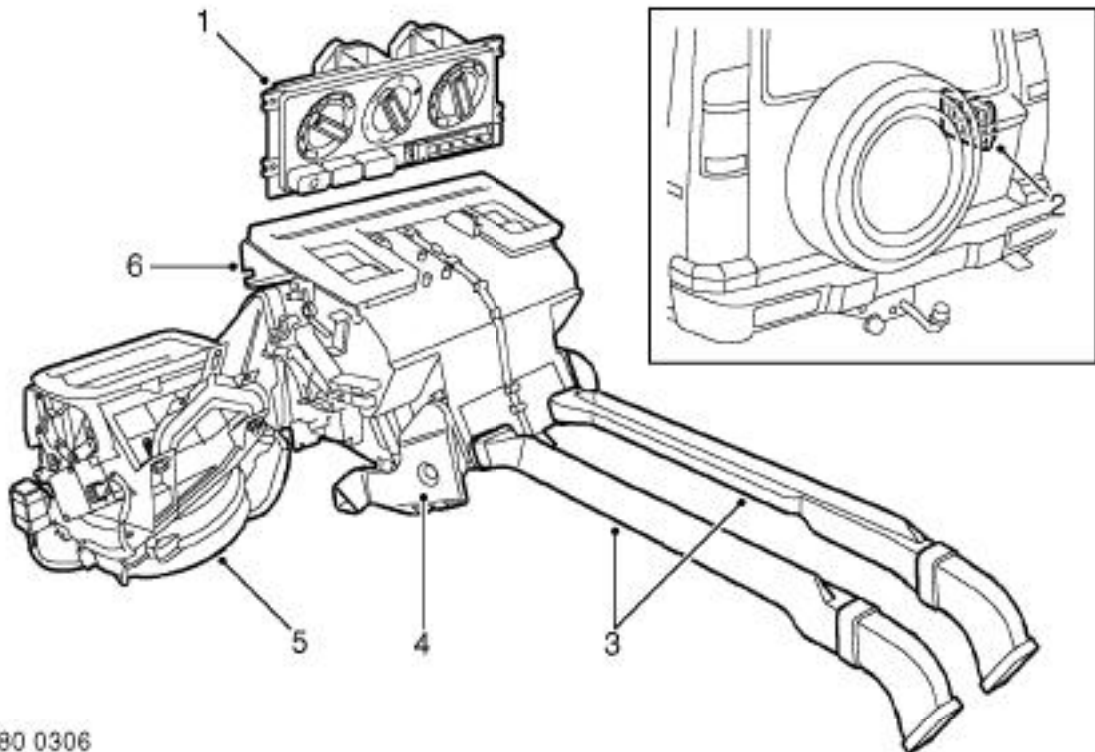


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**Heating and ventilation component layout**

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M80 0306

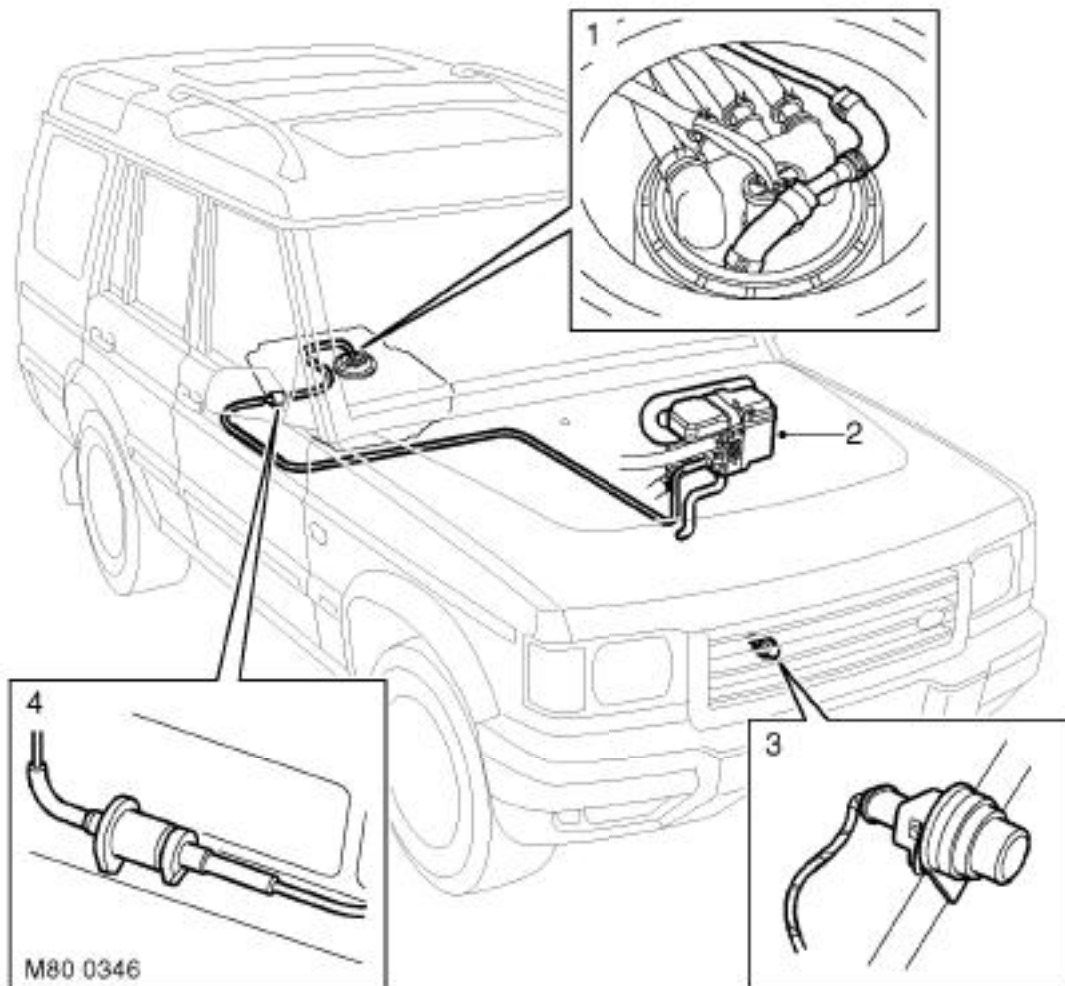
*RH drive shown, LH drive similar*

- 1 Control panel
- 2 Outlet vent
- 3 Rear footwell ducts

- 4 Front footwell duct
- 5 Air inlet duct
- 6 Heater assembly

# HEATING AND VENTILATION

## Fuel burning heater component layout



*RH drive shown, LH drive similar*

- 1 FBH fuel line connection
- 2 FBH unit

- 3 Air temperature sensor
- 4 FBH pump



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## Description

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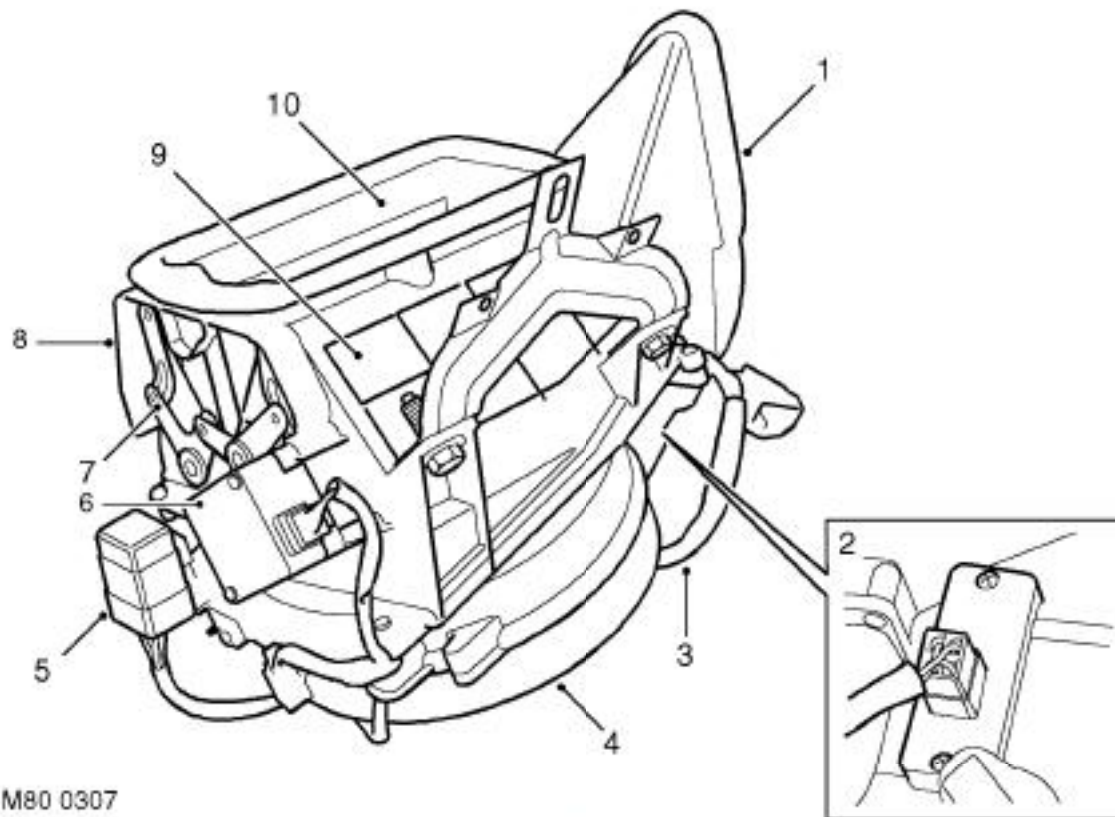
### General

The heating and ventilation system controls the temperature and distribution of air supplied to the vehicle interior. The system consists of an air inlet duct, heater assembly, distribution ducts and a control panel. An outlet vent is incorporated at the rear of the cabin. Some diesel models also incorporate a fuel burning heater (FBH) system in the engine coolant supply to the heater assembly.

Fresh or recirculated air flows into the heater assembly from the inlet duct. An electrical variable speed blower in the inlet duct, and/or ram effect, forces the air through the system. Depending on the settings on the control panel, the air is then heated and supplied through the distribution ducts to fascia and floor level outlets.

# HEATING AND VENTILATION

## Air inlet duct



M80 0307

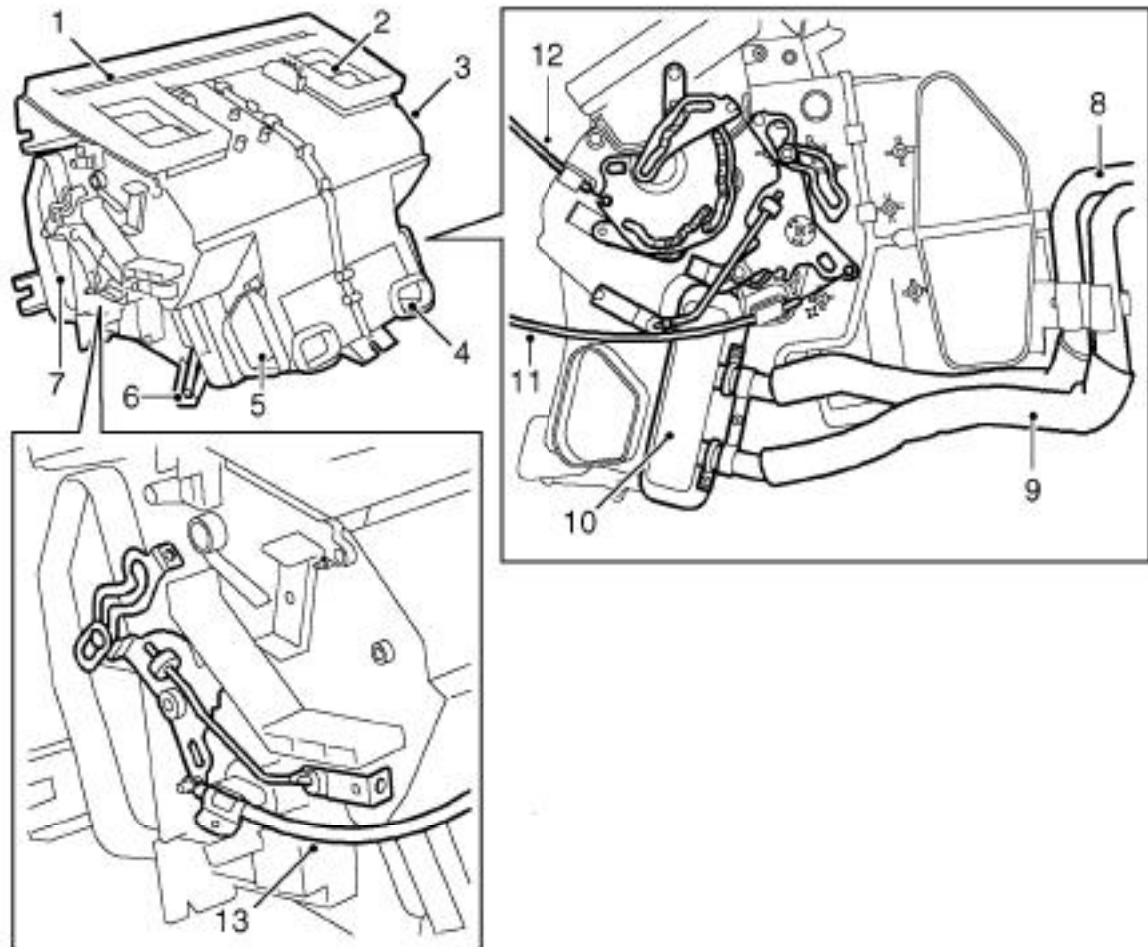
*RH drive shown, LH drive similar*

- |                  |                                    |
|------------------|------------------------------------|
| 1 Air outlet     | 6 Recirculated air servo motor     |
| 2 Resistor pack  | 7 Control flap operating mechanism |
| 3 Wiring harness | 8 Recirculated air inlet           |
| 4 Blower         | 9 Recirculated air inlet           |
| 5 Blower relay   | 10 Fresh air inlet                 |

The air inlet duct is installed behind the fascia, on the passenger's side. The air inlet duct is connected to the plenum to provide the fresh air inlet. Two grilles in the air inlet duct provide recirculated air inlets from the cabin. Two control flaps, operated by a servo motor, open and close the fresh and recirculated air inlets to control the source of incoming air. Operation of the servo motor is controlled by a switch on the control panel.

The blower is installed between the air inlets and the outlet to the heater assembly, and consists of an open hub, centrifugal fan powered by an electric motor. Operation of the blower is controlled by a slider switch on the control panel, via a blower relay mounted on the air inlet duct and a resistor pack. The resistor pack is installed in the air outlet from the blower fan, so that any heat generated is dissipated by the air flow. A wiring harness on the air inlet duct connects the servo motor, blower motor, blower relay and resistor pack to the vehicle wiring.

### Heater assembly



M80 0308A

- |   |                                 |
|---|---------------------------------|
| 1 Windscreen and side window air outlet | 8 Engine coolant return         |
| 2 Face level air outlet                 | 9 Engine coolant feed           |
| 3 Casing                                | 10 Heater matrix                |
| 4 Rear footwell air outlet              | 11 RH temperature control cable |
| 5 Front footwell air outlet             | 12 Distribution control cable   |
| 6 Drain outlet                          | 13 LH temperature control cable |
| 7 Air inlet                             |                                 |

The heater assembly heats and distributes air as directed by selections made on the control panel. The assembly is installed on the vehicle centre-line, between the fascia and the engine bulkhead. The heater assembly consists of a casing, formed from a series of plastic moldings, which contains a heater matrix and control flaps. Internal passages integrated into the casing guide the air through the casing and separate it into two flows, one for the LH outlets and one for the RH outlets. Two drain outlets at the bottom of the casing connect to overboard drain tubes installed in the sides of the transmission tunnel.

#### Heater matrix

The heater matrix provides the heat source to warm the air being supplied to the distribution outlets. The heater matrix is an aluminium two pass, fin and tube heat exchanger, installed in the RH side of the casing. Two aluminium tubes attached to the heater matrix extend through the engine bulkhead to connect the heater assembly to the engine coolant system. When the engine is running, coolant is constantly circulated through the heater matrix by the engine coolant pump. On diesel models, the coolant flow is assisted by an electric pump while the FBH system is active.

## HEATING AND VENTILATION

### Control flaps

Control flaps are installed in the heater assembly to control the temperature and distribution of air. Blend flaps control the temperature and distribution flaps control the distribution.

### Temperature and distribution control

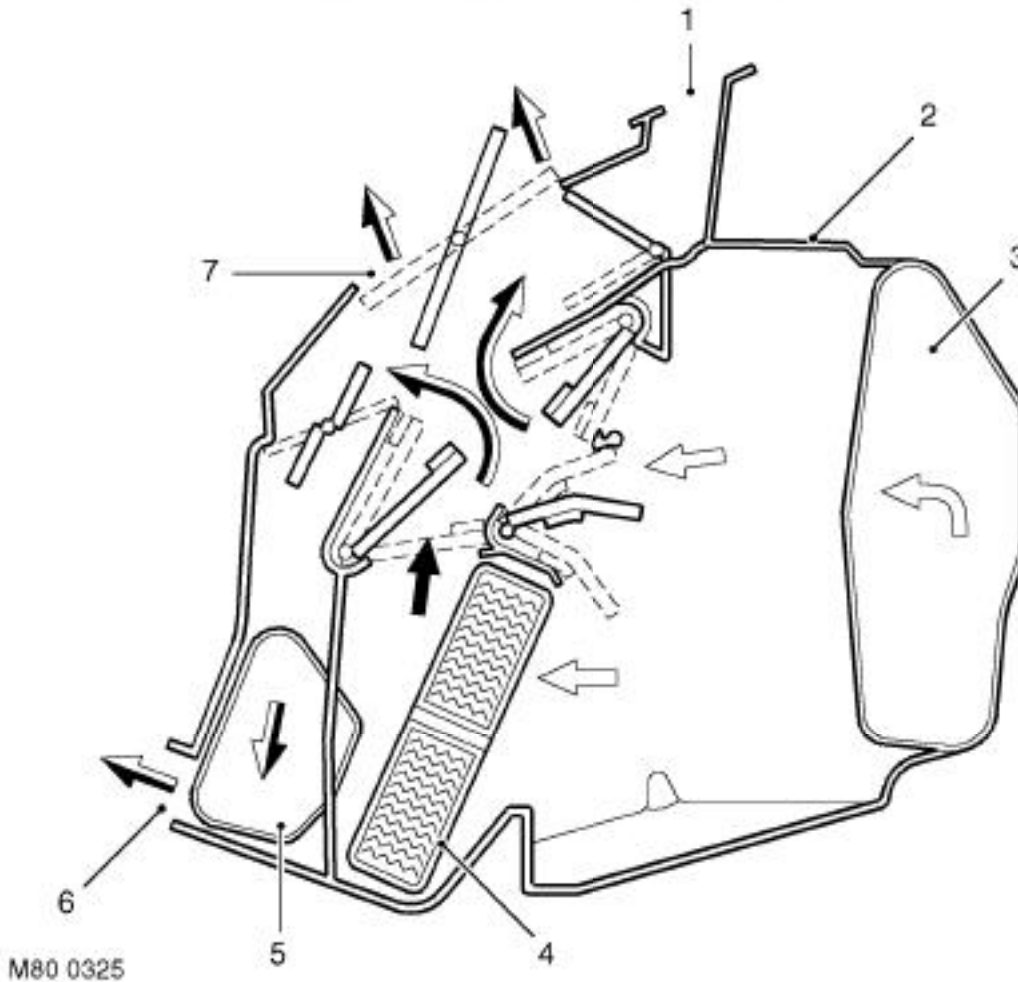


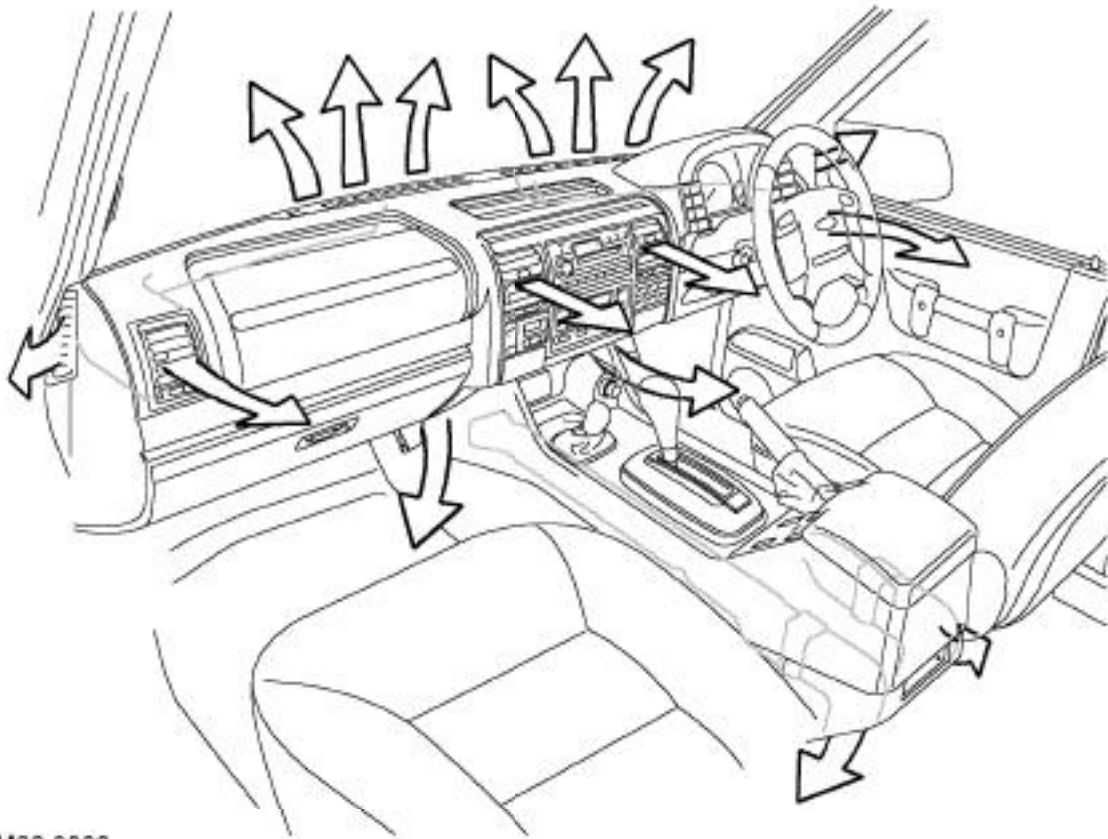
Figure shows flaps set for medium heat to face level and footwell outlets

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

**Blend flaps:** Two sets of three blend flaps, one LH and one RH, regulate the flow of air through the heater matrix and a heater matrix bypass, to control the temperature of the air leaving the heater assembly. The two sets of blend flaps operate independently to allow different temperatures to be set for the LH and RH outlets.

Each blend flap is attached to a spindle. The end of each spindle extends through the side of the heater casing and is attached to a common lever mechanism on the related side of the casing. A control cable is installed between the lever mechanism and the related temperature knob on the control panel. When the flow is split between the bypass and the heater matrix, the two flows mix downstream of the heater matrix to produce an even air temperature at the individual outlets.

**Distribution flaps:** Separate distribution flaps are installed to control the flow of air to the footwells, windscreen/side windows and the LH and RH face level outlets. The distribution flaps are attached to spindles that extend through the RH side of the heater casing and are attached to a common lever mechanism. A control cable is installed between the lever mechanism and the distribution knob on the control panel.

**Distribution ducts**

M80 0309

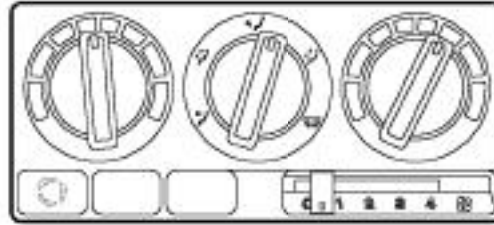
Separate distribution ducts are installed for the front and rear footwell outlets. Distribution ducts for the face level, windscreen and side windows outlets are integrated into the fascia. The front footwell ducts are attached to ports at the sides of the heater assembly. The rear footwell ducts locate in ports at the rear of the heater assembly and extend along each side of the centre console to vent into the rear footwells from below the cubby box.

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

## HEATING AND VENTILATION

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### Control panel



M80 0310

The controls for heating and ventilation are installed on a control panel in the centre of the fascia, below the radio. Three rotary knobs control the LH and RH outlet temperatures and distribution. A slider switch controls blower speed. A latching pushswitch controls the selection of fresh/recirculated air; an amber LED in the switch illuminates when recirculated air is selected.

Graphics on the panel and the controls indicate the function and operating positions of the controls.

### Outlet vent

The outlet vent promotes the free flow of heating and ventilation air through the cabin. The outlet vent is installed in the RH rear quarter body panel and vents cabin air into the sheltered area between the rear quarter body panel and the outer body side panel. The vent consists of a grille covered by soft rubber flaps and is effectively a non-return valve. The flap opens and closes automatically depending on the differential between cabin and outside air pressures.

### FBH system (diesel models only)

The FBH system is an auxiliary heating system that compensates for the relatively low coolant temperatures inherent in the diesel engine. At low ambient temperatures, the FBH system heats the coolant supply to the heater assembly, and maintains it within the temperature range required for good in-car heating performance. Operation is fully automatic, with no intervention required by the driver.

The system consists of an air temperature sensor, a FBH fuel pump and a FBH unit. Fuel for the FBH system is taken from the fuel tank, through a line attached to the fuel tank's fuel pump, and supplied via the FBH fuel pump to the FBH unit. The connection on the fuel tank's fuel pump incorporates a tube which extends down into the tank. At the FBH unit connection, the fuel line incorporates a self-sealing, quick disconnect coupling. In the FBH unit, the fuel delivered by the FBH fuel pump is burned and the resultant heat output is used to heat the coolant. An ECU integrated into the FBH unit controls the operation of the system at one of two heat output levels, 2.5 kW at part load and 5 kW at full load.

### Ambient temperature sensor

The ambient temperature sensor controls a power supply from the alternator to the FBH unit. The sensor is installed on the RH support strut of the bonnet closing panel and contains a temperature sensitive switch that is closed at temperatures below 5 °C (41 °F) and open at temperatures of 5 °C (41 °F) and above.