# FUEL SYSTEM

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*See also 2GR FE engine repair CD; T000T1516F (Toyota production)*
LD.1a - GENERAL DESCRIPTION

From start of production (except Exige Sport 380 variant)

**Fuel Tank** *(Refer to Section LD1.b for Exige Sport 380 models)*

The 43.5 litre fuel tank is fabricated from stainless steel. The tank is mounted within the chassis crossmember between the cockpit compartment and engine bay and is secured by two support brackets from beneath. The fuel filler neck connects with the right hand top of the tank, with the filler breather pipe routed to the centre and the fuel pump/fuel gauge sender unit mounted into the left hand top surface.

**Fuel Pump** *(Refer to Section LD1.b for Exige Sport 380 models)*

The modular fuel pump/sender assembly includes a submerged turbine type pump with non-return valve, integrated fuel filter and a pressure regulator valve which controls the output pressure to around 3.2 bar, spilling excess fuel back into the tank and supplying the pressurised fuel to the outlet port on the top surface. A non-recirculation type of fuel feed system is used to minimise any evaporative emissions.

Fuel is pumped via the fuel feed pipe to the end of the LH engine rear bank fuel rail, to which the front bank rail is linked by a short connector hose, supplying the six fuel injectors at a pressure of around 325 kPa.

**Fuel Pump Operation**

When the ignition is switched on, the engine management ECU energises the fuel pump for a period of about 3 seconds to prime the system before switching off. If a signal from the crankshaft sensor indicates that the engine is being cranked or is running, the fuel pump feed will be maintained. The pump is switched off immediately when the ignition is switched off, or about 3 seconds after a stall. Note that if coolant temperature at the time of ignition switch off is over 88°C, the ECU remains powered for a period of 20 minutes to allow for heat soak management (see sub-section KH.5). Re-energising the ignition during this period will not run the fuel pump until a crank signal is received.

*Updated 23rd February 2017*
Safety Inertia Switch
A safety inertia switch is incorporated into the fuel pump electrical circuit, and operates in a severe impact (such as a vehicle collision) to switch off the fuel pump feed and minimise the fire risk. The switch is located in the engine bay on the right hand forward face of the rear subframe, and is reset once tripped, by pressing the rubber button on the top of the switch.

Emissions System
An evaporative emissions 'charcoal' canister is mounted at the left hand front of the engine bay and is connected to the air space inside the fuel tank via a port in the top plate of the fuel pump assembly. The connecting pipe is routed through a roll over shut off valve mounted by the canister, to protect against fuel spillage in case of vehicle inversion. The purge port of the canister is routed through a solenoid valve mounted on top of the canister, to a port on the supercharger/inlet manifold. The evaporative emissions control system prevents untreated fuel vapour from the tank reaching the atmosphere, by absorbing the tank vapour in a bed of activated charcoal in the canister. When the engine is running, the engine management ECM opens the purge solenoid valve and allows intake manifold depression to draw fresh air through the canister, purging absorbed fuel from the charcoal, and consuming the resultant vapour in the normal combustion process. In this way, the charcoal bed is 'cleaned' ready to absorb more tank vapour.
LD.1b - GENERAL DESCRIPTION

Exige Sport 380

The basic operating principle is unchanged from previous Exige S and Exige Sport 350 models (i.e. a fuel pump assembly with filter submerged within a fabricated stainless steel fuel tank etc) except for:

**Fuel Tank**
The Exige Sport 380 utilises a 48 litre capacity fuel tank fitted using similar internal components as fitted to the Evora 400 fuel tank as shown below:

- Fill Level Vent Valve (FLVV)
- Gradient Vent Valve (GVV)

These valve components are fitted within the fuel tank whereas previously they were fitted within the modular fuel pump assembly.

**Fuel Pump**
A modified version of the Evora 400 fuel pump is fitted. The top section of a blanked outlet spigot on top of the pump assembly body is removed to accommodate an external pump to tank vent pipe which is required on the Exige Sport 380 because of the different internal tank architecture as compared to the Evora 400 fuel tank. The fuel pump is considered a non-serviceable item.

**Fuel Pump Pressure**
The pump assembly is not equipped with a pressure regulator, therefore fuel pressure demand by engine speed and load is controlled by the fuel pressure sensor (end of the LH engine rear bank fuel rail) and the engine management system ECM (Electronic Control Module). The signal from the fuel pressure sensor is processed by the ECM which outputs a PWM (Pulse Width Modulation) signal to the fuel pump drive controller module which regulates the voltage supply to the fuel pump. The pump drive controller module is located behind the rear bulkhead trim panel and fixed to left hand side of the main bulkhead panel.

**Updated 23rd February 2017**
LD 2 - FUEL REQUIREMENT & FILLING

Fuel Requirements
Use only premium grade UNLEADED fuel with a minimum octane rating of 95 RON. Using fuel with a lower octane rating may cause knocking (pinking) which, if severe, can cause serious engine damage. Light knocking may occasionally be heard for short periods when accelerating or driving up hills, and should cause no concern, although using a lower gear would be advised. If, however, persistent heavy knocking is heard when using the specified fuel, a fault is indicated.

If no unleaded premium grade fuel is available, 91 RON unleaded fuel may be used for short periods, but heavy engine loads and wide throttle openings must be avoided. The use of good quality fuels containing proper detergent additives is advised for good performance and emission control.

Exige V6 models are fitted with ‘three way’ catalytic converters in the exhaust system in order to reduce the noxious content of the exhaust gases and comply with emission control regulations. It is essential that ONLY UNLEADED FUEL is used. The effectiveness of the catalytic converters decreases after as little as one full tank of leaded fuel or LRP.

Note
• The use of leaded fuel, or lead replacement petrol (LRP), will cause irreversible contamination of the precious metal catalysts and of the exhaust gas sensors used by the computer controlled engine management system.
• Fuel system damage and running problems, resulting from the use of incorrect fuels will not be covered by the Lotus New Vehicle Warranty.
• DO NOT push or tow start the car; or turn off the ignition at engine speeds above idle; or run the fuel tank dry: Any of these actions may damage the catalytic converters.

Ethanol E5 & E10 - A mixture of 5% or 10% ethanol (grain alcohol) and unleaded petrol may be used but the lower octane rating (typically 93 - 94 RON) will result in slightly reduced performance and economy. If driveability problems are experienced as a result of using ethanol, use 95 RON unleaded petrol. Do not use Ethanol blends with a higher concentration than 10%.

Methanol - Do not use fuels containing methanol (wood alcohol). Use of this type of alcohol can result in performance deterioration and damage to critical parts in the fuel system.

Fuels Containing MMT - Some fuels contain methylcyclopentadienyl manganese tricarbonyl (MM T), which is an octane enhancing additive. Such fuels may damage the emission control system and should NOT be used.

Diesel - Exige models will not operate on diesel fuel.

Fuel Filling
WARNING: Be aware of the danger of explosion when dealing with petrol and petrol fumes. Before stopping at a filling station, switch off mobile phones, ensure that all cigarettes are extinguished and that no naked flames or other potential ignition sources are present. Switch off the engine before refuelling.

Filler Cap: The key locking filler cap is located in the right hand rear quarter panel:

To remove the cap: Insert the key (same key as ignition), turn ¼ counter-clockwise and withdraw the cap with the key. As the cap is unlocked, any slight pressure differential between the tank and atmosphere will be released, and a brief hiss may be heard, which is completely normal. Note that the key can only be withdrawn if the fuel cap is locked.

To refit the cap: Engage the lugs on the cap with the slots in the neck, turn the key ¼ clockwise to lock and withdraw the key.
**Filling Procedure:** Insert the pump nozzle fully into the neck and fill until the first time the auto-shut off mechanism is triggered.

Do not attempt to overfill the tank by continuing to operate the fuel pump nozzle even though the automatic shut off mechanism has triggered so that the fuel appears at the top of the filler neck, as expansion of the fuel due to temperature change (especially in hot weather - the temperature in underground storage tanks is significantly colder) may cause flooding of the charcoal canister, or spillage of fuel. The total usable fuel capacity is 43.5 litres (Exige S & Sport 350 models) and 48 litres (Exige Sport 380 models).
LD.3 - PRECAUTIONS & FUEL LINE DISCONNECTION

The fuel line between pump and the injector rails, as well as the injector rails, contain pressurised fuel both when the ignition is switched on and for a period after switching off. This feature aids engine starting by reducing the time needed to build up operating fuel pressure and by inhibiting the formation of vapour pockets in the supply line after switching off a hot engine.

⚠️ WARNING:
1. To minimise the risk of fire and personal injury, relieve the fuel system pressure before servicing any part of the fuel supply circuit. See 'Fuel Pressure Relief Procedure' below.
2. To reduce the possibility of sparks occurring when a fuel line is disconnected, or when fuel vapour is present, the negative battery cable should be disconnected before work is commenced, refer to service notes section MV.10 for further information.
3. When fuel lines are disconnected, absorb any escaping fuel in an absorbent cloth and dispose of safely.

Fuel Pressure Relief Procedure
This procedure should be used prior to disconnecting any part of the fuel line, also refer to the notes on the following page prior to carrying out this procedure.

- Remove the fuel pump fuse R1, from the rear luggage compartment fusebox; refer to service notes section MV.12 for further information. Start the engine and run until it stops from starvation. Crank the engine for a few seconds.

- If the engine will not run, then pull out the fuel pump fuse and crank the engine for 20 seconds to minimise residual fuel pressure.

- Disconnect the battery, refer to service notes section MV.10 for further information.

- To gain access to the fuel tank rail, remove the air intake hose from both the throttle body inlet and airbox cover outlet, also remove the rear engine cover fitted to RH cylinder bank (1); refer to service notes sections EM.4 and EM.2 for further information.

- The hose connecting the fuel tank to the fuel rail has no joints other than the push-on connectors at each of its ends. For access to the fuel tank connection, the cabin rear compartment floor must be removed, followed by the body and chassis access hatches. To access the fuel rail connection with the clamshell fitted, it is necessary to remove the airbox.

- Remove the fuel pipe clamp at injector rail connection as shown on the RH illustration.

- Surround the pipe joint with a shop towel to absorb fuel contained in the pipework before unlatching the fuel pipe quick connector at the injector rail fuel inlet by pinching the two buttons on the side of connector and pulling it away from the rail as shown on the RH illustration. (by hand only).

- Pull the fuel pipe away from fuel rail (protect the fuel rail and pipe ends from contamination by covering with clean plastic bags).
Note: Check that there is no dirt or other foreign objects around the connector before carrying out this operation and clean the connector as necessary.

- It is necessary to prevent dirt or foreign objects from entering the quick connector. If dirt enters the connector, the O-rings may not seal properly.

- Only remove the quick connector by hand.

- Do not bend or twist the nylon fuel hose. Protect the connector by covering it with a plastic bag.

- If the pipe and the connector are stuck, try wiggling or pushing and pulling the connector to release it and pull the connector off of the pipe carefully

⚠️ WARNING: Be aware of the possibility of full pressure retention in the fuel line caused by a system fault.

On re-fitting, push the joint firmly together until a click is heard. Pull on the pipe to ensure complete engagement and refit the fuel pipe clamp.
LD.4 - FUEL TANK

The fuel tank is mounted within the chassis crossmember between the cockpit compartment and engine bay, and is secured by two support cradles from beneath. The fuel filler neck connects with the right hand top of the tank, with the filler breather pipe routed to the centre, and the fuel pump/fuel gauge sender unit mounted into the left hand top surface.

A removable panel is provided in the top of the chassis crossmember in the cabin, which provides access to the fuel pipe connections and harness connector. If the pump/gauge sender unit is to be replaced, the tank must be removed from the chassis.

Removal:

Preparation:
- If necessary, syphon fuel from the tank to reduce the weight before removal.
- Carry out the fuel pressure relief procedure as detailed in sub-section LD.3.
- Disconnect the battery: refer to service notes section MV.10 for further information.

Removal:
1. Remove the rear bulkhead trim panel; refer to service notes section VE.11 for further information.

2. From the left hand rear corner of the cabin, release the M5 x 12 screws securing the access panel to the top of the chassis rear crossmember and remove.

3. Vehicles with 43 litre capacity tank: Release the quickfit type connector on the fuel vapour line connection to the pump/sender unit top plate. Prise out the retaining spring clip and withdraw the fuel feed pipe. Disconnect the wiring harness plug from the pump unit and from the pressure sensor.

3a. Vehicles fitted with a 48 litre capacity tank: Using an absorbent cloth to collect residual fuel, Gently using one hand, pull the fuel feed pipe away from the fuel pump inlet port spigot until resistance is felt.

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3b At the same time the fuel pipe retaining ring clip will move outwards within the pumps inlet port. With the fuel feed hose still pulled outwards away from the pump, use your other hand to push retaining ring clip inwards towards the pump inlet spigot.

3c The fuel feed pipe should now detach from the retaining ring clip and fuel pump inlet spigot.

3d Disconnect the wiring harness connector for the fuel pump module.

4. Release the quickfit type connector on the vapour line to the charcoal canister, and cap the pipe and canister port. Pull out the grommet surrounding this pipe in the rear wall of the chassis bay.

5. Remove the RH rear wheel and wheelarch liner to provide access to the filler hose connections; refer to service notes sections GK.4 and BT.5 for further information.

6. Remove the engine bay undertray/diffuser: refer to service notes section AN.2 for further information.

7. Release the parking brake cable from the horseshoe compensator and abutment brackets: refer to service notes section JM.7 for further information.

8. Release the gearchange cables from the transmission selector levers and abutment brackets located on the top of the transmission: refer to service notes section FK.3 for further information.

9. Release the M5 nyloc nuts and washers (2) securing gear cable retaining bracket to the fuel tank shear panel: refer to service notes section FK.3 for further information.

10. Position the gearchange and handbrake primary cables away the shear panel.

11. Release the filler hose and filler breather hose from the tank spigots, and cap both orifices to prevent debris ingress and reduce the fire hazard.
12. Release the M8 x 25 screws and washers securing the shear panel front and rear edges to the chassis, and those at each side securing the composite sills to the panel.

Note that this panel is a structural part of the chassis and that the car should not be used without the panel fitted.

13. Support the tank before removing the two support cradles from the chassis.

14. Release the M8 x 20 screws (3) securing the right hand side support cradle.

15. Release the M8 x 20 screws (2) securing the left hand side support cradle and the M8 x 25 screw (1) and washers (2) securing the support cradle and fuel pump earth eyelet (fitted between the washers).

16. Carefully lower the tank from the chassis.

Refitment:
Is the reverse of removal except it is possible during tank removal that the clamping foams will be disturbed or withdrawn from the chassis when the tank is lowered.

Before re-fitting the tank, ensure that all the clamping pads are in good condition and positioned correctly and replace if necessary.

At the time of manufacture the foams highlighted with an * in the illustration on the following page were fitted within the chassis crossmember prior to fuel tank fitment.

Updated 23rd February 2017
Foam block fitment

- *Upper fuel tank retention foam blocks, (inside the chassis fuel tank bay - positioned inboard of the fuel pump access panel aperture and fuel filler spigot aperture).

- *Retention block spacers (fitted to underside of upper fuel tank foam blocks).

- *Isolating foam strips (fitted to the rear face of the forward tank bay crossmember - 1 pad is fitted centrally directly above the handbrake/gearchange cables. Another pad is cut into 2 pieces and each piece is then fitted 30mm inboard of the fuel tank support cradle rivnuts).

- Isolating foam strips (fitted to base of support cradles at lower fuel tank mating face area).

- Rear restraint pads (fitted to side inner angled side of support cradles).

- Support pads (fitted to rear restraint pads).

- Foam blocks (fitted to LH/RH end of fuel tank - positioned so that they are compressed when the support cradles are fitted.

- Ensure the pump/sender unit is fitted into the tank, with the earth braid fitted onto the ‘10 O’clock’ position pump mounting stud.

- Apply Permabond A130 to the threads of the support cradle fixing screws.

- Loose fit the LH tank mounting cradle ensuring that the earth braid is fitted between the 2 washers beneath the head of the horizontally orientated front fixing bolt.

- Feed the LH end of the tank into the cradle, and raise the tank into position taking care not to trap or pinch the fuel pipes or wiring harness. Retain with the RH cradle, torque tighten the cradle fixing bolts to 24 Nm.

- Continue the installation in reverse order to removal, and ensure that the shear panel is fitted beneath the fuel tank bay before driving the car.

*Retention block spacers

*Foam blocks, fuel tank retention, upper

Support pad

Rear restraint pad

Isolating foam strip

*Isolating foam strips

Foam support

Updated 23rd February 2017
LD.5a - FUEL PUMP/SENDER ASSEMBLY (43 LITRE CAPACITY FUEL TANK)

The combined fuel pump/gauge sender unit is mounted in the left hand end of the tank top surface. A removable panel is provided in the top of the chassis crossmember in the cabin, which provides access to the fuel pipe connections and harness connector, but if the pump/gauge sender unit is to be replaced, the tank must be removed from the chassis (see sub-section LD.4).

For fuel pump test procedures, refer to Toyota 2GR-FE Engine - Toyota engine repair CD manual T000T1516F.

Removal:
1. Remove the fuel tank; refer to sub-section LD.4 for further information.

2. Loosen the M6 nylon nuts (8) progressively in opposing pairs securing the fuel pump clamping ring.

3. Once all the nuts are loose, remove them from the pump retaining threads.

4. Withdraw the fuel pump clamping ring from the tank retaining threads.

5. Carefully withdraw the pump assembly and spacer ring from the tank. Immediately seal the tank aperture to reduce the fire hazard and prevent dirt ingress.

6. For permitted disassembly of the pump unit, refer to 2GR-FE Engine - Toyota engine repair CD manual T000T1516F.

Refitment:
Is the reversal of removal except:

- Renew the nylon spacer ring before carefully feeding the sender float arm in through the tank aperture.

- Orientate the assembly ensuring the breather spigot is pointing inboard, perpendicular to the tank and fit the clamping ring with the location tab engaged with the recess in the pump top moulding.

- Loosely fit and M6 washers and nylon nuts to the pump retaining threads.

- Tighten the nuts in opposing pairs to 2Nm and then tighten to a final torque of 3Nm.

- Refit the fuel tank into the car (see sub-section LD.4).

- Connect the fuel feed pipe and retain with the spring clip. Connect the breather pipe to the spigot on the pump top plate. Fit the harness plugs to the pump/sender connector, and to the pressure sensor.
Fuel pump pressure
Fuel pressure demand by engine speed and load is controlled by the fuel pressure sensor (fitted within the fuel feed pipe located near the fuel rail) and the engine management system ECM (Electronic Control Module). The signal from the fuel pressure sensor is processed by the ECM which outputs a PWM (Pulse Width Modulation) signal to the fuel pump drive controller module which regulates the voltage supply to the fuel pump.

Fuel pump drive controller module
Located behind the rear bulkhead trim panel and fixed to left hand side of the main bulkhead panel.

Removal:
1. Remove the fuel tank; refer to sub-section LD.4 for further information.

Press the quick connector securing the fuel tank vent pipe to the spigot on the top of the fuel pump and detach from the pump.

3. Loosen the M6 nyloc nuts and washers (6) in sequence (opposing pairs) securing the fuel pump clamp ring to the fuel tank/pump retaining studs

Carepoint: To prevent ‘Galling’ (also referred to as cold adhesive wear when tightening fixings made from stainless steel such as the fuel pump tank retaining studs), it is recommended to apply a suitable lithium based lubricant such as Castrol Moly Grease to the threads of the pump retaining studs prior to loosening or tightening the retaining nuts by hand.

4. Gently withdraw the pump assembly from the fuel tank and seal. Manipulate the pump as it is withdrawn to prevent the float or arm fouling the tank. Immediately seal the tank aperture to reduce fire hazard and prevent dirt ingress.

Refitment:
- Prior to refitment inspect the seal and ensure it is in a serviceable condition, or renew as necessary.

- If already not in position, fit the seal into the fuel tank pump aperture.

- Carefully feeding the sender float arm in through the tank aperture. Orientate the pump with the fuel pipe spigot and terminal block pointing towards the side of the tank.
- Apply a suitable lithium based lubricant such as Castrol Moly Grease to the threads of the pump retaining studs to prevent ‘Galling’ (see carepoint above for removal).

- Fit the clamping ring over the retaining studs, Orientate the ring with the location tab on the inner diameter of the clamp ring positioned towards the centre of the tank.

- If necessary carefully rotate the pump so that location tab on the inner diameter of the clamp ring is engaged with the recess in the pump top moulding (indicated with an arrow moulded into the top of the pump flange).

- Fit the M6 nyloc nuts and washers to the fuel tank studs and initially tighten to 2Nm in sequence (opposing pairs). Ensure the clamp ring is sitting flat against the top of the pump flange and apply a final tightening torque of 3 Nm.

- Refit the assembled fuel tank, refer to sub-section LD.4 for further information.
In order to prevent fuel vapour venting from the fuel tank to atmosphere, the breather pipe from the tank is routed to a canister filled with activated-charcoal, which absorbs and stores the fuel vapour when the engine is stopped.

When the engine is running, the canister is connected to the depression in the intake plenum via a port on the inlet manifold such that fresh air is drawn through the canister to purge the charcoal of its absorbed fuel, with the resultant gas then consumed by the engine in the normal combustion process.

**Charcoal Canister**

This is mounted at the left hand front corner of the engine bay via a bracket fixed to the bulkhead. Fuel vapour from within the tank collected from a spigot on the fuel pump/sender top plate, is routed via a roll-over valve (to prevent fuel spillage if the car is inverted) mounted on the charcoal canister bracket, to the canister port labelled ‘tank’.

This port is extended within the canister to the underside of the charcoal bed, below which is a reservoir to collect any liquid fuel. A second port on the canister (‘vent’) connects the top side of the charcoal bed to atmosphere. In this way, vapour from the fuel tank is cleansed of fuel by the charcoal bed before venting to atmosphere.

The third, 'purge' port, controlled by a solenoid valve mounted on canister housing, connects the underside of the charcoal bed with a port on the engine inlet manifold. The solenoid valve is opened during certain engine running conditions in order to allow intake depression to draw fresh air through the vent pipe and charcoal bed, cleansing the charcoal of fuel before consuming the resultant vapour in the normal combustion process. In this way, the charcoal is prepared for further vapour absorption.
Control System
The canister purge valve is controlled by the engine management ECU, which keeps the valve closed (un-energised) when the engine is cold or idling in order to protect the catalyst and maintain idle quality. At normal running temperatures and engine speeds above idle, the ECU monitors other running conditions within the management system, and when appropriate conditions are achieved, the ECU will apply a duty cycle to the valve in order to regulate the amount of purging allowed dependent on the amount of vapour in the canister.
The Steel fuel filler neck assembly combines an earth mounting stud point and a normally closed integral sprung loaded restrictor flap valve requiring the insertion of the fuel pump nozzle to open it.

A small aperture is machined just below the restrictor valve onto which a steel elbow is welded to accommodate a breather hose.

A neck and flange assembly is welded to the inlet side of the filler pipe providing attachment points for a spacer ring which is secured to it using two M5 x 10 counter sunk socket headed screws (torque 4Nm). Eight M5 threads are drilled equally around the spacer ring providing fixing points for aluminium finisher ring located on the exterior surface of the rear clamshell.
A rubber ‘O’ ring is fitted into a machined groove located on the inside of the finisher ring which in turn is fits around the neck of the filler pipe providing a fluid tight seal ensuring water/fuel cannot leak through the finisher ring/spacer ring into the engine bay area.

Nitrile bonded cork gaskets are placed on the inner and outer clamshell contact surfaces of the finisher and spacer ring and clamped together using eight M5 x 25 counter sunk socket headed screws (torque 4Nm)

A fuel hose connects the filler neck to the fuel tank filler pipe positioned to the right hand top of the tank, and a breather hose connects the breather pipe elbow to the breather pipe routed to the centre of the tank.

An earth strap is fixed to the earth mounting stud on the filler neck using an M5 nut and flat washer (torque 5Nm), the other end of the strap is fixed to the A/C pipe support bracket using an M6 x 20 flange bolt and penny washer. The strap is tie-wrapped to the breather hose to prevent excessive movement.

Care point: It is recommended to pack the mouth of fuel filler neck with bubble wrap to prevent fixings falling in, if removing the finisher ring or spacer assembly whilst the filler neck is still attached to the fuel tank hose.

Fuel Filler Cap Renewal
The existing fuel filler lock barrel can be removed from the original fuel filler cap and fitted into a new cap body if required.

Removal Procedure:
1. Using the vehicles key, unlock and remove the fuel filler cap from the filler neck, ensure to leave the key in the barrel in the ‘Unlock’ position (fully counter-clockwise).

Care point: Whilst performing this procedure, it is recommended to fit a temporary fuel filler cap to the vehicle so that fuel filler neck is not open to the atmosphere which could result in potential contamination of the fuel system. Fitting a temporary cap will also prevent excessive fuel vapour from exiting the fuel tank.

Ensure the vehicle is not stored in an area where it may be exposed to excessive heat sources and sparks whilst performing this procedure.

2. Place the cap lock face downwards onto a suitable vice so that the vehicle key is positioned between the open jaws of the vice.

3. Using a suitable screwdriver or lever, prise apart the 4 integral plastic tangs securing the end of the cap body to the internal groove in the lock barrel retaining cap.

Note: The cap body and tangs are produced in a hard plastic material which is relatively inflexible. This may require the tangs to be broken to release the lock barrels retaining cap.

Updated 6th February 2017
With the tangs sufficiently prised apart (or broken) to release the lock barrel:

4. Ensure to support the vehicles key in the lock barrel whilst carefully pushing down on the top of the lock barrel retaining cap.

5. The lock barrel, retaining cap (with key) should now slide out of the fuel cap.

CARE POINT: THE INTERNAL LOCK PLATES WITHIN THE BARREL WILL FALL OUT IF THE KEY IS REMOVED FROM THE BARREL WHILST BEING WITHDRAWN FROM THE CAP BODY.

Preparation to fit lock barrel into a new cap:

6. Place the lock barrel, retaining cap and key onto a clean, dust free working surface and/or suitable lint free cloth.

7. Using a screwdriver, prise open the tangs securing the retaining cap onto the end of the lock barrel and remove.

Note: If the lock barrel appears dry or corroded then a small amount of Renocal FN 745-94 grease (Lotus part number A120B6069S) should be applied to the outer surface of the barrel.

Fitment of lock barrel into a new cap:

Note: The new cap body is pre-fitted with a lock barrel retaining cap.

8. With the key still in place in the lock barrel, align the barrel with the slotted sections of the new cap body and retaining cap.

9. Slide the barrel into the new cap body. The end of the lock barrel should positively engage with the retaining cap at the base of the fuel cap body.

10. Turn the key to operate the lock barrel and test the lock and new cap are functioning correctly.