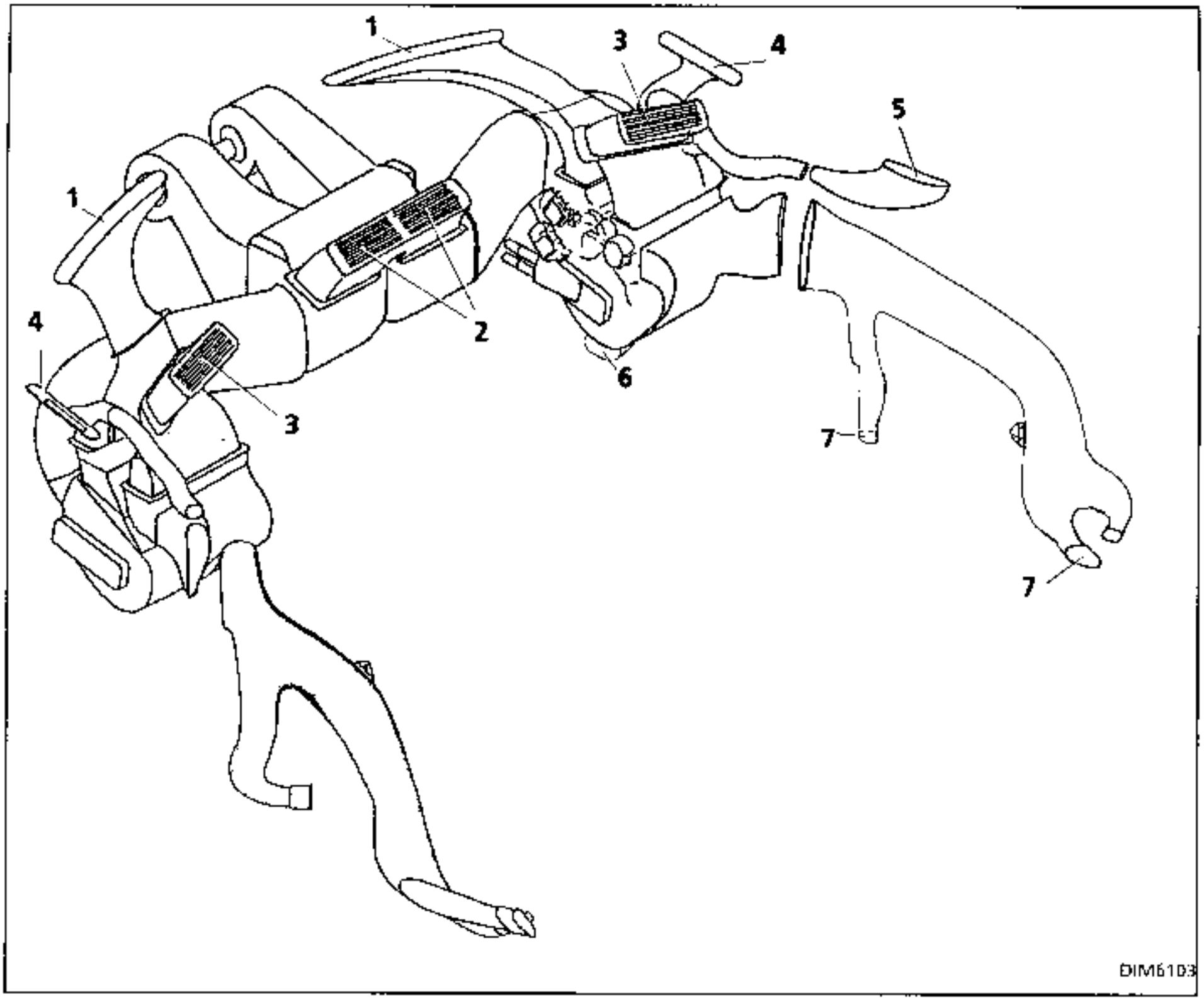
Air is taken in via the sides of the rear view mirrors and the front door pillar lining. It is blown into the passenger compartment via two particle filters and a central dual fan assembly.

Before reaching the vents (demisting vents, side vents), it is heated as it crosses the heater matrices.

AIR **DISTRIBUTION**: allocation of air distribution outlets in the passenger compartment.



1 Windscreen demisters

2 Centre vents

3 Side vents

4 Side window demisters

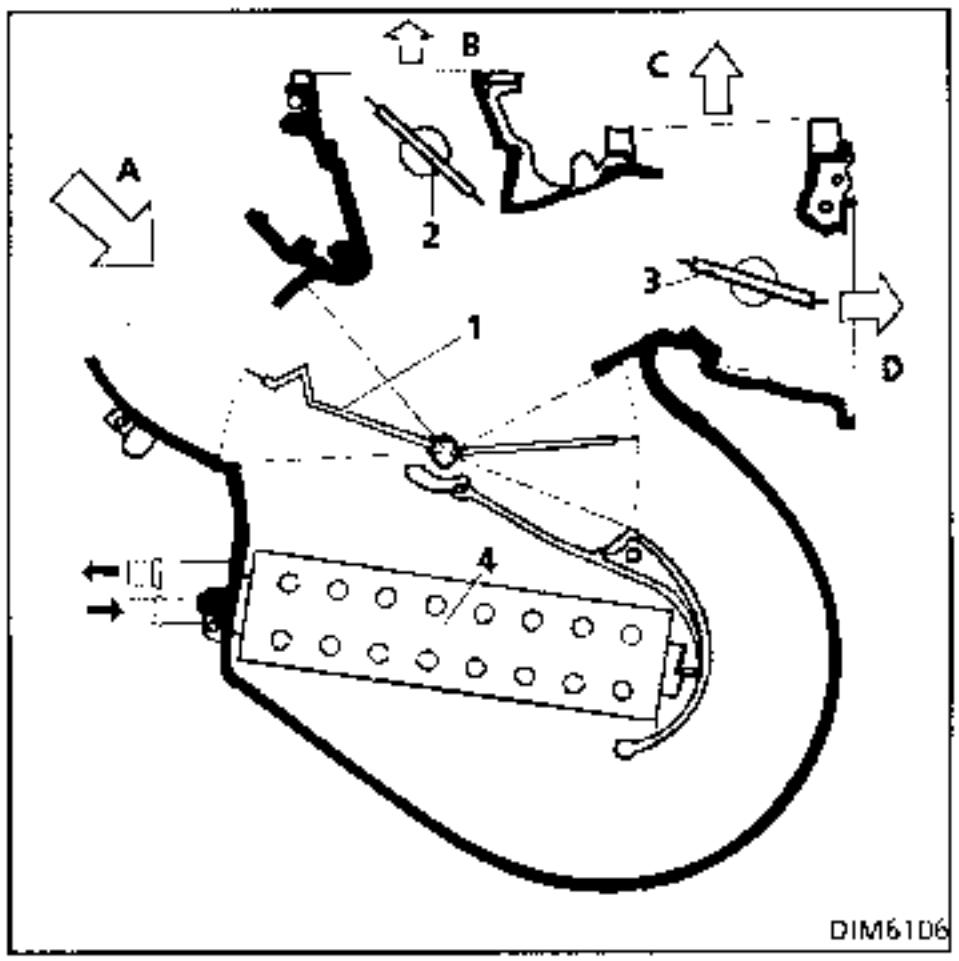
5 Front door window demisters

6 Front seat lower air outlets

7 Rear seat lower air outlets

The centre vents may only be supplied with fresh air.

Right hand air distribution / heating unit (left hand unit is symmetrical): diagram showing position of air distribution flaps



A Air inlet from fan

B Air outlet to demisting vents

C Air outlet to side vents

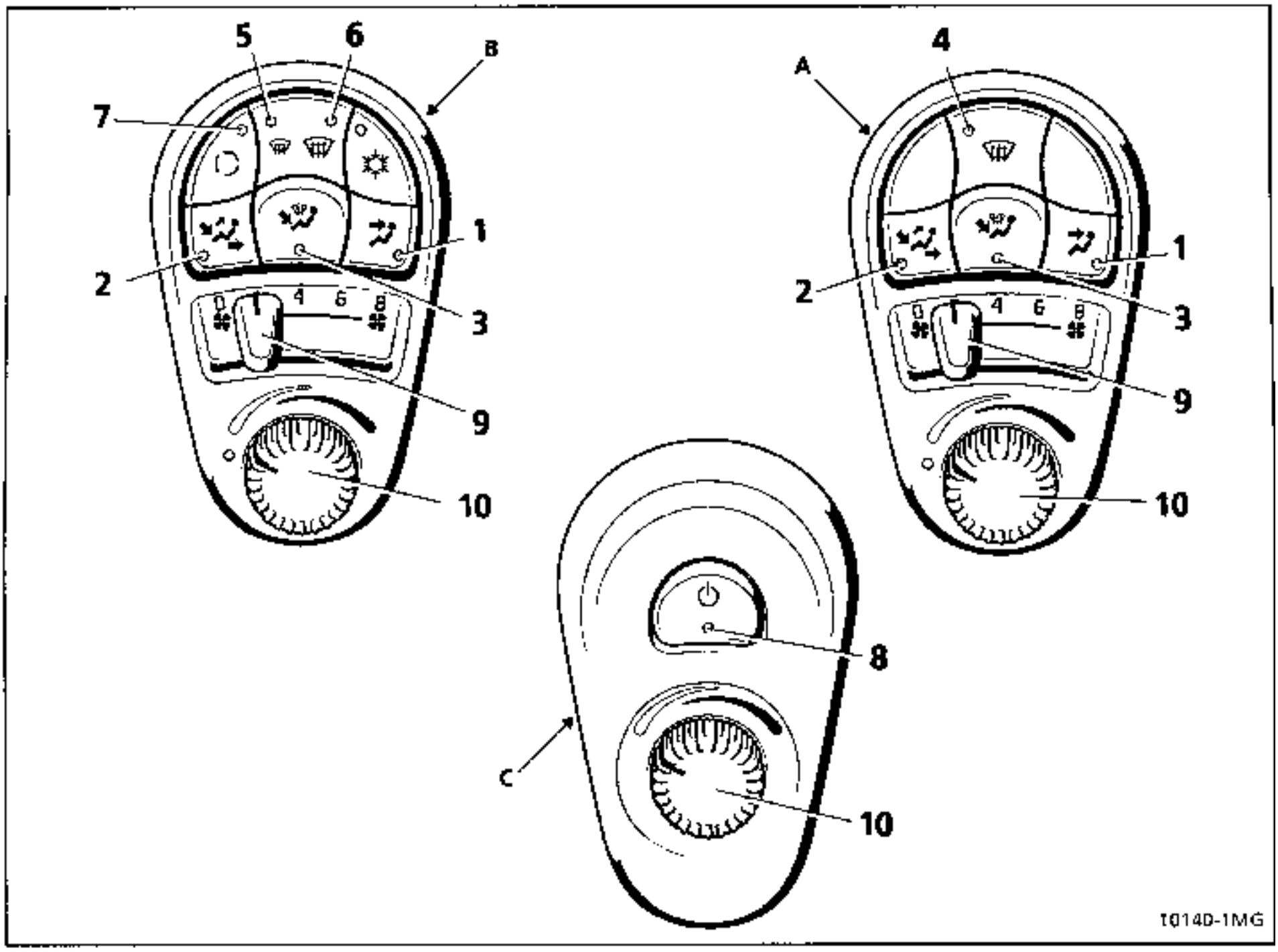
D Air outlet to front and rear footwells via front door ducts

1 Hot / cold air mixing flap

2 Demisting open / close flap

3 Footwell warming open / close flap

4 Heater matrix



A Control unit, driver's side, basic version

B Control unit, driver's side, version with air conditioning

C Control unit on front passenger side

The vehicle has two air distribution assemblies (see diagram on page 61-01), and two control units. This allows the temperature of distributed air to differ on each side of the passenger compartment.

Distribution is synchronous and is controlled by the driver's side. The driver may also control the mix of air for the passenger side.

Apart from the conventional air mixing knob and the air flow control, the controls are buttons (1 brief press on each button) .

For the basic version (without air conditioning), the vents are constantly supplied. They must all be closed to shut off the outside atmosphere.

DRIVER'S SIDE CONTROL UNIT:

BUTTON

The air flow is directed to the centre and side vents only (see previous pages).Warning light (1) illuminates if the function is active.

BUTTON

The air flow is directed to the feet of the front and rear occupants (see previous page)with a small amount to the demisting vents. Warning light (2) illuminates if the function is active.

BUTTON 

The air flow is distributed between the demisting / de-icing vents and the feet of the front and rear occupants. Warning light (3) illuminates if the function is active.

BUTTON  **(version without AC)**

The air flow is directed solely to the demisting / de-icing vents. Warning light (4) illuminates if the function is active.

BUTTON  **(DEMISTING key for version with AC)**

One press starts the conventional demisting / de-icing system (all the air is directed to the windscreen, side window and front door vents).Warning light (5) illuminates if the function is active.
For the version with air conditioning only, pressing the key again will give a 15 minute period where:

- the two mixing flaps move to MAXIMUM hot (passenger mixing controls are switched to automatic operation),
- the system sets to external air (if the recycling position was selected),
- the fan is set to maximum speed,
- the heated rear screen and rear view mirrors operate,
- the air conditioning system operates,
- warning light (6) illuminates (in addition to (5)).

Any action at any of the distribution keys returns the system to the driver's control.

BUTTON  **(version with AC)**

The air flow is recycled and the vehicle is isolated from the external air. Warning light (7) illuminates independently of the other function keys.

PASSENGER'S SIDE CONTROL UNIT:

CENTRAL BUTTON

Pressing this button gives the passenger control of air mixing for the right hand side of the vehicle.Warning light (8) illuminates.To return mixing control to the driver, press the button once more or, on the driver's side, press and hold any distribution button for 1.5 seconds.

AIR FLOW CONTROL (9):

Position **0** : fan off or very low speed.

Position **8** : fan at maximum speed.

There are 14 intermediate positions.

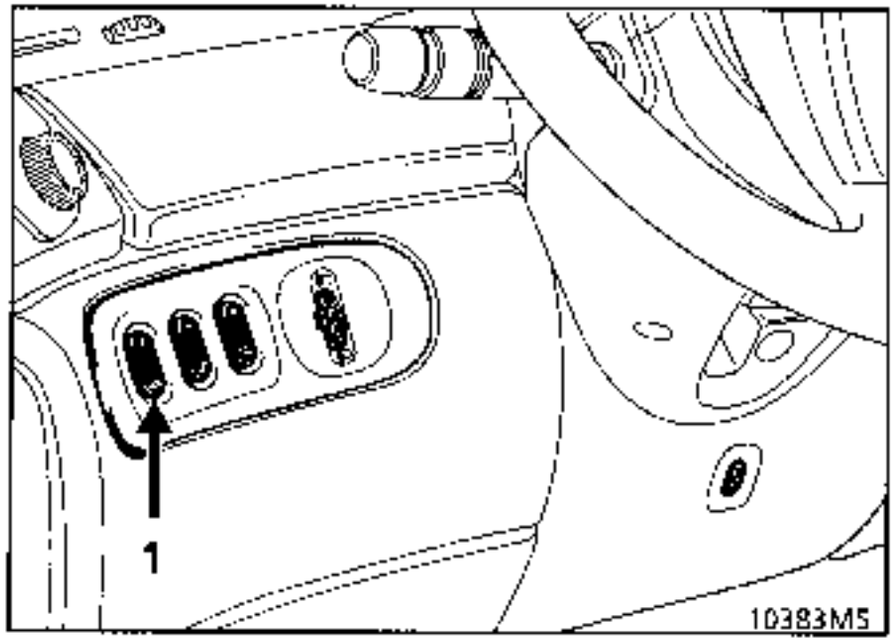
AIR TEMPERATURE ADJUSTMENT CONTROL (mixing) (10):

Knob turned to the left:
the heating radiator is isolated from the air flow - maximum cold position

Knob turned to the right:
the air flow passes through the heating radiator - maximum hot position.

Between these two extremes, the hot air / fresh air mixture is proportional to the position of the knob.

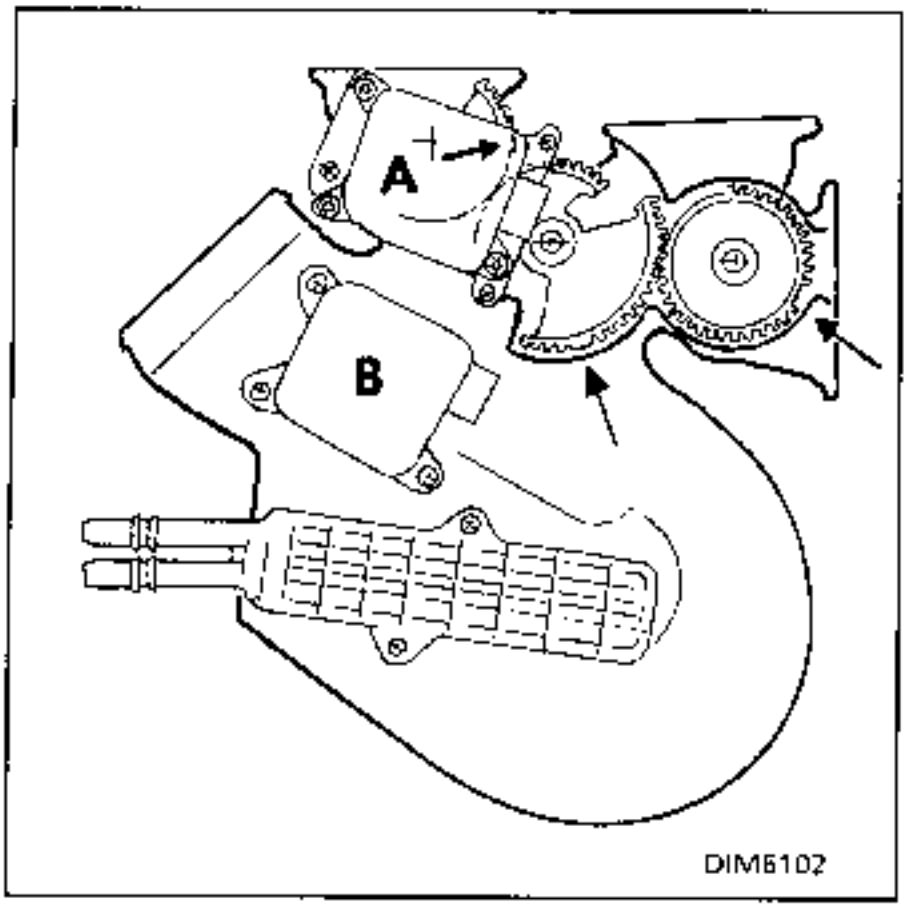
REAR SCREEN DEMISTING AND DE-ICING KEY (1)



Pressing the key operates or stops the demisting / de-icing function of the heated rear screen.

The function may also be stopped by pressing the key.

AIR MIXING AND DISTRIBUTION CONTROL MOTOR



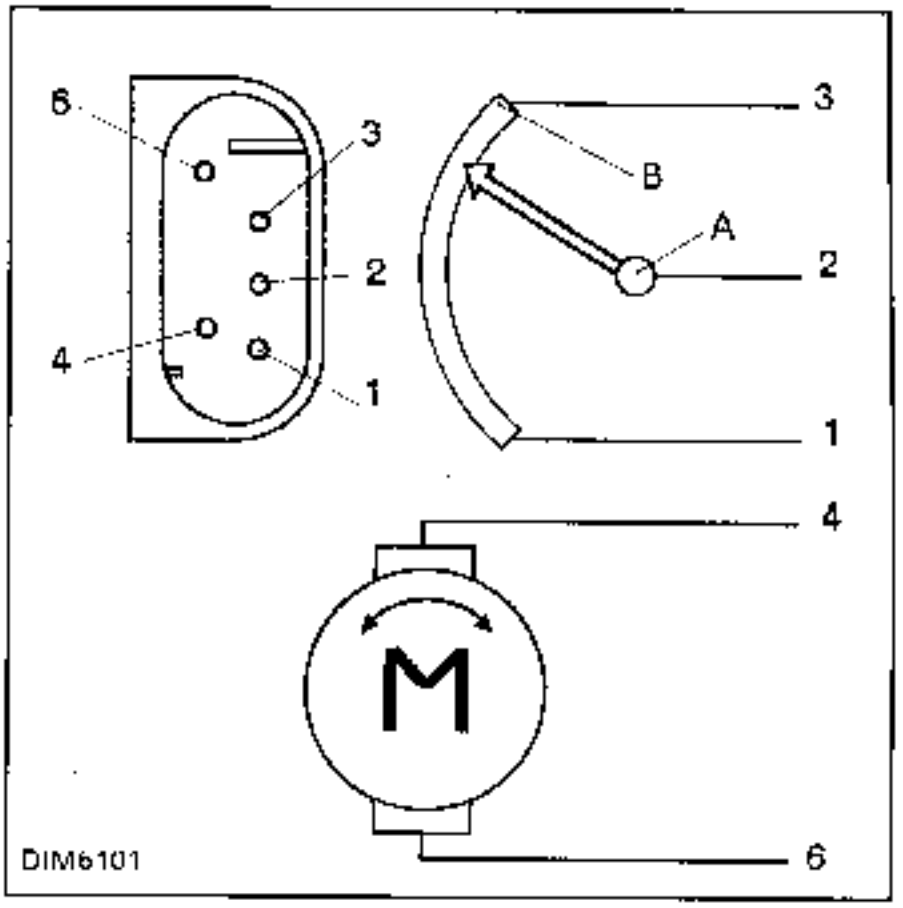
A : Air distribution control motor

B : Air mixing control motor

The drive and return gears are marked by foolproofing so they cannot be confused (arrows on diagram above).

The unit shown is for the right hand side. The left hand side unit is symmetrical.

AIR MIXING CONTROL MOTOR CONNECTOR (B)



Terminals **4 and 6** supply the motor with 12 Volts according to the control setting on the control panel.

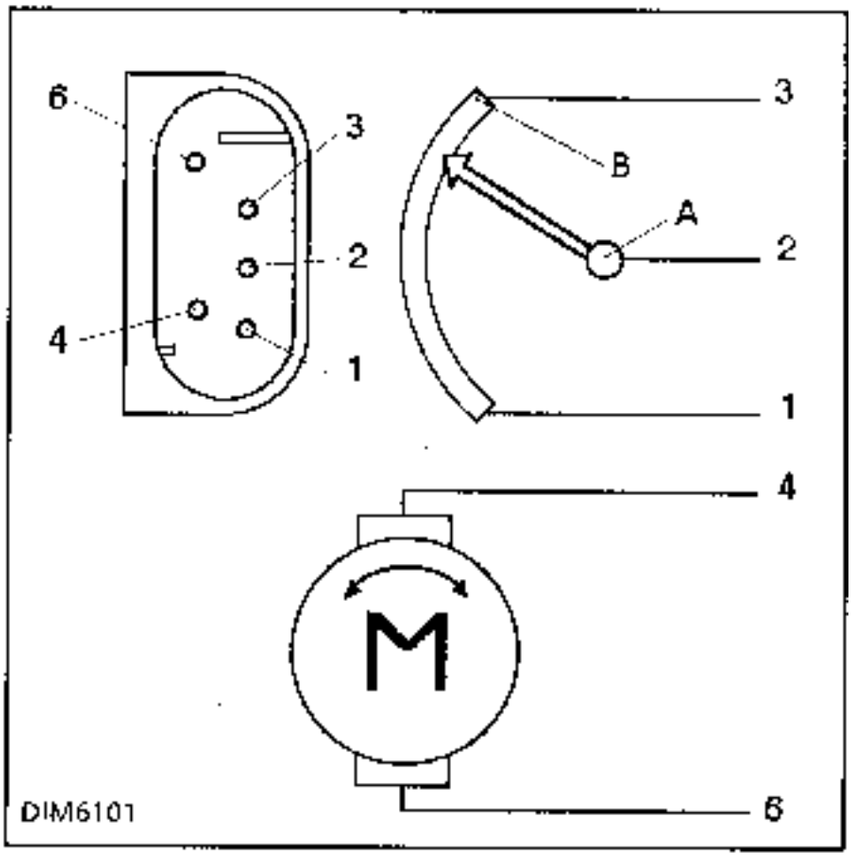
Terminals **1** and **3** constantly supply the potentiometer (A) with 5 Volts.

- Terminal 1: Earth for LH drive vehicles, + feed for RH drive vehicles.
- Terminal **3** : + feed for LH drive vehicles, earth for RH drive vehicles.

Terminal **2** : connected to a slide attached to the mixing flap shaft, it reflects the electrical position of the mixing flap. Reading this value and comparing it with a reference value when it changes operates the mixing motor to align it with the electrical response from terminal 2.

Specifications apply equally to the two units (LH and RH sides) on the same vehicle.

AIR DISTRIBUTION CONTROL MOTOR CONNECTOR (A)



Terminals **4** and **6** supply the motor with 12 Volts according to the control setting on the control panel.

Terminals **1** and **3** constantly supply the potentiometer (A) with 5 Volts.

- Terminal **1** : earth.

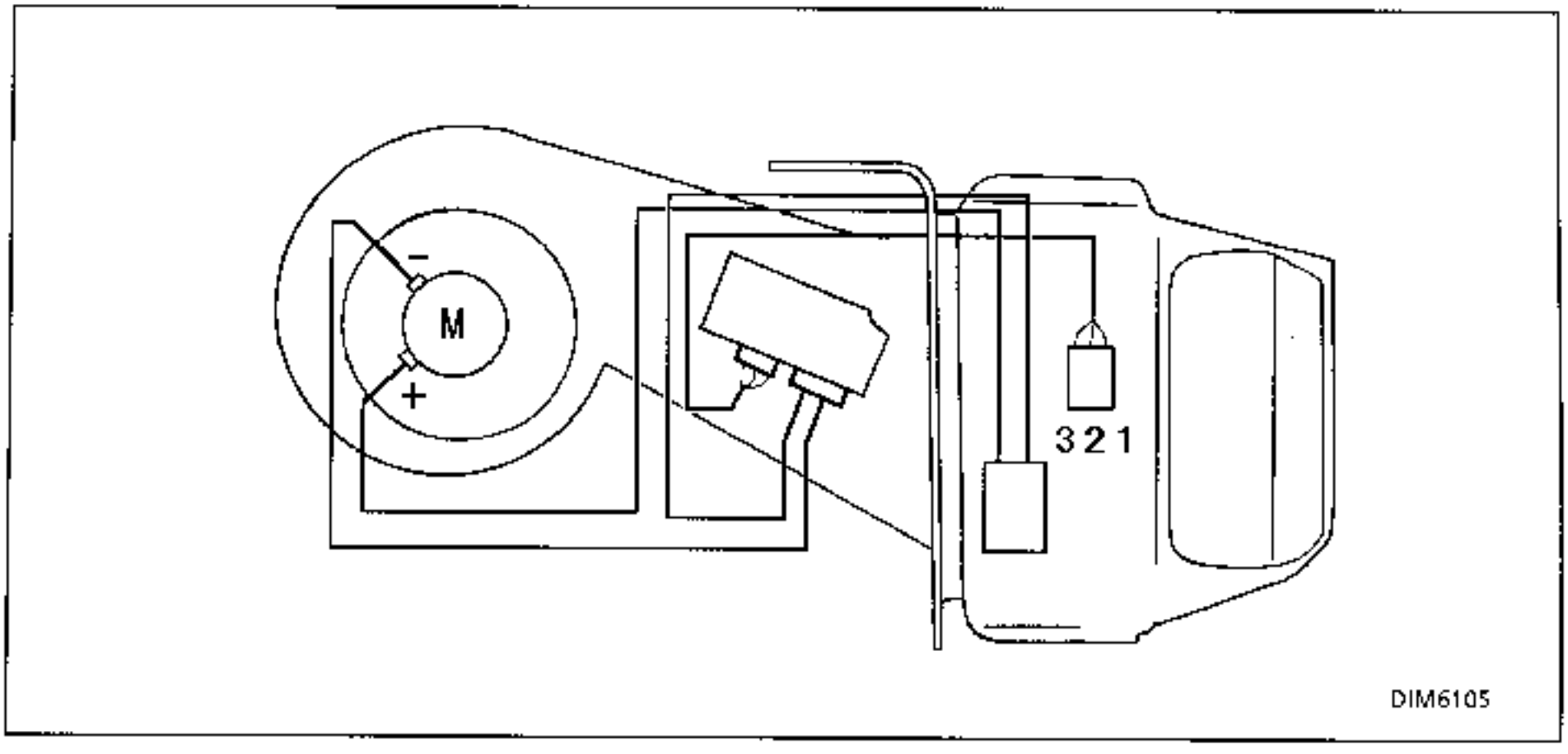
- Terminal **3** : +5 Volts feed.

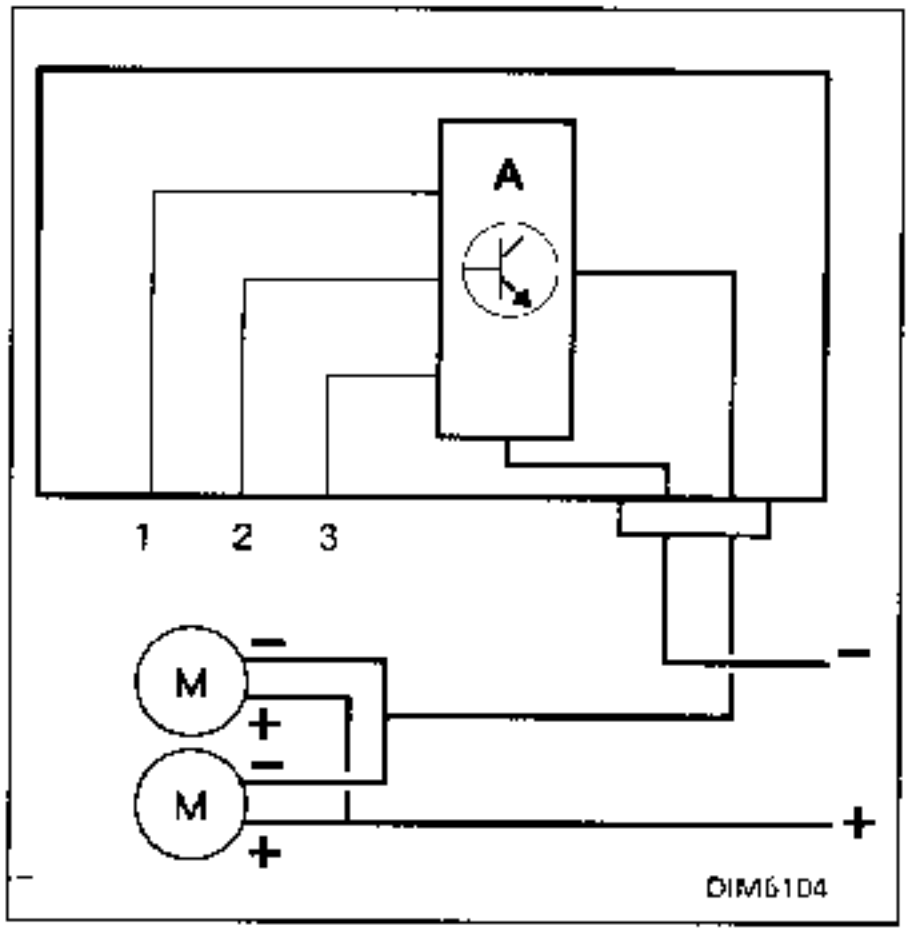
Terminal **2** : connected to a slide attached to the de-icing flap shaft, it reflects the electrical position of the distribution flaps.

Reading this value and comparing it with a reference value when it changes operates the distribution control motor to align it with the electrical response from terminal **2**.

Specifications apply equally to the two units (LH and RH sides) on the same vehicle, both for LH and RH drive.

FAN MOTOR CONTROL





The motors (**M**) are fed constantly by + after ignition feed.

Negative feed passes via a transistor (**A**) which authorises the return proportional to the reference value supplied by wire (**2**).

Wire (**1**): transistor feed : + 12 Volts, constant.

Wire (**2**) : control voltage from control panel, varying from 0 Volt (maximum fan speed)
to 6.3 Volts (fan off).

Wire (**3**): earth.

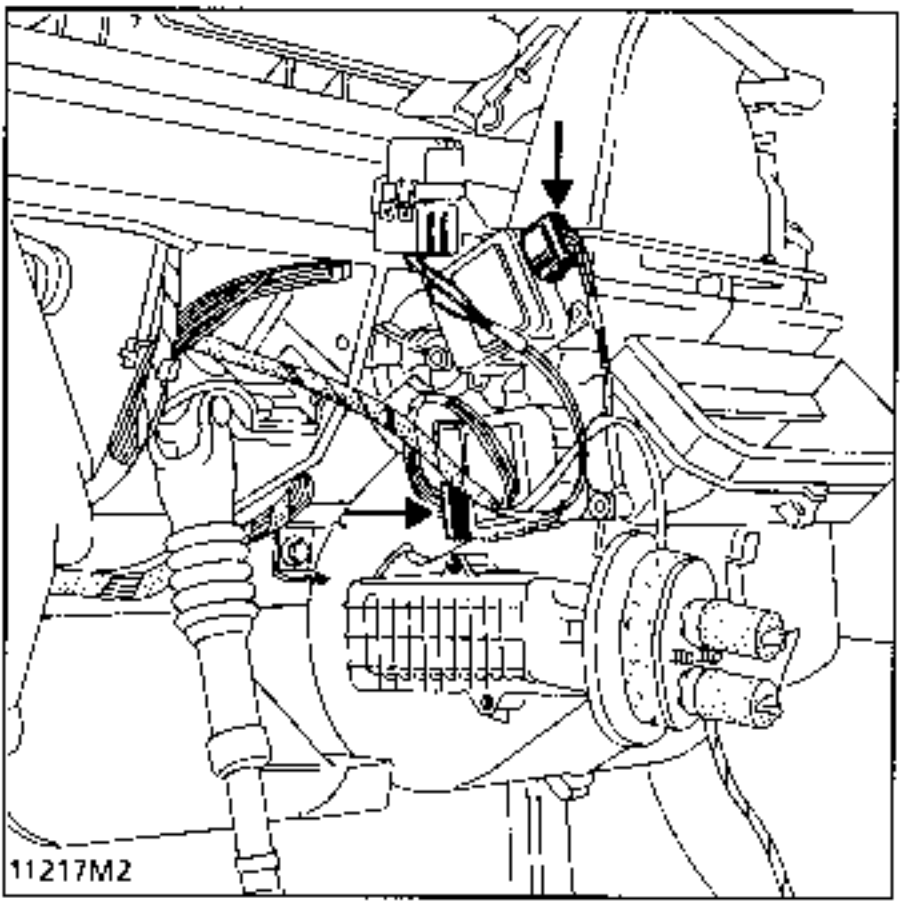
The distribution unit (LH or RH) may be reached after removing the dashboard and the supporting ladder has been moved back

Follow the instructions for removing and refitting given in section 57 "Moving the dashboard back".

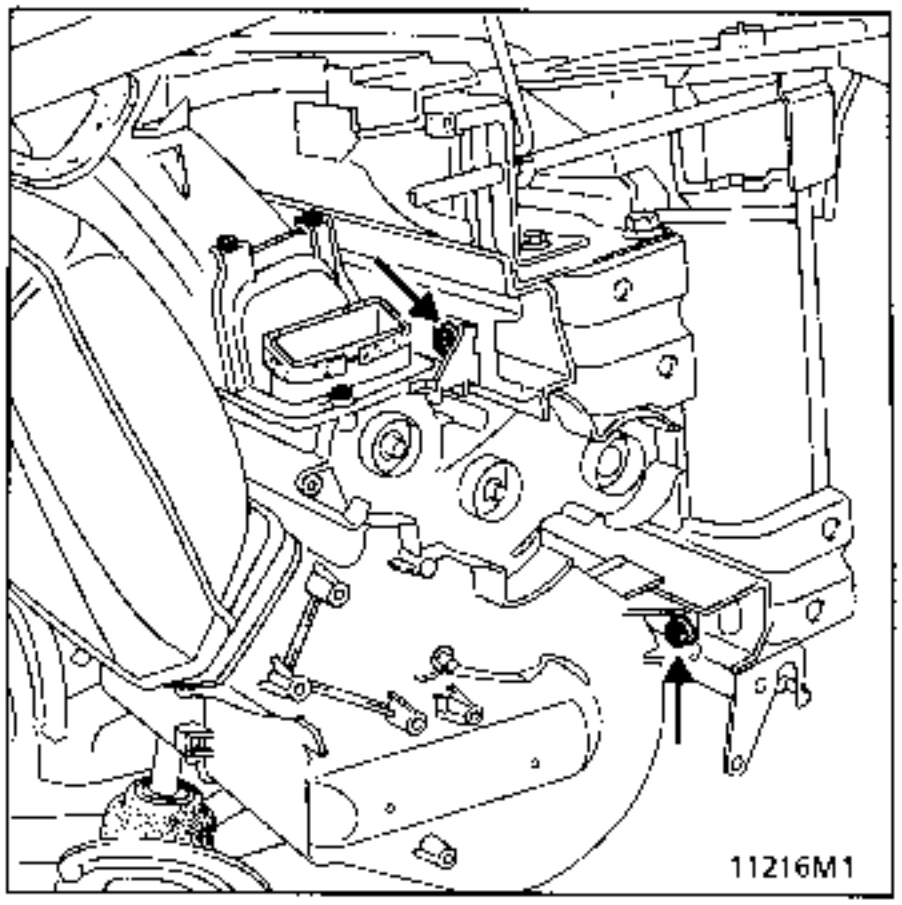
Release the air sleeve at the fan end.

Remove the demisting duct.

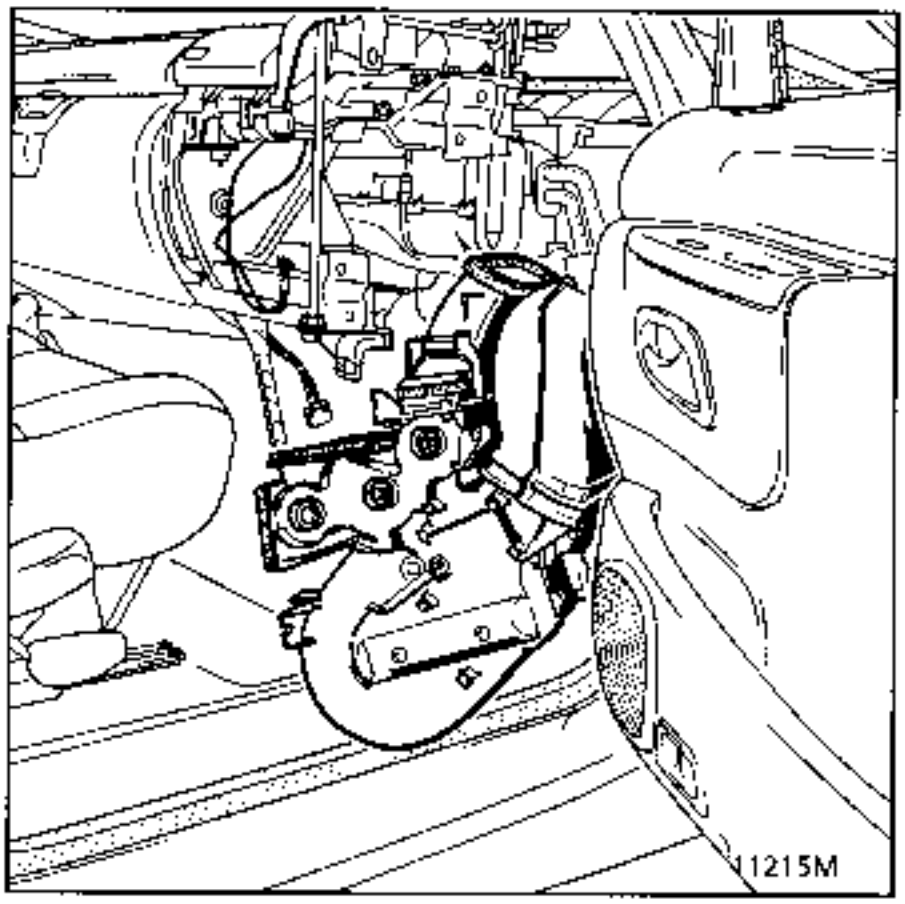
Disconnect the mixing and distribution motors.



Remove the mounting bolts.



Take out the distribution unit between the ladder and the open door.



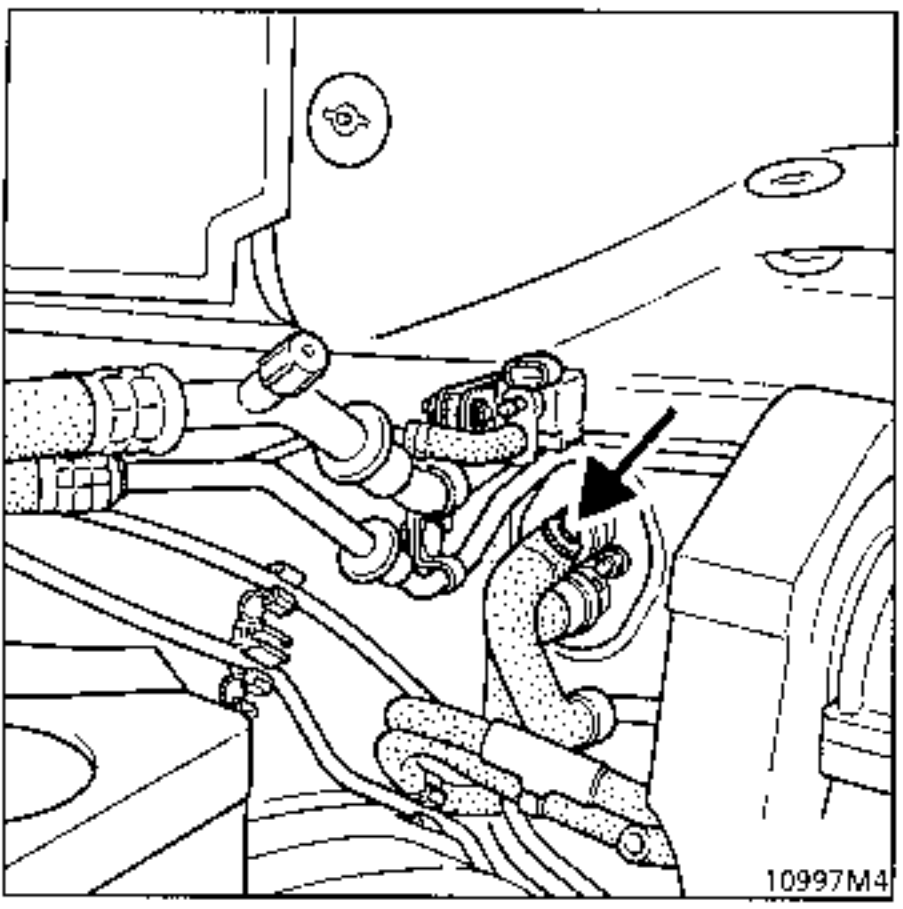
REFITTING:

Refitting is the reverse of removal.
Reset the new distribution unit.

The dashboard must be removed to remove a heating radiator. The ladder must be moved to one side by 50 mm to take out the water pipes for the bulkhead heater matrices.

REMOVING - REFITTING(Operations for both sides):

Fit hose clamps to the engine water pipes.



Disconnect the quick release unions. Blow compressed air into one of the pipes to drain as much water as possible from the radiators.

Special note for G8T engine with air conditioning: use tool **Mot. 1395** on the left hand side to disconnect the quick release unions (see section 19 "Quick release unions")

Remove the 2 nuts from the bulkhead flanges and shunt the heater matrix inlets and outlets.

Retain the foam insulation.
Remove the dashboard and move the ladder back by 50 cm.

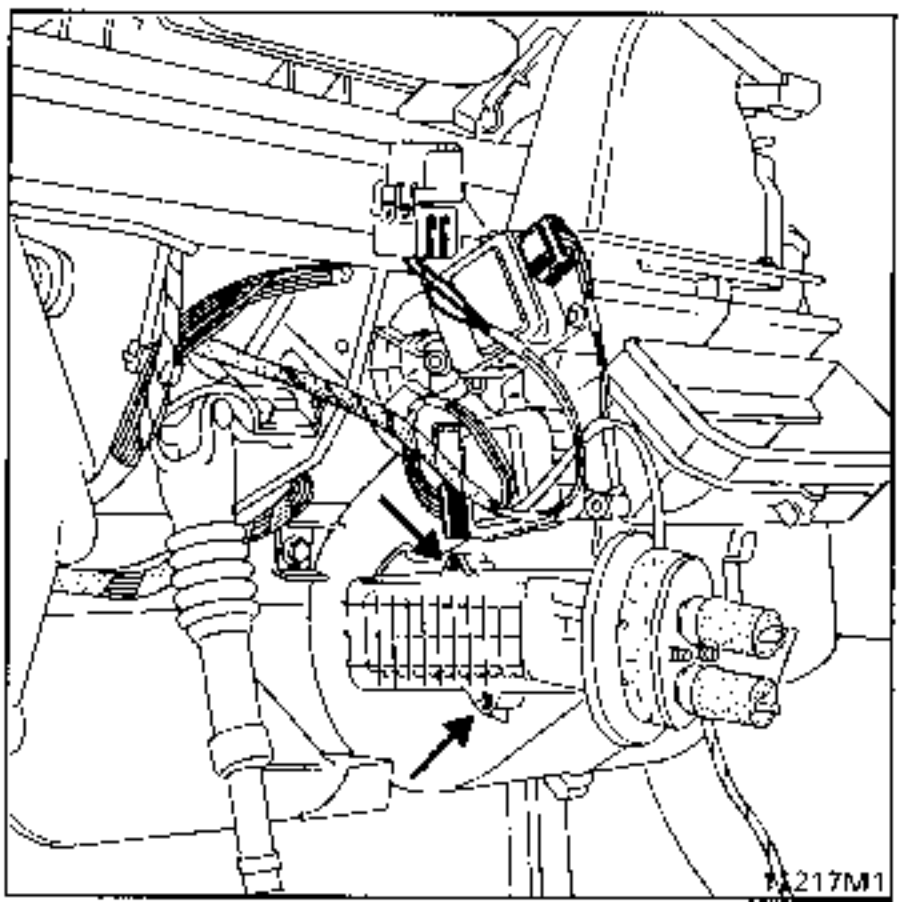
IMPORTANT:
- protect the trim,
- move the front seats as far back as possible,
- set the centre vents to closed,
- disconnect the safety connecting cable for the automatic transmission on the brake pedal mounting (Z7X engine),
- after releasing the steering column yoke, immobilise the steering wheel using the ignition switch,
- do not slacken the dashboard position adjustment nuts.

Follow the instructions for removing and refitting given in section 57 "Moving the dashboard back".

Remove the 2 mounting bolts for the heater matrix in question and remove it transversely, taking care not to damage the fins.

Passenger side only:

Remove the distribution unit on the passenger side to allow the heater matrix to be removed.



REPLACEMENT

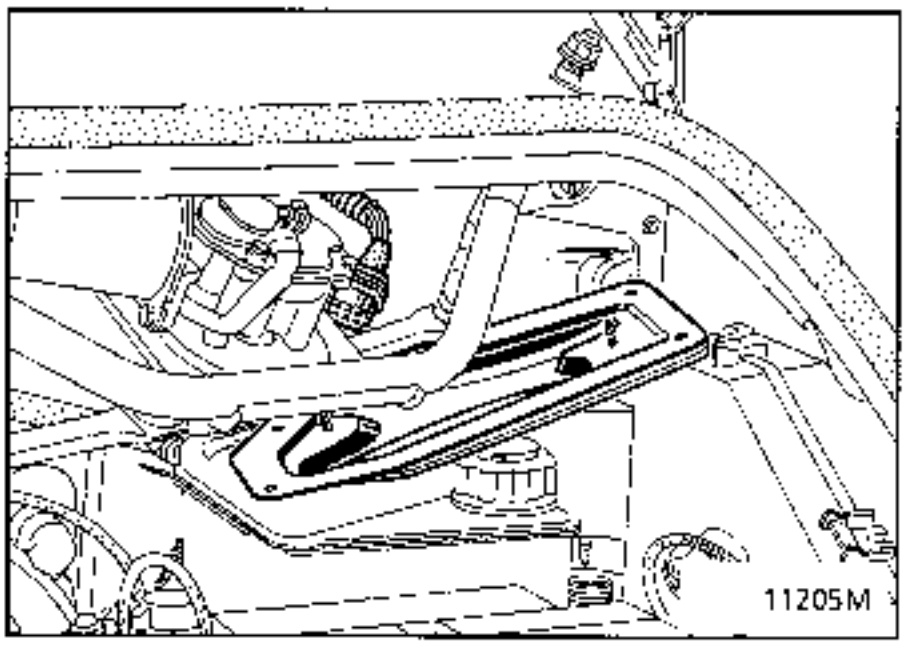
Both filter cartridges must be renewed in the same operation.

Disconnect the battery and the windscreen wiper connector.

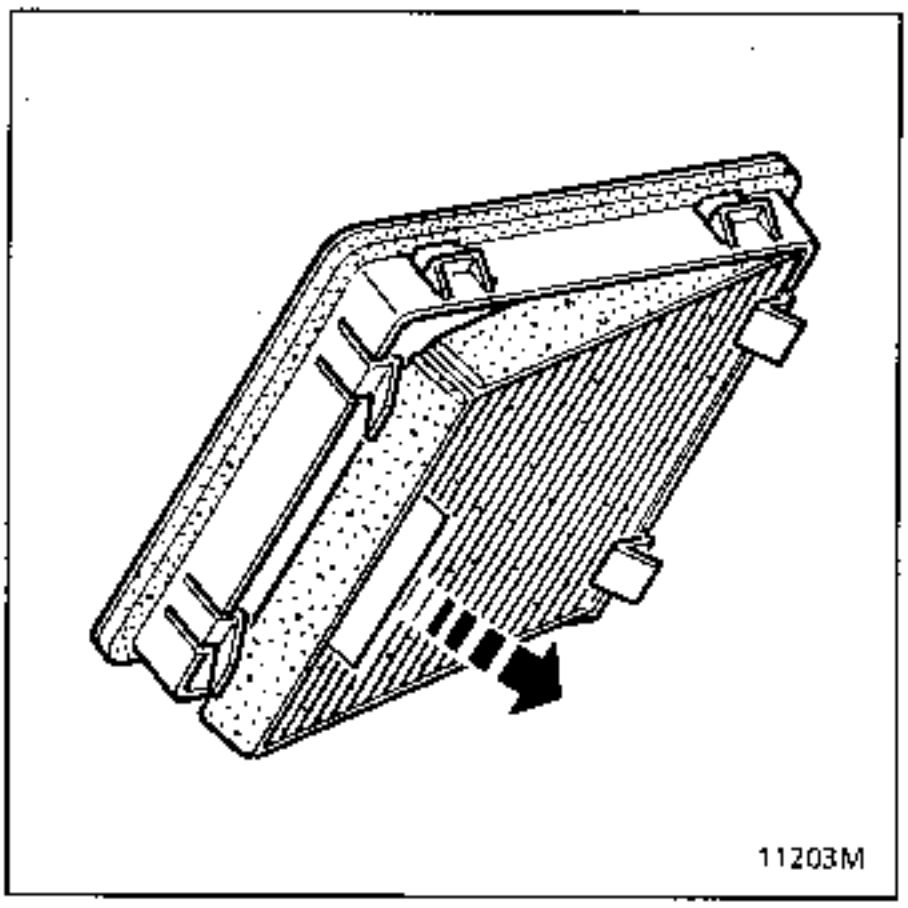
Set the wipers in a vertical position, by moving the drive bars.

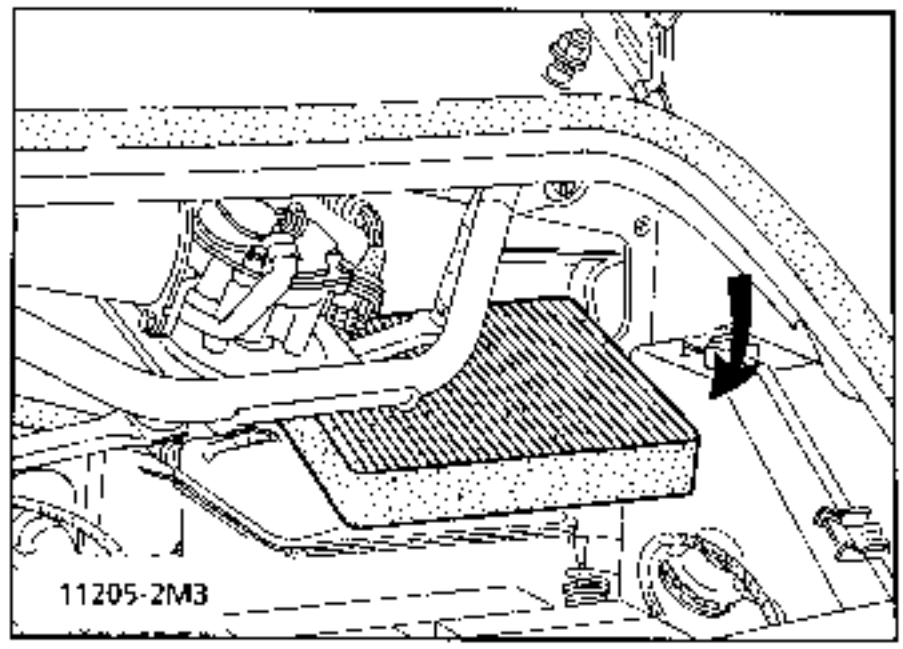
Remove the soundproofing panels.

Remove the shock absorber turret closure panels.

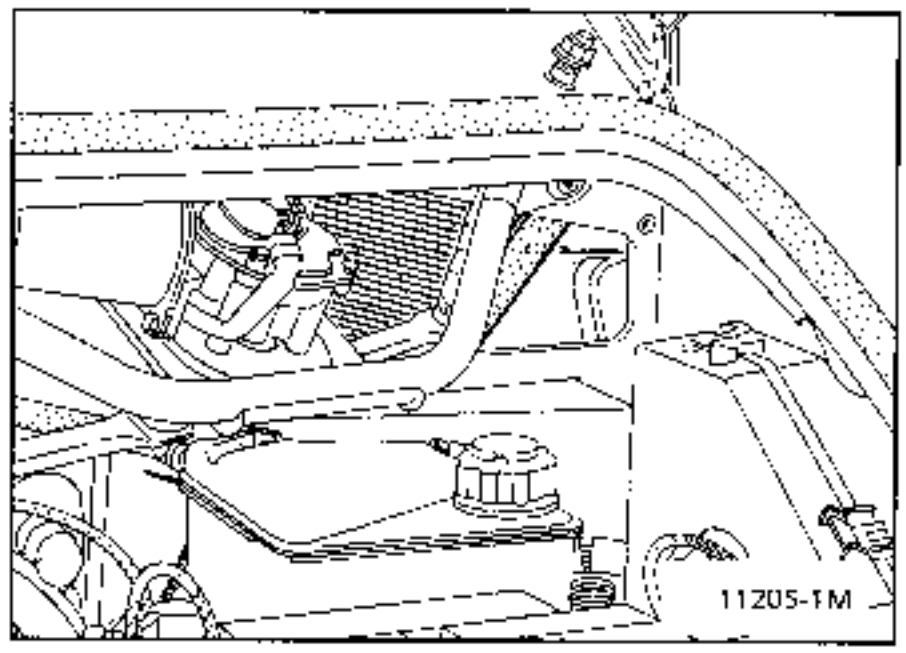


Remove the old cartridge by pulling the tab and bringing it out the same way as the closure panel.





Fit the new filter cartridge, with the tab at the outside, attaching it to its diagonal mounting.

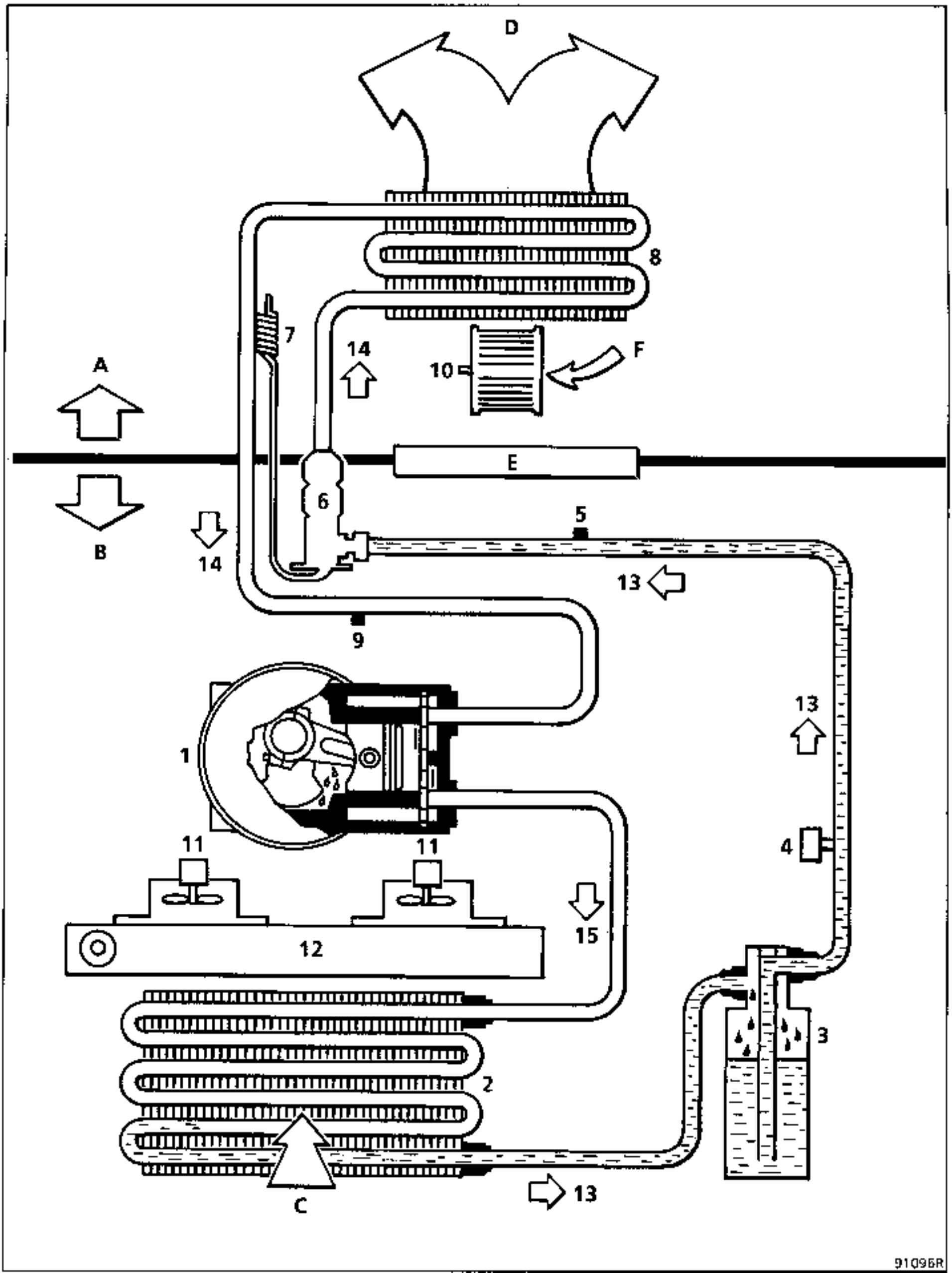


Refit the closure panels and their soundproofing.

Reconnect the electric motor connector and the battery.

The wipers will return to the park position when the ignition is turned on.

Reset the clock.


D
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13
91096R

A Passenger compartment

B Engine compartment

C External air

D To air mixing unit

E Scuttle panel grille

F External or recycled air

1 Compressor

2 Condenser

3 Refrigerant fluid reservoir

4 Trifunction pressostat

5 High pressure bleed

6 Pressure relief valve

7 Pressure relief valve thermostatic regulation

8 Evaporator

9 Low pressure bleed

10 Air conditioning fan

11 Cooling fan

12 Engine radiator

13 High pressure liquid

14 Low pressure vapour

15 High pressure vapour

Consumables:

- Compressor oil
  SANDEN SP 20 (PAG)
  135 cm^3 ÷ 15

- Refrigerant fluid
  R134a
  F3R - Z7X engine : 880 g ± 30g
  G8T engine: 800g ±30g

INFORMATION ON REFRIGERANT FLUID R134a

With the aim of **protecting the environment**, public authorities have imposed the use of **refrigerant fluid R134a** in air conditioning systems.

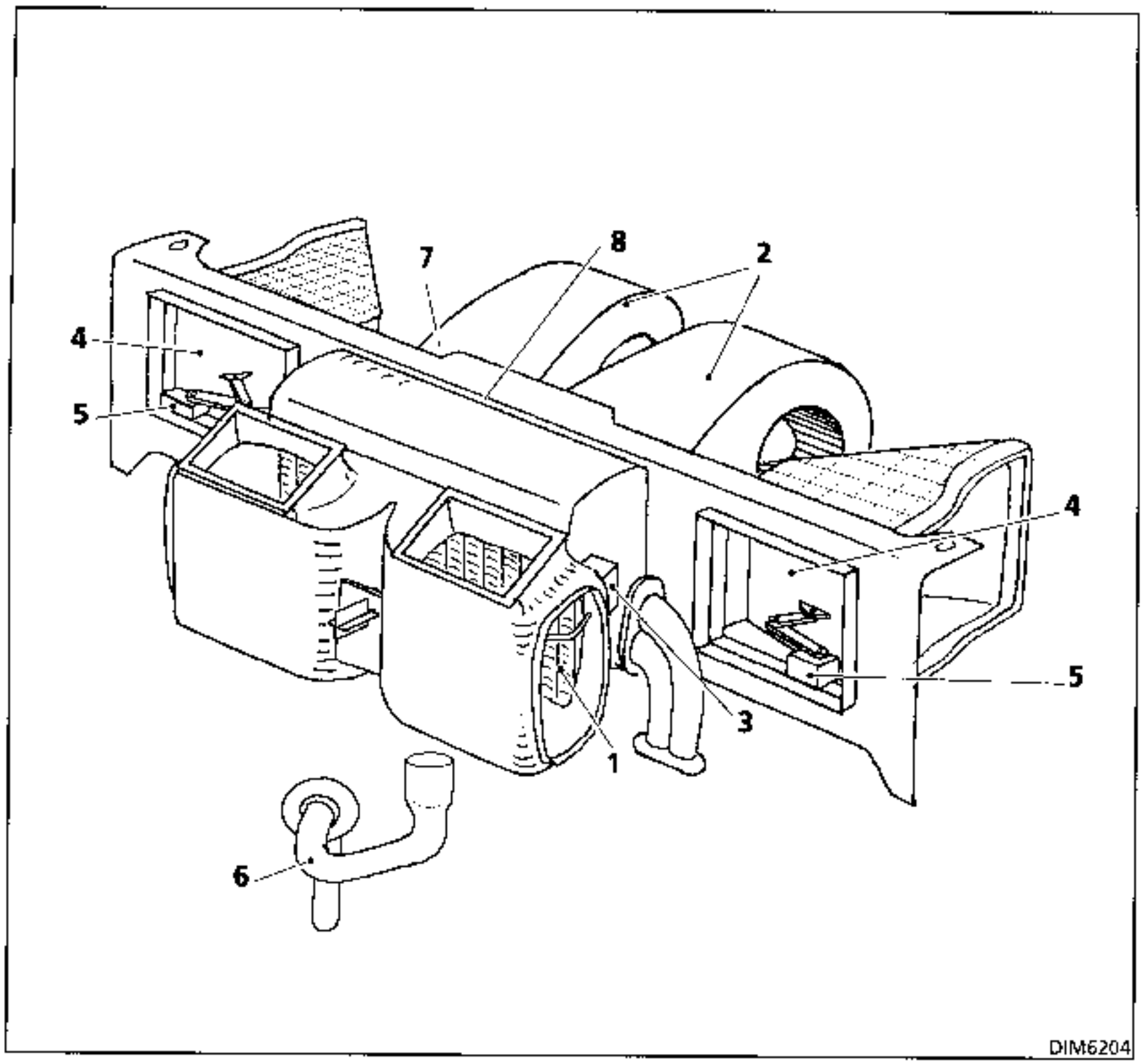
A label in the engine compartment shows the specifications of the refrigerant fluid.

The section "Air conditioning - New refrigerant R134a" gives more detailed information on this development.

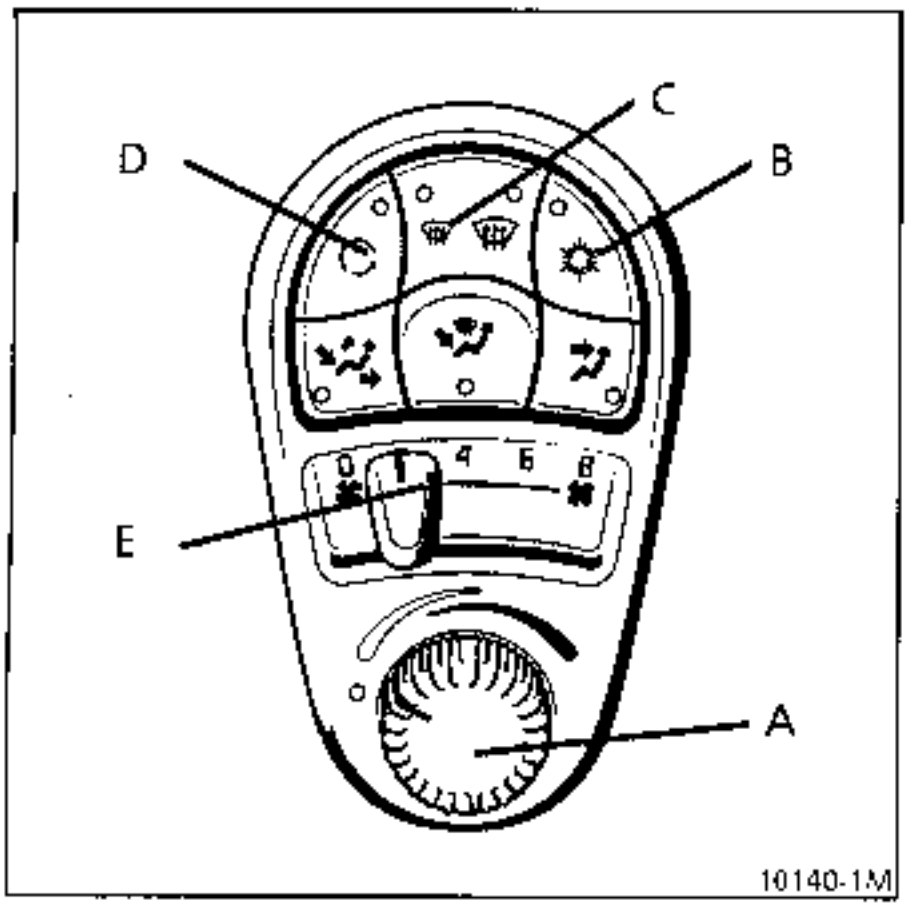
The most important recommendation concerns the exclusive use of **SANDEN SP 20** oil for the compressor and when fitting pipes in the circuit.

The oil is packaged in 250 ml cans and supplied by the Parts Department under Part Number 77 11 143 700.

Presentation of the fan assembly



1 Evaporator
2 Fans
3 Evaporator sensor
4 Air inlet and recycling flaps
5 Air recycling motor
6 Condensation drain pipe
7 Fan speed regulation unit
8 Pressure relief valve



DISTRIBUTION OF AIR IN THE PASSENGER COMPARTMENT

Refrigerated air may be sent to all the passenger compartment outlets described in the Heating section, as well as to the centre vents.

TEMPERATURE CONTROL KNOB (A)

Set these controls to "MAXIMUM COLD" (knob A turned to the left) to benefit from the air conditioning when the weather is warm.

To demist the windows when the weather is cold and humid, turn the air conditioning on and adjust the temperature at the vents using the temperature control knob.
The dehydrating action of the air conditioning system allows dry air to be blown into the passenger compartment, drying the windows more quickly.

AIR CONDITIONING SYSTEM ON/OFF KEY (B)

Pressing key (B) starts the air conditioning system. Its use allows:
- the temperature of the air inside the passenger compartment to be lowered,
- the humidity of the air blown into the passenger compartment to be reduced (improves demisting).

The compressor clutch may be controlled under two conditions :

1) the user requests it (key B),

2) injection computer authorisation.

To obtain maximum efficiency from the air conditioning system, press key (D) once,which will set the system to recycled air. We recommend that the system is returned to external air from time to time, to renew the air in the passenger compartment and avoid the build up of smells and carbon dioxide.

DEMISTING KEY (C)

The air conditioning system is also turned on by this control : see Heating section.

AIR FLOW CONTROL (E)

Ventilation is by blown air.

The air flow circulating in the passenger compartment is determined by the positions of control (E)

MANAGEMENT OF THE COMPRESSOR BY THE ENGINE INJECTION COMPUTER

In order to improve performance, the injection computer and air conditioning computer exchange information between themselves.

Idle speed

The idle speed is increased when the air conditioning is used to increase the performance of the system. It is regulated to compensate for variations due to the compressor clutch being engaged and disengaged

The idle speeds given below are for a warm engine (T^c coolant ≥ 80°c) at ± 50 rpm

	MANUAL GEARBOX	
	AC running	AC not running
F3R ENGINE	950 rpm	730 rpm
G8T ENGINE	850 rpm	725 rpm

Engine thermal protection

The compressor will be prevented from operating if the coolant temperature is very high or if the engine load is high at high engine speeds, together with a high coolant temperature.

	MAXIMUM COOLANT TEMPERATURE	MAXIMUM COOLANT TEMPERATURE WITH HIGH LOAD
F3R ENGINE	115°C	120 °C
G8T ENGINE	105 °C	105 °C
Z7X ENGINE	120 °C	120 °C

Return of engine performance

If the engine is running below a certain engine speed threshold and the accelerator pedal is fully depressed, the compressor is prevented from operating so that all the available engine torque may be used, for a certain time period (cut-out period).

	THRESHOLD ENGINE SPEED	CUT-OUT PERIOD
F3R ENGINE	maximum engine speed	20 seconds
Z7X ENGINE	3 000 rpm	20 seconds

NOTE : during the timed period if one of the two conditions is no longer present, the compressor may engage once more without the cut-out period having expired.

Compressor protection from excess rotation

The compressor has a maximum rotation speed (compressor SD 709 is limited to 6 500 rpm) It must therefore be prevented from operating if the engine is running at a speed greater than the limit speed.

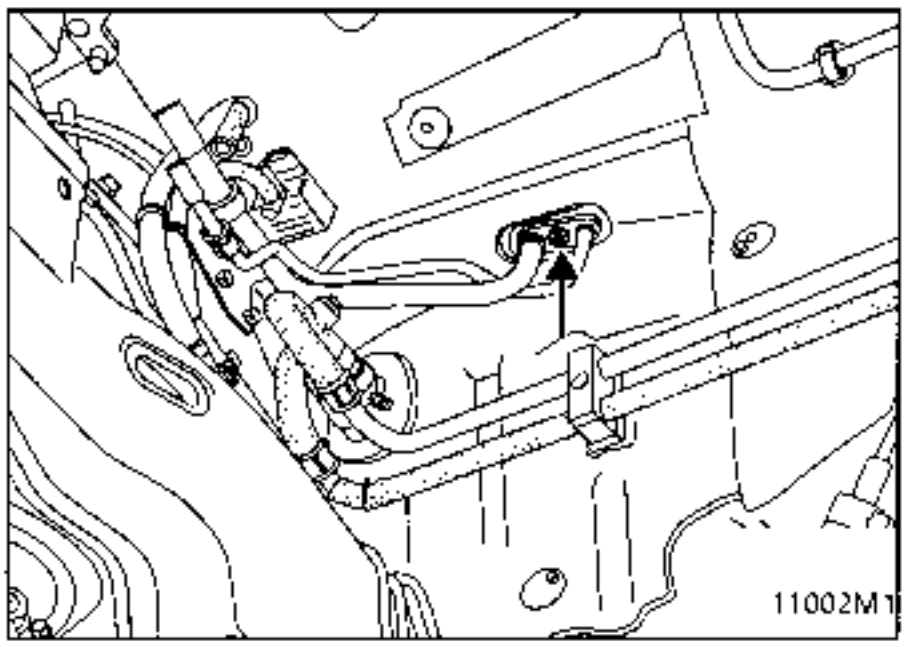
	LIMIT SPEED
F3R ENGINE	6 000 rpm
Z7X ENGINE	6 000 rpm

REMOVAL

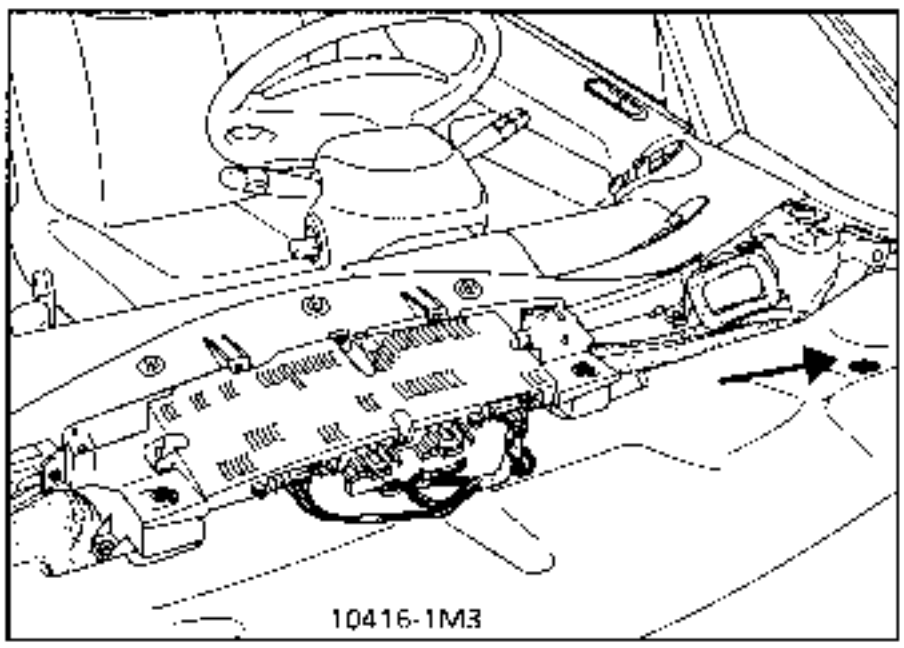
The fan is fitted (emprisoned) on its mounting plate.

Disconnect the battery.
Drain and collect the refrigerant fluid (see air conditioning section).
Remove the front of the dashboard .
(see section 57 - Removing the dashboard)

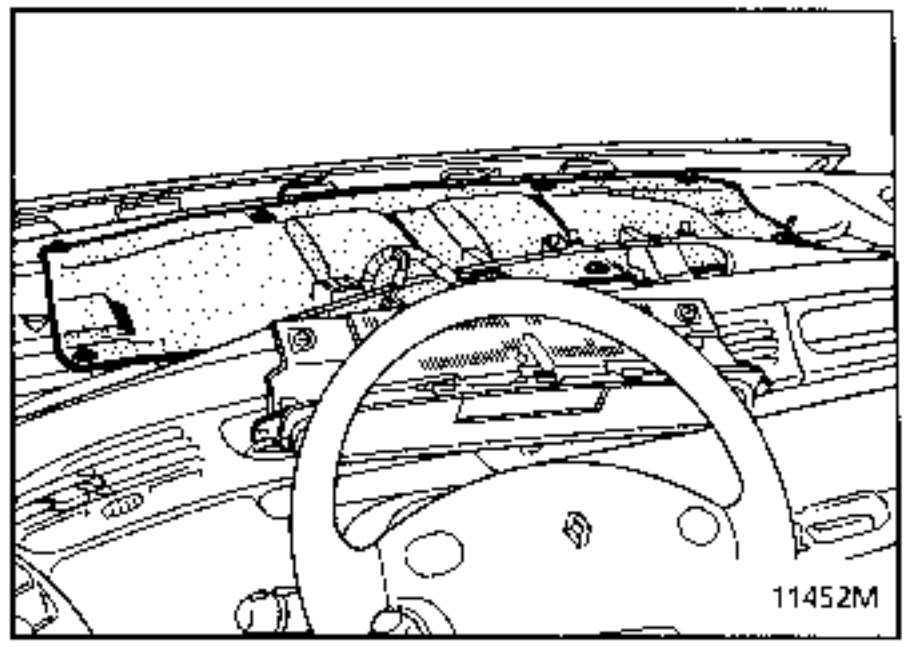
Slacken the mounting flange for the air conditioning pipes at the bulkhead.



Remove the two plastic nuts for the soundproofing on the dashboard.



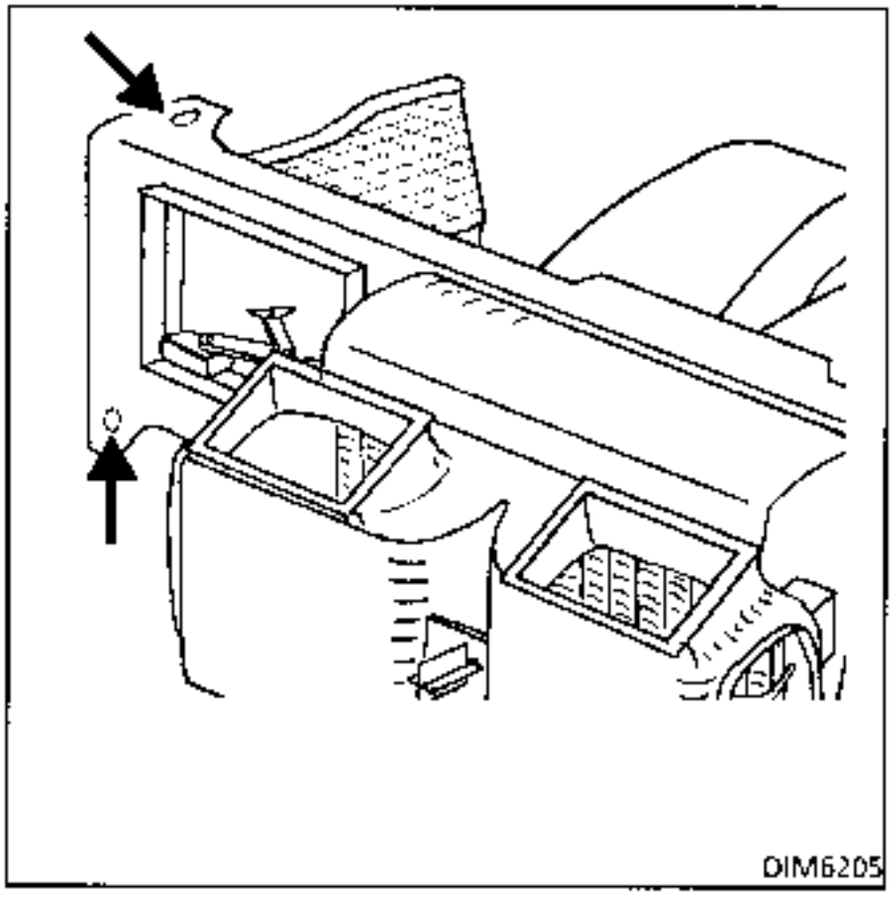
Remove the 8 mounting bolts for the cover on the fan unit.



Disconnect the two air ducts between the fan and the distribution units.
Disconnect the feed wires to the motor and recycling unit.

Remove part of the front soundproofing (4 plastic nuts).
Remove the front rubber mounting.
Disconnect the engine connection unit.

Move the dashboard back (see section 57 "Dashboard").
Disconnect the condensation drain elbow.
Remove the 4 mounting bolts for the mounting plate on the fan unit.



Remove the fan / evaporator unit from below the dashboard on the passenger side.

Refitting:

Refitting is the reverse of removal.
Fill the circuit with refrigerant fluid.
Check the recycling flaps operate and the various speeds of the fan are correct.

REMOVAL:
The fan / evaporator unit must be removed to remove the evaporator (see previous section).

Separate the unit from the mounting plate (4 bolts).

Separate the two half cowlings on the unit and remove the evaporator.

PRESSURE RELIEF VALVE:

REMOVAL:
After removing the evaporator, remove the two bolts mounting the pressure relief valve on the evaporator.
Plug the openings.

REFITTING:

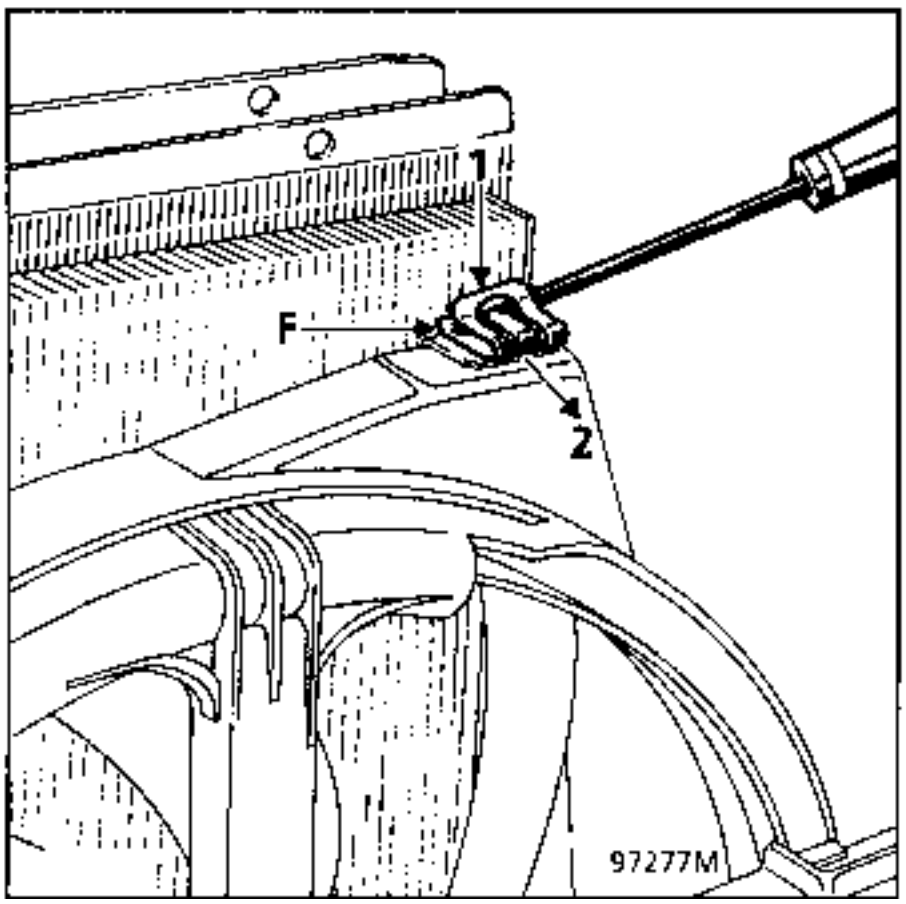
Refitting is the reverse of removal.
Renew the seals; check the evaporator fins have not been damaged when refitting or handling the component.

The complete refrigeration assembly must be removed to remove - refit the condenser or the dehydration canister.
See section 19 "removing - refitting the refrigeration assembly" .

IMPORTANT: The fins on the various exchangers are very fragile. Ensure the correct precautions are taken when handling these components so they are not damaged.

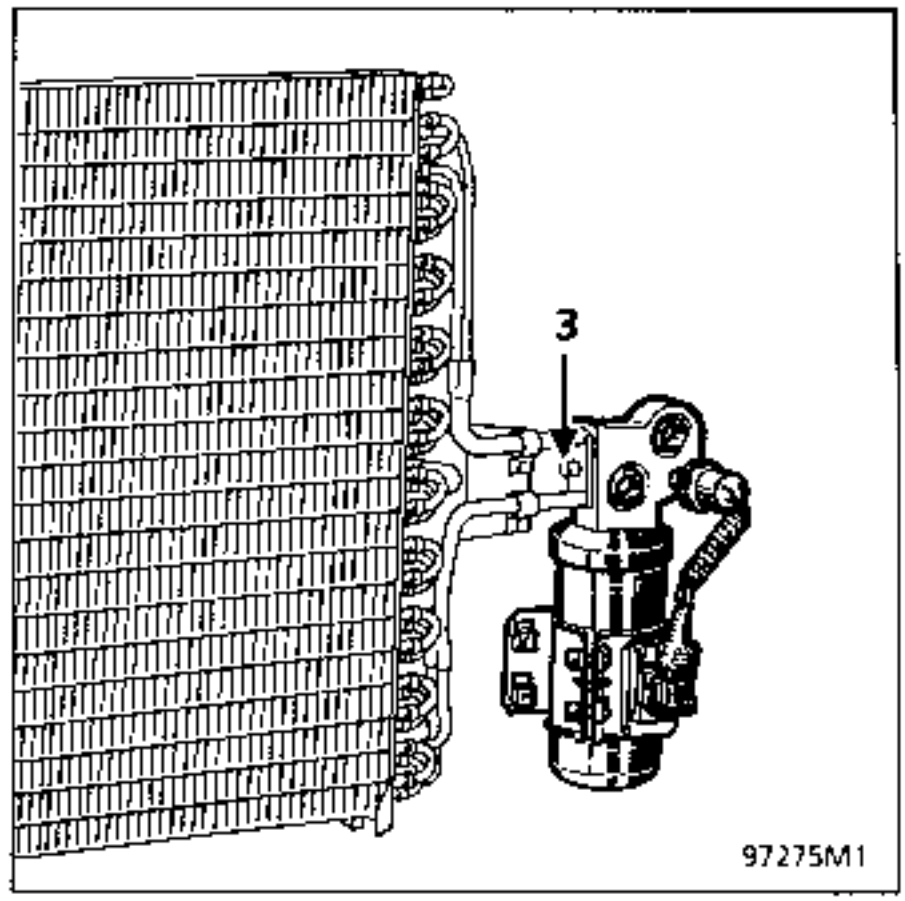
Removing - refitting the condenser:

Method for removing the upper clips for the fan ferrules:
Remove the clips(F) lifting them at the top using a screwdriver and releasing them towards the rear (2).



Removing - refitting the dehydration canister ;

Remove the flange mounting bolt (3)



REFITTING

Refitting is the reverse of removal.

When refitting the pipes to the dehydration canister, the seals must be lubricated using the recommended oil for the compressor.

Fill the refrigerant fluid circuit using the filling station (method described in the section New Refrigerant R134a)

Reminder of quantity:
F3R - Z7X engine : 880 g ± 30g
G8T engine: 800g ± 30g

IMPORTANT : the instructions regarding adding oil must be rigorously followed during operations on the air conditioning circuit components, as described in the section New Refrigerant R134a.

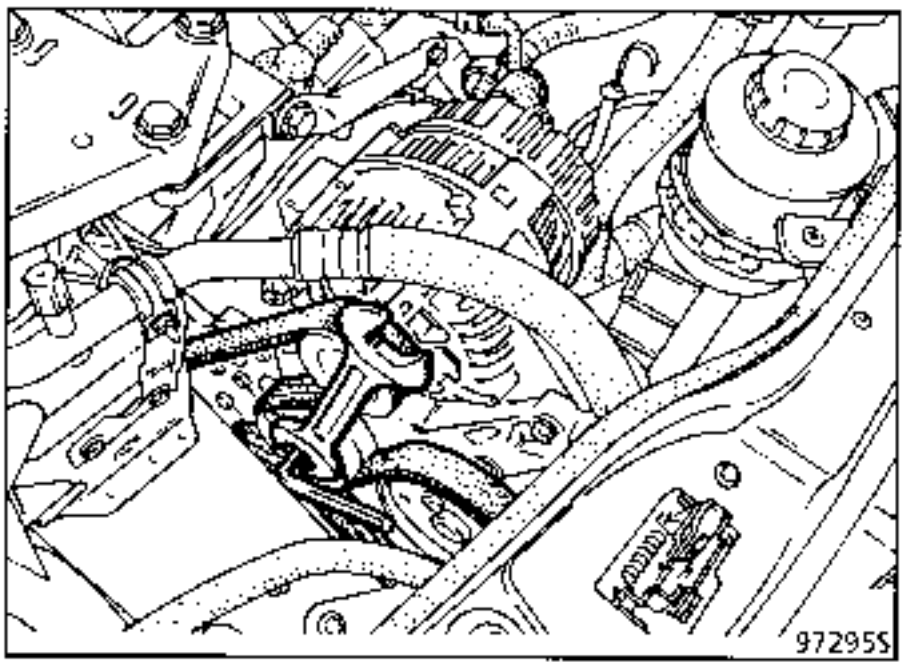
REMOVAL

Disconnect the battery.

Drain the refrigerant fluid circuit using the filling station.

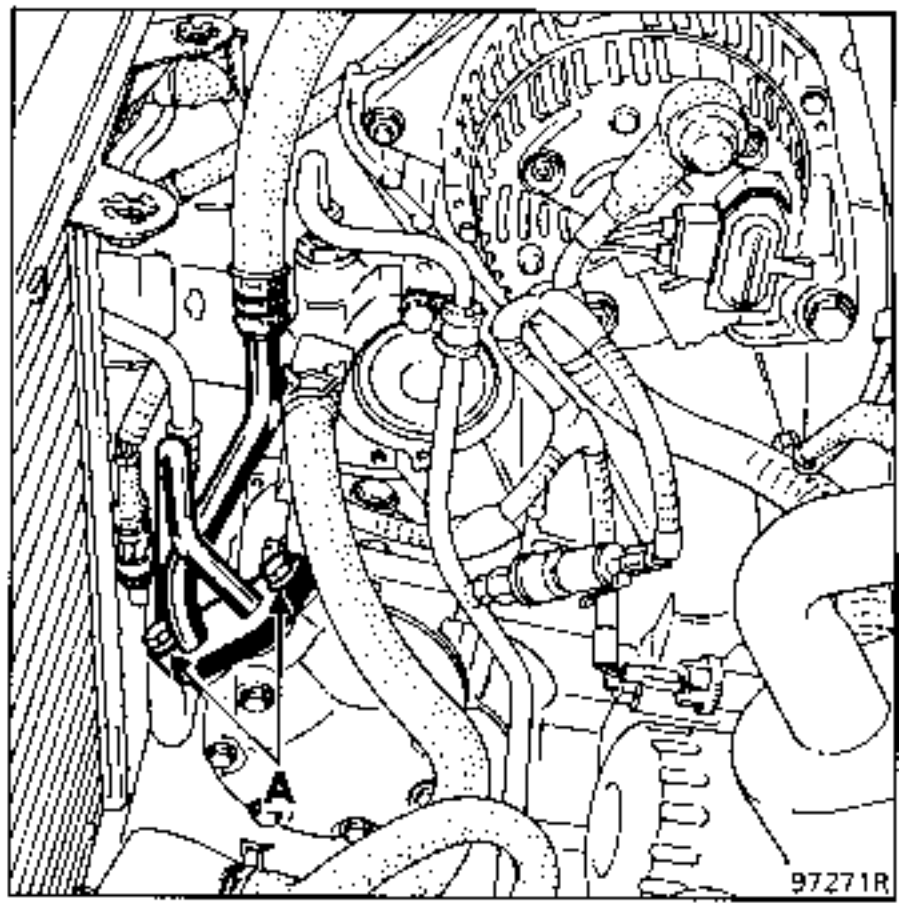
Slacken the hexagonal socket bolt (7 mm across the flats) for the belt tensioner and using an open wrench (22 mm) slacken the belt.

Any belt which has been slackened must be renewed (see following section Belt tension).



Disconnect the compressor clutch feed wire.

Remove:
- the pipes from the compressor (two bolts (A)),



- the four compressor mounting bolts (B) and remove the compressor.

REFITTING

When refitting, if the compressor is replaced, the new compressor is supplied filled with oil.

IMPORTANT : the instructions regarding adding oil must be rigorously followed during operations on the air conditioning circuit components, as described in the section New Refrigerant R134a.

Refitting is the reverse of removal.

When refitting the pipes to the compressor , the seals must be lubricated using the recommended oil for the compressor.

Refer to the following section for fitting the belt.

Fill the refrigerant fluid circuit using the filling station (method described in the section Air conditioning - New refrigerant R134a)

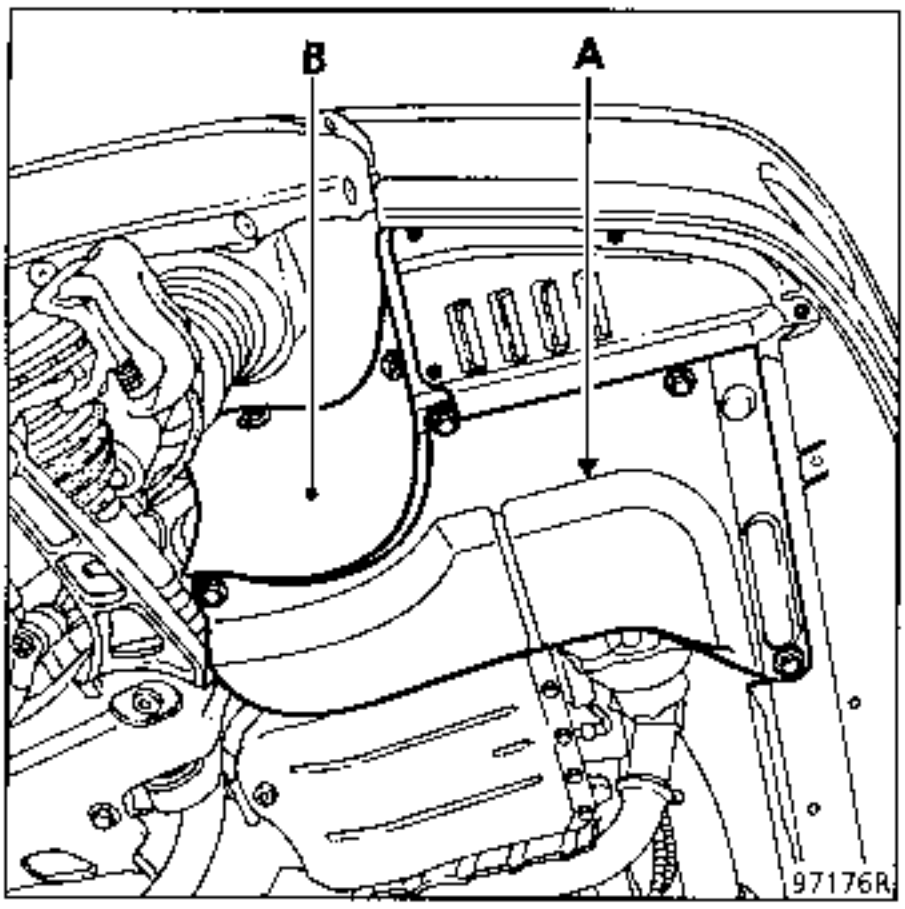
Reminder of quantity : 880g ± 25

REMOVAL

Disconnect the battery.

Drain the refrigerant fluid circuit using the filling station.

On the right hand side of the vehicle, remove the two engine protection housings (A) and (B).

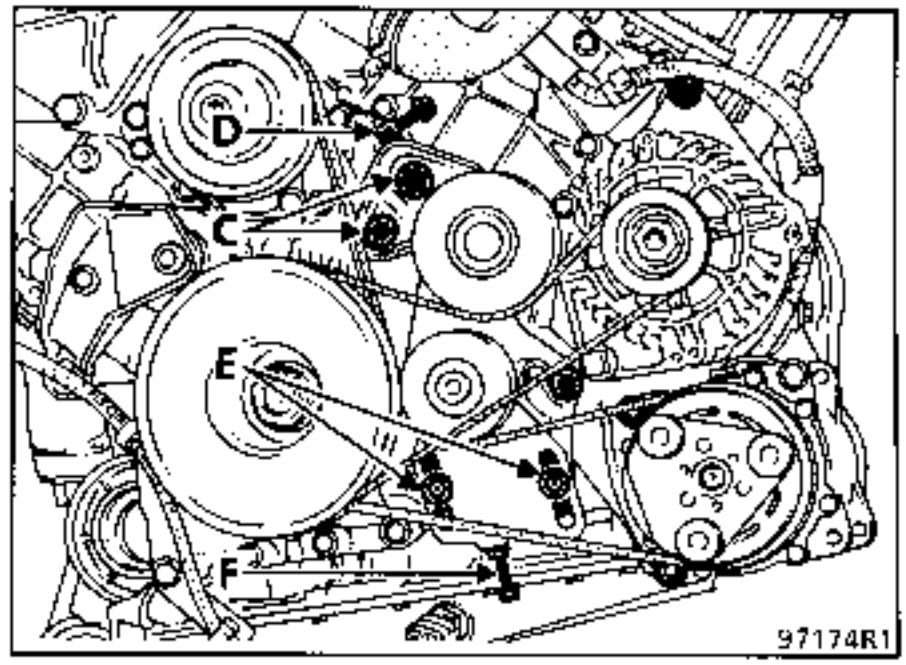


Remove the two alternator and compressor belts in the following manner:

Any belt which has been slackened must be renewed (see following section Belt tension).

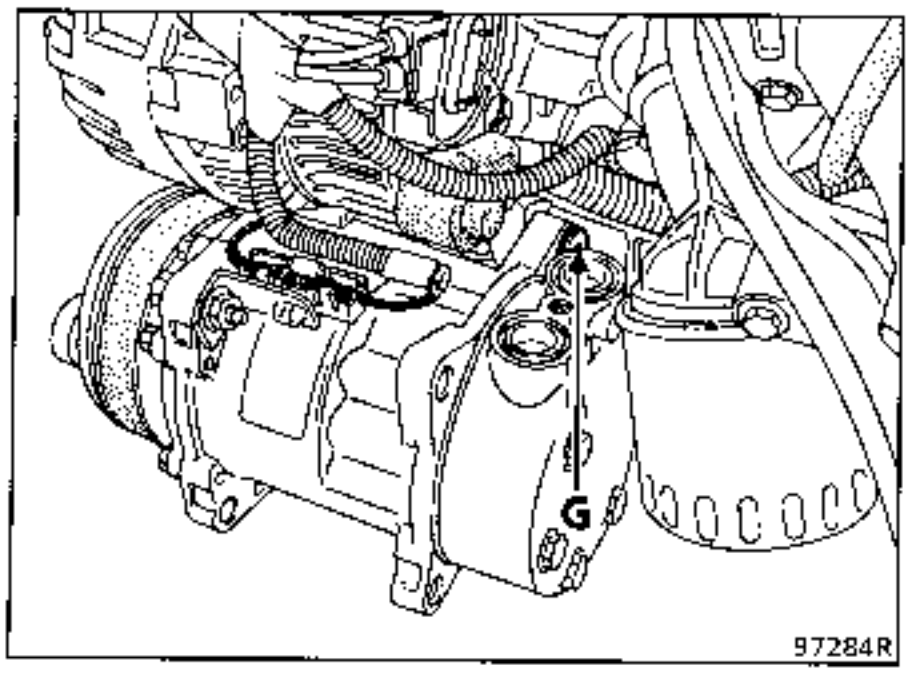
Slacken:

- the two bolts (C) for the alternator belt tensioner and slacken it using bolt (D),
- the two bolts (E) for the compressor belt tensioner and slacken it using bolt (F).



Remove:

- the two belts,
- the oil filter,
- the four compressor mounting bolts (G).



Remove the retaining flange for the pipes on the compressor.

Disconnect the compressor feed connector.

Remove the compressor.

REFITTING

When refitting, if the compressor is replaced, the new compressor is supplied filled with oil.

IMPORTANT : the instructions regarding adding oil must be rigorously followed during operations on the air conditioning circuit components, as described in the section New Refrigerant R134a.

Refitting is the reverse of removal.

When refitting the pipes to the compressor , the seals must be lubricated using the recommended oil for the compressor.

Refer to the following section for fitting the belt.

Fill the refrigerant fluid circuit using the filling station.

Reminder of quantity: 800 g = 25.

EVAPORATOR TEMPERATURE SENSOR

This is a thermistor with negative temperature coefficient (CTN), located in front of the evaporator.

It may be reached on the evaporator unit after removing the upper section of the dashboard and the closure panel (see previous pages).

RECYCLING MOTOR

The recycling command positions the air inlet flap according to the position of the recycling control key or according to the requirements of the demisting key.

The flap is moved by a stepping motor which can be reached after removing the upper section of the dashboard and the closure panel (see previous pages).

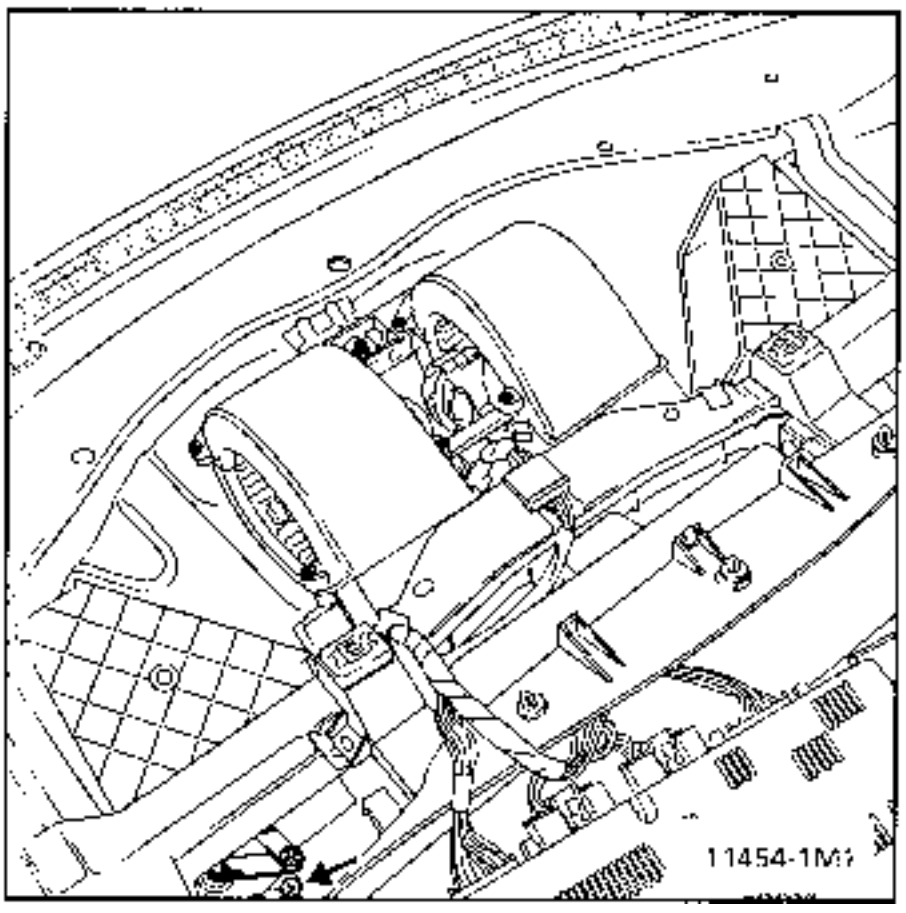
REMOVAL

IMPORTANT : disconnect the battery - this is very important for adjustment.

Disconnect the motor concerned.

Disconnect the flap control bar.

Remove the 3 mounting bolts, disconnect the control bar with care and remove the motor.



REFITTING

Refitting is the reverse of removal.

No adjustment needs to be made; disconnecting the battery allows the motor to reset when the battery is reconnected and the system operates.

FAN MOTOR

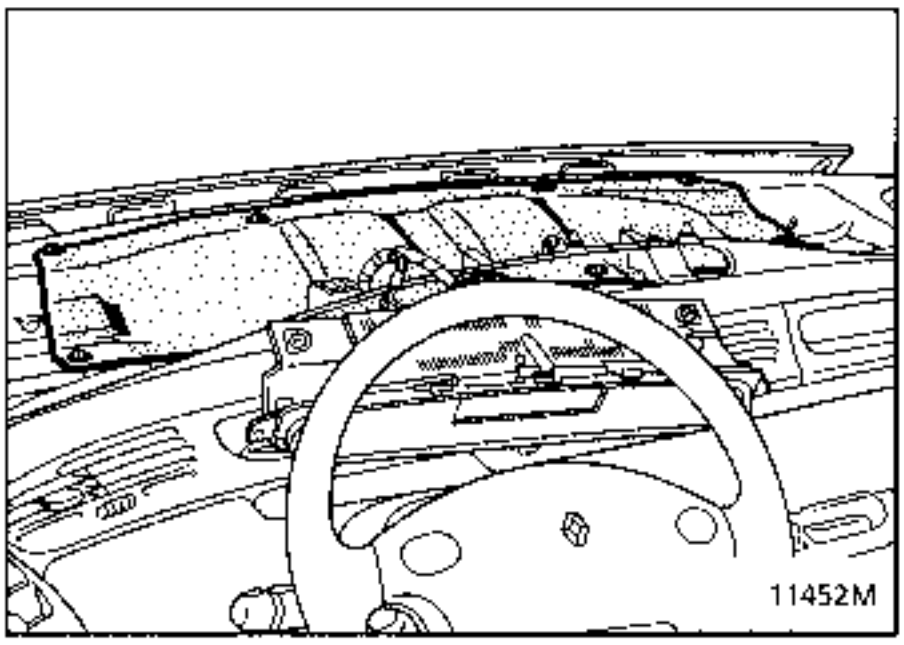
REMOVAL

Disconnect the battery.

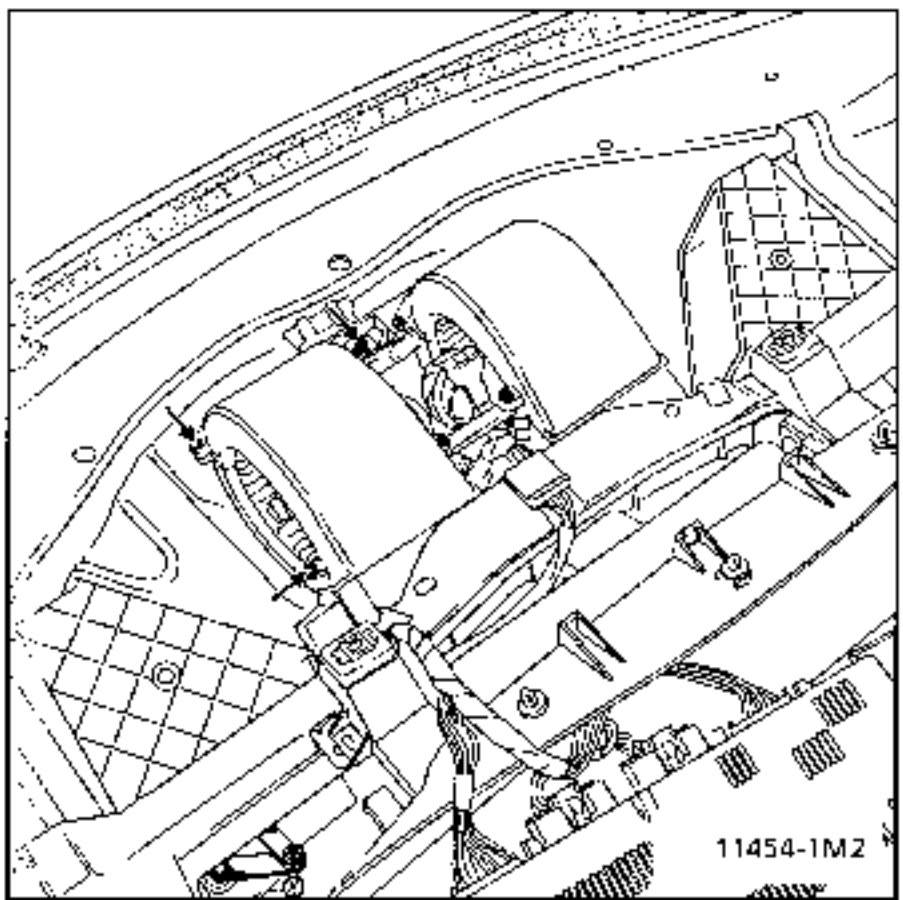
Remove the front section of the dashboard.

Remove the display unit.

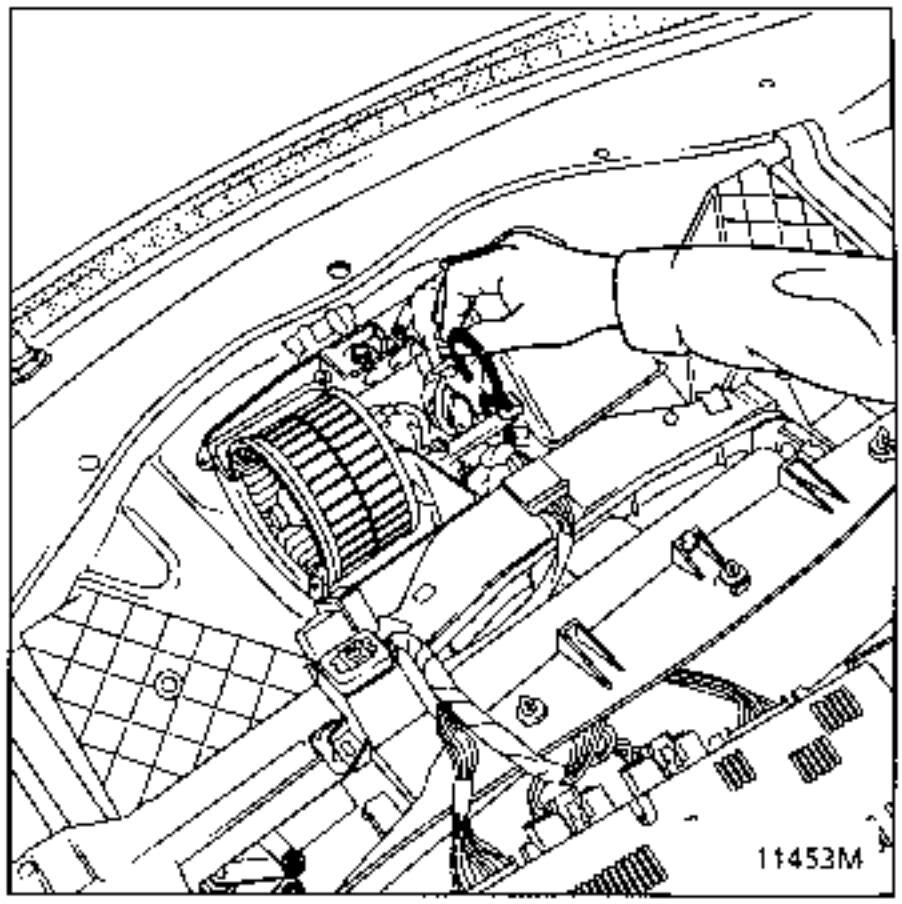
Remove the upper section of the soundproofing so that the fan unit cover may be removed.



Remove the mounting bolts for the fan housing in question and disconnect the motor.



Release the retaining tab using a locally made hooked tool.



REFITTING

Refitting is the reverse of removal.

FAN SPEED REGULATOR

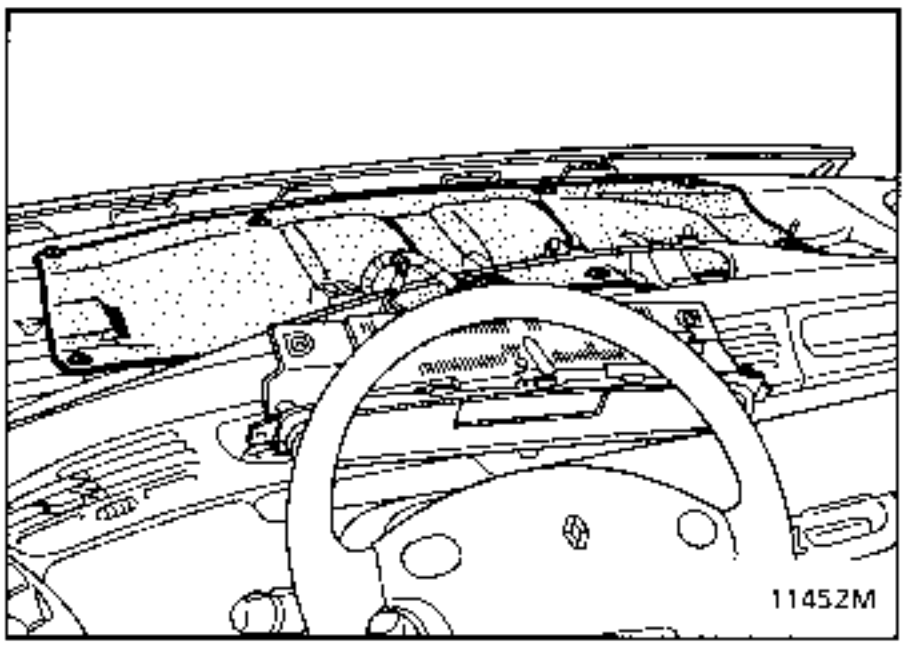
REMOVAL

Disconnect the battery.

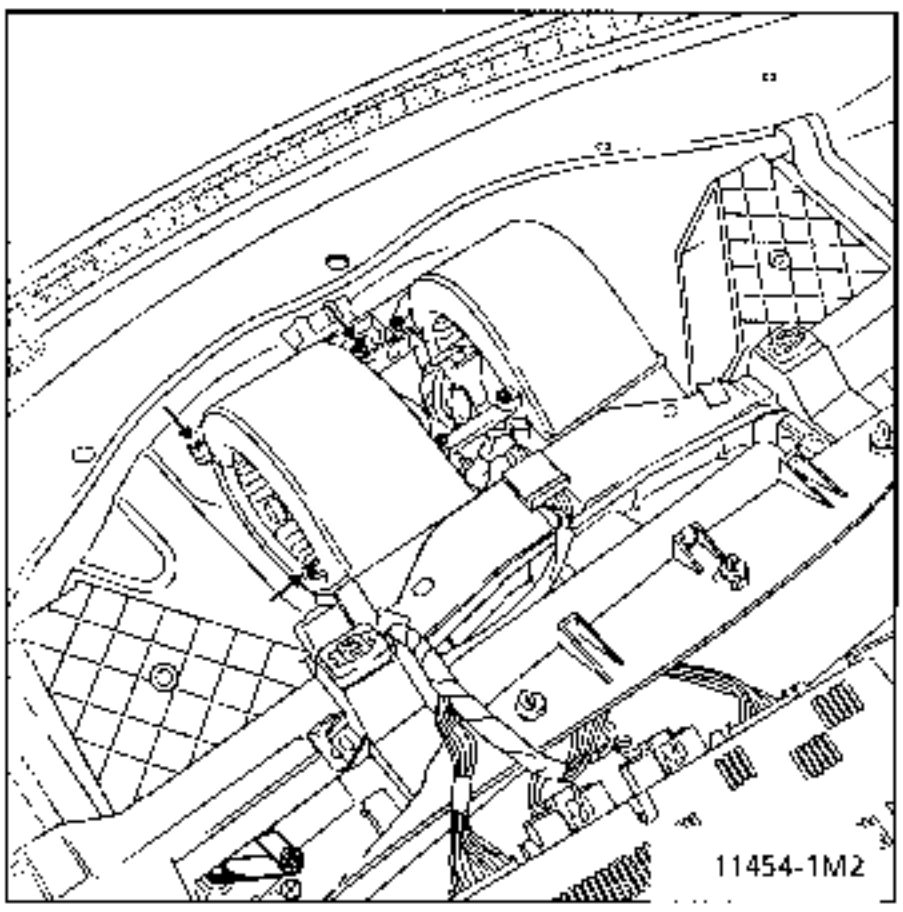
Remove the front section of the dashboard.

Remove the display unit.

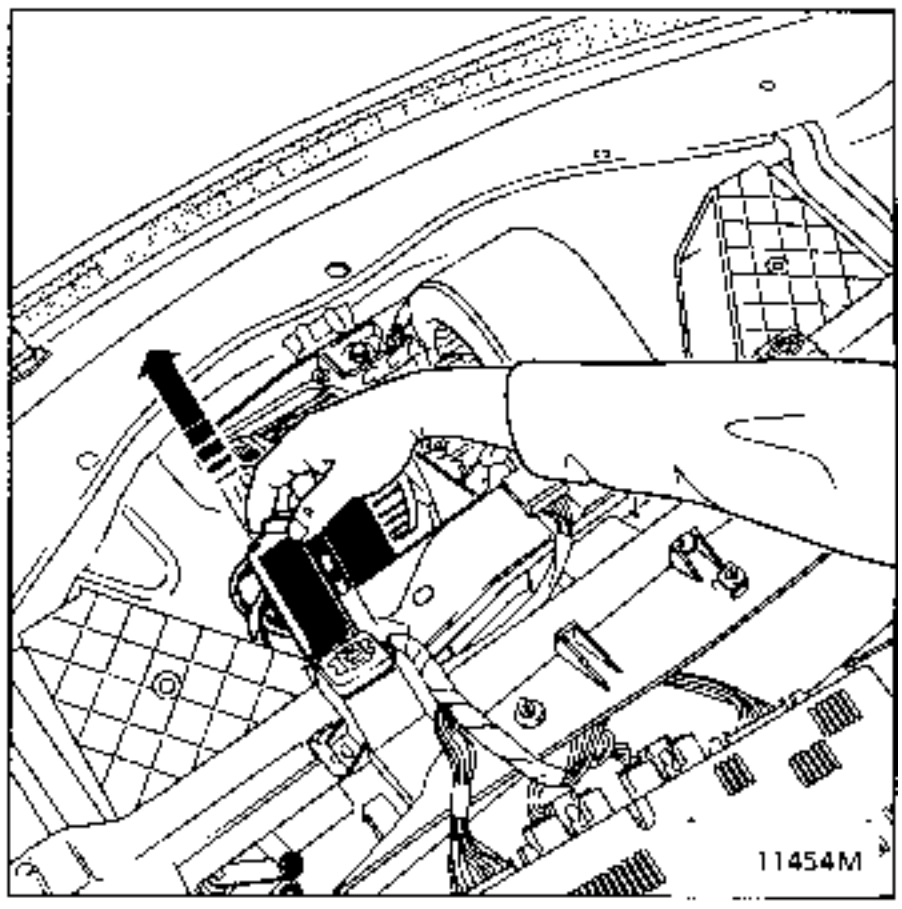
Remove the upper section of the soundproofing so that the fan unit cover may be removed.



Remove the mounting bolts for the fan unit cover on the left hand side.



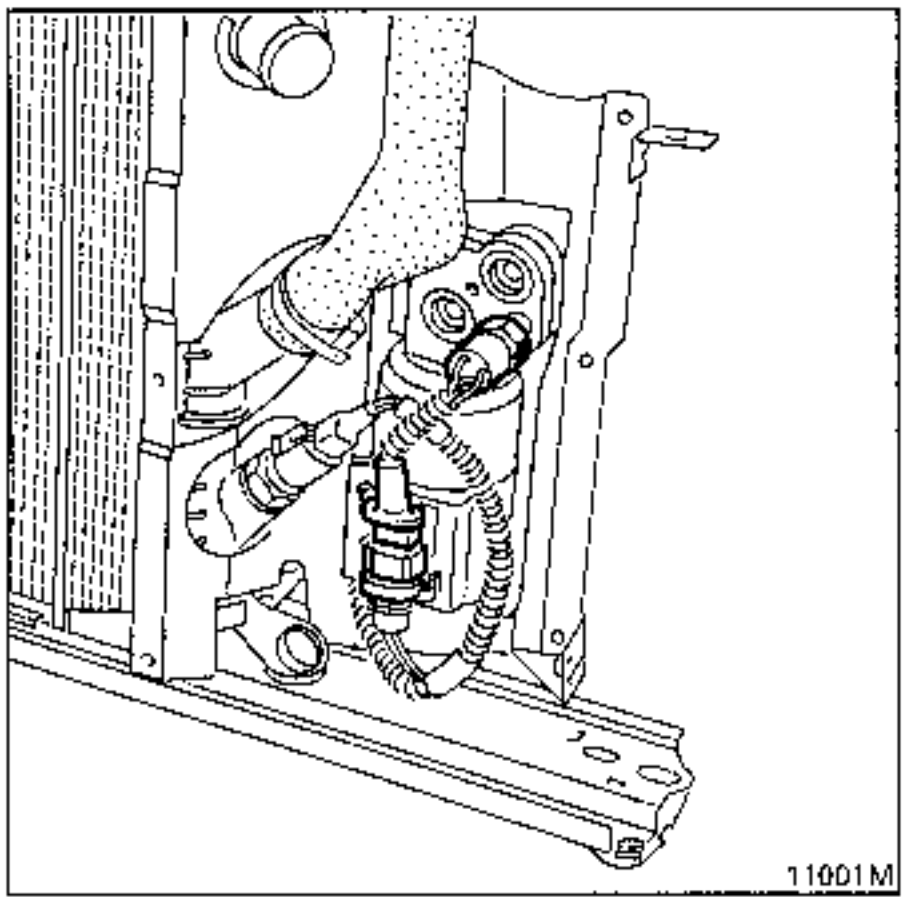
Remove the resistance after disconnecting it.



REPOSE

Refitting is the reverse of removal.

TRIFUNCTION PRESSOSTAT (411)



This has three functions:

Low pressure cut-out

Compressor operation is cut as soon as the pressure in the high pressure circuit drops below **2 bars ± 0.25.**

The circuit is closed again at **2.15 bars ± 0.35.**

High pressure cut-out

Compressor operation is cut as soon as the pressure in the high pressure circuit reaches
27 bars $^{+2}_{-3}$

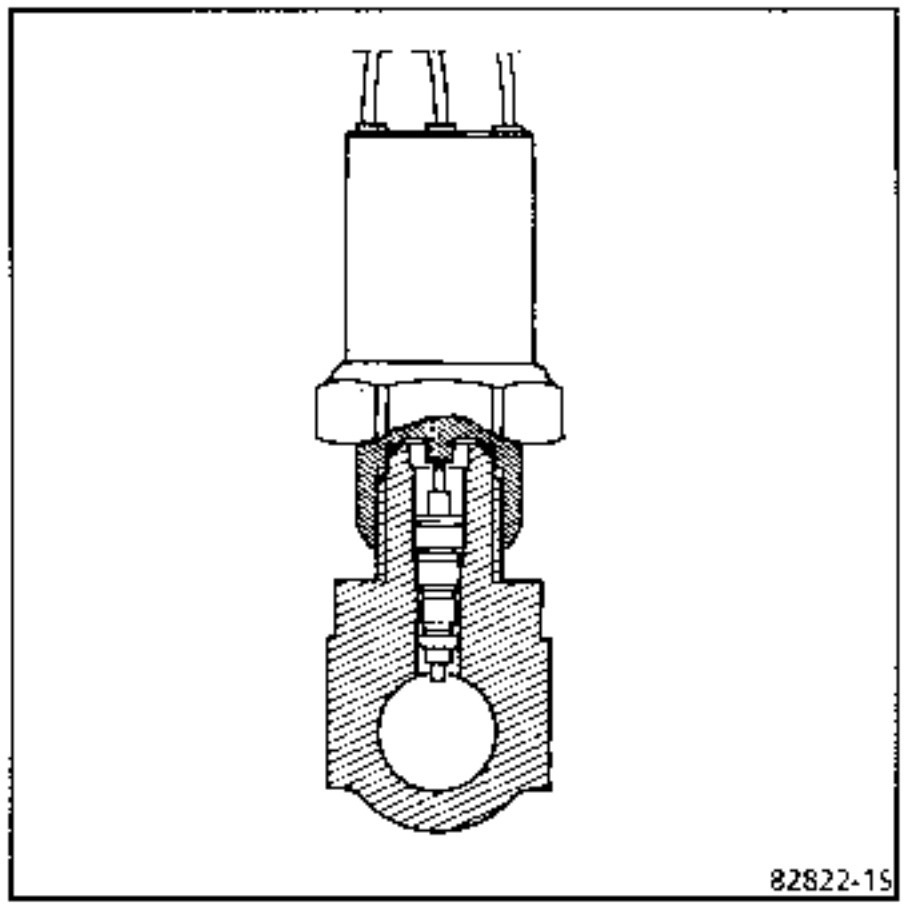
The circuit is closed again at **21 bars ± 2.**

Fan control

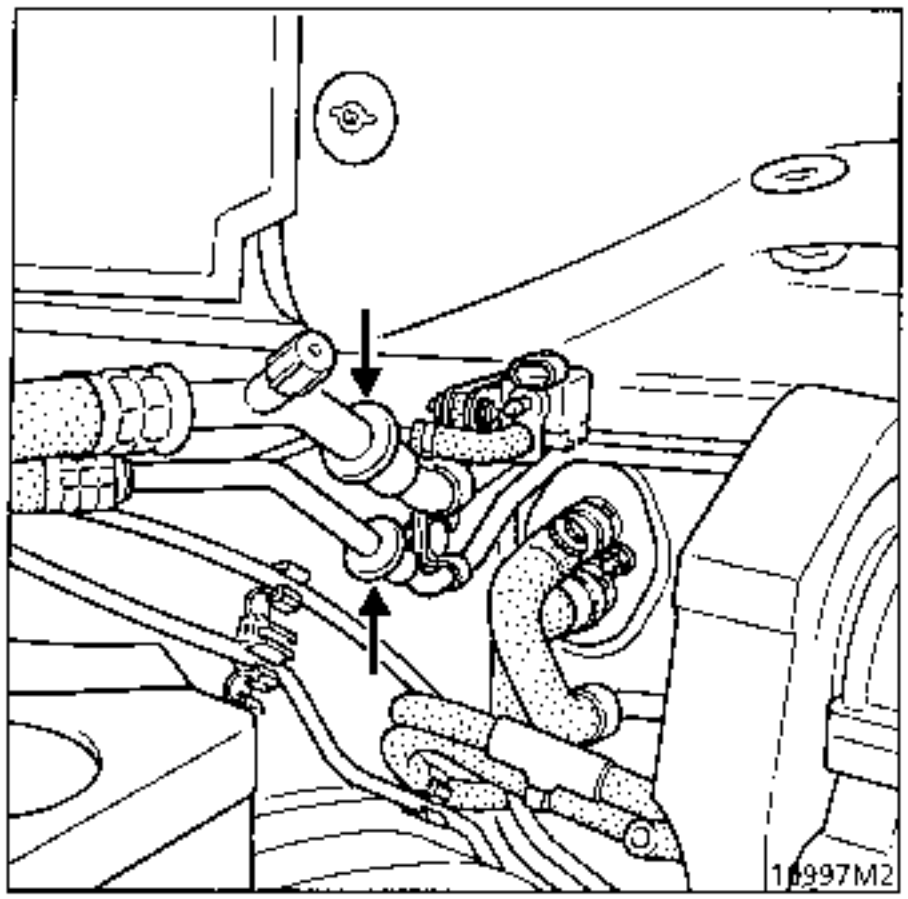
The engine cooling fans are forced to operate as soon as the pressure exceeds **19 bars ± 1.5.**

This actions stops as soon as the pressure in the circuit drops below **14 bars ± 1.5.**

The refrigerant fluid circuit does not need to be drained to remove the pressostat.
A valve automatically closes, isolating the circuit from the outside when the pressostat is removed.
Removal / refitting is carried out using tool **Mot.1394:**
- F3R and Z7X engines: via the right hand wheel arch after removing the wheel arch protector
- G8T engines: from above, no components require removal

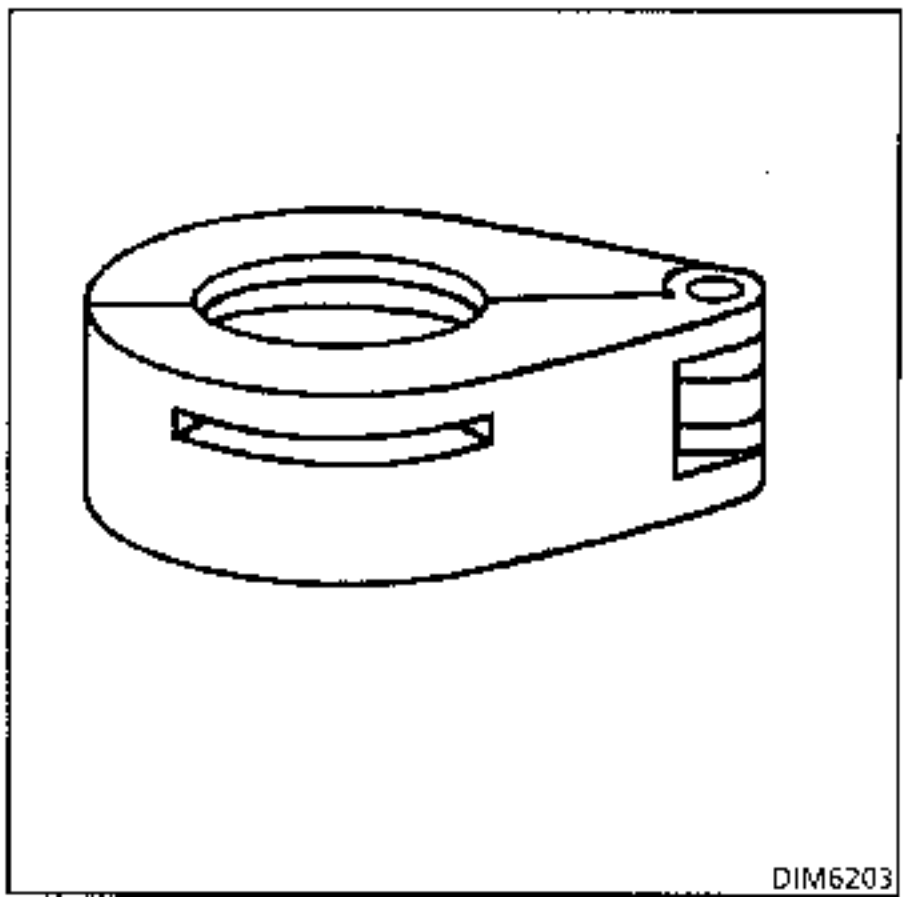


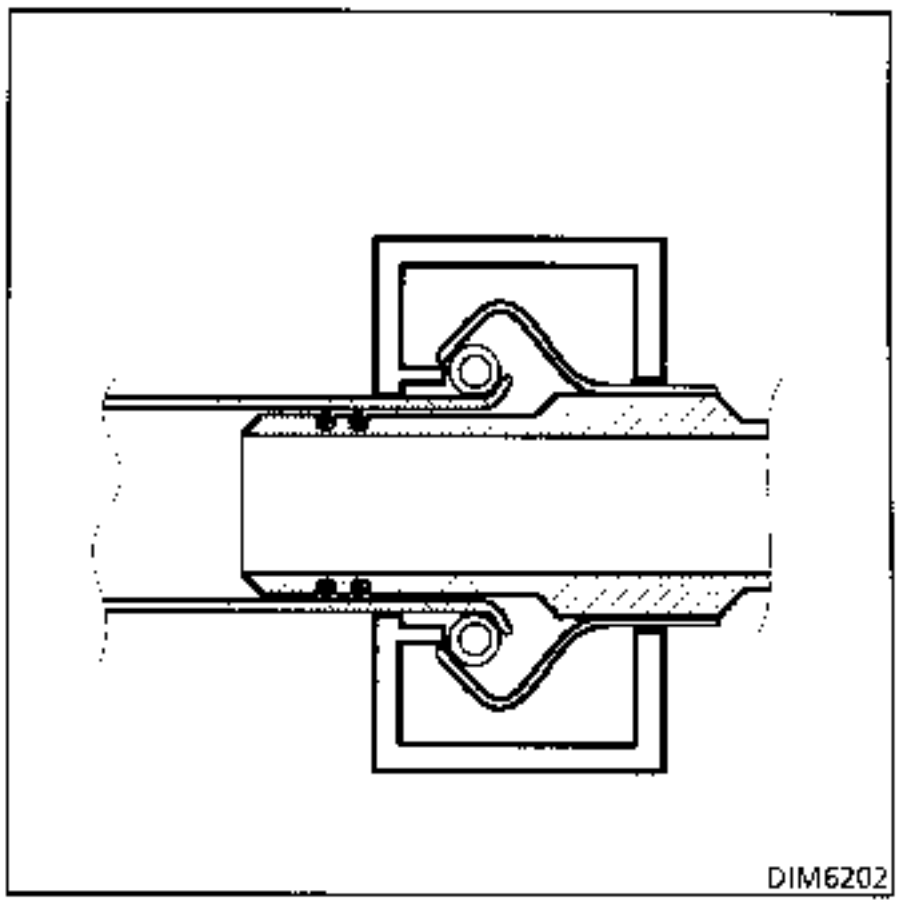
The refrigerant fluid pipes at the bulkhead are fitted with quick release unions.



Method of separation:.

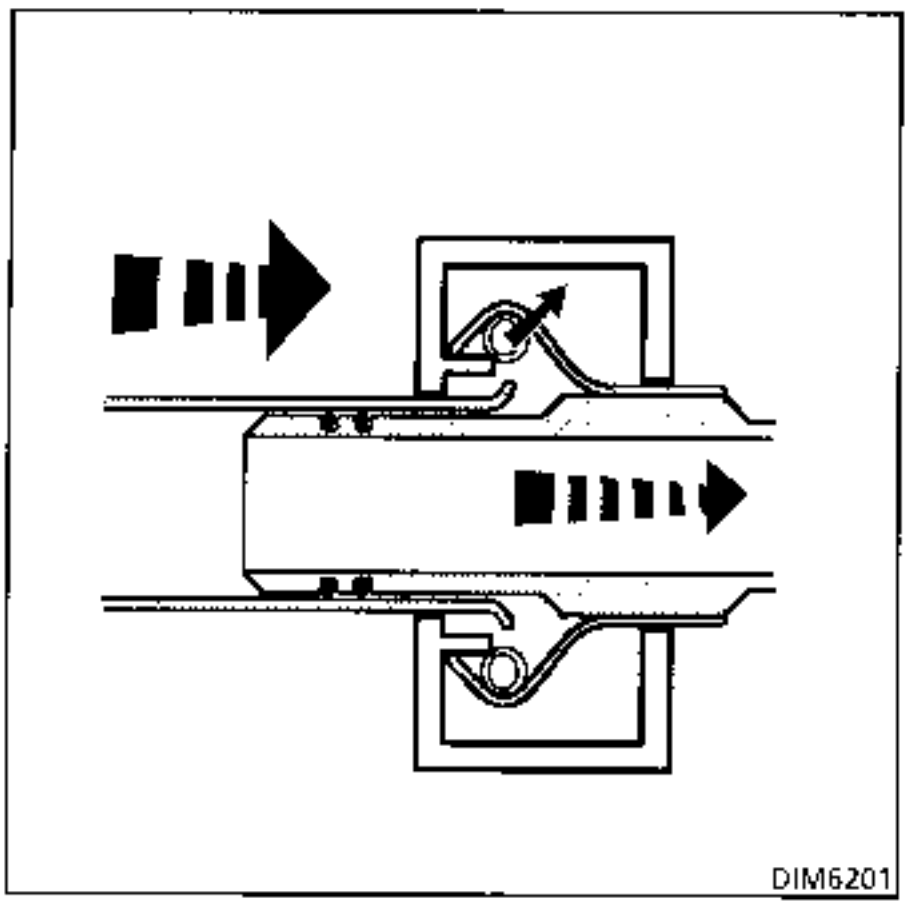
- drain the circuit of refrigerant fluid.
- fit tool NAUDER Part Number:7240 around the high pressure union (small diameter) and tool NAUDER Part Number: 7242 around the low pressure union (large diameter).

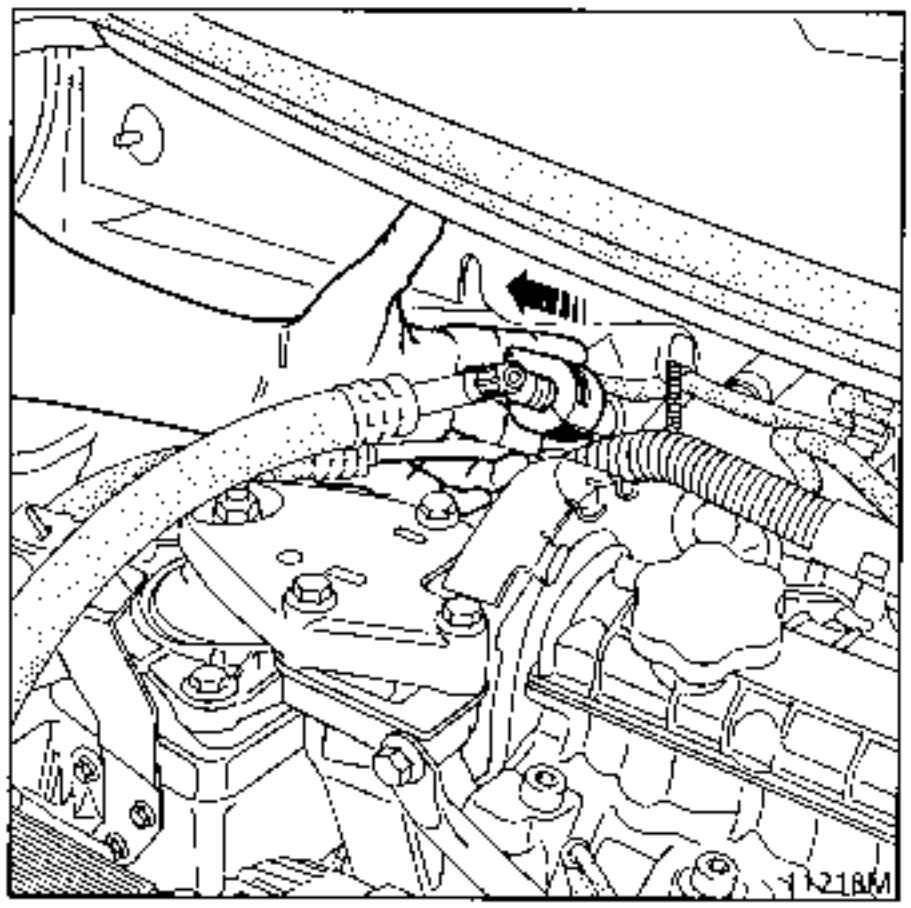




Pull the tool towards you to release the locking spring then pull the pipe to release it.

Plug the openings at once to prevent humidity or foreign bodies entering the circuit (this is very important).





Refitting:

Click the unions together - no tools are required. Ensure they fit correctly into the rigid pipes on the bulkhead.

Check the seals around the pipes are present and are in good condition.

TOOLS FOR REMOVING QUICK RELEASE UNIONS:

Part Numbers **7240** and **7242** from :

NAUDER tooling.
Ordering details: consult your After Sales Head Office.