P3979

Fault code description

P3979, NOx sensor before catalyst - Persist, not valid

Possible cause

1. The NOx before catalyst sensor has carbon build-up on the tip of the sensor.
2. An incorrectly installed NOx before catalyst sensor.
3. Excessive engine oil consumption.
4. NOx before catalyst sensor internal failure
5. Engine failure

Additional information

-

Set condition of fault code

This diagnostic runs continuously when the engine is running and the exhaust gas temperature before DOC is above 302ºF (150ºC) for five seconds.

The EAS-3 ECU detects that the NOx reading is changing more slowly than expected with the engine conditions.

Reset condition of fault code

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

M028421 - 07/22/2015 15:05:52

P3979, Diagnostic information

Technical data

"Sensor, NOx, before catalyst (F844)"

Location of component(s)

"Location information, EAS-3"

Electrical diagram(s)

Refer to the OEM service manual for more information.

Description of component(s)

"Sensor, NOx, before catalyst (F844)"

Block diagram

"Block diagram EAS-3"

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.

- Disconnecting the EAS 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.
- It is necessary to exit the fault code menu 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 fault codes. Refer to the 'possible causes' section.

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.

Is fault code P3979 active?

- Yes – Proceed to step 1B
- No – Proceed to step 5A

Step 1B: Check for fault codes

Troubleshooting steps

1. Turn the key switch ON.
2. Use DAVIE to check for fault codes related to the NOx before catalyst sensor.

Are fault codes related to the NOx before catalyst sensor active?

- Yes – Proceed with the appropriate fault code
- No – Proceed to step 1C

Step 1C: Check for fault codes

Troubleshooting steps

1. Turn the key switch ON.
2. Use DAVIE to check for fault codes related to the NOx after catalyst sensor.

Are fault codes related to the NOx after

catalyst sensor active?

- Yes – Proceed with the appropriate fault code
- No – Proceed to step 2A

Step by step 2: Check the NOx sensor before catalyst

Step 2A: 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.

   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 2C. Use caution during installation, the NOx sensor could be hot.
- No – Replace the NOx before catalyst sensor. Proceed to step 6A to confirm repair. If the fault recurs then return to step 3A. Use caution during installation, the NOx sensor could be hot.

Step 2C: Confirm operation and check accuracy

Troubleshooting steps

1. Connect all components.
2. Move electrical and DEF connections from truck-mounted DEF dosing valve another DEF dosing valve. Put the secondary DEF dosing valve in a bucket to catch dosed DEF. The bucket should 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 6A to confirm repair. If the fault recurs then return to step 3A

Step 3A: Check for deposits in the decomposition pipe

Troubleshooting steps

1. Turn the key switch OFF.
2. Engine off.
3. Remove the decomposition pipe from the vehicle.
4. Inspect for excessive DEF deposits and crystallisation.

Are excessive deposits/crystallisation found inside the decomposition pipe?

- Yes – Clean and re-install the decomposition pipe - Proceed to step 6A
- No – Proceed to step 4A

Step by step 4: Check the exhaust system

Step 4A: Inspect the exhaust system for leaks

Troubleshooting steps

1. Turn the key switch OFF.
2. Visually inspect the exhaust system between the turbo charger outlet and the aftertreatment system for leaks.

Are exhaust system leaks found?

- Yes – Repair or replace the leaking components. Proceed to step 6A
- No – Proceed to step 5A

Step by step 5: Check the condition of the NOx sensors

Step 5A: Inspect the condition of the NOx sensors

Troubleshooting steps

1. Turn the key switch ON.
2. Bring the NOx sensors to operating temperature by driving the truck at motorway speed for 15 minutes.
3. Use DAVIE to check for fault codes.

Is fault code P3979 active?

- Yes – Proceed to step 5B
- No – Proceed to step 6A

Step 5B: Check for fault codes

Troubleshooting steps

1. Turn the key switch ON.
2. Check for active fault codes related to the NOx after catalyst sensor.

Are fault codes related to the NOx after catalyst sensor active?

- Yes – Proceed with the appropriate fault code - Proceed to step 6A
- No – Replace the NOx before catalyst sensor - Proceed to step 6A

Step by step 6: Clear the fault code

Step 6A: Disable the fault code

Troubleshooting steps

1. Connect all components.
2. Operate the system within the 'reset condition of the fault code' found in the fault code information.
3. Use DAVIE to verify that the fault codes are inactive.

Is fault code P3979 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: Clear the inactive fault codes

Troubleshooting steps

1. Connect all components
2. Turn the key switch ON.
3. 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

M046926 - 07/22/2015 16:14:27