

Evaporative Emissions - V6 4.0L Petrol -**Torque Specifications**

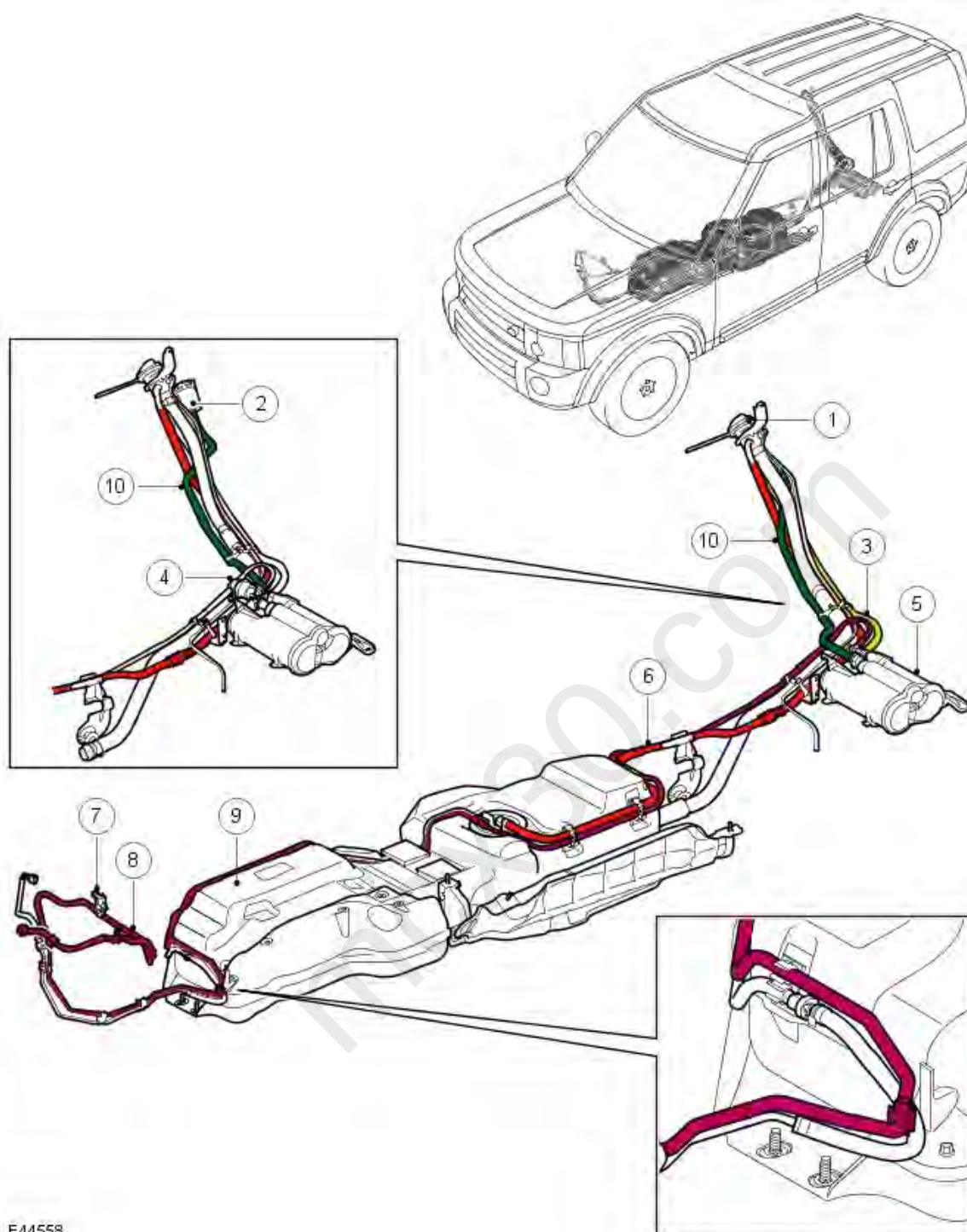
Description	Nm	lb-ft
Evaporative emissions canister bolts	23	17

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Evaporative Emissions - V6 4.0L Petrol - Evaporative Emissions

Description and Operation

4.0L V6 Evaporative Emissions Component Layout



E44558

Item	Part Number	Description
1	-	Fuel filler head
2	-	DMTL pump filter (NAS only)
3	-	Fuel tank vent hose to canister
4	-	DMTL pump (NAS only)
5	-	Charcoal canister
6	-	Fuel tank breather hose from tank
7	-	Purge valve
8	-	Purge hose
9	-	Fuel tank
10	-	Charcoal canister vent hose (All except NAS) or DMTL pump vent hose (NAS)

GENERAL

The 4.0L V6 Evaporative emission (EVAP) control system reduces the level of hydrocarbons released into the atmosphere by fuel vapor venting from the fuel tank. The system comprises a charcoal canister, purge valve and interconnecting vent pipes and hoses. The vent pipes are connected to the system components using quick release connectors.

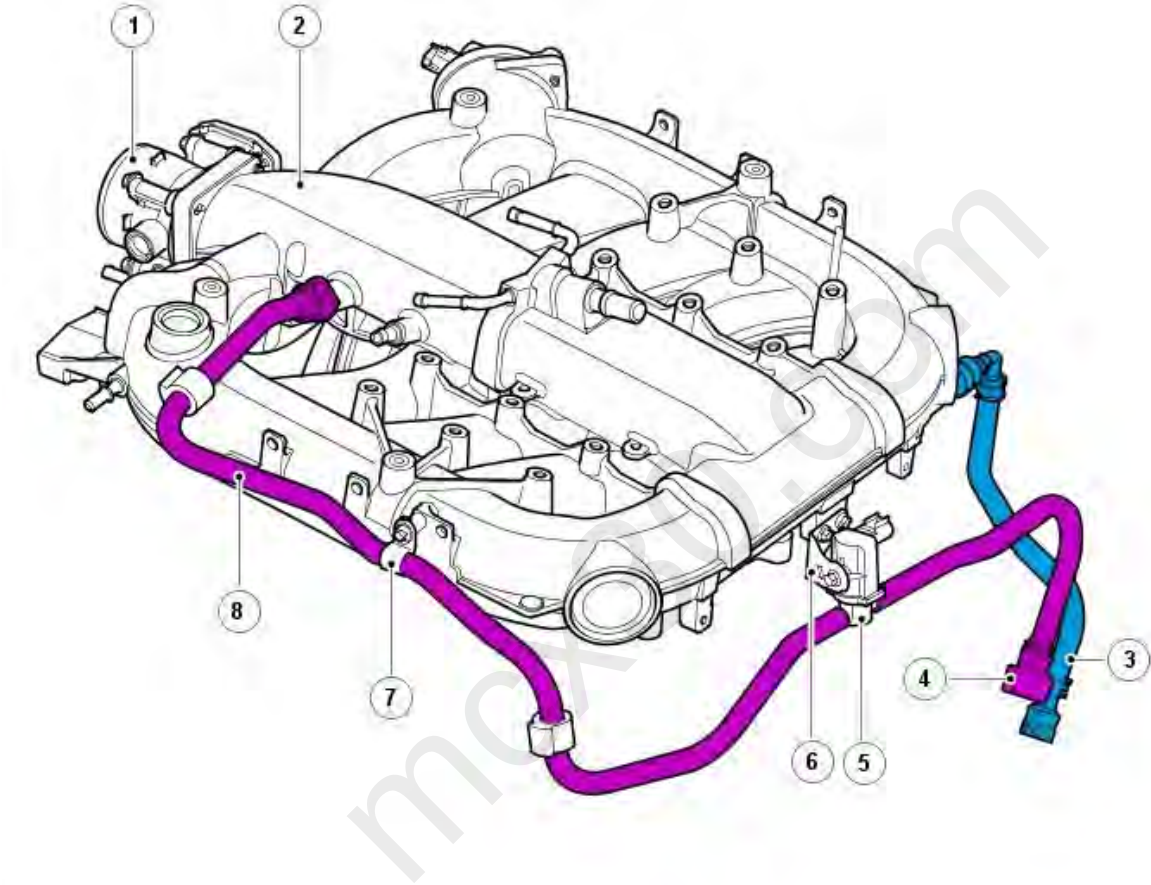
Fuel vapor is generated by the fuel in the tank and the amount of vapor produced increases as the fuel heats up. Fuel vapor can flow freely to the charcoal canister via the tank venting system. The venting system consists of roll over valves and a liquid vapor separator mounted internally in the tank and then externally via a breather line. The breather line allows the fuel vapor to flow to the charcoal canister via a 'Y' piece mounted on the filler head.

On NAS vehicles the vapor generated during refueling flows without restriction to the charcoal canister.

On all vehicles except NAS, the vapor is restricted in its path to the charcoal canister but can flow freely during the refueling operation to atmosphere, via the filler opening.

The vapor passes into the charcoal canister where it is absorbed and stored by the charcoal. Because there is a limit to the amount of vapor the canister can contain, the fuel vapor is purged from the canister when the engine is running and burned in the engine.

PURGE VALVE AND HOSES



E44559

Item	Part Number	Description
1	-	Electric throttle
2	-	Air intake manifold
3	-	Fuel feed jump hose (Ref. only)
4	-	Purge hose
5	-	Purge valve
6	-	Bracket
7	-	Hose clamp
8	-	Manifold to purge valve hose

The purge valve and purge hose are located on the air intake manifold, which is attached to the top of the engine and covered by the engine acoustic cover.

The purge hose is connected, at the right hand rear of the engine, from the purge valve with a quick release coupling to the purge line which runs parallel with the fuel feed line along the top of the fuel tank to the charcoal canister.

The purge hose is connected to the purge valve on the air intake manifold and is routed, via a hose clamp, to a connection on the manifold. The hose is connected to the air intake manifold with a quick release connector.

The purge valve is located on a bracket at the rear of the air intake manifold and secured with a single bolt. The purge valve is a solenoid operated valve which is closed when de-energised. The valve is controlled by the Engine Control Module (ECM) and is cycled when engine operating conditions are correct to allow purging of the charcoal canister.

The purge valve is Pulse Width Modulated (PWM) at 10Hz by the ECM. At this high frequency the pulses of purge gas flowing into the inlet manifold are almost a continuous flow. The valve operates between 5% and 100% duty or mark space ratio (% open time).

The ECM waits until the engine is running above 40°C (104°F) coolant with closed loop fuel operational. Under these conditions the engine

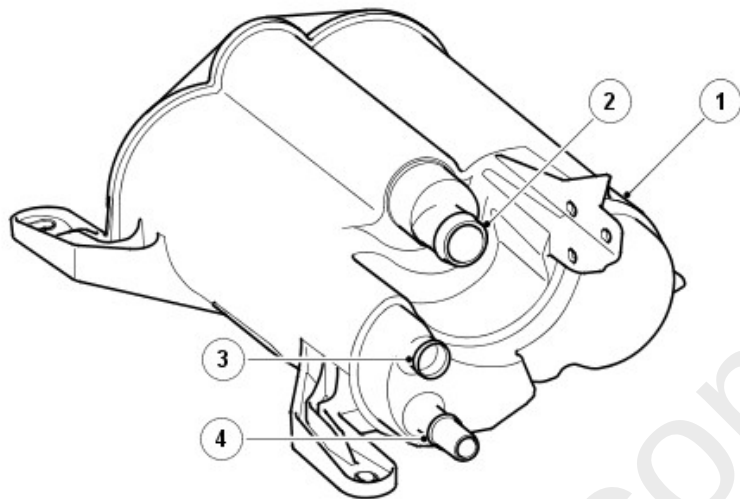
should be running smoothly with no warm up enrichment. The purge valve duty (and flow) is initially ramped slowly because the vapor concentration is unknown (a sudden increase in purge could cause the engine to flood). The concentration is then determined from the amount of adjustment that the closed loop fuelling is required to make to achieve the target Air Fuel Ratio (AFR). Once the concentration has been determined, the purge flow can be increased rapidly and the injected fuel can be proactively adjusted to compensate for the know purge vapor and the target AFR control is maintained.

When the purging process is active, fresh air is drawn into the charcoal canister via the DMTL pump atmospheric vent connection and its filter on NAS vehicles and via the vent hose connection and the spider trap on non NAS vehicles.

On NAS vehicles the system does not include a pressure test point. Pressure testing of the purge valve hose is achieved by disconnecting the purge valve joint on the underside of the vehicle, forward of the fuel tank and connecting a special tool to allow the system to be pressure tested. The test performs a pressure test on the purge hose connection forward of the fuel tank back to the charcoal canister. The special tool is then connected to the purge hose connection forward of the fuel tank to perform a pressure test on the purge hose to the purge valve.

CHARCOAL CANISTER

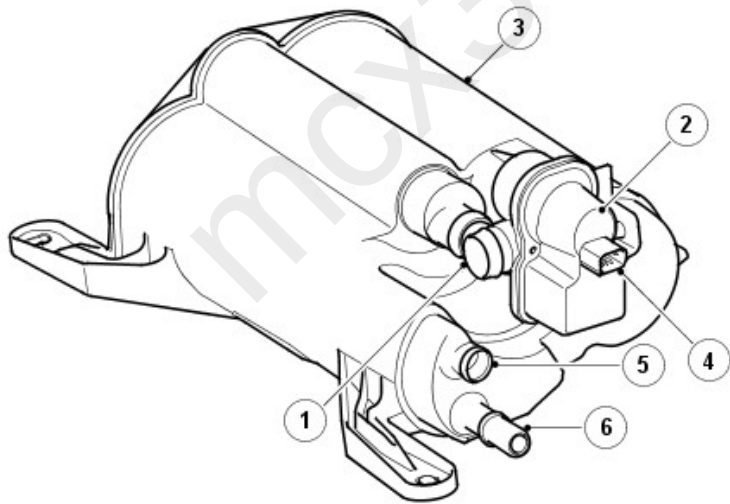
Charcoal Canister - All except NAS



E44560

Item	Part Number	Description
1	-	Charcoal canister
2	-	Charcoal canister atmospheric vent connection
3	-	Purge hose connection
4	-	Charcoal canister tank vent connection

Charcoal Canister - NAS



E44561

Item	Part Number	Description
1	-	Charcoal atmospheric vent connection (via DMTL pump)
2	-	DMTL pump
3	-	Charcoal canister
4	-	Electrical connector
5	-	Purge hose connection
6	-	Charcoal canister vent hose connection

The charcoal canister is located in a central position, forward of the spare wheel. It is attached at the rear with two bolts which screw into the spare wheel carrier. At the front, the canister has two lugs which locate in the parking brake module support bracket.

The canister on ROW vehicles has a capacity of 1400 cc (85.4 in³).

The canister on NAS vehicles has a capacity of 3000 cc (183 in³).

The canister has three ports which allow for the attachment of the atmospheric vent hose, the purge hose and the tank vent hose. On NAS vehicles the atmospheric vent hose connection allows for the attachment of the DMTL pump.

The canister contains a bed of activated charcoal or carbon. The charcoal is produced using special manufacturing techniques to treat the charcoal with oxygen. The oxygen treatment opens up millions of pores between the carbon atoms resulting in a highly porous charcoal with a

very large effective surface area which is capable of absorbing large quantities of fuel vapor. Once treated the charcoal is known as 'activated' carbon or charcoal. The charcoal canister on NAS vehicles uses a higher grade charcoal to meet the requirements of LEV2 emission regulations.

DIAGNOSTIC MONITORING OF TANK LEAKAGE (DMTL) - NAS ONLY

The DMTL system is a legislative requirement for NAS vehicles. The DMTL system periodically checks the EVAP system and the fuel tank for leaks when the ignition is switched off.

The DMTL system comprises the previously described components of the EVAP system with the following additional components; a DMTL pump and a DMTL filter.

The DMTL pump is connected to the atmospheric vent of the charcoal canister and incorporates an electric air pump, a Positive Temperature Co-efficient (PTC) heating element, a normally open valve and a reference orifice. The DMTL pump is only operated when the ignition is switched off and is controlled by the ECM. The ECM also monitors the electric air pump operation and the normally open valve for faults.

The DMTL filter protects the pump from dust being drawn into the system when the pump is being operated. The filter is located on the fuel filler head and is connected to the DMTL pump by a hose.

DMTL Operation

To check the fuel tank and the EVAP system for leaks, the ECM operates the DMTL pump and monitors the current draw. Initially, the ECM establishes a reference current by pumping air through the reference orifice and back to atmosphere. Once the reference current is determined, the ECM closes the normally open valve which seals the EVAP system. The purge valve remains de-energised and is therefore closed. The output from the air pump is diverted from the reference orifice and into the EVAP system.

When the normally open valve is closed, the load on the air pump falls to zero. Providing there are no leaks, the air pump will begin to pressurise the EVAP system and the load and current draw in the pump increases. By monitoring the rate and level of the current increase, the ECM can determine if there is a leak in the EVAP system.

During normal vehicle operation, the ECM energises the heating element in the pump to prevent condensation formation and possible incorrect current readings.

Leaks are classified as:

- Minor - equivalent to a hole diameter of 0.5 to 1.0 mm (0.02 to 0.04 in)
- Major - equivalent to hole diameter of 1.0 mm (0.04 in) or greater.

The ECM performs a check for major leaks each time the ignition is switched off, providing the following conditions are met:

- The vehicle speed is zero
- The engine speed is zero
- The pressure altitude (70kPa (10.15 lbf/in²) derived from engine load calculations) is below 3047 m (10,000 feet)
- The ambient temperature is between 0 and 40°C (32 and 104°F)
- The charcoal canister load factor is 2 or less (where the load factor is a measure, between -1 and +30, of the fuel vapor stored in the charcoal canister. Where -1 is 0% fuel vapor, 0 is stoichiometric fuel vapor level and +30 is 100% saturated with fuel vapor.
- The fuel tank level is valid and between 15 and 85% of nominal capacity
- The engine running time during the previous cycle was more than 10 minutes
- The battery voltage is between 10 and 15 volts
- The last engine off time was more than 180 minutes
- No errors are detected with the EVAP components, the ambient air temperature and the fuel level
- High range must be selected on the transfer box.

• NOTE: A leak test can be performed using T4. This overrides the above conditions and is useful for checking correct system and component operation.

The ECM performs a check for minor leaks after every 14th major leak check or after refuelling is detected.

When the leak check is complete, the ECM stops the DMTL pump and opens (de-energises) the normally open valve.

If the fuel filler cap is opened or refuelling is detected during the leak check, by a sudden drop in the current draw or a rise in the fuel level, the ECM aborts the leak check.

If a leak is detected during the check, the ECM stores an appropriate fault code in its memory. If a leak is detected on two consecutive checks, the ECM illuminates the Malfunction Indicator Lamp (MIL) in the instrument cluster on the next drive cycle.

The duration of a leak check can be between 40 and 270 seconds depending on the results and fuel tank level.

Evaporative Emissions - V6 4.0L Petrol - Evaporative Emissions

Diagnosis and Testing

Principles of Operation

For a detailed description of the evaporative emission system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: Evaporative Emissions (303-13 Evaporative Emissions - V8 5.0L Petrol/V8 S/C 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. **1.** Verify the customer concern.
2. **2.** Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection

Mechanical	Electrical
● Fuel filler cap and seal ● Fuel filler neck ● DMTL fresh air filter (restriction, etc) ● Fuel tank (leaks, damage, etc) ● Fuel lines and joints, etc ● Carbon canister ● Purge valve ● Diagnostic module fuel tank leak (DMTL) pump module	● Fuses ● Connectors ● Harness ● Purge valve ● Diagnostic module fuel tank leak (DMTL) pump

3. **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. **4.** If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.
5. **5.** Where K-Line, Vacutec or other proprietary smoke test equipment is available, it should be utilized to assist with Evaporative Emissions System leak diagnosis.

Symptom Chart

Symptom	Possible Causes	Action
Difficulty in filling fuel tank	● Restriction in the vapour line between the fuel tank and the carbon canister outlet/atmospheric port	Check for restrictions/damage, etc (see visual inspection)
Fuel smell	● System leak ● Purge valve inoperative	Check for leaks, check the purge valve operation
'Check Fuel Filler Cap' displayed on Message Center	● Fuel filler cap missing/not tightened after refuelling	Check the fuel filler cap and seal

DTC Index

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

Evaporative Leak OBD Fault Rectification Guide

Determine Which DTC Has Been Stored

Using the manufacturer approved diagnostic system, choose **diagnostic session**, then choose the following symptom paths : **Powertrain/engine system/fuel vapour and odor, Powertrain/engine system/fuel tank, Electrical/instruments / warning lamps/engine malfunction lamp/lamp illuminated, Powertrain/engine system/engine performance/fuel consumption high**

• **NOTE:** This guide covers DTCs that relate to evaporative leak monitoring, as listed in the table below

DTC	Description
P0442-00	DMTL small leak
P0447-00	DMTL COV electrical low (open)
P0448-00	DMTL COV electrical high
P0455-00	DMTL rough leak
P2401-00	DMTL pump electrical low (open)
P2402-00	DMTL pump electrical high
P2404-2F	DMTL noise fault
P2404-29	DMTL reference leak

DTC	Description
P2405-00	DMTL reference current low
P2406-00	DMTL reference current high
P2450-00	DMTL COV stuck open
P2451-00	DMTL COV stuck closed
P240B-00	DMTL heater electrical low (open)
P240C-00	DMTL heater electrical high

Attempt To Replicate The Fault Using The "Fuel Leak Check" Forced Test

1. Record any DTCs that has been logged
2. Using the manufacturer approved diagnostic system, in the **Recommendations** tab run the **Fuel Leak Check** forced test
3. For the test to run the fuel level must be between 15% and 85%
4. During this procedure the engine must be off
5. The possible responses from the test and the associated DTCs are listed below
6. If again no fault is found it could suggest that the failure mode is a borderline condition (refer to section 3) or that it was caused by incorrect fitment of the fuel cap or the fuel filler neck is at fault therefore it is important not disturb the fuel cap
7. Disconnect purge pipe from the purge valve, observe the condition of connection (the seating and condition of the "O" ring) and then reconnect. Using the manufacturer approved diagnostic system, run **Purge Valve Self Test** (to clean the purge valve) then run the **Fuel Leak Check**
8. If the test failed, a smoke test is required to determine the cause of the leak

• NOTE: P240B & P240C are not included in the **Fuel Leak Check** forced test (these monitors run at every ignition on and complete within 30 seconds)

Response Description	ID	Equivalent DTC
Function running: Reference leak measurement	1	
Function running: Rough leak measurement	2	
Function running: Small leak measurement	3	
Function running: 2nd ref leak measurement	4	
Function running: COV Cleaning	5	
Function aborted due to conditions: Vbatt conditions not correct (too high/ low)	11	
Function aborted due to conditions: Variation Ref. I (reference current) too high	12	P2404-29
Function aborted due to conditions: DMTL electrical fault	13	P0447, P0448
Function aborted due to conditions: Maximum diagnostic time exceeded	14	
Function aborted due to conditions: Crash detected	15	
Function aborted due to conditions: Refuel detected	20	
Function aborted due to conditions: Filler cap opened	21	
Function aborted due to conditions: Engine start	23	
Function aborted due to conditions: Noisy current measurement	24	P2404-2F
Function aborted due to conditions: Ambient temp outside range	26	
Function aborted due to conditions: Ambient pressure outside range	27	
Function aborted due to conditions: Other conditions	29	
Function complete - Tight system, fault free	30	
Function complete - Fine leak detected	31	P0442
Function complete - Rough leak detected	32	P0455
Function complete - Module error	33	P2401, P2402, P2450, P2451, P2405, P2406, P2404-29
Function complete - Medium leak detected	34	P0442, P0455

Read The "Ranking values" To Determine How Far Away The Result Is From The Failure Threshold

9. When the **Fuel Leak Check** forced test has completed the test results (known as ranking values) will be displayed
10. These should be compared against the limits shown in the table below
11. If the test result is borderline then there is a risk that a failure will occur at a later date (during customer usage of the vehicle)
12. To avoid this the vehicle should be carefully checked for any small leaks

Ranking Value	Normal Result For Tight System	Leak Failure Condition
Rough Leak (40 thou+)	0 > = 50	>= 128
Small Leak (20 thou+)	0 > = 60	>= 128

TRACE THE ROOT CAUSE OF THE FAULT

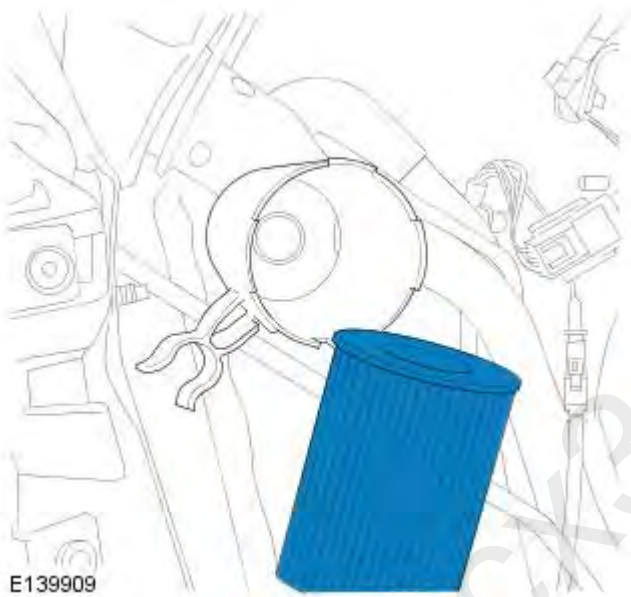
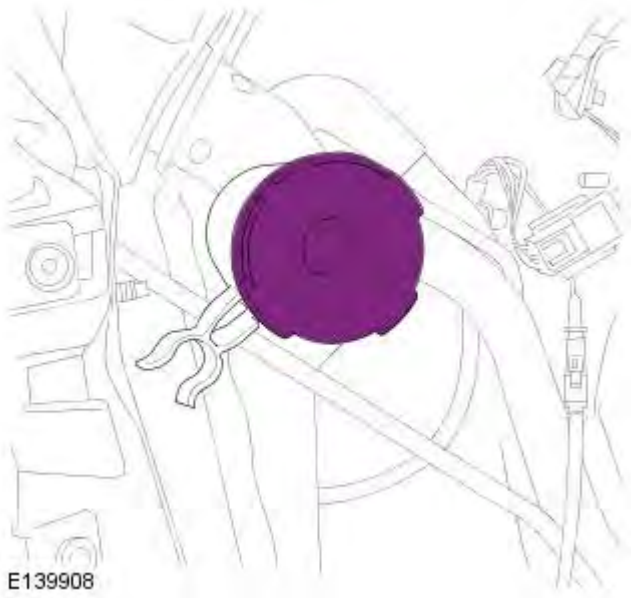
The list below provides some suggested actions to help trace the root cause of the fault

Each action should be followed up with a **Fuel Leak Check** forced test (and ranking value check) in order to determine if any improvement has been made

DTC	Fault Description	Fault Rectification Actions after smoke test
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DTC	Fault Description	Fault Rectification Actions after smoke test
P0442-00	DMTL small leak	1. Inspect / refit filler cap after smoke test (inspect filler neck for correct fitment to pocket so that filler neck protrudes) 2. Run engine at idle; Using the manufacturer approved diagnostic system, run Purge Valve Self Test (to clean the purge valve) 3. Check that the DMTL module wiring connector has been installed correctly and that the seals around the connector body and individual wires are in good condition 4. Check all fuel system connections are correctly installed and secure 5. Visually inspect purge canister, purge pipes, fuel tank and filler neck for any obvious damage 6. Try isolating the purge valve by fitting a blanking plug to the purge pipe 7. Carry out a smoke test 8. Replace the DMTL module
P0447-00	DMTL COV electrical low (open)	1. Check fuse 2. Check that fuse fits tightly into the fuse holder 3. Check that the DMTL module wiring connector has been fitted correctly 4. Check wiring harness continuity between DMTL module and ECU connectors 5. Replace DMTL module
P0448-00	DMTL COV electrical high	1. Check wiring 2. Replace DMTL module
P0455-00	DMTL rough leak	1. Inspect / refit filler cap after smoke test (inspect filler neck for correct fitment to pocket so that filler neck protrudes) 2. Run engine at idle; Using the manufacturer approved diagnostic system, run "Purge Valve Self Test" (to help clean the purge valve) 3. Check that the DMTL module wiring connector has been installed correctly and that the seals around the connector body and individual wires are in good condition (surprisingly, this is a potential leakage path!) 4. Check all fuel system connections are correctly installed and secure 5. Visually inspect purge canister, purge pipes, fuel tank and filler neck for any obvious damage 6. Try isolating the purge valve by fitting a blanking plug to the purge pipe 7. Carry out a smoke test 8. Replace DMTL module
P2401-00	DMTL pump electrical low (open)	1. Check fuse 2. Check that fuse fits correctly into the fuse holder 3. Check that the DMTL module wiring connector has been fitted correctly 4. Check wiring harness continuity between DMTL module and ECU connectors 5. Replace DMTL module
P2402-00	DMTL pump electrical high	1. Check wiring 2. Replace DMTL module
P2404-2F	DMTL noise fault	Replace DMTL module
P2404-29	DMTL reference leak	Replace DMTL module
P2405-00	DMTL reference current low	Replace DMTL module
P2406-00	DMTL reference current high	1. Check for any blockages in the DMTL ventilation pipe & filter 2. Replace DMTL module
P2450-00	DMTL COV stuck open	Replace DMTL module
P2451-00	DMTL COV stuck close	Replace DMTL module
P240B-00	DMTL heater electrical low (open)	1. Check fuse 2. Check that fuse fits tightly into the fuse holder 3. Check that the DMTL module wiring connector has been fitted correctly 4. Check wiring harness continuity between DMTL module and ECU connectors 5. Replace DMTL module
P240C-00	DMTL heater electrical high	1. Check wiring 2. Replace DMTL module

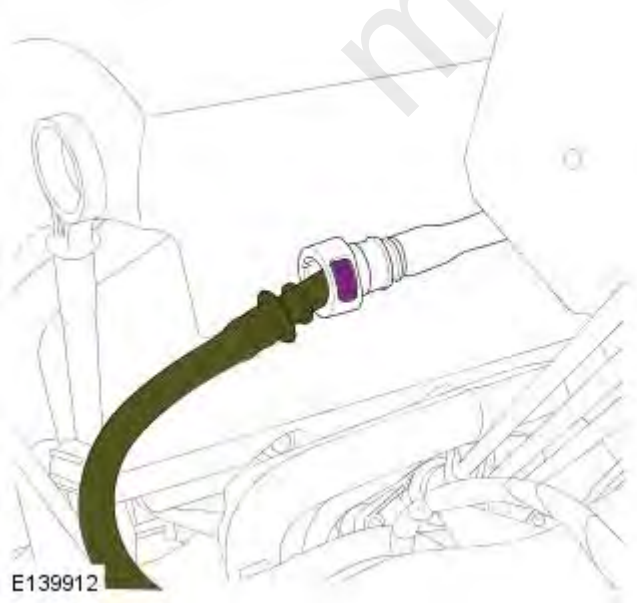
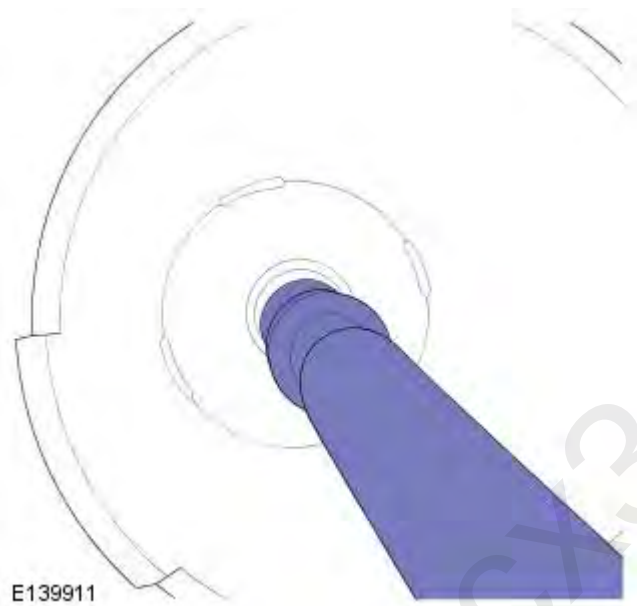
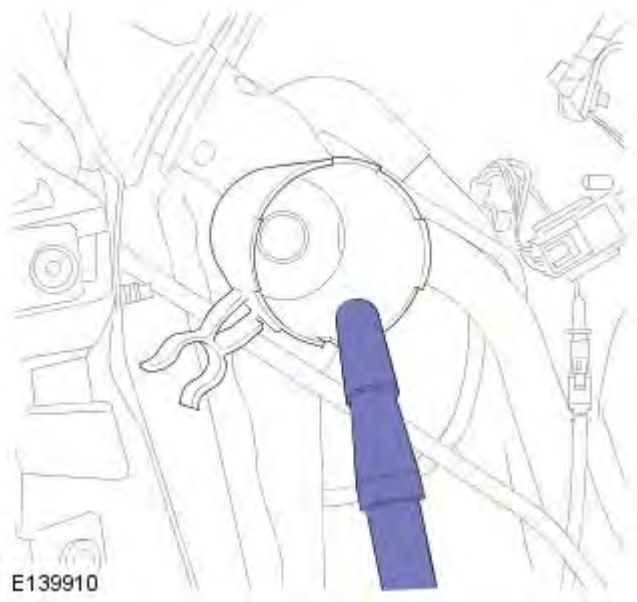
Pre and 10MY Denso/Bosch PCM Systems



CAUTION: The Maximum pressure of the EVAP system is 0.07 bar **do not exceed**

• **NOTE:** Apart from the purge valve connection, it is recommended to smoke test the EVAP system without disturbing any joints associated with the system, this will determine the leak more accurately and quickly

- 1. Remove rear wheel arch liner to access fuel filler neck
- 2. On the fuel filler neck the DMTL filter will be visible as shown in picture. Unclip filter housing from fuel filler neck to gain better access to DMTL filter
- 3. Remove carefully the top of filter to expose filter and remove
- 4. Attach rubber adapter to tip of smoke machine nozzle to ensure tight seal to filter housing. Disconnect the purge pipe from purge valve; this will be an escape point for the smoke to exit
- 5. Allow tester to complete self-test and green READY light to turn ON 2. For best Tester performance; completely unwind Tester's supply hose
- 6. Press **Smoke** on control panel to fill EVAP system with smoke vapour. The control panel **Smoke** light will light indicating smoke production. The smoke setting is on a 15 minute timer. Pressing the **Smoke** button again turns Tester off. It is normal for the flow meter ball, while in the smoke mode, not to be as steady as when it is in the **Test** mode. Note: The pressure gauge is active only after smoke cycle is complete
- 7. Continue introducing smoke into the EVAP System until the flow meter's ball stops descending and this assures the system test pressure is met and smoke will appear from the purge pipe, then close off purge pipe with special tool (Test Adapter Hose/EVAP Port 310-142)



CAUTION: On some vehicles, the DMTL filter can not be removed, in these instances fill the system through the purge valve and smoke will appear from the filter

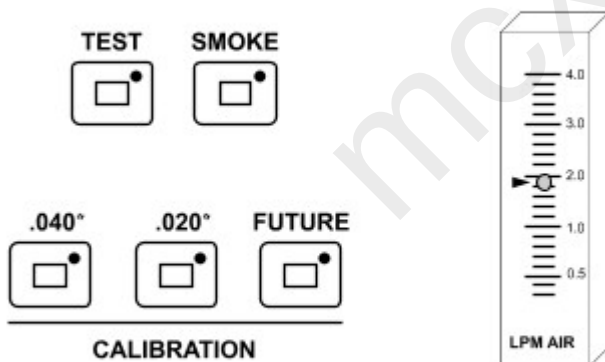
Pre 10MY Vehicles

On pre 10MY DMTL systems, Using the manufacturer approved diagnostic system, select **Measurement application** session then select the **Recommendations** tab which will give you access to **Datalogger**. Then select **Engine systems** then select the **Output state control** data-logger signal **Engine output 1 – diagnostic module – tank leakage -change over valve active** which will close the system. Then select **Engine output 1 – diagnostic module – tank leakage – pump active** this will pressurize the EVAP system



- Engine output 1 - engine management system warning lamp.
- Engine output 1 - malfunction indicator warning lamp.
- Engine output 1 - diagnostics module - tank leakage - test complete.
- Engine output 1 - diagnostics module - tank leakage - heater active.
- Engine output 1 - diagnostics module - tank leakage - pump active.
- Engine output 1 - diagnostics module - tank leakage - changeover valve active.
- Engine output 2 - treated exhaust gas oxygen heater active - bank 2.

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10MY vehicles

On 10MY vehicles a smoke test application is available so therefore only smoke fill the system and then run the application

- 8. Follow the EVAP system path with the halogen light provided and looks for the smoke exiting the leak(s) or use the UV light provided and look for the dye deposited at the exact location of the leak(s)
- 9. Repair the leak(s) and perform the **Fuel Leak Check** application again or smoke test to verify repair, as well as to make sure there are no additional leaks in the EVAP system

The UltraTraceUV® smoke solution's dye feature is especially helpful when the leak is in an area that is not readily visible, as on the top of the fuel tank or behind a panel. Once you gain access to the area of the leak, wear the yellow UV glasses and shine the UV light provided to identify the exact location of the leak(s). Smoke exiting a very small leak is even easier to see with lower pressure. If you encounter smoke leaking out of an area but find it difficult to pinpoint exactly where the source of the leak is; try reducing the pressure in the system being tested by turning the Tester OFF and allow the pressure to dissipate. The longer a particular leak is allowed to leak, the more fluorescent dye material will be deposited

at that leak. With some vapour system leaks, the leak may only present itself under vacuum and not under pressure. If equipment permits, test the system in both states. Purge valve faults [P0441, P0444, P0458 and P0459] should all inhibit DMTL leak test and therefore need to be resolved prior to any DMTL issues. For this reason, when smoke testing the vapour system, it should be sufficient to enter the system at the connection up stream of the purge valve. If no leak is found then testing the remainder of the system up to the purge valve is recommended

• **NOTE:** It may be possible to search for small leaks using a gas analyzer and looking for HC (hydro carbon) spikes. This should enable leaks to be detected in areas of the vapor system that are out of sight of the technician. The solenoid should be deactivated after five minutes to prevent potential damage. Check that connector and individual terminals are sealed correctly

Phase-One – (quantifying the leak)



E139914

- 1. Connect the tester supply hose to vehicle EVAP system. > Refer to appropriate vehicle application
- 2. Determine if the vehicle's EVAP system you are testing is governed by a .020" (0.5 mm) or .040" (1 mm) acceptable leak standard. Press the appropriate calibration standard on the tester's control panel and observe the position of the flow meter ball. > This function automatically turns off in 10 seconds
- 3. Position the flow meter's pointer flag so that it aligns with the measurement observed in step 2 above. > This sets PASS / FAIL mark
- 4. Close vehicle's EVAP Vent Solenoid. > Refer to appropriate vehicle application
- 5. Press TEST on control panel and fill EVAP system. > This introduces 5-minutes of nitrogen gas
- 6. Look for flow meter ball to stop descending indicating that the vehicle system is full. > Fill time 1-4 minutes depending on system volume
- 7. Compare flow meter ball reading to pointer flag. > ABOVE flag = FAIL (go to Phase-Two). > BELOW flag = PASS (test complete)

Testing With Pressure and Vacuum Decay

In addition to quantifying the leak with the Phase-One flow test, the Tester allows you the flexibility of testing the vehicle's EVAP system by using either **Pressure Decay** or **Vacuum Decay** methods. Below are instructions for performing both decay tests

Pressure-Decay Test

• **NOTE:** The Pressure Decay test is best performed immediately after the Phase-one flow test, since the system has already built up pressure

At the completion of the Phase-one flow test, the EVAP system is fully pressurized, since the Phase-one test uses pressure to perform its flow test. Testing pressure decay with the Vacutec® 522B-J/LR is very simple. All you need to do is the following:

- 1. Allow tester to complete self-test and green **READY** light to turn ON
- 2. Connect Tester supply hose to vehicle EVAP system
- 3. Close vehicle's EVAP Vent solenoid > Refer to appropriate vehicle application
- 4. Press **VACUUM** switch on the tester control panel
 - NOTE: The vacuum switch is on a 30-second timer, which should be sufficient time to draw the appropriate vacuum from the EVAP system. Press VACUUM switch again if additional time is required
- 5. After vacuum timer turns off, observe the vacuum gauge for any decay (loss of vacuum) indicating a leak in the EVAP system



E139915

- NOTE: Disconnect the Tester from the vehicle after the Vacuum Decay Test. The fuel pressure in the vehicle's fuel tank is constantly changing due to the vehicle's fuel volatility and that could cause the Tester's pressure gauge to exceed its maximum reading limits

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Evaporative Emissions - V6 4.0L Petrol - Evaporative Emission System Leak Test

General Procedures

Special Tool(s)	
 310-142 E67117	EVAP tool 310-142

• **NOTE:** The following procedure allows a fuel leak, indicated by the Malfunction Indicator Lamp (MIL), to be accurately located. The test must only be carried out once it has been established that there are no obvious faults with any of the fuel system components.

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

Position the vehicle on a lift.

- 2.** Check the components in the fuel and EVAP system for obvious damage. Make sure all the connections are secure.
- 3.** Connect T4 to the vehicle.
 - Run the DMTL test.
 - Follow the on-screen prompts and force the DMTL to close.

4. WARNINGS:

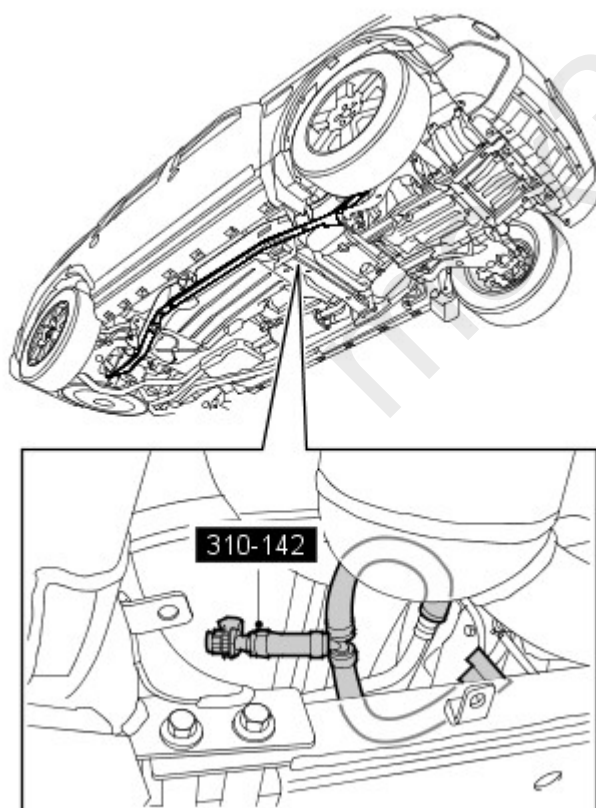
⚠ Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapors are always present and may ignite. Failure to follow these instructions may result in personal injury.

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

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

Install the special tool to the purge line.

- Release the clip and disconnect the purge line.
- Clean the component mating faces.
- Connect the special tool.



E67118

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

Disconnect the purge line at the emission canister line.

- Release the clip.
- 6.** Carry out the procedures in order, from the instruction sheet supplied with the EVAPS diagnostic testing station 310-115 (LRA-19-004) or (LRA-19-005A).
 - 7.** When a leak is detected, replace the component as necessary and repeat the test to validate the repair.
 - 8.** Connect the purge line to the emission canister line.
 - Clean the component mating faces.
 - Secure with the clip.
 - 9.** Disconnect the special tool from the purge line.
 - Clean the component mating faces.
 - Connect the purge line.
 - 10.** Disconnect T4 from the vehicle.

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Evaporative Emissions - V6 4.0L Petrol - Evaporative Emission Canister

Removal and Installation

Removal

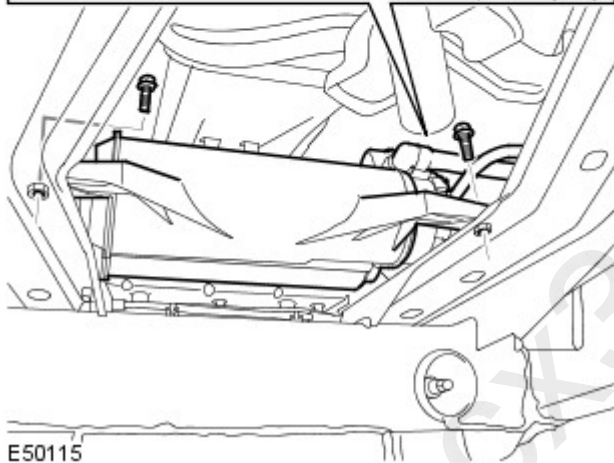
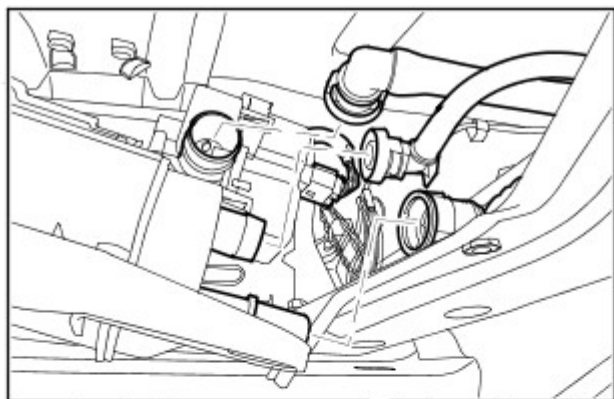
1. Remove the spare wheel and tire.

2.  **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.

3. Remove the evaporative emissions canister.

- Remove the 2 bolts.
- Disconnect the 3 lines.
- Disconnect the electrical connector.



E50115

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

NAS vehicles: Remove the fuel tank leakage detection module.

- Remove the 3 screws.



E50116

Installation

1. NAS vehicles: Install the fuel tank leakage detection module.

- Install the screws.

2. Install the evaporative emissions canister.

- Connect the electrical connector.
- Connect the lines.

- Tighten the bolts to 23 Nm (17 lb.ft).

3. Install the spare wheel and tire.

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Evaporative Emissions - V6 4.0L Petrol - Evaporative Emission Canister

Purge Valve

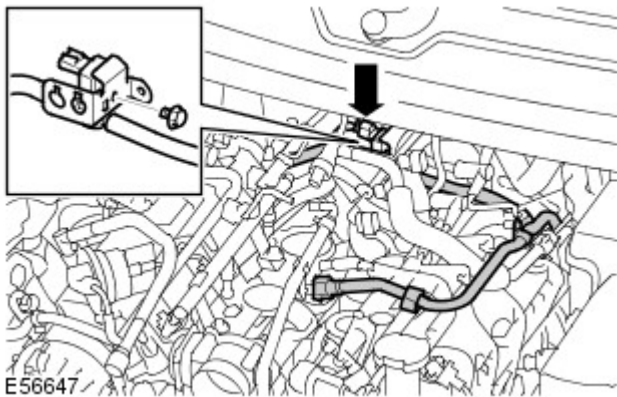
Removal and Installation

Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the intake manifold casting.
For additional information, refer to: [Intake Manifold](#) (303-01C Engine - V6 4.0L Petrol, In-vehicle Repair).
3. **NOTE:** Note the fitted position.

Release the purge valve from the mounting bracket.

- Remove the bolt.



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

Remove the purge valve.

- Disconnect the 2 hoses.
- Disconnect the electrical connector.

Installation

1. Connect the purge valve.
 - Connect the hoses.
 - Connect and secure the electrical connector.

2. **NOTE:** Align to the position noted on removal.

Install the purge valve, align the peg and tighten the bolt to 6 Nm (4 lb.ft).

3. Install the intake manifold casting.
For additional information, refer to: [Intake Manifold](#) (303-01C Engine - V6 4.0L Petrol, In-vehicle Repair).
4. Connect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

Evaporative Emissions - V6 4.0L Petrol - Fuel Tank Leakage Monitoring Pump

Removal and Installation

Removal

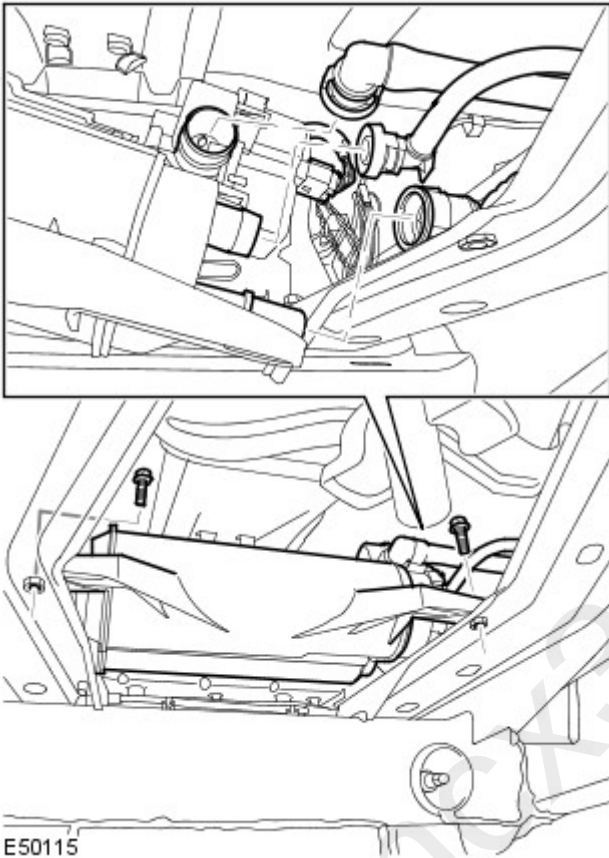
1. Remove the spare wheel and tire.

2.  **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.

3. Remove the evaporative emissions canister.

- Remove the 2 bolts.
- Disconnect the 3 lines.
- Disconnect the electrical connector.



4. Remove the fuel tank leakage detection module.

- Remove the 3 screws.



Installation

1. Install the fuel tank leakage detection module.

- Install the screws.

2. Install the evaporative emissions canister.

- Connect the electrical connector.

- Connect the lines.
- Tighten the bolts to 23 Nm (17 lb.ft).

3. Install the spare wheel and tire.

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Evaporative Emissions - V6 4.0L Petrol - Fuel Tank Leakage Monitoring

Pump Filter

Removal and Installation

Removal

1. Remove the spare wheel and tire.

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

Position the vehicle on a lift.

3. Disconnect the battery ground cable.

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

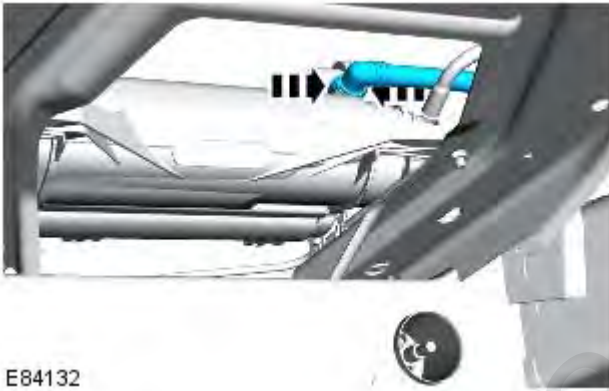
4. Remove the RH rear wheel and tire.

5. Remove the fender moulding.

For additional information, refer to: [Rear Quarter Panel Moulding](#) (501-08 Exterior Trim and Ornamentation, Removal and Installation).

6. Release the fuel leak detection filter.

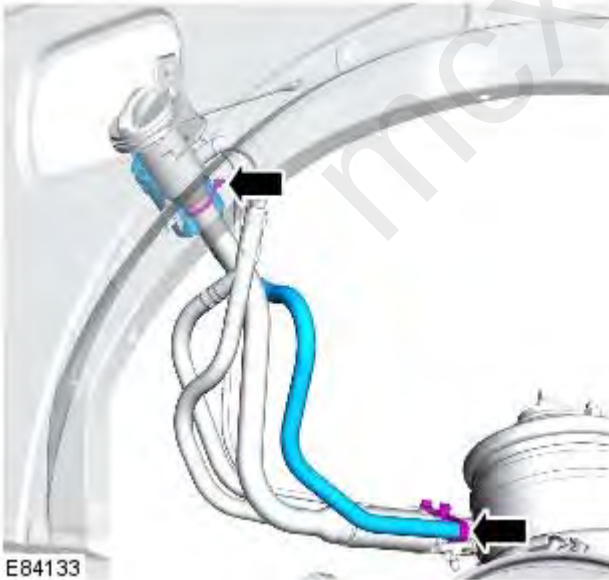
- Disconnect the breather hose from the fuel leak detection pump.



E84132

7. Remove the fuel leak detection filter and breather hose assembly.

- Release the breather hose from the clip.
- Remove and discard the cable tie.



E84133

Installation

1. Install the fuel leak detection filter and breather hose assembly.

- Secure with a cable tie.
- Secure the breather hose in the clip.

2. Attach the fuel leak detection filter breather hose to the

pump.

3. Install the fender moulding.

For additional information, refer to: [Rear Quarter Panel Moulding](#) (501-08 Exterior Trim and Ornamentation, Removal and Installation).

4. Install the RH rear wheel and tire.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

5. Connect the battery ground cable.

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

6. Install the spare wheel and tire.

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Evaporative Emissions - V6 4.0L Petrol - Evaporative Emission Canister Ventilation Filter

Removal and Installation

Removal

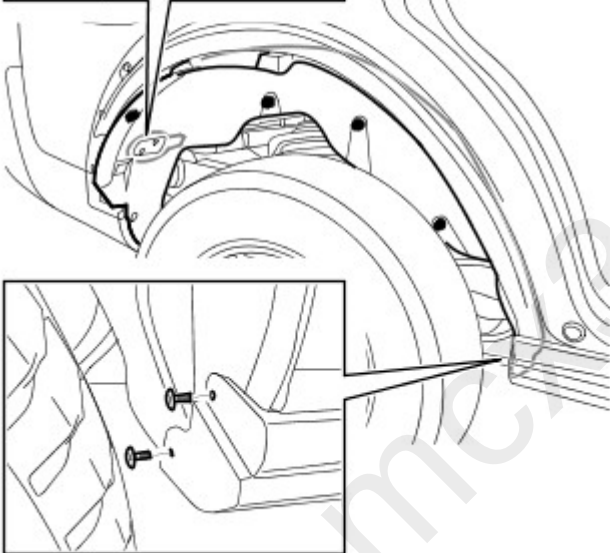
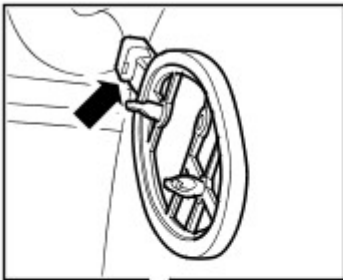
1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Remove the RH rear wheel and tire.
3. Remove the RH rear quarter panel moulding.
For additional information, refer to: [Rear Quarter Panel Moulding](#) (501-08 Exterior Trim and Oramentation, Removal and Installation).
4. **NOTE:** Some variation in the illustrations may occur, but the essential information is always correct.

Remove the RH rear fender splash shield.

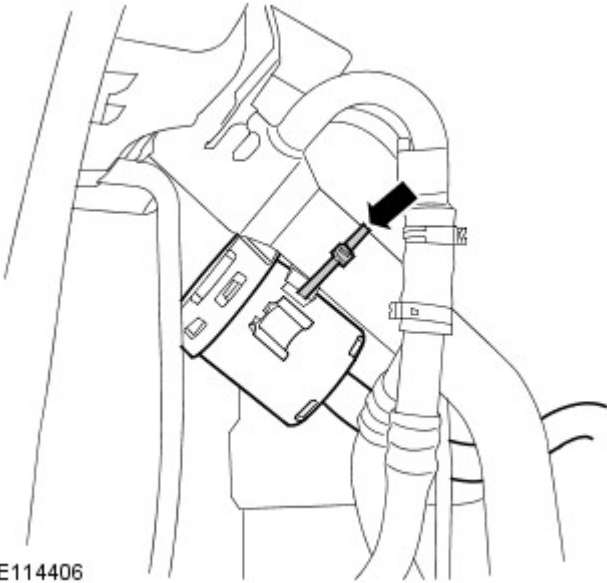
- Remove the 2 screws.
- Remove the 6 retainers.
- Disconnect the electrical connector.



E48478

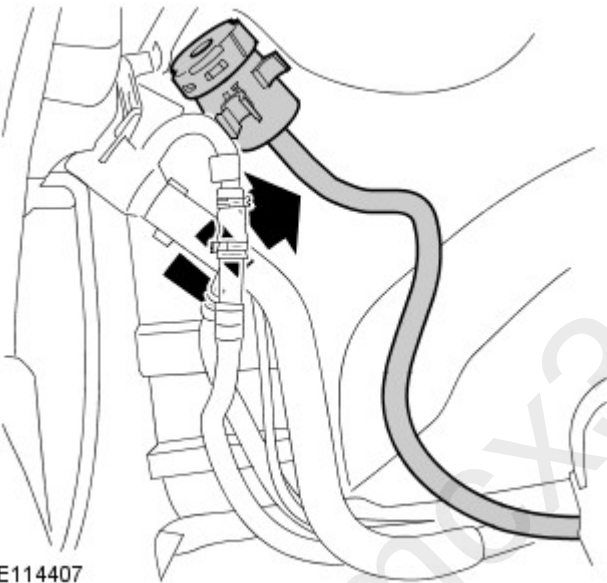
5. Release the evaporative emission canister ventilation filter from the fuel filler pipe.

- Cut the cable tie.



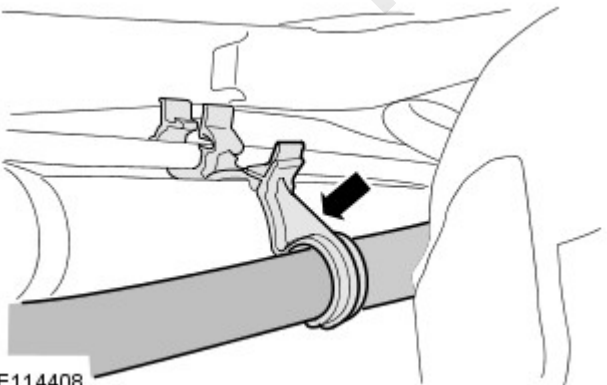
E114406

6. Position the evaporative emission canister ventilation filter to one side.



E114407

7. Release the evaporative emission ventilation filter from the clip.

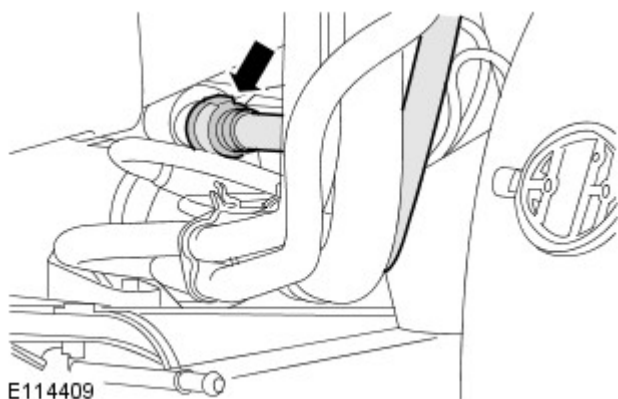


E114408

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

Remove the evaporative emission canister ventilation filter.

- Release the evaporative emission canister ventilation filter from the evaporative emission canister.



Installation

1. To install reverse the removal procedure.

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