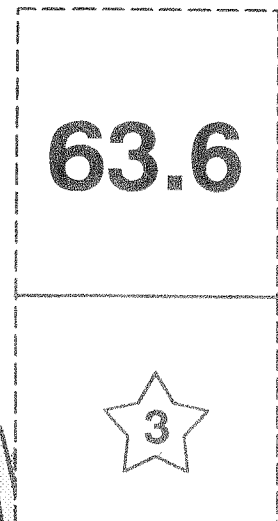
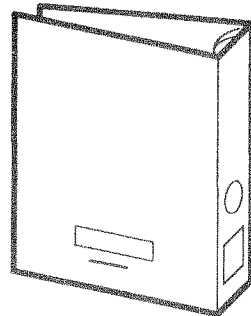
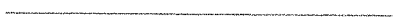
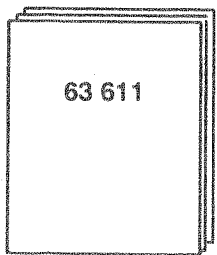


63 611 - AN - 07.1994

AIR CONDITIONING - AE MAGNUM RANGE

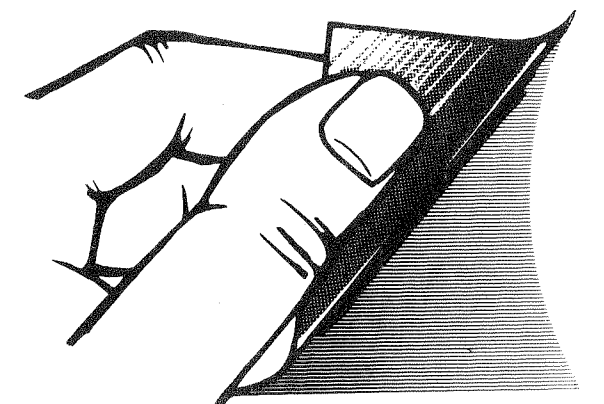






































<p><b>AIR CONDITIONING</b></p>	<p><b>VEHICLES</b></p>
<p><b>AIR CONDITIONER</b> <b>"BEHR"</b></p>	<p><b>AE MAGNUM</b></p>

**CONTENTS**

<b>VOLUME</b>	<b>DESCRIPTION</b>	<b>PAGES</b>
	Conventional signs	3/4
<b>A</b>	Technical data	<b>A1 → A7</b>
<b>B</b>	Operation	<b>B1 → B9</b>
<b>C</b>	Air conditioner	<b>C1 → C14</b>
<b>D</b>	Condenser	<b>D1 → D2</b>
<b>E</b>	Dehydrator/filter	<b>E1 → E3</b>
<b>F</b>	Compressor	<b>F1 → F6</b>
<b>G</b>	Flexible pipes and unions	<b>G1 → G2</b>
<b>H</b>	Chilling fluid circuit	<b>H1 → H4</b>
<b>I</b>	Troubleshooting and testing	<b>I1 → I8</b>
<b>J</b>	Electrical diagrams	<b>J1 → J11</b>
<b>K</b>	Tools	<b>K1→K2</b>

CONVENTIONAL SIGNS



	Tighten at indicated torque (N.m) (left-hand thread)		Adjust - Place in contact.
	Tighten at indicated torque (N.m) (right-hand thread)		Clearance - Dimension to be assured or noted down (mm)
	Tighten by indicated value		Axial - Vertical
	Loosen by indicated value		Radial - Horizontal
	Interference fit		Maximum out-of-true
	Force to be exerted in direction of arrow (hammer - press)		Maximum static parallelism error
	Rotational force		Machining tolerance or allowance
	Heat or cool Temperature in degrees Celsius (e.g.: + 80°C)		... to ...
	Weld bead		Equal - One or the other
	Repair time		... Less than ...
	Exhaust - Outlet		... More than ...
	Intake - Inlet		... Less than or equal to ...
	Weight in kg (e.g. : 275 kg)		... More than or equal to ...
	Smear (see "Consumables" table)		Repair dimension
	Grease or oil (see "Consumables" table)		Part to be replaced
	Fill to level (see "Specifications" and "Consumables" table)		Wear limit
	Depending on versions or options		Inspect - Check condition of part
	Mark - Assemble as per marking		Danger for persons, vehicle or equipment

**TECHNICAL DATA**

## TECHNICAL DATA

### AIR CONDITIONER

Heating power .....13 kW  
 Chilling power .....5.7 kW

#### Motor-driven fan unit

Supply voltage .....24 V  
 Air conditioner unit total power .....350 W

#### Chilling unit

High pressure safety .....28 bar  
 Low pressure safety .....2 bar  
 Circuit lubricant total capacity .....165 ml

### Compressor

“SANDEN” ..... SD - 709SQ  
 Number of cylinders .....7  
 Displacement .....154.9 cm<sup>3</sup>  
 Chilling fluid .....R 12  
 Chilling fluid capacity .....1.5 kg  
 Lubricant type (viscosity) .....525  
 Circuit lubricant capacity .....135 ml  
 “SANDEN” ..... SD - 7H15SQ  
 Number of cylinders .....7  
 Displacement .....154.9 cm<sup>3</sup>  
 Chilling fluid .....R 134a  
 Chilling fluid capacity .....1.5 kg  
 Lubricant type (viscosity) .....(to 100°) 21,15  
 Circuit lubricant capacity .....165 ml

### Clutch

Supply voltage .....24 V  
 Coil power .....42 W  
 Coil resistance .....13.15 → 14.25 Ohm  
 Air gap .....0.4 → 0.8 mm

### CONSUMABLES

#### Refrigerant oils with R12 fluid :

Denisoil 6  
 Esso Zerice 40  
 Fuchs KES  
 Shell Clavus N° 129  
 Suniso N° 5GS  
 Texaco Capella E

#### RENAULT V.I. recommend Huiles Renault Diesel

FC 100

#### Refrigerant oils with R134a fluid :

SANDEN SP 20

#### **IMPORTANT**

*Use SANDEN SP 20 oil exclusively for compressor SD - 7H15SQ.*

## Tightening torques

Torque loadings are given in N.m.

Standard threaded hardware.

Dimensions for "METRIC system" screws to standard 01.504.002		
Diameter and pitch of screws and nuts	Class 8.8	Class 10.9
6 x 100	8	12
8 x 125	20	29
10 x 150	39	57
12 x 175	67	98
14 x 20	107	156
16 x 200	165	242

## MANIPULATION PRECAUTIONS

Prior to carrying out any work on the circuit, it is compulsory to take the following precautions :

### 1 - SAFETY

- Always wear protective goggles when you open a chilling circuit. Refrigerant liquid or gas may cause permanent damage to your eyes.
- Never heat a closed chilling circuit with a naked flame. The chilling fluid could cause an explosion (excessive pressure). Take precautions when entering into paint booths (80°C maximum).
- Make sure that the chilling circuit pipes are properly fastened and cannot enter into contact with any metallic parts.
- In the presence of a flame, the chilling fluid produces phosgene (carbonyl chloride), a toxic gas : never inhale it.
- Do not smoke in the vicinity of a chilling fluid circuit.
- Do not use any chilling fluid other than what is recommended.

### FIRST AID

- If chilling fluid has splashed into your eyes, you must consult a doctor.
- To alleviate the effect of "the chilling fluid in your eyes or on your skin, apply a few drops of neutral mineral oil and then wash with a weak solution of boric acid.

### 2 - HUMIDITY

The least trace of humidity in the circuit will risk stopping its operation. In fact, water droplets will freeze at the pressure reducer. The dehydrator cylinder has a very low capacity of 5.5 grams (about 60 drops) ; beyond this amount, water will combine with the chilling fluid to produce acids which attack metallic components. A mere trace of humidity is the most frequent cause of intermittent cooling problems. It is necessary to apply compressor oil to each threaded union. 80 % of all circuit failures will be eliminated if the system is kept clean.

### REMARK :

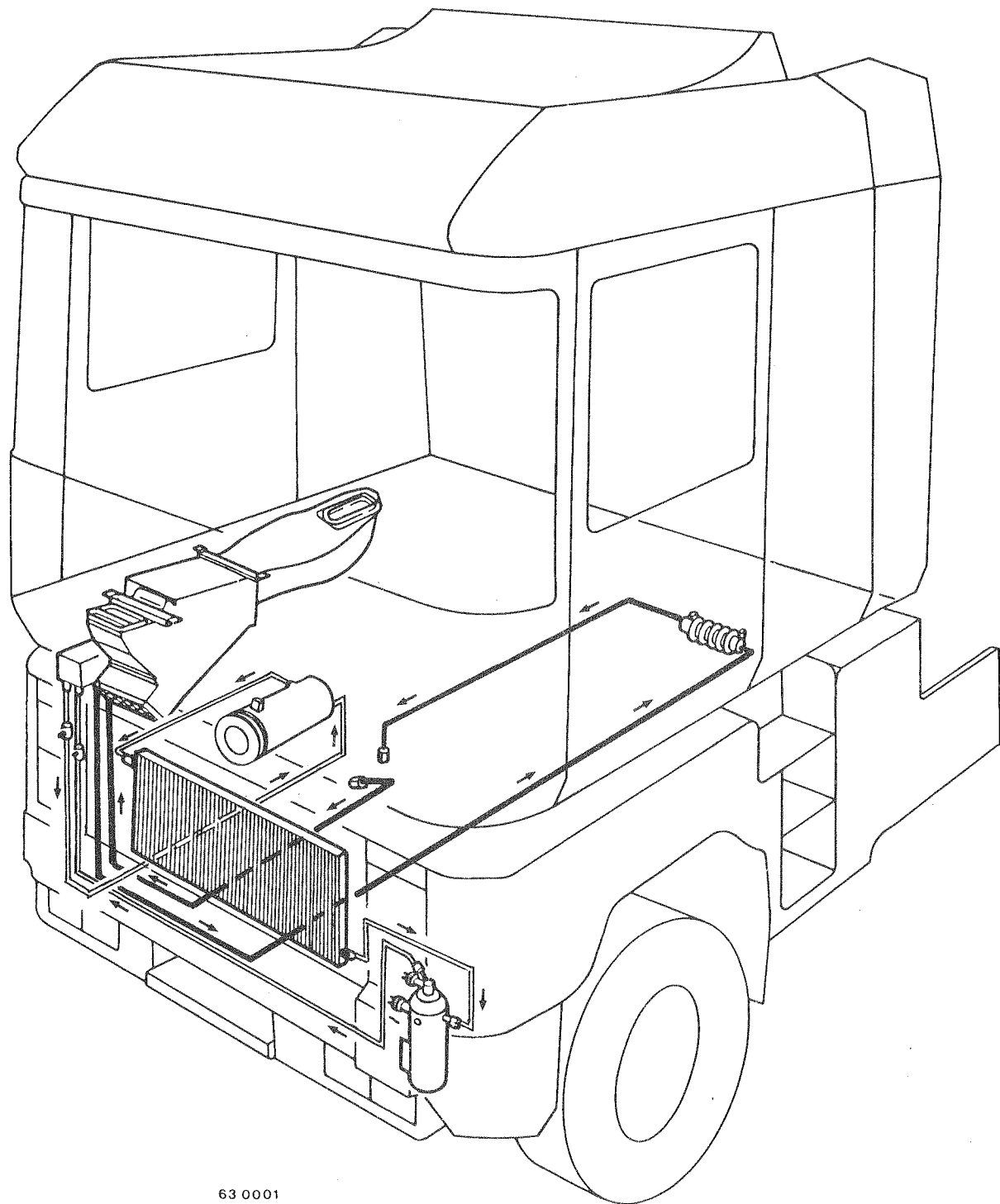
When the chilling fluid circuit is opened suddenly (punctured condenser, burst freon pipe, chilling system component wear, etc.), the following parts are to be replaced :

- the defective component.
- the dehydrator/filter cylinder.

It will be necessary to drain the system and refill the compressor with oil.



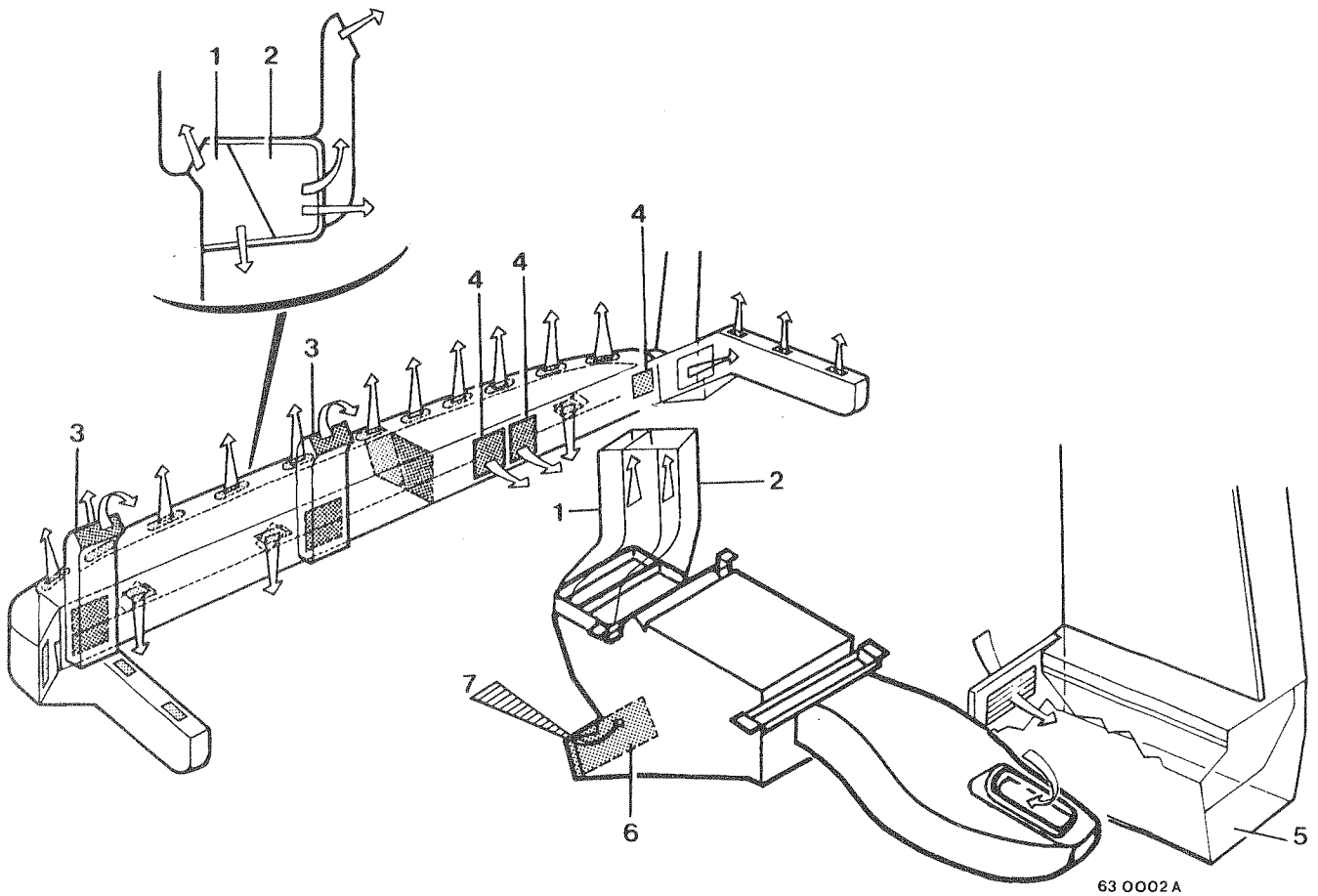
LAYOUT OF EQUIPMENT ON VEHICLE (LH drive)



63 0001

- Heating circuit
- ==== Chilling circuit

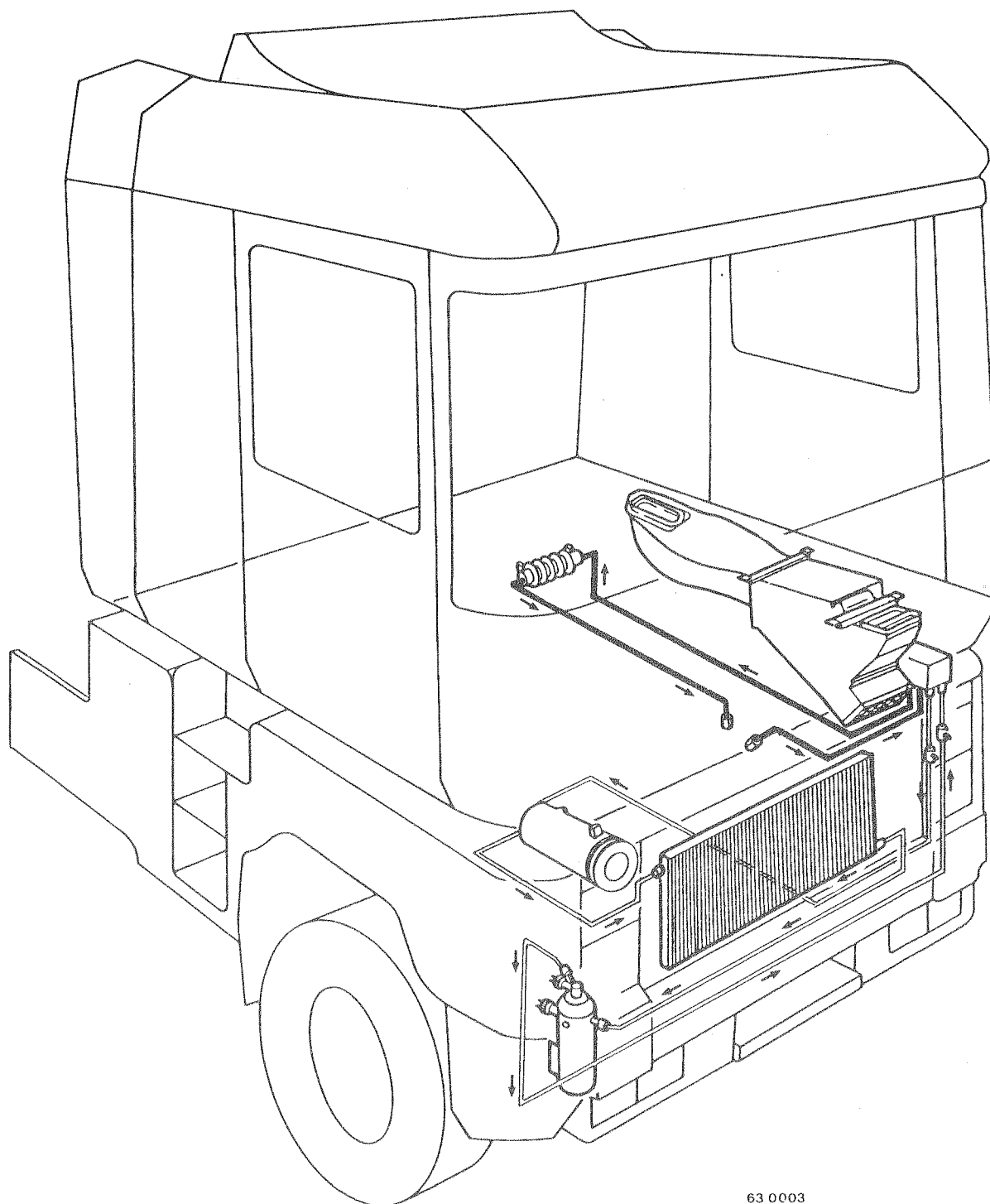
## CIRCULATION OF AIR IN CAB (LH drive)



63 002A

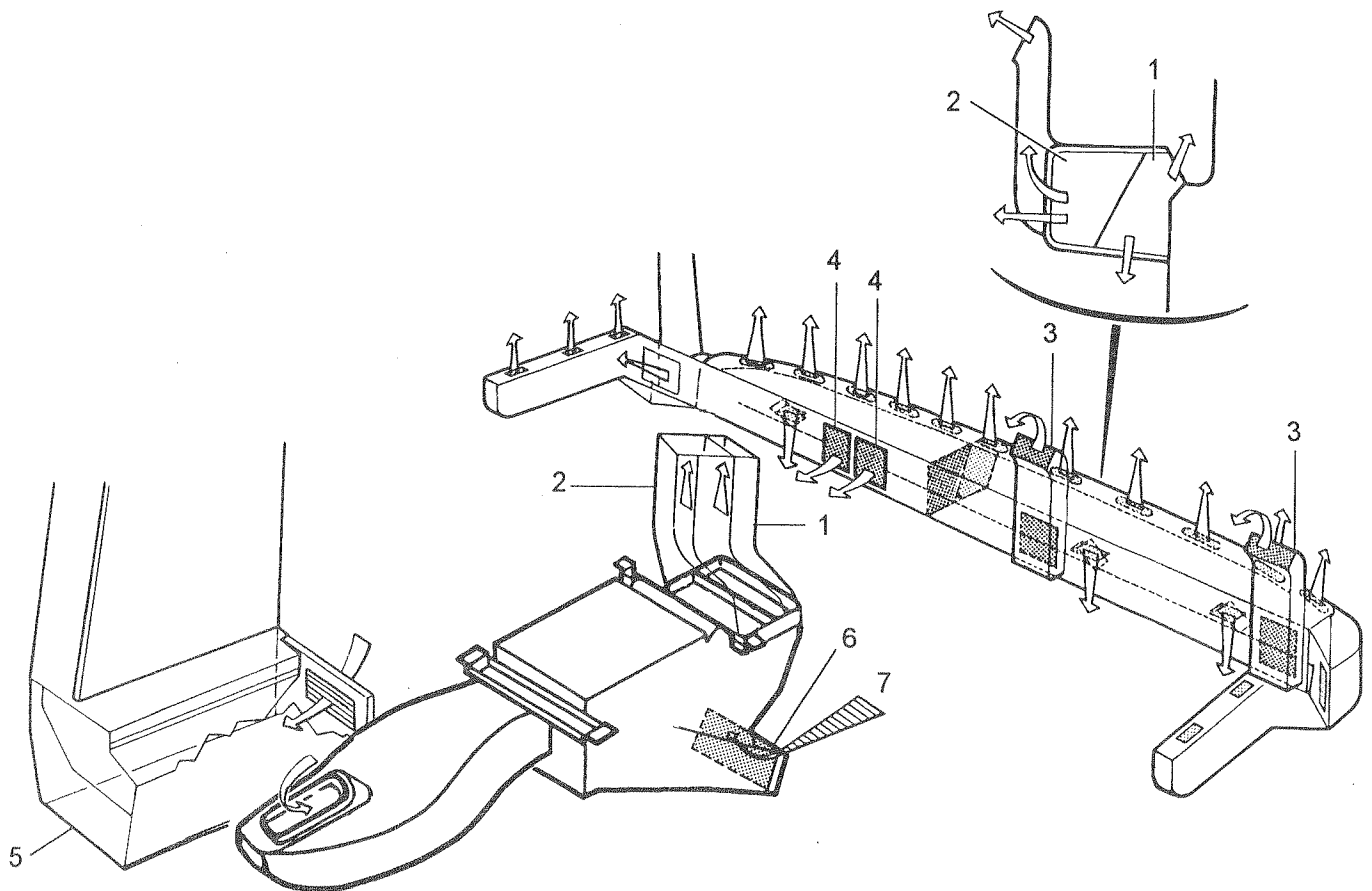
- 1 – Windscreen and footwell feed duct
- 2 – Air vents feed duct
- 3 – Driver's swivelling and flow adjustable air vents
- 4 – Passenger swivelling air vents
- 5 – Cab air recycling box
- 6 – Exterior air inlet filter
- 7 – Exterior air inlet

LAYOUT OF EQUIPMENT ON VEHICLE (RH drive)



- Heating circuit
- == Chilling circuit

## CIRCULATION OF AIR IN CAB (RH drive)

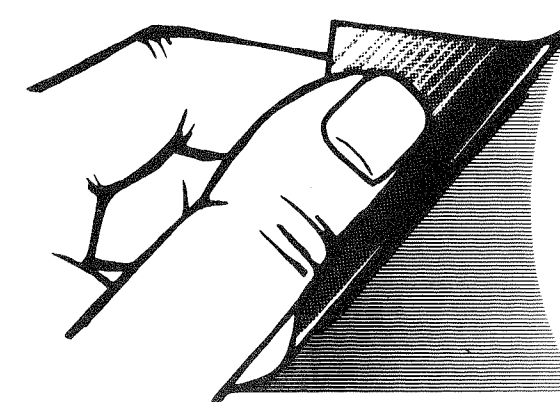


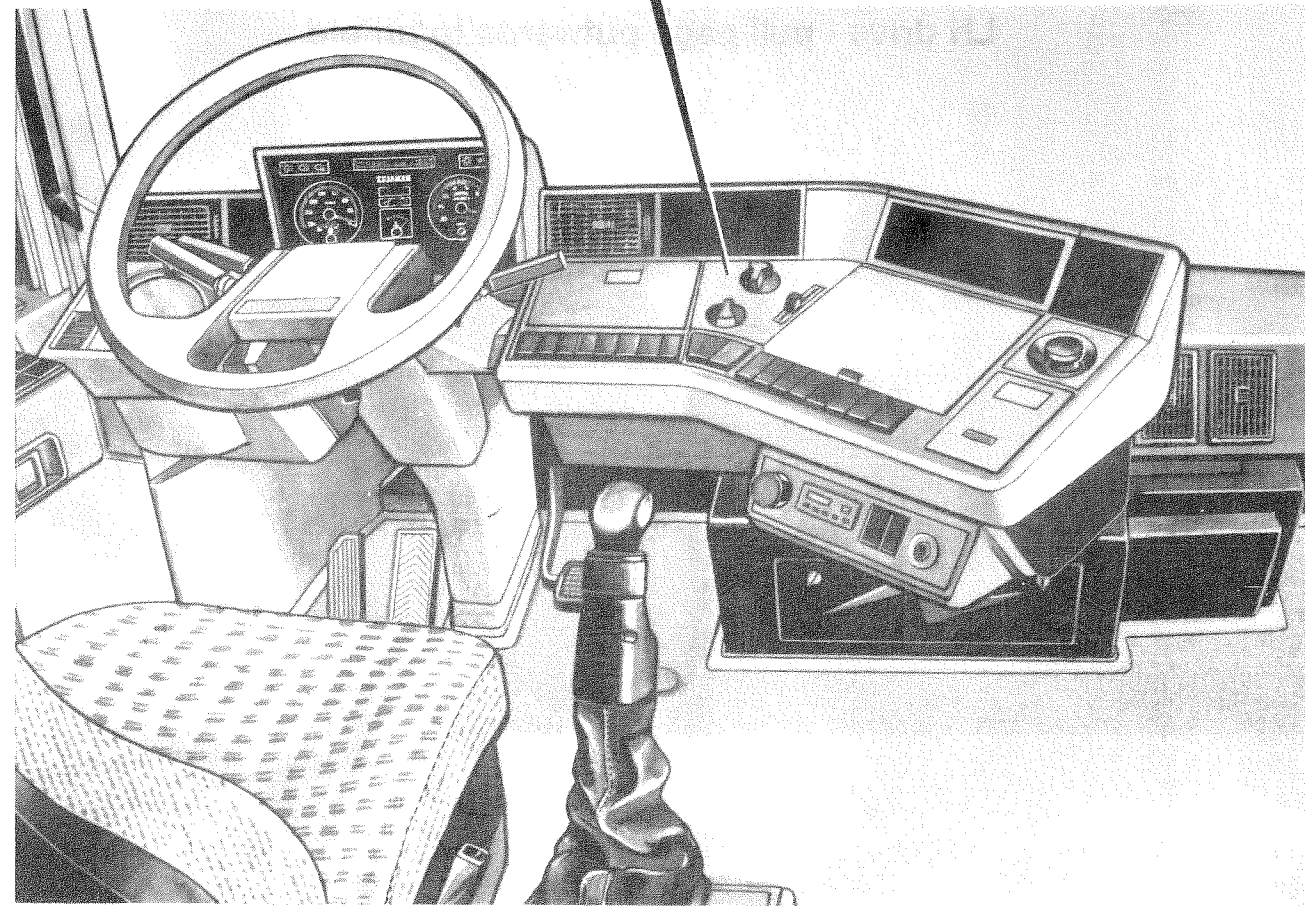
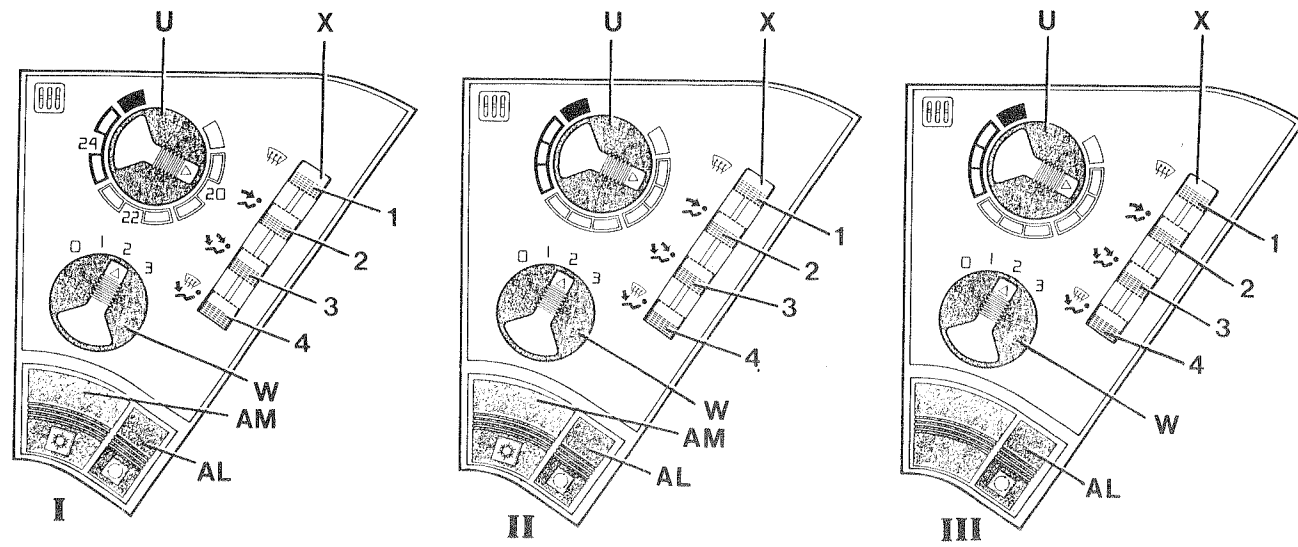
63 0004A

- 1 – Windscreen and footwell feed duct
- 2 – Air vents feed duct
- 3 – Driver's swivelling and flow adjustable air vents
- 4 – Passenger swivelling air vents
- 5 – Cab air recycling box
- 6 – Exterior air inlet filter
- 7 – Exterior air inlet

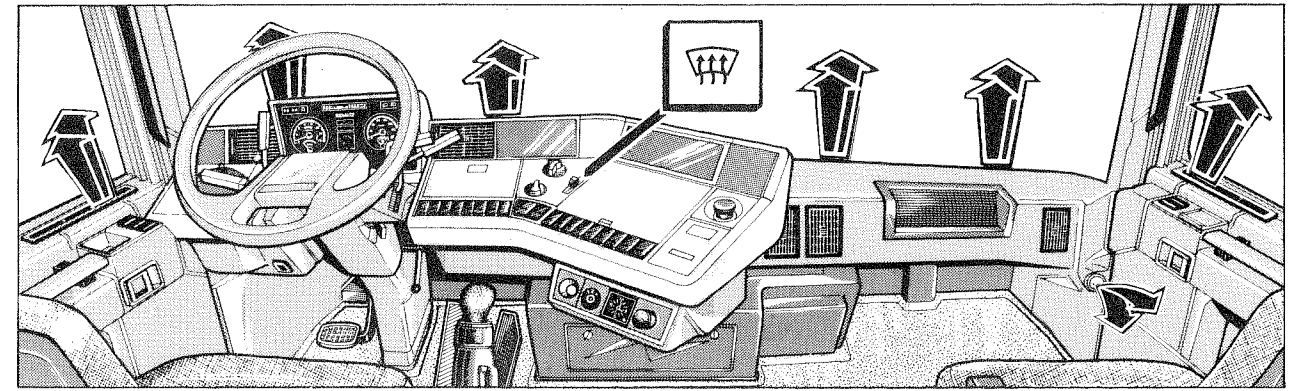
**OPERATION**

**LH drive - pull page outwards to unfold**

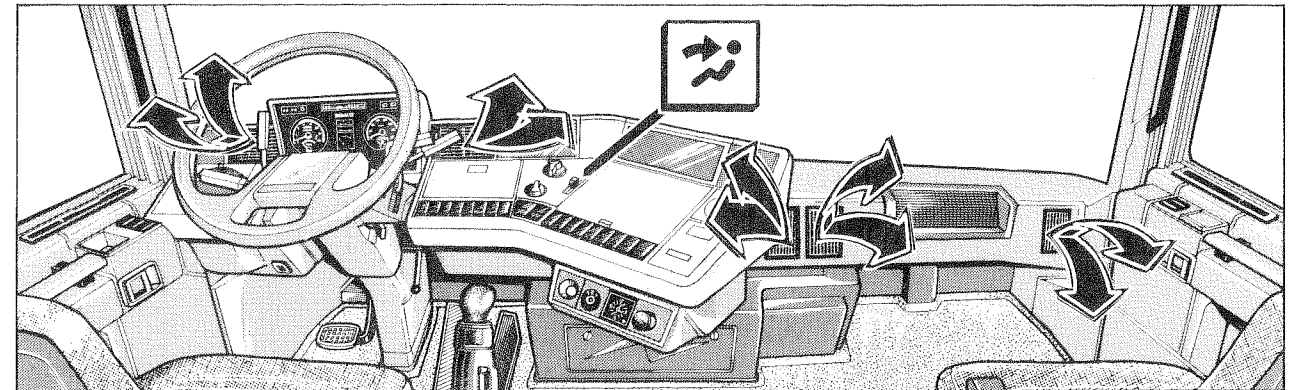




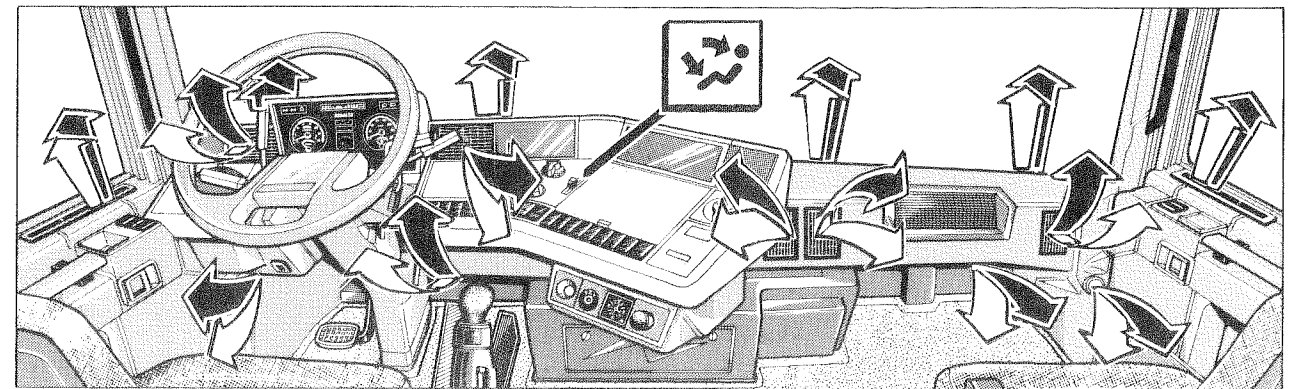
63 0028A



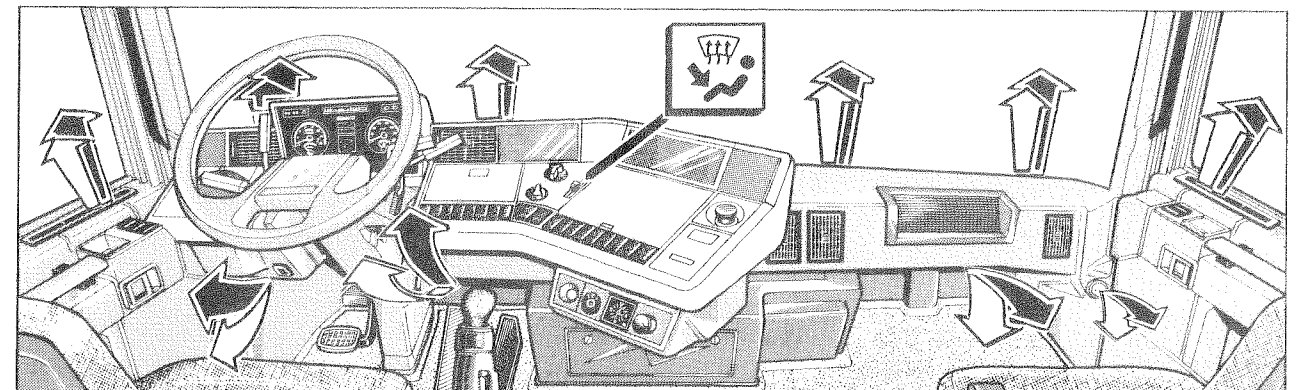
630064A



630064B



630064C



630064D

**DISTRIBUTION OF AIR IN THE CAB (LH drive)****Air distribution control (X)**

This control cursor serves both for distributing the air between the different outlet ports and for optimizing the temperature in relation to the positioning of the outlets.

**Position 1**

Hot air directed only to the windscreen and side windows for maximum defrosting/demisting (in this case, variator (B) is overridden : the temperature is adjusted automatically to the "max. hot" position and the air conditioner is automatically started up).

**Position 2**

Mild air directed to the dashboard air vents.

**Position 3**

Fresh air directed upwards (dashboard air vents), hot air directed downwards (footwell air vents). This is the ideal position for climatic comfort.

**Position 4**

Mild air directed downwards (footwell air vents), gentle air flow directed to the windscreen and side windows.

**Ventilation control (W)**

This control knob serves to vary the ventilation power.

**Very important reminder**

For maximum climatic comfort in hot or in cold weather :

- The air conditioner must ALWAYS be engaged.
- The ventilation must ALWAYS be in positions "1" to "2".

**Cab air recycling control (AL)**

This control key serves to :

- avoid breathing in stale exterior air (road tunnel...)
- obtain maximum cooling or heating power from the air conditioner.

It should only be used in short spells.

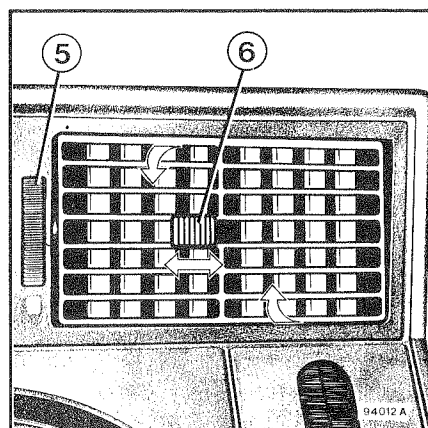
**"Driver" air vents**

**Flow opening :** Turn knurled wheel (5) upwards.

**Flow closing :** Turn knurled wheel (5) downwards.

**Horizontal swivelling :** Move control (6).

**Vertical swivelling :** Tilt the air vent.

**"Passenger" air vents**

- Air vents (7) :

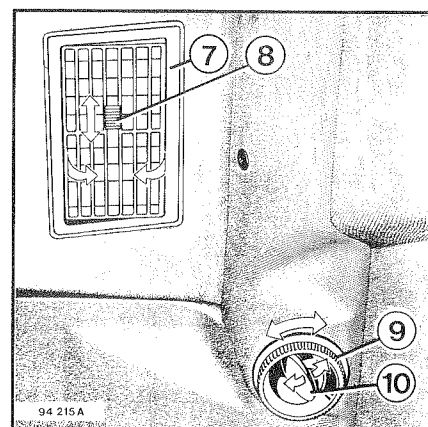
**Horizontal swivelling :** Tilt the air vent.

**Vertical swivelling :** Move control (8).

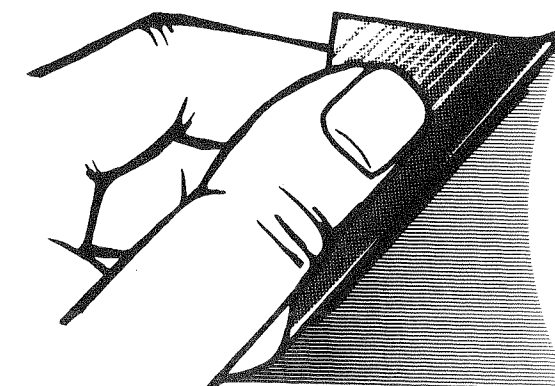
- Air vents (9)

**Flow :** Manoeuvre flap (10).

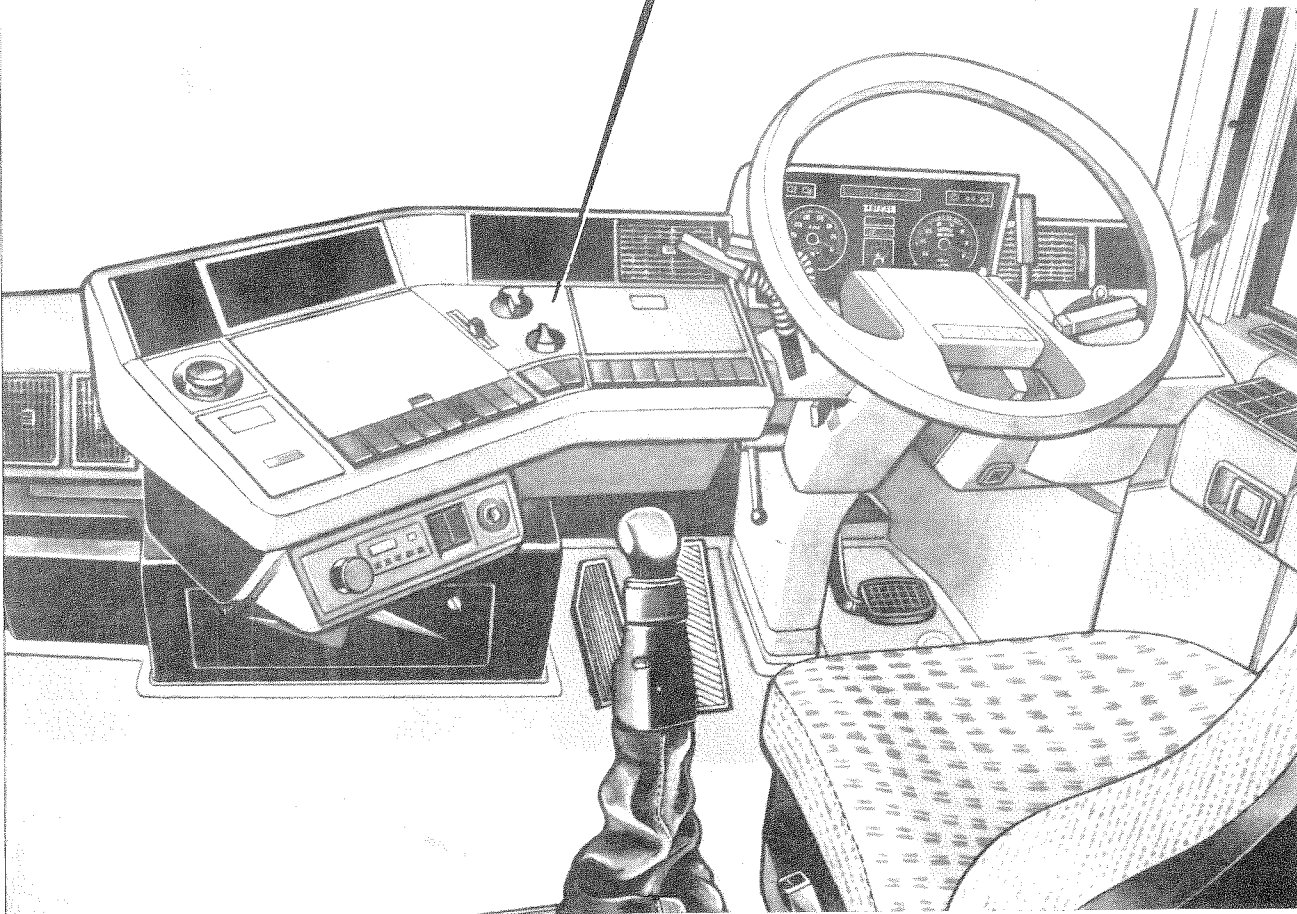
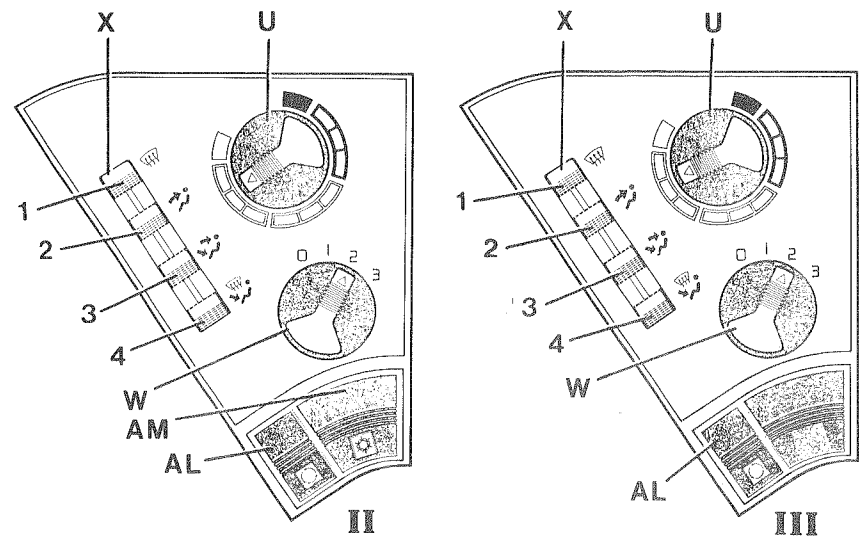
**Swivelling :** Turn the air vent.



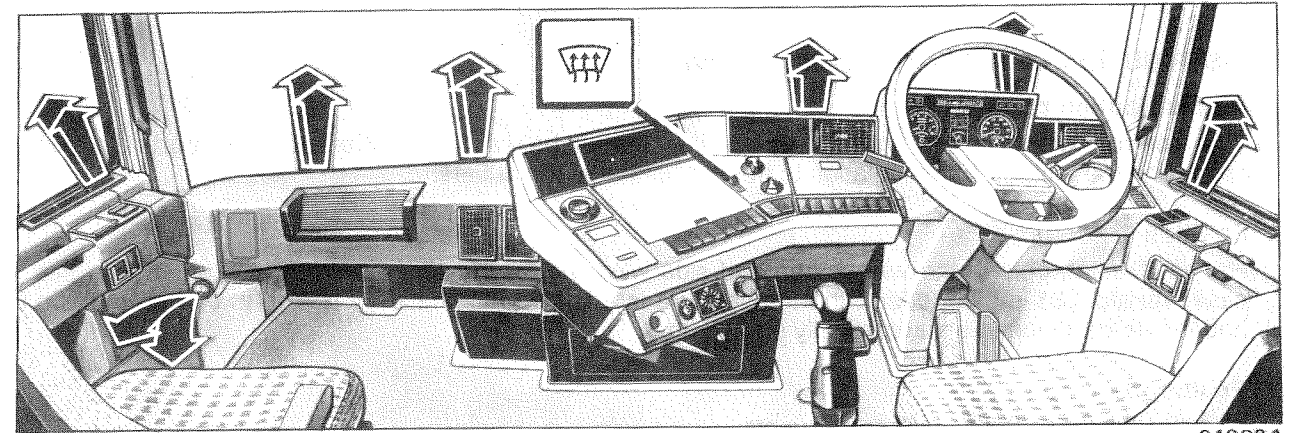
**RH drive - pull page outwards to unfold**



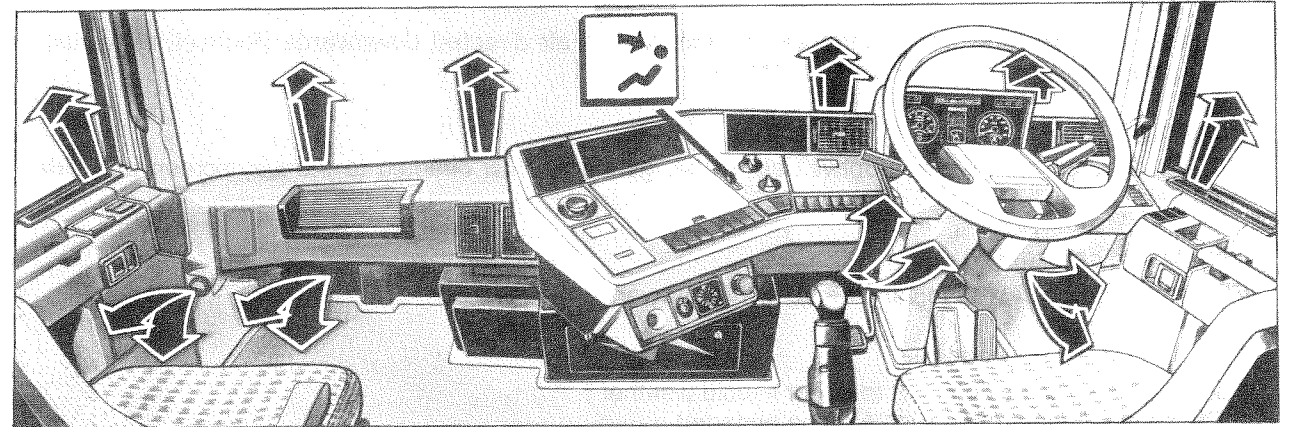




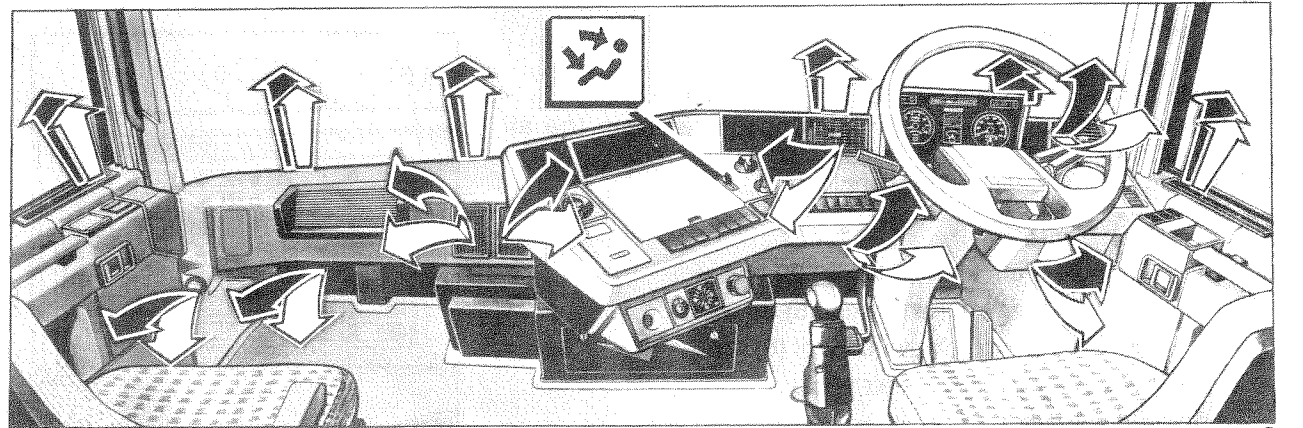
63 0029 A



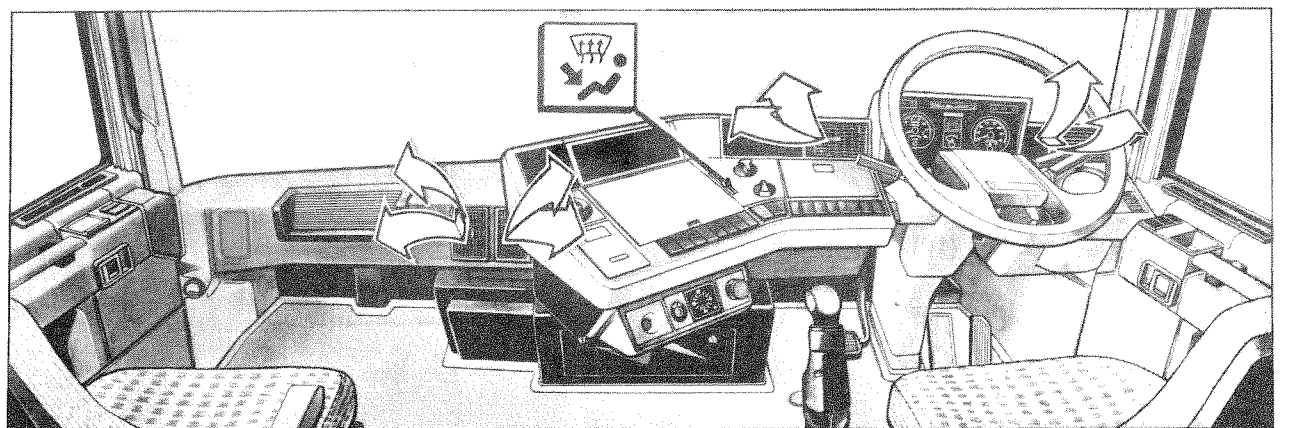
94008A



94008B



94008C



94008D



## DISTRIBUTION OF AIR IN THE CAB (RH drive)

### Air distribution control (X)

This control cursor serves both for distributing the air between the different outlet ports and for optimizing the temperature in relation to the positioning of the outlets.

#### Position 1

Hot air directed only to the windscreen and side windows for maximum defrosting/demisting (in this case, variator (B) is overridden: the temperature is adjusted automatically to the "max. hot" position and the air conditioner is automatically started up).

#### Position 2

Mild air directed to the dashboard air vents.

#### Position 3

Fresh air directed upwards (dashboard air vents), hot air directed downwards (footwell air vents). This is the ideal position for climatic comfort.

#### Position 4

Mild air directed downwards (footwell air vents), gentle air flow directed to the windscreen and side windows.

### Ventilation control (W)

This control knob serves to vary the ventilation power.

### Very important reminder

- For maximum climatic comfort in hot or in cold weather:
- The air conditioner must ALWAYS be engaged.
  - The ventilation must ALWAYS be in positions "1" to "2".

### Cab air recycling control (AL)

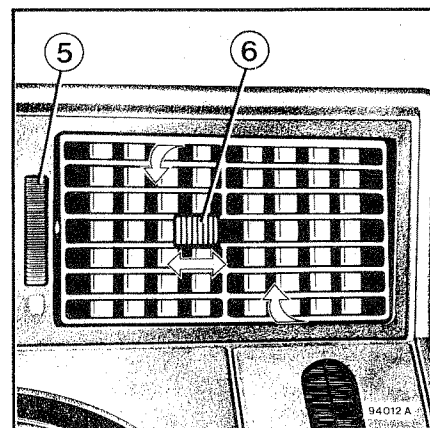
This control key serves to :

- avoid breathing in stale exterior air (road tunnel...)
- obtain maximum cooling or heating power from the air conditioner.

It should only be used in short spells.

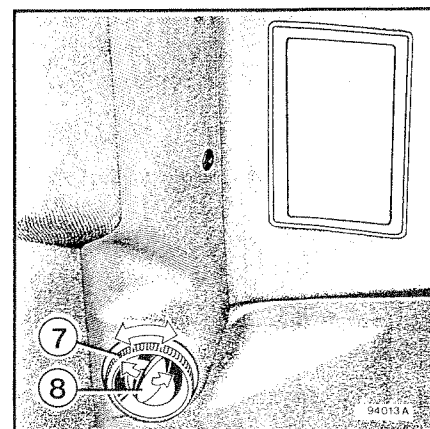
### "Driver" air vents

- Flow opening :** Turn knurled wheel (5) upwards.  
**Flow closing :** Turn knurled wheel (5) downwards.  
**Horizontal swivelling :** Move control (6).  
**Vertical swivelling :** Tilt the air vent.



### "Passenger" air vents

- Air vents (7) :
- Flow :** Manoeuvre flap (8).
- Swivelling :** Turn the air vent.



**AIR CONDITIONER WITH AUTOMATIC REGULATION (I) (LH drive only)**

**The design of the cab of this vehicle, combined with a very sophisticated air conditioning system, provides exceptional climate control.**

The driver sets the required temperature and the electronic management system acts on:

- The integrated air conditioner, if the set value is lower than the ambient temperature of the cab.
- The heater, if the set value is higher than the ambient temperature of the cab.

**On account of the design of the system, two conditions are absolutely essential in order to benefit from this high level of climate control :**

- a - The air conditioner must always be in operation (air dehumidifying function)
- b - The ventilation must always be running: position "1" minimum (temperature regulation function).

With this system it is possible to cross extremely varied climatic zones without having to frequently alter the adjustment of the "temperature variator" while maintaining a constant temperature in the cab.

**Temperature variator (U)**

Set the variator in the desired position and wait for a few moments to assess the result before altering it slightly, if necessary. The figures 20, 22, 24 serve for situating the temperature level, but do not correspond exactly to a precise value in degrees.

**Air conditioner control (AM)**

This switch stops the air conditioner provided that ventilation control (W) is actuated (position "1" minimum). This is to avoid icing up of the evaporator.

**NOTE**

During normal operation, the air conditioner is in action, the switch is actuated.

**Use in cold weather**

- Move ventilation control knob (W) to position "0". If you stopped the air conditioner the day before, actuate switch (AM).
- Move air distribution control cursor (X) to the "defrosting/demisting" position.
- As soon as the temperature rises, move ventilation control knob (W) to position "1". Increase the air flow as the engine temperature rises.
- As long as the control cursor (X) is in the "defrosting/demisting" position, the system is at "max. hot" - the temperature variator (U) is overridden.
- When the "defrosting/demisting" action has finished, move cursor (X) to the position of your choice and move temperature variator knob (U) into the required zone. The reaction time will vary according to the position chosen. Keep a minimum air flow for better efficiency (W in position "2" minimum).

**Use in hot weather**

- If the temperature inside the cab is higher than the outside temperature, aerate the cab by driving for a few minutes with the side windows down.
- Move cursor (X) to the position of your choice.
- Move temperature variator knob (U) to the "max. cold" position and the ventilation control knob (W) to position "3" to obtain a maximum air flow.
- As soon as the required comfort is obtained, move temperature variator knob (U) back to a more moderate position and reduce the ventilation with control knob (W). Keep a minimum air flow for better efficiency (W in position "2" minimum).

**Reminder**

If you wish to increase the heating or cooling power, it is possible to actuate cab air recycling control key (AL) with air conditioner control switch (AM) engaged. Recycling should only be used in short spells.

## AIR CONDITIONER WITH MANUAL REGULATION (II)

### Temperature variator (U)

Set the variator in the desired position and wait for a few moments to assess the result before altering it slightly, if necessary.

### Air conditioner control (AM)

This switch stops the air conditioner provided that ventilation control (W) is actuated (position "1" minimum). This is to avoid icing up of the evaporator.

### NOTE

The temperature is not regulated automatically, so set the variator to obtain the desired temperature. During normal operation, the air conditioner is in action, the switch is actuated.

### Use in cold weather

- Move ventilation control knob (W) to position "0". If you stopped the air conditioner the day before, actuate switch (AM).
- Move air distribution control cursor (X) to the "defrosting/demisting" position.
- As soon as the temperature rises, move ventilation control knob (W) to position "1". Increase the air flow as the engine temperature rises.
- As long as the control cursor (X) is in the "defrosting/demisting" position, the system is at "max. hot" - the temperature variator (U) is overridden.
- When the "defrosting/demisting" action has finished, move cursor (X) to the position of your choice and move temperature variator knob (U) into the required zone. The reaction time will vary according to the position chosen. Keep a minimum air flow for better efficiency (W in position "2" minimum).

### Use in hot weather

- If the temperature inside the cab is higher than the outside temperature, aerate the cab by driving for a few minutes with the side windows down.
- Move cursor (X) to the position of your choice.
- Move temperature variator knob (U) to the "max. cold" position and the ventilation control knob (W) to position "3" to obtain a maximum air flow.
- As soon as the required comfort is obtained, move temperature variator knob (U) back to a more moderate position and reduce the ventilation with control knob (W). Keep a minimum air flow for better efficiency (W in position "2" minimum).

### Reminder

If you wish to increase the heating or cooling power, it is possible to actuate cab air recycling control key (AL) with air conditioner control switch (AM) engaged. Recycling should only be used in short spells.

**HEATING ONLY (III)****Temperature variator (U)**

Set the variator in the desired position and wait for a few moments to assess the result before altering it slightly, if necessary.

**Use in cold weather**

- Move ventilation control knob (W) to position "0". Move air distribution control cursor (X) to the "defrosting/demisting" position.
- As soon as the temperature rises, move ventilation control knob (W) to position "1". Increase the air flow as the engine temperature rises.
- As long as the control cursor (X) is in the "defrosting/demisting" position, the system is at "max. hot" - the temperature variator (U) is overridden.
- When the "defrosting/demisting" action has finished, move cursor (X) to the position of your choice and move temperature variator knob (U) into the required zone. The reaction time will vary according to the position chosen. Keep a minimum air flow for better efficiency (W in position "2" minimum).

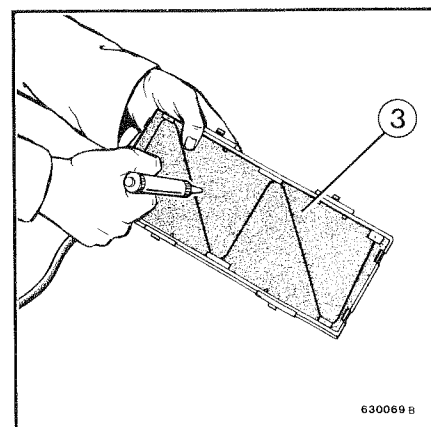
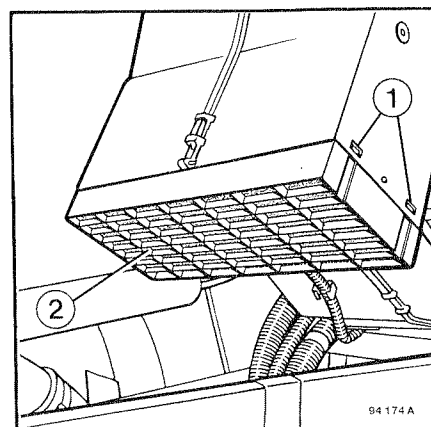
## MAINTENANCE

### Air conditioner filter

At the scheduled intervals, press the four catches (1) to remove filter unit (2).

Blow compressed air (**maximum pressure 7 bars**) through filter element (3) from the interior towards the exterior.

Replace the filter, if necessary.



### Air conditioner

I = LH drive

II = RH drive

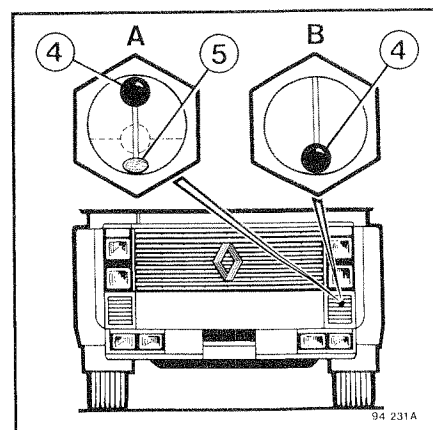
Regularly check the circuit charge and the state of the chilling fluid through the sight mounted on the dehydrator/filter.

### Circuit charge

Check the position of ball (4) after the air conditioner has been in operation for 5 minutes.

**A** = Charge correct when the ball fluctuates between the top and bottom of the sight.

**B** = Charge incorrect when the ball does not fluctuate in the sight.

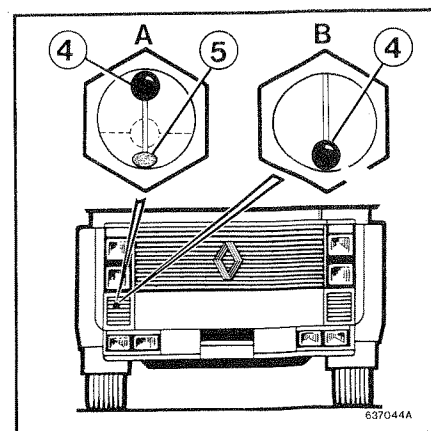


### State of chilling fluid

Check the colour of pellet (5).

Blue = fluid correct.

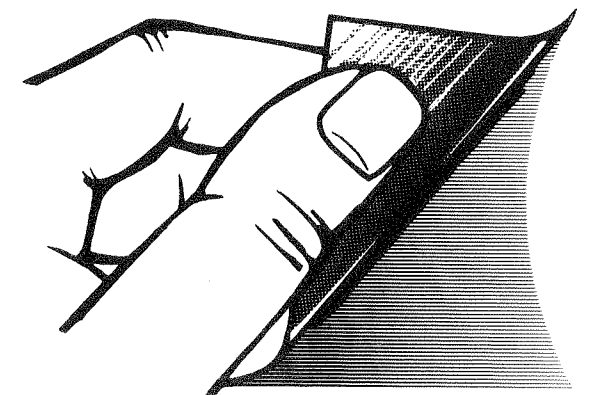
Pink = humidity in circuit

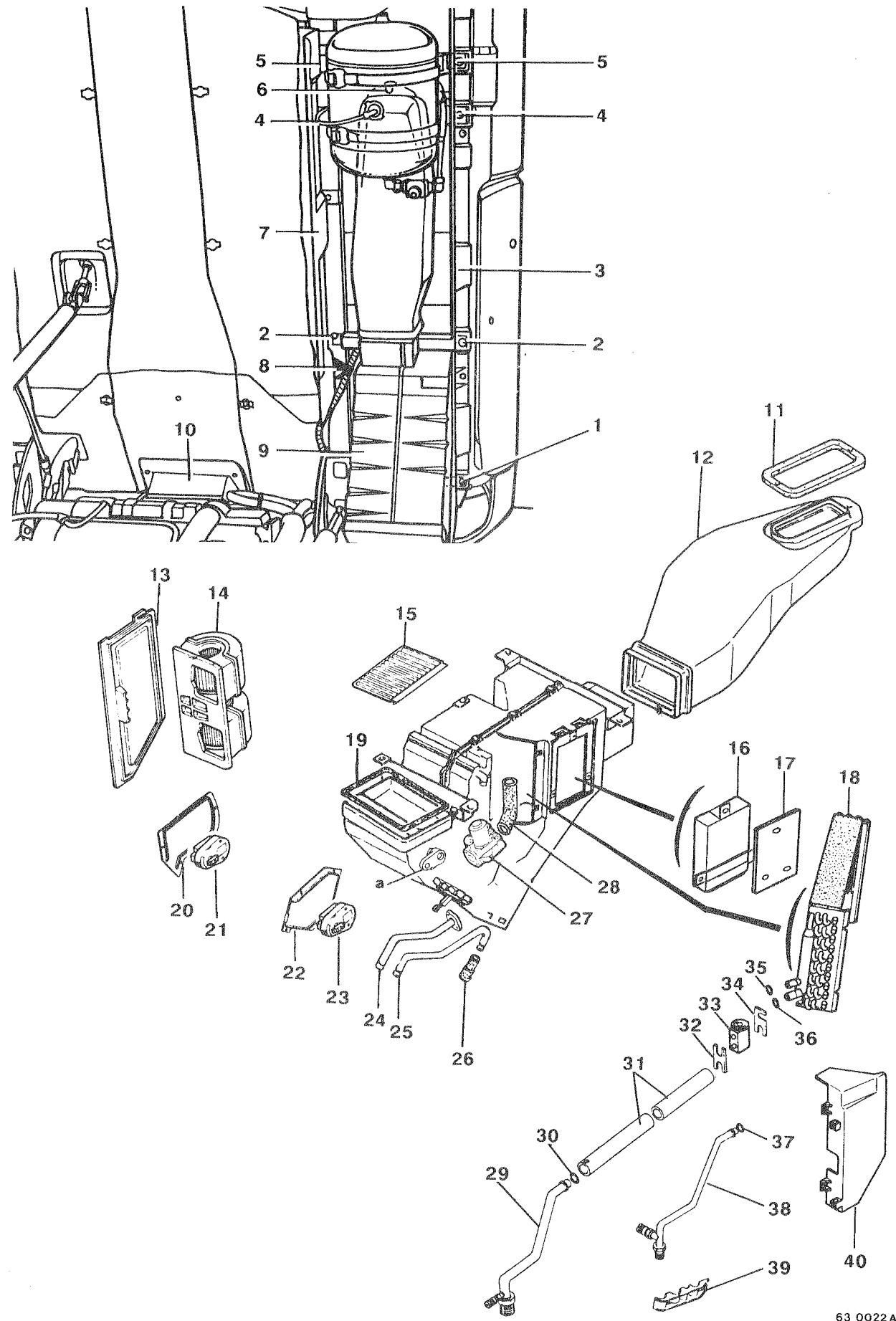


### WARNING

Specific safety precautions must be taken when working on the chilling circuit and/or appliances.

**AIR CONDITIONER  
Removal / Fitting**



**To remove**

Drain the chilling circuit and save the fluid (see chapter H).

Partially drain the cooling circuit.

Disconnect the flexible pipes (air conditioner).  
Take off the O-rings.

Mark, then disconnect the hoses (heating).

Tilt the cab.  
Open the master switch to cut off the electrical power supply.

Remove flap (3).  
Remove protective screen (7).

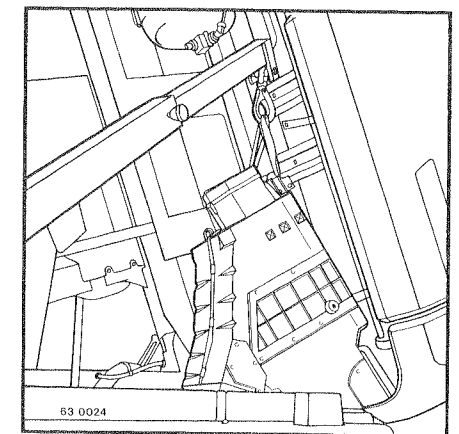
Remove nuts (4).  
Unscrew nuts (5).

Remove screw (6).  
Remove duct (12).  
Save gasket (11).

Mark, then disconnect wiring harness (10).  
Remove clamps (8).  
Disengage the wiring harness.

Lash up air conditioner (9).  
Use lifting tackle.  
Remove the air conditioner.

Save gasket (19).



63 0022 A

**To fit**

Install gasket (19).

Fit air conditioner (9).

Screw up nuts (1-2). Tighten at the specified torque.

Install gasket (11).

Fit duct (12).

Fit screw (6). Tighten at the specified torque.

Screw up nuts (4-5). Tighten at the specified torque.

Connect wiring harness (10).

Fit clamps (8).

Fit protective screen (7).

Fit the screws. Tighten at the specified torque.

Fit flap (3).

Fit the screws. Tighten at the specified torque.

Tilt the cab.

Connect the hoses. Respect their positions.

It is absolutely essential to replace all the seals.

Oil all seals with refrigerant oil.

Connect the flexible pipes (air conditioner). Assemble the unions (see page G2).

Top up with coolant.

Fill the chilling circuit with the correct quantity of refrigerant oil (see chapter H).

**REGULATION BOX****To remove**

Tilt the cab.

Open the master switch to cut off the electrical power supply.

Remove cover (17).

Remove regulation box (16).

Unplug the connector.

**To fit**

Plug in the connector.

Fit regulation box (16).

Position cover (17).

Fit the screws.

Tilt the cab.



**SOLENOID VALVE****To remove**

Tilt the cab.  
Open the master switch to cut off the electrical power supply.  
Partially drain the cooling circuit.

LH drive only  
Remove flap (3).  
Remove screw (1).  
Unscrew screws (2).  
Tilt air conditioner (9).

Remove flange clip (39).  
Disconnect tube (24).  
Disconnect hose (28).  
Unplug the connector.  
Remove solenoid valve (27).

**To fit**

Fit solenoid valve (27).  
Plug in the connector.  
Connect tube (24).  
Connect hose (28). Tighten the clamps.  
Fit flange clip (39).

LH drive only  
Fasten air conditioner (9).  
Screw up nuts (1-2). Tighten at the specified torque.  
Fit flap (3).  
Fit the screws. Tighten at the specified torque.

Tilt the cab.  
Top up with coolant.

**MOTOR/FAN UNIT****To remove**

Tilt the cab.

Open the master switch to cut off the electrical power supply.

Remove flap **(3)**.

Remove screw **(1)**.

Remove screw **(2)**.

Tilt air conditioner **(9)**.

Remove cover **(13)**.

Unplug the connector.

Take out fan/motor unit **(14)**.

Remove grating **(15)** and clean.

**To fit**

Fit grating **(15)**.

Fit fan/motor unit **(14)**.

Plug in the connector.

Position cover **(13)**.

Fasten air conditioner **(9)**.

Screw up nuts **(1-2)**. Tighten at the specified torque.

Fit flap **(3)**.

Fit the screws. Tighten at the specified torque.

Tilt the cab.

## EXPANSION VALVE

### To remove

Drain the chilling circuit and save the fluid (**see chapter H**).  
Tilt the cab.  
Open the master switch to cut off the electrical power supply.

Disengage the wiring harness.  
Remove flange clip (**39**).

Remove flange clip (**32**).  
Disconnect tubes (**29-38**).  
Take out O-rings (**30-37**).  
Remove flange clip (**34**).  
Remove expansion valve (**33**).  
Take out O-rings (**35-36**).

### To fit

It is absolutely essential to replace all the seals.  
Oil all seals with refrigerant oil.

Install O-rings (**35-36**).  
Fit expansion valve (**33**).  
Fit flange clip (**34**).  
Fit the screws. Tighten at the specified torque.

Install O-rings (**30-37**).  
Connect tubes (**29-38**).  
Fit flange clip (**32**).  
Fit the screw. Tighten at the specified torque.  
Fit flange clip (**39**).

Fasten the wiring harness.

Tilt the cab.  
Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).

## EVAPORATOR

### To remove

Drain the chilling circuit and save the fluid (**see chapter H**).

Tilt the cab.

Open the master switch to cut off the electrical power supply.

Remove flap **(3)**.

Remove protective screen **(7)**.

Remove nuts **(4)**.

Unscrew nuts **(5)**.

Remove screw **(6)**.

Remove duct **(12)**.

Save gasket **(11)**.

Mark, then disconnect wiring harness **(10)**.

Remove clamps **(8)**.

Disengage the wiring harness.

Lash up air conditioner **(9)**.

Use lifting tackle.

Lift up the air conditioner.

Disengage the wiring harness.

Remove cover **(40)**.

Remove flange clip **(39)**.

Remove flange clip **(32)**.

Disconnect tubes **(29-38)**.

Take out O-rings **(30-37)**.

Remove flange clip **(34)**.

Remove expansion valve **(33)**.

Take out O-rings **(35-36)**.

Unclip the defrosting sensor.

Remove evaporator **(18)**.

**To fit**

Fit evaporator **(18)**.

Take all precautions necessary so as not to damage the fins.

Fit the screws. Tighten at the specified torque.

It is absolutely essential to replace all the seals.

Oil all seals with refrigerant oil.

Install O-rings **(35-36)**.

Fit expansion valve **(33)**.

Fit flange clip **(34)**.

Fit the screws. Tighten at the specified torque.

Install O-rings **(30-37)**.

Connect tubes **(29-38)**.

Fit flange clip **(32)**.

Fit the screw. Tighten at the specified torque.

Fit flange clip **(39)**.

Clip on the defrosting sensor.

Position cover **(40)**.

Fasten the wiring harness.

Fasten air conditioner **(9)**.

Screw up nuts **(1-2)**. Tighten at the specified torque.

Fit flap **(3)**.

Fit the screws. Tighten at the specified torque.

Tilt the cab.

Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).

## DISTRIBUTION FLAP MOTOR

### To remove

Tilt the cab.  
Open the master switch to cut off the electrical power supply.

LH drive only  
Remove flap (3).  
Remove screw (1).  
Unscrew screws (2).  
Tilt air conditioner (9).

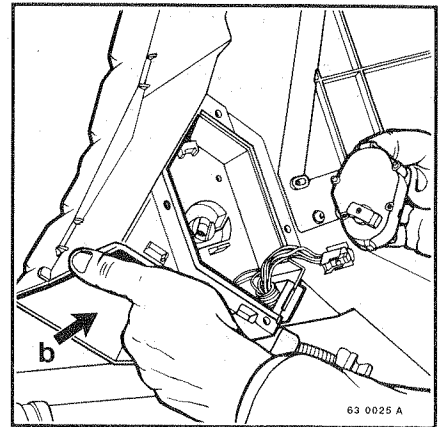
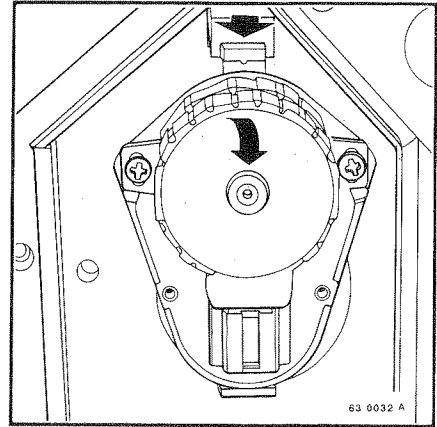
Remove cover (20).  
Unplug the connector.  
Remove motor (21).

### To fit

Orient flaps (b).  
Install motor (21).  
Plug in the connector.  
Position cover (20).

RH drive only  
Fasten air conditioner (9).  
Screw up nuts (1-2). Tighten at the specified torque.  
Fit flap (3).  
Fit the screws. Tighten at the specified torque.

Tilt the cab.



## EXTERIOR AIR FLAP AND RECYCLING AIR FLAP MOTOR

### To remove

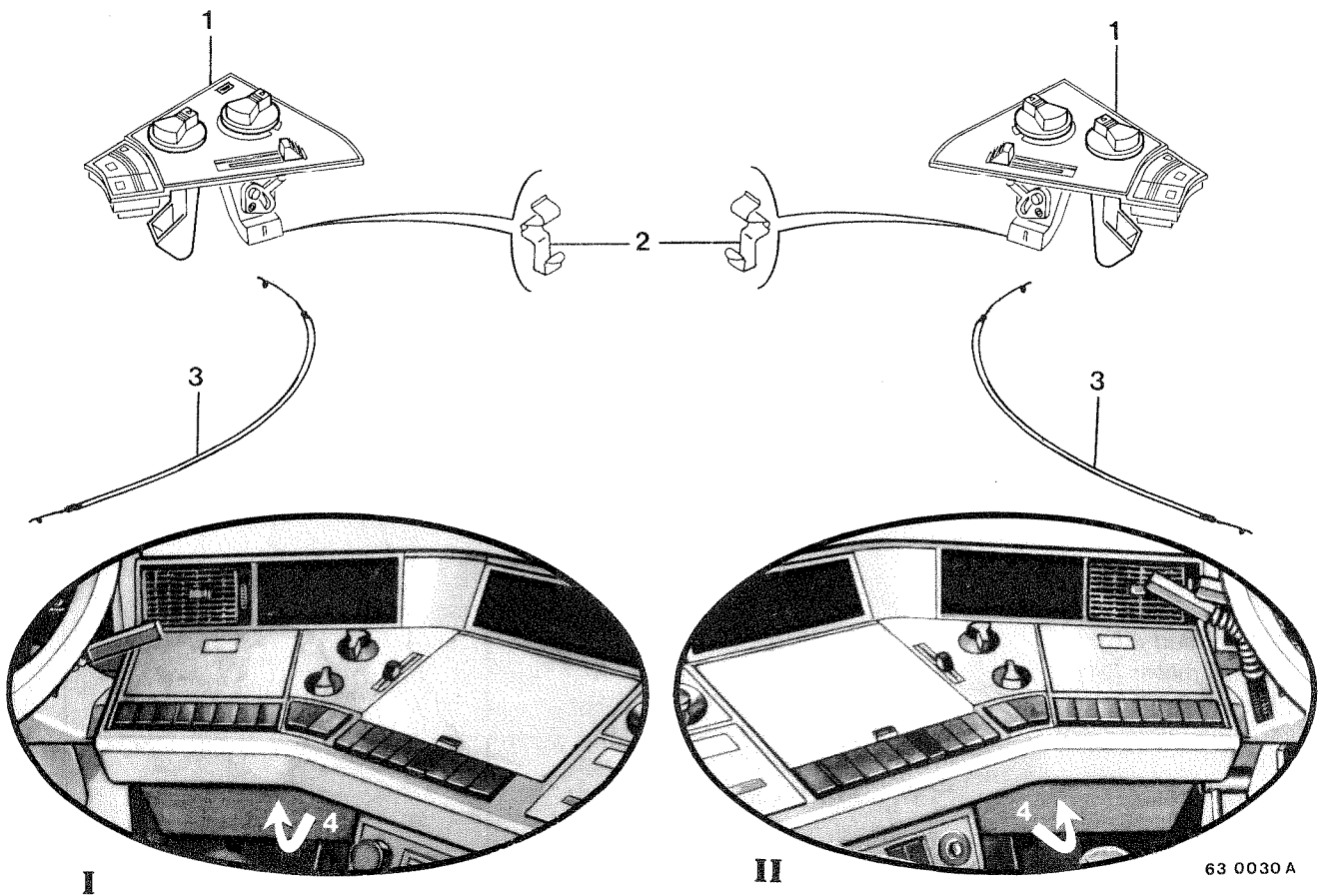
Tilt the cab.  
Open the master switch to cut off the electrical power supply.

Remove cover (22).  
Unplug the connector.  
Remove motor (23).

### To fit

Orient flap (a).  
Install motor (23).  
Plug in the connector.  
Position cover (22).

Tilt the cab.



63 0030 A

## CONTROL CIRCUIT BOARD

- I LH drive
- II RH drive

### To remove

Remove screw (4).  
Withdraw circuit board (1).

Unplug the connectors.  
Remove sheath stop (2).  
Uncouple cable (3).

### To fit

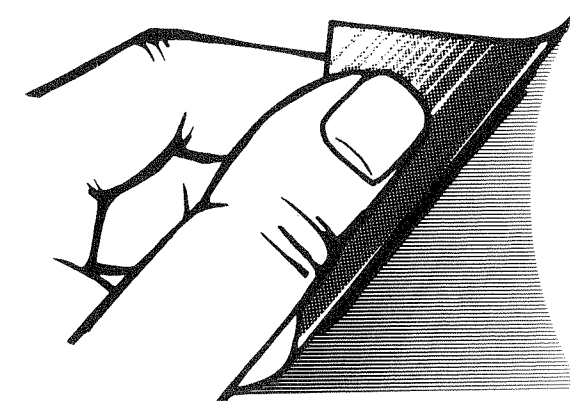
Connect cable (3).

### To adjust

Close the flaps, move the air distribution control cursor to the "defrosting" position.  
Fit sheath stop (2).

Install circuit board (1).  
Fit screw (4).

**AIR CONDITIONER**  
**Disassembly / Assembly**





## AIR CONDITIONER

**To disassemble**

Remove fittings (6-16).  
 Uncouple air filter (35).  
 Remove covers (2-13-17-26-46).

Remove regulation box (25).  
 Unplug the connectors.  
 Unclip the defrosting sensor.  
 Withdraw wiring harness (1).

Take out fan/motor unit (3).  
 Remove grating (4).

Remove motors (14-18).

Remove flange clip (43).  
 Disconnect tubes (31-32).  
 Disconnect hoses (28-33).  
 Remove solenoid valve (29).

Remove flange clip (38).  
 Disconnect tubes (35-44).  
 Take out O-rings (36-45).  
 Remove sleeves (37).  
 Remove flange clip (40).  
 Remove expansion valve (39).  
 Take out O-rings (41-42).

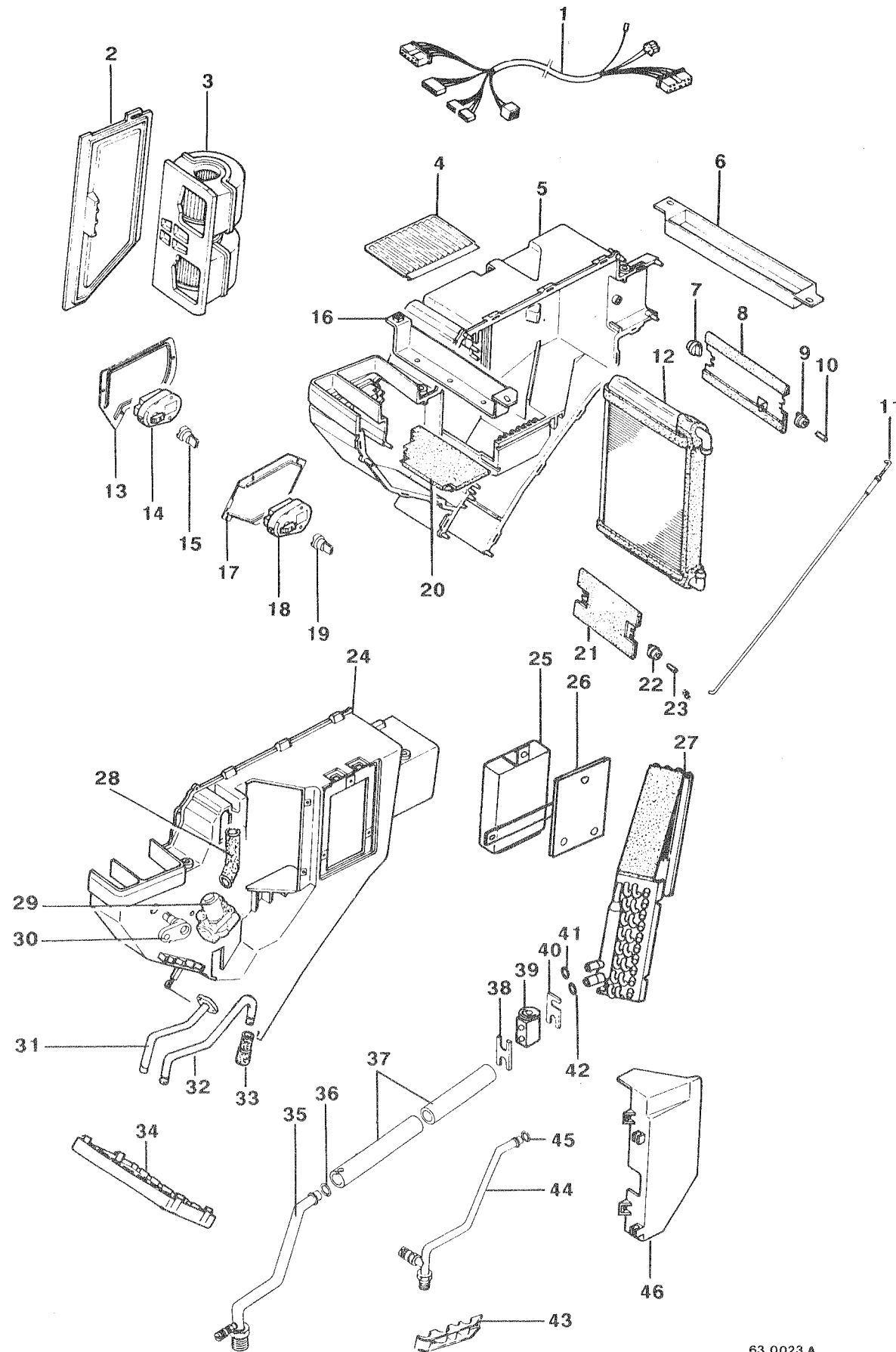
Remove evaporator (27).

Withdraw securing clips.  
 Separate half-casings (5-24).

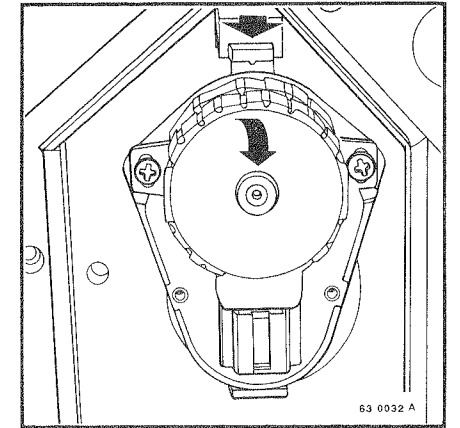
Withdraw flap (20).  
 Take out pins (15-30).

Uncouple link rod (11).  
 Take out pins (10-23), if necessary.  
 Remove flaps (8-21).  
 Take out pins (7-9-19-22).

Take out fan coil heater (12).



63 0023 A



**To assemble**

Fit fan coil heater (12).

Take all precautions necessary so as not to damage the fins.

Install pin (15).

Fit flap (20).

Fit pins (7-9-19-22-30).

Fit flaps (8-21).

Install pins (10-23).

Fit link rod (11).

Assemble half-casings (5-24).

Install securing clips.

Fit evaporator (27).

Take all precautions necessary so as not to damage the fins.

Fit the screws. Tighten at the specified torque.

It is absolutely essential to replace all the seals.

Oil all seals with refrigerant oil.

Install O-rings (41-42).

Fit expansion valve (39).

Fit flange clip (40).

Fit the screws. Tighten at the specified torque.

Fit sleeves (37).

Install O-rings (36-45).

Connect tubes (35-44).

Fit flange clip (38).

Fit the screw. Tighten at the specified torque.

Fit solenoid valve (29).

Connect hoses (28-33).

Fit tubes (31-32). Tighten the clamps.

Remove flange clip (43).

Orient flaps (20-8-21).

Fit motors (14-18).

Fit grating (4).

Fit motor/fan unit (3).

Fit wiring harness (1).

Plug in the connectors.

Clip on the defrosting sensor.

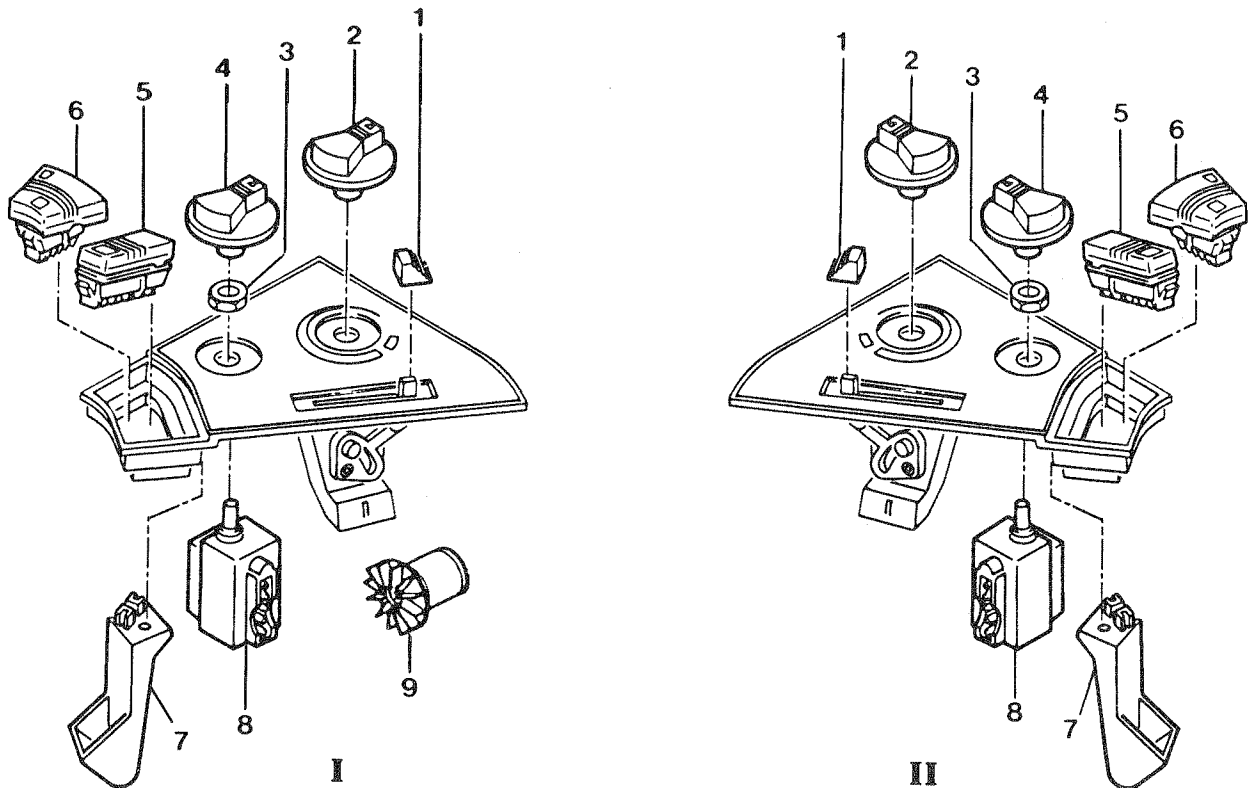
Fit regulation box (25).

Fit covers (2-13-17-26-46).

Fit fittings (6-16). Respect their orientation.

Fit the screws. Tighten at the specified torque.

Fit air filter (34).



63 0031A

## CONTROL CIRCUIT BOARD

I LH drive

II RH drive

### To disassemble

Remove securing clip.

Remove bracket (7).

Withdraw knob (2).

Withdraw knob (4).

Remove nut (3). Use a socket **S19** (see page K2).

Remove control (8).

Remove control (5).

Remove control (6)\*.

Withdraw cursor (1).

Remove sensor motor (9)\*.

### To assemble

Fit sensor motor (9)\*.

Fit knob (2).

Position control (8).

Tighten nut (3). Use a socket **S19** (see page K2).

Fit knob (4).

Position control (5).

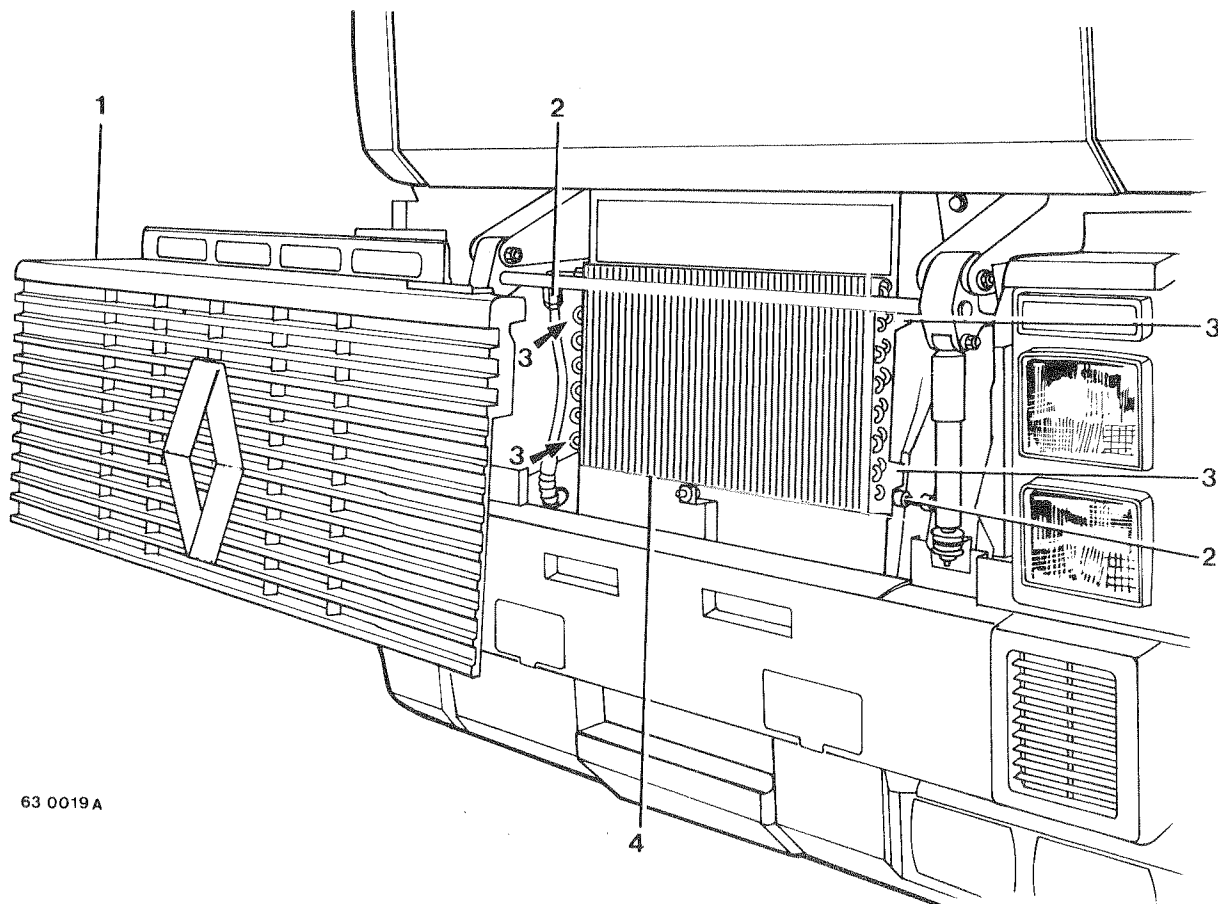
Position control (6)\*.

Fit cursor (1).

Fit bracket (7).

Install securing clip.

**CONDENSER**



63 0019 A

## LH drive and RH drive

### To remove

Open the master switch to cut off the electrical power supply.  
Drain the chilling circuit and save the fluid (**see chapter H**).

Remove front grille (1).  
Disconnect flexible pipes (2).  
Take off the O-rings.  
Remove screws (3).  
Remove condenser (4).

### To fit

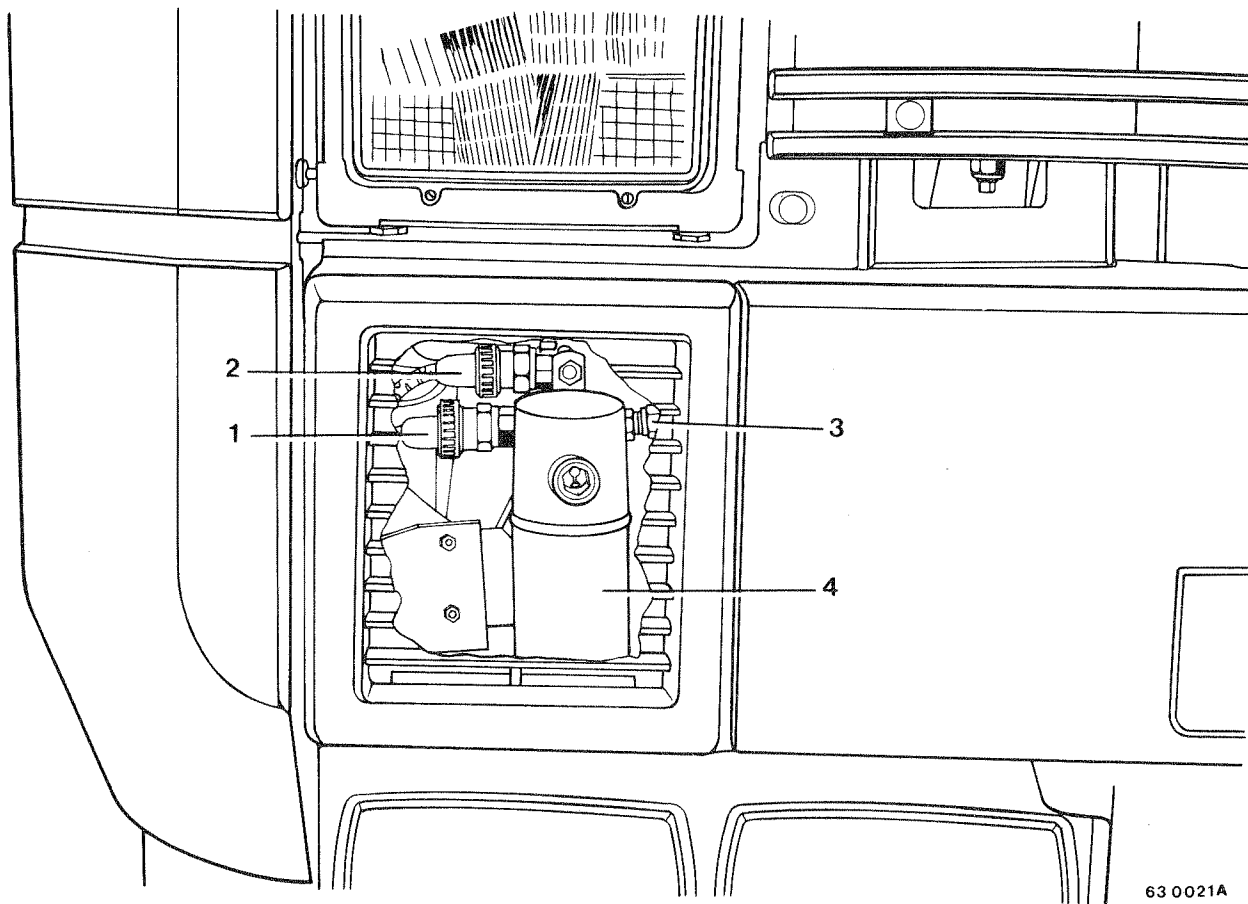
Fit condenser (4).  
Fit screws (3). Tighten at the specified torque.  
Connect flexible pipes (2).

It is absolutely essential to replace all the seals.  
Assemble the unions (**see page G2**).

Fit front grille (1). Fit screws (3). Tighten at the specified torque.

Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).

**DEHYDRATOR/FILTER**



63 0021A

## RH drive

### To remove

Open the master switch to cut off the electrical power supply.  
Drain the chilling circuit and save the fluid (**see page H**).

**R12 fluid** : Mark, then disconnect switches (1-2).

**R134a fluid** : Disconnect switch (1).

Disconnect tubes (3).

Take off the O-rings.

Remove dehydrator filter (4).

### To fit

Fit dehydrator filter (4).

Fit the screws. Tighten at the specified torque.

Connect tubes (3).

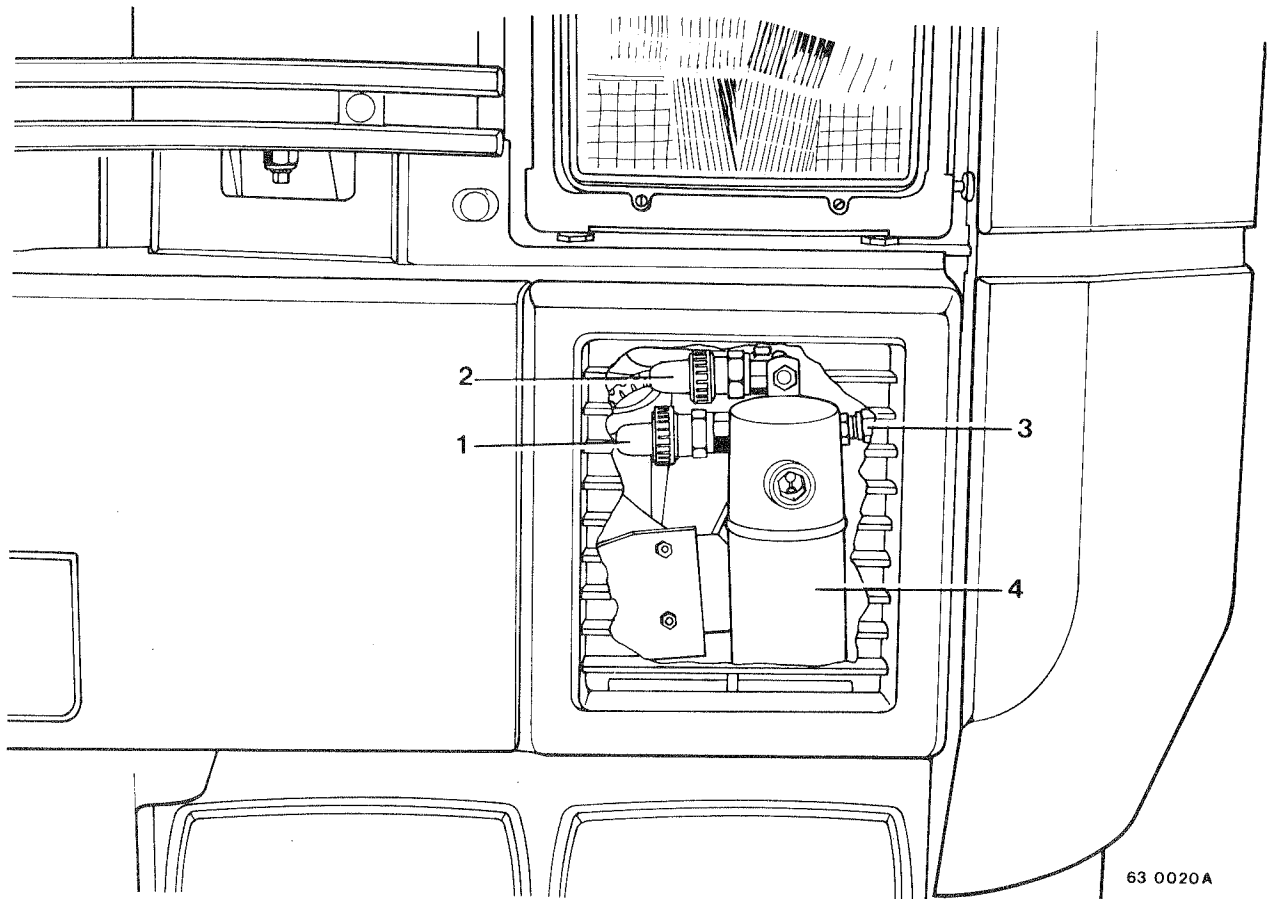
It is absolutely essential to replace all the seals.

Assemble the unions (**see page G2**).

**R12 fluid** : Connect switches (1-2).

**R134a fluid** : Connect switch (1).

Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).



63 0020 A

## LH drive

### To remove

Open the master switch to cut off the electrical power supply.  
Drain the chilling circuit and save the fluid (**see page H**).

**R12 fluid** : Mark, then disconnect switches (1-2).

**R134a fluid** : Disconnect switch (1).

Disconnect tubes (3).

Take off the O-rings.

Remove dehydrator filter (4).

### To fit

Fit dehydrator filter (4).

Fit the screws. Tighten at the specified torque.

Connect tubes (3).

It is absolutely essential to replace all the seals.

Assemble the unions (**see page G2**).

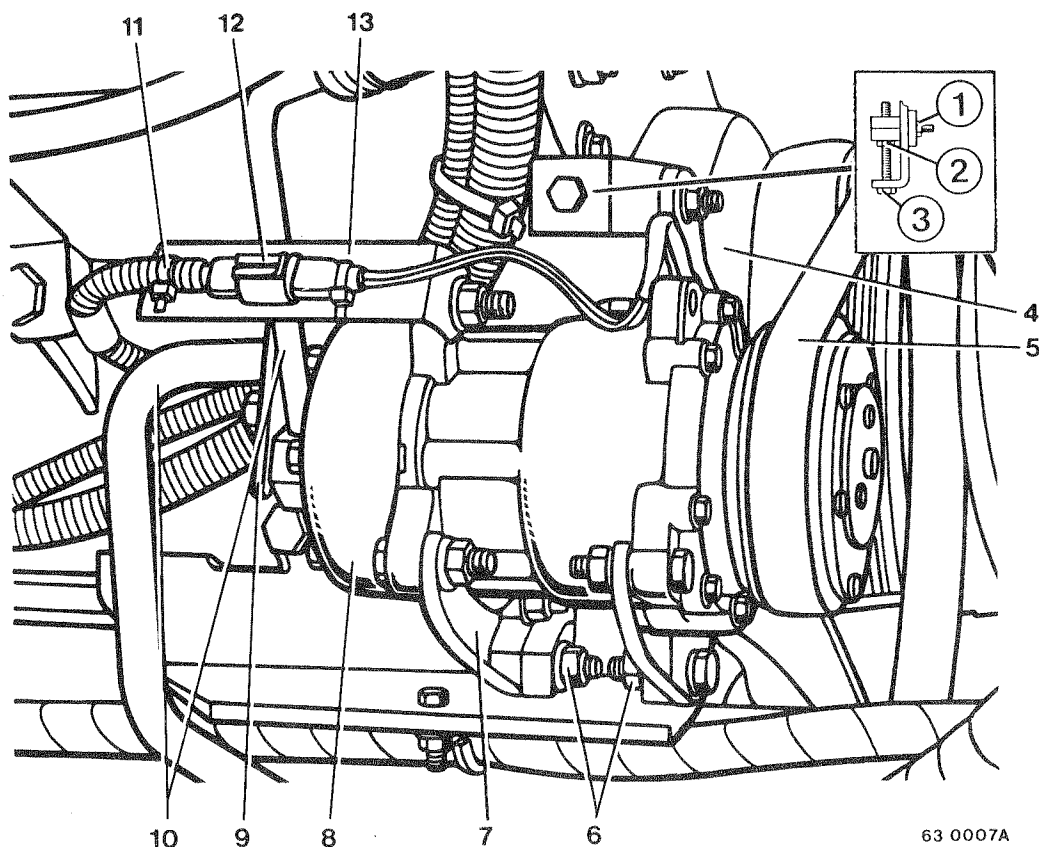
**R12 fluid** : Connect switches (1-2).

**R134a fluid** : Connect switch (1).

Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).



**COMPRESSOR CLUTCH**



63 0007A

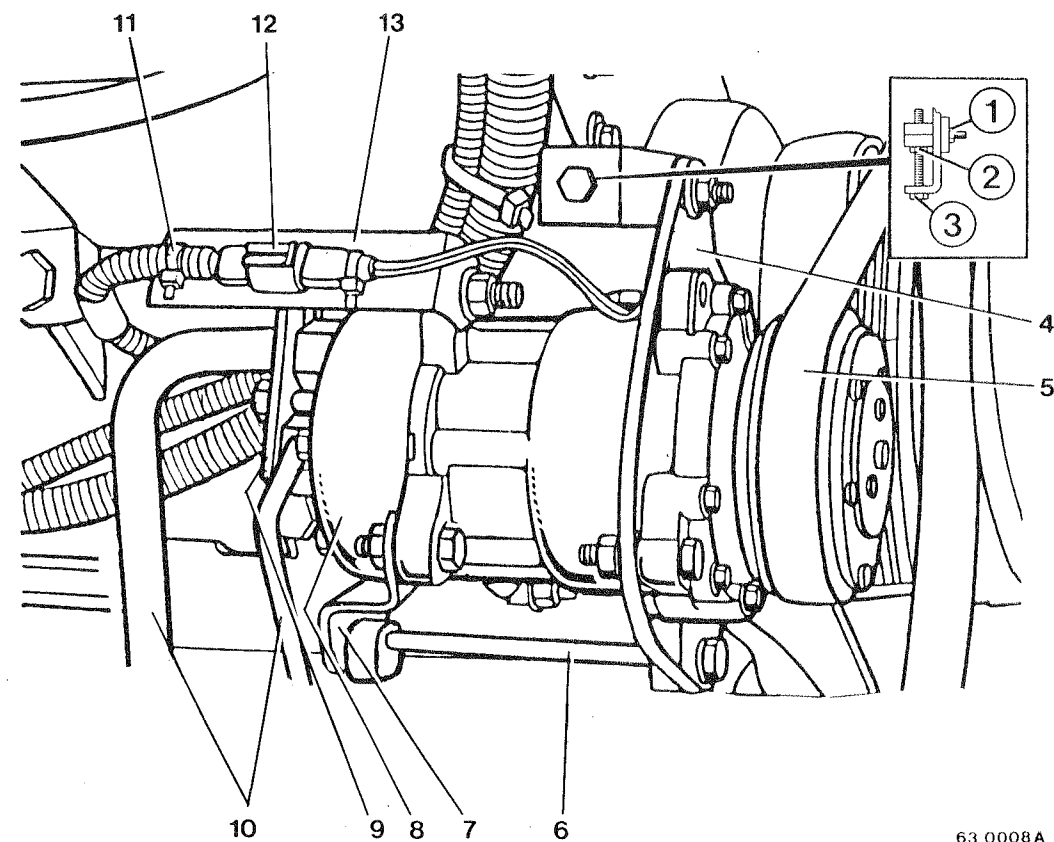
## E9 engine

### To remove

- Open the master switch to cut off the electrical power supply.
- Drain the chilling circuit and save the fluid (**see chapter H**).
- Cut clamp **(11)**.
- Unplug connector **(12)**.
- Loosen nuts and bolts **(1-2-3)**.
- Remove drive belt **(5)**.
- Remove flange clip **(9)**.
- Withdraw pipes **(10)**.
- Take off the O-rings.
- Remove nut and bolts **(1-6)**.
- Remove compressor **(8)**.
- Remove fittings **(4-7-13)**.

### To fit

- The compressor is supplied with the correct quantity of oil.
- As safety precaution, check the oil level (**see page F4**).
- Fit fittings **(4-7-13)**.
- Fit compressor **(8)**.
- Fit nuts and bolts **(1-6)**.
- Fit drive belt **(5)**.
- Tension drive belt **(5)**. Turn screw **(3)** to adjust.
- Tighten nuts and bolts **(1-2-6)** at the specified torque.
- Fit pipes **(10)**. It is absolutely essential to replace all the seals.
- Fit flange clip **(9)**.
- Fit the screw. Tighten at the specified torque.
- Plug in connector **(12)**.
- Fit clamp **(11)**.
- Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).



63 0008A

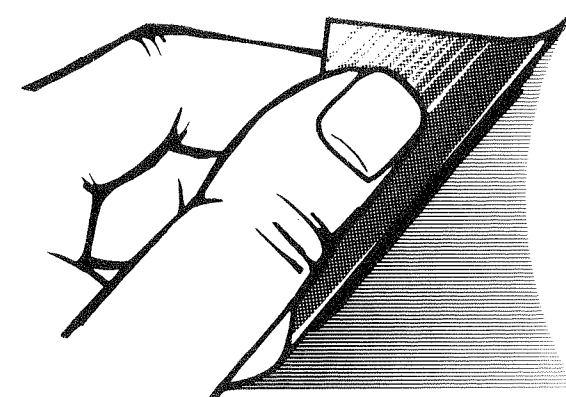
### 06.35.40 engine

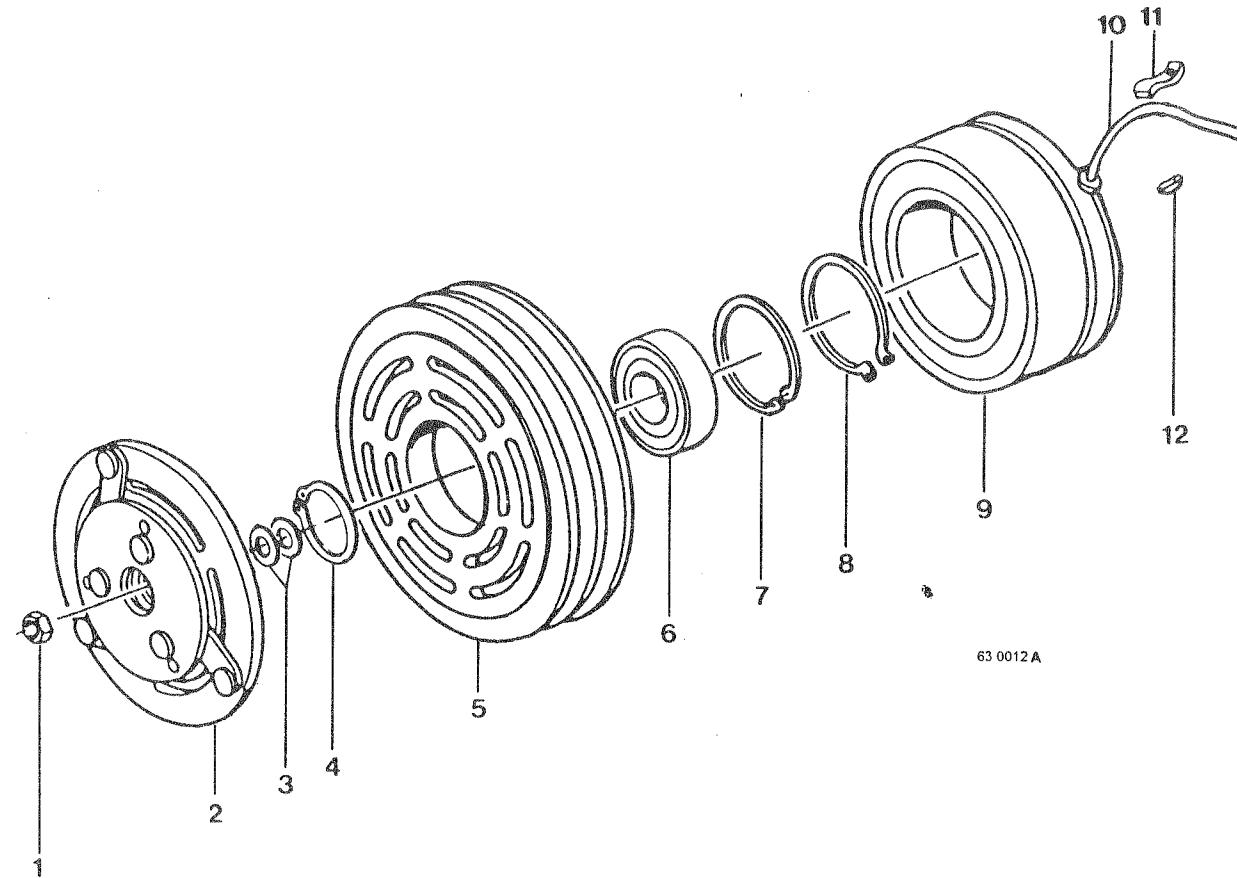
#### To remove

- Open the master switch to cut off the electrical power supply.
- Drain the chilling circuit and save the fluid (**see chapter H**).
- Cut clamp (11).
- Unplug connector (12).
- Loosen nuts and bolts (1-2-3).
- Remove drive belt (5).
- Remove flange clip (9).
- Withdraw pipes (10).
- Take off the O-rings.
- Remove nut and bolts (1-6).
- Remove compressor (8).
- Remove fittings (4-7-13).

#### To fit

- The compressor is supplied with the correct quantity of oil.
- As safety precaution, check the oil level (**see page F4**).
- Fit fittings (4-7-13).
- Fit compressor (8).
- Fit nuts and bolts (1-6).
- Fit drive belt (5).
- Tension drive belt (5). Turn screw (3) to adjust.
- Tighten nuts and bolts (1-2-6) at the specified torque.
- Fit pipes (10). It is absolutely essential to replace all the seals.
- Fit flange clip (9).
- Fit the screw. Tighten at the specified torque.
- Plug in connector (12).
- Fit clamp (11).
- Fill the chilling circuit with the correct quantity of refrigerant oil (**see chapter H**).

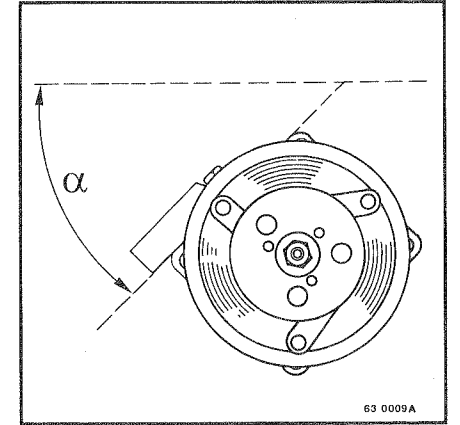




63 0012 A

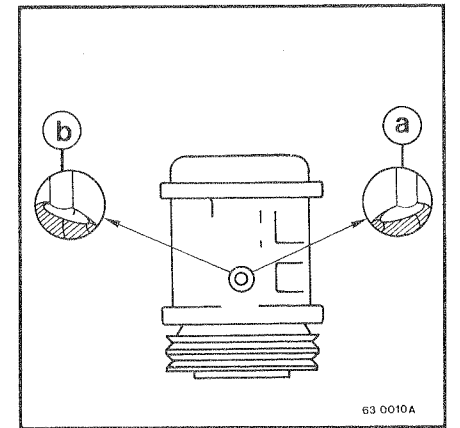
**To check the oil level**

It is necessary to check the oil level in the event of leakage or total loss of the chilling fluid.  
Determine the angle of assembly of the compressor.  
Use an angle gauge.



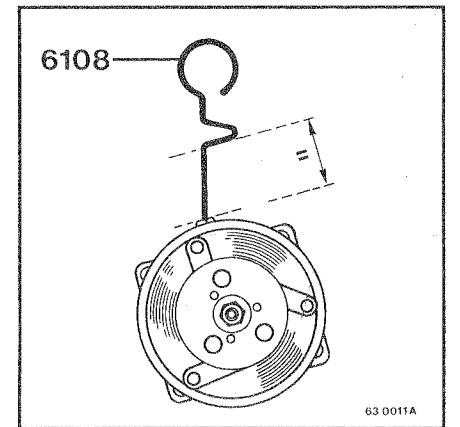
63 0009 A

When the compressor is inclined towards the left, rotate the shaft until internal part (a) appears.  
When the compressor is inclined towards the right, rotate the shaft until internal part (b) appears.



63 0010 A

Insert dipstick N° 6108 into the port, with the bend opposing the angle of inclination of the compressor and parallel to the compressor. Withdraw the dipstick and count the graduations in order to determine the oil level according to the table below :

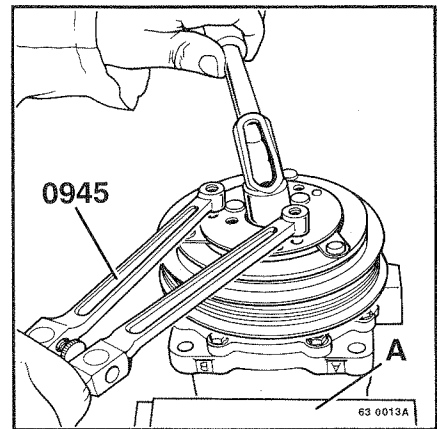


63 0011 A

Angle of inclination in °	Number of graduations
0	3 → 5
10	4 → 6
20	5 → 7
30	6 → 8
40	7 → 9
50	8 → 10
60	9 → 11
90	10 → 13

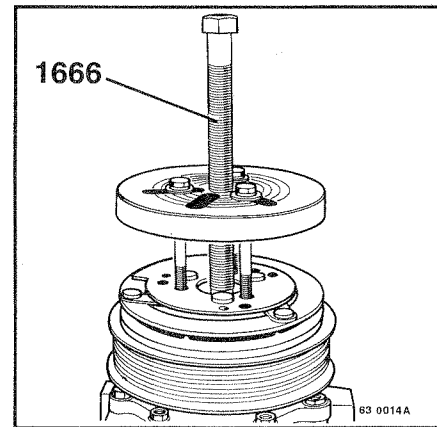
**CLUTCH****To disassemble**

In a vice, use some means of protection (A).  
 Remove nut (1).  
 Use tool N° 0945.



Remove disc (2).  
 Use tool N° 1666.

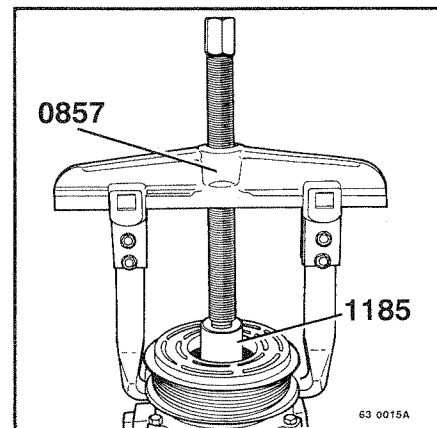
Save shims (3).



Withdraw retaining ring (4).  
 Remove pulley (5).  
 Use tool N° 0857 + 1185.

Remove clamp (11).  
 Withdraw wire (10).  
 Withdraw retaining ring (8).  
 Remove coil (9).

Withdraw retaining ring (7).  
 Extract bearing (6).  
 Use a tube.  
 Use a press.

**To assemble**

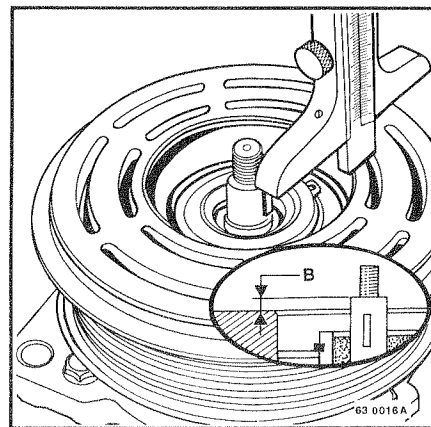
Install bearing (6).  
 Use a tube.  
 Use a press.  
 Install retaining ring (7).

Fit coil (9).  
 Respect the direction of orientation.  
 Install retaining ring (8).  
 Install wire (10).  
 Fit clamp (11).

Assemble pulley (5).  
 Use a tube.  
 Install retaining ring (4).

### To adjust

Measure dimension (B).



Measure dimensions (C / D).

Determine the thickness E of shims (3).

$$E = (0.6 + B) - (C - D)$$

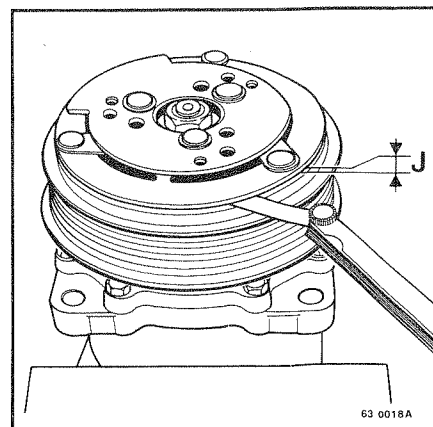
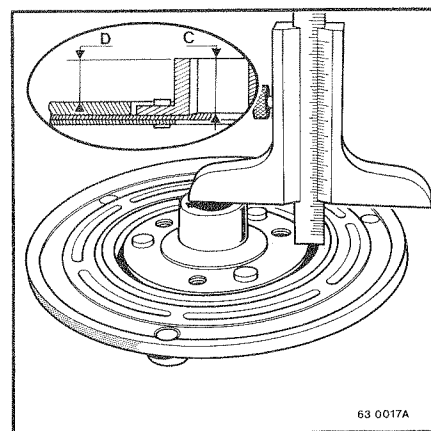
(Spare parts value : 1 - 0.5 - 0.12 mm)

Insert shims (3).

Replace key (12), if necessary.  
 Fit disc (2).  
 Screw up nut (1).  
 Tighten at the recommended torque (30 N.m).  
 Use tool N° 0945 (see page F5).

Inspect clearance (J).

$$J = 0.4 \rightarrow 0.8 \text{ mm}$$



**FLEXIBLE PIPES AND UNIONS**

### To change a damaged flexible pipe

Always replace a flexible pipe with one of the same length, with identical cross-section and conforming to international standards **SAE J 51B** or **NF R 18.701**.

Before removing a damaged flexible pipe, mark its routing and its fastenings.

After replacing a flexible pipe, fill the chilling circuit with the correct quantity of refrigerant oil (see chapter H).

### To assemble unions

Degrease the union screw-thread (1) and smear with "OMNIFIT 10".

Install a new O-ring (2).

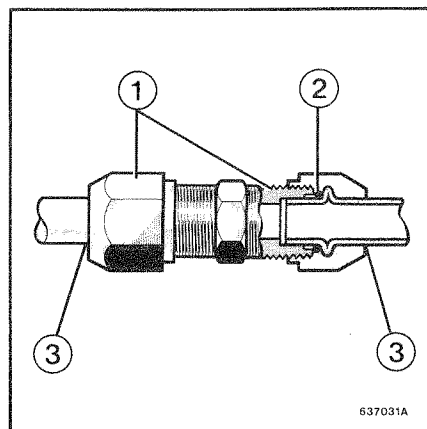
Assemble the union by hand until both parts make contact and tighten at the recommended torque (see table below).

If tightening to the recommended torque is impossible on account of problems of restricted access, lock the nuts by 1/6th to 1/3rd of a turn maximum, using two spanners, so as not to kink the pipes.

Overtightening will cause irreparable damage to the seal with risk of leakage.

In all cases, the leak will occur at point (3) at the base of the union.

Each time after changing a flexible pipe, test for leaks.



Module	Tightening torque (N.m)	
	Steel-brass	Steel-Steel
6	16 → 23	20 → 26
8	27 → 32	40 → 46
10	28 → 34	42 → 48
12	30 → 37	44 → 53



**CHILLING FLUID CIRCUIT**

### ENVIRONMENTAL PROTECTION

Destruction of the ozone layer by chlorofluorocarbons ("CFCs"), which are the active ingredient of chilling fluids, has led the public authorities to sign an international agreement (**Montreal Protocol**) in order to limit the use and production of certain CFCs and forbid their discharge into the atmosphere.

A fluid which has been in operation in an installation has been fouled by oil, overheating and impurities (such as: carbon deposits, iron filings, etc...). Such a fluid cannot be re-used in that state and must be treated.

Automatic "**PUROZONE**" units have been specially designed for recuperating CFCs from air conditioners. Such units serve to either package the fluids in special packs made available by chilling fluid distributors, or recycle the fluids and re-inject them into installations.

**RENAULT V.I.** has officially approved several types of appliances.

### Refrigerant oil

Whatever the type of appliance, the oil necessary for lubricating the compressor is recuperated.

This especially applies if the installation was in operation just before the intervention.

#### **IMPORTANT**

*Re-inject the same quantity of oil as that recuperated from the circuit at the time of transfer.*

*A higher quantity of oil will lead to a fall in efficiency of some 10 to 20 %. A lower quantity will lead to damage to the compressor.*

When replacing a circuit component, add the following extra amounts of oil :

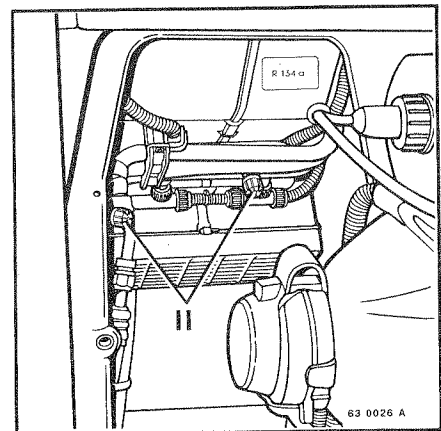
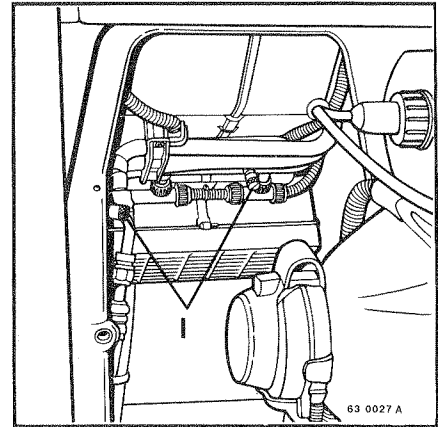
- Filter = **10 ml**
- Piping = **10 ml**
- Condenser = **20 ml**
- Evaporator = **20 ml**

### Chilling fluid

- I 1/4 union = R12
- II 3/8 union = R134a

### Operations

- 1 - Connect up the charging station.
  - . Remove the blanking plugs.
  - . Connect the conical valve plug clips on the vehicle:
    - . Male union on the small pipe.
    - . Female union on the large pipe.
  - . Connect the red and blue flexible pipes.
  - . Withdraw the conical valve plugs.
- 2 - Recuperate the chilling fluid.
- 3 - Repair the component in question.
- 4 - Exhaust the vacuum (30 minutes).
- 5 - Hold the vacuum.
- 6 - Partially charge the circuit (300 grams approx.).
- 7 - Test for leaks.
- 8 - Recuperate the chilling fluid (the 300 grams).
- 9 - Replace the dehydrator/filter.
- 10 - Exhaust the vacuum (45 minutes).
- 11 - Top up with refrigerant oil.
- 12 - Charge the circuit.
- 13 - Disconnect the charging station.
  - . Screw up the conical valve plugs.
  - . Close the valves.
  - . Remove the conical valve plug clips.
  - . Screw up the blanking plugs.



For operation and maintenance of the appliance, consult the manufacturer's manual.

### Periodically checking the charge

Each chilling circuit of the vehicle must be checked out approximately once a month during the in-service period and especially just before the annual utilization period.

The circuit must also be checked out in the event of irregularity in operation of the system.

Connect up two pressure gauges or a charging station.

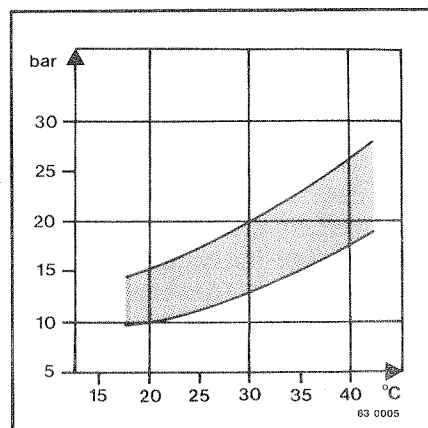
Start the engine and run at a speed of **1000 to 2000 rpm**.

Start up the chilling system, move the control to the "maximum cold" position.

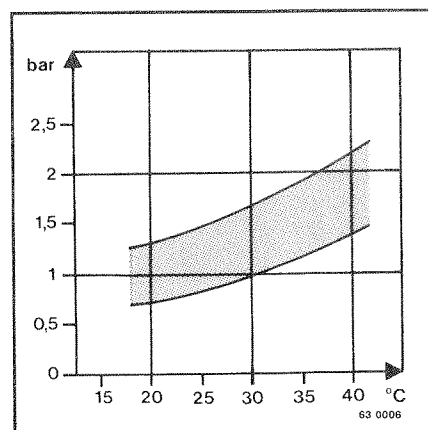
Operation is correct when the pressures lie within the curves shown hereafter, which depend on the ambient exterior temperature.

If the pressures are insufficient, it is possible to proceed with partial charging of the circuit in gaseous phase or regenerate the chilling fluid and charge as required.

### High pressure curve



### Low pressure curve



**TROUBLESHOOTING DIAGNOSTICS AND TESTING**

DEFECT NOTED	PROBABLE CAUSE	REMEDY
<p><b>1</b></p> <p>The system does not cool.</p>	<p>Fuse defective</p> <p>Electrical installation defective</p> <p>Clutch defective</p> <p>Compressor partially or completely seized</p> <p>Expansion valve defective</p> <p>Dehydrator filter obstructed</p> <p>No chilling fluid in circuit</p> <p>Air filter obstructed</p>	<p>Replace the fuse.</p> <p>Test the line.</p> <p>Change the defective clutch components.</p> <p>Change the compressor.</p> <p>Change the expansion valve.</p> <p>Change the filter.</p> <p>Change the defective component and recharge the circuit.</p> <p>Clean or change the filter.</p>
<p><b>2</b></p> <p>The system does not cool sufficiently.</p>	<p>Air flow incorrect</p> <p>Drive belt slack</p> <p>Clutch slipping</p> <p>Condenser obstructed</p> <p>Dehydrator filter partially obstructed</p> <p>Excessive humidity in circuit</p> <p>Insufficient chilling fluid</p> <p>Expansion valve sensor malfunction</p> <p>Air filter partially obstructed</p>	<p>Check out the motor/fan unit.</p> <p>Tension the drive belt.</p> <p>Change the defective clutch components.</p> <p>Clean the condenser.</p> <p>Change the filter.</p> <p>Drain the circuit, save the fluid, change the filter, recharge the circuit.</p> <p>Top up with chilling fluid.</p> <p>Change the expansion valve.</p> <p>Clean or change the filter.</p>
<p><b>3</b></p> <p>The system cools intermittently.</p>	<p>Electrical installation or control defective</p> <p>Evaporator iced up</p> <p>Temperature variator set at maximum</p>	<p>Perform DIAGNOSTICA test.</p> <p>Check the defrosting sensor. Perform DIAGNOSTICA test.</p> <p>Lower the variator setting.</p>
<p><b>4</b></p> <p>The system is noisy.</p>	<p>Motor/ fan unit impeller</p> <p>Excessive humidity in circuit</p>	<p>Change the fan/motor unit.</p> <p>Drain the circuit, save the fluid, change the filter, recharge the circuit.</p>

DEFECT NOTED	PROBABLE CAUSE	REMEDY
5 The compressor is noisy.	Drive belt worn or slack Clutch defective Oil level insufficient Compressor seized Excessive chilling fluid or ingress of air into circuit	Tension or change the drive belt. Change the defective clutch components. Drain the circuit, save the fluid, change the filter, recharge the circuit. Change the compressor. Check the charge. Drain the circuit, save the fluid, change the filter, recharge the circuit.
6 Abnormal circuit overheating.	Engine ventilation defective Condenser obstructed Ingress of air into circuit Excessive humidity in circuit	Check the ventilation. Clean the condenser. Drain the circuit, save the fluid, change the filter, recharge the circuit.
7 Insufficient high pressure.	Insufficient chilling fluid Chilling fluid leak Expansion valve seized (open) Compressor defective	Top up with chilling fluid. Detect the leak, drain the circuit, save the fluid, change the filter, recharge the circuit. Change the expansion valve. Change the compressor.
8 Excessive high pressure.	Condenser obstructed Excessive chilling fluid Expansion valve seized (closed) Ingress of air into circuit Dehydrator filter obstructed	Clean the condenser. Check the filling charge. Change the expansion valve. Drain the circuit, save the fluid, change the filter, recharge the circuit. Change the filter.
9 Insufficient low pressure.	Dehydrator filter obstructed Circuit charge insufficient Low pressure circuit leak Excessive humidity in circuit Evaporator fouled Expansion valve seized (closed)	Change the filter. Recharge the circuit. Find the leak, drain the circuit, save the fluid, change the filter, recharge the circuit. Drain the circuit, save the fluid, change the filter, recharge the circuit. Clean the evaporator. Change the expansion valve.

DEFECT NOTED	PROBABLE CAUSE	REMEDY
<p><b>10</b></p> <p>Excessive low pressure.</p>	<p>Excessive humidity in circuit</p> <p>Expansion valve seized (open)</p> <p>Defrosting sensor defective</p>	<p>Drain the circuit, save the fluid, change the filter, recharge the circuit.</p> <p>Change the expansion valve.</p> <p>Perform DIAGNOSTICA test.</p>
<p><b>11</b></p> <p>Temperature diffused by air conditioner not corresponding to desired temperature when temperature variator in blue zone</p>	<p>Air distribution control (X) in "Defrosting" position</p> <p>Solenoid valve malfunction</p> <p>Air conditioner control (AM) not actuated</p> <p>Air conditioner broken down</p>	<p>Move the air distribution control.</p> <p>Perform DIAGNOSTICA test.</p> <p>Actuate the air conditioner control.</p> <p>Refer to steps 1 to 10.</p>
<p><b>12</b></p> <p>Temperature diffused by air conditioner not corresponding to desired temperature when temperature variator in white zone</p>	<p>Air distribution control (X) in "Defrosting" position</p> <p>Solenoid valve malfunction</p>	<p>Move the air distribution control.</p> <p>Perform DIAGNOSTICA test.</p>
<p><b>13</b></p> <p>Temperature diffused by air conditioner not corresponding to desired temperature when temperature variator in red zone</p>	<p>Engine not yet at normal operating temperature</p> <p>Incorrect coolant circulation</p> <p>Air conditioner radiator scaled</p> <p>Solenoid valve malfunction</p>	<p>Let the engine run.</p> <p>Check the coolant circuit.</p> <p>Clean the radiator.</p> <p>Perform DIAGNOSTICA test.</p>
<p><b>14</b></p> <p>Air distribution diffused not corresponding to desired air distribution when control is in "Defrosting" position</p>	<p>Motor, wiring harness, electronic control unit</p> <p>Air distribution flap jammed or jams during self-calibration</p>	<p>Perform DIAGNOSTICA test.</p> <p>Visually check the air flap.</p>



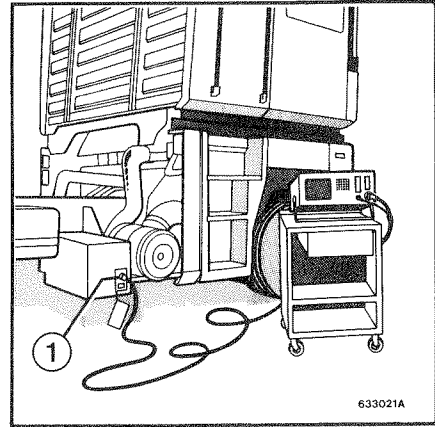
DEFECT NOTED	PROBABLE CAUSE	REMEDY
<p><b>15</b></p> <p>Air distribution diffused not corresponding to desired air distribution when control is in "Air vents" position</p>	<p>Motor, wiring harness, electronic control unit</p> <p>Air distribution flap jammed or jams during self-calibration</p>	<p>Perform DIAGNOSTICA test.</p> <p>Visually check the air flap.</p>
<p><b>16</b></p> <p>Air distribution diffused not corresponding to desired air distribution when control is in "Air vents/Footwell" position</p>	<p>Motor, wiring harness, electronic control unit</p> <p>Air distribution flap jammed or jams during self-calibration</p> <p>Footwell air vents control (X) malfunction</p>	<p>Perform DIAGNOSTICA test.</p> <p>Visually check the air flap.</p> <p>Check the control cable.</p>
<p><b>17</b></p> <p>Air distribution diffused not corresponding to desired air distribution when control is in "Windscreen/Footwell" position</p>	<p>Motor, wiring harness, electronic control unit</p> <p>Air distribution flap jammed or jams during self-calibration</p> <p>Footwell air vents control (X) malfunction</p>	<p>Perform DIAGNOSTICA test.</p> <p>Visually check the air flap.</p> <p>Check the control cable.</p>
<p><b>18</b></p> <p>Ventilation insufficient</p>	<p>Fuses F17 and F30 Relay (4557) Ventilation control Motor</p> <p>Air filter clogged</p> <p>Evaporator fouled</p>	<p>Perform DIAGNOSTICA test.</p> <p>Replace the air filter.</p> <p>Clean the evaporator.</p>
<p><b>19</b></p> <p>Cab air recycling inoperative</p>	<p>Air distribution control (X) in "Defrosting" position</p> <p>Switch (AL) Motor, wiring harness, electronic control unit</p> <p>Air recycling flaps jammed</p>	<p>Move the air distribution control.</p> <p>Perform DIAGNOSTICA test.</p> <p>Visually check the air flaps.</p>

### Electrical and electronic trouble

Find the reason for electrical and electronic malfunctions using the "DIAGNOSTICA" test case plugged into socket (1) (see pages 17 → 18).

### Mechanical trouble

Find the reason for mechanical malfunctions by means of visual checks and with the help of the "Troubleshooting and Testing" diagnostics procedure (see pages 12 → 15).



### Resistances of sensors in Ohms as a function of temperatures in °C

Temp.	Interior sensor		Exterior sensor		Blown air sensor		Defrosting sensor	
	Min.	Max.	Min.	Max.	Min.	Max.	Mín.	Máx.
- 40					331 000	422 900		
- 30	141 610	212 410			174 800	217 600		
- 25			10 940	13 680				
- 20	81 190	119 420	7 020	10 220	95 460	115 900		
- 10	48 040	64 650	4 280	5 850	53 920	63 980		
- 5							11 421	11 935
0	29 270	37 250	2 690	3 460	31 510	36 580	8 820	9 180
5							6 831	7 167
10	18 550	21 820	1 740	2 110	19 040	21 650	5 353	5 617
15							4 200	4 460
20	11 850	13 290	1 150	1 320	11 880	13 250	3 329	3 557
25	9 500	10 500	950	1 050	9 500	10 500	2 657	2 855
30	7 620	8 370	760	870	7 583	8 456		
40	4 930	5 440	490	600	4 942	5 604		
50	3 210	3 640	330	420	3 313	3 817		
60	2 100	2 500	220	300	2 280	2 665		
70	1 360	1 750	150	220	1 606	1 904		
80	910	1 250	110	160	1 156	1 387		
85			90	140				
90					847	1 029		
100					630	774		

## TESTING USING THE DIAGNOSTICA UNIT

Vehicle equipment

Vehicles : AE range

Diagnostics socket : Terminal 1 - diagnostics line

Electronics package : GKR supply

### Preliminary checks

System protection fuses.

Mechanical functioning of compressor, controls and air flaps.

Compressor drive belt.

Air inlet filter.

Chilling fluid level.

### Putting into service

Module MS 01 + connecting cables to diagnostics socket + memory card N° 4.

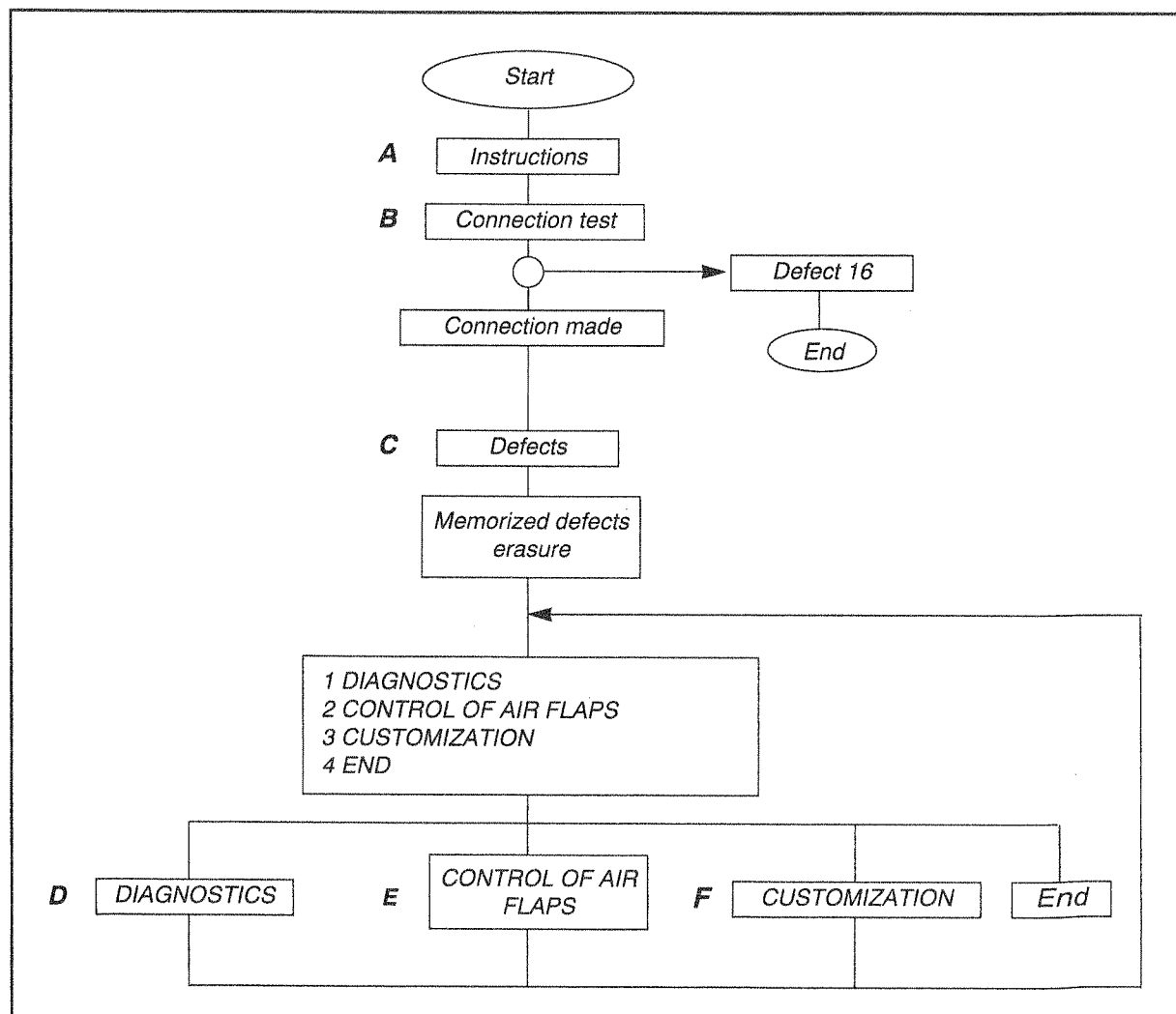
Plug the DIAGNOSTICA unit into the diagnostics socket, unit switch in the "BAT" position and close the master switch to switch on the vehicle electrics.

Press key "\*" to quit the display of screens 1 and 2.

### INTRODUCTION

Memory card N° 4 assures the maintenance functions for air conditioning systems on FR1 and AE vehicles by automatically detecting the type of box installed.

Maintenance operations run in stages according to the following process chart (for AE 1994) :



## A - Instructions

"Switch" on the ignition.

## B - Link-up test

To activate the diagnostics mode, DIAGNOSTICA establishes communication with the electronic control unit and identifies the type of box installed.

If the system is operating correctly :

- The message "link made" is displayed.
- The software version is displayed.
- The configuration of the box is indicated.
- The diagnostics mode is operational.

If not, "DEFECT 16" is indicated - follow the instructions to remedy the defect.

Diagnostics is impossible and the program is ended.

## C - Memorized defects

A symbolization page is displayed, presenting the different types of possible "defects" and their symbols.

The defects are presented in a table.

Presence of a defect is indicated by the display of a defect symbol opposite the wording concerned.

## Warning

Memorized defects are not necessarily present.

The program continues with automatic erasure of memorized defects.

## D - Diagnostics

Diagnostics begins with screen presenting the constituent parts of the system, which enables :

- defects to be visualized,
- access to be gained to the pages specific to each unit via the keyboard,
- system states to be visualized (contacts, position).

### D.1 - Air distribution motor

This procedure enables the air distribution function of the air conditioning system to be tested electrically. Diagnostics are run on the control, the set-point and the air distribution motor. Any defects are indicated.

### D.2 - Air recycling motor

This procedure enables the air recycling function of the air conditioning system to be tested electrically. Diagnostics are run on the control, the set-point and the air distribution motor. Any defects are indicated.

### D.3 - Aid-to-diagnostics

Symbolization screens are shown to the user in order to facilitate diagnostics.

## D - Control of air flaps

This procedure enables the air distribution and air recycling function of the air conditioning system to be tested mechanically. Tilt the cab, then use DIAGNOSTICA to control the air distribution flap and the air recycling flap, then check their mechanical travel visually.

## F - Customization

When replacing the box or physically changing the type of air conditioner on-vehicle, it is necessary to customize the box again.

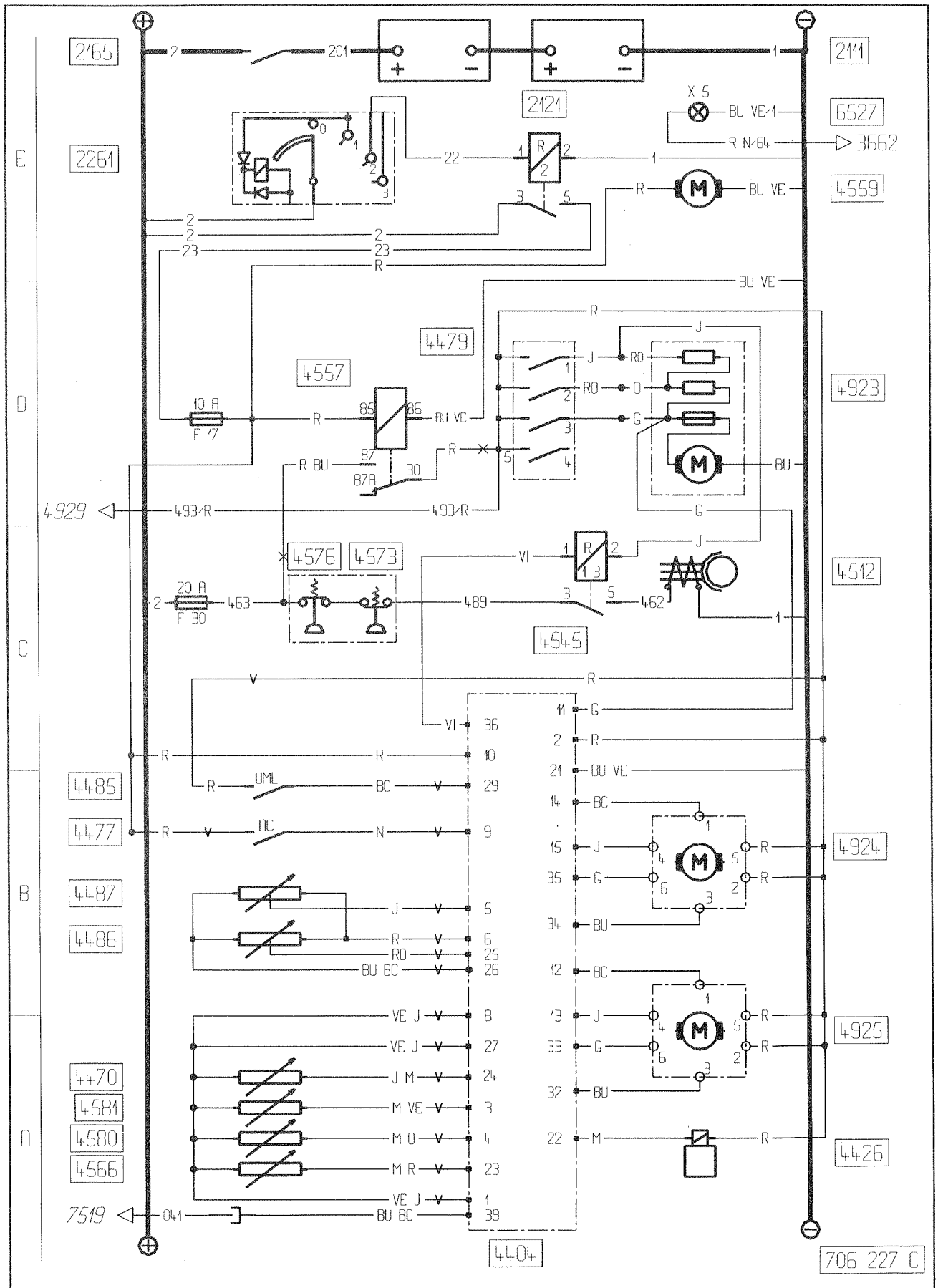
The box automatically detects the configuration installed on-board the vehicle.

It is essential to switch off the ignition, then switch it on again so that such customization is taken into account. The program then specifies the new customization of the box.

**ELECTRICAL DIAGRAMS**

**KEY TO DIAGRAM****AIR CONDITIONER WITH AUTOMATIC REGULATION**

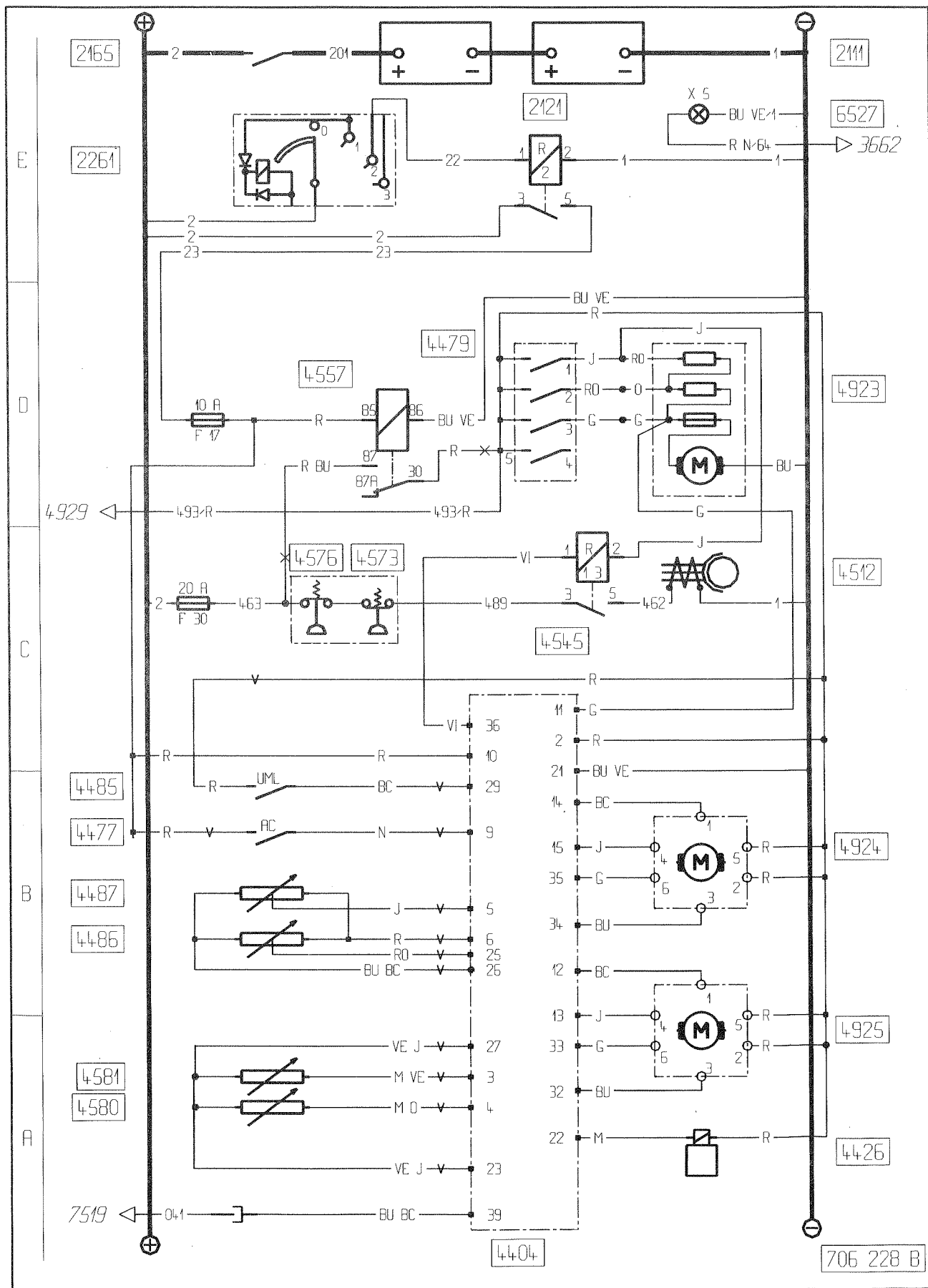
- 2111 – Batteries
- 2121 – After ignition power supply relay
- 2165 – Master switch
- 2261 – Steering column lock and starting control
- 3662 – Lighting relay
- 4404 – Regulation box
- 4426 – Main water circuit solenoid valve
- 4470 – Interior temperature sensor
- 4477 – Air conditioning control
- 4479 – Driving position ventilation control
- 4485 – Cab air recycling control
- 4486 – Air distribution control
- 4487 – Temperature variator
- 4512 – Compressor
- 4545 – Air conditioning relay
- 4557 – Ventilation relay
- 4559 – Interior temperature sensor fan
- 4566 – Exterior temperature sensor
- 4573 – LP pressure controller
- 4576 – HP pressure controller
- 4580 – Blown air temperature sensor
- 4581 – Defrosting sensor
- 4923 – Motor/fan unit
- 4924 – Air recycling flap and exterior air flap motor
- 4925 – Air distribution flap (e) motor
- 4929 – Ventilation reversing relay (with independent heating)
- 6527 – Switch lighting
- 7519 – Diagnostics socket



**KEY TO DIAGRAM****AIR CONDITIONER WITH MANUAL REGULATION**

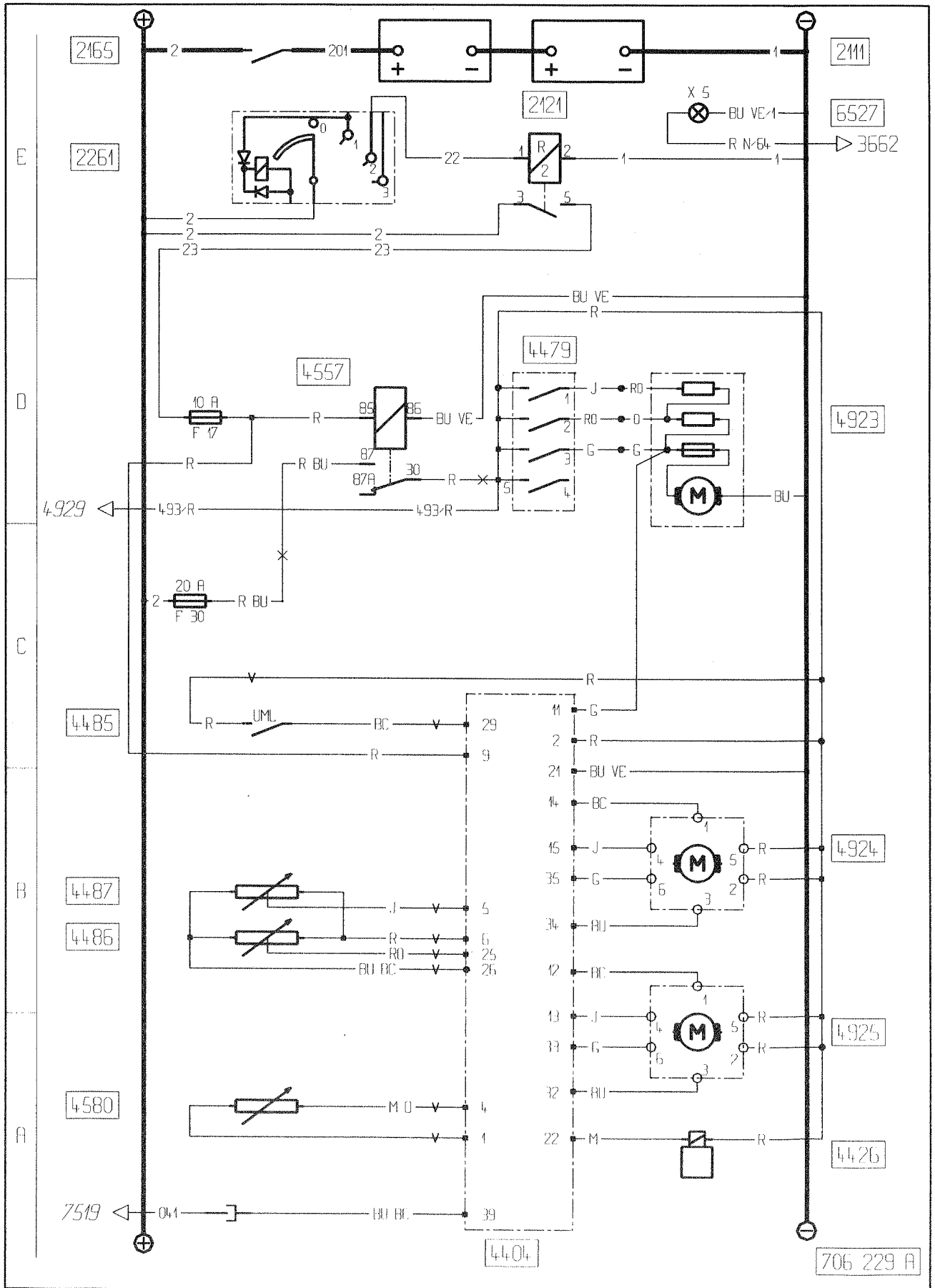
- 2111 – Batteries
- 2121 – After ignition power supply relay
- 2165 – Master switch
- 2261 – Steering column lock and starting control
- 3662 – Lighting relay
- 4404 – Regulation box
- 4426 – Main water circuit solenoid valve
- 4477 – Air conditioning control
- 4479 – Driving position ventilation control
- 4485 – Cab air recycling control
- 4486 – Air distribution control
- 4487 – Temperature variator
- 4512 – Compressor
- 4545 – Air conditioning relay
- 4557 – Ventilation relay
- 4573 – LP pressure controller
- 4576 – HP pressure controller
- 4580 – Blown air temperature sensor
- 4581 – Defrosting sensor
- 4923 – Motor/fan unit
- 4924 – Air recycling flap and exterior air flap motor
- 4925 – Air distribution flap (e) motor
- 4929 – Ventilation reversing relay (with independent heating)
- 6527 – Switch lighting
- 7519 – Diagnostics socket





**KEY TO DIAGRAM****CAB HEATING**

- 2111 – Batteries
- 2121 – After ignition power supply relay
- 2165 – Master switch
- 2261 – Steering column lock and starting control
- 3662 – Lighting relay
- 4404 – Regulation box
- 4426 – Main water circuit solenoid valve
- 4479 – Driving position ventilation control
- 4485 – Cab air recycling control
- 4486 – Air distribution control
- 4487 – Temperature variator
- 4557 – Ventilation relay
- 4580 – Blown air temperature sensor
- 4923 – Motor/fan unit
- 4924 – Air recycling flap and exterior air flap motor
- 4925 – Air distribution flap (e) motor
- 4929 – Ventilation reversing relay (with independent heating)
- 6527 – Switch lighting
- 7519 – Diagnostics socket



**WIRING DIAGRAM****AUTOMATIC REGULATION**

- 1117 – Control board
- 2111 – Batteries
- 2121 – After ignition power supply relay
- 2165 – Master switch
- 2261 – Steering column lock and starting control
- 3662 – Lighting relay
- 4404 – Regulation box
- 4426 – Main water circuit solenoid valve
- 4470 – Interior temperature sensor
- 4477 – Air conditioning control
- 4479 – Driving position ventilation control
- 4485 – Cab air recycling control
- 4486 – Air distribution control
- 4487 – Temperature variator
- 4521 – Electromagnetic clutch - Compressor
- 4545 – Air conditioning relay (R13)
- 4550 – Air conditioner
- 4557 – Ventilation relay
- 4559 – Interior temperature sensor fan
- 4566 – Exterior temperature sensor
- 4573 – LP pressure controller
- 4576 – HP pressure controller
- 4580 – Blown air temperature sensor
- 4581 – Defrosting sensor
- 4923 – Motor/fan unit
- 4924 – Air recycling flap and exterior air flap motor
- 4925 – Air distribution flap (e) motor
- 4929 – Ventilation reversing relay (with independent heating)
- 6527 – Switch lighting
- 7519 – Diagnostics socket

B1, B7, B10, B15, BX2, H5, H6, H15, H16, PVT, X1, X2 : Connectors



**WIRING DIAGRAM****CAB HEATING**

- 1117 – Control board
- 2111 – Batteries
- 2121 – After ignition power supply relay
- 2165 – Master switch
- 2261 – Steering column lock and starting control
- 3662 – Lighting relay
- 4404 – Regulation box
- 4426 – Main water circuit solenoid valve
- 4479 – Driving position ventilation control
- 4485 – Cab air recycling control
- 4486 – Air distribution control
- 4487 – Temperature variator
- 4550 – Air conditioner
- 4557 – Ventilation relay
- 4580 – Blown air temperature sensor
- 4923 – Motor/fan unit
- 4924 – Air recycling flap and exterior air flap motor
- 4925 – Air distribution flap (e) motor
- 4929 – Ventilation reversing relay (with independent heating)
- 6527 – Switch lighting
- 7519 – Diagnostics socket

B1, B7, B10, B15, BX2, H5, H6, H15, H16, PVI, X1, X2 : Connectors



## TOOLS

RENAULT V.I. divide tools into three categories :

- **General-purpose tools** : proprietary tools.
- **Special or specific tools** : specially created tools, distributed by the RENAULT V.I. "Spare Parts" division.
- **Locally manufactured tools** : tools that are easy to make.

Three levels (or echelons) determine their assignment :

- **LEVEL 1** : tools for servicing, maintenance and minor tasks.
- **LEVEL 2** : tools for major repairs.
- **LEVEL 3** : useful tools.

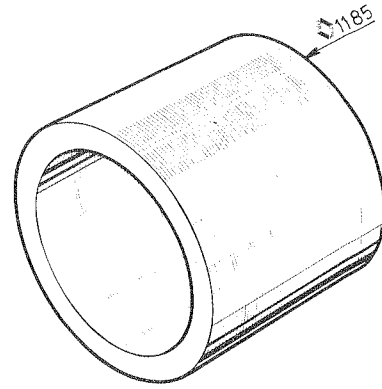
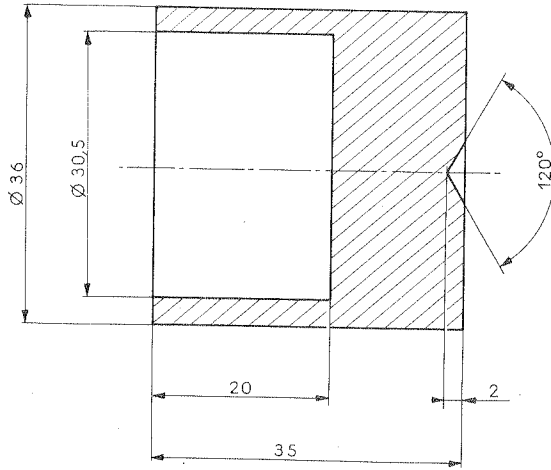
General-purpose tools				
Renault V.I. Ref. N°	Designation	Level	Qty	Page
50 00 26 0857	Puller	1	1	F5
50 00 26 0945	Wrench	1	1	F5

Special or specific tools				
Renault V.I. Ref. N°	Designation	Level	Qty	Page
50 00 26 1666	Puller	1	1	F5
50 00 26 7000	DIAGNOSTICA unit	2	1	I5
50 00 26 2003	Acquisition unit MS 01	2	1	
	Memory card n°4	2	1	

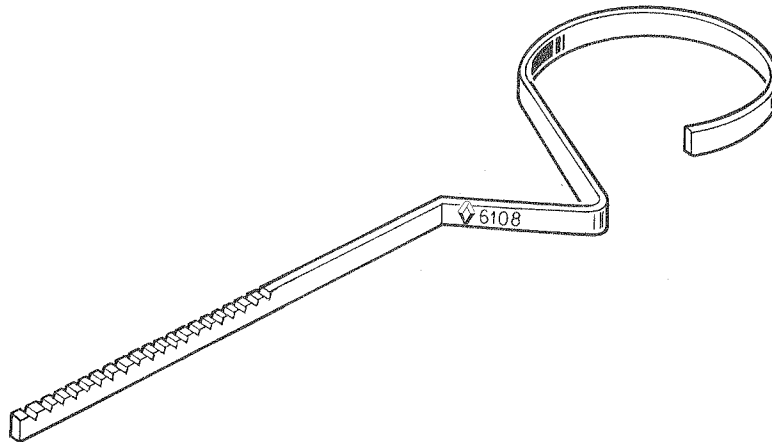
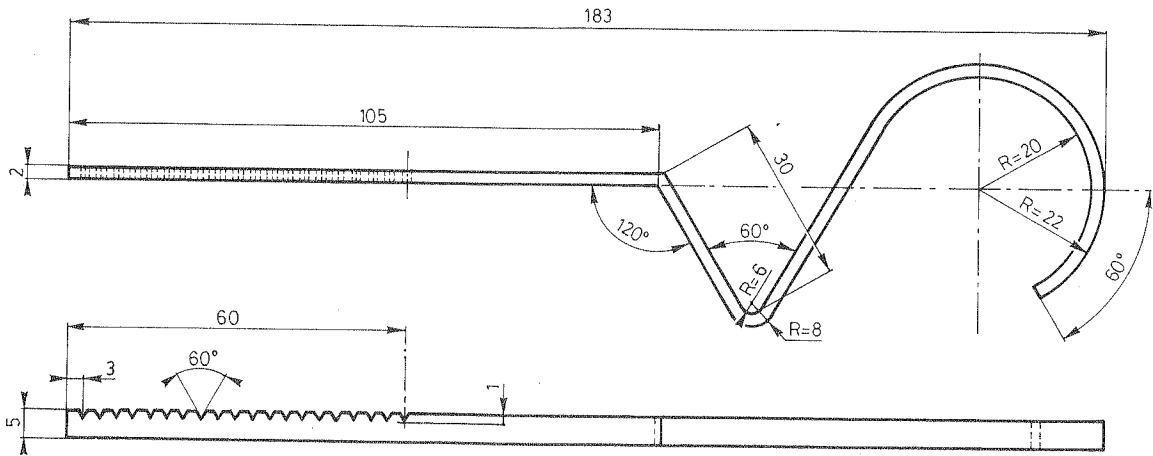
Locally manufactured tools				
Renault V.I. Ref. N°	Designation	Level	Qty	Page
50 00 26 1185	Puller	1	1	F5
50 00 26 6108	Wrench	1	1	F4



Locally manufactured tool



FL 1185



FL 6108

