DZ: Universal Heated Oxygen Sensor (HO2S)

DZ: Introduction

DZ1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0030, P0040, P0050, P0053, P0059, P0130, P0133, P0134, P0135, P0150, P0153, P0154, P0155, P1127, P2096, P2097, P2098, or P2099 present?

Yes	No
For DTCs P0030 or P0050, GO to DZ2 . For DTC P0040, GO to DZ5 . For DTCs P0053, P0059, P0135 or P0155, GO to DZ6 . For DTCs P0130 or P0150, GO to DZ11 . For DTCs P0133 or P0153, GO to DZ15 . For DTCs P0134 or P0154, GO to DZ18 . For DTC P1127, GO to DZ19 . For DTCs P2096, P2097, P2098 or P2099, GO to DZ20 .	For symptoms without DTCs, GO to DZ23 . For all others, GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .

DZ2 DTCS P0030 AND P0050: CHECK FOR MISFIRE CONCERNS AND AFTERMARKET EQUIPMENT

- Ignition OFF.
- Check for the following:
  - misfire concern
  - non-factory or aftermarket equipment that may increase the exhaust temperature
- Universal HO2S-Front connector disconnected.
- Check the universal HO2S connector for damage or corrosion.

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to DZ3 .

DZ3 CHECK THE UO2SHTR CIRCUIT FOR A SHORT TO VOLTAGE

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

(+) Universal HO2S-Front Connector, Harness Side	(-)

UO2SHTR - Pin 3	Ground

Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	GO to DZ4 .

DZ4 CHECK THE UO2S, UO2SGREF, UO2SHTR CIRCUITS FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) PCM Connector, Harness Side
UO2S - Pin 6	UO2S
UO2SGREF - Pin 2	UO2SGREF
UO2SHTR - Pin 3	HO2S Heater

Are the resistances less than 5 ohms?

Yes	No
INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ5 DTC P0040: CROSSED SENSOR WIRES

- Ignition OFF.
- Check the vehicle repair history.
- Verify the connectors are connected to the correct engine bank.

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z .

DZ6 DTCS P0053, P0059, P0135 AND P0155: CHECK FOR VPWR IN THE HARNESS

- Ignition OFF.
- Universal HO2S-Front connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Universal HO2S-Front Connector, Harness Side	(-)
VPWR - Pin 4	Ground

Is the voltage greater than 10 V?

Yes	No
GO to DZ7 .	REPAIR the open circuit. CHECK the fuses. Clear the PCM DTCs. REPEAT the self-test.

DZ7 CHECK THE UO2SHTR CIRCUIT FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- Universal HO2S-Front connector disconnected.
- PCM connector disconnected.
- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) PCM Connector, Harness Side
UO2SHTR - Pin 3	UO2SHTR

Is the resistance less than 5 ohms?

Yes	No
GO to DZ8 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ8 CHECK THE UO2SHTR CIRCUIT FOR A SHORT IN THE HARNESS

- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) Vehicle Battery
UO2SHTR - Pin 3	Negative terminal

- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) Universal HO2S-Front Connector, Harness Side
UO2SHTR - Pin 3	UO2S - Pin 6
UO2SHTR - Pin 3	UO2SGREF - Pin 2
UO2SHTR - Pin 3	UO2SPC - Pin 1
UO2SHTR - Pin 3	UO2SPCT - Pin 5
UO2SHTR - Pin 3	VPWR - Pin 4

Are the resistances greater than 10K ohms?

Yes	No
GO to DZ9 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ9 CHECK THE INTERNAL RESISTANCE OF THE UNIVERSAL HO2S HEATER

- Measure the resistance between:

(+) Universal HO2S-Front Connector, Component Side	(-) Universal HO2S-Front Connector, Component Side
VPWR - Pin 4	UO2SHTR - Pin 3

Is the resistance between 1.8 - 9 ohms?

Yes	No
GO to DZ10 .	INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.

DZ10 CHECK THE UO2SHTR CIRCUIT FOR AN INTERNAL SHORT TO GROUND

- Measure the resistance between:

(+) Universal HO2S-Front Connector, Component Side	(-)
UO2SHTR - Pin 3	Ground

Is the resistance greater than 10K ohms?

Yes	No
GO to DZ25 .	INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.

DZ11 DTCS P0130 AND P0150: CHECK THE UO2S AND UO2SGREF CIRCUITS FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- Universal HO2S-Front connector disconnected.
- PCM connector disconnected.
- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) PCM Connector, Harness Side
UO2S - Pin 6	UO2S
UO2SGREF - Pin 2	UO2SGREF

Are the resistances less than 5 ohms?

Yes	No
GO to DZ12 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ12 CHECK THE UO2S, UO2SGREF, UO2SPC, AND UO2SPCT CIRCUITS FOR A SHORT TO GROUND IN THE HARNESS

- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-)
UO2S - Pin 6	Ground
UO2SGREF - Pin 2	Ground
UO2SPC - Pin 1	Ground
UO2SPCT - Pin 5	Ground

Are the resistances greater than 10K ohms?

Yes	No
GO to DZ13 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ13 CHECK THE UO2S, UO2SGREF, UO2SPC, AND UO2SPCT CIRCUITS FOR A SHORT TO VOLTAGE IN THE HARNESS

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

(+) Universal HO2S-Front Connector, Harness Side	(-)
UO2S - Pin 6	Ground
UO2SGREF - Pin 2	Ground
UO2SPC - Pin 1	Ground
UO2SPCT - Pin 5	Ground

Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	GO to DZ14 .

DZ14 CHECK THE UO2SGREF CIRCUIT FOR VOLTAGE

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

(+) Universal HO2S-Front Connector, Harness Side	(-)

UO2SGREF - Pin 2	Ground

Is the voltage between 2.4 - 2.6 V?

Yes	No
INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.	GO to DZ25 .

DZ15 DTCS P0133 AND P0153: CARRY OUT THE KOER SELF-TEST

- Engine at normal operating temperature.
- Carry out the PCM KOER self-test.

Are any DTCs present other than P0133 or P0153?

Yes	No
DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions .	GO to DZ16 .

DZ16 CHECK FOR A SOURCE OF POTENTIAL CONTAMINATION

- Investigate the following items as potential sources of universal HO2S contamination:
  - use of unapproved silicon sealers
  - fuel contaminated by silicon additives
  - excessive oil consumption
  - glycol leaking internally in the engine
  - lead-contaminated fuel
  - short drive cycles in cold weather
  - use of unapproved cleaning agents

Is a concern present?

Yes	No
REPAIR the source of the contamination. CHANGE the engine oil and oil filter. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.	GO to DZ17 .

DZ17 CHECK THE UNIVERSAL HO2S RESPONSE TEST RESULTS

- Ignition ON, engine OFF.
- Access the diagnostic monitoring test results for the HO2S11 and HO2S21. Refer to Section 2, Diagnostic Monitoring Test Results Mode 6 .

Is the indicated value greater than the minimum threshold?

Yes	No
Unable to duplicate or identify the concern at this time. Clear the PCM DTCs. REPEAT the self-test.	INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.

DZ18 DTCS P0134 AND P0154: CHECK THE UO2SPC CIRCUIT FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- Universal HO2S-Front connector disconnected.
- PCM connector disconnected.
- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) PCM Connector, Harness Side
UO2SPC - Pin 1	UO2SPC

Is the resistance less than 5 ohms?

Yes	No
INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ19 KOER DTC P1127: EXHAUST TEMPERATURE OUT OF RANGE

Note: Address all other DTCs before proceeding.

- Ignition ON, engine running.
- Engine at normal operating temperature.
- Access the PCM and monitor the HTR11 and HTR21 PIDs.

Are the PID states ON?

Yes	No
CARRY OUT the KOER self-test.	RUN the engine until the PID indicates ON. CARRY OUT the KOER self-test.

DZ20 DTCS P2096, P2097, P2098 AND P2099: VISUALLY INSPECT THE UPSTREAM AND DOWNSTREAM HO2S CONNECTORS

- Ignition OFF.
- HO2S connector disconnected.
- Universal HO2S-Front connector disconnected.
- Check for a loose connection, and damaged or corroded terminals.

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to DZ21 .

DZ21 CHECK FOR LEAKS IN THE EXHAUST SYSTEM

- Visually inspect the exhaust system for the following:
  - exhaust leaks at flanges and gaskets
  - HO2Ss not tightened to specification
  - physical exhaust system concerns
  - aftermarket exhaust
  - punctures or cracks in the catalytic converter

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to DZ22 .

DZ22 CHECK FOR POTENTIAL SENSOR CONTAMINATION CONCERNS

- Investigate the following items as potential sources of universal HO2S contamination:
  - use of unapproved silicon sealers
  - fuel contaminated by silicon additives
  - excessive oil consumption
  - glycol leaking internally in the engine
  - lead-contaminated fuel
  - short drive cycles in cold weather
  - use of unapproved cleaning agents

Is a concern present?

Yes	No
REPAIR the source of the contamination. CHANGE the engine oil and oil filter. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.	GO to DZ25 .

DZ23 CHECK THE UO2SPCT CIRCUIT FOR AN OPEN CIRCUIT IN THE HARNESS

- Ignition OFF.
- Universal HO2S-Front connector disconnected.
- PCM connector disconnected.
- Measure the resistance between:

(+) Universal HO2S-Front Connector, Harness Side	(-) PCM Connector, Harness Side
UO2SPCT - Pin 5	UO2SPCT

Is the resistance less than 5 ohms?

Yes	No
GO to DZ24 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DZ24 CHECK THE RESISTANCE OF THE CURRENT TRIM RESISTOR IN THE UNIVERSAL HO2S

- Measure the resistance between:

(+) Universal HO2S-Front Connector, Component Side	(-) Universal HO2S-Front Connector, Component Side
UO2SPCT - Pin 5	UO2SPC - Pin 1

Is the resistance between 25 - 330 ohms?

Yes	No
The concern is elsewhere. RETURN to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index for further direction.	INSTALL a new Universal HO2S. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.

DZ25 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test.
- Verify the concern is still present.

Is the concern still present?

Yes	No

INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) , Programming the VID Block for a Replacement PCM.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.