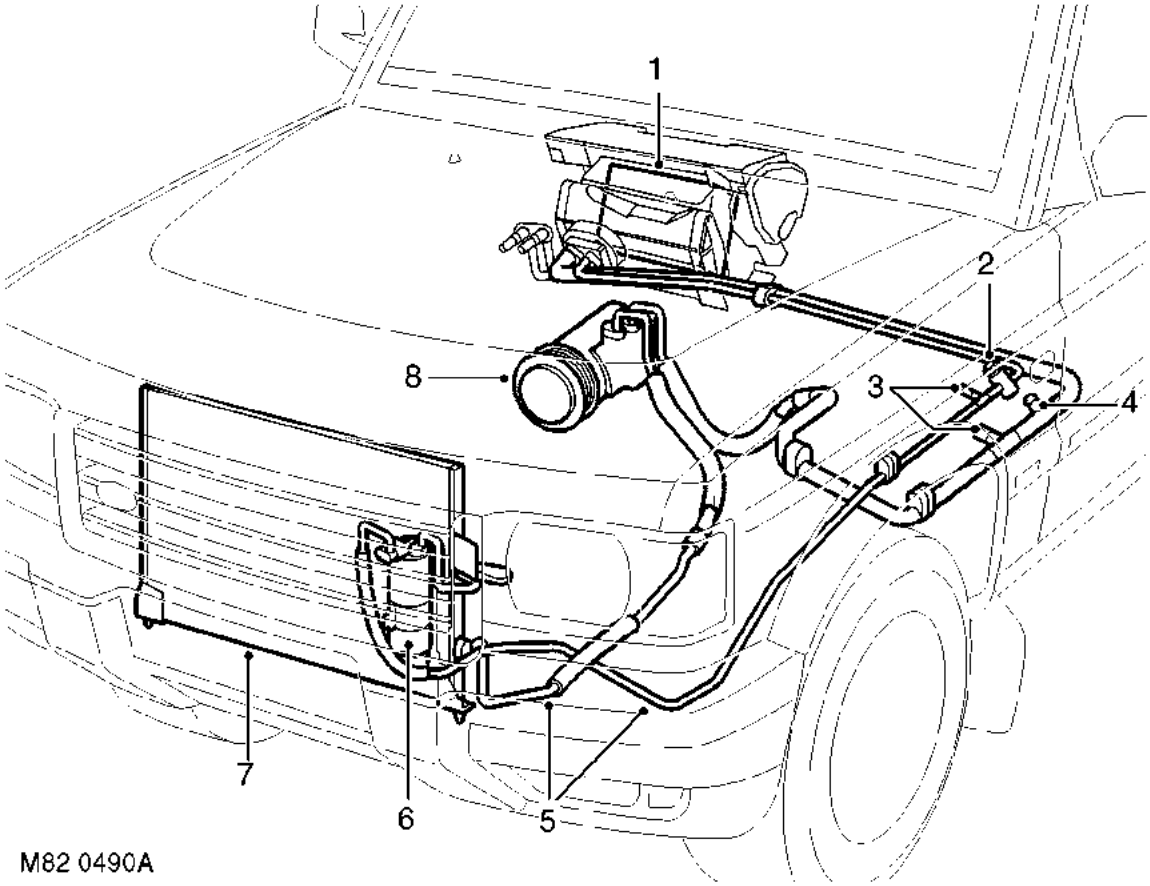
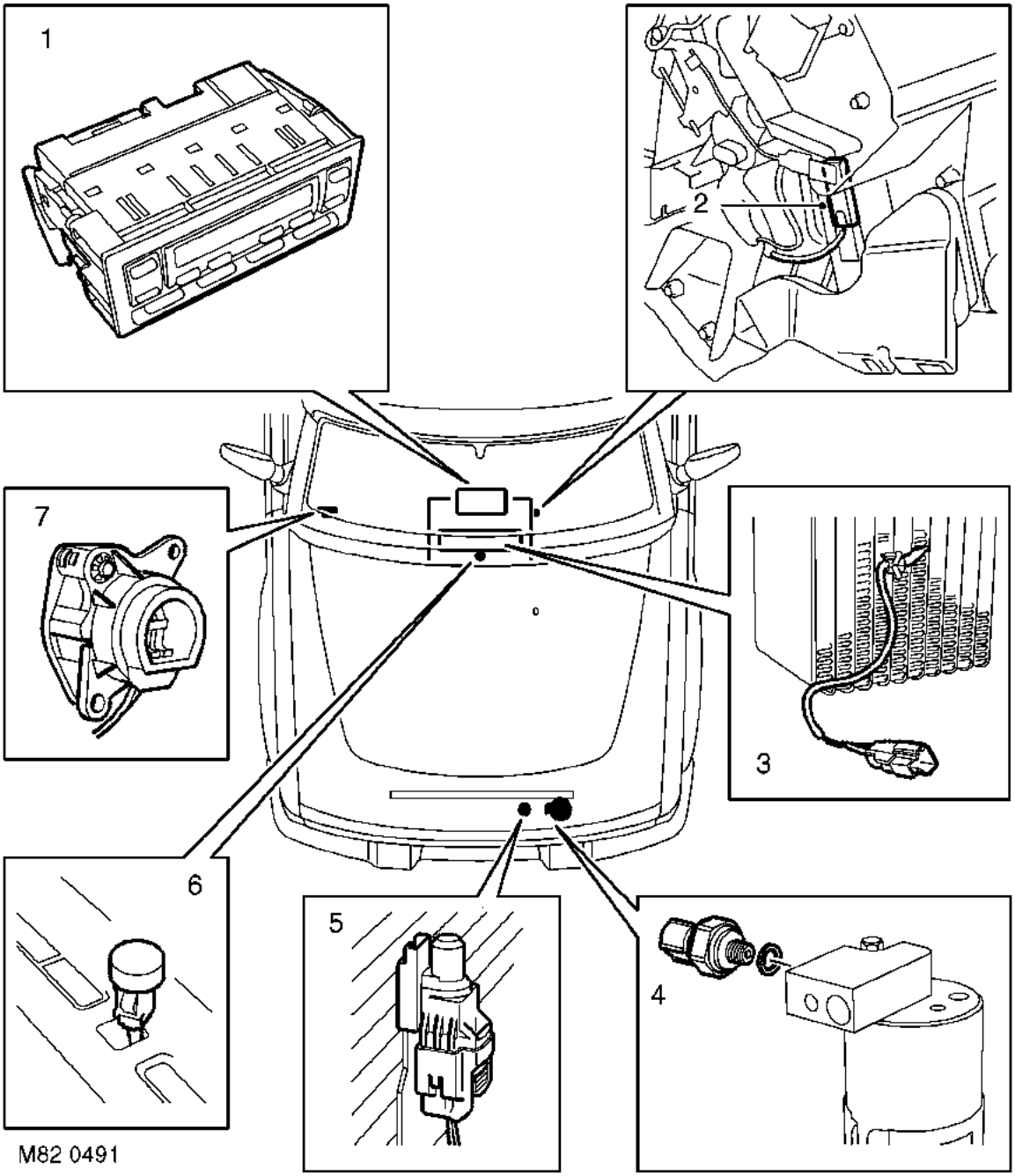
A/C refrigerant system component layout



Diesel installation shown, V8 similar

1 Evaporator and thermostatic expansion valve
2 High pressure servicing connection
3 To rear A/C system (where fitted)
4 Low pressure servicing connection
5 Refrigerant lines
6 Receiver drier
7 Condenser
8 Compressor

A/C control system component layout



RH drive shown, LH drive similar

1 Air temperature control ECU
2 Heater coolant temperature sensor
3 Evaporator temperature sensor
4 Dual pressure switch
5 Ambient temperature sensor
6 Sunlight sensor
7 In-car temperature sensor

Description

General

The air conditioning system controls the temperature, distribution and volume of air supplied to the vehicle interior to provide a comfortable cabin environment. The system is electronically controlled and features automatic and manual modes of operation, with separate temperature control of the LH and RH air outlets. The automatic modes provide optimum control of the system under most ambient conditions and require no manual intervention. The manual modes allow individual functions of automatic operation to be overridden, to accommodate personal preferences.

The air conditioning system consists of a refrigerant system, a heater assembly and a control system. It also uses the same air inlet duct and distribution ducts as the Heating and Ventilation system on non air conditioned vehicles.

☞ **HEATING AND VENTILATION, DESCRIPTION AND OPERATION, Description.**

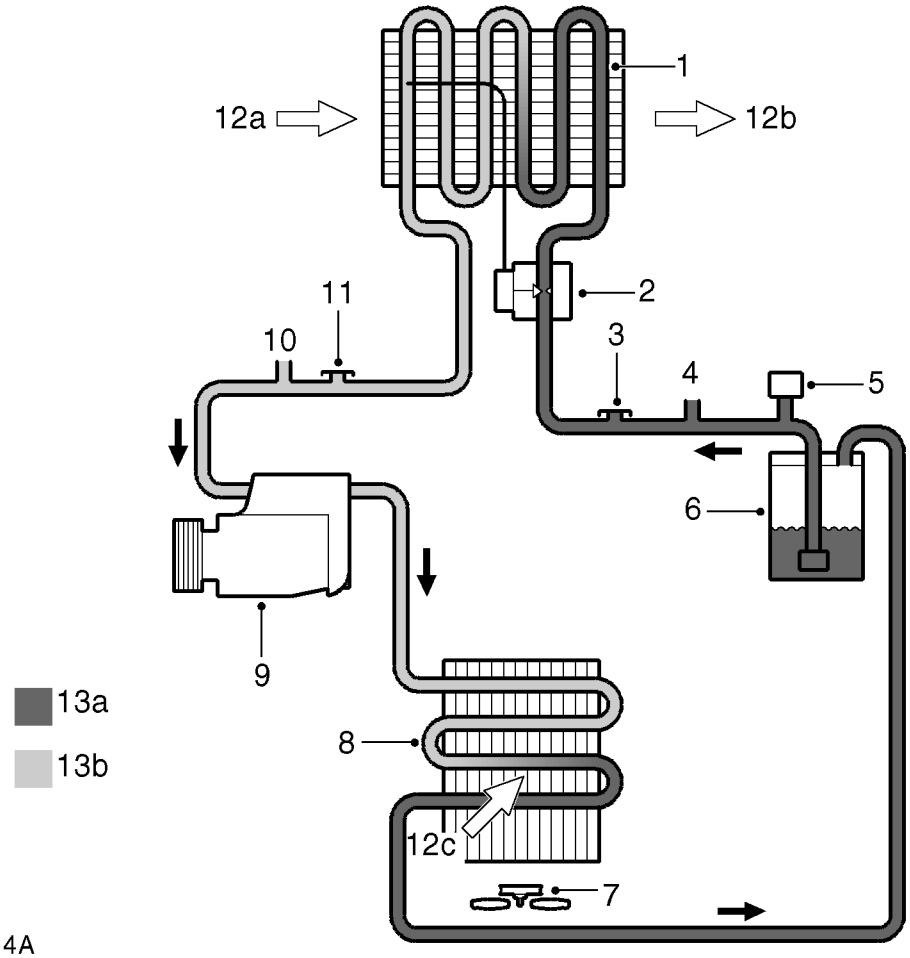
Fresh or recirculated inlet air flows into the heater assembly from the blower in the air inlet duct. In the heater assembly, the air is cooled and/or heated, depending on the selected cabin temperature and ambient conditions, then directed to selected air outlets.

On vehicles with rear air conditioning, additional cooling is provided by recirculating air through a second evaporator and distributing it to outlets in the roof.

☞ **AIR CONDITIONING, DESCRIPTION AND OPERATION, Description.**

Refrigerant system

Schematic of air conditioning system



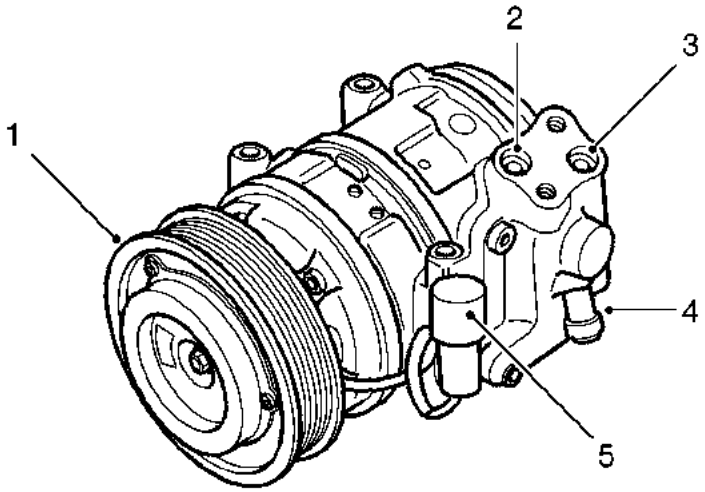
1 Evaporator
2 Thermostatic expansion valve
3 Low pressure servicing connection
4 Outlet to rear A/C system (where fitted)
5 Dual pressure switch
6 Receiver drier
7 Cooling fan
8 Condenser
9 Compressor
10 Inlet from rear A/C system (where fitted)
11 High pressure servicing connection
12 Air flows
- **a** Ambient air
- **b** Cooled air
- **c** Ambient air through condenser

13 Refrigerant
- **a** Liquid
- **b** Vapour

The refrigerant system transfers heat from the vehicle interior to the outside atmosphere to provide the heater assembly with dehumidified cool air. The system comprises a compressor, condenser, receiver drier, thermostatic expansion valve and evaporator, joined together by refrigerant lines. The system is a sealed, closed loop, filled with a charge weight of R134a refrigerant as the heat transfer medium. Oil is added to the refrigerant to lubricate the internal components of the compressor.

To accomplish the transfer of heat, the refrigerant is circulated around the system, where it passes through two pressure/temperature regimes. In each of the pressure/temperature regimes, the refrigerant changes state, during which process maximum heat absorption or release occurs. The low pressure/temperature regime is from the thermostatic expansion valve, through the evaporator to the compressor; the refrigerant decreases in pressure and temperature at the thermostatic expansion valve, then changes state from liquid to vapour in the evaporator, to absorb heat. The high pressure/temperature regime is from the compressor, through the condenser and receiver drier to the thermostatic expansion valve; the refrigerant increases in pressure and temperature as it passes through the compressor, then releases heat and changes state from vapour to liquid in the condenser.

Compressor



M82 0492

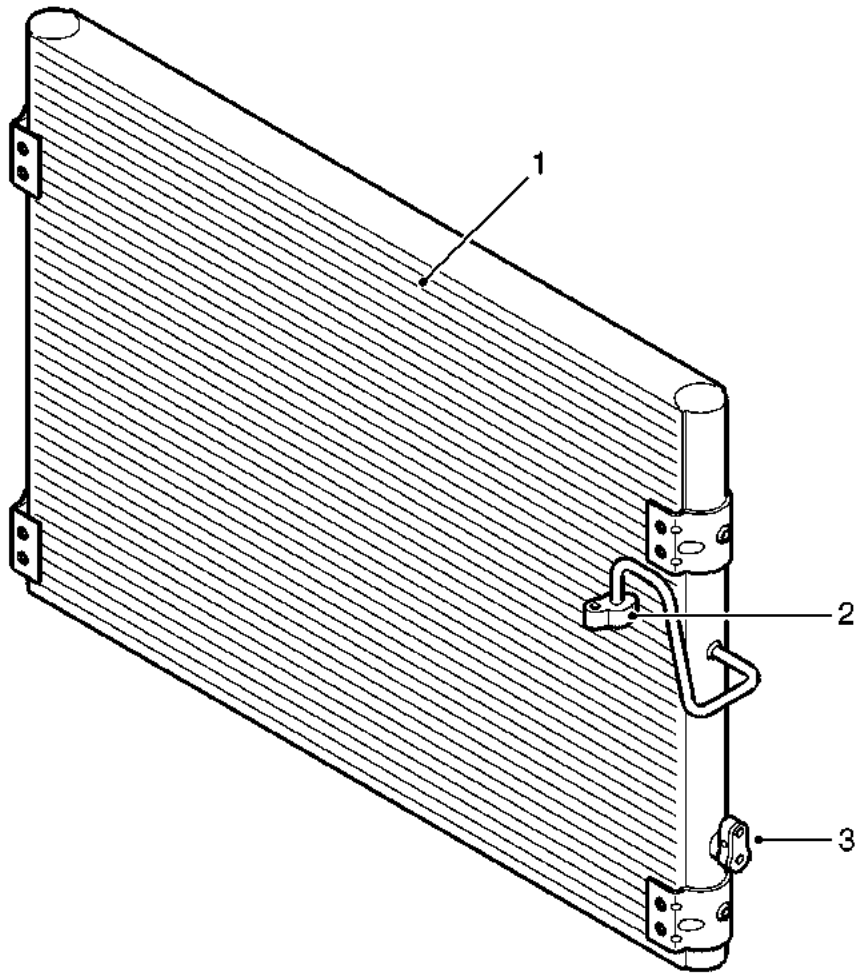
1 Pulley
2 Inlet connection
3 Outlet connection
4 Pressure relief valve
5 Clutch connector

The compressor circulates the refrigerant around the system by compressing low pressure, low temperature vapour from the evaporator and discharging the resultant high pressure, high temperature vapour to the condenser.

The compressor is attached to a mounting bracket on the engine, and is a ten cylinder swash plate unit with a fixed displacement of 177 ml/rev (0.19 US qt/rev). The auxiliary drive belt drives the compressor via a pulley and an electrically actuated clutch. Operation of the clutch is controlled by the Engine Control Module (ECM).

To protect the refrigerant system from unacceptably high pressure, a pressure relief valve is installed in the outlet side of the compressor. The pressure relief valve is set to operate at 34.3 to 41.4 bars (497 to 600 lbf.in^2) and vents excess pressure into the engine compartment.

Condenser



M82 0493

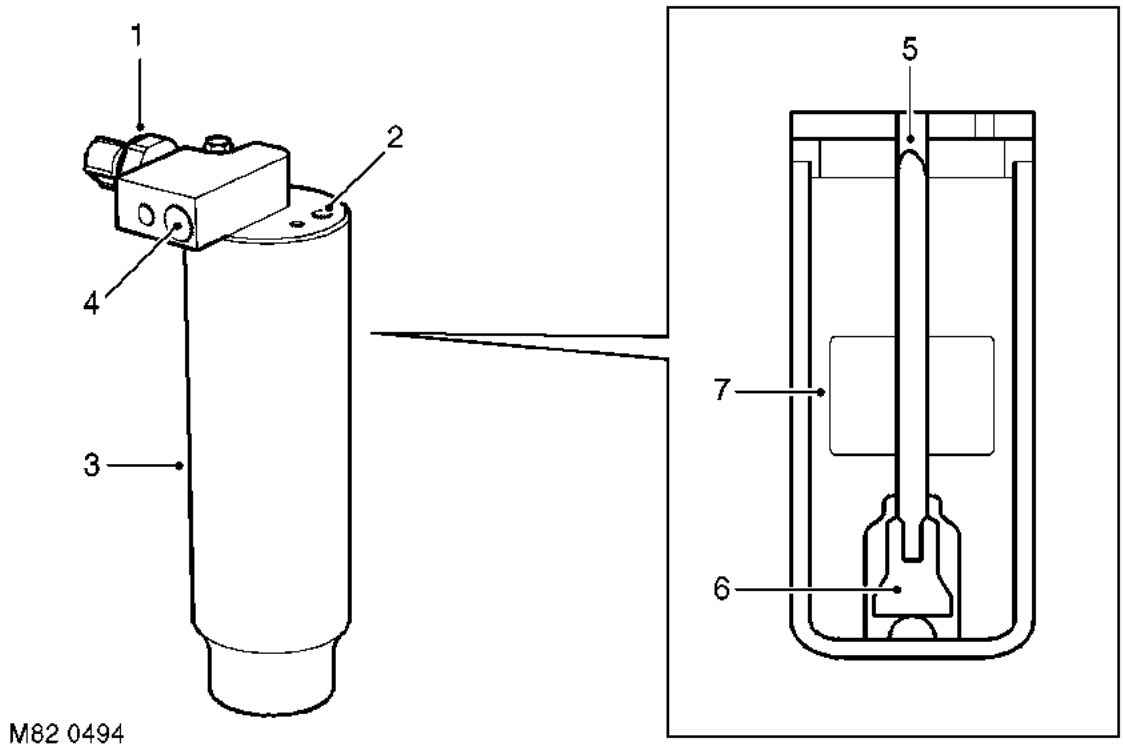
1 Condenser matrix
2 Outlet connection
3 Inlet connection

The condenser transfers heat from the refrigerant to the surrounding air.

The condenser is installed immediately in front of the oil coolers. Rubber mounting bushes are used to mount the condenser to the chassis sidemembers and brackets on the headlamp panels.

Ambient air, passing through the condenser matrix due to ram effect and/or the cooling fan, absorbs heat from the refrigerant, which changes state from a vapour to a liquid.

Receiver drier



1 Dual pressure switch
2 Inlet connection
3 Housing
4 Outlet connection
5 Outlet tube
6 Screen
7 Desiccant

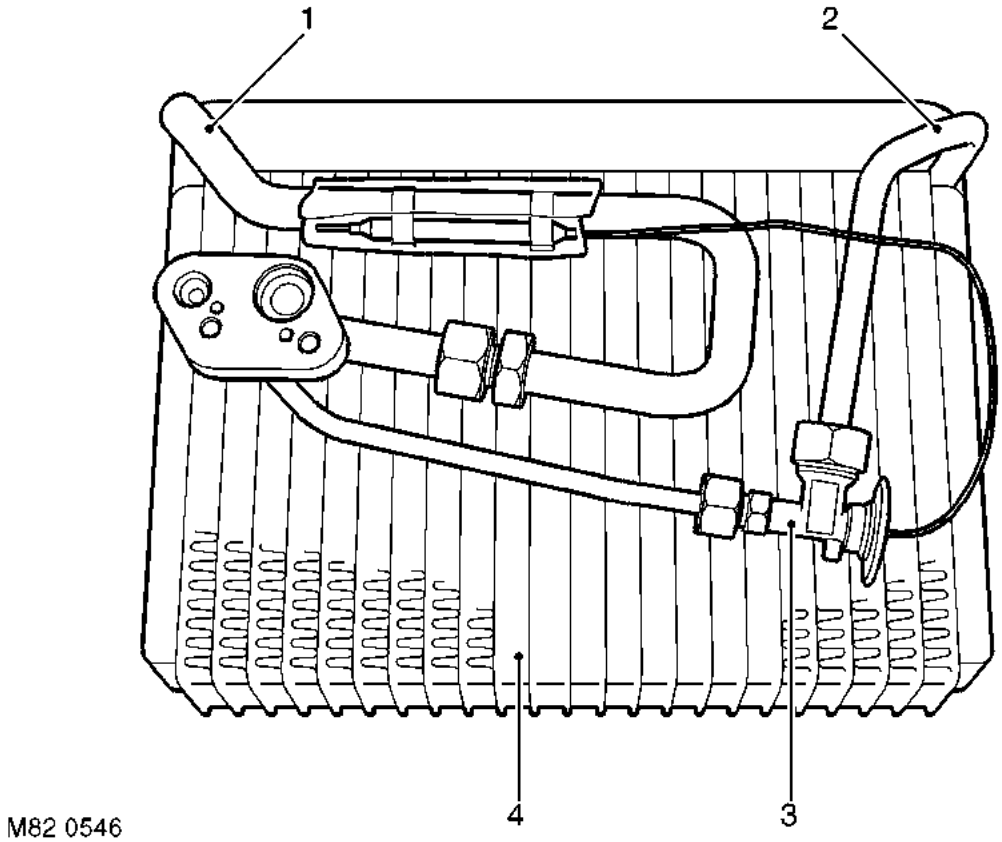
The receiver drier removes moisture and solid impurities from the refrigerant and also acts as a refrigerant reservoir.

The receiver drier is clamped to a bracket in front of the condenser. The receiver drier housing is manufactured in aluminium and contains a desiccant to absorb moisture. A mesh screen in the housing removes solid impurities. Inlet, outlet and dual pressure switch connections are located in the top of the housing.

Liquid refrigerant enters the receiver drier, passes through the desiccant and mesh screen, and through a tube to the outlet connection.

Thermostatic expansion valve

Thermostatic expansion valve and evaporator



1 Refrigerant outlet
2 Refrigerant inlet
3 Thermostatic expansion valve
4 Evaporator

The thermostatic expansion valve meters the flow of refrigerant into the evaporator to match the refrigerant flow with the heat load of the air passing through the evaporator matrix.

The thermostatic expansion valve is installed in the heater assembly, in the refrigerant inlet line to the evaporator. Liquid refrigerant flows through the valve to the evaporator. The restriction across the valve reduces the pressure and temperature of the refrigerant and changes it to a fine spray, which improves the evaporation process. Valve opening is controlled by the pressure in a capillary tube containing a temperature sensitive fluid. One end of the capillary tube is connected to a diaphragm housing on the thermostatic expansion valve, the other end of the capillary tube is sealed and attached to the refrigerant outlet line of the evaporator. As the temperature of the refrigerant leaving the evaporator changes, a corresponding change of capillary tube pressure and valve opening are produced. The warmer the refrigerant leaving the evaporator becomes, the greater the volume of refrigerant allowed through the valve.

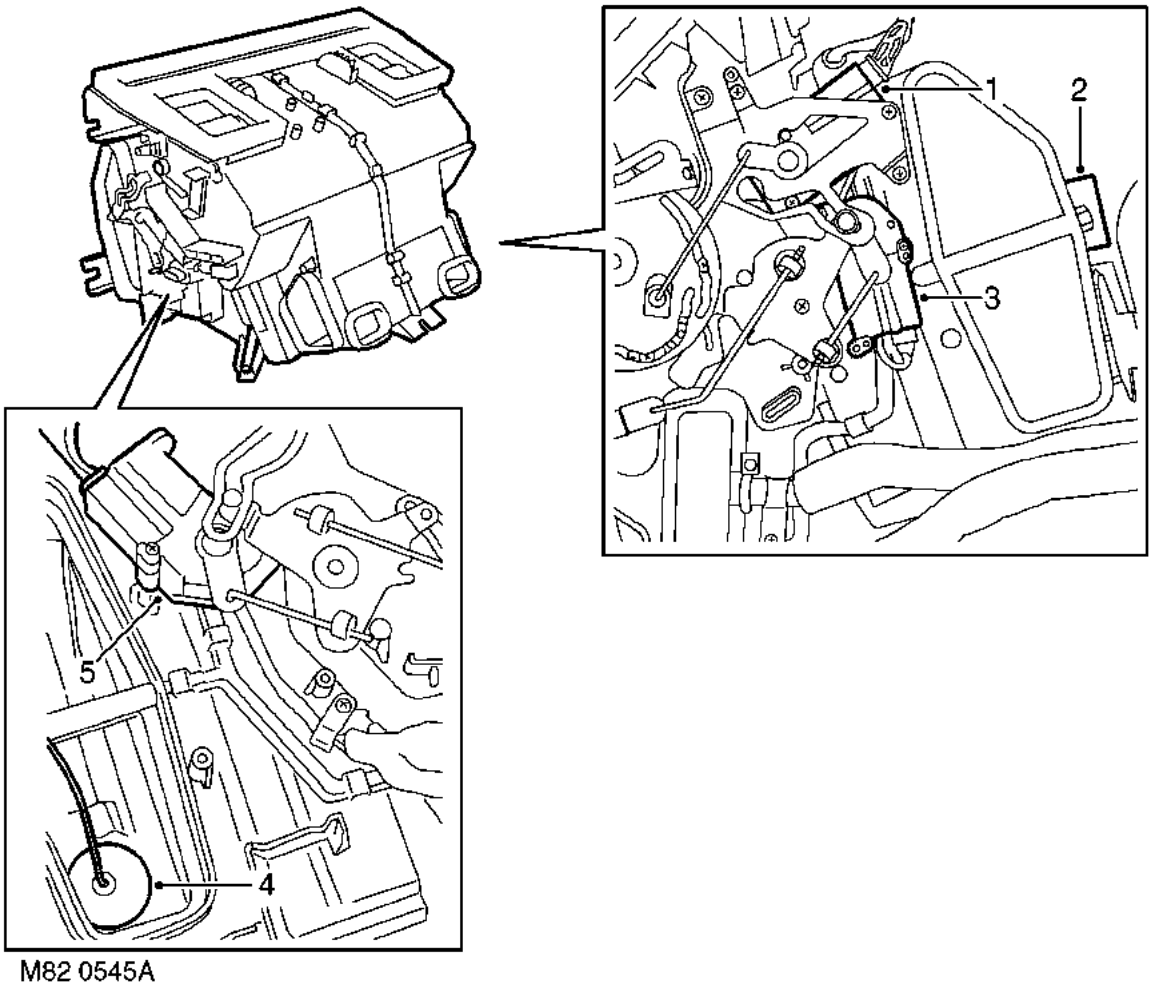
Evaporator

The evaporator is installed in the air inlet of the heater assembly and absorbs heat from the exterior or recirculated inlet air. Low pressure, low temperature refrigerant changes from liquid to vapour in the evaporator, absorbing large quantities of heat as it changes state.

Refrigerant lines

To maintain similar flow velocities around the system, the diameter of the refrigerant lines varies to suit the two pressure/temperature regimes. The larger diameters are installed in the low pressure/temperature regime and the smaller diameters are installed in the high pressure/temperature regime. Low and high pressure charging connections are incorporated into the refrigerant lines for system servicing. Where rear AC is installed, connections for the rear refrigerant lines are incorporated next to the charging connections.

Heater assembly



1 Distribution servo motor
2 Refrigerant inlet and outlet connector block
3 RH blend flap servo motor
4 Thermostatic expansion valve
5 LH blend flap servo motor

The heater assembly controls the temperature and distribution of air supplied to the distribution ducts, and is similar to the heater assembly installed in non A/C vehicles.

☞ **HEATING AND VENTILATION, DESCRIPTION AND OPERATION, Description.** The only differences from the heater assembly in non A/C vehicles are as follows:

- The thermostatic expansion valve, evaporator and evaporator temperature sensor are installed at the air inlet side of the casing.
- Three servo motors operate the control flaps instead of control cables.
- A coolant temperature sensor is installed against the heater matrix.

The servo motors are controlled by the ATC ECU. Feedback potentiometers in the servo motors provide the ATC ECU with flap position signals.

Temperature and distribution control

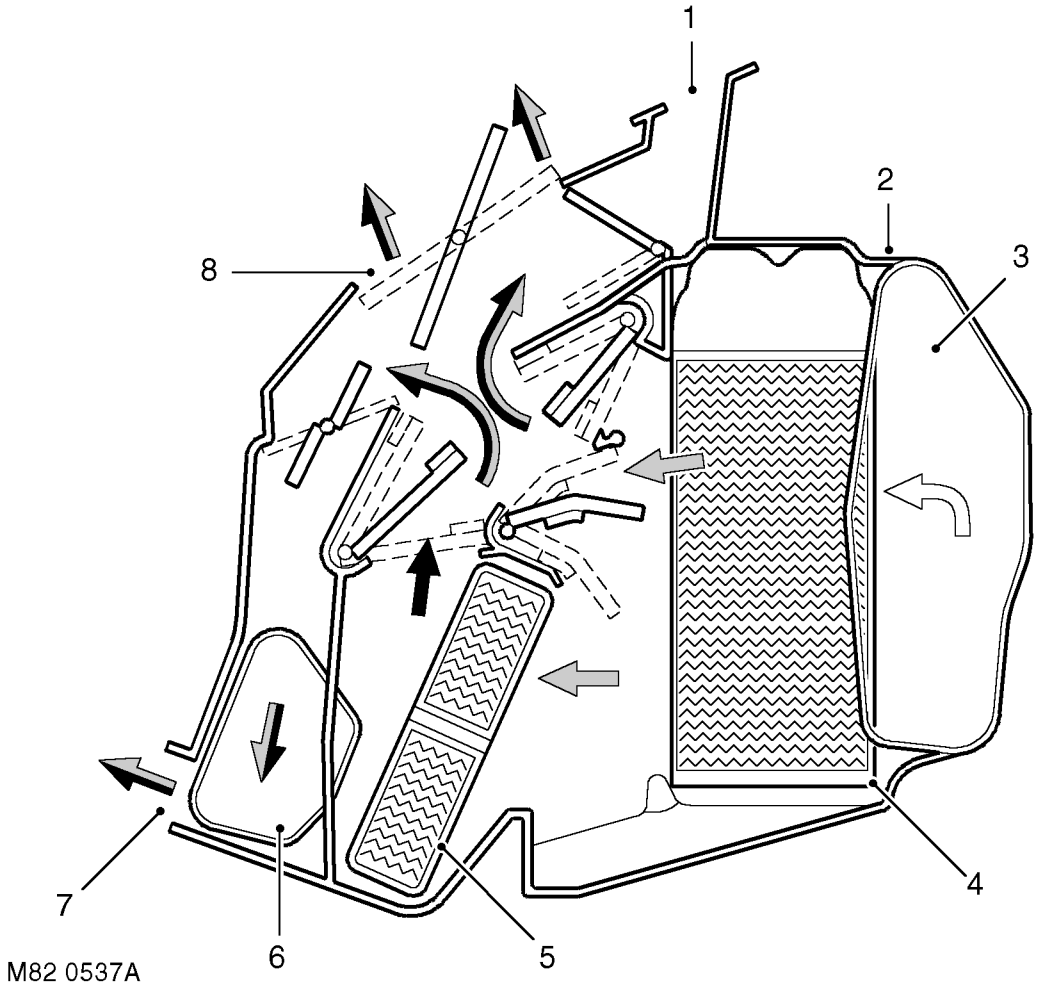


Figure shows flaps set for medium heat to face level and footwell outlets

1 Windscreen/Side windows outlet
2 Heater assembly casing
3 Air inlet
4 Evaporator
5 Heater matrix
6 Front footwells outlet
7 Rear footwells outlet
8 Face level outlet

Control system

The control system operates the refrigerant system and the control flaps in the heater assembly to control the temperature and distribution of air in the vehicle interior. It also outputs signals to the fresh/recirculated air servo motor and the blower to control the volume and source of inlet air. The control system consists of:

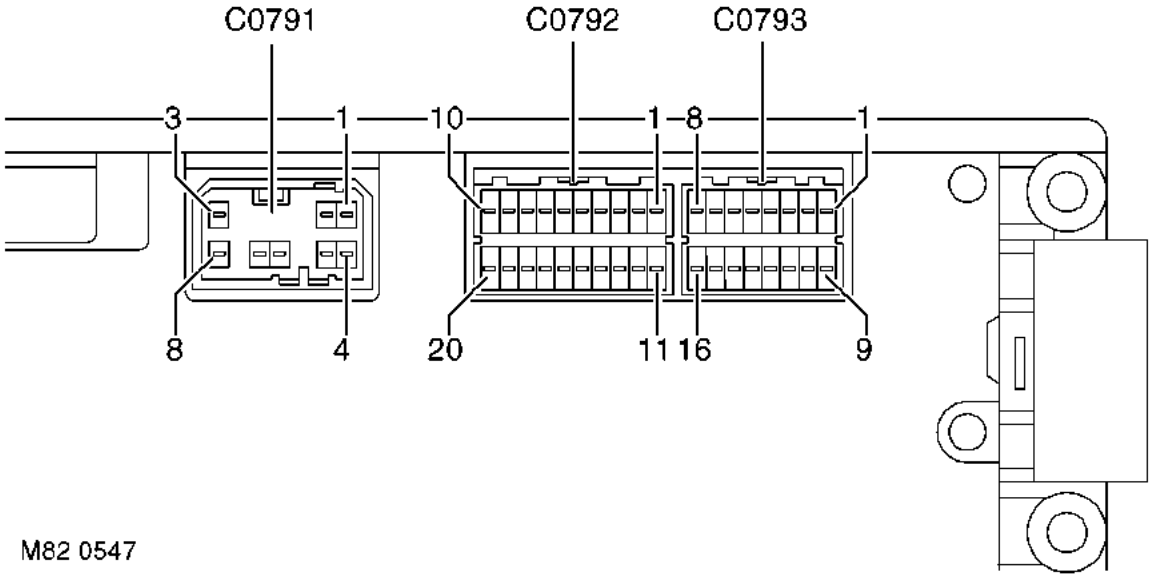
- An Air Temperature Control (ATC) ECU.
- A dual pressure switch.
- An evaporator temperature sensor.
- An in-car temperature sensor.
- A sunlight sensor.
- A heater coolant temperature sensor.
- An ambient temperature sensor.

ATC ECU

The ATC ECU is installed in the centre of the fascia, below the radio. An integral control panel on the ATC ECU contains switches for system control inputs and a LCD to provide system status information.

Inputs from sensors and the control panel switches are processed by the ATC ECU, which then outputs the appropriate control signals.

ATC ECU connectors

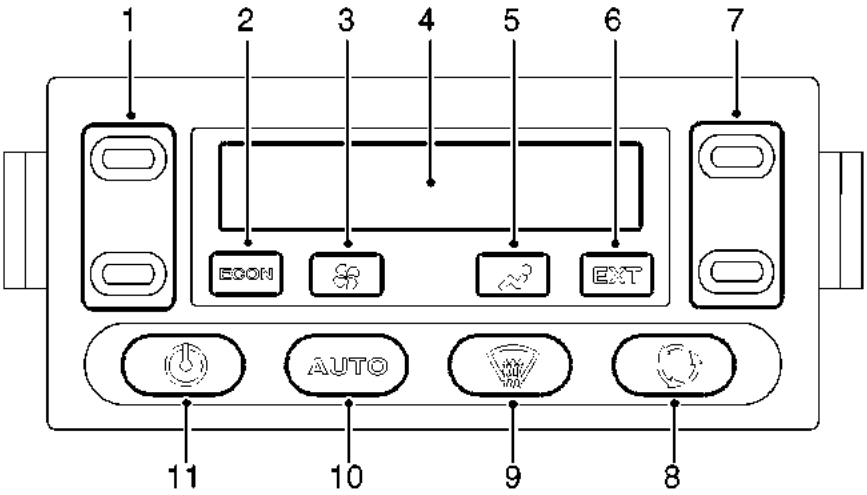


ATC ECU connector pin details

Connector/Pin No.	Description	Input/Output
C0791		
1	Battery power supply	Input
2	Ignition power supply	Input
3	Sensor power supply	Output
4	Earth	-
5	Display illumination	Input
6	Not used	-
7	Not used	-
8	Sensor earth	-
C0792		
1	Night lighting/dimming	Input
2	Vehicle speed	Input
3	Hand of drive	Input
4	Distribution flaps position	Input
5	Heater coolant temperature	Input
6	External air temperature	Input
7	In-car air temperature	Input
8	Blower power transistor collector voltage	Input
9	Not used	-
10	Not used	-
11	Windscreen heater status	Input
12	Rear screen heater status	Input
13	Rear air conditioning ON	Input

Connector/Pin No.	Description	Input/Output
14	Driver's blend flaps position	Input
15	Passenger's blend flaps position	Input
16	LH solar heating load	Input
17	RH solar heating load	Input
18	Evaporator	Input
19	Not used	-
20	Not used	-
C0793		
1	Blower power transistor base current	Output
2	Blower relay	Output
3	Windscreen heater request	Output
4	Rear screen heater request	Output
5	Passenger's blend flaps servo motor, drive to hot	Output
6	Driver's blend flaps servo motor, drive to hot	Output
7	Distribution flaps servo motor, drive to windscreen and side windows demist	Output
8	Fresh/Recirculated air servo motor, drive to recirculated air	Output
9	Cooling fan request (diesel models)	Output
10	Power relay	Output
11	Compressor clutch request	Output
12	Cooling fan request (V8 models)	Output
13	Passenger's blend flaps servo motor, drive to cold	Output
14	Driver's blend flaps servo motor, drive to cold	Output
15	Distribution flaps servo motor, drive to footwells	Output
16	Fresh/Recirculated air servo motor, drive to fresh air	Output

Control panel



M82 0495

1 LH temperature switch
2 Economy mode (ECON) switch
3 Blower switch
4 Display
5 Distribution switch
6 External air temperature (EXT) switch
7 RH temperature switch
8 Fresh/Recirculated air switch
9 Defrost mode switch
10 Automatic mode (AUTO) switch
11 A/C on/off switch

The control panel switches are all non-latching pushswitches except for the LH and RH temperature switches, which are centre-off rocker switches. The switches have the following functions:

LH and RH temperature switches. Enabled only while the system is on:
- Each press increases or decreases the related temperature setting, in steps of 1 °C (2 °F), between 16 and 28 °C (60 and 84 °F).
- If the decrease side of the switch is pressed when a temperature of 16 °C (60 °F) is set, the display changes to LO (maximum cold).
- If the increase side of the switch is pressed when a temperature of 28 °C (84 °F) is set, the display changes to HI (maximum hot).
- If a switch is kept depressed, step changes occur every 0.4 seconds.

A/C on/off switch. Switches the system on and off. When used to switch the system on, the system resumes the configuration in use prior to the previous off selection.

Blower switch. Enabled only while the system is on. Provides manual control of blower speed:
- Each press changes the blower speed, in sequence, through off (only available if economy mode is selected on) and five incremental speeds.
- If the switch is kept depressed, after 1 second subsequent speed increments occur every 0.4 second until blower reaches high speed. Releasing and then pressing the switch again changes blower back to off or low speed.

Distribution switch. Enabled only while the system is on. Provides manual control of air distribution:
- Each press changes the air distribution, in sequence, through footwells only, footwells and windscreen/side windows demist, windscreen/side windows demist only, face level only, face level and footwells.
- If the switch is kept depressed, after 1 second subsequent distribution changes occur every 0.4 seconds until distribution reaches face level and footwells. Releasing and then pressing the switch again changes distribution back to footwells only.

External air temperature (EXT) switch. Enabled while the system is on or off. Switches the external temperature output on and off:
- If the system is already on, the temperature output overrides the system outputs for approximately 7 seconds, then the display reverts to system outputs.
- If the system is switched on while the external temperature output is on, the system outputs override the external temperature output.

Fresh/Recirculated air switch. Enabled only while the system is on. Provides manual control of inlet air selection.

Defrost mode switch. Starts the system in, or switches the system to and from, defrost mode.

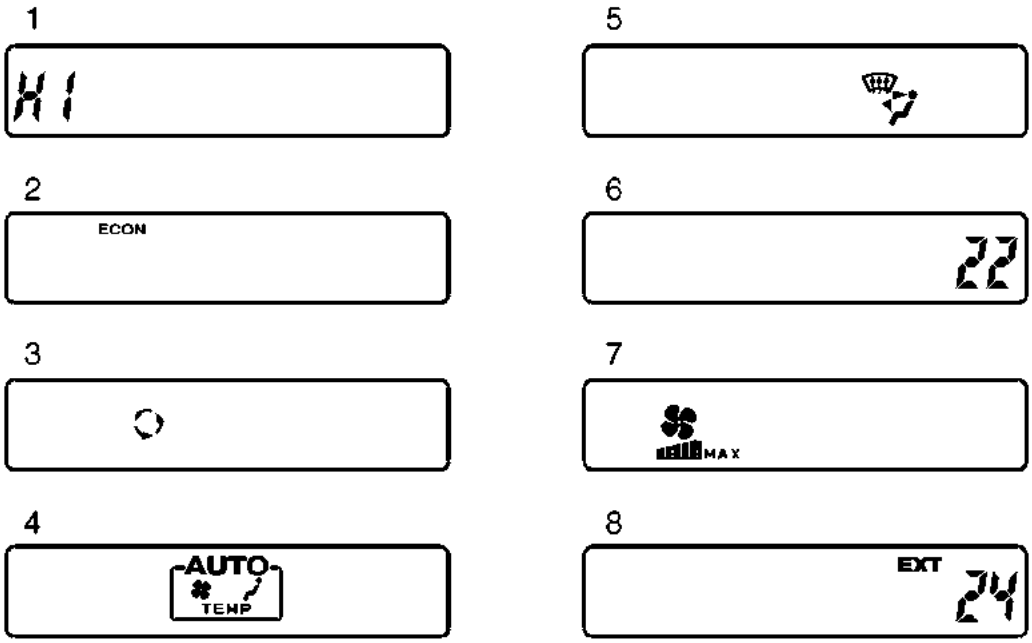
Automatic mode (AUTO) switch. Starts the system in, or switches the system to and from, the automatic mode.

Economy mode (ECON) switch. Enabled only while the system is on. Provides manual on/off control of the refrigerant system compressor, to reduce fuel consumption when there is no requirement for cool or dehumidified air, e.g. when the ambient temperature is lower than the LH and RH temperature settings.

Temperature settings: The LH and RH temperature settings are reference inputs used by the control system and give an approximation of the temperatures that will be established in the cabin. They are not necessarily actual distribution outlet temperatures, or the temperatures at specific points in the cabin.

Audible warning: A 'beep' is emitted from the ATC ECU each time it receives a control switch input. This audible warning can be switched off and on by pressing and holding the AUTO switch, then pressing and holding the A/C on/off switch until the audible warning sounds (approximately 3 seconds). While switched off, the audible warning still sounds when:
- Switching between °F and °C on the display.
- Switching the audible warning from off to on.
- Switching the timed feet function on and off.
- Switching the timed recirculated inlet air on and off.
- Switching the latched recirculated inlet air on and off.
- When there is a fault warning.
- Running the self diagnostic routine.

Display outputs



M82 0496

1 LH temperature
2 Economy mode
3 Recirculated air
4 Automatic mode
5 Manual distribution
6 RH temperature
7 Blower speed
8 External air temperature

Outputs on the display are shown at full brightness when the exterior lights are off, and dimmed when the exterior lights are on.

LH temperature. Illuminates to show the LH temperature selection, the temperature scale or that the ATC ECU is in diagnostic mode.

Economy mode. Illuminates when the compressor is manually selected off with the ECON switch.

Recirculated air. Illuminates when the inlet air is manually selected to recirculated mode.

Automatic mode. Illuminates the AUTO legend and related symbol(s) when the blower speed, air distribution or temperature control are in the automatic mode.

Manual distribution. Illuminates the appropriate symbol(s) to show the manually selected air distribution. Also illuminates in the automatic modes when one of the temperatures is set to LO or HI.

RH temperature. Illuminates to show the RH temperature selection, external air temperature or diagnostic fault code.

Blower speed. Illuminates when the blower speed is manually selected. Also illuminates in the automatic modes when one of the temperatures is set to LO or HI.

External air temperature. EXT illuminates to show that external air temperature is selected on.

All temperature indications on the display are in either °C or °F. For 1 second after the system is first switched on, the display shows only °C or °F, in the LH temperature window, to indicate which temperature scale is in use. After 1 second, the °C or °F indication goes off and the display shows all relevant outputs.

Temperature conversion: While the system is on, the temperature indications on the display can be switched between the two scales by pressing and holding the fresh/recirculated air switch, then pressing and holding the A/C on/off switch until the audible warning sounds (approximately 3 seconds).

Dual pressure switch

The dual pressure switch protects the refrigerant system from extremes of pressure. The normally closed switch is installed in the top of the receiver drier. If minimum or maximum pressure limits are exceeded the switch contacts open, causing the compressor clutch to be disengaged. The minimum pressure limit protects the compressor, by preventing operation of the system unless there is a minimum refrigerant pressure (and thus refrigerant and lubricating oil) in the system. The maximum pressure limit keeps the refrigerant system within a safe operating pressure.

Dual pressure switch nominal operating pressures

Limit	Opening pressure, bar (lbf.in^2)	Closing pressure, bar (lbf.in^2)
Minimum	2.0 (29.0), pressure decreasing	2.3 (33.4), pressure increasing
Maximum	32 (464), pressure increasing	26 (377), pressure decreasing

Evaporator temperature sensor

The evaporator temperature sensor is an encapsulated thermistor that provides the ATC ECU with an input of the evaporator air outlet temperature. The evaporator temperature sensor is installed in a clip which locates in the evaporator matrix in the heater assembly. The ATC ECU uses the input to prevent the formation of ice on the evaporator.

In-car temperature sensor

The in-car temperature sensor is an encapsulated thermistor that provides the ATC ECU with an input of cabin air temperature. The sensor is integrated into the inlet of an electric fan, which is installed behind a grille in the fascia outboard of the steering column. The fan runs continuously, while the ignition is on, to draw air through the grille and across the sensor.

Sunlight sensor

The sunlight sensor consists of two diodes that provide the ATC ECU with inputs of light intensity, one as sensed coming from the left of the vehicle and one as sensed coming from the right. The inputs are used as a measure of the solar heating effect on vehicle occupants. The sensor is installed in the centre of the fascia upper surface.

Heater coolant temperature sensor

The heater coolant temperature sensor is an encapsulated thermistor that provides the ATC ECU with an input related to heater matrix coolant temperature. The sensor is installed in the casing of the heater assembly and presses against the end tank of the heater matrix.

Ambient temperature sensor

The ambient temperature sensor is an encapsulated thermistor that provides the ATC ECU with an input of external air temperature. The sensor is attached to the cooling fan mounting bracket in front of the condenser.

Operation

General
While the system is on, the ATC ECU operates the refrigerant system and the inlet air, blower speed, air temperature and air distribution functions to produce the conditions requested on the control panel. When the system is first switched on, the ATC ECU resumes the control outputs in use when the system was last switched off. If conditions have changed, or a different mode is selected to switch the system on, the control outputs are then changed to produce the required new settings.

The system operates in automatic, economy and defrost modes, with manual overrides of the inlet air source, blower speed and air distribution. The air temperature is automatically controlled in all operating modes.

In the automatic mode, the ATC ECU operates the system to warm-up or cool down the cabin to establish and maintain the temperature selections on the control panel, while directing the air to those outlets most comfortable for the occupant(s). If a difference between the LH and RH temperature selections causes a conflict of the required inlet air source, blower speed or air distribution settings, priority is given to achieving the temperature requested on the driver's side of the control panel.

The ATC ECU enters the economy mode when the refrigerant compressor is selected off while the system is in the automatic mode, which reduces the load on the engine. Economy mode operation is similar to the automatic mode, but without the ability to cool the cabin if the ambient temperature is higher than the temperature selections made on the control panel, or to dehumidify the air in the cabin.

In the defrost mode, the ATC ECU sets the inlet air source to fresh air, the blower to maximum speed, the air distribution to windscreen and side windows, and outputs signals to the BCU to operate the rear window heater and (where fitted) the windscreen heater. The BCU starts or, if the heaters are already on, resets the heater timers and energises the rear window and windscreen heaters for a complete on cycle.

Air temperature control
To determine the amount of heat or cooling required by the cabin, the ATC ECU uses the sensor inputs and the temperatures selected on the control panel to calculate target air outlet temperatures for the driver's and the front passenger's side of the heater assembly. The ATC ECU then signals the servo motors controlling the respective blend flaps in the heater assembly to move to the flaps to the appropriate position. The target temperatures are constantly updated and, in the automatic mode, also used in further calculations to determine the inlet air source, the blower speed and the air distribution.

Inlet air control
The inlet air source is automatically controlled while the system is off or on. While the system is on, the inlet air source can also be manually controlled to give timed recirculated air or latched recirculated air.

While the system is off, the ATC ECU uses vehicle speed to determine the inlet air source. With the vehicle at rest, the inlet air source is set to recirculated air. When vehicle speed reaches 17.5 mph (28 km/h), the inlet air source changes to fresh air. The inlet air source then remains at fresh air until the vehicle speed decreases to 5 mph (8 km/h), when it returns to recirculated air.

While the system is on, the ATC ECU uses the LH and RH temperature selections, vehicle speed, ambient air temperature and coolant temperature to determine the inlet air source. In the automatic mode:

- If one temperature selection is set to LO and one is set to a specific temperature or HI, the inlet air is set to recirculated air.
- If one temperature selection is set to HI and one is set to a specific temperature or HI, the inlet air is set to fresh air.
- When specific LH and RH temperature selections are set, the inlet air source remains at fresh air except when the air distribution function is set to face level only or face level and footwell outlets. If the air distribution function is set to face level only or face level and footwell outlets, at 56 mph (90 km/h) the inlet air source changes to recirculated air (to exclude ram effect, which becomes excessive at speed). When the vehicle speed decreases to 37.5 mph (60 km/h), the inlet air source returns to fresh air.

In the defrost mode, the inlet air source is set to fresh air except at low ambient air and coolant temperatures. If, within 5 minutes of the ignition being switched on, the vehicle speed is less than 5 mph (8 km/h) while the external air temperature is –16 °C (3 °F) or less and the heater coolant temperature is –10 °C (14 °F) or less, then the inlet air source is automatically set to the timed recirculated air mode. The timed recirculated air mode is cancelled immediately the vehicle speed reaches 8 km/h or more .

Timed recirculated air

The timed recirculated air mode sets the inlet air source to recirculated air for 5 ± 1 minutes, after which it automatically reverts to fresh air. Timed recirculated air can be manually selected:

- In the automatic mode, by pressing the fresh/recirculated air switch for 1.5 seconds or more; the audible warning sounds twice.
- In the economy or defrost modes, by pressing the fresh/recirculated air switch for less than 1.5 seconds; the audible warning sounds once.

Latched recirculated air

The inlet air source can be latched to recirculated air:

- In the automatic mode, by pressing the fresh/recirculated air switch for less than 1.5 seconds; the audible warning sounds once.
- In the economy or defrost modes, by pressing the fresh/recirculated air switch for 1.5 seconds or more; the audible warning sounds twice.

Blower control

The ATC ECU operates a blower relay, power transistor and power relay to run the blower at one of 31 stepped speeds. All speed steps are available in the automatic modes of blower control. In the manual mode, speed steps 3, 10, 16, 22 and 31 are used to provide slow, three intermediate and fast blower speeds. The ATC ECU energises the blower relay and modulates the power transistor to operate the blower for speed steps 1 to 30. For speed step 31, the ATC ECU energises the power relay, which switches the earth side of the blower motor direct to earth, bypassing the power transistor.

In the automatic, economy and defrost modes, blower speed is corrected for vehicle speed to compensate for the increase in ram effect on the inlet air as the vehicle speed increases. Correction begins at approximately 50 km/h, when blower speed is progressively decreased as vehicle speed increases, until a maximum decrease of 13 steps occurs at 123 km/h. Similarly, blower speed increases as vehicle speed decreases down to approximately 50 km/h.

In the automatic and economy modes, if the LH or RH temperature is set to LO or HI, the blower runs at maximum speed with correction only for vehicle speed. If both the LH and RH outlet air temperatures are set to a specific temperature, blower speed corrections are added to compensate for the heater coolant temperature, external air temperature, and the solar load acting on the vehicle:

- During warm-up, the blower speed is set to 3 while the heater coolant temperature is below approximately 20 °C (68 °F). From approximately 20 °C (68 °F), the blower speed is progressively increased as the coolant temperature increases, until maximum speed is set at approximately 50 °C (122 °F).
- During cool down, blower speed is set to 3, for 5 seconds after the system is switched on. Over the following 6 seconds, the blower speed is progressively increased up to maximum speed.
- As the temperature in the cabin approaches the selected temperatures, blower speed is progressively reduced until, once the selected temperatures have been established, blower speed stabilises at approximately 6.
- Solar heating correction is employed when air distribution is set to face level or to face and footwells. The correction progressively increases the blower speed, up to a maximum of 9 steps, with increasing values of solar heating.

Air distribution control
To control the air distribution within the cabin the ATC ECU signals the servo motor controlling the distribution flaps in the heater assembly to move to the flaps to the appropriate position.

In the automatic and economy modes, if the LH or RH temperature selections are set to LO or HI, air distribution is fixed as follows:

- If one is set to LO and one is set to a specific temperature, to face level only.
- If one is set to HI and one is set to a specific temperature, to footwells only.
- If one is set to LO and one is set to HI, to face level and footwells.

When specific LH and RH temperature selections are set, air distribution is determined from the target air outlet temperatures. For higher target air outlet temperatures, air distribution is set to footwells only. For lower target air outlet temperatures, air distribution is set to face level only. For intermediate target air outlet temperatures, air distribution is set to face level and footwells. When the air distribution is set to face level and footwells, the ATC ECU varies the bias between the footwells and the face level outlets, in three stages, to provide a gradual transition of air distribution from footwells only to face level only. The three stages of bias are also employed when the air distribution is manually selected to face level and footwells.

During warm-up, the air distribution changes to face level and footwells for a period, then reverts to footwells only. The period of air distribution at face level and footwells can be cancelled by pressing and holding the on/off and defrost mode switches, then turning the ignition switch from off to on. Pressing and holding the AUTO and defrost switches, then turning the ignition switch from off to on, restores the period of air distribution at face level and footwells.

Compressor control
To engage the compressor clutch, the ATC ECU outputs a compressor clutch request to the ECM, which then energises the A/C compressor clutch relay. Compressor operation is governed by the evaporator outlet air temperature, at one of two settings, dependent on the amount of cooling required. When more cooling is required, the compressor clutch request is output if evaporator outlet air temperature increases to 4 °C (39 °F) and cancelled when it decreases to 3 °C (37 °F). When less cooling is required, the compressor clutch request is output if evaporator outlet air temperature increases to 11 °C (52 °F) and cancelled when it decreases to 10 °C (50 °F).

Engine cooling fan control
While the A/C system is on, operation of the electric engine cooling fan, to assist refrigerant condenser operation, is determined by a combination of vehicle speed and external air temperature. When cooling fan operation is required, the ATC ECU outputs a cooling fan request to the ECM, which then energises the cooling fan relay. The cooling fan request is output if vehicle speed is 80 km/h or less while the external air temperature is 28 °C (82 °F) or more. The request is cancelled, and the cooling fan switched off, if either the vehicle speed increases to 100 km/h, or the external air temperature decreases to 25 °C (77 °F).

Default settings
If the battery power supply to the ATC ECU is disrupted for any reason, e.g. battery disconnected, the system reverts to default settings when the battery power supply is restored. Default settings are:

- Temperature indications in °C (in some markets a conversion connector is fitted to the ATC ECU to change the default temperature scale to °F).
- LH and RH outlet temperatures of 22 °C (72 °F).
- audible warning switched on.
- Warm-up air distribution (to face level and footwells) function switched on.
- If the system is first switched on using the A/C on/off switch, the automatic mode is engaged, regardless of the settings in use when the battery was disconnected.

Diagnostics

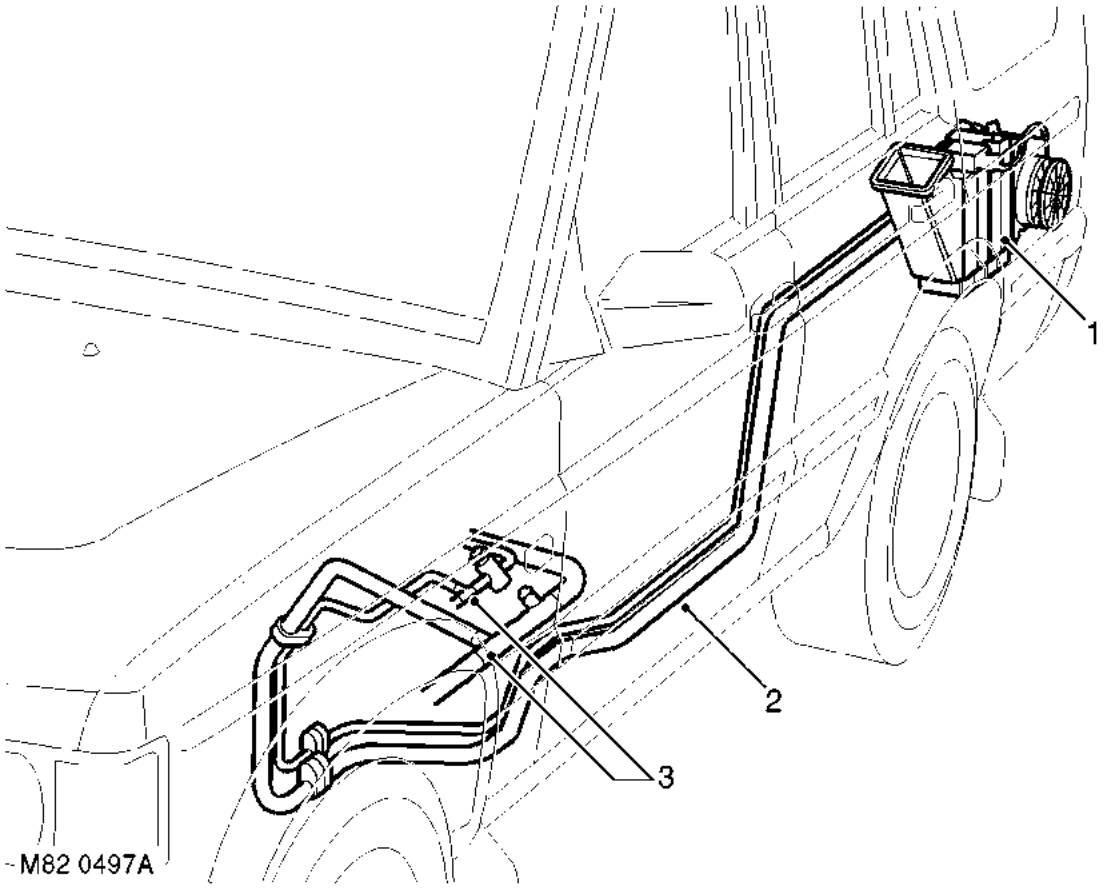
The ATC ECU performs a diagnostic check each time the ignition is switched on. To avoid nuisance fault indications at low light levels, the sunlight sensor is omitted from the diagnostic check. If a fault is detected, the audible warning sounds three times and the AUTO window on the control panel display flashes for 20 seconds. The ATC ECU then reverts to normal control but uses a default value or strategy for the detected fault. Faults are identified by performing a manual diagnostic check of the system.

A manual diagnostic check includes a check of the sunlight sensor, and is initiated by pressing and holding the AUTO switch and the air distribution switch, then turning the ignition switch from off to on. The audible warning sounds once and the indications on the control panel display illuminate. FC is shown in the LH temperature window and the results of the check are shown as a two digit fault code in the RH temperature window. If a fault is detected, the audible warning sounds three times and the AUTO window on the display flashes on and off for 20 seconds. If more than one fault is detected, the fault codes cycle in numerical order, at 1 Hz. The audible warning sounds as each fault code is shown. In low light conditions, to avoid false sunlight sensor fault indications, the sunlight sensor should be illuminated with a strong light source.

Diagnostic fault codes and fault descriptions

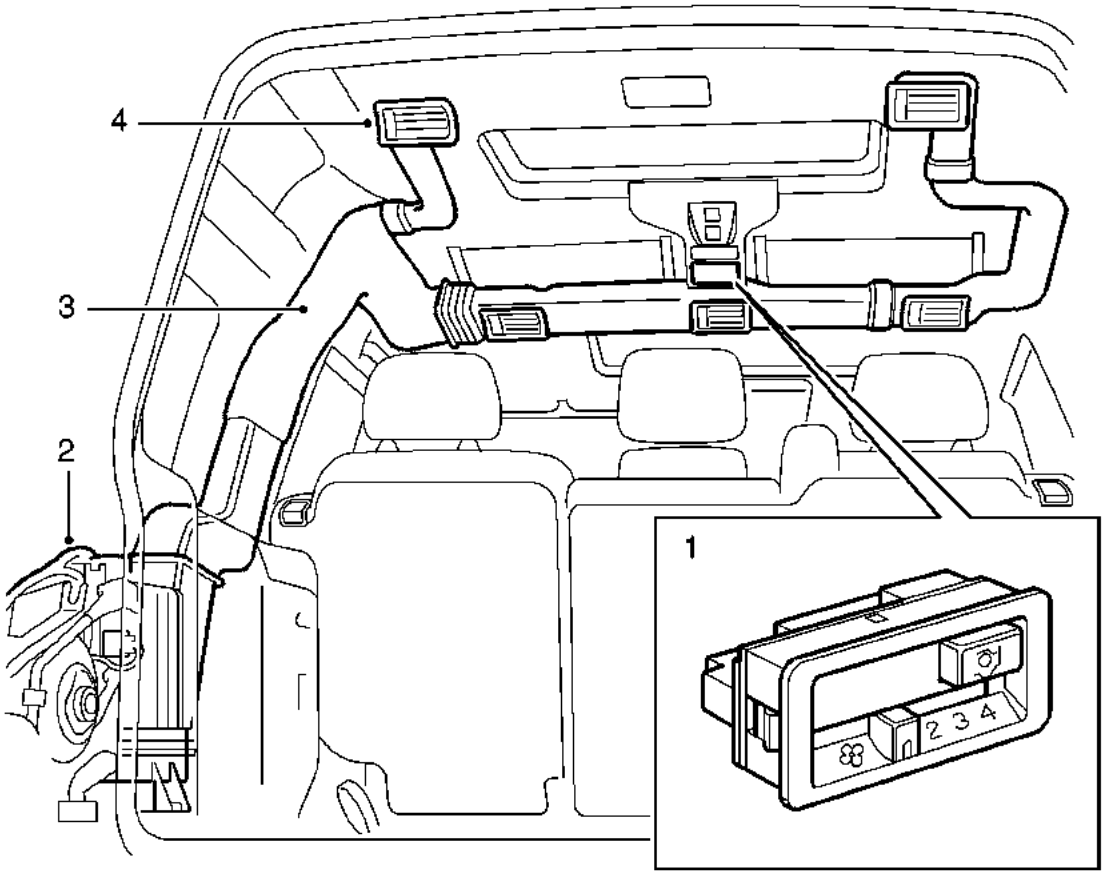
Code	Component	Fault	Default value/strategy
00	-	No fault found	-
11	In-car temperature sensor	Open or short circuit	25°C (77°F)
12	Ambient temperature sensor	Open or short circuit	10°C (50°F) Cooling fan permanently on Display shows "- -" if external air temperature selected
13	Thermistor	Open or short circuit	0°C (32°F)
14	Heater coolant temperature sensor	Open or short circuit	70°C (158°F)
21	Sunlight sensor, left output	Open or short circuit	No solar heating correction
22	Sunlight sensor, right output	Open or short circuit	No solar heating correction
31	LH temperature servo motor	Open or short circuit Motor or flap mechanism seized	Servo motor locked in position
32	RH temperature servo motor	Open or short circuit Motor or flap mechanism seized	Servo motor locked in position
33	Distribution servo motor	Open or short circuit Motor or flap mechanism seized	Servo motor locked in position

Rear A/C refrigerant system component layout



1 Rear evaporator/blower assembly
2 Refrigerant lines
3 Connections to front A/C system

Rear A/C distribution and control component layout



M82 0498

1 Control panel
2 Rear evaporator/blower assembly
3 Air distribution ducts
4 Vent assembly

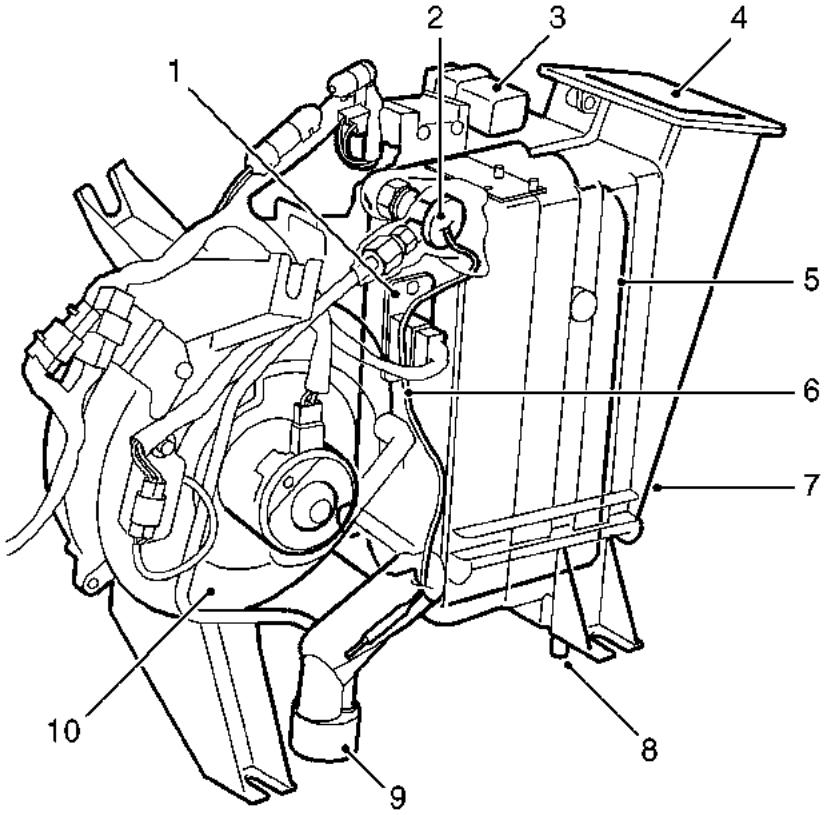
Description

The rear air conditioning system cools and recirculates air at the rear of the cabin. The system consists of refrigerant lines, a rear evaporator/blower assembly, a distribution system and a control panel.

Cooled air from the rear evaporator/blower assembly is supplied by the distribution system to vent outlets above each second and third row seat. The system is controlled by two switches on the control panel.

Refrigerant lines
Two refrigerant lines connect the rear evaporator/blower assembly to the front A/C refrigerant system. The lines are routed along the LH underside of the vehicle and secured to a connector block in the floor. A heat shield protects the lines where they pass above the rear silencer.

Rear evaporator/blower assembly



M82 0544

1 Resistor pack
2 Thermostatic expansion valve
3 Rear blower relay
4 Air outlet
5 Evaporator
6 Capillary tube
7 Housing
8 Condensate drain outlet
9 Refrigerant lines
10 Blower

The rear evaporator/blower assembly cools and dehumidifies air from the cabin and supplies it to the rear distribution system. The unit is installed on the left side of the loadspace, behind the quarter trim. A grille in the quarter trim allows air to flow from the loadspace into the evaporator/blower. Refrigerant lines for the evaporator and a condensate drain tube are attached to the rear floor.

The evaporator and blower are installed in a common housing, which also incorporates the resistor pack for the blower. A thermostatic expansion valve is integrated into the inlet refrigerant line. A rear blower relay is attached to the top of the housing.

Evaporator
The evaporator absorbs heat from the recirculated air being supplied to the distribution ducts.

Thermostatic expansion valve
The thermostatic expansion valve meters the flow of refrigerant into the evaporator to match the heat load of the air passing through the evaporator matrix. A capillary tube, attached to the outlet pipe of the evaporator and connected to the thermostatic expansion valve, automatically adjusts the valve opening in relation to the refrigerant temperature at the evaporator outlet.

Blower
The blower controls the volume of air being supplied to the distribution outlets. The blower is an open hub, centrifugal fan powered by an electric motor. A dust filter is installed over the fan inlet. The blower switch on the control panel and the resistor pack control the operation of the blower, which can be selected to run at one of four speeds.

Resistor pack
The resistor pack supplies reduced voltages to the blower motor for blower speeds 1, 2 and 3. For blower speed 4, the resistor pack is bypassed and battery voltage drives the motor at full speed. The pack is installed in the air outlet from the blower fan, so that any heat generated is dissipated by the air flow.

Distribution system

Air ducts
Ducts connected to the rear evaporator/blower motor assembly distribute air to five vent assemblies in the roof.

Vent assemblies
The vent assemblies allow occupants to control the flow and direction of air. Each vent assembly incorporates a thumbwheel to regulate flow and moveable vanes to control direction.

Rear control system
The control system operates the blower to control the operation of the rear A/C. The control system consists of two control switches and a rear blower relay.

Control switches
A rear A/C switch and a blower speed switch are installed on a control panel in the roof lining. The A/C switch is a latching pushswitch with an amber indicator lamp which illuminates when rear A/C is selected on. The blower speed switch is a slide switch with a positive detent at each of four speed positions (there is no off position).

Rear blower relay
The rear blower relay controls the electrical supply to the blower.

Operation

The rear A/C only operates if the front A/C is on to pump refrigerant through the rear evaporator/blower assembly. When the rear A/C switch is selected on, the indicator lamp in the switch illuminates and the rear blower relay is energised. The rear blower relay switches battery power to the blower motor, which runs at the speed selected on the blower speed switch.

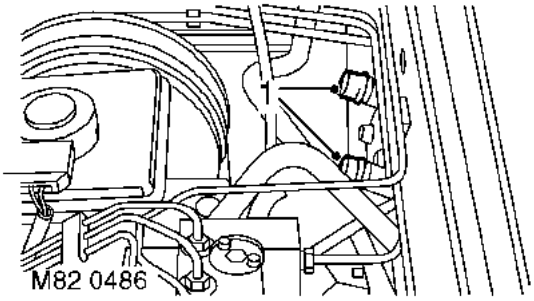
The air from the blower passes through the evaporator matrix, which absorbs heat from the air. The cooled air is then supplied to the roof vents through the distribution ducts. The heat absorbed by the refrigerant in the evaporator is sensed by the thermostatic expansion valve. The thermostatic expansion valve then opens and regulates the flow of refrigerant through the evaporator in proportion to the amount of heat being absorbed from the air.

When the rear A/C switch is selected off, the blower stops. The thermostatic expansion valve senses the subsequent decrease in temperature of the refrigerant in the evaporator. The thermostatic expansion valve then closes and stops the flow of refrigerant, except for a minimal bleed flow.

Refrigerant recovery, recycling and recharging

82.30.02

Recovery



1. Remove dust caps from high and low pressure connectors.
2. Connect high and low pressure hoses to appropriate connections.
3. Open valves on connectors.
4. Turn valves on refrigerant station to correct positions.

   Operate the refrigerant station in accordance with the manufacturers instructions.

5. Turn Process switch to correct position.
6. Turn Main switch to 'ON'.
7. Allow station to recover refrigerant from system.

   WARNING: Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerant is high enough for safe use in the air conditioning system.

   Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SAE J1991. Other equipment may not recycle refrigerant to the required level of purity.

   A R134a Refrigerant Recovery Recycling Recharging Station must not be used with any other type of refrigerant.

   Refrigerant R134a from domestic and commercial sources must not be used in motor vehicle air conditioning systems.

8. Close valves on refrigerant station.
9. Turn Main switch to 'OFF'.
10. Close valves on connectors.
11. Disconnect connectors high and low pressure hoses from connectors.
12. Fit dust caps to connectors.
13. Open tap at rear of station to drain refrigerant oil.
14. Measure and record quantity of refrigerant oil recovered from system.
15. Close tap at rear of station.

Evacuation

WARNING: Servicing must only be carried out by personnel familiar with both the vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

1. Remove dust caps from high and low pressure connectors.
2. Connect high and low pressure hoses to appropriate connections.
3. Open valves on connectors.
4. Turn valves on refrigerant station to correct positions.
5. Turn Process switch to correct position.
6. Turn Main switch to 'ON'.
7. Allow station to evacuate system.

Recharging

NOTE: When recharging, always make allowance for refrigerant in the line between the charging station and the vehicle. This is calculated at 30 grammes/metre of charging line. System charge weights are 700 ± 25 grammes for front A/C system only and 900 ± 25 grammes for combined front and rear A/C system.

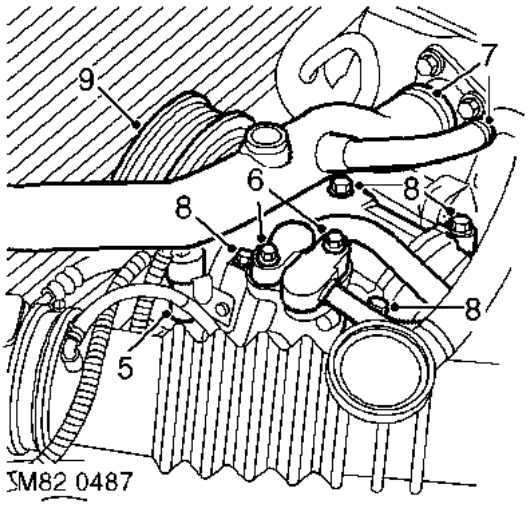
1. Close valves on refrigerant station.
2. Close valve on oil charger.
3. Disconnect yellow hose from refrigerant station.
4. Remove lid from oil charger.
5. Pour same quantity of refrigerant oil into oil charger as collected during recovery. If the following components have been renewed, add the following additional quantity of lubricating oil:
   - Condenser = 40 cm^3
   - Evaporator = 40 cm^3
   - Pipe or hose = 5 cm^3/metre
   - Receiver/dryer = 15 cm^3.
6. Fit lid to oil charger.
7. Connect yellow hose to refrigerant station.
8. Open valve on oil charger.
9. Move pointer on refrigerant gauge to mark position of refrigerant charge quantity.
   ☞ **CAPACITIES, FLUIDS, LUBRICANTS AND SEALANTS, Capacities.**
10. Slowly open correct valve on refrigerant station and allow vacuum to pull refrigerant into system.
11. Close valve on refrigerant station when correct amount of refrigerant has been drawn into air conditioning system.
12. Turn Main switch to 'OFF'.
13. Close valves on connectors.
14. Disconnect high and low pressure hoses from connectors.
15. Fit dust caps to connectors.

Compressor - diesel

82.10.20

Remove

1. Remove engine acoustic cover.
2. Depressurise air conditioning system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.
3. Remove auxiliary drive belt.
   CHARGING AND STARTING, REPAIRS, Belt - auxiliary drive.
4. Drain cooling system.
   COOLING SYSTEM - Td5, ADJUSTMENTS, Drain and refill.



5. Disconnect multiplug from compressor.
6. Remove 2 bolts securing air conditioning pipes to compressor and discard 'O' rings.
   CAUTION: Always fit plugs to open connections to prevent contamination.
7. Release clips and disconnect top hose from coolant elbow and heater pipe.
8. Remove 4 bolts securing compressor to mounting bracket.
9. Remove compressor.

Refit

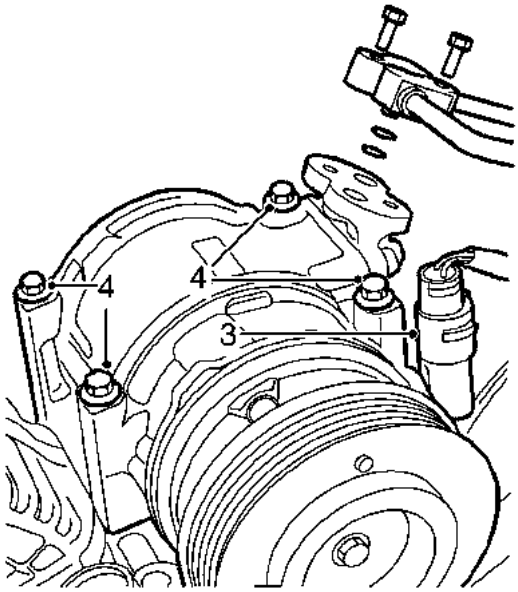
1. Calculate the quantity of refrigerant oil required.
   GENERAL INFORMATION, Air Conditioning Compressor Replacement.
2. Position compressor to mounting bracket and tighten bolts to 25 Nm (18 lbf.ft).
3. Remove caps from compressor and pipe connections.
4. Clean compressor and pipe connections.
5. Lubricate new 'O'rings with refrigerant oil and fit to compressor.
6. Position A/C pipes to compressor and tighten bolts to 10 Nm (7 lbf.ft) .
7. Connect multiplug to compressor.
8. Position top hose and secure with clips.
9. Refill cooling system.
   COOLING SYSTEM - Td5, ADJUSTMENTS, Drain and refill.
10. Fit auxiliary drive belt.
    CHARGING AND STARTING, REPAIRS, Belt - auxiliary drive.
11. Recharge air conditioning system.
    AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.
12. Fit engine acoustic cover.

Compressor - V8

82.10.20

Remove

1. Depressurise air conditioning system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.**
2. Remove auxiliary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Belt - auxiliary drive.**



M82 0488

3. Disconnect multiplug from compressor.
4. Remove 2 bolts securing air conditioning pipes to compressor and discard 'O' rings.

   CAUTION: Always fit plugs to open connections to prevent contamination.

5. Remove 4 bolts securing compressor to mounting bracket.
6. Remove compressor.

Refit

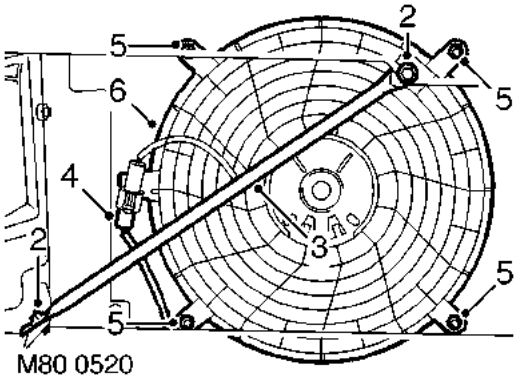
1. Calculate the quantity of refrigerant oil required.
   ☞ **GENERAL INFORMATION, Air Conditioning Compressor Replacement.**
2. Clean compressor dowels and dowel holes.
3. Position compressor to mounting bracket and tighten bolts to 25 Nm (18 lbf.ft).
4. Remove caps from compressor and pipe connections.
5. Clean compressor and pipe connections.
6. Lubricate new 'O' rings with refrigerant oil and fit to compressor.
7. Position A/C pipes to compressor and tighten bolts to 10 Nm (7 lbf.ft).
8. Connect multiplug to compressor.
9. Fit auxiliary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Belt - auxiliary drive.**
10. Recharge air conditioning system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.**

Fan - condenser

82.15.01

Remove

1. Remove front grille.
   EXTERIOR FITTINGS, REPAIRS, Grille - front - up to 03MY.



M80 0520

2. Remove 2 bolts securing bonnet platform RH support stay.
3. Remove support stay.
4. Disconnect multiplug from condenser cooling fan motor.
5. Remove 4 screws securing cooling fan cowl to mounting bracket.
6. Remove cooling fan assembly and collect spacing washers.

Refit

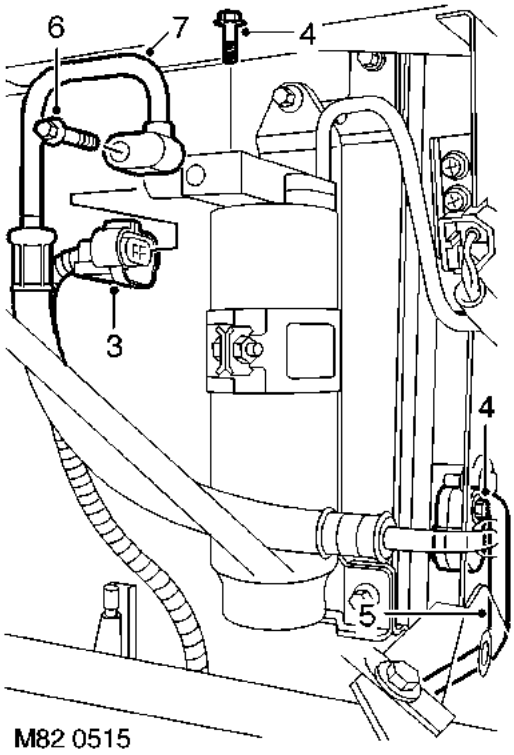
1. Fit condenser fan.
2. Fit spacing washers between fan cowl and mounting bracket and secure with screws.
3. Connect multiplug to motor.
4. Fit bonnet platform support stay and secure with bolts.
5. Fit front grille.
   EXTERIOR FITTINGS, REPAIRS, Grille - front - up to 03MY.

Condenser

82.15.07

Remove

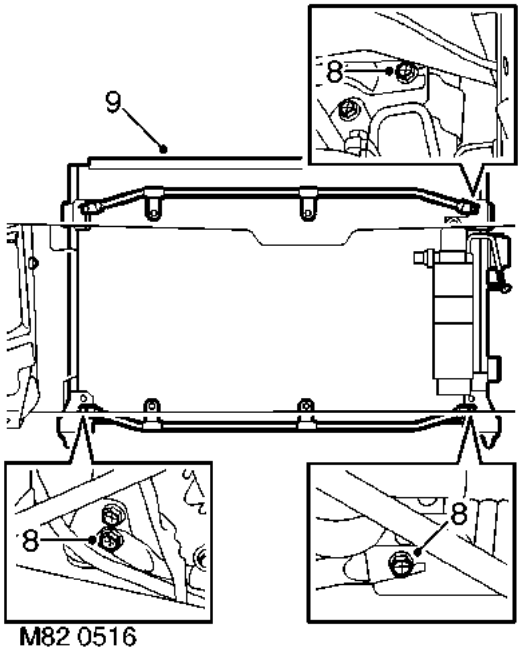
1. Recover refrigerant from A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.
2. Remove radiator.
   - **COOLING SYSTEM - Td5, REPAIRS, Radiator.**
   - **COOLING SYSTEM - V8, REPAIRS, Radiator.**



M82 0515

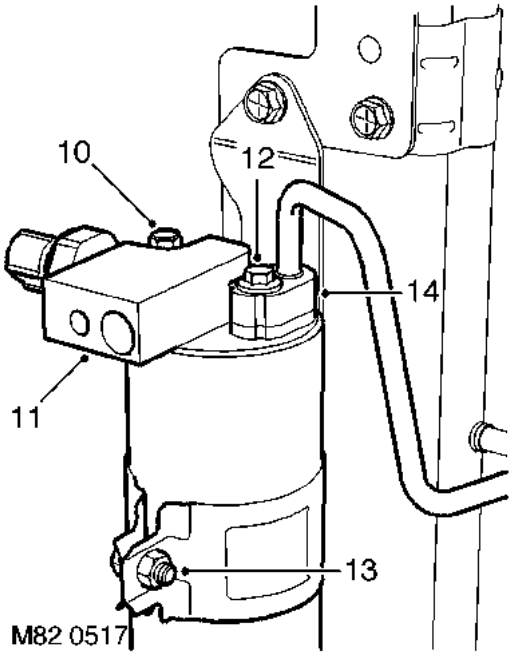
3. Disconnect multiplug from dual pressure switch.
4. Remove bolt securing evaporator pipe to condenser.
5. Disconnect evaporator pipe from condenser and discard 'O' ring.
6. Remove bolt securing evaporator pipe to receiver drier.
7. Disconnect evaporator pipe from receiver drier and discard 'O' ring.

CAUTION: Always fit plugs to open connections to prevent contamination.



M82 0516

8. Remove 3 remaining bolts securing cooling fan support rails to condenser.
9. Remove condenser.



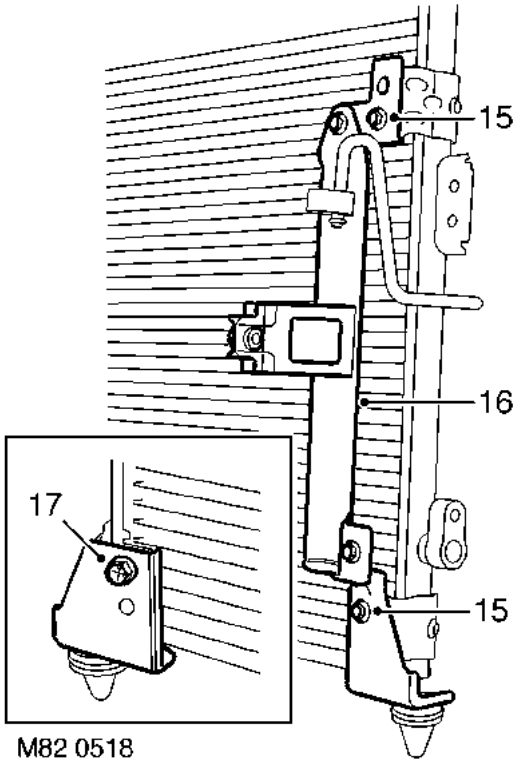
M82 0517

10. Remove bolt securing adaptor block to receiver drier.
11. Remove adaptor block from receiver drier and discard 'O' ring.

CAUTION: Always fit plugs to open connections to prevent contamination.

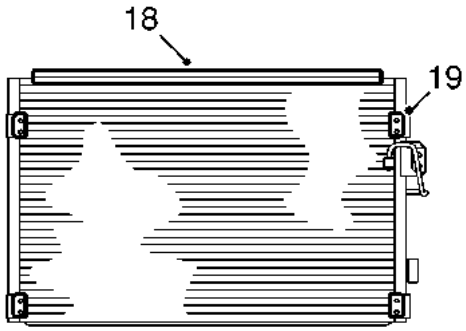
12. Remove bolt securing condenser pipe to receiver drier.
13. Remove clamp bolt receiver drier to bracket and remove drier from bracket.
14. Remove and discard 'O' ring from condenser pipe.

CAUTION: Always fit plugs to open connections to prevent contamination.



M82 0518

15. Remove 2 remaining bolts securing receiver drier brackets and condenser LH mounting bracket to condenser.
16. Remove mounting bracket assembly.
17. Remove remaining bolt securing condenser RH mounting and remove mounting.



M82 0519

18. Remove sealing strip from outer upper seam of condenser.
19. Remove captive nut plates from condenser.

Refit

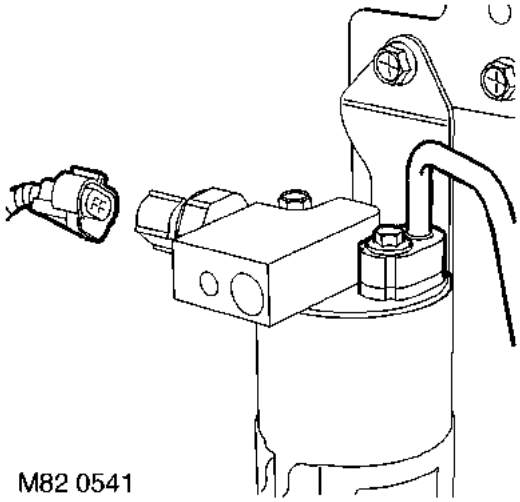
1. Fit captive nut plates to new condenser.
2. Fit seal to condenser.
3. Fit RH mounting bracket to condenser and secure with bolt.
4. Fit receiver drier bracket assembly and secure with bolts.
5. Ensure condenser pipe and new receiver drier connections are clean.
6. Lubricate new 'O' ring with refrigerant oil and fit to condenser pipe.
7. Fit receiver drier to bracket and condenser pipe. Tighten bolt securing condenser pipe to 5 Nm (3.7 lbf.ft). Fit clamping bolt securing receiver drier to bracket and tighten to 5 Nm (3.7 lbf.ft).
8. Ensure adaptor block and receiver drier connections are clean.
9. Lubricate new 'O' ring with refrigerant oil and fit to adaptor block.
10. Fit adaptor block to receiver drier and tighten bolt to 5 Nm. (3.7 lbf.ft).
11. Fit condenser assembly.
12. Fit cooling fan to condenser and fit bolts to secure support rails to condenser brackets.
13. Ensure connections of condenser, receiver drier and evaporator pipes are clean.
14. Lubricate new 'O' ring seals with refrigerant oil and fit one seal to each evaporator pipe.
15. Connect evaporator pipes and tighten bolts to 5 Nm (3.7 lbf.ft).
16. Connect multiplug to dual pressure switch.
17. Fit radiator.
    - ☞ **COOLING SYSTEM - Td5, REPAIRS, Radiator.**
    - ☞ **COOLING SYSTEM - V8, REPAIRS, Radiator.**
18. Recharge A/C system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.**

Receiver drier and dual pressure switch

82.17.03

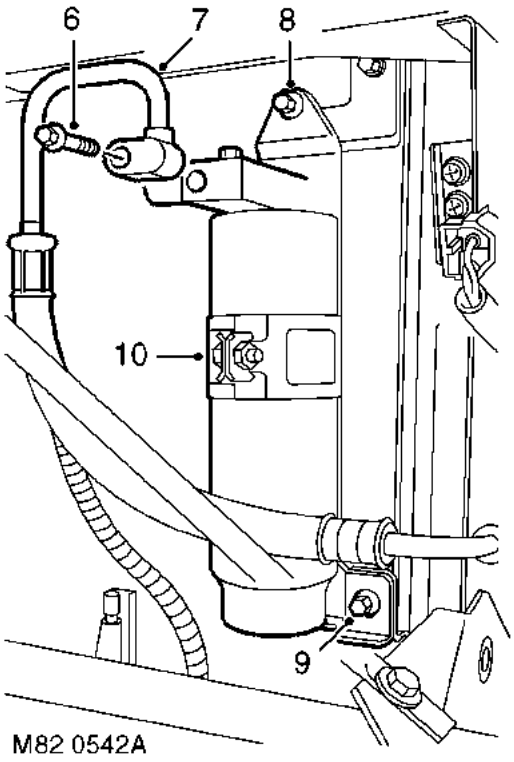
Remove

1. Recover refrigerant from air conditioning system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.**
2. Remove front grille.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Grille - front - up to 03MY.**



3. Disconnect multiplug from dual pressure switch.
4. Remove bolt securing condenser pipe to receiver drier.
5. Disconnect condenser pipe from receiver drier.

CAUTION: Always fit plugs to open connections to prevent contamination.

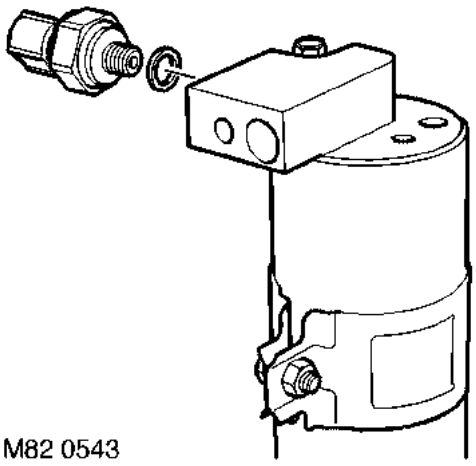


M82 0542A

6. Remove bolt securing evaporator pipe to receiver drier.
7. Disconnect evaporator pipe from receiver drier.

CAUTION: Always fit plugs to open connections to prevent contamination.

8. Remove bolt securing top of receiver drier mounting bracket to condenser.
9. Remove bolt securing bottom of receiver drier mounting bracket to condenser.
10. Remove receiver drier assembly.


M82 0543

11. Loosen mounting bracket clamping bolt.
12. Remove receiver drier from mounting bracket.
13. Remove dual pressure switch from receiver drier

Refit

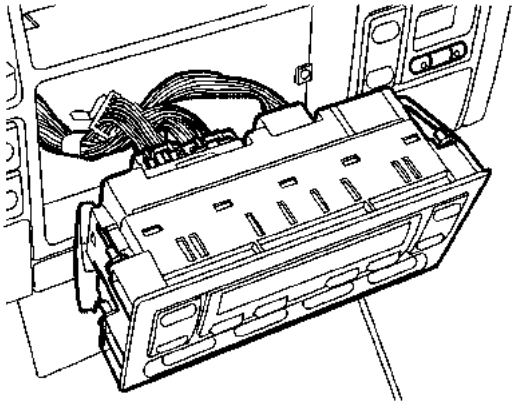
1. Fit dual pressure switch to receiver drier and tighten to 10 Nm (7 lbf.ft).
2. Fit receiver drier to mounting bracket and tighten clamping bolt.
3. Fit receiver drier assembly to condenser.
4. Fit bolts securing receiver drier mounting bracket to condenser and tighten to 5 Nm (3.7 lbf.ft).
5. Remove caps from air conditioning pipes and receiver drier.
6. Remove old 'O' rings from pipes.
7. Fit new 'O' rings to pipes and lubricate with refrigerant oil.
8. Connect air conditioning pipes to receiver drier.
9. Fit bolts securing air conditioning pipes to receiver drier and tighten to 5 Nm (3.7 lbf.ft).
10. Connect multiplug to dual pressure switch.
11. Fit front grille.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Grille - front - up to 03MY.**
12. Recharge air conditioning system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.**

ECU - air temperature control

82.20.90

Remove

1. Release radio from fascia.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.



M82 0538

2. Working through radio aperture, release control unit from fascia.
3. Disconnect 3 multiplugs and remove control unit.
4. Collect bushes from control unit location pegs.

Refit

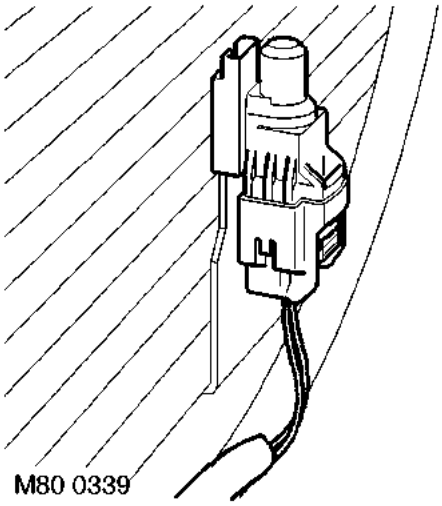
1. Fit bushes to new control unit.
2. Position control unit and connect multiplugs.
3. Fit control unit to fascia.
4. Fit radio to fascia.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.

Sensor - ambient air temperature

82.20.91

Remove

1. Remove front grille.
   EXTERIOR FITTINGS, REPAIRS, Grille - front - up to 03MY.



M80 0339

2. Release ambient air temperature sensor from support bracket, disconnect multiplug and remove sensor.

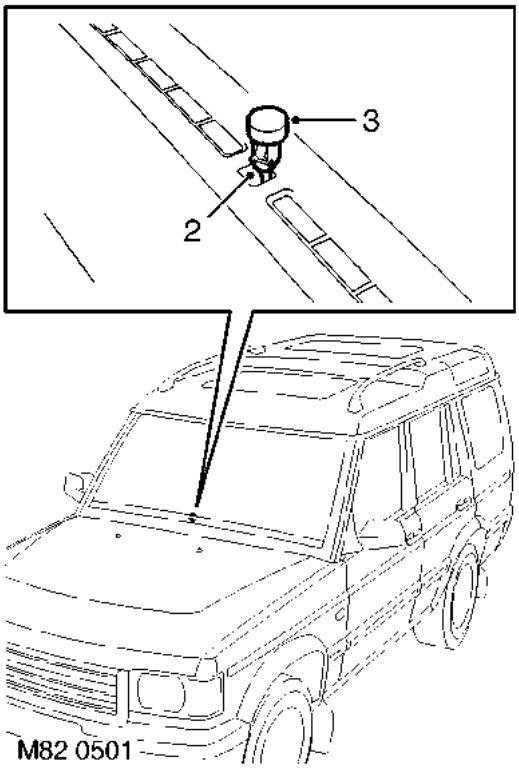
Refit

1. Position sensor, connect multiplug and secure sensor to support bracket
2. Fit front grille.
   EXTERIOR FITTINGS, REPAIRS, Grille - front - up to 03MY.

Sensor - solar light

82.20.92

Remove



1. Carefully remove solar light sensor from fascia.
2. Disconnect multiplug from solar light sensor.
3. Remove solar light sensor.

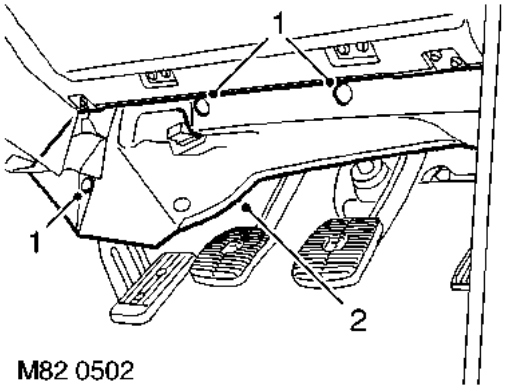
Refit

1. Connect multiplug to solar light sensor.
2. Position solar light sensor to fascia and push to secure.

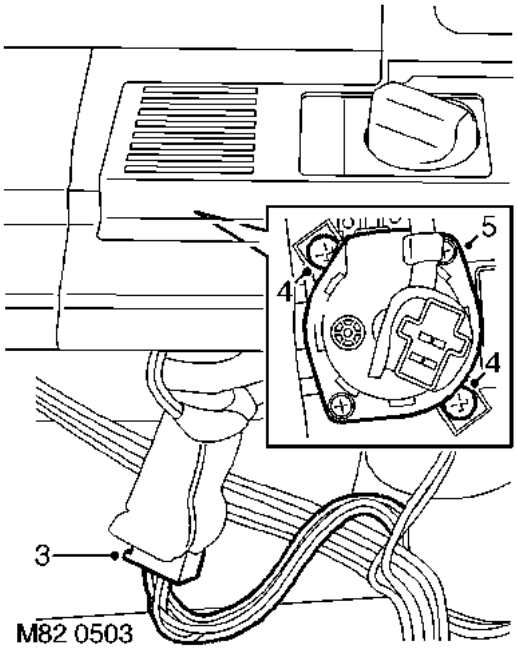
Sensor - air temperature

82.20.93

Remove



1. Release 2 quarter turn screws to release fascia access panel.
2. Lower fascia access panel.



3. Disconnect multiplug from air temperature sensor.
4. Remove 2 screws securing air temperature sensor to fascia.
5. Remove air temperature sensor from fascia.

Refit

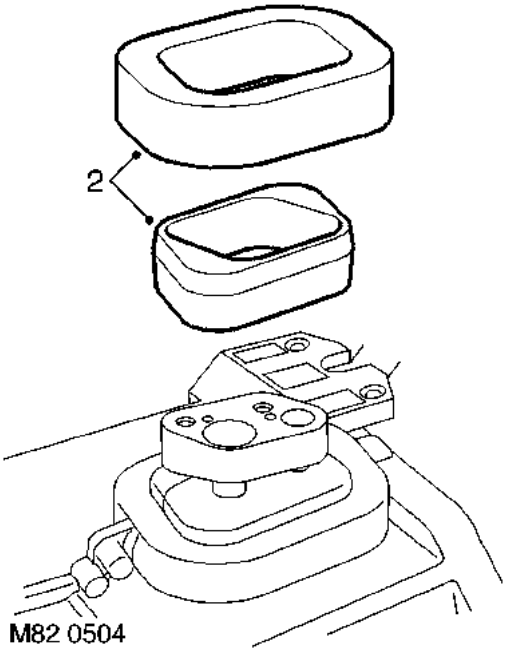
1. Position air temperature sensor to fascia and secure with screws.
2. Connect multiplug to air temperature
3. Position and secure fascia access panel with quarter turn screws.

Evaporator, evaporator thermistor and thermal expansion valve (TXV)

82.25.20

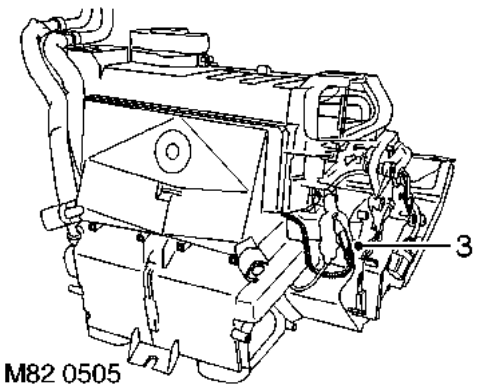
Remove

1. Remove heater assembly.
   HEATING AND VENTILATION, REPAIRS, Heater assembly - models with air conditioning.



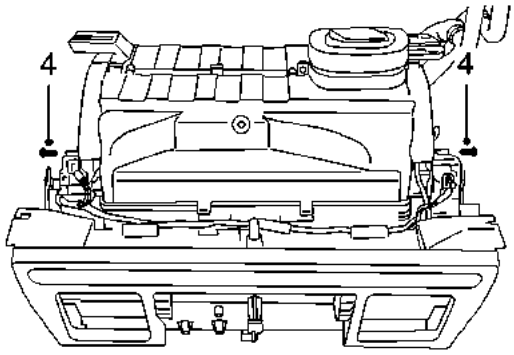
M82 0504

2. Remove bulkhead and evaporator pipe seals.



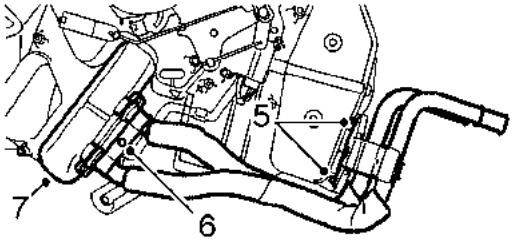
M82 0505

3. Disconnect multiplug from evaporator thermistor.



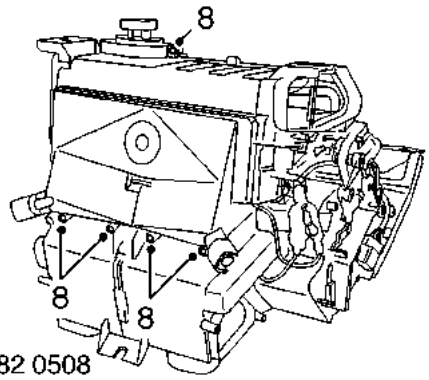
M82 0506

4. Remove 2 screws securing temperature control servos to evaporator casing.



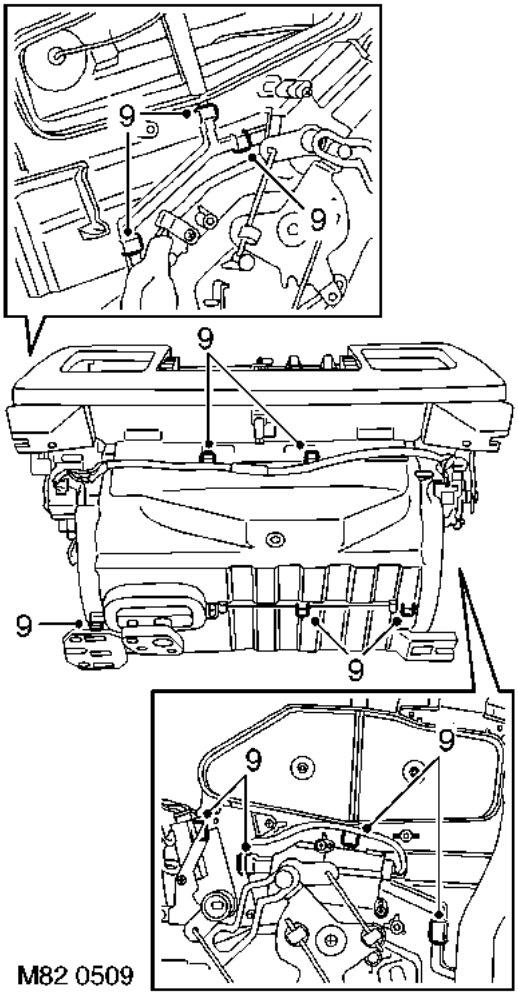
M82 0507

5. Remove 2 screws securing coolant pipe support bracket to casing.
6. Remove screws securing coolant pipe saddle clamp to casing and remove saddle.
7. Remove heater matrix.

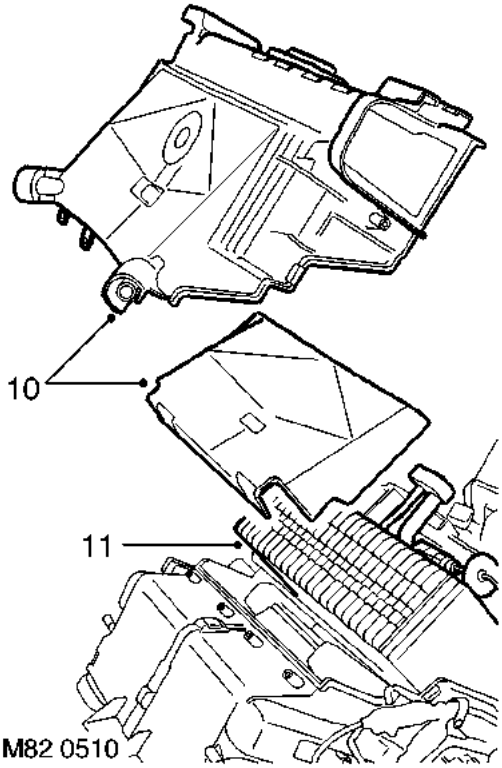


M82 0508

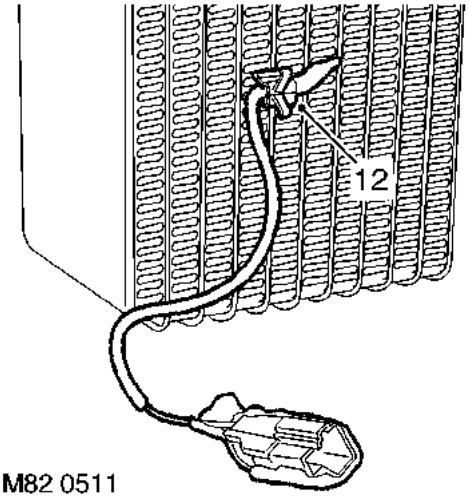
8. Remove 5 screws securing casings.



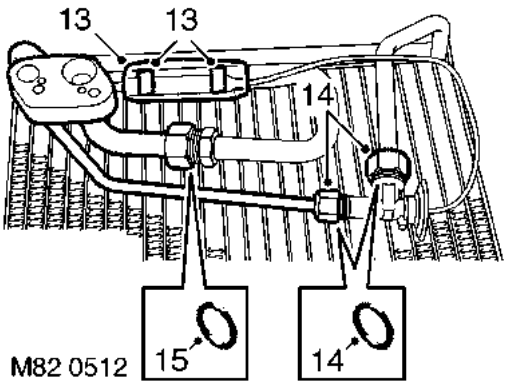
9. Remove 12 spring clips securing casings.



10. Remove evaporator casing and collect insulation.
11. Remove evaporator assembly.



12. Remove evaporator thermistor.



13. Remove covering from TX valve, release 2 clips securing TX valve to pipe.
14. Release 2 unions securing TX valve, remove TX valve, remove and discard 'O' rings.
15. Release pipe union, remove pipe and discard 'O' ring.

Refit

1. Using a new 'O' ring, position pipe to evaporator and tighten union.
2. Using new 'O' rings, position TX valve. Connect pressure pipe union and tighten to 22 Nm (16 lbf. ft). Connect evaporator pipe and tighten to 32 Nm (24 lbf.ft).
3. Position TX valve sensor to pipe and secure with clips.
4. Fit sensor covering.
5. Fit evaporator thermistor.
6. Fit evaporator assembly.
7. Fit insulation to evaporator casing and fit casing.
8. Secure spring clips.
9. Fit and tighten casing screws.
10. Fit heater matrix, ensuring matrix temperature is correctly positioned.
11. Fit coolant pipe saddle, fit and tighten screws securing saddle and pipe bracket.
12. Fit and tighten temperature servo screws.
13. Connect multiplug to evaporator thermistor.
14. Clean any bulk head seal from casing.
15. Fit bulkhead and evaporator pipe seals.
16. Fit heater assembly.

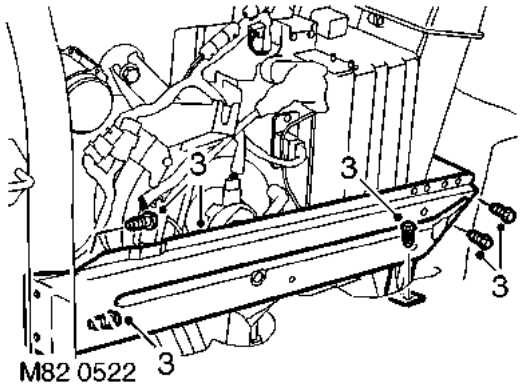
☞ **HEATING AND VENTILATION, REPAIRS, Heater assembly - models with air conditioning.**

Expansion valve - (TXV) - rear

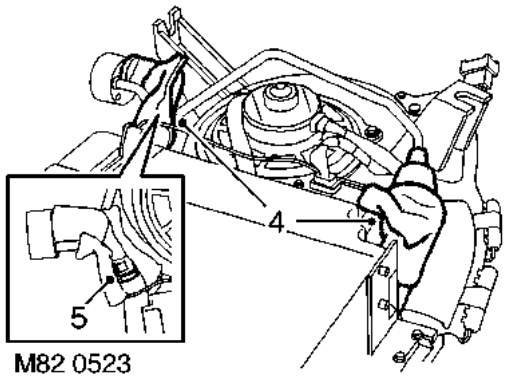
82.26.01

Remove

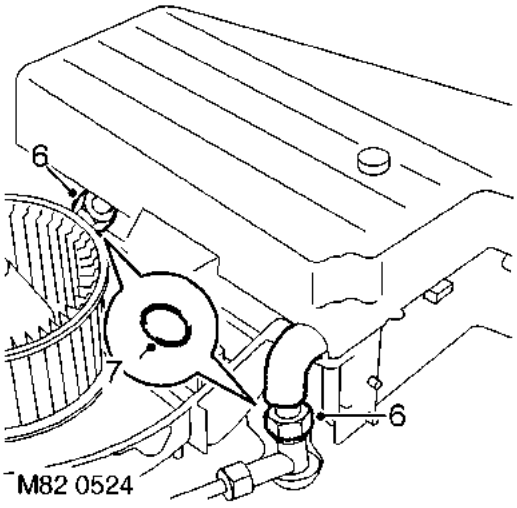
1. Depressurise air conditioning system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.
2. Remove rear lower trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.



3. Remove 5 bolts securing seat support bracket and remove bracket.



4. Release insulation from TXV pipe unions and sensor.
5. Remove clip securing sensor to pipe and release sensor.



6. Loosen TXV pipe unions, release pipes and remove TXV.
7. Remove and discard 'O' rings.

Refit

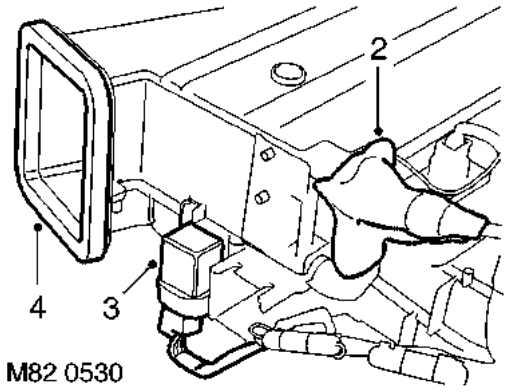
1. Lubricate new 'O' rings with clean refrigerant oil and fit to TXV pipes.
2. Position TXV, align pipes and tighten unions.
3. Connect sensor and secure with clip.
4. Fit insulation to TXV valve and sensor.
5. Position seat support bracket, fit bolts and tighten to 24 Nm (18 lbf.ft)
6. Repressurise air conditioning system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.
7. Fit rear lower trim casing .
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.

Evaporator - rear

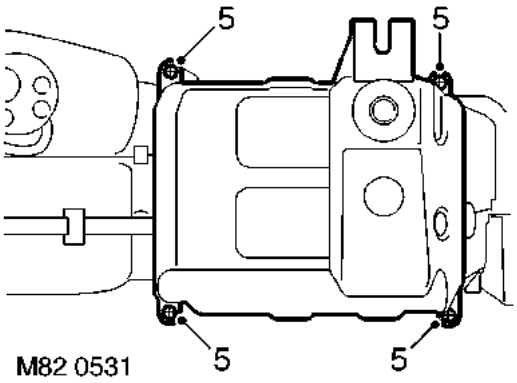
82.26.20

Remove

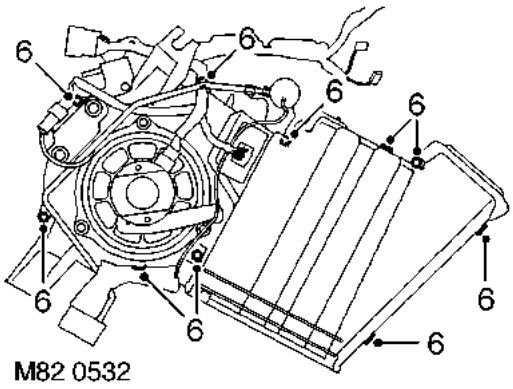
1. Remove evaporator assembly.
   AIR CONDITIONING, REPAIRS, Evaporator and motor assembly - rear.



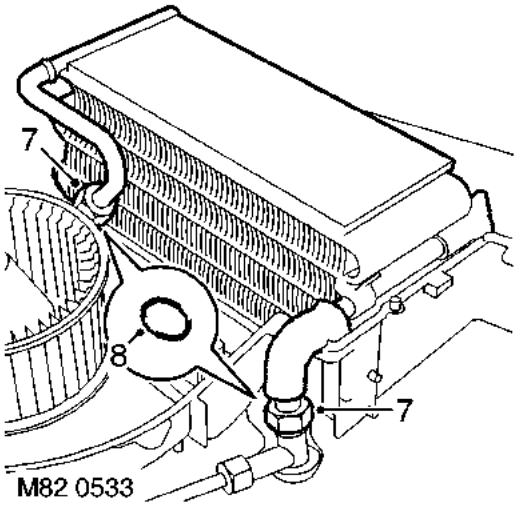
2. Remove insulation from TXV.
3. Release relay from support bracket.
4. Remove ducting seal.



5. Remove 4 screws securing lower part of casing, release and remove lower casing.



6. Remove 6 screws and 4 clips securing main casing and remove top half of casing.



7. Loosen and release evaporator pipes unions, release pipes and remove evaporator.
8. Remove and discard evaporator pipe 'O' rings.

Refit

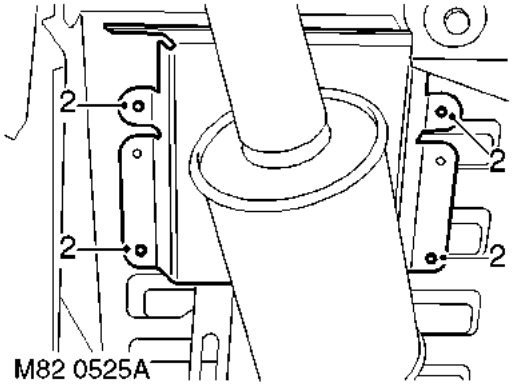
1. Lubricate new 'O' rings with clean refrigerant oil and fit to evaporator pipes
2. Position evaporator, connect pipes and tighten unions.
3. Position main casing and secure with clips and screws.
4. Position lower part of casing and secure with screws.
5. Fit ducting seal
6. Secure relay to support bracket.
7. Fit insulation to TXV.
8. Fit evaporator assembly.
   AIR CONDITIONING, REPAIRS, Evaporator and motor assembly - rear.

Evaporator and motor assembly - rear

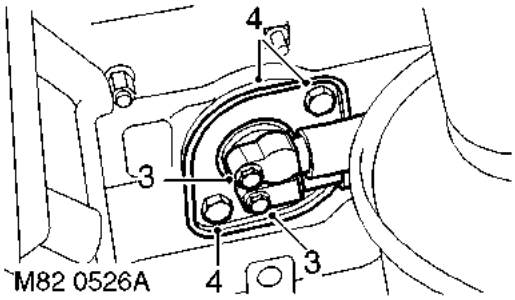
82.26.21

Remove

1. Depressurise air conditioning system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.



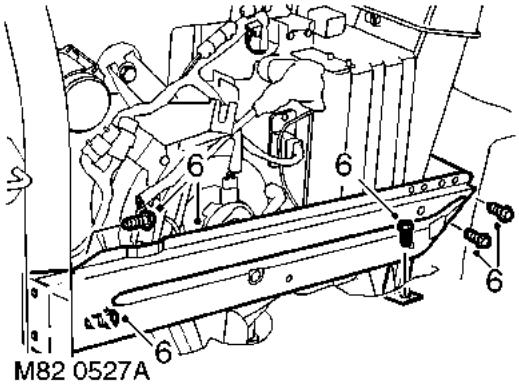
2. **V8 models:** Remove 4 clips securing rear exhaust heat shield and remove heat shield.



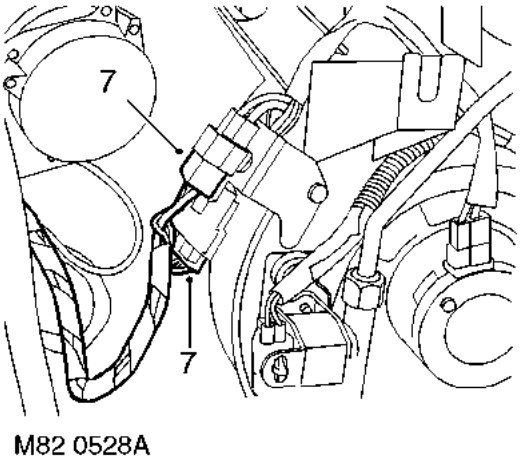
3. Remove 2 bolts securing high and low pressure pipes, release pipes and discard 'O' rings.

   CAUTION: Always fit plugs to open connections to prevent contamination.

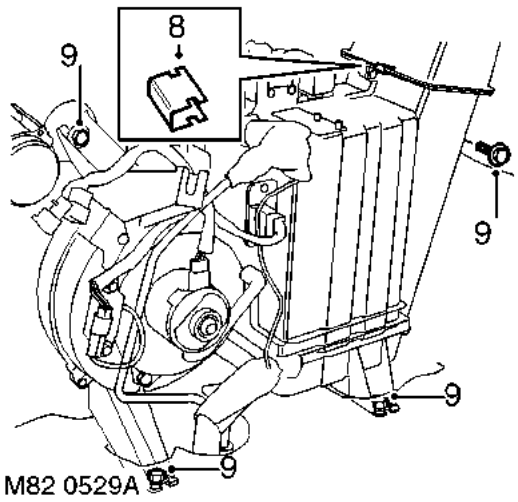
4. Remove 2 bolts securing grommet flange to body and remove flange.
5. Remove LH rear lower trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.



6. Remove 5 bolts securing seat support bracket and remove bracket.



7. Disconnect A/C harness multiplugs from body harness.



8. Remove 2 clips securing ducting to A/C assembly and release ducting.
9. Remove 4 bolts securing evaporator assembly and remove assembly.

Refit

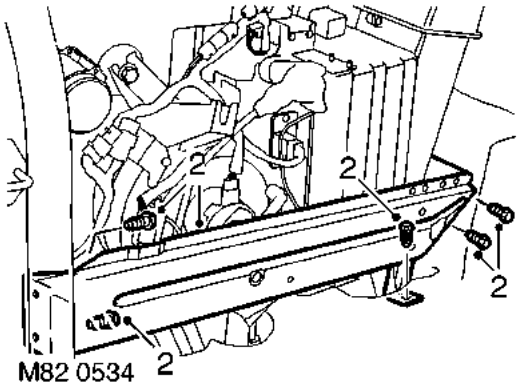
1. Position evaporator assembly to body fit bolts and tighten to 16 Nm (12 lbf.ft).
2. Position ducting to evaporator assembly and secure with clips.
3. Connect harness multiplugs.
4. Position seat support bracket, fit bolts and tighten to 24 Nm (18 lbf.ft).
5. Fit LH rear lower trim casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.**
6. Position grommet flange and tighten bolts.
7. Lubricate new 'O' rings with clean refrigerant oil and fit to high and low pressure pipes.
8. Position high and low pressure pipes, fit bolts and tighten to 10 Nm (7 lbf.ft).
9. **V8 models:** Position exhaust heat shield and secure with clips.
10. Repressurise air conditioning system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery, recycling and recharging.**

Blower motor assembly - rear

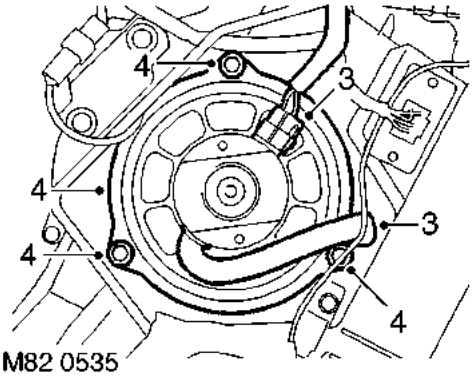
🔧 ***82.26.33***

Remove

1. Remove rear lower trim casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.**



2. Remove 5 bolts securing third row seat support bracket and remove bracket.



3. Disconnect blower motor multiplug and release hose from casing.
4. Remove screws securing blower motor and remove motor from casing.

Refit

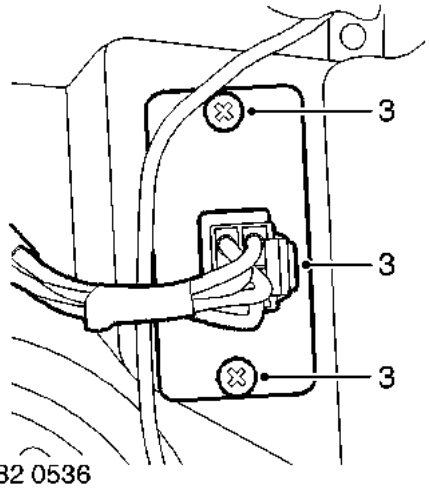
1. Position motor, align to casing and secure with screws.
2. Connect motor multiplug and secure hose to casing.
3. Position seat support bracket, fit bolts and tighten to 24 Nm (18 lbf.ft)
4. Fit rear lower trim casing .
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.**

Resistor - blower motor

82.26.48

Remove

1. Remove rear lower trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.
2. Disconnect resistor multiplug.



M82 0536

3. Remove 2 screws securing resistor pack to casing. Remove resistor from casing.

Refit

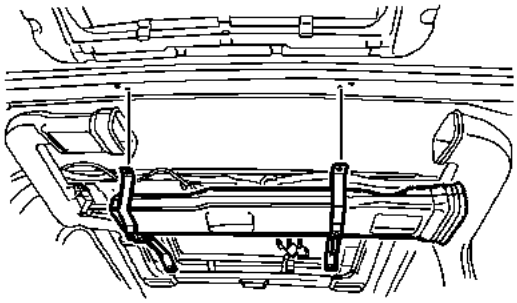
1. Position resistor and secure with screws.
2. Connect resistor multiplug.
3. Fit rear lower trim casing .
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - side - loadspace.

Duct - centre - rear

82.26.70

Remove

1. Remove headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining.


M82 0489

2. Drill out 4 rivets securing centre duct to roof.
3. Release centre duct from upper side duct and remove.
4. Drill out 2 rivets securing mounting braces to duct.
5. Remove braces.

Refit

1. Position braces to duct and secure with rivets.
2. Fit centre duct between upper side ducts.
3. Fit rivets securing centre duct to roof.
4. Fit headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining.