P1712

Fault code description

NOx sensor before catalyst - Data valid but too low

Possible cause

1. Faulty NOx sensor (F844)
2. Leakage in EGR system
3. Blockage in EGR system
4. Leakage in intake air system
5. Blockage in intake air system
6. Leakage in exhaust system
7. Blockage in exhaust system
8. Failure in fuel system
9. Faulty boost pressure sensor
10. Faulty EGR differential pressure sensor (F751)
11. Faulty humidity sensor (F852)
12. Incorrect type of fuel used

Additional information

Monitoring of the difference between the NOx sensor signal and the NOx model

Set condition of fault code

The PMCI-2 detects a difference between the measured NOx and the NOx model.

Reset condition of fault code

This fault code will change to inactive immediately after the diagnostic runs and passes.

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P1712, Diagnostic information

Technical data

"Sensor, NOx before catalyst (F844)"

"Humidity sensor (F852)"

"EGR differential pressure sensor (F751)"

Location of component(s)

"Location information, PMCI-2"

Electrical diagram(s)

"PMCI-2"

Description of component(s)

"Sensor, NOx before catalyst (F844)"

"Humidity sensor (F852)"

"EGR differential pressure sensor (F751)"

Block diagram

"PMCI-2"

Step by step troubleshooting

Please perform the troubleshooting steps below by utilising the breakout harness if necessary to check electrical components such as sensors, electrical control units or harnesses. Back probing is not recommended as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to electrical components.

- This troubleshooting tree is based on the assumption that supply power and earth to the PMCI are functioning properly.
- Disconnecting the PMCI connectors during the troubleshooting process will result in multiple errors.

- For specific electrical component information and pin out locations, always refer to the technical data in Rapido.
- It is necessary to exit the 'active errors' screen in DAVIE and run the diagnostic test again to identify a change in errors.
- Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive codes. Refer to the 'possible causes' section in Rapido.

Step by step 1: Pressure sensors

Step 1A: Check pressure sensors

Troubleshooting steps

1. Turn the key switch ON.
2. Use DAVIE to check all engine pressure sensors.
   - Sensors should be close to ambient with the engine off and at room temperature.
   - Differential pressure should be close to 0.

Were any issues found?

- Yes – Repair/replace as needed. Proceed to step 2A.
- No – Proceed to step 2A

Step by step 2: Check the NOx sensor before catalyst

Step 2A: Check for physical damage

Troubleshooting steps

1. Turn the key switch OFF.
2. Disconnect the NOx before catalyst

sensor from the harness.

3. Inspect the NOx before catalyst sensor harness and connector for:
   - Corroded or dirty pins
   - Damaged pins
   - Pushed back or expanded pins
   - Loose connector
   - Moisture in or on the connector
   - Connector shell damage
   - Missing or damaged connector seals
   - Wire insulation damage
4. Remove the NOx sensor before catalyst.
5. Inspect the NOx sensor before catalyst sensor tip for corrosion, blockages and/or physical damage.

Was any damage found?

- Yes – Repair the damage as needed. Do not replace the sensor if it is only coated with soot. Proceed to step 6A to confirm the repair. If the fault recurs then proceed to step 2B.
- No – Proceed to step 2B.

Step 2B: Check for sensor contamination

Troubleshooting steps

1. This test can be negatively affected by truck exhaust inside the shop. Before beginning this test, the truck must be moved outside or efforts must be made to vent the exhaust outside the shop.
2. Remove the NOx sensor before catalyst from the exhaust system, leaving it connected to the wiring harness.

   Lubricate the NOx sensor or plug threads with high-temperature lubricant to aid in sealing and removal. Install another NOx sensor or other plug into the NOx sensor

mounting hole. If using a plug, the mating thread is M20x1.5-6e and the total threaded length must not exceed ¾ inch. Ensure that the removed NOx sensor is not in contact with non-metallic parts as it will become hot during this procedure.

3. Initiate a stationary regeneration.
4. When the temperature before DOC reaches 200°C (392°F), abort the regeneration. Do not turn off the engine.
5. Use DAVIE to monitor the NOx sensor before catalyst.
6. It is normal for any of the following fault codes to be set during this test and they do not indicate a problem. If codes P3971, P3977 or P3978 are set they should be cleared before proceeding.

Is the oxygen concentration (O2 %) between 17 and 23 and the NOx concentration (NOx PPM) between -20 and 40?

- Yes – Reinstall the NOx sensor and proceed to Step 3A. Use caution during installation, the NOx sensor could be hot.
- No – Reinstall the NOx sensor and proceed to Step 2B. Use caution during installation, the NOx sensor could be hot.

Step 2B: NOx sensor before catalyst cleaning procedure

Troubleshooting steps

1. Connect DAVIE and monitor the BPV temperature.
2. Drive the truck until the engine reaches the operating temperature.
3. Drive the truck without a trailer or load at approximately 1100 RPM.
4. The BPV temperature should be approximately 300°C. Adjust the engine speed as necessary to maintain a temperature of at least 300°C. Note that

this may require engine speeds below 1100 RPM depending on the conditions.

5. Maintain the BPV Temperature of at least 300°C for at least 30 minutes to completely burn soot out of the sensor. It is acceptable for the temperature to temporarily fall below 300°C (for example while at a stop light), but the total time at 300°C must be greater than or equal to 30 minutes.
6. Repeat Step 2A, then answer the questions below.

Is the oxygen concentration (O2 %) between 17 and 23 and the NOx concentration (NOx PPM) between -20 and 40?

- Yes – Reinstall the NOx sensor and proceed to Step 3A. Use caution during installation, the NOx sensor could be hot.
- No – Replace the NOx before catalyst sensor. Proceed to step 6A to confirm the repair. If the fault recurs then return to step 3A. Use caution during installation, the NOx sensor could be hot.

Step by step 3: Check the EGR measurement system

Step 3A: Check the EGR temperature sensor (F749) for damage

Troubleshooting steps

1. Turn the key switch OFF.
2. Visually inspect the EGR temperature sensor (F749) for damage.

Is there visible damage to the EGR temperature sensor (F749)?

- Yes – Replace the EGR temperature sensor (F749). Proceed to Step 3B.
- No – Proceed to step 3B

Step 3B: Check for soot buildup in the EGR pressure difference sensor (F751)

Troubleshooting steps

1. Turn the key switch OFF.
2. Visually inspect the EGR pressure difference sensor (F751) for soot build-up.
3. Check for proper sealing between the EGR pressure difference sensor (F751) and the mounting block.
4. Check for proper sealing at the pipe fittings.

Is there soot build-up in the pipes or mounting block for the EGR pressure difference sensor (F751)?

- Yes – Clean out the soot build-up. Repair any leaking seals. Proceed to Step 3C.
- No – Proceed to step 3C

Step 3C: Check for soot build-up in the boost pressure sensor

Troubleshooting steps

1. Turn the key switch OFF.
2. Remove the boost pressure sensor.
3. Check for soot build-up in the boost pressure sensor orifice and the sensor port on the engine.

Is there soot build-up?

- Yes – If the port is clogged, remove the blockage. If the boost pressure sensor orifice is clogged and cannot be cleaned, replace the sensor. Proceed to Step 3D
- No – Proceed to step 3D

Step 3D: Check for corrosion and soot build-up in the EGR venturi

Troubleshooting steps

1. Turn the key switch OFF.
2. Measure any corrosion.
3. Check for soot build-up.

Is there more than 0.5 mm of corrosion

(about 1/32") or soot build-up inside the EGR venturi?

- Yes – If the venturi has more than 0.5 mm of corrosion, replace the venturi. If there is soot build-up, clean the inside of the venturi. Proceed to Step 4A.
- No – Proceed to step 4A

Step by step 4: Check for EGR system blockage

Step 4A: Check the EGR system for restrictions or blockages

Troubleshooting steps

1. Turn the key switch OFF.
2. Check these EGR system regions for restrictions or blockages: EGR valve, piping and intake horn/mixer.

Were any restrictions or blockages found?

- Yes – Solve the restriction or blockage. Proceed to step 5A
- No – Proceed to step 5A

Step by step 5: Check for air and exhaust leaks

Step 5A: Check for air and exhaust leaks

Troubleshooting steps

1. Turn the key switch ON.
2. Block the exhaust.
3. Pressurise the intake to 5 psi
4. Spray soapy water on connections throughout the intake and exhaust system.
5. Check the intake and exhaust system for leaks.

Were any leaks found?

- Yes – Repair the leaks. Proceed to step 6A to confirm the repair.
- No – Proceed to step 6A

Step by step 6: Check for fault code

Step 6A: Check for active fault codes

Troubleshooting steps

1. Connect all components.
2. Drive the truck for 15 minutes at freeway speed.
3. Check for active faults upon completion of the drive.

Is fault code P1710 inactive?

- Yes – Proceed to step 6B
- No – Return to the troubleshooting steps - Proceed to step 1A

  If all the steps have been completed and checked again, contact the Engine Support Center for further instructions.

Step 6B: Check for other active fault codes

Troubleshooting steps

Are there other active fault codes?

- Yes – Proceed with appropriate fault codes.
- No – Proceed to step 6C

Step 6B: Clear the inactive fault codes

Troubleshooting steps

1. Turn the key switch ON.
2. Use DAVIE to clear the inactive fault codes.

Have all the fault codes been cleared?

- Yes – The repair is complete.
- No – Troubleshoot any remaining active fault codes.

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