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Fuel Tank and Lines - TDV8 3.6L Diesel - Fuel Tank and Lines

Diagnosis and Testing

Overview

For information on the fuel system description and operation:
REFER to: Fuel Tank and Lines (310-01D Fuel Tank and Lines - TDV8 3.6L Diesel, Description and Operation).

Inspection and Verification

WARNING: Make sure that all suitable safety precautions are observed when carrying out any work on the fuel system. Failure to observe this warning may result in personal injury.

CAUTION: Make sure that absolute cleanliness is observed when working with these components. Always install blanking plugs to any open orifices or lines. Failure to follow this instruction may result in damage to the vehicle.

1. Verify the customer concern.
2. Visually inspect for obvious mechanical or electrical faults.

Visual Inspection

Mechanical	Electrical
• Fuel level • Contaminated fuel • Fuel supply line(s) • Fuel return line(s) • High-pressure fuel supply line(s) • Fuel tank filler pipe • Fuel leak(s) • Fuel tank • Fuel filler cap • Fuel filter • Push connect fittings • Fuel rail • Fuel injection pump • Exhaust gas recirculation (EGR) system	• Battery charge and condition • Fuse(s) • Inertia fuel shutoff (IFS) switch • Fuel pump module (lift pump) • Fuel pump module relay • Electrical connector(s) • Damaged or corroded wiring harness • Fuel volume control valve • Fuel pressure control valve • Engine control module (ECM)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. Use the approved diagnostic system or a scan tool to retrieve any diagnostic trouble codes (DTCs) before moving onto the symptom chart or DTC index.
   - Make sure that all DTCs are cleared following rectification.

Symptom Chart

Symptom	Possible causes	Action
Engine cranks, but does not start	• Inertia fuel shutoff (ISF) switch • Low/Contaminated fuel • Air leakage • Low-pressure fuel system fault • Fuel pump module (lift pump) fault • Blocked fuel filter • Fuel volume regulator blocked/contaminated • Fuel pressure control valve blocked/contaminated • Fuel pump fault • Crankshaft position (CKP) sensor	Check that the ISF switch has not tripped. Check the fuel level and condition. Draw off approximately 1 ltr (2.11 pints) of fuel and allow to stand for 1 minute. Check to make sure there is no separation of the fuel indicating water or other liquid in the fuel. Check the intake air system for leaks. Check for DTCs. Check the lift pump operation, check the low-pressure fuel system for leaks/damage. Check the fuel filter, check the fuel volume and pressure control valves and circuits. Refer to the electrical guides. Check the fuel pump: REFER to: Fuel Charging and Controls (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Diagnosis and Testing). Check the CKP sensor circuits. Refer to the electrical guides.
Difficult to start	• Glow plug system fault (very cold	Check the glow plug circuits: REFER to: Glow Plug System (303-07D Glow Plug System - TDV8 3.6L

	conditions) • Low / Contaminated fuel • Air leakage • Fuel pump module (lift pump) fault • Low-pressure fuel system fault • Blocked fuel filter • Fuel volume control valve blocked/contaminated • Fuel pressure control valve blocked/contaminated • Exhaust gas recirculation (EGR) valve(s) fault	Diesel, Diagnosis and Testing). Check the fuel level and condition. Draw off approximately 1 ltr (2.11 pints) of fuel and allow to stand for 1 minute. Check to make sure there is no separation of the fuel indicating water or other liquid in the fuel. Check the intake air system for leaks: REFER to: Intake Air Distribution and Filtering (303-12D Intake Air Distribution and Filtering - TDV8 3.6L Diesel, Diagnosis and Testing). Check for DTCs. Check the lift pump operation, check the low-pressure fuel system for leaks/damage. Check the fuel filter, check the fuel volume and pressure control valves and circuits. Refer to the electrical guides. For EGR valve checks: REFER to: Engine Emission Control (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).
Rough idle	• Air ingress • Low/Contaminated fuel • Low-pressure fuel system fault • Blocked fuel filter • Fuel volume control valve blocked/contaminated • Fuel pressure control valve blocked/contaminated • Exhaust gas recirculation (EGR) valve(s) fault	Check the intake air system for leaks: REFER to: Intake Air Distribution and Filtering (303-12D Intake Air Distribution and Filtering - TDV8 3.6L Diesel, Diagnosis and Testing). Check the fuel level and condition. Draw off approximately 1 ltr (2.11 pints) of fuel and allow to stand for 1 minute. Check to make sure there is no separation of the fuel indicating water or other liquid in the fuel. Check for DTCs. Check the low-pressure fuel system for leaks/damage. Check the fuel filter, check the fuel volume and pressure control valves and circuits. Refer to the electrical guides. For EGR valve checks: REFER to: Engine Emission Control (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).
Lack of power when accelerating	• Intake air system fault • Restricted exhaust system • Low fuel pressure • Exhaust gas recirculation (EGR) valve(s) fault • Turbocharger actuator fault	Check the intake air system: REFER to: Intake Air Distribution and Filtering (303-12D Intake Air Distribution and Filtering - TDV8 3.6L Diesel, Diagnosis and Testing). Check for a blockage/restriction in the exhaust system, install new components as necessary: REFER to: Engine Emission Control (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing). Check the fuel pressure: REFER to: Fuel Charging and Controls (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Diagnosis and Testing). For EGR valve tests: REFER to: Engine Emission Control (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing). For turbocharger actuator checks: REFER to: Turbocharger (303-04F Fuel Charging and Controls - Turbocharger - TDV8 3.6L Diesel, Diagnosis and Testing).
Engine stops/stalls	• Air leakage • Low/Contaminated fuel • Low-pressure fuel system fault • High-pressure fuel leak • Fuel volume control valve blocked/contaminated • Fuel pressure control valve blocked/contaminated • Exhaust gas recirculation (EGR) valve fault	Check the intake air system for leaks, REFER to: Intake Air Distribution and Filtering (303-12D Intake Air Distribution and Filtering - TDV8 3.6L Diesel, Diagnosis and Testing). Check the fuel level and condition. Draw off approximately 1 ltr (2.11 pints) of fuel and allow to stand for 1 minute. Check to make sure there is no separation of the fuel indicating water or other liquid in the fuel. Check the fuel system for leaks/damage. Check the fuel volume and pressure control valves and circuits. Refer to the electrical guides. For EGR valve checks: REFER to: Engine Emission Control (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).
Engine judders	• Low/Contaminated fuel • Air ingress • Low-pressure fuel system fault • Fuel volume control valve	Check the fuel level and condition. Draw off approximately 1 ltr (2.11 pints) of fuel and allow to stand for 1 minute. Check to make sure there is no separation of the fuel indicating water or other liquid in the fuel. Check the intake air system for leaks: REFER to: Intake Air Distribution and Filtering (303-12D Intake Air Distribution and Filtering - TDV8 3.6L Diesel, Diagnosis and Testing). Check the low-pressure fuel system for leaks/damage. Check the high-

	blocked/contaminated • Fuel pressure control valve blocked/contaminated • High-pressure fuel leak • Fuel pump fault	pressure fuel system for leaks, check the fuel volume and pressure control valves and circuits. Refer to the electrical guides. Check the fuel pump: REFER to: Fuel Charging and Controls (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Diagnosis and Testing).
Excessive fuel consumption	• Low-pressure fuel system fault • Fuel volume control valve blocked/contaminated • Fuel pressure control valve blocked/contaminated • Fuel temperature sensor leak • High-pressure fuel leak • Injector(s) fault • Exhaust gas recirculation (EGR) valve(s) fault	Check the low-pressure fuel system for leaks/damage. Check the fuel volume and pressure control valves and circuits. Refer to the electrical guides. Check the fuel temperature sensor, fuel pump, etc for leaks. Check for DTCs indicating injector fault(s). For EGR valve checks: REFER to: Engine Emission Control (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).

DTC index

NOTES:

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

For a full list of ECM DTCs:
REFER to: Electronic Engine Controls (303-14 Electronic Engine Controls - 3.6L (TdV8) Diesel, Diagnosis and Testing).

DTC	Description	Possible causes	Action
P008700	Fuel rail/system pressure too low	• Fuel rail pressure (FRP) sensor disconnected • FRP sensor to ECM sensing circuit short circuit to ground • FRP sensor supply circuit high resistance • FRP sensor failure • Fuel line leak • Restricted fuel line • Fuel pump module circuit high resistance • Fuel pump module circuit short circuit to ground • Fuel pump module failure • Volume control valve fault • Pressure control valve	Refer to the electrical guides and check the FRP sensor circuits. For FRP sensor tests, refer to the relevant workshop manual section. Check the low pressure fuel lines for damage or restrictions. Check the fuel pressure. Check the low pressure fuel pump module circuits and operation. Check for fuel rail and high pressure fuel line leaks. Check for VCV and PCV DTCs and rectify as necessary.

		fault	
P008800	Fuel rail/system pressure too high	• Fuel rail pressure (FRP) sensor to ECM wiring (supply/sense) short circuit to each other • FRP sensor to ECM sense circuit short circuit to power • FRP sensor failure • Fuel pressure control valve (FPCV) fault • Fuel pump module circuit short circuit to power • Fuel pump module failure	Check the FRP sensor circuits. Refer to the electrical guides. For FRP sensor tests, refer to the relevant workshop manual section. Check the fuel lines, check the fuel pressure and the fuel pump module circuits.
P062712	Fuel Pump A Control Circuit / Open	• Fuel pump relay control circuit short circuit to power • Fuel pump relay fault	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Refer to the relevant workshop manual section. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062811	Fuel Pump A Control Circuit Low	• Fuel pump relay control circuit short circuit to ground • Fuel pump relay fault	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062913	Fuel Pump A Control Circuit High	• Fuel pump relay control circuit high resistance • Fuel pump relay control circuit open circuit • Fuel pump relay fault	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P115A68	Low Fuel Level - Forced Limited Power	• Low fuel level - forced limited power - event information (anti air suction intervention occurred) • Low fuel • Fuel level sensor circuit short circuit to ground • Fuel level sensor circuit high resistance • Fuel level sensor fault	Check that there is sufficient fuel in the tank. Check the fuel level sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fuel level sensor. Clear the DTCs and test for normal operation.
P115B68	Low Fuel Level -	• Low fuel level	Check that there is sufficient fuel in the tank. Check the fuel

	Forced Engine Shutdown	- forced engine shutdown - event information (anti air suction intervention occurred) • Low fuel • Fuel level sensor circuit short circuit to ground • Fuel level sensor circuit high resistance • Fuel level sensor fault	level sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fuel level sensor. Clear the DTCs and test for normal operation.
P213F07	Fuel Injection System Fault Forced Engine Shutdown	• Engine stop by hydraulic	Check for associated DTCs and Repair/renew as necessary. If this DTC resets, contact the technical help desk.
P226413	Water in Fuel Sensor Circuit	• Sensor circuit high resistance	Check the sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P226532	Water in Fuel Sensor Circuit Range/Performance	• Water in fuel sensor connector fault - signal low time less than minimum - Initialization error, edge too short • Water in fuel sensor circuit fault	Check the sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P226533	Water in Fuel Sensor Circuit Range/Performance	• Water in fuel sensor connector fault - signal low time greater than maximum • Water in fuel sensor circuit fault	Check the sensor and circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P226611	Water in Fuel Sensor Circuit Low	• Sensor circuit short circuit to ground	Check the sensor and circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P226968	Water in Fuel Condition	• Water in fuel condition • Water in fuel sensor circuit short circuit to ground • Water in fuel sensor fault	Drain the water from the fuel filter. Clear the DTC and retest. If the DTC resets, check the sensor circuit. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor.
P229000	Injector Control Pressure Too Low	• Fuel leak (high or low-pressure system) • Fuel filter/line fault • Air lock in injection pump	There are different approaches to this depending on whether or not the vehicle runs. If the vehicle does **not** run: remove the lift pump fuse (fuse 1E of the engine compartment junction box). Disconnect the volume control valve connector from the rear of the injection pump. Disconnect the fuel spill lines and direct into a suitable container through a length of clear pipe. Crank the engine to at least 250 rpm for a minimum of 15 seconds. The pump spill flow should be at

		• Fuel pump fault	least 160 ml/min. If the spill flow is greater than this, install a new injection pump. REFER to: Fuel Pump (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation. If the spill flow is less than 160 ml/min, carry out the low-pressure bleeding procedure. REFER to: Low-Pressure Fuel System Bleeding - TDV6 2.7L Diesel (310-00 Fuel System - General Information, General Procedures). Recheck the spill flow, if it is still less than 160 ml/min, install a new fuel pump. REFER to: Fuel Pump (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation. If the vehicle **does** run, install a new fuel filter and run the engine at 3,000 rpm for 3 minutes. During this, monitor the fuel pressure using a data logger function. If there is an airlock in the pump, the fuel pressure will be low and unstable, but a high-speed run should clear this. If the fault does not clear, check the low-pressure system to the injection pump. Insert a length of clear pipe into the fuel line and check for a steady flow of fuel with no air bubbles. If the low-pressure system checks out, disconnect the fuel injector electrical connectors and check connections. Direct the lines into a suitable container and crank the engine. Compare the flow from the injectors and if there is one or more with low flow, install a new injector to that cylinder. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) Fuel Injectors LH (Removal and Installation), Fuel Injectors RH (Removal and Installation). Clear the DTCs and test for normal operation. If the fault does not clear, install a new injection pump. REFER to: Fuel Pump (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.