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2022 Ford Expedition Service and Repair Manual

[Go to manual page](#)

PCM (powertrain control module) P21D1:00	Cylinder 3 Injector 'B' Circuit/Open: No Sub Type Information	Sets when the PCM (powertrain control module) detects the fuel injector circuitry is inoperative. The comprehensive component monitor (CCM) monitors the operation of the fuel injector drivers in the PCM (powertrain control module) .
PCM (powertrain control module) P21D2:00	Cylinder 4 Injector 'B' Circuit/Open: No Sub Type Information	Sets when the PCM (powertrain control module) detects the fuel injector circuitry is inoperative. The comprehensive component monitor (CCM) monitors the operation of the fuel injector drivers in the PCM (powertrain control module) .
PCM (powertrain control module) P21D3:00	Cylinder 5 Injector 'B' Circuit/Open: No Sub Type Information	Sets when the PCM (powertrain control module) detects the fuel injector circuitry is inoperative. The comprehensive component monitor (CCM) monitors the operation of the fuel injector drivers in the PCM (powertrain control module) .
PCM (powertrain control module) P21D4:00	Cylinder 6 Injector 'B' Circuit/Open: No Sub Type Information	Sets when the PCM (powertrain control module) detects the fuel injector circuitry is inoperative. The comprehensive component monitor (CCM) monitors the operation of the fuel injector drivers in the PCM (powertrain control module) .
PCM (powertrain control module) P2C27:00	Fuel Injector Group 'B' Supply Sense Circuit Low: No Sub Type Information	Sets when the PCM (powertrain control module) detects the injector relay voltage is less than the calibrated threshold. This DTC (diagnostic trouble code) also sets when a concern is detected in the injector relay (INJRLY) circuit or the injector power monitor (INJPWRM) circuit.
PCM (powertrain control module) P2C28:00	Fuel Injector Group 'B' Supply Sense Circuit High: No Sub Type Information	Sets when the PCM (powertrain control module) detects the INJRLY circuit voltage is more than the calibrated threshold. This DTC (diagnostic trouble code) also sets when the injector power monitor (INJPWRM) circuit voltage is more than the calibrated threshold.

Possible Sources

- Fuel injector relay
- Fuel injector (9F593)
- PCM (powertrain control module) (12A650)

Fuel Control

303-04A Fuel Charging and Controls - 2.7L EcoBoost (238kW/324PS)	2022 F-150
Diagnosis and Testing	Procedure revision date: 11/5/2020

Fuel Control

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#)

(100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC (diagnostic trouble code)	Description	Action
PCM (powertrain control module)	P0087:00	Fuel Rail/System Pressure - Too Low (Bank 1): No Sub Type Information	GO to Pinpoint Test DD
PCM (powertrain control module)	P0088:00	Fuel Rail/System Pressure - Too High (Bank 1): No Sub Type Information	GO to Pinpoint Test DD
PCM (powertrain control module)	P0181:00	Fuel Temperature Sensor A Circuit Range/Performance: No Sub Type Information	GO to Pinpoint Test DD
PCM (powertrain control module)	P0182:00	Fuel Temperature Sensor A Circuit Low: No Sub Type Information	GO to Pinpoint Test DD

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 or 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.

WARNING

Fuel may remain pressurized in some fuel lines after the Fuel System Pressure Release procedure. Wear safety gloves and a face shield when disconnecting pressure lines to avoid skin and eye contact. Failure to follow this instruction may result in serious personal injury.

NOTE

With the engine running, the FRP PID (parameter identification) value may be 48-70 kPa (7-10 psi) higher than a fuel pressure reading taken with a mechanical gauge.

Refer to Wiring Diagrams Cell 022 for schematic and connector information.

Normal Operation and Fault Conditions Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions. **DTC Fault Trigger Conditions**

PCM (powertrain control module) P018C:00	Fuel Pressure Sensor 'B' Circuit Low: No Sub Type Information	Sets when the PCM (powertrain control module) detects the fuel pressure sensor circuit is shorted to signal return or ground. A fuel pressure sensor PID (parameter identification) value during ignition ON, engine OFF, or ignition ON, engine running, less than 0.3 volt indicates a concern is present.
PCM (powertrain control module) P018D:00	Fuel Pressure Sensor 'B' Circuit High: No Sub Type Information	Sets when the PCM (powertrain control module) detects the fuel pressure sensor circuit is open or shorted to voltage.
PCM (powertrain control module) P0192:00	Fuel Rail Pressure Sensor Circuit Low (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects the FRP (fuel rail pressure) circuit is shorted to SIGRTN or ground. A FRP (fuel rail pressure) sensor PID (parameter identification) value during ignition ON, engine OFF, or ignition ON, engine running, less than 0.3 volt indicates a concern is present.
PCM (powertrain control module) P0193:00	Fuel Rail Pressure Sensor Circuit High (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects the FRP (fuel rail pressure) circuit is open or shorted to voltage.

Possible Sources

- FRP (fuel rail pressure) sensor circuitry concern
- Low fuel level
- Fuel filter
- Fuel supply line
- Fuel pump module
- Fuel injection pump
- Low ambient temperature operation
- Fuel pressure sensor (9F972)
- FRP (fuel rail pressure) sensor (6B288)
- FRP (fuel rail pressure) temperature sensor (9G756)
- PCM (powertrain control module) (12A650)

Pinpoint Test Steps available in the on-line Workshop Manual.

High-Pressure Fuel System

303-04A Fuel Charging and Controls - 2.7L EcoBoost (238kW/324PS)	2022 F-150
Diagnosis and Testing	Procedure revision date: 11/5/2020

High-Pressure Fuel System

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#)

(100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC (diagnostic trouble code)	Description	Action
PCM (powertrain control module)	P0001:00	Fuel Volume Regulator Control Circuit/Open: No Sub Type Information	GO to Pinpoint Test HP
PCM (powertrain control module)	P0003:00	Fuel Volume Regulator Control Circuit Low: No Sub Type Information	GO to Pinpoint Test HP
PCM (powertrain control module)	P0004:00	Fuel Volume Regulator Control Circuit High: No Sub Type Information	GO to Pinpoint Test HP
PCM (powertrain control module)	P0087:00	Fuel Rail/System Pressure - Too Low (Bank 1): No Sub Type Information	GO to Pinpoint Test HP

trouble code)		
PCM (powertrain control module) P0001:00	Fuel Volume Regulator 'A' Control Circuit/Open: No Sub Type Information	Sets when the PCM (powertrain control module) detects high or low voltage from the fuel volume regulator (FVR) and fuel volume regulator return (FVRRTN) circuits.
PCM (powertrain control module) P0003:00	Fuel Volume Regulator 'A' Control Circuit Low: No Sub Type Information	Sets when the PCM (powertrain control module) detects high or low voltage from the fuel volume regulator (FVR) and fuel volume regulator return (FVRRTN) circuits. A FVRRTN circuit short to ground may damage the solenoid coil. If P0001 is retrieved after a circuit repair, check the solenoid coil for an open circuit.
PCM (powertrain control module) P0004:00	Fuel Volume Regulator 'A' Control Circuit High: No Sub Type Information	Sets when the PCM (powertrain control module) detects high or low voltage from the fuel volume regulator (FVR) and fuel volume regulator return (FVRRTN) circuits.
PCM (powertrain control module) P0087:00	Fuel Rail/System Pressure - Too Low (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects it is no longer capable of maintaining the fuel pressure within the calibrated parameters. The PCM (powertrain control module) regulates the fuel rail pressure by controlling the fuel volume regulator. Diagnose any FRP and FVR circuit Diagnostic Trouble Codes (DTCs) first.
PCM (powertrain control module) P0088:00	Fuel Rail/System Pressure - Too High (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects it is no longer capable of maintaining the fuel pressure within the calibrated parameters. The PCM (powertrain control module) regulates the fuel rail pressure by controlling the fuel volume regulator.
PCM (powertrain control module) P00C6:00	Fuel Rail Pressure Too Low - Engine Cranking (Bank 1): No Sub Type Information	Sets when the PCM (powertrain control module) detects the high pressure fuel system cannot achieve the threshold within certain time and crankshaft rotation limits; the PCM (powertrain control module) attempts to start the engine at fuel pump assembly pressure. The high pressure fuel system must reach a minimum pressure threshold before the engine can be started. The high pressure fuel system must

Direct Injection Fuel Rail LH

303-04A Fuel Charging and Controls - 2.7L EcoBoost (238kW/324PS)	2022 F-150
Removal and Installation	Procedure revision date: 04/21/2021

Direct Injection Fuel Rail LH

Removal

1. Remove the port injection fuel rail LH and RH.

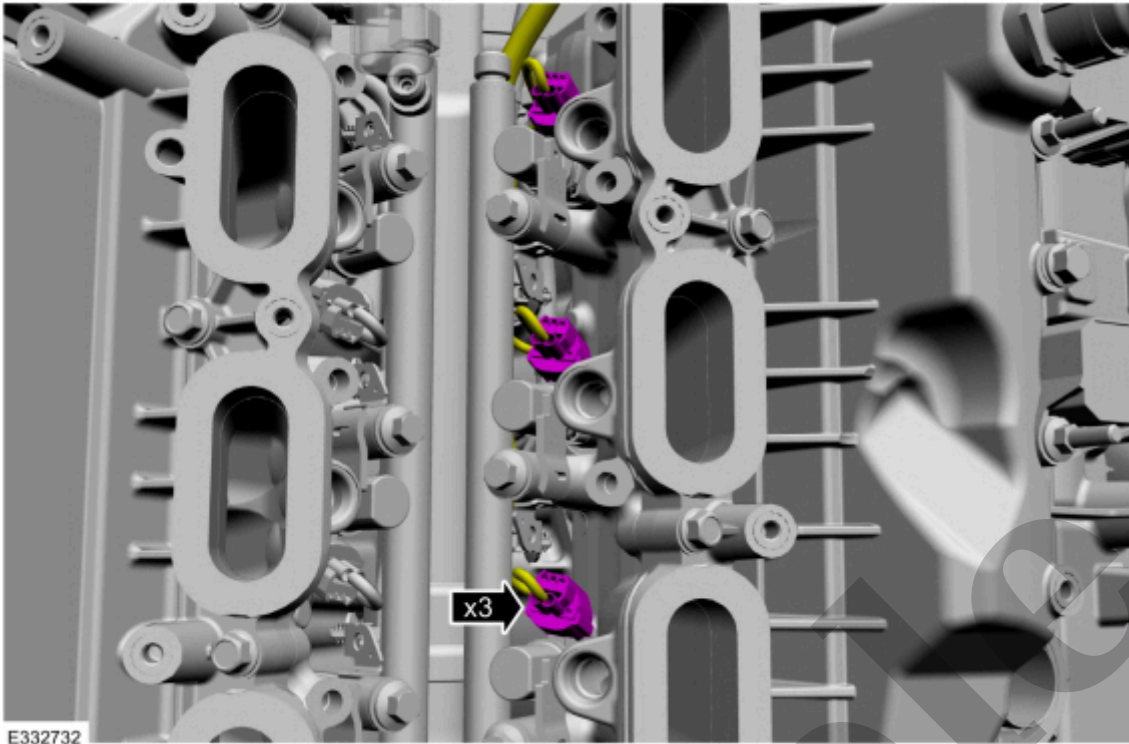
Refer to: [Port Injection Fuel Rail LH](#)(303-04A Fuel Charging and Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

Refer to: [Port Injection Fuel Rail RH](#)(303-04A Fuel Charging and Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

2. 1. **NOTICE**

To release the fuel pressure in the fuel rail to fuel rail high-pressure fuel tube, wrap the fuel rail to fuel rail high-pressure fuel tube flare nuts with a shop towel to absorb any residual fuel pressure during the loosening of the fuel rail to fuel rail high-pressure fuel tube flare nuts.

2. Disconnect the fuel rail to fuel rail high-pressure fuel tube flare nuts, then remove and discard the fuel rail to fuel rail high-pressure fuel tube.

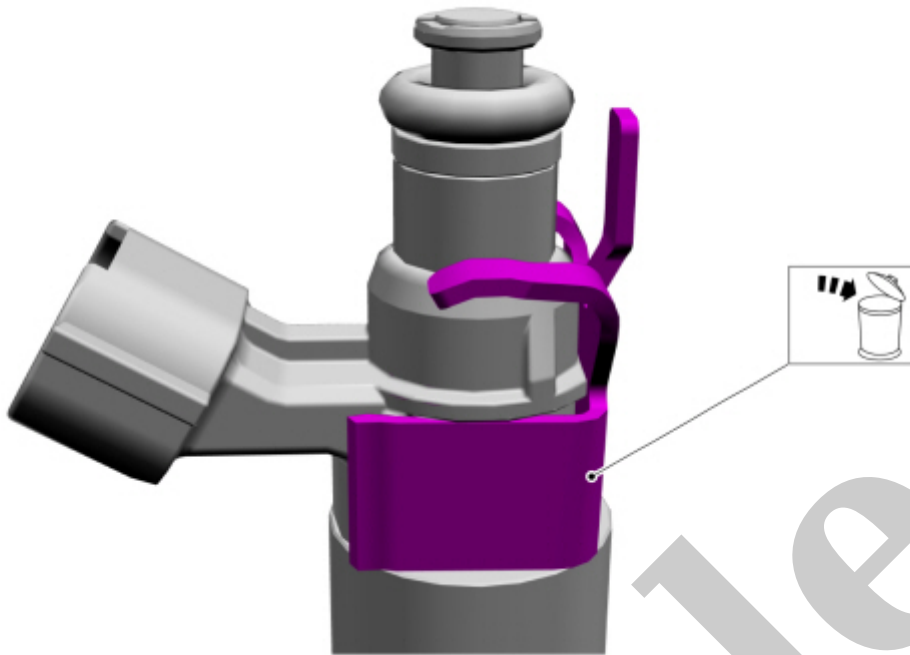


[Click here to learn about symbols, color coding, and icons used in this manual.](#)

5. NOTICE

Pull out the fuel rails in the direction of the fuel injector axis or damage may occur to the fuel injectors.

1. Use compressed air and remove any dirt or foreign material from the cylinder head, block and general surrounding area of the fuel rail and injectors.
 2. Remove the fuel rail bolts, then remove the fuel rail.
- Should any of the fuel injectors remain in the head, then the fuel injector electrical connectors will need to be disconnected as the fuel rail is being removed.
 - When removing the fuel rails, the fuel injectors may remain in the cylinder heads and require the use of a Fuel Injector Remover tool to extract. Wiggling the injector by hand to break it loose may allow the injector to be removed by hand.



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[Click here to learn about symbols, color coding, and icons used in this manual.](#)

8. NOTICE

Use minimal force to remove the fuel injectors that remained in the cylinder head with the Fuel Injector Remover tool or damage to the fuel injector assembly may occur. Wiggling the injector by hand to break it loose may allow the injector to be removed by hand.

NOTE

Commercially available OTC 5028 8-1/2" long slide hammer may be substituted for 307-005 where there are clearance concerns.

Using the special tools, remove any of the fuel injectors that remained in the cylinder head.

Use Special Service Tool : 307-005 (T59L-100-B) Slide Hammer , 310-206 Remover, Fuel Injector