

SECTION : 310-00 Fuel System

VEHICLE APPLICATION : 2008.0 Falcon

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SPECIFICATIONS

General Specifications

Description	Specification
Fuel Tank Capacities - Total	
Sedan	68 Litre
Ute	81 Litre
PCM	
For detailed electrical specifications of the fuel injection system, refer to Diagnosis and Test in Section 303-14 of the FG Falcon Workshop Manual.	
Fuel Pump (I6 engine)	
Delivery (minimum)	305cc in 10 seconds @ 270 kPa, 13.2 volts
Fuel Pump (I6 Turbo and V8 4V engine)	
Delivery (minimum)	510cc in 10 seconds @ 400 kPa, 13.2 volts
Pressure at:	
Engine idle	I6 engine 225 kPa, I6 Turbo and V8 4V 350 kPa
Engine stationary	I6 engine 270 kPa, I6 Turbo and V8 4V 400 kPa
Maximum pressure drop on engine shut down	10% in 10 seconds
Fuel pump resistance at loom connector	< 10 ohms

Torque Specifications

Description	Nm
Pressure regulator tube nut	27
Fuel tank retaining shield - Sedan	35
Fuel tank retaining strap - ute	30 - 40
Sedan filler hose clamp (9mm width band)	3.0 +/- 0.5
Utility filler hose clamp (12mm width band)	5.0 +/- 0.5

CAUTION: ⚠ Do not use cutting torches or equipment generating heat or sparks in proximity of the fuel tank.

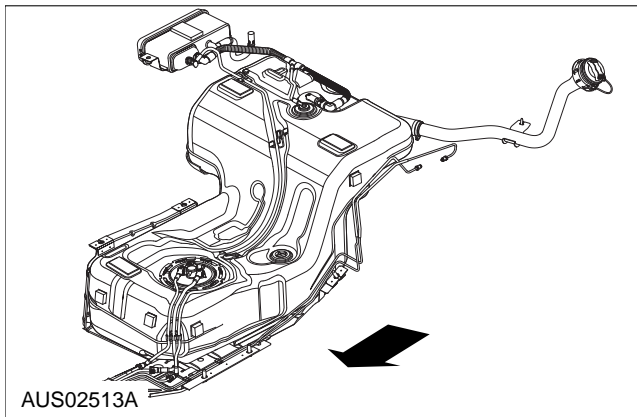
CAUTION: ⚠ No repair of the fuel system components is allowed. Repair is to be achieved through replacement of non-functioning components only. For example, a fuel line assembly must be replaced if one of its connectors is damaged or leaking.



DESCRIPTION AND OPERATION

Fuel System

Sedan



The fuel tank on sedan models is a multi layer co-extruded blow moulding with a separate steel filler neck (joined by a rubber hose).

The tank is located beneath the floor of the left hand side rear passenger.

The top of the filler neck is located in the left hand rear quarter panel. The filler neck is fixed to the side rail with a specially coated bolt that ensures electrical grounding to eliminate electrostatic charge.

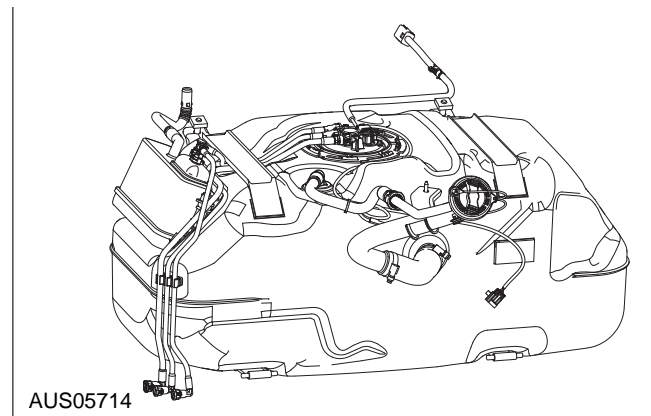
The fuel pump assembly is mounted in the tank and is accessible beneath a plastic plug under the rear cushion on the LHS of the vehicle. The fuel level sender arm assembly is mounted remotely from the pump on the internal mounting arm inside the tank. It is serviceable and is electrically connected via the fuel pump wiring connector.

Nylon tubing form the fuel lines. The refuelling vapour vent line is a large diameter corrugated nylon tube attached to the fuel level vent valve on the top of the tank. It vents directly into the carbon canister.

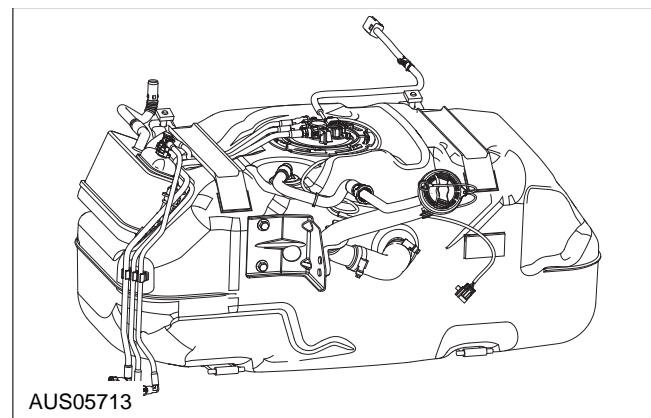
A nylon purge line then connects the canister back to the main underbody lines. The canister has a corrugated nylon breather hose which is clipped into a cross member to reduce ingestion of water or dust into the canister.

The tank is secured to the underbody by a large galvanized steel stamping which also acts as a shield. The carbon canister is mounted on the body adjacent to the tank on the other side of the exhaust pipe and above the IRS.

Ute style side box



Ute cab chassis



The fuel tank on ute models is a multi layer co-extruded blow moulding with a separate steel filler neck (joining by rubber hose). It is located beneath the ute load floor, between the rear of the cabin and forward of the axle.

The filler neck is located in the left hand rear quarter panel. The tank is electrically grounded via the filler neck to the body.

The fuel gauge sender unit and fuel pump assembly is locked into the top of the tank. The tank is secured to the underbody by two straps.

Nylon tubing form the fuel lines. The vapour line is a nylon tube. These lines connect the tank to the main underbody lines.

The carbon canister is mounted on the tank. A nylon tube connects it to the central spigot of the pump top. Another nylon line joins the canister outlet to the main body lines. The canister has a corrugated nylon breather hose which is clipped into a cross member to reduce ingestion of water or dust onto the canister.



DESCRIPTION AND OPERATION (Continued)

All models

Steel tubing, 8.0mm O/D for fuel delivery and return and 6.3mm O/D for vapour, forms the main underbody lines. The tubes are coated with zinc PVF for corrosion protection. (The main body harness also contains one or two 4.9mm brake lines) Elastomer lined nitride rubber hoses connect the engine fuel rail to the main underbody lines.

A fuel filter is installed in the delivery line and attached to the LHS side rail roughly in line with the B pillar. The filter consists of a paper filtering element in a stainless steel casing. The filter is a sealed unit and is replaced as an assembly when required.

The fuel system supplies the fuel injectors with filtered fuel at a controlled pressure. The Powertrain Control Module (PCM) controls the fuel pump and the on/off duration (pulse width) and timing of the fuel injectors.

Fuel Injector PCM

The electronic fuel injection system supplies the correct amount of fuel to the engine as required for the operating conditions.

Each cylinder has an individual fuel injector controlled sequentially to inject the fuel at the optimum point in the engine cycle. The Powertrain Control Module (PCM) adjusts the fuel injection pulse width, delivering a precise quantity of fuel into the intake port above the inlet valve.

Fuel is injected into the cylinders in the same sequence as the ignition firing order. As fuel is injected into a closed port, the period that each charge remains in the port is even for all cylinders, ensuring optimum mixture throughout the engine.

Fuel System Components

The fuel system consists of the following components:

- Fuel tank
- Fuel pump
- Fuel supply and return lines
- Fuel filter
- Fuel rail
- Fuel injector
- Fuel pressure regulator
- Fuel shut off switch

Electrical Fuel Pump

The fuel supply system incorporates an electric fuel pump mounted inside the fuel tank.

FPV vehicles have fuel pumps with fuel pumps with higher flow rates and operate at higher pressures. 6 cylinder turbo pump must deliver upto 145 litres/hr at 500 kPa and the V8 must deliver upto 180 litres/hr at 400 kPa. Both high flow variants run a 400 kPa regulator on the engine fuel rail.

The pump has a check valve inside the outlet port. The function of this valve is to maintain pressure in the system after the engine is shut down. The pressure retention helps to prevent hot starting problems.

System pressure is controlled by a pressure regulator valve mounted on the fuel rail.

All Falcon models have the electric pump mounted in a Modular Reservoir Assembly (MRA). The MRA has an integral reservoir in which the fuel pump rests to ensure that the pump pickup is submerged in fuel at all times during extreme vehicle manoeuvres and attitudes when the fuel level in the tank is low.

The reservoir is spring loaded to maintain the pump and sender is always in contact with the bottom of the fuel tank (for improved low fuel usage and fuel gauge accuracy). A filtering element is located in the fuel pump reservoir to prevent contaminants which could damage internal components of the pump. The electrical system has a fuel pump control relay which is controlled by the PCM.

When the ignition switch is OFF the contacts of the PCM and fuel pump relays are open. When the ignition switch is first turned to the 'ON' position, the PCM power relay is energized, closing its contacts.

When the ignition switch ON and prior to moving it to START fuel pump operation will be audible.

The fuel pump is powered via the contacts of the fuel pump relay. If the ignition switch is not turned to the START position, the PCM will open the ground circuit after approximately one second. Opening the ground circuit de-energizes the fuel pump relay which, in turn, de-energizes the fuel pump.

The circuitry provides for pre-pressurization of the fuel system. When the ignition switch is turned to the START position, the PCM operates the fuel pump relay to provide fuel for starting the engine while cranking. After the engine starts and the ignition switch is returned to the ON position, power to the fuel pump is again supplied through the fuel pump relay.

The PCM senses engine speed and shuts off the fuel pump by opening the ground circuit to the fuel pump relay when the engine stops or is below 120 rpm.



DESCRIPTION AND OPERATION (Continued)

Evaporative Emission Control System

A large percentage of overall emissions can consist of petrol vapours that might escape from the fuel tank. These evaporative losses occur not only when the vehicle is operating but also when the vehicle is parked. In fact most vapours are lost when the vehicle is parked.

These losses have been eliminated by providing a sealed fuel tank system. With such a system, fuel vapours are trapped and directed to the engine for burning in the normal combustion process.

The system consist of the following components:

- Fuel tank
- Vapour lines
- Carbon canister
- Canister purge control valve
- Fuel tank filler cap

These components form the fuel expansion and vapour collection system and the vapour vent and storage system.

Fuel Expansion and Vapour Collection

All fuel tanks are designed to leave a volume void for space above the fuel when the tank is filled to capacity:

- Sedan tank capacity is 68 litres
- Ute tank capacity is 81 litres

Filled to capacity is generally when the fuel bowser nozzle shuts off. This space allows for the expansion of the fuel and the collection of vapours.

Trickle filling the tank beyond the rated capacity will damage the emission system. To prevent this, DO NOT fill past the first bowser shut off click.

Vapour Vent and Storage

Sedan

The majority of the fuel vapour generated in the tank during re-fuelling is vented through the filler neck and released to the atmosphere. The remaining vapours are vented through the fuel level vent valve to the carbon canister where they are stored prior to being consumed by the engine.

Pressure in the tank will force vapour into the canister. The roll over valve (ROV) prevents the canister from receiving liquid fuel in the event of a vehicle roll over accident.

The fuel level vent valve controls the rated liquid capacity of the fuel tank.

Ute

Fuel vapours generated during re-fuelling is directed through the vent spigot and corrugated vent line to the filler neck and released to the atmosphere.

The fuel vapours generated in the tank during normal running and stationary conditions are vented through the vapour line to the carbon canister where they are stored prior to being consumed in the engine.

Pressure in the tank will force vapour into the canister via the central spigot on the pump unit. The upper filler neck is vented via a nylon line back to the tank.

A roll over valve (ROV) is installed in the central spigot. The valve prevents the canister from receiving liquid fuel in the event of a vehicle roll over accident.

Carbon Canister

The canister contains a quantity of activated carbon granules for storage of fuel vapours and filters to prevent ingress of particulate matter into the engine. It is mounted on or near the tank.

Pressure in the fuel tank forces vapours through the vapour line into the canister where it is absorbed by the carbon granules. Purging of the vapours from the canister is controlled by a signal from the PCM that varies the duty cycle (frequency of opening and closing) of the solenoid type purge control valve when engine operating conditions are favourable.

When the purge valve is open, manifold vacuum is applied to the canister. Fresh air is drawn through the canister from the corrugated nylon tube on the atmospheric port. As the fresh air is drawn through the carbon bed it releases the vapour from the granules and carries it into the engine to be consumed in the combustion process.

Filler Cap

The filler cap incorporates a two way pressure/vacuum relief valve. The cap functions as a check valve under normal operating conditions. It allows air to enter the tank as fuel is used while preventing vapours to escape to the atmosphere. IT IS VERY IMPORTANT THAT THE CORRECT CAP IS USED.

The cap opening pressure have been varied since the EA Falcon in 1988 to improve vapour management. To indicate the difference the colour of the cap was changed.

- Black - 2.5 kPa 1988 to 1998
- Grey - 4.5 kPa 1998 to 2002
- Green - 11 kPa 2002 to 2005
- Black tethered cap - 11.2 kPa 2005

CAUTION:  It is very important that the correct fuel cap is used.



DESCRIPTION AND OPERATION (Continued)

Fuel Filters

To prevent the fuel injectors becoming clogged or contaminated with foreign material, the fuel system contains four levels of filtering:

- **Fuel Pump:** A filter screen is mounted on the intake side of the fuel pump. The filter is part of the assembly and can not be replaced separately.
- **Fuel Filter Assembly:** The fuel filter assembly is located in the fuel supply line between the fuel pump and the fuel rail. the fuel filter assembly must be periodically replaced according to the maintenance schedule.
- **Fuel Pressure Regulator:** A filter is located on the inlet side of the fuel pressure regulator. The filter is part of the assembly and can not be replaced separately.

CAUTION:  It is very important that the correct pressure regulator to suit the engine type is used.

- **Fuel Injectors:** A mesh screen on the inlet side of the fuel injector prevents foreign debris and materials from entering the fuel injector mechanism. The filter is part of the assembly and can not be replaced separately.

Fuel System Shut Off Switch

All Falcon models are fitted with a switch that cuts off fuel supply to the engine in the event of a accident. Sudden vibrations such as collisions when parking may also activate the switch.

Fuel Pressure Regulator

The fuel pressure regulator works with the fuel pump to maintain a steady pressure relationship between the fuel line side of the injectors and the intake manifold. The regulator is a spring loaded diaphragm. The spring keeps the appropriate amount of pressure in the fuel system. When there is a high vacuum in the intake manifold, such as at low rpm, the pressure in the fuel system must be reduced. When there is low pressure in the intake manifold, such as high speed or full throttle operation, the pressure in the fuel line must be increased. In order to maintain desired fuel pressure, excess fuel is returned to the tank by a separate line from the fuel pressure regulator.



DIAGNOSIS AND TESTING

Fuel System

Inspection and Verification

WARNING: ⚠ Fuel supply lines will remain pressurised for long periods of time after engine or pump shut down. Use care to prevent personal injury or combustion of fuel when disconnecting fuel lines.

WARNING: ⚠ Do not smoke or carry an open flame of any type when working on or near any fuel related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

Symptom Chart

NOTE: Please note the following assumptions:

- Battery voltage has been checked and verified as 12V
- Starter motor is cranking
- DTC 0232 on PCM not flagged

CAUTION: ⚠ Do not run the fuel pump in a dry condition, to do so will damage the internal components of the pump. Ensure that there is fuel in the tank.

NOTE: If the Diagnostic Trouble Code P0232 is displayed the PCM Self Test the fuel pump relay actuating circuit is faulty. This fault must be rectified before carrying out any further fuel delivery tests.

To carry out pressure and volume tests it is first necessary to install a remote control switch in the power line to the pump. Detach the loom connector from the base of the fuel pump relay. Connect the switch across terminals 57 (BK) and 787 (BK/Y) of the loom connector.

Condition	Source	Action
<ul style="list-style-type: none"> • Able to crank (ie starter motor working) but engine does not catch. 	<ul style="list-style-type: none"> • Fuel pump • Fuel shut off switch • Fuel relay in PDB wiring, circuitry • Ignition coils, spark plugs 	<ul style="list-style-type: none"> • Go to Pinpoint Test A



DIAGNOSIS AND TESTING (Continued)

Pinpoint Test

PINPOINT TEST A: ABLE TO CRANK (IE. STARTER MOTOR WORKING) BUT ENGINE DOES NOT CATCH

Test Step		Result / Action To Take
A1	CHECK IF FUEL SHUT OFF SWITCH IS "ACTIVATED" (O/C BETWEEN FUEL PUMP AND POWER FROM PDB)	
	<ul style="list-style-type: none"> Turn the key to ACC or ON Is fuel shut off switch activation light on cluster illuminated? 	<p>Yes</p> <p>Press fuel shut off switch button, then retry starting the vehicle. Fuel shut off switch is accessed via the scuff plate in front passenger foot well.</p> <p>No</p> <p>Go to A2</p>
A2	LISTEN FOR FUEL PUMP OPERATION	
	<ul style="list-style-type: none"> Turn the key to ON and for fuel pump. Fuel pump should make buzzing or clicking noise when operational. <p>NOTE: Two people are required for this test: 1 person to turn the key, 1 person to listen to fuel pump under car.</p> <ul style="list-style-type: none"> Is the fuel pump operational? 	<p>Yes</p> <p>Check ignition coil and spark plugs</p> <p>No</p> <p>Go to A3</p>
A3	CHECK FUEL FUSE IN PDB	
	<ul style="list-style-type: none"> Check if fuel fuse in PDB is blown. Is fuel fuse in PDB blown? 	<p>Yes</p> <p>Replace the fuel fuse with a new fuse, then retry starting the vehicle.</p> <p>No</p> <p>Go to A4</p>
A4	CHECK VOLTAGE SUPPLY TERMINAL OF FUEL RELAY SOCKET IN PDB	
	<ul style="list-style-type: none"> Remove the fuel relay from PDB Measure voltage of fuel relay socket terminal (on PDB) circuit 1059 to ground. Is 12V measured on the terminal? 	<p>Yes</p> <p>Go to A5</p> <p>No</p> <p>Check the wiring between fuel fuse and fuel relay socket terminal (on PDB) circuit 1059</p>
A5	CHECK THE PDB RELAY	
	<ul style="list-style-type: none"> Turn the key to OFF position Place a finger on the fuel pump relay in PDB Turn the key to ON and feel for activation "click" from the fuel relay. <p>NOTE: Two people are required for this test: 1 person to turn the key, 1 person to place finger on the fuel relay.</p> <ul style="list-style-type: none"> Is the fuel relay activating? 	<p>Yes</p> <p>Go to A6</p> <p>No</p> <p>Replace the fuel relay and retest for correct operation.</p>
A6	CHECK VOLTAGE ACROSS THE FUEL PUMP	
	<ul style="list-style-type: none"> Check the voltage across the fuel pump. Refer to Fuel Module - Fuel Pump for instructions on how to access the fuel pump. Is voltage across the fuel pump 12V? 	<p>Yes</p> <p>Problem with fuel pump. Replace the fuel pump</p> <p>No</p> <p>Go to A7</p>
A7	CHECK IF FUEL SHUT OFF SWITCH IS CONNECTED TO HARNESS	
	<ul style="list-style-type: none"> Remove scuff plate in front passenger foot well. Is fuel shut off switch connected to harness? 	<p>Yes</p> <p>Go to A8</p> <p>No</p> <p>Connect the fuel shut off switch to harness, then retry starting vehicle.</p>



DIAGNOSIS AND TESTING (Continued)

Test Step		Result / Action To Take
A8	CHECK CONTINUITY OF FUEL SHUT OFF SWITCH	
<ul style="list-style-type: none"> • Disconnect the fuel shut off switch. • Check the continuity of the fuel shut off switch • Does the fuel shut off switch function as expected? 		Yes Go to A9 No Fuel shut off switch is faulty. Replace the fuel shut off switch and retry starting the vehicle.
A9	CHECK VOLTAGES SUPPLIED TO FUEL SHUT OFF SWITCH	
<ul style="list-style-type: none"> • Measure the voltage of circuit 787A at fuel shut off terminal on harness. • Is 12V measured? 		Yes There is a wiring break between the connector of fuel shut off switch (on harness) and fuel pump connector (on harness). Repair harness and retest for correct operation. No There is a wiring break between the fuel relay socket terminal (on PDB) and connector of fuel shut off switch (on harness). Repair the harness and retest for correct operation.



GENERAL PROCEDURES

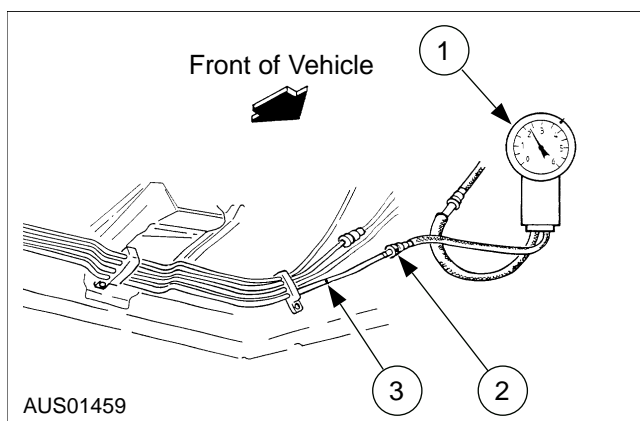
Pump Operation Check

1. Detach the fuel delivery line (the line coming from the filter) from the fuel rail. Place the end of the delivery line in a container.
2. Switch the ignition ON. The pump should deliver fuel for one second. Switch the ignition off.
3. If the pump does not run, detach the wiring connector from the pump end of the loom. On sedan this connector is located beneath the plastic cover under the rear seat cushion. On Utes the connector may be accessible from under the vehicle via the extended wiring loom.
4. Connect a voltmeter across the loom terminals. Switch on the ignition while observing the meter. The meter should read battery voltage for approximately one second then drop to zero. Failure to do this indicates a fault in the power supply circuit.
5. Check the pump for continuity. Connect an ohmmeter across the terminals of the pump lead. (Specifications - less than 10 ohms.)

NOTE: Do not attempt to detach the fuel pump lead from the pump bracket.

Pressure Test

1. "T" a fuel pressure gauge into the fuel delivery line.



Item	Description
1	Fuel pressure gauge
2	Quick connect fitting
3	Pressure line

2. Start the engine if possible and note the fuel pressure at idle.
If the engine can not be started, install a remote control switch at the relay.
Operate the switch and note the pressure.
Specification: 400 kPa I6 Turbo and V8 4V

3. If the pressure reading is low slowly close off the fuel delivery test line between the gauge and the fuel rail while operating the pump. Pressure should increase to at least 400 kPa.

If the pressure doesn't increase a faulty fuel pump is indicated.

Fuel Flow (Volume) Test

WARNING: ⚠ Engine must be switched off during this test.

1. Disconnect the fuel return line from the steel line (lower dash panel) and place the end of the flexible hose into a graduated container.
2. Operate the remote control switch for 10 seconds.
3. Remove the measuring container and check contents against specification: 277cc.

NOTE: Fuel volume must be at nominal regulated pressure. See specifications listed in Pressure Test of General Procedures in this chapter.

Fuel System Pressure Retention


1. "T" a fuel pressure gauge into the fuel delivery line.
2. Operate the remote control switch for 10 seconds and note the fuel pressure. Maximum pressure drop permissible is 10% in 10 seconds. A pressure drop in excess of this figure indicates a leak in the pressure system.
3. Check by closing off the pressure line just before the gauge.
 - No pressure drop - leak in pressure line to pump or in non-return valve of pump.
 - Pressure continues to drop - leak in injectors, pressure regulator or fuel rail connections.
 - To determine the source of the pressure leak close off the fuel return line.
 - No pressure drop - replace the pressure regulator.
 - Pressure continues to drop - check the fuel rail connections and test the injectors.
4. Remove the pressure gauge and reconnect the fuel lines.
5. Check for fuel leaks.
6. Remove the remote control switch and install the loom plug in the base of the relay.



GENERAL PROCEDURES (Continued)

Draining Fuel

If the fuel pump is operational then it should be used if necessary to drain the fuel from the tank. Disconnect the fuel return lines and attach a transparent drain tube. Run the engine to facilitate expedient fuel removal. Air bubbles in the fuel stream will indicate a low fuel level.

CAUTION:  Care should be taken to ensure the fuel pump is not run dry.

In situations where the fuel pump is not functioning then:

- Use a nylon 5mm OD tube carefully inserted down the filler neck, past the tank check valve to the bottom of the tank to siphon the fuel.

Sedan

With a vehicle on a level surface and the fuel tank no more than 1/2 full it is not necessary to remove any fuel from the tank.

Purge Control Valve Testing

1. Detach the solenoid valve.
2. Apply 250 mm Hg vacuum to one port of the valve.
3. Apply 12V across the solenoid terminals. Vacuum should collapse immediately. If this does not happen, renew the valve.

NOTE: All hardware must be correctly installed and torqued to specification.

Depressurising the Fuel System

1. Open the hood and remove the junction box cover.
2. Start the engine.
3. Whilst the engine is running, remove the fuel pump relay.
4. Wait for the engine to stall.



REMOVAL AND INSTALLATION (Continued)

Fuel Tank - Sedan

Removal

1. Drain the fuel from the fuel tank into a suitable container. For additional information, refer to Draining Fuel procedure in this section.
2. Depressurise the fuel delivery system.
3. Raise the vehicle. For additional information, refer to Section 100-02 of the FG Falcon Workshop Manual.
4. Disconnect the vapour and fuel lines at the main underbody lines.

NOTE: To avoid kinking the fuel lines, do not bend excessively when disconnecting.

NOTE: Quick fitting connectors are normal removed by pushing the quick fitting connector further on (approximately 1mm), squeezing the knurled pads together and then pulling the quick fitting connector off.

5. Disconnect the vent and purge lines quick fitting connectors at the carbon canister.
6. Disconnect the fuel filler hose and mounting bracket.
6. Disconnect the electrical connector on top of the fuel pump.
7. Remove the IRS module. For additional information, refer to Section 204-02a of the FG Falcon Workshop Manual.
8. Remove the tank shield bolts and nuts.
9. Lower the tank carefully to the ground.

NOTE: Do not allow the tank to hang from the fuel lines, wiring or filler neck during removal.

Installation

1. Ensure all insulation pads are still attached to the tank moulding. They are held in position with tape until the tank is fitted. Position the tank and shield under the vehicle and loosely attach with bolts and nuts.
2. Align the tank and shield via holes in shield and dimples in the tank.
3. Tighten the retaining nuts and bolts to specification.
4. Connect the electrical connector on top of the fuel pump.
5. Connect the vapour and fuel lines to the main underbody lines.

NOTE: To avoid kinking the lines, do not bend excessively upon reconnection.

6. Connect the rubber hose on the filler neck to tank and bolt the filler pipe onto the body.

7. Connect the vent and purge lines to carbon canister.
8. Fill the tank, start the engine and check all connections for leaks.
9. Install the IRS module. For additional information, refer to Section 204-02a of the FG Falcon Workshop Manual.

Fuel Tank - Ute

Removal

1. Drain the fuel from the fuel tank into a suitable container. For additional information, refer to Draining Fuel procedure in this section.
2. Depressurise the fuel delivery system.
3. Raise the vehicle. For additional information, refer to Section 100-02 of the FG Falcon Workshop Manual.
4. Disconnect the two fuel quick fitting fuel line connectors and the fuel vapour line connector at the end of the body mounted fuel and brake harness assembly.

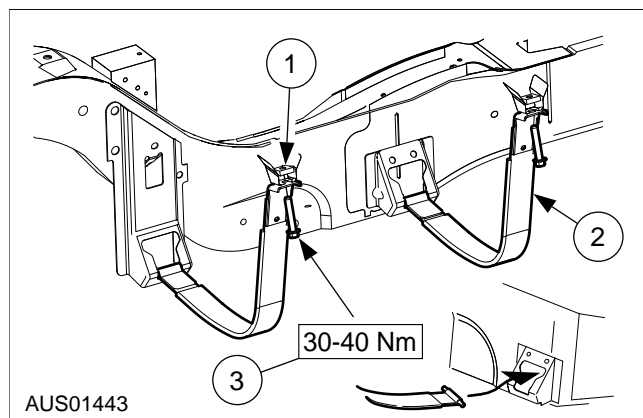
NOTE: To avoid kinking the fuel lines, do not bend excessively when disconnecting.

5. Remove the two 10mm nuts from the filler pipe mounting bracket.
6. Loosen the filler hose clamp and pull off the hose from the tank filler stub.
7. Disconnect the large vent hose quick fit connector from the tank to the filler neck.
8. Disconnect the wiring for the fuel sender/pump from the upper cross member.
9. Disconnect the ABS wheel speed sensor connector if fitted.



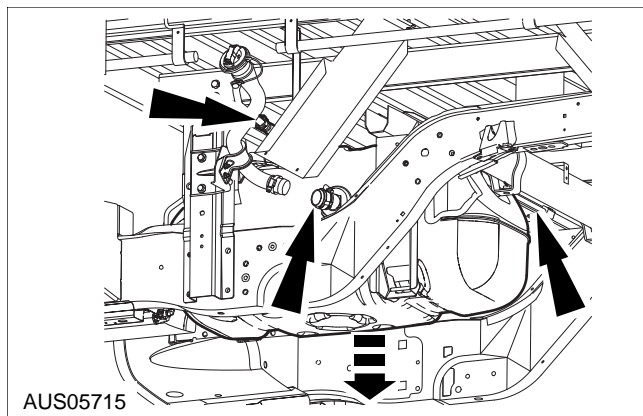
REMOVAL AND INSTALLATION (Continued)

10. Remove the 13mm bolts that retain the fuel tank straps.



Item	Description
1	Chassis
2	Fuel tank assembly strap
3	Bolt

11. Carefully manoeuvre the tank out of position and lower to access the carbon canister atmospheric vent tube, pull the vent tube out of its location in the chassis cross member.
12. Continue to lower the tank to the ground.



Installation

1. Loosely hang the tank in the vehicle by the tank straps.
2. Insert the carbon canister atmospheric vent pipe into the cross member location hole.
3. To ensure correct position of the tank when the tank straps are fully tightened, it is recommended that some liquid soap or detergent be smeared on the tank strap rubber insulators.
4. Reconnect the fuel pump wiring at the cross member.
5. Reconnect the ABS wheel speed sensor connector if fitted.

6. Refit the pipe and slide the hose onto the filler stub, ensure that the filler neck is aligned in the housing and tighten the 10mm nuts to 10 Nm.
7. Tighten the filler hose clamp to 3.5 Nm.
8. Reconnect the large vent hose quick fit connector to the filler pipe vent pipe.
9. Reconnect the fuel line quick fit connectors to the main fuel and brake harness on the body. the return fuel line has a piece of silver tape adjacent to the quick fit connector.

NOTE: To avoid kinking the lines, do not bend excessively upon reconnection.

10. Tighten the retaining strap nuts to specification.
11. Fill the fuel tank with fuel and check for leaks and fuel gauge.

In-line Filter

Removal

1. Depressurise the fuel system.
2. Raise the vehicle on a hoist. For additional information, refer to Section 100-02 of the FG Falcon Workshop Manual.
3. Remove the fuel filter line retaining nipples.
4. Loosen the filter retaining clamp and slide the filter rearward to remove from the vehicle.

Installation

1. Install the fuel filter in the retaining clamp with the arrow on the filter in the direction of fuel flow.
2. Fit and tighten the fuel line retaining nipples to 32 Nm.
3. Run the engine and check for fuel leaks.
4. Lower the vehicle. For additional information, refer to Section 100-02 of the FG Falcon Workshop Manual.

Fuel Supply and Fuel Return Lines

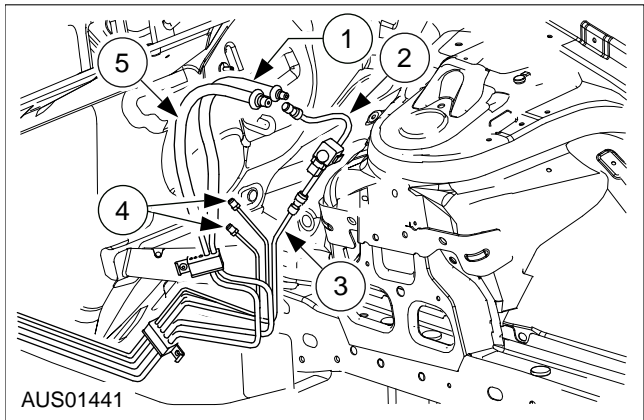
Removal

1. With the vehicle on a level surface and the fuel level below the bottom of the filler neck it is not necessary to remove any fuel from the tank.
2. Depressurise the fuel system.
3. Prepare blanking plugs to prevent fuel syphoning from disconnected fuel lines.

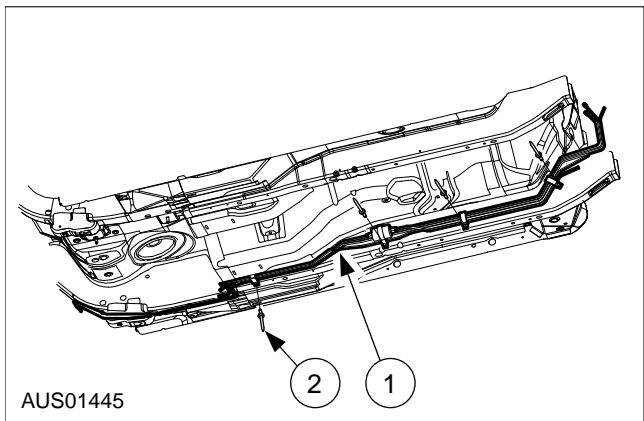


REMOVAL AND INSTALLATION (Continued)

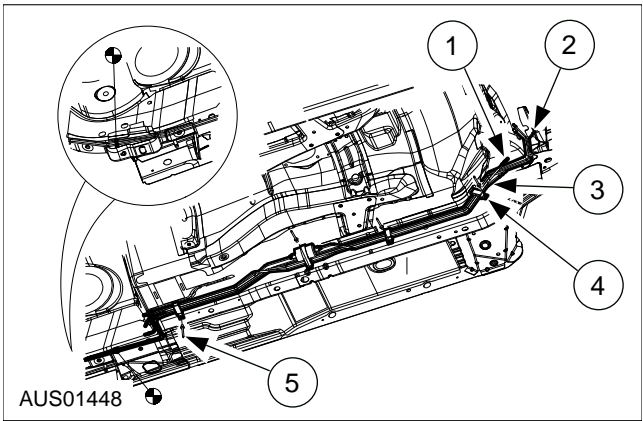
4. Disconnect the line at each end and remove the line from the holding clips along the underbody.



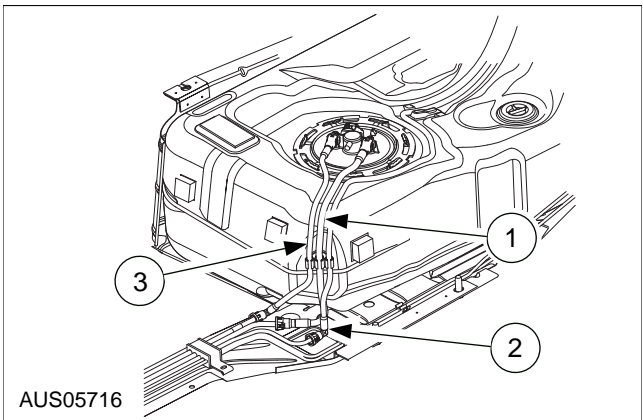
Item	Description
1	Fuel tube return
2	Fuel vapour hose
3	Fuel tank to vapour hose
4	Rear brake lines
5	Fuel tube return



Item	Description
1	Fuel tube assembly
2	Blind rivet 4.8x13.8



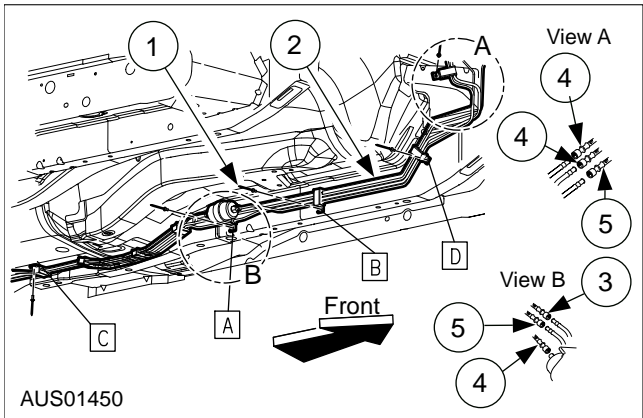
Item	Description
1	Fuel tube assembly
2	Vapour fuel hose
3	Fuel tube assembly
4	Fuel line support bracket
5	Rivet



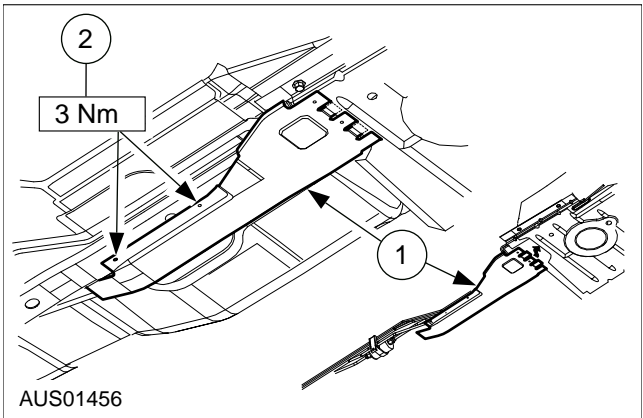
Item	Description
1	Fuel tube assembly
2	Fuel upper to engine tube
3	Return fuel line assembly.



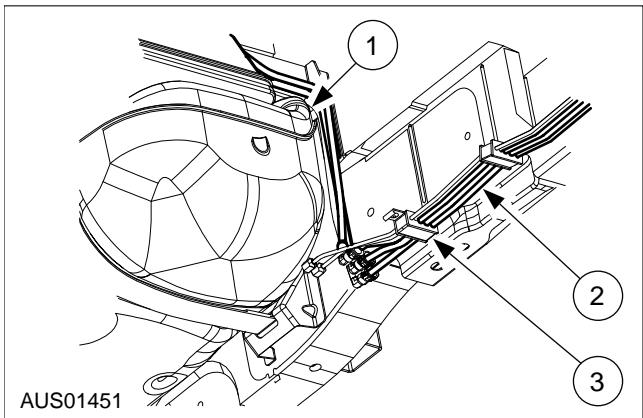
REMOVAL AND INSTALLATION (Continued)



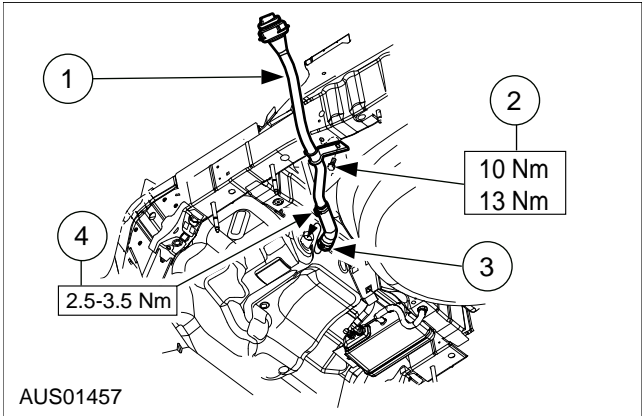
Item	Description
1	Rivet
2	Fuel tube assembly
3	Vapour line
4	Delivery line
5	Return line



Item	Description
1	Fuel tubing shield
2	Screw



Item	Description
1	Fuel tank assembly
2	Fuel lines
3	Bracket



Item	Description
1	Fuel tank filler pipe assembly
2	Bolt M6x25
3	Cobra clamp
4	Pipe end

Installation

1. Position the lines in the underbody clips and tighten the clips to specification.
2. Fill the tank, start the engine, and check for leaks.



REMOVAL AND INSTALLATION (Continued)



Vapour Lines

The vapour lines can be replaced similarly to the fuel lines.

Carbon Canister

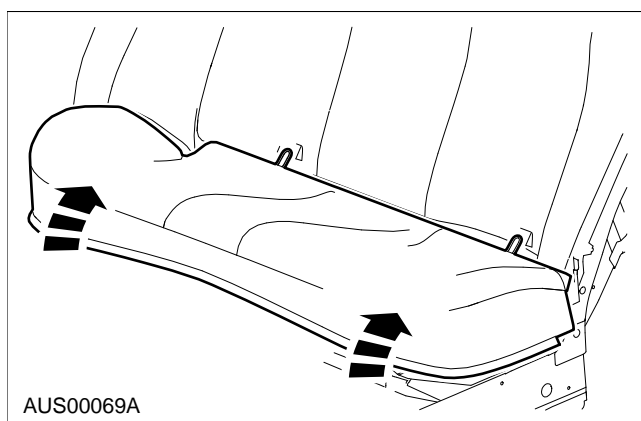
The carbon canister is good for the life of the vehicle, however the canister must be replaced if punctured, subjected to crushing, corrosion or contamination by any liquid such as oil, fuel or water.

Fuel Module - Fuel Pump - Sedan

Special Tools	
	Fuel Tank Sender Lock Ring Tool
	310-123 BF / FG
	Quick Connect Removal Tool
	AU601 BA / BF / FG

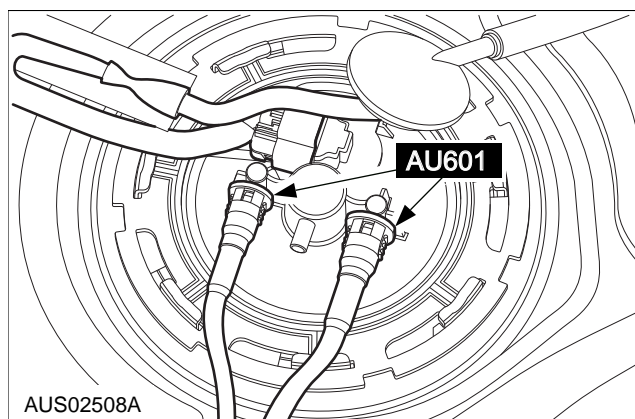
Removal

1. Depressurise the fuel system.
2. Drain the fuel tank if required. For additional information, refer to the Draining Fuel procedure in this section.
3. Disconnect the negative battery terminal.
4. Remove the rear seat cushion.

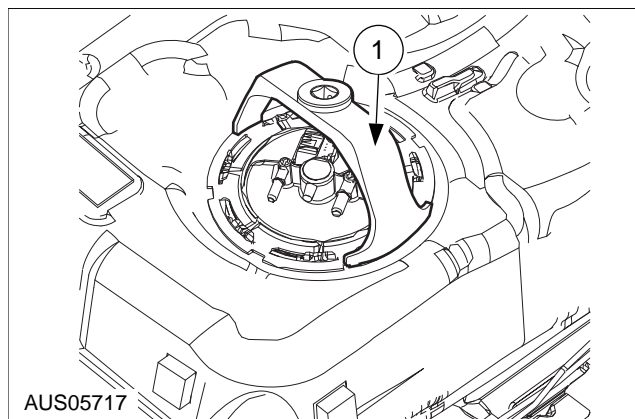


5. Disconnect the fuel module assembly electrical harness.

6. Remove the two fuel lines from the fuel module assembly using special tool AU601.



7. Remove the fuel module retainer and fuel module assembly from the fuel tank using special tool 310-123.



8. Disconnect (Blue/Black) sender electrical connector from the fuel module.

NOTE: After removing the fuel module assembly, cover the fuel tank to prevent any continuation of the fuel.

Installation

1. Replace original gasket from the top of the fuel tank with a new gasket.

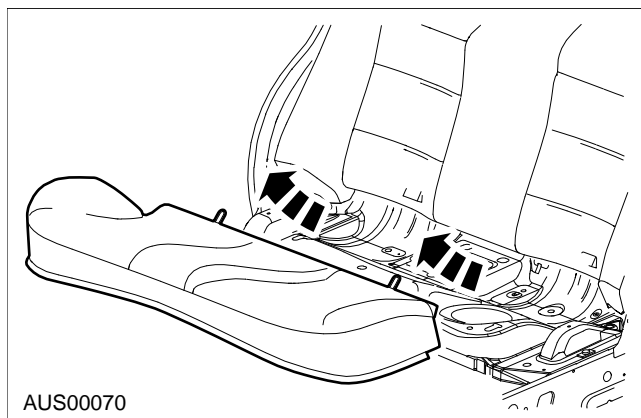
CAUTION:  Fuel module gasket must always be replaced with a new gasket before installing a fuel module assembly.

2. Carefully lower the fuel module through the access hole into the tank.
3. Reconnect the (Blue/Black) sender electrical connector to new fuel module assembly.
4. Align the dovetail lug on the flange with the large gap in the locking clip feature moulded into the tank and press down the flange against the spring pressure until the flange is fully inserted. Maintain the pressure on the flange and install the locking ring onto the locking pegs.




REMOVAL AND INSTALLATION (Continued)

5. Connect the electrical harness to the fuel module assembly.
6. Use the special tool 310-123 to rotate the locking ring into the fully locked position.
7. Connect the two fuel lines to the fuel module assembly.
8. Re-fit the rubber sealing grommet and replace the rear seat cushion.



9. Refill the fuel tank.
10. Reconnect the negative battery terminal.

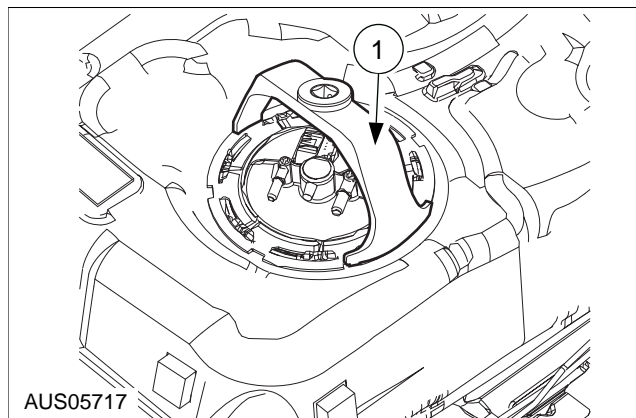
Fuel Module - Fuel Pump - Ute

Special Tools	
	Fuel Tank Sender Lock Ring Tool
	310-123
	BF / FG

Removal

1. Depressurise the fuel system.
2. Drain the fuel tank if required. For additional information, refer to the Draining Fuel procedure in this section.
3. Disconnect the negative battery terminal.
4. Remove the fuel tank. For additional information, refer to the Fuel Tank - Ute procedure in this section.

5. Remove the fuel module retainer and fuel module assembly from the fuel tank using special tool 310-123.



6. Disconnect (Blue/Black) sender electrical connector from the fuel module.

NOTE: After removing the fuel module assembly, cover the fuel tank to prevent any continuation of the fuel.

Installation

1. Replace original gasket from the top of the fuel tank with a new gasket.

CAUTION:  Fuel module gasket must always be replaced with a new gasket before installing a fuel module assembly.

2. Carefully lower the fuel module through the access hole into the tank.
3. Reconnect the (Blue/Black) sender electrical connector to new fuel module assembly.
4. Align the dovetail lug on the flange with the large gap in the locking clip feature moulded into the tank and press down the flange against the spring pressure until the flange is fully inserted. Maintain the pressure on the flange and install the locking ring onto the locking pegs.
5. Use the special tool 310-123 to rotate the locking ring into the fully locked position.
6. Remove the fuel tank. For additional information, refer to the Fuel Tank - Ute procedure in this section.
7. Refill the fuel tank.
8. Reconnect the negative battery terminal.




REMOVAL AND INSTALLATION (Continued)

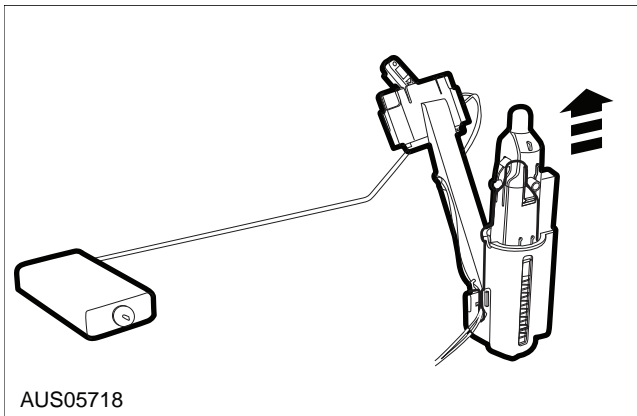
Sedan Sender Assembly

Removal

1. Remove the fuel module. For additional information, refer to Fuel Module - Fuel Pump - Sedan procedure in this section.

CAUTION:  Do not allow any portion of the float arm to bend. Be sure the 90° bend near the pivot arm of the float arm is intact. A deformed float arm will result in an inoperative sending unit.

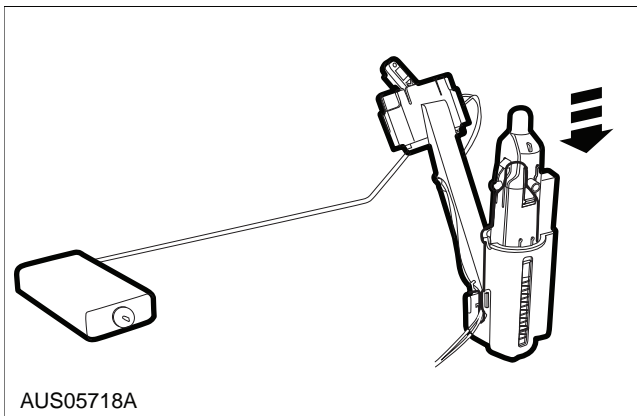
2. Grip the top section of the mounting stalk and push down against the internal spring until the top section latches into its retracted position.



3. Carefully extract the assembly through the fuel module mounting hole rotating the unit to remove.

Installation

1. Re-fit the sender unit ensure the unit is latched into it's fully retracted position.




2. Carefully guide the unit through the fuel module mounting hole and locate the base of the stalk into the recess in the tank shell.
3. Press the latch release button on the side of the stalk which allows the top section to move upwards and lock into the top cap welding to the tank shell.

4. Ensure the electrical wire and connector is correctly routed and can not foul the sender float operation.

Ute Sender Assembly

Removal

1. Remove the fuel module. For additional information, refer to Fuel Module - Fuel Pump - Ute procedure in this section.

CAUTION:  Do not allow any portion of the float arm to bend. Be sure the 90° bend near the pivot arm of the float arm is intact. A deformed float arm will result in an inoperative sending unit.

2. Carefully extract the assembly through the module mounting hole rotating the unit to remove.
3. The sender unit is clipped onto the the fuel pump reservoir and can be unclipped and disconnected electronically from the underside of the flange.

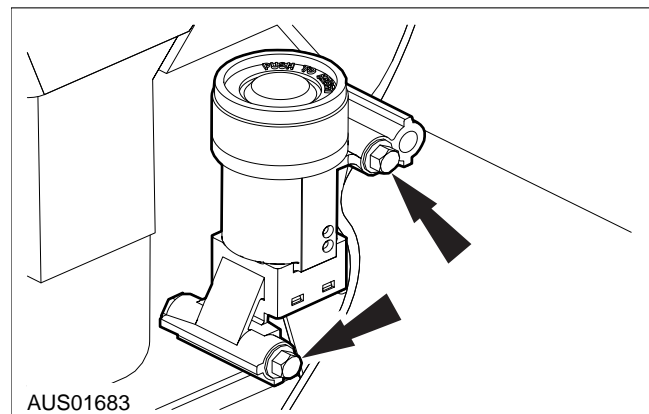
Installation

1. To refit the sender unit ensure the unit is latched into its location clips.
2. Ensure the electrical wire and connector are correctly routed and can not foul the sender float operation.
3. Carefully guide the unit through the module mounting hole and locate the base of the stalk into the recess in the tank shell.
4. Install the fuel module. For additional information, refer to Fuel Module - Fuel Pump - Ute procedure in this section.

Fuel Shut Off Switch

Removal

1. Remove the left front scuff plate. For additional information, refer to Section 501-05 of the FG Falcon Workshop Manual.
2. Unscrew the fuel shut off switch.



REMOVAL AND INSTALLATION (Continued)

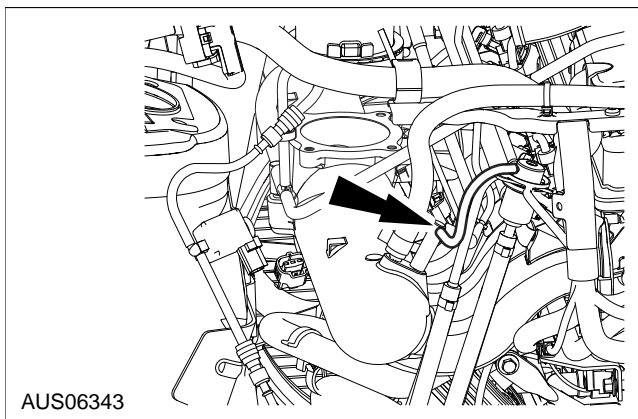
Installation

1. To install, reverse the removal procedure.

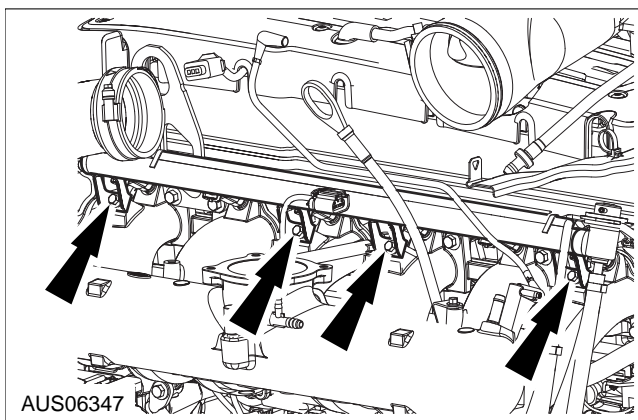
Injector Rail - I6 Turbo

Removal

1. Depressurise the fuel system.
2. Disconnect the negative battery terminal.
3. Raise the vehicle on a hoist. For additional information, refer to Section 100-02 of the FG Falcon Workshop Manual.
4. Disconnect the fuel supply and return hoses.
5. Lower the vehicle on the hoist.
6. Remove the electronic throttle body. For additional information, Refer to Section 303-01a in this supplement.
7. Disconnect the injector wiring from each injector.
8. Disconnect the vacuum hose to the fuel pressure regulator.



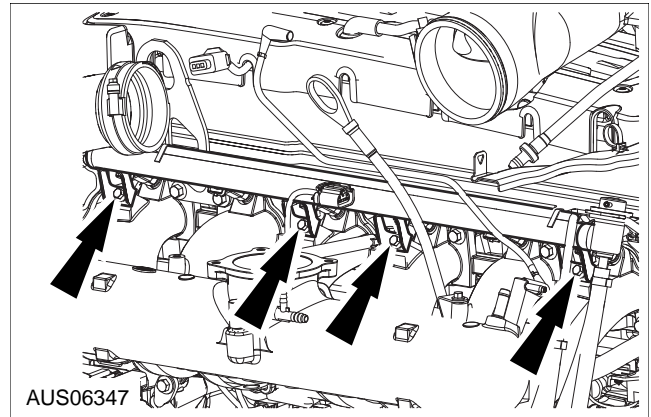
9. Remove the 4 injector rail retaining bolts and remove the rail with the injectors attached.



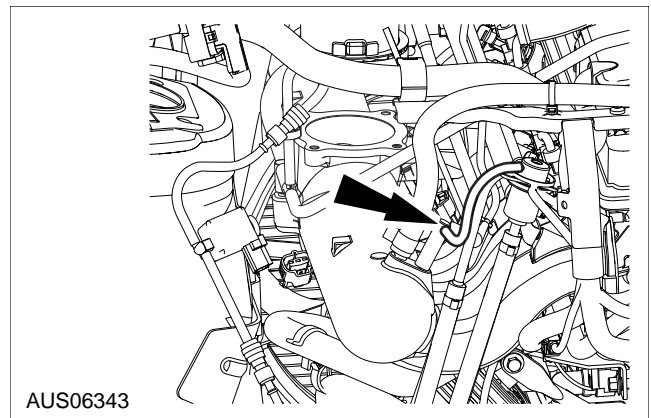
Installation

1. Install the injector rail into the manifold and secure with 4 injector rail retaining bolts tightened to specification.

NOTE: Coat the injector seal ring lightly with clean engine oil.



2. Connect the vacuum hose to the fuel pressure regulator.



3. Reconnect the injector wiring.
4. Install the electronic throttle body. For additional information, Refer to Section 303-01a in this supplement.
5. Raise the vehicle on the hoist.
6. Connect the fuel supply and return hoses.
7. Lower the vehicle on a hoist.
8. Connect the negative battery terminal.
9. Start the vehicle and check for leaks.



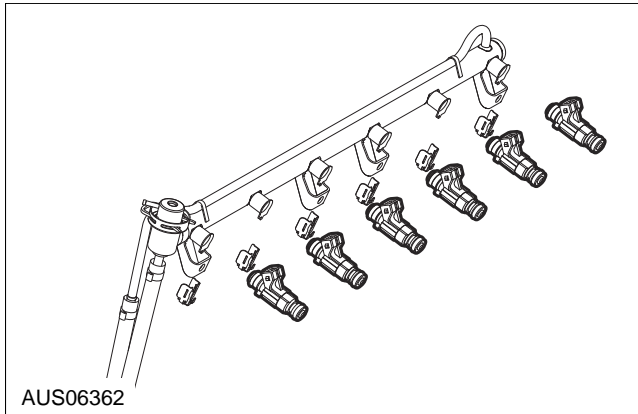
REMOVAL AND INSTALLATION (Continued)

Injectors - I6 Turbo

Removal

1. Remove the injector rail. For additional information, refer to Injector Rail - I6 Turbo procedure in this section.
2. Remove the 6 injectors from the injector rail.

NOTE: Number the position from the injector rail and bag separately.



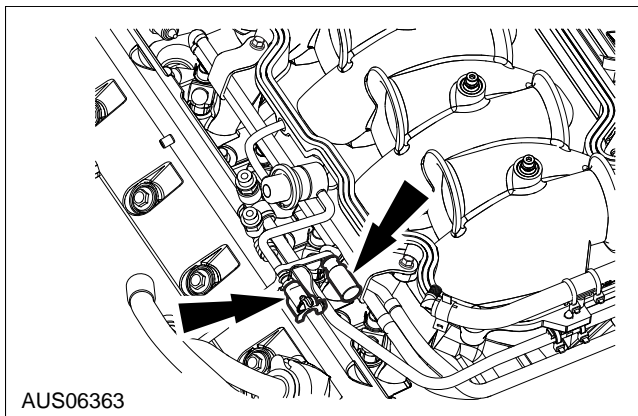
Installation

1. To install, reverse the removal procedure.

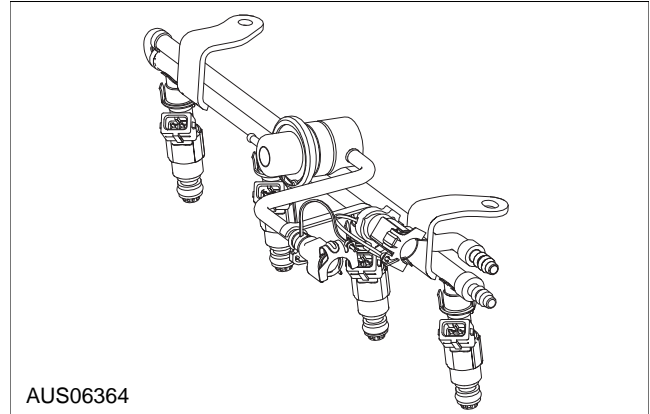
Injector Rail - V8 4V

Removal

1. Depressurise the fuel system.
2. Disconnect the negative battery terminal.
3. Remove the engine cover.
4. Remove upper intake manifold. For additional information, refer to Section 303-01c of this supplement.
5. Disconnect the fuel supply and return lines.



6. Disconnect the fuel injector wiring connectors.
7. Remove the bolts retaining the injector rail.
8. Remove the injector rail and injectors as an assembly.

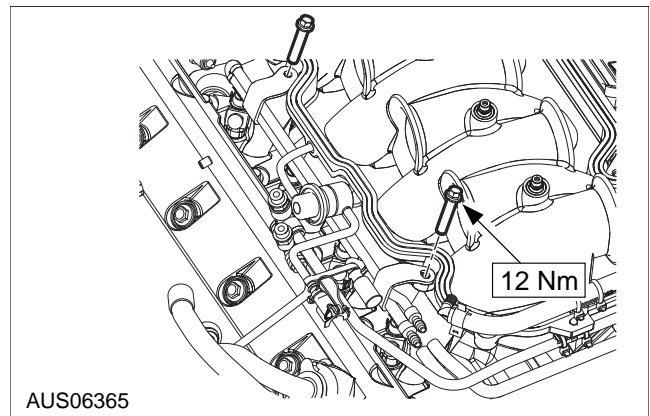


Installation

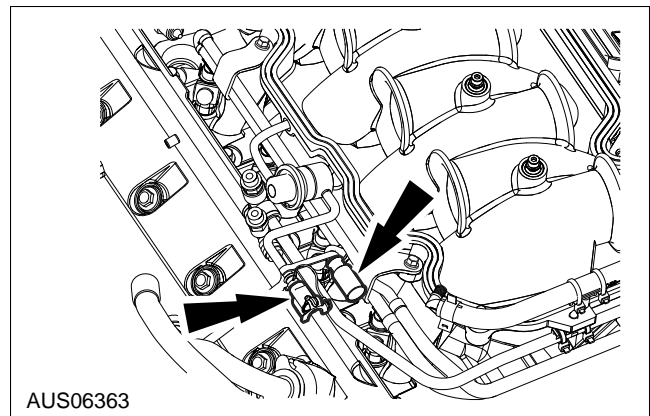
1. Install the injector rail into the manifold.

NOTE: Coat the injector seal ring lightly with clean engine oil.

2. Install the injector rail bolts and torque to 12 Nm.



3. Connect the fuel injector wiring connectors.
4. Connect the fuel supply and return lines.



REMOVAL AND INSTALLATION (Continued)

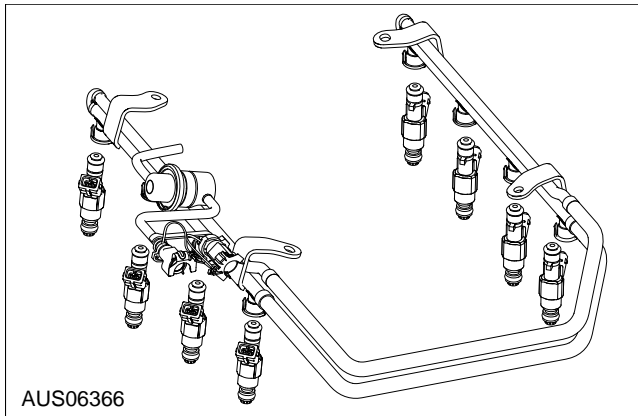
5. Install the upper intake manifold. For additional information, refer to Section 303-01c of this supplement.
6. Install the engine cover.
7. Connect the negative battery terminal.
8. Start the vehicle and check for leaks.

Injectors - V8 4V

Removal

1. Remove the injector rail. For additional information, refer to Injector Rail - V8 4V procedure in this section.
2. Remove the 8 injectors from the injector rail.

NOTE: Number the position from the injector rail and bag separately.



Installation

1. To install, reverse the removal procedure.

