

C0460 or C0461 the EBCM can determine the position of the steering wheel and the direction of the steering wheel rotation

Circuit Description

The steering wheel position sensor supplies 2 analog inputs, Phase A and Phase B, to the EBCM. The 2 input signals are approximately 90 degrees out of phase. By interpreting the relationship between the 2 inputs, the EBCM can determine the position of the steering wheel and the direction of the steering wheel rotation.

Conditions for Running the DTC

- The ignition is ON.
- Ignition voltage is greater than 8 volts.

Conditions for Setting the DTC

C0460

One of the following conditions exists:

- Both Phase A and Phase B are greater than 4.9 volts or less than 0.2 volts for 1.6 seconds.
- The changes in Phase A or Phase B is greater than 36 degrees between consecutive scans of the signal.

C0461

The difference in the phase angle between Phase A and Phase B is greater than 16 degrees continuously for 0.25 seconds.

Action Taken When the DTC Sets

- The EBCM disables the VSES for the duration of the ignition cycle.
- The DIC displays the Service Stability System message.
- The ABS remains functional.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present and the DTC is cleared with a scan tool.
- The electronic brake control module (EBCM) automatically clears the history DTC when a current DTC is not detected in 100 consecutive drive cycles.

Diagnostic Aids

- Check the vehicle for proper alignment. The car should not pull in either direction while driving straight on a level surface.
- The Snapshot function on the scan tool can help find an intermittent DTC.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2. Perform the Steering Position Sensor Test in order to verify if the steering wheel position sensor (SWPS) is operating properly.
3. Tests for the proper operation of the steering wheel position signal A circuit in the low voltage range.
4. Tests for the proper operation of the steering wheel position signal B circuit in the low voltage range.
5. Tests for the proper operation of the steering wheel position signal A circuit in the high voltage range. If the fuse in the jumper opens when you perform this test, the signal circuit is shorted to ground.
6. Tests for the proper operation of the steering wheel position signal B circuit in the high voltage range. If the fuse in the jumper opens when you perform this test, the signal circuit is shorted to ground.
7. Tests for a short to voltage in the 5-volt reference circuit.
8. Tests for a high resistance or an open in the low reference circuit.

Step	Action	Values	Yes	No
Schematic Reference: ABS Schematics Connector End View Reference: ABS Connector End Views				
1	Did you perform the Diagnostic System Check -ABS?	—	Go to Step 2	Go to Diagnostic System Check -ABS
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, perform the Steering Position Sensor Test. Did the SWPS pass the test?	—	Go to Diagnostic Aids	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the steering wheel position sensor (SWPS) connector. 3. Turn ON the ignition, with the engine OFF. 4. With the scan tool, observe the Dual Analog SWPS Input A parameter in the VSES data list. Does the scan tool indicate the Dual Analog SWPS Input A parameter is less than the specified value?	0.2 V	Go to Step 4	Go to Step 13
4	With the scan tool, observe the Dual Analog SWPS Input B parameter. Does the scan tool indicate the Dual Analog SWPS Input B parameter is less than the specified value?	0.2 V	Go to Step 5	Go to Step 14

Step	Action	Value(s)	Yes	No
5	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Connect a 3-amp fused jumper wire between the 5-volt reference circuit of the steering wheel position sensor (SWPS) and the signal A circuit of the steering wheel position sensor (SWPS). 3. Turn ON the ignition, with the engine OFF. 4. With the scan tool, observe the Dual Analog SWPS Input A parameter. <p>Does the scan tool indicate that the Dual Analog SWPS Input A parameter is greater than the specified value?</p>	4.9 V	Go to Step 6	Go to Step 10
6	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the fused jumper wire. 3. Connect a 3-amp fused jumper wire between the 5-volt reference circuit of the steering wheel position sensor (SWPS) and the signal B circuit of the steering wheel position sensor (SWPS). 4. Turn ON the ignition, with the engine OFF. 5. With the scan tool, observe the Dual Analog SWPS Input B parameter. <p>Does the scan tool indicate that the Dual Analog SWPS Input B parameter is greater than the specified value?</p>	4.9 V	Go to Step 7	Go to Step 10

Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> 1. Disconnect the fused jumper wire. 2. Measure the voltage between the 5-volt reference circuit of the steering wheel position sensor (SWPS) and the low reference circuit of the steering wheel position sensor (SWPS). Does the voltage measure less the specified value? 	5V	Go to Step 8	Go to Step 9
8	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnect/Connect Procedure in Engine Electrical. 3. Measure the resistance from the low reference circuit of the steering wheel position sensor (SWPS) to a good ground. Does the resistance measure less than the specified value? 	5 W	Go to Step 16	Go to Step 15
9	<p>Test the 5-volt reference circuit of the steering wheel position sensor (SWPS) for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?</p>	—	Go to Step 20	Go to Step 17
10	<p>Test the 5-volt reference circuit of the steering wheel position sensor (SWPS) for the following conditions:</p> <ul style="list-style-type: none"> • An open • A short to ground • A high resistance Refer to Circuit Testing and Wiring Repairs in Wiring Systems. <p>Did you find and correct the condition?</p>	—	Go to Step 20	Go to Step 11

Step	Action	Value(s)	Yes	No
11	<p>Test the signal A circuit of the steering wheel position sensor (SWPS) for the following conditions:</p> <ul style="list-style-type: none"> • An open • A short to ground • A high resistance Refer to Circuit Testing and Wiring Repairs in Wiring Systems. <p>Did you find and correct the condition?</p>	—	Go to Step 20	Go to Step 12
12	<p>Test the signal B circuit of the steering wheel position sensor (SWPS) for the following conditions:</p> <ul style="list-style-type: none"> • An open • A short to ground • A high resistance Refer to Circuit Testing and Wiring Repairs in Wiring Systems. <p>Did you find and correct the condition?</p>	—	Go to Step 20	Go to Step 17
13	<p>Test the signal A circuit of the steering wheel position sensor (SWPS) for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?</p>	—	Go to Step 20	Go to Step 17
14	<p>Test the signal B circuit of the steering wheel position sensor (SWPS) for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?</p>	—	Go to Step 20	Go to Step 17

Step	Action	Value(s)	Yes	No
15	1. Disconnect the EBCM harness connector. 2. Install the J 39700 universal pinout box using the J 39700-300 cable adapter to the EBCM harness connector only. 3. Test the low reference circuit of the steering wheel position sensor (SWPS) for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 20	Go to Step 17
16	Inspect for poor connections at the harness connector of the steering wheel position sensor (SWPS). Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 20	Go to Step 18
17	Inspect for poor connections at the harness connector of the EBCM. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 20	Go to Step 19

Step	Action	Value(s)	Yes	No
18	Replace the steering wheel position sensor (SWPS). Refer to Steering Wheel Position Sensor or Steering Shaft Lower Bearing Replacement on page 2-97 in Steering Wheel and Column. Did you complete the repair?	—	Go to Step 20	—
19	Replace the EBCM. Refer to Electronic Brake Control Module (EBCM) Replacement. Did you complete the repair?	—	Go to Step 20	—
20	1. Clear the DTCs using the scan tool. 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

LAUNCH