P170F

Fault code description

NOx sensor before catalyst - Data erratic, intermittent or incorrect, during overrun

Possible cause

1. Contaminated NOx sensor (F844).
2. Faulty NOx sensor (F844).
3. Incorrect EGR measurement due to leakage or faulty sensor.
4. Blocked EGR cooler.

Additional information

Monitoring the engine out NOx sensor level during overrun (no fueling).

Set condition of fault code

This diagnostic starts and runs continuously when coolant temperature and fueling quantity are in range. Conditions need to be met for 30 seconds for diagnostic to complete.

Reset condition of fault code

This fault code changes to inactive as soon as the diagnostic runs and passes three times.

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P170F, Diagnostic information

Technical data

"Sensor, NOx before catalyst (F844)"

Location of component(s)

"Location information, PMCI-2"

Electrical diagram(s)

"PMCI-2"

Description of component(s)

"Sensor, NOx before catalyst (F844)"

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: Check fault codes

Step 1A: Check for fault codes

Troubleshooting steps

1. Turn the key switch ON.
2. Use DAVIE to check for line heating fault codes.
3. Record codes, status and counts for later reference in troubleshooting as some steps will clear faults that still require diagnosis.

Are there other NOx sensor upstream, EGR, or engine-related fault codes active?

- Yes – Stop troubleshooting P170F. Proceed with the appropriate fault codes.
- 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 before catalyst sensor.
5. Inspect the NOx before catalyst sensor tip for corrosion, blockages and/or physical damage.

Was any damage found?

- Yes – Repair the damage if possible. Do not replace the sensor if it is only coated with soot. If soot coating is the only sensor issue - Proceed to step 2B for the cleaning procedure. If a repair was made, proceed to step 3A to confirm. If the fault recurs then return 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 2D. Use caution during installation, the NOx sensor could be hot.
- No – Reinstall the NOx sensor and proceed to Step 2C. Use caution during installation, the NOx sensor could be hot.

Step 2C: 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.

If unable to meet the cleaning conditions, inspect the exhaust system for leaks. See Engine Rapido for the pressure testing (inlet/exhaust) instructions and tool. Repair as needed, then repeat step 2B.

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 2D. Use caution during installation, the NOx sensor could be hot.
- No – Replace the NOx before catalyst sensor. Proceed to step 3A to confirm repair. If the fault recurs then return to step 2D. Use caution during installation, the NOx sensor could be hot.

Step 2D: Confirm operation and check accuracy

Troubleshooting steps

1. Connect all components.
2. Move electrical and AdBlue connections from truck-mounted AdBlue dosing valve to another AdBlue dosing valve. Put the secondary AdBlue dosing valve in a bucket to catch dosed AdBlue. The bucket must be no smaller than 1 gallon.
3. Perform a stationary regeneration and record an SCR overview. For more information, go to 'Explanatory notes to DAVIE'

4. Compare the NOx before catalyst sensor value to the NOx after catalyst sensor value shortly before the end of the regeneration. The NOx before catalyst sensor value should be within 40 ppm of the NOx after catalyst sensor value.
5. It is normal for fault codes P3978 and/or P3977 to be set during this test and they do not indicate a problem. If they are set they should be cleared before proceeding.
6. Return the DEF dosing valve connections to their original configuration.

Shortly before the end of the stationary regeneration, is the NOx before catalyst sensor value within 40 ppm of the NOx after catalyst sensor value?

- Yes – Proceed to Step 3A.
- No – Replace the NOx before catalyst sensor. Proceed to step 3A to confirm repair. If the fault recurs then return to step 2A

Step by step 3: Verify the repair

Step 3A: Check for active P170F fault code

Troubleshooting steps

1. Connect all components.
2. Drive the truck for 10 minutes at freeway speed and until coolant temperature is at least 70C (158F).
3. Once at temperature, find a flat highway section to coast for 30 seconds with truck in gear. Be aware of traffic.
4. Repeat coasting test until able to complete three 30 second coasts.
5. Check for active faults upon completion of the drive.

Is fault code P170F inactive?

- Yes – Proceed to step 3B
- No – Return to the troubleshooting steps. Proceed to step 1A.

  If all of the steps have been completed and the fault is still active, contact the Engine Support Center for further instructions

Step 3B: Check for other active fault codes

Troubleshooting steps

1. Check for other active fault codes.

Are there other active fault codes?

- Yes – Proceed with the appropriate fault codes.
- No – Proceed to step 3C

Step 3C: Clear all the 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 – Repair complete
- No – Troubleshoot any remaining active fault codes

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