

All-Wheel Drive (AWD) Disabled Indicator Always On

Circuit Description

The differential clutch pump actuator check valve assembly is a pulse width modulated actuator mounted to the rear drive assembly. Ignition voltage is supplied to the clutch pump actuator check valve through a fused circuit. The PCM controls the actuator with a negative duty cycle. The actuator controls the supply fluid to the pump inlet in the rear drive assembly. When the actuator is commanded OFF, the PCM will detect a high voltage. When the actuator is commanded ON, the PCM will detect a low voltage. At engine start-up, the actuator is turned ON at 49-90 percent duty cycle for 3 seconds, then drops to 16-28 percent for holding. Every 30 seconds, the duty cycle is ramped to 49-90 percent for 0.5 second, then back to 16-28 percent. If the PCM detects a voltage on the axle actuator circuit that is outside of the calibrated limits then the all-wheel drive (AWD) disable lamp illuminates.

Conditions for Running the All-Wheel Drive (AWD) Disable Fault

- The system voltage is 9-18 volts.
- The engine speed is greater than 500 RPM for 5 seconds, and the engine is not in fuel shut-off.
- The rear drive module must not be in an overtemperature condition.

Conditions for Turning On the All-Wheel Drive (AWD) Disable Lamp

The AWD disable lamp illuminates when one of the following conditions exists for 5 seconds:

- The PCM commands the solenoid ON and the voltage feedback remains high, B+.
- The PCM commands the solenoid OFF and the voltage feedback remains low, 0 volts. This condition is present for 3 key cycles.

Action Taken When the All-Wheel Drive (AWD) Lamp Illuminates

- The PCM does not illuminate the malfunction indicator lamp (MIL).
- The PCM inhibits AWD.
- The PCM records the operating conditions when the Conditions for Setting the DTC are met. The PCM stores this information as Failure Records.
- The PCM stores the AWD disable fault in PCM history.

Conditions for Clearing the All-Wheel Drive (AWD) Disable Fault

- A scan tool can clear the fault.
- The PCM clears the fault from PCM history if the vehicle completes 40 warm-up cycles without a non-emission related diagnostic fault occurring.
- The PCM cancels the fault default actions when the fault no longer exists.

Important: When an AWD mini spare disable condition is present, after correcting the condition, the vehicle must be driven 0.5 km (0.3 mi) in a straight line and then brought to a complete stop before the PCM will command the AWD disable lamp OFF.

Diagnostic Aids

An ABS DTC may cause the AWD Disabled light to illuminate. Check for ABS DTCs if no AWD fault is present.

Test Description

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

3. This step tests the ignition 1 voltage circuit for proper voltage.
4. This step tests the ground circuit for an open.
5. This step tests the axle actuator control circuit duty cycle.
6. This step tests the axle actuator control circuit for an open or short.

Step	Action	Value(s)	Yes	No
<i>Schematic Reference: Differential Lock Schematics</i>				
1	Did you perform the Diagnostic System Check - Rear Axle Controls?	--	Go to Step 2	Go to Diagnostic System Check - Rear Axle Controls
2	Verify the fault is present. Does the system operate normally?	--	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	<ol style="list-style-type: none"> 1. Disconnect the differential clutch pump actuator check valve. 2. Turn ON the ignition, with the engine OFF. 3. Using a DMM, test the ignition 1 voltage circuit for proper voltage. Does the voltage measure within the specified value?	9-14 V	Go to Step 4	Go to Step 7
4	<ol style="list-style-type: none"> 1. Connect a test lamp between the ignition 1 voltage circuit and the ground circuit at the differential clutch pump actuator check valve. 2. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	--	Go to Step 5	Go to Step 8
5	<ol style="list-style-type: none"> 1. Turn the ignition OFF. 2. With the connector connected, connect a DMM in parallel to the control circuit. Set the DMM to read duty cycle. Important: The differential clutch pump actuator check valve duty cycle will initiate at 49-90 percent duty cycle for 3 seconds, then drop to 16-28 percent duty cycle. Every 30 seconds, the duty cycle will cycle up to 49-90 percent for 0.5 seconds, then back to 16-28 percent. 3. Start the engine. 	HI Range: 49-90% LO Range: 16-28%		

	<p>4. Observe AWD Duty Cycle on the DMM from the time of engine start.</p> <p>Is the duty cycle functioning as described?</p>		Go to Step 9	Go to Step 6
6	<p>Test the axle actuator control circuit for an open, short to voltage, or short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	--	Go to Step 11	Go to Step 10
7	<p>Locate and repair an open or short to ground in the ignition 1 voltage circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you complete the repair?</p>	--	Go to Step 11	--
8	<p>Locate and repair an open in the ground circuit. Refer to Testing for Continuity and Wiring Repairs in Wiring Systems.</p> <p>Did you complete the repair?</p>	--	Go to Step 11	--
9	<p>Replace the differential clutch pump actuator check valve. Refer to Differential Clutch Pump Check Valve Replacement.</p> <p>Did you complete the replacement?</p>	--	Go to Step 11	--
10	<p>Replace the PCM. Refer to Powertrain Control Module (PCM) Replacement in Engine Controls-3.4L.</p> <p>Did you complete the replacement?</p>	--	Go to Step 11	--
11	<p>1. Use the scan tool in order to clear the faults. 2. Operate the vehicle within the Conditions for Running the All-Wheel Drive (AWD) Disable Fault, as specified in the supporting text.</p> <p>Does the fault set?</p>	--	Go to Step 3	Go to All-Wheel Drive (AWD) System Functional Inspection