

DTC B0429 Temperature Control #3 Rear Circuit Range/Performance

Circuit Description

The auxiliary air temperature actuator is an electronic stepper motor that is part of the air temperature actuator assembly. The HVAC control module supplies power and ground to the actuator. The HVAC control module controls the direction of the auxiliary air temperature actuator by changing the polarity of the control circuits. When the actuator reaches its desired position both circuits are fixed to the same value (9.5 to 12 volts). The HVAC control module determines the door position by counting pulses (voltage fluctuations) caused by the brush to commutator action generated during normal motor operation. The HVAC control module (IPM) monitors a voltage drop across an internal resistance to detect the pulses. The HVAC control module converts the pulses to counts with a range of 0 to 255 counts.

When a calibration or recalibration procedure is performed, the HVAC control module calculates the auxiliary air temperature door travel range. The HVAC control module commands the actuator to each extreme position and counts the total number of pulses. The HVAC control module compares the total number of pulses to calibrated limits. If the total pulse count is less than or equal to the maximum calibrated limit and greater than or equal to the minimum calibrated limit, then the calibration is considered successful.

Conditions for Running the DTC

The HVAC control module will run the DTC when either of the following conditions are met.

- The HVAC control module has completed a calibration/recalibration of the auxiliary air temperature actuator.
- The HVAC control module commands the actuator to move.

Conditions for Setting the DTC

The HVAC control module will set this DTC if either of the following conditions are true.

- The auxiliary air temperature actuator fails calibration/recalibration due to an over travel or under travel condition. (The HVAC control module does not detect the calibrated number of total pulse counts during a travel range check.)
- The HVAC control module determines that the actual door position does not equal the commanded door position. (The HVAC control module commands the door to move but does not see the expected number of pulses between positions.)

Action Taken When the DTC Sets

- The HVAC control module will attempt to make use of whatever range is still available.
- The HVAC control module will recalibrate the auxiliary air temperature actuator each time the ignition switch is turned ON.

Conditions for Clearing the DTC

- The DTC will become history if the HVAC control module no longer detects a failure.
- The history DTC will clear after 50 fault free ignition cycles.
- The DTC can be cleared with a scan tool.

Diagnostic Aids

- If condition not present refer to [Testing for Intermittent and Poor Connections](#) in Wiring Systems.
- Inspect the auxiliary air temperature door and the air temperature actuator assembly for the following conditions:
 - A misaligned air temperature actuator assembly. Refer to Air Temperature Actuator Assembly Replacement.
 - Broken or binding linkages or auxiliary air temperature door
 - An obstruction that prevents the auxiliary air temperature door from operating within it's full range of motion
 - Missing seals to the auxiliary air temperature door
 - Misaligned seals to the auxiliary air temperature door

Test Description

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

2. This step verifies that the HVAC control module is able to command the auxiliary air temperature actuator through its full range of motion.
3. This step verifies that the HVAC control module has successfully calibrated the auxiliary air temperature actuator.
4. If the actuator does not move at all, the problem is likely to be the drive circuitry within the HVAC control module, the actuator, or the wiring harness. If the actuator does move, but not within its full range of motion, the problem is likely to be a mechanical binding of the auxiliary air temperature door or auxiliary air temperature door linkage.
6. This step drives the actuator to the cold position. The auxiliary air temperature actuator will not move if the auxiliary air temperature door is already at the extreme position
7. This step drives the actuator to the hot position.

Step	Action	Values	Yes	No
<i>Schematic Reference:</i> HVAC Blower Control Schematics , HVAC Compressor Control Schematics , and HVAC Air Delivery/Temperature Control Schematics				
1	Did you perform the HVAC Diagnostic System Check?	--	Go to Step 2	Go to Diagnostic System Check
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, command the auxiliary air temperature actuator to hot and to cold. 4. Observe the Rear Temp Dr Actual parameter. Does the scan tool indicate that the value of the Rear Temp Dr Actual parameter changes from the minimum specified value to the maximum specified value?	18 Counts 238 Counts	Go to Step 3	Go to Step 4
3	With a scan tool observe the Rear Temp Dr Cal. Status parameter. Does the scan tool display Cal OK?	--	Go to Diagnostic Aids	Go to Step 8
4	Does the scan tool indicate that the value of the Rear Temp Dr Actual parameter changes by more than the specified value?	0-3 Counts	Go to Step 8	Go to Step 5
	Test the auxiliary air temperature door signal circuit and the auxiliary			

5	<p>air temperature door actuator drive circuit of the air temperature actuator assembly for an open, high resistance, short to ground or a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	--	Go to Step 13	Go to Step 6
6	<ol style="list-style-type: none"> 1. Remove air temperature actuator assembly. Refer to Air Mix Actuator Replacement - Passenger . 2. Turn OFF the ignition. 3. Connect a 10 amp fused jumper wire between the auxiliary air temperature door signal circuit of the air temperature actuator assembly and battery positive voltage. 4. Connect a 10 amp fused jumper wire between the auxiliary air temperature door actuator drive circuit of the air temperature actuator assembly and a good ground. <p>Does the auxiliary air temperature actuator shaft rotate?</p>	--	Go to Step 10	Go to Step 7
7	<ol style="list-style-type: none"> 1. Connect a 10 amp fused jumper wire between the auxiliary air temperature door actuator drive circuit of the air temperature actuator assembly and battery positive voltage. 2. Connect a 10 amp fused jumper wire between the auxiliary air temperature door signal circuit of the air temperature actuator assembly and a good ground. <p>Does the auxiliary air temperature actuator shaft rotate?</p>	--	Go to Step 10	Go to Step 8
8	<p>Inspect the auxiliary air temperature door and the air temperature actuator assembly for the following conditions:</p> <ol style="list-style-type: none"> 1. A misaligned air temperature actuator assembly. Refer to Air Mix Actuator Replacement - Passenger . 2. Broken or binding linkages or auxiliary air temperature door 3. An obstruction that prevents the auxiliary air temperature door from operating within it's full range of motion 4. Missing seals to the auxiliary air temperature door 5. Misaligned seals to the auxiliary air temperature door <p>Did you find and correct the condition?</p>	--	Go to Step 13	Go to Step 9
9	<p>Inspect for poor connections at the harness connector of the air temperature actuator assembly. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	--	Go to Step 13	Go to Step 11
10	<p>Inspect for poor connections at the harness connector of the HVAC control module. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	--	Go to Step 13	Go to Step 12
11	<p>Important</p> <p>Perform the recalibration procedure Re-Calibrating Actuators for the auxiliary air temperature actuator assembly.</p> <p>Replace the air temperature actuator assembly. Refer to Air Mix</p>	--		--

	Actuator Replacement - Passenger . Did you complete the replacement?		Go to Step 13	
12	Important Perform the recalibration procedure Instrument Panel Module Recalibration Procedure for the HVAC control module. Replace the HVAC control module. Refer to HVAC Module Assembly Replacement in Heating, Ventilation, and Air Conditioning. Did you complete the replacement?	--	Go to Step 13	--
13	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