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2023 Ford F-150 Service and Repair Manual

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PCM (powertrain control module)	P2272:00	O2 Sensor Signal Biased/Stuck Lean (Bank 2 Sensor 2): No Sub Type Information	GO to Pinpoint Test DW
PCM (powertrain control module)	P2272:00	O2 Sensor Signal Biased/Stuck Lean (Bank 2 Sensor 2): No Sub Type Information	GO to Pinpoint Test H
PCM (powertrain control module)	P2273:00	O2 Sensor Signal Biased/Stuck Rich (Bank 2 Sensor 2): No Sub Type Information	GO to Pinpoint Test DW
PCM (powertrain control module)	P2273:00	O2 Sensor Signal Biased/Stuck Rich (Bank 2 Sensor 2): No Sub Type Information	GO to Pinpoint Test H
PCM (powertrain control module)	P2297:00	O2 Sensor Out Of Range During Deceleration (Bank 1, Sensor 1): No Sub Type Information	GO to Pinpoint Test DW
PCM (powertrain control module)	P2626:00	O2 Sensor Positive Current Trim Circuit / Open (Bank 1 Sensor 1): No Sub Type Information	GO to Pinpoint Test DZ
PCM (powertrain control module)	P2627:00	O2 Sensor Positive Current Trim Circuit Low (Bank 1 Sensor 1): No Sub Type Information	GO to Pinpoint Test DZ
PCM (powertrain control module)	P2628:00	O2 Sensor Positive Current Trim Circuit High (Bank 1 Sensor 1): No Sub Type Information	GO to Pinpoint Test DZ
PCM (powertrain control module)	P2629:00	O2 Sensor Positive Current Trim Circuit / Open (Bank 2 Sensor 1): No Sub Type Information	GO to Pinpoint Test DZ
PCM (powertrain control module)	P2630:00	O2 Sensor Positive Current Trim Circuit Low (Bank 2 Sensor 1): No Sub Type Information	GO to Pinpoint Test DZ
PCM (powertrain control module)	P2631:00	O2 Sensor Positive Current Trim Circuit High (Bank 2 Sensor 1): No Sub Type Information	GO to Pinpoint Test DZ

<ul style="list-style-type: none"> The engine runs rough. 	<ul style="list-style-type: none"> Refer to the pinpoint test. 	<ul style="list-style-type: none"> GO to Pinpoint Test DZ
<ul style="list-style-type: none"> The engine has a surge. 	<ul style="list-style-type: none"> Refer to the pinpoint test. 	<ul style="list-style-type: none"> GO to Pinpoint Test H

Pinpoint Tests

PINPOINT TEST DW : HEATED OXYGEN SENSOR (HO2S)

WARNING

While conducting tests on a hot engine take all safety precautions to prevent skin contact with hot engine components. Failure to follow these instructions may result in personal injury.

Normal Operation and Fault Conditions

Refer to the DTC (diagnostic trouble code) Fault Trigger Conditions.

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
PCM (powertrain control module) P0036:00	HO2S Heater Control Circuit (Bank 1, Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects the sensor does not warm up to the required temperature in a calibrated amount of time. This DTC (diagnostic trouble code) also sets when the PCM (powertrain control module) is not able to maintain the required temperature after the sensor is warm. The PCM (powertrain control module) controls the HO2S (heated oxygen sensor) bank 1, sensor 2 heater ON and OFF duty cycle to maintain a calibrated temperature.
PCM (powertrain control module) P0037:00	HO2S Heater Control Circuit Low (Bank 1, Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects the sensor does not warm up to the required temperature in a calibrated amount of time. This DTC (diagnostic trouble code) also sets when the PCM (powertrain control module) is not able to maintain the required temperature after the sensor is warm. The PCM (powertrain control module) controls the HO2S (heated oxygen sensor) bank 1, sensor 2 heater ON and OFF duty cycle to maintain a calibrated temperature.

module) P00D2:00	(Bank 1 Sensor 2): No Sub Type Information	
PCM (powertrain control module) P0136:00	O2 Sensor Circuit (Bank 1 Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects a concern with one of the circuits used to determine the oxygen content in the exhaust gas.
PCM (powertrain control module) P0137:00	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects a concern with one of the circuits used to determine the oxygen content in the exhaust gas.
PCM (powertrain control module) P0138:00	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects an over voltage condition is present on the HO2S12 circuit.
PCM (powertrain control module) P0139:00	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects it is at the allowable limit or has exceeded an allowable length of time for fuel trim modification, without detecting an acceptable rate of voltage change. The HO2S (heated oxygen sensor) monitor tracks the rate of voltage change during the rise and fall of the HO2S (heated oxygen sensor) bank 1, sensor 2 (HO2S12) signal. When the rate of voltage change is less than a calibrated value, the PCM (powertrain control module) begins to modify the fuel trim attempting to increase the HO2S (heated oxygen sensor) voltage switch rate.
PCM (powertrain control module) P013A:00	O2 Sensor Slow Response - Rich to Lean (Bank 1 and Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects the measured response rate is slower than the threshold value. This monitor is highly sensitive to exhaust leaks near the rear HO2S (heated oxygen sensor) . The heated oxygen sensor monitor measures the response rate of the rear HO2S (heated oxygen sensor) to a rich to lean transition. This monitor is highly sensitive to exhaust leaks near the rear HO2S (heated oxygen sensor) . Check for leaks in the exhaust system.

<p>control module) P0140:00</p>	<p>1 Sensor 2): No Sub Type Information</p>	<p>oscillating. If the sensor signal value is not changing from the default value, the PCM (powertrain control module) commands an oscillating air to fuel ratio attempting to detect some movement in the signal value. An O2S12 PID (parameter identification) switching across 0.45 volt from 0.2 to 0.9 volts indicates a normal switching HO2S (heated oxygen sensor) .</p>
<p>PCM (powertrain control module) P0141:00</p>	<p>O2 Sensor Heater Circuit (Bank 1 Sensor 2): No Sub Type Information</p>	<p>Sets when the PCM (powertrain control module) detects an open or short circuit is detected or the HO2S (heated oxygen sensor) bank 1, sensor 2 heater current draw exceeds a calibrated limit.</p>
<p>PCM (powertrain control module) P014A:00</p>	<p>O2 Sensor Delayed Response - Rich to Lean (Bank 2 Sensor 2): No Sub Type Information</p>	<p>Sets when the PCM (powertrain control module) , after three consecutive intrusive attempts, the cannot force the signal greater than the calibrated rich value. Also, if the signal voltage remains greater than the lean value after a calibrated amount of time with the fuel injectors off, a counter is incremented. This DTC (diagnostic trouble code) also sets when after three consecutive occurrences the signal is not less than the calibrated lean value. During a deceleration fuel shut-off (DFSO) event, the PCM (powertrain control module) monitors the HO2S (heated oxygen sensor) bank 2, sensor 2 signal to determine if the signal is stuck in range. The PCM (powertrain control module) expects the signal to exceed a calibrated rich or lean value within a calibrated amount of time. If the signal voltage remains less than the rich value after a number of occurrences, the PCM (powertrain control module) intrusively controls the fuel system rich over increasing time periods in an attempt to force the signal to greater than the calibrated rich value. Check for leaks in the exhaust system. Check for an intermittent HO2S12 or HO2S22 signal.</p>
<p>PCM (powertrain control module) P0157:00</p>	<p>O2 Sensor Circuit Low Voltage (Bank 2 Sensor 2): No Sub Type Information</p>	<p>Sets when the PCM (powertrain control module) detects a concern with one of the circuits used to determine the oxygen content in the exhaust gas.</p>

PCM (powertrain control module) P2272:00	O2 Sensor Signal Stuck Lean - Bank 2, Sensor 2: No Sub Type Information	Sets when the PCM (powertrain control module) detects the HO2S (heated oxygen sensor) bank 2, sensor 2 signal is less than the calibrated rich value during the current key cycle and, after three consecutive intrusive events, the signal cannot be forced greater than the calibrated rich value. Check for leaks in the exhaust system. Check for an intermittent HO2S22 signal.
PCM (powertrain control module) P2273:00	O2 Sensor Signal Stuck Rich - Bank 2, Sensor 2: No Sub Type Information	This DTC (diagnostic trouble code) sets when the HO2S (heated oxygen sensor) bank 2, sensor 2 signal is greater than the calibrated lean value during the current key cycle and, after three consecutive intrusive events, the signal cannot be forced less than the calibrated lean value. Check for leaks in the exhaust system. Check for an intermittent HO2S22 signal.
PCM (powertrain control module) P2297:00	O2 Sensor Out of Range During Deceleration Bank 1, Sensor 1: No Sub Type Information	Sets when the PCM (powertrain control module) detects the measured value for the HO2S (heated oxygen sensor) bank 1, sensor 1 is slower than the measured value of the HO2S (heated oxygen sensor) bank 1, sensor 2. During a deceleration fuel shut-off event, the PCM (powertrain control module) monitors how quickly the rear HO2S (heated oxygen sensor) switches from rich to lean. The measured rate of the rich to lean switch is compared to a calibrated threshold value. The threshold value takes into account the level of oxygen in the catalyst, which has an impact on how quickly the rich to lean switch occurs. Check for leaks in the exhaust system.
PCM (powertrain control module) P2A01:00	O2 Circuit Range/Performance (Bank 1, Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects the HO2S (heated oxygen sensor) bank 1, sensor 2 voltage is out of range low for a calibrated period of time.
PCM (powertrain control module) P2A04:00	O2 Circuit Range/Performance (Bank 2, Sensor 2): No Sub Type Information	Sets when the PCM (powertrain control module) detects the HO2S (heated oxygen sensor) bank 2, sensor 2 voltage is out of range low for a calibrated period of time.

Possible Sources

- Aftermarket accessories or performance modifications

control module) P0040:00	Bank 1 Sensor 1 / Bank 2 Sensor 1: No Sub Type Information	HO2S (heated oxygen sensor) monitor determines if the universal HO2S (heated oxygen sensor) signal response for a fuel shift corresponds to the correct engine bank. Connect the universal HO2S (heated oxygen sensor) connector to the correct bank.
PCM (powertrain control module) P0050:00	HO2S Heater Control Circuit (Bank 2, Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects the sensor does not warm up to the required temperature in a calibrated amount of time. This DTC (diagnostic trouble code) also sets when the PCM (powertrain control module) is not able to maintain the required temperature after the sensor is warm. The PCM (powertrain control module) controls the universal HO2S (heated oxygen sensor) bank 2, sensor 1 heater ON and OFF duty cycle to maintain a calibrated temperature.
PCM (powertrain control module) P0053:00	HO2S Heater Resistance (Bank 1, Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects the heater current requirements are too low or too high in the UO2SHTR11 circuit .
PCM (powertrain control module) P0059:00	HO2S Heater Resistance (Bank 2, Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects the heater current requirements are too low or too high in the UO2SHTR21 circuit.
PCM (powertrain control module) P0130:00	O2 Sensor Circuit (Bank 1 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects a concern with one of the circuits used to determine the oxygen content in the exhaust gas.
PCM (powertrain control module) P0131:00	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects a concern with one of the circuits used to determine the oxygen content in the exhaust gas. An engine stall condition or an extremely rich air to fuel ratio may set this DTC (diagnostic trouble code) . Diagnose any engine stall or rich air to fuel ratio concerns before diagnosing this DTC (diagnostic trouble code) . An engine stall condition or an extremely rich air to fuel ratio may set this DTC (diagnostic trouble code) . Diagnose any engine stall or rich air to fuel ratio concerns before diagnosing this DTC (diagnostic trouble code) .

PCM (powertrain control module) P0152:00	O2 Sensor Circuit High Voltage (Bank 2 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects an over voltage concern with one of the circuits used to determine the oxygen content in the exhaust gas.
PCM (powertrain control module) P0153:00	O2 Sensor Circuit Slow Response (Bank 2 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects the oxygen sensor signal does not reach the predicted amplitude within a predetermined response time. The PCM (powertrain control module) monitors the universal HO2S (heated oxygen sensor) bank 2, sensor 1 response time by commanding a calibrated fuel control routine. This routine sets the air to fuel ratio to a calibrated limit to produce a predictable oxygen sensor signal amplitude.
PCM (powertrain control module) P0154:00	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects no movement in the sensor signal while the air to fuel ratio is oscillating. If the sensor signal value is not changing from the default value, the PCM (powertrain control module) commands an oscillating air to fuel ratio attempting to detect some movement in the signal value.
PCM (powertrain control module) P0155:00	O2 Sensor Heater Circuit (Bank 2 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects an open circuit , a short circuit or the universal HO2S (heated oxygen sensor) bank 2, sensor 1 heater current draw exceeds a calibrated limit.
PCM (powertrain control module) P064D:00	Internal Control Module O2 Sensor Processor Performance - Bank 1: No Sub Type Information	Sets when PCM (powertrain control module) detects an internal circuit or communication concern. The PCM (powertrain control module) monitors the application specific integrated circuit that controls and monitors the universal heated oxygen sensor HO2S (heated oxygen sensor) bank 1, sensor 1. Check for other Diagnostic Trouble Codes (DTCs) and diagnose those first. Check for intermittent universal HO2S (heated oxygen sensor) wiring concerns. Check the universal HO2S (heated oxygen sensor) wiring between the PCM (powertrain control module) and the sensor for damage. Check for aftermarket performance products. Reprogram or update the calibration. Clear the Diagnostic Trouble Codes (DTCs), repeat the self-test.
PCM (powertrain control module)	Internal Control Module O2 Sensor	Sets when PCM (powertrain control module) detects an internal circuit or communication concern. The PCM (powertrain control

		module) and the sensor for damage. Check for aftermarket performance products. Reprogram or update the calibration. Clear the Diagnostic Trouble Codes (DTCs), repeat the self-test.
PCM (powertrain control module) P164A:00	O2 Sensor Positive Current Trim Circuit Performance (Bank 1 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects an inconsistent or erratic measurement of the resistor. A resistor is installed in the universal HO2S (heated oxygen sensor) bank 1, sensor 1 connector for part to part variance. The PCM (powertrain control module) determines the value of this resistor by taking multiple measurements of the resistor during each ignition ON event. The PCM (powertrain control module) uses this value to compensate for the variance in the pumping current signal.
PCM (powertrain control module) P164B:00	O2 Sensor Positive Current Trim Circuit Performance (Bank 2 Sensor 1): No Sub Type Information	Sets when PCM (powertrain control module) detects an inconsistent or erratic measurement of the resistor. A resistor is installed in the universal HO2S (heated oxygen sensor) bank 2, sensor 1 connector for part to part variance. The PCM (powertrain control module) determines the value of this resistor by taking multiple measurements of the resistor during each ignition ON event. The PCM (powertrain control module) uses this value to compensate for the variance in the pumping current signal.
PCM (powertrain control module) P2096:00	Post Catalyst Fuel Trim System Too Lean Bank 1: No Sub Type Information	Sets when PCM (powertrain control module) detects the correction value is greater than a calibrated limit. The PCM (powertrain control module) monitors the correction value from the HO2S (heated oxygen sensor) bank 1, sensor 2 as part of the fore-aft oxygen sensor control routine.
PCM (powertrain control module) P2097:00	Post Catalyst Fuel Trim System Too Rich Bank 1: No Sub Type Information	Sets when PCM (powertrain control module) detects the correction value is greater than a calibrated limit. The PCM (powertrain control module) monitors the correction value from the HO2S (heated oxygen sensor) bank 1, sensor 2 as part of the fore-aft oxygen sensor control routine.
PCM (powertrain control module) P2098:00	Post Catalyst Fuel Trim System Too Lean Bank 2: No Sub Type Information	Sets when PCM (powertrain control module) detects the correction value is greater than a calibrated limit. The PCM (powertrain control module) monitors the correction value from the HO2S (heated oxygen sensor) bank 2, sensor 2 as part of the fore-aft oxygen sensor control routine.

	No Sub Type Information	
PCM (powertrain control module) P2254:00	O2 Sensor Negative Current Control Circuit/Open - Bank 2, Sensor 1: No Sub Type Information	Sets when PCM (powertrain control module) detects a concern with the circuit used to determine the oxygen content in the exhaust gas.
PCM (powertrain control module) P2626:00	O2 Sensor Positive Current Trim Circuit/Open Bank 1 Sensor 1: No Sub Type Information	Sets when PCM (powertrain control module) detects the actual oxygen sensor voltage exceeds the maximum expected voltage threshold for a specified amount of time. During deceleration fuel shut-off the PCM (powertrain control module) monitors the integrity of the UO2SPCT11 circuit by comparing the actual oxygen sensor voltage signal to an expected oxygen sensor voltage signal.
PCM (powertrain control module) P2627:00	O2 Sensor Positive Current Trim Circuit Low Bank 1, Sensor 1: No Sub Type Information	Sets when PCM (powertrain control module) detects the resistance value from the universal HO2S (heated oxygen sensor) is too high. A resistor is installed in the universal HO2S (heated oxygen sensor) connector for part to part variance. The PCM (powertrain control module) determines the value of this resistor by taking multiple measurements of the resistor during each ignition ON event. The PCM (powertrain control module) uses this value in order to compensate for the variance in the pumping current signal.
PCM (powertrain control module) P2628:00	O2 Sensor Positive Current Trim Circuit High Bank 1, Sensor 1: No Sub Type Information	Sets when PCM (powertrain control module) detects a concern with the circuit used to determine the oxygen content in the exhaust gas.
PCM (powertrain control module) P2629:00	O2 Sensor Positive Current Trim Circuit/Open Bank 2 Sensor 1: No Sub Type Information	Sets when PCM (powertrain control module) detects the actual oxygen sensor voltage exceeds the maximum expected voltage threshold for a specified amount of time. During deceleration fuel shut-off the PCM (powertrain control module) monitors the integrity of the UO2SPCT21 circuit by comparing the actual oxygen sensor voltage signal to an expected oxygen sensor voltage signal.