

## Air Conditioning - V6 S/C 3.0L Petrol -

### Lubricant

Item	Specification
Air conditioning (A/C) compressor oil type	Sanden SPA2 oil
A/C compressor oil - vehicles fitted with 2 zone	80ml
A/C compressor oil - vehicles fitted with 4 zone	130 ml

### Refrigerant



NOTE: For NAS vehicles.

Item	Specification
Refrigerant type	R1234yf
Refrigerant - vehicles fitted with 2 zone - vehicles with 3.0 diesel	600 grammes
Refrigerant - vehicles fitted with 2 zone - vehicles with 3.0L/5.0L	650 grammes
Refrigerant - vehicles fitted with 4 zone	900 grammes

### Refrigerant



NOTE: For ROW vehicles.

Item	Specification
Refrigerant type	R134A
Refrigerant - vehicles fitted with 2 zone - vehicles with 3.0 diesel	600 grammes
Refrigerant - vehicles fitted with 2 zone - vehicles with 3.0L/5.0L	650 grammes
Refrigerant - vehicles fitted with 4 zone	900 grammes

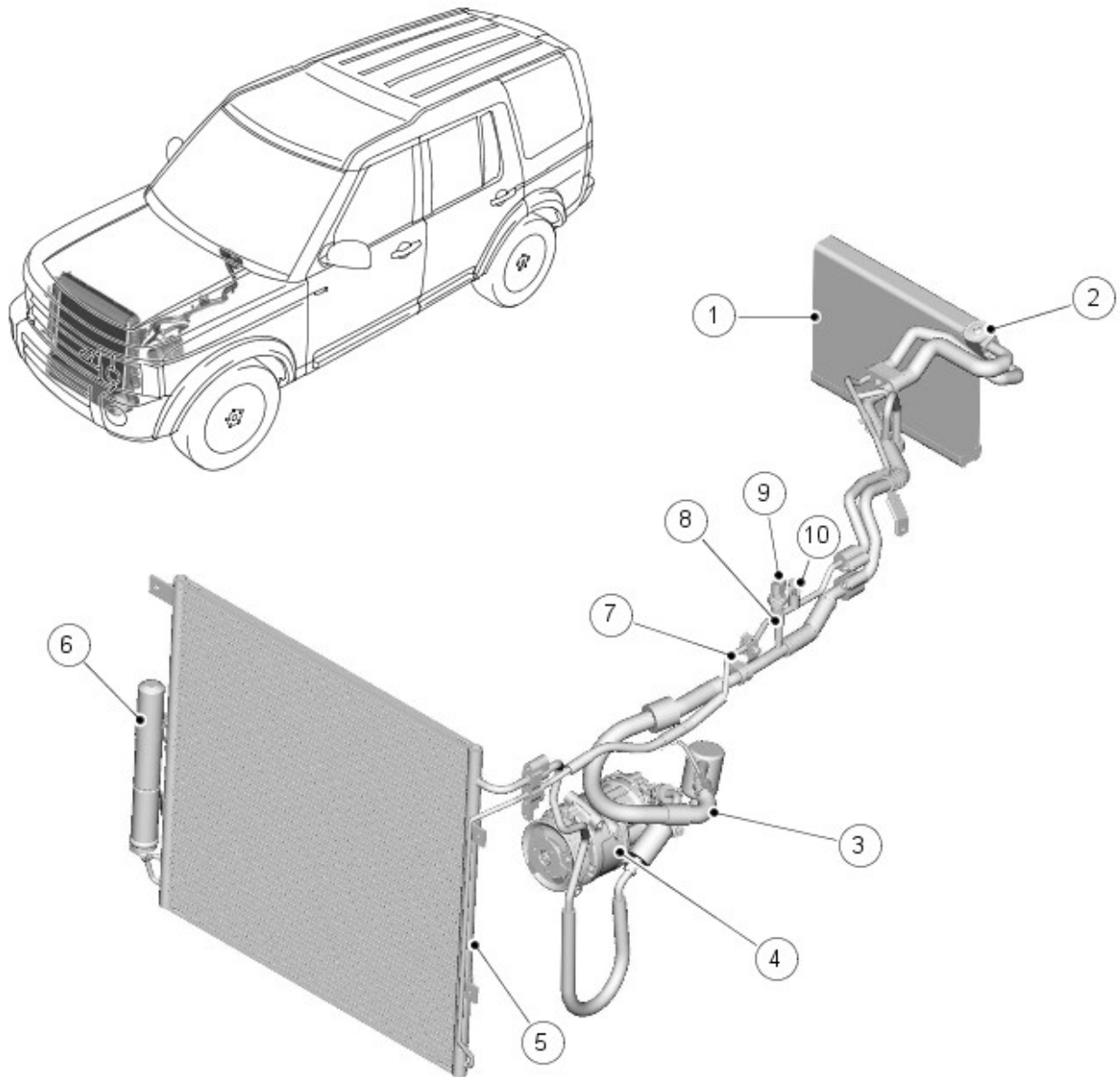
### Torque Specifications

Description	Nm	lb-ft	lb-in
A/C compressor bolts	25	18	221
A/C discharge line to compressor bolt	18	13	159
A/C suction line to compressor bolt	18	13	159
A/C suction line bracket bolts	6	4	53
A/C discharge line to condenser bolt	6	4	53
A/C liquid line to condenser bolt	6	4	53
A/C condenser manifold to radiator bolt	10	7	88
Condenser to radiator bolt - vehicles with 5.0L	10	7	88
Condenser to radiator bolt - vehicles with 3.0 diesel	5	4	44
Evaporator line to evaporator core bolt	6	4	53
Evaporator line bracket nut	6	4	53
A/C liquid line to front evaporator line bolt - vehicles fitted with 4 zone	18	13	159
A/C suction line to front evaporator line bolt - vehicles fitted with 4 zone	18	13	159
A/C lines to rear evaporator bolts - vehicles fitted with 4 zone	9	7	80
A/C pressure transducer	10	7	88
Thermostatic expansion valve (TXV) to refrigerant line clamp bolts	5	4	44

# Air Conditioning - V6 S/C 3.0L Petrol - Air Conditioning

Description and Operation

## COMPONENT LOCATION



E131583

Item	Part Number	Description
1	-	Evaporator
2	-	Thermostatic expansion valve
3	-	Low pressure line
4	-	A/C (air conditioning) compressor
5	-	Condenser
6	-	Receiver drier
7	-	High pressure line
8	-	Low pressure servicing connection
9	-	Refrigerant pressure sensor (reference)
10	-	High pressure servicing connection

## OVERVIEW

The A/C system is a sealed, closed loop system filled with a charge weight of refrigerant as the heat transfer medium. Depending on market, the refrigerant is either R1234yf or R134a. Oil is added to the refrigerant to lubricate the internal components of the A/C compressor. The system consists of:

- A A/C compressor.

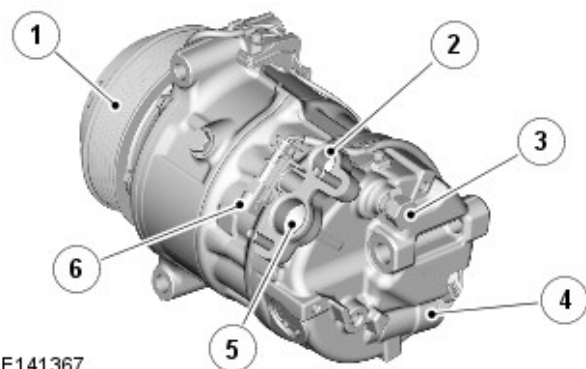
- A condenser.
- A receiver drier.
- A thermostatic expansion valve.
- An evaporator.
- Low and high pressure refrigerant lines.

A pressure sensor in the high pressure refrigerant line allows the ATCM (automatic temperature control module) to monitor the status of the A/C system.

For additional information, refer to: [Control Components](#) (412-04 Control Components, Description and Operation).

## DESCRIPTION

### Air Conditioning Compressor



Item	Part Number	Description
1	-	Pulley
2	-	Refrigerant outlet port
3	-	Pressure relief valve
4	-	Electronic control valve
5	-	Refrigerant inlet port
6	-	Electrical connector

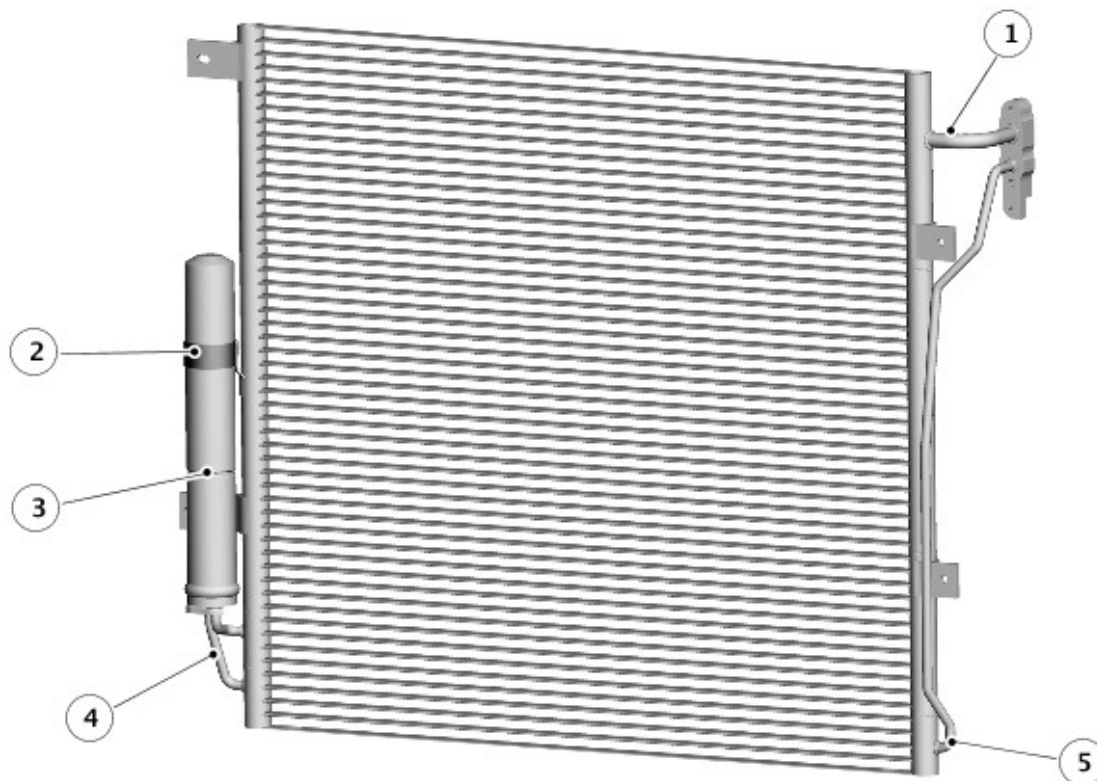
On all engine variants, the A/C compressor is a variable displacement unit attached to the front left side of the engine with three bolts.

The compressor is driven by the engine accessory drive belt via an electro-magnetic clutch in the compressor pulley. The ATCM (automatic temperature control module) controls the operation of the electro-magnetic clutch. The clutch incorporates a thermal cut-off fuse, which disconnects the power feed from the ATCM if the temperature increases to  $182 \pm 5 \text{ }^{\circ}\text{C}$  ( $360 \pm 9 \text{ }^{\circ}\text{F}$ ).

The displacement of the compressor is controlled by an integral electronic control valve, which is operated by the ATCM. The ATCM automatically adjusts the displacement of the A/C compressor, between the minimum and maximum values, to match the thermal load of the evaporator.

To protect the refrigerant system from excessive pressure, a pressure relief valve is installed in the outlet side of the A/C compressor. The pressure relief valve vents excess pressure into the engine compartment.

### Condenser



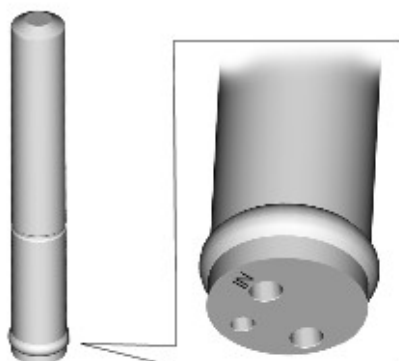
E161114

Item	Part Number	Description
1	-	Refrigerant inlet port
2	-	Receiver drier attachment bracket
3	-	Receiver drier
4	-	Receiver drier pipes
5	-	Refrigerant outlet port

The condenser transfers heat from the refrigerant to the surrounding air to convert the high pressure vapor from the compressor into a liquid. The condenser is installed immediately in front of the radiator. Two brackets on each end tank of the condenser attach the condenser to clips on the end tanks of the radiator.

The condenser is classified as a sub-cooling condenser and consists of a fin and tube heat exchanger core installed between two end tanks. Divisions in the end tanks separate the heat exchanger into a four pass upper (condenser) section and a two pass lower (sub-cooler) section. A connector block on the left end tank of the condenser provides connections for the high pressure lines from the A/C compressor and the evaporator. Two pipes at the bottom of the right end tank of the condenser provide connections for the receiver drier.

### Receiver Drier



E141370

The receiver drier is attached to the two stub pipes on the right end tank of the condenser. A collar, located on lands on the stub pipes and secured with a bolt, attaches the stub pipes to the receiver drier. The body of the receiver drier is installed in a bracket welded to the right end tank of the condenser.

The inlet and outlet ports of the receiver drier are the same size, so care must be taken to install the receiver drier the correct way round on the stub pipes. To assist with installation, the inlet port is identified with the word 'IN' etched into the receiver drier.

Refrigerant entering the receiver drier passes through a filter and a desiccant pack, then collects in the base of the unit before flowing through the outlet stub pipe back to the condenser. The desiccant and the filter are both

serviceable.

### **Thermostatic Expansion Valve**



E127740

The thermostatic expansion valve is a block type valve attached to the inlet and outlet ports of the evaporator, under a thermal insulation cover.

Two bolts secure the refrigerant pipes and the thermostatic expansion valve to the inlet and outlet ports of the evaporator.

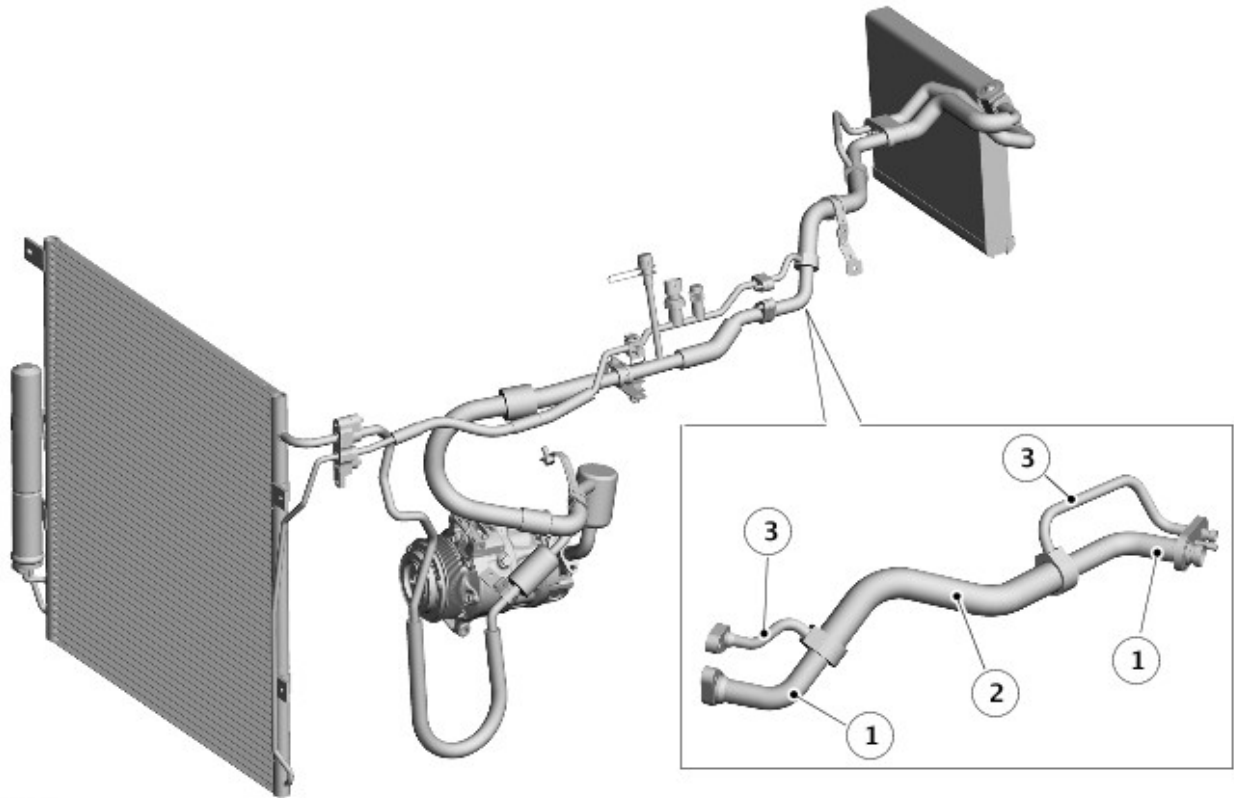
### **Evaporator**



E161115

The evaporator is a fin and tube heat exchanger installed in the heater assembly, between the blower and the heater core.

### **Refrigerant Lines**



E161116

Item	Part Number	Description
1	-	Low pressure pipe
2	-	Internal heat exchanger
3	-	High pressure pipe

The refrigerant lines consist of a combination of rigid pipes and flexible hoses that connect the thermostatic expansion valve on the evaporator to the [A/C](#) compressor and the condenser. An internal heat exchanger increases the efficiency of the evaporator and ensures any residual liquid in the low pressure line is evaporated before it reaches the compressor.

Low and high pressure servicing connections are incorporated into the refrigerant lines for system servicing. The high pressure line also incorporates a refrigerant pressure sensor for the climate control system.

For additional information, refer to: [Control Components](#) (412-04 Control Components, Description and Operation).

On vehicles with auxiliary climate control, connections for the auxiliary A/C system are incorporated into the refrigerant lines in the left rear corner of the engine compartment.

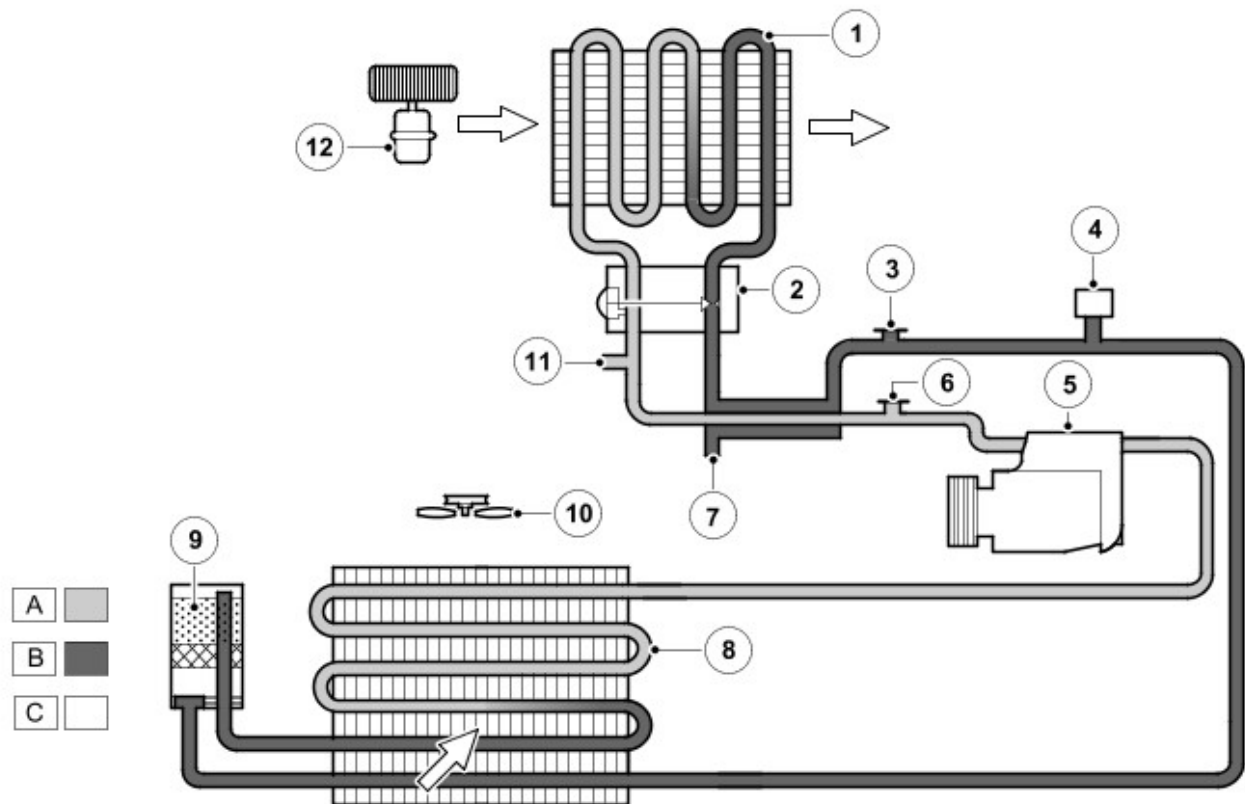
For additional information, refer to: [Auxiliary Climate Control](#) (412-03C Auxiliary Climate Control, Description and Operation).

## OPERATION

The [A/C](#) compressor circulates the refrigerant around the system by compressing low pressure, low temperature vapor from the evaporator and discharging the resultant high pressure, high temperature vapor to the condenser. In the condenser the vapor converts to a liquid, which then passes through the receiver drier and out of the condenser to the thermostatic expansion valve. As it passes through the thermostatic expansion valve, the liquid refrigerant changes to a fine, low pressure, spray, which is directed into the evaporator. In the evaporator the refrigerant changes back to a low pressure, low temperature vapor, as it absorbs heat from the air in the passenger compartment, then returns to the A/C compressor to begin the cycle again.

Operation of the air conditioning system is controlled by the ATCM (automatic temperature control module), which adjust the electronic control valve in the A/C compressor to match the refrigerant flow around the system to the thermal load of the evaporator. By matching refrigerant flow to the thermal load of the evaporator, the ATCM maintains the required temperature in the passenger compartment while maximizing fuel economy.

Air Conditioning System Schematic



E141373

**A = Refrigerant vapor; B = Refrigerant liquid; C = Air flow.**

Item	Part Number	Description
1	-	Evaporator
2	-	Thermostatic expansion valve
3	-	High pressure servicing connection
4	-	Refrigerant pressure sensor
5	-	Air conditioning compressor
6	-	Low pressure servicing connection
7	-	High pressure connection for auxiliary climate control (where fitted)
8	-	Condenser
9	-	Receiver drier
10	-	Engine cooling fan
11	-	Low pressure connection for auxiliary climate control (where fitted)
12	-	Blower

## **Air Conditioning - V6 S/C 3.0L Petrol - Air Conditioning**

Diagnosis and Testing

For additional information.

REFER to: Climate Control System (412-00, Diagnosis and Testing).




# Air Conditioning - V6 S/C 3.0L Petrol - Air Conditioning (A/C) Compressor

Removal and Installation

## Removal

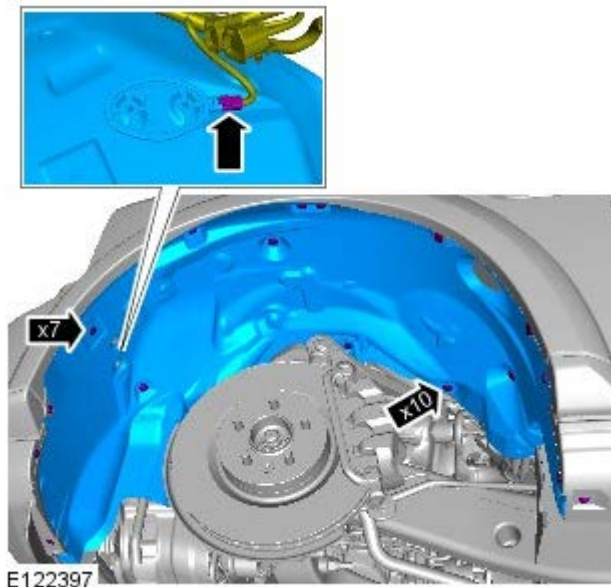



NOTE: Removal steps in this procedure may contain installation details.

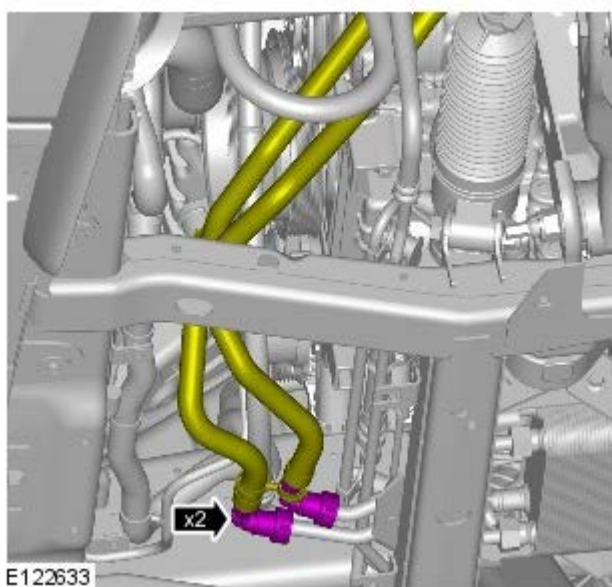
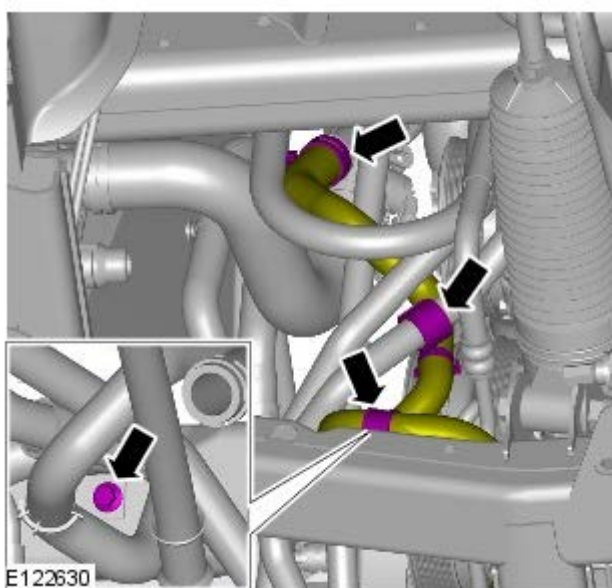
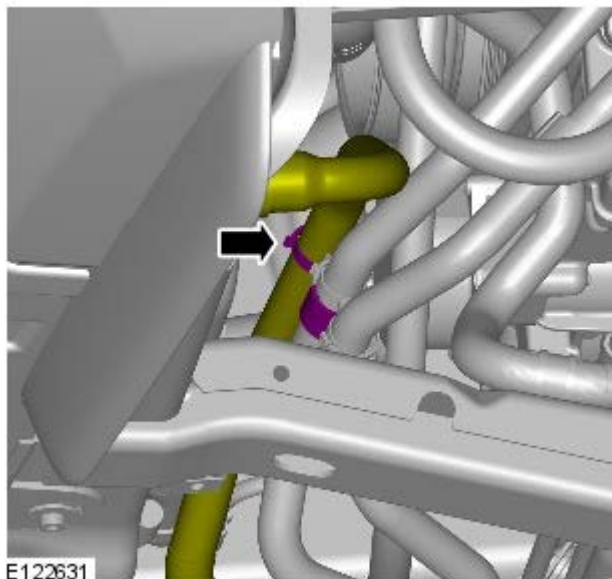
1.  **WARNING:** Make sure to support the vehicle with axle stands.  
Raise and support the vehicle.
2. Refer to: Cooling System Partial Draining, Filling and Bleeding - V8 5.0L Petrol (303-03B, General Procedures).
3. Refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).
4. Refer to: Accessory Drive Belt (303-05 Accessory Drive - V8 5.0L Petrol, Removal and Installation).
5. Remove the LH front road wheel.


*Torque: 140 Nm*

6.



7.  **CAUTION:** Be prepared to collect escaping coolant.

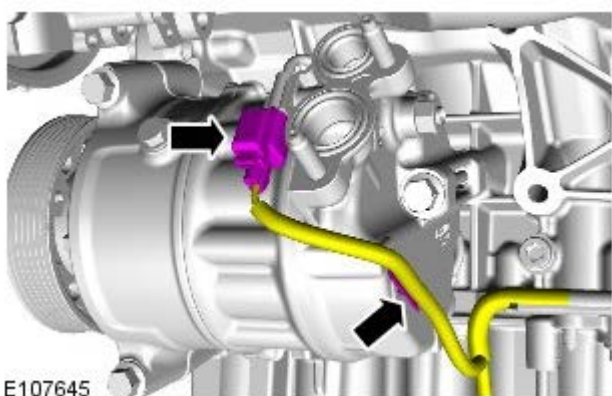
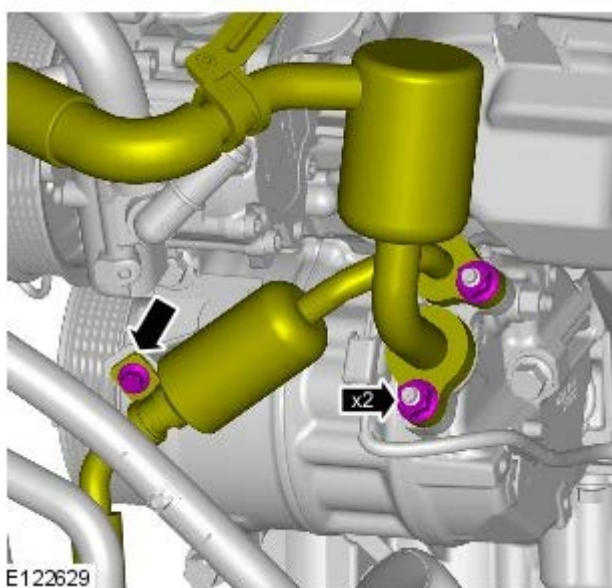
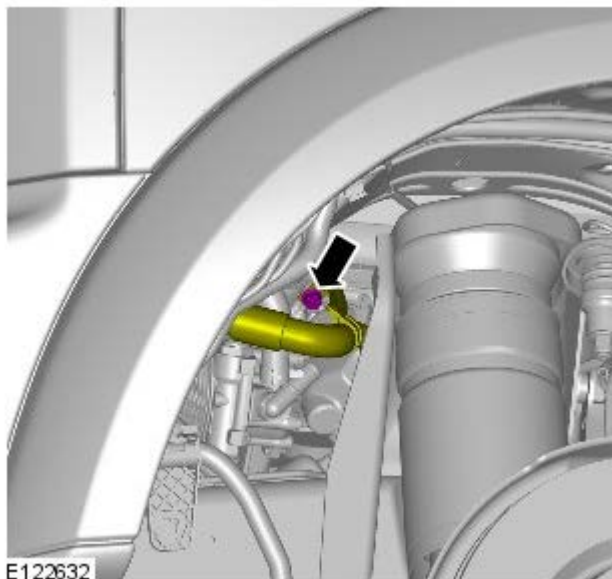


8.  **CAUTION:** Be prepared to collect escaping coolant.


*Torque:* 10 Nm

9.  **CAUTION:** Make sure that all openings are sealed. Use new blanking caps.

10. *Torque:* 18 Nm



# 11. CAUTIONS:

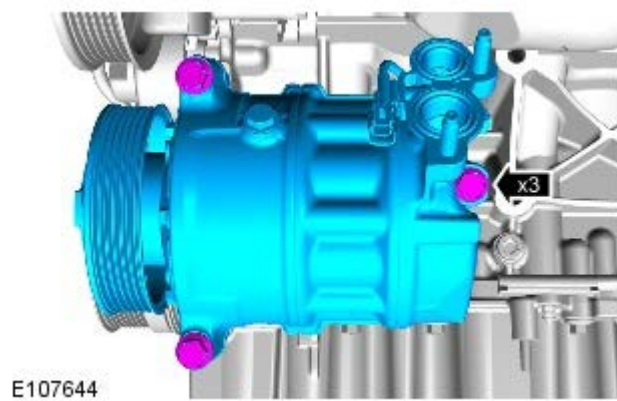
 Make sure that all openings are sealed.  
Use new blanking caps.

 A new O-ring seal is to be installed.

*Torque:*  
M8 18 Nm  
M6 6 Nm

## 12.

13. *Torque:* 25 Nm



## Installation

1. To install, reverse the removal procedure.

## Air Conditioning - V6 S/C 3.0L Petrol - Condenser Core

Removal and Installation

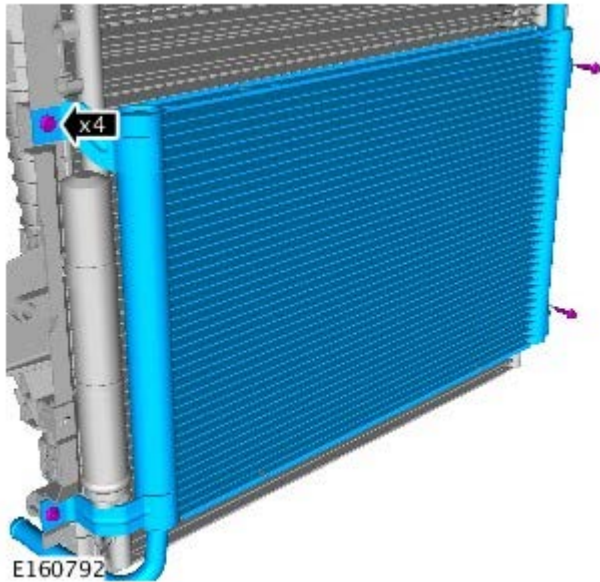
### Removal



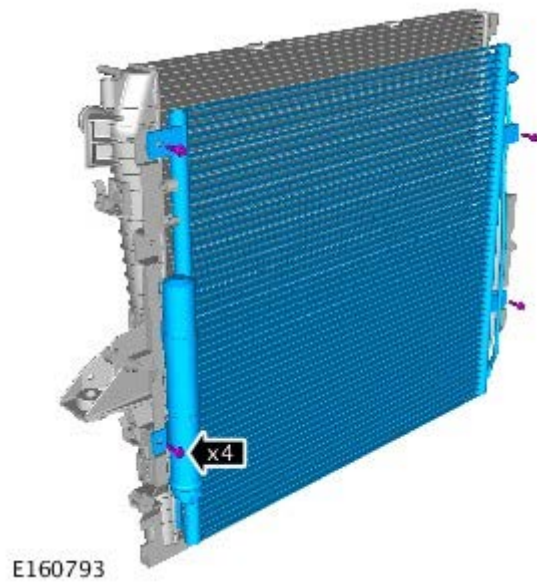
NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: [Radiator](#) (303-03B Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).

2. Torque: 10 Nm



3. Torque: 10 Nm



### Installation

1. To install, reverse the removal procedure.



# Air Conditioning - V6 S/C 3.0L Petrol - Condenser Fan

Removal and Installation

## Removal



NOTE: Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.

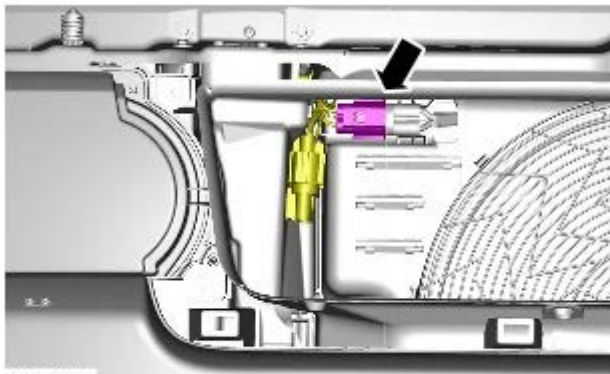
Refer to: Specifications (414-00, Specifications).

2.  **WARNING:** Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

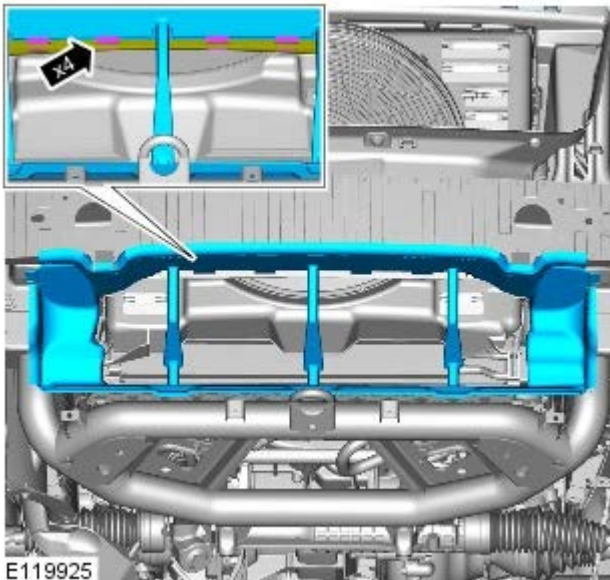
3. Refer to: Hood Latch Panel (501-02, Removal and Installation).

4.



E119172

5.



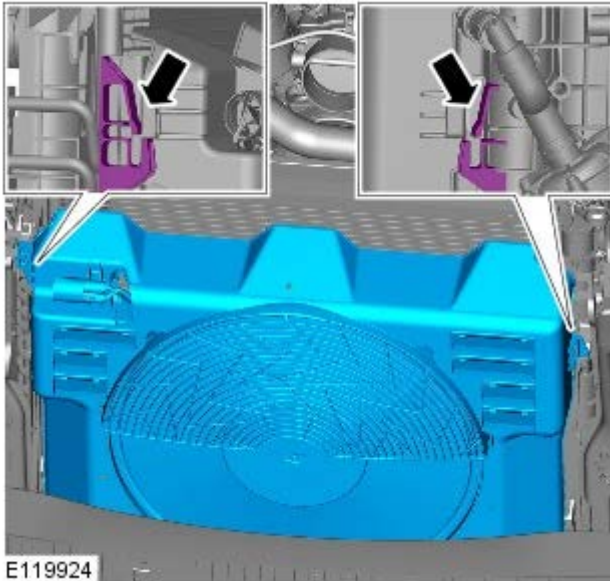
E119925

6.



E119923

7.



E119924

## Installation


1. To install reverse the removal procedure.

# Air Conditioning - V6 S/C 3.0L Petrol - Evaporator Core

Removal and Installation

## Removal

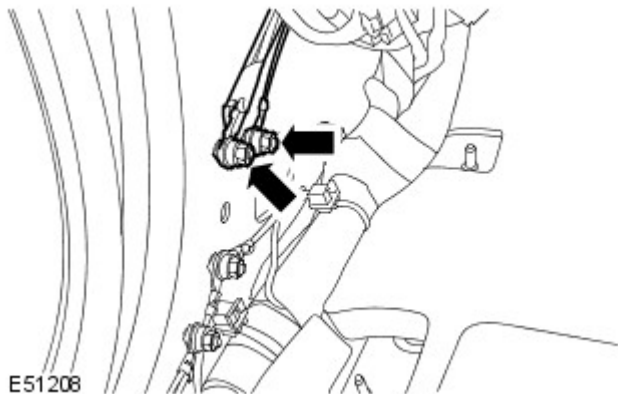
1. Remove the engine cover.  
For additional information, refer to: [Engine Cover - V6 S/C 3.0L Petrol](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
2. Evacuate the A/C system.  
For additional information, refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).

3.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

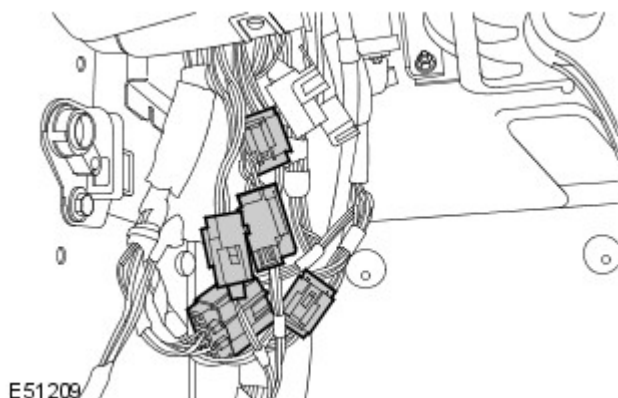
Raise and support the vehicle.

4. Drain the cooling system.  
For additional information, refer to: Cooling System Partial Draining, Filling and Bleeding (303-03B, General Procedures).
5. Remove the driver side front seat.  
For additional information, refer to: [Front Seat](#) (501-10 Seating, Removal and Installation).
6. Remove the floor console.  
For additional information, refer to: [Floor Console](#) (501-12 Instrument Panel and Console, Removal and Installation).
7. Remove the instrument panel upper section.  
For additional information, refer to: [Instrument Panel Upper Section](#) (501-12 Instrument Panel and Console, Removal and Installation).

8. Release the 3 ground cables from the driver side lower A-pillar.
  - Remove the 2 nuts.

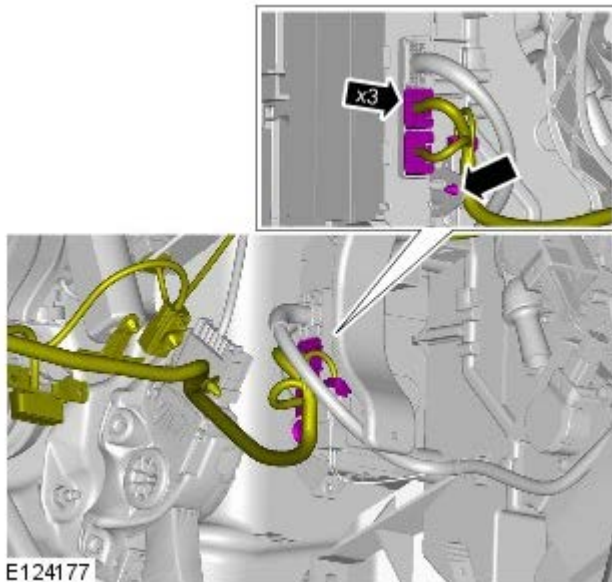


9. Disconnect the 5 electrical connectors from the driver side lower A-pillar.

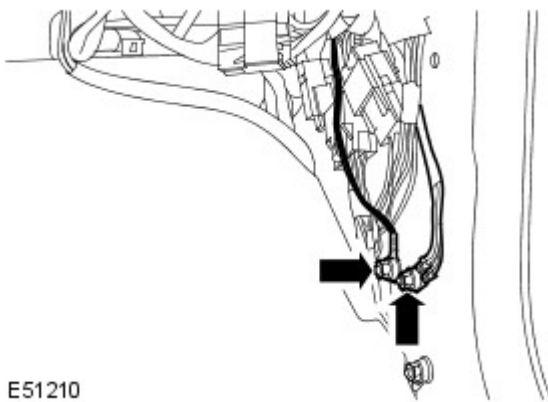


10. Disconnect the 3 electrical connectors.



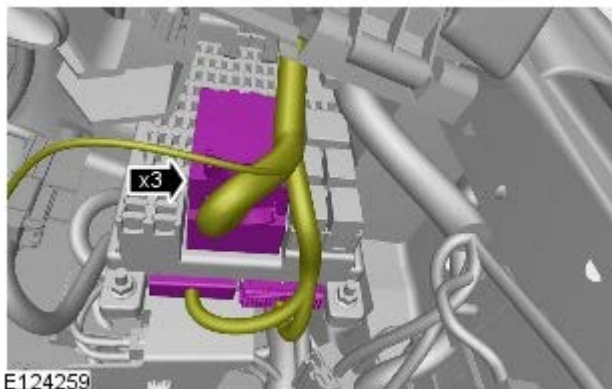


11. Release the 3 ground cables from the passenger side lower A-pillar.
  - Remove the 2 nuts.




12. Disconnect the 5 electrical connectors from the passenger side lower A-pillar.

13. Disconnect the central junction box (CJB) three electrical connectors.



14. Disconnect 2 electrical connectors from the instrument panel center reinforcement.

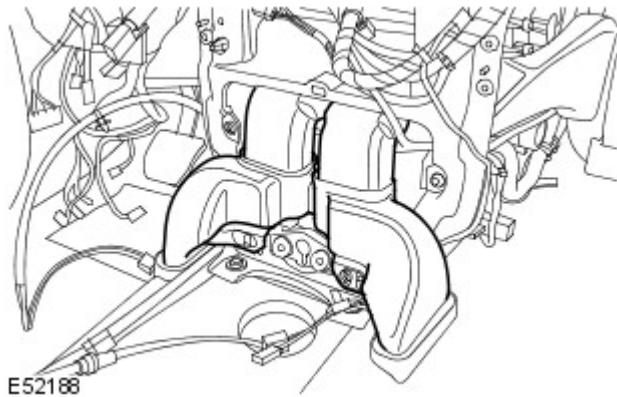
15.  **CAUTION:** Cover fiber optic cable connectors to minimize dust ingress and avoid bending the cables in a radius of less than 30 mm.

If installed, disconnect the instrument panel center reinforcement fibre optic cables.

- Disconnect the electrical connector.



16. Remove the heater housing center ducts.



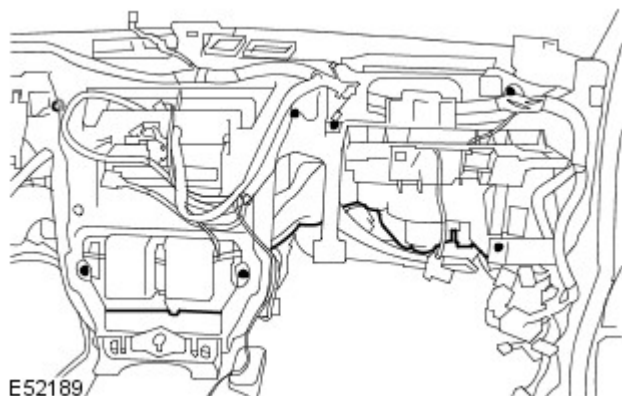
17. Disconnect the steering column intermediate shaft from the steering column.

- Note the fitted position.
- Remove the special bolt and discard the nut.



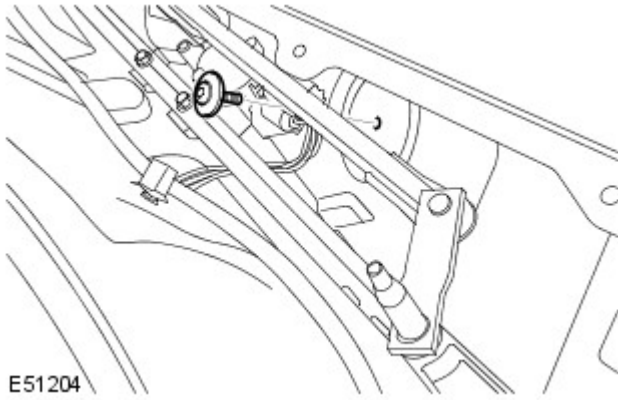
18. Release the heater housing from the instrument panel carrier.

- Remove the 7 Torx screws.



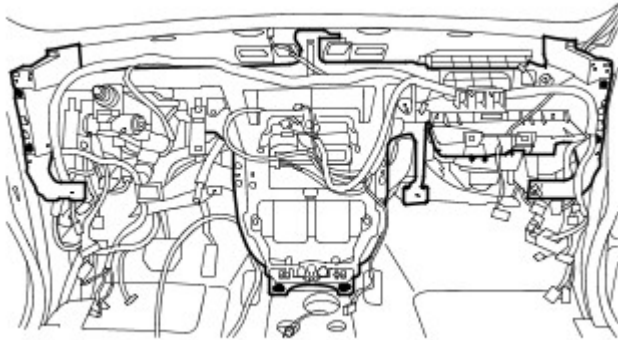
19. Remove the plenum chamber panel.  
For additional information, refer to: [Plenum Chamber](#) (412-01 Air Distribution and Filtering, Removal and Installation).

20. Remove the instrument panel carrier to bulkhead Torx bolt.




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21. With assistance, remove the instrument panel.
  - Remove the 6 Torx bolts.

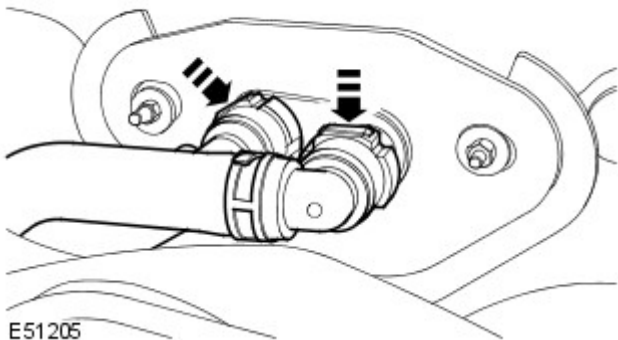


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22.  **CAUTION:** Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

Disconnect 2 heater hoses from the bulkhead.

- Release the 2 clips.

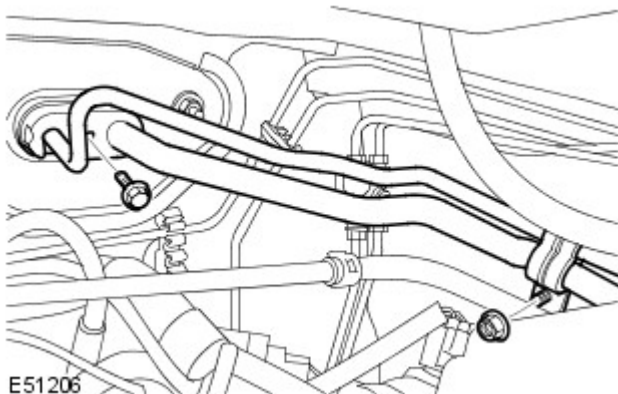


E51205

23.  **CAUTION:** Immediately cap all refrigerant lines to prevent ingress of dirt and moisture.

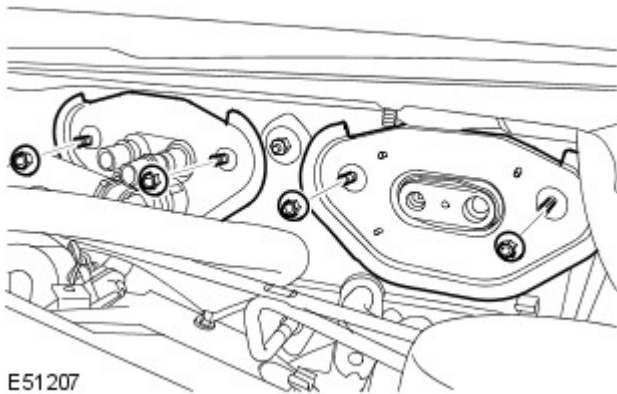
Release the 2 A/C refrigerant lines.

- Remove the nut and bolt.
- Remove and discard the O-ring seals.

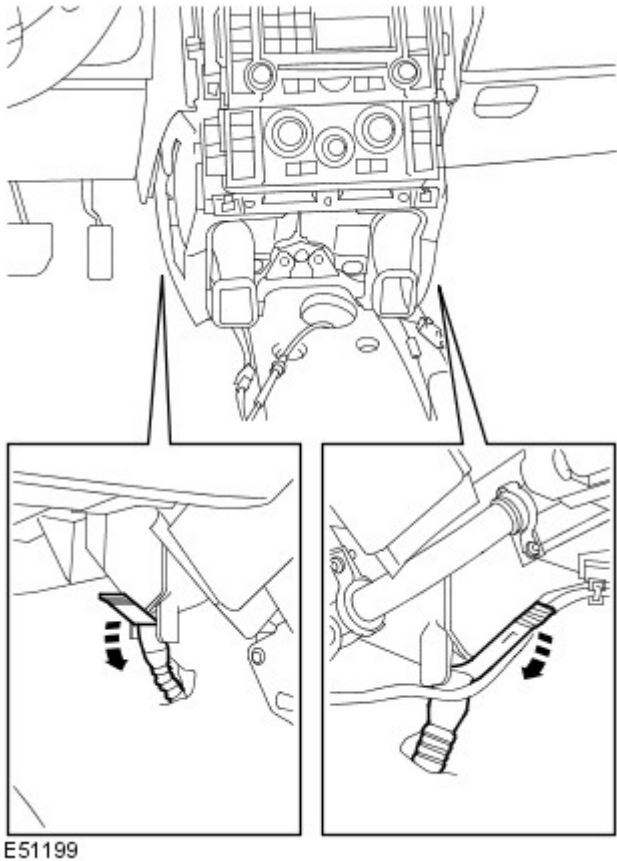


E51206

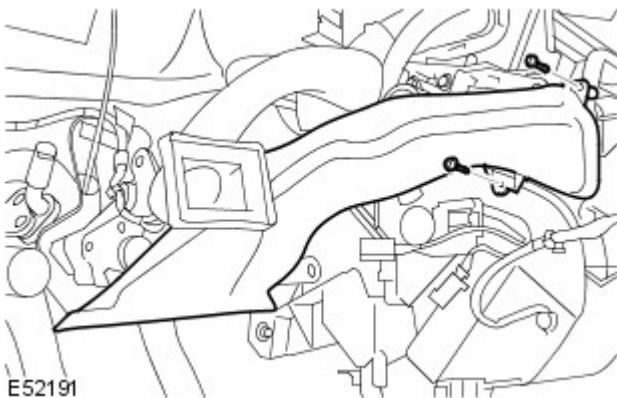
24. Remove the 2 adapter panels.
  - Remove the 4 nuts.



25. Disconnect 2 drain tubes from the heater housing.

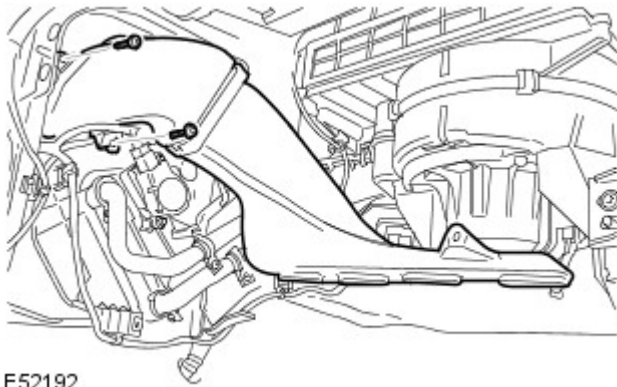


26. Remove the driver side footwell duct.
  - Remove the 2 Torx screws.

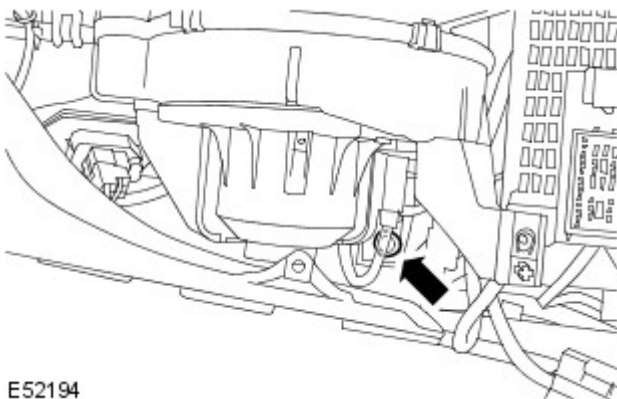


27. Remove the passenger side footwell duct.
  - Remove the 2 Torx screws.



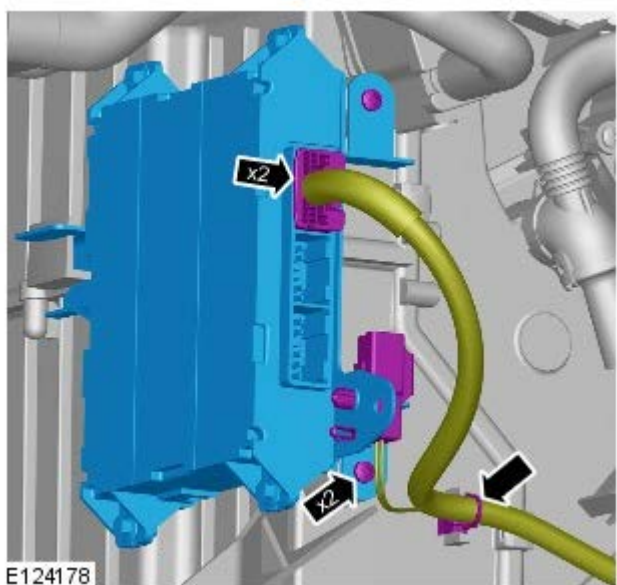


28. Driver side: Remove the heater housing to bulkhead Torx bolt.



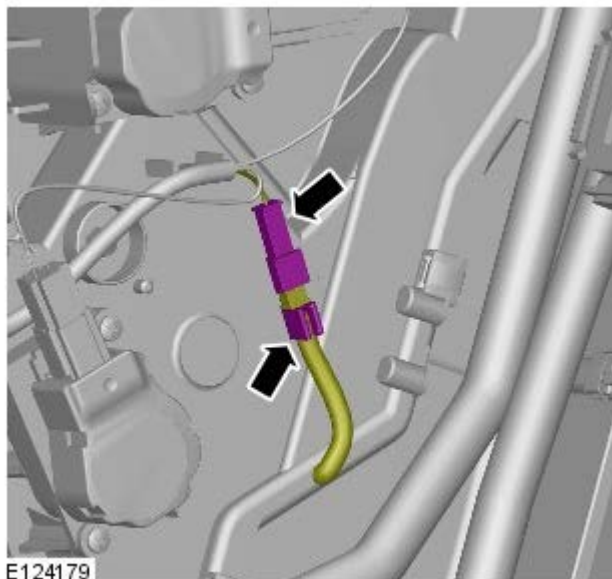
29. Passenger side: Remove the heater housing to bulkhead Torx bolt.

- With assistance, remove the heater and evaporator core housing.



30. Remove the A/C control module.

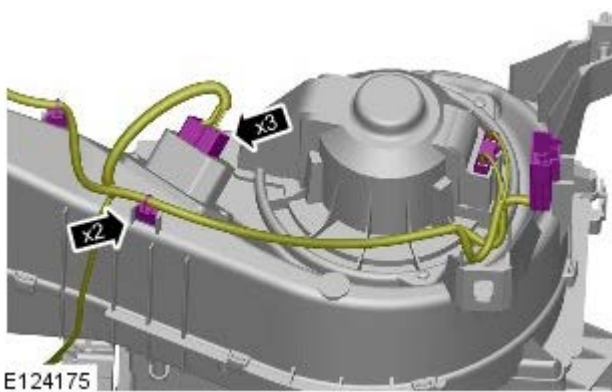
31. Disconnect the evaporator core temperature sensor electrical connector.



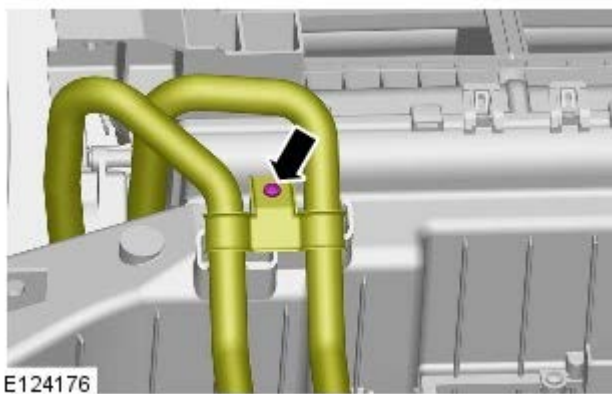
32. Disconnect the electrical connector.



33. Detach the wiring harness.

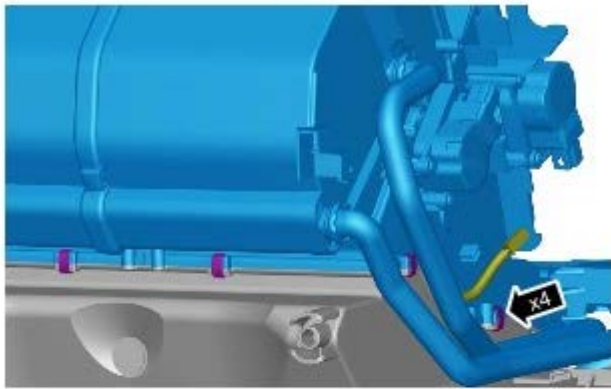


34. Remove the bolt from the support bracket.

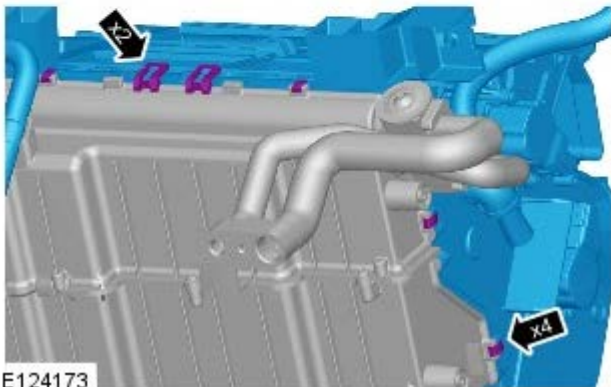


35. Remove the heater and evaporator core housing.

- Remove the 8 clips.

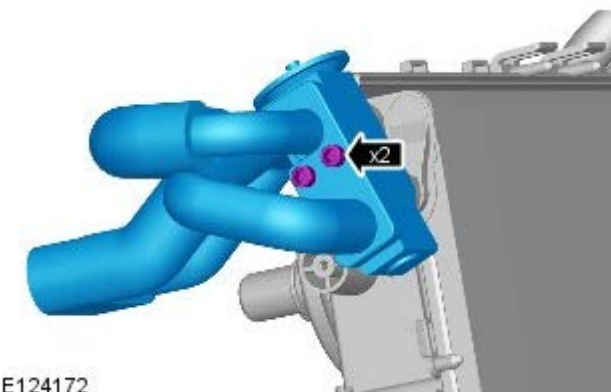


- Carefully release the 2 clips.



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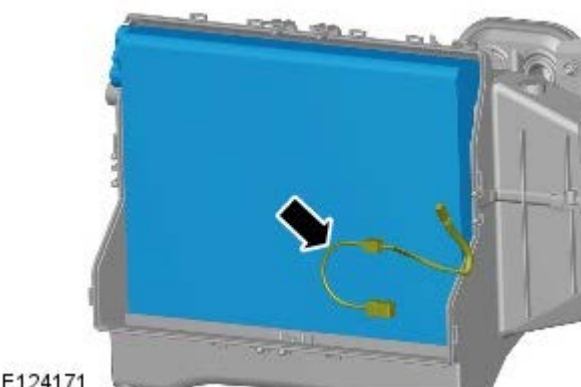
36. Remove the thermostatic expansion valve.



E124172

37. Remove the evaporator core.

- Release the temperature sensor.



E124171

## Installation

1. Install the evaporator core.
  - Secure the temperature sensor.
2. Secure the heater core housing.
  - Install the clips.
3. Install the thermostatic expansion valve.

- Tighten the bolts to 3.5 Nm (2.5 lb.ft).
4. Install the wiring harness.
  5. Install and tighten the bolt.
  6. Connect the temperature sensor electrical connector.
  7. Install the CC module.
    - Tighten the bolts.
  8. Passenger side: Install the heater housing to bulkhead Torx bolt and tighten to 6 Nm (4 lb.ft).
    - With assistance, install the heater and evaporator core housing.
  9. Driver side: Install the heater housing to bulkhead Torx bolt and tighten to 6 Nm (4 lb.ft).
  10. Install the footwell ducts.
    - Tighten the Torx screws.
  11. Connect the drain tubes to the heater housing.
  12. Install the adapter panels.
    - Tighten the nuts to 6 Nm (4 lb.ft).
  13. Secure the A/C refrigerant lines.
    - Clean the components.
    - Install new O-ring seals.
    - Tighten the bolt to 5 Nm (4 lb.ft).
    - Tighten the nut to 6 Nm.
  14. Connect the bulkhead heater hoses.
  15. With assistance, install the instrument panel.
    - Tighten the Torx bolts to 25 Nm (18 lb.ft).
  16. Install the instrument panel carrier to bulkhead Torx bolt and tighten to 25 Nm (18 lb.ft).
  17. Install the plenum chamber panel.  
For additional information, refer to: [Plenum Chamber](#) (412-01 Air Distribution and Filtering, Removal and Installation).
  18. Secure the heater housing.
    - Tighten the screws.
  19. Connect the steering column intermediate shaft.
    - Install the special bolt and tighten the new nut to 22 Nm (16 lb.ft).
  20. Install the heater housing center ducts.
  21. Connect the instrument panel center reinforcement fibre optic cables.
  22. Connect the instrument panel center reinforcement electrical connectors.
  23. Connect the CJB electrical connectors.
  24. Connect the electrical connectors to the passenger side lower A-pillar.
  25. Connect the ground cables to the passenger side lower A-pillar.
    - Tighten the nuts to 10 Nm (7 lb.ft).
  26. Connect the electrical connectors to the driver side lower A-pillar.
  27. Connect the ground cables to the driver side lower A-pillar.



Tighten the nuts to 10 Nm (7 lb.ft).

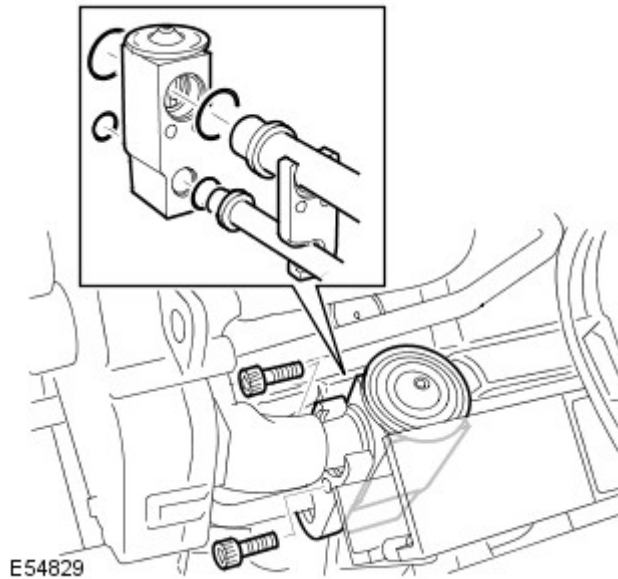
28. Connect the 3 electrical connectors.
29. Install the instrument panel upper section.  
For additional information, refer to: [Instrument Panel Upper Section](#) (501-12 Instrument Panel and Console, Removal and Installation).
30. Install the floor console.  
For additional information, refer to: [Floor Console](#) (501-12 Instrument Panel and Console, Removal and Installation).
31. Install the front seat.  
For additional information, refer to: [Front Seat](#) (501-10 Seating, Removal and Installation).
32. Recharge the A/C system.  
For additional information, refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).
33. Refill the cooling system.  
For additional information, refer to: Cooling System Partial Draining, Filling and Bleeding (303-03B, General Procedures).
34. Install the engine cover.  
For additional information, refer to: [Engine Cover - V6 S/C 3.0L Petrol](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

# Air Conditioning - V6 S/C 3.0L Petrol - Thermostatic Expansion Valve

## Removal and Installation

### Removal

1. Evacuate the A/C system.  
For additional information, refer to: Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).
2. Remove the instrument panel upper section.  
For additional information, refer to: Instrument Panel Upper Section (501-12 Instrument Panel and Console, Removal and Installation).



3.  **CAUTION:** Immediately cap all refrigerant lines to prevent ingress of dirt and moisture.

Remove the thermostatic expansion valve.

- Remove the cover.
- Remove the 2 Allen bolts.
- Remove and discard the 4 O-ring seals.

### Installation

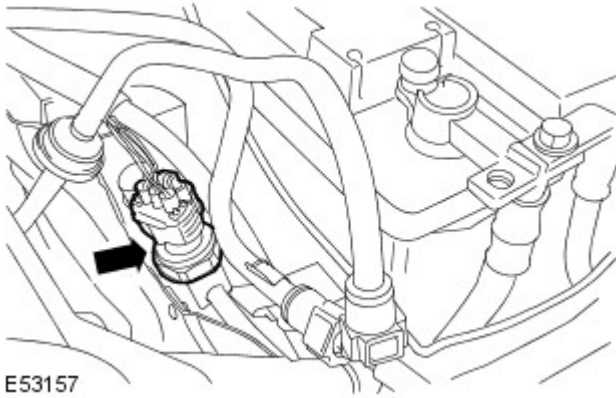
1. Install the thermostatic expansion valve.
  - Clean the components.
  - Install the new O-ring seals.
  - Tighten the Allen bolts to 5 Nm (4 lb.ft).
  - Install the cover.
2. Install the instrument panel upper section.  
For additional information, refer to: Instrument Panel Upper Section (501-12 Instrument Panel and Console, Removal and Installation).
3. Recharge the A/C system.  
For additional information, refer to: Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).

# Air Conditioning - V6 S/C 3.0L Petrol - Air Conditioning (A/C) Pressure Transducer


Removal and Installation


## Removal

1. Disconnect the battery ground cable.  
For additional information, refer to: Specifications (414-00 Charging System - General Information, Specifications).
2. Recover the A/C refrigerant.  
For additional information, refer to: Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).



## 3. CAUTIONS:

 Before disconnecting or removing the components, ensure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

 To prevent damage to components, use an additional wrench when loosening or tightening unions.

Remove the A/C pressure transducer.

- Disconnect the electrical connector.
- Remove and discard the seal.

## Installation

1. Install the A/C pressure transducer.
  - Clean the component mating faces.
  - Install a new seal.
  - Tighten the transducer to 10 Nm (7 lb.ft).
  - Connect the electrical connector.
2. Recharge the A/C system.  
For additional information, refer to: Air Conditioning (A/C) System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).
3. Connect the battery ground cable.  
For additional information, refer to: Specifications (414-00 Charging System - General Information, Specifications).