

# RENAULT

## Technical Note 6001A

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### TTY

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## Air conditioning

**All types**

**General procedures**

**Edition 3**

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**77 11 327 562**

**AUGUST 2004**

**Edition Anglaise**

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# Air conditioning

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Some vehicles now have a climate control system combining the heating system (production of warm air) with the air conditioning system (production of cold air), to cope with the discomfort caused by weather conditions (heat waves, cold snaps, etc.).

The climate control system controls the passenger compartment's internal temperature as well as on the humidity level of the air to increase comfort for the occupants.

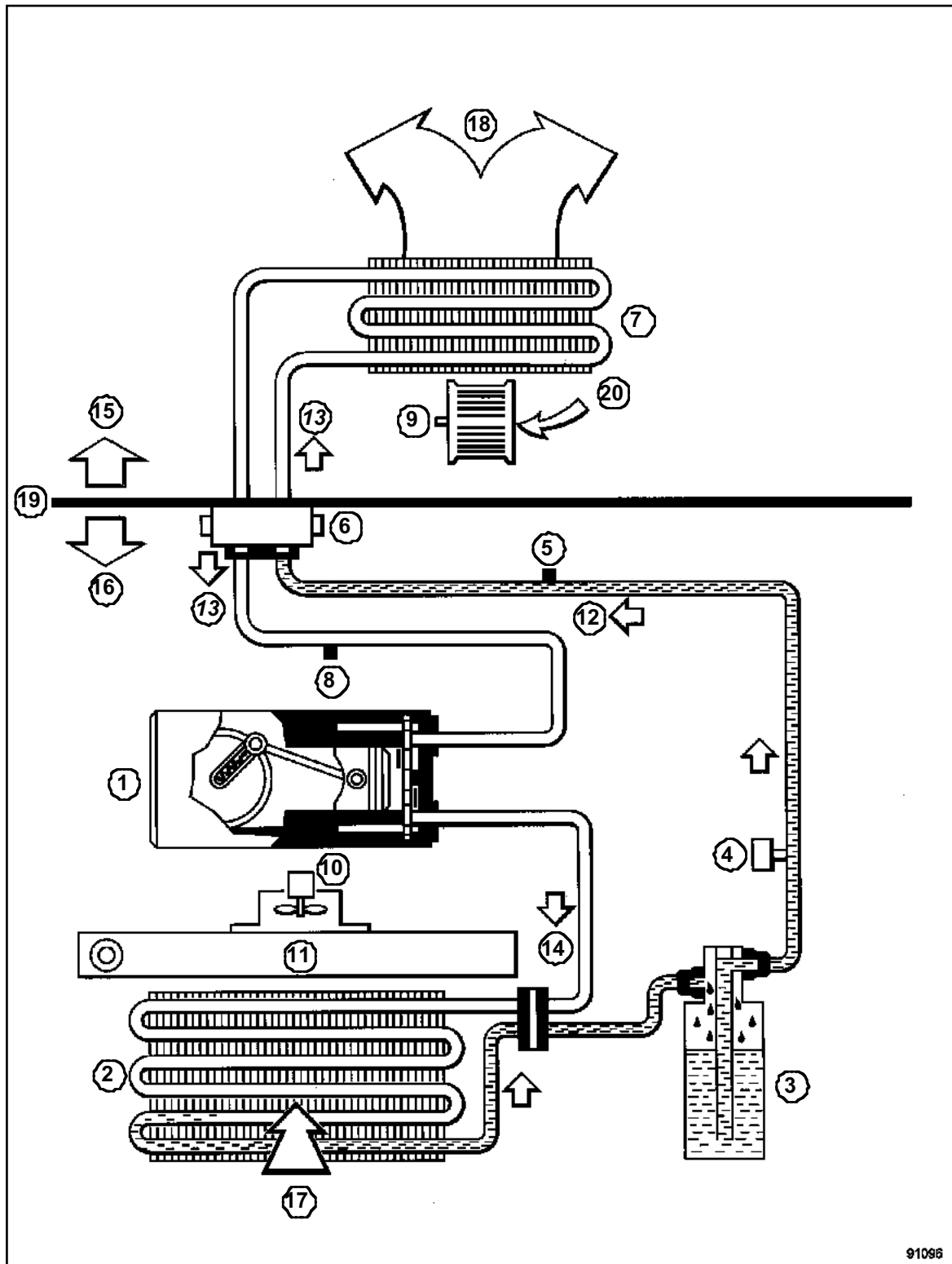
In some situations (prolonged parking in direct sunlight), the temperature can become difficult to bear or even present a genuine hazard. To obtain an acceptable comfort level quickly, evacuate the overheated air by leaving the doors open for a few minutes, then start the vehicle and activate the climate control; it can also be used to demist the windows more quickly in cold weather by drying the air.

### IMPORTANT

Never exceed a temperature difference between the exterior and interior of more than 20°C, as this could cause the occupants to catch cold.

### Note:

- Keep the windows closed when using the air conditioning to improve efficiency of the latter,
- Use air recirculation to supplement the air conditioning in very hot weather: however, only use air recirculation for a maximum of **10 minutes** since this function, though sometimes limited automatically, isolates the passenger compartment from the exterior by reusing the internal air, which thins the oxygen inhaled and increases the humidity level,
- Use the air conditioning regularly throughout the year to keep it in good condition.



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- |     |                      |      |                         |
|-----|----------------------|------|-------------------------|
| (1) | Compressor           | (6)  | Expansion valve         |
| (2) | Condenser            | (7)  | Evaporator              |
| (3) | Dehydration canister | (8)  | Low pressure valve      |
| (4) | Pressure sensor      | (9)  | Air conditioning blower |
| (5) | High pressure valve  | (10) | Engine cooling fan      |
|     |                      | (11) | Cooling radiator        |

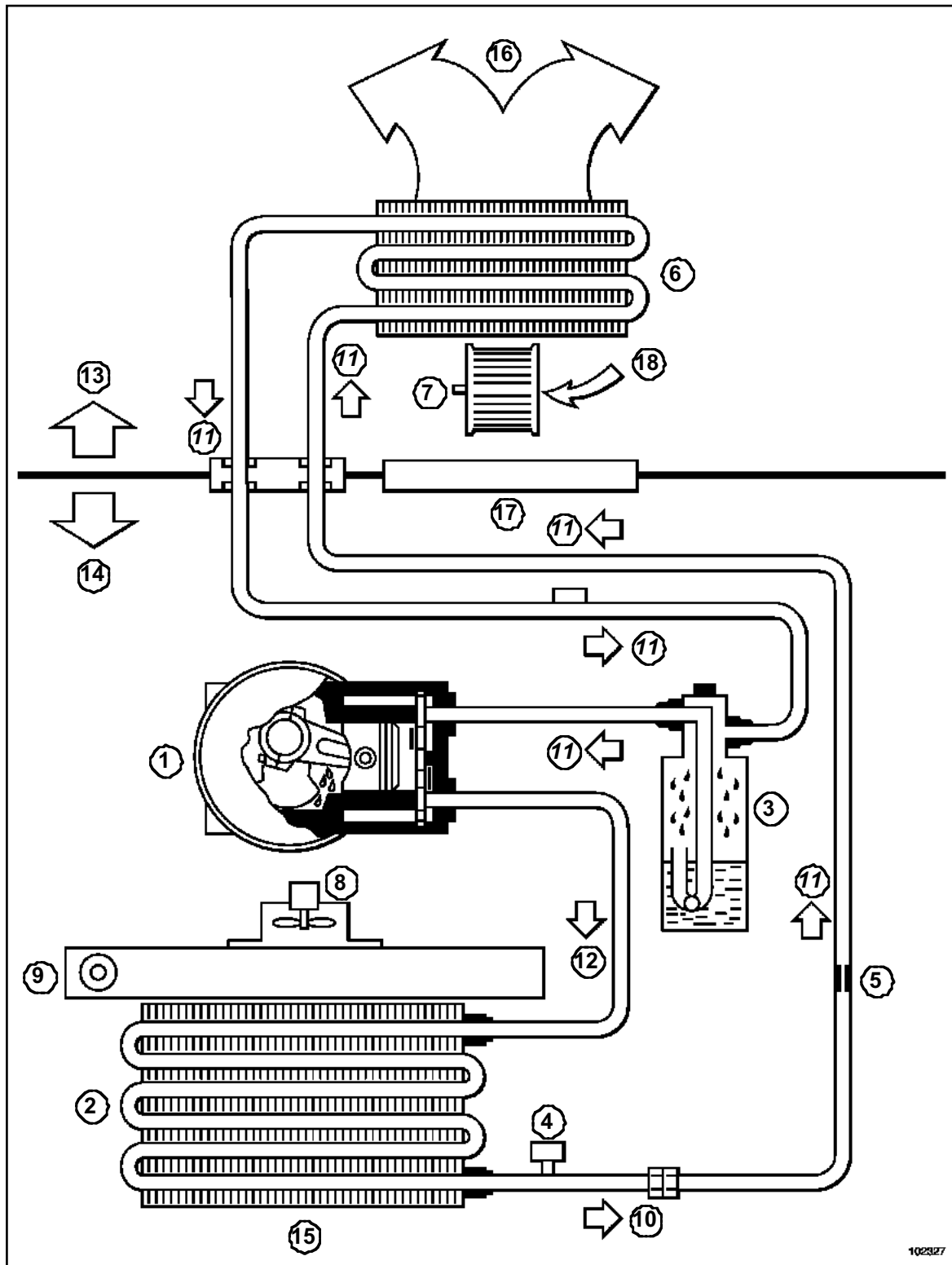
# AIR CONDITIONING

## General information

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- |      |                              |
|------|------------------------------|
| (12) | High pressure fluid          |
| (13) | Low pressure vapour          |
| (14) | High pressure vapour         |
| (15) | Passenger compartment        |
| (16) | Engine compartment           |
| (17) | External air                 |
| (18) | Towards air mixing unit      |
| (19) | Scuttle panel bulkhead       |
| (20) | External or recirculated air |



- (1) Compressor
- (2) Condenser
- (3) Dehydration canister
- (4) Pressure sensor
- (5) Calibrated choke

- (6) Evaporator
- (7) Air conditioning blower
- (8) Engine cooling fan
- (9) Cooling radiator
- (10) High pressure fluid
- (11) Low pressure vapour

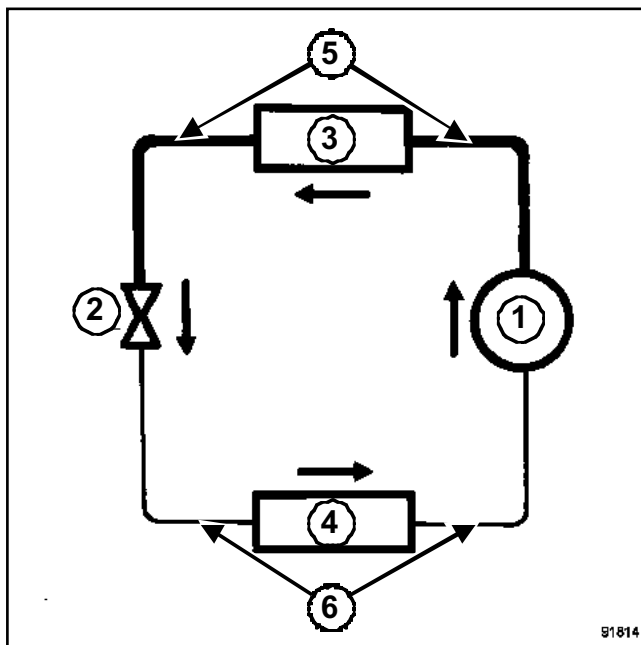
- (12) High pressure vapour
- (13) Passenger compartment
- (14) Engine compartment
- (15) External air
- (16) To mixing unit
- (17) Scuttle panel bulkhead
- (18) External or recirculated air

the system, the climate control computer manages air distribution and ventilation to achieve the desired comfort level.

Note:

For more information on the system, refer to all the documentation for the vehicle.

**REMINDER**



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- (1) Compressor
- (2) Expansion valve
- (3) Condenser
- (4) Evaporator
- (5) High pressure
- (6) Low pressure

Assemblies (1), (2), (3), (4) and the connecting piping are known as the cold loop.

There are two types of comfort level regulation:

- manual systems,
- automatic systems.

Manual systems are regulated directly by the user, who selects a comfort level and adjusts the settings to obtain this level.

Automatic systems are managed by the air conditioning computer, which analyses various data (internal temperature, external temperature, etc.). In addition to

## Air conditioning: Precautions for repair

### IMPORTANT

The following must be worn when handling refrigerant fluid:

- gloves,
- protective eyewear (with side shields where possible).
- In the event of refrigerant fluid coming into contact with the eyes, rinse thoroughly with plain water for **15 minutes**.
- Keep eyewash available if possible.
- If refrigerant comes into contact with your eyes, consult a doctor immediately. Inform the doctor that the burns were caused by **R134A** refrigerant.
- In the event of contact with other unprotected parts of the body (despite the safety advice being followed), rinse well with clean water continuously for **15 minutes**.

### IMPORTANT

- Any work involving refrigerants must be carried out in a well ventilated area.
- The refrigerant must not be stored in a well, a pit, a hermetically sealed room, etc.
- Refrigerants are colourless and odourless fluids.

Refrigerants are denser than air and so they sink to the ground. This results in a risk of asphyxiation. Consequently, when working on the system ensure that there are no pits, wells, ventilation shafts, etc., any nearer than **5 m** away, and run the gas extraction equipment.

At above **100°C**, due to a hot spot for example, refrigerant decomposes and produces a highly irritant gas.

### IMPORTANT

It is prohibited to carry out welding or brazing on:

- components of the air conditioning system when these are in place,
- the vehicle, if there is a risk of overheating an air conditioning component.

It is possible to place components in the drying oven after painting or to carry out work near the system if the temperature does not exceed **80°C**.

### IMPORTANT

- Repairing any faulty components of the air conditioning system is strictly prohibited.
- Any faulty component must be replaced.

Pipes must be correctly routed.

Ensure that the refrigerant piping is correctly attached to prevent contact with metal parts in the engine compartment.



# AIR CONDITIONING

## Consumables

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### TWINGO

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
C3G	SANDEN SD7H15	PAG SP 10	<b>135 ± 10</b>	<b>650 ± 35</b>
D7F	SD7V16	PAG SP 10		<b>740 ± 35</b>
D7F/D4F	SD6V12			<b>700 ± 35</b>

### CLIO II

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
All engines	SD6V12	PAG SP 10	<b>135 ± 10</b>	<b>660 ± 35</b>
K4M/K4J (Mexico)	SD7V16			<b>830 ± 35</b>
K4M/K4J (manufactured in Turkey with automatic transmission)	SD7V16			<b>740 ± 35</b>

### CLIO III

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
D4F	Sanden SD6V12	PAG SP 10	<b>135 ± 10</b>	<b>530 ± 35</b>
K4M				
K4J				
K9K				

### MODUS

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
D4F	Sanden SD6V16	PAG SP 10	<b>135 ± 10</b>	<b>530 ± 35</b>
K4M				
K4J				
K9K				

# AIR CONDITIONING

## Consumables

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### LOGAN

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
K7M	Sanden SD7V16 or SD7V12	PAG SP 10	135 ± 10	840 ± 35
K7J				
K9	SANDEN SD7V16	PAG SP 10	135 ± 10	840 ± 35

### MEGANE

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
E7J/K7M	DELPHI V5	PLANETELF PAG 488	220 ± 15	750 ± 35
K7M MERCO	SD6V12	PAG SP 10	135 ± 10	750 ± 35
K4J/K4M	DELPHI 6CVC135	PLANETELF PAG 488 and 897	150 ± 10	700 ± 35
F3R MERCO	SANDEM SD7V16	PAG SP 10	135 ± 10	780 ± 35
F4P/F4R/F5R	DELPHI V5	PLANETELF PAG 488	220 ± 15	750 ± 35
F8Q/F9Q	DELPHI V5	PLANETELF PAG 488	220 ± 15	750 ± 35

### SCENIC

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
K4M/K4J (left-hand drive)	DELPHI V5	PLANETELF PAG488	220 ± 15	680 ± 35
K4M/K4J (right-hand drive)				780 ± 35
F4 (left-hand drive)				680 ± 35
F4 (right-hand drive)				780 ± 35
F4 (Mexico)				750 ± 35
F9Q (left-hand drive)				680 ± 35
F9Q (right-hand drive)				780 ± 35

# AIR CONDITIONING

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### MEGANE II

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
K4J/K4M/F4/F5/K9K/F9Q	DELPHI 6CVC135	PLANETELF PAG 488	150 ± 10	550 ± 35
M9R	DELPHI 5CVC126	PLANETELF PAG 488	150 ± 10	650 ± 35

### SCENIC II

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
K4J/K4M/F4/F5/K9K/F9Q	DELPHI 6CVC135	PLANETELF PAG 488	150 ± 10	550 ± 35
M9R	DELPHI 5CVC126	PLANETELF PAG 488	150 ± 10	650 ± 35

### LAGUNA

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
K4M/N7Q/F4P/F3R/F3P/F9Q/G8T (turbocharger)/F4R	SANDEN SD7H15	PAG SP 10	135 ± 15	700 ± 35
F3P (LPG)/Z7X/L7X/G8T (Normally aspirated)				780 ± 35

### LAGUNA II

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
K4/F4P/F4R/F5R/F9Q/G9T	DELPHI V5	PLANETELF PAG488	265 ± 15	650 ± 35
L7X	SANDEN SD7V16	PAG SP 10	135 ± 15	
M9R	ZEXEL-VALEO	ZXL100PG	210 ± 10	

# AIR CONDITIONING

## Consumables

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### VELSATIS

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
G9T/F4RT	DELPHI V5	PLANETELF PAG488	220 ± 15	650 ± 35
V4Y	CALSONIC V6	PAG SP 10	220 ± 15	
P9X	DENSO 7SBU16	ND-OIL8	245 ± 15	

### ESPACE IV

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
F4/G9T/F9Q	DELPHI 7CVCE	PLANETELF PAG 488	200 ± 10	1000 ± 35
V4Y	CALSONIC V6	PLANETELF PAG 488	220 ± 15	
P9X	DENSO 7SBU16	ND-OIL8	245 ± 15	
M9R	ZEXEL KC88	ZXL 100 PG	210 ± 10	

### ESPACE III

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
F3R/Z7X/G9T	SANDEN SD7H15	PAG SP 10	135 ± 15	820 ± 30
L7X				890 ± 30
F4R				750 ± 30
G8T				700 ± 35
F9Q				720 ± 35

### AVANTIME

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
L7X	SANDEN SD7V16	PAG SP 10	135 ± 15	800 ± 35
F4R/G9T	DELPHI V5	PLANETELF PAG 488	220 ± 15	

# AIR CONDITIONING Consumables

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## SAFRANE

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
All engines	SANDEN SD7H15	PAG SP 10	135 ± 15	810 ± 35

## KANGOO

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
All engines	SD6V12	PAG SP 10	135 ± 10	660 ± 35
K4M/K4J (Mexico)	SD7V16			830 ± 35
K4M/K4J (manufactured in Turkey with automatic transmission)	SD7V16			740 ± 35

## TRAFIC

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
All engines (van)	DELPHI V5	PLANETELF PAG 488	220 ± 15	750 ± 35
All engines (with additional air conditioning)				1050 ± 35

## MASTER

Engine (specification)	Compressor	Type of oil	Total volume of oil in the circuit (ml or cm <sup>3</sup> )	Refrigerant capacity (g)
S8U/S9W (van)	SANDEN SD6V12	PAG SP 10	135 ± 15	850 ± 35
S8U/S9W (9-seater MPV)				1400 ± 35
S8U/S9W (16-seater MPV)				1200 ± 35
F9Q/G9T/G9U (van)	DELPHI V5	PLANETELF PAG 488	220 ± 15	850 ± 35
F9Q/G9T/G9U (9-seater MPV)				1400 ± 35
F9Q/G9T/G9U (16-seater MPV)				1200 ± 35

# AIR CONDITIONING

## Consumables

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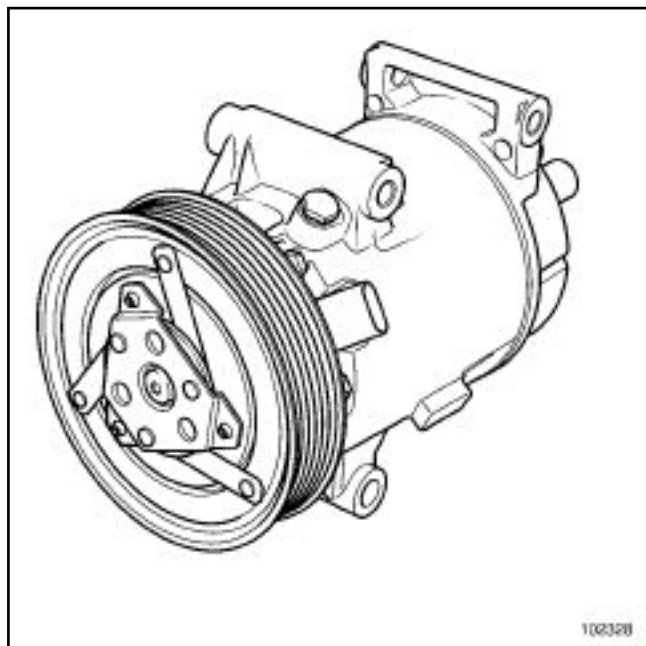
Table of volumes of oil to add when replacing components:

Operation on the air conditioning circuit	Volume of oil (ml or cm <sup>3</sup> )
Circuit oil change	Measure the volume recovered and add the same volume of new oil
Split hose or other rapid leak	<b>100</b>
Replacement of a condenser	Volume recovered + <b>30</b>
Replacement of an evaporator	Volume recovered + <b>30</b>
Replacement of the dehydration canister	Volume recovered + <b>15</b>
Replacing a hose	Volume recovered + <b>10</b>
Removing/refitting the compressor	Quantity recovered
Replacing a compressor	None added
replacing a compressor in standard exchange	top up as necessary
Replacing a compressor and one or several climate control circuit component(s).	None added
Replacing a compressor in standard exchange and one or several air conditioning circuit component(s)	top up as necessary

## Air conditioning: Function of components

### I - COMPRESSOR

The compressor places the gas from the evaporator under high pressure. To do this, it is driven in rotation by the engine using a belt and an electromagnetic clutch.



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There are two types of compressor in the RENAULT range:

- fixed capacity compressors,
- variable capacity compressors.

Fixed capacity compressors have an oscillating plate driven by a shaft: this is used to intake the refrigerant at low pressure and discharge it at high pressure by actuating the pistons cycle.

Variable capacity compressors operate on the same principle, except that the oscillating plate can also vary the stroke of the pistons according to two types of device:

- pneumatic: the gradient value depends on the low pressure,
- electronic: the gradient is controlled by a signal from the evaporator sensor and the high pressure.

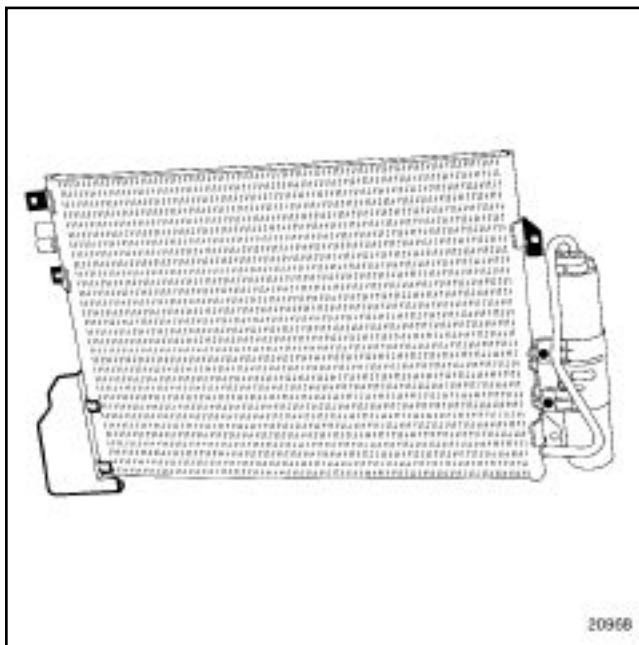
### IMPORTANT

Since the compressor is a rotating unit, it must be run with oil of the correct grade and volume (see **Air conditioning, Consumables**).

When the compressor is replaced, it is supplied with the correct level of oil, except in standard exchanges. Top up the oil for compressors in standard exchanges.

Whenever a job requires the compressor to be removed, always replace all belts removed and tighten them to the specified tension if there are no automatic tensioners.

### II - CONDENSER



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The condenser is installed after the compressor in the circuit; it is located in front of the engine radiator and is intended to dissipate the heat accumulated during compression of the gas. Once cooled, the gas becomes liquid and remains under high pressure.

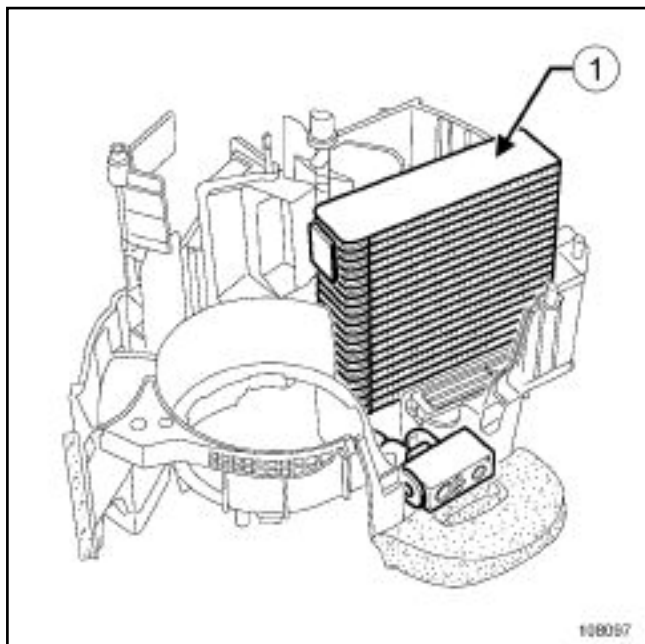
### WARNING

Take care not to damage the condenser and radiator fins while handling them.

Check that the condenser is well-maintained and that the seals on the piping are in good condition.

## Air conditioning: Function of components

### III - EVAPORATOR

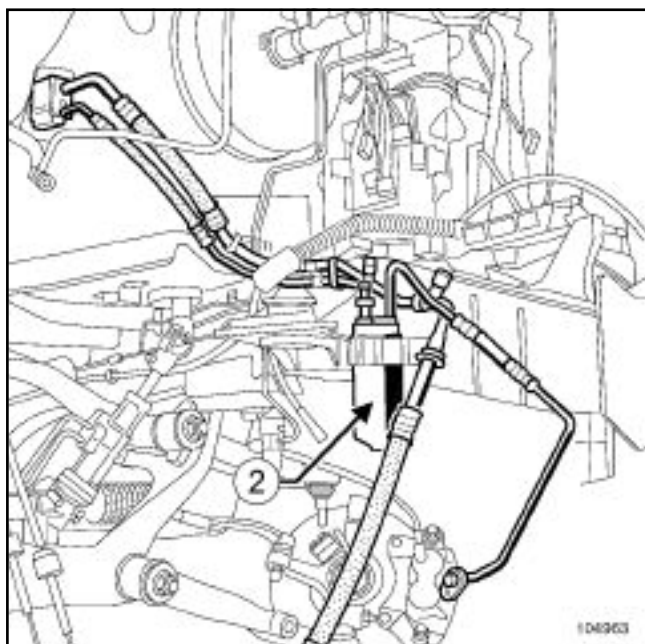


Evaporator (1) cools and dries the passenger compartment inlet air.

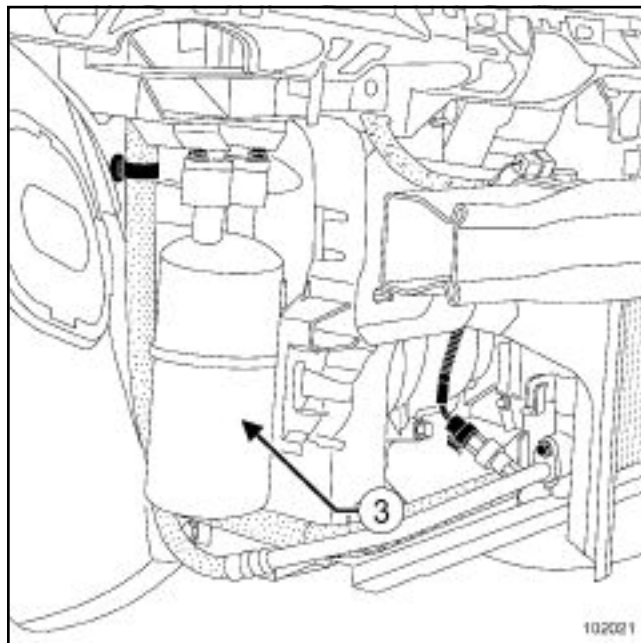
The refrigerant absorbs heat, the humidity in the air is condensed and evacuated outside via a drain pipe (water under vehicle when stationary).

### IV - DEHYDRATION CANISTER

The dehydration canister acts as a reservoir, filter and humidity absorber.



Dehydration canister (2) or the "reservoir" is located between the condenser and the expansion valve. In this type of set-up, the refrigerant fluid circulates in the dehydration canister in liquid form.



Dehydration canister (3) or the "accumulator" is placed at the evaporator outlet to protect the compressor from any liquid coming in at the intake point.

Whatever the type of dehydration canister, reservoir or accumulator, it must always be replaced if the circuit has been opened to the air and the circuit has not been plugged as indicated.

The dehydration canister cannot be repaired.

### V - EXPANSION VALVE

The expansion valve is used to convert the fluid from a high pressure liquid state to a low pressure liquid + gas state.

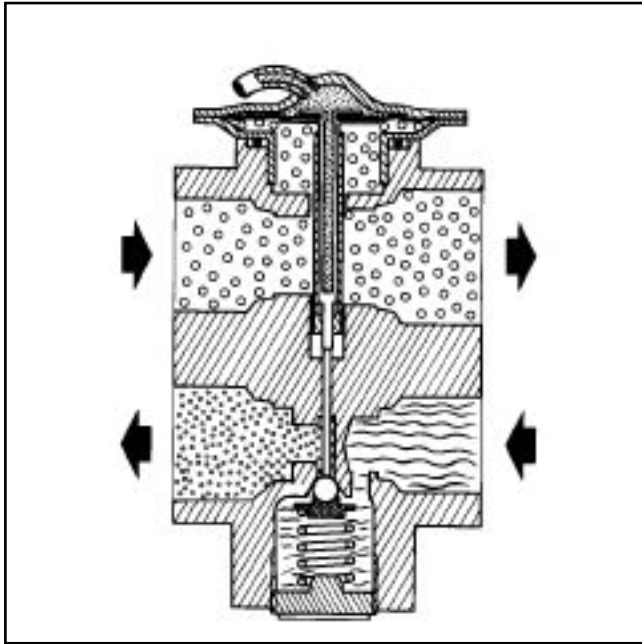
Even though there are two types of expansion valve, the system operation is the same.

#### WARNING

The expansion valve cannot be repaired.



## Air conditioning: Function of components

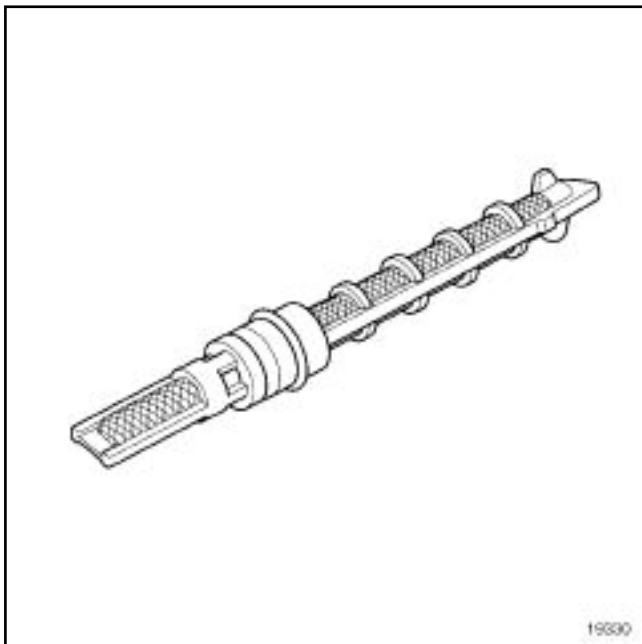


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The thermostatic expansion valves are located beyond the dehydration canister.

This type of expansion valve operates according to the temperature of the fluid at the evaporator outlet and proceeds in a cycle as follows:

- if the temperature is high, the refrigerant contained in the tube and the capsule expands and increases the fluid inlet, causing a greater pressure reduction and thereby a drop in temperature;
- if the temperature drops, the volume of the tube and capsule contents decreases and the needle closes the fluid inlet valve.



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The expansion valves with calibrated openings are positioned at the condenser outlet.

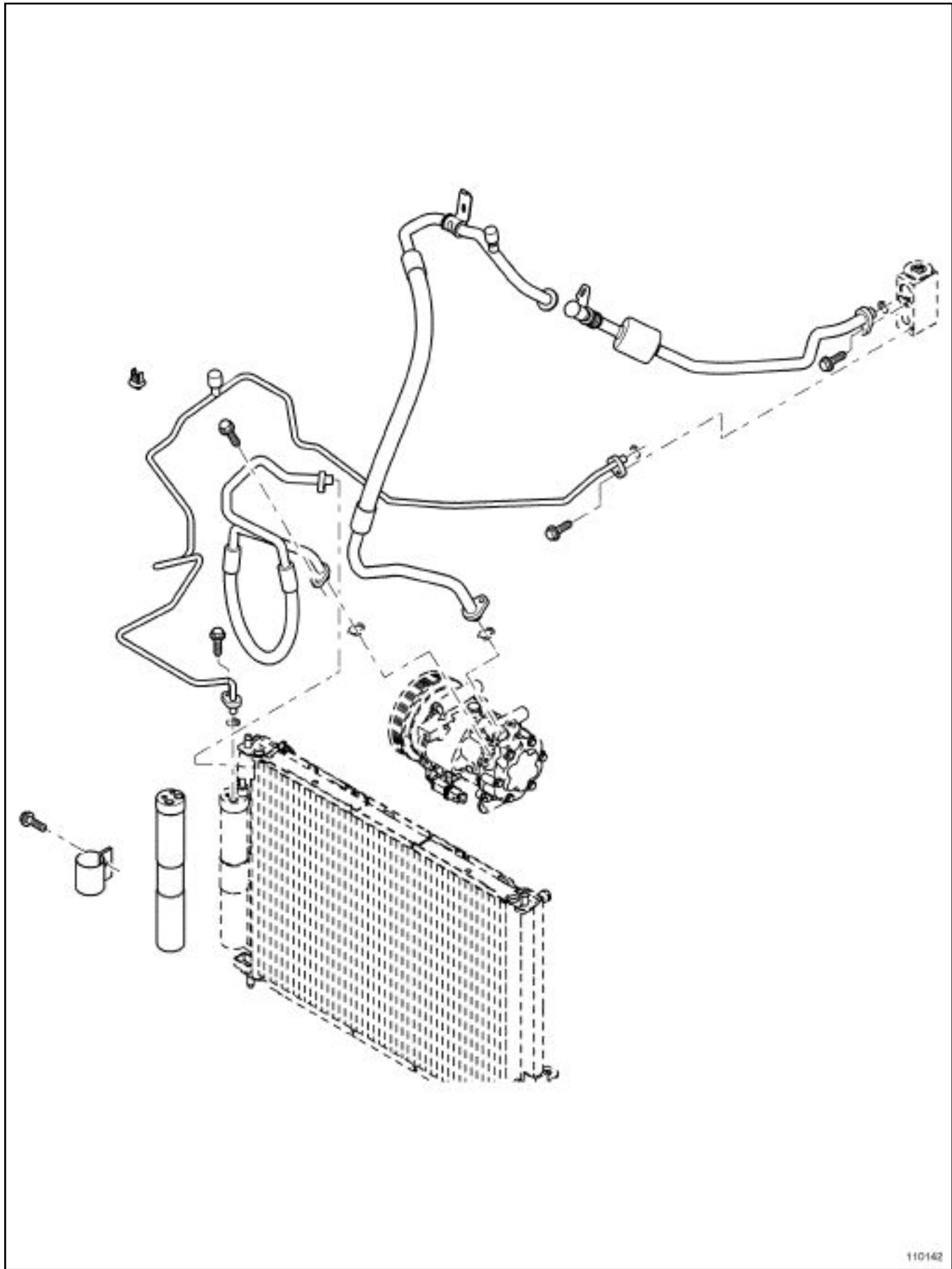
These expansion valves are built into the pipe: the pressure reduction is achieved through a restriction in the tube.

Since the fluid travels through the expansion valves in one direction only, unlike the thermostatic expansion valves, there is less room taken up in the engine compartment.

### VI - PIPING

The piping assembly is composed of pipes (flexible rubber piping which is reinforced to make it more watertight) and tubes (rigid aluminium piping).

This piping allows the fluid to circulate in various forms around the circuit.



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## Air conditioning: Function of components

### VII - SEALS

These isolate the air conditioning circuit from the outside. They are O-ring or Euro Manuli seals and are found on each circuit connection.

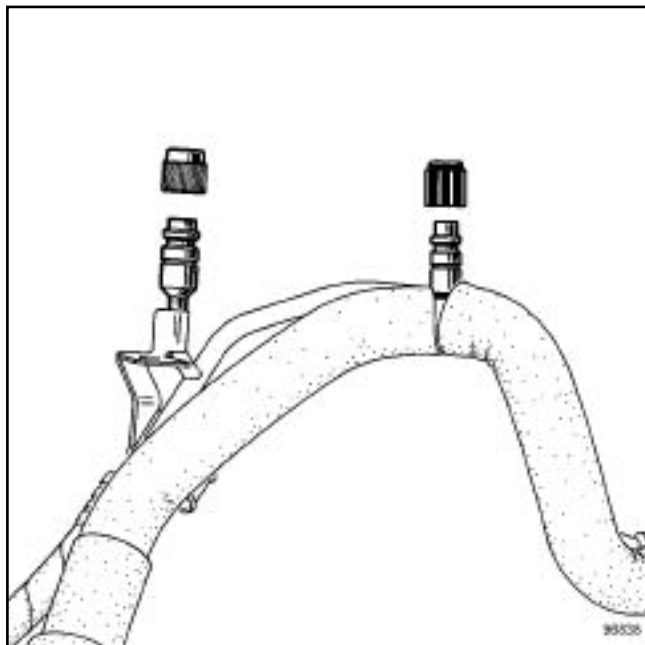
#### WARNING

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

### VIII - FILLER VALVE

A filler valve is used to fill the circuit with refrigerant or drain it.

Most systems have two (one for high pressure, one for low pressure), but on vehicles equipped with orifice-type expansion valves there is only one valve.

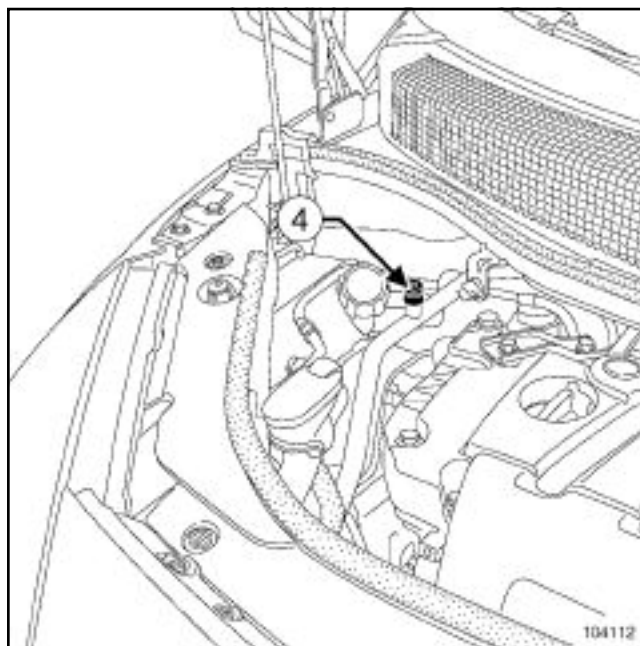


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On circuits equipped with two valves, the valves have different diameters to avoid any interchange.

Large diameter valve for the high pressure circuit.

Small diameter valve for the low pressure circuit.



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For vehicles that only use one valve (4), this will be a large diameter valve, which is placed on the low pressure circuit

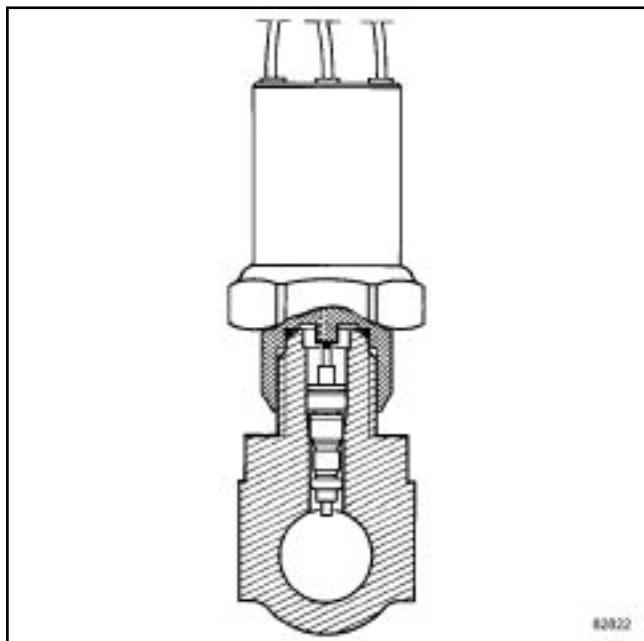
#### WARNING

Comply with the recommended valve tightening torques:

- Small diameter: **8 Nm**
- Large diameter: **10 Nm.**

## Air conditioning: Function of components

### IX - TRI-FUNCTION PRESSOSTAT



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The tri-function pressostat is used to control the air conditioning compressor and the engine cooling fans.

The pressostat is fitted on the high pressure section of the circuit and ensures the following functions:

Low pressure cut-out (approximately **2 bar**):

- If the high pressure in the circuit reaches too low a value (below a given threshold), then the tri-function pressostat cuts the supply to the compressor clutch (e.g. refrigerant fluid load too low, could lead to the compressor seizing up through lack of lubricant and refrigerant fluid).

High pressure cut-out (approximately **27 bar**):

- When the pressure of the circuit is too high (above a given threshold) and represents a danger to the circuit, the tri-function pressostat cuts the supply to the compressor clutch.

Ventilation fans control (approximately **19 bar**):

- If the pressure rises, the tri-function pressostat selects the ventilation fan(s) at either mid-speed or full speed depending on the circumstances. This promotes heat exchange and improves condensation to limit the pressure.

### X - PRESSURE SENSOR

This has the same function as the tri-function pressostat, i.e. measuring the pressure in the high pressure circuit.

It sends the signal back to the air conditioning or engine management computer, which manages the system accordingly.

Any work on these components can be carried out without draining the refrigerant fluid circuit: they are mounted on a non-return valve.

#### WARNING

These components are fitted with a seal: make sure that it is in good condition and lubricate it with the air conditioning oil recommended for the system (see **TN 6001A, Air conditioning, Consumables**).

### XI - PASSENGER COMPARTMENT FAN ASSEMBLY CONTROL UNIT

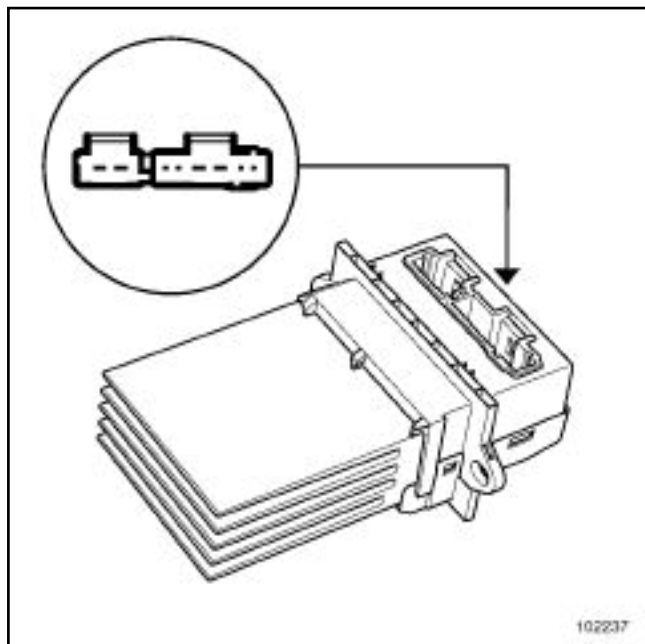


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102235

This varies the fan assembly speed using a resistance system.

### XII - POWER MODULE



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This varies the fan assembly speed using an electronic system.

**Note:**

In general, the modules can be accessed without removing the fan unit or any other system.

### XIII - FLAP CONTROL MOTORS

These motors are located in the distribution unit and actuate the flaps to direct the flow according to certain criteria:

- The mixing motor is used to mix warm air and cold air to obtain the required comfort level,
- the distribution motor directs the air flow into the passenger compartment via the vents,
- the recirculation motor can re-use the air in the passenger compartment by isolating the compartment from the external air,
- the demisting motor directs the air flow to the windscreen via the vents.

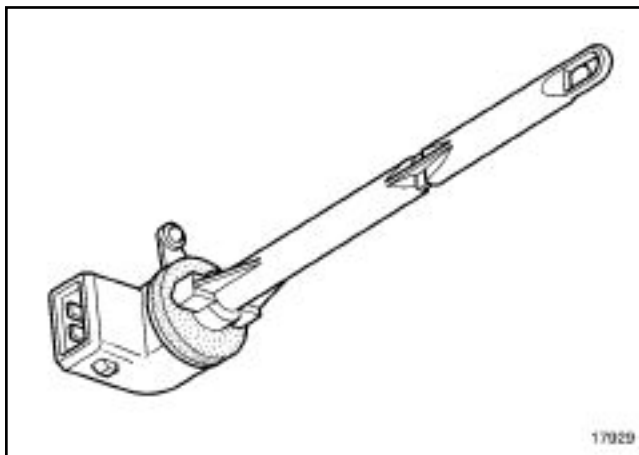
### XIV - EVAPORATOR SENSOR

This sensor measures the air temperature at the evaporator; there are different models but the operating principle is the same. This sensor is a negative temperature coefficient thermistor.

With the signal provided by this sensor, the computer can react accordingly to protect the evaporator from freezing by cutting off the compressor.

**Note:**

This sensor is not always used; see Workshop Repair Manual for the vehicle concerned.



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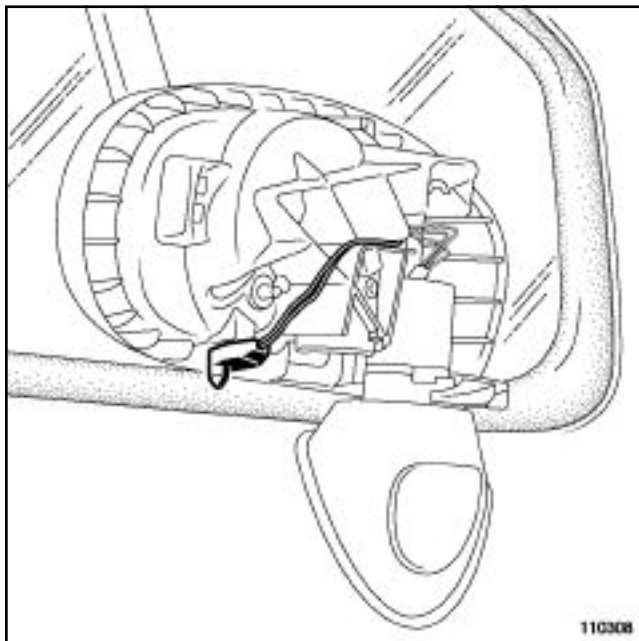
Although the procedure for removal is the same (rotate through a quarter turn), their accessibility in the passenger compartment varies according to the vehicle.

### XV - EXTERNAL TEMPERATURE SENSOR

This sensor supplies information about the outside temperature.

It is located either in the right-hand door mirror or in the passenger compartment air inlet.

It is a negative temperature coefficient thermistor.



110308

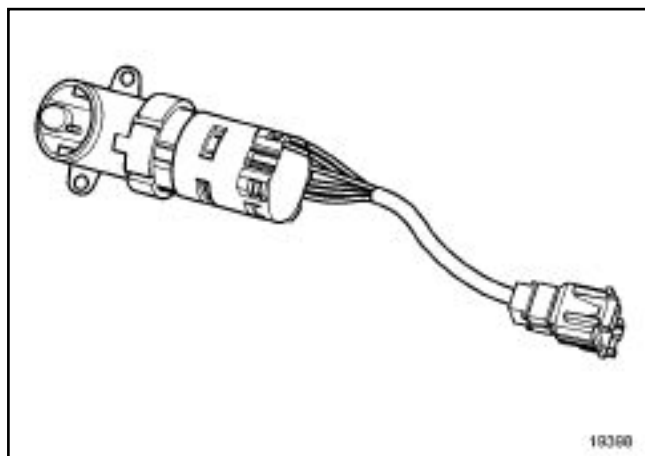
110308

## Air conditioning: Function of components

### XVI - PASSENGER COMPARTMENT TEMPERATURE SENSOR

This sensor supplies information on the interior temperature.

It is a negative coefficient thermistor.



19398

### XVII - HUMIDITY DETECTOR

This capacitance sensor measures, through the increase in resistance, the humidity of the air in the vehicle interior to determine whether or not air recirculation should be actuated.

### XVIII - SOLAR RADIATION DETECTOR

This sensor informs the computer of the intensity of sunlight to correct the air flow to the air vents.

### XIX - TOXICITY SENSOR

This sensor continuously analyses the change in concentration of gases (CO and NO<sub>x</sub>) in the passenger compartment to isolate the compartment, if necessary, by actuating the air recirculation system.

Ambient temperature	Acceptable temperature at the centre air vents outlet
15°C	between 4°C and 8°C
20°C	between 6°C and 10°C
25°C	between 8°C and 13°C
30°C	between 12°C and 16°C
35°C	between 17°C and 20°C
40°C	between 21°C and 25°C

### PRELIMINARY CHECK

Check the battery voltage (see **80A, Battery, Battery: Test**).

Check that the particle filter is clean (if easily accessible).

Note:

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

### CHECKING THAT THE AIR CONDITIONING IS EFFICIENT

#### I - PREPARING THE VEHICLE

Keep the vehicle in the shade for approximately an hour (doors, windows and bonnet closed, centre air vent open).

#### II - METHOD OF USE

Start the vehicle's engine (leave it idling).

Make sure that the air conditioning is not activated.

Wait **2 minutes**.

Adjust the air conditioning controls:

- temperature: maximum cold setting,
- distribution: centre air vent (all at face level),
- ventilation: maximum setting,
- recirculation: open (external air position).

Check the temperature of the air blown from the centre air vents using a thermometer:

- the temperature must be the same as the ambient air temperature  $\pm 5^\circ\text{C}$ .

Activate the air conditioning.

Check the temperature of the air blown from the centre air vents using a thermometer, **6 minutes** after the air conditioning is switched on and refer to the table above. The temperature must not change more than  $\pm 0.5^\circ\text{C}$ .

### ADVICE FOR IDENTIFYING THE SYSTEM

Use the diagnostic tool to identify the system fitted in the vehicle (reading the group, program number, etc.).

Find the Fault finding documents corresponding to the system identified.

# AIR CONDITIONING

## Fault finding

# 62A

Before proceeding with any fault finding on the air conditioning, follow these preliminary steps:

The fault detection table below refers to all air conditioning systems (automatic or otherwise). This table is only shown as an example as not all of the components listed are used (see MR of vehicle concerned).

The following figures indicate the most common causes of faults (repeated where there is more than one cause at the same time).

Components	Causes		
	No cold air	Too much cold air	Inefficient operation
Fuses	1	-	-
Air distribution	1	1	-
Air flow	1	-	1
Recirculation flap	-	-	1
Passenger compartment blower	-	-	1
Lack of refrigerant	1	-	2
Compressor belt (condition or tension)	2	-	2
Wiring harness assembly	3	-	2
Evaporator sensor	4	2	3
Sensor signal	4	2	3
Pressure sensor	4	3	4
Cooling fan	-	-	4
Compressor clutch relay	5	-	-
Compressor clutch	5	-	-
Compressor	5	-	5
Expansion valve	5	-	5
Dehydration canister	-	-	5
Control panel	6	4	6

### Fault finding table for lack of cold air

Possible cause	Check	Remedy
Belt slipping	Belt tension	Tighten belt
Compressor not working	1- Check the load 2- Check the power supply 3- Check the pressostat	Readjust the load Repair Replace the pressostat



Possible cause	Check	Remedy
Expansion valve	Check the temperature difference between the inlet and outlet	Replace the expansion valve if there is no difference
Calibrated opening	Check the temperature difference between the inlet and outlet	Replace the calibrated opening if there is no difference
Condenser	Check the exterior cleanliness	Clean the exterior of the condenser
Evaporator	Check the exterior cleanliness Check that the evaporator is not frozen	Clean the exterior of the evaporator Check the evaporator sensor
High pressure circuit too high	1- Check the cleanliness of the condenser 2- Excess load 3- Insufficient cooling	Clean the exterior of the condenser Readjust the load Check that the ventilation fans are working properly
Low pressure circuit too high	1- Excess load 2- Check the expansion valve	Readjust the load Replace the expansion valve

# AIR CONDITIONING

## Coolant circuit check

# 62A

### Fault finding for detecting leaks:

Component	Detection area	Part to be replaced after first check	Part to be replaced after filling and second check
Condenser	Inlet or outlet	Pipes	Condenser
Evaporator	Connection flange	Pipes	Connection flange and/or evaporator
Compressor	Inlet or outlet	Pipes	Compressor
Dehydration canister	Inlet or outlet	Pipes	Dehydration canister

There are several types of devices for detecting leaks:

- electronic detectors,
- trace detectors.

Note:

Use the electronic detector and then the trace detector to check for leaks.

### I - ELECTRONIC DETECTORS

#### WARNING

Always consult the user manual for the device before carrying out any work.

This device measures variation in the quantity of refrigerant in the air: it emits an audible signal depending on this variation.

The device must be initialised before checking.

To do this:

- immobilise the device,
- calibrate the device in the engine compartment,
- do not start the engine.

This point is then used as standard for detecting the contamination rate.

This equipment is highly sensitive: during the detection process, follow the line of the circuit only as closely as possible in order to limit variations caused by other gases.

This device only detects relatively substantial leaks.

#### WARNING

Make sure that the sensor at the end of the rod is kept extremely clean and in good condition.

### II - TRACE DETECTORS

Detecting leaks using a trace involves adding a dye to the refrigerant, and locating the points of loss using an ultraviolet light.

#### IMPORTANT

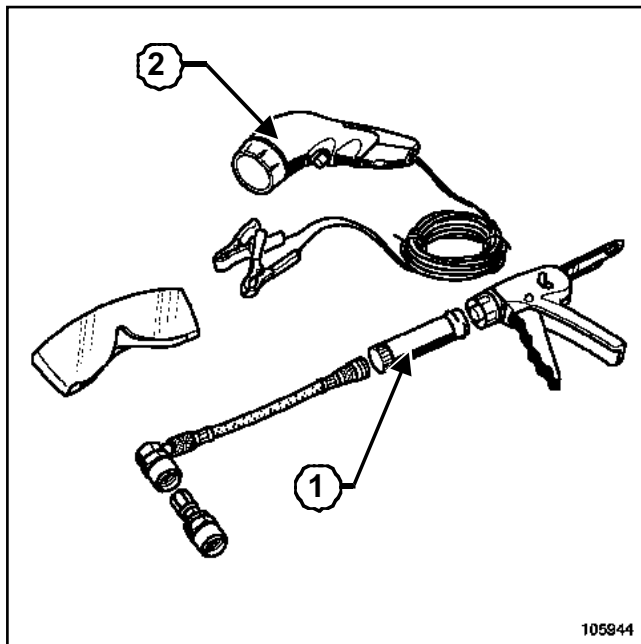
Be sure to observe the safety instructions when working on the cold loop (see **62A, Air conditioning, Safety instructions**).

#### WARNING

The procedure described must be observed.

Note:

Use this leak protection procedure as a last resort for « leaks that cannot be found ».



105944

The refrigerant leak detection procedure is based on the use of a dye available as a single-use capsule (1): fluid traces are revealed using an ultraviolet light (2).

The dye remains in the air conditioning system.

The condition of the cold loop can be checked using an ultraviolet light without introducing fresh dye.

If there is nothing to indicate that dye has been used previously (label, etc.):

- have a cloth ready,
- release a small jet of refrigerant through the two valves,
- shine the ultraviolet light inside the valves,
- check for fluorescent traces.

### WARNING

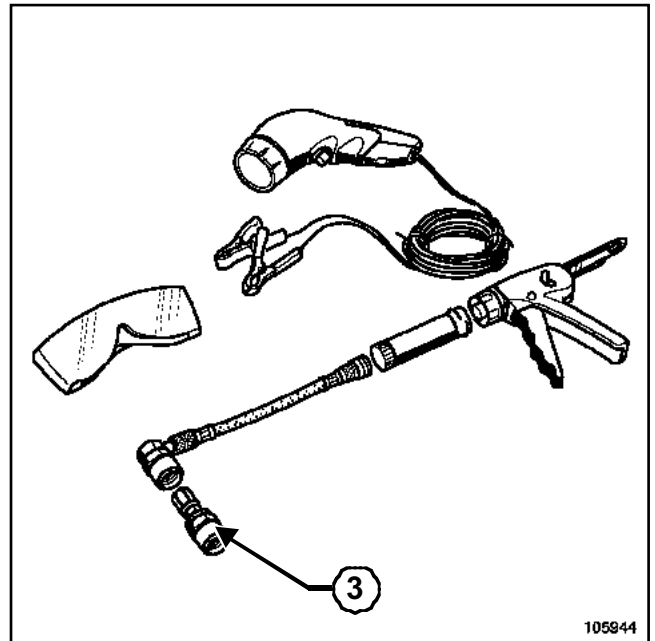
Adding dye to the cold loop is prohibited if fluorescent traces appear.

Add a dose of detection dye if there are no fluorescent traces or label.

Affix a label.

Record the date when the dye was added.

### 1 - Injecting dye into the circuit



105944

Set up the dye injection system on the low pressure valve, observing the product's direction of circulation, using union (3), for vehicles with a single valve.

Inject the dye into the circuit.

Run the air conditioning system for approximately **15 minutes**.

**2 - Leak detection procedure**

**Note:**

After any work on air conditioning circuit leaks on the Laguna II, Vel Satis and Espace IV, fault **Refrigerant DF033** must always be cleared using the diagnostic tool. The compressor cannot operate until the fault is cleared.

Carry out an initial check (with the engine stopped) by sweeping the circuit with an ultraviolet light.

**Note:**

Use an adjustable mirror wherever access is difficult.

If no leak is apparent:

- carefully clean the exterior of the coolant circuit,
- run the air conditioning system until the leak can be detected (if no leak is detected, check the condition of the evaporator).

**WARNING**

After injecting dye into the refrigerant, be sure to indicate this on a label (supplied with the dye capsule), and the date of the operation. The label should be positioned so that it is visible close to the cold loop filler valve (shock absorber cup).

# AIR CONDITIONING

## Coolant circuit Draining - Refilling

# 62A

### Equipment required

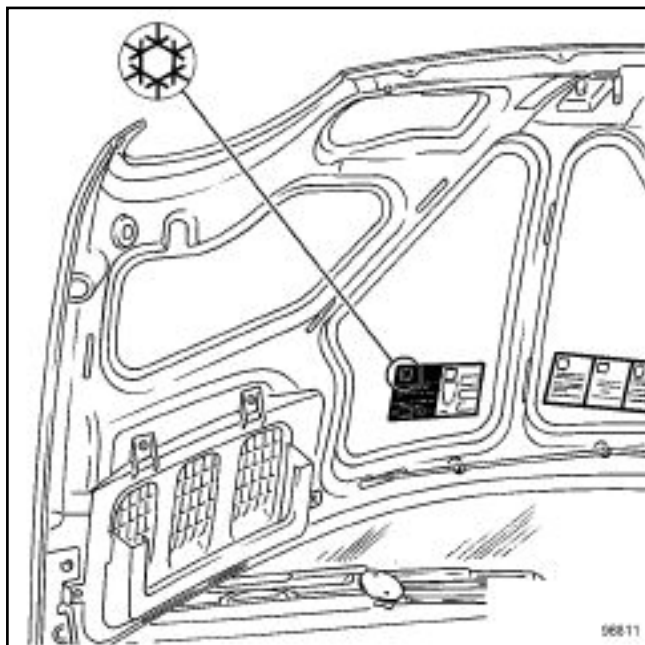
filling station

### I - FLUID

Previously, the refrigerant used was **R12** refrigerant (see **NT 2494A, R12/R134a Conversion** and **NT 2422A, R12/R134a Conversion**). It has been withdrawn from use and replaced with refrigerant fluid **R134A**, which is less hazardous.

#### Note:

All vehicles using **R134A** have a label in the engine compartment specifying its use.



96811

Refrigerant **R134A** is colourless in its liquid state, and odourless and invisible in its gaseous state.

A summary table provides the quantities of refrigerant for the system for the various vehicles (see **TN 6001A, Air conditioning, Consumables**).

### II - OIL

The cold loop contains a special oil to lubricate the compressor.

Fill up with the same quantity of oil as was drained.

When replacing a component, top up the oil with the volume required for the component replaced (see **NT 6001A, Air conditioning, Consumables**).

When replacing a compressor and one or more of the various air conditioning circuit components, the quantity of oil in the compressor is sufficient to lubricate the entire circuit. Do not add oil.

### WARNING

Lubricants are not mutually compatible: always adhere to the types and grades of oil required for each compressor, even when topping up, or you could break the cold loop.

Always close oil cans after use to prevent moisture getting inside, and never use oil contained in a can that has been open for a long time (viscous appearance).

### III - PROCUREMENT OF OIL

**PAG SP10:** Part no. 77 01 419 313

**PLANETELF PAG 488:** Part no. 77 11 172 668

To find out the type of oil used (see **62A, Air conditioning, Consumables**).

# AIR CONDITIONING

## Coolant circuit Draining - Refilling

# 62A

### IV - RECOVERING REFRIGERANT FLUID

#### Note:

- The air conditioning circuit is fitted with a single filler valve; some stations only require the high pressure pipe to be used (see **the filling station instructions**).
- Depending on the situation, run the system for a few minutes before recovering the coolant to improve drainage.

#### IMPORTANT

These procedures must be followed in order to prevent:

- gas escaping when the circuit is opened,
- environmental damage through the release of gas into the atmosphere when the circuit is opened or when a vacuum is created.

When draining or checking the refrigerant fluid fill load, three situations must be taken into account:

- the engine and air conditioning are working (scenario A),
- the engine is working but not the air conditioning (scenario B),
- neither the engine nor the air conditioning are working (scenario C).

#### Scenario A:

- run the air conditioning until the cooling fan has been triggered twice,
- switch off the engine,
- drain for the first time (note down the original value),
- wait **15 minutes**,
- check that the relative pressure is no more than **0 bar**,
- start the drain cycles again if the relative pressure is above **0 bar**,
- add together the values of the various draining operations; the fill is confirmed as being correct if the volume of refrigerant fluid is the specified fill **+ 35 g or - 100 g**.

#### Scenario B:

- run the engine until the cooling fan is triggered twice,

- switch off the engine,
- drain for the first time (note down the value),
- wait **15 minutes**,
- run the engine until the cooling fan is triggered twice,
- drain for the second time (note down the value),
- start the drain cycles again if the relative pressure is above **0 bar**,
- add together the values of the various draining operations; the fill is confirmed as being correct if the volume of refrigerant fluid is the specified fill **+ 35 g or - 100 g**.

#### Scenario C:

- drain for the first time (note down the value),
- wait **2 hours**,
- start the drain cycles again if the relative pressure is above **0 bar**,
- add together the values of the various draining operations; the fill is confirmed as being correct if the volume of refrigerant fluid is the specified fill **+ 35 g or - 100 g**.

### V - CREATION OF A VACUUM

Evacuation needs to be carried out properly before the filling procedure, otherwise the air conditioning will not operate properly.

There are two scenarios to consider:

- the vacuum will be created immediately after draining (scenario A),
- the vacuum will be created after a delay of several hours or days (scenario B).

#### Scenario A:

- creating a vacuum takes **20 minutes**.

#### Scenario B:

- creating a vacuum takes **45 minutes** to remove any residual moisture.

Test the tightness once evacuation is complete (some stations do this automatically).

# AIR CONDITIONING

## Coolant circuit Draining - Refilling

62A

### VI - FILLING

Note:

After any work on air conditioning circuit leaks on the Laguna II, Vel Satis and Espace IV, filling fault **Refrigerant DF033** must always be cleared using the diagnostic tool. The compressor cannot operate until the fault is cleared.

Top up the oil with the recommended type and volume of oil, depending on the work carried out.

Fill up **Air conditioning, Consumables**).

Empty the pipes on the **filling station**.

Check that the system is working correctly (see **Air conditioning, Air conditioning: Test**).

Check for leaks.

# AIR CONDITIONING

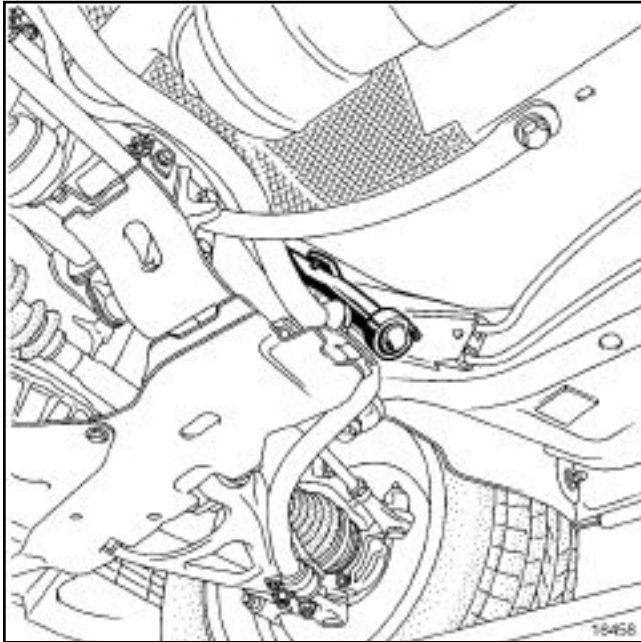
## Evaporator: Cleaning

# 62A

Air conditioning cleaner: Part no. 77 01 410 170

### I - TWINGO, LAGUNA, SAFRANE, CLIO I, MEGANE I

Position the vehicle on a lift.



16458

Run an extension piece through the condensation drain pipe to apply the air conditioning cleaner.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

### II - CLIO III

#### 1 - Left-hand drive

#### a - REMOVAL



112763

Unclip the passenger compartment filter.

#### Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.



# AIR CONDITIONING

## Evaporator: Cleaning

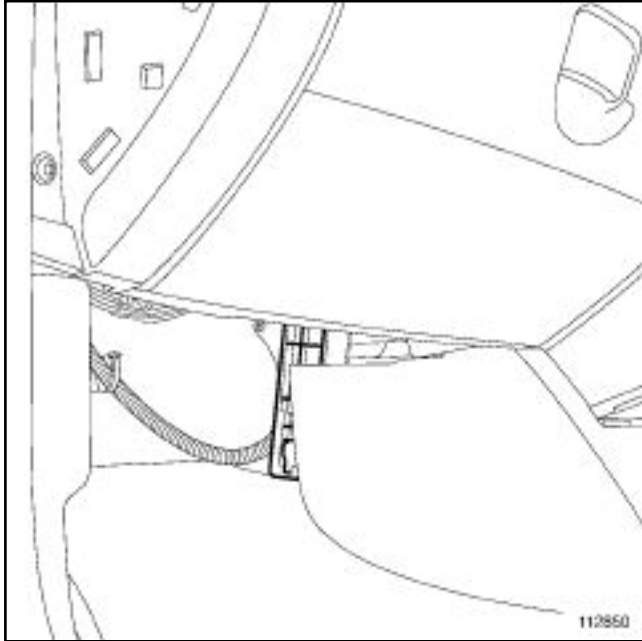
# 62A

### **b - REFITTING**

Refit the passenger compartment filter.

### **2 - Right-hand drive**

#### **a - REMOVAL**



112850

Unclip the passenger compartment filter.

#### **Note:**

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### **WARNING**

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

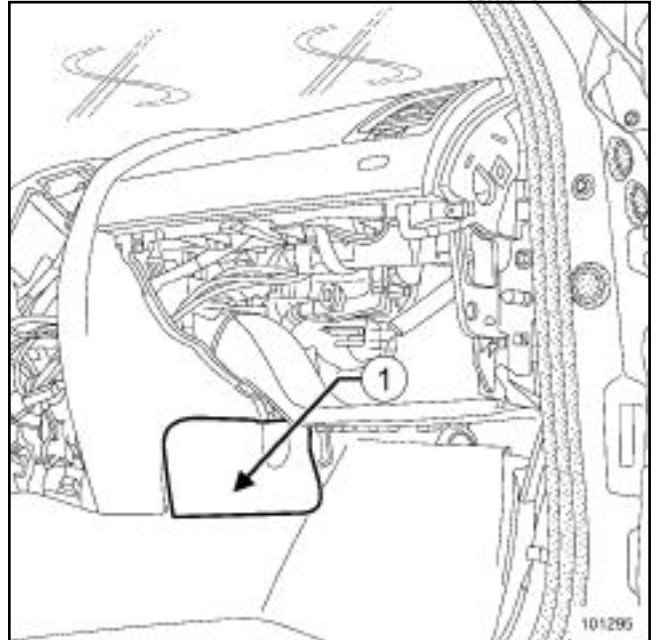
### **b - REFITTING**

Refit the passenger compartment filter.

### **III - MEGANE II**

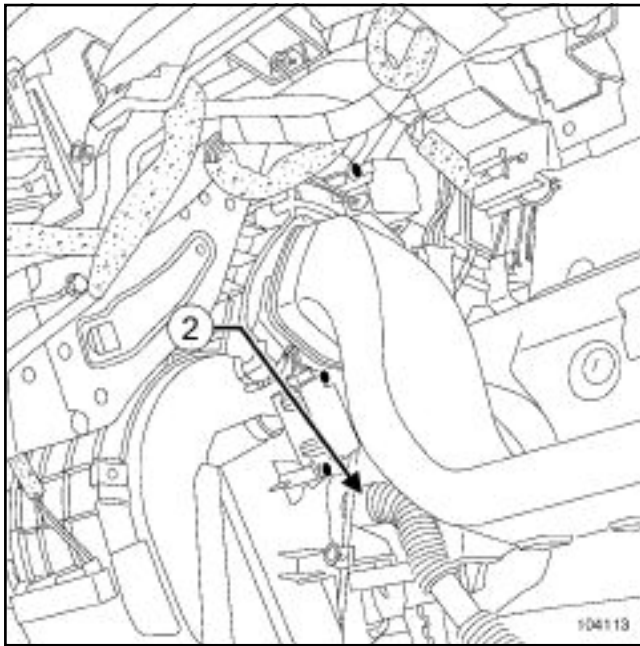
### **1 - Left-hand drive**

#### **a - REMOVAL**



101295

Remove the trim at (1).



104113

Move the refrigerant pipe (2) to one side of the distribution unit.

Turn the refrigerant pipe through a quarter turn.

Remove the refrigerant pipe at the distribution unit end.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

**WARNING**

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

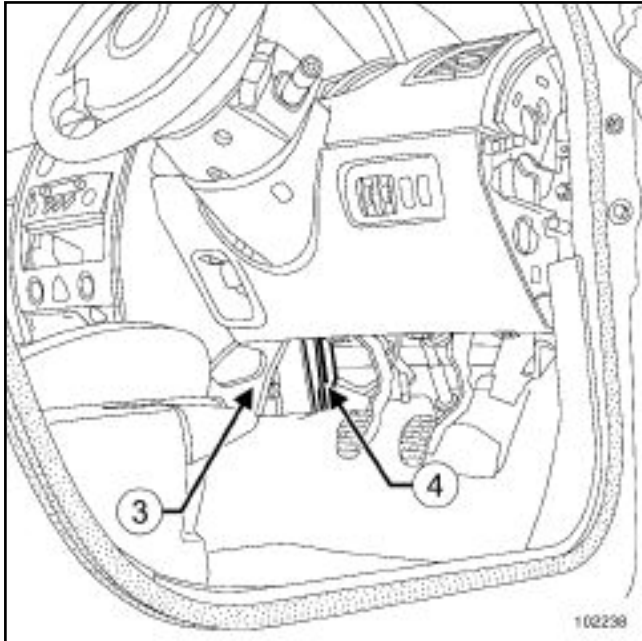
**b - REFITTING**

Refit the refrigerant pipe at the distribution unit end.

Refit the trim under the glovebox.

### 2 - Right-hand drive

#### a - REMOVAL



102238

Remove the trim at (3).

#### Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the filter with care so as to prevent foreign bodies getting into the evaporator.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Remove passenger compartment filter (4).

#### Note:

Break the rigid sections of the filter in order to remove it.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

#### b - REFITTING

Refit the passenger compartment filter.

Refit the trim under the glovebox.

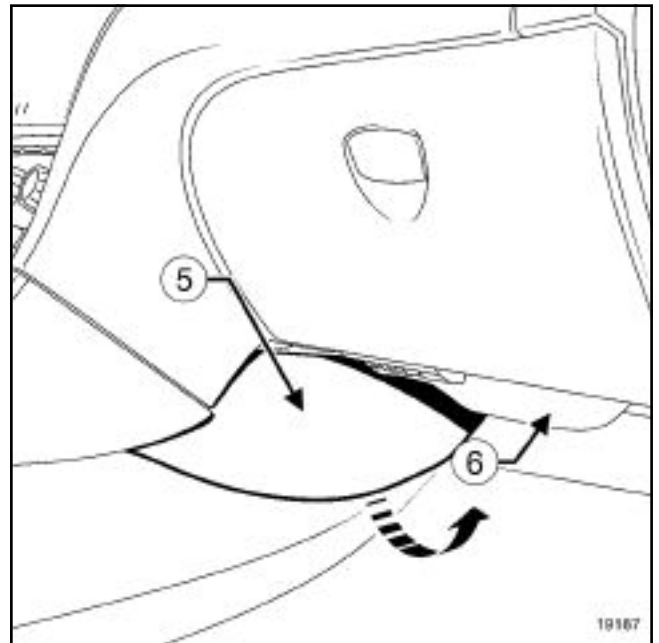
#### Note:

- Break the rigid sections of the filter to make it easier to refit.
- Be sure not to damage the filtering section.

### IV - LAGUNA II

#### 1 - Left-hand drive

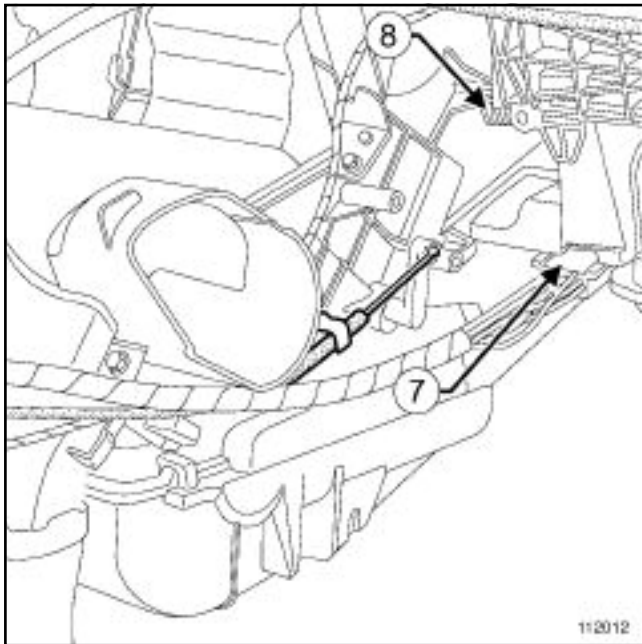
#### a - REMOVAL



19167

Remove:

- the right-hand trim from the centre console (5),
- the soundproofing below the storage compartment (6).



112012

Disconnect the connector (7) from the fan assembly.

Move the refrigerant pipe (8).

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

### **b - REFITTING**

Refit the refrigerant pipe.

Connect the fan assembly connector.

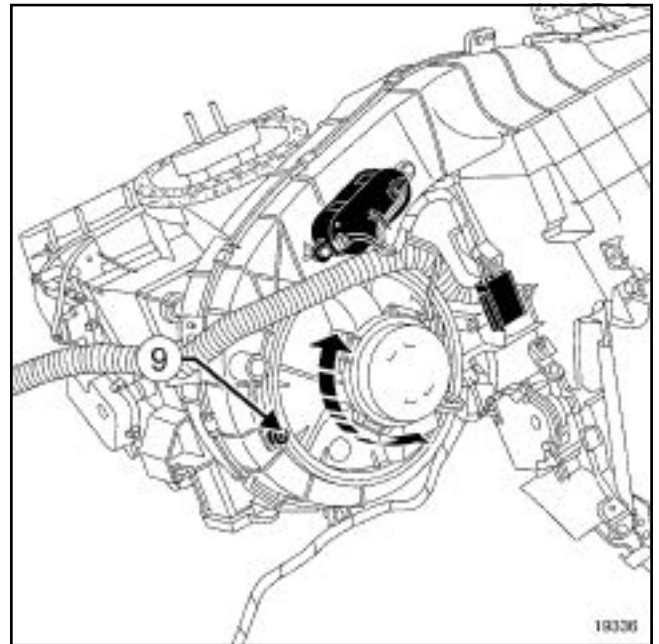
Refit the soundproofing below the storage compartment.

Refit the right-hand trim to the centre console,

### **2 - Right-hand drive**

### **a - REMOVAL**

Remove the soundproofing below the storage compartment.



19336

Remove fan assembly mounting bolt (9).

Turn the fan assembly through a quarter turn.

Remove the fan assembly.

Apply the air conditioning cleaner using an extension piece.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

### **b - REFITTING**

Refit the fan assembly.

Refit the fan assembly mounting bolt.

Refit the soundproofing below the storage compartment.

### **V - SCENIC II**

### **Left-hand and Right-hand drive**

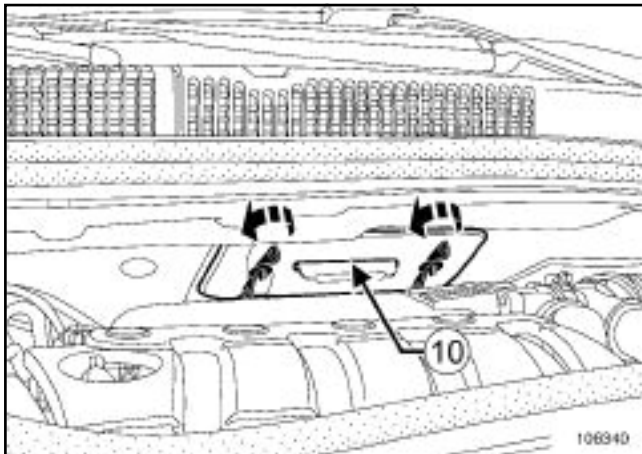
### **a - REMOVAL**

Remove the engine covers.

# AIR CONDITIONING

## Evaporator: Cleaning

# 62A



106340

Remove:

- the passenger compartment filter access flap (10),

Note:

Break the rigid sections of the filter in order to remove it.

Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

### **b - REFITTING**

Refit the passenger compartment filter.

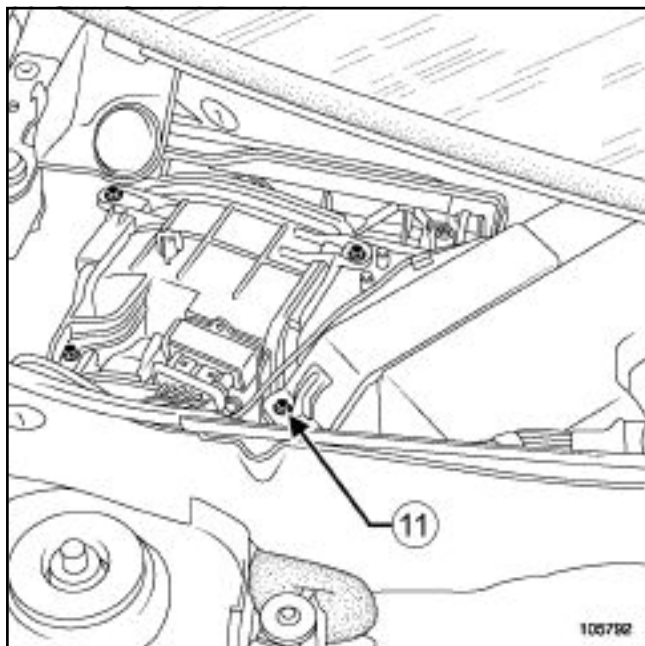
Refit the passenger compartment filter access flap,

Note:

- Break the rigid sections of the filter to make it easier to refit.
- Be sure not to damage the filtering section.

### VI - CLIO II

#### a - REMOVAL



105792

Remove:

- the wiper arms,
- the scuttle panel grille (see **MR 338 Bodywork, 55D, Exterior protection, Scuttle panel grille** ),
- the fan assembly guard mounting bolts,
- the passenger compartment filter cover mounting bolts (**11**).
- the passenger compartment filter.

Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the passenger compartment filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

#### b - REFITTING

Refit the passenger compartment filter.

Refit the passenger compartment filter cover.

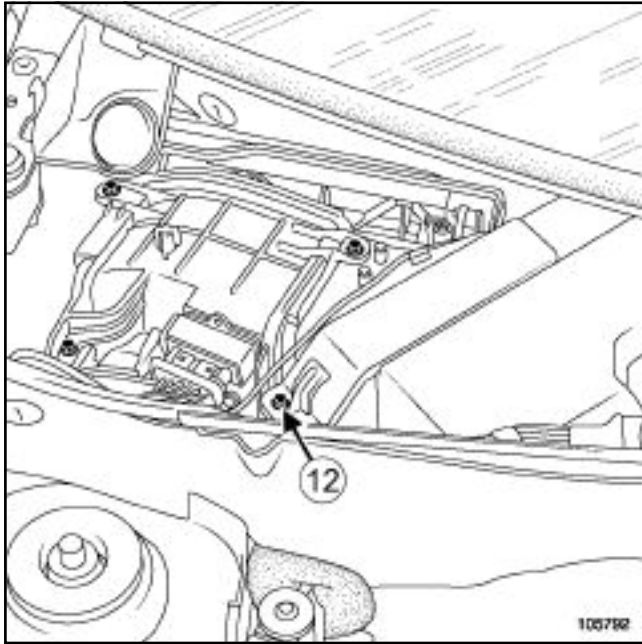
Refit the fan assembly guard bolt.

Refit the scuttle panel grille.

Refit the wiper arms.

### VII - KANGOO

#### a - REMOVAL



Remove:

- the wiper arms,
- the scuttle panel grille (see **MR 381 Bodywork, 56A, Exterior accessories, Scuttle panel grille: Removal - Refitting**).
- the fan assembly guard mounting bolts,
- the passenger compartment filter cover mounting bolts (12).
- the passenger compartment filter.

Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the passenger compartment filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

#### b - REFITTING

Refit the passenger compartment filter.

Refit the passenger compartment filter cover.

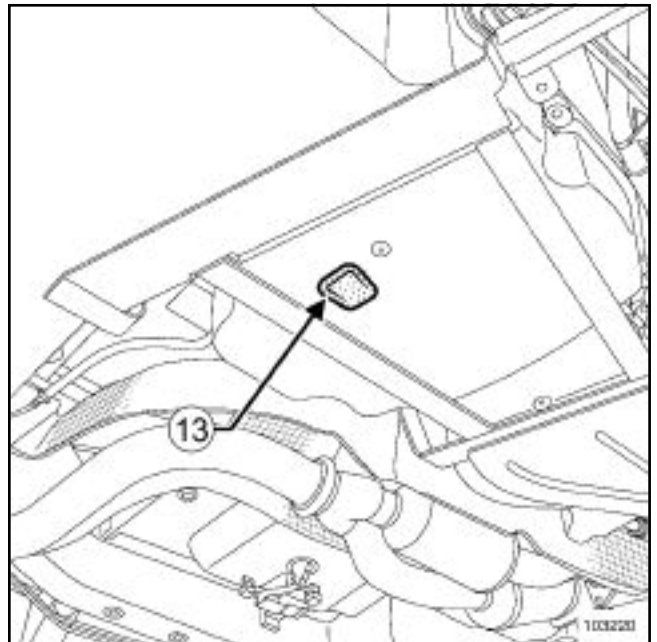
Refit the fan assembly guard bolt.

Refit the scuttle panel grille.

Refit the wiper arms.

### VIII - ESPACE IV

Position the vehicle on a lift.



Run an extension piece through the condensation drain pipe (13) to apply the air conditioning cleaner.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

# AIR CONDITIONING

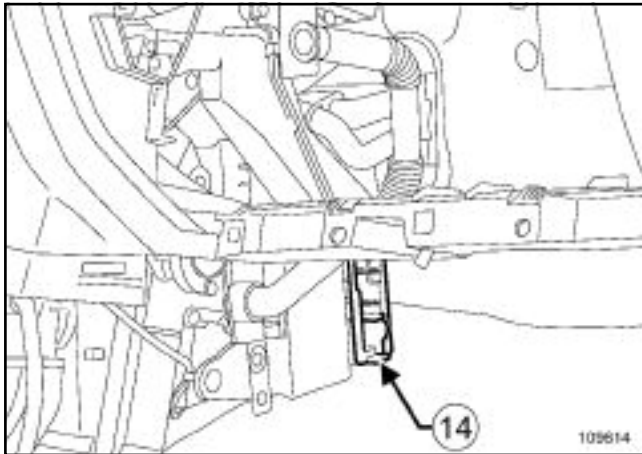
## Evaporator: Cleaning

# 62A

### IX - MODUS

#### 1 - Left-hand drive

#### a - REMOVAL



Raise passenger compartment filter tab (14).

Rotate the filter around the upper section of the base of the filter.

Release the upper section of the base of the filter from the air conditioning unit.

#### Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the passenger compartment filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

#### b - REFITTING

Tilt the passenger compartment filter before inserting it into the air conditioning unit.

Engage the upper section of the base of the filter into the air conditioning unit.



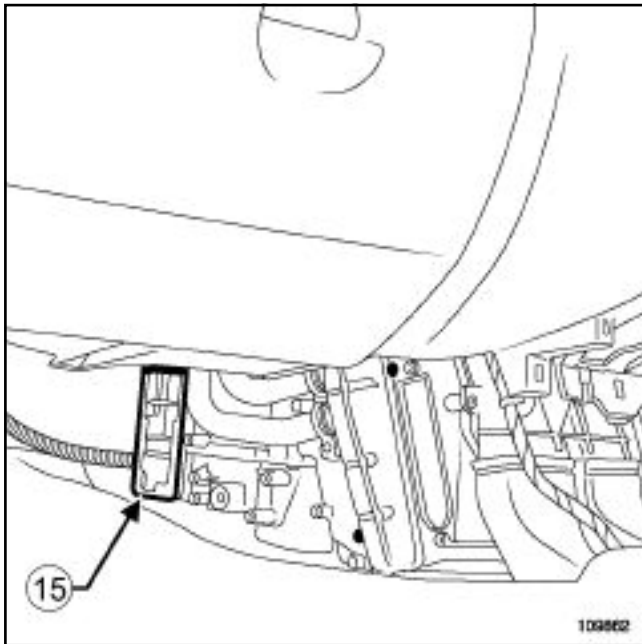
# AIR CONDITIONING

## Evaporator: Cleaning

# 62A

### 2 - Right-hand drive

#### a - REMOVAL



109862

Raise passenger compartment filter tab (15).

Rotate the filter around the upper section of the base of the filter.

Release the upper section of the base of the filter from the air conditioning unit.

#### Note:

Foreign bodies (leaves, insects etc.) are likely to accumulate in the passenger compartment filter. Remove the passenger compartment filter with care so as to prevent foreign bodies getting into the evaporator.

Remove the passenger compartment filter.

Check for foreign bodies in the passenger compartment filter housing, and clean thoroughly if necessary.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

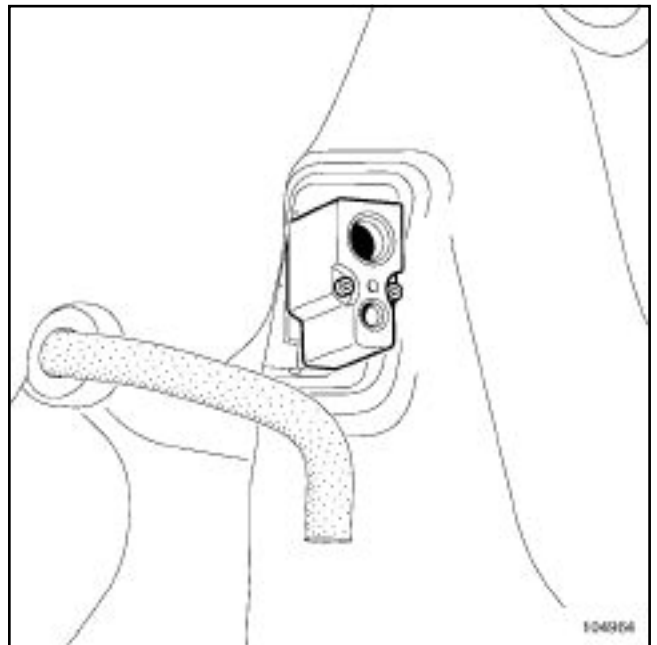
Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

#### b - REFITTING

Tilt the passenger compartment filter before inserting it into the air conditioning unit.

Engage the upper section of the base of the filter into the air conditioning unit.

#### X - MASTER



104964

Apply the cleaner using an extension piece via the condensation drain pipe (located on the engine compartment side bulkhead).

#### Note:

Bend the end piece so that when it is inserted into the condensation drain pipe it is forced to the left-hand side of the technician.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

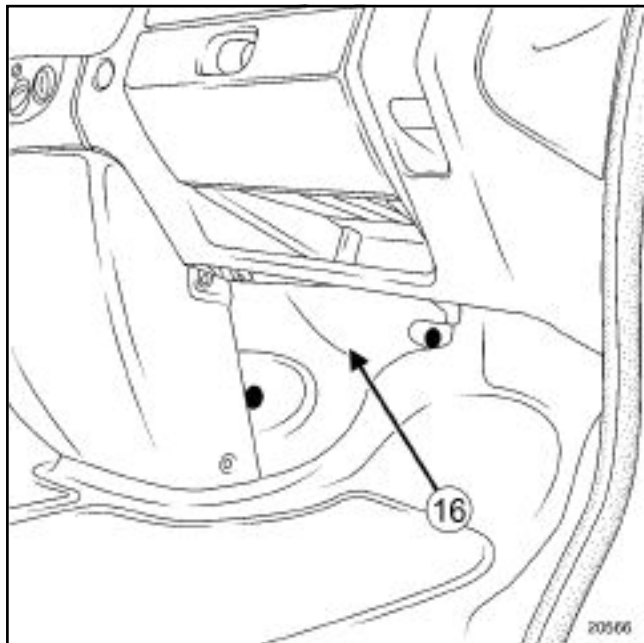
Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

### XI - TRAFIC

#### a - REMOVAL



20566

Remove the trim at (16).

Remove the refrigerant pipe at the distribution unit end.

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

#### WARNING

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

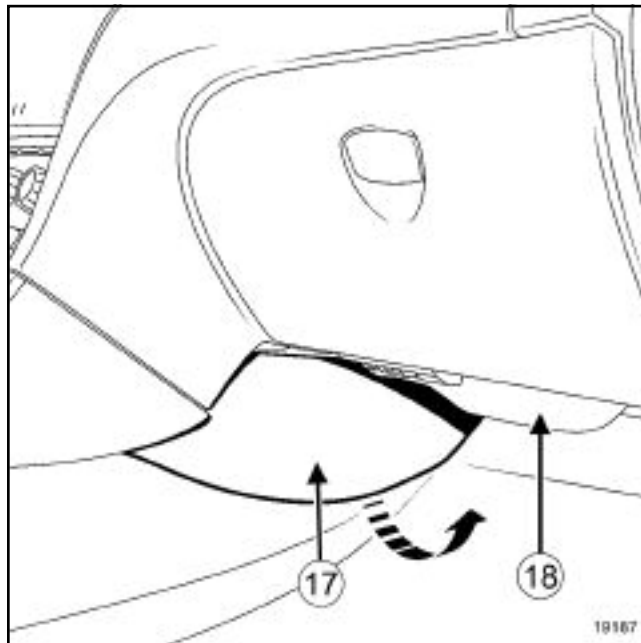
#### b - REFITTING

Refit the refrigerant pipe at the distribution unit end.

Refit the trim under the glovebox.

### XII - VELSATIS

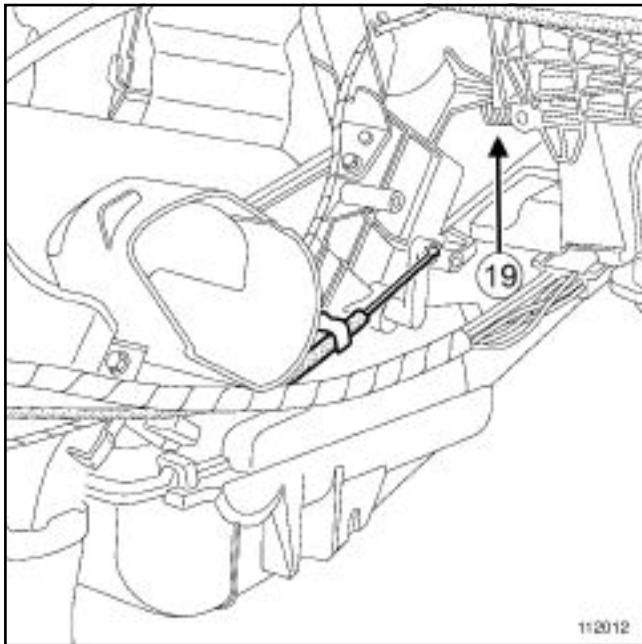
#### a - REMOVAL



19187

Remove:

- the right-hand trim from the centre console (17),
- the soundproofing below the storage compartment (18).



112012

Move refrigerant pipe (19).

Apply the air conditioning cleaner using an extension piece. The end of the extension piece must be positioned at the base of the evaporator.

Spray the entire contents of the can.

Leave the product to work for **15 minutes**.

Run the fan assembly very slowly for **5 minutes**.

**WARNING**

Do not spray the cleaner via the air inlet, as this could damage the fan assembly.

**b - REFITTING**

Refit the refrigerant pipe.

Refit the soundproofing below the storage compartment.

Refit the right-hand trim to the centre console,