major damage

Cause of malfunction	Method of elimination
The left wheel drive inner joint cover is torn	Replace the cover
The clutch housing and gearbox cover are loose	Retighten the screw connections
Drain plug, reverse gear light switch not tightly screwed on	Tighten drain plug, reverse light switch, reverse light switch
CLUNK	
Wear of front wheel drive joints	Replace worn joints or actuators
Worn or damaged rubber element of the upper support of the shock absorber strut, rubber-metal joints (silent blocks) of suspension arms, bushings and pads of the transverse stabilizer bar	Replace worn or damaged parts
Loose fasteners of the cross stabilizer bar to the body, front suspension knuckle to the strut, suspension arms to the subframe, shock absorber strut to the body	Retighten the screw connections
Severe wear of the front wheel hub bearing or loose bearing nut fastening	Tighten wheel hub bearing nut, replace bearing if necessary
Suspension spring failure	Replace the spring (both left and right suspension springs must be replaced at the same time).
Brake lining peeling away from the boat base	Replace the pads (all on one axle at the same time)
Power unit supports have lost their elasticity or collapsed	Replace the supports
The subframe fastener is loose	Retighten the subframe mounting bolts
Clutch malfunction	Refer to clutch fault diagnosis
NOISE WHEN DRIVING ON A SMOOTH HIGHWAY	
Wear of wheel hub bearings	Replace wheel hub bearings
Tires are not designed for the operating conditions (all-terrain tires, studded tires, etc. on asphalt)	Use tires in accordance with their intended use

Cause of malfunction	Method of elimination
Uneven tread wear or separation, tire or rim deformation	Replace the wheel
The wheel is caught on the fender flap	Check and adjust wheel alignment, replace deformed suspension parts, sagging springs. Do not overload the vehicle. Use wheel rims of the correct size
Wheel bolts are caught in the rear wheel brake components	Use bolts according to the thickness of the wheel rim
Wheel mounting bolts are loose	Tighten the bolts, replace the wheel if the wheel rim is deformed
The brake lining is detached from the shoe base	Replace the pads (all on one axle at the same time)
KNOCK WHEN DRIVING OVER SMALL BUMPS	
Shock absorber or upper support of shock absorber strut is defective	Replace both shock absorbers (both struts) or the shock absorber strut support
Front suspension ball bearing wear	Replace the ball bearing
Wear of the bushings of the transverse stabilizer bar	Replace the stabilizer bushings
KNOCKS, SQUEAKS DURING SUSPENSION OPERATION (OFF-ROADING)	
Vehicle overloading	Do not overload the vehicle. Distribute the load evenly (use the passenger compartment).
Damper defective	Replace both shock absorbers (both struts)
The compression stroke buffer has been destroyed	Replace the compression stroke buffer
Suspension spring settling or breakage	Replace both springs, left and right springs
Fracture or settlement of the upper strut support	Replace the upper strut support
Deformed suspension arms, transverse stabilizer bar, steering rods, subframe, rear suspension beam. The fastening of these parts has loosened	Replace deformed parts. Retighten screw connections
Wear of ball joints and front sub-assembly straps	Replace worn parts
Suspension components, steering, brake system, power unit loosened	Retighten the screw connections

Cause of malfunction	Method of elimination
Power unit supports have lost their elasticity or collapsed	Replace the power unit supports

THE SHOCK ABSORBER (STRUT) SHOWS TRACES OF SHOCK ABSORBER FLUID

Fluid leaks from the shock absorber (due to worn stem packing, reservoir O-ring, chinks, wear and tear). and damage to the chrome plating on the stem)	A slight "sweating" of the shock absorber in the upper part (if there is no sweating) while the shock absorber characteristics remain unchanged is not a malfunction. The shock absorbers can be checked by rocking the vehicle by the fender. Allow no more than 1 to 2 free oscillations of the vehicle

THERE ARE TRACES OF JOINT LUBRICATION ON THE JOINT COVER AND/OR THE WHEEL DRIVE SHAFT

Hinge protective cover is damaged, hinge collars are loose	Inspect the joint, replace if there is play. If there is no play and there is a little dirt in the grease, remove as much grease as possible with a screwdriver without disassembling the joint and put in new grease. Replace damaged cover, collars, and clamps

KNOCKING, CLICKING WHEN TURNING THE VEHICLE

Wear of the outer joint of the wheel drive	Replace the wheel drive
Axial wheel play (severe wear of the front wheel hub bearing or loosening of the hub bearing nut)	Tighten wheel hub bearing nut, replace bearing if necessary

VEHICLE DRIFTING AWAY FROM STRAIGHT AHEAD (ON A LEVEL ROAD)

Unequal tire pressure	Set the tire pressure to the normal level
Violation of the steering axis inclination and/or camber angles of the front wheels	Adjust the angles of the steering axle and/or camber of the front wheels
Significant difference in tire wear	Replace the worn tire
Uneven settlement of front suspension struts	Replace both springs
Suspension and/or body parts of the vehicle are deformed	Straighten or replace deformed underbody parts and body panels
Rear axle misalignment due to wear of the rear suspension beam silent-blocks	Replace the beam arm silent blocks
Wheel retardation due to jamming of the wheel cylinder piston	Replace the wheel cylinder

Cause of malfunction	Method of elimination
Braking of the front wheel due to loose bolts securing the shoe guide to the steering knuckle (offset caliper)	Tighten the bolts
Rear wheel retardation due to loose or broken rear brake shoe retaining spring	Replace the spring
Increased imbalance of the front wheels	Balance the wheels

UNEVEN TIRE TREAD WEAR

Increased wheel imbalance	Balance the wheels
Deformation of tire, rim	Replace the wheel
Different tire pressures	Set the tire pressure to the normal value
Wheel alignment angles disturbed	Adjust wheel alignment angles
High cornering speeds, skidding or skidding with the wheels	Observe the normal driving speed of the vehicle
Axial wheel play (severe wear of the front wheel hub bearing or loosening of the hub bearing nut)	Tighten wheel hub bearing nut, replace bearing if necessary
Worn suspension joints, deformation of suspension or body parts	Replace joints, deformed suspension parts, spars, body panels
Steering play (see also "Increased steering clearance")	Replace worn joints, retighten threaded connections
Damper defective	Replace both shock absorbers (both struts)

INCREASED STEERING CLEARANCE

Steering link ball pin nuts or bolts securing the steering gear casing to the subframe are loose	Tighten nuts and bolts
Increased play in the ball joints of the steering rods	Replace the tie rod ends, tie rods, left tie rods
Large side clearance between pinion and nut	Replace the steering mechanism

STIFF STEERING WHEEL

The auxiliary drive belt (for vehicles with power steering) is loose or under-tensioned.	Check the condition of the belt. Replace the belt

Cause of malfunction	Method of elimination
Low fluid level in the power steering reservoir	Check the hydraulic system for leaks. Fill the reservoir with fluid
The hydraulic steering pump is defective	Replace the pump, pump the system
Upper bearing of the front suspension shock absorber strut upper support is damaged	Replace the support bearing
The steering rack support bush or stop is damaged	Replace damaged parts or complete steering mechanism
Low tire pressure in front tires	Set the tire pressure to the normal level
The steering link rod end joints are damaged	Replace the tie rod ends
The steering gear bearings are damaged	Replace bearings or steering gear assembly
Front wheel alignment angles disturbed	Adjust w h e e l alignment angles
Steering gear fastening is loose	Tighten the bolts securing the steering gear to the subframe

UNEVEN RESISTANCE TO STEERING WHEEL ROTATION WHEN THE ENGINE IS RUNNING

Cause of malfunction	Method of elimination
Air in the steering hydraulic system	Remove air from the hydraulic system
Insufficient pressure in the booster fluid at work	Replace the power steering pump
Spool valve of the selector lever of the steering gearbox is jammed	Replace the steering mechanism

SQUEAK

Cause of malfunction	Method of elimination
Limit wear of brake shoe linings	Replace the brake pads (all at the same time on one axle)
Heavy contamination of the pad support surfaces in the caliper	Remove the pads, clean the caliper and pad bearing surfaces
Brake shoe lining has detached from the base plate	Replace the pads (all on one axle at the same time)
Rear brake shoe retaining spring is loose or broken	Replace the spring

BRAKING VIBRATION**

Cause of malfunction	Method of elimination
Deformation of the brake disk	Replace both disks
Increased axial play of the wheel	Tighten wheel hub bearing nut, replace bearing if necessary

Cause of malfunction	Method of elimination
Brake drum ovality	Grind or replace the drum
Piston in the rear wheel cylinder is stuck	Replace the wheel cylinder
Brake shoe lining has detached from the base plate	Replace the pads (all on one axle at the same time)
Rear brake shoe retaining spring is loose or broken	Replace the spring

STEERING OR SKIDDING WHEN BRAKING

Cause of malfunction	Method of elimination
Cylinder piston jammed in the boiler cylinder	Replace the wheel cylinder
Blocked brake lines: tubes or hoses	Replace damaged pipes and hoses
The lining is detached from the brake pad base	Replace the pads (all on one axle at the same time)
Grease on brake disks, drums, brake shoe linings	Clean oily discs and drums and replace the brake pads. Remove the cause of oiling
Different tire pressure in left and right tires	Set the tire pressure to the normal level
Significant difference in tire wear	Replace the worn tire
The pressure regulator or its actuator in the rear wheel brakes is defective	Replace the pressure regulator. Adjust the actuator
One of the service brake circuits is not working (braking performance is significantly reduced)	Repair brake system fluid leakage, pump the system
Deformation of the brake disk	Replace both disks
Wheel axial play	Tighten wheel hub bearing nut, replace bearing if necessary
Damper defective	Replace both shock absorbers (both struts)
Brake drum ovality	Grind or replace the b a r a - b a n
Uneven settlement of front suspension struts	Replace both springs
Wheel alignment angles disturbed	Adjust w h e e l alignment angles

**** Shaking** of the brake pedal during hard braking on vehicles with ABS is an indication that the anti-lock braking system is operating.

Cause of malfunction	Method of elimination
INCREASED BRAKE PEDAL TRAVEL (PEDAL IS "SOFT" OR "SLUMPS")	
Air in the brake system, brake fluid leakage through leaks in the hydraulic system, damaged seals in the brake master cylinder, pressure regulator, damaged brake pipes and hoses	Inspect all lines, screw connections and cylinders and correct leaks. Restore normal fluid level in hydraulic reservoir and pump the system. If brake hoses are damaged (cracked, swollen or leaking brake fluid), replace the hoses. If defects a r e suspected in the brake master cylinder, replace it with a serviceable one
Cylinder rubber seals swollen due to oil, gasoline, etc. in the brake fluid.	Replace cylinders, hoses, drain brake fluid completely, flush the system with fresh fluid and recirculate the system
Increased clearance between the boats and the drum (automatic clearance adjustment mechanism does not work)	Replace the elements of the automatic clearance adjustment mechanism
One of the service brake circuits does not work	Repair brake system fluid leakage, pump the system
BRAKE PEDAL TRAVEL WITHIN NORMAL LIMITS (PEDAL IS "HARD"), BUT THE CAR DOESN'T BRAKE WELL	
Cylinder piston jammed in the boiler cylinder	Replace the wheel cylinder
Blocked brake lines: tubes (due to dents) or hoses (due to loosened or split laths)	Replace damaged pipes and hoses
Grease on brake disks, drums, brake shoe linings	Clean oily discs and drums and replace the brake pads. Remove the cause of oiling
Complete wear of brake shoe linings (brake grinding)	Replace the brake pads (all at the same time on one axle)
Brake shoe lining has detached from the base plate	Replace the pads (all on one axle at the same time)
The pressure regulator or its actuator in the rear wheel brakes is defective	Replace the pressure regulator. Adjust the actuator

Cause of malfunction	Method of elimination
The vacuum booster is defective or the check valve tube connecting the booster is leaking. with inlet piping	Check the operation of the booster and check valve. Replace defective parts
BRAKING OF ONE OF THE WHEELS WHEN THE BRAKE PEDAL IS RELEASED	
Cylinder piston jammed in the boiler cylinder	Replace the wheel cylinder
Blocked brake lines: tubes (due to dents) or hoses (due to swelling or separation of rubber)	Replace damaged pipes and hoses
Brake shoes jammed due to heavy contamination of the caliper bearing surfaces	Remove the pads, clean the pad bearing surfaces and the caliper
Peeling rear brake pad lining	Replace the pads (all on one axle at the same time)
Rear brake shoe retaining spring is loose or broken	Replace the coupling spring
The fastening of the shoe guide to the steering knuckle is loose	Tighten the bolts
Parking brake is overtightened, cables are wedged in pins	Adjust cable tension, lubricate with engine oil, replace the cable if the sheath is damaged or the cable wires are frayed, or if the cable is badly corroded.
WHEELS ARE NOT RELEASED WHEN THE PARKING BRAKE LEVER IS RELEASED	
Incorrect adjustment of the parking brake actuator	Adjust the actuator
After the vehicle has been parked for a long time, the brake pads are stuck (or frozen) to the brake bar	Pull the lever or cables and try to turn the wheel carefully (to avoid breaking the brake linings). When parking the machine, do not apply the brake as far as possible, but engage a gear
THE ANTI-LOCK BRAKES WARNING LIGHT IN THE INSTRUMENT CLUSTER IS ILLUMINATED	
The vehicle's on-board voltage is too low (below 10 V). The no battery charge indicator in the instrument cluster must be illuminated.	Remove malfunction in the battery charging circuit

Cause of malfunction	Method of elimination
There is no fluid in the brake system reservoir. If the parking brake is applied and the brake fluid level in the reservoir is insufficient, the parking brake warning light must illuminate in the instrument cluster.	Check hydraulic system connections for leaks and repair. Fill the hydraulic reservoir of the brake system with fluid
Malfunction in the electrical connections of the ABS components	Check and, if necessary, repair the contacts in the ABS electrical circuits

Cause of malfunction	Method of elimination
Fuse F8 (50A) or F9 (25A) of the anti-lock braking system in the engine compartment mounting block is blown	Find out the cause of the blown fuse. Replace the blown fuse
Malfunction of wheel speed sensors or ABS control unit	Checking with diagnostic equipment

Electrical equipment

Cause of malfunction	Method of elimination
RECHARGEABLE BATTERY	
See also Engine and its systems: "The crankshaft won't turn with the starter."	
BATTERY PACK IS DISCHARGED	
The vehicle has been running for a long time - Recharge the battery with a battery charger.	
I've never been exploited	Use the battery charger or run the engine from the battery of another vehicle.
Auxiliary drive belt (alternator) tension is loose	Tighten the belt
The alternator is faulty	See Diagnosing the faulty alternator. generator performance
When the engine is off, many power consumers are running (head unit of the sound system). works, etc.)	Reduce the number of consumers Consumers operating from battery pack
Damage to the insulation of electrical circuits, current leakage on the battery surface	Check leakage current (max. 10 mA with consumers disconnected), clean the battery surface. Watch out for acid! Replace the
Short circuit between the battery plates ("boiling" of the electrolyte, local heating of the battery)	battery
GENERATOR	
THE NO BATTERY CHARGE INDICATOR IS ILLUMINATED. VEHICLE VOLTAGE BELOW 13.5 V (CHECK WITH A TESTER)	
Auxiliary drive belt (alternator) tension is loose	Tighten the belt

Cause of malfunction	Method of elimination
The voltage regulator is defective	Replace the voltage regulator
The diodes of the rectifier unit are damaged	Replace the rectifier unit
Excitation winding leads are not connected to the slip rings, shorted or open in the winding	Replace the alternator rotor or alternator assembly
Open or short-circuit in the stator winding, short-circuited.	Replace the stator or alternator assembly
The alternator can be switched to the ground (the alternator howls when it is switched on).	
VEHICLE ON-BOARD VOLTAGE IS ABOVE 14.7 V (CHECK WITH A TESTER)	
The voltage regulator is damaged stipulations	disconnect the wires from the alternator
GENERATOR NOISE	
The alternator bearings are damaged (squealing, howling). The noise is reduced when the cables are disconnected from the alternator and disappears when the drive belt is removed.	
Short circuit in stator winding (whine). The noise disappears when the wires are disconnected from the alternator	
Short circuit in one of the diodes. Noise disappears if you	

Replace the voltage regulator stipulations

Replace rear bearing, front bearing and cover or alternator assembly

Replace the stator or alternator assembly

Replace the rectifier unit

Cause of malfunction	Method of elimination
LIGHTING AND LIGHT SIGNALING	
HEADLIGHT, TAILLIGHT BULBS ARE NOT ILLUMINATED	
Bulb filament burned	outReplace bulb
the wiper off, ped-	Fuse blownCheck the protected If the fuse is blown, check the circuit for shorting to earth, replace the fuse.
Relay contacts oxidized, relay windings burned out, switches inoperative	Clean contacts, replace relays and switches
TURN SIGNAL LAMP FLASHES WITH DOUBLE FREQUENCY	
One of the turn signal lamps has burned out	Replace the burned out bulb
THE TURN SIGNAL SWITCH LEVER DOES NOT RETURN TO ITS ORIGINAL POSITION, THE STEERING WHEEL SWITCH LEVER DOES NOT LOCK INTO POSITION	
Broken clips, lost switch springs	Replace the defective diverter switch
HEADLIGHT DIFFUSER IS FOGGED UP	
Water penetrates between housing and diffuser, cracks in diffuser	Seal gaps, replace cracked diffuser or headlamp unit
Water has entered from the engine compartment side	Remove the water by removing the bulb. When pressure washing the engine compartment, cover the headlights
WINDSHIELD WIPER	
WIPER MOTOR DOES NOT WORK, FUSE F01 (OF THE WIRING BLOCK) IN THE PASSENGER COMPARTMENT) OF THE WIPER CIRCUIT PROTECTION IS IN GOOD WORKING ORDER	
Damaged wires, oxidized or loose wire lugs	Crimp lugs, replace defective leads
Malfunction of the steering wheel switch	Replace a defective wiper switch
Motor brushes are stuck, collector is heavily soiled or burnt out	Replace the gearmotor
Open circuit in the motor armature winding	Replace the gearmotor
Switching unit defective	Replace the switching unit

Cause of malfunction	Method of elimination
WIPER MOTOR DOES NOT WORK, FUSE F01 (PASSENGER COMPARTMENT FUSE BOX) BLOWN WIPER CIRCUIT PROTECTION	
The wiper turn off the wiper and rest the wiper blades on the glass.	blades are frozen to the glassWith gently separate the wiper blades from the glass, check the integrity of the rubber scraper, restore the mobility of the wiper joints
The wiper brushes are catching on body parts	Check levers for proper alignment, straighten deformed levers or replace the wiper.
Short-circuit in the winding inmotor	Replace thegearmotor
WIPER MOTOR DOES NOT OPERATE IN INTERMITTENT MODE	
Switching unit defective unit	Replace theswitching unit
The steering wheel shifter is defective shifter.	Replace the steering wheel key switch
THE WIPER MOTOR DOES NOT STOP IN INTERMITTENT MODE MODE	
Oxidized or burntcontacts limit switchReplace gearmotor	Clean contacts or contacts of Clean gearmotor titler
BRUSHES STOP IN ANY POSITION	
The crank nut on the axle is loose	Having correctly installed the curved stud, tighten the nut
Contact lobes gearboxes	end-Bend the contact lobes. the limitswitch paddlesproperlythe motor gear.
BRUSHES RUN OUT OF SYNC	
Lever arm of one of the brushes is loose on the shaft	Set the brush in the desired position and tighten the arm mounting nut
THE WIPER MOTOR RUNS, BUT THE BRUSHES DO NOT MOVE	
looseCorrectly positioningthe crank tighten the nut	mounting nut has come on the pinion axle stud,
Gear teeth are gearmotor	chippedReplace the gearmotor

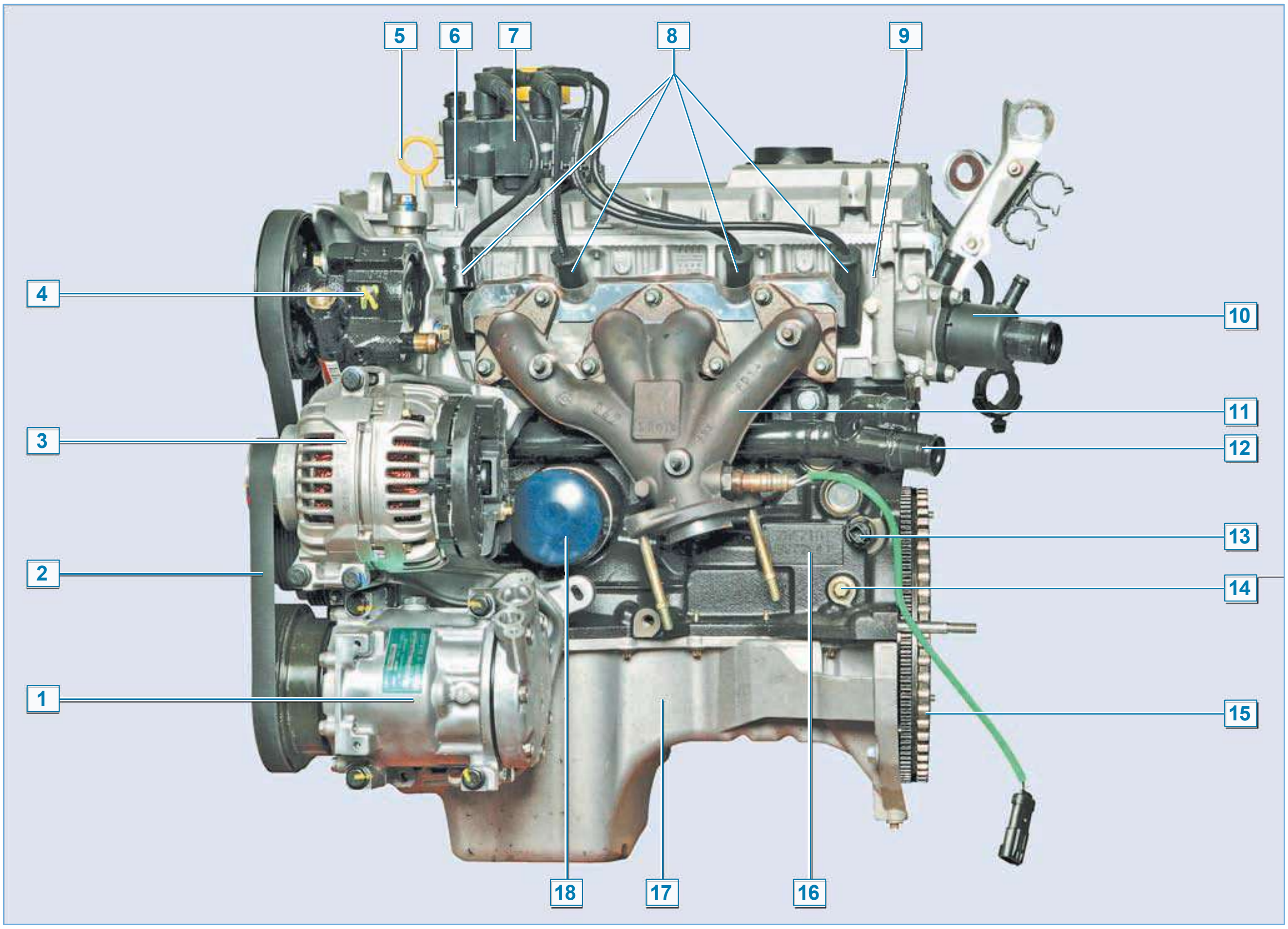
Cause of malfunction	Method of elimination
REAR WINDOW HEATER	
THE INDIVIDUAL FILAMENTS OF THE HEATING ELEMENT ARE NOT HEATED	
Rear window heater element filament breakage	Repair the rear window heater element filaments with a special conductive preparation or replace the rear window heater element
NONE OF THE HEATING ELEMENT FILAMENTS GET HOT	
Rear window heater switch, relay, fuse defective, wires damaged, lugs oxidized or poorly connected, contact broken off rear window heater element	Replace defective switch, relay, fuse, wire. Clean, rewire the lugs. Replace the glass with the heated element
HEATER FAN MOTOR DOES NOT WORK	
Wires are damaged, oxidized or loose lugs are loose	Crimp and strip lugs, replace defective wires
Relay K1 of the heater fan switch is defective, fuse F36 or F39 of the passenger compartment fuse box is blown.	Replace defective relay or fuse
The heater fan motor is defective	Replace the heater fan
Heater fan operation mode switch defective	Replace the switch
HEATER FAN MOTOR DOES NOT RUN AT LOW SPEED	
The auxiliary resistor is burned out	Replace the resistor
Heater fan operation mode switch defective	Replace the switch
SIGNALING DEVICES	
COOLANT TEMPERATURE GAUGE DOES NOT WORK OR FUEL GAUGE	
Indicator is defective	Replace the combination of the instrument panel. hog
Pointer sensor defective	Replace the pointer sensor

Cause of malfunction	Method of elimination
Wires are damaged, oxidized or	Crimp lugs, replace defective
THE FUEL RESERVE WARNING LIGHT IS PERMANENTLY ILLUMINATED	
Sensor resistor defective	Replace the pointer sensor fuel level
ALARMS DO NOT LIGHT UP	
Alarm is defective	Replace the alarm combination. hog
The appropriate alarm sensor is defective	Replace the alarm sensor
amaged wires, oxidized- or loose defective wires lugs	Crimp the lugs, plugged change
SPEEDOMETER DOES NOT WORK	
Speed sensor defective	Replace the speed sensor
The speedometer is defective	Replace the speedometer combination. hog
TACHOMETER DOES NOT WORK	
Instrument cluster power supply circuits, tachometer control circuit damaged	Shrink the lugs, replace defective wires, instrument cluster
The ECU does not provide a signal to the tachometer	Replace the defective ECU
Tachometer defective	Replace the instrument combination
BUZZER	
SIGNAL DOESN'T WORK	
signal is defective, its output is- restore the keyer, burned out pre- keeper screw F17, damaged housing.wires, oxidized or poorly lugs	Try to sound by turning on the signal Clean, crimp the wires
Signal defective, wires damaged, oxidized or poorly connected terminals	Adjust the sound by turning the screw on the signal housing. Clean, crimp and crimp the
Faulty signal, switch, wires, blown fuse - replace	
FAINT, HOARSE BEEP	
	Defective signal, switch, wires - replace

CAR REPAIR

Engine 1.4-1.6 (8V)

Description of design



Engine (front view in the direction of vehicle movement): 1 - air conditioner compressor; **2 -** drive belt of auxiliary units; **3** - generator; **4** - power steering pump; **5** - oil level indicator (oil dipstick); **6 -** cylinder head cover; **7 -** ignition coil; **8 -** high voltage wire tips; **9** - cylinder head; **10 -** thermostat housing; **11 -** exhaust manifold; **12 -** coolant pump pipe; **13 -** oil pressure sensor; **14 -** process plug; **15** - flywheel; **16** - cylinder block; **17 -** crankcase pan; **18** - o i l filter.

The K7J and K7M engines are identical in design and differ only in displacement. The K7J engine has a displacement of 1.4 liters, while the K7M engine has a displacement of 1.6 liters. The increase in displacement is due to the larger radius of the crank shaft and therefore a longer piston stroke.

Both engines are gasoline, four-stroke, four-cylinder, in-line, eight-valve, overhead camshaft.

The order of operation of the cylinders is 1-3-4-2, counting from the flywheel.

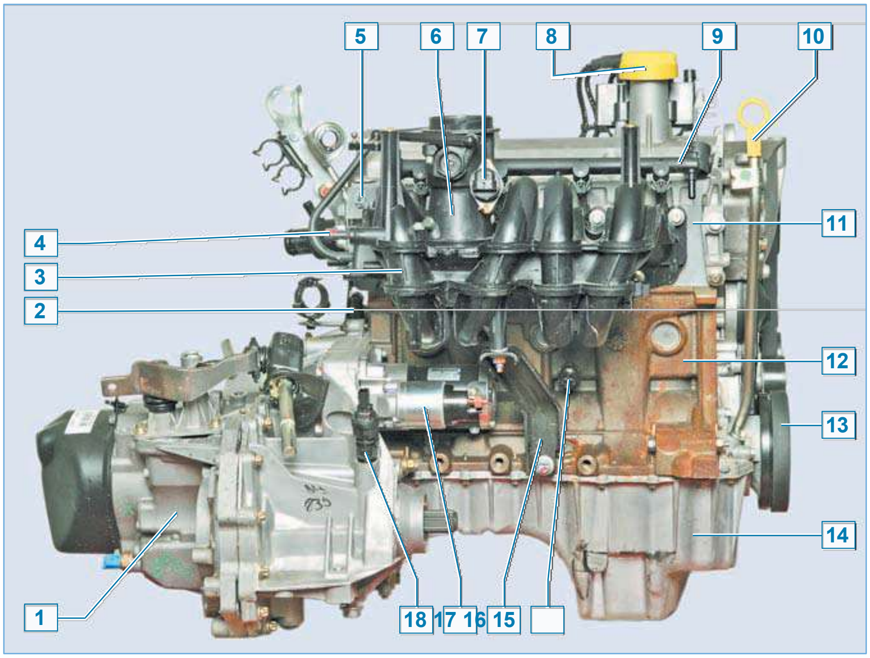
Power supply system - distributed fuel injection (Euro 4 standards).

The engine, gearbox and clutch form a power unit - a single unit mounted in the engine compartment on three elastic rubber-metal supports. The right support is attached to the bracket on the upper timing belt cover, and the left and rear supports are attached to the gearbox crankcase.

The following are located at the front of the engine (in the direction of travel of the vehicle): exhaust manifold; oil filter; oil pressure warning sensor; coolant pump supply pipe; spark plugs; alternator; power steering pump; air conditioning compressor.

At the rear of the engine are: intake pipe with absolute pressure and intake air temperature sensors; throttle assembly with throttle position sensor and idle speed regulator; fuel ramp with injectors; detonation sensor; starter; oil level gauge.

On the right is the coolant pump



Power unit (rear view in the direction of vehicle movement): 1 - gearbox; **2** - crankshaft position sensor; **3** - intake pipe;
4 - absolute air pressure sensor in the inlet pipe; **5** - inlet air temperature sensor; **6** - throttle unit; **7** - idle speed regulator; **8** - oil filler cap; **9** - fuel ramp; **10 - oil** level indicator (oil dipstick); **11** - cylinder head; **12** - cylinder block; **13** - auxiliary units drive relay; **14** - crankcase pan; **15** - detonation sensor; **16** - intake pipe support bracket; **17** - starter; **18** - vehicle speed sensor

fluid; timing and coolant pump drive (timing belt); auxiliary drive (V-belt).

On the left: flywheel; thermostat; crankshaft position sensor; coolant temperature sensor.

From above - ignition coil; oil filler neck.

The engine cylinder block is cast from cast iron, the cylinders are bored directly into the block.

In the lower part of the cylinder block there are five crankshaft main bearing supports with removable covers, which are fastened to the block with special bolts. The holes in the cylinder block for the bearings are machined with the covers installed, therefore the covers are not interchangeable and are marked to distinguish them.

The covers are located on the outer surface (the counting of the covers is from the flywheel side). The end faces of the center support have sockets for thrust half-rings to prevent axial movement of the crankshaft.

Crankshaft main and connecting rod bearing shells are steel, thin-walled with anti-friction coating applied to the working surfaces.

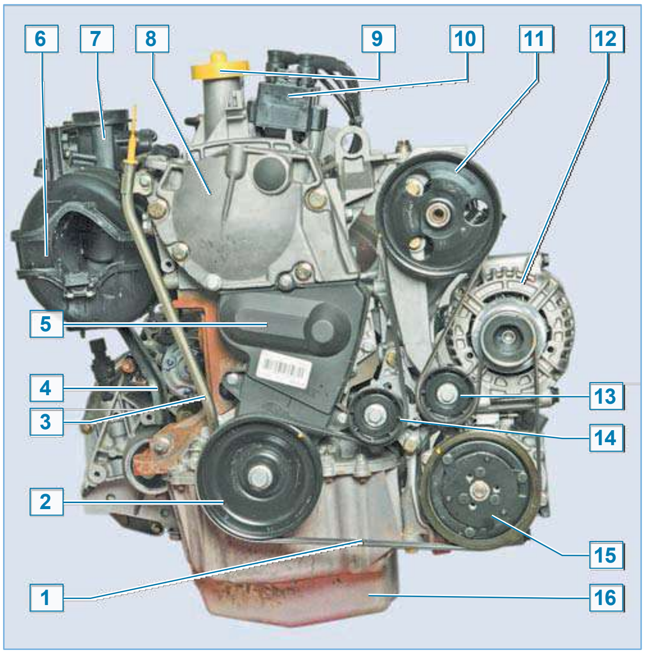
Crankshaft with five crank pins and four connecting rod pins. The shaft is equipped with four counterweights cast in one piece. The counterweights are made on an extension of the crankshaft jaws. of the engine shaft. Counterweights are designed to balance the forces and moments of inertia arising from the movement of the crank mechanism during engine operation. For

The oil supply from the crankpins to the connecting rod journals is channeled through the shaft journals and cheeks. The front end (toe) of the crankshaft is equipped with: oil pump drive sprocket, timing pulley, gear drive pulley, oil pump drive sprocket, oil pump drive sprocket, oil pump drive sprocket, oil pump drive sprocket, oil pump drive sprocket, oil pump drive sprocket.

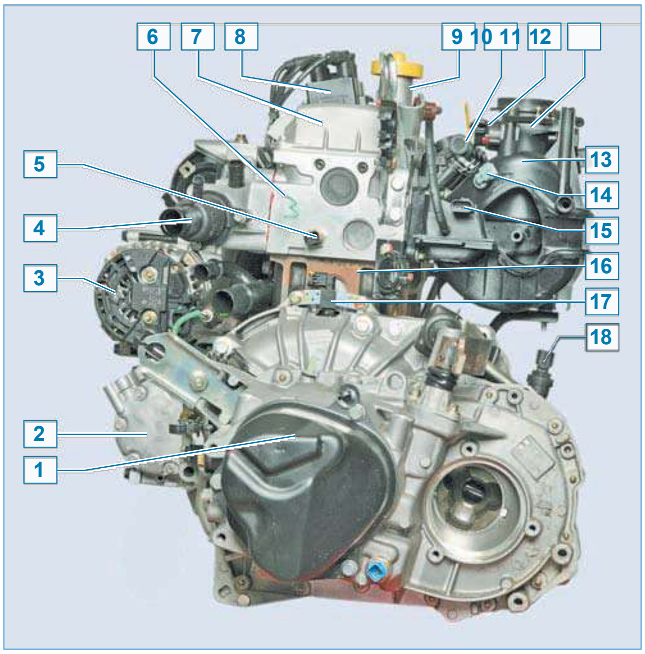
The toothed pulley is secured to the shaft by a tab which fits into a groove in the toe of the crankshaft and prevents the pulley from turning. The auxiliary drive pulley is secured to the shaft in the same way.

The flywheel is bolted to the crankshaft flange with seven bolts. It is cast from cast iron and has a pressed steel crown for starting the engine with a starter. In addition, the flywheel has a toothed gear on it.

If the vehicle is not equipped with a wheel sensor, do not use the wheel sensor.



Power unit (view from the right in the direction of vehicle travel): **1** - auxiliary units drive belt; **2** - auxiliary units drive pulley; **3** - oil level gauge guide tube; **4** - inlet pipe support bracket; **5** - lower cover of gas distributor drive belt; **6** - inlet pipe; **7** - throttle assembly; **8** - upper cover of the gas distributor belt drive; **9** - oil filler cap; **10** - ignition coil; **11** - hydraulic power steering pump pulley; **12** - generator; **13** - **belt** support roller; **14** - belt tensioner roller; **15** - air conditioner compressor pulley; **16** - crankcase pan



Power unit (view from the left in the direction of vehicle travel): **1** - transmission; **2** - air conditioner compressor; **3** - generator; **4** - thermostat housing; **5** - coolant temperature sensor; **6** - cylinder head; **7** - cylinder head cover; **8** - ignition coil; **9** - oil filler neck; **10** - fuel ramp; **11** - throttle position sensor; **12** - throttle assembly; **13** - intake pipe; **14** - **intake** air temperature sensor; **15** - absolute air pressure sensor in the intake pipe; **16** - cylinder block; **17** - crankshaft position sensor; **18** - vehicle speed sensor.

The connecting rods are steel I-beams, machined together with the covers. The covers are fastened to the connecting rods with special bolts and nuts.

The piston pin is a tubular steel pin. The pin is pressed into the upper connecting rod head and rotates freely in the piston bosses.

Piston is made of aluminum alloy. The piston skirt has a complex shape: barrel-shaped in the longitudinal section and oval in the lateral section. There are three piston ring slots in the upper part of the piston.

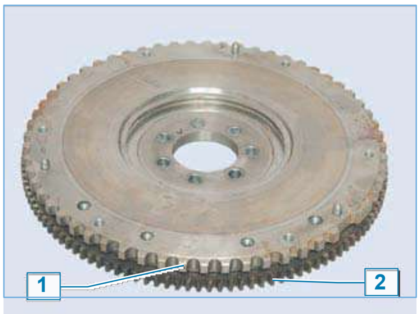
Two upper piston rings

The compression rings are the compression rings and the lower one is the oil ring. The compression rings prevent gases from escaping from the cylinder into the crankcase

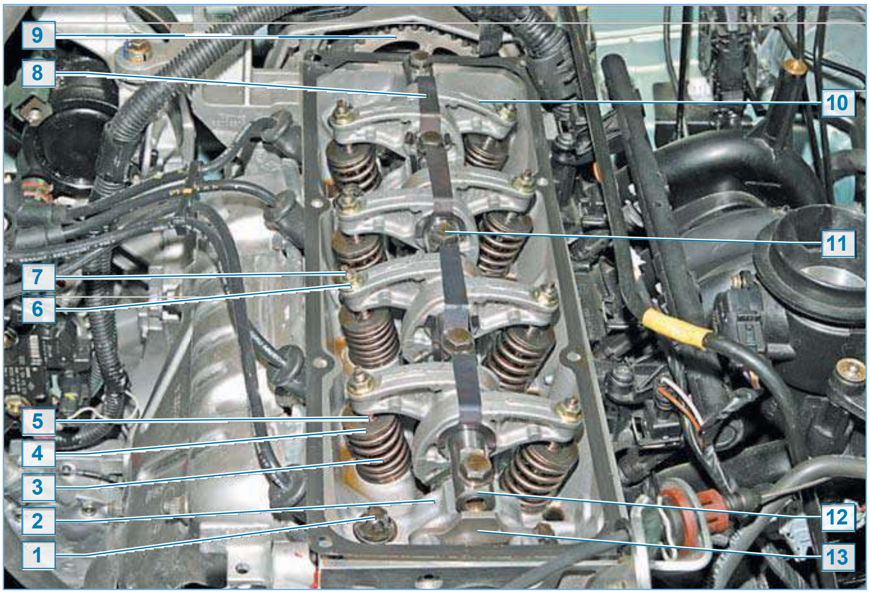
The oil ring removes excess oil from the cylinder walls as the piston moves. The oil ring removes excess oil from the cylinder walls as the piston moves.

The cylinder head is of aluminum alloy, common to all four cylinders. It is centered on the block with two bushings and secured with ten screws. A shrink-free metal gasket is fitted between the block and the cylinder head. Five camshaft supports (bearings) are located in the upper part of the cylinder head. The supports are non-separable and the camshaft is inserted into them from the timing drive side. The camshaft is driven by a timing belt from the crankshaft.

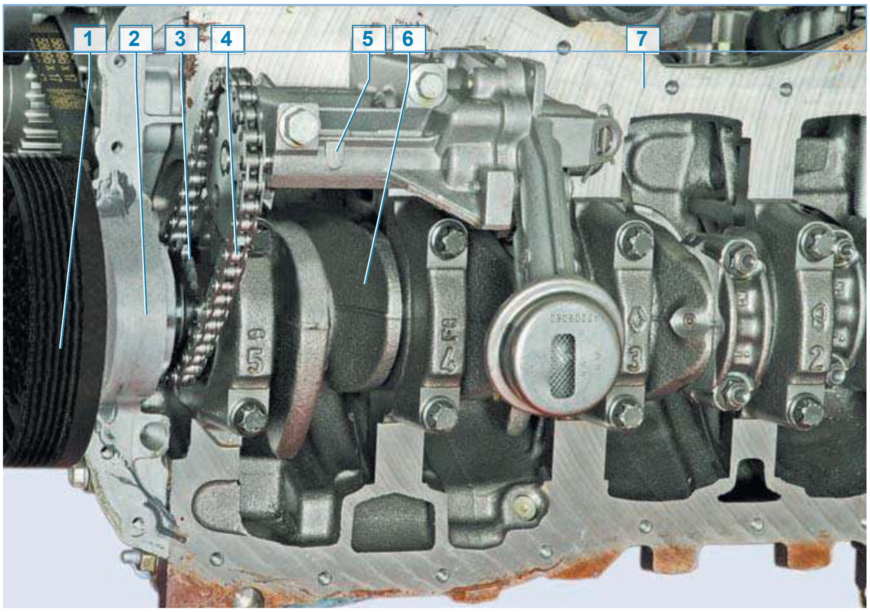
The outer support journal of the camshaft (flywheel side) has a groove in which a thrust flange is inserted to prevent axial movement of the shaft. The thrust flange is attached to the cylinder head



Flywheel: **1** - crankshaft position sensor crown; **2** - engine starting crown



Cylinder block head (head cover removed): 1 - cylinder head fastening screw; **2** - camshaft support; **3** - valve spring; **4** - valve plate; **5** - breadcrumbs; **6** - lock nut; **7** - adjusting screw; **8** - bracket; **9** - **camshaft** pulley; **10** - valve rocker; **11** - **valve rocker** axle mounting bolt; **12** - valve rocker axle; **13** - camshaft thrust flange.

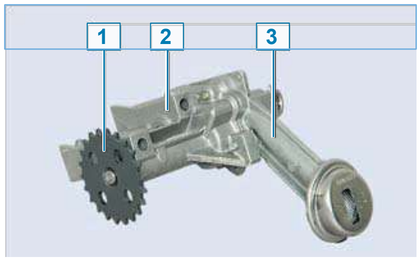


Oil pump drive (crankcase pan removed): 1 - auxiliary units drive pulley; **2** - cylinder block front cover; **3** - pump drive sprocket; **4** - drive chain; **5** - oil pump; **6** - crankshaft; **7** - cylinder block.

with two screws. The valve rocker arm axle is bolted to the camshaft supports from above with five bolts. The rocker arms are secured against movement along the axis

two brackets, which are fastened by bolts fixing the axis of the rocker arms. There are screws screwed into the rocker arms, which are used for adjusting the heat-

The valve actuator clearances.



Oil pump: 1 - driven drive sprocket; **2** - pump casing;
3 - pump casing cover with oil reservoir

The adjusting screws are secured against loosening with lock nuts. The valve seats and valve guide sleeves are pressed into the cylinder head. The valve guide sleeves are fitted with oil deflector caps on top. The valves are steel, arranged in two rows, inclined to the plane passing through the cylinder axles. There is a row of exhaust valves at the front (in the direction of the vehicle) and a row of intake valves at the rear. The intake valve plate is larger than the exhaust valve.

The valve is opened by a rocker arm, One end rests on the camshaft cam and the other end rests on the end of the valve stem via the adjusting screw. The valve is closed by the spring. The lower end of the spring rests on a washer and the upper end on a plate, which is held in place by two knuckles. The folded nuts are truncated cone-shaped on the outside and have thrust flanges on the inside that enter the groove in the valve stem.

Engine lubrication - combined pressurized. The crankshaft main and connecting rod bearings and camshaft bearings are lubricated under pressure. Other engine components are lubricated by splash lubrication. The pressure in the lubrication system is created by a gear wheel.

The oil pump is located at the front in the crankcase sump and attached to the cylinder block. The oil pump is driven by a chain drive from the crankshaft.

The pump drive sprocket is mounted on the crankshaft under the front cover of the cylinder block. The sprocket has a cylindrical belt on which the front crankshaft oil seal runs. The sprocket is mounted on the crankshaft without tension and is not secured with a key. When the engine is assembled, the pump drive sprocket is clamped between the timing pulley and the crankshaft shoulder as a result of tightening of the component package by the auxiliary drive pulley bolt. The torque from the crankshaft is transmitted to the sprocket only by frictional forces between the end faces of the sprocket, toothed pulley and crankshaft.

! **If the auxiliary drive pulley bolt is loose, the drive sprocket of the oil pump drive may start to rotate on the crankshaft and the engine oil pressure will drop.**

The oil inlet is made in one piece with the cover of the oil pump housing. The cover is secured to the pump casing with five screws. The pressure reducing valve is located in the pump casing cover and is secured against falling out by a spring clip.

Oil from the pump passes through the oil filter and into the oil line in the cylinder block. The oil filter is full-flow, non-separable. The oil flows from the line to the crankshaft main bearings and then, through channels in the crankshaft, to the connecting rod bearings. The vertical channel in the cylinder block carries the oil
from the line is fed to the cylinder head
of the cylinder block to the center support
of the camshaft. In the middle bearing journal of the camshaft.

There is an annular groove in the camshaft, through which the oil passes to the hollow bolt securing the rocker arm axle. The oil then flows through the hollow bolt into the channel in the rocker arm axle and from there to the rocker arms and through the other hollow bolts securing the axle to the other camshaft supports.

There are holes in the rocker arms through which oil is sprayed onto the cams of the camshaft. The oil flows from the cylinder head through vertical channels into the engine oil pan.

The crankcase ventilation system is closed, forced, with gas extraction through an oil separator (in the cylinder head cover), which cleans the crankcase.
gases from oil particles . Gases from the bottom of the crankcase through internal passages in the cylinder head to the head cover and then through two hoses (main circuit and idle circuit) to the engine intake pipe.

The main circuit hose discharges carburetor gases at partial and full load to the space in front of the throttle valve.

The idle circuit hose discharges crankcase gases into the space behind the throttle valve both at part load, full load and idle speed.

The control, supply, cooling and exhaust systems are described in the respective chapters.

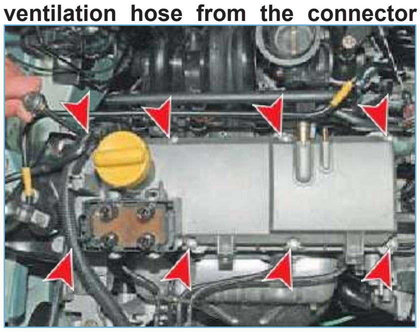
Replacing the head cover gasket
cylinder block

Replace the gasket if there is oil leakage at the cap joint with the cylinder head and each time the cover is removed. The work should be carried out on a cold engine.

Remove air filter (see "Removing the air filter", page 116).

Disconnect the engine-ECU wiring harness and high-voltage cable lugs from the ignition coil (see "Removing the ignition coil", page 110).

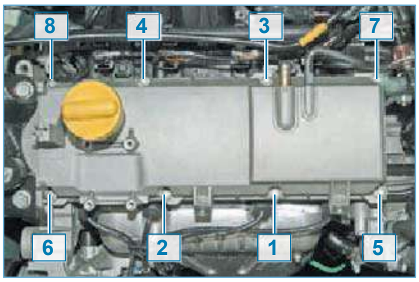
Disconnect the idle circuit crankcase ventilation hose from the connector



Unscrew the wo-
seven bolts securing the cylinder head cover.

Remove cylinder head cover with

Remove the cover gasket. After cleaning oil and dirt from the sealing surfaces of the cover and cylinder head, fit a new gasket and reassemble in reverse order. Tighten the cover bolts to the prescribed torque (see "Tightening the cover bolts"). "Appendices," p. 315) in the sequence indicated.



Tightening procedure for the m o u n t i n g bolts of the cylinder head cover.

Checking and adjustment of thermal clearances in the valve train

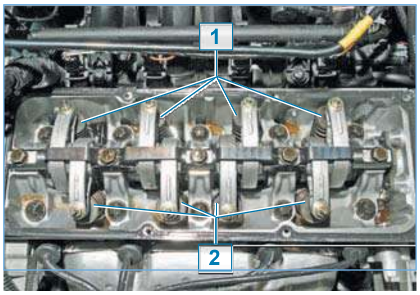
The work should be carried out if there is a characteristic " clattering" s o u n d in the cylinder head area.

at half the crankshaft speed. Knocks are mainly caused by wear of valve train components and the resulting increase in thermal clearances in the valve train. The knocks are clearly audible when the engine is running at idling speed.

It is also recommended to check the clearances when the vehicle has been driven more than 100,000 km.

The work must be carried out with the engine cold.

Remove the cylinder head cover (see "Replacing the cylinder head cover gasket", page 89).



Valve arrangement in the cylinder head: 1 - intake valve row; **2** - exhaust valve row

Remove the upper timing belt cover and set the piston of the first cylinder at TDC at the end of the compression stroke according to the mark on the timing pulley of the camshaft (see "Checking the condition and replacement of the timing belt of the 1.4-1.6 (8V) engine", page 34).

! **The cylinder count is from the master cylinder.**

Then alternately check and, if necessary, adjust the clearances in the intake and exhaust valves of the 1st cylinder. When checking (in this position of the crankshaft and camshaft), the heels of the rocker arms of these valves must face the backs of the cylindrical parts of the cams.

of the camshaft. The rocker arms can swing on the axle within the actuator clearance.

Use flat feeler gauges from the set to check the thermal clearance between the valve stem end faces and the adjusting screw.

The clearance must be within the limit 0.2$^{+0,05}_{-0,075}$ mm for inlet valves- and 0.4$^{+0,05}_{-0,075}$ mm - for the outlet ones.

The stylus should move in the gap with a slight force.

If the gap value (feeler gauge thickness) differs from the required value....

... loosen the lock nut of the adjusting screw with a 10 mm spanner, holding the screw by the flats (3 mm wide) with an adjustable wrench.

Then, turning turn the adjusting screw to set the desired clearance. Tighten the lock nut while holding the adjusting screw with a wrench. Again check the gap and if necessary Repeat the adjustment. Successively turn the crankshaft c l o c k w i s e by the auxiliary drive pulley bolt 180° to check and, if necessary, adjust the thermal clearances in the valve train of cylinders 3, 4 and 2. After adjusting the thermal clearances in the valve train, install the removed parts in reverse order.

Replacement of the distributor oil seal shaft

It is convenient to assess the condition of the camshaft oil seal and, if necessary, replace it during the timing belt inspection service.

The work is carried out on the inspection station.

help of-

or an overpass.

Replace the oil seal if there are traces of engine oil under the timing pulley or on the timing belt.

If an oil leak is detected through the camshaft oil seal, it is advisable to replace the timing belt, as oil on the belt and the toothed pulleys of the camshaft and crankshaft will cause rapid belt failure. Before installing a new belt, the pulleys must be thoroughly wiped with a rag soaked in gasoline.

Remove the upper and lower timing belt covers and, turning the crankshaft, set the crankshaft and camshaft at the mark on the camshaft pulley to the TDC position of the 1st cylinder compression stroke (see "Checking the condition and replacement of the timing belt on the 1.4-1.6 (8V) engine", page 34).

Use a 16" socket to loosen the bolt securing the toothed camshaft pulley, keeping the shaft from turning with a power screwdriver inserted through the pulley hole in the recess in the cylinder head.

Remove the auxiliary drive belt (see "Replacing the auxiliary drive belt on the 1.4-1.6 (8V) engine", page 32).

By loosening the drive belt tension Remove the timing belt from the camshaft pulley (see "Checking the condition and replacing the timing belt on the 1.4-1.6 (8V) engine", page 34).

! **After removing the belt from the timing pulley of the camshaft, the crankshaft and camshaft must not be rotated in order to avoid disturbing the timing of the engine.**

Remove the camshaft toothed pulley mounting bolt....

...remove the pulley.

By prying up with a screwdriver...

...remove the oil seal from the cylinder head seat.

By applying a thin layer of engine oil to the working edge of the new packing...

... put the stuffing box on the toe of the camshaft.

Use a tool head or mandrel of a suitable diameter.

Install the toothed pulley on the camshaft so that the tab on the pulley fits into the groove on the toe of the camshaft.

Subsequent assembly is carried out in the same sequence.

Adjust the timing belt tension (see "Checking the condition and replacing the timing belt on the 1.4-1.6 (8V) engine", page 34).

Replacing the exhaust manifold gasket

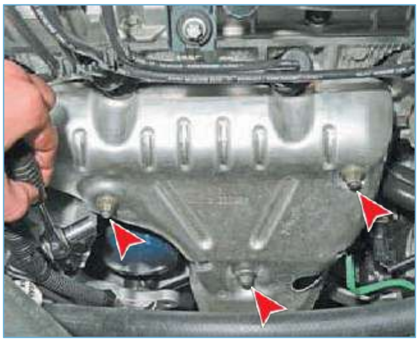
This work is carried out when replacing the gasket or when repairing the engine by removing the exhaust manifold.

The work is carried out on an inspection trolley or trestle.

Junction between the exhaust manifold and the head stock plane

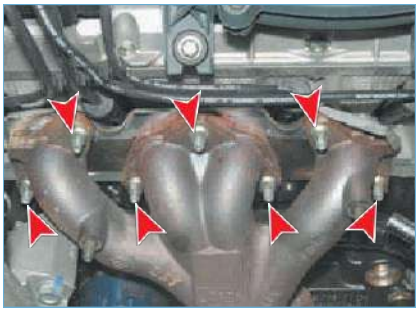
The cylinder block is sealed with a thin metal gasket.
If the gasket is burnt or the exhaust manifold mounting nuts are loose, exhaust gases may escape through this connection, accompanied by a characteristic sound. If the defect cannot be eliminated by tightening the exhaust manifold mounting nuts, the gasket must be replaced. To do this, remove the

connect the intake pipe from the out-
The exhaust manifold (see "Removing the exhaust system", page 132).
Before loosening the nuts of the heat shield fasteners, wet the threaded connections with the studs with a penetrating liquid such as WD-40.



Unscrew the three nuts securing the heat shield with a 10 mm socket.

...and remove the screen.
Use a penetrating fluid such as WD-40 to lubricate the threaded connections of the nuts and studs securing the exhaust manifold.
After waiting about 5 minutes....



...using a 10" head, unscrew seven nuts securing the exhaust manifold
of the manifold.

Removing the insulation shield...

... and exhaust manifold gasket.
Before installation, clean the sealing surfaces of the cylinder head and exhaust manifold of soot.

After installing the new gasket, reassemble in reverse order. Before tightening the exhaust manifold mounting nuts, apply graphite grease to the cylinder head studs.

Replacing the front crank oil seal shaft

Replace the front crankshaft oil seal if there are signs of oil leakage on the engine crankcase pan wall or under the auxiliary drive pulley. The work is carried out on an inspection pit or trestle.
Remove the timing belt (see "Checking the condition and replacing the timing belt").
The "1.4-1.6 (8V) Engine Mechanism", p. 34).

The crankshaft and camshaft must not be rotated after the belt has been removed, so as not to disturb the gas distribution phases of the engine.

toothed crankshaft pulley with a screwdriver....

... and remove the pulley from the toe of the crankshaft.

screwdriver....

... remove it from its seat in the front cover of the cylinder block.

Apply a thin layer of engine oil to the working edge of the new oil seal....

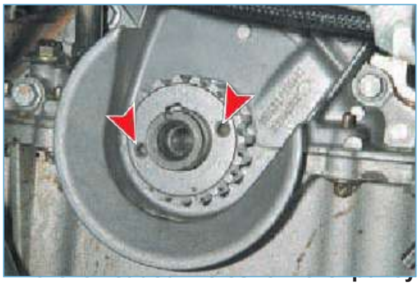
... press in the gland with a tool head or a piece of pipe of suitable size.

Press the oil seal in to the same depth as the old oil seal.

When installing the toothed pulley, the key in the bore of the pulley (which acts as a key) must be....

...enter the groove on the toe of the crankshaft.

That said...



end must face outwards.

Further assembly is carried out in the reverse order.

Adjust the timing belt tension (see "Checking the condition and replacing the timing belt on the 1.4-1.6 (8V) engine", page 34).

Replacing the rear oil seal of the crankshaft shaft

Replace the rear crankshaft oil seal if the engine oil consumption is high and there are signs of oil leakage at the engine crankcase sump connector with the coupling crankcase.

The work is carried out on an inspection trolley or trestle.

Remove gearbox (see "Removing the gearbox", page 189), clutch cover and clutch plate (see "Removing the clutch parts", page 184).

Mark the position of the master cylinder in relation to the crankshaft with a marker.

Screw the transmission mounting bolt into the threaded hole in the cylinder block and secure the flywheel against turning with a slotted power screwdriver (or assembly spatula) by inserting it between the flywheel teeth and resting it on the bolt.

Using a 17" head, loosen the seven bolts securing the flywheel....

...and remove the flywheel.

Use a slotted screwdriver to pry up the oil seal.

...remove it from its seat.

Apply a thin layer of engine oil to the working edge of the new oil seal. Place the oil seal on the crankshaft flange and use a thin slotted screwdriver to gently thread the oil seal onto the crankshaft.

the working edge of the gland on the flange.

Using the old oil seal as a support, press in the new oil seal. Install the flywheel according to the previously set marks. Before tightening the flywheel mounting bolts, apply thread sealant to the threaded part of the bolts. Screw in and evenly tighten

Tighten the bolts to the prescribed torque (see "Tightening the bolts"). "Appendices," p. 315).
Further assembly is carried out in the reverse order.

Replacing the sensor for the low oil pressure warning switch

Replace the sensor when it fails.
The sensor is screwed into a hole in the lower part of the front wall of the cylinder block below the spark plug of cylinder 1.
Press the locking mechanism on the pad retainer.

...disconnecting the block from the sensor.

With a wrench or high head unscrew the sensor with a "22".

The sensor connection to the cylinder unit is sealed with an aluminum ring.

When installing the sensor, screw it into the cylinder block bore by hand and tighten with a tool. Connect the wiring harness to the sensor.

Replacing crankcase oil pan gasket

The crankcase oil pan gasket should be replaced if oil leaks at the junction between the oil pan and the cylinder block and whenever the oil pan is removed during engine repair.
The work is carried out on an inspection trolley or trestle.
The operations are shown on a vehicle with ABS and air conditioning.
Remove the power unit protection. Drain the engine oil.
Disconnect the intake pipe from the exhaust manifold. Remove the rear support for the power unit. Remove the three screws securing the front bumper to the subframe (see "Removing the front bumper on Logan", page 286).
Unscrew the rear subframe mounting bolts by 3 to 4 turns (see "Unscrewing the rear subframe mounting bolts").
Remove the subframe (see "Removing the subframe", page 204). Remove the bolts securing the two subframe brackets to the body (see "Removing the arm", page 203) and the bolts securing the front subframe to the body (see "Removing the subframe", page 204) and lower the front subframe on the adjustable strut.

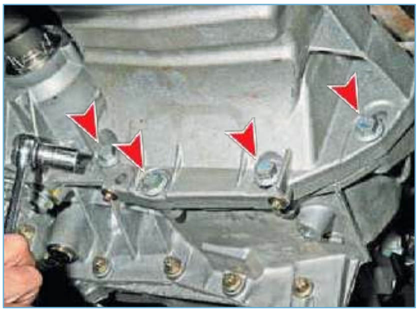
Unscrew the nut of the bolt securing the power steering tube bracket to the cylinder block using a 13" socket while holding the bolt against turning with a wrench of the same size.

Unscrew the bolt securing the bracket of the hydraulic power steering tube to the air conditioner compressor bracket with a 13" socket.

Use a 13" head to loosen the bolt securing the crankcase pan to the air conditioner compressor bracket.

Unscrew the nut securing the power steering tube bracket to the subframe using a 10 mm wrench on the left side of the subframe.

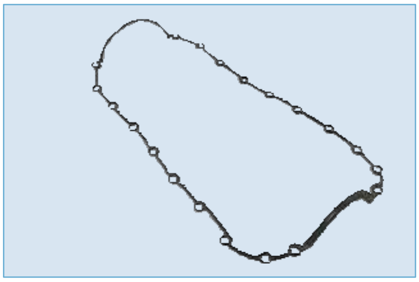
Remove the hydraulic power steering tube bracket from the stud.



Use a 13" socket to loosen the four bolts securing the oil pan to the gearbox.

Unscrew 20 bolts securing the oil pan to the cylinder block with a 10 mm socket.

Pulling the subframe down, remove the crankcase pan and remove it from behind the subframe.

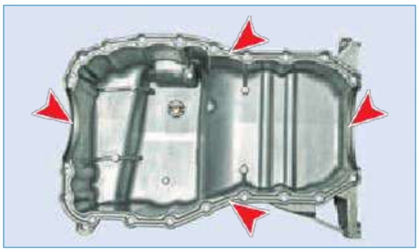


Remove the sealing strip from the grooves in the crankcase oil pan.

Clean sealing surfaces of the cylinder block and crankcase oil pan from residual sealant and oil.

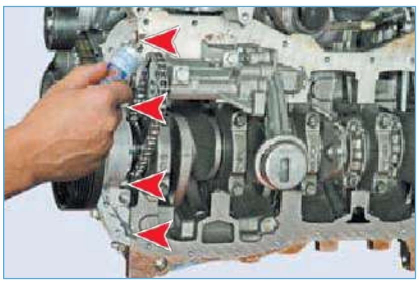
Clean the inside of the crankcase oil pan with kerosene.

Laying a new gasket....



...into the grooves of the crankcase pan.

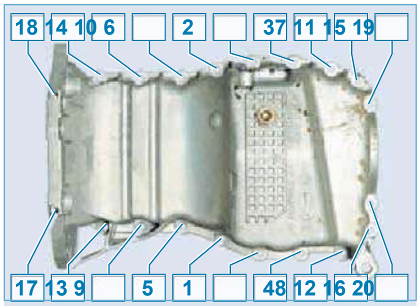
Before installing the crankcase pan, we apply a thin coat of sealant....



...in the area of the front cylinder cover (for clarity, shown with the engine removed).....

...and in the area of the 1st main bearing cap.

Install the crankcase oil pan and tighten the crankcase oil pan retaining bolts.



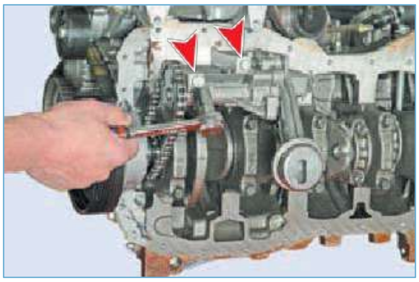
Tighten the crankcase oil pan mounting bolts to the prescribed torque (see "Appendices", page 315) in the following order.

Further assembly is carried out in the reverse order.

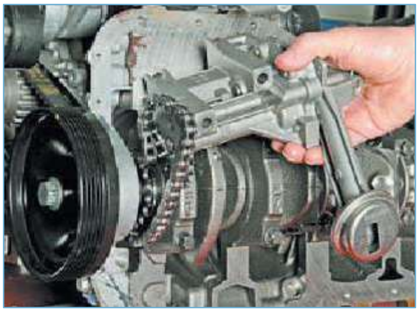
Removing the oil pump

One of the causes of low engine oil pressure (determined by illumination of the low oil pressure warning lamp in the instrument cluster) may be a malfunction of the oil pump. This defect may be caused by clogging of the oil inlet screen, malfunction of the pressure reducing valve, damage or severe wear of the pump components. In this case, the pump must be removed and inspected. If the oil inlet strainer is dirty, it must be cleaned and flushed with gasoline. The pump must also be dismantled if the drive chain is changed, if the chain has become too long and makes a characteristic noise when the engine is running.

The work is carried out on an inspection trolley or trestle.
Take off oil pan crankcase (see "Removing the crankcase pan").
"Replacing the oil pan gasket", page 94).



Use a 13" head to loosen the two bolts securing the oil pump to the cylinder block (for clarity, shown on the removed engine)....



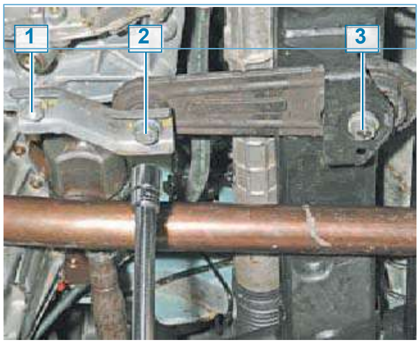
...and disengage the pump sprocket from the drive chain.
Remove the oil pump.
Before installing the pump, clean the oil from the pump and cylinder block mating surfaces.
Install the oil pump in reverse order. Tighten the pump mounting bolts to the prescribed torque (see "Appendices", page 315).

Replacement of power unit supports

Replace the support if the rubber is torn or peeled from the metal parts of the support, which may cause knocking when starting the engine or driving over bumps.
The work is carried out on an inspection trolley or trestle.

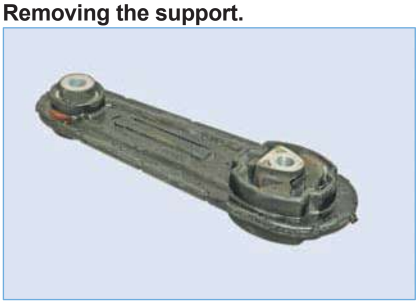
Replacing the rear support

Remove the power unit protection (see "Removing the power unit protection", page 283).



Using a "na 18" nut loosen the tightening of bolt 1 securing the support bracket to the transmission crankcase, loosen bolt 2 securing the support to the transmission crankcase and bolt 3 securing the support to the subframe.

Removing the support.



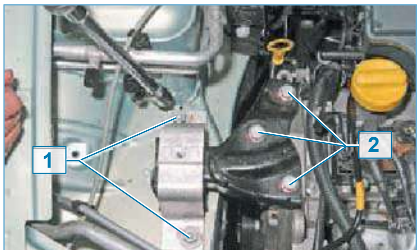
Rear support of the power unit

Install the rear support of the power pack in reverse order.

Replacing the right support

Remove the power unit protection (see "Removing the power unit protection", page 283).

Place a jack under the crankcase pan.
To prevent damage to the drip tray, place a thick rubber pad or a block of wood under the drip tray.



Using a 16" socket loosen two bolts 1 securing the support bracket to the body and three bolts 2 securing the support bracket to the upper timing belt cover.

Remove the right support assembly.
If necessary...

... with the assembly spatula, push out....

... and remove the bracket from the support cushion.

Install the right support in the reverse order.

Replacement of the left support

Remove the battery (see "Removing the battery", page 248). Remove the power unit protection (see "Removing the power unit protection", page 283). Place a jack under the gearbox as described above for removing the right support.

Use a 16" socket to loosen the two bolts securing the support bracket to the gearbox.

The third bolt securing the support bracket to the gearbox is located under the battery shelf.

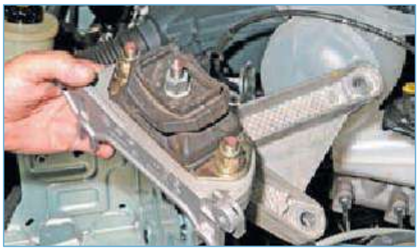
Unscrew it with a 16" head with PTO joint through the hole in the battery shelf.

Under the battery shelf, loosen the front bolt of the upper support bracket upper mounting bracket to the spar using a 13" head with high taper.

Unscrew the rear bolt of the upper support bracket upper attachment to the support member located behind the battery shelf using a 13" socket.

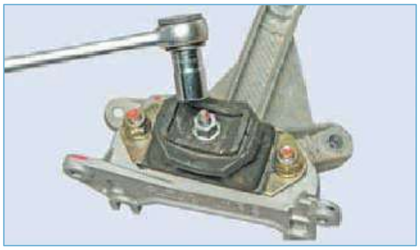
Under the battery shelf, loosen the two bolts of the lower support bracket mounting bracket to the support member by 2-3 turns using a head "for 13" with a high extension.

Location of holes in support bracket mounting bracket to member (shown on removed support): 1 - upper mounting holes; **2** - lower mounting holes

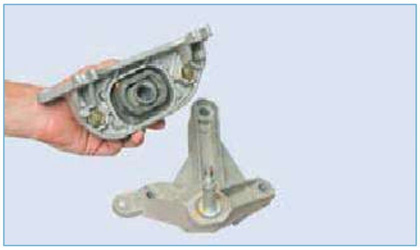


Remove the left-hand support of the power-aggregate assembly.

If necessary...



...unscrew the nut securing the support to the bracket with a 16" head....



...and remove the support from the bracket.

Take out rubber out of the support.

By unscrewing two nuts with a "18" head....

...remove the support cushion.

Parts of the left power unit support

Install the left-hand power unit support in reverse order.

Removing and installing the engine or power unit

The work is carried out if the engine needs to be repaired or replaced.
If work is carried out on an inspection trench or trestle, the engine should be removed from the engine compartment upwards using a lifting device, having previously removed the gearbox.
In a garage equipped with a lift, it is more convenient to remove the entire power unit downwards from the engine compartment and then disconnect the engine and transmission.
Engine and power unit disassembly operations are shown for a vehicle with power steering and air conditioning.
Remove the battery (see "Removing the b a t t e r y ", page 248). Drain engine oil (see "Changing the oil and oil filter in the 1.4-1.6 (8V) engine", page 30) and coolant (see "Changing the engine coolant", page 248).

1.4-1.6 (8V)", page 38). Disconnect the exhaust intake pipe from the exhaust manifold. manifold (see. Disconnect the exhaust system intake pipe from the exhaust manifold (see "Removing the exhaust system", page 132). Disconnect the fuel pipe tip from the fuel rail connector (see "Removing the fuel rail and injectors", page 117). Disconnect lug cable from the intermediate throttle lever (see "Replacing the throttle cable", page 121). Disconnect brake vacuum check valve tube from engine inlet line connector (see "Removing the brake vacuum check valve", page 231).
Disconnect the adsorber purge tube.
Remove the inlet pipe from the inlet pipe connection (see "Removing the inlet pipe, replacing the gaskets", page 119).
Remove the power steering reservoir from the upper cross member of the radiator frame. Disconnect power steering tube bracket

of the steering unit from the cylin- (see "Replacing the tray gasket"). on the crankcase", page 94). Loosen the bolts securing the power steering pump to the engine bracket (see "Removing the power steering pump" p. 219) and, without disconnecting the tube and hose from the pump, tie the pump to the upper cross member of the radiator frame with a cord or wire so that it does not interfere with engine dismantling.
Remove the alternator (see "Removing the alternator, replacing the voltage regulator and rectifier unit on the 1.4-1.6 (8V) engine", page 248). Disconnect wires from starter (see "Removing and inspecting starter", page 251).
Loosen the bolts securing the air conditioner compressor to the bracket (see "Removing the air conditioner compressor", page 313) and, without disconnecting the air conditioning system pipes, take the compressor aside and tie it up so that it does not interfere with engine removal.

Remove the cooling system radiator (see "Removing the radiator", page 128). Disconnect the cooling system hoses from the thermostat housing, cylinder head exhaust pipe and coolant pump pipe.
Disconnect the engine management system harness from the ignition coil, idle speed regulator, fuel injectors, adsorber purge solenoid valve and sensors: oxygen concentration, detonation, absolute air pressure, inlet air temperature, oil underpressure alarm, coolant temperature, crankshaft position, throttle position (see relevant sections).
Pull the wiring harnesses away from the engine-
I'm gonna have to move aside.
If the engine is to be removed from the engine compartment upwards using a lifting device, the engine must first be removed.

gearbox (see "Removing the gearbox", page 189).
Lift the hood and hold--
We keep it in the upright position. Secure the chains of the lifting device....

... by the motor brackets (arrows).

With the chains tightened, remove the stop from under the engine that supported it when the transmission was removed.
On the right power unit support, remove the holder for the adsorber tube and pull the tube to the side, remove the stretching bar and loosen the two bolts securing the right support to the body (see "Replacing the power unit support", page 96).

Before removing the engine, once again check that all hoses, pipes, wires are disconnected from the engine and set aside.

Using a lifting device, lift and remove the engine from the engine compartment.

If the work is carried out on a lift and the power unit is removed downwards, it is not necessary to dismantle the alternator - only disconnect its cables. It is a l s o possible not to dismantle the power steering pump and air conditioner compressor from the engine, but only disconnect pipes and hoses from them (respectively see "Removal of power steering pump and air conditioner compressor"). "The air conditioning compressor and the power steering pump can also be removed from the engine.

air conditioner spring", page 313). When dismantling the power unit, perform the following operations instead of removing the transmission.

Remove front wheel drive u n i t s (see "Removing the front wheel drive units", page 194) and subframe (see "Removing the subframe", page 204).

Disconnect clutch release cable from clutch release fork and bracket on gearbox (see "Replacing the clutch release cable", page 183).

Disconnect the transmission control rod from the gearshift rod (see "Removing the transmission control rod", page 188).

Disconnect mass wires and wiring harness from gearbox (see "Removing the gearbox", page 188).

Remove speed sensor
speed sensor (see
"Removing the speed sensor").
"Removing the speed sensor", page 110). Disconnect harness
Disconnect the wiring harness from the reversing light switch (see "Removing the reversing light switch", page 261).

Place adjustable stops or a sturdy table under the engine and transmission. Remove the right power unit support (see "Replacing the power unit supports", page 96).

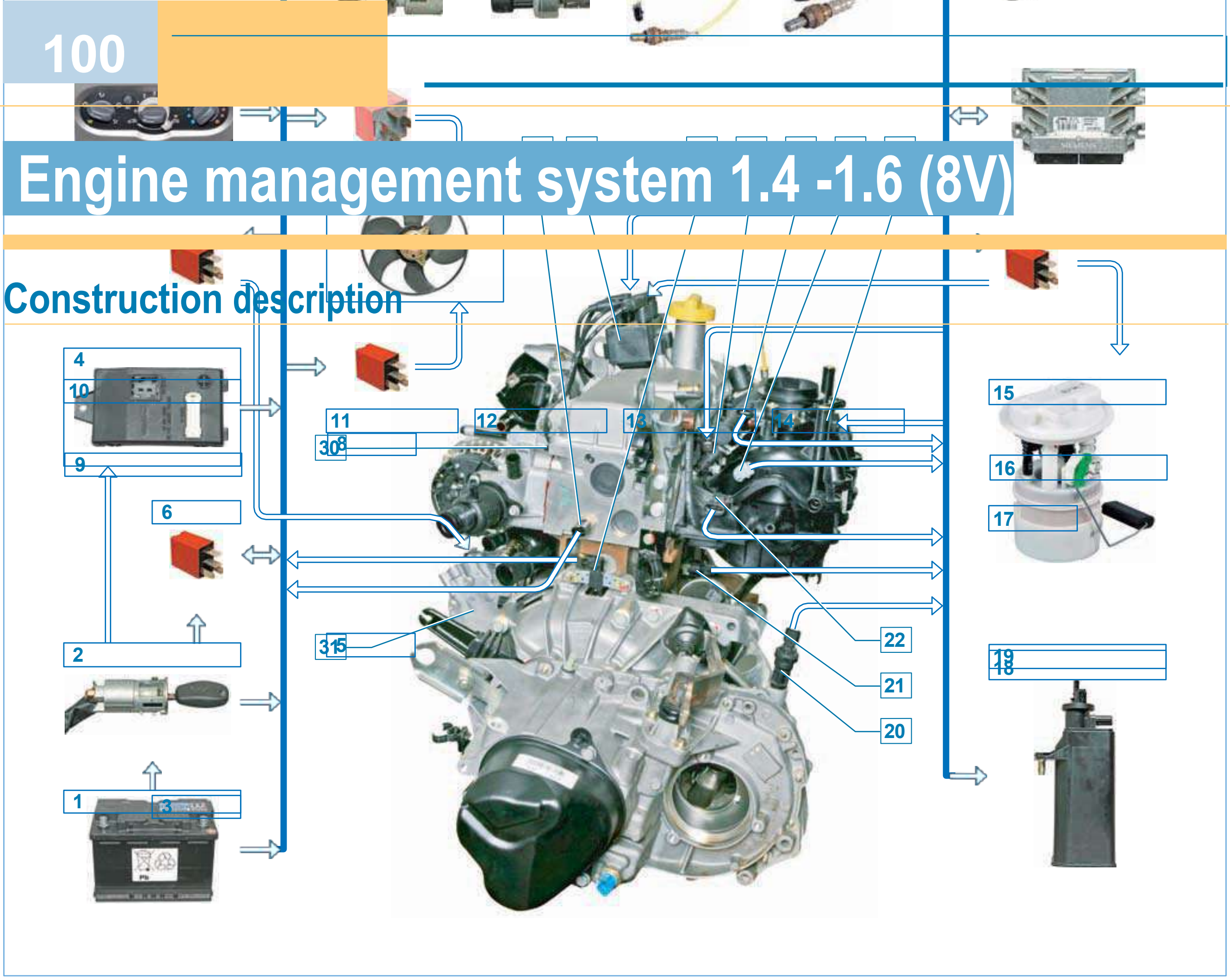
Unscrew nut securing the left power unit support to the support bracket (see "Removing the gearbox", page 189).

While raising the vehicle on a lift or lowering the power unit on adjustable stops, remove the stud of the left support bracket from the hole in the support cushion.

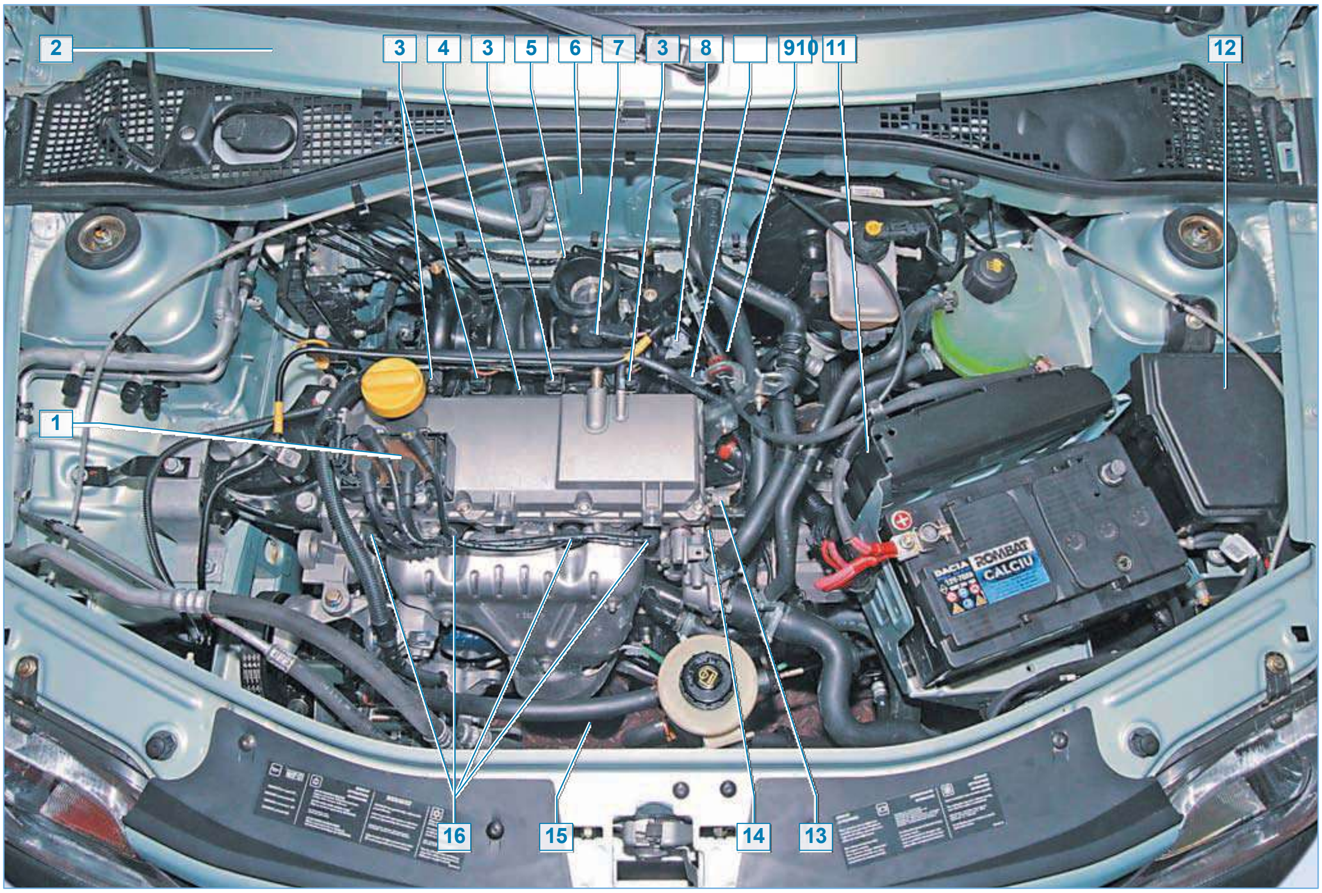
Remove the power pack. Install the engine or power pack to the vehicle in reverse order.

Engine management system 1.4 -1.6 (8V)

Construction description



Schematic diagram of the electronic engine control system: 1 - battery; **2 -** ignition switch; **3 -** main relay; **4** - switching unit; **5** - cooling system fan low speed relay; **6** - air conditioner on-off relay; **7** - fan; **8 -** cooling system fan high speed relay; **9** - ventilation, heating and air conditioning control unit; **10** - instrument cluster; **11 -** refrigerant pressure sensor; **12 -** power steering pressure sensor; **13 -** control oxygen concentration sensor; **14 -** diagnostic oxygen concentration sensor **15** - diagnostic connector (diagnostic block); **16** - electronic engine control unit; **17** - fuel pump and ignition coil power relay; **18 -** fuel module; **19 -** gasoline vapor recovery system adsorber; **20 -** vehicle speed sensor; **21 -** detonation sensor; **22 -** absolute air pressure sensor; **23** - idle speed regulator; **24 -** inlet air temperature sensor; **25** - throttle position sensor; **26** - injector; **27 -** crankshaft position sensor; **28** - ignition coil; **29** - coolant temperature sensor; **30 -** spark plug; **31** - air conditioner compressor.



Elements of the electronic engine control system (ECS): 1 - ignition coil; 2* - diagnostic connector; **3** - injectors; 4* - detonation sensor; **5** - idle speed regulator; **6*** - diagnostic oxygen concentration sensor; **7** - throttle position sensor; **8** - inlet air temperature sensor; **9** - absolute air pressure sensor; **10*** - vehicle speed sensor; **11** - electronic engine control unit; **12** - fuse and relay box in the engine compartment; **13** - coolant temperature sensor; **14*** - crankshaft position sensor; **15** - control oxygen concentration sensor; **16*** - spark plugs.

* The item is not visible in the photo.

The engine is equipped with an electronically controlled distributed fuel injection system (separate injector for each cylinder) and an exhaust gas reduction system.

The engine management system consists of the electronic engine control unit (ECU), engine and vehicle sensors and actuators.

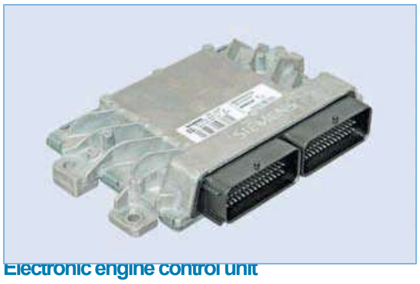
The ECU is a special purpose mini-computer, it consists of an operational memory RAM and a programmable permanent memory ROM.

The RAM is used to temporarily store current information on engine operation (measured parameters) and calculation data. The engine-ECU takes the initial data for processing from the RAM. Codes for faults that occur are also stored in the RAM. This memory is energy-dependent, i.e. its contents are deleted when the electrical supply is interrupted (battery disconnected or wiring harness disconnected from the ECU).

The ROM stores the control program The engine control system contains a sequence of operating commands (algorithms) and calibration commands (algorithms).

The ROM determines the most important parameters of engine operation: torque and power changes, fuel consumption, ignition advance angle, exhaust gas composition, etc. The ROM determines the most important parameters of engine operation: torque and power, fuel consumption, ignition advance angle, exhaust gas content, etc. The ROM is non-volatile, i.e. the contents of its memory are not changed when the power supply is disconnected.

The ECU is mounted on the rear wall of the battery compartment. The ECU processes information from the control system sensors, receives signals from the switch and the air conditioner refrigerant pressure sensor, power steering pressure sensor and the air conditioning pressure sensor



Electronic engine control unit

The ECU also controls actuators such as the fuel pump, fuel injectors, ignition coil, idle speed regulator, electromagnetic adsorber purge valve, cooling fan, engine overheat alarm, air conditioning compressor solenoid clutch, and various relays in the system. When the ignition is switched on, the ECU outputs a control signal to the main relay and when the ignition is switched off, it delays switching off the main relay for the time required to prepare for the next switch-on (to complete calculations, set the idle speed regulator, control the cooling fan).
The ECU also performs a diagnostic-
The ECU determines whether there are any faults in the control system and stores fault codes in its memory. The ECU detects the presence of faults in the control system components and stores fault codes in its memory. When a malfunction is detected, in order to avoid negative consequences (piston burnout due to detonation, damage to the catalytic converter in case of ignition misses of the fuel-air mixture, exceeding the limits for toxicity of exhaust gases, etc.), the ECU switches on the malfunction indicator in the instrument cluster and switches the system to emergency operation modes. The ECU activates the malfunction indicator in the instrument cluster and switches the system to emergency modes.

The ECU uses substitute data stored in ROM to control the engine.
Indicator lamp The engine-ECU malfunction indicator is located in the instrument cluster. If the system is correct, when the ignition is switched on

the signaling lamp lights up and then
The alarm indicator lights up and then goes out - thus the ECU pro-
If the warning light illuminates when the engine is running, it indicates that the on-board diagnostic system has malfunctioned and the vehicle is in emergency mode. If the warning light illuminates while the engine is running, the on-board diagnostic system has detected a fault and the vehicle will continue to run in emergency mode. Do not operate the vehicle with the warning light illuminated or flashing in the instrument cluster. It is permissible to drive the vehicle independently (in this case some engine performance parameters may deteriorate - power, speed, fuel economy) to a workshop to eliminate the malfunction. If the malfunction is temporary, the ECU will switch off the warning lamp after 10 s, provided that there are no other fault codes in the block memory that require switching on the warning lamp. The fault codes remain in the ECU memory and can be read out using a diagnostic tool connected to the diagnostic socket.

Diagnostic connector (cover removed)

The diagnostic connector is located in the instrument panel dashboard duffel box. The connector is covered with a plastic cover.

Crankshaft position sensor

The crankshaft **position sensor (CCPS) is** mounted on the clutch card, above the engine flywheel.
The sensor provides the ECU with information on the speed and angular position of the crankshaft. The sensor is of the inductive type and reacts to the teeth on the flywheel passing close to its core. The teeth are arranged on the disk at 6° intervals. In order to synchronize with the TDC of pistons 1-4, one tooth out of 60 is cut to form a depression and one tooth is double. When the double tooth and the trough pass the sensor, the sensor generates what is known as a "double tooth".
"reference" synchronization pulse
The rotation of the flywheel changes the magnetic flux in the magnet wire of the sensor - AC voltage pulses are induced in its winding. When the flywheel rotates, the magnetic flux in the sensor magnet wire changes - AC voltage pulses are induced in the sensor winding. Based on the number and frequency of these pulses, the ECU reads the phase and duration of the injector and ignition coil control pulses.
If the DPKV or its circuits fail, the engine will not run.

Coolant temperature sensor

The coolant temperature sensor (coolant temperature sensor) is

mounted in the left end of the head unit

The sensor provides information on the coolant temperature to the ECU and the overheating alarm and coolant temperature indicator in the instrument cluster. The sensor provides information on the coolant temperature to the ECU, the overheating alarm and the coolant temperature indicator in the instrument cluster.
The sensor is a thermistor with a negative temperature coefficient, i.e. its resistance decreases as the temperature rises. The ECU supplies the sensor with a stabilized voltage of +5 V and calculates the coolant temperature based on the voltage drop across the sensor.

If the sensor or its circuits fail, the ECU calculates the predicted throttle position from the crankshaft speed, absolute pressure and inlet air temperature.

Detonation sensor

the duration of the fuel injection pulse based on such parameters as air flow rate, crankshaft speed, coolant temperature and throttle position. The ECU adjusts the fuel supply to the injectors on the basis of a signal from the ECU on the presence of oxygen in the exhaust gases so that the composition of the exhaust gases is optimal for efficient operation of the catalytic converter. The oxygen contained in the exhaust gases, after entering into the che-

are used in most engine control functions.

The engine control functions are

The difference between the sensor and the electrodes of the sensor creates a reaction

used in most engine control functions.
If the sensor or its circuits malfunction, the ECU switches the cooling fan to constant operation and calculates the temperature value using a bypass algorithm.

Throttle valve position sensor

The throttle position sensor (TPMS) is mounted on the throttle valve axle and is a sensor of the tensiometric type.
On one end of its winding, the winding is

The detonation sensor (DS) is screwed into the threaded hole in the rear wall of the cylinder block, in the area of the 3rd cylinder.
The piezoceramic sensor element generates an AC voltage signal, the amplitude and frequency of which correspond to the engine vibration parameters. When detonation occurs, the amplitude of vibrations of a certain frequency increases. The ECU adjusts the ignition advance angle to cancel detonation.

Oxygen concentration sensor

potentials at the sensor output, varying approximately from 100±100 mV to 800 mV.
±100 mV. A low signal level corresponds to a lean mixture (presence of oxygen) and a high signal level corresponds to a rich mixture (absence of oxygen). When the UDCC is cold, the sensor output signal is absent because its internal resistance is very high - several Mohms (the engine management system operates on an open circuit). For normal operation, the oxygen concentration sensor must have a temperature of at least 300 °C, so a heating element controlled by the ECU is built into the sensor for rapid warm-up after the engine is started. As it warms up, the resistance of the sensor

is given from the ECU a stabilized voltage of +5 V

+5 V voltage, and the other

The ECU sends a message to the driver's license plate. The ECU is sending

is connected to the ground of the ECU. The third pin of the potentiometer (half-bounce) provides the signal to the ECU. The ECU periodically measures the output voltage of the remote control signal to determine the current throttle position for calculating the ignition advance angle and the duration of fuel injection pulses and

for controlling the idle speed regulator.

The oxygen concentration control sensor (OCCS) is installed in the intake pipe of the exhaust system upstream of the catalytic converter. The sensor is a galvanic current source whose output voltage depends on the oxygen concentration in the environment surrounding the sensor. The ECU calculates

The ECU continuously outputs a stabilized reference voltage to the sensor circuit. Until the sensor warms up, the ECU controls the injection system without considering the sensor voltage. As soon as the sensor warms up, the ECU disables sensor heating and starts to take into account the oxygen sensor signal to control the fuel supply in ignition mode.

The oxygen concentration sensor can be "poisoned" by the use of leaded gasoline or the use of sealants containing high levels of toxic substances during engine assembly. The oxygen sensor can be "poisoned" by the use of leaded gasoline or the use of sealants containing large quantities of highly volatile silicon (silicon compounds) during engine assembly.
Silicone vapors may
through the venting system-
The presence of lead or silicon compounds in the exhaust gases can lead to exhaust emissions. The presence of lead or silicon compounds in the exhaust gases can lead to the escape of
If the sensor fails. If the sensor or its circuitry fails, the sensor must be replaced.
The ECU enters the corresponding fault code into its memory and controls the fuel supply by open loop.
The diagnostic oxygen concentration sensor (DCOS) is installed in the exhaust gas pipe after the catalytic converter. Its function is to diagnose (evaluate the performance) of the catalytic converter and to perform a second, more precise control of the fuel-air mixture enrichment (slow-rate control system). The signal generated by the sensor indicates the presence of oxygen in the exhaust gases after the catalytic converter.

of the neutralizer. If the neutralizer neutralizer is working normal,
the readings of the diagnostic sensor will differ from those of the control sensor (at a constant vehicle speed, the voltage at the sensor outputs should vary within the range of 600±100 mV, and lower when the vehicle slows down
200 mV). The principle of operation of the diagnostic sensor is the same as that of the control


Vehicle speed sensor

The sensor is driven from a gear mounted on the differential gearbox. The sensor is driven from the pinion mounted on the differential gearbox. The principle of operation of the speed sensor
is based on the Hall effect.
The sensor provides the ECU with a direct-

The number of sensor pulses is proportional to the distance traveled by the vehicle. The number of sensor pulses is proportional to the distance traveled by the vehicle. The ECU determines the vehicle speed from the frequency of the pulses. If the sensor or its circuits fail, the ECU stores a fault code in its memory.


Absolute air pressure sensor

oxygen sensor, but the sensors are not interchangeable. **The sensor speed sensor The vehicle speed sensor** (VSA) **is** mounted on top of the map.

The ECU takes the voltage into account when calculating the amount of air entering the engine.
If the sensor or its circuits fail, the ECU stores a fault code in its memory.


Inlet air temperature sensor

The air temperature sensor (ATS) **is** installed in the intake pipe on the left-hand side (in the direction of travel of the vehicle).
The sensor is a thermistor with a negative temperature coefficient, i.e. its resistance decreases as the temperature rises. The sensor changes its resistance depending on the air temperature in the inlet air pipe. The ECU takes the information from the sensor into account when calculating the fuel-air mixture and adjusting the ignition advance angle. If the sensor or its circuits fail, the ECU stores a fault code in its memory.
The ignition system is included in the co--

The engine control system consists of a coil and a coil
The absolute air pressure sensor (AAP) is installed in the intake pipe on the left-hand side (in vehicle direction of travel). The sensor contains a sensitive piezo element and a load cell. variable resistor.
The ECU supplies a stabilized voltage of +5 V to the sensor resistor.
The sensor piezo element reacts to changes in pressure (vacuum) in the

inlet pipe and changes the reference voltage applied to the load resistor. This change

The system does not require maintenance and adjustment during operation, except for replacement of spark plugs. The system is maintenance and adjustment free during operation, except for the replacement of spark plugs.

The four-wire ignition coil is a block of two coils.

The ECU controls the current in the primary coil windings depending on the engine operation mode. The spark plug wires are connected to the terminals of the secondary (high-voltage) coil windings: to one coil - 1st winding.


ignition coil

and 4th cylinders, to the other cylinders 2nd and 3rd. Thus, the spark fires simultaneously in two cylinders (1-4 or 2-3) - one at the end of the compression stroke (working spark) and the other at the end of the exhaust stroke (idle spark). The ignition coil is non-disassembled and must be replaced if it fails.


Spark plug

Spark plugs with 4-10 kOhm noise suppression resistor. Spark plug electrode gap 0.9-1.0 mm, hexagonal key size 16 mm. Due to the constant current direction in the secondary windings of the coil, the spark formation current for each pair of plugs working simultaneously always flows from the center electrode to the side electrode for one plug and from the side electrode to the center electrode for the other.

The fuel injection system relays and fuses are located in a mounting block in the engine compartment (see "Electrical equipment", page 240).

Control system operation

When the ignition is switched on, the ECU activates the control system: switches on the fuel pump to build up the required pressure in the fuel ramp and processes the signals from the coolant temperature and throttle position sensors to calculate the fuel-air mixture when the engine is started.

I'm not going to be able to do that. If, during that time.
crankshaft rotation
the starter has not started, the ECU via
2 s switches off the fuel pump and switches it on again after starting to turn.

When the engine is running, the ECU processes information from sensors (crankshaft position, throttle position, coolant temperature, absolute air pressure, intake air temperature, vehicle speed, oxygen concentration in exhaust gases, refrigerant pressure, power steering pressure). The ECU controls the operation of injectors, ignition coil, idle speed regulator depending on the engine operation mode.

the air intake valve , the adsorber purge valve,
cooling fan
When the engine is running. When the air conditioning is switched on, the ECU increases the engine crankshaft speed at idling speed and signals the air conditioning compressor clutch to engage.

The ECU calculates the ignition advance angle depending on engine speed, engine load and coolant temperature.

The mixture composition is controlled by the duration of the control pulse to the injectors - the longer the pulse, the greater the fuel output and vice versa.

Under normal engine operating conditions, fuel injection takes place

The ECU uses information from the crankshaft position sensor to determine the NPT of pistons 1 and 4 as well as 2 and 3 cylinders. For this purpose, the ECU uses information from the crankshaft position sensor, which determines the VMT of pistons 1 and 4, as well as 2 and 3 cylinders. The system does not have a camshaft position sensor (phase sensor). The ECU therefore uses the following to determine which of the two cylinders should be injected.

The following algorithm. Each time the engine is parked, the ECU memory is filled with
The last injector activated is detected and when the engine is restarted, this injector is commanded first. If fuel is not injected into the cylinder at the start of the intake stroke, the ECU switches on the test program and determines the correct injection timing. If there is no signal from the crankshaft position sensor (the crankshaft is not rotating or the sensor and its circuits are defective), the ECU switches off the fuel supply to the cylinders. The fuel supply is also cut off when the ignition is switched off, preventing the mixture from igniting spontaneously in the engine cylinders.
During engine braking

(with gear engaged and coupling engaged) when the throttle is closed.

alternately, each time the engine is running

The engine is fully closed and the engine crankshaft speed is high. is high, fuel injection fuel injection is not carried out to reduce exhaust emissions. If the voltage drops, the ECU increases the energy storage time in the ignition coil (for reliable ignition of the fuel mixture) and the duration of the injection pulse (to compensate for the increase in the injector opening time). If the on-board voltage increases, the energy storage time in the ignition coil and the duration of the injector pulse decreases.
The ECU controls the switching on of the electric
cooling fan

(via relay) depending on engine temperature, crankshaft speed and air conditioning operation (if fitted). The cooling fan is switched on if the coolant temperature exceeds the permissible value.

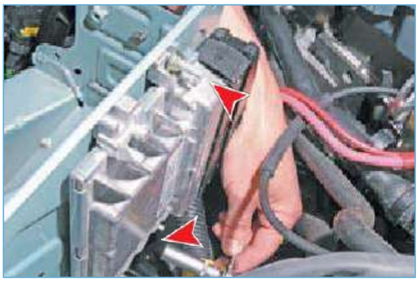
When servicing or repairing the engine management system, always switch off the ignition (in some cases it may be necessary to disconnect the wire terminal from the battery minus terminal). When carrying out welding work on the vehicle, disconnect the engine-ECU wiring harness from the ECU. Remove the ECU before drying the vehicle in the drying room (after painting). Do not disconnect or adjust the engine-ECU wiring harness pads while the engine is running.

Do not start the engine if the battery terminals and the earth lead lugs on the engine are loose or dirty. Do not start the engine if the battery terminals and the earth cable lugs on the engine are loose or dirty. The ECU contains electronic components that can be damaged by static electricity, therefore do not touch its terminals with your hands.

Removing the electronic control unit

The unit must be removed for replacement or when performing vehicle repair operations that may cause damage to the electronic components of the unit (e.g. drying the vehicle in a dryer after painting, etc.).

Disconnect the lead terminal from the negative terminal of the battery.



Unscrew the two nuts securing the ECU with a tall "10" head.

Remove the ECU from the bracket studs.

Slide up the engine management system wiring harness retainer.

Disconnect wiring harness from ECU connector and remove ECU from engine compartment.

The wiring harness connector must be protected against the ingress of

The following table shows the type of the device to be used.

Install the electronic engine control unit in reverse order.

Removing the crankshaft position sensor

Remove the sensor for inspection or replacement.

Remove the air intake hose from the air filter connection (see "Removing the air filter", page 116).

With the ignition off, unclip the engine-ECU harness harness retainer and disconnect the harness harness from the crankshaft position sensor.

Allen wrench or socket head

"Loosen the two bolts securing the sensor (for clarity, shown with the power unit removed).

Remove the crankshaft position sensor.

Install the crankshaft position sensor in reverse order.

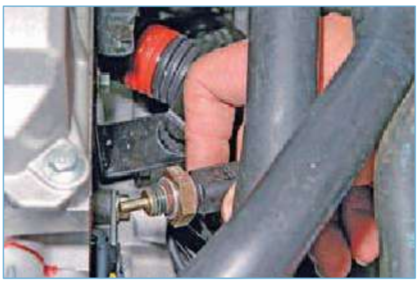
Removing the coolant temperature sensor

Remove the coolant temperature sensor for replacement. Do this when the engine is cold.
When the ignition is switched off, release the retainer of the engine-ECU wiring harness.

... and disconnect the wiring harness from the air temperature sensor.

of the coolant.

tightening of the sensor....



... unscrew the sensor from the hole in the cylinder head....
...and cover the hole in the cylinder head with your thumb, what-

The sensor connection to the cylinder head is sealed with an aluminum washer

to prevent the coolant from leaking.
Install the coolant temperature sensor in reverse order. Check and, if necessary, adjust the coolant level in the expansion tank.

Removing the position sensor throttle valve

Remove the throttle position sensor for replacement.
Remove the air filter (see "Removing the air filter", page 116).
With the ignition off, unlatch the engine control wiring harness retainer and disconnect the engine control wiring harness.
If the vehicle is not equipped with a throttle position sensor, the vehicle is not equipped with a throttle position sensor.

Use a Torx T-20 wrench to loosen the

Remove the sensor from the throttle body axle.

Install the sensor in r e v e r s e order. Before installing the sensor, make sure that the throttle valve is fully closed.

Removing the detonation sensor

Remove sensor for inspection and replacement.
The work is carried out on an inspection trolley or trestle.
Remove the power unit guard (see "Removing the power unit guard").
gata," p. 283).
With the ignition off...

...pushing down on the wire lock....

... and disconnect the engine-ECU harness from the sensor.

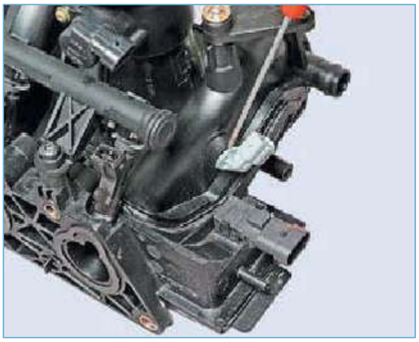
Use a 24 mm open-end wrench to unscrew the...

... and remove the detonation sensor.
Before installing the sensor, clean the surface of the cylinder block where the sensor is to be installed.
Install the detonation sensor in reverse order and tighten it with the prescribed torque.

Removing the air temperature sensor inlet

Remove the sensor to replace a defective rubber sealing ring or the sensor itself. With the ignition off, press t h e wire clamp on the engine-ECU harness connector.

... and disconnect the harness harness from the sensor.



Pry up the sensor with a slotted screwdriver and, overcoming the resistance of its plastic clips (for clarity, shown on the removed intake pipe)...

t h e inlet pipe.
If the ring is damaged in the form of cracks and breaks, or if the elasticity of the ring is lost, the ring must be replaced with a new one.
Replace the ring with a new one.
When installing the sensor, enter the sensor
The clips are inserted into the corresponding holes in the inlet pipe.

The sensor connection to the inlet pipe is sealed with a rubber ring

Removing the absolute air pressure sensor

The sensor is removed to replace defective rubber sealing rings or the sensor itself.
With the ignition off...

...use a screwdriver to pry off the engine management system wiring harness retainer....

...and disconnect the wiring harness plug...
from the sensor.
By prying up the sensor with two slotted det-
If the inlet pipe is not open, push it out of the inlet pipe opening....

... and remove the sensor (for clarity, shown with the inlet pipe removed).
If the rings are damaged in the form of cracks and tears or if the elasticity of the rubber band is lost, replace the rings with new ones.

The sensor is sealed with two rubber rings

Install the absolute air pressure sensor in reverse order.

Removing the oxygen concentration sensors

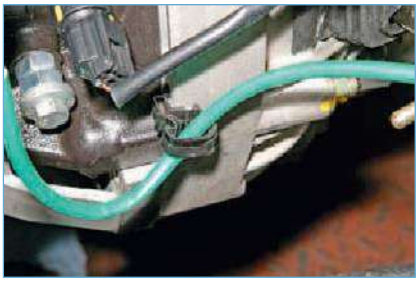
Remove sensors for replacement or when dismantling the exhaust system. Perform work when exhaust system components are cold.

Removing the oxygen concentration control sensor

In the engine compartment with the ignition off.

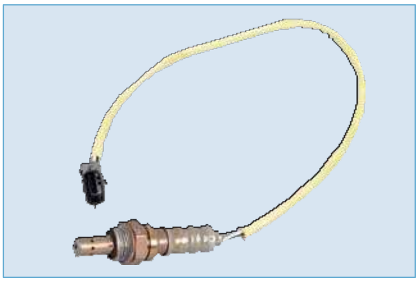
...unlock the engine-ECU harness latch....

... and disconnect the wiring harness from the sensor wiring harness.



Unfasten the plastic cover and remove the sensor wiring harness.

sensor from the opening in the intake pipe.



... and remove sensor. Install the control oxygen sensor in the reverse order. Before installing the sensor, apply a thin film to the sensor threads. thin thin layer Before installing the sensor, apply a thin layer of graphite grease to the sensor threads to prevent it from entering the sensor through the hole in the sensor tip. Tighten the sensor with the prescribed torque (see "Appendices", page 315).

Removing the diagnostic oxygen concentration sensor

The work is performed on an inspection tent or overpass. From underneath the vehicle with the ignition off, unlock the engine control harness connector block.

... disconnect the wiring harness from the sensor wiring harness.

from the holder attached to the heat shield.

By passing the sensor wiring harness through the ring of a "for 22" ring wrench...

... unscrew the sensor from the threaded hole in the pipe.

Install the diagnostic oxygen concentration sensor in reverse order. Before installing the sensor, apply a thin layer of graphite grease to the sensor threads to prevent it from entering the sensor through the hole in the sensor tip. Tighten the sensor to the prescribed torque (see "Appendices", page 315).

Removing the speed sensor

Remove the vehicle speed sensor for replacement and when dismantling the transmission.
Remove the air filter (see "Removing the air filter", page 116). For clarity, the operation is shown from underneath the vehicle.
With the ignition off...

...press the locking tab (red) of the engine-ECU wiring harness....

... and disconnect the harness harness from the sensor.

Use a slotted screwdriver to pry off the sensor.
...and, overcoming the resistance of its two latches, push the sensor out of the hole in the clutch crankcase trough.

The speed sensor is sealed in the clutch housing by two rubber rings

Installing speed sensor in in reverse Install the speed sensor in reverse order. If there are cracks or b r e a k s i n the sensor O-r i n g s , replace the O-rings with new ones. When installing the sensor, orient the sensor so...

... so that its pawls engage in the side holes of the clutch crankcase counterbore (second hole on the other side of the counterbore).

Removing the ignition coil

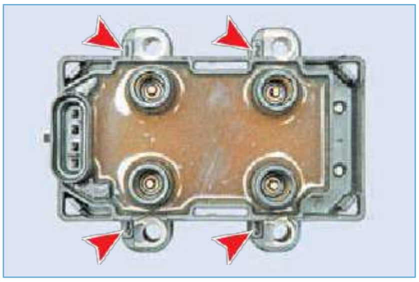
Remove the ignition coil for replacement or engine repair. When the ignition is switched off, release the retainer of the engine-ECU wiring harness.

... and disconnect the harness harness from the ignition coil.

Remove the high-voltage cable lug from the ignition coil lead.
Remove the lugs of the other high voltage wires in the same way.

Use a Torx T-30 wrench to loosen the three screws securing the ignition coil to the cylinder head cover.

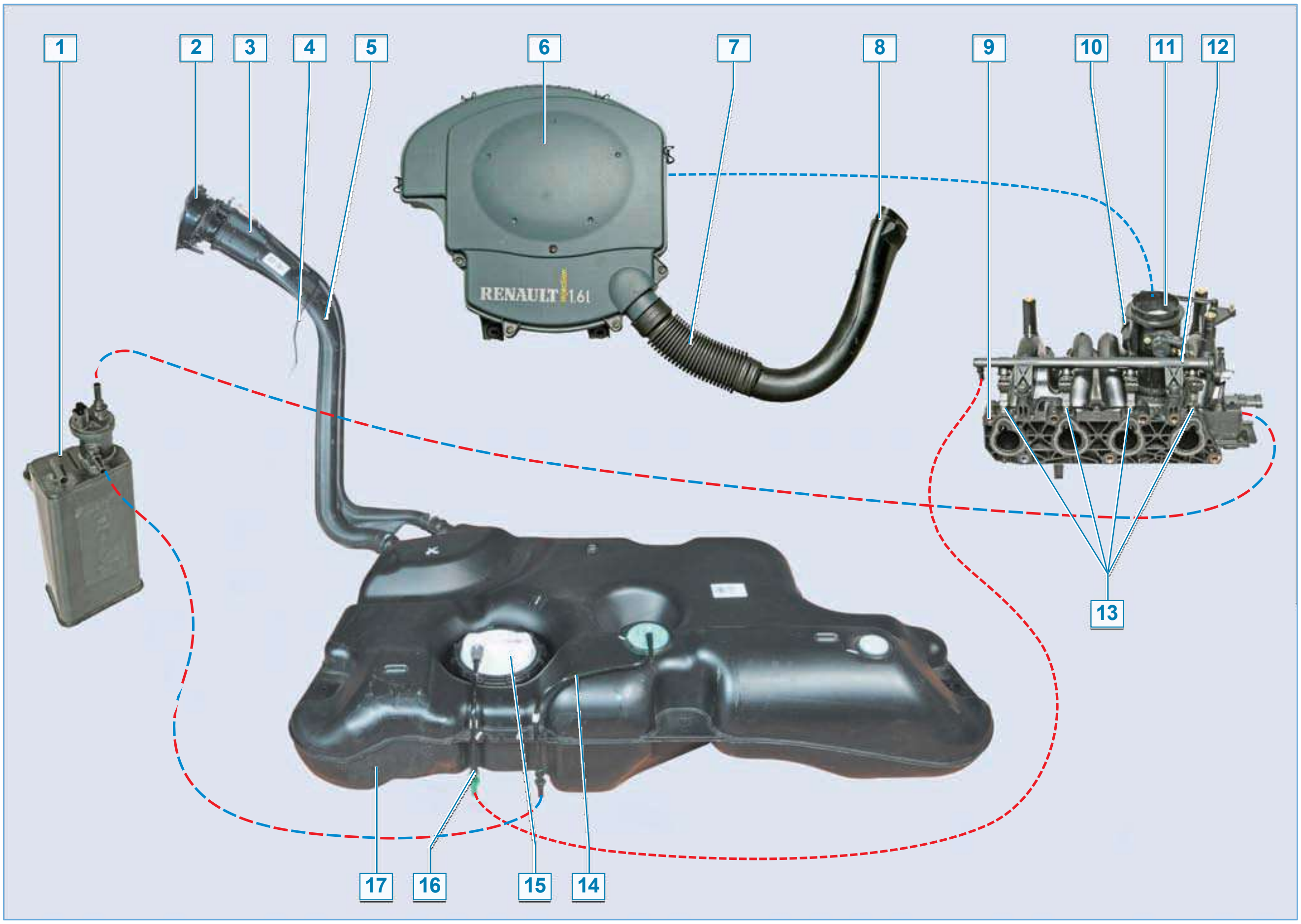
...and remove the ignition coil. Install the i g n i t i o n coil in reverse order.



Connect the high-voltage cables to the coil terminals in accordance with the cylinder numbers marked on the coil body.

Engine power supply system 1.4-1.6 (8V)

Construction description



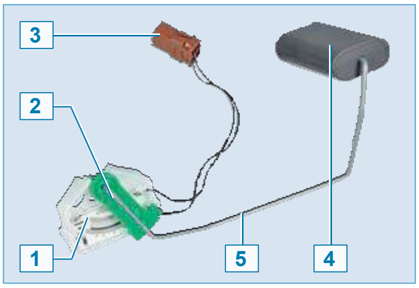
Elements of the power supply system: 1 - adsorber; **2 -** filler neck; **3 -** fuel tank ventilation pipe; **4 -** "mass" wire; **5** - filler pipe; **6 -** air filter; **7** - air intake hose; **8** - air intake; **9** - intake pipe; **10** - idle speed regulator; **11** - throttle unit; **12** - fuel ramp; **13** - injectors; **14** - fuel vapor supply pipe to adsorber; **15** - fuel module; **16 - fuel** supply pipe to ramp; **17** - fuel tank.

The fuel is supplied from a tank located under the underbody in the rear seat area. The fuel tank, filler pipe and vent tube are made of plastic. The filler pipe and vent tube are connected to the tank connections in a non-separable manner. In the upper part of the filler pipe there is a throat, which is attached to the cuso-w. The vent tube is used to remove air displaced from the tank during refueling. The fuel **module** including fuel pump, fuel pressure regulator, fuel filter and fuel level gauge is installed in the fuel tank. For coarse fuel purification, a strainer is installed at the inlet of the module.

For access to the fuel module there is a hatch in the underbody of the vehicle under the rear seat cushion.

The fuel level sensor is attached to the fuel module housing. The fuel level sensor is a variable resistor whose resistance depends on the float movement. The sensor controls

Fuel module: 1 - cup; **2** - fuel filter; **3** - module cover; **4** - fuel level gauge; **5** - float



Fuel level gauge sensor: 1 - resistor; **2** - slider; **3** - sensor wiring block; **4** - float; **5** - float lever

Fuel pump

The fuel pump is located inside the fuel module housing. The **fuel pump is** located inside the fuel module housing. The pump is electric, submersible, rotary. It is switched on by the ECU when the ignition is switched on and delivers fuel into the line at a pressure (approx. 6.0 bar) higher than the working pressure in the ramp.

Fuel passing through the pump lubricates and cools the pump during operation. Therefore do not operate the pump even for a short time if there is no fuel in the tank. The fuel pump must have a fuel capacity of at least 60 l/h.

The fuel is pressurized from the pump to the fuel filter. The fuel filter is part of the fuel module and must only be replaced together with it. It is designed to clean fuel from mechanical impurities with a fineness of up to 10 microns.

The fuel pressure regulator is an integral part of the fuel module and must be replaced together with it if it fails. The fuel pressure in the fuel sump should be approx. 3.2 bar with the ignition on and the engine not running.

The **fuel rail is** a plastic tube on which the nozzles are mounted. The ramp is attached to the inlet pipe with two screws. There is a connector on the right side of the ramp to which the fuel supply line is connected.

The fuel is pressurized into the interior of the frame and from there into the intake pipe via **nozzles.**

Fuel ramp with nozzles

Fuel injector

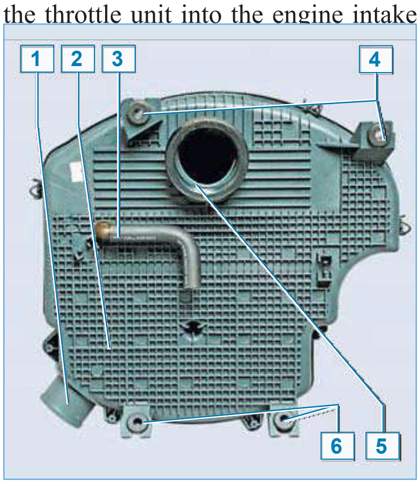
The injector outlet is equipped with an atomizer with four holes through which fuel is injected into the inlet pipe channels. The injectors are controlled by the ECU. The injectors are sealed in the ramp and inlet pipe with rubber rings and secured to the ramp with metal brackets. If the winding is open or short-circuited, the injector must be replaced.

Air is supplied to the throttle

The air intake, the corrugated plastic hose and the air filter are connected to the engine unit.

The air filter is mounted on top of the engine with four screws. The filter element is paper. The filter housing has a neck at the bottom, which is attached to the throttle body connection. The main crankcase ventilation circuit hose is also connected to the filter housing connector from below.

After the filter, the air flows through the throttle unit into the engine intake



Bottom view of the air filter:
1 - air inlet pipe to air filter; **2** - **filter** housing; **3** - crankcase ventilation main circuit hose connector; **4** - filter attachment points to inlet pipe;
5 - throat for connection with the throttle unit pipe; **6** - points for fixing the filter to the cylinder head cover

Throttle unit: 1 - throttle valve position sensor; **2** - flange of connection with air filter; **3** - housing; **4** - throttle valve; **5** - air supply channel to idle speed regulator; **6** - flange of connection with inlet pipeline; **7** - throttle valve drive lever; **8** - idle speed regulator.

throttle unit is made of high-strength, The throttle unit is made of high-strength, heat-resistant plastic and consists of a throttle body (with channels in it) on which the idle speed regulator and throttle position sensor are mounted. Throttleunit is mounted on the inlet pipe.

When the accelerator pedal is depressed, the throttle valve opens, changing the amount of air entering the engine (fuel supply is calculated by the ECU depending on the air flow rate).

When the engine is idling (throttle closed), the ECU controls the air supply via the idle speed regulator.

The idle speed regulator (idle speed control) is a stepper electric motor with a micrometer screw (valve). The valve's shut-off element (needle) changes the channel cross-section and provides air flow control bypassing the throttle valve.

Idle speed regulator

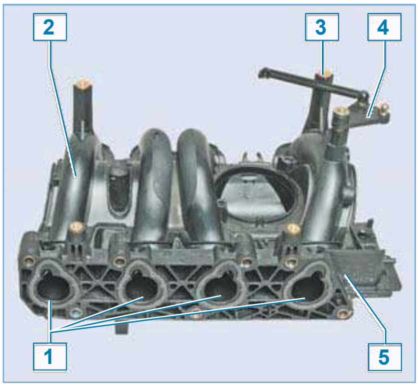
The throttle valve is opened. To increase crankshaft speed at idling speed, the ECU provides a control signal to open the valve, increasing the air flow bypassing the throttle valve, and vice versa, to reduce speed, it provides a command to close the valve. When the engine is braked, the throttle valve closes sharply and the RCC increases the air flow bypassing the throttle valve, resulting in a leaner fuel mixture. This reduces emissions of hydrocarbons and carbon monoxide. The throttle control is non-disassembling and must be replaced if it fails.

After passing through the throttle assembly, the air is fed into the **inlet pipe** made of high-strength heat-resistant plastic.

The air is transported from the common cavity of the intake pipe - the air receiver - to the intake ducts of the cylinder head via four separate ducts molded into the pipe. In order to ensure that the engine cylinders are filled with air in the same way, the intake ducts are approximately the same length.

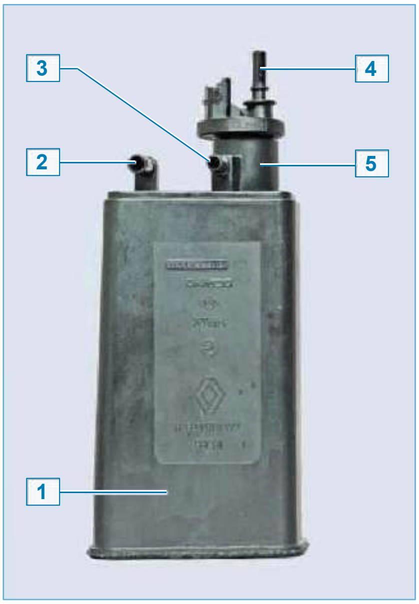
The fuel vapor recovery system used in the supply system includes an adsorber, electromagnetic adsorber purge valve, connecting pipes and hoses.

Fuel vapors from the tank enter the **adsorber** (mounted under the front bumper, in front of the right-hand bumper).



Inlet piping elements:
1 - air supply channels to the cylinder; **2** - receiver; **3** - throttle actuator rod; **4** - intermediate lever of throttle actuator; **5** - sealing gasket

The second connection of the adsorber is connected to the atmosphere through the arrowhead, where it is absorbed by the sorbent (activated carbon). The second connection of the adsorber is connected to the atmosphere. A solenoid valve for blowing the adsorber is mounted on top of the adsorber. The valve connector is connected to the inlet pipe with a plastic tube.



Adsorber elements: 1 - adsorber; **2** - air inlet fitting; **3** - fuel vapor inlet fitting from the tank;
4 - solenoid valve fitting;
5 - solenoid valve

When the engine is stopped, the purge solenoid valve is closed and the adsorber is not connected to the intake pipe. The ECU, controlling the solenoid valve, purges the adsorber after the engine has been running for a preset period of time since switching to closed loop fuel control mode (oxygen sensors must be warmed up to the required temperature). The valve connects the adsorber cavity with the inlet pipe and the sorbent is blown: gasoline vapors are mixed with air and discharged into the inlet pipe and further into the engine cylinders. The higher the engine air flow rate, the longer the ECU control pulses and the more intensive the purging.

Checking the components of the power supply system

See "Troubleshooting", page 55.

Removing and disassembling the fuel module

The fuel module must be removed if any of its components fail. The fuel pump, strainer or fuel level gauge sensor is replaced for road repairs and in the absence of original spare parts.

In the passenger compartment, lift up the rear seat cover.

By prying up with a screwdriver...

...lift the fuel filler flap cover

Release the lock...

...and disconnect the wiring harness from the fuel module cover.

The next step is to depressurize the supply system. To do this, start the engine. The engine will stop after a few seconds due to lack of fuel. The system pressure is released. Switch off ignition.

Press the clips on the fuel pipe lug to remove it from the fuel module cover connector.

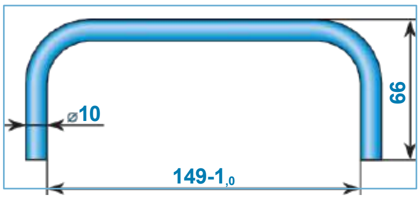
The fuel module is secured in the tank by a clamping ring screwed onto the tank neck. The fuel module is secured in the tank with the clamping ring screwed onto the tank neck.

Using the troughs of the hole cut in the cousin's floor panel, push the ring by the tabs counterclockwise with the mounting spatula.

The procedure may have to be repeated several times by pressing the different tabs around the circumference of the ring. This must always be done when assembling the ring when screwing it in.

Remove the clamping ring.

When the tank is removed, a simple tool made from a metal bar in the form of a bracket can be used to unscrew the clamping ring.



Tool for unscrewing the clamping ring

Remove the fuel module O-ring by sliding it over the module cover.

Remove the fuel module from the tank by withdrawing the float of the fuel level sensor from the opening in the fuel tank.

Drain residual fuel from the fuel module into a previously prepared container. Cover the opening in the fuel tank with heavy paper or polyethylene.

The fuel module cannot be disassembled further. The vehicle is designed to replace the entire module if any of its components fail. However, it is possible to clean the fuel pump inlet strainer, replace the fuel level gauge or fuel pump in the event of an emergency.

Disconnect the fuel level gauge wiring harness from the connector on the inside of the fuel module cover.

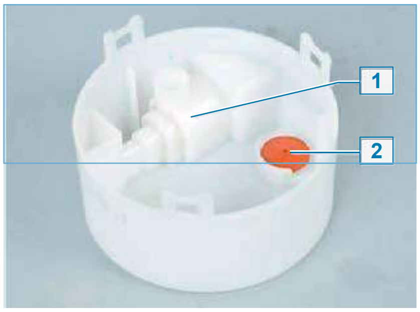
Release retainer of the fuel gauge sensor.

Remove the fuel level gauge sensor.

Use a screwdriver to release the three cup retainers.

... and remove the cup from the filter housing.

The fuel pressure regulator channel connection is sealed with a rubber ring.



Fuel pressure regulator 1 and counter pressure valve 2 are installed in the cup.

Pull and remove the strainer from the fuel filler nozzle.

It can now be rinsed or replaced.

Use a screwdriver to pry off the fuel module cover retainer....

...and pull back the lid....

...releasing the spring.

Disconnect the fuel pump wiring harness from the connector on the inside of the fuel pump.
On the right side of the fuel cap module.

Remove the fuel pump from the fuel filter.
Heating the plastic corrugated tube on the pump connection with a jet of boiling water from a kettle....

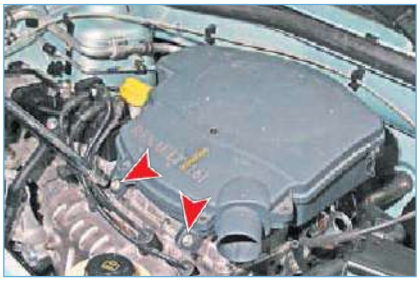
... remove the pipe from the pump connection. Reassemble and install the fuel tank in reverse order.

When installing the fuel module in the tank, the arrow on the module cover must be opposite the mark on the tank.
Place the fuel pipe on the module cover piece until the rod clips click into place. At the end of the work, switch on the ignition and check the tightness of the fuel pump module connections.

Removing the air filter

Remove the air filter to access the intake pipe, throttle assembly, fuel ramp with injectors and engine block head cover.

Remove the air intake hose from the air filter connection.



Using an E-12 head, loosen the two screws securing the air filter housing to the cylinder head cover....

...and two screws securing the housing to the inlet pipe (the left-hand screw is not visible in the photo).

Lift up the filter housing to remove the

from the right holder on the body
Connect the plastic tube connecting the adsorber to the throttle body.

Lift the filter housing further up and disconnect the main crankcase ventilation hose from the connector on the cylinder head cover.

Pull the plastic adsorber pipe out of the left holder on the housing and remove the air filter assembly.

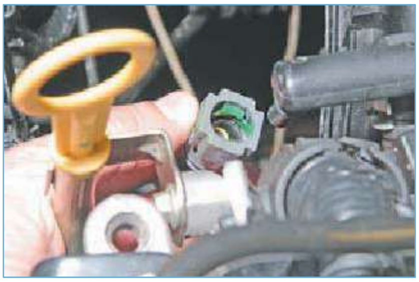
Remove the O-ring. Before installing the filter, inspect the rubber sealing ring at the connection between the filter housing neck and the throttle body connection. If the ring is damaged (tears, cracks) or has lost elasticity, it must be replaced.

Also check the condition of the rubber hose of the main crankcase ventilation circuit and replace the hose if there are any defects.

Install the air filter in reverse order.

Removing the fuel ramp and injectors

The fuel filler neck is removed for injector testing and replacement. Depressurize the fuel system (see "Removing and disassembling the fuel module", page 114). Disconnect lead from battery negative terminal. Remove the air filter (see "Removing the air filter", page 116).



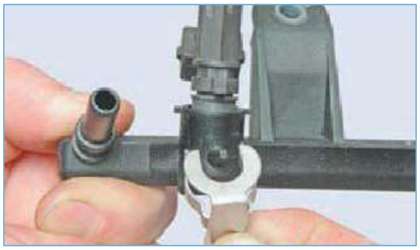
Press the clips to remove the fuel pipe end from the fuel filler flap connector.

Press the spring clip to disconnect the wiring harness from the nozzle.

Similarly, disconnect the wiring harnesses from the remaining injectors.

Use a Torx T-30 wrench to loosen the two screws securing the fuel ramp.

Sliding the fuel rail along the injector axes so that all injectors are out of their seats in the inlet pipe, remove the rail together with the injectors.



Remove the nozzle retainer.

Overcoming the resistance of the O-ring, remove the injector from the fuel filler neck.

The injector is sealed with two rubber rings: blue in the fuel sump and brown in the inlet pipe.

Remove the other nozzles in the same way.

Replace the O-rings with new ones.

Before installation, apply a thin layer of engine oil to the nozzle sealing rings.

Reverse the sequence of assembly and installation of the fuel frame with injectors.

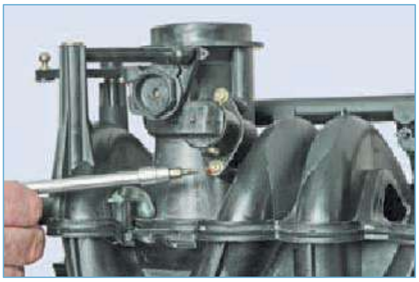
Removing the idle speed regulator

Remove the idle speed regulator (idle speed control) for replacement.

Disconnect the lead from the battery negative terminal. Remove air filter (see "Removing the air filter", page 116).

Disconnect the wiring harness from the idle speed regulator by releasing the catch.

Using a Torx T-20 wrench, unscrew two self-tapping screws securing the throttle valve to the throttle body.



For clarity, the operation is shown with the inlet pipe removed.

Remove idle speed regulator. Before installing the regulator, clean the valve seat, air duct and O-ring surface of the regulator in the throttle body.

The connection between the throttle valve and the throttle body is sealed with a rubber ring

Apply engine oil to the new regulator O-ring. Install the idle speed regulator in reverse order.

Removing the throttle assembly

Remove the throttle assembly to replace it (cracks, damage to the choke actuator lever), flush the idle speed channels and in case of damage to the rubber ring sealing the connection between the assembly and the inlet pipe line.
Remove the air filter (see "Removing the air filter", page 116).
With the ignition off, disconnect the engine management system wiring harness from the throttle position sensor (see "Removing the throttle position sensor", page 107) and the idle speed regulator (see "Removing the idle speed regulator", page 117).

Use a slotted screwdriver to pry up the tie rod end.

...disconnect the linkage from the throttle lever (for clarity, shown with the engine removed).

Using a Torx T-30 wrench, unscrew the self-tapping screw of the throttle assembly holder by 3 - 4 turns.

Remove the throttle assembly holder.

Remove the throttle body by overcoming the resistance of the rubber O-ring.

If necessary, remove the idle speed regulator and throttle position sensor from the throttle body.

Remove the O-ring from the throttle body.

If the O-ring has lost elasticity or is damaged, it must be replaced with a new one.

Install the throttle assembly in reverse order.

When installing the throttle assembly, orient it so...

... so that the tab on the inlet pipe wire fits into the groove on the body of the assembly.

Removal of inlet pipe, replacement of gaskets

The intake pipe is removed when repairing the cylinder head or to replace seals in the pipe connection to the cylinder head.

Disconnect the lead terminal from the negative terminal of the battery.

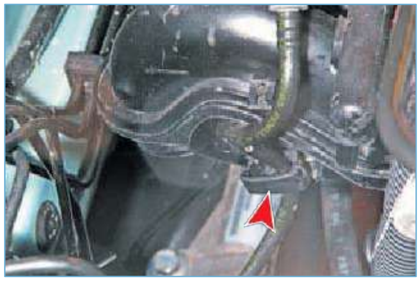
Remove the power unit protection (see "Removing the power unit protection", page 283).

Disconnect the tip of the fuel supply pipe from the fuel filler flap connector and disconnect the engine-ECU harness cables from the fuel injectors (see "Removing the fuel filler flap and injectors", page 117). Disconnect the tip of the throttle cable from the throttle lever (see "Replacing the throttle cable", page 121).

Disconnect engine-ECU harness plugs from inlet air temperature sensor (see "Removing the inlet air temperature sensor", page 108) and absolute a i r pressure sensor (see "Removing the absolute air pressure sensor", page 108). Disconnect the brake vacuum booster check valve pipe from the inlet pipe connection (see "Removing the brake vacuum booster check valve", page 231).

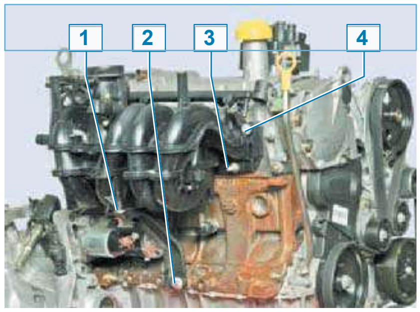
Disconnect the idle circuit vent hose from the connector on the head cover.

Remove the rubber tip of the adsorber tube from the inlet pipe connection on the left side of the pipe.



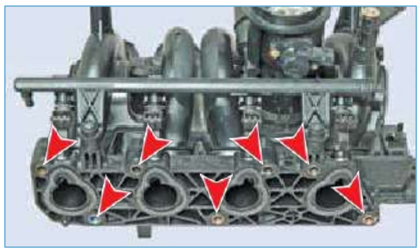
Unbuckle the fuel pipe holder on the right-hand side of the pipe and remove the fuel pipe from the holder.

From the bottom of the car...



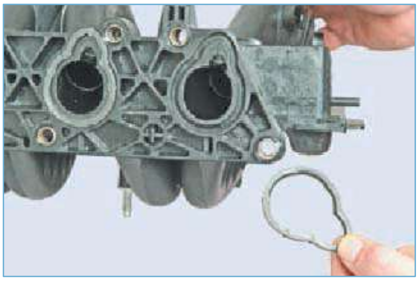
...using a 13" head unscrew nut 1 securing the support bracket to the inlet pipe and bolt 2 securing the bracket to the cylinder block (for clarity, shown on the removed power unit).

Remove the intake pipe support bracket. Use the same tool to loosen three nuts 3 of the lower mounting (from underneath the vehicle) and four bolts 4 of the upper mounting of the intake pipe to the cylinder head (one nut and one bolt are shown - the others are not visible in the photo).



Attachment points for the inlet pipe flange to the cylinder head (for clarity, shown with the inlet pipe removed).

Remove inlet pipe complete with fuel rail and injectors, If necessary, dismantle the fuel rail with injectors and sensors. If necessary, dismantle the fuel rail with injectors and sensors.



Remove the four sealing strips from the grooves in the inlet pipe flange.

Install new gaskets and inlet piping in reverse order.

Removing the fuel tank

Remove the fuel tank for cleaning or replacement. The work must be carried out in an inspection trench or on a trestle with an empty tank.

Squeeze the clips of the adsorber tube tip and disconnect it from the fuel tank tube.

Similarly, disconnect the tip of the fuel supply tube to the fuel ramp from the fuel tank tube.

Place a hose on the tip of the fuel tank tube, the end of which is lowered into a metal gasoline canister. Disconnect the engine-ECU wiring harness from the ignition coil (see "Removing the ignition coil", page 110).

Then remove relay K5 from the relay and fuse box located in the engine compartment (see "Electrical equipment", page 240).

Install a jumper between sockets 3 and 5 of the relay power leads (socket number corresponds to the relay lead number). When the ignition is switched on, the fuel pump will start and gasoline will be pumped from the tank to the canister.

! **When performing this operation, observe the safety regulations!**

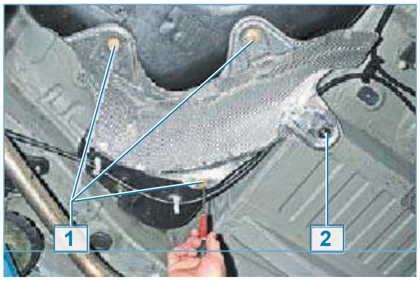
After draining fuel, switch off ignition, remove jumper and replace relay K5. Remove the hose from the tip of the fuel pipe in the tank.

Use a Torx T-20 wrench to loosen the two self-tapping screws securing the filler neck.

Unscrew the nut securing the "mass" wire in the wheel arch of the right rear wheel with a 10 mm socket.

Remove cable lug "A" from stud. Remove the exhaust system support cushions from the body brackets and disconnect the tailpipe from the exhaust manifold (see "Removing the exhaust system", page 132).

Move the exhaust system to the left side of the vehicle and place a stop under the intake pipe.



Use a Phillips screwdriver to loosen the screws of the three pistons 1 securing the heat shield.

Use pliers to loosen nut 2 securing the heat shield. Remove the pistons...

... and remove the heat shield.

Remove parking brake cables from holders on fuel tank and underbody (see "Replacing parking brake cables", page 235).

Place the adjustable stop under the fuel tank with a wooden block to prevent damage to the tank.


Unscrew the rear fuel tank mounting bolt with a 13 mm socket.
... and the front mounting bolt.


Unscrew the two nuts (one on each side) of the fuel filler flap side mountings using a tall head "for 13".


With the fuel tank slightly lowered, engage the parking brake cables behind the fuel tank.


Lower the fuel tank on the adjustable stop and remove it.
Install the fuel tank in the reverse order.

Fill the tank with fuel, start the ignition and check the tightness of the fuel line connections.

Removing the fuel vapor recovery system adsorber

The adsorber must be removed for replacement if its housing is leaking (can be identified by the presence of gasoline odor and visual inspection) or if the adsorber purge solenoid valve is defective (the defect is accompanied by unstable engine idling).
The work is carried out on an inspection duct or trestle.
To remove the adsorber, remove the right front wheel underfender (see "Removing the mudguards and front wheel underfenders", page 284).


Use a screwdriver to pry off the engine-ECU wiring harness cat- boat lock (front bumper removed for clarity).
...and remove the block.


Press the retainers on the end of the tube connecting the adsorber purge solenoid valve to the inlet line....
...remove the tube tip from the valve connection.


Similarly, remove the tip of the tube connecting the adsorber to the fuel tank from the ad-sorber connection.


Unscrew the two nuts securing the adsorber body to the body using a 13" nut....
... and remove the adsorber together with the vent tube.
Install the adsorber i n reverse order.

Throttle actuator cable replacement

Replace the throttle cable in the event of seizure (difficult movement of the cable in the sheath) caused by part of the wires breaking off and becoming frayed, or if the cable breaks.
Remove the air filter (see "Removing the air filter").
"Removing the air filter," p. 116).

Disconnect the cable lug from the intermediate throttle actuator arm.

Use a slotted screwdriver to remove the rubber bushing with the cable sheath tip from the plastic bushing on the bracket.

...and pull the cable tip out of the plastic bushing.

In the interior of the vehicle, under the instrument panel...

... remove the cable tip from the throttle pedal by guiding the cable through the slot in the pedal.

In the engine compartment, pry up the cable sheath bushing with a slotted screwdriver.

...pull the bushing out of the gasket in the front shield.

Remove the cable lug from the cable grommet in the front shield.

Remove the cable from the cable holder on the battery compartment.

Install the new throttle cable in reverse order. After installing

Throttle actuator cable

The actuator must be adjusted.

When the pedal is fully released

"The throttle valve must be fully closed and the throttle valve must be fully open when the accelerator pedal is fully depressed. The throttle lever must not have any additional travel.

To adjust the actuator...

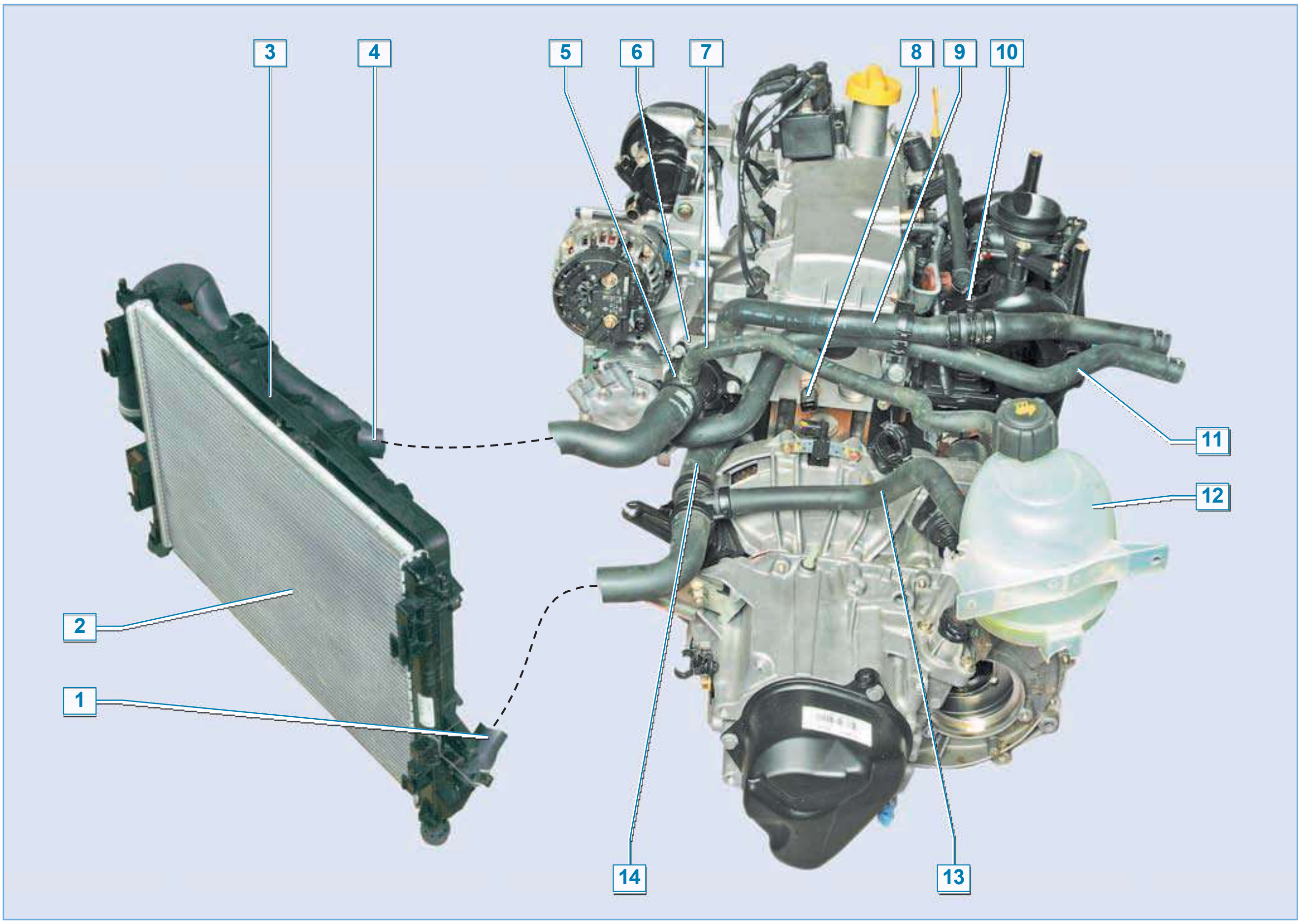
...Use pliers to remove the upper cable sheath lug retainer.....

... and by moving the tip in the plastic sleeve of the bracket to the desired position, insert the retainer into the annular groove on the tip.

Press the accelerator pedal a few times to ensure that the throttle valve opens and closes fully without sticking.

Engine cooling system 1.4 -1.6 (8V)

Construction description

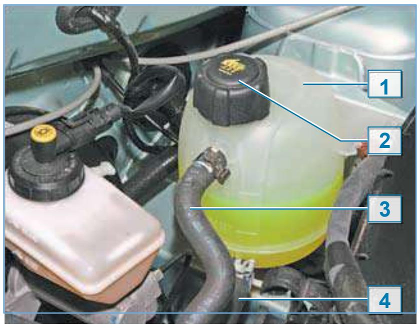


Engine cooling system: 1 - radiator exhaust hose; **2** - radiator; **3** - fan guard; **4** - radiator supply hose; **5** - thermostat housing; **6** - cylinder head exhaust pipe; **7** - steam exhaust hose; **8** - **coolant** temperature sensor; **9** - heater radiator inlet hose; **10** - air outlet fitting; **11** - heater radiator outlet hose; **12** - expansion tank; **13** - filler hose; **14** - **coolant** pump inlet pipe.

The cooling system is liquid, closed type, with forced circulation. It consists of expansion tank, coolant pump, engine cooling head, thermostat, connecting hoses and radiator with electric fan. The radiator is connected to the cooling system. Filling the system

The expansion tank is made of translucent plastic to allow visual inspection of the coolant level. The expansion tank is made of translucent plastic, which allows visual inspection of the coolant level. The expansion tank wall is marked with MAX and MIN marks, between which the coolant level should be between when the engine is cold. The upper

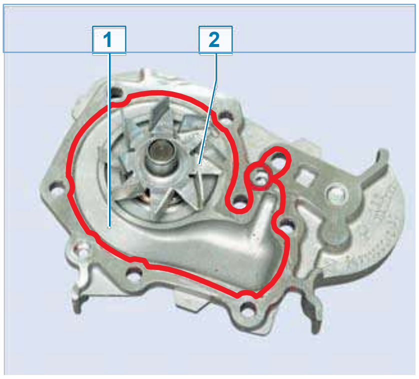
A vapor drain hose is connected to the tank connection and connects the tank to the thermostat housing. The lower tank connection is connected with a filler hose to the radiator outlet (lower) hose and the pump inlet pipe.
The cooling system is sealed by inlet and outlet valves in the expansion tank cap.



Elements of the expansion tank:
1 - tank; **2** - filler cap; **3** - vapor hose;
4 - filling hose

The exhaust valve maintains a higher system pressure than atmospheric pressure when the engine is hot. This increases the boiling point of the coolant and reduces vapor losses. The inlet valve opens when the system pressure drops on a cooling engine. The coolant level in the expansion tank is reduced. If the expansion tank cap is lost, it must not be replaced by a sealed cap without valves.
On the fluid inlet hose
There is a connection to the heater for bleeding air from the cooling system when filling it with liquid. The connector is closed with a cap.
The coolant circulation in the cooling system is provided by the coolant pump. The coolant pump is of the vane type, centrifugal type, driven by a toothed belt drive.

Expansion tank cap



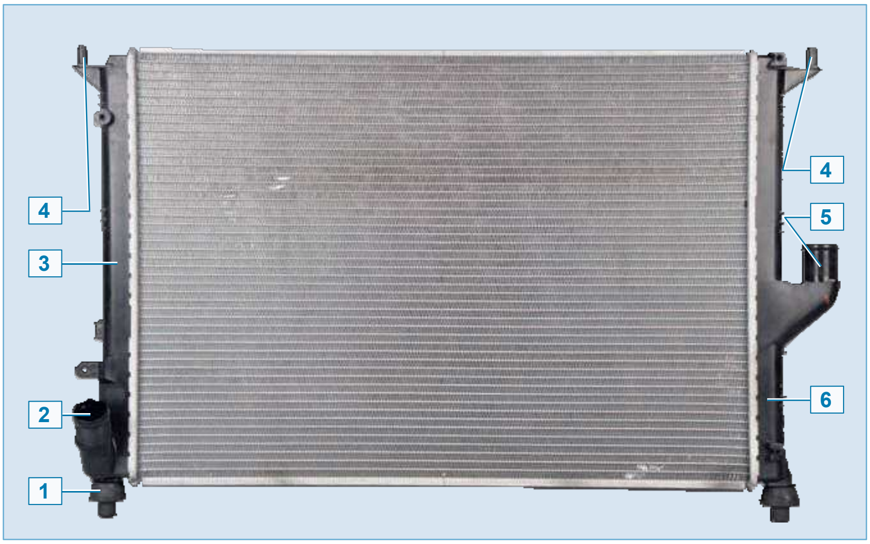
Coolant pump: 1 - casing; **2** - impeller

The timing belt is connected to the toothed pulley on the crankshaft. Consists of housing, sub stud assembly with seal, impeller and toothed pulley.
The fluid flows to the pump through the inlet pipe located on the front wall of the cylinder block under the exhaust manifold.
The fluid is pressurized from the pump into the engine cooling jacket and from there to the exhaust port of the cylinder head, to which the thermostat housing is connected.
When the engine is not warm, the thermostat valve is closed, blocking the thermostat housing connection to the cooling system radiator. All fluid flows through the cylinder head exhaust manifold to the heater radiator, bypassing the cooling system radiator and returning to the pump - small circulation circle. As the engine warms up, at a fluid temperature of 89 °C the thermostat valve begins to move, allowing the fluid flow into the radiator of the cooling system. At a temperature of 95±2 °C the thermostat valve opens fully and the liquid flows into the radiator of the cooling system, where it releases heat to the surrounding air.
The movement of the fluid through the engine cooling jacket and the radiator of the cooling system forms a large circulation circle. The fluid circulates through the heater radiator.

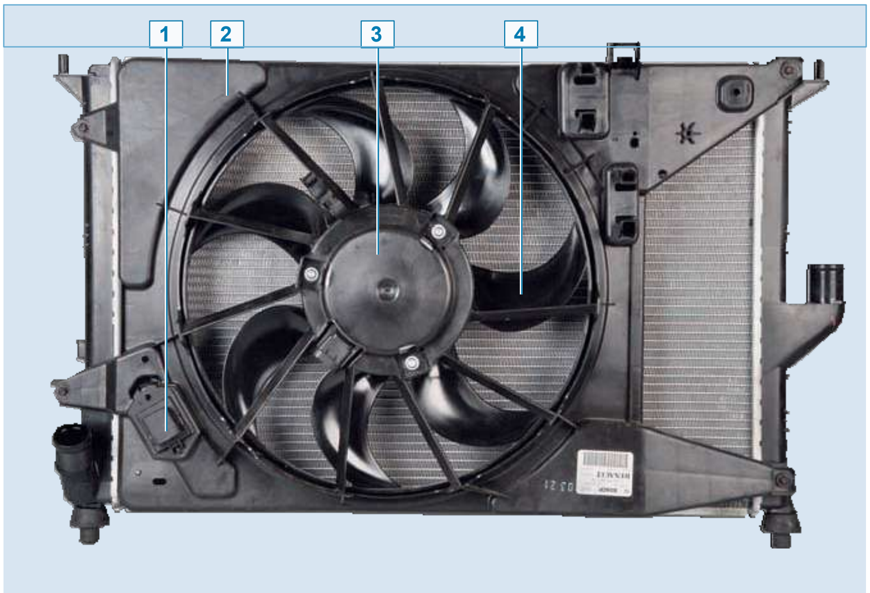
Cooling system venting connection

The cooling system radiator consists of two vertically arranged plastic tanks connected by aluminum tubes with cooling plates. The radiator of the cooling system consists of two vertically arranged plastic tanks connected by aluminum tubes to cooling plates. Fluid enters the radiator through the upper pipe and drains out through the lower pipe. There is no drain hole in the radiator.
The electric fan is mounted in the casing behind the radiator. The fan blades are mounted on a hub with variable pitch.
When the coolant temperature rises, the fan is switched on by the electronic engine control unit (ECU) via a relay.
On vehicles equipped with air conditioning, an additional resistor is fitted to the fan guard. If the coolant temperature rises or the air conditioning is switched on, the fan shroud is equipped with an additional resistor.

Thermostat



Radiator: 1 - rubber cushion of the lower mount; **2 -** outlet pipe; **3 -** left tank; **4 -** pin of the upper mount; **5 -** supply pipe; **6 -** right tank.



Additional fan resistor

Coolant temperature sensor

The ECU turns on the fan

The ECU activates the motor bypassing the resistor and the fan rotates at low speed. If the liquid temperature rises further and the refrigerant pressure reaches a value above the threshold level, the ECU switches on the motor, bypassing the resistor, and the fan rotates at high speed.

Cooling water temperature sensor

The coolant temperature sensor is mounted in the cylinder head end of the cylinder block on the left-hand side in the direction of travel (see "Removing the coolant temperature sensor", page 107).

The sensor provides information to the temperature gauge in the instrument cluster and the electronic control panel.

The engine control unit.

Removing and checking the thermostat

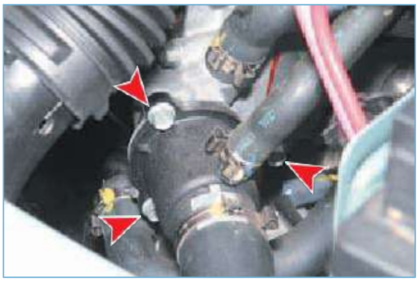
The thermostat is replaced when the engine heat condition is disturbed, when the engine is either overheating or underheating.

When checking the thermostat on a vehicle, the lower hose leading from the radiator must remain cold for some time after starting a cold engine. The thermostat valve is closed and the fluid is not flowing.

The coolant circulates through the small circle, bypassing the radiator. When the coolant temperature reaches 89 °C, the lower radiator hose should warm up quickly, indicating that the coolant is circulating in the large circle.

The work is carried out on an inspection trolley or trestle.

To remove the thermostat, drain the coolant (see "Changing the coolant in the 1.4-1.6 (8V) engine", page 38).
The thermostat can be replaced without removing the hoses from the thermostat housing connections in order to reduce the amount of work required.



Use a 10" head to loosen the three bolts securing the thermo-stat housing.....
...and disconnect it from the cylinder head exhaust manifold.

Remove the thermostat from the housing.

Remove the rubber gasket from the thermostat.
If the gasket is damaged or has lost elasticity, it must be replaced with a new one.
To test the thermostat, lower it into a container of water. Heat up the vessel while stirring the water and checking the opening of the valve with a thermometer. Valve stem should start to extend at a temperature of 89 °C.....

...as indicated by the number "89" on the thermostat valve.
At a temperature of 95±2 °C the valve must be fully open - stem stroke at least 8 mm.
Install the thermostat in reverse order. Tighten the mounting bolts carefully to avoid damage to the plastic thermostat housing.

Removing the radiator fan

The fan is removed for replacement and when removing the engine cooling system radiator and air conditioning condenser. The work is shown on a vehicle with power steering.
Disconnect the lead terminal from the negative terminal of the battery.

Slide the power steering reservoir upwards from the upper radiator frame cross member bracket without disconnecting the hose and set aside.

Use a Torx T-30 wrench to loosen the two screws securing the cistern bracket.

...and remove the bracket.

By unclipping the plastic holder on the fan shroud.....

...remove the power steering reservoir hose from the reservoir.

Remove the fan inlet hose from the fan guard holder.

Press the engine-ECU wiring harness retainer.

...disconnect the harness from the electric fan motor.

Disconnect the engine-ECU harness cable harness from the auxiliary resistor in the same way.

Unscrew the two lower...

...and the two upper self-tapping screws securing the fan shroud to the plastic radiator tanks.....

...and remove the fan assembly with fan shroud from the engine compartment.

Use a Torx T-20 wrench to loosen the three screws securing the fan impeller to the electric motor.

...and take it off.

Use a Torx T-25 wrench to loosen the three screws securing the electric motor to the fan guard....

...and take it off.

If the auxiliary resistor must be replaced.

...use a screwdriver to release the resistor lock....

... and remove it from the fan guard.

Install the cooling system radiator fan in reverse order.

Removing the radiator

Remove radiator to check for leaks (if leakage is suspected) or replace if damaged.
The work is carried out on an inspection trolley or trestle.
Remove front
Remove the front bumper (see "Removing the front bumper on Logan", page 286; "Removing the front bumper on Sandero and Sandero Stepway", page 287). Drain the coolant (see "Changing the coolant in the 1.4-1.6 (8V) engine", page 38).
Remove radiator fan (see "Removing the radiator fan", page 126).

Use sliding pliers to loosen the hose clamp on the supply hose.

...and remove the hose from the radiator connection.

The air conditioning condenser is mounted in plastic feet made one piece with the plastic radiator reservoirs.
To remove the condenser without disconnecting the refrigerant inlet and outlet pipes....

...Use a screwdriver to tighten the upper condenser bracket and the lower one (not visible in the photo).

Lift the left side of the condenser so that the bracket clips remain in the pinched position.
Perform the same operations on the right side of the condenser, then lift the condenser by removing its brackets from the radiator feet....

... and carefully lower the condenser to the floor, taking care not to damage the tubes connecting it.

Use a 10" head to loosen the bolt securing the left upper radiator bracket....

...and remove the rubber cushion bracket from the left radiator pin.

Remove the right-hand bracket from the right-hand radiator pin in the same way.
Lift the radiator so that the rubber pads of the lower mounting bracket come out of the holes in the subframe cross member.....

...and remove the radiator from the engine compartment.

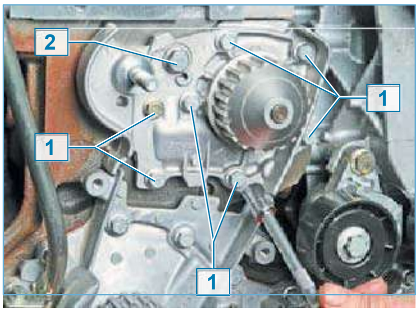
Remove the lower radiator support cushions from the radiator pins.

If necessary, remove the rubber pads from the upper mounting brackets. Replace any cracked or loose cushions.
Check radiator tightness in a bath of water. Having plugged radiator connections with wooden plugs, supply it with compressed air at a pressure of about 0.1 MPa (1 $^{kgf/cm2}$) through one of the tubes and lower the radiator into the water bath for at least 30 seconds. There should be no etching (bubbles) of air. Replace a leaking radiator with a new one.
Install the radiator in reverse order.
If the rubber cushions for the lower radiator mounting were removed with the radiator, first insert the cushions into the holes in the subframe when installing the radiator.
Pour coolant into the cooling system and bring the fluid level in the reservoir up to normal.

Removing the coolant pump

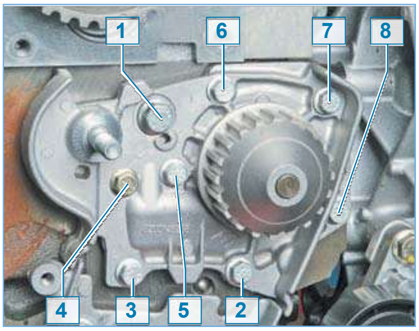
The pump must be replaced as a complete unit if there is bearing noise or if the pulley turns tightly with the drive belt removed, if there is a large amount of backlash on the pump shaft or if fluid leaks from the counter bore.

The pump is mounted on sealant.
Drain the coolant
(see "Changing the coolant in the 1.4-1.6 (8V) engine", page 38).
Remove timing belt and tensioner (see "Checking the condition and replacing the timing belt", page 34).



Loosen seven bolts 1 and one bolt 2 securing the pump to the cylinder block with a 10 mm head and one bolt 2 with a 13 mm head.
Using a slotted screwdriver, pry the pump from the cylinder block.

Remove the coolant pump.
Clean old sealant and fluid residue from the pump flats before installation



Procedure for tightening the coolant pump mounting bolts

and the cylinder block. Apply a thin coat of sealant to the pump flats and the threaded portion of the pump mounting bolts.
Install the coolant pump in reverse order.
Tighten the cap screws to the specified torque (see "Appendices", page 315).

Removing the expansion tank

The expansion tank is removed for replacement.
The expansion tank is secured to the body bracket with two nuts. If there is coolant in the expansion tank, place a wide container under the vehicle in the area of the tank to collect the fluid.

Use sliding pliers to loosen the clamp securing the vapor exhaust hose.

... and remove the hose from the tank connector. Use sliding pliers to loosen the clamp securing the filler hose.....

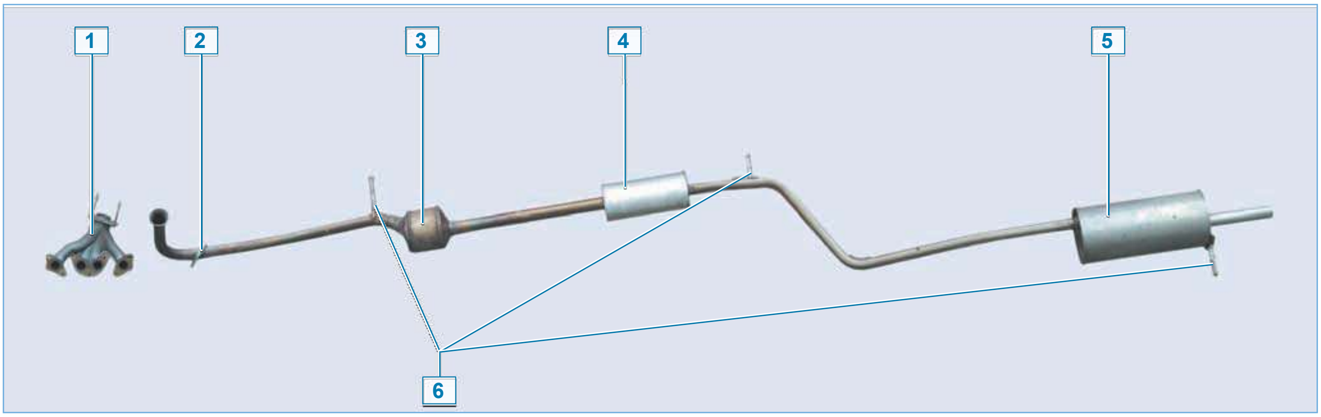
... and remove the hose from the tank connection. Plug the hole in the hose with a suitably sized plug.

Unscrew the two tank nuts with a "10" nut and extension....

... remove it from the body bracket studs and remove the tank from the engine compartment.
Install the expansion tank in reverse order. Fill the cooling system with coolant (see "Changing the engine coolant 1.4-1.6 (8V)", page 38).

Exhaust system of engine 1.4-1.6 (8V)

Construction description

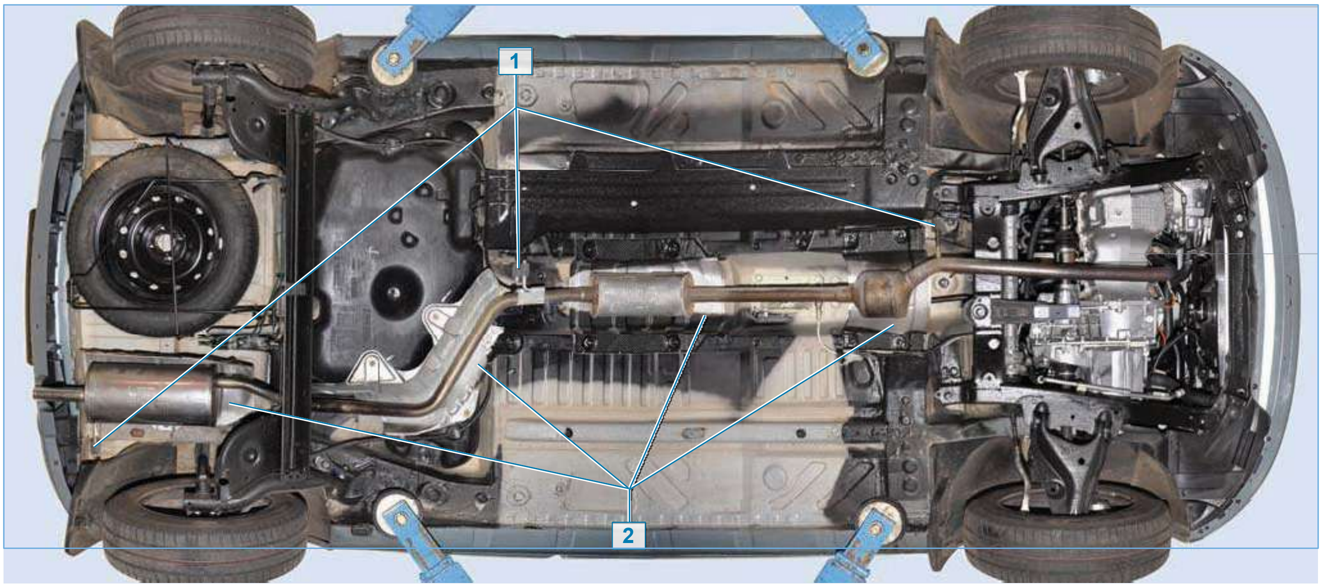


Exhaust system: 1 - exhaust manifold; **2 -** pressure plate fixing the intake pipe to the exhaust manifold; **3 -** catalytic exhaust gas neutralizer; **4 -** additional silencer; **5 -** main silencer; **6** - system suspension bracket.

The exhaust system consists of the exhaust manifold, the intake pipe with catalytic converter, the additional and main exhaust pipes, and the exhaust system.

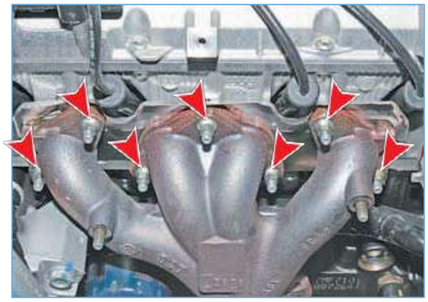
The system is welded together. All system components except the exhaust manifold are welded together. The flange of the exhaust manifold is connected with a ball joint.

with the flange of the intake pipe.
The exhaust system is suspended from the body on three rubber pads. Above the neutralizer, an additional

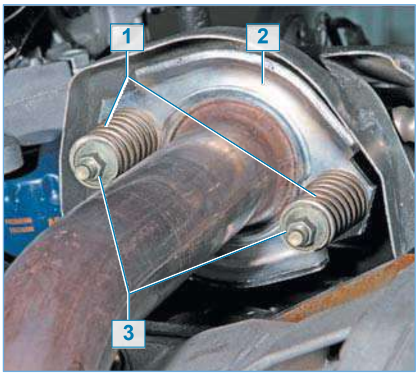


Location of the exhaust system on the vehicle (shown on the Sandero): 1 - exhaust system suspension rubber cover; **2** - heat shield

The exhaust manifold is covered with a heat shield.

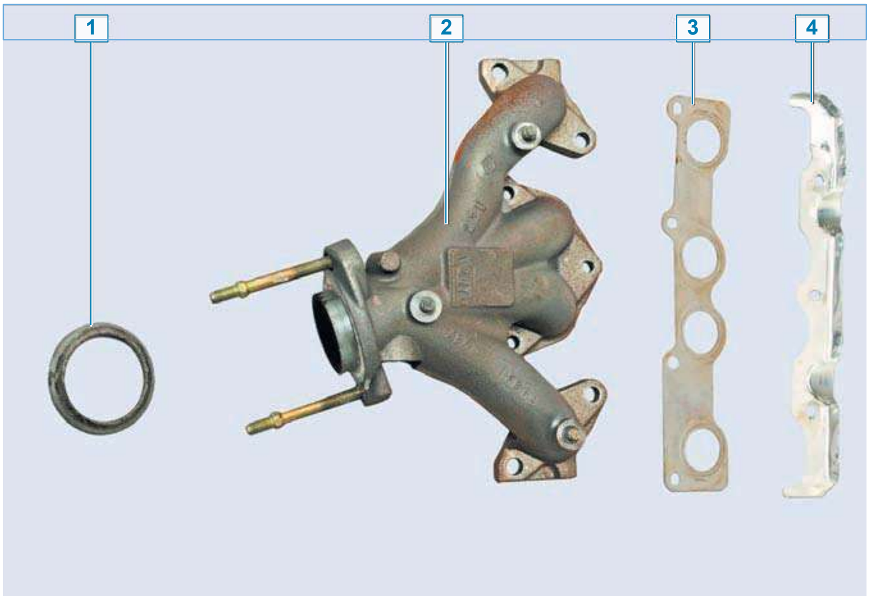


... and is fastened with seven nuts to the cylinder head studs (heat shield removed for clarity).



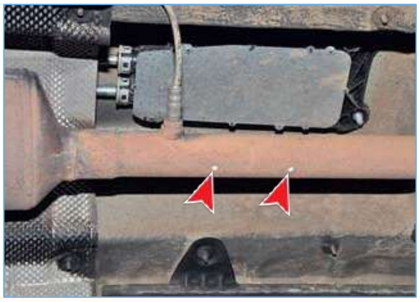
Receiving pipe connection with outlet manifold: 1 - spring; **2** - pressure plate; **3** - nut

heat shields are installed near the fuel tank and main mufflers.
A metal gasket is installed between the exhaust manifold and the cylinder head.
To seal the swivel joint between the exhaust manifold and the intake pipe, the flange of the exhaust manifold is fitted to the flange of the exhaust manifold.

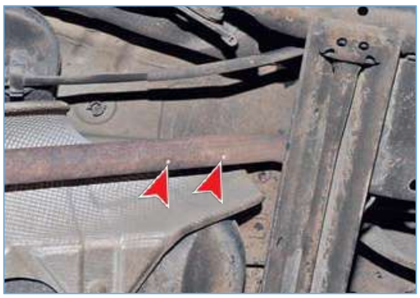


Exhaust manifold: 1 - sealing ring **of** the manifold connection with the intake pipe; **2** - exhaust manifold; **3** - sealing gasket of the manifold and cylinder head connection; **4** - exhaust manifold screen

The lector is equipped with a composite ring with a spherical outer surface and the intake pipe flange has a spherical inner surface. The flange connection is tightened by a pressure plate through two conical springs on the exhaust manifold studs. The springs are tightened by nuts screwed onto the studs.
The control oxygen sensor is installed in the pipe after the exhaust manifold. The diagnostic oxygen sensor is installed behind the catalytic converter.
The catalytic converter is designed to reduce emissions of carbon monoxide, nitrogen oxides and unburned hydrocarbons. For the neutralizer to function properly, the composition of the exhaust gases (in particular their oxygen content) must be within strictly defined limits. This function is performed by the electronic engine control unit (ECU), which determines the amount of fuel supplied.



Location of marks on the pipe between the neutralizer and the auxiliary silencer



Location of marks on the pipe between the additional and main blanking plugs

If the engine is running, the engine will not start.

Connect the pipes of the new assembly to the pipes of the exhaust system with a special connector

If lead compounds are present in the exhaust gases, the catalytic converter and oxygen concentration sensors will quickly fail. For this reason, it is strictly forbidden to operate the vehicle with leaded gasoline, even for a short period of time.

A faulty ignition system or power supply system can also cause failure of the neutralizer. In case of ignition misses, unburned fuel enters the neutralizer, burns out and sinter the catalyst unit in the neutralizer, which can lead to blockage of the exhaust system and engine stoppage (or severe loss of power).

The silencers and catalytic converter are non-disassembling components and must be replaced if they fail. Spare parts include the neutralizer with intake pipe, additional and main silencers with pipes of a certain length and special clamps for connecting the pipes. To replace a single component of a complete system, the pipes are marked in two places with coring marks, which can be used to cut the pipes.

Maintenance of the exhaust system

The vehicle is subject to periodic inspection, checking for tightness and corrosion, tightening loose connections and replacing rubber suspension pads.

Replacement of the exhaust system suspension pads exhaust gases

If the rubber cushions of the exhaust system suspension are damaged, a knocking noise may be heard under the vehicle underbody when the vehicle is moving or when the engine is started due to system components touching the body. The cushions may be torn, lose elasticity, cracked or torn.

Work is carried out on an inspection duct or trestle.

All cushions have the same design and method of attachment, therefore cushion replacement is shown as an example of one cushion, the others are replaced in the same way.

To remove the cushion, insert the stub of a screwdriver into the hole in the cushion where the pipe bracket is inserted. After pressing the cushion from the bracket with a screwdriver, inject light penetrating liquid such as WD-40 into the cushion hole. Do the same with the other hole in the cushion where the body bracket is inserted.

Pull the cushion off both brackets one by one. If the cushion is to be replaced, it can also be removed from the brackets by cutting it with a knife.

Before installing the new shower head, clean both brackets, wet them with a soapy water solution....

...and place the cushion first on the body bracket and then on the pipe bracket.

Removing the exhaust system

! To avoid burns, start work after the exhaust system has cooled down.

Welded exhaust system components can be dismantled without having to cut them apart.

Work is carried out on an inspection duct or trestle.

To remove the main silencer from the space between the body and the rear suspension beam, hang up the rear of the vehicle and remove the left rear suspension spring (see "Removing the spring", page 210).

Remove the oxygen sensors (see "Removing the oxygen sensors", page 109).

Remove the three rubber exhaust system suspension pads one by one from the body brackets or exhaust system brackets (see "Replacing the exhaust system suspension pads", page 132).

Unscrew the nut securing the intake pipe flange to the exhaust manifold flange using a 10" socket with an extension.....

...and remove the spring.

Unscrew the nut and remove the spring from the other stud on the exhaust manifold in the same way. Slide the cover plate downwards over the tailpipe. Push down the left side of the rear suspension beam and push the exhaust system forward (in the direction of travel of the vehicle), making sure that the muffler suspension bracket does not rest on body components and does not catch on the parking brake cable and ABS sensor wiring harness (if fitted).
Before installing the exhaust system
Check the condition of the ball joint seal ring at the flange connection between the intake pipe and exhaust manifold.

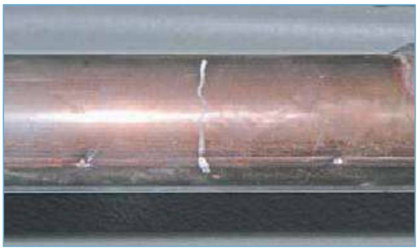
Remove the O-ring from the exhaust manifold flange.
If the ring is cracked and the sealing spherical surface is damaged, replace the ring with a new one.
Install the exhaust system in reverse order.

Replacement of exhaust system components

Parts of the exhaust system must be replaced if they are burnt out, corroded or mechanically damaged.
or the failure of the catalytic--
of the neutralizer.
The work is carried out on an inspection trolley or trestle.
If necessary, remove the sensors
concentration oxygen
(see "Removing the oxygen concentration sensors", page 109).
As the exhaust system is not disassembled (except for the exhaust manifold connection to the tailpipe), it is necessary to cut the part to be replaced from the system piping in order to replace an individual component. The additional and main silencer as well as the catalytic converter with tailpipe are available as spare parts separately. One or two special clamps (if replacing the additional silencer) must also be purchased to connect the parts.

! **To avoid burns, start work after the exhaust system has cooled down.**

Before replacing the intake pipe with a ca-
with a talitic neutralizer or
mark the cut point on the pipe connecting the neutralizer and the additional silencer. To do this, divide the distance (80 mm) between the two marks on the pipe in half....



...and mark (with chalk or marker) the cutting point.
Use a cutting machine to cut the pipe according to the mark.

! **To avoid fire, make sure that there are no flammable substances in the area where sparks fly!**

After cutting the pipe, the intake pipe with catalytic converter can be replaced. To do so, disconnect the intake pipe from the exhaust manifold (see "Removing the exhaust system", page 132) and remove the intake pipe with catalytic converter. After installing the new intake pipe with catalytic converter, connect the pipes between the catalytic converter and the additional silencer with a special clamp (45 mm pipe clamp required).
To replace an auxiliary or
main muffler It is
necessary to cut through the pipe
connecting the

them. To do this, we use chalk or
Use a marker to draw a line in the middle between the two marks on the pipe connecting the silencers (in the area of the left rear suspension bracket). Use a metal hacksaw to cut the pipe along the mark.

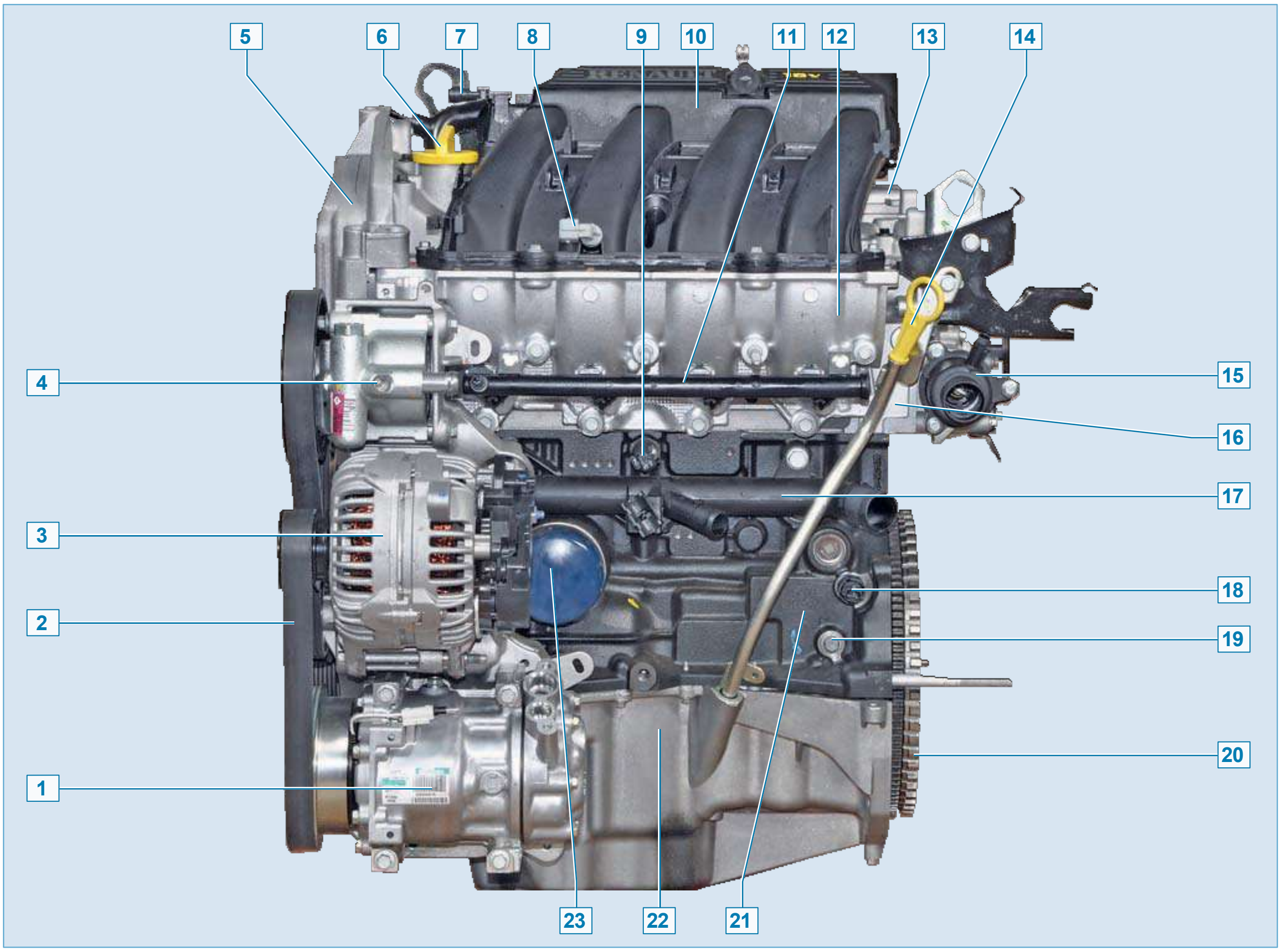
! **To avoid the possibility o f ignition of fuel vapors, do not use a cutting machine, as this cutting point is close to the fuel tank and the fuel system pipes.**

Then, when replacing the main silencer, remove the silencer bracket from the rubber cushion (see "Replacing the exhaust system suspension cushions", page 132) and remove the silencer.
When replacing the additional silencer, also cut the pipe connecting the silencer and catalytic converter (see above) and remove the additional silencer by removing its pipe bracket

from the rubber cushion.
When installing a new main or additional silencer, use a special clamp (for 40 mm diameter pipe) at the pipe connection.

Engine 1.6 (16V)

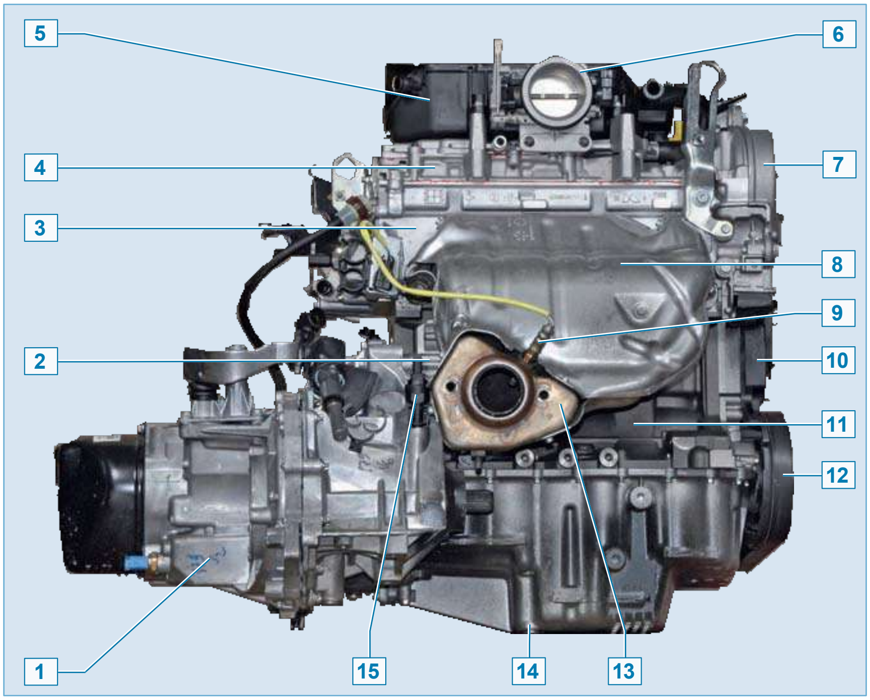
Construction description



Engine (front view in the direction of vehicle movement): 1 - air conditioner compressor; **2 -** drive belt of auxiliary units; **3 -** generator; **4 -** power steering pump; **5 -** upper cover of the gas distributor drive belt; **6 -** oil filler cap; **7 -** absolute air pressure sensor; **8 -** inlet air temperature sensor; **9 -** detonation sensor; **10** - receiver; **11** - fuel ramp with injectors; **12** - intake pipe; **13** - cylinder head cover; **14 -** oil level gauge; **15** - thermostat housing; **16** - cylinder head; **17 -** coolant pump pipe; **18** - oil under-pressure alarm sensor; **19** - process hole; **20** - flywheel; **21** - cylinder block; **22 -** crankcase pan; **23** - o i l filter.

The K4M engine is gasoline, four-stroke, four-cylinder, four-cylinder, in-line, sixteen-valve, with two overhead camshafts. Cylinder order: 1-3-4-2, starting from the flywheel. Fuel injection system - distributed fuel injection (toxicity standards). Euro 4). The engine, gearbox and clutch form a power unit - a single unit mounted in the engine compartment on three elastic rubber-metallic supports. The right support is attached to the bracket on the upper cover of the timing belt, and the left support is attached to the bracket on the upper cover of the t i m i n g belt. The engine cylinder block is cast iron. The engine cylinder block is cast from cast iron and the cylinders are mounted directly in the block. The following are located in the front of the engine (in the direction of vehicle travel): intake pipe; oil filter; oil level gauge; oil level indicator; alarm sensor

The engine is equipped with an oil pressure sensor; fuel filler with injectors; detonation sensor; coolant pump inlet pipe; alternator; power steering pump; air conditioning compressor. At the rear of the engine are: air filter housing with idle speed regulator; exhaust manifold with control oxygen sensor; starter.
On the right: coolant pump; timing and coolant pump drive (timing belt); auxiliary drive (V-belt).
On the left: flywheel, crankshaft position sensor, thermostat, thermostat housing with coolant temperature sensor. On top: coils and spark plugs; oil filler neck; air reservoir with absolute pressure and inlet air temperature sensors, throttle body with throttle position sensor.
Five root supports are located in the lower part of the cylinder block.

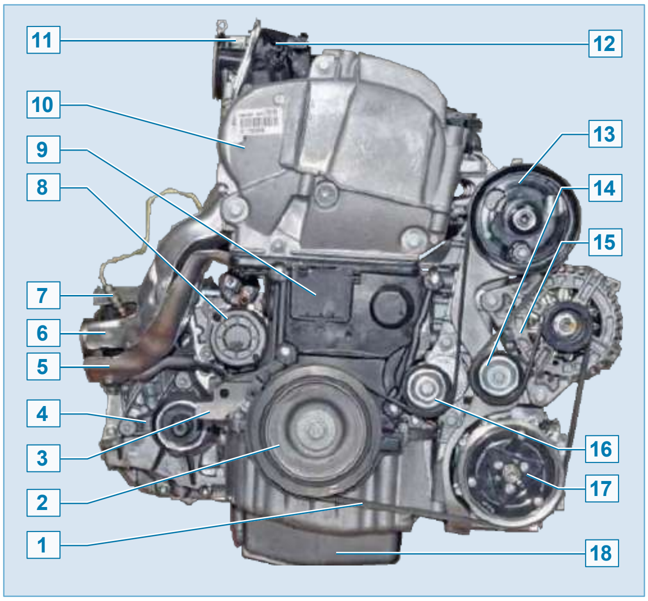


Power unit (rear view in the direction of car movement): 1 - transmission; **2** - starter; **3** - cylinder head; **4** - cylinder head cover; **5** - receiver; **6** - throttle assembly; **7** - upper timing belt cover; **8** - upper heat shield of the exhaust manifold; **9** - control oxygen concentration sensor; **10** - lower timing belt cover; **11** - cylinder block; **12** - auxiliary units drive belt; **13** - exhaust manifold; **14** - crankcase oil drain plug; **15** - car speed sensor.

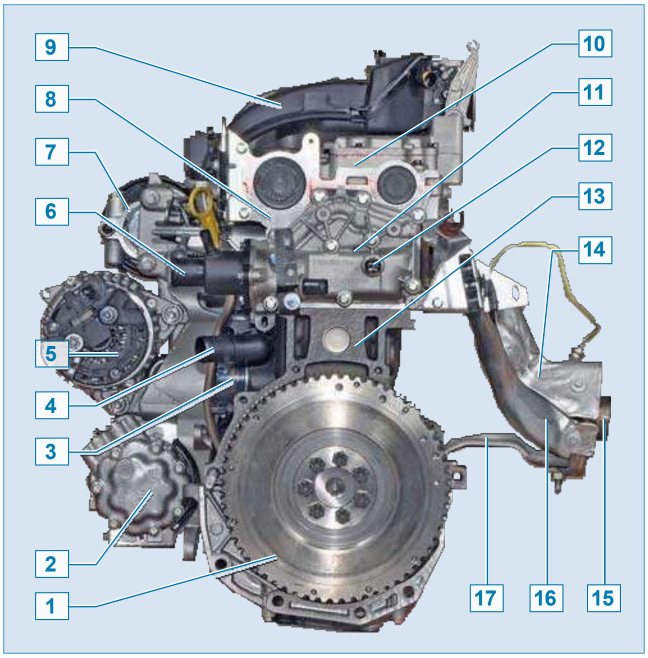
crankshaft bearings
with removable covers, which are fastened to the block with special bolts. The bearing holes in the cylinder block are machined with the covers installed, therefore the covers are not interchangeable and are marked on the outer surface to distinguish them (counting of covers is done from the flywheel side). The end faces of the center support have sockets for thrust half-rings preventing axial movement of the crankshaft. Crankshaft main and connecting rod bearing shells are steel, thin-walled with antifriction coating applied to the working surfaces of the shells. Crankshaft with five main journals and four connecting rod journals. The shaft is equipped with four counterweights cast in one piece. Four counterweights are cast together with the shaft.

from the main journals to the connecting rod journals
channels are made in the shaft journals and cheeks. The crankshaft is fitted with an oil pump drive sprocket, timing pulley and auxiliary drive pulley at the front end (toe) of the crankshaft. The toothed pulley is secured to the shaft by a tab that fits into a groove in the toe of the crankshaft. The auxiliary drive pulley is secured to the shaft in the same way.
The crankshaft is sealed by two oil seals, one of which (timing gear side) is pressed into the cylinder block cover and the other (flywheel side) into the seat formed by the surfaces of the cylinder block and main bearing cap. The flywheel is attached to the crankshaft flange with seven bolts. It is cast

made of cast iron and has a pressed
A steel crown for starting the engine with the starter motor. In addition, the crankshaft is equipped with a toothed crown for the crankshaft position sensor.
The connecting rods are forged steel, double-beam section, machined together with covers. The covers are fastened to the connecting rods with special bolts and nuts. The connecting rods are connected to the crankshaft crank journals with their lower (crank) heads through liners, and to the piston pins with the pistons with their upper heads. Piston pins are tubular steel. The pin, pressed into the upper head of the connecting rod, rotates freely in the piston bosses. Pistons are made of aluminum alloy. The piston skirt has a complex shape: the longitudinal section is barrel-shaped.



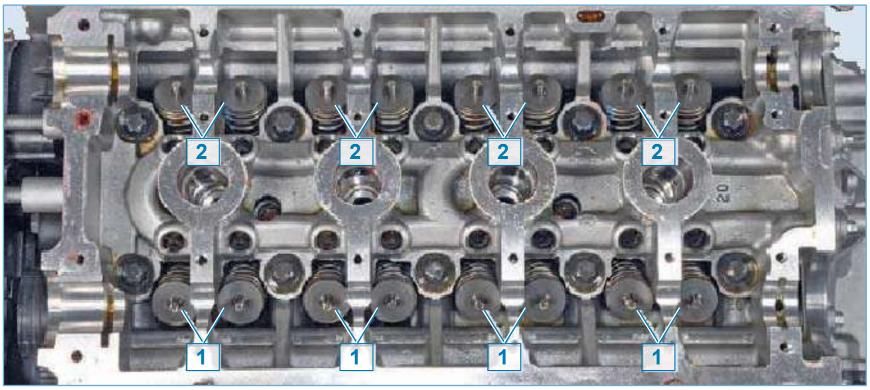
Power unit (view on the right in the direction of vehicle travel): **1** - auxiliary units drive belt; **2** - auxiliary units drive pulley; **3** - cylinder block; **4** - gearbox; **5** - lower heat shield of exhaust manifold; **6** - upper heat shield of exhaust manifold; **7** - control oxygen concentration sensor; **8** - starter; **9** - lower timing belt cover; **10** - upper timing belt cover; **11** - throttle assembly; **12** - receiver; **13** - **power** steering pump pulley; **14** - **belt** support roller; **15** - alternator; **16** - **belt** tensioner roller; **17** - air conditioner compressor pulley; **18** - crankcase pan.



Engine (view from the left in the direction of vehicle movement): **1** - flywheel; **2** - air conditioner compressor; **3** - oil filter; **4** - coolant pump supply pipe; **5** - generator; **6** - thermostat housing; **7** - power steering pump; **8** - cylinder head; **9** - receiver; **10** - cylinder head cover; **11** - cylinder head cooling jacket cover; **12** - coolant temperature sensor; **13** - **cylinder** block; **14** - exhaust manifold upper heat shield; **15** - **exhaust manifold; 16 - exhaust** manifold lower heat shield; **17** - **exhaust manifold** bracket.

The piston has three grooves for piston rings. There are three grooves for piston rings in the upper part of the piston. The two upper piston rings are compression rings and the lower one is an oil ring. The cylinder head is cast from aluminum alloy, common to all four cylinders.

The cylinder head is centered on the block with two bushings and secured with ten screws. A shrink-free metal gasket is installed between the block and the cylinder head. The cylinder head has windows on opposite sides of the cylinder head.

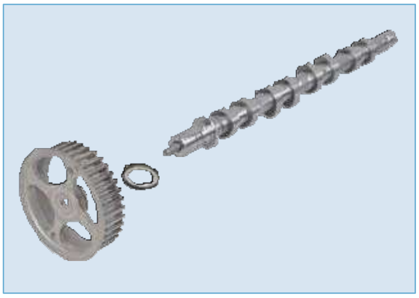


on the intake and exhaust ducts. Spark plugs are mounted in the center of each combustion chamber. The valves are steel, in the cylinder head, arranged in two rows, V-shaped, with two inlet and two exhaust valves per cylinder. The inlet valve disc is larger than the exhaust valve. The valve seats and guide sleeves are pressed into the cylinder head. The valve guide sleeves are fitted with oil sealing caps on top of the valve guide sleeves. The valve is closed by a spring. The lower end rests on a washer and the upper end rests on a plate, which is held in place by two wafers. The folded nuts have a truncated cone shape on the outside and thrust burs on the inside.
The following is a description of the components that enter the groove
on the valve stem. In the upper part-

There are two camshafts in the cylinder head. One shaft drives the intake valves of the timing system and the other drives the exhaust valves. Each shaft has eight cams - a neighboring pair of cams simultaneously controls the valves (intake or exhaust) of each cylinder. A special feature of the camshaft design is that the cams are pressed onto a tubular shaft.
Supports (beds) spreading
The camshafts (six supports for each shaft) are split - located in the cylinder head and in the cylinder head cover. The camshafts are driven by a timing belt from the crankshaft pulley. On the shaft next to the first (counting from the timing pulley of the camshaft). shaft) A thrust flange is fitted on the shaft near the first (counting from the timing pulley of the camshaft) bearing journals, which, when assembled, fits into the grooves of the block head and cover, thereby preventing axial movement of the shaft.
The camshaft pulley is not secured to the shaft by means of a key or pin, but only by friction forces arising on the end faces of the pulley and the shaft when tightening the pulley nut. The toe of the camshaft is sealed with an oil seal worn on the first shaft journal and pressed into a socket formed by the surfaces of the cylinder head and the cylinder head cover. The valves are actuated by the camshaft cams via valve levers.

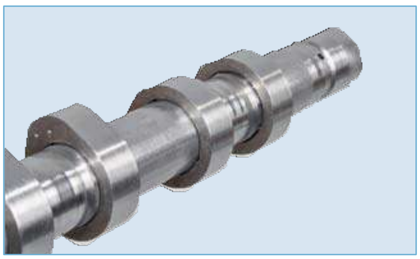
One end of the lever rests on the spherical head of the hydraulic support (hydraulic clearance compensator) and the other end acts on the end of the valve stem

To increase the service life of the camshaft and valve levers, the cam of the camshaft acts on the lever via a roller rotating on the lever axle.
The valve lever hydraulic mounts are mounted in the cylinder head sockets. A hydraulic compensator with a ball check valve is mounted inside the hydraulic bearing housing. Oil enters the hydraulic bearing from a line in the cylinder head through a hole in the hydraulic bearing housing. The hydraulic support automatically ensures clearance-free contact between the camshaft cam and the valve lever roller, compensating for wear of the cam, lever, valve stem face, valve seat chamfers and valve plate.
Engine lubrication is combined. Pressurized oil is supplied to the crankshaft main and connecting rod bearings, camshaft bearings and hydraulic valve lever bearings. Other engine components are lubricated by splash lubrication. The pressure in the lubrication system is created by



Distributor shaft with toothed pulley and oil seal

The oil pump is driven by a gear oil pump located in the crankcase underneath and attached to the cylinder block. The oil pump is driven by a chain drive from the crankshaft. The pump drive sprocket is mounted on the crankshaft under the front cover of the cylinder block. The sprocket has a cylindrical belt on which the crankshaft front oil seal runs. The sprocket is mounted on the crankshaft without tension and is not secured with a key. When the engine is assembled, the pump drive sprocket is clamped between the timing pulley and the crankshaft shoulder as a result of tightening of the component package by the auxiliary drive pulley bolt. Torque from the crankshaft is transmitted to the sprocket only by friction forces between the end faces of the sprocket, toothed pulley and crankshaft. If the bolt securing the auxiliary drive pulley is loosened.

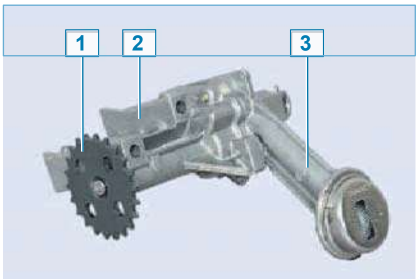


Cams are pressed onto the camshaft

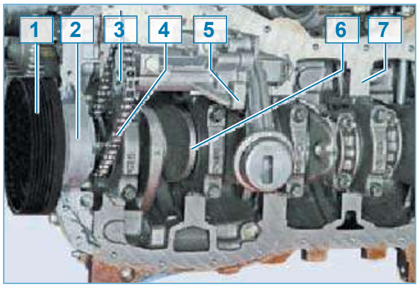
Valve lever

Valve arm hydraulic support

The oil pump drive sprocket may rotate on the crankshaft and the engine oil pressure will drop. The oil inlet is made in one piece with the oil pump housing cover. The cover is secured to the pump casing with five screws. The pressure reducing valve is located in the pump casing cover and is secured against falling out by a spring clip. Oil from the pump passes through the oil filter and into the main oil line of the cylinder block. The oil filter is full-flow, non-disassembling. From the main line, oil flows to the crankshaft main bearings and then, through channels in the crankshaft, to the connecting rod bearings. Through two vertical channels in the cylinder block, oil from the main trunk line flows into the cylinder block head to the extreme (left) supports (bearings) of the camshafts. Oil flows into the shafts through grooves and drilled holes in the outermost support journals of camshafts and then through drilled holes in other shaft journals to the remaining camshaft bearings. The oil flows from the cylinder head into the engine crankcase oil pan via vertical channels.
Crankcase ventilation system - za-covered, forced, with gas extraction through an oil separator



Oil pump: 1 - driven sprocket drive; **2** - pump housing; **3 - pump** housing cover with oil receiver



Oil pump drive (oil pan removed): 1 - drive pulley of auxiliary units; **2 -** front cover of cylinder block; **3 - drive** sprocket of pump drive; **4** - drive chain; **5 -** oil pump; **6 -** crankshaft; **7** - cylinder block.

(in the cylinder head cover), which cleans the crankcase gases of oil particles. The gases from the lower part of the crankcase flow through internal passages in the cylinder head into the cylinder head cover and then into the air reservoir and the engine intake pipe. The control, power, cooling and exhaust systems are described in the respective chapters.

Replacing the sensor for the low oil pressure warning switch

Replace the sensor if it fails. The work must be carried out in an inspection trench or on a trestle. Remove the power unit protection (see "Removing the power unit protection", page 283).

The sensor is screwed into a hole in the lower part of the front wall of the cylinder block.

Press the pad retainer on the wiring harness.

...disconnect the wire harness from the sensor.

Unscrew the sensor from the threaded hole in the cylinder block with a 22 mm wrench.

The sensor connection to the cylinder block is sealed with a soft metal ring.
When installing the sensor, screw it into the cylinder block bore by hand and tighten with a tool. Connect the wiring harness to the sensor.

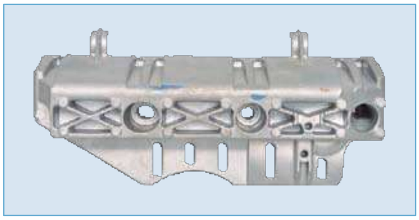
Removing the fuel sump guard

Remove the fuel filler shield for access to the injectors and when removing the cooling system radiator fan. Slide the power steering reservoir upwards from the upper radiator frame cross member bracket....

...and lower the reservoir so that the hose connecting the reservoir to the power steering pump is positioned below the ramp guard.

Through the holes in the head protection
"Unscrew the two stud nuts of the ramp shield mounting studs using a 13 mm bolt and extension.
Remove nuts from the guard wells. Slide the ramp guard forward off the inlet pipe studs....

... and remove it from the engine compartment.

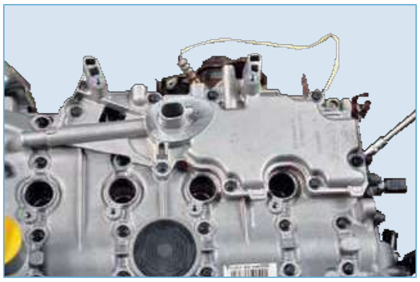


Fuel Ramp Protector

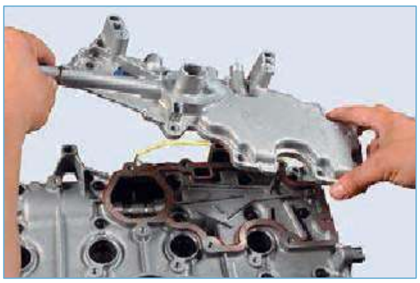
Install the fuel filler shield in reverse order.

Removing the crankcase ventilation oil separator

Remove the oil separator to clean it of deposits and when removing the cylinder head cover. Remove the air reservoir (see "Removing the air reservoir, replacing parts", page 167). For clarity, the operations are shown on the dismantled engine.

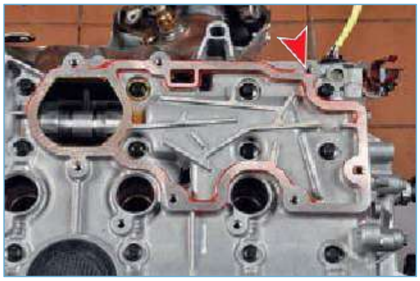


Loosen the seven bolts securing the oil separator to the cylinder head cover using an 8 mm socket....

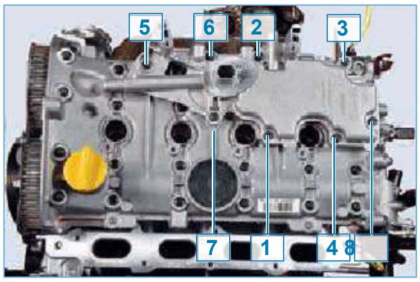


...and remove the oil separator.

Before installing the oil separator, clean and flush its cavities and channels of deposits with gasoline.



Remove old sealant from the sealing surfaces of the oil separator and cylinder head cover and degrease the surfaces.
The surfaces must be clean, dry and free of fingerprints. Apply Loctite 518 Flange Sealant to the flange flange of the oil separator until the surface is reddish in color. Install the oil separator and tighten the oil separator mounting bolts in the specified sequence to the prescribed torque (see "Appendices", page 315).



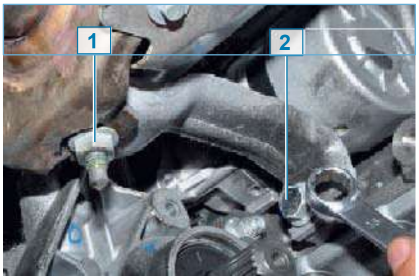
Tightening sequence for oil separator mounting bolts.
Further assembly is carried out in the same sequence.

Removing the exhaust manifold

Remove the exhaust manifold for replacing it, replacing the manifold gasket and for repairing the cylinder head. The work is performed on the inspection pit

Remove the power unit protection (see "Removing the power unit protection" p. 283). Remove the power train protection (see "Removing the power train protection", page 283). Disconnect the exhaust air intake pipe from the exhaust manifold (see "Removing the exhaust air system", page 180).

from below by a bracket attached to the cylinder block (right wheel drive removed for clarity).



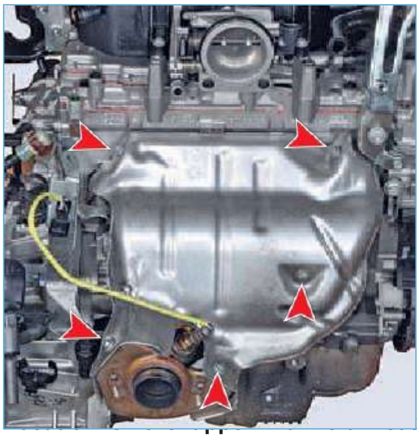
Allen wrench or socket head

"Loosen the nut 1 securing the bracket to the manifold and the bolt 2 securing the bracket to the cylinder block by several threads.

Remove the speaker mounting bracket.

Remove the air filter housing (see "Removing the air filter housing", page 166). For clarity, further operations are shown with the engine dismantled.

Unscrew the five bolts securing the upper manifold heat shield with a 10" socket.



shield mounting bolts.

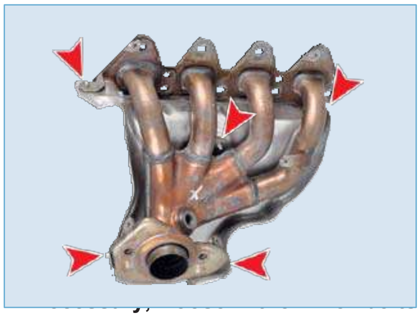
Remove the control oxygen sensor (see "Dismantling the control oxygen sensor").

"Remove the oxygen sensor, page 159). Before loosening manifold mounting nuts, lubricate threaded connections of nuts and studs with penetrating liquid such as WD-40.

Unscrew the nine nuts securing the exhaust manifold to the cylinder head studs with a tall "10" head....

...and remove the manifold assembly with the lower heat shield.

Remove the exhaust manifold gasket from the cylinder head studs.



securing the lower heat shield to the exhaust manifold with a 10 mm wrench.....

... and disconnect manifold and shield.

Before installing the exhaust manifold, clean the cylinder head and manifold flanges of carbon deposits. After installing a new gasket, reassemble in the in reverse in reverse order.

Before tightening the manifold mounting nuts, apply graphite grease to the cylinder head studs. The nuts securing the exhaust manifold manifold Tighten evenly (moving from center to edges) to the prescribed torque (see "Appendices", page 315).

Removal of camshafts, replacement of valve lever hydraulic supports

Remove camshafts for replacement in case of significant wear on cams and shaft support journals and when replacing levers

The condition of camshaft cams and their hydraulic supports, valve oil caps, as well as during cylinder head repair. The condition of camshaft cams and valve lever hydraulic supports should be assessed if there is a characteristic knocking noise in the valve train while the engine is running. The work is performed on an inspection trench or trestle. Remove the timing belt (see "Checking the condition and replacement of the timing belt on the 1.6 (16V) engine", page 42). Remove the crankcase ventilation system oil separator (see "Removing the crankcase ventilation system oil separator", page 139). For clarity, the operations are shown with the engine dismantled.

Loosen the bolt securing the oil level gauge tube guide bracket to the air intake bracket with a "10" nut.

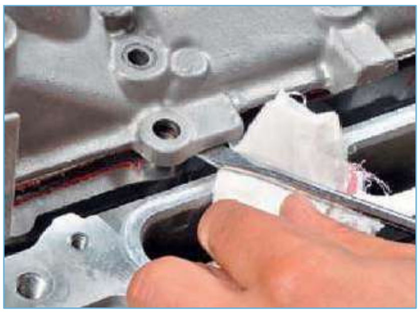
Remove the oil level gauge guide tube from the engine crankcase oil pan socket.

The guide tube is sealed in the crankcase socket with a rubber ring.

Use a "8" head to loosen the two bolts securing the eyebolt....

...and remove the air intake bracket eyebolt.

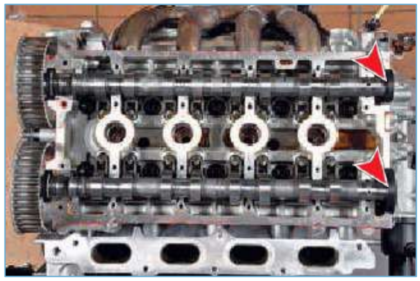
Unscrew twenty-four cylinder head cover mounting bolts using an 8 mm socket.



Using a slotted screwdriver as a lever, pry up the cylinder head cover by its flanges. Use a slotted screwdriver as a lever to pry up the cylinder head cover by the troughs.

If the vehicle is not equipped with a screwdriver, the vehicle is not to be used.

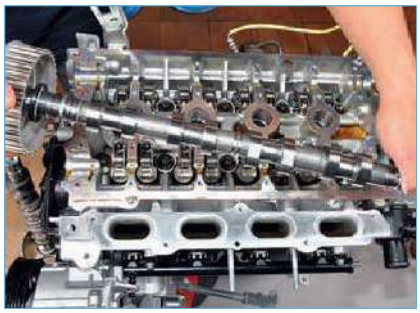
Remove the cylinder head cover.



Remove the two rubber-metal plugs from the cylinder head.

Remove cylinder head from the cylinder head beds.

...exhaust valve shaft ...



...and the exhaust valve shaft.

To evaluate the condition of the valve arm hydraulic support...

...removing the lever....

...and remove the hydraulic support from the cylinder head seat.

To check the function of the hydraulic bearing, hold the bearing by the stem and press the spherical head of the plug with your thumb. In good condition, the hydraulic support plunger should move with considerable force. If the plug moves lightly, the bearing is defective and must be replaced. Before installing a new hydraulic support, place it in a container with engine oil and press the plug several times until no air bubbles come out. The bearing should stop springing and become rigid. Remove the levers in the same way and check the condition of the hydraulic supports on the levers of the other valves. In doing so, mark the position of the parts in the cylinder head so that they are reassembled in their original positions. When reassembling the timing mechanism, the camshaft oil seals must be replaced. To remove the pulley, lay the shaft in the cylinder head bed. Put an 18 mm open-end wrench on the camshaft toothed pulley nut and insert a heavy-duty screwdriver through the hole in the pulley.

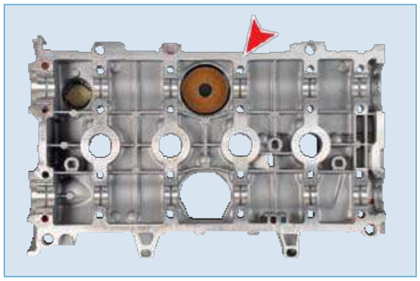
With the blade of a screwdriver resting on the pulley spoke, press the key with the screwdriver stem and turn it counterclockwise.

The camshaft pulley must not rotate and the pulley nut must be loosened.

Unscrew the nut and remove the pulley from the toe of the camshaft....

...and remove the oil seal.

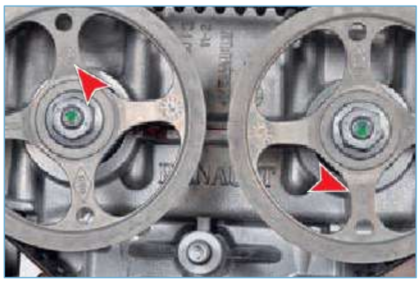
Remove the oil seal from the other camshaft in the same way. After installing the hydraulic supports and valve levers, place camshafts in the cylinder head beds. Before installing the cylinder head cover, clean old sealant residue from the fitting surfaces of the cover and cylinder head. The surfaces must be clean, dry and free of finger marks.



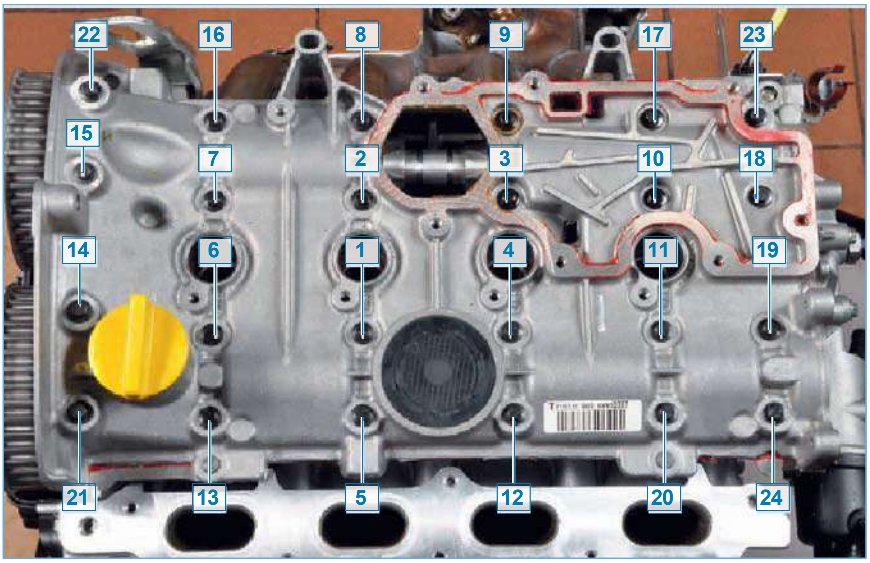
Apply Loctite 518 Flange Sealant to the flange flange of the cylinder-head cover until the surface is red in color.

Install the cylinder head cover and tighten the cylinder head cover bolts to the prescribed torque in the sequence shown in the table (see page 143).

After installing the cylinder head cover, press the new camshaft oil seals into the seats in the cylinder head using a tool bit or a piece of pipe of suitable size, having previously applied a thin layer of engine oil to the working edges of the oil seals. Having checked the timing and locked the shafts (see "Checking the condition and replacing the timing belt on the 1.6 (16V) engine", page 42), fit the toothed pulleys to the toes of the camshafts so that the Renault emblems on the pulley spokes are vertical upwards (exhaust valve shaft) and downwards (intake valve shaft). Tighten the pulley nuts lightly after tightening them.



Location of Renault emblems on the pulleys.



Numbering of cylinder head cover bolts

Admission no.	Bolt tightening procedure	Procedure for loosening the bolts	Tightening torque, N-m
1	22-23-20-13		8,0
2	1 through 12 14 through 19 21 и 24		12,0
3		22-23-20-13	-
4	22-23-20-13		12,0

Install and tighten the timing belt on the pulleys (see "Checking the condition and replacement of the timing belt").
of the engine
1.6 (16V)", page 42). Tighten the nut
Fasten the camshaft pulleys to the prescribed torque (see " Appendices", page 315). Turn crankshaft clockwise two revolutions and check correct timing (see "Checking the condition and replacement of the timing belt on the 1.6 (16V) engine", page 42). If necessary, repeat the timing adjustment. Further assembly is carried out in reverse order.

Replacing the front crank oil seal shaft

timing mechanism

Replace the crankshaft front oil seal if there are signs of oil leakage on the crankcase sump wall under the auxiliary drive pulley. The work is performed on an inspection trench or trestle. Remove the timing belt (see "Checking the condition and changing the timing belt on the 1.6 (16V) engine", page 42). After removing the belt, the crankshaft and camshaft must not be turned to avoid disturbing the engine timing. For clarity, the operations are shown on the dismantled engine. By prying off the spline

The crankshaft toothed pulley with a screwdriver.

... remove the pulley from the toe of the crankshaft.

By prying up the oil seal with a screwdriver....

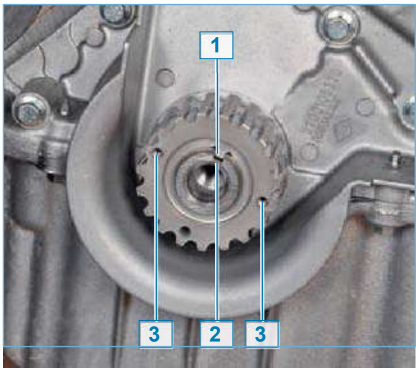
... remove it from its seat in the front cover of the cylinder block.
After applying a thin layer of engine oil to the working edge of the new stuffing box, press the stuffing box into the seat using a tool head or a suitably sized piece of pipe. The new oil seal must be

pressed to the same depth as the old one was pressed
gland (the gland should be slightly "recessed" in the cover).
For a more precise fit of the oil seal in the cover...

...it can be pressed in using an old oil seal and toothed pulley.....

... by tightening the auxiliary drive pulley bolt.

Reassemble the timing gear in reverse order. When installing the toothed pulley...



...its tab 1 (acting as a key) must fit into the groove 2 on the crankshaft nose and the threaded holes 3 on the pulley end must face outwards.

Install timing belt (see "Checking the condition and replacing the timing belt of the 1.6 (16V) engine", page 42).

Substitution rear crankshaft oil seal

Replacing the rear crankshaft oil seal of the 1.6 (16V) engine is the same as replacing the rear crankshaft oil seal of the 1.4-1.6 (8V) engine - see "Replacing the rear crankshaft oil seal", page 93).

Replacing the crankcase oil pan gasket

Replace the oil pan gasket if oil leaks at the joint between the oil pan and the cylinder block and each time the oil pan is removed during engine repair. The work is performed on an inspection ditch or overpass. The operations are shown on a vehicle with air conditioning. Remove the power train protection (see "Removing the power train protection", page 283). Drain engine oil (see "Changing the oil and oil filter in the 1.6 (16V) engine", page 39). Remove the right engine compartment mudguard (see "Removing the engine compartment mudguards", page 283). Remove the rear power unit support (see "Replacing the power unit supports", page 96). From underneath the vehicle on the front side of the engine.

...loosen the bolt securing the radiator outlet hose holder to the crankcase sump using a "10" head.

Use a 13" socket to loosen the four bolts securing the oil pan to the gearbox.

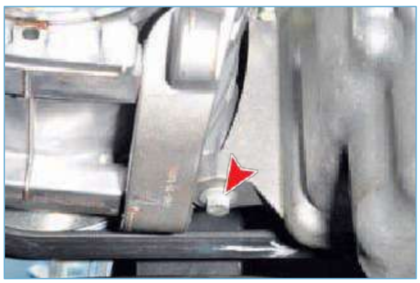
With a head "on 10" unscrew twenty bolts fixing the crankcase pan to the cylinder block, of them....

... nine bolts of the front....

...nine rear mounting bolts.....

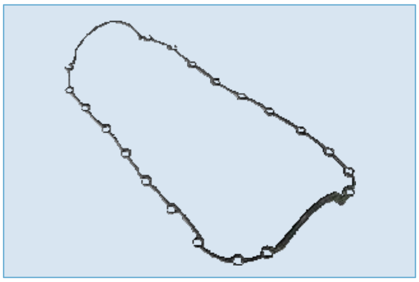
...and the two bolts on the left side mount.

The two left crankcase pan mounting bolts are long.



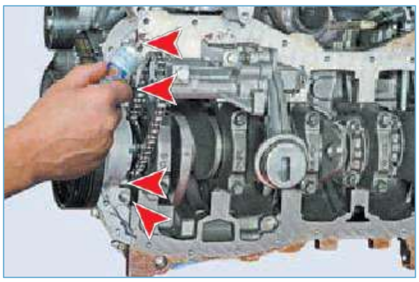
Use a 13" head to loosen the bolt securing the air conditioner compressor bracket to the crankcase pan.

Remove the oil level indicator guide tube (see "Removing camshafts, replacing valve lever hydraulic supports", page 140). Loosen the three screws securing the front bumper to the subframe (see "Removing the front bumper on the Logan", page 286). Loosen the rear subframe mounting bolts by 3-4 turns (see "Removing the subframe", page 204). After loosening the bolts securing the two subframe brackets to the body (see "Removing the arm", page 203) and the bolts securing the front subframe to the body (see "Removing the subframe", page 204), lower the front part of the subframe on the adjustable strut. Pull the subframe downwards to remove the crankcase oil pan and remove it from behind the subframe.



Remove sealing
Remove the sealing strip from the grooves in the crankcase oil pan.

Clean the cylinder block and crankcase oil pan mating surfaces of sealant and oil residue. Rinse the inner Wash the inner surface of the crankcase pan with kerosene. Place a new gasket in the crankcase oil pan grooves. Before installing the crankcase pan, apply a thin layer of sealant....



... in four places on the front cylinder head (for clarity, shown on the dismantled engine)

...and in two places on the cover of the 1st crankshaft main bearing. Install oil pan and tighten the crankcase oil pan mounting bolts to the cylinder block. Tighten the crankcase oil pan mounting bolts ("crosswise", center t o edge) to the prescribed torque (see "Appendices", page 315).

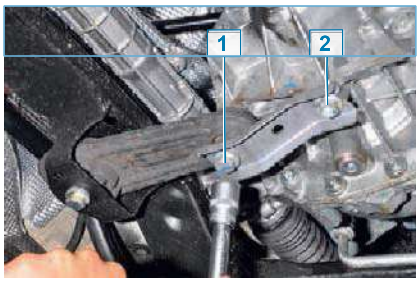
Removing the oil pump

The steps for removing the oil pump on the 1.6 (16V) engine are the same as for removing the oil pump on the 1.4-1.6 (8V) engine - see "Removing the oil pump", page 95).

Replacement of power unit supports

Replace supports if the rubber mass of the support is torn or detached from metal parts, which may cause knocking when starting the engine and driving over bumps. The work should be performed in an inspection trench or on an overpass.

Replacing the rear support



Loosen bolt 1 with an 18" socket and loosen bolt 2 of the fastener.

The bearing and bearing bracket to the gearbox crankcase.

Remove the support bracket.

Use a "18" head to loosen the bolt securing the support to the subframe....

...and remove the support.

Install the rear support of the power pack in reverse order. Tighten the support mounting bolts to the specified torque (see "Appendices", page 315).

Replacing the right support

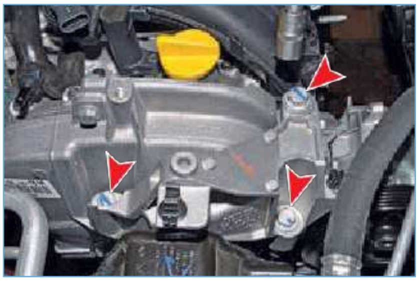
Remove the power unit protection (see "Removing the power unit protection", page 283). Place an adjustable stop (e.g. jack) under the crankcase oil pan using a wooden block. Without using the adjustable stop, the right side of the engine can be lifted slightly with an assembly spatula (by the crankcase pan, resting the spatula on the subframe)....

...and insert a wooden wedge between the subframe and the crankcase pan.

Use an 18 mm open-end wrench to loosen the bolt securing the support to the support bracket.

Remove the fuel inlet pipe to the ramp, the fuel vapor exhaust pipe from the ad- sorber and the wiring harness from the two holders on the support bracket.

Use a 16" head to unscrew...

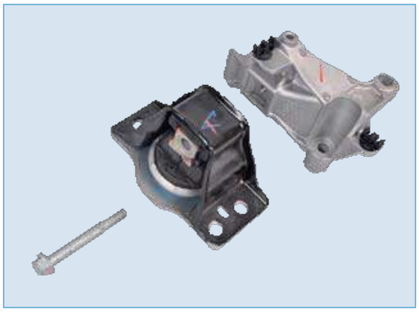


...three bolts securing the support bracket to the upper timing cover.....

...and the three bolts securing the support to the body.

Remove the right-hand support of the power-aggregate assembly with bracket.

By removing the bolt securing the support to its bracket...

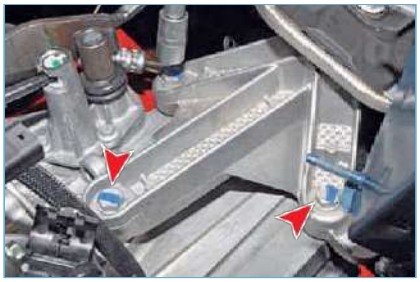


... disconnect support and bracket.

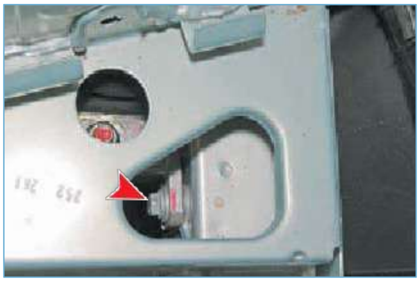
Install the right support of the power pack in reverse order. Tighten the support mounting bolts to the prescribed torque (see "Appendices", page 315).

Replacement of the left support

Remove the battery (see "Removing the battery", page 248). Remove the power unit protection (see "Removing the power unit protection", page 283). Place an adjustable stop (e.g. jack) under the gearbox crankcase using a wooden block.



Use a 16" socket to loosen the three bolts securing the support bracket to the gearbox.



Under the battery shelf, loosen the front bolt of the upper support bracket upper mounting bracket to the spar using a 13" head with a long extension.

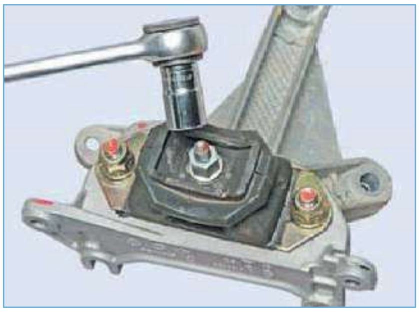
Unscrew the rear bolt of the upper support bracket upper attachment to the support member located behind the battery shelf using a 13" socket.

Under the battery shelf unscrew 2-3 turns with a 13" head with a long extension.

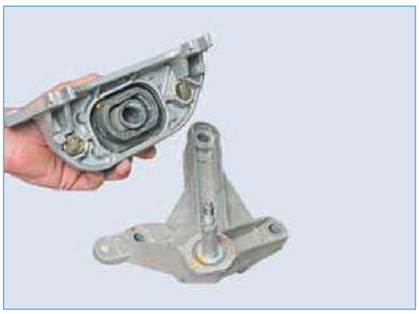
Location of holes in support bracket mounting bracket to member (shown on removed support): 1 - holes of upper attachment; **2** - holes of lower attachment

two bolts of the lower support bracket lower attachment to the support member.

Remove the left-hand support of the power-aggregate assembly.
If necessary...



... with a head "on 16" unscrew the nut fixing the support to the bracket - well ...



...and remove the support from the bracket.

Remove the rubber insert from the support.
By unscrewing two nuts with a "18" head....

... remove the support cushion. Install the left-hand power unit support in reverse order. Tighten the bolts and nuts securing the support with the specified torques (see "Appendices", page 315).

Parts of the left power unit support

Removing and installing the engine or powertrain

The work is performed when it is necessary to repair or replace the engine. If the work is carried out on an inspection trench or trestle,

The engine should be removed upwards from the engine compartment using a lifting device, having previously removed the gearbox.
In a garage equipped with a lift, it is more convenient to remove the entire power unit from the engine compartment downwards and then disconnect the engine and transmission.
The engine and power unit disassembly operations are described for a vehicle with power steering and air conditioning.
Remove the battery (see "Removing the battery", page 248). Drain engine oil (see "Changing the oil and oil filter in the 1.6 (16V) engine", page 39) and coolant (see "Changing the coolant in the 1.6 (16V) engine", page 46). Remove the air filter housing (see "Removing the air filter housing", page 166). Disconnect the exhaust intake pipe from the exhaust manifold (see "Removing the exhaust system", page 180). Remove the fuel rail guard (see "Removing the fuel rail guard", page 139). Disconnect the fuel pipe tip from the fuel filler flap connector (see "Removing the fuel filler flap and injectors", page 164). Disconnect throttle valve cable from throttle lever and air reservoir (see "Replacing the throttle valve cable", page 169). Disconnect the brake vacuum booster check valve tube from the reservoir connector (see "Removing the brake vacuum booster check valve", page 231).

Disconnect the adsorber purge tube from the engine idle speed hose connector by squeezing the two catches.

Remove the power steering reservoir from the upper cross member of the radiator frame.

Use a 13" socket to loosen the bolt securing the bracket of the power steering tube to the cylinder block.

Dismantle engine can-
в assembledc pump
power steeringsteering or
without without
disconnecting the power steering pump. In the first option, loosen the bolts securing the power steering pump to the engine bracket and, without disconnecting the tube and hose from the pump, tie the pump to the upper cross member of the radiator frame with a cord or wire so that it does not interfere with engine dismantling. In the second option, disconnect the tube and hose from the pump (see "Removing the power steering pump", page 219), draining the working fluid into a container. Remove the alternator (see "Removing the alternator, replacing the voltage regulator and rectifier unit on the 1.6 (16V) engine", page 250). Disconnect the wires from the starter (see "Removing and inspecting the starter", page 251). Unscrew the bolts securing the air conditioning compressor to the bracket (see "Removing the air conditioning compressor", page 313) and without disconnecting the air conditioning system tubes, pull the compressor spring to the side and tie it off so that it does not interfere with engine removal. Remove the cooling system radiator (see "Removing the radiator", page 128). Disconnect cooling system hoses from the thermostat cover and housing as well as from the coolant pump supply pipe. Disconnect the harness pads

Engine control system wiring harnesses from ignition coils, idle speed regulator, fuel injectors, adsorber purge solenoid valve and sensors: oxygen concentration, detonation, absolute pressure and inlet air temperature, low oil pressure alarm, coolant temperature, crankshaft position, throttle position (see respective chapters):
"Engine 1.6 (16V)", "Pi-
The engine 1.6 (16V)", "Engine management system 1.6 (16V)"). Move the wiring harnesses away from the engine.

If the engine is to be removed from the engine compartment upwards using a lifting device, the gearbox must first be removed (see "Removing the gearbox", page 189).

Lift the hood and hold it upright. Fasten the chains of the lifting device to the two lifting eyebolts on the engine.

After tensioning the chains, remove the stop from under the engine that supported it when removing the gearbox. Remove the right power unit support (see "Replacing the power unit supports", page 145).

Before removing the engine, once again check that all hoses, pipes, wires are disconnected from the engine and set aside.

Using a lifting device, lift and remove the engine from the engine compartment.

If work is carried out on a lift and the power unit is removed downwards, the alternator does not need to be dismantled - just disconnect the wiring harness. The following work must be carried out instead of removing the gearbox when dismantling the power unit.

Remove front wheel drive units (see "Removing the front wheel drive units", page 194) and subframe (see "Removing the subframe", page 204).

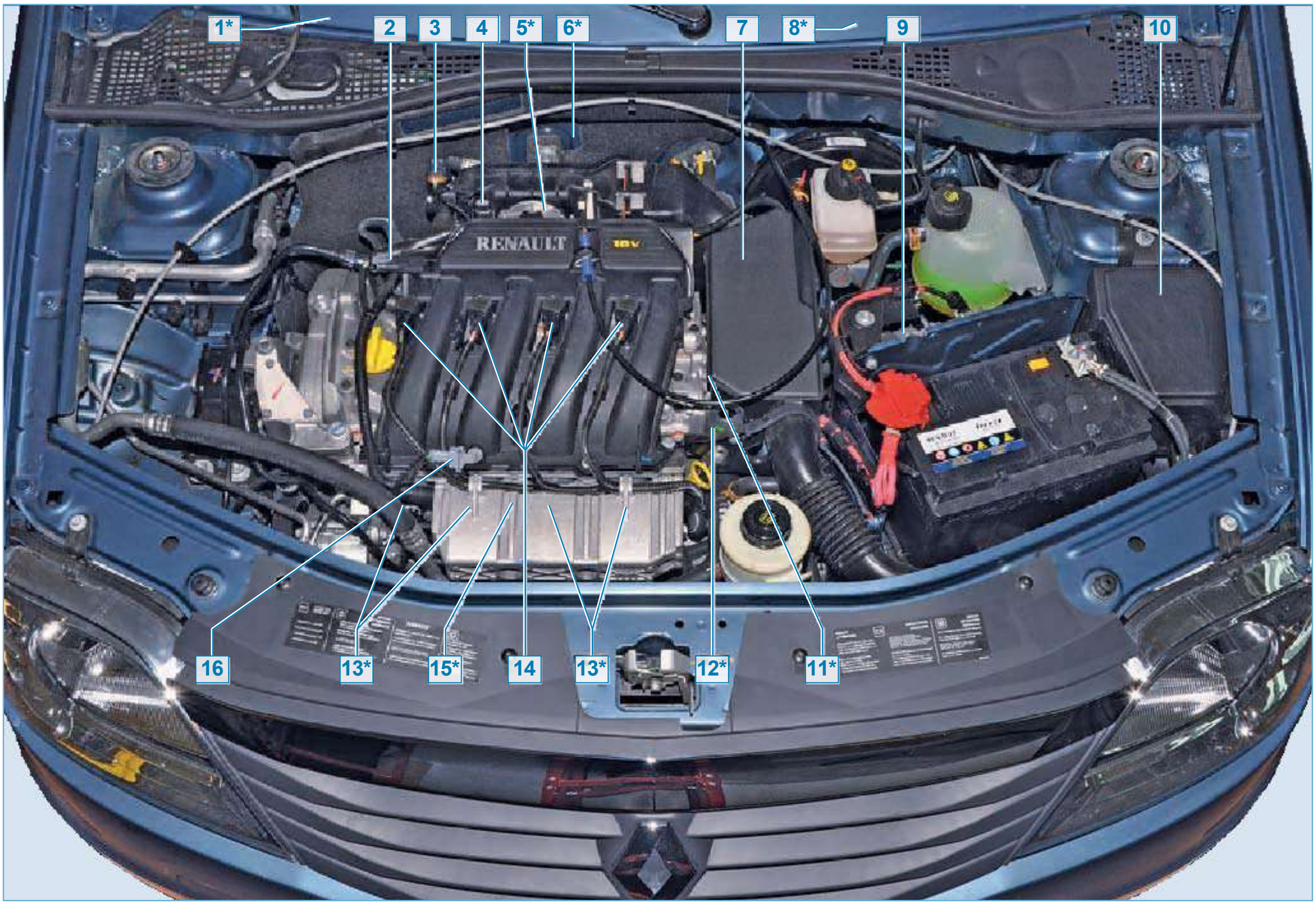
Disconnect clutch release cable from clutch release linkage fork and bracket on gearbox (see "Replacing the clutch release cable", page 183). Disconnect transmission control rod from gearshift rod (see "Removing the transmission control rod", page 188). Disconnect
"Remove mass wires and harness from gearbox (see "Removing the gearbox", page 189). Remove the speed sensor (see "Removing the speed sensor", page 110). Disconnect the wiring harness from the reversing light switch (see "Removing the reversing light switch", page 261).

Place adjustable stops or a sturdy table under the engine and gearbox. Remove the right power unit support (see "Replacing the power unit supports", page 145). Unscrew nut securing the left power unit support to the support bracket (see "Removing the gearbox", page 189). Raise the vehicle on a hoist or lower the power unit on adjustable jack stands and remove the stud of the left support bracket from the hole in the support cushion.

Remove the power pack. Install the engine or power pack to the vehicle in reverse order.

Engine management system 1.6 (16V)

Construction description



Elements of the electronic engine control system (ECS): 1* - diagnostic pad; **2 -** absolute air pressure sensor; **3** - idle speed regulator; **4** - throttle position sensor; 5* - control oxygen concentration sensor; 6* - diagnostic oxygen concentration sensor; **7** - vehicle speed sensor; 8* - control system fault indicator; **9** - electronic engine control unit; **10** - fuse and relay box in the engine compartment; 11* - coolant temperature sensor; 12* - crankshaft position sensor; 13* - injectors; 14* - ignition coils; 15* - detonation sensor; **16 -** inlet air temperature sensor.

* The item is not visible in the photo.

The engine is equipped with an electronically controlled distributed fuel injection system (separate injector for each cylinder) and an exhaust gas reduction system.

The engine management system consists of the electronic engine control unit (ECU), engine sensors and engine parameters

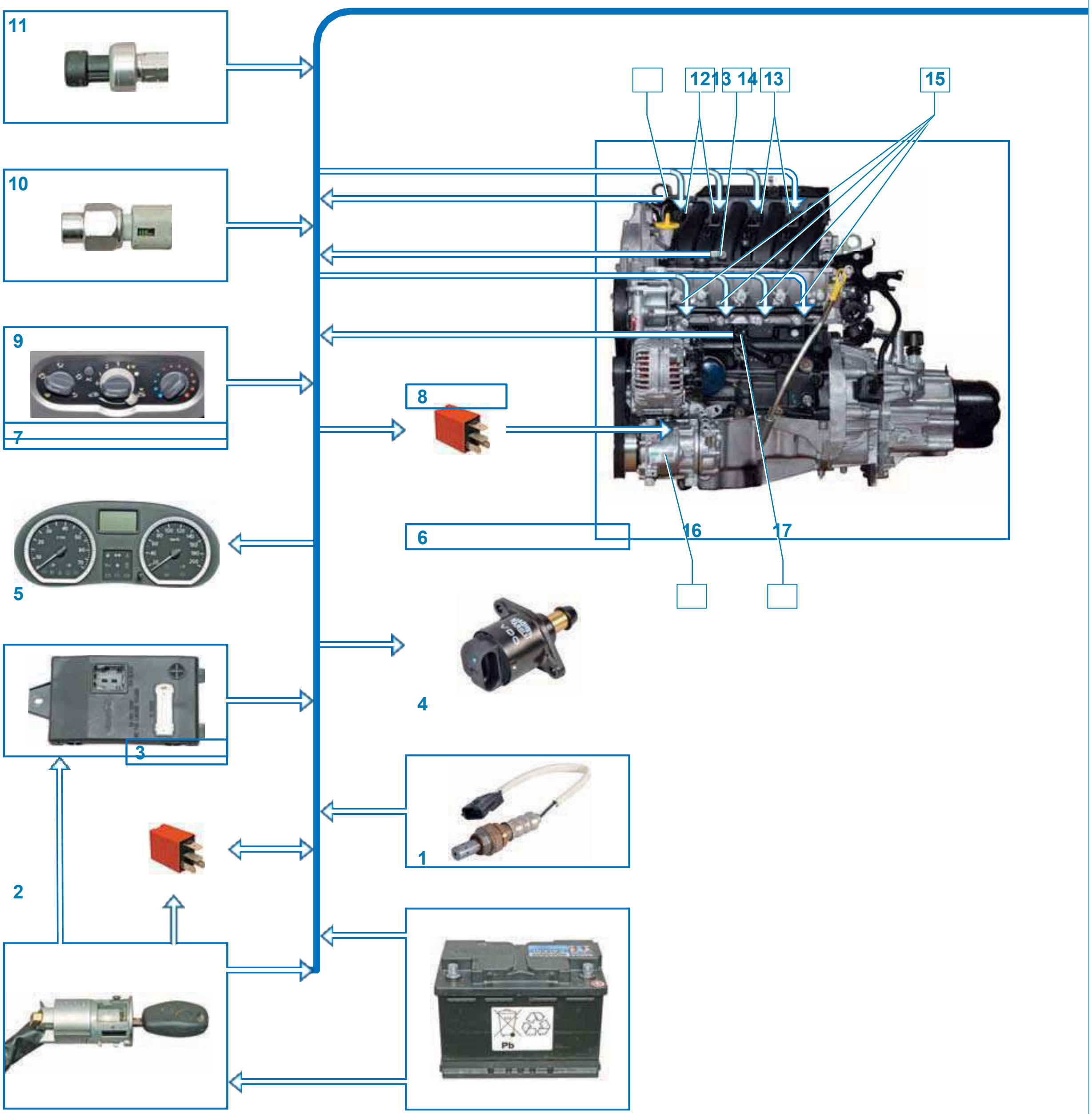
The 90-channel ECU is the central unit of the engine management system. The 90-channel **ECU** is the central unit of the engine management system.

The ECU is mounted on the rear wall of the battery compartment.

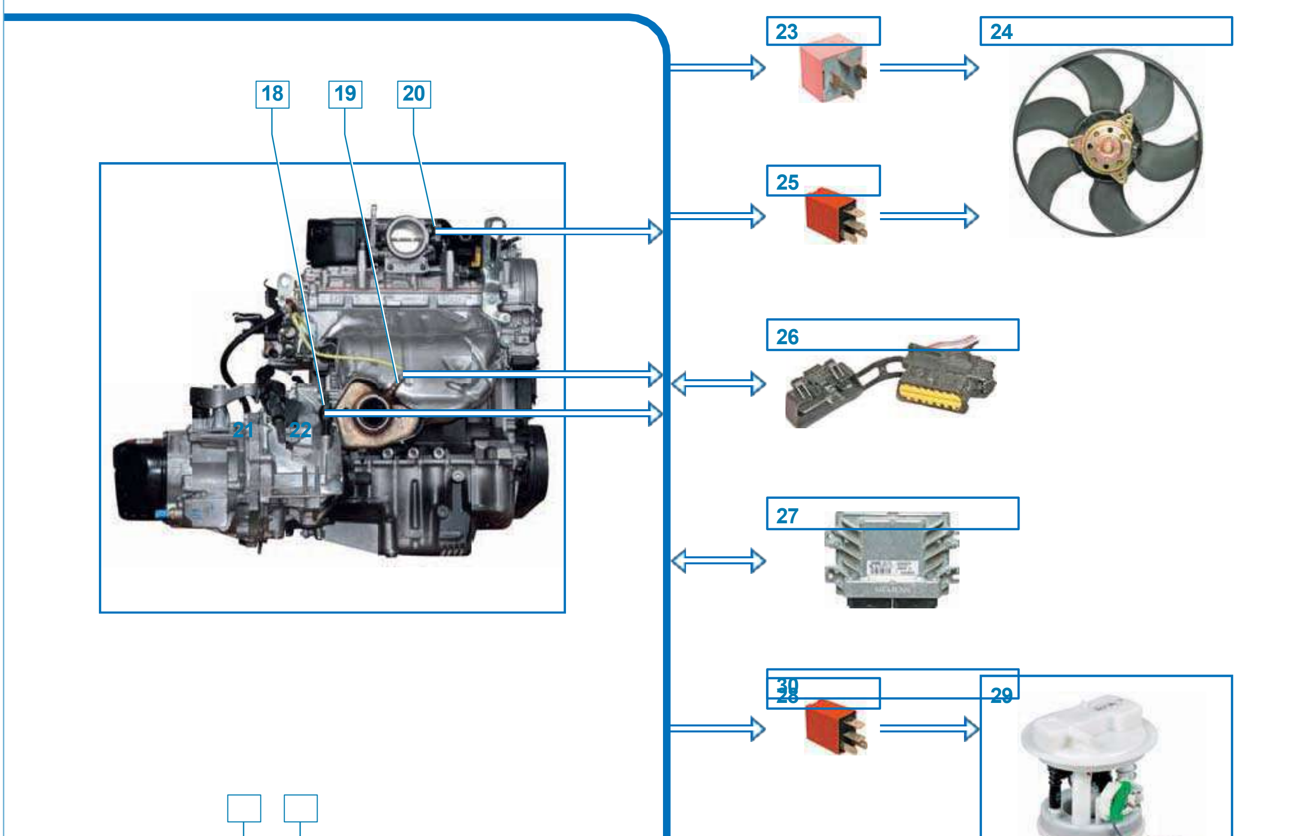
The ECU is a microcomputer with a special purpose.

It consists of a RAM and a programmable permanent memory device (PPROM).

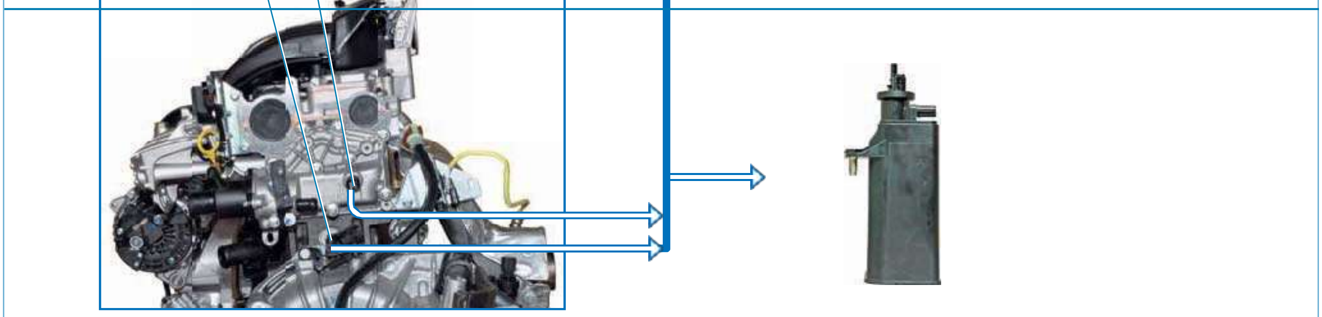
The RAM is used to temporarily store current information on engine operation (measured parameters) and calculation data. The RAM also stores the codes of the occurring



Schematic diagram of the electronic engine control system: **1** - battery; **2** - ignition switch; **3** - main relay; **4** - diagnostic sensor of oxygen concentration **5** - switching unit; **6** - idle speed regulator; **7** - instrument cluster; **8** - relay of air conditioner switching on; **9** - heating, ventilation and conditioning control unit; **10** - refrigerant pressure sensor; **11** - power steering pressure sensor; **12** - air pressure sensor; **13** - ignition coils; **14** - inlet air temperature sensor; **15** - injectors; **16** - compression-



air conditioner; **17** - detonation sensor; **18 -** vehicle speed sensor; **19 -** oxygen concentration control sensor; **20 -** throttle position sensor; **21 -** crankshaft position sensor; **22 -** coolant temperature sensor; **23 -** cooling system fan high speed relay; **24** - fan; **25 -** cooling system fan low speed relay; **26** - diagnostic connector (diagnostic pad); **27 -** electronic engine control unit; **28 -** fuel pump and ignition coil power supply relay; **29** - fuel module; **30** - fuel pump and ignition coil power supply relay.




Electronic engine control unit (ECU)

The memory is energy-dependent, i.e. if the electrical power supply is interrupted (battery disconnected or wiring harness disconnected from ECU), its contents are erased. This memory is energy-dependent, i.e. its contents are erased when the electrical power supply is interrupted (battery disconnected or wiring harness disconnected from ECU). The ROM stores the engine management program, which contains a sequence of operating commands (algorithms) and calibration data (settings). ROM determines the most important parameters of engine operation: the nature of torque and power changes, fuel consumption, ignition advance angle, exhaust gas composition, etc. The ROM is non-volatile, i.e. its contents are not changed during power failure.
The ECU receives information from the sensor
The ECU also controls actuators such as fuel pump, injectors, ignition coils, idle speed regulator, adsorber purge solenoid valve, cooling system fan, engine overheating alarm, air conditioning compressor solenoid clutch and various system relays. When the ignition is switched on, the ECU outputs a control signal to the main relay, and when the ignition is switched off, it delays switching off the main relay for the time required to prepare for the next switch-on (to complete the calculations, condition

The following functions are available: idle speed regulator setting, cooling system fan control).
The ECU also performs diagnostic functions for the engine management system (on-board diagnostic system). The ECU detects faults in the control system components and stores fault codes in its memory. If a malfunction is detected

In order to avoid negative
The consequences (burnout of pist-
The ECU activates the fault indicator in the instrument cluster and switches the system to the emergency modes of operation if a sensor or its circuit fails, the ECU uses substitute data stored in the ROM to control the engine. In the event of a sensor or sensor circuit failure, the ECU uses substitute data stored in ROM to control the engine.

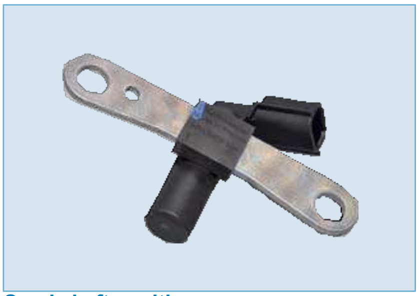
System fault indicator

The engine **control system is** located in the instrument cluster. If the system i s correct, the warning light illuminates when the ignition is switched on and then goes out - this is how the ECU checks that the on-board diagnostic system is correct. If the warning light illuminates when the engine is running, it indicates that the on-board diagnostic system has detected a malfunction and the vehicle continues to be driven in emergency mode. Do not operate the vehicle with the warning light illuminated or flashing in the instrument cluster. It is permissible to drive the vehicle independently (some engine performance parameters may deteriorate - power, speed, fuel economy) to a workshop to rectify the fault. If the malfunction is temporary


Engine management system malfunction indicator in combination devices

The ECU will switch off the indicator after 10 s, provided that there are no other fault codes in the ECU memory that require the indicator to be switched on.
Fault codes are stored in the ECU and can be read using a diagnostic tool connected to the **diagnostic socket (diagnostic block) in** the load compartment.
The crankshaft **position sensor (CCPS) is** mounted on the clutch housing, above the engine flywheel.
The sensor provides the ECU with information on speed and crankshaft angle. The sensor is of the inductive type and reacts to the teeth of the flywheel crown passing close to its core. The teeth are arranged on a disk with an interval of 6°. In order to synchronize with the TDC of pistons 1-4, one tooth of the 60 is sheared to form a depression and one tooth is double. When the double tooth and the trough pass the sensor, the sensor generates the


Diagnostic connector

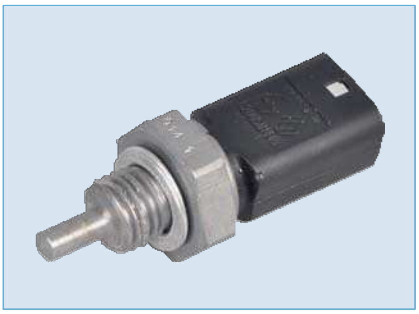


Crankshaft position sensor

The so-called "reference" synchronization pulse is generated. When the flywheel rotates, the magnetic flux in the sensor's magnetic core changes and AC voltage pulses are induced in its winding. Based on the number and frequency of these pulses, the ECU calculates the phase and duration of the injectors and ignition coil control pulses. The engine does not run if the AVC or its circuits are defective. The **coolant temperature sensor (coolant temperature sensor) is** screwed into the threaded hole in the thermostat housing located on the left end of the cylinder head. The sensor provides information to the ECU, the coolant temperature indicator and the engine overheating indicator in the instrument cluster.

The sensor is a thermo

A resistor with a negative temperature coefficient, i.e. its resistance decreases as the temperature rises. The ECU provides the sensor with a stabilized voltage of +5 V and a drop of



Coolant temperature sensor

If the sensor or its circuits malfunction, the ECU switches the cooling fan on permanently and calculates the coolant temperature, which is used in most engine management functions. If the sensor or its circuits malfunction, the ECU switches the cooling fan to constant operation and calculates the temperature value.

tours using a bypass algorithm.

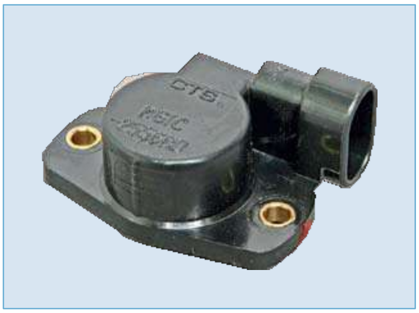
Sensor position throttle

The throttle **valve is** mounted on the throttle valve axis and is a sensor of **the** tenaciometric type.

One end of its winding is supplied with a stabilized voltage of +5 V from the ECU and the other end is connected to the ECU ground. From the third potentiometer terminal (half-zunk) the signal to the ECU is taken. The ECU periodically measures the output voltage of the remote control signal and determines the current throttle position to calculate the ignition advance angle and the duration of fuel injection pulses and to control the idle speed regulator.

If the sensor or its circuits fail, the ECU calculates the expected throttle position from the crankshaft speed and air flow.

The detonation sensor (DS) is screwed into a threaded hole in the front wall of the cylinder block, located in the area between the 2nd and 3rd cylinders.



Throttle valve position sensor

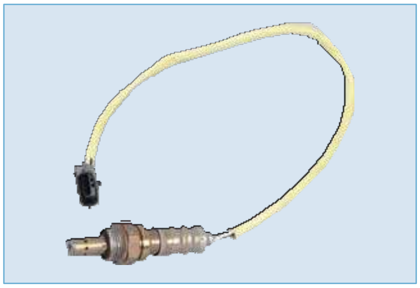
Detonation sensor

The piezoceramic sensor element generates an AC voltage signal, the amplitude and frequency of which correspond to the engine vibration parameters. When detonation occurs, the amplitude of vibrations of a certain frequency increases. The ECU adjusts the ignition advance angle to cancel detonation.

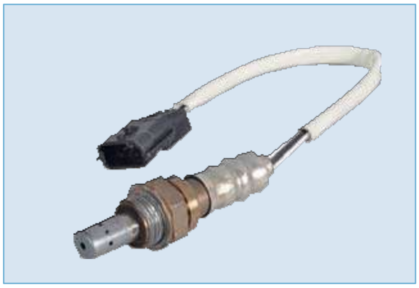
Two oxygen sensors are used in the control system.

The oxygen concentration control sensor (OCCS) is installed in the intake pipe of the exhaust system upstream of the catalytic converter. The sensor is a galvanic current source whose output voltage depends on the oxygen concentration in the environment surrounding the sensor. The ECU calculates the duration of the fuel injection pulse based on such parameters as air flow rate, crankshaft speed, coolant temperature and throttle position. On the basis of a signal from the ECU about the presence of oxygen in the exhaust gases, the ECU adjusts the fuel supply by the injectors so that the composition of the exhaust gases is optimal for efficient operation of the catalytic converter. The oxygen contained in the exhaust gases, after chemical reaction with the sensor electrodes, creates a potential difference at the sensor output, varying from approximately 100±100 mV.

to 800 ±100 mV. A low signal level corresponds to a poor mixture (presence of oxygen) and a high signal level corresponds to a rich mixture (absence of oxygen). When the UDCC is cold, there is no sensor output signal because its internal resistance in this state is very high - a few Mohms (the engine control system operates on open circuit).



Oxygen concentration control sensor



Diagnostic oxygen concentration sensor

The following applies.) For normal operation you're the oxygen sensor

The sensor must have a temperature of at least 300 °C, so a heating element controlled by the ECU is built into the sensor for rapid warm-up after the engine is started. As it warms up, the resistance of the sensor drops and it starts to generate an output signal. The ECU continuously supplies a stabilized reference voltage to the sensor circuit. Until the sensor warms up, the ECU controls the injection system without taking into account the sensor voltage. As soon as the sensor warms up, the ECU switches off the sensor heating and starts to take the oxygen sensor signal into account for closed loop fuel management. The oxygen sensor can be "poisoned" b y t h e use of ethylated gasoline or the use of sealants containing large quantities of highly volatile silicon (silicon compounds) during engine assembly. Silicone vapors may enter the combustion chamber through the crankcase ventilation system. The presence of lead or silicon compounds in exhaust gases may cause sensor failure. If the sensor or its parts fail, the ECU stores the corresponding fault code in its memory and controls the open loop fuel supply.

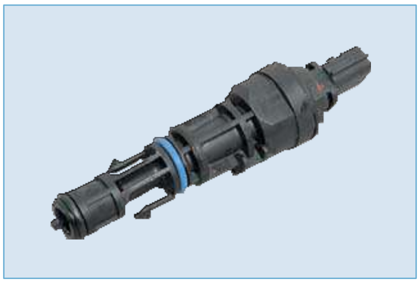
Diagnostic concentration sensor

The Oxygen Demand Control System **(ODCS) is** installed in the exhaust gas outlet pipe after the catalytic converter. Function

This sensor is used for diagnostics (performance evaluation) of the catalytic converter and for a second, more precise control of the enrichment of the fuel-air mixture (slow control system). The signal generated by the sensor indicates the presence of oxygen in the exhaust gases after the catalytic converter. If the catalytic converter is operating normally, the diagnostic sensor readings will differ from those of the control sensor (at a constant vehicle speed, the voltage at the sensor terminals should vary in the range of 600±100 mV, and below 200 mV when the vehicle slows down). The principle of operation of the diagnostic sensor is the same as that of the control oxygen sensor, but the sensors are not interchangeable.

Vehicle Speed Sensor (VSS)

The sensor is mounted on top of the gear case. The sensor is driven by a gear mounted on the differential gearbox.



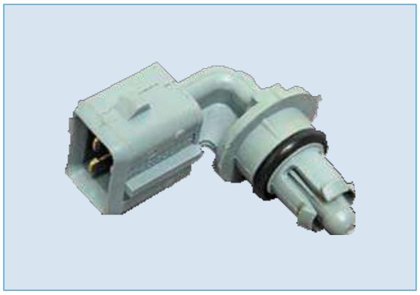
Vehicle speed sensor

The speed sensor is based on the Hall effect. The sensor provides the ECU with straight angular voltage pulses with a frequency, proportional to the rotational speed of the drive wheels. The number of pulses of the sensor is proportional to the distance traveled by the vehicle. The ECU determines the vehicle speed from the pulse frequency. If the sensor or its circuits fail, the ECU stores a fault code in its memory. The **absolute air pressure sensor (AAP) is located** in the air reservoir on the right side.

The sensor contains sensor

The ECU supplies a stabilized voltage of +5 V to the sensor resistor. The ECU supplies a stabilized voltage of +5 V to the sensor resistor. The sensor piezo element reacts to changes in pressure (vacuum) in the inlet pipe and changes the reference voltage applied to the load resistor. The ECU takes this voltage change into account when calculating the amount of air entering the engine. When exiting

Absolute air pressure sensor



Inlet air temperature sensor

Spark plug

If the sensor or its circuits fail, the ECU stores a fault code in its memory.

The inlet air temperature sensor (DTV) is mounted in the receiver at the front.

The sensor is a thermistor with a negative temperature coefficient, i.e. its resistance decreases as the temperature rises. The sensor changes its resistance depending on the air temperature in the inlet air pipe. The ECU takes the information from the sensor into account when calculating the engine air flow rate and adjusting the ignition timing angle. If the sensor or its circuits fail, the ECU stores a fault code in its memory.

The ignition system is included in the co--

The engine management system consists of individual ignition coils and spark plugs for each cylinder. There are no high-voltage wires in the ignition system - the coil is fitted with a coil end cap.

ignition coil

directly to the plug. The system requires no maintenance or adjustment during operation, with the exception of plug replacement. The ignition coil must be replaced if it fails.

The ECU controls the current in the primary windings of the ignition coils depending on the engine operation mode. The coils are energized sequentially in pairs. Thus, the spark simultaneously occurs in two cylinders (1-4 or 2-3) - one at the end of the compression stroke (working spark) and the other at the end of the exhaust stroke (idle spark). The ignition coil is non-disassembled and must be replaced if it fails.

Spark plugs with 6 kOhm±1.5 noise suppression resistor. Spark plug electrode gap - 0.9-1.0 mm, hexagonal key size - 16 mm.

The fuel injection system relays and fuses are located in a mounting block in the engine compartment (see "Electrical equipment", page 240).

Control system operation

When the ignition is switched on, the ECU activates the control system: switches on the fuel pump to build up the required pressure in the fuel sump and processes the temperature sensor signals.

The ECU uses the coolant and throttle position to calculate the fuel-air mixture when starting the engine. If crankshaft rotation is not started by the starter during this time, the ECU will send the fuel/air mixture to the engine via the

2 s switches off the fuel pump and switches it on again after starting to turn.

When the engine is running, the ECU processes sensor information (crankshaft position, throttle position, coolant temperature, absolute air pressure, intake air temperature, vehicle speed, oxygen concentration). The ECU controls the operation of injectors, ignition coils, idle speed regulator, adsorber purge valve, engine cooling system ventilator depending on the engine operation mode. When the air conditioner is switched on, the ECU increases the engine crankshaft speed at idling speed and signals the air conditioner compressor clutch to engage.

Ignition advance angle

The ECU calculates according to engine speed, engine load and coolant temperature.

The mixture composition is controlled by the duration of the control pulse to the injectors - the longer the pulse, the greater the fuel output and vice versa.

Under normal engine conditions, fuel is injected alternately into each cylinder at the start of the intake cycle. For this purpose, the ECU uses information from the crankshaft position sensor, which determines the VMT of pistons 1 and 4 as well as 2 and 3 cylinders. The system does not have a camshaft position sensor (phase sensor). Therefore, in order to determine which of the two

The ECU uses the following algorithm to inject fuel into the cylinders. At each
to stop the engine in the ECU memory
The last injector to be operated is detected and the command is given to this injector first when the engine is restarted. If fuel is not injected into the cylinder at the start of the intake cycle, the ECU activates a pro-route program and determines the correct order of fuel injection into the cylinders.
If there is no signal from the crankshaft position sensor (the crankshaft is not rotating or the sensor and its circuits are defective), the ECU switches off the fuel supply to the cylinders. The fuel supply is also switched off when the ignition is switched off to prevent self-melting of the mixture in the engine cylinders.
During engine braking (with gear engaged and clutch engaged), when the throttle is fully closed and the engine speed is high, fuel injection is not performed to reduce exhaust emissions.
When the vehicle's on-board voltage drops, the ECU increases the energy storage time in the ignition coils (for rapid ignition of the fuel mixture) and the injection pulse duration (to compensate for the increased injector opening time). If the on-board voltage increases, the accumulation time is increased.

The energy level in the ignition coils-and the duration of the feed
on the pulse nozzles are reduced.
The ECU controls the activation of the cooling fan (via a relay) depending on engine temperature, crankshaft speed and air conditioning operation (if fitted). The cooling fan is switched on,

if the coolant temperature exceeds the permissible value.

!

When servicing or repairing the engine management system, always switch off the ignition (in some cases it may be necessary to disconnect the wire terminal from the minus terminal).
When welding on the vehicle, disconnect the engine-ECU wiring harnesses from the ECU.) When carrying out welding work on the vehicle, disconnect the engine management system wiring harnesses from the ECU.
Remove the ECU before drying the vehicle in the dryer (after painting). Do not disconnect the wiring harnesses from the ECU while the engine is running.
Do not remove or adjust the engine control wiring harness and battery t e r m i n a l s . Do not start the engine if the terminals on the battery terminals and the earth cable lugs on the engine are loose or dirty.
The ECU contains electronic components that can be damaged by static electricity, so do not touch its terminals with your hands.

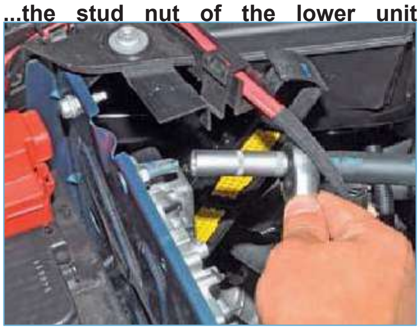
Removal of electronic control unit

The unit must be removed for replacement or when carrying out vehicle repair operations that may cause damage to the electronic components of the unit (e.g. drying the vehicle i n a dryer after painting, etc.).
Disconnect the lead terminal from the battery negative terminal.

Slide up the engine-ECU wiring harness retainer....

... and disconnect the harness harness strip from the unit connector.
Unscrew with a high head "10".

...the stud nut of the lower unit



... and the nut of the upper mounting stud.

Remove the control unit from the studs of the battery compartment.

Install the electronic engine control unit in reverse order.

Removing the position sensor crankshaft

Remove the crankshaft position sensor for inspection or replacement or when dismantling the gearbox. Remove the air intake resonator. Disconnect the engine management system wiring harness from the coolant temperature sensor (see "Removing the coolant temperature sensor", page 157). For clarity, the sensor disassembly operations are shown with the heater radiator hoses disassembled.

Unfasten the plastic retainer for the engine-ECU wiring harness....

... and lead the wiring harness away from the crankshaft position sensor.

Press the locking tab on the wiring harness connector of the engine control wiring harness.

If you are not sure about the connector ,
remove the connector block.
crankshaft position sensor
I'm not.

Unscrew the two bolts securing the sensor and the wiring harness holder bracket with a 10 mm socket.

Remove sensor and wiring harness cover bracket.

Install the crankshaft position sensor in reverse order. Fastening bolts

ghten the sensor with the prescribed torque (see "Appendices", page 315).

Removing the coolant temperature sensor

Remove the coolant temperature sensor for replacement. The sensor is screwed into the threaded hole in the thermostat housing. When removing the sensor, it is necessary to first drain some coolant from the engine (to the level of the sensor hole). When replacing the sensor (if a new sensor is available), the sensor can be unscrewed without draining the fluid and the new sensor can be screwed in without draining the fluid, plugging the hole with a finger (to prevent fluid leakage).

Dismantle the air line resonator. With the ignition off

Press the engine-ECU wiring harness retainer.

... and disconnect the harness harness strip from the sensor connector.

Unscrew the sensor from the hole in the thermostat housing using a 21 mm

open-end wrench.

The sensor connection to the thermostat housing is sealed with an aluminum washer.

Install the coolant temperature sensor in reverse order. Tighten the sensor to the prescribed torque (see "Appendices", page 315).

Check and, if necessary, adjust the coolant level in the expansion tank.

Removing the position sensor throttle valve

Remove the throttle position sensor for replacement. With the ignition off, unlock the engine-ECU wiring harness locking tab.

... disconnect the harness from the throttle position sensor connector.

Remove the throttle unit (see "Removing the throttle unit").

"Removing the Throttle Assembly," p. 165).

Using a Torx T-20 wrench, loosen the two screws securing the sensor to the throttle body....

... and remove the sensor from the throttle valve axle.

Install the sensor in reverse order. The sensor can only be mounted on the axle in one way

position with the throttle closed

I'm going to have to use the flap.

Removing the detonation sensor

Remove sensor for inspection and replacement or for engine repair. Remove the fuel filler flap guard (see "Removing the fuel filler flap guard", page 139).

Lead the wiring harnesses away from

Press the engine-ECU wiring harness wire clamp on the boat.

...disconnect the block from the sensor connector.

Use a 24" socket wrench to unscrew the...

...and remove the detonation sensor. Before installing the sensor, clean its mounting location on the engine block. Install the detonation sensor in reverse order and tighten the sensor to the prescribed torque (see "Appendices", page 315).

Removing the absolute air pressure sensor

Remove the sensor to replace its rubber sealing rings or the sensor itself. With the ignition off...

... by releasing the retainer of the engine-ECU wiring harness....

... disconnect the harness cable harness from the sensor connector.
Overcoming the resistance of the sensor's rubber O-rings....

...remove the sensor from the hole in the receiver.
If the rings are damaged in the form of cracks or tears or if the elasticity of the rubber band is lost, replace the rings with new ones. Install the absolute air pressure sensor in reverse order.

Removing the air temperature sensor inlet

The sensor is removed to replace a defective rubber sealing ring or the sensor itself. With the ignition off.

...press the wire lock on the engine-ECU wiring harness....

... and disconnect the harness from the sensor connector.
Overcoming the resistance of the sensor's plastic retainers....

...remove the sensor from the hole in the receiver.
If the sensor O-ring is damaged in the form of cracks and tears or if the rubber has lost its elasticity, replace the O-ring with a new one.
Installing the temperature sensor air in reverse sequence-
When installing the sensor, insert its retainers into the corresponding slots in the receiver bore. When installing the sensor, insert the sensor retainers into the corresponding slots in the receiver bore.

Removing the oxygen concentration sensors

Remove sensors for replacement or when dismantling the exhaust system. Perform work when exhaust system components are cold.

Removing the oxygen concentration control sensor

Remove the air filter housing (see "Removing the air filter housing", page 166). With the ignition off, unclip the engine-ECU wiring harness boat catch....

... and disconnect the harness connector from the control oxygen sensor wiring harness.
Remove the sensor wiring harness from the holder.

through the ring of the "22" ring wrench....

... put the wrench ring on the six-prong sensor....

...and unscrew the sensor from the exhaust manifold hole.

Install the control oxygen sensor in the reverse order. Before installing the sensor, apply a thin layer of graphite grease to the sensor threads to prevent it from entering the sensor through the hole in the sensor tip. Tighten the sensor to the prescribed torque (see "Appendices", page 315).

Removing the diagnostic oxygen concentration sensor

The work is performed on an inspection tent or overpass. From underneath the vehicle with the ignition off, unlock the engine control harness connector block.

... disconnect the wiring harness from the sensor wiring harness.

Remove the sensor wiring harness from the holder attached to the heat shield.

Pass the sensor wiring harness through the ring of the "for 22" wrench and, having put the ring of the wrench on the hexagon of the sensor....

... unscrew the sensor from the threaded hole in the pipe.

Install the diagnostic oxygen sensor in the reverse order. Before installing the sensor, apply a thin layer of graphite grease to the sensor threads to prevent it from entering the sensor through the hole in the sensor tip. Tighten the sensor to the specified torque (see "Appendices", page 315).

Removing the speed sensor

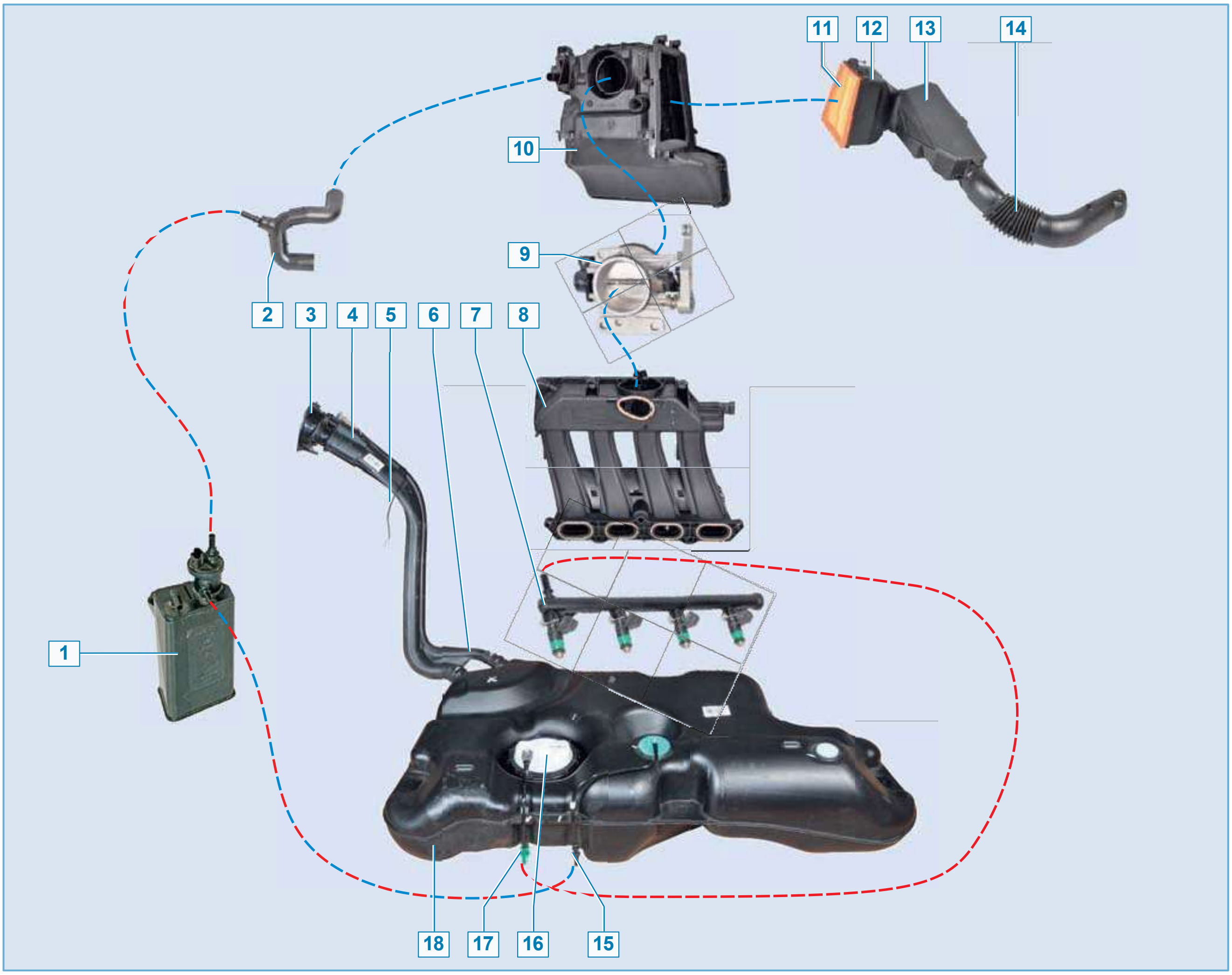
Removing the speed sensor on a vehicle with 1.6 (16V) engine is the same as removing the speed sensor on a vehicle with 1.6 (8V) engine (see "Removing the speed sensor", page 110).

Removing the ignition coil

Remove the ignition coil for inspection and replacement and for access to the spark plugs (see "Replacing the spark plugs in the 1.6 (16V) engine", page 40).

Engine power supply system 1.6 (16V)

Construction description



Elements of the power supply system: 1 - adsorber; **2** - idle air supply hose; **3** - filler neck; **4** - fuel tank filler tube; 5 - "mass" wire; **6 - fuel** tank vent tube; **7 - fuel** ramp; **8** - receiver; **9** - throttle assembly; **10 - air** filter housing; **11** - air filter replacement element; **12 - air** filter cover; **13** - air path resonator; **14** - air intake; **15** - fuel vapor supply tube to adsorber; **16** - fuel module; **17** - fuel supply tube to ramp; **18 - fuel** tank.

The fuel is supplied from a tank located under the underbody in the rear seat area. The fuel tank, filler pipe and vent tube are made of plastic. The filler pipe and vent tube are connected to the tank connections in a non-disassembled manner. In the upper part of the

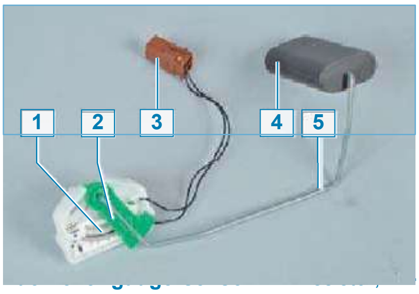
The filler pipe is equipped with a neck, which is attached to the body. The vent tube is used to remove air displaced from the tank during refueling. The **fuel module,** including fuel pump, fuel pressure regulator, fuel tank, fuel pump, fuel pump, fuel pump, fuel pump, fuel tank

filter and fuel level gauge, installed in the fuel tank. For coarse fuel purification, a strainer is installed at the module inlet.
The fuel module can be accessed via a hatch under the rear seat cushion in the vehicle underbody.

Fuel module: 1 - cup; **2** - fuel filter; **3** - module cover; **4** - fuel level gauge; **5** - float

The fuel level sensor is attached to the fuel module housing. The fuel level sensor is a variable resistor whose resistance depends on the float movement. It controls the operation of the level indicator and the minimum fuel level indicator in the tank. The fuel pump is located inside the fuel module housing. The pump is electric, submersible, rotary. It is switched on by the ECU when the ignition is switched on and delivers fuel to the mains at a pressure (approx. 6.0 bar) higher than the working pressure in the ramp.

Fuel passing through the pump, during operation lubricates and cools the pump. For this reason, the pump must not be switched on even for a short time if there is no fuel in the tank. The fuel pump has a capacity of at least 60 l/h.



slider; **3** - sensor wiring block; **4** - float; **5** - float lever

Fuel pump

The fuel is pressurized from the pump to the fuel filter. The fuel filter is part of the fuel module and must only be replaced together with it. It is designed to clean fuel from mechanical impurities with a fineness of up to 10 microns.

The fuel pressure regulator is an integral part of the fuel module and must be replaced together with it if it fails. The fuel pressure in the fuel sump should be approx. 3.2 bar with the ignition on and the engine not running.

The fuel ramp is a tube made of high-strength heat-resistant plastic on which the nozzles are mounted. The ramp is attached to the inlet pipe with two screws. There is a connector on the right side of the ramp to which the fuel supply line is connected.

The fuel is pressurized into the inside of the ramp and from there into the intake pipe via the nozzles.

Fuel ramp with nozzles

The injector is an electromagnetic valve that injects fuel into the inlet pipe channel when energized and closes by a return spring when de-energized.

The injector outlet is equipped with an atomizer with four holes through which fuel is injected into the inlet pipe channels. The ECU controls the operation of the injectors. The injectors are sealed in the ramp and inlet pipe with rubber rings and secured to the ramp with metal brackets. If the winding is open or short-circuited, the injector must be replaced.

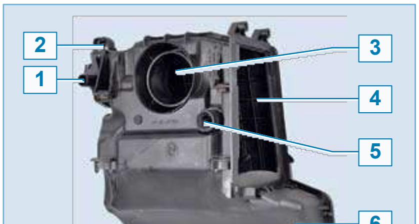
The air is supplied to the engine throttle unit via the air intake, resonator and air filter.

The **resonator** absorbs air pressure waves and reduces inlet noise.

The air filter housing is mounted on the rear of the engine. The filter element is paper. The filter housing is fitted with a neck which is connected to the throttle body connection. A crankcase ventilation system oil separator pipe is connected to the filter housing connector via a rubber bushing.

The throttle unit is made of aluminum alloy and consists of a throttle body on which a throttle position sensor is mounted.

Nozzle with O-rings



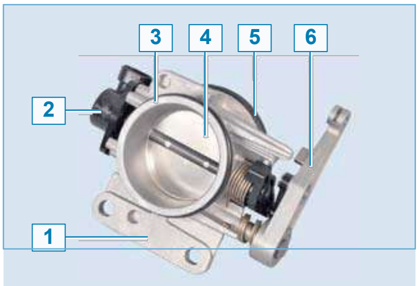
Air filter housing: 1 - idle circuit connector; **2** - idle speed regulator; **3** - throttle body connection neck; **4** - air inlet to the air filter housing; **5** - crankcase gas inlet connector; **6** - filter housing

The throttle unit is mounted between the air filter housing and the air reservoir.

When the accelerator pedal is depressed, the throttle valve opens, changing the amount of air entering the engine (fuel supply is calculated by the ECU depending on the air flow rate).

When the engine is idling (throttle closed), the ECU controls the air supply via the idle speed regulator.

The idle speed regulator (idle speed control) is mounted on the air filter housing. The idle speed regulator is a stepper motor with a micro-rometric screw (valve-

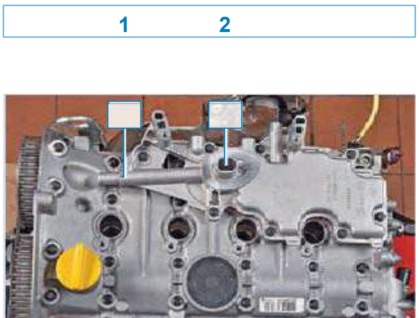


Throttle unit: 1 - body; **2** - t h r o t t l e position sensor;
3 - connection pipe to the receiver;
4 - throttle valve; **5** - air filter housing connection pipe; **6** - throttle valve drive lever

The air from the air filter housing 1, having passed through the air flow control valve 2, is supplied to the nozzle by rubber hose 4.
5 of the oil separator body and from there, through the air channel in the oil separator body, enters the receiver 3

The air flow rate is controlled by the throttle valve.) The shut-off element of the valve (needle) changes the passage cross-section of the duct and ensures that the air flow bypasses the throttle valve.

To increase crankshaft speed at idling speed, the ECU provides a control signal to open the valve, increasing the air flow bypassing the throttle plate, and conversely to reduce speed, it provides a command to close the valve. When the engine is braked, the throttle valve closes sharply and the RCC increases the air flow bypassing the throttle valve, resulting in a leaner fuel mixture. This contributes to the reduction of the fuel mixture.



Air supply (at engine idle speed) to the receiver through channels in the oil separator (for clarity, shown on the dismantled engine): 1 - pipe connecting the oil separator with the fuel con- troller; **2** - pipe connecting the oil separator with the receiver

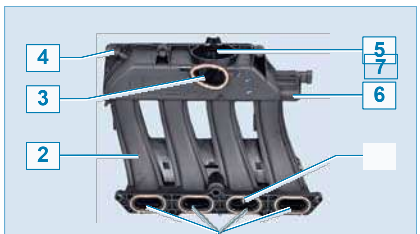
Idle speed regulator

The cold-running regulator is non-disassembling and must be replaced if it fails. The throttle control is not disassembled and must be replaced in case of failure.

After passing through the throttle unit, the air flows into the air receiver made of high-strength heat-resistant plastic.

The air flows through four separate ducts from the common air reservoir cavity to the ducts in the intake pipe. In order to ensure that the air supply to the engine cylinders is equal, the air ducts of the air reservoir and the intake pipe are approximately the same length.

The fuel vapor recovery system used in the supply system includes an adsorber, an electromagnetic valve to purge the adsorber, connecting pipes and hoses.



Receiver elements: 1 - air supply channels to the cylinder; **2** - receiver; **3** - opening for air supply after the idle speed regulator; **4** - connector for connecting the brake vacuum booster tube; **5** - flange for attaching the throttle unit; **6** - absolute air pressure sensor; **7** - inlet air temperature sensor.

Adsorber elements: 1 - adsorber; **2** - air inlet fitting; **3** - fuel vapor inlet fitting from the tank; **4** - solenoid valve fitting; **5** - solenoid valve.

Fuel vapors from the tank enter the adsorber (mounted under the front bumper, in front of the right wheel arch) through the connector marked with an arrow, where they are absorbed by a sorbent (activated carbon). The second adsorber connection is connected to the atmosphere. A solenoid valve for blowing the adsorber is mounted on top of the adsorber. The valve is connected by a plastic tube to a rubber hose supplying air to the receiver through the oil separator bypassing the throttle valve.
When the engine is stopped
The solenoid valve is closed, in which case the adsorber does not communicate with the air reservoir. The ECU, controlling the solenoid valve, purges the adsorber after the engine has been running for a preset period of time since switching to closed loop fuel control mode (the controlling oxygen sensor must be warmed up to the required temperature). The valve connects the adsorber cavity with the air reservoir and the sorbent is purged: gasoline vapors are mixed with air and discharged through the air reservoir into the intake pipe and then into the engine cylinders. The higher the engine air flow rate, the longer the ECU control pulses and the more intensive the purging.

Removing and disassembling the fuel module

The steps for removing and disassembling the fuel module on a vehicle with a 1.6 (16V) engine are the same as for removing and disassembling the fuel module on a vehicle with a 1.4-1.6 (8V) engine (see "Removing and disassembling the fuel module", page 114).

Removing the fuel ramp and injectors

The fuel filler neck is removed to check the injectors and replace them. Depressurize the fuel system (see "Removing and disassembling the fuel module", page 114).
Disconnect lead from battery negative terminal. Remove the fuel filler flap guard (see "Removing the fuel filler flap guard", page 139).

By squeezing the retainers...

...remove the fuel tube tip from the fuel socket.

By pushing down on the spring retainer.....

...disconnect the wiring harness from the nozzle.

Similarly, disconnect the wiring harnesses from the remaining injectors.

Use a "8" head to loosen the two bolts securing the fuel ramp to the inlet pipe.

Location of the fuel ramp mounting

bolts.

Sliding the fuel rail along the injector axes so that all injectors are out of their seats in the inlet pipe, remove the rail together with the injectors.

By prying up with a screwdriver...

...remove the nozzle retainer.

Overcoming the resistance of the O-ring, remove the injector from the fuel filler neck.

By prying with a thin slotted screwdriver...

...remove the nozzle o-rings.

The injector is sealed with two zinc rings: blue in the fuel rail and black in the inlet pipe. In the same way remove the rest of the injectors.

Replace the sealing rings with new ones. Reassemble and install fuel ramp with injectors in reverse order. Before assembly, apply a thin layer of engine oil to the injector sealing rings.

Removing the air intake

Remove the air intake for replacement and to access parts and components located on the left side of the engine compartment.

Unhook the rubber clamp securing the resonator....

...and remove the air intake from the resonator tube.

Squeeze the air intake socket and remove it from the hole in the body.

...and remove the air intake. Reinstall the air intake in reverse order.

Removing the throttle assembly

Remove the throttle body to replace the throttle position sensor or the throttle body itself, or in the event of damage to the rubber rings sealing the connection between the throttle body and the air reservoir and air filter housing.

Remove the two screws securing the air filter housing (see "Removing the air filter housing", page 166) and move the housing to the front panel.

Disconnect the engine-ECU harness from the throttle position sensor (see "Removing the throttle position sensor", page 158).

Disconnect the tip of the throttle cable from the throttle lever (see "Changing the throttle cable", page 169).

With a head "on 8" unscrew two bolts fixing the throttle assembly to the receiver.

Remove the throttle body by overcoming the resistance of its rubber O-ring.

If the O-rings have lost elasticity or are damaged, replace them with new ones.

Use a screwdriver to pry up the rubber ring....

...and remove it from the groove of the chuck assembly.

Remove the rubber O-ring from the other rubbing unit in the same way.

Install the throttle assembly in reverse order.

Removing the idle speed regulator

Remove the idle speed regulator for inspection and replacement.
With the ignition off...

...by releasing the lock....

... disconnect the engine-ECU harness connector from the regulator connector.

Remove the two screws securing the regulator to the air filter housing with a Phillips screwdriver....

...and remove the regulator.

The regulator connection to the air filter housing is sealed with a rubber ring.

Before installing the throttle control valve, clean the valve seat, the air duct and the O-ring surface in the air filter housing. Apply a thin layer of engine oil to the new O-ring of the regulator. Install the cruise control in reverse order.

Removing the air filter housing

Remove the air filter housing for replacement or when removing the throttle body, air reservoir and cylinder head cover.

Remove the air filter housing cover (see "Changing the air filter element of the 1.6 (16V) engine", page 40).

Disconnect the engine-ECU harness from the idle speed regulator (see "Removing the idle speed regulator", page 166).

Remove the idle speed hose from the air filter housing connection.

Loosen the two screws securing the air filter housing to the cylinder head cover using an E8 socket.

Location of the air filter housing mounting screws.

Slide the air filter housing from the throttle body to the rear, to overcome the resistance of the rubber O-ring.

That said...

...the rubber sleeve of the filter housing connector (crankcase ventilation system) comes off the oil separator socket (for clarity, shown with the filter housing removed).

Remove the throttle assembly (see "Removing the throttle assembly", page 165).

Remove the air filter housing.

If the sealing sleeve of the crankcase ventilation system connector is damaged.

Replace it with a new one if it is damaged or has lost its elasticity.

Install the air filter in reverse order.

Receiver removal, gasket replacement

The air reservoir is removed when repairing the cylinder head or to replace the gaskets in the air reservoir and inlet pipe connection.

Disconnect the engine-ECU harness from the idle speed regulator and throttle position sensor (see "Removing the idle speed regulator", page 166 and "Removing the throttle position sensor", page 158).

Use a screwdriver to pry off the wiring harness holder for the idle speed regulator and throttle position sensor.

...and slide it off the receiver rib.

Disconnecting lug of the throttle cable from the throttle lever and remove cable sheath from the bracket in the air reservoir (see "Replacing the throttle cable", page 169). Remove throttle body assembly

(see "Removing the throttle assembly", page 165).
Disconnect the engine-ECU harness cables from the intake air temperature sensor (see "Removing the intake air temperature sensor", page 159) and the absolute air pressure sensor (see "Removing the absolute air pressure sensor", page 158).

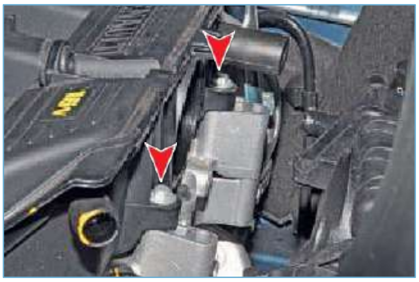
Disconnect the engine-ECU harness cables from the four ignition coils (see "Changing the spark plugs in the 1.6 (16V) engine", page 40)....

... and remove the coil harnesses from the four holders on the receiver.
Disconnect the engine management system wiring harness from the air reservoir.

Disconnect the brake vacuum booster check valve tube from the air reservoir connector (see "Removing the brake vacuum booster check valve"). The "Vacuum brake booster valve", page 231).

Unscrew the five bolts of the front mounting of the receiver to the inlet pipe using an 8 mm socket.

Location of the front receiver mounting bolts.



Use the same tool to loosen the two bolts of the rear receiver mounting to the cylinder head cover.

The air reservoir mounting bolts are special - with a cylindrical belt for aligning the air reservoir.

Remove air reservoir assembly with temperature and absolute air pressure sensors.
If necessary, we will dismantle the sensors.
If the seals at t h e connections to the oil separator and inlet pipe are damaged or have lost their elasticity, replace them with new ones.

To replace the gasket in the oil separator connection, remove it from the groove in the air reservoir flange.

Similarly, remove the four sealing gaskets from the grooves of the receiver flanges in connection with the inlet pipe.
Install new gaskets and air reservoir in reverse order. After tightening the air reservoir mounting bolts, tighten them with the prescribed torque (see "Appendices", page 315) in the following s e q u e n c e : first the five front mounting bolts (evenly from the center to the edges) and then the two rear mounting bolts.

Removing the fuel tank

Removing the fuel tank on a vehicle with 1.6 (16V) engine is the same as removing the fuel tank on a vehicle with 1.4-1.6 (8V) engine (see "Removing the fuel tank", page 120).

Removing the fuel vapor recovery system adsorber

The procedure for removing the fuel vapor recovery system adsorber on a vehicle with a 1.6 (16V) engine is the same as for a vehicle with a 1.4-1.6 (8V) engine (see "Removing the fuel vapor recovery system adsorber", page 121).

Throttle actuator cable replacement

Replace the throttle cable in the event of seizure (difficult movement of the cable in the sheath) caused by part of the wires breaking off and becoming frayed, or if the cable breaks.

Press the throttle actuator lever and disconnect the cable end from the throttle actuator lever.

Remove the cable sheath tip from the plastic bracket on the inlet pipe.

In the interior of the vehicle, under the instrument panel...

... remove the cable tip from the throttle pedal by guiding the cable through the slot in the pedal.

In the engine compartment, pry up the cable sheath bushing with a screwdriver.

...pull the bushing out of the gasket in the front shield.

Remove the cable lug from the cable grommet in the front shield.

Remove the cable from the cable holder on the battery compartment.

Install new throttle cable in reverse order. After installing the cable, the actuator must be adjusted.

When the pedal is fully released

"The throttle valve must be fully closed and the throttle valve must be fully open when the accelerator pedal is depressed all the way. The throttle lever must not have any additional travel.

To adjust the actuator...

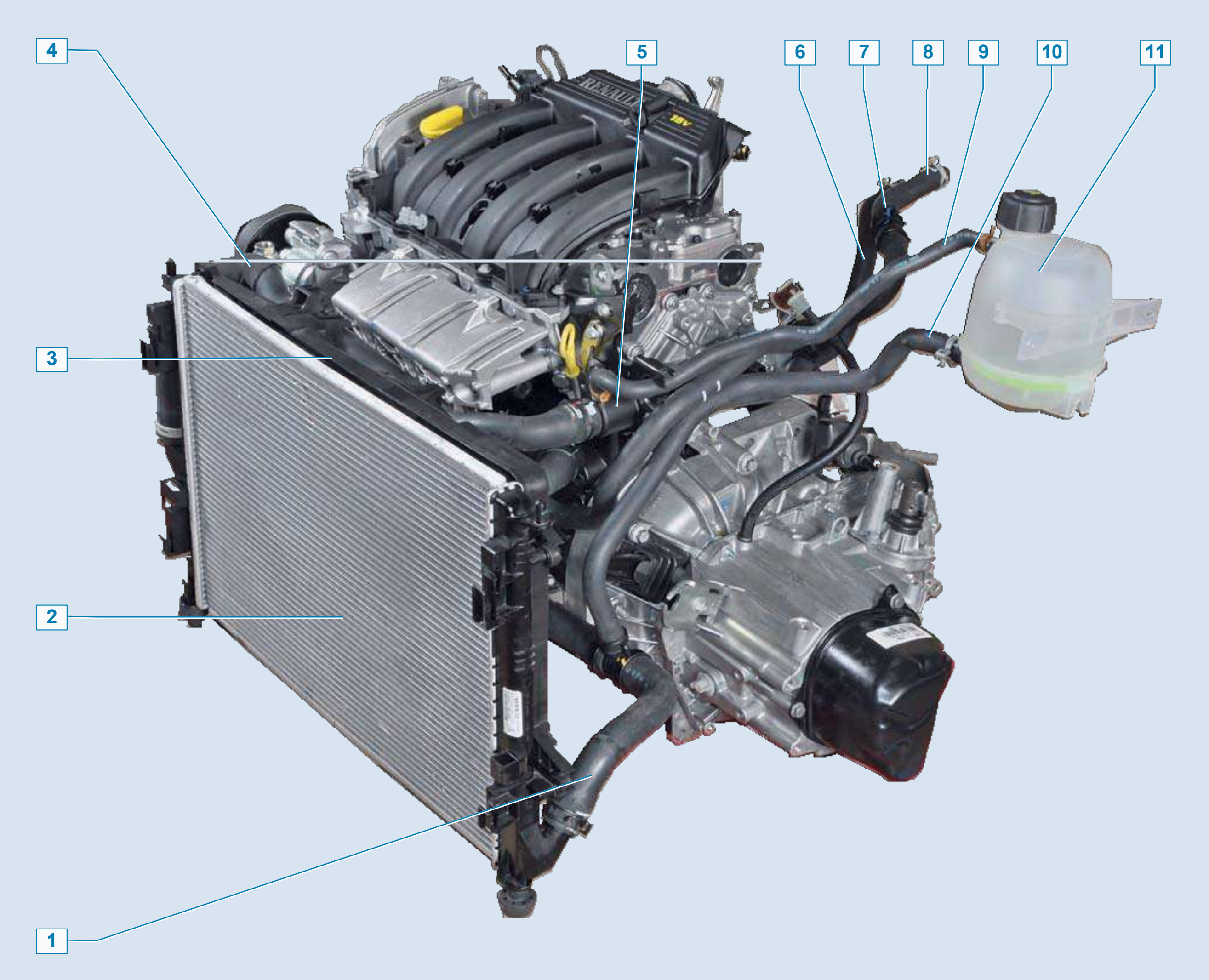
...Use pliers to remove the cable sheath upper tip retainer.....

...and by moving the tip in the plastic bracket of the inlet pipe to the desired position, insert the retainer into the annular groove on the tip.

Press the accelerator pedal a few times to ensure that the throttle valve opens and closes fully without sticking.

Engine cooling system 1.6 (16V)

Construction description



Engine cooling system: 1 - radiator outlet hose; **2** - radiator; **3** - fan guard; **4** - radiator inlet hose; **5 -** thermostat housing; **6** - heater radiator outlet hose; **7** - air outlet fitting; **8 -** heater radiator inlet hose; **9** - steam exhaust hose; **10 -** fill hose; **11 -** expansion tank.

The cooling system is liquid, closed type, with forced circulation. Consists of expansion tank, coolant pump, engine cooling head, thermostat, connecting hoses and radiator with electric cooling system.

The cooling system is connected to the radiator. The radiator is connected to the cooling system. The system is filled with coolant through the neck of the expansion tank. The expansion tank is made of translucent plastic, which allows visual inspection.

Check the coolant level. There are MAX and MIN marks on the wall of the expansion tank between which the coolant level should be between when the engine is cold. A vapor drain hose is connected to the upper reservoir connector to connect the coolant level.

Elements of the expansion tank: 1 - vapor hose; **2** - filler cap; **3** - tank; **4** - filler hose

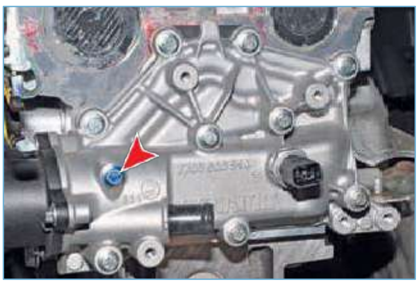
The expansion tank with thermostat cover. The expansion tank filler hose and radiator outlet hose are connected to the pump inlet pipe.
The cooling system is sealed by inlet and outlet valves in the expansion tank cap.
The exhaust valve maintains a higher system pressure than atmospheric pressure when the engine is hot. This increases the boiling point of the fluid and reduces vapor losses. The inlet valve opens when the system pressure drops when the engine cools down.

If the cap is lost, it must not be replaced with a sealed cap without valves, even one of suitable size and threads, as this will lead to an unacceptable increase in pressure in the cooling system (on a hot engine) and consequently to coolant leaking from under the hose clamps.

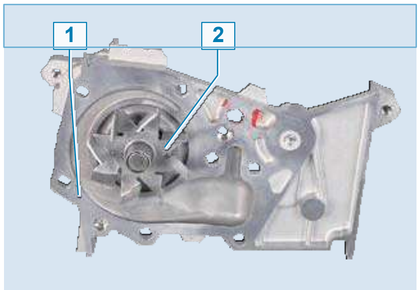
Expansion tank cap

Cooling system venting connection

There is a connector on the heater fluid supply hose and a plug on the thermostat housing for bleeding air from the cooling system when refilling it with fluid. The hose connector is sealed with a cap.
The coolant circulation in the cooling system is provided by the coolant pump. The coolant pump is of the vane type, centrifugal type, driven by the timing belt from the toothed crankshaft pulley. It consists of casing, spike assembly with seal, impeller and toothed pulley.
The fluid is supplied to the pump via a supply pipe located on the front wall of the cylinder block under the fuel sump guard.
From the pump, the fluid is pressurized to the engine cooling jacket and from there to the thermostat housing.
The thermostat helps to accelerate engine warm-up, automatically maintain its thermal condition, and automatically maintain the engine's temperature.

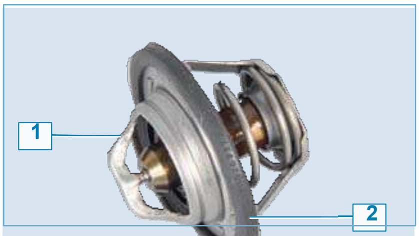


Plug on the thermostat housing for bleeding air from the cooling system



Coolant pump: 1 - housing; **2** - impeller

The thermostat has a metal cylinder with a temperature-sensitive filler (wax) inside. Inside the thermostat there is a metal cylinder with a temperature-sensitive filler (wax). The cylinder is hermetically sealed with a rubber insert. When heated, the filler melts and increases in volume, squeezing the insert. The rubber insert deforms, the diaphragm deflects and moves the stem that controls the thermostat valve.
When the engine is not warm, the valve
The thermostat is closed and closes the pipe leading to the cooling system radiator. All fluid flows through the thermostat housing to the heater radiator, bypassing the cooling system radiator and returning to the pump - small circulation circle. As the engine warms up, at a fluid temperature of 89 °C the thermostat valve begins to move, allowing the fluid flow into the radiator of the cooling system. At a temperature of 95±2 °C the thermostat valve opens fully and the fluid flows into the radiator of the cooling system, where it releases heat to the surrounding air.
Fluid movement through the jacket
The engine cooling system and the radiator of the cooling system form a large circulation circle. The fluid circulates through the heater radiator at all times and is independent of the thermostat valve position. The radiator of the cooling system consists of two vertically arranged radiators.



Thermostat: 1 - thermostat; **2** - sealing ring

Rubber cushion of the lower radiator bracket

The fluid enters the radiator through a pipe in the right tank and is discharged through a pipe in the left tank. Fluid enters the radiator through the socket in the right tank and is discharged through the socket in the left tank. There is no drain hole in the radiator.

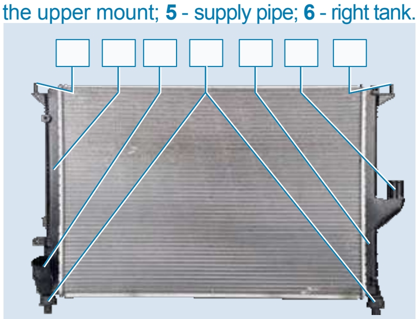
The electric fan is mounted in the casing behind the radiator.

As the temperature rises och-
coolant fan

The engine is switched on by the electronic engine control unit (ECU) via a relay.

On vehicles equipped with air conditioning, an additional resistor is mounted on the fan guard. When the coolant temperature rises or the air conditioning is switched on, the ECU switches the fan on via the additional resistor and the fan rotates at low speed. When the fluid temperature rises further

Radiator: 1 - rubber cushion of the lower mount; **2** - outlet pipe; **3 -** left tank; **4 -** pin of the upper mount; **5** - supply pipe; **6** - right tank.



The ECU activates the motor bypassing the resistor and the fan rotates at high speed.

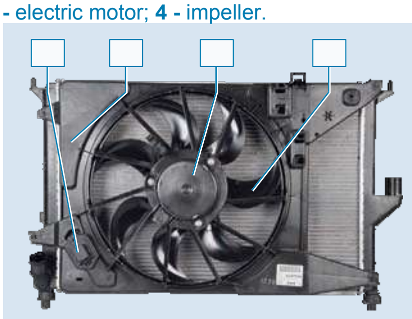
The fan switches on at low speed when the coolant temperature is above 99 °C and switches off when the temperature drops to 96 °C.

The fan turns on at a high
speeds when the temperature och-

The coolant temperature is above 102 °C and is switched off when the temperature drops to 98 °C. If
temperature If the
coolant temperature exceeds 118 ° C , the engine overheat warning light illuminates in the instrument cluster.

If the coolant temperature exceeds 103 °C after switching off the ignition, the fan continues to run at low speed for five minutes. After the temperature

Cooling system fan complete with radiator: 1 - additional resistor; **2 -** cover; **3** - electric motor; **4 -** impeller.



Additional fan resistor

Coolant temperature sensor

The fan is switched off when the liquid is below 100 °C.

The coolant temperature sensor is screwed into the thermostat housing (see "Removing the coolant temperature sensor", page 157).

The sensor provides information to the instrument cluster temperature gauge, engine overheating indicator and engine-ECU.

Removing and checking the thermostat

The thermostat is replaced when the engine heat condition is disturbed, when the engine is either overheating or underheating.

When checking the thermostat on a vehicle, after starting a cold engine, the lower hose leading from the radiator should remain cold for a while and then (after the coolant temperature reaches 89 °C) quickly (after the coolant temperature reaches 89 °C)

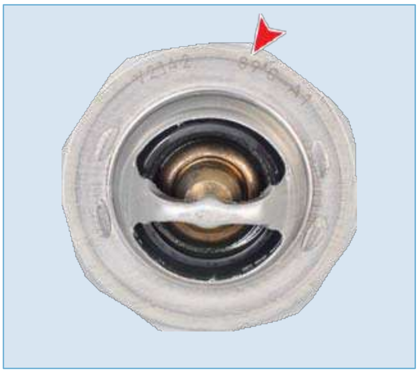
If the engine is running hot, the engine coolant will start to circulate in a large circle.
To remove the thermostat, drain the coolant (see "Changing the coolant in the 1.6 (16V) engine", page 46).
Do not remove the hoses from the thermostat cover....

...using a 10-head unscrew the three bolts securing the thermo-stat cover.....

...and pull it away from the thermostat housing.

Remove the thermostat from the housing.

The connection between the thermostat and the cover is sealed with a rubber gasket.



If the gasket is damaged or has lost elasticity, it must be replaced with a new one.
To test the thermostat, place it in a vessel with coolant. Heat the vessel, stirring the coolant at the same time and checking the start of valve opening with a thermometer. The valve stem should start to extend at 89 °C....

...as indicated by the number "89" on the thermostat flange

At a temperature of 95±2 °C the valve should be fully open - stem stroke of at least 8 mm.
Install the thermostat in reverse order.
Fill the cooling system with coolant and bring the level in the reservoir up to normal (see "Changing the 1.6 (16V) engine coolant", page 46).

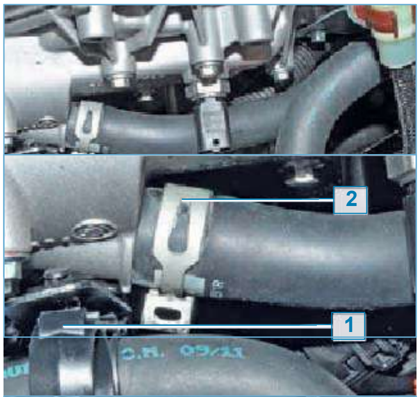
Removing the thermostat housing

Remove the thermostat housing if coolant leaks are detected at the joint between the cylinder head flange and the thermostat housing flange.
Drain the coolant (see "Changing the coolant in the 1.6 (16V) engine", page 46).
Remove the air intake (see "Removing the air intake").
"Removing the air intake," p. 165)....

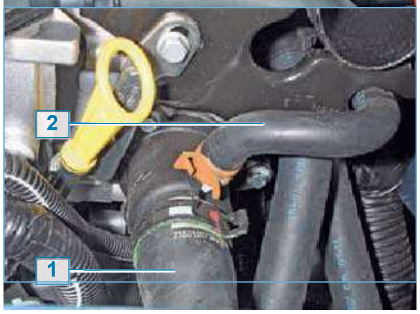
...and remove the resonator.

Disconnect the wiring harness from the coolant temperature sensor (see "Removing the coolant temperature sensor", page 157).

After overcoming the resistance of the clips, remove cooling system hose holder 1 from the holes in the bracket. Squeezing the ends of clamp 2, slide the clamp over the hose and remove the heater hose from the thermostat housing socket.



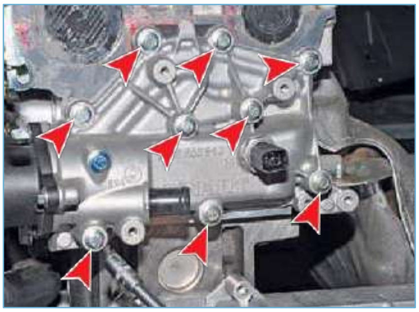
Similarly, disconnect the inlet pipe from the thermostat cover sockets



radiator hose 1 and vapor exhaust hose 2.

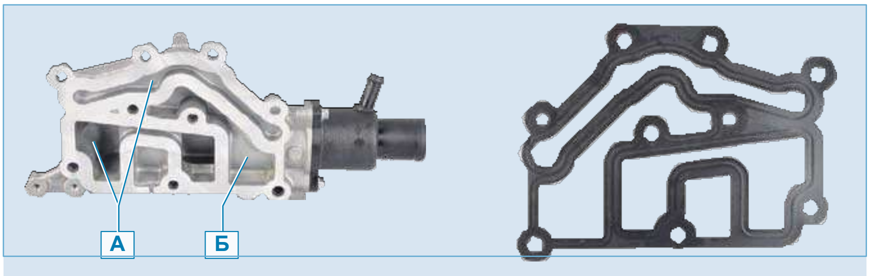
Unscrew the bolt securing the hose holder bracket with a "10" socket....

...and take it off.



Unscrew ten bolts securing the thermostat housing to the cylinder head using an 8 mm socket.

The bolt shown by the arrow is the longest of the nine bolts.



Thermostat housing with gasket: A - oil cavities; **B** - coolant cavity

Separate the pump casing from the gasket and remove it.

Remove the gasket.

Note that there are cavities in the housing and gasket for oil and coolant (see photo above).

Replace the damaged gasket with a new one.

Install the thermostat housing i n reverse order.

Fill t h e cooling system with coolant and bring the level in the reservoir to the correct level (see "Changing the 1.6 (16V) engine coolant", page 46).

Removing the radiator fan

Remove the fan for replacement and also when dismantling the radiato- The engine cooling system and the air conditioning condenser.

The work is carried out on an inspection trolley or trestle.

The work is shown on a vehicle with power steering.

Disconnect the lead terminal from the negative terminal of the battery.

Remove the power unit protection (see "Removing the power unit protection", page 283).

Loosen two screws securing the front bumper to the upper cross member of the radiator frame using a T-30 Togh wrench.

After bending the upper right-hand side of the front bumper, use the same tool to loosen the two screws securing the bracket for the power steering reservoir....

... and without disconnecting the hoses from the tank, remove the tank bracket from the upper cross member of the radiator frame.

Remove the fuel sump guard (see "Removing the fuel sump guard", page 138).

The remaining operations are the same as those for removing the fan on the 1.4-1.6 (8V) engine (see "Removing the radiator fan", page 126).

Removing the radiator

Remove radiator to check for leaks (if leaks are suspected) or replace if damaged.

The work is carried out on an inspection trolley or trestle.

Remove front

Remove the front bumper (see "Removing the front bumper on Logan", page 286; "Removing the front bumper on Sandero and Sandero Stepway", page 287). Drain coolant (see "Changing the coolant in the 1.6 (16V) engine", page 46). Remove fan

Remove the radiator fan (see "Removing the radiator fan", page 174).

Remove both headlamps to gain access to the headlamp deflector

See "Removing the headlamp assembly on the Sandero and Sandero Stepway", p. 256; "Removing the headlamp assembly on the

Use a screwdriver to pry off the upper left radiator deflector mounting bracket to the upper radiator cross member.....

...and remove the radiator deflector.

...and remove the piston from the hole.
Similarly, remove the right upper deflector mounting piston....

...and two lower ones, one on each side.

Remove the piston located behind the radiator trim in the same way.

Use sliding pliers to loosen the hose clamp on the supply hose.

...and remove the hose from the radiator connection.

The air conditioning condenser is mounted in plastic feet made one piece with the plastic radiator reservoirs.

To remove the condenser without disconnecting the refrigerant inlet and outlet pipes....

...use a screwdriver to tighten the lock of the upper condenser bracket and the lower one (not visible in the photo).

Lift the left side of the condenser so that the bracket clips remain in the pinched position.
Perform the same operations on the right side of the condenser, then lift the condenser by removing its brackets from the radiator feet....

... and carefully lower the condenser to the floor, taking care not to damage the tubes connecting it.

Use a 10" head to loosen the bolt securing the left upper radiator bracket....

...and remove the rubber cushion bracket from the left radiator tank pin.

Remove the right-hand bracket from the right-hand radiator reservoir pin in the same way.

Lift the radiator so that the rubber pads of the lower mounting bracket come out of the holes in the subframe cross member.....

...and pull it down.

Remove the lower radiator support cushions from the radiator pins.

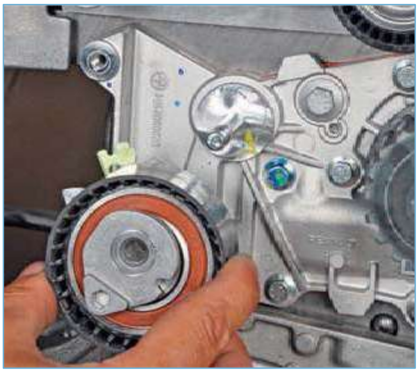
If necessary, remove rubber cushions from the upper mounting brackets. Replace cracked, loose rubber cushions.
Check radiator tightness in a bath of water. Having plugged radiator connections with wooden plugs, supply it with compressed air at a pressure of about 0.1 MPa (1 kgf/cm2) through one of the tubes and lower the radiator into the water bath for at least 30 seconds. There should be no etching (bubbles) of air. Replace a leaking radiator with a new one.
Install the radiator in reverse order.
If the rubber cushions for the lower radiator mounting were removed with the radiator, first insert the cushions into the holes in the subframe when installing the radiator.

Fill t h e cooling system with coolant and bring the level in the reservoir up to normal (see "Changing the 1.6 (16V) engine coolant", page 46).

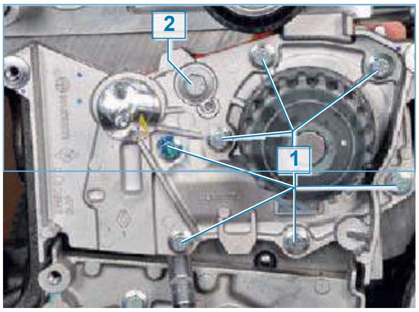
Removing the coolant pump

Replace the pump assembly if there is bearing noise or if the pulley turns tightly with the drive belt removed, if there is a large radial play of the pump shaft or if the fluid leaks from the inspection hole.
Drain the coolant (see "Changing the coolant in the 1.6 (16V) engine", page 46).

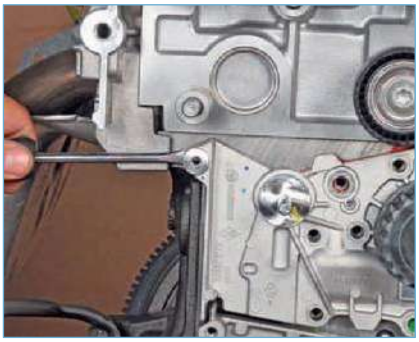
Remove the timing belt....



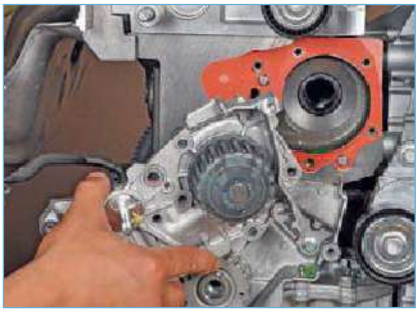
...and tensioner (see "Checking the condition and replacing the timing belt of the 1.6 (16V) engine," page 42).



Unscrew seven bolts 1 and one bolt 2 securing the pump to the cylinder block with a head "for 8" and one bolt 2 with a head "for 10".



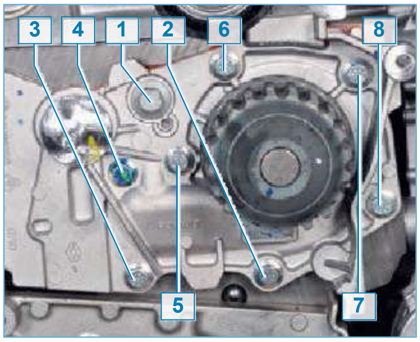
Using a slotted screwdriver, pry the pump off the cylinder block....



...and remove the coolant pump.

Remove the gasket. Install a new gasket.

Install the coolant pump in reverse order. Tighten the pump mounting bolts to the specified torque.



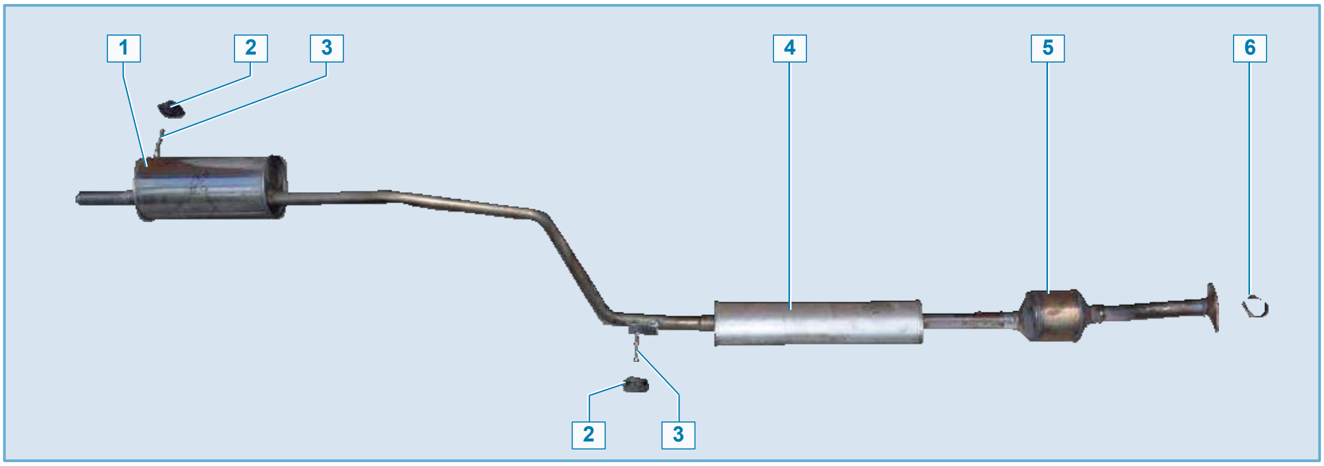
Tightening sequence of coolant filler bolts

Removing the expansion tank

The procedure for removing the 1.6 (16V) cooling system expansion tank is the same as for removing the 1.4-1.6 (8V) cooling system tank (see "Removing the expansion tank", page 129).

Exhaust system of the 1.6 (16V) engine

Construction description

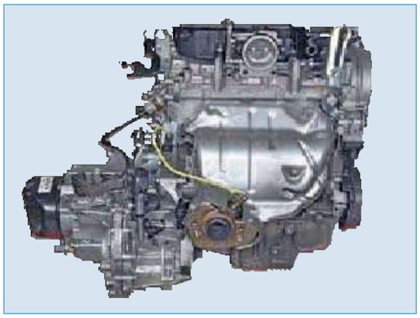


Exhaust system: 1 - main muffler; **2** - exhaust system suspension cushion; **3 -** system suspension bracket; **4 -** additional muffler; **5** - exhaust gas catalytic converter; **6** - o-ring.

The exhaust system consists of exhaust manifold, intake pipe with catalytic converter, additional and main silencers and connecting pipes. All system components except the exhaust manifold are welded as a single unit. The flange of the exhaust manifold is connected by a ball joint to the flange of the intake pipe.
The exhaust system is suspended from the body on two rubber pads.

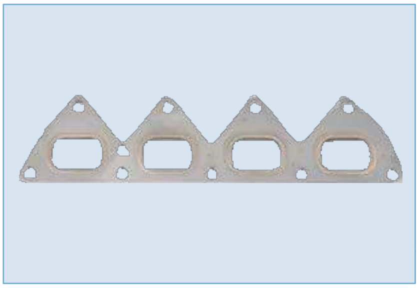
Exhaust system suspension cushions

Heat shields are fitted over the neutralizer, additional and main silencers and near the fuel tank.
The exhaust manifold is secured to the cylinder head studs with nine nuts.
A metal gasket is installed between the exhaust manifold and the cylinder head.



heat shield (shown with the engine removed for clarity).

The intake pipe flange is attached to the exhaust manifold flange on two studs.
To seal the swivel joint between the exhaust manifold and the intake pipe, a composite ring with a spherical outer surface is fitted to the flange of the exhaust manifold and a spherical inner surface is fitted to the flange of the intake pipe.

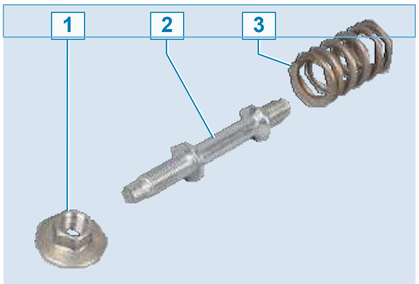



Sealing ring with spherical surface

The flange connection is tightened by two nuts and cylindrical springs, put on the studs of the exhaust manifold.

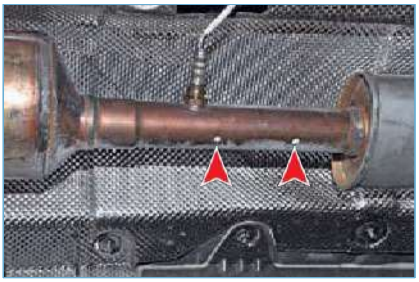

Connecting the intake pipe to the exhaust manifold

A control sensor for the concentration of oxygen in the exhaust gases (lambda probe) is installed in the lower part of the exhaust manifold. The second oxygen concentration sensor - diagnostic - is installed in the pipe after the catalytic converter.
The catalytic converter is designed to reduce emissions of carbon monoxide, nitrogen oxides and unburned hydrocarbons.



Parts of connection of the intake pipe and exhaust manifold: 1 - nut; **2** - stud; **3** - spring

Catalytic A catalytic converter is a catalytic converter with many pores coated with gas catalysts: rhodium, palladium, platinum. Passing through the pores, carbon oxide is converted into carbon dioxide, unburned hydrocarbons into water vapor, and nitrogen oxides are reduced to harmless nitrogen. The degree of gas purification in a serviceable neutralizer reaches 90-95%. For normal operation of the neutralizer, the composition of the exhaust gases (in particular, their oxygen content) must be as follows must be within strictly defined limits. If lead compounds are present in the exhaust gases, the catalytic converter and the oxygen sensor fail quickly. For this reason, operating the vehicle with with leaded gasoline is strictly forbidden, even for short periods of time. A faulty ignition or power supply system can also cause the neuralizer to malfunction. In the event of ignition failure, unburned fuel enters the neutralizer, burns out and sinter the catalyst assembly, which can lead to blockage of the exhaust system and engine stoppage (or severe loss of power). Mufflers and catalytic converters are non-disassembling components and must be replaced if they fail. Spare parts include the neutralizer with the intake pipe, an additional


Location of marks on the pipe between the neutralizer and the auxiliary silencer


Positioning the marks on the pipe between the additional and main silencers

and main silencer with pipes of a certain length, as well as special clamps for connecting the pipes. To replace a single component of the complete system, the pipes are marked in two places with coring marks, which can be used to cut the pipes.
Maintenance of the exhaust system includes periodic inspection, checking for leaks and corrosion, tightening loose connections and replacing rubber suspension pads.


Connect the pipes of the new assembly to the pipes of the exhaust system with a special connector

Substitution exhaust system suspension cushions

The operations for replacing the exhaust system suspension pads of the 1.6 (16V) engine are the same as for replacing the exhaust system suspension pads of the 1.4-1.6 (8V) engine (see "Replacing the exhaust system suspension pads").

exhaust system suspension cushions", page 132).

Withdrawal exhaust systems exhaust gases

If one of the silencers burns out, the catalytic converter fails or there is major mechanical damage, the complete assembly must be replaced.
Individual exhaust system components are also available as spare parts. To replace them, the damaged component must be cut out and replaced with a new one (see "Construction description", page 178 and "Exhaust system component replacement", page 180).
Work is carried out on an inspection duct or trestle.

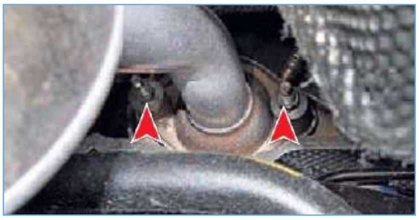
! **To avoid burns, start work after the exhaust system has cooled down.**

To remove the starter system parts from the space between the body and the rear suspension beam, hang up the rear of the vehicle.
Remove the two rubber exhaust system suspension cushions from the body brackets or exhaust system brackets (see "Replacing the exhaust system suspension cushions", page 132).

Disconnect the wiring harness of the diagnostic oxygen sensor from the engine-ECU harness (see "Removing the oxygen sensors", page 159).

A tall 14" head with an extended-

The following table summarizes the following: - retract the two lug nuts the intake pipe flange to the exhaust manifold flange.



The position of the flange nuts on the tailpipe and exhaust manifold.

(in this case the nut has come off together with the stud).

Pull the flange of the intake pipe away from the exhaust manifold flange....

... and remove the O-ring from the exhaust manifold flange.

If the ring is cracked and the sealing spherical surface is damaged, replace the ring with a new one.
Sliding the exhaust system back...

...and by passing the launch system parts between the rear suspension beam and the underbody.....

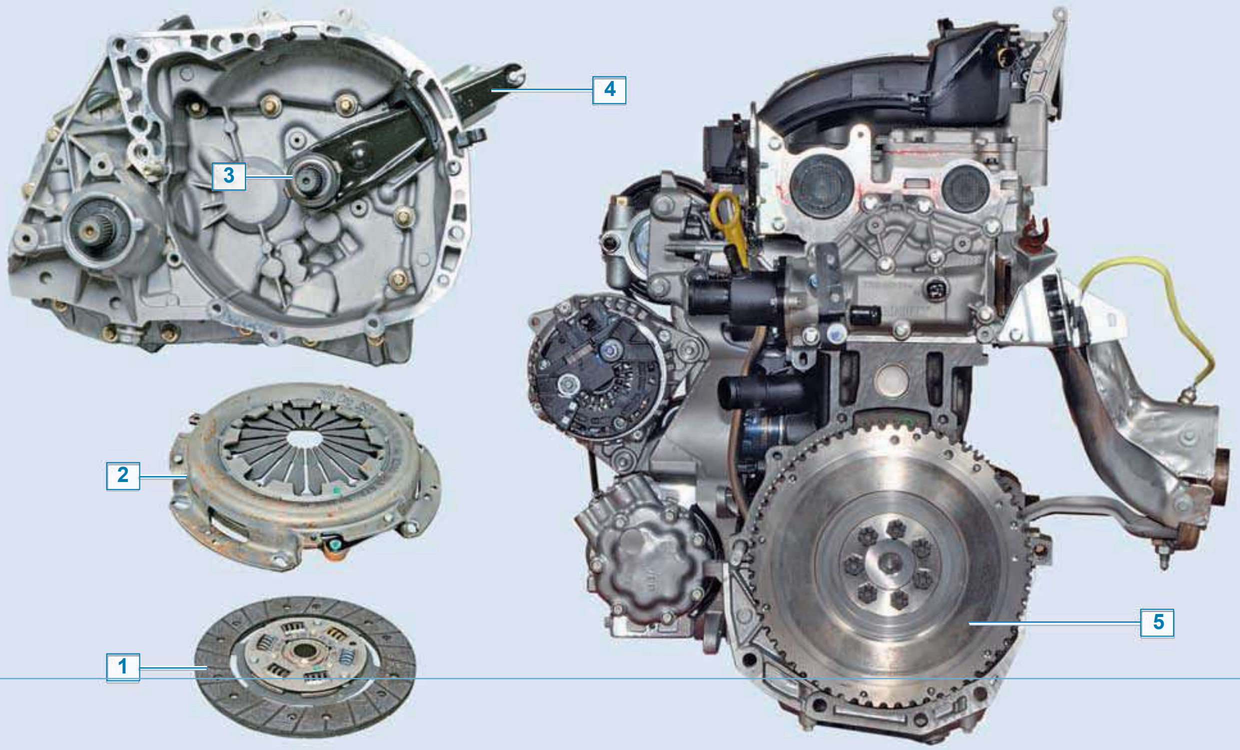
Install the exhaust system in reverse order.
If the nuts were loosened together with the studs when disconnecting the flanges of the tailpipe and the exhaust manifold, screw the studs back in before installing the exhaust system.

Replacement of exhaust system components

The operations for replacing exhaust system components in the 1.6 (16V) engine are the same as for replacing exhaust system components in the 1.4-1.6 (8V) engine (see "Replacing exhaust system components", page 133).

Clutch

Construction description



Elements of the clutch Logan and Sandero cars: 1 - driven disk; **2** - pressure plate with the casing assembly ("basket"); **3** - clutch release bearing with clutch assembly; **4** - clutch release fork; **5** - flywheel

The clutch is single-disc, dry, with central diaphragm spring. The mechanism is located in an aluminum crankcase, structurally united with the gearbox and attached to the engine cylinder block.

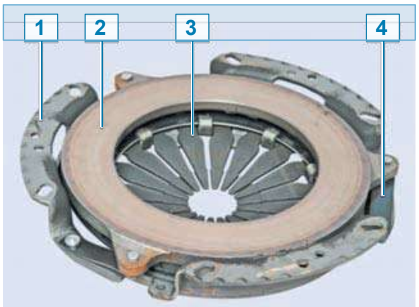
The clutch housing is connected to the engine flywheel by six bolts. Three pins are pressed into the flywheel, which, when the clutch is installed, are inserted into the corresponding holes in the housing, centering the clutch housing.

The diaphragm spring is installed in the hood. The diaphragm spring is installed in the housing. It is stamped from spring steel sheet. When free, the diaphragm spring has a truncated cone shape with radial slots extending from the inner edge of the spring. The spring slots form eighteen lobes, which are elastic release levers. Due to the elasticity of the levers, the diaphragm spring creates a more even spring rate.

The clutch pressure on the clutch pressure plate contributes to smoother clutch engagement and disengagement. The housing is connected to the pressure plate at three points by elastic steel plates. This assembly (also known as the clutch basket) is balanced on a bench and must therefore be replaced as a complete unit. The clutch basket must be replaced if the diaphragm spring lobes are annularly worn to a depth of more than 0.8 mm,

and in the event of reduced pedal force when disengaging the clutch (and consequently increased travel), which indicates heavy wear on the pressure plate or
"the spring's sag.

The torsion spring disc is located on the splines of the transmission primary shaft between the flywheel and the pressure plate. It provides an elastic connection between the clutch slave disk and the transmission primary shaft. Dampens torsional vibrations caused by dynamic loads in the transmission and unequal engine operation. Two friction plates are riveted on both sides to a spring plate, which in turn is riveted to one of the two damper plates. A disk hub is mounted between the damper plates. The hub and damper plates are separated by the damper springs. The damper plates are connected by three support pins. The disk hub has cut-outs opposite the support pins which allow the hub to rotate within certain limits relative to the damper plates while compressing the damper springs. This reduces dynamic loads in the transmission when starting the vehicle and when shifting gears. The outer diameter of the driven disk for a car with a 1.4 liter engine is 180 mm, with a 1.6 liter engine - 200 mm, disk thickness - 7.6 mm. The driven disk should be replaced if its axial runout in the friction lining area exceeds 0.5 mm, oiling, cracking, scoring or uneven wear of the lining, loosening of rivet connections, as well as if the rivet heads are recessed from the lining surface by less than 0.2 mm.

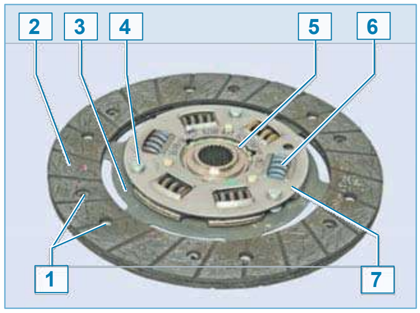


Clutch "basket" (pressure plate with clutch cover assembly): 1 - clutch cover; **2 - pressure** plate; **3 -** diaphragm spring; **4 -** connecting plate.

The clutch actuator in **Logan** and **Sandero** is cable-operated. The front cable tip is fixed in the clutch fork and the rear cable tip in the clutch pedal holder.

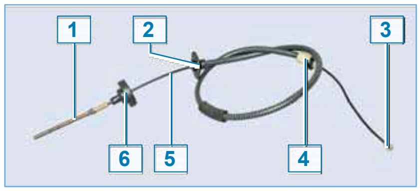
The front tip is threaded and is used to adjust the clutch release actuator. The clutch pedal is mounted on an axle in the pedal unit bracket. The pedal return spring is mounted on the same axle. The fork pivots on a ball bearing in the clutch housing. A clutch release bearing is mounted between the clutch release fork and the diaphragm spring pads. There are two hooks on the clutch of the sub-collar, by which it hooks into the fork legs. A clutch engagement scheme is used in which the bearing is permanently pressed against the diaphragm spring lobes. The bearing moves freely on a guide bush pressed into the clutch housing.

The clutch is disengaged as follows. When the clutch pedal is depressed, the cable turns the clutch release fork, which moves the bearing along the guide bush. The bearing presses against the diaphragm spring. The diaphragm spring deforms and moves the diaphragm spring.

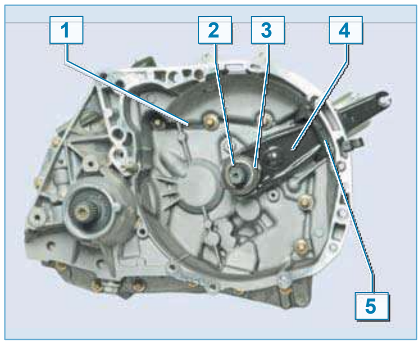


Clutch driven disk: 1 - friction lining rivet; **2** - friction lining; **3 -** spring plate; **4 -** support pin; **5** - disk hub; **6** - damper spring; **7 -** damper plate.

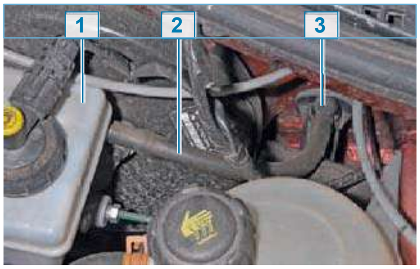
When the pressure plate is pressed against the flywheel, the pressure plate moves away from the flywheel, allowing the engine crankshaft and transmission primary shaft to rotate independently of each other. When releasing



Clutch drive cable: 1 - front cable tip; **2 -** front cable sheath tip; **3 -** rear cable tip; **4 - rear cable** sheath tip; **5 -** cable; **6 -** rubber support sleeve



Elements of the clutch drive mechanism: 1 - clutch crankcase; **2 - clutch** release bearing guide bushing; **3 - clutch** release bearing with clutch assembly; **4 - clutch release** fork; **5 -** mud cover.



Elements of clutch hydraulic system of Sandero Stepway car: 1 - brake master cylinder and clutch cylinder reservoir; **2** - fluid supply pipe to clutch master cylinder; **3** - clutch master cylinder

If the clutch pedal is depressed, the bearing is reset, the diaphragm spring presses the pressure plate again, which in turn presses the driven disk against the flywheel - as a result, torque transmission is resumed.
The **Sandero Stepway** has a hydraulic clutch release actuator.
The clutch release actuator consists of the clutch pedal, clutch master cylinder, release bearing combined with the slave cylinder and connecting lines. The actuator uses a

The clutch cylinder acts on the release bearing to move it forward, thus disengaging the clutch. A coil spring keeps the release bearing pressed against the diaphragm spring of the clutch housing at all times. The diaphragm spring returns the bearing to its original position when the line pressure is released. The release bearing contains
"lifetime" supply of plastic
The bearing and diaphragm spring are in constant contact. As the bearing and diaphragm spring are in constant contact, there are no clearances in the clutch mechanism and therefore no adjustment is required.
The hydraulic clutch actuator pump connection is located at the connection point between the clutch slave cylinder and the fluid supply line, which is a steel tube.

Replacing the trip drive cable clutches

The brake fluid is filled with brake fluid, the brake fluid is poured in.

The brake system and the clutch release actuator are used for the brake system and the clutch release actuator at the same time.
The clutch master cylinder is mounted on the front shield and the cylinder rod is connected to the pedal. A filler pipe leads from the reservoir on the brake master cylinder to the clutch master cylinder. When the pedal is depressed, the rod moves, creating fluid pressure in the working line, which acts on the clutch master cylinder. The slave cylinder is mounted inside the clutch housing and is aligned with the release bearing. When pressure is applied, the piston of the slave cyl-

If the cable breaks or moves tightly in the sheath, replace the complete cable.

By pulling the weight on the front cable end piece, pull the cable out of the slit in the clutch release fork.

Remove the cable sheath end from the bracket on the gearbox.

...remove the rear cable lug 1 from the pedal holder and then by squeezing the two lobes of the rear lug 2 of the cable sheath.....
...push the lug out of the front shield and into the engine compartment.

The lobes of the rear cable clipping lug (shown with the cable removed for clarity).

Pull the cable out into the engine compartment through the hole in the front shield.

Installing cable в in reverse

sequences и from

The clutch release actuator (see "Checking and adjusting the clutch release actuator", page 50).

Removal of clutch parts

Remove the clutch "basket", drive plate and release bearing for replacement if they fail.

"The casing and idler disk are also removed when replacing the flywheel and rear crankshaft oil seal.

The work is carried out on an inspection tarmac or overpass. Use the Logan vehicle to demonstrate the operations.

When replacing clutch parts, it is possible not to completely dismantle the gearbox (as this would require time-consuming operations to remove the subframe), but only to move it away from the engine to the required distance.

Disconnect terminal terminal from the negative terminal of the battery.

Remove the left wheel drive (see "Removing the front wheel drive", page 194). Unscrew bolt securing left subframe bracket to body and loosen nut securing bracket to suspension arm (see "Removing the arm", page 203).

Disconnect clutch actuator cable from clutch release fork and bracket on gearbox (see "Replacing the clutch release cable", page 183). Disconnect the transmission control link from the switch on the gearbox (see "Removing

Remove speed sensor speed sensor (see "Removing the speed sensor").

Remove the speed sensor (see "Removing the speed sensor", page 110). Remove the crankshaft position sensor (see "Removing the crankshaft position sensor", page 106).

Disconnect the wiring harness from the reversing light switch (see "Removing the reversing light switch", page 261).

Disconnect the engine-ECU harness harness strip the control wiring harness the transmission control link", page 188).

... **move the transmission away from the engine by removing the primary shaft**

from the hub of the coupling plate.

The spline shaft of the differential axle pinion will come out of the lug of the right wheel drive inner joint housing. Move the gearbox away from the engine (to a distance that will allow removal of clutch parts) and rest the left side of the gearbox on the subframe.

! Remove the oxygen concentration sensor. Remove the sensor block from the holder on the transmission and remove the sensor wiring harness from the holder on the transmission (see "Removing the oxygen sensor", page 109).

Remove the starter (see "Removing and repairing the starter", page 251).

Unclip the holder on the gearcase and remove the wiring harness. Loosen the four bolts securing the engine oil pan to the gearbox (see "Removing the gearbox", page 189).

Place adjustable stops under engine and gearbox. Remove the rear and left power unit supports (see "Replacing the power unit supports", page 96).

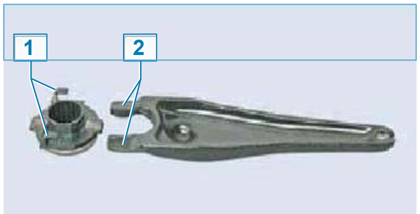
Disconnect the "mass" wires from the gearbox, loosen the bolts and nuts securing the gearbox to the engine block (see "Removing the gearbox", page 189).

While holding the right wheel drive inner ball joint housing...

When removing and installing the transmission, the transmission primary shaft must not be resting on the diaphragm spring lobes to avoid damaging them.

To replace the clutch release bearing, slide the clutch release bearing along the guide sleeve to the end of the transmission primary shaft, disengaging the clutch release fork feet from the bearing clutch coupling.

Remove the bearing (for clarity, shown with the gearbox removed). Remove the fork from the ball bearing and remove the fork end from the mudguard.
Before installing the bearing, apply grease to the guide bush, the clutch fork foot and the fork ball bearing. Replace torn rubber cover of the clutch fork with a new one.
Install the clutch release bearing in reverse order.



When installing the foot bearing 2 forks must engage in the plastic hooks 1 of the bearing coupling. Place the mounting spatula between the flywheel crown teeth and rest on the transmission mounting stud....

... head "on 11" unscrew six bolts securing the clutch housing to the flywheel.

Unscrew the bolts evenly, each not more than one turn per pass, so as not to deform the clutch basket.

If the bolts are difficult to loosen, tap the bolt heads with a soft metal hammer.

Remove the clutch basket and clutch slave disk (for clarity, show with the gearbox removed). Install drive

Install the clutch

slave disk and clutch basket in reverse order.

When installing the driven disk, orient it with the protruding part (arrow) towards the clutch "basket". Position the clutch "basket" so that the flywheel pins engage in the corresponding holes in the "basket".

Insert the centering mandrel (suitable centering mandrel for clutch VAZ cars) in the splines of the driven disk and insert the shank of the mandrel into the hole in the crankshaft flange.

Thread in and tighten the opposite bolts securing the clutch housing to the flywheel evenly (one turn per pass). Tighten the bolts to the required torque. Remove the centering mandrel for the driven disk. Reinstall the gearbox and all removed parts and components in reverse order. Adjust

clutch actuator

Adjust the clutch

actuator (see "Checking and adjusting the clutch release actuator", page 50).

Pumping the hydraulic clutch release actuator on the Sandero Stepway

Pump the hydraulic clutch release actuator to bleed it after unsealing, which is possible when replacing actuator parts.

Remove the protective cap from the slave cylinder pump connection and insert a sight tube into the pump connection. Place the other end of the tube in a container filled with brake fluid so that the free end of the hose is immersed in the fluid. The reservoir should preferably be positioned under the vehicle below the level of the hose coupling.

The assistant depresses the clutch pedal several times and holds it down.

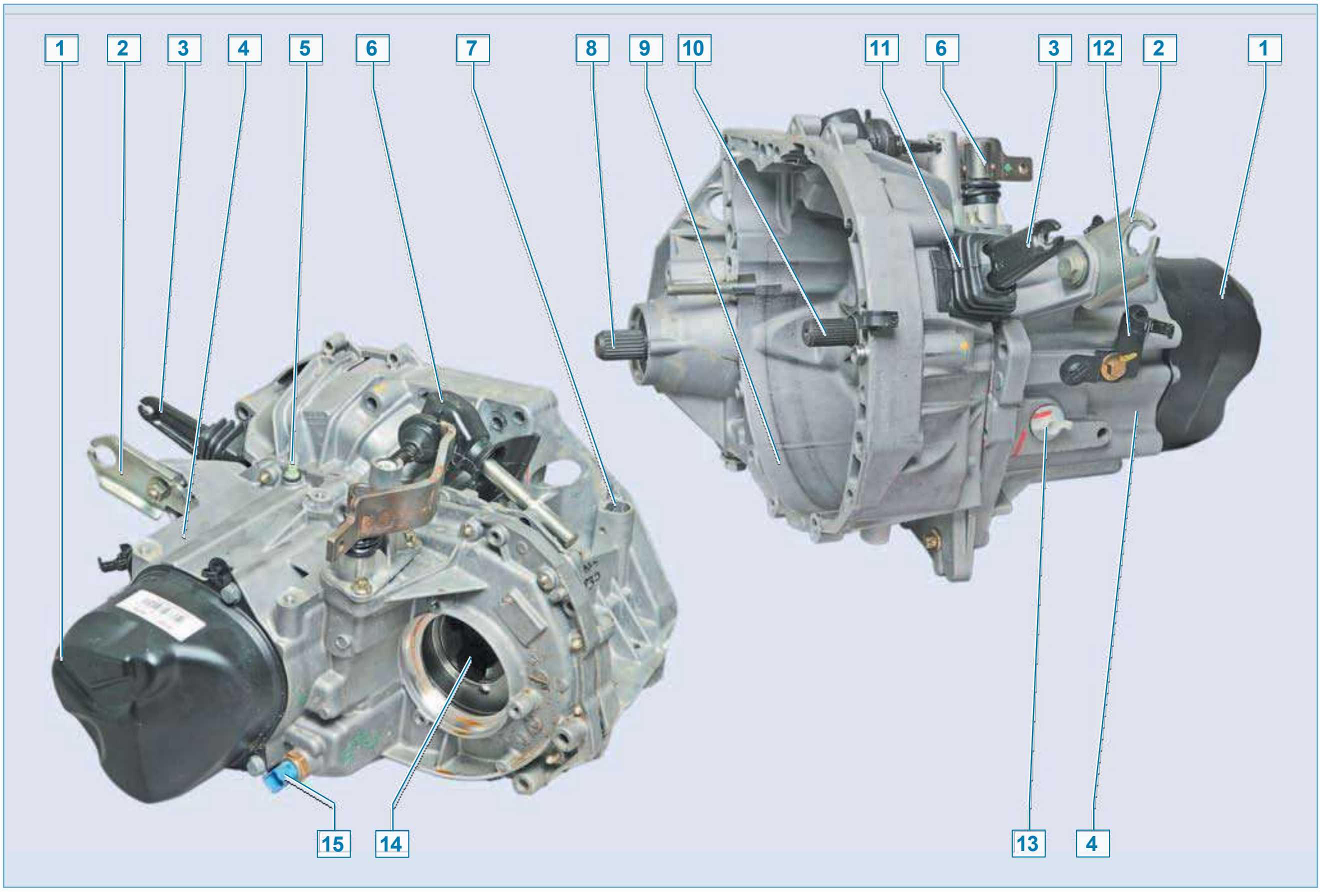
To pump the actuator, remove the wire clamp with a screwdriver.

Slightly (4-6 mm) extend the steel tube from the plastic housing. This displaces part of the brake fluid and air bubbles in the system into a container underneath the vehicle. The transparent tube allows the process to be monitored.

Push the steel tube into the housing, hold it by hand and repeat the procedure until no more air escapes from the connector. If necessary, top up brake fluid in the reservoir on the brake master cylinder.

Manual transmission

Construction description



Logan and Sandero gearbox: 1 - rear cover; **2** - clutch release actuator cable sheath bracket; **3** - clutch release actuator fork; **4** - transmission case; **5** - breather hose fitting; **6** - gear shift mechanism; **7** - hole for car speed sensor; **8** - shaft of the differential axle pinion; **9** - clutch crankcase; **10** - primary shaft; **11** - mud cover; **12** - wiring harness holder; **13** - oil filler plug; **14** - inner joint housing of the left wheel drive; **15** - reverse light switch.

Logan and **Sandero** vehicles are equipped with two types of manual transmission: JH1 with 1.4-liter engine and JH3 with 1.6-liter engine. The markings are marked at the bottom of the gearbox crankcase. Both gearboxes are identical in design. The gear ratios of both gearboxes are identical.

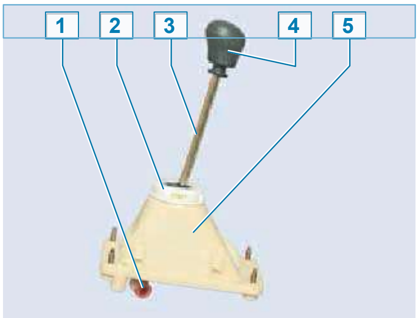
Gearbox - twin-shaft, with five forward gears and one reverse gear, with synchronizat- It is structurally integrated with the differential gear and the main gear. It is structurally integrated with the differential gear and the main transmission.

The gearbox housing consists of three parts: clutch crankcase, gearbox crankcase and gearbox crankcase rear cover. The clutch crankcase and gearbox crankcase are cast from aluminum alloy and the rear cover is steel, stamped. The clutch crankcase is attached to the gearbox crankcase with screws. When assembling, a petrol-oil-resistant sealant gasket is applied between them. The rear cover is secured to the crankcase with three bolts.

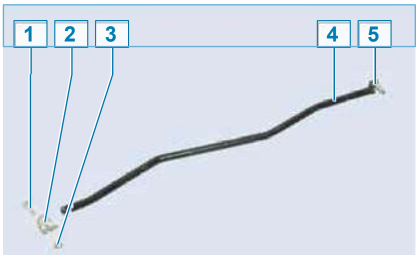
The primary shaft is designed as a set of drive gears, which are in constant mesh with the main gears of all forward gears. All forward gears are helical gears and all reverse gears are spur gears. Gears 1 to 4 are made in one piece

The fifth gear pinion rotates freely on the shaft. A fifth gear synchronizer is mounted at the rear end of the primary shaft. The secondary shaft is hollow and carries the oil to the idler gears. The shaft contains idler gears and synchronizers for 1-2 and 3-4 gears. Fifth gear pinion is mounted on the shaft on splines. On the side of the clutch crankcase bearing secondary shaft roller, and on the side of the cover - ball. Under the roller bearing of the secondary shaft is an oil pan that directs the oil flow into the shaft. All parts mounted on the secondary shaft are bundled by a bolt screwed into the shaft end on the cover side. The differential gear box is fitted with a main transmission idler gear. A tapered roller bearing is mounted behind the idler gear on the differential gear box. Between the idler pinion and the bearing there is a adjusting ring, the thickness of which is used to adjust the preload in the differential bearings. On the other (right) side of the differential gear box there is a gear of the vehicle speed sensor drive and a second tapered roller bearing. The differential gear box is equipped with two satellites and two axle gears. The satellites are mounted on an axle mounted in the differential gearbox.
Right half axle pinion of the diff-
The spline shaft on which the inner joint of the right-wheel drive is mounted is made in one piece with the spline shaft. The cylindrical surface of the shaft is covered by an oil seal, which is pressed into the clutch housing. The left half-axle pinion is made on the body of the inner joint of the left wheel drive, and the body is installed in the socket of the gearbox and secured in it with a retaining ring. To prevent oil leaks from the gearbox, the connection between the inner joint of the left wheel drive and the gearbox crankcase is sealed.

The other side of the cover is attached to the outer ring of the needle bearing mounted on the left wheel drive shaft. The other side of the cover is attached to the outer ring of the needle bearing mounted on the left wheel drive shaft. The needle bearing is fitted with an oil seal to prevent oil leaking from the gearbox along the wheel drive shaft (see "Front wheel drive", page 191).
To prevent water ingress and reduce dust ingress into the gearbox cavity, the breather plug is located in the upper part of the engine compartment. The breather plug is connected by a rubber hose to the plastic connector on the gearbox.
The transmission control actuator consists of the control mechanism, control rod and gearshift lever. The gearshift lever is fitted with a ball bearing, which is inserted into the plastic housing of the control gear and secured with a retainer. A bushing is welded to the lower end of the lever to which the control rod is connected. The other end of the control rod is connected to the gearshift mechanism mounted on the gearbox.
The gearbox is factory-installed
The transmission oil is designed for the entire service life of the vehicle.
The Sandero Stepway is equipped with the JR5 gearbox. The design of this gearbox is

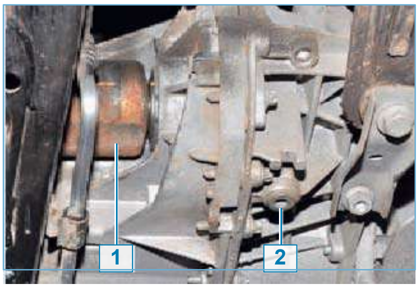


Control mechanism: 1 - bushing; **2 - lever** lock; **3** - gear lever; **4** - lever handle; **5** - mechanism body



Control rod: 1 - tie bolt; **2** - clamp; **3** - nut; **4** - rod; **5** - rod pin

The design of the gearboxes is generally similar to that of the JH1 and JH3 families. The difference is mainly in the design of the connection points between the gearbox and the drive shafts of the drive wheels. In the JR5 gearbox, the axle gears are connected to the splined shanks of the housings of the inner joints of the wheel drive shafts. The inner joint housing of the left wheel drive is secured in the axle pinion gear with a split ring and the elongated inner joint housing of the left wheel drive is secured in the axle pinion gear with a split ring.



Sandero Stepway gearbox: 1 - left wheel drive inner joint housing; **2** - drain hole plug


Sandero Stepway gearbox crankcase outlet location of the elongated housing of the right wheel drive inner joint

The inner joint housing of the right wheel drive is held axially by the intermediate bearing.

Replacing the shift lever bushings gears

lever.

Replace plastic bushings on the lever if there is excessive play in the connection between lever and control rod.

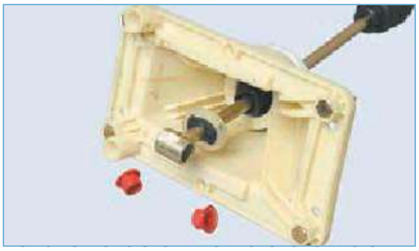
The work is carried out on an inspection trolley or trestle.

From the bottom of the car...

...unscrew the nut securing the control rod to the gearshift lever with a "13" head.

Pull the link pin out of the lever hole.

Use a screwdriver to pry off the bushings (for clarity, shown with the gearbox control unit removed).....



Install the new bushings in the ob-
in the correct order.

Apply a thin layer of grease to the inside of the bushings. Tighten the nut securing the control rod to the gear lever to the prescribed torque.

Removing the gear lever

The lever is removed for replacement as an assembly if the ball bearing of the control mechanism fails.

The work is carried out on an inspection trolley or trestle.

Disconnect the control rod from underneath the vehicle (see "Replacing the shift lever bushings").

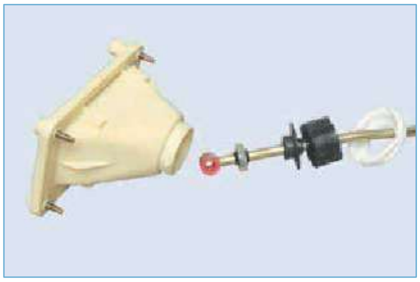
In the interior of the car...

... separate the cover from the tunnel liner.

Bite off the plastic clamp with a box cutter.

хол.

Remove the ball bearing retainer by turning the ball bearing retainer of the lever (for clarity, shown with the steering mechanism removed).



... and remove the gear lever assembly from the control housing.

Install the gear lever in reverse order.

Removing the transmission control rod

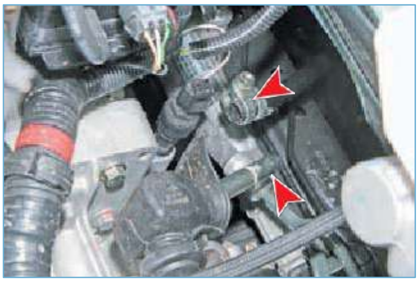
Remove the rod for replacement if it is damaged.

The work is carried out on an inspection trolley or trestle.

Before removing the tie rod...

rod.

Use a 13 mm wrench to loosen the nut tightening the tie rod clamp bolt securing the tie rod to the gearshift rod.



Remove the rod from the rod.

Disconnect the rod from the gear lever (see "Replacing the gear lever bushings", page 188).

If necessary, remove the clamp from the tie rod. Install the transmission control rod in reverse order.

When installing the tie rod clamp....

... orient it so that the tab on the clamp tongue is positioned in the longer slot of the tie rod.

Install the rod on the gearshift rod according to the marking made earlier and secure with the cable tie.

Replacing the right drive oil seal wheels

Replace the right wheel drive oil seal if oil leaks through it from the gearbox. The work is carried out on an inspection pit or on a trestle.

Drain the oil from the gearbox (see "Checking the oil level and topping up the oil in the manual transmission", page 47).

Remove the right wheel drive (see "Removing the front wheel drive", page 194).

Remove the rubber sealing ring.

Use a screwdriver to pry open the water gland.

... and remove it from its seat in the transmission case.

To avoid damaging the working edge of the new oil seal with the splines of the axle shaft when installing the new oil seal, wrap insulation tape around the splines.

Apply a thin layer of gear oil to the working edge of the new oil seal.

press the stuffing box into the seat of the transmission case.

Remove insulating tape from the splines of the axle shaft.

Fill the gearbox with oil and install the wheel drive.

Removing the gearbox

Remove the gearbox for repair or replacement or when dismantling the engine.

The work is carried out on an inspection trench or overpass. The gearbox disassembly operations are shown on a Logan with engine 1.4-1.6 (8V).

Disconnect the wire terminal from "The minus terminal of the battery pack.

Remove the wheel drives (see "Removing the front wheel drives", page 194).

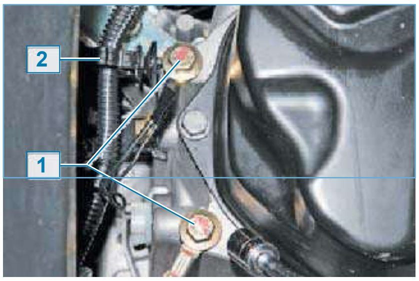
Remove the subframe (see "Removing the subframe", page 204).

Disconnect the cable from the clutch release actuator fork and the bracket on the gearbox (see "Disconnecting the cable from the clutch release actuator fork").

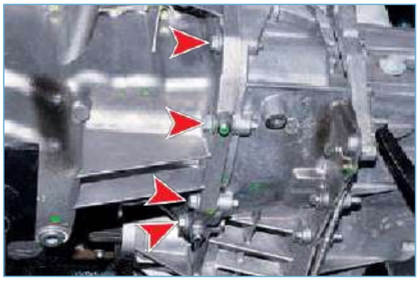
"Replace clutch release cable", page 193). Disconnect the transmission control rod from the shift linkage rod (see "Removing the control rod", page 193).

Remove the crankshaft position sensor (see "Removing the crankshaft position sensor", page 106) and vehicle speed sensor (see "Removing the vehicle speed sensor", page 188). Remove crankshaft position sensor (see "Removing the crankshaft position sensor", page 106) and vehicle speed sensor (see "Removing the speed sensor", page 110). Remove breather hose from gearbox crankcase connector. Disconnect the wiring harness from the reversing light switch (see "Removing the reversing light switch", page 261). Remove the wiring harness for the control oxygen sensor from the gearbox cover (see "Removing the reversing light switch", page 261).
"Removing the acid concentration sensors-
lorod," p. 109).

Remove the starter (see "Removing and repairing the starter", page 251).

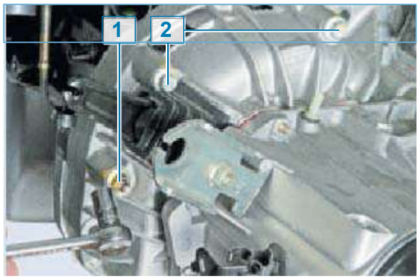


Use a 13" socket to loosen the two bolts 1 securing the "mass-
of the "out" wires.
Unclip plastic holder 2 and remove the wiring harness.



Unscrew the four bolts securing the engine crankcase pan to the clutch crankcase (see "Replacing the crankcase pan gasket", page 94).

Use a 16 mm wrench to loosen the nut securing the left power unit support to the support bracket.



Unscrew nut 1 and two bolts 2 securing the gearbox to the cylinder block (for clarity, shown with the power unit removed).
Lower the power unit on the adjustable stops to remove the stud of the left support bracket from the support cushion.

Drive the gearbox away from the engine by removing the primary shaft from the clutch plate hub.
...and remove the gearbox.

! When removing and installing the transmission, do not rest the transmission primary shaft on the diaphragm spring lobes to avoid damaging them.

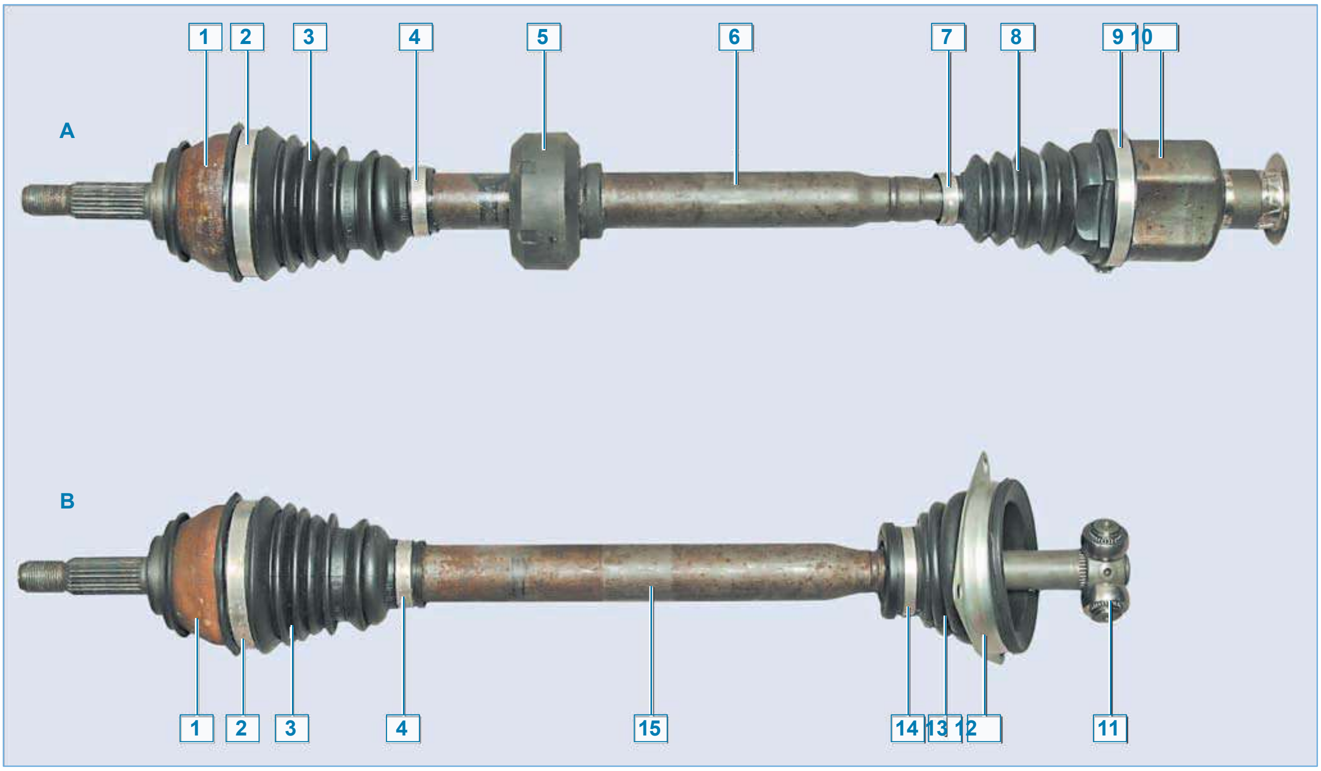
Unscrew the transmission mounting nut (to the cylinder block) located above the splined shaft of the right differential axle pinion (for clarity,

shown on the removed power unit).

Before installing the gearbox, apply a thin layer of SHRUS-4 grease to the splined end of the primary shaft. Insert the transmission primary shaft into the splines of the clutch driven disk and, having oriented the transmission so that the cylinder block stud and the clutch crankcase stud enter the corresponding holes in the crankcase and the block, push the transmission to the stop in the engine cylinder block. Carry out further assembly operations in reverse order. Fill gearbox with oil.

Front wheel drives

Construction description



Drives of the right "A" and left "B" wheels of Logan and Sandero cars: 1 - outer hinge housing; **2** - large clamp of the outer hinge cover; **3** - outer hinge cover; **4** - small clamp of the outer hinge cover; **5** - damper; **6** - right wheel drive shaft; **7** - small clamp of the inner hinge cover of the right wheel drive; **8** - inner hinge cover of the right wheel drive; **9** - large clamp of fastening of the cover of the inner joint of the right wheel drive; **10** - body of the inner joint of the right wheel drive; **11** - tricone of the inner joint of the left wheel drive; **12** - holder of the cover of the inner joint of the left wheel drive; **13** - cover of the inner joint of the left wheel drive; **14** - clamp of fastening of the cover of the inner joint of the left wheel drive; **15** - shaft of the left wheel drive.

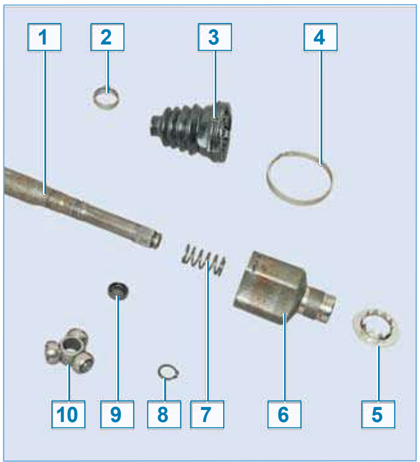
Wheel drives with constant velocity joints (CV joints) are used to transmit torque from the main transmission to the drive wheels at various wheel angles and suspension travels.

Logan and Sandero wheel drives

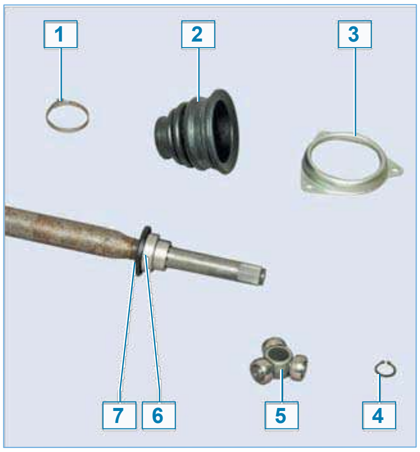
The lengths of the drive shafts should be identical, as this ensures that the forces and moments occurring at the drive wheels are equal. The design of the drive shafts is as follows

This condition is difficult to meet in vehicles with a transverse powertrain arrangement, which is why, as a rule, the right-hand drive train is considerably longer than the left-hand drive train. For Logan and Sandero, design solutions have been used to bring the drive train lengths of the drive wheels closer together. The drive train lengths are brought closer together by the different construction of the inner joints. In order to increase the drive length of the left wheel drive, the body of the

The inner joint of the actuator is located inside the gearcase. In order to reduce the length of the right wheel drive, the inner joint housing is moved away from the gearbox crankcase. For this purpose, an additional element was introduced into the gearbox design - a splined shaft, which is made in one piece with the differential axle pinion gear. A rubber-metal damper is installed on the right wheel drive shaft. External and internal joints



Elements of the inner joint of the right wheel drive: 1 - drive shaft; **2** - small clamp of the cover fastening; **3** - joint cover; **4** - large clamp o f t h e cover fastening; **5** - mud deflector; **6** - joint body; **7** - spring; **8** - locking ring of the triple stud; **9** - thrust washer of the spring; **10** - three-stud



Elements of the inner joint of the left wheel drive: 1 - clamp for securing the cover on the outer ring of the bearing; **2** - mud cover of the joint; **3** - cover holder; **4** - locking ring of the triple stud; **5** - triple stud; **6** - bearing; **7** - mud deflector

o f t h e actuators (Tripod type) have different designs. Joints

The actuators are covered with protective covers.

The inner pivot of the a c t u a t o r enables angular movements of the suspension system

and compensates for mutual movements of the suspension and the power pack by varying the length of the drive shaft. The inner joint is collapsible. At the splined end of the drive shaft on the inner joint side there is a hub with three studs - a tricone, on each of the studs (trunnion) of which there is a roller with an outer spherical surface rotating on a needle bearing. The needle bearing i s secured against displacement along the stud axis by a locking ring fitted on a locking ring located in the stud groove. The tricuspid i s s e c u r e d t o the drive shaft by a circlip. Mutual movements o f t h e suspension and power unit are compensated for by the movement of the tricuspid rollers in the longitudinal grooves of the inner joint housing.

Internal joints of actuators

The left and right wheels are not interchangeable.

The tip of the right wheel drive inner ball joint housing is put on the...

... on the splined shaft coming out o f t h e gearbox crankcase and built in conjunction with the differential axle pinion (for clarity, shown on the dismantled gearbox).

Spring, mounted internally

The right wheel drive inner pivot housing presses the pivot housing against the differential axle pinion during suspension operation.

The housing of the inner joint of the left wheel drive is located in the gearbox and is made in one piece with the left half-axle pinion of the differential gear (wheel drive removed for clarity).

Bearing (complete with oil seal) of the inner joint of the left-hand drive unit

The left wheel drive shaft is fitted with a needle roller bearing and oil seal assembly behind the inner ball joint's three studs. The inner ring of the bearing is pressed onto the drive shaft and rotates with it. The protective cover of the inner ball joint is clamped to the stationary outer ring of the bearing. The other end of the ball joint cover is attached to the gearbox crankcase via a metal flange holder.

The gland installed in the outer-

The bearing gland is sealed against dirt by a plastic dirt deflector mounted on the shaft. The bearing gland is protected from dirt by a plastic dirt deflector mounted on the shaft.

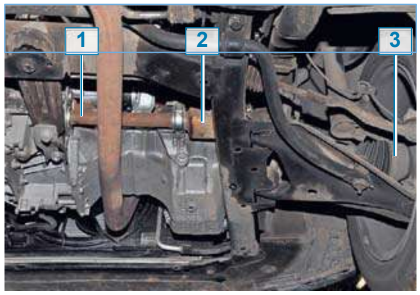
! **The gearbox will leak oil if the joint cover or bearing gland is damaged.**

Outer joint of the drive: 1 - lacquer; **2** - roller; **3** - tricone; **4** - hinge body

The outer drive joint ensures torque transmission at different drive wheel angles. The outer joints of both wheel drives are identical, non-disassembled and cannot be removed from the shafts. The outer joint consists of a housing with a rigidly mounted tricone with rollers rotating on needle bearings and a cam made in one piece with the drive shaft. In case of mutual angular displacements of the hinge body and cam, the rollers of the tricuspid rollers roll in the longitudinal grooves of the cam.
The outer joint housing of the spline-The shank fits into the wheel hub bore and is secured by the hub bearing nut.
MOBIL CVJ 825 BLACK grease is used in the outer joints of both actuators and the inner joint of the right-hand actuator.
STAR for their entire service life. Do not refill or change the lubricant or perform any other maintenance on the wheel drive shafts during vehicle operation.
is required. The owner of the vehicle only needs to check the condition of the protective covers of the joints and their mounting clamps as well as the condition of the bearing gland of the left-hand drive inner joint. A damaged cover must be repaired as soon as possible.
replace, as dirt in the lubricant causes rapid wear of the joint components and its failure, and damage to the rubber cover or bearing gland of the inner joint of the left-hand drive will result in oil leakage from the gearbox and its failure. When installing a new joint cover, the joint retaining clamps should also be replaced with new ones.
If the outer joint fails, the entire actuator assembly must be replaced; if the inner joint fails, only the joint can be replaced.
The bearing (complete with oil seal) of the inner joint of the left wheel drive is supplied in spare parts together with a protective cover. The same bearing is used in Renault: Megan, Scenic, Clio, Twingo, Kangoo; Citroën Saxo; Peugeot 106; Volvo: 440, 460, 480. But the protective cover of the hinge is different for these vehicles.

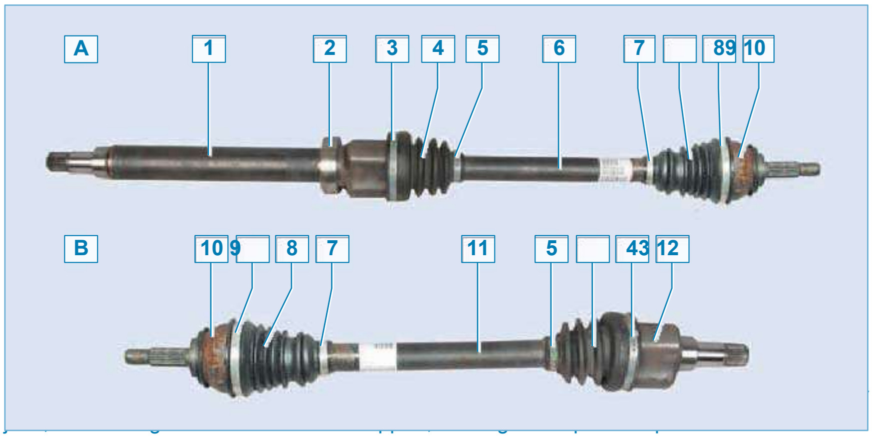
Sandero Stepway wheel drives

Sandero Stepway transmission and drive shafts



Right wheel drive of Sandero Stepway: 1 - intermediate shaft with internal joint; **2** - intermediate support; **3** - external joint of the right wheel drive

In the case of the Logan and Sandero vehicles, the design is different.
In this vehicle, a solution has been implemented to make the drive shafts of the right and left wheels the same length, with the right wheel drive having an intermediate shaft made in one piece with an internal joint. An intermediate bearing is pressed onto the shaft and the splined shank is inserted into the hole in the axle pinion of the differential gear box. The shaft is secured against axial movement by t h e spacer bearing. Outer



inner joint; **4** - protective cover of the inner joint of the drive; **5** - small clamp of the protective cover of the inner joint; **6** - shaft of the right wheel drive; **7** - small clamp of the outer joint cover; **8 - outer joint cover**; **9** - large clamp of the outer joint cover; **10 - outer joint; 11** - left wheel drive shaft; **12** - inner joint of the left wheel drive.

The joints of the right and left wheel drive shafts are identical.
The removal and repair of the front wheel drive is shown on a Logan.

Removing the front wheel drives

Front wheel drive shafts are removed when dismantling gearbox or power unit, when replacing drive shafts, when replacing mud covers of inner and outer joints of drive shafts. The right actuator is also removed to replace its oil seal and the left actuator to replace the bearing of the inner joint cover.
The work is carried out on an inspection trolley or trestle.
Remove the power unit guard (see "Removing the power unit guard", page 283). Before removing the left wheel drive, drain oil from the gearbox (see "Checking the oil level and topping up the oil in the manual transmission", page 47).
Unscrew the front wheel stud nut (see "Unscrewing the front wheel stud nut"). "Replacing the front wheel hub bearing", page 204). Remove wheel. Remove the suspension ball bearing pin from the hole in the steering knuckle (see "Removing the arm", page 203).

Move steering knuckle with shock absorber strut to the side and remove the splined shank of the outer joint housing from the wheel hub.

Clean dirt from the carrier and the crankcase mounting surface to prevent dirt from entering the gearbox when removing the actuator.

Unscrew three bolts securing the inner joint cover holder to the transmission case with a 13 mm socket.

Remove the left wheel drive.

When installing the actuator, carefully insert the rollers of the tricone into the grooves of the inner joint housing and fasten the joint cover protector to the gearbox crankcase. Further installation of the actuator is carried out in reverse order.
Do not force the actuator along its axis against the gearbox during assembly, as this could cause the tricuspid rollers to come out of the grooves of the inner joint housing and damage the needle roller bearings.
If there is the slightest suspicion that the tricone is out of the grooves of the inner joint housing, loosen the bolts securing the inner joint cover holder and, after checking that the needle roller bearings are in good condition, repeat the drive installation. After installing the left wheel drive, fill the gearbox with oil.
When removing the right wheel drive it is not necessary to drain oil from the gearbox. Unscrew hub bearing retaining nut and disconnect ball bearing from steering knuckle and remove splined shank of the wheel drive.

Remove the outer drive pivot from the wheel hub as shown above.

Slide the lug of the right wheel drive inner joint housing off the splined shaft of the differential spline pinion.

... and remove the right wheel drive. Install the right wheel drive in reverse order.

Replacing the mud cover of the inner joint of the right wheel drive system

The work must be carried out if the cover is damaged or if the joint is replaced. Remove right front wheel drive (see "Removing the front wheel drive").
Clean the joint from the outside and clamp the shaft in a vise with soft metal jaw pads.

Use a metal hacksaw to saw off (or bite off with side cutters) the large clamp securing the cover so as not to damage the hinge housing.

Pull the cover off the inner hinge housing.

...and remove the hinge housing.
Remove the grease from the end of the three-joint.....

...Use the retaining ring pliers to remove the retaining ring.
If only the joint cover is to be replaced, mark the position of the triple stud relative to the shaft.

Knock the tricuspid off the shaft by striking the end of the tricuspid with a soft metal mallet.

! **The gouge must not apply force to the rollers of the three-way bar to prevent damage to the rollers.**

Bite off the small clamp with a box cutter....

...and remove the mud cover of the hinge.

Remove the spring together with the thrust washer.
If the spring is broken or has lost its elasticity, replace it with a new one.
Remove old grease from the joint housing and wash in kerosene. Clean the joint with a rag and blow out with compressed air. Inspect the rollers, the needle roller bearings of the three-way pins and the inside of the joint housing. The tricuspid rollers must rotate freely on the needle roller bearings without seizure. Scuffs, dents, cracks, corrosion marks are not permitted - the joint must be replaced.
Before installing the new cover, the ball-Apply a small amount of grease to the shaft end. Place the cover over the shaft and position the cover under the small clamp in the shaft groove. Put half of the recommended volume (124±10 cm^3) of the required grease and distribute it evenly in the cavities of the joint housing, the other half in the cavities of the cover.

Using a mandrel, press the tricone onto the shaft in the same position as when the tricone was removed.
Install a new circlip in the shaft groove.

Slide the joint housing onto the three tires and pull the cover over the joint housing, positioning the belt of the cover under the large clamp in the housing mounting groove. Secure the ball joint cover with new clips (see "Replacing the outer wheel drive outer ball joint cover", page 196).
Further assembly is carried out in the reverse order.

Replacing the cover and bearing of the inner joint of the left wheel drive

The work is carried out if the cover is damaged or if the joint cover stud is replaced. Remove the front left wheel drive (see "Removing the front wheel drive", page 194).
Clamp the drive shaft in a vise with soft metal jaws.

Remove the retaining ring with locking ring pliers.
Mark the position of the tricone relative to the shaft.

Strike the end of the tricuspid with a soft metal mallet to knock the tricuspid off the shaft.

...and take it off.

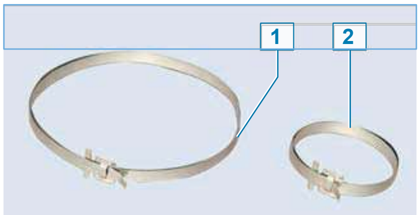
! The gouge must not transmit force to the rollers of the three-way bar to prevent damage to the rollers.

Use the clippers to bite off the clamp securing the cover....

...and remove the mud cover assembly with holder.

Remove the holder from the cover. Inspect the rollers and needle roller bearings of the tricone. The tricuspid rollers should rotate on the needle bearings freely, without seizure. Scuffs, dents, cracks, corrosion marks are not permissible - replace the tricone with a new one.

If the cover bearing oil seal leaks oil from the gearbox or the bearing itself is defective (play or seizure in the bearing), it must be replaced. To do this, place the drive shaft in a vise so that the bearing rests on the shaft.



Universal band clamps for fixing the joint **cover: 1 - clamp** for fixing the cover on the hinge body;
2 - clamp for fastening the cover to the drive shaft

If the gland packing has been removed, the gland packing must be removed.

By striking the shaft end with a hammer through a wood block....

...press the bearing assembly with the stuffing box together....

... and remove the deflector from the shaft.

Fit new strainer and bearing and oil seal assembly on the shaft.

The bearing can only be pressed in using a press, as the bearing and its oil seal can be damaged by impact pressing. For correct positioning on the shaft, the bearing must be pressed onto the shaft so that the distance between the end faces of the bearing and the shaft is 118±0.2 mm. This requires a mandrel, which can be made from a piece of pipe with an outside diameter of 30 mm, an inside diameter of 26 mm, and a length of 118±0.2 mm.

Slide the mandrel onto the shaft....

... and press the sub-plate on the press until the end of the bearing is flush with the shaft end. Place a new joint cover on the shaft and secure it to the outer ring of the bearing with a new clamp. Press the tricone onto the shaft to the position marked before removal and secure it on the shaft with the circlip. Place the holder on the cover.

Replacing the outer wheel drive outer ball joint mud cover

The outer joint cover must be replaced if the cover is damaged. Since the outer joint is non-disassembled, a new cover can only be fitted to the joint housing by first removing the inner joint and pulling the cover over the entire shaft.

The outer joint cover is replaced using the right wheel drive as an example. Remove the inner joint cover (see "Replacing the right wheel drive inner joint cover", page 194).

Mark the position of the de-sphere relative to the shaft with a marker.

Pull the damper off the shaft.

Thoroughly clean the actuator shaft of dirt and corrosion.

Use a metal hacksaw to saw off (or cut off with a cutter) the large and small clamps securing the cover.

Remove the outer ball joint cover from the outer ball joint housing.

...and pull it through the entire shaft or cut it with a knife.

Remove old grease from the joint and rinse in kerosene. Blow out the joint with compressed air. Rotate the joint housing relative to the cam in various positions to inspect the rollers of the three-way pivot and the grooves in the cam. Scuffs, dents, cracks, corrosion marks on the elements of the joint are not allowed; the rollers of the tricuspid should move in the grooves of the cam smoothly, without seizure. If the outer joint of the actuator is defective, the entire actuator must be replaced.

Before putting a new cover on-

Apply a thin layer of grease to the shaft surface. Place the cover over the shaft, positioning it under the small collar in the shaft groove. Apply and evenly distribute the required amount of grease (294±10 cm^3) in the cavities of the joint and its cover. Pull the cover over the hinge body, positioning the belt of the cover under the large clamp in the mounting groove of the body. Secure the joint cover with new clamps.

To install the original clamps supplied in the spare parts, special pliers are required. If these are not available, commercially available universal joint cover clamps can be used.

We show the installation of the universal band clamp securing the cover to the hinge body.

By installing the clamp into the groove of the cover...

...use pliers to pull out the tape by squeezing the clamp.

Use the other pliers to press against the clamp lock or the clamp feet to keep the clamp from turning.

Tightening the clamp tightly....

...bend the extended end of the ribbon in the opposite direction.

While holding the tape taut, check the tightness of the clamp by trying to slide the clamp by its lock along the groove of the cover. If the clamp slides, The clamp is not tightened sufficiently and the clamp must be tightened again.

Tightening the clamp tightly....

... bend the clamping feet onto the tape.

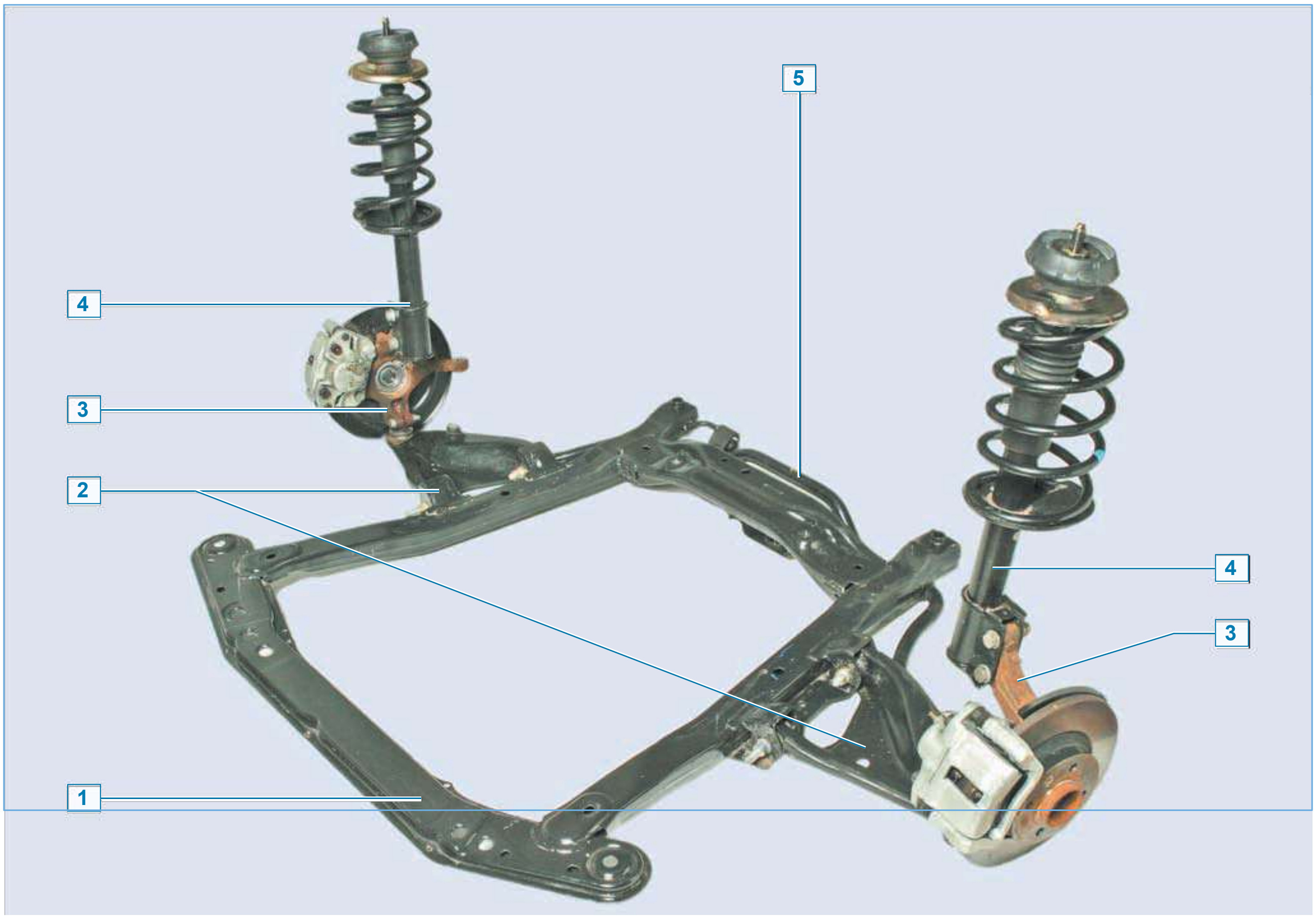
Secure the cover to the actuator shaft in the same way.

Check that the joint cover is securely fastened with clamps. During angular movements of the joint housing relative to the shaft, the cover must not slide off the housing, move along the drive shaft or rotate on them. Bite off the excess end of the clamp strap (behind the strap retainer feet) with a pair of cutters.

Further assembly of the actuator in reverse order. When replacing the left wheel drive outer ball joint cover, remove the cover and inner ball bearing of the drive (see "Replacing the cover and inner ball bearing of the left wheel drive", page 195). Further operations for replacing the cover of the outer joint of the left wheel drive are similar to those for replacing the cover of the outer joint of the right wheel drive.

Front suspension

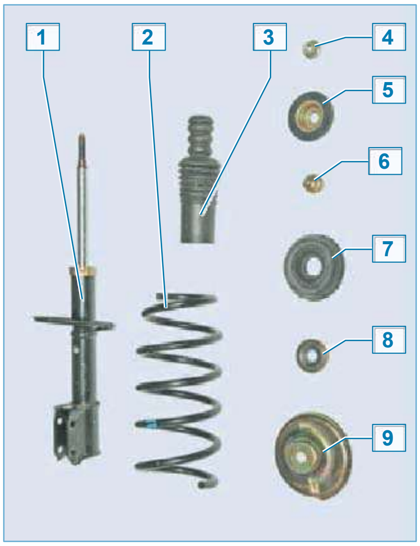
Construction description



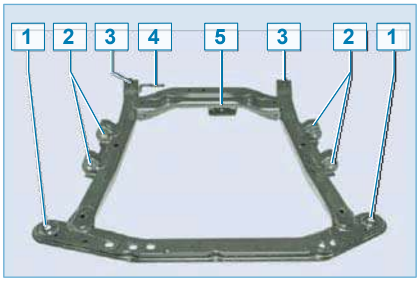
Front suspension: 1 - subframe; **2** - suspension arm with silent-blocks and ball bearing; **3** - steering knuckle with hub and bearing; **4** - shock absorber rack; **5** - transverse stability stabilizer bar.

The front suspension is independent, McFerson type with triangular cross arms and transverse stabilizer bar (on some vehicles).
The suspension is based on a telescopic shock absorber strut, which allows the wheels to move up and down over bumps while dampening body vibrations. The strut is attached to the steering knuckle with two bolts and nuts at the bottom and a nut at the top through the rubber-metal support to the body.
To effectively dampen body vibrations and improve vehicle handling and stability, the strut body is equipped with a twin-tube gas-filled shock absorber, which has better characteristics than a conventional hydraulic shock absorber. The lower spring support cup is welded to the middle part of the strut body and the bracket for mounting the strut to the steering knuckle is welded to the lower part of the strut body.
The shock absorber stem is fitted with a compression buffer, which is integrated with the protective cover. From above, the spring rests on the upper support cup mounted on the shock absorber stem. A thrust ball bearing is mounted between the upper spring cup and the upper strut support, allowing the strut body to rotate with the spring and the shock absorber rod to remain stationary.
Braking and traction forces at the movement of the vehicle perceived-

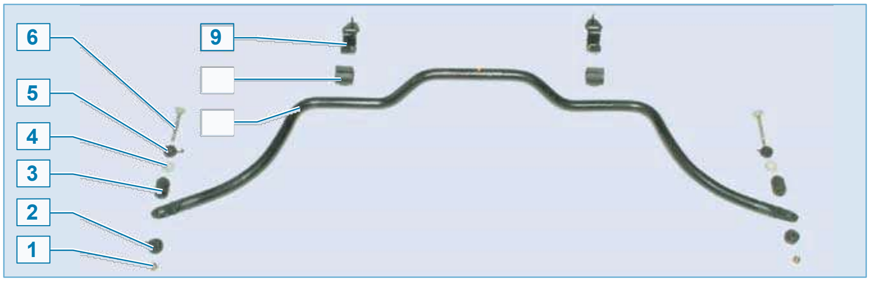
Elements of the front suspension on the car: 1 - arm; **2** - subframe; **3 -** bolt fixing the arm to the subframe; **4** - transverse stability stabilizer bar; **5 -** bracket fixing the stabilizer bar to the subframe; **6 -** shock absorber rack; **7 -** steering knuckle; **8** - elements fixing the stabilizer bar to the arm;
9 - tightening bolt of the terminal connection of the steering knuckle and ball bearing pin;
10 - ball bearing



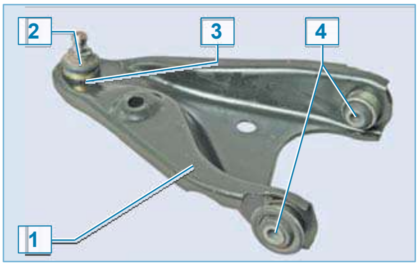
Parts of the shock absorber strut**: 1** - telescopic strut; **2 -** rod; **3 -** compression stroke buffer with protective cover; **4 -** nut of strut fastening to the body; **5 -** support washer; **6 -** nut of upper support fastening; **7 -** upper strut support; **8 - upper support** bearing; **9** - upper spring cup



Subframe: 1 - points of front attachment of the subframe to the body; **2 - points of** attachment of the suspension arm to the subframe; **3** - points of rear attachment of the subframe and transverse stabilizer.
4 - mounting bracket of the exhaust system suspension cushion; **5** - mounting bracket of the rear support of the power unit

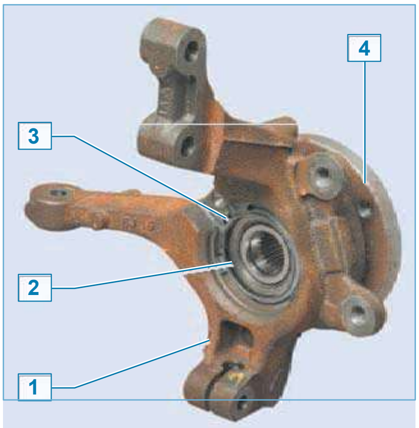


Elements of the transverse stability stabilizer: 1 - nut; **2 -** lower rubber bushing; **3 -** intermediate rubber-metal bushing; **4 -** plastic washer; **5** - upper rubber bushing; **6 -** screw; **7 -** stabilizer bar; **8** - bracket; **9** - stabilizer bar cushion.

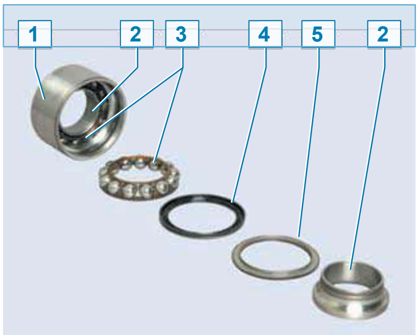


Front suspension arm: 1 - arm; **2** - support cover; **3 -** ball bearing; **4** - silent block

The suspension arms are connected via ball joints to the steering knuckles and via silent blocks to the subframe.
The subframe is rigidly attached to the body with four bolts, the two rear bolts also attach the cross stabilizer bar brackets to the subframe. A bracket, the other end of which is attached to the body, is fastened to the subframe by a nut on the front bolt securing the suspension arm to the subframe.
The ball bearing housing is pressed into the bore of the suspension arm, the support is covered with a rubber cover. The ball joint pin of the support is secured by a terminal connection with a tie bolt in the lug of the steering knuckle.
A double-row angular contact ball bearing of the closed type is pressed into the bore of the steering knuckle, and the wheel hub is pressed into the inner bearing rings.
The inner rings are tightened (via the hub) by a nut on the threaded part of the shank of the wheel drive shaft housing.



Front wheel hub assembly: 1 - steering knuckle; **2** - hub bearing; **3** - speed sensor mounting ring; **4** - wheel hub.



Double row bearing design hubs of one row removed from the outer ring of the bearing): 1 - bearing outer ring; **2** - bearing inner ring; **3** - cage with balls; **4** - stuffing box; **5** - protective washer

The bearing does not need to be relubricated or relubricated during operation.
The hub bearings of vehicles with and without ABS are not interchangeable. The hub bearing nuts of both wheels are identical, right-hand threaded.
A transverse stabilizer bar is fitted to some vehicles.
The transverse stabilizer bar is made of bar steel. The stabilizer bar is attached to the subframe in its middle part by brackets through rubber pads. Both ends of the stabilizer bar are secured to the sub-frame with rubber pads via screws.
The stabilizer bars are connected to the suspension arms by rubber and rubber-metal bushings. The middle part of the stabilizer bar has a bend above the intake pipe of the exhaust system.
The front wheel axle tilt angle (2°42'±30') and the wheel camber angle (-0°10'±30') are set by design and cannot be adjusted in operation. These angles can only be checked on a special test bench (at a workshop) and compared with the reference values. If the front wheel angles do not correspond to the reference values, the condition of the front suspension components must be checked.
Adjust wheel convergence (-0°10'±10') by adjusting the length of the steering rods (see "Changing the steering rod ends", page 217).

Removing the shock absorber rack and disassembly

Remove the shock absorber strut to replace its components. Disassemble the shock absorber strut when its upper support, upper support bearing, spring, compression buffer or shock absorber need to be replaced.
Under the hood...

...tighten the nut on the upper shock absorber strut mount using a 21" z-wrench, keeping the shock absorber rod from turning with a 6" hexagon.

Remove the wheel and securely fasten the vehicle to the factory stand.
On a vehicle with ABS...

...loosen the bolt securing the speed sensor wiring harness holder with a 10 mm open-ended wrench. Pull the holder with the wiring harness away from the rack.
Before removing the strut, separate it from the steering knuckle. To do this, remove the bolts securing the strut to the knuckle. The lower bolt is obstructed by the wheel brake hose tip.

Use a 13" socket wrench to loosen-loosen the upper bolt securing the caliper to the guide pin, keeping the pin from turning with a 17 mm wrench. Then rotate the caliper with respect to the lower guide pin forward so that the lower bolt securing the strut to the steering knuckle can be removed.

Use an 18" socket to loosen the nut on the upper strut mounting bolt to the steering knuckle, holding the bolt with a wrench of the same size.

Unscrew the nut of the lower strut mounting bolt in the same way.
Remove the bolts or knock them out with a soft metal mallet.

Remove the steering knuckle from the eye of the strut bracket.
To prevent the strut from falling, loosen the nut on the upper strut mounting.

Remove the shock absorber strut.

Remove the rubber-metal support washer of the upper shock absorber strut mount.
To disassemble the strut, place two spring ties diametrically opposite to each other so that they engage the four coils of the spring.

Turn the tie screws evenly to compress the spring.

! Be careful when working with a compressed spring.

After the spring stops pressing on the support cups....

...loosen the upper support mounting nut with a 27 mm open-ended wrench, keeping the stem from turning with a 6 mm hexagon.

Removing the strut support...

...Upper support bearing....

...and the upper spring cup.
Removing the spring with the tie rods....

...compression stroke buffer with protective cover.
Reassemble and install the rack in reverse order.
Install the spring like this...

...so that its bottom coil rests on the tab of the lower spring cup.....
... and the upper coil rests on the upper spring cup sub-stamping.
Tighten the nut securing the upper strut support and the nuts of the strut bolts securing the strut to the steering knuckle to the prescribed torque.
Tighten the nut securing the strut to the body to the prescribed torque in the "vehicle on wheels" position.

Replacing the elements of the transverse stability stabilizer

Rubber elements of the stabilizer bar - bushings and cushions - should be replaced in case of cracking, tearing and swelling of the rubber, as well as in case of their significant wear, which causes play in the connection of parts.
The work is carried out on an inspection pit or trestle.
Hang up the front of the vehicle.
Before loosening the nut of the stabilizer bar mounting screw to the front suspension arm, thoroughly clean off contamination

the head of the screw into which the Torx wrench is to be inserted. If the wrench is not fully inserted into the screw head, the screw and the wrench may be damaged when loosening the nut in a corroded threaded joint if the wrench is not fully inserted.

Loosen the nut securing the stabilizer bar to the suspension arm using a Torx T-40 wrench.

Remove the lower rubber bushing.

A metal washer is installed in the recess of the bushing end facing the nut.

Remove the screw with the upper rubber bushing and plastic washer.
With your hand, pull down the end of the barbell.....

... and remove the rubber-metal intermediate sleeve.
Remove the parts securing the stabilizer bar to the other arm in the same way. Install new parts in reverse order. Tighten the nuts of the bolts securing the stabilizer bar to the levers to the prescribed torque in the "vehicle on wheels" position.

When installing the intermediate bushing, orient it upwards with the grooves on the outer surface of the bushing.
To replace the stabilizer bar cushion.

...with a head "on 18" with an extension unscrew the bolt fixing the bracket of the cushion and subframe to the body.

Unscrew the nut securing the cushion bracket to the subframe using a 10 mm open-ended wrench.

Lower the bracket by moving its stud out of the subframe hole....
... and remove the bracket by pulling its front end out of the subframe groove.

Remove the cushion from the boom.
Install new stabilizer bar cushion in reverse order.
Replace the cushion on the other side of the stabilizer bar in the same way. If necessity If it is necessary to dismantle the rod, disconnect both ends from the suspension arms and remove the cushion brackets (see above).

Remove the stabilizer bar. Examine the stabilizer bar of the stabilizer bar. There must be no deep abrasion at the cushion mounting points. Areas with deep abrasion significantly increase the risk of rod failure.
Reinstall the cross stabilizer bar in reverse order.

Removing the lever

Remove the lever to replace the ball bearing or the lever itself if it is damaged or if its silent blocks are damaged (tears, rubber peeling).
Work is carried out on an inspection duct or trestle.
Suspend the front of the vehicle - both front wheels, because when only one wheel is suspended, the stabilizer bar prevents removal of the lever by pushing the suspension components upwards. Work is shown on the left lever, remove the right lever in the same way. Disconnect transverse stabilizer bar mount from lever (see "Replacing transverse stabilizer bar components", page 201). Remove the engine compartment mudguard (see "Removing the engine compartment mudguards", page 283).

Use a 16" nut to loosen the tie bolt of the steering knuckle and ball bearing pin terminal connection, holding the bolt with a wrench of the same size. Remove the bolt or knock it out with a soft metal mallet.

Use a heavy-duty slotted screwdriver or an assembly spatula to loosen the terminal connection between the steering knuckle and the ball bearing pin.

Use the mounting spatula to push the lever downwards on the knuckle....

...and slide the ball bearing pin out of the bore of the steering knuckle.

Loosen the bolt securing the subframe bracket to the body with a 13 mm socket.

Unscrew the subframe bracket nut with an 18 mm open-ended wrench....

...and remove the bracket from the front arm mounting bolt to the subframe.

Unscrew the nut of the front lever mounting bolt with a '18' ring spanner, holding the bolt with the same size head. Remove the bolt or knock it out with a soft metal mandrel.
Unscrew the nut of the rear lever bolt in the same way and remove the bolt.

Remove the suspension arm. Install the lever in reverse order. Tighten the nuts of the bolts securing the lever to the subframe to the prescribed torque in the "vehicle on wheels" position.

Ball bearing replacement

Replace the ball bearing if its protective cover is damaged or if play is detected in the ball bearing.
Work is carried out on an inspection duct or trestle.
Remove the front suspension arm assembly with ball bearing (see "Removing the arm", page 203).

Using a heavy-duty slotted screwdriver, evenly (from different sides) pry the support housing under the shoulder and, resting on the rib of the lever....

...press the ball bearing out of the arm bore.

Inspect the lever eyelet - there should be no cracks or tears around the hole.

Before pressing in a new ball bearing, thoroughly clean the seating surface of the lever bore from dirt and corrosion.

Place a tool head or a piece of pipe of suitable diameter under the lever and insert the new ball bearing into the hole.

By striking the frame with a hammer (can be used with a tool).

talal head),
on the shoulder of the bearing housing...

...press the support into the bore hole of the lever as far as it will go.

Further assembly is carried out in the reverse order.

Removing the subframe

The subframe must be removed for replacement if it is damaged (cracks, deformation, tears) or if the gearbox is removed and the complete power unit is dismantled.

Work is carried out on an inspection duct or trestle.

Remove the engine compartment mudguards (see "Removing the engine compartment mudguards", page 283) and the power unit protection (see "Removing the power unit protection", page 283).

On both sides of the vehicle unbolt the subframe brackets from the suspension arm mounting bolts and remove the ball bearing pins from the knuckle bores (see "Arm removal", page 203).

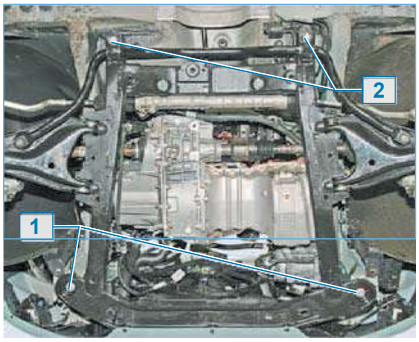
Remove the three screws securing the front bumper to the subframe (see "Removing the front bumper on the Logan", page 286).

Remove the rear power unit support bracket (see "Replacing the power unit supports", page 96).

Loosen the two bolts securing the steering gear to the subframe and the bolt securing the power steering tube holder to the steering subframe.
the left-hand side of the subframe
(see "Removing the steering gear", page 218).

Disconnect the exhaust system tailpipe from the exhaust manifold (see "Removing the exhaust system", page 132) and remove the tailpipe bracket from the exhaust system suspension cushion (see "Replacing the exhaust system suspension cushion", page 132). Before loosening the subframe mounting bolts, place adjustable stops under the subframe or support it with an assistant.

Use an 18" head to unscrew...



...two bolts 1 of the front mount and two bolts 2 of the rear mount of the subframe to the body.

Remove subframe assembly with arms and front suspension stabilizer bar.

If necessary, remove the front suspension arms from the subframe (see "Removing the arm", page 203) and the anti-roll bar (see "Replacing the anti-roll bar components", page 201). Install the subframe in the reverse order. Tighten the subframe body mounting bolts to the prescribed torque.

Front hub bearing replacement wheels

The front wheel hub bearing must be replaced when it fails or when dismantling the hub, as the bearing elements will be damaged during this operation.

The work is carried out on an inspection trench or trestle.

The work is shown on the hub bearing of a vehicle equipped with ABS. On a vehicle without ABS, the bearing replacement operation is almost identical. The difference is that there is no mounting ring for the wheel speed sensor, which on vehicles with ABS is located in the bearing socket in the steering knuckle.

The operations for replacing the right and left wheel bearings are similar. Apply parking brake, engage first gear and place wheel chocks under the wheels.

! **The wheel hub bearing nut is tightened to a high torque, therefore the head and the bolt must be strong enough to transmit the necessary force.**

Unscrew wheel hub bearing nut with a 30 mm socket.

If it is not possible to unscrew the nut in this way (the vehicle wheel turns), you can brake the vehicle by depressing the brake pedal and holding it - you will need an assistant to do this.

Suspend and remove wheel. Remove the front wheel sensor (see "Removing the front wheel sensor", page 237).

Remove brake disc and shield (see "Replacing the front wheel brake disc", page 233).

Disconnect the tie rod lug from the steering knuckle (see "Replacing the tie rod lug", page 217). Remove the ball bearing pin from the hole in the steering knuckle (see "Removing the arm", page 203). Disconnect the shock absorber strut from the steering knuckle (see "Removing and disassembling the shock absorber strut", page 200).....

...and remove the steering knuckle assembly with hub from the splined shank of the wheel outer ball joint housing.

! **When dismantling the left steering knuckle, do not apply force to the scaffold actuator along its axis outwards from the vehicle, as this may cause the rollers of the inner drive triple-joint to come out of the grooves of the gearbox half axle pinion.**

Support the knuckle on the jaws of the vise.

Press the hub end with a mandrel or a suitably sized head.

...press out the hub.

The inner bearing ring closer to the hub flange remains on the hub.

Use a screwdriver to pry off the protective washer covering the stud packing.

...and remove the washer.

Clamp the hub flange in a vise. Insert a chisel between the end faces.

The bearing inner ring and the hub shoulder.

Use a chisel to tap the inner ring on the hub with a hammer.

Then, insert the puller grips into the gap created....

... and finally press the inner ring of the bearing off the hub.

Use circlip pliers to remove the bearing retaining ring from the groove in the steering knuckle.

Use a cup puller to press the bearing out of the steering knuckle.

The bearing can also be pressed out by percussion. To do this, rest the knuckle on the jaws of a vise.

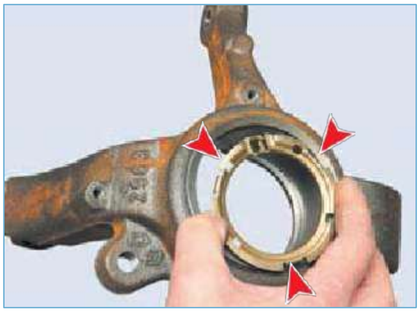
By striking the end face of the bearing outer ring through a mandrel or head of suitable size,

press the bearing out of the cu-

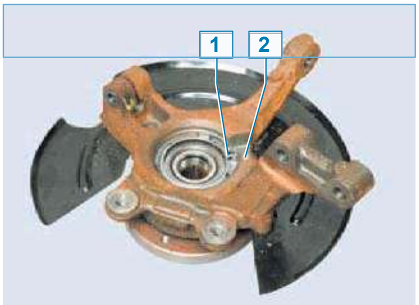
varnish.

Before installing a new bearing, clean the seating hole in the steering knuckle and the groove for the circlip. Clean chisel m a r k s on the hub with a chisel file.

Before pressing the bearing in...



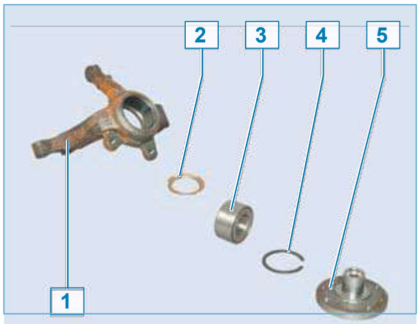
...insert the wheel speed sensor mounting ring into the bore of the knuckle (with the feet centering the ring inside the knuckle).



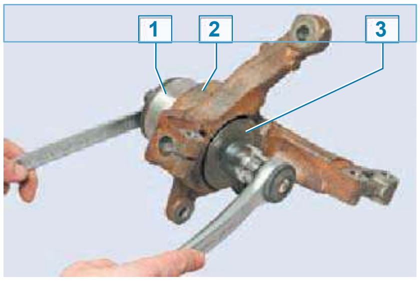
Orient the ring in the cam bore so that the speed sensor holder on ring 1 is positioned in the groove of cam 2 (for clarity, shown on the assembled hub unit). Install cup puller screw with support washer....

... insert the new bearing into the bore of the knuckle.

! **The bearing must be mounted so that its dark-colored shield (made of magnetic material) faces the mounting ring of the wheel speed sensor.**



Elements of the hub unit: 1 - hub knuckle; **2 -** wheel speed sensor mounting ring (not available on vehicles without ABS); **3 -** hub bearing; **4 -** snap ring; **5** - wheel h u b .



Press the bearing by applying force through the puller cup 1 to the end face of the bearing outer ring 2, with the puller washer 3 resting on the steering knuckle.

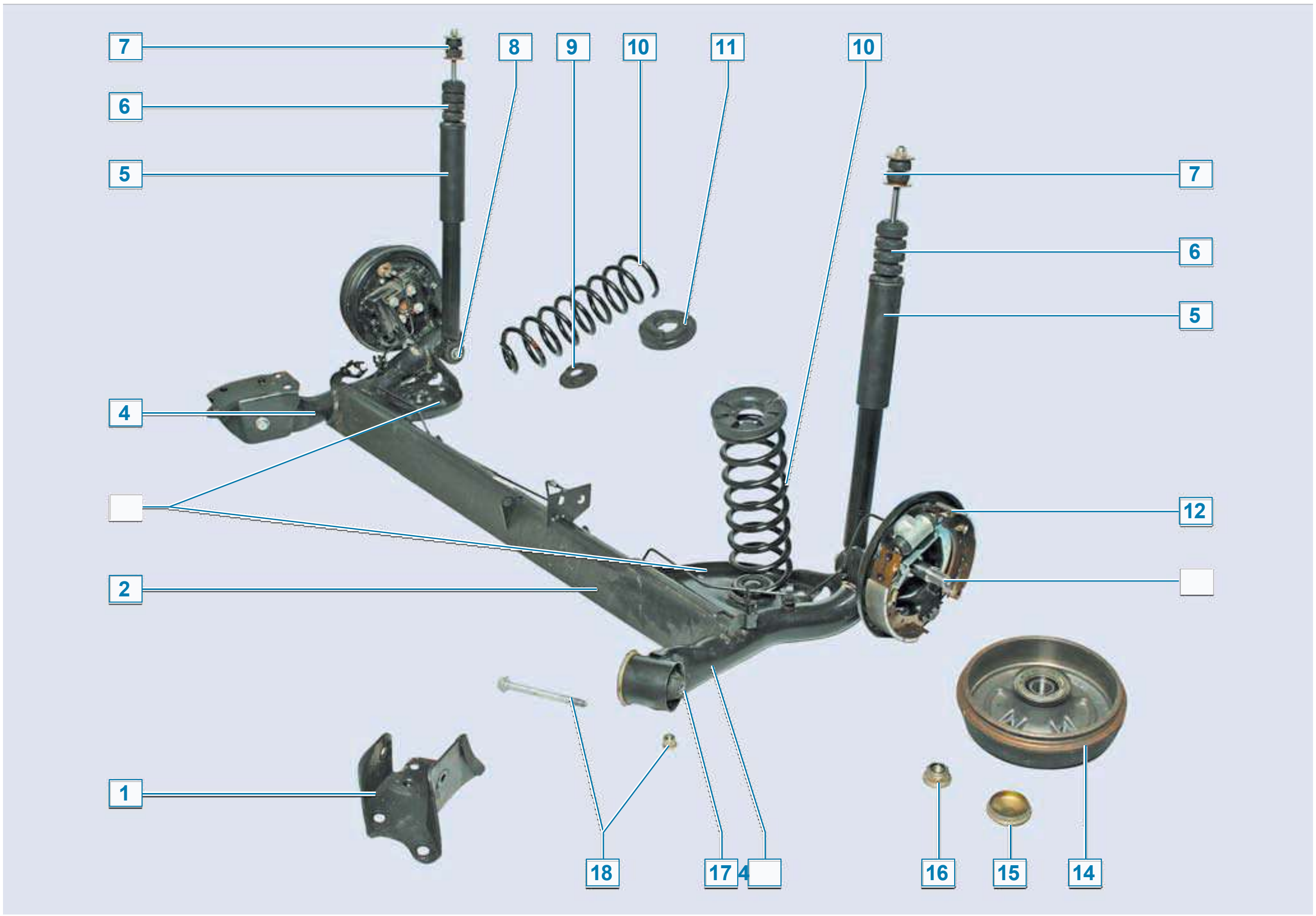
After pressing the bearing in, insert the circlip into the groove of the hub. Then press the hub into the bearing.

When pressing in the hub, the puller cup must rest on the inner ring of the bearing.

Further assembly and installation of the hub assembly is carried out in reverse order.

Rear suspension

Construction description



Elements of the rear suspension: 1 - bracket of beam arm attachment to the body; **2** - beam; **3** - arm bracket; **4** - beam arm; **5 -** shock absorber; **6** - buffer of compression stroke; **7** - cushions and washers of upper shock absorber attachment to the body; **8** - bolt of amortizer attachment to the arm; **9 -** lower spring gasket; **10 -** spring; **11** - upper spring gasket; **12 -** rear wheel brake mechanism; **13** - rear wheel trunnion; **14** - brake mechanism drum complete with rear wheel bearing; **15 -** cap; **16** - wheel bearing nut; **17 -** beam arm silent-block; **18** - bolt and nut securing the beam arm to the bracket.

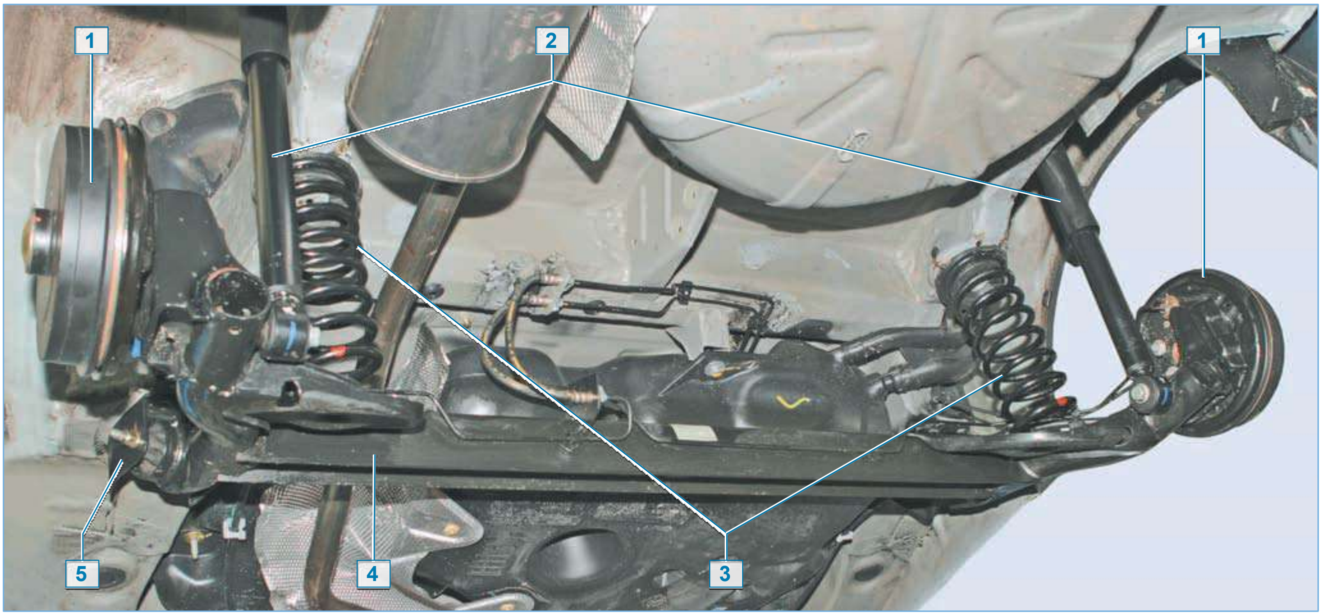
The rear suspension is semi-independent, spring-loaded with double-acting telescopic gas strut shock absorbers.

Spring support brackets are welded to the beam and arms. To increase transverse stability and reduce roll angles, a transverse stability stabilizer is installed inside the beam, the ends of which are welded to the reinforcements.

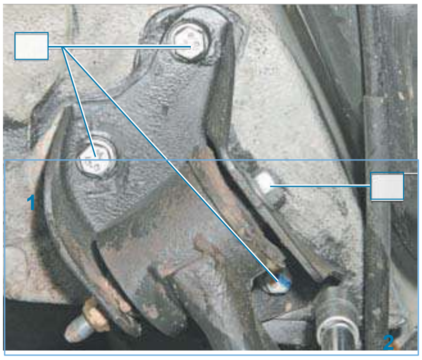
A rubber cushion is mounted on the stabilizer in the middle section

The stabilizer is a tube - round at the edges and oval in the middle. The stabilizer is a tube - round at the edges and oval in the middle.

The suspension arms have flanges welded to them for mounting rear wheel axles and brake shields. At the front, the arms are equipped with welded bushings with silent-blocks pressed into them. The outer cage of the silent-block is plastic, and the inner cage is plastic.



Rear suspension: 1 - brake drum; **2 -** shock absorber; **3 -** spring; **4 -** rear suspension beam; **5** - beam arm mounting bracket to the body.

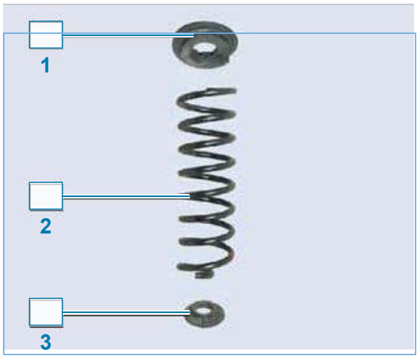


Bolt 2 passes through the inner cage of the silent block and connects the arm to the body bracket. The bracket is secured to the body with three bolts 1

metal. The rubber mass of the silent-block vulcanized to the cages is asymmetrical in cross-section. Therefore, it must be strictly oriented when pressing the silent-block into the lever.

The elastic elements of the suspension are coil springs.

The spring is supported by rubber gaskets: at the bottom on the lever arm and at the top on a support welded to the body member. The lower coil of the spring has a smaller diameter.

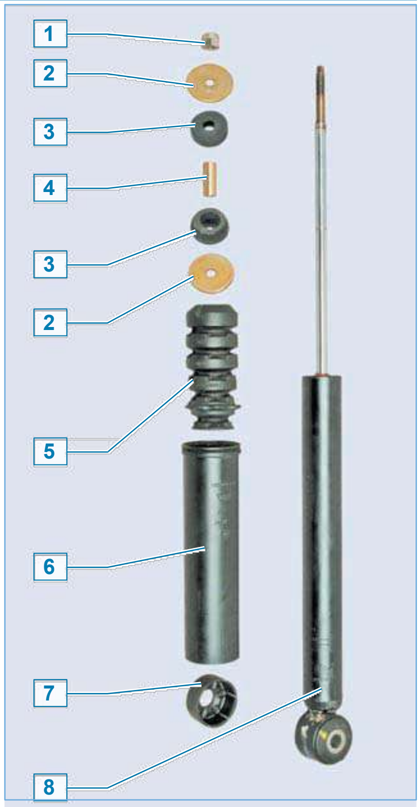


Rear suspension spring: 1 - upper gasket; **2** - spring; **3** - lower gasket

The rear suspension springs are classified according to their stiffness. The spring class is marked with paint. The same spring class must be installed on the left and right sides of the vehicle.

When replacing, it is recommended that springs of the same class as those fitted to the vehicle are used.

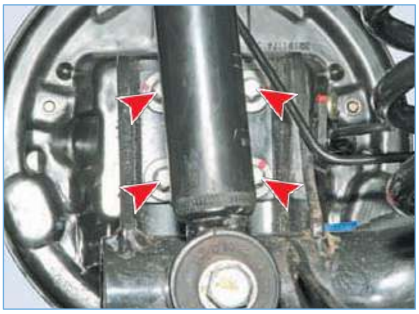
A rubber-metal joint is pressed into the lower eye of the shock absorber, through the central bushing of which passes the bolt securing the shock absorber to the suspension arm. Шток амортизатора крепится к ку-



Rear suspension shock absorber: 1 - rod mounting nut; **2** - washer; **3 -** rod cushion; **4** - spacer bushing; **5** - compression stroke buffer; **6** - cover; **7** - protective cap; **8** - shock absorber.

Rear wheel bearing assembly: 1 - trunnion; **2** - brake drum; **3** - rear wheel bearing; **4 - bearing** retaining ring; **5** - bearing nut; **6** - cap.

the cushions (one at the bottom of the support, the other on top) and two metal washers. A spacer sleeve is installed between the cushions on the shock absorber stem to prevent the cushions from deforming when the stem nut is tightened. The shock absorber stem is fitted with a compression buffer to which the cover is attached.



The rear wheel hub is bolted through the brake shield to the rear suspension beam flange with four bolts.

The rear wheel bearings are double row roller bearings. The brake drum acts as the rear wheel hub and the outer ring of the bearing is tightly seated in the bore of the brake drum. Inner

bearing rings are installed

on the rear wheel trunnion (axle) - with a small gap. The bearing is secured in the drum by a circlip. The bearing does not require replenishment of grease during operation.

The rear wheel angles are set by the beam geometry and cannot be adjusted in operation. The angles can only be checked on a special test bench and compared with the reference values (camber angle - 0°51'±15', wheel offset +0°44'±15'). If the rear wheel angles do not correspond to the reference values, check the condition of the rear suspension components.

Removing the shock absorber

The shock absorber must be removed if it loses performance, if the lower attachment silent block is destroyed or badly worn, if the upper attachment rubber cushions, the shock absorber cover or the shock absorber compression buffer fail. Both shock absorbers must be replaced to ensure that the performance of the left and right shock absorbers does not differ.

The work must be carried out on a level horizontal platform or inspection trench.

! **To prevent damage to the rear brake hoses, do not remove two shock absorbers at the same time with the rear of the vehicle suspended.**

The operation is shown on the left shock absorber, the right shock absorber can be removed in the same way. Open the trunk lid (Logan vehicle).

...lift up the wheel arch trim.

Opening the luggage compartment door-(Sandero and Sandero Stepway cars)....

...remove the side trim.

Unscrew the nut of the upper mounting of the amor- tizer using a 16" wrench, keeping the amor- tizer stem from turning with a special 6" wrench (you can use a wrench for the upper mounting of the front shock absorbers of Zhiguli cars).

Remove the support washer....

...and the upper rod mount rubber pad.

From underneath the vehicle, loosen the lower shock absorber mounting bolt to the beam arm using a ring wrench or an 18" head....

... and remove shock absorber assembly with lower rubber pad and bushing, lower support washer, compression buffer and protective cover.

Replace defective parts with new ones.

Before installing the shock absorber, attach the above-mentioned parts to the shock absorber stem.

Insert upper end of shock absorber into body bore and tighten lower shock absorber mounting bolt. Place upper rubber cushion and support washer on shock absorber stem, tighten stem retaining nut.

Tighten the lower shock absorber mounting bolt to the specified torque in position "car on wheels."

Spring removal

Remove the springs when replacing them, replacing the rubber springs gaskets, removing the rear suspension beam and when dismantling the entire exhaust system (left spring).

The work is carried out on an inspection trolley or trestle.

! The springs must only be replaced in pairs.

Remove the left spring, remove the right spring in the same way.

Unscrew the bolt securing the lower shock absorber to the rear suspension beam arm (see "Removing the shock absorber", page 209).

Suspend the rear of the vehicle and secure it securely on the factory-made stands.

Remove the spring by compressing the spring coils with two cable ties. The spring can also be removed without the use of cable ties. An assistant may be required.

Insert a piece of pipe or a sturdy rod into the opening of the beam lever.

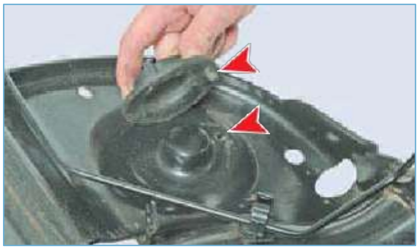
Pull down the pipe section by pushing down the beam lever and remove the spring. Remove the lower and upper spring spacers. The upper spring spacer is usually stuck to the body.

Ensure that there are no deformations or tears in the spacers.

Before installing the spring, place the upper spacer on the spring.

... so that the end of the upper coil of the rod rests on the ledge of the gasket.

Затем, чтобы верхняя прокладка не сдвинулась при монтаже пружи-
and attach it to the spring with a cattle prod
.
or insulating tape. Install the lower spring gasket on the tab of the lever arm so that....



... the gasket pin is inserted into the hole in the bracket (for clarity, shown with the beam removed).

Mount the spring so that the end of the lower coil of the spring is against the ledge of the gasket (for clarity, shown with the gasket removed).

Pull the beam arm downwards and place the upper end of the spring with the spacer on the tab of the body bracket.

Further assembly of the rear suspension is carried out in reverse order.

Replacement of beam arm silent block

Replace arm cylent block if the joint rubber is torn or peeled.

The work is carried out on an inspection trolley or trestle.

Suspend the rear of the vehicle and secure it securely on the factory-made jack stands.

The replacement of the silent block is shown on the right rear suspension beam arm.

Remove the tire from the side of the silent-block to be removed. Silent-block side. Place the adjustable stop under the right beam arm.
Pull the parking brake cable out of the beam bracket eyelet.
If the vehicle is equipped with anti-lock brakes (ABS), remove the rubber coupling of the wheel speed sensor harness from the holder on the rear suspension arm (see "Removing the rear wheel speed sensor", page 237).
Disconnect the lower shock absorber mount from the beam arm (see "Removing the shock absorber", page 209). Unscrew the nut of the bolt securing the arm to the bracket and the three bolts securing the bracket to the body (see "Removing the rear suspension beam"). Lower the right side of the beam on the adjustable stop until....

... until the fuel tank no longer interferes with the release of the lever bolt.

When lowering the beam, make sure that the brake hoses of the rear wheels are not too tight.

With the bolt out, remove the bracket from the arm.
A significant portion of the loads are absorbed along the axis of the vehicle...

...so the rubber mass of the silent block is asymmetrical in cross-section.

Before pressing out the silent-block, mark the orientation of the elements in relation to the lever arm so that the new silent-block can be pressed in.
in the same position.

The best way to press the silent block out of the arm is with a special puller. If you do not have a puller, you can make the removal easier by cutting through the outer cage of the silent block.

Insert the blade of a metal hacksaw into the hole in the rubber mask of the silent-block and saw through the plastic outer sleeve of the silent-block. This will significantly reduce the tension of the silent block in the arm bore.
After that, use a mandrel or a piece of pipe with a suitable diameter to dislodge the silent-block from the lever on the sill side, applying force to the outer cage.

Before pressing in a new silent-
Clean the bore of the block in the arm.
Insert the silent block into the bore of the arm, aligning it with the marks.

Press the silent-block into the arm using a cup puller, applying force through the mandrel to the outer bushing of the silent-block (for clarity, show on the removed beam).
Replace the silent block of the left arm in the same way, except that the bolts for the arm bracket are loosened.

(by loosening the nut of the bolt securing the left lever to the bracket, remove the bolt and remove the lever from the eye of the bracket).
Install the rear suspension beam arms in reverse order. Tighten the nuts of the bolts securing the lever arms to the brackets to the prescribed torque in the "vehicle on wheels" position.

Removing the rear suspension beam

The beam is removed for replacement in case it is damaged.
The work is carried out with a helper on an inspection trench or trestle.
Remove the rear brake shoes (see "Replacing the rear brake shoes", page 228). Disconnect parking brake cables from the rear suspension beam (see "Replacing the parking brake cables", page 235). Disconnect the rear brake hoses from the brake pipes on the beam (see "Replacing the rear brake hose", page 234).

If the vehicle is equipped with ABS from-connect wheel speed sensors from brake shields (see "Removing the rear wheel speed sensor", page 237).
Place an adjustable stop under the beam.
Disconnect the lower shock absorber mountings from the beam arms (see "Shock absorber removal", page 209) and remove both rear suspension springs (see "Spring removal", page 210).

Unscrew the nut of the bolt fixing the left-hand side of the vehicle with an 18

mm open-ended wrench.

If the vehicle is not equipped with a spare wheel, do not use the same size wrench to remove the bolt.
Remove the bolt from the holes in the bracket and the silent block or knock it out with a soft metal chisel. After loosening the nut of the b o l t securing the right lever arm to the bracket, the bolt cannot be removed because it rests against the fuel tank. Therefore.

...loosen three bolts securing the right arm bracket to the body using a 16" head with an extension. Remove the left beam arm from the eye of the bracket.....

... and lower the beam on the adjustable stop, holding it on both sides.
Remove right arm bracket, rear wheel brake shields, brake pipes and wheel trunnions from the beam.
Install the rear suspension beam in reverse order.

! Tighten the nuts of the bolts securing the lever arms to the brackets to the prescribed torque in the "vehicle on wheels" position.

After mounting the beam, pump the hydraulic brake system (see "Pumping the hydraulic brake system", page 48).

Replacing the rear wheel bearing

Replace the bearing if it fails - noise, howling in the rear wheel area or noticeable play. The work is carried out on an inspection pit or overpass.
Fully lower parking brake lever. Remove the rear wheel and dismantle the brake drum (see "Replacing the rear brake shoes", page 228).

! After removing the brake drum, do not depress the brake pedal, as thepistons may come completely out of the wheel cylinder.

Remove the bearing retaining ring from the outer side of the drum using special pliers for removing the washers.
Press the bearing to be replaced out of the drum seat.

...with a cup puller....

... or knock out with a suitable mandrel by placing two wooden blocks under the brake drum. Clean the seating surface before installing a new bearing under it in the brake drum. Insert the bearing into the socket in the brake drum.

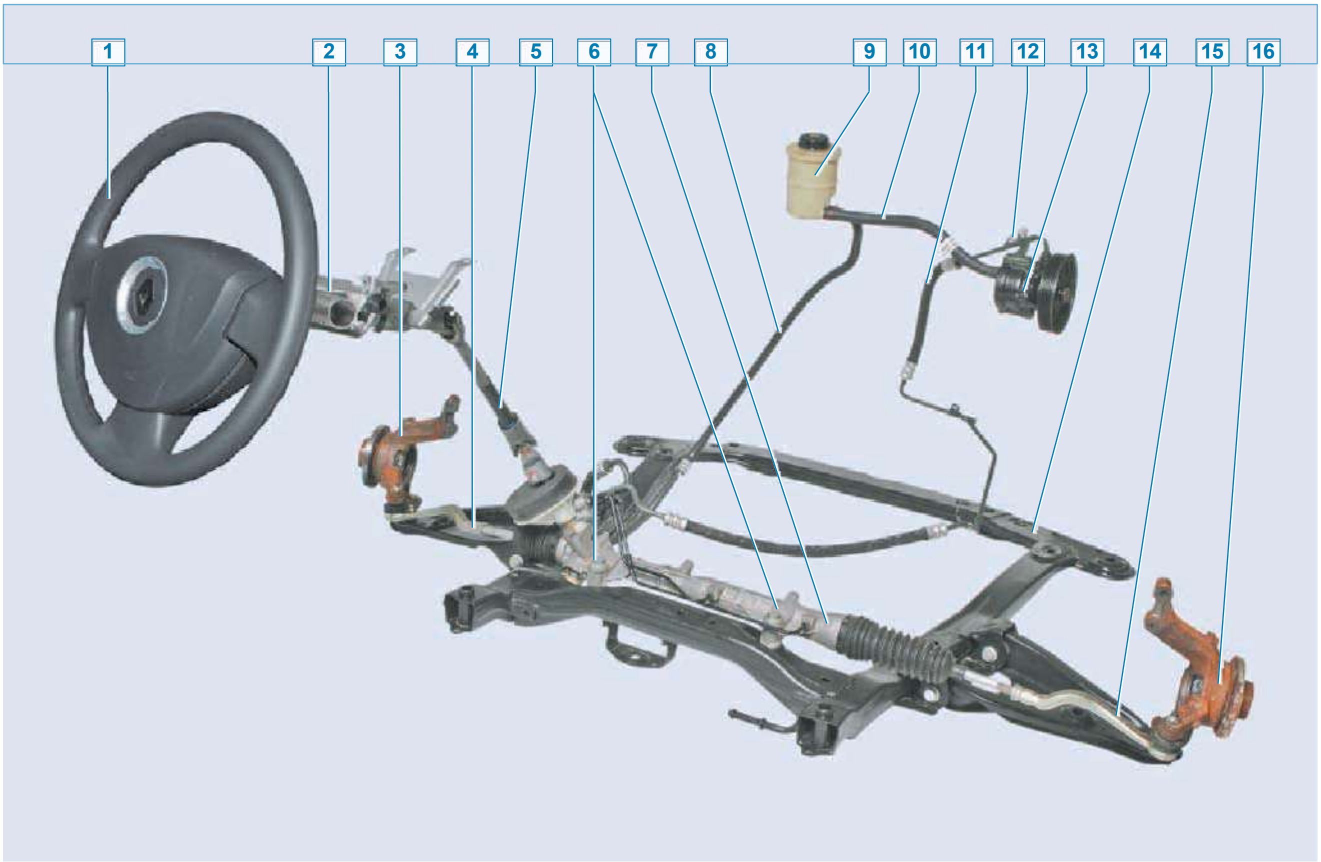
Press the new bearing in with the puller as far as it will go, applying force through the mandrel to the outer ring of the bearing.
The outer ring of an old bearing can be used as a mandrel.

When pressing in the bearing on a vehicle with ABS, do not damage the rear wheel speed sensor set ring by supporting the puller cup on the other side of the drum.
Fit retaining ring in the drum groove. Check the condition of the journal. If its seating surface for the wheel stud or the threads for the nut are damaged, replace the trunnion.
To that end...

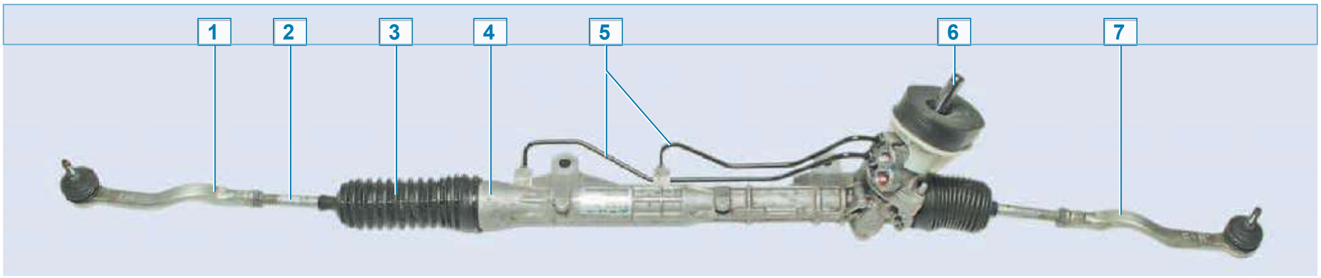
...Use an E-16 head to loosen the four screws securing the rear wheel trunnion to the rear suspension beam flange.....
...remove it and install the new trunnion.
Mount the brake drum on the journal (see "Replacing the rear wheel brake shoes", page 228).

Steering

Construction description



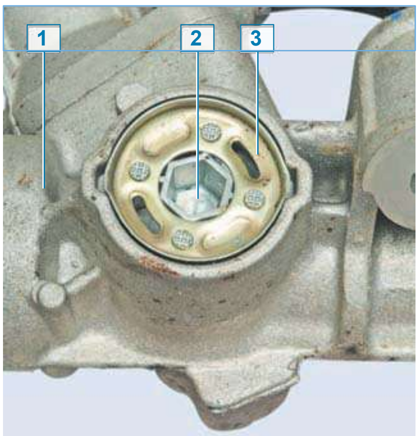
Elements of steering of a car with power steering: 1 - steering wheel; **2** - steering column; **3** - left steering knuckle complete with hub; **4 -** left steering rod lug; **5 -** intermediate shaft; **6 -** bolts fixing the steering gear cage to the subframe; **7 - steering** gear cage; **8 - power steering** drain line; **9** - power steering reservoir; **10 -** power steering filler line; **11 -** power steering discharge line; **12 - power steering** fluid pressure sensor; **13 - power steering** pump; **14 -** subframe; **15 -** right steering rod lug; **16 -** right steering knuckle assembly with hub



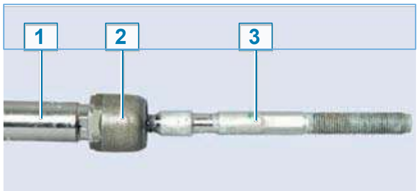
Steering mechanism of the car with power steering: 1 - right steering rod lug; **2** - steering rod; **3** - rod cover; **4 - steering** mechanism crankcase; **5 -** connecting tubes of power steering; **6 -** drive pinion; **7 -** left steering rod lug.

The vehicle steering is rack-and-pinion, with power steering. The steering mechanism is of the rack-and-pinion type.
A drive pinion is mounted on two bearings in the steering gear casing and is meshed with the rack. Turning the steering wheel rotates the steering column shaft, which is connected to the drive pinion via an intermediate shaft (with cardan joints at the ends). The pinion gear moves the rack, which turns the steering wheels of the vehicle via the steering rods with lugs and the steering knuckle arms connected to them.
The steering crankcase is attached to the subframe with two bolts.

mi. In the steering b o x .
The rack is pressed against the drive shaft the pinion gear through the stop. Adjustment of lateral clearance between pinion and rack is performed by turning the adjusting plug. Adjustment is only carried out when the steering gear is assembled at the manufacturer. In operation
the clearance cannot be adjusted.
The steering gear consists of two steering rods connected to the steering rack and a lever.

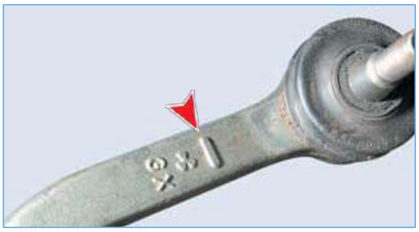


Adjustment plug 2 is fixed to the steering gear housing
1 by lock washer 3 riveted to the plug. The washer shoulder is pressed into the crankcase grooves in two places

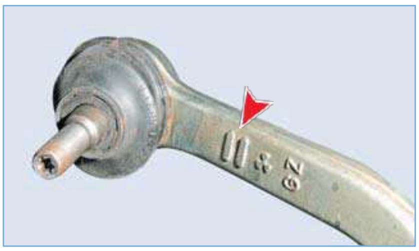


Steering rod assembly with steering rack: 1 - rack; **2** - ball joint **of the rod; 3 -** steering rod

Steering rod end



There is one mark on the right steering rod lug....



...and the left one has two marks on it

The tie rods are attached to the steering rack via a non-disassembled ball joint. Each tie rod is attached to the steering rack with its inner end via a non-disassembled ball joint - the threaded end of the joint is screwed into the hole in the rack.
The middle part of the steering link has a hexagonal key in it
"13" and on the outer end there is a thread (right-hand thread) on which

The steering linkage has a non-disassembled ball joint that does not require replenishment of the lifetime lubricant.
The right and left steering rods are the same, but the steering knuckles are different. The connection between the steering rack and the steering link ball joint is protected from dirt and moisture by a corrugated rubber cover. The cover is secured with a plastic clamp on the steering gear casing, and the cover is held on the steering rod by the elasticity of the rubber - the narrow belt of the cover must be aligned with the groove made on the steering rod.
When the steering gear is assembled at the factory, the threaded connection of the steering linkage joint lug is threaded into the steering link-
The rail is secured against unscrewing.....

the rod end is screwed on.

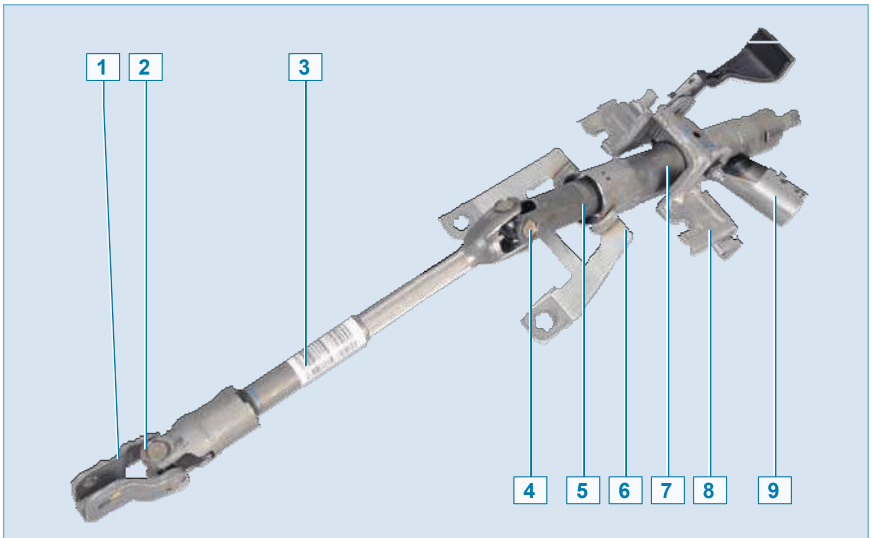
...by crimping the end of the rail.

The geometry of the threaded connection is disturbed when the rail end is compressed.

In order to replace the steering link, it is necessary to unscrew the ball joint lug from the hole in the rack (hexagon on the ball joint housing for a 32 mm wrench and the groove on the end of the rack for a 18 mm wrench). In this case, the thread in the bore of the steering rack is likely to be damaged. If the threads in the bore of the steering rack are only slightly damaged, they can be repaired.

"If this is not the case, it is better to replace the steering gear assembly.

The steering column is injury-safe, with steering wheel tilt adjustment mechanism.



Steering column: 1 - coupling; **2** - lower cardan joint; **3** - intermediate shaft; **4 -** upper cardan joint; **5** - steering column shaft; **6** - lower column mounting bracket; **7** - pipe; **8** - upper column mounting bracket; **9** - ignition switch socket.

The steering column shaft is attached to the drive pinion of the steering mechanism via an intermediate shaft with two cardan joints. The intermediate shaft is designed as a composite shaft for personal injury protection. In the event of a frontal impact during an accident, the steering column must not move towards the driver. This is achieved by a splined connection in the middle part of the shaft. The steering wheel is mounted on the splines in the upper part of the steering column shaft and secured with a screw. The steering wheel is attached to the cross member bracket located under the instrument panel.

Power steering pump - power steering pump

Some vehicles are equipped with hydraulic power steering (power steering). The power steering system includes: steering gear, pump, fluid reservoir and connecting pipes. A fluid pressure sensor is installed in the discharge line to provide a signal to the electronic engine control unit.
The pump is driven by a rotating
The hydraulic fluid is fed from the reservoir to the pump and from the pump it is supplied under high pressure to the distributor located in a separate housing on the steering gear case. The hydraulic fluid from the reservoir flows to the pump and from the pump it is supplied under high pressure to the distributor located in a separate housing on the steering gear housing and mechanically connected to the steering column shaft. The distributor is designed to monitor the alignment of the steering wheel and steering gear drive shaft angles and strictly dosed to change the fluid pressure in the chambers of the steering gear. The hydraulic cylinder piston is mounted on the steering rack.

When the steering wheel is turned, the distributor connects one chamber of the hydraulic cylinder to the pump discharge line and the other chamber to the drain. When turning the steering wheel, the distributor connects one of the hydraulic cylinder chambers to the pump discharge line and the other chamber to the drain. In this case, the hydraulic cylinder piston moves the rack to the left or right due to the differential pressure of the working fluid and turns the steering wheels of the vehicle via the steering rods and knuckle arms. If the hydraulic booster fails, the vehicle can still be steered, but the steering force on the steering wheel increases.
To control the liquid level
The MIN and MAX markings are marked on the translucent casing of the tank.

Removing the steering wheel

Remove the steering wheel to replace it or when removing the steering wheel coupler, steering column or instrument cluster.
Set the front wheels of the vehicle to straight ahead. Remove the driver's airbag (see "Removing the driver's airbag", page 278).

Use a Torx T-50 wrench to loosen the steering wheel fastening screw a few turns.
Do not loosen the screw all the way to avoid injury when removing the steering wheel.

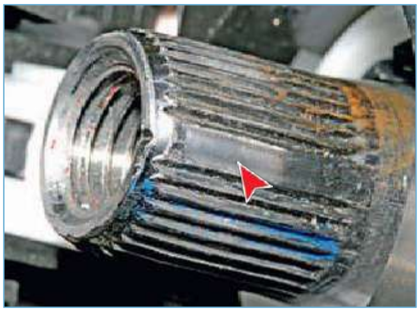
While wiggling, pull the steering wheel toward you and slide it over the shaft splines.

Fully loosen the steering wheel mounting screw.

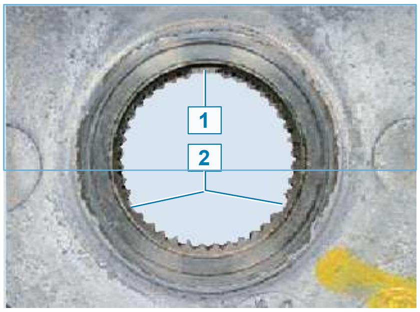
Insert the spiral cable of the safety belt through the hole in the steering wheel hub....

... and remove the steering wheel from the shaft. Install the steering wheel in the reverse order.

The steering wheel is mounted on the steering column shaft in one position only. The steering wheel is mounted on the steering column shaft in one position only.



...wide tab on the splined end of the steering column shaft....



... with the wide slot 1 of the steering wheel stud hole.

The two narrow grooves 2 are aligned with the corresponding protrusions of the steering column shaft lug.

Removing the steering column

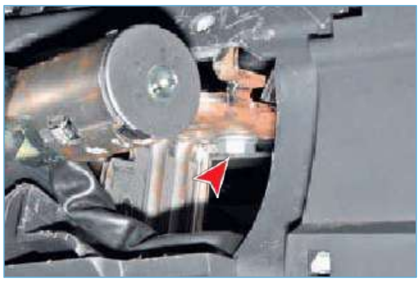
The steering column must be removed for replacement of the complete steering column in case of failure of the column shaft bearings or the cardan joints of the intermediate shaft.

Remove paddle shifters (see "Removing paddle shifters and paddle shifter connector with spiral cable reel assembly", page 267). Disconnect the ignition switch and immobilizer coil harness leads from the wiring harness (see "Replacing the immobilizer coil and ignition switch", page 247). Remove the instrument cluster (see "Removing the instrument cluster", page 276) to avoid damaging it when removing the steering column through the hole in the instrument cluster.

Unscrew the nut of the special bolt securing the coupling of the lower PTO joint of the intermediate shaft to the drive pinion of the steering gear using a 13 nut. Remove the bolt.

Special bolt and nut for securing the coupling of the lower PTO joint of the intermediate shaft.

Remove the lower universal joint coupling from the pinion (arrow shows pinion flats).



On the right side of the steering column, loosen the rear bolt securing the steering column bracket to the crossbar bracket with a 13 mm wrench.

Use the same tool to loosen the rear bolt on the left side of the steering column.

Unscrew the two front bolts securing the steering column bracket to the crossbar bracket located under the instrument panel with a 13" socket.

Move the upper part of the steering column so that it does not catch on the dashboard and crossbar components and remove the column through the opening in the dashboard.

Install the steering column in reverse order.

Mount the lower universal joint coupling to the steering gear drive pinion so that the coupling mounting bolt is aligned with the pinion flats. Tighten the coupling bolt nut and steering column mounting bolts to the specified torque.

Replacing the steering rod lug

Replace the steering link rod end if its ball joint fails or if the joint cover is damaged. Remove the front wheel on the side of the steering link rod end to be replaced and securely fix the vehicle on a factory-made stand.

Turn the steering wheel as far as it will go in the opposite direction to the lug to be removed. The work is shown for the right steering link lug, replace the left steering link lug in the same way.

Use a 21" wrench to loosen the lock nut, holding the lug with a 19" wrench by the flats.

Before loosening the nut securing the lug pivot pin to the steering knuckle arm, clean the Togh key hole in the pin end with a metal brush.

Use a 16" wrench to loosen the nut securing the ball joint pin to the knuckle arm, holding the pin with a Torx T-30 wrench. Use a puller to press the ball joint pin out of the lever arm bore. If there is no

Do not unscrew the pin nut completely with the puller. Insert mounting spatula between steering link lug and steering knuckle lever.

Press the steering link rod end down with a mounting spatula and strike the end of the knuckle arm with a hammer to press the pin out of the hole in the arm.

Press the button to select the desired setting and press the button.

...move the ball joint pin out of the hole in the arm.

Before unscrewing the lug, mark its position relative to the steering rod with a marker or count the number of turns by which the lug was screwed in. This will approximately maintain the same wheel alignment adjustment.

Use a 19" wrench to unscrew the steering link, holding the steering link in place

from turning by the hex with a 13" wrench.

Remove the steering link lug. Install
lug Install the steering link lug in reverse order.
Screw to the threaded end of the steering rod by the same number of turns (or to the mark) as before removal. Tighten the lug lock nut and the ball joint pin nut. ball joint
to the prescribed torques.
After completing work on the steering link lug, the wheel alignment must be checked and, if necessary, adjusted on a special test bench - at a workshop.
To adjust the wheel alignment

It is necessary to loosen the tightening of the counter-
The steering linkage can be turned by the hexagon with a wrench.
"13" by holding the tip with a 19" wrench (see above).
After adjusting the offset, tighten the lug lock nut to the required torque.

Replacement of the steering gear cover

If the steering gear cover has lost elasticity, cracked or torn, it must be replaced. Remove the wheel from the side of the cover to be replaced and securely fix the vehicle on a factory-made stand.
Remove the steering link lug (see "Replacing the steering link lug", page

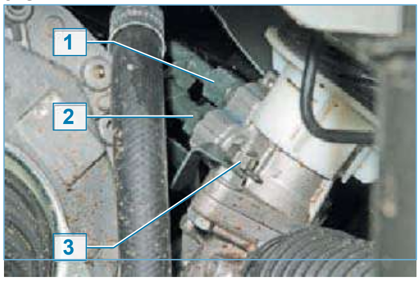
Bite off the plastic clamp securing the protective cover to the steering gear casing with a pair of cutters.

Remove the steering gear protective cover.
Clean joint steering
Remove dirt from the tie rod and install the new cover in reverse order. Secure the cover with a new clamp.

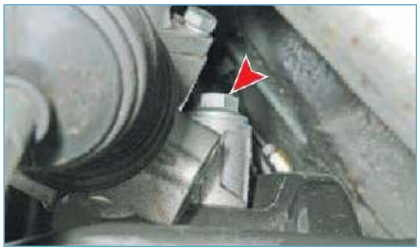
Removing the steering gear mechanisms

217).

From underneath the vehicle, unscrew the...



... with a 13 mm wrench - nut 3 securing the drain line tube bracket, with a 19 mm wrench - socket 2 of the drain line tube and with a 17 mm wrench - socket 1 of the pressure line tube.
Pull the pipe lugs of both lines out of the holes in the steering gear casing and insert plugs of suitable diameter into the holes in the pipes and the casing.



On the left side using an 18" head
Remove the steering gear for repair or replacement.
The operations are shown on a vehicle with power steering.
The work is carried out on an inspection trolley or trestle.
Drain fluid from power steering reservoir using a hose. Disconnect both tie rod ends from the steering knuckles (see "Replacing the tie rod end", page 217).
In the passenger compartment, disconnect t h e steering column propeller shaft universal joint coupling from the steering gear drive pinion (see "Removing the steering column", page 218). Before disconnecting the hydraulic lines from the steering gear housing, place a wide container under the housing to collect fluid.

Loosen the bolt securing the steering gear to the subframe.

Unscrew the bolt securing the steering gear to the subframe on the right-hand side in the same way. Remove the rear power unit support (see "Replacing the power unit supports", page 96).

Push the power unit forward (in the direction of the vehicle)...

...and place a 300-350 mm long wooden block between the engine crankcase pan and the subframe.

Sliding the steering mechanism down....

...remove the steering gear drive pinion from the hole in the front shield.

Remove the steering gear to the left. Install the steering gear in reverse order.

Before installation, check that the rack is in the center position. To do this, use sliding pliers to turn the steering gear drive pinion by its bald point in either direction up to the stop and then turn the pinion in the other direction by 1.5 turns.

Fill the power steering reservoir with operating fluid and bleed the system (see "Pumping the power steering system", page 220).

Removing the power steering pump

Remove the power steering pump for replacement or when dismantling the engine.

Remove the auxiliary drive belt (see "Replacing the auxiliary drive belt"). 1.4-1.6 (8V) engine units", page 32; "Changing the drive belt of the 1.6 (16V) engine auxiliary units", page 41).

Remove the left headlight unit (see "Removing the left headlight unit"). "Removing the headlight unit on the Logan car", p. 256; "Removing the headlight unit on the Sandero and Sandero Stepway cars", p. 258).

Pump fluid out of the power steering reservoir with a pump.

Unscrew the bolt securing the fuel line tube holder with a 10 mm socket.

Hold the pump connection with a wrench

Use a key "for 22" and a key "for 17" to unscrew the discharge line tube fitting.

Remove the tube connector from the pump connector hole and pull the tube away from the pump casing.

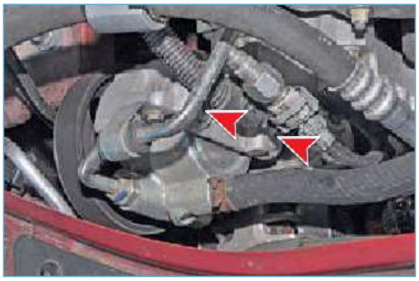
Use pliers to squeeze the clamp securing the filler line and slide the clamp over the hose.

Remove the hose from the pump connection. Insert plugs of suitable diameter into the openings of the tube, hose and pump housing connection.

Turn the pump pulley and align the hole in the pulley with the head of one of the two bolts securing the pump to the engine bracket.

Loosen the bolt securing the pump to the engine bracket with a 10 mm socket. Unscrew the second bolt in the same way.

Use the same tool to loosen the two pump mounting bolts on the opposite side of the bracket (vehicle with 1.6 (16V) engine).



On a vehicle with 1.4-1.6 (8V) engine, the pump is on the opposite side of the vehicle.

The bracket is secured to the bracket by two screws.

screws, which we loosen

with a Torx T-40 wrench.

Insert a screwdriver between the pump casing and the motor bracket and push the pump casing away from the motor bracket....

...and remove the pump.

Install the power steering pump in reverse order.

Adjust the auxiliary drive belt tension (see "Changing the auxiliary drive belt of the 1.4-1.6 (8V) engine", page 32; "Changing the auxiliary drive belt of the 1.6 (16V) engine", page 41).

Fill the power steering reservoir with operating fluid and bleed the system (see "Pumping the power steering system").

Pumping the power steering system
steering controls

Pumping the power steering system-

The steering system is required to remove air trapped in the hydraulic drive when repairing or replacing individual system components. Air trapped in the hydraulic system causes a reduction in the efficiency of the power steering system.

For pumping the hydraulic system on a cold engine that is not running.

... open the power steering reservoir cap....

... and fill the reservoir to the MIN mark (see "Checking the fluid level").

See "Steering fluid level in power steering reservoir", page 49).

Start the engine and check the fluid level in the reservoir at idle speed. If the fluid level drops, top up to the MIN mark. Turn the steering wheel several times to the left and right as far as it will go, making sure that the fluid level in the reservoir is near the MIN mark and, if necessary, topping up.

pour the liquid.

Returning the steering wheels to the straight-ahead position

Turn the steering wheel to the left and right as far as it will go and, if necessary, top up the reservoir to the MIN mark. Then turn the steering wheel to the left and right as far as it will go and, if necessary, top up the reservoir to the MIN mark. Stop the engine and check the fluid level in the reservoir again. After warming up и

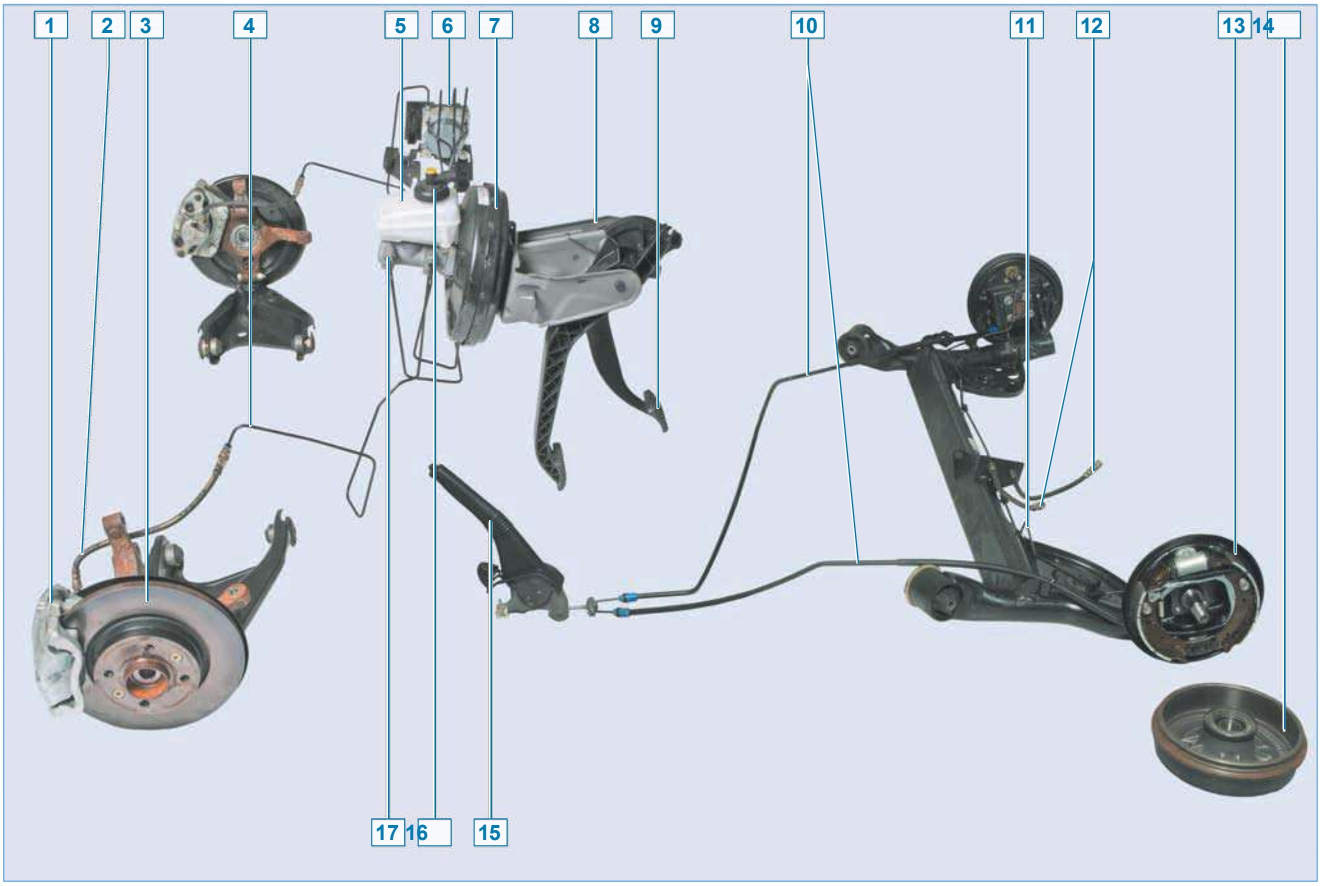
After the fluid temperature has stabilised, the fluid level should be at the MAX mark and not below the MIN mark when cold. Close the steering fluid reservoir cap.

Normal power steering operation

The steering wheel should not make any noise and no air bubbles should be visible in the fluid. The steering force on the steering wheel when the engine is running should be considerably less than when it is not running. Noise from the power steering when the front wheels are turned to the limit is not a malfunction.

Brake system

Construction description

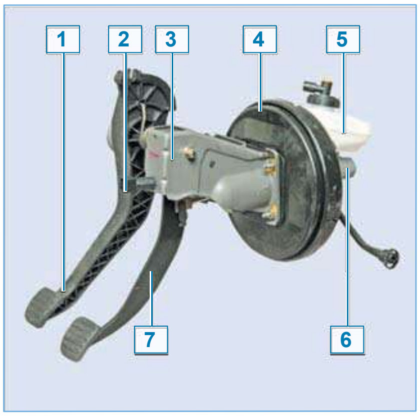


Elements of the braking system of a vehicle with anti-lock braking system (ABS): 1 - floating bracket;
2 - front wheel brake hose; **3 - front wheel brake** disk; **4 -** front wheel brake tube; **5 -** hydraulic reservoir; **6** - ABS unit; **7 -** vacuum brake booster; **8** - pedal assembly;
9 - brake pedal; **10** - rear parking brake cable; **11** - rear wheel brake tube; **12 - rear wheel brake** hose; **13** - rear wheel brake mechanism; **14** - rear wheel brake drum; **15 -** parking brake lever; **16** - b r a k e fluid level sensor; **17 - brake** master cylinder.

The service brake system is hydraulic, dual-circuit with diagonally separated circuits. In normal mode (when the system is in good working order) both circuits operate. In case of failure (depressurization) of one of the circuits, the second circuit provides braking of the vehicle, although with less efficiency.

The service brake system comprises the wheel brakes, pedal unit, vacuum booster, brake master cylinder, hydraulic reservoir, rear brake pressure regulator (only on vehicles without ABS), ABS unit and connecting pipes and hoses.

The brake pedal is of the suspended type. A brake signal switch is installed in the pedal bracket in front of the brake pedal - its contacts close when the pedal is depressed.
The brake vacuum booster is located in the engine compartment between the pedal pusher and the brake master cylinder

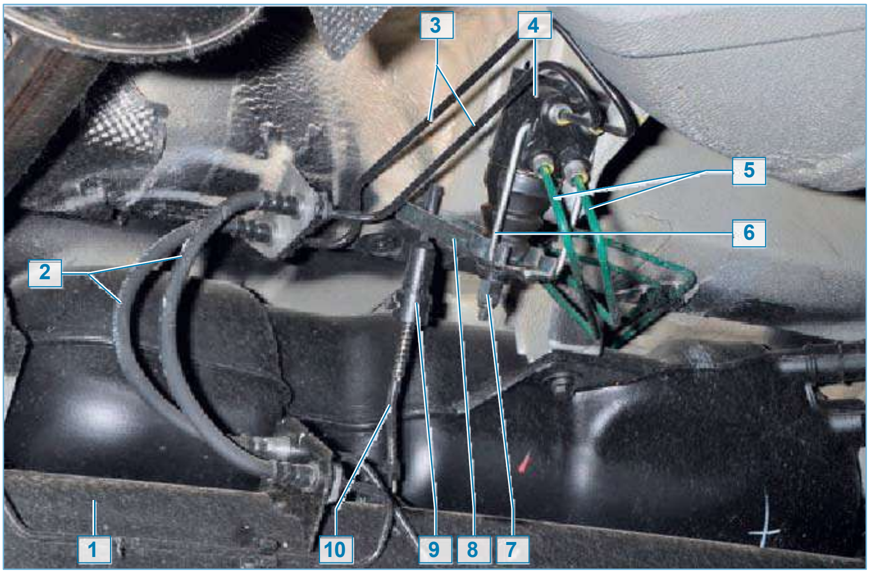


Pedal unit complete with vacuum booster and brake master cylinder: 1 - clutch pedal; **2 - brake** signal switch; **3 -** pedal unit bracket; **4 - brake** vacuum booster; **5 -** hydraulic system reservoir; **6 -** brake master cylinder;
7 - brake pedal

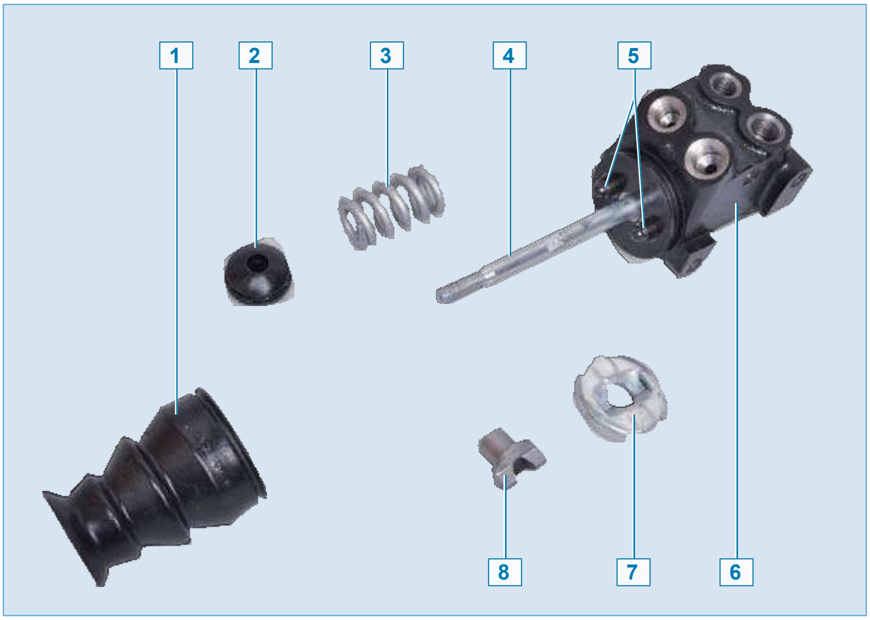
and is secured by four nuts through the front shield to the pedal bracket. The vacuum booster is non-disassembling and must be replaced if it fails.

The brake master cylinder is attached to the vacuum booster housing on two studs. The brake system hydraulic reservoir is mounted on top of the cylinder and contains a fluid reserve. The reservoir body is marked with maximum and minimum fluid level markings and the reservoir cap is fitted with a sensor which activates the signaling device in the instrument cluster when the fluid level drops below the MIN mark. When the brake pedal is depressed, the pistons of the master cylinder move, creating pressure in the hydraulic system, which is fed through pipes and hoses to the wheel brake slave cylinders.

On a vehicle without ABS, fluid to the rear brakes



Location of the pressure regulator in the hydraulic brakes of the rear wheels: 1 - rear suspension beam; **2 - rear brake** hoses; **3 - rear brake** pipes; **4 -** pressure regulator; **5 -** brake fluid supply pipes to the pressure regulator; **6 - regulator** bracket; **7** - regulator stud adjusting nut; **8 -** pressure lever; **9 - rod adjusting** bushing; **10 -** rod.



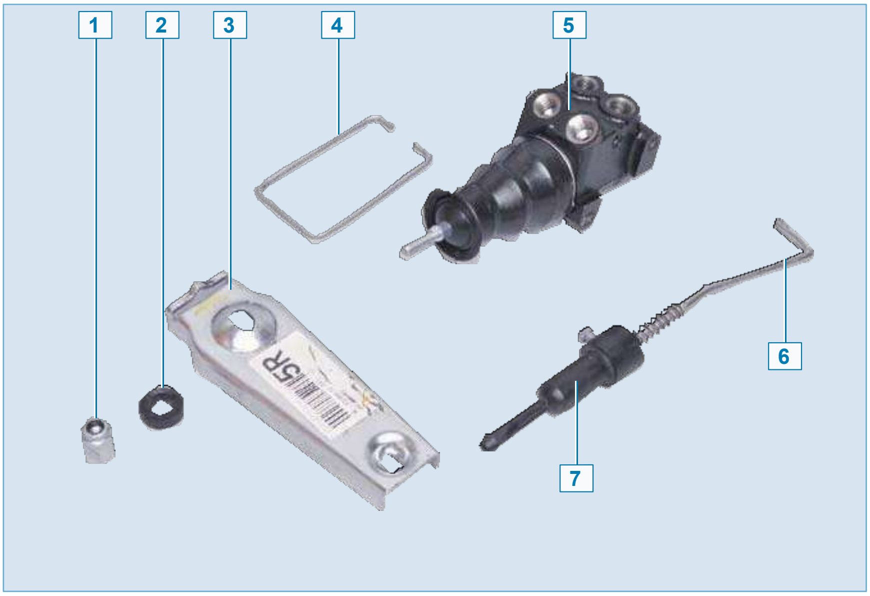
Details of the pressure regulator of the rear wheel brakes: 1 - mud shield cover; **2** - support bushing; **3** - spring; **4** - pressure regulator stud; **5 - pressure regulator** pistons; **6** - pressure regulator housing; **7** - thrust washer; **8** - guide bushing.

The wheel pressure regulator is located on the underbody between the rear suspension beam and the rear wheel recess.

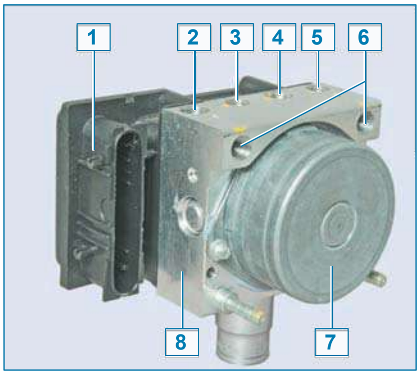
As the vehicle rear axle load increases, the adjuster link connected to the rear suspension beam is loaded, transmitting the force through the pressure arm.

to the stud and then to the two regulator pistons.

When the brake pedal is depressed, the fluid pressure tends to push the pistons out of the regulator housing.



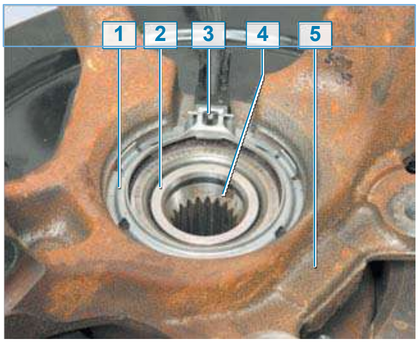
Rear wheel brake pressure regulator with levers: 1 - adjusting nut; **2** - plastic bushing; **3** - pressure lever; **4** - regulator bracket; **5** - pressure regulator; **6 - regulator** rod; **7** - adjusting rod bushing



ABS unit: 1 - control unit; **2 -** opening for connection of front right wheel brake tube; **3** - opening for connection of rear left wheel brake tube; **4 - opening for connection of** rear right wheel brake tube; **5 - opening for connection of** front left wheel brake tube; **6 - opening for connection of** front left wheel brake tube; **3 - opening for** connection of rear left wheel brake tube; **4** - opening for connection of rear right wheel brake tube; **5 - opening for connection of** front left wheel brake tube; **5 - opening for connection of** front left wheel brake tube; **6** - opening for connection of front left wheel brake tube.
main brake cylinder; **7** - pump;
8 - hydraulic block

The system is balanced by a valve in the regulator, which cuts off the fluid supply to the rear wheel brake cylinders. When the system is balanced, a valve in the regulator cuts off the fluid supply to the rear wheel brake cylinders, preventing a further increase in braking force on the rear axle and preventing the rear wheels from locking ahead of the front wheels. When the rear axle load increases and the rear wheel traction improves, the regulator provides more fluid pressure in the rear wheel brake cylinders, and vice versa, when the rear axle load decreases (e.g. when the vehicle "rolls" during hard braking), the pressure decreases.
Some vehicles are equipped-
The vehicle is equipped with anti-lock braking system (ABS), which provides more efficient braking by reducing the fluid pressure in the brakes of the brakes when they become locked. Prevents skidding and maintains vehicle controllability.
On a vehicle with ABS, fluid from the brake master cylinder flows to the ABS unit and from there to the brakes on all wheels.
The ABS unit, mounted in the engine compartment on the right-hand spar near the front panel, consists of a hydraulic unit, module, pump and control unit.
The ABS acts according to the signals of the inductive wheel speed sensors.
The front wheel speed sensor is located in the wheel hub assembly - it is inserted in the groove of a special sensor mounting ring sandwiched between the end face of the outer ring of the hub bearing and the shoulder of the bearing bore of the steering knuckle.
The speed sensor disc of the front wheel speed sensor is a hub bearing shield located on one of the two end faces of the bearing. This dark-colored washer is made of mag-

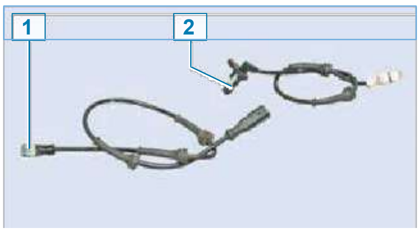
The other end face of the bearing has a plain, light-colored protective washer made of tinplate. On the other end face of the bearing there is a plain, light-colored, tin-plated protective washer.
The rear wheel speed sensor is mounted on the brake shield and the sensor reference disk is a ring of magnetic material pressed onto the brake drum shoulder.



Location of the front wheel speed sensor in the hub assembly: 1 - speed sensor mounting ring; **2 -** inner ring of the hub sub- stud; **3 -** wheel speed sensor; **4 -** wheel hub; **5** - steering knuckle.

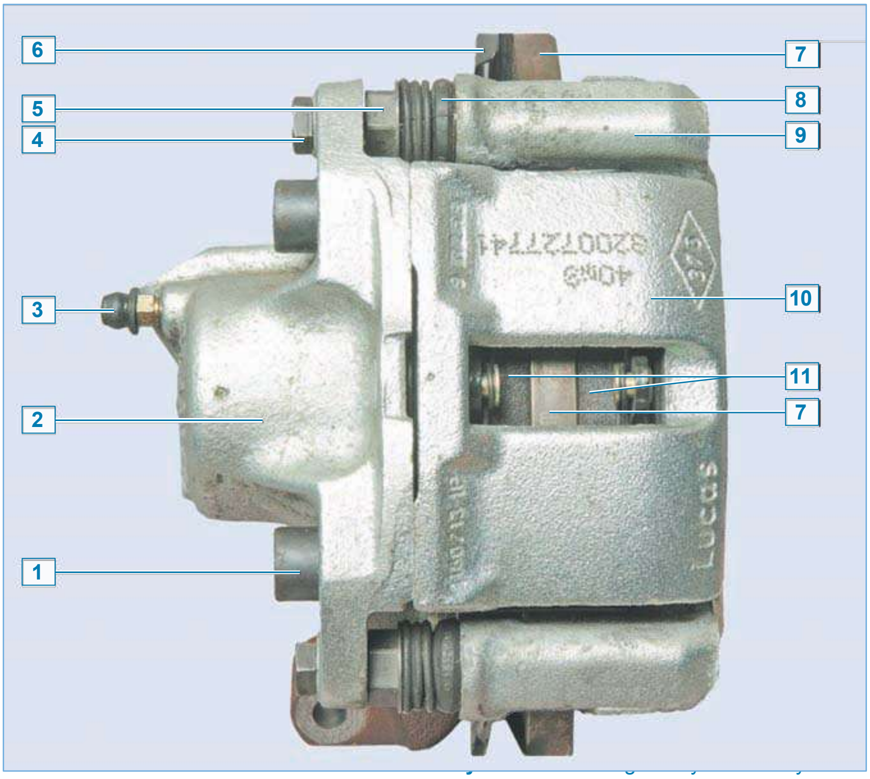
Elements of the front wheel speed sensor: 1 - bearing shield; **2** - speed sensor; **3 -** hub bearing; **4 -** speed sensor adjusting ring

sensor reference disk



Front 1 and rear 2 wheel speed sensors

When braking the vehicle, the ABS control unit detects the onset of wheel lockup and opens the corresponding modulator solenoid valve to relieve pressure.



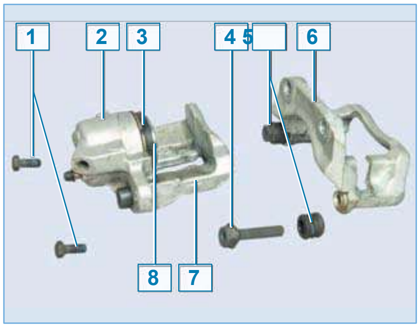
caliper; **2** - wheel cylinder body; **3 -** hydraulic brake pumping fitting; **4 -** bolt fixing the bracket to the guide pin; **5 -** guide pin; **6 - brake mechanism** shield; **7 - brake** mechanism disk; **8 - guide pin** cover; **9 -** pad guide; **10 -** caliper; **11 -** brake pads.

The valve opens and closes several times a second, so you can confirm that the ABS is working by a slight shudder of the brake pedal when braking. The valve opens and closes several times per second, so you can confirm that the ABS is working by a slight shuddering of the brake pedal when braking. When the occurrence of If the ABS malfunctions, the braking system remains operational, but the wheels may be locked. In this case, the corresponding fault code is stored in the control unit, which In this case, the corresponding fault code is stored in the control unit memory and can be read out using special equipment at a service center.

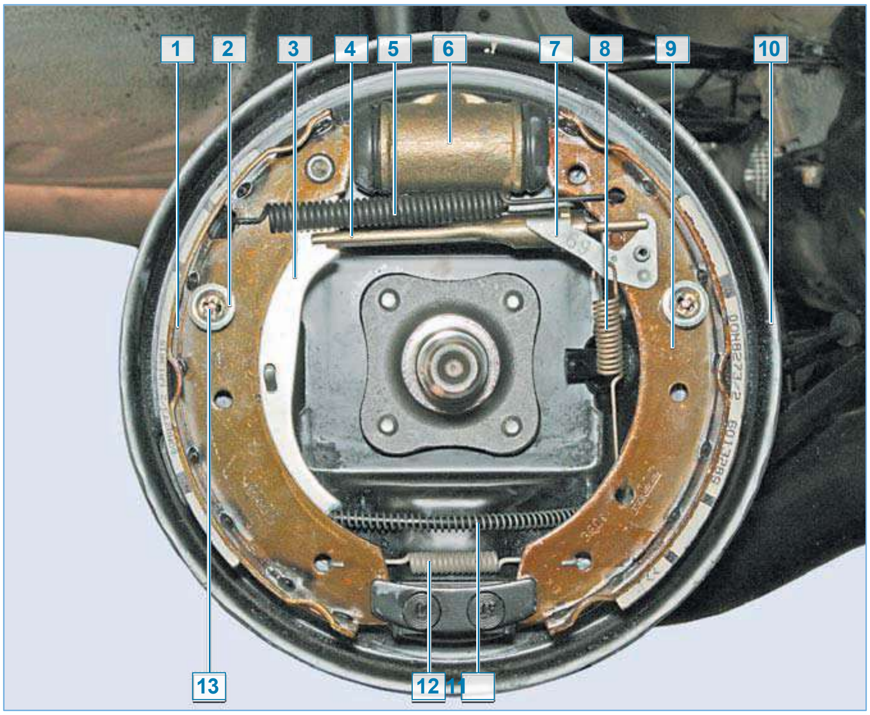
Front brake mechanism

The brakes on the front wheels are disc brakes with a floating bracket comprising a caliper and a single-piston wheel cylinder held together by two screws. Brake mechanisms of the front wheels of the vehicle.

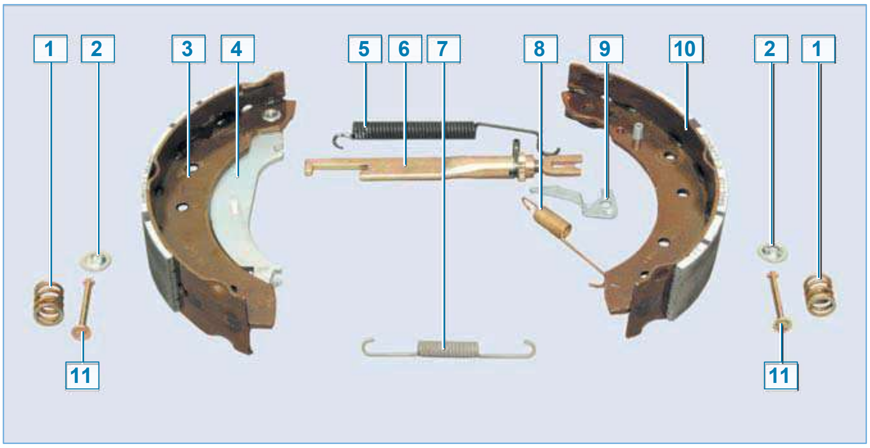
The same for vehicles with 1.4-liter and 1.6-liter engines. Some cars



Elements of the braking mechanism of the pedestrian wheel: 1 - bolt fixing the bracket to the guide pin; **2** - wheel cylinder housing; **3 -** piston protective cover; **4 -** guide pin; **5 - guide** pin protective cover; **6 -** pad guide; **7 -** caliper; **8** - piston.



Rear wheel brake mechanism with removed drum: 1 - rear brake pad; **2 -** spring cup; **3 -** parking brake actuator lever; **4 -** spacer bar; **5 -** upper tie spring; **6** - wheel cylinder; **7 -** regulator lever; **8** - regulator spring; **9** - front pad; **10 -** shield; **11 -** parking brake cable; **12 -** lower tie spring; **13** - support strut.



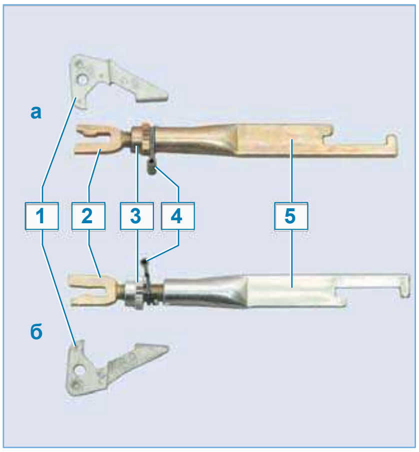
Elements of the rear wheel brake mechanism: 1 - co-boat compression spring; **2 -** spring cup; **3 -** rear pad; **4 -** parking brake actuator lever; **5 -** upper coupling spring; **6 -** spacer bar; **7 -** lower coupling spring; **8 -** regulator spring; **9 -** regulator lever; **10** - front pad; **11** - support post

is equipped with ventilated disc brakes.
The brake column guide is attached to the steering knuckle with two bolts and the bracket is attached to the steering knuckle.

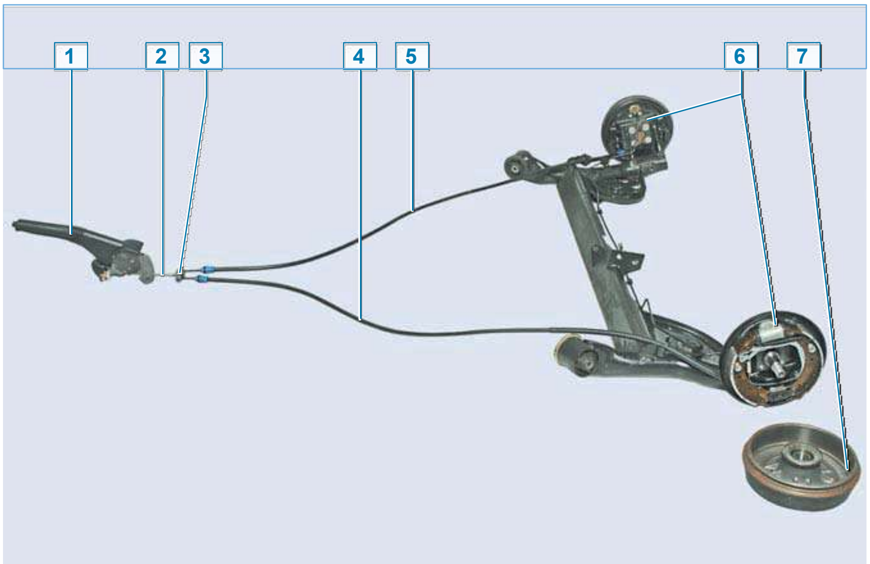
is secured by two bolts to the guide pins installed in the holes in the shoe guide. The pins are fitted with protective rubber covers. The holes for the guide pins are located in the holes in the guide pins.

The brake pads are pressed into the grooves by the guide springs. The brake pads are pressed against the grooves by the guide springs. When braking, the fluid pressure in the brake hydraulic system increases and the piston extends from the wheel cylinder and presses the inner brake pad against the disk. Then the bracket (by moving the guide pins in the pad guide holes) moves relative to the disk, pressing the outer brake pad against it. A piston with a straight-section rubber sealing ring is mounted in the cylinder housing attached to the caliper. The elasticity of this ring maintains a constant and optimum clearance between the disc and brake shoes.
The brake mechanism of the rear co-
The brake system is drum-type, with a twin-piston wheel cylinder and two brake shoes, with automatic adjustment of the gap between the shoes and the drum. Rear brake mechanisms of vehicles with 1.4 l and 1.6 l engines are identical.
The brake drum is integrated in the rear wheel hub.
The automatic clearance adjustment mechanism consists of a composite shoe spacer bar, the adjuster lever and the adjuster spring. The automatic play adjustment mechanism starts to operate when the play between the brake shoes and the brake drum is increased.
When the brake pedal is depressed, the brake pistons of the wheel cylinder cause the brake shoes to expand and press against the drum,

the adjuster lever tab moves over the depression between the teeth of the ratchet nut. When the pads are worn and the brake pedal is depressed, the adjuster lever has sufficient travel to



Elements of the mechanism of automatic adjustment of the gap between the shoes and the drum: a - brake mechanism of the right wheel; **b** - brake mechanism of the left wheel; **1** - regulator lever; **2** - threaded tip of the spacer bar; **3** - ratchet nut; **4** - spring-stopper; **5** - spacer bar



Parking brake elements: 1 - lever; **2** - front cable; **3** - cable equalizer; **4** - left rear cable; **5** - right rear cable; **6** - rear wheel brake mechanism; **7** - drum.

turn the ratchet nut by one tooth, thereby increasing the length of the spacer bar and a t the same time reducing the clearance between brake shoes and brake drum. The gradual lengthening of the spacer bar automatically maintains the clearance between brake drum and shoes. The wheel cylinders of the rear brake cylinders are identical. The front brake shoes of the rear brake system are the same, but the rear brake shoes are different because they are fitted with mirror-symmetrical fixed parking brake actuator levers.

Spacer bar and ratchet nut-

The brake levers on the left wheel are silver in color (the ratchet nut and the spacer bar tip are right-hand threaded) and those on the right wheel are gold in color (the ratchet nut and the spacer bar tip are left-hand threaded). Brake adjuster levers of left and right wheels are mirror-symmetrical. The right lever is marked with marking "69" and the left lever with marking "68".

The parking brake actuator is manual, mechanical, cable-operated to the rear wheels. It consists of a lever, front cable with adjusting nut on its tip, equalizer, two rear cables and levers in the brake mechanisms of the rear wheels.

The parking brake lever, mounted between the front seats on the floor tunnel, is connected to the front cable. An equalizer is attached to the rear end of the front cable, into which the front ends of the rear cables are inserted. The rear cable ends are connected to the parking brake actuator levers attached to the rear shoes.

The parking brake actuator does not need to be adjusted during operation (until the rear brake shoes are fully worn) as the extension of the brake spacer bar compensates for the wear of the shoes. The parking brake actuator only needs to be adjusted if the brake shoes, cables or parking brake lever are replaced.

Replacement of front wheel brake shoes

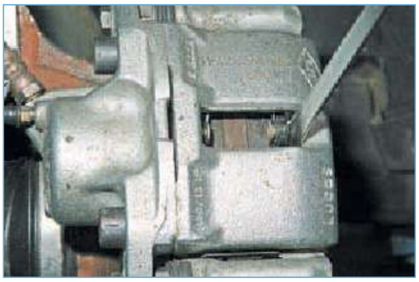
Pads should be replaced in the event of maximum permissible wear of their linings - the minimum thickness of the linings, including their base, should not be less than 6 mm. Pads should also be replaced if the brake disc is replaced, if the linings are greasy or have deep grooves, cracks and chips, or if the linings have peeled off from the pad base.

!

The brake pads of the front wheel brakes must only be replaced as a set - all four pads. Replacing only one brake pad may cause the vehicle to move sideways when braking.

If the fluid level in the hydraulic brake reservoir is at the MAX mark, drain the reservoir with a syringe or rubber hose before installing new pads

part of the fluid. This operation is necessary to prevent fluid from leaking out from under the reservoir cap when the piston is pushed into the brake wheel cylinder during installation of new brake pads.
Remove the front wheel. Before installing new pads, move the wheel cylinder piston as far as possible into the cylinder. To do this, insert a wide-bladed screwdriver through the hole in the caliper between the base of the outer pad and the caliper and rest it on the caliper....



... slide the bracket, pushing the piston rod into the cylinder.

Loosen the bolt securing the bracket to the lower guide pin using a 13 mm open-ended wrench, holding the pin with an open-ended wrench "at 17."

Lifting the bracket...

...remove the brake pads from their guide.

Remove the two spring brackets of the boats.

Use a metal brush to remove dirt and corrosion from the seating areas of the pads in their guide.
Before installing new pins, check the condition of the pin guiding covers. If the cover is torn or has lost its elasticity, replace it. For this purpose...

... remove the guide pin from the hole in the shoe guide....

...and replace the cover (to replace the cover of the upper guide pin, remove the bolt securing the bracket to the pin and remove the bracket from the pad guide).
Before installing the pin, put in some grease into the hole in the colo-dock guide....

...and apply a thin layer of grease to the surface of the pin.

Install the new brake pads in the pad guide and lower the bracket.
If the part of the piston protruding from the wheel cylinder prevents the caliper from being fitted to the brake boats, lift the bracket....

...and use sliding pliers to push the piston into the cylinder.

Replace the pads on the other side of the vehicle in the same manner.
After replacing the pads, depress the brake pedal several times to adjust the clearance between the pads and the discs. Check fluid level in reservoir and adjust if necessary.
During operation, the brake disc surface becomes uneven, which reduces the contact area between the new pads, which have not yet been worked in, and the disc. Therefore, during the first 100 km after replacing the brake pads, while the new pads are still in service, exercise caution as the vehicle's braking distance may increase.

Replacing the front wheel brake piston protective cover

Replace the piston protective cover if it is damaged - cracks, tears in the rubber or loss of elasticity of the cover.
Remove front wheel brake shoes and press wheel cylinder piston into cylinder (see "Replacing front wheel brake shoes", page 226).
Clean the area around the cover from dirt.

Use a screwdriver to pry open the lock

pouch ring.

...and take it off.

Remove the cover from the cylinder housing shoulder and piston.

Clean piston and cylinder housing shoulder with a hair brush and rinse with brake fluid. Wipe surfaces with a clean, fiber-free cloth.
Install the new protective cover in reverse order.

Replacement of rear wheel brake shoes

Pads should be replaced when the maximum permissible wear of their linings or the rear wheel brake drum has occurred. Pads should also be replaced if the linings are greasy, have deep grooves and chips on them or if the linings are detached from the pad base.

! **The brake pads of the rear wheels must only be replaced as a set.**

all four pads.

Replacing the pads of only one brake unit may cause the vehicle to move sideways when braking.
Changing the pads is shown on the le-

The rear tire. Remove the wheel cover.

Use a screwdriver to remove the hub bearing cover.

Unscrew the hub bearing nut with a 30" socket.

Remove the rear wheel and secure the vehicle on the factory-made support stand. Before removing the brake drum, lower the parking cable lever as far as it will go - the vehicle must be unlocked.

Remove the brake drum assembly with bearing.

! **Do not depress the brake pedal after removing the brake reservoir, as the pistons may come completely out of the wheel cylinder.**

Clean all parts of the brake system of dirt.
Use pliers to disconnect the lower end of the clearance adjuster spring from the front pad....

...and remove the spring.

Remove the clearance adjuster lever.

the upper compression spring out of its connection with the rear pad....

...and remove the spring.

the pad support strut until the groove in the cup aligns with the strut tail.

Remove the spring cup and spring and remove the support leg from the hole in the brake shield.

Remove the rear pad support strut in the same way.

Pull the upper end of the front cat-boat away from the slave cylinder.

...and remove the spacer bar.

remove the front brake housing.

Remove the lower tie rod.

Disconnect the parking brake cable lug from the rear brake shoe lever and remove the brake shoe.

Check the technical condition of the parts and clean them.

Before installing new pads, clean the threads of the clevis lug and ratchet nut and apply a thin layer of grease to the threads. Install new rear wheel brake shoes in reverse order. After installing the pads, reset the automatic clearance adjustment mechanism. T o do this, adjust the distance between the outer surfaces of the brake shoes by changing the length of the spacer bar.

of front and rear pads 202,45±0,25 mm.

Use a caliper to measure the distance between the outer surfaces of the front and rear shoe linings.

To change the length of the spacer bar....

...pull the adjuster lever away from the threaded rod end retaining nut and turn the nut with a screwdriver (right-hand thread).

Before installing the brake drum, clean dirt and shoe wear with a metal brush from the working surface of the brake drum. Replace wheel hub bearing nut with a new one and tighten to the prescribed torque. Replace the brake shoes of the right wheel brake system in the same way (the threads on the end of the release bar and ratchet nut are left-handed).

Then press the ped-

The brake pads can be adjusted by pressing the brake lever. When doing so, clicks will be heard in the rear wheel brakes due to the automatic brake shoe-to-brake shoe clearance adjustment. Depress the pedal until the clicks s t o p . Adjusting the parking brake

(see "Adjusting the parking brake actuator", page 236).
Check whether the outrigger wheels turn easily with the parking brake lever fully lowered.
Check the brake fluid level in the hydraulic system reservoir and adjust if necessary.

Removing the brake master cylinder

The work is carried out when replacing the brake master cylinder and removing the brake booster.
Work is carried out on an inspection duct or trestle.

By lifting the catch, disconnect the wiring harness from the brake fluid level sensor.
Unscrew reservoir cap and remove it together with the fluid level sensor. Use a rubber bulb to draw fluid from the reservoir and tighten the cap.

connectors with an 11 mm open-ended wrench or a special wrench for brake pipe connectors.

Pull the hose ends out of the brake master cylinder bushings.

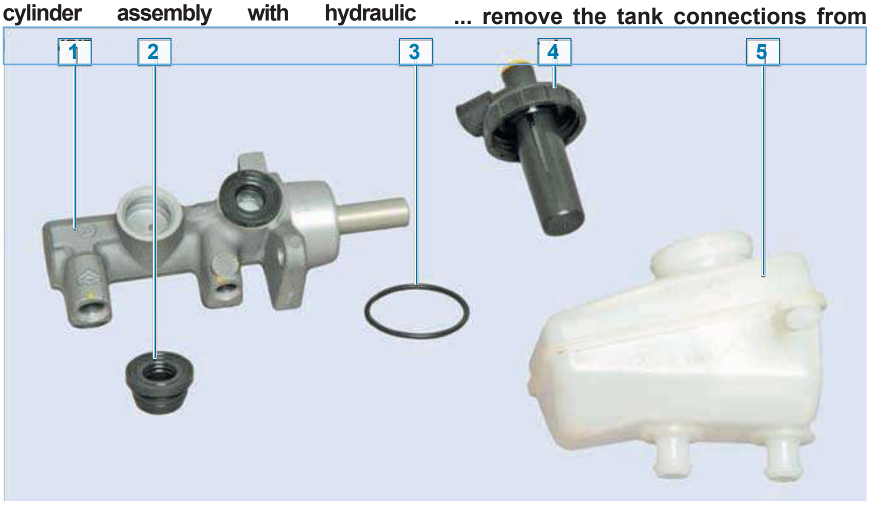
Unscrew the two nuts securing the cylinder to the brake vacuum booster with a 13 nut....

... and remove the brake master cylinder assembly with hydraulic

The connection between the brake master cylinder and brake vacuum booster is sealed by a rubber ring located in a groove in the cylinder flange. Remove the ring from the flange groove.
If it is necessary to remove the hydraulic actuator reservoir....

...insert a screwdriver between the cistern housing and the cylinder.
Overcoming the resistance of the sealing rubber bushings.

... remove the tank connections from



Elements of the brake master cylinder and hydraulic reservoir of the braking system: 1 - brake master cylinder; **2 -** sealing sleeve; **3 - sealing** ring of the vacuum brake booster; **4** - reservoir cover with a sensor of insufficient liquid level in the reservoir; **5** - hydraulic reservo i r .

... and remove the reservoir. Remove the sealing sleeves of the reservoir connections from the brake master cylinder openings. Check condition of rubber sealing sleeves and ring. If they are damaged (tears, cracks) or have lost elasticity, replace them with new ones. Reassemble brake master cylinder with reservoir and install in reverse order.
Pump the hydraulic brake system (see "Pumping the hydraulic brake system", page 48).

Removing the brake vacuum booster check valve

The work is carried out to assess the valve's serviceability or when replacing it.

After overcoming the resistance of the retainers, remove the check valve from the sealing sleeve of the brake vacuum booster housing.

To assess the serviceability of the check valve, disconnect the check valve tube from the 1.6 (16V) engine air reservoir connector or the 1.4-1.6 (8V) engine intake pipe connector. To do this...

...squeeze the two retainers on the valve tube lug....

...and disconnect the tube tip from the receiver connection (shown on the 1.6 (16V) engine).

Remove the check valve from the pipe.

The function of the valve can be assessed by blowing in both directions (e.g. with the mouth). Air should flow from the booster to the air reservoir, but not in the opposite direction. Replace defective valve. If the booster check valve is in good condition, install it in reverse order. Before installing the valve, check the condition of the...

... of the rubber O-ring of the valve tube tip....

... and the rubber sealing sleeve of the valve located in the valve bore.

The brake vacuum booster housing.

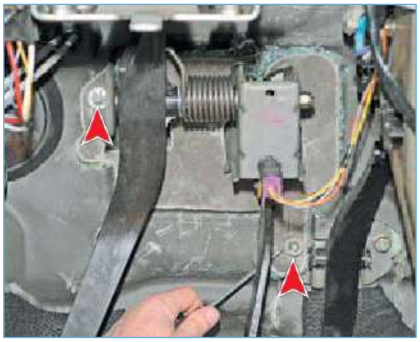
If the ring and bushing are deformed, cracked, torn or if the rubber has lost its elasticity, replace the parts with new ones.

Removing the brake vacuum booster

The brake vacuum booster must be removed for replacement in the event of brake vacuum booster failure. The vacuum booster can also be removed for convenience when replacing the clutch cable.
Remove the booster check valve (see "Removing the vacuum booster check valve").
Unscrew the two nuts securing the brake master cylinder to the vacuum booster (see "Removing the brake master cylinder", page 230).
Do not disconnect the brake pipes from the brake master cylinder to prevent air from entering the hydraulic brake system.

Carefully bend the brake pipes to remove the brake master cylinder (complete with reservoir) from the vacuum booster studs and set aside.

The brake master cylinder connection to the brake vacuum booster is sealed with a rubber ring (see "Removing the brake master cylinder", page 230).
In the interior of the car, under the dashboard (dashboard removed for clarity)...



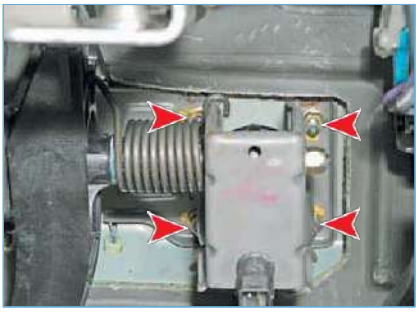
...use a screwdriver to pry up the two noise insulation holders.....

...and take it off.

Remove the plastic retaining ring from the pin securing the push rod to the brake pedal.

Remove the pin retainer bar from the brake pedal to secure the vacuum booster tappet to the pedal....

...and remove the pin from the holes in the pedal and tappet eye.



Unscrew four nuts securing the vacuum booster to the front shield using a 13" nut.

Pull the booster tappet out of the front panel opening.

...and remove the vacuum booster from the engine compartment.

Install the brake vacuum booster in reverse order.

Replacing the front wheel brake hose

Replace the brake hose if it is mechanically damaged.

If the brake fluid leaks through the hose, it is advisable to replace both brake hoses after more than 120,000 km or 5 years of vehicle operation (whichever comes first).

After more than 120,000 km or 5 years of vehicle operation (whichever comes first), it is advisable to have the hoses of both brake systems of the front wheels replaced.

Work is carried out on an inspection duct or trestle.

Remove the front tire and secure the vehicle firmly on the factory-made jack stands.

Before unscrewing the brake pipe connector from the upper hose end, clean dirt and corrosion from the connection point with a metal brush and apply a light penetrating fluid such as WD-40.

Unscrew the brake pipe connector from the upper hose end using a special brake pipe connector wrench.

Pull the hose end out of the body bracket opening.

To prevent brake fluid leaks, place the rubber cap of the brake pumping fitting on the tip of the tube.

Use a 14 mm wrench to unscrew the lower hose end from the front wheel brake cylinder housing.

...and remove the hose.

The connection between the hose end and the cylinder body is sealed with a cone, without O-rings.

Install front wheel brake hose in reverse order.

When installing the hose, ensure that it is not twisted. The hose is marked with a yellow longitudinal stripe to ensure correct installation. The hose is also marked with yellow paint with the month and year of manufacture.

Pump the hydraulic brake system (see "Pumping the hydraulic brake system", page 48).

Replacing the front wheel brake disc

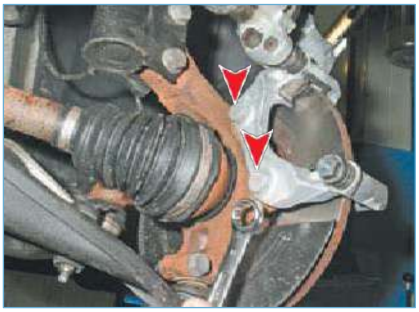
Replace the brake disk when its working surfaces are extremely worn.

If the brake disk has cracks, deep marks,

If the vehicle is wavy or otherwise damaged, it must also be replaced.

! The brake discs of the front wheels must be replaced in pairs and the brake pads must also be replaced.

Remove the front tire and secure the vehicle firmly on the factory-made jack stands. Turn the steering wheel as far as possible to the side in which the disc is to be removed. Remove the brake pads (see "Replacing the front brake pads", page 226).



Loosen the two bolts securing the steering knuckle to the steering knuckle with an 18 mm open-end wrench.

Remove the shoe guide assembly and bracket from the brake disk.

... and tie them with wire or cord to the front suspension spring to prevent the brake hose from being stretched.

Use a metal brush to remove dirt and corrosion from the heads of the screws securing the brake disc to the front wheel hub.

The wheel mounting bolt is screwed into the threaded hole in the hub. Screw the wheel bolt into the threaded hole in the hub
and install the mounting spatula between the bolt and the hub shoulder to keep the hub from turning.

Use a T-40 Torx wrench to loosen the two screws securing the brake disc to the front wheel hub.

...and remove the disk from the hub.

If the brake disc shield is badly damaged - torn metal, large deformation - it must be replaced (minor defects must be corrected with pliers).

Before removing the shield, use a metal brush to clean dirt and corrosion from the heads of the three screws securing the shield to the steering knuckle.

Use a Torx T-30 wrench to loosen the three screws securing the shield to the steering knuckle.

... and remove the front wheel brake shield.
Install the front wheel brake shield and disc in reverse order.

Rear wheel brake cylinder replacement

The wheel (slave) cylinder of the rear wheel brake system must be replaced if the braking performance of the wheel is reduced due to wedged pistons in the cylinder or brake fluid leaks through the cylinder seals.
Remove the rear tire and securely fix the vehicle to the factory stand.
Work is carried out on an inspection duct or trestle.
Remove the brake drum (see "Replacing the rear brake shoes", page 228). Before unscrewing the brake pipe connector from the cylinder bore, clean dirt and corrosion from the connection point with a metal brush and apply light penetrating fluid such as WD-40.

Unscrew the brake pipe fitting with a special "11" wrench for brake pipe fittings....

...and pull the tip of the tube out of the cylinder bore.
To prevent brake fluid leaks, place the rubber cap of the brake pumping fitting on the tip of the tube.

Unscrew the two bolts securing the cylinder to the brake shield with a "10" head....

... and remove the cylinder. Install the new cylinder in the reverse order. After installing the brake cylinder, pump the hydraulic brake system.

Replacing the rear wheel brake hose

The brake hose should be replaced if it has mechanical defects such as abrasions, cracks or ruptures, if brake fluid l e a k s through the hose or if the rubber swells when the brake pedal is depressed. After driving more than 120 thousand kilometers or 5 years of vehicle operation (whichever comes first), it is advisable to have the brake fluid forcibly replaced.

Replace both rear wheel brake hoses.
Work is carried out on an inspection duct or trestle.
Before unscrewing the brake pipe connectors from the hose ends, use a metal brush to remove dirt and corrosion from their joints and apply light penetrating fluid such as WD-40.

Use a special wrench "for 11" for brake pipe connectors to unscrew the brake pipe connector from the upper hose end.

Pull the upper hose tip out of the bracket hole in the body. In order to prevent brake fluid leaks, the rubber cap of the brake pump connector may be placed over the hose end.
Unscrew the brake pipe connector on the rear suspension beam from the lower hose end in the same way.

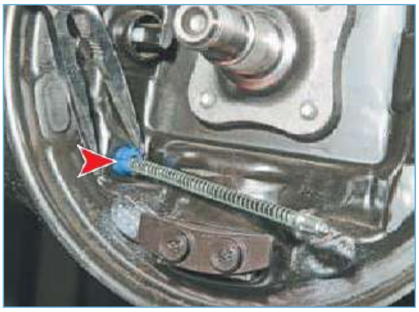
Remove rear wheel brake hose.

Remove the brake hose of the other wheel in the same way.
The hoses are of different lengths, with the longer hose closer to the rear of the vehicle. The hoses are parallel to each other.
Install rear brake hoses in reverse order. When installing the hoses, ensure that they are not kinked. The hoses are marked with a yellow longitudinal stripe for this purpose. Pump the hydraulic brake system (see "Pumping the hydraulic brake system", page 48).

Replacing the parking brake cables

The parking brake cables must be replaced if they break, pull out or seize inside their sheaths (rear cables), when the parking brake cannot be adjusted to hold the vehicle stationary on gradients up to and including 23%.
Work is carried out on an inspection duct or trestle.
The work of replacing the rear cable is shown on the example of the left cable, the right cable is replaced in the same way.
Remove the floor tunnel liner (see "Removing the floor tunnel liner", page 303). To loosen cable tension, lift parking brake lever and use a wrench to loosen cable tension
"Loosen the actuator adjusting nut on the threaded end of the front cable almost completely (see "Adjusting the parking brake lever", page 236). Lower the parking brake lever. Remove the rear brake shoes (see "Replacing the rear brake shoes", page 228).
Use the pliers to pull the pedal cable tip into the vehicle interior and turn the equalizer.

... pull the cable out of the equalizer slot.



Press the rear cable sheath retainer tabs together with pliers.

...pull the tip out of the hole in the brake shield.....
...and from the metal holder on the rear suspension arm.

Remove the cable from the two plastic holders on the fuel tank.

...and a plastic holder on the underside of the body.
In the interior of the vehicle ...

... Use pliers to squeeze the lugs of the front cable sheath lug retainer and push the lug out of the hole in the bottom.
This operation is not easy to perform because you have to work in the cramped space of the underbody recess. However, since the cable is being removed for replacement, the plastic clamping lugs may be broken.

Pull the cable out of the hole in the underbody.
Remove the right parking brake cable in the same way.
Install the rear parking brake cables in reverse order.
To replace the front parking brake cable, remove the floor tunnel liner (see "Removing the floor tunnel liner", page 303) and loosen the cable tension by loosening the actuator adjusting nut at the threaded end of the front cable.

Disconnect the front rear cable lugs from the equalizer (see above).

Use a knife to carefully cut through the carpeting on the floor behind the parking brake lever.

By bending away the cut parts of the carpeting....

...using a 13" head unscrew the two nuts securing the lever to the floor.

disconnect the wiring harness from the parking brake warning switch.

Remove the cover plate from the lever trim and use a 10 mm wrench to fully open the lever trim.

Turn the adjusting nut on the threaded end of the front cable.

Remove the front cable from the lever opening.

Use a screwdriver to remove the plastic parts from the equalizer one by one.

retainers...

Install the front parking brake cable in reverse order.

After replacing the cables or lever, the parking brake actuator must be adjusted (see "Adjusting the parking brake actuator").

Adjusting the parking brake actuator

Adjustment of the parking brake actuator is carried out after replacing the rear wheel brake shoes, cables or parking brake lever.

Hang up the rear wheels and secure the vehicle securely on jack stands.

To prevent the vehicle from falling, only use factory-fitted chocks.

Remove the field tunnel liner (see "Removing the field tunnel liner", page 303).

For clarity, the operations are shown with the seats removed.

Lift the parking brake lever.

... remove the plug on the lever cover covering the parking brake adjusting nut.

the front cable with a 10 mm wrench to adjust the travel of the parking brake lever.

The parking brake lever must have a travel of 6-8 clicks (teeth on the ratchet section).

With the lever fully lowered, the rear wheels are out....

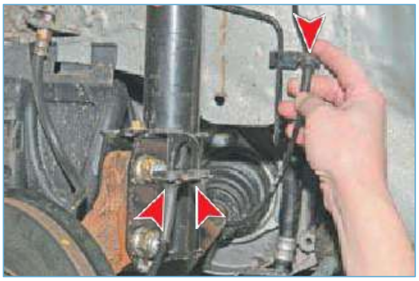
...must rotate freely a n d must be locked when the lever is raised.
According to road traffic regulations, a properly adjusted parking brake should hold the vehicle on gradients up to and including 23 %.

Removing the front wheel speed sensor

The front wheel speed sensor must be removed for inspection or replacement if ABS malfunctions are detected or if the steering knuckle is dismantled.
Remove the front wheel underfender (see "Removing the mudguards and front wheel underfenders", page 284).
Securely fasten the vehicle to the factory stand.

Press the catch and disconnect the front wiring harness from the sensor wiring harness.

Remove the sensor wiring harness from the bracket attached to the wheel arch.



Pull the rubber coupling o f t h e sensor wiring harness out of the plastic holder located on the mudguard and the other two couplings out of the bracket located on the shock absorber strut.

By squeezing the petals of the retainers ...

... remove the wheel speed sensor from the mounting ring in the hub assembly. Before reassembly, clean the sensor mounting location and the sensor itself if it is not to be replaced.
Installing the speed sensor
The front wheel must be moved in reverse order.

Removing the rear wheel speed sensor

The rear wheel speed sensor must be removed for inspection or replacement if ABS malfunctions are detected or if the rear suspension beam is removed.
Hang up and remove the wheel.
Securely securely fix The vehicle on the factory stand.

Use a slotted screwdriver to loosen the two pistons securing the sensor wiring harness cover.

Unscrew the two nuts securing the protective cover with a 10" nut.

remove the wiring harnesses from the cover brackets.

Disconnect the rear wiring harness from the sensor wiring harness.

Pull the rubber coupling of the sensor wiring harness out of the holder on the rear suspension arm.

Using a Torx T-30 wrench, loosen the sensor mounting screw...

...and remove the sensor from the hole in the brake shield.

Before installation, clean the sensor mounting location and the sensor itself if it will not be replaced.

Install the rear wheel sensor in reverse order.

Removing the ABS unit

The ABS unit is removed for replacement if it fails.

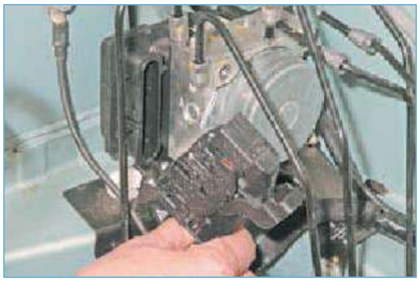
Work is carried out on an inspection duct or trestle.

Before removing the unit, mark the position of the brake pipes on the unit.

In the underbody on the right-hand side.

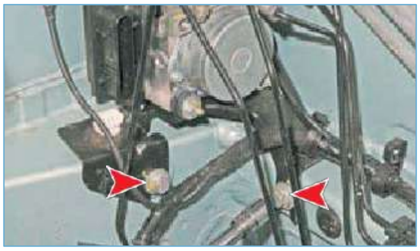
... Unscrew the six brake pipe connectors with an 11 mm open-ended wrench or a special brake pipe connector wrench and disconnect the brake pipes from the hydraulic unit.

By lifting the wiring harness pad retainer...



...disconnect the harness from the control unit.

1 and wiring harness from defroster 2 of ABS unit bracket.



Unscrew the two bolts securing the ABS unit bracket to the body with a "13" head....

...and remove ABS unit with bracket.

The ABS unit is attached to the bracket through two rubber bushings. If the bushings are cracked or the rubber has lost elasticity, the bushings must be replaced.

Unscrew the two nuts securing the ABS unit to the bracket with a "10" wrench.....

...separating the block and the bracket.

Install the ABS unit in reverse order.
Pumping the hydraulic drive system

If the brake fluid does not leak out, place rubber caps on the tubes.

Install the pressure regulator in reverse order and pump the hydraulic brake system.

The brakes (see "Pumping the hydraulic system (see "Pumping the hydraulic system")). ________The brake system (see "Pumping the hydraulic system").
water of the brake system", p. 48).

In order not to confuse the tubes during assembly, their threads are different.
The right brake fittings have M12x1 threads and the left brake fittings have M10x1 threads.

...remove the regulator.

Removing the pressure regulator in rear wheel brakes, adjusting the actuator

Remove pressure regulator for replacement in case of failure (leaks, jammed piston). Work should be carried out on an inspection trench or scaffolding.
Use a metal brush to remove dirt and corrosion from the connection points between the brake pipes and the regulator and apply a light penetrating fluid such as WD-40 to the pipe connections. Before disconnecting the brake pipes from the pressure regulator, mark them.

Use a special "11" wrench for brake pipe fittings to unscrew the fittings of the four brake pipes to the regulator....

...take out the tips of the tubes out of the regulator holes and to

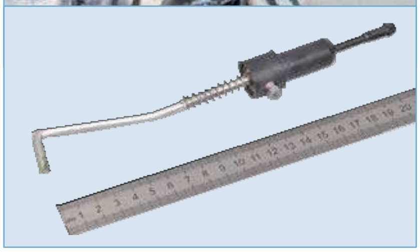
Disconnect the lower end of the adjuster rod from the suspension beam bracket.

... and remove the tie rod by pulling the adjusting sleeve out of the hole in the pressure lever.

Unscrew the two bolts securing the regulator to the body with an 11 mm head.

Brake system actuator", page 48).
After pumping the system, adjust the pressure regulator actuator.
This operation can only be performed accurately with special equipment by a specialist workshop.
Before the pressure regulator is diagnosed in a specialized workshop, you can carry out a rough adjustment of the regulator water supply in several steps. Before adjustment, in a safe place and on level asphalt, we carry out a kind of road test, in which an observer outside the car should record the moments of locking of front and rear wheels at sharp braking at a speed of 30-40 km/h. The rear wheels should lock slightly later than the front wheels.

Adjustment is carried out by turning the adjusting nut on the pressure regulator stud.
If the adjustment range is insufficient....



... then change the length of the link rod by moving the adjusting bush along it. Carry out a road test again and repeat the adjustment if necessary.

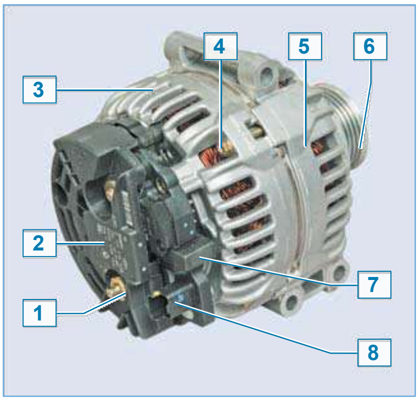
Electrical equipment

Construction description

On-board DC network with a nominal voltage of 12 V. The electrical equipment is single-wire: the negative terminals of power sources and consumers are connected to the "mass" - the vehicle body and power unit, which act as the second conductor.
When the engine is not running, the switched-on consumers are supplied from the battery and after the engine has been started, from the alternator.
The battery is charged when the alternator is running.
The vehicle is equipped with a lead starter battery with reverse polarity (minus terminal facing the left side of the vehicle and both terminals closer to the windshield). The nominal capacity at 20 hours of discharge is 70 Ah.
The battery is maintenance-free and has no plugs for determining the electrolyte density or topping up with distilled water.
The battery charge level can be determined by the color of the indicator on the battery cover:

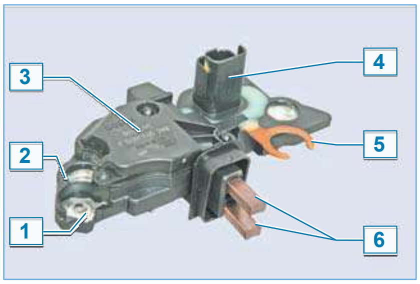
Battery pack

— The indicator light is green to indicate that the battery is charged;
— The battery is partially discharged when the indicator light is dark;
— transparent or light yellow color of the indicator indicates that the electrolyte level has dropped beyond the permissible level.
When working on the battery, strictly observe the safety instructions (see "Maintenance and repair safety").
Depending on the equipment, the vehicle is equipped with MELKO, VALEO or BOSCH ge- nitors (maximum output current from 70 to 150 A).
The alternator is driven by a poly-V belt from the auxiliary drive pulley. On vehicles without power steering and air conditioning, the alternator is mounted on the engine at the rear (in the direction of travel), on other vehicles at the front.



Generator: 1 - pin "B2+"; **2** - casing; **3** - back cover; **4** - tie bolt; **5** - front cover; **6** - generator pulley; **7** - brush holder with voltage regulator; **8** - brush holder connector.

All generators are three-phase, alternating current, with integrated rectifier and voltage regulator.
The alternator covers and stator are fastened with four bolts. The rear part of the generator is covered with a plastic cover. The rotor shaft rotates in two ball bearings mounted in the generator covers. The bearings are of the closed type, lubricated for the entire service life of the generator. The rear bearing is pressed onto the rotor shaft, mounted in a plastic bushing in the rear cover. The front bearing is pressed into the front cover of the alternator, the bearing is sliding on the rotor shaft.
Three-phase windings are located in the generator stator. The ends of the phase windings are connected to the outputs of a rectifier unit consisting of six diodes, three positive and three negative, pressed into two plate-holders. в according to polarity (positive and negative diodes on different plates).
Rectifier rectifier unit is mounted on the rear cover of the alternator (under the plastic cover).
The winding excitation winding is located on the alternator rotor, its leads are soldered to two copper contact rings on the rotor shaft. Power is supplied to the excitation winding through two brushes located in the brush holder, which is structurally combined with the voltage regulator and mounted on the generator rear cover.
The voltage regulator - not disassembled-
In the event of failure, the brush holder assembly must be replaced.

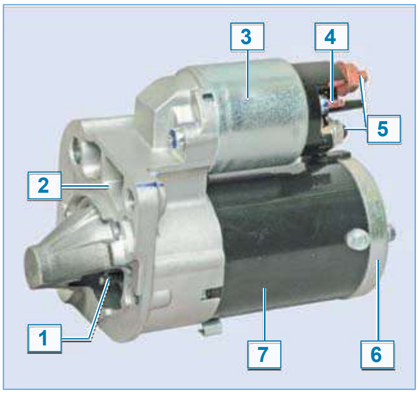


Brush holder with voltage regulator: 1 - ground terminal; **2** - brush holder housing; **3** - voltage regulator; **4** - electrical connector; **5** - "+" terminal; **6** - brushes.

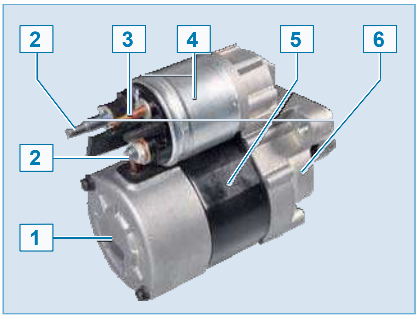
The starter motor for vehicles with 1.4 and 1.6 (8V) engines is MITSUBISHI model M000T45171ZT and for vehicles with 1.6 (16V) engine is VALEO model TS10E3. The starter is located at the rear of the engine and is attached to the clutch housing by three bolts.

The starter is a DC motor with a free-wheeling clutch and a two-winding traction relay. The MITSUBISHI starter is energized by permanent magnets and the VALEO starter by electromagnets.

The armature shaft rotates in two bushings pressed into the front and rear covers of the starter. The housing and covers are fastened with two bolts.



Starter MITSUBISHI: 1 - water gear; **2** - front cover; **3** - traction relay; **4** - control output of the traction relay; **5** - contact bolts; **6** - rear cover; **7** - **starter** housing.



Starter VALEO: 1 - back cover; **2** - contact bolts; **3** - control output of traction relay; **4** - traction relay; **5** - starter housing; **6** - front cover

The armature shaft is fitted with a freewheeling clutch with a drive pin that can be moved along the shaft splines. It transmits torque in one direction only, from the starter to the engine, separating them after the engine has been started. This is to protect the starter motor from damage due to excessive speed.

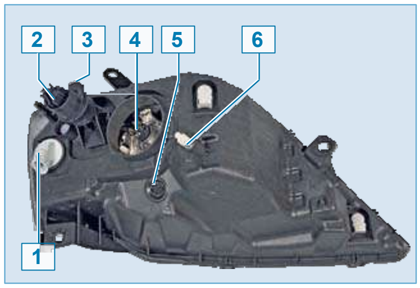
The traction relay is used to engage the drive pinion with the engine flywheel gear and energize the starter motor.

When the ignition key is turned to the starter position, voltage is applied to both windings (retracting and retaining) of the traction relay. The relay armature is retracted and the plastic lever moves the freewheeling clutch with the drive pinion over the armature shaft splines, bringing the pinion into engagement with the flywheel crown. This engages the starter motor and temporarily disengages the pull-in relay winding.

When the key is returned to position "ignition" retaining winding

The traction relay is de-energized and the drive pinion is disengaged from the flywheel by the spring. The defective traction relay must be replaced. Faulty starter drive is detected by inspection after disassembly of the starter.

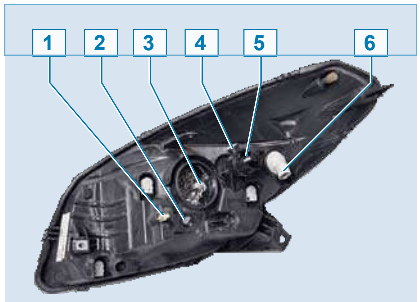
The lighting and signaling system includes: two headlamps,



Logan car headlamp unit: 1 - turn signal lamp socket; **2** - headlamp beam adjuster end mechanism; **3** - headlamp beam adjustment screw in the vertical plane; **4** - headlamp bulb; **5** - parking light bulb socket; **6** - headlamp beam adjustment knob in the horizontal plane

Fog lights (optional), side turn signal lamps, tail lamps, license plate lamp, additional brake light, interior lighting, luggage compartment lighting, luggage compartment lighting, luggage box lighting (optional) and one or two horns (depending on equipment).

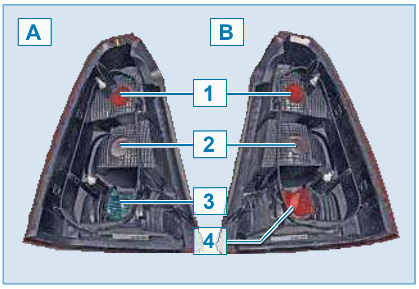
The headlamp unit comprises two sections. One section contains a double-thread H4 headlight bulb for low-beam and main beam and a W5W parking light bulb. The other



Sandero and Sandero Stepway headlight unit: 1 - headlight beam adjustment knob in the horizontal plane; **2** - socket for parking light bulb; **3** - headlight bulb; **4** - headlight beam adjustment screw in the vertical plane; **5** - headlight beam direction adjuster actuator; **6** - turn signal lamp holder

Fog light: 1 - adjusting screw; **2** - headlight bulb

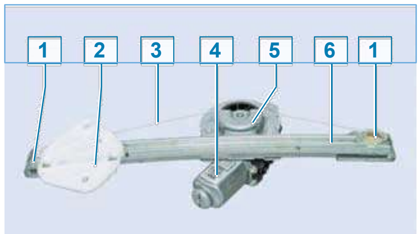
The section is equipped with a PY21W turn signal lamp (orange).
Some vehicles are equipped with fog lights in the front bumper. The fog lights are fitted with single filament halogen H11 lamps.
The tail lamp includes lamp sections for brake and parking lights (P21/5W twin-thread l a m p), turn signal (PY21W lamp), fog light in the left lamp or reversing light in the right lamp (P21W lamp). Logan has an interesting solution. In order to make the right and left lights look identical, their lower ends are



Location of bulbs in tail lamps: A - right **lamp**; **B** - left l a m p;
1 - brake signal and parking light; **2** - turn signal; **3** - reverse light; **4** - fog light

Switching unit

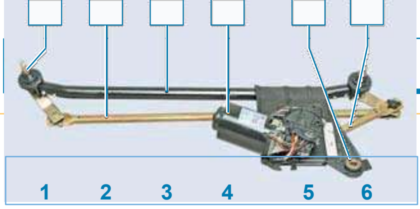
The outer diffusers are rose-colored. In order to obtain white light when the reversing light bulb is switched on, an additional green light filter is installed in the reversing light section and a red light filter in the fog light section.
There is a switch unit in the passenger compartment on the left under the instrument panel. This unit is the electronic control unit for the central locking system, interior lighting, turn indicators, hazard warning lights, intermittent operation of the windscreen wiper, rear window heater relay, anti-theft engine start interlock system. In addition, the switch unit emits an acoustic signal (buzzer) to remind you that the exterior lighting is not switched off when the doors are open and activates the warning light in the instrument cluster.
Depending on the equipment, some vehicles are equipped with power windows on either the front or all doors.
The window lift motor gearbox consists of a worm gearbox and a DC motor. The motor is reversible. A drum with a cable is mounted on the gearbox output shaft. A slider is attached to the cable and the door glass is fastened to it with two self-tapping screws.
Some vehicles are equipped with a door locking system (central locking system). The system is designed to lock all doors at the same time.



Power window elevator: 1 - directional roller; **2** - slider; **3** - cable; **4** - gearmotor; **5** - drum; **6** - guiding roller.

Press the switch located on the instrument panel console or the ignition key remote control to switch off the tailgate and trunk lid (tailgate on Sandero and Sandero Stepway).
All door and boot lid locks are equipped with electric actuators which are connected to the lock levers.
Some vehicles are equipped with electrically operated and electrically heated exterior mirrors. Both mirrors are controlled by the exterior mirror drive controller mounted in the floor tunnel trim. Voltage from the switch is supplied to two electric motors located in the mirror housing. One motor rotates the mirror vertically and the other horizontally. The mirror heater is energized by the rear window heater switch.
The windshield wiper is installed on the windshield.
The wiper is located on the left-hand side under the front fascia cover. The wiper consists of

Electric door lock actuator



Windshield wiper: 1 - wiper arm shaft; **2** - long rod; **3** - bracket; **4** - gear motor; **5** - wiper mounting cushion; **6** - short rod.

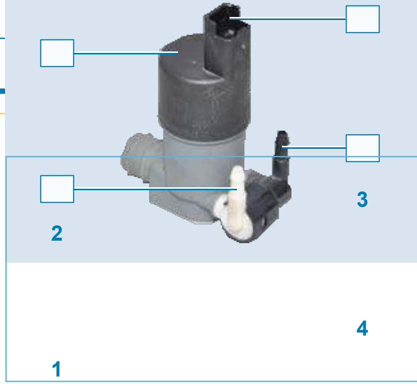
consisting of a gearmotor with rods mounted on a bracket, levers and brushes. The wiper motor is a three-brush, two-speed motor with excitation by permanent magnets. The wiper has three operating modes, which are activated by the right-hand steering wheel switch. Intermittent operation of the wiper is ensured by the switching unit. If the gearmotor is defective, it must be replaced.

Luggage compartment door glass cleaner

The wiper is mounted on the load compartment door, under the upholstery. The wiper consists of a gearmotor, lever and brush. The wiper motor is a double brush motor with permanent magnet excitation.

The windscreen washer consists of a translucent plastic tank, an electric pump, flexible hoses and two nozzles. The windshield washer is activated by the right-hand paddle switch. The washer reservoir is mounted on the right under the front fascia cover. The pump is inserted into the washer reservoir via a rubber seal. A defective pump must be replaced. The nozzles are mounted on the bonnet. Clogged nozzles can be blown backwards or cleaned with a fishing line.

On Sandero and Sandero Stepway, the windscreen washer is combined with the tailgate washer. The pump motor is reversible.



Sandero and Sandero Stepway car washer pump: 1 - luggage compartment door window fluid connection; **2** - electric motor; **3** - electrical connector; **4** - windshield fluid connection

The engine shaft rotates in one direction. When the engine shaft is rotated to one side, the fluid is delivered to the windscreen, when rotated to the other side it is delivered to the tailgate window.

All vehicles are equipped with an immobilizer, a pro-theft engine start interlock system. The immobilizer consists of a switching unit, a communication coil mounted on the ignition switch, a microcircuit in the ignition key (trans ponder) and a status indicator in the instrument cluster.

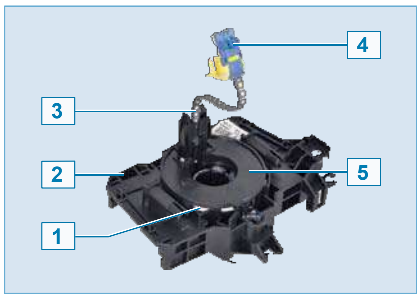
When the key is inserted into the ignition switch, the coil reads the code from the key chip and transmits it to the switching unit. The switching unit compares the key code with the code stored in the unit's memory. If the codes match, the switching unit sends a signal to the electronic engine control unit (ECU) authorizing the engine to start - the signal is then switched off.

Immobilizer coil

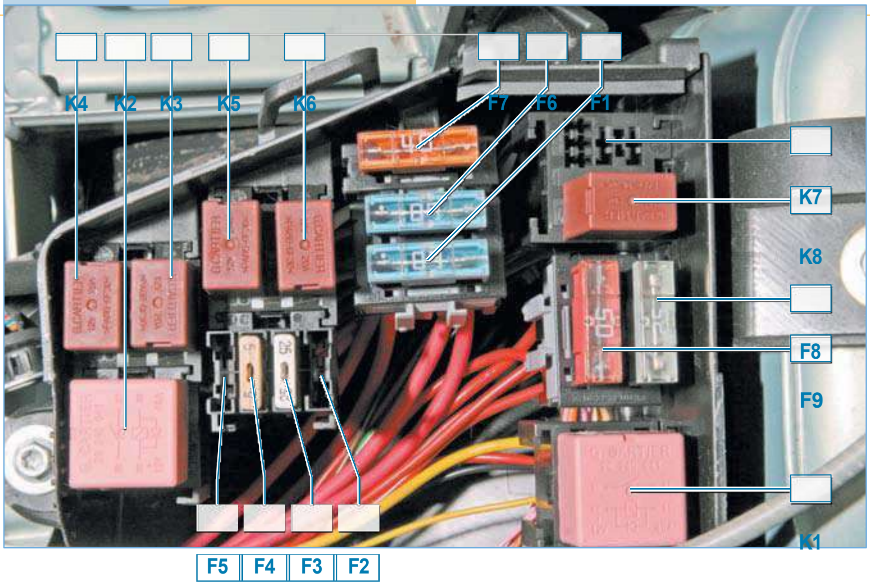
If the codes do not match, the ECU will block the engine from starting and the warning lamp in the instrument cluster will flash continuously and frequently. If the codes do not match, the ECU blocks the engine from starting by a signal from the switchgear unit and the warning lamp in the instrument cluster flashes continuously and frequently. The engine starting interlock is automatically activated a few seconds after the key is removed from the ignition switch.

B depending on depending on equipment cars can

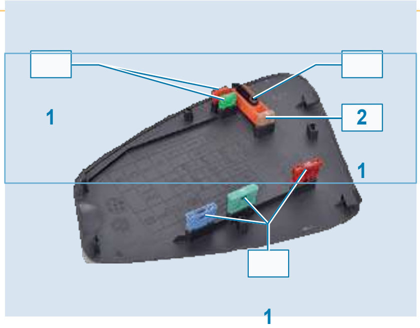
The driver's airbag is installed in the steering wheel and the passenger airbag in the instrument panel, above the load compartment. The driver's airbag is installed in the steering wheel and the passenger airbag in the instrument panel, above the duffel box. The electrical connection between the driver's airbag and the vehicle's electrical system must not be made with a conventional sliding contact to prevent sparking and unintended deployment of the airbag. For this purpose, the vehicle is equipped with a device with a so-called spiral cable, which works on the tape measure principle. In the cylindrical plastic casing of the device, which is made in the body of the steering wheel switch connector, several coils of a metalloplastic tape are spirally arranged, which is used to connect the cushion.



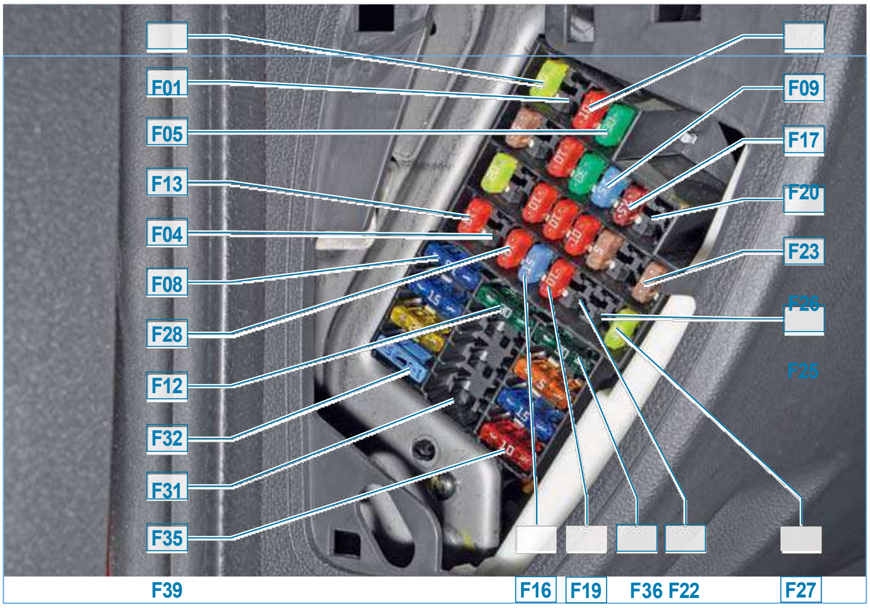
Drum unit **with spiral cable: 1** - spiral cable; **2** - steering wheel switch connector; **3** - drum lever; **4** - airbag connection block; **5** - drum



Relay and fuse box in the engine compartment: F1-F9 - fuses, K1-K8 - relays (see Tables 1 and 2 for fuse and relay assignments).



On the inner side of the mounting block cover there are spare fuses 1 (rated for 5, 10, 15 and 30 A), tweezers 2 for removing the fuses from the block, and a diagram of the fuse arrangement is shown



Fuse box in the passenger compartment (see Tab. 3 for fuse assignments)

is an electrical conductor. One end of the cable strip is connected to the vehicle's electrical harness via a connector located on the body of the handwheel switch coupler. The other end of the cable is led to the protruding drum leash of the device and is connected via the the airbag pad. The unit's drum leash enters the hub bore of the steering wheel. As the wheel rotates, the leash turns the drum and with it the cable belt, which is positioned in the cylindrical housing at either a larger or smaller radius. From its center position

The drum with the leash in the device can be rotated three full turns in each direction up to the stop.

This prevents the cable from breaking when the steering wheel is rotated from the neutral position by 2.25 revolutions each way on a vehicle without power steering and by a slightly lower number of revolutions on a vehicle with power steering.

Most electrical circuits are protected by fuses. Powerful consumers (rear window heater, heater fan, engine cooling fan, air conditioning, etc.) are connected via relays. All relays (except rear window heater relay), power fuses and engine-ECU fuses are installed in the relay and fuse box.

The other fuses are located in the fuse box in the passenger compartment in the left-hand side of the instrument panel. The other fuses are located in the fuse box in the passenger compartment in the left end of the instrument panel. The rear window heater relay is mounted on the cross member under the instrument panel.

Table 1

FUSES IN THE ENGINE COMPARTMENT MOUNTING BLOCK	
Fuse designation (rated current, A)	**Protected elements**
F1 (60)	Circuits: ignition switch power supply and all consumers powered from the ignition switch; left paddle switch power supply circuits
F2 (30)	Cooling fan relay K3 power circuit (on vehicles without air conditioning)
F3 (25)	Power circuits: relay K5 of fuel pump and ignition coil; main relay K6 of engine management system
F4 (5)	Circuits: engine control ECU DC power supply; engine control main relay K6 windings
F5 (15)	Not used
F6 (60)	Power supply circuit to the fuse box in the passenger compartment
F7 (40)	Power circuits: air conditioner relay K4; cooling fan low speed relay K3 (on vehicle with air conditioner); cooling fan high speed relay K2 (on vehicle with air conditioner)
F8 (25) and F9 (50)	ABS ECU circuits

Table 2

WIRING BLOCK RELAY IN THE ENGINE COMPARTMENT		
Designation	**Name**	**Consumers to be supplied**
K1	Heater fan relay	Heater fan electric motor
K2	Cooling fan high speed relay (for vehicle with air conditioner)	Cooling fan motor
K3	Cooling system fan low speed relay Cooling (for vehicles with air conditioning) or cooling (on vehicles without a air conditioner)	system fan electric motor relay (for vehicles with air conditioning - cooling fan resistor)
K4	Air conditioner relay	Air conditioner compressor solenoid clutch
K5	Fuel pump relay and ignition coil relay	Fuel pump and ignition coil
K6	Engine control system main relay	Oxygen concentration sensors (heated circuit); speed sensor; fuel injectors; electromagnetic adsorber purge valve; relay windings K2, K3, K4; engine management system ECU
K7 (optional)	Headlight washer pump relay	Headlight washer pump
K8	Fog light relay	Fog lamp bulbs

Table 3

FUSES IN THE PASSENGER COMPARTMENT FUSE BOX	
Fuse designation (rated current, A)	**Protected elements**
F01 (20)	Circuits: windshield wiper; rear window heater relay windings; switching unit; luggage compartment door wiper (Sandero)
F02 (5)	Circuits: instrument cluster power supply; K5 relay winding of fuel pump and ignition coil; engine control ECU power supply from ignition switch
F03 (20)	Circuits: brake light bulbs; windshield washer bulbs
F04 (10)	Circuits: turn signal lamps; engine management system diagnostic connector; immobilizer coil; switching unit
F09 (10)	Circuits: headlight bulb of the left headlight unit (dipped beam); dipped beam warning lamp in instrument cluster; headlight washer pump
F10 (10)	Headlight bulb circuit of the right headlight unit (dipped beam)
F11 (10)	Circuits: headlight bulb of the left headlight unit (high beam); high beam warning lamp in the instrument cluster
F12 (10)	Headlight bulb circuit of the right headlight unit (high beam)
F13 (30) and F14 (30)	Power window chains for rear and front doors respectively

FUSES IN THE PASSENGER COMPARTMENT FUSE BOX	
Fuse designation (rated current, A)	**Protected elements**
F15 (10)	ABS ECU circuit
F16 (15)	Driver and front passenger seat heating circuits
F17 (15)	Buzzer circuit
F18 (10)	Circuits: parking light bulb of the left headlamp; parking light bulb of the left tail lamp; license plate light bulb
F19 (10)	Circuits: parking light bulb of the right headlamp unit; parking light bulb of the right tail lamp; lamp of the duffel box light; illumination of the instrument cluster and controls on the instrument panel, console and floor tunnel trim; buzzer of the switch unit
F20 (7,5)	Circuits: rear fog light bulb and warning light switch
F21 (5)	External rear view mirror heating element circuit
F28 (15)	Circuits: passenger compartment light bulb; luggage compartment light bulb; permanent power supply for head unit; instrument cluster
F29 (15)	Circuits: emergency signal switch; turn signal switch; intermittent operation of windshield wiper; central locking control; engine management system diagnostic connector; switching unit
F30 (20)	Central locking system circuits; switching unit circuits
F31 (15)	K8 fog lamp relay winding power circuit
F32 (30)	Rear window heater relay power circuit
F36 (30)	Heater fan relay K1 power circuit
F37 (5)	Electric exterior rearview mirror drive circuits
F38 (10)	Circuits: cigarette lighter; head unit power supply from the ignition switch
F39 (10)	Heater fan relay K1 relay winding circuit

Note: Fuses F05-F08, F22-27, F33-F35 are not installed in the mounting block shown in the photo.

Relay removal and fuses

The work is carried out when checking relays and fuses and replacing them.

When removing relays and fuses, be sure to disconnect the lead terminal from the negative terminal of the battery.

To access the fuses and relays of the mounting block in the engine compartment....

...pull the block cover retainer aside.....

... and remove the cover by sliding it towards the battery. A defective fuse can be identified by a blown jumper. To remove the fuse, manually remove the fuse.
LOGO SIZE...

...use the tweezers located in the cover of the mounting block in the passenger compartment.
Remove large fuses by hand. In case of difficulty...

...gently pry it up with the blade of a slotted screwdriver.
Remove the relay from the socket of the unit in the same way.

A new relay or fuse should only be installed in place of a defective relay or fuse after it has been identified and eliminate the cause of the malfunction. Only use standard fuses designed for a certain current rating (the current rating of the fuse is indicated on the fuse case).

To access the fuse box in the passenger compartment, use your finger to pry open the fuse box cover from underneath and, overcoming the resistance of the latches....

...remove the cover.

Remove the fuses from the fuse box using tweezers as shown above.

Install new fuses and relays in reverse order.

Replacement of immobilizer coil and ignition switch

The immobilizer coil is attached to a piece of pipe (welded to the steering column pipe) in which the ignition switch is inserted.

Remove the coil for replacement and when removing the ignition switch. The ignition switch is removed for replacement if its cylinder mechanism or contact group fails.

Disconnect the lead terminal from the "minus" terminal of the battery.

Remove the steering column shrouds (see "Removing the steering column paddle shifters and switch coupler with spiral cable drum", page 267).

Press the two plastic clips to remove the immobilizer coil.

The steering wheel switches have been removed for clarity.

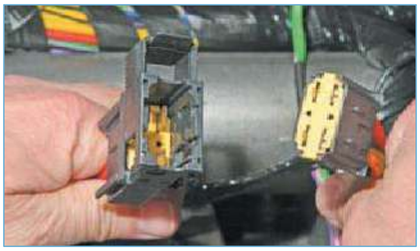
Press the wire harness lock to disconnect it from the ignition coil.

Remove the instrument cluster (see "Removing the instrument cluster", page 276).

Unlock the retainer of the ignition switch wire harness holder.

...and remove the pads from the holder.

Use a slotted screwdriver to pry open the wiring harness locking tab and slide the locking tab out.....



... and disconnect the harness harness from the ignition switch wiring harness.

Use a Torx T-20 wrench to loosen the screw securing the ignition switch.

With the ignition key positioned between the "A" and "M" marks (located on the end of the switch), use tweezers to push in the two switch catches....

...and remove it from the steering column socket (shown with the steering column removed for clarity).

Install ignition switch and immobilizer coil i n reverse order.

Removing the battery pack

Remove the battery for charging or replacing it when removing the left-hand support of the power unit. Also dismantle the battery for convenience when replacing the bulbs in the left headlight cluster.

Use a 10 mm wrench to loosen the wire terminal bolt nut on the negative terminal of the battery.

... and remove the wire terminal from the battery outlet.

Squeeze the two retainers....

...and open the cover of the protective hood.

Use a 10 mm socket to loosen the tightening bolt of the wire terminal on the battery's "plus" terminal....

... and remove the wire terminal from the battery outlet.

Unscrew the bolt securing the battery clamping plate with a 13 mm socket.

... and remove the plate and bolt.

Sliding the b a t t e r y slightly forward (in the direction of the vehicle), slide the bracket at the bottom of the battery housing out from under the two brackets on the battery shelf wall....

... and remove the battery from the engine compartment.

Install the battery in reverse order.

Removal of alternator, replacement of voltage regulator and rectifier block on the 1.4-1.6 (8V) engine.

The alternator must be removed for repair or replacement when it fails o r when the engine is dismantled. It is more convenient to replace the brush holder with voltage regulator when the alternator is removed.

Operation is shown on a vehicle with power steering and air conditioning.

Remove the alternator by placing the vehicle on an inspection pit or a tacada.

Disconnect the wire terminal from the "minus" t e r m i n a l of the battery pack.

battery. Remove the power train protection (see "Removing the power train protection", page 283). Remove the auxiliary drive belt (see "Replacing the auxiliary drive belt on the 1.4-1.6 (8V) engine", page 32).

Disconnect the excitation lead harness from the alternator connector using a screwdriver.

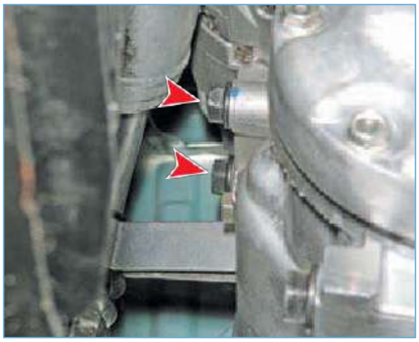
Unscrew the nut securing the lug of the plus wire to the B2+ terminal of the alternator with a 13mm socket....

lead.

Use a 13" socket to loosen the bolt securing the bracket for the hydraulic discharge line pipe.

The power steering unit to the engine bracket.

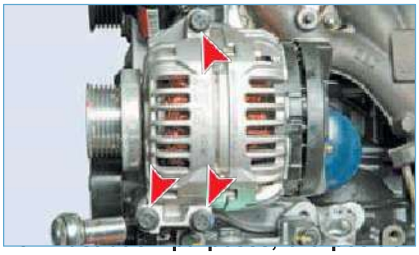
Loosen the bolts securing the power steering pump to the engine bracket (see "Removing the power steering pump", page 219) and, without disconnecting the tube and hose from the pump, move it aside.



Allen wrench or socket head

"Loosen the two bolts of the lower alternator mounting bracket to the engine bracket.....

...and the top mounting bolt.



of the alternator mounting bolts is shown with the engine removed.

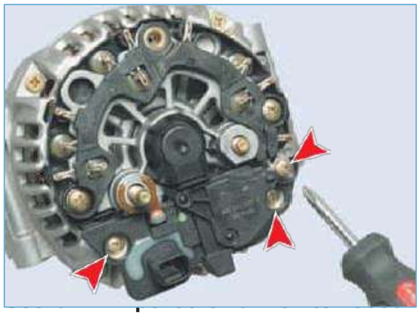
Take off the alternator.

To access the brush holder with voltage regulator and rectifier unit.

...loosen the screw securing the rotor case with a Phillips screwdriver.

socket....

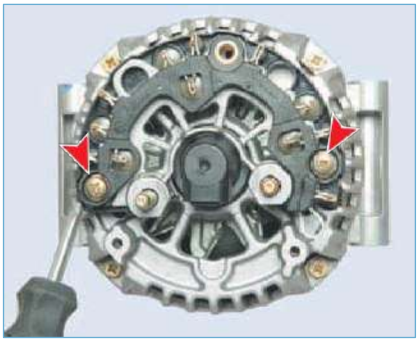
...and remove the hood.



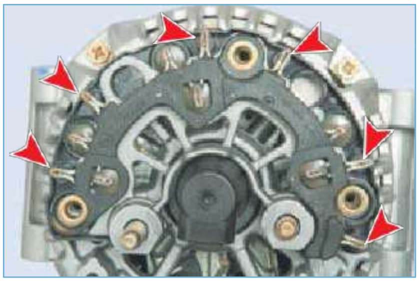
the three screws securing the brush holder.

Remove brush holder with voltage regulator.

To replace the alternator rectifier unit...



...Use a Phillips screwdriver to loosen the two screws securing the unit. Use a slotted screwdriver to loosen the...



... six loop leads of the rectifier unit that crimp the stator winding leads.
Remove the rectifier unit.
When installing the rectifier unit, after crimping its loop leads, solder the stator winding leads to them for reliability.
Further assembly and installation of the rotor is carried out in reverse order.

Removal of alternator, replacement of voltage regulator and rectifier block on the 1.6 (16V) engine.

The alternator is removed for repair or replacement when it fails o r when the engine is dismantled. The voltage regulator and rectifier unit must be replaced on the removed alternator.
The work is carried out on an inspection trolley or trestle.

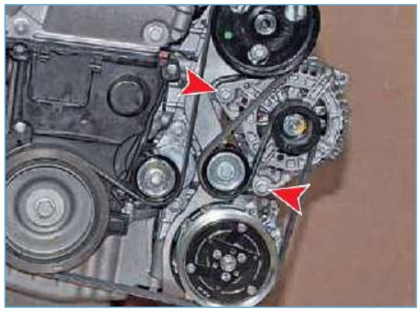
Disconnect the lead terminal from the negative terminal of the battery.
Remove the front bumper (see "Removing the front bumper on Logan", page 286 or "Removing the front bumper on Sandero and Sandero Stepway", page 287).
Remove the auxiliary drive belt (see "Changing the auxiliary drive belt on the 1.6 (16V) engine", page 41).

Disconnect the wiring harness from the ignition switch connector by releasing the catch.

Unscrew the nut securing the lug of the plus wire to the B2+ terminal of the alternator with a 13mm socket....

...and remove the wire lug from the alternator lead.

Unscrew the upper alternator mounting bolt with a "10" head....
...and remove the bolt.



For illustration purposes, the position of the alternator mounting bolts is shown with the engine removed.

Unscrew the lower alternator mounting bolt with a "10" head.
Holding the generator...

... remove the lower alternator mounting bolt....

...and remove the alternator from the engine compartment.

Unscrew the nut on the "B2+" terminal of the alternator using a high head "for 13".

Unscrew the nut securing the alternator casing with a 15" socket.

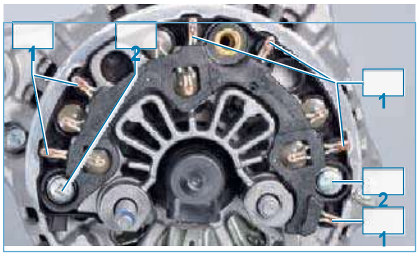
Unscrew the screw securing the alternator cover with a Phillips screwdriver.

Remove the alternator cover.

Use a Phillips screwdriver to loosen the three screws....

... and remove the brush holder with voltage regulator.

To replace the rectifier unit, use a slotted screwdriver to loosen the...



... six terminals 1 of the rectifier unit, which crimp the stator winding leads.

Use a Phillips screwdriver to loosen the two screws 2 securing the unit and remove the rectifier unit.

When installing the rectifier unit, after crimping its leads, solder the stator winding leads to them for reliability.

Further assembly and installation of the rotor is carried out in reverse order.

Removing and checking the starter

The starter is removed for repair or replacement, or when dismantling the engine and gearbox.

The work is carried out on an inspection trolley or trestle.

Remove the starter for vehicles with 1.4-1.6 (8V) engine. Remove the starter in the same way for vehicles with 1.6 (16V) engine.

Disconnect the lead terminal from the negative terminal of the battery.

Remove the power unit protection (see "Removing the power unit protection", page 283).

From the bottom of the car...

...with a box wrench or a socket head. Unscrew the nut securing the wire lug to the control terminal of the traction relay with a "8 mm".

...and remove the wire lug from the relay lead.

Allen wrench or socket head "Unscrew the nut securing the wire lug connected to the "plus" terminal of the battery.....

...and remove the wire lug from the traction relay contact bolt.

In the engine compartment...

...with a 13" head, loosen the three bolts securing the starter to the clutch housing (for clarity, shown on the removed power unit). From the bottom of the vehicle...

...remove the starter.

To assess the serviceability of the actuator of the starter...

... turn the drive gear with a screwdriver.

The pinion gear must rotate in the same direction as the drive shaft and in the other direction on the drive shaft. If this is not the case, the actuator must be replaced.

Use a screwdriver to slide the water pinion over the shaft.

The pinion gear should move easily on the shaft without seizing. If the pinion gear seizes on the shaft, the actuator must be replaced.

To test the starter, we connect the cigarette lighter wires

The "plus" terminal of the battery with the upper contact bolt of the traction relay and the "minus" terminal with the starter housing.

Use a screwdriver to short-circuit the upper contact bolt and the control output of the traction relay.

Care must be taken when carrying out this operation as sparks may be generated in the area where the terminals are short-circuited. Do not touch the ground with a screwdriver at the moment of terminal closure.

The actuator pins should extend and the starter motor should engage. If this is not the case, check starter motor and starter relay.

To test the electric motor...

...connect the battery "plus" terminal to the lower contact bolt of the traction relay and the "minus" terminal to the starter housing.

The motor shaft must be rotating at the same time. Otherwise the motor is defective.

To test the traction relay, connect the wires...

... the "plus" terminal of the battery with the control terminal of the traction relay (shown by the arrow) and the "minus" terminal with the starter housing.

The actuator pinion should extend. If this does not happen, the traction relay is defective.

Install the starter in reverse sequences.

Disassembly starter motor 1.4-1.6 (8V)

Disassemble the starter to replace the traction relay, brush holder with brushes and drive components.

To remove the starter pull relay,...

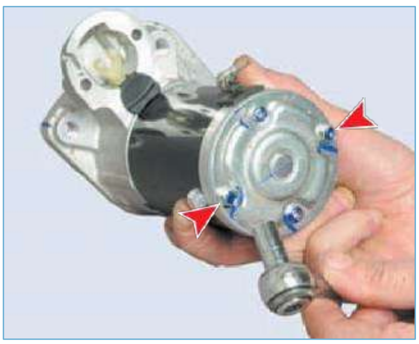
...Use a 13" head to loosen the nut securing the brush assembly water lug to the contact bolt of the traction relay.....

...and remove the wire lug from the contact bolt.

Unscrew the two screws securing the traction control relay with a Phillips screwdriver.

...and remove the traction relay.

Remove the armature of the traction relay.
To replace the starter drive...



...loosen the two tie bolts with a head or an 8" wrench.

Remove support and drive lever seal.

Remove the front cover of the starter.

Remove the actuator lever.

Use a mandrel (can be used with a twelve-sided dresser head)
Press down the pinion travel stop ring with a "12").

By prying up with a screwdriver...

...remove the retaining ring from the groove of the armature shaft.

Remove the limiting ring from the armature shaft.

...and drive train assembly.
The screw splines on the shaft must be free of nicks and burrs. The freewheel coupling must move easily axially on the shaft.
To assess the serviceability of the free-wheel drive clutch.

...turn the pinion gear while holding the coupling by the outer ring.
The gear must only rotate in one direction. The gear teeth must not be damaged. If this is not the case, the complete drive must be replaced.
To replace the brush assembly...

...loosen the two cover screws with a Phillips screwdriver....

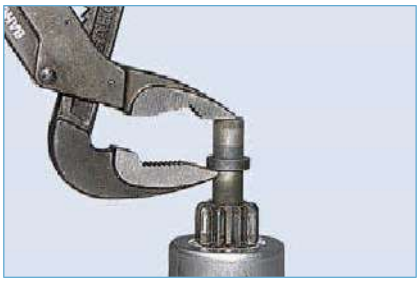
...and remove the starter cover.

Remove the brush assembly, brushes and springs may come out of the brush guides.

Remove the armature from the stator.
Reassemble and install the starter in reverse order.
Before installing the brush assembly on the armature collector...

... press the brushes into the brush guides and insert the mandrel into the center of the brush unit.
The mandrel can be a tall tool shank with an outer diameter equal to or slightly larger than the outer diameter of the armature collector.

With the mandrel pressed against the collector, slide the brush assembly from the mandrel onto the collector.



Slide the actuator stem travel stop ring onto the locking ring using sliding pliers.

Disassembly of the starter motor 1.6 (16V)

Disassemble the starter to replace the traction relay and drive elements.
To remove the traction relay....

... using a 13" wrench, unscrew the nut securing the brush assembly wire lug to the contact bolt of the traction relay....
...and remove the wire from the contact bolt.

Use a Torx T-20 wrench to loosen the two screws securing the traction relay.

Remove the traction relay.

Remove the spring of the traction relay.

To replace the starter drive...

...with a head "for 8" unscrew the two tie bolts.

Remove the water lever seal from the front cover.

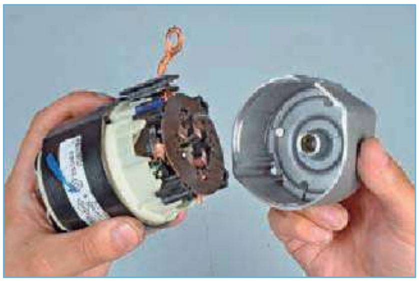
...and remove the front cover.

Remove the actuator lever together with the armature of the traction relay.

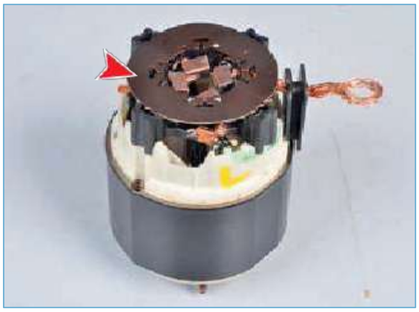
Remove the armature with drive from the stator.

The starter drive cannot be removed from the armature shaft (for this purpose the armature must be completely disassembled), so if the drive is defective, replace the armature and drive assembly.

The brush holder cannot be removed from the stator because the brush leads are welded to the stator winding leads. The brush holder can therefore only be replaced together with the stator. Reassemble the starter in reverse order.
Before installing the anchor...



...remove the rear cover of the starter.

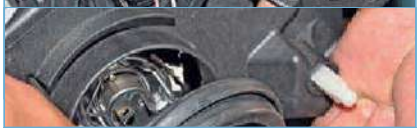


Remove brush holder cover. Press the brushes into the brush guides and insert a mandrel into the center of the brush assembly (see "Disassembling the starter motor 1.4-1.6 (8V)", page 252). Insert the armature into the stator and slide the brush holder from the mandrel onto the armature collector.

Replacing the bulbs in the headlamp unit of a Logan vehicle

To replace the bulbs in the left headlight cluster, the battery must be removed (see "Removing the battery", page 248).
The operation is shown on the left headlamp, change bulbs in the right headlamp in the same way.
To replace the headlight bulb...

... by pressing the catch, remove the plastic cover (for illustration purposes, the headlamp mounting bolts are removed and the headlamp is pulled forward).



Disconnect the wiring harness from the headlight bulb and remove the rubber sealing cover.

Press the spring clip to disengage it from the reflector hook.

Remove the bulb from the headlamp housing.

! **The headlight bulb is a halogen bulb. Do not touch its glass bulb with fingers, as marks will cause the bulb to darken when heated. Remove dirt from the bulb with a clean cloth soaked in alcohol.**

Install a new H4 headlight bulb in reverse order.
To replace the turn signal lamp.

...unlocking the pad retainer.....

...and disconnect the wiring harness from the turn signal lamp holder.

Turn the bulb holder anticlockwise (clockwise for the right headlamp).

headlamp housing.
Pressing down on the bulb, turn it counterclockwise.....

...and remove the bulb from the socket.

If the ring is torn or cracked, replace it with a new one.
Install the new PY21W bulb in reverse order.
To replace the parking light bulb,...

... turn the bulb holder counterclockwise.....

headlight housing.
Pull the bulb out of the socket by pulling it.
Install the new W5W bulb in reverse order.

Removing the headlight unit on a Logan vehicle

Remove the headlamp unit for replacement. Remove front bumper (see "Removing the front bumper on Logan", page 286).
Disconnect the wiring harnesses from the headlight bulb and turn signal lamp socket and remove the socket with the parking light bulb from the headlight housing
(see "Replacing the headlight bulbs in

Unscrew three bolts fixing the headlamp unit to the body with a head "for 10".

Pull the headlight assembly out of the body.

Remove protective cover from headlight beam direction control actuator housing. Remove the cable sheath from the cable holder on the actuator housing.

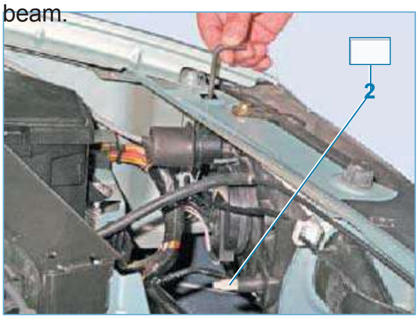
...disconnect the cable lug from the actuator stem-

the headlight beam direction controller....

... and remove the headlamp unit.

Install the headlamp unit in reverse order.

After installing the headlamp unit, adjust the direction of the headlamp beam.



To change the direction of the light beam in the vertical plane, turn hexagon "6" screw 1 (see previous photo) by inserting the hexagon through the hole in the body cross member. To change the direction of the light beam in the horizontal plane, turn knob 2.

Sandero and Sandero Stepway headlight bulbs replacement

The work is shown on the right headlamp. The bulbs in the left headlamp are changed in the same way, but the accumulator battery must be removed (see "Removing the accumulator battery", page 248).

To replace the headlight bulb...

...disconnect the wiring harness from the headlight bulb (for clarity, the headlight unit mounting bolts are removed and the headlight unit is pulled forward).

Remove the rubber sealing cover.

Press the spring clip to disengage it from the reflector hook.

...and lower the retainer.

Remove the bulb from the headlamp housing.

The headlight bulb is a halogen bulb. Do not touch its glass bulb with fingers, as marks will cause the bulb to darken when heated. Remove dirt from the bulb with a clean cloth soaked in alcohol.

Install a new H4 headlight bulb in reverse order.

To replace the turn signal lamp.

...unlocking the pad retainer.....

...and disconnect the wiring harness from the turn signal lamp holder.

Turn the bulb holder anticlockwise (clockwise for the left headlamp).

headlamp housing.
Pressing down on the bulb, turn it counterclockwise.....

...and remove the bulb from the socket.

The cartridge is sealed in the headlamp housing with a rubber ring.
If the ring is torn or cracked, replace it with a new one.
Install the new PY21W bulb in reverse order.
To replace the parking light bulb,...

... turn the bulb holder counterclockwise.....

headlight housing.
Pull the bulb out of the socket by pulling it.
Install the new W5W bulb in reverse order.

Removing the headlight unit on Sandero and Sandero Stepway vehicles

Remove the headlamp unit for replacement. Remove front bumper (see "Removing the front bumper on Sandero and Sandero Stepway", page 287).
Disconnect wiring harnesses from the headlight bulb and turn signal lamp socket and remove the socket with the parking light bulb from the headlamp housing (see "Replacing bulbs in Sandero and Sandero Stepway headlamps", page 257).

Unscrew the upper and side mounting bolts with a 10 mm socket.

...and the lower headlight assembly bolt to the body.

body. Remove the protective cover and disconnect the cable tip from the headlamp beam direction adjuster actuator rod (see "Removing the headlamp unit on a Logan", page 256)....

... and remove the headlamp unit.
Install the headlamp unit in reverse order.
After installing the headlamp unit, adjust the direction of the headlamp beam.

To change the direction of the light beam in the vertical plane, turn the hexagon 6 screw by inserting the hexagon through the hole in the body cross member.

Rotate the knob to change the direction of the light beam in the horizontal plane.

Removing the headlight beam direction adjuster actuator

Remove headlight beam control actuator for replacement if it fails.
The work is shown on the Logan, Sandero and Sandero Stepway vehicles are operated in the same way.
The mechanism removal is shown on the left headlamp (for clarity of operation, show it on the removed headlamp).

... and remove the regulator actuator from the headlamp housing.
Install headlight beam control actuator in reverse order.
Before fixing the actuator housing in the headlamp housing, make sure that the stem tip of the actuator is in the correct position.

Turn counterclockwise and remove the bulb.
Replace the defective bulb with a new H11 bulb and install the parts in the reverse order.

For ease of disassembly, the
of the regulator's control mechanism
Remove the battery on the left headlamp unit.
Before disconnecting the cable lug from the controller actuator, turn the headlight beam adjuster knob to the left-most position in the passenger compartment.
Disconnect the cable lug when-

headlamp reflector socket - when wo
wobbling of the actuator housing
The headlamp reflector must rotate in the vertical plane of the adjuster mechanism.

Removing the fog light headlights

The fog lamp is removed for replacement.
The work is carried out on an inspection trolley or trestle.
The operations are shown on the left fog light, the right fog light is replaced in the same way.
Removing the mud guard

water from the actuator
regulator (see "Removing the headlamp assembly

on the Logan automobile," p. 256).

By releasing the catch on the headlamp housing.....
... turn the headlight beam adjuster actuator housing clockwise. On the right-hand headlamp unit, turn the adjuster housing counterclockwise.....

Replacing the fog lamp bulb headlights

The work is carried out on an inspection trolley or trestle.
Remove the front bumper mudguard on the side of the bulb to be replaced (see "Removing the front bumper mudguards", page 283).
Unclip the plastic retainer on the wiring harness....

...and disconnect it from the bulb.

front bumper at The front bumper on the side of the headlamp to be replaced (see "Removing the mud-
The front bumper shields", p. 283).
Disconnect the wiring harness from the fog lamp bulb (see "Replacing the fog lamp bulb").

Using a Torx T-20 wrench, loosen the two screws securing the headlight to the bumper....

...and remove the headlight.

Fog lamp marking

Install the fog light in reverse order.
After installing the headlamp, adjust the beam direction in the vertical plane.

Use a slotted screwdriver to turn the plastic adjusting screw clockwise to raise the light beam or counterclockwise to lower the beam.

Removing the side turn signal lamp, replacing the bulb on a Logan

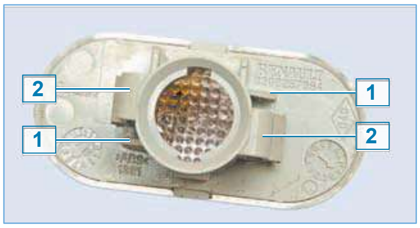
Remove the side turn signal lamp to replace the bulb or the signal lamp itself.
Operation is shown on the left side direction indicator, right side direction indicator

The direction indicator can be removed in the same way.

The side turn indicator is mounted in the fender opening and is secured by two clips (one clip is shown with an arrow, the other clip is not visible in the photo). There are two ways to remove the side turn signal indicator.
In one method remove the front wheel mudguard (see "Removing the front wheel mudguards and fenders", page 284).
Bend the rear part of the fender liner, insert your hand into the gap between the fender liner and the fender and squeeze the two turn signal clips....

... push the pointer out of the wing opening.
For the other method, remove the turn signal indicator by squeezing its clips on the outside of the wing.
To that end...

...insert two plastic plates (you can use plastic cards) between the fender and the pointer on both sides and, squeezing the two retainers ...
...remove the side gate indicator.



There are two protrusions 1 on the body of the direction indicator next to the clips 2

When removing the left-hand gate indicator, insert the front plate below the protrusion and the rear plate above the protrusion.
When removing the right-hand indicator, insert the plates in the opposite direction.

By turning the bulb socket counterclockwise....

...remove it from the pointer housing.

Taking out the bulb...

...and replace it with a new WY5W.

Install the door side indicator in reverse order.

Removing the side turn signal lamp, replacing the bulb on Sandero and Sandero cars Stepway

Remove the side turn signal lamp to replace the bulb or the signal lamp itself.

The operation is shown on the right side direction indicator, the left side direction indicator can be removed in the same way.

Insert the cardboard or plastic plate between the wing and the indicator and press the catch.

...remove the pointer from the hole in the fender.

Turn the bulb holder counterclockwise....

... remove the bulb holder from the indicator housing.

Taking the bulb out of the socket.....

...and replace it with a new W5W.

Installing the side indicator

turn in reverse sequence-

but I'm not.

Removing the switch reverse light

The work is carried out when checking and replacing the reversing light switch.

Remove the switch at an inspection trench or overpass.

Remove the left engine compartment mudguard (see "Removing the engine compartment mudguards", page 000).

Clean all dirt from the reverse light switch and the part of the gear case around the switch.

By depressing the wiring harness retainer....

... disconnect the harness from the reversing light switch.

With the ignition on, use a piece of wire to short-circuit the contacts in the switch wiring harness. If the reverse light does not illuminate, check the electrical circuit of the switch.

If this is not the case, replace the switch with a new one. Before unscrewing the switch, drain the oil from the gearbox (see "Checking the oil level and topping up the oil in the manual transmission", page 47).

Unscrew the reversing light switch with a 24 mm spanner.

Reverse light switch

Connect tester probes to the switch terminals and check the switch in ohmmeter mode.

In a serviceable switch, the tester should detect "infinity" when the stem is free....

... and when the stem is recessed (switch contacts closed), the circuit is present.

Before installing the switch, degrease the threaded part of the switch and the threaded hole in the transmission case with acetone. Apply a thin layer of sealant to the switch threads and screw the switch into the transmission case bore. Tighten reverse light switch. Fill the gearbox with oil. Further assembly is carried out in reverse order.

Removing the tail light, replacing the bulbs on the Logan car

The work is carried out when replacing the bulbs in the tail light or the light itself. The operations are shown on the right tail light, they are the same for the left tail light.
Opening the trunk...

...and unscrew the trunk trim fastener.

Fold back the edge of the trunk liner.

Press the catch to disconnect the wiring harness from the lamp connector.

Unscrew the bottom...

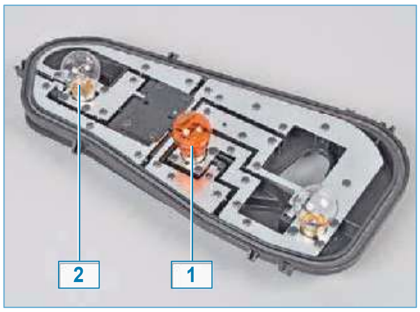
...and upper plastic lantern mounting nuts.

Take off the taillight.

Unhooking the four latches...

... and remove the bulb holder. Press the bulb and turn it counterclockwise.....

... remove the tail light bulb from the holder.
Install the new P21W bulb in reverse order.



Replace turn signal lamp 1 (PY21W) and double-needle brake and parking light lamp 2 (P21/5W) in the same way.
The projections on the base of the brake light and parking light combination lamp are at different levels and must fit into the corresponding grooves in the socket when installed.
Install the tail light in the reverse order.

Removing the tail light, replacing the bulbs on Sandero and Sandero Stepway cars

The work is performed when replacing the bulbs in the tail light or replacing the tail light itself.

The operations are shown for the right lamp, they are the same for the left lamp.

Open the luggage compartment door...

...unscrew the plastic nut securing the lamp.

Pull the lamp away from the vehicle body.

Press the catch to disconnect the wiring harness from the lamp connector.

...and remove the flashlight.

Remove the flashlight gasket.

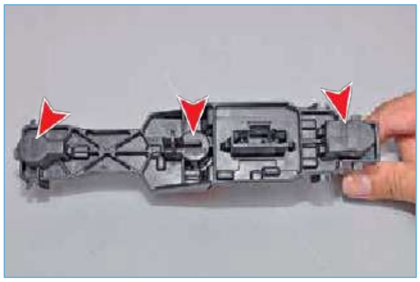
Unhooking the three latches...

... and remove the bulb holder. Press the bulb and turn it counterclockwise.....

...remove the brake light and parking light combination lamp from the holder.

Install the new P21/5W bulb in reverse order. The projections on the base of the brake light and parking light combination bulb are at different levels and must fit into the corresponding grooves in the socket when installed.

Replace the turn signal lamp (PY21W) and reversing light bulb (P21W) (fog light bulb in the left-hand headlamp) in the same way.



Each lamp holder socket is labeled with the lamp type.

Install the tail light in the reverse order.

Lamp replacement in the auxiliary brake signal on the Logan car

The auxiliary brake signal is installed in the passenger compartment on the rear shelf.

To access the auxiliary brake light, open and lift the trunk lid.

Inside the load compartment, turn the bulb holder counterclockwise through the hole in the rear shelf....

... and remove the bulb holder. Press the bulb and turn it counterclockwise to remove it from the bulb holder.
Install the new P21W bulb in reverse order.

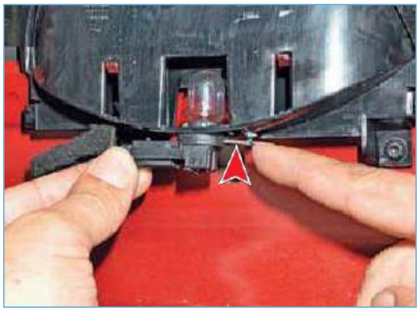
Lamp replacement in the auxiliary brake signal, removal of the signal on Sandero and Sandero Stepway cars

The additional brake signal is mounted on the load compartment door.
Open the luggage compartment door...

...and by pressing the two latches.....

...remove the cover of the auxiliary signal.

To replace the bulb...



...pushing down on the cartridge retainer.....

...and turn the bulb holder clockwise.

Remove bulb holder from the signal housing.

Remove the bulb from the socket.
Install the new W16W bulb in reverse order.
To deactivate the auxiliary alarm.

... by pressing the catch, disconnect the wiring harness from the headlight connector.

Use a Torx T-20 wrench to loosen the two screws securing the signal.

Remove the auxiliary brake signal.
Install the additional brake signal in reverse order.

Removing the license plate light, replacing the bulb

Remove the rear license plate light to replace the bulb, the light itself, and when removing the rear bumper.
The operations are shown on the Logan, Sandero and Sandero Stepway are performed in the same way.

Press the plastic locking tab.

...remove the light from the hole in the rear bumper.

Turn counterclockwise to remove the bulb holder from the lamp housing.

Remove the bulb from the socket.
Install the new W5W bulb in reverse order.

Replacing the interior lighting bulb, removing the headlamp

Remove the interior lighting plafond for replacement or when removing the headliner during body repairs.
Disconnect the lead terminal from the negative terminal of the battery.
To replace the bulb...

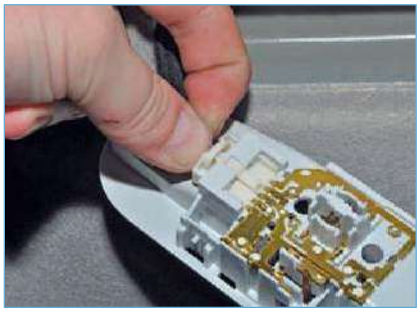
...using a screwdriver....

...and remove the light diffuser.

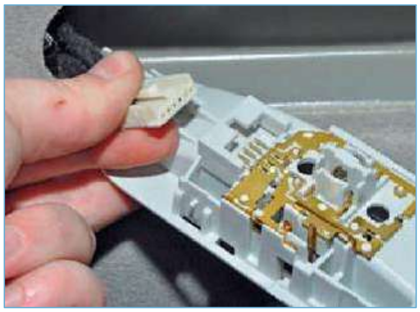
Remove the bulb from the headlamp.
Install the new W5W bulb in reverse order.
If there is an individual light bulb in the headlamp, replace it in the same way.
To remove the headlamp, remove the diffuser as shown above.

Press the plastic locking tab.

...remove the plafond from the headliner.



By pressing the pad retainer....



...disconnect the wire harness from the headlight connector....
... and remove the headlamp. Install the passenger compartment lighting in reverse order.

Removing the glove box light, replacing the bulb, replacing the switch

When replacing the bulb or light bulb of the load compartment lighting, remove the plafond.
To replace the headlamp bulb, open the load compartment.

...use a screwdriver to pry up the plafond....

...and remove the plafond from the duffel box opening.

Press the catch to disconnect the wiring harness from the headlamp connector.

...remove the light diffuser.

Remove the bulb from the headlamp.
Install the new W5W bulb in reverse order.
To replace the headlight switch, open the duffel box....

... Use a screwdriver to pry off the switch....

... and remove the switch from the duffel box.

Disconnect the two wiring harnesses from the switch terminals...
... and remove the switch from the appliance drawer.
Install the tailgate switch in reverse order.

Removing the trunk light bulb, replacing the bulb on a Logan

The work is carried out when replacing the bulb or the trunk light bulb. The luggage compartment light bulb is located on the rear shelf on the luggage compartment side.
Disconnect the wire terminal from the battery's "minus" terminal.
To access the plafond, open and lift the trunk lid.
To replace the bulb...

...use a screwdriver to pry up the plafond....

... and remove it from the hole in the rear shelf.

...and remove the light diffuser.

Remove bulb from bulb holder. Insert a new W5W bulb and install the lamp trunk light In the reverse order, install the trunk light in the reverse order.
To replace the plafond, remove it from the hole in the rear shelf (see above).

Press the wire guide retainer.
...disconnect the wiring harness from the headlight.

Install the tailgate lighting in reverse order.

Removing the trunk light bulb, replacing the bulb on Sandero and Sandero Stepway cars

The work is carried out when replacing the bulb or trunk light bulb. Disconnect terminal disconnect the lead terminal from the battery minus terminal.
Open the luggage compartment door...

...use a screwdriver to pry up the plafond....

...and remove it from the luggage compartment upholstery.

Press the catch to disconnect the wiring harness from the lamp connector.

...and remove the light diffuser.

Remove the bulb from the headlamp. Install the new W5W bulb in reverse order.

Removing the paddle shifters and the switch coupler with the drum device spiral cable

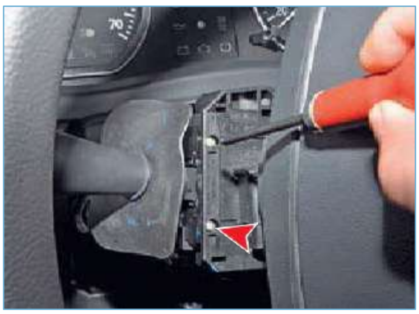
The work is carried out when replacing the selector lever, selector lever connector with drum unit and when removing the steering column and instrument panel.
Disconnect the lead terminal from the negative terminal of the battery.

To remove the paddle shifters.

the two self-tapping screws securing the steering column shrouds.

Remove the upper steering column cover by overcoming the resistance of the four clips.

Remove steering column lower cover.



Use a Phillips screwdriver to loosen the two self-tapping screws securing the left-hand paddle shifter.

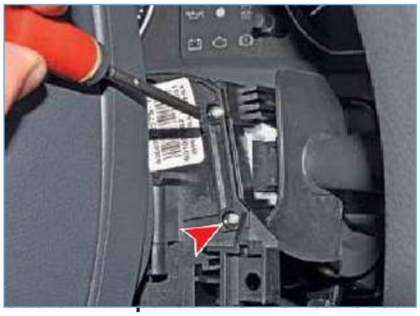
connector.

Squeeze the two pad retainers.....

...disconnect the wiring harness from the switch connector.....

... and remove the left-hand paddle shifter.

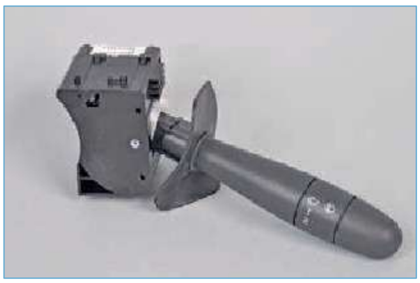
To remove the right-hand paddle switch, remove the immobilizer coil (see "Replacing the immobilizer coil and ignition switch", page 247).



the two self-tapping screws securing the right-hand paddle shifter.

Remove the switch from the connector.

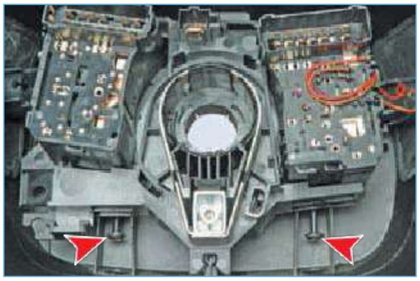
Disconnect the wiring harness from the switch connector by squeezing the two catches on the harness.



... and remove the right hand paddle switch.

Install the steering wheel switches in reverse order.

When installing the steering wheel housings.



...the self-tapping screws of the hoods through the holes in the bosses of the steering column coupler housing (for clarity, shown with the hoods and steering column coupler removed). To remove the paddle shifter coupler, set the front wheels in a straight-ahead position. Remove the steering wheel (see "Removing the steering wheel", page 215).

Remove the steering column shrouds as shown above.

Before removing the coupler from the steering column (for ease of reassembly), it is better to secure the drum of the device against turning. For this purpose, if necessary, turn the drum by a small angle, aligning the depression between the two lugs of the drum with the groove of the housing....

...and insert the wooden wedge.

Use a Torx T-20 wrench to loosen the connector fastening screw a few turns.

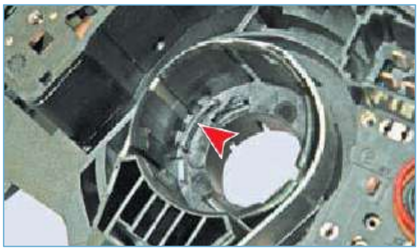
By pushing the head of the screw along its axis...

...slide the connector off the steering column.

Disconnect the wiring harnesses from the paddle shifters (see above) and remove the connector with switch assembly.

Install the connector with the parking brake and the steering wheel controls in reverse order.

When installing the coupler, align the...



... a tab in the connector housing socket...

...with the slot on the end of the steering column tube.

Removing audible signals

The work is carried out when replacing the horns.

Depending on the vehicle configuration, the vehicle can be equipped with -

The horns are located behind the front bumper. The signals are located behind the front bumper.

If one horn (high tone) is installed, it is located on the right side, if two horns are installed, high tone on the right and low tone on the left. The removal of the high tone signal is shown, the low tone signal is removed in the same way.

The work is carried out on an inspection trolley or trestle.

Disconnect the lead terminal from the negative terminal of the battery.

Remove the right front wheel underfender (see "Removing mudguards and front wheel underfenders", page 284).

Pressing the spring clamp, disconnect the wiring harness from the signal connector (the front bumper is removed for clarity).

Unscrew the bolt with a 13" socket....

...and remove the signal with the bracket.

To remove the bracket...

... loosen the nut with a wrench or a 13 mm head.

Set the high-pitched horn in reverse order.

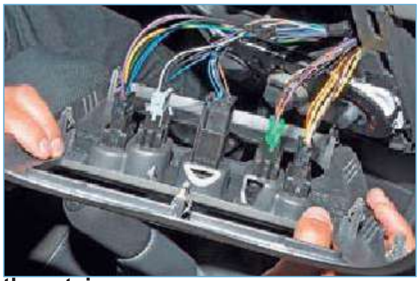
Removing the switches

The work is carried out when replacing the switches. The switches on the instrument panel console trim must also be removed when replacing the trim.

To remove the **switches on the dashboard ends.**

...by prying up the console trim with a knife.....

... pull the cover away from the console, overcoming the resistance of



the retainers....

...and remove the cover plate.

Before disconnecting the wiring harnesses from the switches, mark them with a marker.

Disconnect the wiring harnesses from the switches.

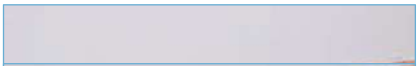
Press the two catches together to remove the diverter switch from the cover opening.

... and remove the switch from the panel.

Remove the other switches in the same way.

To replace the bulb of the emergency signaling switch...

... Use a screwdriver to pry off the key switch....

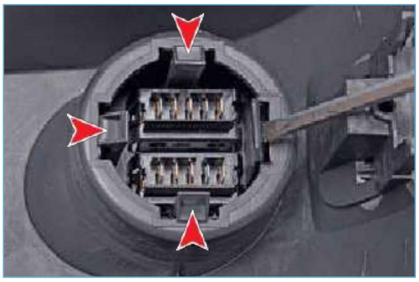


...and take it off.

Taking the bulb out of the switch.....
...and replace it with a new W1.2W bulb.
Install the switches on the dashboard ends in reverse order.
To remove the **switches on the floor tunnel,** remove the rear part of the floor tunnel liner (see "Removing the floor tunnel liner", page 303).

Use a screwdriver to alternately press the two latches....

...and remove the electric exterior mirror drive regulator.

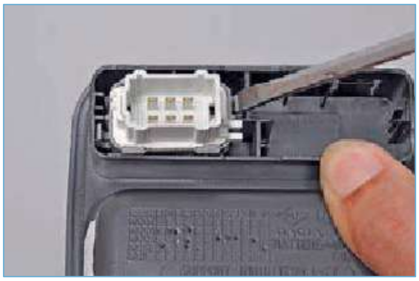


Use the screwdriver to press the four latches one by one....

... and remove the rear window elevator switch assembly. The rear window elevator interlock switch can be removed without dismantling the floor pan liner (for clarity, the operation is shown with the liner removed).

Use a screwdriver to pry open the tunnel liner insert.

... and remove the insert with the lock switch.
If the work is carried out on a vehicle, disconnect the wiring harness from the switch.

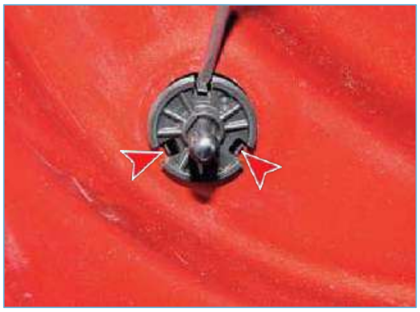


Use the screwdriver to press down on the retainer....

... and remove the lock switch.
Install the switches on the floor tunnel trim in reverse order.
To remove the **door limit switch...**

...prying off the protective cap with a screwdriver....

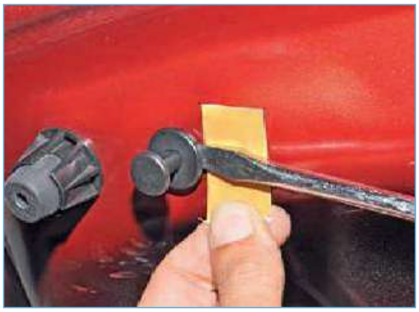
...and remove it from the switch.



Press the three latches one by one...

... and remove the switch from the opening in the body.

Disconnect the wiring harness from the switch by pressing the catch. Install the switch in the reverse order.
On Sandero and Sandero Stepway vehicles, remove the **luggage compartment lighting switch.**



...use a screwdriver (with a cardboard plate underneath) to pry open the key....

... and remove it from the opening in the load compartment door.

Disconnect the wiring harness from the switch by pressing the catch.
Install the switch in the reverse order.

Removing the windscreen wiper motor gearbox

The work is carried out when replacing the windscreen wiper gearmotor.
Disconnect the lead terminal from the negative terminal of the battery.

Remove the sealing strip from the front shield partition.

Use a screwdriver to pry up the piston pin of the left cover plate....

...and remove the piston.

Remove the left side cover.
In the event of malfunctions of the cleaner due to the condition of the limit switch contacts.

... by releasing the motor-reactor cover latches....

...remove the cover.
If necessary, clean and bend the limit switch contacts.
Before removing the gearmotor, mark the position of the brushes on the windscreen with a marker.
Use a screwdriver to remove the decal cap covering the wiper arm nut.

Unscrew the nut securing the wiper arm using a 13 mm socket.

Remove the lever with the brush from the gearmotor shaft.

Remove the decorative cover from the shaft.

Unscrew the nut with a 24" wrench....

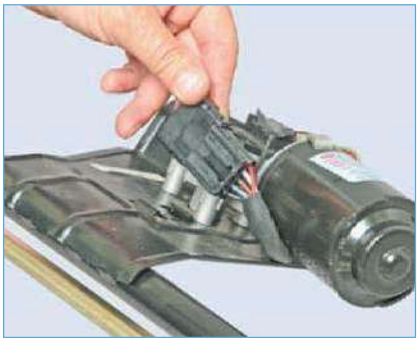
...and remove the nut, washer and seal from the gearmotor shaft.
Perform the same operations on the other wiper shaft.
By pushing down on the catch....

... disconnect the wiring harness from the gearmotor wiring harness.

Unscrew the bolt securing the wiper bracket with a "10" head.

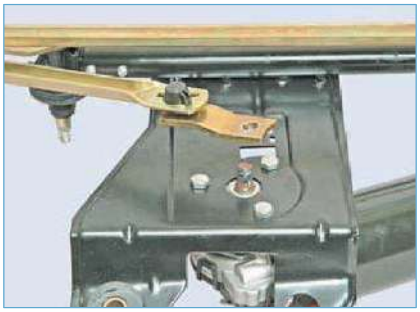
Remove the windshield wiper.

By prying off the wiring harness retainer with a screwdriver....



... lead the wiring harness out of the guide rails of the bracket.

Unscrew the nut securing the wiper crank with a 13" socket while holding the crank with a screwdriver.



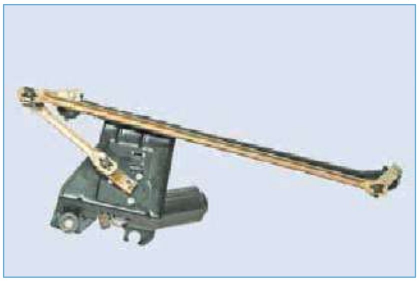
Remove the crank from the motor-reactor shaft.

Use a 10" head to loosen the three bolts securing the gearmotor to the wiper bracket.....

...and remove the gearmotor. Reinstall the gearmotor to the wiper bracket in reverse order.

To set the windscreen wiper gearmotor shaft to its original position, connect the wire terminal to the battery negative terminal. Then connect the engine compartment wiring harness to the windshield wiper gearmotor and switch on the windshield wiper using the right-hand steering wheel switch. Switch off the windscreen wiper and wait for the gearmotor motor shaft to stop.

Disconnect engine compartment wiring harness from wiper motor.
In this position on the gearmotor shaft, position the wiper crank so that...



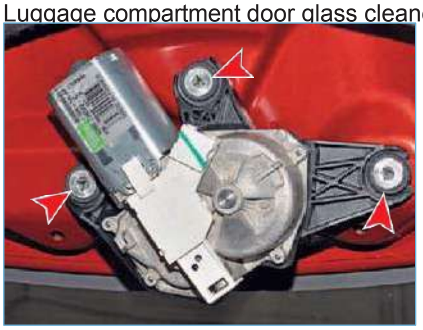
...as shown in the photo.
Tighten the nut securing the curve spike.
When installing the brush arms on the wiper shafts, pay attention to their markings.

...the right lever has an "R" on it and the left lever has an "L" on it.
Further installation of the windshield wiper is carried out in reverse order.

Removing the tailgate window wiper on Sandero and Sandero Stepway vehicles

The work is carried out when replacing the gearmotor of the tailgate window wiper.

Luggage compartment door glass cleaner..

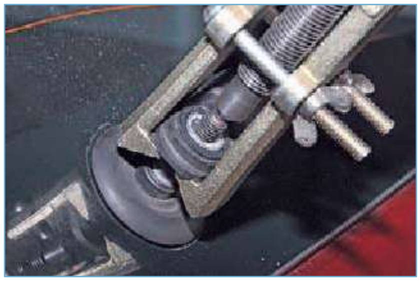


... is secured to the inner door panel with three special rivets.
We therefore recommend that you have the gearmotor replaced by a workshop.
To remove the wiper, remove the luggage compartment door trim (see "Removing the luggage compartment door lock on Sandero and Sandero Stepway cars", page 303).
Disconnect the lead terminal from the negative terminal of the battery.

Lift the protective cap covering the wiper arm retaining nut.

Use a 13" wrench to loosen the lever nut....

...and remove the brush lever.
If the lever cannot be removed from the wiper shaft.



...press it down with the puller.

Disconnect the wiring harness from the gearmotor connector by pressing the catch.

Drill out the three rivets securing the wiper.....
... and remove the wiper. Install the tailgate w i p e r in reverse order.
Use new rivets to secure the wiper.

Removing the electric window washer pump

The work is carried out when replacing the electric pump and washer reservoir.
Opening the hood...

... Remove the washer hose from the hood brackets....

...and disconnect it from the tee.

Remove the seal from the front panel bulkhead.
Use a screwdriver to pry up the piston pin and remove the piston securing the right side cover (for details see "Removing the windshield wiper gearmotor", page 272). For more

... and remove the cover plate by passing the washer hose through its opening.

Disconnect the wiring harness from the washer pump by releasing the catch.

Unscrew the washer tank mounting bolt with a "10" head.
On Sandero and Sandero Stepway vehicles, by lifting the tank...

Remove washer reservoir and pump assembly.

By prying up the pump with a screwdriver...
...take it out of the tank.

Remove the windshield fluid hose from the connector on the windshield pump.

... disconnect the fluid hose to the

tailgate window from the pump connection.

Remove the sealing sleeve from the pump connection.

If the bushing is torn, cracked or has lost its elasticity, replace it with a new one.

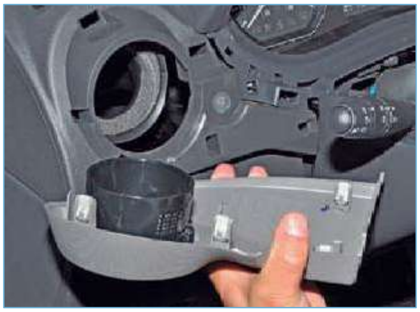
Insert the sealing sleeve into the opening of the tank.
Before installing the pump, moisten the pump connection with soapy water.

...and insert into the bushing hole.
Install tank Install the windshield washer reservoir in reverse order.

Removing the instrument cluster

The work is performed when replacing the instrument cluster and when removing the instrument panel and steering column. Disconnect the lead terminal from the negative terminal of the battery.
Remove the upper steering column cover (see "Removing the steering column paddle shifters and the spiral cable reel coupler", page 267). Remove the instrument panel console adjustment (see "Removing the switches", page 270).

Use a screwdriver to pry off the left instrument panel trim.



... and remove it by overcoming the resistance of the retainers.

Use your finger to pry up the right-hand instrument panel trim.

... and remove it by overcoming the resistance of the retainers.

Use a Torx T-20 wrench to loosen the screw securing the instrument cluster cover on the right-hand side.
Unscrew the screw securing the cover plate on the left side in the same way.

Use a screwdriver to pry open the instrument cluster visor.

...and remove the visor, overcoming the resistance of the clips.

Pry up the edge of the instrument cluster cover with a screwdriver....

...and disengage the latch on the right-hand side of the cover.
Similarly, unhook the left side lining retainer.

Remove the instrument cluster cover.

Use a Torx T-20 wrench to loosen the four self-tapping screws securing the instrument cluster.

Taking the instrument cluster out of the dashboard....

... and by pressing the catch, disconnect the gray wiring harness from it.

Similarly, disconnect the black colored wiring harness....

... and remove the instrument cluster.

The LED indicator lights installed in the instrument cluster are soldered into the circuit board and must not be replaced. In the event of failure of the indicator, indicator or display, replace the instrument cluster with a new one.

Install the instrument cluster in reverse order.

Removing the switching unit

The work is carried out when replacing the switch unit located under the instrument panel on the left-hand side. Disconnect the wire terminal from the "minus" terminal of the battery. For clarity of operation, show with the instrument panel removed.

By pushing down on the wiring harness pad retainer....

...and by turning the retainer clip, disconnect the harness strip from the block.

By squeezing the retainers...

...disconnect the other wiring harness strip from the block.

Use a Torx T-20 wrench to loosen the block mounting screw...

...and remove the switching unit.

Install the switching unit in reverse order.

Removing the airbag control unit

The work is carried out when replacing the airbag control u n i t .
Disconnect the wire terminal from
Remove floor tunnel lining (see "Removing the floor tunnel lining" page 303). Remove the floor tunnel lining (see "Removing the floor tunnel lining", page 303).
Fold back the carpeting on the floor tunnel.

Unscrew the three bolts of the airbag control unit with a 10" head.

with a screwdriver....

... and by turning the wire harness locking tab....

...unplugging the block....

...and remove the airbag control unit.

Airbag control unit marking

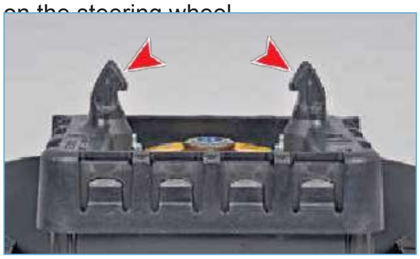
Install the airbag control unit in reverse order.

Removing the driver's airbag

The work is carried out when removing the steering wheel and replacing the driver's airbag.

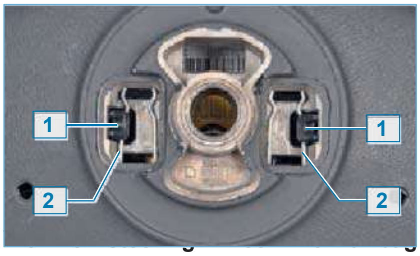
> **!** **Before removing the airbag, disconnect the lead terminal from the negative terminal of the battery. Afterwards wait at least 10 minutes for the capacitor of the cushion activator to discharge.**

Airbag airbag mounted



...two plastic hooks that engage in the hooks.....

... with two spring clips on the steering wheel (for clarity, shown with the cover removed).



assembly (from dashboard side): 1 - airbag hooks; 2 - steering wheel spring clips

To remove the airbag from the back of the steering wheel...

...insert a screwdriver into the hole in the steering wheel (for clarity)

The steering wheel is removed).

...release the spring lock with a screwdriver (for clarity, it is shown with the cushion removed)....

... and pull the cushion towards you to disengage the cushion hook from t h e retainer.

Similarly disengage the second airbag hook from the catch.

Set the steering wheel to the straight-ahead position.

Pull the cushion away from the steering wheel.

Use a screwdriver to pry off the wiring harness retainer.

...and lift the retainer.

Use a screwdriver to pry up the wiring harness.

...disconnect the pad from the cushion connector.

If the airbag has been removed, store it in a place protected from moisture and excessive heat by placing it in the airbag compartment.

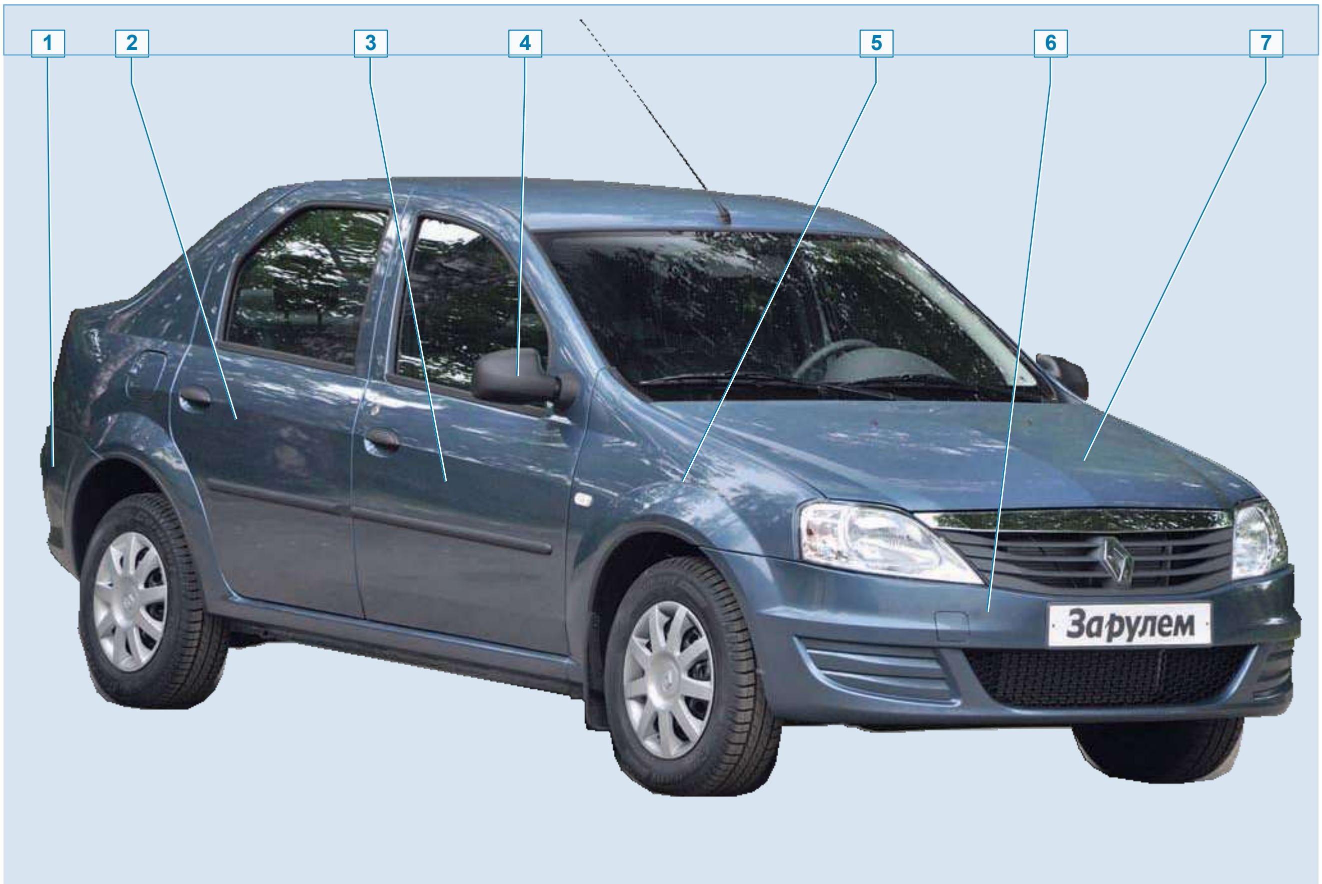
...lining up.

! Do not disassemble or repair the airbag yourself.

Connect the wiring harness to the cushion connector and insert the retainer into the harness. Place the driver's airbag on the steering wheel so that the cushion hooks engage in the corresponding holes in the steering wheel and press the cushion until the cushion hooks engage with the steering wheel clips.

Body

Construction description



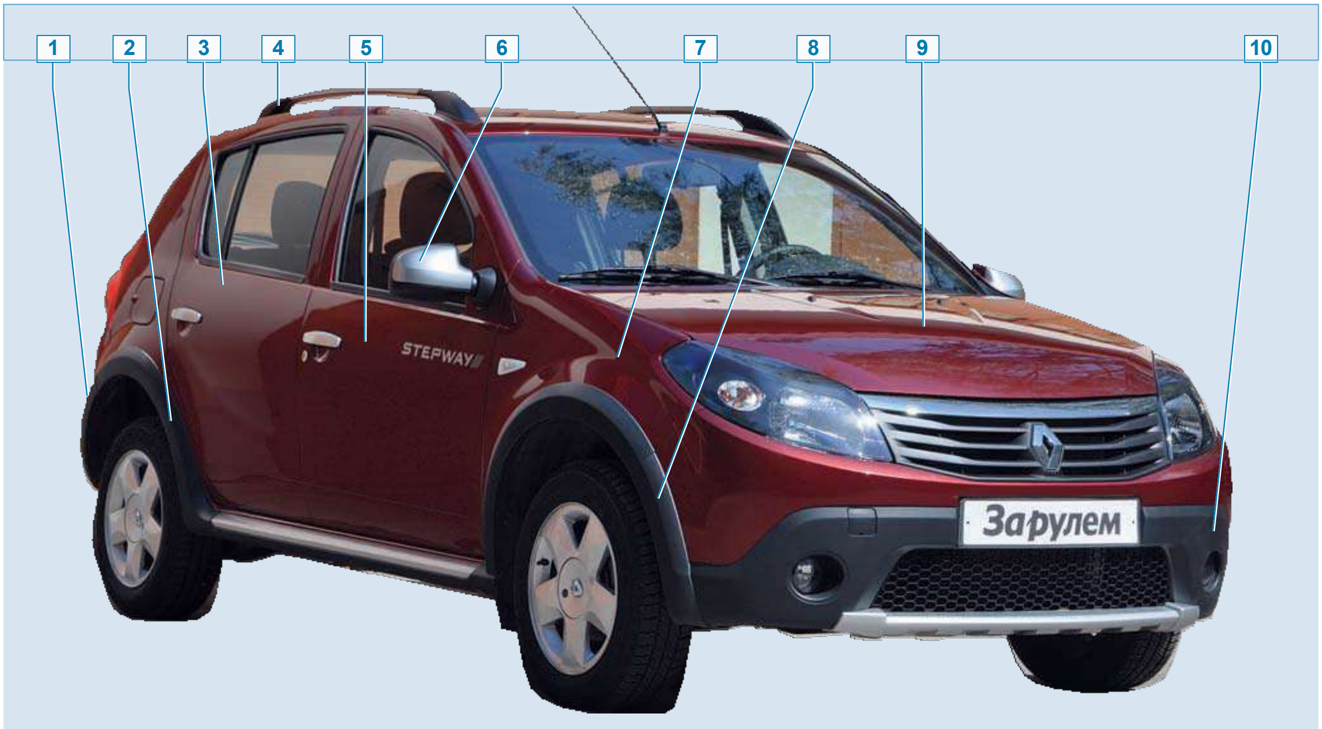
Removable elements of Logan body: 1 - rear bumper; **2** - rear door; **3** - front door; **4** - exterior rearview mirror; **5 - front** fender; **6 -** front bumper with radiator trim; **7 -** hood

The body of the Logan, Sandero and Sandero Stepway is a load-bearing, all-metal, welded body. Body elements are joined together by resistance welding, and in hard-to-reach places - by electric welding. Panel joints and weld seams are sealed with mastic. After panel welding, the body is cataphoresed by immersing it in a special bath to obtain an anti-corrosion coating. The underbody, sills and wheel wells are given an anti-gravel coating. The body is then primed and coated.

The body's hidden cavities are treated at the factory with a wax preservative. The hidden body cavities are treated at the factory with a wax preservative. Several layers of anti-corrosion mastic are applied from underneath. This anti-corrosion treatment of the body allows the manufacturer to establish a warranty period of 6 years against through corrosion.
The body structure complies with European passive safety standards.
The passenger compartment is protected against frontal impact by a front force member

The main part of the side impact is absorbed by the central body pillars. The central body pillars absorb most of the side impact. The doors are also equipped with safety bars.
All glass is bent, polished, safety type. The windshield is triple-pane, the rest are tempered. Rear window (Logan) and luggage compartment door window (Sandero, Sandero Stepway) are heated. The side door windows are tinted. Depending on

Removable elements of the Sandero body: 1 - rear bumper; **2** - rear door; **3** - front door; **4** - exterior rear view mirror; **5** - front fender; **6** - front bumper with radiator cladding; **7** - hood



Removable elements of Sandero Stepway body: 1 - rear bumper; **2 - rear** wheel arch trim; **3 -** rear door; **4 -** rails; **5 -** front door; **6** - outside rear view mirror; **7** - front fender; **9** - hood; **8 -** front wheel arch trim; **10** - front bumper with radiator trim.

Body member - cross beam (dashboard removed)

Depending on the vehicle equipment, the door windows are operated by mechanical or electric windows.
Plastic bumpers are fitted at the front and rear, with the front bumper made in one piece with the radiator shell. Some vehicles have fog lights in the front bumper. Removable body parts include: doors, trunk lid (Logan), luggage compartment door (Sandero, Sandero Stepway), hood, front wings, bumpers. The front fenders are bolted to the body.
Externally, the Sandero car
The Stepway differs from the Sandero in having decorative sill plates, longitudinal roof rails and black plastic cladding over the scaffolding. The Sandero Stepway has protective covers in the front and rear bumpers.
The vehicles are equipped with a central locking system that locks or unlocks all doors at the same time. The central locking system also locks the trunk lid (Logan) and the luggage compartment door (Sandero, Sandero Stepway).

The passenger compartment is equipped with two rows of seats. The front seats are split, with adjustable longitudinal movement and backrest tilt. Some vehicles are equipped with electrically heated seats, and the driver's seat is height-adjustable. The head restraints are removable and height-adjustable. The Logan has a three-place, non-split rear seat. The rear seat backrest does not recline. In the Sandero and Sandero Stepway, the rear seat cushion is split and the backrest consists of two sections.
The seats of all passengers are equipped with three-point seat belts with inertia-type seat belts.

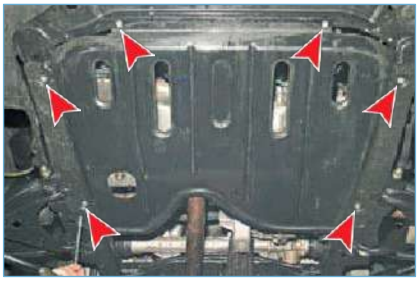
To enlarge the load compartment on Sandero and Sandero Stepway vehicles, the load compartment shelf can be removed and the backrest sections can be folded individually or together

The driver's and front passenger's seat belts are height adjustable. The driver and front passenger seat belts are height-adjustable. Some vehicles are equipped with inertial seat belts with pre-tensioners.
The body is equipped with an instrument panel, a storage compartment, a cigarette lighter, ashtray, sun visors, interior and exterior mirrors, front (removable) and rear towing eyes.
Some vehicles a r e equipped with electrically operated and electrically heated exterior mirrors. The mirrors are electrically heated at the same time as electrically heated mirrors.
of the rear window.
On all vehicles is installed airbag The driver's airbag is installed in the steering wheel and the passenger airbag in the instrument panel on the right side. The driver's airbag is installed in the steering wheel and the passenger airbag in the instrument panel on the right side. The passenger compartment is equipped with a heating and ventilation system, which serves to create the most comfortable conditions for the driver and passengers, regardless of weather conditions. Expensive versions of the vehicle are equipped with air conditioning.
When the car is moving, the air is blown into the passenger compartment with a high velocity head through the air intake openings located under the hood.

On the Logan, there are vents under the rear bumper on both sides, covered with rubber curtains

Removing the power unit protection

Work is performed if it is necessary to access engine and gearbox components and assemblies from underneath the vehicle and when dismantling the subframe.
Work is carried out on an inspection duct or trestle.
From the bottom of the car...



... loosen the six bolts securing the power unit guard to the subframe using a head or a "10" wrench....

...and remove the protection.
After cleaning, fit the power unit protection in the reverse order.

Removing the front bumper mudguards

The work is carried out when replacing the shields and when removing the front bumper, fog lights, subframe, horns and adsorber (right shield).

Work is carried out on an inspection duct or trestle.
The operations are shown on the left front bumper mudguard.
From the bottom of the car...

... using a slotted screwdriver, loosen the spacer screw of the shield to fender liner fastener.

Take out the piston.

By prying off the edge of the shield with a screwdriver.....

...remove the pistons securing the shield to the subframe.

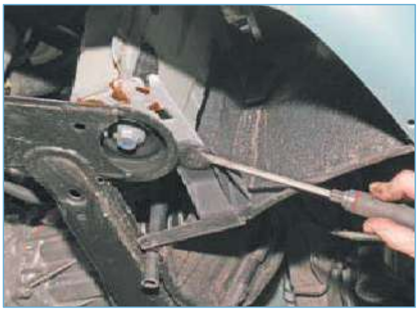
Use a Torx T-20 wrench to loosen the three self-tapping screws....

...and remove the front bumper mudguard.
Remove the right-hand mudguard in the same way.
The pistons and their spacer screws should be rinsed in water for reuse.
After cleaning, install the mudguards in reverse order.

Removing the engine compartment mudguards

The shields must be removed for replacement and when dismantling the front suspension arms and subframe. The right mudguard must be removed when replacing auxiliary power unit and timing belts, adjusting thermal clearances in the valve train (engine 1.4-1.6 (8V)).
The work is carried out on an inspection trolley or trestle.

The operations are shown on the left engine compartment plate. Remove the wheel.
Removing the left mud guard-
Front bumper (see "Removing the front bumper")
front bumper mudguards", p. 283).



Use a screwdriver to pry up and remove the piston for the lower attachment of the mudguard and underfender from the bodywork opening.

Unscrew the piston of the upper shield fastener.

Remove the left engine compartment mudguard.

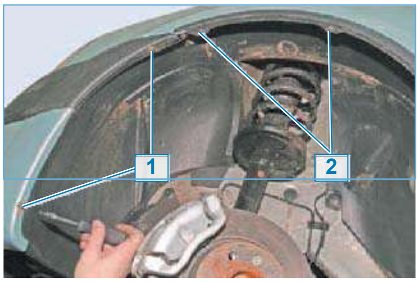
Remove the right-hand mudguard in the engine compartment in the same way. Clean the pistons and the mudguards. Install the engine compartment mudguards in the reverse order.

Removing mudguards and fenders front wheels

Remove fenders and mudguards for replacement and anti-corrosion treatment of the bodywork.
The work is carried out on an inspection trolley or trestle.
We show the operations on the underfender and mudguard of the left wheel.
Remove wheel and left front bumper mudguard (see "Removing the front bumper mudguards", page 283).

Use a screwdriver to pry the piston for the lower attachment of the engine compartment mudguard and underfender out of the hole in the body.

Bend off the edge of the engine compartment mudguard and pull out the underfender from underneath.



Use a Torx T-20 wrench to loosen the two long self-tapping screws 1 securing the wing to the bumper and the two short self-tapping screws 2

Use a slotted screwdriver to loosen the piston of the lower wing sub mount.

Using a screwdriver, remove the upper fender liner mounting piston.

Use a Torx T-20 wrench to loosen the two self-tapping screws securing the mudguard.

Use a Torx T-30 wrench to loosen the mudguard mounting screw.

Use a slotted screwdriver to loosen the two pistons securing the mudguard and fender liner, remove the mudguard....

...and the fender.

Remove underfender and right wheel mudguard in the same way.

Install the underfenders in reverse order.

Removing the rear wheel underfenders

The work is carried out for replacing the under wing and for removing the rear bumper and bodywork corrosion protection.

The work is shown on the Logan. Removing the rear underfenders on Sandero and Sandero Stepway (see "Removing the rear bumper on Sandero and Sandero Stepway", page 288).

The operations are shown on the left rear wheel underfender. Remove the wheel well.

In the wheel arch...

Using a Torx T-20 wrench, loosen the upper and lower self-tapping screws on the fender liner.

Use a slotted screwdriver to loosen the two plastic nuts securing the fender liner.

The nuts are screwed onto studs welded to the body.

Take off the fender liner.

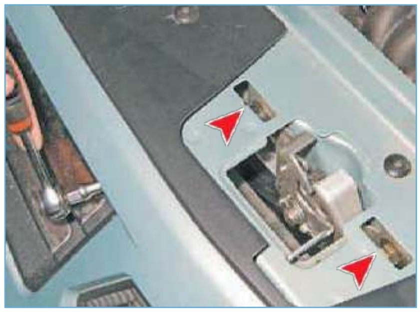
The right wheel underfender can be removed in the same way.

Install the rear fender flaps in reverse order.

Removing the hood lock and lock actuator cable

The hood lock is removed to replace the spring and cable of the lock actuator as well as the lock itself. Remove the lock cable to replace it if it breaks or if the cable is stuck in the bracket.

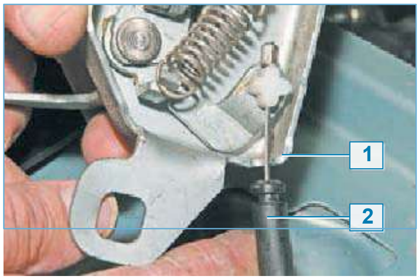
Before removing the lock, mark its position in relation to the upper cross member of the radiator frame with a marker.



Unscrew the two nuts securing the lock through the upper openings in the radiator shell using a 13" head with a knurled joint.

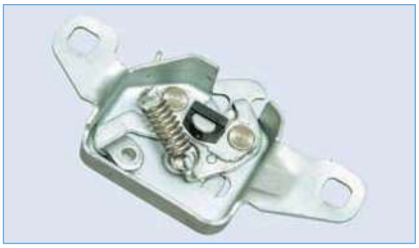
Pull the cable out of the two plastic holders.

After removing the lock from the studs on the upper radiator frame cross member, remove the lock through the hole in the cross member.



Take out the tip 2 of the cable sheath from the slot 1 in the lock body. Use pliers to remove the lock spring. Squeeze the lugs of the cable holder....

lock lever and remove the lock.



Hood lock

Устанавливаем замок капота в обратной последовательности.
When installing the lock, orient it according to the marks previously made.
When closing the hood, make sure that it rests evenly on all sides against the other body parts. Otherwise...

...by loosening the latch nuts....

... move it in the desired direction to the right-left and up and down. Lightly tighten the lock nuts and check the fit of the cover again. When adjustment is complete, tighten the lock nuts. To remove the lock cable, remove the lock as shown above.
Unscrew the two nuts securing the air conditioning expansion tank (see "Removing the expansion tank", page 129) and set the tank aside.

Pulling the cable sheath out of the holder-of the body.
In the interior of the car...

...using a Torx T-20 wrench, loosen the self-tapping screw securing the hood opening handle (dashboard removed for clarity).

Remove the hood handle.

Pull the plastic bushing of the cable sheath out of the rubber grommet on the front shield and pull the cable out into the passenger compartment.
Install hood lock actuator cable in reverse order.

Withdrawal front bumper on the Logan

The work is performed when repairing and replacing the front bumper and removing the headlamp assembly.
Work with an assistant. Remove the mudguards of the front bumper (see "Removing the mudguards").
guards Remove
the front bumper mudguards (see "Removing the front bumper mudguards", page 283).
Unscrew self-tapping screws securing front wheel underfenders to bumper (see "Removing front wheel underfenders and mudguards", page 284).
On the left side...

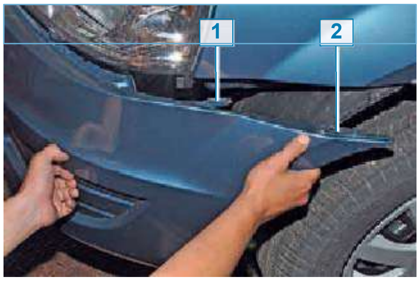
...disconnect the fog lamp wiring harness from the wiring harness.
On each side of the bumper...

...loosen the screws of its side fasteners one at a time with a Togh T-30 wrench.
From the bottom of the car...

...Using a Torkh T-30 wrench, loosen the three screws securing the bumper to the subframe.
Opening the hood...

... Use the same wrench to loosen the four screws securing the bumper to the upper cross member of the radiator frame.

Location of the bumper mounting screws to the upper cross member of the radiator frame



Push the left side of the bumper so that guide 1 is out of contact with the fender and pin 2 is out of the hole in the fender.
Similar actions are performed on the right side of the bumper.

Remove the front bumper with a helper.
Install the front bumper in reverse order.

Removing the front bumper on Sandero and Sandero Stepway cars

The work is performed when repairing and replacing the front bumper and removing the headlamp assembly.
The work must be carried out with an assistant. Remove the mudguards of the front bumper (see "Removing the mudguards"). guards Remove the front bumper mudguards (see "Removing the front bumper mudguards", page 283).
Remove the self-tapping screws securing the front wheel underfenders to the bumper (see "Removing the front wheel underfenders and mudguards", page 284). Under the

The front bumper (similar to Logan, see "Removing the front bumper on Logan", page 286). "Remove the front bumper on the Logan, page 286).

hood, detach the front bumper from the upper body cross member and from underneath from the underfender.

Insert a screwdriver into the gap between the front fender and the right side of the bumper (it is better if the screwdriver tip is slightly bent) and press the three teeth of the plastic holder on the front fender out of the grooves of the bumper side....

...and disengage the right-hand side of the bumper from the plastic holder.

In the photo, the white marks on the plastic holder show the approximate position of the holder teeth.

Similarly, unclip and unhook the left-hand side of the bumper from the plastic holder.

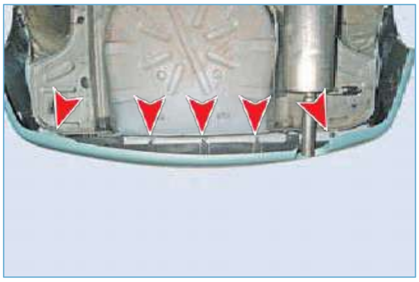
helper. Installing front bumper in reverse order.

Removing the rear bumper on a Logan

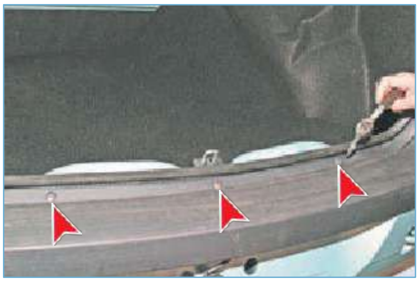
The work is carried out when repairing and replacing the rear bumper.
The work is carried out with a helper.
The work is carried out when repairing and replacing the rear bumper.
Remove the license plate light (see "Removing the license plate light, replacing the bulb", page 264).
Remove the rear wheel underfenders (see "Removing the rear wheel underfenders", page 285).
In the arch of the left rear tire ...

...unscrew the rear bumper mounting bolt with a "10" head.

the body, disengaging the clips located on the body from the bumper. Disconnect the bumper mount on the right side in the same way.



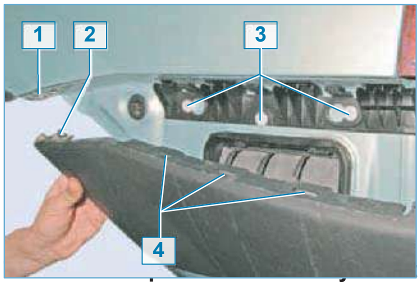
Unscrew the five bolts of the lower bumper mounting with a 10" head. After opening the trunk lid...



...using a Torx T-30 wrench, loosen the three screws of the upper mounting of the bumper quill.

Remove the rear bumper with a helper.

Clean dirt from the bumper and its attachment points to the body. Install the rear bumper in reverse order.



engage in the grooves 4 of the bumper and the pin 2 on the bumper must engage in the hole 1 in the body.

Removing the rear bumper on Sandero and Sandero Stepway cars

The work is carried out when repairing and replacing the rear bumper.
The work should be performed with an assistant. The operations for removing the rear bumper are shown on the Sandero Stepway, on the Sandero the operations are similar.
Remove the license plate light (see "Removing the license plate light, replacing the bulb", page 264).
In the arch of the left rear tire ...

...Using a Torx T-20 wrench, loosen the three screws securing the rear wheel underfender to the bumper shell.

Use a slotted screwdriver to loosen the two plastic nuts securing the fender to the body.

Location of the two fender liner mounting nuts.

Use a Torx T-20 wrench to loosen the screw securing the wing liner to the rear bumper.

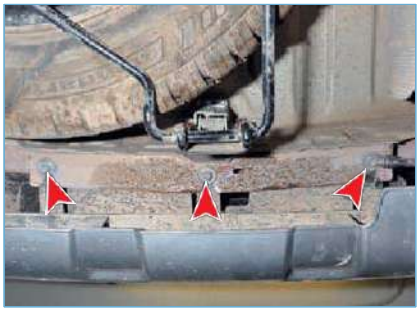
...and remove the underfender in the left rear wheel arch.

In the same way remove the underfender in the right rear wheel arch.

Open the luggage compartment door...

...and using a Torx T-30 wrench, loosen the four screws securing the rear bumper to the body.

From the bottom of the car...



...loosen the three bolts securing the bumper to the body with a "10" head.

Use a Torx T-20 wrench to loosen one screw on each side of the bumper to reinforcement.

Remove the tail lights (see "Removing the tail light, replacing bulbs on Sandero and Sandero Stepway", page 263).

Use a screwdriver to unscrew the piston retainer....

... and remove the piston from the hole. Remove the piston from the other side in the same way.

Insert a screwdriver into the gap between the rear fender and the left side of the bumper (it is better if the end of the screwdriver is slightly bent) and press the three teeth of the plastic holder out of the grooves of the side of the bumper....

...and pull the left side of the bumper-feather away from the body, taking the three grooves of the bumper-feather out of engagement with the clips of the plastic holder.

Supporting the left side of the bumper, pull the right side of the

bumper away from the body and remove it.

Install the rear bumper in the reverse order.

Removing the front door trim

The work is performed when repairing or replacing the exterior mirror, electric window elevator, door lock, exterior and interior door handles, replacing door glass.
The operations are shown on the driver's door.

Use a screwdriver to pry...

...and pull back the speaker cover.

Use a Torx T-20 wrench to loosen the four self-tapping screws securing the speaker to the door trim.

After releasing the two catches, remove the speaker from the recess in the door trim.

By pushing down on the catch....

...disconnect the wiring harness from the speaker.

Use a Torx T-20 wrench to loosen the upholstery fastening screw on the door end.

Use a screwdriver to pry off the plug in the armrest....

...and fold it back.

Use a Torx T-20 wrench to unscrew the fastening screw in the opening of the underbody.

Use a Torx T-30 wrench to loosen the screw securing the inner door handle.

Remove the inner handle from the opening in the upholstery.

...and remove the inner handle by pulling the rod out of the handle lever hole.

Use a screwdriver to pry off the lower edge of the armrest trim.

...and after overcoming the resistance of the retainers, remove it.

Use a Torx T-30 wrench to loosen the armrest mounting screw.

With a rag under the screwdriver, unlatch the upholstery from the inner panel of the door, disengaging the 11 pistons.

Pull the exterior mirror joystick out of the opening in the upholstery.

Lift up the upholstery, remove the door lock button from the hole in the upholstery and remove the upholstery.

Location of the pistons on the door trim.

Install the front door trim in reverse order.

Removing the exterior rear view mirror

The work is carried out when repairing or replacing the mirror.

The operations are shown on the left mirror.

Vehicle with mechanically adjustable exterior mirror

Remove the front door trim (see "Removing the front door trim", page 290).

Remove the gasket from the joystick.

Remove the foam gasket from the hole in the door.

Unscrew the two self-tapping screws securing the exterior mirror to the door using a Torx T-20 wrench or an 8" socket.

Remove the exterior mirror.

The mirror base is sealed on the outside with a rubber gasket.
It is not necessary to remove the mirror from the vehicle to replace the mirror element.
To remove the mirror element...

...turn it as shown in the photo and, inserting the slotted spindle into the resulting gap, release 2-3 clips of the element base (eight in total)....

...and remove the mirror element from the housing.
Reassemble and install the exterior mirror in reverse order.

Vehicle with electrically operated exterior mirror

Remove the front door trim (see "Removing the front door trim", page 290).

By pushing down on the catch....

... disconnect the wiring harness from the exterior mirror wiring harness.

By pressing the locking mechanism with a screwdriver....

...remove the mirror wiring harness from the holder on the door.

Remove the foam gasket from the hole in the door and remove it by passing the water through the hole in the gasket.

Unscrew the two self-tapping screws securing the exterior mirror to the door with a Torx T-20 wrench or an 8" socket.

Remove the exterior mirror by pulling its wiring harness from the hole in the door. To remove the mirror element...

...turn it as shown in the photo and, inserting the slotted spindle into the resulting gap, release 2-3 clips of the element base (eight in total)....

... and pull the element away from the mirror housing.

Remove the wire lugs from the contacts of the mirror element and remove it.

Reassemble and install the exterior mirror in reverse order.

Removing the front door glass

The work is carried out when replacing the door glass.

Remove the front door trim (see "Removing the front door trim", page 290).

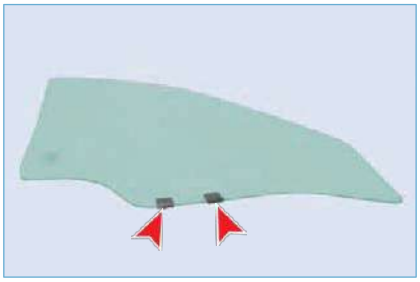
Remove the inner glass seal.

Lower the glass so that the self-tapping screws of the glass are positioned against the technological hole in the inner door panel.

Using a Torx T-20 wrench or a Torx head

"Unscrew the two self-tapping screws fixing the glass to the slider of the glass elevator.

Turning the glass, we take it out of the door.



Two plastic holders are mounted on the glass.

If the door glass is broken, clear the door cavity of debris.

You should also remove the glass seal from the door frame for better shatter removal.

The plastic holders must be replaced on the new glass.

Install the front door glass in reverse order.

Removing the front door power window mechanism

The work is carried out to replace the power window.

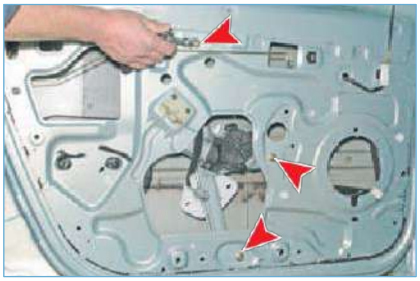
Disconnect the lead terminal from the negative terminal of the battery.

Remove the front door trim (see "Removing the front door trim", page 290).

Unscrew the self-tapping screws securing the glass to the power window slider (see "Removing the front door glass").

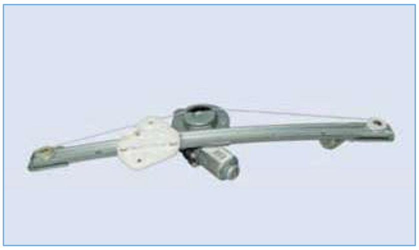
Lift the glass by hand and secure it with insulation tape or tape.

Press the wire harness lock and disconnect the harness from the power window motor.



Unscrew three nuts of the glass-lift mechanism fastening with a "10" nut.

mechanism through the opening in the inner door panel.



Power window mechanism

Install the power window mechanism in reverse order.

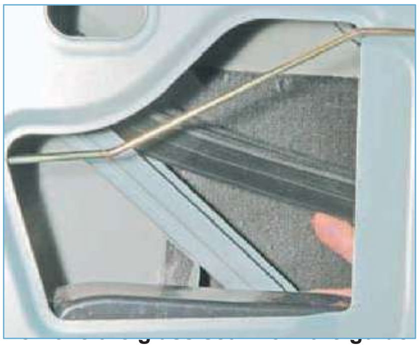
Lock removal and the outside front door handle

The work is carried out when replacing the lock and the outside handle.

The operations are shown on the driver's door. The right-hand door lock and handle are removed in the same way.

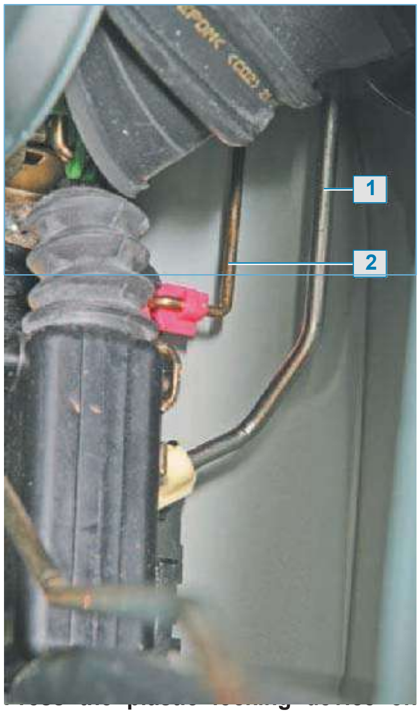
Remove the door trim (see "Removing the front door trim", page 290).

Use a Torx T-30 wrench to loosen the screw securing the lower glass guide.



Insert the guide through the technical hole in the inner door panel.

... and remove the lower glass guide.

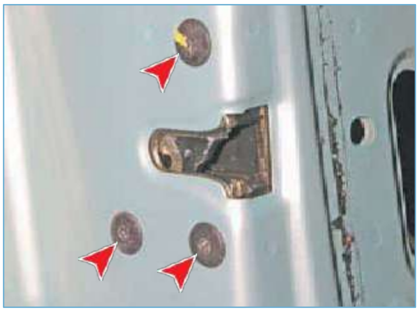


the pull rod 1 of the outside handle, turn it around and disengage the pull rod from the lock.

Disconnect link 2 of the lock cylinder mechanism in the same way.

Turn the lock button link so that the tab on the link engages in the slot in the locking mechanism.

...and remove the pull rod with the button.



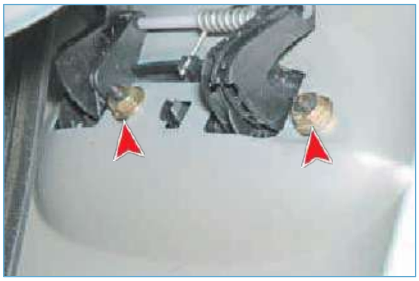
Use a Torx T-30 wrench to loosen the three screws securing the lock....

... and withdraw the lock through the technological opening in the inner panel of the door.

Disconnect the wiring harness and remove the lock and actuator assembly.

If necessary, disconnect the inner door handle link from the lock and remove the electric lock actuator. These operations are the same as for the tailgate lock (see "Removing the tailgate lock and tailgate handle", page 300).

Install the front door lock in reverse order. To remove the outer door handle, remove the lower glass guide and disconnect the outer door handle link from the lock (see above).



Unscrew the two nuts securing the outer handle with a "10" nut.

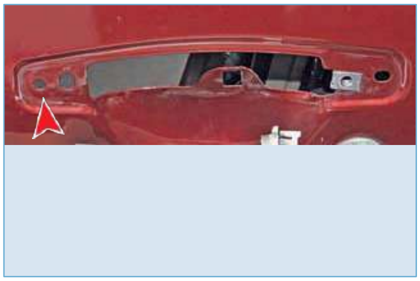
Remove the outer door handle with the pull rod, overcoming the resistance of two latches.

On Sandero and Sandero Stepway vehicles, to remove the exterior door handle,...

...using a Torx T-20 wrench, loosen the rear handle base mounting screw....

...and pull it out of the hole.

Unscrew the nut for the front attachment of the handle base on the inside of the door using a 10 mm socket.



Hole for the front attachment of the handle base.

Remove handle with linkage. Install the outer door handle in reverse order (for all vehicles).

To remove the cylinder mechanism of the front door lock, remove the lower window guide and disconnect the cylinder link from the lock (see above).

Use a screwdriver to pry off the lock cylinder bracket.

...and remove the bracket.

Remove the lock cylinder mechanism with pull rod from the hole in the door. Install cylinder Install the lock cylinder mechanism with rod in reverse order, with the plastic lever 1 facing the rear of the door.

Removing the tailgate trim on the Logan vehicle

The work is carried out when repairing or replacing the window elevator, door lock, outer and inner door handles, glass replacement.

The operations are shown on a vehicle with manual windows. On a vehicle equipped with power windows, the operations for removing the door trim are the same, except that there is no operation for removing the window handle.

Remove the window elevator handle by overcoming the resistance of the rod retainer.

Use a Torx T-30 wrench to loosen the screw securing the inner door handle.

Remove the inner handle by pulling the rod out of the handle lever hole.

Use a Torx T-20 wrench to loosen the upholstery fastening screw located in the door armrest.

Remove the door lock button trim from the door trim.

Push the upholstery away from the door, disengaging the nine pistons.

Location of the pistons on the door trim.

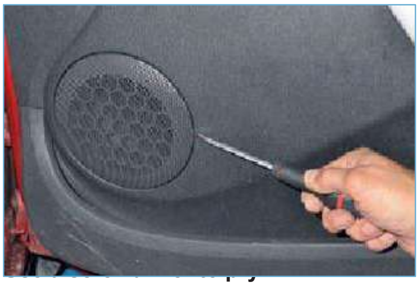
Lift up the upholstery, remove the door lock button from the hole in the upholstery and remove the upholstery.

Install the tailgate trim in reverse order.

Removing the tailgate trim on Sandero and Sandero Stepway vehicles

The work is carried out when repairing or replacing the window elevator, door lock, outer and inner door handles, glass replacement.

The operations are shown on a vehicle with manual windows. On a vehicle equipped with power windows, the operations for removing the door trim are the same, except that there is no operation for removing the window handle.



...and pull back the speaker cover.

Use a Torx T-20 wrench to loosen the four self-tapping screws securing the speaker to the door trim.

By releasing the two latches.....

...remove speaker from the recess in the door trim.

y pushing down on the catch....

...disconnect the wiring harness from the speaker.

Use a Torx T-20 wrench to loosen the upholstery fastening screw located in the door armrest.

Use a Torx T-30 wrench to loosen the screw securing the inner door handle.

g up with a screwdriver...

...remove the inner handle by pulling the rod out of the hole in the handle lever.

Push the upholstery away from the door, disengaging the nine pistons.

Lift up the upholstery and remove the door lock button from the hole in the upholstery.

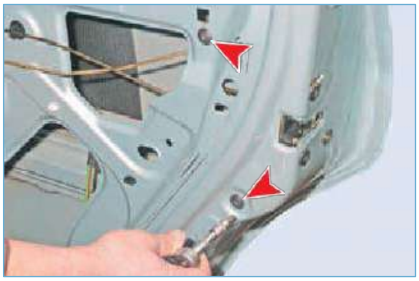
...and remove the upholstery.
Install the tailgate trim in reverse order.

Removing the tailgate glass on a Logan

The work is carried out when replacing the door glass.
Remove the door trim (see "Removing the tailgate trim on Logan, page 296").

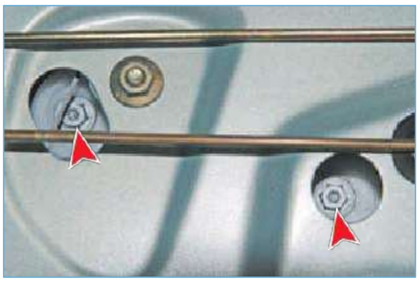
Remove the inner glass seal.

Take out seal from the lower glass guide.



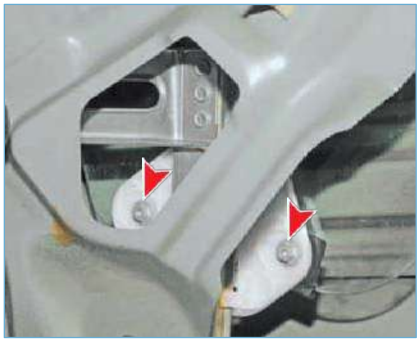
Use a Torx T-30 wrench to loosen the two screws securing the lower glass guide.

Remove the lower glass guide through the access hole in the inner door panel.
On a vehicle with power windows.

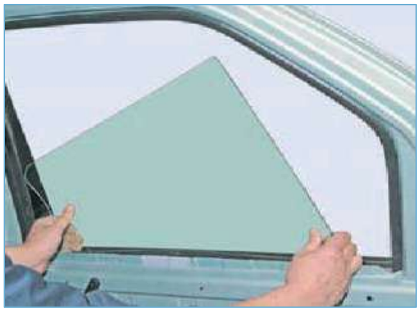


... lower the glass so that the self-tapping screws of the glass fasteners are against the holes in the inner door panel.

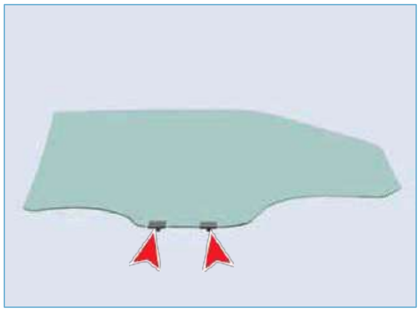
Unscrew the two self-tapping screws securing the glass to the glass slider with a Torx T-20 or a Torx T-20 wrench.
On vehicles with manual window lifters, place the window elevator handle on the axle and lower the window so that...



... so that the self-tapping screws of the glass fixing are positioned against the holes in the inner panel of the door.
Using a Torx T-20 or a Torx T-20 wrench, unscrew the two self-tapping screws securing the glass to the glass-lift slider.



Turning the glass, we take it out of the door.



Two holders are mounted on the glass.
Install the rear door glass in reverse order.

Removing the tailgate windows on Sandero and Sandero Stepway vehicles

The work is carried out when replacing the door glass.

Remove the tailgate trim (see "Removing the tailgate trim on Sandero and Sandero Stepway", page 296).

To remove the fixed glass ...

...remove the inner seal

of glass.

Unscrew the bolt securing the glass guide with a "8" head.

Move the guide down into the interior of the door.....

... and remove it through the access hole in the inner panel of the door.

By turning the fixed glass toward the side of the window.....

...remove the fixed glass.

To remove the windshield, it is necessary to

the fixed glass (see above), after which.....

... press the power window elevator button and lower the window so that the self-tapping screws of the glass holder to the slide are against the holes in the inner door panel.

On vehicles with manual window lifters, place the window elevator handle on the axle and lower the window.

Unscrew the two self-tapping screws securing the glass to the power window slide with a head "for 8".

Turning the glass, we take it out of the door.

Install the windows in the reverse order.

Removing the window elevator mechanism rear door

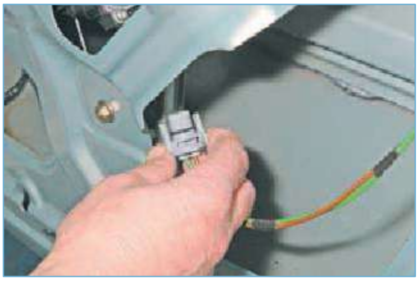
must be removed

The work is carried out when replacing the power window mechanism.

Remove the rear door trim. Unscrew the self-tapping screws securing the glass to the glass slider.

Lift the glass with your hands and secure it to the door frame with insulation tape or tape.

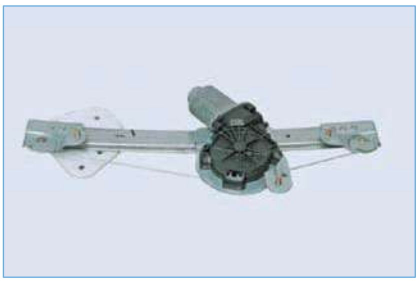
On a vehicle with power windows.



... by pressing the catch, disconnect the wiring harness from the power window.

Unscrew three nuts of the glass-lift mechanism fastening with a "10" nut.

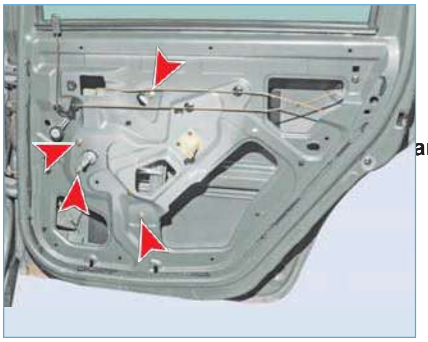
Remove the power window mechanism through the opening in the inner door panel.



Rear door power window mechanism

When dismantling the window elevator mechanism on a vehicle with manual windows, remove the...

...foam gasket from the handle shaft.



Unscrew the four nuts securing the window elevator mechanism with a 10 mm socket.

After turning the window lift mechanism in the door cavity, remove it through the technological opening in the inner door panel.

Install the tailgate window elevator mechanism in reverse order. Use a hand or electric tool to guide the slider to the mounting hole for securing the glass.

Lock removal and the outside rear door handle

The work is carried out when replacing the lock and outer door handle.

To remove the tailgate lock, remove the door trim and lower glass guide.

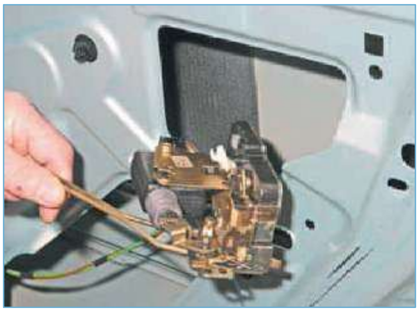
Squeeze the four lobes of the pro- lever axis....

and

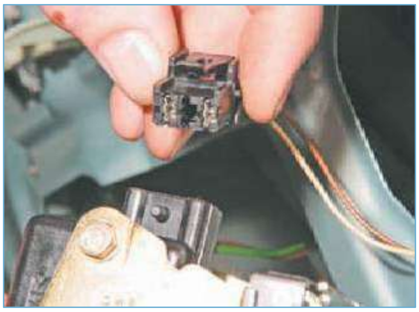
Remove the inner handle link and the locking link from the holders.

Disconnect the outer handle rod from the lock by turning the catch.

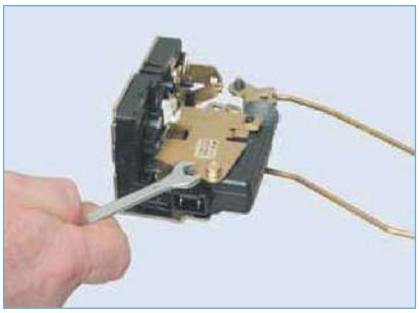
Use a Torx T-30 wrench to loosen the three screws securing the lock.



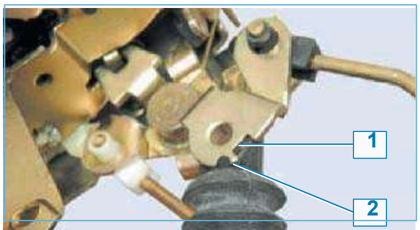
Remove the lock and actuator assembly through the opening in the inner door panel.



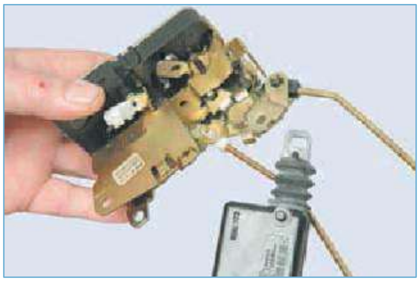
Disconnect the cable clamp from the lock actuator and remove the lock and actuator assembly.



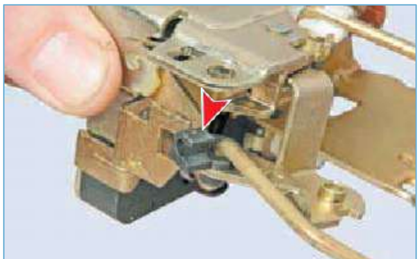
Use an 8 mm spanner to loosen the actuator mounting screw.



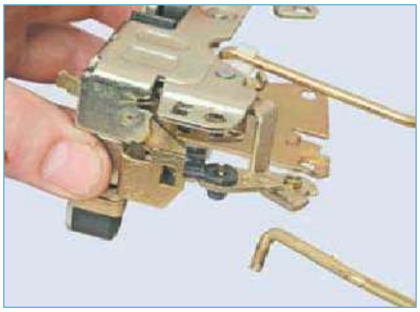
Turn the actuator so that the tab on the actuator stem 2 fits into slot 1 on the lock lever....



...and remove the actuator.



Turn the plastic catch to release the locking rod.



...and disconnect the rod from the locking lever.

Disconnect the inner handle rod from the lock in the same way.

Install the tailgate lock in reverse order.

To remove the tailgate outer handle, remove the tailgate trim and disconnect the outer handle pull rod from the lock (see above).

Loosen the two nuts securing the outer handle to the tailgate using a 10 mm open-end wrench.

... and remove the outside handle.

Reinstall the outside handle in reverse order.

The tailgate outer handle on Sandero and Sandero Stepway vehicles can be removed in the same way as the front door outer handle on these vehicles (see "Removing the front door lock and outer handle", page 294).

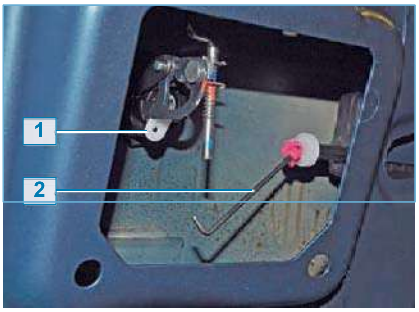
Removing the trunk lid lock on a Logan vehicle

The work is performed when replacing the trunk lid lock.

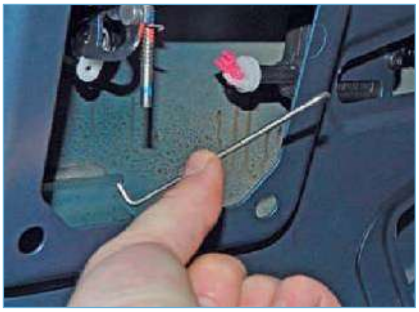
To remove the lock...

...press the two latches on the dome cover.....

...and take it off.



Remove the rod 1 of the electric trunk lid opening actuator from the hole in the lever 2 of the lock cylinder mechanism.



After releasing the catch, remove the rod from the opening of the trunk lid electric opening lever.

Use a Torx T-20 wrench to loosen the socket securing the electric trunk lid opener.

Use a screwdriver to remove the tapered lock washer from the pin of the electric trunk lid opener.

Slide the electric trunk lid opener towards the opening in the inner panel of the trunk lid.

By pushing down on the catch....

...disconnect the wiring harness from the electric trunk lid opener.

Use a Torx T-30 wrench to loosen the two screws securing the lock.

Remove the lock from the luggage cover.

...and by disconnecting the pull rod, remove the lock.

Turn the retaining ring counterclockwise so that the two lugs on the cylinder body fit into the slots of the ring....

...and remove the ring (for clarity, shown with the cylinder mechanism removed).

Remove the lock cylinder mechanism from the trunk lid.

Electrically operated trunk lid lock assembly.

Install the lock cylinder mechanism in reverse order.

Removing the luggage compartment door lock on Sandero and Sandero Stepway vehicles

Lift the load compartment door.

Use a Phillips screwdriver to loosen the two self-tapping screws in the upholstery recess.

Press the load compartment door trim away from the inner door panel, overcoming the resistance of the six catches....

...and take it off.

Further operations to remove the lock are the same as for Logan (see "Removing the trunk lid lock on Logan", page 301).

Install the luggage compartment door lock and trim in reverse order.

Removing the floor tunnel lining

Work to remove the power window switches on the rear doors, electric exterior mirror regulator, cigarette lighter, parking brake lever and to adjust the parking brake.

Use a screwdriver to open the cover at the rear of the floor tunnel liner (driver's seat removed for clarity).

Use a Torx T-20 wrench to loosen the rear trim fastening screws.

Remove the rear part of the floor tunnel liner from the parking brake lever.

Disconnect the wiring harnesses from the rear window switches.

... and from the power mirror controller and the power window lock switch on the rear doors.

Unscrew the nut securing the front part of the floor tunnel lining with a 10 mm socket.

Remove the gear lever cover from the opening in the cladding.

Using a Torx T-20 wrench, loosen the two self-tapping screws securing the front part of the floor tunnel liner in the cupholder recess.

Use a Torx T-20 wrench to loosen one self-tapping screw on each side of the side fasteners on the front part of the floor tunnel liner.

Remove the cover from the gear lever by pushing the lever blade into the opening in the cover.

By pushing down on the catch....

...disconnect the wiring harness from the cigarette lighter socket and remove the front part of the floor tunnel liner.

Install both parts of the floor tunnel liner in reverse order.

Removing the instrument panel

The work is performed when dismantling the heater, heater fan and replacing the wiring harness. The operations are performed on a vehicle equipped with two airbags. Disconnect the wire terminal from the "minus" terminal of the battery. Remove steering wheel (see "Removing the steering wheel", page 215). Remove paddle shifters together with connector (see "Removing the paddle shifters and switch coupler with spiral cable bar", page 267). Remove the instrument cluster (see "Removing the instrument cluster", page 276). Disconnect wiring harness from ignition switch and immobilizer coil (see "Replacing the immobilizer coil and ignition switch", page 247). Remove the floor tunnel lining (see "Removing the floor tunnel lining", page 303).

Use a Torx T-20 wrench to loosen one screw on each side of the lower attachment of the instrument panel center section to the body.

Remove the instrument panel console cover (see "Removing the switches", page 270).

Unscrew the two self-tapping screws securing the heating, ventilation and air conditioning control unit (see "Removing the heating, ventilation and air conditioning control unit", page 310) and push the unit inside the instrument panel.

On the right side, from inside the dashboard, remove the airbag wiring harnesses with the holder and pull the wiring harnesses out from under the dashboard.

By prying up and lifting the locking mechanism with a screwdriver....

... disconnect the harness harness from the airbag wiring harness.

Pull the headlight beam adjuster lever towards you to remove it.

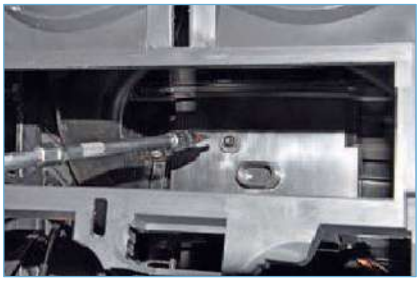
Unscrew the two self-tapping screws on the headlight beam adjuster using a Torx T-20 wrench.

Push headlight beam adjuster inside the instrument panel.

Use a screwdriver to pry off the cover of the dashboard side retaining screw.

Use a Torx T-20 wrench to loosen the dashboard side mounting screw.

Unscrew the screw on the other side of the dashboard in the same way.



Use a Torx T-20 wrench to loosen the screw for the center mounting of the instrument panel.

Overcoming the resistance of the plastic latches, unclip the left front pillar trim....

... remove the lower clips from the holes in the dashboard and remove the left front pillar trim.

Remove the right front pillar trim in the same way.

Use a Torx T-20 wrench to loosen the upper dashboard mounting screw.

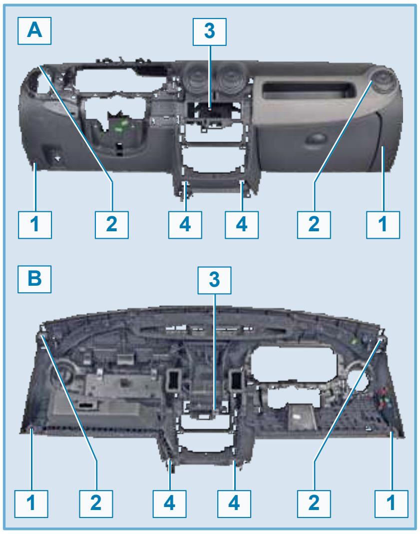
Similarly unscrew the screw on the other side of the dashboard.

Pulling back the dashboard...

...and by pressing the latch, remove the diagnostic connector from the instrument panel socket.

Remove the instrument panel from the passenger compartment.

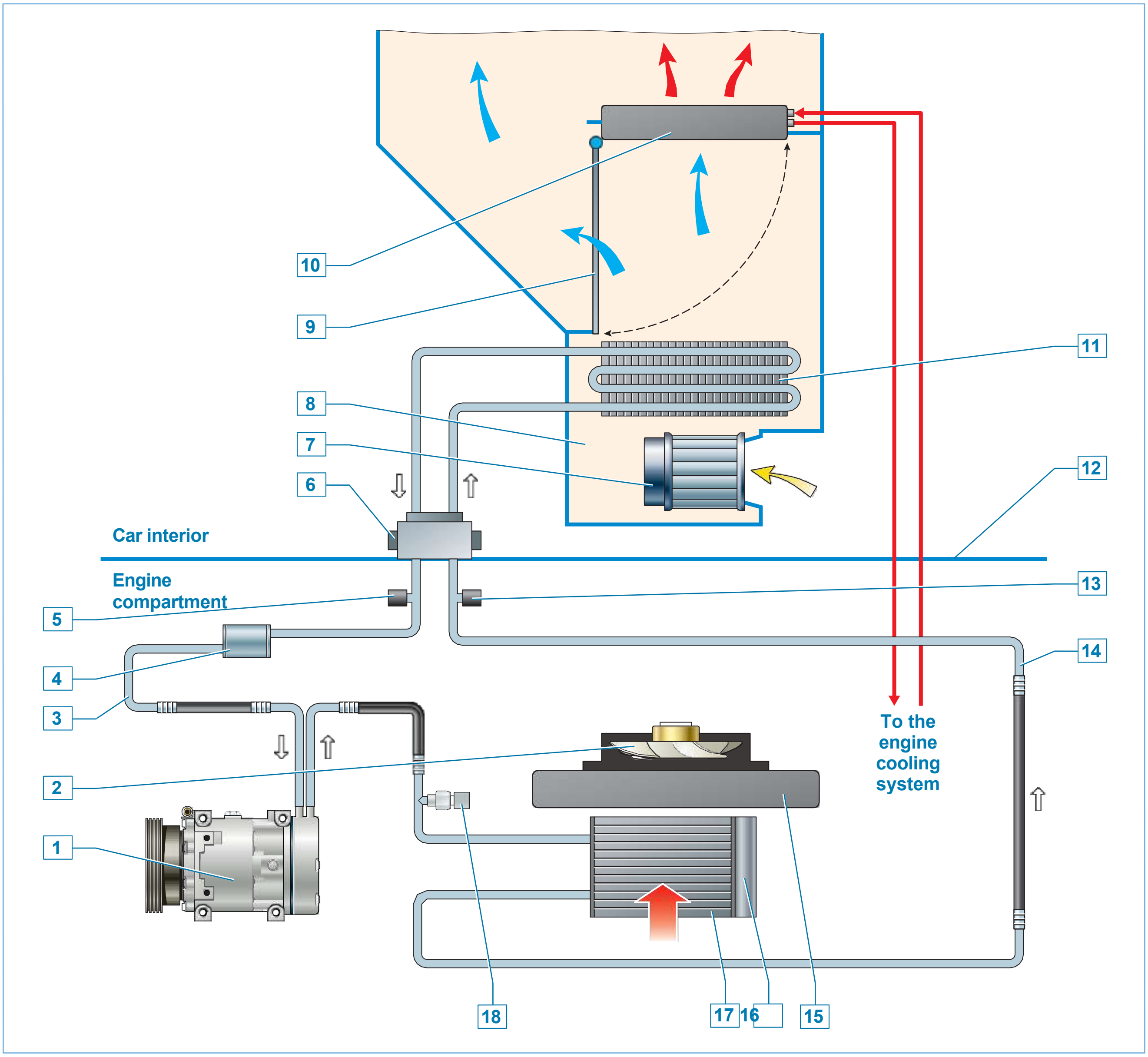
Install the instrument panel in reverse order.



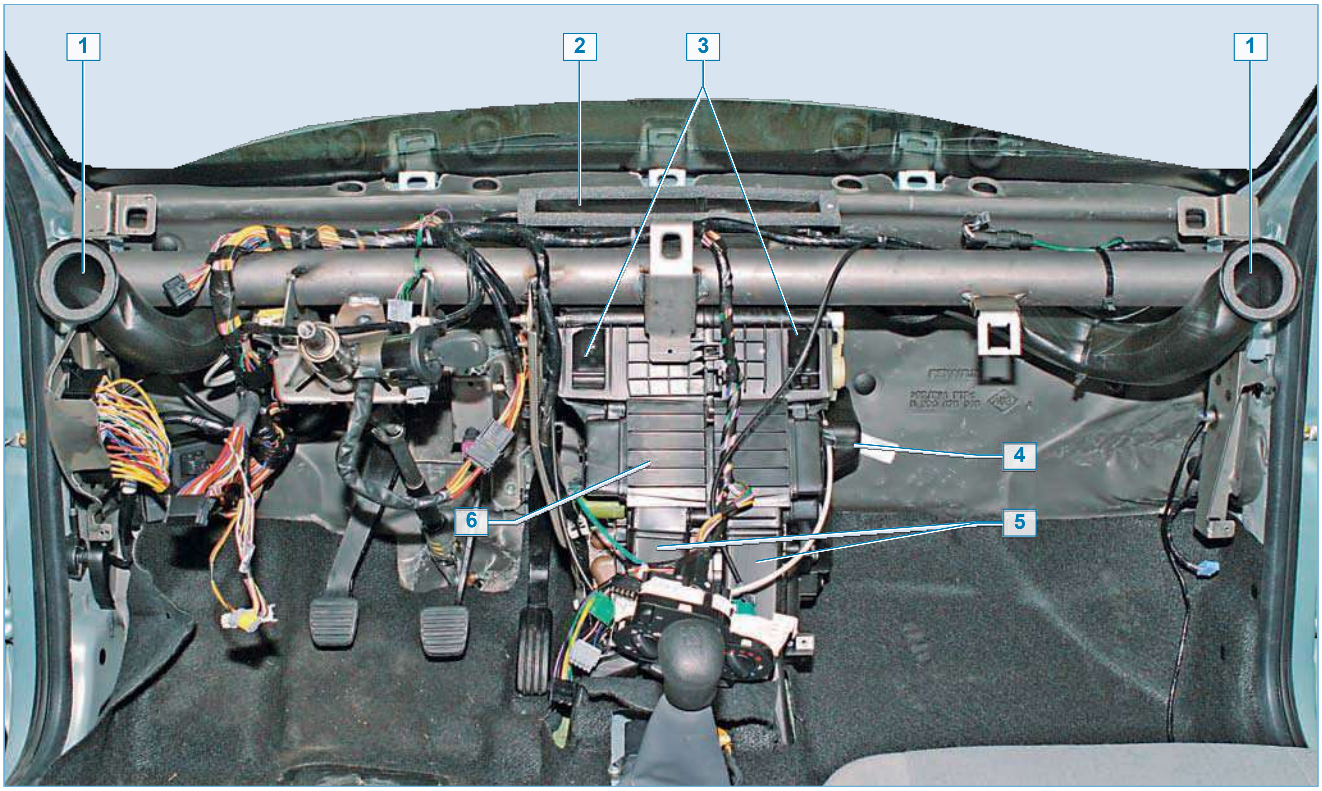
Instrument panel mounting points: 1 - side mount; **2** - top mount; **3 -** center mount; **4 -** bottom mount; (**A** - outside of instrument panel; **B** - inside of instrument panel)

Heating, ventilation and air conditioning system

Construction description



Scheme of heating, ventilation and air conditioning system: 1 - compressor; **2** - engine cooling fan; **3** - low-pressure pipeline; **4** - tank; **5** - valve for charging and releasing refrigerant from the low-pressure pipeline; **6** - reducer; **7** - heater fan; **8** - heater housing; **9** - temperature regulator flap; **10** - heater radiator; **11** - evaporator; **12** - front panel; **13** - valve for charging and releasing refrigerant from the high-pressure pipeline; **14** - high-pressure pipeline; **15** - engine cooling system radiator; **16** - receiver; **17** - condenser; **18** - refrigerant pressure sensor



Location of the heater and air ducts of the heating, ventilation and air conditioning system: **1** - air duct to the side deflector; **2** - air duct to the windshield grille; **3** - air duct to the center deflectors; **4** - heater fan electric motor; **5** - air ducts to the legs of the rear seat passengers; **6** - heater.

The vehicle can be equipped with either a heating and ventilation system or a heating, ventilation and air conditioning system, which serve to create the most comfortable conditions for the driver and passengers regardless of the yearly conditions.

The ventilation and heating system comprises: heater, heater fan, air ducts and deflectors. Air from the heater is supplied via ducts to the windshield and side window air grilles, to the center and side deflectors on the instrument panel, as well as to ventilation openings in the heater cover to supply air to the driver's and passenger's feet. The system is operated by turning the knobs located on the heating and ventilation control unit.

The control unit is mounted on the dashboard console. The control unit is mounted on the instrument panel console.

The heater is mounted under the instrument panel in the center, the air is mounted under the instrument panel cross member. The heater housing contains the heater fan, air distribution flaps that direct the air flow to specific areas and the heater radiator connected to the engine cooling system by hoses. The coolant circulates continuously through the radiator. Depending on the position of the flap associated with the temperature regulator, the outside air can pass through or bypass the heater radiator.

When the vehicle is moving, the air enters the heater through the openings in the left-hand side of the heater and the right-hand side of the front fascia trim. The heater fan is used to increase the air supply to the passenger compartment when the vehicle is moving or parked.

The intensity of the air flow is determined by the fan speed. Electric motor

Heating, ventilation and air conditioning control unit

Heater radiator

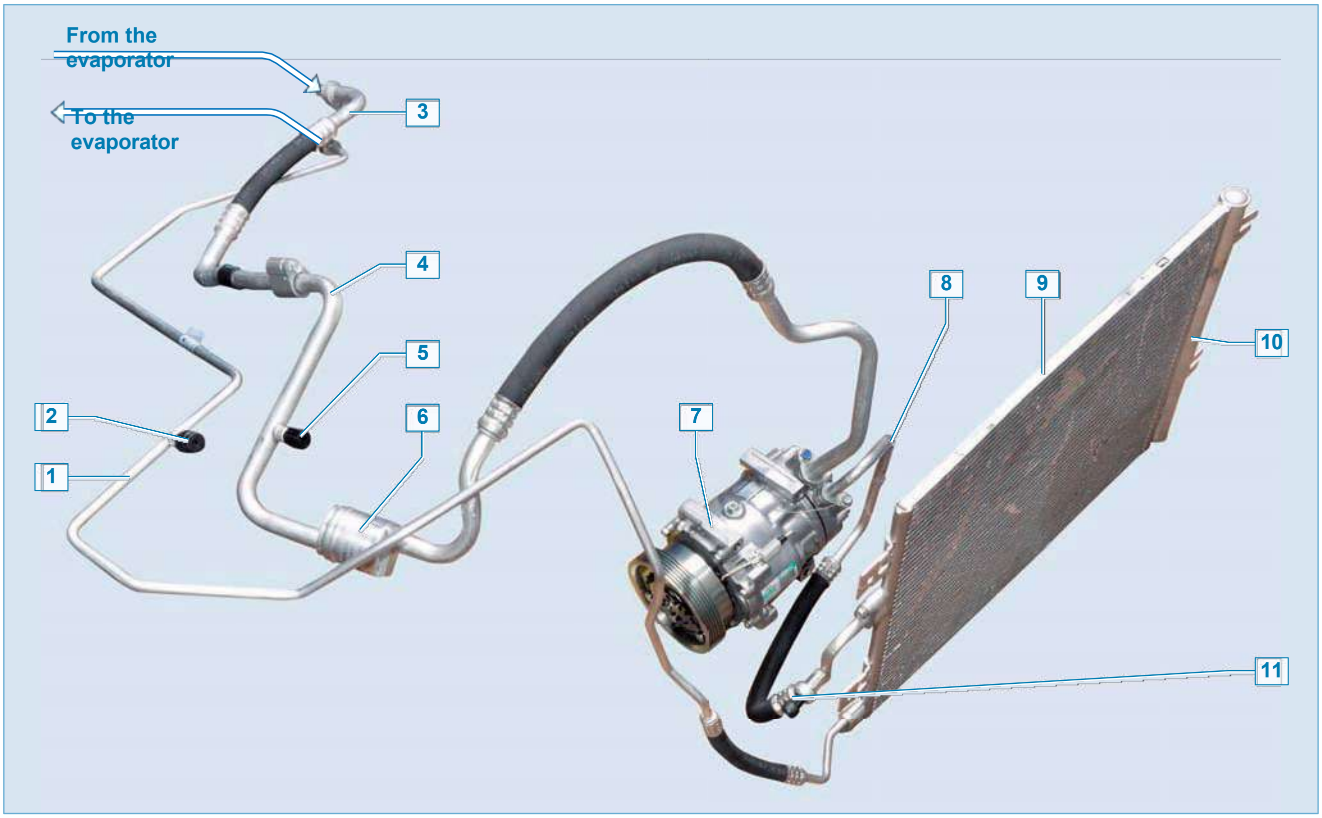
Heater fan

Cabin air outlet valves (with rear bumper removed)

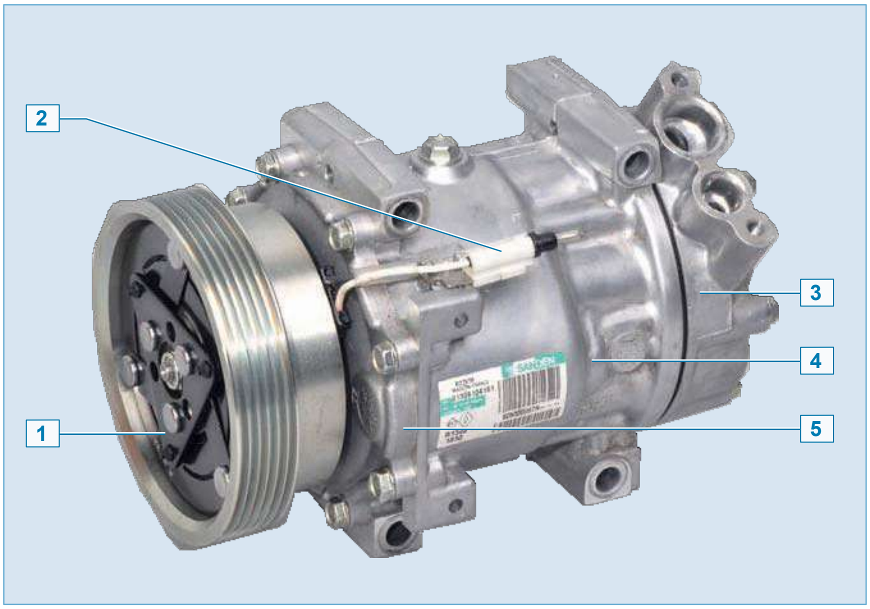
The fan can rotate at four different speeds depending on the connection of the additional resistor.
The air flow in the passenger compartment is controlled by the air flow regulator, which is linked to the flaps by rods.

By operating the flaps, the control directs the air flow through the air ducts to the center and side deflectors, to the lower air vents in the heater cowl and to the window air grilles in the instrument panel.

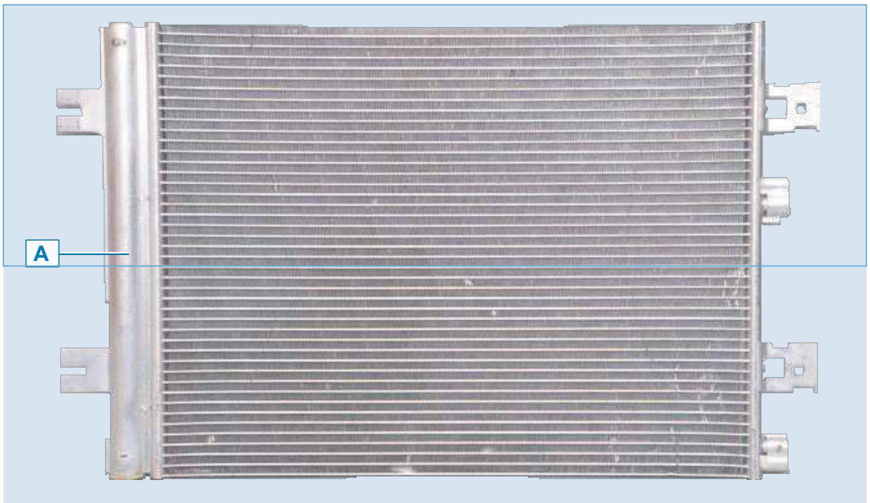
From the passenger compartment, the air is discharged through the openings on top of the load compartment sidewalls and further out through the dampers behind the rear bumper sidewalls.



Elements of air conditioning system: 1 - high-pressure pipeline; **2** - valve for charging and releasing refrigerant in high-pressure pipeline; **3** - rear part of low-pressure pipeline; **4** - front part of low-pressure pipeline; **5** - valve for charging and releasing refrigerant in low-pressure pipeline; **6** - damper; **7** - compressor; **8** - high-pressure pipeline connecting compressor and condenser; **9** - condenser; **10** - receiver; **11** - pressure sensor.



Air conditioner compressor: 1 - pulley with electromagnetic clutch; **2** - electromagnetic clutch pro-water outlet; **3** - rear cover; **4 -** housing; **5** - front cover.



Condenser. A - receiver-drier

The air recirculation system is used to accelerate the warming up of the passenger compartment and to prevent outside air from entering the passenger compartment (when driving on smoky, dusty roads). When the air recirculation lever is moved, the air recirculation flap cuts off the outside air to the passenger compartment.

The air in the vehicle interior starts to circulate in a closed circuit without exchanging with the outside air.

Some vehicles are equipped with an air conditioning system. The air conditioning system is designed to reduce the temperature and humidity in the passenger compartment. The air conditioning system is activated by pressing the switch.

The air conditioner switch located in the heating, ventilation and air conditioning control unit must be on and the heater fan must be on. When the air conditioning is switched on, the indicator light located in the air conditioning switch button illuminates.

The air conditioning compressor is mounted on the engine bracket at the front, under the alternator. The compressor compresses the refrigerant coming to it from the evaporator, which is in a vapor state at a low pressure of 0.5 - 2.0 bar. At the outlet of the air conditioning compressor, the refrigerant vapor pressure rises and the temperature reaches 80 - 100 °C. The air conditioner compressor is driven by a poly-V belt from the auxiliary drive pulley. The compressor pulley is equipped with an electromagnetic friction clutch, which connects or disconnects the compressor shaft from the pulley by signals from the engine ECU.

After the compressor, the refrigerant vapors enter the condenser located in front of the engine cooling system radiator. When the condenser plates are blown by the air flow created during driving and by the cooling system fan, the refrigerant under high pressure (15.0 - 20.0 bar) changes from gaseous to liquid state. In the left part of the condenser there is a receiver-drier. The receiver-drier is also equipped with a filter to clean the refrigerant.

From the condenser, the refrigerant enters the reducer, which is a throttle valve, at the outlet of which the pressure and temperature of the refrigerant decrease sharply (to 1.0 bar and - 7 °C respectively), as a result of which the refrigerant changes from a liquid to a gaseous state. The refrigerant then flows into the evaporator, which is located in the vaporizer.

Refrigerant pressure sensor

under the instrument panel in the heater casing. The air flow in the heater housing through the air conditioning evaporator under the influence of the heater fan causes the refrigerant to evaporate. This causes the air to become cooler, giving up heat to the refrigerant in the evaporator. The refrigerant is sucked back from the evaporator by the compressor and the operating cycle is repeated. The high and low pressure lines have valves for charging and discharging refrigerant from the air conditioning system. A refrigerant pressure sensor is installed in the line between the compressor and the condenser.
The pressure sensor gives a signal
The ECU controls the electric fan of the engine cooling system depending on the refrigerant pressure and vehicle speed.
In addition, the ECU switches off the air conditioning compressor based on the pressure sensor signals when the refrigerant pressure in the system drops to 2.0 bar and when the pressure rises to 27.0 bar. There is a shut-off valve in the pipe connection under the pressure sensor, which closes when the sensor is opened. Therefore, there will be no refrigerant leakage from the air conditioning system when the pressure sensor is replaced.
The refrigerant in the air conditioning system is highly pressurized. Avoid contact with refrigerant in the eyes, skin and respiratory system during work involving depressurization of the air conditioning system.

Any work on the refrigerant must only be carried out in a ventilated area.
When refilling the air conditioning system, use only materials recommended by the manufacturer.
Do not carry out welding or soldering work on the air conditioning system components. Repair and maintenance work on the air conditioning system must be carried out by a specialist workshop. Special equipment is used to search for leaks in the system and a special contrast agent must be injected into the system. After the refrigerant has been removed from the system, it is essential to evacuate the system to remove any residual moisture. Before refueling, the system must be filled with special oil recommended by the manufacturer.

Removing the heating, ventilation and air conditioning control unit

Remove unit to replace defective flap actuator rods and light bulb or to replace complete unit.

Remove the instrument panel console cover (see "Removing the switches", page 270).

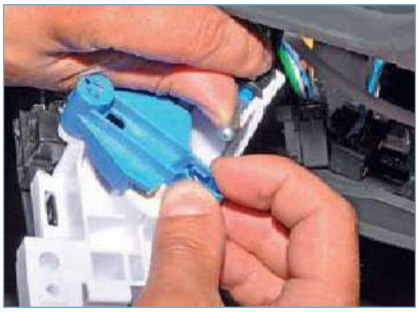
Use a Torx T-20 wrench to loosen the two self-tapping screws securing the block.

Remove the control unit from the dashboard console.

By prying up the retainer with a screwdriver....

... disconnect the harness cable

harness from the unit.



Disconnect the air temperature regulator damper rod end from the regulator section.

Use a screwdriver to remove the air temperature controller damper actuator linkage from the holder.

Pull the recirculation air damper actuator link rod sheath out of the holder.

Disconnect the recirculation air damper control rod lug from the lever.

Disconnect the air distribution flap control rod end from the regulator section.

Use a screwdriver to pry off the catch and remove the air distribution flap actuator link rod sheath from the holder.

Remove the heating, ventilation and air conditioning control unit from the instrument panel.

Turn the backlight bulb holder counterclockwise to remove it from the unit.

Remove bulb from bulb holder and replace with a new W1.2W bulb. Install the heating, ventilation and air conditioning control unit in reverse order.

Removing the heater fan

The heater fan is removed for replacement if it fails.

Remove the instrument panel (see "Removing the instrument panel", page 304).

Press the plastic catch and turn the fan counterclockwise a quarter turn....
...and remove the fan from the heater housing.

Disconnect the wiring harness from the fan motor by squeezing the catches.

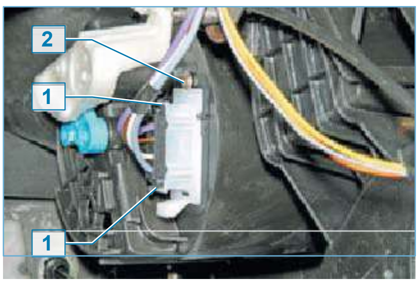
...and remove the heater fan.

Heater fan

Install the heater fan in reverse order.

Removing the heater fan auxiliary resistor

Remove the resistor for replacement if it fails.
Disconnect the wire terminal from the negative terminal of the battery. For clarity, the operations are shown with the instrument panel removed.



Press the catches 1 of the wiring harness....

...disconnect the cable from the heater fan auxiliary resistor. Use a Torx T-20 wrench to loosen screw 2 securing the resistor.

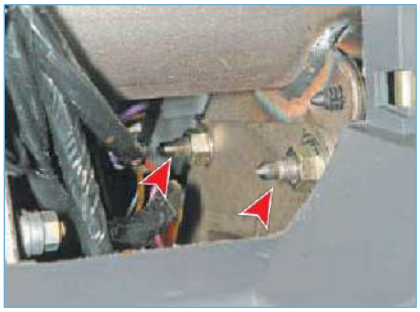
Slide the resistor upwards and remove it from the heater housing.
Install heater fan auxiliary resistor in reverse order.

Removing the heater radiator

Remove heater radiator for replacement if coolant leaks through radiator. Drain coolant (see "Changing the coolant in engine 1.4-1.6 (8V)", page 38; "Changing the engine coolant of a 1.6 (16V) engine "p. 46). Remove the instrument cluster (see "Removing the instrument cluster", page 276). Remove the floor tunnel liner (see "Removing the floor tunnel liner", page 303).
Remove the pin for securing the carpet to the cross member bracket on the left side of the console.

...and fold back the edge of the coating.

Loosen the two bolts of the lower crossbar bracket lower mounting bracket with a 13-head (for clarity, the instrument panel is removed).



Through the hole in the instrument panel (under the instrument cluster) with a wrench
Unscrew the two nuts of the upper crossbar bracket mounting bracket with a "13" torque wrench.

Remove the wiring harness from the holders on the inside of the bracket and remove the cross member bracket.

Use a Torx T-20 wrench to loosen the screw securing the heater radiator tube clamping plate.

Remove the tubes from the openings in the radiator tank.

Rubber sealing rings are fitted to the tube tips.

Use a Torx T-20 wrench to loosen the two self-tapping screws securing the radiator.

By releasing the three latches.....

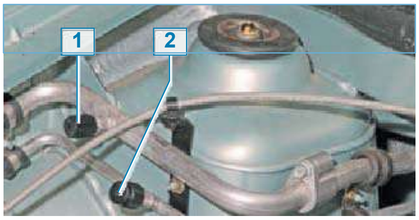
...remove the radiator from the heater housing.

Before installing the radiator, replace the rubber sealing rings on the tube ends.

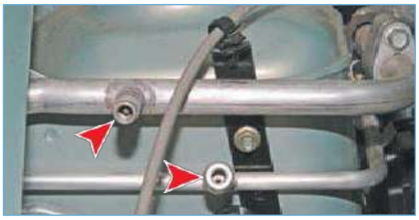
Install the heater radiator in reverse order.

Removing the air conditioner compressor

Remove the air conditioning compressor for repair or replacement or when dismantling the engine. Operation is shown on the 1.6 (8V) engine. Remove the auxiliary drive belt (see "Replacing the auxiliary drive belt on the 1.4-1.6 (8V) engine", page 32; "Replacing the auxiliary drive belt on the 1.6 (16V) engine", page 41). Remove the power train protection (see "Removing the power train protection", page 283). Before disconnecting the air conditioning system lines, the system must be discharged. If the system is discharged, the refrigerant must be evacuated.



... through the valves of the low 1 and high 2 pressure lines, which are covered with caps.

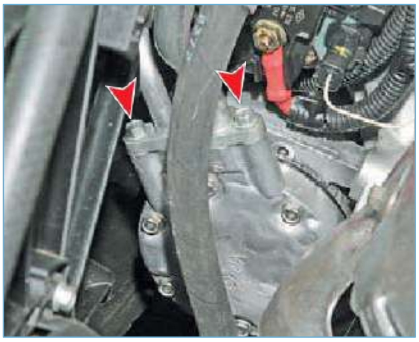


Press the valve stems with a suitable tool to release the refrigerant.

When valve replacement is necessary, the...

... with a wrench similar to the metal cap of the wheel valve,

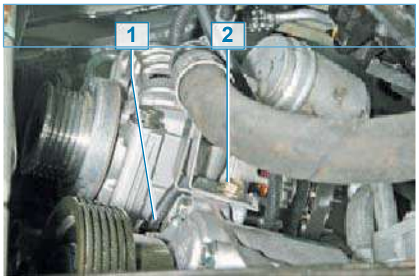
unscrew the valve from the pipe connection.
Have the air conditioning system discharged by a workshop with special equipment. The equipment is necessary for safety reasons and for determining the amount of oil that has escaped with the refrigerant.



Use a 10" socket to loosen the two bolts....

...and disconnect the high and low pressure tubes from the compressor cover.
To prevent dirt and moisture from entering the system, close the pipe openings with plugs.

Refrigerant filling and venting valve



Disconnect wire lug 1 from compressor solenoid clutch terminal and loosen bolt 2 securing high pressure hose bracket with a 10 mm head.
The difference in removing the air conditioning compressor on a vehicle with a 1.6 (16V) engine is.

...in the slightly different location of the solenoid clutch pin.

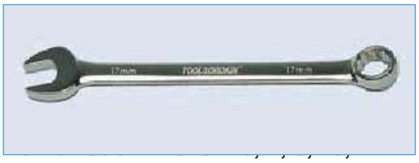
Unscrew the four compressor mounting bolts with a 13" socket (for clarity, shown on the removed engine).....

...and remove the compressor.

Before installing the compressor, replace the rubber sealing rings on the pipe lugs with new ones. Install the air conditioning compressor in reverse order. Have the system charged with refrigerant at a workshop and check the operation of the air conditioner at maximum heater fan speed.

APPENDICES.

Tools used for repair



11; 12; 13; 14; 15; 16; 17; 18; 19; 21; 22; 24; 27; 30; 32

Socket heads: 8; 10; 10 (height-(high); 11; 12; 13; 13 (high); 14; 16; 16 (high); 17; 18; 19; 21 (high); 22; 24; 27; 30; 32

Screwdrivers and head extensions

ratchet

Cardan joint

Torx wrench: T-20; T-30; T-40; T-50

Socket head: E8; E10; E11; E12; E14; E16

Hexagon set

Square "for 8"

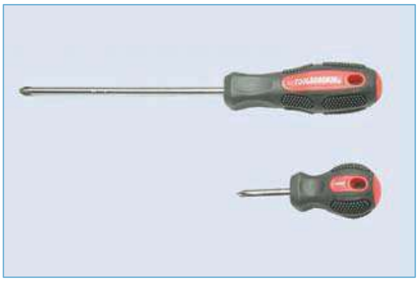
Allen key 0-19

Wrench for brake pipe fittings "for 11"

Wrench z-key "for 21"

Rear suspension shock absorber rod wrench

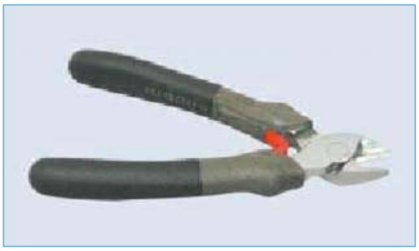
Slotted screwdrivers



Phillips screwdrivers


Vise


Pliers


Miter cutters

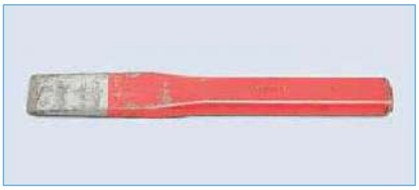

Sliding pliers


Pliers with curved jaws


Pliers for removing circlips

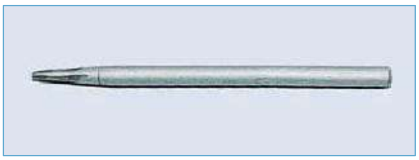

Tweezers


Soft metal gouge


Chisel


Hammer


Hammer with plastic striker

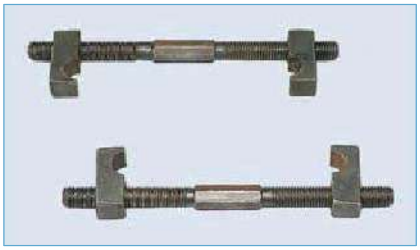

Borodok


Mounting spatula


Three-grip puller


Two-grip puller


Oil filter puller


Spring tensioners

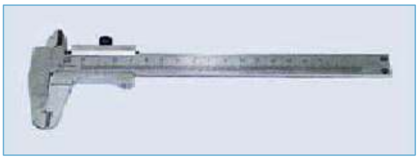

Cup puller for extruding and pressing in knocker bearings

Clutch slave disk alignment spacer

compressometer

Pressure gauge

feeler gauge set



Caliper

Torque wrench

Transmission oil filler syringe

Key

Stop ("shoe")

Rolling jack

Stand

Tal

Traverse for lifting the engine

Hydraulic crane

Tightening torques for critical threaded connections

Name of unit, part	Tightening torque, N-m
ENGINE 1.4-1.6 (8V)	
Right support bolt	62
Bolt securing the left support bracket to the gearbox crankcase	62
Bolt securing the left support to the spar	62
Left support cushion bolt nut	105
Nut securing the left support to the bracket	62
Rear support mounting bolt	105
Head cover bolt cylinders 1st stage Stage 2	 2 10
Auxiliary drive pulley mounting bolt	30 80±5°
Flywheel mounting bolt	65
Auxiliary drive belt tensioner housing bolt	21
Timing belt tensioner pulley fastener nut	50
M8 bolt for fastening the upper timing cover	22
M10 bolt for fastening the upper timing cover	44
Bolt securing the lower timing cover	8
Cylinder head mounting screw	20 rotate 220±10°
Engine crankcase oil pan retaining screw to the cylinder block 1st stage Stage 2	 8 14
Engine crankcase oil pan bolt to the clutch housing 1st stage Stage 3	 8 44
Oil pump mounting bolt	25
Air filter housing retaining screw	25
Self-tapping screw securing the throttle assembly to the inlet pipe	10
Bolt/nut securing the intake pipe to the cylinder head	25
Fuel tank mounting bolt/nut	21
Adsorber body mount nut	21
Fuel Ramp Mounting Screw	7
Coolant temperature sensor	20
Cooling system radiator bracket mounting nut	10
Cooling pump mounting bolt fluids: M6 M8	 10 22
Thermostat housing mounting bolt	10

Name of unit, part	Tightening torque, N-m
Nut securing the exhaust manifold to the cylinder head	25
Nut securing the intake pipe flange to the exhaust manifold flange	21
ECU mounting nut	8
Ignition coil mounting screw	15
Crankshaft position sensor mounting bolt	8-10
Detonation sensor	20-25
Oxygen concentration sensor	45
ENGINE 1.6 (16V)	
Bolt securing the right support to the body	62
Bolt securing the left support bracket to the gearbox crankcase	62
Bolt securing the left support to the spar	62
Left support cushion bolt nut	105
Nut securing the left support to the bracket	62
Rear support mounting bolt	105
Cylinder head cover bolt	12
Auxiliary drive pulley mounting bolt	20 tilt 135±15°
Nut securing the camshaft pulley	30 **84°**
Flywheel mounting bolt	65
Nut securing the idler pulley axle of the timing belt: 1st stage Stage 2	 7 27
Bolt securing the timing belt support roller	45
Cylinder head mounting bolt	20 240 ±6°
Engine crankcase oil pan mounting bolt: to the cylinder block: 1st stage Stage 2 to the clutch housing: 1st stage Stage 2	 8 14 8 44
Oil pump mounting bolt	25
Bolt securing the oil separator to the cylinder head cover	13
Air filter housing retaining screw	9
Bolt securing the throttle assembly to the receiver	13
Bolt securing the air reservoir to the cylinder head cover	9
Nut securing the intake pipe to the cylinder head	21
Fuel tank mounting bolt/nut	21

Name of unit, part	Tightening torque, N-m
Adsorber body mount nut	21
Fuel Ramp Mounting Bolt	9
Coolant temperature sensor	20
Cooling system radiator bracket mounting nut	10
Coolant pump mounting bolt: M6 M8	 11 22
Thermostat housing mounting bolt	10
Nut securing the exhaust manifold to the cylinder head	18
Nut securing the intake pipe flange to the exhaust manifold flange	21
ECU mounting nut	8
Ignition coil mounting bolt	8
Crankshaft position sensor mounting bolt	8-10
Detonation sensor	20-25
Oxygen concentration sensor	45
CLUTCH	
Bolt/nut securing the clutch housing to the engine	44
Bolt securing the clutch guard to the flywheel	20
GEARBOX	
Bolt securing the left wheel drive inner joint cover holder to the transmission case	25
Shift lever base mounting nut	15
Drain plug	25
FRONT SUSPENSION	
Bolt for front and rear subframe body mounts	105
Upper shock absorber strut body mount nut	44
Nut securing the upper support of the shock absorber strut upper support	62
Shock absorber strut mounting bolt nut to steering knuckle	105
Tie bolt nut of the steering knuckle and ball bearing pin terminal connection	62
Bolt nut securing the suspension arm to the subframe	105
Nut securing subframe bracket to front suspension arm bolt	62
Bolt securing the subframe bracket to the body	21
Nut of the screw securing the cross stabilizer bar to the suspension arm	14
Front wheel hub bearing nut	280
Wheel bolt	105
REAR SUSPENSION	
Nut bolt securing rear suspension arm to body bracket	125

Name of unit, part	Tightening torque, N-m
Suspension arm bracket mounting bolt	62
Rear wheel hub bearing nut	175
Screw securing rear wheel trunnion to rear suspension beam flange	80
Lower shock absorber mounting bolt	105
Upper shock absorber upper mounting nut	14
STEERING	
Steering wheel mounting screw	44
Steering gear casing mounting bolt	105
Steering column bracket mounting nut	21
Attaching the steering link to the rack	34
Steering link lug lock nut	50
Ball stud tie rod lug pin nut	37
Power steering pump mounting bolt	21
Coupling bolt nut of intermediate shaft lower universal joint coupling	21
Power steering fluid pressure sensor	12
BRAKE SYSTEM	
Bolt securing the shoe guide to the steering knuckle	105
Screw securing the brake disk to the hub	14
Bolt securing the bracket to the guide pin	34
Nut securing the master cylinder to the vacuum booster	21
Vacuum booster mounting nut	21
Brake pipe connector	14
Rear wheel cylinder mounting bolt	14
Attaching the front brake hose lug to the caliper	17
Nut securing the pedal assembly bracket to the front end shield	21
Parking brake lever bracket mounting nut	21
ELECTRICAL EQUIPMENT	
Battery mounting bolt	12
Spark plug	25-30
Generator mounting bolt	21
Starter mounting bolt	44
Driver airbag mounting screw	6,5
BODY	
Door hinge mounting bolt/nut	28
Bolt securing the instrument panel crossmember mounting bracket	21
Screw securing the front seats to the body	21
HEATING, VENTILATION AND AIR CONDITIONING SYSTEM	
Bolt securing the air conditioner compressor bracket to the cylinder block	44
Air conditioner compressor mounting bolt	25
Refrigerant pressure sensor	9

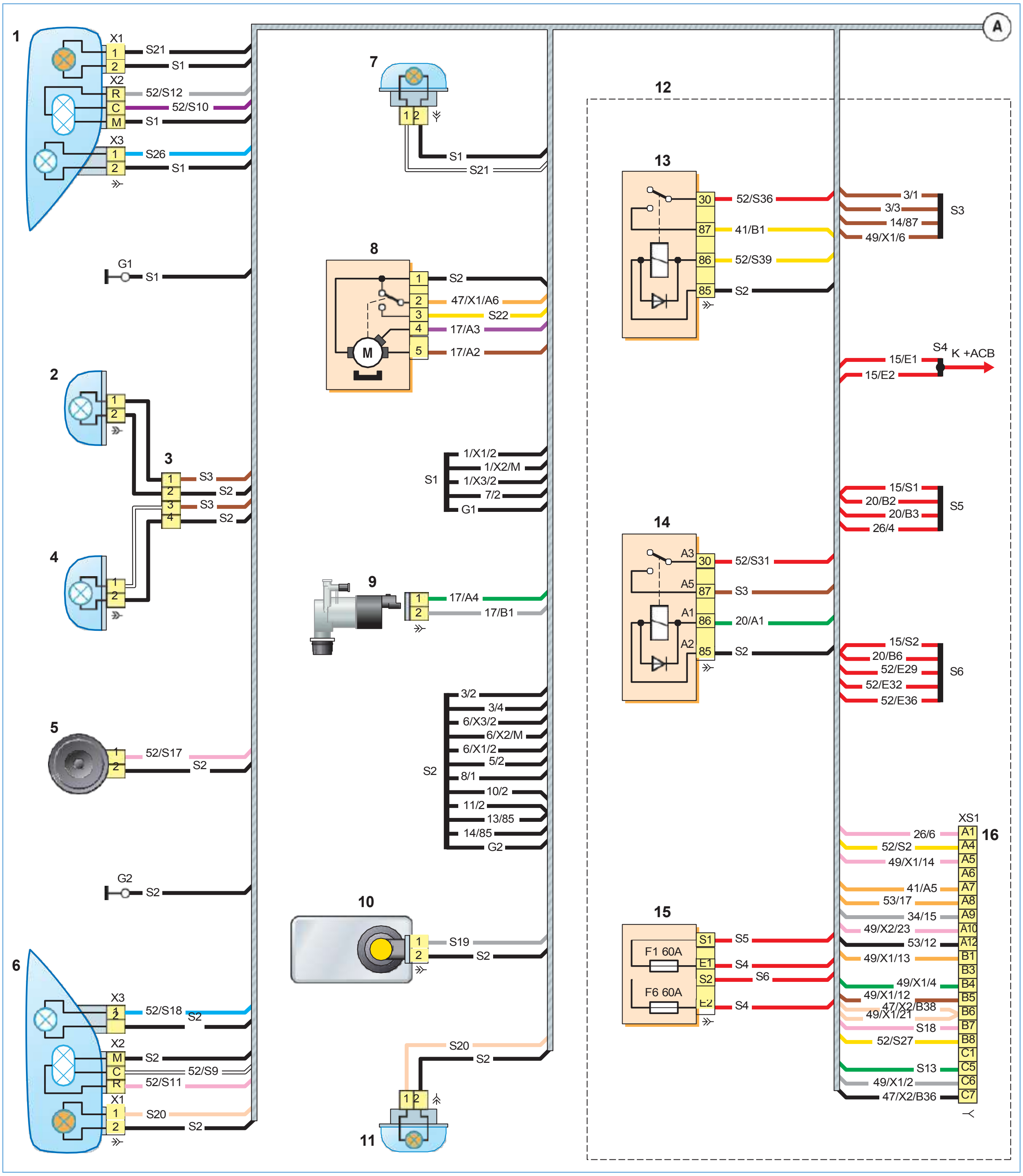
Fuels, lubricants and operating fluids used

Filling or lubrication point	Quantity	Name of material
Fuel tank	50 л	Automobile gasoline AI-92 and AI-95
Engine cooling system, including cabin heating system	5,45 л	GLACEOL RX (type D)
Engine lubrication system 1.4-1.6 (8V) / 1.6 (16V)	3,3/4,75 л	Motor oils with API quality class: SL; SM and SAE viscosity level: 5W30; 5W40; 5W50; 0W30; 0W40
Manual transmission crankcase	3,1 л	Transmission oils: API quality grade: GL-4; GL-5 and viscosity level SAE: 75W80
Hydraulic brake actuator	0,5 л	DOT-4 type brake fluid
Front wheel drive joints: outer one right inner	294±10 cm^3 124±10 cm^3	MOBIL CVJ 825 BLACK STAR or MOBIL EXF57C grease
Transmission control mechanism	-	MOLYKOTE 33 "MEDIUM" grease

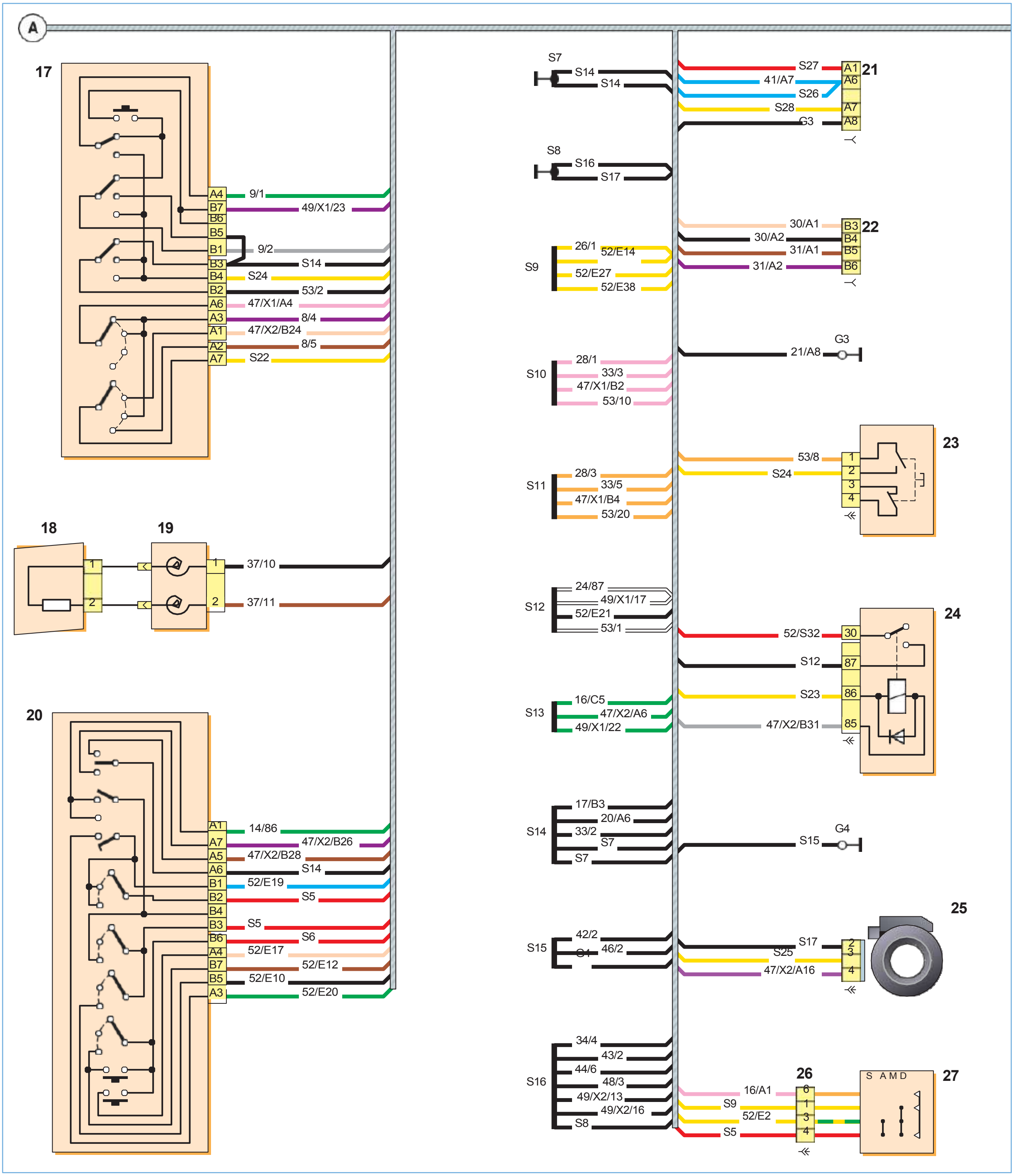
Lamps used in the vehicle

Name	ECE designation	Power, W	Photo position
Block headlight: high beam/low beam bulb front direction indicator lamp parking light b u l b	 H4 PY21W W5W	 60/55 21 5	 1 5 8
Fog lamp bulb	H11	55	2
Logan side turn indicator lamp	WY5W	5	7
Sandero and Sandero Stepway side turn indicator lamp	W5W	5	8
Rear light: turn signal lamp parking light and brake light bulb fog light bulb fog light bulb reverse light bulb	 P21W P21/5W P21W P21W P21W	 21 21/5 21 21	 4 3 4 4
Logan auxiliary brake light bulb	P21W	21	4
Sandero and Sandero Stepway auxiliary brake warning lamp	W16W	16	6
License plate lamp lamp bulb	W5W	5	8
Trunk light bulb	W5W	5	8
Light bulb of the passenger compartment light	W5W	5	8
Individual light bulb	W5W	5	8
Duffel box illumination lamp lamp	W5W	5	8
Cigarette lighter illumination lamp	W1,2W	1,2	9

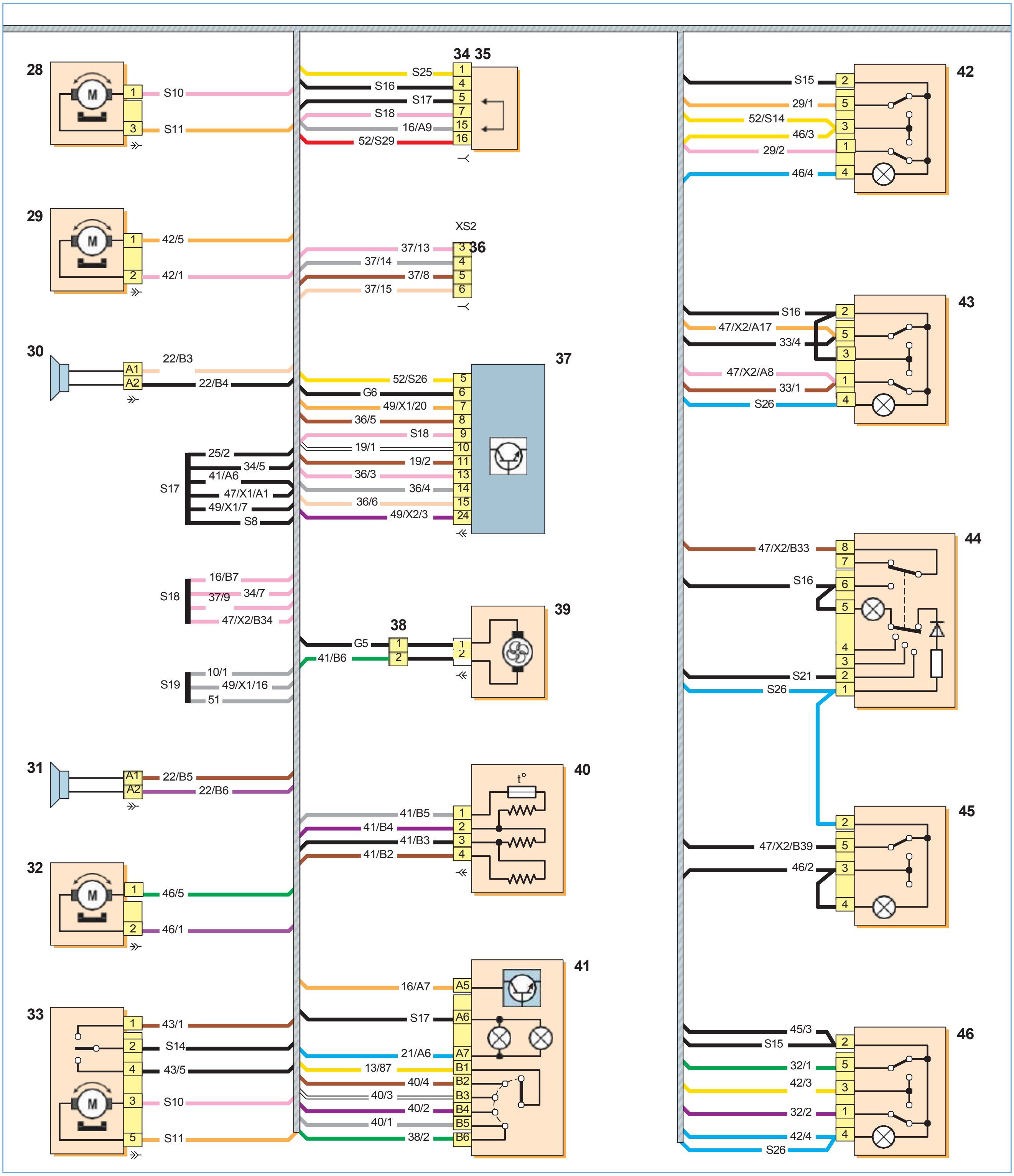
Ventilation, heating and air conditioning control unit illumination lamp	W1,2W	1,2	9



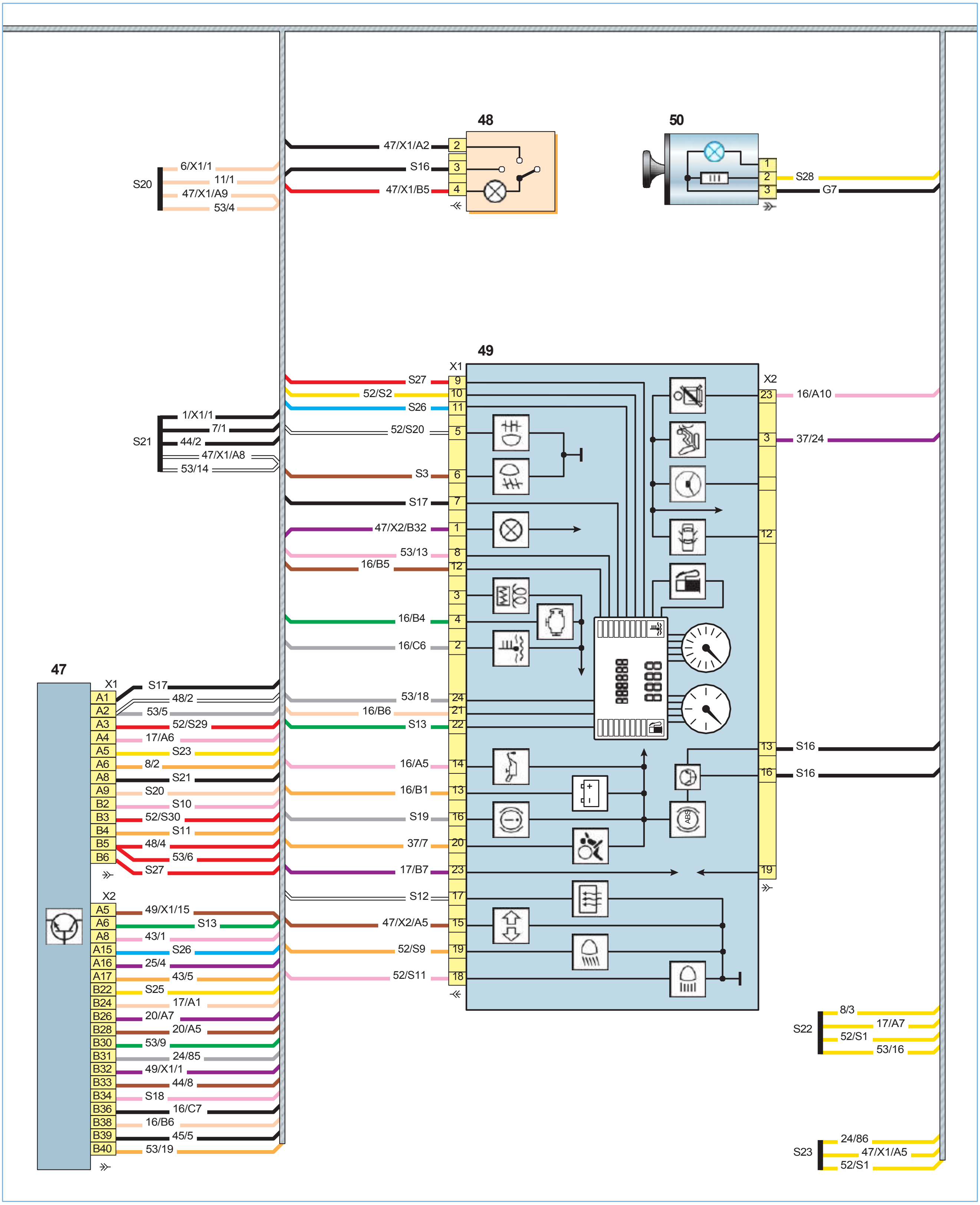
Logan front wiring harness connection diagram (for options not included in this diagram, see Sandero diagrams): A - location of the wiring harness from the engine compartment to the passenger compartment; **1** - right headlight assembly; **2** - right fog lamp; **3** - fog lamp wiring harness connection block; **4** - left fog lamp; **5** - horn; **6 -** left headlight assembly; **7** - right side turn signal indicator; **8** - windshield wiper; **9** - windshield washer; **10** - brake fluid level sensor; **11** - left side turn signal; **12** - relay and fuse block in the engine compartment; **13 -** fog lamp relay; **14** - heater fan relay; **15** - fuses in the relay and fuse block in the engine compartment; **16** - connection block with the engine wiring harness;



17 - right paddle switch; **18** - driver airbag; **19** - spiral cable; **20** - left paddle switch; **21**, **22** - audio system connection block; **23** - brake pedal position sensor and brake signal switch; **24** - rear window heater relay; **25** - immobilizer coil; **26** - ignition switch wiring harness connection block; **27** - ignition switch; **28** - electric actuator of the right front door lock; **29** - window elevator of the right front door; **30** - right front speaker; **31** - left front speaker; **32** - window elevator of the left front door; **33** - electric actuator of the left front door lock; **34** - diagnostic block;



35 - diagnostic block cover with jumper; **36** - front passenger airbag and duffel box lighting wiring harness connection block; **37** - airbag control unit; **38** - heater fan wiring harness connection block; **39 - heater** fan; **40** - heater fan auxiliary resistor block; **41** - ventilation, heating and air conditioning control unit; **42** - right front door window elevator switch; **43** - central locking switch; **44 -** emergency stop switch; **45** - rear window heater switch; **46** - left front door window elevator switch;



47 - switchgear block; **48** - interior illumination lamp; **49** - instrument cluster; **50** - cigarette lighter; **51** - parking brake switch and brake system malfunction indicator light switch;

G5
38/1

G6
37/6

17/B4
23/2
52/S3
S24

51

S19

G7
50/3

25/3
34/1
47/X2/B22
52/S4
S25

1/X3/1
21/A6
43/4
44/1
46/4
47/X2/A15
49/X1/11
52/S19
S26

52

26/3 E2
20/B5 E10
20/B7 E12
S9 E14
20/A4 E17
20/B1 E19
20/A3 E20
S12 E21
S9 E27
S6 E29
S6 E32
S6 E36
S9 E38

F01 20A
F02 5A
F03 15A
F04 10A
F09 10A
F10 10A
F11 10A
F12 10A
F14 30A
F17 15A
F18 10A
F19 10A
F20 7,5A
F26 5A
F27 20A
F28 15A
F29 15A
F30 20A
F31
F32 30A
F36 30A
F38 15A
F39 10A

S22
S1
S23
S2 16/A4
49/X1/10
S3 S24
S3 S25
49/X1/19
S4 6/X2/C
S9 1/X2/C
S10
6/X2/R
49/X1/18
S11
1/X2/R
S12
S13 42/3
S14
S15
S16
S17 5/1
6/X3/1
S18 53/7
S18 S26
53/15
S19 49/X1/5
53/3
S20
S21 37/5
S26 16/B8
S27
S28 S27
S29 47/X1/A3
34/16
S30 47/X1/B3
S31 14/30
S32 24/30
S36 13/30
S38 S28
S39 13/86

21/A1
47/X1/B6
49/X1/9
52/S28
S27

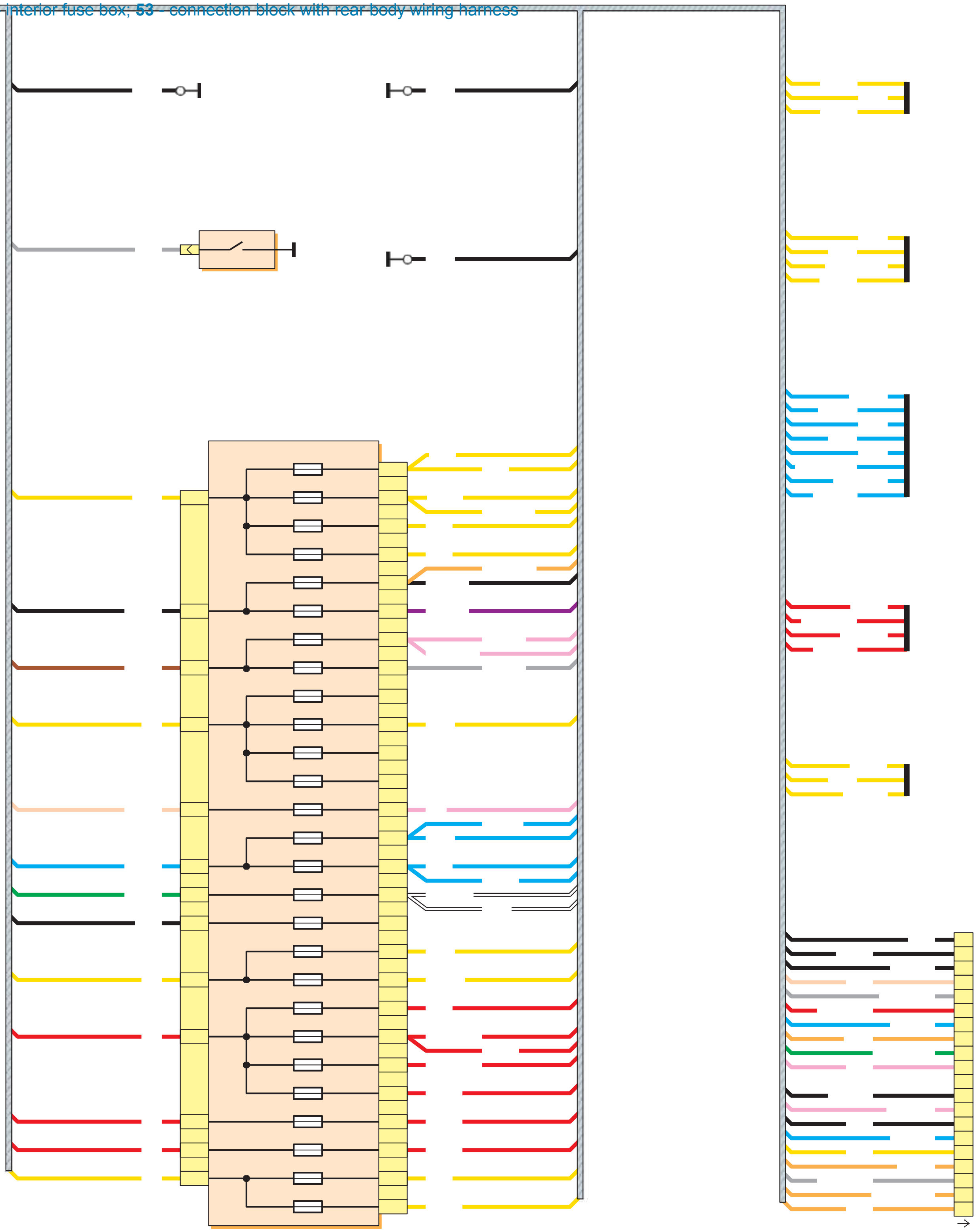
21/A7
50/2
52/S38
S28

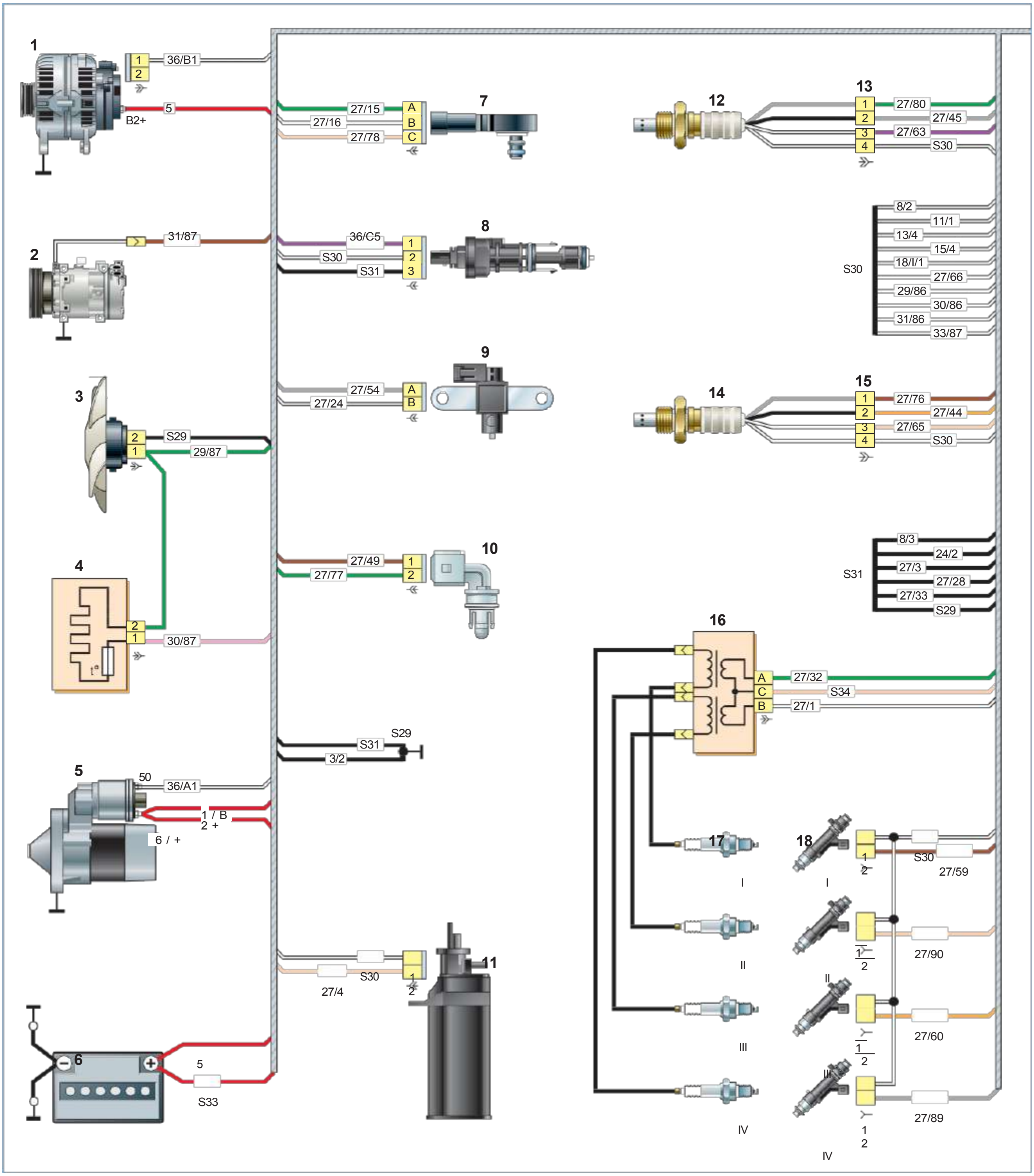
XP3

53

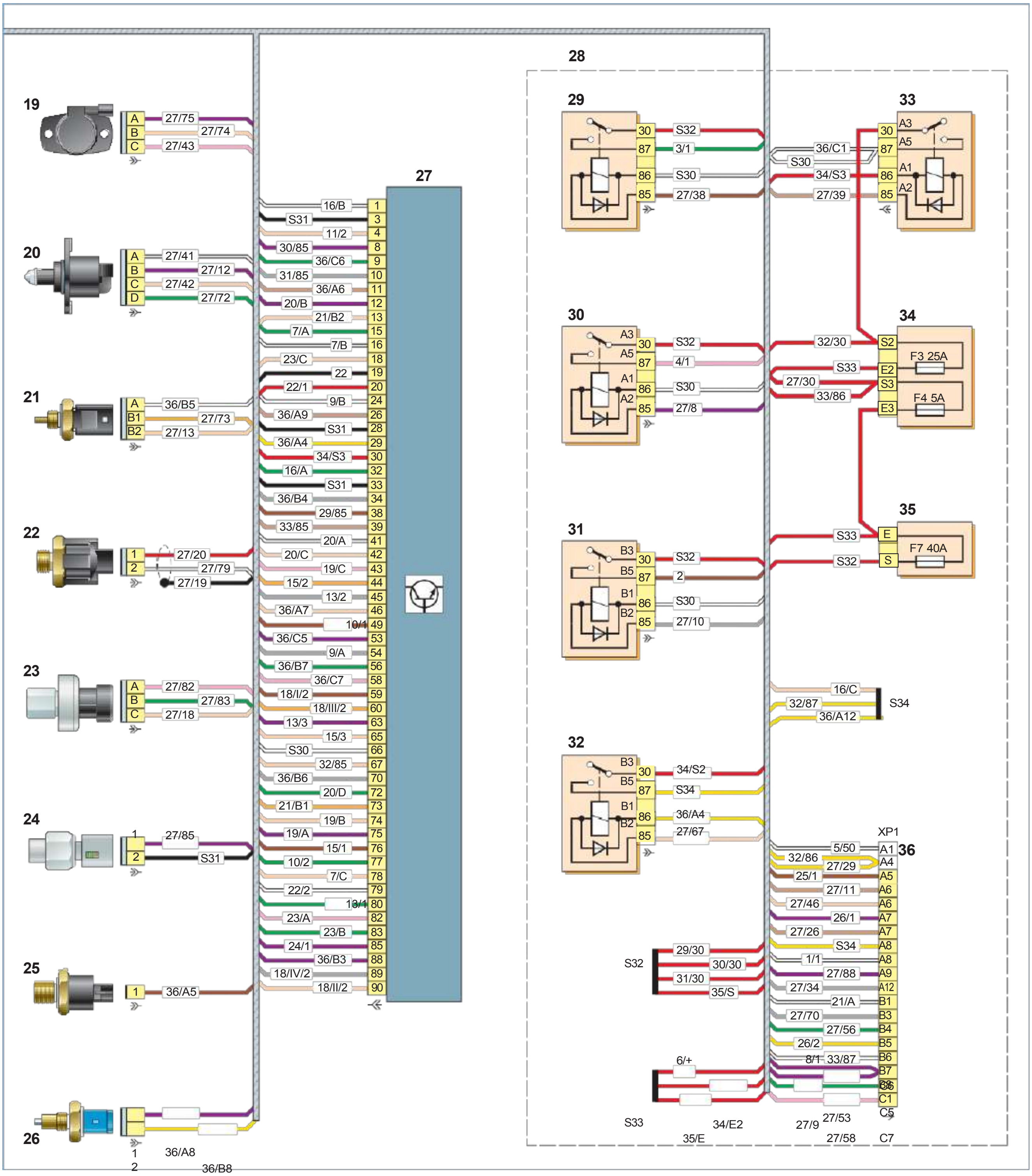
S12 1
17/B2 2
52/S20 3
S20 4
47/X1/A2 5
47/X1/B5 6
52/S18 7
23/1 8
47/X2/B30 9
S10 10
11
16/A12 12
49/X1/8 13
S21 14
52/S19 15
S22 16
16/A8 17
49/X1/24 18
47/X2/B40 19
S11 20

52 – interior fuse box; **53** – connection block with rear body wiring harness

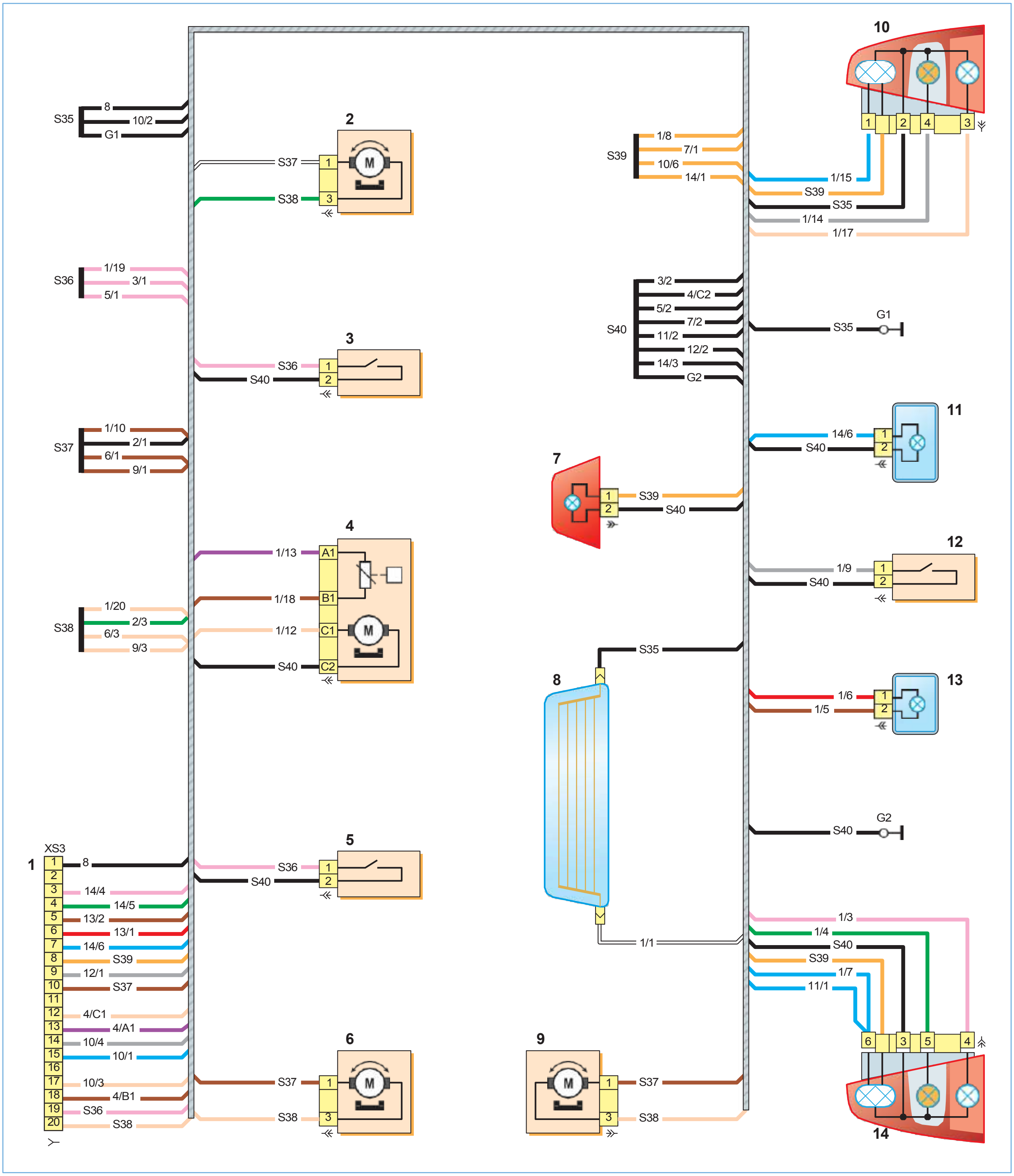




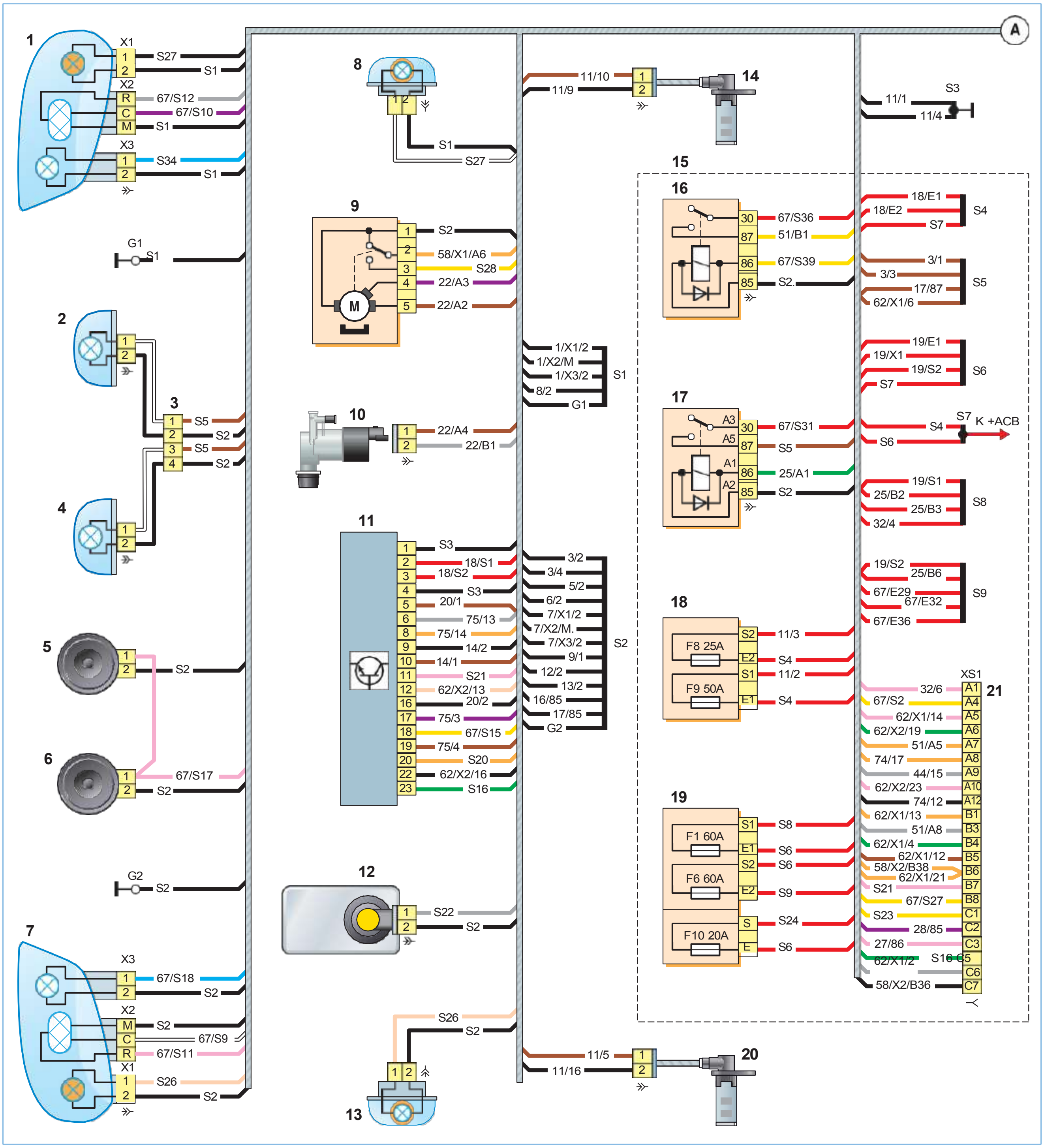
Wiring harness connection diagram for engine 1,4-1,6 (8V): 1 - alternator; **2** - air conditioner compressor; **3** - cooling system fan; **4 -** additional resistor; **5 -** starter; **6 -** battery; **7 -** absolute air pressure sensor; **8 -** vehicle speed sensor; **9 -** crankshaft position sensor; **10** - inlet air temperature sensor; **11** - adsorber purge valve; **12** - control oxygen concentration sensor; **13** - oxygen sensor control wiring harness connection block; **14 -** diagnostic oxygen sensor; **15 -** oxygen sensor diagnostic wiring harness connection block; **16** - ignition coil; **17** - spark plugs; **18 -** injectors; **19** - throttle position sensor;



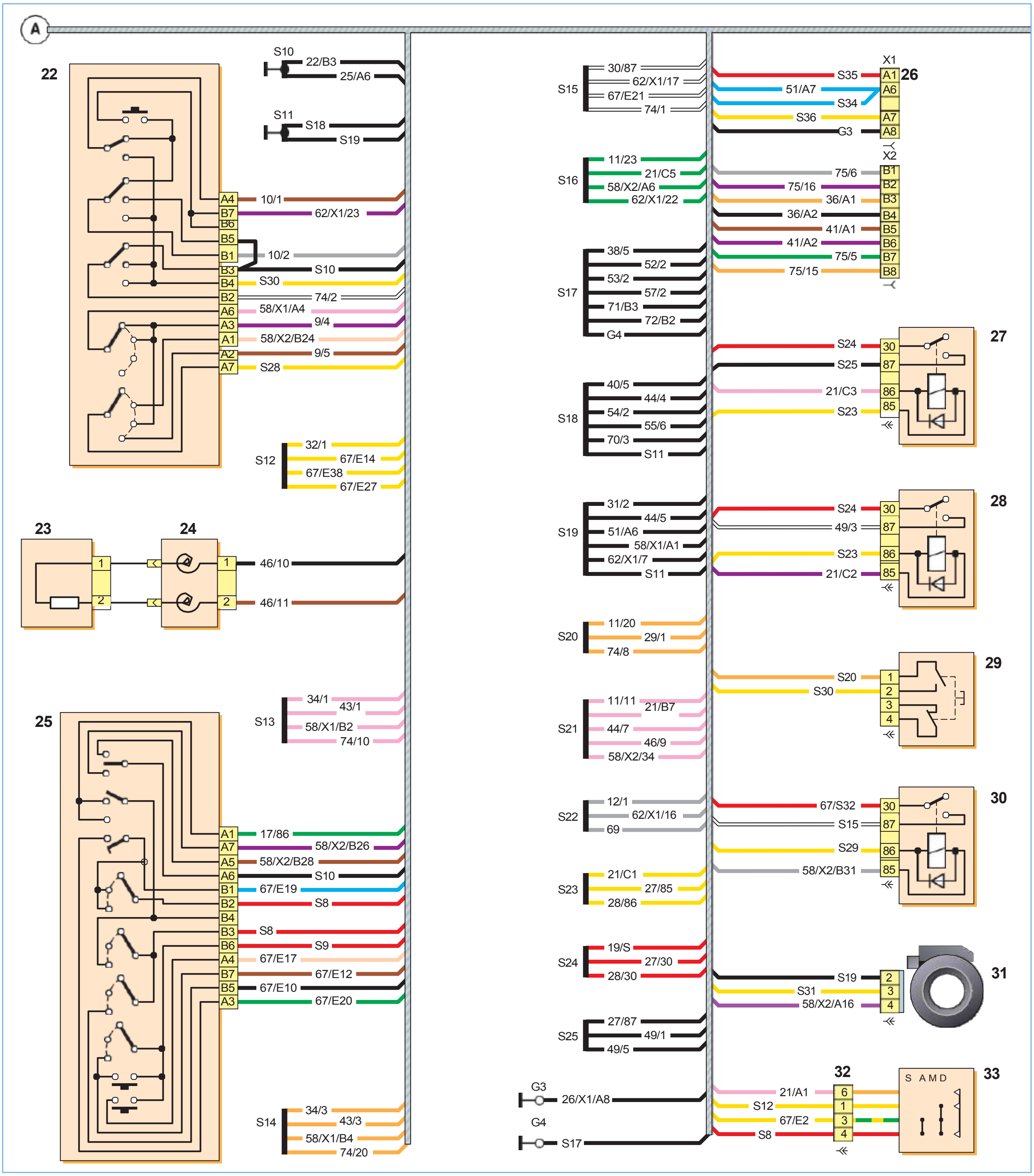
20 - idle speed regulator; **21** - coolant temperature sensor; **22** - detonation sensor; **23** - coolant pressure sensor; **24** - pressure sensor in power steering system; **25** - oil pressure sensor; **26** - reverse light switch; **27** - electronic engine control unit (controller); **28** - fuse and relay box in engine compartment; **29** - cooling fan high speed relay; **30** - cooling fan low speed relay; **31** - air conditioner compressor relay; **32** - fuel pump and ignition coil relay; **33** - main relay; **34**, **35** - fuses in the relay and fuse block in the engine compartment; **36** - connection block with the front body wiring harness.



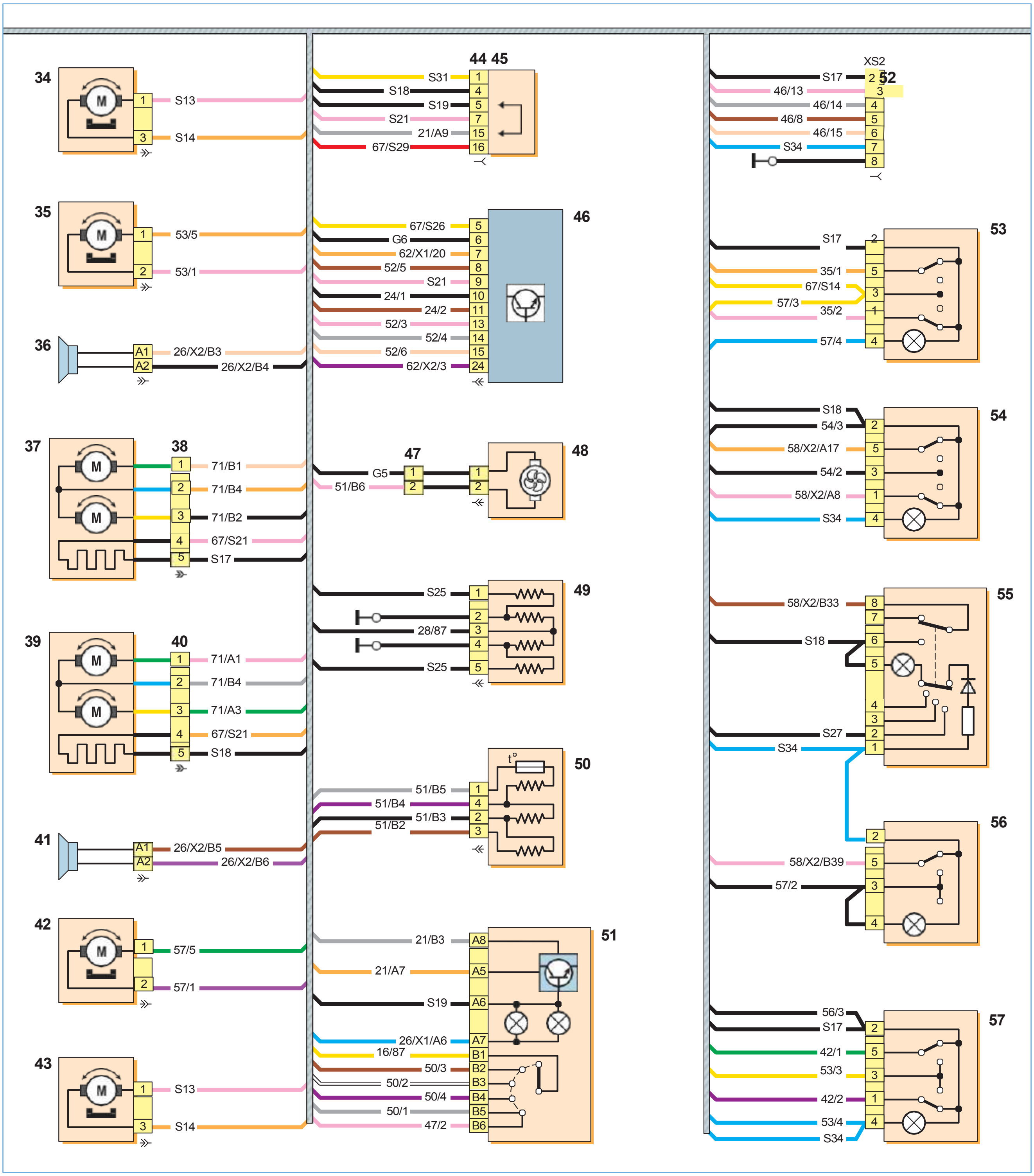
Logan body rear wiring harness connection diagram: 1 - front body harness connection strip; **2** - right rear door lock actuator; **3** - right front door interior lighting limit switch; **4 -** fuel module; **5** - left front door interior lighting limit switch; **6** - left rear door lock actuator; **7** - additional braking signal; **8** - rear window heating element; **9** - trunk lid lock actuator; **10** - right tail light; **11** - license plate illumination lamp; **12** - trunk illumination limit switch; **13** - trunk illumination plafond; **14** - left tail light.



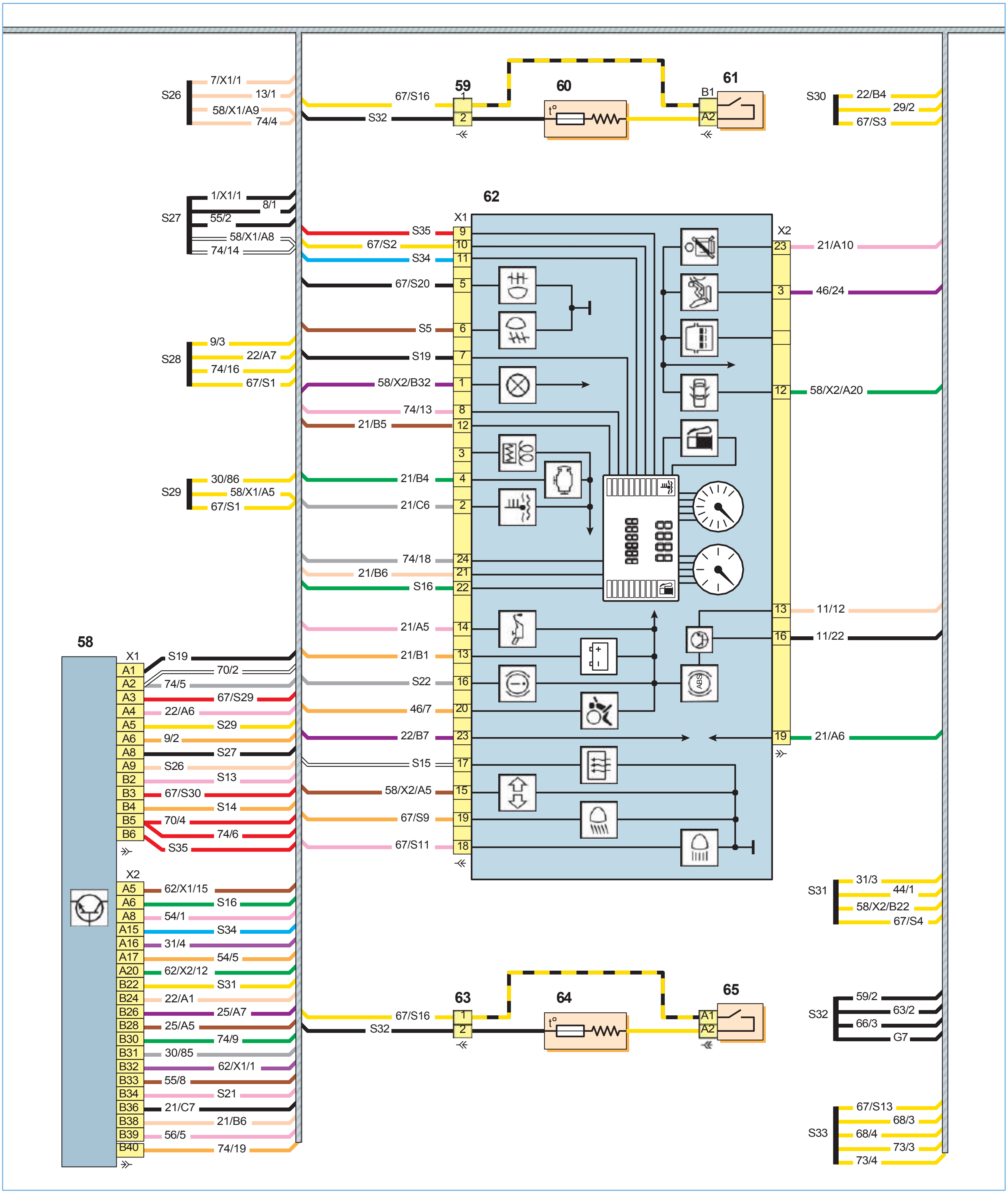
Sandero front wiring harness connection diagram (options included in this diagram are suitable for Logan diagrams): A - place of transition of the wiring harness from the engine compartment to the passenger compartment; **1** - right headlight unit; **2** - right fog lamp; **3** - fog lamp wiring harness connection block; **4** - left fog lamp; **5** - right high tone horn; **6** - left low tone horn; **7** - left headlight unit; **8** - right side turn signal; **9** - windshield wiper; **10** - windshield washer; **11** - ABS control unit; **12** - brake fluid level sensor; **13** - left side turn signal indicator; **14** - right front wheel speed sensor; **15** - relay and fuse block in the engine compartment; **16** - heater fan relay; **17** - fog lamp relay; **18**, **19** - **fuses** in the relay and fuse block in the engine compartment; **20** - left front wheel speed sensor; **21** - connection block with engine wiring harness;



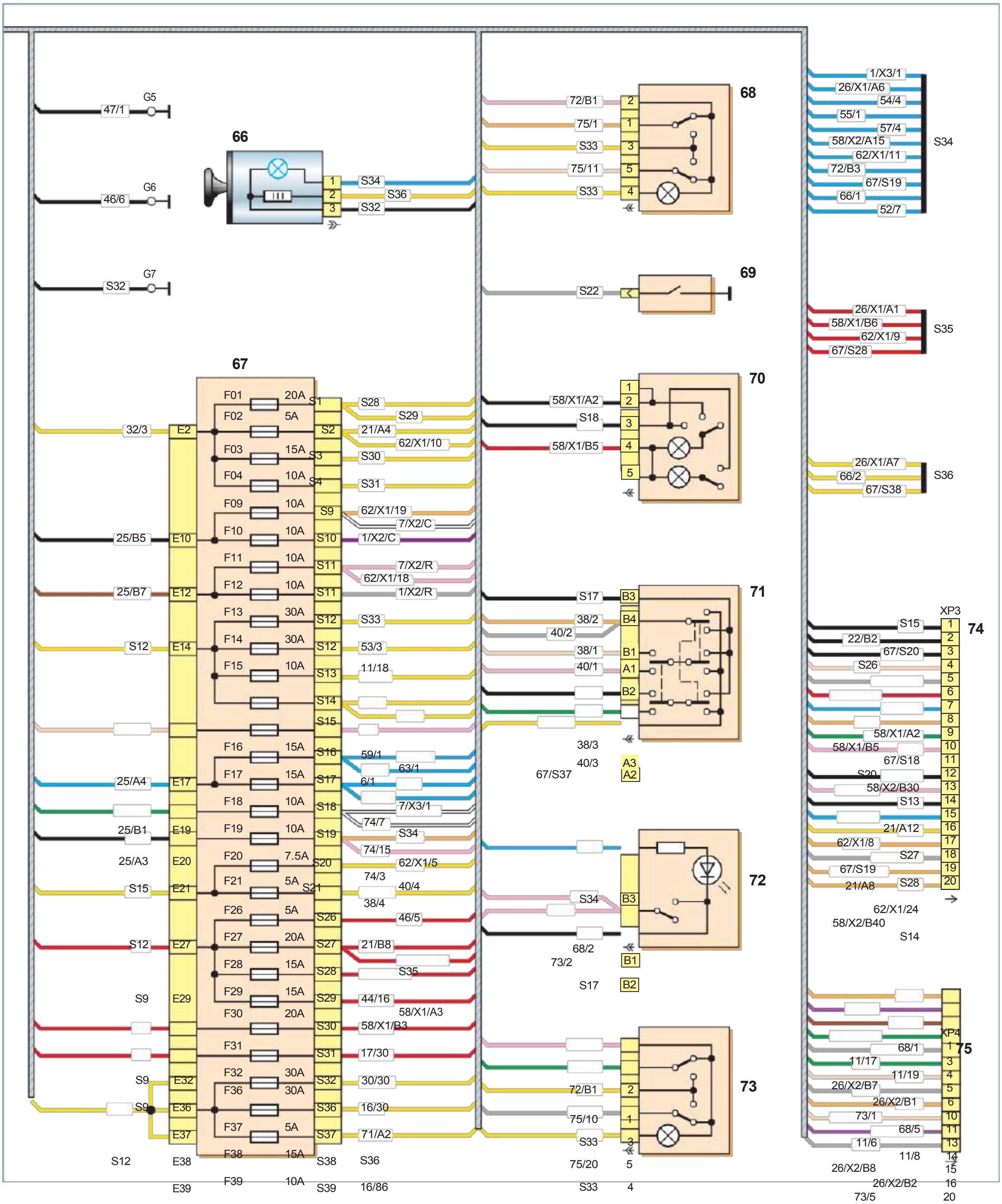
22 - right steering wheel switch; **23** - driver airbag; **24** - spiral cable; **25** - left steering wheel switch; **26 -** audio system connection pads; **27** - auxiliary cabin heater relay (**70** A); **28** - auxiliary cabin heater relay (**40** A); **29** - brake pedal position sensor and brake light switch; **30 -** rear window heater relay; **31** - immobilizer coil; **32** - ignition switch wiring harness connection block; **33** - ignition switch; **34** - right front door lock actuator; **35** - right front door window elevator; **36** - right front speaker; **37 - right** outside mirror; **38** - right outside mirror connection block; **39** - left outside mirror; **40 -** left outside mirror connection block; **41 -** left front mirror; **39** - left outside mirror; **40 -** left outside mirror connection block; **40 - left** outside mirror connection block; **40** - left front mirror connection block.



speaker; **42** - left front door window elevator; **43** - electric actuator of the left front door lock; **44** - diagnostic block; **45** - diagnostic block cover with jumper; **46** - airbag control unit; **47** - connection block with heater fan wiring harness; **48** - heater fan; **49** - additional cabin heater; **50** - block of additional heater fan resistors; **51** - ventilation, heating and air conditioning control unit; **52** - connection block with front passenger airbag wiring harness.

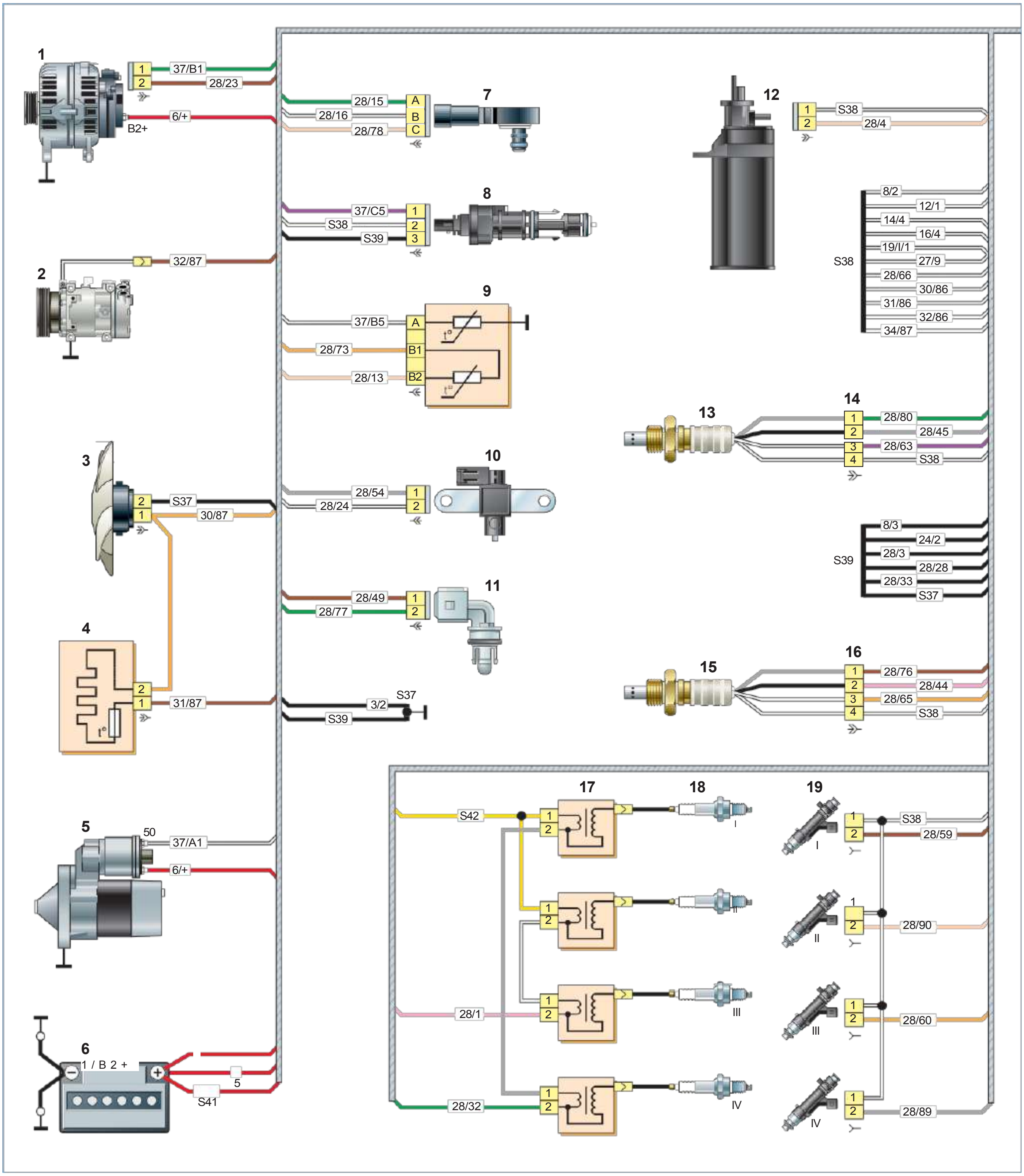


58 - switch box; **59** - right front seat heater harness connection block; **60** - right front seat heater element; **61 -** right front seat heater switch; **62** - instrument cluster;
63 - left front s e a t heater harness connection strip; **64** - left front s e a t heater element; **65 -** left front s e a t heater switch; **66** - cigarette lighter; **67** - passenger compartment fuse box;

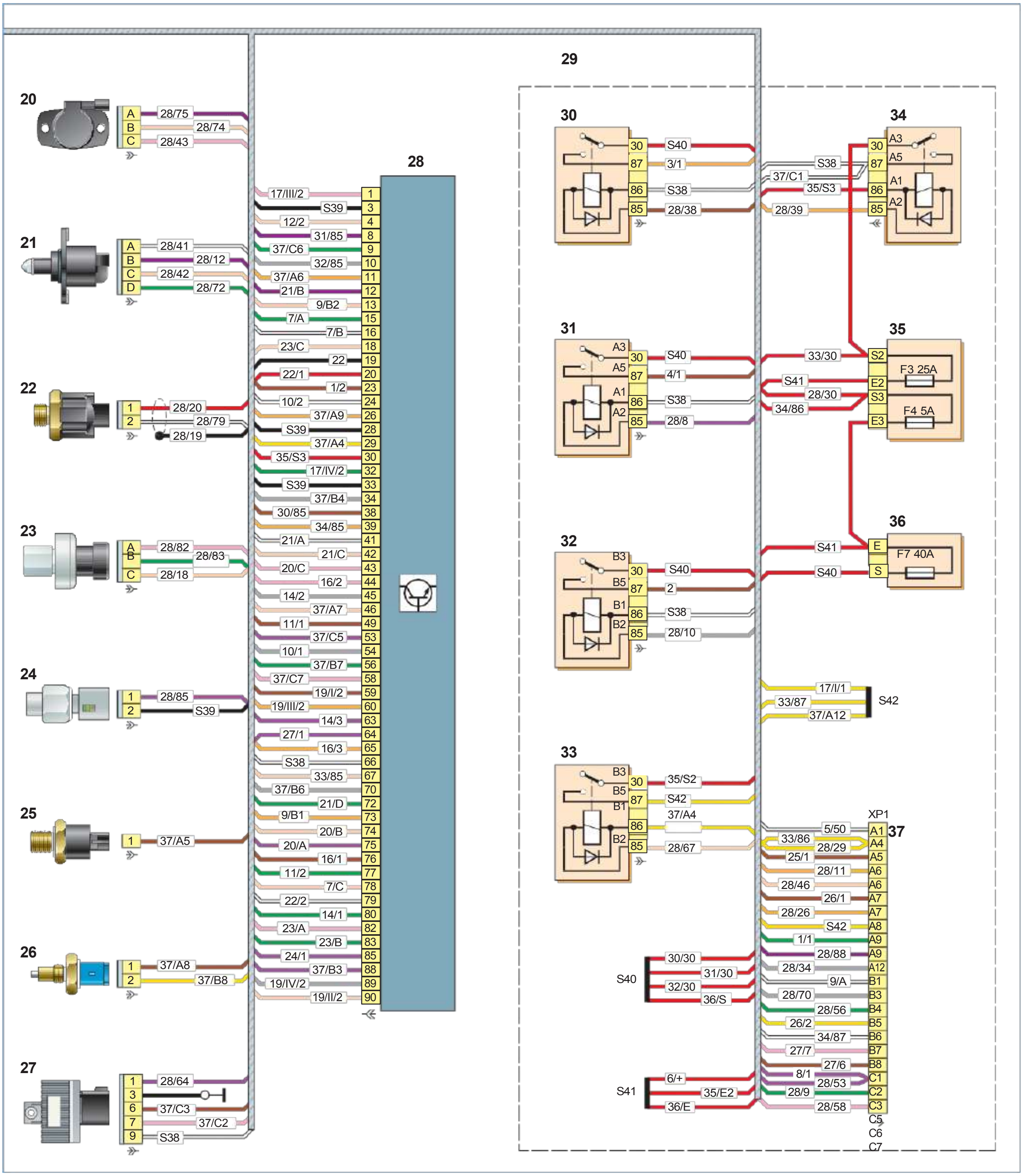


68 - switch of the right rear door window elevator; **69** - switch of the parking brake switch and brake system malfunction indicator; **70** -

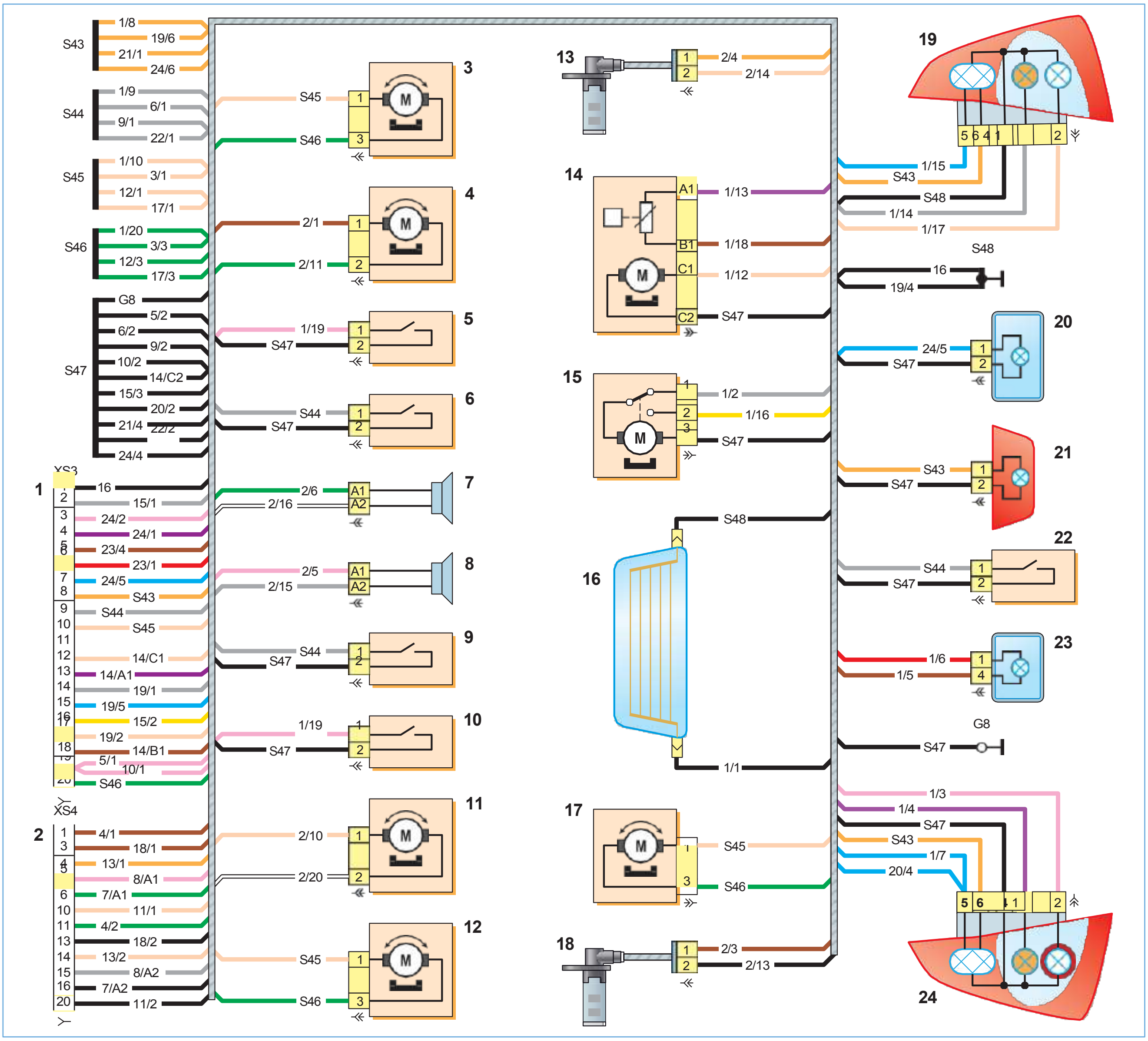
interior illumination lamp; **71** - control regulator of the exterior mirrors electric drives; **72 -** rear window lock switch; **73** - switch of the left rear door window elevator; **74**, **75** - pads of connection with the rear body wiring harness.



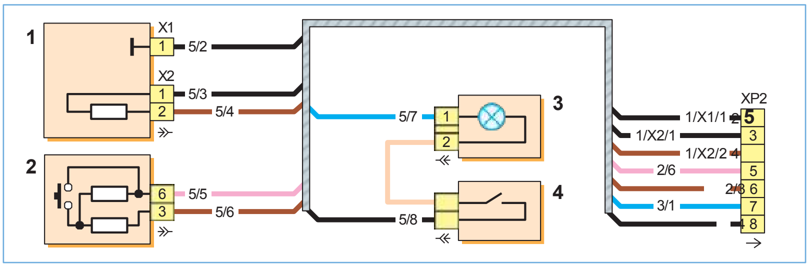
Wiring harness connection diagram for engine 1.6 (16V): 1 - alternator; **2 -** air conditioner compressor; **3 -** cooling fan; **4** - additional resistor; **5** - starter; **6 -** battery; **7** - absolute air pressure sensor; **8** - vehicle speed sensor; **9 -** coolant temperature sensor; **10** - crankshaft position sensor; **11** - inlet air temperature sensor; **12** - adsorber purge valve; **13** - control oxygen concentration sensor; **14** - oxygen concentration sensor control wiring harness connection block; **15 -** diagnostic oxygen concentration sensor; **16 -** oxygen concentration sensor diagnostic wiring harness connection block; **17 -** ignition coils; **18** - spark plugs;



19 - injectors; **20** - throttle position sensor; **21** - idle speed regulator; **22** - detonation sensor; **23** - refrigerant pressure sensor; **24** - pressure sensor in power steering system; **25** - oil pressure sensor; **26** - reverse light switch; **27** - relay for additional cabin heating; **28** - electronic engine control unit (controller); **29** - fuse and relay block in the engine compartment; **30** - cooling fan high speed relay; **31** - cooling fan low speed relay; **32** - air conditioner compressor relay; **33** - fuel pump and ignition coil relay; **34** - main relay; **35**, **36** - fuses in the relay and fuse block in the engine compartment; **37** - body wiring harness connection block.



Connection diagram of the rear wiring harness of the Sandero body: 1, **2** - connection pads to the front body harness; **3 -** right rear door lock actuator; **4** - right rear door window elevator; **5** - cabin light bulb limit switch at right front door; **6** - cabin light bulb limit switch at right rear door; **7** - right rear loudspeaker; **8** - left rear loudspeaker; **9** - left rear door interior lighting lamp limit switch; **10** - left front door interior lighting lamp limit switch; **11** - left rear door window elevator; **12** - electric actuator of the left rear door lock; **13 -** speed sensor of the right rear wheel; **14 -** fuel module; **15 -** luggage compartment door glass cleaner; **16** - rear window heating element; **17** - electric actuator of the luggage compartment door lock; **18** - speed sensor of the right rear wheel; **19 -** right rear lamp; **20** - license plate lamp; **21 -** additional brake signal; **22** - limit switch of the luggage compartment lighting lamp; **23 -** luggage compartment lighting lamp; **24 -** left rear lamp.



Front passenger airbag and duffel box lighting wiring harness wiring diagram: 1 - front passenger airbag; **2 - front passenger airbag** switch; **3** - duffel box lighting plug; **4 - duffel** box lighting switch; **5** - front wiring harness wiring harness connection boat

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