



1. Description

This procedure describes methods for the removal and installation of an in-tank fuel pump. Inspection and evaluation requirements are also included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of in-tank fuel pumps. This procedure is intended for use by professionals who are qualified through training and experience.



3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

- EL11 Troubleshooting
- EL21 Self-Diagnostics
- FU01 Tank Assembly
- FU11 Lines
- HM01 Hazardous Materials
- PS01 Personnel Safety

3.2 Other Information

Vehicle-specific repair information



4. Equipment And Material Requirements

4.1 Electrical Equipment

Use electrical troubleshooting equipment as described in **EL11**.



5. Damage Analysis

5.1 General Damage

Inspect an in-tank fuel pump for these conditions:

- visible damage
- fuel leaks
- loose parts
- excessive noise when the engine is running
- clogged ports
- damaged check valve

Damaged fuel pumps should be replaced. Verify the availability of replacement parts.

5.2 Electrical Parts

If the pump appears undamaged but does not operate, troubleshoot the fuel pump circuit. See **EL11**.



6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Fuel Safety

To prevent injury when working with fuel systems:

- Have the proper fire extinguisher available.
- Quickly open shop doors and windows if there is a leak.
- Always relieve fuel pressure before performing any repairs to the fuel system.
- Keep fuel, fuel tanks, and fuel containers away from any sparks, flames, or other heat sources.
- Do not turn the ignition switch ON or crank the engine with a fuel line disconnected.

(cont'd)



6. Personnel Safety (cont'd)

- Store fuel only in approved containers.
- Do not fill containers completely with liquid fuel. Leave about 25 mm (1") for expansion.
- If filled containers must be transported, make sure they are secured to prevent tipping.
- Do not store a partially filled container for long periods of time.
- Never leave containers open after filling or pouring from the container.
- Do not prime an engine with fuel while cranking the engine.
- Never use any type of fuel as a cleaning agent.
- Wear gloves made of fuel-resistant material, such as nitrile rubber, when handling fuels. If fuel gets on your skin, wash it off immediately.
- When fuel is present, work in a well-ventilated area.
- Identify air-conditioning and fuel-rail access ports before attaching equipment.
- Ground fuel transfer equipment to the vehicle when pumping fuel into or out of the tank, or into storage containers.
- Whenever possible, use a battery powered drop lamp to light the work area.



7. Environmental Safety

7.1 Hazardous Materials

Hazardous material safety information is in **HM01**.

7.2 Fuel

To protect the environment from fuel spills:

- Plug or cap disconnected hoses and lines to prevent fuel spillage.
- Properly collect and dispose of fuel.
- Treat spilled fuel as hazardous waste.



8. Vehicle Protection

8.1 Adjacent Parts

To protect adjacent parts when working with fuel tanks:

- Ensure that the ignition switch is in the LOCK position, and the key is removed.
- Cover adjacent cosmetic areas to protect them from spilled fuel. Even if the fuel pressure is relieved, there may still be some line pressure when disconnecting fuel lines.
- Plug or cap hoses and lines to prevent fuel spillage.
- Carefully handle removed parts to avoid spilling any fuel.
- Immediately rinse off any spilled fuel with water and clean the surface.



9. Repair Procedure

9.1 In-Tank Fuel Pump Removal

To remove an in-tank fuel pump:

- 1. Relieve the fuel pressure from the fuel lines. Follow the vehicle maker's recommendations.
- 2. Remove the fuel filler cap to relieve pressure from the tank.
- 3. Disconnect and isolate the negative battery cable, if required. Follow the vehicle maker's recommendations for recording and resetting electronic memories.
- 4. Properly lift and support the vehicle.
- 5. Disconnect the fuel lines from the fuel pump.
- 6. Remove the fuel tank, if required.
- 7. Disconnect the electrical connector from the fuel pump.
- 8. Remove the fasteners holding the fuel pump to the fuel tank.
- 9. Remove the fuel pump from the fuel tank.
- 10. Follow the vehicle maker's recommendations for fasteners, seals, washers, etc., that must be replaced.

9.2 In-Tank Fuel Pump Installation

To install a repaired or replacement in-tank fuel pump:

- 1. Position the replacement fuel pump in the fuel tank.
- 2. Install the fasteners holding the fuel pump to the fuel tank.
- 3. Reconnect the electrical connector to the fuel pump.
- 4. Reinstall the fuel tank to the vehicle, if it was removed. Ensure that the mounting straps are properly positioned. Torque the fasteners to the vehicle maker's recommendations.
- 5. Reconnect the fuel lines to the pump. Torque the fasteners to the vehicle maker's recommendations.
- 6. Reinstall the fuel filler cap.
- 7. Reconnect the battery, if disconnected. Reset electronic memories.
- 8. Start the vehicle and check for leaks.
- 9. Road-test the vehicle to check the fuel system performance.
- 10. Perform a visual inspection to ensure that fuel system parts do not improperly contact adjacent parts.



10. Use Of Recycled (Salvage) Parts

10.1 Condition Of Salvage Parts

Do not install a salvage in-tank fuel pump having any of these conditions:

- corrosion
- dirty or clogged pickup screen
- damaged float or fuel sender

Test a salvage pump and fuel sender before installation.



11. Inspection And Testing

11.1 Inspection Of A Replaced In-Tank Fuel Pump

After installation, inspect an in-tank fuel pump for these conditions:

- proper routing of wiring
- proper installation of clamps and mounting fasteners
- fasteners torqued to the vehicle maker's recommendations
- no fuel leaks
- proper operation of the fuel-level gauge

Road-test to check for abnormal fuel-pump noise and proper fuel-system performance. Verify that no stored trouble codes indicate a fuel system problem. See **EL21**.

Correct any defects.