

DTC C0253

Circuit Description

The steering position sensor provides 3 digital signal inputs and 1 analog signal inputs to the rear wheel steering control module. The 3 digital signals are:

- Phase A
- Phase B
- Index pulse

The analog signal is the steering wheel position signal. This is a class 2 signal from the TBC.

The rear wheel position sensor provides 2 discreet analog signal inputs to the rear wheel steering control module. These inputs are :

- Rear wheel position 1 signal
- Rear wheel position 2 signal

The rear wheel steering control module compares the differences between the steering wheel position sensor and the rear wheel position sensor. If the difference exceeds the internal values in the rear wheel steering control module than C0253 will set.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0253 Centering Error

Conditions for Running the DTC

- The ignition is ON.
- Performing the alignment procedure

Conditions for Setting the DTC

- A valid alignment was not performed.
- The steering wheel sensor analog voltage is out of valid alignment range, which is within 2.0-3.0 volts.
- The steering wheel sensor marker pulse is out of valid alignment range, and the steering wheel sensor index switch points are not between +/- 10 degrees of center.
- The rear sensor analog voltage out of valid alignment range:
 - The scan tool data parameter rear wheel centering 1 is not within 2.0-3.0 volts.
 - The scan tool data parameter rear wheel centering 2 is not within 2.0-3.0 volts.

Action Taken When the DTC Sets

- The Service 4 Wheel Steer indicator on instrument panel cluster (IPC) will be displayed.
- The code is displayed on the scan tool as DTC C0253.
- The output command to the motor is zeroed. The motor drive circuits are disabled using commands to open the power relay, and to close the motor shorting relay.
- The rear wheels will be returned to the centered position.

Conditions for Clearing the DTC

- The condition for the DTC is not currently present.
- The module receives a clear code command from the scan tool.
- The history DTC clears after 100 malfunction free ignition cycles.
- A valid alignment is performed.

Diagnostic Aids

- Inspect for poor connections at the harness connector of the rear wheel steering control module, rear wheel position sensor and the steering wheel position sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** , and to **Connector Repairs** in Wiring Systems.
- Observe the rear wheel steering mode select switch. If all of the mode indicator LEDs are illuminated the rear wheel steering control module has lost its memory settings and the scan tool must be used to re-calibrate the rear wheel steering alignment data in the rear wheel steering control module. Refer to **Measuring Wheel Alignment (w/Rear Wheel Steering)** or **Measuring Wheel Alignment (w/o Rear Wheel Steering)** .

Steering Wheel Position Sensor - Digital Signal

- 3 outputs used (Phase A, Phase B, Index Pulse)
- Phase A & Phase B

Offset pulse width modulator (PWM) wave forms created when turning the wheel

- Index pulse

Signal is present only when steering wheel is within 10 degrees either side of center

Steering Wheel Position Sensor- Analog Signal

- This is a class 2 message from the TBC.
- Voltage is at or near 2.5 volts with wheels at center.
- Voltage increases/decreases for less than one full turn (+/- 225 Degrees), then plateaus for the remainder of the travel.

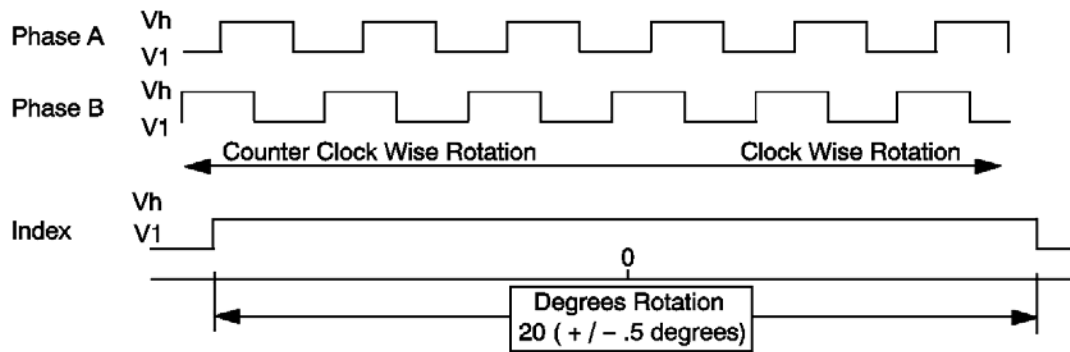


Fig. 9: Steering Wheel Position Sensor - Digital Signal
 Courtesy of GENERAL MOTORS CORP.

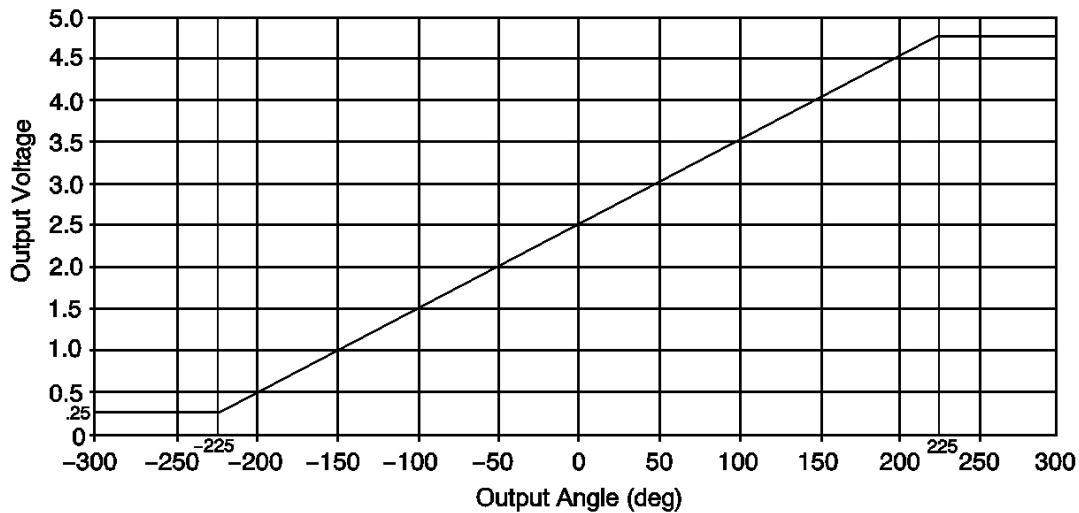


Fig. 10: Steering Wheel Position Sensor - Analog Signal
 Courtesy of GENERAL MOTORS CORP.

Test Description

The number below refers to the step number on the diagnostic table.

2: This step verifies there was an improper rear wheel steering alignment performed.

DTC C0253

Step	Action	Yes	No
Schematic Reference: <u>Rear Wheel Steering Schematics</u> Connector End View Reference: <u>Rear Wheel Steering Connector End Views</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	1. Turn the ignition switch to the ON position, with the engine OFF. 2. With a scan tool, monitor the DTC Information for DTC C0253 in the rear wheel steering control module. Does the scan tool indicate that DTC C0253 is current?	Go to Step 3	Go to Diagnostic Aids
3	With a scan tool, monitor the DTC Information for DTC C0455 in the rear wheel steering control module. Does the scan tool indicate that DTC C0455 is current?	Go to <u>DTC C0455</u>	Go to Step 4
4	With a scan tool, monitor the DTC Information for DTC C0522 in the rear wheel steering control module. Does the scan tool indicate that DTC C0522 is current?	Go to <u>DTC C0522</u>	Go to Step 5
5	With the scan tool, monitor the sensor data. Is the steering wheel sensor analog voltage within valid alignment range (which is within 2.0-3.0 volts) and also is the sensor feed voltage 5.00 volts?	Go to Step 6	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
6	With the scan tool, monitor the sensor data. Is the steering wheel sensor marker pulse within valid alignment range, and the steering wheel sensor index switch points are between +/- 10 degrees of center, is the steering wheel centered?	Go to Step 7	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
7	Is the scan tool data parameter rear wheel centering 1 within 2-3 volts and rear wheel centering 2 within 2-3 volts?	Go to Step 8	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
8	Replace the rear wheel steering module. Refer to <u>Control Module References</u> in Computer/Integrating Systems for replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
9	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK