Fuel Charging and Controls - 2.0L EcoBlue (77kW/105PS) (YL)/2.0L EcoBlue (96kW/130PS) (YM)/2.0L EcoBlue (125kW/170PS) (YN) - Fuel Charging and Controls

Print

Diagnosis and Testing

General Equipment

Ford diagnostic equipment

Refer to Wiring Diagram Section 023-1 for schematic and connector information.

Inspection and Verification

WARNINGS:

Do not smoke or carry lighted tobacco of any type when working on or near any fuel related components. Highly flammable mixtures are always present and may ignite. Failure to follow these instructions may result in personal injury.

This procedure involves fuel handling. Be prepared for fuel spillage at all times. Failure to follow this instruction may result in personal injury.

NOTICE: Diesel fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is therefore essential that absolute cleanliness is observed when working with these components. Always fit blanking plugs to any open orifices or lines.
NOTE: If a DTC is detected, all DTCs must be cleared after the concern is repaired. Failure to clear all DTCs may cause driveability concerns.
NOTE: If the fuel level in the fuel tank drops below approximately four liters, rough running will occur. This is to signal to the driver that the vehicle requires refuelling in order to prevent the fuel system from running dry.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Fuel leak(s) • Fuel filter element • Air cleaner element • Vacuum line(s)/vacuum connectors • Hose(s)/hose connectors • Tube(s)/tube connectors • Contaminated fuel • Fuel supply line(s) • Fuel return line(s) • High-pressure fuel supply line(s) • Fuel injectors • Fuel rail • Fuel pump	• Fuse(s) • Relay(s) • Wiring harness • Electrical connector(s) • Fuel injectors • Fuel temperature sensor • Fuel rail pressure sensor • Fuel metering valve • Fuel line low pressure sensor • Fuel pump and sender unit • Passive anti-theft system (PATS) LED operation • Glow plug indicator • PCM

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. NOTE: A PCM calibration update should only be carried out if it is applicable to the symptoms exhibited by the vehicle.
   If the cause is not visually evident, verify the symptom and refer to the Ford diagnostic equipment. Check for the availability of an applicable PCM calibration update. Continue using the Ford diagnostic equipment and retrieve the DTCs and refer to the DTC Index Chart.

DTC INDEX CHART

DTC	Description/Condition	Possible Source	Action
P1250	Fuel metering valve controllability failure (displayed in addition to DTC P0089)	Circuit(s), air ingress into the fuel lines, fuel metering valve	GO to Pinpoint Test A.

5. If no DTCs related to the concern are retrieved, proceed to the Symptom Chart to continue diagnostics.

Symptom Chart

Symptom	Possible Sources	Action
Engine does not crank and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine does not crank	* Passive anti-theft system (PATS).	* CHECK the PATS LED extinguishes within 3 seconds when the ignition is turned on. REFER to: Passive Anti-Theft System (PATS) (419-01B Passive Anti-Theft System (PATS), Diagnosis and Testing).
	* Starting system.	* REFER to: Starting System (303-06C, Diagnosis and Testing).
	* Ignition switch.	* REFER to the Wiring Diagrams.
	* PCM.	* REFER to the Ford diagnostic equipment.
	* Engine seized.	* REFER to: Engine (303-01A Engine, Diagnosis and Testing).
	* Accessories locked.	* REFER to: Accessory Drive (303-05A Accessory Drive, Diagnosis and Testing).
Engine cranks but does not start and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine cranks but does not start	* Low fuel tank fuel level.	* CHECK the fuel tank fuel level is greater than four liters. If the fuel tank fuel level is less then four liters, FILL with fuel.
	* Fuel filter element blocked.	* INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation).
	* Fuel line(s) damaged or blocked.	* INSPECT the fuel line(s) for damage or blockage. INSTALL new fuel line(s) as necessary.
	* Air ingress into the fuel lines.	* REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	* Fuel pump and sender unit.	* REFER to the Ford diagnostic equipment.
	* Glow plug relay.	* REFER to the Ford diagnostic equipment.
	* Glow plug module.	* REFER to the Ford diagnostic equipment.
	* Glow plugs.	* REFER to the Ford diagnostic equipment.
	* Crankshaft position (CKP) sensor.	* REFER to the Ford diagnostic equipment.
	* Camshaft position (CMP) sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
	* Fuel injectors.	* REFER to the Ford diagnostic equipment.
	* Incorrect valve timing.	* CHECK the valve timing.

	* Low cylinder compression.	* TEST the cylinder compression. REFER to: Engine (303-01A Engine, Diagnosis and Testing).
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: (303-04A Fuel Charging and Controls) Fuel Injection Pump (Removal and Installation), Fuel Injectors (Removal and Installation), Fuel Rail (Removal and Installation).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Accessories load.	* REFER to: Accessory Drive (303-05A Accessory Drive, Diagnosis and Testing).
	* Air intake blocked.	* REFER to: Intake Air Distribution and Filtering (303-12A Intake Air Distribution and Filtering, Diagnosis and Testing).
	* PCM.	* REFER to the Ford diagnostic equipment.
Poor starting and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Poor starting	* Low fuel tank fuel level.	* CHECK the fuel tank fuel level is greater than four liters. If the fuel tank fuel level is less then four liters, FILL with fuel.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: (303-04A Fuel Charging and Controls) Fuel Injection Pump (Removal and Installation), Fuel Rail (Removal and Installation).
	* Fuel filter element blocked.	* INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation).
	* Air cleaner element blocked.	* INSTALL a new air cleaner element.
	* Glow plug relay.	* REFER to the Ford diagnostic equipment.
	* Glow plug module.	* REFER to the Ford diagnostic equipment.
	* Glow plugs.	* REFER to the Ford diagnostic equipment.
	* Fuel system leak.	* CHECK the system for fuel leak(s). REPAIR the system as necessary.
	*	*

	Air ingress into the fuel lines.	REFER to: Intake Air Distribution and Filtering (303-12A Intake Air Distribution and Filtering, Diagnosis and Testing).
	* Fuel line(s) damaged or blocked.	* INSPECT the fuel line(s) for damage or blockage. INSTALL new fuel line(s) as necessary.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Accessories load.	* REFER to: Accessory Drive (303-05A Accessory Drive, Diagnosis and Testing).
	* Incorrect engine oil.	* INSTALL a new engine oil filter and engine oil. CARRY OUT the oil reset procedure. REFER to the Service interval indicator lamp section within the Owner's Guide.
	* Incorrect power steering fluid.	* DRAIN and REFILL the power steering system with the correct fluid. REFER to: (211-00 Steering System - General Information) Power Steering System Flushing (General Procedures), Power Steering System Filling (General Procedures), Power Steering System Bleeding (General Procedures).
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* Manifold absolute pressure (MAP) sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Catalytic converter blocked.	* REMOVE and visually INSPECT the catalytic converter as necessary. REFER to: Catalytic Converter (309-00A Exhaust System, Removal and Installation).
	* Low cylinder compression.	* TEST the cylinder compression. REFER to: Engine (303-01A Engine, Diagnosis and Testing).
Engine starts but immediately stops and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine starts but immediately stops	* Incorrect or contaminated fuel.	* INSTALL a new air cleaner element.
	* Air ingress into the fuel lines.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: (303-04A Fuel Charging and Controls) Fuel Injection Pump (Removal and Installation), Fuel Injectors (Removal and Installation), Fuel Rail (Removal and Installation).
	*	*

	Air cleaner element blocked.	REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	* PCM relay.	* CHECK the PCM relay. INSTALL a new PCM relay as necessary.
	* Accessories load.	* REFER to: Accessory Drive (303-05A Accessory Drive, Diagnosis and Testing).
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* CMP sensor.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Poor idling and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Poor idling	* Low fuel tank fuel level.	* CHECK the fuel tank fuel level is greater than four liters. If the fuel tank fuel level is less then four liters, FILL with fuel.
	* Air cleaner element blocked.	* INSTALL a new air cleaner element.
	* Accessories load.	* REFER to: Accessory Drive (303-05A Accessory Drive, Diagnosis and Testing).
	* Fuel filter element blocked.	* INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation).
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: (303-04A Fuel Charging and Controls) Fuel Injection Pump (Removal and Installation), Fuel Injectors (Removal and Installation), Fuel Rail (Removal and Installation).
	* Air ingress into the fuel lines.	* REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* MAP sensor.	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
Engine stumbling and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine stumbling	* Low fuel level.	* CHECK the fuel tank level is greater than four liters. If the fuel tank level is less than four liters, FILL with fuel.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. *

		If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Accelerator pedal position (APP) sensor.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* CMP sensor.	* REFER to the Ford diagnostic equipment.
Engine lacks power and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine lacks power	* Low fuel level.	* CHECK the fuel tank level is greater than four liters. If the fuel tank level is less than four liters, FILL with fuel.
	* Fuel system leak(s).	* Carry out a Fuel System Leak Test using the Ford diagnostic equipment menu options: ToolBox/Powertrain/Service Functions. REFER to the Ford diagnostic equipment.
	* Brakes binding.	* CHECK the braking system. REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).
	* Vehicle overloaded, or excessive wind resistance (roof racks, towing etc).	* ADVISE the customer about the effects of overloading the vehicle and wind resistance on the performance.
	* Accessories load.	* REFER to: Accessory Drive (303-05A Accessory Drive, Diagnosis and Testing).
	* Air cleaner element blocked.	* INSTALL a new air cleaner element as necessary.
	* Fuel filter element blocked.	* INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation).
	* Fuel line(s) damaged or blocked.	* INSPECT the fuel line(s) for damage or blockage. INSTALL new fuel line(s) as necessary.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Air ingress into the fuel lines.	* REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	* Turbocharger. * Turbocharger variable vane actuator.	* REFER to the Ford diagnostic equipment.

	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* Charge air cooler blocked or cracked. * Charge air cooler pipes split or cracked. * Charge air cooler retaining clips missing or loose.	* INSPECT for visible signs of damage or blockage. CLEAN, REPAIR or INSTALL new parts as necessary.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Vehicle speed sensor (VSS).	* REFER to the Ford diagnostic equipment.
	* MAP sensor.	* REFER to the Ford diagnostic equipment.
	* MAFT sensor.	* REFER to the Ford diagnostic equipment.
	* APP sensor.	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Incorrect valve timing.	* CHECK the valve timing.
	* Low cylinder compression.	* CHECK the cylinder compression. REFER to: Engine (303-01A Engine, Diagnosis and Testing).
	* Catalytic converter blocked.	* REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary. REFER to: Catalytic Converter (309-00A Exhaust System, Removal and Installation).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Black smoke at idle and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Black smoke at idle	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel

		Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Air cleaner element blocked.	* INSTALL a new air cleaner element as necessary.
	* Glow plug relay.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Turbocharger. * Turbocharger variable vane actuator.	* REFER to the Ford diagnostic equipment.
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* MAP sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Incorrect valve timing.	* CHECK the valve timing.
	* Catalytic converter blocked.	* REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary. REFER to: Catalytic Converter (309-00A Exhaust System, Removal and Installation).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Excessive black smoke during acceleration and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Excessive black smoke during acceleration	* Air cleaner element blocked.	* INSTALL a new air cleaner element as necessary.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation),

		Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* APP sensor.	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Catalytic converter blocked.	* REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new catalytic converter as necessary. REFER to: Catalytic Converter (309-00A Exhaust System, Removal and Installation).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Black smoke at cruising speeds and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Black smoke at cruising speeds	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Air cleaner element blocked.	* INSTALL a new air cleaner element.
	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Turbocharger. * Turbocharger variable vane actuator.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* MAP sensor.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Catalytic converter blocked.	* REMOVE and visually INSPECT the catalytic converter for damage. INSTALL a new

		catalytic converter as necessary. REFER to: Catalytic Converter (309-00A Exhaust System, Removal and Installation).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Blue smoke and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Blue smoke	* Engine burning oil.	* CARRY OUT a controlled oil consumption test over 1000 km (600 miles). CONFIRM that the oil consumption is less than 0.1 litre per 1000 km (600 miles).
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Positive crankcase ventilation (PCV) system.	* INSPECT for visible signs of damage or blockage. CLEAN, REPAIR or INSTALL new parts as necessary.
	* Turbocharger oil return tube blocked or damaged.	* REFER to: Turbocharger (303-04C Fuel Charging and Controls - Turbocharger, Diagnosis and Testing).
	* Worn or damaged valve guide(s), piston ring(s), cylinder bore (s), cylinder head or gasket.	* REMOVE the cylinder head. INSPECT the cylinder head, pistons and cylinder bores for signs of wear or damage. REFER to: Cylinder Head - Vehicles Built From: 01-11-2016 (303-01A Engine, Removal and Installation).
White smoke and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
White smoke	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to:

		Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* Incorrect valve timing.	* CHECK the valve timing.
	* Coolant in the combustion chamber.	* CARRY OUT a cooling system pressure test. REFER to: Engine Cooling (303-03A Engine Cooling, Diagnosis and Testing). REMOVE the cylinder head. INSPECT the cylinder head, cylinder head gasket and cylinder bores for wear or damage. REFER to: Cylinder Head - Vehicles Built From: 01-11-2016 (303-01A Engine, Removal and Installation).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Engine misfire and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine misfire	* Low fuel tank level.	* CHECK the fuel tank level is greater than four liters. If the fuel tank level is less than four liters, FILL with fuel.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* Air ingress into the fuel lines.	*

		REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* Engine operating temperature too high.	* REFER to: Engine Cooling (303-03A Engine Cooling, Diagnosis and Testing).
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* CMP sensor.	* REFER to the Ford diagnostic equipment.
	* MAP sensor.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Low cylinder compression.	* CHECK the cylinder compression. REFER to: Engine (303-01A Engine, Diagnosis and Testing).
	* Worn or damaged valve(s), tappet(s), camshaft(s) or cylinder head gasket.	* REMOVE the cylinder head. INSPECT the cylinder head, valves, tappets and camshafts for signs of wear or damage. REFER to: Cylinder Head - Vehicles Built From: 01-11-2016 (303-01A Engine, Removal and Installation).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Engine knock at idle and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine knock at idle	* Low engine oil level.	* CHECK the engine oil level. REFILL as necessary.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* Incorrect valve timing.	* CHECK the valve timing.
	* Excessive carbon build up.	* REMOVE the cylinder head. INSPECT the cylinder head and pistons for signs carbon

		build up. REFER to: Cylinder Head - Vehicles Built From: 01-11-2016 (303-01A Engine, Removal and Installation).
	* Worn or damaged oil pump. * Worn or damaged timing chain or sprocket. * Major mechanical engine failure.	* INSPECT the engine components.
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Engine knock during acceleration and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
Engine knock during acceleration	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.
	* Major mechanical engine failure.	* REFER to: Engine (303-01A Engine, Diagnosis and Testing).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Excessive fuel consumption and glow plug indicator is flashing	* DTC detected.	* REFER to the Ford diagnostic equipment.
NOTE: Before proceeding with any of the actions in relation to the possible sources for excessive fuel consumption, a fuel consumption test must be carried out using the Ford diagnostic equipment. Excessive fuel consumption	* Brakes binding.	* CHECK the braking system. REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).
	* Vehicle overloaded, or excessive wind resistance (roof racks, towing etc).	* ADVISE the customer about the effects of overloading the vehicle and wind resistance on the fuel consumption.
	* Incorrect or contaminated fuel.	* CHECK for signs of contamination such as strange odours from the fuel tank. * CHECK for signs of water or petrol in the diesel. * If contaminated fuel is found, DRAIN the complete fuel system. FLUSH the fuel system through with clean diesel. INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation). INSTALL a new fuel pump, fuel injectors, fuel rail, and high-pressure fuel supply lines. REFER to: Fuel Injection Pump (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Injectors (303-04A Fuel Charging and Controls, Removal and Installation), Fuel Rail (303-04B Fuel Charging and Controls, Removal and Installation).
	* Air cleaner element blocked.	* INSTALL a new air cleaner element.

	* Fuel filter element blocked.	* INSTALL a new fuel filter element. REFER to: Fuel Filter Element (310-01A Fuel Tank and Lines, Removal and Installation).
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* Incorrect engine timing.	* REFER to the Ford diagnostic equipment.
	* Fuel system leak(s).	* CHECK the system for fuel leak(s). REPAIR or INSTALL new parts as necessary.
	* Incorrect engine oil.	* INSTALL a new oil filter and engine oil.
	* Generator.	* REFER to: Charging System (414-00 Charging System - General Information, Diagnosis and Testing).
	* EGR valve sticking open.	* REFER to: Engine Emission Control (303-08C, Diagnosis and Testing).
	* Turbocharger variable vane actuator.	* REFER to the Ford diagnostic equipment.
	* Air ingress into the fuel lines.	* REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	* MAP sensor.	* REFER to the Ford diagnostic equipment.
	* Fuel injector(s).	* REFER to the Ford diagnostic equipment.
	* Turbocharger.	* REFER to: Turbocharger (303-04C Fuel Charging and Controls - Turbocharger, Diagnosis and Testing).
	* Incorrect valve timing.	* CHECK the valve timing.
	* Slipping clutch.	* REFER to Clutch
	* Low cylinder compression.	* CHECK the cylinder compression. REFER to: Engine (303-01A Engine, Diagnosis and Testing).
	* Wiring harness/connector.	* REFER to the Ford diagnostic equipment.
	* PCM.	* REFER to the Ford diagnostic equipment.
Engine cuts out during hard acceleration	* CMP sensor.	* REFER to the Ford diagnostic equipment.
	* CKP sensor.	* REFER to the Ford diagnostic equipment.
	* Incorrect pilot learn. * Incorrect pump learn.	* REFER to the Ford diagnostic equipment.
	* FRP sensor.	* REFER to the Ford diagnostic equipment.
	* Fuel pressure relief valve.	* REFER to the Ford diagnostic equipment.
	* Fuel pump.	* REFER to the Ford diagnostic equipment.

Pinpoint Tests

PINPOINT TEST A : DTC P1250 - FUEL METERING VALVE CONTROLLABILITY FAILURE	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
A1: CHECK FOR AIR INGRESS INTO THE FUEL LINES	
	1 Check for air ingress into the fuel system. REFER to: Fuel System (310-00A Fuel System - General Information, Diagnosis and Testing).
	Are there signs of air ingress into the fuel system? **Yes** REPAIR the system as recommended in the fuel system diagnostic. CLEAR the DTCs. TEST the system for normal operation. **No** GO to A2.
A2: CHECK THE FUEL RAIL PRESSURE SENSOR CIRCUIT	

	1 Using the wiring diagrams, CHECK the fuel rail pressure sensor circuit wiring harnesses and electrical connectors for electrical shorts or damage.
	Is the fuel rail pressure sensor circuit shorted or damaged? **Yes** REPAIR the circuit as necessary. TEST the system for normal operation. **No** GO to A3.
A3: CHECK THE FUEL METERING VALVE CIRCUIT	
	1 Using the wiring diagrams, CHECK the fuel metering valve circuit wiring harnesses and electrical connectors for electrical shorts or damage.
	Is the fuel metering valve circuit shorted or damaged? **Yes** REPAIR the circuit as necessary. TEST the system for normal operation. **No** GO to A4.
A4: CHECK THE OPERATION OF THE FUEL METERING VALVE	
NOTE: This test requires the aid of another technician.	
	1 Connect the Ford diagnostic equipment.
	2 Start the engine.
	3 Using the Ford diagnostic equipment, DATALOGGER, set the parameters FRP, FRP_DSD, VSS, RPM, MFDES,SCV_DC, SCV_AMP.
	4 Carry out a road test.
	5 Select second gear.
	6 Release the accelerator pedal and allow the engine speed to decrease to idle while the vehicle is moving with second gear engaged.
	7 Rapidly apply full throttle until the engine speed reaches 4,000 RPM and then immediately release the accelerator pedal, allowing the engine speed to return to idle while the vehicle is moving with second gear engaged.
	8 Repeat step 7 approximately four times consecutively.
	9 Observe the recorded data from the tests.
	Is the value for the FRP parameter data either staying constant or not changing with the FRP_DSD parameter data? **Yes** This indicates that the fuel metering valve is either stuck or not responding. INSTALL a new fuel metering valve. TEST the system for normal operation. **No** CLEAR the DTC and REPEAT the test. If the concern persists, INSTALL a new fuel metering valve. TEST the system for normal operation.