

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

Remove the exhaust hangers.

Installation

1. Install the exhaust hangers.
2. With assistance, install the exhaust system.

Attach the exhaust hangers.

Tighten the nuts to 45 Nm (33 lb.ft).

3. With assistance, attach the exhaust hangers.
4. Secure the LH and RH catalytic converters to the turbochargers.

Install new gaskets.

Tighten the bolts to 21 Nm (15 lb.ft).

5. Install the LH catalytic converter heat shield.

Tighten the nuts.

Tighten the screws.

6. Install the RH catalytic converter heat shield.

Tighten the nuts.

Tighten the screws.

7. Install the engine undershield.
For additional information, refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).

Exhaust System - TDV8 3.6L Diesel - Exhaust System Vehicles With: Diesel Particulate Filter (DPF)

Removal and Installation

Removal



WARNING: Observe due care when working near a hot exhaust system.



CAUTION: Make a note of the connection orientation of the high and low pressure hoses to the sensor ports. Make sure the hoses are located to the correct sensor port when installed. Failure to follow these instructions may result in damage to the vehicle.



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.

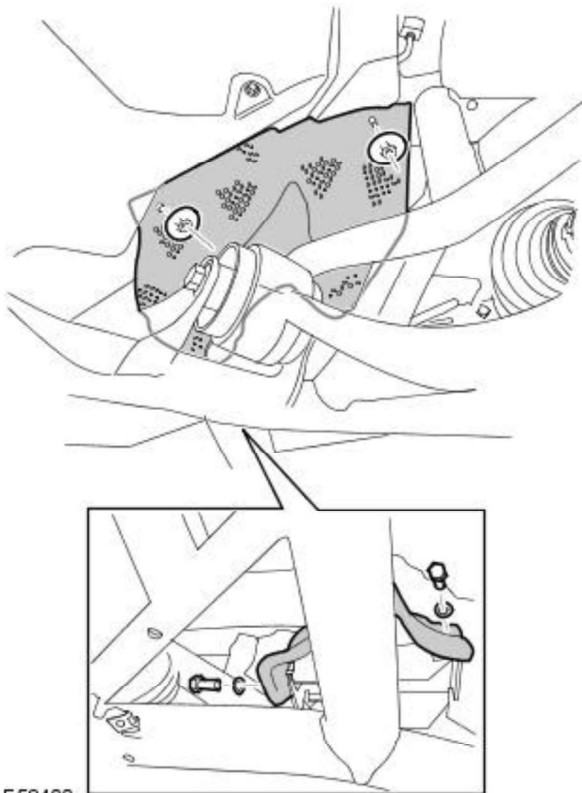
2. Remove the engine undershield.
For additional information, refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).

3. NOTE: Right-hand shown, left-hand similar.

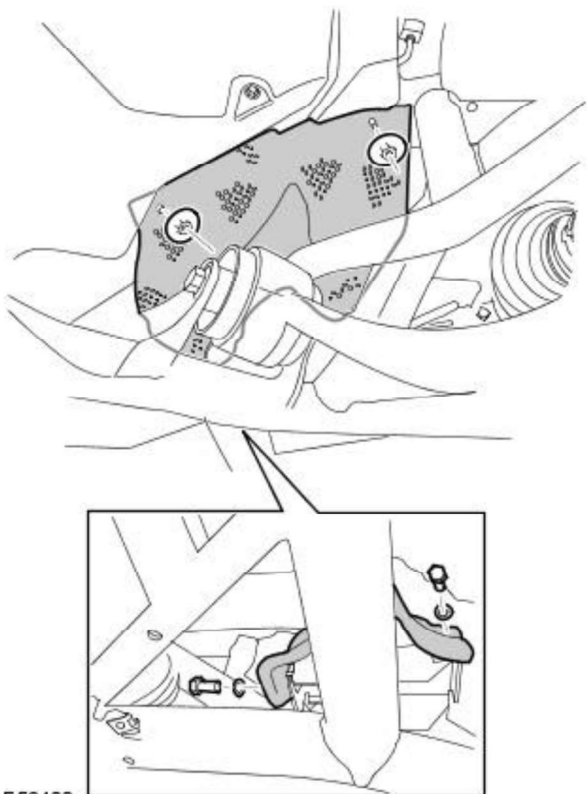
Remove the LH catalytic converter heat shield.

Remove the 2 nuts.

Remove the 2 screws.



E58400

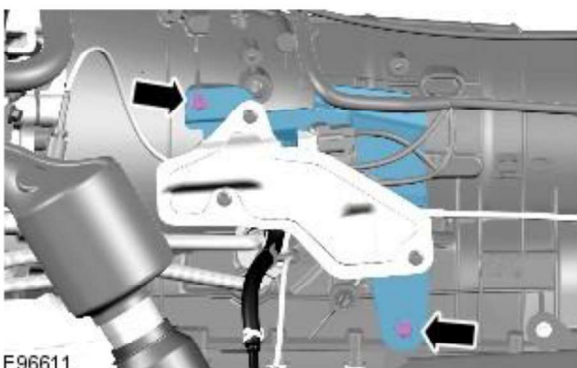


E58400

4. Remove the RH catalytic converter heat shield.

Remove the 2 nuts.

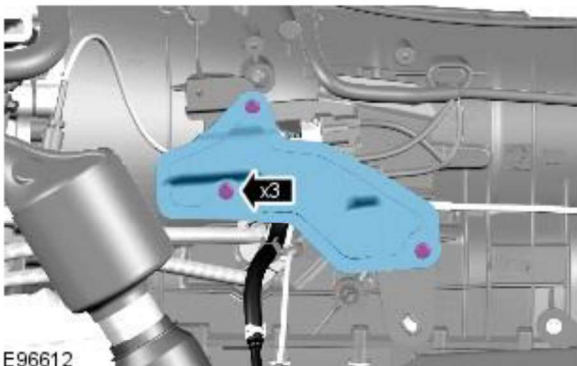
Remove the 2 screws.



E96611

5. Release the LH side diesel particulate filter (DPF) differential pressure sensor bracket.

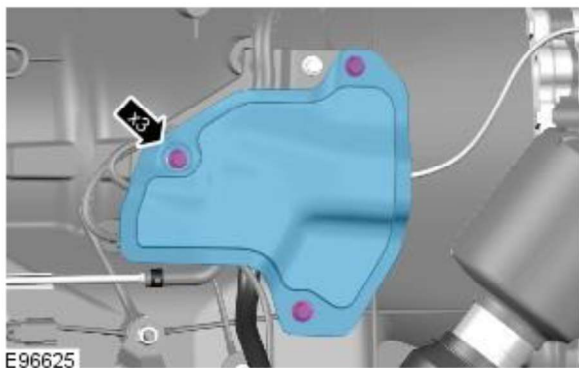
Remove the 2 bolts.



E96612

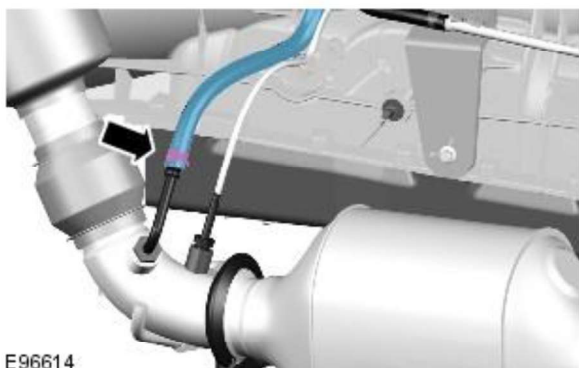
6. Remove the LH side DPF differential pressure sensor heat shield.

Remove the 3 bolts.



7. Remove the RH DPF differential pressure sensor heat shield.

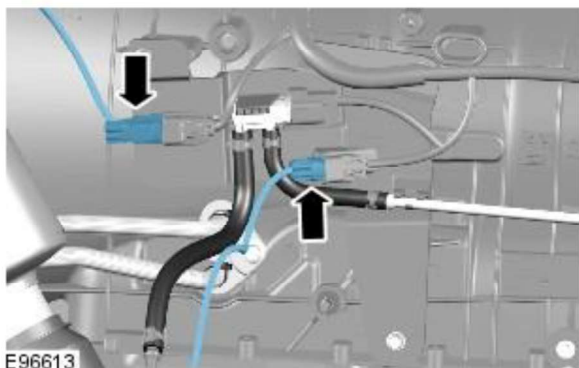
Remove the 3 bolts.



8. NOTE: LH illustration shown, RH is similar.

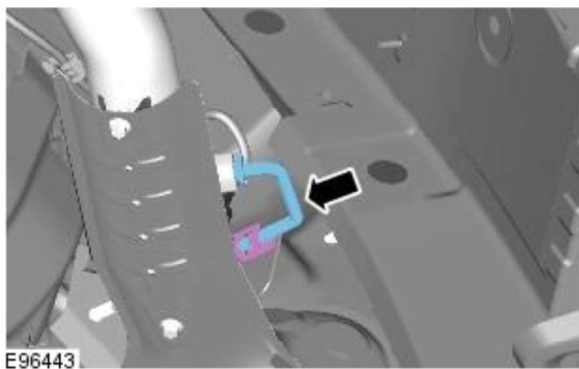
Release the 2 DPF differential pressure sensor high-pressure pipes.

Release the clips.



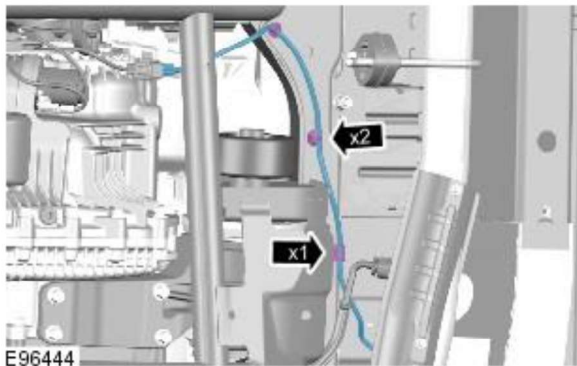
9. NOTE: LH illustration shown, RH is similar.

Disconnect the exhaust gas temperature sensor electrical connectors.



10. NOTE: RH illustration shown, LH is similar.

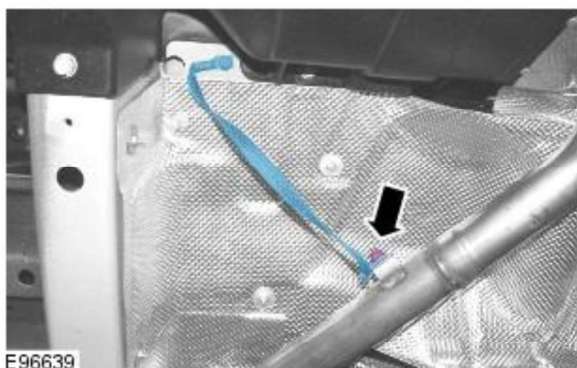
Release the 2 DPF differential pressure sensor low-pressure pipe unions.



11. NOTE: RH illustration shown, LH is similar.

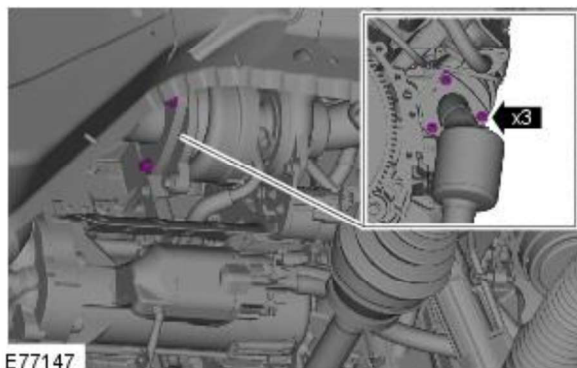
Disconnect the 2 rear exhaust gas temperature sensor electrical connectors.

Release the clips.



12. Disconnect the exhaust system earth lead.

Remove the nut.

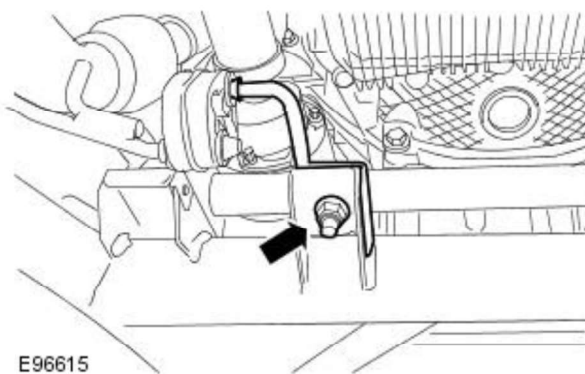


13. NOTE: Right-hand shown, left-hand similar.

Release the exhaust system from the turbochargers.

Remove the 6 bolts.

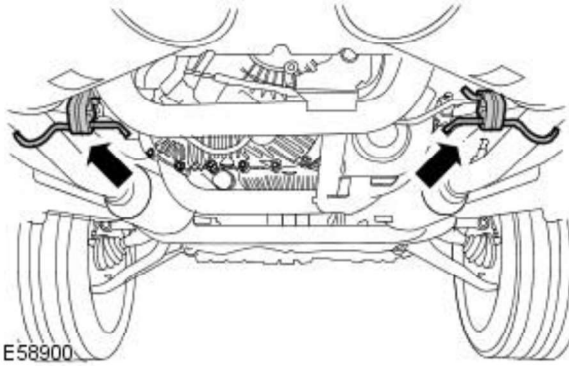
Remove and discard the 2 gaskets.



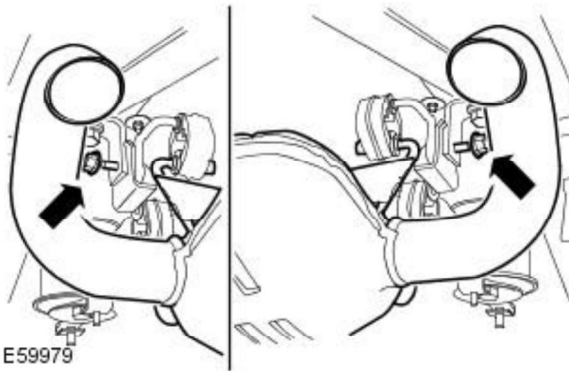
14. NOTE: LH illustration shown, RH is similar.

Release the 2 front exhaust hanger brackets.

Remove and discard the nuts.



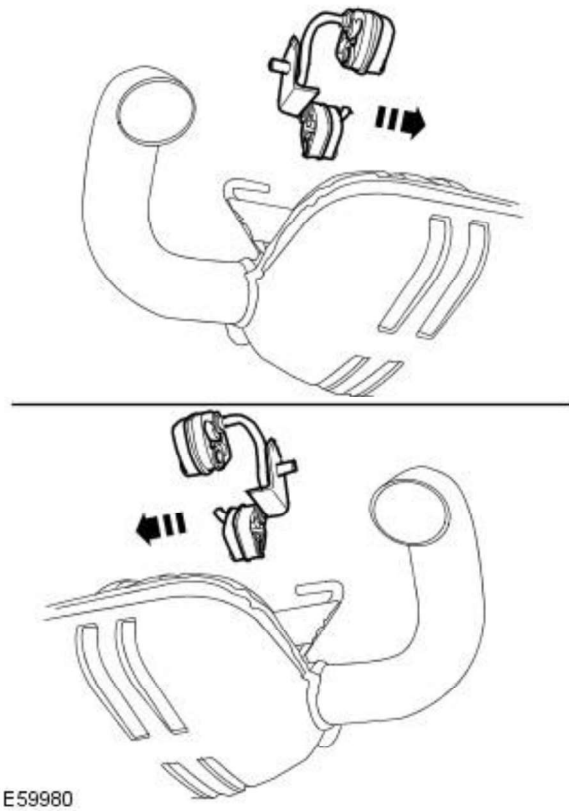
- 15.** With assistance, support the exhaust system and unhook the hangers.



- 16.** With assistance, remove the exhaust system.

Remove the 2 nuts.

Release the 2 exhaust hangers.



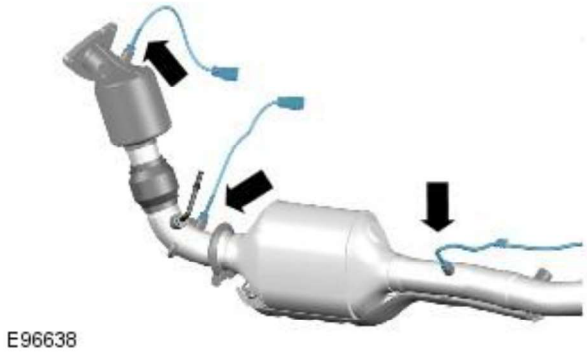
- 17. NOTE:** Do not disassemble further if the component is removed for access only.

Remove the exhaust hangers.

18. NOTE: Make a note of the fitted positions of the sensors before removal.

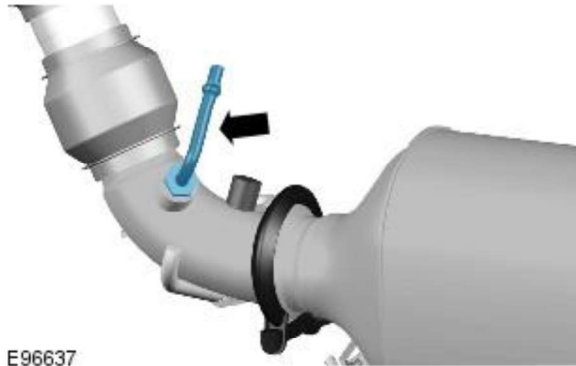
- NOTE: LH illustration shown, RH is similar.

Remove the 6 exhaust gas temperature sensors.



E96638

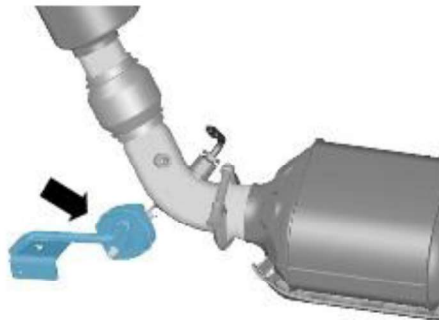
19. Remove the 2 DPF differential pressure sensor high-pressure pipe unions.



E96637

20. NOTE: RH illustration shown, LH is similar.

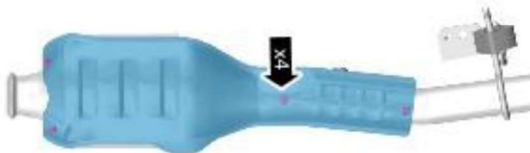
Remove the 2 front exhaust hangers.



E96857

21. Remove the 2 DPF grass shields.

Remove the bolts.



E96447

Installation

1. Install the 2 DPF grass shields.

Tighten to 10 Nm (7 lb.ft).

2. Install the 2 front exhaust hangers.
3. Install the 2 DPF differential pressure sensor high-pressure pipe unions.

Tighten to 25 Nm (18 lb.ft).

4. **NOTE:** Install the components to their original fitted positions.

Install the 6 exhaust gas temperature sensors.

Tighten to 35 Nm (26 lb.ft).


5. Install the exhaust hangers.
6. With assistance, install the exhaust system.

Attach the exhaust hangers.

Tighten the nuts to 45 Nm (33 lb.ft).

7. With assistance, attach the exhaust hangers.
8. Secure the 2 front exhaust hanger brackets.

Tighten the new nuts to 45 Nm (33 lb.ft).

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

Secure the LH and RH catalytic converters to the turbochargers.

Install new gaskets.

Tighten the bolts to 21 Nm (15 lb.ft).

10. Connect the exhaust system earth lead.

Tighten the nut to 25 Nm (18 lb.ft).

11. Connect the 2 rear exhaust gas temperature sensor electrical connectors.
12. Connect the exhaust gas temperature sensor electrical connectors.
13. Secure the 2 DPF differential pressure sensor low-pressure pipe unions.

Tighten to 25 Nm (18 lb.ft).

14. Secure the 2 DPF differential pressure sensor high-pressure pipes.

Secure the clips.

15. Install the RH DPF differential pressure sensor heat shield.

Tighten the 3 bolts to 4 Nm (3 lb.ft).

16. Install the LH DPF differential pressure sensor heat shield.

Tighten the 3 bolts to 4 Nm (3 lb.ft).

17. Secure the LH DPF differential pressure sensor bracket.

Tighten the 2 bolts to 10 Nm (7 lb.ft).

- 18.** Install the LH catalytic converter heat shield.

Install the 2 screws.

Install the 2 nuts.

- 19.** Install the RH catalytic converter heat shield.

Install the 2 nuts.

Install the 2 screws.

- 20.** Install the engine undershield.


For additional information, refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).

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Exhaust System - TDV8 3.6L Diesel - Tailpipe

Removal and Installation

Special Tool(s)

 <p>E45589</p>	<p>Pipe cutter-exhaust (LRT-99-027)</p> <p>100-051</p>
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Removal

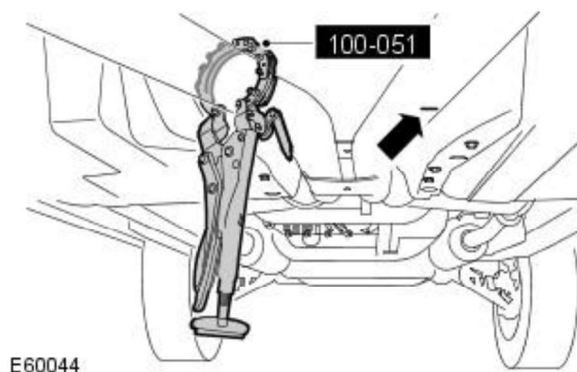
- 1.**  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

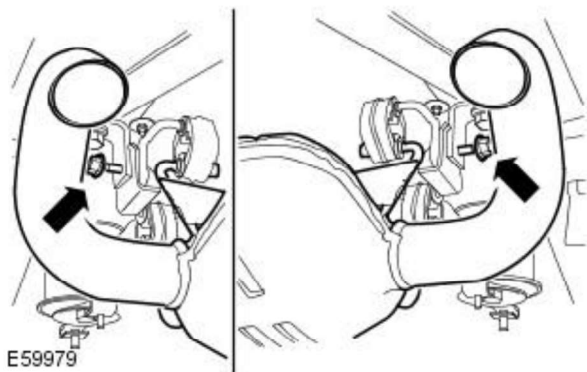
Raise and support the vehicle.

- 2.** Release the tail pipe.

Using 100-051, cut the tail pipe at the point indicated by a depression in the pipe.

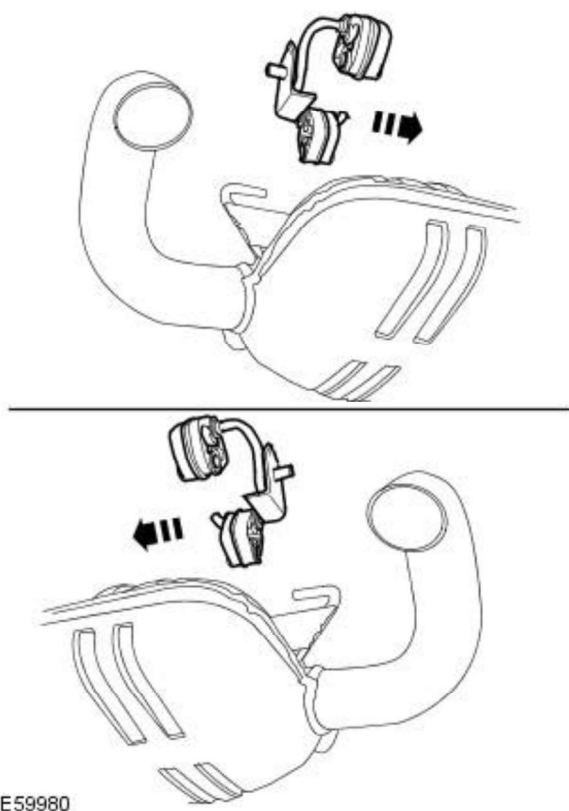
Repeat the above procedure for the remaining pipe.





3. With assistance, remove the tail pipe.

Remove the 2 nuts.



4. Remove both rear exhaust hanger assemblies.

Installation

1. Install the rear exhaust hanger assemblies.
2. **NOTE: Do not tighten the retaining clamps at this stage.**

With assistance, install the tail pipe.

Clean the components.

Install the retaining clamps.

3. Align the tail pipe and tighten the retaining clamps to 55 Nm (40 lb.ft).

Published: 11-May-2011

Fuel System - General Information -

Torque Specification

Description	Nm	lb-ft
Fuel tank module locking ring	25	18
Fuel tank access cover nuts	10	7
Spare wheel removal strap Allen bolts	45	33

Published: 11-May-2011

Fuel System - General Information - Diesel Filter Water Drain-Off

General Procedures

• WARNINGS:



The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



Do not carry or operate cellular phones when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



If fuel contacts the eyes, flush the eyes with cold water or eyewash solution and seek immediate medical attention.

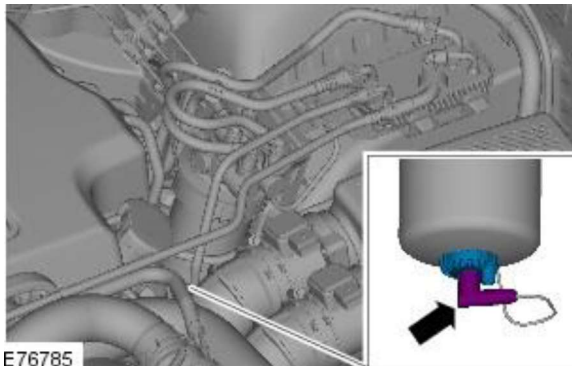


Wash hands thoroughly after fuel handling, as prolonged contact may cause irritation. Should irritation develop, seek medical attention.



CAUTION: Diesel fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is therefore essential that absolute cleanliness is observed when working with these components. Always install blanking plugs to any open orifices or lines. Failure to follow this instruction may result in foreign matter ingress to the fuel injection system.

1. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).



E76785

2. Drain the fuel filter element.

Disconnect the water-in-fuel sensor electrical connector.

Attach a suitable drain tube to the water-in-fuel sensor drain port.

Loosen the water-in-fuel sensor one complete turn and allow the fuel to drain into a container.

Remove the drain tube.

Remove the container.

3. Tighten the water-in-fuel sensor.
4. Connect the water-in-fuel sensor electrical connector.
5. Connect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).

6. Bleed the fuel system.



For additional information, refer to: [Low-Pressure Fuel System Bleeding - TDV8 3.6L Diesel](#) (310-00 Fuel System - General Information, General Procedures).

Published: 11-May-2011

Fuel System - General Information - Fuel System Pressure Check

General Procedures

Special Tool(s)

	Adapter - fuel pressure check 310-116(LRT-19-006A)
	Gauge fuel pressure 310-116-01

- WARNINGS:



Do not carry out any repairs to the fuel system with the engine running. The fuel pressure within the system can be as high as 1650 bar (23,931 lb-sq-in). Failure to follow this instruction may result in personal injury.



Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



If fuel contacts the eyes, flush the eyes with cold water or eyewash solution and seek immediate medical attention.



Place the vehicle in a well ventilated, quarantined area and arrange ' No Smoking/Petrol Fumes' signs about the vehicle.



Wait at least 30 seconds after the engine stops before commencing any repair to the high-pressure fuel injection system. Failure to follow this instruction may result in personal injury.



Wash hands thoroughly after fuel handling, as prolonged contact may cause irritation. Should irritation develop, seek medical attention.



Do not carry or operate cellular phones when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

- CAUTIONS:

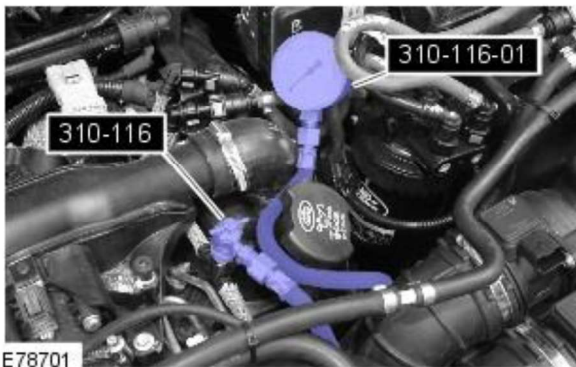


Make sure that any protective clothing worn is clean and made from lint-free non-flocking material.



Make sure the workshop area in which the vehicle is being worked on is as clean and as dust free as possible. Foreign matter from work on clutches, brakes or from machining or welding operations can contaminate the fuel system and may result in later malfunction.

1. Remove the engine cover.
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
2. Remove the Schraeder valve cap.
3. Install the special tool union to the Schraeder valve.



4. Start and run the engine.

Open the valve on the special tool.

Note the fuel pressure readings.

5. Switch the engine off.
6. Close the valve on the special tool.
7. Remove the special tool.
8. Install the Schraeder valve cap.
9. Install the engine cover.
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

Published: 11-May-2011

Fuel System - General Information - Fuel Tank Draining

General Procedures

• WARNINGS:



Place the vehicle in a well ventilated, quarantined area and arrange ' No Smoking/Petrol Fumes' signs about the vehicle.



Do not carry or operate cellular phones when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



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

1. Open the fuel filler door and remove the cap.
2. Disconnect the battery ground cable.
For additional information, refer to: Specifications (414-00, Specifications).
3. Connect the fuel tank drain equipment ground cable to the vehicle.
4. Remove the fuel from the fuel tank, via the filler neck, using the fuel tank draining equipment. Follow the manufacturer's operating instructions.
5. Remove the LH C-pillar lower trim panel.
For additional information, refer to: [C-Pillar Lower Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
6. Remove the RH C-pillar lower trim panel.
7. Release the spare wheel removal straps.

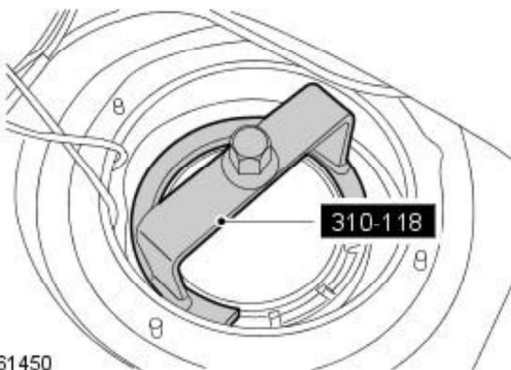
Remove the 2 Allen bolts.


8. Lift the carpet for access.



9. Remove the LH fuel tank access cover.

Remove the 4 nuts.



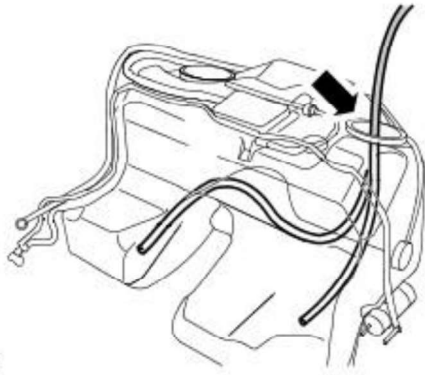
10.  **CAUTION:** Before disconnecting or removing components, ensure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

Remove the LH fuel sender cover.

Using the special tool, remove the fuel sender cover locking ring.

Release the LH fuel sender cover.

Remove and discard the seal.



E61451

11. Remove the remaining fuel from the fuel tank, via the LH sender unit access aperture, using the fuel tank draining equipment. Follow the manufacturer's operating instructions.

12. Install the LH fuel sender cover.

Install a new seal.

Using the special tool, install the fuel tank module locking ring and tighten to 35 Nm (26 lb.ft).

13. Install the LH fuel tank access cover.

Tighten the 4 nuts to 10 Nm (7 lb.ft).

14. Position the carpet.

15. Attach the spare wheel removal straps.

Tighten the Allen bolts to 45 Nm (33 lb.ft).

16. Install the RH C-pillar lower trim panel.

17. Install the LH C-pillar lower trim panel.

For additional information, refer to: [C-Pillar Lower Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

18. Connect the battery ground cable.

For additional information, refer to: Specifications (414-00, Specifications).

Published: 11-May-2011

Fuel System - General Information - High-Pressure Fuel System Bleeding TDV8 3.6L Diesel

General Procedures

1. Set the ignition to the ON position and wait for 60 seconds.

2.  **CAUTION:** Do not crank the engine for more than 20 seconds.

Start the engine.

3. **NOTE:** If the engine does not start, wait for 5 seconds and repeat step 2.

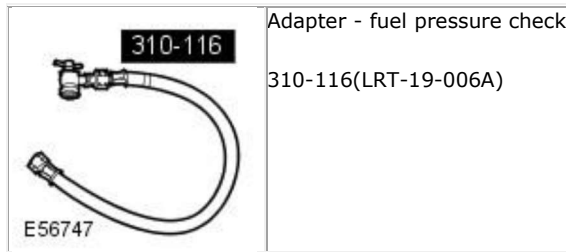
Set the ignition to the OFF position.

Published: 11-May-2011

Fuel System - General Information - Low-Pressure Fuel System Bleeding TDV8 3.6L Diesel

General Procedures

Special Tool(s)



- WARNINGS:



Do not carry out any repairs to the fuel system with the engine running. The fuel pressure within the system can be as high as 1650 bar (23,931 lb-sq-in). Failure to follow this instruction may result in personal injury.



Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



If fuel contacts the eyes, flush the eyes with cold water or eyewash solution and seek immediate medical attention.



Place the vehicle in a well ventilated, quarantined area and arrange ' No Smoking/Petrol Fumes' signs about the vehicle.



Wait at least 30 seconds after the engine stops before commencing any repair to the high-pressure fuel injection system. Failure to follow this instruction may result in personal injury.



Wash hands thoroughly after fuel handling, as prolonged contact may cause irritation. Should irritation develop, seek medical attention.



Do not carry or operate cellular phones when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

- CAUTIONS:



Make sure that any protective clothing worn is clean and made from lint-free non-flocking material.

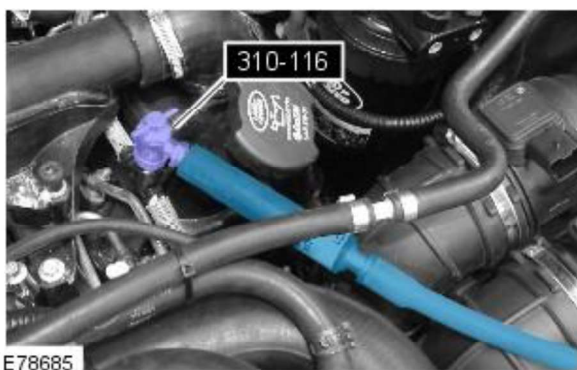


Make sure the workshop area in which the vehicle is being worked on is as clean and as dust free as possible. Foreign matter from work on clutches, brakes or from machining or welding operations can contaminate the fuel system and may result in later malfunction.

1. Remove the engine cover.
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
2. Remove the Schraeder valve cap.



3. Install the special tool union to the Schraeder valve.



4. Connect a suitable clean piece of clear tube to the special tool.

Position the piece of clear tube in a suitable fluid container.

Open the valve on the special tool.

5. Turn the ignition key to position II to operate the fuel pump.

6. **NOTE:** The fuel pump will only operate for a set time and will switch off if it does not see a crank signal.

Repeat the above procedure until air-free fuel flows from the piece of clear tube.

7. Disconnect the piece of clear tube from the special tool.

Remove the container.

Close the valve on the special tool.

8. Remove the special tool.

9. Install the Schraeder valve cap.

10. Install the engine cover.

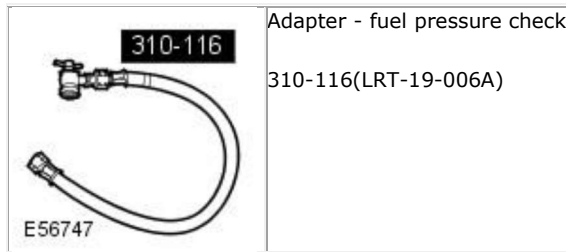
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

Published: 11-May-2011

Fuel System - General Information - Low-Pressure Fuel System Bleeding TDV8 3.6L Diesel

General Procedures

Special Tool(s)



• WARNINGS:



Do not carry out any repairs to the fuel system with the engine running. The fuel pressure within the system can be as high as 1650 bar (23,931 lb-sq-in). Failure to follow this instruction may result in personal injury.



Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



If fuel contacts the eyes, flush the eyes with cold water or eyewash solution and seek immediate medical attention.



Place the vehicle in a well ventilated, quarantined area and arrange ' No Smoking/Petrol Fumes' signs about the vehicle.



Wait at least 30 seconds after the engine stops before commencing any repair to the high-pressure fuel injection system. Failure to follow this instruction may result in personal injury.



Wash hands thoroughly after fuel handling, as prolonged contact may cause irritation. Should irritation develop, seek medical attention.



Do not carry or operate cellular phones when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

• CAUTIONS:

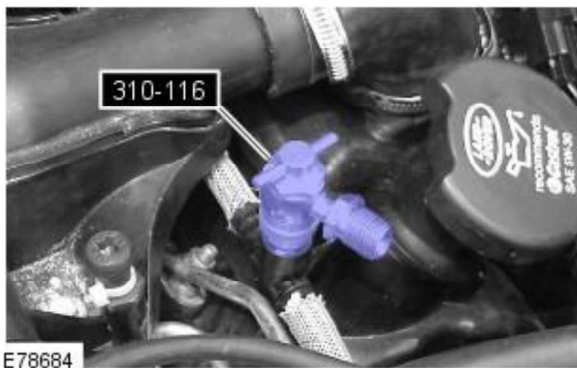


Make sure that any protective clothing worn is clean and made from lint-free non-flocking material.

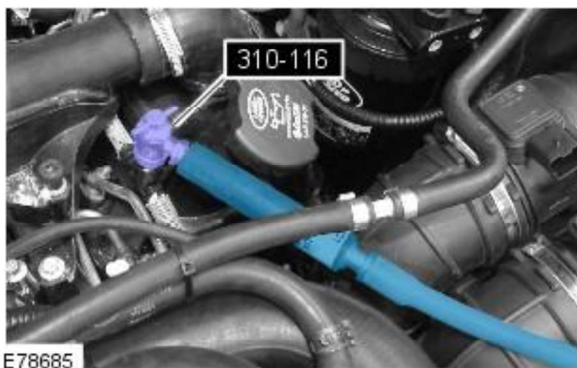


Make sure the workshop area in which the vehicle is being worked on is as clean and as dust free as possible. Foreign matter from work on clutches, brakes or from machining or welding operations can contaminate the fuel system and may result in later malfunction.

1. Remove the engine cover.
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
2. Remove the Schraeder valve cap.



3. Install the special tool union to the Schraeder valve.



4. Connect a suitable clean piece of clear tube to the special tool.

Position the piece of clear tube in a suitable fluid container.

Open the valve on the special tool.

5. Turn the ignition key to position II to operate the fuel pump.

6. **NOTE:** The fuel pump will only operate for a set time and will switch off if it does not see a crank signal.

Repeat the above procedure until air-free fuel flows from the piece of clear tube.

7. Disconnect the piece of clear tube from the special tool.

Remove the container.

Close the valve on the special tool.

8. Remove the special tool.

9. Install the Schraeder valve cap.

10. Install the engine cover.

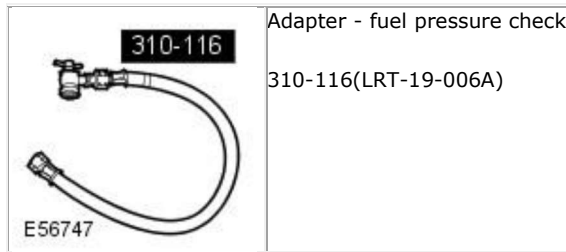
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

Published: 11-May-2011

Fuel System - General Information - Low-Pressure Fuel System Bleeding TDV8 3.6L Diesel

General Procedures

Special Tool(s)



- WARNINGS:



Do not carry out any repairs to the fuel system with the engine running. The fuel pressure within the system can be as high as 1650 bar (23,931 lb-sq-in). Failure to follow this instruction may result in personal injury.



Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.



If fuel contacts the eyes, flush the eyes with cold water or eyewash solution and seek immediate medical attention.



Place the vehicle in a well ventilated, quarantined area and arrange 'No Smoking/Petrol Fumes' signs about the vehicle.



Wait at least 30 seconds after the engine stops before commencing any repair to the high-pressure fuel injection system. Failure to follow this instruction may result in personal injury.



Wash hands thoroughly after fuel handling, as prolonged contact may cause irritation. Should irritation develop, seek medical attention.



Do not carry or operate cellular phones when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

- CAUTIONS:



Make sure that any protective clothing worn is clean and made from lint-free non-flocking material.

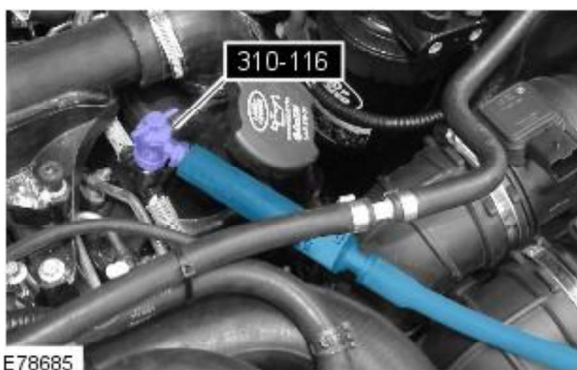


Make sure the workshop area in which the vehicle is being worked on is as clean and as dust free as possible. Foreign matter from work on clutches, brakes or from machining or welding operations can contaminate the fuel system and may result in later malfunction.

1. Remove the engine cover.
For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
2. Remove the Schraeder valve cap.



3. Install the special tool union to the Schraeder valve.



4. Connect a suitable clean piece of clear tube to the special tool.

Position the piece of clear tube in a suitable fluid container.

Open the valve on the special tool.

5. Turn the ignition key to position II to operate the fuel pump.

6. **NOTE:** The fuel pump will only operate for a set time and will switch off if it does not see a crank signal.

Repeat the above procedure until air-free fuel flows from the piece of clear tube.

7. Disconnect the piece of clear tube from the special tool.

Remove the container.

Close the valve on the special tool.

8. Remove the special tool.

9. Install the Schraeder valve cap.

10. Install the engine cover.

For additional information, refer to: [Engine Cover - TDV8 3.6L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

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Fuel Tank and Lines - TDV8 3.6L Diesel -

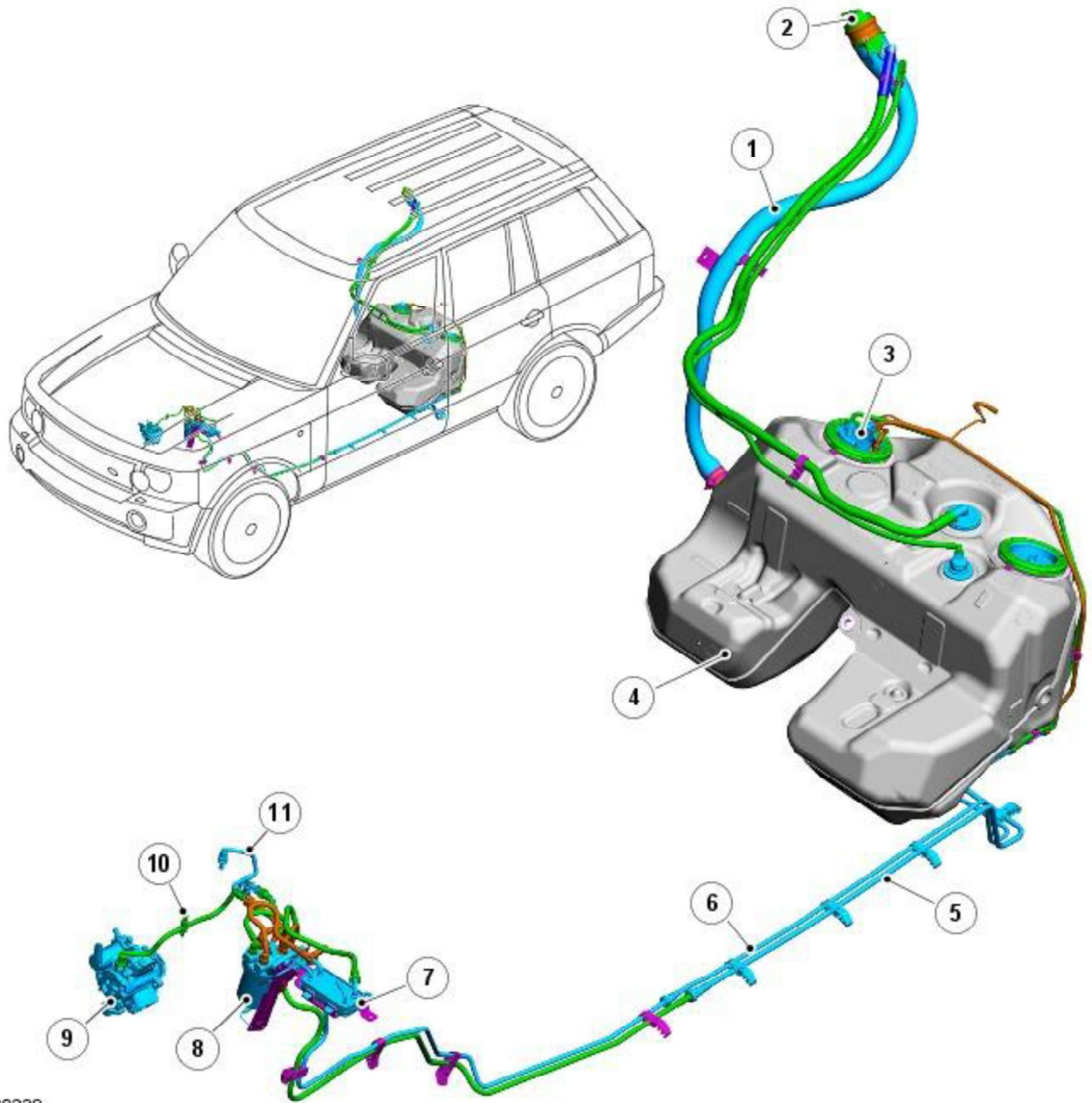
Torque Specifications

Description	Nm	lb-ft
Fuel tank access cover nuts	10	7
Fuel tank filler pipe bolt	10	7
Fuel tank retaining bolts	45	33
Fuel tank shield nuts/bolts	25	18
Auxiliary fuel cooler retaining bolts	5	4
Fuel cooler retaining bolt	23	17

Published: 11-May-2011

Fuel Tank and Lines - TDV8 3.6L Diesel - Fuel Tank and Lines

TDV8 COMPONENT LOCATION



E80238

Item	Part Number	Description
1	-	Fuel filler pipe
2	-	Fuel filler cap
3	-	Fuel delivery pump module
4	-	Fuel tank
5	-	Return pipe from fuel filter to tank
6	-	Pressure feed pipe to filter and high pressure fuel pump
7	-	Fuel cooler
8	-	Fuel filter
9	-	High-pressure fuel pump
10	-	Schraeder valve
11	-	Return pipe from high pressure fuel pump

INTRODUCTION

The fuel system is divided into 2 sub systems:

Low pressure system

High pressure system.

The low pressure system features the following components:

Fuel tank

Fuel pump delivery module in tank

Outlet protection valves

Body mounted fuel to coolant cooler

Fuel filter with water in fuel sensor and water drain plug

Air bleed schraeder valve.

The low pressure system pressure is 0.5 bar and the return pressure is less than 0.5 bar.

The pressure in the high pressure system is up to 1750 bar. The high pressure system is described in Fuel and Charging Controls

For additional information, refer to: [Fuel Charging and Controls](#) (303-04C Fuel Charging and Controls - TDV8 3.6L Diesel, Description and Operation).

FUEL TANK

The fuel tank is a saddle type tank and is constructed from moulded plastic. It is located towards the rear of the vehicle just in front of the rear suspension. The fuel tank has a 104.5 liter (27.6 US gallons) capacity and incorporates one roll over valve to prevent fuel leakage through the vent in the event of a vehicle roll over.

The tank has two apertures on the top of the tank. The right hand aperture provides for the location of the advance delivery fuel pump which is sealed in the aperture with a sealing ring and secured with a locking ring. The left hand aperture has a flange plate which is sealed in the aperture with a sealing ring and secured with a locking ring. The flange, when removed, allows access to the left-hand (LH) fuel level sensor and remote jet pump assembly.

The tank fuel level is monitored by two fuel level sensors which are connected to the instrument cluster. A fuel warning lamp in the instrument cluster is illuminated when there is approximately 12 liters (3.17 US Gallons) of useable fuel remaining in the tank.

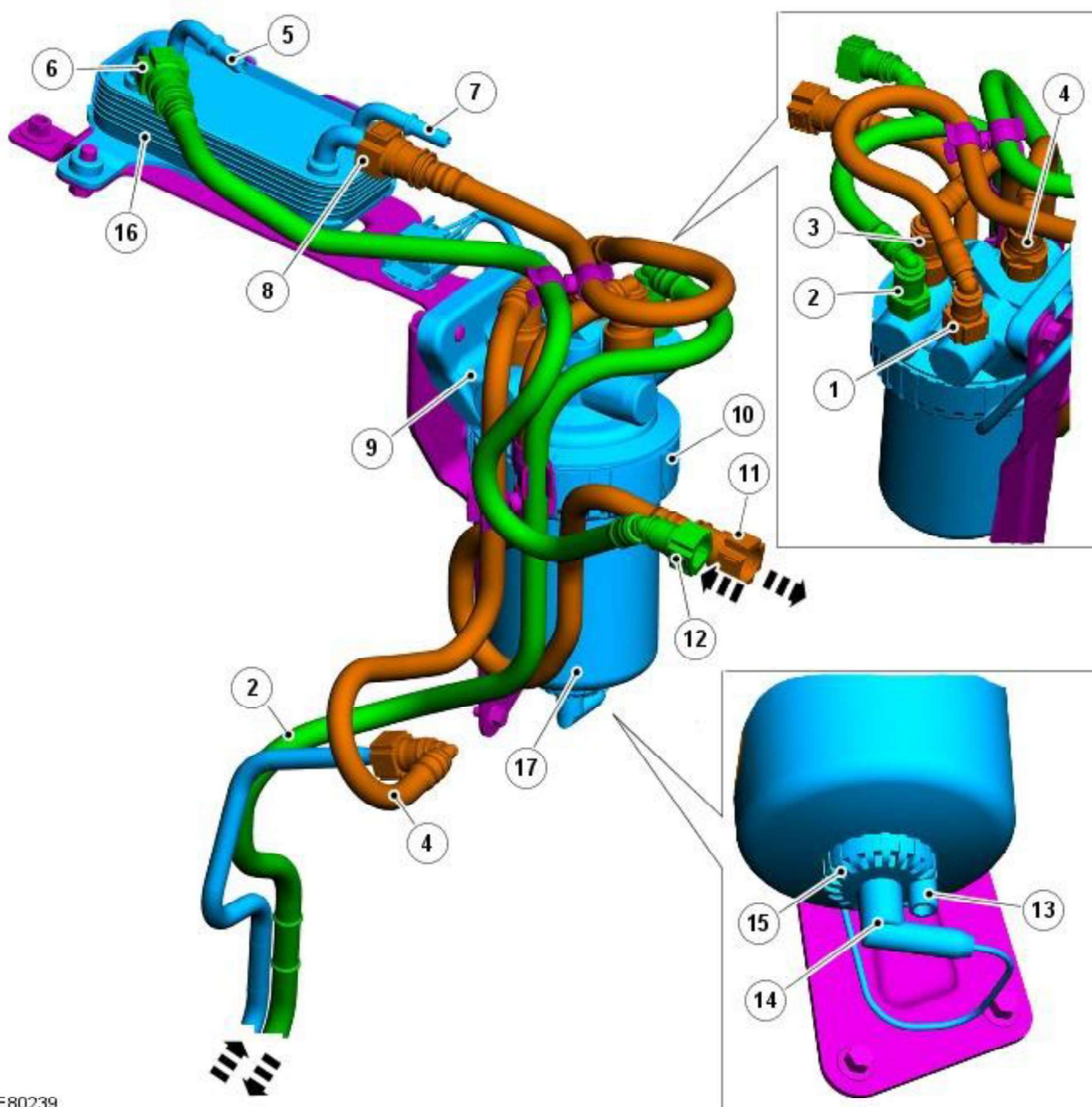
Low Fuel Strategy

The engine control module (ECM) is programmed with a strategy which shuts the engine off before the fuel tank runs dry. This is to prevent fuel system damage by air being drawn into the high pressure fuel pump. For additional information, refer to: [Electronic Engine Controls](#) (303-14C Electronic Engine Controls - TDV8 3.6L Diesel, Description and Operation).

A misfire is induced when the fuel in the tank reaches approximately 0.25 liters (0.06 US Gallons) of useable fuel remaining to alert the driver to this condition. The engine is shut down when the fuel in the tank reaches 0.00 liters (0.00 US Gallons) of useable fuel remaining in the tank and 4.0 liters (1.05 US Gallons) of un-useable fuel remaining.

To reset the fuel strategy after engine shutdown, it is required that a minimum of 4 liters (1.05 US Gallons) of fuel is added to the fuel tank, when the vehicle is on level ground.

FUEL COOLER AND FILTER ASSEMBLY



E80239

Item	Part Number	Description
1	-	Pipe connection - fuel cooler to fuel filter
2	-	Pipe connection - Air bleed fuel return - fuel filter to fuel tank
3	-	Pipe connection - fuel feed - fuel filter to high-pressure fuel pump
4	-	Pipe connection - fuel feed - fuel tank to fuel filter
5	-	Pipe connection - fuel cooler - engine coolant inlet
6	-	Pipe connection - fuel return - engine to fuel cooler
7	-	Pipe connection - fuel cooler - engine coolant outlet
8	-	Pipe connection - fuel return - fuel cooler to fuel filter
9	-	Fuel filter housing
10	-	Fuel filter locking ring
11	-	Pipe connection - fuel feed to high-pressure pump
12	-	Pipe connection - fuel return - engine to fuel cooler
13	-	Water drain outlet
14	-	Water sensor electrical connector

15	-	Water sensor
16	-	Fuel cooler
17	-	Fuel filter

The fuel cooler and filter assembly is located in the LH side of the engine compartment.

The fuel cooler is located on a bracket on top of the inner fender suspension turret. The fuel cooler is connected to the engine cooling system and cools the fuel by heat transfer through internal galleries within the cooler.

Four quick release fittings are located on the top face of the filter head. Fuel from the fuel pump module in the fuel tank is passed to the filter housing and through the filter to the high-pressure fuel pump.

Fuel returning from the high pressure pump is passed through a combined air/fuel cooler located in a central position on the engine before being passed to the body mounted fuel/coolant cooler, adjacent to the filter. From the fuel cooler, the fuel is passed back into the fuel filter and excess fuel and air is sent back to the fuel tank via the return line.

The fuel cooler receives a flow of engine coolant which is directed through a dedicated air blast cooler located in front of the engine cooling radiator. This allows the engine coolant to be directly cooled before it passes through the fuel cooler improving the efficiency of the fuel cooling.

For additional information, refer to: [Engine Cooling](#) (303-03B Engine Cooling - V8 4.4L Petrol, Description and Operation).

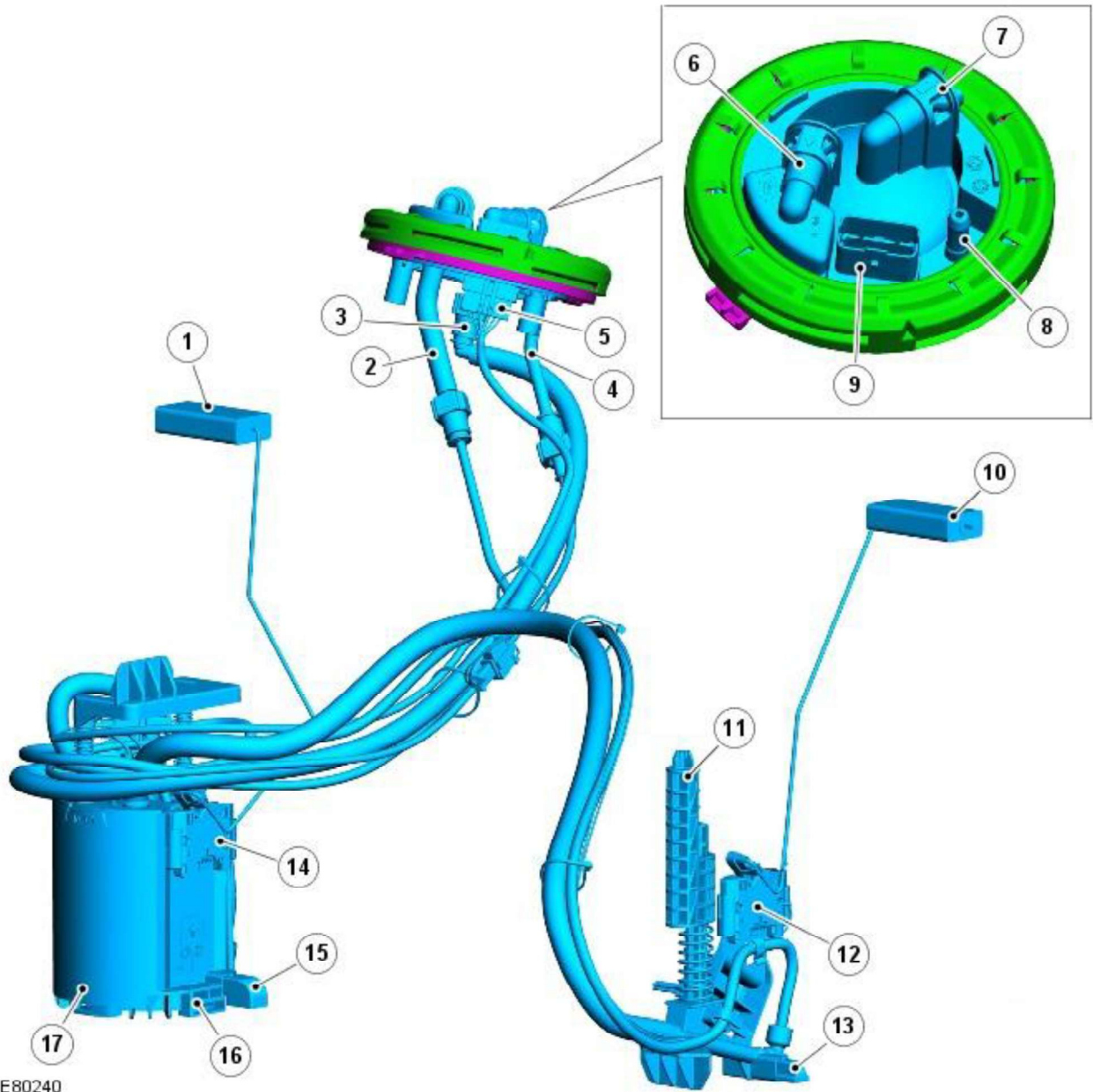
The filter element is located on the underside of the filter head and is secured in position with a plastic locking ring. Rotation of this ring allows removal and fitment of the filter for servicing purposes. The filter can trap particulate matter of 2 microns or more and has a fuel capacity of 372 cm³.

The filter is fitted with a removable water sensor which is secured in the base of the filter. The sensor can be unscrewed and fitted to the new filter. The water sensor housing also incorporates a water drain. A tube can be fitted to the drain to collect the water/fuel mixture and by rotating the sensor housing, the fuel can be drained to purge the filter of any water collected in it. This is performed at service intervals defined in the service schedule and differs between markets.

The maximum water capacity of the fuel filter is 158 ml and this is the minimum amount required to drain from the filter at service to ensure all water has been removed.

The water sensor operates on the principle of differing resistance values to the transmission of current through water and fuel. When the volume of water in the fuel reaches 85 cm³ or more, the sensor value is sensed by the ECM. The ECM transmits a message on the high speed controller area network (CAN) bus to the instrument cluster which displays a message 'WATER IN FUEL VISIT DEALER' in the message centre.

FUEL PUMP DELIVERY MODULE



E80240

Item	Part Number	Description
1	-	right-hand (RH) fuel level sensor float
2	-	Fuel return pipe
3	-	Fuel feed pipe
4	-	Fuel fired heater feed pipe
5	-	Electrical connector
6	-	Fuel return connection
7	-	Fuel feed pressure connection
8	-	Fuel fired heater feed connection
9	-	Electrical connector
10	-	LH fuel level sensor float
11	-	Jet pump assembly
12	-	LH fuel level sensor
13	-	Jet pump coarse filter
14	-	RH fuel level sensor

15	-	Fuel pump coarse filter
16	-	Swirl pot
17	-	Fuel pump (inside swirl pot)

The electric fuel pump is mounted in the swirl pot which is located inside the fuel tank in the RH side of the tank.

The pump collects fuel from the fuel swirl pot at the base of the pump and passes it from the tank into the feed line to the engine mounted, high-pressure fuel pump.

The pump is connected via pipes to a jet pump located in the LH side of the tank. The jet pump delivers fuel to the fuel swirl pot in the RH side of the tank to ensure fuel is always in the RH side of the tank to supply the fuel pump.

Two fuel level sensors are located in the fuel tank. One is attached to the fuel pump body and monitors the fuel level on the RH side of the tank. The second fuel level sensor is attached to the frame of the jet pump and monitors the fuel level in the LH side of the tank. Each sensor is connected on 2 wires to the instrument cluster. The instrument cluster calculates the total fuel tank contents using the two level values from the sensors.

The pump is controlled by the ECM via the fuel pump relay located in the battery junction box (BJB). Should the fuel pump electrical connection need to be disconnected, it is important that the ignition is switched off. If the ignition is on in positions I or II, the instrument cluster will store its last fuel gage needle position prior to power down. Once power is restored the gage will display the last stored position regardless of the actual level of fuel in the tank. This could result in incorrect fuel gage readings if the fuel tank has been drained and not filled with exactly the same quantity of fuel that was removed.

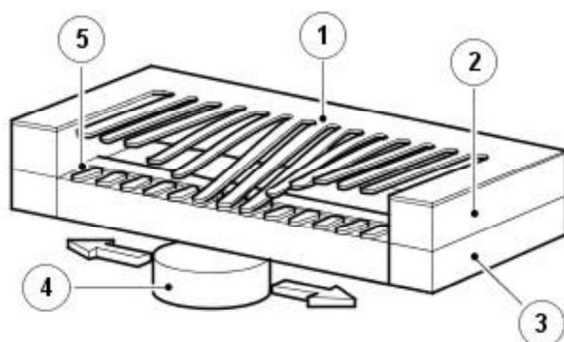
FUEL LEVEL SENSORS

The fuel level sensors are a Magnetic Passive Position Sensor (MAPPS) which provides a variable resistance to ground for the output from the fuel gage. The sensor is sealed from the fuel preventing contamination of the contacts, increasing reliability. Both fuel level sensors are connected to the external electrical connector on the flange via the connectors on the underside of the fuel pump module flange.

The LH and RH sensors are attached to the fuel pump module and the remote jet pump assembly respectively and are accessible via the fuel pump flange apertures.

The sensor comprises a series of 51 film resistors mounted in an arc on a ceramic surface. The resistors are wired in series with individual contacts. A soft magnetic foil with 51 flexible contacts is mounted a small distance above the film resistors. A magnet, located below the ceramic surface, is attached to the sender unit float arm. As the float arm moves, the magnet follows the same arc as the film resistors. The magnet pulls the flexible contacts onto the opposite film resistor contacts forming an electrical circuit.

Sensor Operating Principle



E44504

Item	Part Number	Description
1	-	Magnetic foil
2	-	Spacer