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Toyota's U660E: First Things First

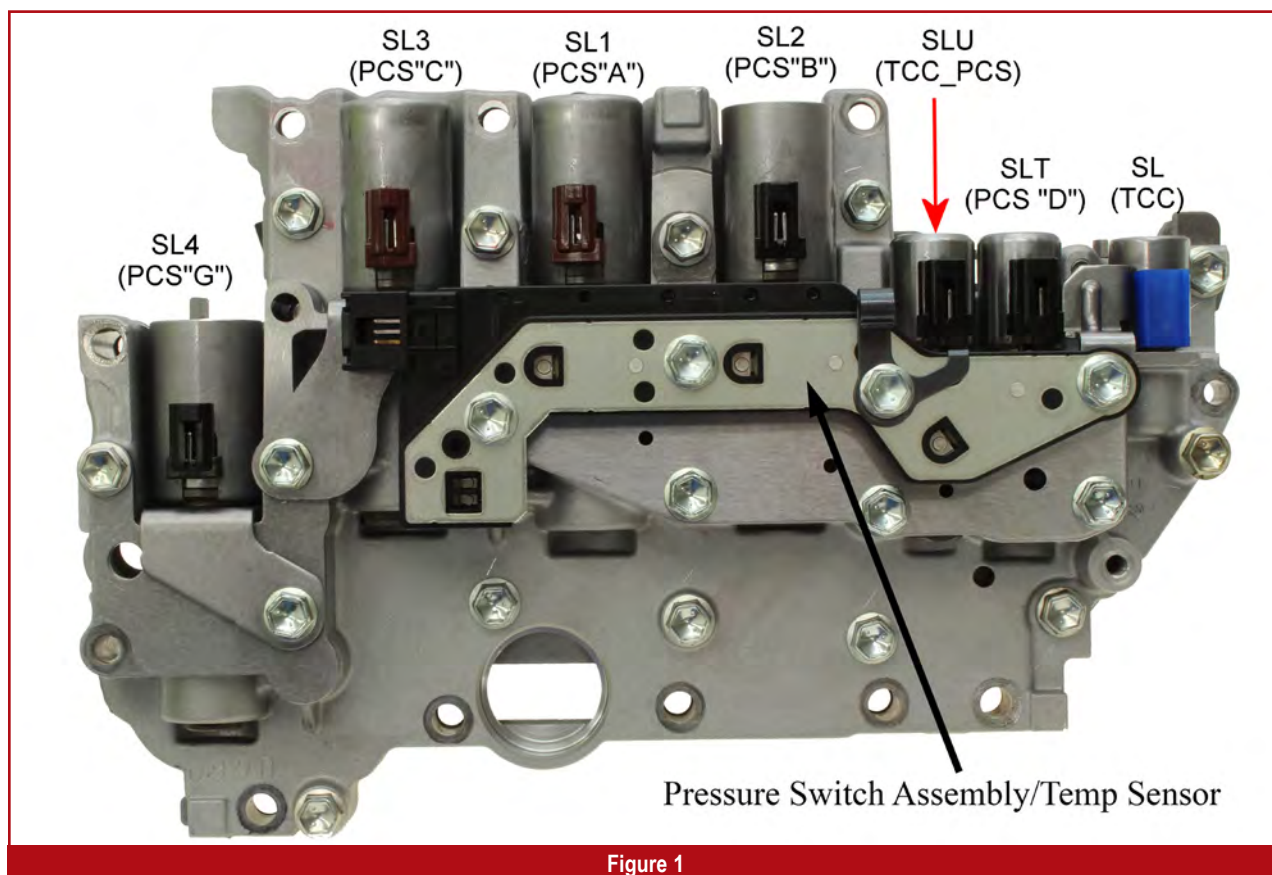


Figure 1

The U660E first appeared in the Lexus ES350 and the Toyota Camry in 2007, and was followed by five additional models in the U.S. over the next four years:

- RX350 2010-13
- Avalon 2008-12
- Highlander 2008-12
- Sienna 2010-13
- Venza 2009-13

Since then we've starting to see recurring problems with this unit; such as shifting and solenoid issues, to name a few. In this issue of *Street Smart*,

we'll cover problems plaguing the U660E valve body and solenoids.

Toyota and Lexus have a large number of computer system failures. Most diagnostic procedures only involve inspecting one circuit at a time. Others require replacement of the TCM, which has a history of failures.

Wrong Fluid Causes Shift Feel Problems

One of the biggest problems with this unit appears when someone doesn't use the right type of transmission fluid. This transmission requires ATF WS.

Using the wrong type of transmission fluid can cause many types of problems, such as a shift flare, harsh shifts, and TCC shudder. Similar to ZF, Mercedes, and Chrysler units, it just makes sense to have the correct fluid for the transmission.

SLT Solenoid Causes Multiple Shift Problems

This transmission has six linear-type solenoids, one on/off solenoid (figure 1) and typical for Toyota solenoids, the SLT (line pressure control) is one to watch. It's the most common

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solenoid to fail, and when it does, you're likely to experience symptoms such as falling out of gear while coming to a stop, slamming back into gear, or a long slide-bump on the shift.

Look for these codes to set: P2714 (SLT performance fault) or P2716 (SLT electrical fault).

TCC Shudder or No Lockup

The second solenoid likely to fail is the SLU torque converter clutch pressure control. When this solenoid begins to fail you can have a uncontrolled or no lockup, along with codes P2757 (SLU performance) or P2759 (SLU electrical).

An easy way to check these solenoids is through a scan tool; but if you don't have a scan tool that can communicate with the Toyota computer system, you can still check them the old fashion way. Disconnect the TCM from the transmission. The transmission connector pin ID (figure 2) will help you isolate the failure.

Measure the solenoid resistances: SLT, SLU, SL1, SL2, SL3, and SL4 should each be between 5.0–5.6 ohms; the SL should be between 11–15 ohms. If the solenoids aren't within specs, replace them.

Valve Body Assembly

Let's take a look at the valve body. As with most Toyota or Lexus transmissions, there are no exploded views of the valve body or checkball locations readily available.

So we created our own: With this information you could take these valve bodies completely apart, put all the pieces in a box, and have no problem putting them back together correctly later.

Middle Valve Body, Valve ID, and Spring Locations

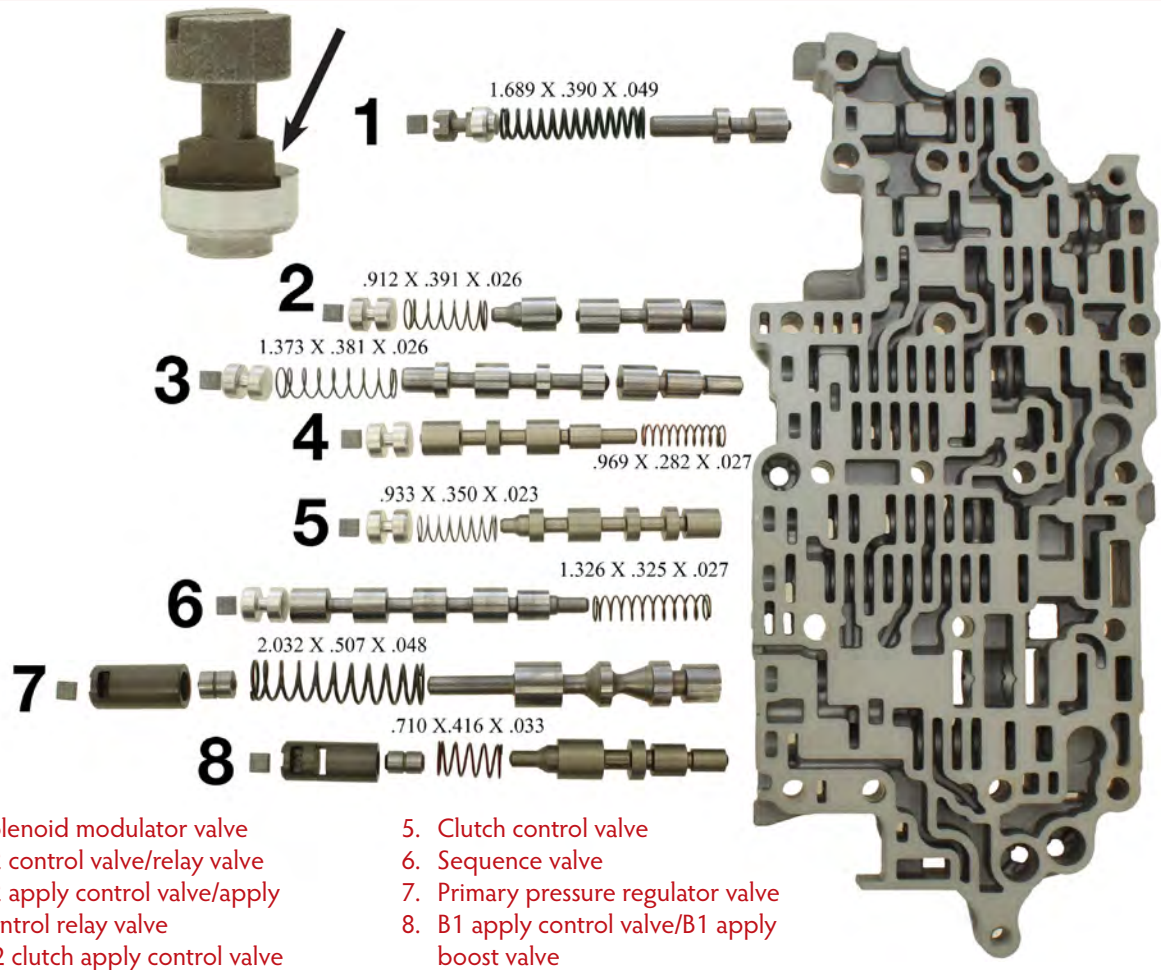
(figure3, page 12)

1. Solenoid modulator valve
2. B2 control valve/relay valve
3. B2 apply control valve/apply control relay valve
4. C2 clutch apply control valve
5. Clutch control valve
6. Sequence valve
7. Primary pressure regulator valve
8. B1 apply control valve/B1 apply boost valve



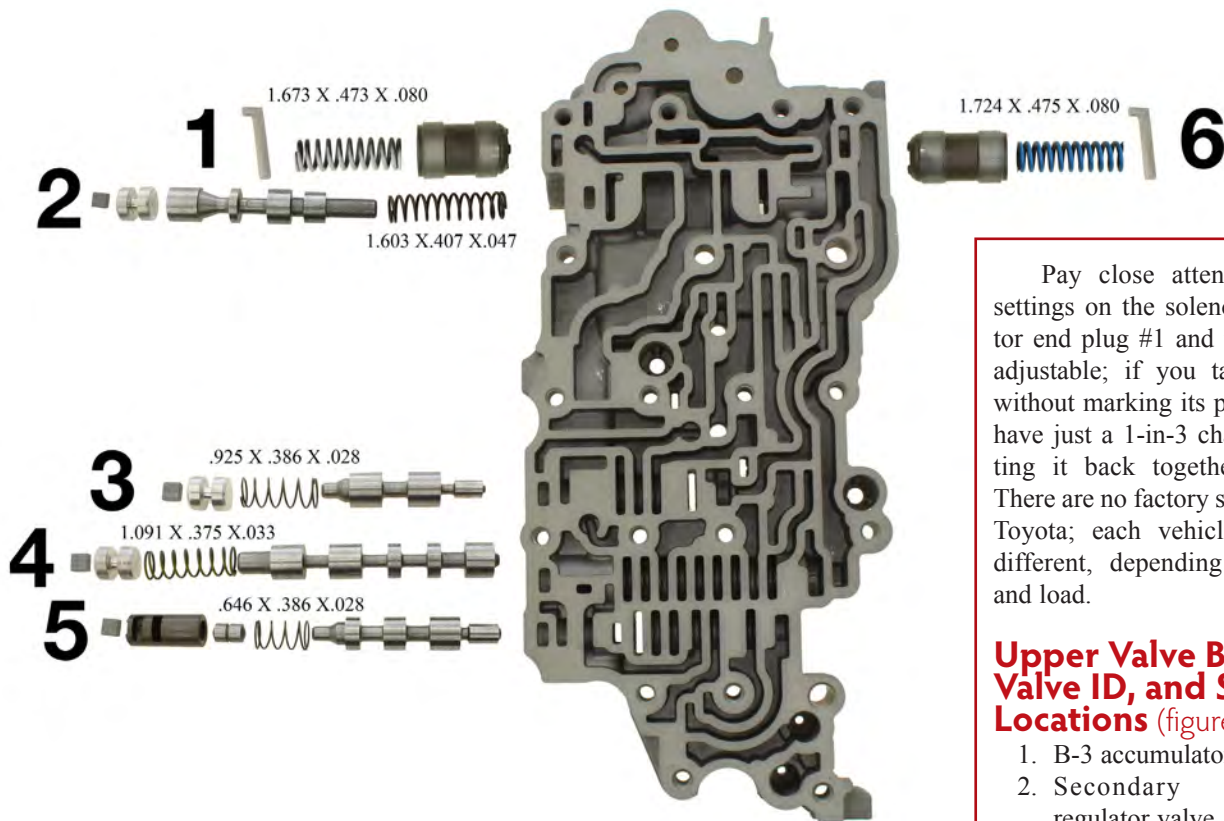
TERMINAL	FUNCTION
1	Turbine Speed Sensor Ground
2	Turbine Speed Sensor Signal
3	Counter Gear Speed Sensor Ground
4	Counter Gear Speed Sensor Signal
5	"SLU" Ground
6	"SL" Positive (This solenoid is internally grounded)
7	"SLT" Ground
8	"SL2" Ground
9	"SL2" Positive
10	Pressure Switch Number 1
11	"SLU" Positive
12	"SLT" Positive
13	"SL1" Ground
14	"SL1" Positive
15	"SL3" Ground
16	"SL3" Positive
17	Transaxle Fluid Temperature Ground
18	Transaxle Fluid Temperature Signal
19	Pressure Switch Number 3
20	Pressure Switch Number 2
21	"SL4" Ground
22	"SL4" Positive

Figure 2



- | | |
|---|--|
| 1. Solenoid modulator valve | 5. Clutch control valve |
| 2. B2 control valve/relay valve | 6. Sequence valve |
| 3. B2 apply control valve/apply control relay valve | 7. Primary pressure regulator valve |
| 4. C2 clutch apply control valve | 8. B1 apply control valve/B1 apply boost valve |

Figure 3



Pay close attention to the settings on the solenoid modulator end plug #1 and mark it. It's adjustable; if you take it apart without marking its position, you have just a 1-in-3 chance of getting it back together properly. There are no factory settings from Toyota; each vehicle model is different, depending on engine and load.

Upper Valve Body, Valve ID, and Spring Locations (figure 4)

1. B-3 accumulator
2. Secondary pressure regulator valve
3. Reverse sequence valve

Figure 4

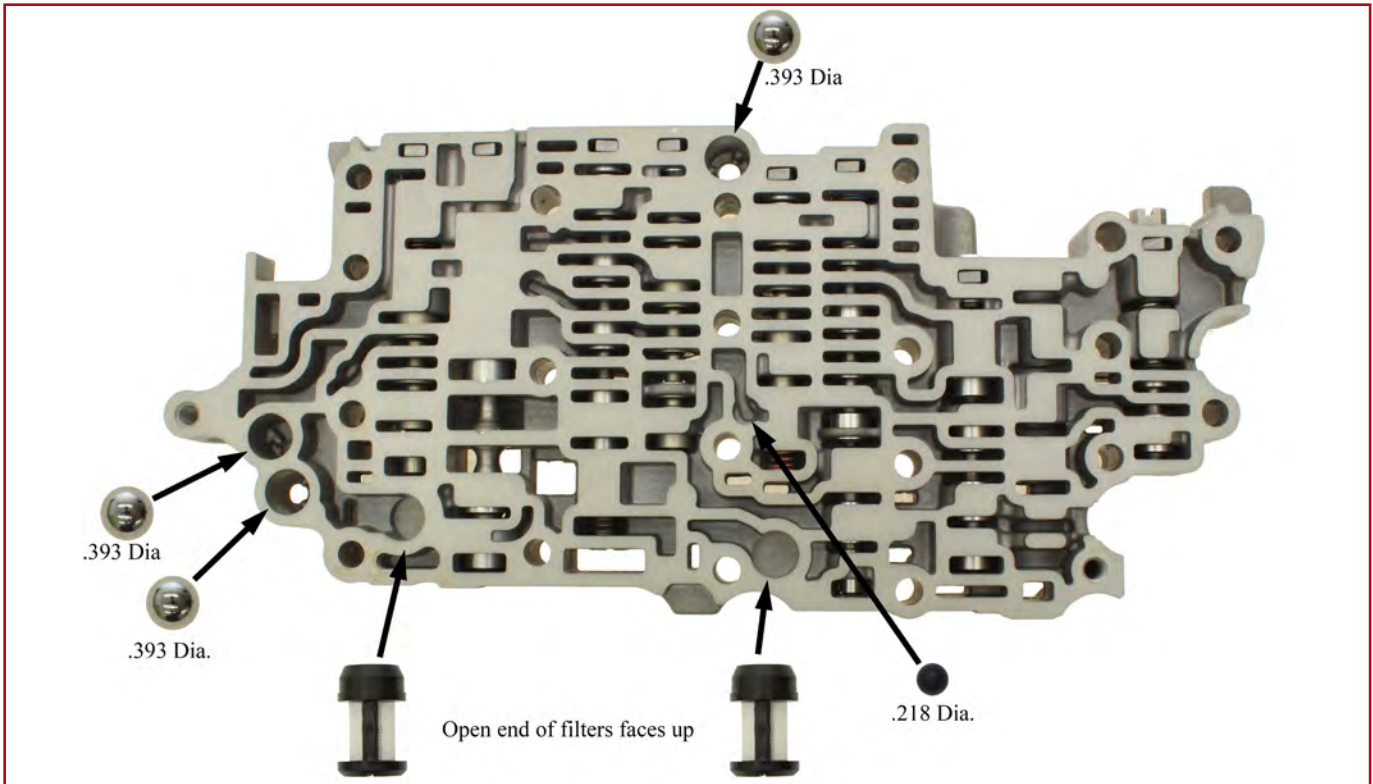


Figure 5

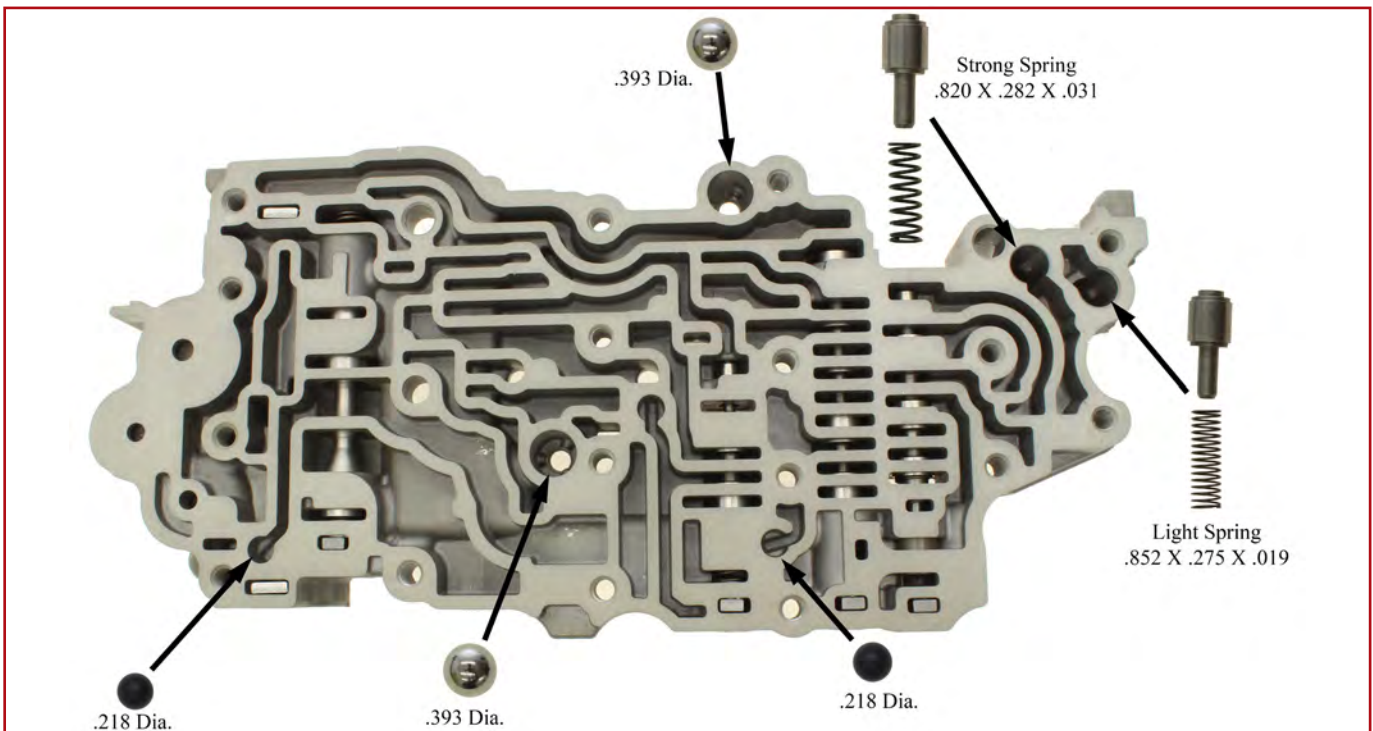


Figure 6

4. Lockup relay valve
5. Lockup control valve and lockup control boost valve
6. C-2 accumulator

In this part of the valve body look closely at:

- #3 reverse sequence valve and bore
- #4 lockup relay valve and bore
- #5 lockup control and boost valve

Middle Valve Body, Checkballs, and Filter Locations

During your disassembly, make sure the filter open end faces up. Unlike the A340, these filters don't snap into the plate. They sit in the channel casting with the open end facing up (figure 5).

If these filters are installed incor-

rectly it will cut off oil that specific location.

Upper Valve Body, Checkballs, and Check Valve Locations (figure 6)

Pay close attention to the separator plate and checkballs for wear (figure 6).



Figure 7



Figure 7A

Like most Toyotas, this is a pretty normal failure. When you turn over the upper valve body you'll see the C-1, B-1, and B2 accumulator pistons and spring locations (figure 7).

This is also the location of the input and output speed sensor assembly.

Installation

During installation, the valve body bolt locations are specific (figure 8). First, temporarily tighten the two bolts marked by (*) in figure 8. These bolts are used for positioning and will assist you in aligning the rest of the bolt holes. That'll make this an easy install, and that's not just smart... that's *street smart!*

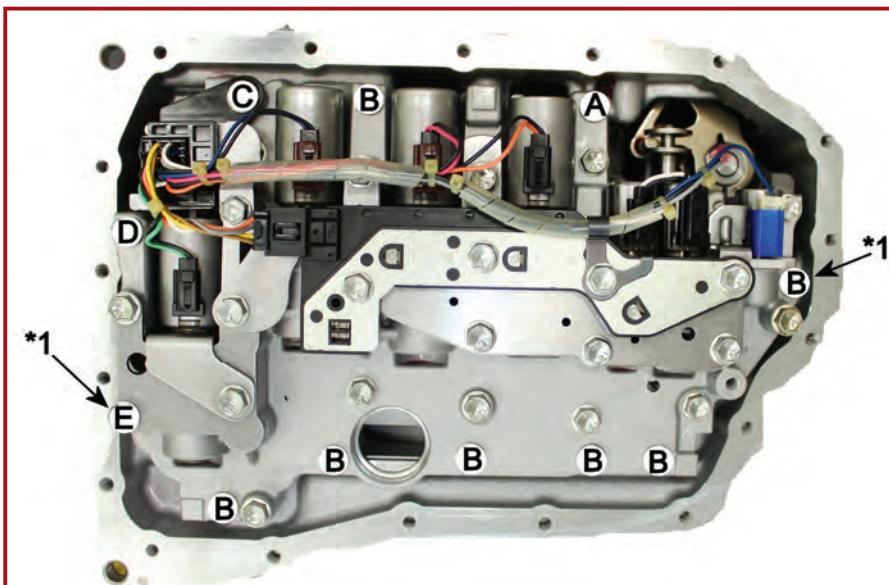


Figure 8

BOLT	BOLT LENGTH
A	25mm (0.98")
B	30mm (1.18")
C	35mm (1.38")
D	45mm (1.77")
E	55mm (2.17")
Torque: 11 N•m {112 kgf•cm, 8ft•lbf}	