

Fuel Tank and Lines - V8 5.0L Petrol -**Capacity**

Item	Liters
Fuel tank capacity	86.3 (total)

General Specifications

Item	Specifications
Fuel system	Electronic - returnless
Fuel tank	Multi layer plastic
Fuel tank sender units	Two - Front and Rear - front sender unit is attached to the frame of the fuel pick up tube and the rear sender unit is attached to the fuel pump swirl pot
Fuel filter	Located in the fuel tank - if the fuel filter becomes blocked a new pump and sender unit must be installed
Fuel pump	Dual stage electric - submersible - located in fuel tank
System pressure	4.5 bar - 65.3 lbf/in ²
Starting pressure	6.3 bar - 91.4 lbf/in ²

Torque Specifications

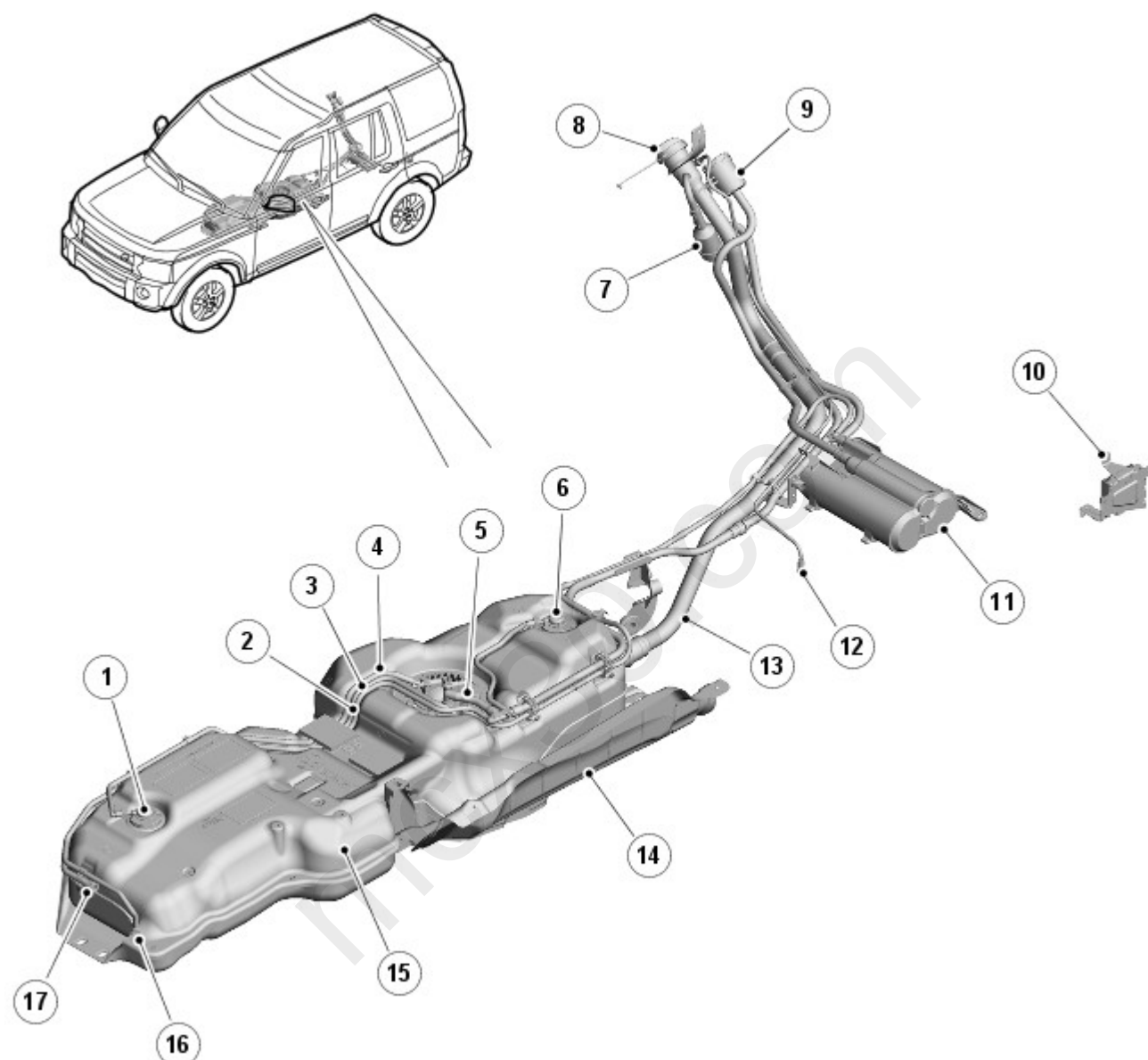
Item	Nm	lb-ft	lb-in
Fuel tank filler pipe retaining bolt	4	-	35
Fuel tank heat shield retaining bolts	6	-	53
Fuel tank heat shield retaining nuts	3	-	27
Fuel tank retaining bolts	45	33	-

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Fuel Tank and Lines - V8 5.0L Petrol - Fuel Tank and Lines

Description and Operation

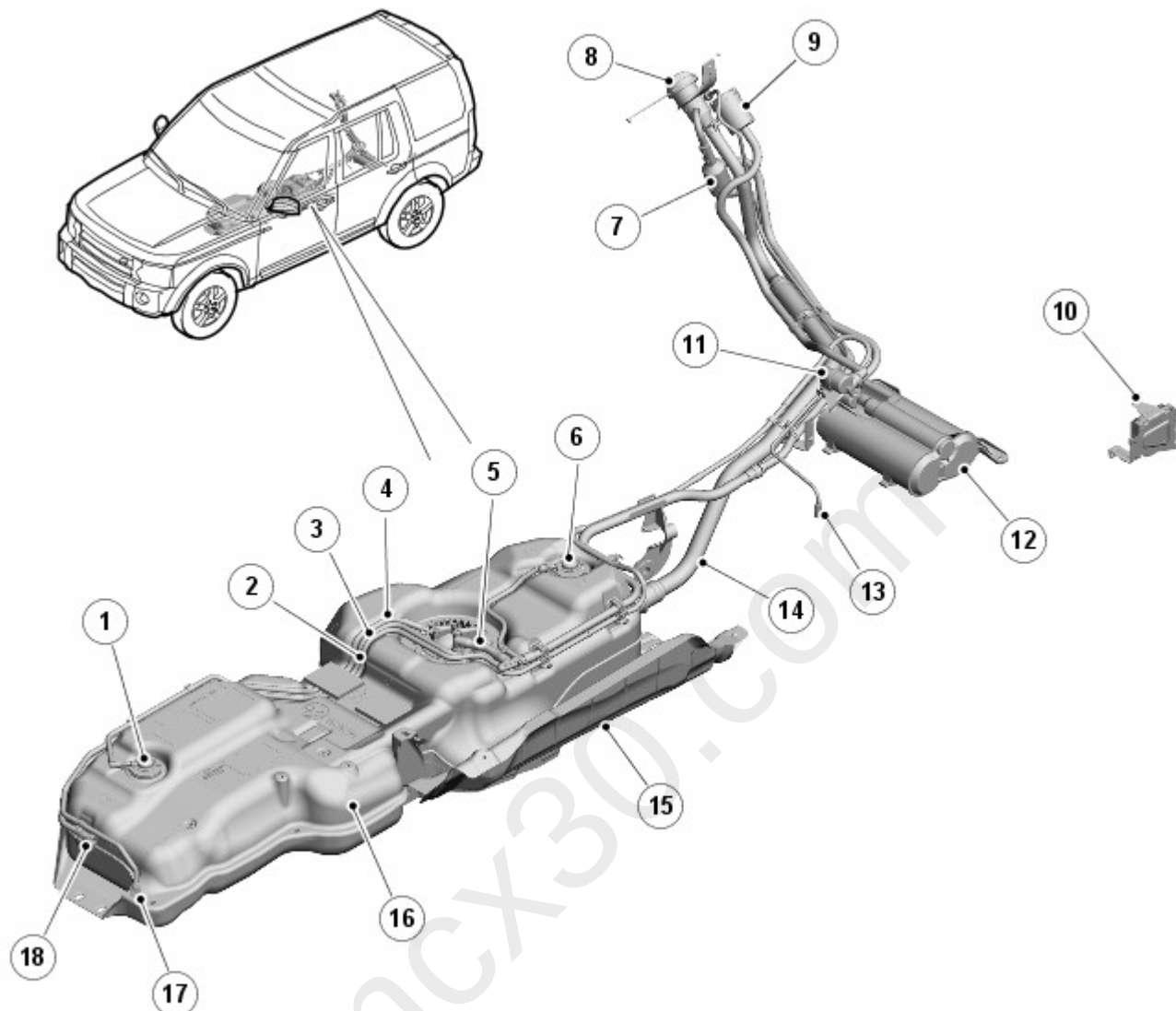
5.0L V8 FUEL TANK AND LINES COMPONENT LOCATION (All except NAS)



E122736

Item	Part Number	Description
1	-	Front Roll Over Valve (ROV)
2	-	Pipe - fuel vapor from charcoal canister to purge valve
3	-	Pipe - vent from front ROV
4	-	Pipe - fuel supply to engine mounted fuel pumps
5	-	Fuel delivery module
6	-	Rear ROV
7	-	Liquid Vapor Separator (LVS)
8	-	Fuel filler cap
9	-	Charcoal canister breather pipe
10	-	Fuel Pump Driver Module (FPDM)
11	-	Charcoal canister
12	-	Pipe - rear differential breather (Reference only)
13	-	Filler pipe
14	-	Heat shield
15	-	Cover
16	-	Pipe - charcoal canister breather connection to purge valve
17	-	Pipe - fuel supply connection to engine mounted fuel pumps

5.0L V8 FUEL TANK AND LINES COMPONENT LOCATION (NAS ONLY)



E122737

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1	-	Front Roll Over Valve (ROV)
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9	-	Charcoal canister breather pipe
10	-	Fuel Pump Driver Module (FPDM)
11	-	Diagnostic Monitoring Tank Leakage (DMTL) pump
12	-	Charcoal canister
13	-	Pipe - rear differential breather (Reference only)
14	-	Filler pipe
15	-	Heat shield
16	-	Cover
17	-	Pipe - connection to purge valve
18	-	Pipe - fuel supply

GENERAL

The major components of the 5.0L V8 fuel system comprises a fuel tank, a fuel delivery module, a fuel filler assembly and

two fuel level sensors.

The 5.0L V8 fuel system uses a returnless fuel system which comprises a fuel pump mounted in the fuel tank to deliver fuel at a variable flow and pressure to the engine mounted high pressure fuel pumps which supply fuel to the fuel rails and to all the fuel injectors.

The fuel pump operation is regulated by a Fuel Pump Driver Module (FPDM) which is controlled by the engine management system. The driver module regulates the flow and pressure supplied by controlling the operation of the fuel pump using a Pulse Width Modulation (PWM) output.

The fuel rails and the injectors are described in Fuel Charging and Controls – 5.0L V8.

For additional information, refer to: [Fuel Charging and Controls](#) (303-04C Fuel Charging and Controls - TDV6 3.0L Diesel, Description and Operation) / [Turbocharger](#) (303-04D Fuel Charging and Controls - Turbocharger - TDV6 3.0L Diesel, Description and Operation).

Fuel system emission control is described in Engine Emission Control - 5.0L V8

For additional information, refer to: [Electronic Engine Controls](#) (303-14B Electronic Engine Controls - TDV6 3.0L Diesel, Description and Operation) / [Electronic Engine Controls](#) (303-14C Electronic Engine Controls - V6 4.0L Petrol, Description and Operation).

FUEL TANK

The fuel tank is located on the right hand side of the vehicle, between the transmission and the right hand chassis longitudinal. The tank is located on a mounting cradle which secures the whole fuel tank assembly to the vehicle. The tank is blow moulded from HDPE (high density polyethylene) and has a useable capacity of 86.0 liters (19 gallons).

The cradle is attached to the chassis with six screws. When the cradle is attached to the chassis, the tank is positively secured via foam pads which bear against the central chassis cross beam. A protective cover is fitted to the front right hand corner of the tank and provides additional protection.

The fuel tank is manufactured from moulded plastic which is a minimum of 3 mm thick. The tank is a sealed unit with the only internal access being via the pump module flange aperture on the top of the tank.

The flange is fitted with a locking ring and seal. The seal locates in a groove on the tank. The locking ring locates and clamps on the encapsulated ring that is moulded into the fuel tank. The flange has a tag which locates in the top of the tank to ensure correct orientation.

The flange has six pin internal and external connectors which provide for electrical connections for the level sensors and the fuel pump. A quick release connector provides for the connection of the fuel supply pipe.

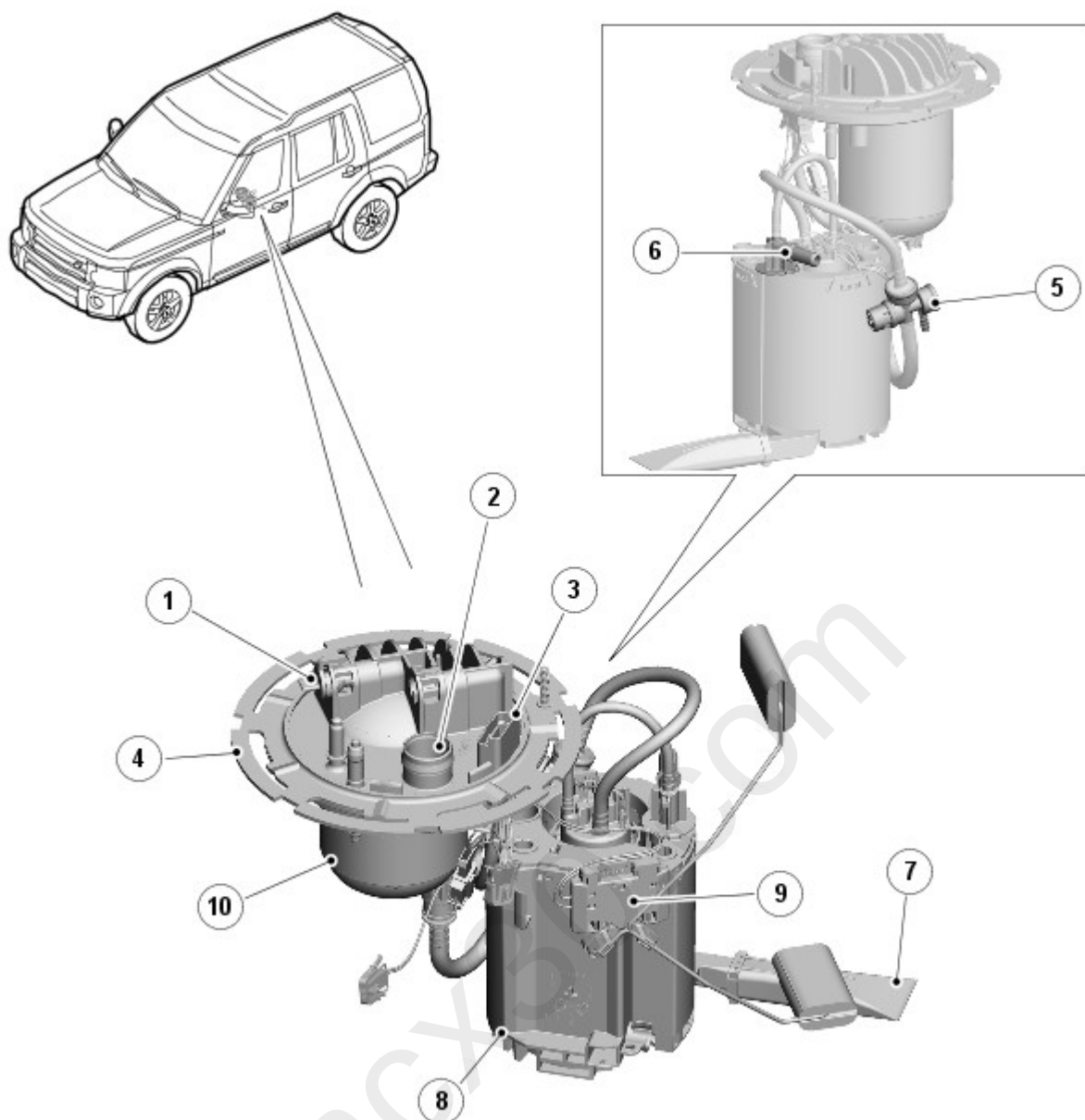
A carrier within the tank provides for the mounting of the fuel suction tube, vent valve, and the front fuel level sensor.

The fuel delivery module is mounted on a bayonet lock ring which is welded inside the fuel tank. The fuel delivery module comprises the fuel pump, jet pumps, the pump inlet filter and the fuel pressure relief valve. The rear fuel level sensor is also mounted on the side of the pump module body.

The pressure relief valve assists engine starting by retaining a pre-set fuel pressure in the fuel supply pipe and the fuel rails. The valve also limits fuel rail pressure due to temporary vapor increase in hot conditions and pressure caused by sudden load changes; a fully open to closed throttle transition, for example.

Only the pump module assembly, the fuel level sensors and the flange are available as serviceable components, the individual assembly components are not available separately.

FUEL DELIVERY MODULE



E 122738

Item	Part Number	Description
1	-	Fuel supply outlet connection
2	-	Vent pipe connection
3	-	Electrical connector
4	-	Locking ring
5	-	Pressure relief valve
6	-	Suction pipe connection
7	-	Fuel pick-up filter
8	-	Fuel pump
9	-	Rear fuel level sensor
10	-	Fuel filter

The fuel delivery module is a new design for 5.0L V8 2010MY vehicles. The module is located inside the fuel tank and comprises three main components; a fuel pump, a remote fuel pick-up and a top flange assembly.

Fuel Pump

The fuel pump is a variable-speed rotary-vane type, which operates in a fuel pump module located at the rear of the fuel tank. A venturi transfer pump is also located in the rear of the tank. The fuel pump module is secured in the fuel tank with a bayonet style locking ring that is welded into the tank structure. The fuel pump module has an integral top plate for the external pipe work and electrical connectors.

The fuel pump delivers fuel at a maximum pressure of 630 kPa (6.3 bar; 91.4 lbf/in.²) to the filter bowl in the top flange.

The electric pump is located in a plastic swirl pot which collects fuel from the base of the fuel tank via a filter. The swirl pot acts as a fuel reserve, providing a constant supply of fuel to the fuel pump irrespective of fuel quantity or vehicle attitude. When the vehicle is level the swirl pot contains approximately 275 cm³ (16.8 in³) of fuel when the engine is

running. The jet pump ensures that fuel is constantly supplied to the swirl pot to provide a sufficient fuel supply for the pump. A one way valve is located in the base of the swirl pot. The valve allows fuel from the tank to enter the swirl pot, but prevents it from escaping.

The fuel level sensor for the rear of the tank is attached to the outside of the swirl pot.

The fuel pump module is a serviceable component and access to the pump is by removal of the top flange.

Remote Fuel Suction Jet and Level Sensor Assembly

The remote fuel suction jet is located in the front of the fuel tank. The fuel suction jet is attached to the internal carrier which is secured inside the fuel tank.

The fuel system incorporates 2 jet pumps. The jet pumps are integrated into the fuel pump module and draw fuel from the front and rear of the fuel tank. A suction pipe is connected to the fuel suction jet that is located in the front of the tank that allows fuel to be drawn from the front of the tank, delivering fuel into the swirl pot via the suction pipe connection on the pump body. The jet pump operates on a venturi effect created by the fuel at pump output pressure passing through the jet pump.

The fuel level sensor for the front of the fuel tank is attached to the carrier frame. The fuel suction jet and the level sensor are serviceable components and access is by removal of the flange cover on the top rear of the fuel tank.

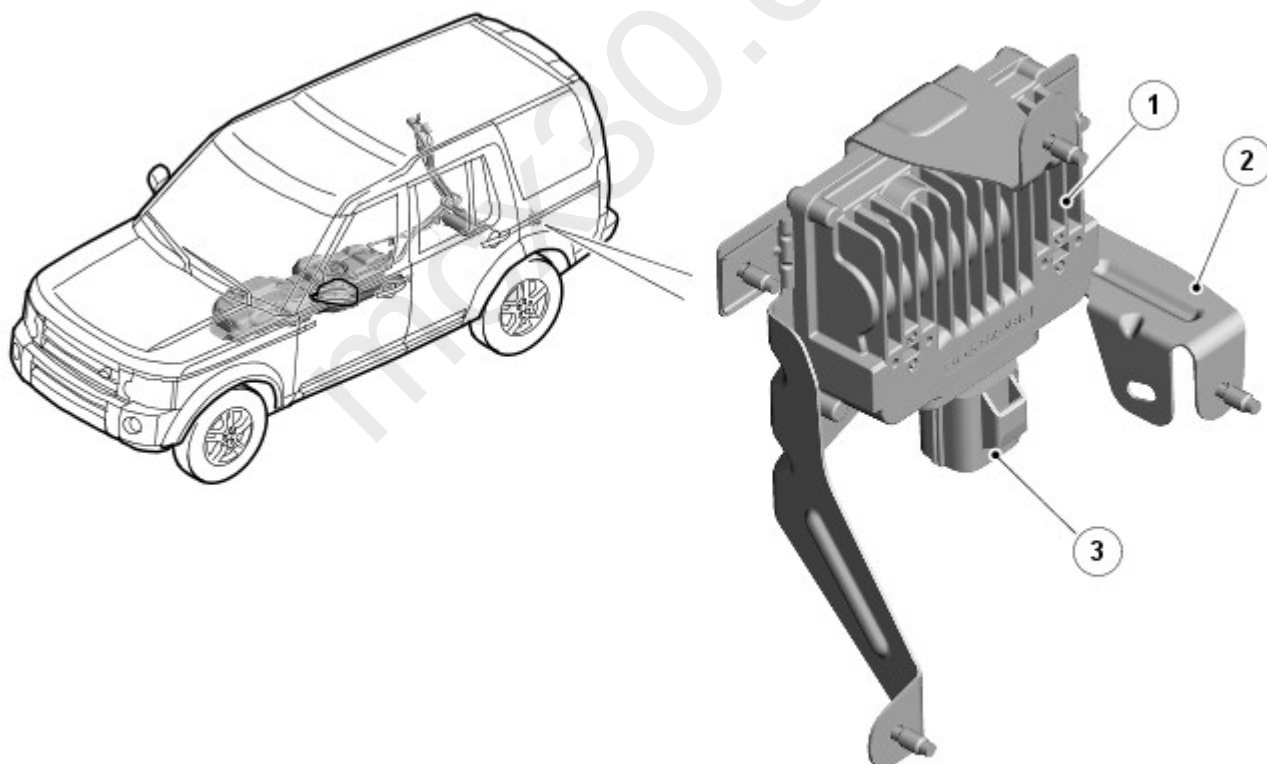
Top Flange Assembly

The top flange is located on the top of the fuel tank. The flange assembly is sealed in the tank with a with a sealing ring. A locking ring secures the flange assembly in the tank and requires a special tool for removal.

The outer surface of the flange has 1 fuel feed outlet with a quick-fit connection. The connection is for the fuel supply pressure outlet to the engine mounted fuel pumps. An electrical connector is located adjacent to the pipe connections and provides the electrical interface to the fuel pump and the level sensors. A breather connection allows the fuel tank to breathe and connects the fuel tank to the fuel filler and charcoal canister systems.

On the underside of the flange, inside the tank, is a moulded housing which contains the non-serviceable fuel filter. Fuel from the fuel pump enters the base of the housing and passes through the filter before exiting the tank to the engine mounted fuel pumps. An electrical connection on the base of the filter housing provides a ground for the filter.

FUEL PUMP DRIVER MODULE (FPDM)



E122739

Item	Part Number	Description
1	-	Fuel Pump Driver Module (FPDM)
2	-	Mounting bracket

The FPDM is located in the LH side of the luggage compartment, above the LH wheel arch, behind the trim panel. The FPDM is located on a bracket and secured with 2 bolts and nuts.

The fuel pump operation is regulated by the FPDM which is controlled by the Engine Control Module (ECM). The FPDM regulates the flow and pressure supplied by controlling the operation of the fuel pump using a PWM output.

The FPDM is powered by a supply from the fuel pump relay in the Engine Junction Box (EJB). The fuel pump relay is energized on opening the driver's door or when power mode 9 engine crank is initiated using the stop/start button. The FPDM supplies power to the fuel pump, and adjusts the power to control the speed of the fuel pump and thus the pressure and flow in the fuel delivery line.

A Pulse Width Modulation (PWM) signal from the ECM tells the FPDM the required speed for the fuel pump. The on time of the PWM signal represents half the fuel pump speed, e.g. if the PWM signal has an on time of 50%, the FPDM drives the pump at 100%.

The FPDM will only energize the fuel pump if it receives a valid PWM signal, with an on time of between 4% and 50%. To switch the fuel pump off, the ECM transmits a PWM signal with an on time of 75%.

The output pressure from the fuel pump will change with changes of engine demand and fuel temperature. The ECM monitors the input from the Low Pressure (LP) fuel sensor and the fuel rail pressure sensor and adjusts the speed of the fuel pump as necessary to maintain a nominal output pressure of 450 kPa (4.5 bar; 65.3 lbf/in.²), except during engine start-up. At engine start-up the target pressure for the fuel delivery line is 630 kPa (6.3 bar; 91.4 lbf/in.²).

If the Supplemental Restraint System (SRS) outputs a crash signal on the high speed Controller Area Network (CAN) bus, the ECM de-energizes the fuel pump relay to prevent any further fuel being pumped to the engine.

If the ECM does not detect pressure in the fuel delivery line, it stops, or refuses to start the engine and stores the appropriate Diagnostic Trouble Code (DTC).

The ECM receives a monitoring signal from the FPDM. Any DTC's produced by the FPDM are stored by the ECM.

DTC's can be retrieved from the ECM using an approved Land Rover diagnostic system. The FPDM itself cannot be interrogated by the approved Land Rover diagnostic system.

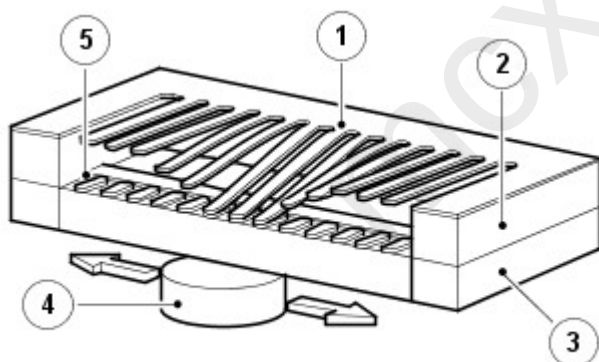
FUEL LEVEL SENSORS

Two fuel level sensors are used in the fuel tank to measure the amount of remaining fuel in the front and rear of the fuel tank. The front level sensor is attached to the internal carrier and the rear level sensor is attached to the fuel pump swirl pot. The sensors are connected to the vehicle wiring harness via a connector on the outer face of the top flange assembly.

The sensors are a MAGnetic Passive Position Sensor (MAPPS) which provides a variable resistance to ground for the output from the fuel gauge. The sensor is sealed from the fuel preventing contamination of the contacts and increasing reliability. The front and rear 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 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
3	-	Ceramic surface
4	-	Magnet
5	-	Resistance film

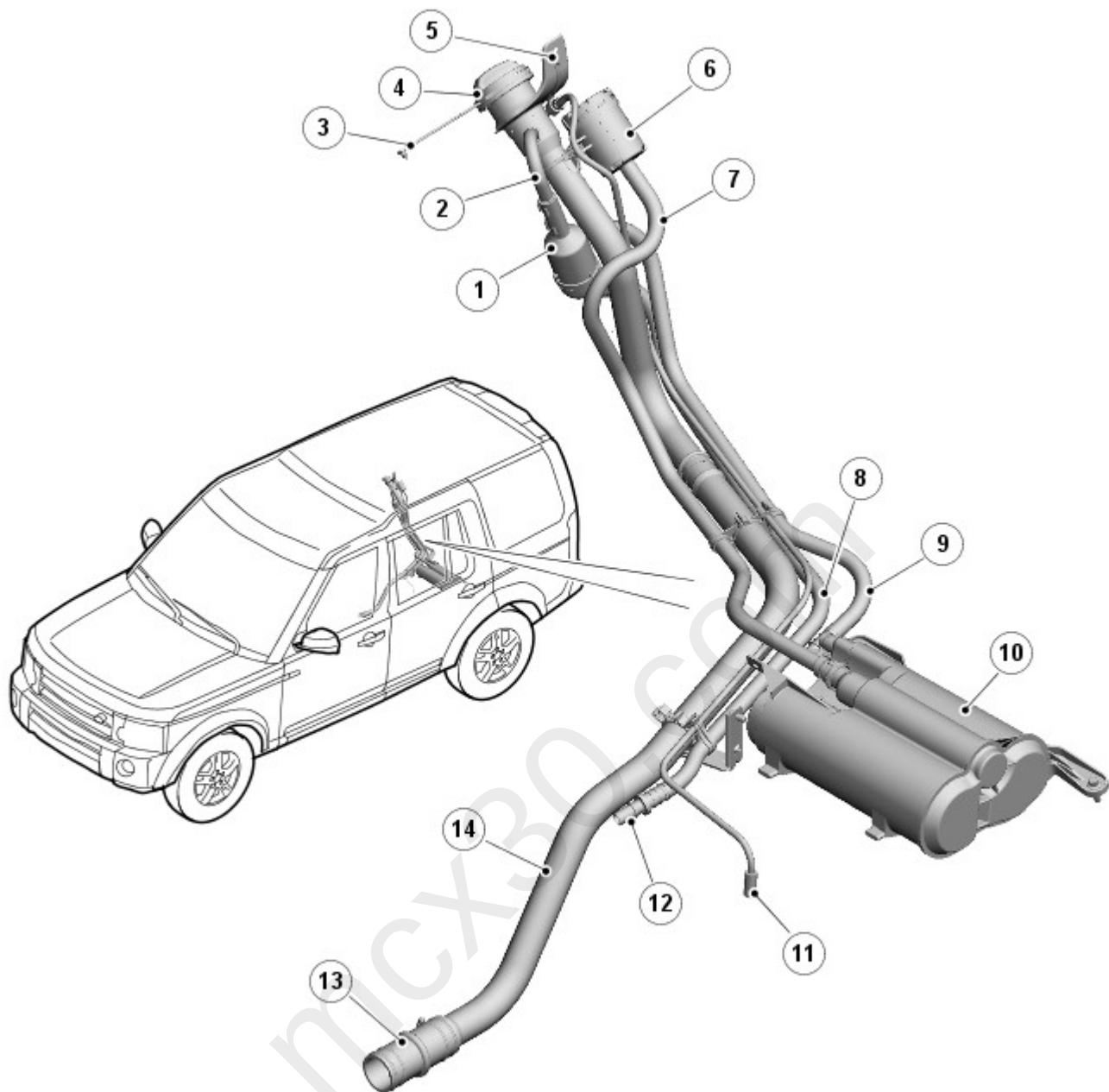
The film resistors are arranged in a linear arc with resistance ranging from 51.2 to 992.11 Ohms. The electrical output signal output is proportional to the amount of fuel in each side of the tank and the position of the float arms. The measured resistance is processed by the instrument cluster to implement an anti-slosh function. This monitors the signal and updates the fuel gauge pointer position at regular intervals, preventing constant pointer movement caused by fuel movement in the tank due to cornering or braking.

A warning indicator is incorporated in the instrument cluster and illuminates when the fuel level is at or below 10 liters (2.64 US gallons).

The fuel level sender signals are converted into a CAN bus message by the instrument cluster as a direct interpretation of the fuel tank contents in liters. The ECM uses the CAN bus message to store additional On-Board Diagnostic (OBD) P Codes for misfire detection when the fuel level is below a predetermined capacity.

FUEL FILLER PIPE AND TANK BREATHER ASSEMBLY

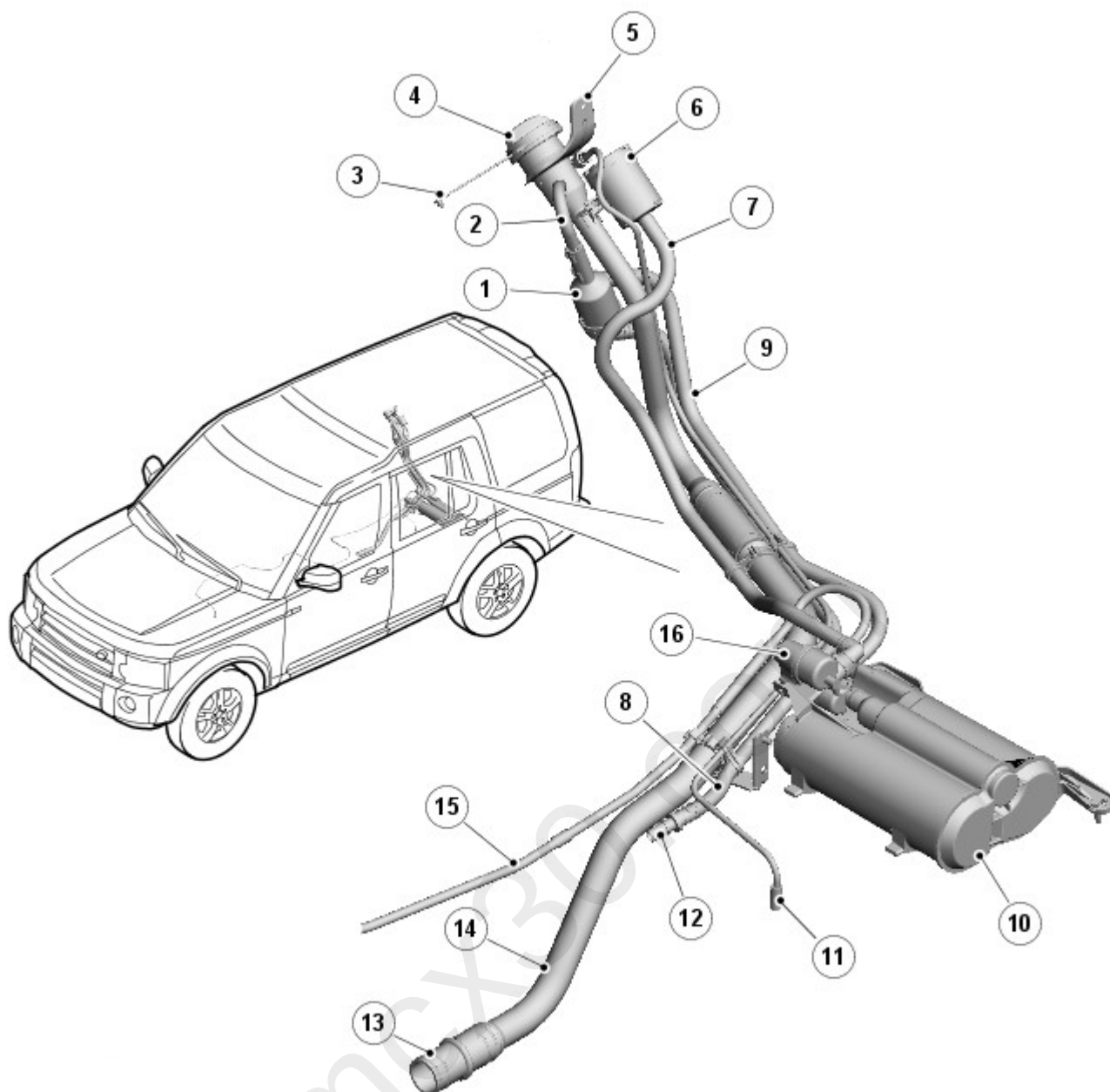
Fuel Filler Pipe Assembly (All Except NAS)



E 122740

Item	Part Number	Description
1	-	Liquid Vapor Separator (LVS)
2	-	Pipe - fuel vapor vent
3	-	Filler cap lanyard
4	-	Filler cap
5	-	Bracket
6	-	Charcoal canister breather/dust filter
7	-	Pipe - breather
8	-	Pipe - fuel vapor vent
9	-	Pipe - fuel vapor to charcoal canister
10	-	Charcoal canister
11	-	Pipe - rear differential breather (Reference only)
12	-	Pipe - fuel vapor connection
13	-	Hose - fuel filler pipe to fuel tank spit back flap
14	-	Pipe - fuel filler

Fuel Filler Pipe Assembly (NAS Only)



E122741

Item	Part Number	Description
1	-	Liquid Vapor Separator (LVS)
2	-	Pipe - fuel vapor vent
3	-	Filler cap lanyard
4	-	Filler cap
5	-	Bracket
6	-	Charcoal canister breather/dust filter
7	-	Pipe - breather
8	-	Pipe - fuel vapor vent
9	-	Pipe - fuel vapor to charcoal canister
10	-	Charcoal canister
11	-	Pipe - rear differential breather (Reference only)
12	-	Pipe - fuel vapor connection
13	-	Hose - fuel filler pipe to fuel tank spit back flap
14	-	Pipe - fuel filler
15	-	Pipe - fuel vapor to purge valve (part of fuel tank assembly)
16	-	Diagnostic Tank Monitoring Leakage (DMTL) pump

The fuel filler head is positioned at the rear of the vehicle, above the right hand rear wheel. The filler head and cap is covered by a moulded plastic cover which is electrically locked when the vehicle is locked.

The filler cap is a conventional screw in type which is secured to the vehicle with a lanyard. The filler cap must be securely fitted to ensure that the tank venting system is sealed. The cap has a locking mechanism which gives an audible click when the cap is correctly tightened.

Failure to correctly secure the filler cap will result in vapor being lost from the system. On NAS Vehicles, if the cap is incorrectly secured when the engine management system operates the Diagnostic Monitoring Tank Leakage (DMTL)

system, the loss of vapor will be detected as a leak and the MIL lamp will be illuminated.

The filler head is a stainless steel fabrication. A bracket provides for the attachment of the filler head to the vehicle body.

A connection on the rear of the filler head allows for the connection of the fuel tank breather pipe from the vapor separator on ROW vehicles and from the roll over valves on NAS vehicles.

The fuel filler pipe locates in the tank and incorporates a spitback flap in the tank end of the pipe. The flap is a spring loaded cover which acts as a 1-way valve, allowing the tank to be filled but preventing fuel leaving the tank into the filler pipe.

All vehicles have a charcoal canister breather pipe which is connected from the charcoal canister and is routed alongside the fuel filler pipe to the filler head. The filler head end of this pipe is connected differently depending on market as follows:

- On ROW vehicles the breather pipe is fitted with a mesh and allows fresh air to be drawn into the charcoal canister when fuel vapor is being purged from the system.
- On NAS vehicles the breather pipe is connected to the DMTL pump. Fresh air is drawn into the pipe via a DMTL filter integral with the pump when fuel vapor is being purged from the system. When the DMTL system is active, the breather pipe is closed by the pump, sealing the system and allowing the system to be pressure checked for leakage.

For information on the charcoal canister and purging system refer to the evaporative emissions section.

For additional information, refer to: [Evaporative Emissions](#) (303-13A Evaporative Emissions - V6 4.0L Petrol, Description and Operation).

A second pipe is routed alongside the charcoal canister breather pipe. On ROW vehicles, this pipe is the fuel tank breather pipe from the vapor separator and is connected into the fuel filler pipe near to the filler head. On NAS vehicles, this pipe is smaller in diameter and also serves as the fuel tank breather pipe. The pipe is not connected to the vapor separator but allows fuel vapor from the right hand roll over valve to vent into the connection with the fuel filler pipe near to the filler head.

A pipe is routed across the top of the tank in front of the vapor separator. This pipe connects the charcoal canister to the purge valve located in the engine compartment.

FUEL LOW PRESSURE (LP) SENSOR



E112870

The fuel LP sensor supplies a pressure signal to the Engine Control Module (ECM) to enable closed loop control of the fuel pump. The fuel LP sensor is installed in a manifold in the fuel supply line. The manifold is located in the rear of the front Right Hand (RH) wheelarch, behind the splash shield.

OPERATION

The fuel pump is a variable-speed rotary-vane type, which operates in a fuel delivery module located in the fuel tank. The fuel delivery module is secured in the fuel tank with a bayonet style locking ring that is welded into the tank structure. The fuel pump module has an integral top plate for the external pipe work and electrical connectors.

Fuel level is biased towards the rear of the fuel tank by drawing fuel from the front of the tank via the jet pump, which serves to deliver a constant supply of fuel to the swirl pot. High pressure fuel from the fuel pump is directed through the jet pump's orifice, creating a low pressure area to be formed in the cross over pipe. The fuel is drawn into this low pressure area in the cross over pipe and directed into the swirl pot delivery pipe.

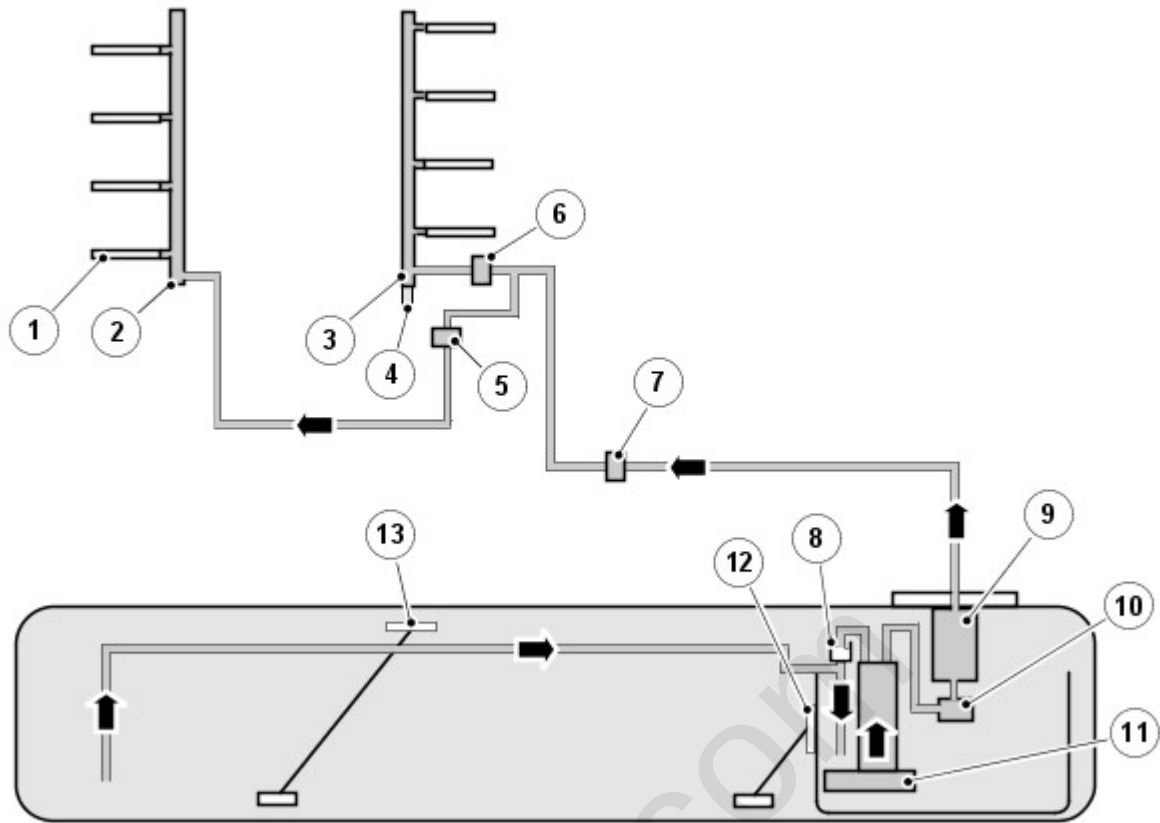
Fuel is pumped from the fuel pump to the two engine mounted HP fuel pumps via the integral filter and pressure relief valve.

The pressure relief valve assists engine starting by retaining a pre-set fuel pressure in the supply pipe and fuel rail. The pressure relief valve also limits fuel rail pressure due to temporary vapor increase in hot conditions and pressure caused by sudden load changes, for example, a fully open to closed throttle transition.

To meet emission requirements, the fuel tank and associated components are designed to minimize fuel vapor loss during refueling. This is achieved by preventing fuel vapor from the fuel tank venting directly to the atmosphere. Instead fuel vapor is directed into the charcoal canister where it is stored before being purged at intervals to the engine's intake manifold.

North American Specification (NAS) vehicles feature additional connections and pipes at the rear of the filler head and also incorporates a Diagnostic Monitoring Tank Leakage (DMTL) pump for leak detection requirements.

Fuel System Schematic Diagram



E122742

Item	Part Number	Description
1	-	Fuel injector (8 off)
2	-	Left Hand (LH) fuel rail
3	-	Right Hand (RH) fuel rail
4	-	Fuel rail pressure sensor
5	-	RH High Pressure(HP) fuel pump
6	-	LH HP fuel pump
7	-	Fuel Low Pressure (LP) sensor
8	-	Jet pump
9	-	Fuel filter
10	-	Pressure relief valve
11	-	Fuel delivery module assembly
12	-	Fuel level sensor - Rear
13	-	Fuel level sensor - Front

Fuel Tank and Lines - V8 5.0L Petrol - Fuel Tank and Lines

Diagnosis and Testing

Principle of Operation

For a detailed description of the fuel tank and lines system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: [Fuel Tank and Lines](#) (310-01D Fuel Tank and Lines - V8 5.0L Petrol, Description and Operation).

Inspection and Verification



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 checked and/or the donor vehicle.

- **NOTE:** Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection

Mechanical	Electrical
● Fuel level ● Fuel leaks ● Damaged fuel lines ● Damaged push connect fittings ● Fuel contamination/grade/quality ● Throttle body ● Damaged fuel tank filler pipe cap ● Damaged fuel tank filler pipe	● Fuses ● Loose or corroded electrical connectors ● Harnesses ● Sensor(s) ● Engine Control Module (ECM)

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.

Symptom Chart

Symptom	Possible Causes	Action
Engine cranks, but does not fire	● Engine breather system disconnected/restricted ● Ignition system ● Fuel system ● Electronic engine control	Ensure the engine breather system is free from restriction and is correctly installed. Check for ignition system, fuel system and electronic engine control DTCs and refer to the relevant DTC Index
Engine cranks and fires, but will not start	● Evaporative emissions purge valve ● Fuel pump ● Spark plugs ● HT short to ground (tracking) check rubber boots for cracks/damage ● Ignition system	Check for evaporative emissions, fuel system and ignition system related DTCs and refer to the relevant DTC Index
Difficult cold start	● Engine coolant level/anti-freeze content ● Battery ● Electronic engine controls ● Exhaust Gas Recirculation (EGR) valve stuck open ● Fuel pump ● Purge valve	Check the engine coolant level and condition. Ensure the battery is in a fully charged and serviceable condition. Check for electronic engine controls, engine emissions, fuel system and evaporative emissions system related DTCs and refer to the relevant DTC Index
Difficult hot start	● Injector leak ● Electronic engine control ● Purge valve ● Fuel pump ● Ignition system ● EGR valve stuck open	Check for injector leak, install new injector as required. Check for electronic engine controls, evaporative emissions, fuel system, ignition system and engine emission system related DTCs and refer to the relevant DTC Index
Difficult to start after hot soak (vehicle standing, engine off, after engine has reached operating temperature)	● Injector leak ● Electronic engine control ● Purge valve ● Fuel pump ● Ignition system ● EGR valve stuck open	Check for injector leak, install new injector as required. Check for electronic engine controls, evaporative emissions, fuel system, ignition system and engine emission system related DTCs and refer to the relevant DTC Index

Symptom	Possible Causes	Action
Engine stalls soon after start	- Breather system disconnected/restricted - ECM relay - Electronic engine control - Ignition system - Air intake system restricted - Air leakage - Fuel lines	Ensure the engine breather system is free from restriction and is correctly installed. Check for electronic engine control, ignition system and fuel system related DTCs and refer to the relevant DTC Index. Check for blockage in air filter element and air intake system. Check for air leakage in air intake system
Engine hesitates/poor acceleration	- Fuel pressure, fuel pump, fuel lines - Injector leak - Air leakage - Electronic engine control - Throttle motor - Restricted accelerator pedal travel (carpet, etc) - Ignition system - EGR valve stuck open - Transmission malfunction	Check for fuel system related DTCs and refer to the relevant DTC Index. Check for injector leak, install new injector as required. Check for air leakage in air intake system. Ensure accelerator pedal is free from restriction. Check for electronic engine controls, ignition, engine emission system and transmission related DTCs and refer to the relevant DTC Index
Engine backfires	- Fuel pump/lines - Air leakage - Electronic engine controls - Ignition system - Sticking variable camshaft timing (VCT) hub	Check for fuel system failures. Check for air leakage in intake air system. Check for electronic engine controls, ignition system and VCT system related DTCs and refer to the relevant DTC Index
Engine surges	- Fuel pump/lines - Electronic engine controls - Throttle motor - Ignition system	Check for fuel system failures. Check for electronic engine controls, throttle system and ignition system related DTCs and refer to the relevant DTC Index
Engine detonates/knocks	- Fuel pump/lines - Air leakage - Electronic engine controls - Sticking VCT hub	Check for fuel system failures. Check for air leakage in intake air system. Check for electronic engine controls and VCT system related DTCs and refer to the relevant DTC Index
No throttle response	- Electronic engine controls - Throttle motor	Check for electronic engine controls and throttle system related DTCs and refer to the relevant DTC Index
Poor throttle response	- Breather system disconnected/restricted - Electronic engine controls - Transmission malfunction - Traction control event - Air leakage	Ensure the engine breather system is free from restriction and is correctly installed. Check for electronic engine controls, transmission and traction control related DTCs and refer to the related DTC Index. Check for air leakage in intake air system

Fuel Gauge Diagnosis

1. Using the manufacturer approved diagnostic system monitor, "active fuel level sensor(A)" and "passive fuel level sensor(B)" data logger signals located within the body control module subsection.

Customer Complaint	Possible Concern	Fuel Pressure	Active Fuel Level Sensor Voltage Reading A	Passive Fuel Level Sensor Voltage Reading B	Action
Fuel gauge switches on and off intermittently and / or fuel gauge indicates empty whilst there is fuel still available in the fuel tank	Open circuit	Yes	>3.6v	>3.6v	- Refer to the electrical circuit diagrams and check for backed out terminals and circuit faults between, - C0390-18 and C0114-1 - If no fault is evident then check C0376-18 to C0586R-8, - If no fault is evident with the above, remove the fuel pump module and two fuel senders from the fuel tank and check for backed out terminals and circuit faults. Refer to the warranty policy and procedures manual if a module/component is suspect
Fuel gauge switches on and off intermittently and / or fuel gauge indicates empty whilst there is fuel still available in the fuel tank	Open circuit	Yes	<3.0v	>3.6v	- Refer to the electrical circuit diagrams and check for backed out terminals and circuit faults between, - C0390-2 and C0114-6, - If no fault is evident then check C0376-2 to C0586R-20 - If no fault is evident with the above, remove the fuel sender B (front) from the fuel tank and check for backed out terminals and circuit faults

Customer Complaint	Possible Concern	Fuel Pressure	Active Fuel Level Sensor Voltage Reading A	Passive Fuel Level Sensor Voltage Reading B	Action
Fuel gauge switches on and off intermittently and / or fuel gauge indicates empty whilst there is fuel still available in the fuel tank	Open circuit	Yes	>3.6v	<3.0v	- Refer to the electrical circuit diagrams and check for backed out terminals and circuit faults between, - C0390-3 and C0114-2 - If no fault is evident then check C0376-3 to C0586R-21 - If no fault can be found with the above check then the active fuel sender A (rear) will need to be removed and the wiring carefully inspected
Fuel gauge switches on and off intermittently and / or fuel gauge indicates empty whilst there is fuel still available in the fuel tank	Electric parkbrake fault (EPB)	Yes	0.35v to 3.06v	0.35v to 3.06v	- NOTE: Check for correct EPB operation prior to carrying out the following checks. - NOTE: The EPB module is calibrated to allow fuel gauge correction for varying gradients (via CAN Bus). - Refer to the electrical circuit diagrams and check for backed out terminals and circuit faults at connectors, - C2178-31, C2178-32 - C2178-9, - C2178-10, - C2178-15 and C2178-16 - Check Earth Point (LH D Post) C2570S (Discovery 4/LR4) C2570T (Range Rover Sport)
Fuel gauge indicating fuel present	No fuel present inside tank	No	0.35v to 3.06v	0.35v	Check active sender A (rear) for potential hang up/fouling inside of the fuel tank
Fuel gauge indicating fuel present	No fuel present inside tank	No	0.35v	0.35v to 3.06v	Check passive sender B (front) for potential hang up/fouling inside of the fuel tank
Fuel gauge indicating fuel present	No fuel present inside tank	No	>1.0v	0.35v to 0.54v	Remove from the fuel tank and check all active sender A (rear) blue wires for backed out pin/defective wire
Fuel gauge indicating fuel present	No fuel present inside tank	No	0.35v to 0.44v	>1.0v	Remove from the fuel tank and check all passive sender B (front) blue circuit wires for backed out pin/defective wire
Fuel gauge indicating fuel present	No fuel present inside tank	No	>0.55v and within 0.6v of B	>0.55v and within 0.6v of A	Remove fuel pump module and both senders from the fuel tank and check all black wires on the circuit for backed out pin/defective wire
Fuel gauge indicating fuel present	No fuel present inside tank	No	>3.2v but <3.6v	0.35v to 0.54v	Active sender A (rear) internal fault. No repair possible, replace the sender. Refer to the warranty policy and procedures manual if a module/component is suspect
Fuel gauge indicating fuel present	No fuel present inside tank	No	0.35v to 0.44v	>3.2v but <3.6v	Passive sender B (front) internal fault. No repair possible, replace the sender. Refer to the warranty policy and procedures manual if a module/component is suspect
Fuel gauge indicating fuel present	Fuel present inside the fuel tank	No	0.35v to 3.06v	0.35v to 3.06v	Check the pressure relief valve inside fuel tank. Check Internal fuel feed pipe is connected to flange
Fuel gauge indicating fuel present	Fuel present inside the fuel tank	Yes	0.35v to 3.06v	0.35v to 3.06v	Check terminals are correctly latched / installed to the fuel pump module
Fuel gauge indicating fuel present but reading an incorrect fuel level	Fuel present inside the fuel tank	Yes	0.35v to 3.06v	0.35v to 3.06v	Check the bayonet fitting on the fuel pump module. Check both the active and passive fuel senders are securely located in their brackets
Fuel gauge indicating fuel present but reading an incorrect fuel level	Fuel tank - out of shape / sucking in (diesel only)	Yes	0.35v to 3.06v	0.35v to 3.06v	Incorrect filler cap installed. Install the correct fuel filler cap (applies to diesel variants only). Refer to the warranty policy and procedures manual if a module/component is suspect

DTC Index

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.

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Fuel Tank and Lines - V8 5.0L Petrol - Fuel Tank Filler Pipe

Removal and Installation

Removal

- **WARNINGS:**



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



After carrying out repairs, the fuel system must be checked visually for leaks. Failure to follow these instructions may result in personal injury.



This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

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

1. Remove the battery ground cable.

For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).



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

Raise and support the vehicle.

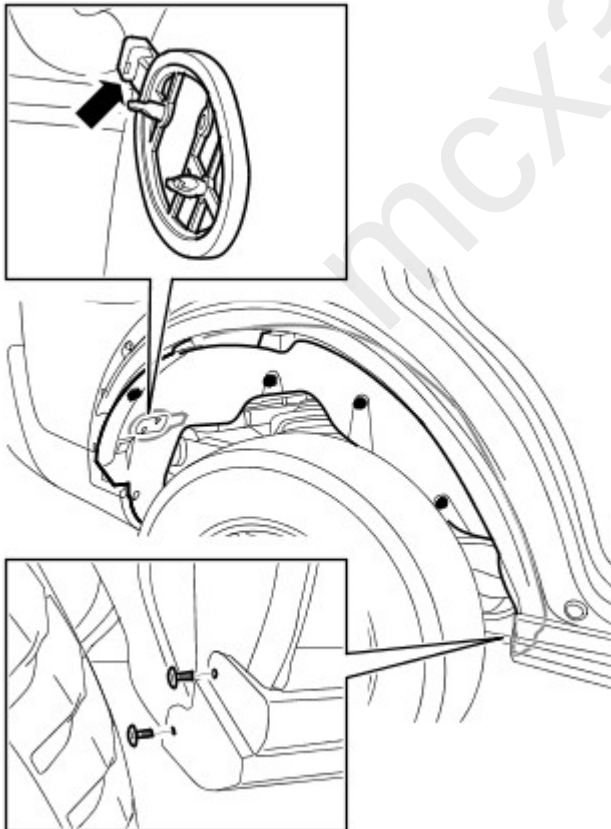
3. For additional information, refer to: [Fuel Tank Draining](#) (310-00 Fuel System - General Information, General Procedures).

4. For additional information, refer to: [Fuel Filler Door Assembly](#) (501-03 Body Closures, Removal and Installation).

5. Remove the RH rear wheel and tire.

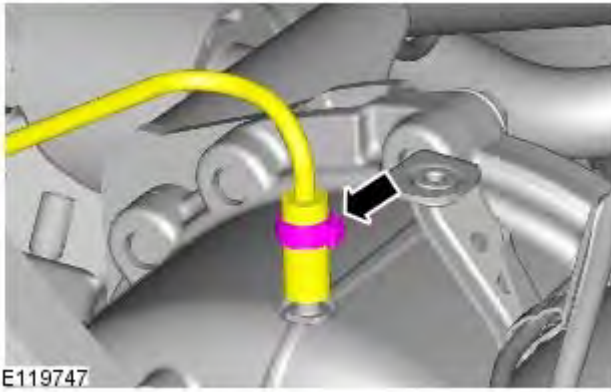
- TORQUE: 140 Nm

6. Remove the fender splash shield.



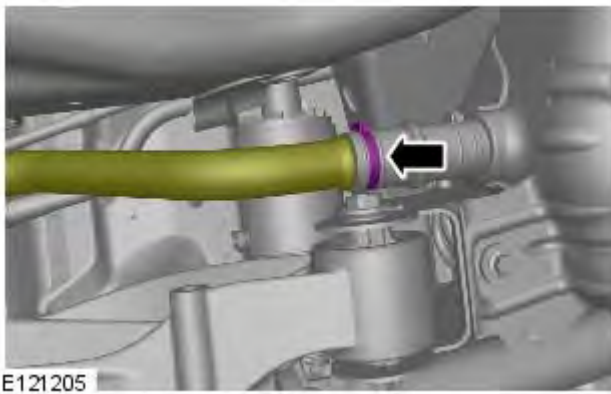
E48478

7.

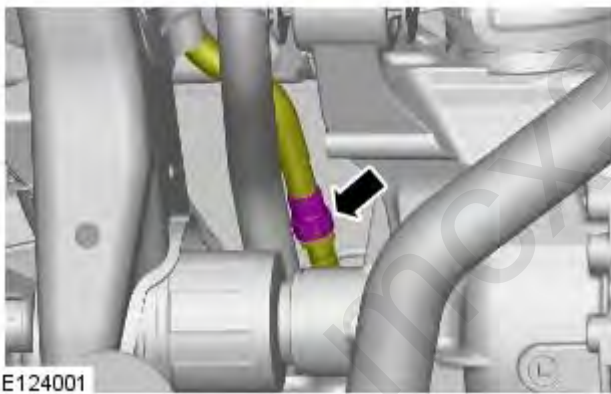


8. NOTE: Discard the retaining clip.

Remove the tamper proof cover from the fuel tank filler pipe hose clip.

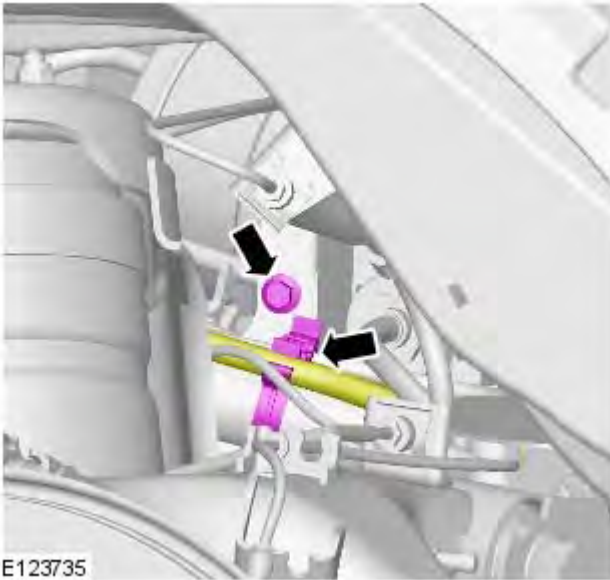


9.  CAUTION: Make sure that all openings are sealed. Use new blanking caps.



10.

- TORQUE: 4 Nm

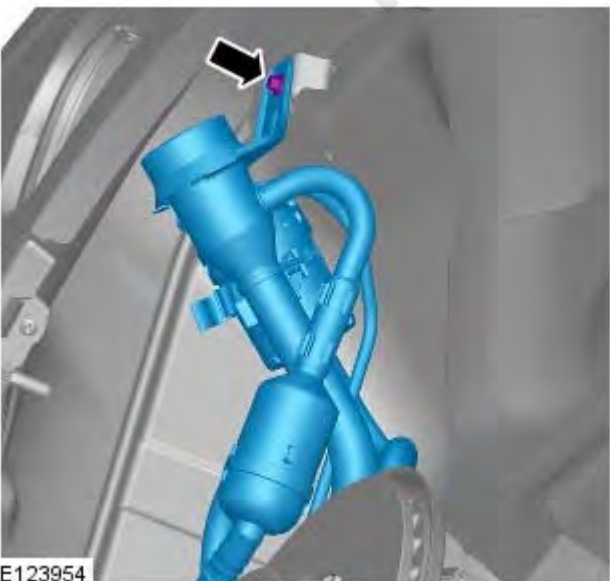


11.  CAUTION: Make sure that all openings are sealed. Use new blanking caps.



12.

- TORQUE: 4 Nm



Installation

1. To install, reverse the removal procedure.

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Fuel Tank and Lines - V8 5.0L Petrol - Fuel Pump and Sender Unit

Removal and Installation

Special Tool(s)

 310-123 E80148	310-123 Locking Ring, Fuel Tank
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General Equipment

Transmission jack

Removal

• WARNINGS:



After carrying out repairs, the fuel system must be checked visually for leaks. Failure to follow this instruction may result in personal injury.



After the fuel tank drain is complete always fit the sealing covers over the drain ports. Failure to do so will mean that fuel vapor can escape.



This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.



CAUTION: 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.

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

1. Refer to: [Petrol and Petrol-Ethanol Fuel Systems Health and Safety Precautions](#) (100-00 General Information, Description and Operation).

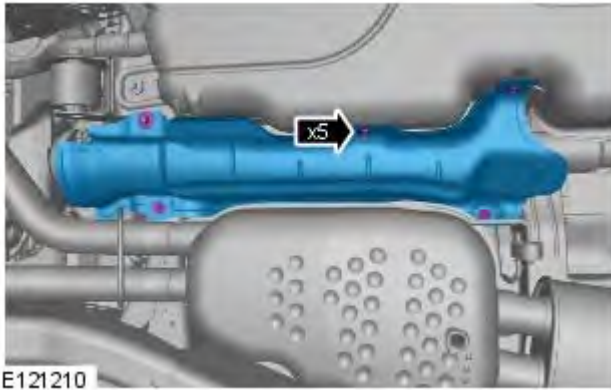
2. Disconnect the battery ground cable.

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

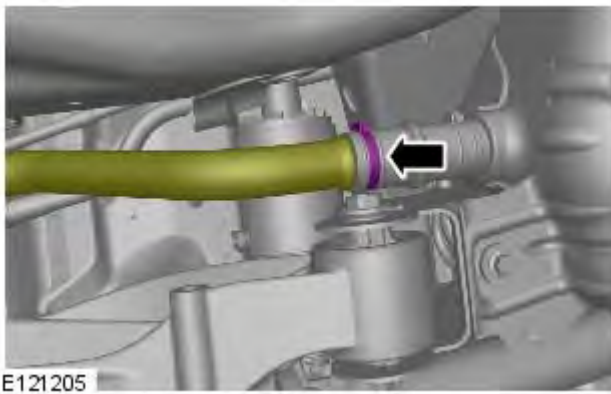
3.  **WARNING:** Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

4. Refer to: [Fuel Tank Draining](#) (310-00 Fuel System - General Information, General Procedures).

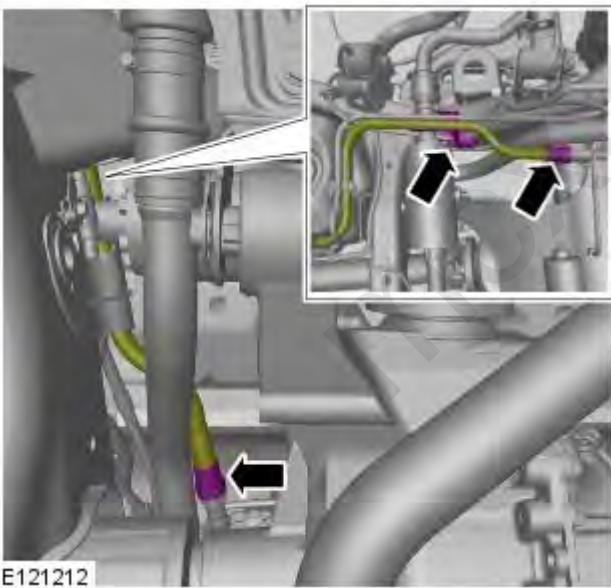


5. *Torque:*
 Bolts 6 Nm
 Nuts 3 Nm

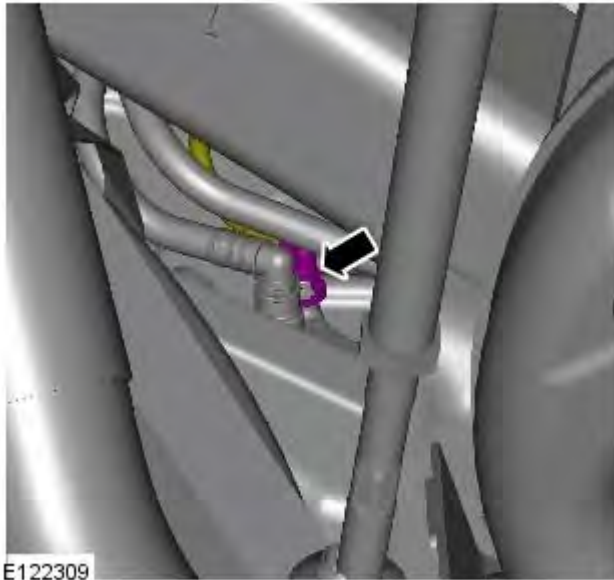


6. **NOTE:** Discard the retaining clip.

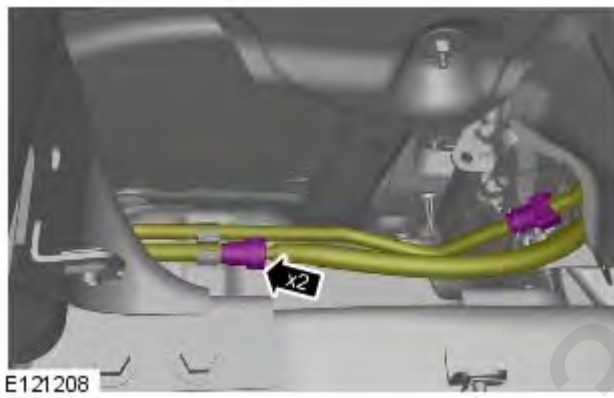
Remove the tamper proof cover.



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



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



9. **CAUTIONS:**

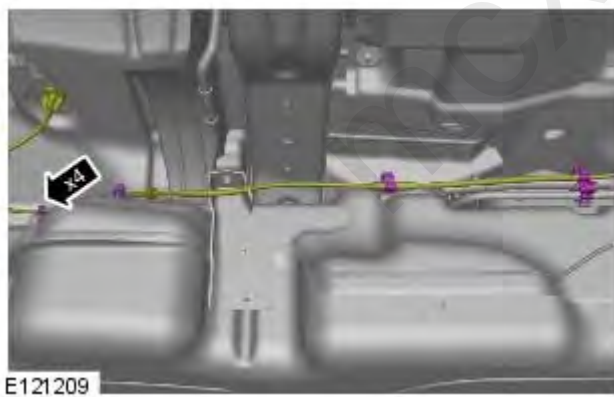


Be prepared to collect escaping fluids.

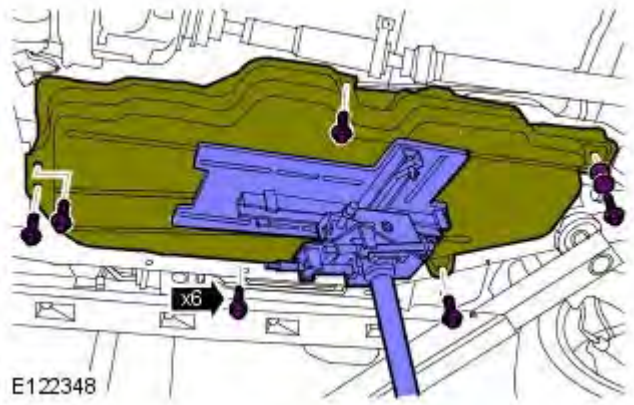


Make sure that all openings are sealed. Use new blanking caps.

- **NOTE:** Transmission support heat shield shown removed for clarity.



- 10.



11. **11.**  **WARNING:** Secure the component to the transmission jack.

 **CAUTION:** Do not lower the fuel tank more than 250 mm.

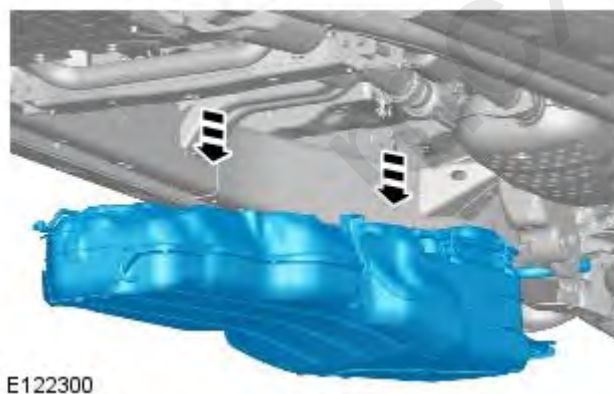
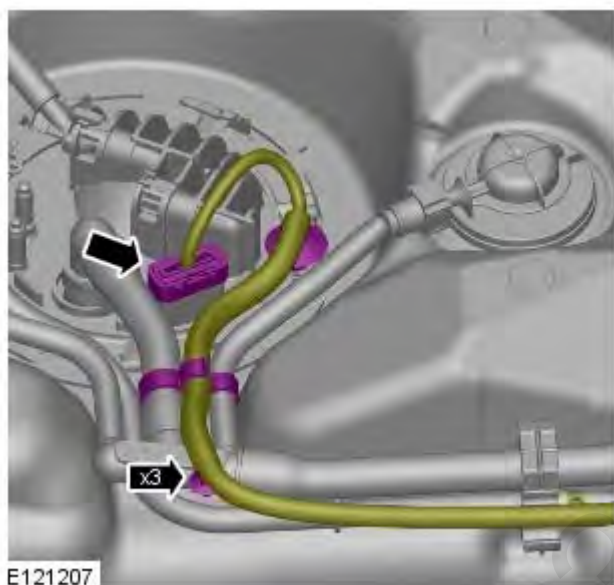
• **NOTE:** Note the orientation of the two rear retaining bolts and washers.

Using a suitable transmission jack, lower the fuel tank sufficiently only to access the top of the fuel tank.

General Equipment: [Transmission jack](#)

Torque: 45 Nm

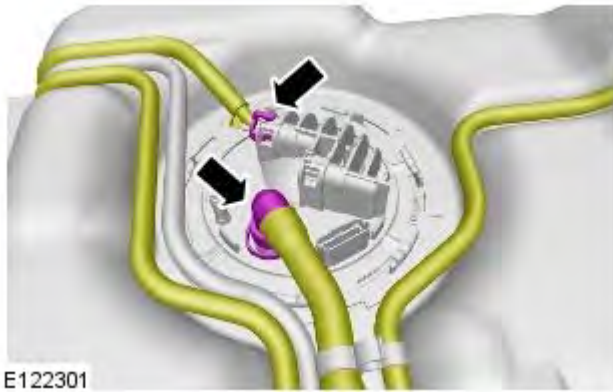
12.



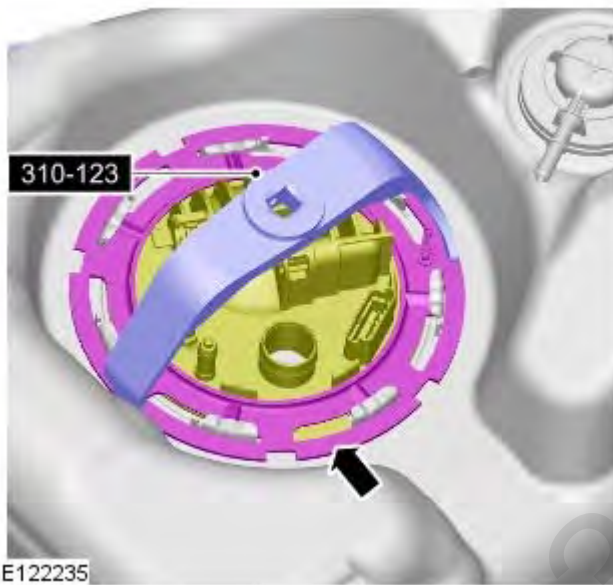
13. **13.**  **CAUTION:** Position the breather hose and vent hose through the vehicle body during the fuel tank removal operation.

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

With assistance, remove the fuel tank.

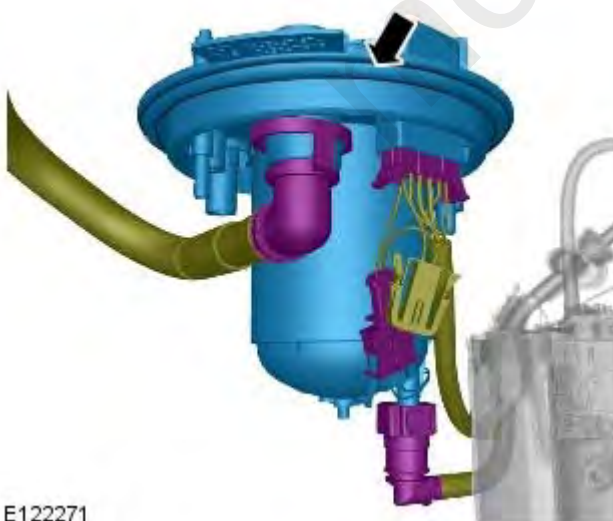


14. **14.**  **CAUTION:** Make sure that all openings are sealed. Use new blanking caps.



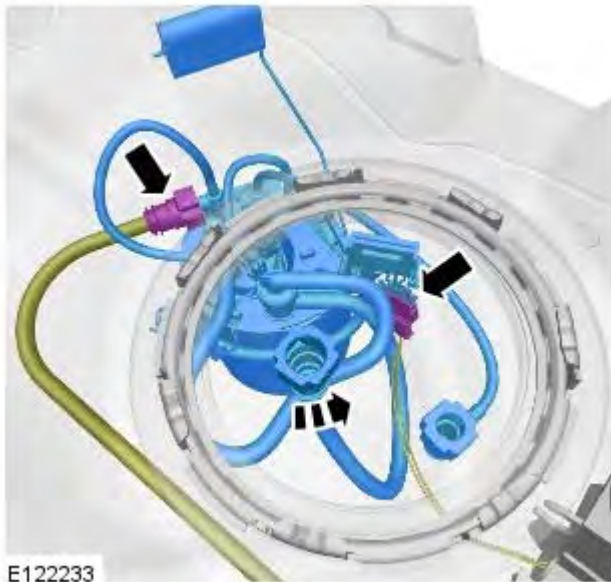
15. **15.** **NOTE:** Note the position of the locating tang.

- *Special Tool(s):* [310-123](#)

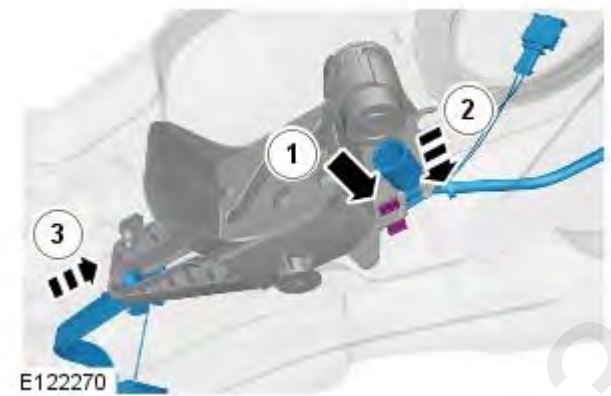


16. **16.**  **CAUTION:** Be prepared to collect escaping fuel.

- **NOTE:** Remove and discard the O-ring seal.



17. **17.**  **CAUTION:** Take extra care not to damage the fuel tank level sensor float and arm.
- **NOTE:** Some variation in the illustrations may occur, but the essential information is always correct.



18. **18.**  **CAUTION:** Take extra care not to damage the fuel tank level sensor float and arm.



19. **19.**  **CAUTION:** Take extra care not to damage the fuel tank level sensor float and arm.

20.



Installation

1. **NOTE:** Remove and discard all blanking caps.
 - **NOTE:** Make sure the locating tang is installed in the position noted in the removal step.To install, reverse the removal procedure.

Fuel Tank and Lines - V8 5.0L Petrol - Fuel Tank

Removal and Installation

Special Tool(s)

 310-123 E80148	310-123 Locking Ring, Fuel Tank
---	--

General Equipment

Transmission jack

Removal

• WARNINGS:



After carrying out repairs, the fuel system must be checked visually for leaks. Failure to follow this instruction may result in personal injury.



After the fuel tank drain is complete always fit the sealing covers over the drain ports. Failure to do so will mean that fuel vapor can escape.



This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.



CAUTION: 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.

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

1. Refer to: [Petrol and Petrol-Ethanol Fuel Systems Health and Safety Precautions](#) (100-00 General Information, Description and Operation).

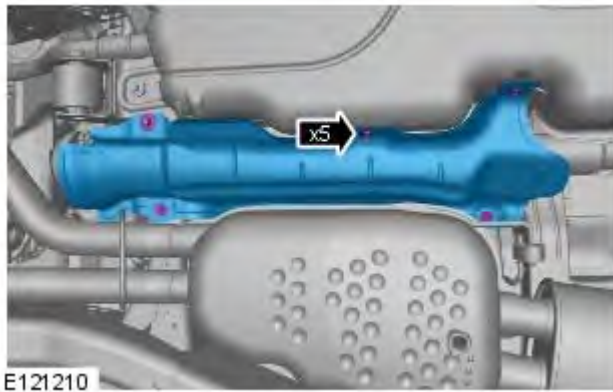
2. Disconnect the battery ground cable.

Refer to: [Specifications](#) (414-01 Battery, Mounting and Cables, Specifications).

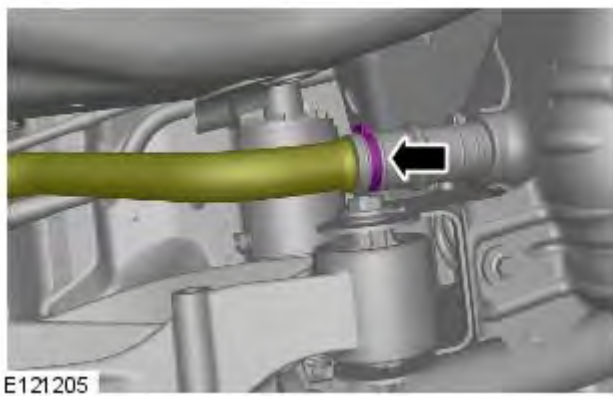
3.  **WARNING:** Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

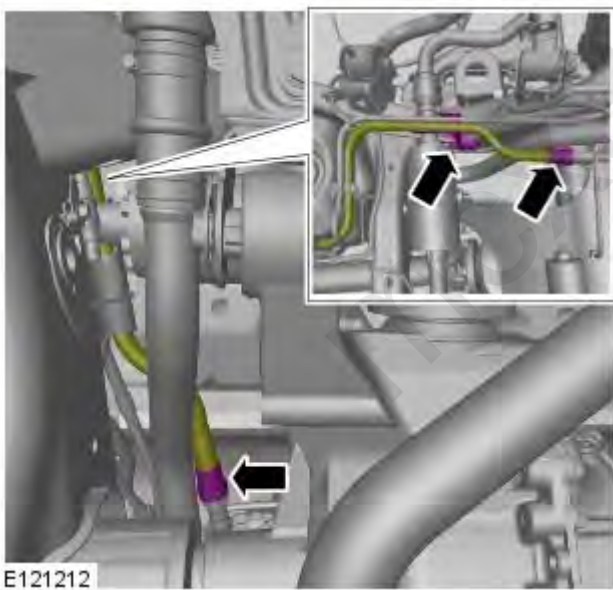
4. Refer to: [Fuel Tank Draining](#) (310-00 Fuel System - General Information, General Procedures).



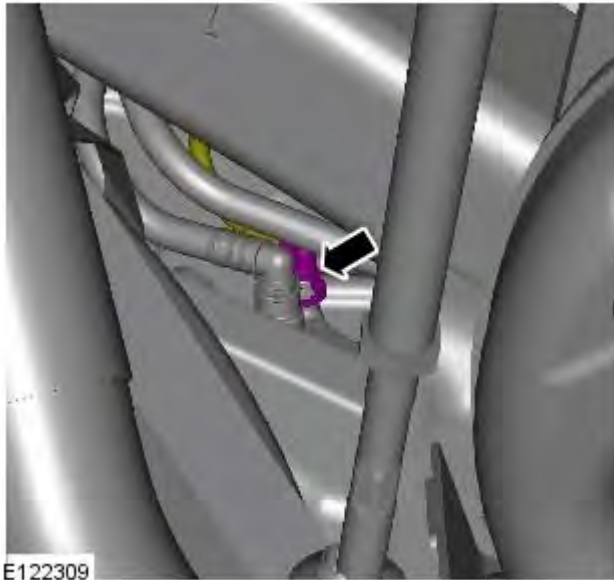
5. *Torque:*
 Bolts 6 Nm
 Nuts 3 Nm



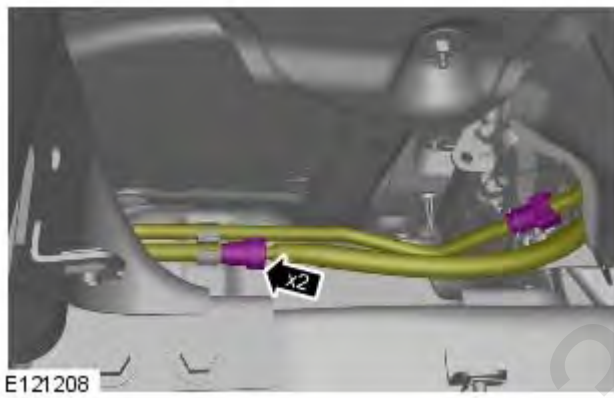
6.  **CAUTION:** Discard the retaining clip.
 Remove the tamper proof cover.



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



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



9. **CAUTIONS:**

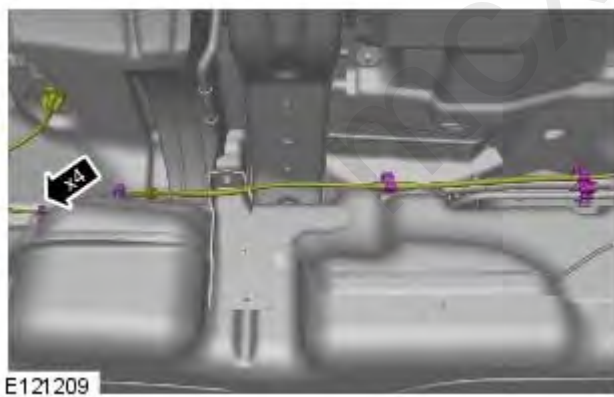


Be prepared to collect escaping fluids.

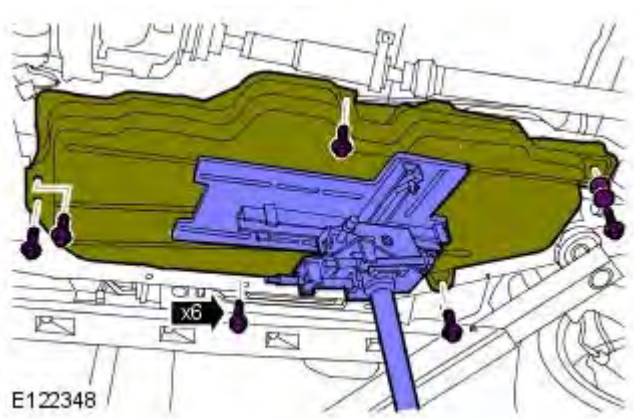


Make sure that all openings are sealed. Use new blanking caps.

- **NOTE:** Transmission support heat shield shown removed for clarity.



- 10.



11. **11.**  **WARNING:** Secure the component to the transmission jack.

 **CAUTION:** Do not lower the fuel tank more than 250 mm.

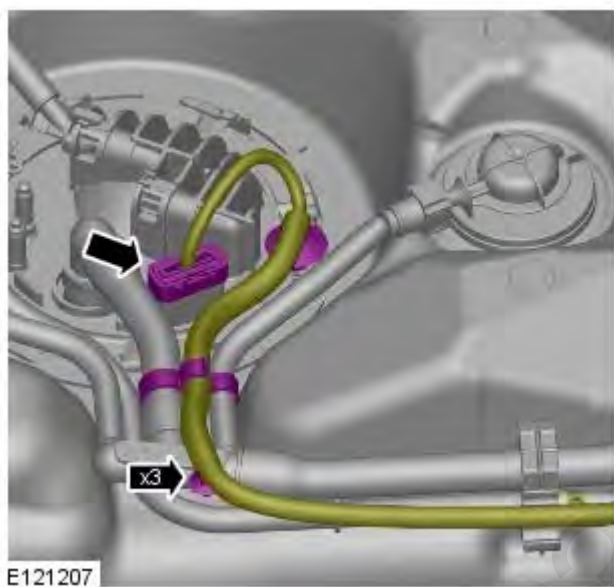
• **NOTE:** Note the orientation of the two rear retaining bolts and washers.

Using a suitable transmission jack, lower the fuel tank sufficiently only to access the top of the fuel tank.

General Equipment: [Transmission jack](#)

Torque: 45 Nm

12.

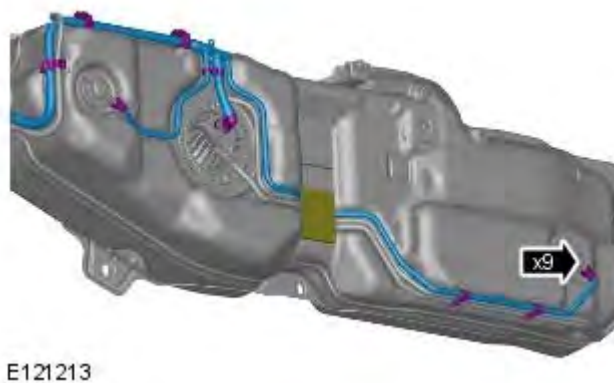


13. **13.**  **CAUTION:** Position the breather and vent hoses through the vehicle body during the fuel tank removal.

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

With assistance, remove the fuel tank.

14.

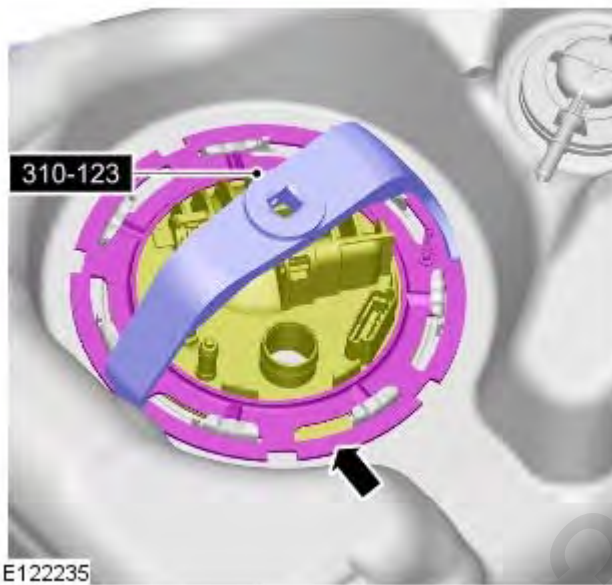


15.



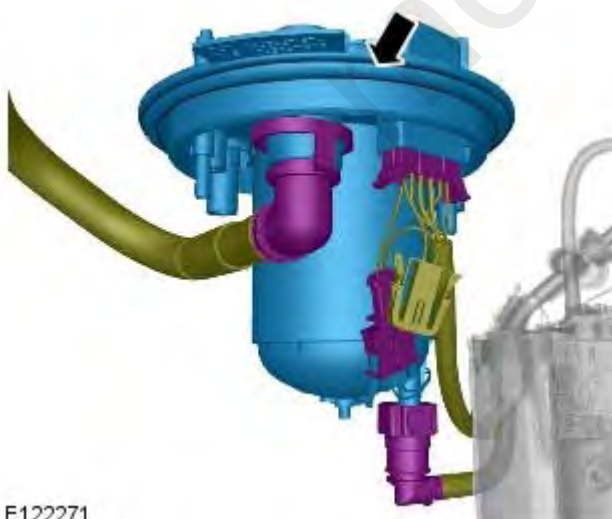
16. **16.** NOTE: Note the position of the locating tang.

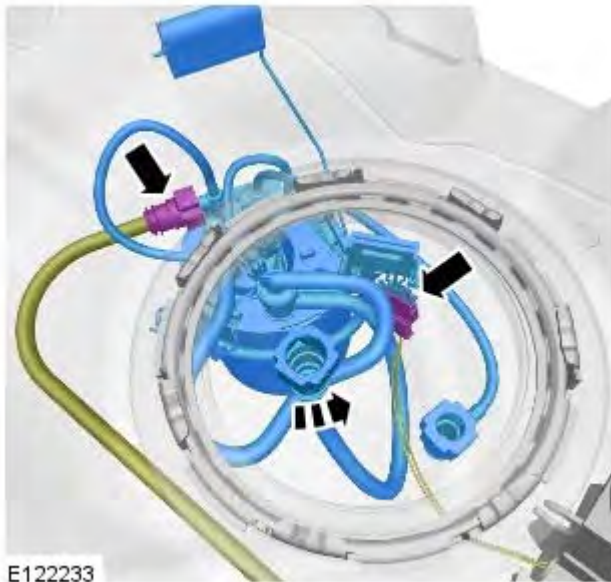
Special Tool(s): [310-123](#)



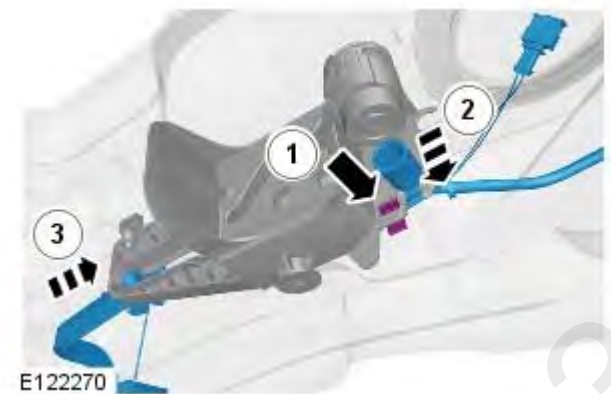
17. **17.**  CAUTION: Be prepared to collect escaping fluids.

• NOTE: Remove and discard the O-ring seal.





18. **18.**  **CAUTION:** Take extra care not to damage the fuel tank level sensor float and arm.
- **NOTE:** Some variation in the illustrations may occur, but the essential information is always correct.



19. **19.**  **CAUTION:** Take extra care not to damage the fuel tank level sensor float and arm.



20.

Installation

1. **1.** **NOTE:** Remove and discard all blanking caps.
- **NOTE:** Make sure the locating tang is installed in the position noted in the removal step.
- To install, reverse the removal procedure.

Fuel Tank and Lines - V8 5.0L Petrol - Fuel Filter

Removal and Installation

Removal

• WARNINGS:



After carrying out repairs, the fuel system must be checked visually for leaks. Failure to follow this instruction may result in personal injury.



This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

• CAUTIONS:



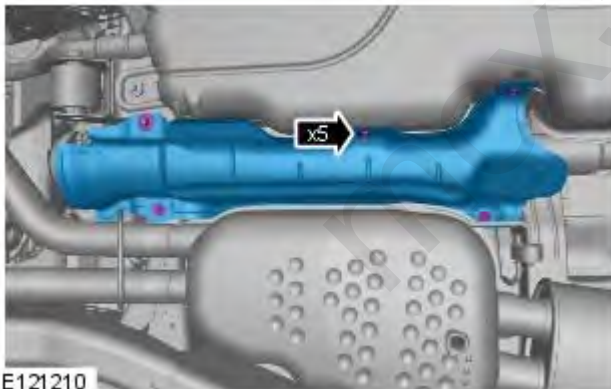
Always carry out the cleaning process before carrying out any repairs to the fuel injection system components. Failure to follow this instruction may result in foreign matter ingress to the fuel injection system.



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.

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

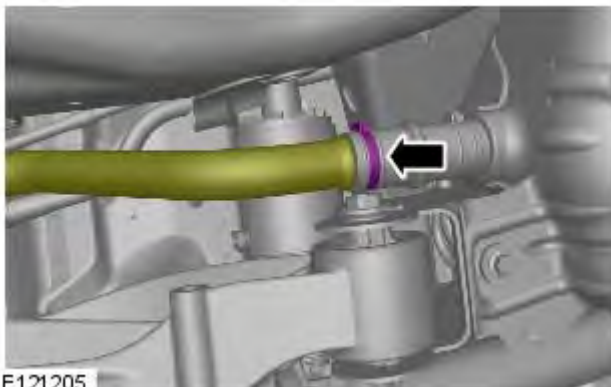
1. For additional information, refer to: [Petrol and Petrol-Ethanol Fuel Systems Health and Safety Precautions](#) (100-00 General Information, Description and Operation).
2. For additional information, refer to: [Fuel System Pressure Release - V8 5.0L Petrol](#) (310-00 Fuel System - General Information, General Procedures).
3. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
4. For additional information, refer to: [Fuel Tank Draining](#) (310-00 Fuel System - General Information, General Procedures).
- 5.



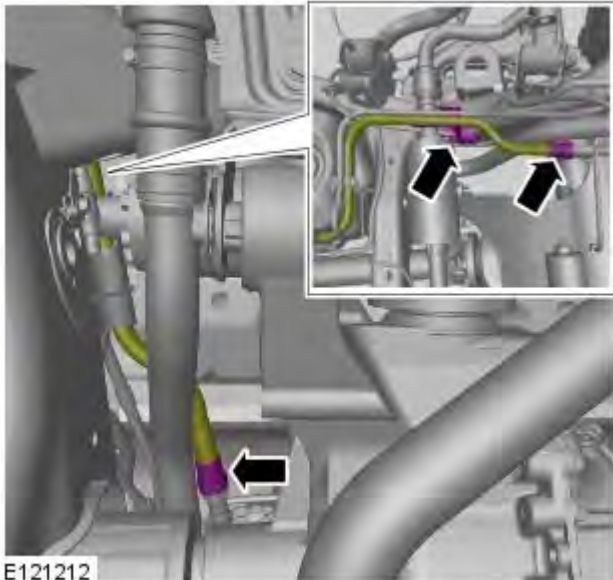
E121210

6. NOTE: Discard the retaining clip.

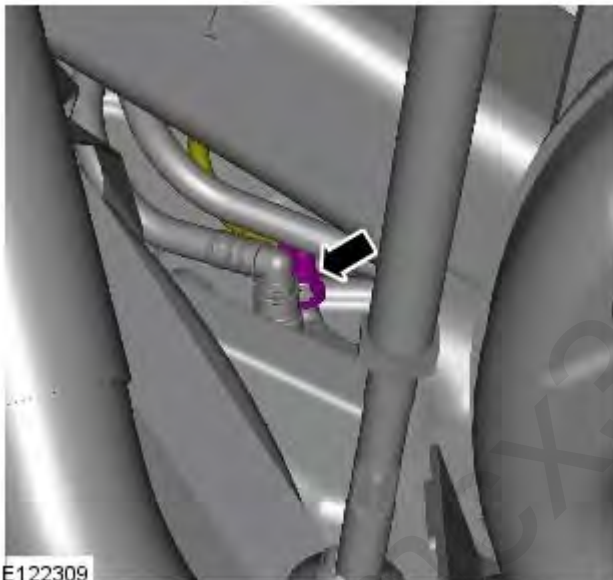
Remove the tamper proof cover.



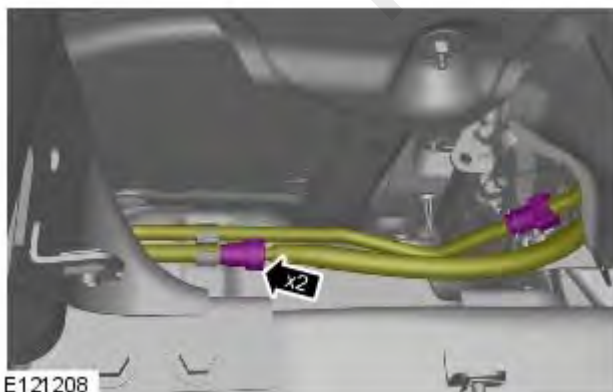
E121205



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



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



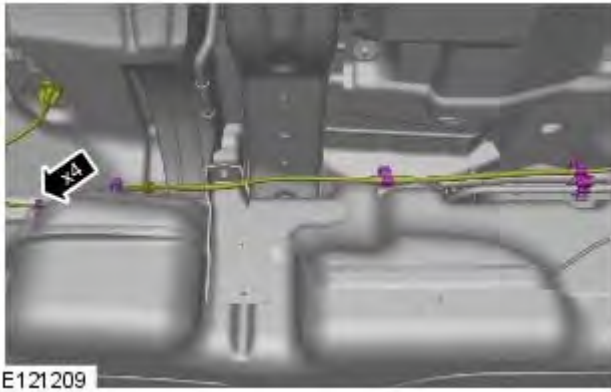
9. **CAUTIONS:**

 Be prepared to collect escaping fuel.

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

• **NOTE:** Transmission support heat shield shown removed for clarity.

10.



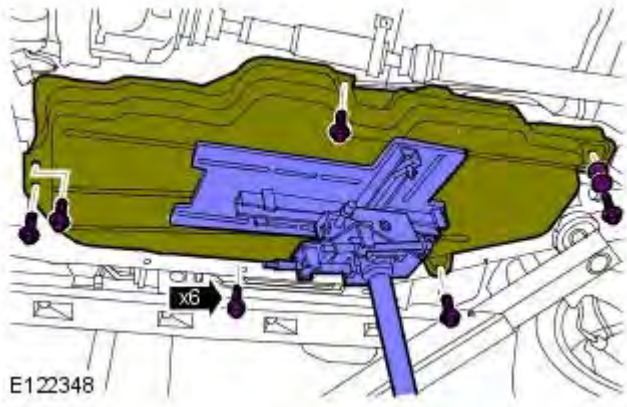
11.  **WARNING:** Secure the component to the transmission jack.

 **CAUTION:** Do not lower the fuel tank more than 250 mm.

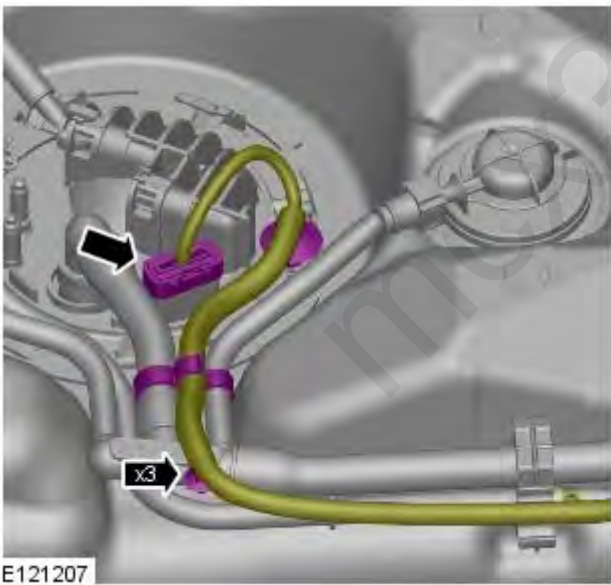
• **NOTE:** Note the orientation of the two rear retaining bolts and washers.

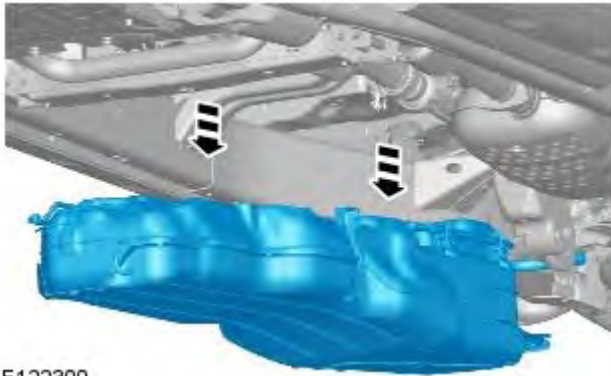
Using a suitable transmission jack, lower the fuel tank sufficiently only to access the top of the fuel tank.

• **TORQUE:** 45 Nm



12.



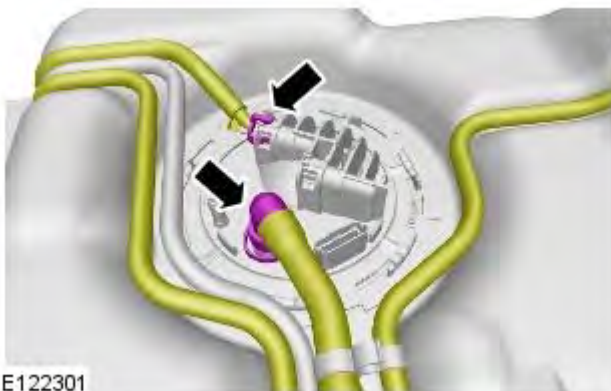


E122300

13.  **CAUTION:** Position the breather hose and vent hose through the vehicle body during the fuel tank removal operation.

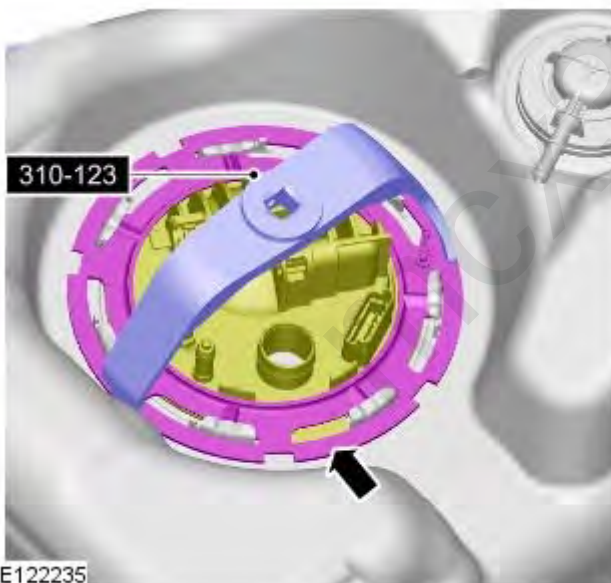
- **NOTE:** Do not disassemble further if the component is removed for access only.

With assistance, remove the fuel tank.



E122301

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

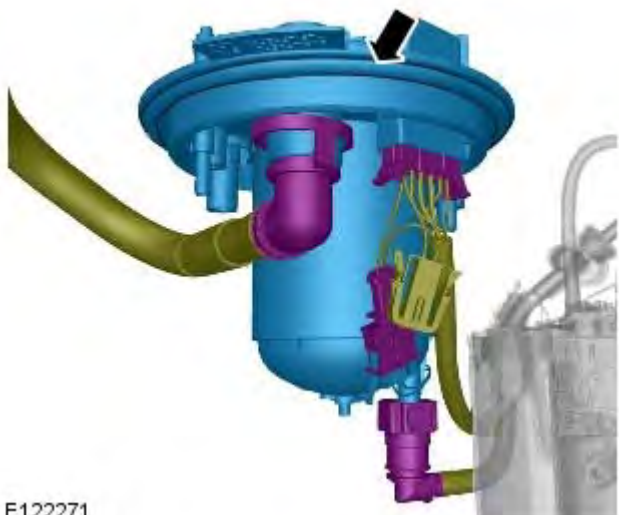


E122235

15. NOTE: Note the position of the locating tang.

16.  CAUTION: Be prepared to collect escaping fuel.

- NOTE: Remove and discard the O-ring seal.



E122271

Installation

1. To install, reverse the removal procedure.