HE: EXHAUST GAS RECIRCULATION (EGR) SYSTEMS - PINPOINT TEST

HE: Exhaust Gas Recirculation (EGR) Systems

HE: Introduction

HE1 CHECK FOR DTCS

Are DTCs P0401, P0402, P044C, P044D, P139A, P139B, P139C, P1408, or P2457 present?

Yes	No
For DTCs P139A, P139B or P139C, GO to HE7 . For DTC P2457, GO to HE9 . For all others, GO to HE2 .	RETURN to Section 3, Symptom Charts for further direction.

HE2 CHECK THE VREF AND SIGRTN CIRCUITS FOR AN OPEN

- Ignition OFF.
- Differential Pressure Feedback EGR Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Differential Pressure Feedback EGR Sensor Connector, Harness Side	(-) Differential Pressure Feedback EGR Sensor Connector, Harness Side
VREF - Pin 3	SIGRTN - Pin 2

Is the voltage between 4.5 - 5.5 V?

Yes	No
GO to HE3 .	GO to Pinpoint Test C .

HE3 CHECK THE DPFE CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) Differential Pressure Feedback EGR Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
DPFE - Pin 1	DPFE

Is the resistance less than 5 ohms?

Yes	No
GO to HE4 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

HE4 CHECK THE DPFE CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:

(+) Differential Pressure Feedback EGR Sensor Connector, Harness Side	(-)
DPFE - Pin 1	Ground

Is the resistance greater than 10K ohms?

Yes	No
GO to HE5 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

HE5 CHECK THE DPFE CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Differential Pressure Feedback EGR Sensor Connector, Harness Side	(-)
DPFE - Pin 1	Ground

Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	GO to HE6 .

HE6 CARRY OUT A THOROUGH WIGGLE TEST ON THE DIFFERENTIAL PRESSURE FEEDBACK EGR HARNESS

- Ignition OFF.
- Differential Pressure Feedback EGR Sensor connector connected.

- Ignition ON, engine OFF.
- Access the PCM and monitor the DPFEGR (VOLT) PID.
- Wiggle, shake, and bend small sections of the wiring harness while working from the sensor to the PCM.

Is there any change in the voltage reading or is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to HE7 .

HE7 INSPECT THE DIFFERENTIAL PRESSURE FEEDBACK EGR PRESSURE HOSES AND ORIFICE TUBE FOR CONCERNS

- Visually inspect the upstream pressure hose routing.
- Visually inspect the downstream pressure hose routing.
- Inspect both hoses for leaks and restrictions.
- Inspect the differential pressure feedback EGR sensor and orifice tube assembly for restrictions or damage at the pick up tubes.

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to HE8 .

HE8 CHECK THE DIFFERENTIAL PRESSURE FEEDBACK EGR SENSOR OUTPUT BY APPLYING VACUUM WITH THE HAND PUMP

Note: Verify a prior repair has not resulted in the differential pressure feedback EGR sensor hoses being connected to the opposite ports.

- Disconnect the pressure hoses at the differential pressure feedback EGR sensor.
- Connect the vacuum pump to the downstream connection at the sensor (intake manifold side of the sensor or the smaller diameter pickup tube).
- Ignition ON, engine OFF.
- Access the PCM and monitor the DPFEGR (VOLT) PID.
- Apply 27 - 30 kPa (8 - 9 in-Hg) vacuum to the differential pressure feedback EGR sensor and hold for 10 seconds.
- Quickly release the vacuum.
    - The DPFEGR PID voltage must be between 0.25 and 1.3 volts with the ignition ON and no vacuum applied.
    - The DPFEGR PID voltage must increase to greater than 4 volts with the vacuum applied.
    - The DPFEGR PID must drop to less than 1.5 volts in less than 3 seconds when the vacuum is released.

Does the DPFEGR PID voltage indicate a concern in the differential pressure feedback EGR sensor?

Yes	No

INSTALL a new Differential Pressure Feedback EGR sensor. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the PCM DTCs. REPEAT the self-test.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

HE9 VISUALLY INSPECT THE EGR COOLER FOR CONCERNS

- Ignition OFF.
- Visually inspect for:
  - damaged EGR cooler
  - damaged EGR cooler coolant hoses

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to HE10 .

HE10 CHECK THE COOLING SYSTEM FOR CONCERNS

- Check the cooling system for a system overheating condition or a low coolant condition. Refer to the Workshop Manual Section 303-03, Engine Cooling, Inspection and Verification.

Is a concern present?

Yes	No
REPAIR as necessary. REFER to the Workshop Manual Section 303-03, Engine Cooling, Symptom Chart to diagnose the overheats symptom or loss of coolant symptom. Clear the PCM DTCs. REPEAT the self-test.	GO to HE11 .

HE11 CHECK THE EGR COOLER OPERATION

- Ignition ON, engine running.
- Access the PCM and monitor the EGRT12 (TEMP) PID.
- Record the EGRT12 PID value.
- Access the PCM and control the RPMDSD (RPM) PID.
- Increase the commanded engine speed to 2,500 RPM.
- Access the PCM and control the EGRVPDES (PER) PID.
- Increase the commanded EGR valve position to the maximum value.
- Record the EGRT12 PID value.

Does the EGRT12 PID value change when the EGR valve is opened?

Yes	No

The system is operating correctly at this time. Clear the PCM DTCs. REPEAT the self-test.	INSTALL a new EGR cooler. REFER to the Workshop Manual Section 303-08, Engine Emission Control. Clear the PCM DTCs. REPEAT the self-test.