



Mack Chassis - Automated Manual Transmission (AMT, mDrive) Clutch Control Actuator (CCA), Diagnostic And Inspection Information; CCA Reuse Or Replace Guidelines - US07 And Newer Emissions, Common Model Years 2008 And Newer



> Internal Content

When Fault tracing for a shifting complaint or fault codes the following items should be considered:

I. Gather information and check system function

1. Review service history to determine if the CCA has ever been replaced. Note the vehicle's current age, mileage, and engine hours.

-- High mileage or age of the vehicle can be a contributing factor in whether or not the CCA is worn and causing control problems that are being picked up in the diagnostic that logs the codes listed in the Fault Codes section.

2. Using Premium Tech Tool (PTT), perform the clutch tests below. Review the results to get a baseline of the health of the system.

NOTE: If a failure is identified, the failure should be investigated and repaired. The remaining tests should only be completed if the problem is still present following the repair. Warranty will not cover time spent on tests performed after an issue is found.

- 4111-08-03-02 - Clutch Wear Check, Test
- 4111-08-03-05 - Clutch Drag, Test
- 4111-08-03-06 - PWM Valves Clutch Activation, Test
- 4313-08-03-01 - Counter Shaft Brake Solenoid Valve, Test
- 4320-08-03-01 - Clutch Cylinder, Test
- 4320-08-03-32 - PWM Valves Clutch, Test

II. Check the Clutch Control Actuator (CCA) for leaks, Inspect Clutch components

- While this is intended to evaluate CCA function prior to removing the transmission from the chassis, the steps below may also be performed with the transmission out of the vehicle and PTT connected directly to the TECU.
- When evaluating the CCA for a leak and the unit still in the chassis, the Clutch Leak Test in PTT **will likely pass** in all but the most severe cases. Even when it does fail, the cause may not be the CCA. The airline or the CVU may be the cause.

1. From the Test tab in PTT, open operation [4320-08-03-32 PWM Valves Clutch](#). Run the Leak Test. This will cause the TECU to stop its attempts to release the clutch.

- **NOTE:** If the tests from section I were run immediately before this step and the ignition has not been cycled, this step may be skipped.

2. Open operation [4311-08-03-02 - Input Signals for Gear Selection](#) from the Test tab in PTT. Expand the sections for Clutch and Gear.

Refer to the animations below for Steps 3 and 4. The first method shown is preferred.

0:00 / 0:35

Method 1: Connect a hand-operated vacuum pump to the air supply port for the CVU. Drawing a vacuum via this port will compress the CCA.

0:00 / 0:21

Method 2: Insert a pry bar through the CVU opening. **Making sure the electrical harness is held aside**, use the pry bar to compress the CCA. Plug the CVU air supply port once correct position is reached.



WARNING

When using a pry bar, do not use excessive force on the CCA. Damage to the housing or other components could result.

The electrical harness is not a suitable surface for leverage and must be held out of the way when using a pry bar.

3. Unbolt the CVU and remove it from the housing. Leave the electrical connector plugged in.

4. Compress the CCA approximately half of its total travel.

5. Leave the vacuum pump connected or plug the air supply port.

6. In PTT, watch the value for Clutch Cylinder Position.

- **If the value increases**, there is an air leak in either the CCA or one of the air supply components that should be located and repaired.

- **If the value remains the same**, proceed to the next step.



Live UI



IMPORTANT

A CCA assembled with the rubber boot to prevent dirt and debris intrusion will most likely not be the source of an air leak. Other components should be checked carefully first, then the CCA checked thoroughly as outlined in section III-3 below.

7. Holding the electrical harness to the side, insert a pry bar into the CVU opening and rock the CCA back and forth as shown below.

VIDEO HERE </kaidara-fieldservice/File/TECHLINE/K58556584/CCA%20manipulation.mp4>

- Some play is normal and acceptable unless air leakage is observed while moving the CCA.
- If excessive play is observed, the CCA will need to be replaced. An example of excessive play (transmission removed for example only) can be viewed below:

VIDEO HERE [/kaidara-](/kaidara-fieldservice/File/TECHLINE/K58556584/CCA%20Excessive%20movement%20on%20gearbox.mp4)

[fieldservice/File/TECHLINE/K58556584/CCA%20Excessive%20movement%20on%20gearbox.mp4](/kaidara-fieldservice/File/TECHLINE/K58556584/CCA%20Excessive%20movement%20on%20gearbox.mp4)

8. Watch the Clutch Cylinder Position signal in PTT while moving the CCA as shown in the animation above.

- **If the signal shows large fluctuation, jumps or creeps up in value**, the CCA is worn and allowing air to pass around its seals.
- **If the signal shows a small fluctuation but returns to the same value each time**, the CCA is not leaking.

9. If the CCA is not leaking, inspect the other clutch components while the CCA is still compressed. A borescope is useful for this.

III. After removing the gearbox

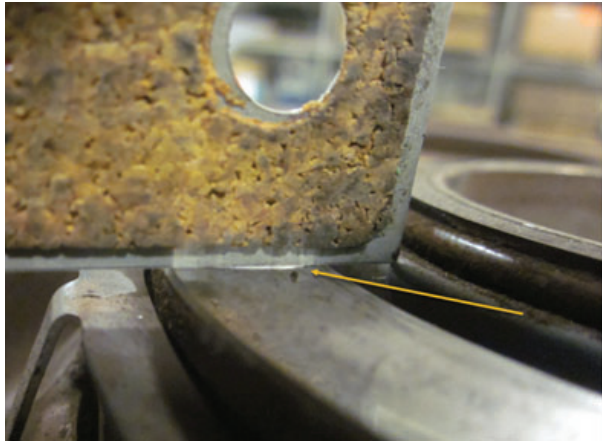
1. Check the face of the CCA bearing for wear.



Live UI

- the example below shows a bearing face with normal wear, caused by the movement

between the clutch fingers and the bearing face.



Wear as shown above does not cause a functional issue. The bearing should be reused if nothing else is found wrong.

- **NOTE:** With excessive wear accompanied by a clutch replacement, Replacement of the CCA should be considered as well.

2. Check the function of the CCA Bearing

- The bearing should turn freely and smoothly.

3. Check the CCA Guide Sleeves

The CCA has guide sleeves inside the assembly to keep the unit centered on the clutch. A video of a new, properly functioning CCA can be viewed below:

0:00 / 0:17

 Live UI

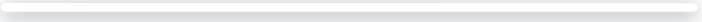
3.1. Compress the CCA about half way back in its travel and rock the bearing from side to side.

- Some play is normal and acceptable unless air leakage is observed while moving the CCA.
- If excessive play is observed, the CCA will need to be replaced. Refer to the video in the previous section for an example of excessive play.

4. Check for Air Leaks

Refer to the video below for steps 4.1 and 4.2:

0:00 / 0:07



4.1. Push the CCA all the way back and plug the Clutch Valve Unit (CVU).

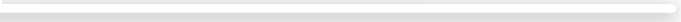
4.2. Observe the CCA for movement.

- **If air leaks out immediately and the CCA cannot hold position,** replace the CCA and its air supply line.

- **If air does not leak immediately but the CCA exhibited excessive wear,** rock the CCA from side to side as shown in the video below:

0:00 / 0:09

 Live UI



- If air leaks are observed, replace the CCA and its air supply line.
- If rocking the bearing does not produce an air leak, the CCA is likely **not** leaking.

5. Check for Heat Damage

- A CCA that has had a clutch failure with extreme heat should be inspected using the above procedures. A melted center dust boot or missing dust boot with extreme wear should be replaced. A CCA that passes all of the tests but has a melted position sensor can be reused and the sensor replaced separately. An example is shown below:



IV. Check The Transmission Electronic Control Unit (TECU)Software Level - **Vehicles built between 11/16 and 6/17 with an AMT-F ONLY**

- If the software is not the current version:

1. Update the TECU software if the SW is 23090996 or older.
2. Test drive the vehicle to ensure there are no other issues, then release.

- If the software is current:

No further action is required.**1.**



Tags

- k63231010
- p1075-38
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