SPECIAL TOOLING REQUIRED	
Mot. 1265	Pliers

REMOVAL

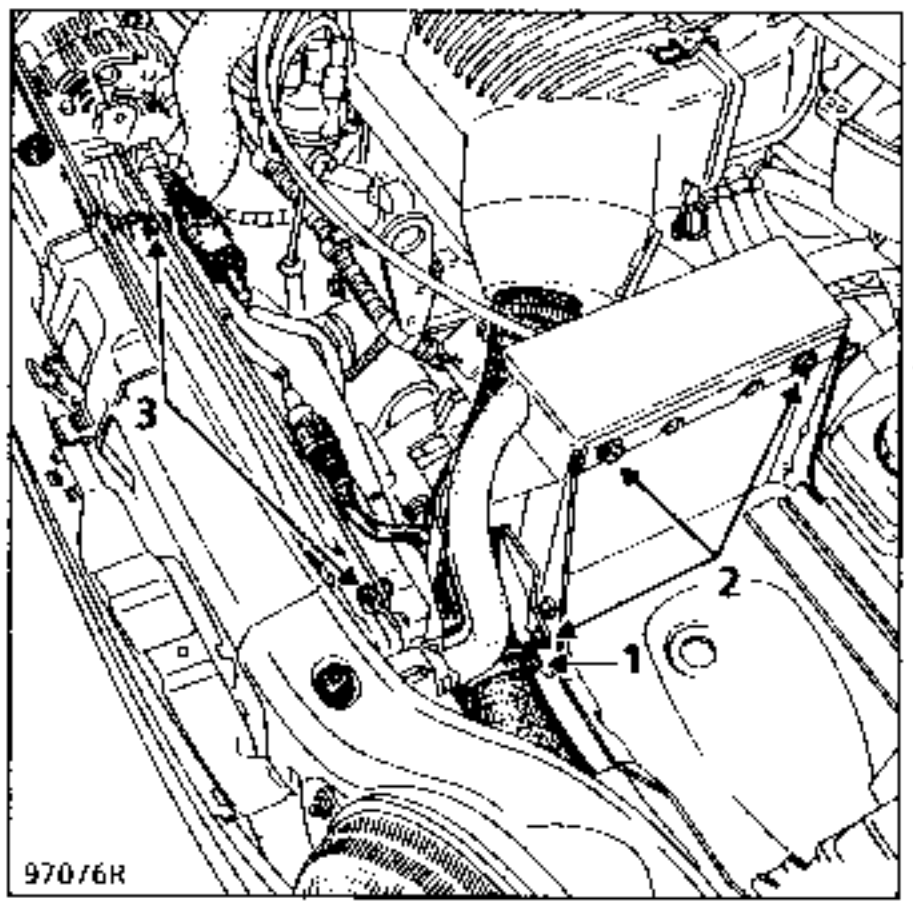
This operation does not require the refrigerant circuit to be drained.

Disconnect the battery.

Lift the vehicle and remove the engine undertray.

Drain the cooling circuit, removing the temperature switch on the radiator for the engine cooling fan.

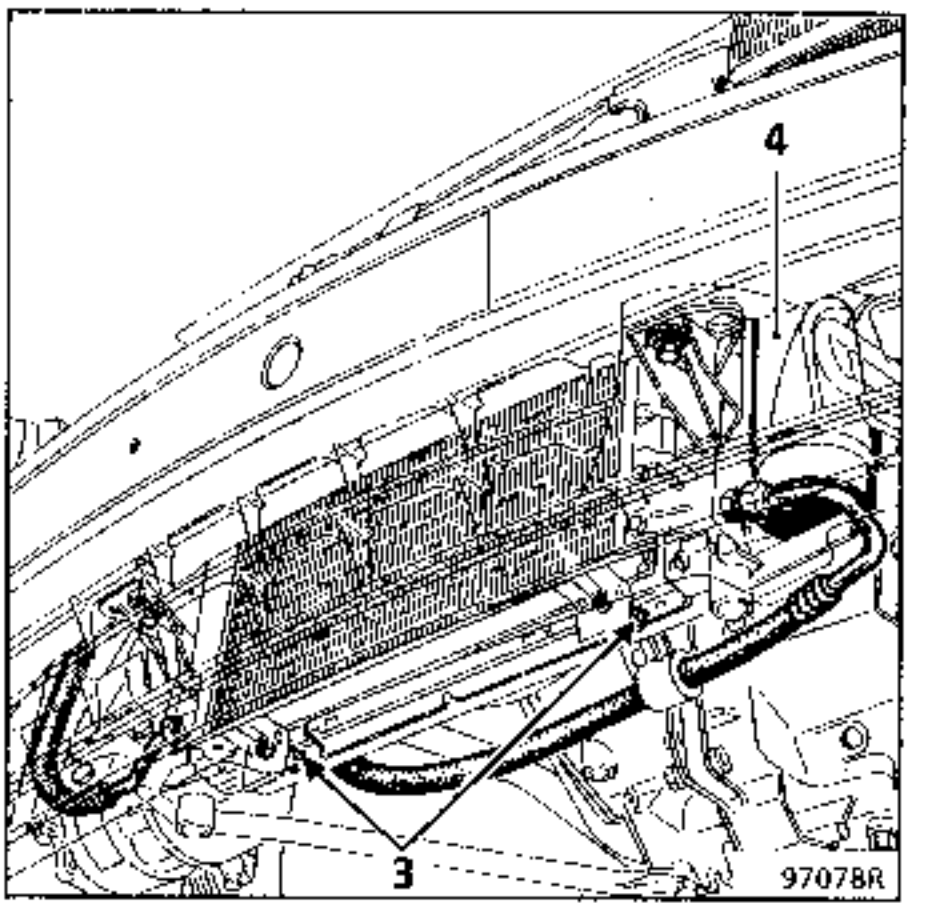
Remove:
- the battery,
- the air inlet duct and its mounting (1),



- the injection computer protective housing (2 bolts)

Disconnect and remove all of the connectors on the radiator.

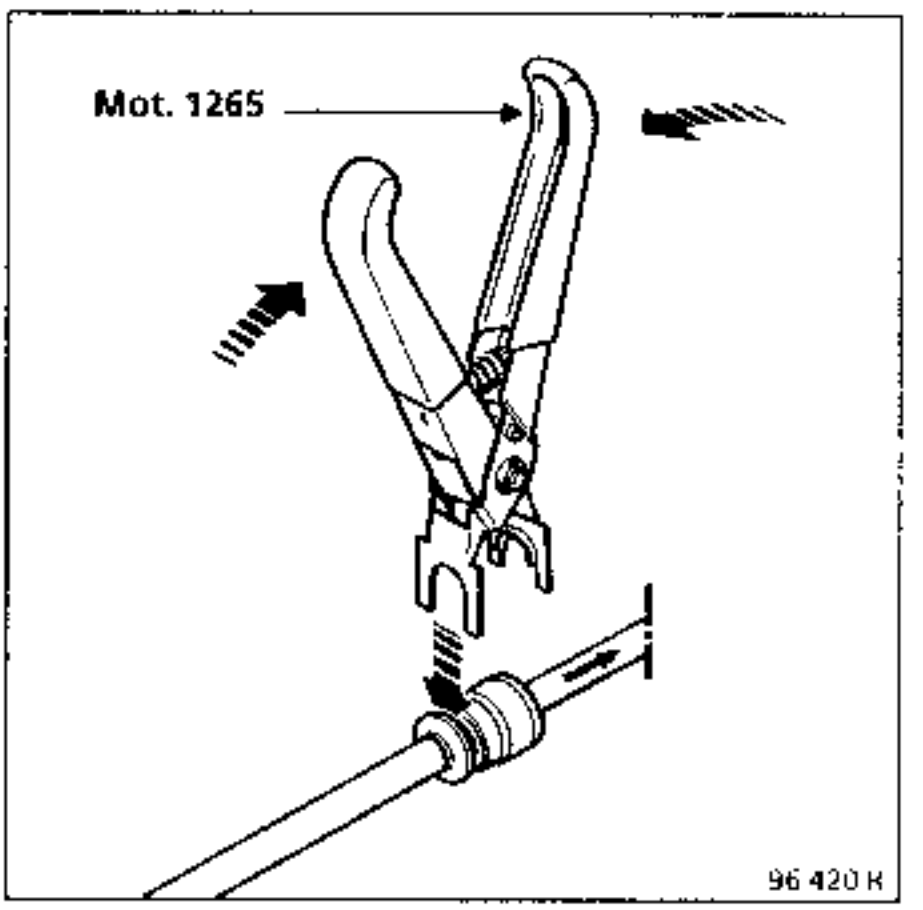
Remove the engine cooling fan (bolts marked 3) and the air conditioning pipe mounting.



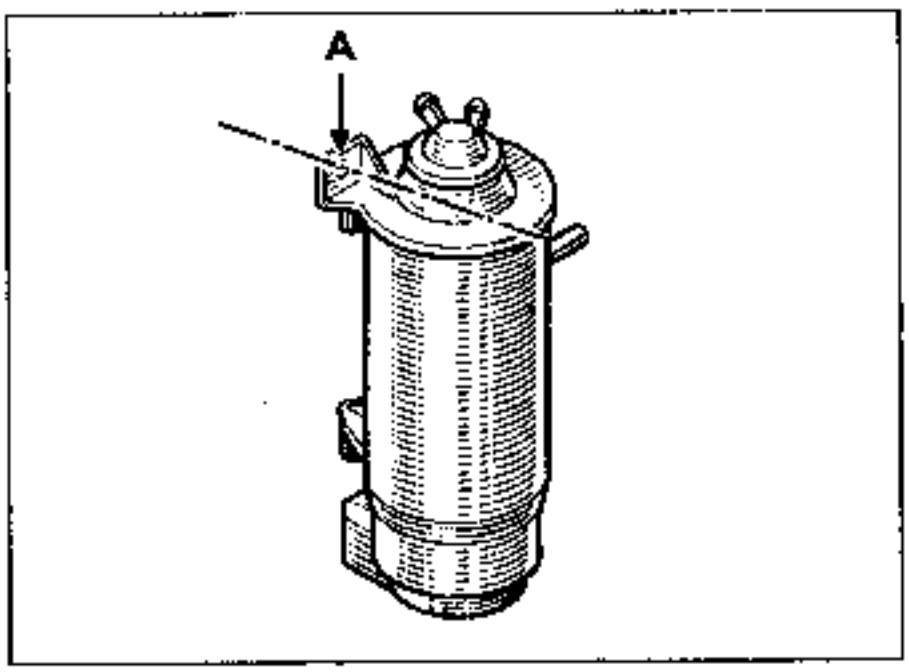
Disconnect the coolant hoses from the radiator. The petrol vapour canister will have to be disconnected and removed (4).

To remove the pipe on the side of the canister, use pliers **Mot. 1265.**

Positioning the pliers

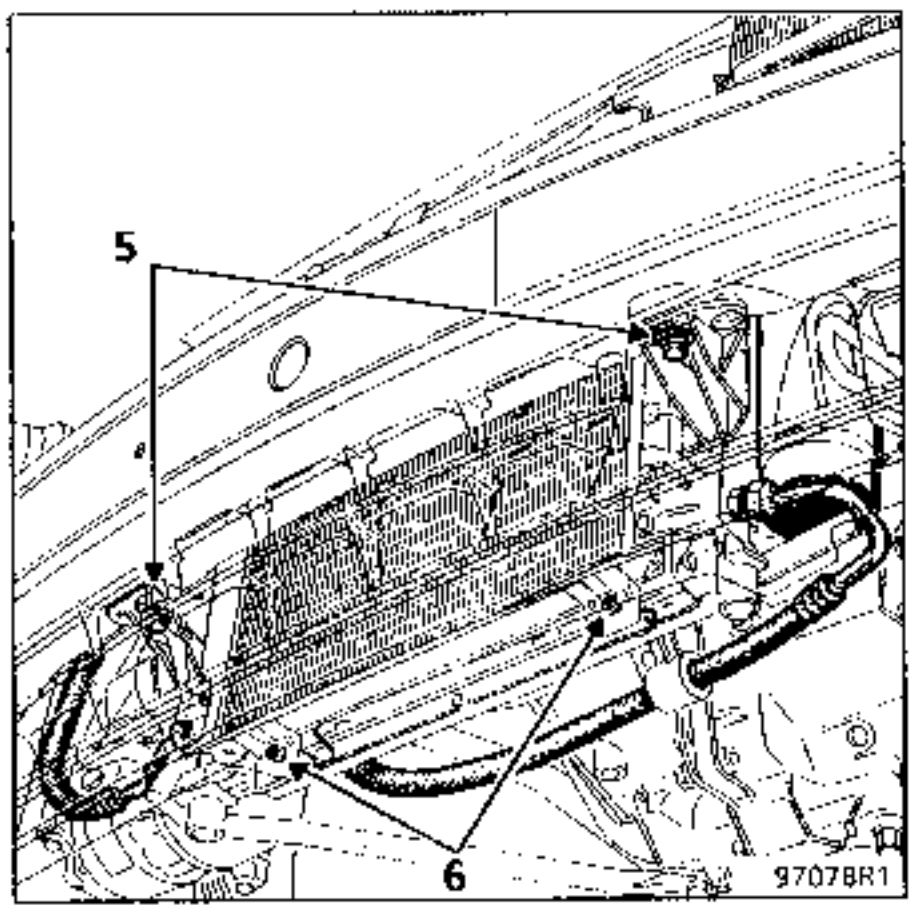


Remove the bolt securing the canister to the radiator (A) and tilt it to remove it.

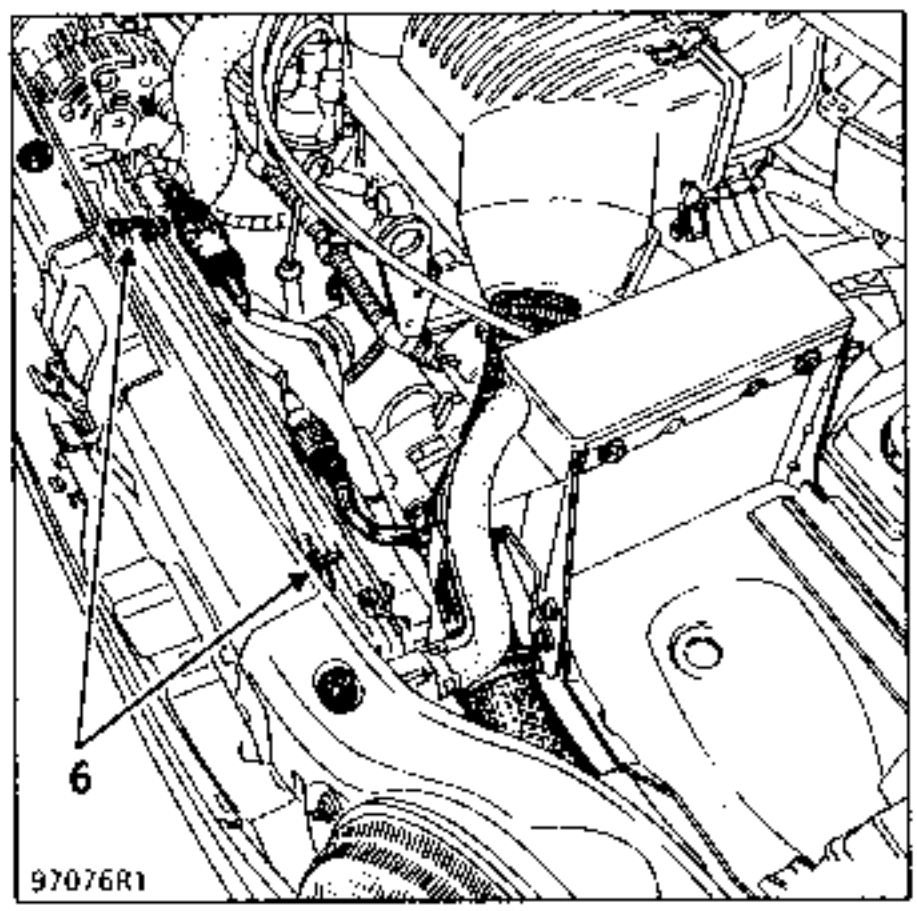


ATTENTION : when reconnecting piping with a union, ensure the union is correctly clicked into position (there are two sealing O rings).

Remove the radiator bolts (5). Release the radiator from its upper guides and lower it.



In this position, remove the 4 bolts (6) which secure the condenser to the radiator and remove the radiator from above.



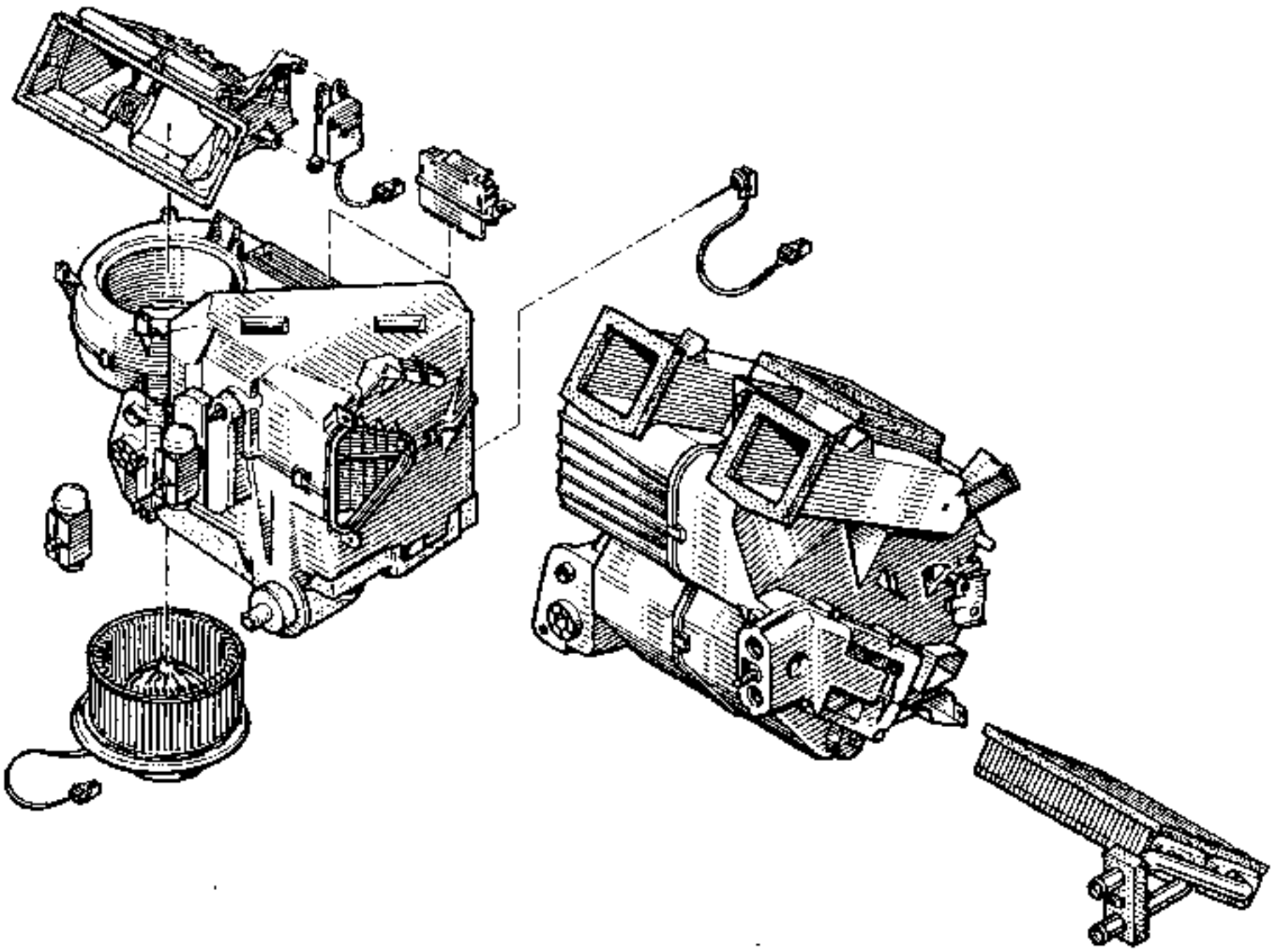
REFITTING

Refitting is the reverse of removal.

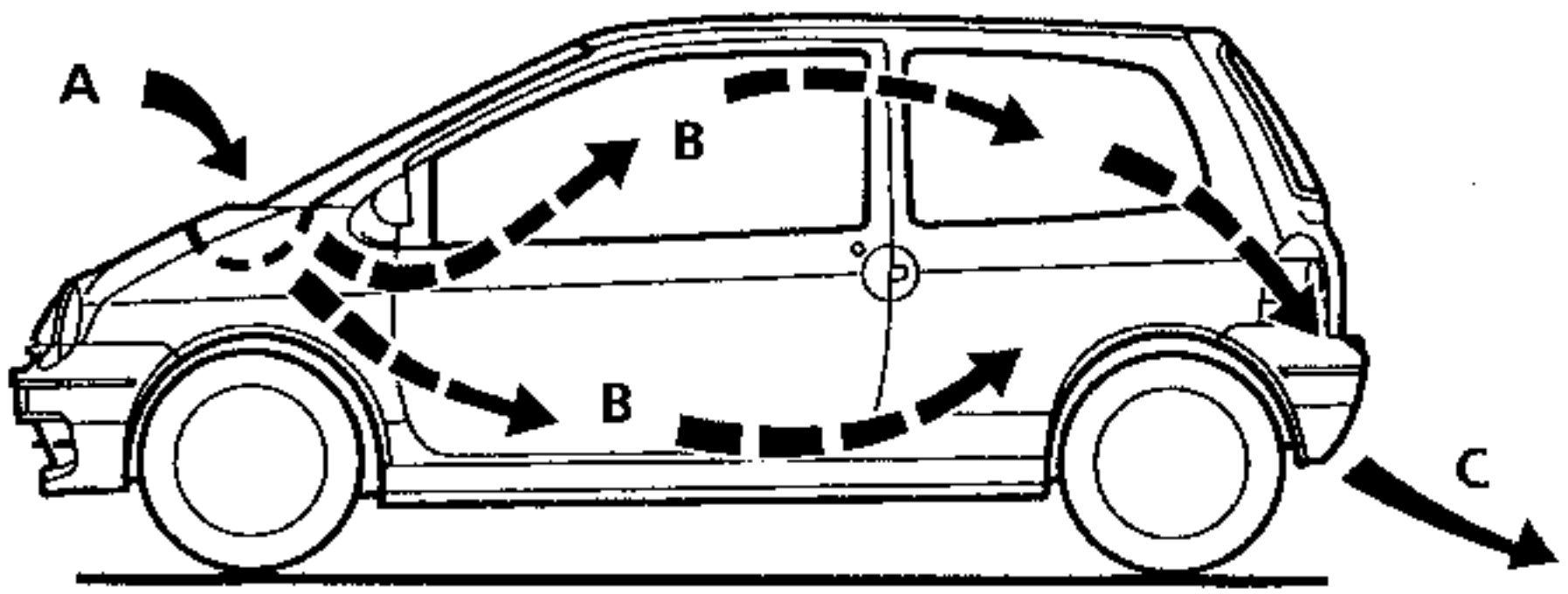
For:
- precautions,
- filling,
- and bleeding,

refer to Chapter 19 of M.R. 305.

ATTENTION : with the ignition on, after reconnecting the battery, wait for 10 seconds before starting the engine (injection computer programming).



AIR CIRCULATION



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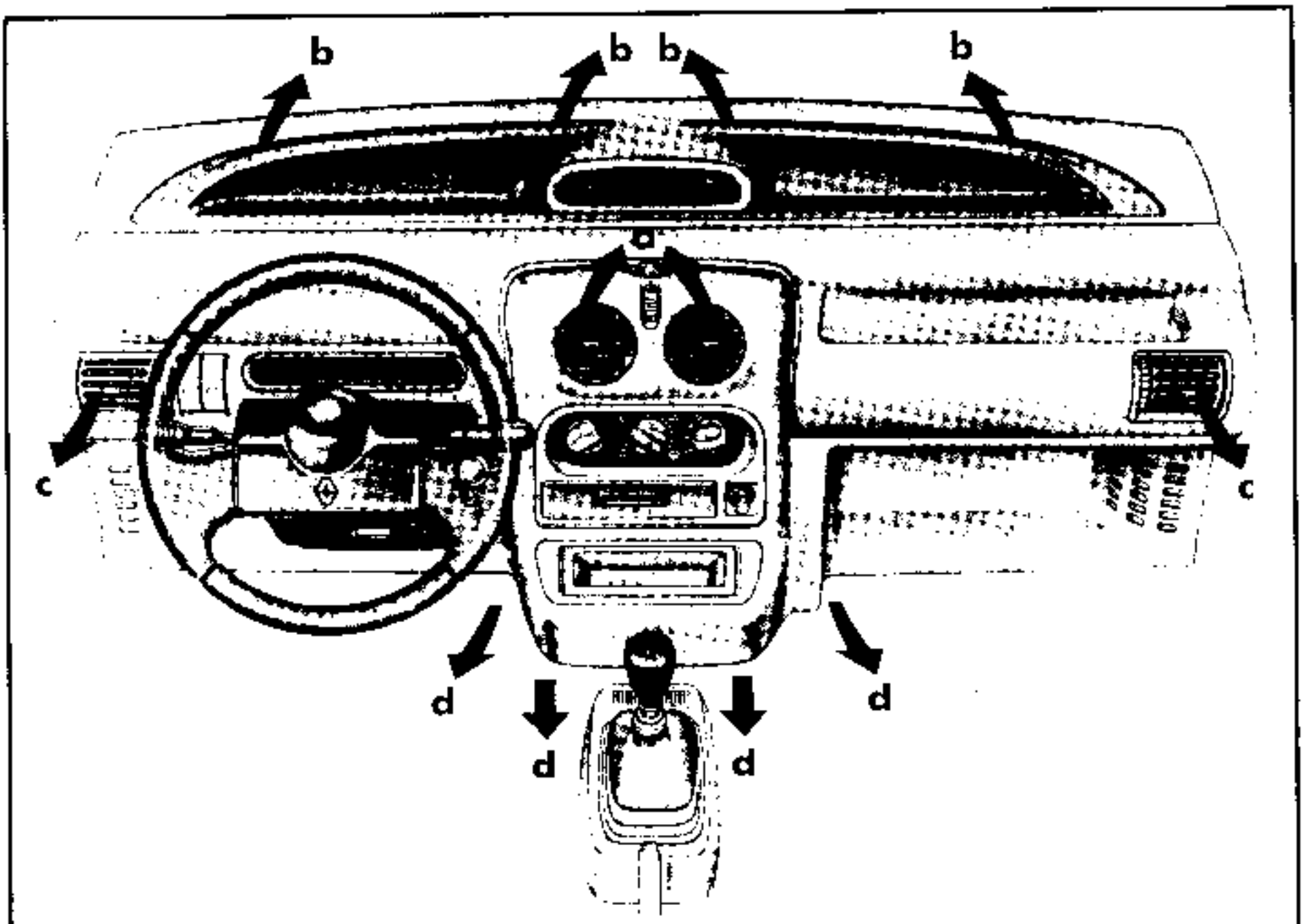
A External air inlet
B Distribution of air in the passenger compartment
C Extraction of air through the luggage compartment

AIR DISTRIBUTION



a Central ventilator outlets
b Windscreen de-mister / de-icer outlets
c Side ventilator outlets
d Footwell ventilator outlets

A Passenger compartment

B Engine compartment

C External air

D To air mixing unit

E Scuttle panel

F External or recycled air

1 **SANDEN SD 7 H 15** compressor

2 Condenser

3 Freon reservoir

4 Trifunction pressostat

5 High pressure bleed

6 Pressure release valve

7 Pressure release valve thermostatic regulator

8 Evaporator

9 Low pressure bleed

10 Passenger compartment fan

11 Engine cooling fan

12 Engine cooling radiator

13 High pressure liquid

14 Low pressure vapour

15 High pressure vapour

CONSUMABLES

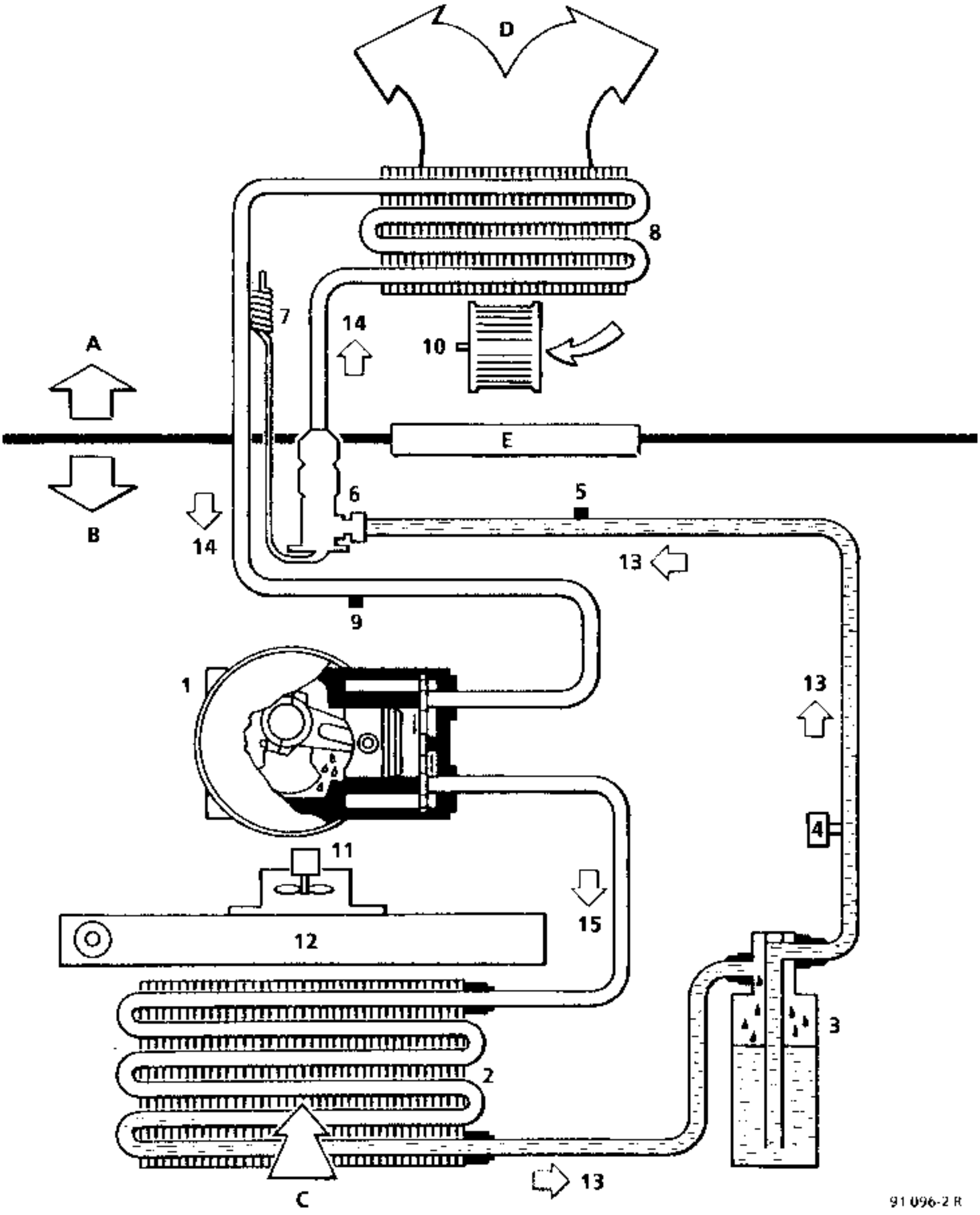
Refrigerant fluid :

R 134a : 650 g ± 35 g

Compressor oil :

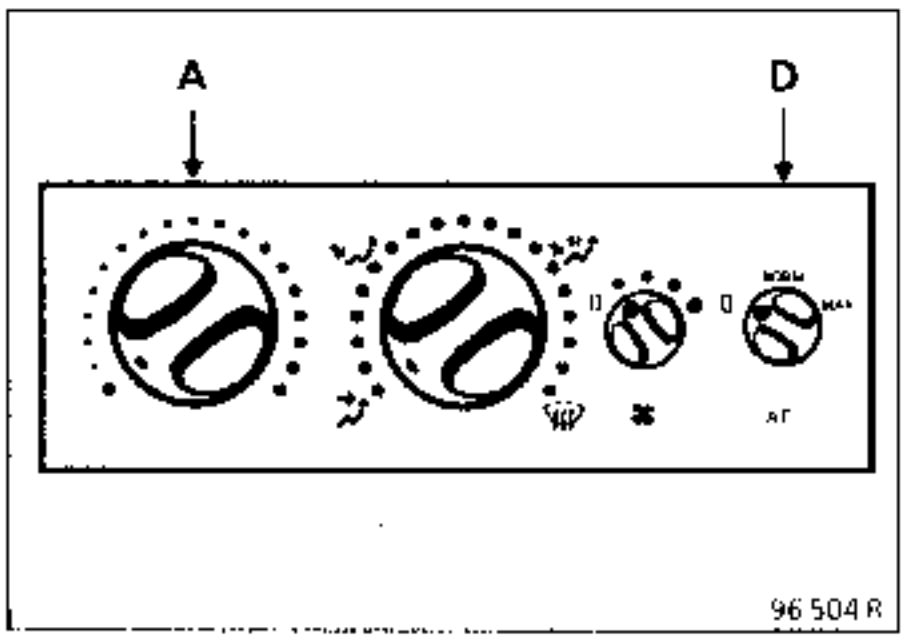
PAG SP20 : 135 cm³ ± 15 cm³

AIR CONDITIONING PRINCIPLE



TEMPERATURE CONTROL (A)

This control has the same function as described in the "Heating" section, when the air conditioning control (D) is on position 0.



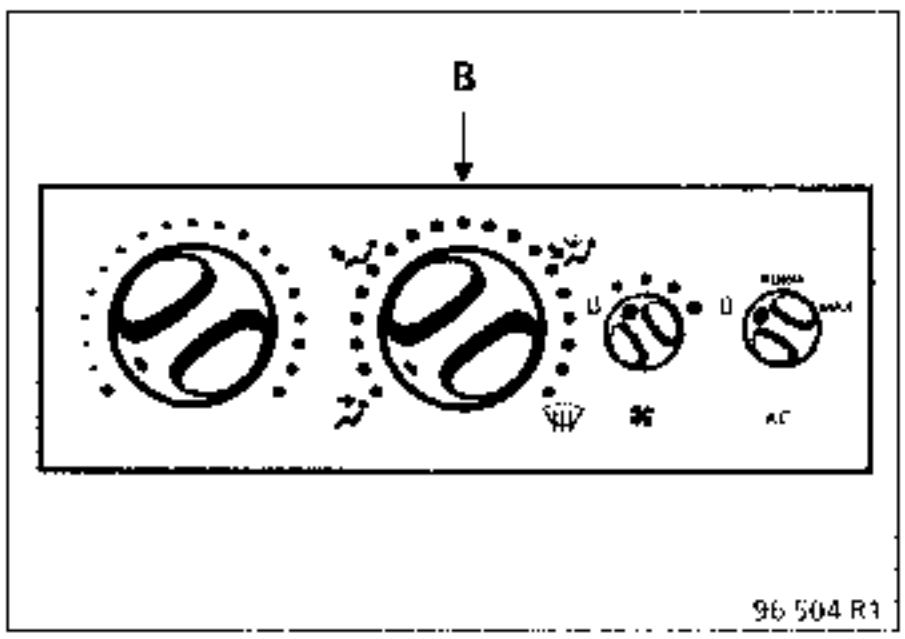
When the air conditioning control (D) is on position **"NORM"** or **"MAX"**, the air is first cooled and dried as it passes through the evaporator, then some of the air is heated as it passes through the radiator.

When control (A) is set to the far left, the air is not heated, so the minimum temperature possible is obtained.

Moving the control to the right allows the air temperature to be adjusted.

AIR DISTRIBUTION KNOB (B)

This control has the same function as described in the "Heating" section.



Operating details (see air distribution diagram)

Position

The air flow is only directed to the dashboard ventilators (a) and (c).

Each ventilator has three settings :
- open or closed,
- up or down,
- left or right.

Position

The air flow is directed to the footwell ventilators (d) and the dashboard ventilators (a) and (c).

Position

The air flow is directed to all the ventilators (a), (b), (c) and (d).

Position

The air flow is directed to the windscreen ventilators (b), and the dashboard ventilators (a) and (c).

For efficient windscreen demisting or de icing ventilators (a) and (c) should be closed.

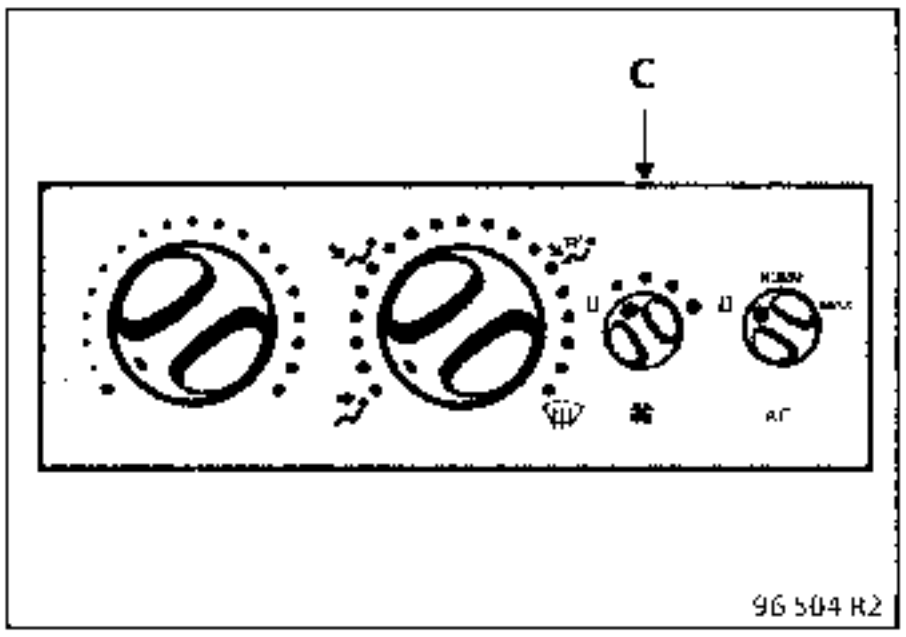
FAN SPEED CONTROL (C)

Ventilation is by blown air. The air flow circulating in the passenger compartment is determined by the four positions of the control (C).

Position 0

The ventilation system is not operating, the air inlet is closed by the recycling flap. The air conditioning system cannot be used.

This position isolates the system, whatever the positions of the other controls.



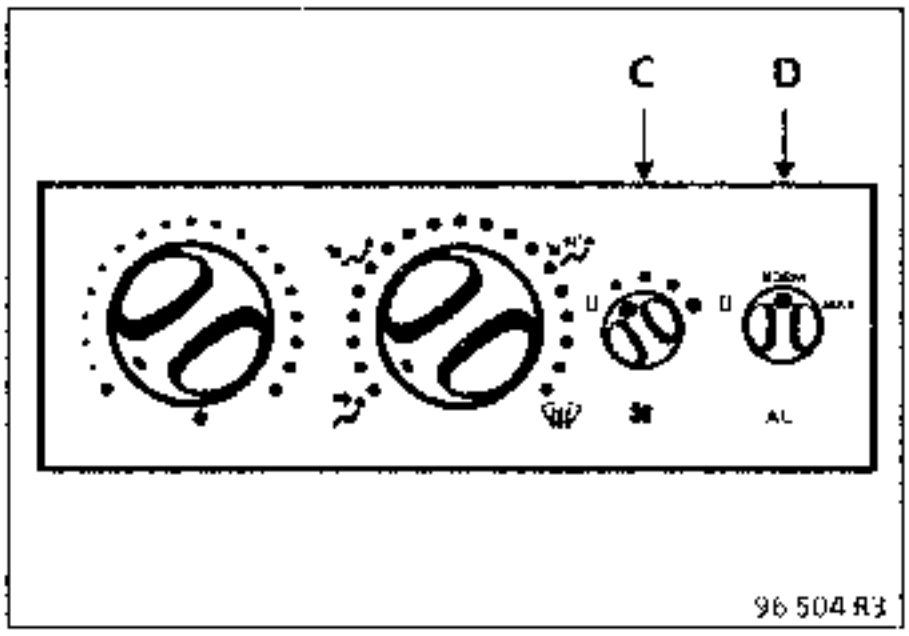
96 504 R2

NOTE: to improve the efficiency of the windscreen demisting and de-icing, the fan speed control (C) should be set to the last but one position.

AIR CONDITIONING CONTROL (D)

This control starts or stops the air conditioning system.

Its use allows :
- the temperature of the air in the passenger compartment to be lowered,
- the humidity of the air blown in the passenger compartment to be reduced (improves de-misting).



96 504 R3

Position 0

The air conditioning system is not operational - the system has the same functions as for a vehicle without air conditioning.

"NORM" Position

The air conditioning system is operational. This is the normal position for use. Fresh air is taken from outside the vehicle and is constantly renewed.

"MAX" Position

The air conditioning system is operational. Air is taken from the passenger compartment and is constantly recirculated. No external air is used.

This allows the temperature in the vehicle to be lowered quickly and permits the passenger compartment to be isolated from the external atmosphere (driving in a polluted area)

Prolonged use of this position may cause the air in the passenger compartment to become stale (smokers).

It is therefore advisable to return to the **"NORM"** position as soon as the polluted area is left behind or the required temperature is reached.

NOTE : The air conditioning control only operates the system if the fan speed control (C) is set to a position other than 0.

AIR CONDITIONING
Component list

+ APC : + after ignition
+ AVC : + before ignition
+ Servitudes : + Accessories

MK : Front left hand pillar earth

MH : Engine earth

R212 : Engine / passenger compartment earth (monoblock)

6 : Passenger compartment fan electronic module

19 : Electronic thermostat

120 : Injection computer

164 : Cold air blower

171 : Air conditioning compressor solenoid clutch

206 : Trifunction air conditioning pressure switch

233 : Passenger compartment fan control relay (low speed - marked B*)

234 : Main control relay for fan (high speed - marked A*)

248 : Fan temperature switch

260 : Fuse box

262 : Engine cooling fan

319 : Control panel

320 : Passenger compartment fan

321 : Fan circuit resistance (air conditioning function)

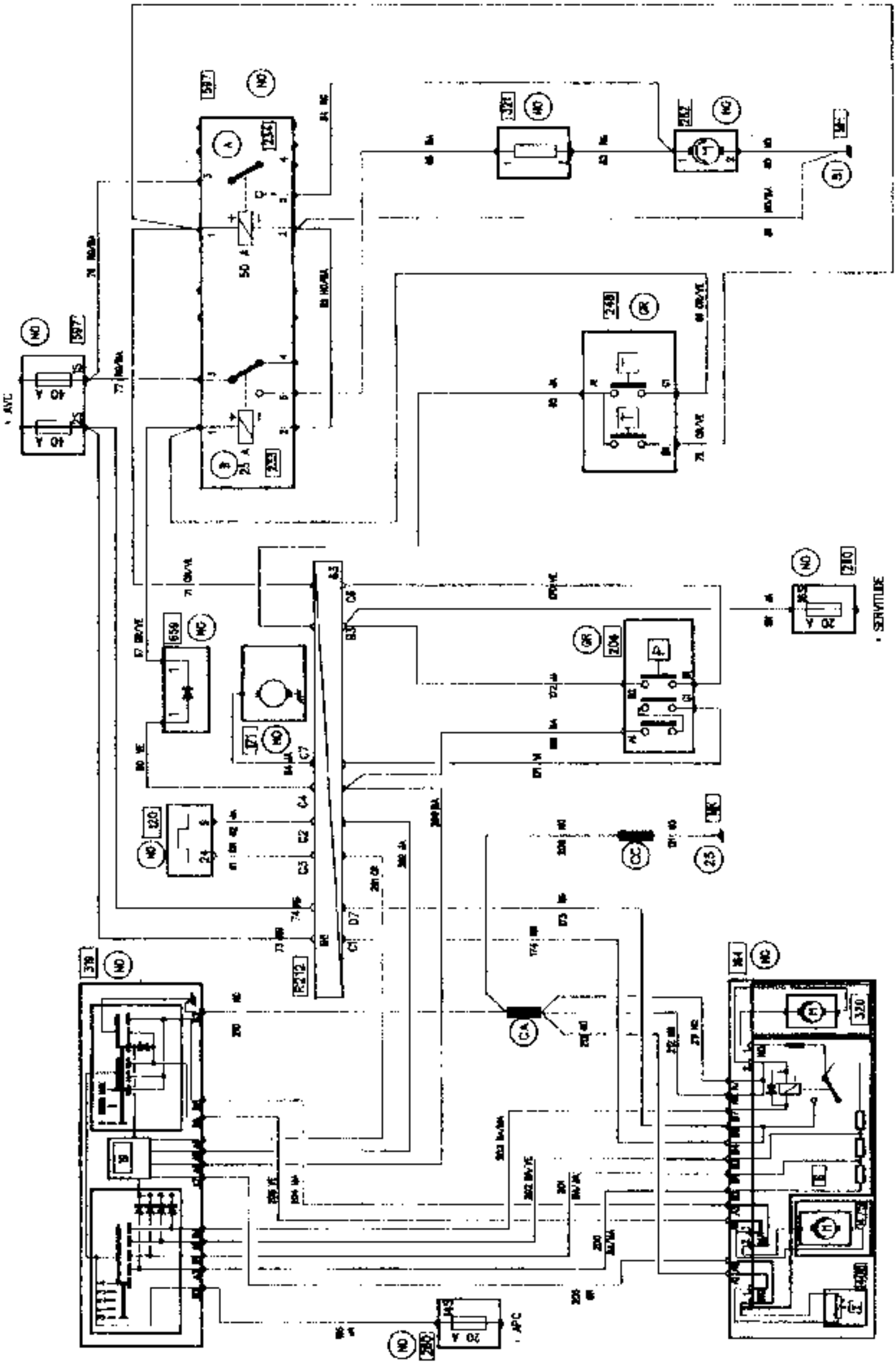
408 : Evaporator temperature sensor

475 : Recycling control motor

597 : Engine fuse box

659 : Air conditioning / ventilation separation diode

(*) Marks moulded on the surface of a block which houses two relays.



96 513 SC

Starting and stopping the operation of the air conditioning compressor and fan causes important changes in the mechanical engine load.

These variations in power absorbed (from 0 to 5 kW) affect the levels of consumption and depollution and includes engine speed stability.

To manage these effects and to ensure operating safety, a dialogue between the injection and air conditioning computers must be established.

There are two types of communication signal :
- air conditioning to injection (track 9),
- injection to air conditioning (track 24).

To improve engine speed stability when the compressor clutch operates, the injection computer is informed of each change in operation (on/off) so that the idle speed and injection timing may be adjusted a fraction of a second before the compressor clutch operates.

To improve engine performance or in certain cases for safety reasons, the injection computer informs the air conditioning computer of when the compressor clutch should not operate (full load).

This information is given in two signals :

AIR CONDITIONING STATUS = 0 : the air conditioning compressor clutch **may be fed**.

AIR CONDITIONING STATUS = 1 : the air conditioning compressor clutch **may not be fed**.

This signal allows the injection computer to manage its timing (retarded when the engine is started and turned off)

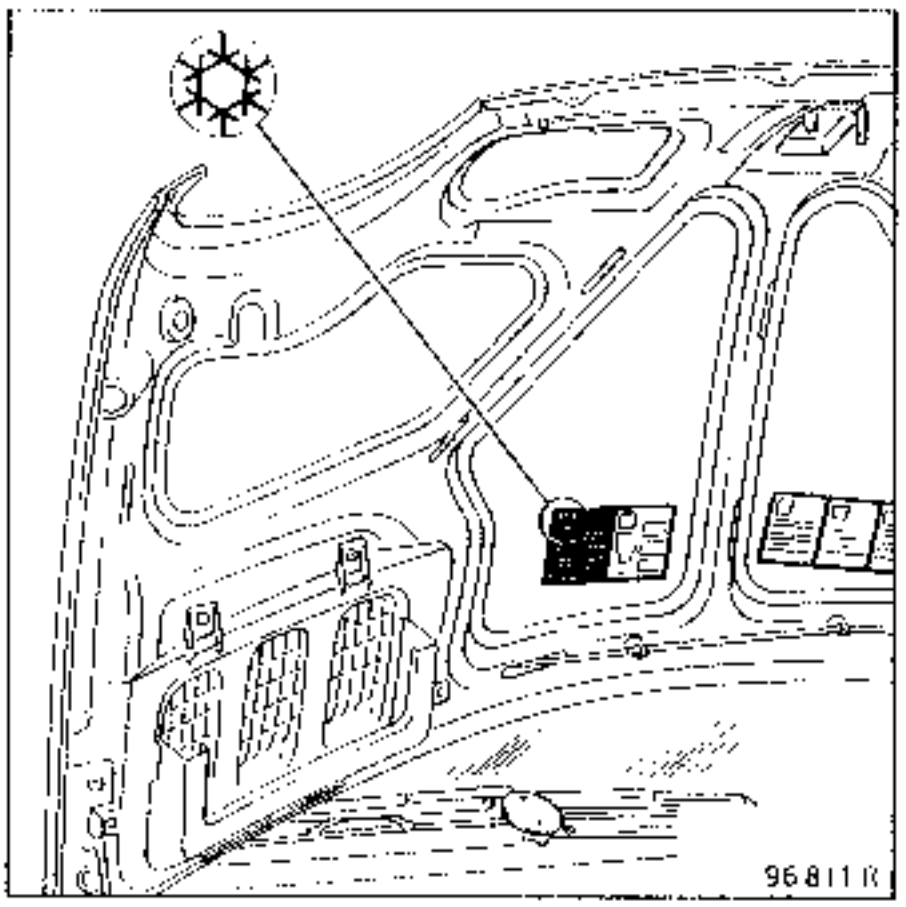
For more details, refer to Technical Note **N° 2024** - Part Number **77 11 096 996**.

AIR CONDITIONING
Information on refrigerant R134a

In order to protect the environment the Authorities have specified that refrigerant R 134a should be used in the air conditioning system fitted to this vehicle

The use of this new product, which was first used on the Twingo, has led to a modification of the design of the air conditioning system components.

A label on the bonnet shows the specifications of the refrigerant fluid.



The section "Air conditioning - **New refrigerant R134a**" contains more detailed information on this modification.

The most important specification concerns the **exclusive use of SANDEN oil** for the compressor and the fitting of pipes for the circuit. This oil is packaged in **cans of 250 ml** and is available from the Parts Department under Part Number **77 11 143 700**.

NOTE : in **R134a** circuits, the oil enters the refrigerant circuit in an emulsion, giving the fluid a milky appearance which prevents fault finding using the filling inspection window.

CUSTOMER COMPLAINTS

- Air distribution fault — **Chart 2**
- Heating efficiency fault — **Chart 3**
- Air flow fault
  - Air distribution control on footwell position — **Chart 4**
  - Air distribution control on de-icing position — **Chart 5**
  - Air distribution control on ventilation position (mixing flap in maximum hot position) — **Chart 6**
  - Air distribution control on ventilation position (mixing flap in maximum cold position) — **Chart 7**

- Controls stiff to operate — **Chart 8**
- Passenger compartment smells — **Chart 10**
- Heating fault (mixing flap in maximum hot position)
  - No hot air — **Chart 11**
  - Too much hot air — **Chart 12**

- De-icing / de-misting efficiency fault (mixing flap in maximum hot position) — **Chart 13**
- Air conditioning fault (mixing flap in maximum cold position)
  - No cold air — **Chart 14**
  - Lack of efficiency — **Chart 15**
  - Too much cold air — **Chart 16**

- Recycling flap does not work — **Chart 17**
- Ventilation fan does not operate correctly — **Chart 18**
- Cooling fan does not operate correctly — **Chart 19**

Chart 1 and Chart 9 : only concern versions without air conditioning

e06061 0

Chart 2 : Air distribution fault

Set the fan to maximum speed,
and the temperature control to maximum cold.
Move the air distribution control and check the ventilation is in accordance with the selection.
Is this correct?

yes → Air distribution is correct.
Explain the system to the customer again if necessary with emphasis on certain points (example : close the ventilators to improve de-misting and de-icing...).

no

Visually check that moving the control moves the flaps (black pinions on right hand side of the assembly).
Is there movement ?

yes → Adjust the cable on the right hand side of the assembly

no

Check the cable connections to the assembly and the control panel
Repair if necessary
Does the fault persist?

no → Correct

yes

Check the moving parts on the control panel and the assembly (pinions, levers).
Is this correct?

no → Repair if possible or replace the assembly

yes

Remove the assembly and check the air distribution flaps. Replace the assembly if necessary.

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Chart 3 : Heating efficiency fault

Before taking any action ensure the customer is using the system correctly (see Driver's Handbook and specific M.R.).

Carry out a road test to verify the customer's complaint.
Is the test satisfactory?

— yes → Advise the customer on how to get the best from the heating system : do not set the system to maximum when starting the engine from cold, but increase the setting progressively

no

Visually check that moving the control moves the mixing flap (cable and blue lever).
Does the flap move?

— no → See Chart 2 "Air distribution fault" from (*)

yes

Visually check that the flap moves as far as it should.
Is this correct?

— no → Readjust the cable

yes

Check the cooling circuit is correctly filled and bled.
Check the circuit cleanliness, the pipes, connections and conformity.
Repair if necessary.
Does the fault persist?

— no → Correct

yes

Remove the engine thermostat and check it is not stuck in the open position
Replace the thermostat if necessary.
Does the fault persist?

— no → Correct

yes

(A)

NOTE : if, during the test, you note that the heating efficiency is very poor at high speed, replace the engine thermostat as it is opening under pressure.

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Chart 3 : Heating efficiency fault (cont)

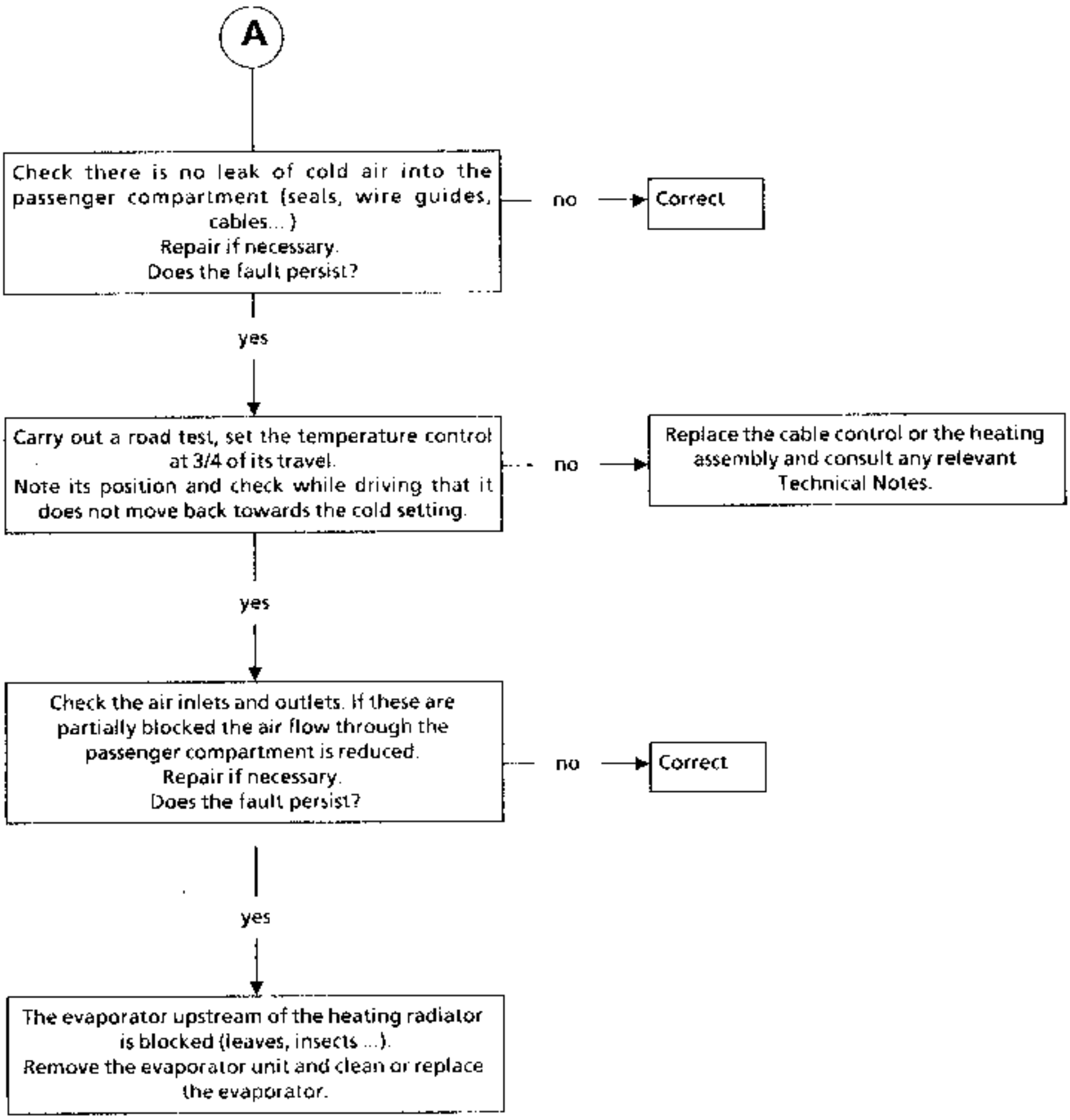

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Chart 4 : Air flow fault
(when the air distribution control is on position)

Check the air inlet circuit , scuttle panel, passenger compartment fan, heating casing (coolant reservoir)... Repair if necessary. Does the fault persist?

no → Correct

yes

Check the air extraction circuit. Repair if necessary. Does the fault persist?

no → Correct

yes

The evaporator upstream of the heating radiator is blocked (leaves, insects ...).
Remove the evaporator unit and clean or replace the evaporator

Chart 4 : Air flow fault
(when the air distribution control is on this position)

Check the air inlet circuit , scuttle panel, passenger compartment fan, heating casing (coolant reservoir)... Repair if necessary. Does the fault persist?

no → Correct

yes

Check the air extraction circuit. Repair if necessary. Does the fault persist?

no → Correct

yes

Check the upper section of the dashboard which contains the air vents is correctly aligned with the heating casing outlets Repair if necessary. Does the fault persist?

no → Correct

yes

The evaporator upstream of the heating radiator is blocked (leaves, insects ...).
Remove the evaporator unit and clean or replace the evaporator.

Chart 6 : Air flow fault
(when the air distribution control is on position and the air mixing control is on maximum hot.)

Check the air inlet circuit , scuttle panel, passenger compartment fan, heating casing (coolant reservoir)... Repair if necessary Does the fault persist?
— no → Correct

yes ↓

Check the air extraction circuit.Repair if necessary. Does the fault persist?
— no → Correct

yes ↓

Check the presence and connection of the ventilation ducts. Repair if necessary. Does the fault persist?
— no → Correct

yes ↓

The evaporator upstream of the heating radiator is blocked (leaves, insects ...).
Remove the evaporator unit and clean or replace the evaporator

Chart 7 : Air flow fault
(when the air distribution control is on position and the air mixing control is on maximum cold.)

Check the air inlet circuit , scuttle panel, passenger compartment fan, heating casing (coolant reservoir). . Repair if necessary. Does the fault persist?
— no → Correct

yes ↓

Check the air extraction circuit Repair if necessary. Does the fault persist?
— no → Correct

yes ↓

Check the presence and connection of the ventilation ducts. Repair

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Chart 8 : Controls stiff to operate

Check the cable route . Ensure the cable is free to move, not too taut, prevented from moving by clips or kinks etc ...
Replace the cable if necessary. Does the fault persist?

no → Correct

yes ↓

Unhook the cable from the assembly and check the operation of the control knob and the flap (mixing or distribution).
Is this correct?

no → Replace the control panel or the heating / ventilation assembly (if the controls are abnormally stiff)

yes ↓

If the stiffness seems to be highly abnormal, inform your local After Sales Head Office Technical Department

e060610

Chart 10 : Passenger compartment smells

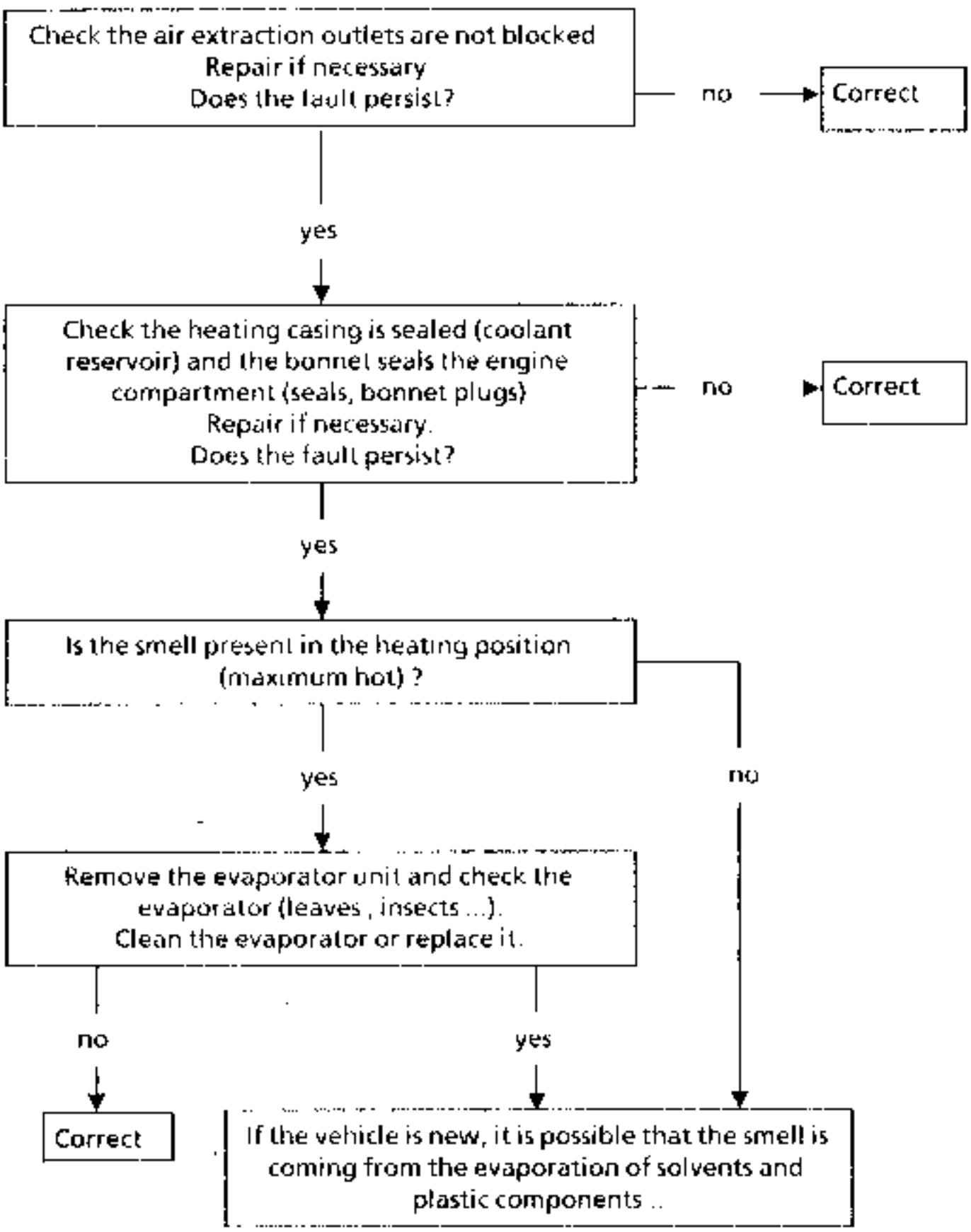

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Chart 11 : No hot air

Is there an air flow fault? — yes → See corresponding chart

no ↓

Check the level of coolant in the engine cooling circuit. Top up if necessary. Does the fault persist? — no → Correct

yes ↓

Visually check the condition of the coolant pipes and check the collars are correctly tightened. Repair if necessary. Does the fault persist? — no → Correct

yes ↓

Visually check that moving the control moves the flap. Does the flap move? — no → See Chart 2 "Air distribution fault" from (*)

yes ↓

Remove the evaporator unit and check the evaporator (leaves , insects ...).
Clean the evaporator or replace it.

Chart 12 : Too much hot air

Visually check that moving the control moves the mixing flap Does the flap move? — no → See Chart 2 "Air distribution fault" from (*)

yes ↓

Check the flap moves as far as it should. Adjust the cable (right hand side of the assembly).
Does the fault persist? — no → Correct

yes ↓

Check the operation of the engine thermostat.
Replace the thermostat if necessary.

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Chart 13 : De-icing / de-misting efficiency fault

Before taking any action check the customer is using the system correctly and remind him that de-icing efficiency is improved by closing the ventilators.
Check the inside of the windows are clean (greasy windows reduce de-icing efficiency).

Check the air extraction outlets are not blocked.
Repair if necessary.
Does the fault persist?

no → Correct

yes

Ensure there are no leaks in the passenger compartment which increase humidity and reduce de-icing efficiency.
NOTE : if there is a leak, after driving the vehicle, stopping it and leaving it for a few hours, condensation will form on the inside of the windows.

no ⋯→ Correct

yes

Is there an air distribution fault?

yes → See Chart 2

no

Is there an air flow fault?

yes → See corresponding chart

Chart 4	footwell position
Chart 5	de-icing / de-misting position
Chart 6	hot ventilation position
Chart 7	cold ventilation position

no

Is there a heating efficiency fault?

yes → See Chart 3 to "remove the thermostat..."

no

RECHECK YOUR DIAGNOSIS

e06061 0

Chart 14 : No cold air

Does the compressor clutch operate? — no → See Chart 14 continued.

↓ yes

Check that moving the heating control moves the mixing flap.
Does the flap move ? — no → See Chart 2 from (*).

↓ yes

Visually check the flap moves as far as it should
Adjust it necessary.
Does the fault persist ? — no → Correct

↓ yes

Connect the high pressure and low pressure gauges and check the pressures at idle speed with the air conditioning system on and the fan at speed 4.
If low pressure = high pressure the pressure release vale is fully open or low pressure ≤ 0 the pressure release valve is closed
If one of these two conditions is noted, replace the pressure release valve and replace the freon.
Does the fault persist ? — no → Correct

↓ yes

Replace the freon.
Note : Do not use the reservoir inspection window as with refrigerant 134A bubbles will always be seen especially for a temperature > 30 °C.
Does the fault persist after the repair ? — no → Correct

↓ yes

Replace the compressor

Chart 14 : No cold air (cont)

Does the compressor clutch operate?
- yes → See Chart 14.
- no ↓

Check the fuse or fuses (passenger compartment and engine compartment) Replace if necessary. Does the fault persist?
- no → Correct
- yes ↓

With the air conditioning system on maximum and the fan on speed 4, check the **+ 12 volts** feed to the compressor. Is there **+ 12 volts** ?
- no → See Chart 14 A.
- yes ↓

Check the compressor clutch resistance, (**R = 3.2 ± 0.5 ohms**) check the compressor earth and also the engine earth. Replace the clutch if necessary

e06061 0

Chart 14 A : No cold air

Run the engine at idle speed.
Connect the XR25 (injection fiche n° 23).
Enter code D13, ISO selector on S8.
Turn the air conditioning on
(passenger compartment fan and air conditioning on maximum).
Are bargraphs 17 right hand side and 18 left hand side illuminated?

no → See Chart 14 B.

yes

Is bargraph 18 right hand side illuminated?

no → The injection computer is preventing air conditioning operation, determine the cause (programming) or replace the computer.
If bargraph 17 right hand side is illuminated there is a short circuit to +12 volts on the line between track 24 on the computer and track A5 on the air conditioning panel.

yes

Run the engine at idle speed.
Run the air conditioning at maximum and the fan on position 4.
Check there is no voltage on track A5 of the the control panel connector.
Is there 0 volt ? (*)

no → Repair the wiring between track A5 on the control panel and track C3 on the connector of connection R212 and track 24 of the injection computer.

yes

Run the engine at idle speed.
Run the air conditioning at maximum and the fan on position 4.
Check for +12 volts on track A6 of the control panel connector.
Is there +12 volts ?

no → Chart 14 C

yes

(A)

(*) Operating programming and voltages for control panel connector

Compressor clutch	AC running track A2	AC off track A5
Engaged	12 V	0 V
Not engaged	0 V	5 V

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Chart 14 A : No cold air (cont)

(A)

Check for **+ 12 volts** on track A1 of the trifunction pressostat connector.
Is there **+ 12 volts** ?

yes → Shunt the trifunction pressostat between tracks A1 and C1 and check if the compressor operates.
Does the compressor clutch engage?

no → Check the wiring between track C1 of the pressostat and the compressor connector.

yes

no →

Repair the wiring between tracks :
- A1 pressostat → C4 connector for connection R212.
- C4 connector for connection R212 → A6 control panel connector.

Check there is **freon** in the circuit by pressing a filling valve
Note : **when the engine is cold (not running) the pressure gauges should show between 5 and 7 bar high pressure and low pressure for a workshop temperature of 20/25 °C.**
Is this correct?

yes → Replace the trifunction pressostat

no → Renew the freon in the circuit.

e06061 0

Chart 14 B : No cold air

With the air conditioning system operating (fan and air conditioning set to maximum). use a voltmeter to check on track C2 of the connector for connection R212 next to the battery for **12 volts**.
Is there + **12 volts** ?

no →

Under the same test conditions, check on track A2 on the control panel connector for **12 volts**.
Is there + **12 volts** ?

no →

Under the same test conditions, shunt the evaporator sensor.
Does the compressor operate?

yes → Replace the evaporator sensor

no → Replace the control panel

yes → Repair the wiring between track A2 of the control panel connector and track C2 of the connector for connection R212

yes

Turn the ignition off.
Connect bornier MS 1048 in the place of the injection computer.
Earth track 24 on the bornier
Turn the ignition on, turn the air conditioning on (fan and air conditioning set to maximum)
and check on track 9 of the bornier for **12 volts**
Is there + **12 volts** ?

no → Repair the wiring between track C2 of the connector for connection R212 and track 9 on the computer connector.

yes

Injection computer fault.

e06061 0

Chart 14 C : No cold air

Check the evaporator sensor.
Is it correct?

— no → Replace the evaporator sensor.

yes ↓

Check the continuity and insulation of the wiring between tracks :

Evaporator sensor
- A1 → AC wire joint → MK earth
- A2 → A7 on control panel connector

Repair if necessary.
Does the fault persist?

— no → Correct

yes ↓

Check the feeds to the control panel.

Control panel
- 83 earth → AC wire joint → MK earth
- 82 → 12 volts after ignition → passenger compartment fuse box.

Repair if necessary.
Does the fault persist?

— no → Correct

yes ↓

Replace the control panel

Chart 15 : Lack of efficiency

With the air conditioning and fan on maximum settings and the engine running at idle speed, does the compressor operate?
— no → See Chart 15 A.

yes

Check the tension of the compressor belt, the clutch air gap and its condition (slip may cause the fault) Retighten the compressor belt or replace the compressor clutch.
Does the fault persist?
— no → Correct

yes

Check the evaporator resistance 408 (*) Replace the sensor if necessary.
Does the fault persist?
— no → Correct

yes

Ensure the recycling flap is in the recycling position when the air conditioning is set to maximum.
(Visible through external air inlet).
Is this correct?
— no → The recycling flap does not work Chart 17.

yes

Check the mixing flap moves as far as it should, adjust the cable if necessary.
Does the fault persist?
— no → Correct

yes

Is there a passenger compartment ventilation fault ?
— yes → See Chart 18.

no

Is there an air flow fault?
— yes → See Chart 7 air flow fault.

no

(A)

(*) If the sensor resistance is incorrect :

1) Exceeds maximum limit. : The compressor operates too early which reduces its efficiency.
2) Exceeds minimum limit. : The compressor operates too late - the evaporator is icing up which reduces its efficiency and the air flow

e06061 0

Chart 15 : Lack of efficiency (cont)

(A)

Connect the high and low pressure gauges and check the pressure Vehicle stationary, engine running at idle speed and air conditioning on maximum.
If high pressure > **25 bar** there is:
- too much freon in the circuit,
- or the cooling fan is not working correctly,
- or the engine is overheating,
- or the condenser is dirty.

In these cases the compressor is operating via the high pressure pressostat.
Is the high pressure < **25 bar** ?

yes →

Use the high pressure gauge to check the fan control pressostat calibration is correct.
Pressure **14/19 bars ± 1.5 bar.**
Note : If the calibration is too high, the fan operates and stops too late, reducing the efficiency of the air conditioning system. Replace the pressostat if necessary. Does the fault persist?

no →

Correct

yes ↓

It is possible that humidity in the circuit has formed a plug of ice in the pressure release valve or that the pressure release valve is faulty. (Slight lack of gas in the bulb).
Replace the dehydrating bottle and the pressure release valve. Renew the freon in the circuit.

no ↓

Check the condenser is clean. Clean or replace the condenser.
Does the fault persist?

no →

Correct

yes ↓

Check the operation of the engine cooling fan at high speed (fan and air conditioning on maximum).
Operates if high pressure ≥ **19 bar ± 1.5**
stopped if high pressure ≤ **14 bar ± 1.5**.
Operates for a coolant temperature ≥ **92 °C**.
Is operation of the fan correct?

no →

See Chart 19 the engine cooling fan is not operating correctly.

yes ↓

Renew the freon in the circuit (1)
A possible cause of the fault is excess freon in the circuit

(1) Note : Excess freon in the circuit will cause the compressor to operate too early and reduces the efficiency of the air conditioning system.

e06061 0

Chart 15 A : Lack of efficiency (cont)

Air conditioning system and fan on maximum and engine running at idle speed
Does the compressor operate?

yes → See Chart 15

no ↓

Connect the high and low pressure gauges.
Check the operation of the engine cooling fan (air conditioning on maximum).
Operates if high pressure ≥ **19 bar ± 1.5**
stopped if high pressure ≤ **14 bar ± 1.5**.
Operates for a coolant temperature ≥ **92 °C**.
Is operation of the fan correct?

no → If the calibration of the cooling fan control pressostat is too high, the fan operates and stops too late, reducing the efficiency of the air conditioning system.
Replace the pressostat in this case.

yes ↓

With the windows and doors closed, when the vehicle is in a shady location, temperature ≥ **25 °C**, engine running at idle speed, passenger compartment fan and air conditioning on maximum. Check the temperature of the air blown from the central ventilator.
Is the temperature less than 10 °C ?

yes → Check the customer is using the system correctly. Re-explain if necessary.

no ↓

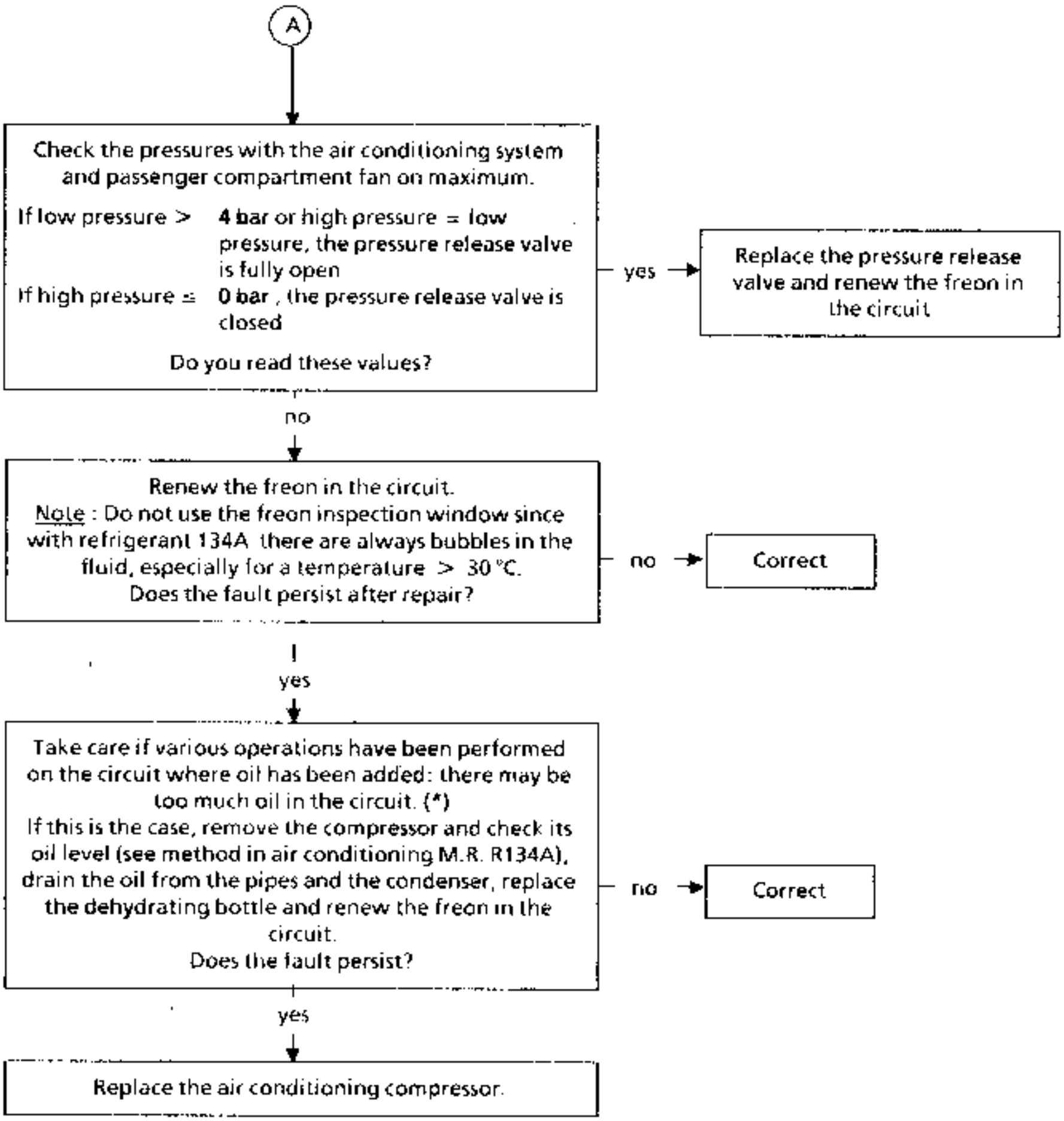
Check the resistance of the evaporator sensor (see MR)
Is this correct?

no → Replace the evaporator sensor

yes ↓

(A)

Chart 15 A : Lack of efficiency (cont)



(*) Warning - Type 709 compressors allow more oil to circulate in the circuit than compressor types 508 and 510. Do not use the dipstick to check the oil level.

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Chart 16 : Too much cold air

Is the compressor operating?
- no → Disconnect the evaporator sensor. Does the compressor stop?
  - no → Replace the control panel
  - yes → Check the evaporator sensor resistance (see chapter 62). Is this correct?
    - yes → Replace the control panel
    - no → Replace the evaporator sensor
- yes → Is the cooling fan assembly still operating ? (Normal if high pressure ≥ **19 bar ± 1.5** or coolant temperature ≥ **92°C**.
  - yes → Connect the pressure gauges and check the values for the pressostat (206) High pressure **14/19 bar ± 1.5 bar**. Replace the pressostat if necessary.
  - no → Check the evaporator resistance.
    Note : If the sensor is set below the minimum tolerance, this will cause the compressor to operate too late. Replace the sensor if necessary. Does the fault persist?
    - yes → Check to ensure the recycling flap remains in the recycling position. Move the control switch with the air conditioning on maximum and check to see if the flap moves. Does the flap move?
      - no → Chart 17 the recycling flap does not work
      - yes → (A)
    - no → Correct

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CHART 16 : Too much cold air (cont)

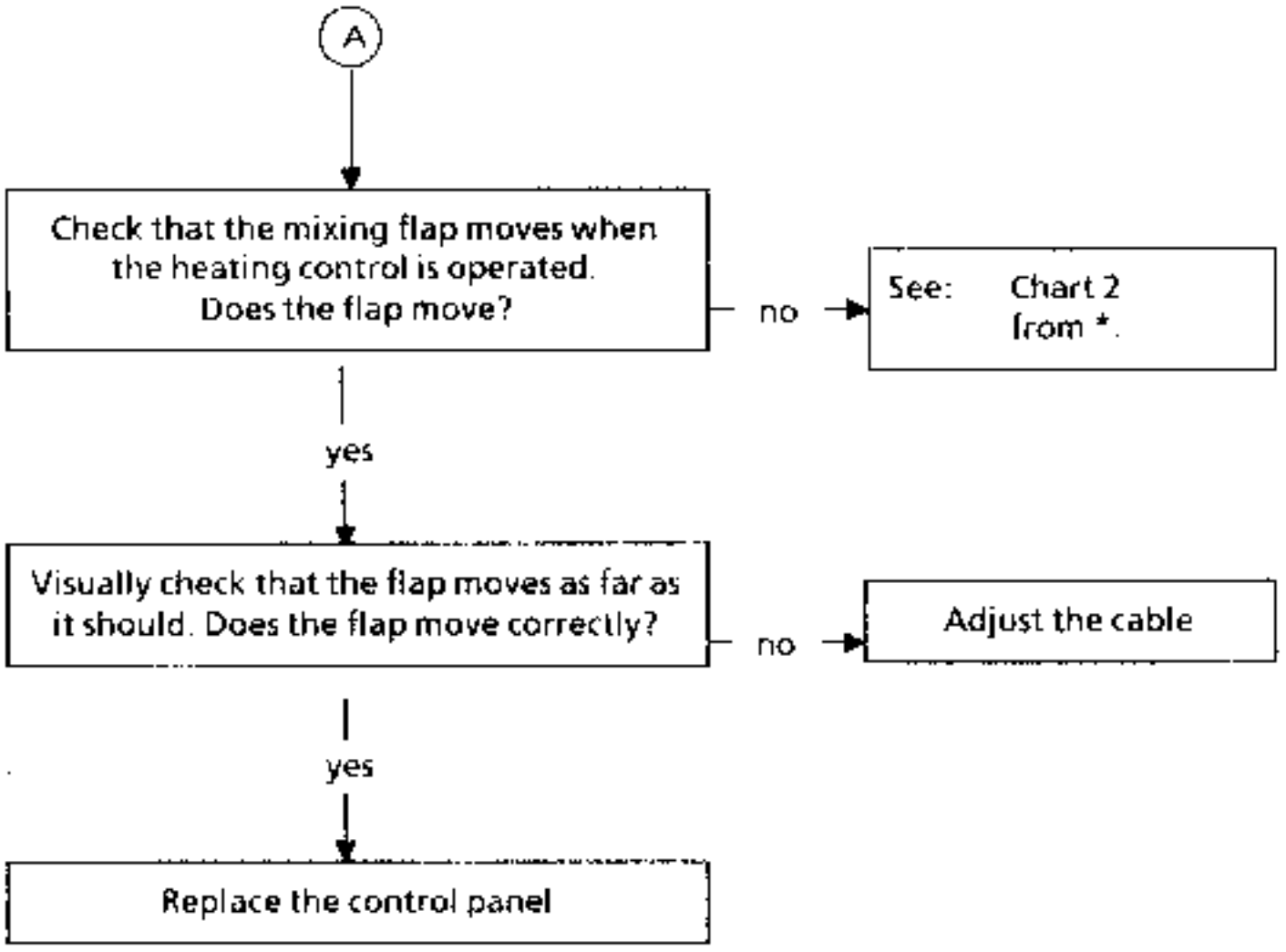

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Chart 17 : Recycling flap does not work

With the air conditioning system on maximum (fan on speed 1).
Check between tracks A3 and A5 on the black 13 track connector for the electronic module for **12 volts**
Is there **+ 12 volts** ?

yes →

Reconnect the 13 track connector.
Disconnect the brown 2 track connector from the recycling motor on the electronic module and check the module output voltage
Is there **+ 12 volts** ?

yes → Replace the recycling motor

no → Replace the module.

no ↓

Under the same test conditions
Check for **12 volts** on the control panel between tracks B5 and B6.
Is there **+ 12 volts** ?

no → Before replacing the control panel, check the feed and the 20 A fuse on the fuse board (passenger compartment side).

yes ↓

Repair the wiring between the following tracks:

control panel	B5 → A3	electronic module	
	B6 → A5		

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Chart 18 : Ventilation fan does not operate correctly (for 1 or more speeds)

Are all the fan speed settings not operating?

no → See Chart 18 A.

yes ↓

Disconnect the black 2 track connector from the passenger compartment fan on the electronic module and apply a 12 volts feed to the fan assembly. Does the fan assembly operate?

no → Replace the fan assembly

yes ↓

Check the earth connections on the electronic module for tracks A6 and A7 on the 13 track electronic module connector .
Are the earth connections correct ?

no → Repair the wiring between the 13 track connector for the electronic module and the MK vehicle earth.

yes ↓

Replace the electronic module

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Chart 18 A : Ventilation fan does not operate correctly
(for 1 or more speeds)

Check the **20 A** fuse.
Is the fuse correct?
— no → See Chart **18 B**.

yes ↓

Does the 4th passenger compartment fan speed operate correctly?
— no → Repair

yes ↓

Check the control panel feeds on the panel connector :
Tracks { B2 **+ 12 volts** after ignition
B3 earth
Is this correct?
— no → Repair the wiring between tracks:
Control panel { B2 » fuse board
B3 » AC wire joint » MK vehicle earth

yes ↓

Ignition on.
On the resistance module connector check for
+ 12 volts between tracks:
Fan control knob in position
1st speed between B2 and A6 or A7
2nd speed between B1 and A6 or A7
3rd speed between B3 and A6 or A7
Is this correct?
— yes → Replace the electronic module

no ↓

Ignition on
On the control panel connector check for
+ 12 volts between tracks :
Fan control knob in position
1st speed between A3 and B3
2nd speed between B1 and B3
3rd speed between A1 and B3
Is this correct?
— no → Replace the control panel

yes ↓

Repair the wiring between tracks:
Control panel { A3 → B2
B1 → B1
A1 → B3 } electronic module

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Chart 18 B : Ventilation fan does not operate correctly
(for 1 or more speeds)

Check the 40 A fuse (engine fuse board) Is this correct?
- no → **Replace the fuse**
- yes ↓

Ignition on, fan set to 4th speed, check for + 12 volts on the electronic module connector between tracks : B7 and A6 or A7. Is this correct?
- no → **Ignition on, fan set to 4th speed, check for + 12 volts on the control panel connector between tracks : B4 and B3.** Is this correct?
  - no ↓ **Replace the control panel**
  - yes ↓ **Repair the wiring between track B4 on the control panel and track B7 on the electronic module.**
- yes ↓

Ignition on, check for + 12 volts on the 13 track electronic module connector between tracks : B4 and A6 or A7, B5 and A6 or A7 Is this correct?
- no → **Repair the wiring between tracks :**
  - Electronic module A6 → AC wire joint → MK vehicle earth
  - Electronic module A7 → AC wire joint → MK vehicle earth
  - Electronic module B4 → Connector for connection R212
  - Electronic module B5 → Connector for connection R212
  - Connector for connection R212 C1 → Engine fuse box
  - Connector for connection R212 D7 → Engine fuse box
- yes ↓ **Replace the electronic module.**

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Chart 19 : Cooling fan does not operate correctly

The compressor operates

Check the fuses :
20 A on the fuse board passenger compartment side
– **40 A** on the fuse / relay board engine side
Is this correct?

no → Repair

yes ↓

Supply the cooling fan with **12 volts** feed
Does the fan operate?

no → Replace the cooling fan assembly

yes ↓

Turn the air conditioning system on, does the cooling fan operate at low speed?

no → See Chart 19 A (fan does not operate for 1st speed).

yes ↑

Shunt tracks B1 and B2 on the pressostat connector (vehicle wiring side).
Does the cooling fan operate at high speed?

yes → Connect the high pressure and low pressure gauges to the air conditioning circuit.
Air conditioning and passenger compartment fan on maximum.
Check the fan control pressostat calibration

High pressure ≥ **19 ± 1.5 bar** fan operates at high speed.

High pressure ≥ **14 ± 1.5 bar** fan operates at low speed.

Note : The fan also operates for a coolant temperature ≥ **92 °C**.

Run the engine at **2000 rpm**.
Is the pressure > **19 ± 1.5 bar** ?

yes → Replace the pressostat.

no → If the high pressure is low and does not reach the pressostat calibrated value, renew the freon in the circuit.

no ↓

Ignition on Shunt between B1 and B2.
Air conditioning and passenger compartment fan on maximum On the fuse / relay board, engine side shunt tracks 3 and 5 on the connector for relay 234
Does the cooling fan operate at high speed?

no → (B)

yes ↓

(A)

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Chart 19 : Cooling fan does not operate correctly (cont)

(A)

(B) → Check for **+ 12 volts** on track 3 of relay 234. Is there **+ 12 volts** ?

no → Repair the wiring between track 3 of the relay and the fuse / relay board on the engine side.

yes → Repair the wiring between tracks : 5 on relay 234 and the engine cooling fan.

Check for **+ 12 volts** between tracks 1 and 2 of relay 234 for the cooling fan assembly. Is there **+ 12 volts** ?

yes → Replace the relay

no → Is there **+ 12 volts** on track 1 of relay 234 for the cooling fan assembly?

yes → Repair the wiring between tracks : 2 for relay 234 and the MK earth

no → Ignition on. Is there **+ 12 volts** on track B2 of the trifunction pressostat connector?

no → Repair the wiring between tracks :
- B2 on the pressostat connector and B3 on the connector for connection R212.
- B3 on the connector for connection R212 and the fuse box.

yes → Repair the wiring between tracks :
- B1 on the pressostat connector and C6 on the connector for connection R212.
- C6 on the connector for connection R212 and 1 on the connector for relay 234 for the cooling fan assembly.

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Chart 19A : Cooling fan does not operate correctly (1st speed)

Ignition on Air conditioning and passenger compartment fan on maximum. On the fuse / relay board, engine side, shunt tracks 3 and 5 on the connector for relay 233. Does the cooling fan operate?

no → Check for **+ 12 volts** on track 3 on relay 233.
Is there **+ 12 volts** ?

no → Repair the wiring between track 3 on relay 233 and the fuse / relay board, engine side.

yes → Repair the wiring between tracks :
- 5 on relay 233 and 1 on the fan resistance (321).
- 2 on the fan resistance (321) and the cooling fan assembly or change the resistance R = **0.28** Ω.

yes

Check for **+ 12 volts** between tracks 1 and 2 on relay 233 for the cooling fan.
Is there **+ 12 volts** ?

yes → Change the relay

no

Is there **+ 12 volts** on track 1 on relay 233 for the cooling fan ?

no → Repair the wiring :
- between track 1 on relay 233 and the diode (659),
- between the diode (659) and track C4 on the connector for connection R212,
- replace the diode if necessary.

yes

Repair the wiring between tracks:
- 2 on relay 233 and track 2 on relay 234.
- 2 on relay 234 and MH vehicle earth

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REMOVAL

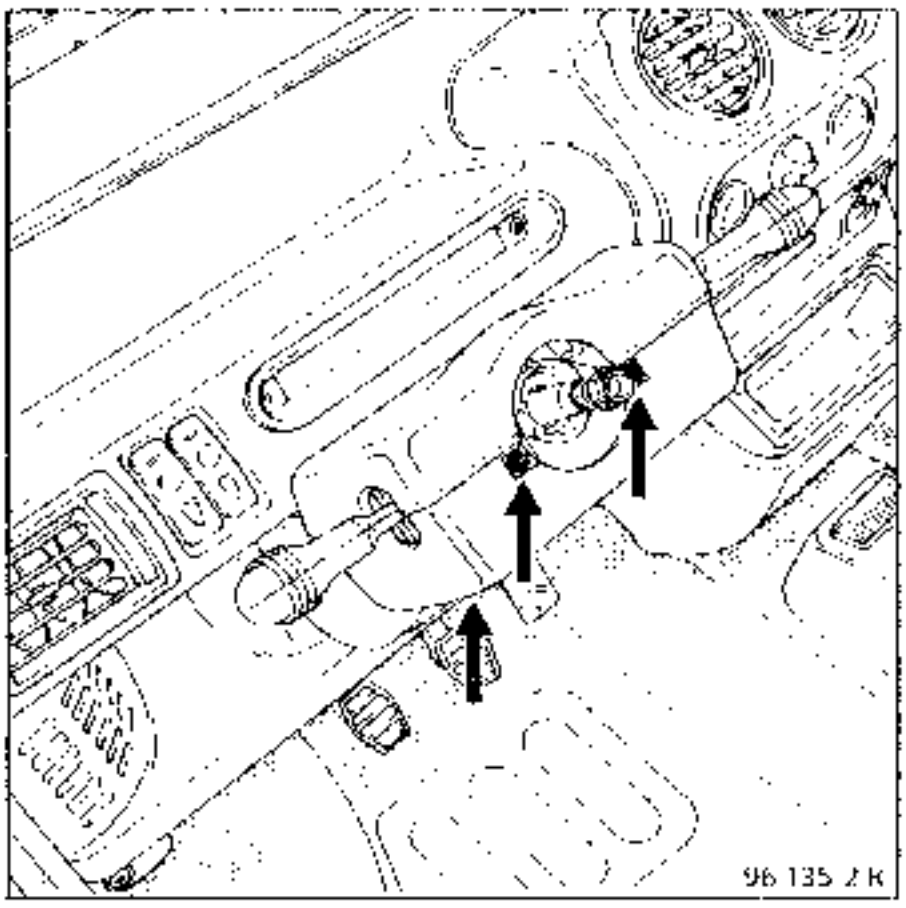
This operation requires the refrigerant circuit to be drained beforehand (method described in section "Air Conditioning - New Refrigerant R134a").

The dashboard must be removed to reach the evaporator unit.

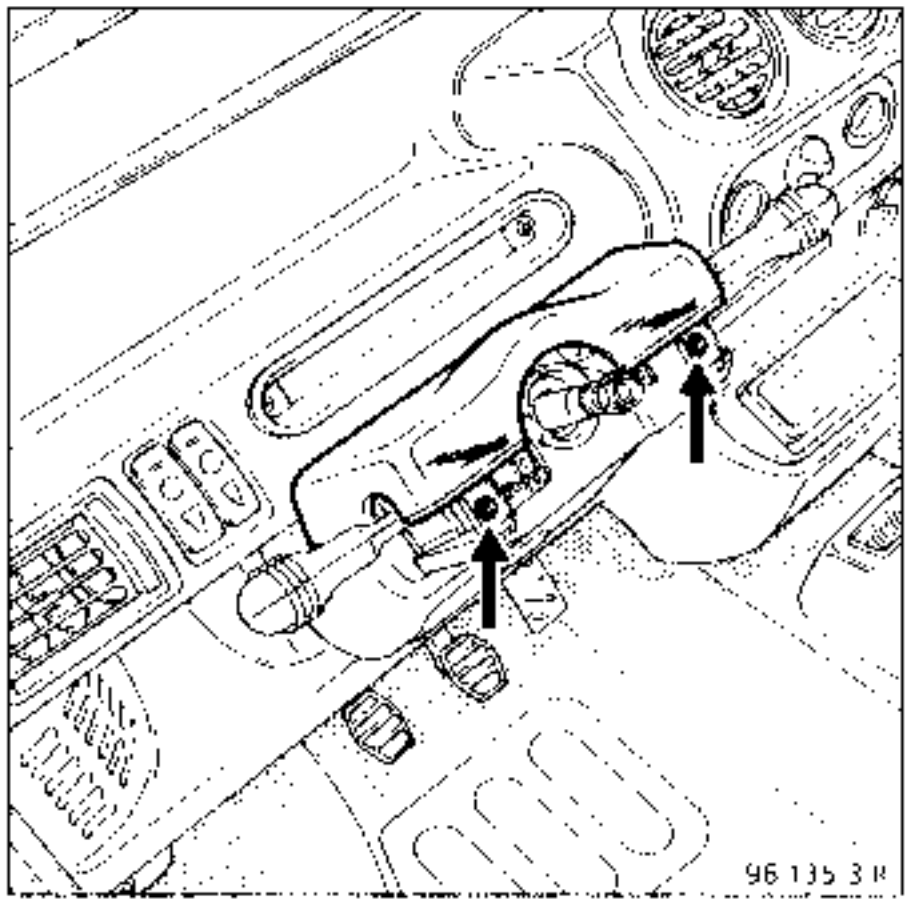
To do this :

Disconnect the battery.

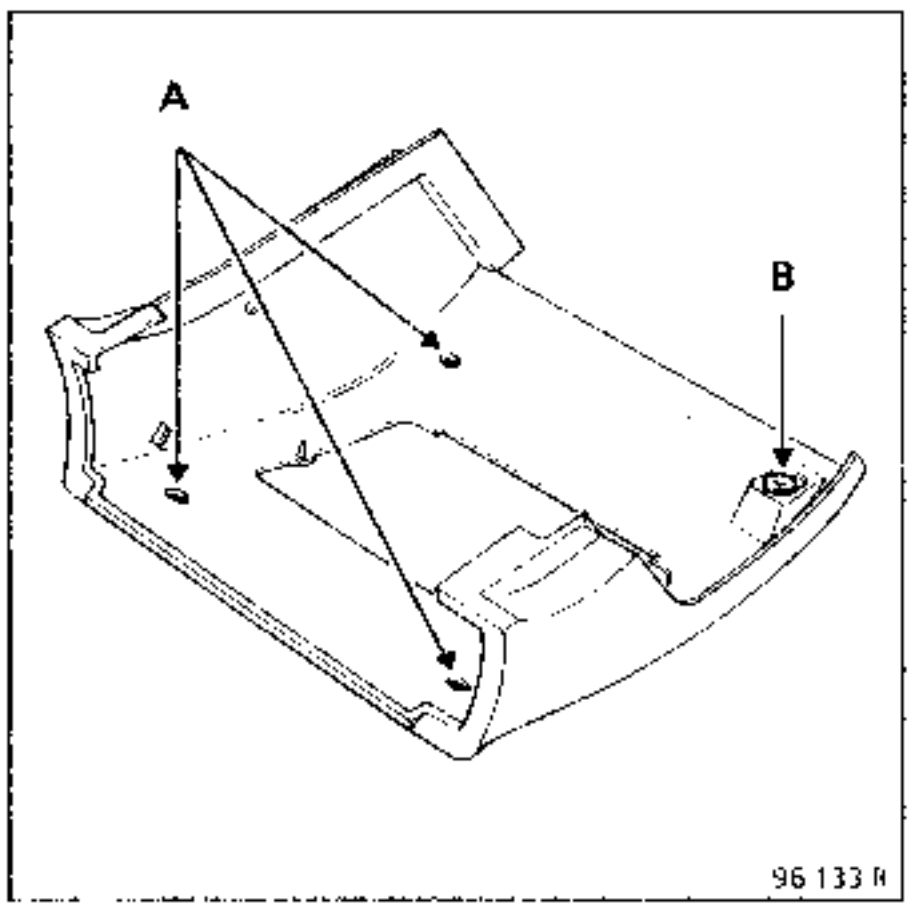
Remove:
- the steering wheel, after marking its position,
- the half cowling under the steering wheel,



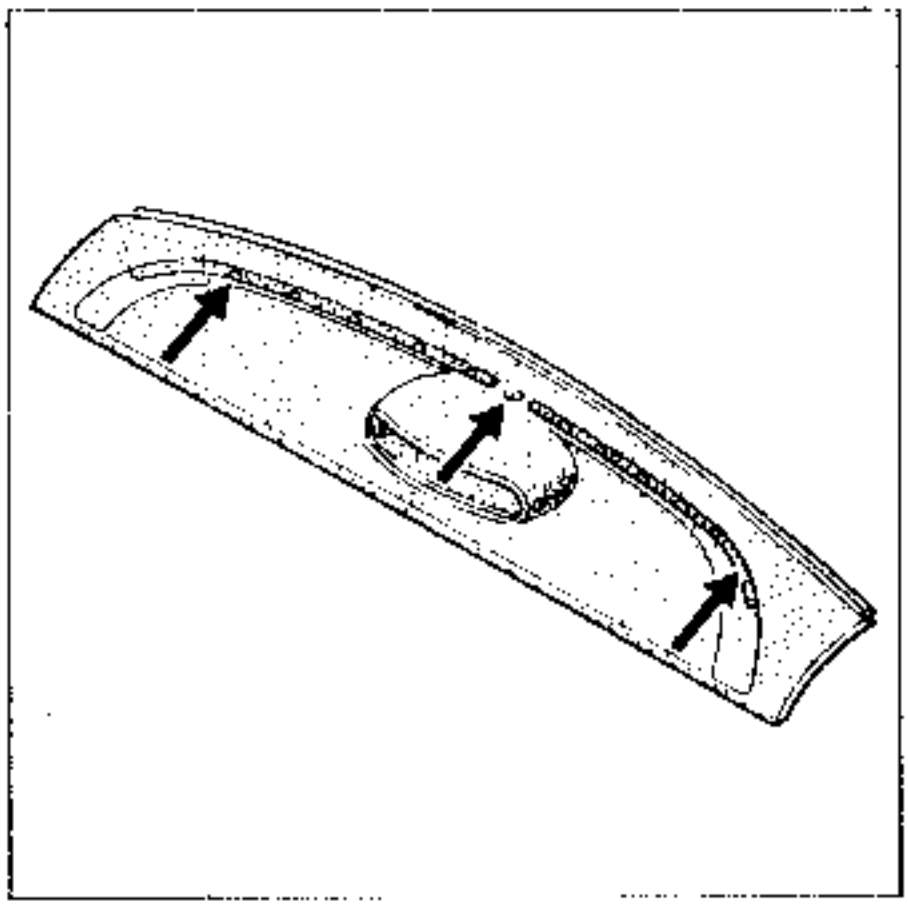
- the upper half cowling,

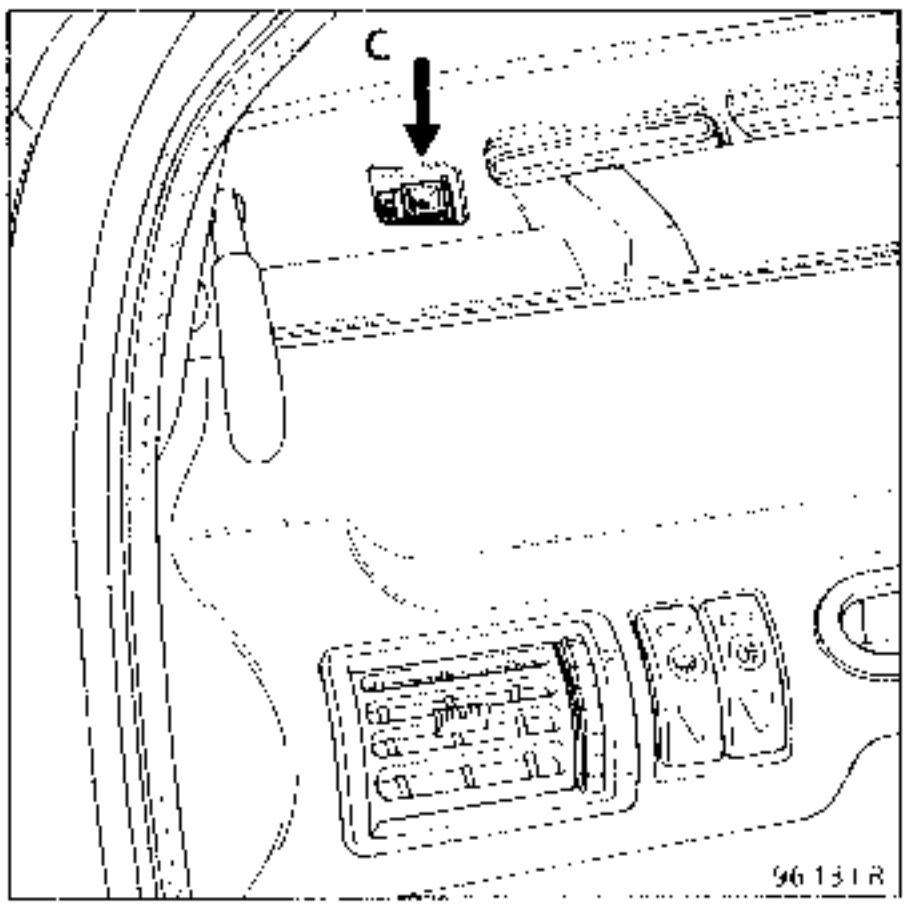


the steering wheel cover : three bolts (A) and one clip (B),

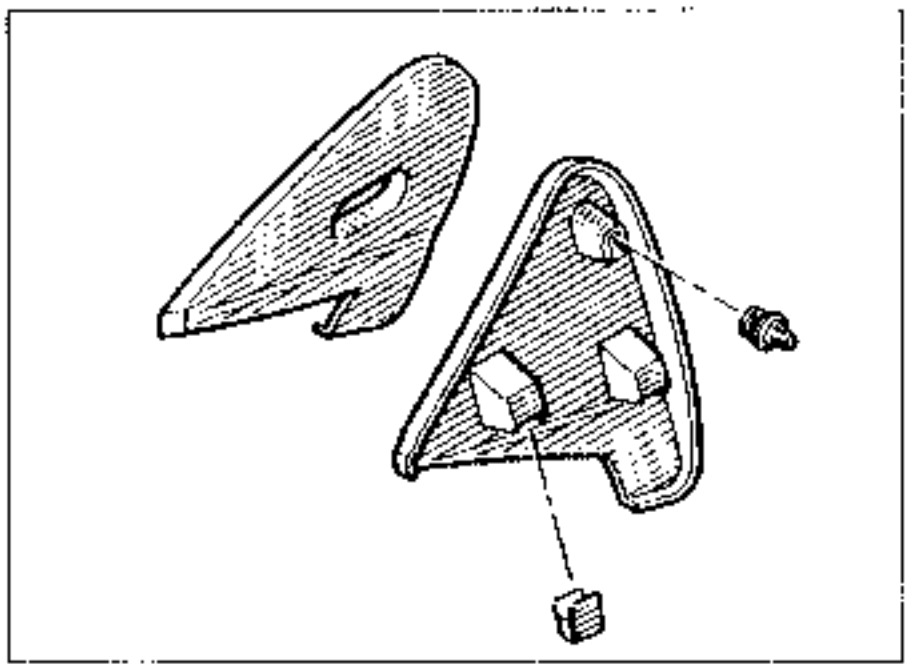


- the lights / windscreen wiper control,
the upper section of the dashboard (three bolts) Clips (C) slide to allow the upper section of the dashboard to be centred

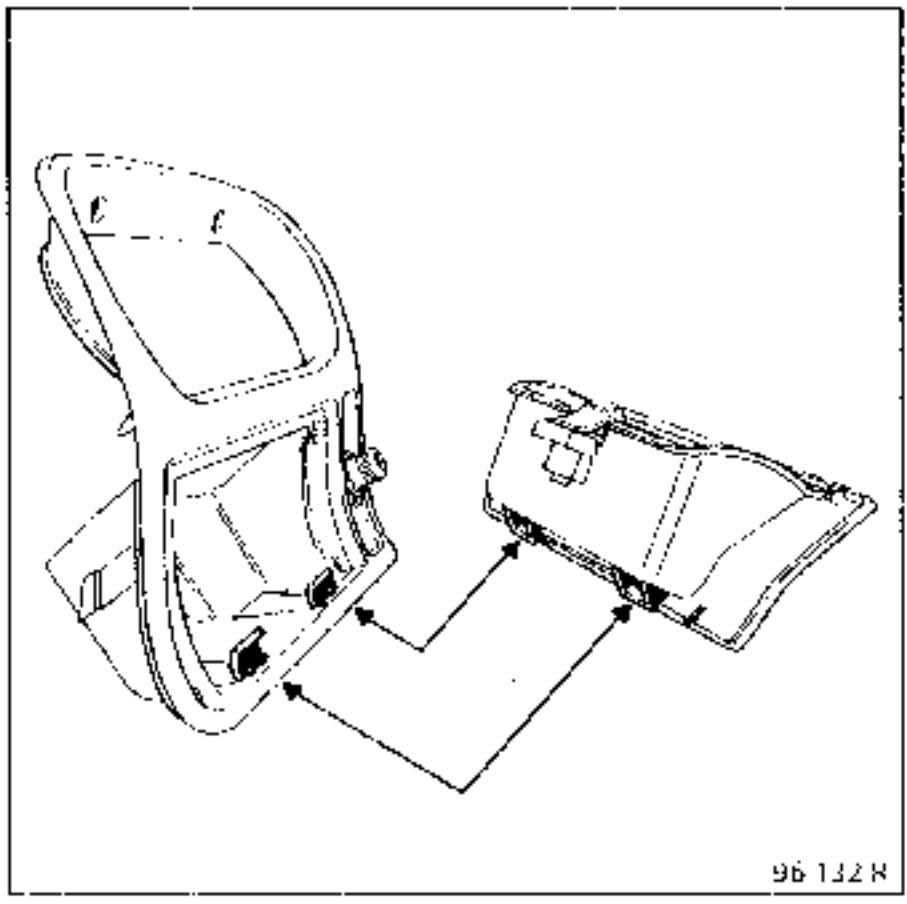




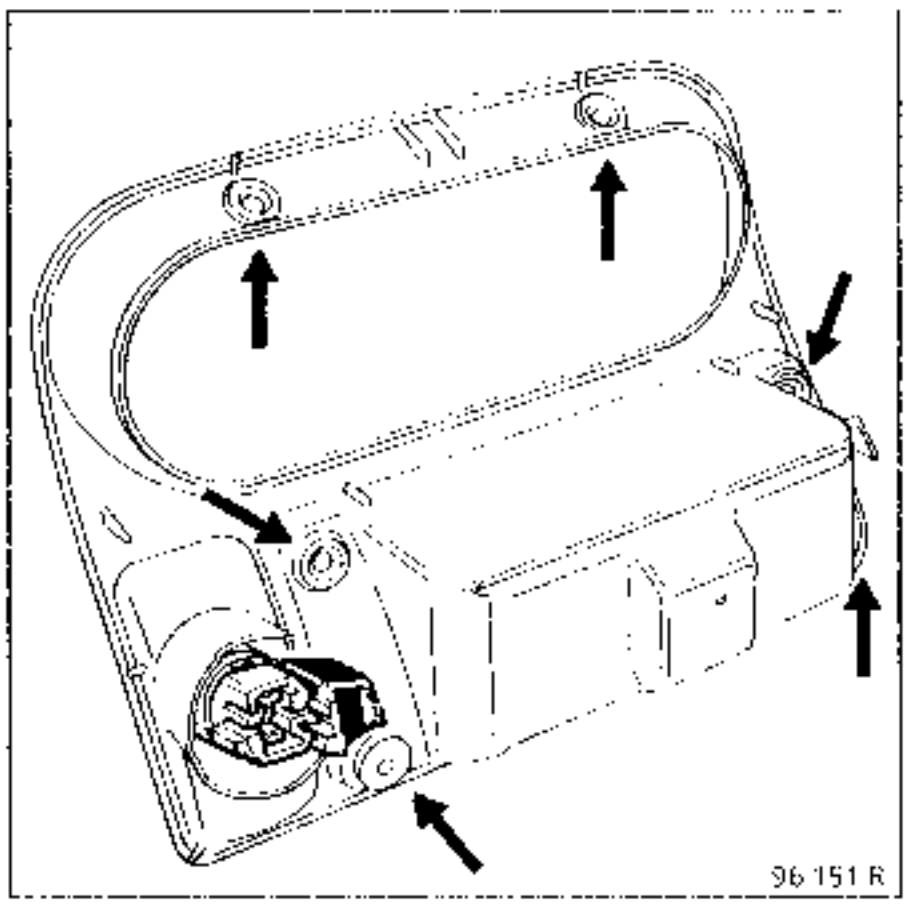
ATTENTION : protect or remove the rear view mirror cover trim.



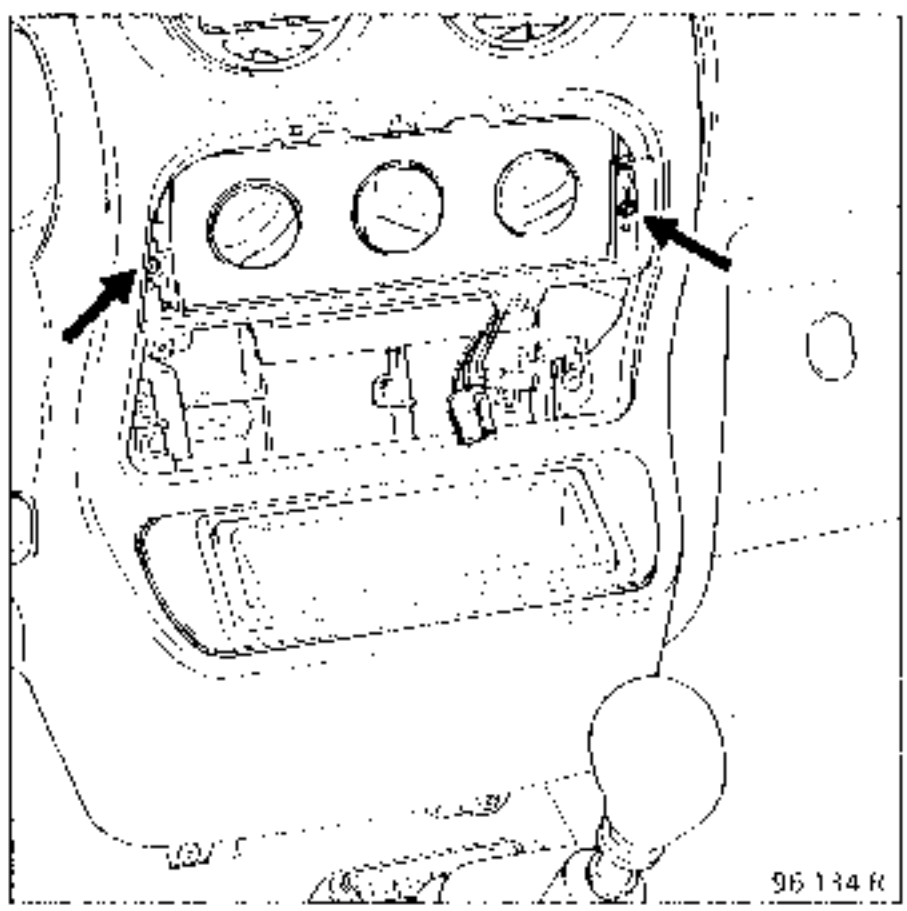
- the ashtray,



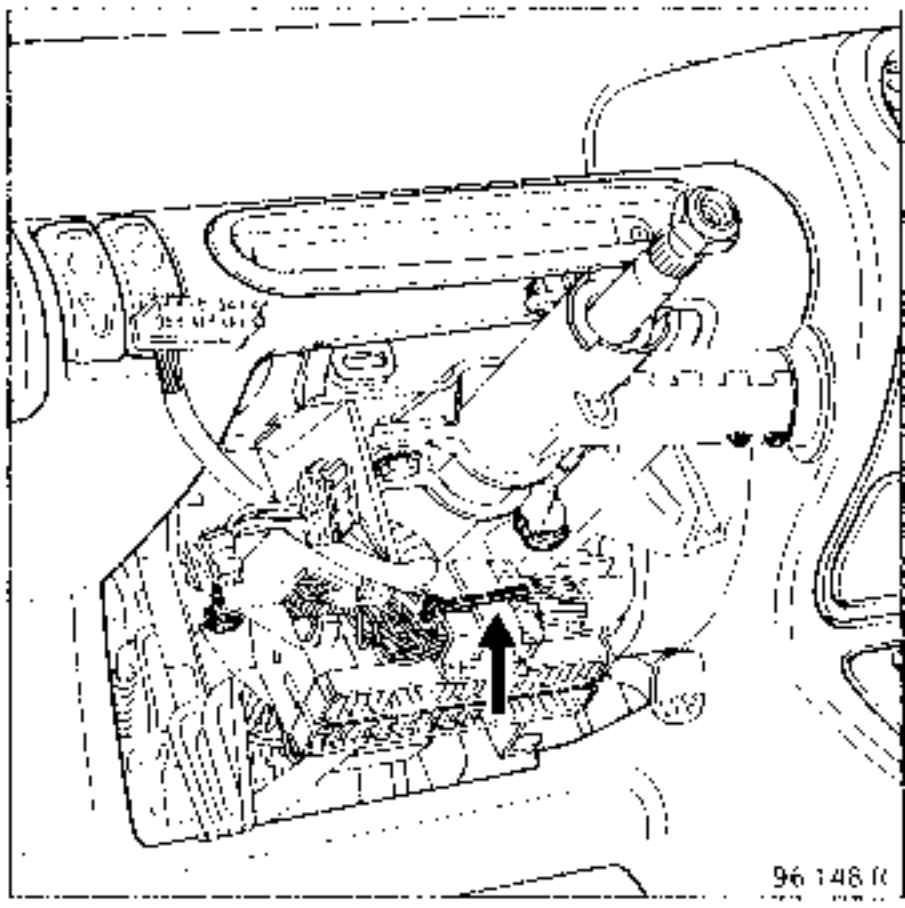
- the air conditioning control panel surround,



– the cigar lighter connectors,
· the control unit bolts.



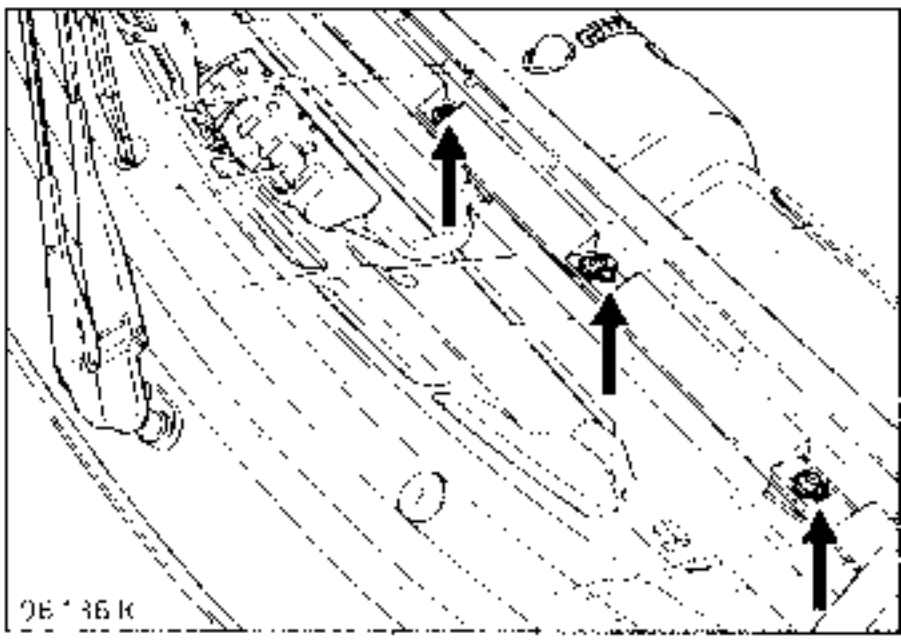
Disconnect the main wiring



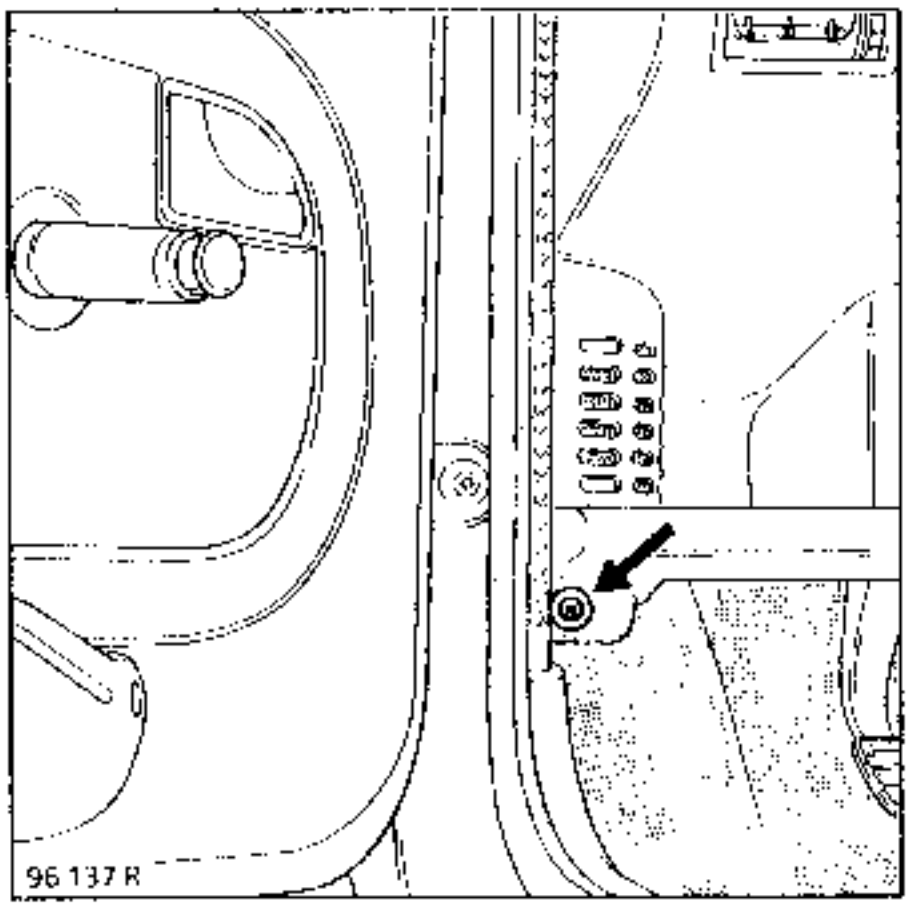
Remove the storage tray or radio.

Remove:

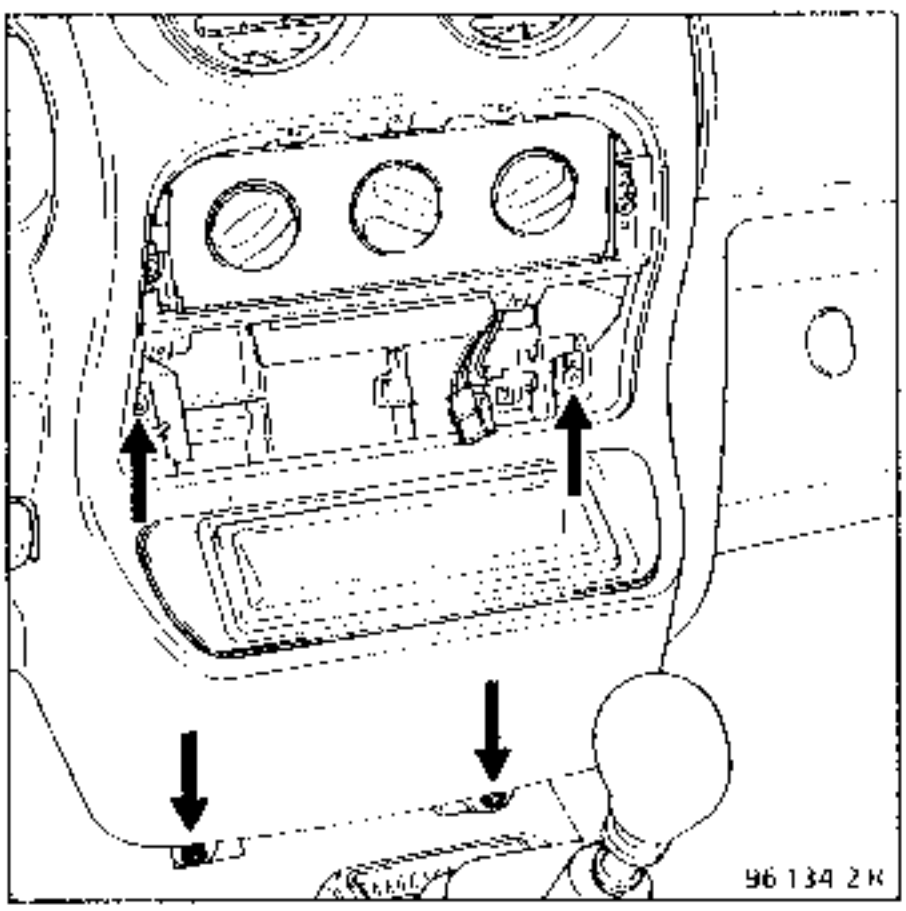
- the five upper dashboard mounting bolts,



– the lower side mountings,

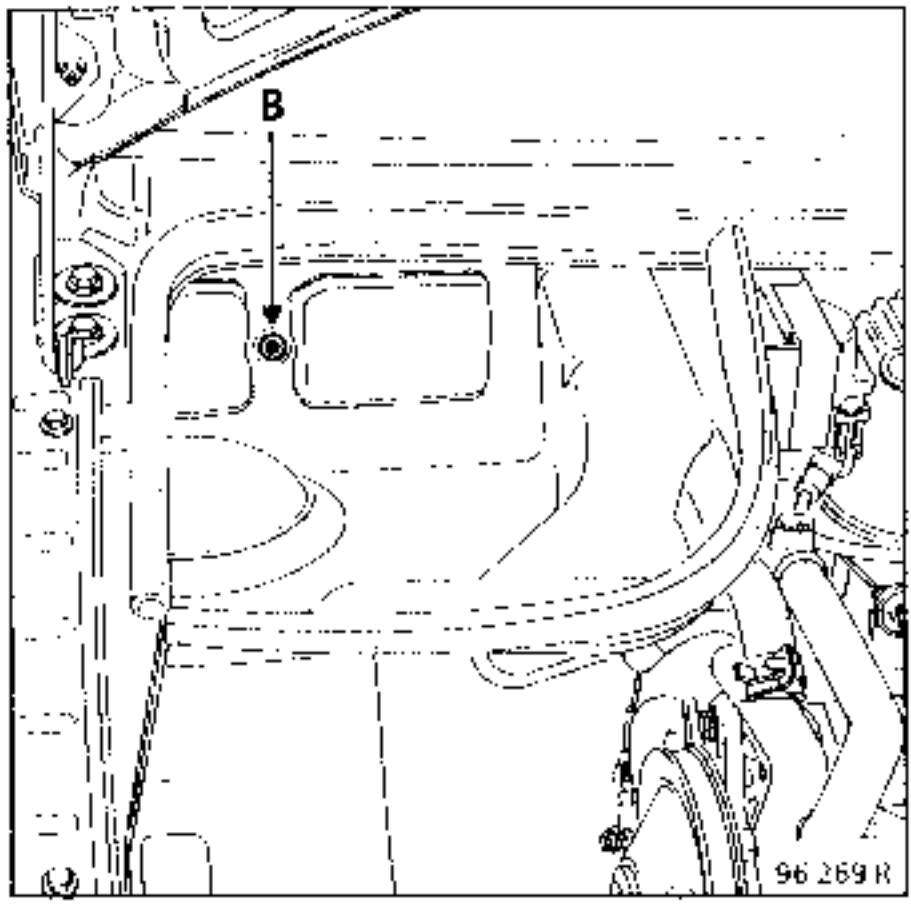


– the lower and central mountings.

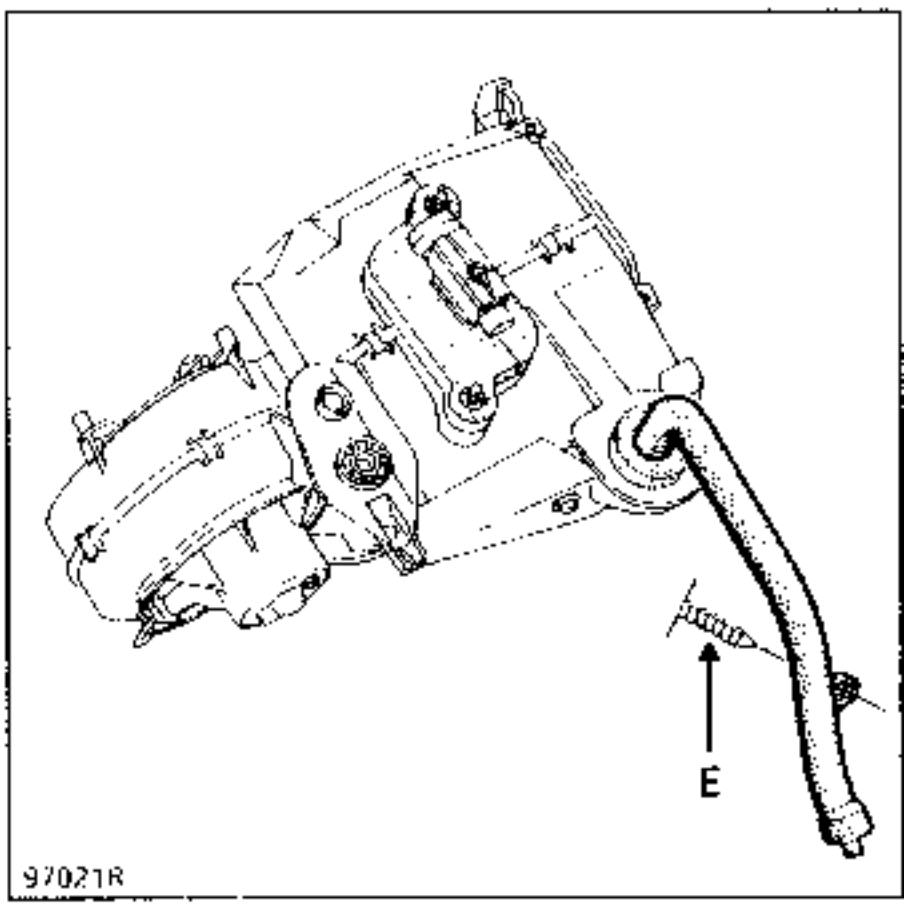


Disconnect the connectors and remove the dashboard with care.

Remove:
– mounting bolt (B) for the fan in the external air inlet chamber,

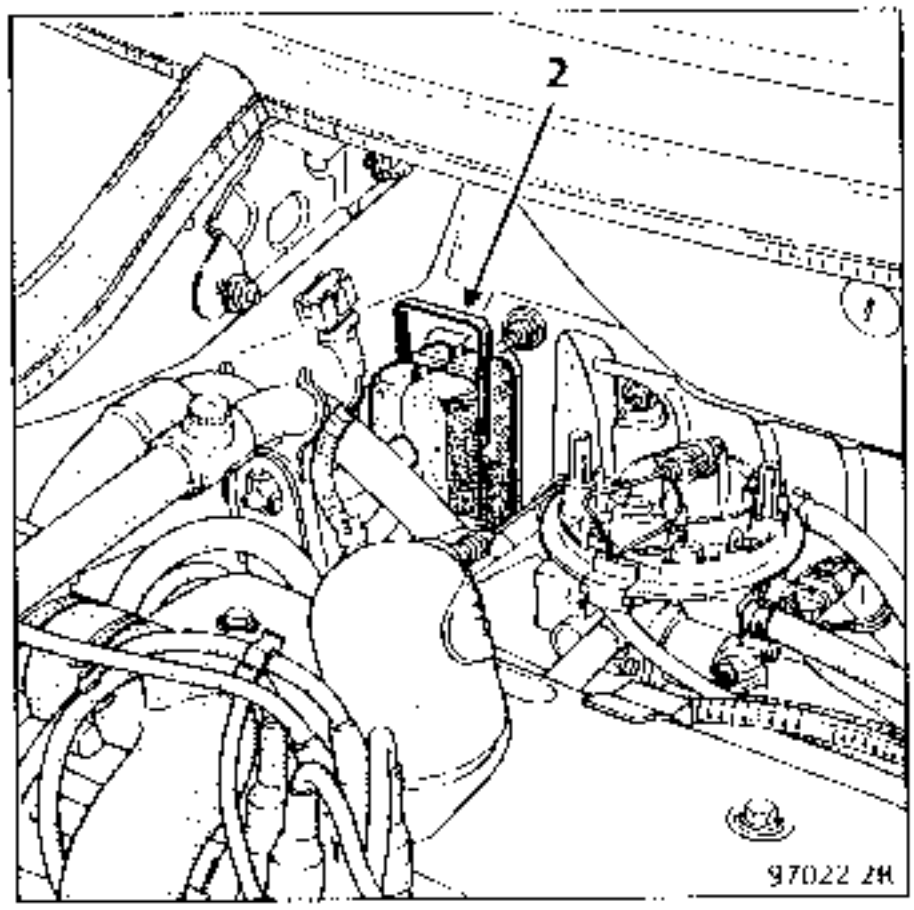


– the condensation drain pipe mounted at (E) on a chassis bolt.



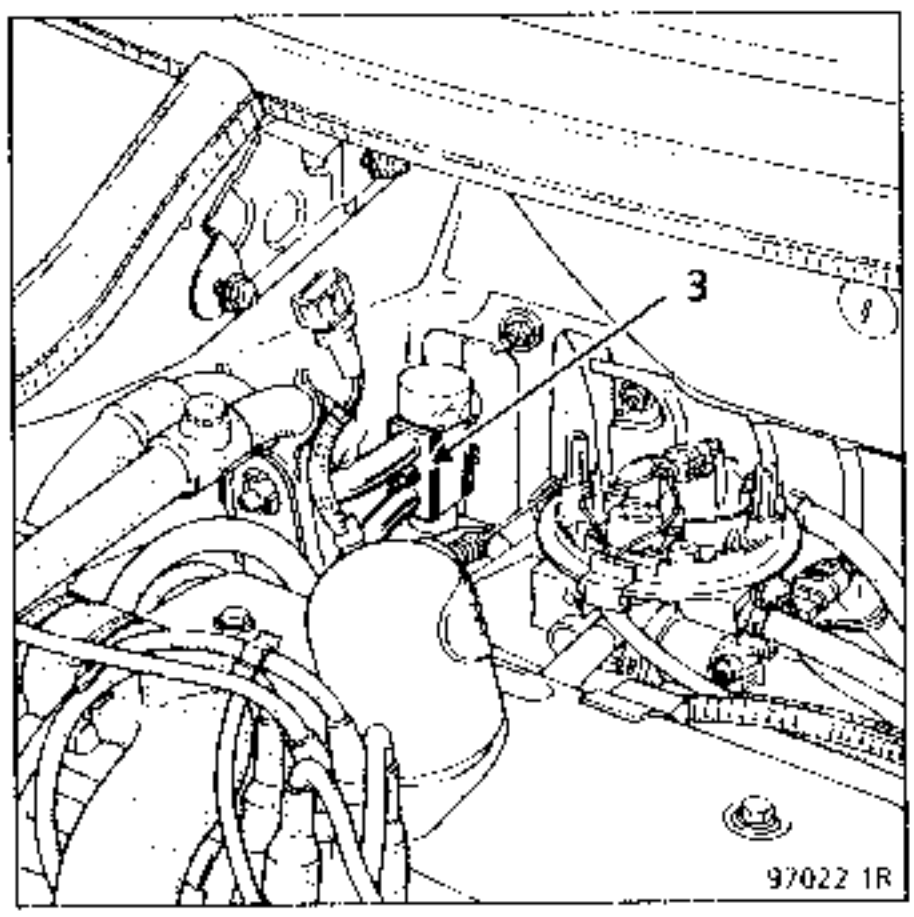
Disconnect the refrigerant pipes from the pressure release valve.

Remove
- clip (2) and the pressure release valve protector,

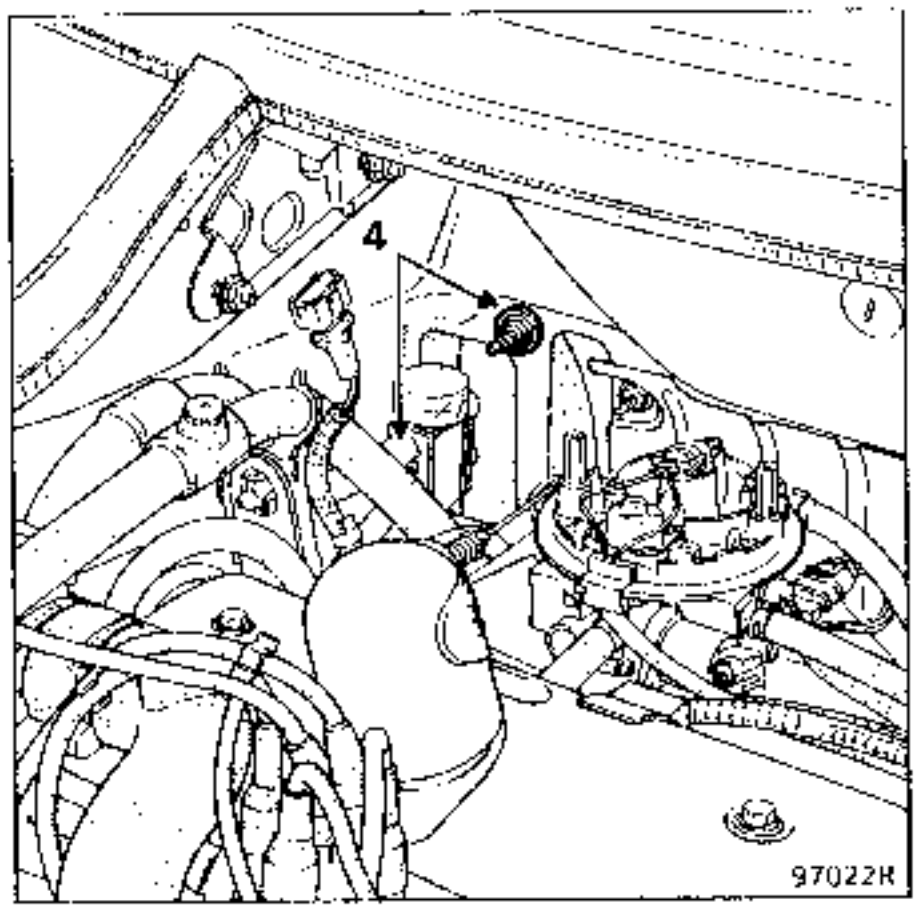


- bolt (3).

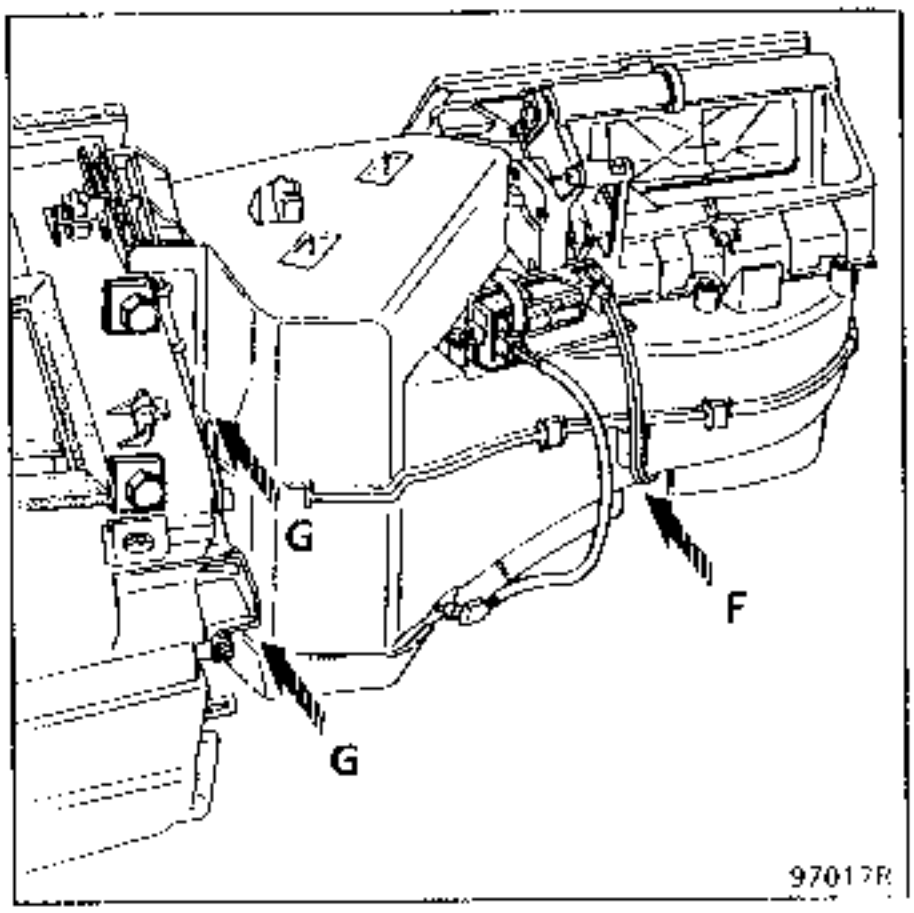
Plug the four openings in the pipes and the pressure release valve quickly.



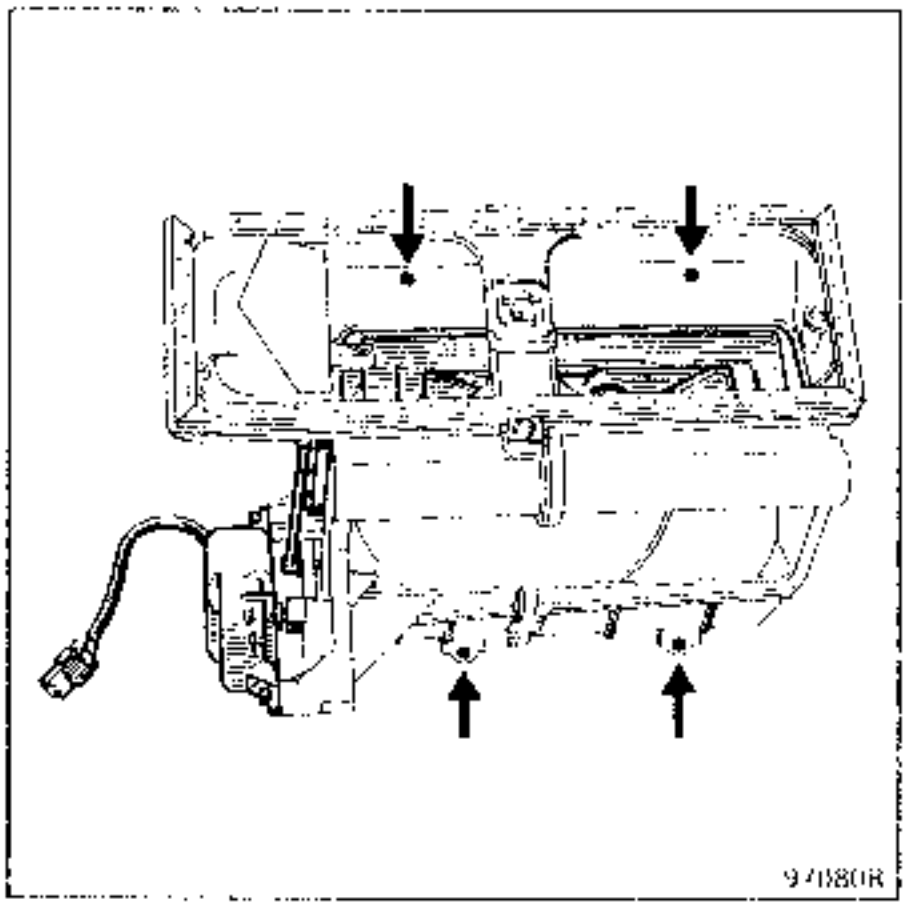
Remove the four mounting nuts (4) securing the evaporator unit to the bulkhead.



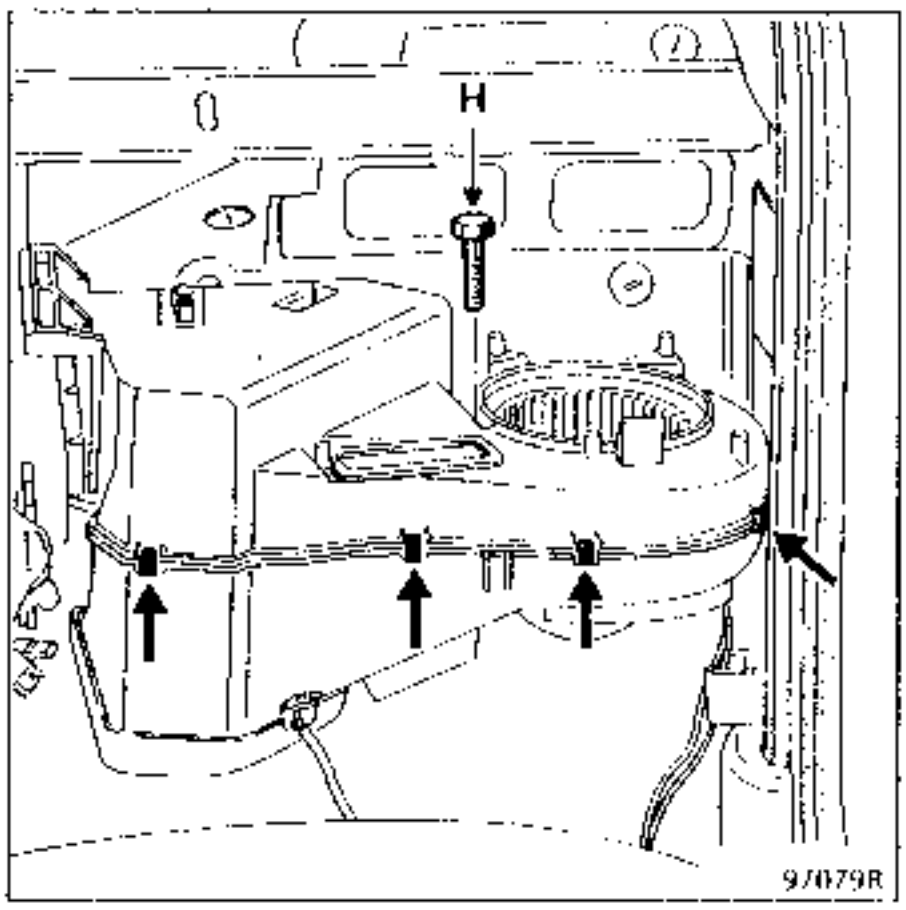
Remove the wiring from the evaporator unit and remove nut (F)



Remove:
- the two bolts (G) holding the evaporator unit to the distribution unit,
- the evaporator unit,
- the four bolts holding the recycling flap unit to the evaporator unit.



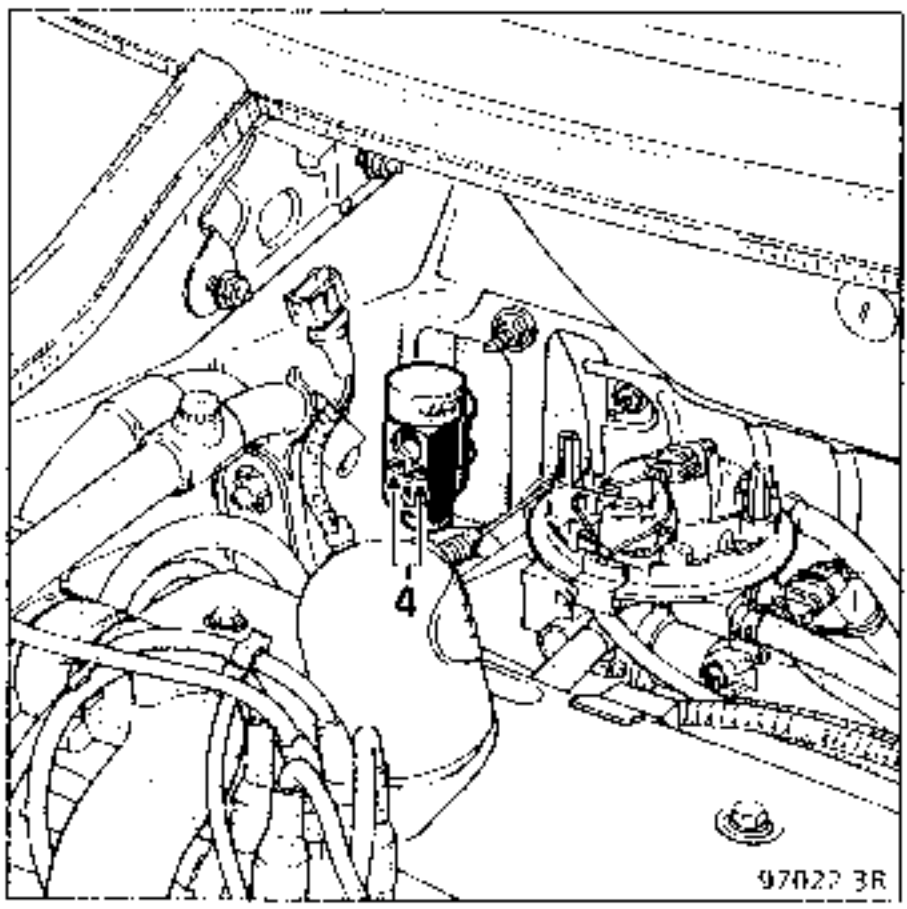
Separate the two sections of the unit by pulling the clips around the edge and removing bolt (H)



Remove the evaporator from the unit

Remove the pressure release valve which is mounted on the evaporator by two bolts (4)

Plug the refrigerant inlet and outlet openings quickly.



REFITTING

Refitting is the reverse of removal.

Take care to ensure the flap control cables are correctly repositioned (heating and distribution)

Ensure the flaps operate correctly.

Reconnect the condensation drain pipe.

When fitting pipes to the various components use the recommended compressor oil to lubricate the seals.

Tighten bolt (3) which retains the refrigerant pipes to a torque of **0.9 daN.m.**

Fill the air conditioning circuit using the filling station (method described in "Air Conditioning - New Refrigerant R134a").

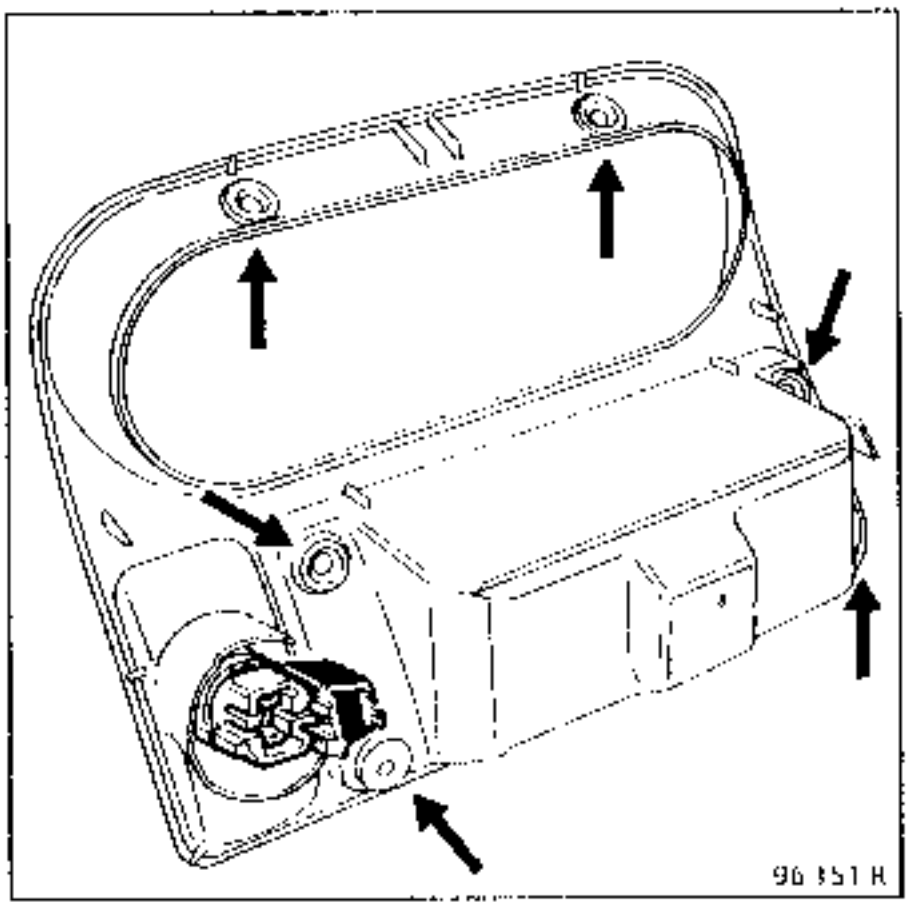
IMPORTANT : the instructions relating to topping up the oil level during operations on the air conditioning circuit must be followed.

ATTENTION : ignition on, after reconnecting the battery, wait 10 seconds before starting the engine (injection computer programming).

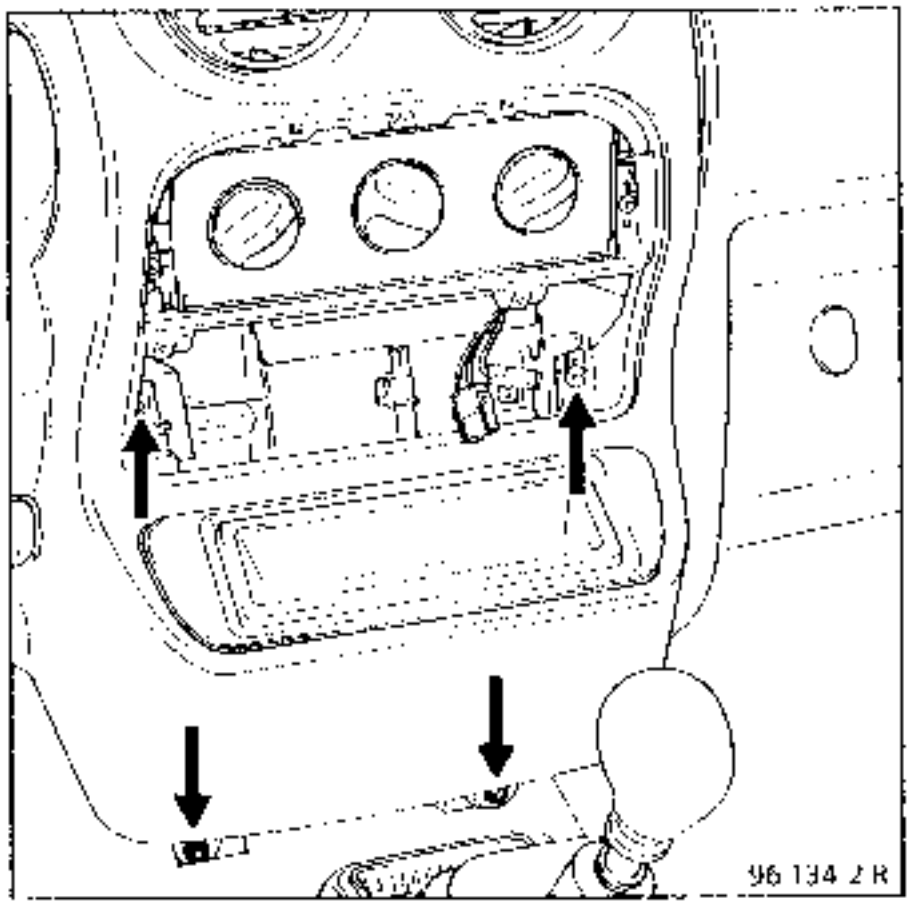
REMOVAL

The dashboard does not need to be removed to remove the passenger compartment fan.

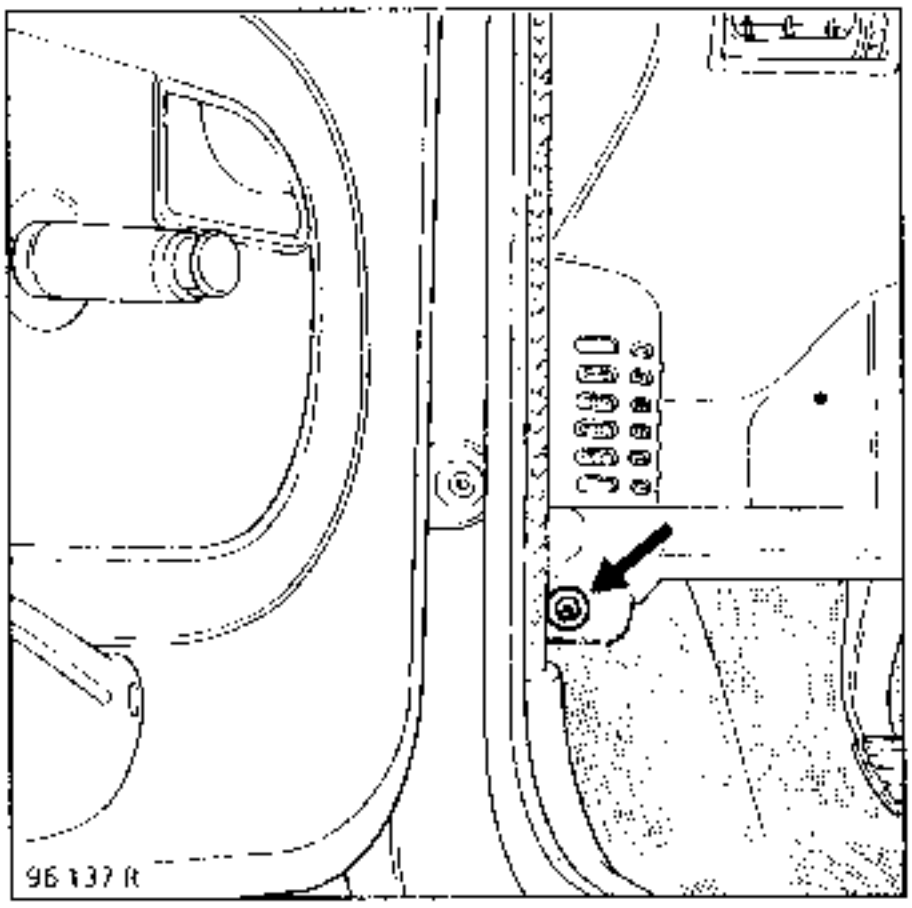
Remove :
– the air conditioning control panel surround,



– the lower and central dashboard mountings,

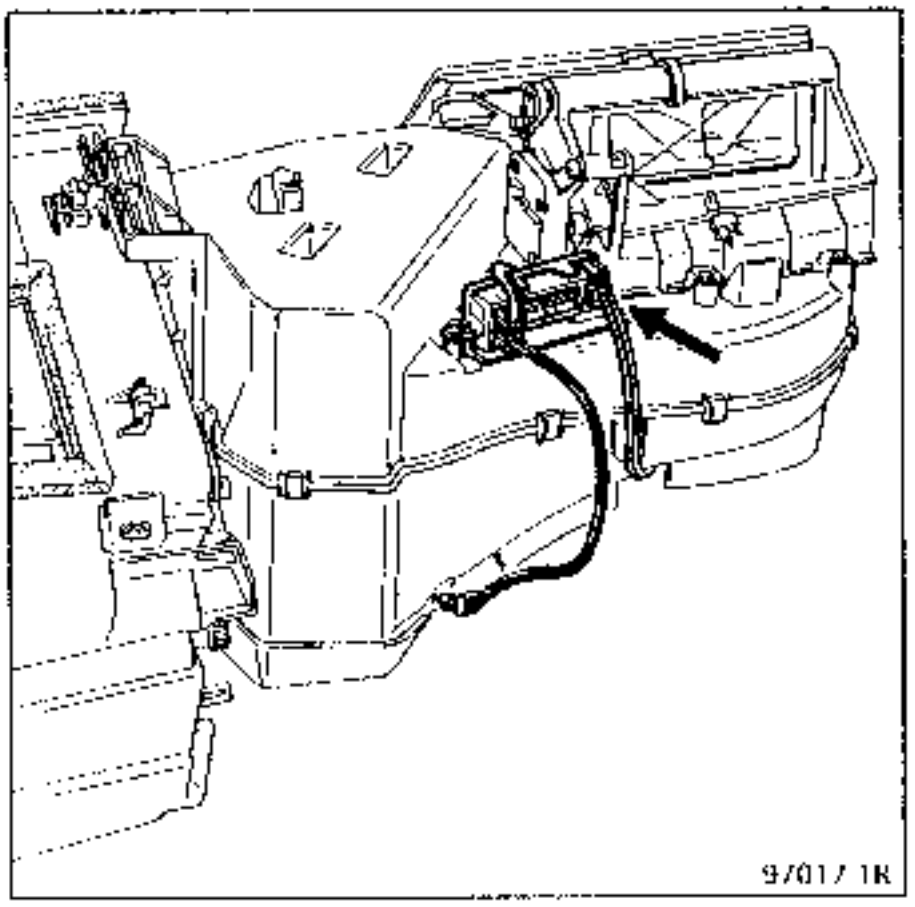


– the lower side mountings.

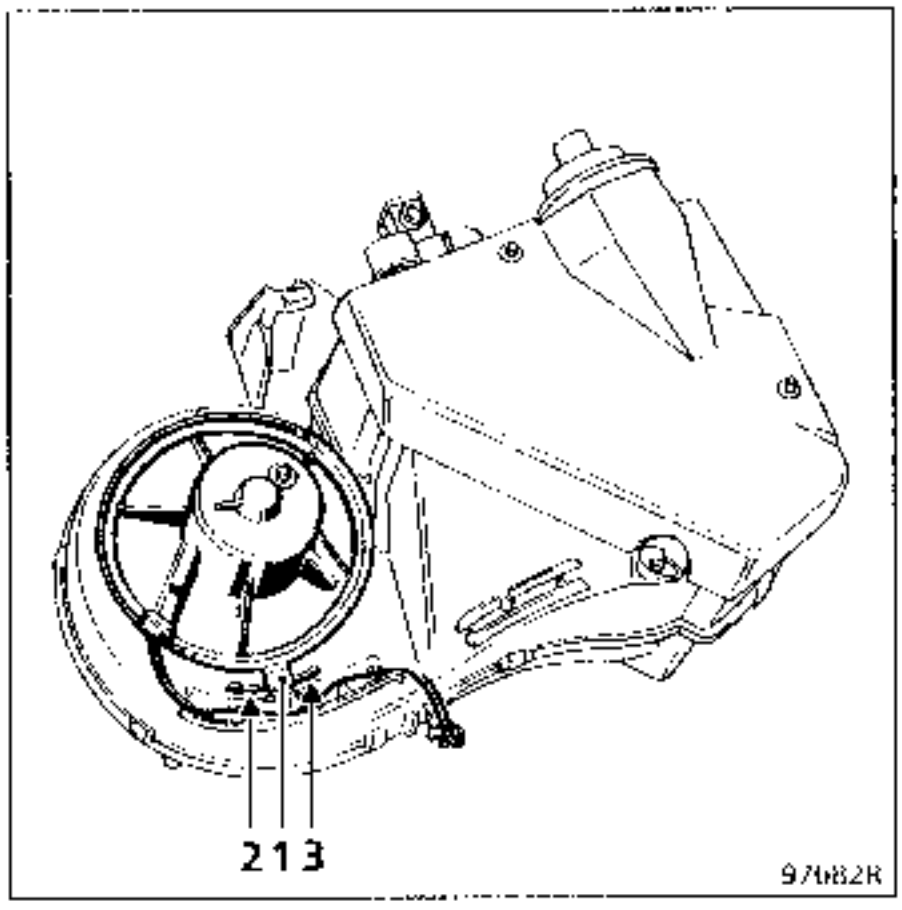


Tilt the dashboard around the upper mounting and hold it in that position.

Disconnect the fan wire from the electronic module and separate it.



Turn the fan clockwise to align the tab (1) with lug (2) then extract the fan by pulling downwards



REFITTING

When refitting reposition the fan in the same position as for extraction.

Lift the tab (1) and turn it anti-clockwise until it rests against the stop (3).

Reconnect the fan and thread the wire in the guides on the evaporator unit.

Refit the dashboard.

REMOVAL

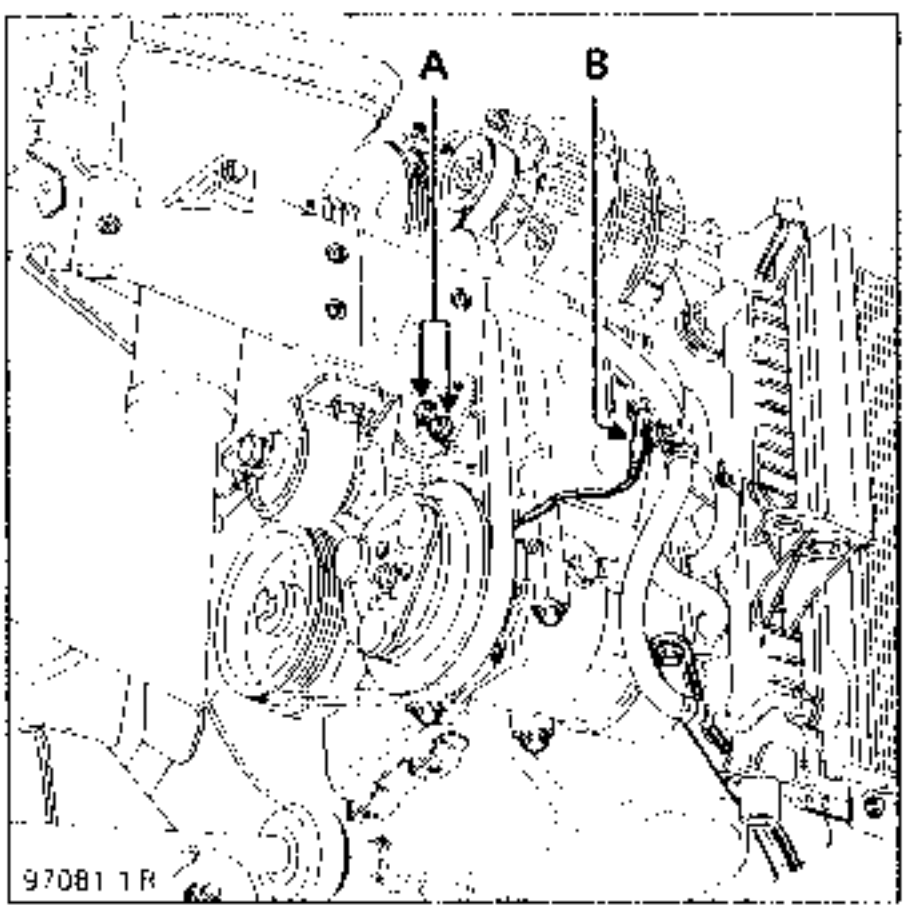
The refrigerant circuit must be drained before the compressor is removed (method described in section "Air Conditioning - New Refrigerant R134a").

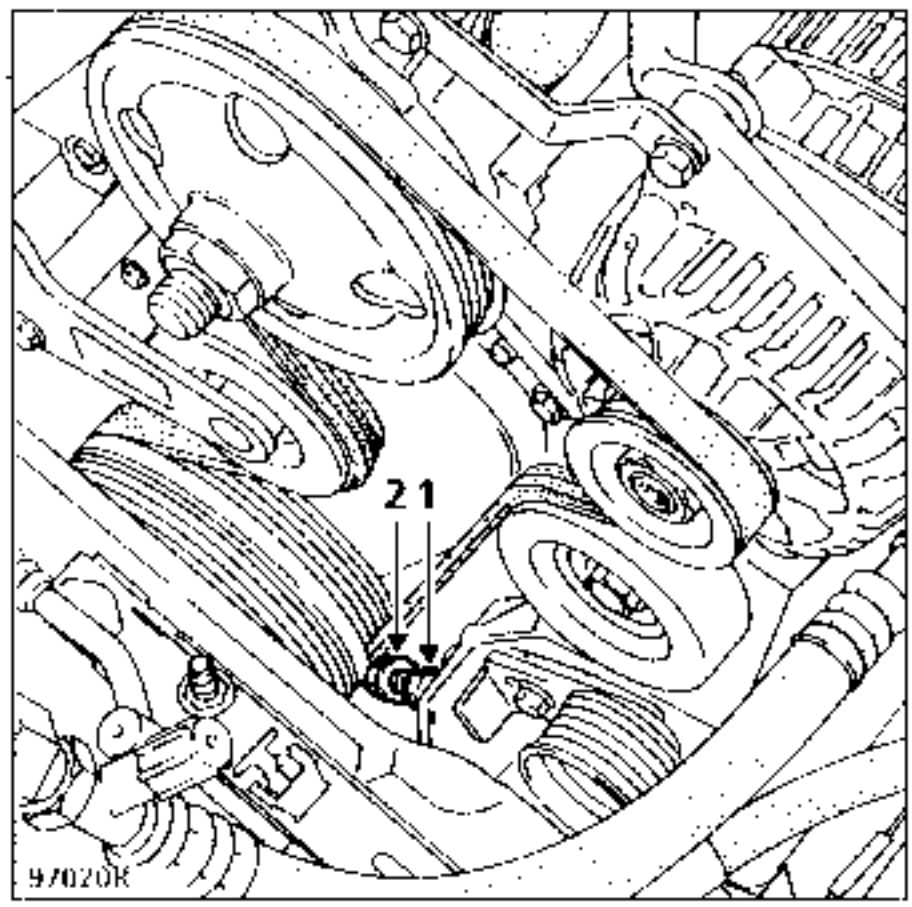
Disconnect the battery

Lift the vehicle on a two post lift

Remove the engine undertray.

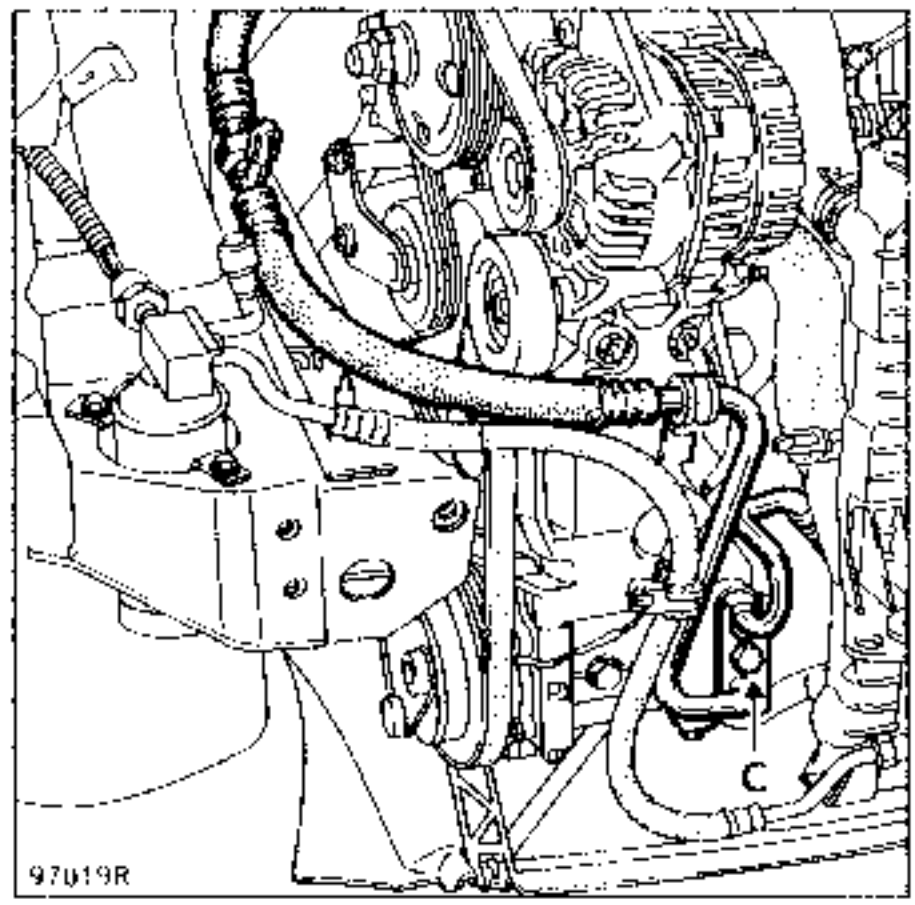
Slacken the compressor drive belt :
- tension wheel bolt (A) ,
  lock nut (1),
- tension adjusting bolt (2)





Disconnect the solenoid clutch connector (B)

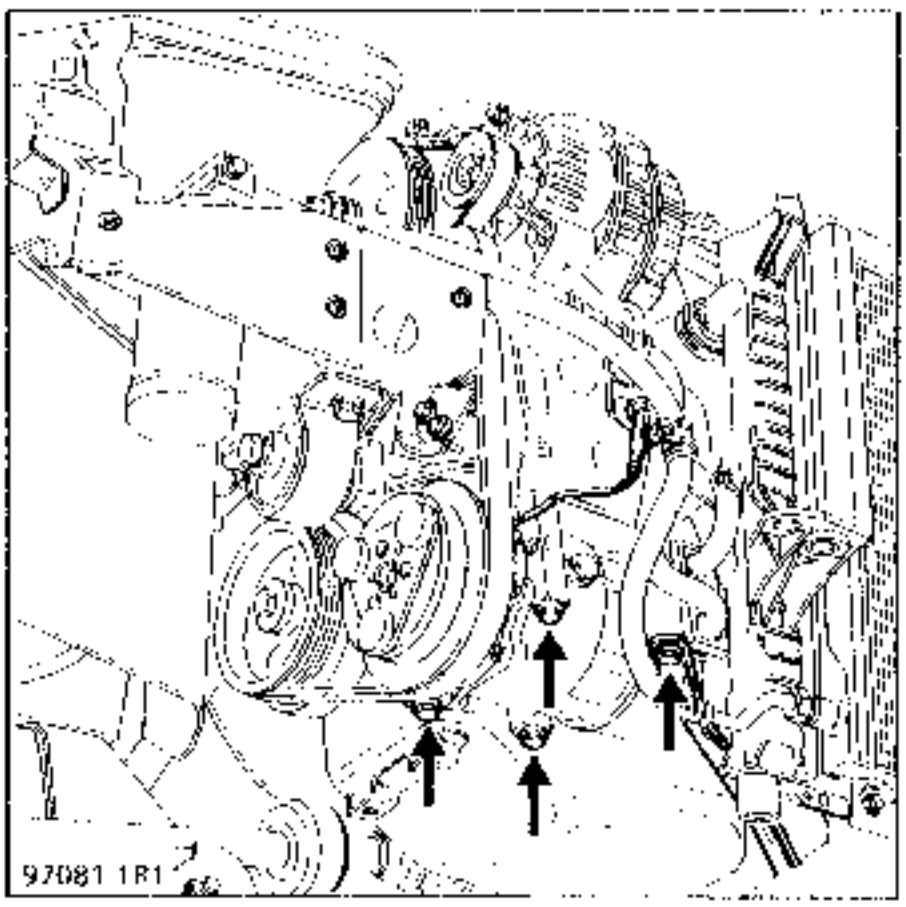
Remove bolt (C) which secures the refrigerant pipe retaining bracket.



Remove the refrigerant pipes. Plug the four pipe openings quickly.

Loosen, but do not remove, the compressor / gear box tie-rod on the gear box side.

Remove the four compressor mounting bolts.



Release the tie-rod and the drive belt and remove the compressor

REFITTING

Refitting is the reverse of removal.

Tighten the bolt for the refrigerant pipe retaining bracket (C) to a torque of 3 **daN.m**.

When fitting pipes to the various components use the recommended compressor oil to lubricate the seals.

Fill the air conditioning circuit using the filling station (method described in "Air Conditioning - New Refrigerant R134a")

IMPORTANT : the instructions relating to topping up the oil level during operations on the air conditioning circuit must be followed.

ATTENTION : ignition on, after reconnecting the battery, wait 10 seconds before starting the engine (injection computer programming).

AIR CONDITIONING
Compressor drive belt

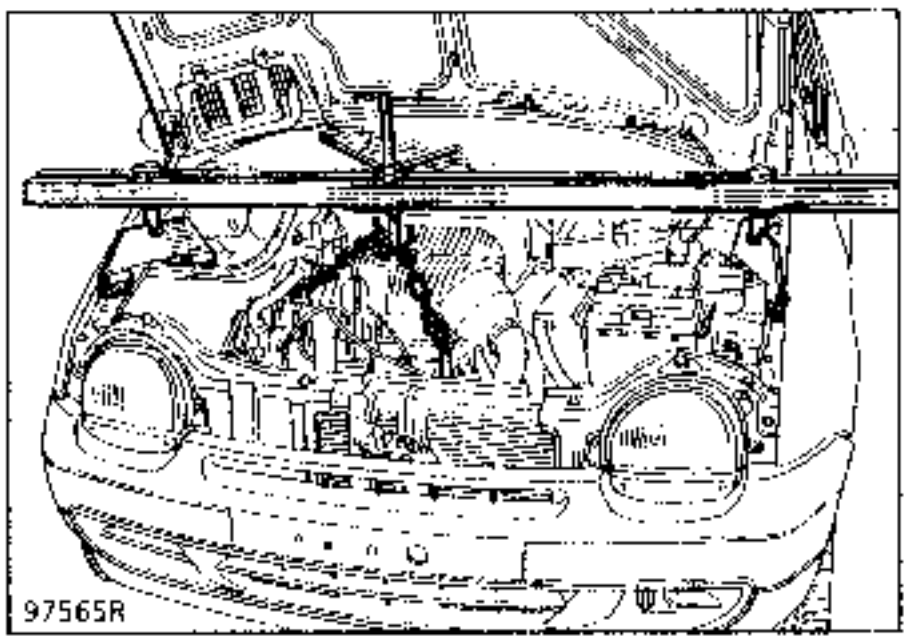
SPECIAL TOOLING REQUIRED	
Mot. 1273	Belt tension testing tool

MATERIALS REQUIRED
Engine - gear box support : DESVIL Part Number 300

Special notes for removing and adjusting the tension of the compressor drive belt.

Place the vehicle on a vehicle lift.

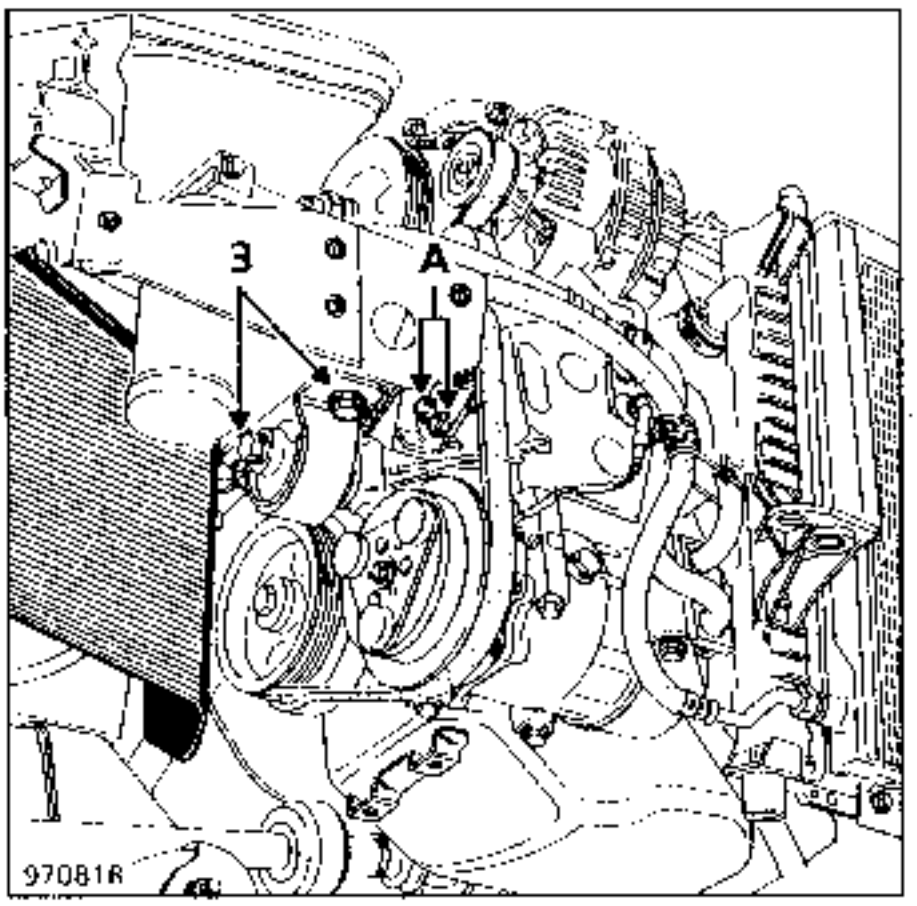
Using the **DESVIL** tool Part Number **300**, or an equivalent tool, support the weight of the engine to ensure its stability.

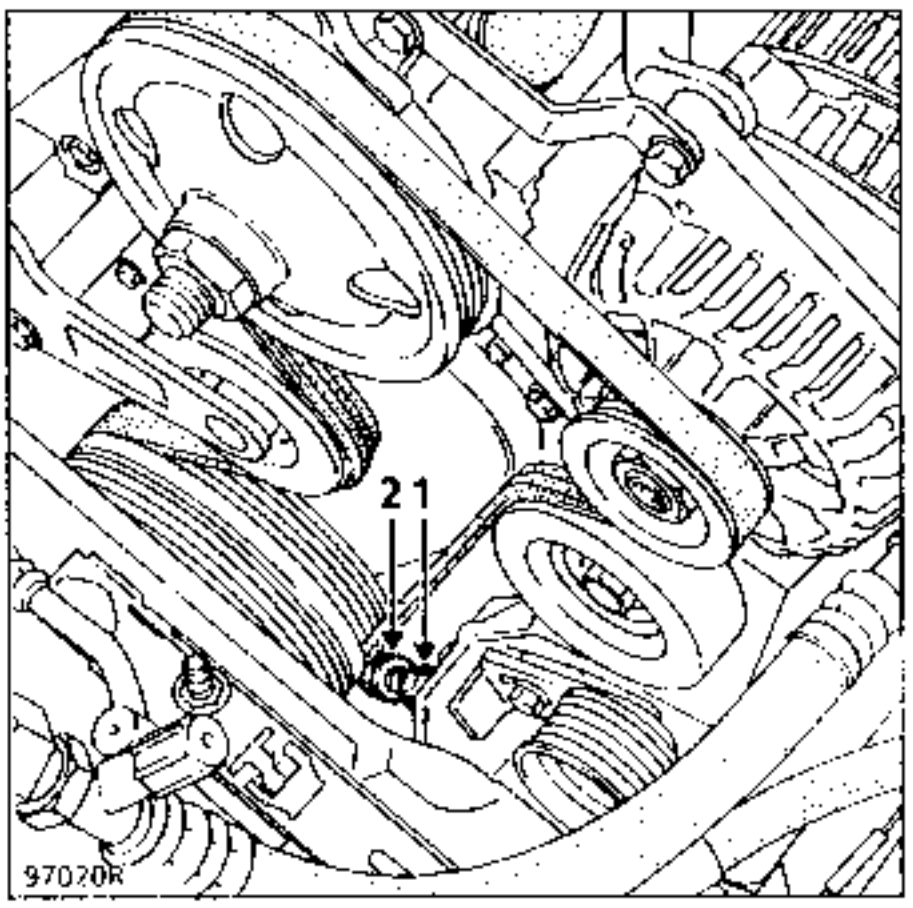


Lift the vehicle, remove the engine undertray and release the front right hand wheel arch protector by removing two clips.

Undo:
- the tension wheel mounting bolts (A),
- the lock nut (1) and bolt (2) to slacken the belt.

Remove the two front right hand engine mounting bolts (3)





Lower the engine a few centimetres using the engine support tool.

Release the drive belt by sliding it between the engine mounting and the side member

Fit the new belt in the same manner.

When refitting the engine mounting bolts (3) refer to chapter 10 of M.R. 305 to ensure the engine and transmission assembly is correctly positioned.

Principle

The sensor ensures the belt has a constant deflection value by means of the adjusting button (1), the pressure device (2) and the external brackets (3).

The force of the belt reaction is measured by the test device (4) which is fitted with stress gauges.

Movement of the gauges creates a variation in their electrical resistance. This variation, once converted by the equipment, is displayed as SEEM units (US)

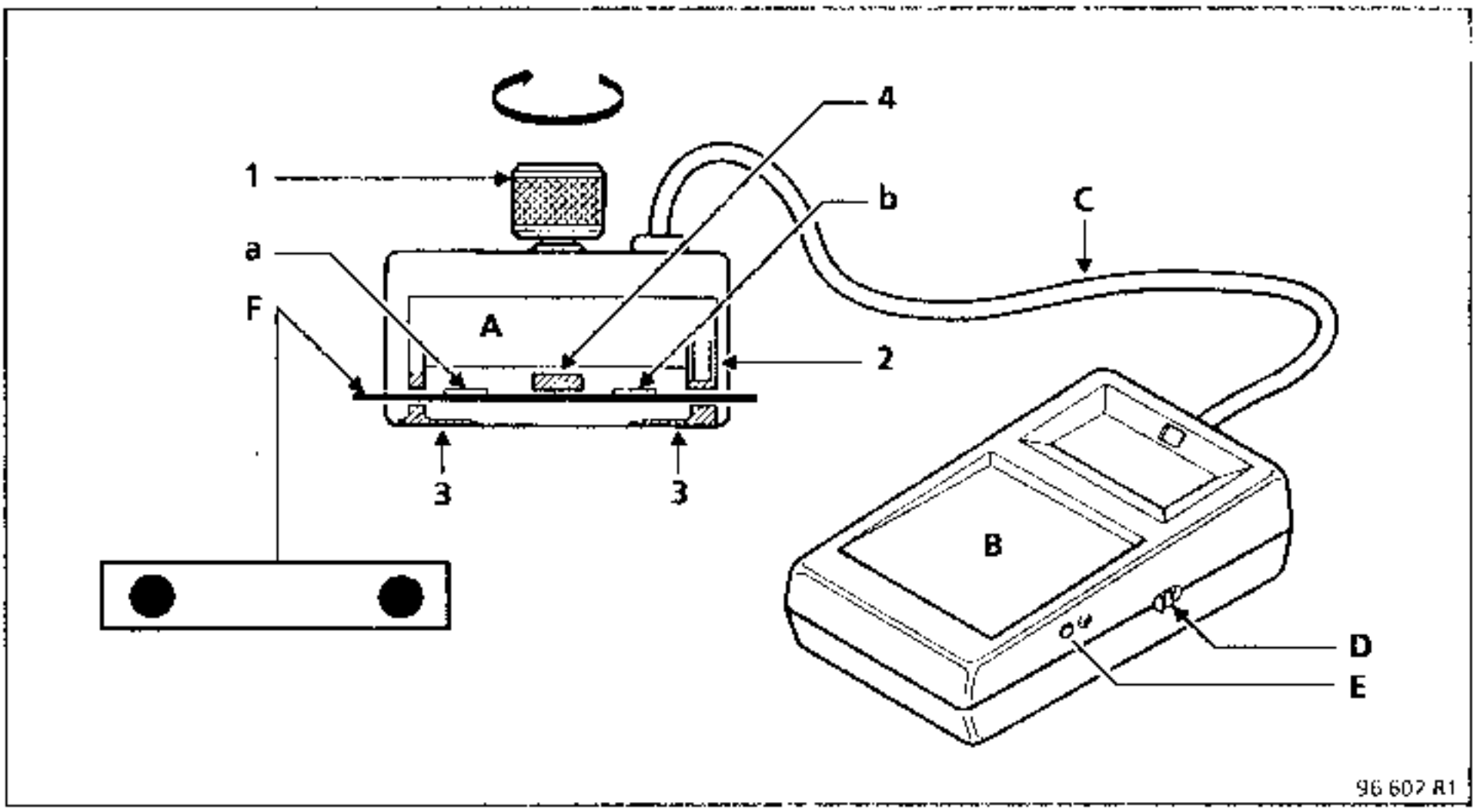
Calibrating the equipment

The equipment is adjusted in the factory. The calibration settings must be checked every six months, however.

Procedure

Adjusting the zero point :

- Turn the equipment on (switch D) with the adjusting button (1) screwed in fully.
- If the display is zero, the equipment is correctly calibrated.
- If there is no display at all, check the charge condition of the 9 V battery.
- If another value than 0 is displayed, move adjusting screw (E) until 0 is displayed



A Sensor
B Display
C Connection lead
D On/off switch
E Adjustment screw

a Minimum value
b Maximum value

Checking the calibration of the equipment

Turn the equipment on

Position the calibration spring blade (F) on the sensor as shown on the diagram (checking values are stamped on the calibration blade on the top).

Tighten the adjustment button (1) until it clicks for the third time.

Check the display shows a value "X" between "a" and "b".

NOTE : each set of equipment has a calibration spring blade of its own - do not exchange the blade with that belonging to other test equipment.

NOTE: several preliminary tests may have to be carried out before the correct value is reached.

If repeated incorrect values are obtained, contact your After Sales Head Office for further information.

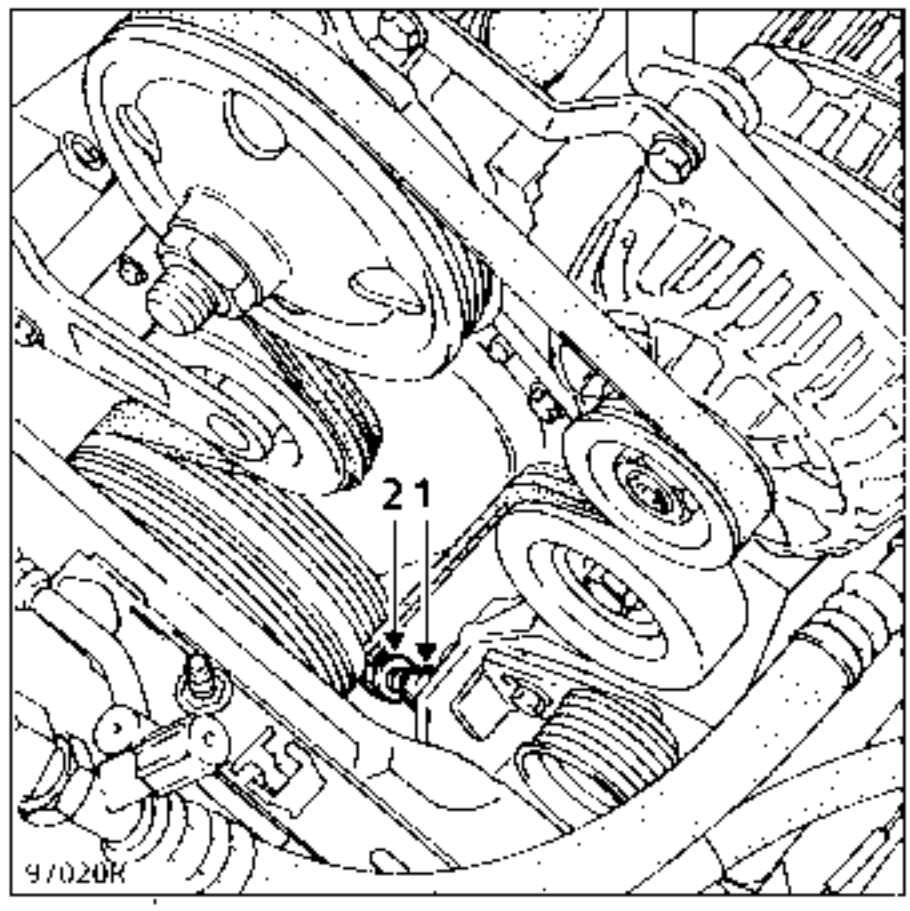
GENERAL ADVICE:

- Never refit a drive belt once it has been removed - renew it.
- Never retension a belt if its tension value is between the fitting value and the minimum operating value
- If the tension is less than the MINIMUM operating value during a test, replace the belt

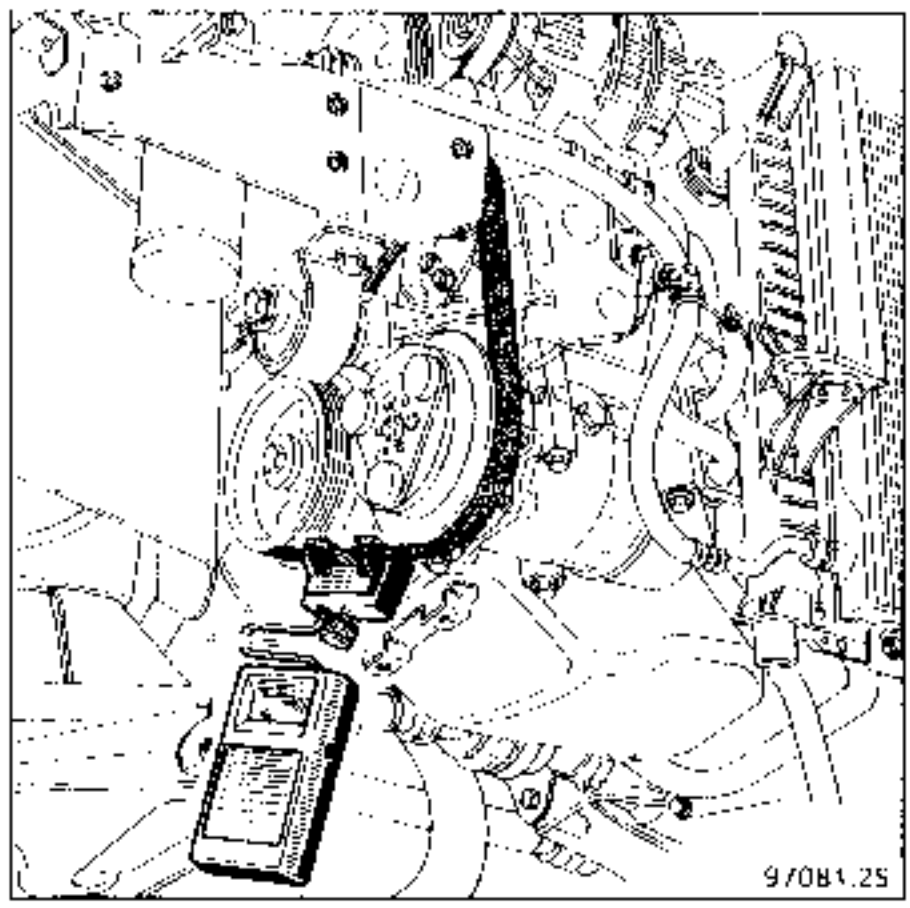
Adjusting the drive belt tension

Fit the belt into place

Move tension adjusting bolt (2) to adjust the value.



Position the belt in tool **Mot. 1273.**



Turn the sensor wheel until it clicks.

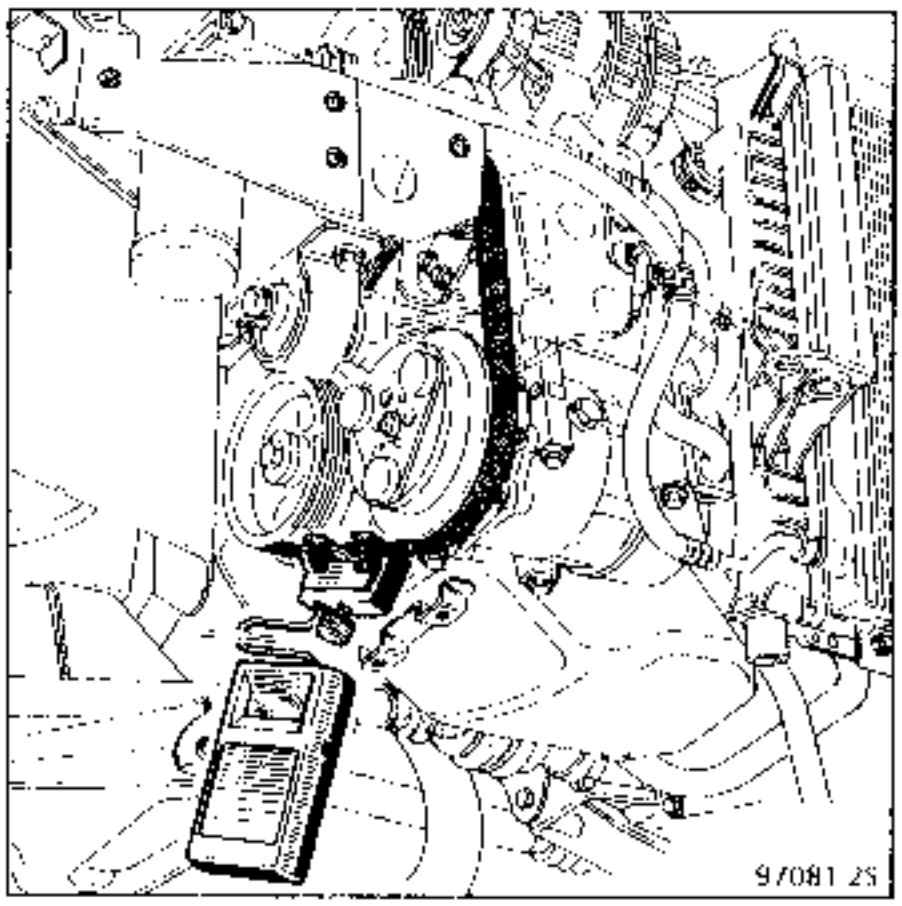
Adjust the value shown on the display of tool **Mot. 1273** by moving bolt (2)until a value of **116 US** (SEEM units) is obtained.

Tighten the lock nut (1) ensuring that the value remains within a tolerance of ± **7 US**.

Checking drive belt tension without removing the drive belt.

Lift the vehicle on a vehicle lift and remove the engine undertray.

Fit tool **Mot. 1273.**



Turn the sensor wheel until it clicks.

Check the value shown on the display of tool **Mot. 1273** is between :
75 → minimum operating tension and
116 → fitting value.

REMOVAL

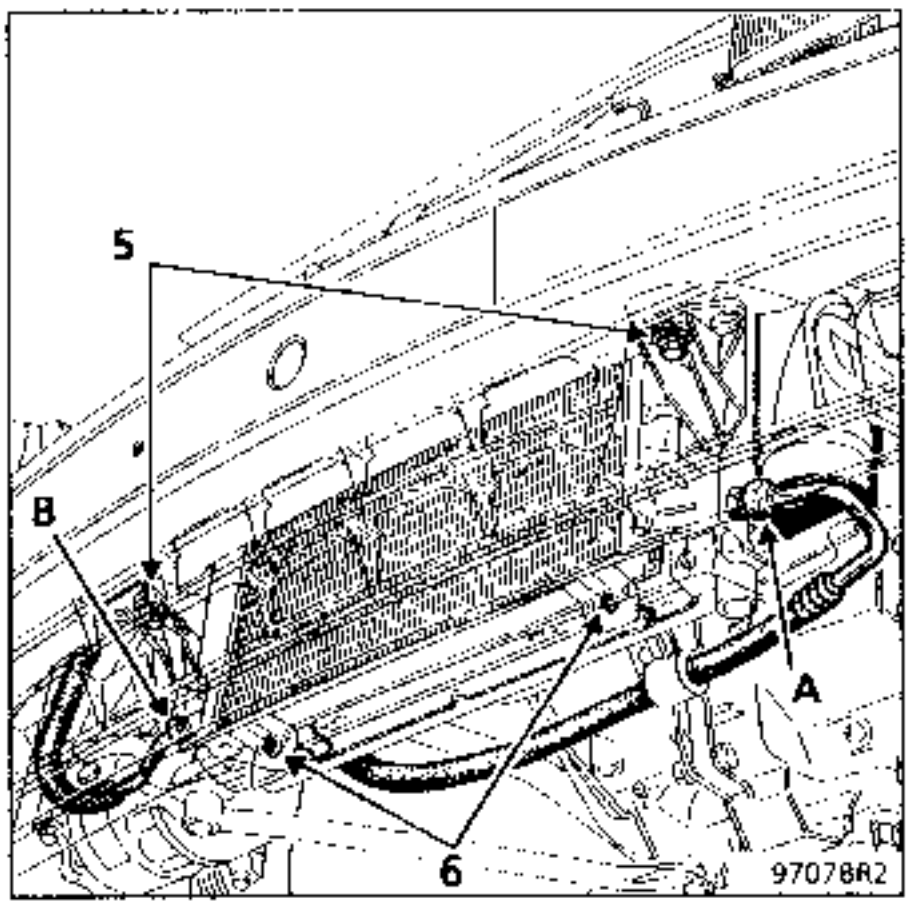
Disconnect the battery

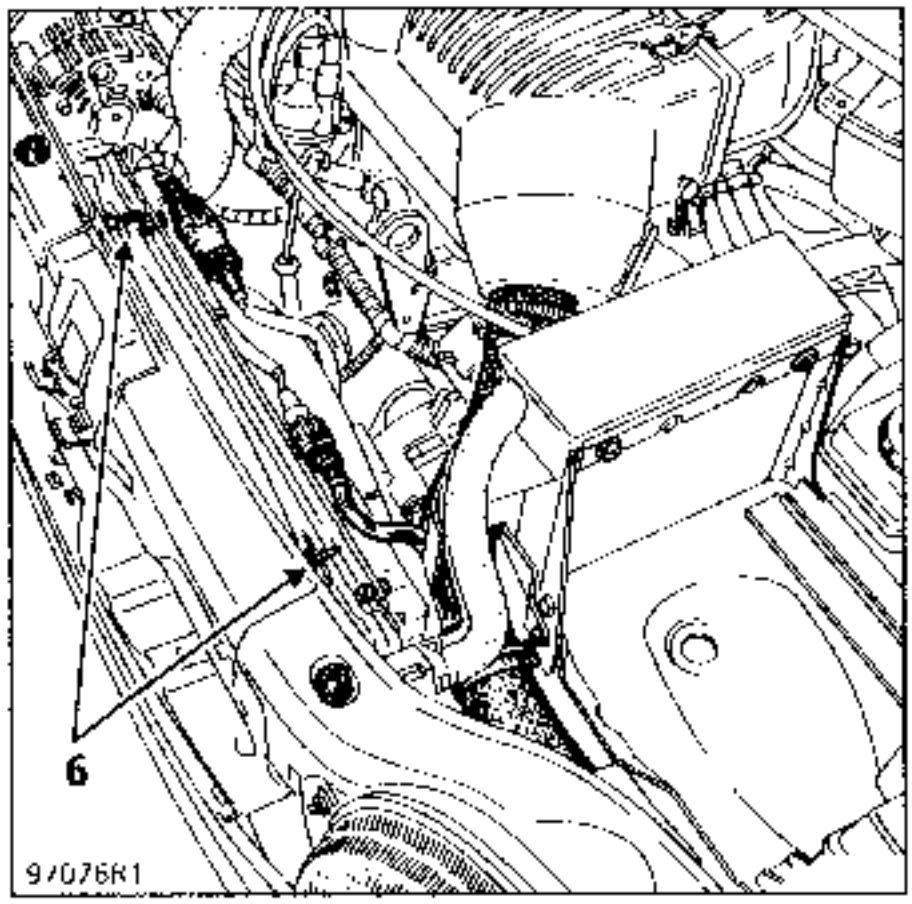
Drain the refrigerant circuit (method described in "Air Conditioning - New Refrigerant R134a").

Lift the vehicle and remove the engine undertray

Remove:
- the refrigerant pipes on the condenser and plug the four openings quickly,
- the two main radiator mounting bolts (5).

Release the radiator from its upper guide holes and lower it





In this position, remove the four bolts (6) mounting the condenser on the radiator.

Extract the condenser from below to remove it

REFITTING

Refitting is the reverse of removal.

Tighten the pipe unions on the condenser to a torque of :
- **2 daN.m** : inlet (A),
- **1.2 daN.m** : outlet (B)

When fitting pipes to the various components use the recommended compressor oil to lubricate the seals.

Fill the air conditioning circuit using the filling station (method described in section used for draining the circuit).

IMPORTANT : the instructions relating to topping up the oil level during operations on the air conditioning circuit must be followed.

ATTENTION : ignition on, after reconnecting the battery, wait 10 seconds before starting the engine (injection computer programming).

AIR CONDITIONING
Pressure release valve

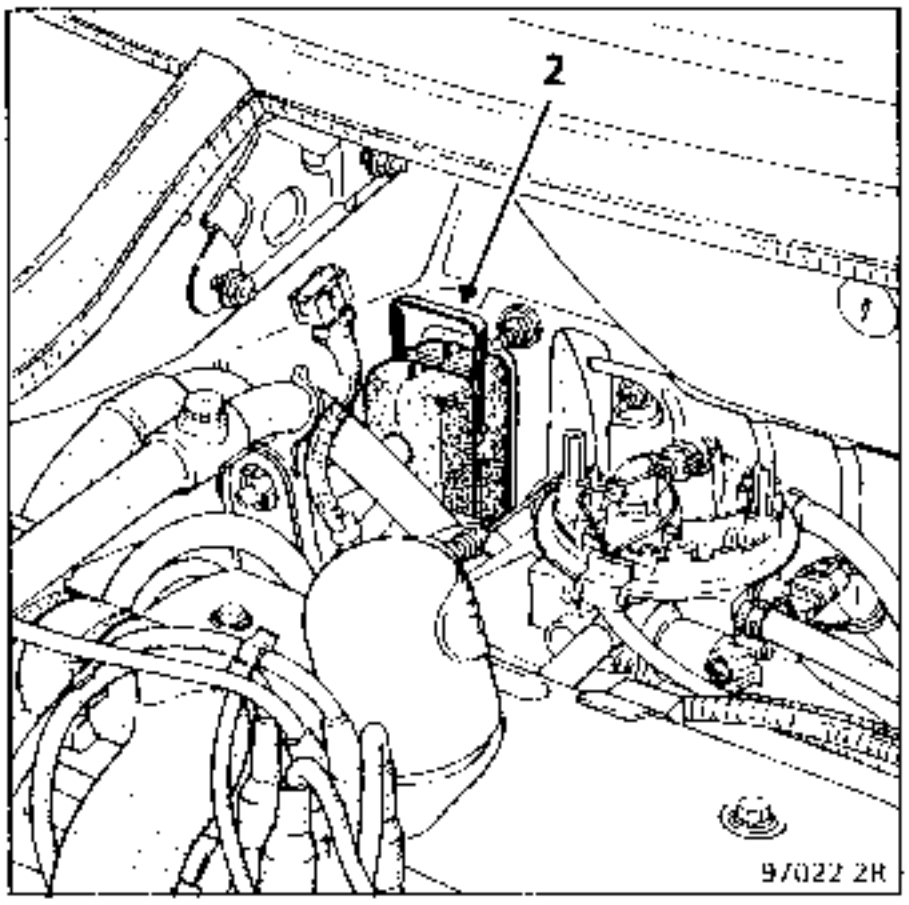
REMOVAL

Disconnect the battery.

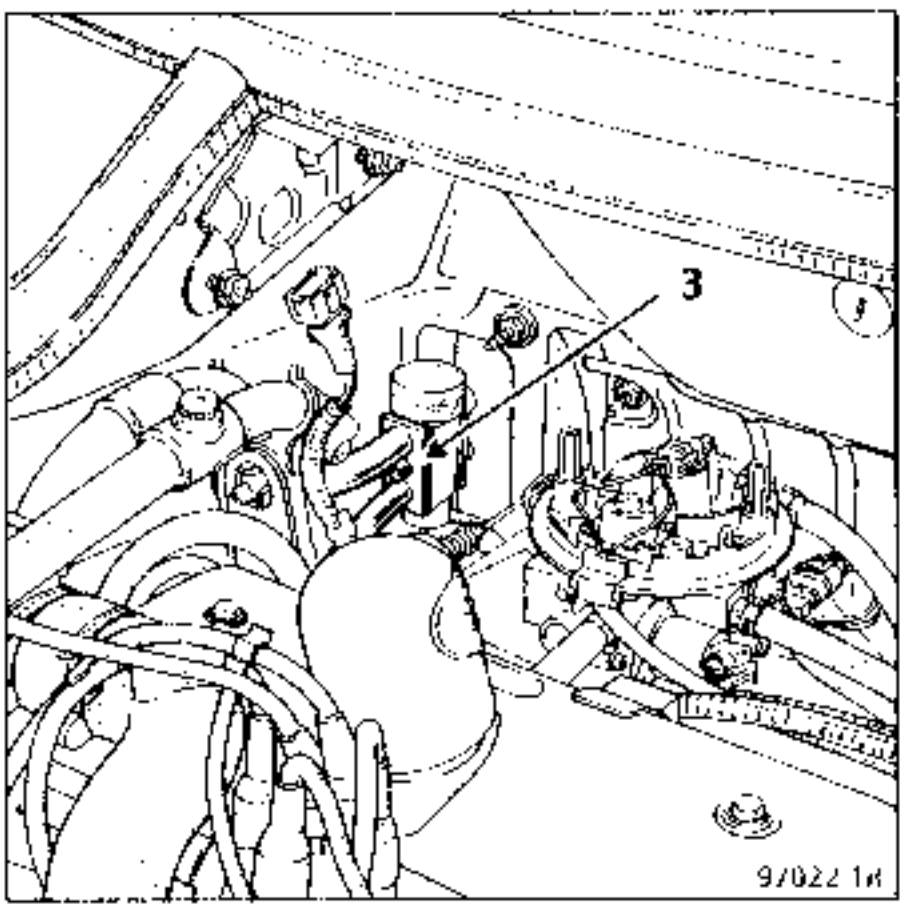
Drain the refrigerant circuit (method described in "Air Conditioning - New Refrigerant R134a").

Disconnect the refrigerant pipes from the pressure release valve.

Remove clip (2).

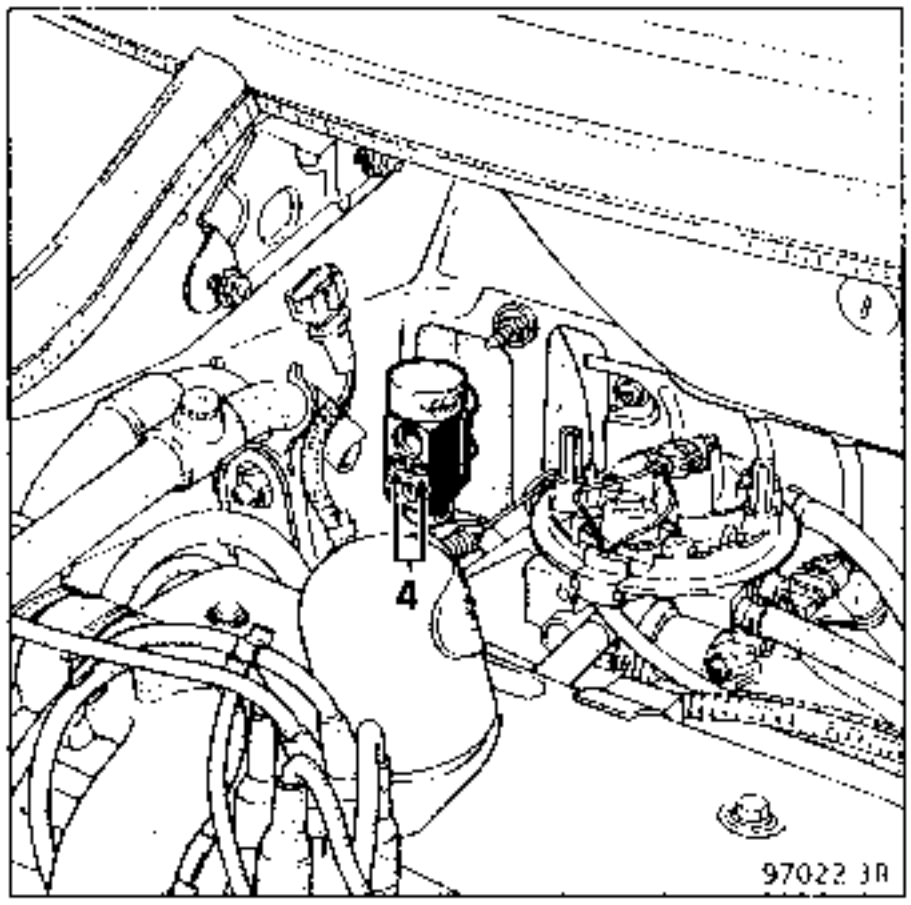


Remove the bolt (3) and plug the four openings quickly.



Remove the pressure release valve which is mounted on the evaporator by two bolts (4)

Plug the refrigerant inlet and outlet pipes immediately.



REFITTING

Refitting is the reverse of removal.

When fitting pipes to the various components use the recommended compressor oil to lubricate the seals.

Tighten bolt (3) for the air conditioning pipes to a torque of **0.9 daN.m.**

Fill the air conditioning circuit using the filling station (method described in section used for draining the circuit).

IMPORTANT : the instructions relating to topping up the oil level during operations on the air conditioning circuit must be followed.

ATTENTION : ignition on, after reconnecting the battery, wait 10 seconds before starting the engine (injection computer programming).

REMOVAL

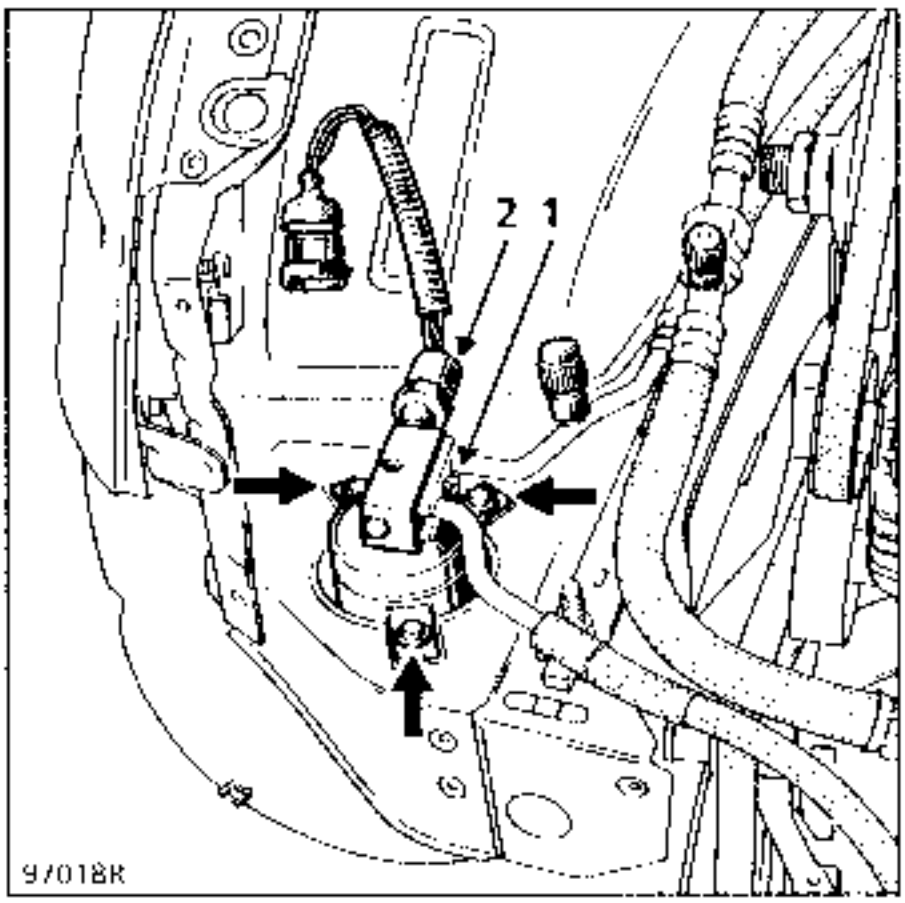
Disconnect the battery

Drain the refrigerant circuit (method described in "Air Conditioning - New Refrigerant R134a").

Disconnect the refrigerant pipes from the dehydrating bottle, bolt (1).

Plug the four openings quickly.

Remove:
- the trifunction pressostat (2),



- the three bolts, then the dehydrating bottle.

REFITTING

Refitting is the reverse of removal.

When fitting pipes to the various components use the recommended compressor oil to lubricate the seals

Tighten the pipe retaining bracket to a torque of **0.8 daN.m**.

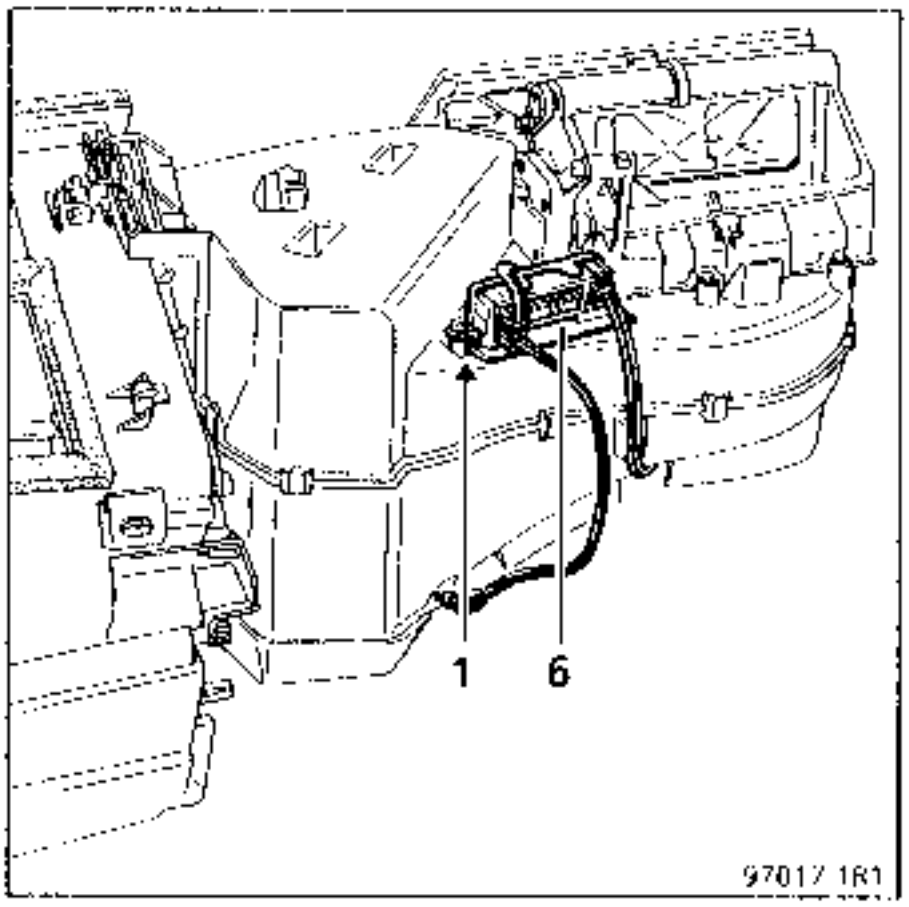
Fill the air conditioning circuit using the filling station (method described in section used for draining the circuit).

IMPORTANT : the instructions relating to topping up the oil level during operations on the air conditioning circuit must be followed.

ATTENTION : ignition on, after reconnecting the battery, wait 10 seconds before starting the engine (injection computer programming).

Electronic module (6)

The electronic module is mounted on the evaporator by the bolt (1).



To replace the electronic module, the dashboard must be removed. Refer to the section "Evaporator".

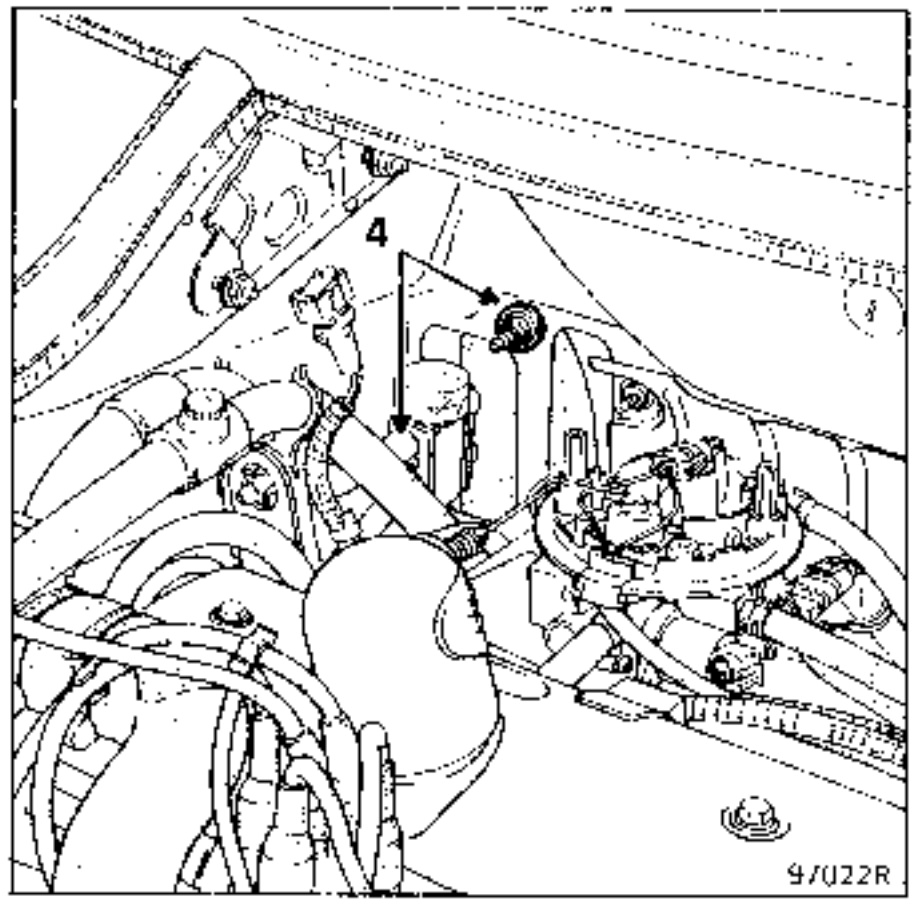
To remove the module, remove
- the various connectors,
- the bolt (1).

Recycling motor (475)

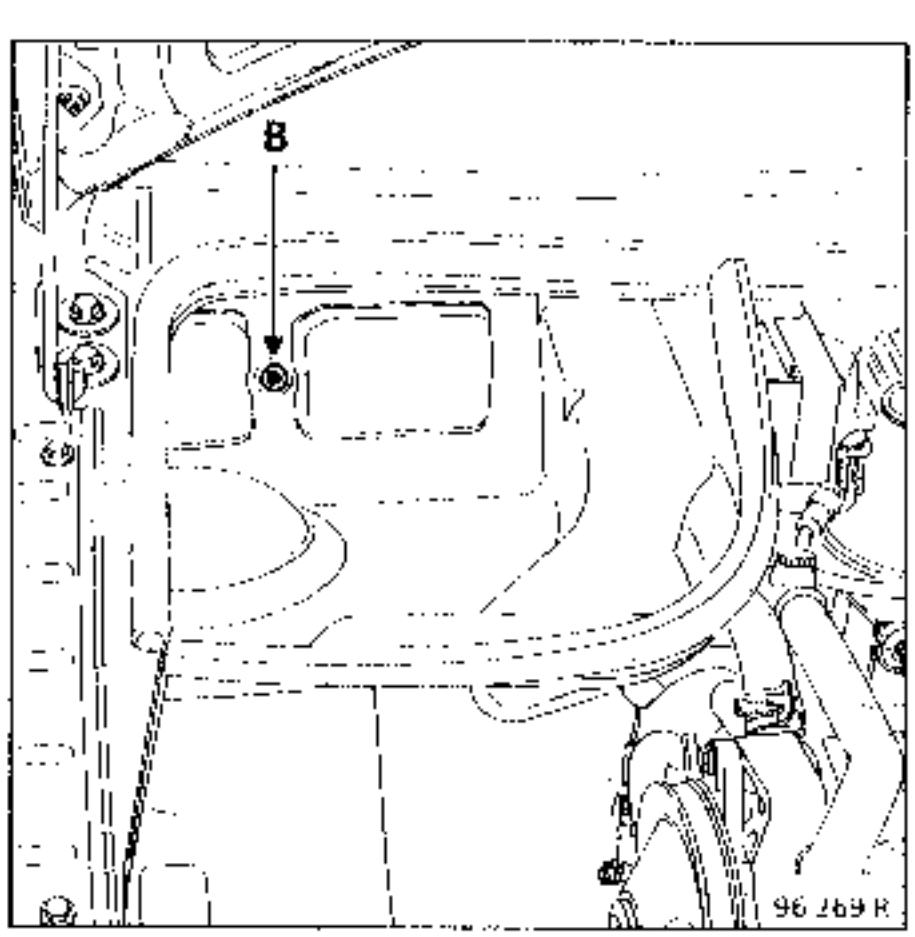
This motor controls the movements of the recycling flap (re-use of air circulating in the passenger compartment).

It may be reached after removing the dashboard (see section on "Evaporator").

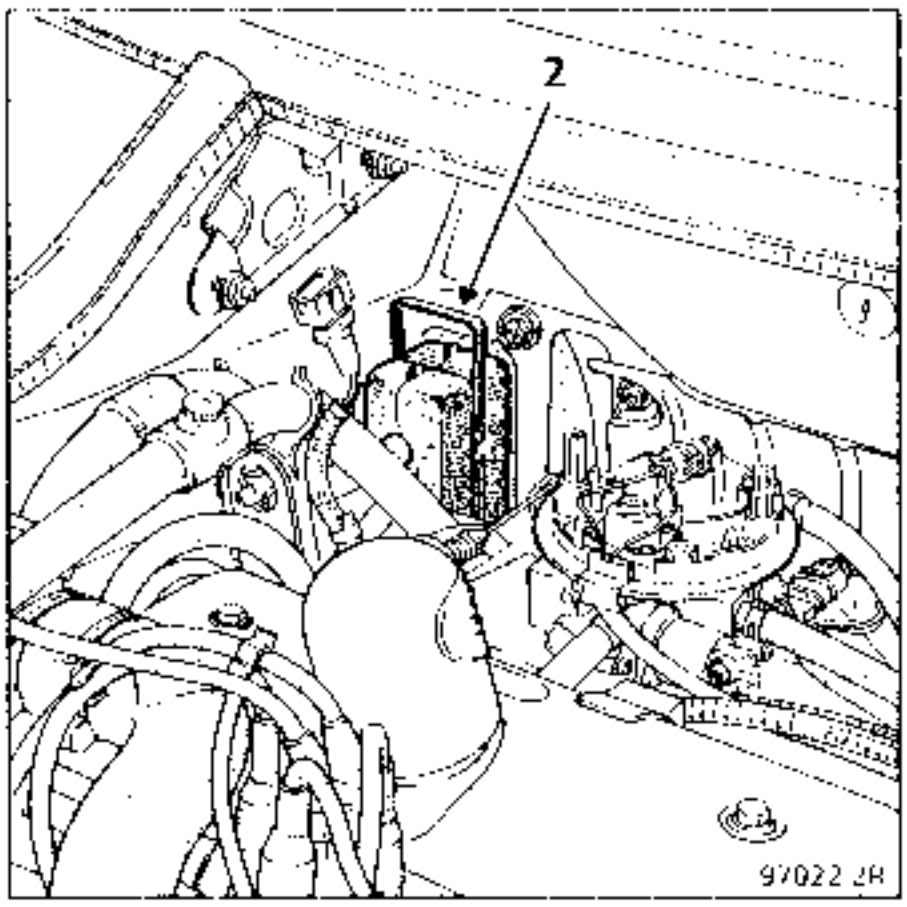
First of all, the evaporator unit must be placed to one side, without disconnecting the refrigerant pipes. To do this, from the engine compartment side, remove
- the nuts (4) which mount the evaporator unit on the bulkhead,



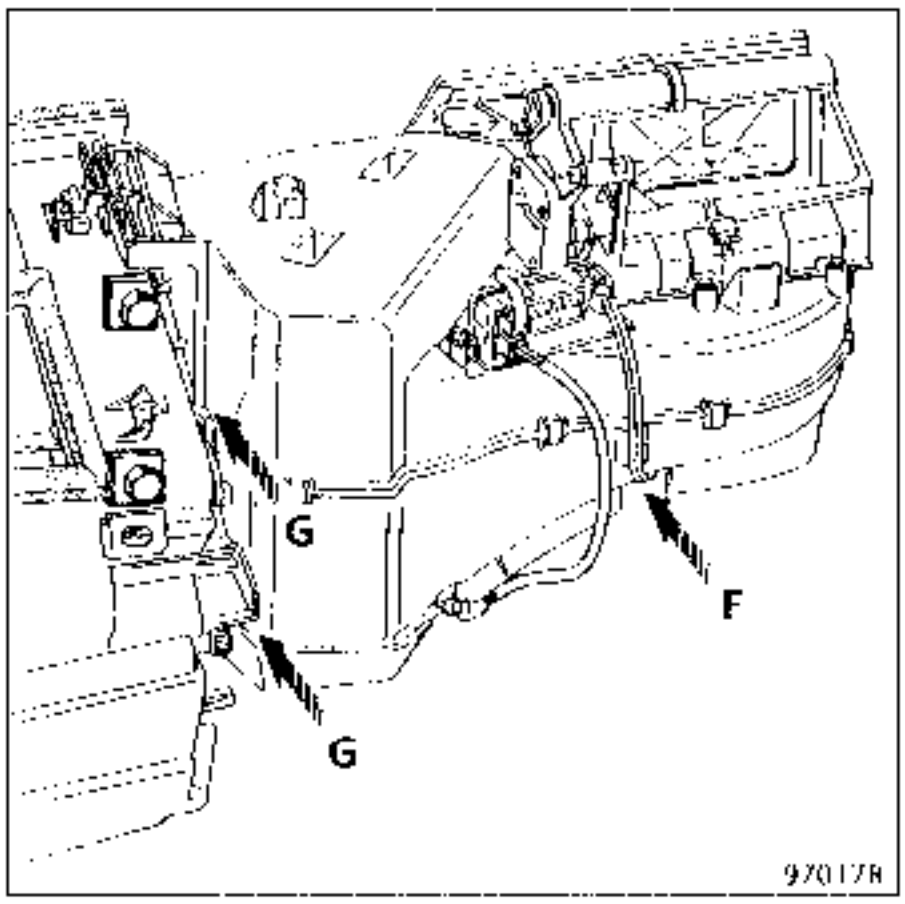
- the fan mounting bolt (8) in the scuttle panel,



– clip (2) and the pressure release protector.



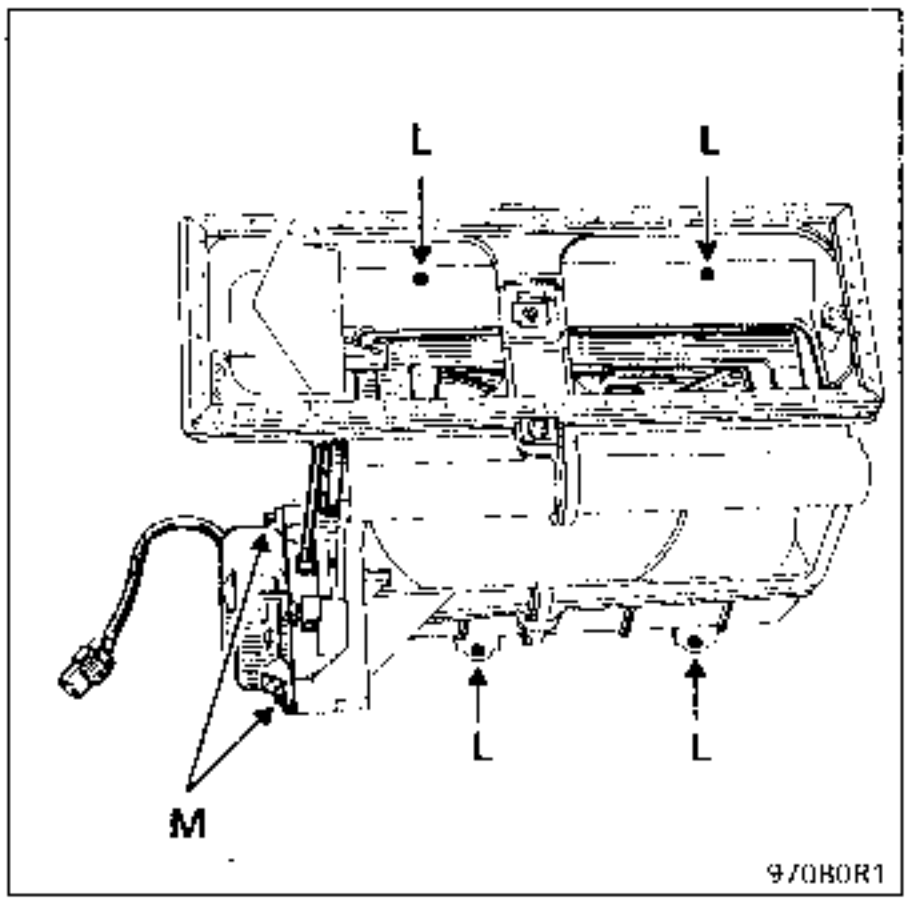
From the passenger compartment, remove :
– the two bolts (G) which mount the evaporator unit on the air distribution unit,
– nut (F).



Disconnect the various wires from the electronic module and remove the connectors

Move the evaporator unit towards the rear of the vehicle and then downwards

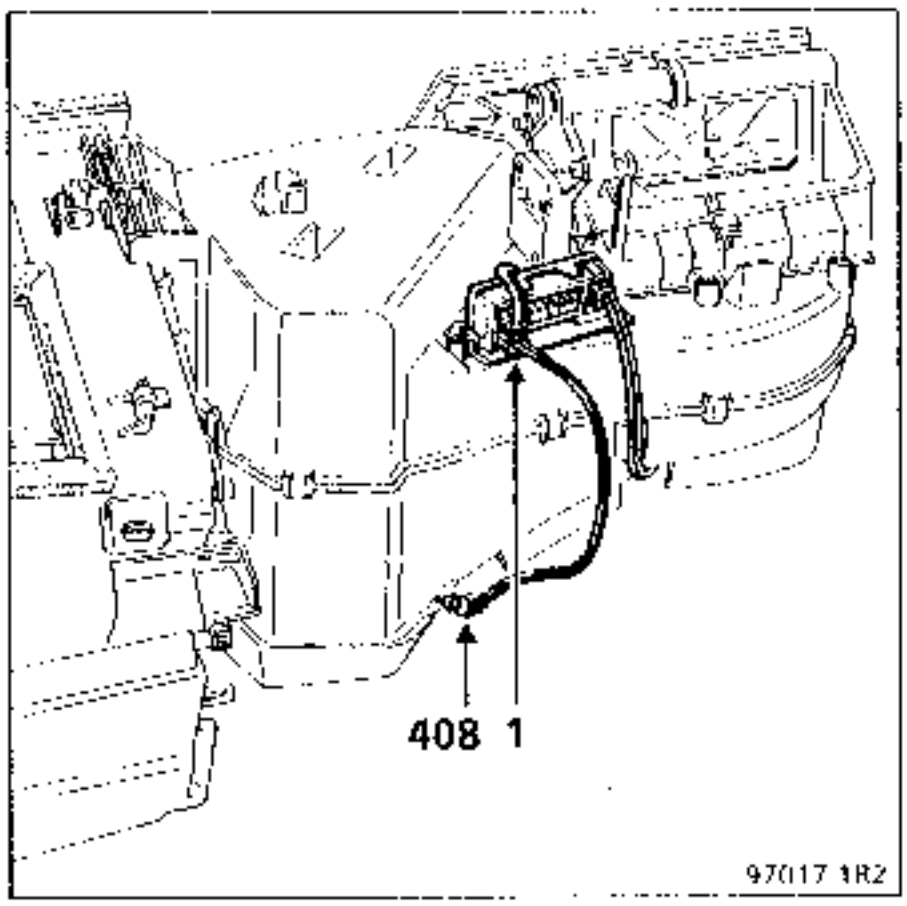
In this position, remove :
– the recycling flap mounting bolts (L),



– the recycling motor mounting bolts (M) (475) from the flap mounting

Evaporator sensor (408)

The temperature sensor (408) is mounted on the evaporator unit.



The sensor is sold with its connector

To remove the sensor, the dashboard must be tilted on its upper mountings (see "Removing the passenger compartment fan")

Disconnect the connector (1) on the electronic module and remove the sensor from its position.

Conditions and values for checking the sensor

The sensor should be checked after removal from the vehicle.

Check the resistance values at the sensor terminals

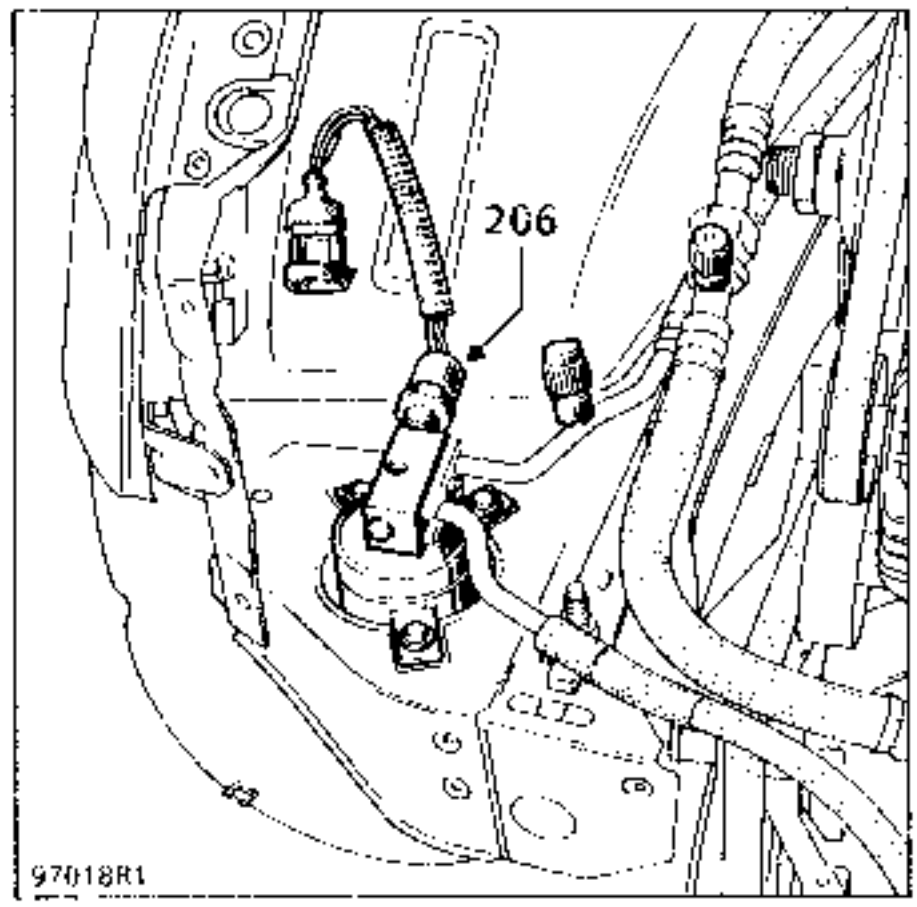
- 5°C	→	11 400 to 11 900 Ω
0°C	→	8 800 to 9 200 Ω
5°C	→	6 800 to 7 200 Ω
10°C	→	5 300 to 5 600 Ω
15°C	→	4 200 to 4 400 Ω
20°C	→	3 300 to 3 600 Ω
25°C	→	2 600 to 2 800 Ω

NOTE : testing at 0°C (when water freezes) and 25°C (ambient temperature) should be enough to demonstrate the sensor is operating correctly.

Trifunction pressostat (206)

This is mounted on the dehydrating bottle.

The refrigerant circuit does not need to be drained to work on the pressostat. Its mounting is fitted with a non-return valve which closes when the pressostat is removed.



The pressostat is mounted on the dehydrating bottle to a torque of **1 daN.m**.

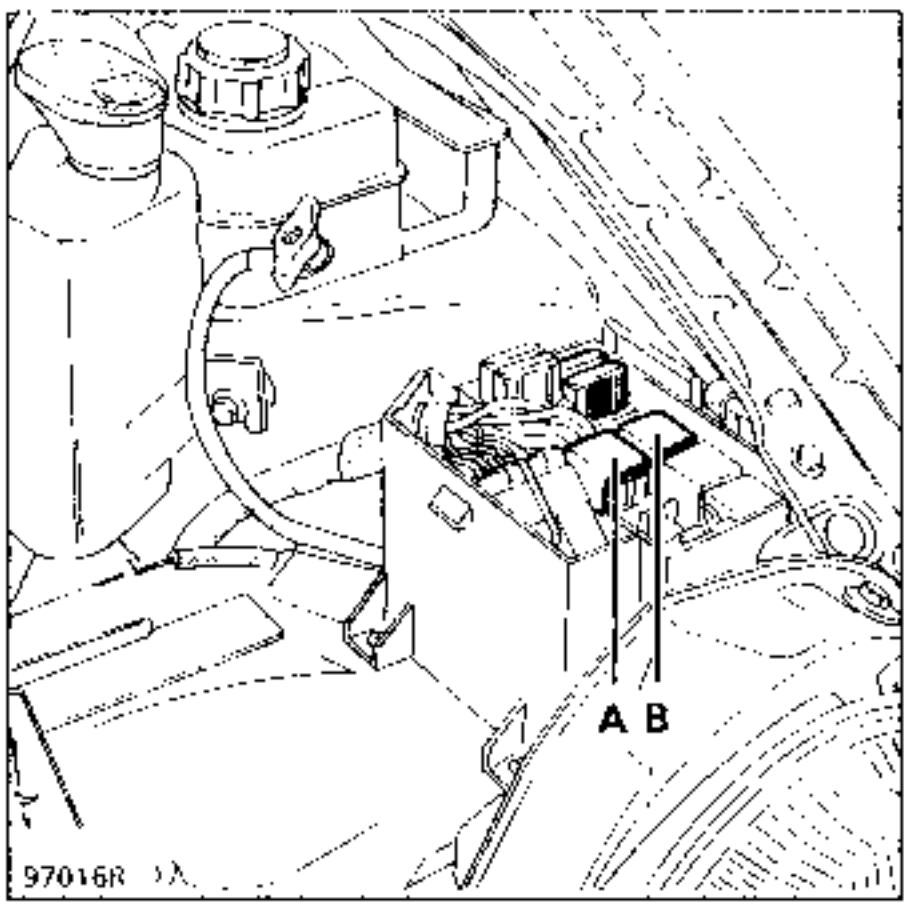
1st speed relay (233) and 2nd speed (234) of engine cooling fan (262)

The air conditioning relays are located in the connecting unit next to the battery

They are marked on the surface of the block in which they are connected (moulded marks) :

A Relay **234** high speed **50A**

B Relay **233** low speed **25 A**



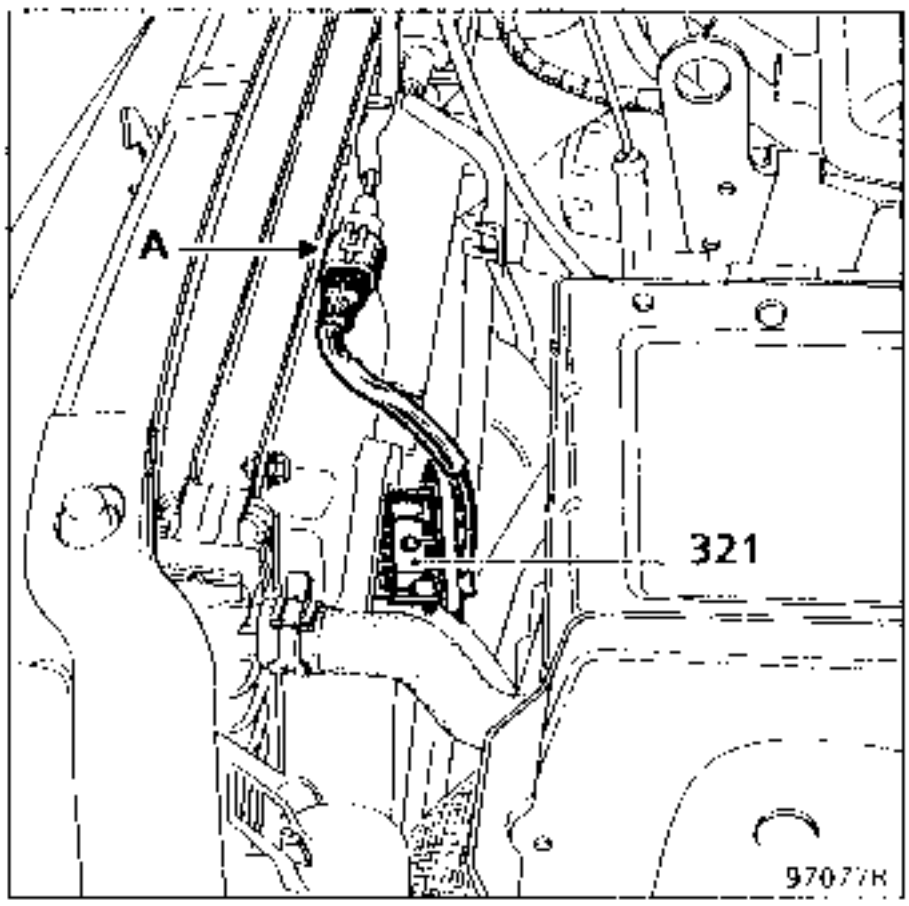
As soon as the air conditioning system is operated, the coil of relay 233 is fed The current passing through this relay and the 0.28 Ω resistance drops the current in the circuit, and makes the engine cooling fan operate at low speed

If there is excess pressure in the freon circuit or if the engine overheats, the coil of relay 234 is fed. The current passing through this relay feeds the engine cooling fan directly and the fan turns at high speed.

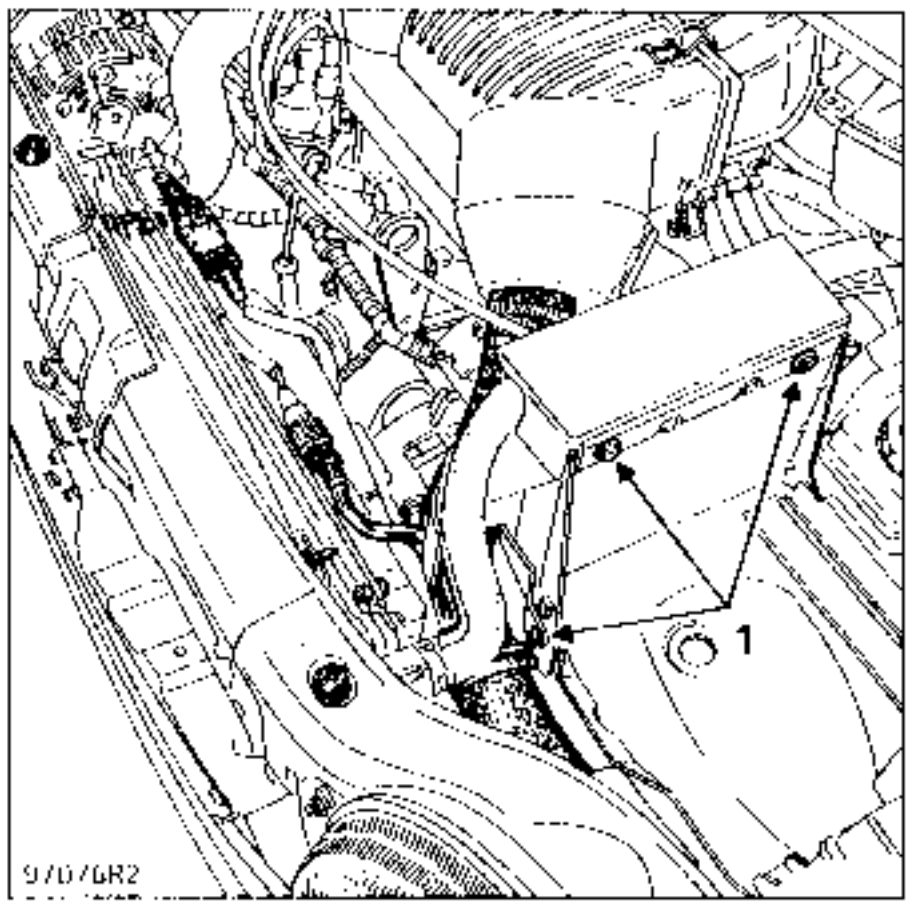
0.28 Ω Resistance (321)

This is mounted on the cooling fan assembly mounting.

The air filter sleeve and its mounting must be removed to reach this resistance



Remove the injection computer shield, bolt (1) then the resistance unit mounting bolts (321)



Disconnect the connector (A) to check the resistance value