**PUBLISHED: 05-NOV-2014**
**2013.0 XJ RANGE (X351), 303-03D**

# ENGINE COOLING - V6 S/C 3.0L PETROL [G1514753]

## SPECIFICATIONS

| DESCRIPTION | SPECIFICATION |
|---|---|
| Jaguar Premium Cooling System Fluid | WSS-M97B44-D |
| Jaguar Premium Cooling System Flush | EGR-M14P7-A |

| ENGINE | CAPACITY (DRY) | CAPACITY (FILL) |
|---|---|---|
| 3.0L supercharger | 13.5 Liters | 8.6 Liters |

| DESCRIPTION | NM | LB-FT | LB-IN |
|---|---|---|---|
| Coolant expansion tank retaining bolt | 7 | - | 62 |
| Cooling fan motor and shroud retaining nuts | 7 | - | 62 |
| Thermostat housing retaining bolt | 10 | 7 | - |
| Coolant pump retaining bolts | 12 | 9 | - |
| Radiator retaining bolts | 9 | - | 80 |
| Radiator drain plug | 2 | - | 18 |
| Coolant bleed screw(s) | 3 | | 27 |

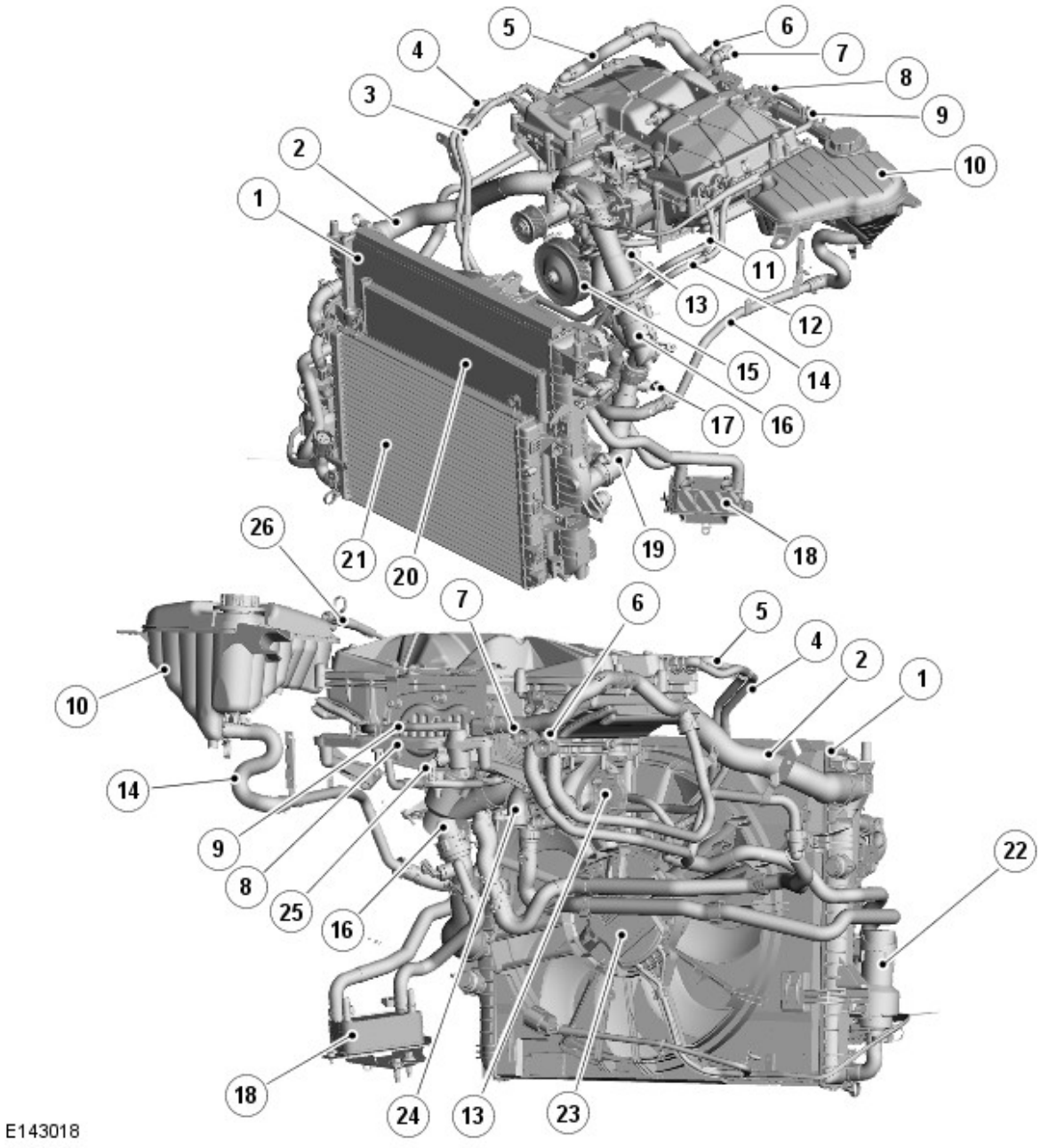
YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzoyNDo0NC4wMzZaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 07-AUG-2012
2013.0 XJ RANGE (X351), 303-03D

# ENGINE COOLING - V6 S/C 3.0L PETROL [G1514754]

DESCRIPTION AND OPERATION

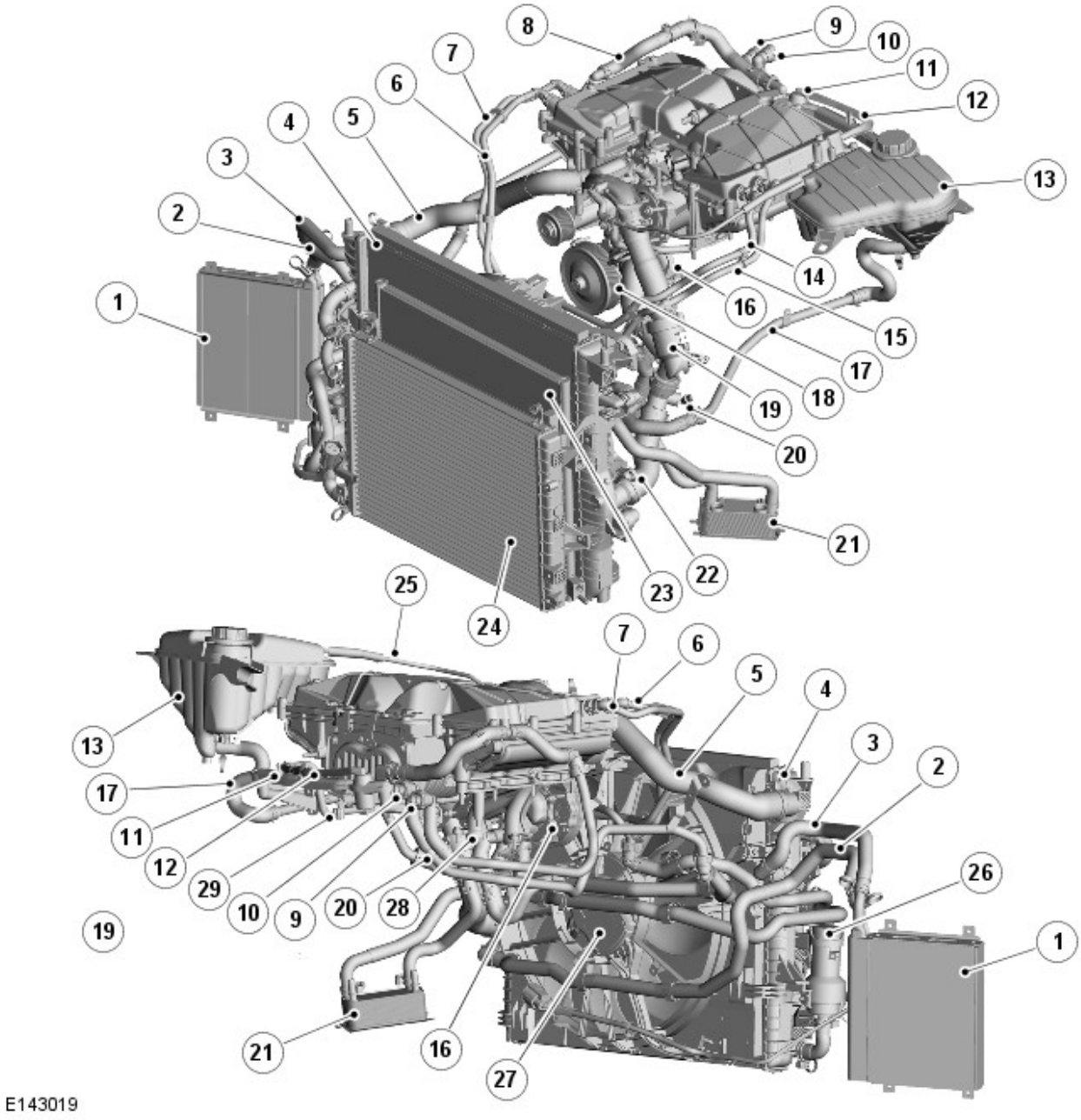
## COMPONENT LOCATION - SHEET 1 OF 3 (ALL MARKETS EXCEPT GULF STATES)




| ITEM | DESCRIPTION |
|---|---|

| ITEM | DESCRIPTION |
|---|---|
| 1 | Radiator |
| 2 | Upper hose |
| 3 | Intercooler return hose |
| 4 | Intercooler supply hose |
| 5 | Heater core supply hose |
| 6 | Heater core supply quick fit connector |
| 7 | Heater core return quick fit connector |
| 8 | Heater manifold |
| 9 | Throttle body heater return hose |
| 10 | Coolant expansion tank |
| 11 | Intercooler return hose |
| 12 | Intercooler supply hose |
| 13 | Coolant pump |
| 14 | Coolant expansion hose |
| 15 | Coolant pump drive pulley |
| 16 | Thermostat housing |
| 17 | Engine Coolant Temperature (ECT) sensor 2 |
| 18 | Automatic Transmission Fluid (ATF) cooler |
| 19 | Lower hose |
| 20 | Air conditioning (A/C) condensor (Reference only) |
| 21 | Charge air radiator |
| 22 | Charge air coolant pump |
| 23 | Cooling fan motor |
| 24 | Engine coolant outlet |
| 25 | ECT sensor 1 |
| 26 | Vent hose |

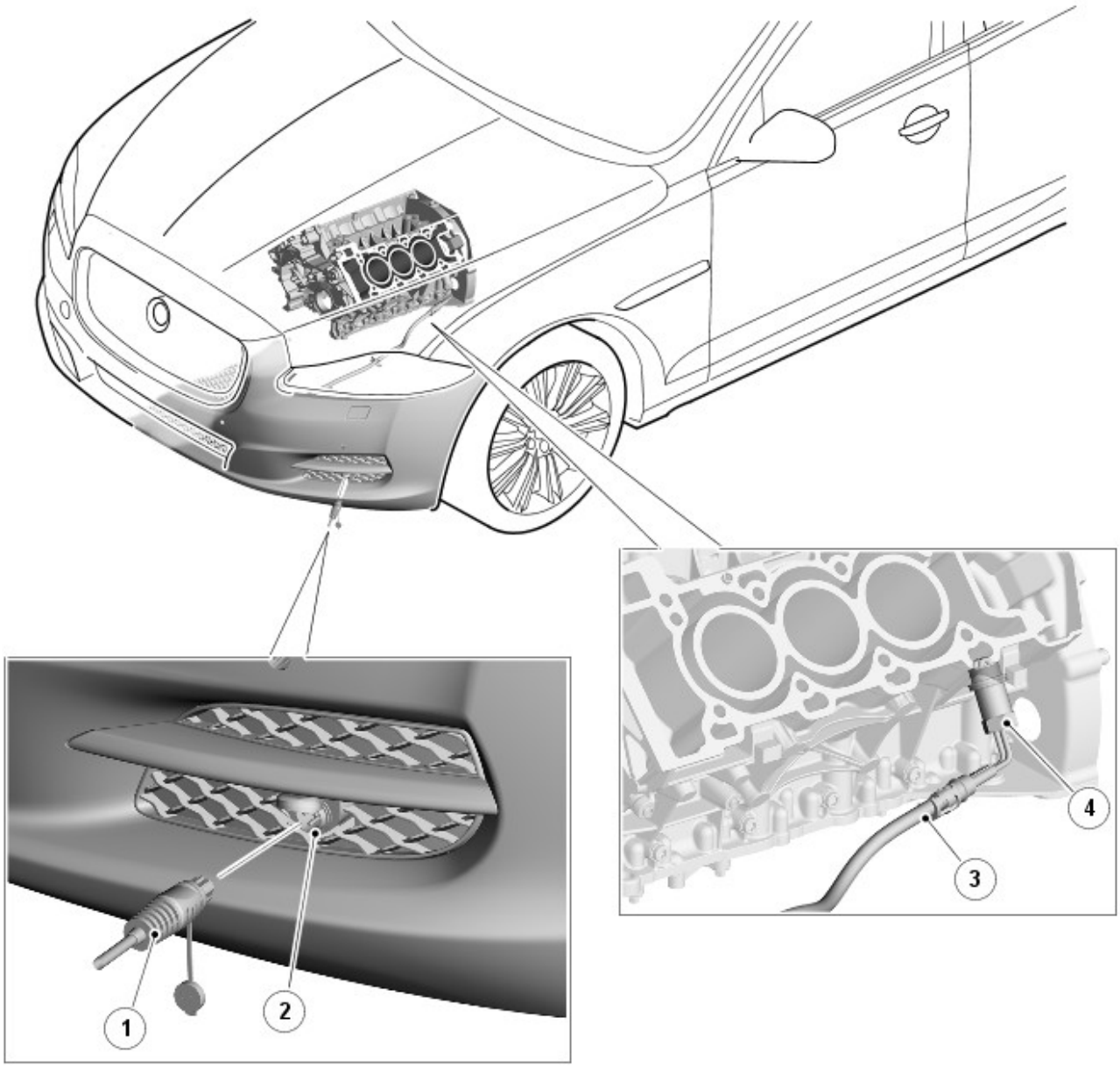
## COMPONENT LOCATION - SHEET 2 OF 3 (GULF STATES ONLY)




| ITEM | DESCRIPTION |
|---|---|
| 1 | Right auxiliary radiator (if fitted) |
| 2 | Right auxiliary radiator outlet hose (if fitted) |
| 3 | Right auxiliary radiator inlet hose (if fitted) |
| 4 | Radiator |
| 5 | Upper hose |
| 6 | Intercooler return hose |

| ITEM | DESCRIPTION |
|---|---|
| 7 | Intercooler supply hose |
| 8 | Heater core supply hose |
| 9 | Heater core supply quick fit connector |
| 10 | Heater core return quick fit connector |
| 11 | Heater manifold |
| 12 | Throttle body heater return hose |
| 13 | Coolant expansion tank |
| 14 | Intercooler return hose |
| 15 | Intercooler supply hose |
| 16 | Coolant pump |
| 17 | Coolant expansion hose |
| 18 | Coolant pump drive pulley |
| 19 | Thermostat housing |
| 20 | Engine Coolant Temperature (ECT) sensor 2 |
| 21 | Automatic Transmission Fluid (ATF) cooler |
| 22 | Lower hose |
| 23 | Air conditioning (A/C) condensor (Reference only) |
| 24 | Charge air radiator |
| 25 | Vent hose |
| 26 | Charge air coolant pump |
| 27 | Cooling fan motor |
| 28 | Engine coolant outlet |
| 29 | ECT sensor 1 |

## COMPONENT LOCATION - SHEET 3 OF 3 - ENGINE BLOCK HEATER




E143020

| ITEM | DESCRIPTION |
|---|---|
| 1 | Power supply connector |
| 2 | Vehicle connector |
| 3 | Harness |
| 4 | Engine block heater |

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PUBLISHED: 07-AUG-2012
2013.0 XJ RANGE (X351), 303-03D

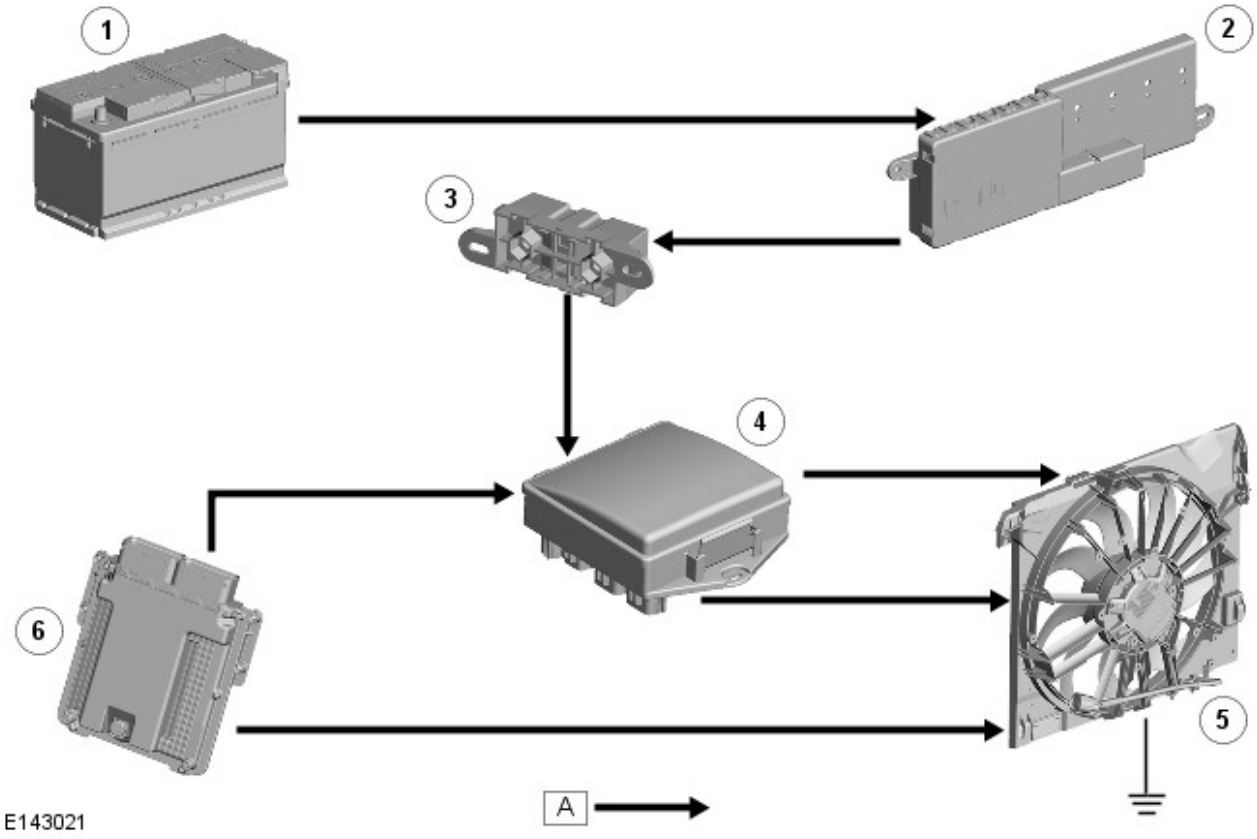
# ENGINE COOLING - V6 S/C 3.0L PETROL [G1514756]

## DESCRIPTION AND OPERATION

### CONTROL DIAGRAM

**NOTE:**

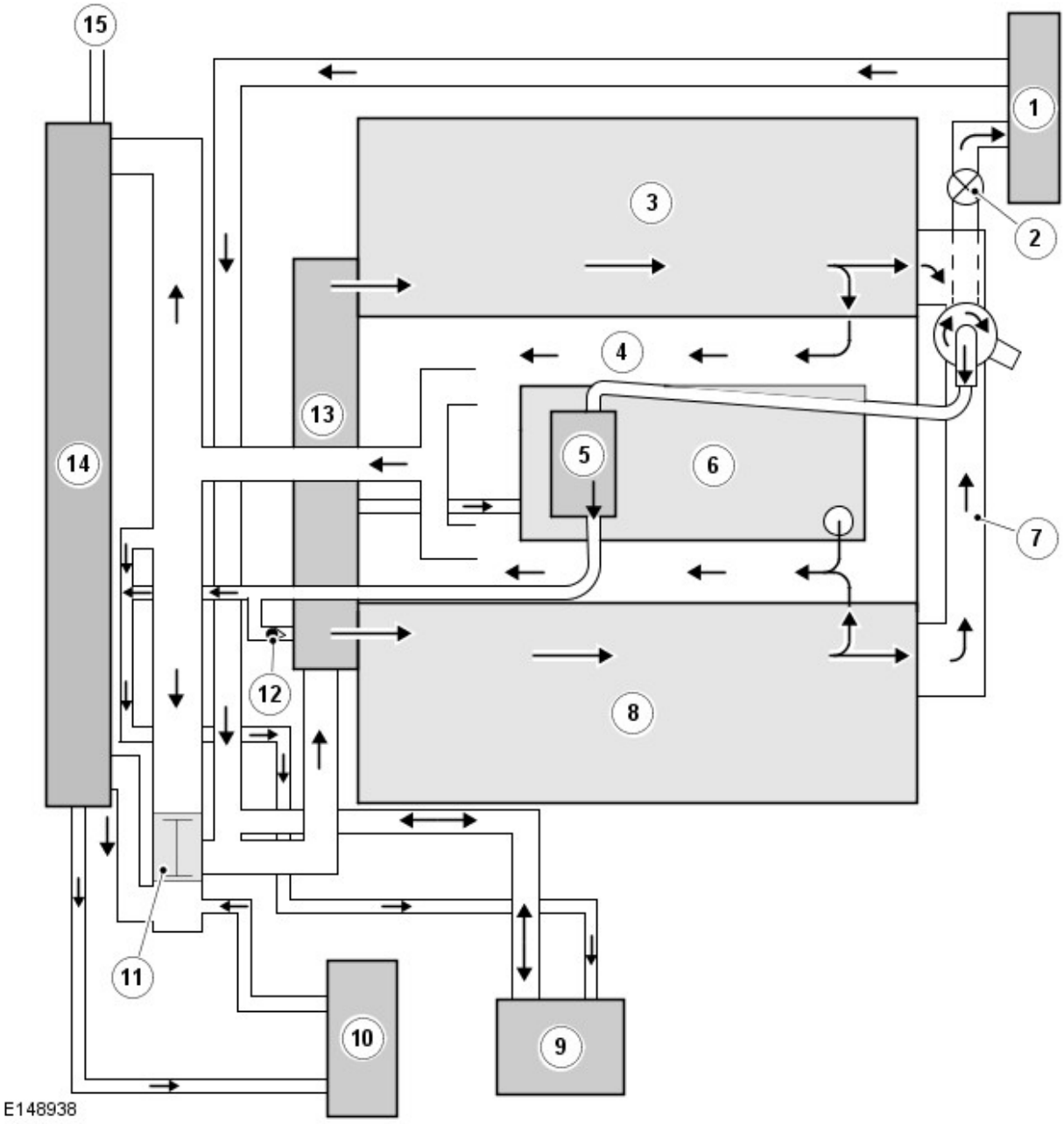
A = Hardwired.




| ITEM | DESCRIPTION |
|---|---|
| 1 | Battery |
| 2 | Battery Junction Box (BJB) (250 A megafuse) |
| 3 | Megafuse (500A) |

| ITEM | DESCRIPTION |
|---|---|
| 4 | Engine Junction Box (EJB) |
| 5 | Cooling fan |
| 6 | Engine Control Module (ECM) |

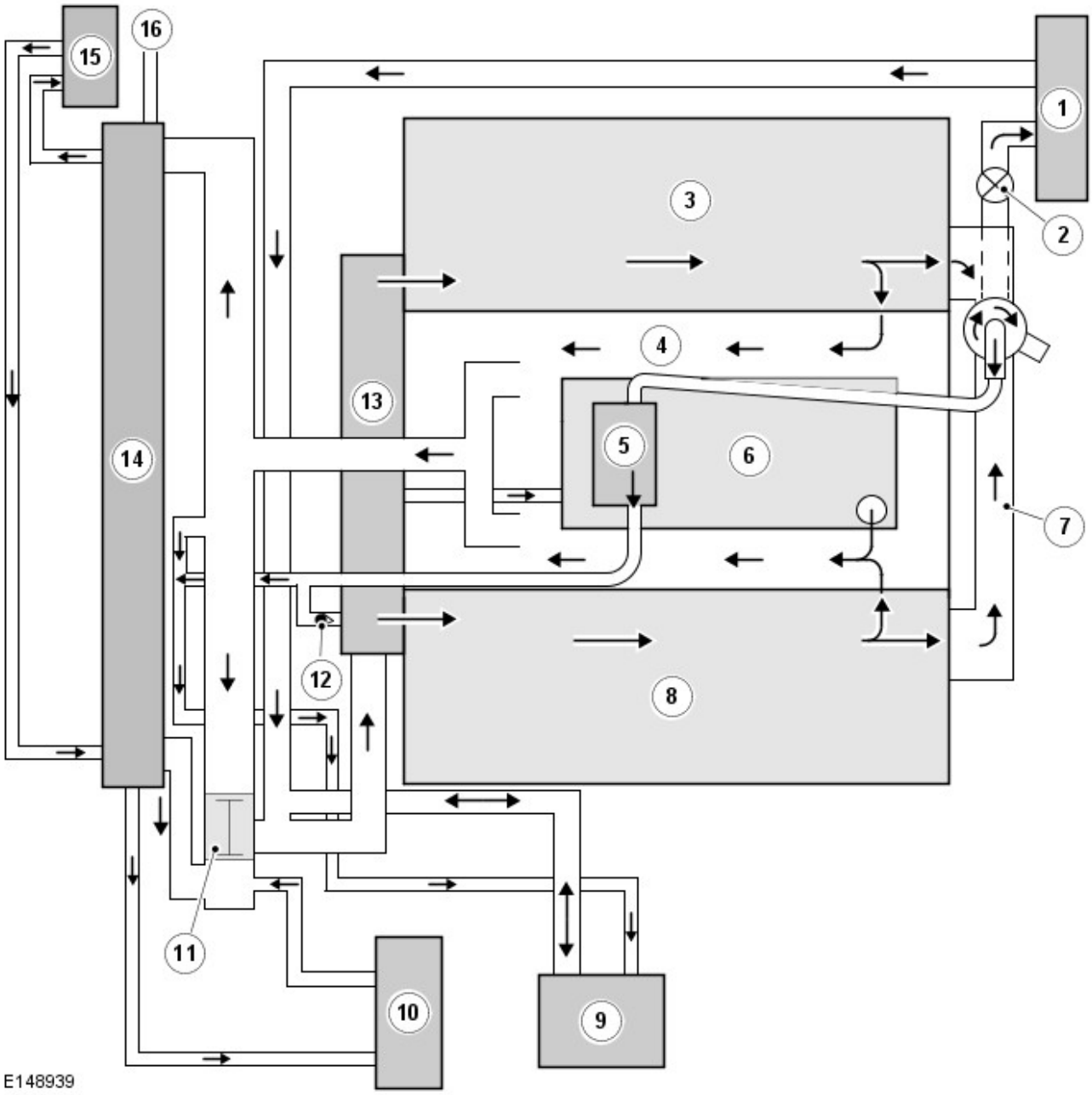
### Engine Cooling Flow Diagram - All Except Gulf States




| ITEM | DESCRIPTION |
|---|---|

| ITEM | DESCRIPTION |
|---|---|
| 1 | Heater core |
| 2 | Bleed screw |
| 3 | Right cylinder head |
| 4 | Cylinder block |
| 5 | Throttle |
| 6 | Engine oil cooler |
| 7 | Heater manifold |
| 8 | Left cylinder head |
| 9 | Expansion tank |
| 10 | Transmission fluid cooler |
| 11 | Thermostat |
| 12 | Check valve |
| 13 | Coolant pump |
| 14 | Radiator |
| 15 | Connection with supercharger cooling system |

### Engine Cooling Flow Diagram - Gulf States Only




| ITEM | DESCRIPTION |
|---|---|
| 1 | Heater core |
| 2 | Bleed screw |
| 3 | Right cylinder head |
| 4 | Cylinder block |
| 5 | Throttle |
| 6 | Engine oil cooler |

| ITEM | DESCRIPTION |
|---|---|
| 7 | Heater manifold |
| 8 | Left cylinder head |
| 9 | Expansion tank |
| 10 | Transmission fluid cooler |
| 11 | Thermostat |
| 12 | Check valve |
| 13 | Coolant pump |
| 14 | Radiator |
| 15 | Right auxiliary radiator (if fitted) |
| 16 | Connection with supercharger cooling system (supercharger vehicles only) |

## SYSTEM OPERATION

When the engine is running, the coolant is circulated around the engine cooling system by the coolant pump. From the coolant pump, coolant flows through the cylinder heads and the engine oil cooler into the cylinder block and the heater manifold.

In the cylinder block, the coolant flows forwards to the outlet tube. When the coolant is cold the thermostat is closed, coolant flows direct from the outlet tube back to the coolant pump. Once the coolant reaches operating temperature, the thermostat begins to open to control the system temperature, coolant flows from the outlet tube to the coolant pump via the radiator and, where fitted, the auxiliary radiator(s). When the thermostat is open, the coolant flow through the radiator(s) also generates a coolant flow through the transmission fluid cooler.

From the heater manifold the coolant flows through the electronic throttle and the heater core, in parallel circuits that are unaffected by the position of the thermostat. From the electronic throttle, the coolant merges with bleed coolant from the coolant pump and the outlet tube and flows to the expansion tank. From the heater core, the coolant flows back to the inlet of the coolant pump.

Expansion and contraction of the coolant is accommodated by an air space in the expansion tank and the compliance of the flexible hoses.

If the coolant level in the expansion tank decreases below a predetermined value, the level sensor connects a ground to the instrument cluster, which activates the appropriate warning. Refer to: Instrument Cluster (413-01 Instrument Cluster, Description and Operation).

The cooling fan is operated by a fan control module integrated into the cooling fan motor. The fan control module

regulates the voltage, and thus speed, of the cooling fan motor in response to a pulse width modulation (PWM) signal from the engine control module (ECM).

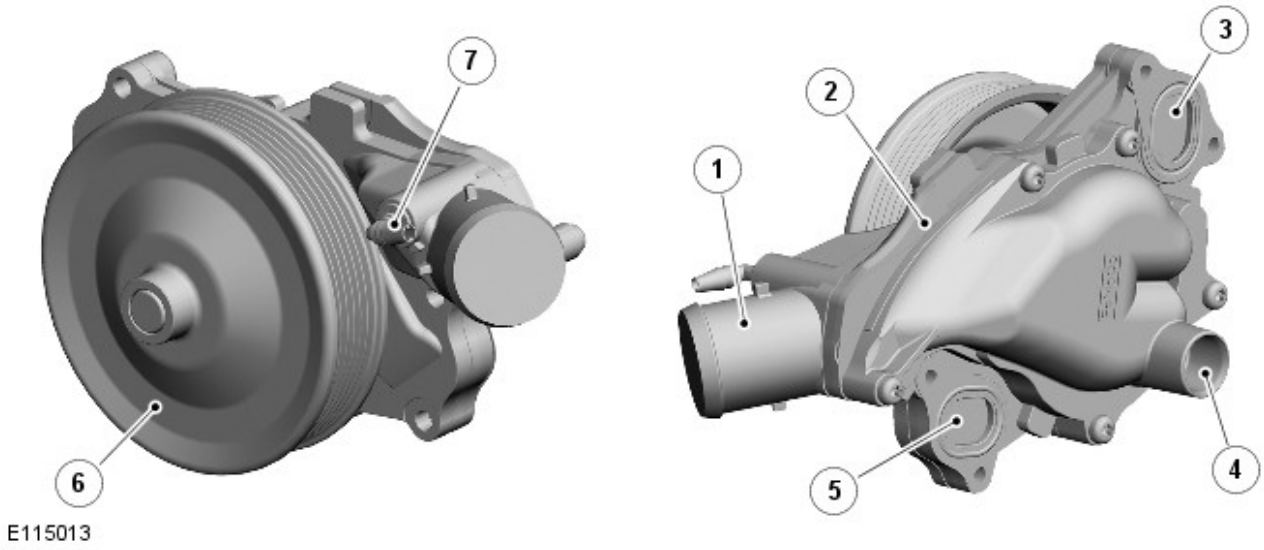
The cooling fan receives a battery feed and an ignition feed from the engine junction box (EJB). The ignition feed is supplied from the ignition relay in the EJB, which is controlled by the ECM.

The ECM calculates the required fan speed from the engine temperature, air conditioning (A/C) system pressure and transmission fluid temperature. Under hot operating conditions, the fan may continue to operate for 4 minutes after the engine has been switched off.

The supercharger cooling system also uses the engine cooling system for charge air cooling. Refer to: Supercharger Cooling (303-03D Supercharger Cooling - V6 S/C 3.0L Petrol, Description and Operation).

## COMPONENT DESCRIPTION

## COOLANT PUMP



E115013

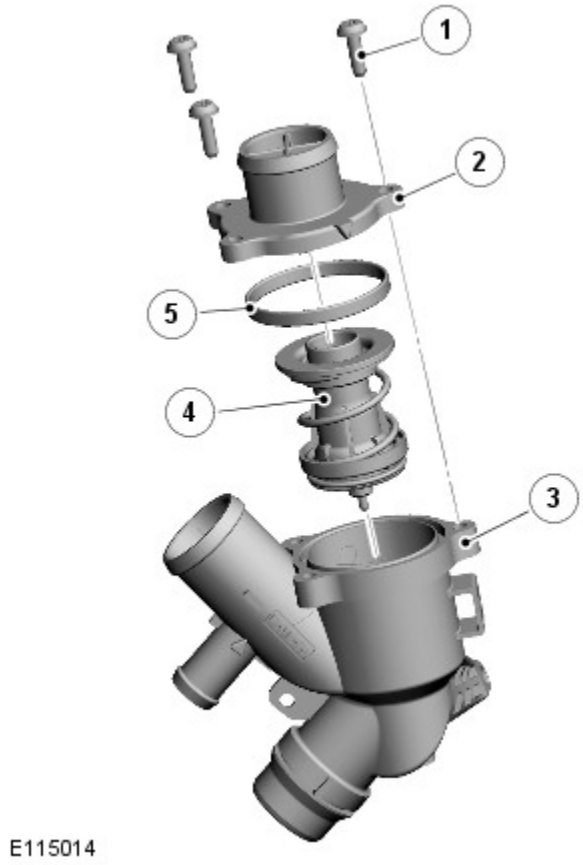
| ITEM | DESCRIPTION |
|---|---|
| 1 | Inlet connection |
| 2 | Pump body |
| 3 | Outlet flange to right-hand (RH) cylinder head |
| 4 | Outlet to engine oil cooler |

| ITEM | DESCRIPTION |
|---|---|
| 5 | Outlet flange to left-hand (LH) cylinder head |
| 6 | Pulley |
| 7 | Bleed pipe connection (containing check valve) |

The body of the coolant pump contains an impeller attached to a shaft supported in a bearing assembly. The impeller is driven by a pulley, pressed on to the front of the shaft, which is driven by the accessory drive belt. Refer to: Accessory Drive (303-05C Accessory Drive - V6 S/C 3.0L Petrol, Description and Operation).

Two coolant outlet flanges attach the coolant pump to the front of the cylinder heads. A bleed connector is installed in the front of the coolant pump, adjacent to the coolant inlet connection from the thermostat. A check valve is incorporated into the bleed connection.

## THERMOSTAT HOUSING




| ITEM | DESCRIPTION |
|---|---|
| 1 | Screw (3 off) |

| ITEM | DESCRIPTION |
|---|---|
| 2 | Lower body |
| 3 | Upper body |
| 4 | Thermostat |
| 5 | Seal |

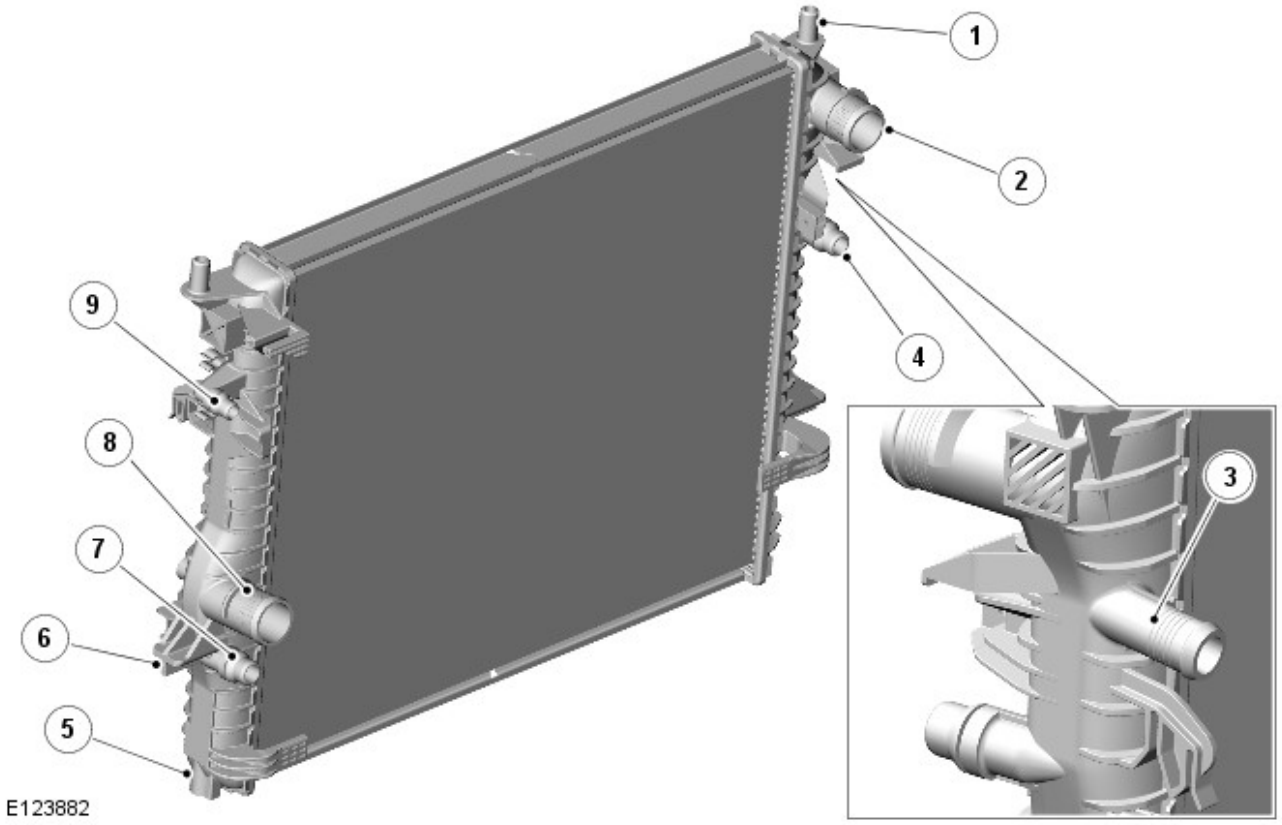
The thermostat is a multi-stage device located in the coolant pump inlet to provide fast response and control of the engine outlet temperature.

The thermostat housing has 4 connections. The lower connection receives a quick fit connector which receives coolant from the radiator lower hose and the automatic transmission fluid cooler. The larger upper connection is connected via a hose, water supply tube and water outlet to the cylinder block. The flow from this connection is governed by the thermostat. A connection at the side provides flow to the coolant pump and a smaller connection from this receives coolant return from the heater core and the coolant expansion tank.

The thermostat allows rapid engine warm-up by preventing coolant flow through the radiator and by limiting coolant flow through the cylinder block when the engine is cold. During warm-up and at engines speeds above approximately 3500 rev/min, a by-pass valve opens to control the coolant flow and pressure, to protect the engine components. When the thermostat opening reaches 6 mm (0.24 in.), the by-pass flow is shut-off. When the thermostat opening exceeds 6 mm (0.24 in.), the radiator coolant flow is further controlled up to the point where the thermostat is fully open. At this point maximum radiator coolant flow is achieved to provide maximum cooling.

The thermostat begins to open at 88 - 90 °C (190 - 194 °F) and is fully open at 102 °C (216 °F).

## RADIATOR




| ITEM | DESCRIPTION |
|---|---|
| 1 | Locating spigot (2 off) |
| 2 | Upper hose connection |
| 3 | Supercharger cooling system connection |
| 4 | Auxiliary radiator inlet hose connection |
| 5 | Drain plug |
| 6 | Support (2 off) |
| 7 | Auxiliary radiator outlet hose connection |
| 8 | Lower hose connection |
| 9 | Automatic transmission fluid cooler inlet hose connection |

The radiator is a cross flow type with an aluminum core and plastic end tanks. The radiator is part of the cooling module and is attached to the vehicle by locating spigots and supports integrated into the end tanks. The supports are installed in rubber bushes located in mounting brackets on the front subframe. The locating spigots are installed in rubber bushes located in mounting brackets on the front cross member.

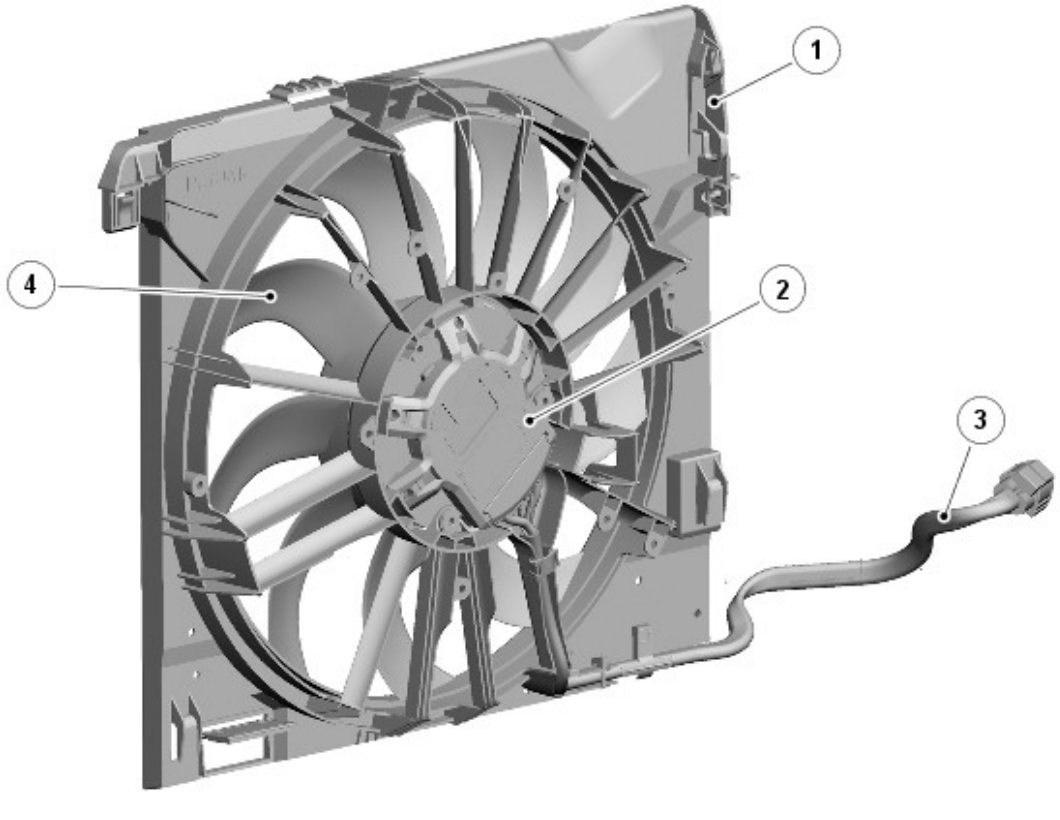
The two end tanks incorporate connections for the upper and lower hoses, the coolant supply hose of the transmission fluid cooler and the supply and return hoses of the auxiliary radiator(s). A drain plug is installed in the bottom of the left end tank.

## AUXILIARY RADIATOR [WHERE FITTED]


| ITEM | DESCRIPTION |
|---|---|
| 1 | Return hose connection |
| 2 | Supply hose connection |
| 3 | Bottom bracket |
| 4 | Top bracket |

The auxiliary radiator(s) increase(s) engine cooling capacity on Gulf States vehicles. The auxiliary radiator is connected in parallel with the (main) radiator and installed in an air duct, which takes cooling air from the related side grille in the front bumper. Two spigots on the top of the auxiliary radiator provide the coolant supply and return connections with the main radiator.

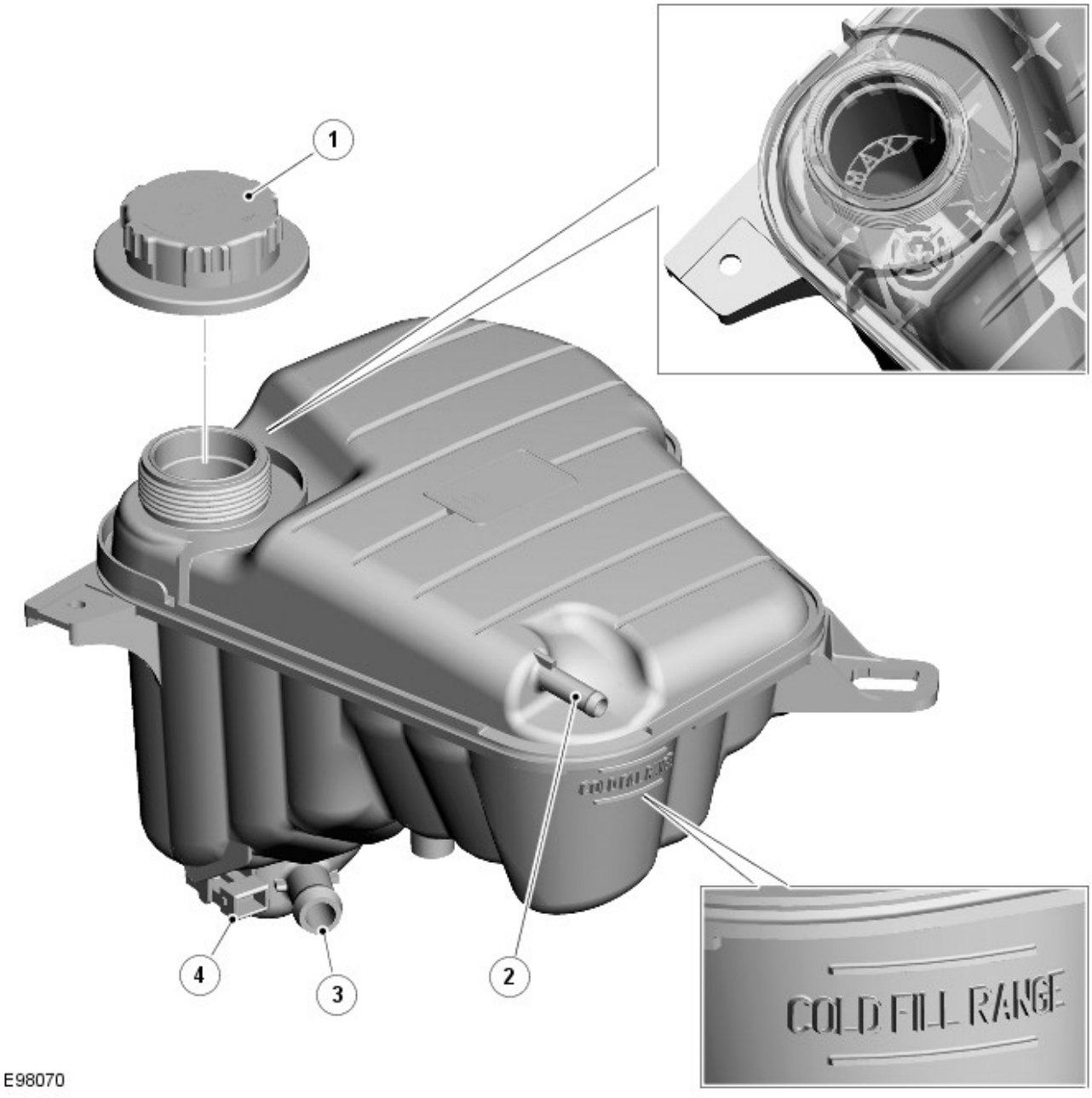
## COOLING FAN




| ITEM | DESCRIPTION |
|---|---|
| 1 | Shroud |
| 2 | Motor and fan control module |
| 3 | Harness |
| 4 | Fan |

An electric, variable speed cooling fan is installed in a shroud attached to the rear of the radiator. The cooling fan is operated by a fan control module, integrated into the electric motor, under the control of the ECM. An electrical connector at the right side of the shroud provides the interface between the cooling fan harness and the vehicle wiring.

## ENGINE COOLANT EXPANSION TANK




| ITEM | DESCRIPTION |
|---|---|
| 1 | Filler cap |
| 2 | Vent hose connection |
| 3 | Expansion hose connection |
| 4 | Level sensor |

The expansion tank is installed in the engine compartment, on the left upper suspension housing.

A filler cap and level sensor are incorporated into the expansion tank. A MAX level marking is molded into the interior of the tank below the filler cap. Cold fill levels are molded onto the exterior of the tank.

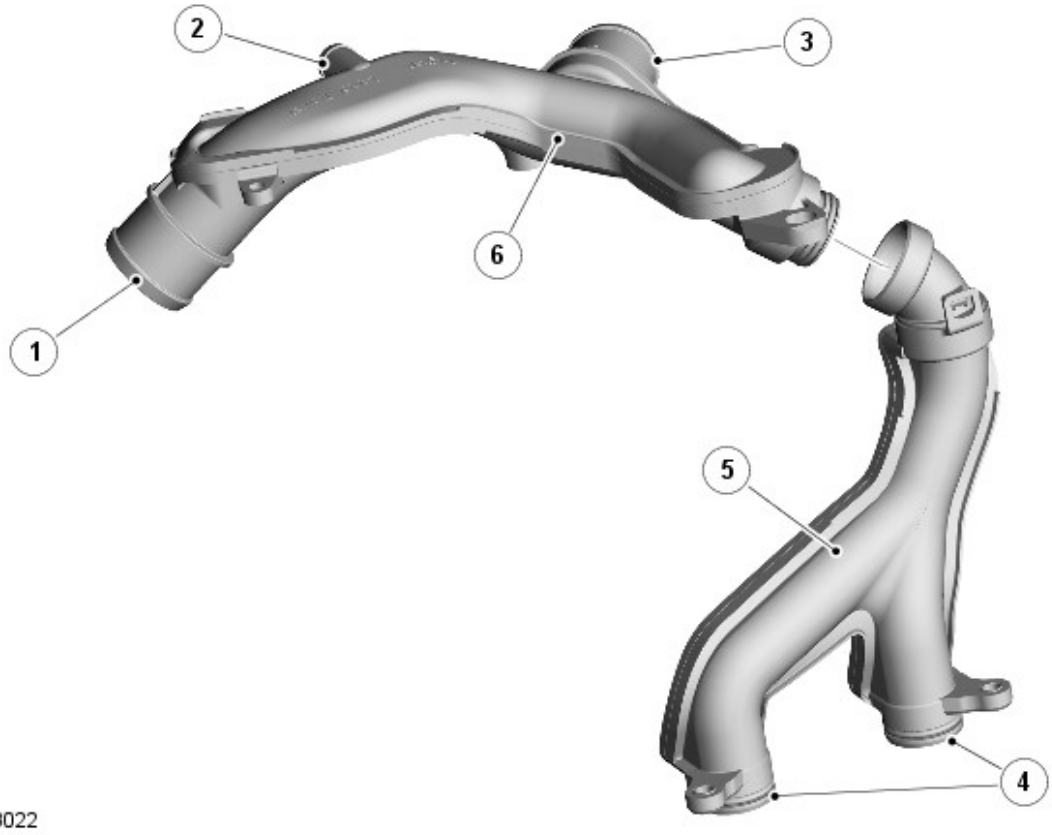
The expansion tank provides the following functions:

- Service fill.
- Coolant expansion during warm-up.
- Air separation during operation.
- System pressurization by the filler cap.

The expansion tank has an air space of approximately 0.5 liter (1.06 US pints), above the MAX level, to allow for coolant expansion.

## ENGINE COOLANT OUTLET TUBE AND HEATER MANIFOLD

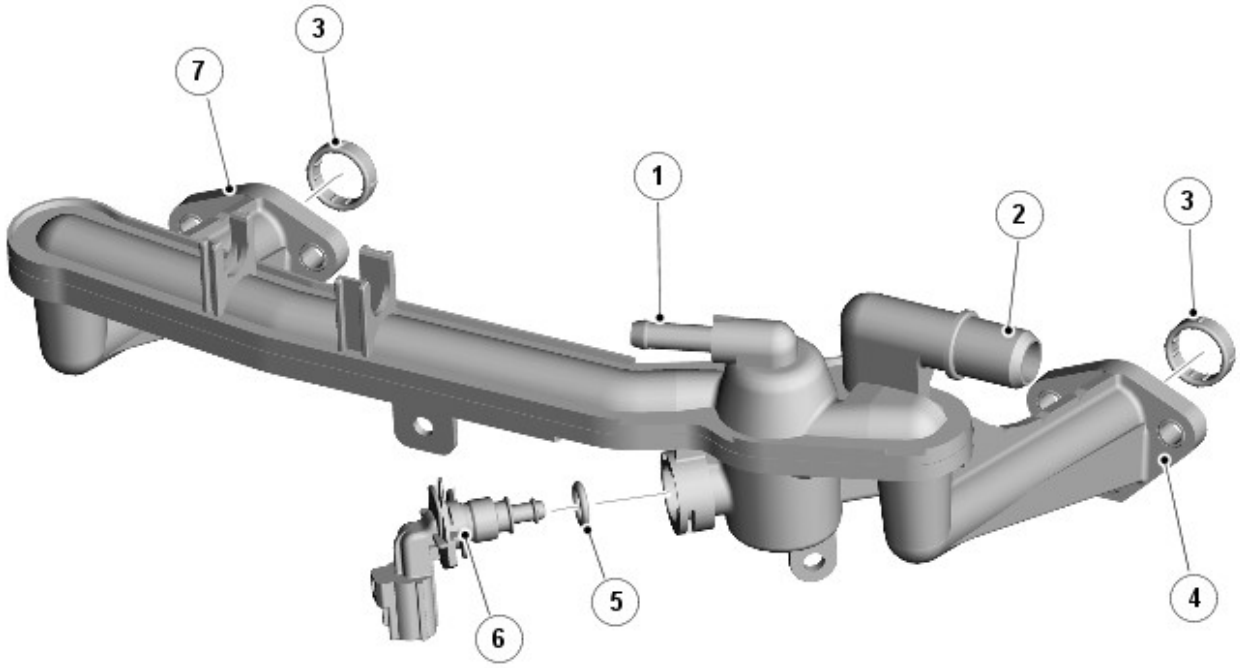
### Engine Coolant Outlet Tube




| ITEM | DESCRIPTION |
|---|---|

| ITEM | DESCRIPTION |
|---|---|
| 1 | Thermostat hose connection |
| 2 | Bleed hose connection |
| 3 | Radiator upper hose connection |
| 4 | Cylinder block connections |
| 5 | Water outlet tube |
| 6 | Water supply tube |

### Heater Manifold




E143023

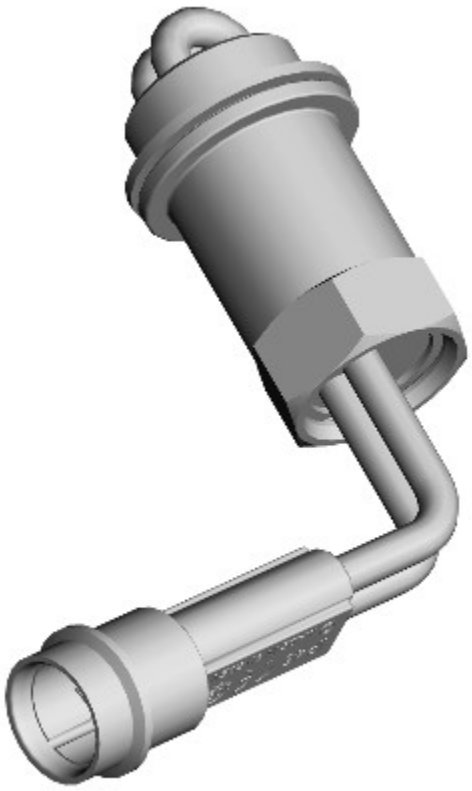
| ITEM | DESCRIPTION |
|---|---|
| 1 | Throttle body heater hose connection |
| 2 | Heater core supply hose connection |
| 3 | Seal (2 off) |
| 4 | Right cylinder head connection |

| ITEM | DESCRIPTION |
|---|---|
| 5 | O-ring seal |
| 6 | Engine coolant temperature sensor |
| 7 | Left cylinder head connection |

## ENGINE COOLANT

The engine coolant is formulated to last for ten years or 240,000 km (150,000 miles). The coolant is silicate free and must not be mixed with conventional engine coolant.

## ENGINE BLOCK HEATER



E143024

For vehicle markets subject to very cold climatic conditions, an engine block heater is installed in place of the cylinder block drain plug. The engine block heater is either a 110 V ac or 240 V ac electric heater element, depending on the market, which can be connected to a domestic power supply via a connector in the LH side grill of the front bumper.

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PUBLISHED: 10-MAR-2021
2013.0 XJ RANGE (X351), 303-03D

# ENGINE COOLING - V6 S/C 3.0L PETROL [G1514757]

DIAGNOSIS AND TESTING

## PRINCIPLES OF OPERATION

For a detailed description of the Engine Cooling system, refer to the relevant Description and Operation section in the workshop manual. REFER to: Engine Cooling (303-03C Engine Cooling - V6 S/C 3.0L Petrol, Description and Operation).

## INSPECTION AND VERIFICATION

**WARNING:**

**DO NOT** remove the coolant expansion tank cap when the engine is hot. Failure to follow this instruction may result in personal injury.

**CAUTION:**

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

**NOTES:**

- If a control module or a component is at fault and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval program is in operation, prior to the installation of a new module/component.
- When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern

2. Visually inspect for obvious signs of damage and system integrity

**Visual Inspection**

| MECHANICAL | ELECTRICAL |
|---|---|
| ▪ Coolant leaks<br>▪ Coolant hoses<br>▪ Coolant expansion tank<br>▪ Coolant expansion tank cap<br>▪ Radiator<br>▪ Heater core<br>▪ Accessory drive belt<br>▪ Cooling fan<br>▪ Coolant pipes and joins<br>▪ Thermostat | ▪ Fuses<br>▪ Wiring harnesses and connectors<br>▪ Powertrain control module<br>▪ Engine coolant temperature sensor<br>▪ Radiator outlet temperature sensor<br>▪ Cooling fan |

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step

4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes ( Diagnostic Trouble Code(s) (DTC)s) and refer to the DTC Index

5. Check Jaguar Land Rover (JLR) claims submission system for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and complete the recommendations as required.

## SYMPTOM CHART

| SYMPTOM | POSSIBLE CAUSES | ACTION |
|---|---|---|

| SYMPTOM | POSSIBLE CAUSES | ACTION |
|---|---|---|
| Coolant loss | ▪ Coolant leak<br>▪ Coolant hose damaged<br>▪ Coolant hose clamp loose/damaged<br>▪ Radiator leaking/damaged<br>▪ Coolant pump seal failed<br>▪ Heater core leaking/damaged<br>▪ Seal/gasket leaking<br>▪ Engine casting leaking<br>▪ Engine core plugs leaking<br>▪ Thermostat<br>▪ Coolant pipes and joins<br>▪ Coolant Degassing lines and degassing point plugs<br>▪ Main radiator and auxiliary radiators<br>▪ Charge air cooler circuit leaks | ▪ Check for coolant leaks. Perform a cooling system pressure test. Rectify as necessary<br>▪ If overheating event is suspected perform actions in overheating section after fixing the leak |
| Overheating | ▪ Coolant level low<br>▪ Coolant contaminated<br>▪ Coolant leak<br>▪ Thermostat stuck closed<br>▪ Radiator airflow obstructed<br>▪ Cooling fan inoperative | ▪ Check the coolant level. Rectify as necessary<br>▪ Check the condition of the coolant. Rectify as necessary<br>▪ Check for coolant leaks. Perform a cooling system pressure test. Rectify as necessary<br>▪ Check the operation of the thermostat. Rectify as necessary<br>▪ Check the radiator for obstructions. Rectify as necessary<br>▪ Check the operation of the cooling fan. GO to Pinpoint Test **A.**<br>▪ Check Active grille operation |
| Engine not reaching normal temperature | ▪ Thermostat stuck open | ▪ Check the operation of the thermostat. Rectify as necessary |
| Cooling fan operating at maximum speed - Engine not running | **NOTE:**<br>Circuit reference - Pulse Width Modulated (PWM) -<br>▪ Cooling fan control module PWM signal circuit short circuit to ground, short circuit to power, open circuit, high resistance | ▪ Refer to the electrical circuit diagrams and check the cooling fan control module PWM signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair the wiring harness as necessary |

| SYMPTOM | POSSIBLE CAUSES | ACTION |
|---|---|---|
| Cooling fan is stationary - Engine running | **NOTE:** Circuit reference - IGN - <br>▪ Cooling fan control module ignition signal circuit short circuit to ground, short circuit to power, open circuit, high resistance | ▪ Refer to the electrical circuit diagrams and check the cooling fan control module ignition signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair the wiring harness as necessary |
| Message centre displays "Coolant Level Low" warning message | ▪ Coolant loss<br>▪ Engine coolant level sensor fault<br>▪ Engine coolant level sensor circuit fault | ▪ GO to Pinpoint Test **B.** |

## PINPOINT TESTS

**PINPOINT TEST A : COOLING FAN TESTS**

**A1: CHECK FOR COOLING FAN RELATED S**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Using the manufacturer approved diagnostic system, check the powertrain control module for the following cooling fan related DTCs (with any third byte):<br>▪ P0480 Fan 1 Control Circuit<br>▪ P0481 Fan 2 Control Circuit<br>▪ P0483 Fan Rationality Check |
| | Are any cooling fan related DTCs set in the powertrain control module?<br>**Yes**<br>Refer to the powertrain control module DTC index and perform the relevant corrective action. **GO to A9**.<br>**No**<br>**GO to A2**. |

**A2: CHECK FOR OTHER S**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Using the manufacturer approved diagnostic system check the powertrain control module for DTCs |
| | Are any other DTCs set in the powertrain control module?<br>**Yes**<br>Refer to the powertrain control module DTC index and perform the relevant corrective action<br>**No**<br>**GO to A3**. |

**A3: COOLING FAN IS OPERATING PERMANENTLY**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Check the operation of the cooling fan |
| | Is the cooling fan operating permanently at maximum speed?<br>**Yes**<br>**GO to A5**.<br>**No**<br>**GO to A4**. |

**A4: COOLING FAN IS NOT OPERATING**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Check the operation of the cooling fan |
| | Is the cooling fan inoperative?<br>**Yes**<br>**GO to A6**.<br>**No**<br>No fault found. Verify customer concern of cooling fan operation |

**A5: COOLING FAN IS OPERATING PERMANENTLY**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|

**WARNING:**

Moving parts can cause severe injury, keep clear of moving parts, never place your hands or any part of your body near to moving parts.

| | |
|---|---|
| | **1** Using the manufacturer approved diagnostic system, check datalogger signal - Electric Fan PWM Control Commanded (0x03F9) |
| | Is the datalogger signal value between 5% and 16% when the cooling fan is operating?<br>**Yes**<br>**GO to A8**.<br>**No**<br>**GO to A6**. |

**A6: COOLING FAN IS NOT OPERATING**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|

**CAUTION:**

Make sure hood is closed and there are not any loose objects in front of the vehicle.

| | |
|---|---|
| | **1** Using the manufacturer approved diagnostic system, set datalogger signal - Electric Fan PWM Control Commanded (0x03F9) - to 30% (using output state control) |
| | Does the cooling fan operate?<br>**Yes**<br>**GO to A7**.<br>**No**<br>**GO to A8**. |

**A7: ELECTRIC FAN CONTROL**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Using the manufacturer approved diagnostic system, set datalogger signal - Electric Fan PWM Control Commanded (0x03F9) - to 90% (using output state control) |
| | Did the cooling fan speed increase?<br>**Yes**<br>No fault found. Verify customer concern of cooling fan operation. **GO to A9**.<br>**No**<br>**GO to A8**. |

**A8: WIRING CHECK**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Refer to the electrical circuit diagrams and check the cooling fan motor control module circuits for short circuit to ground, short circuit to power, open circuit, high resistance |
| | Were any circuit faults present?<br>**Yes**<br>Repair the wiring harness as necessary. **GO to A9**.<br>**No**<br>**GO to A9**. |

**A9: COOLING FAN VALIDATION PROCEDURE**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Make sure that the hood is closed |
| | **2** Start the engine |
| | **3** Set the air conditioning to on, set the temperature to cold and the fan speed to fast |
| | **4** Allow the engine to reach normal operating temperature (approximately 90°C) |
| | **5** Using the manufacturer approved diagnostic system, check datalogger signals - Engine Coolant Temperature (0xF405) - and - Electric Fan PWM Control Commanded (0x03F9). As the engine coolant temperature reaches normal operating temperature, the fan speed should increase between the values of 9% and 90% |
| | Did the cooling fan speed increase speed as engine coolant temperature increased?<br>**Yes**<br>Return vehicle to customer<br>**No**<br>Contact Retailer Technical Support |

**PINPOINT TEST B : COOLANT LEVEL SENSOR TESTS**

**NOTE:**

The coolant expansion tank float is designed to be positioned near the bottom of the tank, significantly (more than 15mm) below the MIN cold fill level. A float in this position does NOT signify float failure (For example, ‘sinking’ or ‘sticking’). Continue to follow the procedure as stated below.

**B1: COOLANT LEVEL SENSOR TEST 1 - COOLANT LEVEL CHECK**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **WARNINGS:**<br>▪ **DO NOT** remove the coolant expansion tank cap when the engine is hot. Failure to follow this instruction may result in personal injury.<br>▪ Never, under any circumstances, remove the coolant expansion tank pressure cap while the engine is operating. To avoid having scalding hot water or steam blow out of the cooling system, use extreme care when removing the coolant expansion tank pressure cap from a hot cooling system. Wait until the engine has cooled, then wrap a thick cloth around the coolant expansion tank pressure cap and turn it slowly until the pressure begins to release, step back while the pressure is released from the system. When certain all the pressure has been released (still with a cloth) turn and remove the coolant expansion tank pressure cap. Failure to follow these instructions may result in damage to the cooling system, engine and/or cause personal injury. |
| | **1** Check the coolant level |
| | Is the coolant level within specification?<br>**Yes**<br>**GO to B2**.<br>**No**<br>Refer to the relevant section of the workshop manual and fill and bleed the cooling system as necessary. Check for coolant loss |

**B2: COOLANT LEVEL SENSOR TEST 2 - SENSOR CIRCUIT CONTINUITY CHECK**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Check harness connector is firmly attached to the level sensor. Rectify as required |
| | **2** Uncouple the engine coolant level sensor/switch assembly harness connector. Confirm that the “Coolant Level Low” warning message appears on the instrument cluster when the harness has been disconnected from the engine coolant level sensor/switch assembly |
|  | **3** Create a circuit short across the pins of the level sensor harness connector. It is recommended to connect a MICRO blade fuse (of any amp rating, as illustrated) to the pins level sensor harness connector. Alternatively, a suitable jumper wire may be used. Shorting the circuit should make the “Coolant Level Low” warning message disappear |
| | **4** If the “Coolant Level Low” warning message does not disappear, using the Jaguar Land Rover approved diagnostic equipment, check the engine coolant level sensor/switch circuit between the coolant expansion tank and the body control module/central junction box for open circuit faults and rectify as required |
| | Is the “Coolant Level Low” message displayed on the instrument cluster when the level sensor harness terminals is short circuited (For example, with a jumper wire or a blade fuse)?<br>**Yes**<br>Repair the harness and repeat Pinpoint Test E2<br>**No**<br>If this is the first reported instance of the fault, **GO to B3**. . If this same fault has been previously reported on the vehicle **GO to B4**. |

**B3: COOLANT LEVEL SENSOR TEST 3 - SENSOR CIRCUIT CONTINUITY CHECK**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|

**B3: COOLANT LEVEL SENSOR TEST 3 - SENSOR CIRCUIT CONTINUITY CHECK**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** 1. Replace the level sensor |
| | **2** Reconnect the engine coolant level sensor/switch assembly harness connector |
| | Is the "Coolant Level Low" warning message displayed?<br>**Yes**<br>**GO to B4**.<br>**No**<br>No further action required |

**B4: COOLANT LEVEL SENSOR TEST 4 - COOLANT EXPANSION TANK REPLACEMENT**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| | **1** Replace the coolant expansion tank |
| | **2** Refill the coolant expansion tank and visually confirm that the coolant level is between the maximum and minimum marks that are moulded on the coolant expansion tank body |
| | Is the "Coolant Level Low" warning message displayed?<br>**Yes**<br>Check the integrity and security of the wiring harness and circuit connectors. Rectify as required and retest<br>**No**<br>No further action required |

## DTC INDEX

For a list of Diagnostic Trouble Codes ( DTCs) that could be set on this vehicle, please refer to Section 100-00. REFER to: Diagnostic Trouble Code Index - DTC: V6 S/C 3.0L Petrol, DTC: Engine Control Module (100-00 General Information, Description and Operation).

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzoyOTo1OC43MjdaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 23-FEB-2016
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# COOLING SYSTEM DRAINING AND VACUUM FILLING [G1269230]

GENERAL PROCEDURES

| | | | | | |
|---|---|---|---|---|---|
| 26.10.05 | COOLING SYSTEM DRAINING AND VACUUM FILLING | ALL DERIVATIVES | 1.30 | USED WITHINS | + |

## DRAINING

1.

**WARNING:**

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2. Refer to: Radiator Splash Shield (501-02 Front End Body Panels, Removal and Installation).

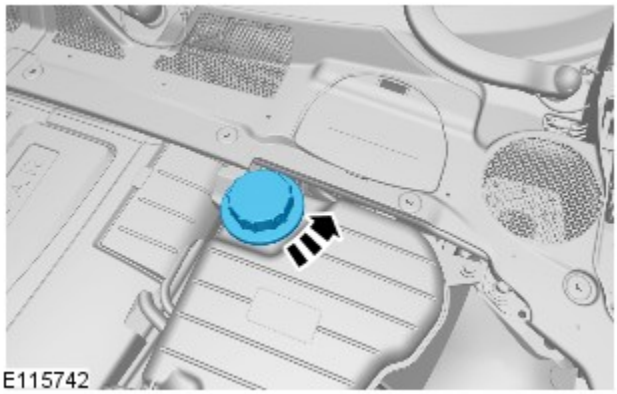
3.

**WARNING:**

Release the cooling system pressure by slowly turning the coolant expansion tank cap a quarter of a turn. Cover the expansion tank cap with a thick cloth to prevent the possibility of scalding. Failure to follow this instruction may result in personal injury.

**CAUTIONS:**

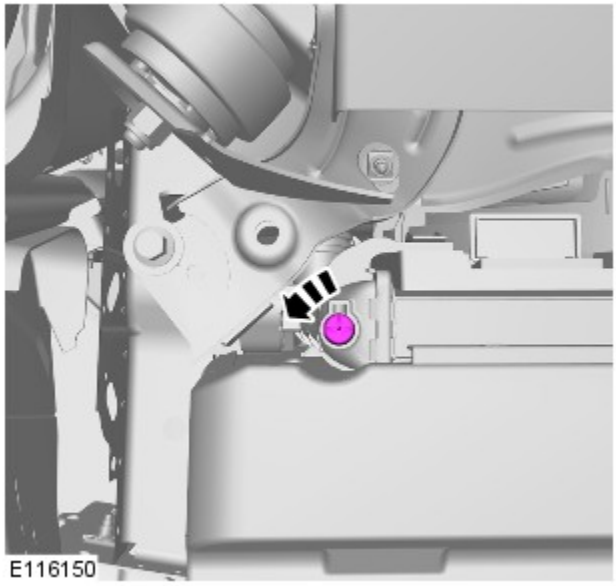
- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure
- Be prepared to collect escaping coolant.



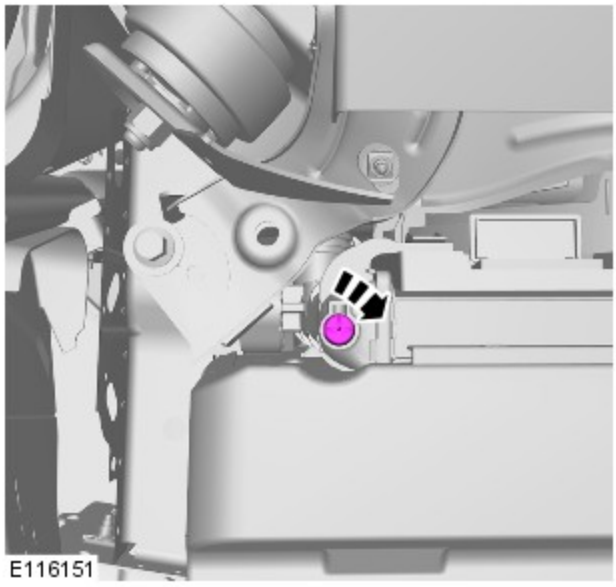
4.

**CAUTION:**

Be prepared to collect escaping coolant.




5.




*Torque*: **2Nm**

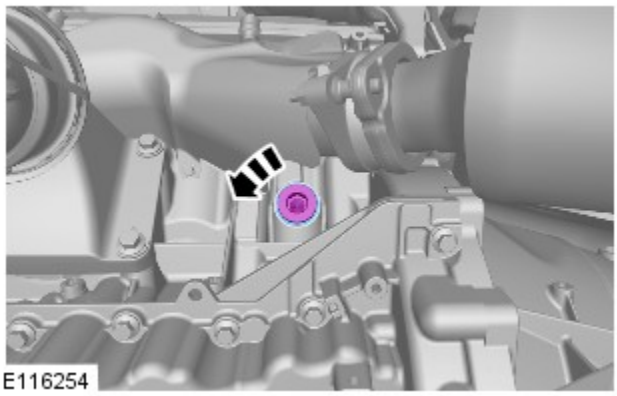
6.

**CAUTION:**

Be prepared to collect escaping coolant.

**NOTE:**

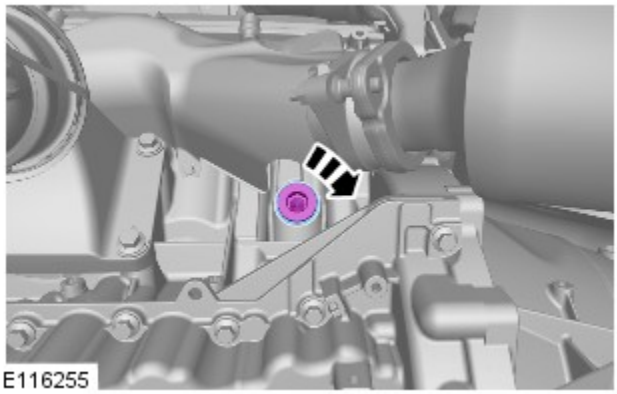
Only carry out the following step if the coolant is to be drained from the engine.


E116254

7.

**NOTE:**

This step is only required if previously removed.


E116255

*Torque*: **50Nm**

## FILLING

1. Refer to: Radiator Splash Shield (501-02 Front End Body Panels, Removal and Installation).

2. Lower the vehicle.

3. **CAUTION:**

   Anti-freeze concentration must be maintained at 50%.

   - Install the cooling system vacuum refill adaptor to the expansion tank.
   - Install the vacuum filler gauge to the cooling system vacuum refill adaptor.
   - Install the venturi tube assembly to the vacuum filler gauge.

4. **NOTES:**

   - Make sure the coolant supply valve is in the closed position on the vacuum filler gauge assembly.
   - The coolant vacuum fill tool needs an air pressure of 6 to 8 bar (87 to 116 psi) to operate correctly.
   - Small diameter or long airlines may restrict airflow to the coolant vacuum fill tool.

   Connect a regulated compressed air supply to the venturi tube assembly.

5. Position the evacuated air hose into a container.

6. Open the air supply valve.

7. **NOTE:**

   Make sure the coolant supply hose is positioned into a container of fifty percent mixture of Jaguar Premium Cooling System Fluid or equivalent, meeting Jaguar specification WSS M97B44-D and fifty percent water. Make sure no air can enter the coolant supply hose.

   Open the coolant supply valve for 2 seconds to prime the coolant supply hose.

8. Apply air pressure progressively until the arrow on the vacuum filler gauge reaches the green segment.

9. Disconnect the compressed air supply line.

10.

**NOTE:**

Close the coolant supply valve when the coolant expansion tank MAX mark is reached or coolant movement has ceased.

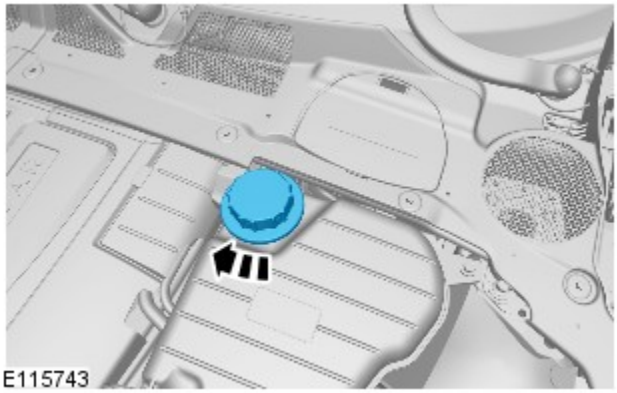
Open the coolant supply valve and allow the coolant to be drawn into the system.

11. Remove the vacuum filler gauge and cooling system vacuum refill adaptor assembly.

12.

**CAUTION:**

Correct installation of the coolant expansion tank cap can be obtained by tightening the cap until 3 audible clicks are heard.




13. Set the heater controls to maximum.

14.

**CAUTION:**

Observe the engine temperature gauge. If the engine starts to over-heat switch off immediately and allow to cool. Failure to follow this instruction may cause damage to the vehicle

Start the engine and idle until hot air is emited at the face registers.

15. Switch the heater off.

16. Raise the engine speed to 2000 RPM for eight minutes.

17.

**CAUTION:**

Switch off the engine and allow the coolant temperature to go cold.

Switch the engine off.

18. Visually check the engine and cooling system for signs of coolant leakage.

19.

**WARNING:**

When releasing the cooling system pressure, cover the coolant expansion tank cap with a thick cloth.

**CAUTIONS:**

- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure
- Make sure the coolant level remains above the "COLD FILL RANGE" lower level mark.

**NOTE:**

When the cooling system is warm, the coolant will be approximately 10mm above the upper level mark on the expansion tank with the cap removed.

Check and top-up the coolant if required.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzozMTozMi4zMTBaOzEwNC4yLjM5LjExOTNBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 13-NOV-2020
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# COOLING SYSTEM PRESSURE TEST [G1898875]

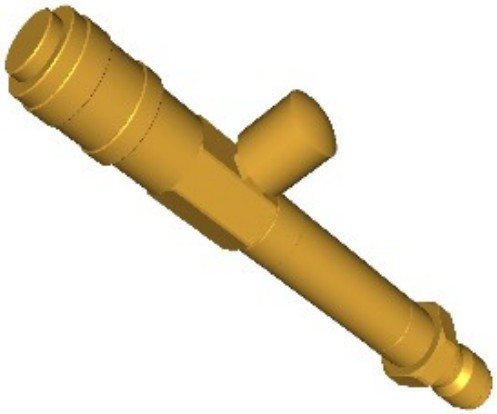
GENERAL PROCEDURES

| | | | | | |
|---|---|---|---|---|---|
| 26.10.07 | COOLING SYSTEM - PRESSURE TEST | ALL DERIVATIVES | 0.20 | USED WITHINS | + |

## SPECIAL TOOL[S]

### JLR-303-1649

Coolant expansion tank drain cap




## GENERAL EQUIPMENT

| EQUIPMENT NAME |
|---|
| Cooling system pressure tester |

## CHECK

**WARNING:**

Injury such as scalding could be caused by escaping steam or coolant, allow the vehicle cooling system to cool before completing this procedure.

**CAUTIONS:**

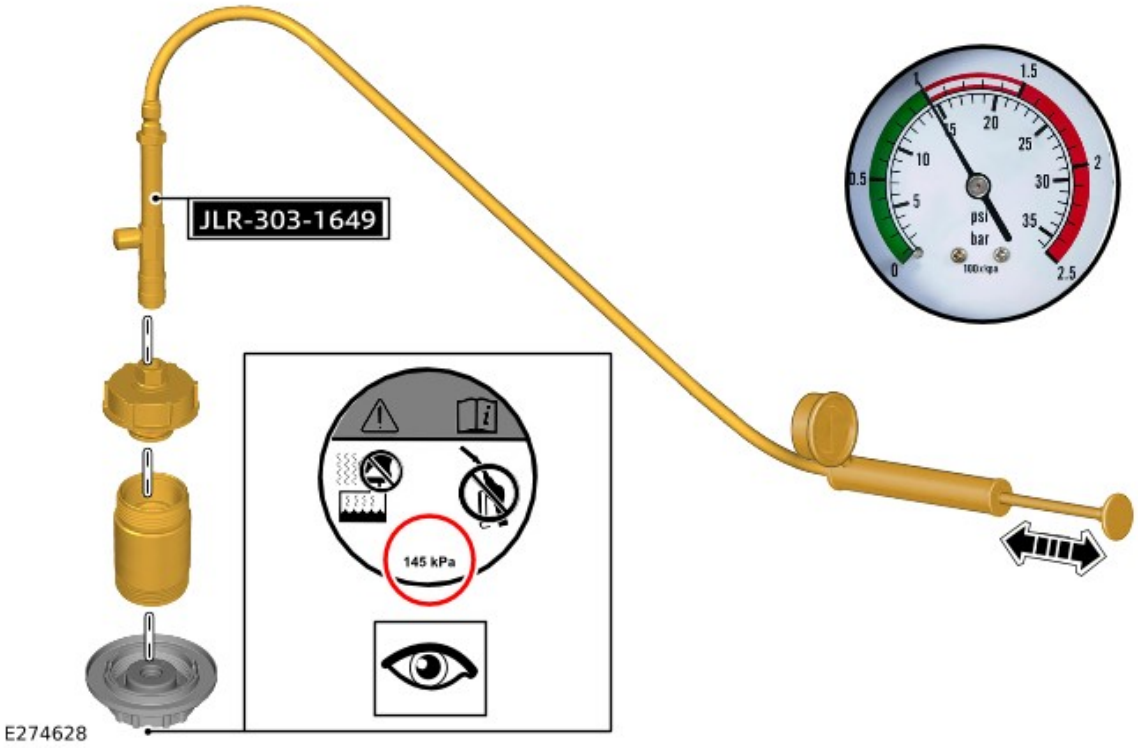
- Coolant will damage the paint finished surfaces. If spilt, immediately remove the coolant and clean the area with water.
- Make sure that the mating faces are clean and free of foreign material.

**NOTES:**

- The following procedure will enable the cooling system to be pressure tested for condition and leaks. Step 2 will check the expansion tank cap seal and the cap for leaks. Step 3 will check the entire cooling system.
- This procedure contains some variation in the illustrations depending on the vehicle specification, but the essential information is always correct.
- This procedure contains illustrations showing certain components removed to provide extra clarity.

1. Visually check the cooling system for signs of leaks and distorted hoses. Make sure all the cooling system components are correctly installed. Replace any damaged or faulty components.

2.




- Remove the coolant expansion tank cap.
- Note the pressure printed on the coolant expansion tank cap.
- Assemble the pressure tester and special tool JLR-303-1649 and install on the coolant expansion tank cap as illustrated.
- Slowly apply the noted pressure to the coolant expansion tank cap and check if it holds the pressure. If the noted pressure is reached, the pressure should be released through the coolant expansion tank cap.
- If the coolant expansion tank cap fails this test, replace the component.
- Disassemble the pressure tester, special tool JLR-303-1649 and the coolant expansion tank cap assembly.
  *Special Tool(s):* JLR-303-1649
  *General Equipment:* Cooling system pressure tester

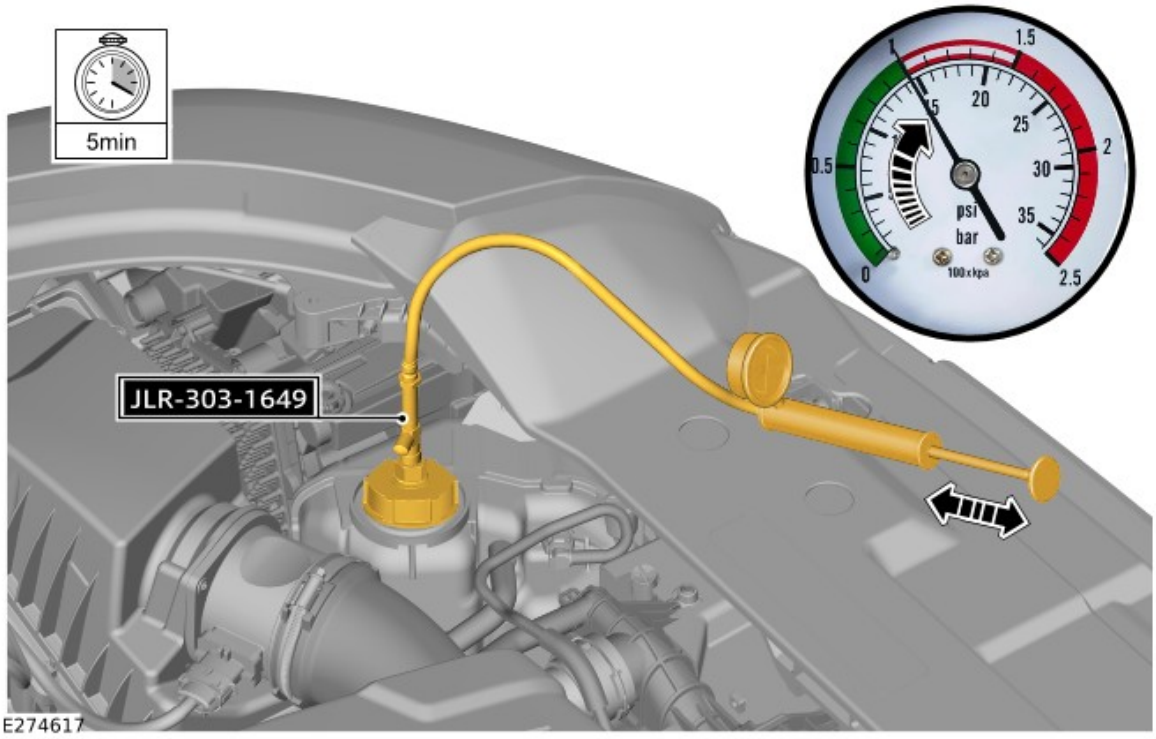
3.

**CAUTION:**

Do not exceed 1.0 bar (15 psi) when pressurizing the cooling system.

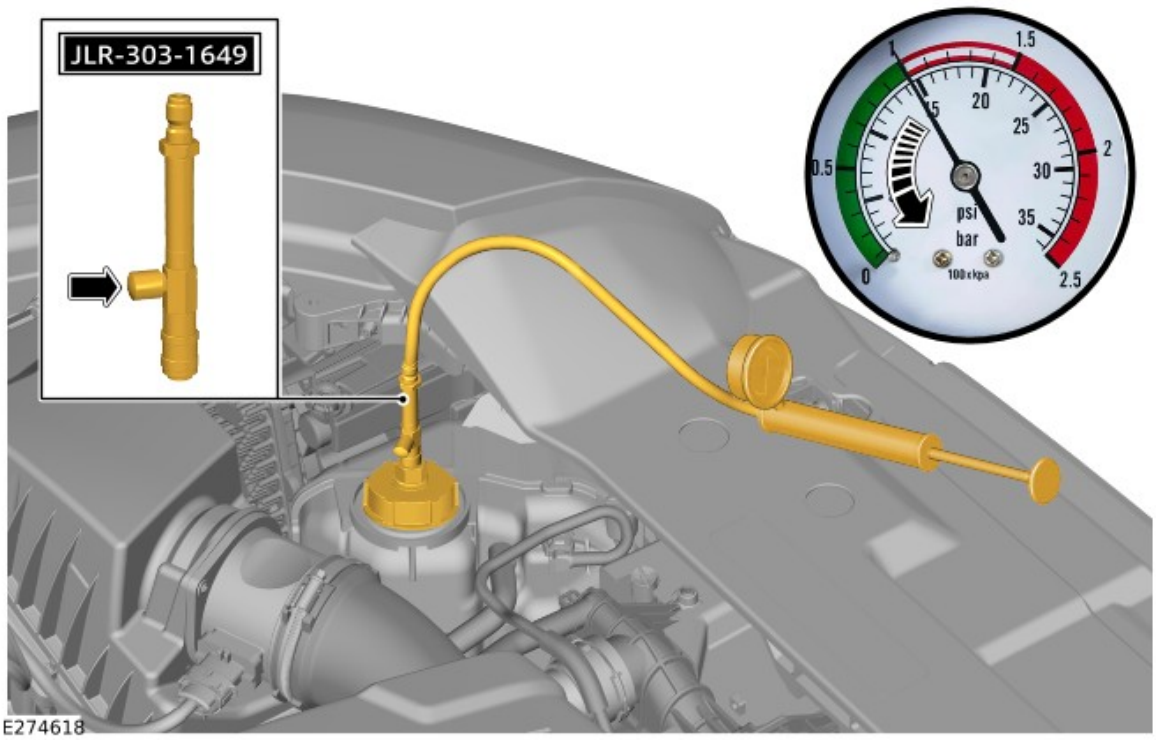
**NOTE:**

If the pressure continues to drop after the initial tolerance, there cooling system needs to be checked for leaks.




- Use the pressure tester and special tool JLR-303-1649 to slowly pressurize the cooling system until the gauge reads 1 bar (15 psi).
- No significant drop in pressure should be noted on the pressure tester gauge. If after 5 minutes the pressure significantly drops, inspect the cooling system for leaks. A pressure drop of 0.15 bar (1 psi) in the first minute is considered normal operation.
  *Special Tool(s):* JLR-303-1649
  *General Equipment:* Cooling system pressure tester

4.




Release the pressure and remove the pressure tester and special tool JLR-303-1649.

*Special Tool(s):* JLR-303-1649

*General Equipment:* Cooling system pressure tester

5.

**CAUTION:**

Correct installation of the coolant expansion tank cap can be obtained by tightening the cap until 3 audible clicks are heard.

- Check and top up the coolant if required.
- Install the cooling system expansion tank cap.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzozOToyNi40ODFaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 02-JUL-2021
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# CYLINDER HEAD COOLANT OUTLET PIPE [G2732374]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| **26.32.52** | **CYLINDER HEAD COOLANT OUTLET PIPE** | **3000 CC, AJ V6 (AJ126), SUPERCHARGED** | **3.60** | **USED WITHINS** | **+** |

## PART(S)

| STEP | PART NAME | QUANTITY |
|---|---|---|
| Installation Step 1 | Cylinder head coolant outlet lower pipe | 1 |
| Installation Step 2 | Cylinder head coolant outlet upper pipe | 1 |

## REMOVAL

**WARNING:**

Be prepared to collect escaping coolant.

**CAUTION:**

Before disconnecting any components, make sure the area is clean and free from foreign material. When disconnected all openings must be sealed.

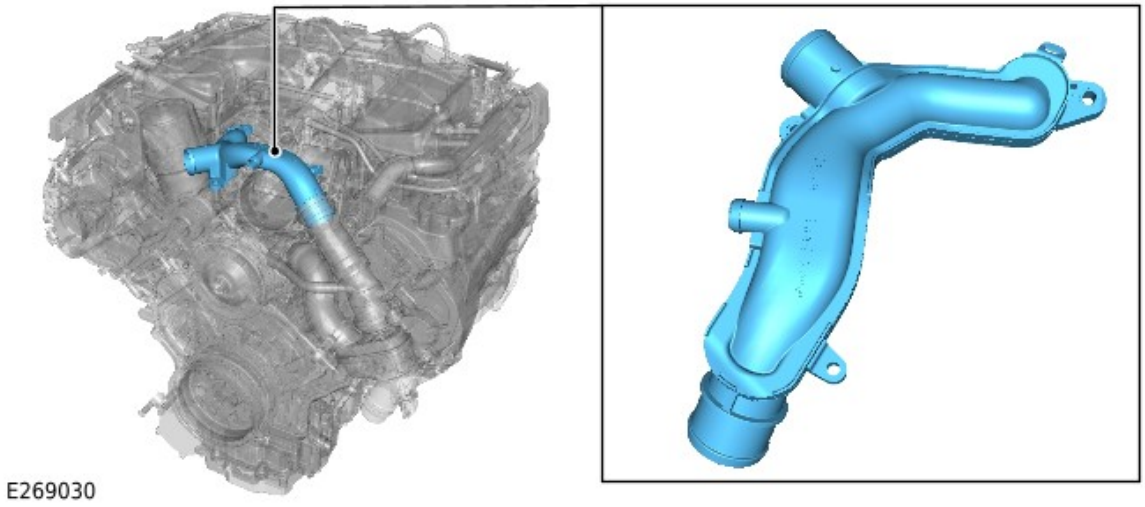
**NOTE:**

- This procedure contains illustrations showing certain components removed to provide extra clarity.
- This procedure contains some variation in the illustrations depending on the vehicle specification, but the essential information is always correct.

1. Raise and support the vehicle on a suitable 2 post lift.
   Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

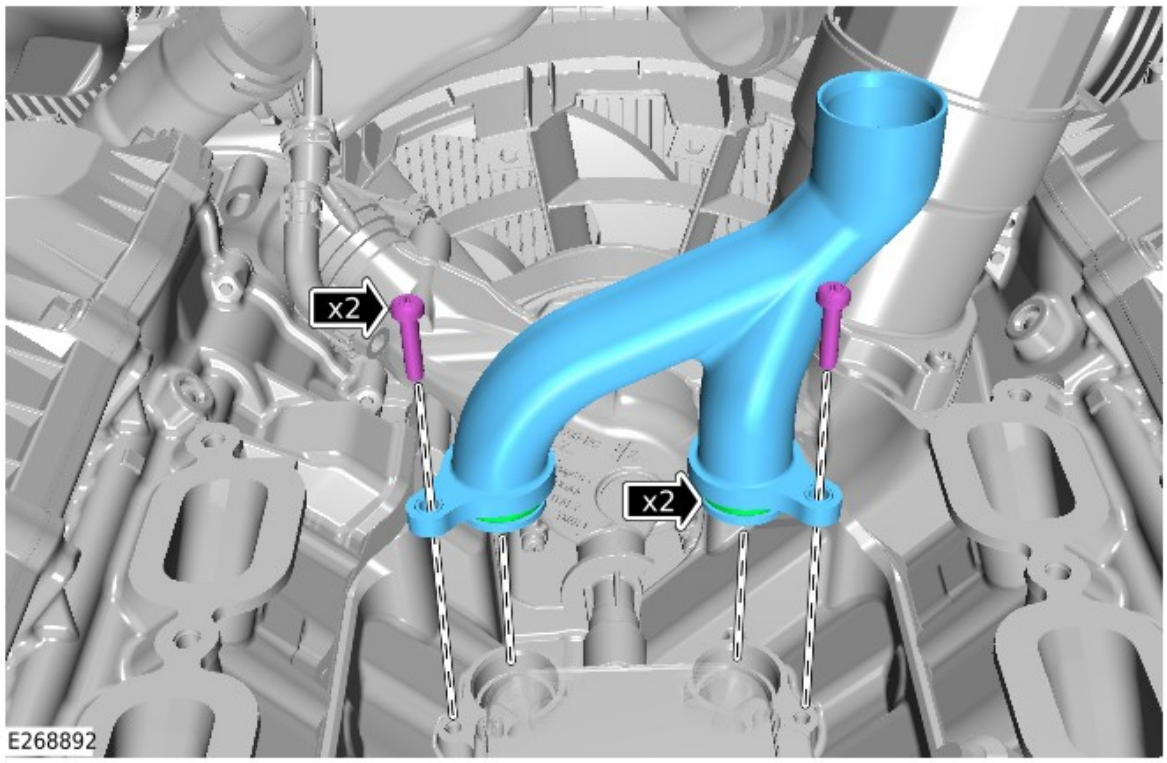
2. Remove the supercharger.
   Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V8 N/A 5.0L Petrol/V8 S/C 5.0L Petrol, Removal and Installation).
   Refer to: Supercharger (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

3.




Discard the upper pipe.

4.




- Remove the 2 bolts.
- Remove and discard the lower pipe.

## INSTALLATION

1.

**CAUTION:**

Make sure that all traces of excess coolant are cleaned from the cylinder head area.

- Install the lower pipe.
  *Renew Part:* Cylinder head coolant outlet lower pipe *Quantity:* 1.
- Install and tighten the 2 bolts.
  *Torque*: **11.5Nm**

2. Make sure a new component is installed.
   *Renew Part:* Cylinder head coolant outlet upper pipe *Quantity:* 1.

3. Install the supercharger.
   Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V8 N/A 5.0L Petrol/V8 S/C 5.0L Petrol, Removal and Installation).
   Refer to: Supercharger (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo1MDoyOS4zNDdaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 26-FEB-2019
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# REAR COOLANT MANIFOLD [G2368812]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| **26.32.32** | **REAR COOLANT MANIFOLD - RENEW** | **3000 CC, AJ V6 (AJ126), SUPERCHARGED** | **2.60** | **USED WITHINS** | **+** |

## PART[S]

| STEP | PART NAME | QUANTITY |
|---|---|---|
| Installation Step 1 | Cylinder block coolant outlet O-ring seals | 2 |

## REMOVAL

**WARNING:**

Be prepared to collect escaping coolant.

**NOTE:**

- This procedure contains some variation in the illustrations depending on the vehicle specification, but the essential information is always correct.
- This procedure contains illustrations showing certain components removed to provide extra clarity.

1. Raise and support the vehicle on a suitable 2 post lift.
   Refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

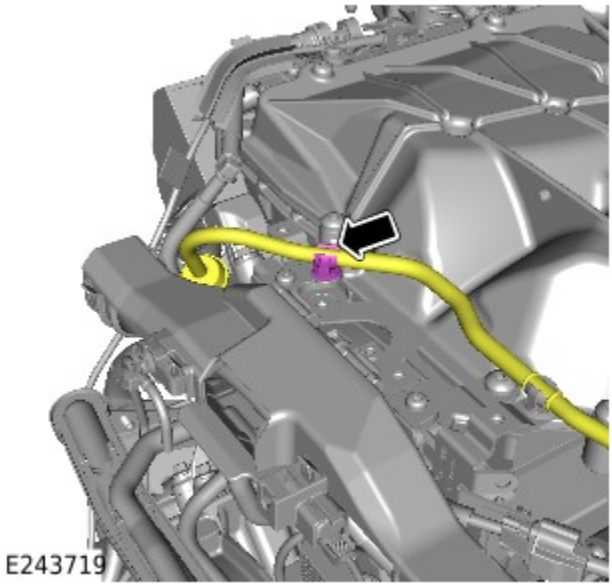
2. Partially drain the cooling system.
   Refer to: Cooling System Partial Draining and Vacuum Filling (303-03A Engine Cooling - V8 N/A 5.0L Petrol/V8 S/C 5.0L Petrol, General Procedures).

3. Remove the secondary bulkhead right panel.

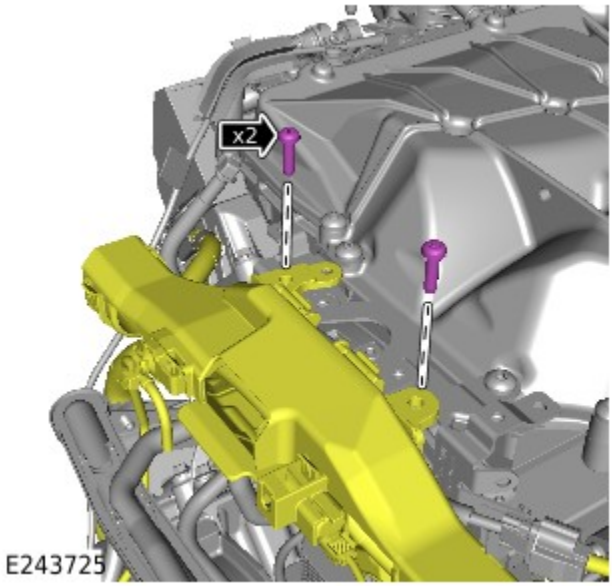
   Refer to: Secondary Bulkhead Right Panel (501-02 Front End Body Panels, Removal and Installation).

4. Remove the secondary bulkhead left panel.

   Refer to: Secondary Bulkhead Left Panel (501-02 Front End Body Panels, Removal and Installation).

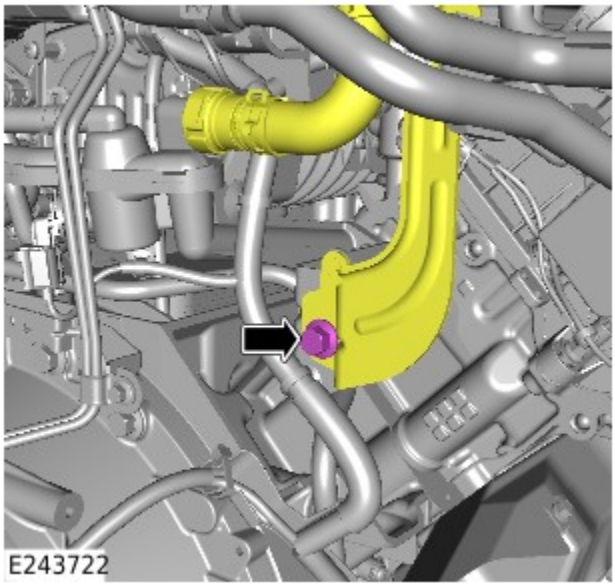
5. 


   Release the vacuum pipe from the clip.

6. 

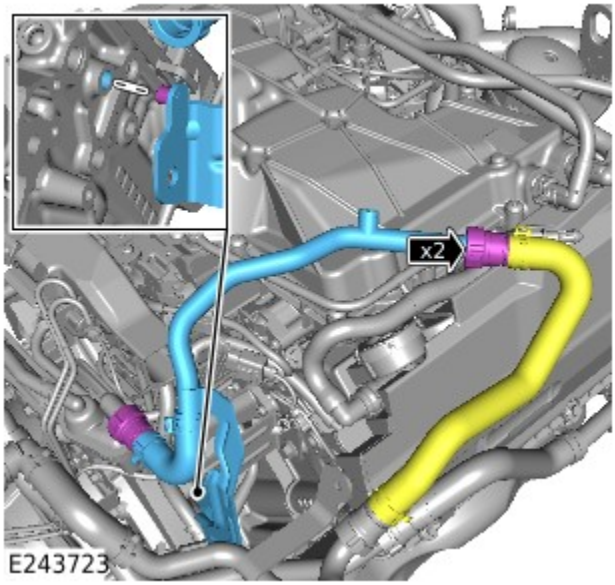

   - Remove the 2 bolts.
   - Reposition the wiring harness away from the rear coolant manifold.

**7.**



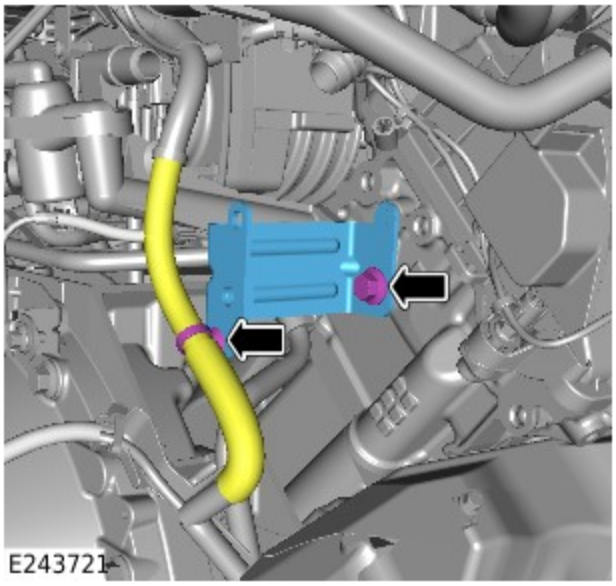

Remove the bolt from the coolant hose bracket.

**8.**




- Disconnect the 2 coolant hose connectors.
- Remove the rear coolant manifold right hose.

**9.**




- Release the wiring harness clip.
- Remove the bolt.
- Remove the coolant hose bracket.

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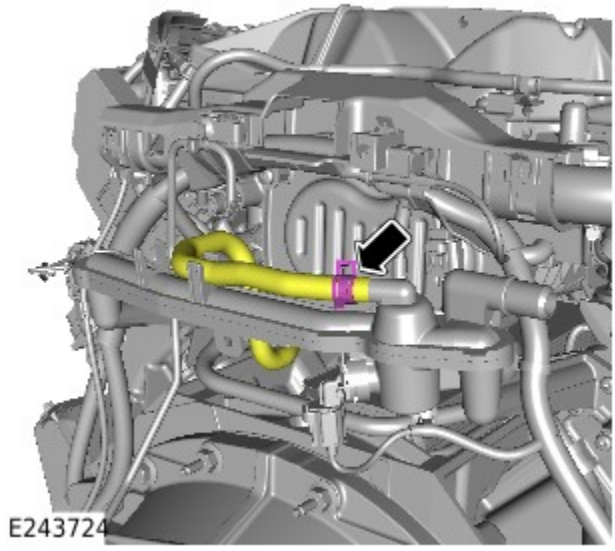
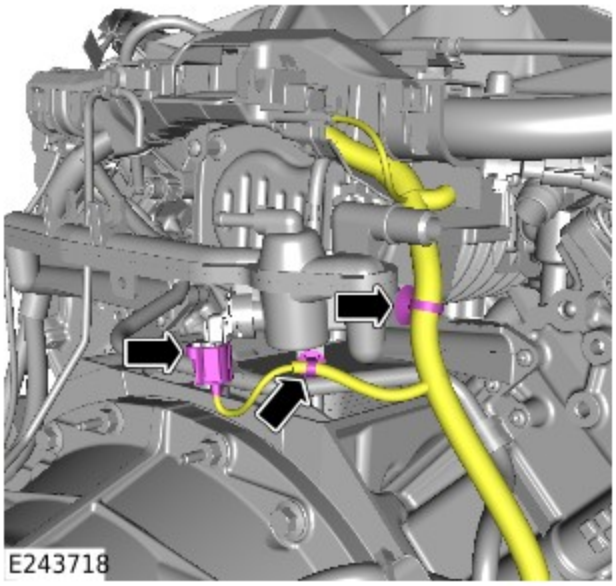
**10.**




- Release the coolant hose clip.
- Disconnect the rear coolant manifold left hose.

---

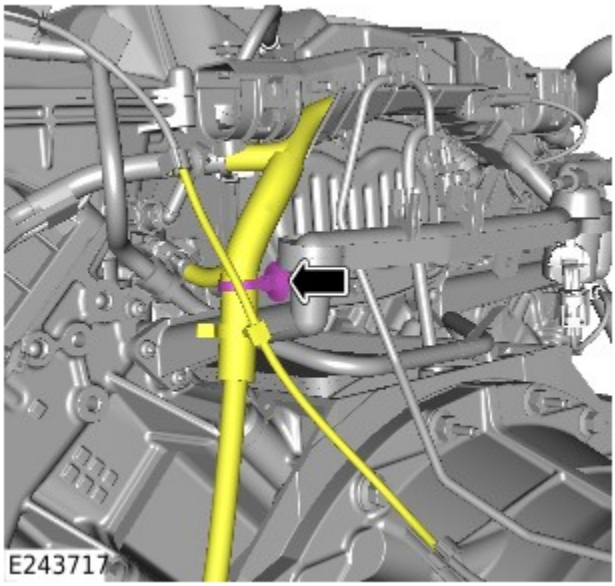
**11.**




- Disconnect the electrical connector.
- Release the 2 wiring harness clips from the right side of the rear coolant manifold.

---

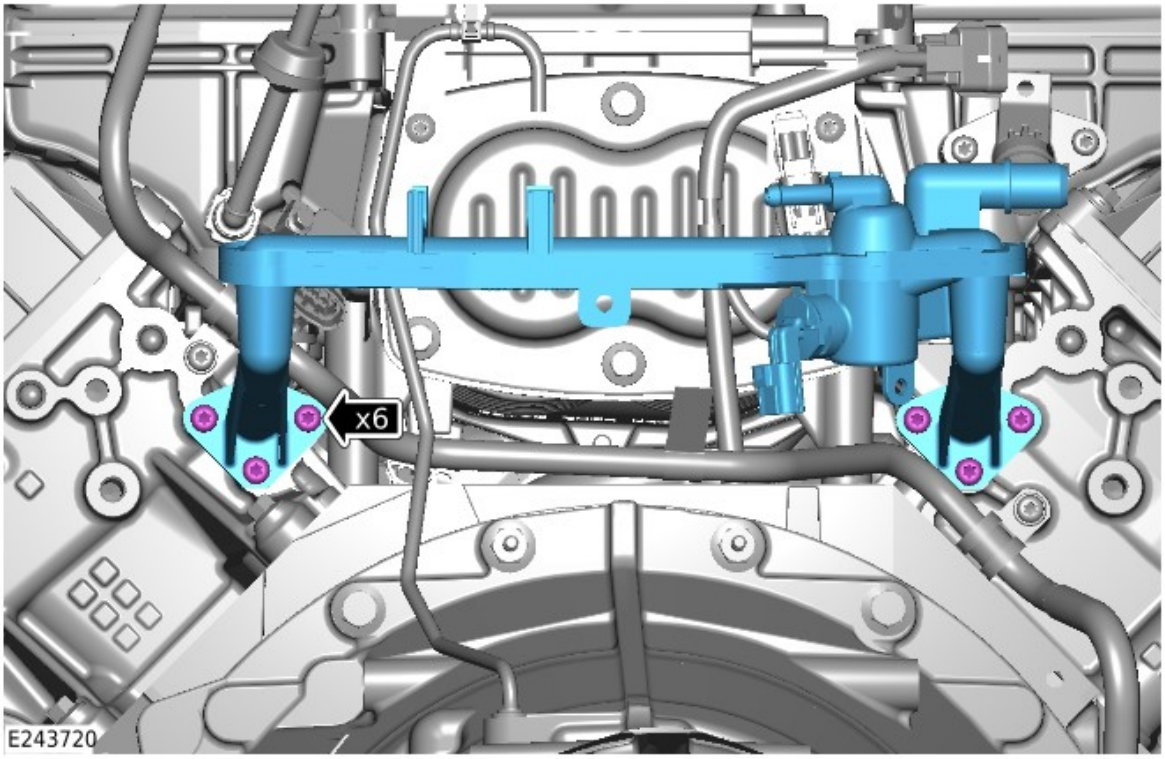
**12.**




Release the wiring harness clip from the left side of the rear coolant manifold.

---

**13.**



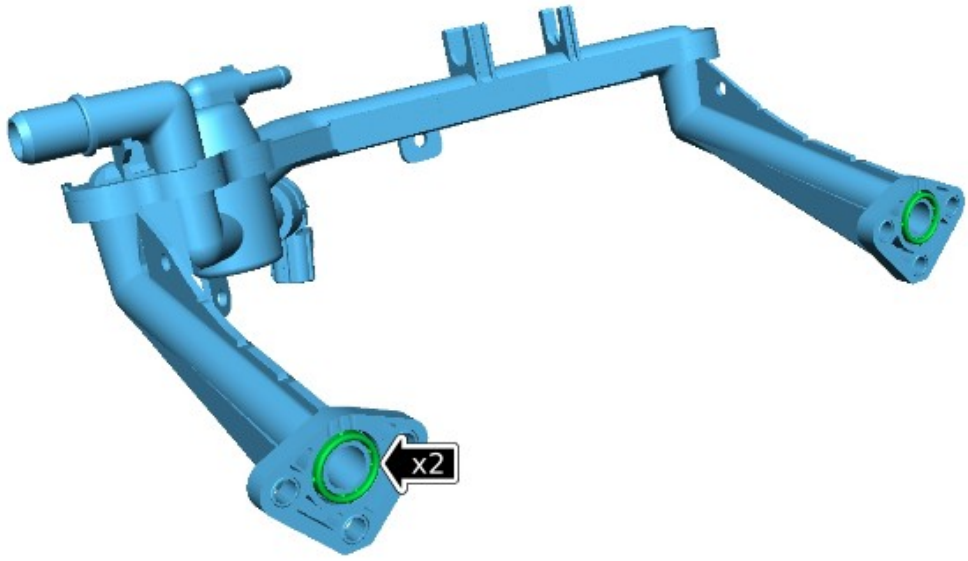

- Remove the 6 bolts.
- Remove the rear coolant manifold.

---

14.

**NOTE:**

This step is only required if new components are not installed.




E243421

Remove and discard the 2 O-ring seals.

## INSTALLATION

1.

**NOTE:**

This step is only required if new components are not installed.

Install 2 new O-ring seals to the rear coolant manifold.

*Renew Part:* *Cylinder block coolant outlet O-ring seals* *Quantity:* *2*.

2.

- Install the rear coolant manifold.
- Install and tighten the 6 bolts.

  *Torque*: **9Nm**

3. Install the wiring harness clip to the left side of the rear coolant manifold.

4.
- Connect the electrical connector.
- Install the 2 wiring harness clips to the right side of the rear coolant manifold.

5.
- Connect the rear coolant manifold left hose.
- Install the coolant hose clip.

6.
- Install the coolant hose bracket.
- Install and tighten the bolt.
  *Torque*: **12Nm**
- Install the wiring harness clip.

7.
- Install the rear coolant manifold right hose.
- Connect the 2 coolant hose connectors.

8. Install and tighten the bolt to the coolant hose bracket.
   *Torque*: **12Nm**

9.
- Reposition the wiring harness into the correct location.
- Install and tighten the 2 bolts.
  *Torque*: **9Nm**

10. Install the vacuum pipe to the clip.

11. Install the secondary bulkhead right panel.
    Refer to: Secondary Bulkhead Right Panel (501-02 Front End Body Panels, Removal and Installation).

12. Install the secondary bulkhead left panel.
    Refer to: Secondary Bulkhead Left Panel (501-02 Front End Body Panels, Removal and Installation).

13. Vacuum fill the coolant system.
    Refer to: Cooling System Partial Draining and Vacuum Filling (303-03A Engine Cooling - V8 N/A 5.0L Petrol/V8 S/C 5.0L Petrol, General Procedures).

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0OTowOS4wODBaOzEwNC4yLjM5LjExOtNBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 09-JUN-2014
2013.0 XJ RANGE (X351), 303-03D

# ENGINE COOLING - V6 S/C 3.0L PETROL

# RADIATOR [G1557004]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| 26.40.01 | RADIATOR ASSEMBLY - RENEW | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 3.10 | USED WITHINS | + |
| 26.40.14 | SUPER CHARGER RADIATOR - RENEW | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 2.30 | USED WITHINS | + |

## REMOVAL

**NOTES:**

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNING:**

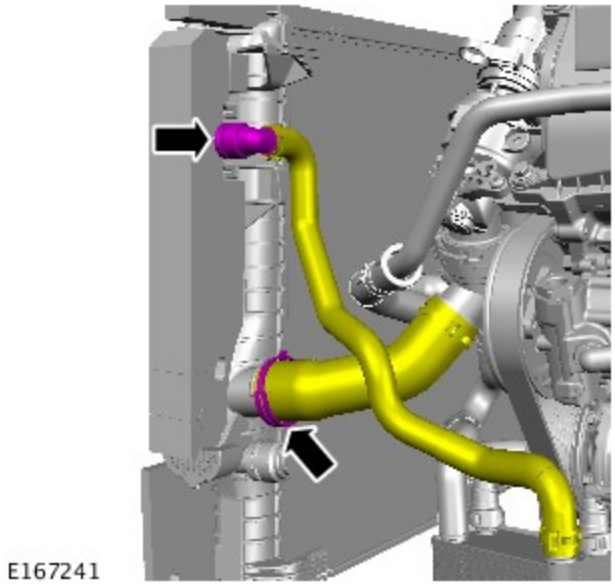
   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

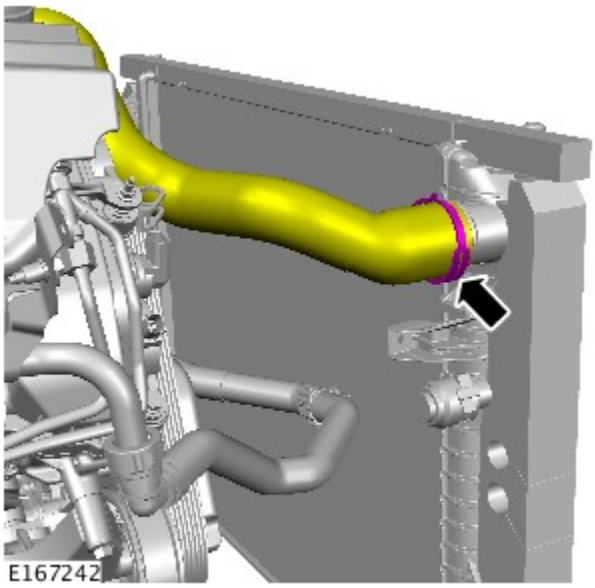
2. Refer to: Electric Cooling Fan and Shroud (303-03C Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).

3. Refer to: Radiator (303-03D Supercharger Cooling - V6 S/C 3.0L Petrol, Removal and Installation).

4.



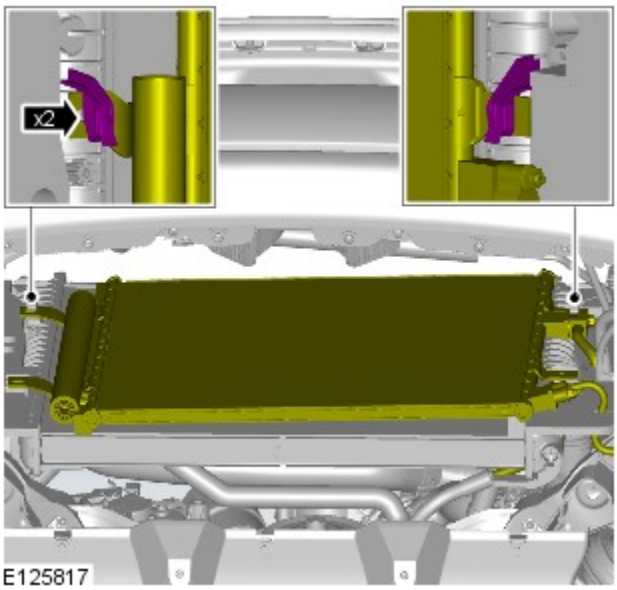

5.



6.

**NOTE:**

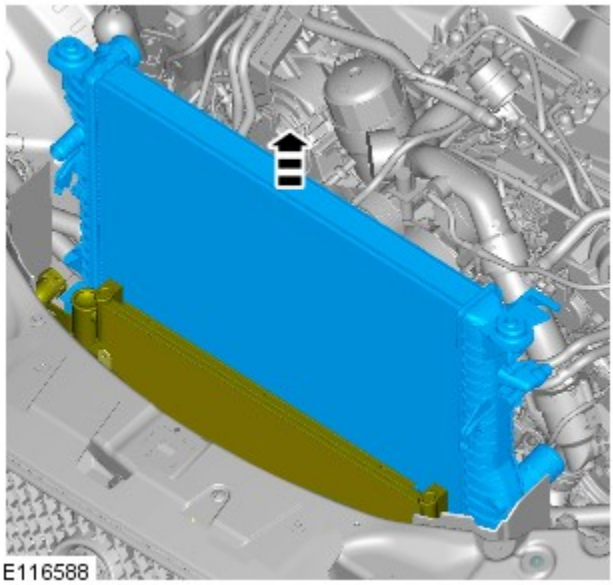
Support the air conditioning (A/C) condenser.




7.

**NOTE:**

Always protect the cooling pack elements to prevent accidental damage.



## INSTALLATION

1. To install, reverse the removal procedure.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0NjozMS4yOTBaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 23-JUL-2021
2013.0 XJ RANGE (X351), 303-03D

# ENGINE COOLING - V6 S/C 3.0L PETROL

# COOLANT PUMP [G1557003]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| 26.50.26 | SUPERCHARGER COOLANT PUMP - RENEW | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 2.10 | USED WITHINS | + |
| 26.50.01 | COOLANT PUMP - RENEW | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 1.70 | USED WITHINS | + |

## PART[S]

| STEP | PART NAME | QUANTITY |
|---|---|---|
| Installation Step 2 | Engine coolant pump gasket | 2 |
| Installation Step 2 | Oil cooler O-ring seals | 2 |

## REMOVAL

**NOTES:**

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNING:**

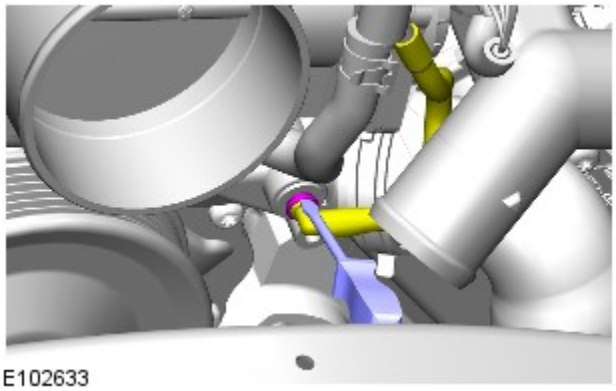
   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

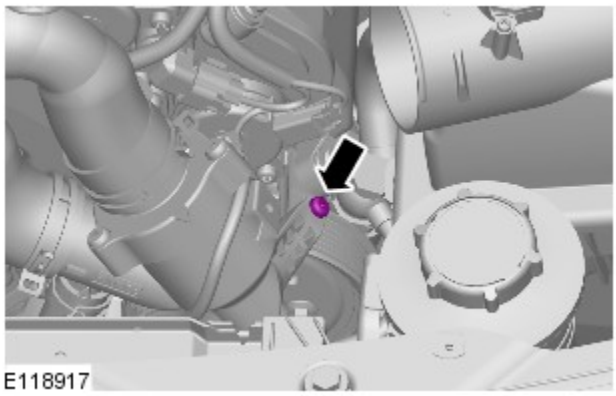
2. Refer to: Cooling System Partial Draining and Vacuum Filling (303-03C Engine Cooling - V6 S/C 3.0L Petrol, General Procedures).

3. Refer to: Accessory Drive Belt (303-05C Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

4.

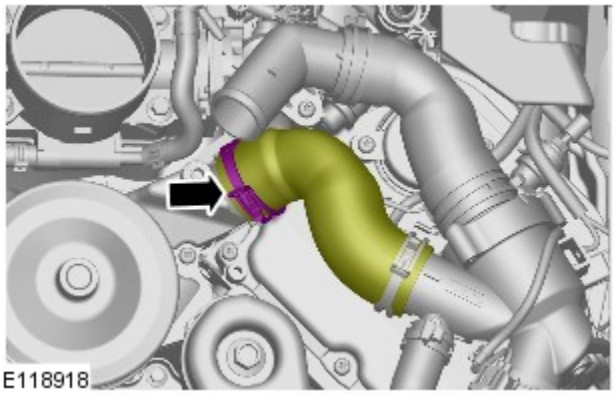

E102633

5.

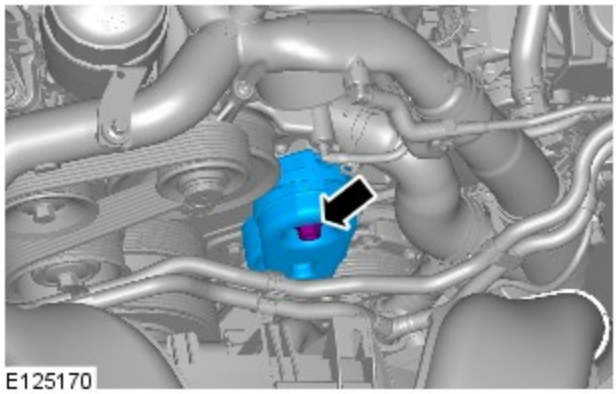

E118917

*Torque*: **10Nm**

6.


E118918

7.




*Torque*: **47Nm**

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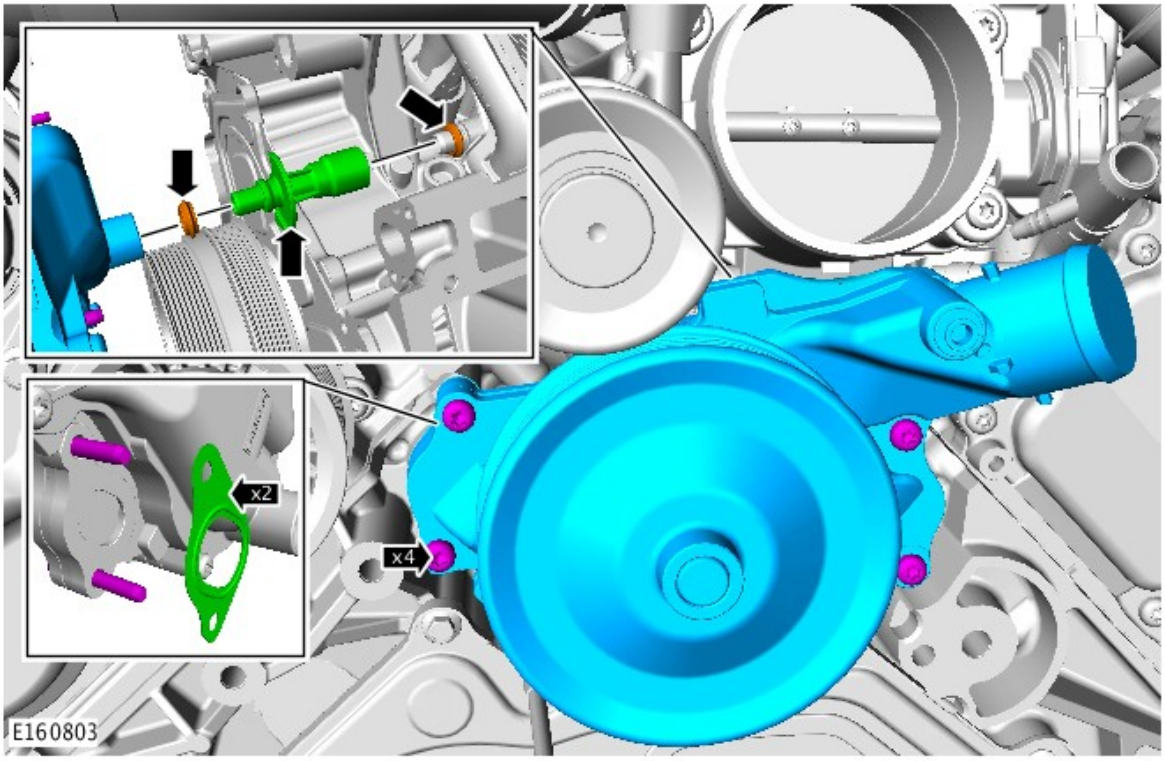
8.

**WARNING:**

Fluid loss is unavoidable, use absorbent cloth or a container to collect the fluid.

**CAUTION:**

Engine coolant will damage the paint finished surfaces. If spilt, immediately remove the coolant and clean the area with water.



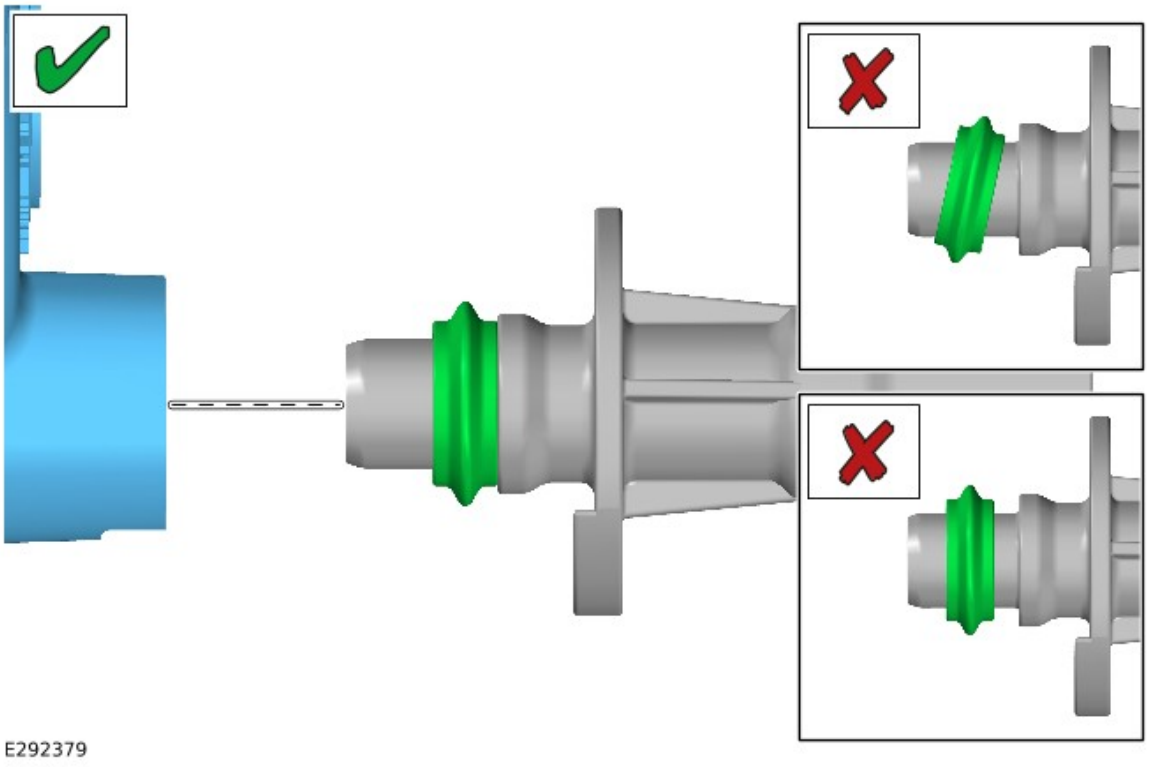

*Torque*: **12Nm**

## INSTALLATION

1.

**CAUTION:**

Observe correct installation of the coolant pump to oil cooler tube o-ring seals. Failure to do so may result in coolant loss.




Make sure that the coolant pump to oil cooler tube o-ring seals are correctly installed.

2.

**CAUTIONS:**

- Make sure that the gaskets are correctly located.
- Install new o-ring seals.
- Install all the bolts finger tight before final tightening.

**NOTE:**

Install new gaskets.

To install, reverse the removal procedure.

*Renew Part:* *Oil cooler O-ring seals* *Quantity:* *2*.

*Renew Part:* *Engine coolant pump gasket* *Quantity:* *2*.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0NToyOS4xNTBaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 24-JUL-2018
2013.0 XJ RANGE (X351), 303-03D

# ENGINE COOLING - V6 S/C 3.0L PETROL

# COOLING MODULE [G1557002]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| 26.40.16 | COOLING MODULE - RENEW | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 2.50 | USED WITHINS | + |

## REMOVAL

**NOTES:**

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

2. Refer to: Air Conditioning System Recovery, Evacuation and Charging (412-00 Climate Control System - General Information, General Procedures).

3. Refer to: Cooling System Partial Draining and Vacuum Filling (303-03C Engine Cooling - V6 S/C 3.0L Petrol, General Procedures).

4. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

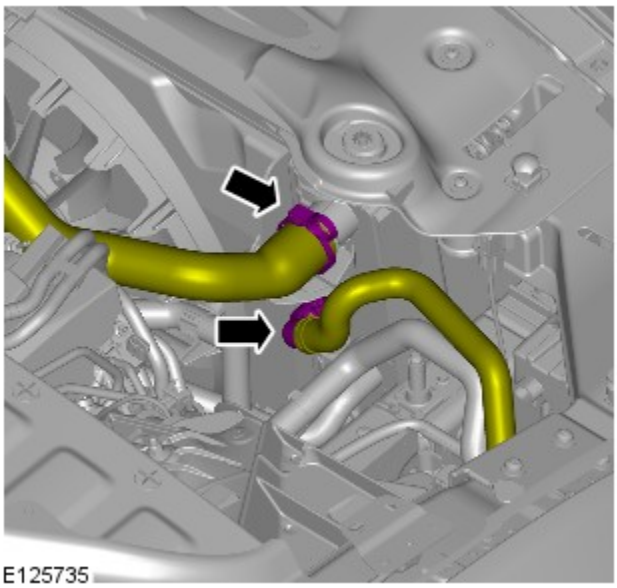
5. Refer to: Left Air Cleaner (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

6. Refer to: Right Air Cleaner (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

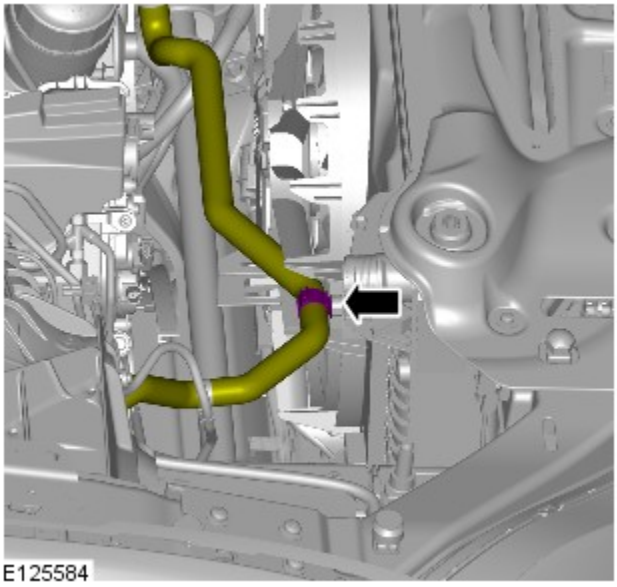
7. Refer to: Left Air Cleaner Outlet Pipe (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

8. Refer to: Right Air Cleaner Outlet Pipe (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

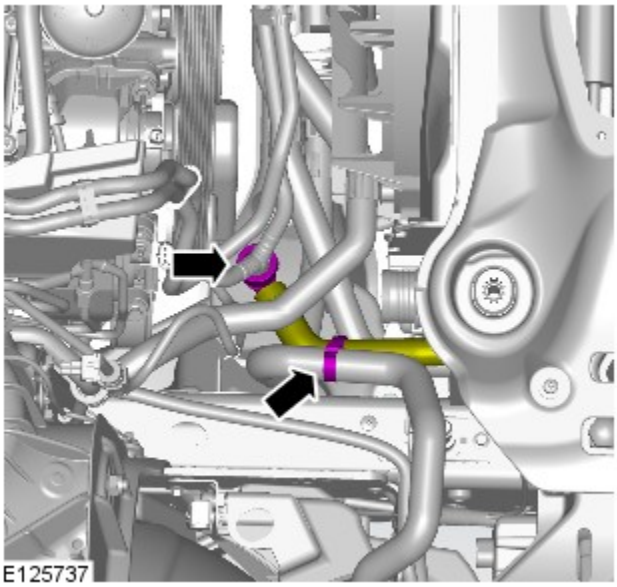
9.


E125735

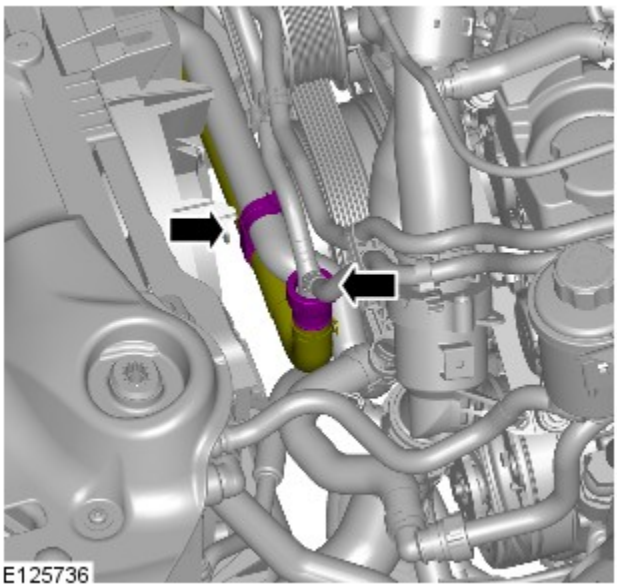
10.


E125584

**11.**



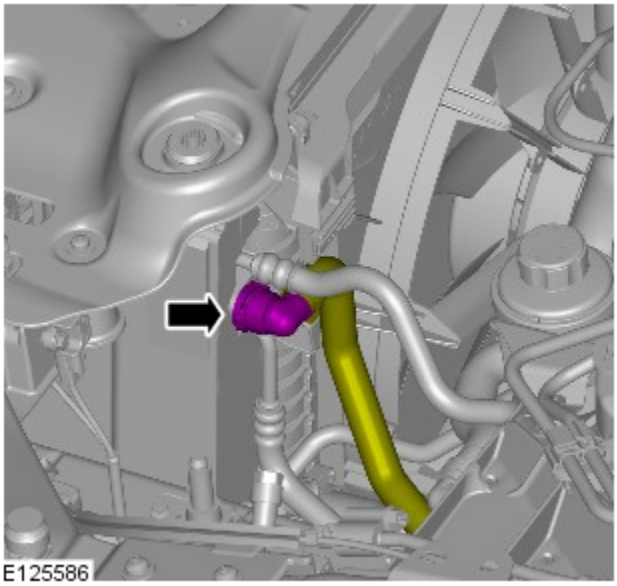

**12.**



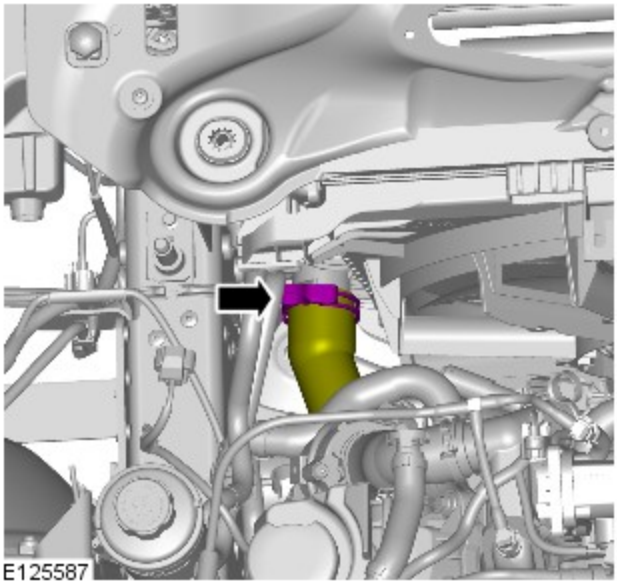
**13.**

**CAUTION:**

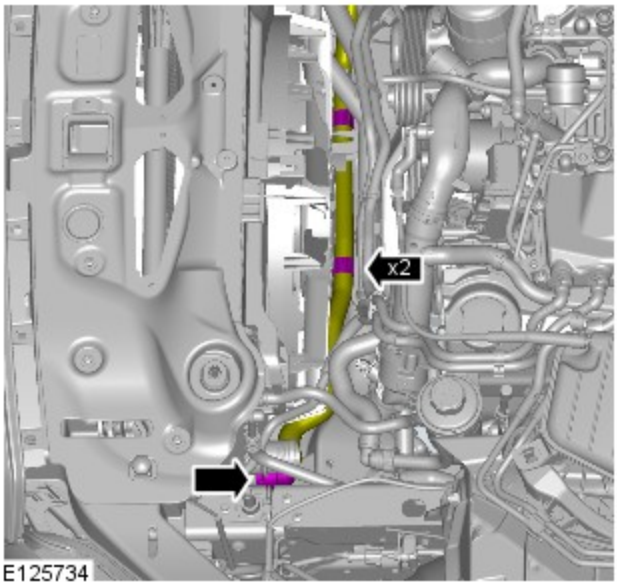
Be prepared to collect escaping coolant.


E125586

**14.**


E125587

**15.**

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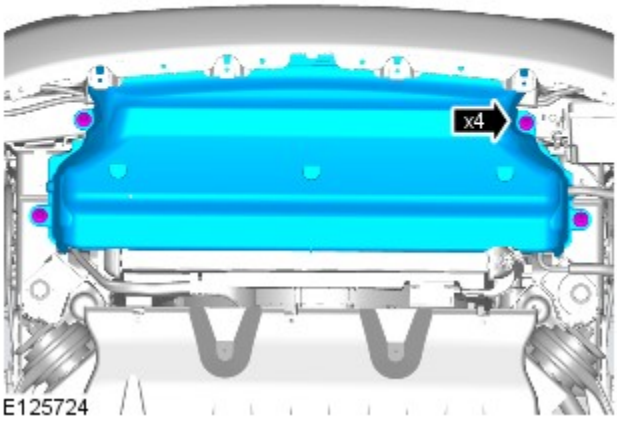
**16.**

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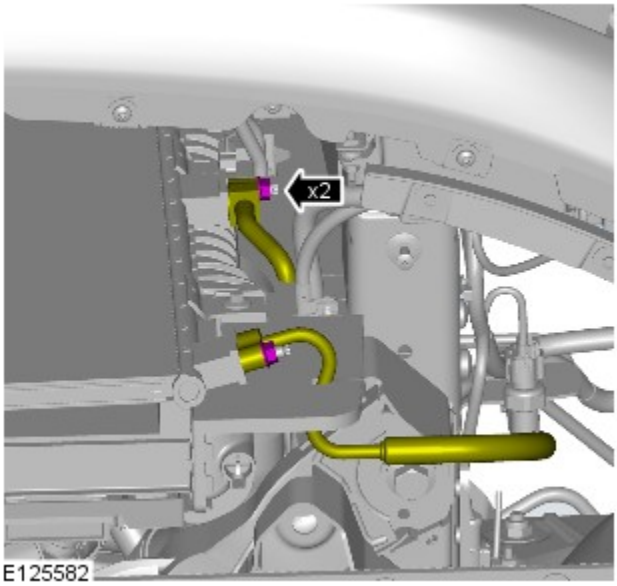
**17.**

**NOTES:**

- Remove and discard the O-rings.
- Install new O-ring seals.




*Torque*: **8Nm**

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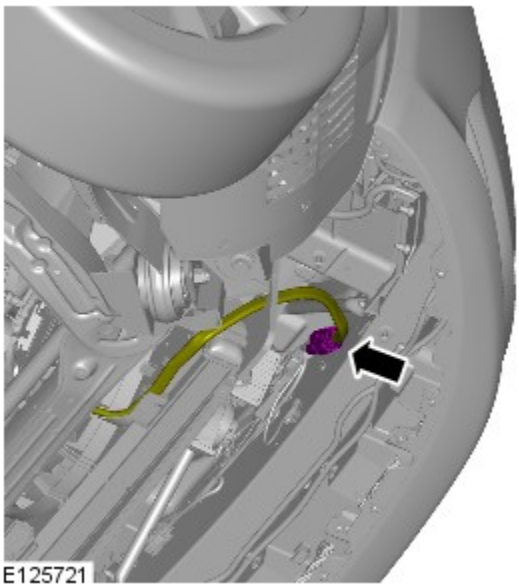
**18.**

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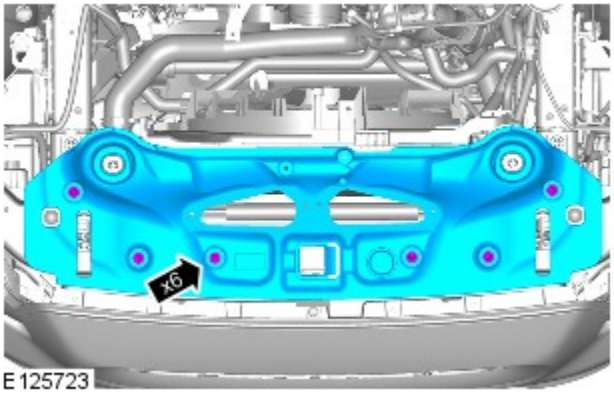
**19.**

**NOTE:**

Some variation in the illustrations may occur, but the essential information is always correct.




*Torque*: **9Nm**

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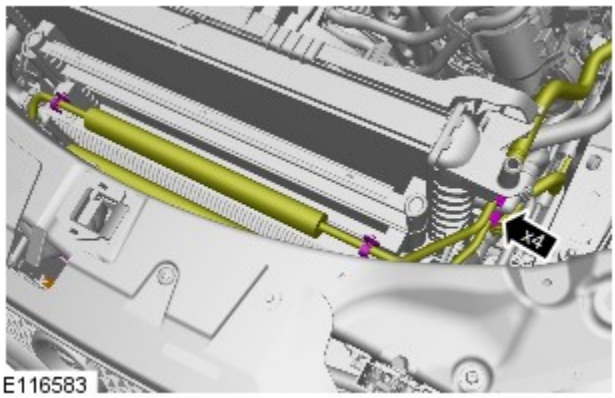
**20.**

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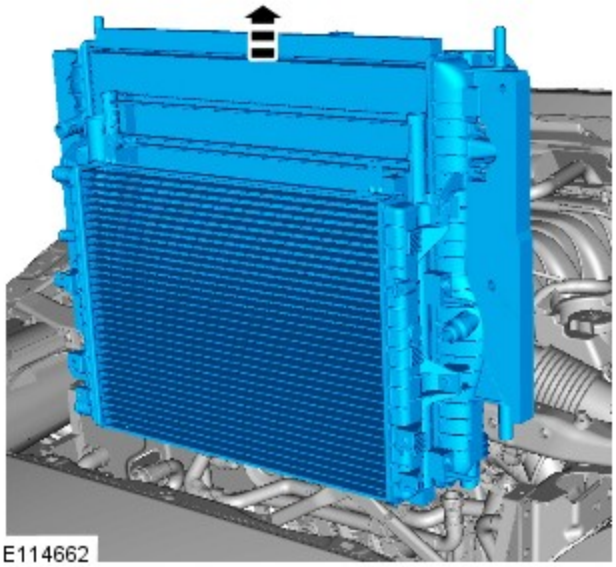
**21.**




## INSTALLATION

**1.** To install, reverse the removal procedure.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0NDozMC4xNDdaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 24-JUL-2018
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# ELECTRIC COOLING FAN AND SHROUD [G1557001]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| 26.25.25 | FAN AND MOTOR UNIT - RENEW - VEHICLE SET | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 2.00 | USED WITHINS | + |

## REMOVAL

**NOTES:**

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

2. Refer to: Radiator Splash Shield (501-02 Front End Body Panels, Removal and Installation).

3. Refer to: Engine Undershield (501-02 Front End Body Panels, Removal and Installation).

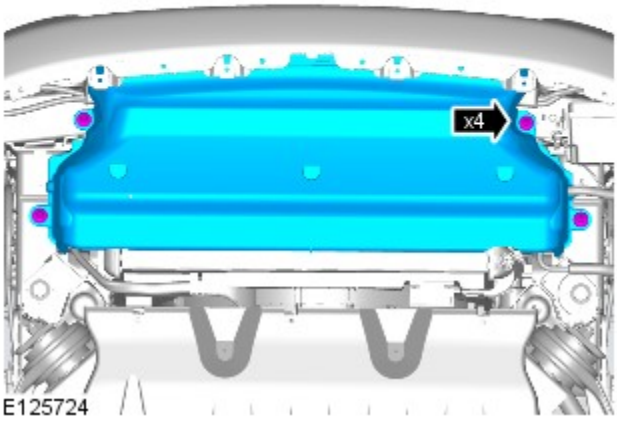
4. Refer to: Left Air Cleaner (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

5. Refer to: Right Air Cleaner (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

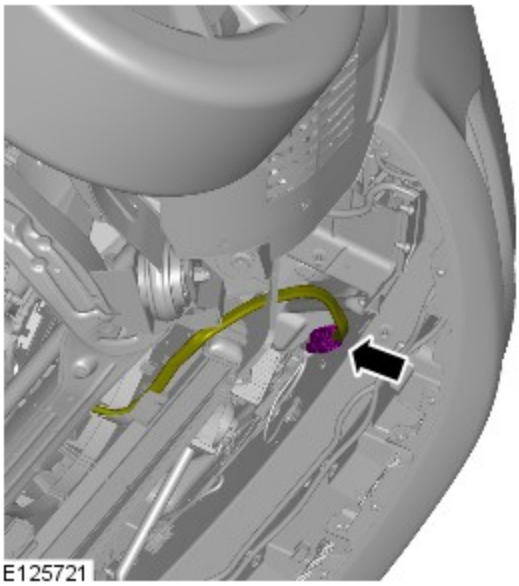
6. Refer to: Left Air Cleaner Outlet Pipe (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

7. Refer to: Right Air Cleaner Outlet Pipe (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

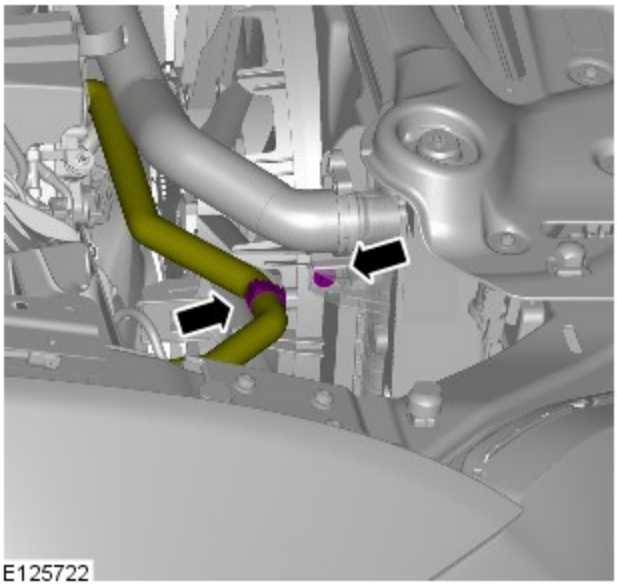
8.




9.



**10.**




*Torque*: **7Nm**

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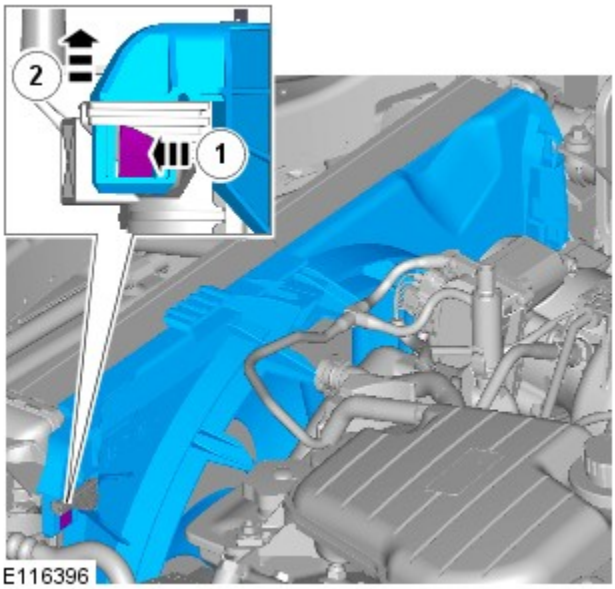
**11.**

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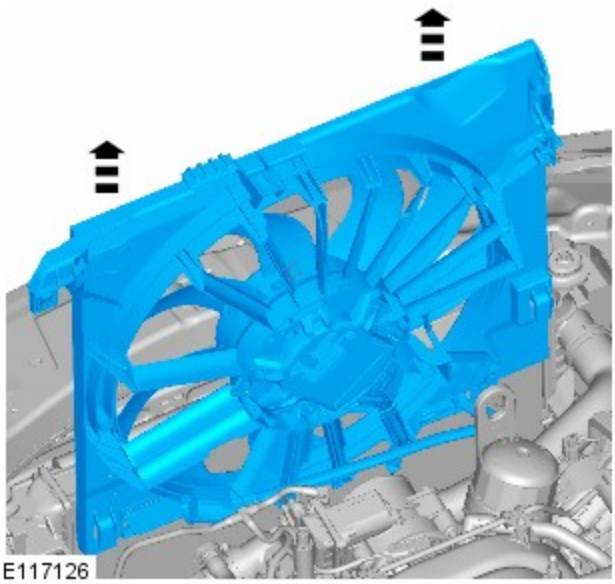
**12.**




## INSTALLATION

**1.** To install, reverse the removal procedure.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0MzoyOC40MDJaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 26-FEB-2016
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# COOLANT EXPANSION TANK [G1269155]

**REMOVAL AND INSTALLATION**

| | | | | | |
|---|---|---|---|---|---|
| 26.15.01 | COOLANT EXPANSION TANK - RENEW | 3000 CC, AJ V6 (AJ126), SUPERCHARGED | 0.30 | USED WITHINS | + |

## REMOVAL

**NOTE:**

Removal steps in this procedure may contain installation details.

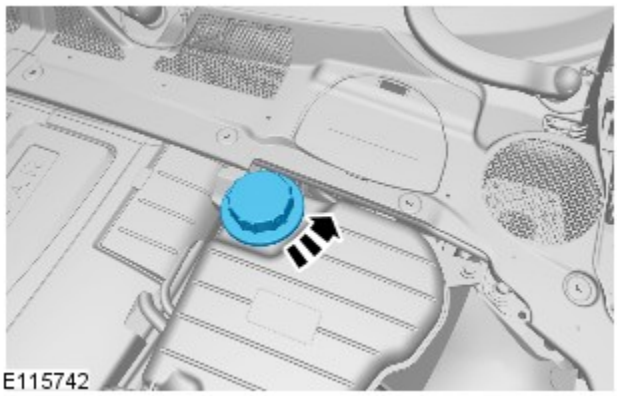
1.

**WARNINGS:**

- Release the cooling system pressure by slowly turning the coolant expansion tank cap a quarter of a turn. Cover the expansion tank cap with a thick cloth to prevent the possibility of scalding. Failure to follow this instruction may result in personal injury.
- Be prepared to collect escaping fluid.

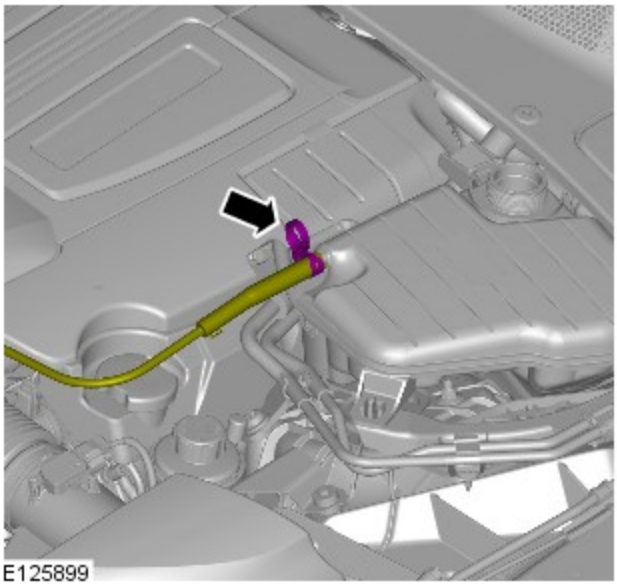
**CAUTIONS:**

- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure
- Correct installation of the coolant expansion tank cap can be obtained by tightening the cap until 3 audible clicks are heard.

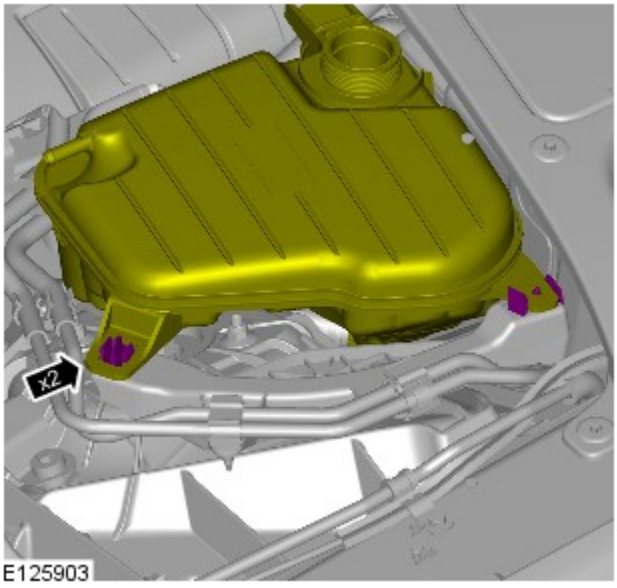



2. Using a syringe, remove the cooling fluid from the expansion tank.

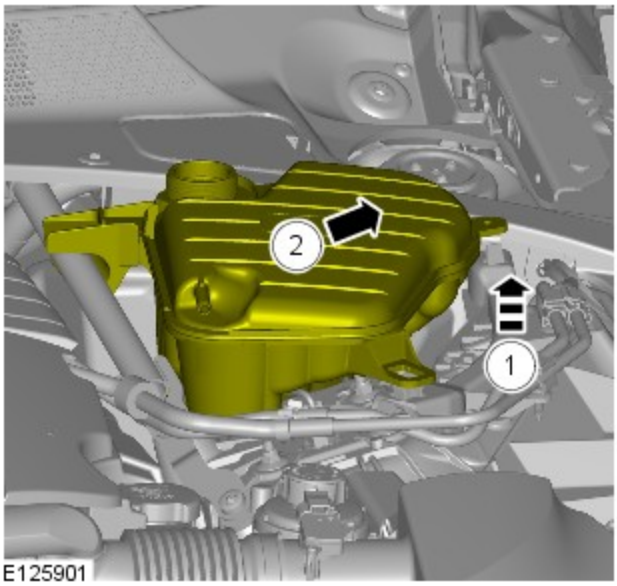
3.




4.



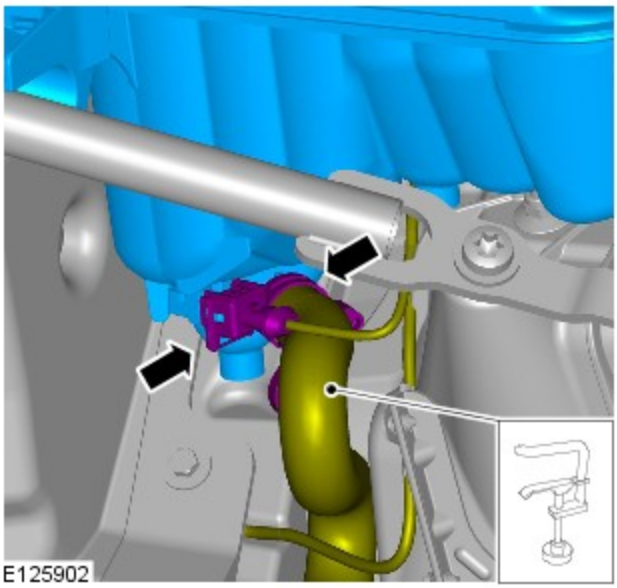
5.




6.

**CAUTION:**

Be prepared to collect escaping coolant.




## INSTALLATION

1. To install, reverse the removal procedure.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0MjoxNy42NDhaOzEwNC4yLjM5LjExOi0tNBSldKMUNENEQ4VjUyNDc1

PUBLISHED: 26-JUL-2012
2013.0 XJ RANGE (X351), 303-03D

## ENGINE COOLING - V6 S/C 3.0L PETROL

# AUXILIARY RADIATOR [G1557000]

### REMOVAL AND INSTALLATION

### REMOVAL

**NOTES:**

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

2. Refer to: Right Air Cleaner (303-12B Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

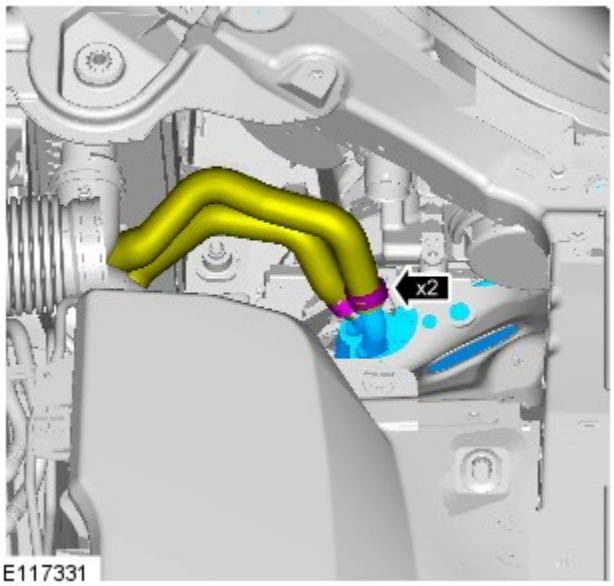
3. Refer to: Cooling System Partial Draining and Vacuum Filling (303-03C Engine Cooling - V6 S/C 3.0L Petrol, General Procedures).

4. Refer to: Fender Splash Shield (501-02 Front End Body Panels, Removal and Installation).

5.

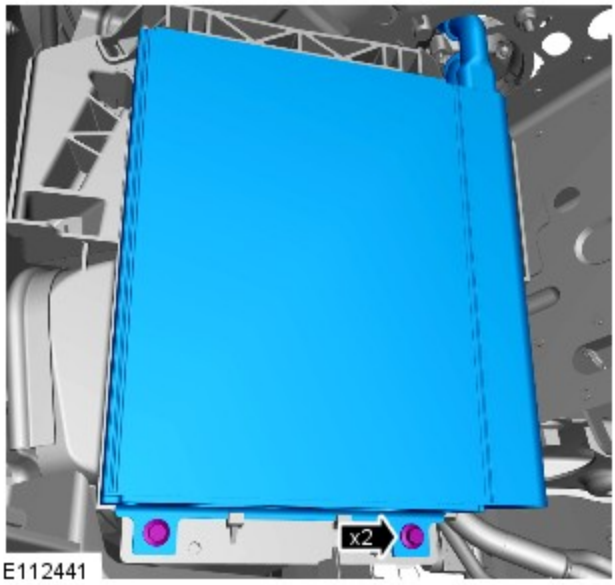
**CAUTION:**

Be prepared to collect escaping coolant.



E117331

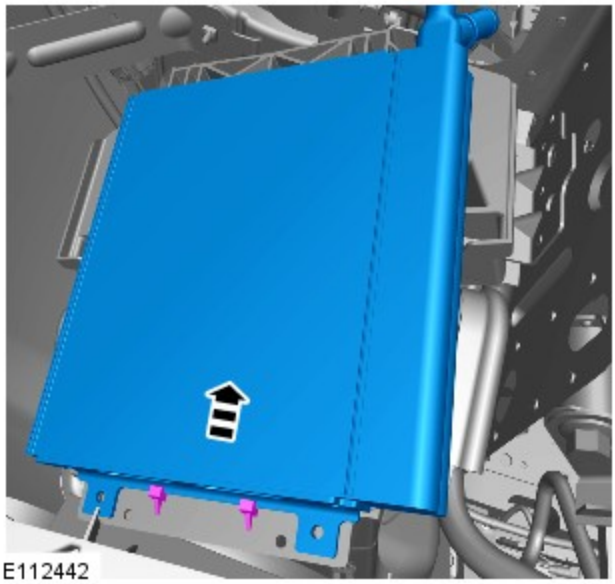
6.



E112441

*Torque*: **9Nm**

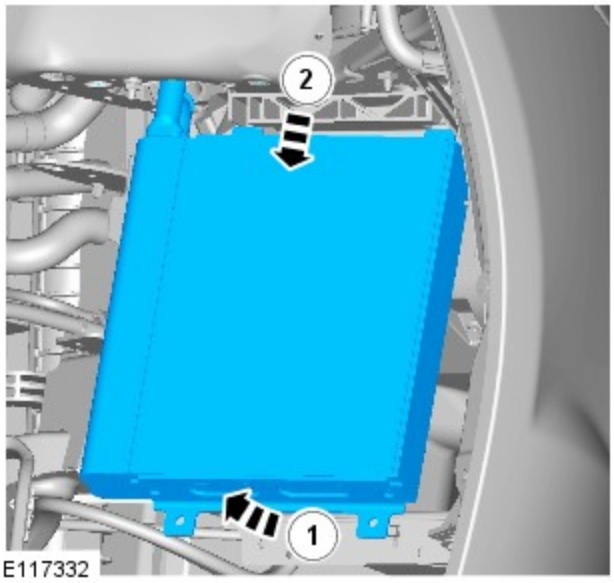
7.


E112442

8.

**CAUTION:**

Be prepared to collect escaping coolant.



E117332

## INSTALLATION

1. To install, reverse the removal procedure.

YmFyYWsuZ3JpZmZpbkBnbWFpbC5jb207MjAyMy0wMi0yMFQxMzo0MToyMC4yMTNaOzEwNC4yLjM5LjExO1NBSldKMUNENEQ4VjUyNDc1