C0252 The brake pedal pulsates at a higher frequency during VSES activation

Circuit Description

The vehicle stability enhancement system (VSES) is activated by the EBCM calculating the desired yaw rate and comparing it to the actual yaw rate input. The desired yaw rate is calculated from measured steering wheel position, vehicle speed, and lateral acceleration. The difference between the desired yaw rate and actual yaw rate is the yaw rate error, which is a measurement of oversteer or understeer. If the yaw rate error becomes too large, the EBCM will attempt to correct the vehicle's yaw motion by applying differential braking to the left or right front wheel.

The amount of differential braking applied to the left or right front wheel is based on both the yaw rate error and side slip rate error. The side slip rate error is a function of the lateral acceleration minus the product of the yaw rate and vehicle speed. The yaw rate error and side slip rate error are combined to produce the total delta velocity error. When the delta velocity error becomes too large and the VSES system activates, the drivers steering inputs combined with the differential braking will attempt to bring the delta velocity error toward zero. The VSES activations generally occur during aggressive driving, in the turns or bumpy roads without much use of the accelerator pedal. When braking during VSES activation, the brake pedal will feel different than the ABS pedal pulsation. The brake pedal pulsates at a higher frequency during VSES activation.

Conditions for Running the DTC

- The steer angle has been centered.
- The VSES is active.
- The direction (understeer or oversteer) of the yaw rate error has not changed.
- The centered lateral acceleration value is less than 0.5 g.
- The yaw rate error is less than 6 degrees/second.
- The side slip error is greater than 1.8 meters/second*second.

Conditions for Setting the DTC

One of the following conditions exists:
- The yaw rate error is greater than 10 degrees/second with the vehicle speed less than 60 km/h (37 mph) and the acceleration pedal is pressed more than 25 percent of the pedal travel range for 1 second during the VSES activation.
- With the yaw rate less than 8 degrees/second, the side slip error is greater than 4.9 meters/second2 for 5 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/TCS 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 EBCM automatically clears the history DTC when a current DTC is not detected in 100 consecutive drive cycles.

Diagnostic Aids

The following conditions can cause this concern:
- Improper steering alignment.
- Open, short to ground, or short to voltage.
- Internal lateral accelerometer failure.
- EBCM internal failure.

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 that the steering wheel position sensor (SWPS) is operating properly.
3. Verify that the lateral accelerometer input parameter is within the valid range.
4. Verify that the yaw rate input parameter is within the valid range.

Step	Action	Values	Yes	No
Schematic Reference: ABS Schematics				
1	Did you perform the ABS Diagnostic System Check?	—	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 Step 3	Go to Step 7
3	With a scan tool, observe the Lateral Accelerometer Input parameter in the VSES data list. Does the scan tool display within the specified range?	2.3–2.7 V	Go to Step 4	Go to Step 8
4	With a scan tool, observe the Yaw Rate Sensor Input parameter in the VSES data list. Does the scan tool display within the specified range?	2.3–2.7 V	Go to Step 5	Go to Step 8
5	1. Use the scan tool in order to clear the DTCs. 2. Perform the Diagnostic Test Drive. Refer to Diagnostic Test Drive. Does the DTC reset?	—	Go to Step 6	Go to Diagnostic Aids
6	**Important: Perform the setup procedure for the EBCM.** An unprogrammed EBCM will result in the following conditions: • Inoperative or poorly functioning system operations • The EBCM sets DTC C0281 and DTC C0550 Replace the EBCM. Refer to Electronic Brake Control Module (EBCM) Replacement. Did you complete the repair?	—	Go to Step 9	—

Step	Action	Value(s)	Yes	No
7	Replace the steering wheel position sensor (SWPS). Refer to Steering Wheel Position Sensor or Steering Shaft Lower Bearing Replacement in Steering Wheel and Column. Did you complete the replacement?	—	Go to Step 9	—
8	Replace the yaw rate/lateral accelerometer sensor. Refer to Yaw Rate Sensor/Lateral Accelerometer Replacement. 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