LET'S PLAYBALL

The Ol' Switch-a-Roo

LCT 1000

by Lance Wiggins
members.atra.com

Nothing makes a diagnosis more difficult than when the manufacturer changes the specifics of the system under the guise of an update.

For the most part, codes are codes and the diagnostic routine remains the same. But occasionally the manufacturer will pull the ol' switch-a-roo and either not tell you about changes, or maybe you just missed it. In this article, we're going to cover the ol' switch-a-roo and how to identify it quickly.

Moreover, scan tools and computers are the same way. Little differences and different definitions can change everything. All manufacturers are guilty of updates. It's a good thing, but some updates come at the most inopportune times. Mid-year changes are the worst to deal with. Imagine rebuilding a unit with the same parts and a week later an update is available for the exact reason you had to build it in the first place.

Today we're going to talk about the LCT 1000 and the name changes the solenoids and Pressure switches have gone through. We're going to try to simplify the confusion.

There are three different, non-interchangeable valve bodies for the LCT 1000: the year breaks are 2000-2003, 2004-2011 and 2012-later.

There are many different features for each valve body: new separator plates, solenoids, valve body casings, retainers, Pressure switches and so on. So you might think with all this new stuff and updates and so on that the manufacturer might help out by keeping the diagnostic trouble codes uniform. Well, they did, but the names where changes to protect the innocent and confuse the technician. Here's where everything gets really confusing.

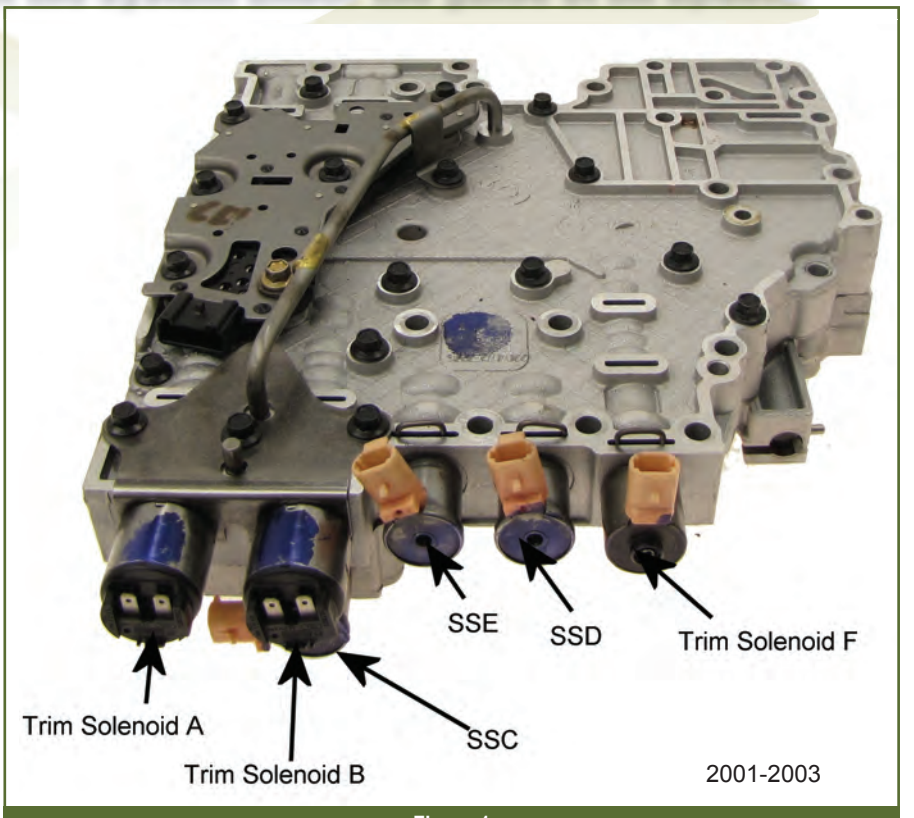

Figure 1

In 2000, when Allison released the LCT 1000 in light-duty trucks, the valve body consisted of these solenoids (figure 1):

1. Trim Solenoid A
2. Trim Solenoid B
3. Shift Solenoid C
4. Shift Solenoid D
5. Shift Solenoid E
6. Trim Solenoid F

In 2004, Allison made some changes to their transmission; specifically the

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Translab/Superior Part#	Box/Unit Codes
STL-HO4-323	A4RA, B4RA, M4RA, S4RA, BDRA, BMXA, SLXA, B46A
STL-HO4-365	BAXA, B6VA, MAXA, MDWA, MPJA, M6HA
STL-HO4-388	B7TA, B7VA, B7XA, B7YA, B7ZA, M7VA, M7ZA
STL-HO5-388	BAYA, BDGA, BGFA, BGHA, BGRA, BYBA, B7WA, MAYA, MGFA, MGHA, MGSA, M7WA
STL-HO5-MDKA	BDHA, BDKA, BJFA, BVLA, BWEA, BYFA, B36A, MDKA, MDPA, MDRA, MJBA, MJFA, MYFA, PN3A, PN4A, PSFA, PVLA, P34A, P35A, P36A
STL-HO5-4CYL	BCLA, BZHA, BZJA, BZKA-1, BZKA-5, BZKA-6, BZKA-7, BZNA-1, B90A, GPLA, GPPA-3, GPPA-4, MCLA, MCTA, MKYA, MKZA, MM2A, MM7A, MNZA-5, MPCA, MP5A, MRMA, MZHA, MZJA, MZKA-1, MZKA-2, MZKA-3, MZKA-4, MZKA-5, MZKA-8, M91A, SMMA, SPCA, SP5A

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valve body. The changes are (figure 2):

1. Pressure Control Solenoid A
2. Pressure Control Solenoid B
3. Shift Solenoid C
4. Shift Solenoid D
5. Shift Solenoid E
6. Modulated Main Pressure Solenoid G
7. TCC PWM Solenoid

In 2011, Allison yet again made changes to the valve body. They are (figure 3):

1. Pressure Control Solenoid 1
2. Pressure Control Solenoid 2
3. Shift Solenoid 1
4. Shift Solenoid 2
5. Shift Solenoid 3
6. Modulated Main Pressure Solenoid
7. TCC PWM Solenoid

In the midst of all of these updates, Allison made changes to the names of the solenoids and so did the scan tools definitions. Now that's a big deal, especially when a code like P0842 meant something might be wrong with solenoid C. Logically you might think solenoid C is now solenoid 3, right? Wrong! Solenoid C is actually now solenoid 1. Here are some helpful hints to guide you through the ol' switch-a-roo.

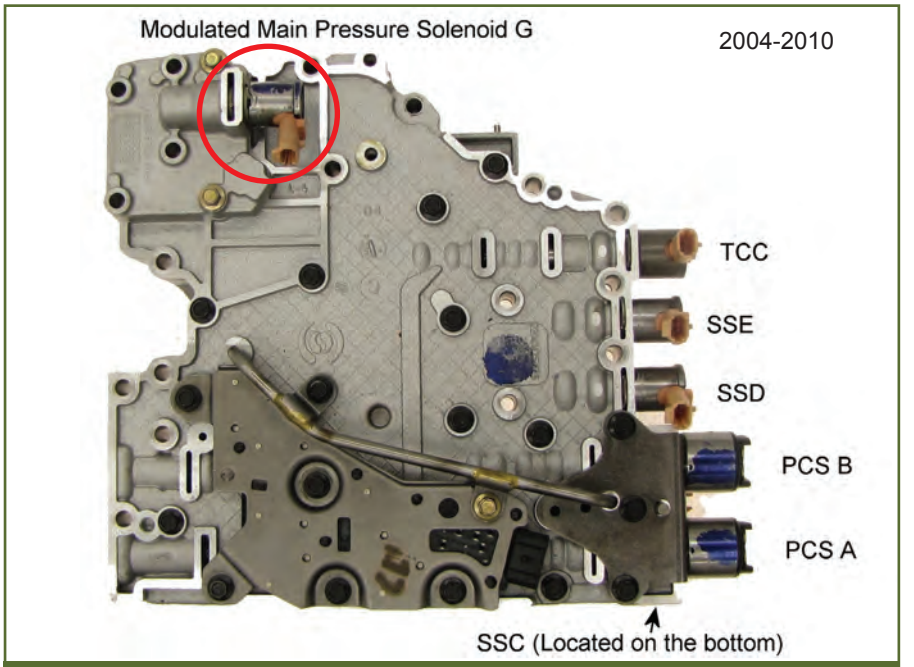

Figure 2

Before we get started, let's make solenoid identification easy from now on (figure 4):

1. Trim Solenoid A, PCSA, PCS1
2. Trim Solenoid B, PCSB, PCS2
3. Shift Solenoid C, SS1
4. Shift Solenoid D, SS2
5. Shift Solenoid E, SS3
6. Trim Solenoid F, TCC
7. Main Mod Pressure Solenoid G

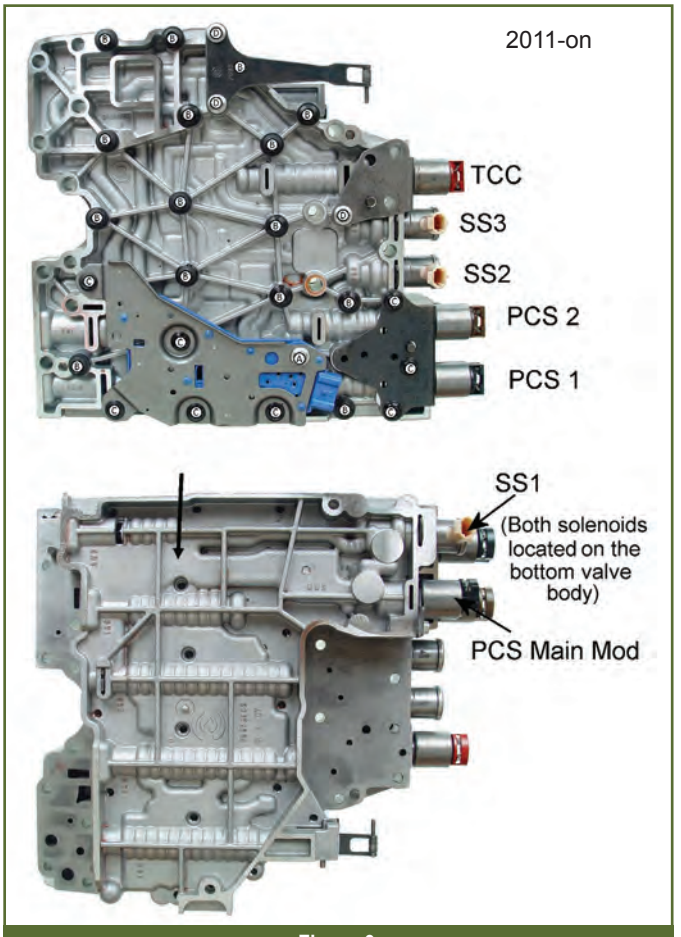

Figure 3

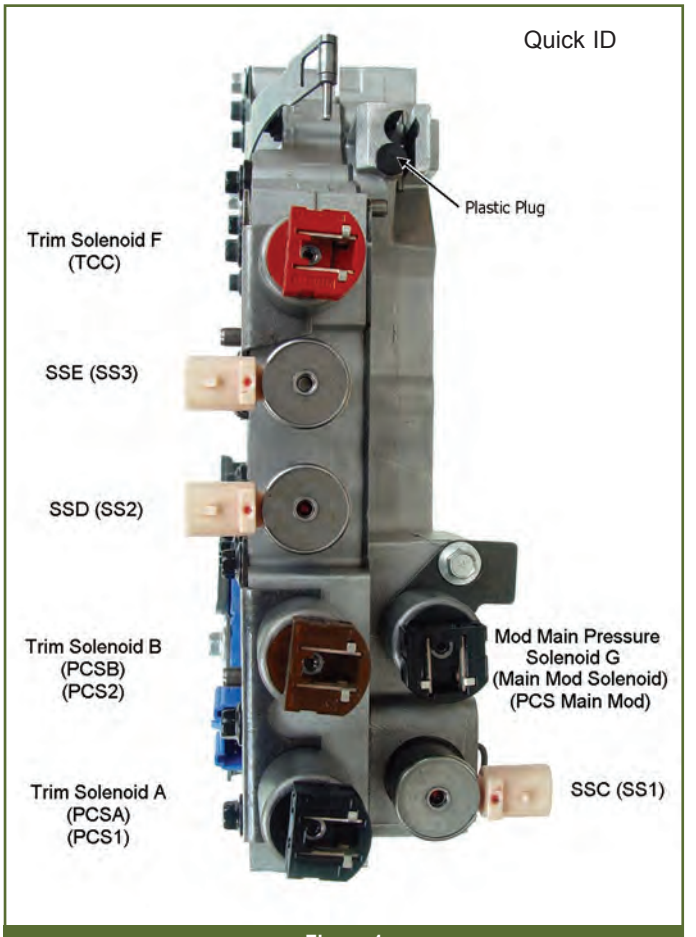

Figure 4

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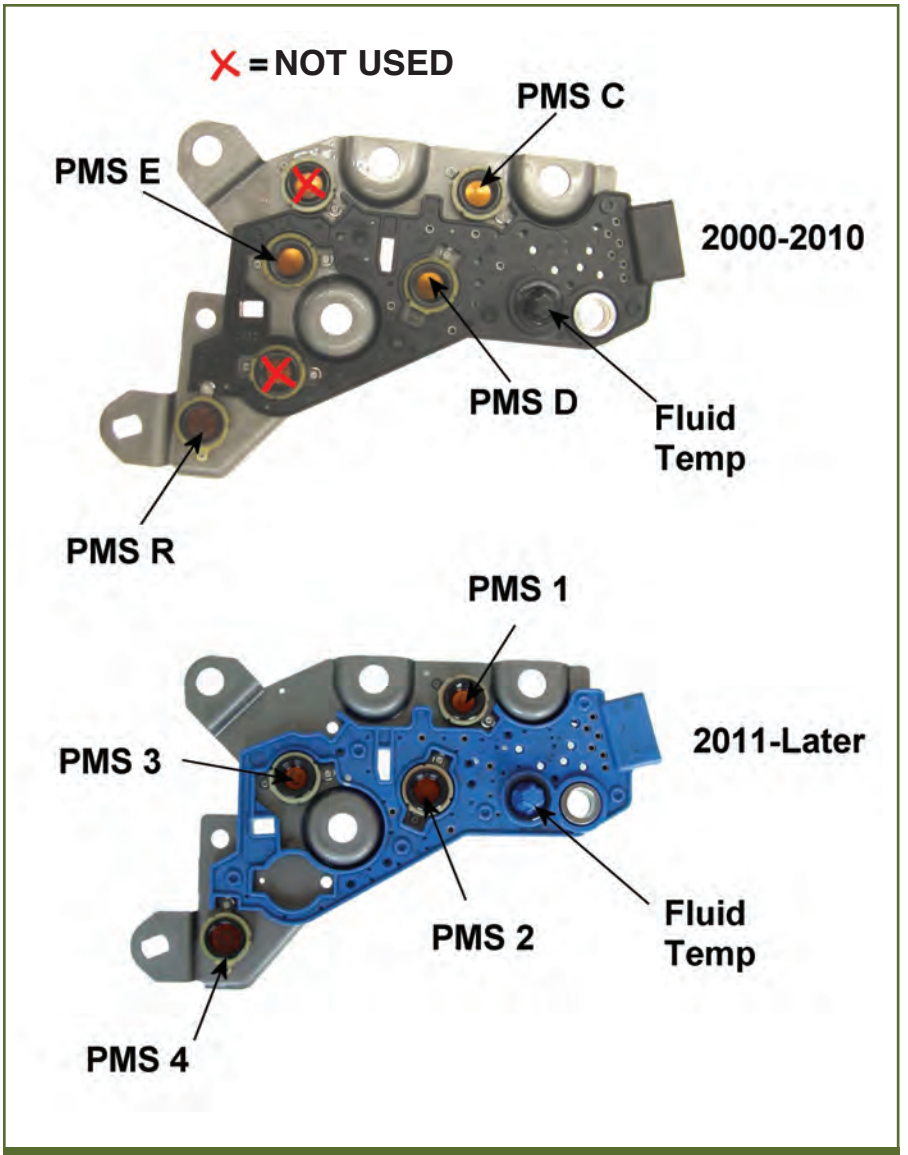

Figure 5

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
PS1 Signal	P0752, P0842	P0751, P0843	--	--
PS2 Signal	P0757, P0847	P0756, P0848	--	--
PS3 Signal	P0762, P0872	P0761, P0873	--	--

Figure 6

Performing the diagnostic system check on any vehicle prior to repair is crucial. Reviewing the strategy-based diagnosis is the next step; then verifying the complaint is key to the final repair. But what if the diagnostics took you in circles because of an update? Here's the issue:

DTC P0842: Transmission Fluid Pressure (TFP) Switch 1; or C Circuit Low Voltage

DTC P0847: Transmission Fluid Pressure (TFP) Switch 2; or D Circuit Low Voltage

DTC P0872: Transmission Fluid Pressure (TFP) Switch 3; or E Circuit Low Voltage

Description

The pressure manifold (PSM) switch is broken into two year breaks, 2000-2010 and 2011-later. It's a multiple switch assembly that is made up of either four or six switches, depending on what year you're working with (figure 5). The pressure switches communicate position to the transmission control module (TCM).

The position of the shift valves 1, 2, and 3 are controlled by three solenoids:

- shift solenoid 1/C (SS1/SSC)
- shift solenoid 2/D (SS2/SSD)
- shift solenoid 3/E (SS3/SSE)

When energized, SS1/SSC directs control main pressure to shift valve 1, SS2/SSD directs control main pressure to shift valve 2, and SS3/SSE directs control main pressure to shift valve 3, which strokes the shift valves.

When the valve strokes, an exhaust passage is blocked and fluid pressure to normally-open PS1/C, PS2/D, or PS3/E increases.

Depending on the year, the descriptions will change.

- Pressure switch 1/C (PS1/PSC) monitors shift valve 1 position.
- Pressure switch 2/D (PS2/PSD) monitors shift valve 2 position.
- Pressure switch 3/E (PS3/PSE) monitors shift valve 3 position.
- Pressure switch 4/R (PS4/PSR) monitors the position of the manual selector valve.

The pressure switches communicate its position to the transmission control module (TCM).

All of these codes — P0842, P0847 and P0872 — will require the same faults to run the code:

- The engine must be running for a minimum of five seconds.
- Ignition voltage must be greater than 9.0 volts and less than 18 volts.
- Shift valves 1/C, 2/D, or 3/E are commanded off, or in the rest position (not stroked).

The same goes for conditions to set the code: the DTC sets during steady state operation when either shift solenoid 1/C, 2/D or 3/E is commanded off and its related pressure switch indicates it's on for a second or more.

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TFP Switch Display Parameters	Normal Range	Short to Ground	Open/High Resistance	Short to Voltage
Operating Conditions: Ignition ON, engine OFF				
TFP Switch 1	High	Low	High	--
TFP Switch 2	High	Low	High	--
TFP Switch 3	High	Low	High	--
Operating Conditions: Engine running, transmission in park or neutral position				
TFP Switch 1	Low	Low	High	--
TFP Switch 2	Low	Low	High	--
TFP Switch 3	Low	Low	High	--

Figure 7

Testing the system is easy: With the engine running, command the transmission through the forward ranges with a scan tool

Range	Pressure Switch 1-N/O		Pressure Switch 2-N/O		Pressure Switch 3-N/O		Pressure Switch 4-N/C	
	Switch Status	Scan Tool Status	Switch Status	Scan Tool Status	Switch Status	Scan Tool Status	Switch Status	Scan Tool Status
R	Open	High*	Closed	Low	Closed	Low	Closed	Low
N	Closed	Low	Closed	Low	Closed	Low	Open	High
1	Open	High	Closed	Low	Open	High	Open	High
2	Open	High	Open	High	Open	High	Open	High
3	Closed	Low	Open	High	Open	High	Open	High
4	Closed	Low	Open	High	Closed	Low	Open	High
5	Open	High	Open	High	Closed	Low	Open	High
6	Open	High	Open	Low	Closed	Low	Open	High

N/C = Normally Closed
N/O = Normally Open
* Pressure switch 1 (PS1) reverts to the Closed/Low state with throttle applied in reverse.

Figure 8

When codes P0842, P0847, and P0872 set, the malfunction indicator lamp (MIL) will light. With the transmission in a forward range and shifting completed, the transmission will shift to another forward range, unless the transmission is compromised by overspeeding or direction change; in that case the transmission will shift to neutral and stay there.

DTCs P0842, P0847, and P0872 are Type A codes (figure 6 & 7). You may have to drive the vehicle to experience a condition.

DTC P0842 may indicate that SS1/C is damaged mechanically.

When DTCs P0752 and P0842 set together, it may indicate a grounded pressure switch circuit or shift valve 1 is stuck in the stroked position.

DTC P0847 may indicate that SS2/D is damaged mechanically.

When DTCs P0757 and P0847 set together, it may indicate an open pressure switch circuit or shift valve 2 is stuck in the stroked position.

DTC P0874 may indicate that SS3/E is damaged mechanically.

When DTCs P0762 and P0872 set together, it may indicate a grounded pressure switch circuit or shift valve 3 is stuck in the stroked position.

System Testing

Testing the system is easy: With the engine running, command the transmission through the forward ranges with a scan tool. Compare the TFP Switch 1/C, TFP Switch 2/D, and TFP Switch 3/E parameters in each forward range with the Pressure Switch Manifold Logic table (figure 8).

Verify with a scan tool the TFP Switch 1/C, TFP Switch 2/D and TFP Switch 3/E parameters are high. If TFP Switch 1/C, TFP switch 2/D, and TFP switch 3/E parameters are at the specified value, remove the valve body assembly and disassemble for cleaning. If valve body inspection is normal, replace the shift solenoid indicated by the DTC.

If any of the TFP switches aren't at the specified value, test the affected pressure switch signal circuit for a short to ground. If circuits test normal, replace the TCM.

Remember when your family member pulled the quarter out of your ear when you were a kid? This is similar: without knowing they updated a part, you'd never know a quarter could come out of your ear! Until next time, don't let the updates bite!

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6L45/50/80/90
Hard Shifts, No Shift
6L80/90
Slips in All Forward Gears, Slow Engagement, Fwd and Rev.
Planetary Noise, Planetary Damage
Unigear Planetary and Speed Sensor Design Change
No Fwd, Slips Moving Fwd, Neutrals on the 1-2 Shift, Check ball Location and Identification
Updated Spacer Plate and Added #8 Check Ball
1-2-3-4 Pressure Plate Identification and Installation
4L60E Hybrid
P2797
4L60/65/70E
No 2-3 Shift, Failsafe has 3rd Gear, After Overhaul
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Burnt 3-5 Reverse and 2-6 Delayed Reverse Engagement, Double Bump Reverse Engagement, Bang in Reverse
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Clutch and Brake Application and Ratio Chart
Self Learn Procedure
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Clutches and Brakes, Oil Pump, Aux Gear Box, Reduction Gear Set, Valve Body, Solenoids, Sensors and Valves
1ET35
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6R80
Starts in High Gear
4R70/75E/W
Dragging Sensation
Check Ball Identification
5R55S

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Harsh Reverse Engagement, Harsh 3-4 Shift

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Excessive Column Shift Efforts, Feels Frozen
DPS6
Shudder on Light Acceleration
Fluid Level

CFT30
Pressure Testing

CHRYSLER

41TE
DTC P0750, Multiple Solenoid Codes

45RFE
DTC P0888
Erratic TCC Operation
DTC P1791, Delayed Engagements

45/545/68RFE
Stalls the Engine in Forward and Reverse

545RFE
Wrong Gear Starts, P2706
DTC P0750, Multiple Solenoid Codes
High Speed Momentary Bind

68RFE
Updated Separator Plate, Solenoid Body and Check Ball Location
Clank Noise from Drive to Neutral
DTC P0871, OD Clutch Failure
DTC P0876, 2C Clutch Failure

48RE
#2 Check Ball Eliminated

62TE
Harsh Shifts

8HP45/W5A580
DTC P0730

722.6/NAG1
DTC P0748
DTC P0730, Limp Mode or Neutral Condition
Adaptation and Repair Verification

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F1 Roller Clutch and B2 Clutch

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Valve Body and Solenoid Identification
Dog Clutch Identification

IMPORT SECTION

Acura MDX
No Reverse

Odyssey B7TA/B7YA
All Solenoid Codes Set

Odyssey BYBA/BGRA
No 3rd or 4th Gear After Overhaul

MDX, MDKA
Bearing Noise While Driving, In Park and Neutral, Goes Away in Gear at a Stop

722.9
Check Ball Identification and Location
No Movement
Binds on the 3-4 Shift
Stuck in Failsafe
Stuck in Failsafe, Arratic Shifts, No 1-2 Shift
2-3 Flare After Rebuild

RE5F22A
Harsh Delayed Forward Engagement
Harsh Downshift
Erratic, Harsh, Soft or Rough 1-2 Shift

RE0F09A
AWD Noise, Damaged Gears, Cracked Case
Codes, Erratic Shifts, Harsh Engagements, Harsh 3-4 shift

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Valve Body Exploded View (Middle)
Valve Body Exploded View (Inner)
Valve Body Exploded View (Outer Small Parts)
Valve Body Exploded View (Middle Small Parts)
Valve Body Exploded View (Inner Small Parts)
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2-6 Brake Clutch Endplay Checks (Alternate Procedure)
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TCM Relearn Procedure
Specifications

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Valve Body Identification
Adaptive Learning