

# Common Codes and Corrections for the Allison LCT 1000



by Steve Garrett

**W**e hear a lot of questions about diagnostic trouble codes for Allison's Light Commercial Truck (LCT) 1000 transmission. Many of the questions are common across the country. With that said, let's look at some of the codes you may run into for these vehicles.

## P0700

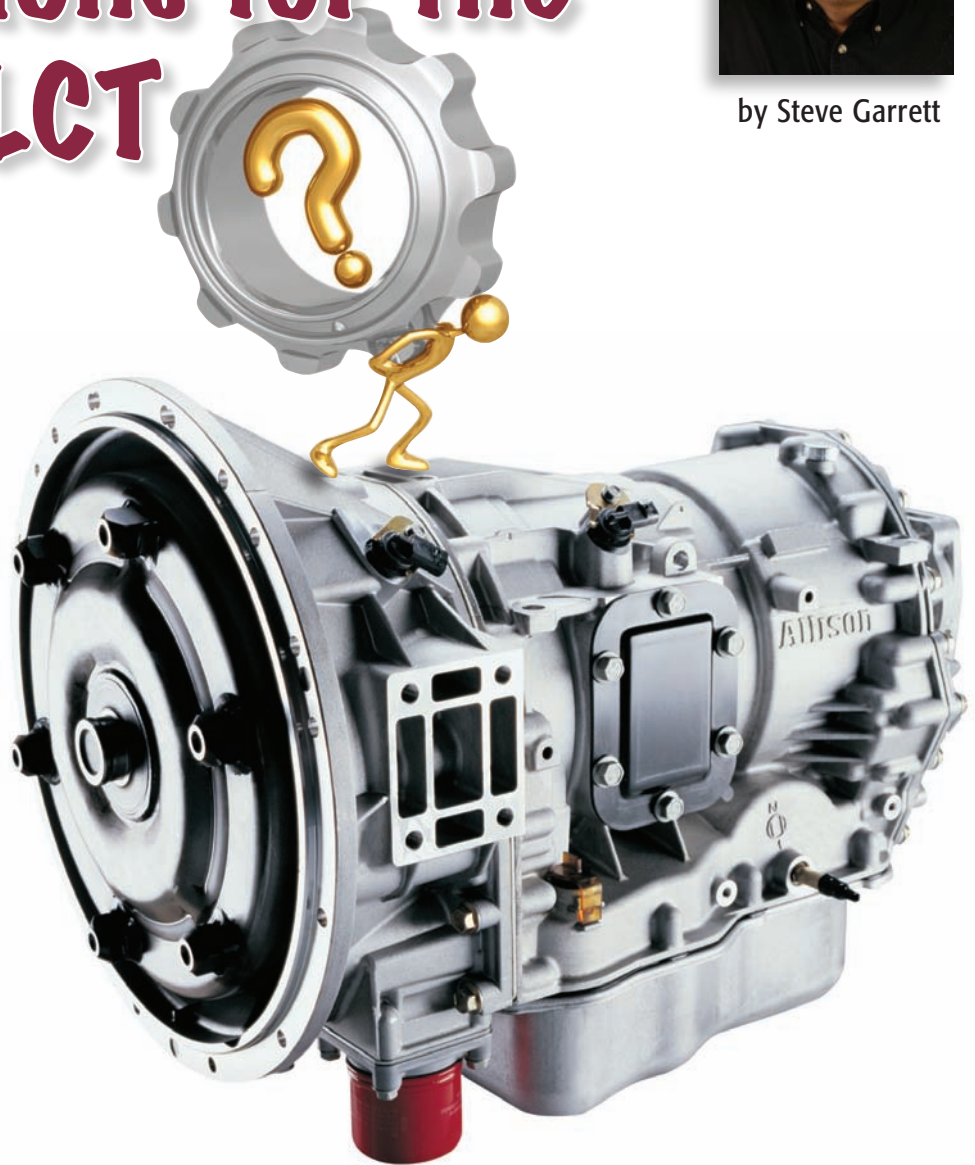
A lot of technicians find this DTC set; in most instances they find other codes set as well. While you're scanning the TCM for trouble codes on an LCT 1000 application, you should also scan the PCM.

P0700 sets in the PCM any time the TCM sets a code. This indicates that the TCM should have a code stored. P0700 isn't a code you'll be able to repair if it's the only one in memory. If the P0700 sets along with a P0802, check the MIL circuit for a short to ground or an open circuit. P0700 will set if:

- The TCM is requesting the MIL to light.
- P0802 (MIL circuit) isn't set.

## P0701

During startup, the TCM monitors the operation of the fluid pressure switch assembly. The TCM expects to see the pressure switches indicating pressure as soon as you start the engine. P0701 will set if:



- TFT indicates fluid temperature is above  $-13^{\circ}\text{F}$  ( $-25^{\circ}\text{C}$ ).
- Engine exceeds 600 RPM for more than 6 seconds.
- Forward or reverse range is selected.
- The pressure switches indicate no pressure at startup (2–6 seconds).

Generally this code will be associated with a delayed engagement. This may have occurred after a fluid change or a rebuild. If code P0701 is present:

- Clear the code and see if it comes back on a cold restart.

If the problem doesn't show up again, you can be reasonably certain it was a pump priming issue during the initial start. This problem usually occurs after a service or rebuild.

- Inspect the fluid level. If the level is low, P0701 may set.
- If the vehicle is placed in gear immediately after starting during cold temperatures, the code may set.
- Inspect or replace the filter and seal. If the pump is cavitating, a P0701 will set.

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\*U.S. Patent 6,899,211

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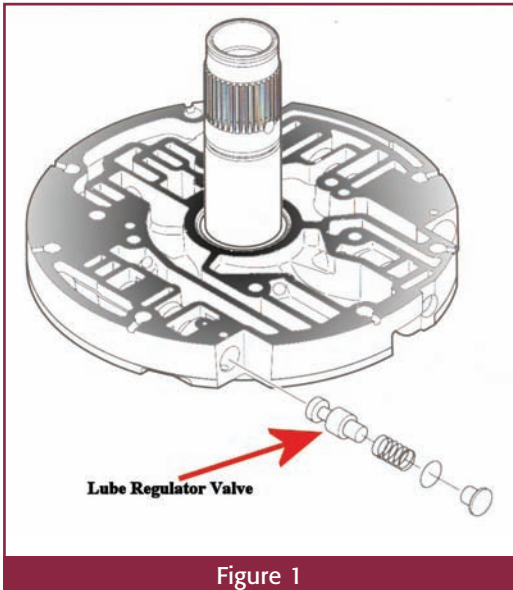


Figure 1

- Inspect for a sticking or damaged main regulator valve.
- Inspect for a sticking or damaged lube regulator valve (figure 1). An updated valve kit is available for earlier applications under GM part number 88996718. This kit is designed to reduce the chance of air

being drawn into the converter circuit, which will affect the unit's ability to prime properly.

- Inspect the dipstick assembly. An updated, vented dipstick assembly has been released to address low fluid caused by venting; GM part number 15115171.
- Look for a worn or damaged pump.

### P0706

You may find difficulty locating this DTC in your shop manual for diagnosis. You may also discover that some scan tools won't be able to display this code; P0706

wasn't calibrated into 2005-and-earlier applications, even though your scan tool may display it. P0706 will set if the TCM detects an invalid internal mode switch (IMS) voltage sequence, and will often set in conjunction with P0722 or P0708. If your transmission isn't equipped with an internal mode switch, ignore the code. It is being falsely dis-

played by your scan tool.

If P0706 is set:

- Inspect the shifter cable adjustment.
- Inspect the internal mode switch circuits 771,772,773,776 for being open or shorted to ground.

### P0708

This code indicates a problem with the neutral safety backup (NSBU) switch or its circuits (Figure 2). In most cases several other codes will set along with P0708, including P0847, P0872, P0875, P1711, P1713 or U1000. In addition, other symptoms may be present, such as:

- A blinking or blank PRNDL display.
- Slow or no engagement or movement.
- Engine won't crank.

The condition is often intermittent, so if you cycle the ignition the symptoms disappear, but the DTC will remain in history status.

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P0708 will set if:

- The TCM detects an invalid neutral safety backup switch voltage sequence.
- The vehicle speed sensor (VSS) signal indicates the vehicle is moving. (with the selector in park?)

If P0708 is present, inspect:

- TCM calibration; an updated calibration has been released for early models.
- The neutral safety backup switch and shifter cable adjustments.
- Check for moisture in the neutral safety backup switch. This is very common with the early, 2-connector NSBU switch. The updated switch is available; GM part number 29540479.
- Missing or improperly installed neutral safety backup switch shields.
- The neutral safety backup switch wasn't fully installed onto the shifter shaft. Inspect

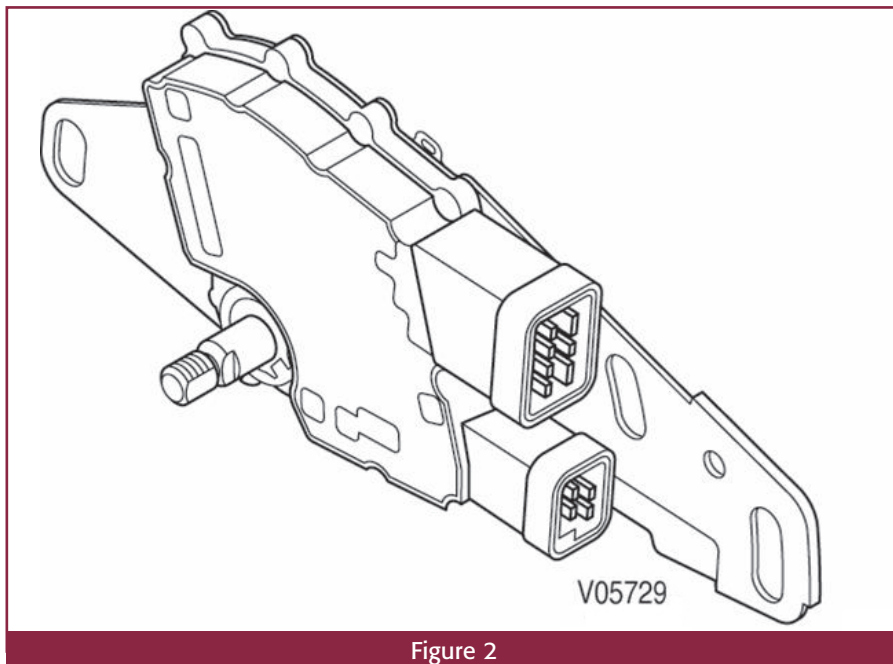


Figure 2

for burrs or damage to the shaft.

- An open or short to ground in one of the neutral safety backup switch circuits: pin A, circuit 771 (BLK/WHT); pin B, circuit 773 (GRA); pin C,

circuit 776 (WHT); pin D, circuit 772 (YEL).

### **P1711/P0872**

NOTE: P1711 was used in 2001-02 applications; P0872 replaced it for 2003-05 applications. These codes can

be caused by improper calibration. Make sure the calibration has been updated before attempting to repair this code.

The transmission pressure switch manifold (switch assembly) used in earlier LCT 1000 applications included one normally-closed and three normally-open pressure switches. P1711/P0872 will set if shift solenoid E is commanded off and pressure switch E remains on for more than 2 seconds.

Two common causes for P1711 are:

1. A lack of pump prime on a restart as described for codes P0701 or P0708.
2. A mechanical failure in solenoid E.

To help isolate the cause of the P1711/P0872:

- Key on, engine off.
- Use your scan tool to check the transmission pressure switches; pressure switches C, D and E should all be off.
- Start the engine.
- With the shifter in park, pressure switches C (PS 1), D (PS 2), and E (PS 3) should change from off to on.

If the switch status changes, electrically the system is functioning correctly. If a switch fails to change state, inspect the switch wiring for opens or shorts to ground. If the wiring and TCM check good, replace the pressure switch manifold assembly.

- Place the transmission into OD range.
- With the transmission in 1<sup>st</sup> gear with the engine running, the pressure switches should read C = off; D = on; E = off.

If switch E doesn't change to off when you put the transmission in gear, the E shift valve may be stuck in its bore, or the C shift valve may be worn, allowing pressure to bleed across to the E valve. This will force the E valve into the on position. If this occurs, DTC P1711 or P0872 will set after 2 seconds of operation.

This DTC may be hard to duplicate. To get the code to set more frequently and to isolate it more easily, it may be necessary to shut the engine off, restart

it, and place the transmission into OD range. If the DTC still fails to reset, you may need to drive the vehicle.

If you can get the DTC to reset as a current code:

- Select park and leave the engine running.
- Disconnect the clear, J1 connector from the TCM.
- Place the transmission into OD range (The PRNDL won't operate with the connector disconnected).

If the transmission defaults to 5<sup>th</sup> gear, the C shift valve may be sticking or leaking. If it defaults to 3<sup>rd</sup> gear, look for an electrical problem. To confirm your suspicions:

- Shut the engine off for at least 30 seconds.
- Restart the engine.
- Place the selector into OD range again (J1 still disconnected).

If the unit starts in 3<sup>rd</sup> gear now, suspect a leak in the C shift valve or circuit. If the unit starts in 5<sup>th</sup>, the C shift valve is likely sticking.

If a shift valve problem led to the DTC, it may be caused by contamination. The most common cause of dirt and sand contamination with these units is a crack in the adapter housing. If the unit had the early design adapter housing installed, repair the contamination and install the updated adapter housing. If the unit is equipped with the updated adapter housing and it's cracked, inspect the u-joints, driveshaft working angle, and driveshaft balance.

If the DTC wasn't set before you rebuilt the unit, suspect contamination caused during the rebuild.

## P0880

This code represents a battery supply voltage or ground problem with the TCM. This code typically sets in conjunction with one or more of these codes: P1760, P0562, P0561, U1000, U1301, U1305, U2105 and P1571. P0880 will set if the TCM loses power before the drive cycle is completed.

If a P0880 is set, inspect:

- Battery voltage feed to the TCM.
- TCM ground (G100, G104, G105, G106).

If power and ground circuits are okay, replace the ignition switch.

## Known Wiring Issues in 2001-2004 Vehicles

Several known conditions may cause multiple DTCs to set, default actions to occur, neutral-only operation, a flashing PRNDL display, and other symptoms.

1. Power Steering Return Line Clamp — Chafes the TCM harness on the clamp in the reservoir area.
2. Body Pinch Weld — Chafes the harness coming from the transmission in the bellhousing, body area.
3. Transmission Pass-Thru Connector — Chafes the harness on the exhaust hanger bracket. In addition, this connector is very difficult to plug into the transmission, so in many cases it isn't fully seated. Make sure the plug is seated all the way.
4. TCM Cover — Chafes the harness at the TCM connector area. The wiring will often be wedged under the cover.
5. Valve Body — Chafes the harness on the valve body.
6. TCM connectors aren't fully seated.
7. These ground circuits may be loose or corroded: G103 (gas) G105 and G105 (diesel) and G110.

As you can see, Allison's LCT 1000 can be a complicated and time-consuming unit to diagnose. Just keep in mind, having the right tools and service information can make your job easier and reduce your comebacks. Many of the codes we discussed really aren't that difficult to repair if you have the right information.

A lot of people don't like spending money for education, but there's little doubt a lack of education can cost far more. So until next time, keep on learning!



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## Electronic Components Benefits

- Sensors: Superior reliability and durability compared to off-shore and OE; eliminate limp mode comebacks
- Solenoids: Corrosion resistant and durable under the most severe operating conditions; reduce risk of solenoid failure

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