

Cause

Pressure leakage during overrun (Leakage in Overrun).

Details

A pressure leakage on fuel line was detected during the engine cut-off check-up.

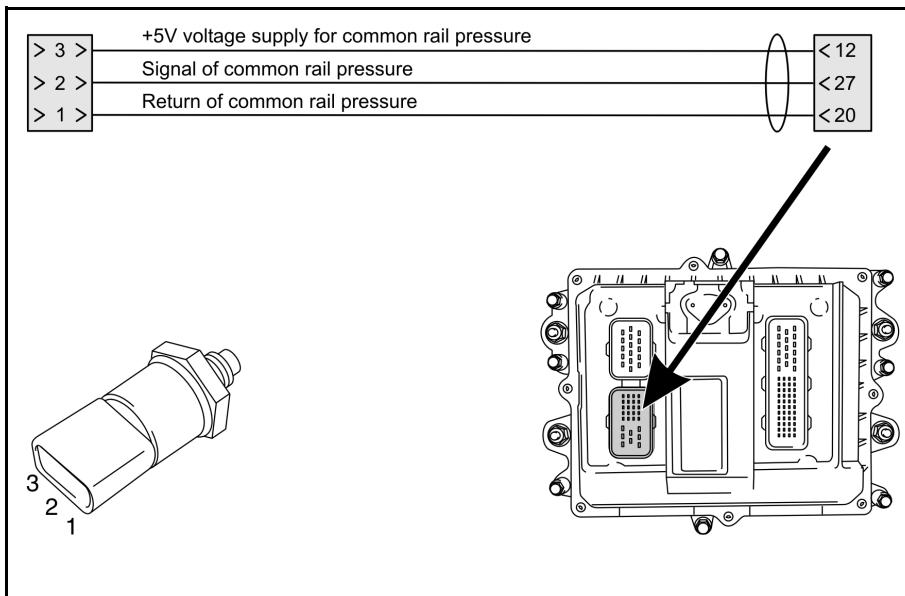
After ignition switch was turned OFF, ECM detected a non-requested pressure drop on fuel line. Inspect fuel system high-pressure circuit and check for possible external leakage. As this sensor is Rail built-in, erase all active fault codes and inspect it again using the Diagnosis Tool.

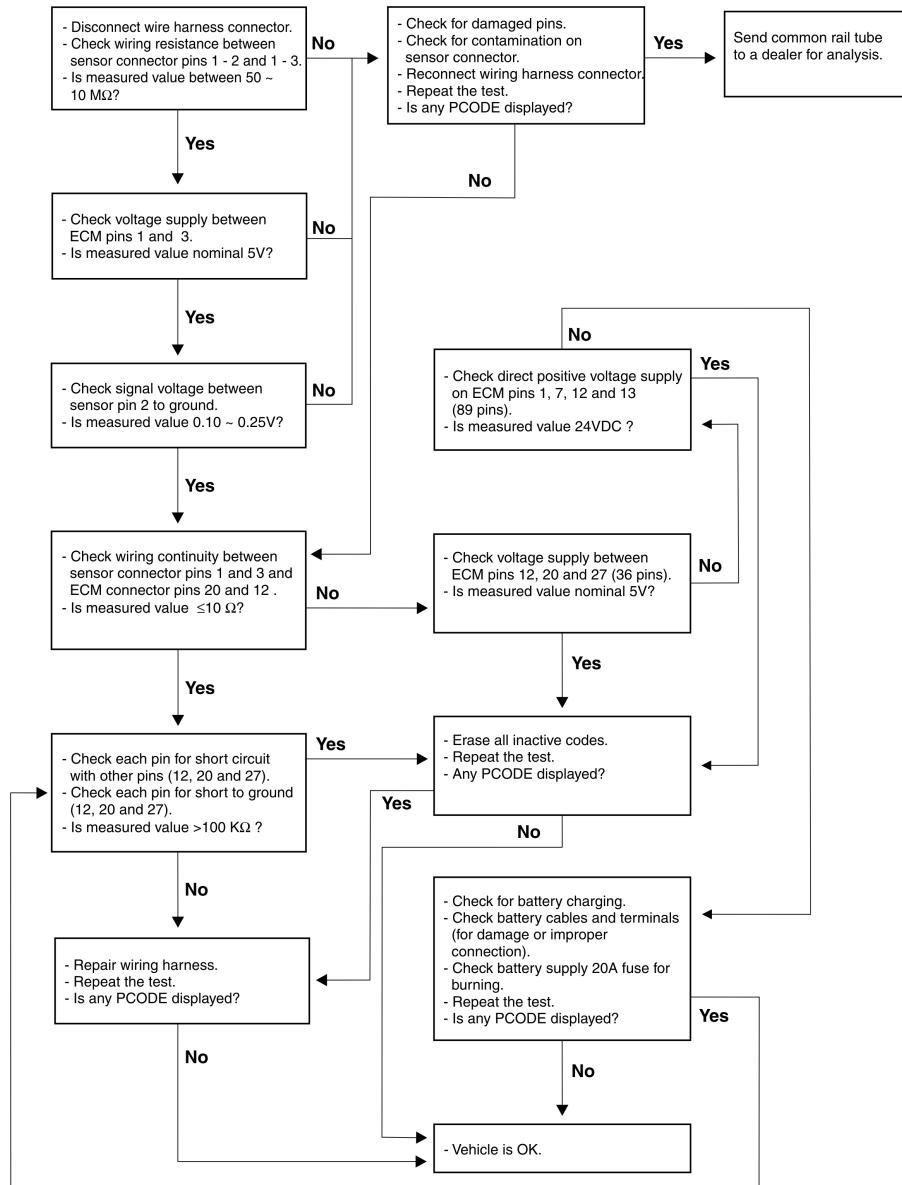
Strategy

Sensor is defective or pressure value exceeds 1485 bar.

Red light turns ON	Engine power is reduced below 80%
Fuel pump return will open	Rail pressure will be reduced to 80 bar.

ECM uses this signal for calculation of fuel injection volume and as a safety element for the system.



Troubleshooting Routine

Cause

Pressure leakage detected by is implausible debt balance calculation

Details

A pressure leakage was detected on fuel line during calculation of actual and programmed pressure.

Inspect the high-pressure circuit of the fuel system to check probable external leakage. Check for damage signs on safety valve or any clogging on fuel filter.

As this sensor is Rail built-in, erase all active fault codes and redo test procedures using the Diagnosis Tool.

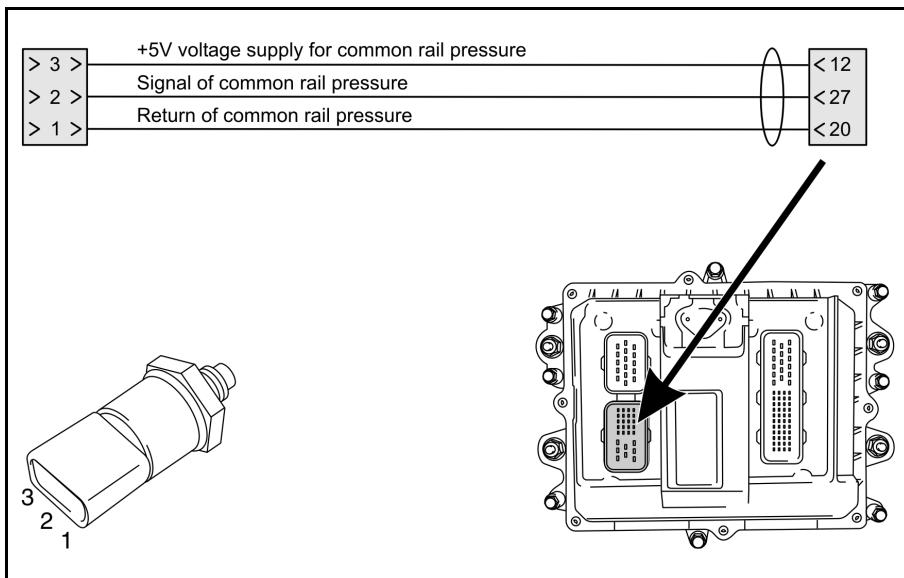
Strategy

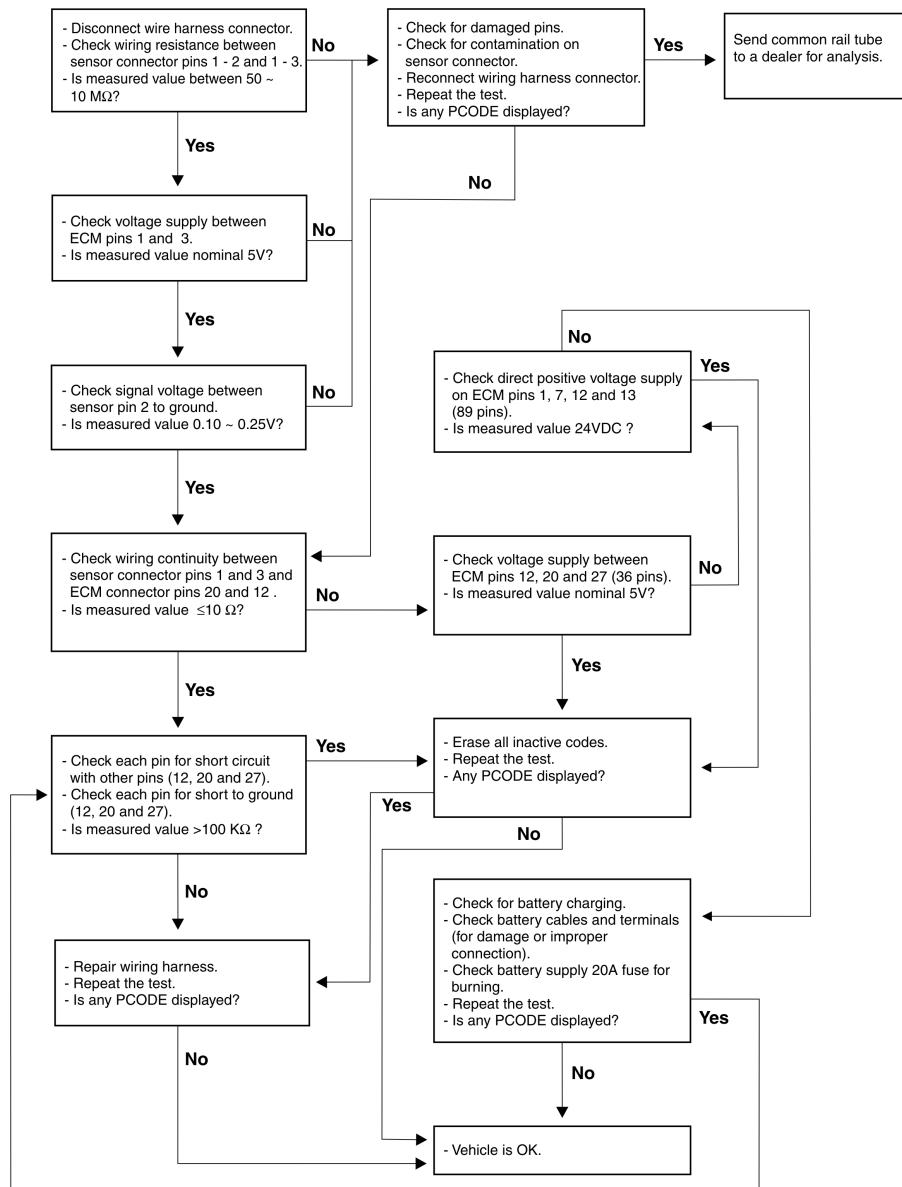
Sensor is defective or pressure value exceeds 1485 bar.

Red light turns ON Engine power is reduced below 80%.

Fuel pump return will open Rail pressure will be reduced to 80 bar.

ECM uses this signal for calculation of fuel injection volume and as a safety element for the system.



Troubleshooting Routine::

Cause
Pressure surge for opening of relief valve.

Details

A pressure surge on fuel line that caused the opening of relief valve was detected. Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines. If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased. As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

1 - ECM (89 pins)

- 1a - Inspect positive voltage supply pins (1, 7 and 12 and 13) and negative voltage supply pins (3, 9, 14 and 15) from 89 pins connector for corrosion, bent pins or moisture presence;
- 1b - Check for voltage supply on pins 1, 7, 12, 13, and 3, 9, 14, 15. Value must be nominal 5V;
- 1c - Check for short-circuits on pins 1, 7, 12 and 13 (to ground) and 3, 9, 14 and 15 (to positive). Value must be =10 Mohms;
- 1d - Check for direct positive voltage supply on pins 1, 7, 12 and 13 and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool. If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Relief valve opening was detected.

Details

A Rail pressure relief valve opening during a short time interval was detected as consequence of a system's brief pressure raising.

This opening may be have occurred as result of a single pressure peak caused by pressure oscillation.

Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines.

If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased.

As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

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- 1d - Check for direct positive voltage supply on pins 1, 7, 12 and 13 and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool.

If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Relief valve opening was detected

Details

A Rail pressure relief valve opening that caused a fast pressure drop was detected. ECM defined a default pressure value in order to stabilize the system.

This opening may have been occurred in function of a single pressure peak or by pressure oscillation.

Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines.

If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased.

As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

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- 1d - Check for direct positive voltage supply on pins 1, 7, 12 and 13 and direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool.

If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Open relief valve

Details

A Rail pressure relief valve opening was caused during engine cut-off was detected. This opening may have been occurred in function of a single pressure peak or by pressure oscillation. Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines. If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased. As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

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- 1d - Check for direct positive voltage supply on pins 1, 7 and 12 and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool. If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Relief valve has not opened after pressure surge

Details

A pressure surge on fuel line that caused the opening of relief valve was detected.
Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines.
If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased.
As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

- 1 - ECM (89 pins)**
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- 1d -** Check for direct positive voltage supply on pins 1, 7, 12 and 13, and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool.
If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Relief valve opening was detected.

Details

A Rail pressure relief valve opening during a short time interval was detected as consequence of a system's brief pressure raising.

This opening may have been occurred in function of a single pressure peak caused by a deviation on parameters for pressure calculation.

Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines.

If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased.

As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

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- 1c - Check for short-circuits on pins 1, 7, 12 and 13 (to ground) and 3, 9, 14 and 15 (to positive). Value must be =10 Mohms;
- 1d - Check for direct positive voltage supply on pins 1, 7, 12 and 13, and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool.

If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Rail pressure relief valve opening was detected

Details

A Rail pressure relief valve opening during a short time interval was detected as consequence of a system's brief pressure raising.

This opening may have been occurred in function of a single pressure peak caused by a deviation on parameters for pressure calculation.

Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines.

If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased.

As this is a component built-in Rail, it is impossible to disassemble it for inspection. Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

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- 1d - Check for direct positive voltage supply on pins 1, 7, 12 and 13, and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool.

If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause
Fuel pressure on Rail above system maximum limit

Details

A Rail pressure relief valve opening during a short time interval was detected as consequence of a system's brief pressure raising.

Using the Diagnosis Tool, check for other fault codes displayed. If confirmed, the faults shall be diagnosed individually using the respective Troubleshooting Routines.

If faults are not confirmed, turn engine off and wait 10 seconds for a new start. This way, the fault code will be erased.

As this is a component built-in Rail, it is impossible to disassemble it for inspection.

Erase all inactive fault codes and inspect it again using the Diagnosis Tool. If failure persists, check ECM for correct voltage supply from battery.

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- 1d - Check for direct positive voltage supply on pins 1, 7, 12 and 13 , and for direct negative voltage supply on pins 3, 9, 14 and 15. Value must be 24VDC.

After having checked all parameters, inspect it again using the Diagnosis Tool.

If failure persists, the Rail shall be sent to a dealer for analysis.

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Cause

Low level of engine coolant.

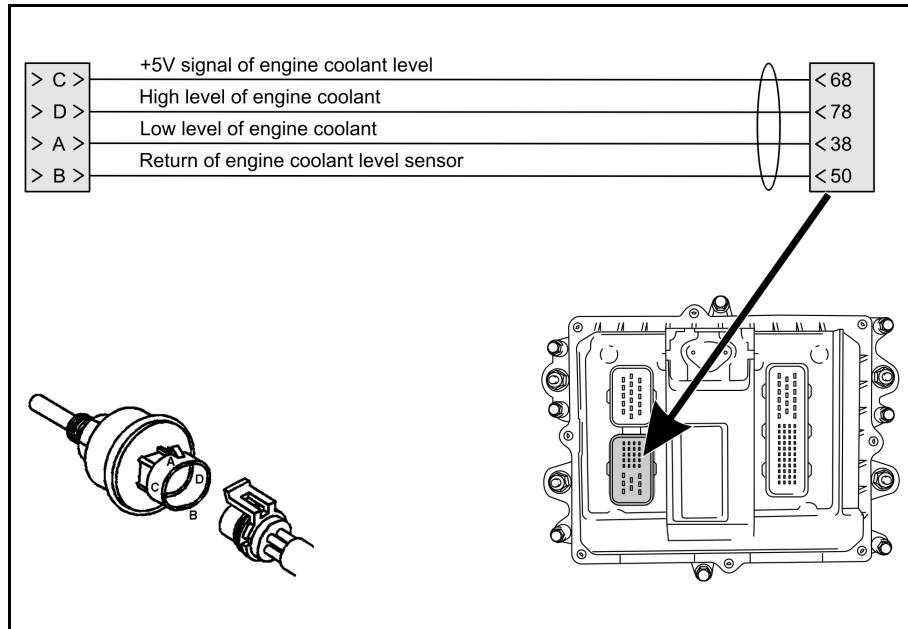
Details

Coolant level sensor indicates a low level.

Check the coolant level on expansion tank and clean the sensor before starting the Troubleshooting Routine.

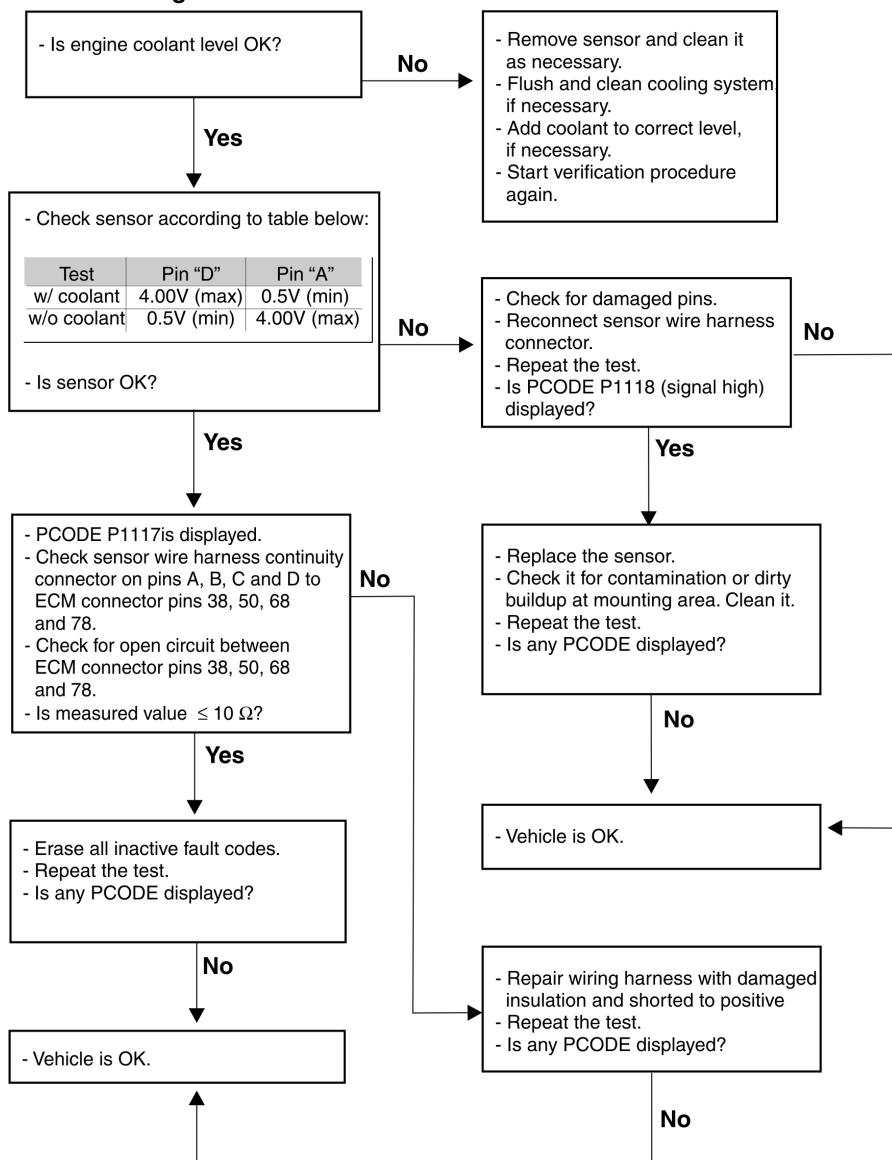
Strategy

Low level	Yellow light turns ON - Reduces by 20%.
Sensor failure	Red light blinks - Reduces by 80 %.
ECM uses this signal as an engine protection element.	



Engine Coolant Level Sensor

Troubleshooting Routine



Cause

No signal from engine coolant level sensor.

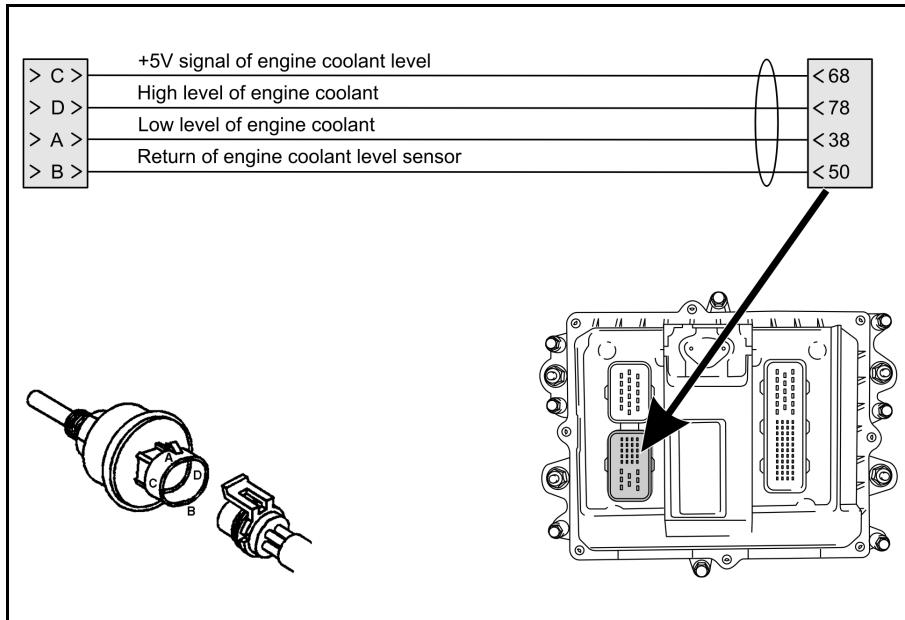
Details

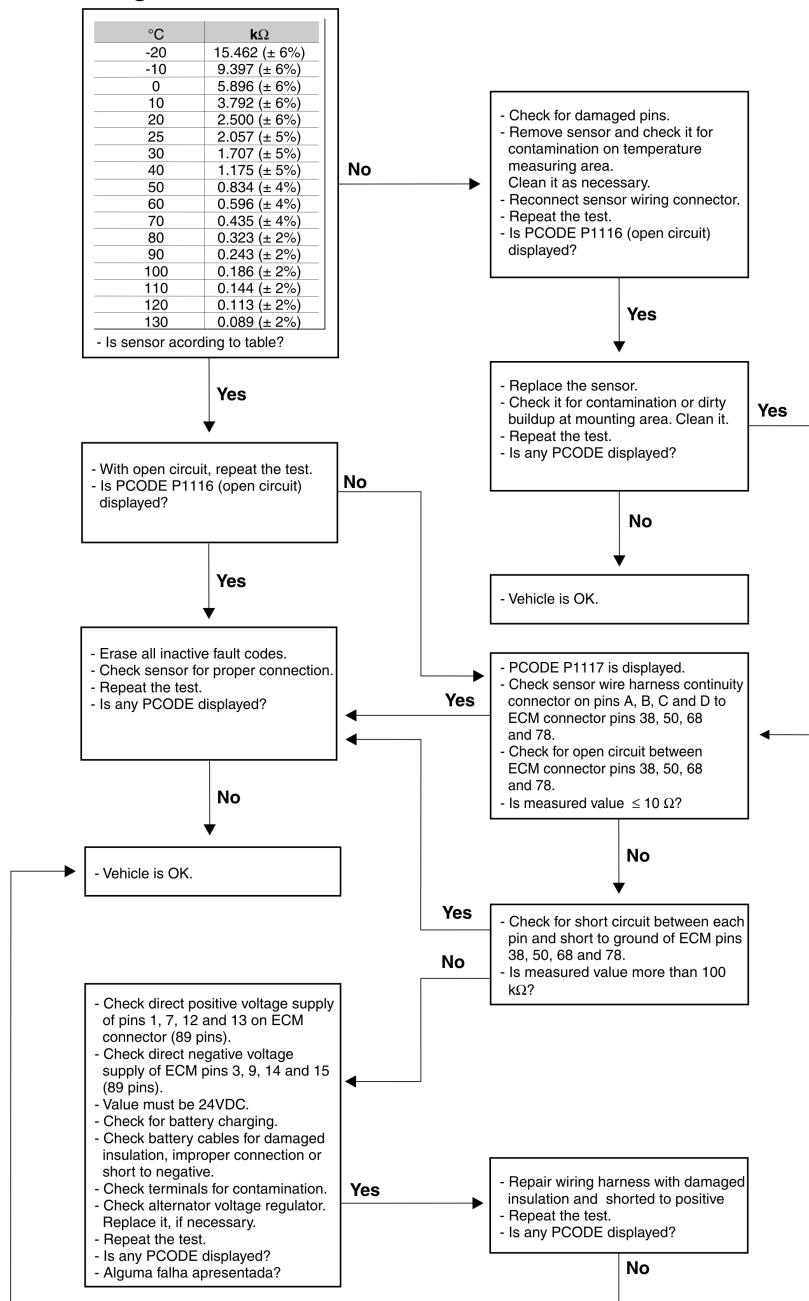
Possibly the circuit or coolant level sensor is in an open circuit condition, with no connection to ECM. Check it for a probable improper connection on wire harness connector and sensor. Check sensor for contamination signs. Clean it as necessary.

Strategy

Low level	Yellow light turns ON - Reduces by 20%.
Sensor failure	Red light blinks - Reduces by 80 %.

ECM uses this signal as an engine protection element.



Troubleshooting Routine

Cause

Engine coolant temperature exceeded engine protection limit.

Details

A engine coolant temperature is above the value programmed for engine protection (105°C). This code may have been generated by actual engine running conditions or due a sensor reading error or defective wire harness.

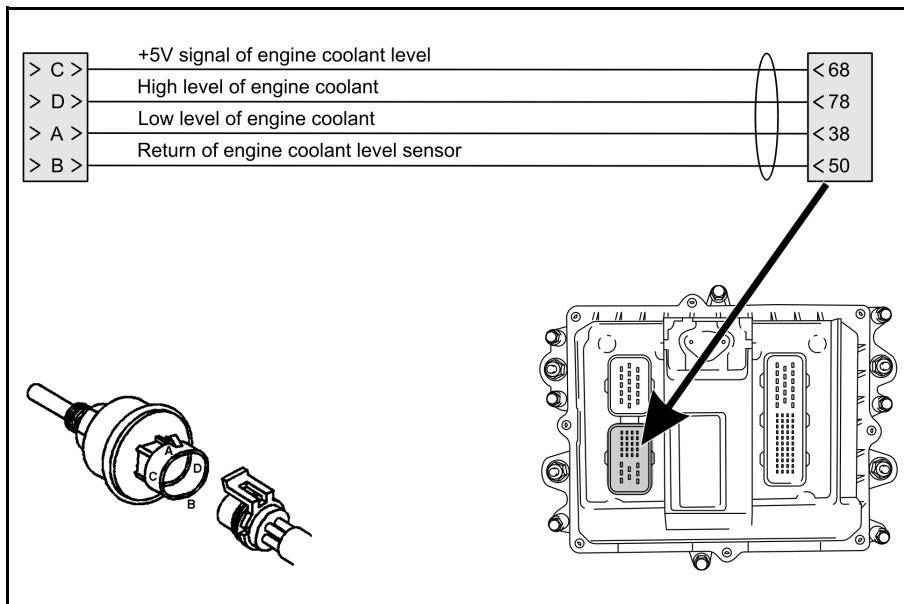
Before starting the test, check sensor for signs of contamination.

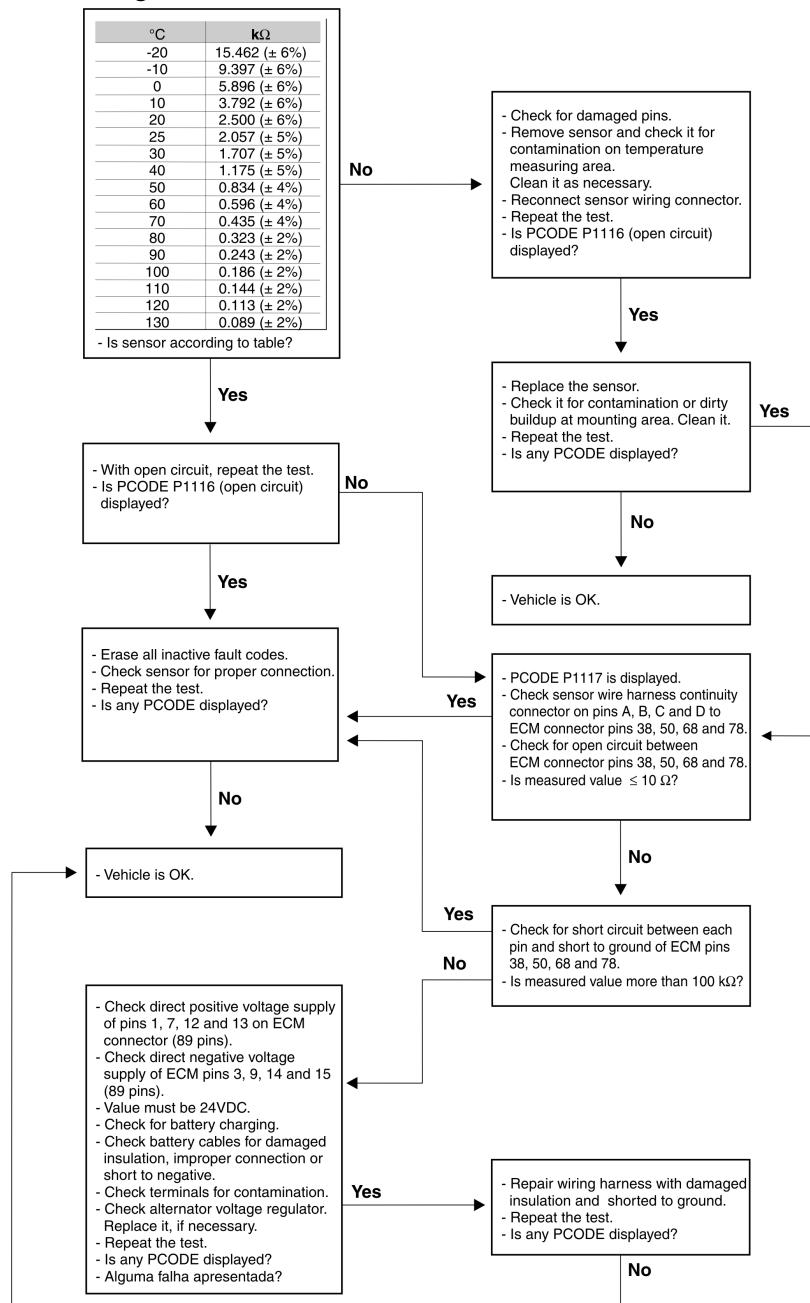
Strategy

Above 100 °C	Yellow light turns ON
Above 105 °C	Engine power is reduced by 50%
Above 115 °C	Engine power is reduced by 100%

The module uses this signal to select:

- Cold or hot start strategies;
- Correct injection timing;
- Correct start of injection angle.



Troubleshooting Routine

Cause

High voltage on engine coolant level sensor.

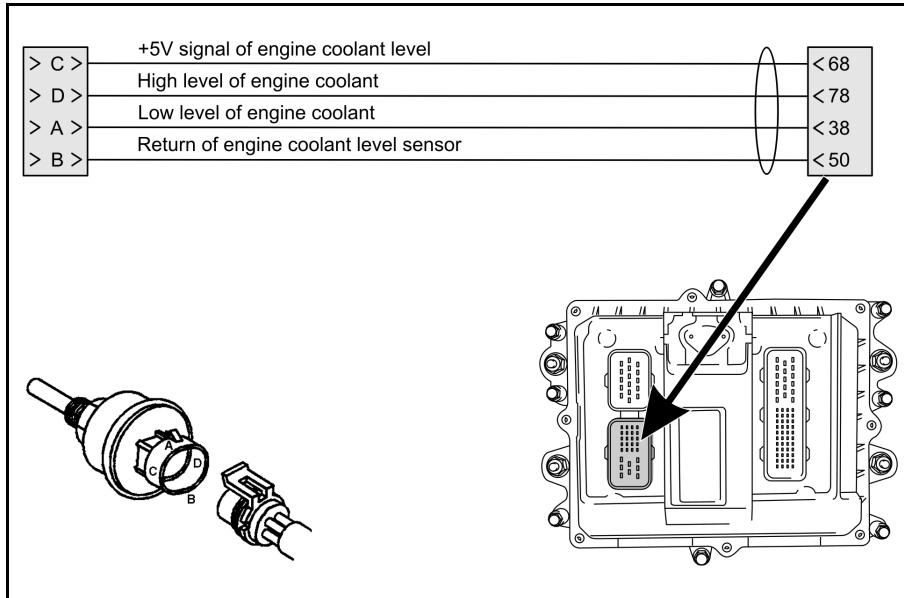
Details

A high voltage signal on engine coolant level sensor. There is possibly a biased or sensor's resistance or short-circuits on wire harness.

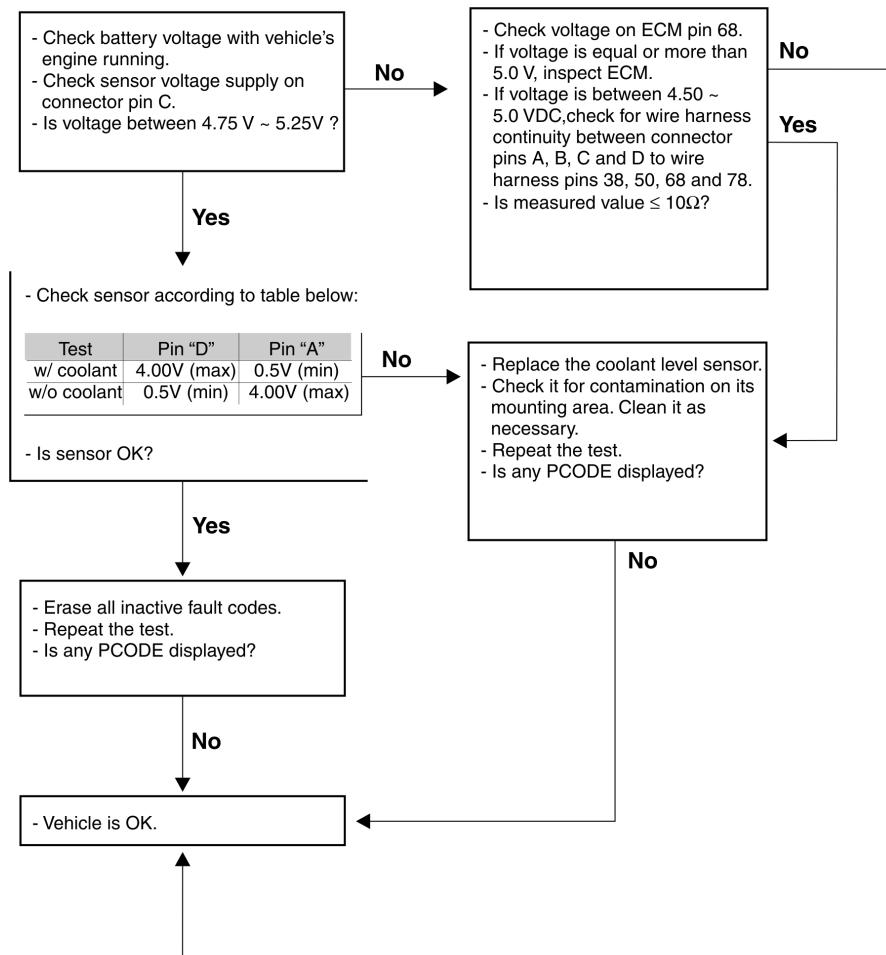
Before inspection, clean the sensor up and check for usage of anti-freezing additive on engine coolant. Check for changing on signal while shaking the wire harness connector on sensor.

Strategy

Low level	Yellow light turns ON - Reduces by 20%.
Sensor failure	Red light blinks - Reduces by 80 %. ECM uses this signal as an engine protection element.



Troubleshooting Routine



Cause

Signal from engine coolant level sensor is implausible.

Details

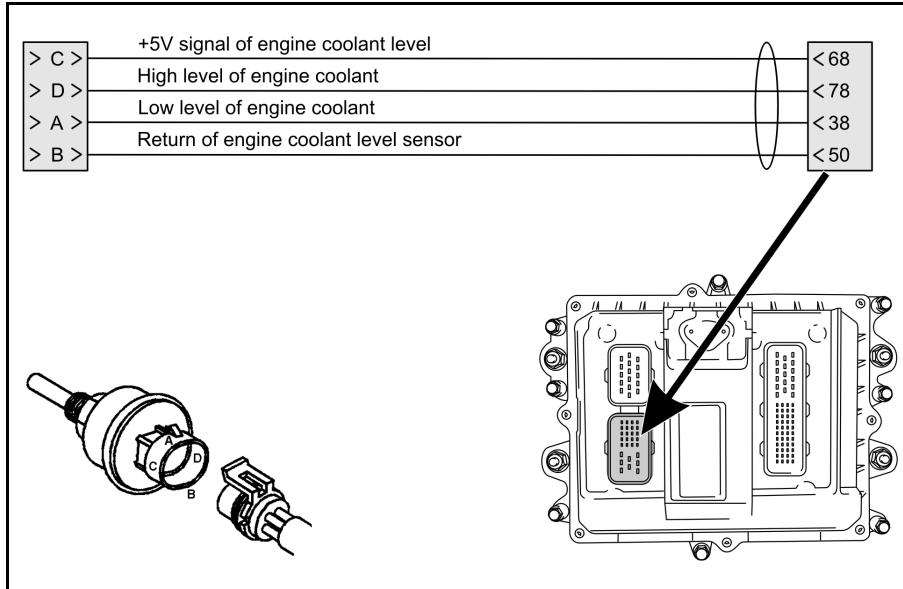
ECM has detected a signal difference that is not compatible with minimum values on testing table at one of sensor pins, or an identical voltage on both sensor pins.

Before starting inspection, clean the sensor up and check usage of anti-freezing additive on engine coolant.

Check the wire harness between connector and sensor for damage.

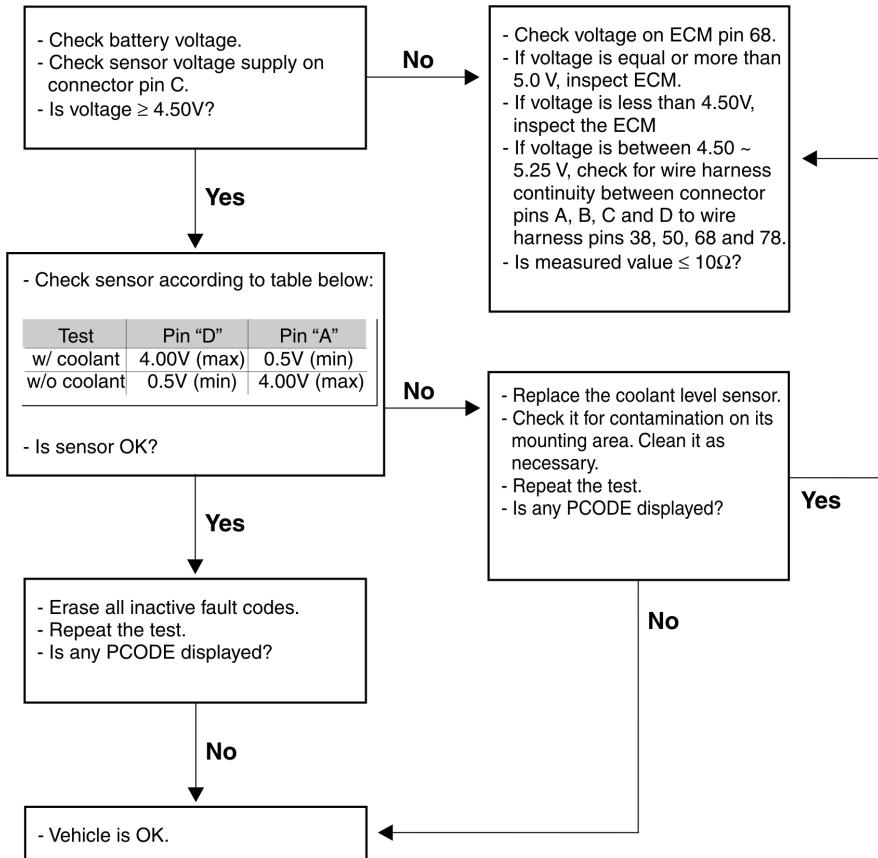
Strategy

Low level	Yellow light turns ON - Reduces by 20%.
Sensor failure	Red light blinks - Reduces by 80 %.
ECM uses this signal as an engine protection element.	



Engine Coolant Level Sensor

Troubleshooting Routine



Cause

Low voltage supply on accelerator position sensor.

Details

A voltage supply inferior to 4.75 volts was detected on accelerator pedal sensor.

This voltage could be caused by an internal problem on ECM or a probable short-circuit to battery negative.

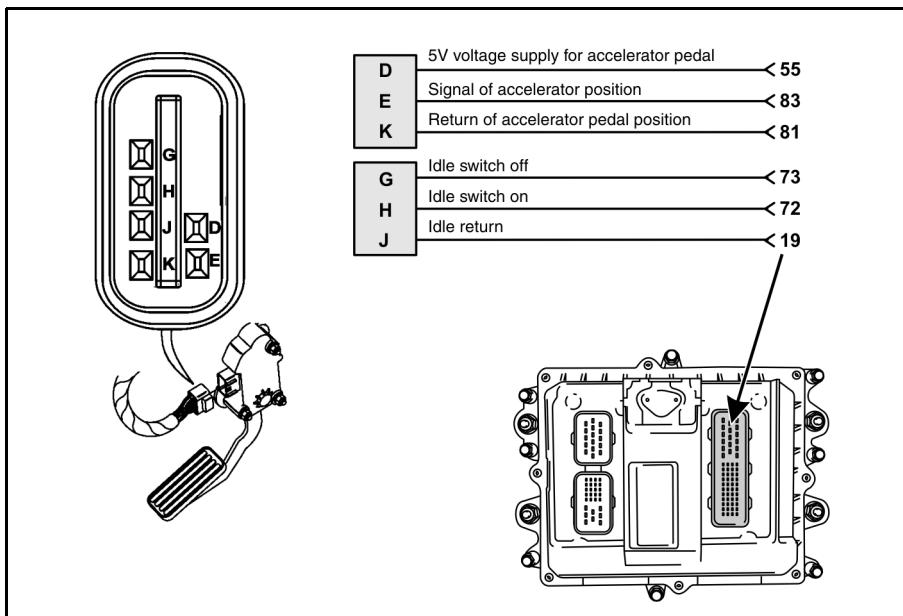
Check for short-circuits to battery negative (ground).

Strategy

If this signal is missing, engine speed will be fixed in 1200 rpm

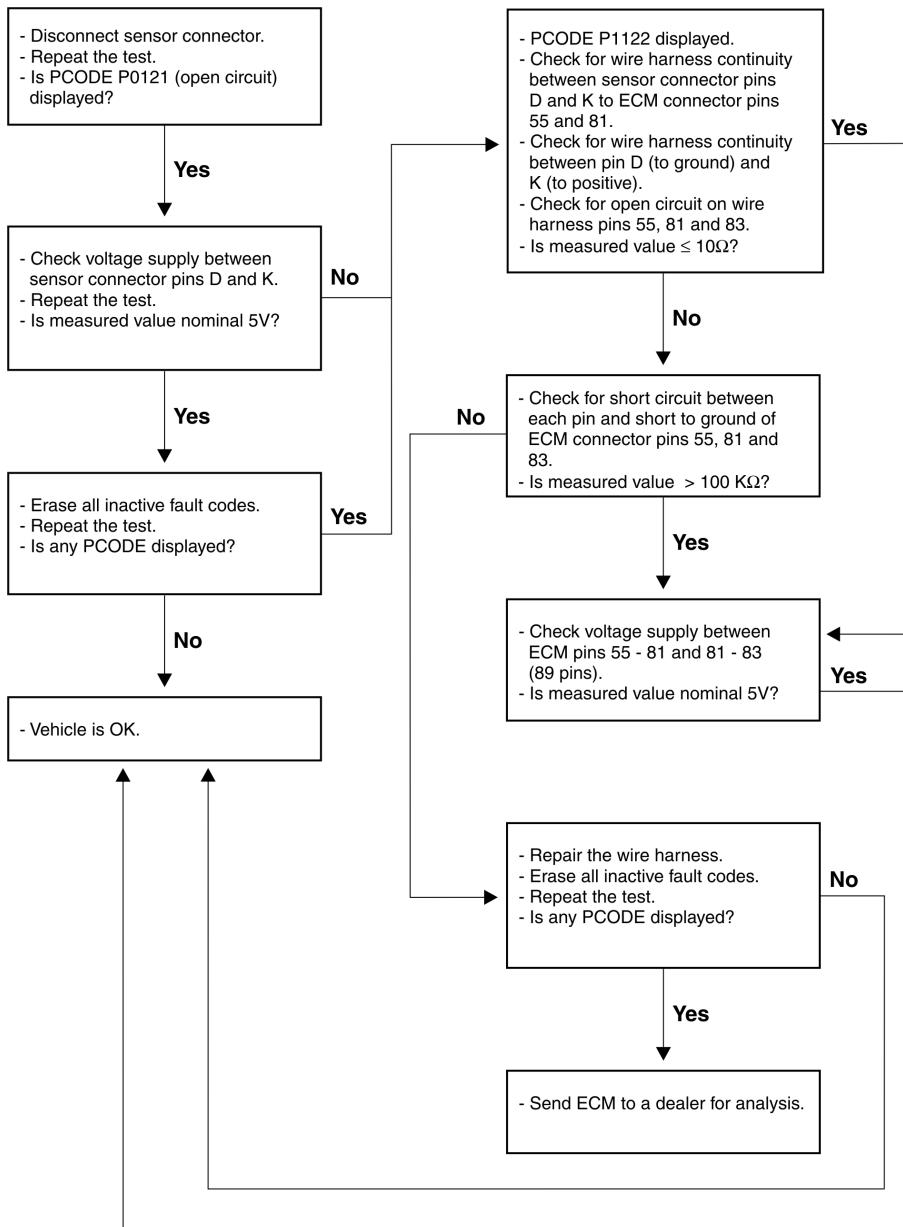
Yellow light is turned ON

- ECM uses this signal for to validate idle speed and to change rpm according to driver's request.



Accelerator Pedal Sensor

Troubleshooting Routine



Cause

Voltage supply high on accelerator position sensor

Details

A voltage supply superior to 5.25 volts was detected on accelerator pedal sensor. This voltage could be caused by an internal problem on ECM or a probable short-circuit to battery positive.

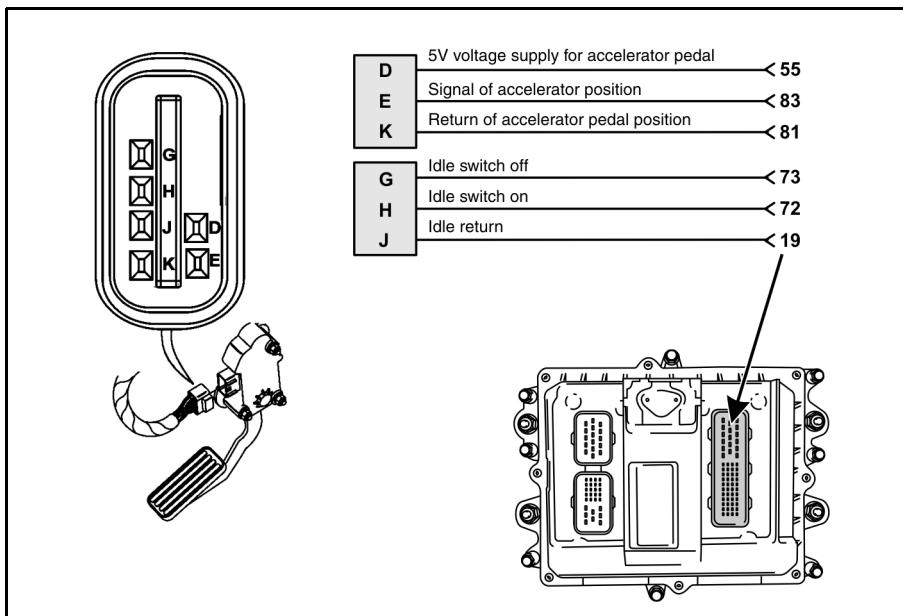
Check for short-circuits to battery positive.

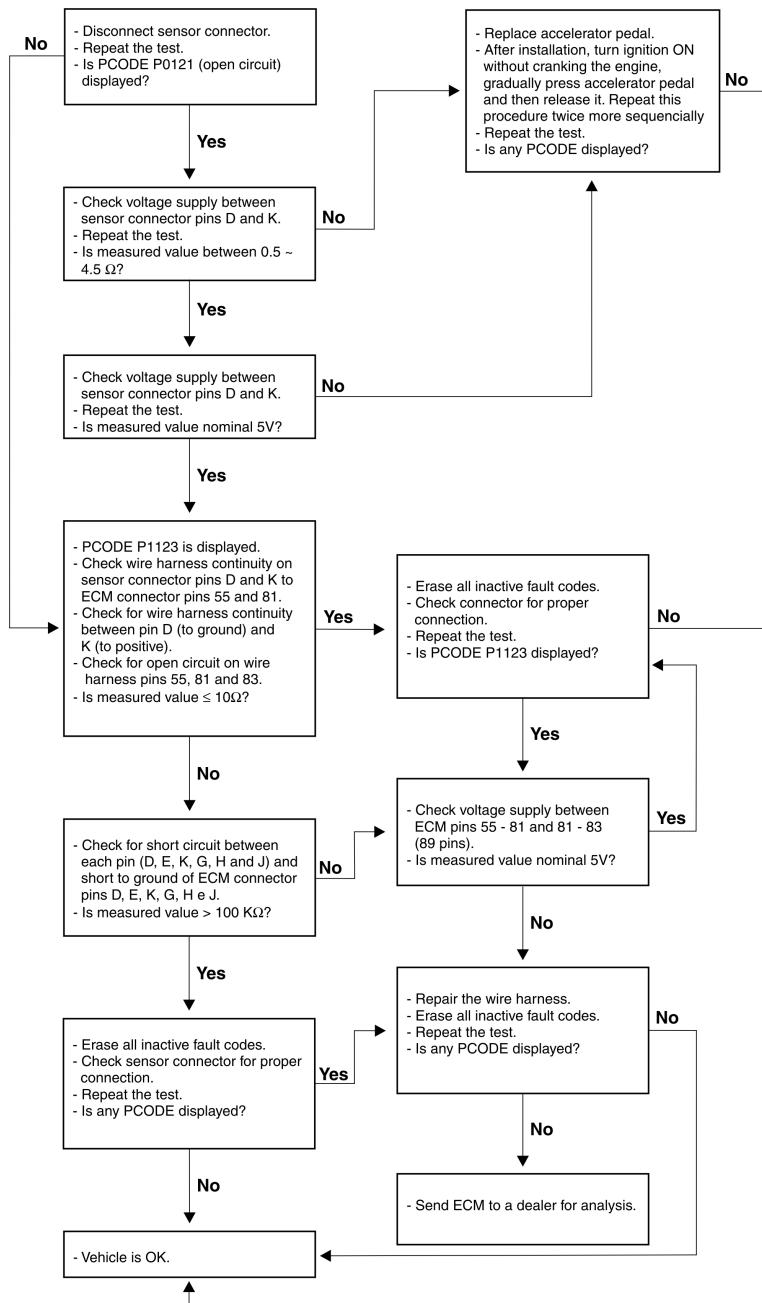
Strategy

If this signal is missing, engine speed will be fixed in 1200 rpm.

Yellow light is turned ON.

- ECM uses this signal for to validate idle speed and to change rpm according to driver's request.



Troubleshooting Routine

Cause

Pressure on fuel line significantly higher than fuel pressure command

Details

A voltage value (proportional to pressure) from Rail pressure sensor without correspondence with the command sent by ECM was detected.

ECM sent a pressure command, monitored the answer and sensed that pressure was above the commanded value.

It is possible that fuel electronic control actuator has a mechanical problem or a voltage supply failure.

As this sensor is Rail built-in, erase all active fault codes and inspect it again using the Diagnosis Tool.

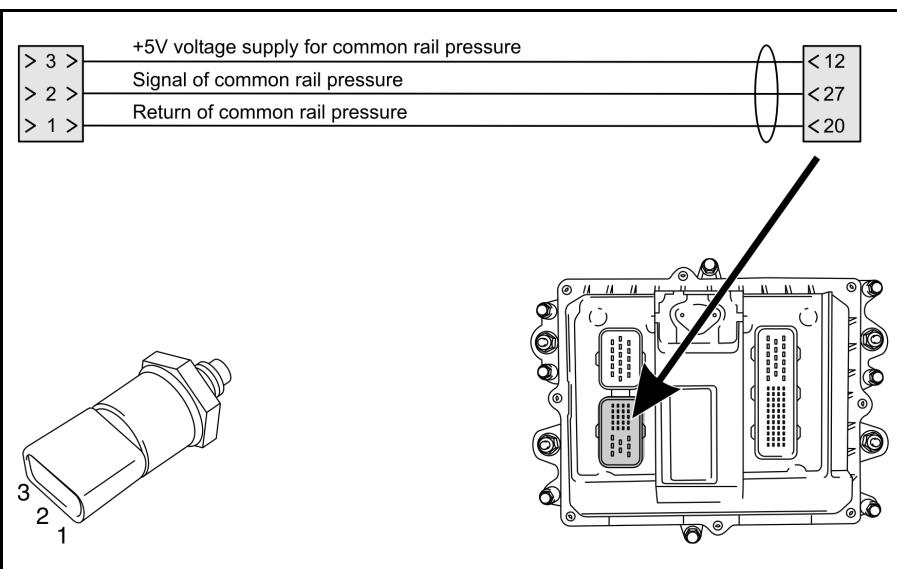
Strategy

Sensor is defective or pressure value exceeds 1485 bar.

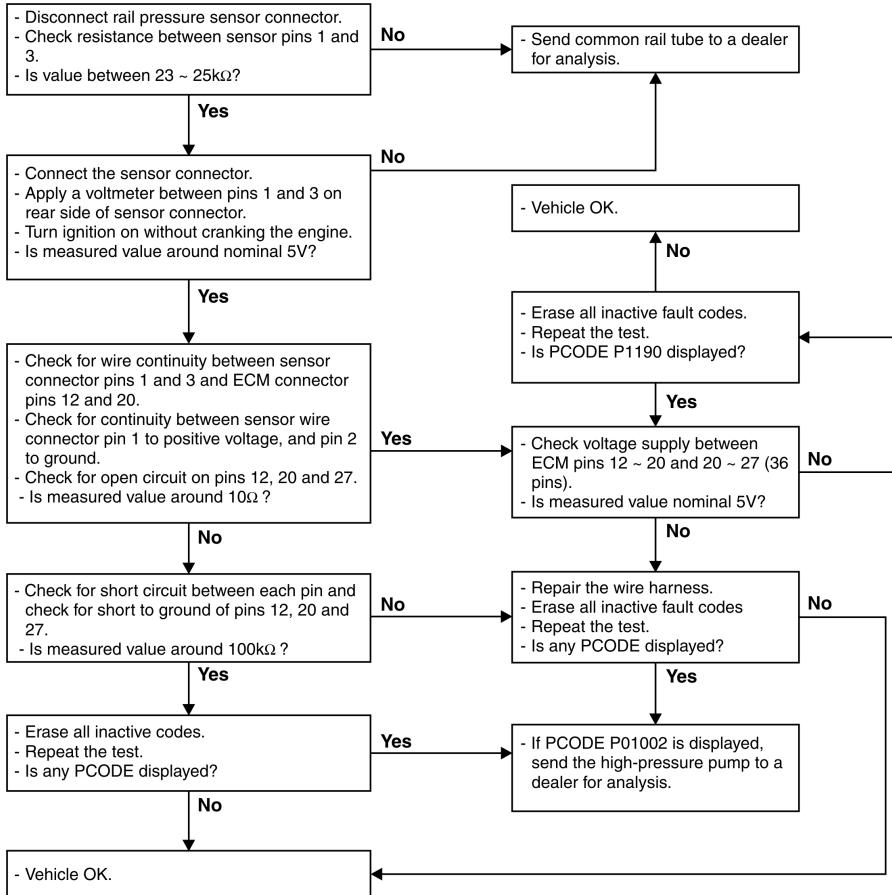
Red light turns ON Engine power is reduced below 80%

Fuel pump return will open Rail pressure will be reduced to 80 bar.

ECM uses this signal for calculation of fuel injection volume and as a safety element for the system.



Troubleshooting Routine:



Cause

Low voltage supply on fuel pressure sensor

Details

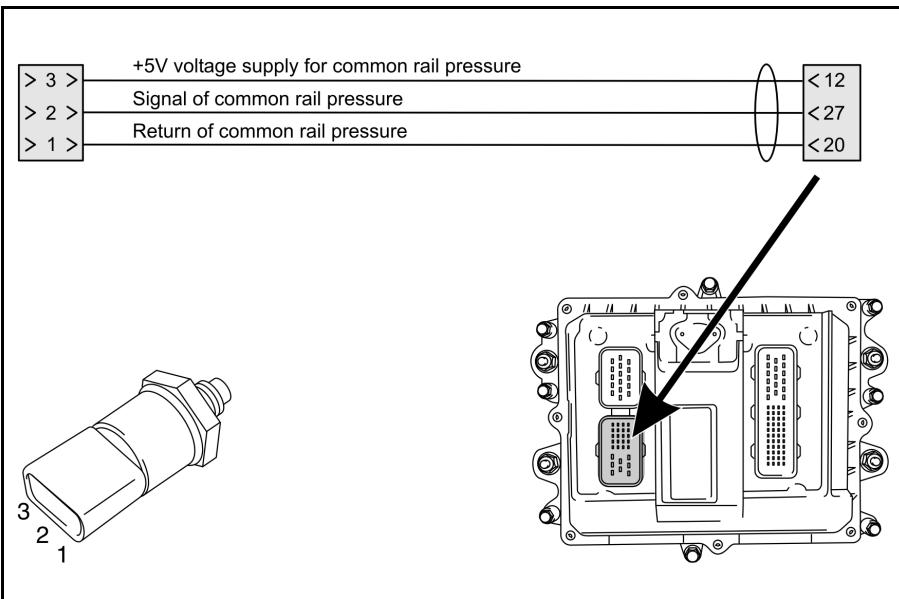
A voltage supply inferior to 4.5 volts was detected on sensor. This voltage may be consequence of an ECM internal problem or a probable short-circuit to battery negative (ground).

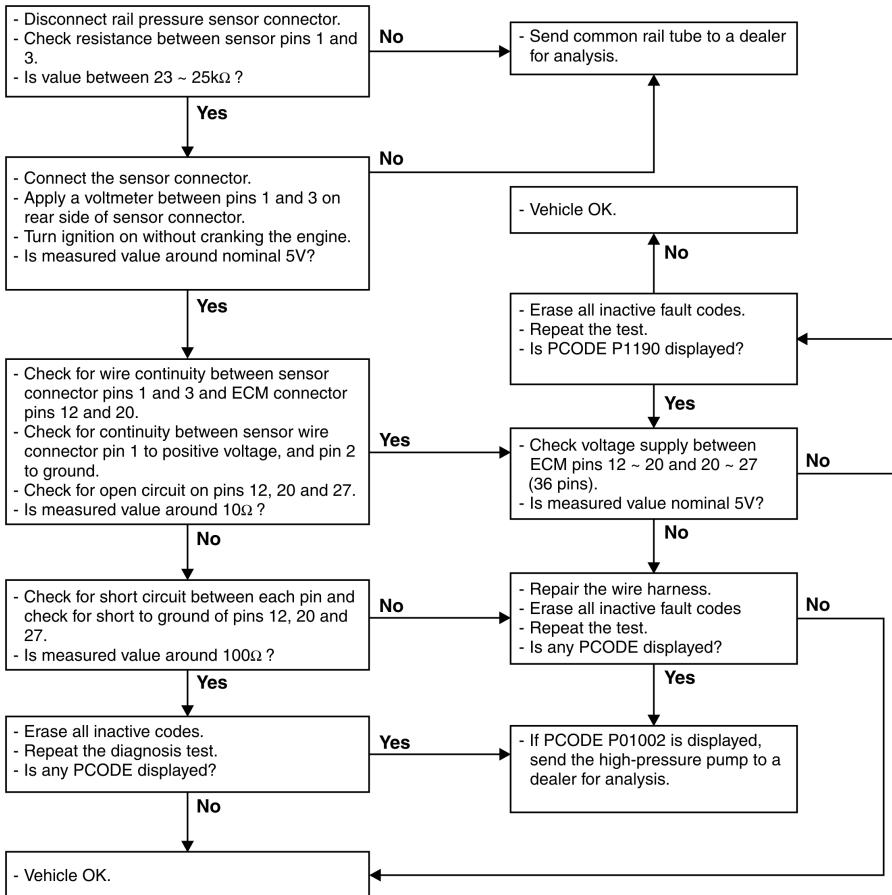
Check for short-circuits to battery negative (ground). Then, erase all active fault codes and start vehicle's engine again. If failure persists, proceed according to Troubleshooting Routine.

Strategy

Sensor is defective or pressure value exceeds 1485 bar.

Red light turns ON	Engine power is reduced below 80%
Fuel pump return will open	Rail pressure will be reduced to 80 bar.
ECM uses this signal for calculation of fuel injection volume and as a safety element for the system.	



Troubleshooting Routine

Cause

Voltage supply high on fuel pressure sensor.

Details

A voltage supply superior to 5.5 volts was detected on rail sensor.

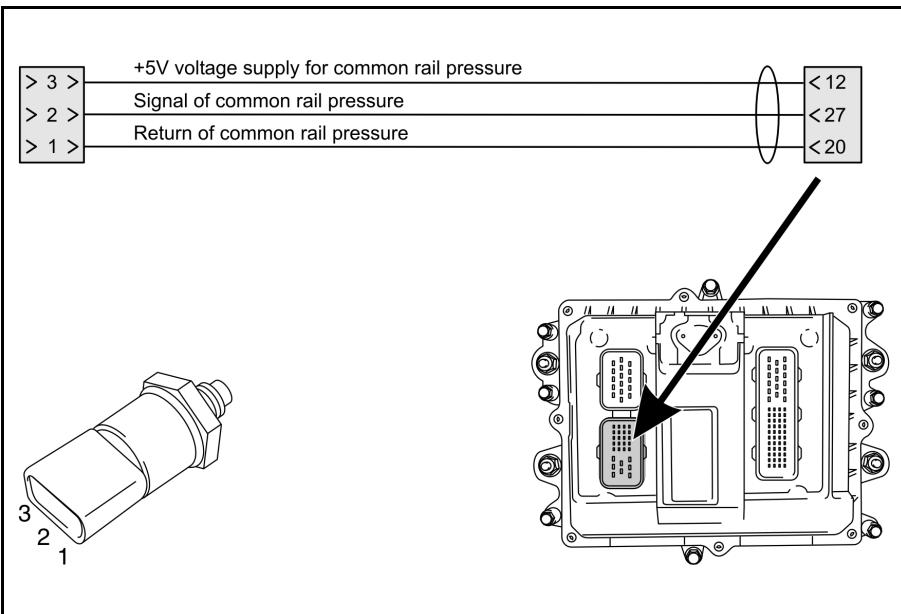
This voltage may be consequence of a module's internal problem or a possible short-circuit to battery positive.

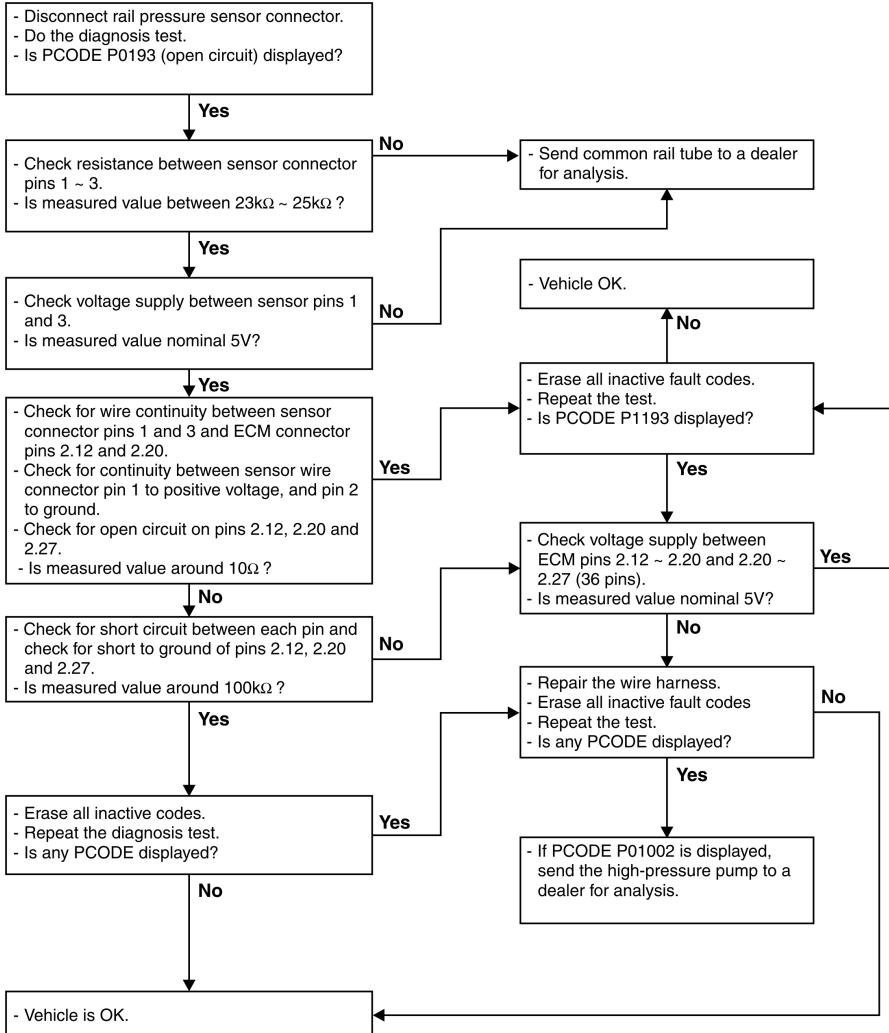
Check for short-circuits to battery positive.

Strategy

Defective sensor or pressure value exceeds 1485 bar.

Red light turns ON	Engine power is reduced below 80%
Fuel pump return will open	Rail pressure will be reduced to 80 bar.
ECM uses this signal for calculation of fuel injection volume and as a safety element for the system.	



Roteiro para Localização e Solução de Falhas

Cause

Pressure on fuel line is significantly lower than fuel pressure command.

Details

A voltage value (proportional to pressure) was detected on Rail pressure sensor without correspondence with command sent by ECM.

ECM sent a pressure command, monitored the answer and sensed that pressure is not achieving the value of the command that was sent.

It is possible that fuel electronic control actuator is having a mechanical problem or there is a leakage through safety valve that was impossible to detect. Inspect safety valve and fuel electronic control actuator and check for tampering signs. Check wire harness connector for proper connection to actuator. Measure the voltage on pin 3 of fuel pressure sensor and on pin 12 of ECM 36 pins connector (4.75 ~ 5.25 V).

As this sensor is Rail built-in, erase all active fault codes and redo test procedures using the Diagnosis Tool.

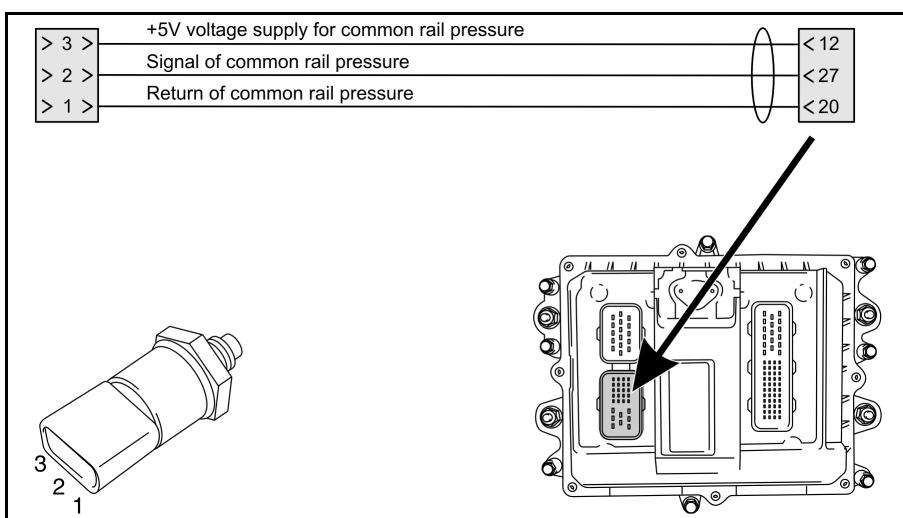
Strategy

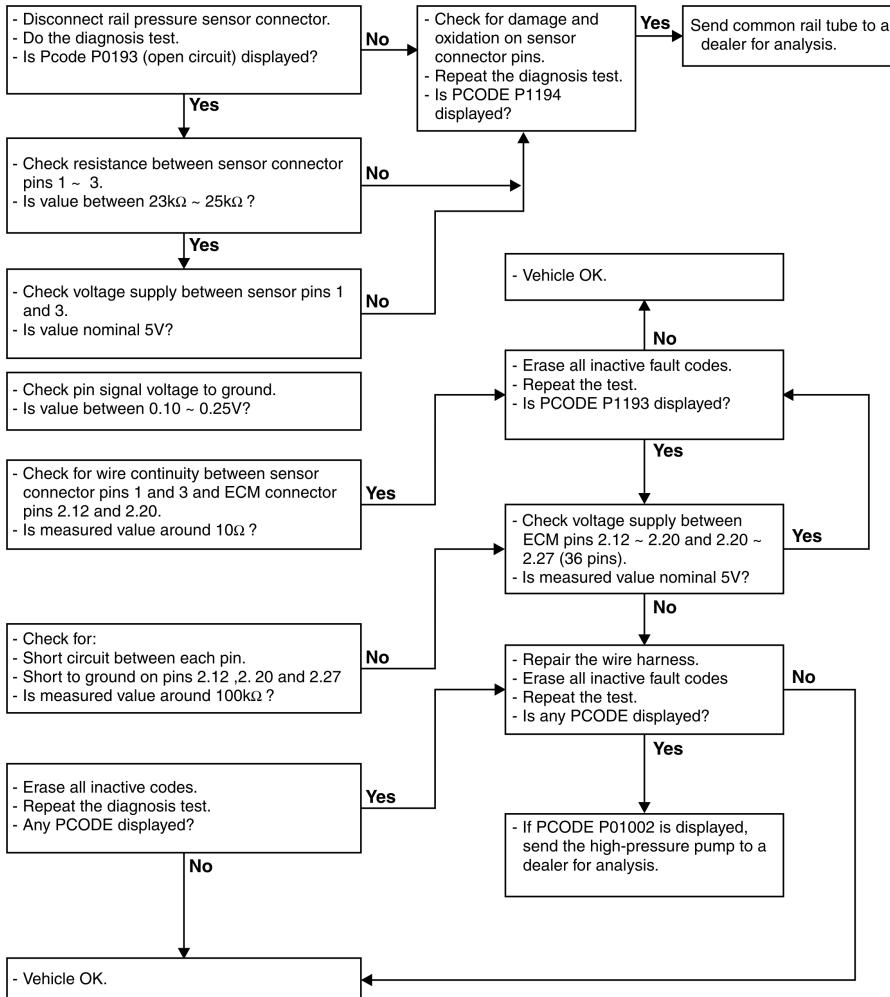
Sensor is defective or pressure value exceeds 1485 bar.

Red light turns ON Engine power is reduced below 80%

Fuel pump return will open Rail pressure will be reduced to 80 bar.

ECM uses this signal for calculation of fuel injection volume and as a safety element for the system.



Troubleshooting Routine

Cause

Failure on monitoring signal from injector #1

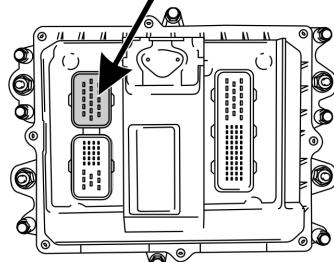
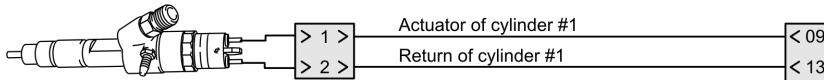
Details

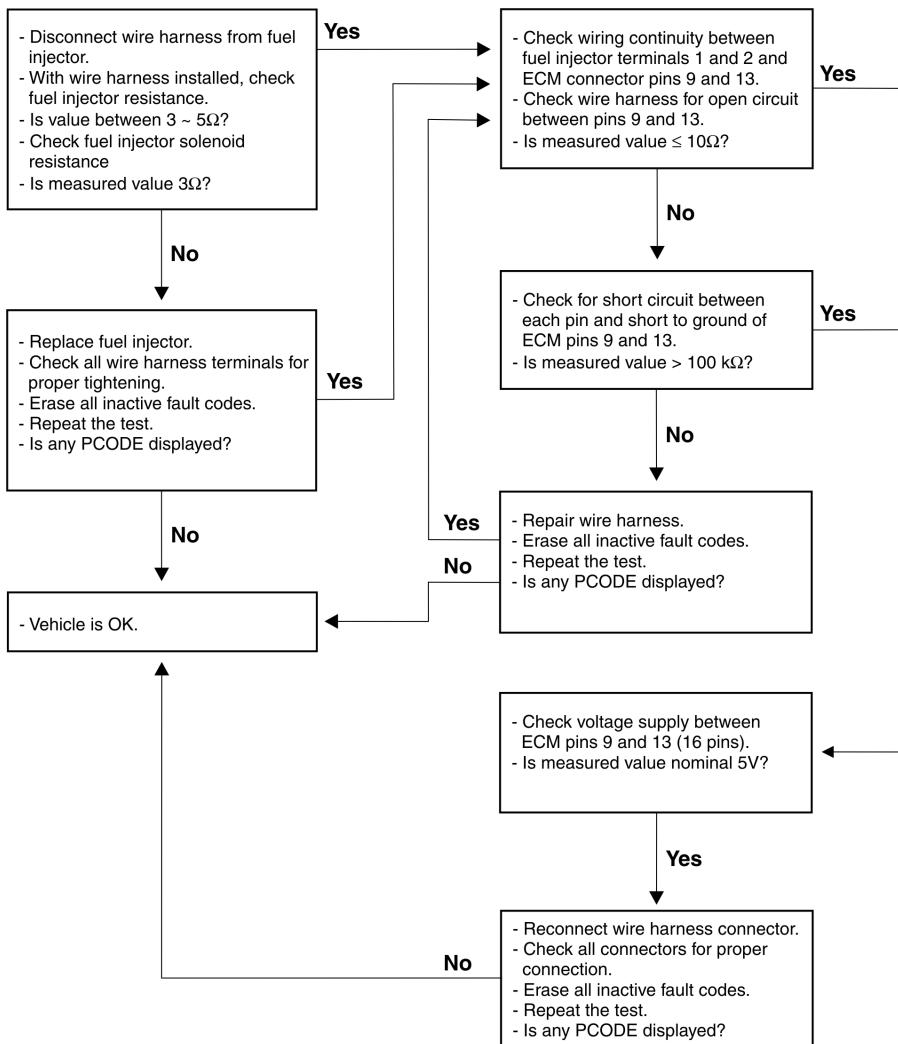
Possibly the circuit or solenoid from fuel injector cylinder #1 presents a biased resistance value. Voltage drop on solenoid activation does not correspond to values programmed on ECM.

Strategy

Failure on monitoring injector	Red light turns ON. Engine power is reduced by 80%.
• ECM uses this signal for to check injectors' activation.	

ECM pins for 4 & 6 cylinders engine



Troubleshooting Routine

Cause

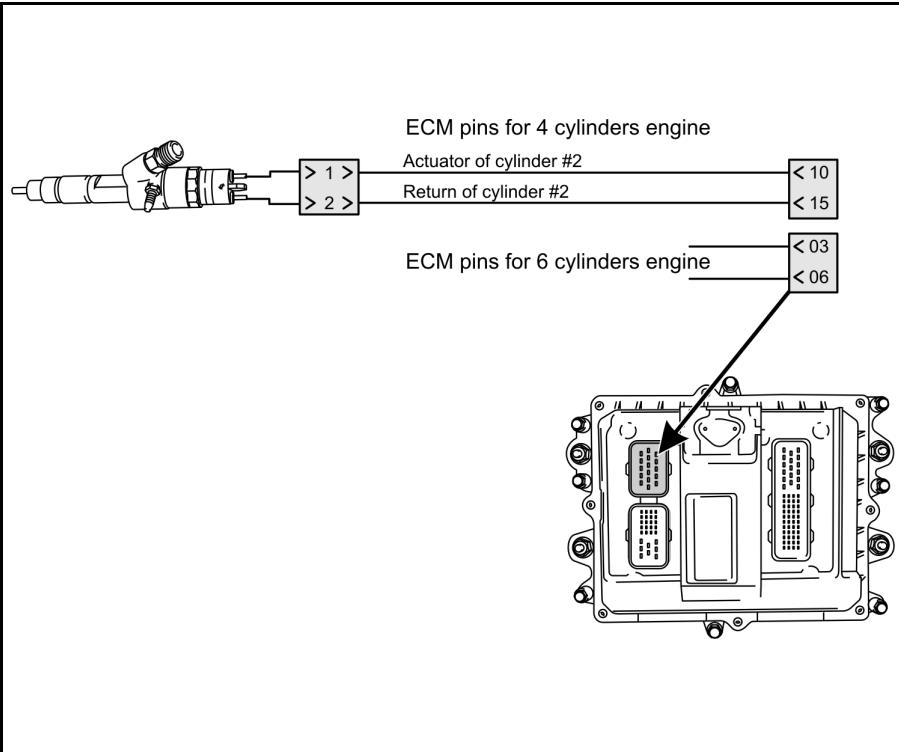
Failure on monitoring injector #2.

Details

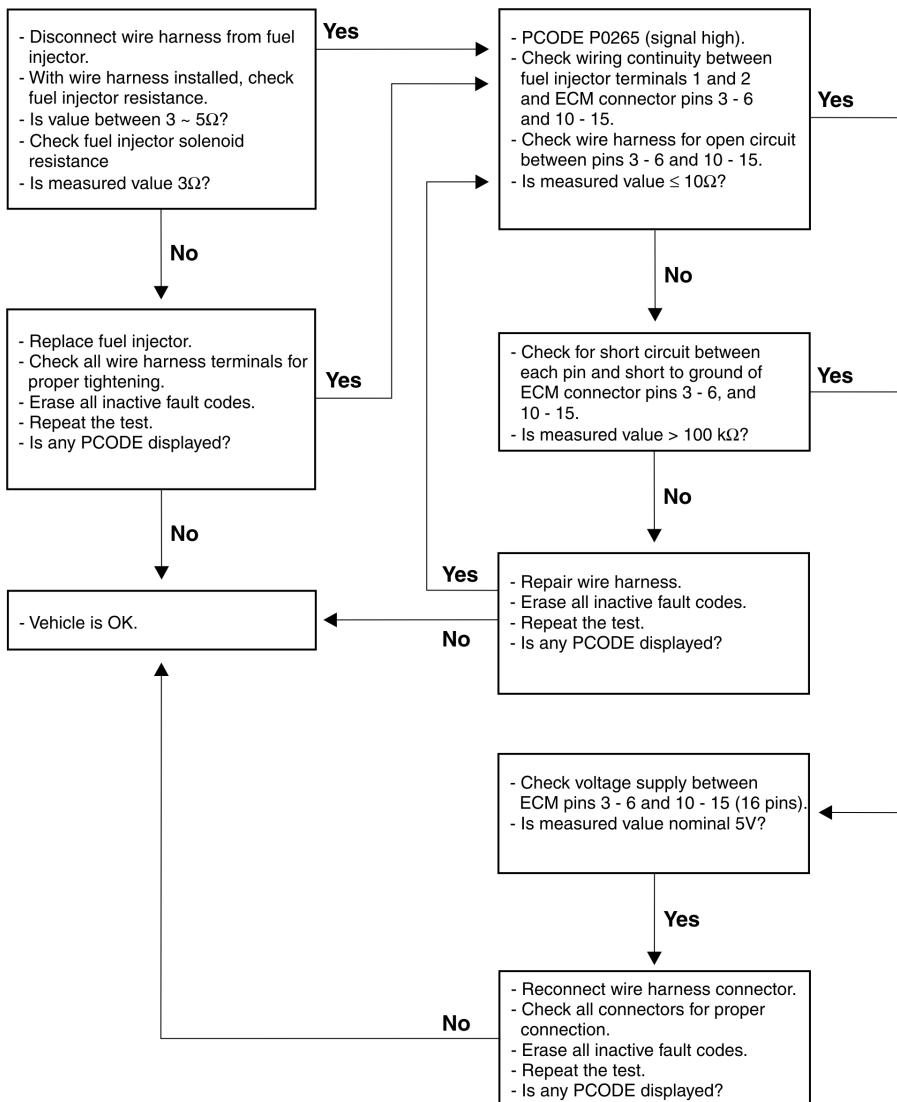
Possibly the circuit or solenoid from fuel injector #2 presents a biased resistance value. Voltage drop on solenoid activation does not correspond to values programmed on ECM.

Strategy

Failure on monitoring injector	Red light turns ON. Engine power is reduced by 80%.
• ECM uses this signal for to check injectors' activation.	



Troubleshooting Routine



Cause

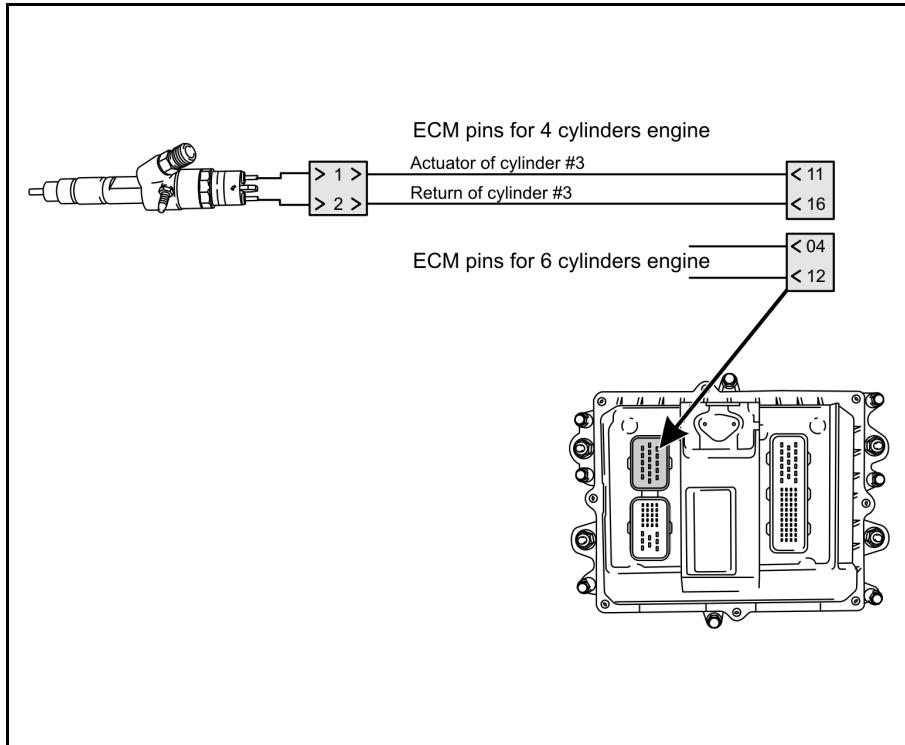
Failure on monitoring injector #3.

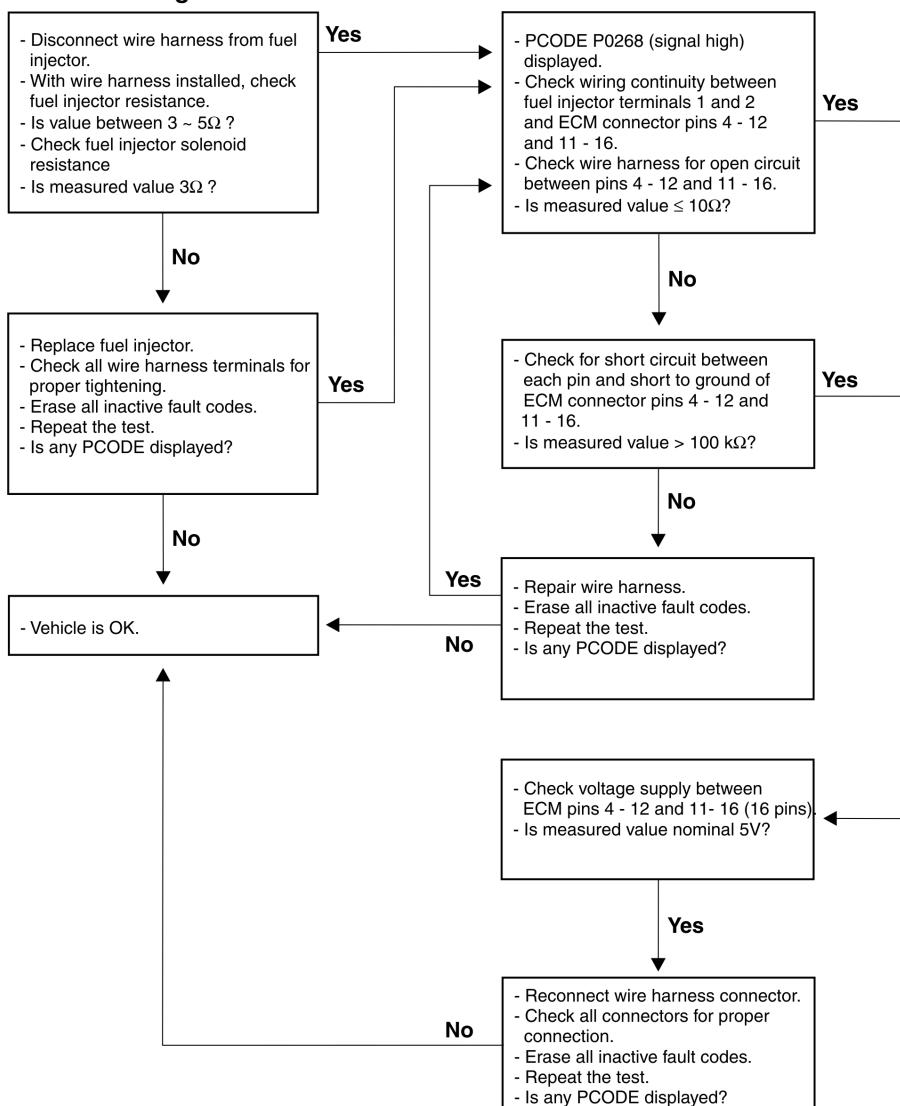
Details

Possibly the circuit or solenoid from fuel injector #3 presents a biased resistance value. Voltage drop on solenoid activation does not correspond to values programmed on ECM.

Strategy

Failure on monitoring injector	Red light turns ON. Engine power is reduced by 80%.
• ECM uses this signal for to check injectors' activation..	



Troubleshooting Routine

Cause

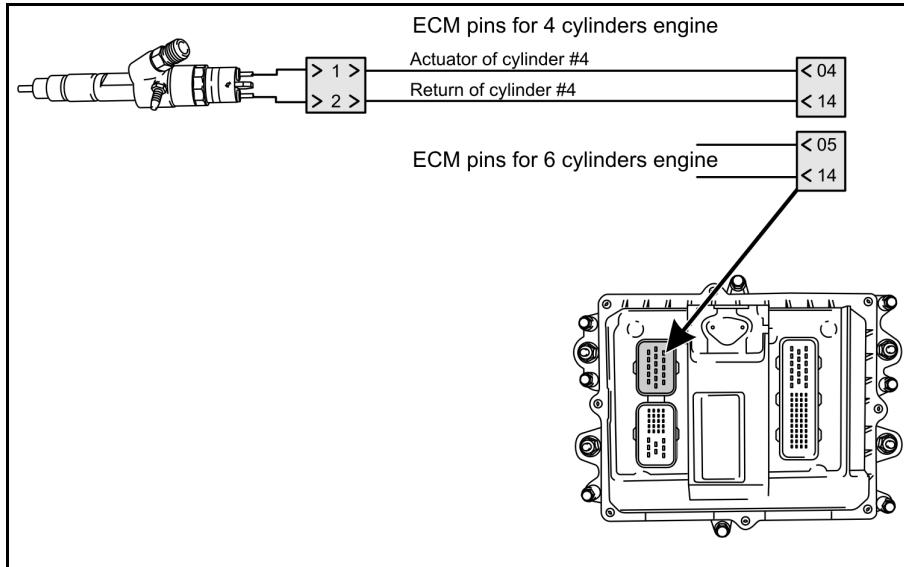
Failure on monitoring injector #4.

Details

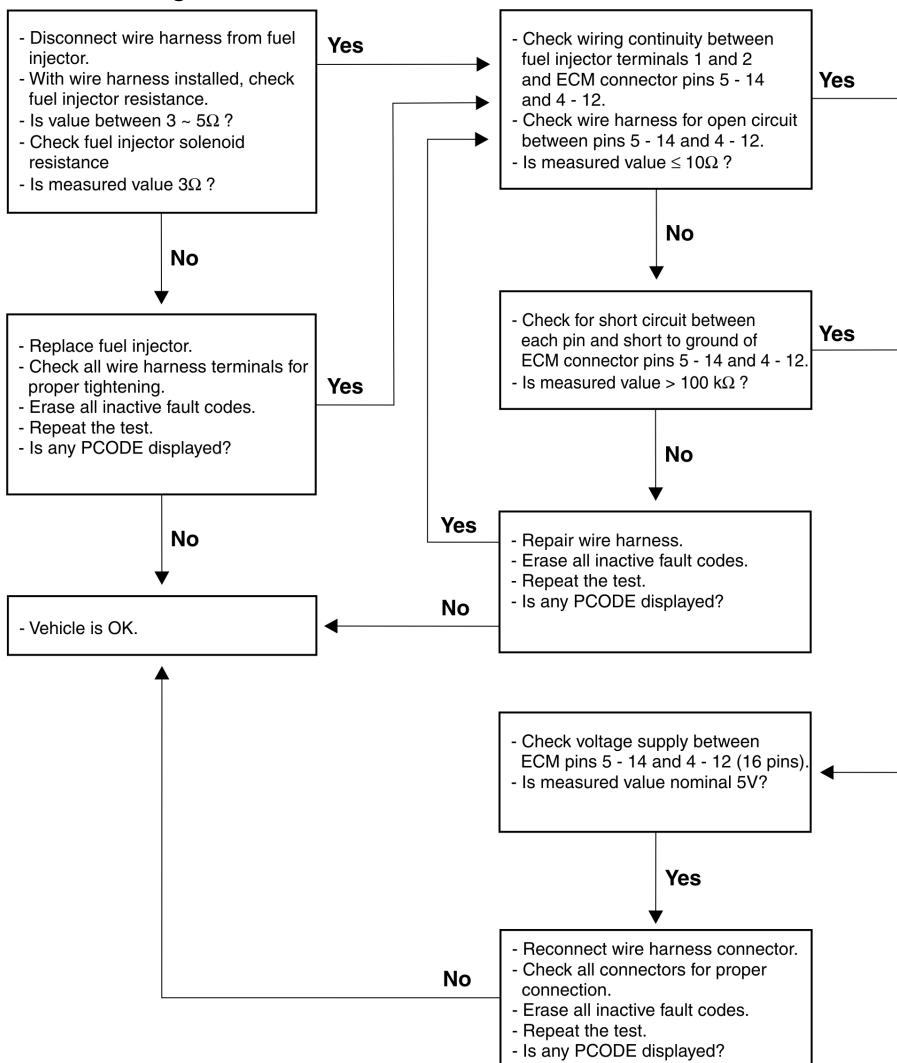
Possibly the circuit or solenoid from fuel injector #4 presents a biased resistance value. Voltage drop on solenoid activation does not correspond to values programmed on ECM.

Strategy

Failure on monitoring injector	Red light turns ON. Engine power is reduced by 80%.
• ECM uses this signal for to check injectors' activation.	



Troubleshooting Routine



Cause

Failure on monitoring injector #5.

Details

Possibly the circuit or solenoid from fuel injector #5 presents a biased resistance value. Voltage drop on solenoid activation does not correspond to values programmed on ECM.

Strategy

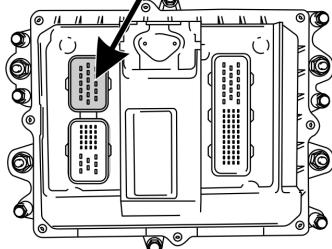
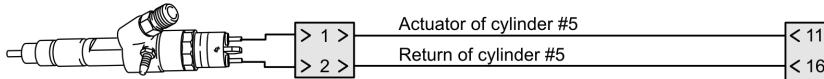
Failure on monitoring injector #5.

Red light turns ON.

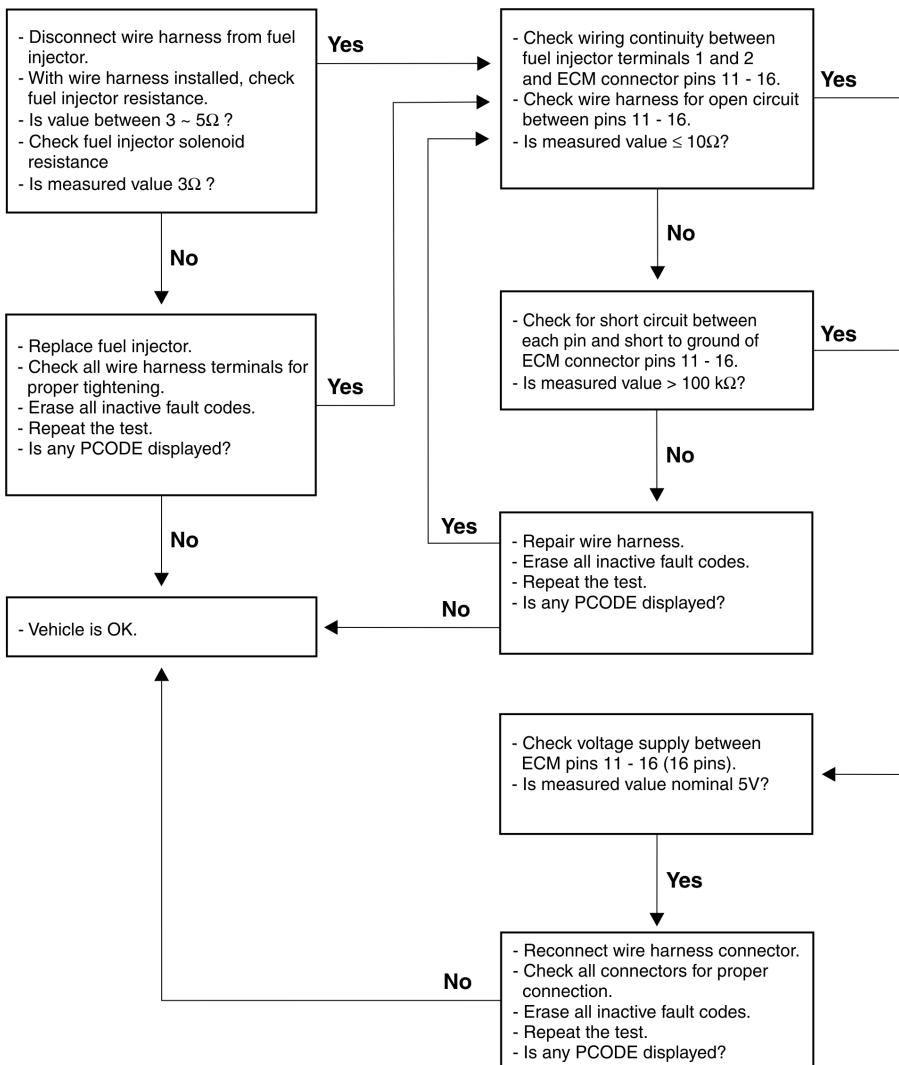
Engine power is reduced by 80%.

- ECM uses this signal for to check injectors' activation.

ECM pins for 4 & 6 cylinders engine



Troubleshooting Routine



Cause

Failure on monitoring injector #6.

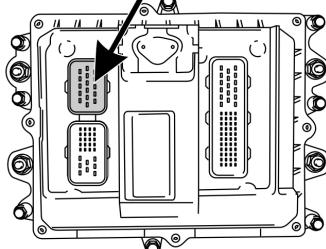
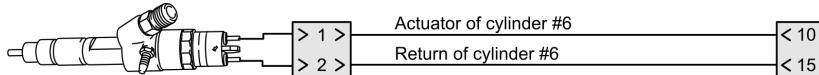
Details

Possibly the circuit or solenoid from fuel injector #6 presents a biased resistance value. Voltage drop on solenoid activation does not correspond to values programmed on ECM.

Strategy

Failure on monitoring injector	Red light turns ON. Engine power is reduced by 80%.
<ul style="list-style-type: none">ECM uses this signal for to check injectors' activation.	

ECM pins for 4 & 6 cylinders engine



Troubleshooting Routine