

DP: Output Shaft Speed (OSS) Sensor/Vehicle Speed Sensor (VSS)/Transfer Case Speed Sensor (TCSS)

← [DP: Introduction](#)

DP1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTC)

Note: For vehicles with automatic transmission and output shaft speed (OSS) sensor DTCs, refer to the Workshop Manual Section 307-01, Diagnostic Trouble Code (DTC) Charts.

Are DTCs P0500, P0503, P0720, P0721, P0722, P0723, P1500, P1501, P1502 or P1900 present?

Yes	No
<p>For DTCs P0500, P0503, P1500, P1501 or P1502, with manual shift transfer case,</p> <p>GO to DP16.</p> <p>For DTCs P0500, P0720, P0721, P0722, P0723, P1502 or P1900, with a manual transmission or an electronic shift transfer case,</p> <p>GO to DP2.</p> <p>For DTCs P0503 or P1500, with a manual transmission or an electronic shift transfer case,</p> <p>GO to DP13.</p> <p>For DTC P1501, with a manual transmission or an electronic shift transfer case,</p> <p>GO to DP12.</p>	<p>For all others, GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions.</p>

DP2 DTCS P0500, P0720, P0721, P0722, P0723, P1502 AND P1900: VERIFY THE DRIVE CYCLE

- Access the PCM and monitor the OSS PID.
- Access the PCM and monitor the VSS PID.
- Drive the vehicle.
- Monitor the PID in all transmission gear ranges while increasing and decreasing the speed.

Does the PID reading increase and decrease with engine and vehicle speed?

Yes	No
GO to DP3 .	GO to DP4 .

DP3 VISUAL INSPECTION

- OSS/VSS connector disconnected.
- Inspect the OSS/VSS harness for damage.

- Inspect the OSS/VSS vehicle harness connector for damage and proper seating.
- If possible, carry out a wiggle test.

Is a concern present?

Yes	No
REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to Pinpoint Test Z .

DP4 VERIFY THE TYPE OF OSS/VSS SENSOR

Note: The variable reluctance (VR) sensors have 2-wire connectors, Hall-effect sensors have 3-wire connectors.

- Ignition OFF.
- Inspect for a Hall-effect or a VR type of OSS/VSS sensor.

Is this a Hall-effect type OSS/VSS sensor?

Yes	No
GO to DP5 .	GO to DP7 .

DP5 CHECK VOLTAGE TO THE OSS/VSS SENSOR

- Ignition OFF.
- OSS/VSS connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) OSS/VSS Connector, Harness Side	(-) Vehicle Battery
VPWR	Negative terminal

Is the voltage greater than 10 V?

Yes	No
GO to DP6 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DP6 CHECK THE VPWR GROUND TO THE OSS/VSS SENSOR

- Ignition OFF.
- Measure the resistance between:

(+) OSS/VSS Connector, Harness Side	(-) Vehicle Battery
PWRGND	Negative terminal

Is the resistance less than 5 ohms?

Yes	No
GO to DP7 .	REPAIR the open circuit. CLEAR the DTCs.

REPEAT the self-test.

DP7 CHECK THE OSS/VSS CIRCUIT FOR A SHORT TO VREF AND VOLTAGE IN THE HARNESS

- Ignition ON, engine OFF.
- OSS/VSS connector disconnected.
- Measure the voltage between:

(+) OSS/VSS Connector, Harness Side	(-) Vehicle Battery
OSS/VSS	Negative terminal

Is the voltage less than 1 V?

Yes	No
GO to DP8 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DP8 CHECK THE OSS/VSS CIRCUIT(S) FOR AN OPEN IN THE HARNESS

Note: Hall-effect sensors are not equipped with a SIGRTN circuit. Disregard the SIGRTN measurement.

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

(+) PCM Connector, Harness Side	(-) OSS/VSS Connector, Harness Side
OSS/VSS	OSS/VSS
SIGRTN	SIGRTN
PWRGND	PWRGND

Are the resistances less than 5 ohms?

Yes	No
GO to DP9 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DP9 CHECK THE OSS/VSS CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS

- Measure the resistance between:

(+) OSS/VSS Connector, Harness Side	(-) OSS/VSS Connector, Harness Side
OSS/VSS	PWRGND

Is the resistance greater than 10K ohms?

Yes	No
For Hall-effect sensors, GO to DP10 .	REPAIR the short circuit. CLEAR the DTCs.

For VR sensors, GO to [DP11](#).

REPEAT the self-test.

DP10 CHECK THE OSS/VSS SIGNAL OUTPUT TO THE PCM, HALL-EFFECT TYPE SENSOR

Note: The opposite wheel must be held stationary.

- PCM connector disconnected.
- Raise the vehicle to allow for the rotation of the front drive wheels.
- Ignition ON, engine OFF.
- Transmission gear selector in NEUTRAL.
- Measure the voltage between:

(+) PCM Connector, Harness Side	(-) PCM Connector, Harness Side
OSS/VSS	PWRGND

- The voltage should rise above 5 volts and fall below 1 volt in a regular cycle. Observe several cycles.

Does the OSS/VSS output voltage rise and fall as specified?

Yes	No
GO to DP22 .	REMOVE the OSS/VSS sensor and inspect the target wheel. REPAIR as necessary. If OK, INSTALL a new OSS/VSS sensor. REFER to the Workshop Manual Section 308-07, Transfer Case and 308-03, Manual Transmission/ Transaxle. CLEAR the DTCs. REPEAT the self-test.

DP11 CHECK THE RESISTANCE OF THE OSS/VSS SENSOR

- Measure the resistance between:

(+) OSS/VSS Connector, Component Side	(-) OSS/VSS Connector, Component Side
OSS/VSS	SIGRTN

Is the resistance between 170 - 270 ohms (VSS) or 400 - 1.25K ohms (OSS)?

Yes	No
GO to DP22 .	REMOVE the OSS/VSS sensor and inspect the target wheel. REPAIR as necessary. If OK, INSTALL a new OSS/VSS sensor. REFER to the Workshop Manual Section 308-07, Transfer Case and 308-03, Manual Transmission/ Transaxle. CLEAR the DTCs. REPEAT the self-test.

DP12 KOER DTC P1501: CHECK THE VSS PID FOR AN INPUT SIGNAL

- Ignition ON, engine running.
- Access the PCM and monitor the VSS PID.
- Observe the VSS input to the PCM.
- Increase the engine speed, not greater than 2,000 RPM, several times while observing the VSS PID.

Is the reading on the PID less than 5 km/h (3 mph)?

Yes	No
Unable to duplicate or identify the concern at this time. REFER to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions for possible causes and additional DTC description information. If DTC P1501 still exists, GO to Pinpoint Test Z .	GO to DP15 .

DP13 DTCS P0503 AND P1500: INSPECT THE VSS AND THE CIRCUIT FOR AN INTERMITTENT

- Visually inspect the VSS and harness circuits for any potential failures.
- Use the following check list for reference:
 - loose wires/connectors
 - pushed out connector pins
 - damaged wiring harness insulation
 - incorrect harness routing
 - incorrect VSS mounting

Is a concern present?

Yes	No
REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DP14 .

DP14 CHECK THE PCM VSS PID FOR AN INPUT SIGNAL

Note: For scan tools which have a data record feature, record the data for future playback to help identify any variations.

- Access the PCM and monitor the VSS PID.
- Drive the vehicle at several steady state speeds above and below 50 km/h (30 mph).

Are there any indicators of a noisy or intermittent signal with the VSS PID?

Yes	No
GO to DP15 .	Unable to duplicate or identify the concern at this time. REPAIR any other DTCs. RETURN to Section 3 , Symptom Charts for further direction.

DP15 CHECK THE VSS HARNESS ROUTING

Note: Refer to Pinpoint Test Schematic and Connectors at the beginning of this pinpoint test.

- Check the VSS harness routing:
 - Verify the harness is not routed adjacent to any high current wires such as ignition wires or generator wiring.
 - Verify the VSS harness is shielded and grounded, if applicable.

- Measure the resistance of the VSS harness.

Is a concern present?

Yes	No
REPAIR as necessary.	Unable to duplicate or identify the concern at this time. REFER to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions for possible causes and additional DTC description information. GO to Pinpoint Test Z .

DP16 DTCS P0500, P0503, P1500, P1501 AND P1502: VISUAL INSPECTION OF THE TCSS

Note: The TCSS provides the rotational speed of the output shaft of the transfer case.

The PCM uses this information to control the powertrain behavior and on some applications it is used as the source for the vehicle speed information.

- TCSS connector disconnected.
- Inspect the TCSS vehicle harness connector for damage and proper seating.

Is a concern present?

Yes	No
REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DP17 .

DP17 CHECK THE RESISTANCE OF THE TCSS

- Measure the resistance between:

(+) TCSS Connector, Component Side	(-) TCSS Connector, Component Side
SIGRTN - Pin 1	TCSS - Pin 2

Is the resistance between 1K - 1.25K ohms?

Yes	No
GO to DP18 .	INSTALL a new TCSS. REFER to the Workshop Manual Section 308-07, Transfer Case. CLEAR the DTCs. REPEAT the self-test.

DP18 CHECK THE TCSS SENSOR OUTPUT

Note: The opposite wheel must be held stationary.

- With the vehicle in NEUTRAL and the parking brake off, position it on a hoist. REFER to 100-02 Jacking and Lifting for the locations of the lifting points.
- Raise the vehicle.
- Measure the frequency between:

(+) TCSS Connector, Component Side	(-) TCSS Connector, Component Side
SIGRTN - Pin 1	TCSS - Pin 2

- Monitor the TCSS signal while rotating the driven wheel as fast as possible.

Does the frequency reading increase and decrease with the wheel speed?

Yes	No
GO to DP19 .	REMOVE the TCSS and inspect the target wheel. REPAIR as necessary. If OK, INSTALL a new TCSS sensor. REFER to the Workshop Manual Section 308-07, Transfer Case. CLEAR the DTCs. REPEAT the self-test.

DP19 CHECK THE TCSS CIRCUIT(S) FOR A SHORT TO GROUND AND VOLTAGE IN THE HARNESS

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

(+) TCSS Connector, Harness Side	(-)
TCSS - Pin 2	Ground

Is the voltage less than 1 V?

Yes	No
GO to DP20 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DP20 CHECK THE CIRCUIT(S) FOR AN OPEN IN THE HARNESS

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

(+) PCM Connector, Harness Side	(-) TCSS Connector, Harness Side
TCSS	TCSS - Pin 2
SIGRTN	SIGRTN - Pin 1

Are the resistances less than 5 ohms?

Yes	No
GO to DP21 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DP21 CHECK THE HARNESS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) TCSS Connector, Harness Side	(-) TCSS Connector, Harness Side
SIGRTN - Pin 1	TCSS - Pin 2

- Measure the resistance between:

(+) TCSS Connector, Harness Side	(-)
TCSS - Pin 2	Ground

Are the resistances greater than 10K ohms?

Yes	No
GO to DP22 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DP22 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 and 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.
