

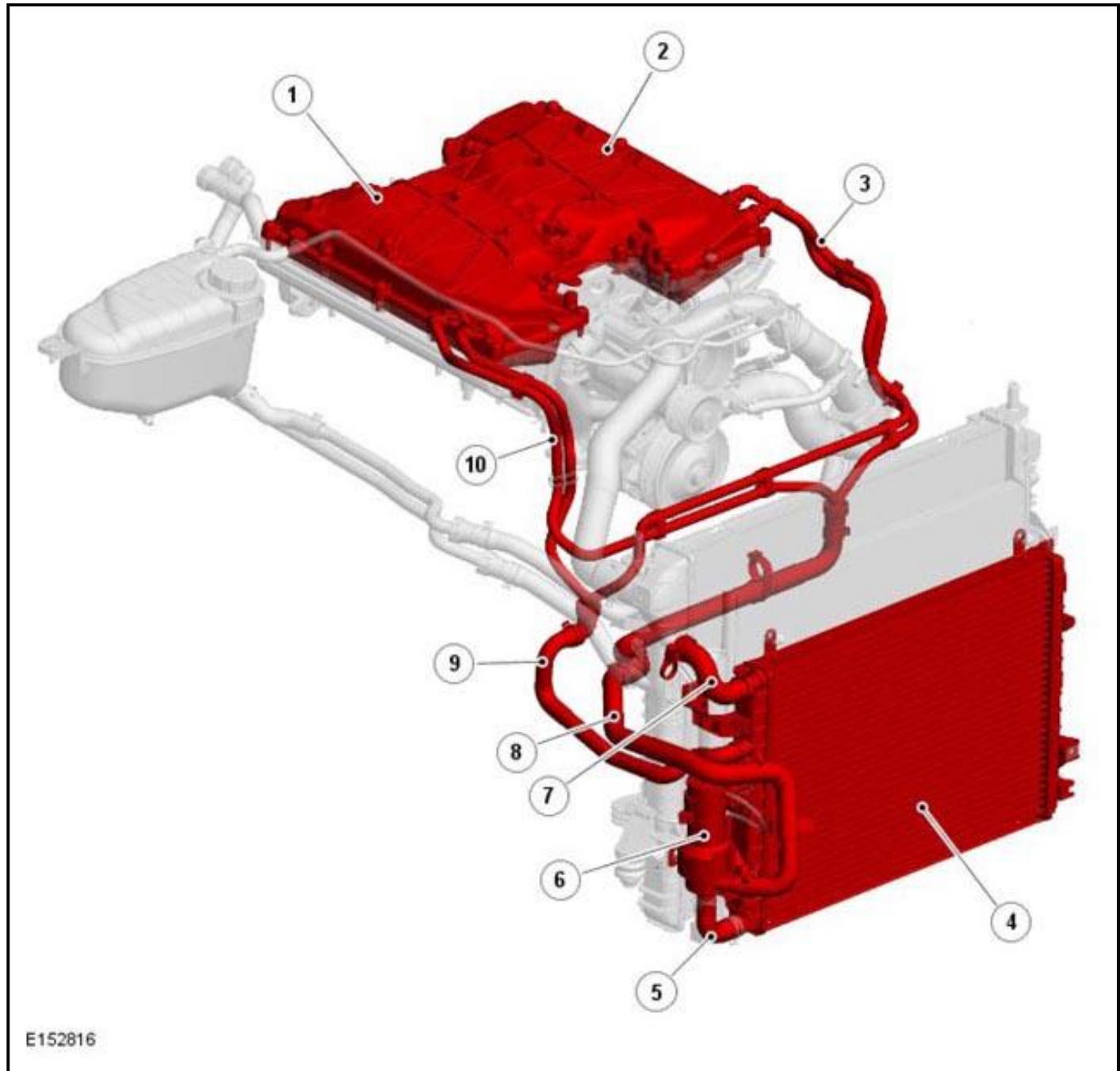
## 2018 ENGINE

### Supercharger Cooling - V8 S/C 5.0L Petrol - F-Type/X152

## SUPERCHARGER COOLING - V8 S/C 5.0L PETROL

### DESCRIPTION AND OPERATION

### COMPONENT LOCATION



E152816

ITEM	DESCRIPTION
1	Right Charge Air Cooler Assembly
2	Left Charge Air Cooler Assembly
3	Supply and Return Hoses to Left Supercharger Charge Air Coolers
4	Charge Air Radiator

ITEM	DESCRIPTION
5	Charge Air Radiator Return Hose
6	Charge Air Coolant Pump
7	Engine Cooling System Connecting Hose
8	Return Hose from Supercharger Charge Air Coolers
9	Supply Hose from Charge Air Coolers
10	Supply and Return Hoses to Right Supercharger Charge Air Coolers

**OVERVIEW**

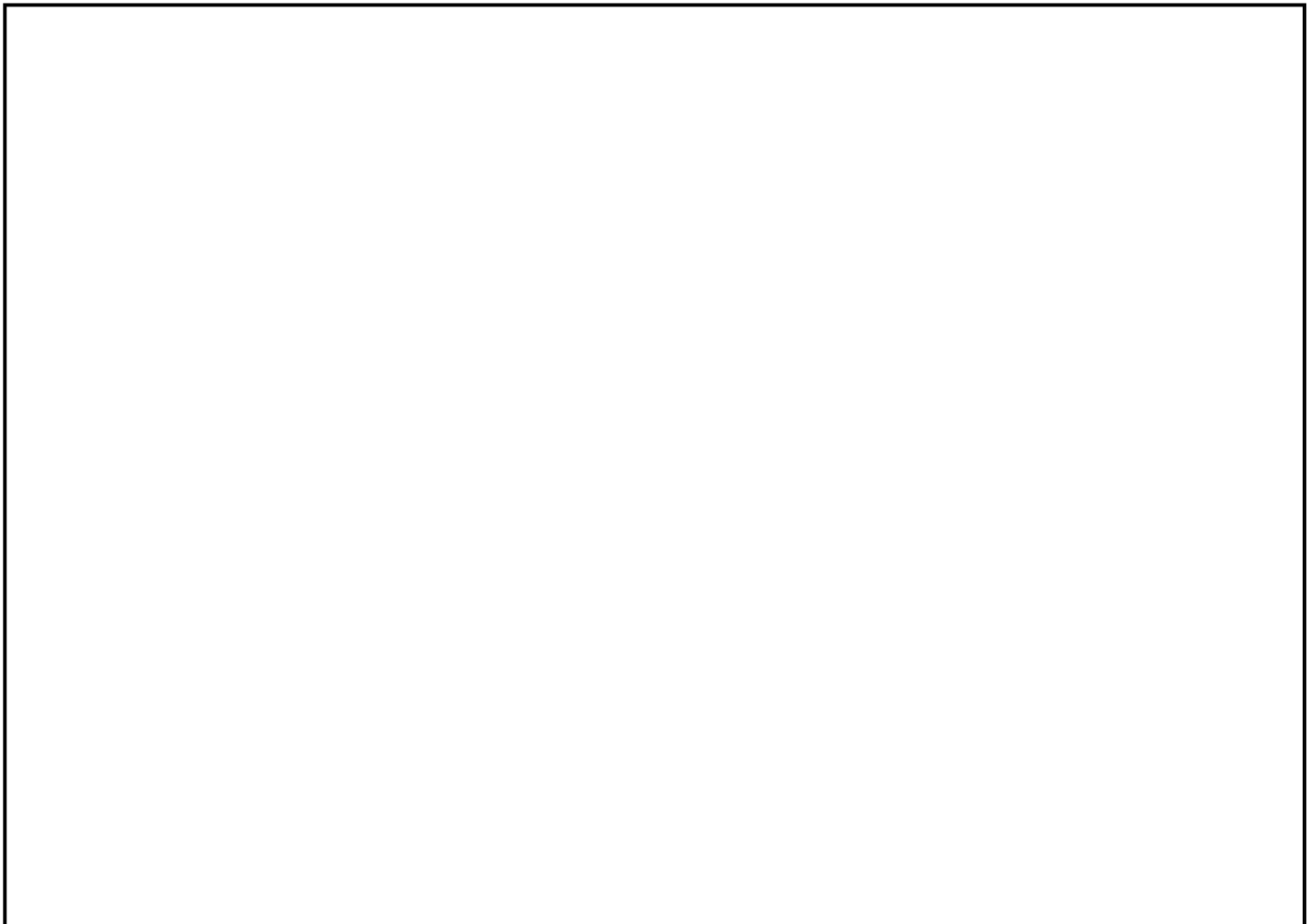
The supercharger cooling system cools the pressurized charge air from the supercharger. The supercharger cooling system consists of:

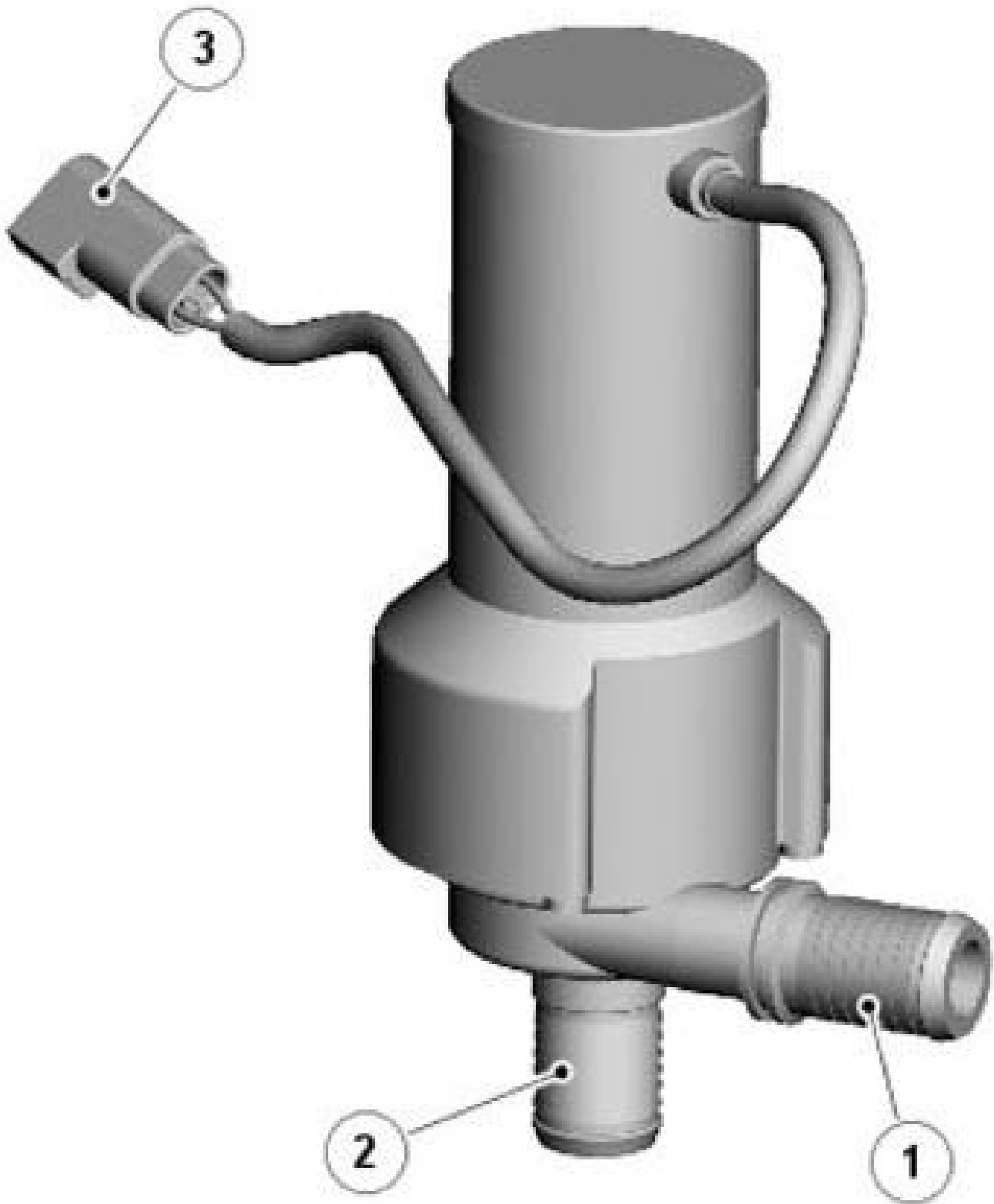
- A Charge Air Coolant Pump
- A Charge Air Radiator
- Two Charge Air Coolers
- Connecting Hoses and Pipes

The supercharger cooling system is operationally independent of the engine cooling system, but connected to it by a hose installed between the charge air radiator and the radiator of the engine cooling system. The connection with the engine cooling system accommodates thermal expansion and retraction of the coolant in the supercharger cooling system, and enables filling and draining of the supercharger cooling system

**COMPONENT DESCRIPTION**

**CHARGE AIR COOLANT PUMP**





E98150

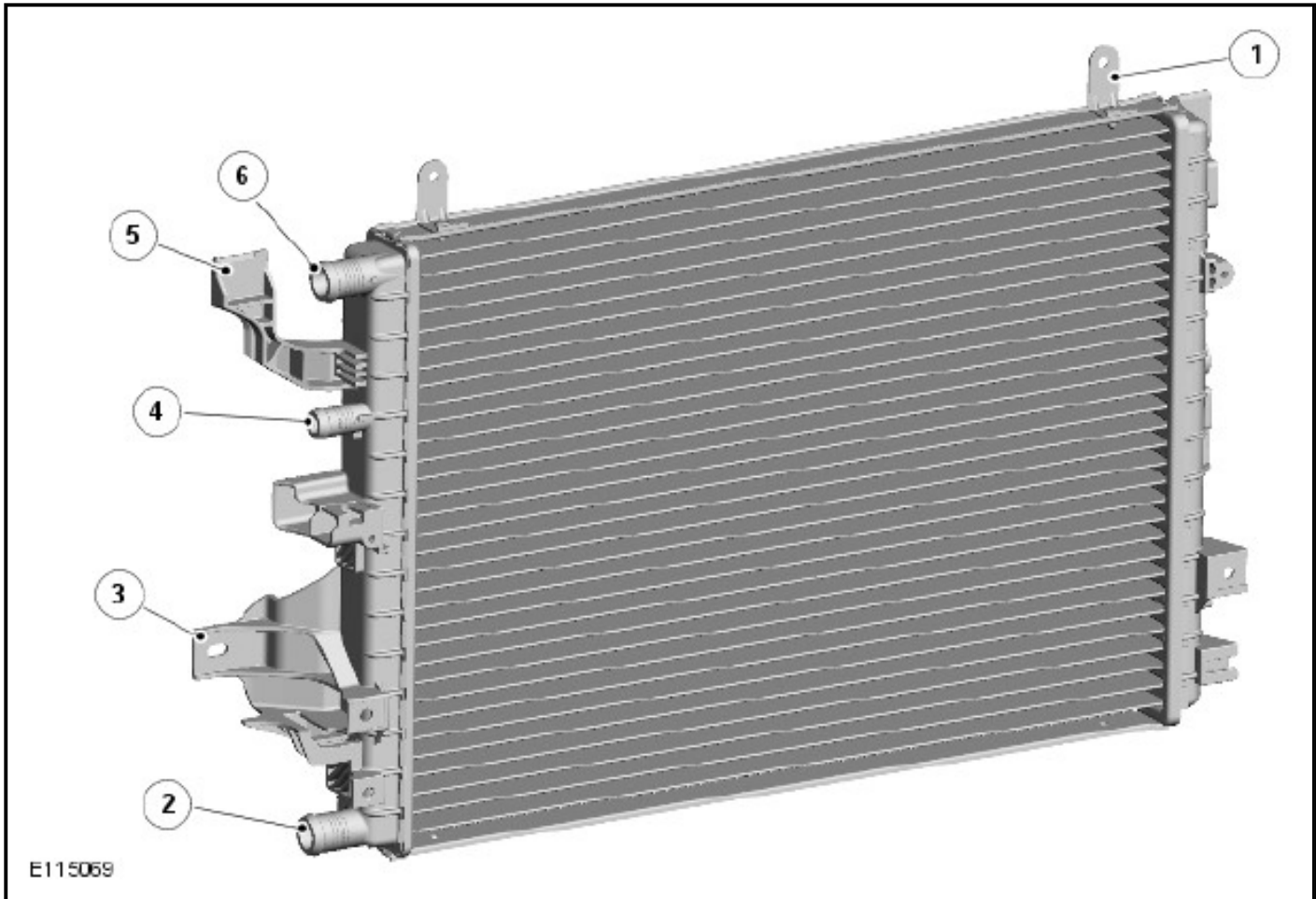
ITEM	DESCRIPTION
1	Coolant Outlet Connection

ITEM	DESCRIPTION
2	Coolant Inlet Connection
3	Electrical Connector

The charge air coolant pump is an electric pump attached to the right side of the charge air radiator. Hoses connect the inlet of the charge air coolant pump to the charge air radiator, and the outlet to the supercharger charge air coolers. An electrical connector provides the interface between the motor of the charge air coolant pump and the vehicle wiring.

The charge air coolant pump receives a fused power supply from a dedicated relay in the EJB (engine junction box). The relay is controlled by the ECM (engine control module).

### CHARGE AIR RADIATOR



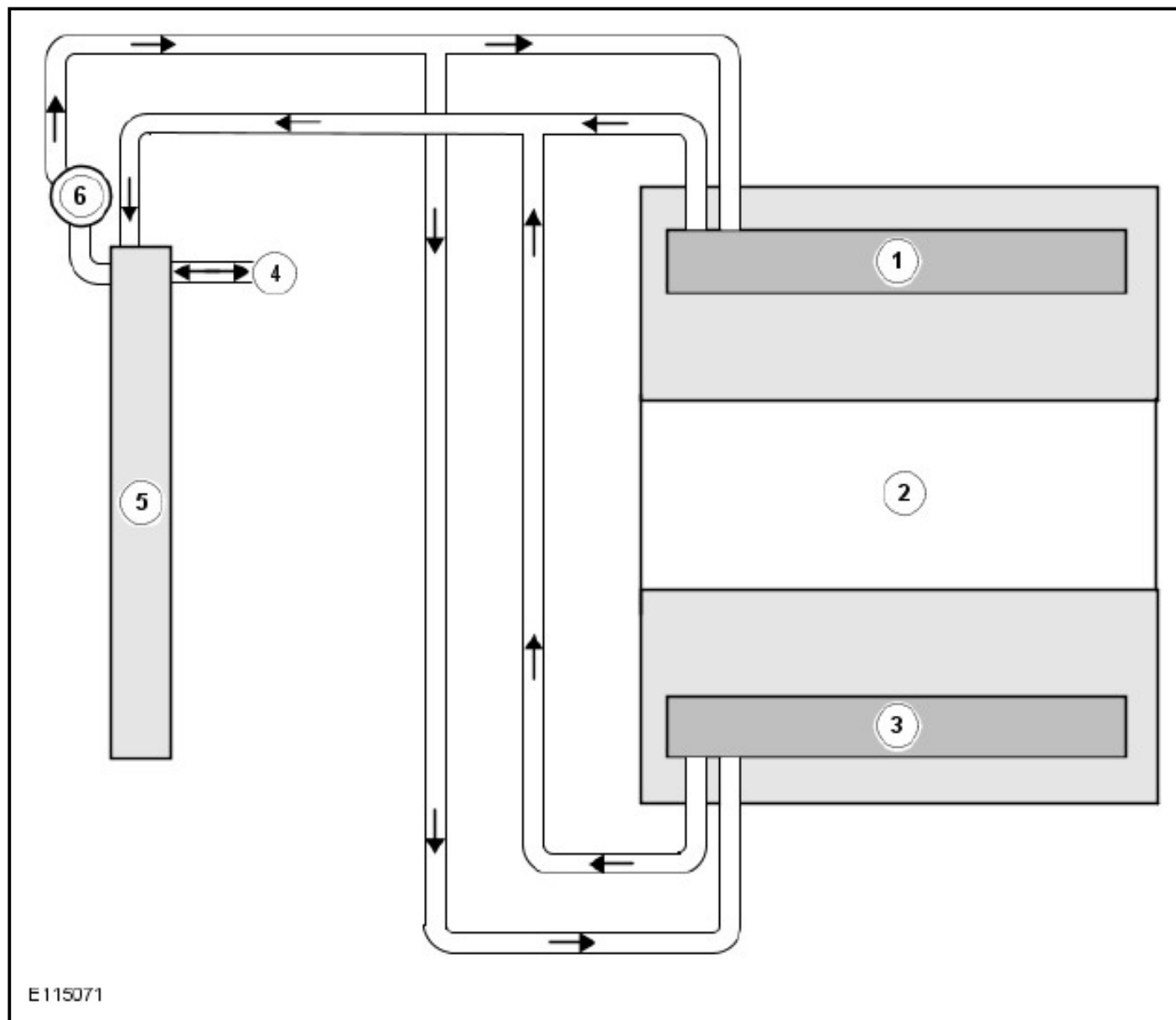
ITEM	DESCRIPTION
1	Pipe Clip Bracket (2 Off)
2	Coolant Outlet Connection
3	Lower Attachment Bracket (2 Off)
4	Coolant Inlet Connection
5	Upper Attachment Bracket (2 Off)
6	Expansion Hose Connection (with engine cooling system)

The charge air radiator is a cross flow type with an aluminum core and plastic end tanks. The charge air radiator is installed in the cooling module, in front of the A/C (air conditioning) condenser. Brackets on the end tanks attach the charge air radiator to the front of the engine cooling system radiator.

The right end tank incorporates the coolant inlet and outlet connections, and a connection for the hose to the engine cooling system. Hoses connect the inlet of the charge air radiator to the supercharger charge air coolers, and the outlet to the charge air coolant pump.

## SYSTEM OPERATION

### Supercharger Cooling Flow Diagram



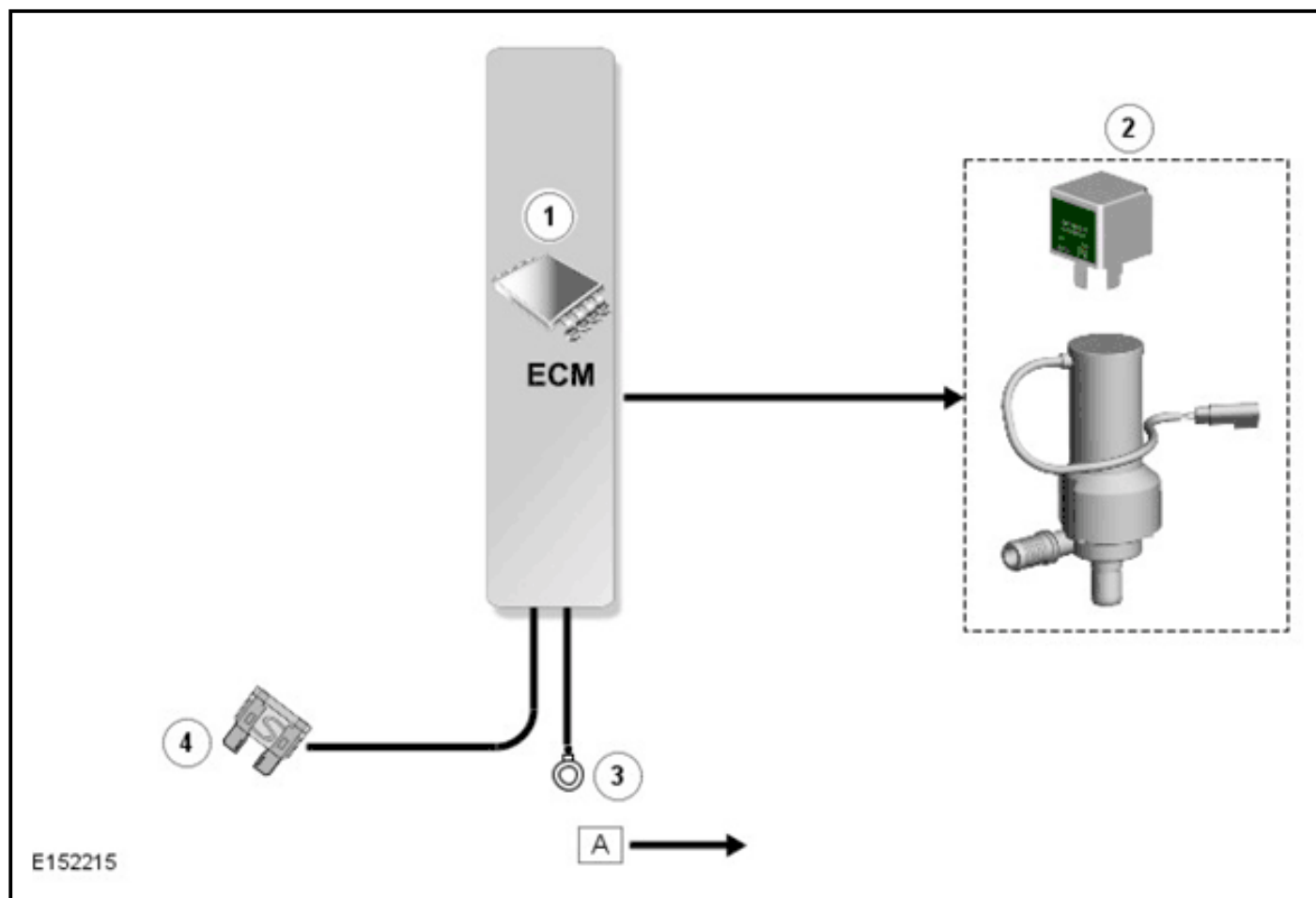
ITEM	DESCRIPTION
1	Right Supercharger Charge Air Cooler
2	Engine
3	Left Supercharger Charge Air Cooler
4	Expansion Hose Connection (with engine cooling system)
5	Charge Air Radiator
6	Charge Air Coolant Pump

Electrical power for the charge air coolant pump is supplied from the charge air coolant pump relay in the EJB. When the charge air coolant pump relay is energized, it connects power from the battery to the charge air coolant pump. Operation of the charge coolant pump relay is controlled by the ECM. The charge air coolant pump relay is energized continuously while the ignition is in power mode 6.

When the charge air coolant pump is running, coolant flows from the pump outlet through the supercharger charge air coolers, to the charge air radiator mounted in front of the engine cooling radiator and back to the pump inlet.

## INPUT AND OUTPUT CONTROL DIAGRAM

**NOTE:** A = Hardwired



ITEM	DESCRIPTION
1	Engine Control Module (ECM)
2	Charge Air Coolant Pump
3	Ground
4	Power Supply

## DIAGNOSIS AND TESTING

### PRINCIPLES OF OPERATION

For a detailed description of the Supercharger Cooling system, refer to the relevant Description and Operation section in the service information. Refer to: [Supercharger Cooling](#) (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.

**NOTE:**

- If a control module or a component is suspect 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.

**Visual Inspection**

1. Verify the customer concern
2. Visually inspect for obvious signs of damage and system integrity

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none"> <li>• Coolant level</li> <li>• Coolant leaks</li> <li>• Coolant hoses/pipes</li> <li>• Coolant expansion tank</li> <li>• Coolant expansion tank cap</li> <li>• Charge air coolant pump</li> <li>• Left charge air cooler</li> <li>• Right charge air cooler</li> <li>• Charge air cooler</li> <li>• Electric fan</li> </ul>	<ul style="list-style-type: none"> <li>• Fuses</li> <li>• Wiring harnesses and connectors</li> <li>• Powertrain control module</li> <li>• Engine coolant temperature sensor</li> <li>• Charge air temperature sensor</li> <li>• Charge air coolant pump</li> </ul>

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 (DTCs) and refer to the DTC Index
5. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

**SYMPTOM CHART**

SYMPTOM	POSSIBLE CAUSES	ACTION

SYMPTOM	POSSIBLE CAUSES	ACTION
Overheating	<ul style="list-style-type: none"> <li>• Coolant leak               <ul style="list-style-type: none"> <li>• Left charge air cooler leaking/damaged</li> <li>• Right charge air cooler leaking/damaged</li> </ul> </li> <li>• Coolant hose damaged</li> <li>• Coolant hose clamp loose/damaged</li> <li>• Charge air cooler leaking/damaged</li> <li>• Charge air coolant pump circuit short circuit to ground, short circuit to power, open circuit, high resistance</li> <li>• Charge air coolant pump failure</li> </ul>	<ul style="list-style-type: none"> <li>• Check for coolant leaks. Perform a cooling system pressure test. Rectify as necessary</li> <li>• Refer to the applicable SYSTEM WIRING DIAGRAM(S) and check the charge air coolant pump circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair the wiring harness or install a new charge air coolant pump as necessary</li> <li>• Install a new charge air coolant pump</li> </ul>

### DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to: [Diagnostic Trouble Code \(DTC\) Index - V8 S/C 5.0L Petrol, DTC: Engine Control Module \(ECM\)](#) (General Information, Description and Operation).

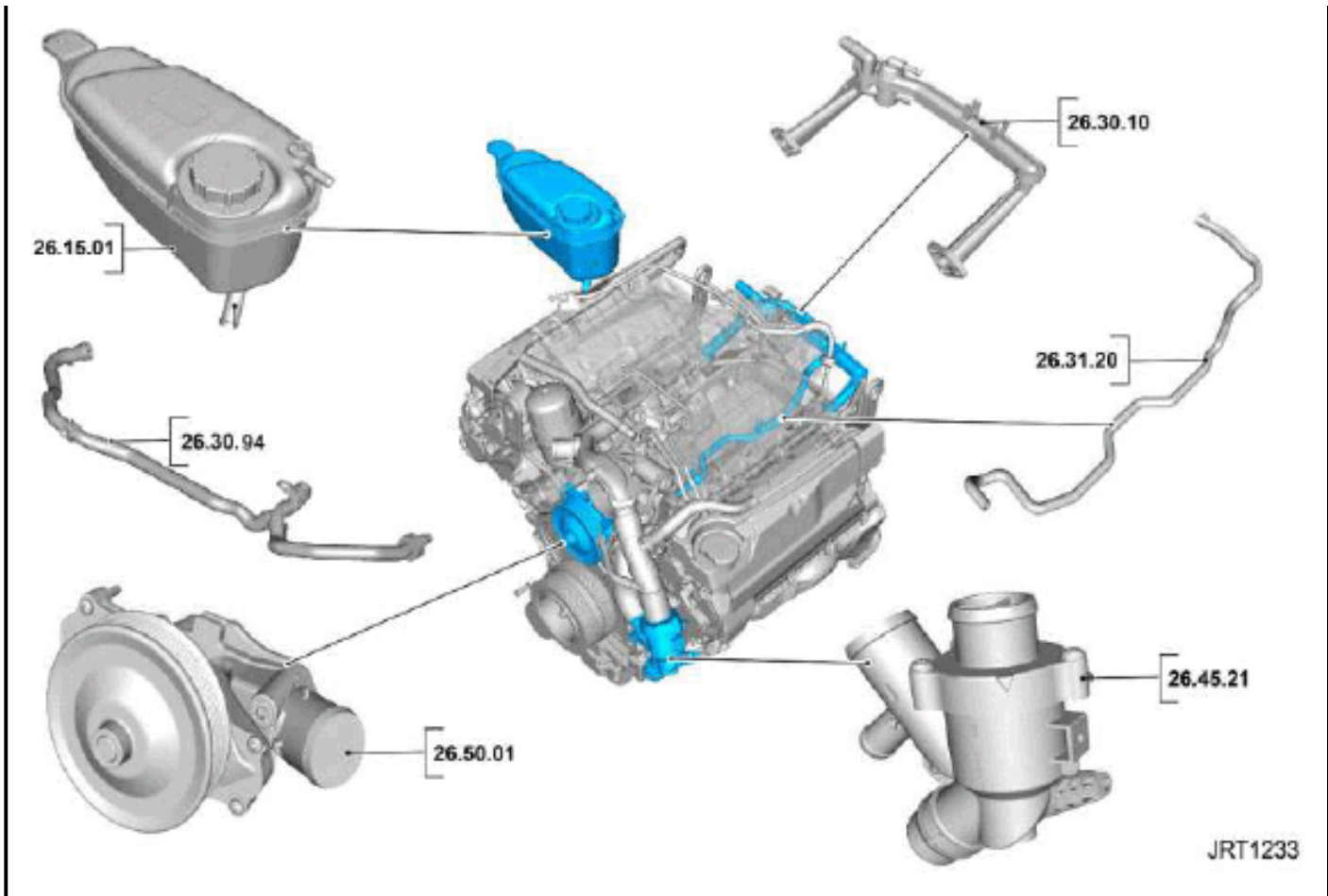
### COOLANT PUMP (G1704757)

#### REMOVAL AND INSTALLATION

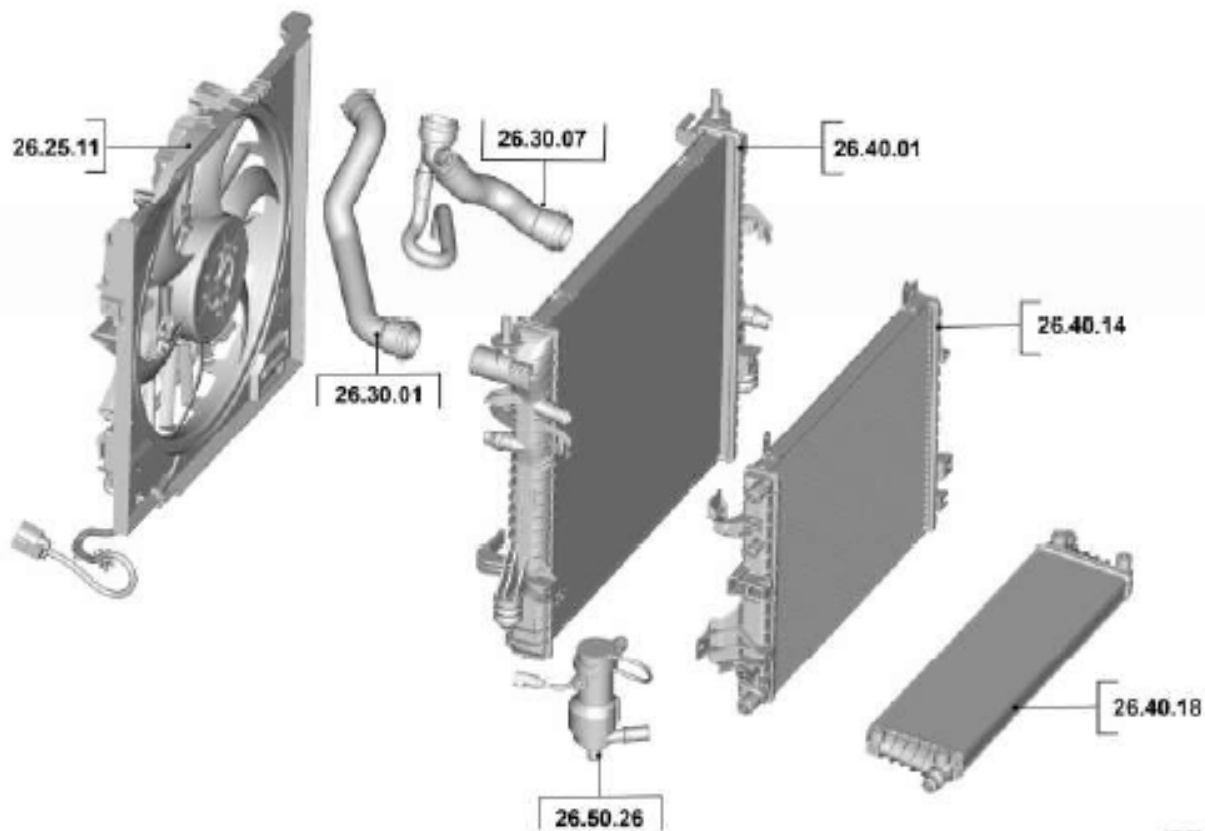
26.50.01	WATER PUMP - RENEW	ALL DERIVATIVES	0.9
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26.50.26	SUPERCHARGER COOLANT PUMP - RENEW	ALL DERIVATIVES	1.5
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## REMOVAL

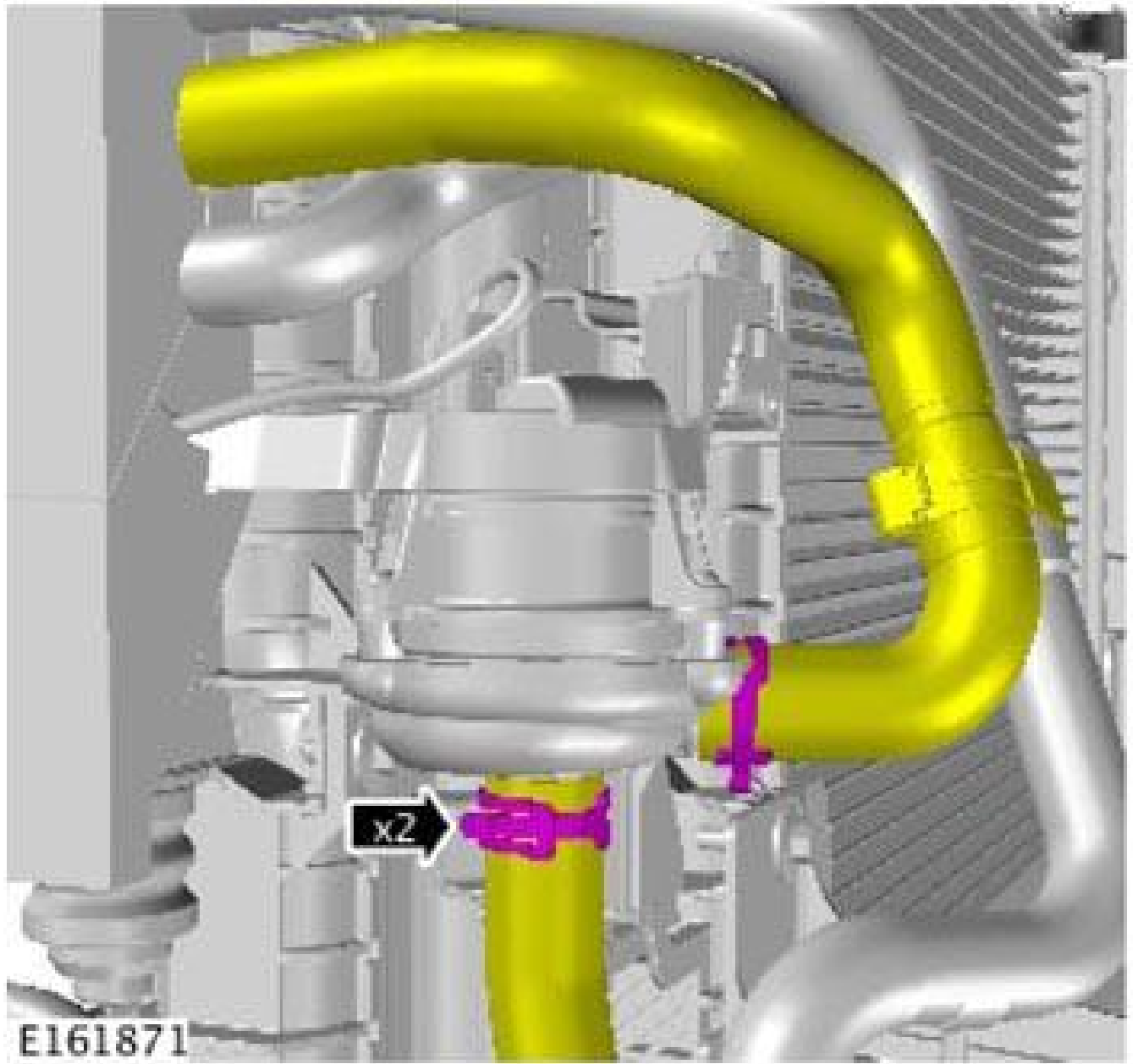
**NOTE:** Removal steps in this procedure may contain installation details.

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

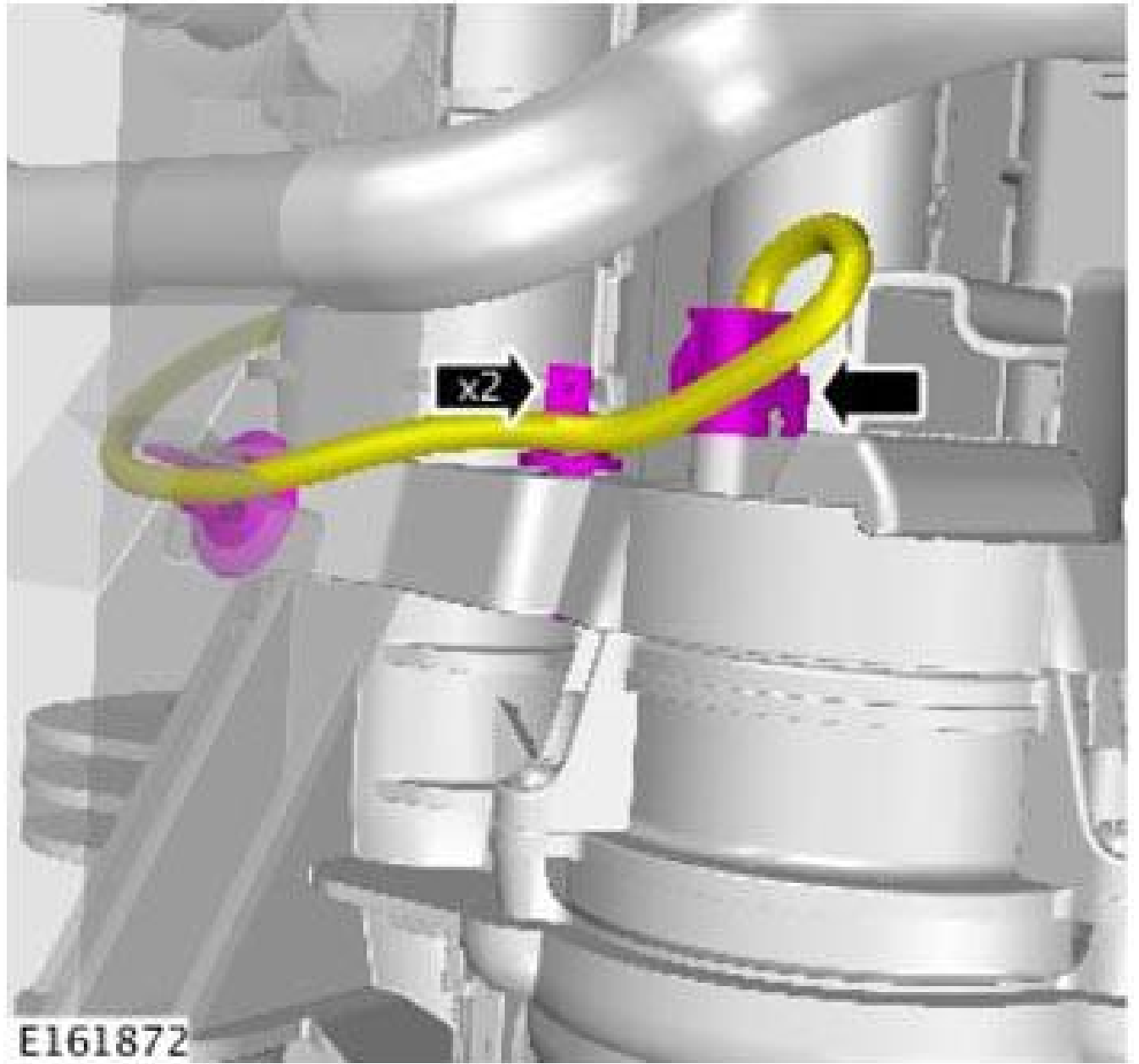
Raise and support the vehicle.

2. Refer to: [Cooling System Partial Draining and Vacuum Filling](#) (General Procedures).
3. Refer to: [Radiator Splash Shield](#) (Front End Body Panels, Removal and Installation).
4. Refer to: [Auxiliary Radiator \(G1580406\)](#) (V8 S/C 5.0L Petrol, Removal and Installation).

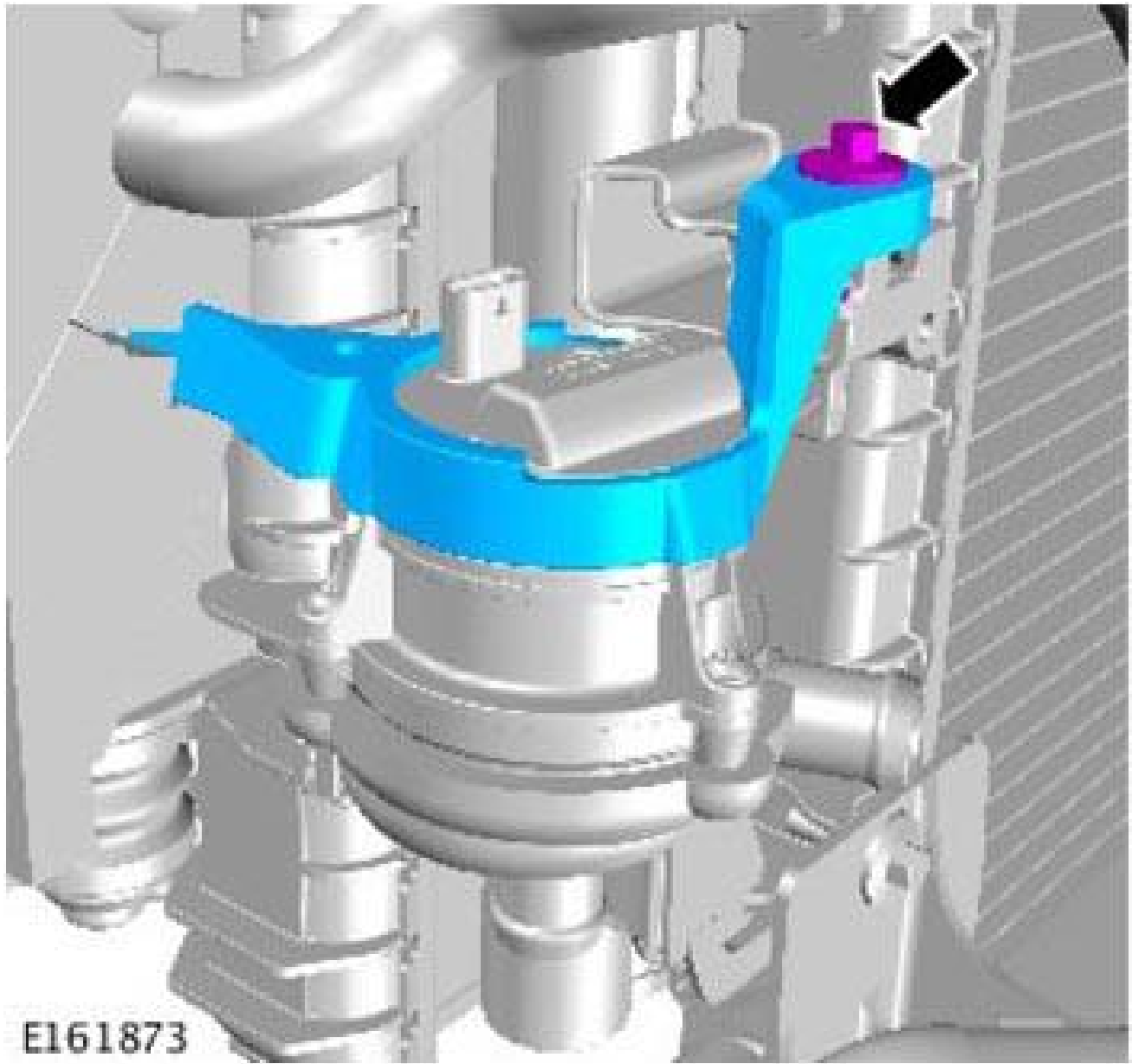
5.



6.

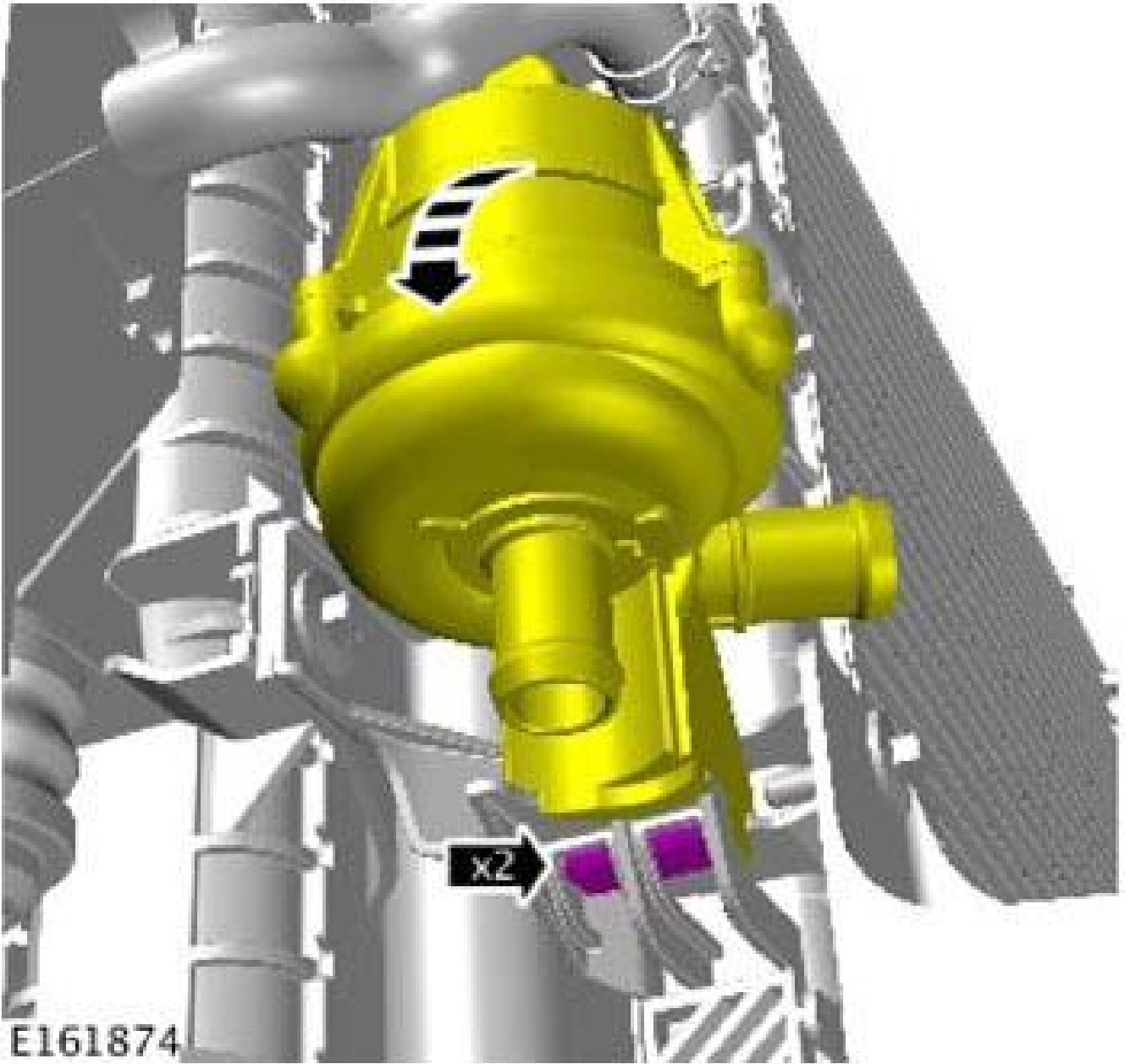


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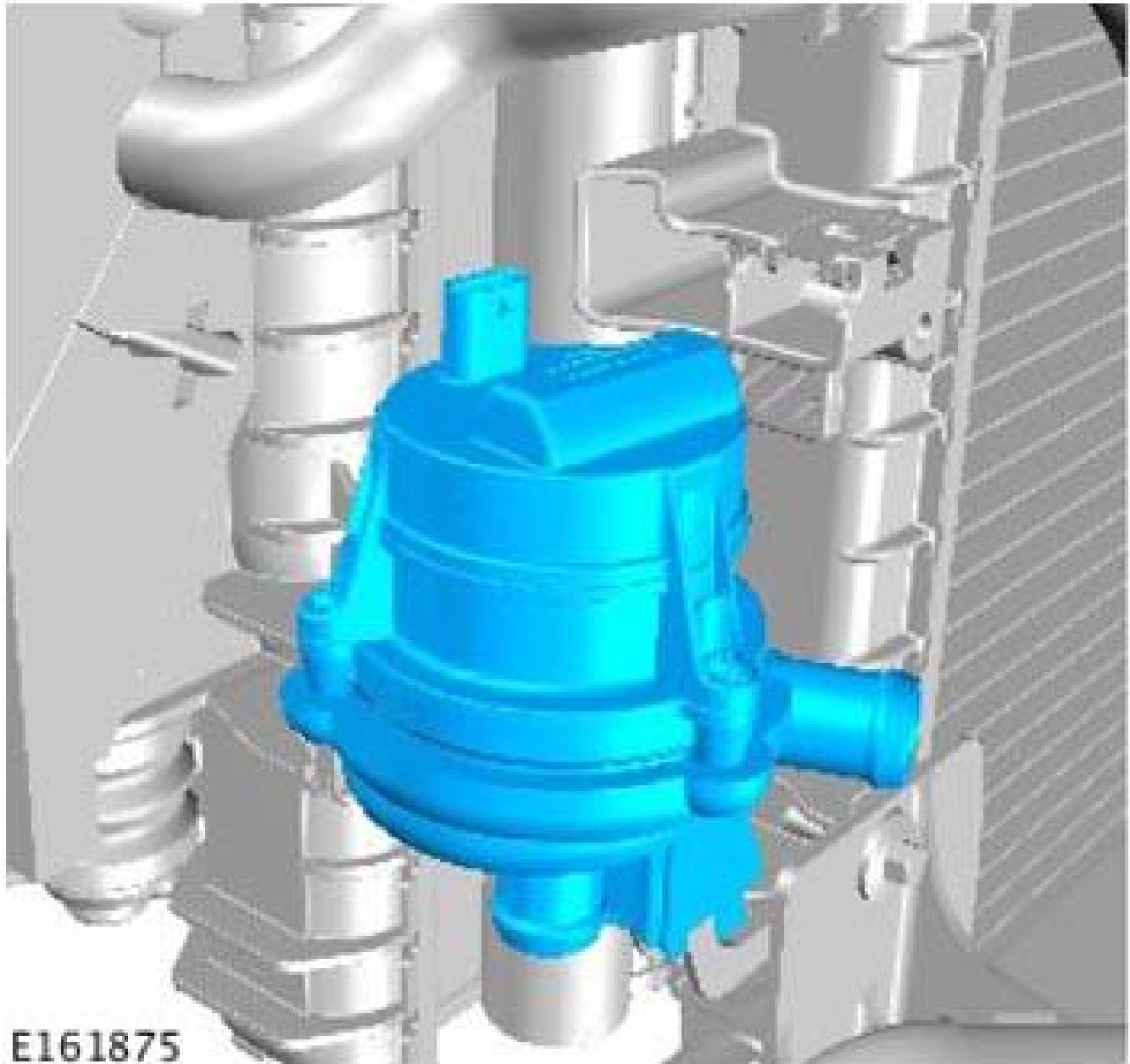


*Torque Specification: 9 Nm*

8.



9.



E161875

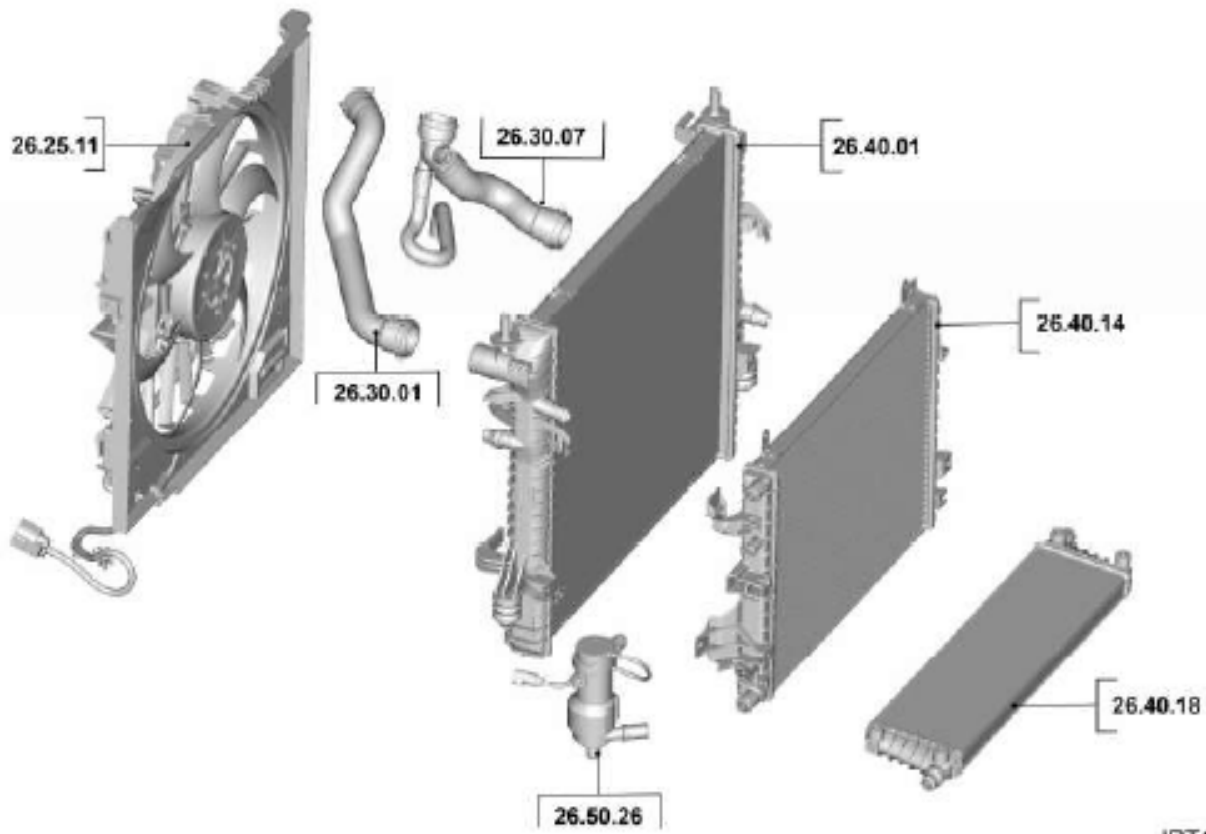
#### INSTALLATION

1. To install, reverse the removal procedure.

#### **RADIATOR (G1707136)**

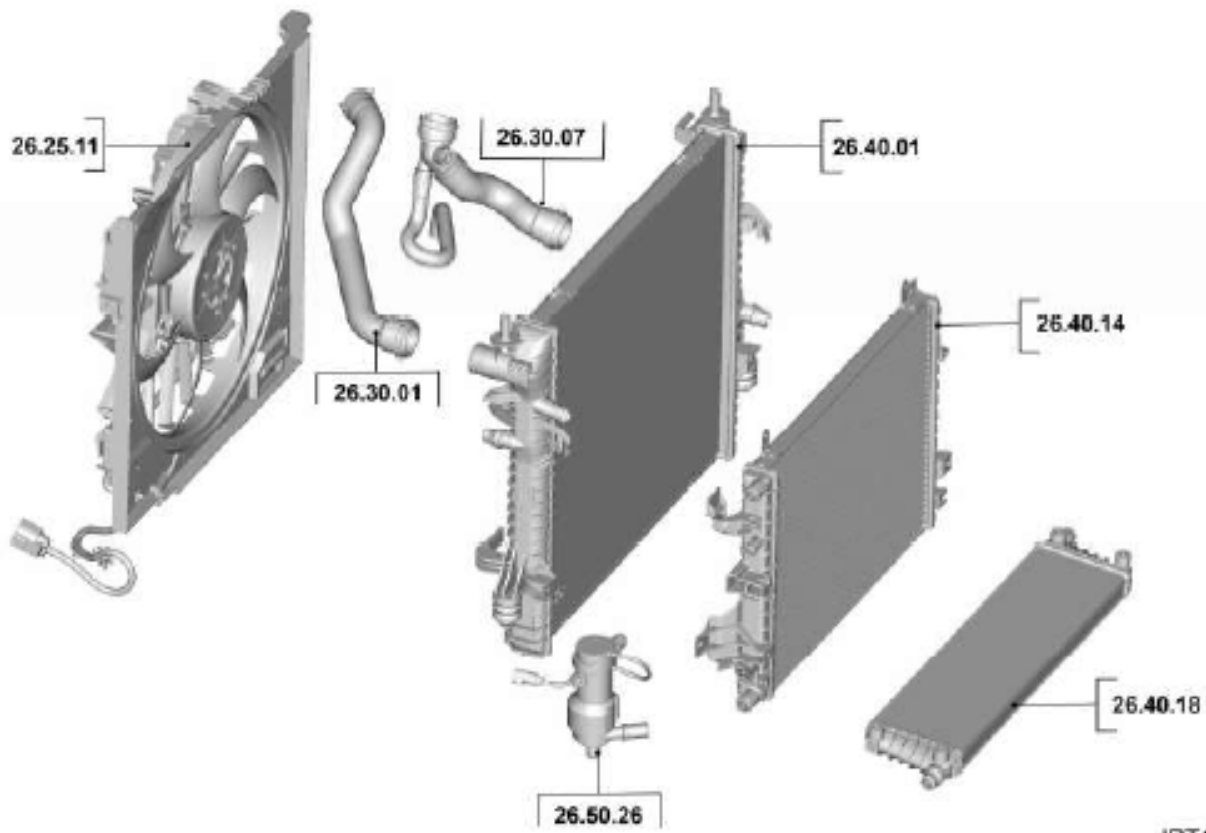
#### REMOVAL AND INSTALLATION

26.40.01	RADIATOR ASSEMBLY - RENEW	ALL DERIVATIVES	1.8
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JRT1232

26.40.14	SUPER CHARGER RADIATOR - RENEW	ALL DERIVATIVES	1.7
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JRT1232



## REMOVAL

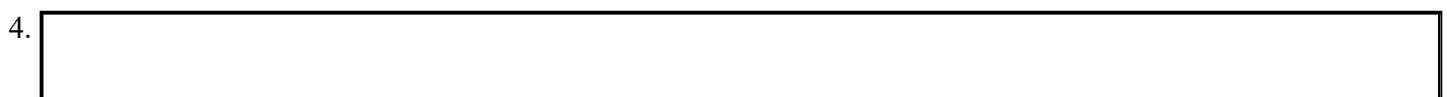
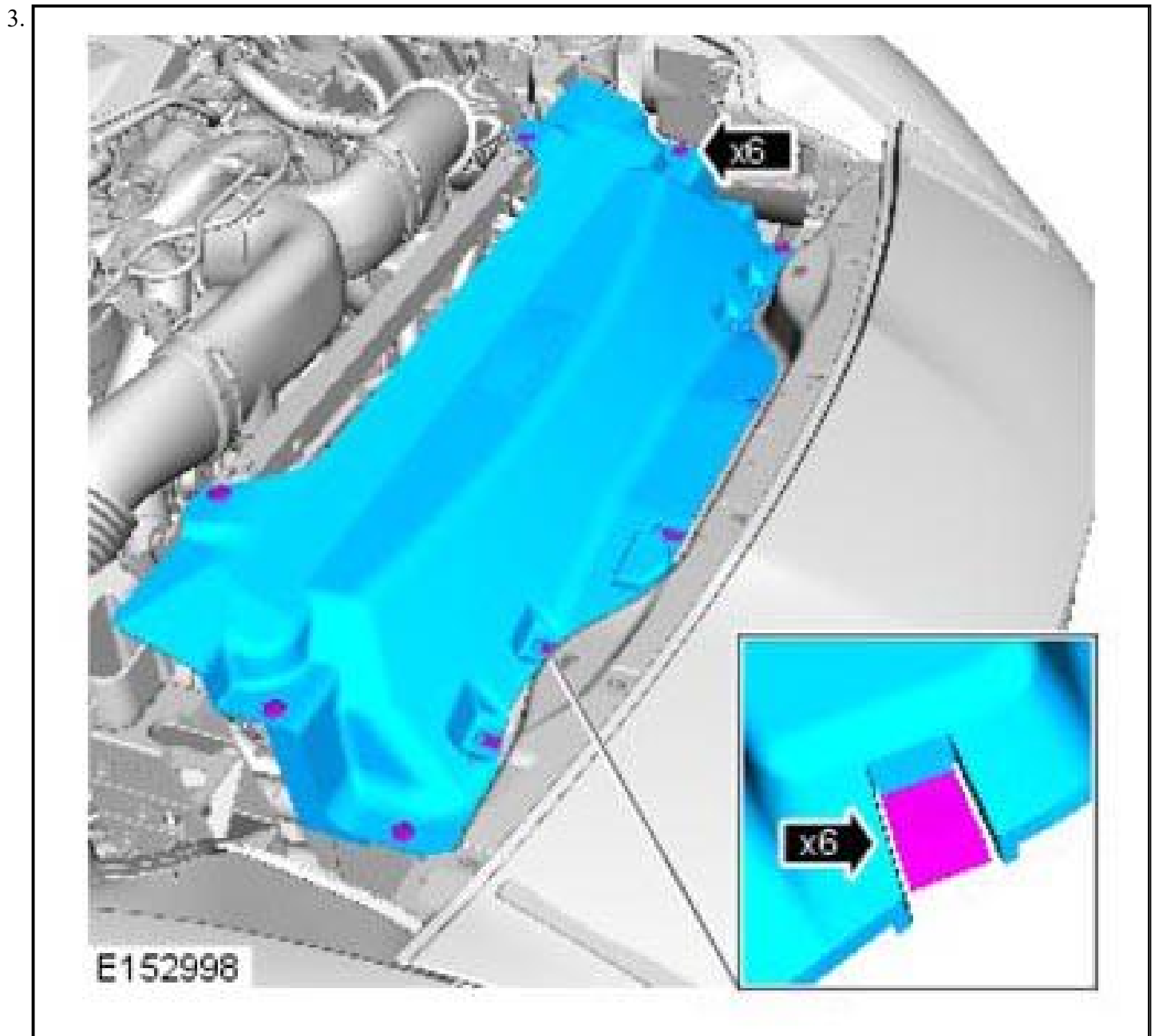
### NOTE:

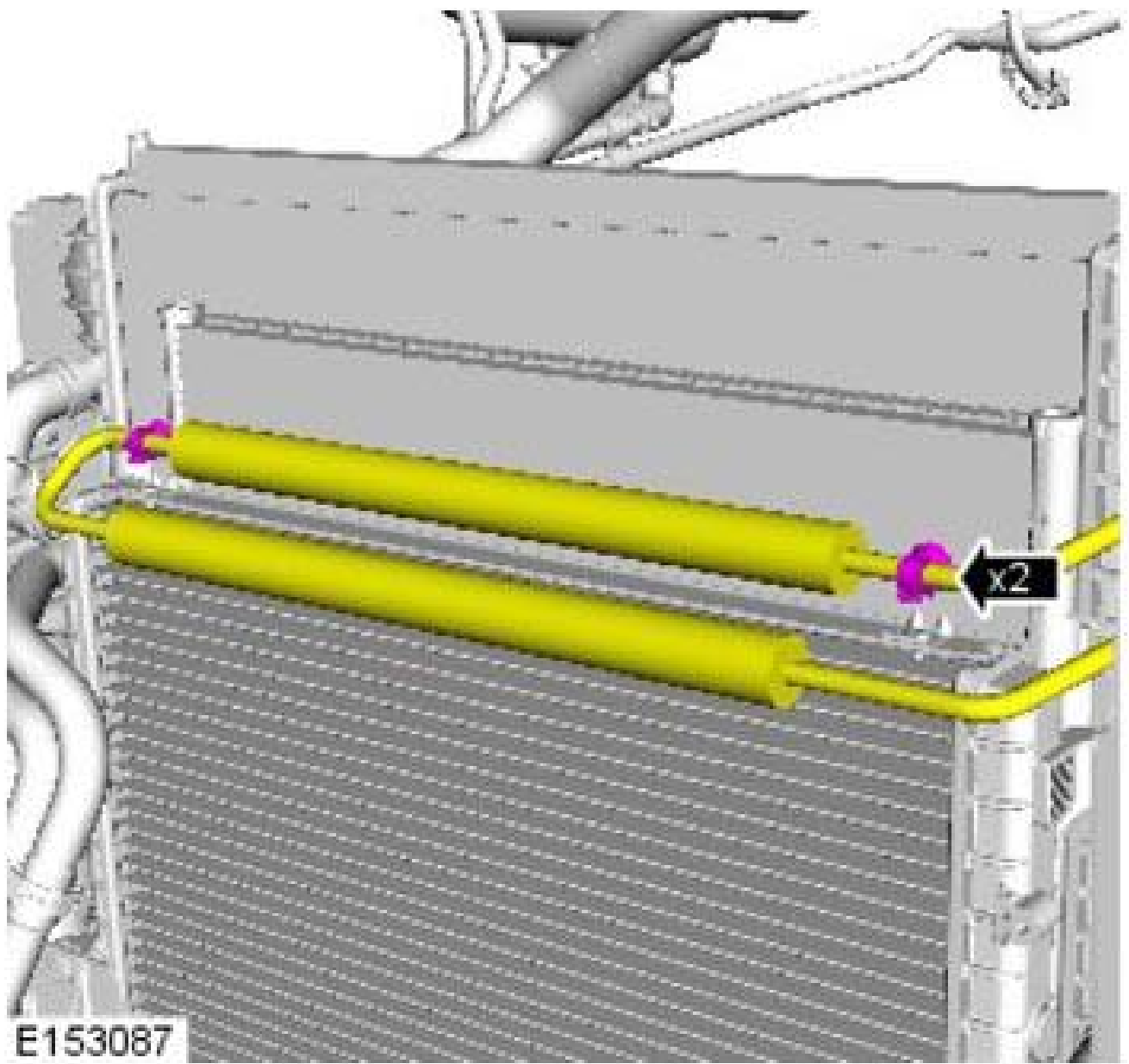
- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

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

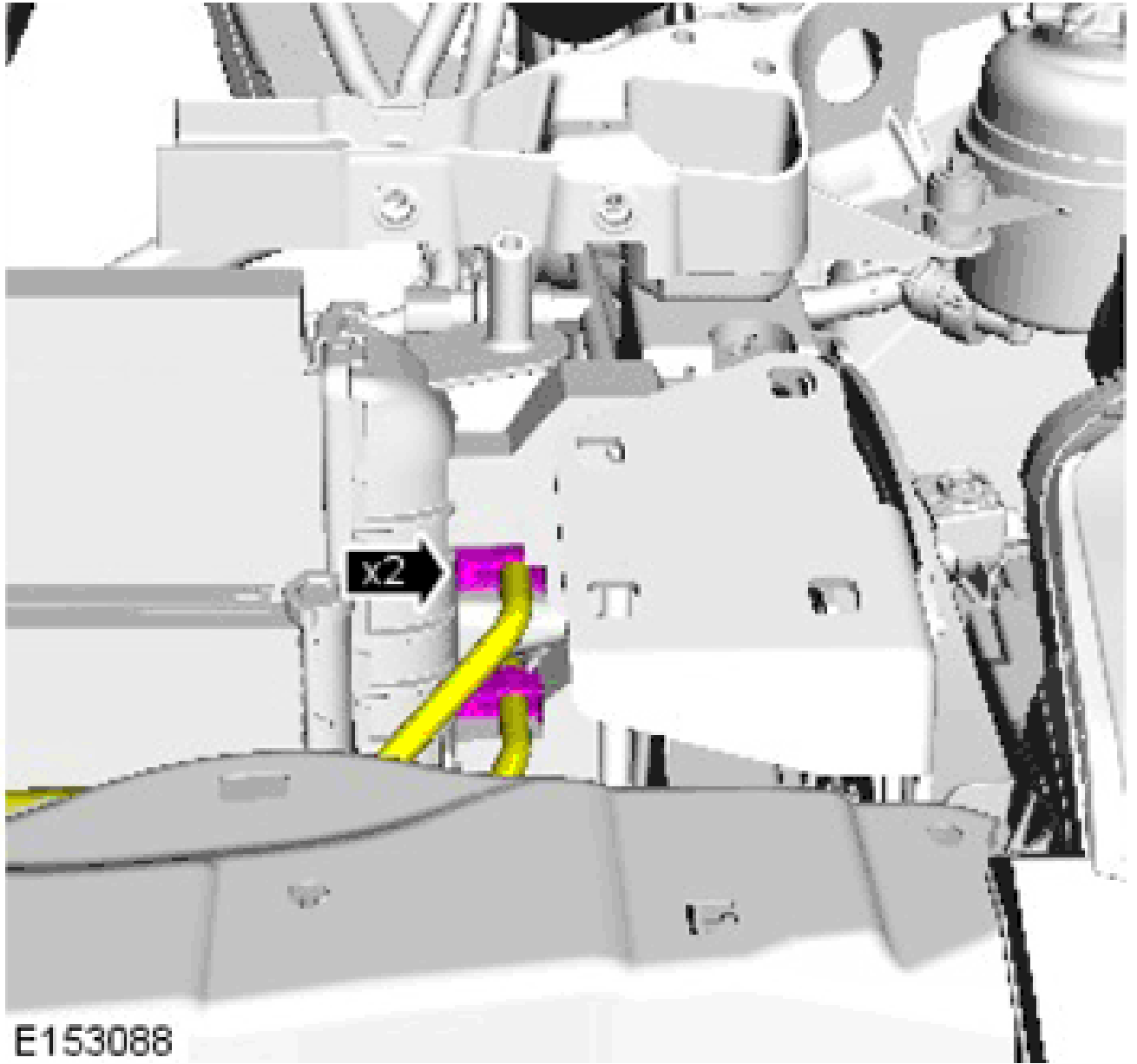
Raise and support the vehicle.

2. Refer to: [Auxiliary Radiator \(G1580406\)](#) (V8 S/C 5.0L Petrol, Removal and Installation).

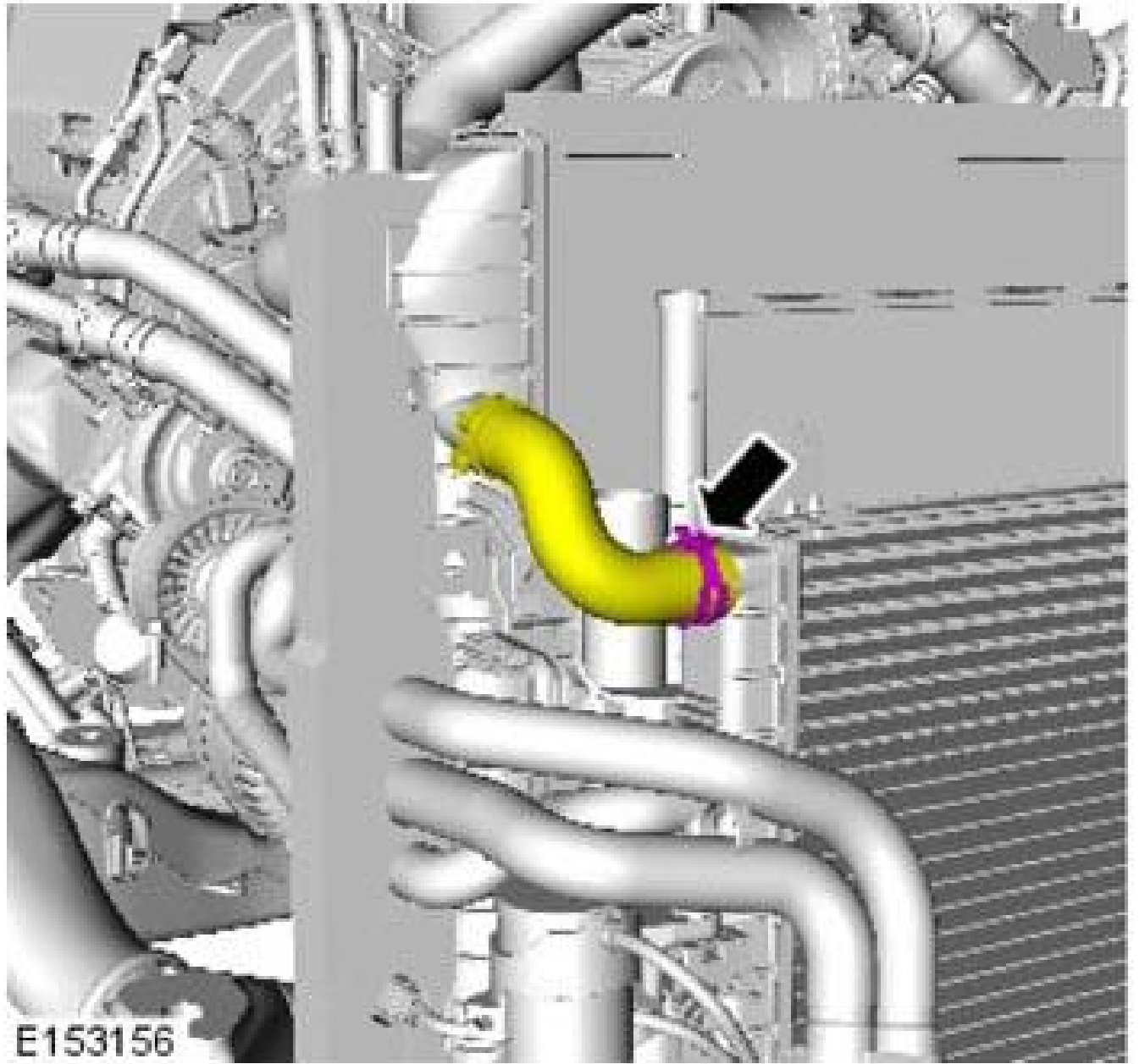




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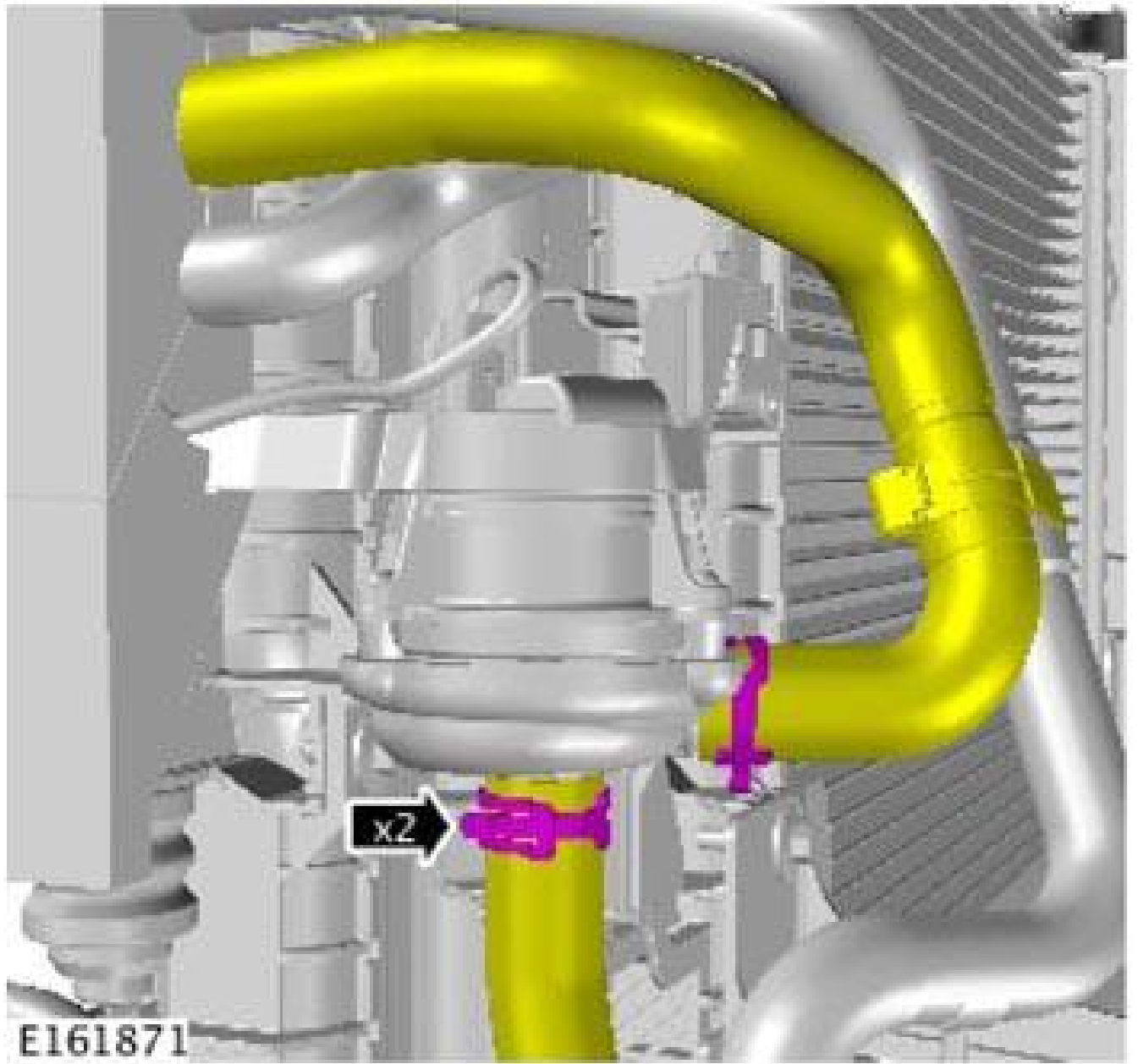


6.

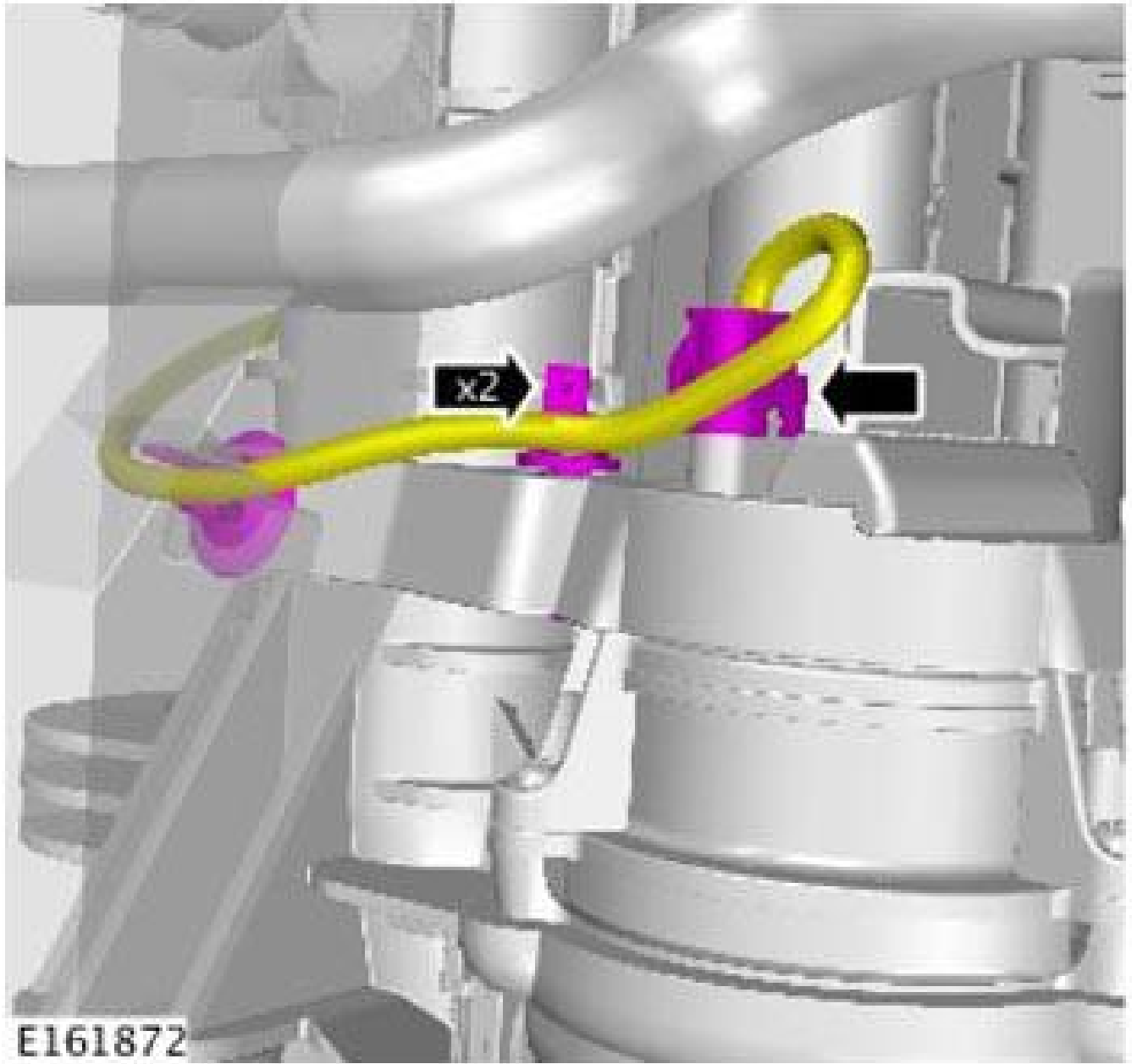


E153156

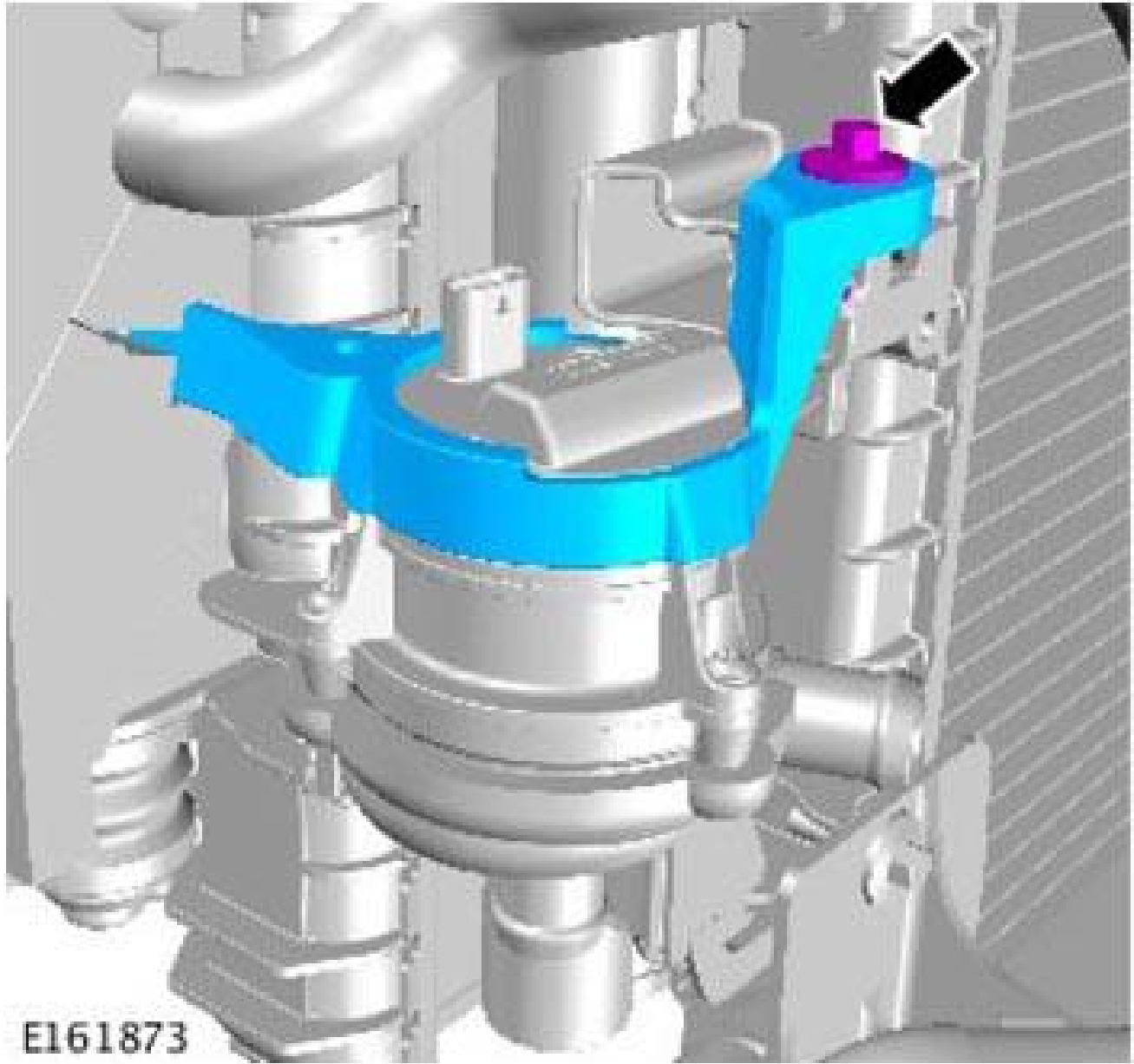
7.



8.

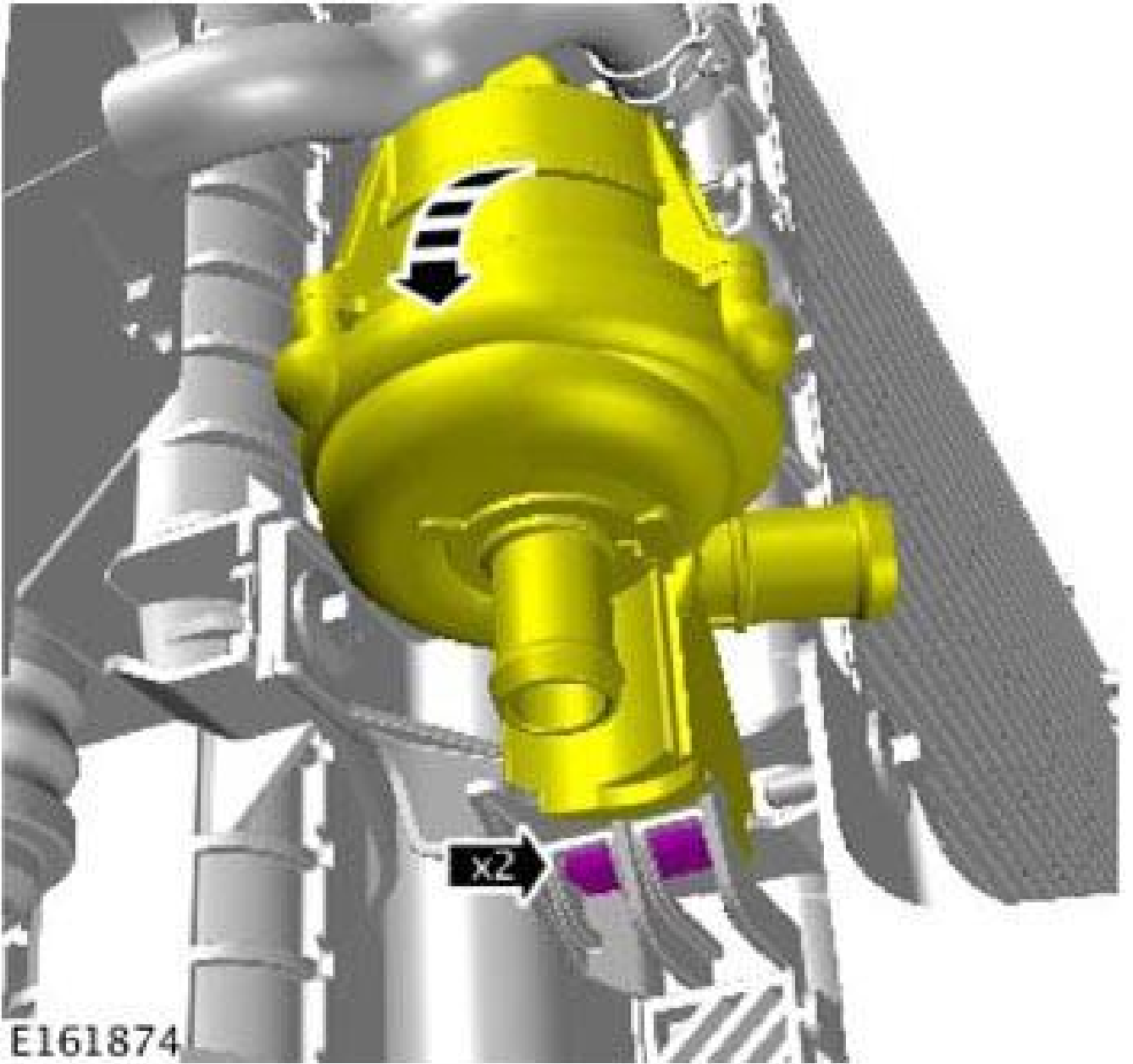


9.



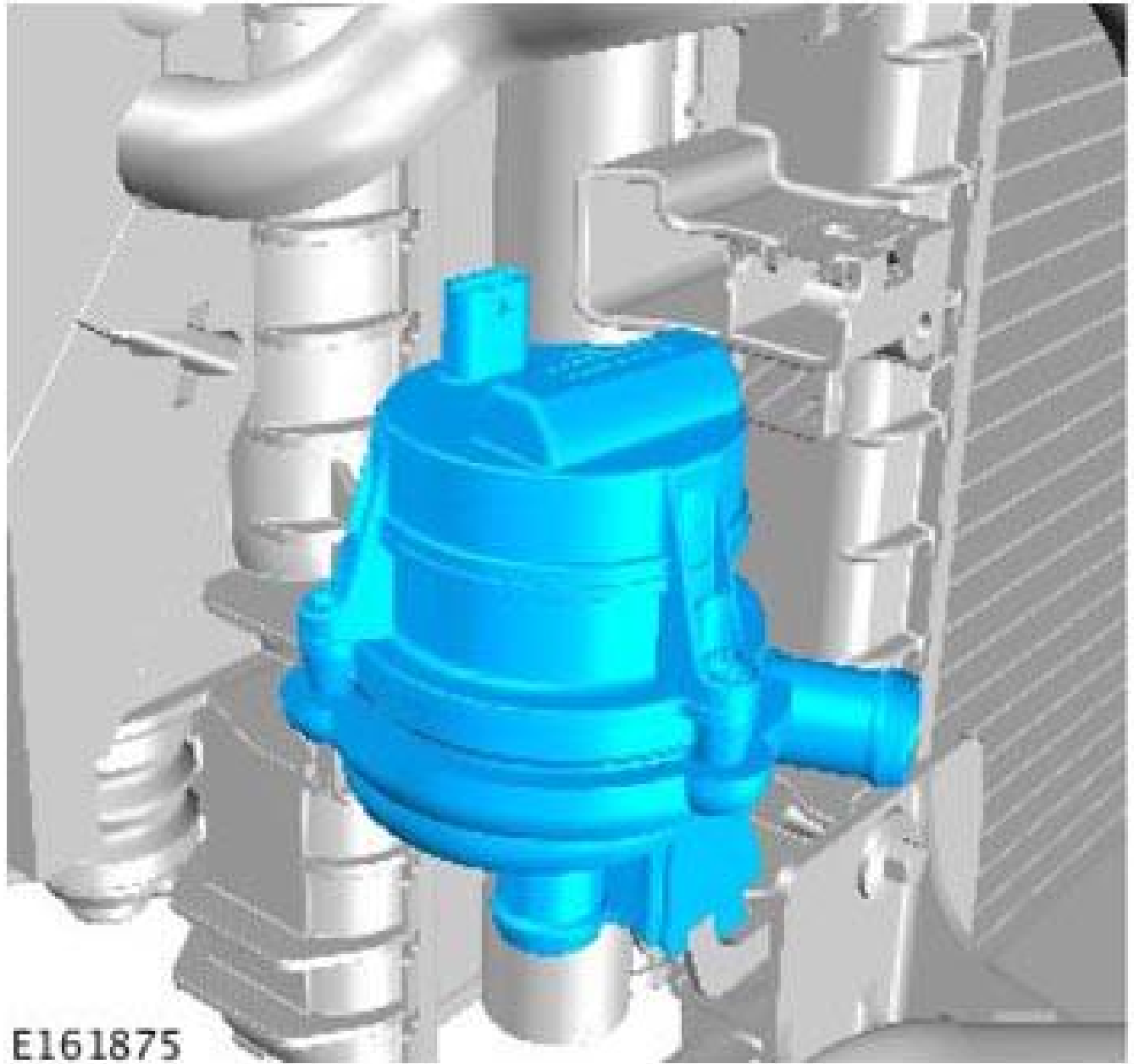
*Torque Specification: 9 Nm*

10.

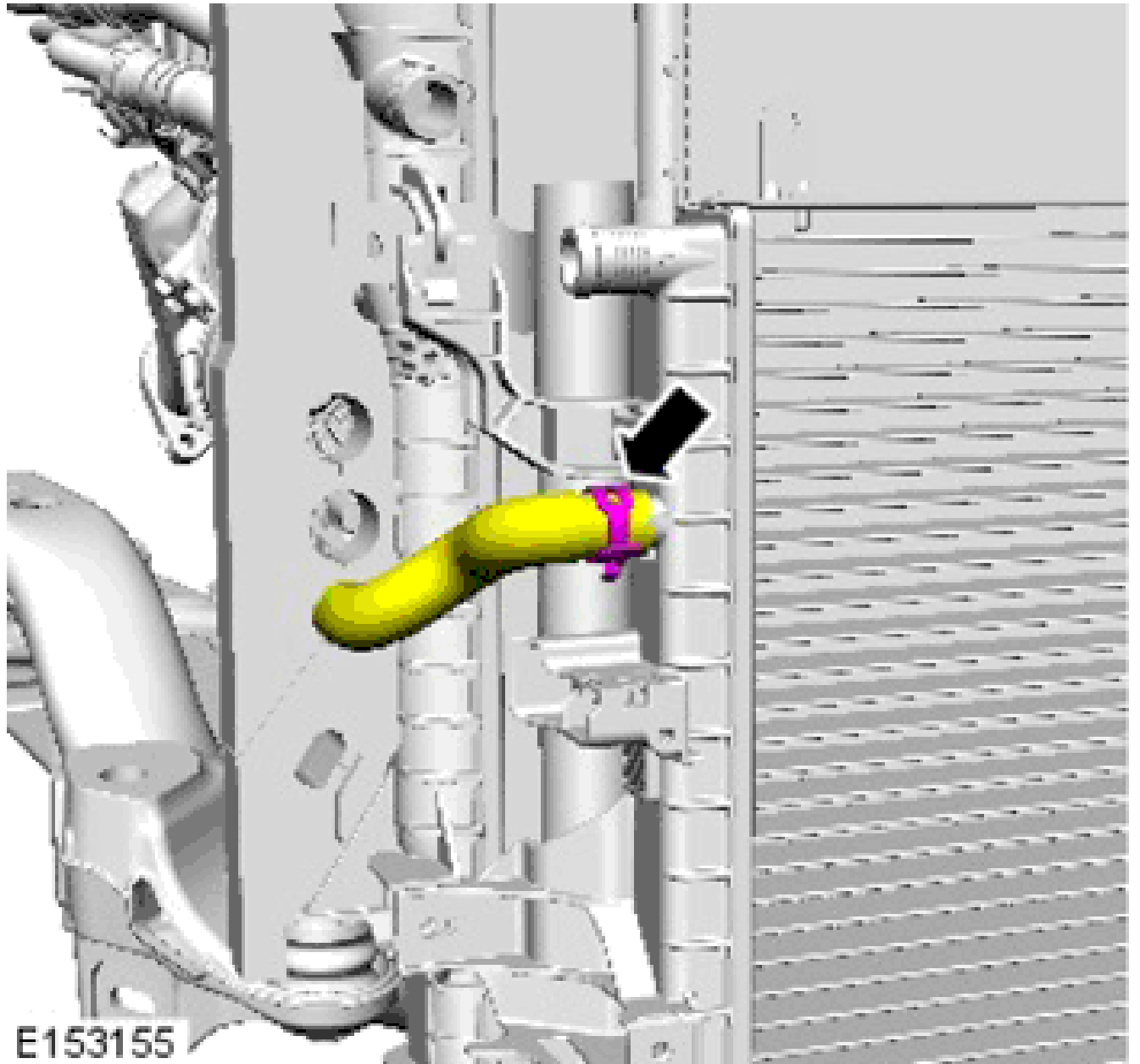


11.

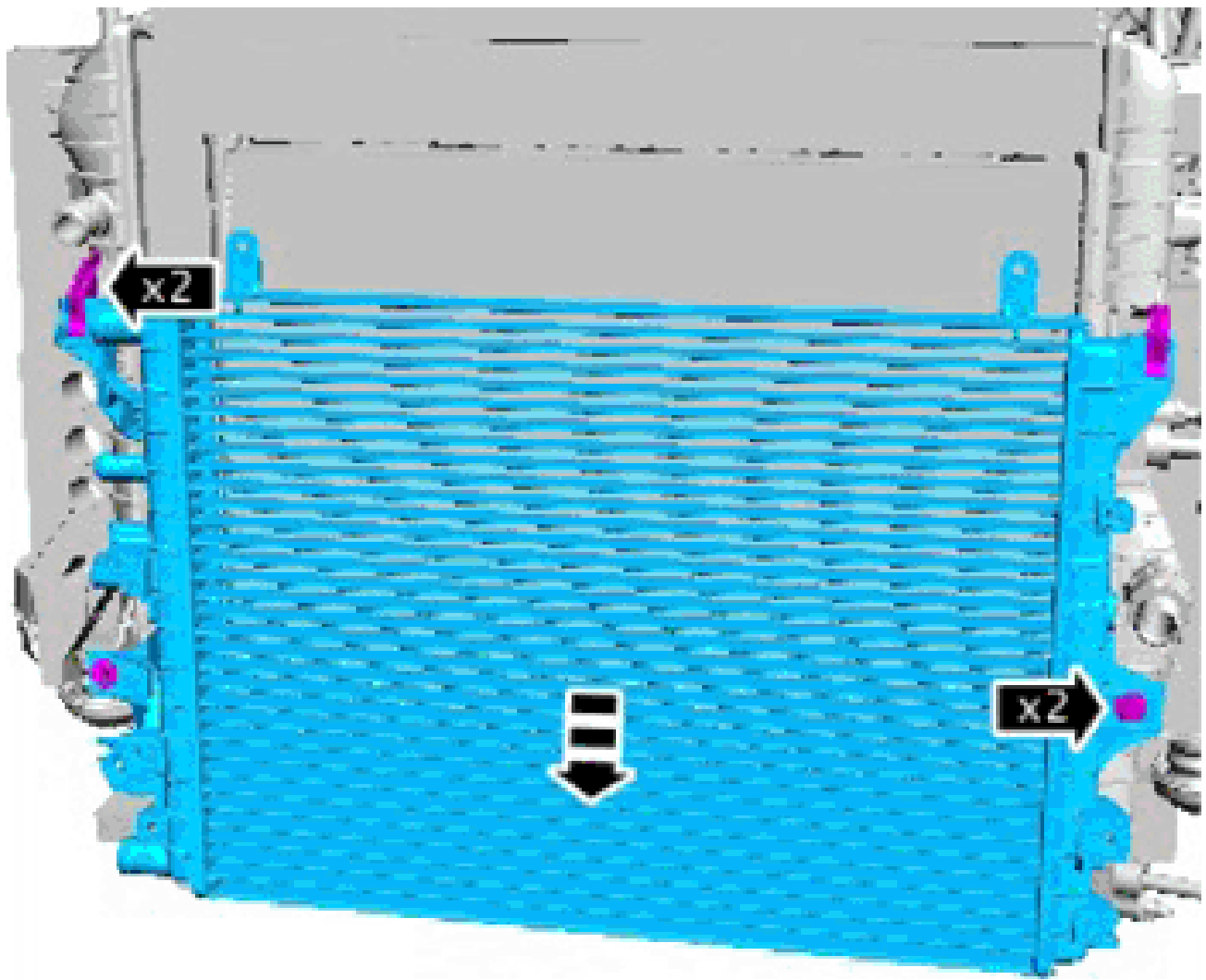




E161875



13. **CAUTION:** Protect the radiator during this operation.



E162128

*Torque Specification: 7 Nm*

#### INSTALLATION

1. To install, reverse the removal procedure.