PRODEMAND

YMMS: 2015 Ford F-250 Super Duty XLT
Engine: 6.7L Eng
VIN:

Apr 7, 2021
License:
Odometer:

Pinpoint Test M: Fuel System

Introduction

WARNING: *CONTACT WITH EXPOSED FUEL INJECTOR WIRING, IF ENERGIZED, MAY RESULT IN ELECTRIC SHOCK. USE CARE WHEN WORKING ON OR AROUND ENERGIZED FUEL INJECTOR WIRING. FUEL INJECTOR WIRING SUPPLIES HIGH VOLTAGE TO OPERATE THE FUEL INJECTORS. FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN SERIOUS PERSONAL INJURY.*

WARNING: *BEFORE WORKING ON OR DISCONNECTING ANY OF THE FUEL TUBES OR FUEL SYSTEM COMPONENTS, RELIEVE THE FUEL SYSTEM PRESSURE TO PREVENT ACCIDENTAL SPRAYING OF FUEL. FUEL IN THE FUEL SYSTEM REMAINS UNDER HIGH PRESSURE, EVEN WHEN THE ENGINE IS NOT RUNNING. FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN SERIOUS PERSONAL INJURY.*

WARNING: *DO NOT SMOKE, CARRY LIGHTED TOBACCO RO HAVE AN OPEN FLAME OF ANY TYPE WHEN WORKING ON OR NEAR ANY FUEL-RELATED COMPONENT. HIGHLY FLAMMABLE MIXTURES ARE ALWAYS PRESENT AND MAY BE IGNITED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS PERSONAL INJURY.*

WARNING: *DO NOT CARRY PERSONAL ELECTRONIC DEVICES SUCH AS CELL PHONES, PAGERS OR AUDIO EQUIPMENT OF ANY TYPE WHEN WORKING ON OR NEAR ANY FUEL-RELATED COMPONENT. HIGHLY FLAMMABLE*

MIXTURES ARE ALWAYS PRESENT AND MAY BE IGNITED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS PERSONAL INJURY.

WARNING: *WHEN HANDLING FUEL, ALWAYS OBSERVE FUEL HANDLING PRECAUTIONS AND BE PREPARED IN THE EVENT OF FUEL SPILLAGE. SPILLED FUEL MAY BE IGNITED BY HOT VEHICLE COMPONENTS OR OTHER IGNITION SOURCES. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS PERSONAL INJURY.*

WARNING: *CLEAN ALL FUEL RESIDUE FROM THE ENGINE COMPARTMENT. IF NOT REMOVED, FUEL RESIDUE MAY IGNITE WHEN THE ENGINE IS RETURNED TO OPERATION. FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN SERIOUS PERSONAL INJURY.*

NOTE: *Regeneration may occur during normal operation. During regeneration, diagnostic procedures may display biased values. If a regeneration occurs during diagnostic procedures, allow the process to complete before continuing diagnostics.*

This pinpoint test is intended to diagnose the following:

- fuel injector (9E527)
- fuel pressure control valve (9C968)
- fuel volume control valve (9J307)
- fuel rail pressure (FRP) sensor (9F838)

Test Procedure

M1 CHECK FOR DTCS

NOTE: *Repair any fuel injector circuit related DTCs before entering this pinpoint test.*

Are DTCs P0087, P0088, P0093, P016D, P0170, P0191, P0263 through P0284, P02CC through P02DB, P054E, P054F, P062B, P127A, P228E, P228F or P2291 present?

Yes	No
For DTCs P0088, GO to M15. For all others, GO to **M2** .	GO to **M2** .

M2 CHECK THE VPWR VOLTAGE

NOTE: *For a no start concern, follow the Yes answer.*

NOTE: *An open VPWR circuit concern is indicated by a VPWR PID value greater than 15 V while the engine is running.*

Ignition ON, engine running.
Access the PCM and monitor the VPWR (VOLT) PID.

Is the voltage less than 15 V?

Yes	No
GO to **M3** .	REPAIR the open VPWR circuit. Clear the PCM DTCs. REPEAT the self-test.

M3 CHECK THE LOW PRESSURE FUEL SYSTEM

NOTE: *The FP runs for 30 seconds then shut off at ignition ON, engine OFF.*

For vehicles with a LP_FUEL_SW PID,
Ignition ON, engine OFF.
Access the PCM and monitor the LP_FUEL_SW (MODE) PID.
Access the PCM and control the FPL_CMD (MODE) PID.
Command the fuel pump ON then OFF.
For all others,
Ignition OFF.
Connect the low pressure fuel supply line to the secondary fuel filter.
Disconnect the injection pump fuel supply tube from the fuel filter to fuel injection pump supply tube quick connect coupling.
Install the Fuel Line Adapter 310-159 or equivalent and the DSL ENG Pressure Test Kit 014-00761 or equivalent to the fuel filter to fuel injection pump supply tube quick connect coupling at the fuel injection pump supply tube.
Ignition ON, engine OFF.
Access the PCM and control the FPL_CMD (MODE) PID.
Command the FP ON.

Does the PID state change (vehicles with the LP_FUEL_SW PID) or is the low pressure fuel system pressure greater than 379 kPa (55 psi) (all others)?

Yes	No
GO to **M4** .	GO to PINPOINT TEST MA .

M4 CARRY OUT THE SUFFICIENT CLEAN FUEL TEST

Carry out the Sufficient Clean Fuel Test. Refer to DIAGNOSTIC PROCEDURES .

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	For DTC P2291, GO to M16. For all others, GO to **M5** .

M5 RELATIVE COMPRESSION TEST

Carry out the Relative Compression Test. Refer to the service informationscan tool manufacturer's manual for specific information on the scan tool setup, operation, and specific cables and adapters required.

Do all cylinders pass the test?

Yes	No
For a no start condition, GO to M12. For all others, GO to **M6** .	GO to M10.

M6 MONITOR ALL 8 FUEL BALANCING PIDS

Ignition ON, engine running.

Access the PCM and monitor the CYL_BAL_1 (MASS), CYL_BAL_2 (MASS), CYL_BAL_3 (MASS), CYL_BAL_4 (MASS), CYL_BAL_5 (MASS), CYL_BAL_6 (MASS), CYL_BAL_7 (MASS) and CYL_BAL_8 (MASS) PIDs.

Are all 8 fuel balance quantity PID values relatively in line with each other?

Yes	No
GO to M9.	GO to **M7** .

M7 VERIFY THE INJECTOR QUANTITY ADJUSTMENT VALUES

NOTE: *If all injector quantity adjustment values read 0, select CANCEL and follow the injector quantity adjustment procedure as directed.*

Verify the PCM injector quantity adjustment values displayed on the scan tool match with the injector quantity adjustment value sticker on the crankcase vent oil separator. Refer to the scan tool manufacturer's manual for specific information on the scan tool setup, operation, and specific cables and adapters required.

Do the PCM injector quantity adjustment values in the scan tool match the injector quantity adjustment value sticker on the crankcase vent oil separator?

Yes	No

GO to **M8** .	ENTER the correct injector quantity adjustment value into the PCM using a scan tool. Clear the PCM DTCs. REPEAT the self-test. VERIFY the repair by road testing the vehicle.

M8 RESET THE MIN FUEL MASS ADAPTION - ALL CYLINDERS

Ignition ON, engine OFF.
Using a scan tool, reset the min fuel mass adaptation - all cylinders. Refer to the scan tool manufacturer's manual for specific information on the scan tool setup, operation, and specific cables and adapters required.
Ignition ON, engine running.
Access the PCM and monitor the CYL_BAL_1 (MASS), CYL_BAL_2 (MASS), CYL_BAL_3 (MASS), CYL_BAL_4 (MASS), CYL_BAL_5 (MASS), CYL_BAL_6 (MASS), CYL_BAL_7 (MASS) and CYL_BAL_8 (MASS) PIDs.

Is the suspect cylinder contributing correctly?

Yes	No
Clear the PCM DTCs. REPEAT the self-test. VERIFY the repair by road testing the vehicle.	GO to **M9** .

M9 CARRY OUT THE POWER BALANCE TEST

Carry out the Power Balance Test. Refer to the scan tool manufacturer's manual for specific information on the scan tool setup, operation, and specific cables and adapters required.

Are all cylinders contributing correctly during the power balance test?

Yes	No
GO to M12.	GO to **M10** .

M10 CARRY OUT A CYLINDER COMPRESSION TEST ON THE SUSPECT CYLINDER

Carry out a cylinder compression test on the suspect cylinder. Refer to the service information , Engine System - General Information.

Are any concerns present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to **M11** .

M11 VERIFY THE INJECTOR QUANTITY ADJUSTMENT VALUE ON THE SUSPECT FUEL INJECTOR MATCHES WITH THE VALUE STORED IN THE PCM AND SHOWN ON THE INJECTOR ADJUSTMENT QUANTITY STICKER

Verify the injector quantity adjustment value on the suspect fuel injector matches with the value displayed on the scan tool and matches with the injector quantity adjustment value sticker on the crankcase vent oil separator. Refer to the scan tool manufacturer's manual for specific information on the scan tool setup, operation, and specific cables and adapters required.

Does the injector quantity adjustment value on the suspect fuel injector match with the value displayed on the scan tool and match with the injector quantity adjustment value sticker on the crankcase vent oil separator.

Yes	No
INSTALL a new Fuel	ENTER the correct injector quantity adjustment value into the PCM using

Injector. REFER to the service information , Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test.	a scan tool. Clear the PCM DTCs. REPEAT the self-test. VERIFY the repair by road testing the vehicle.

M12 CHECK FOR A BIASED FRP SENSOR

Ignition ON, engine OFF.
Access the PCM and monitor the FRP_A (PRESS) PID.

Is the FRP pressure between 0 kPa (0 psi) and 6894 kPa (1, 000 psi)?

Yes	No
For a no start condition, GO to **M13** . For all others, GO to M14.	CHECK the FRP, FRP SIGRTN and FRP VREF circuits for high resistance. If OK, INSTALL a new FRP sensor.

M13 CHECK FOR SUFFICIENT FUEL PRESSURE IN THE FUEL RETURN LINE

Ignition OFF.
Wait 2 minutes.
Disconnect the fuel return line from cylinder number 8 fuel injector.
Using a suitable clear container, catch any fuel that pours from the fuel return line.
Ignition ON, engine OFF.
Access the PCM and control the FPL_CMD (MODE) PID.
Command the fuel pump ON.
Check for a visible steady stream of fuel from the fuel return line into the clear container.

Is a steady stream of fuel from the fuel return line visible?

Yes	No
CONNECT the fuel return line. GO to M16.	CHECK the fuel return line for restrictions. REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.

M14 CHECK THE FUNCTIONALITY OF THE FRP SENSOR

Ignition ON, engine running.
Access the PCM and monitor the FRP (VOLT) PID.
Access the PCM and control the RPMDSD (RPM) PID.
Increase the engine speed to 1, 400 RPM.
Access the PCM and control the FRP_A_CMD (PRESS) PID.
Increase the FRP_A_CMD PID pressure to 180 MPa (26, 106 psi) and monitor the FRP voltage.
Decrease the FRP_A_CMD PID pressure to 40 MPa (5, 801 psi) and monitor the FRP voltage.

Does the FRP voltage increase and decrease when the FRP_A_CMD PID pressure is increased and decreased during each step?

Yes	No
GO to **M15** .	GO to PINPOINT TEST ME .

M15 CARRY OUT THE HIGH PRESSURE FUEL SYSTEM TEST

Carry out the High Pressure Fuel System Test. Refer to the scan tool manufacturer's manual for specific information on the scan tool setup, operation, and specific cables and adapters required.

Is a concern present?

Yes	No
GO to M17.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

M16 CHECK THE FUEL PRESSURE CONTROL VALVE OPERATION

NOTE: *If the fuel pressure control valve is stuck closed, fuel pressure builds in the fuel rail and the engine starts while a continuous DTC may be set.*

NOTE: *Only a small volume of fuel will drain out of the tube when commanding the F_PCV PID low, and may take some time to appear. Allow adequate time for the fuel flow to begin and stop.*

Ignition OFF.
Disconnect the fuel return line at the back of the left hand fuel rail and plug the line using the Diesel Fuel Flow Tester 310-193.
Connect a suitable fuel hose to the fuel return rail fitting and route it through the wheel well and into a suitable container that is lower than the fuel return rail fitting.
Ignition ON, engine OFF.
Access the PCM and control the F_VCV (PER) PID.
Command the F_VCV PID to the lowest duty cycle value.
Access the PCM and control the FPL_CMD (MODE) PID.
Command the FPL_CMD PID to ON.
Access the PCM and control the F_PCV (PER) PID.
Command the F_PCV PID to the lowest duty cycle value while observing the fuel flow from the left hand fuel rail.
Command the F_PCV PID to the highest duty cycle value while observing the fuel flow the left hand fuel rail.

Does the fuel flow from the left hand fuel rail while the F_PCV PID is commanded to the lowest duty cycle value and stop when the F_PCV PID is commanded to the highest duty cycle value?

Yes	No
GO to M18.	REMOVE the Fuel Pressure Control Valve and INSPECT it for damage. REFER to the service information , Electronic Engine Controls. If damage is present, INSTALL a new fuel rail assembly. REFER to the service information , Fuel Charging and Controls. If no damage is present, INSTALL a new Fuel Pressure Control Valve. CARRY OUT the Reset And Clear The Specified Function Fuel System - High Pressure Side on the scan tool. REFER to CLEAR

	THE CONTINUOUS DIAGNOSTIC TROUBLE CODES (DTCS) AND RESET THE EMISSION MONITORS INFORMATION IN THE POWERTRAIN CONTROL MODULE (PCM) . Clear the PCM DTCs. REPEAT the self-test.

M17 CHECK THE FUEL VOLUME CONTROL VALVE OPERATION

Ignition OFF.
Disconnect the fuel return line at the back of the left hand fuel rail and plug the line using the Diesel Fuel Flow Tester 310-193.
Connect a suitable fuel hose to the fuel return rail fitting and route it through the wheel well and into a suitable container that is lower than the fuel return rail fitting.
Ignition ON, engine OFF.
Access the PCM and control the F_PCV (PER) PID.
Command the F_PCV PID to the lowest duty cycle value.
Access the PCM and control the FPL_CMD (MODE) PID.
Command the FPL_CMD PID to ON.
Access the PCM and control the F_VCV (PER) PID.
Command the F_VCV PID to the lowest duty cycle value while observing the fuel flow from the left hand fuel rail.
Command the F_VCV PID to the highest duty cycle value while observing the fuel flow from the left hand fuel rail.

Does the fuel flow from the left hand fuel rail while the F_VCV PID is commanded to the lowest duty cycle value and stop when the F_VCV PID is commanded to the highest duty cycle value?

Yes	No
INSTALL a new Fuel Pressure Control Valve solenoid. REFER to the service information , Electronic Engine Controls. CARRY OUT the Reset And Clear The Specified Function Fuel System - High Pressure Side on the scan tool. REFER to CLEAR THE CONTINUOUS DIAGNOSTIC TROUBLE CODES (DTCS) AND RESET THE EMISSION MONITORS INFORMATION IN THE POWERTRAIN CONTROL MODULE (PCM) . Clear the PCM DTCs. REPEAT the self-test.	REMOVE the fuel volume control valve solenoid and INSPECT for damage and corrosion. REPAIR as necessary. INSTALL a new Fuel Volume Control Valve solenoid. REFER to the service information , Electronic Engine Controls. CARRY OUT the Reset And Clear The Specified Function Fuel System - High Pressure Side on the scan tool. REFER to CLEAR THE CONTINUOUS DIAGNOSTIC TROUBLE CODES (DTCS) AND RESET THE EMISSION MONITORS INFORMATION IN THE POWERTRAIN CONTROL MODULE (PCM) . Clear the PCM DTCs. REPEAT the self-test.

M18 CHECK THE VOLUME CONTROL VALVE OPERATION WITH THE FUEL PRESSURE CONTROL VALVE OPERATION VALIDATED

Ignition OFF.
Disconnect the fuel return line at the back of the left hand fuel rail and plug the line using the Diesel Fuel Flow Tester 310-193.
Connect a suitable fuel hose to the fuel return rail fitting that drains into a suitable container.
Ignition ON, engine OFF.
Access the PCM and control the F_PCV (PER) PID.
Command the F_PCV PID to the lowest duty cycle value.
Access the PCM and control the FPL_CMD (MODE) PID.
Command the FPL_CMD PID to ON.
Access the PCM and control the F_VCV (PER) PID.

Command the F_VCV PID to the lowest duty cycle value while observing the fuel flow from the left hand fuel rail.
Command the F_VCV PID to the highest duty cycle value while observing the fuel flow from the left hand fuel rail.

Does the fuel flow from the left hand fuel rail while the F_VCV PID is commanded to the lowest duty cycle value and stop when the F_VCV PID is commanded to the highest duty cycle value?

Yes	No
REMOVE the fuel pressure control valve solenoid and check for debris and corrosion. If a concern is present, CARRY OUT the Diesel Fuel System Contamination Repair/Flushing procedure. REFER to the service information , Fuel System, General Procedures. If no debris is found, INSTALL a new High Pressure Fuel Injection Pump. REFER to the service information , Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function Fuel System - High Pressure Side on the scan tool. REFER to CLEAR THE CONTINUOUS DIAGNOSTIC TROUBLE CODES (DTCS) AND RESET THE EMISSION MONITORS INFORMATION IN THE POWERTRAIN CONTROL MODULE (PCM) . Clear the PCM DTCs. REPEAT the self-test.	INSTALL a new Fuel Volume Control Valve solenoid. REFER to the service information , Electronic Engine Controls. CARRY OUT the Reset And Clear The Specified Function Fuel System - High Pressure Side on the scan tool. REFER to CLEAR THE CONTINUOUS DIAGNOSTIC TROUBLE CODES (DTCS) AND RESET THE EMISSION MONITORS INFORMATION IN THE POWERTRAIN CONTROL MODULE (PCM) . Clear the PCM DTCs. REPEAT the self-test.