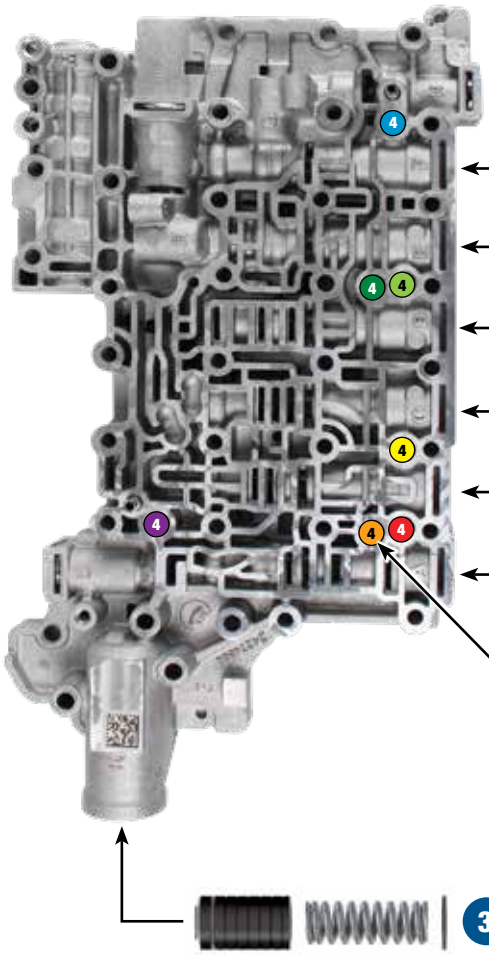
GM 8L45, 8L90 SHIFT ZIP KIT®

PART NUMBER 8L45-8L90-SHIFT-ZIP **QUICK GUIDE**

Parts are labeled here in order of installation. See other side of sheet for details on kit contents.

INSTALLATION DIAGRAM



Solenoid Body

(S2) 1-2-3-4-5-R/L — 1

(S1) 1-2-7-8-R — 2

(S5) 4-5-6-7-8-R — 2

(S3) 1-3-5-6-7 — 1

(S4) 2-3-4-6-8 — 1

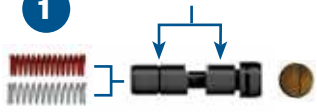
TCC — 1

4

3

NOTE: See corresponding VFS Solenoid & Signal Accumulator Piston Chart on page 2.

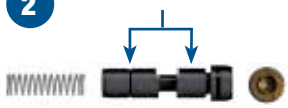
1 .443" dia.



NOTES:
- Use in 1 of 4 possible locations.
- Springs are selective;
  White = S2, S3 & S4 locations
  Red = TCC location
- See page 2 for more details.

NOTE: Additional valves can be purchased, Sonnax part no. **154740-11K**. A TCC valve is included with **8L45-8L90-TCC-ZIP**.

2 .426" dia.



NOTES:
- Use in 1 of 2 possible locations.
- See page 2 for more details.

NOTE: Additional valves can be purchased, Sonnax part no. **154740-13K**.

OE Design

.531" dia.

NOTE: Later design valve bodies have updated the S4 valve to this design. The Sonnax valve CANNOT be used in this location or shift complaints will occur.

Clutch Control Valve	TCC	(S4) 2-3-4-6-8 EARLY	(S4) 2-3-4-6-8 LATE	(S3) 1-3-5-6-7	(S5) 4-5-6-7-8-R	(S1) 1-2-7-8-R	(S2) 1-2-3-4-5-R/L
Inboard Spool Dia.	.443"	.443"	.531"	.443"	.426"	.426"	.443"
Outboard Face ID Mark							

In addition to general rebuilding tips and technical information, the technical booklet included in this kit contains vacuum testing and additional repair options for higher mileage units or for repairing specific complaints which are beyond the scope of this kit.

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Kit Contents & Installation Steps

Step 1 Replace S2, S3, S4 or TCC Clutch Control Valve

NOTES: Reference page 5 of the Installation & Testing Booklet for details on how to vacuum test the bores for wear. Install the replacement valve in the most worn bore.

Reference the end face identification mark and inboard spool diameters on all clutch control valves, as they vary. It is possible to install incorrectly, which will result in shift complaints.

Place scarf-cut seal into shallow groove on valve. Install spring into valve spring pocket. **Use the red spring for the TCC valve. Use the white spring for the S2, S3, or S4 valve.**

Packaging Pocket 1 Use in 1 of 4 Locations*

- Valve
- Springs (2), 1 Red, 1 White (Selective)
- Seal

Recommended: Vacuum Test Tool 154740-TL11
Optional: Bore Sizing Tool 154740-BST11
***Additional Kits Available Seperately:** 154740-11K

Step 2 Replace S1 or S5 Clutch Control Valve

NOTES: Reference page 5 of the Installation & Testing Booklet for details on how to vacuum test the bores for wear. Install the replacement valve in the most worn bore.

Reference the end face identification mark and inboard spool diameters on all clutch control valves, as they vary. It is possible to install incorrectly, which will result in shift complaints.

Place scarf-cut seal into shallow groove on valve. Install spring into valve spring pocket.

Packaging Pocket 2 Use in 1 of 2 Locations**

- Valve
- Spring, White
- Seal

Recommended: Vacuum Test Tool 154740-TL11
Optional: Bore Sizing Tool 154740-BST13
****Additional Kits Available Seperately:** 154740-13K

Step 3 Replace 1-3-5-6-7 Accumulator Piston

Install O-ring in the piston groove. Coat O-ring and piston with Sonnax Slippery Stick **O-LUBE** and roll on bench to size. Install piston O-Ringed end first into bore.

Packaging Pocket 3

- Piston
- O-Rings (2) 1 Extra
- Spring
- Washer

Step 4 Replace Signal Accumulator Pistons

NOTE: Reference page 6 of the Installation & Testing Booklet for details on how to vacuum test the bores for wear.

Install sleeve into casting bore. Install piston into sleeve with open end upward. Install spring into piston spring pocket. Install O-ring into groove in end plug. Lubricate with Sonnax Slippery Stick **O-LUBE** and roll on bench to size. Install O-ringed end plug into bore with recessed end upward. The small boss on the end plug should slide into the installed sleeve inner diameter.

Packaging Pocket 4

- Sleeves (7)
- Pistons (7)
- Springs (7)
- End Plugs (7)
- O-Rings (9) 2 Extra

NOTE: See corresponding chart bellow for detailed information.

VFS Solenoid & Signal Accumulator Piston Chart

VFS Solenoid	TCC	2-3-4-6-8	1-3-5-6-7	4-5-6-7-8-Reverse	1-2-7-8-Reverse	1-2-3-4-5-Reverse	Line Pressure
Current Control	NL	NH	NL	NH	NH	NL	NH
Signal Accumulator Piston	S7	S4	S3	S5	S1	S2	S6
Pressure Controlled (Circuit)	High (TCC/PTS Enable)	High (Line)	High (Line)	Low (AFL)	Low (AFL)	High (Line)	Low (AFL)
Related Complaints	Converter Apply/ Release Complaints; Burnt Converter	2nd, 3rd, 4th, 6th & 8th Gear	1st, 3rd, 5th, 6th & 7th Gear	4th, 5th, 6th, 7th & 8th Gear; Reverse	1st, 2nd, 7th & 8th Gear; Reverse	1st, 2nd, 3rd, 4th & 5th Gear; Reverse	Low Line Pres-sure; Slipping & Burnt Clutches; Various Shift Complaints

KEY: **NL** means increasing solenoid current increases solenoid output pressure and fluid flow.
NH means increasing solenoid current decreases solenoid output pressure and fluid flow.

GM 8L45, 8L90 SHIFT ZIP KIT®

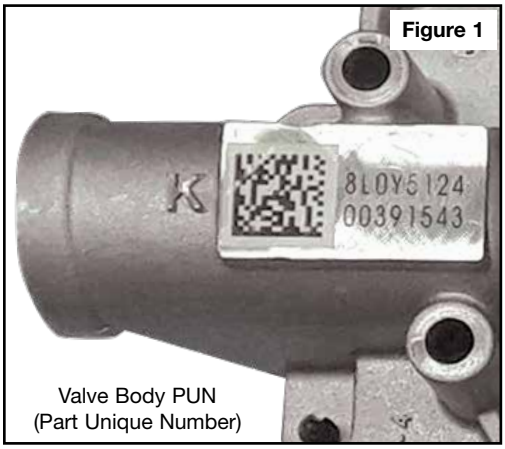
PART NUMBER 8L45-8L90-SHIFT-ZIP **INSTALLATION & TESTING BOOKLET**

CAUTION!

Solenoid Identification and Strategy

Clearly mark each solenoid to indicate what bore it is in before removing! The 8L45 and 8L90 use solenoid and valve body PUNs (part unique numbers, **Figures 1 & 2**) and TUN (transmission unique part number) for performance and shift strategy. The TUN is located on a tag on the side of the transmission case. The solenoid PUNs are individually programmed to the valve body PUN and transmission TUN in the TCM. If the solenoids are not placed back into the original bore, shift results will occur. Reference OEM information on when and how to reprogram if necessary.

Figure 1

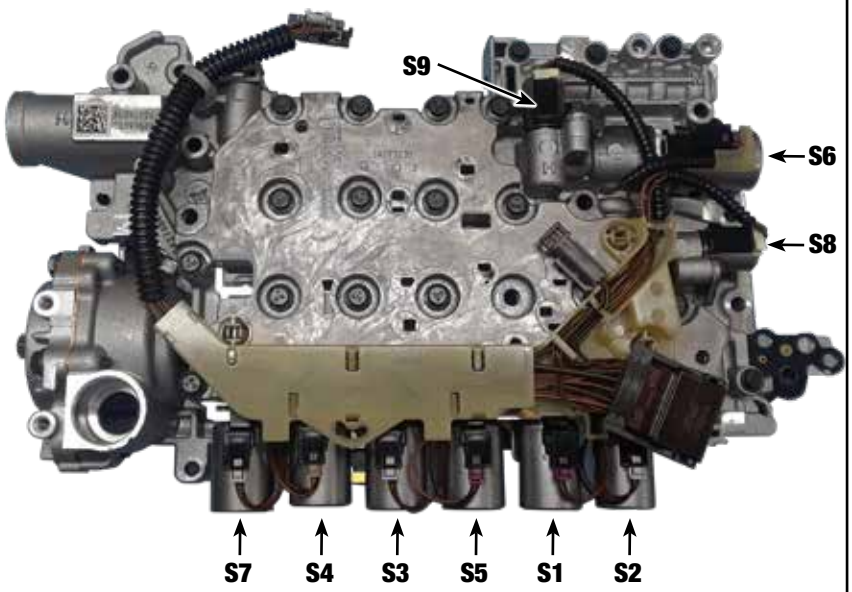


Valve Body PUN
(Part Unique Number)

Figure 2

Solenoid PUN
(Part Unique Number)

Figure 3



Solenoid Locations Shown on
8L90 Valve Body with Internal Wire Harness

Solenoid Location & Apply Charts

Reference **Figures 3, 4, 5** and **6** for solenoid location, function, resistance and connector wire information.

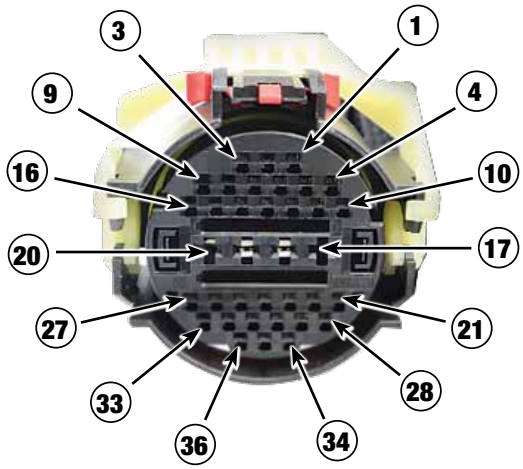
Figure 4

Solenoid Number	Description	Resistance
S1	1-2-7-8 Reverse Control	4.5-5.5 Ohms
S2	1-2-3-4-5 Reverse Control	4.5-5.5 Ohms
S3	1-3-5-6-7 Control	4.5-5.5 Ohms
S4	2-3-4-6-8 Control	4.5-5.5 Ohms
S5	4-5-6-7-8 Reverse Control	4.5-5.5 Ohms
S6	Line Pressure Control	4.5-5.5 Ohms
S7	TCC Control	4.5-5.5 Ohms
S8	Default Control	11-13 Ohms
S9	1-2-3-4-5 Reverse Boost Control	11-13 Ohms

Figure 5

Terminal Number	Solenoid Number	Wire Colors	Internal Connector Color
1	S9	Green/White	Green/White
3	S7	Gray/Brown	Gray
4	S6	Gray/Green	Purple
5	S1	Brown	Purple
6	S2	Blue	Gray
7	S8	Yellow/Brown	White
10	S3	Gray	Gray
13	S4	White	Clear
14	S5	Blue/White	Purple

8L90 Vehicle Harness Connector **Figure 6**



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Solenoid Applications — Figure 7

Range	Gear	1-2-7-8 Reverse Clutch S1 or E N.H. Duty%/PSI	1-2-3-4-5 Reverse Clutch S2 or F N.H. Duty%/PSI	1-3-5-6-7 Clutch S3 or C N.L. Duty%/PSI	2-3-4-6-8 Clutch S4 or B N.H. Duty%/PSI	4-5-6-7-8 Reverse Clutch Sol. S5 or D N.H. Duty%/PSI	Line Press. Control S6 or J N.H. Duty%/PSI	Torque Converter Clutch Control S7 or A N.L.	Default Control S8 or G On/Off	1-2-3-4-5 Reverse Boost Sol. 9 or H On/Off
Park	P	Low/High	Low/High	Low/Low	High/Low	High/Low	Varies	OFF	OFF	OFF
Reverse	R	Low/High	Low/High	Low/Low	High/Low	Low/High	Varies	OFF	OFF	OFF
Neutral	N	Low/High	Low/High	Low/Low	High/Low	High/Low	Varies	OFF	OFF	OFF
Drive	1st	Low/High	Low/High	High/High	High/Low	High/Low	Varies	ON*	OFF / ON	OFF
	2nd	Low/High	Low/High	Low/Low	Low/High	High/Low	Varies	ON*	ON / OFF	OFF
	3rd	High/Low	Low/High	High/High	Low/High	High/Low	Varies	ON*	OFF	OFF
	4th	High/Low	Low/High	Low/Low	Low/High	Low/High	Varies	ON*	OFF	OFF
	5th	High/Low	Low/High	High/High	High/Low	Low/High	Varies	ON*	OFF	OFF
	6th	High/Low	High/Low	High/High	Low/High	Low/High	Varies	ON*	OFF	ON
	7th	Low/High	High/Low	High/High	High/Low	Low/High	Varies	ON*	OFF	ON
	8th	Low/High	High/Low	Low/Low	Low/High	Low/High	Varies	ON*	OFF	ON

Notes: Varies = Varies based on engine load; **ON* =** Torque Converter Clutch can be applied in 1st through 8th gears dependant on load and computer strategy;
Solenoid ID & Location = Example: S7 solenoid is the TCC solenoid and it is located in the solenoid bore marked with an A as shown in Figure 10.
N.H. solenoid information refers to the output circuit on the solenoid. A Normally High solenoid will have high output pressure to the valve It controls at low duty % and low pressure at high Duty %.
N.L Solenoid will have low output pressure at low Duty % and high output pressure at high duty%.

Transmission Service Fast Learn Procedure

This should be completed after valve body and/or transmission service to avoid drive-ability complaints.

1. If a solenoid, TCM or transmission assembly was replaced, reference OEM material and perform the solenoid valve characterization reprogramming.
2. With ignition ON, clear any DTCs with scan tool.
3. Turn ignition and all vehicle systems OFF.
4. Temperature needs to be between 167° –185°F.
5. With engine running, transmission in drive position and brake applied, use a scan tool to perform the fast learn procedure. Follow scan tool instructions.
6. Ignition OFF for 2 minutes.
7. Once the fast learn has been successfully reset, drive the vehicle at light acceleration up to 65 mph, then come down to a stop. Repeat this a minimum 10 times.

Component Application Chart — Figure 8

Range	Gear	1-3-5-6-7 Clutch	4-5-6-7-8 Reverse Clutch	2-3-4-6-8 Clutch	1-2-7-8 Reverse Clutch	1-2-3-4-5 Reverse Clutch	Torque Converter Clutch	8L45 Gear Ratio	8L90 Gear Ratio
Park	P				X*	X*			
Reverse	R		X		X	X		3.93	3.82
Neutral	N				X*	X*			
Drive	1st	X			X	X	X**	4.62	4.56
	2nd			X	X	X	X**	3.04	2.97
	3rd	X		X		X	X**	2.07	2.08
	4th		X	X		X	X**	1.66	1.69
	5th	X	X			X	X**	1.26	1.27
	6th	X	X	X			X**	1.00	1.00
	7th	X	X		X		X**	.85	.84
	8th		X	X	X		X**	.66	.65

* Applied with no output load.
** The converter clutch can be applied from 1st thru 8th gears depending on shift conditions.

Transmission Fluid

The 8L90 transmission uses Mobil 1 Synthetic LV ATF HP or GM #19417577.

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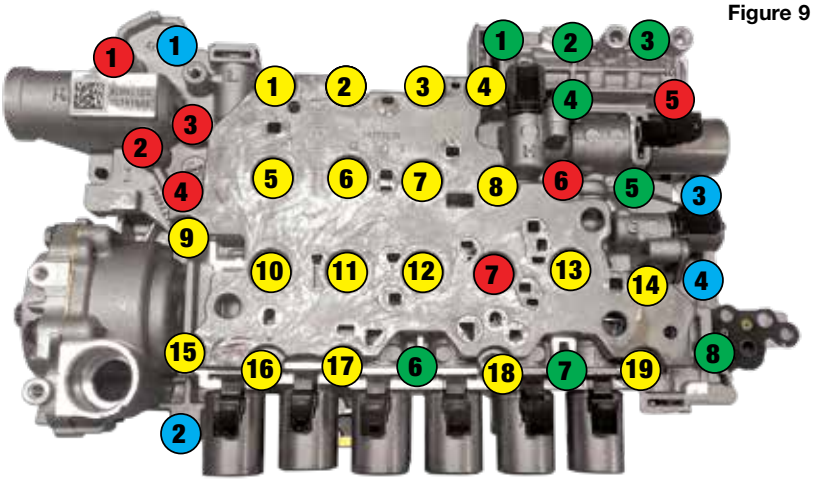
Figure 9



Bolt & Torque Specifications

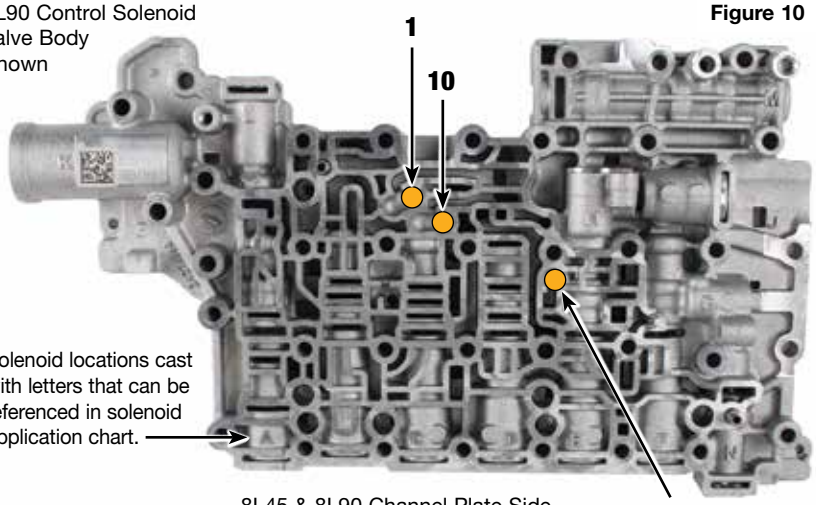
No. Bolts	Bolt Color Code	Bolt Head
19	Yellow	8mm
8	Green	10mm
NOTE: Torque all bolts at 71 in-lb or 8 Nm.		

No. Bolts	Valve Body-to-Case Retaining Bolts	Bolt Head
7	Red	8mm
4	Blue	10mm
NOTE: Torque all bolts at 80 in-lb or 9 Nm.		

NOTE: Bolt for detent spring torque to 106 in-lb or 12 Nm.

8L90 Control Solenoid Valve Body Shown

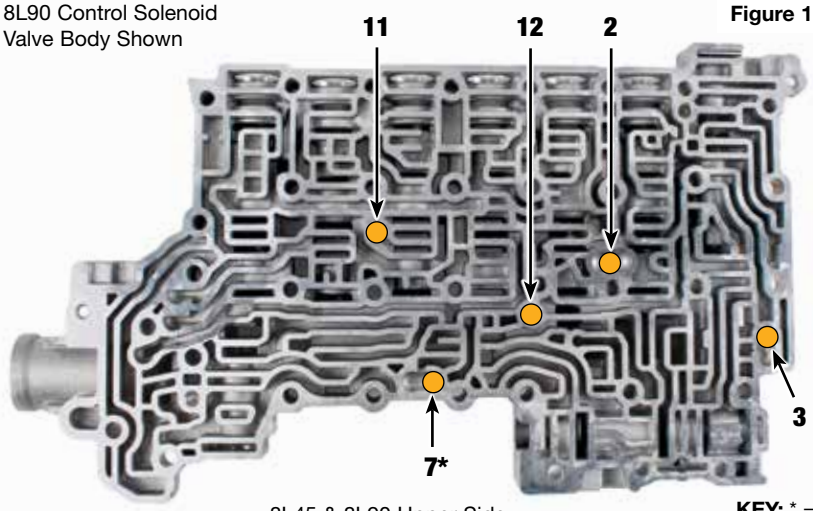
Figure 10



8L45 & 8L90 Channel Plate Side .250" Checkball Locations

8L90 Control Solenoid Valve Body Shown

Figure 11

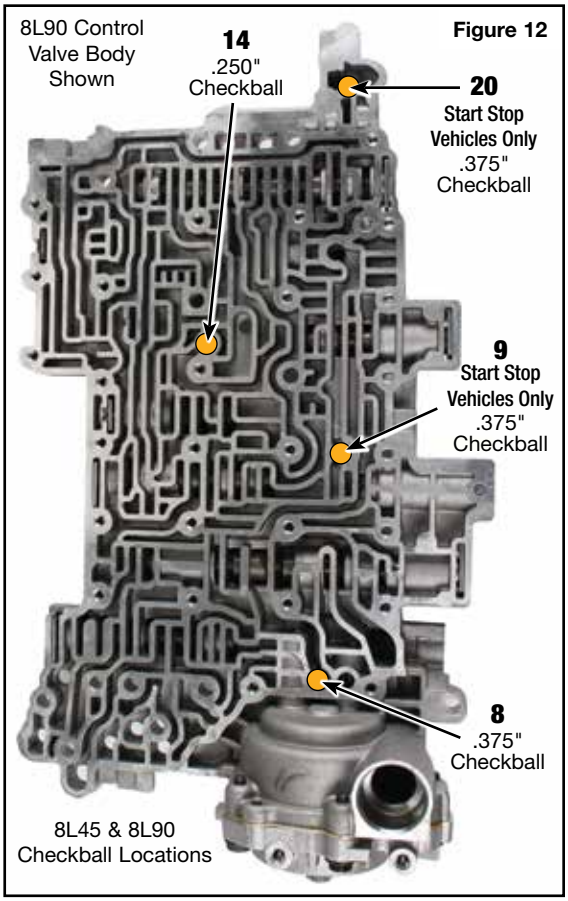


8L45 & 8L90 Upper Side, .250" Checkball Locations

KEY: * = Eliminated 11/2015.

8L90 Control Valve Body Shown

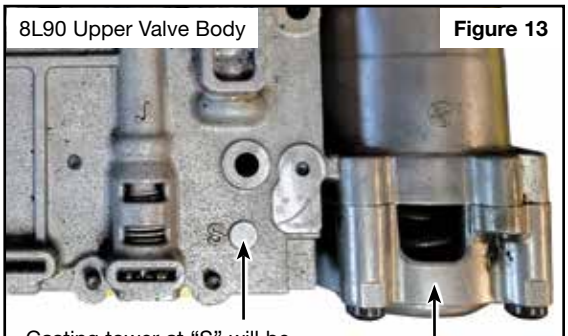
Figure 12



8L45 & 8L90 Checkball Locations

8L90 Upper Valve Body

Figure 13



Casting tower at "S" will be ground down on upper valve body for Start Stop castings

Start Stop Accumulator Housing

Critical Wear Areas & Vacuum Test Locations

Drop-In Zip Valve™ Parts Available

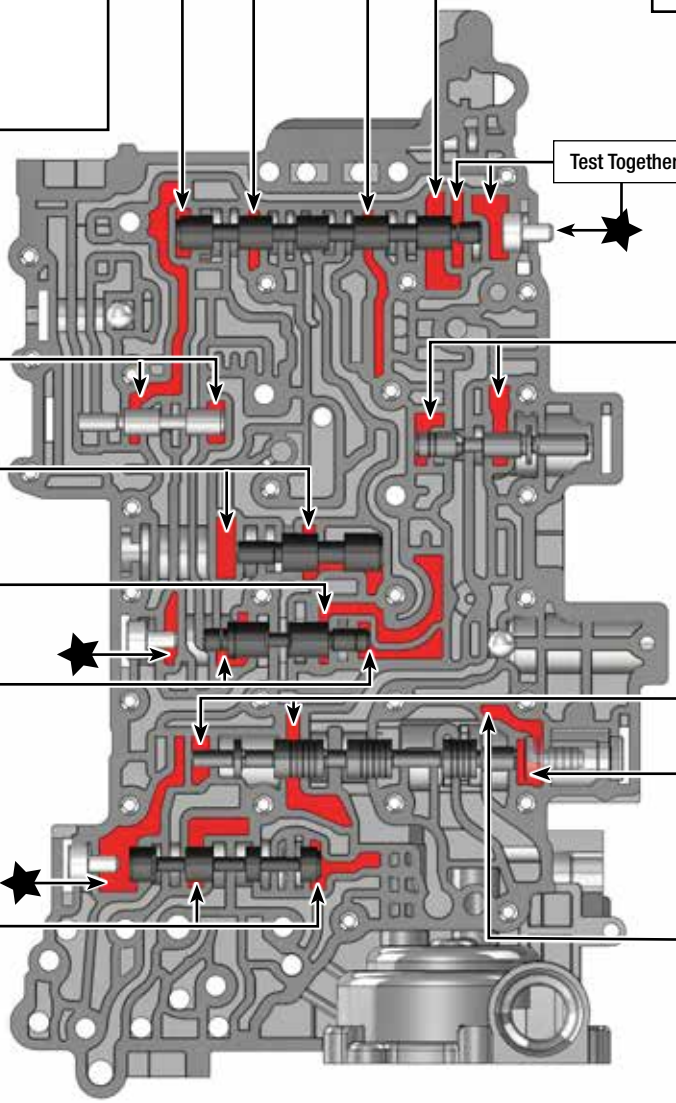
NOTE: OE valves are shown in rest position and should be tested in rest position unless otherwise indicated. Test locations are pointed to with an arrow. Springs are not shown for visual clarity. Low vacuum reading indicates wear and Sonnax parts are noted for replacement.

Upper Valve Body • 8L90 Shown

For specific vacuum test information, refer to individual part instructions included in kits and available at **www.sonnax.com**.

Lube Override Enable Valve (8L45)
1-2-3-4-5 Reverse Clutch Boost Valve (8L90)
- No Reverse
- Reverse slip
- Forward motion in Neutral
- No Forward
- No 6th

Default Override Valve
- No Reverse
- Reverse slip



Actuator Feed Limit Valve
- Harsh shifts
- Soft slide shifts
- No shift
- Burnt clutches

TCC Fault Valve
- TCC apply & release concerns

Lube Flow Regulator Valve
- Overheating & reduced lube feed
- Overheated transmission & converter

Pressure Regulator Valve
- Low line pressure
- Burnt clutches
- Harsh shifts
- Low cooler flow
- Loss of lube oil
- Overheated transmission & converter
- High line pressure

Replace with Sonnax Part Nos.
Replace with Sonnax Part Nos.
154740-02K** ***or***
154740-29K O-Ringed

TCC Control Valve
- No converter apply
- Converter shudder & TCC slip
- Overheated converter
- TCC apply & release concerns

Pressure Regulator Shuttle Valve
- High line pressure
- Harsh shifts
- Low cooler flow
- Loss of lube oil
- Overheated transmission & converter

Replace with Sonnax Part Nos.
154740-09K ***or***
154740-30K O-Ringed

O-Ringed End Plugs
- Gear ratio & solenoid codes
- Lube failures
- Poor lube oil control

Replace with Sonnax Part No.
154740-17K**
★ = Several Locations

NOTE: Part numbers with an asterisk (*) are included in Shift Zip Kit **8L45-8L90-SHIFT-ZIP**.

Part numbers with two asterisks (**) are included in TCC Zip Kit **8L45-8L90-TCC-ZIP**.

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Critical Wear Areas & Vacuum Test Locations

Drop-In Zip Valve™ Parts Available

NOTE: OE valves are shown in rest position and should be tested in rest position unless otherwise indicated. Test locations are pointed to with an arrow. Springs are not shown for visual clarity. Low vacuum reading indicates wear and Sonnax parts are noted for replacement.

Control Solenoid Body • 8L90 Front Shown

For specific vacuum test information, refer to individual part instructions included in kits and available at **www.sonnax.com**.

1-2-3-4-5 Reverse Low Control Valve

- Burnt clutches • Pressure loss
- Poor shift quality • Burnt converter
- TCC apply & release concerns

Replace with Sonnax Part No.
154740-11K*/**

154740-TL11 Recommends Vacuum Test Tool
154740-BST11 Recommends Bore Sizing Tool

Lube Regulator Valve (8L45)
1-2-3-4-5 Reverse Clutch Boost Valve (8L90)

- 5-6 Bind-up • Burnt clutches

1-2-7-8 Reverse Control Valve

- Burnt clutches • Pressure loss
- Poor shift quality

Replace with Sonnax Part No.
154740-13K*

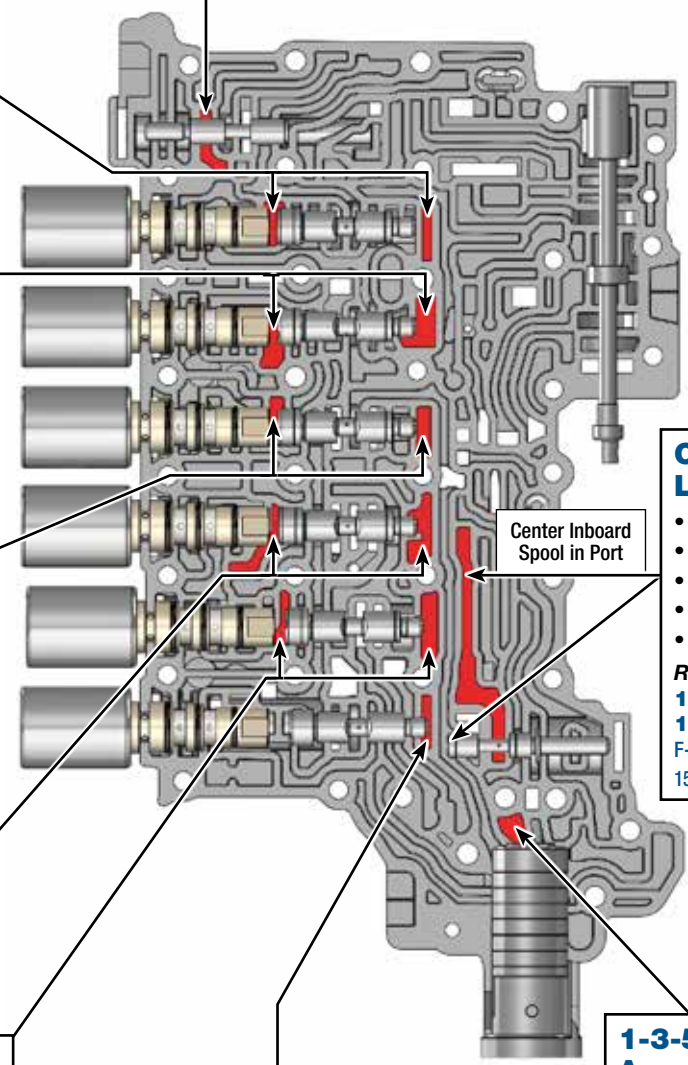
154740-TL11 Recommends Vacuum Test Tool
154740-BST13 Recommends Bore Sizing Tool

4-5-6-7-8 Reverse Control Valve

- Burnt clutches • Pressure loss
- Poor shift quality

Replace with Sonnax Part No.
154740-13K*

154740-TL11 Recommends Vacuum Test Tool
154740-BST13 Recommends Bore Sizing Tool



Converter Feed Limit Valve

- Codes P0218, P0741
- Overheated converter
- Inadequate lubrication
- Excess converter pressure
- High TCC slip RPM

Replace with Sonnax Part Nos.
154740-19K** *or*
154740-22K

F-154740-TL22 & VB-FIX *Requires
154740-TL22 Recommends Vacuum Test Tool

1-3-5-6-7 Control Valve

- Burnt clutches • Pressure loss
- Poor shift quality • Burnt converter
- TCC apply & release concerns

Replace with Sonnax Part No.
154740-11K*/**

154740-TL11 Recommends Vacuum Test Tool
154740-BST11 Recommends Bore Sizing Tool

2-3-4-6-8 Control Valve (S4)

No converter apply

- Converter shudder & TCC slip
- Overheated converter

Replace with Sonnax Part Nos.
154740-11K* 2018–Earlier *or*
154740-24K 2019–Later *or*
154740-26K** 2019–Later

154740-TL11 *Recommends Vacuum Test Tool
154740-BST11 *Recommends Bore Sizing Tool
F-154740-TL26 & VB-FIX **Requires Tool Kits

TCC Control Valve

- No converter apply
- Converter shudder & TCC slip
- Overheated converter

Replace with Sonnax Part No.
154740-11K*/**

154740-TL11 Recommends Vacuum Test Tool
154740-BST11 Recommends Bore Sizing Tool

1-3-5-6-7 Accumulator Piston

- Clutch slippage
- Burnt clutches
- Flare shifts
- Ratio codes

Replace with Sonnax Part No.
154740-15K*

*Part numbers with an asterisk (*) are included in this Zip Kit.

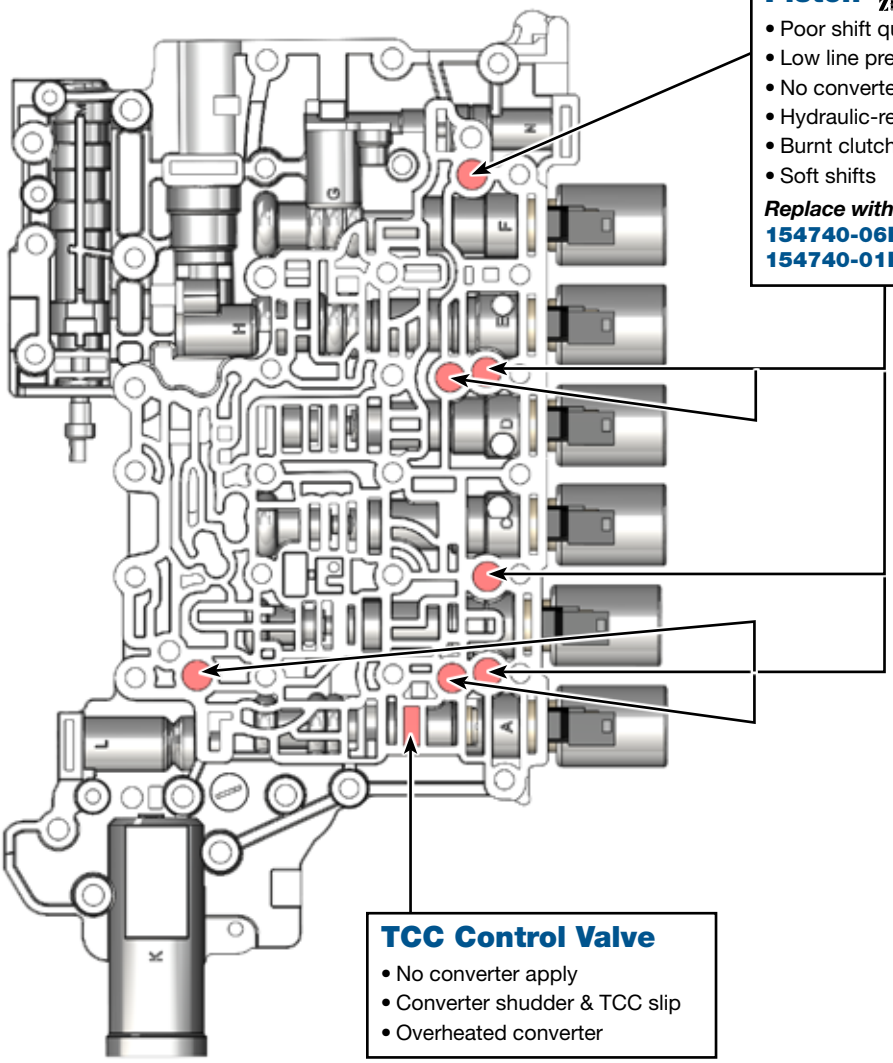
Critical Wear Areas & Vacuum Test Locations

Drop-In Zip Valve™ Parts Available

NOTE: OE valves are shown in rest position and should be tested in rest position unless otherwise indicated. Test locations are pointed to with an arrow. Springs are not shown for visual clarity. Low vacuum reading indicates wear and Sonnax parts are noted for replacement.

Control Solenoid Body • 8L90 Back Shown

For specific vacuum test information, refer to individual part instructions included in kits and available at **www.sonnax.com**.



Signal Accumulator Piston

- Poor shift quality
- Low line pressure
- No converter apply
- Hydraulic-related converter codes
- Burnt clutches
- Soft shifts

Replace with Sonnax Part Nos.
154740-06K* ***or***
154740-01K Requires 154740-TL

TCC Control Valve

- No converter apply
- Converter shudder & TCC slip
- Overheated converter

*Part numbers with an asterisk (*) are included in this Zip Kit.

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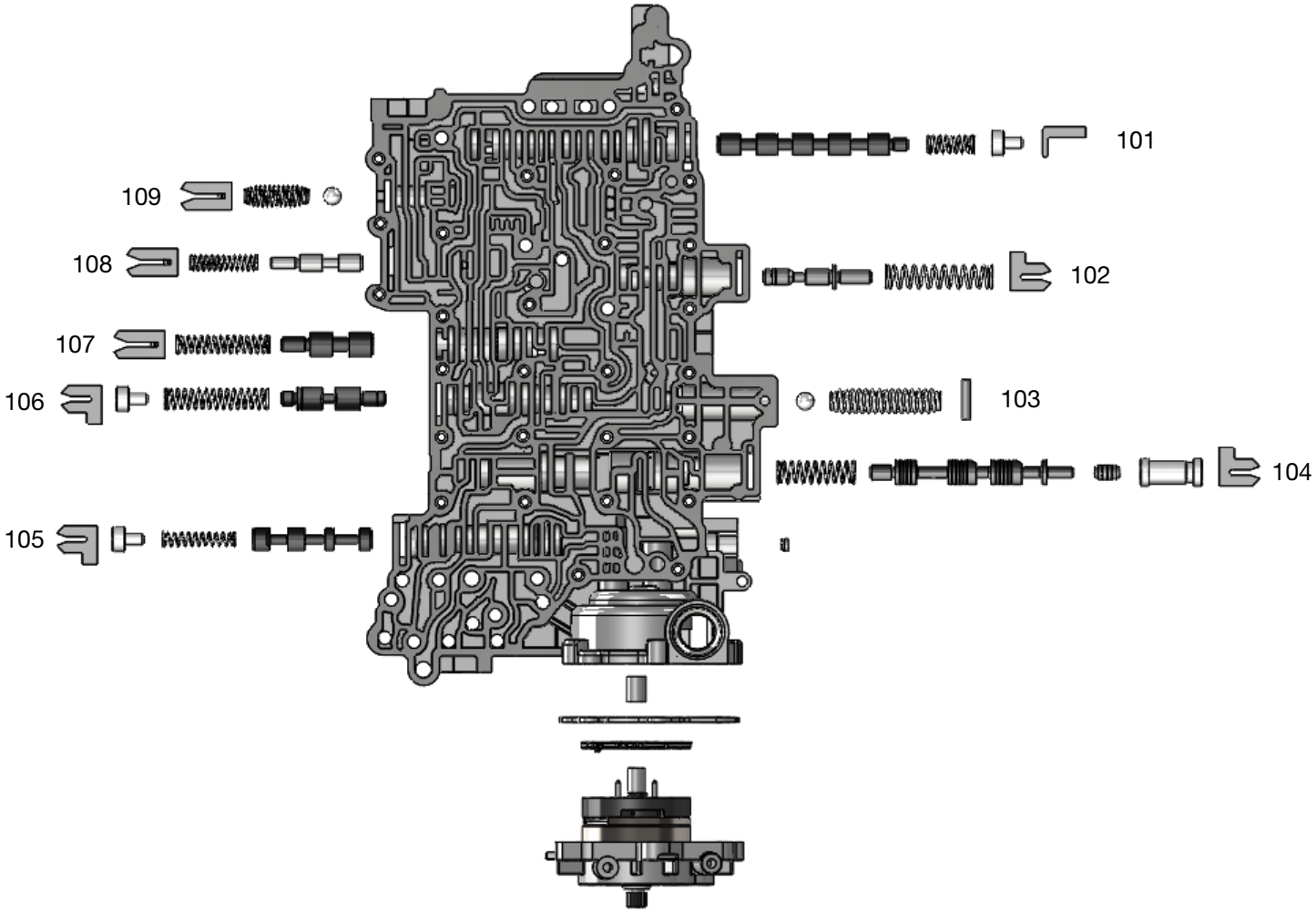
OE Exploded View

Upper Valve Body • 8L90 Shown

NOTE: Depending upon vehicle application, the OE springs shown may not be present.



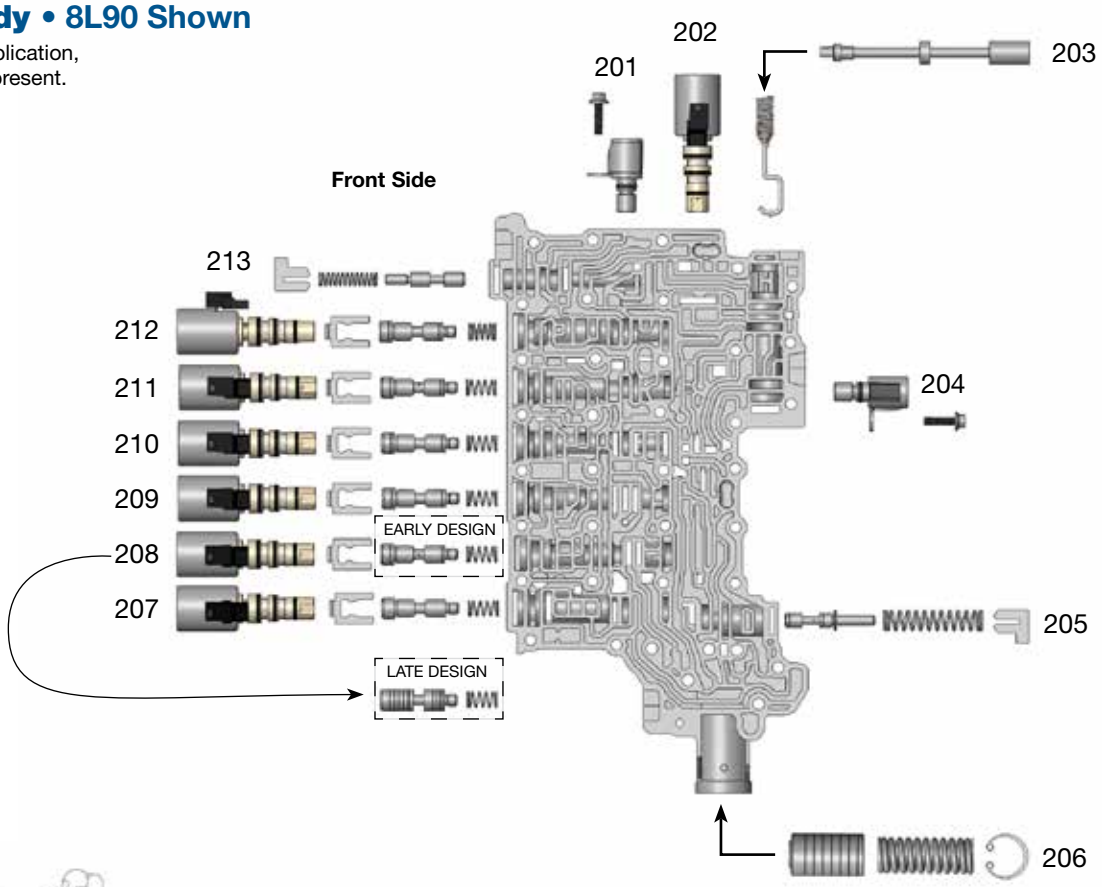
Upper Valve Body 8L45 & 8L90 Descriptions

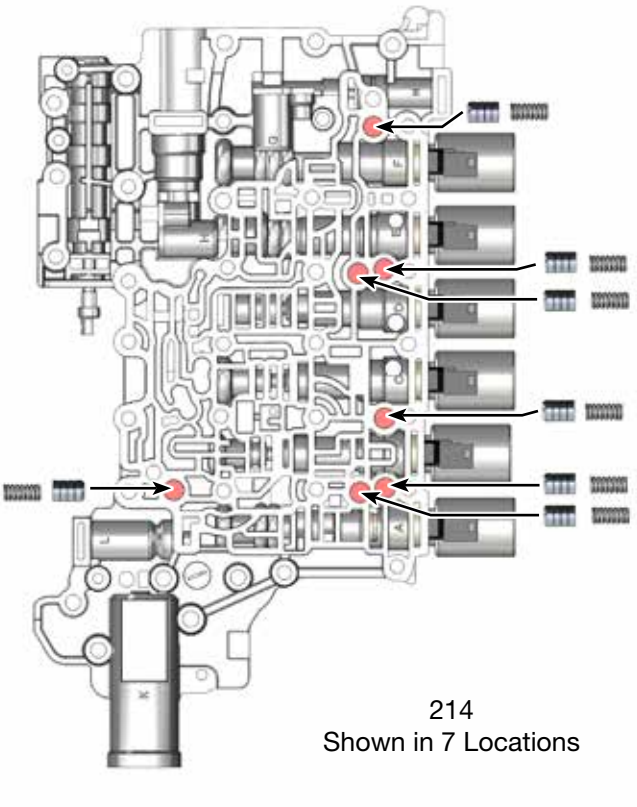
I.D. No.	Description
101	Default Override Valve
102	Actuator Feed Limit Valve
103	Line Pressure Blowoff Ball Valve
104	Pressure Regulator Valve (Inboard) & Shuttle Valve (Outboard)
105	TCC Control Valve
106	Lube Flow Regulator Valve
107	TCC Fault Valve
108	Lube Override Enable Valve (8L45), 1-2-3-4-5 Reverse Clutch Boost Valve (8L90)
109	Clutch Piston Exhaust Blowoff Ball Valve

OE Exploded View

Control Solenoid Body • 8L90 Shown

NOTE: Depending upon vehicle application, the OE springs shown may not be present.





Control Solenoid Valve Body 8L45 & 8L90 Descriptions

I.D. No.	Description
201	Default Control Solenoid
202	Line Pressure Control Solenoid
203	Manual Valve
204	1-2-3-4-5 Reverse Boost Solenoid
205	Converter Feed Limit Valve
206	1-3-5-6-7 Accumulator Piston
207	TCC Control Solenoid & Valve
208	2-3-4-6-8 Control Solenoid & Valve
209	1-3-5-6-7 Control Solenoid & Valve
210	4-5-6-7-8 Reverse Control Solenoid & Valve
211	1-2-7-8 Reverse Control Solenoid & Valve
212	1-2-3-4-5 Reverse Low Control Solenoid & Valve
213	Lube Regulator Valve (8L45), 1-2-3-4-5 Reverse Clutch Boost Valve (8L90)
214	Signal Accumulator Piston

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