Front Axle Will Not Disengage

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Circuit Description

The front axle control circuit consists of an electric motor actuator which engages and disengages the front axle. The front axle actuator motor consists of a permanent magnetic motor, a worm gear controlled plunger, a front axle switch and an electronic control circuit all within the actuator assembly.

The front axle actuator consists of the following circuits:

- The front axle control circuit, which is also connected to the transfer case shift control module
- The front axle switch circuit, which is also connected to the transfer case shift control module
- A battery feed circuit
- A ground circuit

When a shift to AUTO 4WD, 4HI or 4LO is requested, the transfer case shift control module engages the front axle by grounding the front axle control circuit through a current limiting driver.

Diagnostic Aids

A mechanical condition inside the front axle could prevent the shift fork from moving causing the motor to be stuck in one position. Refer to Symptoms - Front Drive Axle
See: Differential Assembly\Testing and Inspection\Symptom Related Diagnostic Procedures\Diagnosis By Symptom - Front Drive Axle\- Symptoms - Front Drive Axle

Test Description

Step	Action	Values	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**				
1	Did you perform the Diagnostic System Check – Vehicle?	—	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	1. Turn the ignition ON, with the engine OFF. 2. Ensure that the vehicle is in 2WD mode 3. Install a scan tool. 4. Using the scan tool, observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status as Locked?	—	Go to Step 10	Go to Step 3
3	1. Turn the ignition OFF. 2. Disconnect the front axle actuator. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage between the ignition 3 voltage circuit and the front axle ground circuit at the front axle actuator. Is the voltage reading within the specified values?	11–13 V	Go to Step 4	Go to Step 6
4	1. Connect a DMM between the ignition 3 voltage circuit and the front axle control circuit at the front axle actuator. 2. Observe the DMM, while using the scan tool in order to engage the front axle. Does the test lamp illuminate?	—	Go to Step 5	Go to Step 8
5	1. Connect a fused jumper wire between the ignition 3 circuit and the front axle switch circuit. 2. Using the scan tool, observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status Locked?	—	Go to Step 15	Go to Step 9
6	Measure the voltage between the ignition 3 voltage circuit and ground. Is the voltage reading within the specified values?	11–13 V	Go to Step 13	Go to Step 7
7	Test for an open fuse in the front axle feed circuit. Did you find and correct the condition?	—	Go to Step 17	Go to Step 14
8	Test the front axle control circuit for an open or high resistance. Did you find and correct the condition?	—	Go to Step 17	Go to Step 16
9	Test the front axle actuator signal circuit for an open or high resistance. Did you find and correct the condition?	—	Go to Step 17	Go to Step 16
10	1. Disconnect the front axle actuator. 2. Use the scan tool in order to observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status Locked?	—	Go to Step 11	Go to Step 12
11	Test the front axle actuator signal circuit for a short to voltage. Did you find and correct the condition?	—	Go to Step 17	Go to Step 16
12	Inspect the front axle for a mechanical malfunction. Did you find and correct the condition?	—	Go to Step 17	Go to Step 16

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Step	Action	Values	Yes	No
13	Repair an open in the front axle actuator ground circuit. Did you complete the repair?	—	Go to Step 17	—
14	Repair an open in the ignition 3 voltage circuit. Did you complete the repair?	—	Go to Step 17	—
15	Replace the front axle switch/actuator. Did you complete the repair?	—	Go to Step 17	—
16	Replace the transfer case shift control module. Did you complete the repair?	—	Go to Step 17	—
17	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	—	Go to Step 2	System OK

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

2. This step tests the electrical function of the front axle actuator and helps determine mechanical and electrical malfunctions.
3. This step tests for proper voltage and ground at the front axle actuator.
4. This step tests the operation of the front axle actuator control circuit.
5. This step tests the electrical function of the front axle actuator control circuit.
6. This step tests for proper supply voltage to the front axle actuator.
7. This step tests for open fuse in the ignition 3 voltage circuit.
8. This step tests the front axle actuator control circuit for an open or high resistance.
9. This step tests the front axle actuator signal circuit for an open or high resistance.
10. This step helps determine if the front axle actuator has a mechanical malfunction.
11. This step tests the front axle switch circuit for a short to voltage.
12. This step inspects the front axle for a mechanical malfunction.