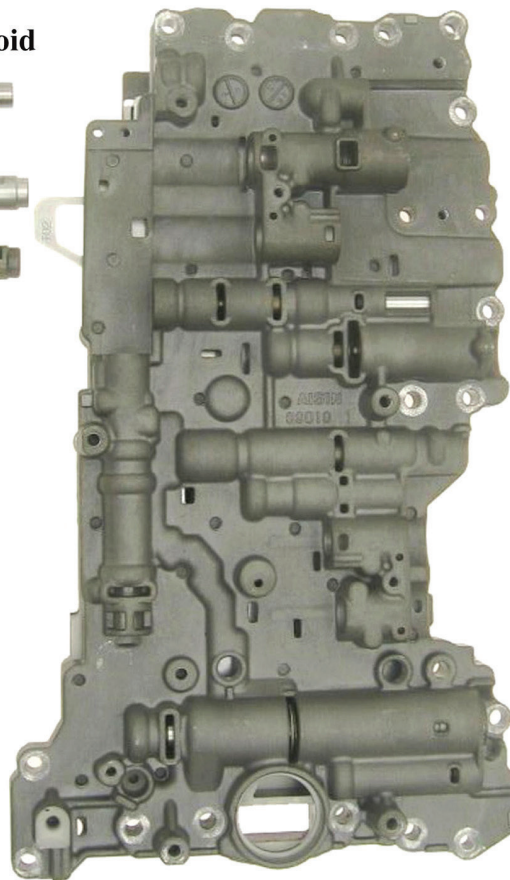




by Mike Brown
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Toyota's A750E

Neck Breaking Engagement



Toyota's A750E has been on the road for eight years now and they're racking up a lot of miles. As those miles add up, new problems are bound to show up.

The most common complaint we hear on the ATRA HotLine about this transmission is it falls out of gear when coming to a stop, then slams back into gear, sometimes so hard that it feels like someone has rear-ended you.

The unit falls out of gear because of low line pressure caused by a faulty SLT solenoid. The computer sees the problem and ramps the pressure up to maximum to overcome it, causing the unit to slam back into gear.

In virtually every case this condition is caused by a worn out line pressure control solenoid. Toyota calls it the SLT solenoid. The solenoid is fine electrically; the problem is wear in the mechanical components of the solenoid. In most cases the system doesn't even set a code.

The A750E uses four pressure control solenoids: the SL1 and SL2 solenoids provide clutch control, the SLU is for lockup control, and the SLT controls line pressure (figure 1).

| ID | Solenoid Name | Parts Catalog Description |
|-----|-------------------------------|--------------------------------|
| S1 | Shift Solenoid A | 3-Way Transmission Solenoid |
| S2 | Shift Solenoid B | Transmission Solenoid 3 |
| SR | Shift Solenoid E | 3-Way Transmission Solenoid 2 |
| SL1 | Pressure Control Solenoid A | Clutch Control Solenoid 1 |
| SL2 | Pressure Control Solenoid B | Clutch Control Solenoid 2 |
| SLT | Pressure Control Solenoid D | Line Pressure Control Solenoid |
| SLU | TCC Pressure Control Solenoid | Lockup Control Solenoid |

Figure 1

Here's what Toyota has to say about the SLT solenoid:

The linear solenoid (SLT) controls the transmission line pressure for smooth transmission operation, based on signals from the throttle position sensor and the vehicle speed sensor. The computer adjusts the SLT solenoid's duty cycle to control line pressure coming from the primary regulator valve.

Since the SLT solenoid controls line pressure, it works harder and longer than any of the other solenoids. Because of this, it's also the solenoid most likely to wear... and fail.

In fact, the SLT solenoid is becoming such a common failure on this unit that it wouldn't be unreasonable to consider replacing it during every high-mileage rebuild. The only problem is cost: The SLT solenoid goes for about \$200, and is currently only available from the dealer. There's no aftermarket replacement available right now.

So what can you do? Well, if you experience this problem and don't find any other likely cause for it, replace the

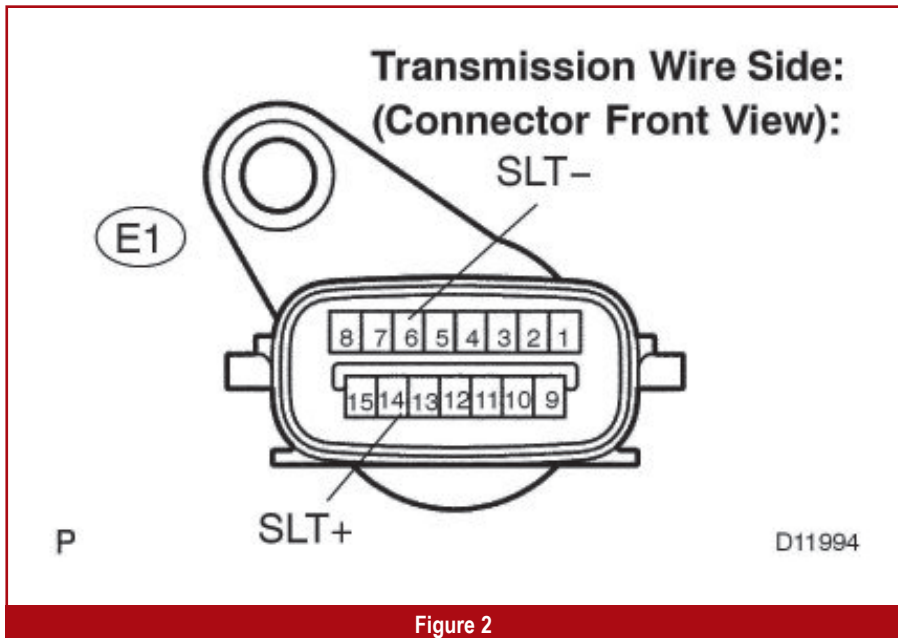


Figure 2

SLT solenoid. And to prevent it from happening after a rebuild, you may want to replace the solenoid on any high mileage rebuilds, even considering the cost.

Have a problem replacing a \$200 solenoid just "because it's due"? The answer is to have a solenoid tester. Test

the solenoid operation before you make a decision about replacing it. For most shops, a good solenoid tester is a must-have item these days.

Diagnostic Procedures

Of course, other conditions could cause similar problems with the A750E



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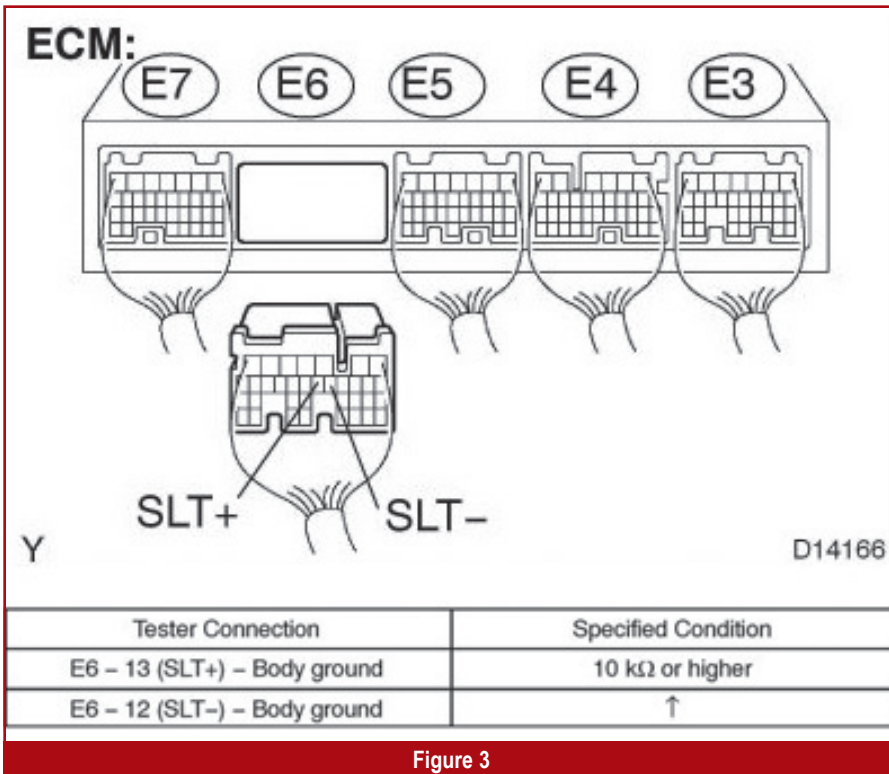


Figure 3

transmission or its solenoids. So it's always worthwhile to check the computer system operation, to rule out other conditions.

As usual, your first step in any computer system diagnosis is to check for diagnostic trouble codes. Toyota has two codes for the SLT solenoid: P2714 and P2716. P2714 is a solenoid performance code; P2716 is an electrical code.

Code P2714: The computer monitors slip between the turbine and output shafts to determine gear ratio, and compares that with line pressure and the SLT solenoid signal to identify problems in the system. It uses a 2-trip detection logic to set a code in memory.

If code P2714 is in memory, look for one of these conditions:

- SLT solenoid is stuck open or closed
- A sticking valve in the valve body

| A750E/F Line Pressure Specifications | | |
|--------------------------------------|-------------|-------------|
| Condition | D Position | R Position |
| Idling | 53-59 psi | 73-84 psi |
| Stall | 196-212 psi | 188-205 psi |

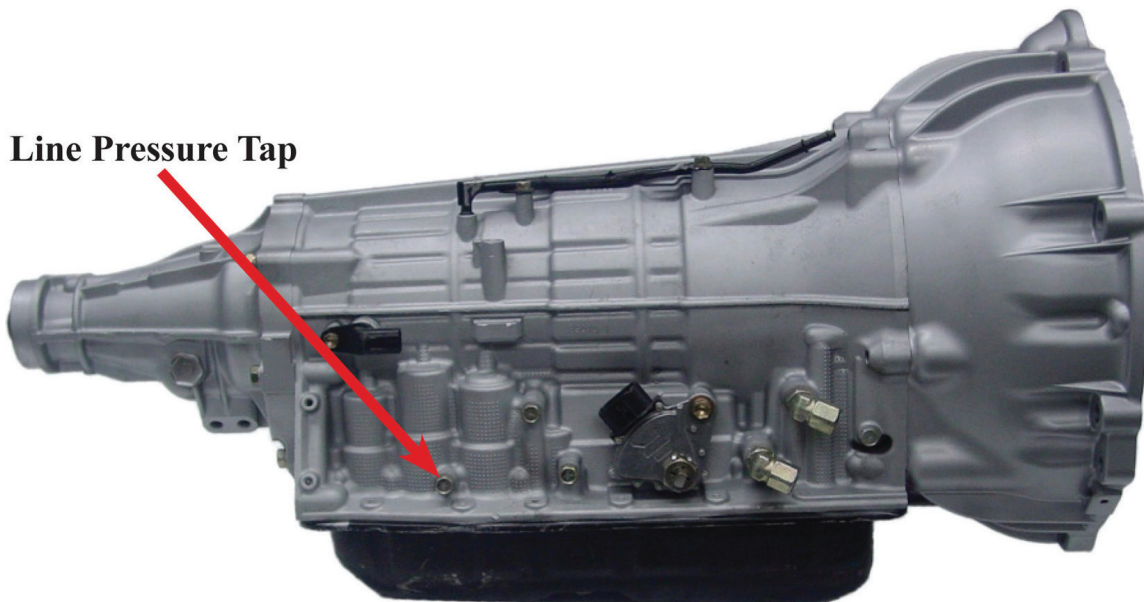


Figure 4

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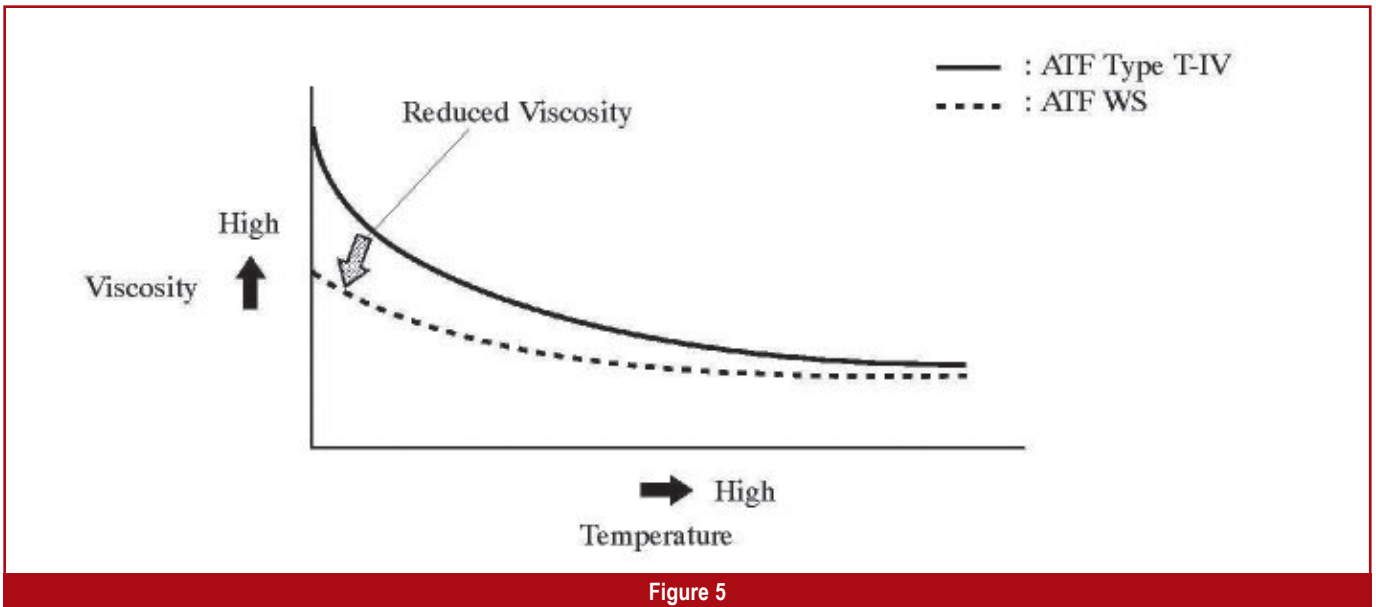


Figure 5

- The transmission is slipping (clutch, brake, or gears)

Code P2716: The computer uses a duty cycle signal to control the SLT solenoid, which controls line pressure. The computer creates its signal based on the throttle position signal and the engine power output.

The computer will set code P2716 if it detects an electrical problem in the SLT solenoid circuit for one second. This is a 1-trip detection logic.

If you have code P2716 in memory, look for one of these problems:

- An open or short in the SLT circuit
- A faulty SLT solenoid
- A faulty computer

SLT Circuit Test Procedure

- Disconnect the electrical connector from the transmission (figure 2).
- Measure the resistance between terminals SLT+ and SLT-. Resistance should be 5.5 ohms to 5.6 ohms at 68°F.
- Check for short to ground: Measure the resistance between SLT+ to body ground, and SLT- to body ground. You should have no continuity (infinite ohms). Any continuity indicates a faulty solenoid.

If SLT solenoid resistance is good and there are no shorts to ground:

- Reconnect the transmission electrical connector.
- Unplug the E6 connector from the computer (figure 3).
- Check the resistance between ter-

Line pressure should rise and drop evenly and smoothly. Sometimes a solenoid will appear to be working properly at idle and wide open throttle, but won't vary smoothly in the middle.

minals SLT+ and SLT- Resistance should be 5.5 ohms to 5.6 ohms at 68°F. If the resistance is outside of specs, look for a problem in the wiring between the computer and the transmission.

- Check for short to ground: Measure the resistance between SLT+ to body ground, and SLT- to body ground. You should have no continuity (infinite ohms). Any continuity indicates a short to ground between the computer and the transmission.
- If resistance is good and there are no shorts to ground, check power and grounds to the computer.
- If you find no other problems, replace the computer

Sometimes a code will take you straight to the problem; other times you won't have a code at all. If that's the case, perform a hydraulic pressure test (figure 4).

Line pressure should rise and drop evenly and smoothly. Sometimes a solenoid will appear to be working

properly at idle and wide open throttle, but won't vary smoothly in the middle.

Fluid Type

One thing to keep in mind when working on an A750E is fluid type. Toyota recommends genuine ATF WS to reduce the drag and improve fuel economy. This ATF has reduced viscosity in the practical operating temperature range (figure 5).

At higher-fluid temperatures, the viscosity is the same as Toyota ATF T-IV, to ensure the transmission's durability.

Always use genuine Toyota ATF WS in the A750E transmission.

Memory Reset

After completing your diagnosis and repair, always perform a memory reset. This allows the computer to clear the codes, and begin to relearn its operating parameters. You'll need to use a compatible scan tool to reset the memory; disconnecting the battery won't do it.

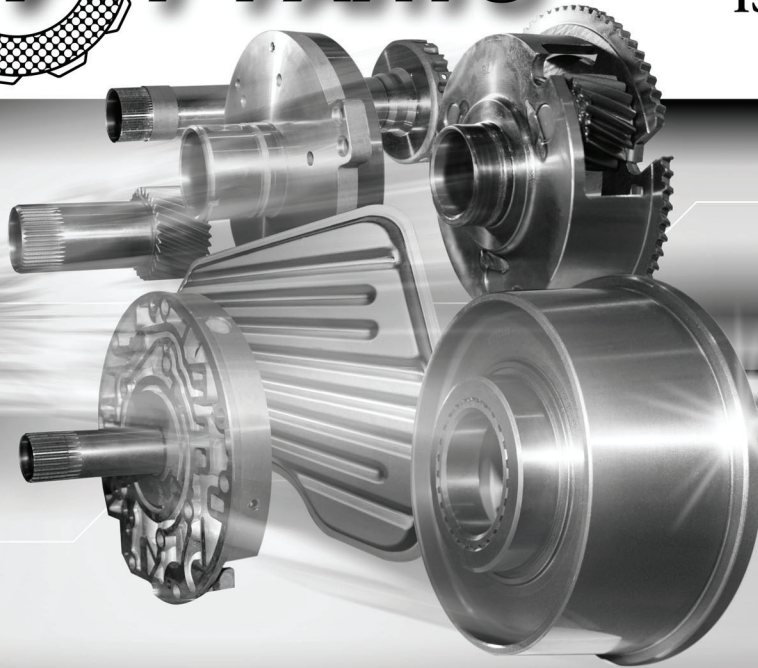
Once you've reset the memory, take the car for a complete road test to begin the computer relearn process.

Having the right information on hand can make it easier to identify and repair the *customers'* problems before they become *your* problems. And that's not just smart... it's *Street Smart!*





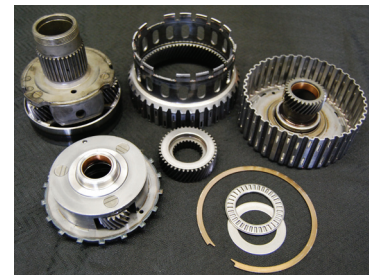
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