

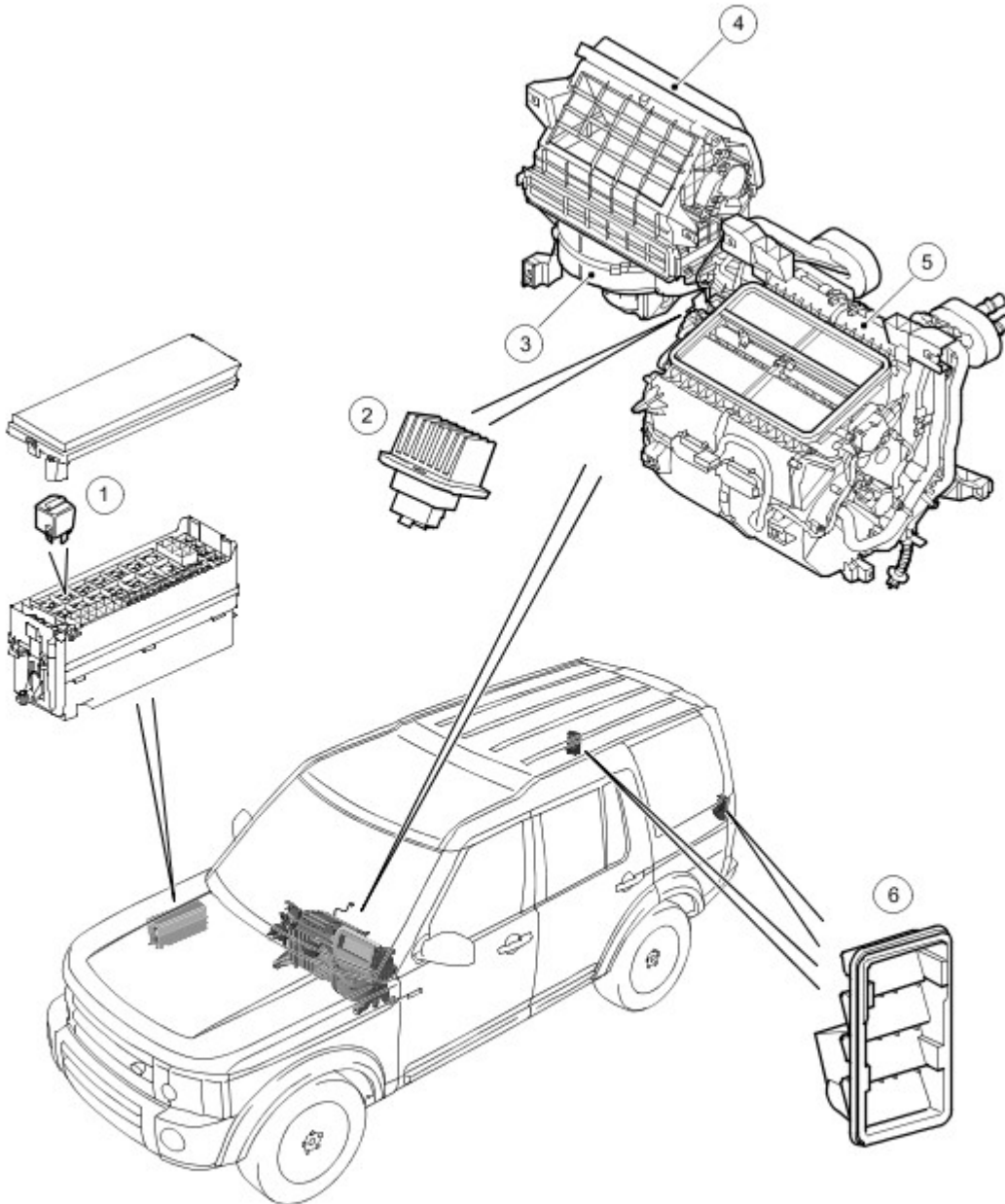


# Heating and Ventilation

## COMPONENT LOCATIONS

**NOTE :**

RHD installation shown, LHD similar



E47348

Item	Part Number	Description
1	-	Blower relay
2	-	Blower control module

3	-	Blower
4	-	Air inlet duct
5	-	Heater
6	-	Ventilation outlets

## GENERAL

The heating and ventilation system controls the temperature and flow of air supplied to the vehicle interior. The system consists of:

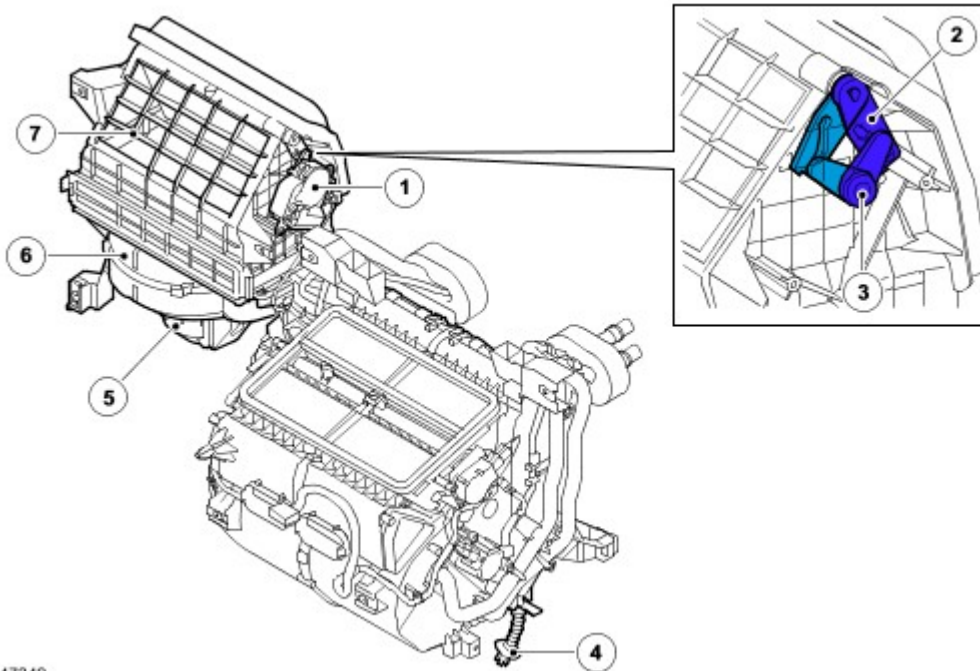
- An air inlet duct.
- A blower.
- A blower control module.
- A blower relay.
- A heater.
- Two ventilation outlets.

Fresh or recirculated air flows into the heater assembly from the inlet duct. The blower, and ram effect when the vehicle is moving, forces the air through the heater assembly. Air from the cabin exhausts through the ventilation outlets.

## AIR INLET DUCT

### NOTE :

RHD version shown, LHD mirror image



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Item	Part Number	Description
1	-	Recirculation door motor
2	-	Recirculation door arm
3	-	Recirculation motor arm
4	-	Evaporator drain tube
5	-	Blower

6	-	Air inlet duct
7	-	Recirculation air inlet

The air inlet duct is installed behind the instrument panel, on the front passenger side, and connected between the plenum chamber below the windshield and the heater.

The plenum chamber is formed by the upper and lower cowl and a plenum molding. Grilles in the plenum molding allow fresh air into the plenum chamber. From the plenum chamber, the air passes through a water separator and into the fresh air inlet of the air inlet duct.

The air inlet duct incorporates a grille to provide the inlet for recirculated air from the vehicle interior. The air inlet duct also accommodates:

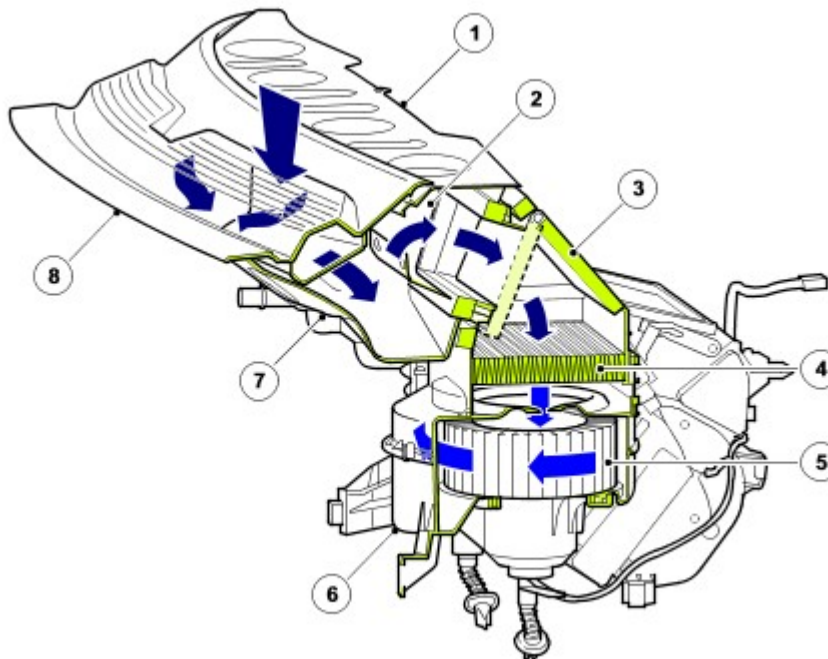
- The cabin air filter. For additional information, refer to [Air Distribution and Filtering](#) (412-01 Air Distribution and Filtering)
- The blower.
- The blower control module.

The outlet from the air inlet duct forms the rear wall of the heater, enclosing the evaporator and incorporating the two evaporator drain outlets. Drain tubes connect the evaporator drain outlets to the transmission tunnel, to direct the water that condenses on the evaporator overboard.

A recirculation door is installed between the fresh and recirculated air inlets, to control the source of incoming air. A lever on the recirculation door is driven by the recirculation door motor. Operation of the recirculation door motor is automatically controlled by the Air Temperature Control Module (ATCM) and manually controlled by a switch on the ATCM control panel. For additional information, refer to [Control Components](#) (412-04 Control Components)

Fresh or recirculated air enters the air inlet duct and passes through the cabin air filter to the hub of the blower. From the blower, the air flows to the outlet of the air inlet duct and into the heater. The blower, and ram effect from the forward motion of the vehicle, forces the air through the air inlet duct.

### Air Flow Through Air Inlet Duct



E47350

Item	Part Number	Description
1	-	Upper cowl

2	-	Water separator
3	-	Recirculation door
4	-	Cabin air filter
5	-	Blower
6	-	Air inlet duct casing
7	-	Lower cowl
8	-	Plenum molding

## BLOWER

The blower is installed in the air inlet duct, below the cabin air filter, and consists of an open hub, centrifugal fan powered by an electric motor. Operation of the blower is controlled by the ATCM, using the blower relay in the Battery Junction Box (BJB) and the blower control module. The blower control module is installed in the air inlet duct downstream of the blower, where any heat generated during operation is dissipated by the air flow. A wiring harness on the air inlet duct connects the recirculation door motor, blower and blower control module to the vehicle wiring.

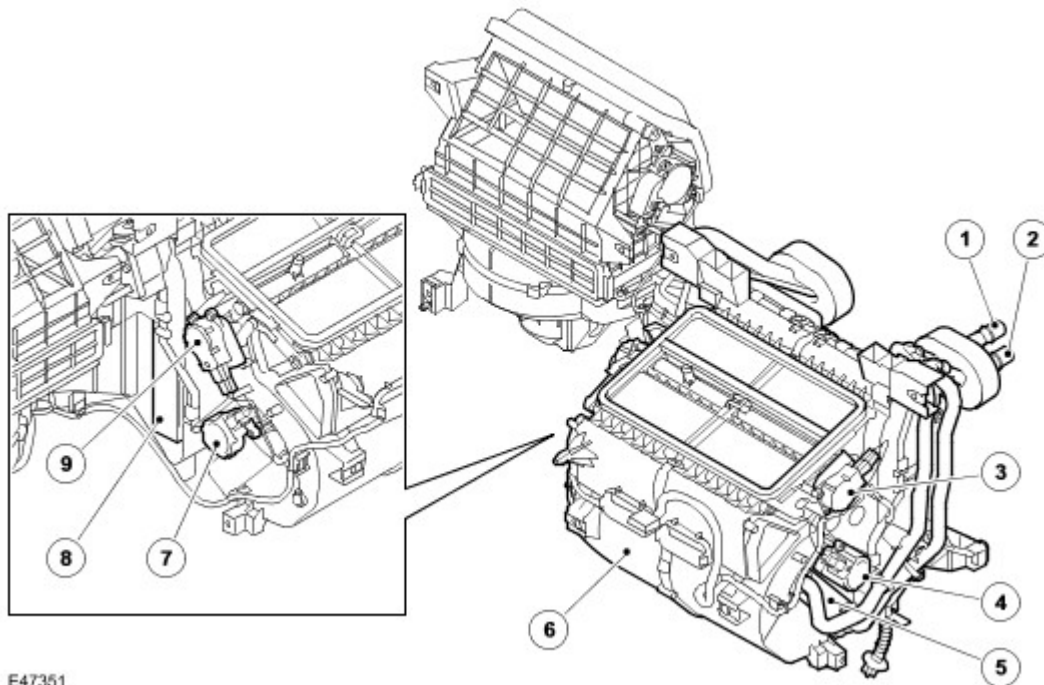
When the blower is required, the ATCM energizes the coil of the blower relay. The energized blower relay supplies battery power to the blower motor, which is connected to ground through the blower control module. The speed of the blower is controlled by the blower control module, which regulates the blower motor voltage in response to a Pulse Width Modulated (PWM) signal from the ATCM. To vary the blower motor voltage the ATCM varies the duty cycle of the PWM signal.

When the blower is in the automatic mode the ATCM determines the blower speed required from the comfort algorithms. When the blower is in the manual mode, the ATCM operates the blower at one of seven fixed speeds as selected on the control panel. For additional information, refer to [Control Components](#) (412-04 Control Components)

## HEATER

**NOTE :**

RHD unit shown, LHD units similar



E47351

Item	Part Number	Description

1	-	Coolant outlet pipe
2	-	Coolant inlet pipe
3	-	Windshield distribution door motor
4	-	RH temperature blend motor
5	-	Heater core
6	-	Heater casing
7	-	LH temperature blend motor (automatic system only)
8		Evaporator
9		Face and feet distribution door motor

The heater controls the temperature of the air supplied to the distribution ducts, as directed by the ATCM. The heater is installed on the vehicle center-line, between the instrument panel and the engine bulkhead. The heater consists of a casing, formed from a series of plastic molding, which contains an evaporator, heater core and control doors. 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.

When the Air Conditioning (A/C) system is operating, the evaporator cools the air entering the heater.

The heater core provides the heat source to warm the air being supplied to the distribution ducts. The heater core is an aluminum two pass, fin and tube heat exchanger, installed across the width of the heater housing. Two aluminum tubes attached to the heater core extend through the engine bulkhead to connect with the engine cooling system. When the engine is running, coolant is constantly circulated through the heater matrix by the coolant pump. On vehicles with a Fuel Fired Booster Heater (FFBH), when the FFBH is active the coolant flow is assisted by an electric circulation pump. For additional information, refer to [Auxiliary Heater](#) (412-02B Auxiliary Heating)

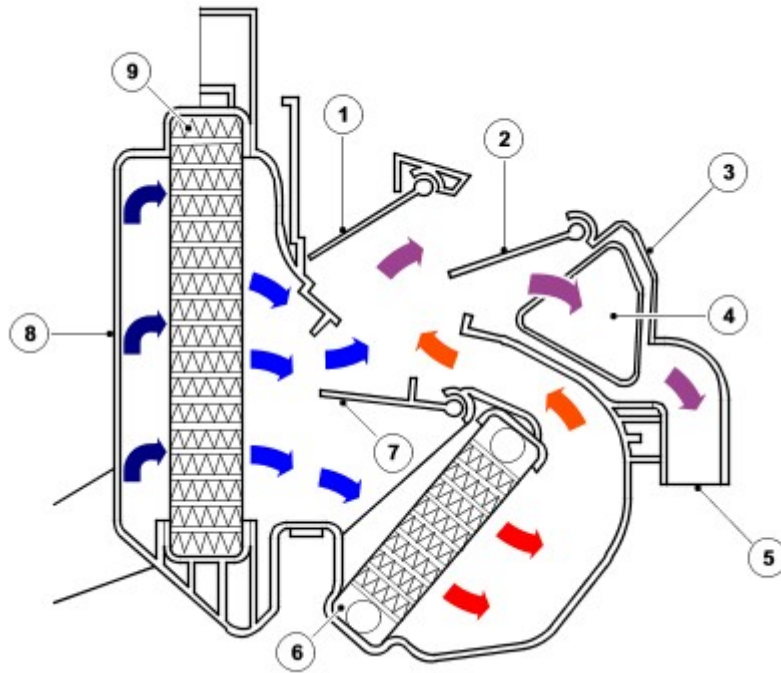
Two temperature blend doors, one LH and one RH, regulate the flow of air through the heater core to control the temperature of the air leaving the heater. On the automatic system, the two temperature blend doors operate independently to allow different temperatures to be set for the LH and RH outlets. On the manual system, the temperature blend doors are coupled together and produce a common temperature for the LH and RH outlets. On the automatic system, separate stepper motors operate the LH and the RH side temperature blend doors. On the manual system, a single stepper motor operates the two doors.

A drive arm is attached to the drive spindle of each temperature blend door stepper motor. The end of the stepper motor drive arm engages with a slot in the drive arm of the related temperature blend door.

Operation of the temperature blend door stepper motors is controlled by the ATCM. For additional information, refer to [Control Components](#) (412-04 Control Components)

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## Air Flow Through Heater



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Item	Part Number	Description
1	-	Windshield distribution door
2	-	Face and feet distribution door
3	-	Heater casing
4	-	Front footwell outlet
5	-	Rear footwell outlet
6	-	Heater core
7	-	Temperature blend door
8	-	Air inlet duct casing
9	-	Evaporator

## VENTILATION OUTLETS

The ventilation outlets promote the free flow of air through the passenger compartment. The outlets are installed in the LH and RH rear quarter body panels, behind the tail lamps.

Each ventilation outlet consists of a grille covered by soft rubber flaps and is effectively a non-return valve. The flaps open and close automatically depending on the differential between cabin and outside air pressures.