

80 - HEATING AND VENTILATION

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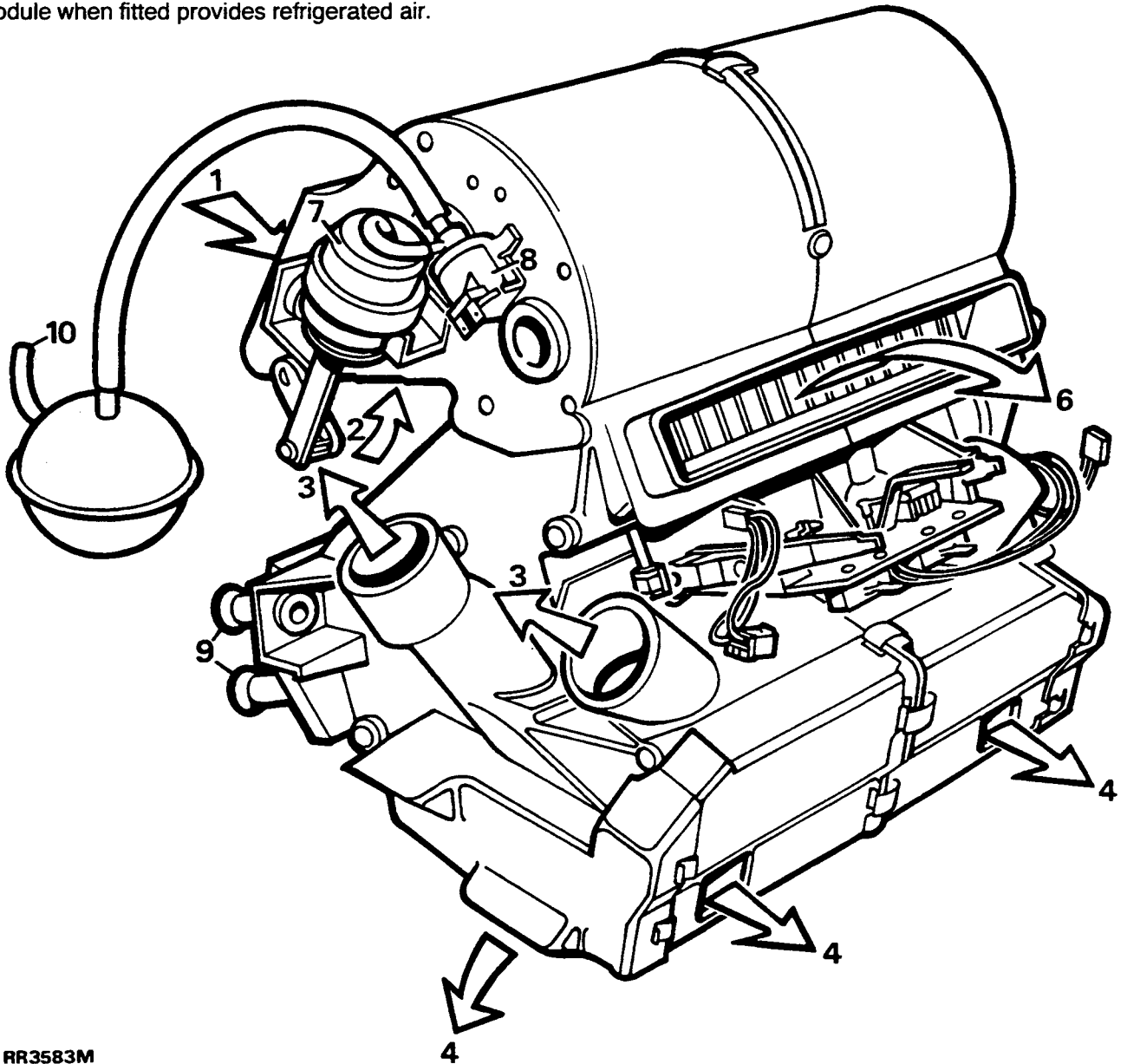




HEATING AND VENTILATION UNIT

The heating and ventilation unit is standard on all models. Air conditioning system is an optional module, which when fitted provides fully integrated climate control for the vehicle interior.

The 'Heating Ventilation Unit' controls the vehicles interior heating and air distribution, while the air conditioning module when fitted provides refrigerated air.



RR3583M

1. Fresh air inlet
2. Recirculation air inlet
3. Air outlets screen de-mist
4. Air outlet front/rear foot wells
6. Air outlet face level vents
7. Fresh/recirculation air flap servo
8. Fresh/recirculation air flap control valve
9. Water connections to heater
10. Inlet manifold connection to reservoir and servo valve

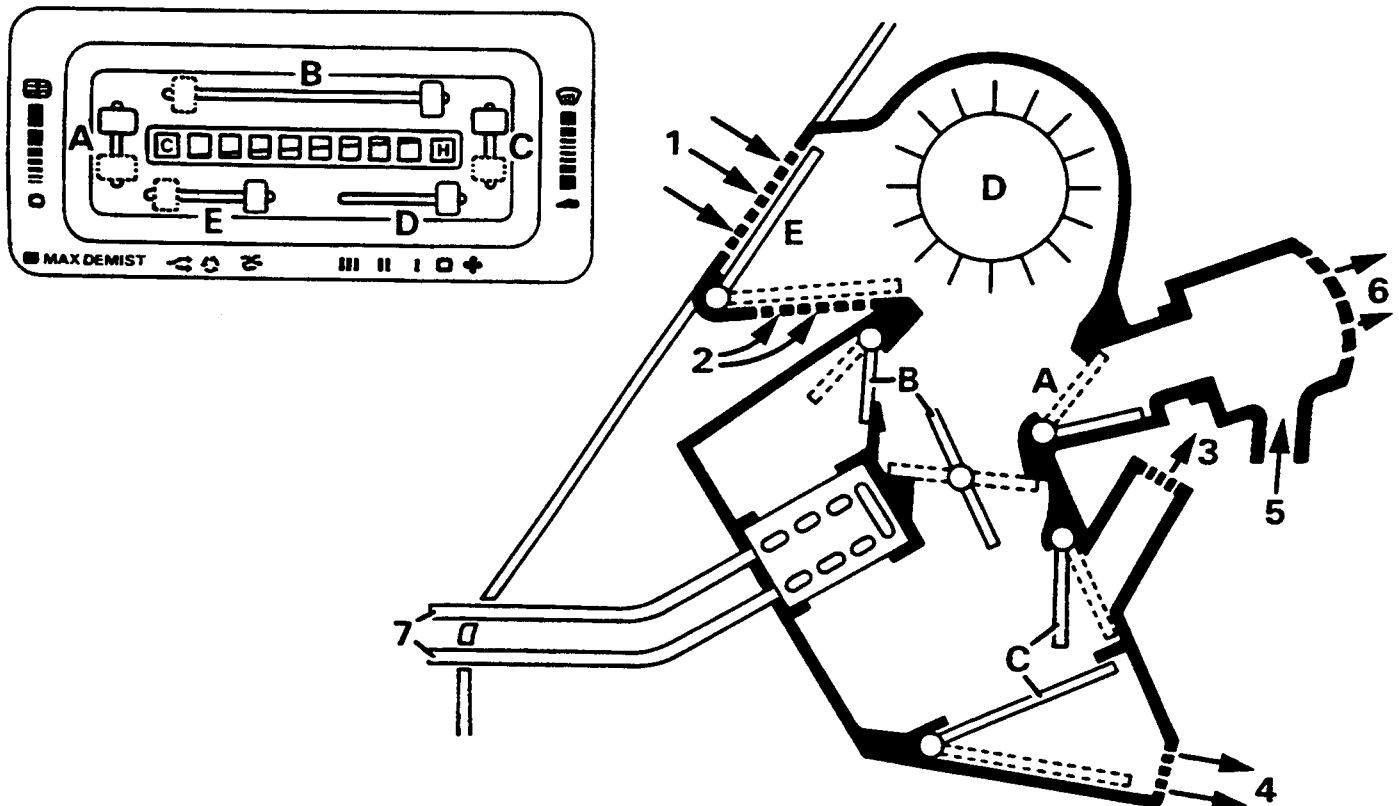
Through-flow ventilation

Through-flow ventilation is achieved by means of one-way air extraction vents incorporated in both rear quarter body panels. The vents open and close automatically dependent upon the heating and ventilation unit control settings and the volume of air entering the vehicle.

Heating and ventilation unit, controls

The 'Heating Ventilation Unit' is centrally located and concealed by the dash assembly. When air conditioning is fitted, an evaporator with twin fans is mounted to the right or left of the 'Heating Ventilating Unit' dependent upon the driving position.

The dash mounted central controls are used to operate both systems.



RR3584M

Heating and ventilation flaps and controls

1. Fresh air vent (outside vehicle)
2. Recirculation vent (inside vehicle)
3. Air outlets screen de-mist
4. Air outlet front/rear foot wells
5. Air outlet for air conditioning (when fitted)
6. Air outlet face level vents
7. Heater radiator connections

- A Face level flap and control
- B Air temperature coupled flaps and control
- C Screen demist/foot wells coupled flaps and control
- D Fanspeed control
- E Fresh and recirculation air flap and control



NOTE: Control E also switches on the air conditioning system when fitted.



Heater operation

The heating and ventilating unit consists of a heater radiator which is connected to the engine cooling system and a three speed fan for air circulation. As water is circulated through the radiator continuously, selection of hot or cold air is achieved by the operation of air flaps which direct the air flow through the unit.

Control 'E' operation Recirculated air

This control when fully to the right operates an electrical switch, vacuum valve and servo, which when the engine is started causes flap E to close fresh air vent 1 and open recirculation air vent 2.

Fresh air

Moving the control to the left switches off the vacuum and flap E which is spring loaded, opens the fresh air vent 1 and closes the recirculation vent 2.



NOTE: Air leakage into the vacuum system controlling flap E, will effect engine performance. See FUEL SYSTEM, Fault diagnosis, Engine Tuning

Control 'A' operation Face level vent

This control is mechanically connected to the face level flap A and controls the volume of air exiting vent 6.

Only fresh or re-circulated air is available from the face level vents 6 when the vehicle is fitted with a 'Heater Ventilation Unit'.

Control 'B' operation

This control mechanically operates two flaps B which are coupled and divert the flow of air through the heater radiator to vary the temperature.

Control 'C' operation

This control mechanically operates two coupled flaps C which distribute air to the screen and foot wells.

Control 'D' operation

This is an electrical control for fan D and provides three speeds and an OFF position.

Air conditioning

When air conditioning is fitted the mechanical operation of the controls remains unaltered. However the air conditioning ON OFF switch is operated by control E and an electronic thermostat is connected to control B.

Controls E must be moved fully to the left to switch on the air conditioning system and moving control B to the left selects the degree of cooling required.

AIR CONDITIONING SYSTEM (WHERE APPLICABLE)

For control of the air conditioning system. *See Heating and ventilation unit*

Air conditioning evaporator

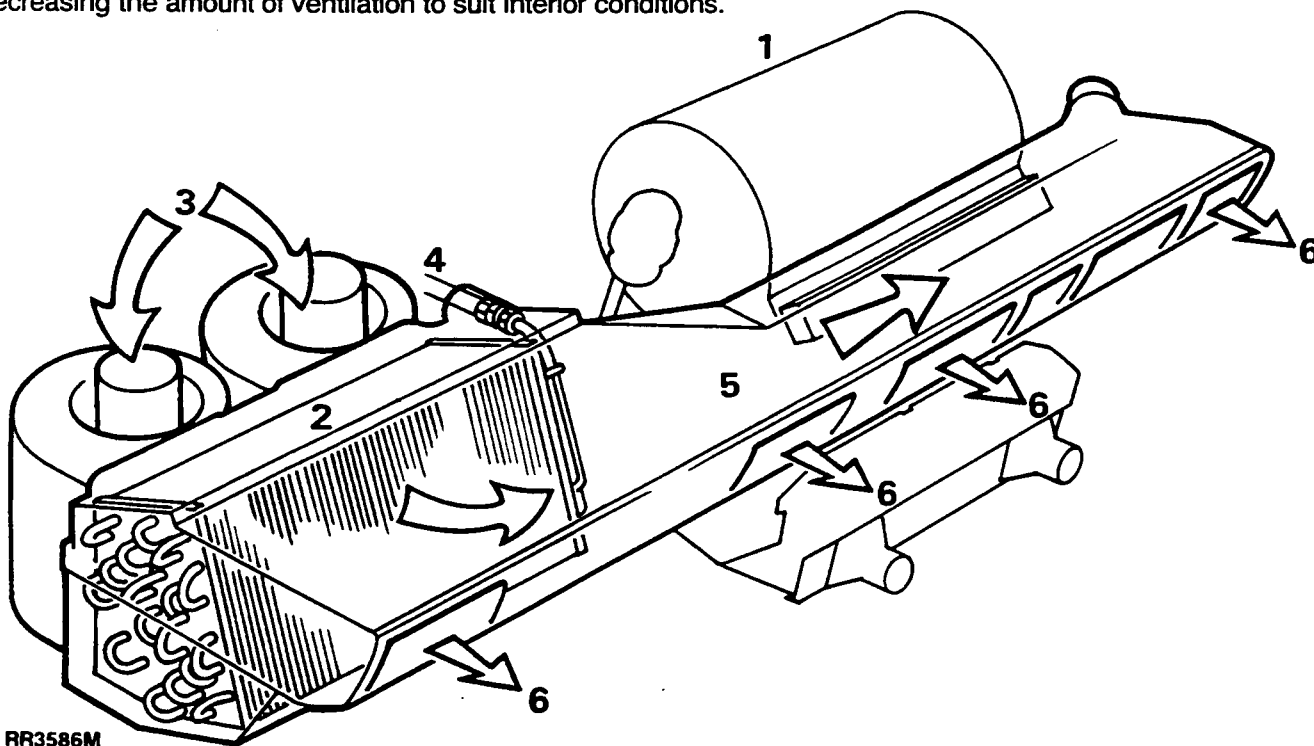
Air (3) drawn only from the vehicle interior is blown through air conditioning evaporator (2) where it is cooled and then discharged through the face level vents 6 via trunking connection 5 as seen in RR3586M.

Highway driving

During a long journey when the ambient temperature and humidity are extremely high and the air conditioning is in use, frost may form on the cooling coils of the evaporator. The unit is equipped with an automatic defrost system which normally will prevent this. However if the temperature control is maintained in its coldest position for extended periods, the defrost system will not operate and the unit will not function correctly. Therefore, whenever possible, move the temperature selector (control 'B' shown in RR3584M) slightly away from its extreme left (cold) position.

Through-flow ventilation

A through-flow ventilation system is achieved in the Range Rover by means of one-way air extraction vents (1) incorporated in both rear quarter panels. Each vent is automatically opened or closed progressively increasing or decreasing the amount of ventilation to suit interior conditions.



RR3586M

Air conditioning evaporator

1. Heating ventilating unit
2. Air conditioning evaporator
3. Air intake and fans (inside vehicle)
4. Refrigerant connection
5. Cold air trunking to face level vents 6



HEATER OUTPUT

Symptom:-**Heater emits cold air**

1. Check for engine running cold. *See COOLING SYSTEM, Fault diagnosis, Engine runs cold*
2. Check heater pipes and hoses for blockage or restriction.
3. Check heater radiator for blockage or restriction, flush system.



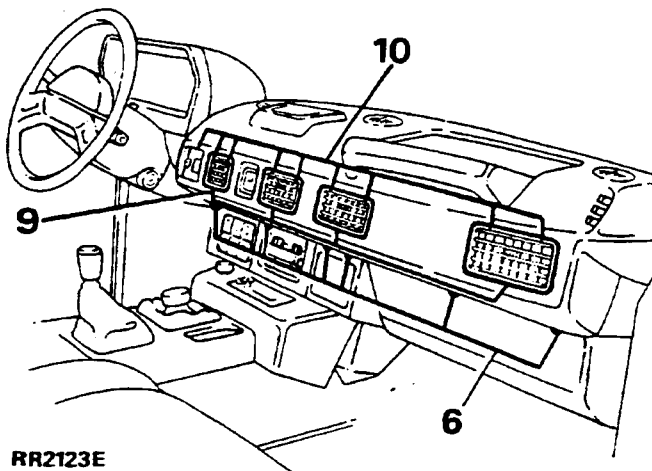
HEATER ASSEMBLY

Service repair no - 80.20.01/20.

Remove and refit

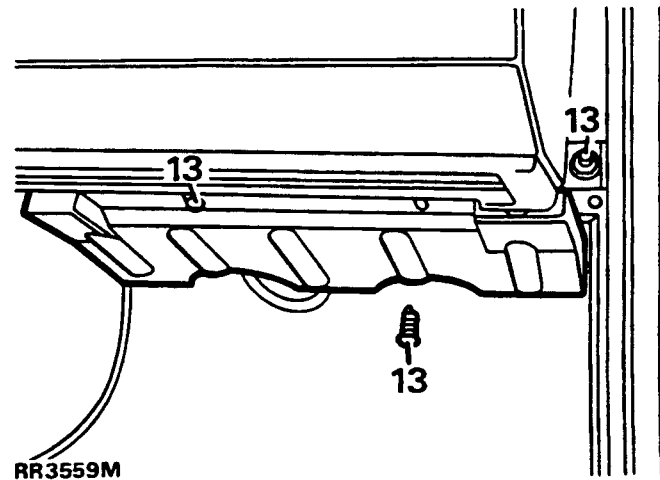
Remove

1. Disconnect the battery negative lead.
2. Drain cooling system. *See COOLING SYSTEM, Adjustment, Coolant*
3. Identify and disconnect water inlet and outlet hoses from heater.
4. Working inside vehicle withdraw lower dash. *See CHASSIS AND BODY, Repair, Lower dash panel*
5. Remove screws securing lower edge of centre console.



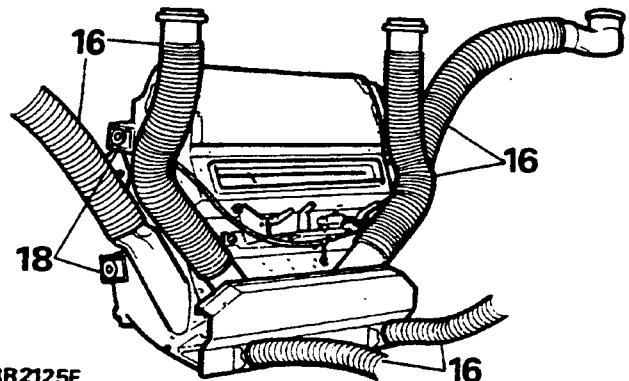
RR2123E

6. Remove six screws securing lower edge of louvre panel to console and evaporator case.
7. Remove heater control panel and knobs from centre console.
8. Remove centre dash panel. *See CHASSIS AND BODY, Repair, Centre dash panel*
9. Carefully pry out four air vents.
10. Remove screws securing evaporator plenum and louvre panel to dash top panel.
11. Disconnect electrical connection from heater to electrical thermostat. Sited at rear of evaporator housing.
12. Disconnect electrical connectors at rear of exterior driving mirror control switches and clock. Withdraw panel clear of dash.



RR3559M

13. Remove screws securing blower closing panel and nut from mounting bracket.
14. Support evaporator case and remove two nuts securing case and reinforcing strip to upper mounting bracket.
15. Remove cover bracket and carefully lower evaporator assembly to floor.



RR2125E

16. Disconnect hoses from heater unit.
17. Disconnect electrical leads from heater unit at multiplugs.
18. Remove four heater mounting bolts.
19. Remove heater unit.

Refit

20. Check that seal for fresh air intake is in place on back of heater unit.
21. Check that seal for heater core is in place on hoses.
22. Reverse removal procedure. Ensure that all openings are adequately sealed against ingress of dust and moisture.

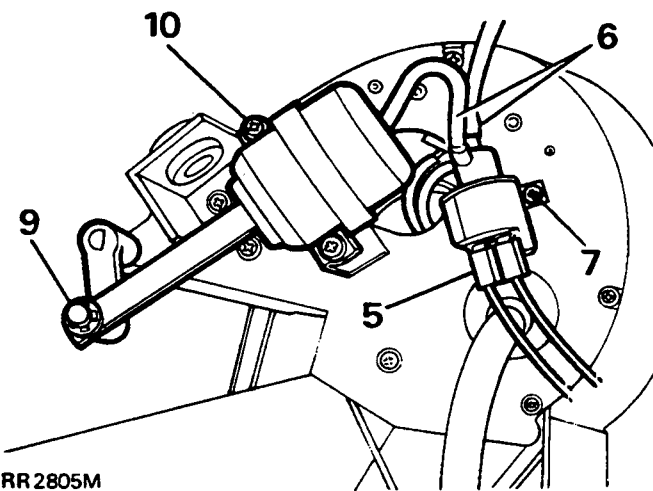
RECIRCULATING/FRESH AIR SOLENOID SWITCH AND VACUUM UNIT

Service repair no - 80.10.24.

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove transmission lever surround.
3. Remove radio mounting console.
4. Remove centre dash unit and lower dash panel.
5. **Solenoid switch:** disconnect electrical leads to solenoid.



6. Disconnect two vacuum hoses.
7. Remove two screws and withdraw solenoid.
8. **Vacuum unit:** remove vacuum hose.
9. Remove actuating rod securing clip.
10. Remove two retaining screws and remove vacuum unit.

Refit

11. Reverse removal procedure.

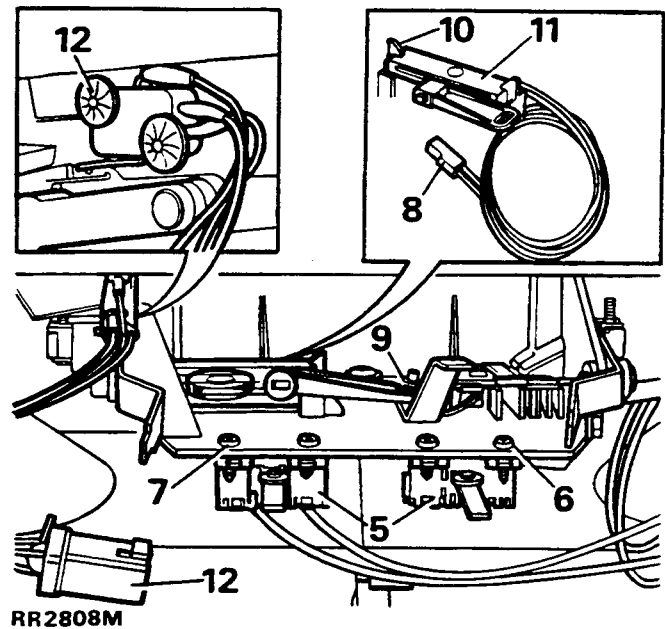
HEATER AND AIR CONDITIONING CONTROLS

Service repair no - 80.10.02.

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove transmission lever surround and radio housing.
3. Remove lower dash panel.
4. Remove centre dash unit.



5. Disconnect electrical plugs from fan speed and recirculate/fresh air switches.
6. **Fan speed switch:** remove fixing screws and withdraw switch.
7. **Air conditioning / fresh air / recirculating switch:** remove fixing screws and withdraw switch.
8. **Potentiometer:** disconnect electrical connector to electronic thermostat sited at rear of the evaporator housing.
9. Prise wire cable connection from the heat control lever.
10. Release potentiometer from its location.



11. Remove potentiometer with connecting arm to heat control lever. Withdraw the attached electrical leads through the grommet.
12. **Microswitch:** disconnect multiplug, lift vent lever, remove two retaining clips and withdraw microswitch.

Refit

13. Reverse removal procedure. Check the satisfactory function of the controls before fitting dash and trim panels.

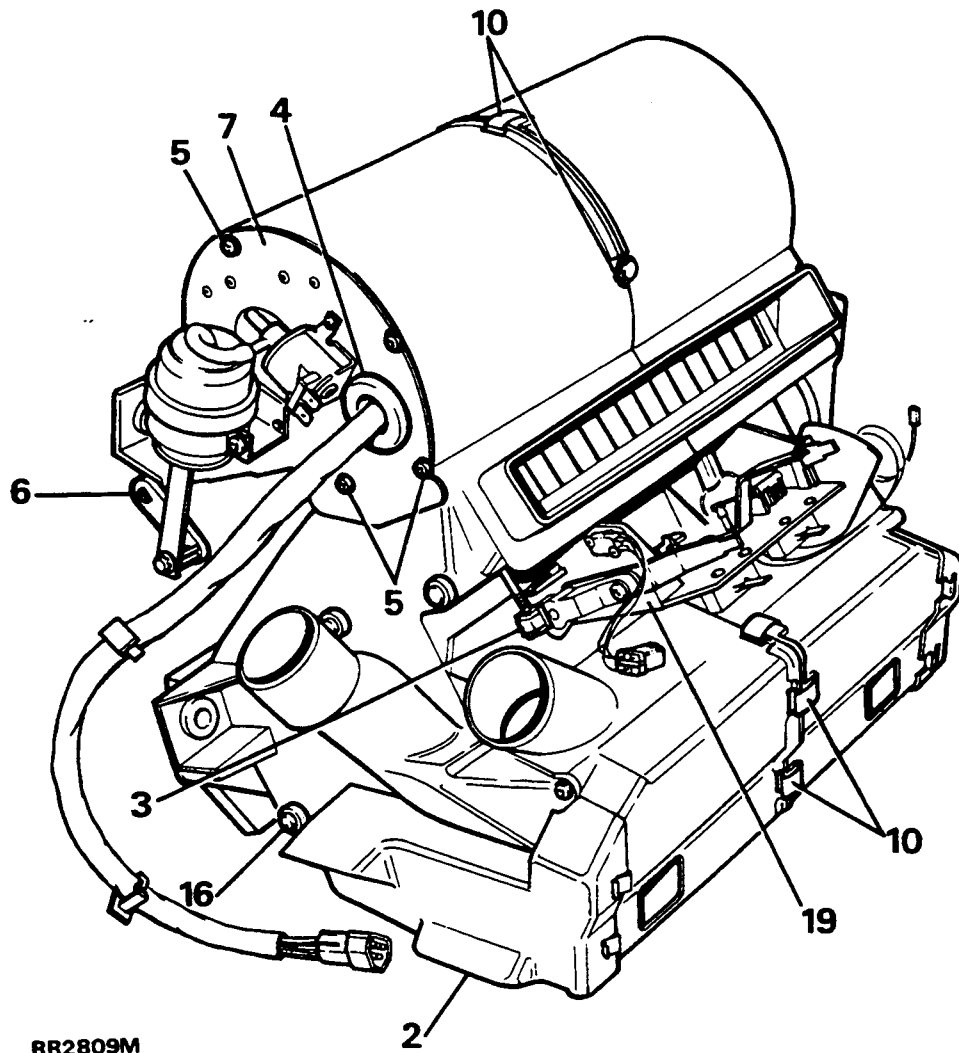
HEATER FAN MOTOR, ROTOR AND RESISTANCE UNIT

Service repair no - 80.20.17/20.

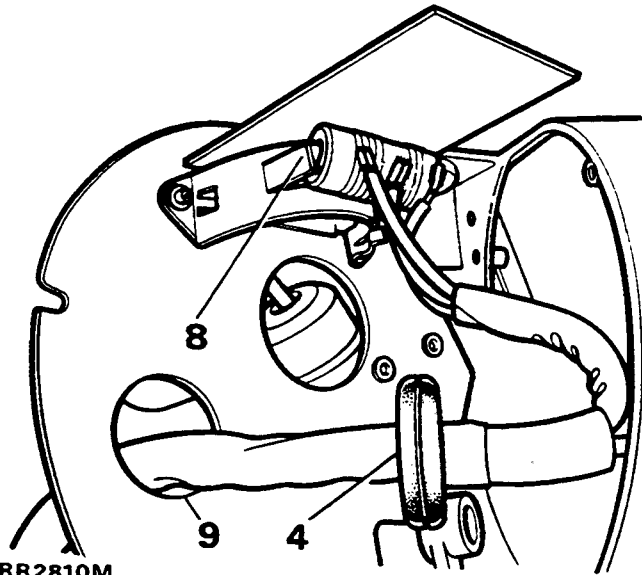
Remove and refit

Remove

1. Remove the heater assembly. *See Heater assembly*
2. Remove left duct to footwell outlet.
3. Mark the position of vent control rod for reassembly. Disconnect by prising open the plastic clip.



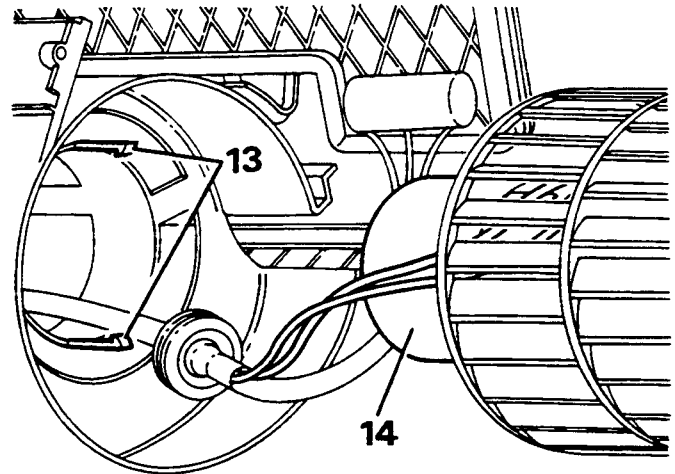
RR2809M



RR2810M

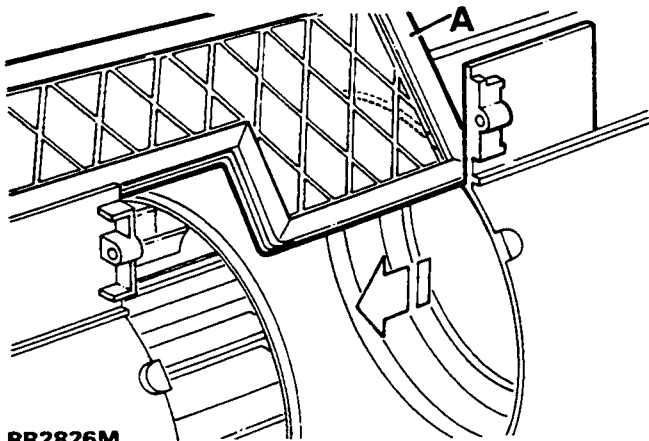
4. Disengage grommet from side cover.
5. Remove six screws retaining the side cover.
6. Remove vacuum unit to air flap linkage.
7. Withdraw side cover to expose electric wires to the fan motor and resistance unit.
8. Release resistance unit by tensioning back the metal mounting straps.
9. Remove side cover feeding electrical leads and multiplug through the hole.
10. Remove ten spring clips, three circlips and two screws that secure the halves of heater casing together. Ensure all fixings and foam gaskets are removed.

11. Position flap (A) as shown, prise and slide its lower edge through gap between motor housing and outer case. While separating each half of the heater casing.
12. Note the location of air flap pivots, for reassembly.



RR2825M

13. The motor assembly is held into the left half of the casing by two plastic tabs, locate and prise them away from motor.
14. Note for reassembly the position and layout of electrical wiring. Then withdraw the motor assembly including attached wires and resistance unit from its housing.



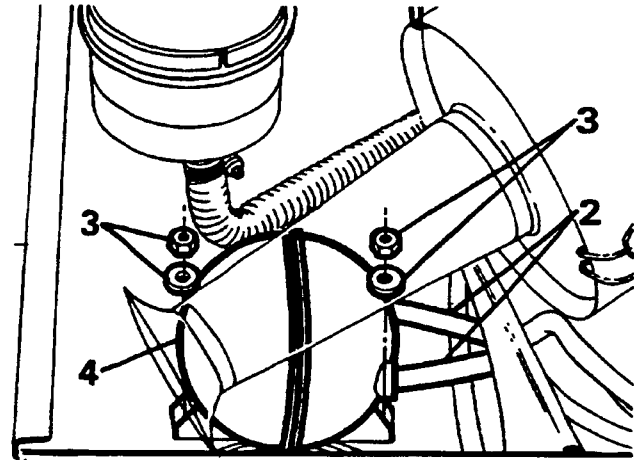
RR2826M

**Refit**

15. Feed wiring and resistance unit through motor housing and fit motor assembly. Ensure wiring is positioned correctly, to avoid entangling rotor, and the plastic tabs locate to secure motor.
16. Mark a white spot on the end of each air flap pivot to be reassembled into heater casing.
17. Offer heater casing halves together. Ensure the flap (A) is positioned to reverse instruction 11.
18. Point remaining air flap pivots in the direction of their location.
19. Locate and slot into left casing the heater control panel assembly. Examine closely to ensure that both fixings engage and slide into their housing.
20. Slowly and firmly push casing halves together checking that all components are aligned. Any solid resistance felt suggests a component is not locating correctly. Rectify and continue until casing halves are together.
21. Refit all fixings holding the heater casing halves together.
22. Reverse removal procedure. 4 to 9.
23. Connect the rod to the vent control lever to its marked position.
24. Check all controls operate and flaps seal against the heater casing.
25. Refit the left duct to footwell outlet.
26. Renew foam gaskets.
27. Refit heater assembly.

VACUUM RESERVOIR**Remove and refit****Remove**

1. Disconnect the battery negative lead.



RR 2187E

2. Remove the two vacuum hoses.
3. Loosen the reservoir fixings.
4. Withdraw vacuum reservoir.

Refit

5. Reverse removal procedure. Note that the larger diameter hose, from inlet manifold fits the inlet marked VAC on the reservoir.

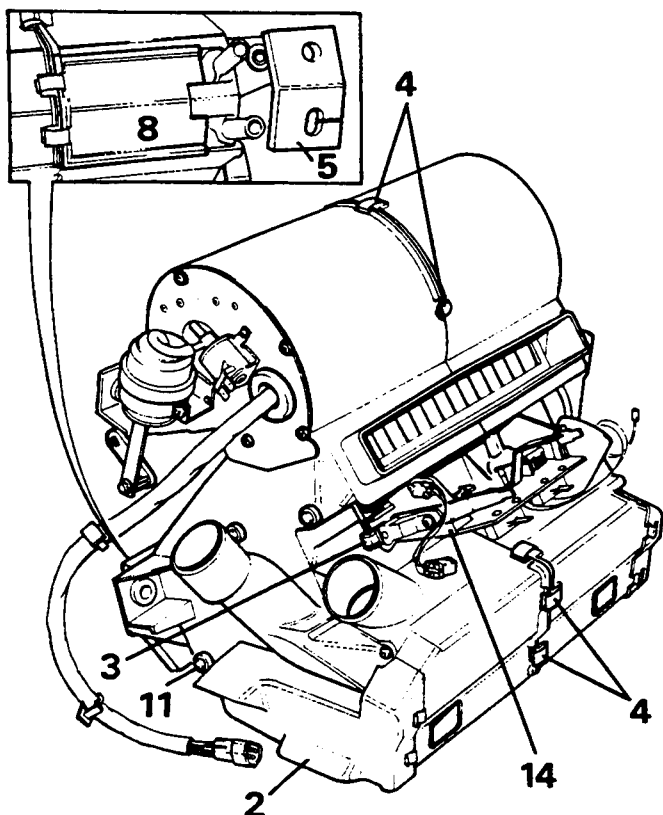
HEATER CORE

Service repair no - 80.20.29.

Remove and refit

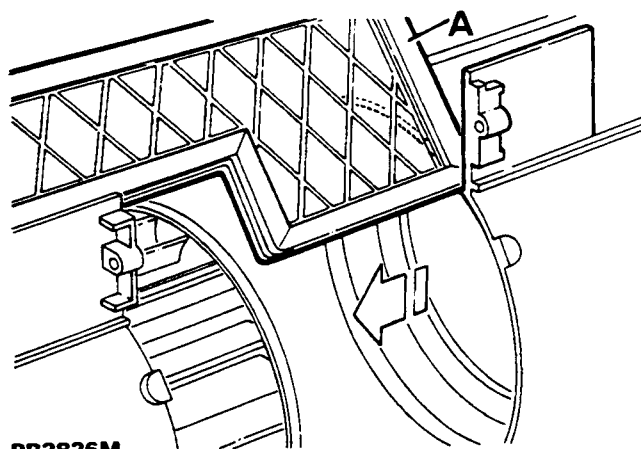
Remove

1. Remove heater assembly. *See Heater assembly*



RR2827M

2. Remove left duct to footwell outlet.
3. Mark the position of vent control rod, for reassembly. Disconnect by prising open the plastic clip.
4. Remove ten spring clips, three circlips and two screws that secure the halves of heater casing together. Ensure all fixings and foam gaskets are removed.
5. Remove pad from around the two coolant hose connections.
6. Position flap (A) as shown, prise and slide its lower edge through the gap between motor housing and outer case. While separating each half of heater casing.
7. Note for reassembly the location of air flap pivots.



RR2826M

8. Slide out the separate panel.
9. Remove heater core complete with sponge packing.

Refit

10. Fit heater core into the left half of casing. Slide in separate panel (8) up to coolant hose connections.
11. Mark a white spot on the end of each air flap pivot to be reassembled into heater casing.
12. Offer heater casing halves together. Ensure flap (A) is positioned to reverse instruction 6.
13. Point remaining air flap pivots in the direction of their location.
14. Locate and slot into left casing the heater control panel assembly. Examine closely to ensure that both fixings engage and slide into their housing.
15. Slowly and firmly push casing halves together checking that all components are aligning. Any solid resistance felt suggests a component is not locating correctly. Rectify and continue until the casing halves are together.
16. Refit all of the fixings that hold heater casing halves together.
17. Connect rod to the vent control lever to its marked position.
18. Check all controls operate and air flaps seal against heater casing.
19. Renew the pad around the two coolant hose connections.
20. Refit the left duct to footwell outlet.
21. Renew foam gaskets.
22. Refit heater assembly.



TORQUE VALUES



NOTE: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

	Nm
METRIC	
M5	6
M6	9
M8	25
M10	45
M12	90
M14	105
M16	180
UNC / UNF	
1/4	9
5/16	24
3/8	39
7/16	78
1/2	90
5/8	136

Torque values above are for all screws and bolts used except for those that are specified otherwise.