Published: 11-May-2011

Power Brake Actuation -

General Specification

Item	Specification
Brake booster type	Twin chamber 203.20 mm and 228.60 mm (8.00 in and 9.00 in)
Boost ratio	8:1
Brake vacuum pump make	Bosch

Torque Specifications

Description	Nm	lb-ft
Brake booster to brake pedal bracket nuts	22	16
Brake master cylinder nuts	26	19
Brake vacuum pump bolts:		
3.2L Petrol	17	13
2.2L Diesel	9	7

Part Number

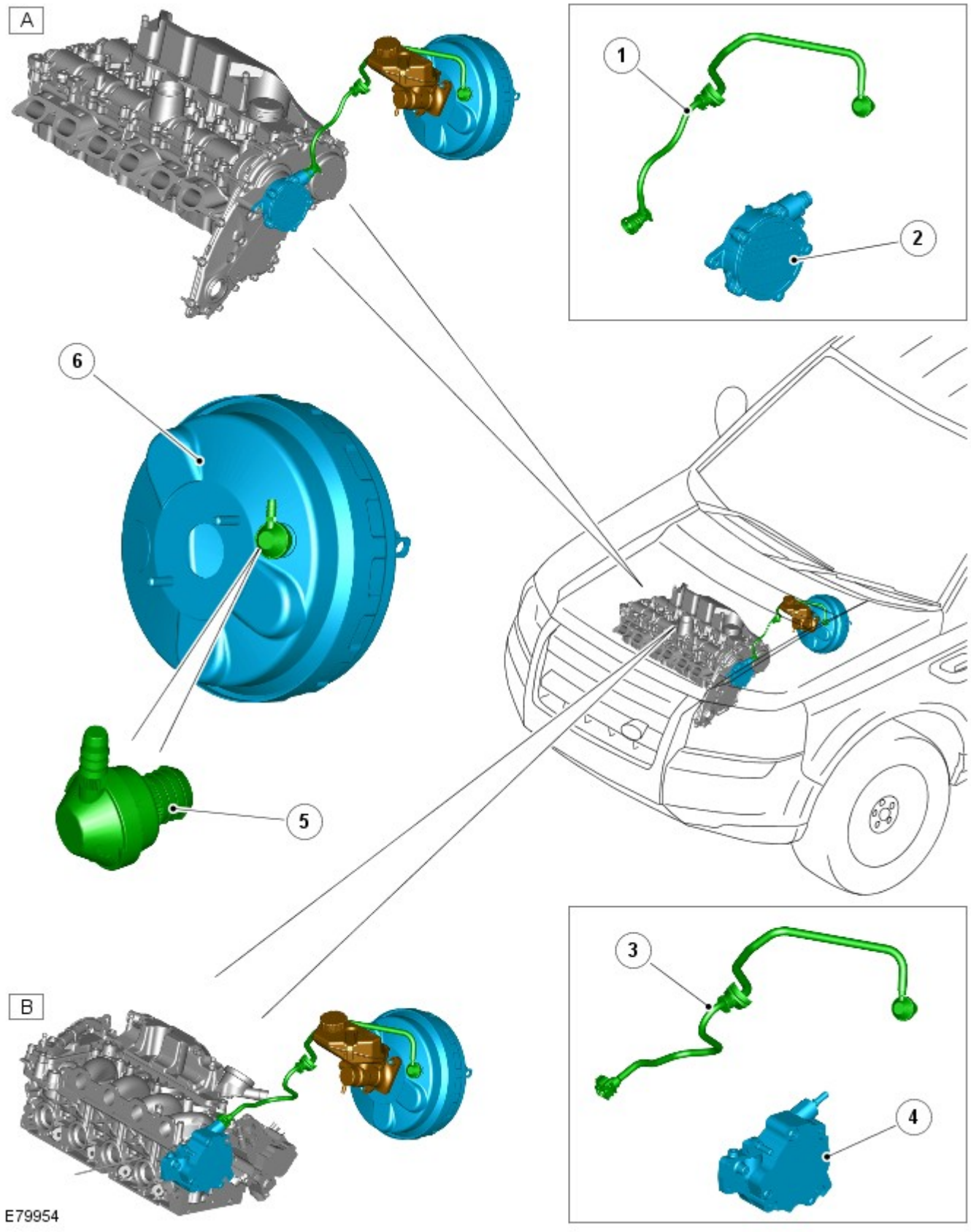
Published: 11-May-2011

Power Brake Actuation - Brake Booster

Description and Operation

COMPONENT LOCATION

NOTE: Left-Hand Drive (LHD) shown; Right-Hand Drive (RHD) similar.



Item	Part Number	Description

A		Power brake component location - i6 engine
B		Power brake component location - TD4 engine
1		Vacuum pipe - i6 engine
2		Vacuum pump - i6 engine
3		Vacuum pipe - TD4 engine (up to 2010 MY)
4		Vacuum pump - TD4 engine
5		Check valve
6		Brake booster

OVERVIEW

Power assistance for the braking system is provided by a vacuum operated, non-active brake booster.

The brake booster is a compact unit that occupies less space than a conventional brake booster, improving the vehicles crash performance characteristics. The unit is installed with tandem diaphragms that are 203.20 mm (8.00 in) and 228.60 mm (9.00 in) in diameter and operate as a single unit.

The unit is located on the driver's side of the engine compartment, and is sealed to the bulkhead with a gasket and secured with 4 studs and locking nuts. The brake booster actuating push rod is attached to the brake pedal with a clevis pin. The booster output rod locates in the primary piston of the brake master cylinder.
For additional information, refer to: Hydraulic Brake Actuation (206-06 Hydraulic Brake Actuation, Description and Operation).

VACUUM COMPONENTS

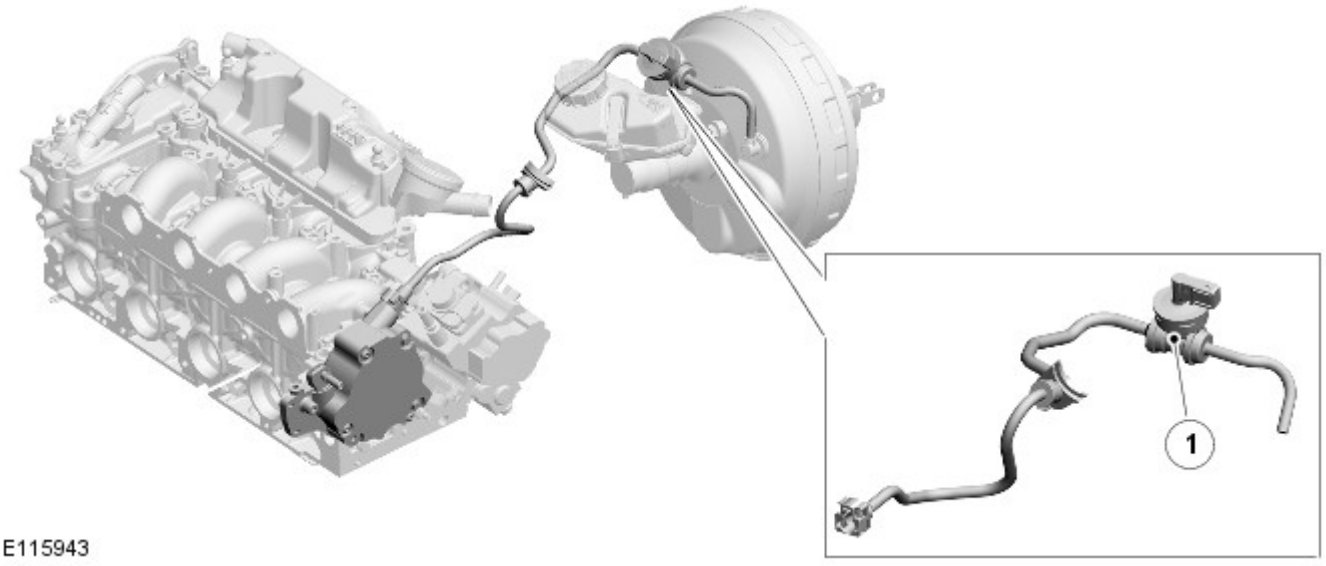
For both the i6 gasoline and TD4 diesel engines, the vacuum required for brake booster operation is created by a vacuum pump mounted at the rear of the cylinder head. The vacuum pump is driven by the intake camshaft.

A rigid plastic pipe connects the vacuum pump to a check valve installed on the front chamber of the brake booster. The pipe length and routing is different for LHD and RHD models.

The check valve maintains the vacuum necessary for brake booster operation and prevents air from entering the front chamber.

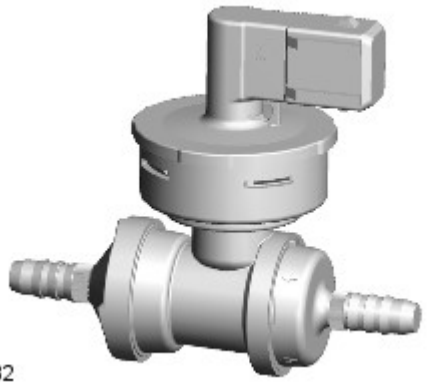
Stop/Start Vehicles - From 2010 MY

Stop/Start Vehicle Components



Item		Description
1		Brake vacuum sensor

Brake vacuum sensor


E115182

A brake vacuum sensor is introduced on Stop/Start vehicles to monitor vacuum reserves in the brake servo. The vacuum sensor is mounted in the vacuum pipe and hardwired to the ECM.
For additional information, refer to: Starting System (303-06C Starting System - TD4 2.2L Diesel, Vehicles Built From: 01-03-2009, Description and Operation).

Published: 11-May-2011

Power Brake Actuation - Power Brake System

Diagnosis and Testing

For additional information.
REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).

Published: 11-May-2011

Power Brake Actuation - Brake Booster

Removal and Installation

Removal

CAUTIONS:

Extreme cleanliness must be exercised when handling these components.

If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.

All vehicles

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

   Raise and support the vehicle.

2. Disconnect the battery ground cable.

   Refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

3. Remove the windshield wiper motor and linkage.

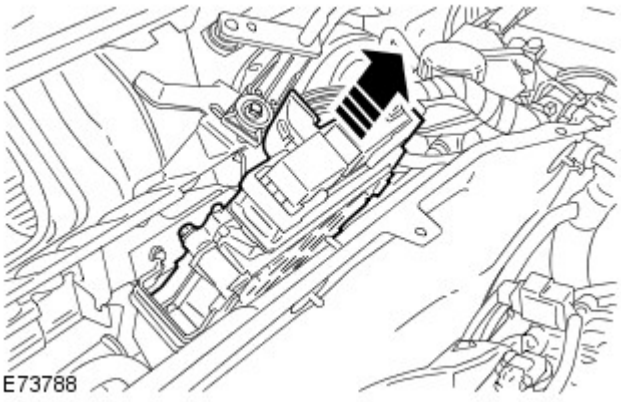
   Refer to: Windshield Wiper Motor (501-16 Wipers and Washers, Removal and Installation).

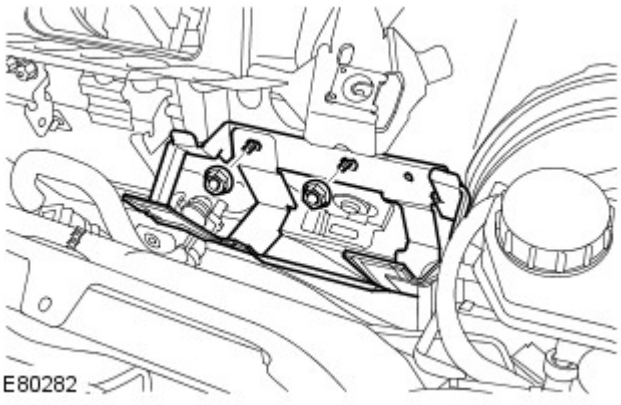
4. Remove the driver lower air bag module.

   Refer to: Driver Lower Air Bag Module (501-20B Supplemental Restraint System, Removal and Installation).

Left-hand drive vehicles

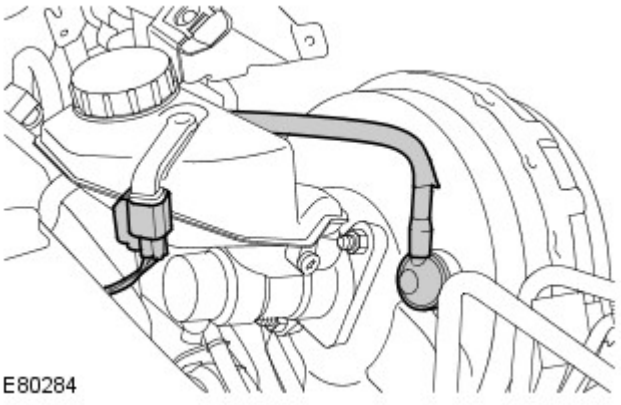
5.





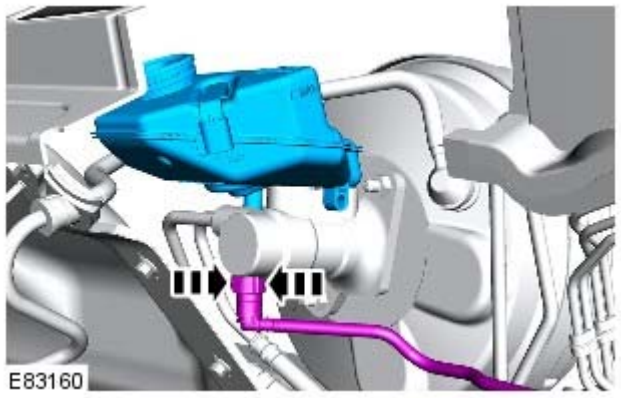
6.

All vehicles



7. CAUTION: Make sure that all openings are sealed.

Vehicles with manual transmission

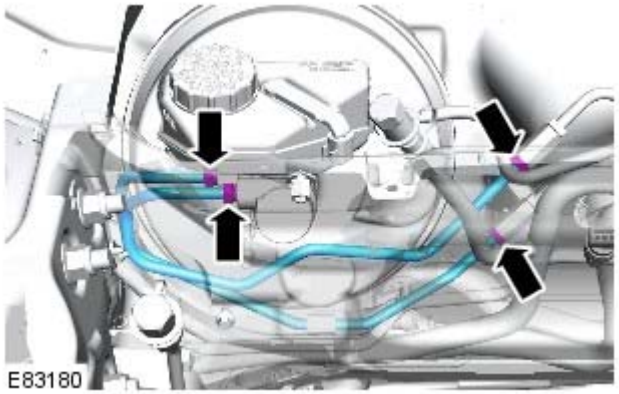


8. CAUTIONS:

Be prepared to collect escaping fluids.

Make sure that all openings are sealed.

Right-hand drive vehicles

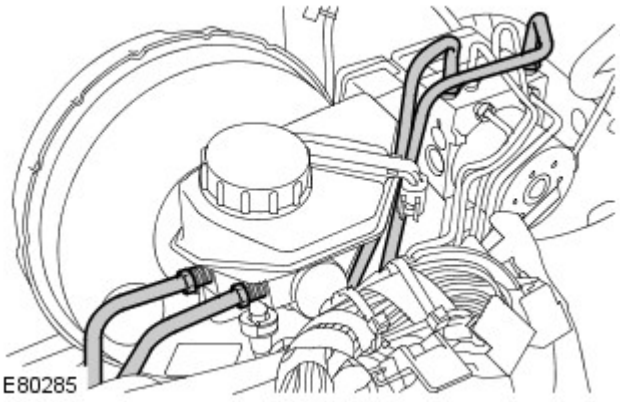


9. CAUTIONS:

⚠ Be prepared to collect escaping fluids.

⚠ Make sure that all openings are sealed.

Left-hand drive vehicles

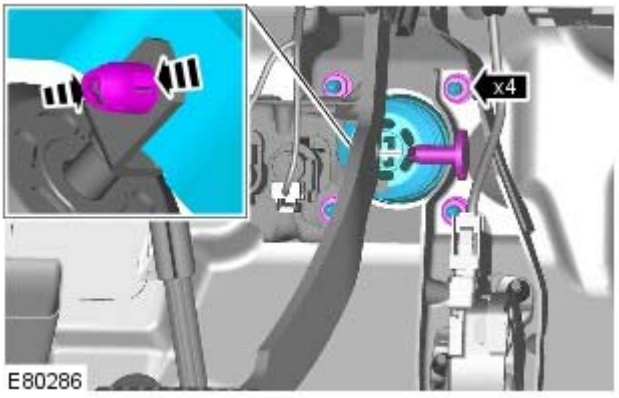


10. CAUTIONS:

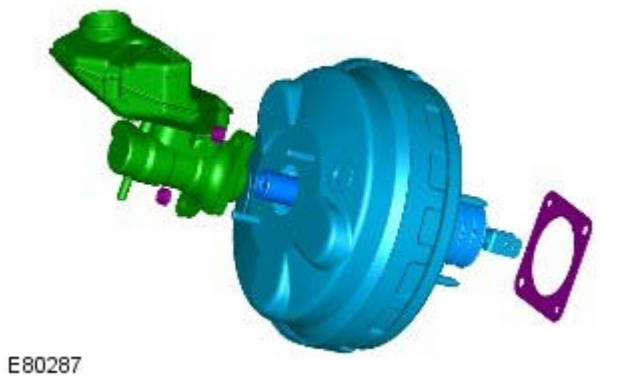
⚠ Be prepared to collect escaping fluids.

⚠ Make sure that all openings are sealed.

All vehicles



11. ⚠ CAUTION: The seal is to be reused unless damaged.



12. ⚠ CAUTION: The seal is to be reused unless damaged.

Installation

All vehicles

1.  CAUTION: Make sure that the mating faces are clean and free of foreign material.

   Install the brake master cylinder.

   Torque: 26 Nm

2.  CAUTION: Make sure that the mating faces are clean and free of foreign material.

   Install the brake booster.

   Torque: 22 Nm

3.  CAUTION: Make sure that the mating faces are clean and free of foreign material.

   Install the brake fluid tubes.

   Torque: 15 Nm

Vehicles with manual transmission

4.  CAUTION: Make sure that the mating faces are clean and free of foreign material.

   Connect the clutch fluid line.

All vehicles

5. Connect the brake booster vacuum line.

6. Connect the low brake fluid warning indicator switch electrical connector.

Left-hand drive vehicles

7. Install the ECM bracket.

   Torque: 10 Nm

8. Install the ECM.

All vehicles

9. Install the driver lower air bag module.

   Refer to: Driver Lower Air Bag Module (501-20B Supplemental Restraint System, Removal and Installation).

10. Install the windshield wiper motor and linkage.

    Refer to: Windshield Wiper Motor (501-16 Wipers and Washers,

Removal and Installation).

11. Connect the battery ground cable.

    Refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

12. Bleed the brake system.

    Refer to: Brake System Bleeding (206-00 Brake System - General Information, General Procedures).

Vehicles with manual transmission

13. Bleed the clutch system.

    Refer to: Clutch System Bleeding (308-00 Manual Transmission/Transaxle and Clutch - General Information, General Procedures).

Published: 11-May-2011

Power Brake Actuation - Brake Vacuum PumpTD4 2.2L Diesel

Removal and Installation

Removal

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

1. Remove the cover and disconnect the battery ground cable.

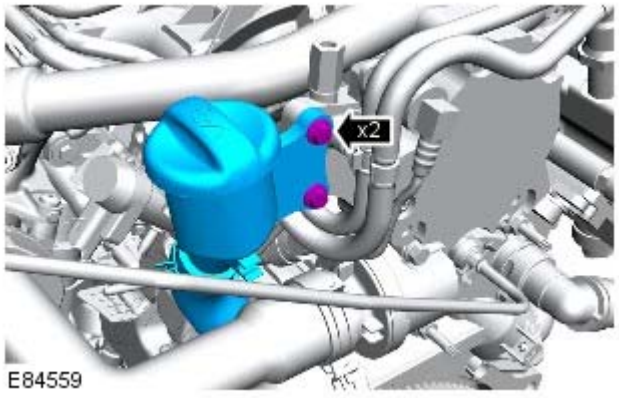
   Refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

2. Remove the engine cover.

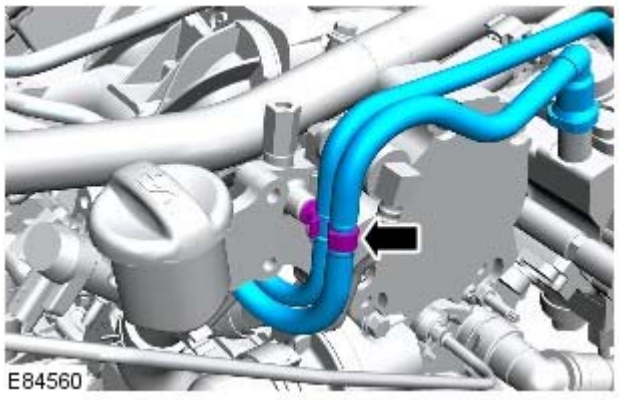
   Refer to: Engine Cover - TD4 2.2L Diesel (501-05 Interior Trim and Ornamentation, Removal and Installation).

3. Remove the air cleaner assembly.

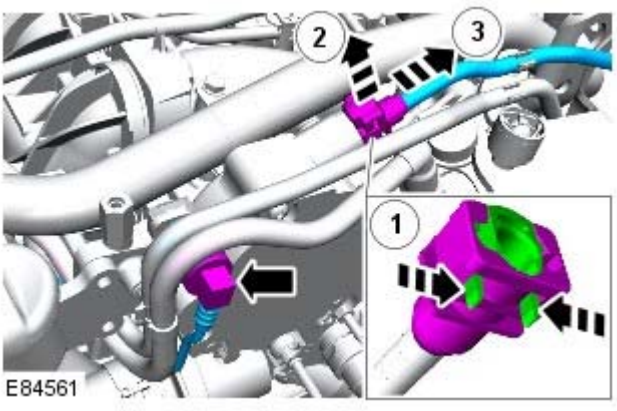
   Refer to: Air Cleaner (303-12B Intake Air Distribution and Filtering - TD4 2.2L Diesel, Removal and Installation).



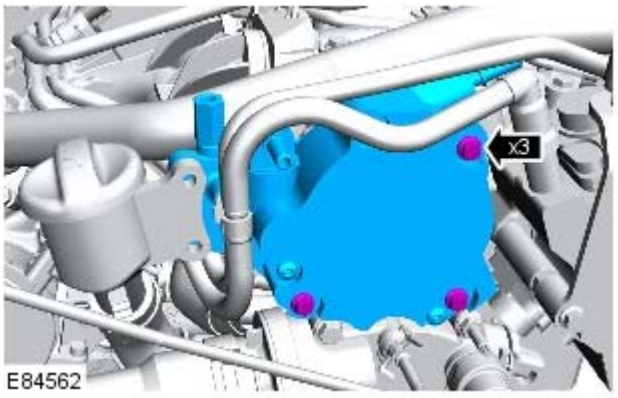
4. *Torque:* 9 Nm



5.

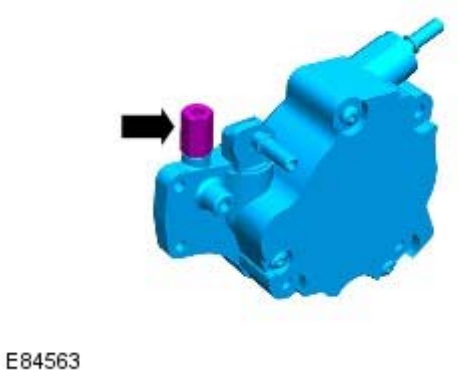


6. CAUTION: Make sure that all openings are sealed.



7. CAUTION: The seals are to be reused unless damaged.

Torque: 9 Nm



8. NOTE: Do not disassemble further if the component is removed for access only.

Torque: 9 Nm

Installation

1. CAUTION: Make sure that the mating faces are clean and free of foreign material.

To install, reverse the removal procedure.