

# Fuel Charging and Controls - TDV8 3.6L Diesel - Fuel Charging and Controls

Diagnosis and Testing

## Overview

This section covers the fuel system from the fuel filter to the fuel injectors, and includes the fuel rail and pump.

For information on the low-pressure fuel system:

REFER to: [Fuel Tank and Lines](#) (310-01D Fuel Tank and Lines - TDV8 3.6L Diesel, Description and Operation).

For information on the operation of the systems:

REFER to: [Fuel Charging and Controls](#) (303-04D Fuel Charging and Controls - 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
<ul style="list-style-type: none"> <li>● Low/Contaminated fuel</li> <li>● Fuel supply/return line(s)</li> <li>● Fuel tank and filler pipe</li> <li>● Fuel leak(s)</li> <li>● Fuel filler cap</li> <li>● Fuel filter</li> <li>● Push connect fittings</li> <li>● Fuel rail</li> <li>● Fuel pump</li> <li>● Exhaust gas recirculation (EGR) system</li> </ul>	<ul style="list-style-type: none"> <li>● Fuses</li> <li>● Fuse F6, engine compartment junction box</li> <li>● Fuse 1E, engine compartment junction box</li> <li>● Fuse 4E, engine compartment junction box</li> <li>● Fuse 13E, engine compartment junction box</li> <li>● Fuse 17E, engine compartment junction box</li> <li>● Fuse 27E, engine compartment junction box</li> <li>● Fuse 25P, passenger compartment junction box</li> <li>● Fuse 60P, passenger compartment junction box</li> <li>● Links</li> <li>● Link 1E, engine compartment junction box</li> <li>● Link 4E, engine compartment junction box</li> <li>● Link 6E, engine compartment junction box</li> <li>● Link 11E, engine compartment junction box</li> <li>● Link 14E, engine compartment junction box</li> <li>● Glow plug indicator</li> <li>● Inertia fuel shutoff (IFS) switch</li> <li>● Fuel pump module</li> <li>● Sensor(s)</li> <li>● Engine control module (ECM)</li> <li>● Fuel volume control valve</li> <li>● Fuel pressure control valve</li> <li>● Fuel rail pressure (FRP) sensor</li> <li>● Fuel temperature sensor</li> <li>● Fuel injector(s)</li> <li>● EGR system</li> </ul>

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	<ul style="list-style-type: none"> <li>● Inertia fuel shutoff (IFS) switch</li> <li>● Low/Contaminated fuel</li> <li>● Air leakage</li> <li>● Low-pressure fuel system fault</li> <li>● Fuel pump module (lift pump) fault</li> <li>● Blocked fuel filter</li> <li>● Fuel volume regulator blocked/contaminated</li> <li>● Fuel pressure control</li> </ul>	<p>Check that the IFS 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 the lift pump operation, check the low-pressure fuel system for leaks/damage. Check the fuel filter, check for DTCs indicating a fuel volume or pressure control valve fault. Check the fuel pump: REFER to: <a href="#">Fuel Charging and Controls</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Diagnosis and Testing).</p> <p>Check the CKP sensor circuits. Refer to the electrical guides.</p>

Symptom	Possible causes	Action
	<ul style="list-style-type: none"> <li>valve blocked/contaminated</li> <li>● Fuel pump fault</li> <li>● Crankshaft position (CKP) sensor</li> </ul>	
Difficult to start	<ul style="list-style-type: none"> <li>● Glow plug system fault (very cold conditions)</li> <li>● Low/Contaminated fuel</li> <li>● Air leakage</li> <li>● Fuel pump module (lift pump) fault</li> <li>● Low-pressure fuel system fault</li> <li>● Blocked fuel filter</li> <li>● Fuel volume control valve blocked/contaminated</li> <li>● Fuel pressure control valve blocked/contaminated</li> <li>● Exhaust gas recirculation (EGR) valve(s) fault</li> </ul>	<p>Check the glow plug circuits. Refer to the electrical guides. Check the fuel level/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 the lift pump operation, check the low-pressure fuel system for leaks/damage. Check the fuel filter, check for DTCs indicating a fuel volume or pressure control valve fault. For EGR valve checks: REFER to: <a href="#">Engine Emission Control</a> (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).</p>
Rough idle	<ul style="list-style-type: none"> <li>● Intake air system fault</li> <li>● Low/Contaminated fuel</li> <li>● Low-pressure fuel system fault</li> <li>● Blocked fuel filter</li> <li>● Fuel volume control valve blocked/contaminated</li> <li>● Fuel pressure control valve blocked/contaminated</li> <li>● Exhaust gas recirculation (EGR) valve(s) fault</li> </ul>	<p>Check the intake air system for leaks. Check the fuel level/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 low-pressure fuel system for leaks/damage. Check the fuel filter, check for DTCs indicating a fuel volume or pressure control valve fault. For EGR valve checks: REFER to: <a href="#">Engine Emission Control</a> (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).</p>
Lack of power when accelerating	<ul style="list-style-type: none"> <li>● Intake air system fault</li> <li>● Restricted exhaust system</li> <li>● Low fuel pressure</li> <li>● Exhaust gas recirculation (EGR) valve(s) fault</li> <li>● Turbocharger actuator fault</li> </ul>	<p>Check the intake air system for leakage or restriction. Check for a blockage/restriction in the exhaust system, install new components as necessary: REFER to: <a href="#">Exhaust System</a> (309-00C Exhaust System - 3.6L (TdV8) Diesel, Removal and Installation). Check for DTCs indicating a fuel pressure fault. For EGR valve checks: REFER to: <a href="#">Engine Emission Control</a> (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing). For turbocharger actuator checks: REFER to: <a href="#">Turbocharger</a> (303-04F Fuel Charging and Controls - Turbocharger - TDV8 3.6L Diesel, Diagnosis and Testing).</p>
Engine stops/stalls	<ul style="list-style-type: none"> <li>● Air leakage</li> <li>● Low/Contaminated fuel</li> <li>● Low-pressure fuel system fault</li> <li>● High-pressure fuel leak</li> <li>● Fuel volume control valve blocked/contaminated</li> <li>● Fuel pressure control valve blocked/contaminated</li> <li>● Exhaust gas recirculation (EGR) valve fault</li> </ul>	<p>Check the intake air system for leaks. Check the fuel level/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 for DTCs indicating a fuel volume or pressure control valve fault. For EGR valve checks: REFER to: <a href="#">Engine Emission Control</a> (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).</p>
Engine judders	<ul style="list-style-type: none"> <li>● Low/Contaminated fuel</li> <li>● Air ingress</li> <li>● Low-pressure fuel system fault</li> <li>● Fuel metering valve blocked/contaminated</li> <li>● Fuel volume control valve blocked/contaminated</li> <li>● Fuel pressure control valve blocked/contaminated</li> <li>● High-pressure fuel leak</li> <li>● Fuel pump fault</li> </ul>	<p>Check the fuel level/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 the low-pressure fuel system for leaks/damage. Check the high-pressure fuel system for leaks, check for DTCs indicating a fuel volume or pressure control valve fault. Check the fuel pump: REFER to: <a href="#">Fuel Charging and Controls</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Diagnosis and Testing).</p>
Excessive fuel consumption	<ul style="list-style-type: none"> <li>● Low-pressure fuel system fault</li> <li>● Fuel volume control valve blocked/contaminated</li> <li>● Fuel pressure control</li> </ul>	<p>Check the low-pressure fuel system for leaks/damage. Check for DTCs indicating a fuel volume or pressure control valve fault. Check the fuel temperature sensor, fuel pump, etc for leaks. Check for injector DTCs. For EGR valve checks: REFER to: <a href="#">Engine Emission Control</a> (303-08D Engine Emission Control - TDV8 3.6L Diesel, Diagnosis and Testing).</p>

Symptom	Possible causes	Action
	valve blocked/contaminated <ul style="list-style-type: none"> <li>● Fuel temperature sensor leak</li> <li>● High-pressure fuel leak</li> <li>● Injector(s) fault</li> <li>● Exhaust gas recirculation (EGR) valve(s) fault</li> </ul>	

## DTC index

NOTE: 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).

NOTE: For a full list of engine control module (ECM) DTCs:  
 REFER to: Electronic Engine Controls (303-14, Diagnosis and Testing).

DTC	Description	Possible causes	Action
P000113	Fuel volume control valve control circuit open	<ul style="list-style-type: none"> <li>● Fuel volume control valve circuit: high resistance</li> <li>● Fuel volume control valve circuit: short circuit to ground</li> <li>● Fuel volume control valve fault</li> </ul>	Check fuse 13E of the engine compartment junction box. Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P000311	Fuel volume control valve control circuit low	<ul style="list-style-type: none"> <li>● Fuel volume control valve circuit: high resistance</li> <li>● Fuel volume control valve circuit: short circuit to ground</li> <li>● Fuel volume control valve circuit: short circuit to power</li> <li>● Fuel volume control valve fault</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P000319	Fuel volume control valve control circuit low	<ul style="list-style-type: none"> <li>● Fuel volume control valve circuit: short circuit to ground</li> <li>● Fuel volume control valve fault</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P000412	Fuel volume control valve control circuit high	<ul style="list-style-type: none"> <li>● Fuel volume control valve circuit: short circuit to power</li> <li>● Fuel volume control valve fault</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P000E21	Fuel volume control valve control exceeded learning limit	<ul style="list-style-type: none"> <li>● Fuel volume control valve amplitude is less than the minimum specified</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P000E22	Fuel volume control valve control exceeded learning limit	<ul style="list-style-type: none"> <li>● Fuel volume control valve amplitude is greater than the maximum specified</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P008700	Fuel rail/system pressure too low	<ul style="list-style-type: none"> <li>● Fuel lift pump circuit fault</li> <li>● Fuel lift pump relay fault</li> <li>● Fuel lift pump fault</li> </ul>	Check the lift pump and circuits. Refer to the electrical guides. Check fuse 1E of the engine compartment junction box. Check the fuel pump relay in the engine compartment junction box. Rectify as necessary. Clear the DTCs and test for normal operation.

DTC	Description	Possible causes	Action
P008800	Fuel rail/system pressure too high	<ul style="list-style-type: none"> <li>Fuel rail pressure (FRP) sensor to engine control module (ECM) wiring (supply/sense): short circuit to each other</li> <li>FRP sensor to ECM sense circuit: short circuit to power</li> <li>FRP sensor fault</li> <li>Fuel pressure control valve fault</li> <li>Fuel pump circuit: short circuit to power</li> <li>Fuel pump fault</li> </ul>	Check for DTCs indicating a fuel pressure sensor fault. Rectify as necessary. Clear the DTCs and test for normal operation. Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the fuel pump and circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P008921	Fuel pressure regulator performance	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: high resistance</li> <li>Fuel pressure control valve circuit: short circuit to ground</li> <li>Fuel pressure control valve circuit: short circuit to power</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P008922	Fuel pressure regulator performance	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: high resistance</li> <li>Fuel pressure control valve circuit: short circuit to ground</li> <li>Fuel pressure control valve circuit: short circuit to power</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P00892F	Fuel pressure regulator performance	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: high resistance</li> <li>Fuel pressure control valve circuit: short circuit to ground</li> <li>Fuel pressure control valve circuit: short circuit to power</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P009013	Fuel pressure control valve control circuit open	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: high resistance</li> <li>Fuel pressure control valve circuit: short circuit to ground</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P009111	Fuel pressure control valve control circuit low	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: short circuit to ground</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P009119	Fuel pressure control valve control circuit low - Circuit current above threshold	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: short circuit to power</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P009212	Fuel pressure control valve control circuit high	<ul style="list-style-type: none"> <li>Fuel pressure control valve circuit: short circuit to power</li> <li>Fuel pressure control valve fault</li> </ul>	Check the fuel pressure control valve and control circuit. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new fuel pump (the fuel pressure control valve cannot be serviced separately).

DTC	Description	Possible causes	Action
			REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P018126	Fuel temperature sensor circuit range/performance - signal rate of change below threshold	<ul style="list-style-type: none"> <li>Fuel temperature sensor circuit: intermittent high resistance</li> <li>Fuel temperature sensor fault</li> </ul>	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Check the fuel temperature using a datalogger function. Make sure the fuel temperature is less than 30 °C (86 °F). Start the engine and allow to warm up for ten minutes. Recheck the fuel temperature. If the value has not increased by more than 8 °C in this time, install a new sensor. REFER to: <a href="#">Fuel Temperature Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P018216	Fuel temperature sensor circuit low input - voltage below threshold	<ul style="list-style-type: none"> <li>Fuel temperature sensor circuit: short circuit to ground</li> <li>Fuel temperature sensor fault</li> </ul>	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Measure the sensor resistance. Nominal resistance at 20 °C (68 °F) should be between 5.86 and 6.62 Kohms. If the resistance is outside this range, install a new sensor. REFER to: <a href="#">Fuel Temperature Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P018317	Fuel temperature sensor circuit high input - voltage above threshold	<ul style="list-style-type: none"> <li>Fuel temperature sensor circuit: short circuit to power</li> <li>Fuel temperature sensor fault</li> </ul>	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Measure the sensor resistance. Nominal resistance at 20 °C (68 °F) should be between 5.86 and 6.62 Kohms. If the resistance is outside this range, install a new sensor. REFER to: <a href="#">Fuel Temperature Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P018427	Fuel temperature sensor circuit intermittent - signal rate of change above threshold	<ul style="list-style-type: none"> <li>Fuel temperature sensor circuit: intermittent high resistance</li> <li>Fuel temperature sensor fault</li> </ul>	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Check the fuel temperature using a datalogger function. Increase the engine speed to 2,000 rpm and recheck the value. If the value has increased by more than 10 °C per 100 ms, install a new sensor. REFER to: <a href="#">Fuel Temperature Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P019123	Fuel rail pressure (FRP) sensor circuit range/performance - signal stuck low	<ul style="list-style-type: none"> <li>Low fuel level</li> <li>Blocked/incorrectly connected low-pressure fuel lines</li> <li>FRP sensor circuit: short circuit to ground</li> <li>FRP sensor circuit: short circuit to power</li> <li>FRP sensor circuit: high resistance</li> <li>FRP sensor fault</li> <li>Fuel pump module (lift pump) circuit: short circuit to ground</li> <li>Fuel pump module (lift pump) circuit: short circuit to power</li> <li>Fuel pump module (lift pump) circuit: high resistance</li> <li>Fuel pump module (lift pump) fault</li> </ul>	Check the fuel level and the condition and correct connection of the low-pressure fuel circuit lines (incorrect connection of the lines to and from the fuel filter can cause serious fuel pressure fluctuations). Check the FRP sensor and circuits. Check the fuel pump module (lift pump) and circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P019124	Fuel rail pressure (FRP) sensor circuit range/performance - signal stuck high	<ul style="list-style-type: none"> <li>FRP sensor circuit: short circuit to ground</li> <li>FRP sensor circuit: short circuit to power</li> <li>FRP sensor circuit: high resistance</li> <li>FRP sensor fault</li> </ul>	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a datalogger function. Switch the engine off, turn the ignition on and recheck the fuel pressure. If the pressure is greater than 10 MPa (1,450 lbs/in <sup>2</sup> ) after 0.4 seconds, install a new sensor. REFER to: <a href="#">Fuel Rail Pressure (FRP) Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P019165	Fuel rail pressure (FRP) sensor circuit range/performance - signal has too few transitions/events	<ul style="list-style-type: none"> <li>FRP sensor circuit: high resistance</li> <li>FRP sensor fault</li> </ul>	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a datalogger function. Increase the engine speed to 2,000 rpm and recheck the fuel pressure. If the value has changed by more than 40 MPa (5,801 lbs/in <sup>2</sup> ) per 10 ms, install a new sensor. REFER to: <a href="#">Fuel Rail Pressure (FRP) Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal



DTC	Description	Possible causes	Action
			and Installation). Clear the DTCs and test for normal operation.
P019216	Fuel rail pressure (FRP) sensor circuit low input - voltage below threshold	<ul style="list-style-type: none"> <li>● FRP sensor circuit: short circuit to ground</li> <li>● FRP sensor fault</li> </ul>	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a datalogger function. If the value is 0 MPa (0 lbs/in <sup>2</sup> ), install a new sensor. REFER to: <a href="#">Fuel Rail Pressure (FRP) Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P019317	Fuel rail pressure (FRP) sensor circuit high input - voltage above threshold	<ul style="list-style-type: none"> <li>● FRP sensor circuit: short circuit to power</li> <li>● FRP sensor fault</li> </ul>	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a datalogger function. If the value is greater than 180 MPa (26,106 lbs/in <sup>2</sup> ), install a new sensor. REFER to: <a href="#">Fuel Rail Pressure (FRP) Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P019427	Fuel rail pressure (FRP) sensor circuit intermittent/erratic - signal rate of change above threshold	<ul style="list-style-type: none"> <li>● FRP sensor circuit: high resistance</li> <li>● FRP sensor fault</li> </ul>	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a datalogger function. Increase the engine speed to 2,000 rpm and recheck the fuel pressure. If the value has changed by more than 40 MPa (5,801 lbs/in <sup>2</sup> ) per 10 ms, install a new sensor. REFER to: <a href="#">Fuel Rail Pressure (FRP) Sensor</a> (303-14D Electronic Engine Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P020101	Fuel injector circuit open cylinder 1 - general electrical fault	<ul style="list-style-type: none"> <li>● Fuel injector circuit: short circuit to ground</li> <li>● Fuel injector circuit: short circuit to power</li> <li>● Fuel injector circuit: high resistance</li> <li>● Fuel injector fault</li> </ul>	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation). If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P020201	Fuel injector circuit open cylinder 2 - general electrical fault		
P020301	Fuel injector circuit open cylinder 3 - general electrical fault		
P020401	Fuel injector circuit open cylinder 4 - general electrical fault		
P020501	Fuel injector circuit open cylinder 5 - general electrical fault		
P020601	Fuel injector circuit open cylinder 6 - general electrical fault		
P020701	Fuel injector circuit open cylinder 7 - general electrical fault		
P020801	Fuel injector circuit open cylinder 8 - general electrical fault		
P020A33	Cylinder 1 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>● Fuel injector circuit: short circuit to ground</li> <li>● Fuel injector circuit: short circuit to power</li> <li>● Fuel injector circuit: high resistance</li> <li>● Fuel injector fault</li> </ul>	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation). If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P020A35	Cylinder 1 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>● Fuel injector circuit: short circuit to ground</li> <li>● Fuel injector circuit: short circuit to power</li> <li>● Fuel injector circuit: high resistance</li> <li>● Fuel injector fault</li> </ul>	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation). If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power

DTC	Description	Possible causes	Action
			and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P020B33	Cylinder 2 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020B35	Cylinder 2 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020C33	Cylinder 3 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020C35	Cylinder 3 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020D33	Cylinder 4 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>

DTC	Description	Possible causes	Action
P020D35	Cylinder 4 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020E33	Cylinder 5 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020E35	Cylinder 5 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020F33	Cylinder 6 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P020F35	Cylinder 6 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>



DTC	Description	Possible causes	Action
P021A33	Cylinder 7 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P021A35	Cylinder 7 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P021B33	Cylinder 8 injection timing - signal low time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P021B35	Cylinder 8 injection timing - signal high time greater than maximum	<ul style="list-style-type: none"> <li>Fuel injector circuit: short circuit to ground</li> <li>Fuel injector circuit: short circuit to power</li> <li>Fuel injector circuit: high resistance</li> <li>Fuel injector fault</li> <li>engine control module (ECM) fault</li> </ul>	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P029A00	Cylinder 1 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>Injector leak</li> <li>Cylinder compression low</li> <li>Blow-by past the injector</li> <li>Blow-by past the glow plug</li> <li>Mechanical fault, valve, piston/ring, etc</li> <li>Injector fault</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P029B00	Cylinder 1 balance - fuel trim at minimum limit		
P029C00	Cylinder 1 balance - injector restricted		
P029D00	Cylinder 1 balance - injector leaking		
P029E00	Cylinder 2 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>Injector leak</li> <li>Cylinder compression low</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as</p>

DTC	Description	Possible causes	Action
P029F00	Cylinder 2 balance - fuel trim at minimum limit	<ul style="list-style-type: none"> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	<p>necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P02A000	Cylinder 2 balance - injector restricted		
P02A100	Cylinder 2 balance - injector leaking		
P02A200	Cylinder 3 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>● Injector leak</li> <li>● Cylinder compression low</li> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P02A300	Cylinder 3 balance - fuel trim at minimum limit		
P02A400	Cylinder 3 balance - injector restricted		
P02A500	Cylinder 3 balance - injector leaking		
P02A600	Cylinder 4 balance - fuel trim at maximum limit		
P02A700	Cylinder 4 balance - fuel trim at minimum limit	<ul style="list-style-type: none"> <li>● Injector leak</li> <li>● Cylinder compression low</li> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P02A800	Cylinder 4 balance - injector restricted		
P02A900	Cylinder 4 balance - injector leaking		
P02AA00	Cylinder 5 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>● Injector leak</li> <li>● Cylinder compression low</li> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P02AB00	Cylinder 5 balance - fuel trim at minimum limit		
P02AC00	Cylinder 5 balance - injector restricted		
P02AD00	Cylinder 5 balance - injector leaking		
P02AE00	Cylinder 6 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>● Injector leak</li> <li>● Cylinder compression low</li> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P02AF00	Cylinder 6 balance - fuel trim at minimum limit		
P02B000	Cylinder 6 balance - injector restricted		
P02B100	Cylinder 6 balance - injector leaking		
P02B200	Cylinder 7 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>● Injector leak</li> <li>● Cylinder compression low</li> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P02B300	Cylinder 7 balance - fuel trim at minimum limit		
P02B400	Cylinder 7 balance - injector restricted		
P02B500	Cylinder 7 balance - injector leaking		

DTC	Description	Possible causes	Action
P02B600	Cylinder 8 balance - fuel trim at maximum limit	<ul style="list-style-type: none"> <li>● Injector leak</li> <li>● Cylinder compression low</li> <li>● Blow-by past the injector</li> <li>● Blow-by past the glow plug</li> <li>● Mechanical fault, valve, piston/ring, etc</li> <li>● Injector fault</li> </ul>	Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60 °C (140 °F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by, etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).
P02B700	Cylinder 8 balance - fuel trim at minimum limit		
P02B800	Cylinder 8 balance - injector restricted		
P02B900	Cylinder 8 balance - injector leaking		
P062712	Fuel pump A control circuit open - circuit short to battery	<ul style="list-style-type: none"> <li>● Fuel pump relay control circuit: short circuit to power</li> <li>● Fuel pump relay fault</li> </ul>	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible "click". Rectify as necessary. Clear the DTCs and test for normal operation.
P062811	Fuel pump A control circuit low - circuit short to ground	<ul style="list-style-type: none"> <li>● Fuel pump relay control circuit: short circuit to ground</li> <li>● Fuel pump relay fault</li> </ul>	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible "click". Rectify as necessary. Clear the DTCs and test for normal operation.
P062913	Fuel pump A control circuit high - circuit open	<ul style="list-style-type: none"> <li>● Fuel pump relay control circuit: high resistance</li> <li>● Fuel pump relay fault</li> </ul>	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible "click". Rectify as necessary. Clear the DTCs and test for normal operation.
P062B46	Internal control module - fuel injector control performance - calibration/parameter memory fault	<ul style="list-style-type: none"> <li>● Fuel cut not plausible</li> <li>● Monitoring of post injection</li> <li>● Monitoring of fuel mass adaption</li> <li>● Monitoring of accelerator pedal position</li> </ul>	Check the engine control module (ECM) circuits. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P062D01	Fuel injector driver circuit performance (right-hand bank) - general electrical fault	<ul style="list-style-type: none"> <li>● Fuel injector circuits: short circuit to ground</li> <li>● Fuel injector circuits: short circuit to power</li> <li>● Fuel injector circuits: high resistance</li> <li>● Fuel injector fault</li> </ul>	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections at fuel injectors 1, 2, 3 and 4. Disconnect the injectors and measure the resistance and capacitance of each injector. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If one or more injectors are outside this range, install new injectors as necessary. REFER to: <a href="#">Fuel Injectors RH</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P062E01	Fuel injector driver circuit performance (left-hand bank) - general electrical fault	<ul style="list-style-type: none"> <li>● Fuel injector circuits: short circuit to ground</li> <li>● Fuel injector circuits: short circuit to power</li> <li>● Fuel injector circuits: high resistance</li> <li>● Fuel injector fault</li> </ul>	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections at fuel injectors 5, 6, 7 and 8. Disconnect the injectors and measure the resistance and capacitance of each injector. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If one or more injectors are outside this range, install new injectors as necessary. REFER to: <a href="#">Fuel Rail LH</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P115A68	Low fuel level - forced limited power - event information (anti air suction intervention occurred)	<ul style="list-style-type: none"> <li>● Low fuel</li> <li>● Fuel level sensor circuit: short circuit to ground</li> <li>● Fuel level sensor circuit: high resistance</li> <li>● Fuel level sensor fault</li> </ul>	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 - forced engine shutdown - event information	<ul style="list-style-type: none"> <li>● Low fuel</li> <li>● Fuel level sensor circuit: short circuit to ground</li> <li>● Fuel level sensor circuit: high resistance</li> <li>● Fuel level sensor fault</li> </ul>	

DTC	Description	Possible causes	Action
P116F2F	Fuel volume control valve control exceeded control limits - signal erratic	<ul style="list-style-type: none"> <li>Fuel volume control valve circuit fault</li> <li>Fuel volume control valve fault</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P117D00	Fuel volume control valve control exceeded maximum control limits	<ul style="list-style-type: none"> <li>Fuel volume control valve circuit fault</li> <li>Fuel volume control valve fault</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P117E00	Fuel volume control valve control exceeded minimum control limits	<ul style="list-style-type: none"> <li>Fuel volume control valve circuit fault</li> <li>Fuel volume control valve fault</li> </ul>	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.
P150A01	Injector circuit range/performance - cylinder 1 - general electrical fault	<ul style="list-style-type: none"> <li>Injector circuit: short circuit to ground</li> <li>Injector circuit: short circuit to power</li> <li>Injector circuit: high resistance</li> <li>Injector fault</li> </ul>	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).
P150B01	Injector circuit range/performance - cylinder 2 - general electrical fault	<ul style="list-style-type: none"> <li>Injector circuit: short circuit to ground</li> <li>Injector circuit: short circuit to power</li> <li>Injector circuit: high resistance</li> <li>Injector fault</li> </ul>	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).
P150C01	Injector circuit range/performance - cylinder 3 - general electrical fault	<ul style="list-style-type: none"> <li>Injector circuit: short circuit to ground</li> <li>Injector circuit: short circuit to power</li> <li>Injector circuit: high resistance</li> <li>Injector fault</li> </ul>	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).
P155401	Injector circuit range/performance cylinder 4 - general electrical fault	<ul style="list-style-type: none"> <li>Injector circuit: short circuit to ground</li> <li>Injector circuit: short circuit to power</li> <li>Injector circuit: high resistance</li> <li>Injector fault</li> </ul>	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).
P155501	Injector circuit range/performance cylinder 5 - general electrical fault	<ul style="list-style-type: none"> <li>Injector circuit: short circuit to ground</li> <li>Injector circuit: short circuit to power</li> <li>Injector circuit: high resistance</li> <li>Injector fault</li> </ul>	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).
P155601	Injector circuit range/performance cylinder 6 - general electrical fault	<ul style="list-style-type: none"> <li>Injector circuit: short circuit to ground</li> <li>Injector circuit: short circuit to power</li> <li>Injector circuit: high resistance</li> <li>Injector fault</li> </ul>	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation),



DTC	Description	Possible causes	Action
P155701	Injector circuit range/performance cylinder 7 - general electrical fault	<ul style="list-style-type: none"> <li>● Injector circuit: short circuit to ground</li> <li>● Injector circuit: short circuit to power</li> <li>● Injector circuit: high resistance</li> <li>● Injector fault</li> </ul>	<p><a href="#">Fuel Injectors RH</a> (Removal and Installation).</p> <p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P155801	Injector circuit range/performance cylinder 8 - general electrical fault	<ul style="list-style-type: none"> <li>● Injector circuit: short circuit to ground</li> <li>● Injector circuit: short circuit to power</li> <li>● Injector circuit: high resistance</li> <li>● Injector fault</li> </ul>	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 to 220 Kohms, capacitance should be greater than 3 microfarad at 20 °C (68 °F). If the values are outside this range, install a new injector as necessary. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel)</p> <p><a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation).</p>
P226413	Water in fuel sensor circuit	<ul style="list-style-type: none"> <li>● Sensor circuit: high resistance</li> </ul>	Check the sensor and circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P226532	Water in fuel sensor circuit range/performance - signal low time greater than maximum - Initialization error - edge too long	<ul style="list-style-type: none"> <li>● Water in fuel sensor connector fault</li> <li>● Water in fuel sensor circuit fault</li> </ul>	Check the sensor and circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P226533	Water in fuel sensor circuit range/performance - signal low time less than minimum - Initialization error - edge too short	<ul style="list-style-type: none"> <li>● Water in fuel sensor connector fault</li> <li>● Water in fuel sensor circuit fault</li> </ul>	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	<ul style="list-style-type: none"> <li>● Sensor circuit: short circuit to ground</li> </ul>	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 warning - event information	<ul style="list-style-type: none"> <li>● Water in fuel condition</li> <li>● Water in fuel sensor circuit: short circuit to ground</li> <li>● Water in fuel sensor fault</li> </ul>	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	<ul style="list-style-type: none"> <li>● Fuel leak (high or low-pressure system)</li> <li>● Fuel filter/line fault</li> <li>● Air lock in injection pump</li> <li>● Fuel pump fault</li> </ul>	<p>There are different approaches to this depending on whether or not the vehicle runs. If the vehicle does <b>not</b> 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 least 160 ml/min. If the spill flow is greater than this, install a new injection pump.</p> <p>REFER to: <a href="#">Fuel Pump</a> (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.</p> <p>REFER to: <a href="#">Low-Pressure Fuel System Bleeding - TDV6 2.7L Diesel</a> (310-00 Fuel System - General Information, General Procedures).</p> <p>Recheck the spill flow, if it is still less than 160 ml/min, install a new fuel pump.</p> <p>REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation. If the vehicle <b>does</b> 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 datalogger 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 backleak 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,</p>



DTC	Description	Possible causes	Action
			<p>install a new injector to that cylinder. REFER to: (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel) <a href="#">Fuel Injectors LH</a> (Removal and Installation), <a href="#">Fuel Injectors RH</a> (Removal and Installation). Clear the DTCs and test for normal operation. If the fault does not clear, install a new injection pump. REFER to: <a href="#">Fuel Pump</a> (303-04D Fuel Charging and Controls - TDV8 3.6L Diesel, Removal and Installation). Clear the DTCs and test for normal operation.</p>