2006 TRANSMISSION

Automatic Transaxle - AF33-5 - Overhaul - Equinox & Torrent

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Description of Usage	Ref No.*	Qty	Size	Specification	
				Metric	English
Automatic Transmission Fluid Pump (2) to Transmission Case Assembly (17)	5	8	M8x1.25x28 mm	25 N.m	18 lb ft
Control Valve Body Cover (29) to Transmission Case Assembly (17)	28	9	M8x1.25x15.5 mm	13 N.m	10 lb ft
Control Valve Body Fluid Passage Cover (37) to Control Valve Body (39)	30	2	M6x1.0x55 mm	10 N.m	89 lb in
Fluid Baffle (803) to Torque Converter Housing Assembly (801)	807	3	M6x1.0x14 mm	5 N.m	44 lb in
Fluid Baffle (803) to Transmission Case Assembly (17)	45	3	M6x1.0x14.7 mm	5 N.m	44 lb in
Fluid Filter (42) to Transmission Case (17)	43	1	M6x1.0x16.7 mm	5 N.m	44 lb in
Fluid Level Indicator Bolt	825	1	M8x1.25x25 mm	10 N.m	89 lb in
Fluid Pump Body (202) to Fluid Pump Stator Shaft Assembly (208)	231	13	M6x1.0x14.5 mm	12 N.m	106 lb in
Fluid Pump Body (202) to Fluid Pump Stator Shaft Assembly (208)	232	1	M5x0.8x17 mm	7 N.m	62 lb in
Fluid Temperature Sensor Clip (49) to Control Valve Body (39)	31	1	M6x1.0x50 mm	10 N.m	89 lb in
Forward Clutch Accumulator Cover (616) to Case Cover (606)	617	2	M6x1.0x14.5 mm	10 N.m	89 lb in
Input Speed Sensor (73) to Transmission Case Assembly (17)	72	1	M6x1.0x16 mm	5 N.m	44 lb in
Lube Fluid Pipe Retainer (805) to Torque Converter Housing (801)	806	1	M6x1.0x14 mm	5 N.m	44 lb in
Lube Fluid Pipe Retainer (84) to Transmission Case Assembly (17)	83	1	M6x1.0x14.5 mm	5 N.m	44 lb in
Manual Shift Detent Spring (711) to Transmission Case (707)	712	1	M6x1.0x14 mm	5 N.m	44 lb in

© 2011 Mitchell Repair Information Company, LLC.

Output Speed Sensor (62) to Transmission Case Assembly (17)	61	1	M6x1.0x16 mm	5 N.m	44 lb in
Park/Neutral Position Switch Nut (78) to Manual Shift Detent Lever (710)	78	1	M16x1.5 mm	7 N.m	62 lb in
Park/Neutral Position Switch (75) to Transmission Case Assembly (17)	76	1	M8x1.25x22 mm	25 N.m	18 lb ft
Park/Neutral Position Switch (75) to Transmission Case Assembly (17)	79	1	M8x1.25x36 mm	25 N.m	18 lb ft
Park Pawl Actuator Bracket (708) to Transmission Case Assembly (17)	715	1	M6x1.0x16.7 mm	10 N.m	89 lb in
Park Pawl Bolt/Screw (706) to Transmission Case Assembly (17)	706	1	M6x1.0x25 mm	10 N.m	89 lb in
Rear Valve Body Cover Plate Bolt - Hexagon	416	2	M5x0.8x13 mm	7 N.m	62 lb in
Rear Valve Body Cover Plate Bolt - Hexagon	421	7	M5x0.8x13 mm	7 N.m	62 lb in
Torque Converter Housing (10) to Transmission Case Assembly (17)	3	2	M8x1.25x30 mm	29 N.m	21 lb ft
Torque Converter Housing (10) to Transmission Case Assembly (17)	4	11	M8x1.25x30 mm	29 N.m	21 lb ft
Torque Converter Housing (10) to Transmission Case Assembly (17)	6	2	M8x1.25x35 mm	29 N.m	21 lb ft
Torque Converter Housing (10) to Transmission Case Assembly (17)	7	1	M8x1.25x45 mm	29 N.m	21 lb ft
Torque Converter Housing (10) to Transmission Case Assembly (17) - TORX	8	1	M8x1.25x30 mm	29 N.m	21 lb ft
Transmission Case Cover (606) to Transmission Case Assembly (17)	20	9	M8x1.25x30 mm	25 N.m	18 lb ft
Transmission Case Cover (606) to Transmission Case Assembly (17)	21	2	M8x1.25x48 mm	25 N.m	18 lb ft
Transmission Case Cover (606) to Transmission Case Assembly (17)	22	1	M8x1.25x45 mm	25 N.m	18 lb ft
Transmission Case Fluid Passage Cover (40) to Transmission Case Assembly (17)	41	2	M6x1.0x14 mm	5 N.m	44 lb in
Transmission Fluid Drain Plug (819) to Torque Converter Housing (801)	819	1	M18x12 mm	39 N.m	29 lb ft
Transmission Fluid Pressure Test Hole Plug	66	9	-	7 N.m	62 lb in

 © 2011 Mitchell Repair Information Company, LLC.

3rd Gear Band Anchor Bolt (64) to Transmission Case Assembly (17)	64	1	M20x1.5x21 mm	167 N.m	123 lb ft
3rd Gear Band Apply Tube Retainer (51) to Transmission Case Assembly (17)	50	2	M6x1.0x14 mm	5 N.m	44 lb in
4-5 Clutch Apply Pipe Retainer (610) to Transmission Case Cover (606)	611	4	M5x0.8x12 mm	7 N.m	62 lb in
Valve Body					
• Control Valve Body (39) to Transmission Case Assembly (17)	34	2	M6x1.0x16 mm	10 N.m	89 lb in
• Control Valve Body (39) to Transmission Case Assembly (17)	35	2	M6x1.0x50 mm	10 N.m	89 lb in
• Control Valve Body (39) to Transmission Case Assembly (17)	47	2	M6x1.0x55 mm	7 N.m	62 lb in
• Control Solenoid Valve Retainer (312) to Control Valve Body (39)	311	1	M5x0.8x13 mm	7 N.m	62 lb in
• Front Control Valve Body (315) to Middle Control Valve Body (323)	313	4	M5x0.8x20 mm	7 N.m	62 lb in
• Front Control Valve Body (315) to Middle Control Valve Body (323)	314	2	M5x0.8x16 mm	7 N.m	62 lb in
• Front Control Valve Body (315) to No. 2 Rear Control Valve Body (330)	331	1	M5x0.8x76 mm	7 N.m	62 lb in
• Front Control Valve Body (315) to No. 2 Rear Control Valve Body (330)	332	4	M5x0.8x49.5 mm	7 N.m	62 lb in
• Lock Up Control Solenoid Valve (339) to Front Control Valve Body (315)	307	1	M5x0.8x10 mm	7 N.m	62 lb in
• Middle Control Valve Body (323) Pressure Tap	334	1	M6x1.0x12 mm	7 N.m	62 lb in
• Middle Control Valve Body (323) to No. 2 Rear Control Valve Body (330)	304	1	M5x0.8x50 mm	7 N.m	62 lb in

© 2011 Mitchell Repair Information Company, LLC.

• No. 2 Rear Control Valve Body (330) to Front Control Valve Body (315)	304	1	M5x0.8x50 mm	7 N.m	62 lb in
• Rear Control Valve Body (326) to Middle Control Valve Body (323)	333	1	M5x0.8x40 mm	7 N.m	62 lb in
• Rear Control Valve Body (326) to Middle Control Valve Body (323)	335	2	M5x0.8x35 mm	7 N.m	62 lb in
• Reverse, 1st Shift Solenoid Valve - S1 (310) to Control Valve Body (39)	302	1	M5x0.8x28 mm	7 N.m	62 lb in
• Reverse Shift Solenoid Valve - S5 (305) to Control Valve Body (39)	302	1	M5x0.8x28 mm	7 N.m	62 lb in
• 1-2, 2-3, Reverse, Shift Solenoid Valve - S3 (300) to Control Valve Body (39)	301	1	M5x0.8x50 mm	7 N.m	62 lb in
• 2-3, 3-4 Shift Solenoid Valve - S2 (308) to Control Valve Body (39)	307	1	M5x0.8x10 mm	7 N.m	62 lb in
• 3-4, 4-5 Shift Solenoid Valve - S4 (303) to Control Valve Body (39)	302	1	M5x0.8x28 mm	7 N.m	62 lb in

SEALERS, ADHESIVES, AND LUBRICANTS

Sealers, Adhesives, and Lubricants

Application	Type of Material	GM Part Number	
		United States	Canada
Case Sealing Surfaces	Sealant	89020326	89021188
Bolts	Threadlocker	12345382	10953489
Transmission Fluid	Automatic Transmission Fluid - Type T-IV	88900925	22689186

FLUID CAPACITY SPECIFICATIONS

Fluid Capacity Specifications

Application	Specification	
	Metric	English
Complete Overhaul, GM P/N 88900925 (Canadian P/N 22689186)	7.8 liters	8.2 quarts

SHIM SIZE SPECIFICATIONS

© 2011 Mitchell Repair Information Company, LLC.

Front Differential Side Gear Shim (88)

Identification	Specifications	
	Metric	English
Available Shims	1.00 mm	0.039 in
	1.05 mm	0.041 in
	1.10 mm	0.043 in
	1.15 mm	0.045 in
	1.20 mm	0.047 in
	1.25 mm	0.049 in
	1.30 mm	0.051 in
	1.35 mm	0.053 in
	1.40 mm	0.055 in
	1.45 mm	0.057 in
	1.50 mm	0.059 in
	1.55 mm	0.061 in
	1.60 mm	0.0629 in
	1.65 mm	0.0649 in
	1.70 mm	0.0669 in
	1.75 mm	0.0688 in
	1.80 mm	0.070 in
	1.85 mm	0.0728 in
	1.90 mm	0.0748 in

Front Differential Transfer Drive Gear Thrust Bearing Washer (264)

Identification	Washer Thickness (mm)	Washer Thickness (in)
None	0.80	0.031
A	0.90	0.035
B	1.00	0.039
C	1.10	0.043
D	1.20	0.047
E	1.30	0.051
F	1.40	0.055
G	1.50	0.059

1-2 Reverse Internal Gear Shim (596)

Identification	Washer Thickness (mm)	Washer Thickness (in)
8	0.81	0.032
9	0.90	0.035
10	1.00	0.039
11	1.10	0.043
12	1.20	0.047

© 2011 Mitchell Repair Information Company, LLC.

13	1.30	0.051
14	1.40	0.055
15	1.50	0.059

Forward/Direct Clutch Housing Thrust Bearing Race (628)

Identification	Washer Thickness (mm)	Washer Thickness (in)
None	0.81	0.032
9	0.90	0.035
10	1.00	0.039
11	1.10	0.043
12	1.20	0.047
13	1.30	0.051
14	1.40	0.055
15	1.50	0.059

TRANSMISSION CLEARANCE SPECIFICATIONS

Transmission Clearance Specifications

Application	Specification	
	Metric	English
Front Differential Assembly (13)		
• Unloaded Rotating Torque	0.70-1.20 N.m	6-11 lb in
Fluid Pump Assembly (2)		
• Driven Gear (204) to Body Clearance	0.075-0.20 mm	0.002-0.007 in
• Drive Gear (205) Tip to Body Clearance	0.013-0.342 mm	0.0005-0.014 in
• Driven Gear (204) Tip to Body Clearance	0.004-0.298 mm	0.0001-0.018 in
• Fluid Pump Body Bushing, ID	38.113-38.188 mm	1.500-1.503 in
• Side Clearance of Drive and Driven Gear to Body	0.03-0.10 mm	0.0012-0.004 in
• Stator Shaft Bushing, ID	22.201-22.257 mm	0.874-0.876 in
Front Carrier Sun Gear Assembly (24)		
• Front Carrier Bushing, ID	30.00-30.076 mm	1.181-1.184 in
• Front Sun Gear Bushing, ID	22.200-22.276 mm	0.874-0.877 in
• Rear Sun Gear Bushing, ID	22.200-22.276 mm	0.874-0.877 in
2nd Coast Clutch and 2nd Clutch Hub and 2nd Clutch Sprag Assembly (11) to Fluid Pump		
• Installed Height	51.09-51.71 mm	2.011-2.036 in
Forward and Direct Clutch Assembly (23) End Play		
• Installed End Play	0.188-0.570 mm	0.007-0.022 in
Forward and Direct Clutch Assembly (23) to Transmission Case (17)		
	50.850-51.825 mm	2.002-2.040 in

 © 2011 Mitchell Repair Information Company, LLC.

• Installed Height		
Front Differential Gear Thrust Bearing (263) to case (17)		
Installed Height	1.269-1.645 mm	0.050-0.065 in
3rd Gear Band Servo (57) Return Springs		
• Outer Spring		
• ○ Free/Relaxed Length	40.2 mm	1.582 in
• ○ Outer Diameter	20.3 mm	0.800 in
• Inner Spring - yellow		
• ○ Free/Relaxed Length	13.5 mm	0.531 in
• ○ Outer Diameter	10.0 mm	0.394 in
3rd Gear Band Servo (57)		
• Piston Bore Stroke	5.76-6.76 mm	0.227-0.266 in
Transmission Housing - Torque Converter Distance		
• Torque Converter mounting lug/pad minimum installed distance to Transmission Housing outer edge	11.35 mm	0.447 in

Clutch Assembly Specifications

Application	Specification	
	Metric	**English**
Direct Clutch (562)		
• Piston Bore Stroke	1.49-1.91 mm	0.059-0.075 in
• Relaxed Clutch Pack Stack Up Clearance	0.76-1.24 mm	0.030-0.049 in
• Available Direct Clutch Backing Plate (555) Thickness	3.6 mm	0.142 in
	3.8 mm	0.150 in
	4.0 mm	0.157 in
Forward Clutch (565)		
• Piston Bore Stroke	0.74-1.06 mm	0.029-0.042 in
• Relaxed Clutch Pack Stack Up Clearance	0.74-1.06 mm	0.029-0.042 in
• Available Forward Clutch Backing Plate (551) Thickness	3.6 mm	0.142 in
	3.8 mm	0.150 in
	4.0 mm	0.157 in

 © 2011 Mitchell Repair Information Company, LLC.

Low and Reverse Clutch (27)		
• Piston Bore Stroke	1.09-1.91 mm	0.43-0.075 in
• Relaxed Clutch Pack Stack Up Clearance	0.43-1.43 mm	0.017-0.056 in
1-2 Reverse Clutch (603)		
• Piston Bore Stroke	2.34-2.70 mm	0.092-0.106 in
• Relaxed Clutch Pack Stack Up Clearance	0.84-1.63 mm	0.033-0.064 in
• Available 1-2 Reverse Clutch Backing Plate (621) Thickness	5.0 mm	0.197 in
	5.1 mm	0.201 in
	5.2 mm	0.205 in
	5.3 mm	0.209 in
	5.5 mm	0.216 in
Second Clutch (210)		
• Piston Bore Stroke	1.10-1.50 mm	0.043-0.059 in
• Relaxed Clutch Pack Stack Up Clearance	0.44-1.04 mm	0.0173-0.040 in
• Available 2nd Clutch Backing Plate (219) Thickness	3.6 mm	0.142 in
	3.8 mm	0.150 in
	4.0 mm	0.157 in
Second Coast Clutch (222)		
• Piston Bore Stroke	1.24-1.96 mm	0.049-0.077 in
• Relaxed Clutch Pack Stack Up Clearance	0.53-1.59 mm	0.021-0.063 in
4-5 Clutch (582)		
• 4-5 Clutch Housing Bushing, ID	36.125-36.200 mm	1.422-1.425 in
• 4-5 Clutch Piston Stroke	1.52-1.90 mm	0.060-0.075 in
Relaxed Clutch Pack Stack Up Clearance	0.60-1.36 mm	0.024-0.054 in
Available 4-5 Clutch Backing Plate (567) Thickness	3.6 mm	0.142 in
	3.8 mm	0.150 in
	4.0 mm	0.158 in

THIRD GEAR BAND SERVO PISTON PIN SELECTION

 © 2011 Mitchell Repair Information Company, LLC.

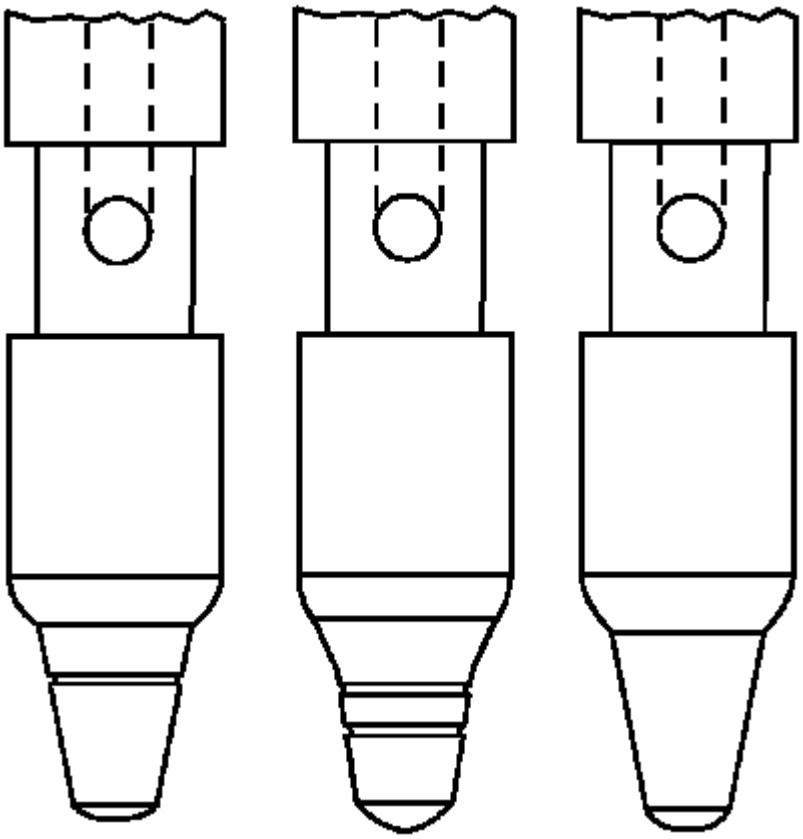


Fig. 1: Third Gear Band Servo Piston Pin Selection
Courtesy of GENERAL MOTORS CORP.

Servo Pin Selection

Pin Length - Mark		Pin Identification
Metric	**English**	
76.2 mm	3.00 in	No Groove
76.7 mm	3.019 in	1 Groove
77.2 mm	3.039 in	2 Grooves
77.7 mm	3.059 in	3 Grooves
78.2 mm	3.078 in	4 Grooves

RACE AND BEARING SPECIFICATIONS

© 2011 Mitchell Repair Information Company, LLC.

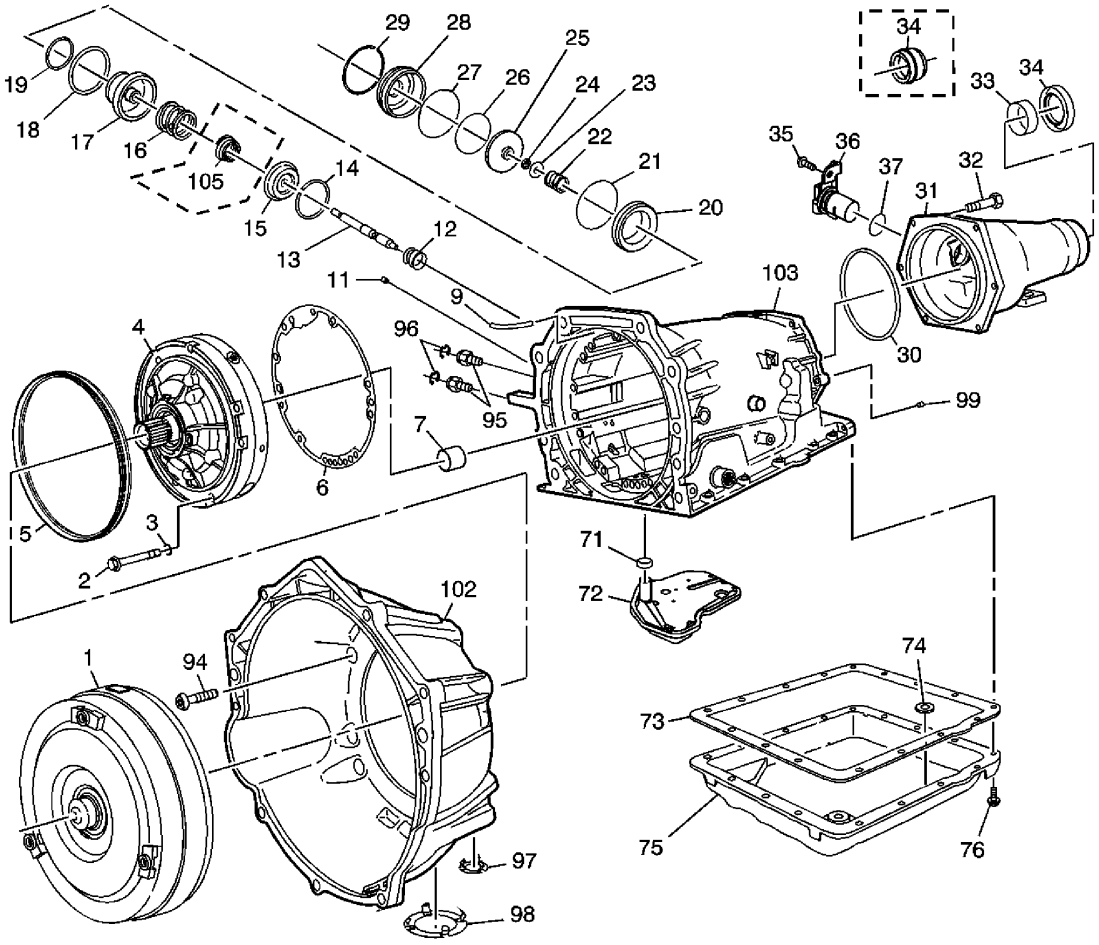


Fig. 2: Race & Bearing Specifications
Courtesy of GENERAL MOTORS CORP.

Race and Bearing Specifications

Alpha	Ref No.	Component	Outer Diameter Specification		Inner Diameter Specification	
			Metric	English	Metric	English
A	226	Coast Clutch Hub Thrust Washer - Front	62.40 mm	2.456 in	33.30 mm	1.311 in
B	501	Coast Clutch Hub Thrust Washer - Front	77.30 mm	3.043 in	56.50 mm	2.224 in
C	506	Second Clutch Sprag Outer Race Thrust Washer - Front	99.30 mm	3.909 in	56.50 mm	2.224 in
D	519	Front Internal Gear Thrust Bearing	61.95 mm	2.439 in	45.80 mm	1.803 in
D	530	Front Internal Gear Thrust Washer Race - Front	58.00 mm	2.283 in	43.80 mm	1.724 in
E	525	Front Internal Gear Thrust Washer - Front	122.00 mm	4.803 in	115.50 mm	4.547 in
F	529	Front Internal Gear Thrust Bearing	89.00 mm	3.504 in	73.50 mm	2.894 in
G	545	Front Sun Gear Thrust Bearing	38.50 mm	1.516 in	23.00 mm	0.905 in

© 2011 Mitchell Repair Information Company, LLC.

G	546	Front Sun Gear Thrust Bearing Race - Rear	35.10 mm	1.382 in	23.00 mm	0.905 in
H	535	Rear Internal Gear Thrust Bearing	64.00 mm	2.520 in	46.40 mm	1.827 in
H	543	Front Carrier Thrust Bearing Race - Front	61.00 mm	2.401 in	45.40 mm	1.787 in
I	537	Rear Sun Gear Thrust Bearing Race - Front	74.00 mm	2.913 in	53.00 mm	2.087 in
I	538	Rear Sun Gear Thrust Bearing	65.00 mm	2.559 in	50.00 mm	1.968 in
J	568	Forward Clutch Housing Thrust Bearing Race - Front	41.00 mm	1.614 in	13.50 mm	0.531 in
J	569	Forward Clutch Housing Thrust Bearing	41.70 mm	1.641 in	23.00 mm	0.905 in
J	628	Forward/Direct Clutch Housing Thrust Bearing Race - Rear	41.00 mm	1.614 in	17.30 mm	0.681 in
K	540	Input Shaft Thrust Bearing	43.40 mm	1.709 in	22.05 mm	0.868 in
L	263	Front Differential Transfer Drive Gear Thrust Bearing	71.00 mm	2.795 in	49.10 mm	1.933 in
L	264	Front Differential Transfer Drive Gear Thrust Bearing Washer - Front	71.00 mm	2.795 in	49.00 mm	1.929 in
M	593	1-2 Reverse Internal Gear Front Thrust Bearing	58.10 mm	2.287 in	39.60 mm	1.559 in
N	595	1-2 Reverse Internal Gear Rear Thrust Bearing	57.70 mm	2.272 in	37.00 mm	1.457 in
N	596	1-2 Reverse Internal Gear Shim	57.70 mm	2.272 in	37.00 mm	1.457 in
O	590	1-2 Reverse Carrier Thrust Washer (2)	77.60 mm	3.055 in	66.80 mm	2.630 in

COMPONENT LOCATOR

AUTOMATIC TRANSMISSION ELECTRONIC COMPONENT VIEWS

 © 2011 Mitchell Repair Information Company, LLC.

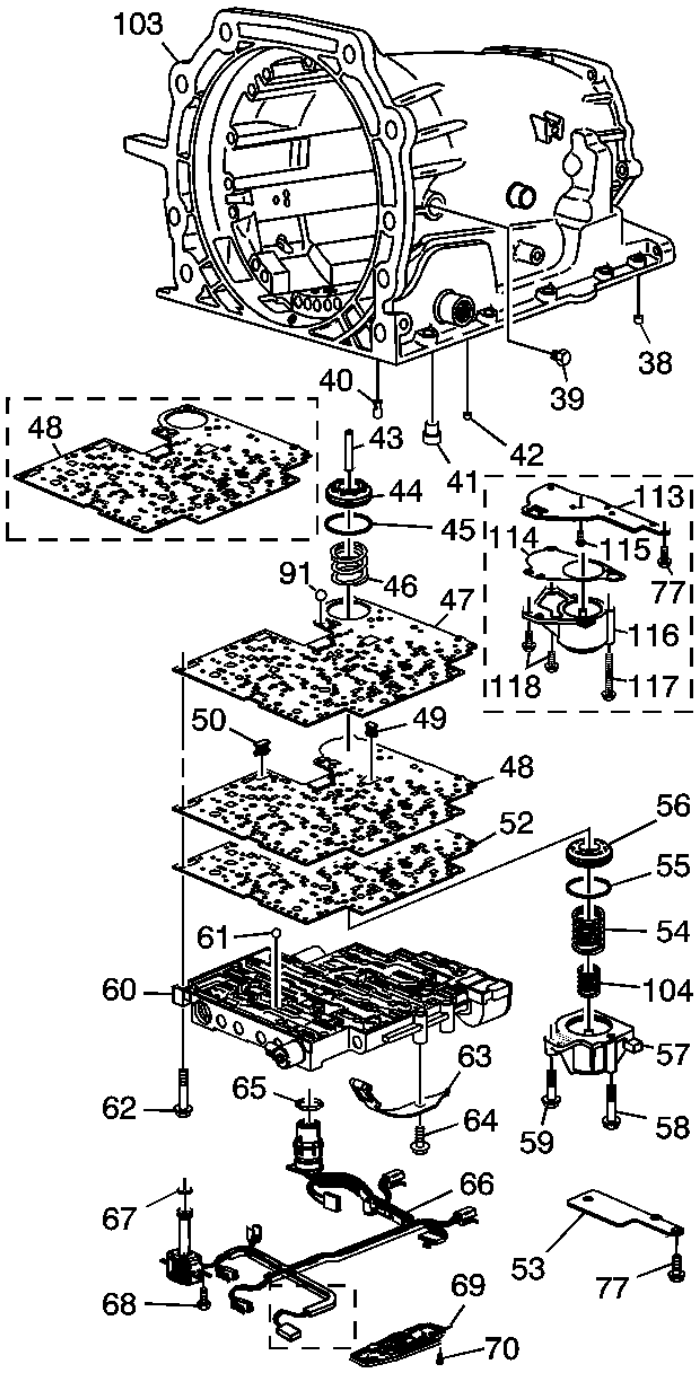


Fig. 3: Electronic Components View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

 © 2011 Mitchell Repair Information Company, LLC.

36	Automatic Transmission Fluid Temperature Sensor
62	Automatic Transmission Output Speed Sensor
73	Automatic Transmission Input Speed Sensor
75	Park/Neutral Position Switch
300	1-2, 2-3, Reverse, Shift Solenoid Valve Assembly (S3)
303	3-4, 4-5 Shift Solenoid Valve Assembly (S4)
305	Reverse Shift Valve Solenoid (S5)
308	2-3, 3-4 Shift Solenoid Valve Assembly (S2)
310	Reverse, 1st Shift Solenoid Valve Assembly (S1)
316	Line Pressure Control Solenoid Valve Assembly (SLT)
339	TCC Lock Up Pressure Control Solenoid Valve Assembly (SLU)
340	Shift Pressure Control Solenoid Valve Assembly (SLS)

DISASSEMBLED VIEWS

 © 2011 Mitchell Repair Information Company, LLC.

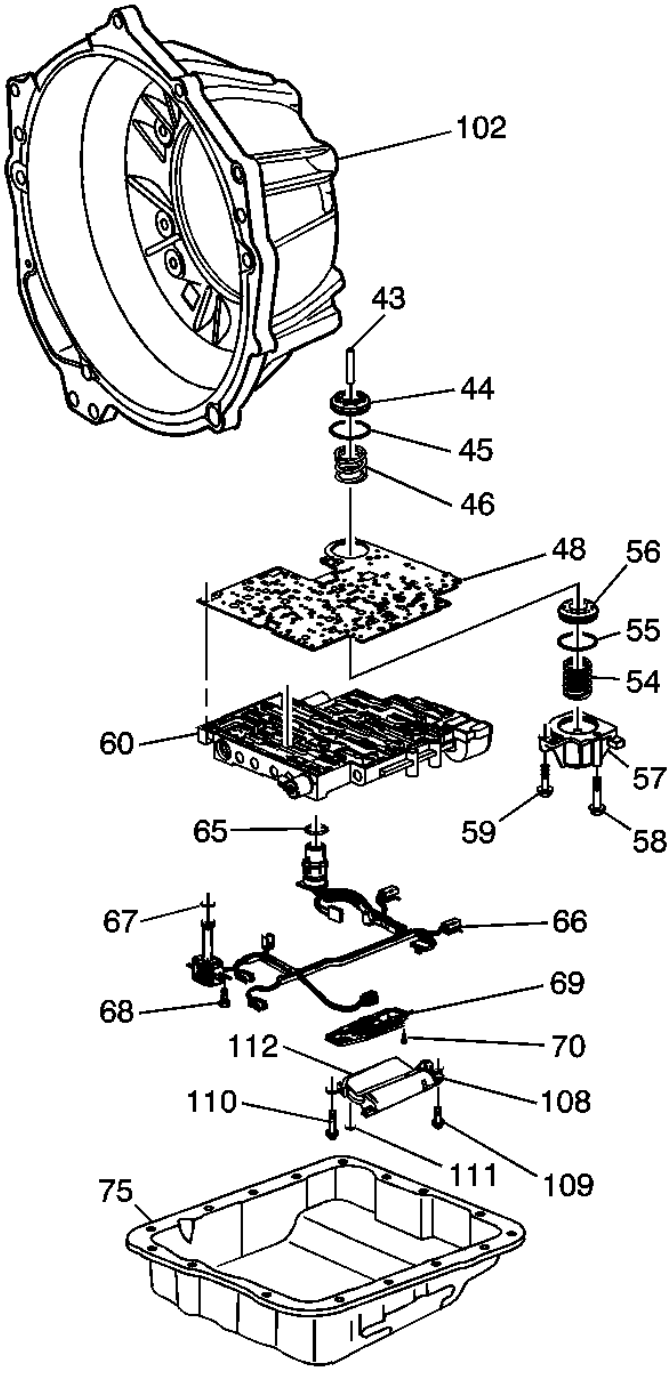


Fig. 4: Case and Associated Parts (1 of 2)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

 © 2011 Mitchell Repair Information Company, LLC.

1	Torque Converter Assembly
2	Automatic Transmission Fluid Pump, 2nd Coast Clutch, 2nd Clutch Assembly
3	Torque Converter Housing Stud (M8 x 1.25 x 30) (2)
4	Torque Converter Housing Bolt/Screw (M8 x 1.25 x 30) (11)
5	Automatic Transmission Fluid Pump to Case Bolt - Coated M8 x 1.25 x 28) (8)
6	Torque Converter Housing Bolt/Screw - Coated (M8 x 1.25 x 35) (2)
7	Torque Converter Housing Bolt/Screw (M8 x 1.25 x 45)
8	Torque Converter Housing Bolt/Screw -TORX, (M8 x 1.25 x 30)
10	Torque Converter Housing Assembly
11	2nd Clutch Hub and 2nd Clutch Sprag Assembly
12	Output Gear Assembly
13	Front Differential Assembly - Model Dependent
14	Front Differential Transfer Drive Gear Assembly - with shaft
15	4-5 Clutch Assembly
16	3rd Gear Band Assembly
17	Automatic Transmission Case Assembly
18	1-2 Reverse Carrier Gear Assembly
19	Automatic Transmission Case Cover and 1-2 Reverse Clutch Assembly
20	Transmission Case Cover Bolt/Screw (M8 x 1.25 x 30) (9) - Coated
21	Transmission Case Cover Bolt/Screw - Coated (M8 x 1.25 x 48)
22	Transmission Case Cover Bolt/Screw (M8 x 1.25 x 45) (2)
23	Forward and Direct Clutch Assembly
24	Front Carrier Sun Gear Assembly
25	Front Internal Gear and Overrun Roller Clutch
26	Low and Reverse Clutch Plates - Fibers and Steels (B3)
27	Low and Reverse Clutch Piston Assembly
28	Control Valve Body Cover Bolt/Screw - TORX® (M8 x 1.25 x 15.5) (9)
29	Control Valve Body Cover
30	Control Valve Body Bolt/Screw (M6 x 1.0 x 50) (4)
31	Fluid Temperature Sensor Clip Bolt (M6 x 1.0 x 55)
32	Automatic Transmission Fluid Temperature Sensor O-ring Seal
33	Automatic Transmission Wiring Harness Assembly
34	Control Valve Body Bolt/Screw (M6 x 1.0 x 16) (2)
35	Control Valve Body Bolt/Screw (M6 x 1.0 x 28) (2)
36	Automatic Transmission Fluid Temperature Sensor
37	Control Valve Body Fluid Passage Cover
38	Control Valve Body Fluid Passage Cover Gasket
39	Automatic Transmission Control Valve Body Assembly
40	Automatic Transmission Case Fluid Passage Cover
41	Automatic Transmission Case Fluid Passage Cover Bolt/Screw (M6 x 1.0 x 14) (2)
42	Automatic Transmission Fluid Filter Assembly

© 2011 Mitchell Repair Information Company, LLC.

	Automatic Transmission Fluid Filter Bolt/Screw (M6 x 1.0 x 16.7)
44	Automatic Transmission Fluid Baffle
45	Transmission Fluid Baffle Bolt/Screw (M6 x 1.0 x 14.7) (3)
46	Automatic Transmission Wiring Connector O-ring Seal
47	Control Valve Body Bolt/Screw (M6 x 1.0 x 55) (2)
48	Output Gear Retaining Ring
49	Automatic Transmission Fluid Temperature Sensor Clip

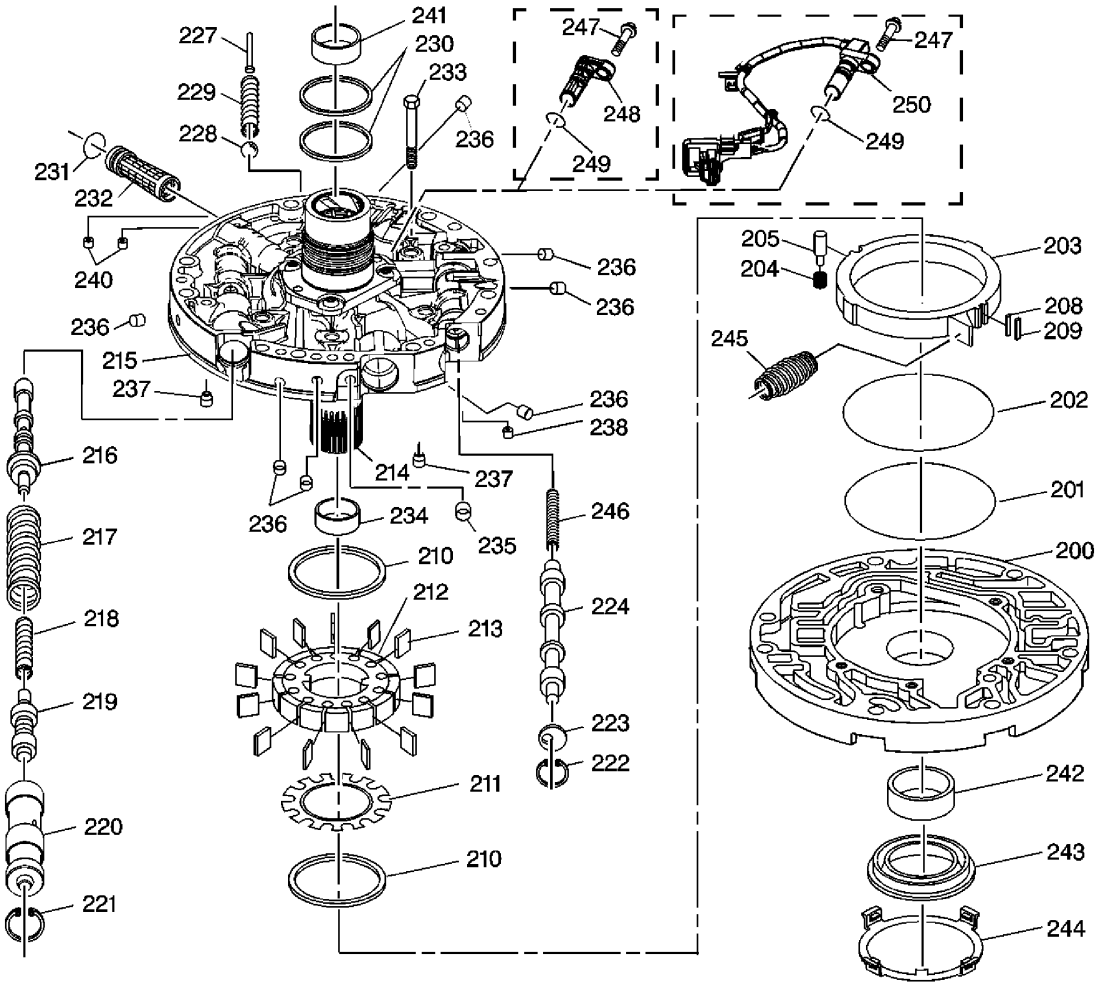


Fig. 5: Case & Associated Parts Component View (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
17	Automatic Transmission Case Assembly
50	3rd Gear Band Apply Tube Retainer Bolt/Screw (M6 x 1.0 x 14) (2)
51	3rd Gear Band Apply Tube Retainer
52	3rd Gear Band Apply Tube

© 2011 Mitchell Repair Information Company, LLC.

53	3rd Gear Band Apply Tube O-ring Seal
54	Automatic Transmission Case Plug (M20 x 1.5 x 13.5)
55	Automatic Transmission Case Plug O-ring Seal
56	3rd Gear Band Servo Spring
57	3rd Gear Band Servo Piston Assembly - Selective
58	3rd Gear Band Servo Piston and Cover O-ring Seal (3)
58	3rd Gear Band Servo Piston and Cover O-ring Seal (3)
59	3rd Gear Band Servo Cover
60	3rd Gear Servo Cover Retaining Ring
61	Automatic Transmission Output Speed Sensor Bolt/Screw (M6 x 1.0 x 16)
62	Automatic Transmission Output Speed Sensor Assembly
63	Automatic Transmission Output Speed Sensor O-ring Seal
64	3rd Gear Band Anchor Bolt/Screw (M20 x 1.5 x 21)
65	3rd Gear Band Anchor Bolt O-ring Seal
66	Automatic Transmission Fluid Pressure Test Hole Plug (UNF 5/16-24-2A) (3)
66	Automatic Transmission Fluid Pressure Test Hole Plug (UNF 5/16-24-2A) (3)
67	Automatic Transmission Fluid Pressure Test Hole Plug O-ring Seal (3)
67	Automatic Transmission Fluid Pressure Test Hole Plug O-ring Seal (3)
68	Transmission Case Locating Pin (4)
68	Transmission Case Locating Pin (4)
68	Transmission Case Locating Pin (4)
69	Washer - Flat (2)
69	Washer - Flat (2)
70	Lube Fill Plug
71	Automatic Transmission Input Speed Sensor O-ring Seal
72	Automatic Transmission Input Speed Sensor Bolt/Screw (M6 x 1.0 x 16)
73	Automatic Transmission Input Speed Sensor Assembly
74	Park/Neutral Position Switch Washer - Flat
75	Park/Neutral Position Switch Assembly
76	Park/Neutral Position Switch Stud (M8 x 1.25 x 22)
77	Park/Neutral Position Switch Washer - Lock Tab
78	Park/Neutral Position Switch Nut (M16 x 1.5)
79	Park/Neutral Position Switch Bolt/Screw (M8 x 1.25 x 36)
80	Front Wheel Drive Shaft Oil Seal
83	Lube Fluid Pipe Retainer Bolt/Screw (M6 x 1.0 x 14.5)
84	Lube Fluid Pipe Retainer
85	Lube Fluid Pipe
86	Automatic Transmission Case Fluid Passage Seal (7)
86	Automatic Transmission Case Fluid Passage Seal (7)
87	Transmission Fluid Cooler Pipe Fitting Seal (2)
88	Front Differential Side Gear Shim - Selective

 © 2011 Mitchell Repair Information Company, LLC.

	Automatic Transmission Case Fluid Passage Seal
90	Front Differential Bearing Race

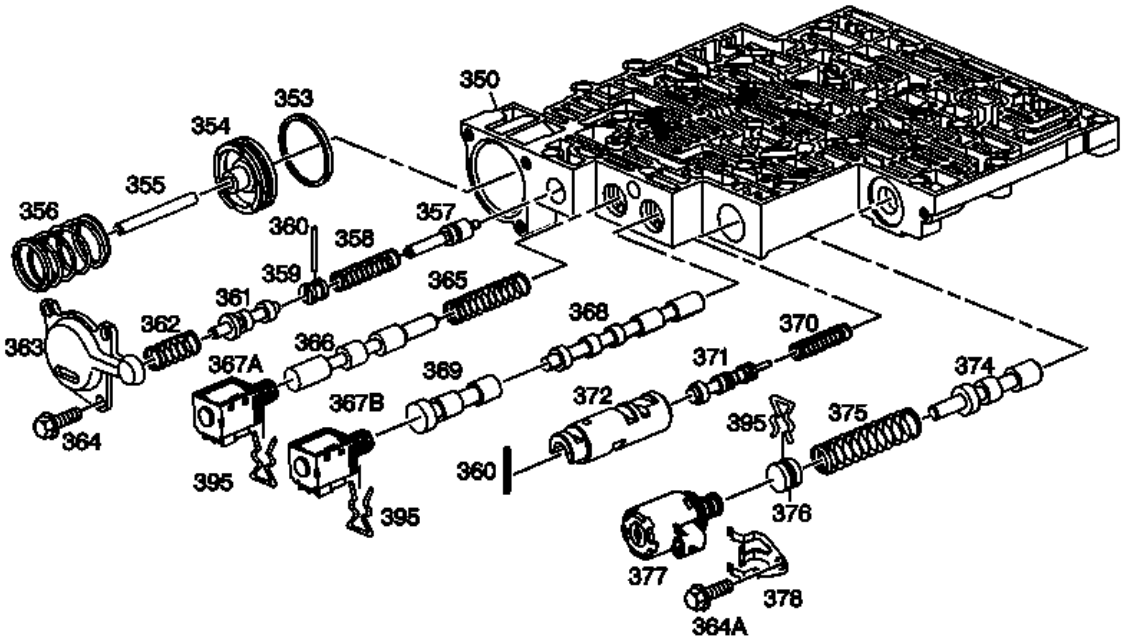


Fig. 6: Torque Converter Housing Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
800	Front Differential Carrier Seal Assembly
801	Torque Converter Housing Assembly
802	Front Differential Transfer Drive Gear Front Lube O-ring Seal
803	Automatic Transmission Fluid Baffle
804	Lube Fluid Pipe
805	Lube Fluid Pipe Retainer
806	Lube Fluid Pipe Retainer Bolt/Screw (M6 x 1.0 x 14)
807	Transmission Fluid Baffle Bolt/Screw (M6 x 1.0 x 14) (3)
808	Transmission Chip Collector Magnet (3)
809	Automatic Transmission Case Plug (M18 x 1.5 x 10.5)
810	Automatic Transmission Case Plug (UNF 5/16-24-2A)
811	Automatic Transmission Case Plug O-ring Seal
812	Transmission Vent Pipe
813	Transmission Vent Hose Clip (2)
813	Transmission Vent Hose Clip
814	Transmission Vent Hose

© 2011 Mitchell Repair Information Company, LLC.

815	Automatic Transmission Vent Assembly
816	Front Differential Transfer Drive Gear Assembly Front Bearing Assembly
817	Front Differential Assembly Bearing Race
819	Transmission Fluid Drain Plug
820	Transmission Fluid Drain Plug Washer
821	Automatic Transmission Case Plug O-ring Seal
822	Transmission Vent Hose Retainer
823	Transmission Fluid Level Indicator Assembly
824	Transmission Fluid Level Indicator Seal
825	Transmission Fluid Level Indicator Bolt/Screw (M8 x 1.25 x 25)

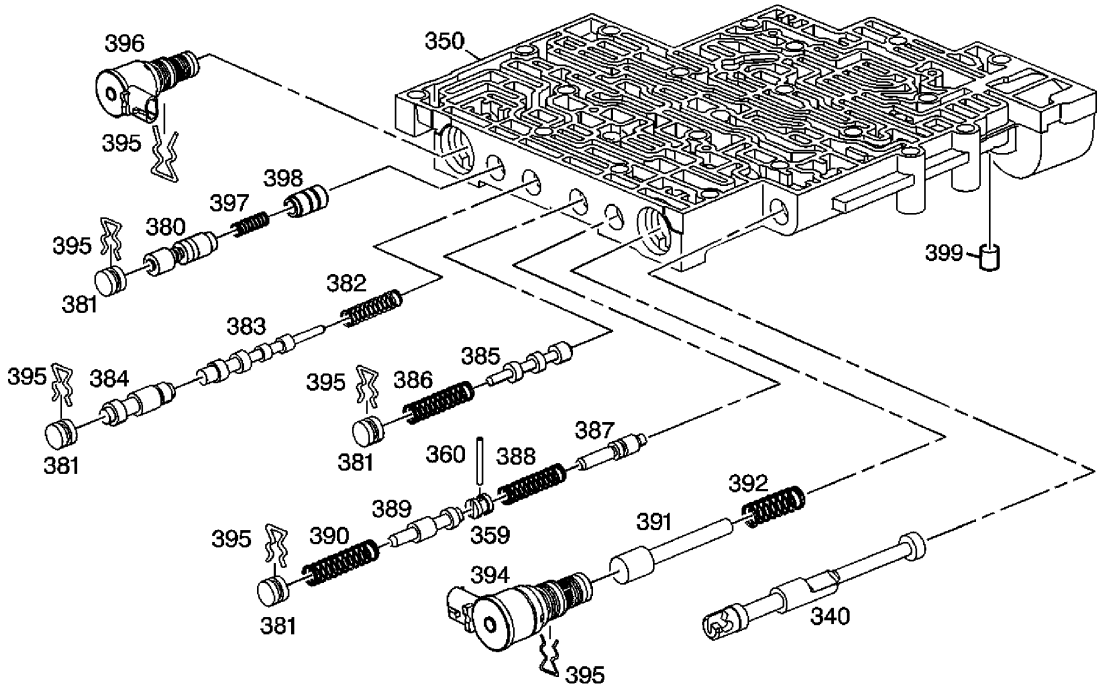


Fig. 7: Fluid Pump, Second Coast and Second Clutch Assemblies
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
200	Automatic Transmission Fluid Pump Body Seal Assembly
202	Fluid Pump Body
203	Fluid Pump Body to Fluid Pump Stator Shaft Assembly Alignment Pin (2)
203	Fluid Pump Body to Fluid Pump Cover Assembly Alignment Pin (2)
204	Fluid Pump Driven Gear (Selective)
205	Fluid Pump Drive Gear (Selective)
206	Automatic Transmission Fluid Pump O-ring Seal
207	Fluid Pump Plate

 © 2011 Mitchell Repair Information Company, LLC.

208	Fluid Pump Cover and Stator Shaft Assembly
209	Second Clutch Piston Outer Seal
210	Second Clutch Piston
211	Second Clutch Piston Sleeve Outer Seal
212	Second Clutch Piston Sleeve
213	Second Clutch Piston Sleeve Inner Seal
214	Second Clutch Spring Retaining Ring
215	Second Clutch Spring Assembly
217	Second Clutch Plate Assembly - Fiber (3)
218	Second Clutch Plate - Steel (2)
219	Second Clutch Backing Plate - Steel (Selective)
220	Second Clutch Backing Plate Retaining Ring
221	Second Coast Clutch Piston Inner Seal
222	Second Coast Clutch Piston
223	Second Coast Clutch Piston Outer Seal
224	Second Coast Clutch Spring
225	Second Coast Clutch Spring Retaining Ring
226	Coast Clutch Hub Thrust Washer
227	Second Coast Clutch Plate - Steel (3)
228	Second Coast Clutch Plate Assembly - Fiber (3)
229	Second Coast Clutch Backing Plate
230	Second Coast Clutch Backing Plate Retaining Ring
231	Automatic Transmission Fluid Pump Cover Bolt/Screw (M6 x 1.0 x 14.5) (13)
232	Automatic Transmission Fluid Pump Cover Bolt/Screw (M5 x 0.8 x 17)

 © 2011 Mitchell Repair Information Company, LLC.

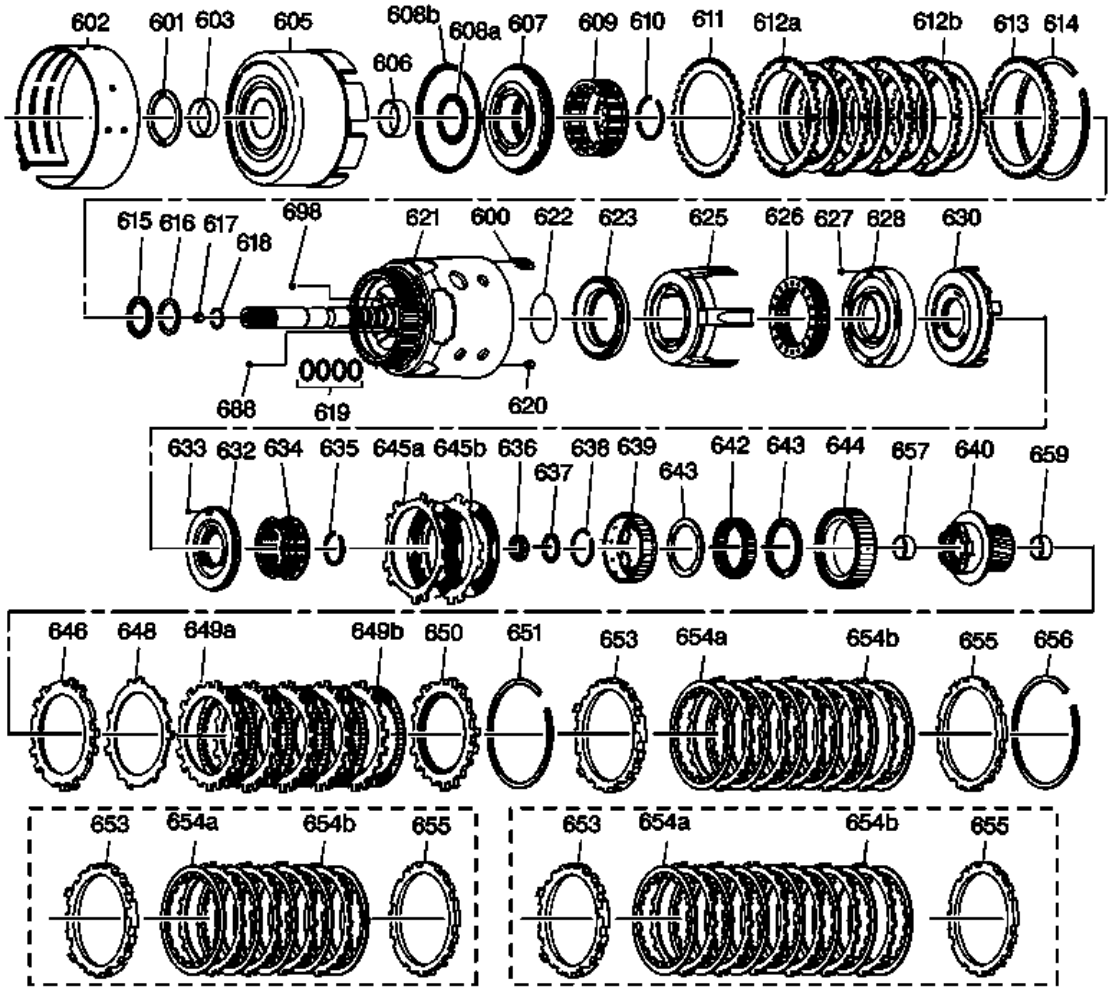


Fig. 8: Output Gear Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
235	Output Gear
236	Output Gear Bearing Assembly
237	Output Gear Bearing Assembly Spacer
238	Output Gear Bearing Assembly Lock Nut

 © 2011 Mitchell Repair Information Company, LLC.

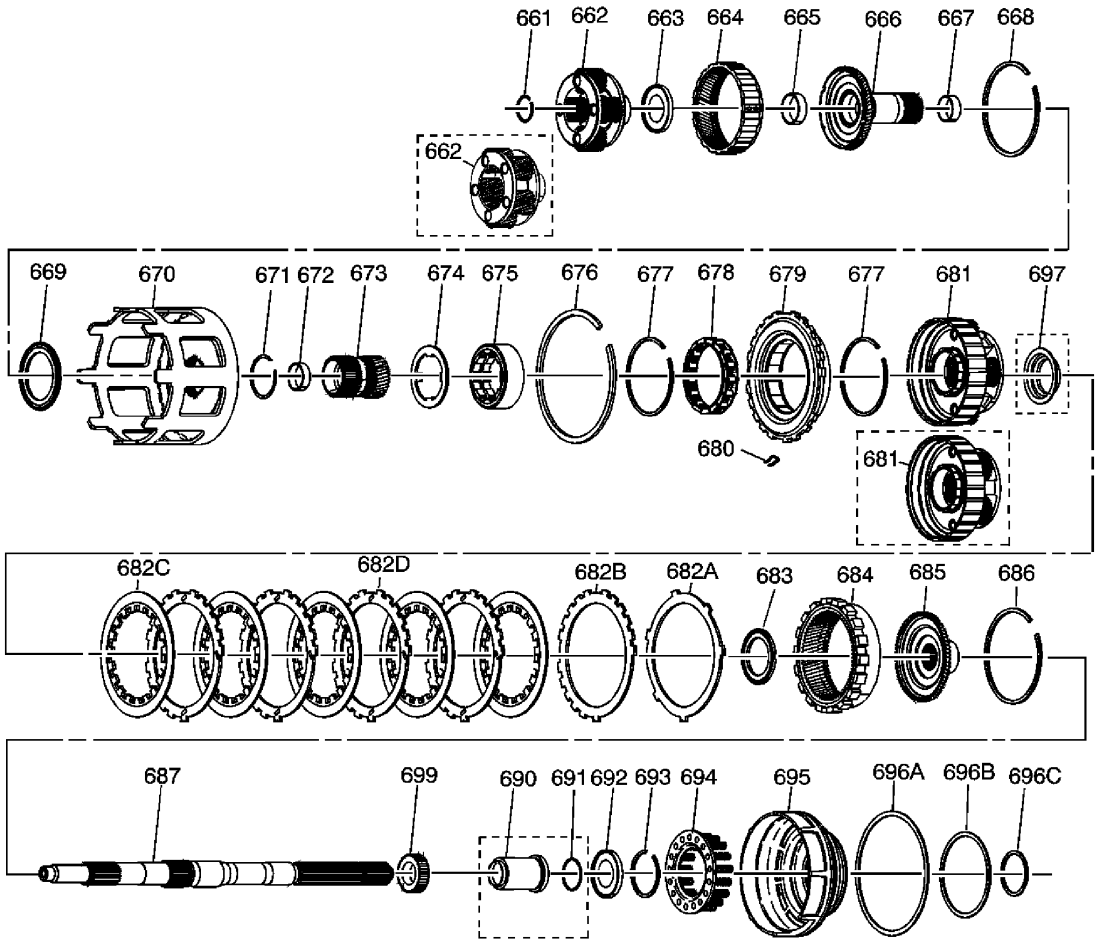


Fig. 9: Front Differential Transfer Drive Gear Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
250	Front Differential Transfer Drive Gear Lock Nut
251	Front Differential Transfer Drive Gear Bearing Assembly Inner Race
252	Front Differential Transfer Drive Gear Drive Pinion
253	Front Differential Transfer Drive Gear Parking Lock Gear
254	Front Differential Transfer Drive Gear Bearing Assembly (2)
254	Front Differential Transfer Drive Gear Bearing Assembly (2)
255	Front Differential Transfer Drive Gear Bearing Race (2)
255	Front Differential Transfer Drive Gear Bearing Race (2)
256	Front Differential Transfer Drive Gear Counter Gear Bearing Spacer
257	Front Differential Transfer Drive Gear Counter Driven Gear
258	Front Differential Transfer Drive Gear Counter Driven Gear Retaining Ring
259	Front Differential Transfer Drive Gear Carrier Assembly
260	Front Differential Transfer Drive Gear Ring Gear Retaining Ring

 © 2011 Mitchell Repair Information Company, LLC.

261	Front Differential Transfer Drive Gear Ring Gear
262	4-5 Clutch Housing Fluid Seal Ring (2)
263	Front Differential Transfer Drive Gear Thrust Bearing Assembly
264	Front Differential Transfer Drive Gear Thrust Bearing Washer - Selective

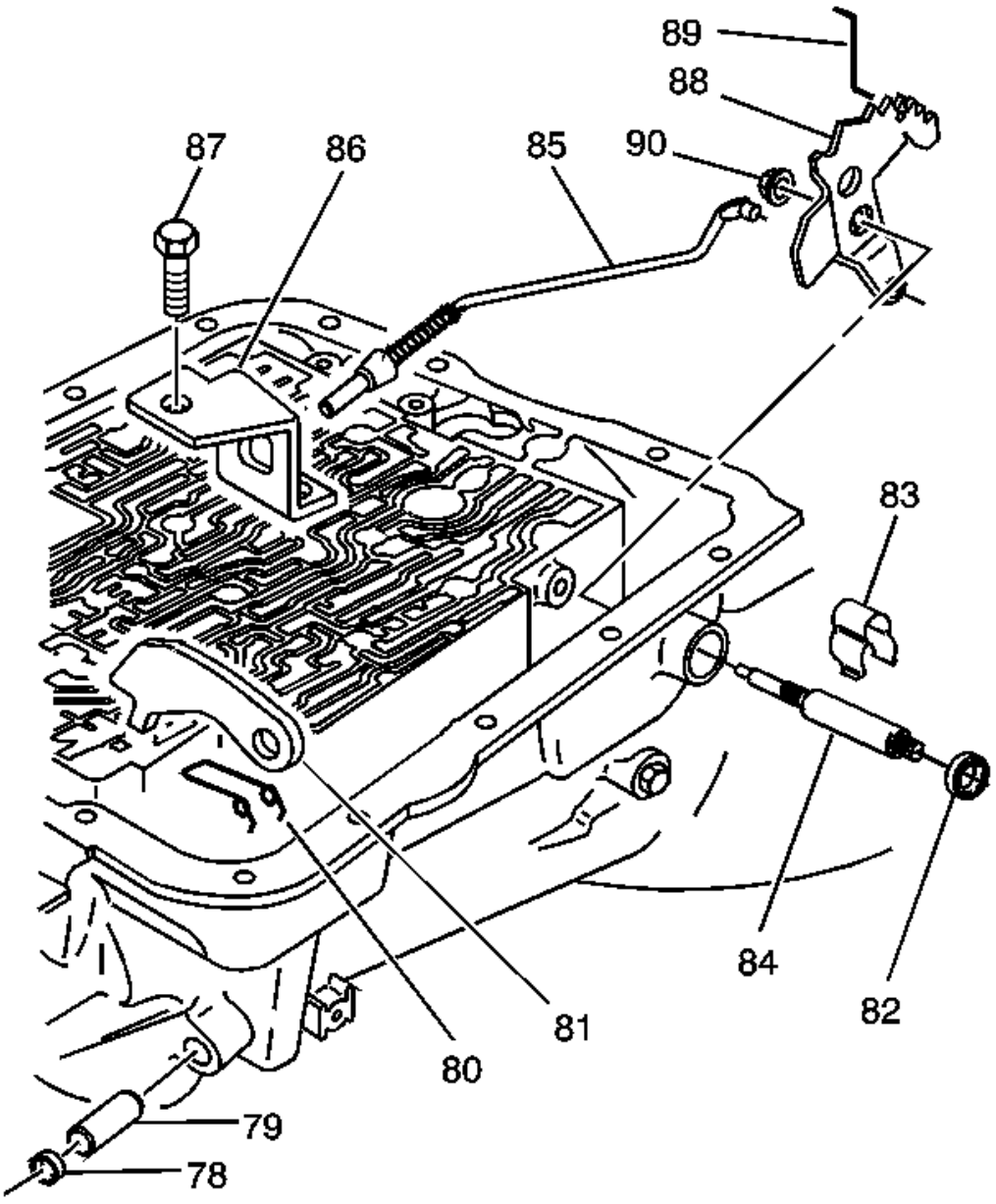


Fig. 10: Control Valve Body Assembly Component View

© 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
300	1-2, 2-3, Reverse Shift Solenoid Valve Assembly (S3) - Dark Gray
301	Control Valve Body Bolt/Screw (M5 x 0.8 x 62)
302	Control Valve Body Bolt/Screw (M5 x 0.8 x 28) (2)
302	Control Valve Body Bolt/Screw (M5 x 0.8 x 28) (2)
302	Control Valve Body Bolt/Screw (M5 x 0.8 x 28) (2)
303	3-4, 4-5 Shift Solenoid Valve Assembly (S4) - Blue
304	Control Valve Body Bolt/Screw (M5 x 0.8 x 50) (2)
304	Control Valve Body Bolt/Screw (M5 x 0.8 x 50) (2)
305	Reverse Shift Solenoid Valve Assembly (S5) - Brown
306	Shift Solenoid Valve O-ring Seal (5)
306	Shift Solenoid Valve O-ring Seal (5)
306	Shift Solenoid Valve O-ring Seal (5)
307	Control Valve Body Bolt/Screw (M5 x 0.8 x 10) (3)
307	Control Valve Body Bolt/Screw (M5 x 0.8 x 10) (3)
307	Control Valve Body Bolt/Screw (M5 x 0.8 x 10) (3)
308	2-3, 3-4 Shift Solenoid Valve Assembly (S2) - Black
310	Reverse, 1st Shift Solenoid Valve Assembly (S1) - Black
311	Control Valve Body Bolt/Screw (M5 x 0.8 x 13)
312	Control Valve Body Solenoid Valve Retainer
313	Control Valve Body Bolt/Screw (M5 x 0.8 x 20) (5)
313	Control Valve Body Bolt/Screw (M5 x 0.8 x 20) (5)
314	Control Valve Body Bolt/Screw (M5 x 0.8 x 16) (2)
315	Front Control Valve Body Assembly
316	Line Pressure Control Solenoid Valve Assembly (SLT) - Blue
318	Automatic Transmission Wiring Harness Clip
319	TCC Lock Up Control Solenoid Valve Retainer (SLU)
320	Front Control Valve Body to Front Control Valve Body Spacer Plate Gasket
321	Front Control Valve Body Spacer Plate
322	Front Control Valve Body Spacer Plate to Middle Control Valve Body Gasket
323	Middle Control Valve Body Assembly
324	Middle Control Valve Body Assembly to Rear Control Valve Body Spacer Plate and Gasket Assembly
326	Rear Control Valve Body Assembly
327	Rear Control Valve Body to Rear Control Valve Body Spacer Plate Gasket
328	Rear Control Valve Body Assembly Spacer Plate
329	Rear Control Valve Body Assembly Spacer Plate to No. 2 Rear Control Valve Body Assembly Gasket
330	No. 2 Rear Control Valve Body Assembly
331	Control Valve Body Bolt/Screw (M5 x 0.8 x 76)

 © 2011 Mitchell Repair Information Company, LLC.

332	Control Valve Body Bolt/Screw (M5 x 0.8 x 49.5) (4)
333	Control Valve Body Bolt/Screw (M5 x 0.8 x 40)
334	Control Valve Body Assembly Pressure Test Hole Bolt/Screw Pressure Tap (M6 x 1.0 x 12) (1)
335	Control Valve Body Bolt/Screw (M5 x 0.8 x 35) (2)
336	Manual Valve Link
337	Manual Valve
338	Manual Valve Link Retainer
339	TCC Lock Up Pressure Control Solenoid Valve Assembly (SLU) - Black
340	Shift Pressure Control Solenoid Valve Assembly (SLS) - Green

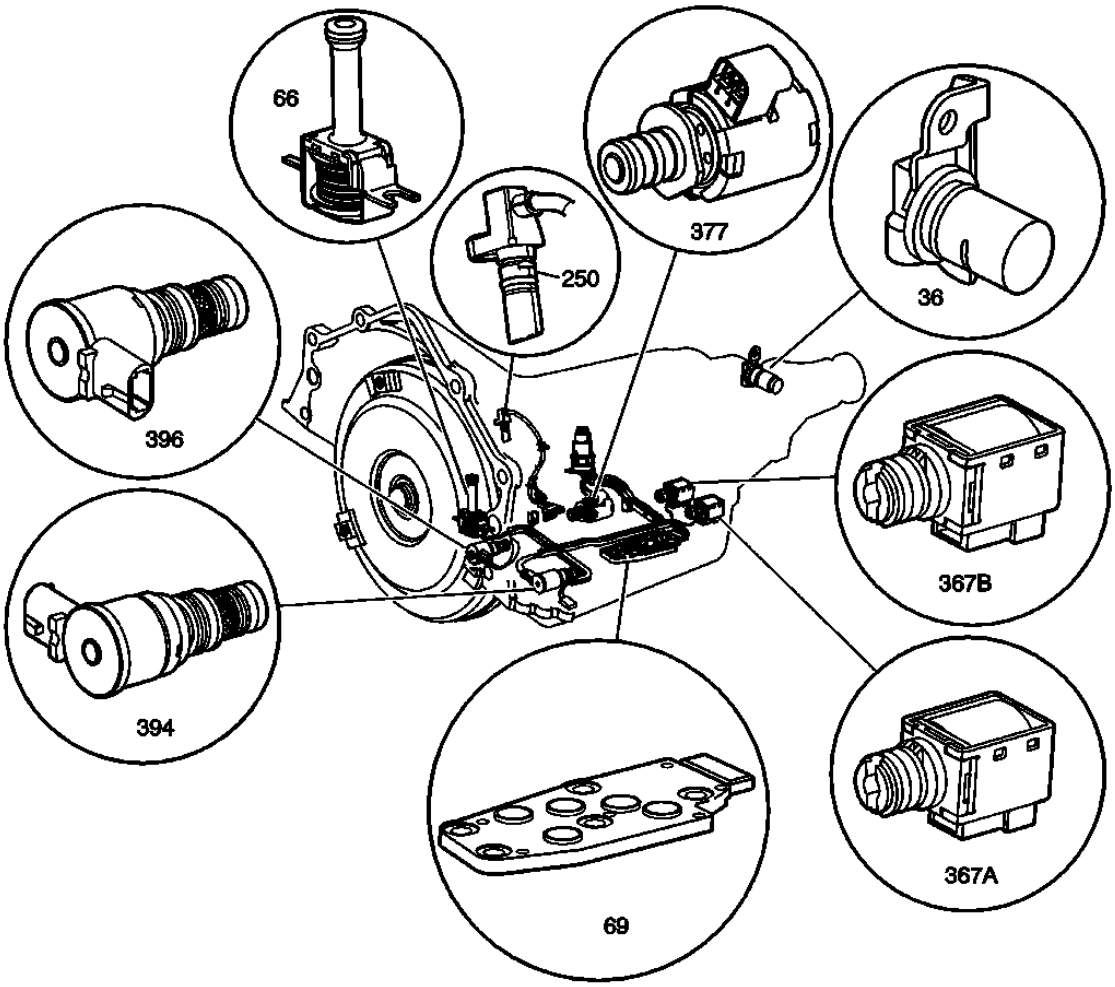


Fig. 11: Front Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
345	Front Control Valve Body
346	Solenoid Modulator Valve

 © 2011 Mitchell Repair Information Company, LLC.

347	Solenoid Modulator Valve Spring - Yellow
348	Solenoid Modulator Valve Bore Plug (4)
348	Solenoid Modulator Valve Bore Plug (4)
348	Solenoid Modulator Valve Bore Plug (4)
348	Solenoid Modulator Valve Bore Plug (4)
349	Sleeve/Bore Plug Retainer (3.2 x 5 x 10) (4)
349	Sleeve/Bore Plug Retainer (3.2 x 5 x 10) (4)
349	Sleeve/Bore Plug Retainer (3.2 x 5 x 10) (4)
349	Sleeve/Bore Plug Retainer (3.2 x 5 x 10) (4)
350	Pressure Relief Valve Spring - Natural Color
351	Pressure Relief Valve
352	Fluid Strainer
354	Forward Clutch (C1) Control Valve
355	Ball Check Valve
356	Neutral Relay Valve
357	Neutral Relay Valve Spring - Light Blue
358	2nd Coast Clutch (B1) Control Valve Spring - Blue
359	2nd Coast Clutch (B1) Control Valve
360	Check Valve (2)
361	Check Valve Spring (2)

 © 2011 Mitchell Repair Information Company, LLC.

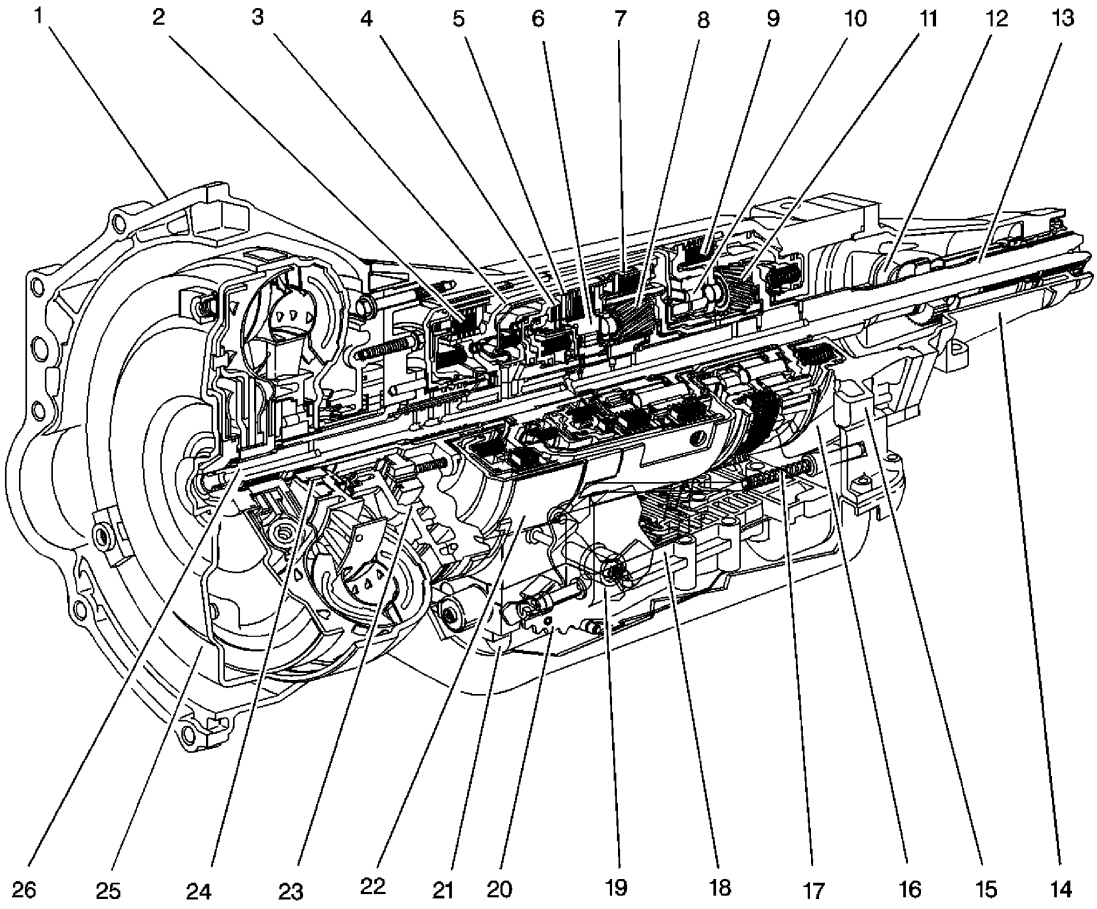


Fig. 12: Middle Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
353	Accumulator Check Valve Assembly (6)
353	Accumulator Check Valve Assembly (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
362	Sleeve/Bore Plug Retainer (3.2 x 5 x 12.5) (7)
370	Middle Control Valve Body
371	Fluid Strainer (3)
371	Fluid Strainer (3)
372	Fluid Strainer
373	Reverse Shift Ball Check Valve Bushing - Inner

 © 2011 Mitchell Repair Information Company, LLC.

374	Reverse Shift Ball Check Valve
375	Reverse Shift Ball Check Valve Bushing - Outer
376	Solenoid Relay Valve Sleeve
377	Solenoid Relay Valve Plunger
378	Solenoid Relay Valve
379	Solenoid Relay Valve Spring - Orange
380	Cooler By-Pass Valve Spring - Natural Color
381	Cooler By-Pass Valve
382	TCC Check Valve
383	TCC Check Valve Spring - Yellow
384	3rd Gear Band (B4) Release Valve Spring - Blue
385	3rd Gear Band (B4) Release Valve
386	U1 Shift Valve
387	U1 Shift Valve Spring - Light Green
389	M1 Shift Valve
390	M1 Shift Valve Spring - Light Blue
391	M1 Shift Valve Bore Plug
392	U2 Shift Valve
393	U2 Shift Valve Spring - Light Green
394	U2 Shift Valve Bore Plug (3)
394	U2 Shift Valve Bore Plug (3)
394	U2 Shift Valve Bore Plug (3)
395	Primary Regulator Valve
396	Primary Regulator Valve Spring - Purple
397	Primary Regulator Valve Plunger
398	Primary Regulator Valve Sleeve
399	Forward Clutch Check Ball

 © 2011 Mitchell Repair Information Company, LLC.

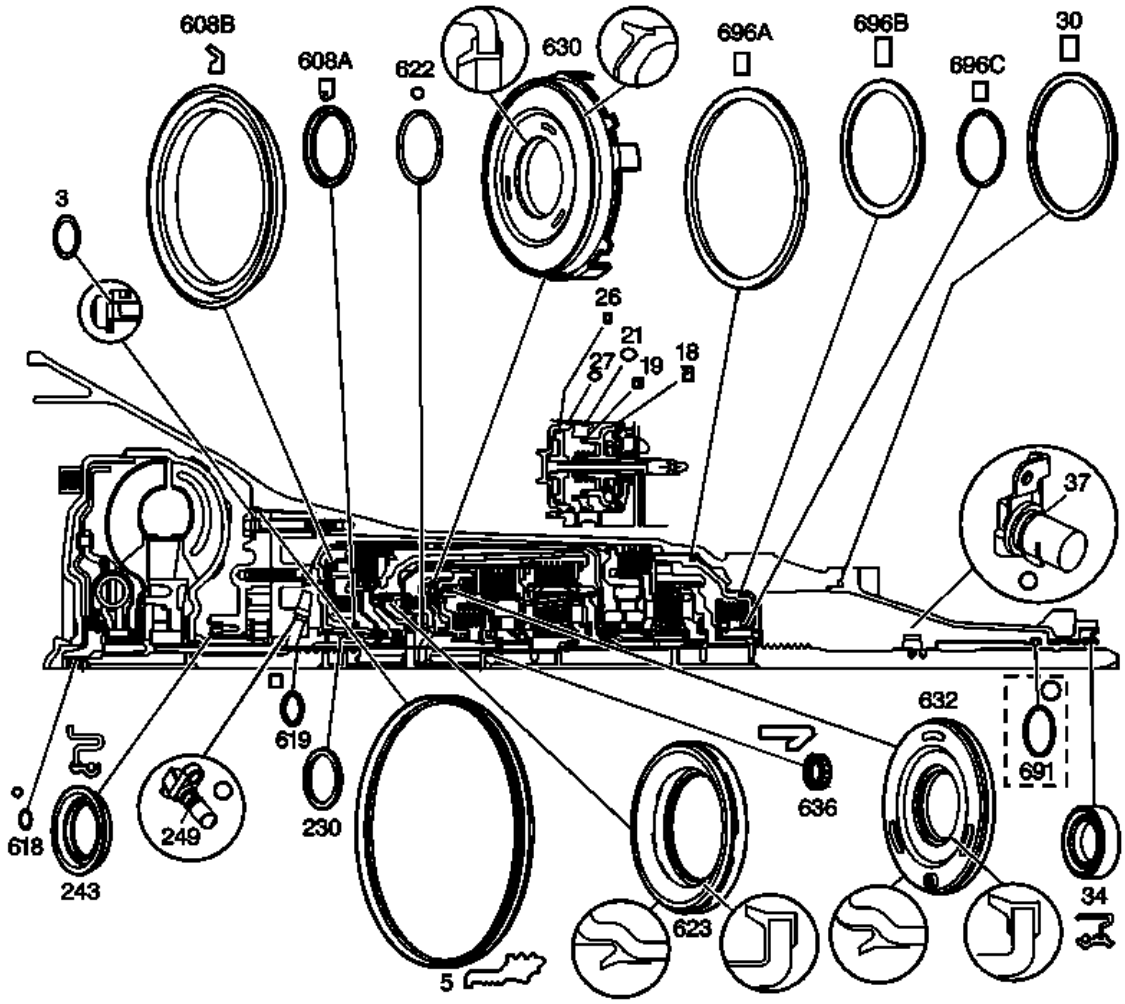


Fig. 13: Rear Control Valve Body Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
410	Rear Control Valve Body
411	1-2 Reverse Clutch (B5) Control Valve
412	Lock Up Relay Control Valve Sleeve
413	Lock Up Relay Control Valve Plunger
414	Lock Up Relay Valve Spring - Red
415	Lock Up Relay Valve
416	Rear Valve Body Cover Plate Bolt - Hexagon (M5 x 0.8 x 13) (2)
417	Rear Valve Body Cover Plate
418	Rear Valve Body Cover Plate Gasket
419	Rear Valve Body Cover Plate Gasket
420	Rear Valve Body Cover Plate
421	Rear Valve Body Cover Plate Bolt - Hexagon (M5 x 0.8 x 13) (7)
422	3rd Gear Band (B4) Control Valve Spring - Orange

 © 2011 Mitchell Repair Information Company, LLC.

423	3rd Gear Band (B4) Control Valve
424	Shift Pressure Relay Valve
425	Shift Pressure Relay Valve Spring - Light Green
426	M2 Shift Valve
427	M2 Shift Valve Spring - Light Blue
428	Shift Pressure Control Valve Sleeve
429	Shift Pressure Control Valve Spring - White
430	Shift Pressure Control Valve
431	Shift Pressure Control Valve Plunger
432	Shift Pressure Control Valve Plunger Sleeve
433	Line Pressure Control (SLT) Accumulator Piston
434	Line Pressure Control (SLT) Accumulator Piston Spring - Outer - Orange
435	Line Pressure Control (SLT) Accumulator Piston Spring - Inner - Orange
436	Secondary Regulator Valve
437	Secondary Regulator Valve Spring - Natural Color

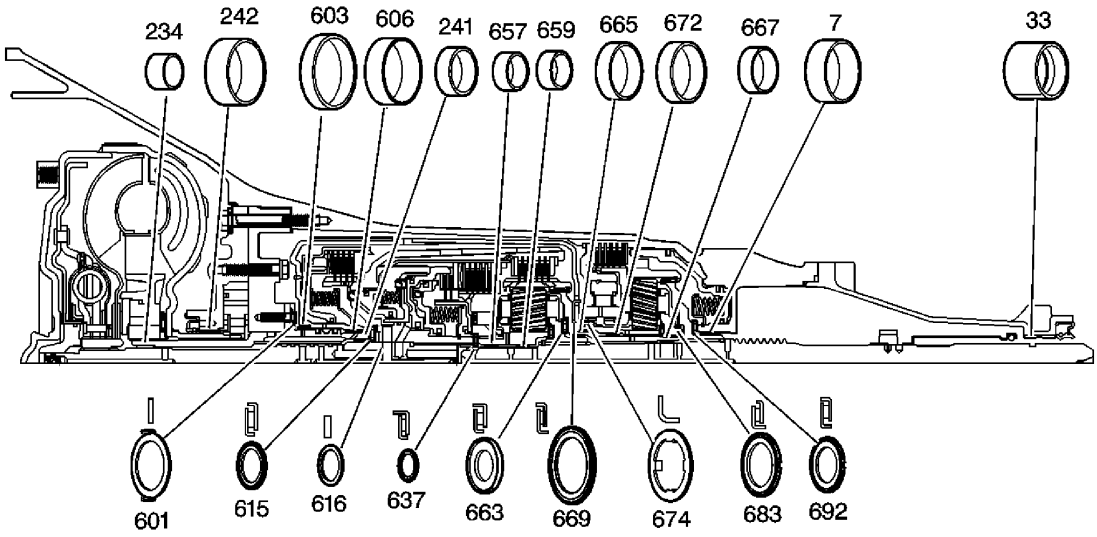


Fig. 14: No. 2 Rear Control Valve Body Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
353	Accumulator Check Valve Assembly (2)
353	Accumulator Check Valve Assembly (2)
445	No. 2 Rear Control Valve Body
446	2nd Clutch (B2) Control Valve
447	2nd Clutch (B2) Control Valve Spring - Natural Color
448	2nd Clutch (B2) Control Valve Plug
449	TCC Check Valve Spring - Light Blue

© 2011 Mitchell Repair Information Company, LLC.

450	TCC Check Valve
451	Reverse Shift Restrict Ball Check Valve Bushing - Inner
452	Reverse Shift Restrict Ball Check Valve
453	Reverse Shift Restrict Ball Check Valve Bushing - Outer
454	Lock Up Control Valve
455	Lock Up Control Valve Plunger
456	Lock Up Control Valve Spring - Yellow
457	Lock Up Control Valve Sleeve
458	Sleeve/Bore Plug Retainer (3.2 x 5 x 21.2)
459	Sleeve/Bore Plug Retainer (3.2 x 5 x 15) (2)
459	Sleeve/Bore Plug Retainer (3.2 x 5 x 15) (2)

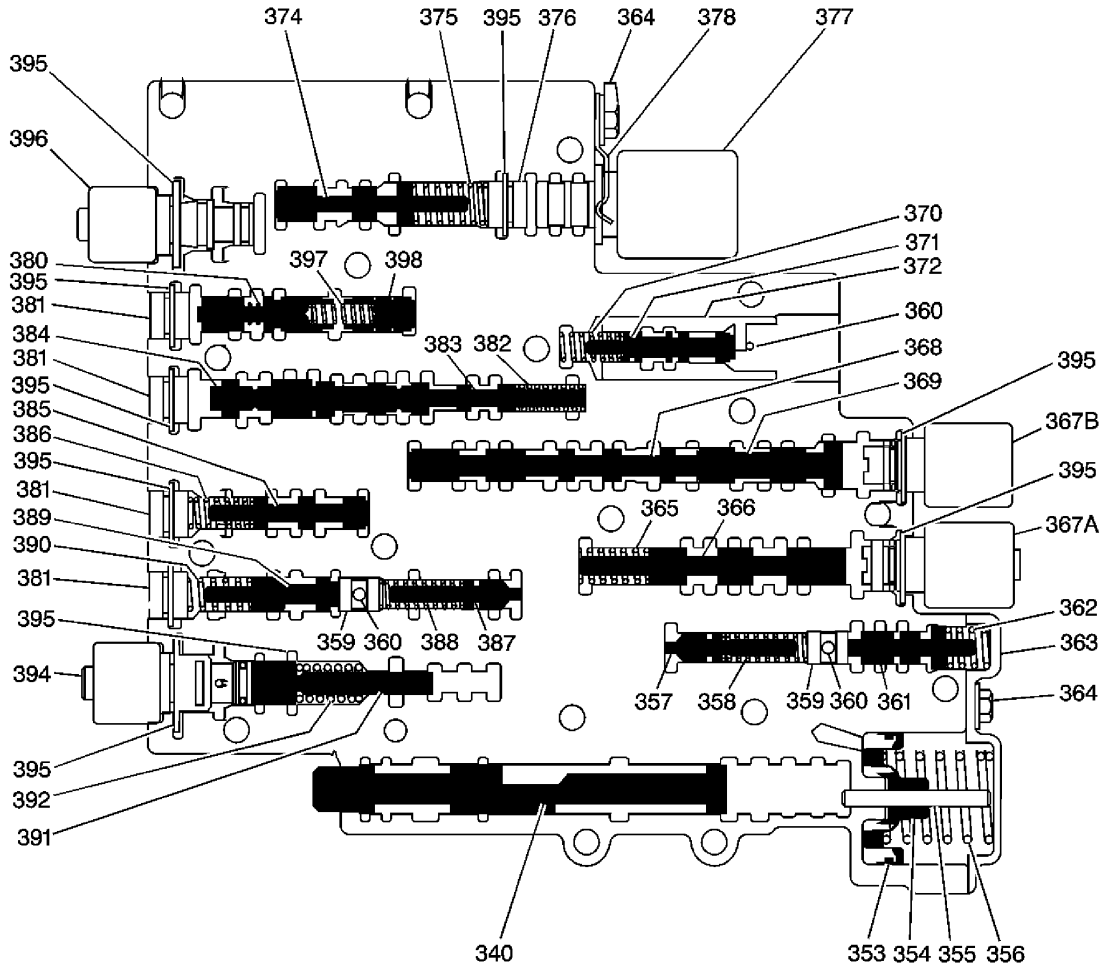


Fig. 15: Second, Second Coast Clutch & Second Clutch Sprag Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

 © 2011 Mitchell Repair Information Company, LLC.

500	Second Coast Clutch Hub
501	Coast Clutch Hub Thrust Washer
502	Second Clutch Sprag End Bearing (2)
502	Second Clutch Sprag End Bearing (2)
503	Second Clutch Sprag Assembly
505	Second Clutch Sprag Outer Race Assembly
506	Second Clutch Sprag Outer Race Thrust Washer

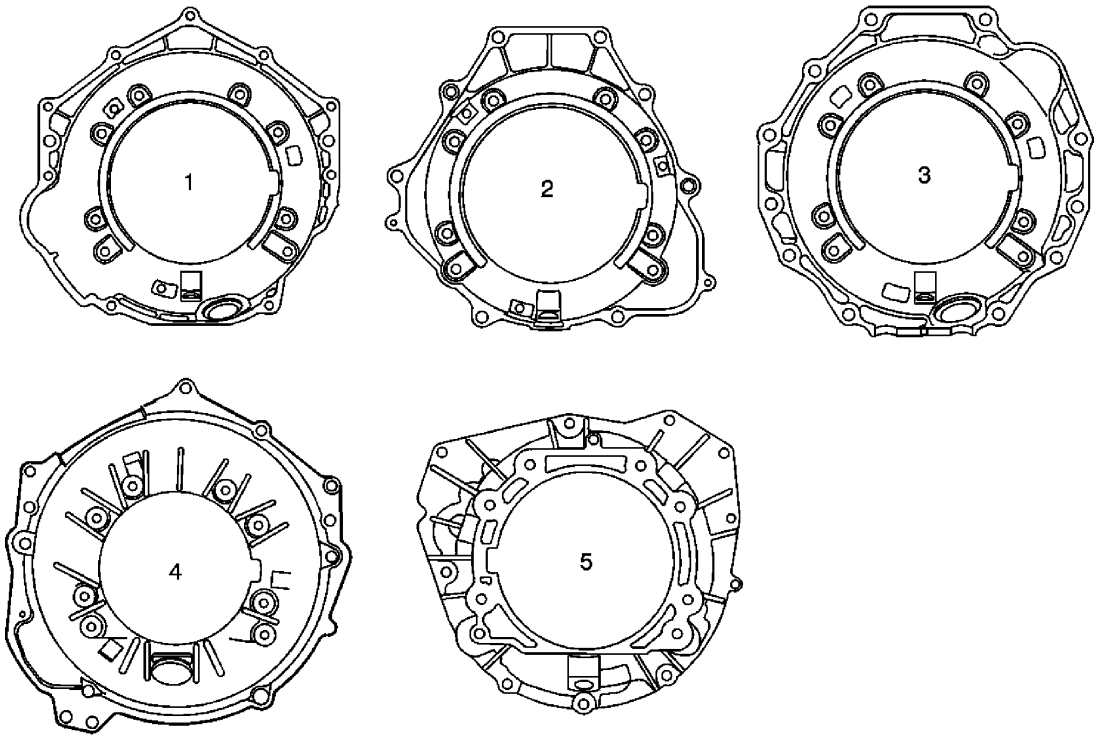


Fig. 16: Low and Reverse Clutch and Front Internal Gear Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
510	Low and Reverse Clutch Piston Inner Seal
511	Low and Reverse Clutch Piston
512	Low and Reverse Clutch Piston Outer Seal
513	Low and Reverse Clutch Spring Assembly
514	Low and Reverse Clutch Spring Retaining Ring
515	Low and Reverse Clutch Backing Plate (2)
515	Low and Reverse Clutch Backing Plate (2)
516	Low and Reverse Clutch Plate Assembly - Fiber (4)
517	Low and Reverse Clutch Plate - Steel (3)
518	Low and Reverse Clutch Plate Retaining Ring

© 2011 Mitchell Repair Information Company, LLC.

519	Front Internal Gear Thrust Bearing Assembly
523	Overrun Roller Clutch Assembly
526	Front Internal Gear
527	Front Internal Gear Flange
528	Front Internal Gear Flange Retaining Ring
529	Front Internal Gear Thrust Bearing Assembly
530	Front Internal Gear Thrust Washer Race

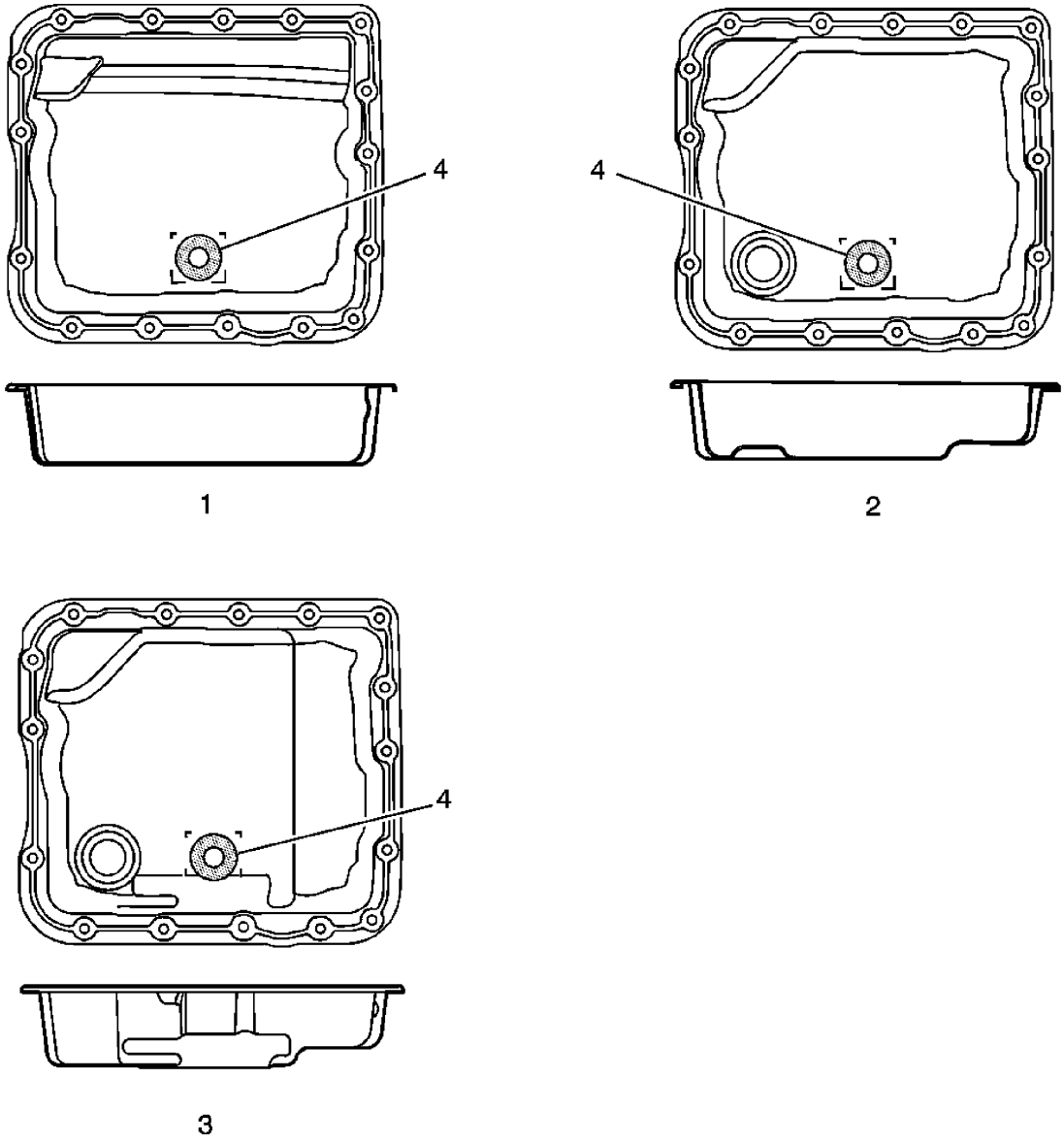


Fig. 17: Rear Internal Gear Assembly Component View
Courtesy of GENERAL MOTORS CORP.

 © 2011 Mitchell Repair Information Company, LLC.

Callout	Component Name
535	Rear Internal Gear Thrust Bearing Assembly
536	Rear Internal Gear
537	Rear Sun Gear Thrust Bearing Race
538	Rear Sun Gear Thrust Bearing Assembly
539	Rear Sun Gear Assembly
540	Input Shaft Thrust Bearing Assembly
541	Front Sun Gear Retaining Ring
542	Front Carrier Assembly
543	Front Carrier Thrust Bearing Race
544	Front Sun Gear
545	Front Sun Gear Thrust Bearing Assembly
546	Front Sun Gear Thrust Bearing Race
547	Rear Internal Gear Flange
548	Rear Internal Gear Flange Retaining Ring

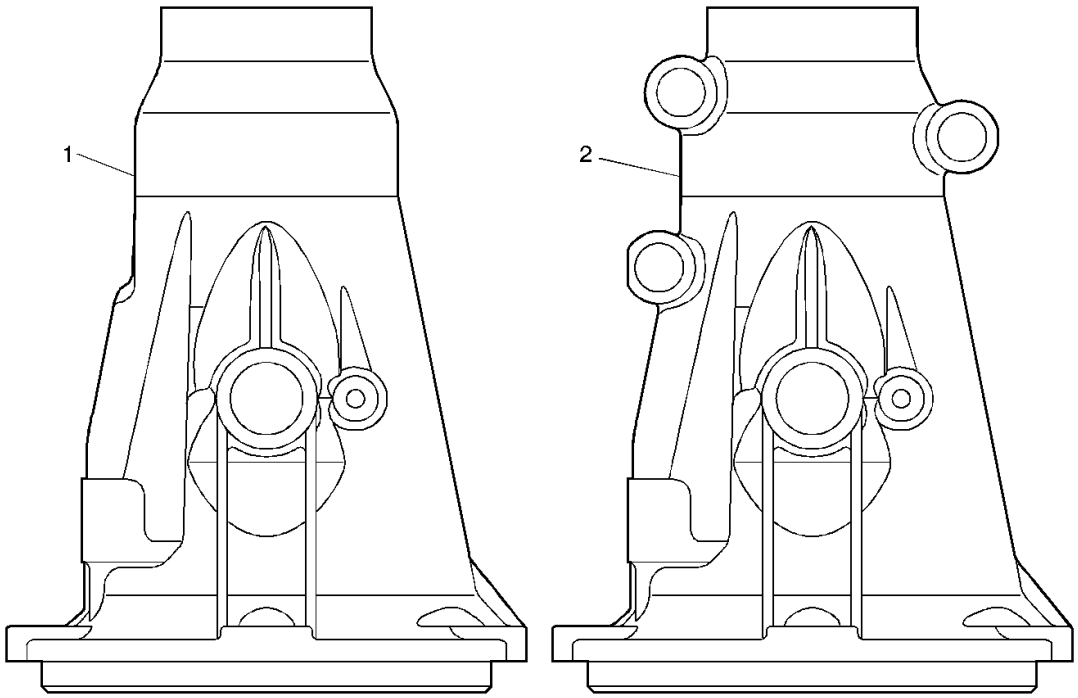


Fig. 18: Forward & Direct Clutch Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
550	Forward Clutch Backing Plate Retaining Ring
551	Forward Clutch Backing Plate (Selective)

© 2011 Mitchell Repair Information Company, LLC.

552	Forward Clutch Plate Assembly - Fiber (4)
553	Forward Clutch Plate - Steel (4)
554	Direct Clutch Backing Plate Retaining Ring
555	Direct Clutch Backing Plate (Selective)
556	Direct Clutch Plate Assembly - Fiber (4)
557	Direct Clutch Plate - Steel (4)
558	Direct Clutch Apply Plate
559	Direct Clutch Spring Retaining Ring
560	Direct Clutch Spring Assembly
561	Direct Clutch Piston Inner Seal
562	Direct Clutch Piston
563	Direct Clutch Piston Outer Seal
564	Forward Clutch Piston Inner Seal
565	Forward Clutch Piston
566	Forward Clutch Piston Outer Seal
567	Forward and Direct Clutch Housing Assembly - with Input Shaft
568	Forward Clutch Housing Thrust Bearing Race (Selective)
569	Forward Clutch Housing Thrust Bearing Assembly
570	Input Shaft O-ring Seal

 © 2011 Mitchell Repair Information Company, LLC.

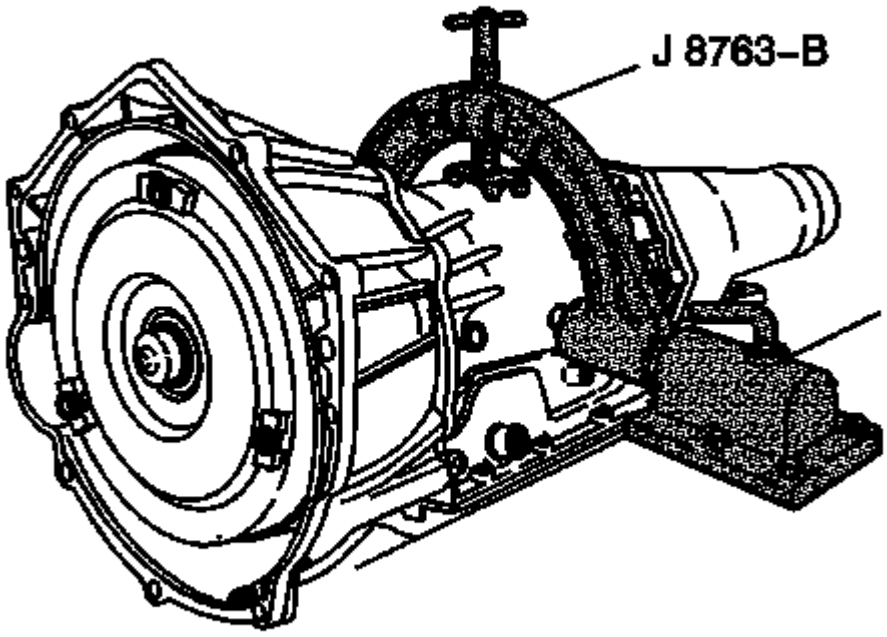


Fig. 19: 4-5 Clutch Drum Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
575	4-5 Clutch Backing Plate Retaining Ring
576	4-5 Clutch Backing Plate (Selective)
577	4-5 Clutch Plate Assembly - Fiber (4)
578	4-5 Clutch Plate - Steel (4)
579	4-5 Clutch Piston Return Spring Retaining Ring
580	4-5 Clutch Piston Return Spring Assembly
581	4-5 Clutch Piston Inner Seal
582	4-5 Clutch Piston
583	4-5 Clutch Piston Outer Seal
584	4-5 Clutch Drum Assembly

 © 2011 Mitchell Repair Information Company, LLC.

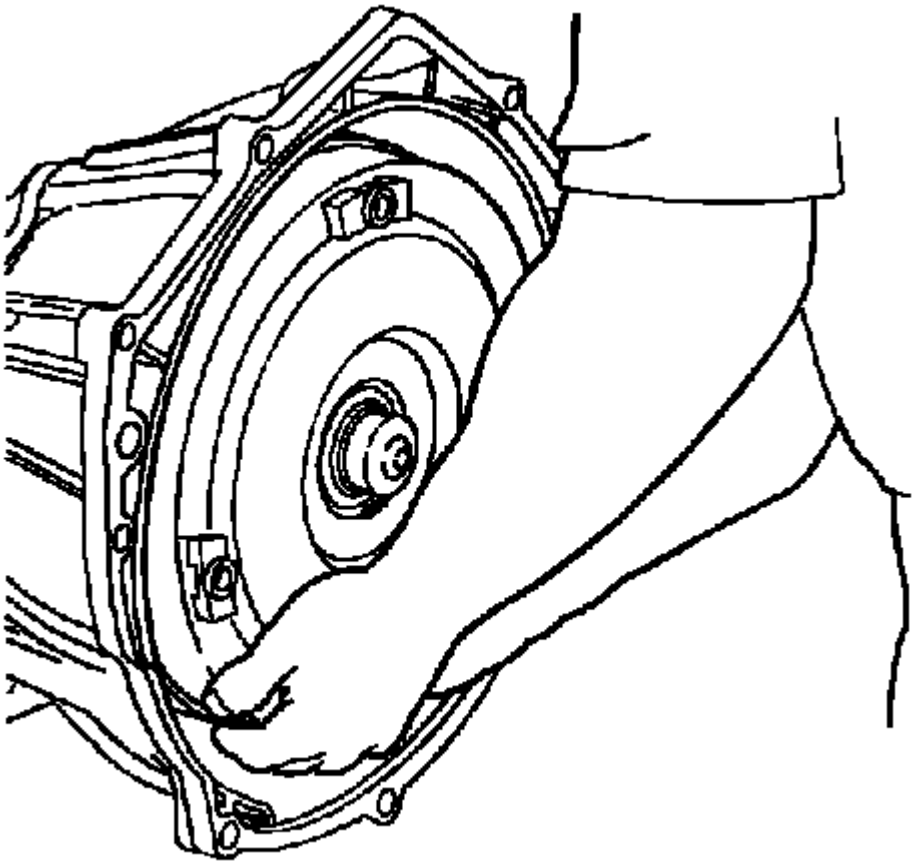


Fig. 20: 1-2 Reverse Carrier Gear Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
18	1-2 Reverse Carrier Gear Assembly
590	1-2 Reverse Carrier Thrust Washer (2)
590	1-2 Reverse Carrier Thrust Washer (2)
591	1-2 Reverse Carrier Gear Assembly
593	1-2 Reverse Internal Gear Front Thrust Bearing Assembly
594	1-2 Reverse Internal Gear
595	1-2 Reverse Internal Gear Rear Thrust Bearing Assembly
596	1-2 Reverse Internal Gear Shim - Selective

 © 2011 Mitchell Repair Information Company, LLC.

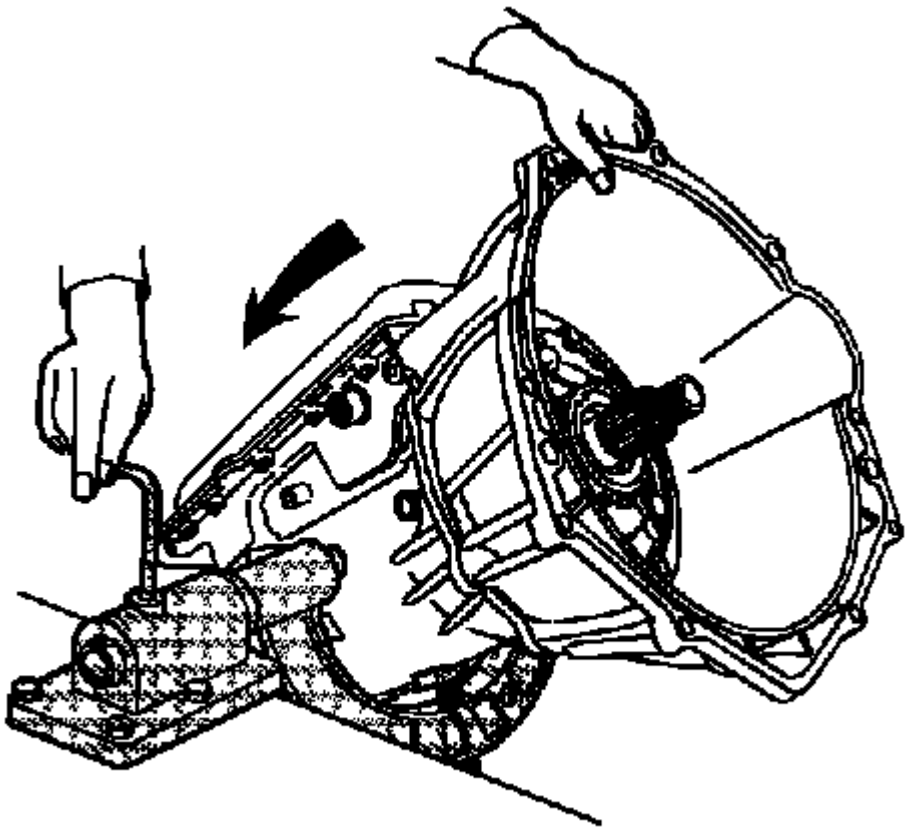


Fig. 21: Automatic Transmission Case Cover Assembly & 1-2 Reverse Clutch Assembly Component View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
66	Automatic Transmission Fluid Pressure Test Hole Plug (UNF 5/16-24-2A) (7)
66	Automatic Transmission Fluid Pressure Test Hole Plug (UNF 5/16-24-2A) (7)
67	Automatic Transmission Fluid Pressure Test Hole Plug O-ring Seal (7)
67	Automatic Transmission Fluid Pressure Test Hole Plug O-ring Seal (7)
600	1-2 Reverse Clutch Piston Return Spring Retaining Ring
601	1-2 Reverse Clutch Piston Return Spring Assembly
602	1-2 Reverse Clutch Piston Inner Seal
603	1-2 Reverse Clutch Piston
604	1-2 Reverse Clutch Piston Outer Seal
606	Automatic Transmission Case Cover Assembly
607	Forward Clutch Housing Fluid Seal Ring (3)
608	4-5 Clutch Apply Pipe Seal (2)
609	4-5 Clutch Apply Pipe
610	4-5 Clutch Apply Pipe Retainer (2)
611	4-5 Clutch Apply Pipe Bolt/Screw (M5 x 0.8 x 12) (4)

 © 2011 Mitchell Repair Information Company, LLC.

612	Forward Clutch Accumulator Piston
613	Forward Clutch Accumulator Piston Fluid Seal Ring
614	Forward Clutch Accumulator Piston Spring - Natural Color
615	Forward Clutch Accumulator Cover Seal
616	Forward Clutch Accumulator Cover
617	Forward Clutch Accumulator Cover Bolt/Screw (M6 x 1.0 x 14.5) (2)
618	1-2 Reverse Clutch Apply Plate
619	1-2 Reverse Clutch Plate - Steel (6)
620	1-2 Reverse Clutch Plate Assembly - Fiber (6)
621	1-2 Reverse Clutch Backing Plate (Selective)
622	1-2 Reverse Clutch Backing Plate Retaining Ring
623	Front Differential Transfer Drive Gear Assembly Rear Bearing Assembly
624	Front Differential Transfer Drive Gear Assembly Lube Seal Ring - Rear
625	Input Shaft Bearing
628	Forward/Direct Clutch Housing Thrust Bearing Race

 © 2011 Mitchell Repair Information Company, LLC.

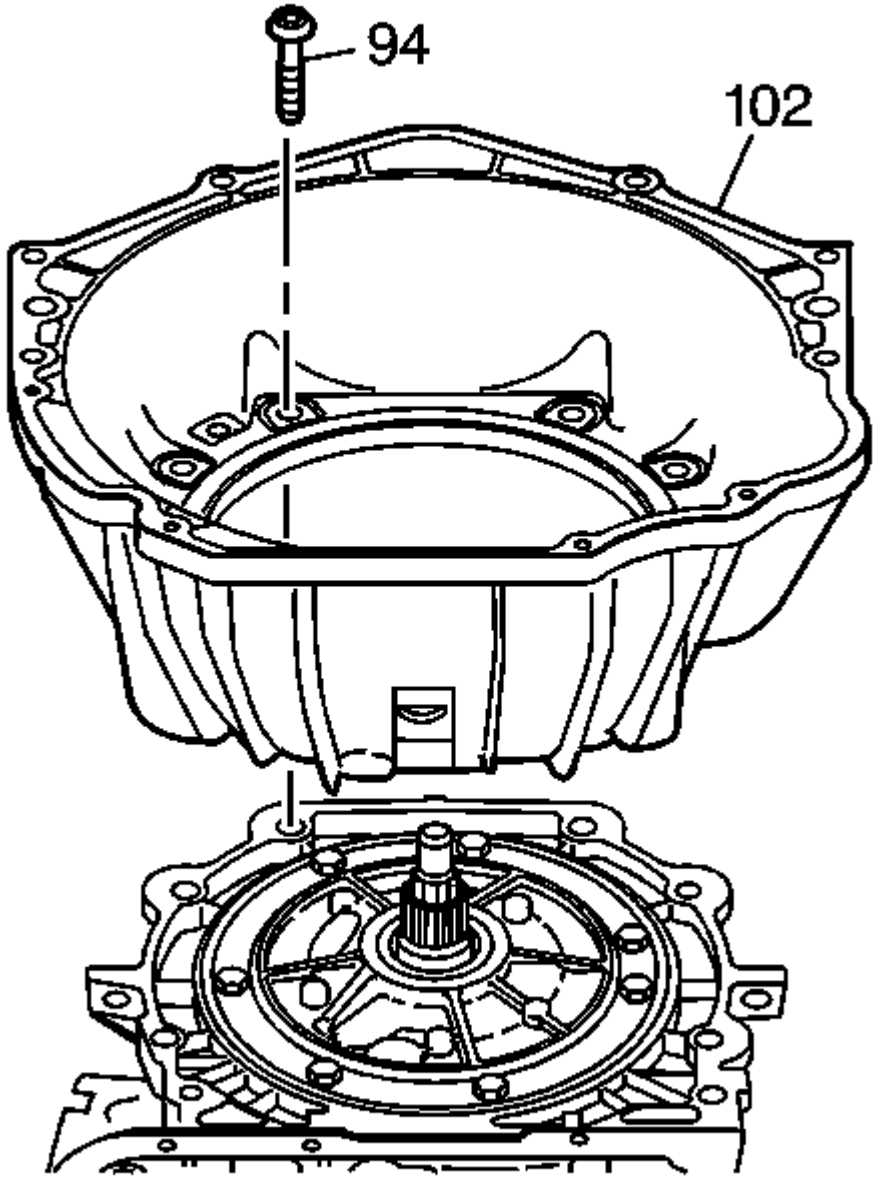


Fig. 22: Front Differential Carrier Assembly - AWD/FWD
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
630	Front Differential Side Gear Thrust Washer (2) (Selective)
630	Front Differential Side Gear Thrust Washer (2) (Selective)

© 2011 Mitchell Repair Information Company, LLC.

631	Front Differential Side Gear (2)
631	Front Differential Side Gear (2)
632	Front Differential Pinion Shaft Thrust Washer (2)
632	Front Differential Pinion Shaft Thrust Washer (2)
633	Front Differential Pinion Gear (2)
633	Front Differential Pinion Gear (2)
635	Front Differential Ring Gear
636	Front Differential Ring Gear Mounting Bolt (M11 x 1.0 x 34) (12)
637	Front Differential Tapered Outer Roller Bearing (86 mm I.D.)
639	Front Differential Pinion Shaft Retaining Pin (6 mm x 38 mm) (1)
640	Front Differential Carrier Assembly - FWD
640a	Front Differential Carrier Assembly - AWD
641	Front Differential Tapered Outer Roller Bearing (90 mm I.D.)
642	Front Differential Pinion Shaft (17.0 x 110.4)
643	Front Differential Pinion Shaft Retaining Ring - AWD
644	Splined Stub Shaft - AWD Only

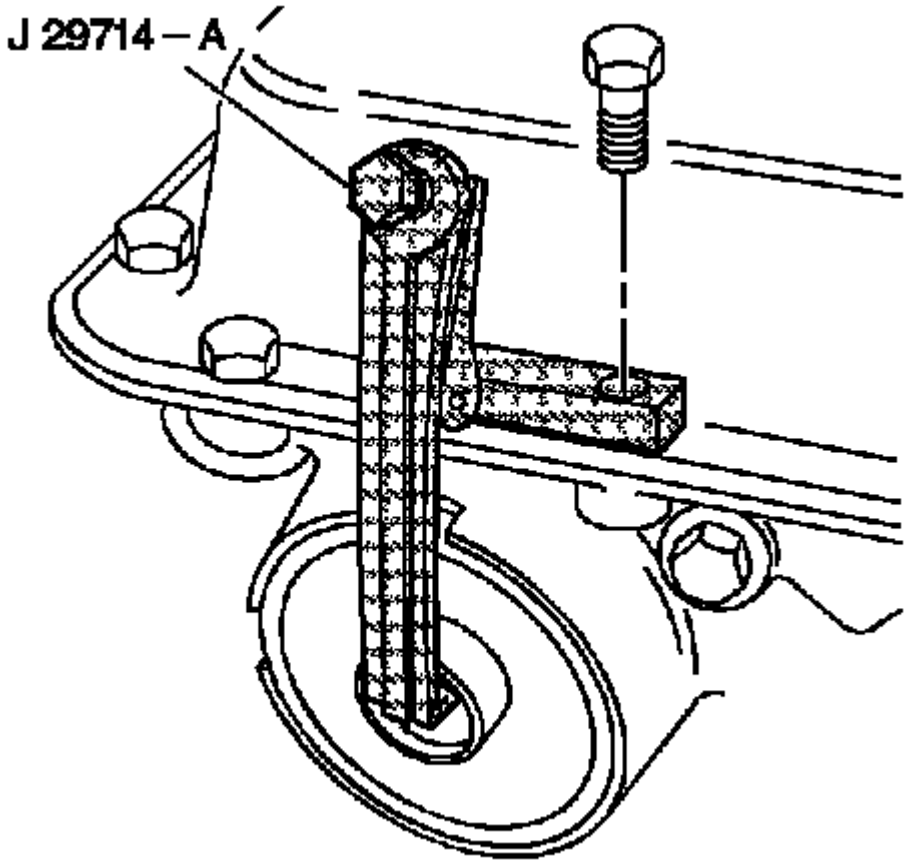


Fig. 23: Park Pawl & Shift Linkage Assembly Component View
Courtesy of GENERAL MOTORS CORP.

 © 2011 Mitchell Repair Information Company, LLC.

Callout	Component Name
17	Automatic Transmission Case
700	Park Pawl Shaft
701	Park Pawl Spring - Return
702	Park Pawl
703	Park Pawl Spring Pin
704	Park Pawl Pin Spring
705	Park Pawl Pin Spring Guide Sleeve
706	Park Pawl Bolt/Screw (M6 x 1.0 x 25)
708	Park Pawl Actuator Bracket
709	Park Pawl Actuator Rod
710	Manual Shaft Detent Lever Assembly
711	Manual Shaft Detent Lever Spring
712	Manual Shaft Detent Spring Bolt/Screw (M6 x 1.0 x 14) and Washer
713	Manual Shift Shaft Seal Assembly
714	Manual Shift Shaft Bearing Assembly
715	Park Pawl Actuator Bracket Bolt/Screw (M6 x 1.0 x 16.7) and Washer

COMPONENT LOCATION

© 2011 Mitchell Repair Information Company, LLC.

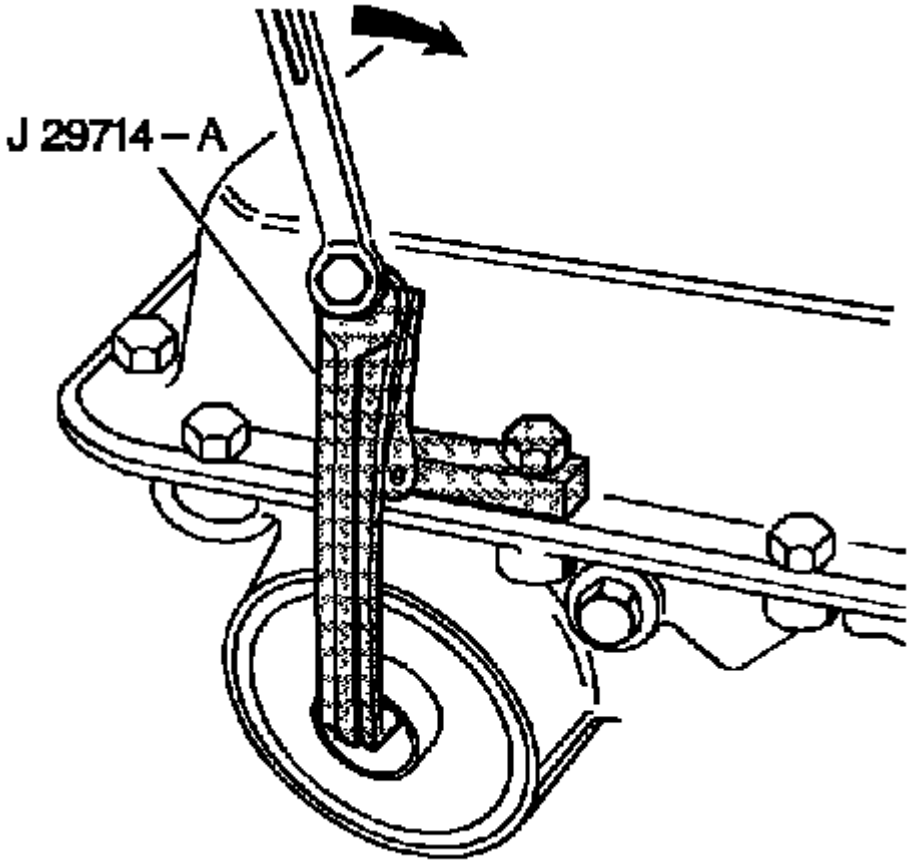


Fig. 24: Bearing, Race and Thrust Washer Locations
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
88	Front Differential Side Gear Shim
90	Front Differential Bearing Race
226	Coast Clutch Hub Thrust Washer
236	Output Gear Bearing Assembly (2)
236	Output Gear Bearing Assembly (2)
254	Front Differential Transfer Drive Gear Bearing Assembly (2)
263	Front Differential Transfer Drive Gear Thrust Bearing Assembly
264	Front Differential Transfer Drive Gear Thrust Bearing Washer
501	Coast Clutch Hub Thrust Washer
506	Second Clutch Sprag Outer Race Thrust Washer
519	Front Internal Gear Thrust Bearing Assembly
525	Front Internal Gear Thrust Washer
529	Front Internal Gear Thrust Bearing Assembly
530	Front Internal Gear Thrust Washer Race
535	Rear Internal Gear Thrust Bearing Assembly

 © 2011 Mitchell Repair Information Company, LLC.

537	Rear Sun Gear Thrust Bearing Race
538	Rear Sun Gear Thrust Bearing Assembly
540	Input Shaft Thrust Bearing Assembly
543	Front Carrier Thrust Bearing Race
545	Front Sun Gear Thrust Bearing Assembly
546	Front Sun Gear Thrust Bearing Race
568	Forward and Direct Clutch Housing Thrust Bearing Race
569	Forward Clutch Housing Thrust Bearing Race
590	1-2 Reverse Carrier Thrust Washer (2)
593	1-2 Reverse Internal Gear Front Thrust Bearing Assembly
595	1-2 Reverse Internal Gear Rear Thrust Bearing Assembly
596	1-2 Reverse Internal Gear Shim
623	Front Differential Transfer Drive Gear Assembly Rear Bearing Assembly
625	Input Shaft Support Bearing
628	Forward/Direct Clutch Housing Thrust Bearing Race
630	Front Differential Side Gear Thrust Washer (2) (Selective)
632	Front Differential Pinion Shaft Thrust Washer (2)
637	Front Differential Tapered Outer Roller Bearing Race (86 mm I.D.)
641	Front Differential Tapered Outer Roller Bearing Race (90 mm I.D.)
816	Front Differential Transfer Drive Gear Assembly Front Bearing Assembly
817	Front Differential Assembly Bearing Race Shim

 © 2011 Mitchell Repair Information Company, LLC.

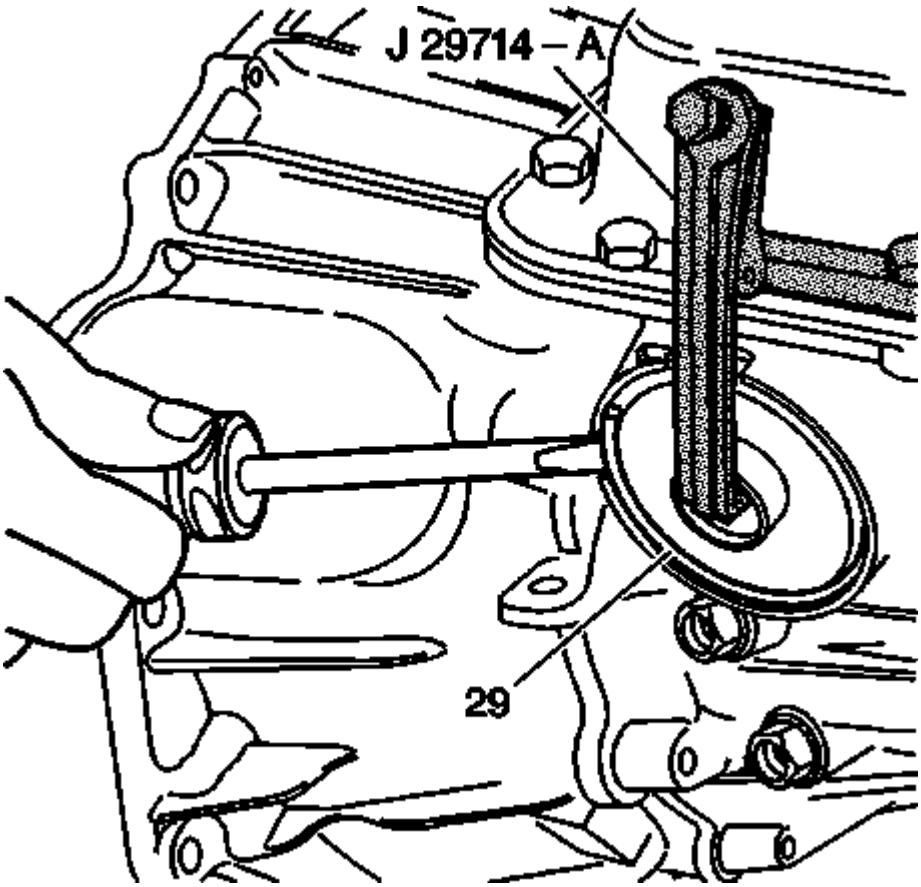


Fig. 25: Seal Locations
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
80	Front Wheel Drive Shaft Oil Seal
86	Automatic Transmission Case Fluid Passage Seal (7)
200	Automatic Transmission Fluid Pump Seal Assembly
206	Automatic Transmission Fluid Pump O-ring Seal
209	Second Clutch Piston Outer Seal
211	Second Clutch Piston Sleeve Outer Seal
213	Second Clutch Piston Sleeve Inner Seal
221	Second Coast Clutch Piston Inner Seal
223	Second Coast Clutch Piston Outer Seal
262	4-5 Clutch Housing Fluid Seal Ring (2)
510	Low and Reverse Clutch Piston Inner Seal
512	Low and Reverse Clutch Piston Outer Seal
561	Direct Clutch Piston Inner Seal
563	Direct Clutch Piston Outer Seal
564	Forward Clutch Piston Inner Seal
566	Forward Clutch Piston Outer Seal

 © 2011 Mitchell Repair Information Company, LLC.

570	Input Shaft O-ring Seal
581	4-5 Clutch Piston Inner Seal
583	4-5 Clutch Piston Outer Seal
602	1-2 Reverse Clutch Piston Inner Seal
604	1-2 Reverse Clutch Piston Outer Seal
607	Forward Clutch Housing Fluid Seal Ring (3)
624	Front Differential Transfer Drive Gear Assembly Lube Seal Ring - Rear
800	Front Differential Carrier Seal Assembly
802	Front Differential Transfer Drive Gear Front Lube O-ring Seal

REPAIR INSTRUCTIONS

TORQUE CONVERTER ASSEMBLY REMOVAL

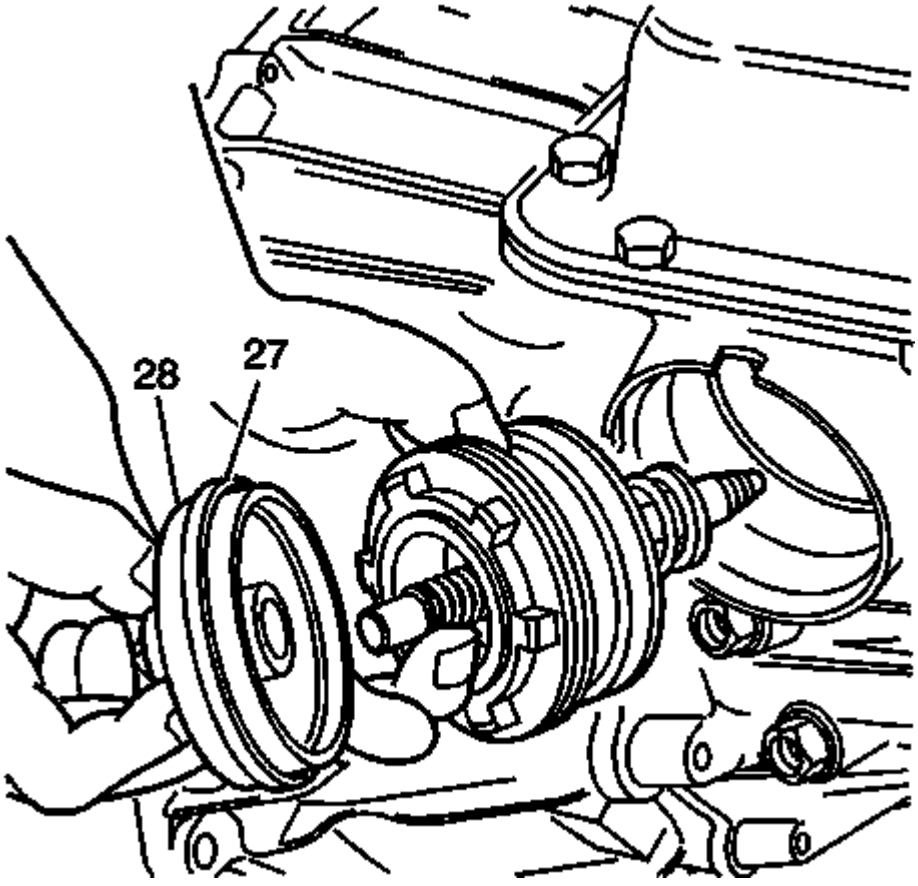


Fig. 26: View Of Torque Converter Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the torque converter assembly.
2. Inspect the torque converter assembly for the following:
    - External damage

 © 2011 Mitchell Repair Information Company, LLC.

- Metal particles found after flushing the oil cooler and the cooler lines
- External leaks in the hub weld area
- The torque converter pilot is damaged or fits poorly into the crankshaft
- Internal failure of the stator roller clutch
- Contamination from the engine coolant
- Excessive end play

HOLDING FIXTURE INSTALLATION

Tools Required

- **J 3289-20** Holding Fixture
- **J 45159** Holding Fixture. See **Special Tools**.

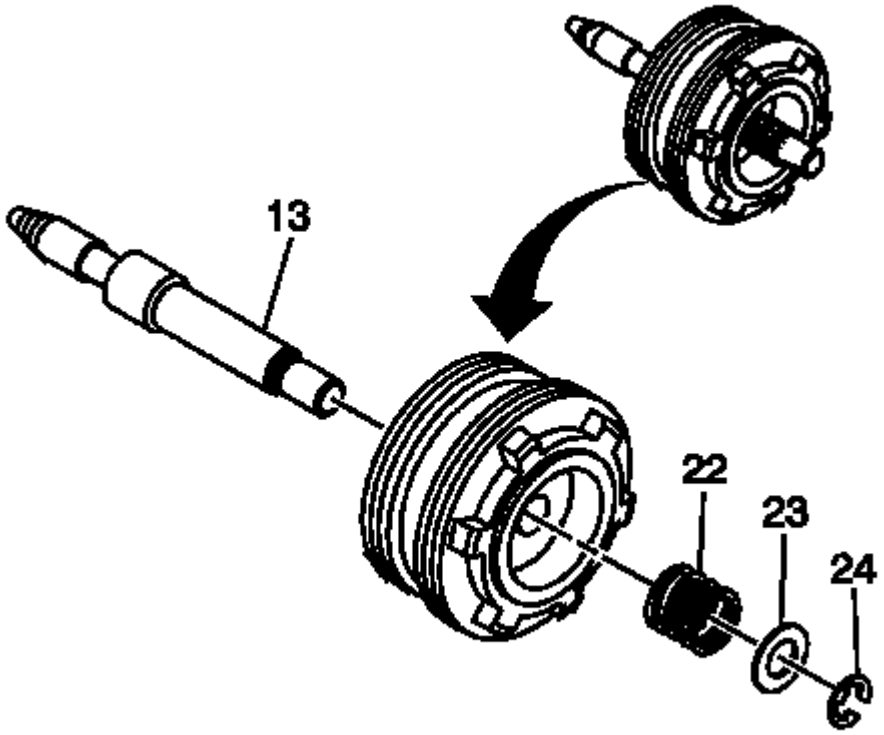


Fig. 27: View Of Holding Fixture
Courtesy of GENERAL MOTORS CORP.

1. Install the body of the **J 45159** with the two long bolts (1) to the transaxle. See **Special Tools**.
2. Loosely install the arm and bolt (2) to the **J 45159** body. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

3. Install the arm with the provided shorter bolt (3) to the transaxle.

   Tighten: Tighten the **J 45159** to 25 N. See **Special Tools**.m (18 lb ft) starting with bolt (3).

4. Install the **J 45159** in the **J 3289-20** . See **Special Tools**.

DRAINING TRANSMISSION FLUID

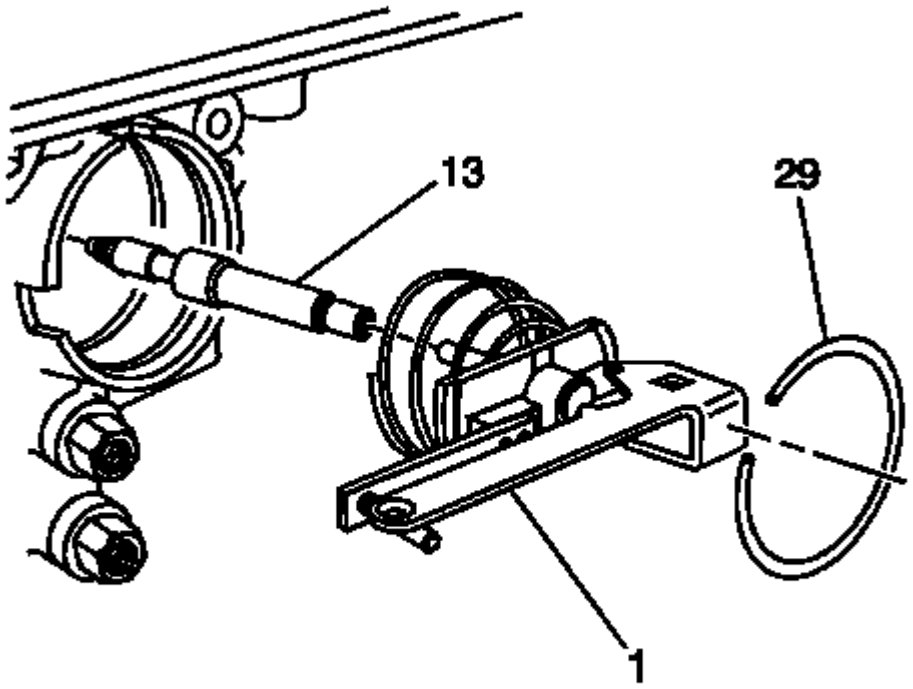


Fig. 28: View Of Transmission Drain Plug & Gasket
Courtesy of GENERAL MOTORS CORP.

1. Place a suitable fluid collection pan under the transmission assembly.
2. Remove the drain plug.
3. Remove the gasket (820) from the drain plug (819).
4. Drain the automatic transmission fluid into the collection pan.
5. Remove the collection pan and properly dispose of the transmission fluid.

 © 2011 Mitchell Repair Information Company, LLC.

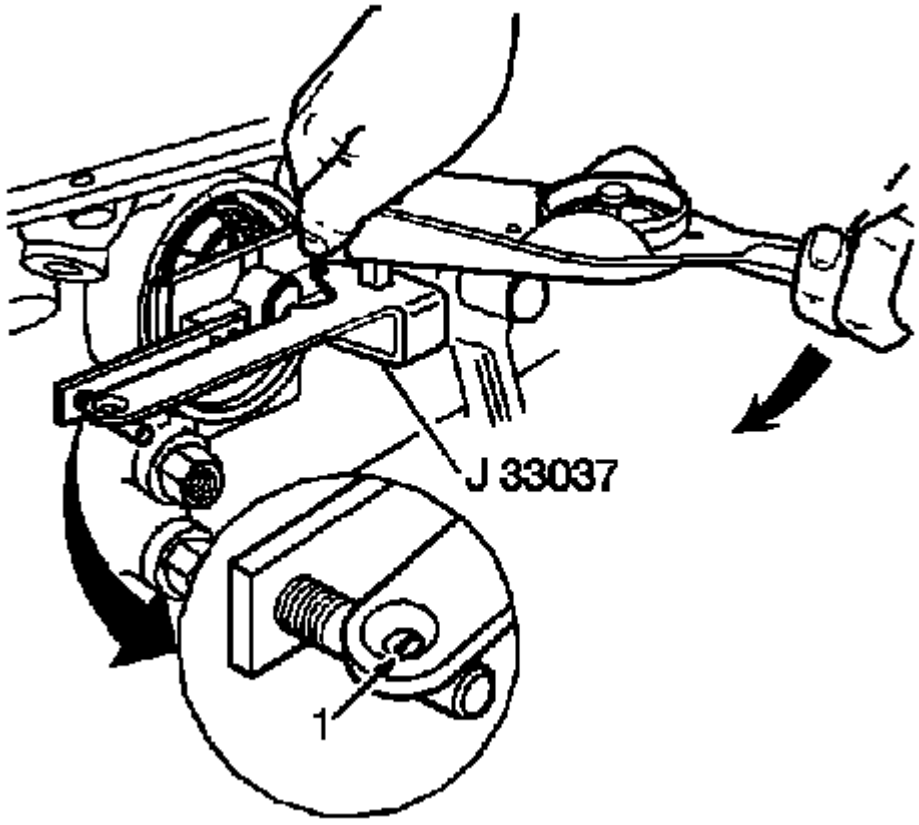


Fig. 29: View Of Vent Hose Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the vent hose assembly and retainer.

 © 2011 Mitchell Repair Information Company, LLC.

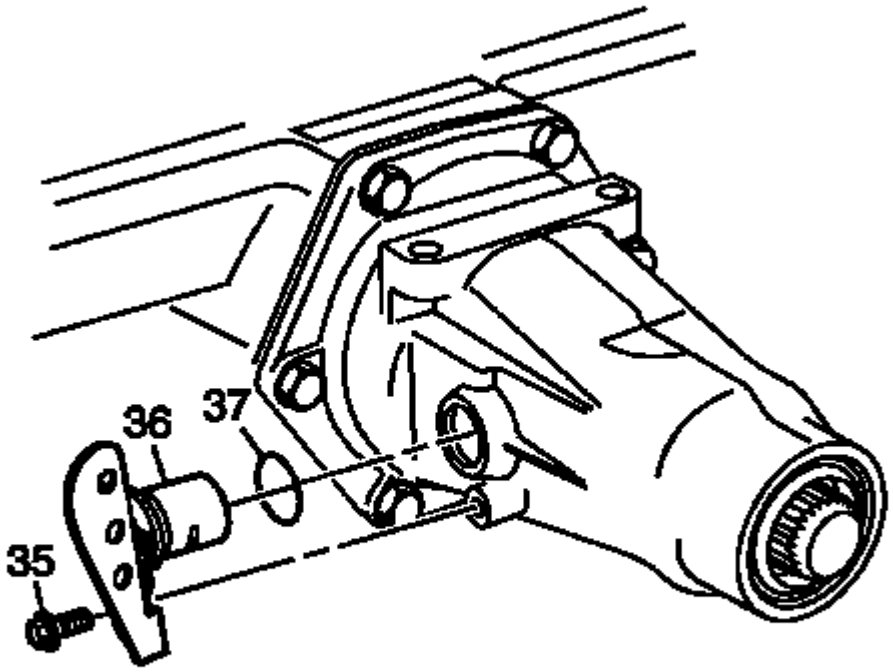


Fig. 30: View Of Transmission Oil Level Indicator, O-Ring & Bolt
Courtesy of GENERAL MOTORS CORP.

7. Remove the bolt (825) for the transmission level indicator.
8. Remove the transmission oil level indicator (823) and the O-ring (824).

OUTPUT SPEED SENSOR REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

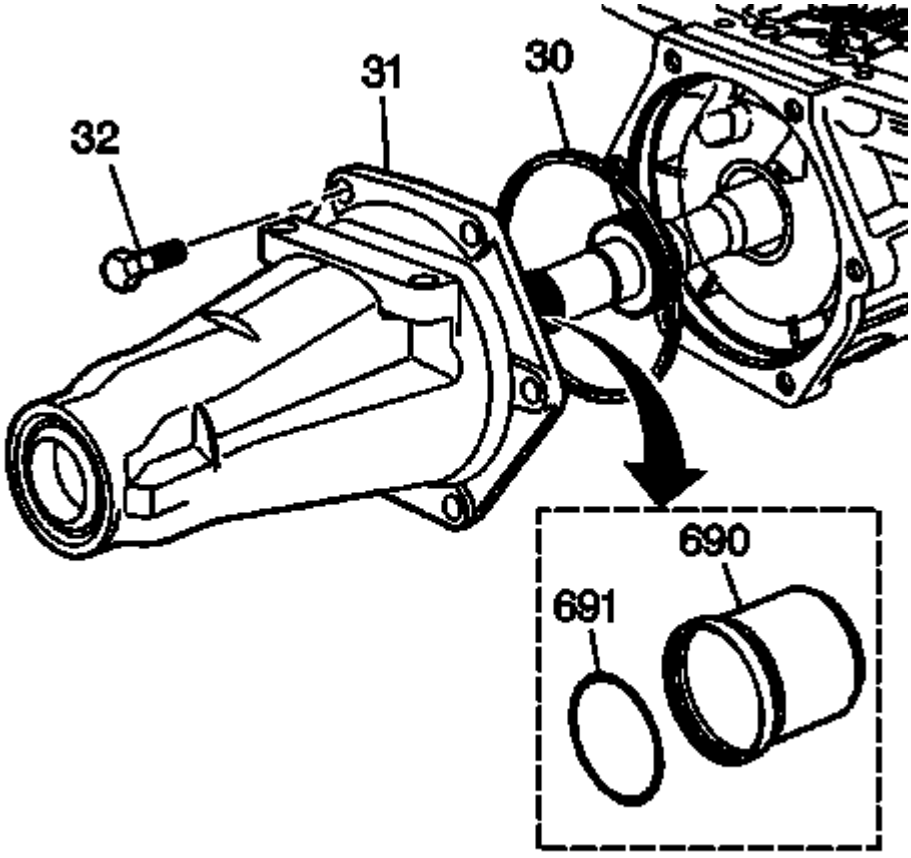


Fig. 31: Output Shaft Speed Sensor
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the output speed sensor or transaxle case.

1. Remove the output speed sensor bolt/screw (61).
2. Remove the output shaft speed sensor (62) and the O-ring (63).
3. Inspect the output speed sensor for damage.

INPUT SPEED SENSOR REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

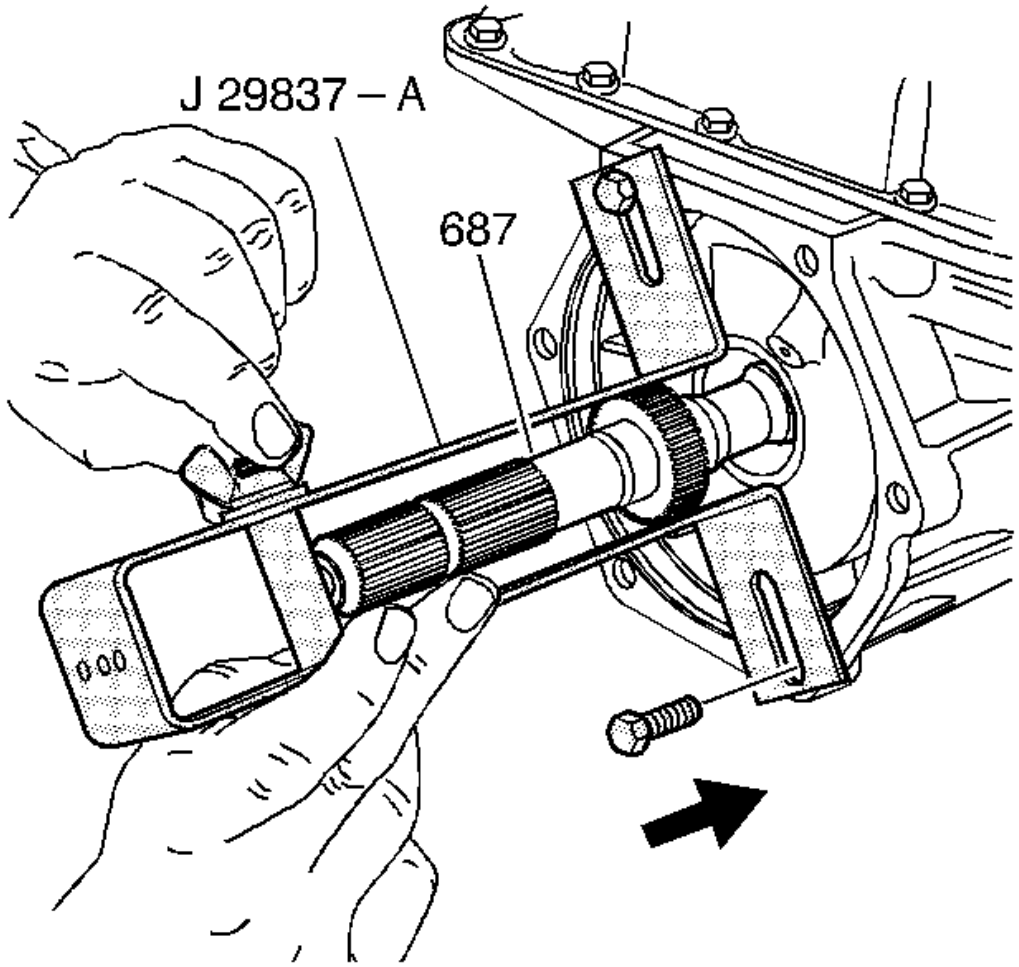


Fig. 32: View Of Input Shaft Speed Sensor
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the input speed sensor or transaxle case.

1. Remove the input speed sensor bolt (72).
2. Remove the input speed sensor (73).
3. Remove the input speed sensor O-ring (71).

PARK/NEUTRAL POSITION SWITCH REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

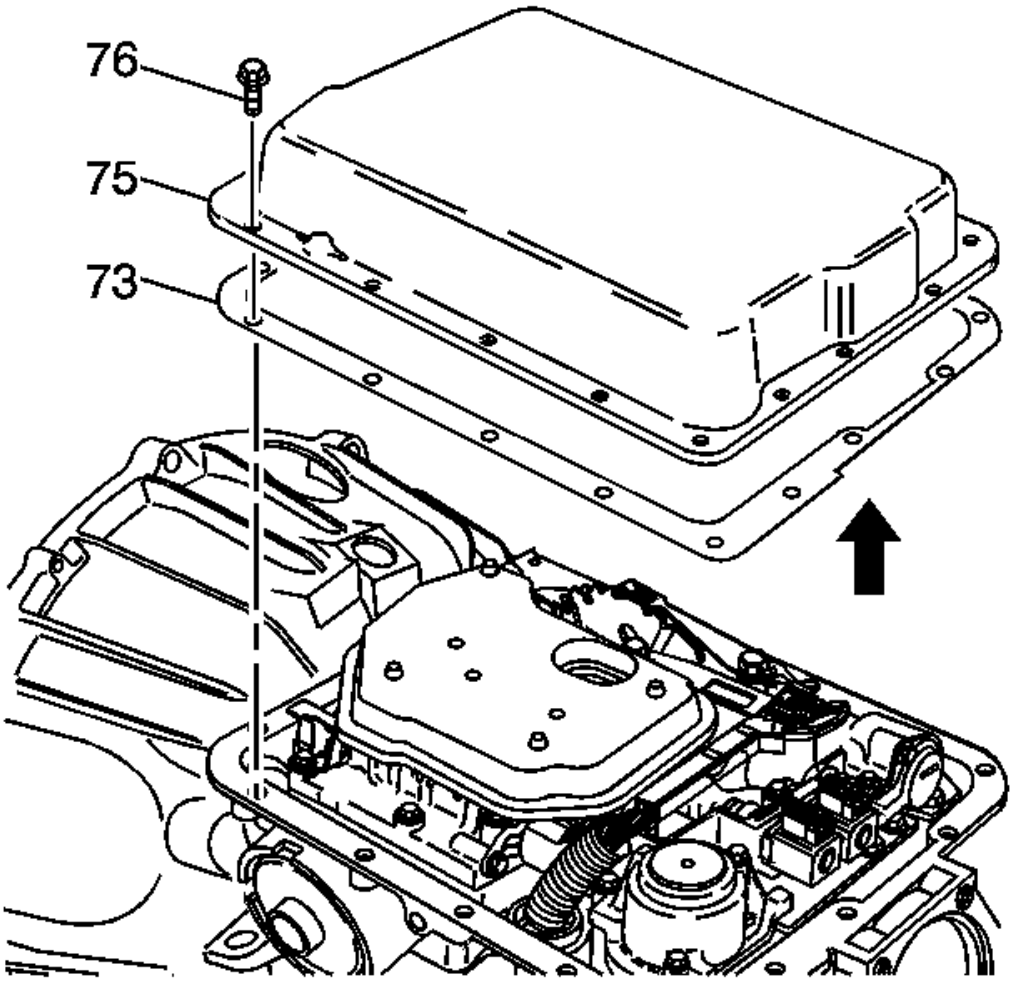


Fig. 33: Bending Tabs From Park/Neutral Position Switch Lock Tab Washer
Courtesy of GENERAL MOTORS CORP.

1. Using a screwdriver, bend any tabs from the park/neutral position switch lock tab washer down from the park neutral position switch nut.

 © 2011 Mitchell Repair Information Company, LLC.

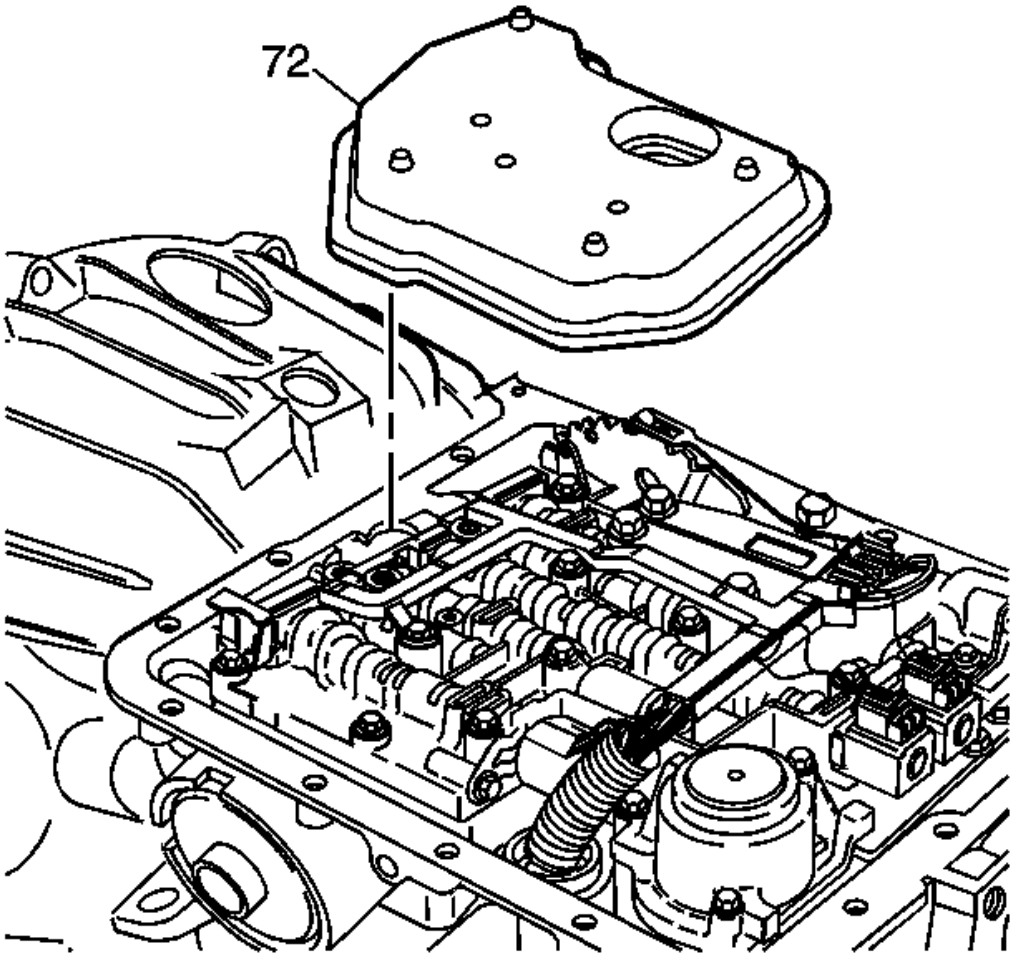


Fig. 34: View Of Flat Washer, Lock Washer & Manual Shaft Nut
Courtesy of GENERAL MOTORS CORP.

2. Remove the park/neutral position switch nut (78), lock tab washer (77) and flat washer (74).

 © 2011 Mitchell Repair Information Company, LLC.

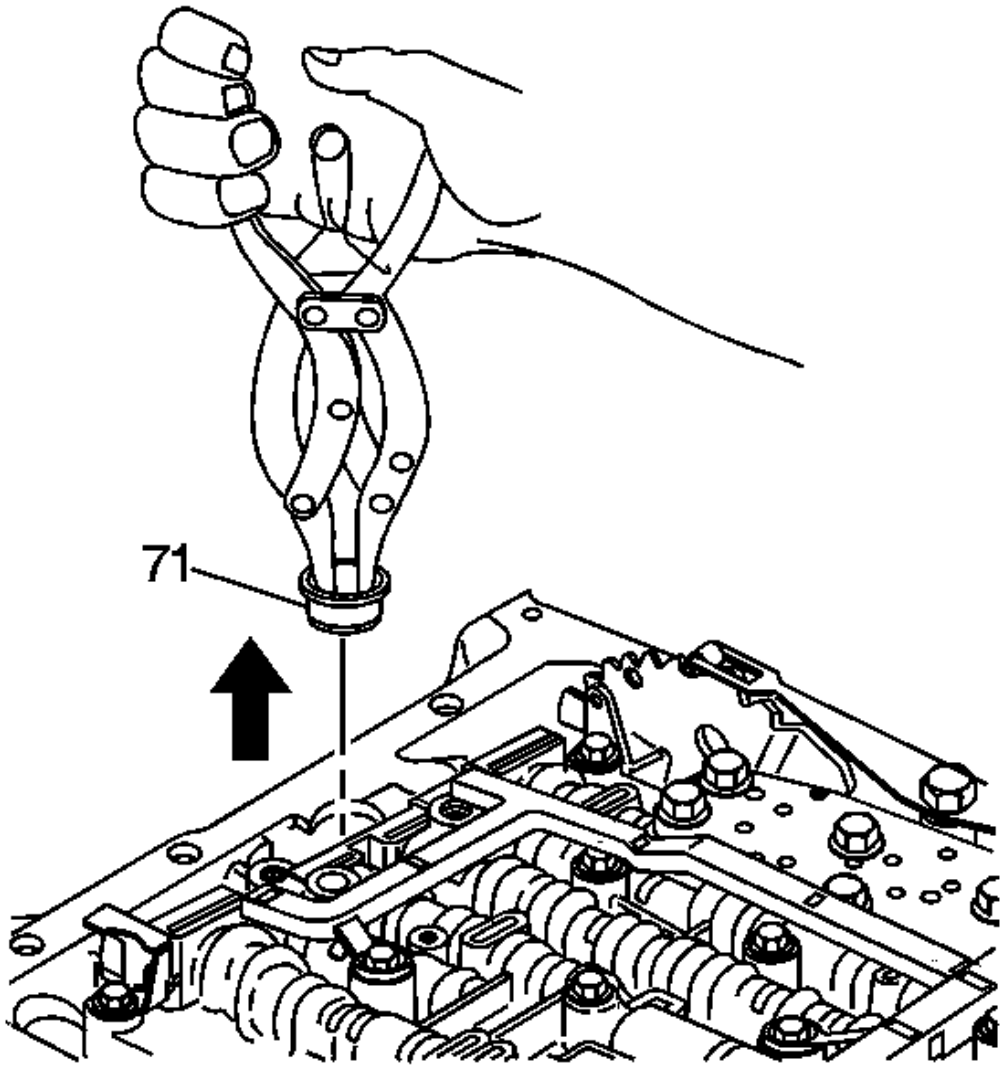


Fig. 35: View Of Park/Neutral Position Switch & Bolt
Courtesy of GENERAL MOTORS CORP.

3. Remove the park/neutral position switch bolt (79), stud (76) and flat washers (69).
4. Remove the park/neutral start position switch (75).

CONTROL VALVE BODY COVER REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

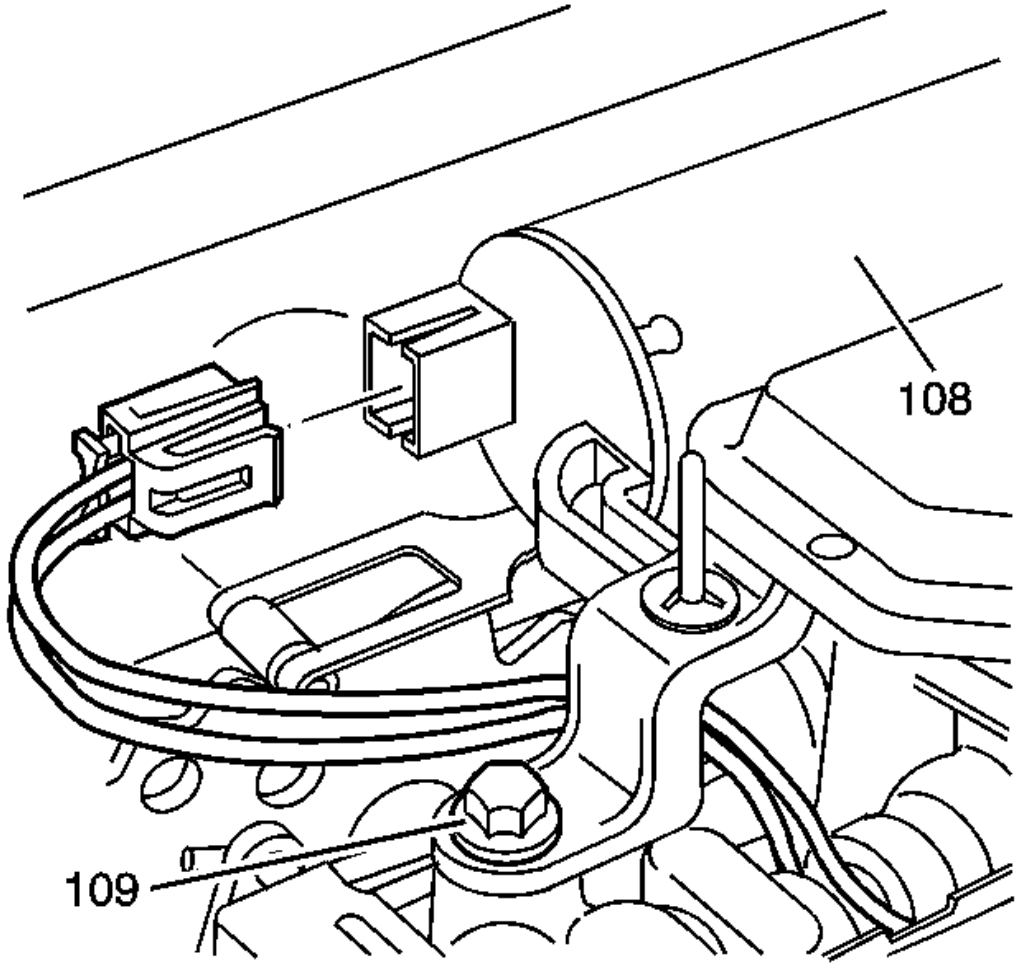


Fig. 36: Identifying Control Valve Body Cover
Courtesy of GENERAL MOTORS CORP.

1. Remove the 9 control valve body cover Torx bolts (28).
2. Remove the control valve body cover (29). Do not bend the cover flange.

WIRING HARNESS REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

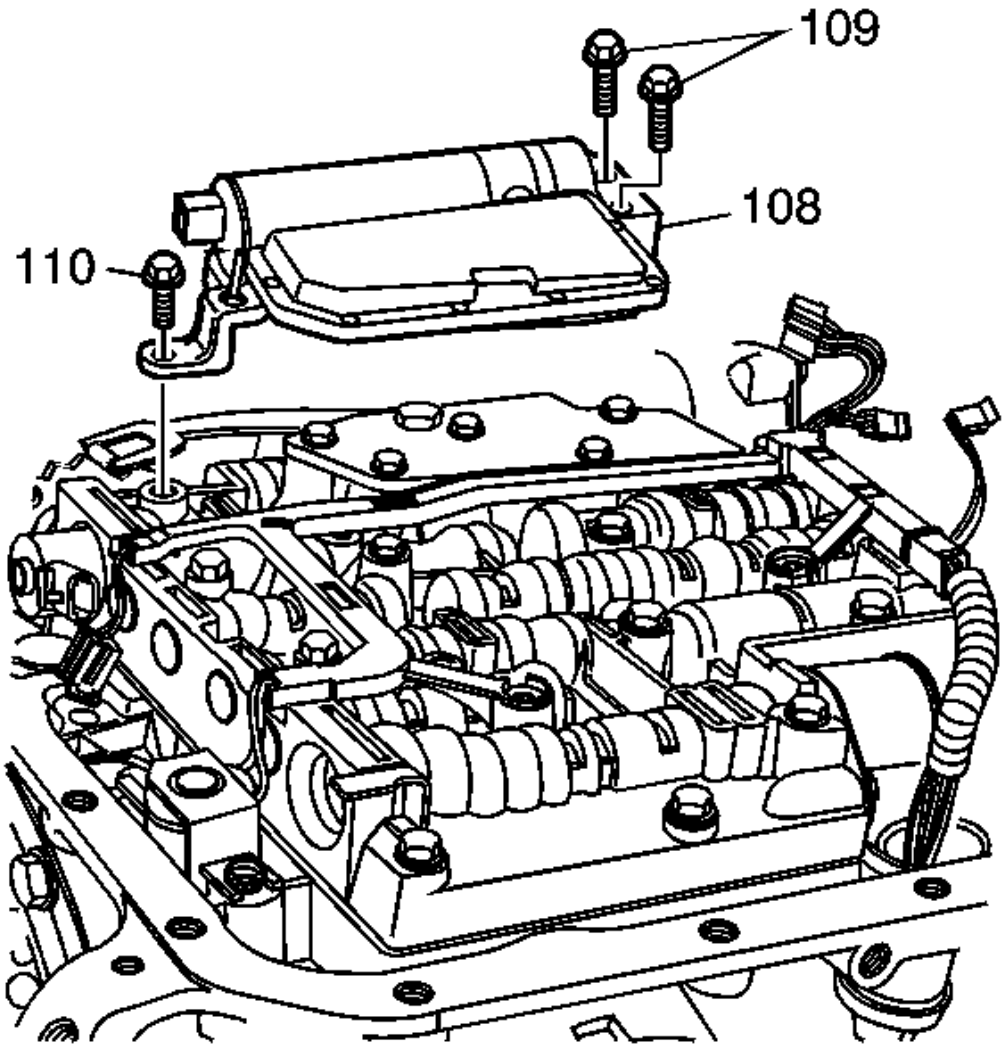


Fig. 37: Locating Solenoid Harness Connectors
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the wiring harness connectors.

1. Disconnect the wiring harness connectors 1-8.

 © 2011 Mitchell Repair Information Company, LLC.

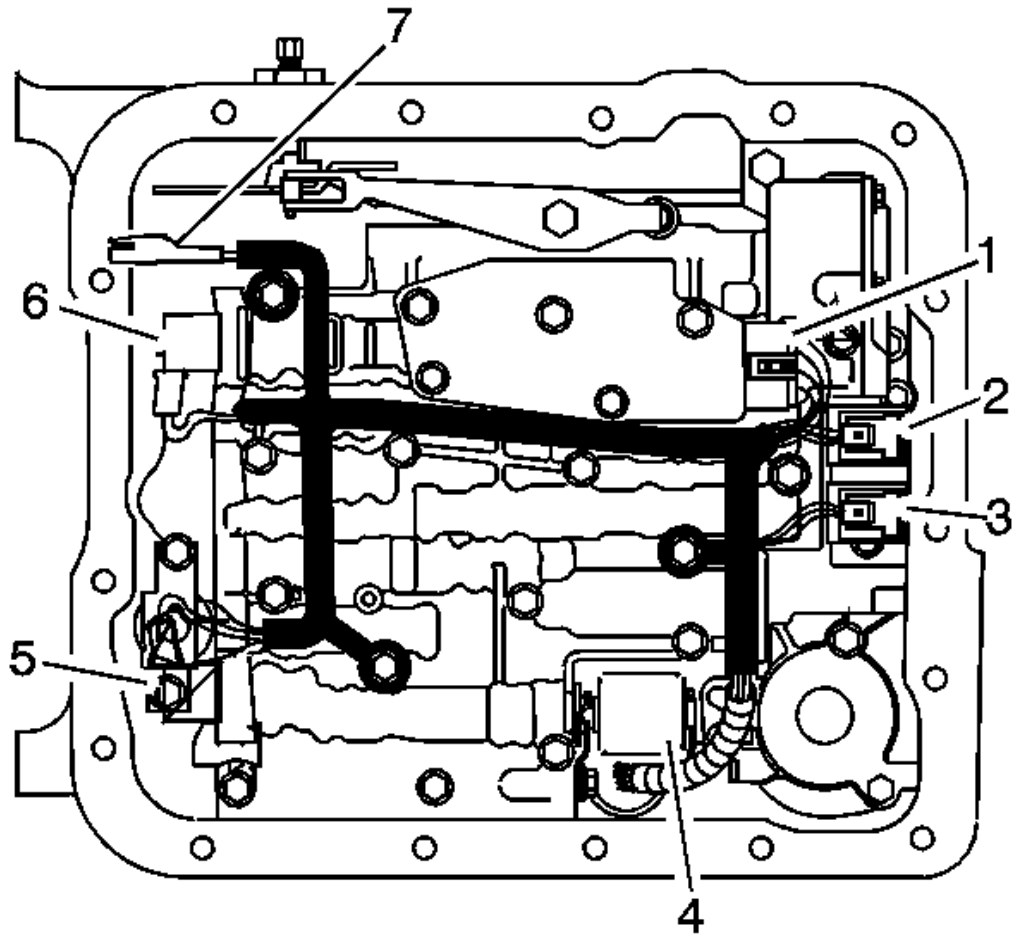


Fig. 38: View Of Fluid Temperature Sensor
Courtesy of GENERAL MOTORS CORP.

2. Remove the fluid temperature sensor bolt (31).
3. Remove the fluid temperature sensor clamp (49).
4. Remove the fluid temperature sensor (36) and the O-ring (32) from the control valve body assembly.

 © 2011 Mitchell Repair Information Company, LLC.

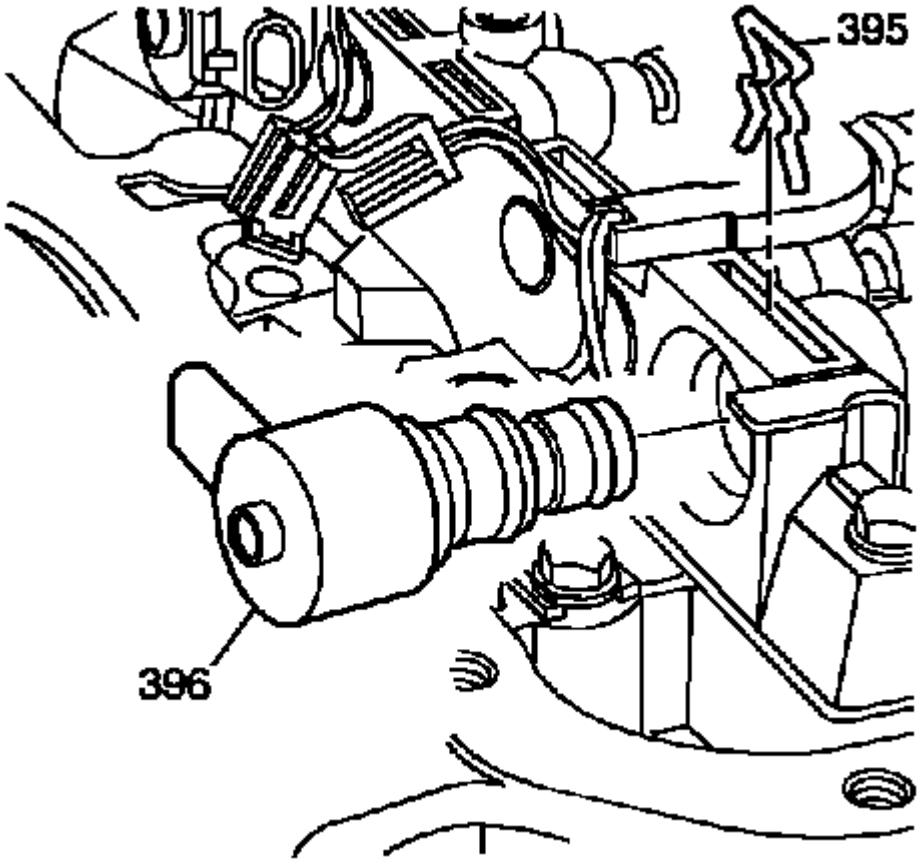


Fig. 39: View Of Wiring Harness Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not break the wiring harness connectors or the fluid temperature sensor.

5. Remove the wiring harness (33) from the automatic transmission wiring harness clip.
6. With a twisting motion remove the complete wiring harness assembly.

CONTROL VALVE BODY ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

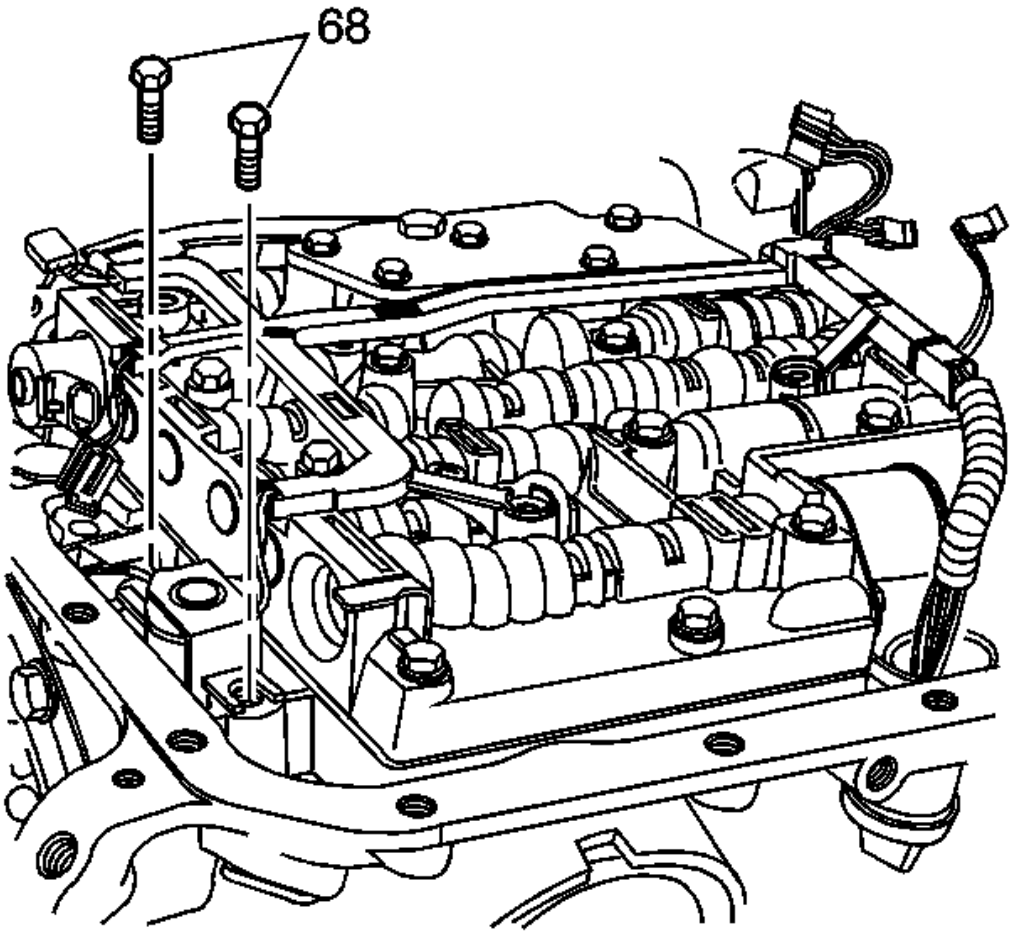


Fig. 40: View Of Control Valve Body Bolts/Screws, Fluid Passage Cover & Gasket
Courtesy of GENERAL MOTORS CORP.

1. Place the transmission in Neutral (N).
2. Remove the 2 control valve body bolts/screws (30), control valve body fluid passage cover (37) and gasket (38).

 © 2011 Mitchell Repair Information Company, LLC.

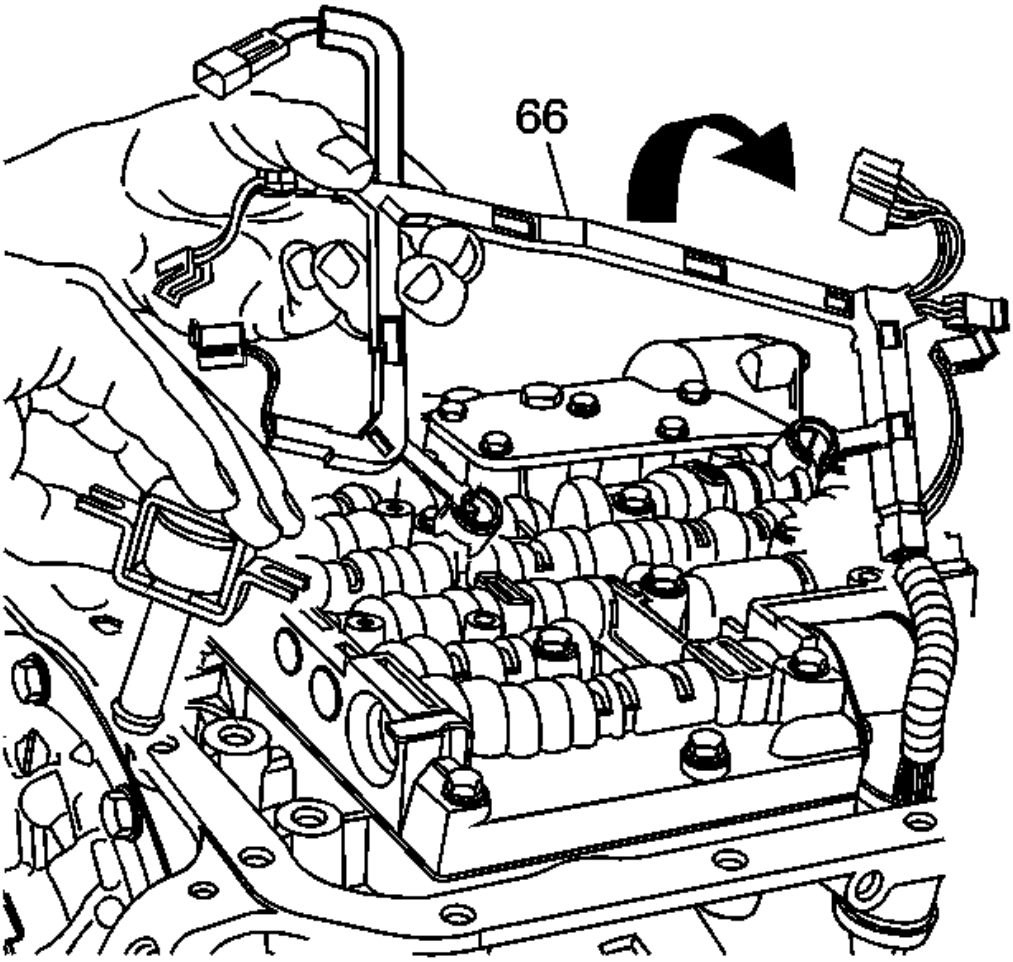


Fig. 41: Installing Valve Body Assembly-To-Transaxle Case Bolts
Courtesy of GENERAL MOTORS CORP.

3. Remove the six 10 mm control valve body mounting bolts/screws (1-6).

 © 2011 Mitchell Repair Information Company, LLC.

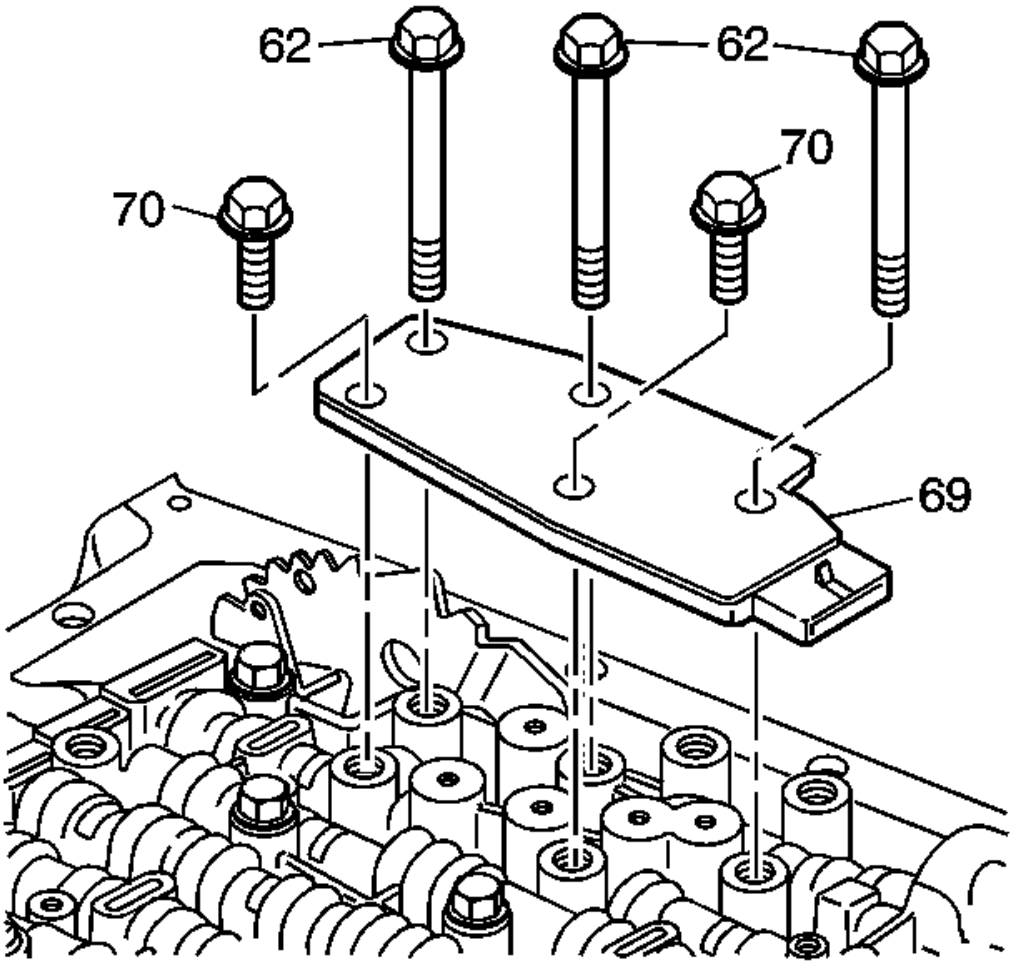


Fig. 42: View Of Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

4. While holding the control valve body assembly, disconnect the manual shift detent lever assembly (710) from the manual valve link (336).
5. Move the detent lever assembly clockwise for ease of removing the manual valve.
6. Remove the control valve body assembly (39).

 © 2011 Mitchell Repair Information Company, LLC.

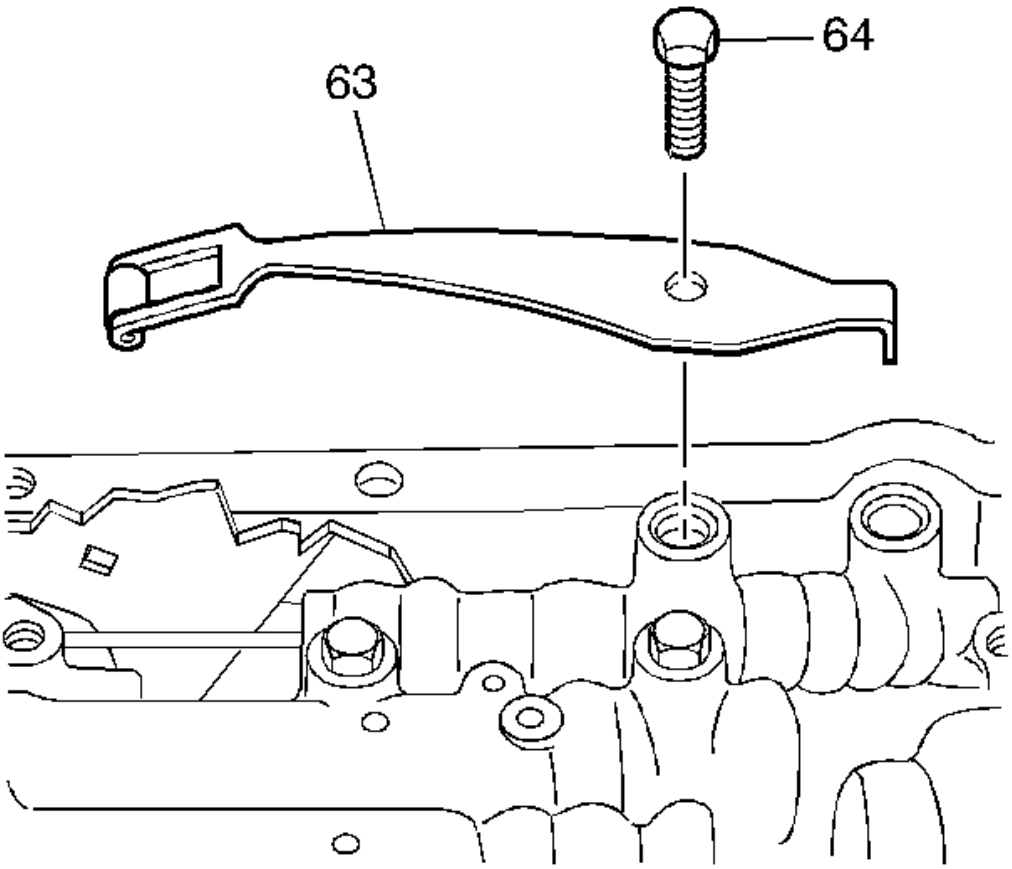


Fig. 43: Identifying Case Fluid Passage Seals
Courtesy of GENERAL MOTORS CORP.

7. Remove the 2 case fluid passage seals (86).

FLUID PUMP ASSEMBLY REMOVAL

Tools Required

J 45053 Universal Clamp Press

 © 2011 Mitchell Repair Information Company, LLC.

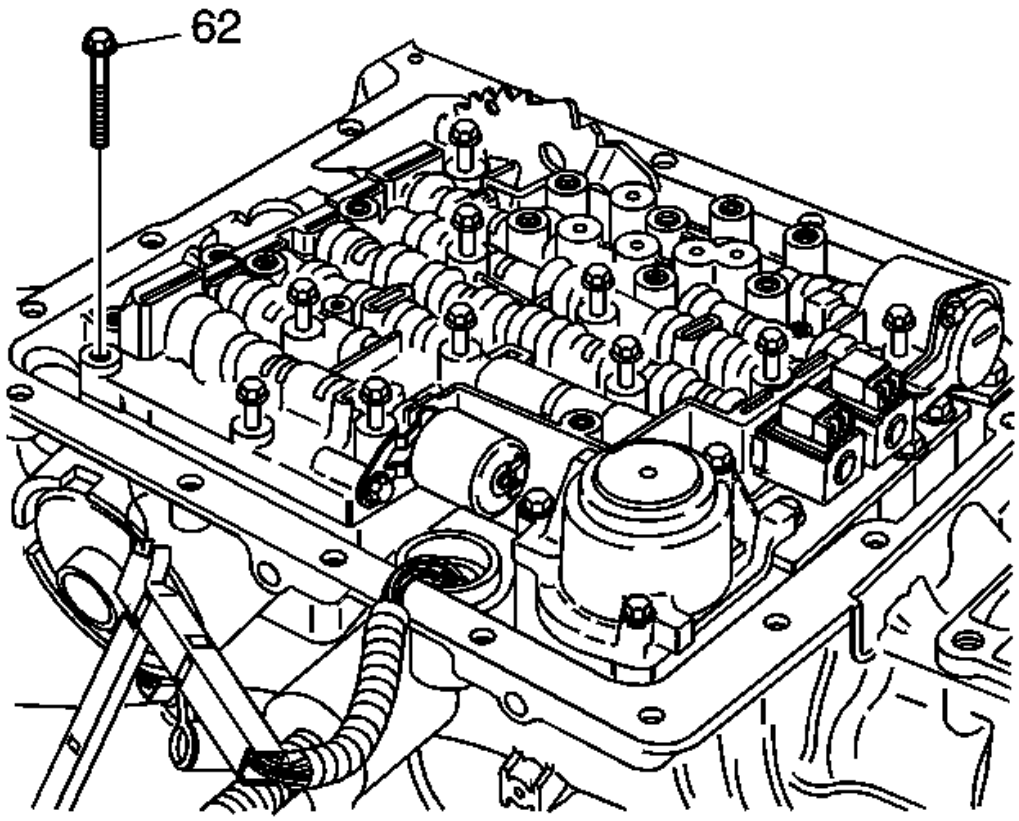


Fig. 44: Locating Fluid Pump Bolts
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission assembly so the fluid pump is facing up.
2. Remove the 8 fluid pump bolts.

 © 2011 Mitchell Repair Information Company, LLC.

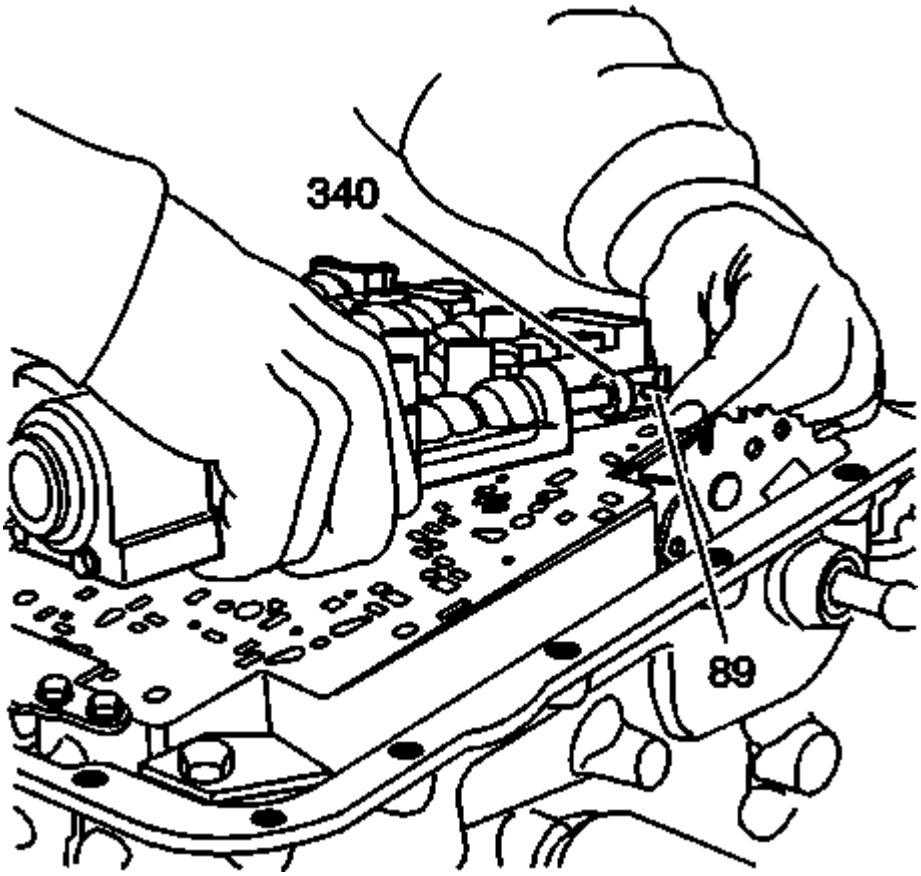


Fig. 45: Removing Fluid Pump Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the stator shaft bushing.

3. Using **J 45053** , remove the fluid pump assembly from the transmission case.

SECOND COAST, SECOND CLUTCH HUB AND SECOND CLUTCH SPRAG ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

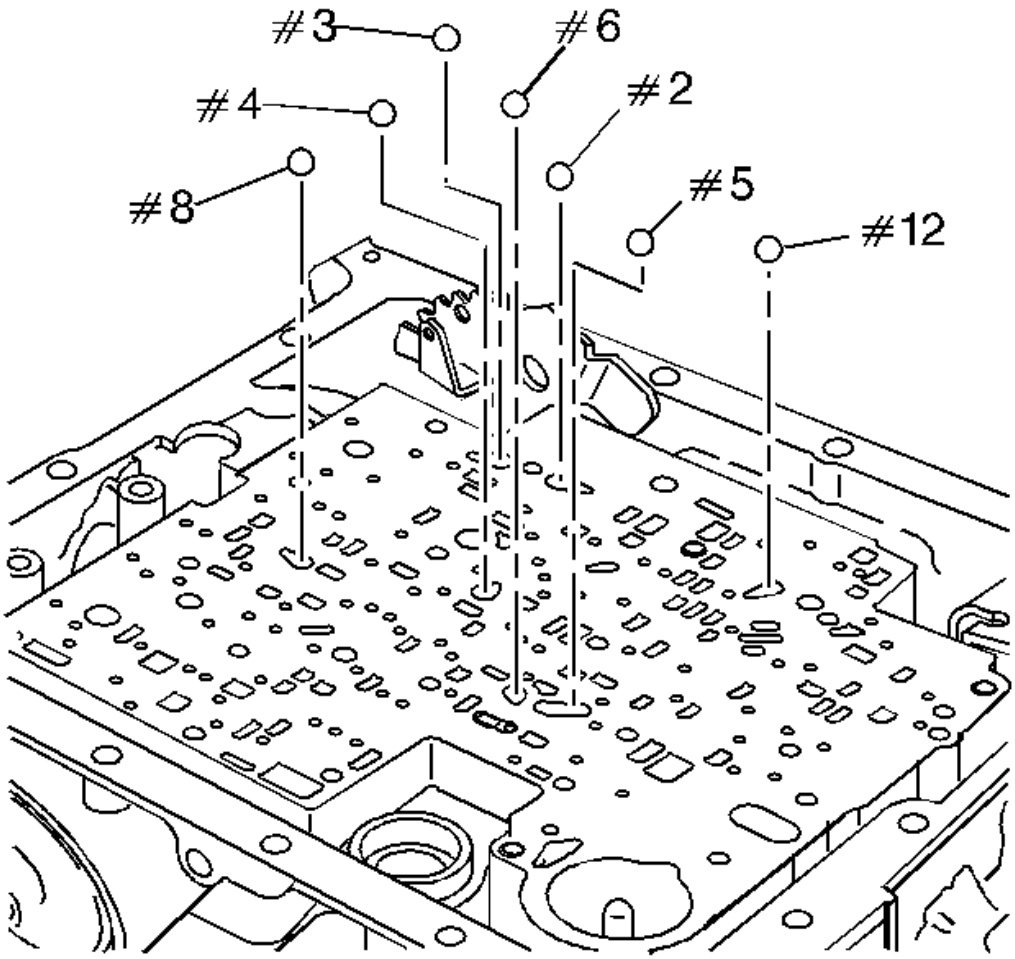


Fig. 46: View Of 2nd Coast Clutch Hub/Outer Race & Washer
Courtesy of GENERAL MOTORS CORP.

Remove the 2nd coast clutch hub/outer race and 2nd coast clutch hub (11) and washer (226).

TORQUE CONVERTER HOUSING REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

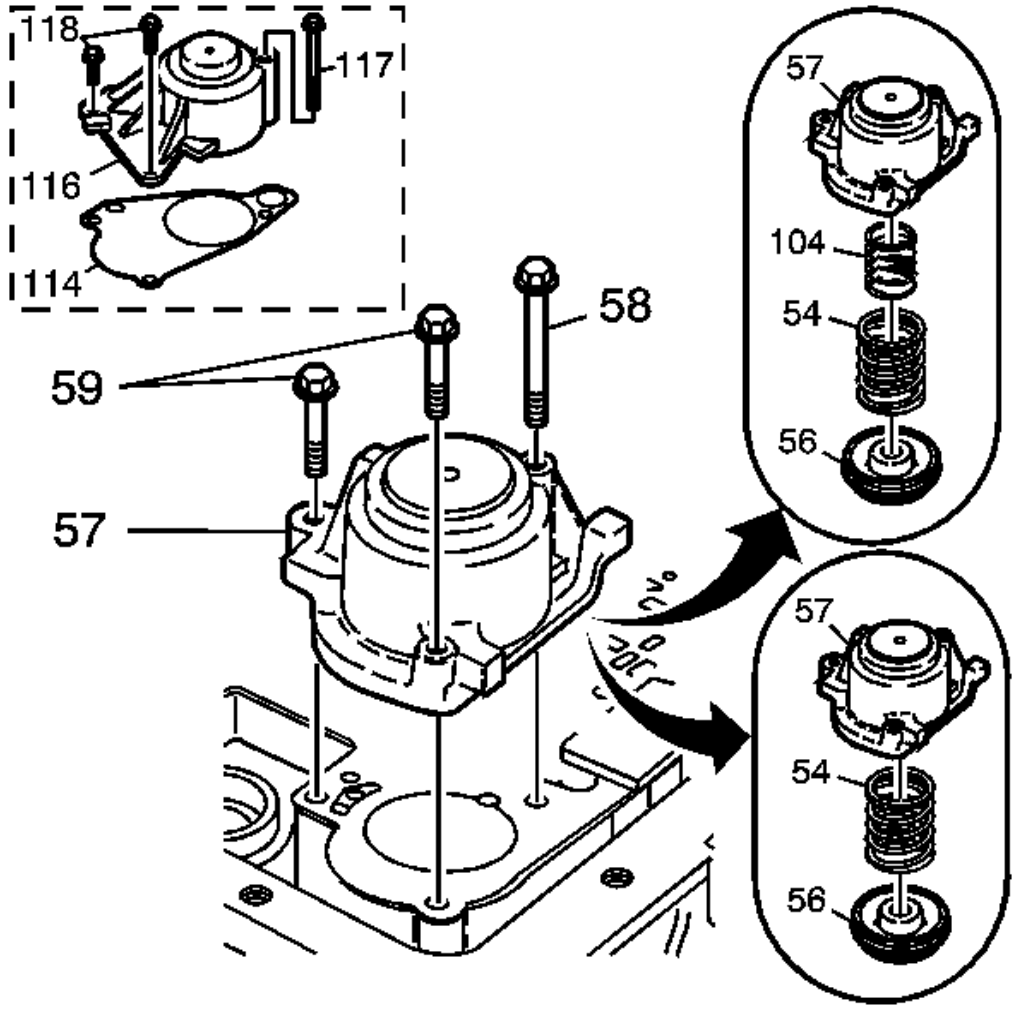


Fig. 47: Locating Torque Converter Housing Cover Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not interchange the 30 mm torque converter housing bolts with the 28 mm fluid pump bolts.

1. Remove the 17 torque converter housing cover bolts/screws.

 © 2011 Mitchell Repair Information Company, LLC.

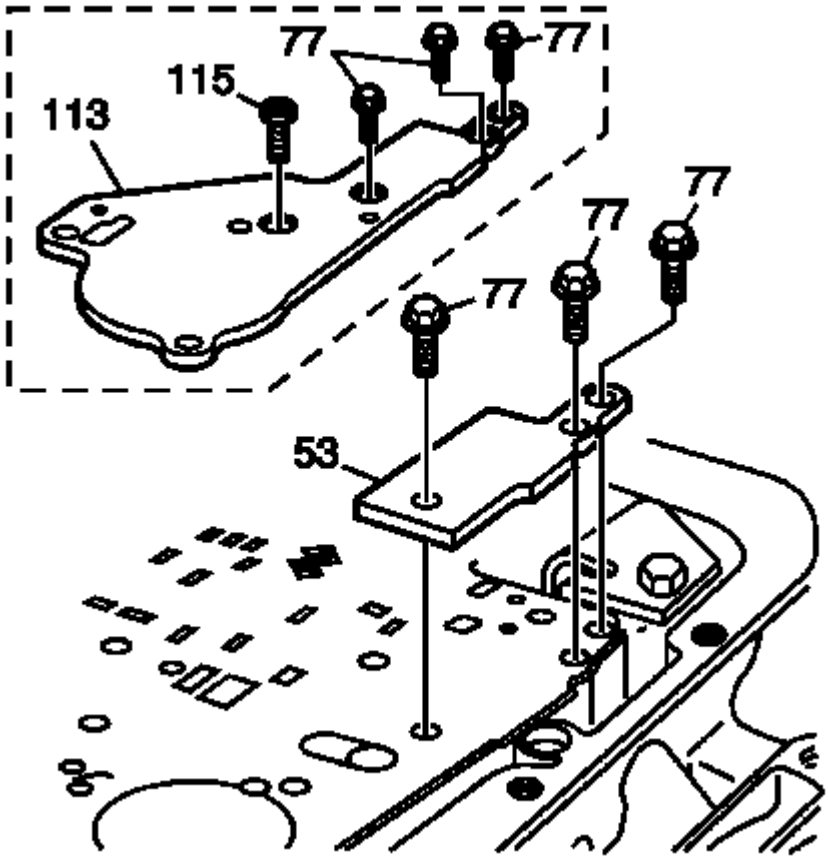


Fig. 48: Removing Torque Converter Housing Assembly
Courtesy of GENERAL MOTORS CORP.

2. Using a plastic hammer if needed, remove the torque converter housing assembly.

FRONT DIFFERENTIAL ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

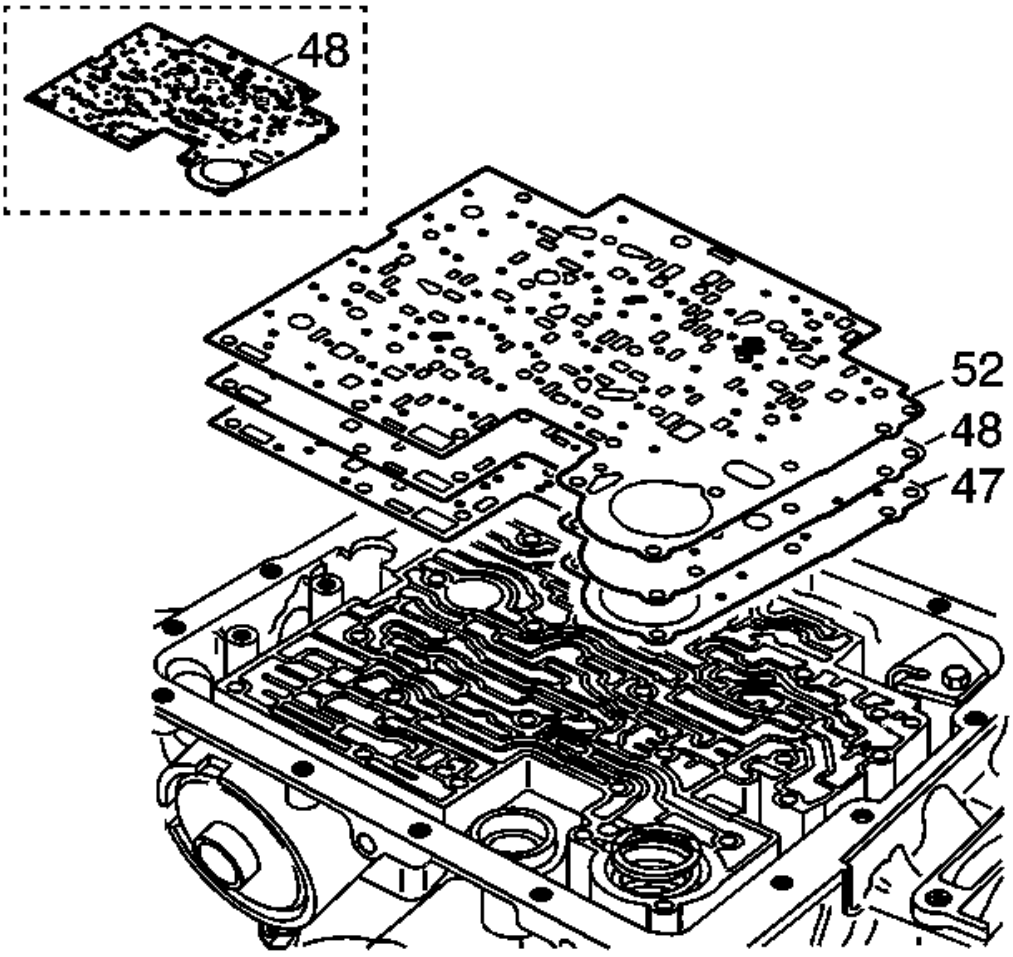


Fig. 49: View Of Front Differential Assembly & Case Fluid Passage Gasket
Courtesy of GENERAL MOTORS CORP.

1. Remove the front differential assembly (13).
2. Remove the case fluid passage gasket (89).

FLUID FILTER REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

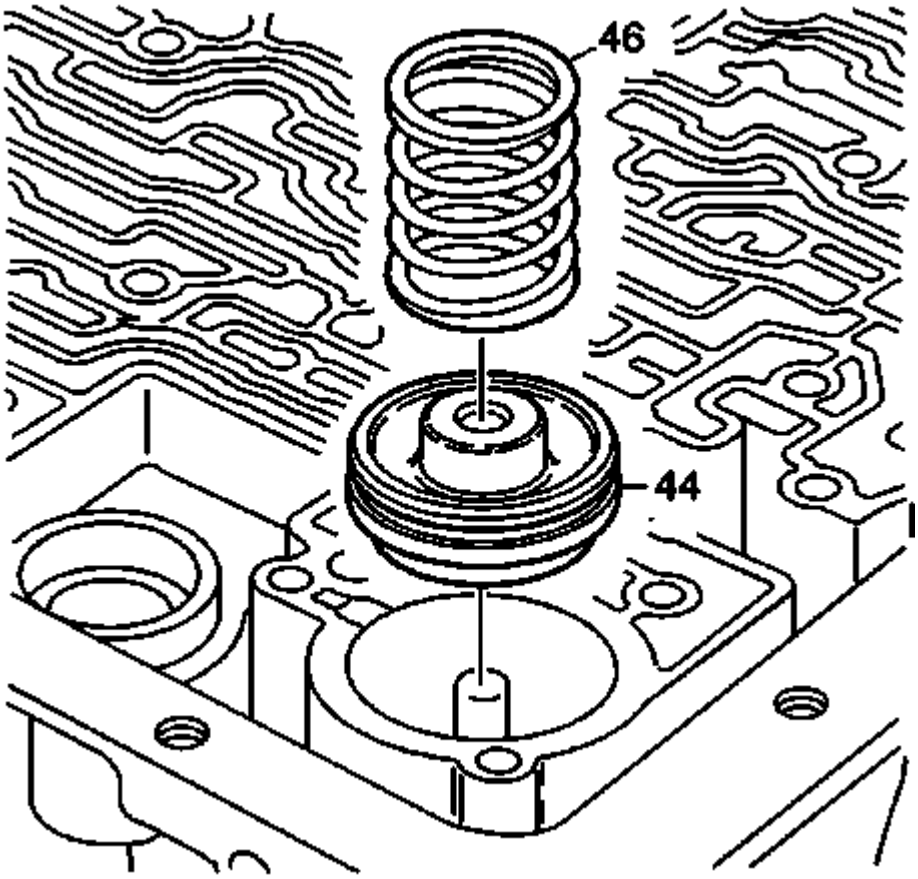


Fig. 50: View Of Fluid Filter
Courtesy of GENERAL MOTORS CORP.

1. Remove the fluid filter retaining bolt/screw (43).
2. Remove the fluid filter (42).

TRANSMISSION FLUID BAFFLE REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

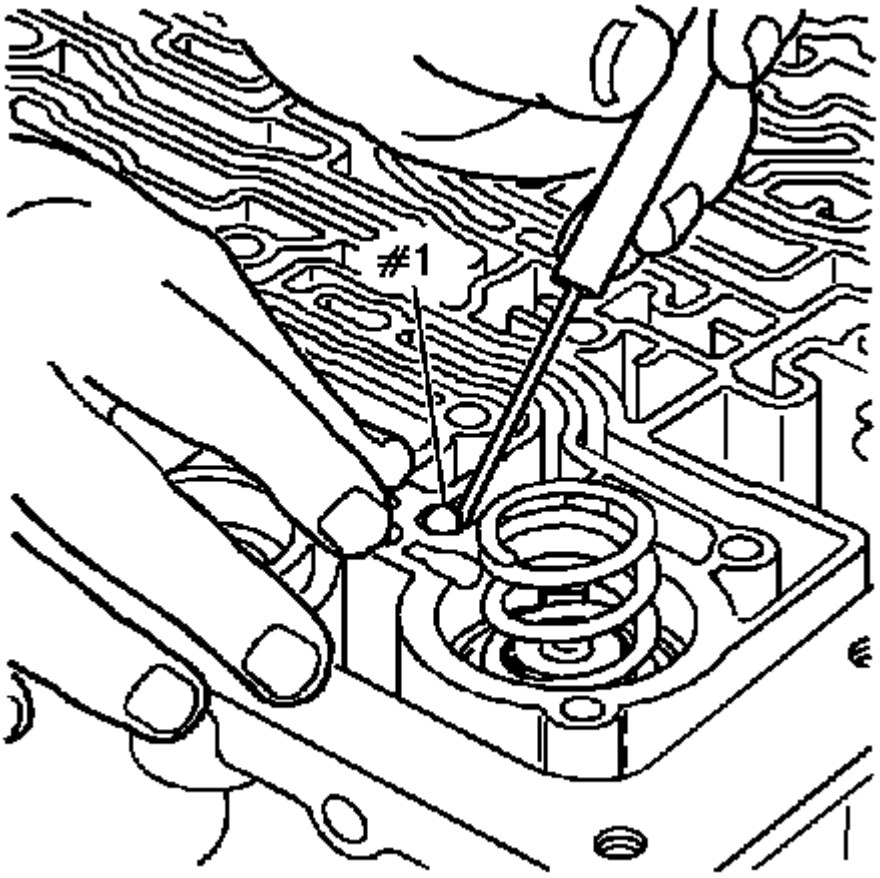


Fig. 51: View Of Automatic Transmission Fluid Baffle
Courtesy of GENERAL MOTORS CORP.

1. Remove the 3 transmission fluid baffle bolts/screws (45).
2. Remove the automatic transmission fluid baffle (44).
3. Inspect the automatic transmission fluid baffle and the bolts/screws.

 © 2011 Mitchell Repair Information Company, LLC.

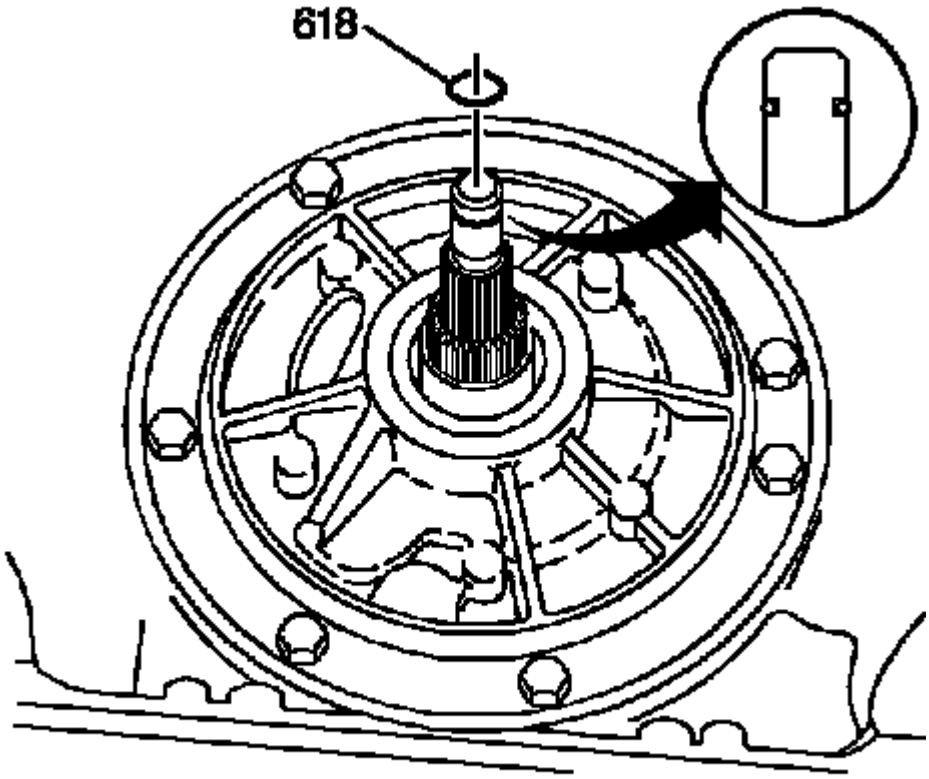


Fig. 52: View Of Automatic Transmission Case Fluid Passage Cover
Courtesy of GENERAL MOTORS CORP.

4. Remove the 2 automatic transmission case fluid passage cover bolts/screws (41).
5. Remove the automatic transmission case fluid passage cover (40).

THIRD GEAR BAND APPLY TUBE REMOVAL

Tools Required

J 28585 Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

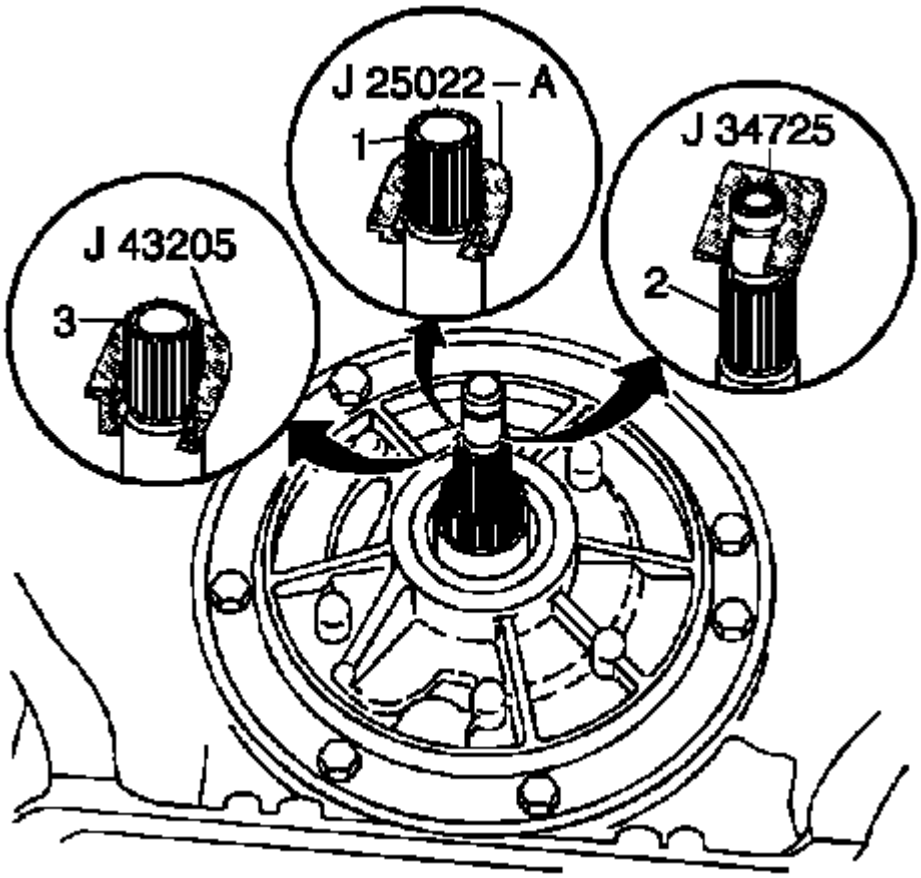


Fig. 53: View Of 3rd Gear Band Apply Tube Retainer
Courtesy of GENERAL MOTORS CORP.

1. Remove the 2 third gear band apply retainer bolts/screws (50).
2. Remove the third gear band apply tube retainer (51).

 © 2011 Mitchell Repair Information Company, LLC.

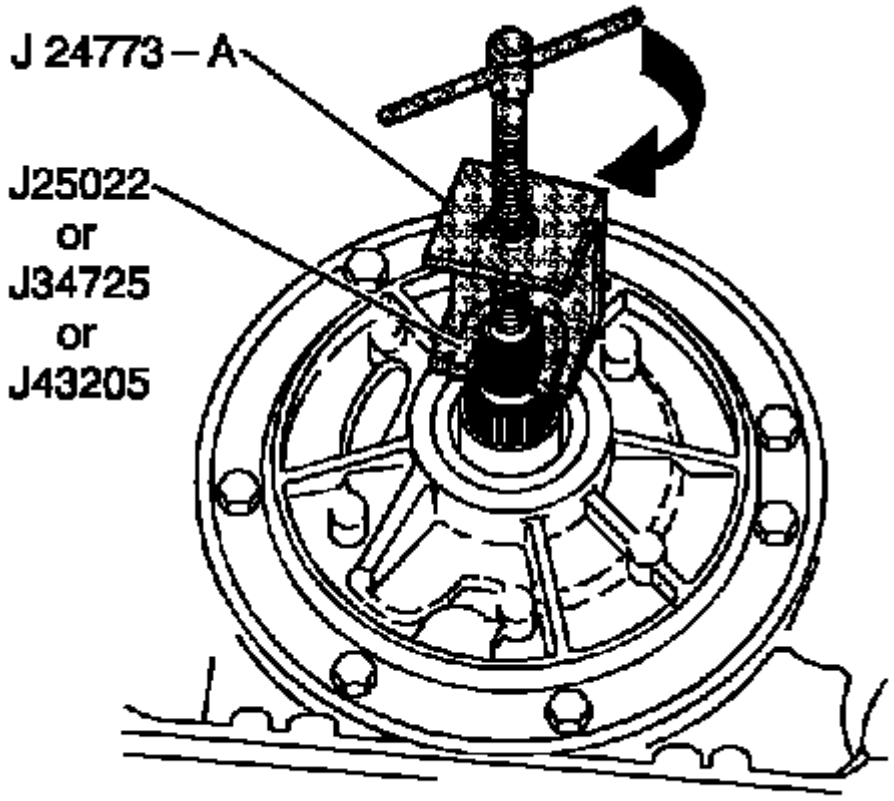


Fig. 54: Removing 3rd Gear Band Apply Tube & O-Rings
Courtesy of GENERAL MOTORS CORP.

IMPORTANT:
- **Do not bend or damage the apply tube or the O-ring.**
- **Do not damage the transmission case sealing surface.**

3. Using **J 28585** , remove the third gear band apply tube (52) and O-ring (53).

MANUAL SHIFT DETENT LEVER AND PARK PAWL REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

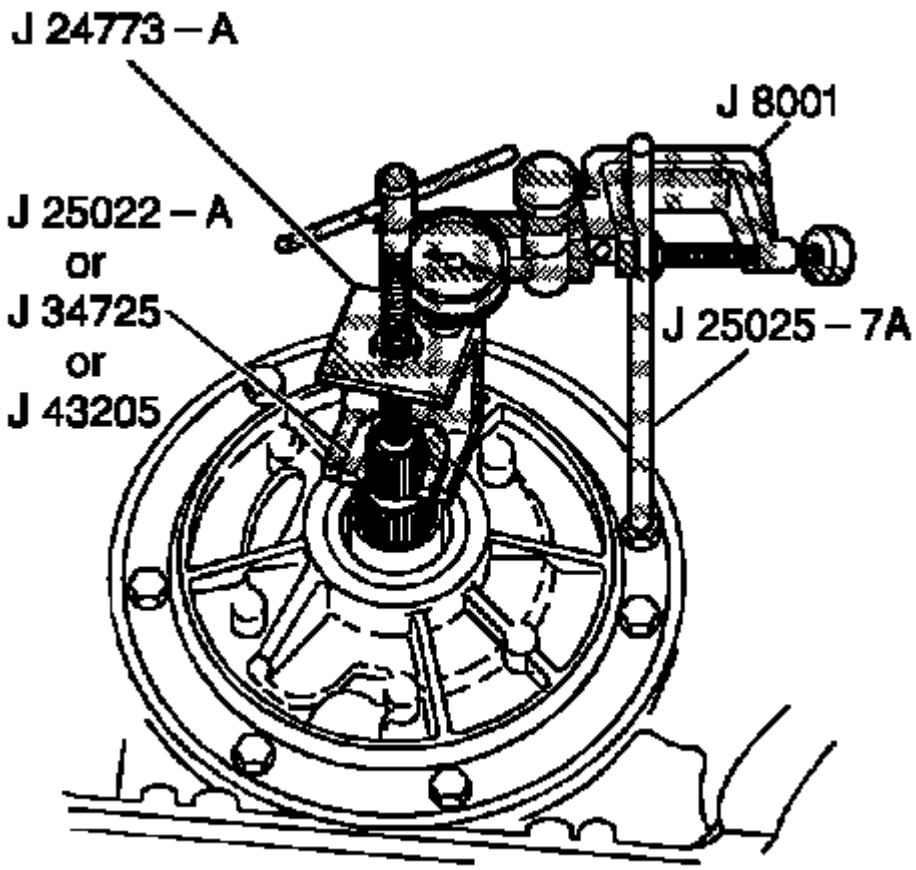


Fig. 55: Locating Park Pawl Actuator Rod, Manual Shift Detent Lever Assembly & Manual Shift Detent Spring
Courtesy of GENERAL MOTORS CORP.

1. Lift the manual shift detent spring (711) off of the manual shift detent lever assembly (710) to disengage the park pawl actuator rod (709) from the manual shift detent lever assembly (710).

 © 2011 Mitchell Repair Information Company, LLC.

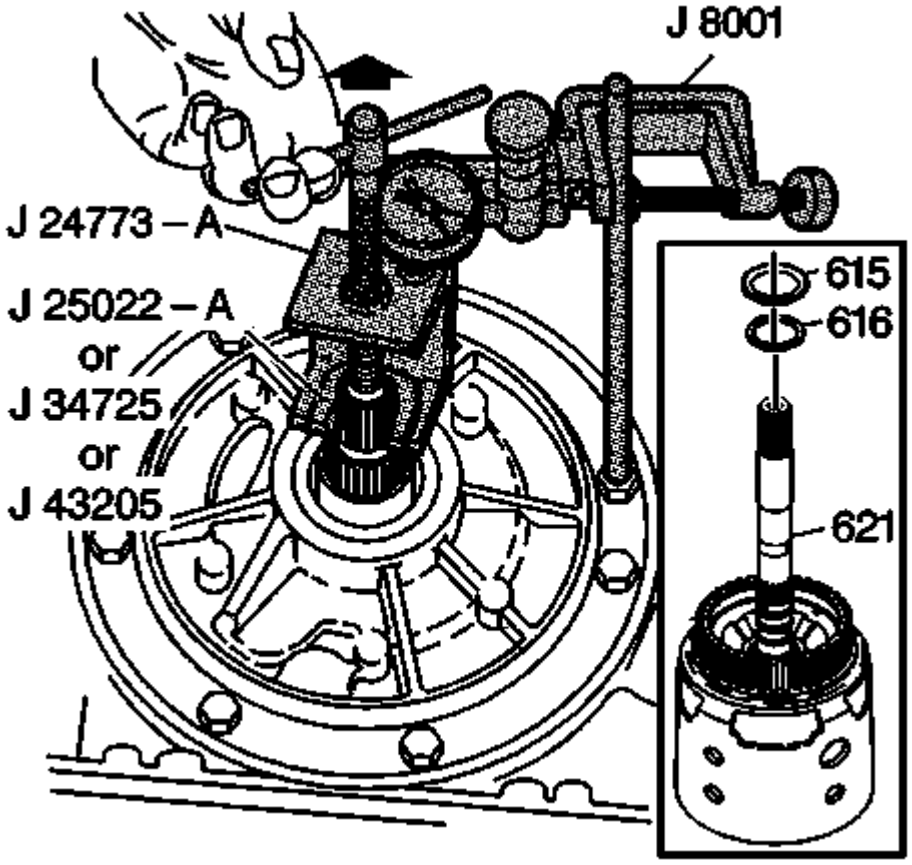


Fig. 56: View Of Manual Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

2. Remove the manual shift detent lever assembly (710) from the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

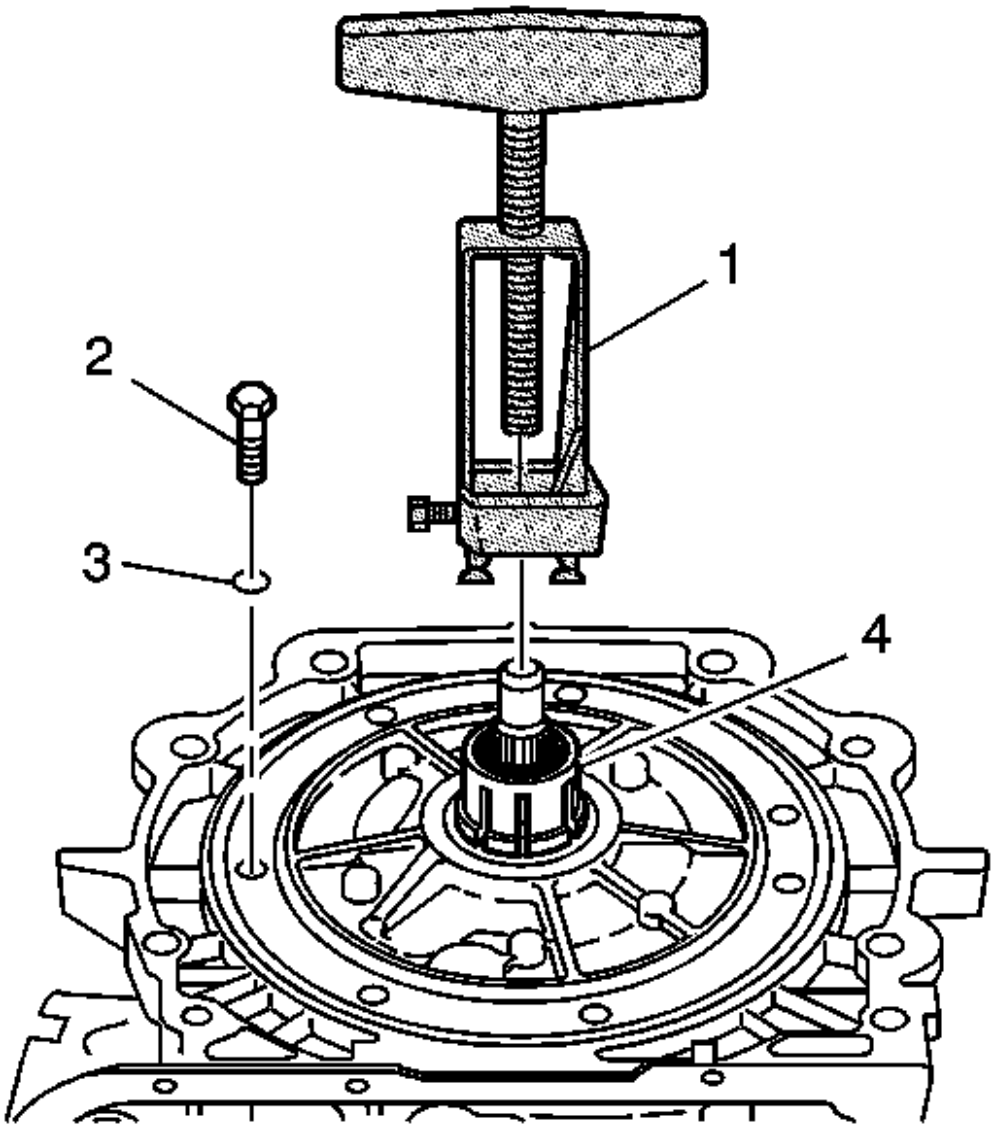


Fig. 57: View Of Park Pawl Actuator Rod
Courtesy of GENERAL MOTORS CORP.

3. Remove the park pawl actuator rod (709) from the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

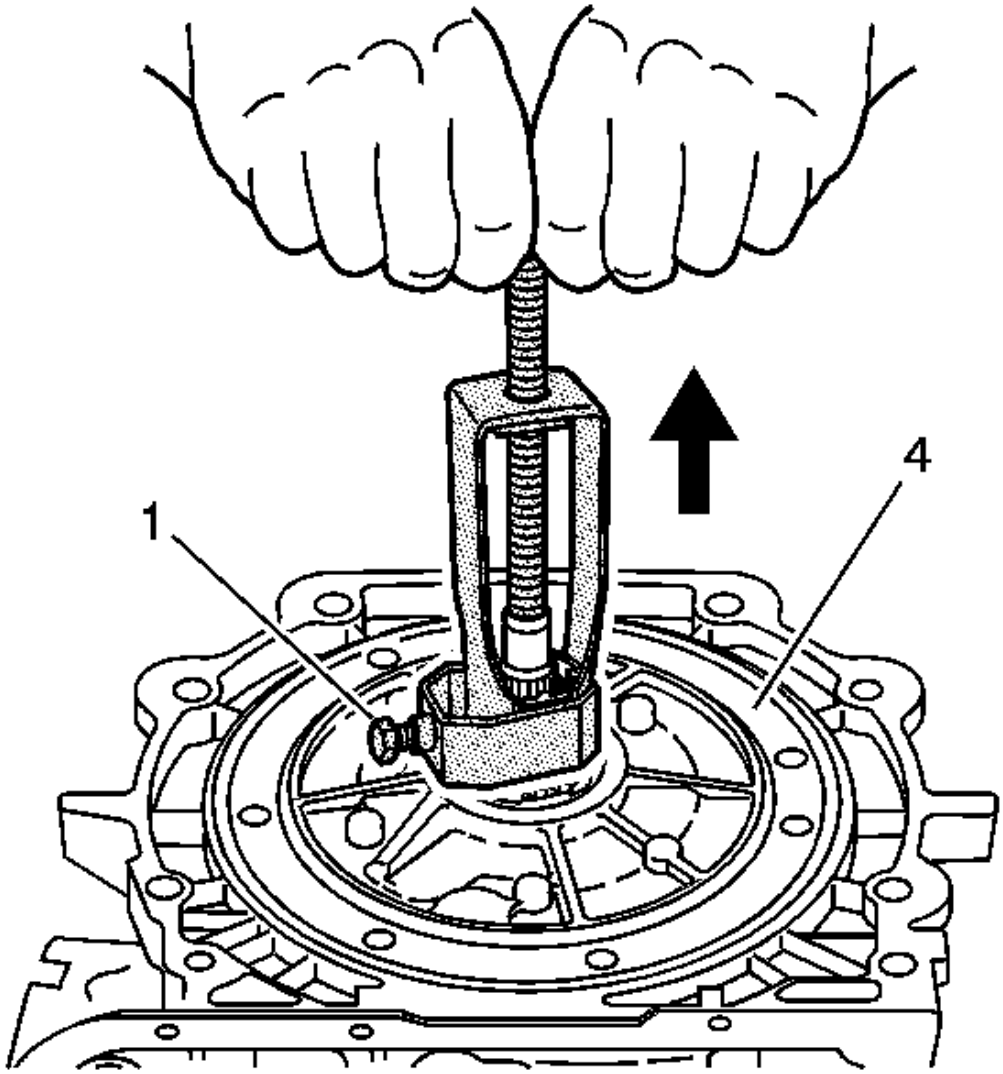


Fig. 58: View Of Manual Shift Detent Lever Spring Bolt/Screw & Park Pawl Actuator Bracket Bolt/Screw
Courtesy of GENERAL MOTORS CORP.

4. Remove the manual shift detent lever spring bolt/screw (712) and the park pawl actuator bracket bolt/screw (715).

 © 2011 Mitchell Repair Information Company, LLC.

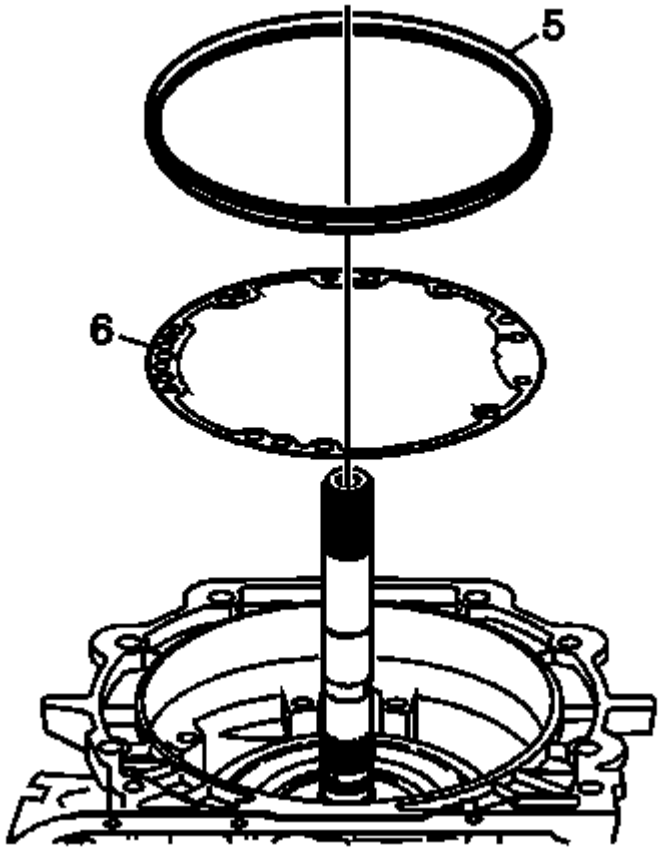


Fig. 59: View Of Manual Shift Detent Spring Assembly
Courtesy of GENERAL MOTORS CORP.

5. Remove the manual shift detent spring assembly (711) from the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

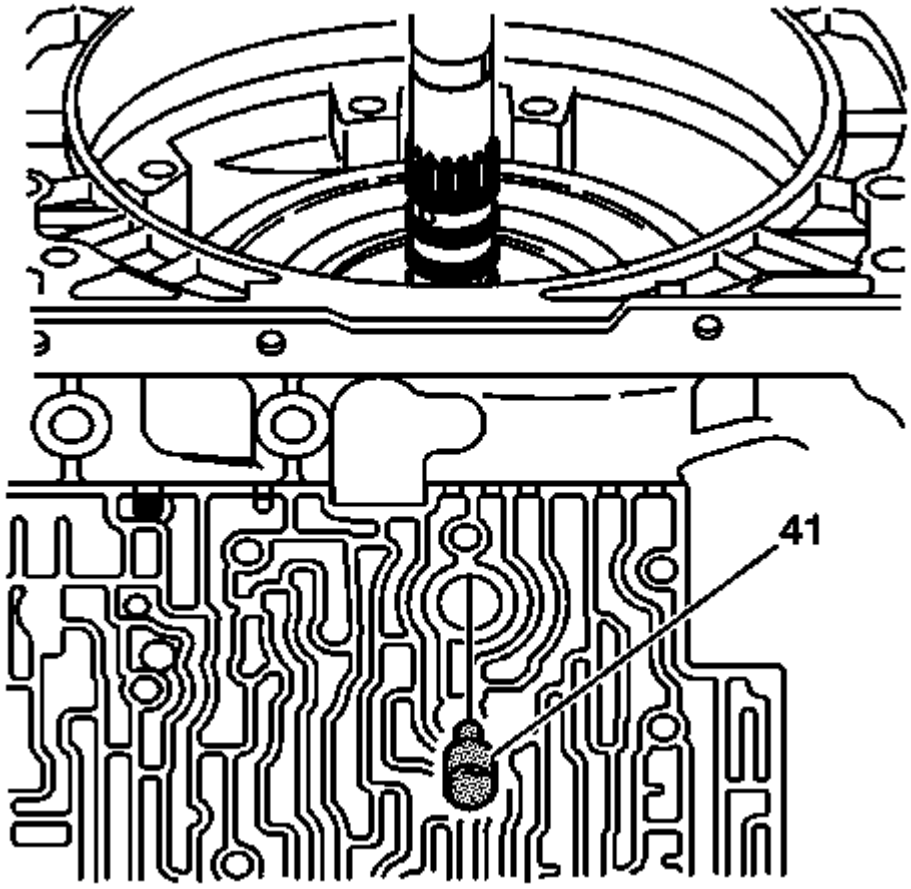


Fig. 60: View Of Park Pawl Shaft & Spring
Courtesy of GENERAL MOTORS CORP.

6. Remove the park pawl shaft (700).
7. Remove the park pawl spring (701).

 © 2011 Mitchell Repair Information Company, LLC.

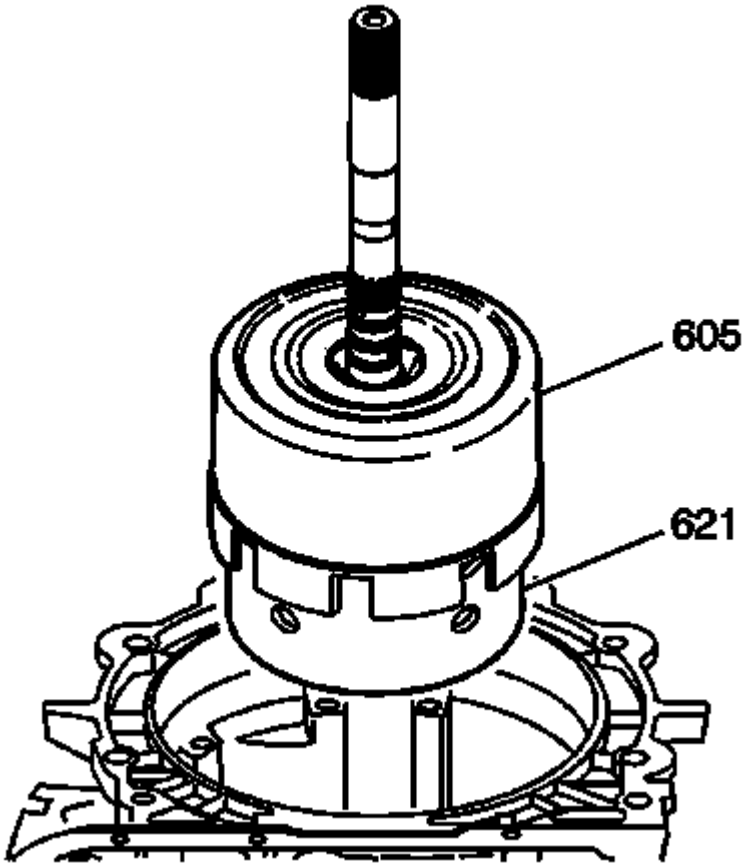


Fig. 61: View Of Park Pawl & Park Pawl Actuator Bracket
Courtesy of GENERAL MOTORS CORP.

8. Remove the park pawl actuator bracket (708) and park pawl (702).

 © 2011 Mitchell Repair Information Company, LLC.

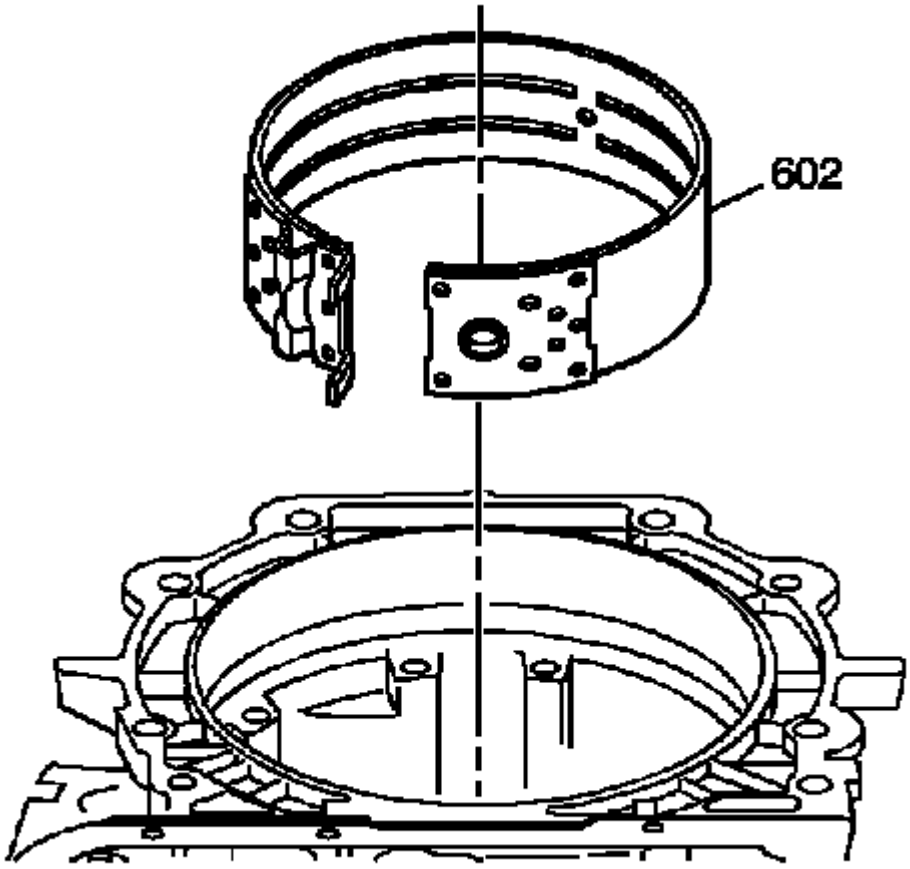


Fig. 62: View Of Park Pawl Spring Pin
Courtesy of GENERAL MOTORS CORP.

9. Remove the park pawl spring pin (703).

 © 2011 Mitchell Repair Information Company, LLC.

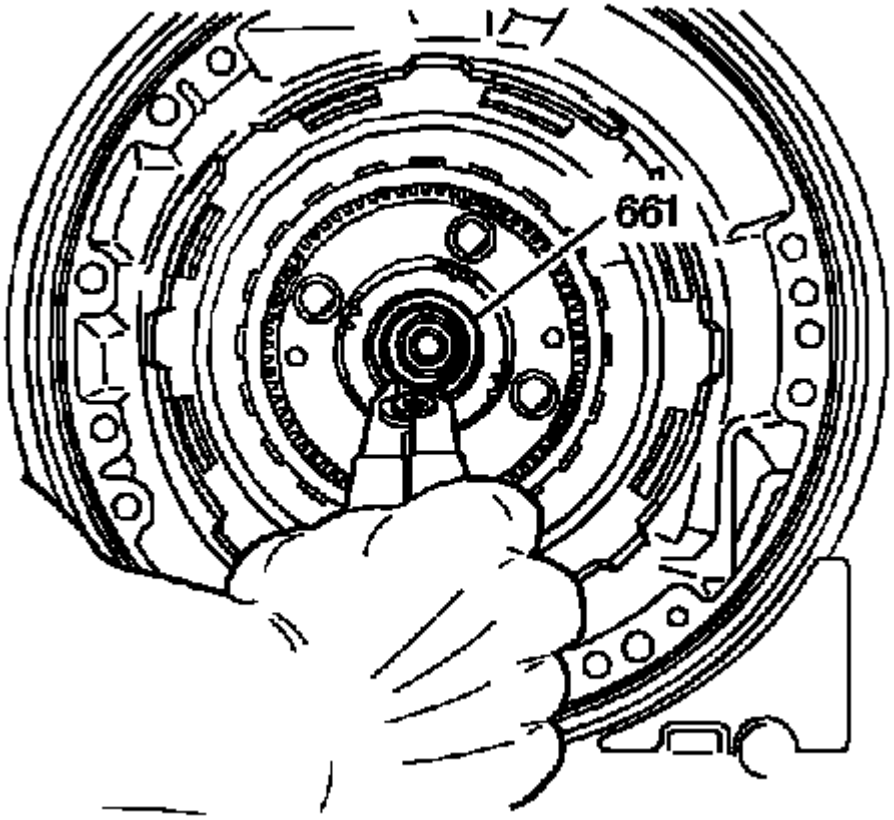


Fig. 63: View Of Park Pawl Pin Spring, Guide Sleeve & Bolt/Screw
Courtesy of GENERAL MOTORS CORP.

10. Remove the park pawl bolt/screw (706).
11. Remove the park pawl pin spring guide sleeve (705).
12. Remove the park pawl pin spring (704).

FRONT DIFFERENTIAL TRANSFER DRIVE GEAR ASSEMBLY REMOVAL

Tools Required

J 45053 Universal Clamp Press

 © 2011 Mitchell Repair Information Company, LLC.

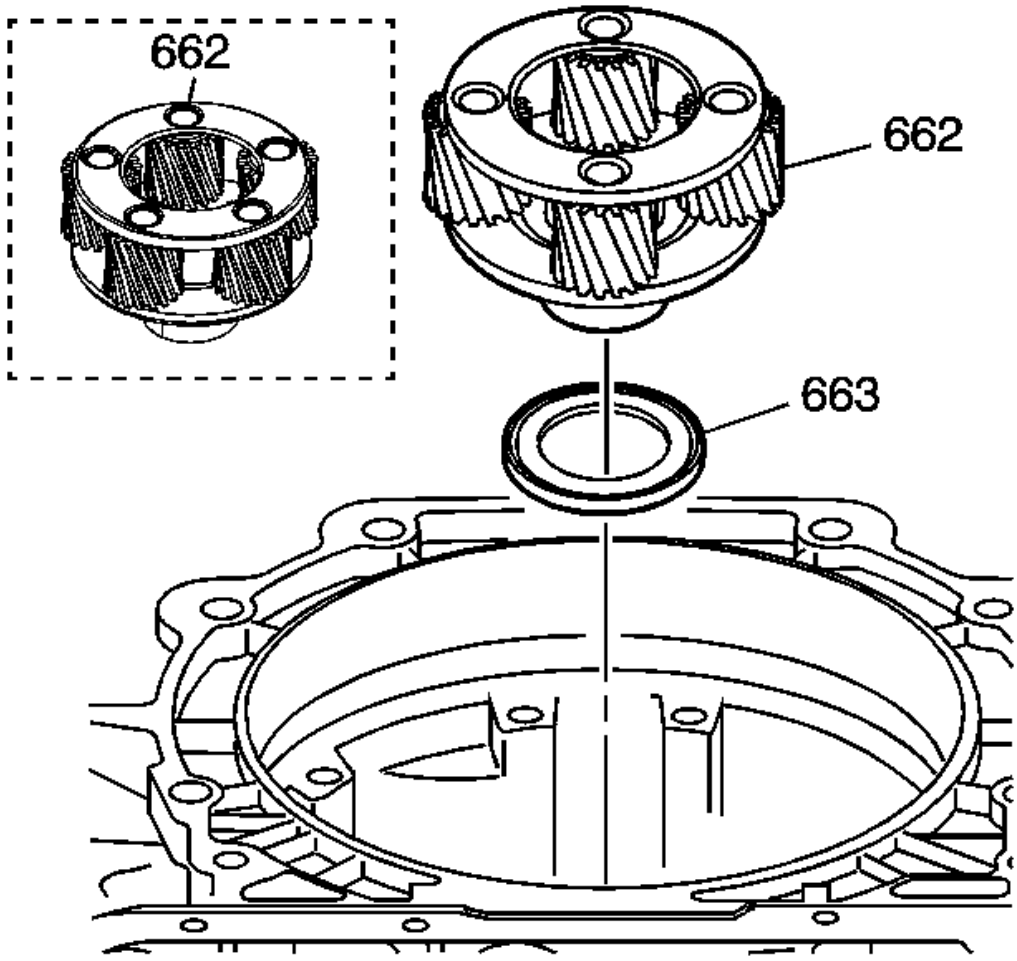


Fig. 64: View Of Front Differential Transfer Drive Gear Assembly & Thrust Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the front differential transfer drive gear thrust bearing assembly (263) from the front differential transfer drive gear assembly (14).
2. Remove the front differential transfer drive gear thrust bearing washer (264) from the front differential transfer drive gear assembly (14).

 © 2011 Mitchell Repair Information Company, LLC.

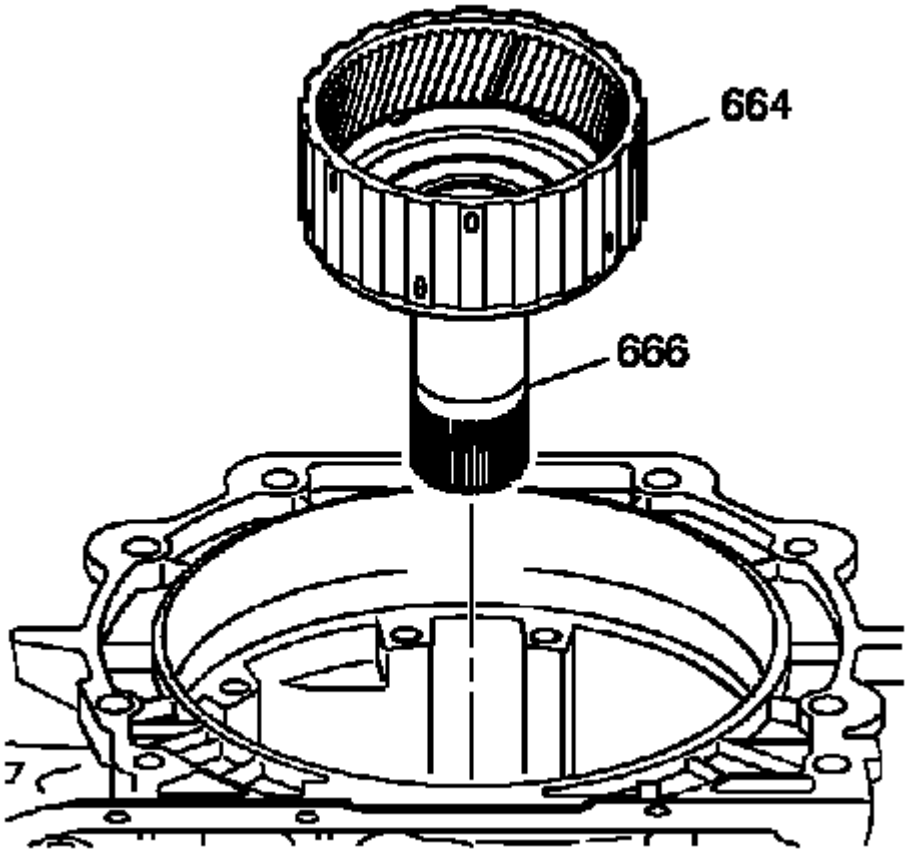


Fig. 65: View Of Front Differential Transfer Drive Gear Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The 4-5 clutch assembly may come out with the front differential transfer drive gear assembly. Do not let the front differential transfer drive gear assembly or the 4-5 clutch assembly fall to the floor or damage may occur.

3. Using **J 45053** , remove the front differential transfer drive gear assembly (14) from the transmission case assembly.

THIRD GEAR BAND SERVO PISTON PIN MEASUREMENT

 © 2011 Mitchell Repair Information Company, LLC.

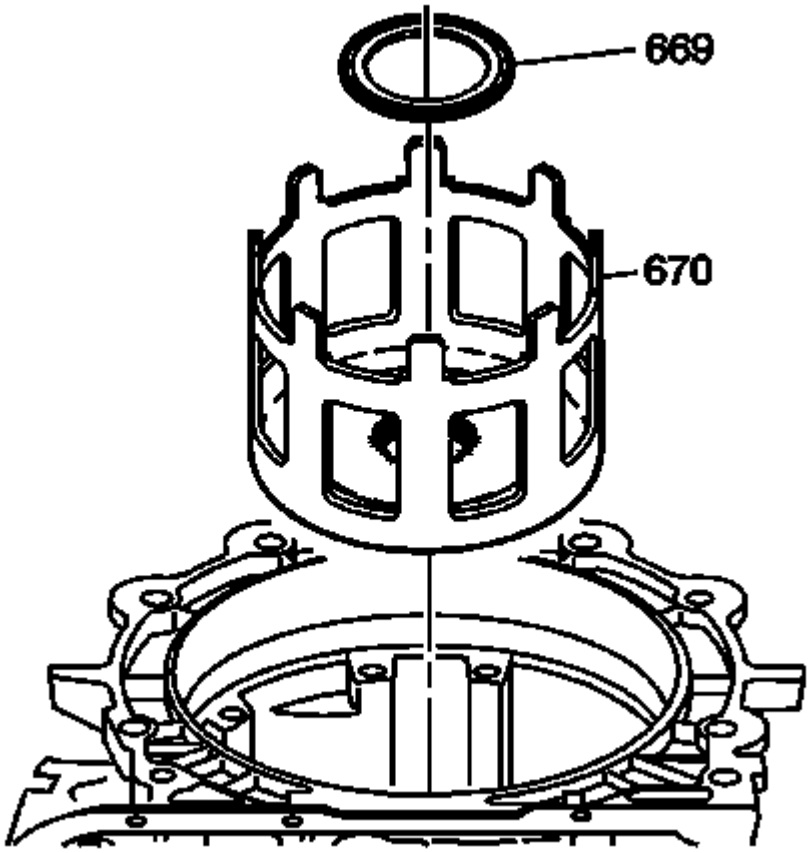


Fig. 66: Measuring Distance Between Third Gear Band Servo Piston Pin Release & Apply Marks
Courtesy of GENERAL MOTORS CORP.

1. Mark the servo piston pin in the released position (1).

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

2. Apply compressed air to the servo apply passage (3), and mark the apply position on the piston pin (2).
3. Measure the distance between the release and apply marks (a). Refer to **Third Gear Band Servo Piston Pin Selection** to select the correct servo piston pin.

4-5 CLUTCH ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

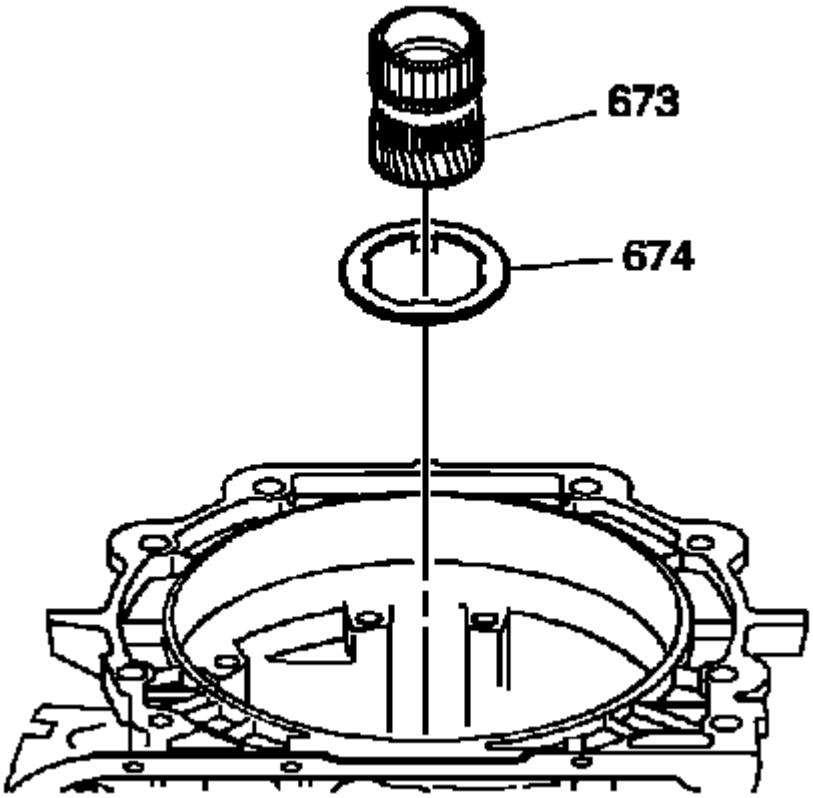


Fig. 67: View Of 4-5 Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

Remove the 4-5 clutch assembly (15) from the transmission case assembly.

THIRD GEAR BAND ASSEMBLY REMOVAL

Tools Required

DT-47599 Anchor Bolt Socket. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

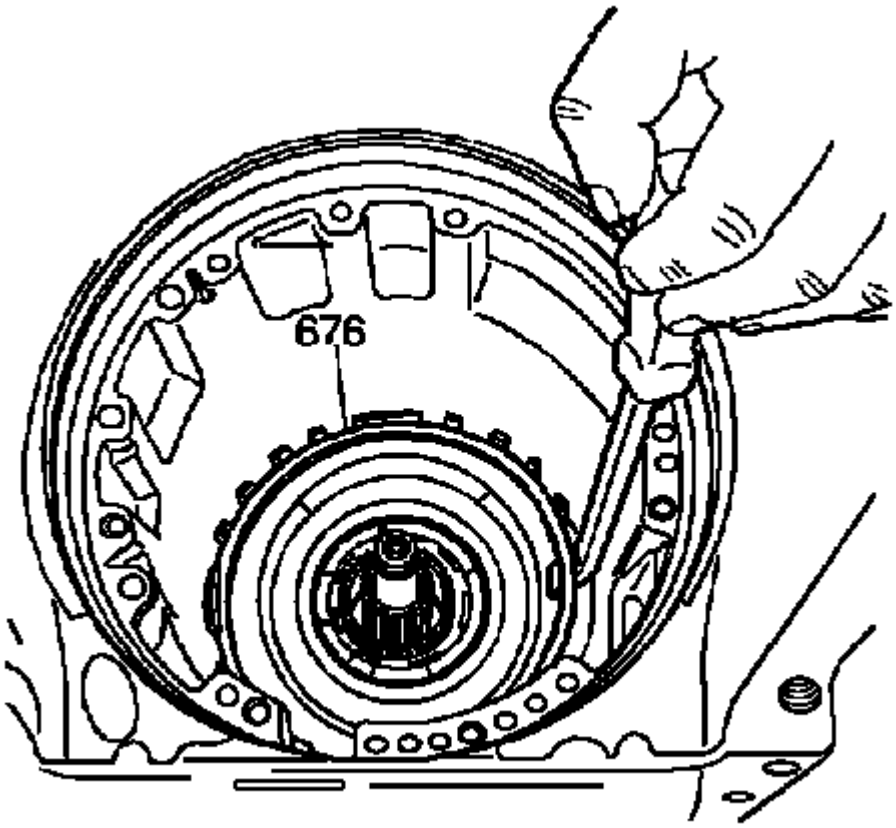


Fig. 68: Removing 3rd Gear Anchor Bolt
Courtesy of GENERAL MOTORS CORP.

1. Using the **DT-47599** remove the third gear anchor bolt (64) with the o-ring seal (65). See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

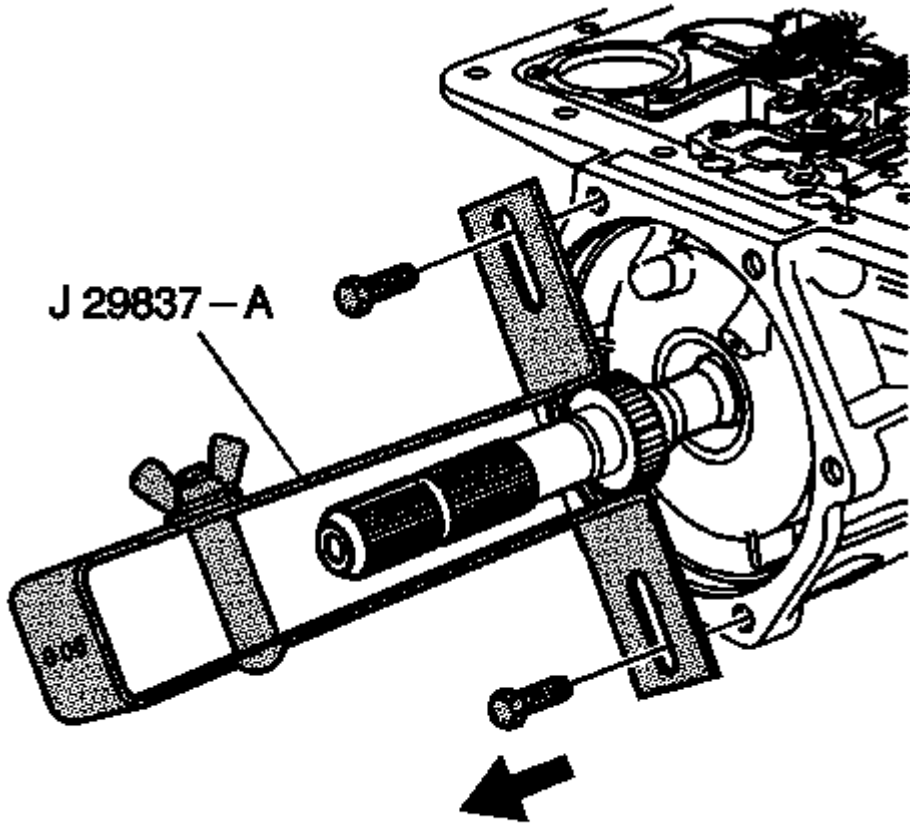


Fig. 69: Removing 3rd Gear Band Assembly
Courtesy of GENERAL MOTORS CORP.

2. Remove the third gear band assembly (16) from the transmission case assembly.

1-2-REVERSE CARRIER GEAR ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

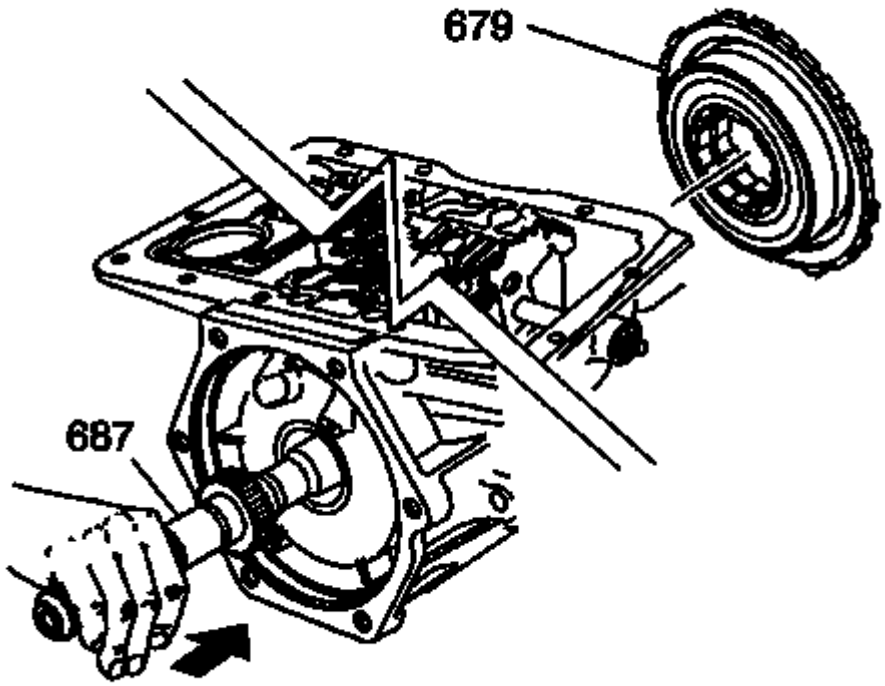


Fig. 70: View Of 1-2 Reverse Carrier Gear Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the 1-2 reverse carrier thrust washer (590).
2. Remove the 1-2 reverse carrier gear assembly (591).
3. Remove the other 1-2 reverse carrier thrust washer (590).

 © 2011 Mitchell Repair Information Company, LLC.

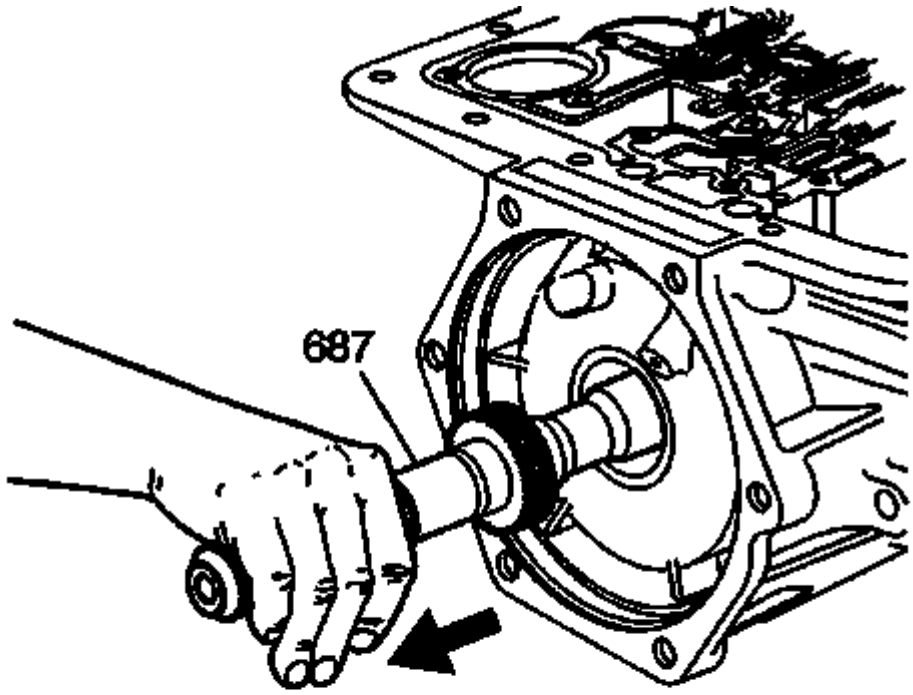


Fig. 71: View Of 1-2 Reverse Internal Gear, Front Thrust Bearing Assembly & Rear Thrust Bearing Assembly
Courtesy of GENERAL MOTORS CORP.

4. Remove the 1-2 reverse internal gear front thrust bearing assembly (593).
5. Remove the 1-2 reverse internal gear (594).
6. Remove the 1-2 reverse internal gear shim (596).
7. Remove the 1-2 reverse internal gear rear thrust bearing assembly (595), from the 1-2 reverse internal gear (594).

THIRD GEAR BAND SERVO PISTON ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

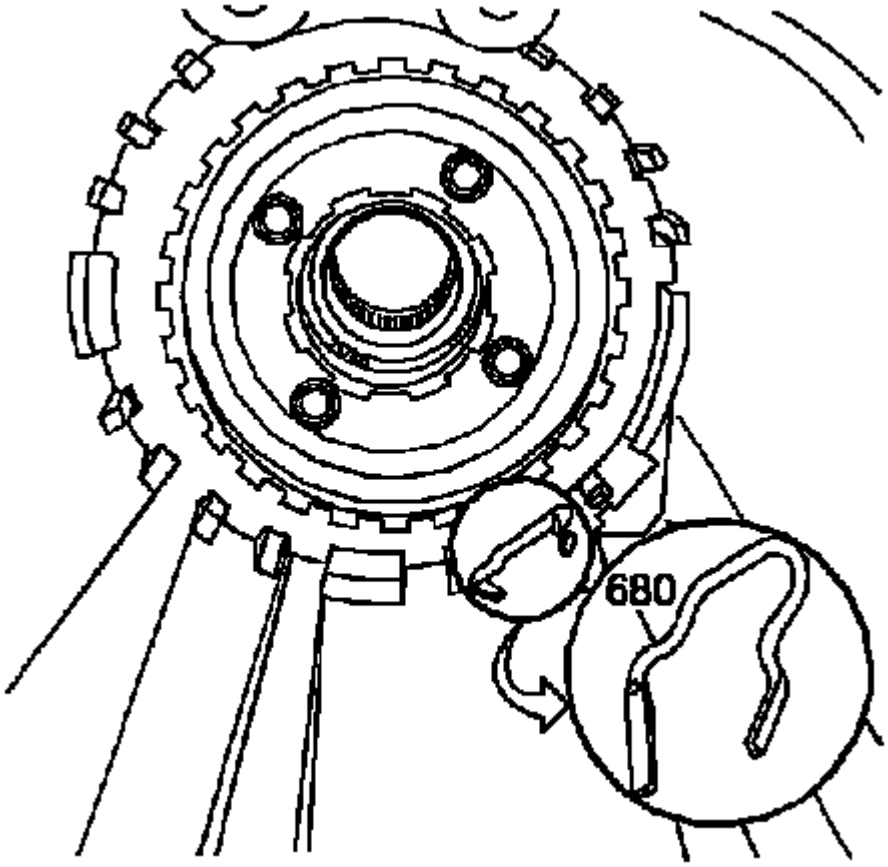


Fig. 72: Removing 3rd Gear Servo Cover Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission assembly so the rear case cover assembly is facing up.
2. Remove the third gear servo cover retaining ring (60) from the transmission case assembly (17).

 © 2011 Mitchell Repair Information Company, LLC.

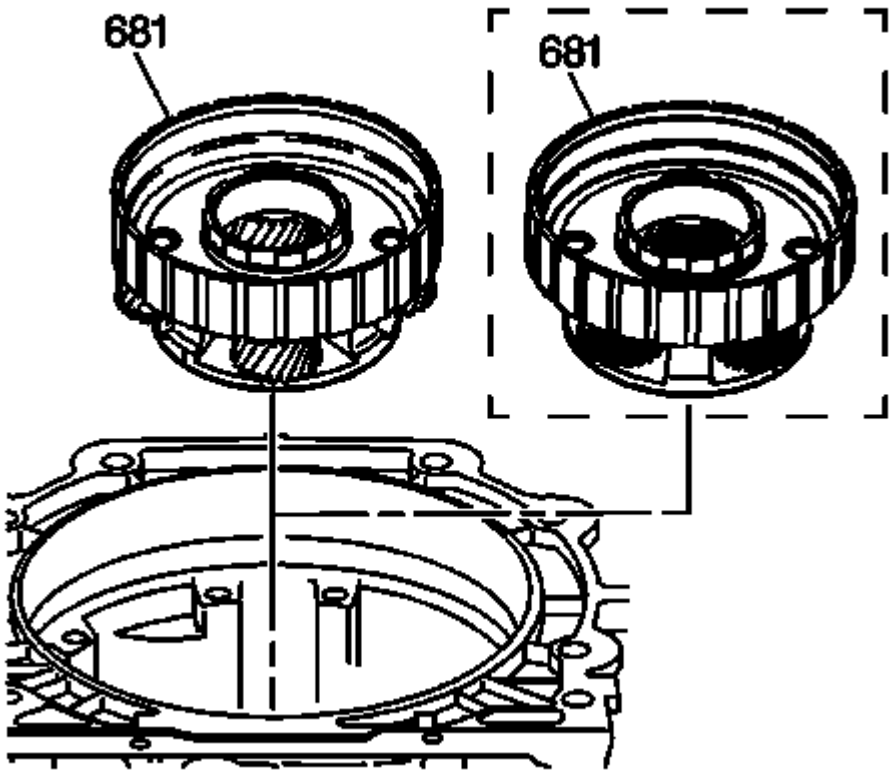


Fig. 73: View Of 3rd Gear Band Servo Cover
Courtesy of GENERAL MOTORS CORP.

3. Remove the third gear band servo cover (59) from the transmission case assembly.
4. Remove the 2 O-ring seals (58) from the third gear band servo cover (59).

 © 2011 Mitchell Repair Information Company, LLC.

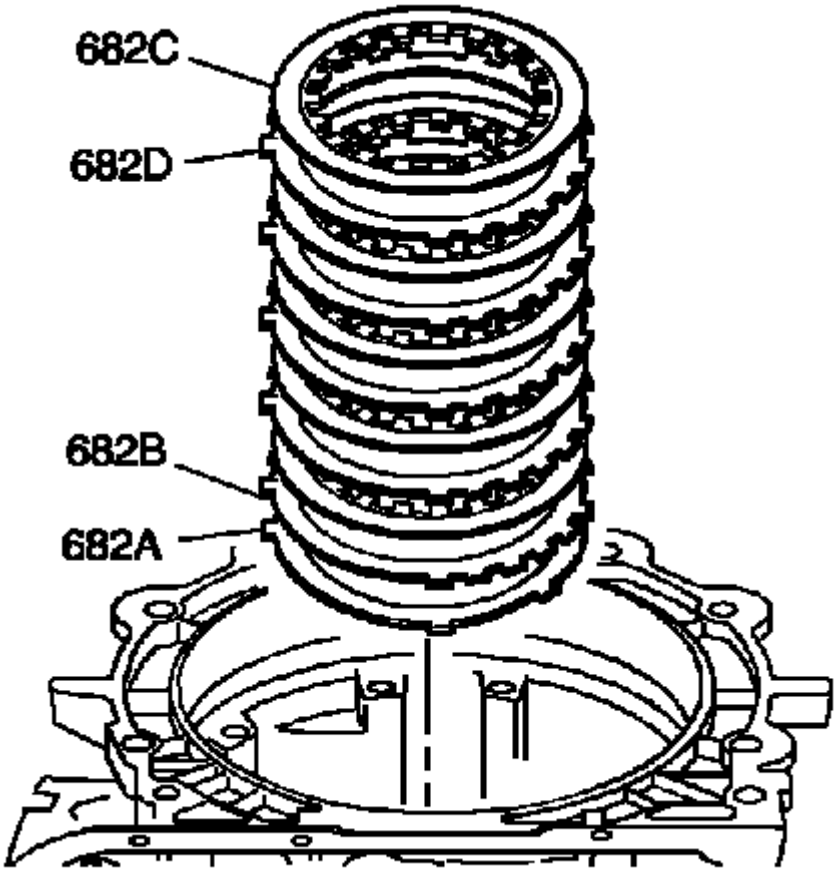


Fig. 74: View Of 3rd Gear Band Servo Piston Assembly & Compression Spring
Courtesy of GENERAL MOTORS CORP.

5. Remove the third gear band servo piston assembly (57).
6. Remove the third gear band servo compression spring (56).

CASE COVER AND 1-2 REVERSE CLUTCH ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

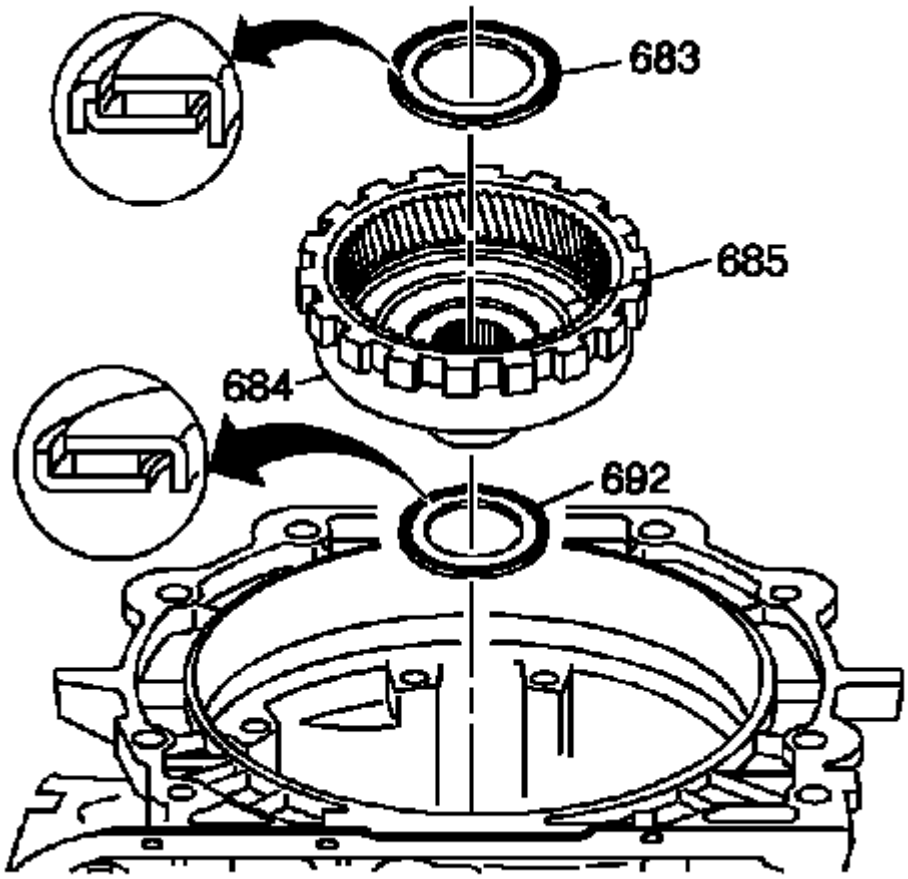


Fig. 75: View Of Transmission Case Cover Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

1. Remove the 12 transmission case cover bolts/screws.

 © 2011 Mitchell Repair Information Company, LLC.

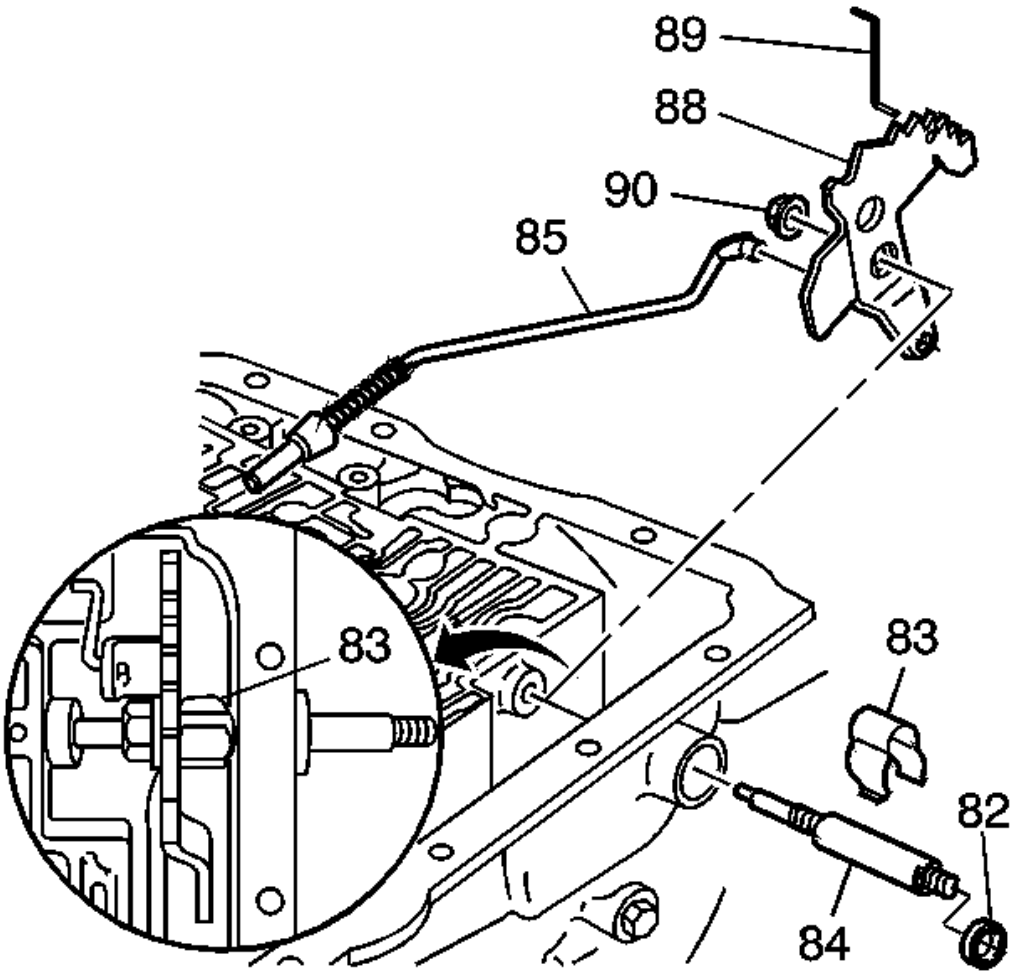


Fig. 76: Removing Transmission Case Cover & 1-2 Reverse Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the transmission case cover.

2. Remove the transmission case cover and 1-2 reverse clutch assembly (19) with a plastic hammer if needed.

 © 2011 Mitchell Repair Information Company, LLC.

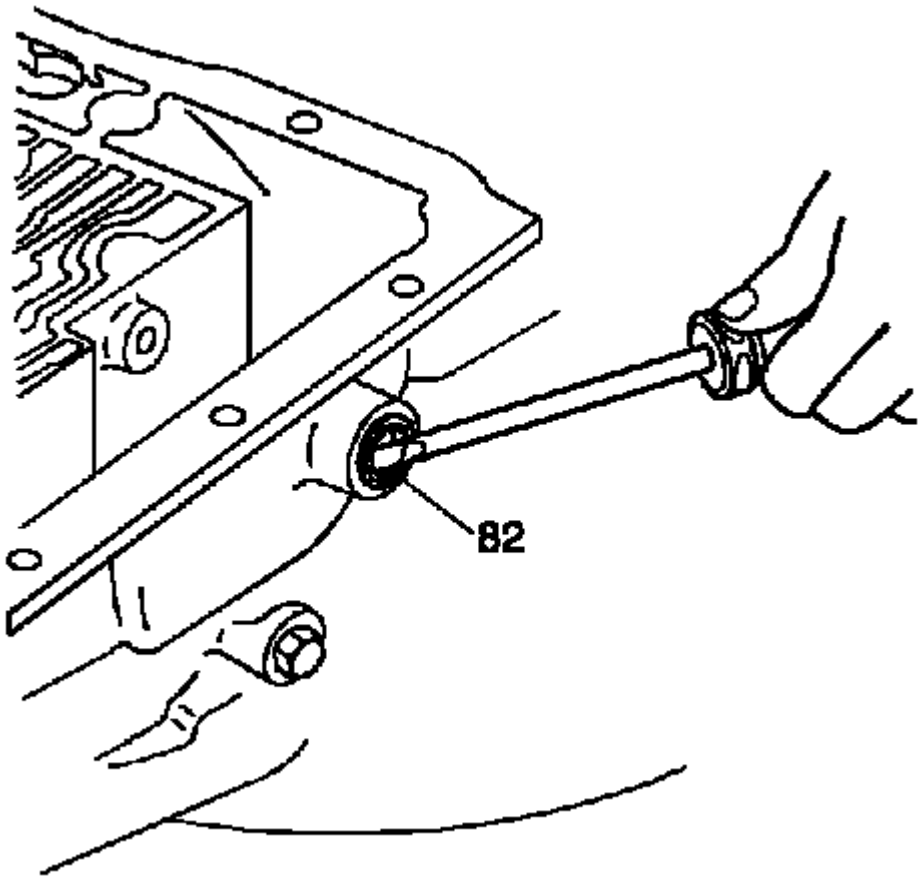


Fig. 77: Identifying Case Fluid Passage Seals
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the transmission case sealing surface.

3. Remove the 5 case fluid passage seals (86) from the transmission case.

FORWARD AND DIRECT CLUTCH ASSEMBLY REMOVAL

Tools Required

J 28585 Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

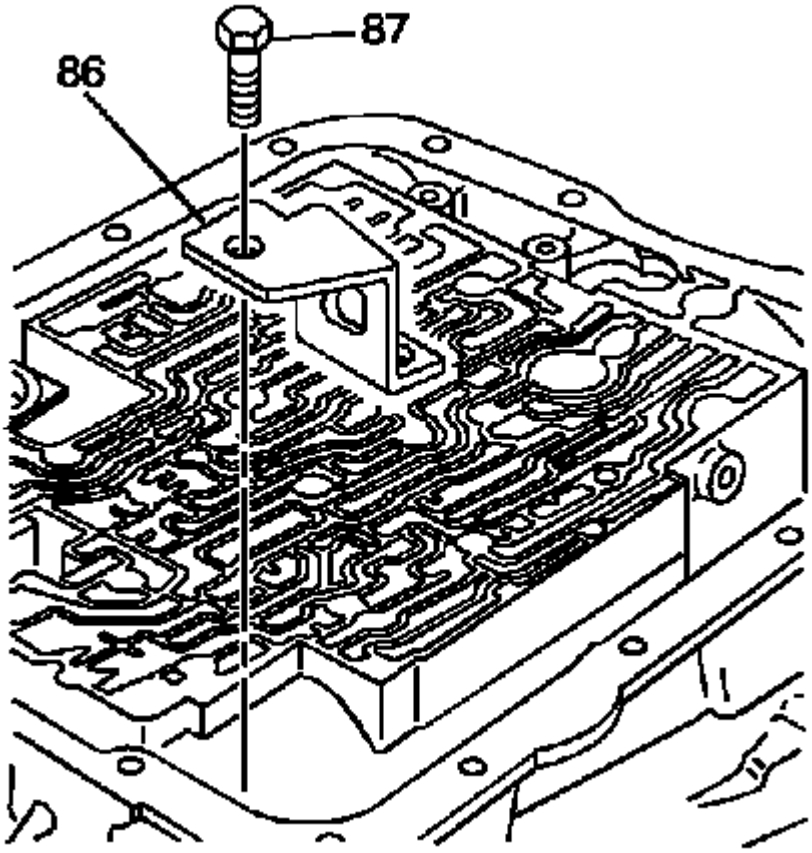


Fig. 78: View Of Lube Fluid Pipe Retainer
Courtesy of GENERAL MOTORS CORP.

1. Remove the lube fluid pipe retainer bolt/screw (83).
2. Remove the lube fluid pipe retainer (84)

 © 2011 Mitchell Repair Information Company, LLC.

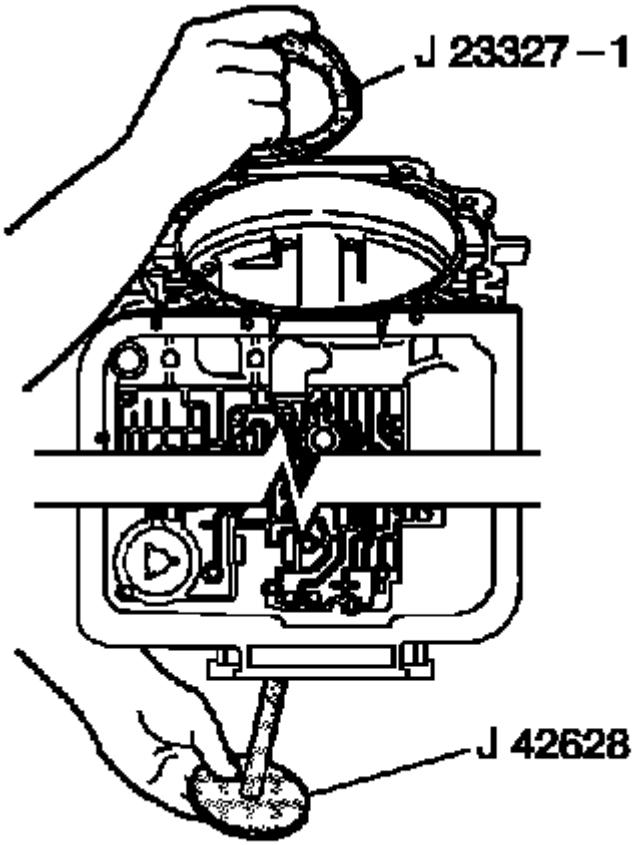


Fig. 79: Removing Lube Fluid Pipe
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not bend or damage the lube fluid pipe.

3. Remove the lube fluid pipe (85) with **J 28585** .

 © 2011 Mitchell Repair Information Company, LLC.

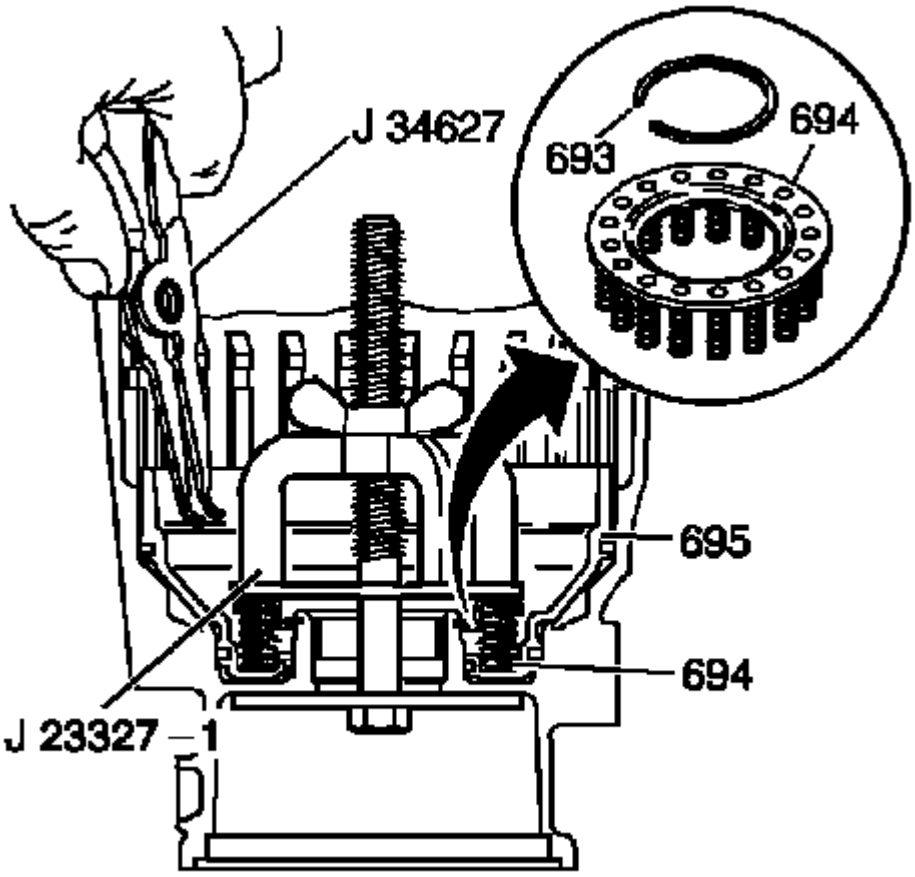


Fig. 80: View Of Forward & Direct Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

4. Remove the forward and direct clutch assembly (23).

REAR INTERNAL GEAR AND FRONT CARRIER REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

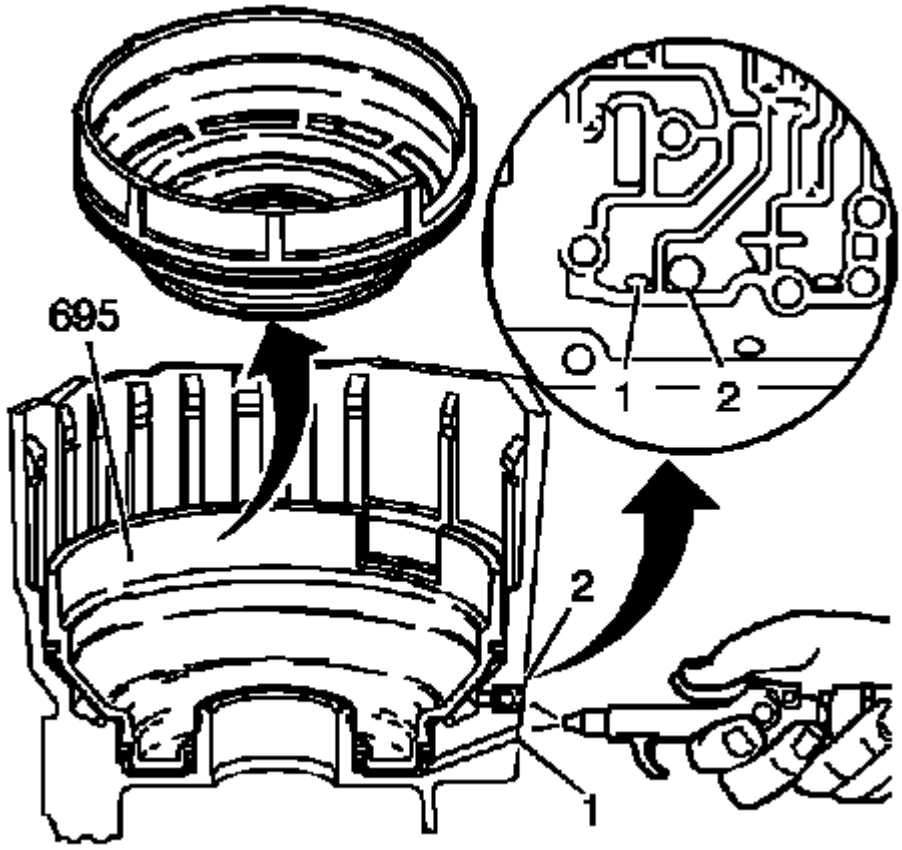


Fig. 81: View Of Rear Sun Gear Assembly, Thrust Bearings & Thrust Bearing Race
Courtesy of GENERAL MOTORS CORP.

1. Remove the input shaft thrust bearing (540).
2. Remove the rear sun gear assembly (539).
3. Remove the front sun gear thrust bearing race (546).
4. Remove the rear sun gear thrust bearing (538).

 © 2011 Mitchell Repair Information Company, LLC.

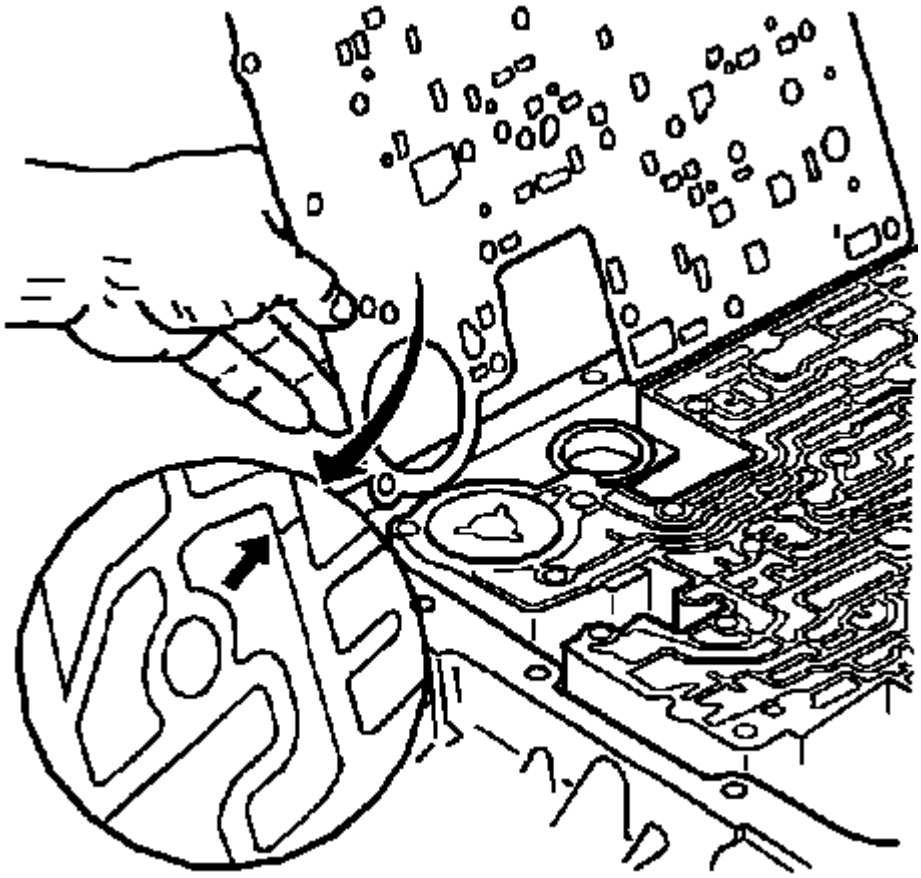


Fig. 82: View Of Rear Internal Gear, Thrust Bearing & Thrust Bearing Race
Courtesy of GENERAL MOTORS CORP.

5. Remove the rear sun gear thrust bearing race (537).
6. Remove the rear internal gear (536).
7. Remove the rear internal gear thrust bearing (535).

 © 2011 Mitchell Repair Information Company, LLC.

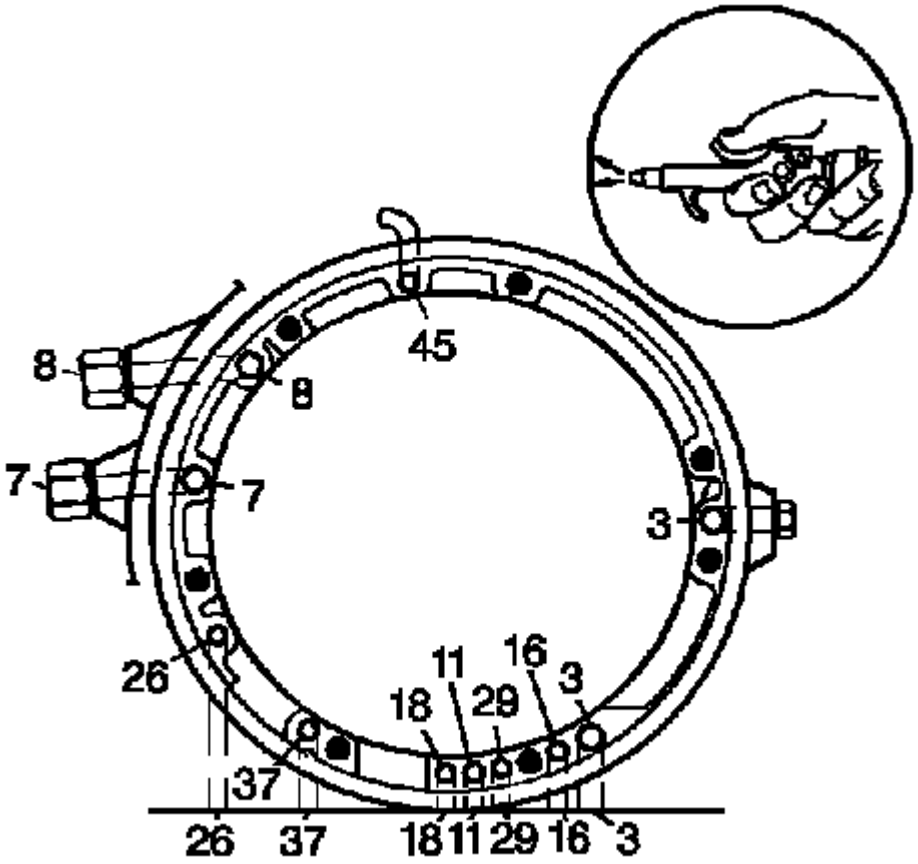


Fig. 83: View Of Front Carrier & Sun Gear Assembly
Courtesy of GENERAL MOTORS CORP.

8. Remove the front carrier thrust bearing race (543).
9. Remove the front sun gear thrust bearing (545).
10. Remove the front carrier and sun gear assembly (24).

FRONT INTERNAL GEAR AND LOW AND REVERSE CLUTCH ASSEMBLY REMOVAL

Tools Required

J 28585 Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

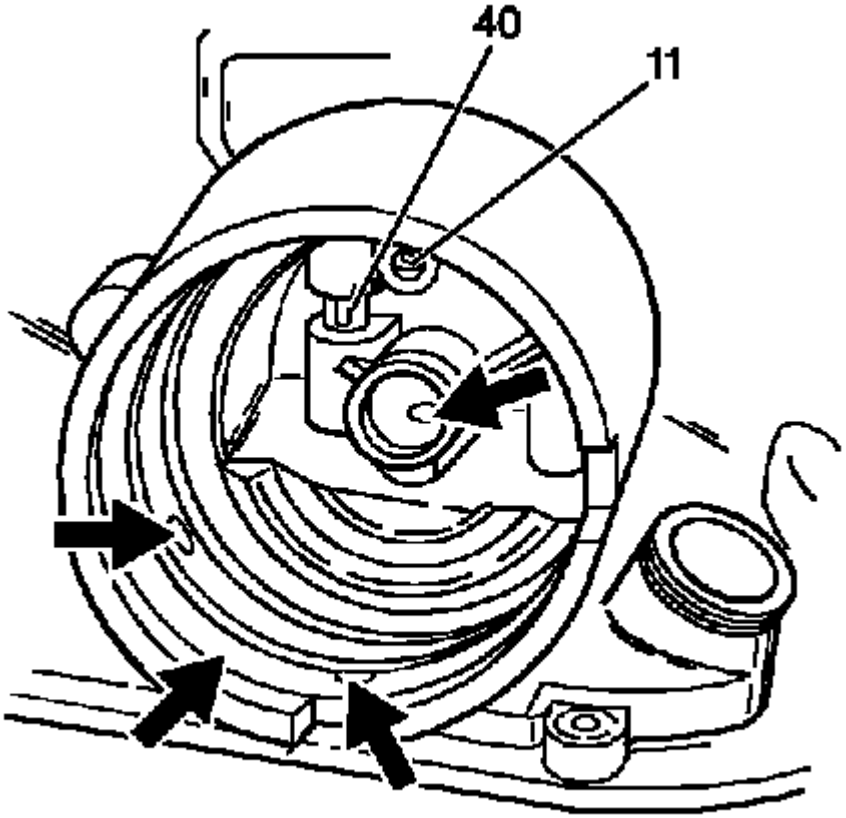


Fig. 84: View Of Front Internal Gear Thrust Bearing
Courtesy of GENERAL MOTORS CORP.

1. Remove the front internal gear thrust bearing (529).

 © 2011 Mitchell Repair Information Company, LLC.

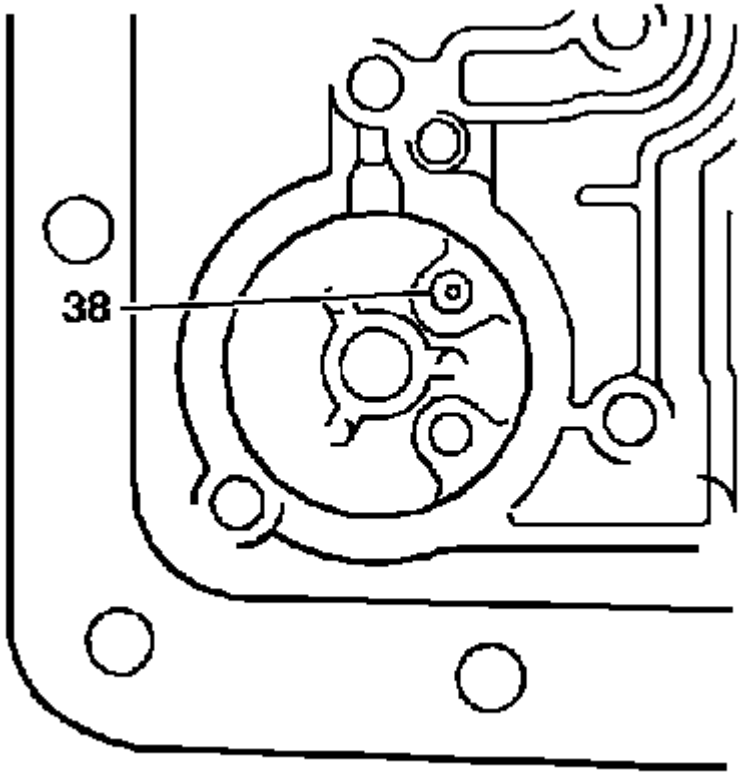


Fig. 85: View Of Low & Reverse Clutch Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

2. Remove the low and reverse clutch plate retaining ring (518) from the transmission case assembly with **J 28585** .

 © 2011 Mitchell Repair Information Company, LLC.

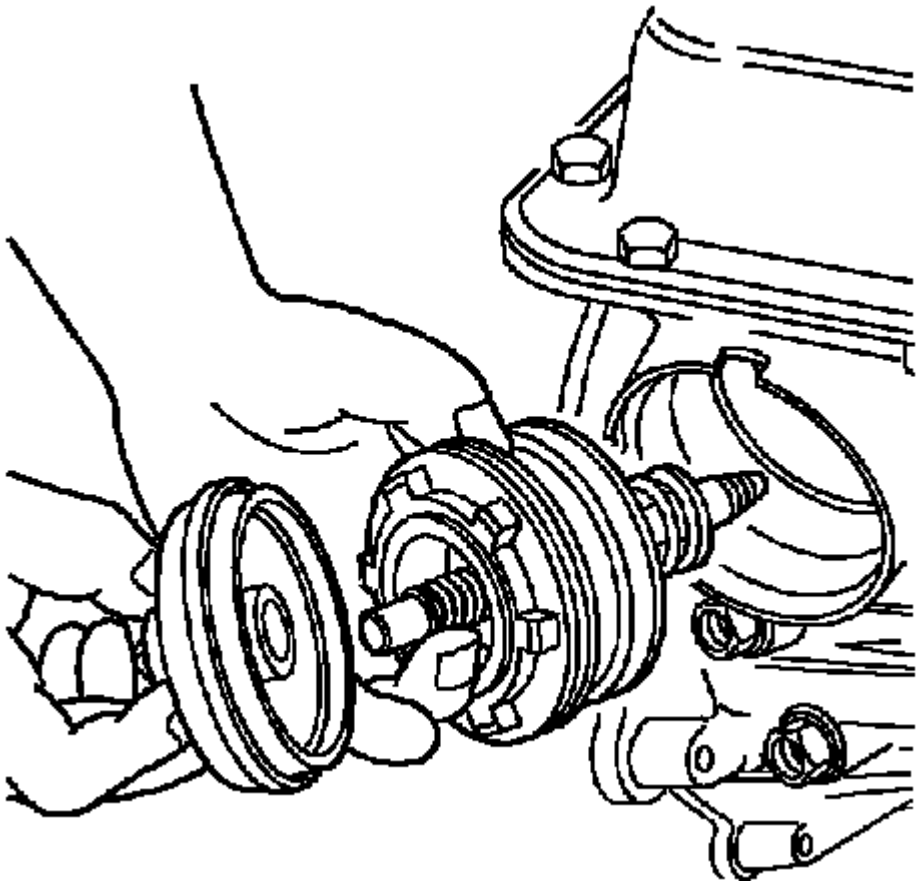


Fig. 86: View Of Low & Reverse Clutch Backing Plate, Fiber Plate Assemblies & Clutch Steel Plates
Courtesy of GENERAL MOTORS CORP.

3. Remove the low and reverse clutch backing plate (515).
4. Remove the 4 low and reverse clutch fiber plate assemblies (516).
5. Remove the 3 low and reverse clutch steel plates (517).
6. Remove the low and reverse clutch backing plate (515).

 © 2011 Mitchell Repair Information Company, LLC.

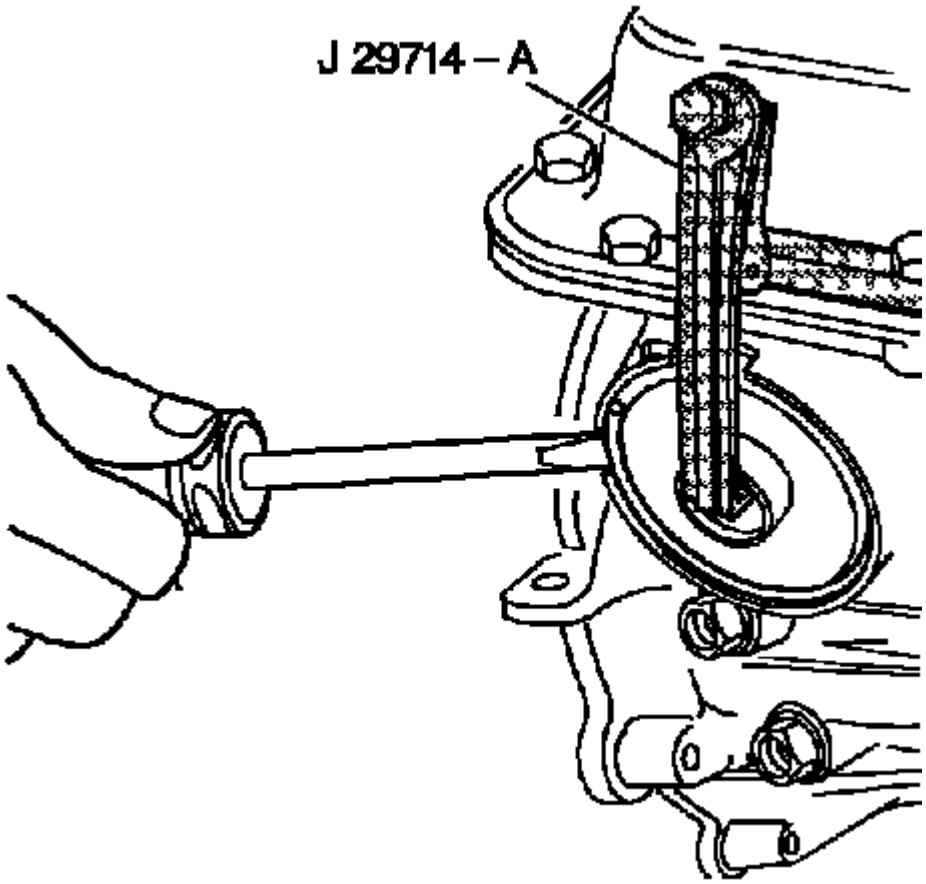


Fig. 87: View Of Front Internal Gear Thrust Bearing Assembly & Front Internal Gear
Courtesy of GENERAL MOTORS CORP.

7. Remove the front internal gear (526). The front internal gear thrust bearing assembly (519) and the thrust washer race (530) are on the back side of the front internal gear (526).

LOW AND REVERSE CLUTCH PISTON REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

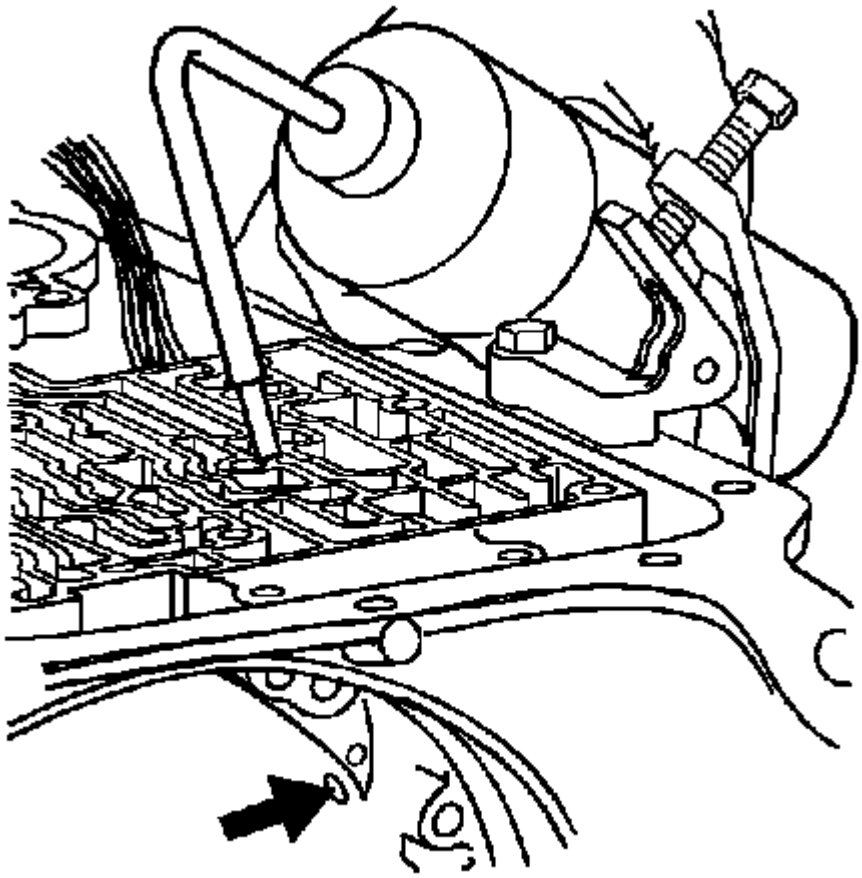


Fig. 88: View Of Low & Reverse Clutch Piston, Spring Assembly & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Remove the low and reverse clutch spring retaining ring (514) from the transmission case assembly.
2. Remove the low and reverse clutch spring assembly (513).

 © 2011 Mitchell Repair Information Company, LLC.

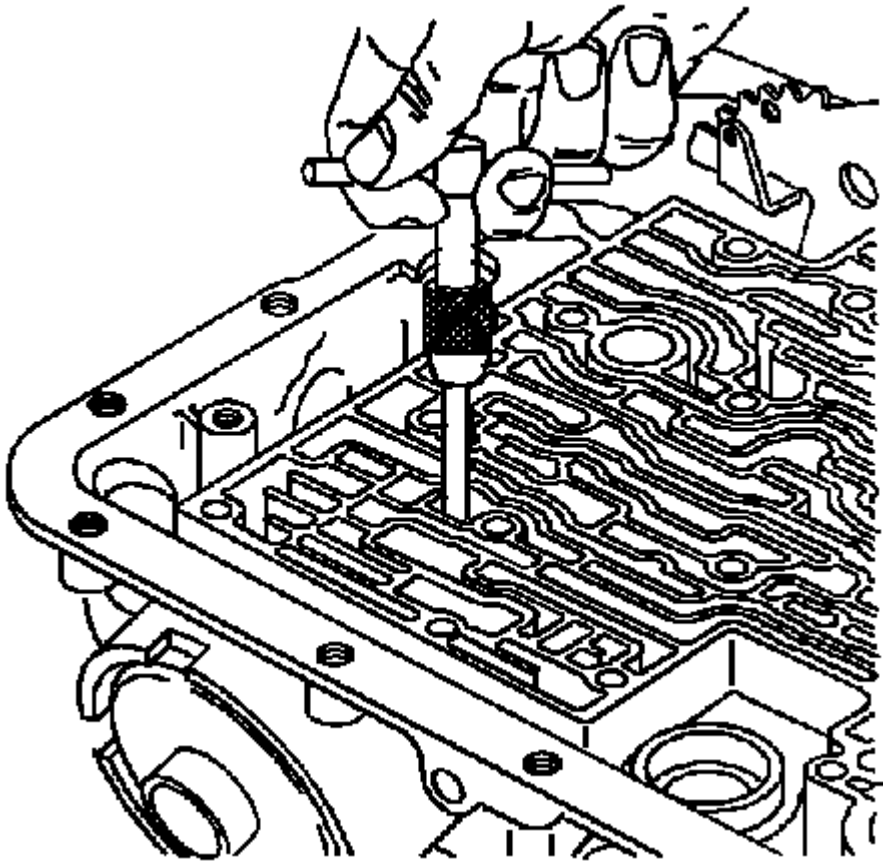


Fig. 89: View Of Low & Reverse Clutch Piston & Piston Seals
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

3. While rotating the low and reverse clutch piston (511) by hand, apply compressed air into the oil passage located in the side of the transmission case and remove the low and reverse clutch piston assembly.
4. Remove the inner seal (510) and the outer seal (512) from the piston.

OUTPUT GEAR ASSEMBLY REMOVAL

 © 2011 Mitchell Repair Information Company, LLC.

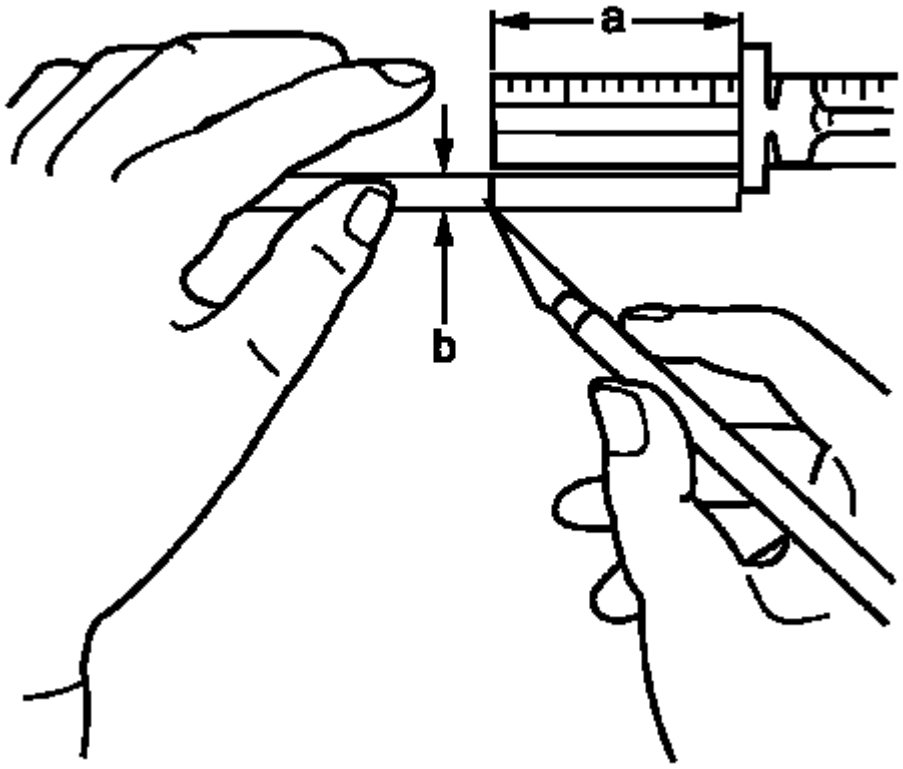


Fig. 90: View Of Output Gear Assembly & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission assembly so the I.D. tag is facing up.
2. Remove the output gear retaining ring (48) from the output gear assembly (12).

 © 2011 Mitchell Repair Information Company, LLC.

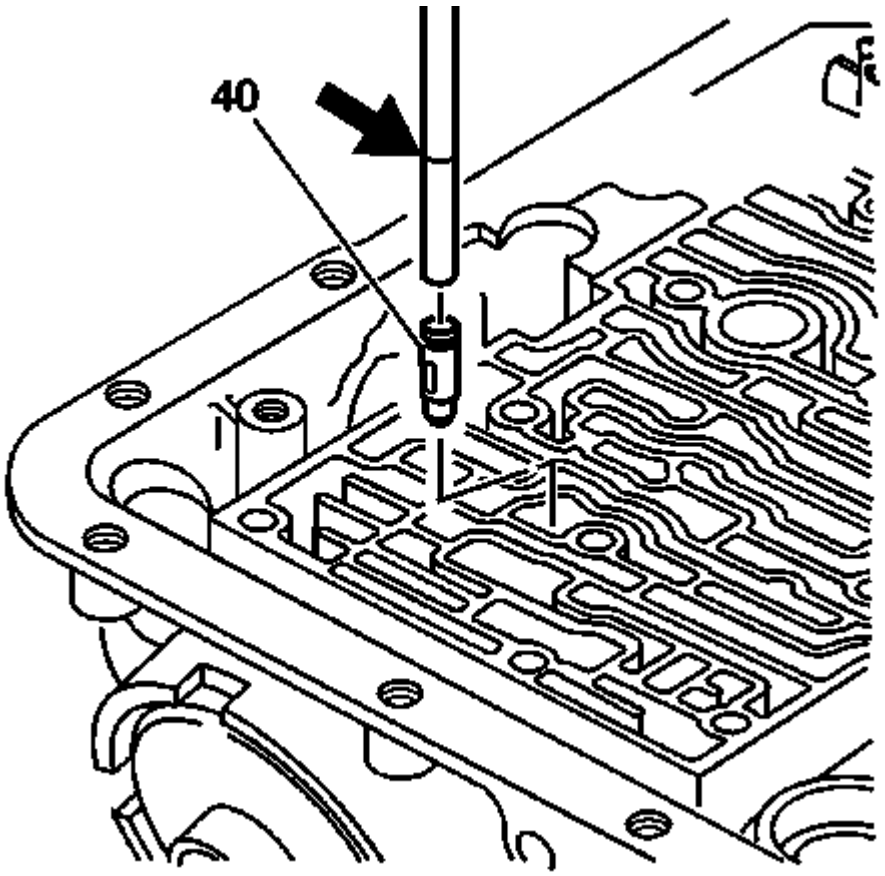


Fig. 91: View Of Output Gear Assembly
Courtesy of GENERAL MOTORS CORP.

3. Remove the output gear assembly (12) from the transmission case assembly.

IMPORTANT: Do not disassemble the output drive gear.

4. Clean the output gear in solvent and air dry. Ensure the solvent is removed from the bearing.
5. Inspect the bearings feel for roughness or noise.
6. Inspect the gear teeth for:
   - Excessive wear
   - Chips or broken teeth
   - Metal embedded in the teeth
7. Replace the output drive gear as an assembly if any of the above conditions are found.

TRANSMISSION COOLER LINE SEALS REMOVAL

Tools Required

J 45201 Cooler Line Seal Remover

 © 2011 Mitchell Repair Information Company, LLC.

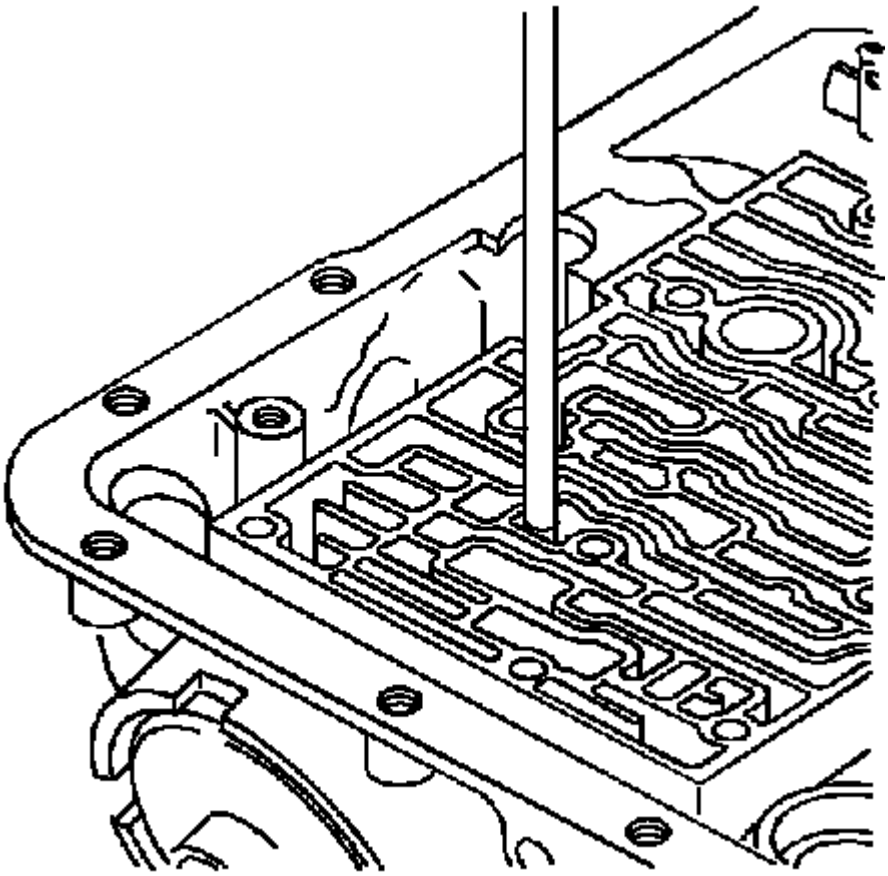


Fig. 92: Installing J 45201
Courtesy of GENERAL MOTORS CORP.

1. Insert the collet (2) of the **J 45201** completely into the fluid cooler pipe fitting seal (87).
2. Insert the forcing screw (1) of the **J 45201** into the collet (2).
3. Tighten the forcing screw (1) until snug.

 © 2011 Mitchell Repair Information Company, LLC.

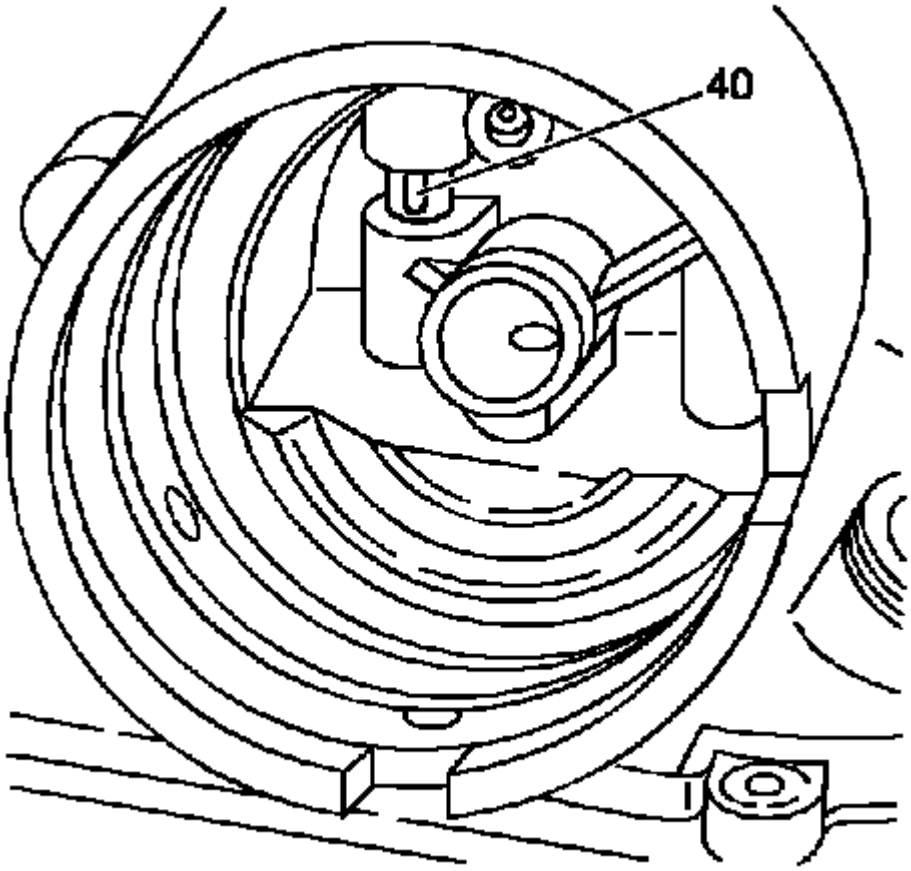


Fig. 93: Installing Collar To Collet
Courtesy of GENERAL MOTORS CORP.

4. Thread the collar (1) of the **J 45201** onto the collet (3) until snug.

 © 2011 Mitchell Repair Information Company, LLC.

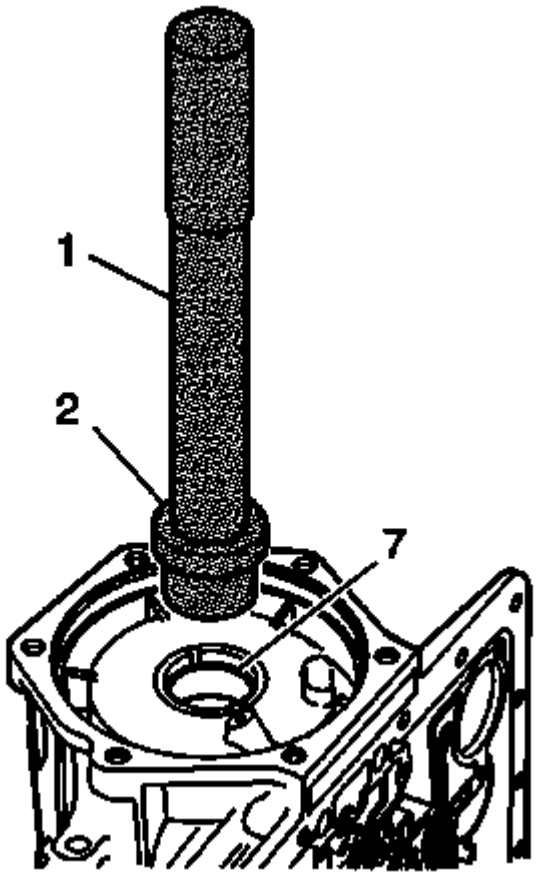


Fig. 94: Removing Fluid Cooler Pipe Fitting Seal
Courtesy of GENERAL MOTORS CORP.

5. Using an adjustable wrench, turn the collar clockwise in order to remove the fluid cooler pipe fitting seal (87).
6. Discard the fluid cooler pipe fitting seal.
7. Clean the case bores for the fluid cooler pipe fitting seals as needed.

TRANSMISSION CASE INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

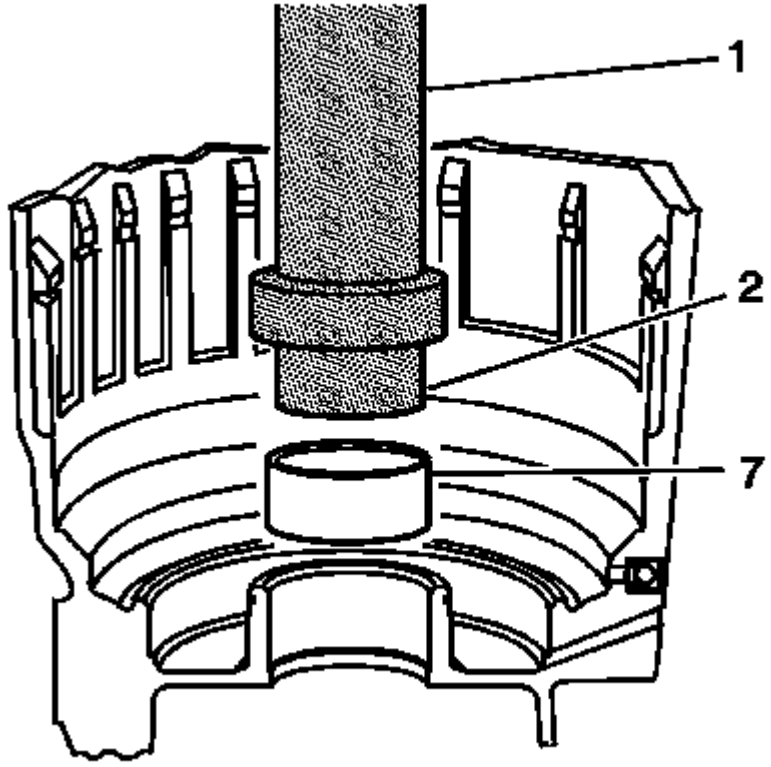


Fig. 95: Inspecting The Case Exterior And The External Bores For Cracks, Sharp Edges, Porosity And Excessive Bushing Wear
Courtesy of GENERAL MOTORS CORP.

NOTE: **Use J 36850 or equivalent during assembly in order to retain checkballs or to lubricate components. Lubricants other than the recommended assembly lube changes the transmission fluid characteristics and causes undesirable shift conditions or filter clogging.**

IMPORTANT: **After cleaning the transmission case, allow the case to air dry. Do not use cloth or paper towels in order to dry the transmission case or any other transmission components. Lint from the towels can cause component failure.**

1. Thoroughly clean the transmission case and all the case threads with solvent.

 © 2011 Mitchell Repair Information Company, LLC.

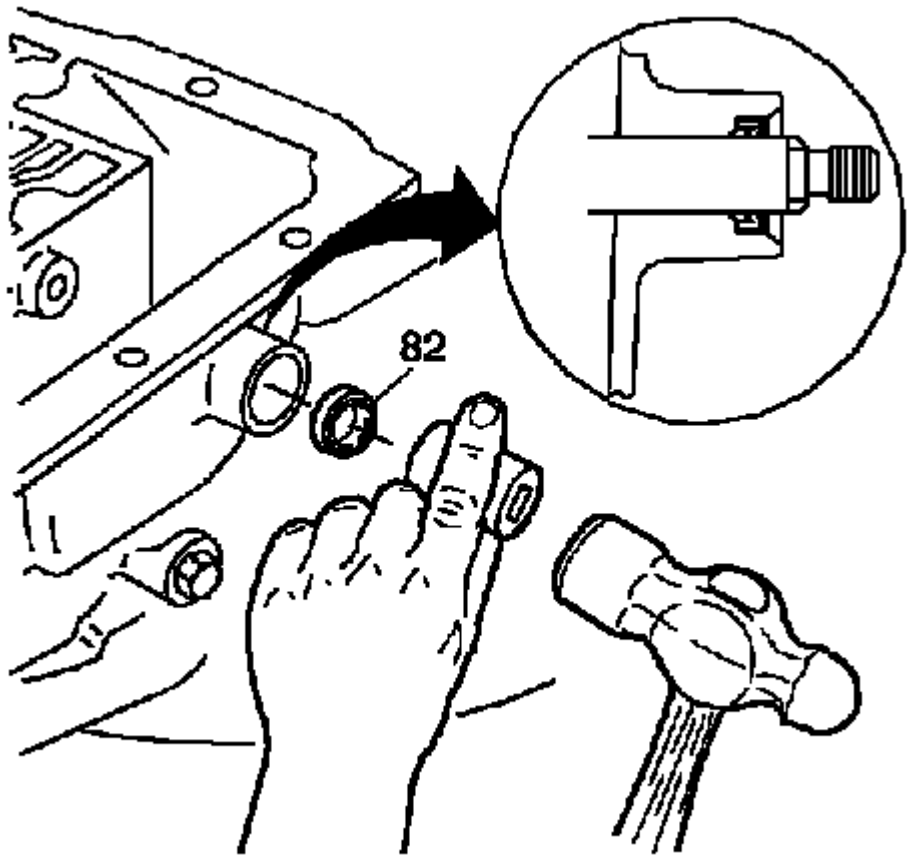


Fig. 96: Inspecting Transmission Case Bolt Holes And Fasteners For Thread Damage
Courtesy of GENERAL MOTORS CORP.

2. Inspect the case exterior and the external bores for cracks, sharp edges, porosity and excessive bushing wear.
3. Inspect the case interior for damage at the snap ring grooves, case lugs and band anchor pin.
4. Inspect all the gasket surfaces for surface damage and in order to ensure surface flatness.
5. Air check the oil passages. For identification of the oil passages, refer to the transmission diagnosis section.
6. Inspect the bearing race for the front differential assembly.
7. Inspect the lugs for low/reverse clutch, for wear or excessive notches.
8. Inspect the low/reverse piston bore for wear, nicks or scratches.
9. Replace the case if any of the above conditions are found.
10. Inspect the bolt holes and fasteners for thread damage. If necessary, repair or replace any bolt holes or fasteners.

TRANSMISSION COOLER LINE SEALS INSTALLATION

Tools Required

 © 2011 Mitchell Repair Information Company, LLC.

J 41239-1A Cooler Line Seal Installer

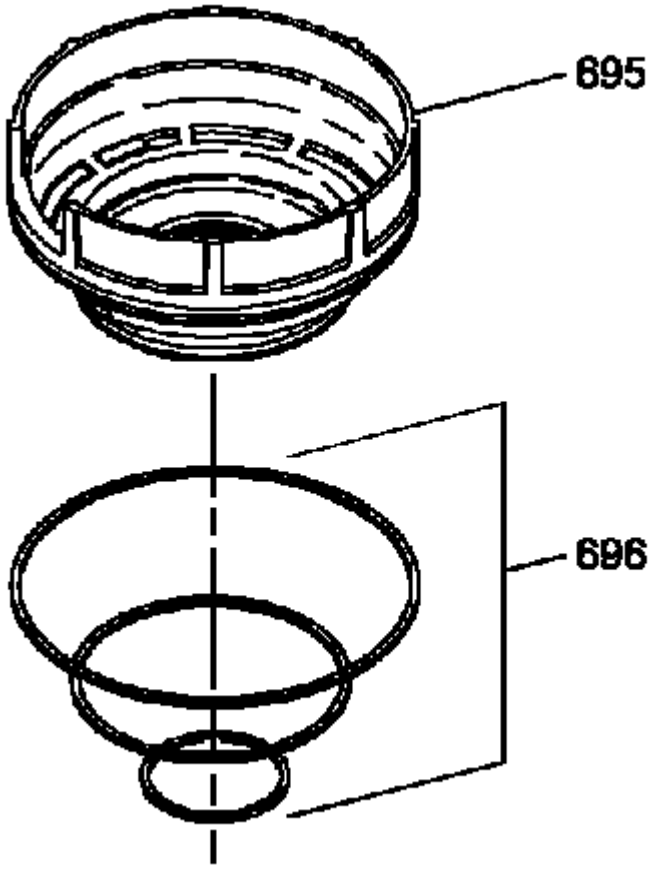


Fig. 97: Installing Cooler Line Seal
Courtesy of GENERAL MOTORS CORP.

Using **J 41239-1A** install 2 NEW fluid cooler pipe fitting seals (87) making sure that the seal lip is flush with the transmission case assembly.

ROTATIONAL TORQUE MEASUREMENT

Tools Required

DT-47687 Rotational Torque Adapter. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

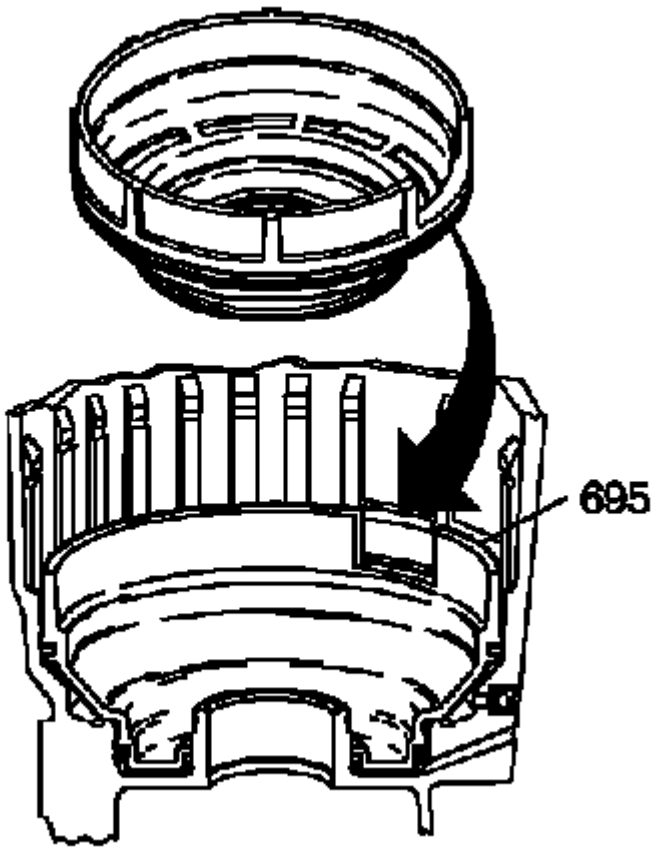


Fig. 98: View Of Front Differential Assembly
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission assembly so that the torque converter housing side is facing up.
2. Install the front differential assembly (13) into the empty transmission case.

 © 2011 Mitchell Repair Information Company, LLC.

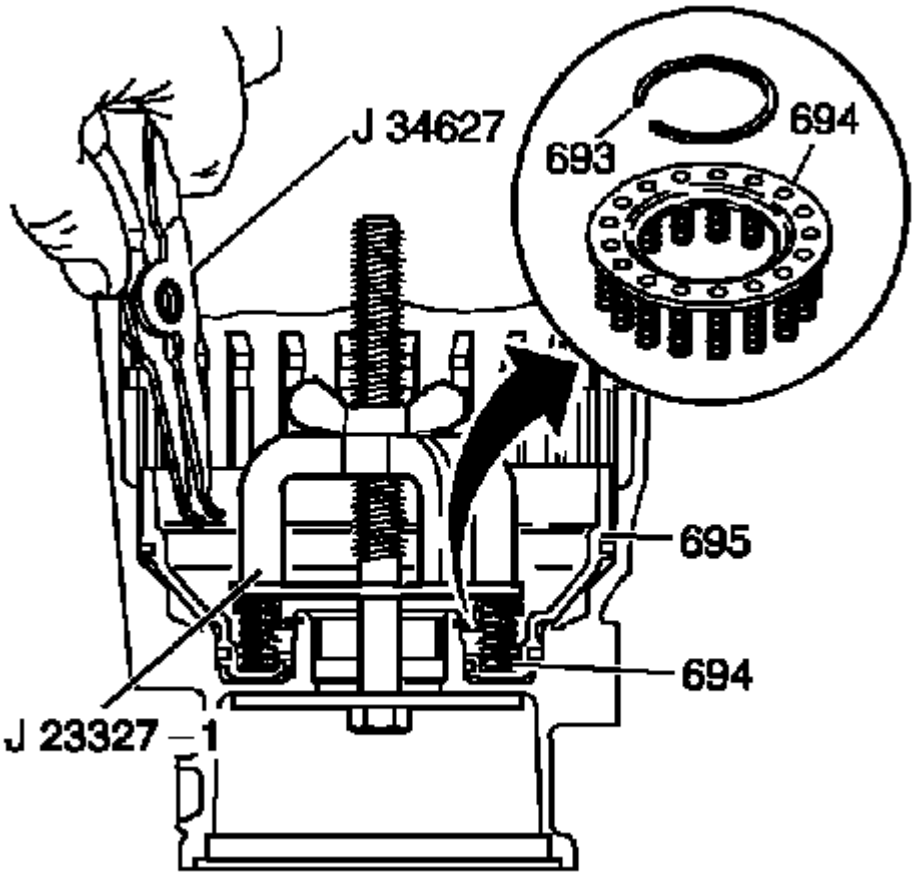


Fig. 99: Installing Torque Converter Housing Assembly & Bolts
Courtesy of GENERAL MOTORS CORP.

3. Install the torque converter housing assembly (10) to the transmission case assembly.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

4. Install the following fasteners and hand tighten.

Tighten:

- 2 - torque converter housing studs (3) - M8 x 1.25 x 30
- 1 - torque converter housing bolt Torx (8) - M8 x 1.25 x 30
- 9 - torque converter housing bolt (4) - M8 x 1.25 x 30

 © 2011 Mitchell Repair Information Company, LLC.

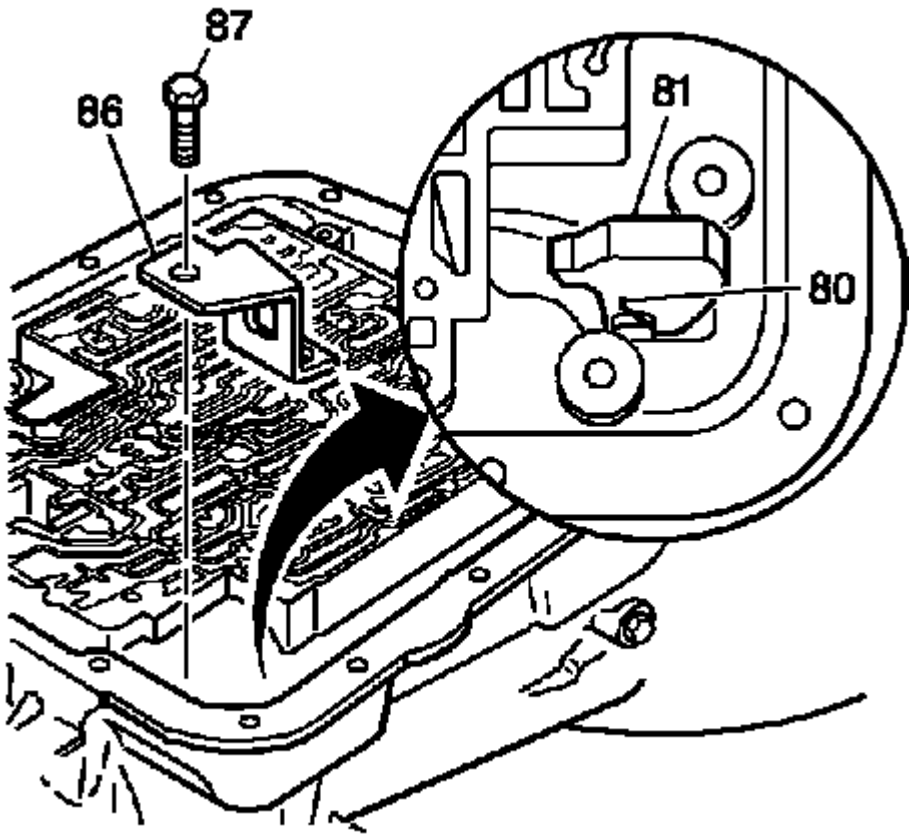


Fig. 100: Installing Torque Converter Housing Bolts
Courtesy of GENERAL MOTORS CORP.

5. Tighten the torque converter housing bolts in sequence.

   Tighten: Tighten the bolts to 29 N.m (21 lb ft).

 © 2011 Mitchell Repair Information Company, LLC.

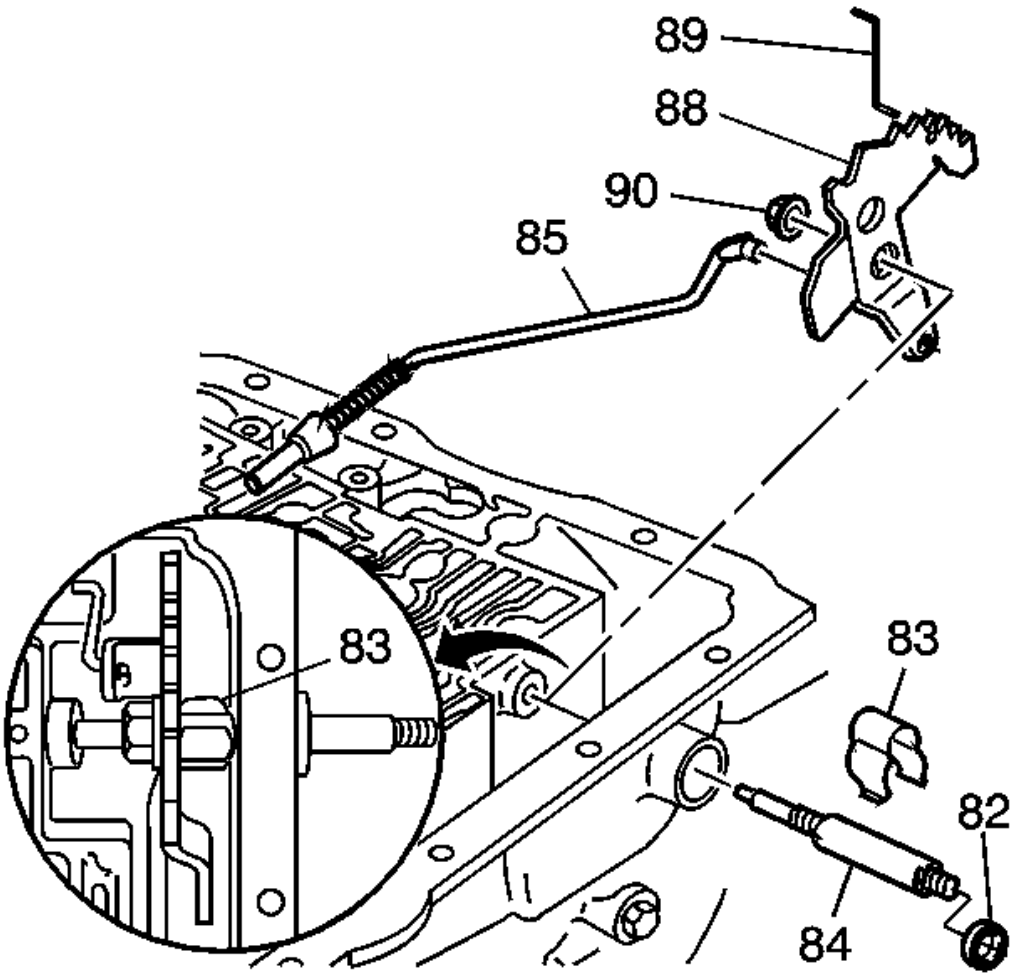


Fig. 101: Measuring The Rotational Torque Required To Slowly Rotate The Front Differential Assembly Using J 46318
Courtesy of GENERAL MOTORS CORP.

6. Insert **DT-47687** (1) into the axle shaft opening of the differential and rotate **DT-47687** (1) until it engages with the differential pinion shaft (645). See **Special Tools**.
7. Using a torque wrench, measure the rotational torque required to slowly rotate the front differential assembly and note the readings.

   Rotational Torque Specification: Specification should be within 0.70-1.20 N.m (6-11 lb in).

8. If the obtained measurement is within specifications, the differential shim replacement is not necessary.

 © 2011 Mitchell Repair Information Company, LLC.

If obtained measurement is not within the listed specifications, the front differential bearing race shim must be replaced.

9. Remove **DT-47687** (1) from the front differential assembly. See **Special Tools**.
10. Remove the torque converter housing assembly and the front differential assembly from the transmission case.

FRONT DIFFERENTIAL BEARING RACE AND SELECTIVE SHIM REMOVAL

Tools Required

- **J 45124** Removal Bridge
- **J 45160** Differential Bearing Race Remover. See **Special Tools**.

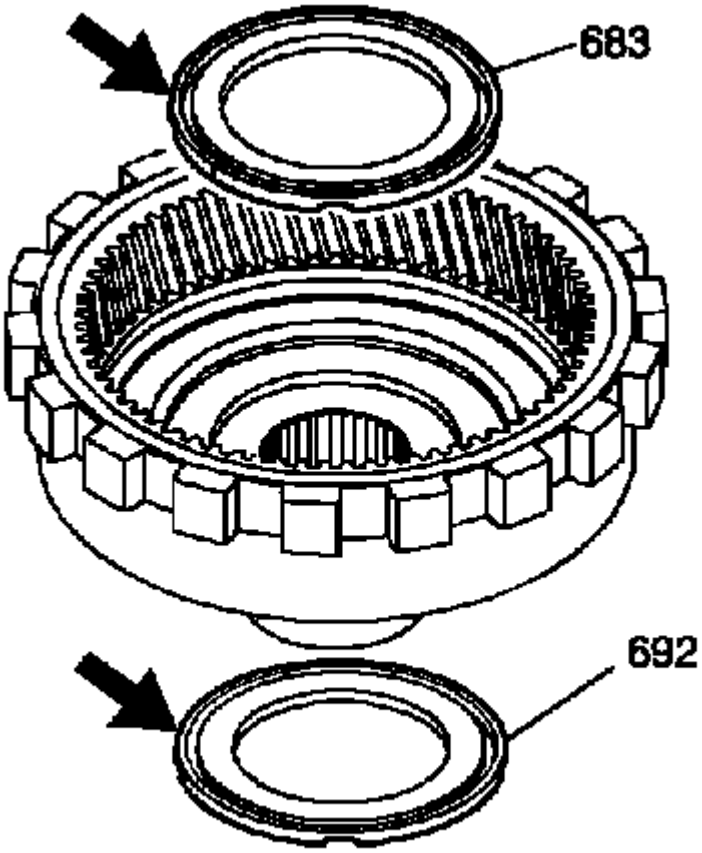


Fig. 102: Seating J 45160 Into Bearing Race
Courtesy of GENERAL MOTORS CORP.

1. Install the **J 45160** onto the bearing race taking care to make sure the bottom of the tool is all the way down inside the race and seats flat on top of the selective shim before tightening. See **Special Tools**.
2. Using two wrenches tighten **J 45160** to firmly seat the tool into the bearing race for removal. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

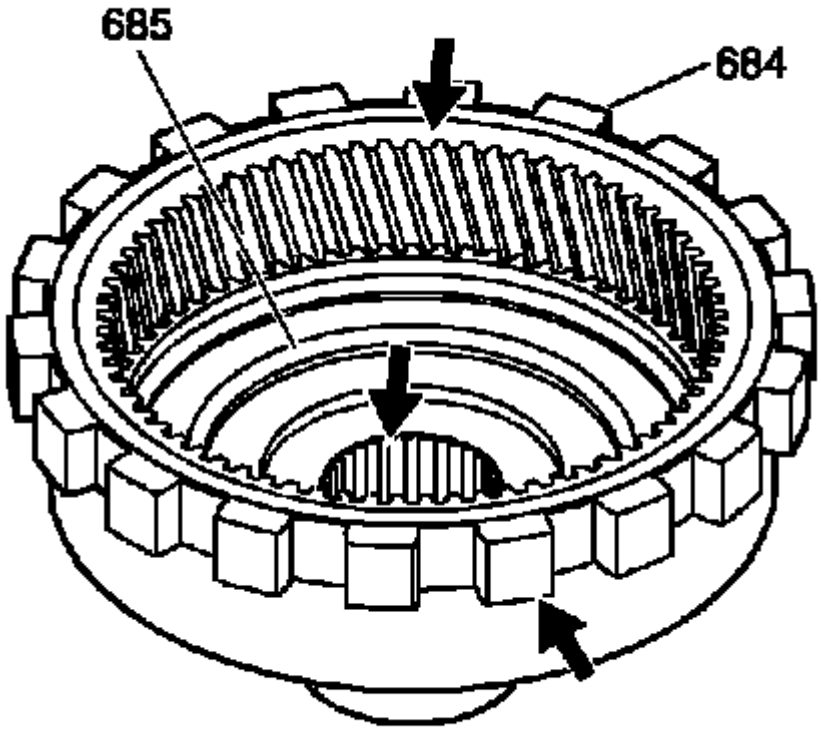


Fig. 103: Removing Front Differential Bearing Race
Courtesy of GENERAL MOTORS CORP.

3. Position the adjustable leg sections of **J 45124** (1) to seat squarely onto the top of the case section around the front differential bearing race (90).
4. Attach **J 45124** (1) to **J 45160** (2) and hand tighten the center bolt to lightly apply tension to prevent movement of the tool assembly. See **Special Tools**. Reinspect the position of the adjustable legs of **J 45124** (1) to ensure that the front differential bearing race will clear the adjustable legs and no damage to the transmission case assembly will occur when removing the race.
5. Tighten the bolt on **J 45124** (1) to remove the front differential bearing race (90) from the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

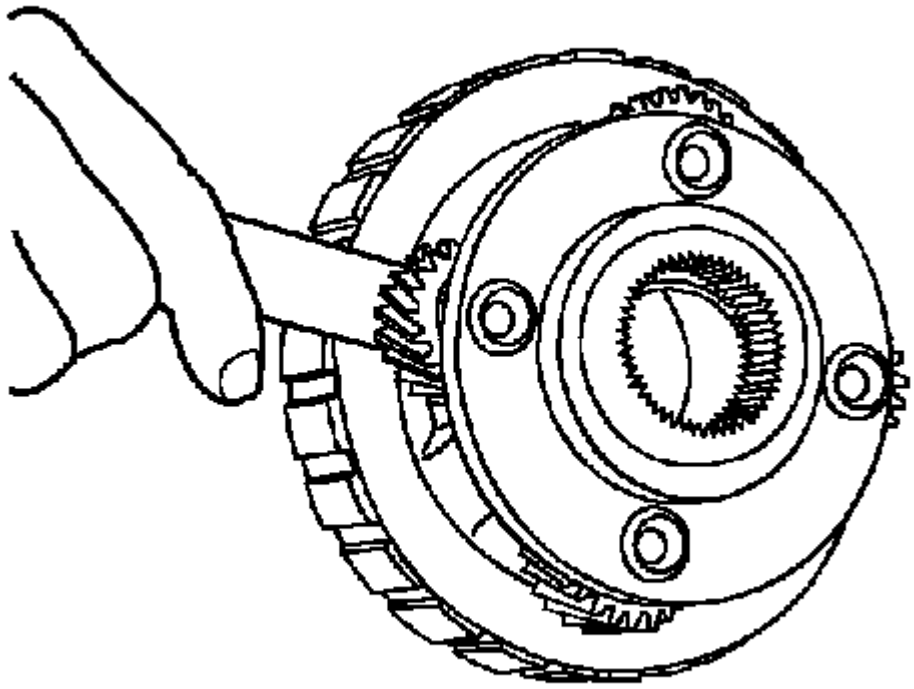


Fig. 104: View Of Front Differential Bearing Race Selective Shim
Courtesy of GENERAL MOTORS CORP.

6. Remove the front differential bearing race selective shim (88) from the transmission case assembly.
7. Measure the front differential bearing race selective shim (88) to determine its size. Based on the obtained measurement, refer to **Shim Size Specifications** in order to determine the correct size of shim that will be needed. If the obtained rotational torque measurement was less than the listed specification, then a larger/thicker selective shim will be required. If the obtained rotational torque measurement was greater than the listed specification, then a smaller/thinner shim will be required.

FRONT DIFFERENTIAL BEARING RACE AND SELECTIVE SHIM INSTALLATION

Tools Required

- **J 8092** Driver Handle
- **J 45184** Differential Bearing Race Installer. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

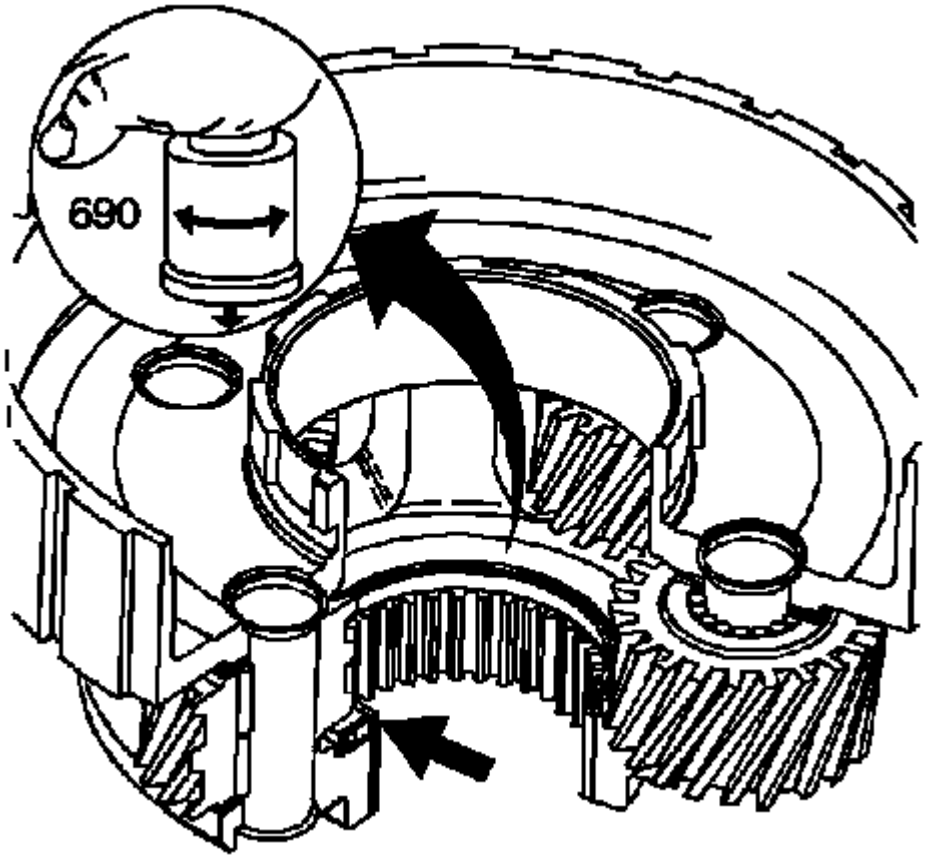


Fig. 105: View Of Front Differential Bearing Race Selective Shim
Courtesy of GENERAL MOTORS CORP.

1. Once the proper shim has been selected, install the new front differential bearing race selective shim (88) into the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

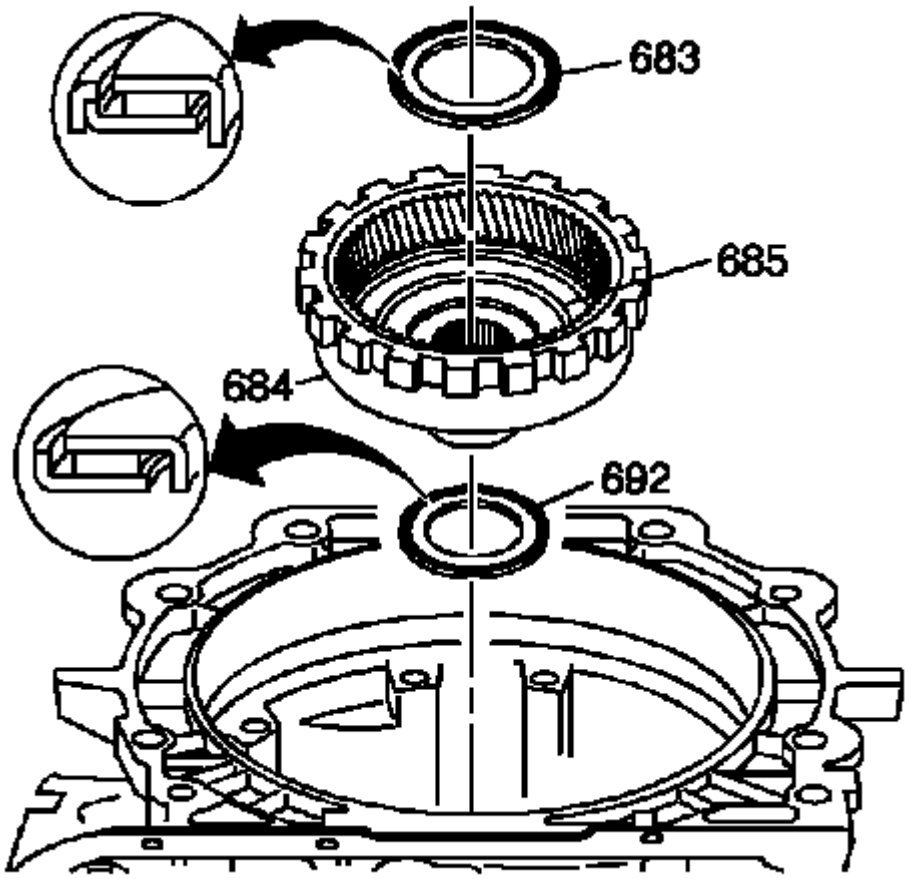


Fig. 106: Installing Front Differential Bearing Race
Courtesy of GENERAL MOTORS CORP.

2. Using **J 8092** (1) and **J 45184** (2), install the front differential bearing race (90) into the transmission case assembly. See **Special Tools**.
3. After the front differential bearing race is correctly installed into the case, repeat the rotational torque measurement procedure to verify that the correct shim thickness was selected.

MANUAL SHIFT SHAFT SEAL AND BEARING REMOVAL

Tools Required

J 45161 Manual Shift Shaft Bearing Replacer. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

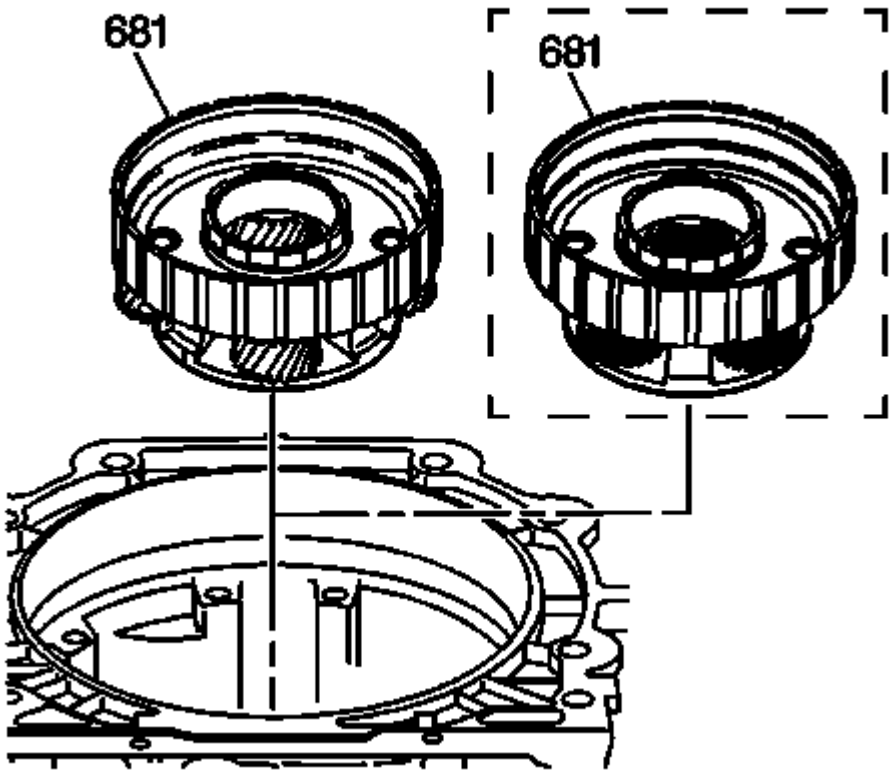


Fig. 107: View Of Manual Shift Shaft Seal Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the manual shift shaft seal assembly (713) from the transmission case assembly using a small pry bar.

 © 2011 Mitchell Repair Information Company, LLC.

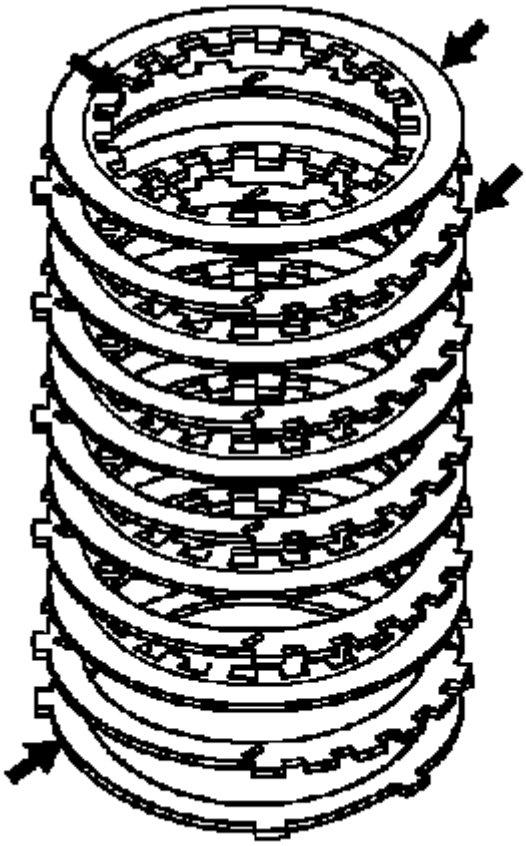


Fig. 108: Removing Manual Shift Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

2. Using **J 45161** and a hammer, drive the manual shift shaft bearing (714) through the transmission case assembly bore to remove the bearing. See **Special Tools**.

MANUAL SHIFT SHAFT SEAL AND BEARING INSTALLATION

Tools Required

J 45161 Manual Shift Shaft Bearing Replacer. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

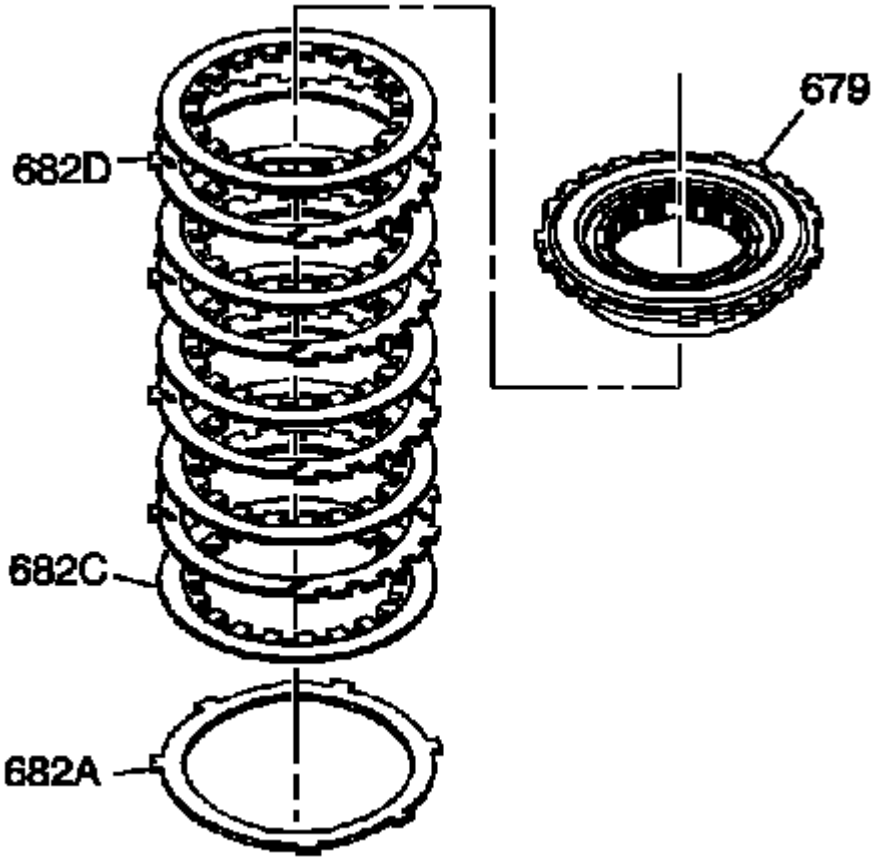


Fig. 109: Installing Manual Shift Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

1. Using **J 45161** and a hammer, install the manual shift shaft bearing (714) into the transmission case assembly until **J 45161** is flush with the case bore. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

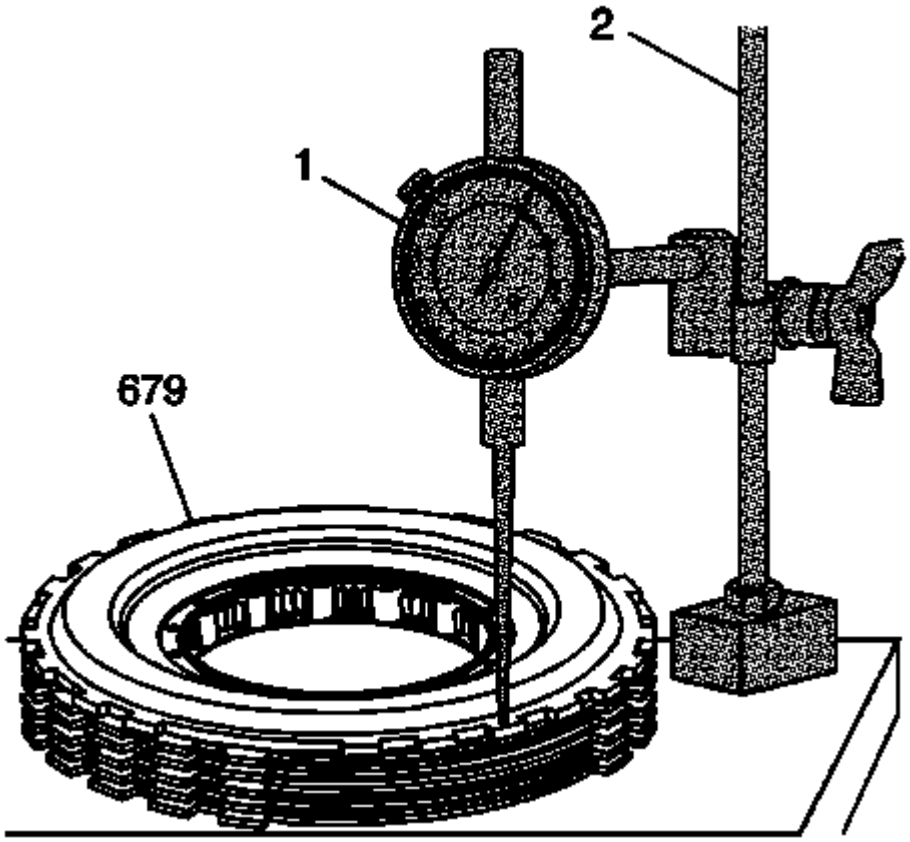


Fig. 110: View Of Manual Shift Shaft Seal Assembly
Courtesy of GENERAL MOTORS CORP.

2. Install the manual shift shaft seal (713) by pressing the seal into the case bore by hand.

FRONT WHEEL DRIVE SHAFT OIL SEAL REMOVAL

Tools Required

J 45000 Seal Remover

 © 2011 Mitchell Repair Information Company, LLC.

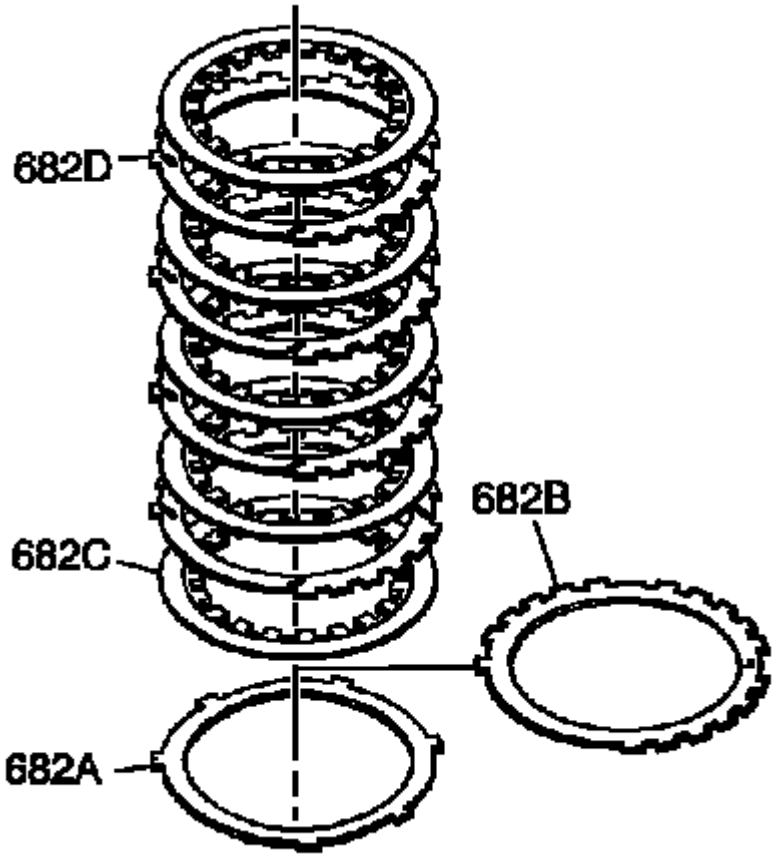


Fig. 111: Removing Left Front Wheel Drive Shaft Oil Seal
Courtesy of GENERAL MOTORS CORP.

Using **J 45000** , remove the left front wheel drive shaft oil seal from the transaxle case.

FRONT WHEEL DRIVE SHAFT OIL SEAL INSTALLATION

Tools Required

J 44809 Output Shaft Seal Installer

 © 2011 Mitchell Repair Information Company, LLC.

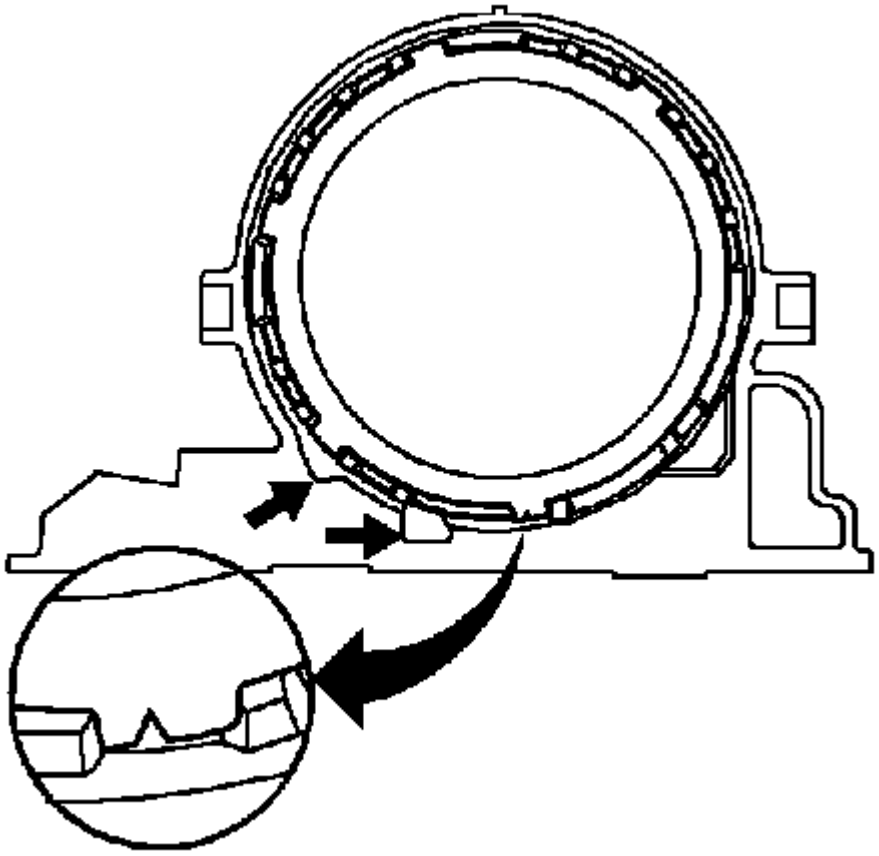


Fig. 112: Installing Left Front Wheel Drive Shaft Oil Seal
Courtesy of GENERAL MOTORS CORP.

Using **J 44809** , install the left front wheel drive shaft oil seal (80) into the transmission case assembly making sure that the seal is flush with the case flange.

FRONT DIFFERENTIAL CARRIER SEAL REMOVAL

Tools Required

J 45000 Seal Removal Tool

 © 2011 Mitchell Repair Information Company, LLC.

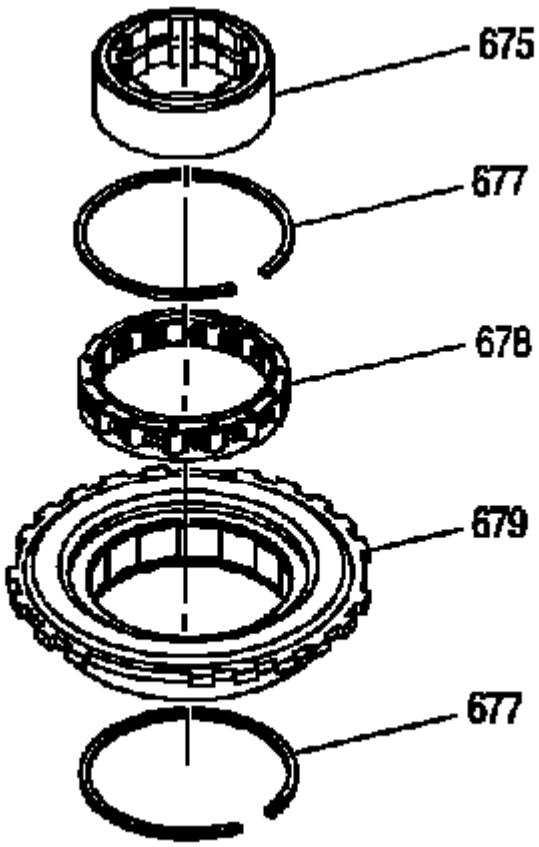


Fig. 113: Removing Front Differential Carrier Seal
Courtesy of GENERAL MOTORS CORP.

Using **J 45000** , remove the front differential carrier seal (800) from the torque converter housing assembly.

FRONT DIFFERENTIAL CARRIER SEAL INSTALLATION

Tools Required

J 45187 Differential Output Shaft Oil Seal Installer. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

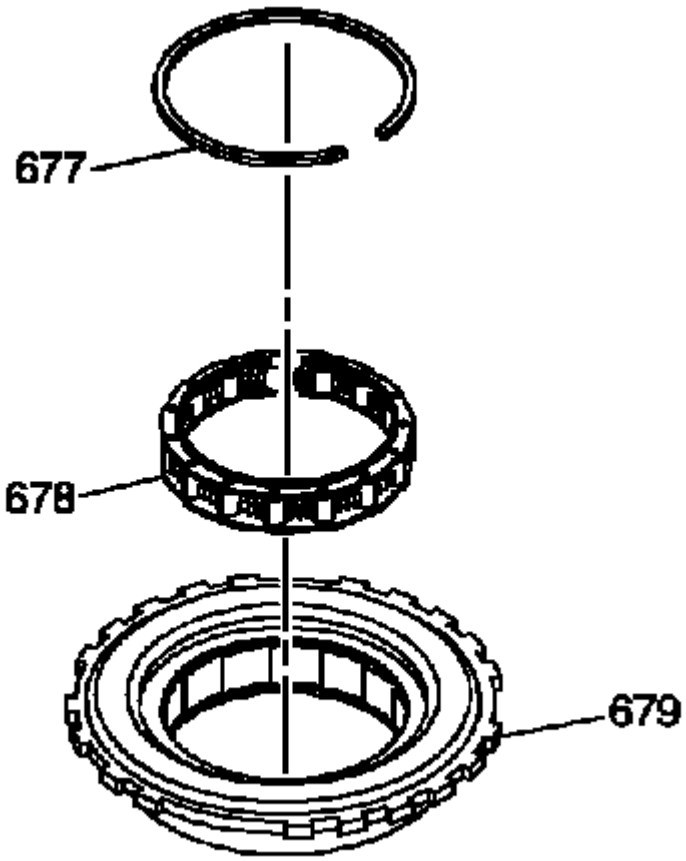


Fig. 114: Installing Front Differential Carrier Seal
Courtesy of GENERAL MOTORS CORP.

Using **J 45187** install the front differential carrier seal (800) into the torque converter housing assembly. See **Special Tools**.

4-5 CLUTCH DRUM ASSEMBLY DISASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 25024-A** Servo Piston/Clutch Spring Compressor. See **Special Tools**.
- **J 28585** Snap Ring Remover
- **J 45186** Forward and Direct Clutch Spring Compressor. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

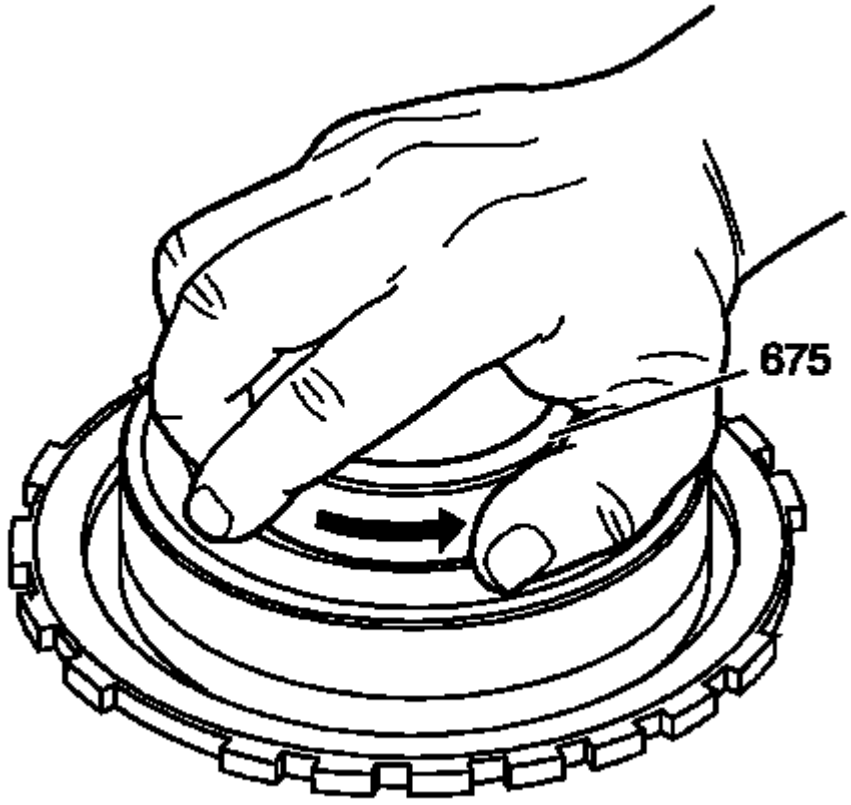


Fig. 115: Exploded View Of 4-5 Clutch Drum Assembly
Courtesy of GENERAL MOTORS CORP.

1. Using **J 28585** remove the 4-5 clutch backing plate retaining ring (575) from the 4-5 clutch drum assembly (584).
2. Remove the following components from the 4-5 clutch drum assembly (584):
    - The 4-5 clutch backing plate (576)
    - The 4 fiber plates (577)
    - The 4 steel plates (578)

 © 2011 Mitchell Repair Information Company, LLC.

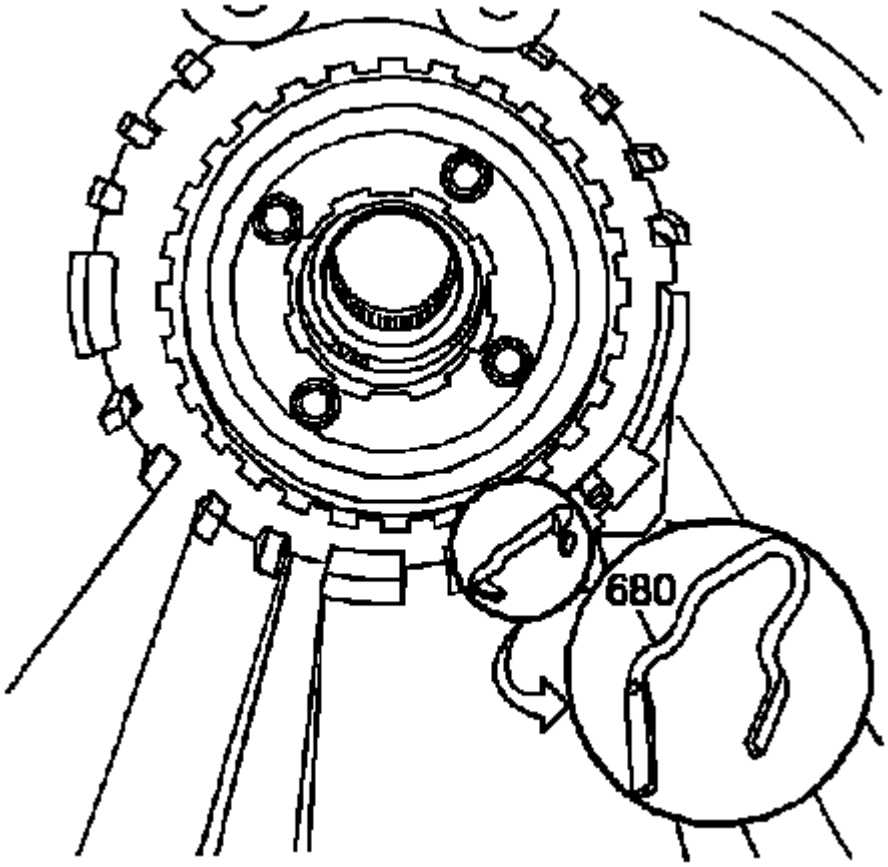


Fig. 116: Removing/Installing 4-5 Clutch Piston Return Spring Assembly
Courtesy of GENERAL MOTORS CORP.

3. Remove the 4-5 clutch piston return spring assembly (580).
    1. Place the **J 25024-A** (3) in a vise with the forcing screw on the bottom and backed out. See **Special Tools**.
    2. Place the **J 45186** (1) on the 4-5 clutch piston return spring assembly (580). See **Special Tools**.
    3. Place the J 21420-2 (4) from the **J 23327** on top of the forcing screw of **J 25024-A** (3). See **Special Tools**.
    4. Place the clutch housing with the **J 45186** (1) on the J 21420-2 (4) and under the arms of **J 25024-A** (3). See **Special Tools**.
    5. With the forcing screw, compress the clutch spring to allow the removal of the retaining ring.
    6. Use **J 28585** (2) or snap ring pliers to remove the retaining ring (579).
4. Remove the 4-5 clutch piston return spring assembly (580).

 © 2011 Mitchell Repair Information Company, LLC.

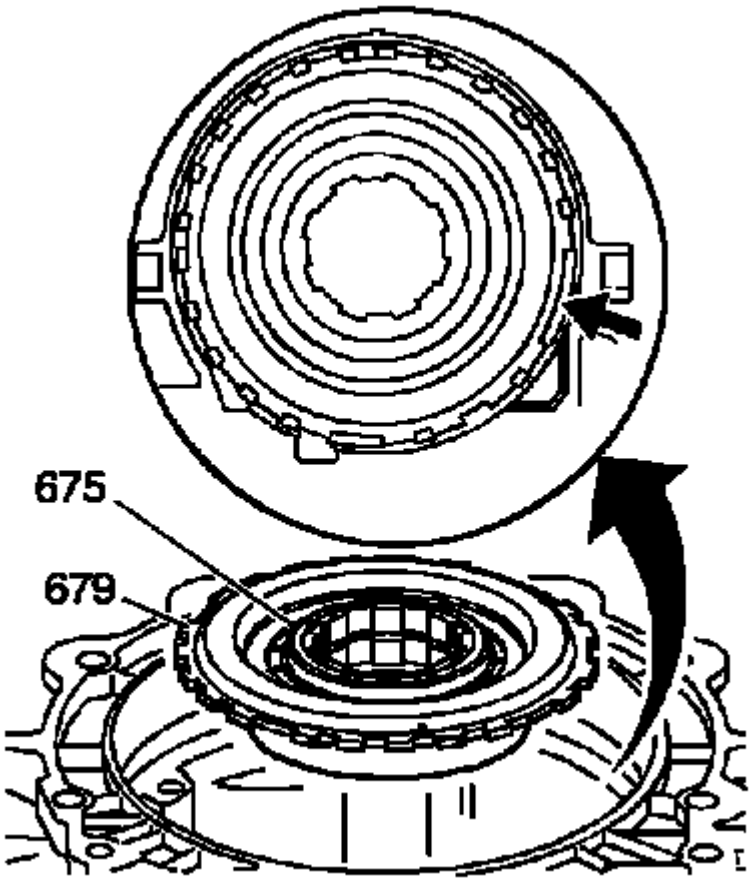


Fig. 117: View Of Front Differential Transfer Drive Gear Assembly & 4-5 Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

5. Using the case as a holding fixture, install the front differential transfer drive gear assembly (14) into the output gear bore.
6. Install the 4-5 clutch assembly (15) onto the front differential transfer drive gear assembly (14), with the clutch piston facing up, so that the fluid passages are around the sealing rings.

 © 2011 Mitchell Repair Information Company, LLC.

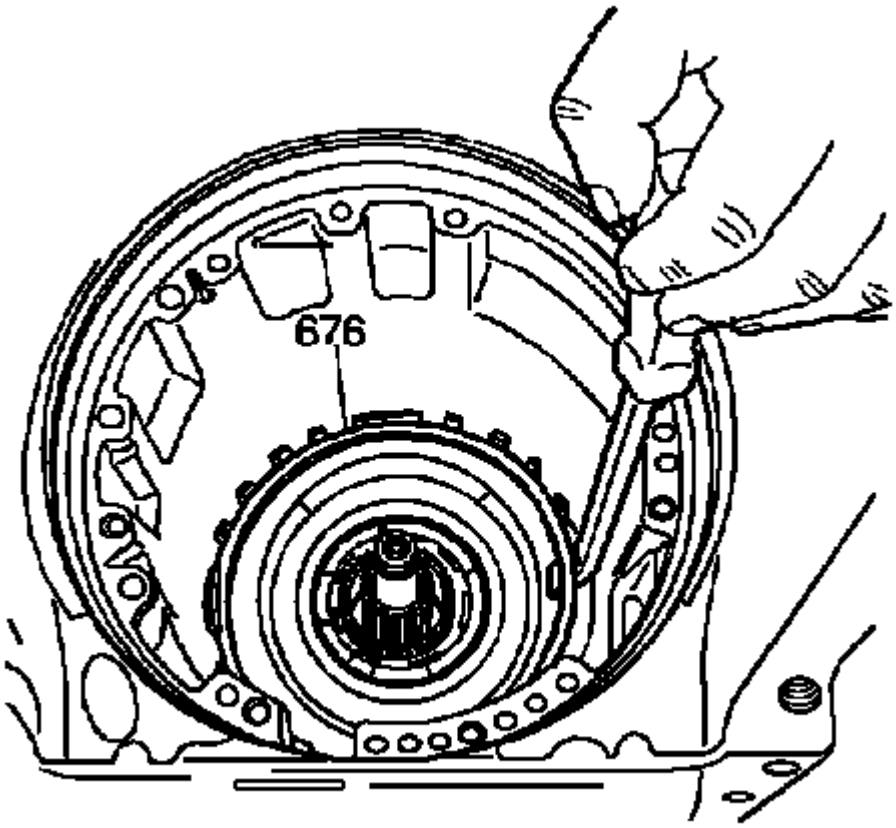


Fig. 118: View Of Fluid Passage & 4-5 Clutch Piston Assembly
Courtesy of GENERAL MOTORS CORP.

7. Apply air pressure to the fluid passage (1) in the end of the front differential transfer drive gear assembly shaft and remove the 4-5 clutch piston assembly (582).
8. Remove the 4-5 clutch drum assembly and the front differential transfer drive gear assembly from the case.

 © 2011 Mitchell Repair Information Company, LLC.

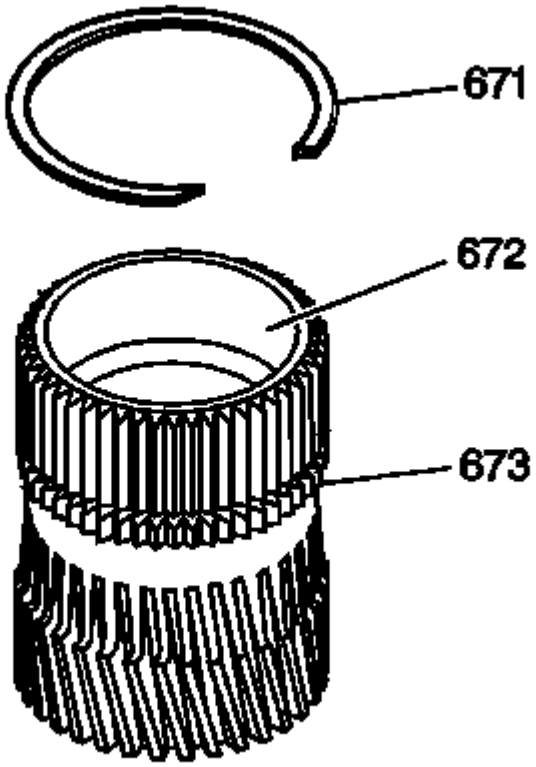


Fig. 119: View Of 4-5 Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

9. Remove the piston inner seal (581) and the piston outer seal (583) from the 4-5 clutch piston (582).

Clean and Inspection

Tools Required

J 45185 Bore Gage Set. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

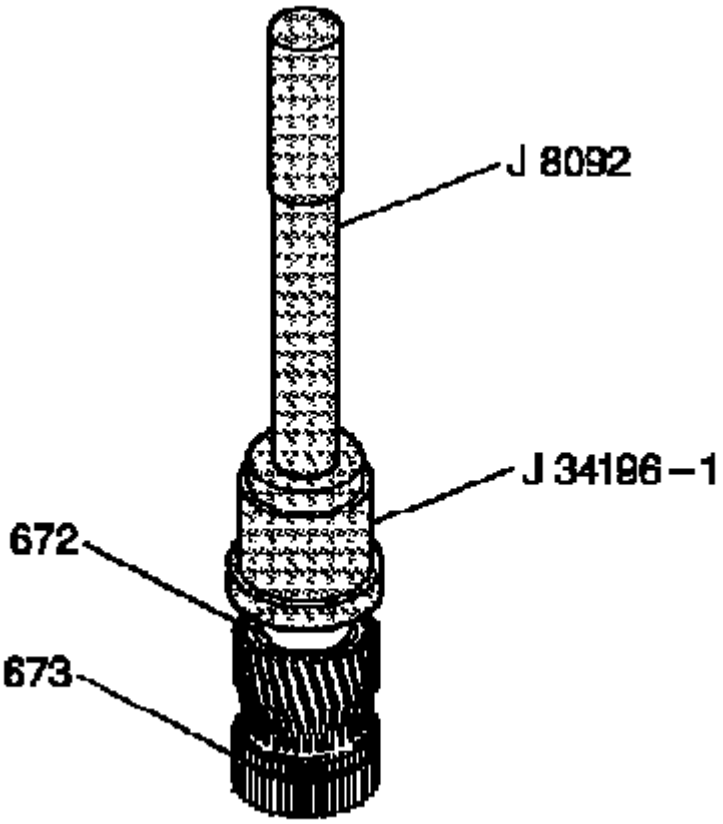


Fig. 120: Measuring Inner Diameter Of 4-5 Clutch Drum Bushing
Courtesy of GENERAL MOTORS CORP.

1. Wash the clutch components in clean solvent and air dry.
2. Inspect the clutch drum for the following conditions:
   - Lugs in the drum for excessive grooves that prevent the clutch plates from sliding
   - Sun gear for chips or meteal embedded in the teeth
   - Drum surface for scoring or excessive wear
   - Piston o-ring surfaces for wear, nicks, or scratches
   - Bearing thrust surfaces for damage or wear
3. Using **J 45185** , measure the inner diameter of the 4-5 clutch drum bushing (A) at different locations and take the average. See **Special Tools**.

   Specification: 36.125 - 36.200 mm (1.422 - 1.425 in)

4. If the bushing is out of specifications or any of the above conditions are found replace the 4-5 clutch drum

 © 2011 Mitchell Repair Information Company, LLC.

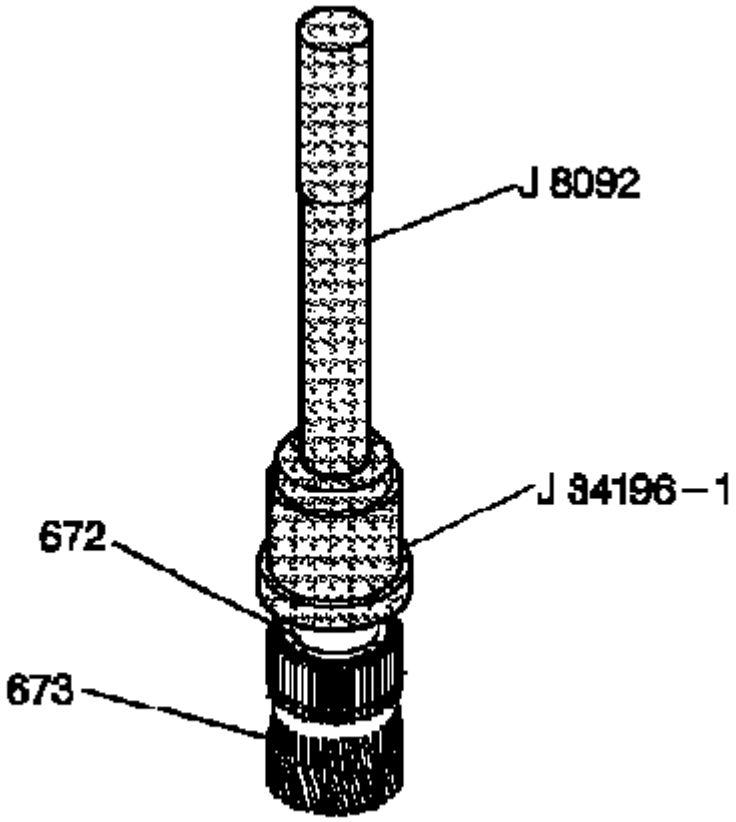


Fig. 121: Inspecting Check Valve For Leaking
Courtesy of GENERAL MOTORS CORP.

5. Shake the clutch piston to inspect the ball check valve for not being stuck.
6. Apply compressed air in the opposite side of the check valve and inspect for leaking.
7. Inspect the piston o-ring seal grooves for damage.
8. Replace the piston if any of the above conditions are found.
9. Inspect the clutch plates and discs for wear, warp age, or being burnt.
10. Replace the clutch plates and discs if any of the above conditions are found.

4-5 CLUTCH DRUM ASSEMBLY ASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 25024-A** Servo Piston/Clutch Spring Compressor. See **Special Tools**.
- **J 28585** Snap Ring Remover
- **J 45186** Forward and Direct Clutch Spring Compressor. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

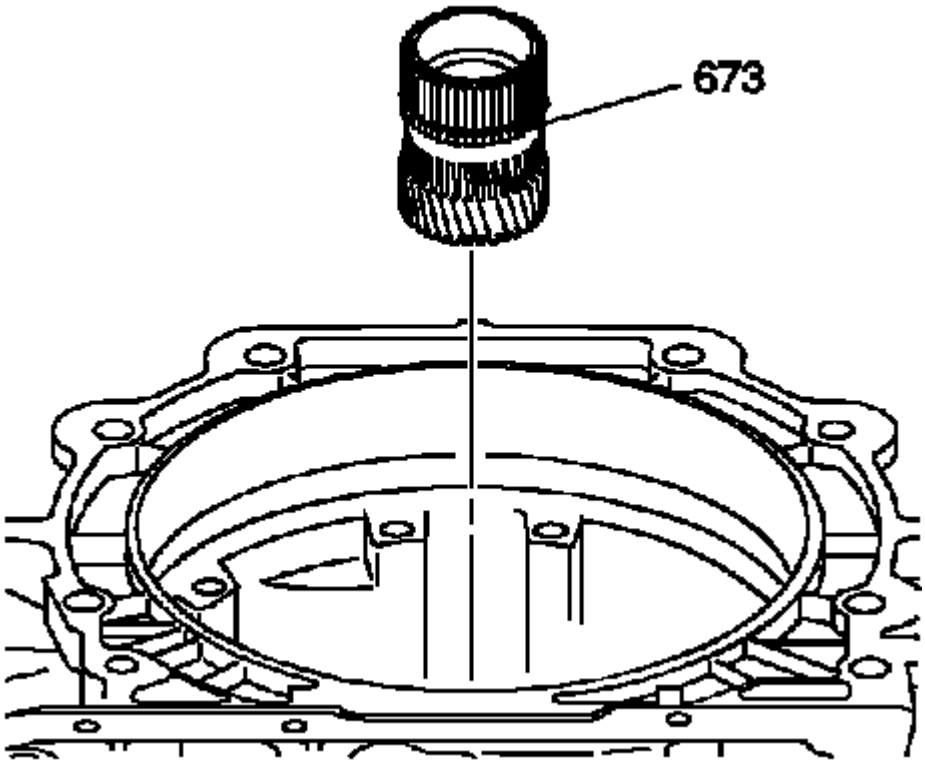


Fig. 122: View Of 4-5 Clutch Piston & Clutch Drum Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Soak the new clutch discs in automatic transmission fluid for at least 2 hours before installation.

1. Apply automatic transmission fluid to the new piston seals.
2. Install a new piston inner seal (581) and a new piston outer seal (583) on to the 4-5 clutch piston (582).
3. Apply automatic transmission fluid to the inner and outer seal surfaces of the 4-5 clutch drum assembly (584).
4. Install the 4-5 clutch piston assembly (582) into the 4-5 clutch drum assembly (584).

 © 2011 Mitchell Repair Information Company, LLC.

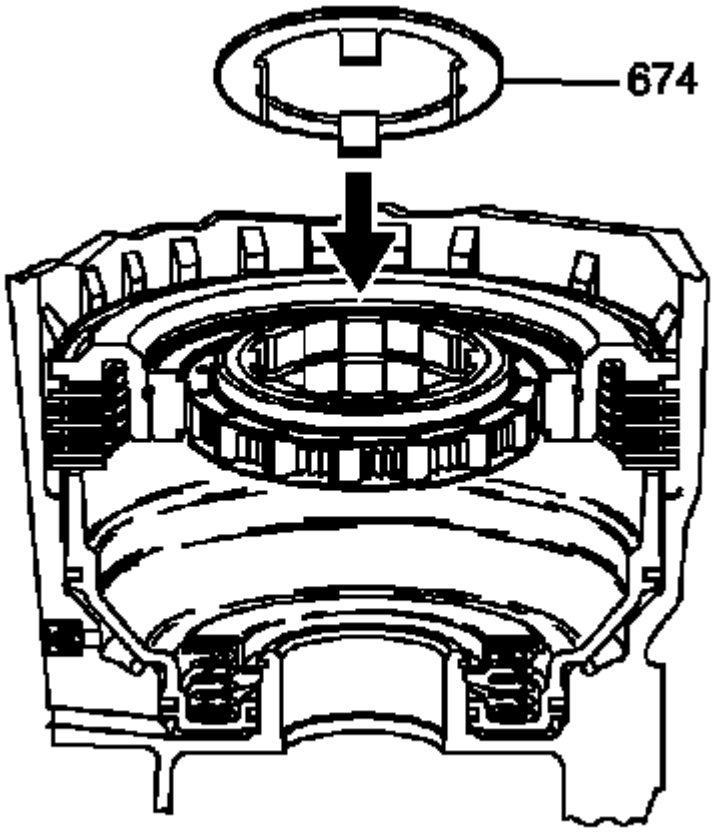


Fig. 123: Installing 4-5 Clutch Piston Return Spring Assembly
Courtesy of GENERAL MOTORS CORP.

5. Install the 4-5 clutch piston return spring assembly (580) on to the 4-5 clutch piston assembly, indexing the springs to the holes in the 4-5 clutch piston assembly.

 © 2011 Mitchell Repair Information Company, LLC.

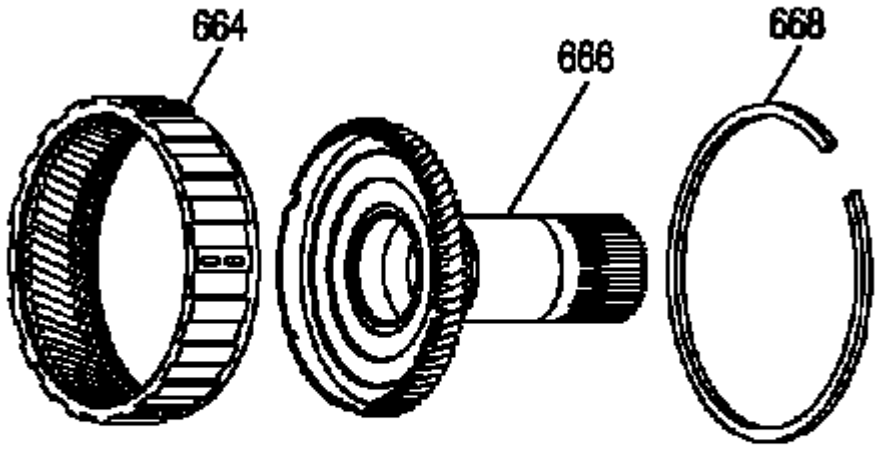


Fig. 124: Removing/Installing 4-5 Clutch Piston Return Spring Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure that the end gap of the retaining ring is not aligned with the spring retainer claw.

6. Install the 4-5 clutch piston return spring retaining ring (579).
    1. Place the **J 25024-A** (3) in a vise with the forcing screw on the bottom and backed out. See **Special Tools**.
    2. Place the **J 45186** (1) on the 4-5 clutch piston return spring assembly (580). See **Special Tools**.
    3. Place the J 21420-2 (4) from the **J 23327** on top of the forcing screw of **J 25024-A** (3). See **Special Tools**.
    4. Place the clutch housing with the **J 45186** (1) on the J 21420-2 (4) and under the arms of **J 25024-A** (3). See **Special Tools**.
    5. With the forcing screw, compress the clutch spring to allow the installation of the retaining ring.
    6. Use **J 28585** (2) or snap ring pliers to install the retaining ring (579).

 © 2011 Mitchell Repair Information Company, LLC.

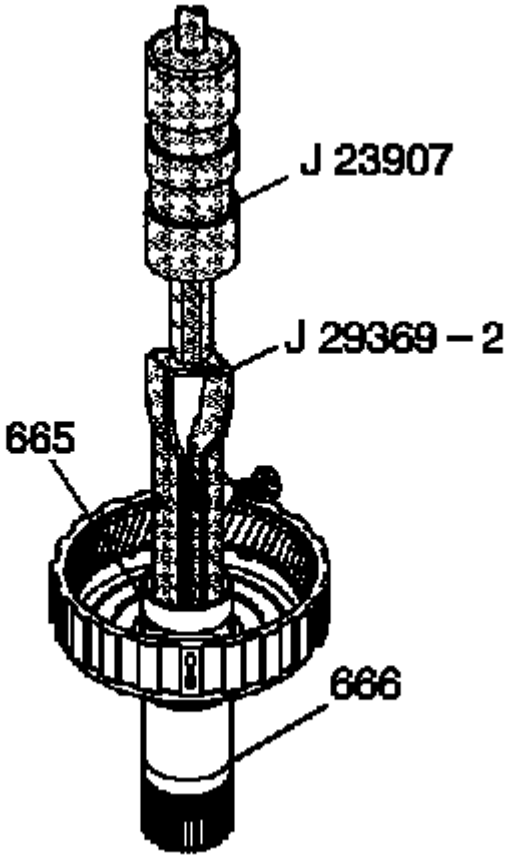


Fig. 125: Assembling 4-5 Clutch Drum Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure that you have the correct number of plates, and that they are in the correct order.

7. Install the 4 fiber plates (577) and the 4 steel plates (578) into the 4-5 clutch drum assembly (584).
8. Install the 4-5 clutch backing plate (576) into the 4-5 clutch drum assembly (584).

 © 2011 Mitchell Repair Information Company, LLC.

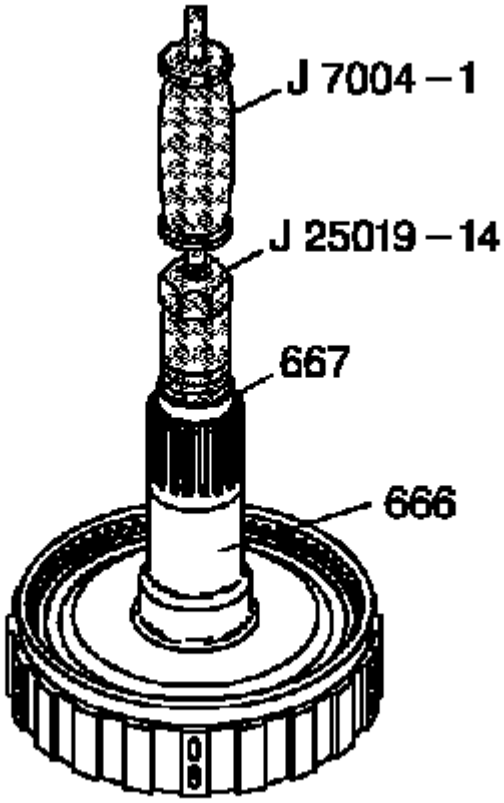


Fig. 126: Installing 4-5 Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

9. Using **J 28585** install the 4-5 clutch backing plate retaining ring (575) into the groove of the 4-5 clutch drum assembly (584). Make sure that the end gap of the retaining ring is not aligned with one of the cutouts in the drum.

4-5 CLUTCH PISTON TRAVEL MEASUREMENT

Tools Required

J 45200 Dial Indicator Set. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

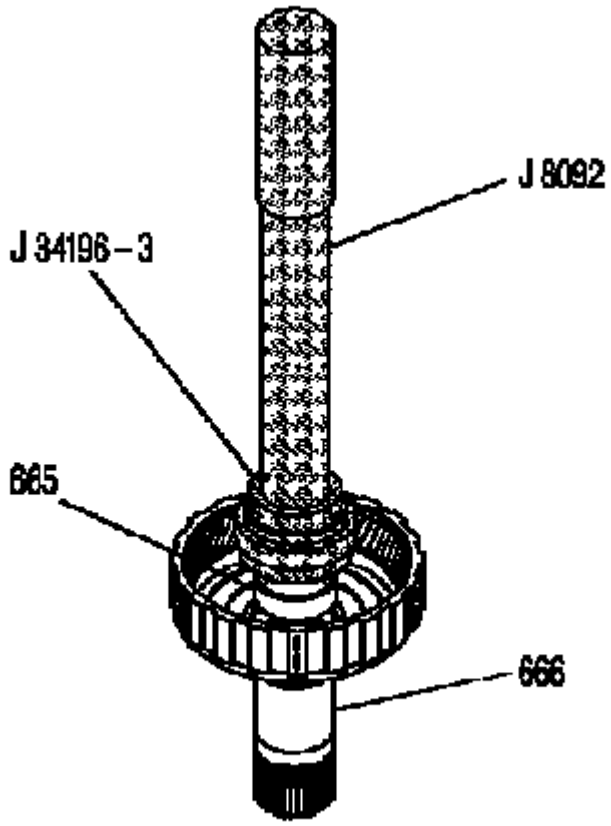


Fig. 127: View Of Front Differential Transfer Drive Gear & Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transaxle assembly so the torque converter housing side is facing up.
2. Using the case as a holding fixture, install the front differential transfer drive gear assembly (14) into the output gear bore.
3. Install the 4-5 clutch assembly (15) onto the front differential transfer drive gear (14), with the clutch plates facing up.

 © 2011 Mitchell Repair Information Company, LLC.

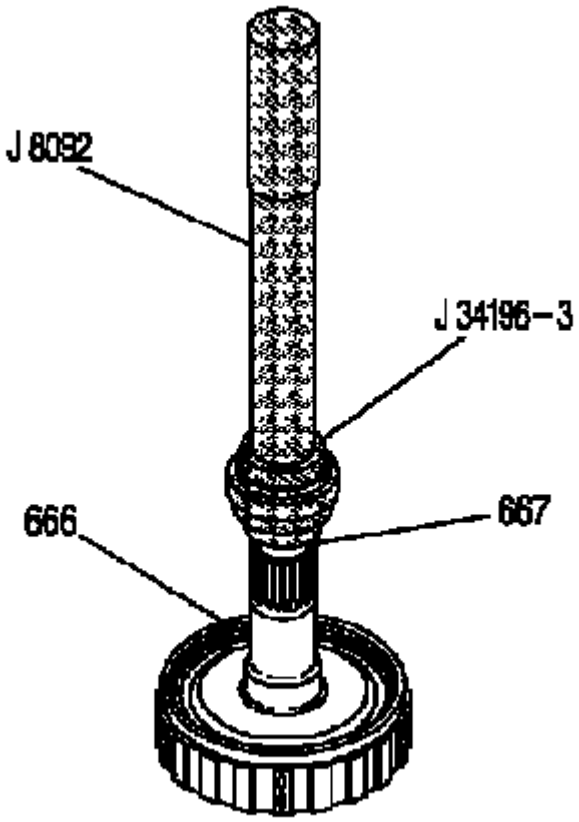


Fig. 128: Measuring 4-5 Clutch Piston Travel
Courtesy of GENERAL MOTORS CORP.

4. Install the **J 45200** on the 4-5 clutch drum. See **Special Tools**.
5. Align the dial indicator pointer on the piston and set the dial indicator to zero.
6. Apply air pressure to the fluid passage (1) in the end of the 4-5 clutch drum shaft, and record the measurement. Refer to **Transmission Clearance Specifications**, 4-5 Clutch Piston Stroke to determine the correct backing plate.
7. If the measurement is out of specifications replace the backing plate with the correct thickness.

   Refer to **Transmission Clearance Specifications**, available 4-5 clutch backing plates (567) thickness.

8. Remove the 4-5 clutch drum assembly and the front differential transfer drive gear assembly from the case.

OUTPUT GEAR ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

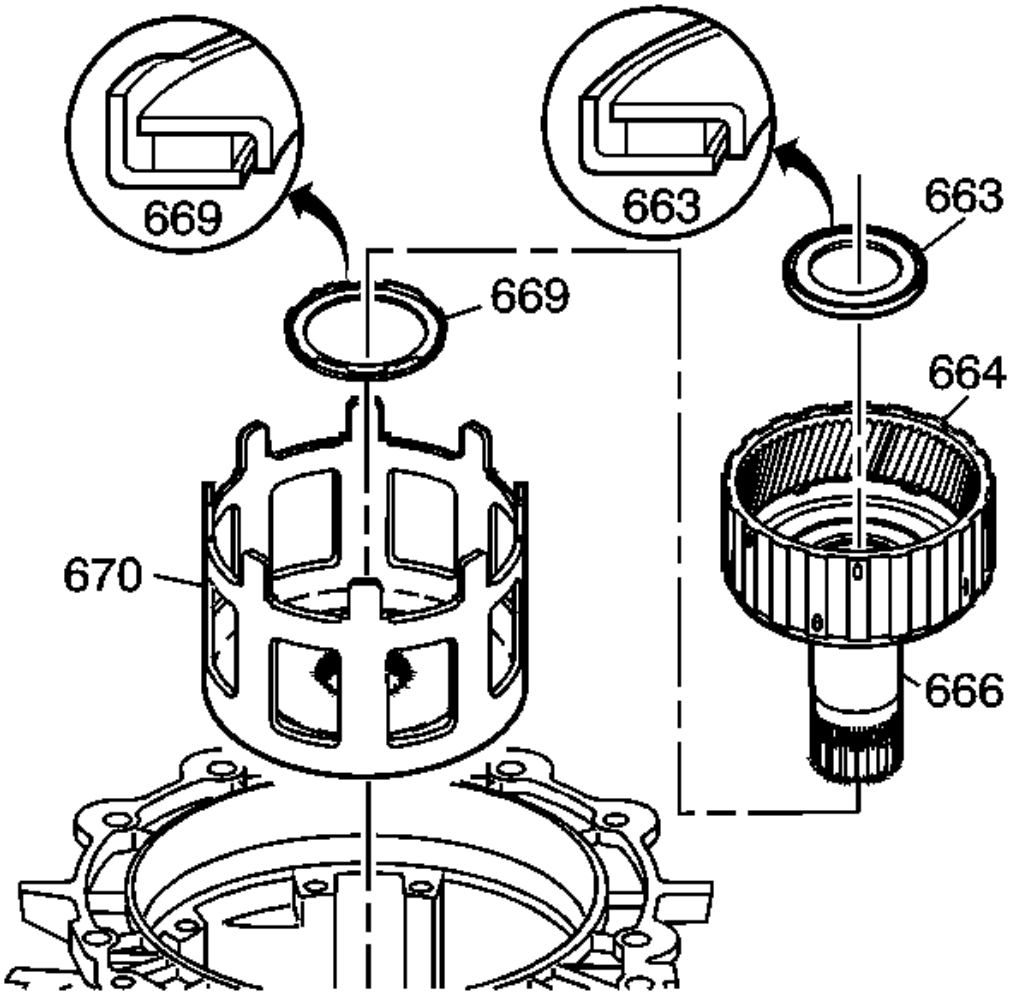


Fig. 129: View Of Output Gear Assembly
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission case so that the I.D. tag is facing up.
2. Install the output gear assembly (12) into the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

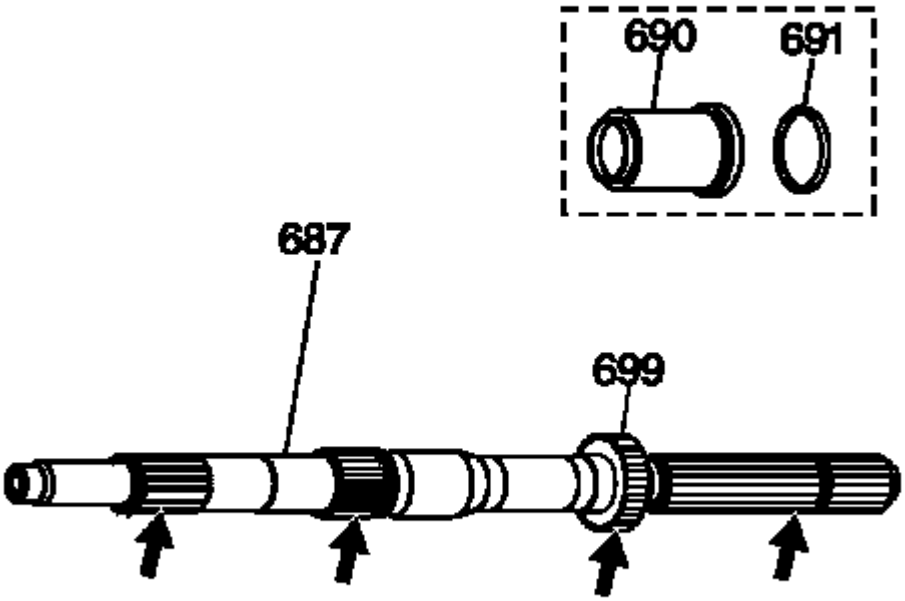


Fig. 130: View Of Output Gear Assembly & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

3. Install the output gear retaining ring (48) into the output gear assembly (12) groove.

LOW AND REVERSE CLUTCH PISTON INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

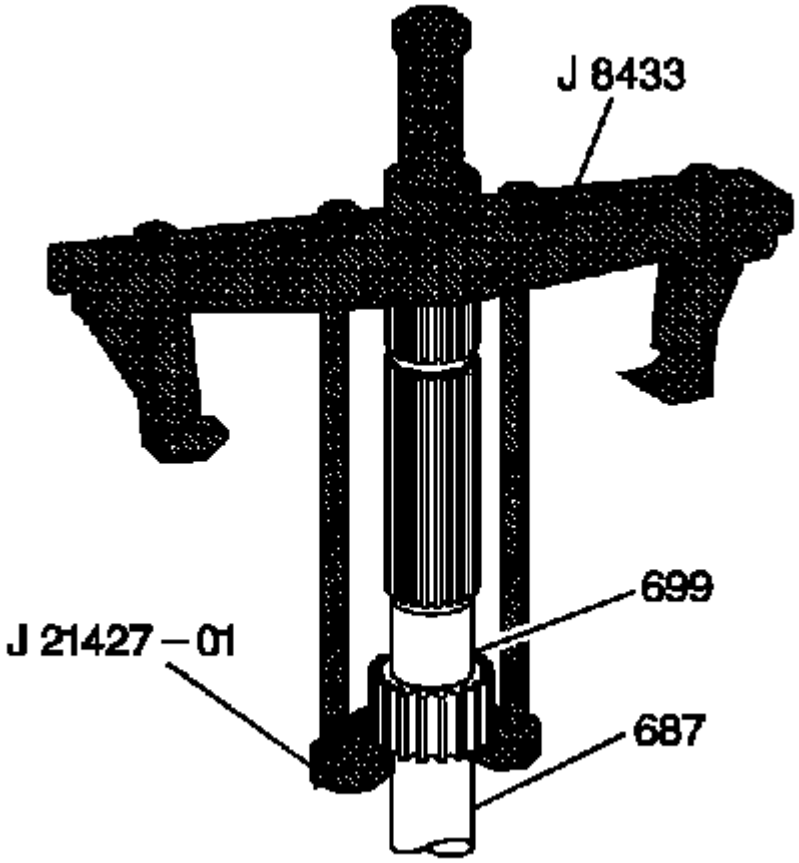


Fig. 131: View Of Low & Reverse Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission case so the transmission case cover side is facing up.
2. Apply automatic transmission fluid to the new seals.
3. Install the new inner (510) and outer (512) piston seals onto the low and reverse clutch piston (511).
4. Apply automatic transmission fluid to the seal surfaces of the transmission case.
5. By hand, press the low and reverse clutch piston (511) into the transmission case until seated. Do not damage the seals.

 © 2011 Mitchell Repair Information Company, LLC.

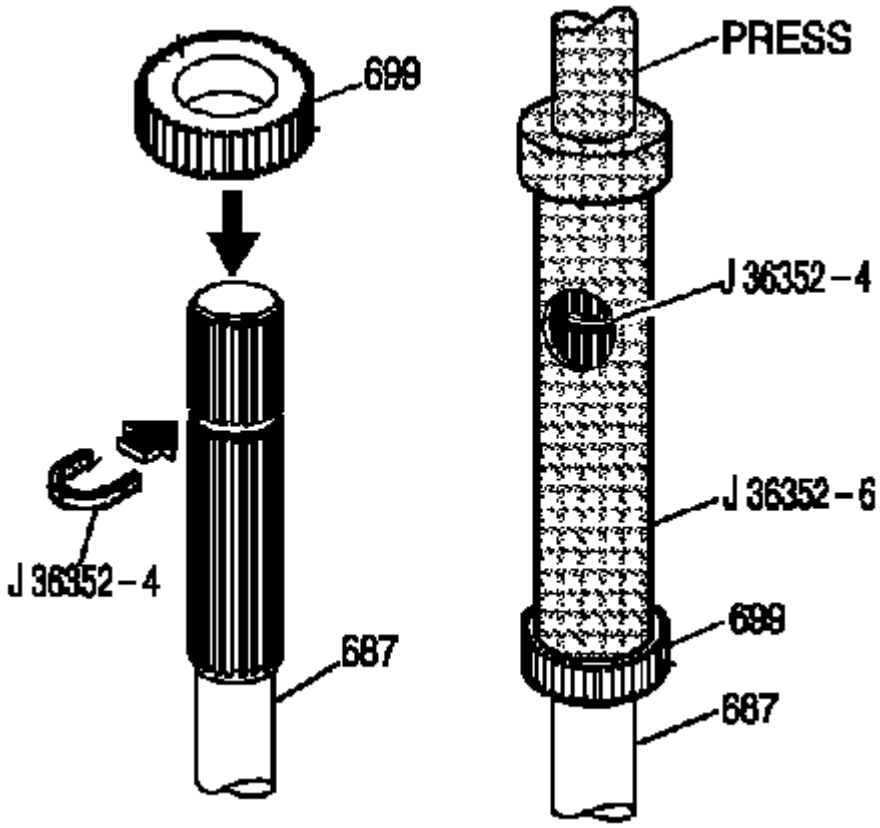


Fig. 132: View Of Low & Reverse Clutch Piston, Spring Assembly & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

6. Install the low and reverse clutch spring assembly (513) onto the low and reverse clutch piston (511), indexing the springs to the piston bosses.

IMPORTANT:
- **Do not damage the inner surface of the transmission case assembly.**
- **Position the low and reverse clutch spring retaining ring (514) opening correctly as shown.**

7. While compressing the low and reverse clutch spring (513) by hand, install the low and reverse clutch spring retaining ring (514) into the groove in the transmission case assembly, making sure the open ends face away from any openings.

FRONT INTERNAL GEAR AND OVERRUN CLUTCH DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

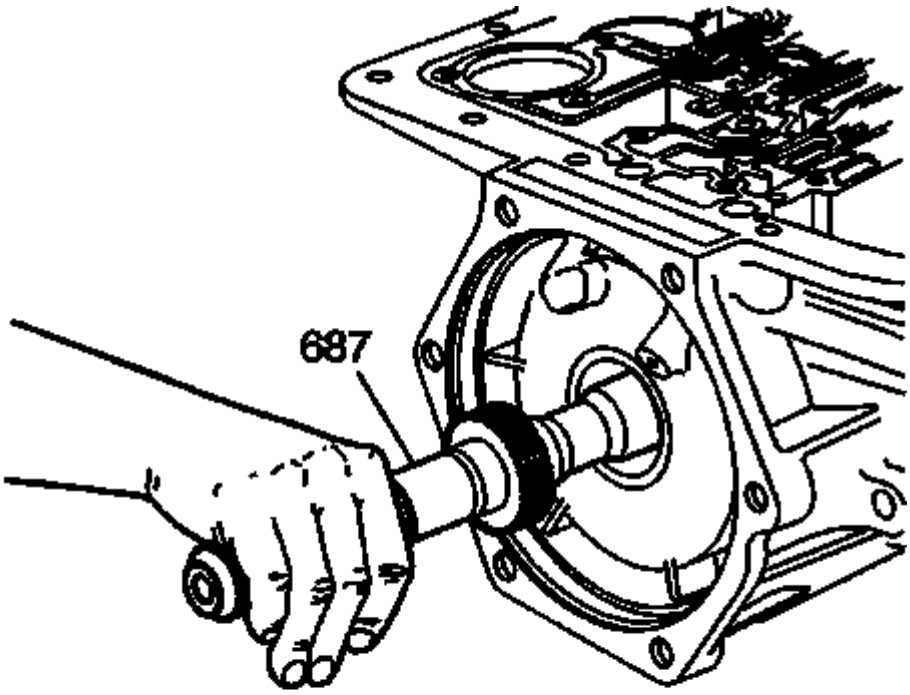


Fig. 133: View Of Overrun Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the overrun clutch assembly (523) from the front internal gear.

 © 2011 Mitchell Repair Information Company, LLC.

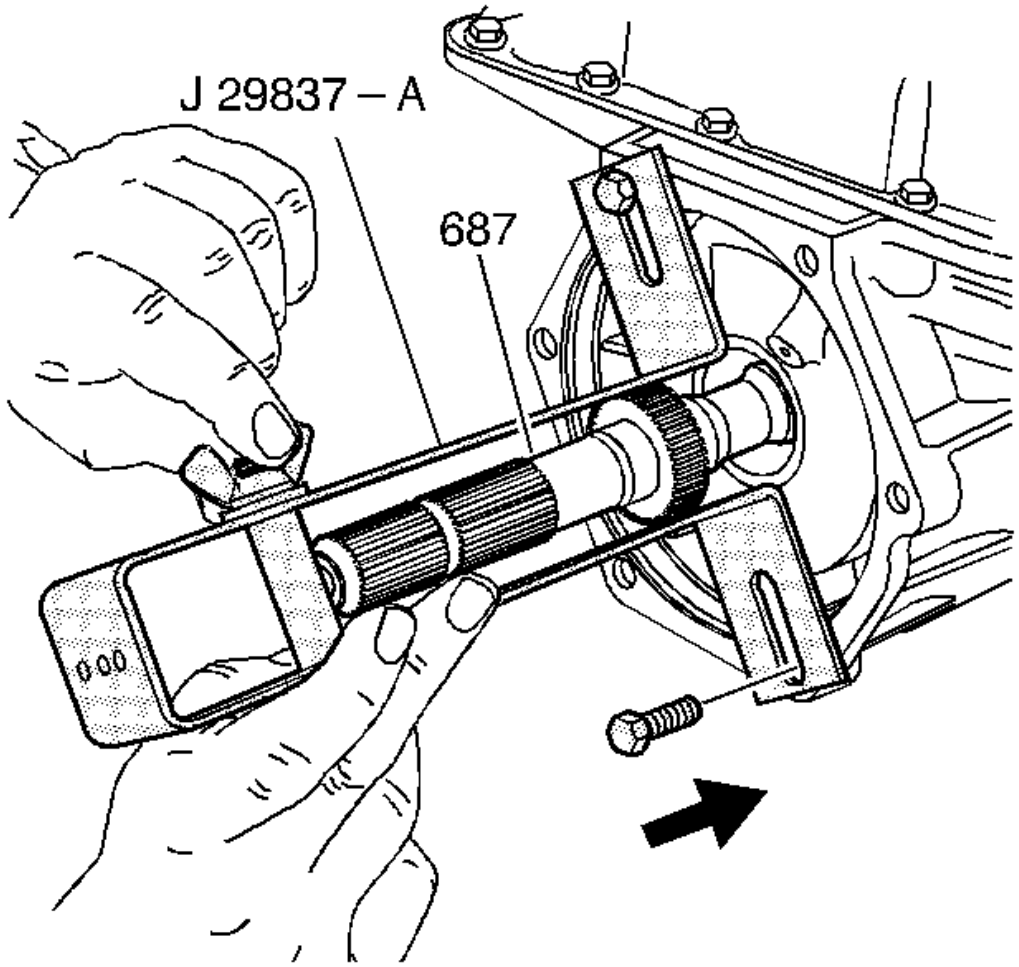


Fig. 134: View Of Front Internal Gear Flange & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

2. Remove the front internal gear flange retaining ring (528).
3. Remove the front internal gear flange (527).

FRONT INTERNAL GEAR CLEANING AND INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

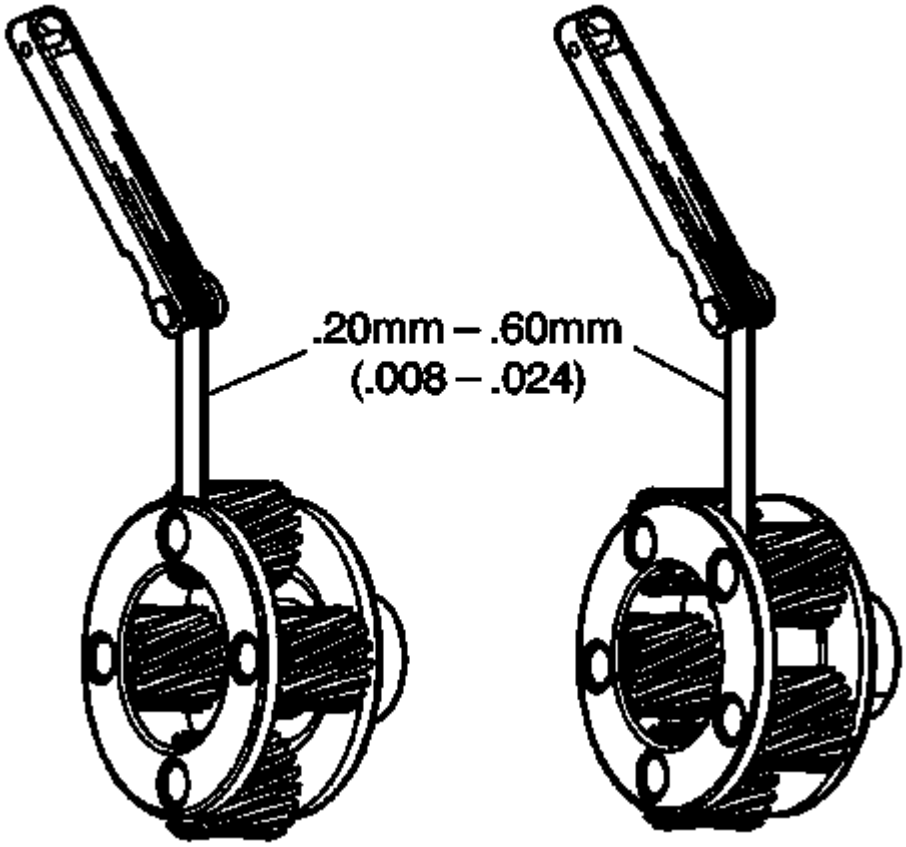


Fig. 135: Inspecting Front Internal Gear
Courtesy of GENERAL MOTORS CORP.

1. Clean the front internal gear and overrun roller clutch assembly in solvent and air dry.
2. Inspect the front internal gear for the following:
   - Clutch teeth for notches or grooves that prevent the clutch disc from sliding
   - Ring gear teeth for excessive wear, damage, or chipped teeth
   - Metal debris embedded in the ring gear teeth
   - Overrun clutch roller surface for roughness or wear
3. Replace the front internal gear if any of the above conditions are found.

 © 2011 Mitchell Repair Information Company, LLC.

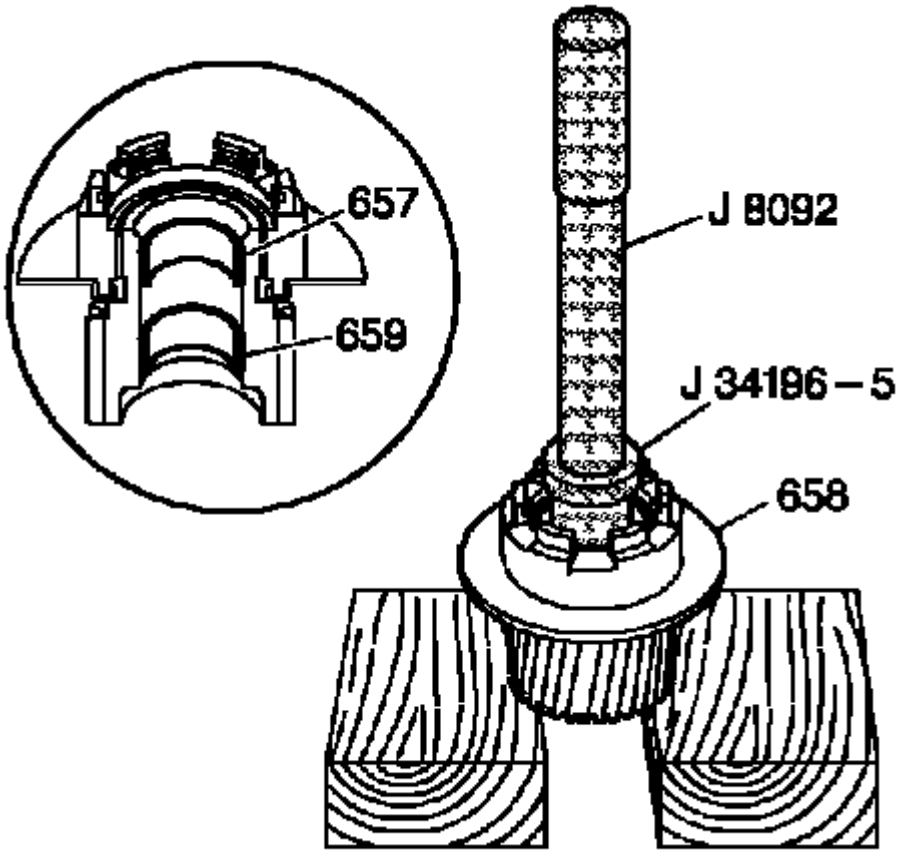


Fig. 136: Inspecting Overrun Roller Clutch
Courtesy of GENERAL MOTORS CORP.

4. Inspect the overrun roller clutch rollers for wear or damage.
5. Replace the overrun roller clutch if faulty.

FRONT INTERNAL GEAR AND OVERRUN CLUTCH ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

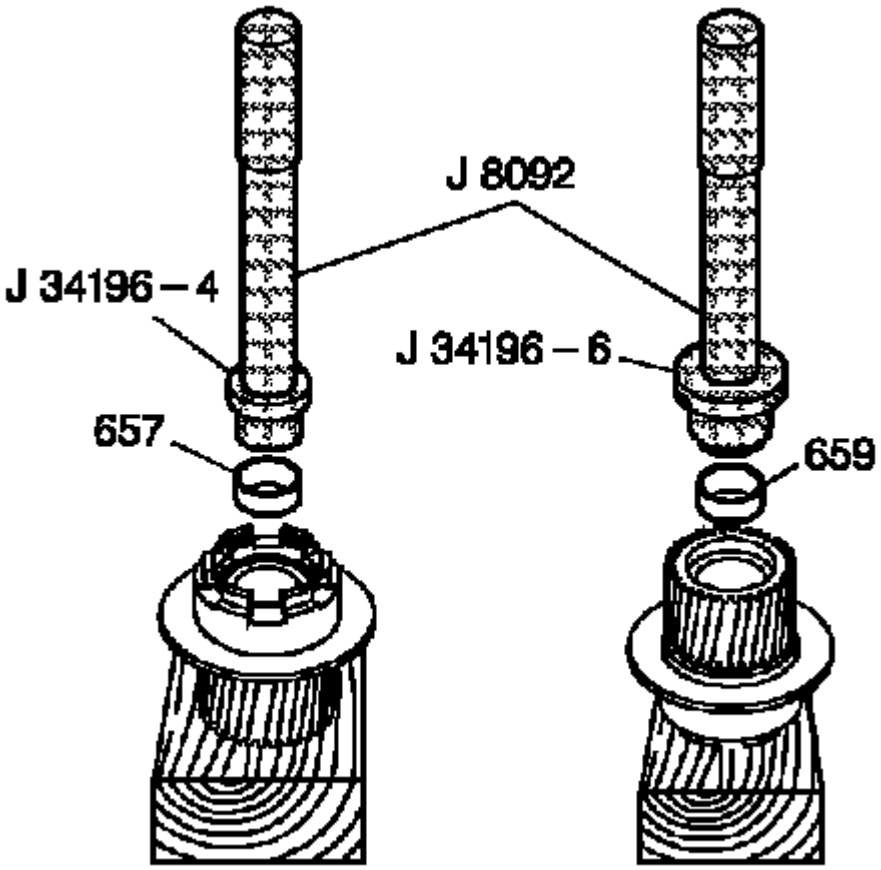


Fig. 137: View Of Front Internal Gear Flange & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Install the front internal gear flange (527).
2. Install the front internal gear flange retaining ring (528).

 © 2011 Mitchell Repair Information Company, LLC.

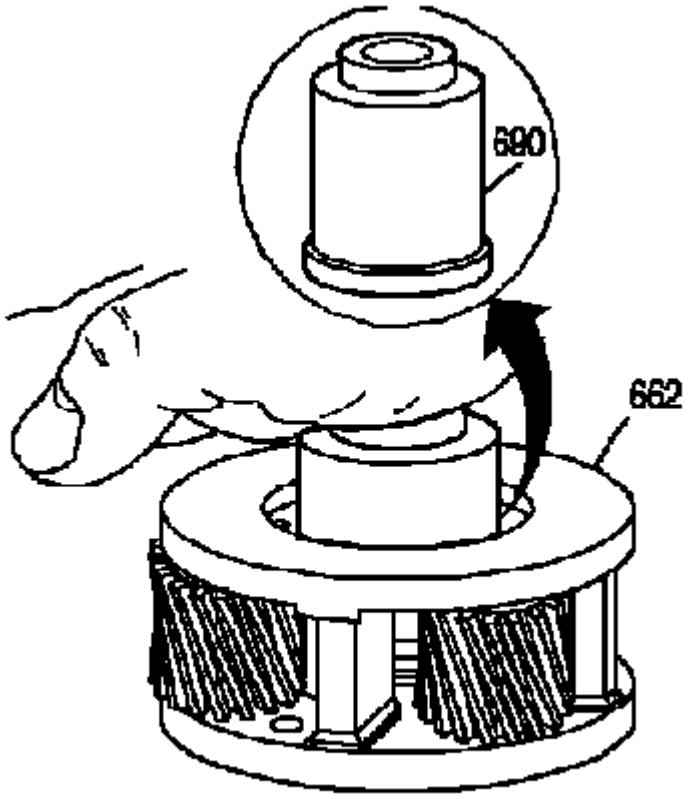


Fig. 138: View Of Overrun Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the overrun clutch assembly (523) into the front internal gear.

 © 2011 Mitchell Repair Information Company, LLC.

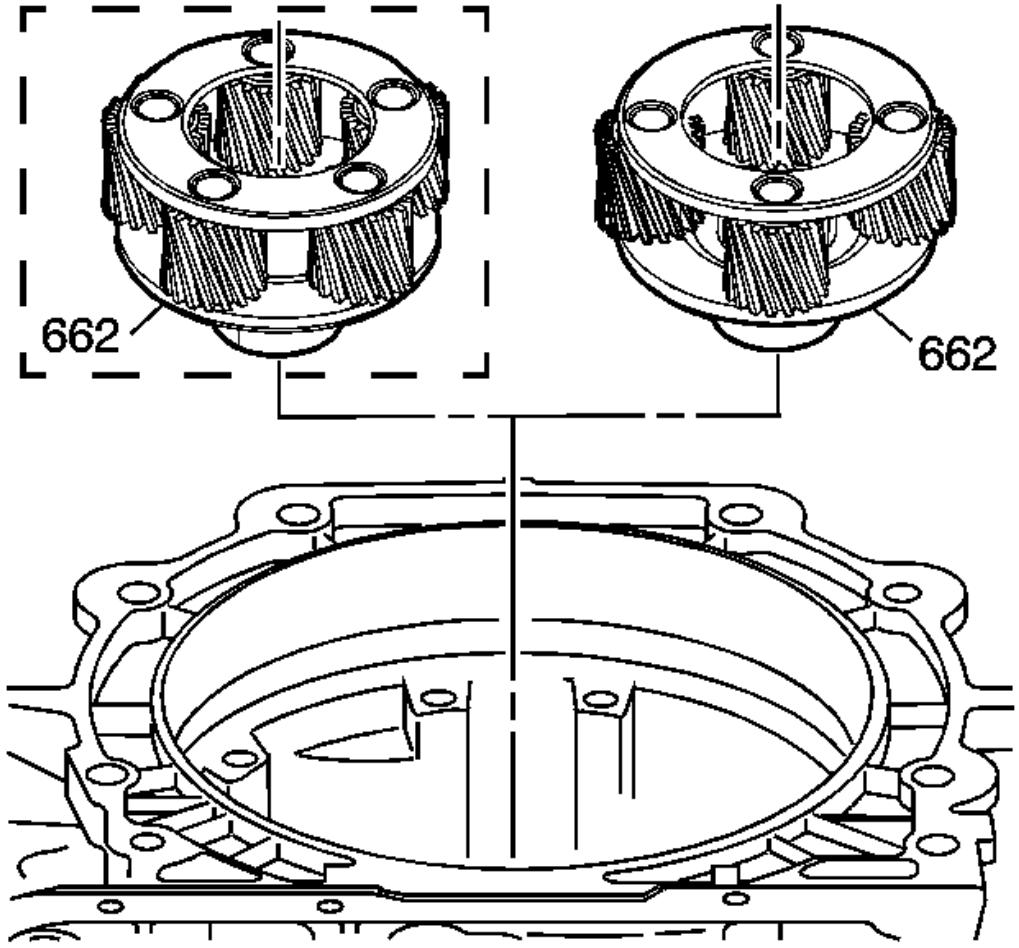


Fig. 139: Testing Inner Race Movement
Courtesy of GENERAL MOTORS CORP.

4. Hold the front internal gear and inspect the movement of the overrun roller clutch. The inner race should turn freely counterclockwise (1) and should lock clockwise (2).

FRONT INTERNAL GEAR AND LOW AND REVERSE CLUTCH INSTALLATION

Tools Required

J 28585 Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

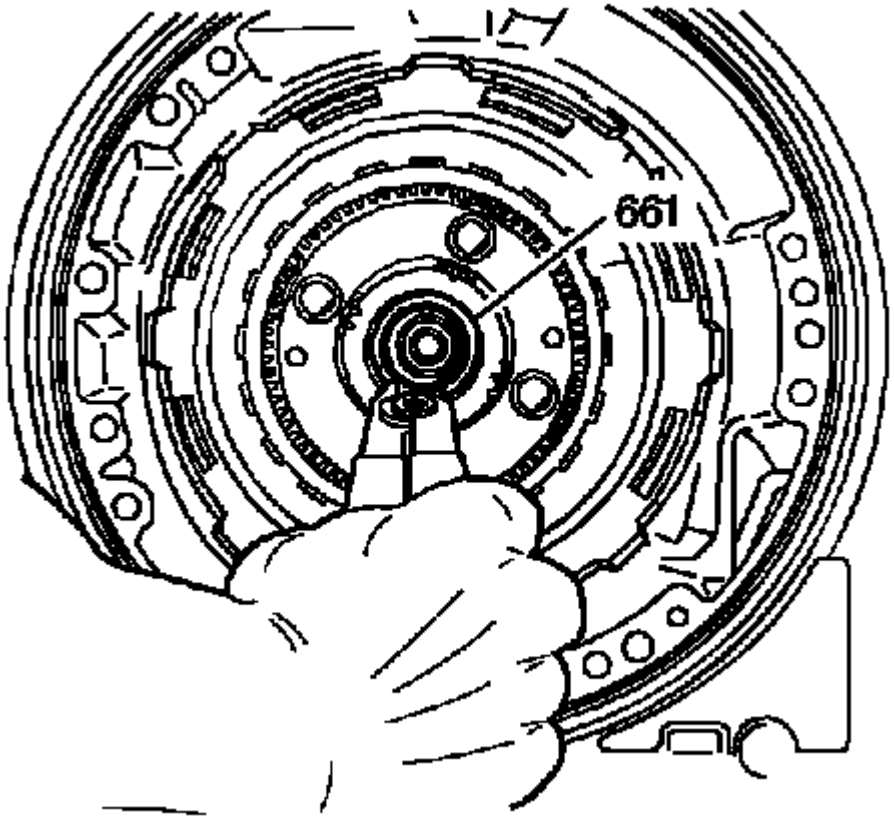


Fig. 140: View Of Front Internal Gear Thrust Bearing Assembly & Front Internal Gear
Courtesy of GENERAL MOTORS CORP.

1. Install the front internal gear thrust washer race (530) on top of the output gear assembly.
2. Install the front internal gear thrust bearing assembly (519) on top of the front internal gear thrust washer race (530).

IMPORTANT: The front internal gear (526) should turn freely counterclockwise, and should lock clockwise.

3. Install the front internal gear and overrun roller clutch assembly (526).

 © 2011 Mitchell Repair Information Company, LLC.

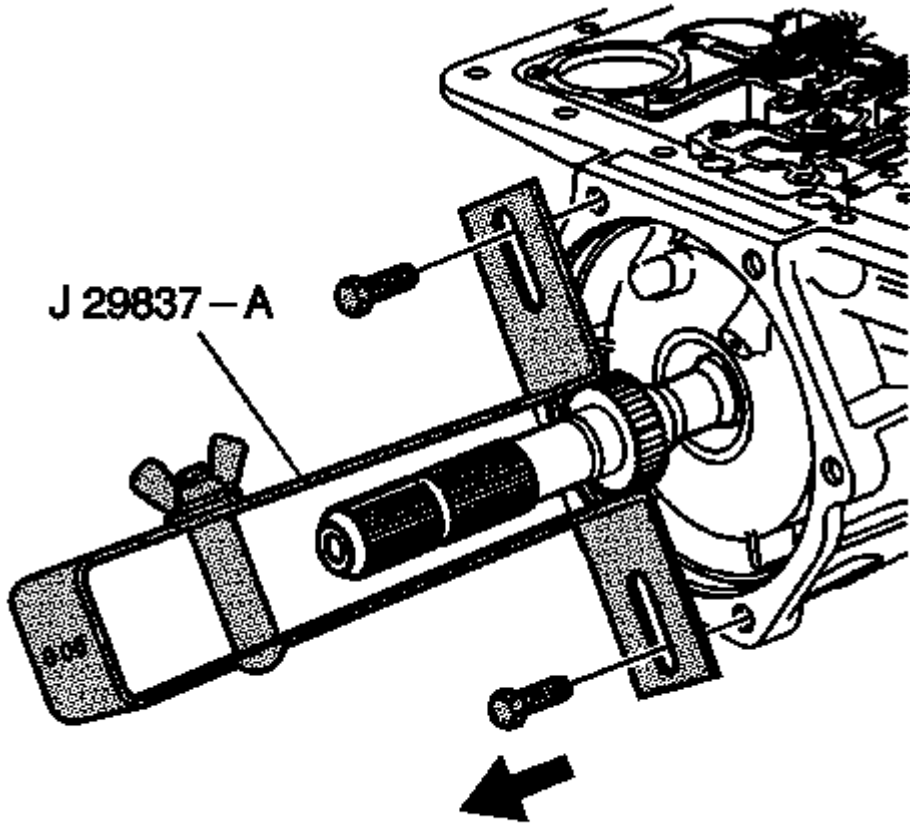


Fig. 141: View Of Low & Reverse Clutch Backing Plate, Fiber Plate Assemblies & Clutch Steel Plates
Courtesy of GENERAL MOTORS CORP.

4. Install the low and reverse clutch backing plate (515)
5. Install the 3 steel plates (517) and the 4 fiber plates (516).
6. Install the low and reverse clutch backing plate (515).

 © 2011 Mitchell Repair Information Company, LLC.

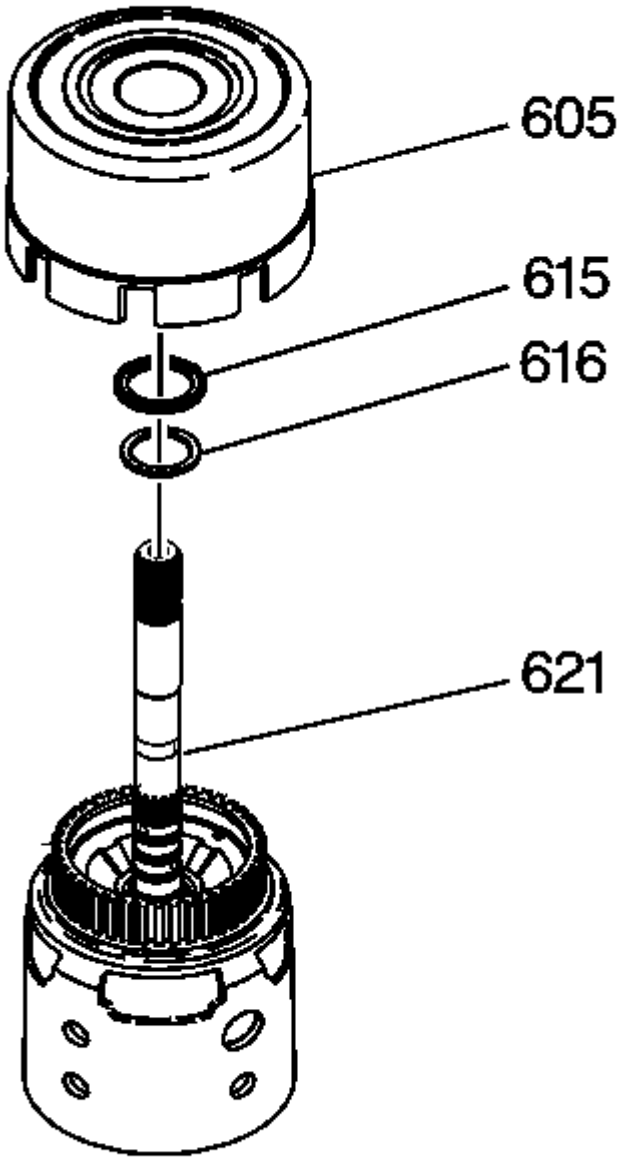


Fig. 142: View Of Low & Reverse Clutch Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

7. Using **J 28585** install the low and reverse clutch plate retaining ring (518), aligning the openings of the retaining ring towards the dowel pin in the case. Both ends of the retaining ring lock in the lug.

LOW AND REVERSE CLUTCH PISTON TRAVEL MEASUREMENT

 © 2011 Mitchell Repair Information Company, LLC.

Tools Required

- **J 45200** Dial Indicator Set. See **Special Tools**.
- **J 45166** 8" Dial Indicator Extension Rod. See **Special Tools**.

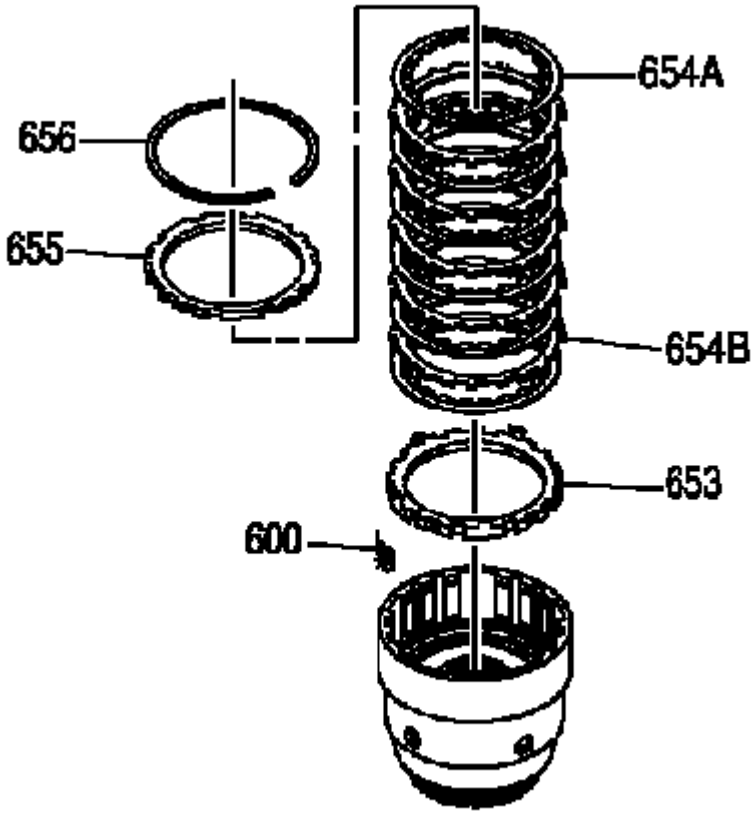


Fig. 143: Measuring Low & Reverse Clutch Piston Stroke
Courtesy of GENERAL MOTORS CORP.

1. Install the **J 45166** (1) in one of the holes of the transmission case. See **Special Tools**.
2. Install the**J 45200** (2) on the **J 45166** (1). See **Special Tools**.
3. Set the dial indicator pointer on the low and reverse clutch backing plate and zero the gage.

CAUTION: When you use compressed air in order to clear fluid passages and to dry parts, always aim the air pressure away from face and eyes. Always wear adequate eye protection in order to avoid injury from dirt and debris that may adhere to parts.

4. Apply compressed air to the case fluid passage as shown in the insert and measure the piston stroke.

   Specification: Low and reverse piston stroke: 1.09 - 1.91 mm (0.043 - 0.075 in)

 © 2011 Mitchell Repair Information Company, LLC.

5. If the piston stroke measurement is not within specifications, ensure proper installation of the clutch discs or the clutch discs are not excessively worn.

FRONT CARRIER SUN GEAR ASSEMBLY DISASSEMBLE

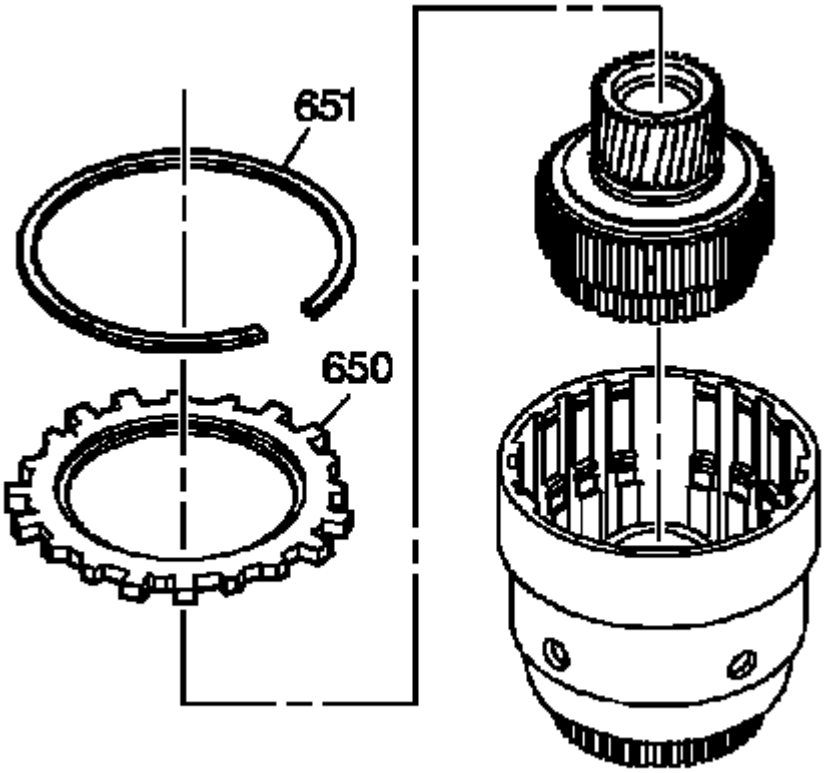


Fig. 144: View Of Front Sun Gear Assembly & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Remove the front sun gear retaining ring (541) from the front sun gear assembly (544).

 © 2011 Mitchell Repair Information Company, LLC.

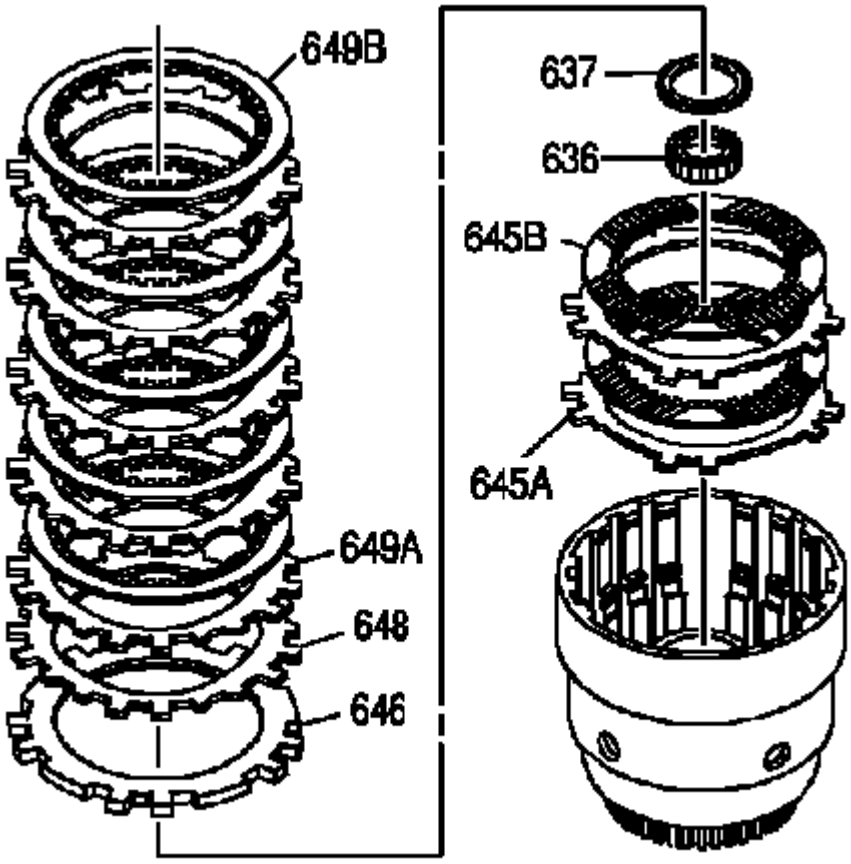


Fig. 145: View Of Front Carrier Assembly & Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

2. Remove the front sun gear (544) from the front carrier assembly (542).

 © 2011 Mitchell Repair Information Company, LLC.

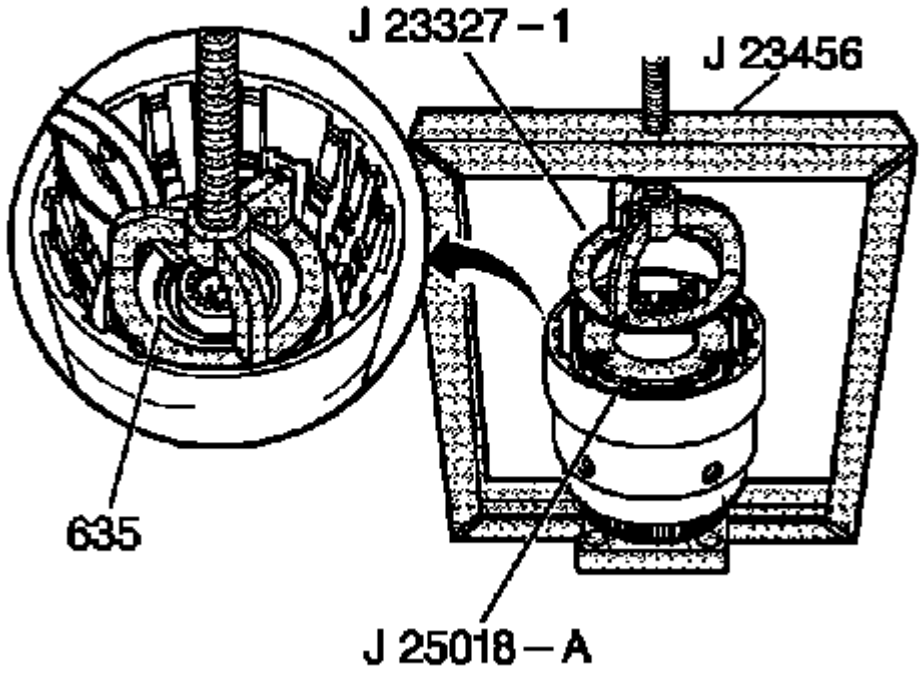


Fig. 146: View Of Rear Internal Gear, Flange & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

3. Remove the rear internal gear flange retaining ring (548) from the rear internal gear (536).
4. Remove the rear internal gear flange (547) from the rear internal gear.

FRONT CARRIER SUN GEAR ASSEMBLY ASSEMBLE

Tools Required

J 45185 Bore Gage Set. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

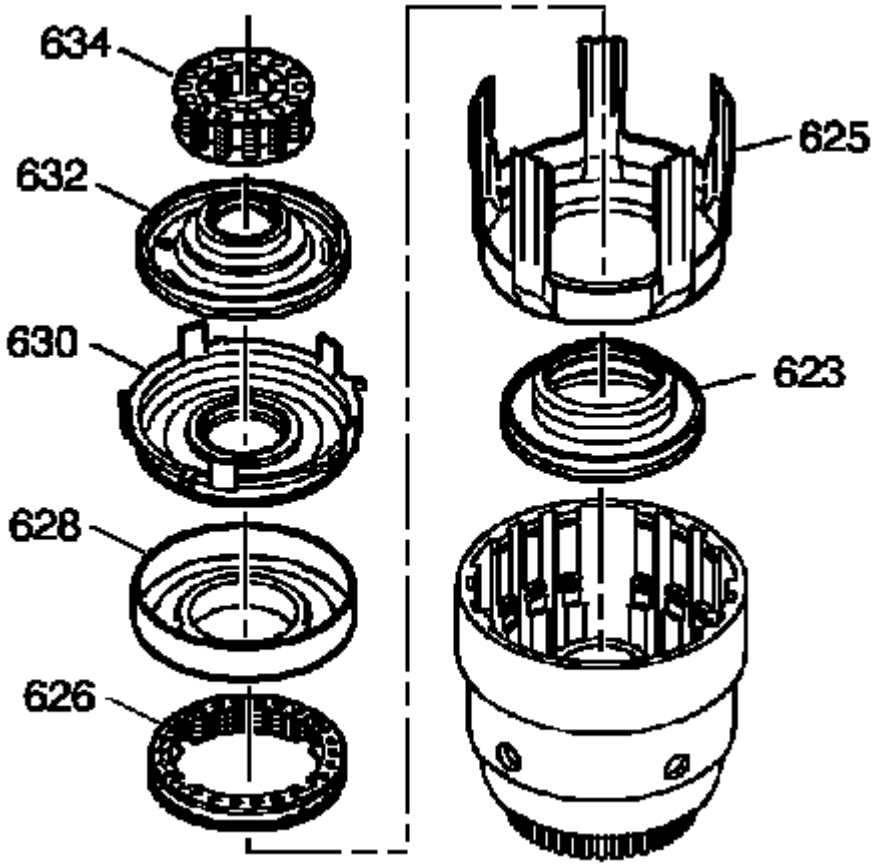


Fig. 147: Inspecting Rear Internal Gear
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear internal gear and air dry.
2. Inspect the rear internal teeth for the following:
   - Chips
   - Cracks
   - Excessive wear
   - Metal debris embeded in teeth
3. Replace the rear internal gear if any of the above conditions are found.

 © 2011 Mitchell Repair Information Company, LLC.

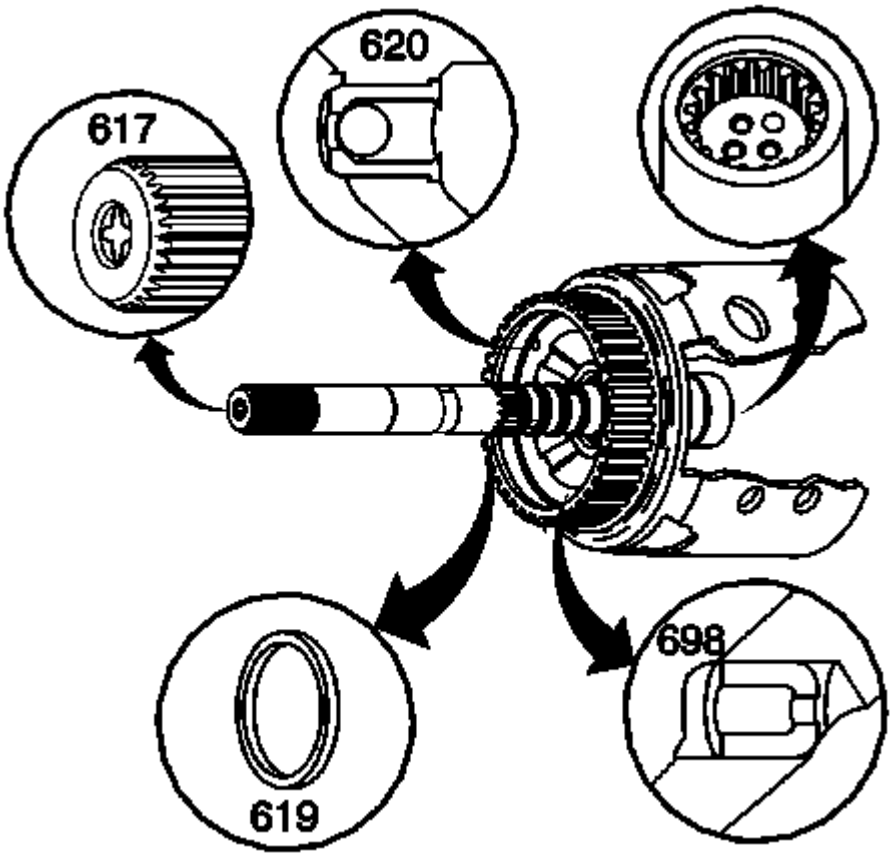


Fig. 148: View Of Rear Internal Gear, Flange & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

4. Install the rear internal gear flange (547) in the rear internal gear (536).
5. Install the rear internal gear flange retaining ring (548).

 © 2011 Mitchell Repair Information Company, LLC.

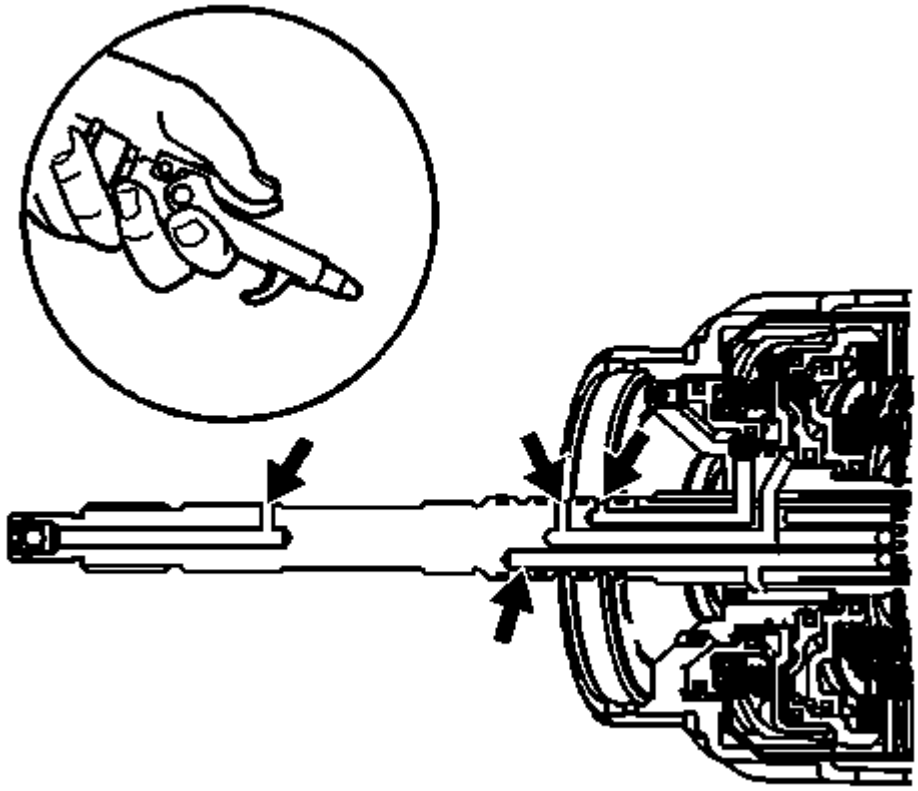


Fig. 149: Measuring Inner Diameter Of Rear Sun Gear Bushing
Courtesy of GENERAL MOTORS CORP.

6. Clean the rear sun gear (539) and air dry.
7. Inspect the rear sun gear teeth for the following:
   - Chips
   - Cracks
   - Excessive wear
   - Metal debris embeded in teeth
8. Inspect the rear sun gear bushing for scoring or excessive wear.
9. Using **J 45185** and a micrometer measure the rear sun gear bushing inner diameter. See **Special Tools**. Measure in three locations and take the average.

   Specification: Rear sun gear bushing: 22.200 - 22.276 mm (0.874 - 0.877 in)

10. If the rear sun gear bushing is not within specifications or any of the above conditions are found, replace the rear sun gear.

 © 2011 Mitchell Repair Information Company, LLC.

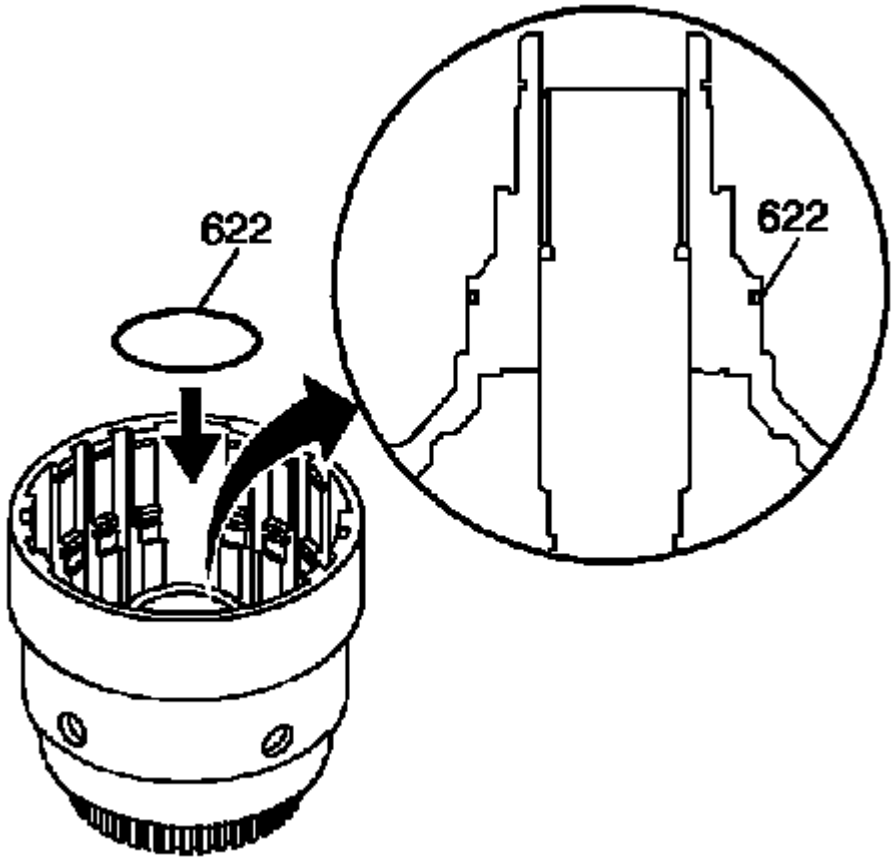


Fig. 150: Measuring Inner Diameter Of Rear Internal Gear Bushing
Courtesy of GENERAL MOTORS CORP.

11. Clean the front carrier assembly (542) and air dry. Ensure to remove all solvent in the pinion gears.
12. Inspect the front carrier assembly pinion teeth for the following conditions:
    - Chips
    - Cracks
    - Excessive wear
    - Metal debris embeded in teeth
13. Inspect for missing washers on both sides of the pinion gears.
14. Inspect the front carrier bushing for scoring or excessive wear.
15. Using **J 45185** and a micrometer measure the front carrier bushing inner diameter. See **Special Tools**. Measure in three locations and take the average.

    Specification: Front carrier bushing: 30.00 - 30.076 mm (1.181 - 1.184 in)

16. If the front carrier bushing is not within specifications or any of the above conditions are found, replace the front carrier assembly.

 © 2011 Mitchell Repair Information Company, LLC.

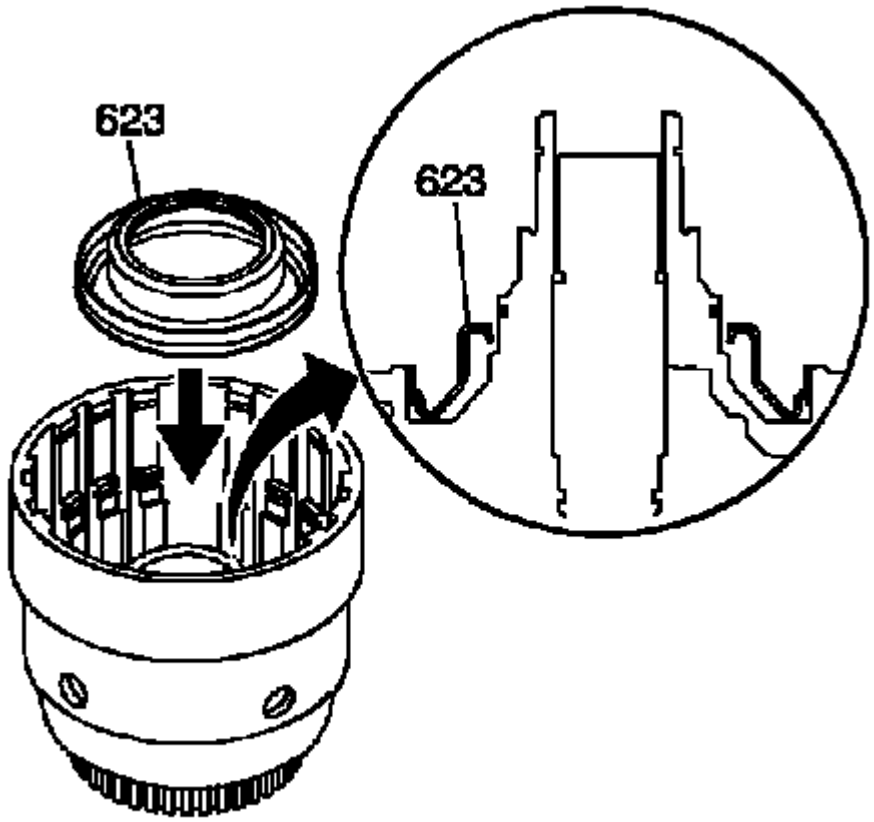


Fig. 151: Measuring Inner Diameter Of Front Sun Gear Bushing
Courtesy of GENERAL MOTORS CORP.

17. Clean the front sun gear (544) and air dry.
18. Inspect the front sun gear teeth for the following conditions:
    - Chips
    - Cracks
    - Excessive wear
    - Metal debris embeded in teeth
19. Inspect the front sun gear shaft for excessive wear or scoring at the front carrier assembly bushing area.
20. Using **J 45185** and a micrometer measure the rear sun gear bushing inner diameter. See **Special Tools**. Measure in three locations and take the average.

    Specification: Front sun gear bushing: 22.200 - 22.276 mm (0.874 - 0.877 in)

21. If the front sun gear bushing is not within specifications or any of the above conditions are found, replace the front sun gear.

 © 2011 Mitchell Repair Information Company, LLC.

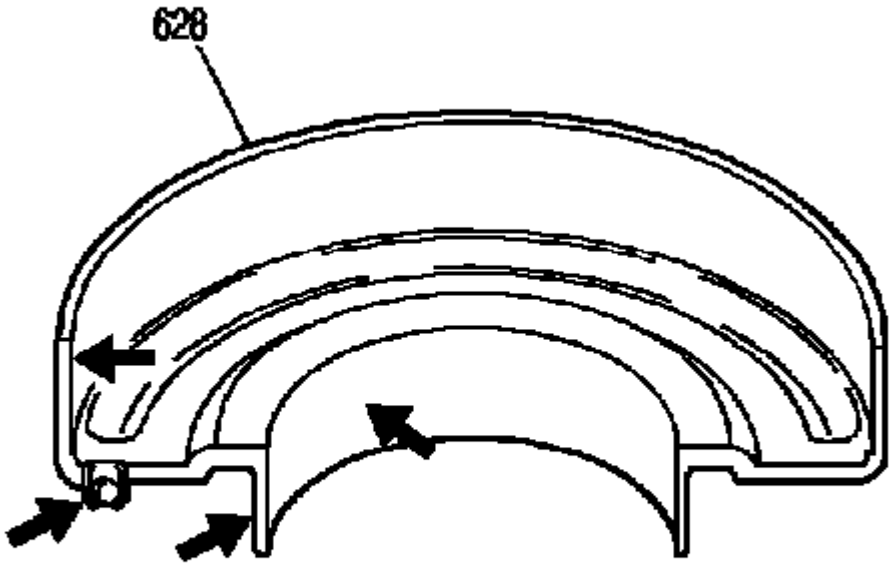


Fig. 152: View Of Front Carrier Assembly & Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

22. Install the front sun gear (544) into the front carrier assembly (542).

 © 2011 Mitchell Repair Information Company, LLC.

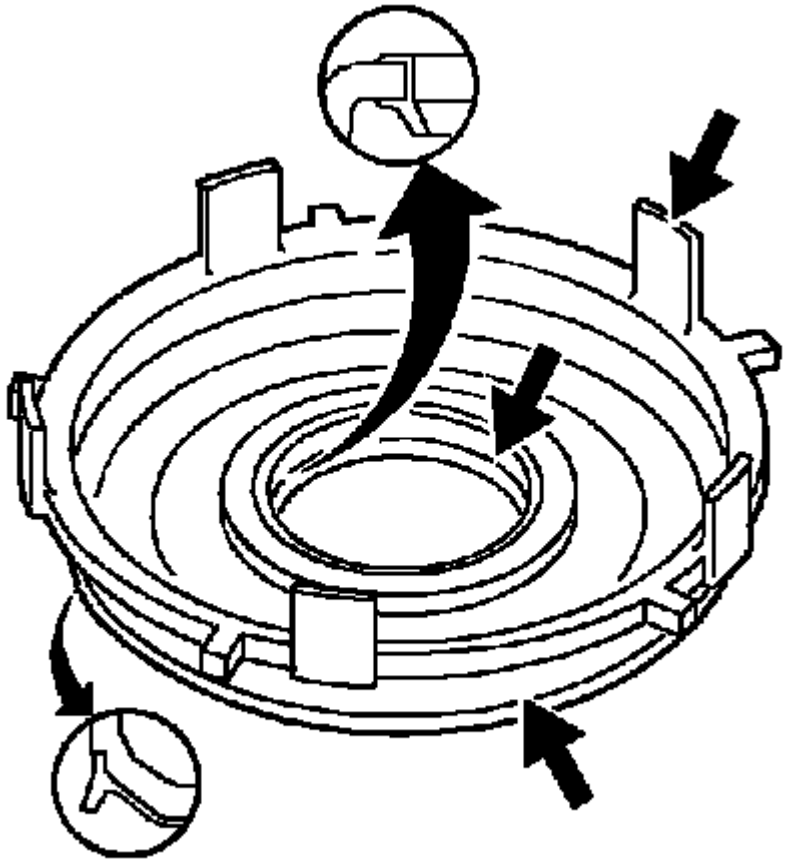


Fig. 153: View Of Front Sun Gear Assembly & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

23. Install the front sun gear retaining ring (541) into the groove of the front sun gear (544).

FRONT CARRIER SUN GEAR ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

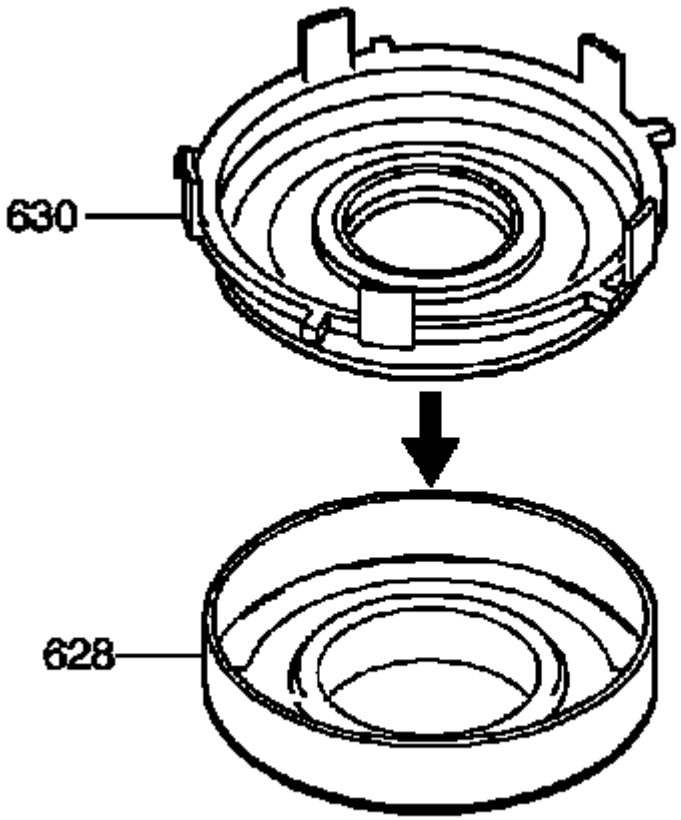


Fig. 154: View Of Front Internal Gear Thrust Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure that the front internal gear thrust bearing assembly (529) is installed with the correct side up.

1. Install the front internal gear thrust bearing assembly (529) - black side up.

 © 2011 Mitchell Repair Information Company, LLC.

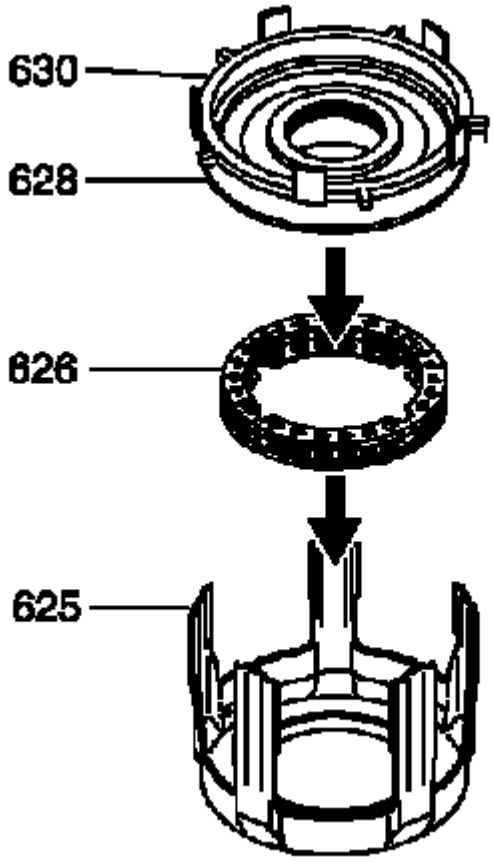


Fig. 155: View Of Front Carrier & Sun Gear Assembly
Courtesy of GENERAL MOTORS CORP.

2. Install the front carrier and sun gear assembly (24).
3. Install the front sun gear thrust bearing (545) and the front sun gear thrust bearing race (543).

REAR INTERNAL GEAR ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

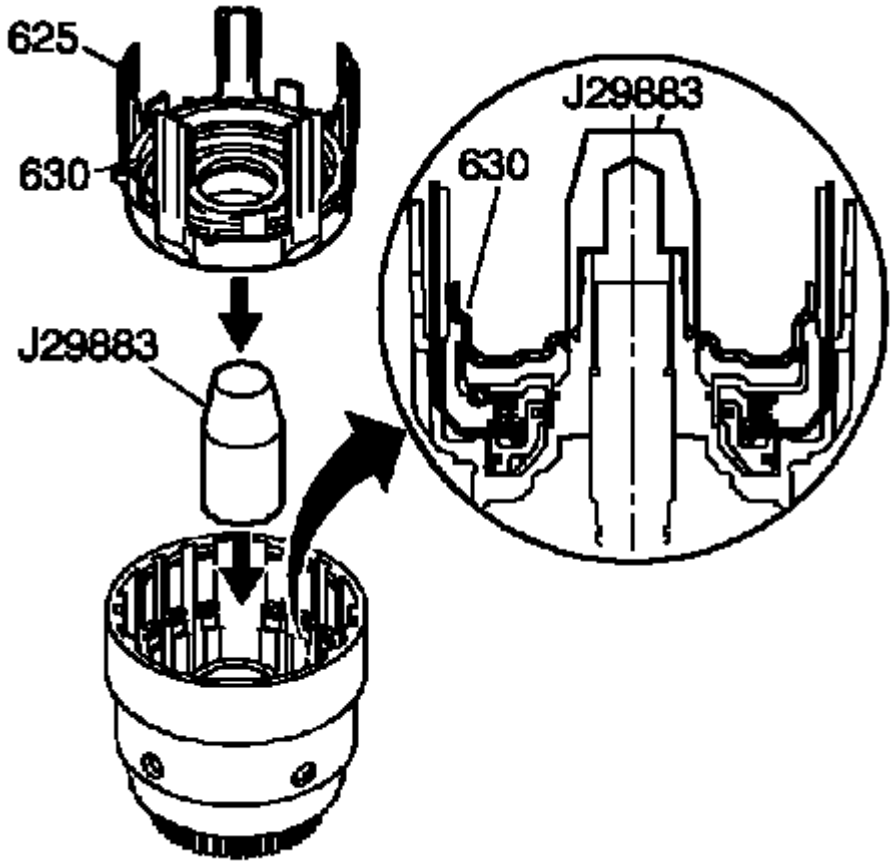


Fig. 156: View Of Rear Internal Gear, Thrust Bearing & Thrust Bearing Race
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure the thrust bearing is installed in the correct direction.

1. Install the rear internal gear thrust bearing (535).
2. Install the rear internal gear assembly (536).
3. Install the rear sun gear thrust bearing race (537).

REAR SUN GEAR AND HUB ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

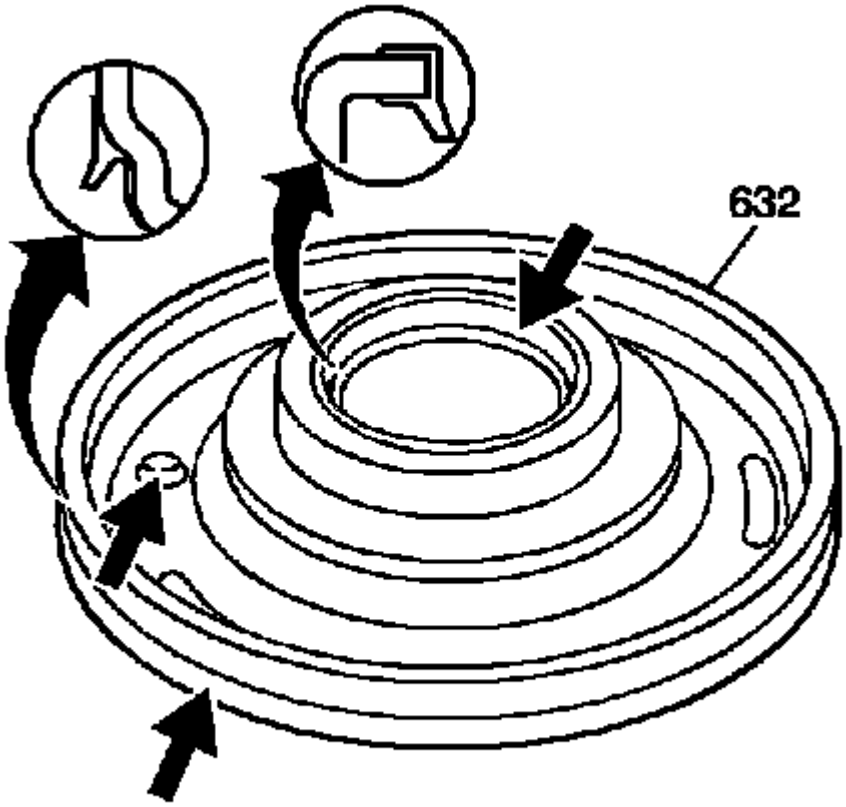


Fig. 157: View Of Rear Sun Gear Assembly, Thrust Bearings & Thrust Bearing Race
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Thrust bearing (538) must be installed with the flat side up.

1. Install the rear sun gear thrust bearing (538).
2. Install the front sun gear thrust bearing race (546).
3. Install the rear sun gear assembly (539).

IMPORTANT: Thrust bearing (540) must be installed with bronze side up.

4. Install the input shaft thrust bearing (540).

FORWARD AND DIRECT CLUTCH ASSEMBLY DISASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 25024-A** Servo Piston/Clutch Spring Compressor. See **Special Tools**.
- **J 28585** Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

- **J 45186** Forward and Direct Clutch Spring Compressor. See **Special Tools**.

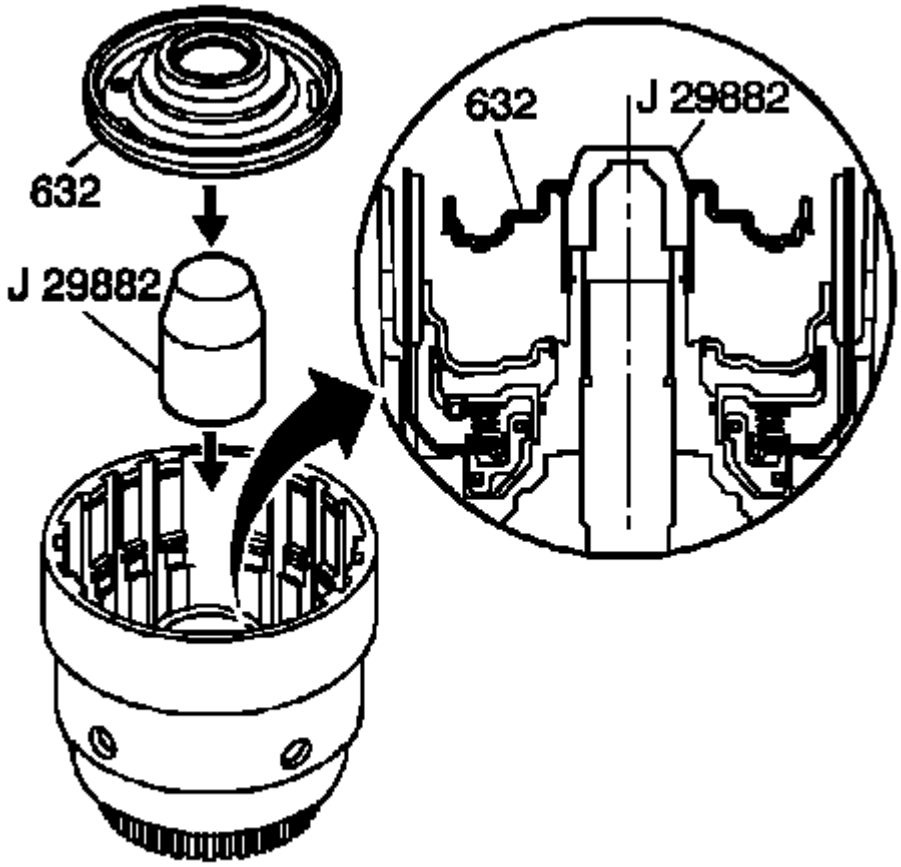


Fig. 158: View Of Input Shaft & O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove the input shaft O-ring seal (570) from the forward and direct clutch housing assembly - with input shaft (567).

 © 2011 Mitchell Repair Information Company, LLC.

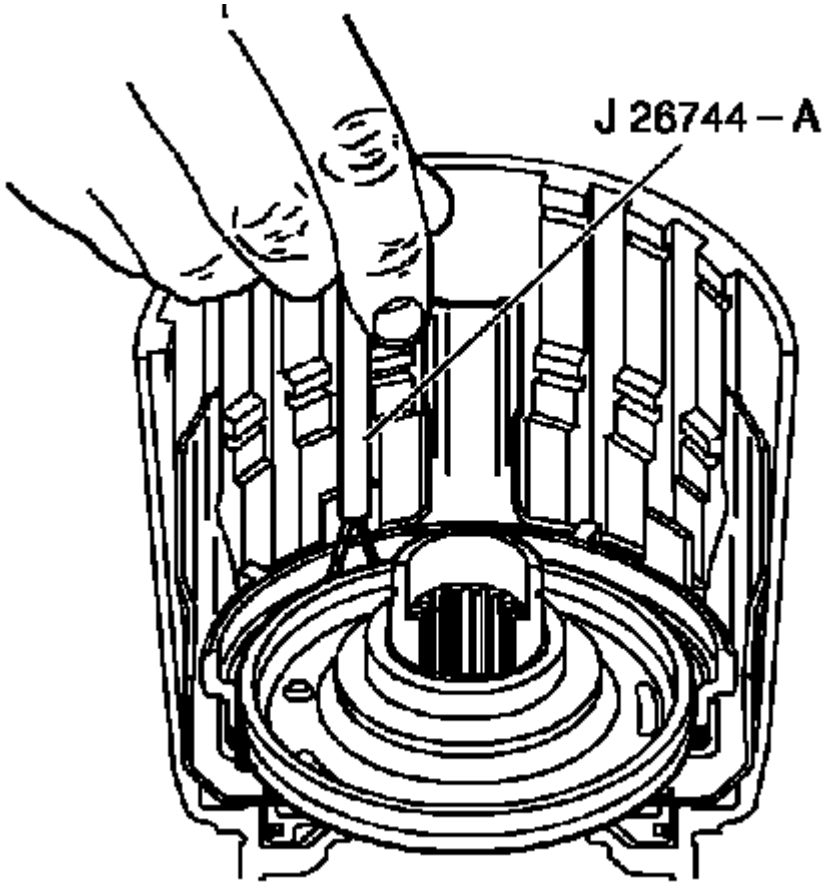


Fig. 159: View Of Forward Clutch Housing Thrust Bearing & Selective Race
Courtesy of GENERAL MOTORS CORP.

2. Remove the forward clutch housing thrust bearing (569) and the forward clutch housing thrust bearing race (568) from the forward and direct clutch housing assembly - with input shaft (567).

 © 2011 Mitchell Repair Information Company, LLC.

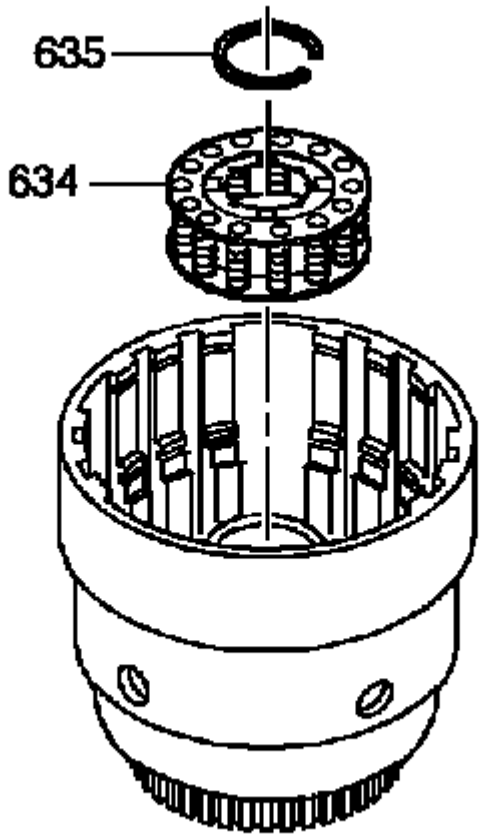


Fig. 160: Removing Forward Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

3. Using **J 28585** , remove the forward clutch backing plate retaining ring (550) from the forward and direct clutch housing assembly - with input shaft (567).

 © 2011 Mitchell Repair Information Company, LLC.

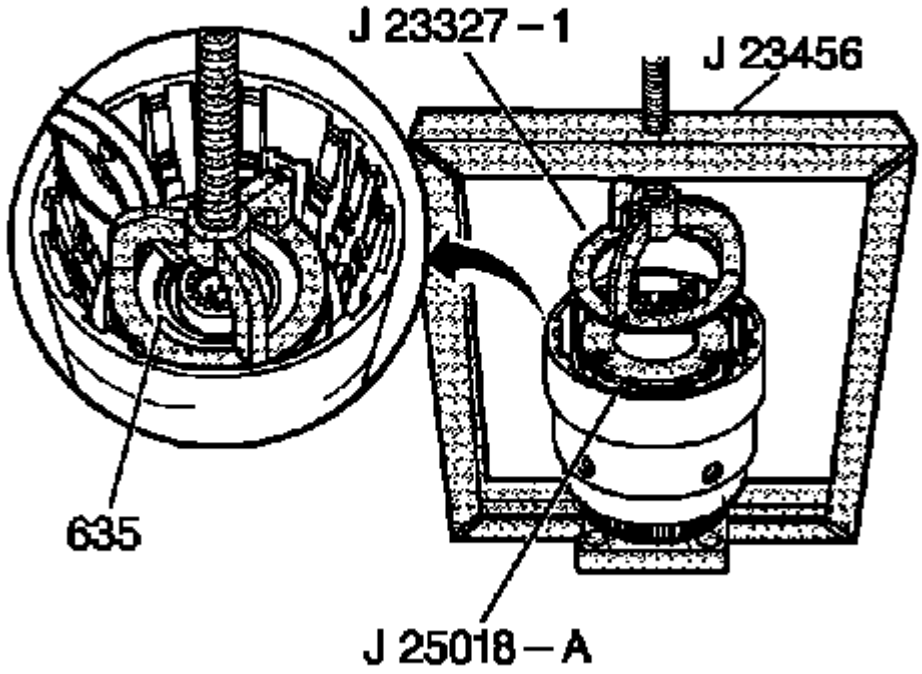


Fig. 161: Exploded View Of Forward & Direct Clutch Housing Assembly
Courtesy of GENERAL MOTORS CORP.

4. Remove the following components from the forward and direct clutch housing assembly - with input shaft (567):
    - The forward clutch backing plate (551)
    - The 4 forward clutch fiber plates (552)
    - The 4 forward clutch steel plates (553)

 © 2011 Mitchell Repair Information Company, LLC.

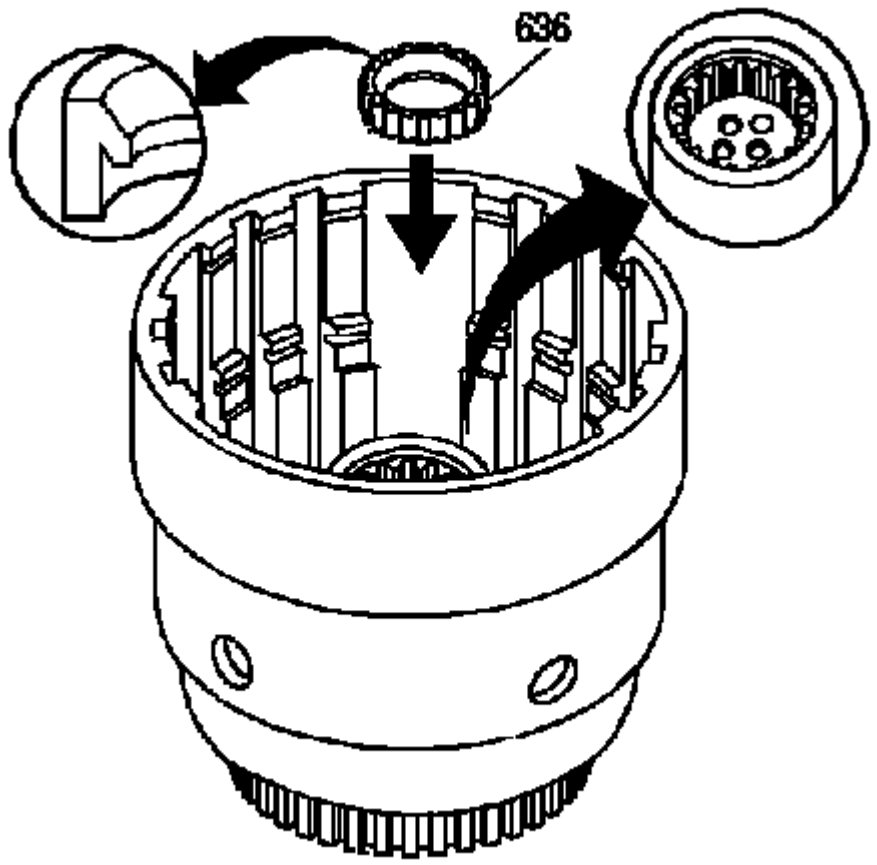


Fig. 162: View Of Direct Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

5. Using **J 28585** , remove the direct clutch backing plate retaining ring (554) from the forward and direct clutch housing assembly - with input shaft (567).

 © 2011 Mitchell Repair Information Company, LLC.

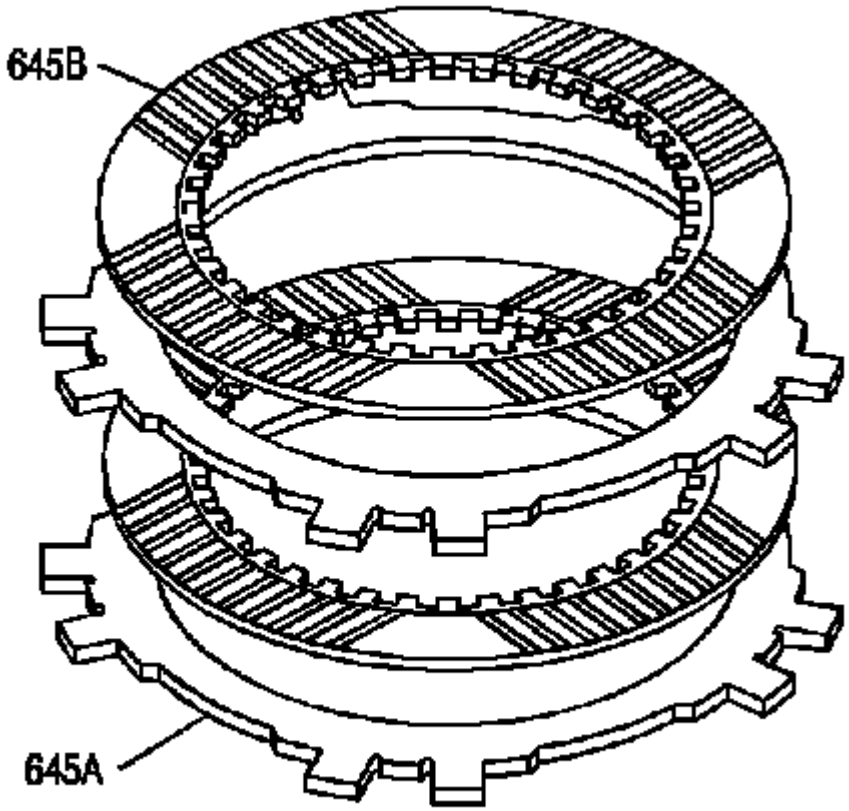


Fig. 163: View Of Forward & Direct Clutch Housing Assembly Clutch Plates
Courtesy of GENERAL MOTORS CORP.

6. Remove the following components from the forward and direct clutch housing assembly - with input shaft (567):
    - The direct clutch backing plate (555)
    - The 4 direct clutch fiber plates (556)
    - The 4 direct clutch steel plates (557)
    - The direct clutch apply plate (558)

 © 2011 Mitchell Repair Information Company, LLC.

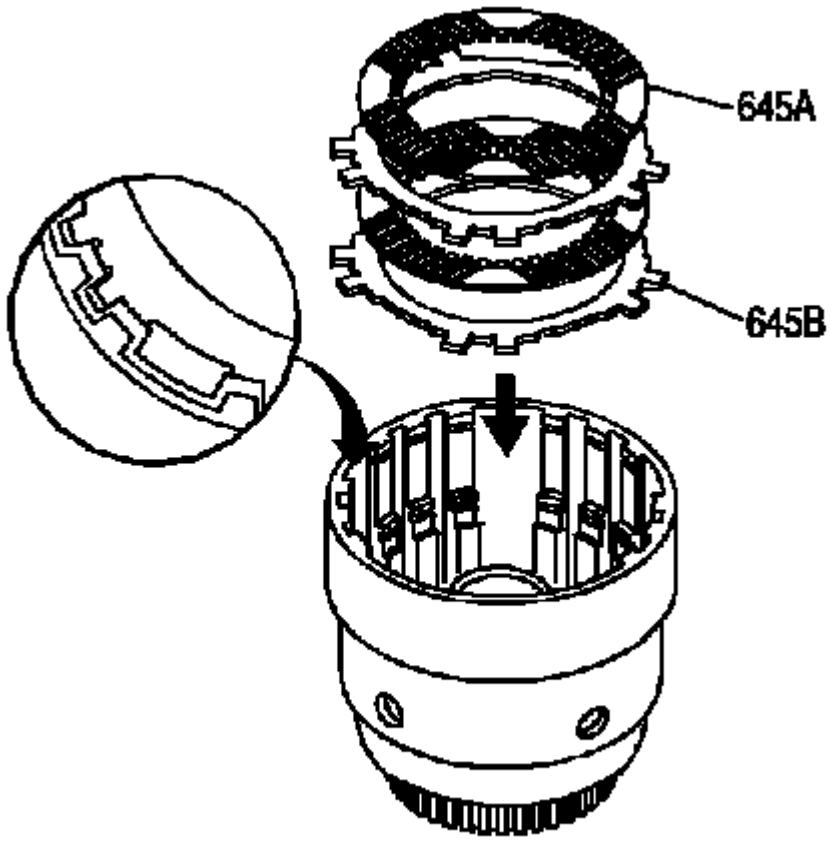


Fig. 164: Removing/Installing Direct Clutch Spring Retaining Ring
Courtesy of GENERAL MOTORS CORP.

7. Remove the direct clutch spring retaining ring (559).
    1. Place the **J 25024-A** (1) in a vise with the forcing screw on the bottom and backed out. See **Special Tools**.
    2. Place the **J 45186** (2) over the shaft of the forward direct clutch housing and input shaft assembly (567). See **Special Tools**.
    3. Place the J 21420-2 (4) from the **J 23327** on top of the forcing screw of **J 25024-A** (1). See **Special Tools**.
    4. With the forcing screw, compress the clutch spring to allow the removal of the retaining ring.
    5. Use **J 28585** (3) or snap ring pliers to remove the retaining ring.
    6. Remove the tools.

 © 2011 Mitchell Repair Information Company, LLC.

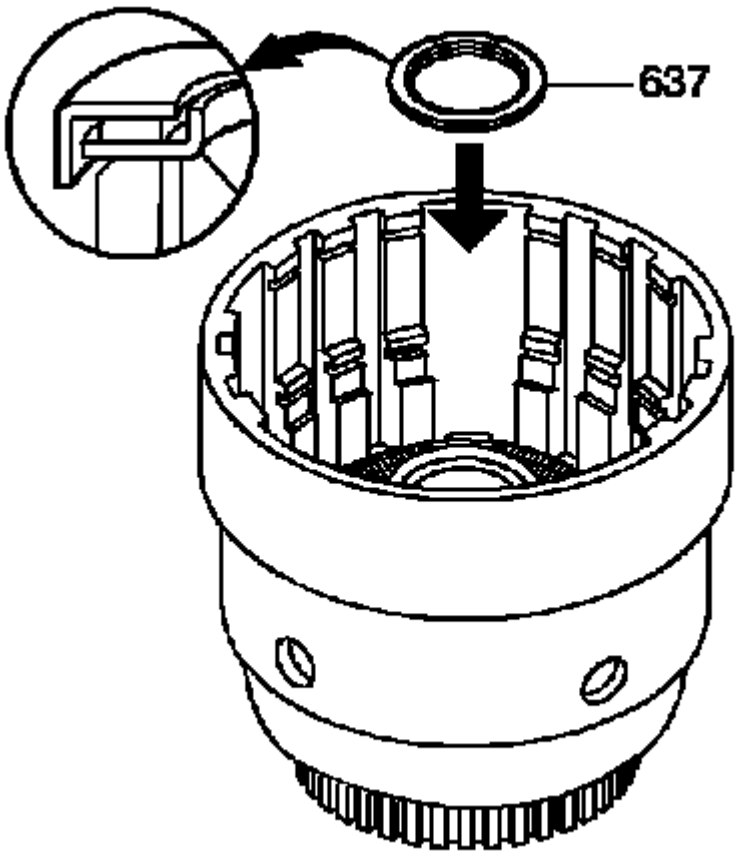


Fig. 165: View Of Direct Clutch Spring Assembly
Courtesy of GENERAL MOTORS CORP.

8. Remove the direct clutch spring assembly (560).

 © 2011 Mitchell Repair Information Company, LLC.

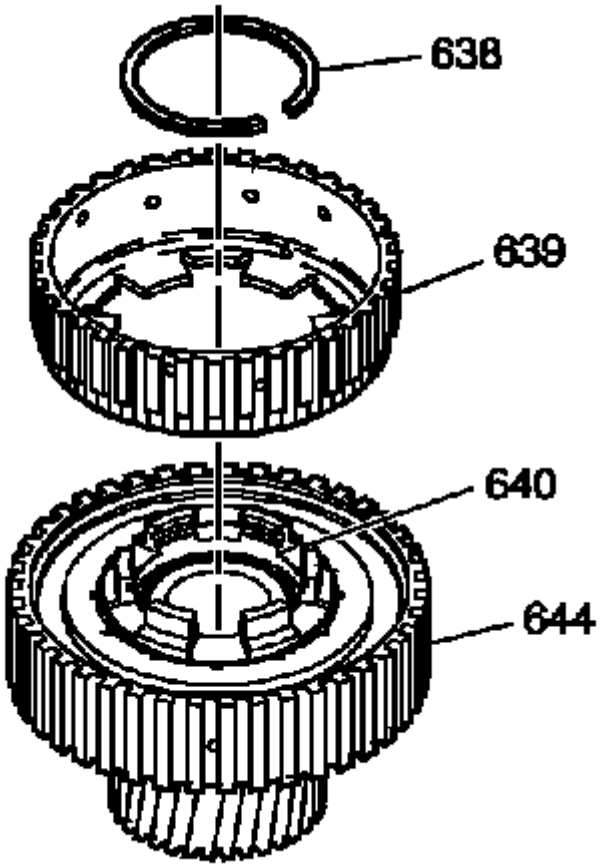


Fig. 166: Removing Direct Clutch Piston
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

9. Install the forward and direct clutch housing assembly with input shaft (567) onto the transmission case cover (19).
10. While pulling on the piston by hand, apply compressed air into the fluid passage (C2) in order to remove the direct clutch piston (562).

 © 2011 Mitchell Repair Information Company, LLC.

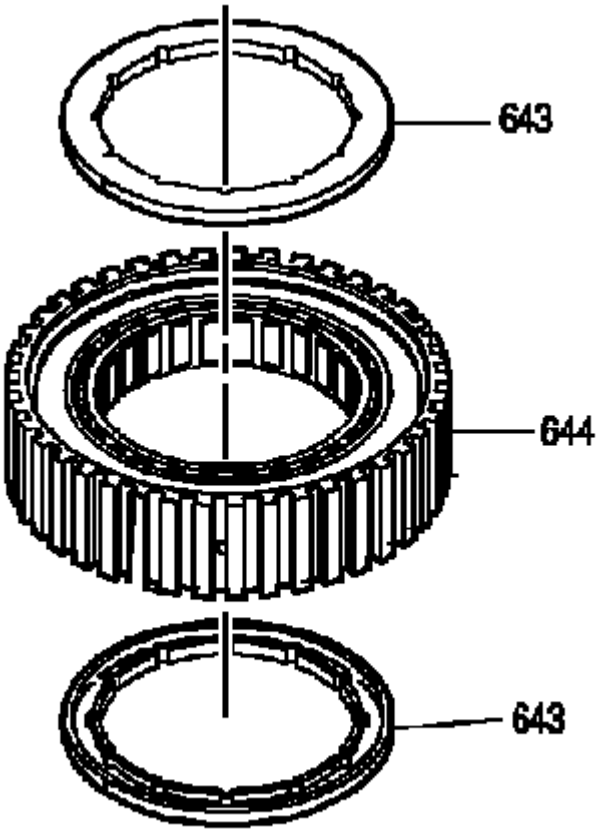


Fig. 167: View Of Direct Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

11. Remove the direct clutch piston inner seal (561) and the direct clutch piston outer seal (563) from the direct clutch piston (562).

 © 2011 Mitchell Repair Information Company, LLC.

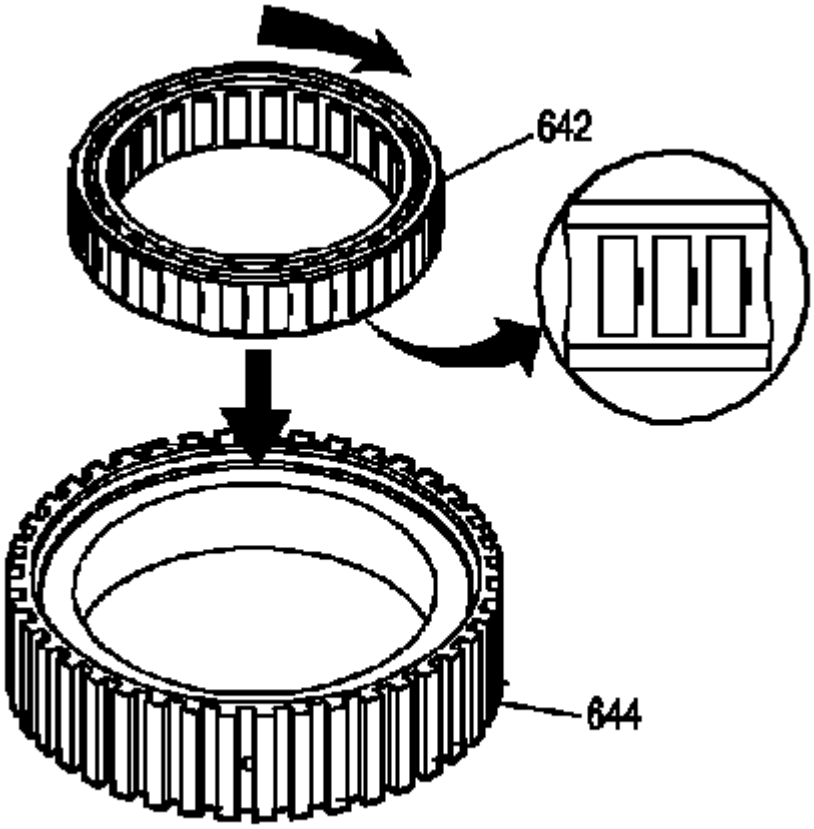


Fig. 168: Removing Forward Clutch Piston
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

12. While pulling upward on the piston by hand, apply compressed air into the fluid passage (C1) in order to remove the forward clutch piston (565).

 © 2011 Mitchell Repair Information Company, LLC.

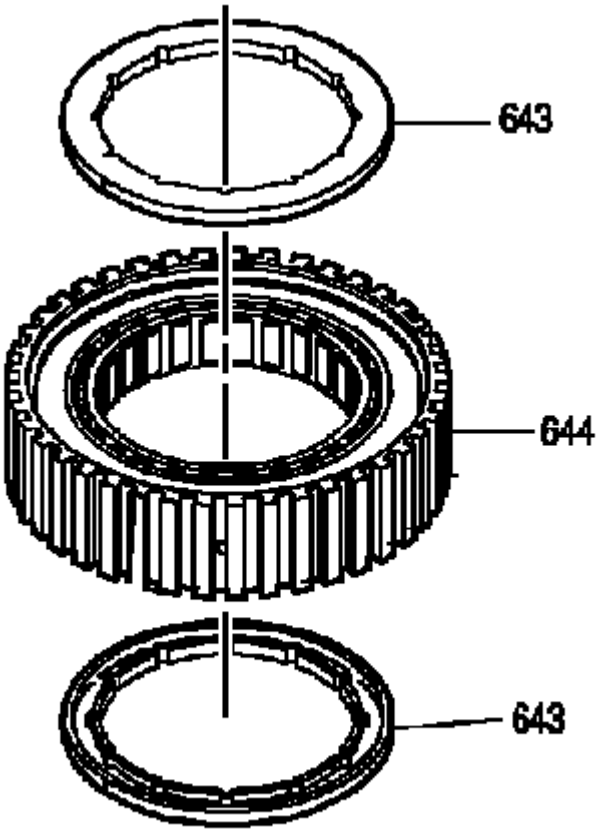


Fig. 169: View Of Forward Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

13. Remove the forward clutch piston inner seal (564) and the forward clutch piston outer seal (566) from the forward clutch piston (565).

FORWARD AND DIRECT CLUTCH ASSEMBLY ASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 25024-A** Servo Piston/Clutch Spring Compressor. See **Special Tools**.
- **J 28585** Snap Ring Remover
- **J 45186** Forward and Direct Clutch Spring Compressor. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

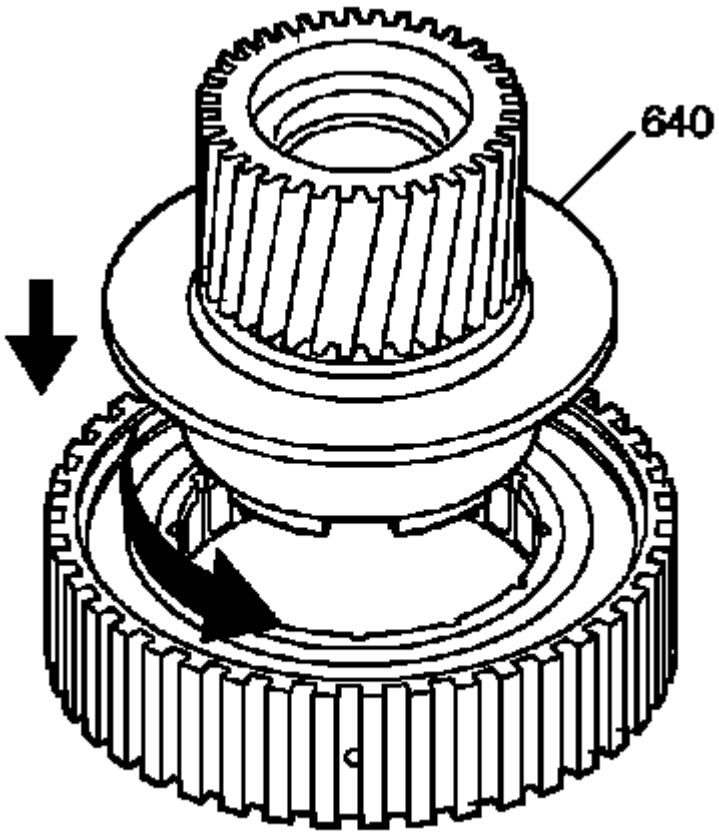


Fig. 170: Applying Compressed Air To Check For Leaks
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Soak the new clutch discs in automatic transmission fluid for at least 2 hours before installation.

1. Inspect the clutch plates for being worn or burnt. Replace the plates if worn or burnt.
2. Shake the piston to be sure the ball check valve is free.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

3. Apply compressed air to the ball check valve to be sure it is not leaking.
4. Inspect the O-ring grooves in the pistons for nicks or scratches.
5. Inspect the clutch plate lugs in the forward clutch piston for grooves.
6. Replace the piston if faulty.

 © 2011 Mitchell Repair Information Company, LLC.

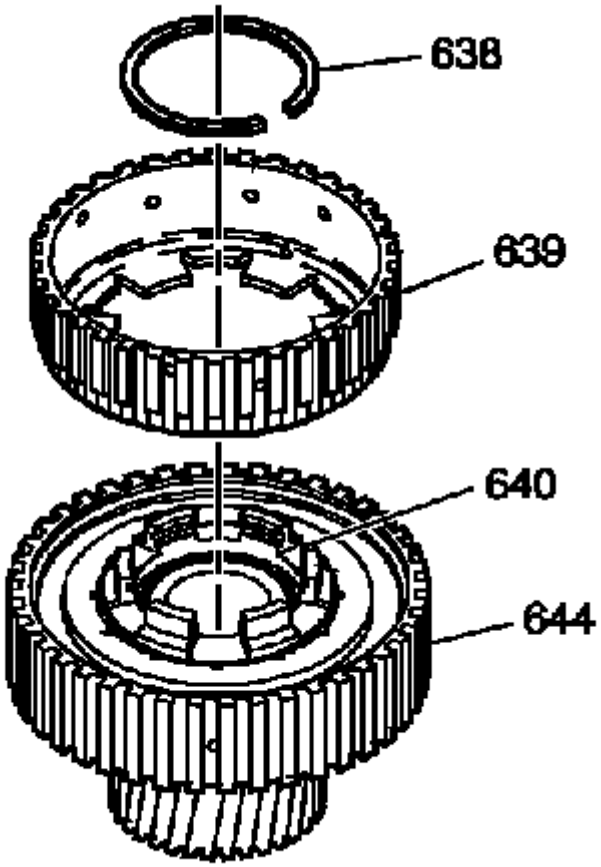


Fig. 171: View Of Forward & Direct Clutch Housing Assembly
Courtesy of GENERAL MOTORS CORP.

7. Clean the forward and direct clutch housing assembly and air dry. Ensure to remove all solvent from the oil passages.
8. Inspect the forward and direct clutch housing assembly for the following conditions:
    - Input shaft bearing and bushing areas for excessive wear or damage
    - Rear support bearing surface for excessive wear or damage
    - Piston bores for nicks, grooves or excessive wear
    - Clutch plate lugs for grooves that will prevent the clutch plates from sliding
9. Replace the forward and direct clutch housing if any of the above conditions are found.

 © 2011 Mitchell Repair Information Company, LLC.

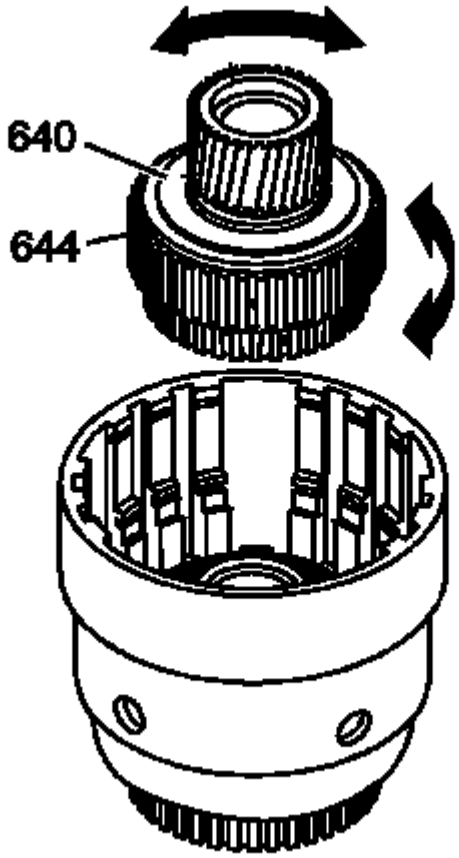


Fig. 172: View Of Forward Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

10. Apply automatic transmission fluid to the new forward clutch piston seals.
11. Install the forward clutch piston inner seal (564) and the forward clutch piston outer seal (566) onto the forward clutch piston (565).
12. Apply automatic transmission fluid to the inner surface of the forward clutch drum.
13. Apply automatic transmission fluid to the inner surface of the forward clutch drum.

IMPORTANT: Do not damage the forward clutch piston seals.

14. Press, by hand, the forward clutch piston (565) into the forward and direct clutch housing assembly - with input shaft.

 © 2011 Mitchell Repair Information Company, LLC.

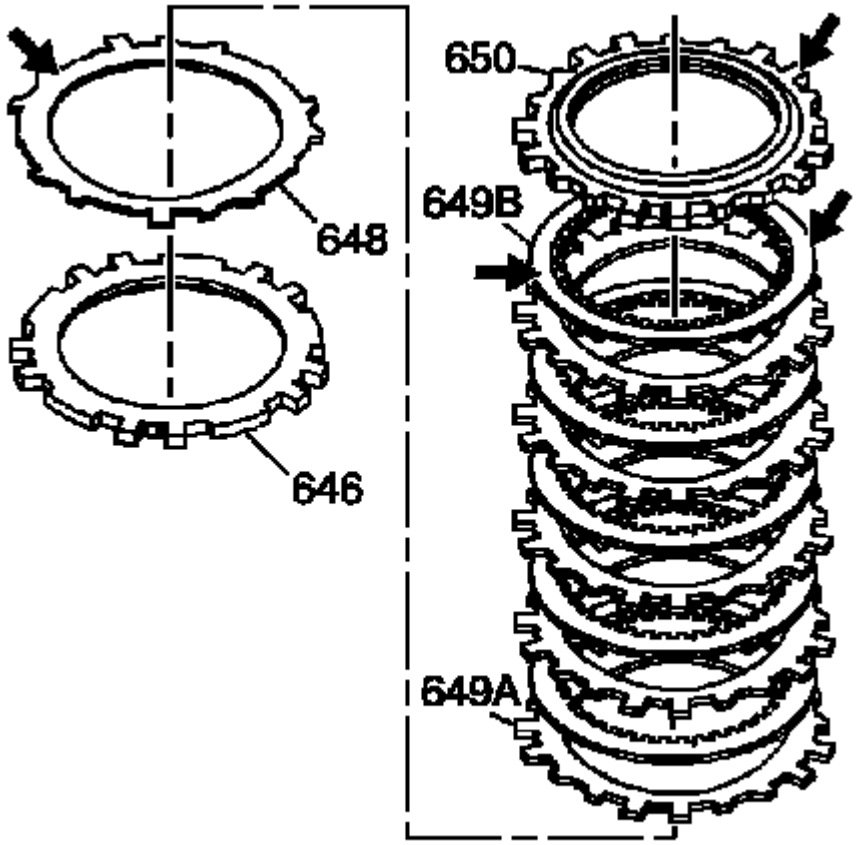


Fig. 173: View Of Direct Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

15. Apply automatic transmission fluid to the new direct clutch piston seals.
16. Install the direct clutch piston inner seal (561) and the direct clutch piston outer seal (563) onto the direct clutch piston (562).
17. Apply automatic transmission fluid to the inner surface of the forward clutch piston.

IMPORTANT: Do not damage the direct clutch piston seals.

18. Press, by hand, the direct clutch piston (562) into the forward clutch piston.

 © 2011 Mitchell Repair Information Company, LLC.

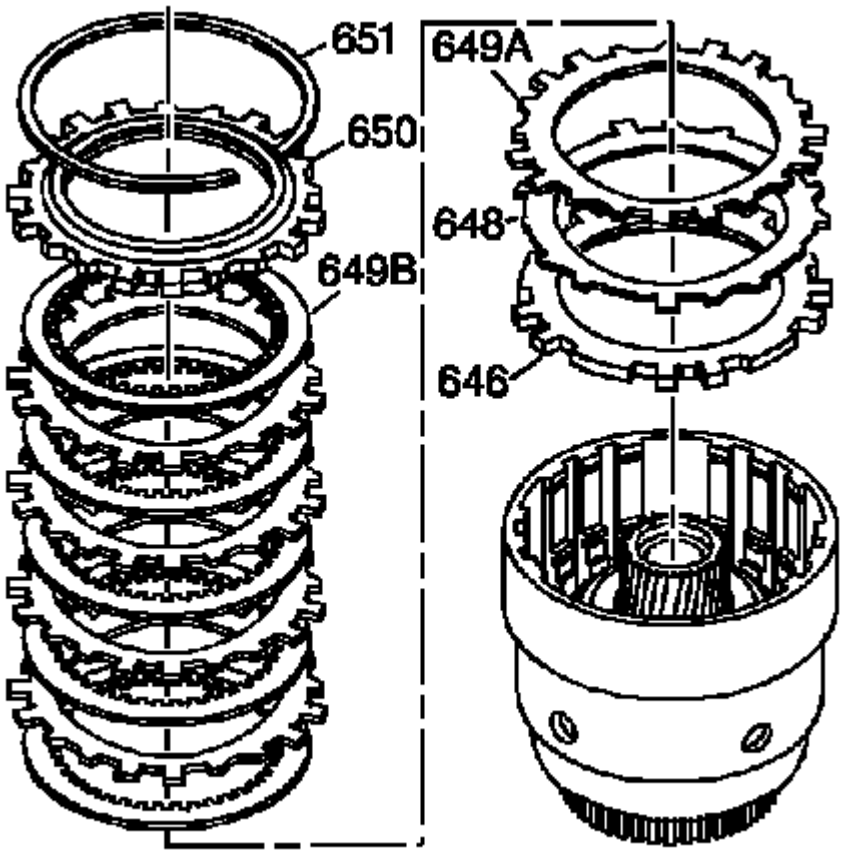


Fig. 174: View Of Direct Clutch Spring Assembly
Courtesy of GENERAL MOTORS CORP.

19. Install the direct clutch spring assembly (560) onto the direct clutch piston, indexing the springs into the holes in the direct clutch piston (562).

 © 2011 Mitchell Repair Information Company, LLC.

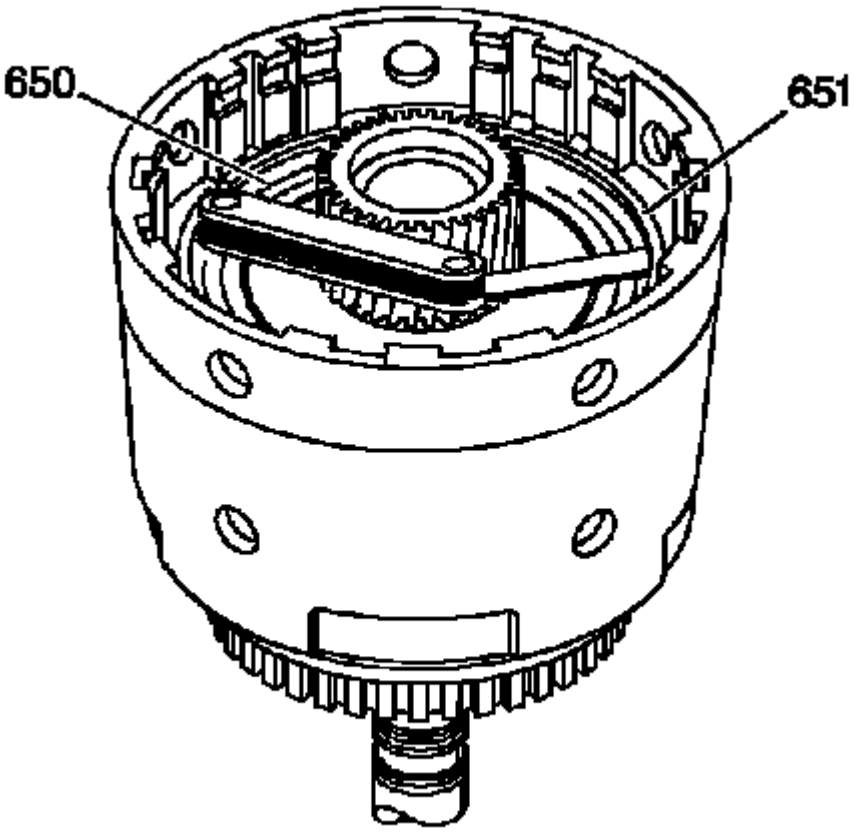


Fig. 175: Removing/Installing Direct Clutch Spring Retaining Ring
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not align the end gap of the direct clutch spring retaining ring (559) with the spring retainer claw.

20. Install the direct clutch spring retaining ring (559).
    1. Place the **J 25024-A** (1) in a vise with the forcing screw on the bottom and backed out. See **Special Tools**.
    2. Place the **J 45186** (2) over the shaft of the forward direct clutch housing and input shaft assembly (567). See **Special Tools**.
    3. Place the J 21420-2 (4) from the **J 23327** on top of the forcing screw of **J 25024-A** (1). See **Special Tools**.
    4. With the forcing screw, compress the clutch spring to allow the installation of the retaining ring.
    5. Use **J 28585** (3) or snap ring pliers to install the retaining ring.
    6. Remove the tools.

 © 2011 Mitchell Repair Information Company, LLC.

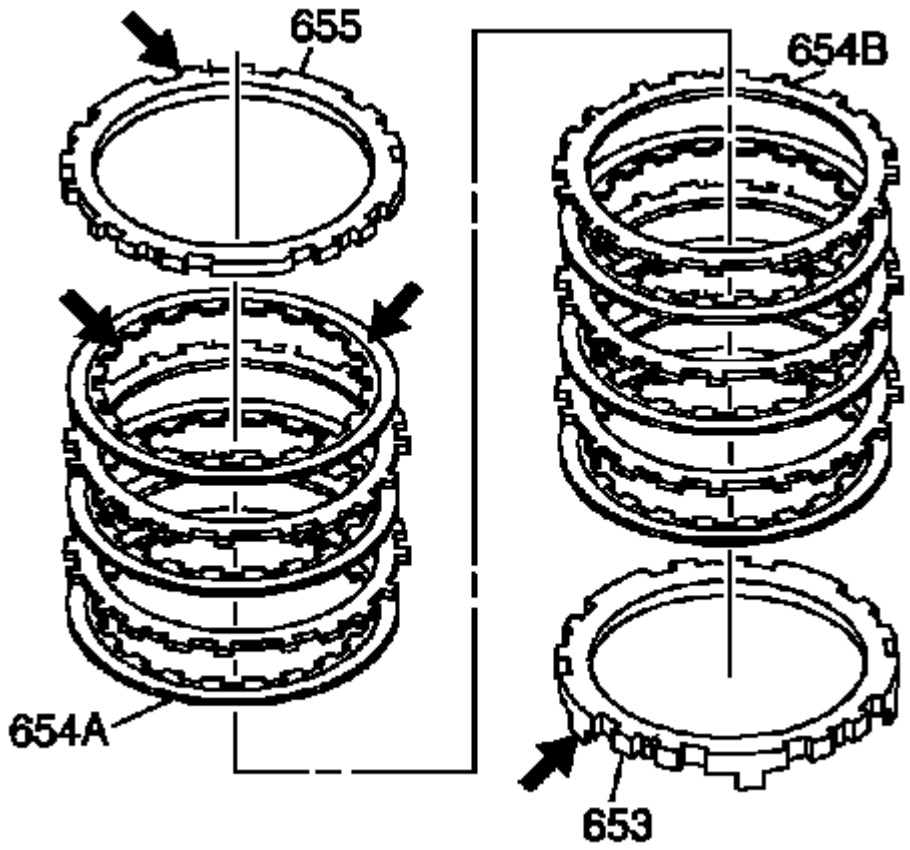


Fig. 176: View Of Forward & Direct Clutch Housing Assembly Clutch Plates
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure the direct clutch apply plate is facing the correct direction.

21. Install the direct clutch apply plate (558). The plate is convex shaped.
22. Install the 4 direct clutch steel plates (557) and the 4 direct clutch fiber plates (556).
23. Install the direct clutch backing plate (555).

 © 2011 Mitchell Repair Information Company, LLC.

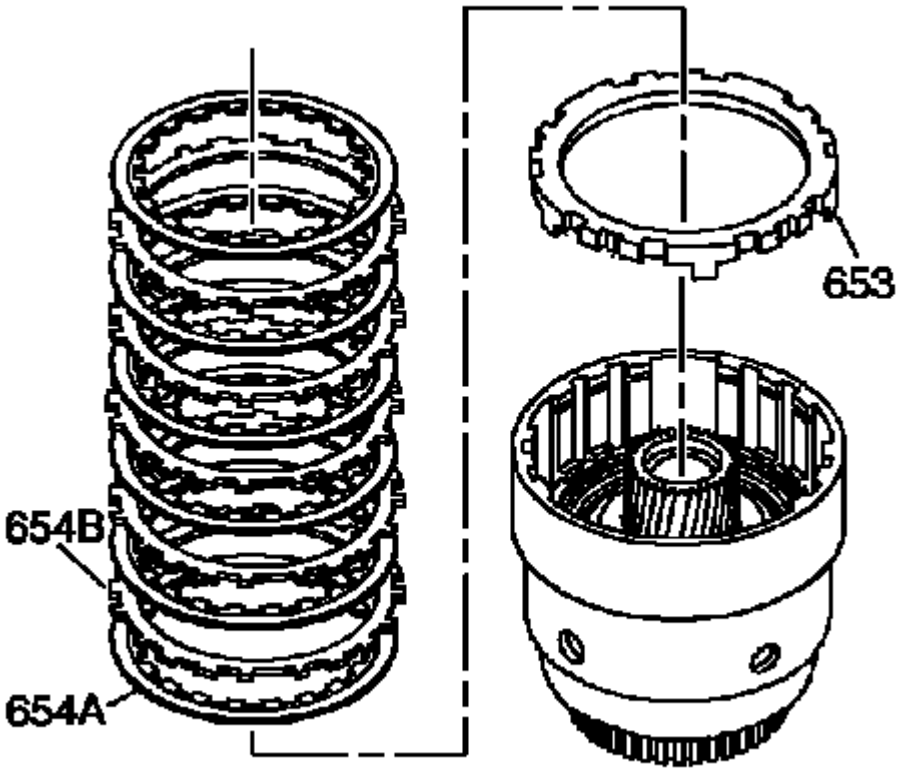


Fig. 177: View Of Direct Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure that the end gap of the direct clutch backing plate retaining ring (554) is not aligned with any of the cut-outs.

24. Install the direct clutch backing plate retaining ring (554) into the groove in the forward and direct clutch housing assembly - with input shaft (567) using **J 28585** .

 © 2011 Mitchell Repair Information Company, LLC.

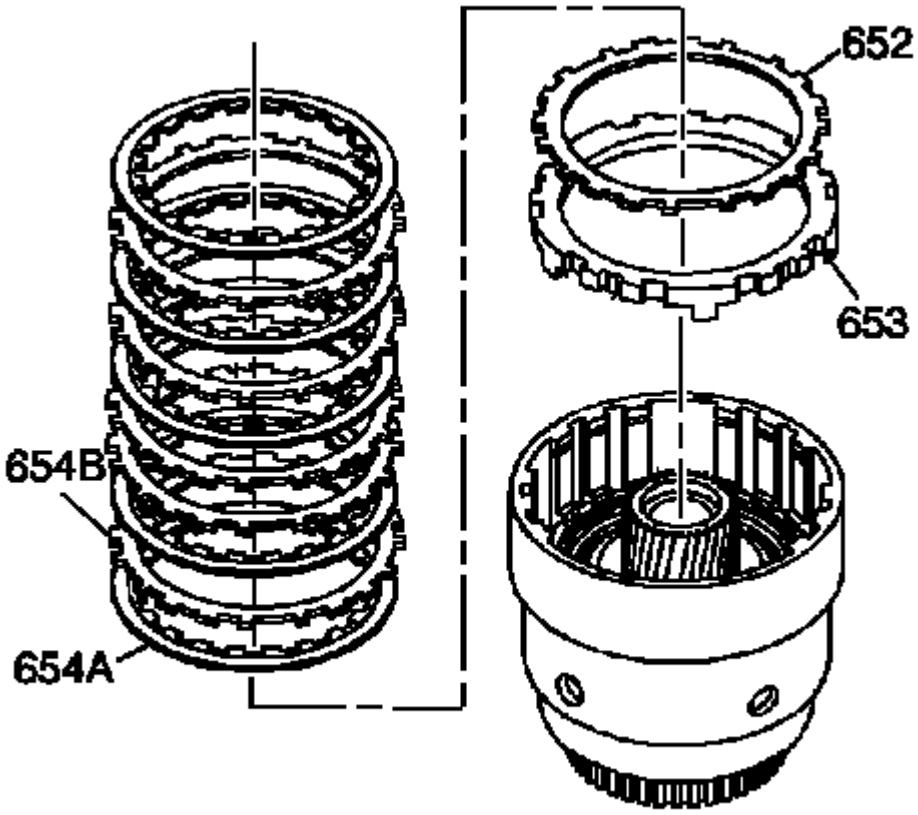


Fig. 178: Exploded View Of Forward & Direct Clutch Housing Assembly
Courtesy of GENERAL MOTORS CORP.

25. Install the 4 forward clutch steel plates (553) and the 4 forward clutch fiber plates (552).
26. Install the forward clutch backing plate (551).

 © 2011 Mitchell Repair Information Company, LLC.

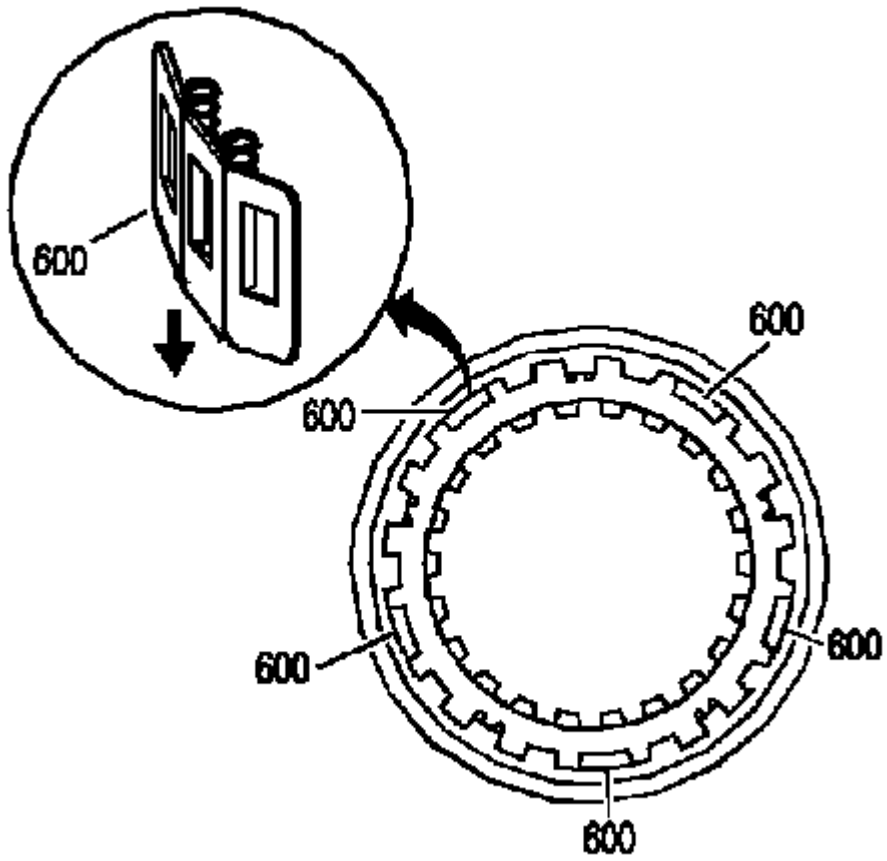


Fig. 179: Removing Forward Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure that the end gap of the forward clutch backing plate retaining ring (550) is not aligned with any of the cut-outs.

27. Install the forward clutch backing plate retaining ring (550) into the groove in the forward and direct clutch housing assembly - with input shaft (567) using **J 28585** .

 © 2011 Mitchell Repair Information Company, LLC.

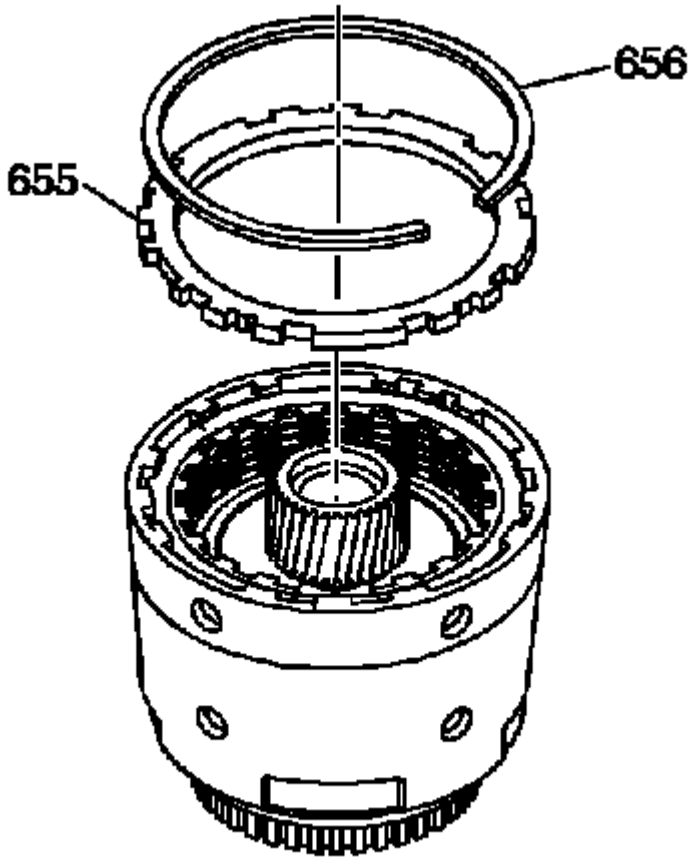


Fig. 180: View Of Forward Clutch Housing Thrust Bearing & Selective Race
Courtesy of GENERAL MOTORS CORP.

28. Install the forward clutch housing thrust bearing race (568) 0.81 mm (0.032 in) thickness and the forward clutch housing thrust bearing (569).

 © 2011 Mitchell Repair Information Company, LLC.

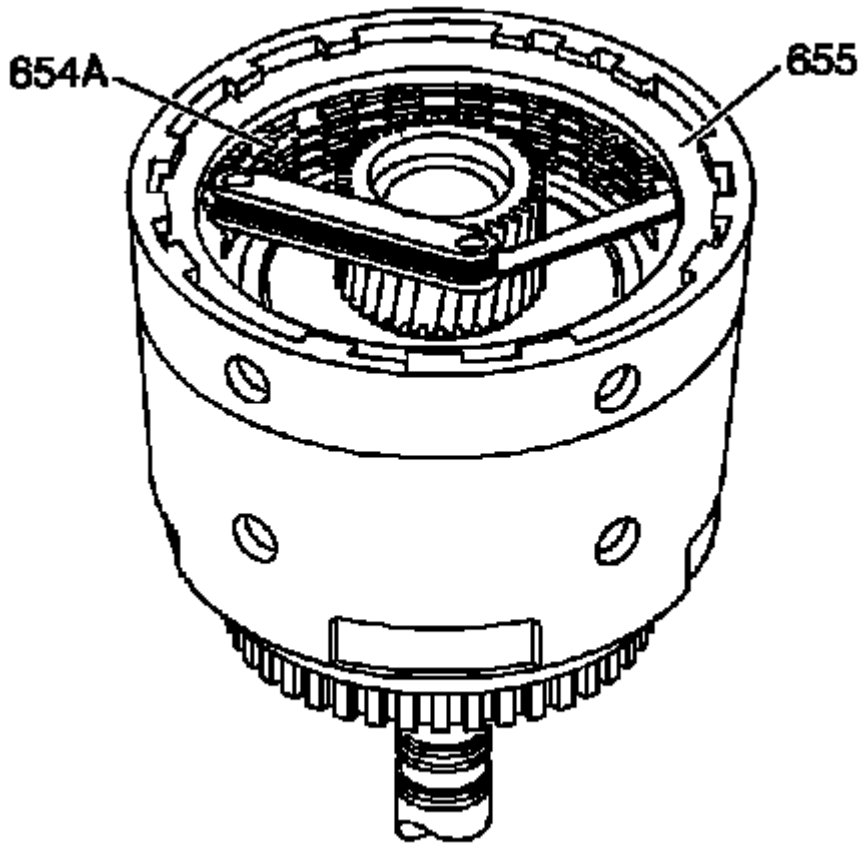


Fig. 181: View Of Input Shaft & O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

29. Apply automatic transmission fluid to the new input shaft O-ring seal (570).
30. Install the new input shaft O-ring seal (570) into the groove of the forward and direct clutch housing assembly - with input shaft (567).

DIRECT CLUTCH PISTON TRAVEL CHECK

Tools Required

- **J 45200** Dial Indicator Set. See **Special Tools**.
- **J 45166** Dial Indicator Extension Rod - 8 inch". See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

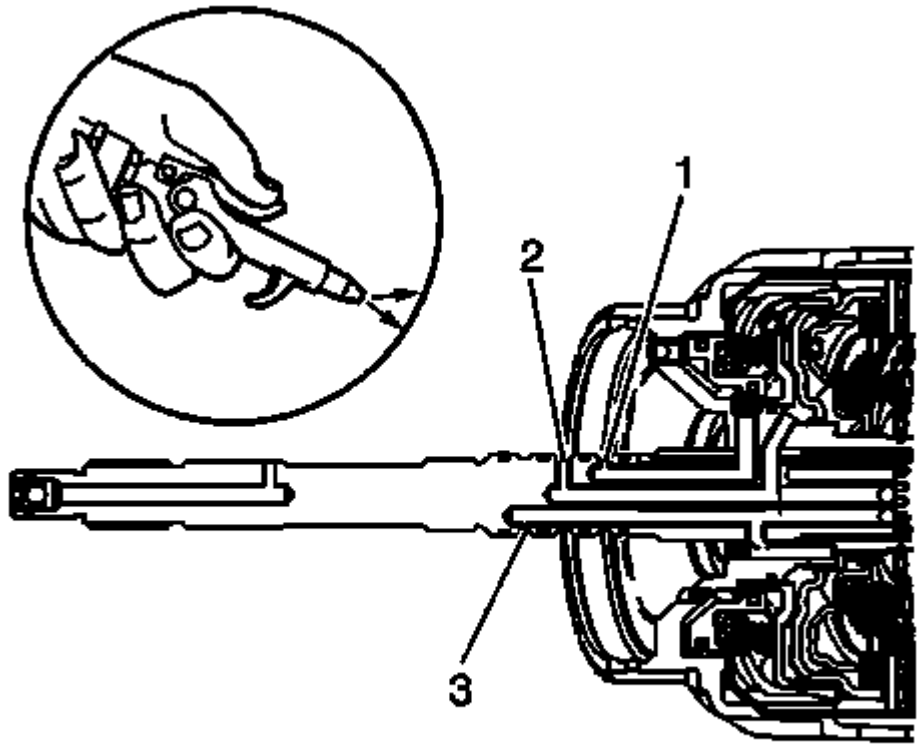


Fig. 182: Checking Direct Clutch Piston Travel
Courtesy of GENERAL MOTORS CORP.

1. Install the forward and direct clutch assembly (23) onto the transmission case cover (19).
2. Remove the inner forward clutch accumulator cover bolt/screw (617) from the forward clutch accumulator assembly. Install **J 45166** (2) in place of the removed bolt. See **Special Tools**.
3. Assemble **J 45200** (3) and **J 45166** (2) onto the transmission case cover (19). See **Special Tools**.
4. Install dial indicator extension - OTC # 222545 or equivalent (4) on the dial indicator plunger.
5. Place the dial indicator plunger on the piston as shown and set the dial indicator to zero.
6. Cover the forward clutch accumulator housing (1) with a shop rag to prevent fluid from spraying out the top of the accumulator housing when compressed air is applied to the passege (C2).

CAUTION: When you use compressed air in order to clear fluid passages and to dry parts, always aim the air pressure away from face and eyes. Always wear adequate eye protection in order to avoid injury from dirt and debris that may adhere to parts.

7. Apply compressed air to the C2 fluid passage in the case and measure the direct clutch piston stroke.

Specification: Direct clutch piston stroke: 1.49 - 1.91 mm (0.059 - 0.075 in)

 © 2011 Mitchell Repair Information Company, LLC.

8. If the piston stroke is not within specifications, replace the direct clutch backing plate with the correct thickness. Refer to **Transmission Clearance Specifications**, Available Direct Clutch Backing Plate Thickness.

FORWARD CLUTCH PISTON TRAVEL CHECK

Tools Required

- **J 45200** Dial Indicator Set. See **Special Tools**.
- **J 45166** Dial Indicator Extension Rod - 8 inch". See **Special Tools**.

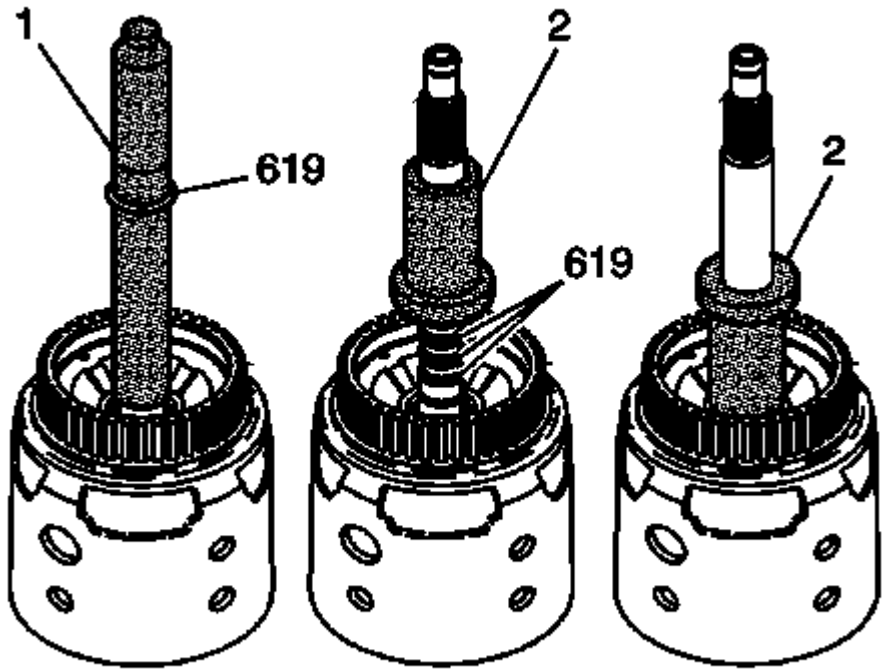


Fig. 183: Forward Clutch Piston Travel Check
Courtesy of GENERAL MOTORS CORP.

1. Install the forward and direct clutch assembly (23) onto the transmission case cover (19).
2. Remove the inner forward clutch accumulator cover bolt/screw from the forward clutch accumulator assembly. Install **J 45166** (2) in place of the removed bolt. See **Special Tools**.
3. Assemble **J 45200** (3) and **J 45166** (2) onto the transmission case cover (19). See **Special Tools**.
4. Install the dial indicator extension - OTC # 222545 or equivalent (4) on the dial indicator plunger.
5. Place the dial indicator plunger on the piston as shown and set the dial indicator to zero.
6. Cover the forward clutch accumulator housing (1) with a shop rag to prevent fluid from spraying out the

 © 2011 Mitchell Repair Information Company, LLC.

top of the accumulator housing when compressed air is applied to the passege (C2).

CAUTION: When you use compressed air in order to clear fluid passages and to dry parts, always aim the air pressure away from face and eyes. Always wear adequate eye protection in order to avoid injury from dirt and debris that may adhere to parts.

7. Apply compressed air to the C1 fluid passage in the case and measure the forward clutch piston stroke.

   Specification: Forward clutch piston stroke: 0.74 - 1.06 mm (0.029 - 0.042 in)

8. If the piston stroke is not within specifications, replace the forward clutch backing plate with the correct thickness. Refer to **Transmission Clearance Specifications**, Available Forward Clutch Backing Plate Thickness.

FORWARD AND DIRECT CLUTCH ASSEMBLY INSTALLATION

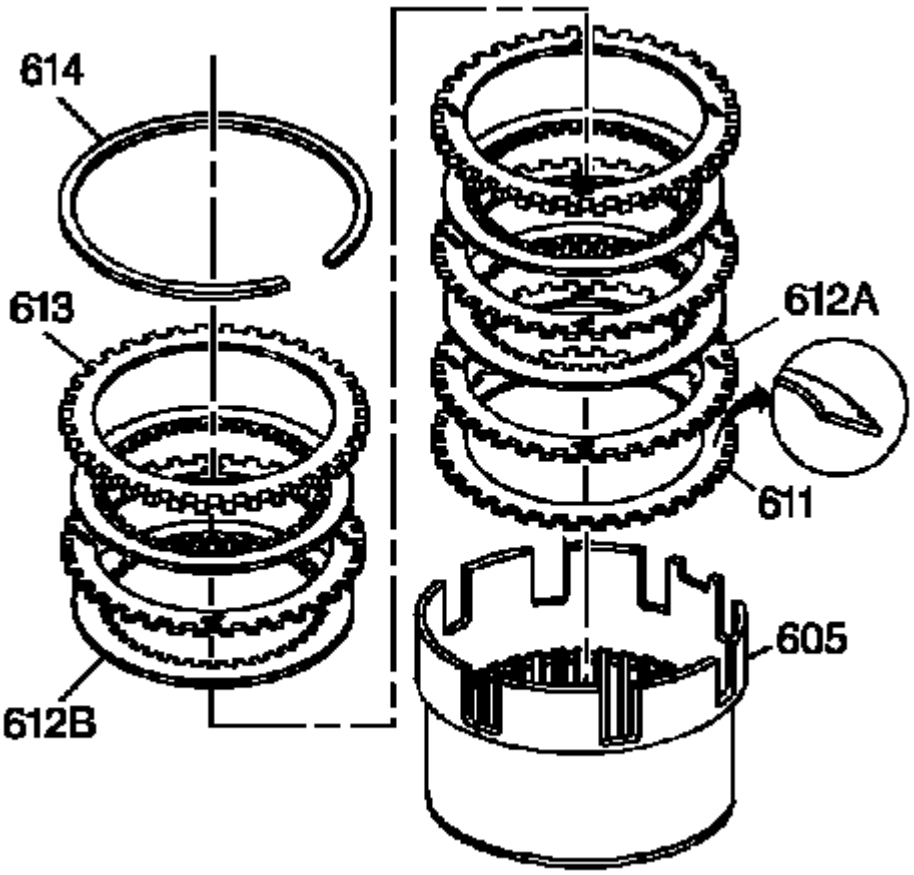


Fig. 184: View Of Forward & Direct Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the forward clutch and direct clutch assembly (23). Rotate the clutch assembly during installation

 © 2011 Mitchell Repair Information Company, LLC.

in order to index the forward and direct clutch plates with the rear internal gear and the rear sun gear assembly.

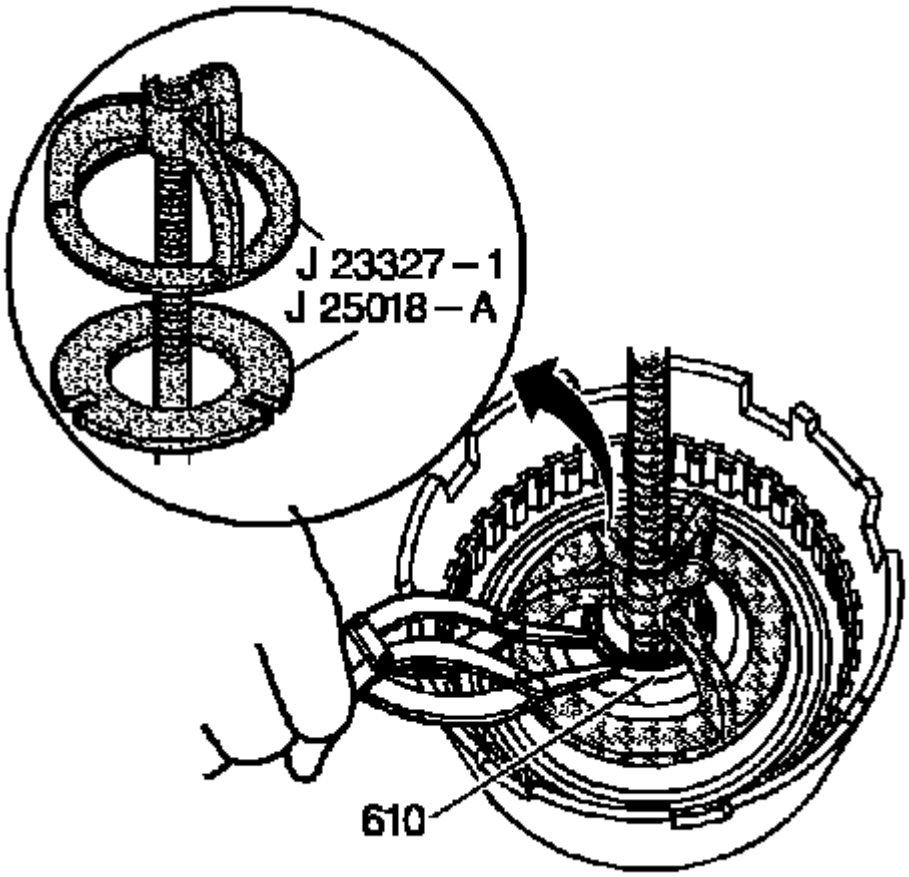


Fig. 185: Measuring Dimension A
Courtesy of GENERAL MOTORS CORP.

2. Measure dimension a.

   Installation Height: Dimension a should be 50.850-51.825 mm (2.002-2.040 in).

3. If dimension a is greater than specification, index the forward and direct clutch assembly until the correct specification is met.

 © 2011 Mitchell Repair Information Company, LLC.

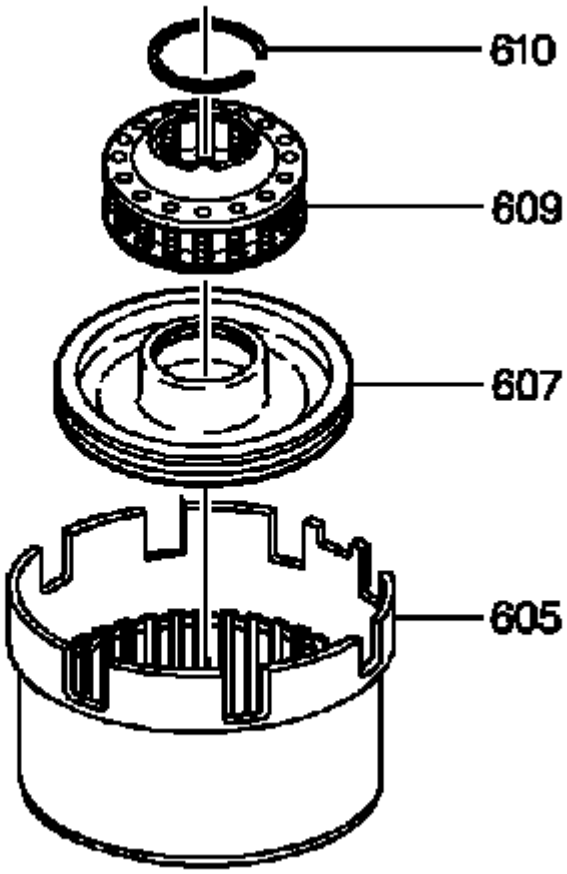


Fig. 186: View Of Lube Fluid Pipe
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not bend or damage the lube fluid pipe.

4. Using a plastic hammer, install the lube fluid pipe (85).

 © 2011 Mitchell Repair Information Company, LLC.

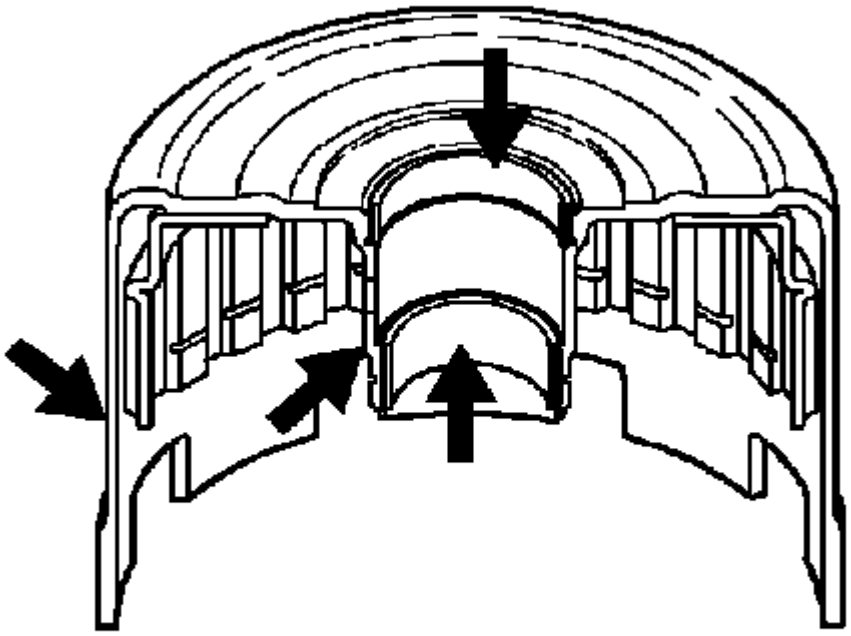


Fig. 187: View Of Lube Fluid Pipe Retainer
Courtesy of GENERAL MOTORS CORP.

5. Install the lube fluid pipe retainer (84)

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

6. Install the lube fluid pipe retainer bolt (83).

Tighten: Tighten the lube fluid pipe retainer bolt to 5 N.m (44 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

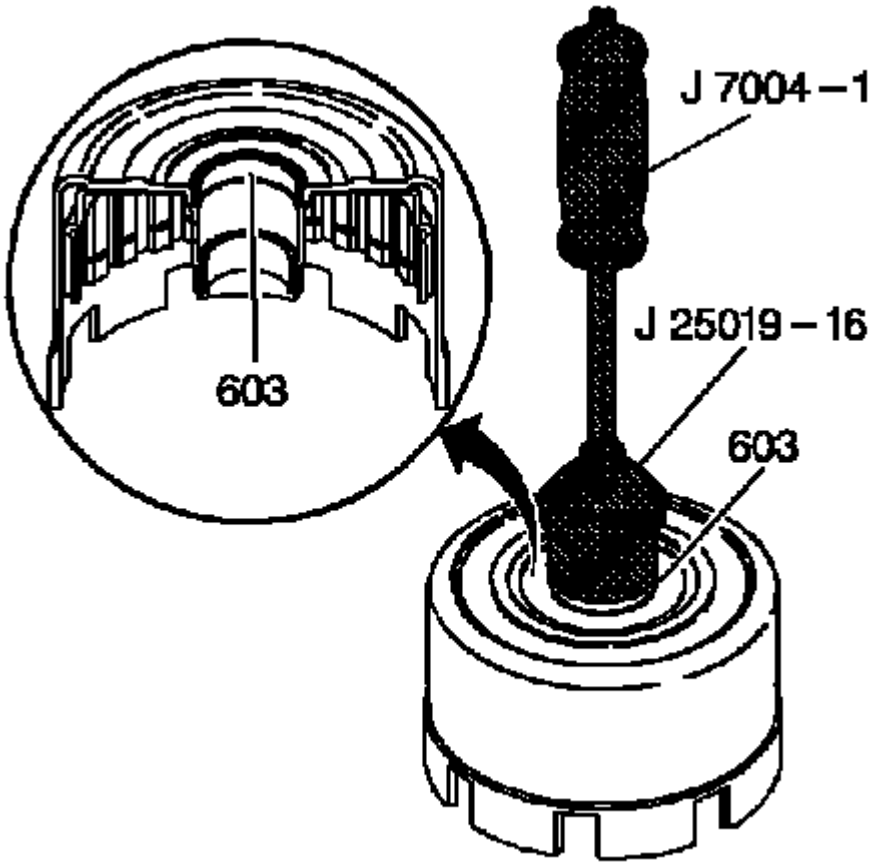


Fig. 188: Identifying Case Fluid Passage Seals
Courtesy of GENERAL MOTORS CORP.

7. Apply grease to the 5 new case fluid passage seals.
8. Install the 5 new case fluid passage seals (86) into the transmission case assembly.

CASE COVER ASSEMBLY DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

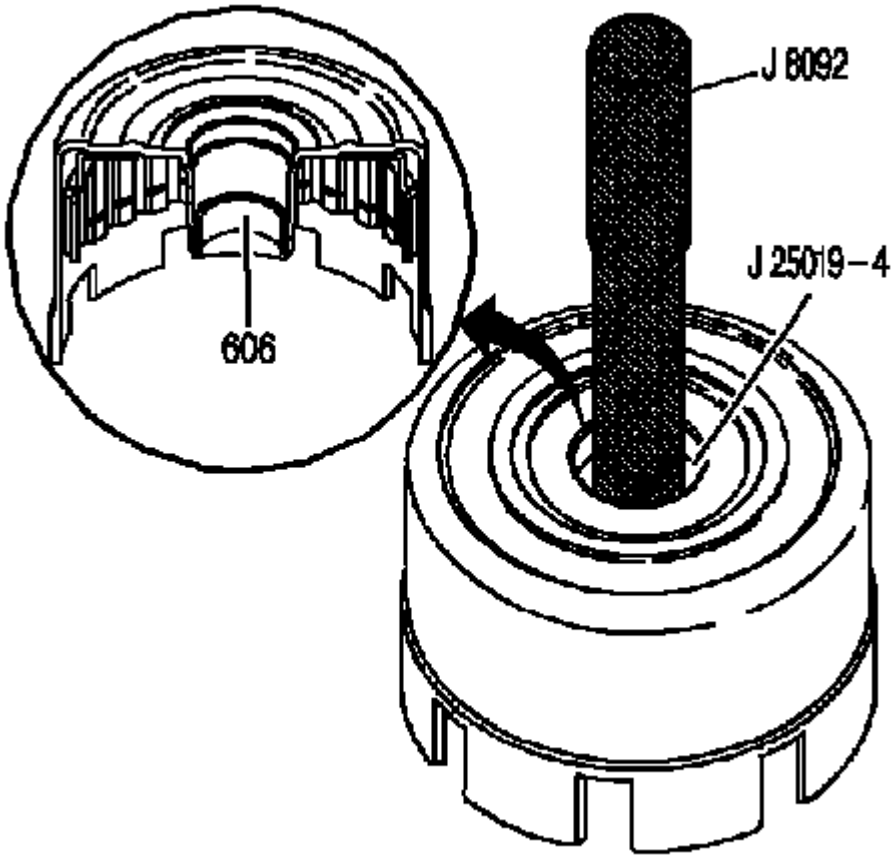


Fig. 189: View Of Clutch Apply Pipe Retainers
Courtesy of GENERAL MOTORS CORP.

1. Remove the 4, 4-5 clutch apply pipe bolts/screws (611) and the 2, 4-5 clutch apply pipe retainers (610) from the transmission case cover.

 © 2011 Mitchell Repair Information Company, LLC.

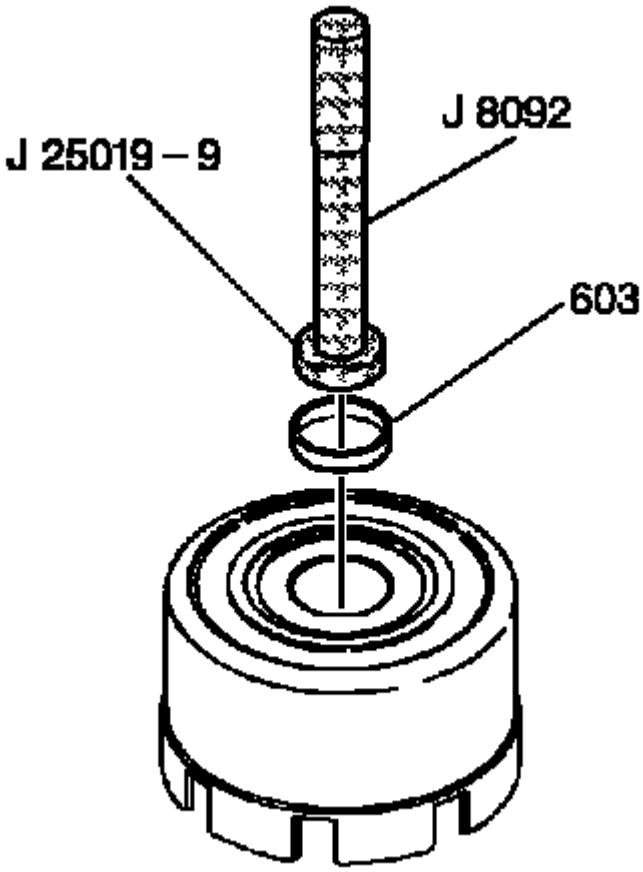


Fig. 190: View Of 4-5 Clutch Apply Pipe
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the 4-5 clutch apply pipe or the transmission case cover.

2. Remove the 4-5 clutch apply pipe (609).

 © 2011 Mitchell Repair Information Company, LLC.

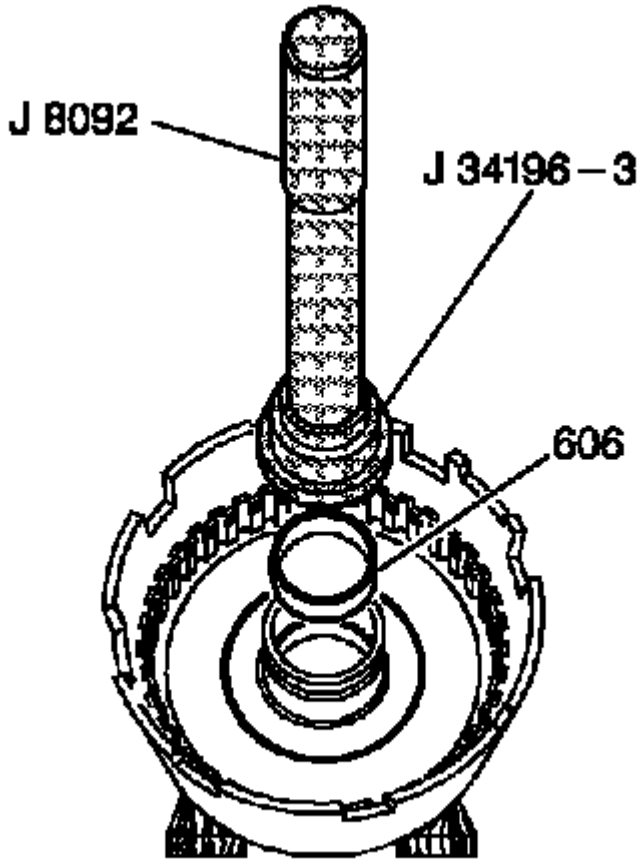


Fig. 191: View Of Forward/Direct Clutch Housing Thrust Bearing Race & Fluid Sealing Rings
Courtesy of GENERAL MOTORS CORP.

3. Remove the forward/direct clutch housing thrust bearing race (628) from the transmission case cover.
4. Remove the 3 forward clutch housing fluid seal rings (607) from the transmission case cover.

 © 2011 Mitchell Repair Information Company, LLC.

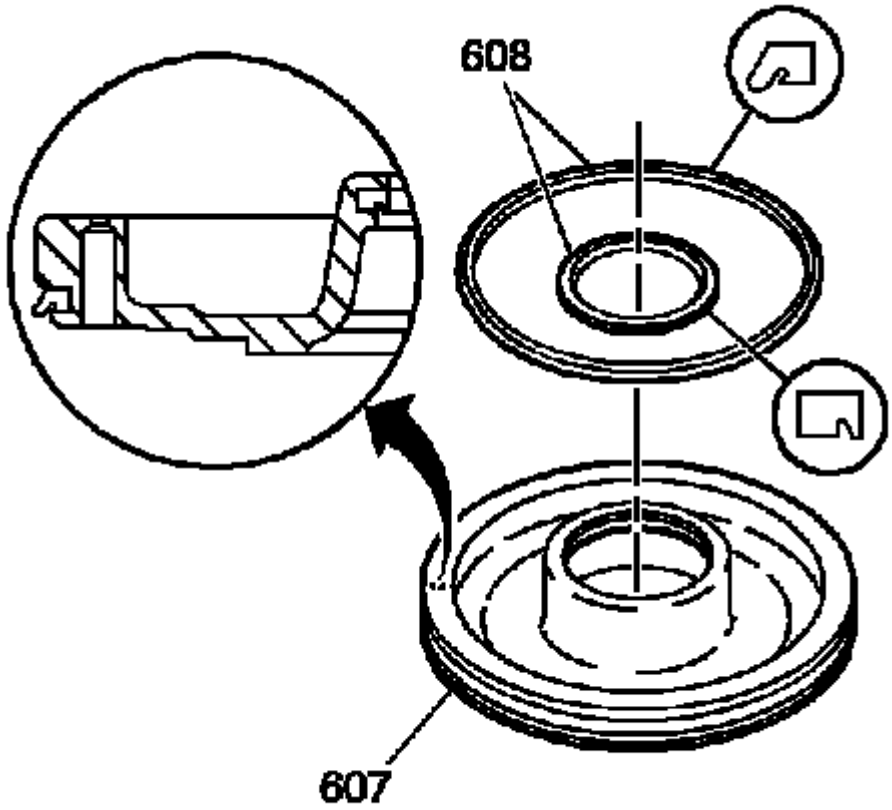


Fig. 192: Exploded View Of Forward Clutch Accumulator
Courtesy of GENERAL MOTORS CORP.

5. Remove the 2 forward clutch accumulator cover bolts/screws (617) and the forward clutch accumulator cover (616).
6. Remove the following components from the forward clutch accumulator cover:
    - The forward clutch accumulator piston (612)
    - The forward clutch accumulator piston fluid seal ring (613)
    - The forward clutch accumulator piston spring (614)
    - The forward clutch accumulator cover seal (615)

1-2 REVERSE CLUTCH DISASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 28585** Snap Ring Remover
- **J 23456** Booster and Clutch Pack Compressor
- **J 45184** Differential Bearing Race Installer. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

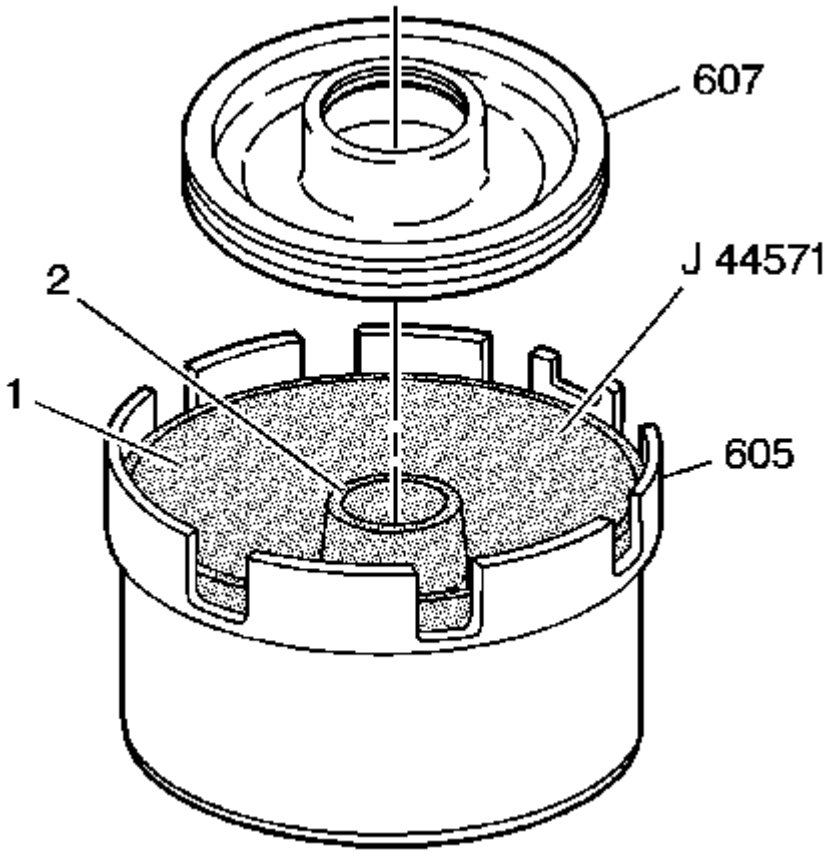


Fig. 193: View Of 1-2 Reverse Clutch Plates
Courtesy of GENERAL MOTORS CORP.

1. Remove the 1-2 reverse clutch backing plate retaining ring (622) using **J 28585** .
2. Remove the following components:
    - The 1-2 reverse clutch backing plate (621)
    - The 6 1-2 reverse clutch fiber plates (620)
    - The 6 1-2 reverse clutch steel plates (619)
    - The 1-2 reverse clutch apply plate (618)

 © 2011 Mitchell Repair Information Company, LLC.

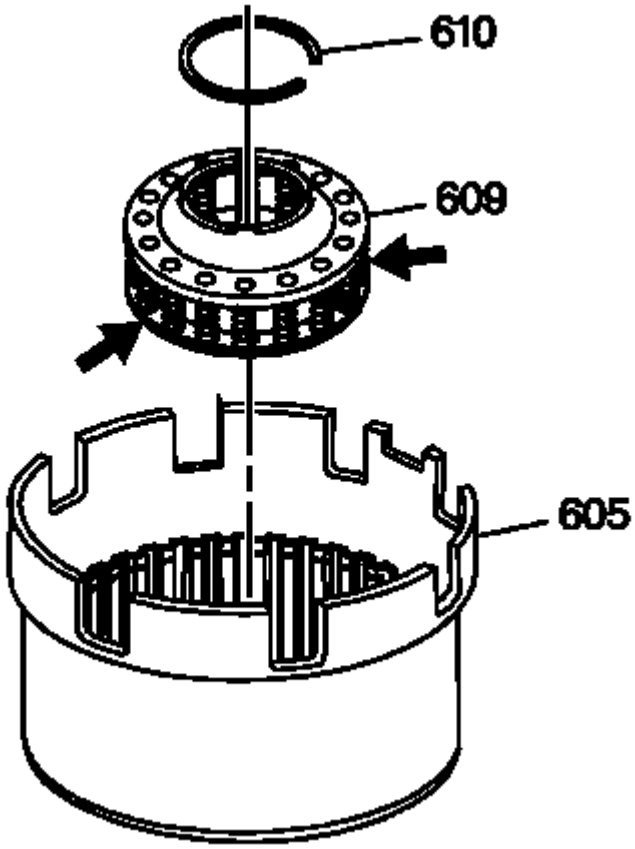


Fig. 194: Removing 1-2 Reverse Clutch Piston Return Spring Retaining Ring
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not bend the 1-2 reverse clutch piston return spring assembly (601).

3. Place **J 45184** (1) on the center of **J 23456** (2). See **Special Tools**.
4. Place the transmission case cover (19) with the 1-2 reverse clutch piston assembly onto **J 45184** (1). See **Special Tools**.
5. Using J 23327-1 (3), which is the bridge part of **J 23327** , compress the 1-2 reverse clutch piston return spring assembly (601).
6. Remove the 1-2 reverse clutch piston return spring retaining ring (600) using snap ring pliers.
7. Remove the pressure from **J 23456** (2), remove J 23327-1 (3) and the 1-2 reverse clutch piston return spring assembly (601).
8. Remove all tools.

 © 2011 Mitchell Repair Information Company, LLC.

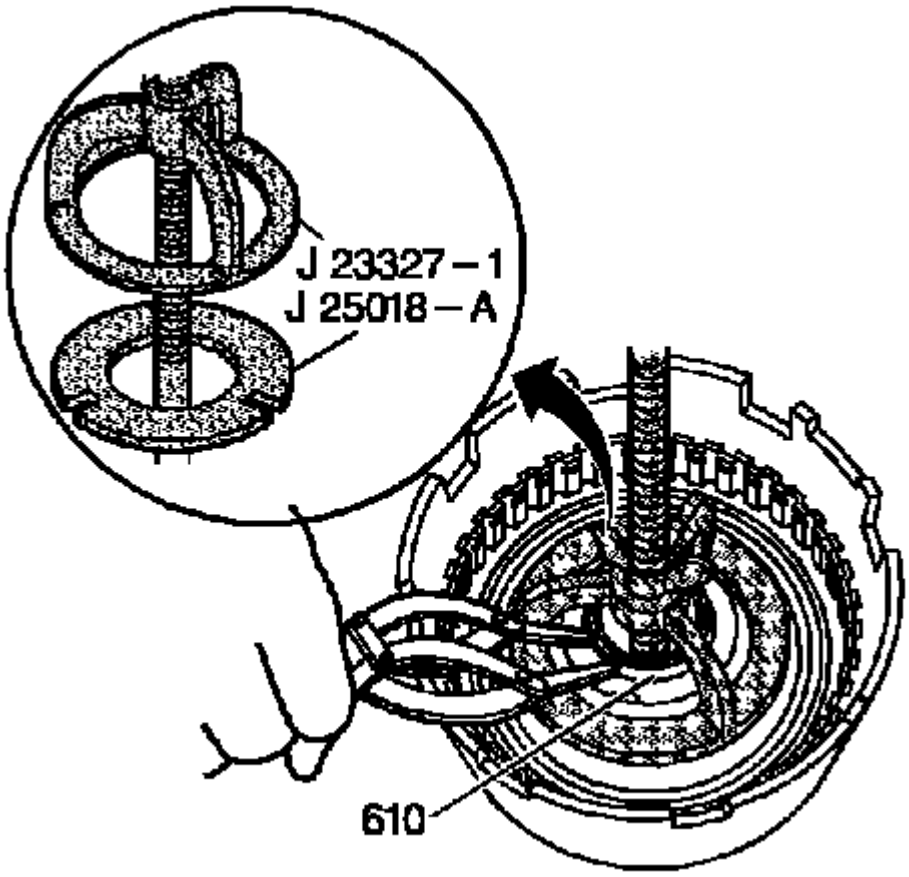


Fig. 195: Removing 1-2 Reverse Clutch Piston
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

9. While pulling upward on the piston by hand, apply compressed air into the 1-2 reverse clutch fluid passage and remove the 1-2 reverse clutch piston (603).
10. Remove the 1-2 reverse clutch piston inner seal (602).
11. Remove the 1-2 reverse clutch piston outer seal (604).

CASE COVER CLEANING AND INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

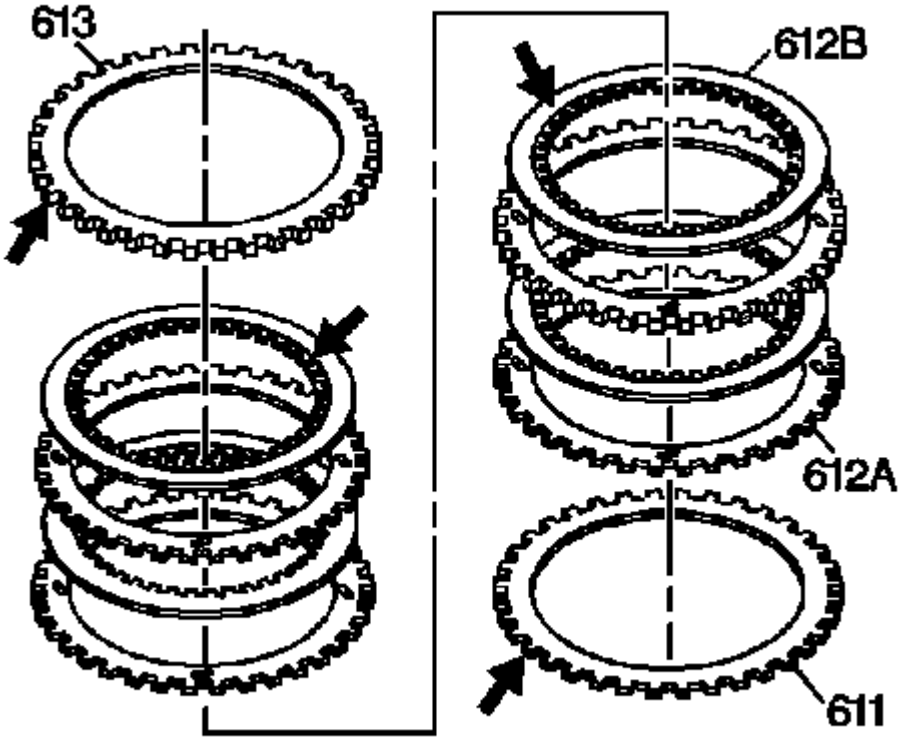


Fig. 196: Locating Front Differential Transfer Drive Gear Assembly Rear Bearing Assembly & Input Shaft Support Bearing
Courtesy of GENERAL MOTORS CORP.

1. Clean the transmission case cover and air dry. Ensure solvent is removed from the fluid passages and bearings.
2. Inspect the front differential transfer drive gear assembly rear bearing assembly (623) for the following conditions:
    - Bent cages
    - Brinneling
    - Pitting
    - Flaking
3. Inspect the input shaft support bearing (625) for the following conditions:
    - Bent cages
    - Brinneling
    - Pitting
    - Flaking
4. Inspect the transmission cover sealing surface for damage.
5. Inspect the 1-2 reverse clutch piston bore for wear or damage.

 © 2011 Mitchell Repair Information Company, LLC.

6. Inspect the lugs for the 1-2 reverse clutch plates for grooves that will prevent the plates for sliding.
7. Replace the transmission case cover if any of the above conditions are found.

1-2 REVERSE CLUTCH ASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 23456** Booster and Clutch Pack Compressor
- **J 45184** Differential Bearing Race Installer. See **Special Tools**.

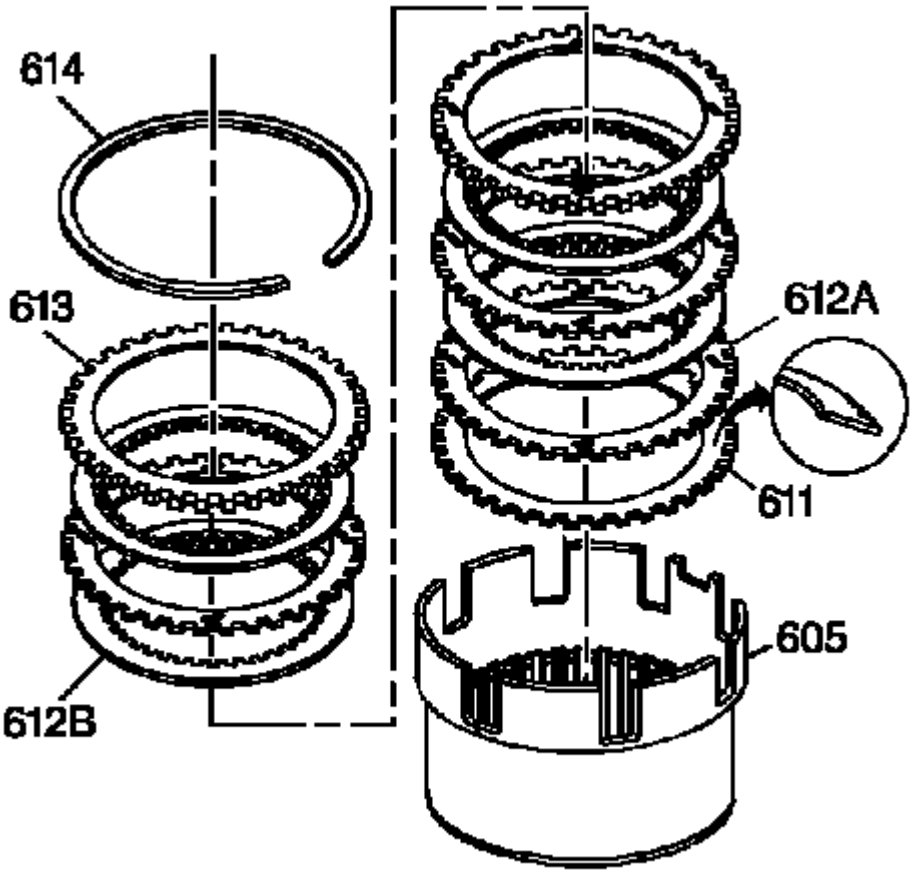


Fig. 197: View Of 1-2 Reverse Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the 1-2 reverse clutch piston seals (602, 603).

1. Apply automatic transmission fluid to the new 1-2 reverse clutch piston seals (602, 603).
2. Install the new 1-2 reverse clutch piston inner seal (602) and the 1-2 reverse clutch piston outer seal (604) onto the 1-2 reverse clutch piston (603).
3. Apply automatic transmission fluid to the inner surface of the transmission case cover.

 © 2011 Mitchell Repair Information Company, LLC.

4. Hand press the 1-2 reverse clutch piston (603) into the transmission case cover, making sure not to damage the seals.

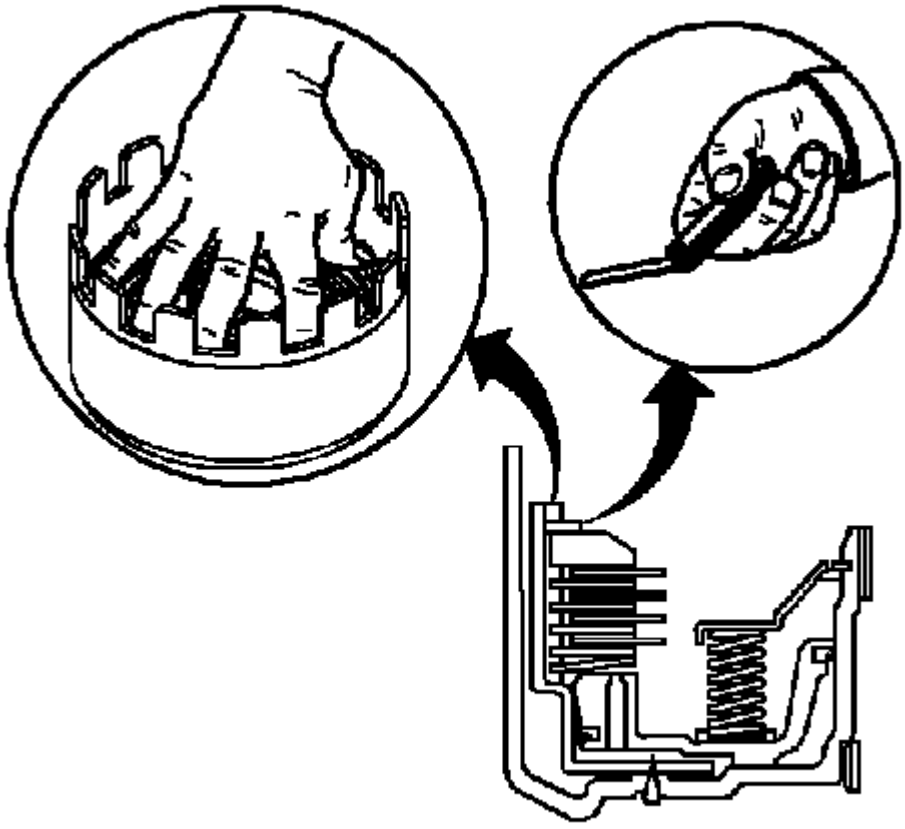


Fig. 198: View Of 1-2 Reverse Clutch Piston Return Spring Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not bend the 1-2 reverse clutch piston return spring assembly (601).

5. Place the 1-2 reverse clutch piston return spring assembly (601) on the 1-2 reverse clutch piston (603), indexing the springs into the holes in the 1-2 reverse clutch piston assembly.

 © 2011 Mitchell Repair Information Company, LLC.

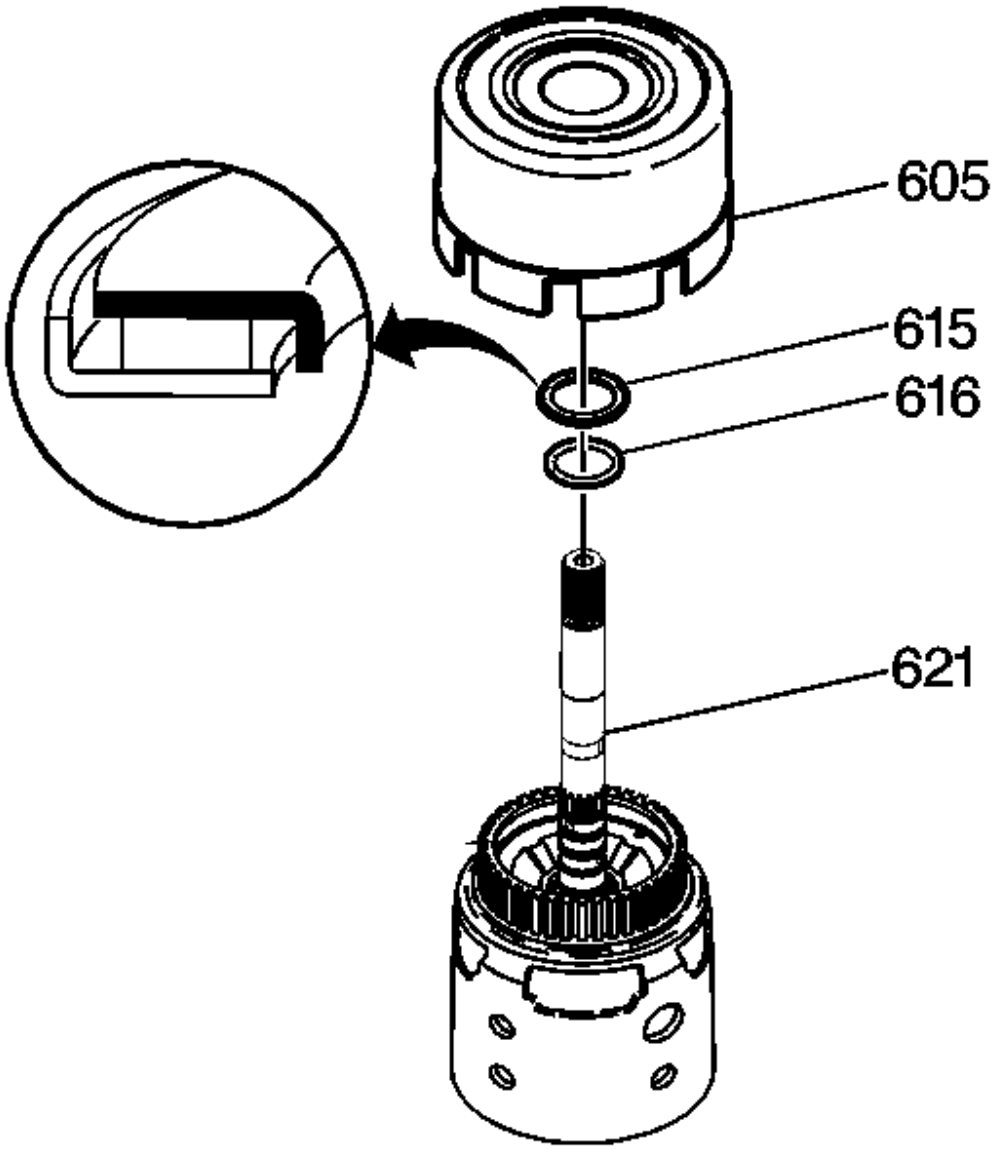


Fig. 199: Removing 1-2 Reverse Clutch Piston Return Spring Retaining Ring
Courtesy of GENERAL MOTORS CORP.

6. Place **J 45184** (1) on the center of **J 23456** (2). See **Special Tools**.
7. Place the transmission case cover (19) with the 1-2 reverse clutch piston assembly onto **J 45184** (1). See **Special Tools**.
8. Using J 23327-1 (3), which is the bridge part of **J 23327** , compress the 1-2 reverse clutch piston return

 © 2011 Mitchell Repair Information Company, LLC.

spring assembly (601).

9. Install the 1-2 reverse clutch piston return spring retaining ring (600) using snap ring pliers.
10. Remove the pressure from **J 23456** (2).
11. Remove all tools.

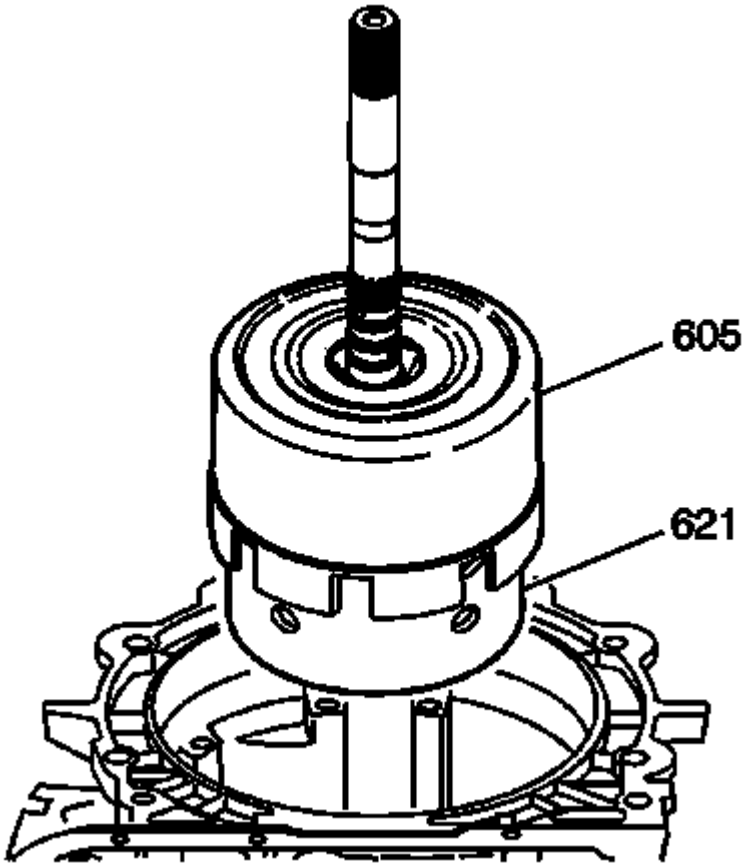


Fig. 200: View Of 1-2 Reverse Clutch Plates
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Check the position and direction of the 1-2 reverse clutch apply plate (618) before installation.

12. Install the 1-2 reverse clutch apply plate (618).

IMPORTANT:
- **Make sure you have the correct number of clutch plates.**
- **Make sure the clutch plates are in the correct order.**

13. Install the 6 steel plates (619) and the 6 fiber plates (620).
14. Install the 1-2 reverse clutch backing plate (621).

IMPORTANT: Check the position of the 1-2 reverse clutch backing plate retaining ring

 © 2011 Mitchell Repair Information Company, LLC.

(622) before installation.

15. Install the 1-2 reverse clutch backing plate retaining ring (622) into the groove indicated.

CASE COVER ASSEMBLY ASSEMBLE

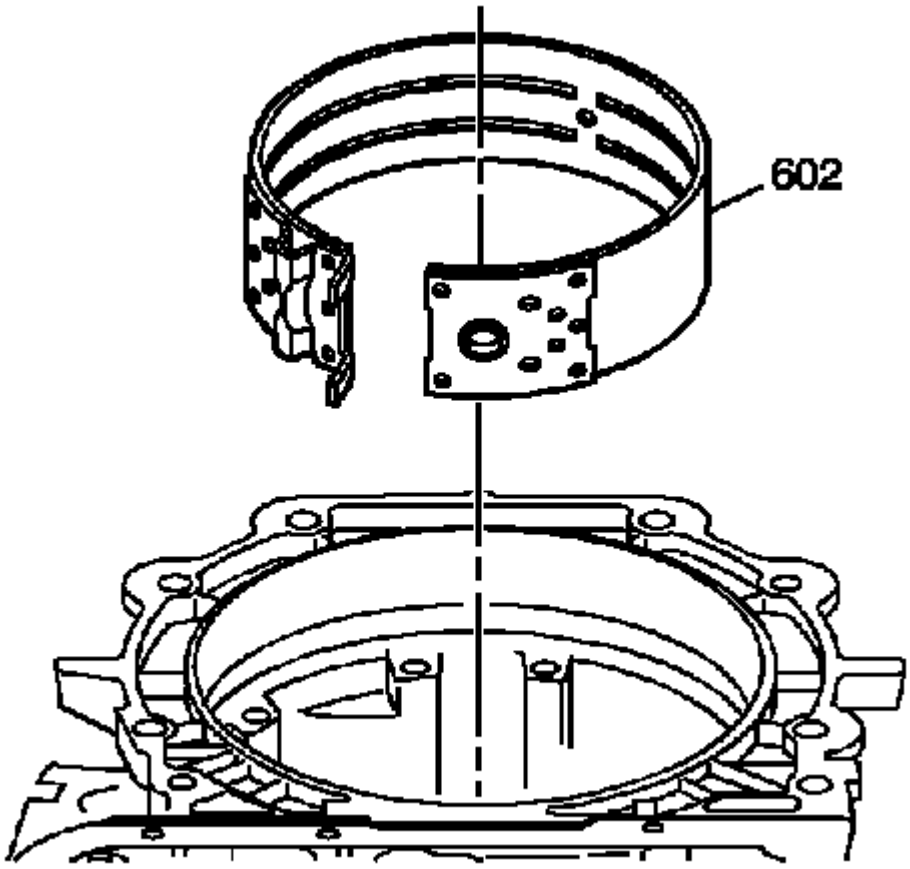


Fig. 201: Installing Forward Clutch Accumulator Cover Assembly
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to the new forward clutch accumulator piston fluid seal ring (613).
2. Install the new forward clutch accumulator piston fluid seal ring (613) onto forward clutch accumulator piston (612).
3. Install the forward clutch accumulator piston spring (614) and the forward clutch accumulator piston (612) into the forward clutch accumulator cover (616).
4. Apply automatic transmission fluid to the new forward clutch accumulator cover seal (615).
5. Install the new forward clutch accumulator cover seal (615) onto forward clutch accumulator cover (616).
6. Install the forward clutch accumulator cover assembly onto the transmission case cover.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

 © 2011 Mitchell Repair Information Company, LLC.

7. Install and tighten 1 of the 2 forward clutch accumulator cover bolts (617).

   Tighten: Tighten the forward clutch accumulator cover bolt (617) to 10 N.m (89 lb in).

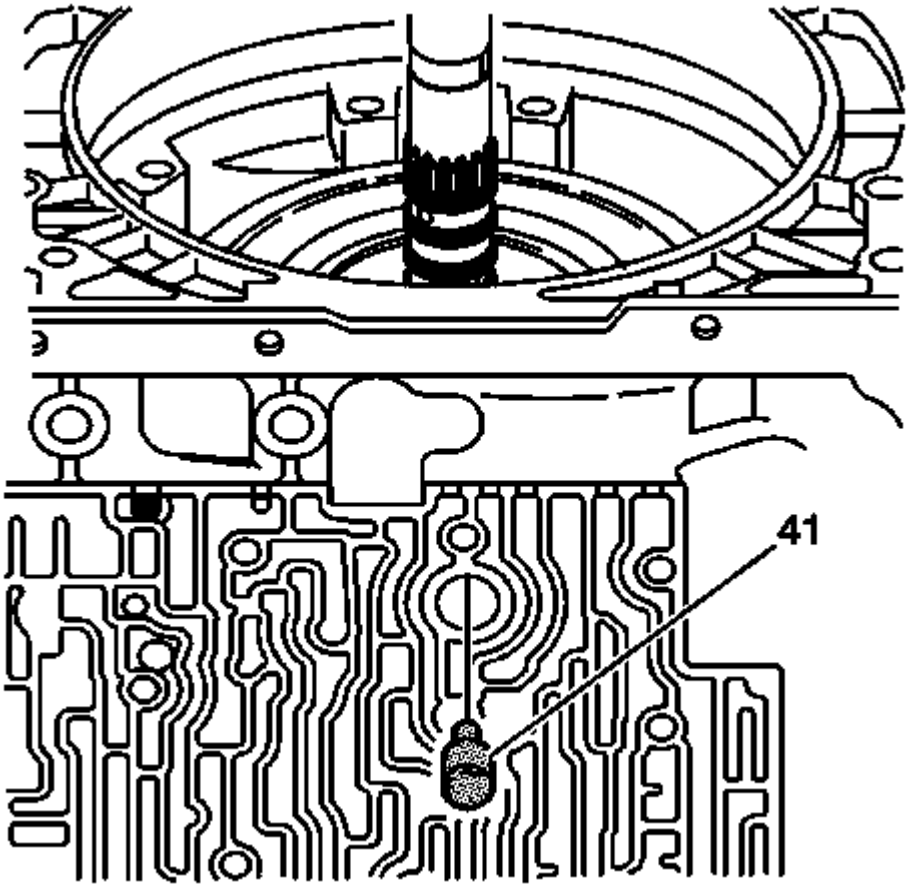


Fig. 202: View Of Forward/Direct Clutch Housing Thrust Bearing Race & Fluid Sealing Rings
Courtesy of GENERAL MOTORS CORP.

8. Apply automatic transmission fluid to the 3 new forward clutch housing fluid seal rings (607).

   Install the 3 new forward clutch housing fluid seal rings (607).

9. Install the forward/direct clutch housing thrust selective bearing race (628) without any markings. This is the 0.81 mm (0.032 in) thick race and will determine the correct thickness for the forward/direct clutch end play measurement.

 © 2011 Mitchell Repair Information Company, LLC.

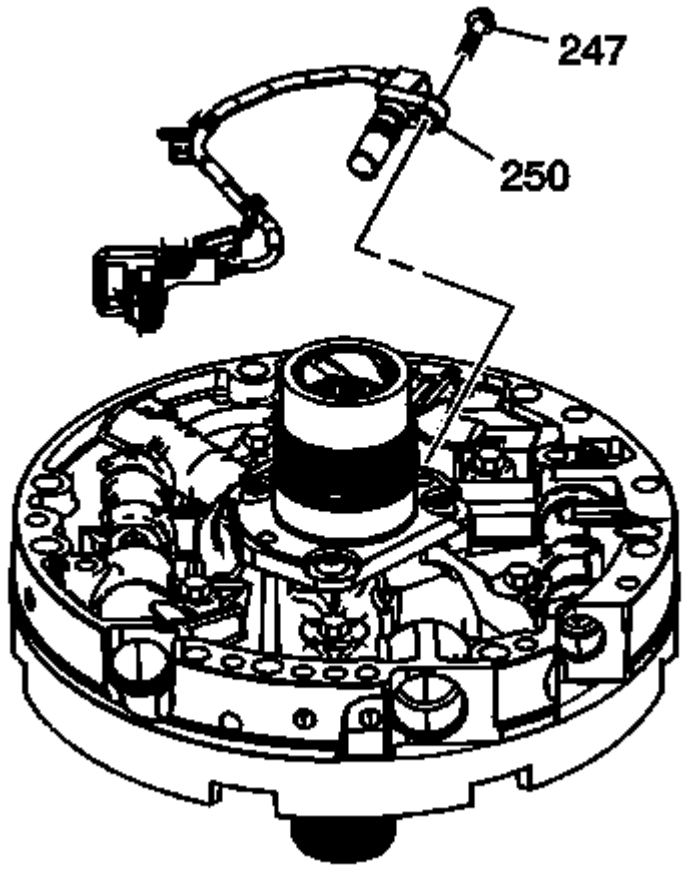


Fig. 203: View Of 4-5 Clutch Apply Pipe & Seals
Courtesy of GENERAL MOTORS CORP.

10. Apply automatic transmission fluid to the 2 new 4-5 clutch apply pipe seals (608).
11. Install the 2 pipe seals (608) onto the 4-5 clutch apply pipe (609).

 © 2011 Mitchell Repair Information Company, LLC.

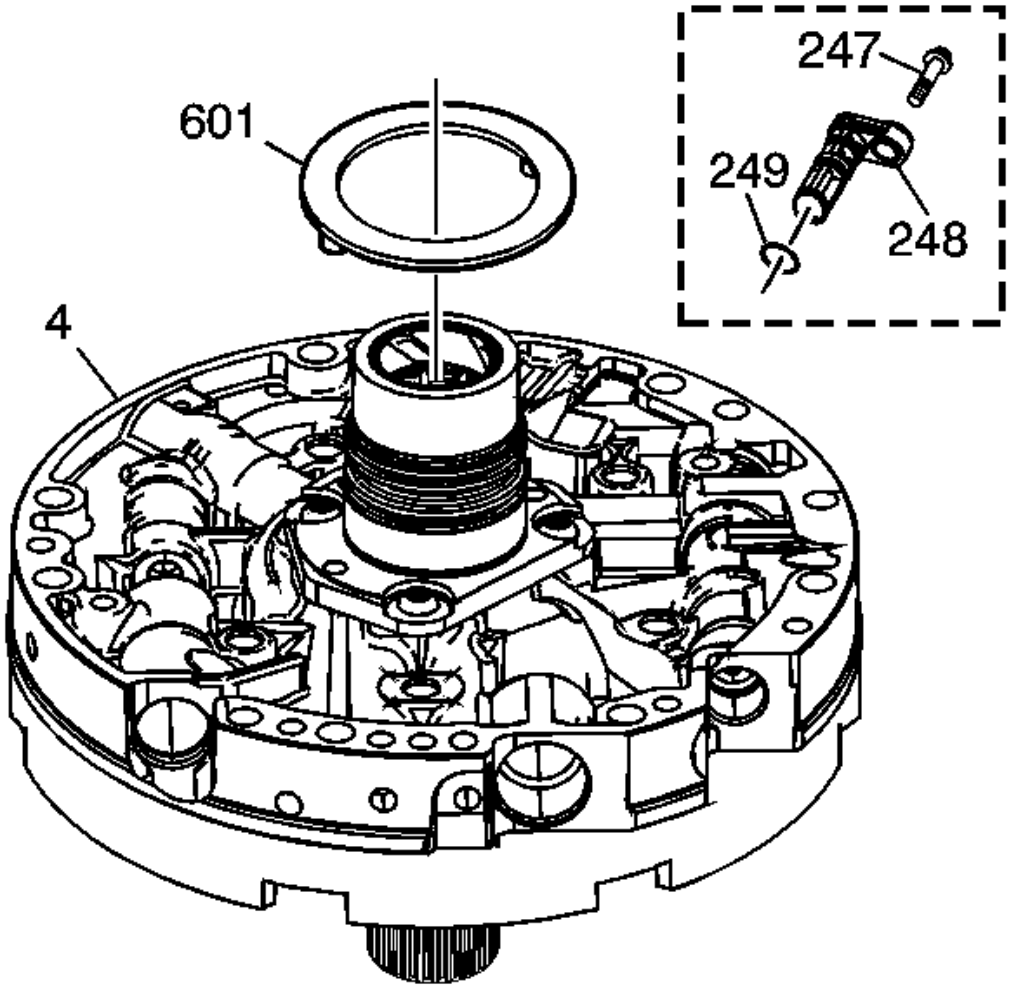


Fig. 204: Installing 4-5 Clutch Apply Pipe
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the pipe seals or the 4-5 clutch apply pipe.

12. Using a plastic hammer if needed, install the 4-5 clutch apply pipe (609) into the transmission case cover.

 © 2011 Mitchell Repair Information Company, LLC.

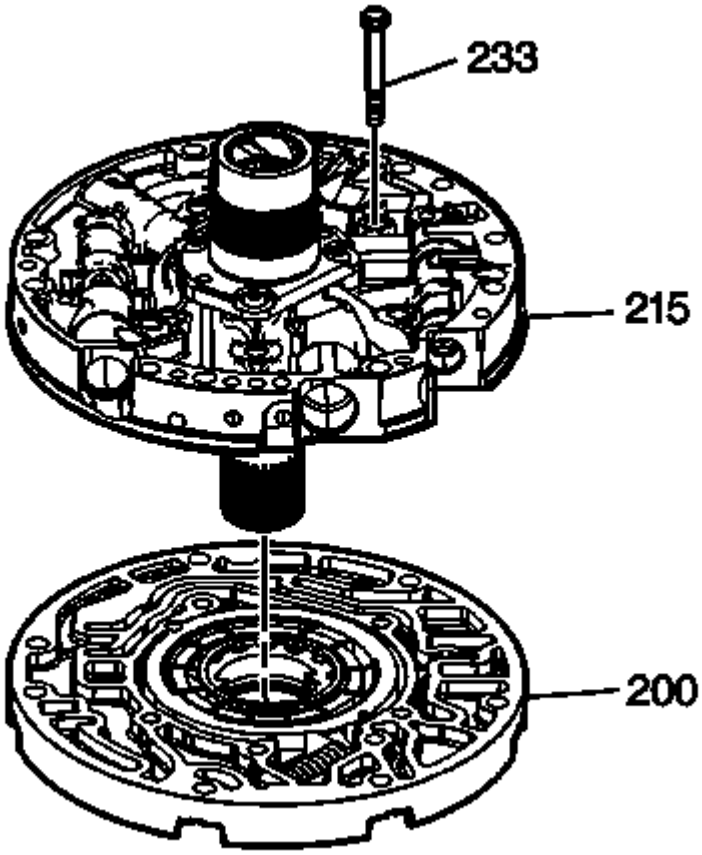


Fig. 205: View Of 4-5 Clutch Apply Pipe Retainers
Courtesy of GENERAL MOTORS CORP.

13. Install the two, 4-5 clutch apply pipe retainers (610).
14. Install the four, 4-5 clutch apply pipe bolts (611).

Tighten: Tighten the 4-5 clutch apply pipe bolts to 7 N.m (62 lb in).

1-2 REVERSE CLUTCH PISTON TRAVEL MEASUREMENT

Tools Required

- **J 45166** Dial Indicator Extension Rod - 8 inch". See **Special Tools**.
- **J 45200** Dial Indicator Set. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

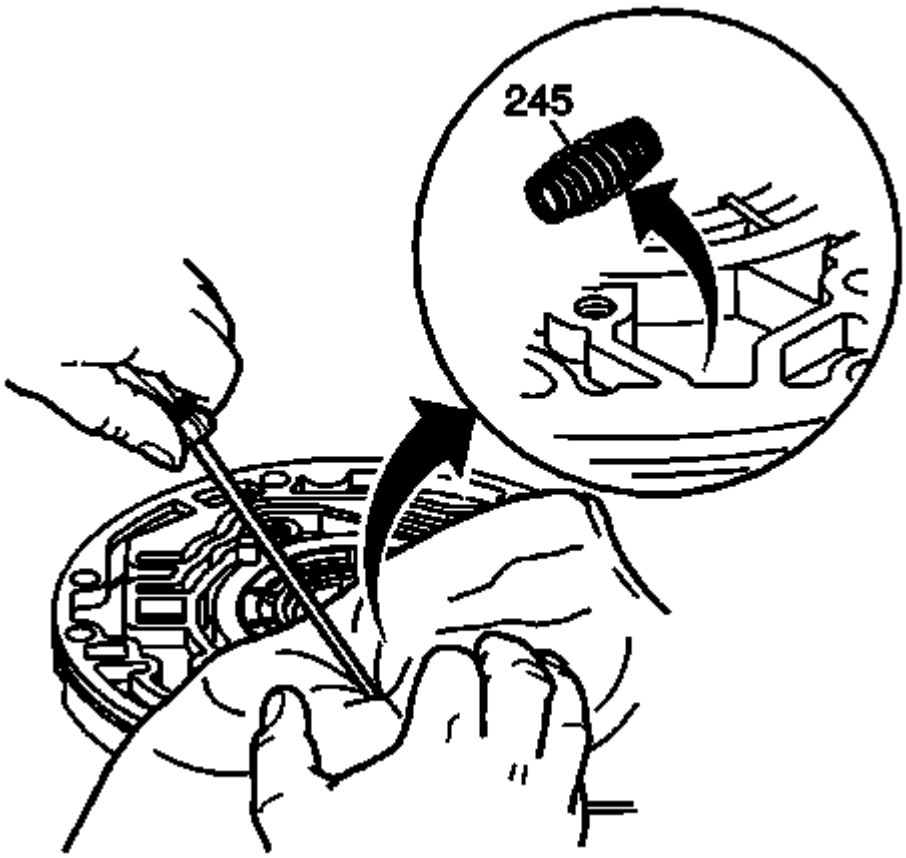


Fig. 206: Measuring 1-2 Reverse Clutch Piston Stroke
Courtesy of GENERAL MOTORS CORP.

1. Inspect the sliding surface of the plates for being worn or burnt. If the plates are worn or burnt, replace them.
2. Install the **J 45166** (1) into the forward clutch accumulator bolt hole that was not installed on the prior step. See **Special Tools**. Assemble **J 45200** (2) onto **J 45166** (1) and set the dial indicator to zero. See **Special Tools**.

CAUTION: When you use compressed air in order to clear fluid passages and to dry parts, always aim the air pressure away from face and eyes. Always wear adequate eye protection in order to avoid injury from dirt and debris that may adhere to parts.

3. Apply compressed air into the fluid passage in order to measure the piston stroke, and to be sure that the piston moves smoothly.
4. If the piston stroke is not within specifications, select another 1-2 reverse clutch backing plate. Refer to 1-2 Reverse Clutch (B5), Piston Bore Stroke in **Transmission Clearance Specifications**.

FORWARD AND DIRECT CLUTCH END PLAY MEASUREMENT

 © 2011 Mitchell Repair Information Company, LLC.

Tools Required

J 45200 Dial Indicator Set. See **Special Tools**.

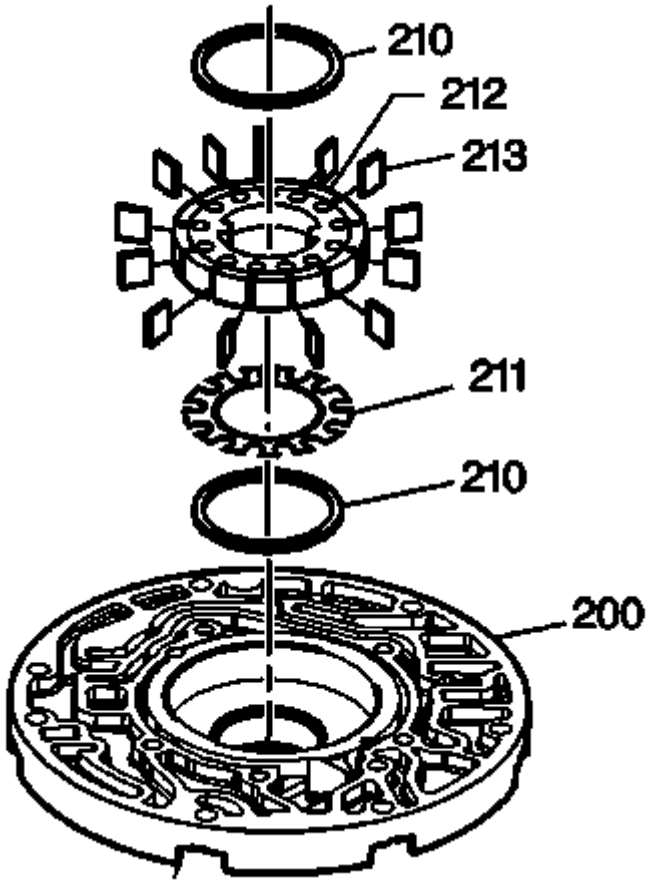


Fig. 207: View Of Transmission Case Assembly & Transmission Case Cover Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the transmission case cover assembly (19) to the transmission case assembly (17).

 © 2011 Mitchell Repair Information Company, LLC.

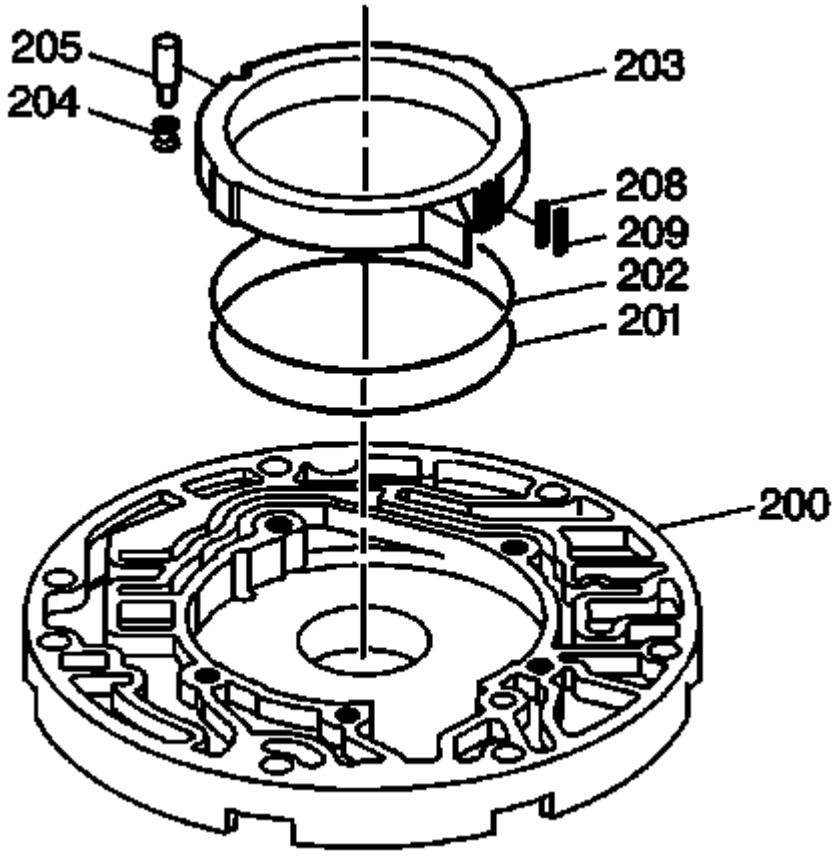


Fig. 208: Identifying Direct Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

2. Rotate the transmission case so that the front section of the case is facing up.
3. Install **J 45200** as shown and set the dial indicator to zero. See **Special Tools**.

IMPORTANT: Excessive upward pressure will cause an incorrect reading.

4. With one hand, carefully pull straight up on the forward and direct clutch assembly (23) input shaft until the assembly first bottoms out.
5. Record the measurement.

 © 2011 Mitchell Repair Information Company, LLC.

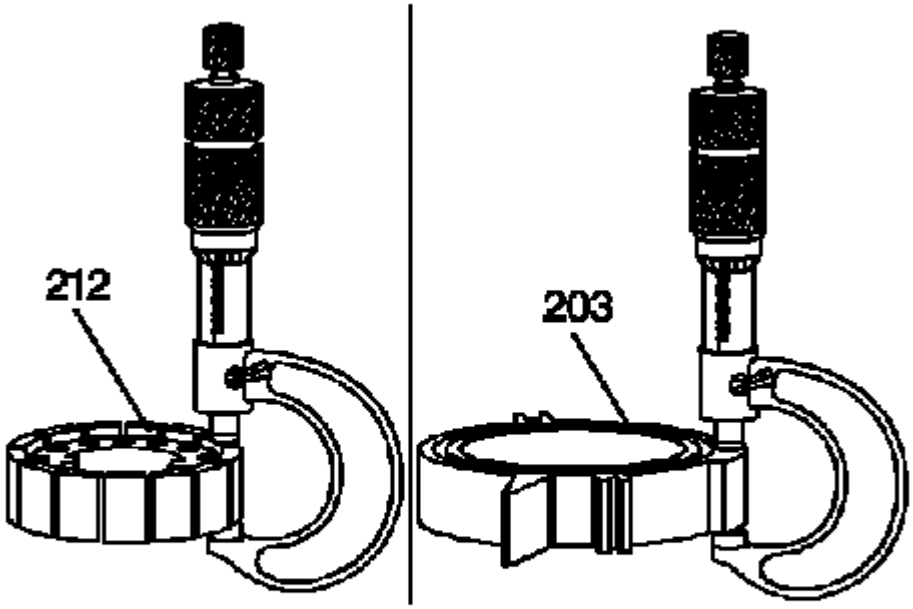


Fig. 209: View Of Forward/Direct Clutch Housing Thrust Bearing Race & Fluid Sealing Rings
Courtesy of GENERAL MOTORS CORP.

6. Compare the measurement with the listed specification.

   Specification: Forward and direct clutch assembly end play: 0.188 - 0.570 mm (0.007 - 0.022 in)

7. If out of specification, remove the transmission case cover assembly.
8. Replace the forward clutch housing selective thrust bearing race (628) as needed to obtain the correct end play specification.

 © 2011 Mitchell Repair Information Company, LLC.

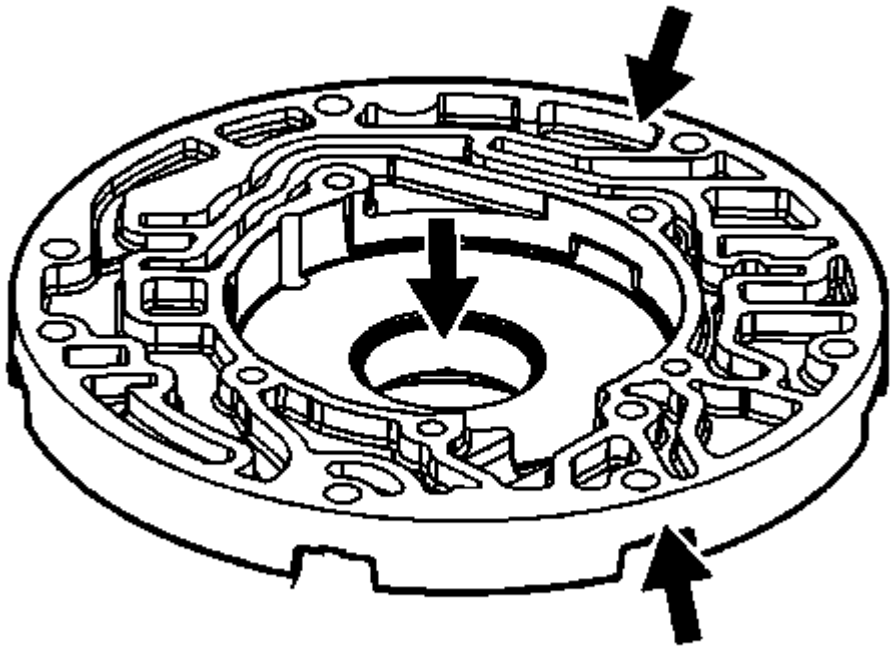


Fig. 210: View Of Transmission Case Assembly & Transmission Case Cover Assembly
Courtesy of GENERAL MOTORS CORP.

9. If the end play measurement is within specifications, rotate the transmission case assembly so that the transmission case cover side is facing up.
10. Remove the transmission case cover assembly (19) and clean the sealing surfaces of the transmission case cover (19) and the transmission case assembly (17).

TRANSMISSION CASE COVER AND 1-2 REVERSE CLUTCH ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

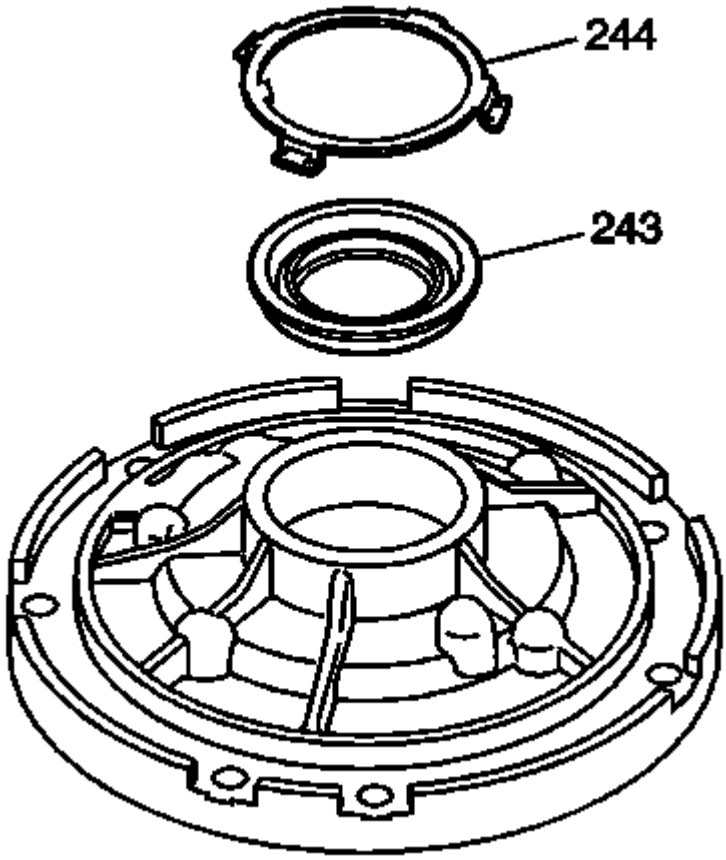


Fig. 211: Applying Formed In Place Gasket RTV To Transmission Case Cover
Courtesy of GENERAL MOTORS CORP.

1. Remove any sealant and automatic transmission fluid from the contacting surfaces of the transmission case cover and the transmission case.

IMPORTANT: Do not get any fluid on the contacting surfaces of the transmission case cover or the transmission case.

2. Apply a 3 mm (1/8 in) bead of sealant GM P/N 89020326 (Canadian P/N 89021188), to the transmission case cover.

 © 2011 Mitchell Repair Information Company, LLC.

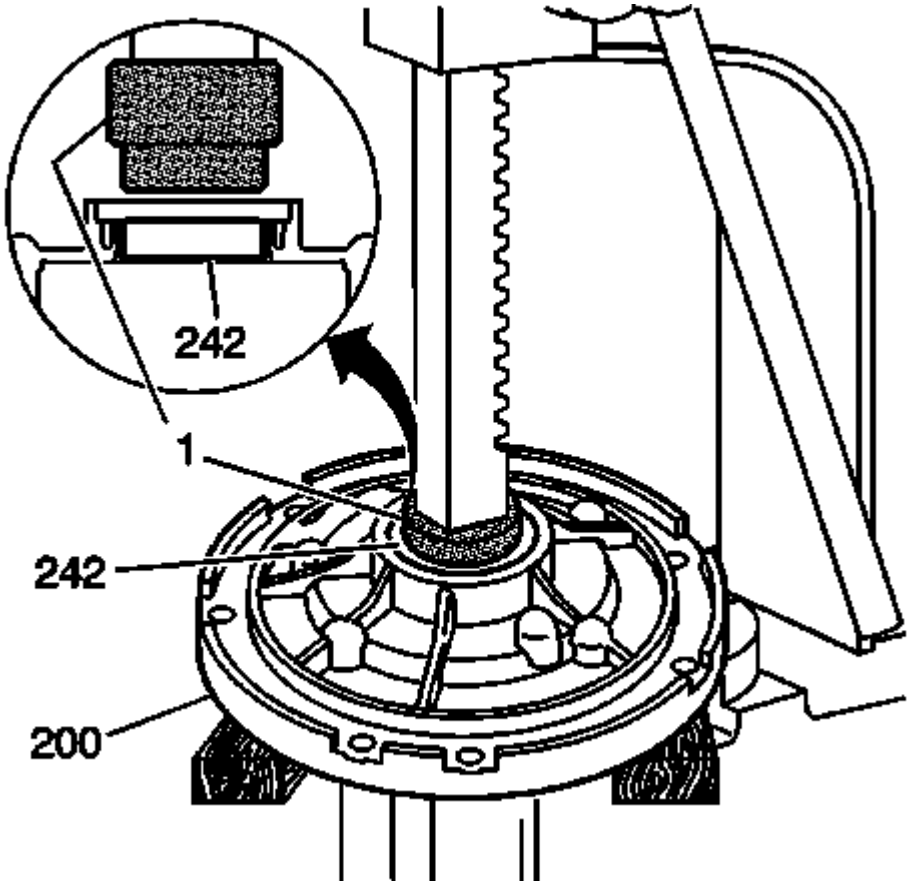


Fig. 212: View Of Transmission Case Assembly & Transmission Case Cover Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the transmission case cover assembly (19) onto the transmission case assembly (17).

 © 2011 Mitchell Repair Information Company, LLC.

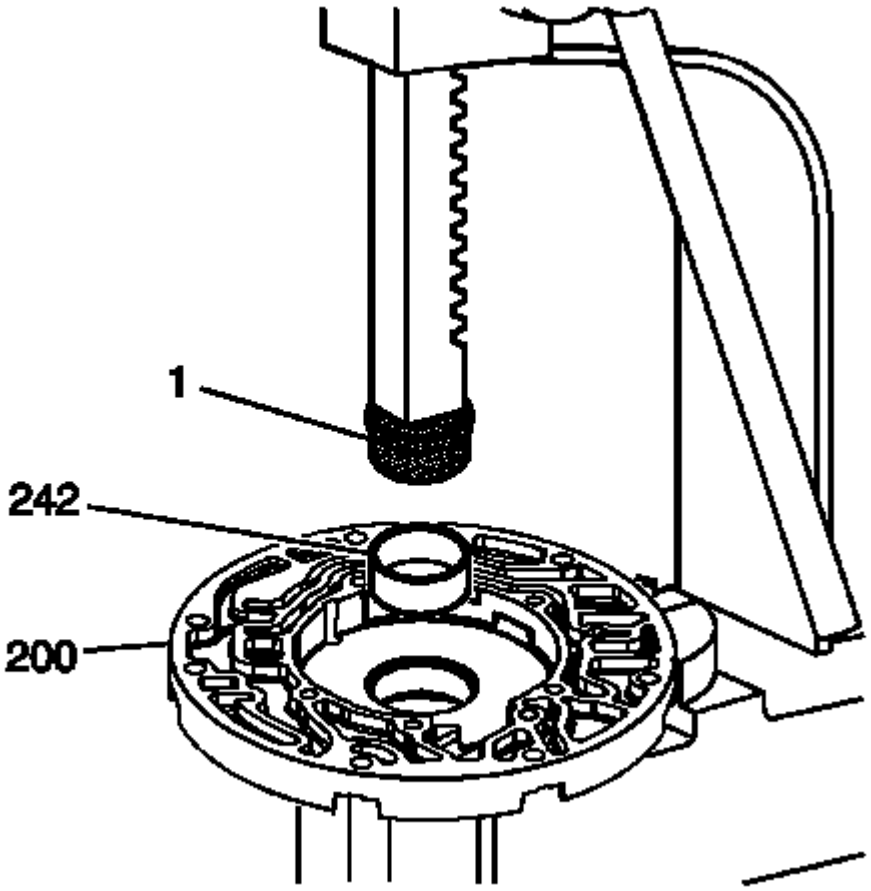


Fig. 213: Installing Transmission Case Cover Bolts
Courtesy of GENERAL MOTORS CORP.

4. Apply threadlocker GM P/N 12345382 (Canadian P/N 10953489), to the threads of all the case cover bolts.
5. Install 9 - M8 x 1.25 x 30 mm bolts (1) and hand tighten.
6. Install 1 - M8 x 1.25 x 45 mm bolt (2) and hand tighten.
7. Install 2 - M8 x 1.25 x 48 mm bolts (3) and hand tighten.

 © 2011 Mitchell Repair Information Company, LLC.

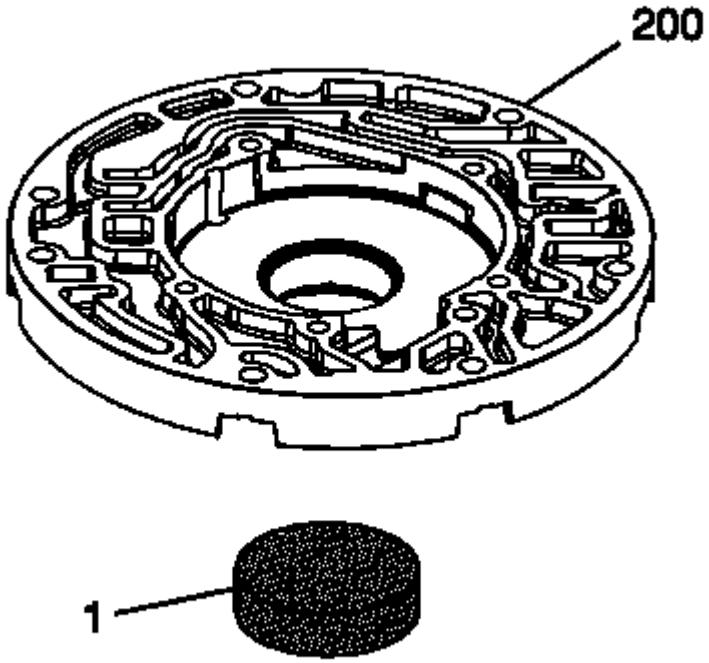


Fig. 214: Tightening Transmission Case Cover Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

8. Tighten the 12 transmission case cover assembly bolts in sequence.

   Tighten: Tighten the 12 transmission case cover assembly bolts to 25 N.m (18 lb ft).

THIRD GEAR BAND SERVO PISTON DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

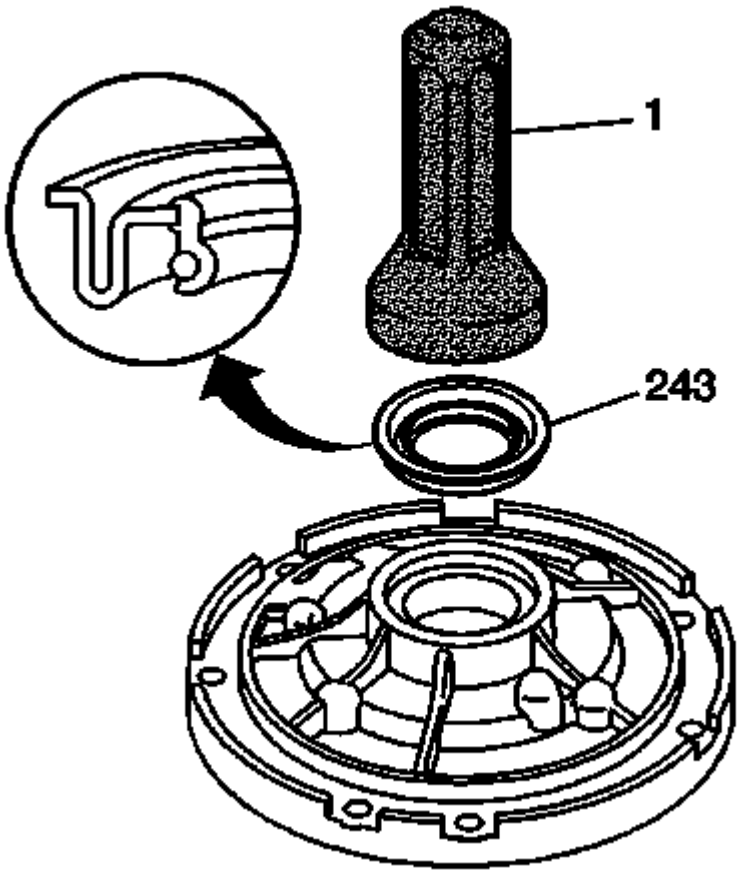


Fig. 215: View Of E-Clip
Courtesy of GENERAL MOTORS CORP.

1. Remove the E-clip.

 © 2011 Mitchell Repair Information Company, LLC.

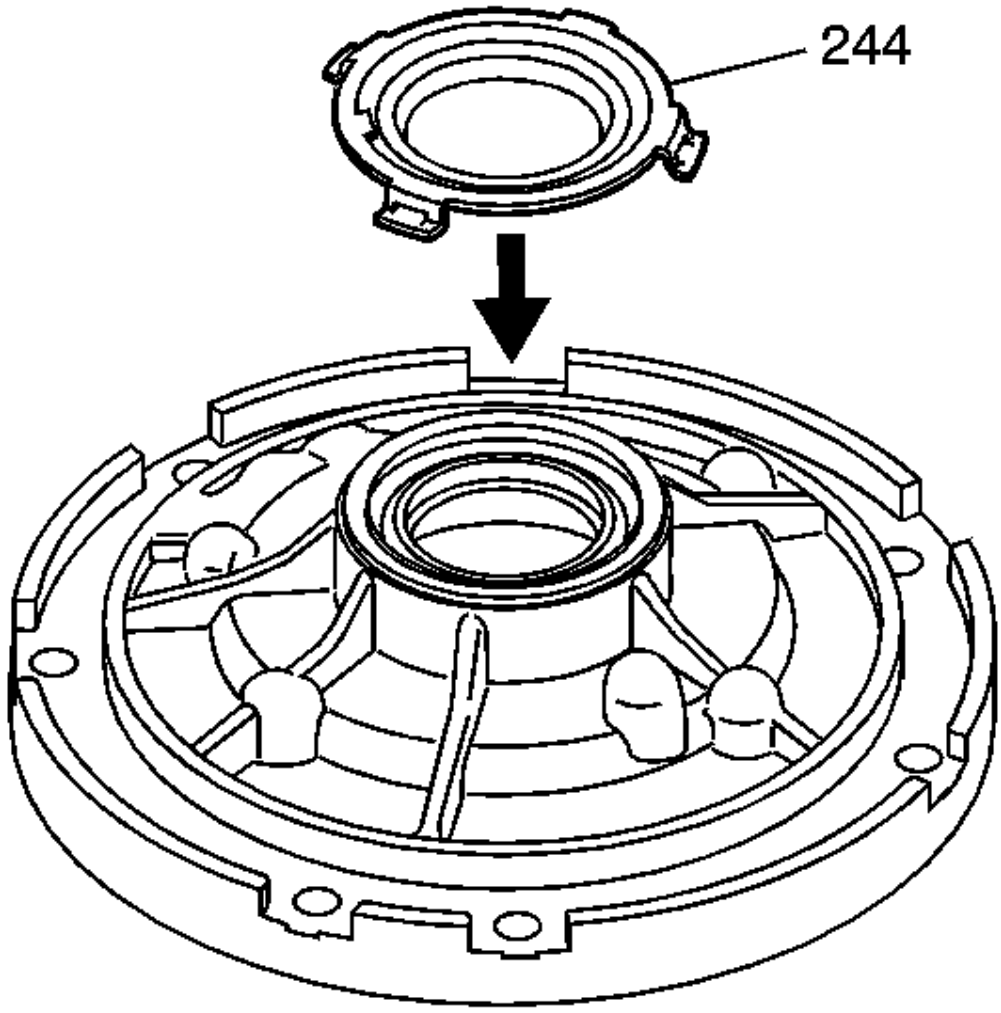


Fig. 216: Exploded View Of 3rd Gear Band Servo Piston Assembly
Courtesy of GENERAL MOTORS CORP.

2. Disassemble the third gear band servo piston assembly.

 © 2011 Mitchell Repair Information Company, LLC.

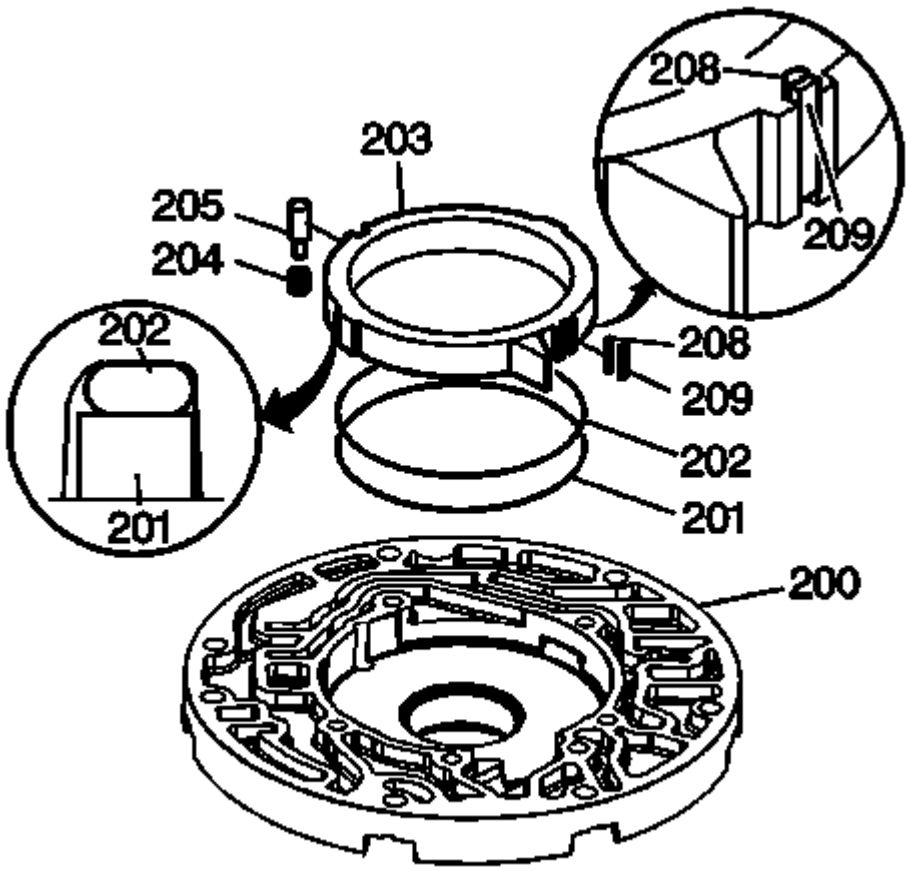


Fig. 217: Measuring 3rd Gear Band Servo Piston Assembly
Courtesy of GENERAL MOTORS CORP.

3. Measure the free length and the outer diameter of the outer and inner third gear band servo piston springs. Refer to 3rd Gear Band Servo (B4) Return Springs in **Transmission Clearance Specifications**.

THIRD GEAR BAND SERVO PISTON ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

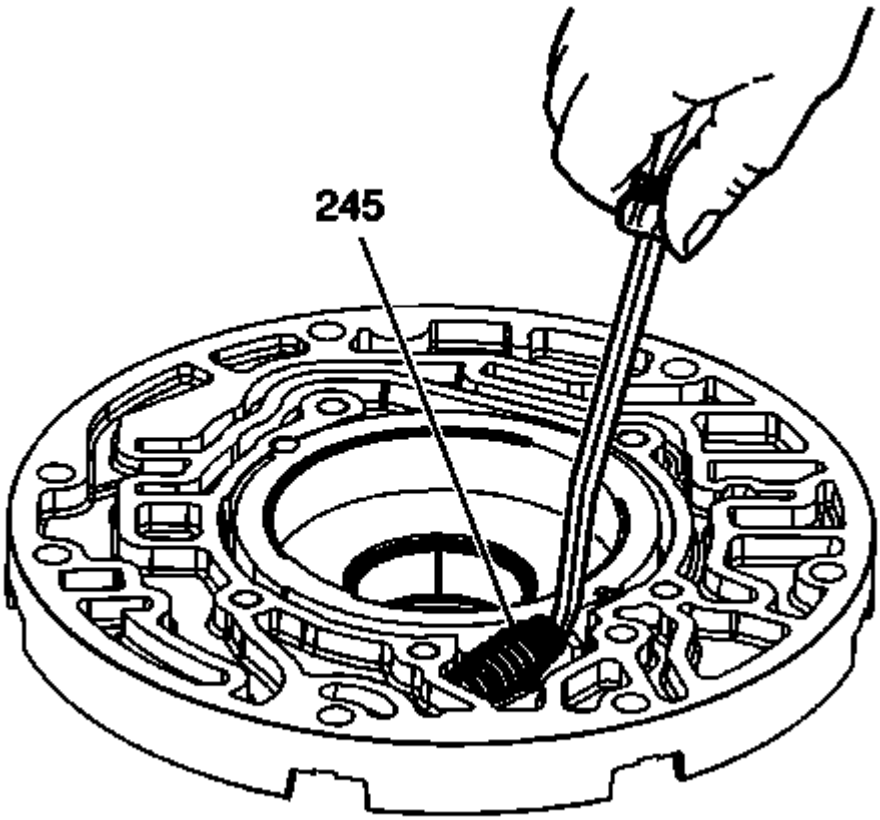


Fig. 218: Exploded View Of 3rd Gear Band Servo Piston Assembly
Courtesy of GENERAL MOTORS CORP.

1. Assemble the third gear band servo piston assembly.
2. Apply automatic transmission fluid to the new 3rd gear band servo piston O-ring seal, and install it into the groove of the third gear band servo piston.

 © 2011 Mitchell Repair Information Company, LLC.

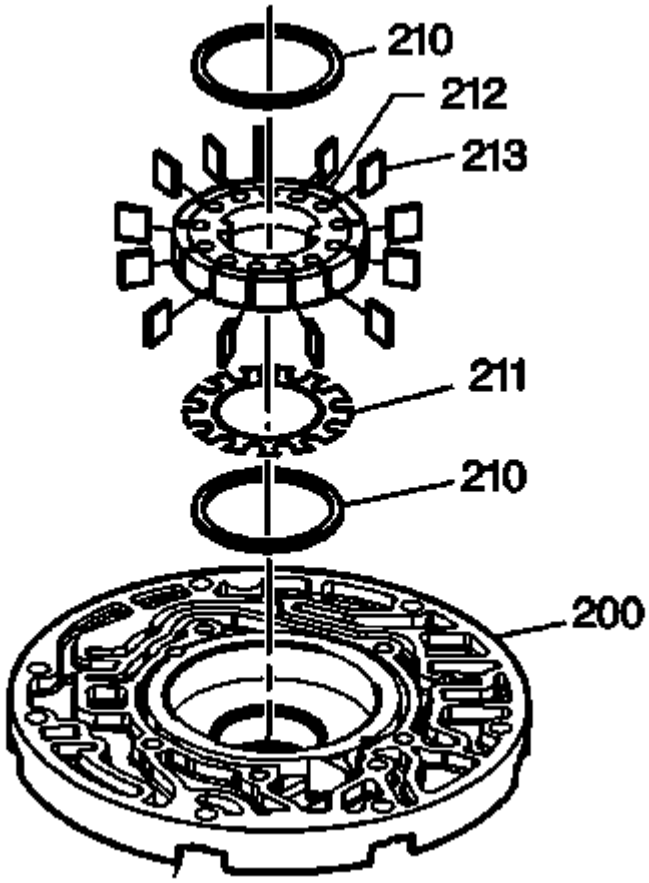


Fig. 219: View Of E-Clip
Courtesy of GENERAL MOTORS CORP.

3. Install the E-clip into the groove of the third gear band servo piston pin.

THIRD GEAR BAND SERVO PISTON INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

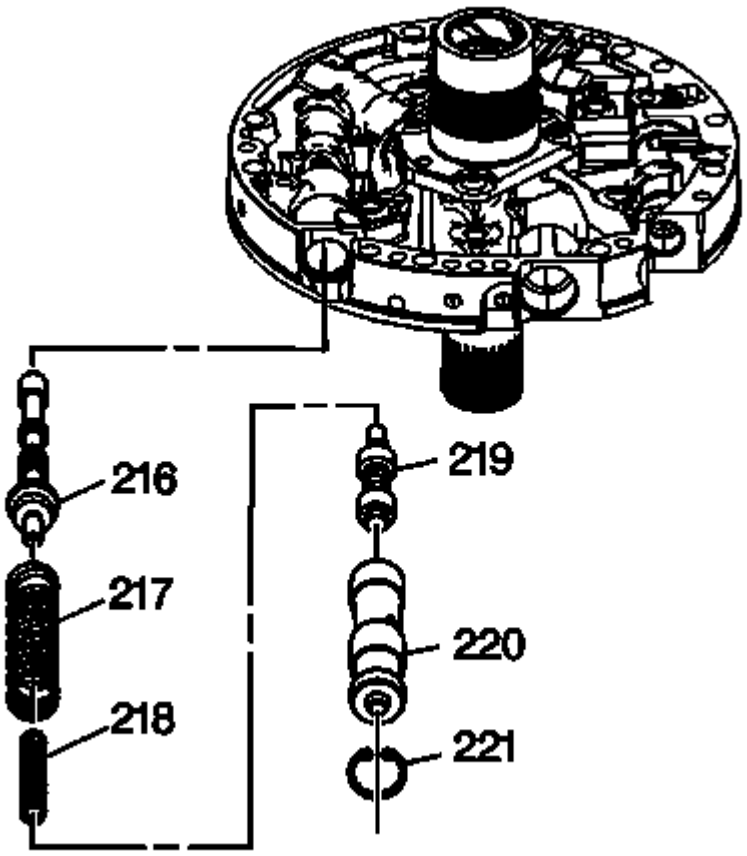


Fig. 220: View Of 3rd Gear Band Servo Piston Assembly & Compression Spring
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to the third gear band servo bore in the transmission case.
2. Install the third gear band servo compression spring (56) and the third gear band servo piston assembly (57) to the transmission case.

 © 2011 Mitchell Repair Information Company, LLC.

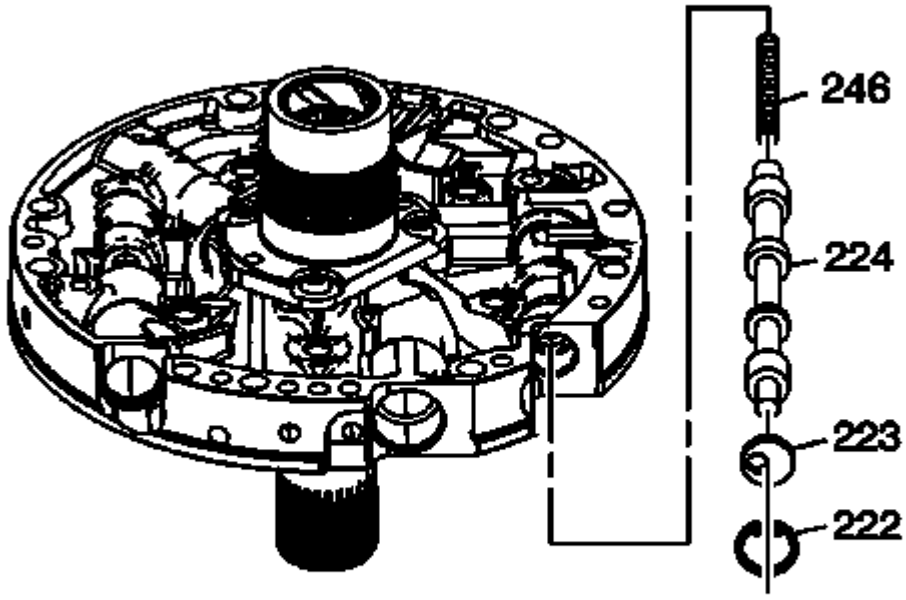


Fig. 221: View Of 3rd Gear Band Servo Cover
Courtesy of GENERAL MOTORS CORP.

3. Apply automatic transmission fluid to the 2 new third gear band servo cover O-ring seals (58).
4. Install the third gear band servo cover O-ring seals (58) onto the third gear band servo cover (59).
5. Install third gear band servo cover (59) into the third gear band servo bore in the transmission case.

 © 2011 Mitchell Repair Information Company, LLC.

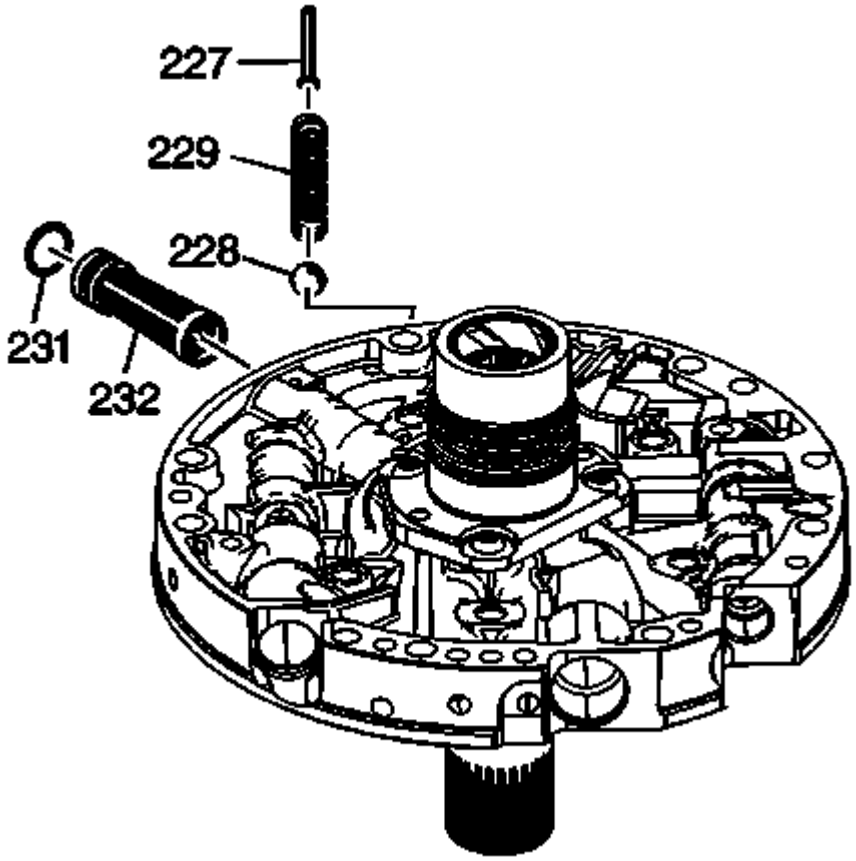


Fig. 222: Removing 3rd Gear Servo Cover Retaining Ring
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the third gear band servo cover retaining ring (60) is deformed, replace it.

6. Using snap ring pliers, install the third gear band servo cover retaining ring (60) while pressing the third gear band servo cover into the third gear band servo bore to properly seat the retaining ring.

1-2-REVERSE CARRIER GEAR ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

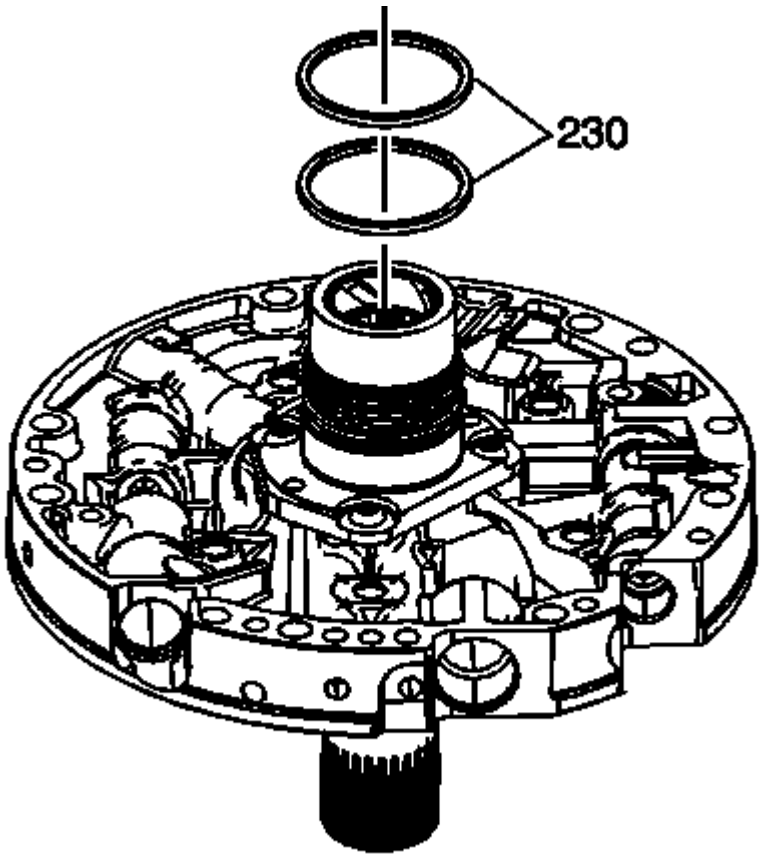


Fig. 223: View Of 1-2 Reverse Internal Gear, Front Thrust Bearing Assembly & Rear Thrust Bearing Assembly
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission case assembly so that the torque converter housing side is facing up.
2. Install the 1-2 reverse internal gear rear thrust bearing assembly (595) with the flat side up.
3. Install the 1-2 reverse internal gear shim (596) without any markings. Correct shim selection is performed during the front differential transfer drive gear assembly installation.
4. Install the 1-2 reverse internal gear (594).
5. Install the 1-2 reverse internal gear front thrust bearing assembly (593) with the flange up.

 © 2011 Mitchell Repair Information Company, LLC.

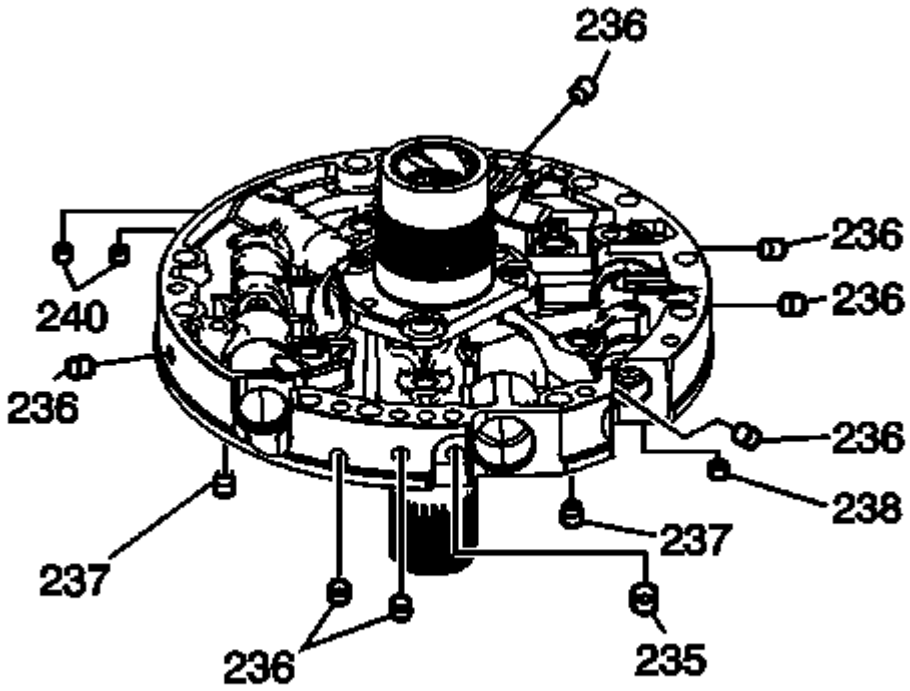


Fig. 224: View Of 1-2 Reverse Carrier Gear Assembly
Courtesy of GENERAL MOTORS CORP.

6. Install a 1-2 reverse carrier thrust washer (590) to the lower side of the 1-2 reverse carrier gear assembly (591).
7. Install the 1-2 reverse carrier gear assembly (591) into the 1-2 reverse internal gear (594). The carrier assembly will be flush to the 1-2 reverse internal gear.
8. Install the other 1-2 reverse carrier thrust washer (590) on top of the 1-2 reverse carrier gear assembly (591).

THIRD GEAR BAND ASSEMBLY INSTALLATION

Tools Required

DT-47599 Anchor Bolt Socket. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

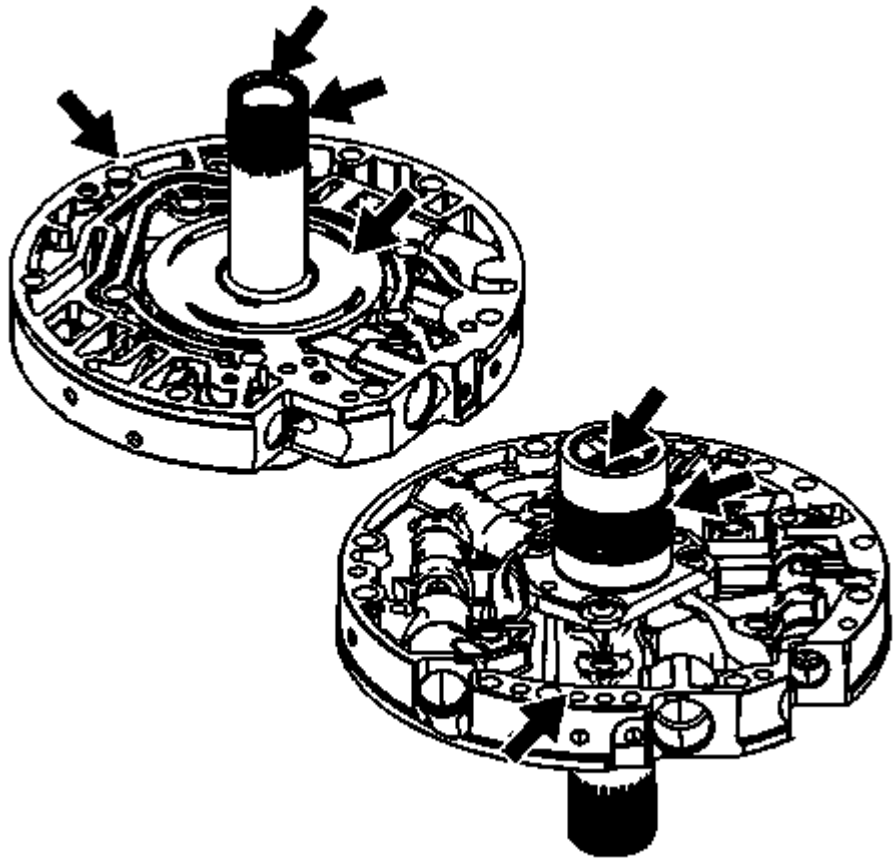


Fig. 225: Removing 3rd Gear Anchor Bolt
Courtesy of GENERAL MOTORS CORP.

1. Inspect the anchor bolt and the bolt hole.
2. Apply automatic transmission fluid to a new O-ring (65).

NOTE: Refer to Fastener Notice.

3. Install the new O-ring and third gear band anchor bolt (64) using **DT-47599** . See **Special Tools**.

   Tighten: Tighten the anchor bolt to 167 N.m (123 lb ft).

 © 2011 Mitchell Repair Information Company, LLC.

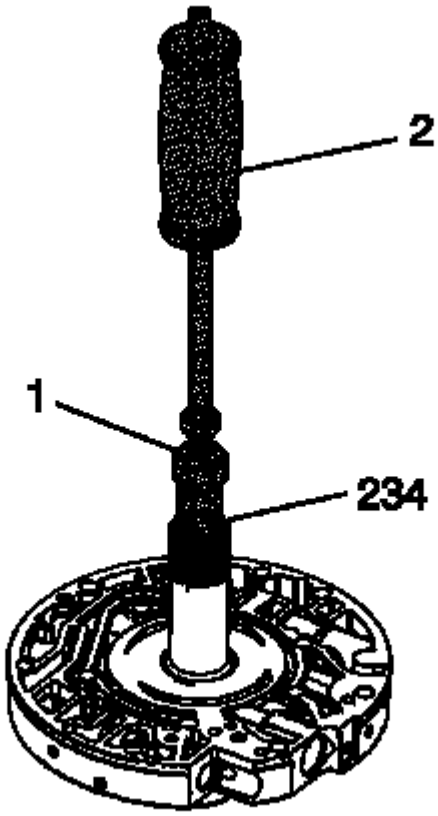


Fig. 226: View Of 3rd Gear Band Assembly
Courtesy of GENERAL MOTORS CORP.

4. Install the third gear band assembly (16) into the transmission case assembly making sure that the band tangs lock into the servo pin and the 3rd gear band anchor bolt (64).

4-5 CLUTCH ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

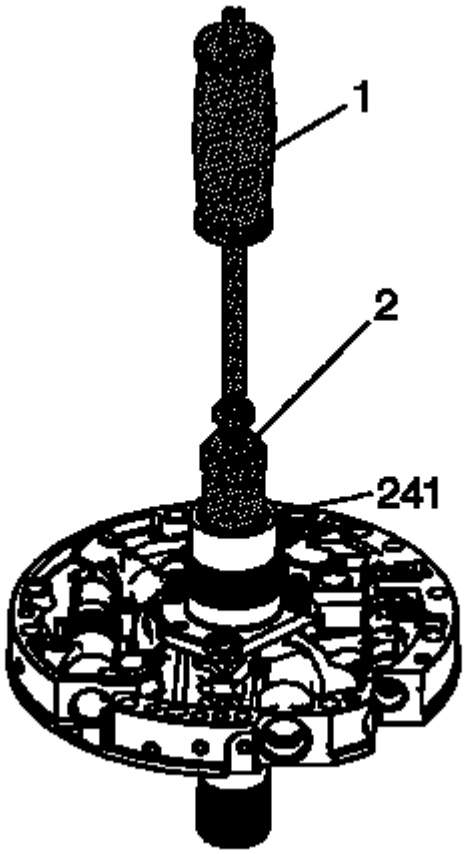


Fig. 227: View Of 4-5 Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

Install the 4-5 clutch assembly (15) into the transmission case assembly, making sure not to disengage the third gear band assembly (16) from its holding points. When properly installed, the 4-5 clutch assembly (15) should spin freely by hand with no drag on the third gear band assembly (16).

FRONT DIFFERENTIAL TRANSFER DRIVE GEAR ASSEMBLY INSTALLATION

Tools Required

J 45053 Universal Clamp Press

 © 2011 Mitchell Repair Information Company, LLC.

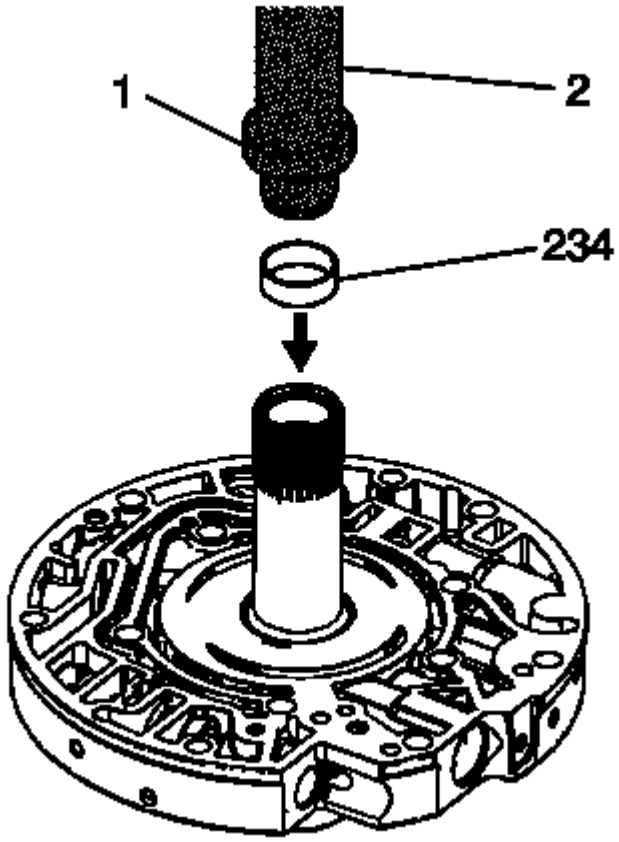


Fig. 228: View Of Front Differential Transfer Drive Gear Assembly
Courtesy of GENERAL MOTORS CORP.

1. Inspect the front differential transfer drive gear assembly rear bearing assembly, located in the transmission case cover assembly, before installing the front differential transfer drive gear assembly (14) to be sure that all roller bearings are in the correct position.

IMPORTANT: When the front differential transfer drive gear assembly (14) is installed correctly, the front differential transfer drive gear assembly and the output gear will mesh evenly. If not, the front differential transfer drive gear assembly did not clear all 4-5 clutch plates in the 4-5 clutch assembly or is not seated into the front differential transfer drive gear assembly rear bearing assembly, located in the transmission case cover assembly.

2. Using **J 45053** install the front differential transfer drive gear assembly (14) to the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

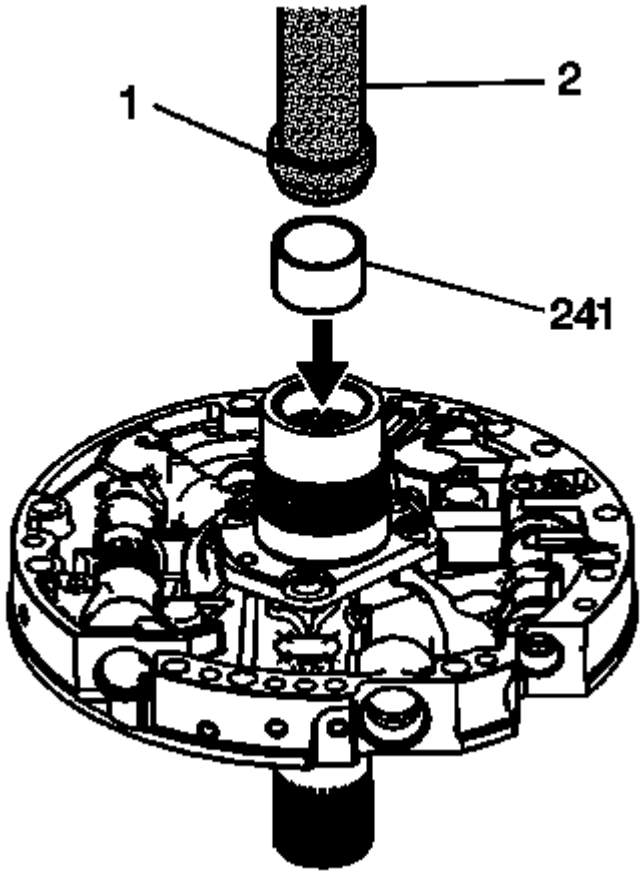


Fig. 229: View Of Front Differential Transfer Drive Gear Assembly & Thrust Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The front differential transfer drive gear thrust washer (264) is available as a select fit washer.

3. Using the front differential transfer drive gear thrust bearing washer (264) without any letter markings, install onto the front differential transfer drive gear assembly (14).
4. Install the front differential transfer drive gear thrust bearing assembly (263) onto the front differential transfer drive gear thrust bearing washer (264).

 © 2011 Mitchell Repair Information Company, LLC.

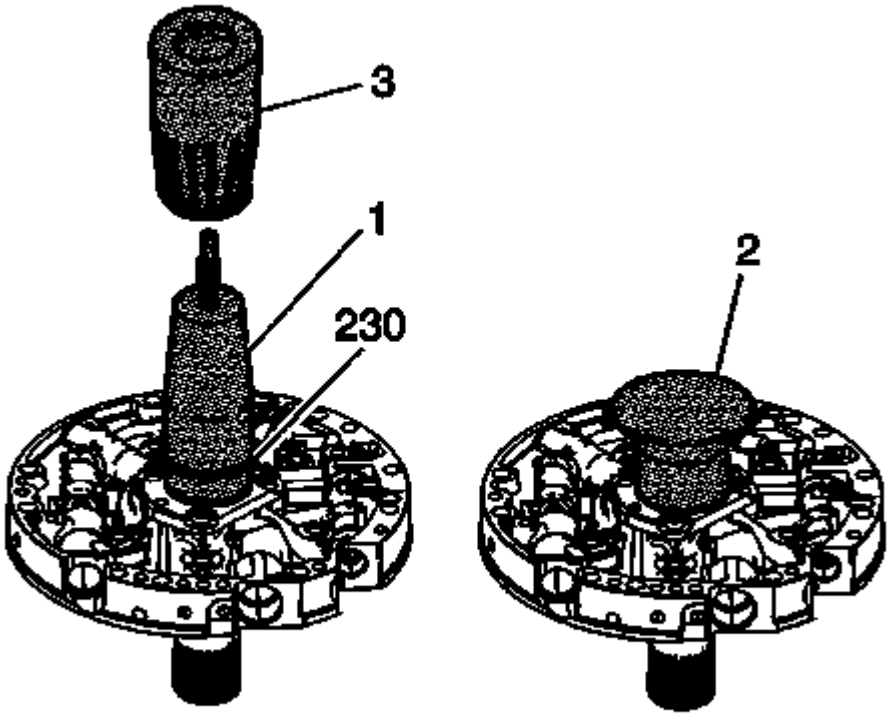


Fig. 230: Measuring Between Straight Edge & Case
Courtesy of GENERAL MOTORS CORP.

5. When installing the 2nd design 1-2 reverse internal gear, place a straight edge on the top of the rollers on the thrust bearing to reach across to the case surface.
6. Using a feeler gage, measure (a) between the straight edge and the case.

   Specification: 1.269-1.645 mm (0.050-0.065 in)

7. If the measurement is not within specifications, refer to **Shim Size Specifications**, Front Differential Transfer Drive Gear Thrust Bearing Washer (264), to select the correct thickness thrust washer.

 © 2011 Mitchell Repair Information Company, LLC.

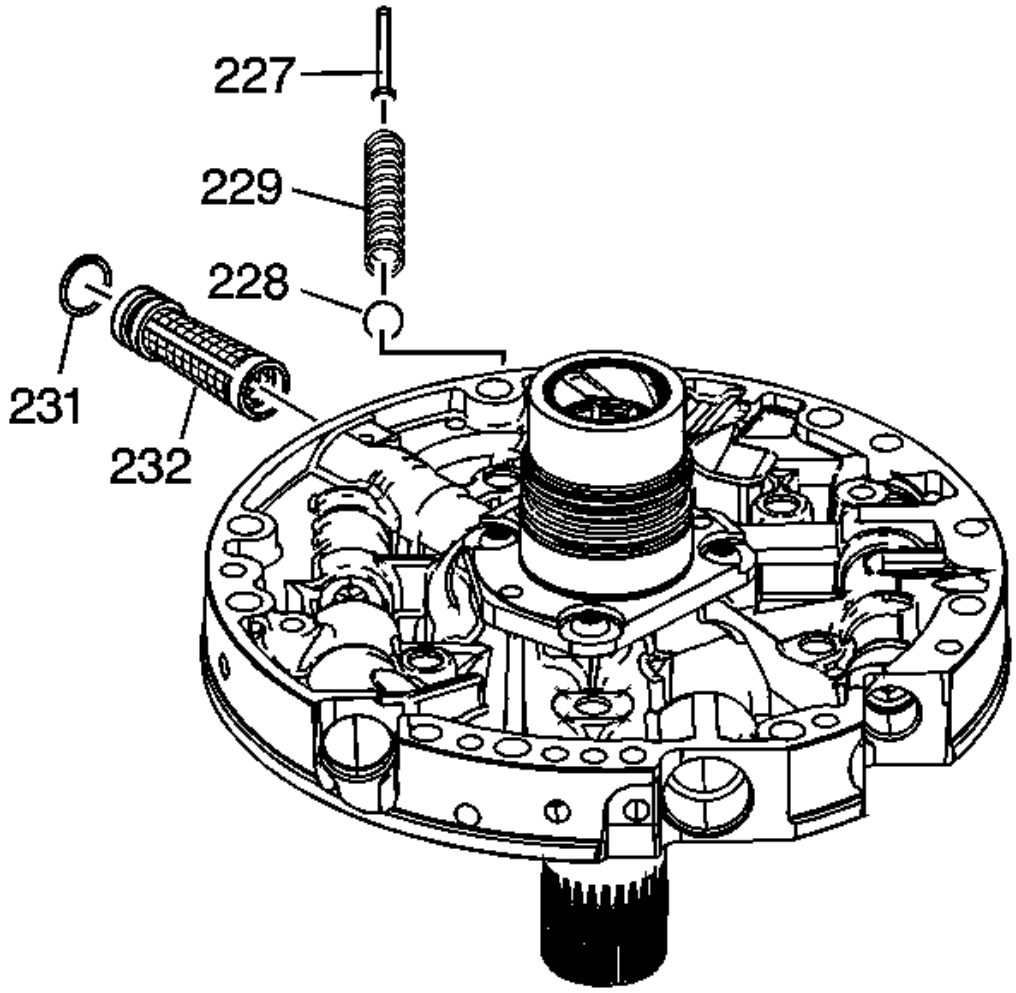


Fig. 231: View Of 1-2 Reverse Internal Gear & Shim
Courtesy of GENERAL MOTORS CORP.

8. If the measurement is not obtainable, using the thickest washer, the 1-2 reverse internal gear (594) will require removal and then a thicker shim (596) installed. Refer to **1-2-Reverse Carrier Gear Assembly Installation**.
9. Refer to **Shim Size Specifications**, 1-2 Reverse Internal Gear Shim (596) to select the correct thickness of shim to obtain the correct measurement.

 © 2011 Mitchell Repair Information Company, LLC.

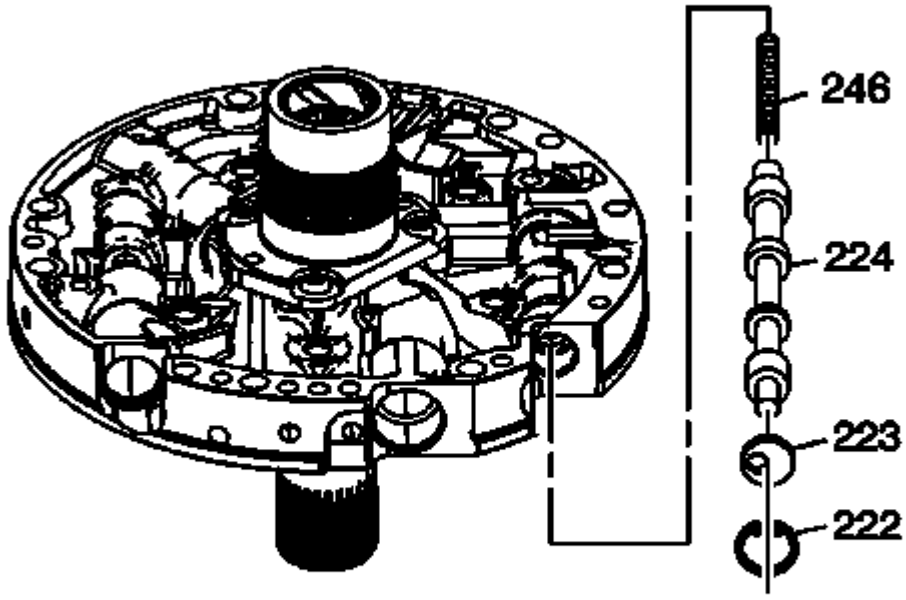


Fig. 232: View Of Front Differential Transfer Drive Gear Assembly
Courtesy of GENERAL MOTORS CORP.

10. Install again the front differential drive gear (14), the thrust washer and the thrust bearing.

 © 2011 Mitchell Repair Information Company, LLC.

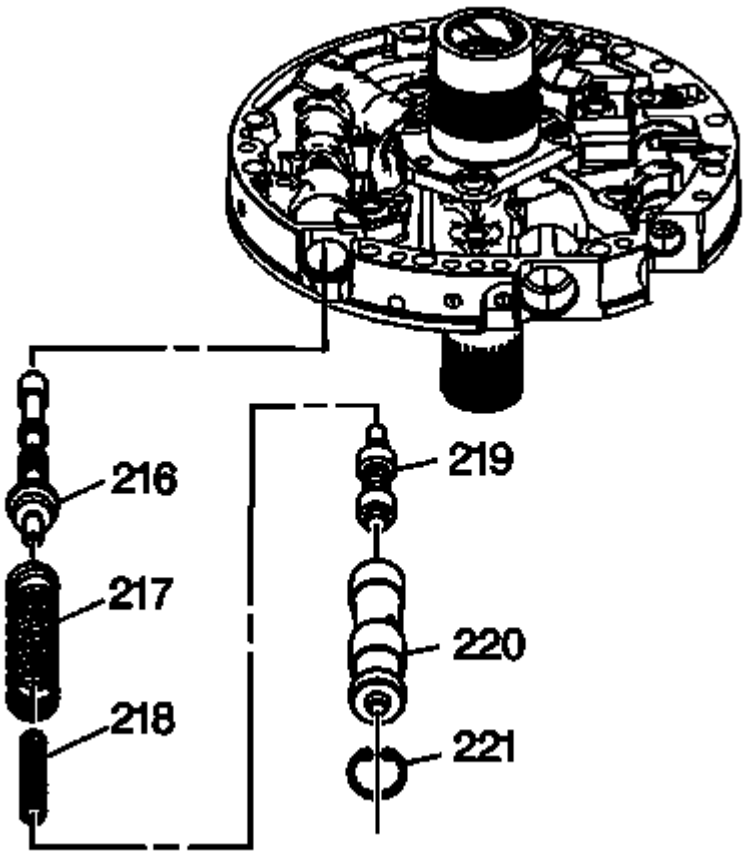


Fig. 233: Measuring Between Straight Edge & Case
Courtesy of GENERAL MOTORS CORP.

11. Measure the thrust bearing height (a) again to make sure it is in the specifications. If not within the specifications, adjust the height by changing the thrust washer.

MANUAL SHIFT DETENT LEVER AND PARK PAWL INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

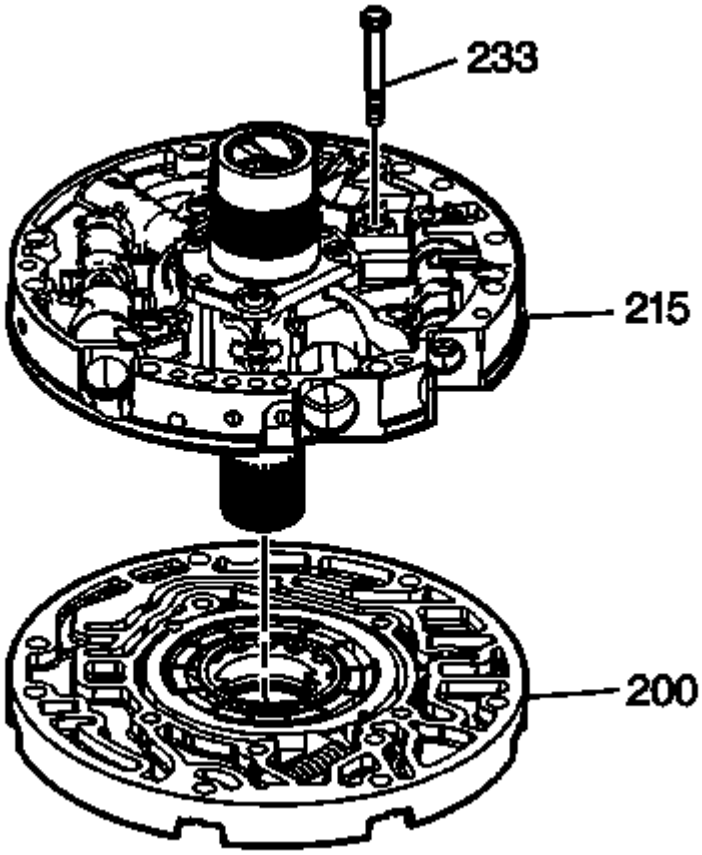


Fig. 234: View Of Park Pawl Pin Spring, Guide Sleeve & Bolt/Screw
Courtesy of GENERAL MOTORS CORP.

1. Install the park pawl pin spring (704).
2. Install the park pawl pin spring guide sleeve (705).

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

3. Install the park pawl bolt/screw (706).

Tighten: Tighten the park pawl bolt to 10 N.m (89 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

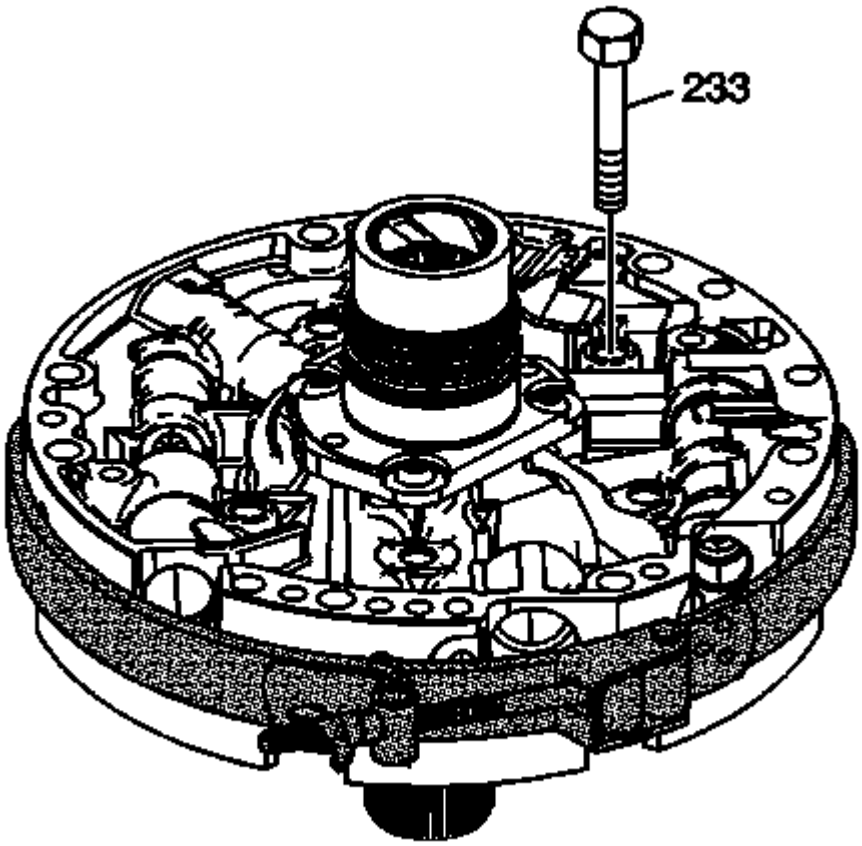


Fig. 235: View Of Park Pawl Spring Pin
Courtesy of GENERAL MOTORS CORP.

4. Install the park pawl spring pin (703).

 © 2011 Mitchell Repair Information Company, LLC.

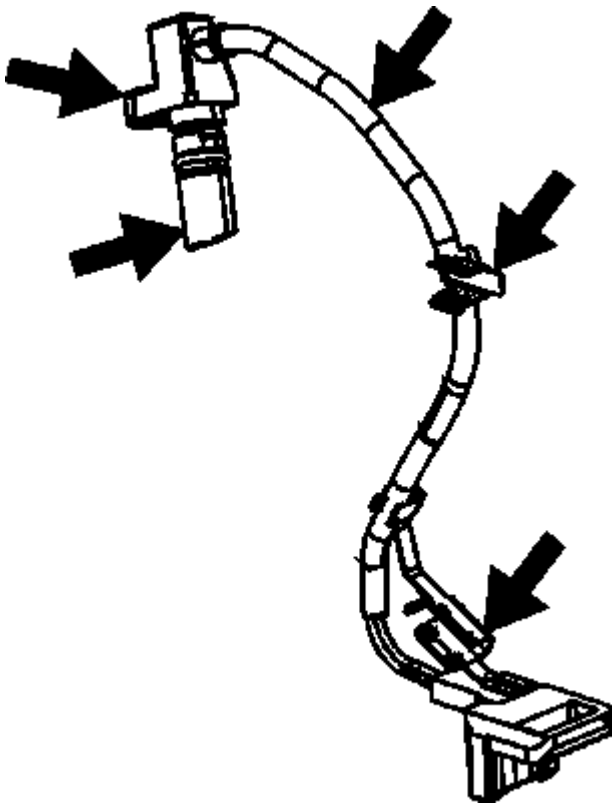


Fig. 236: View Of Park Pawl & Actuator Bracket
Courtesy of GENERAL MOTORS CORP.

5. Install the park pawl (702) and the park pawl actuator bracket (708).

 © 2011 Mitchell Repair Information Company, LLC.

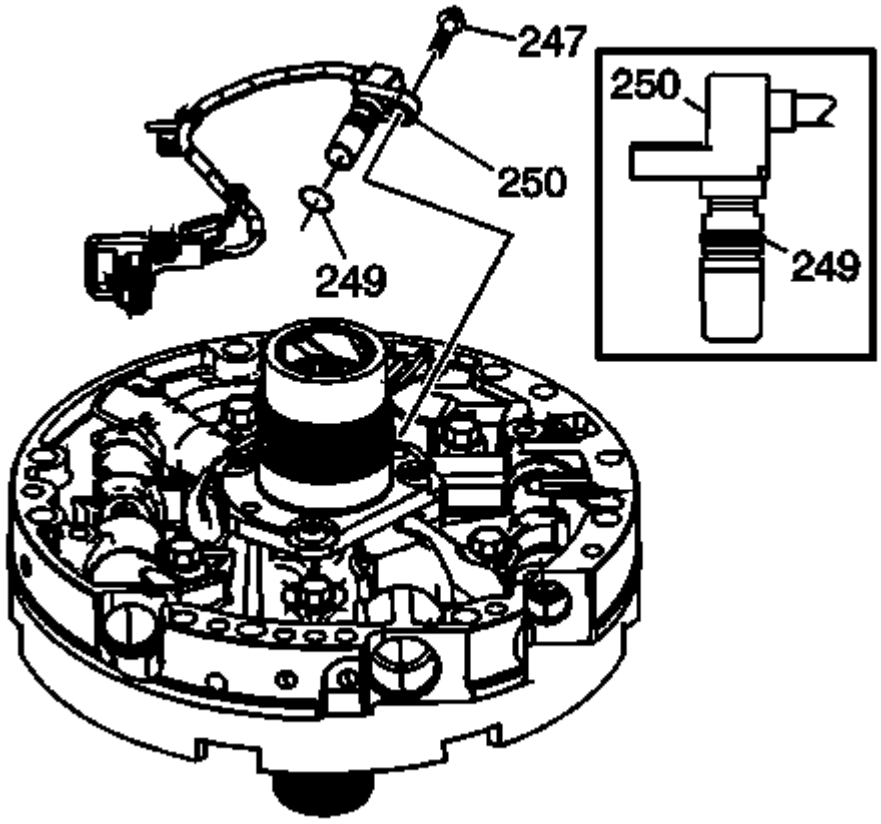


Fig. 237: View Of Park Pawl Shaft & Return Spring
Courtesy of GENERAL MOTORS CORP.

6. Install the park pawl return spring (701).
7. Install the park pawl shaft (700).

 © 2011 Mitchell Repair Information Company, LLC.

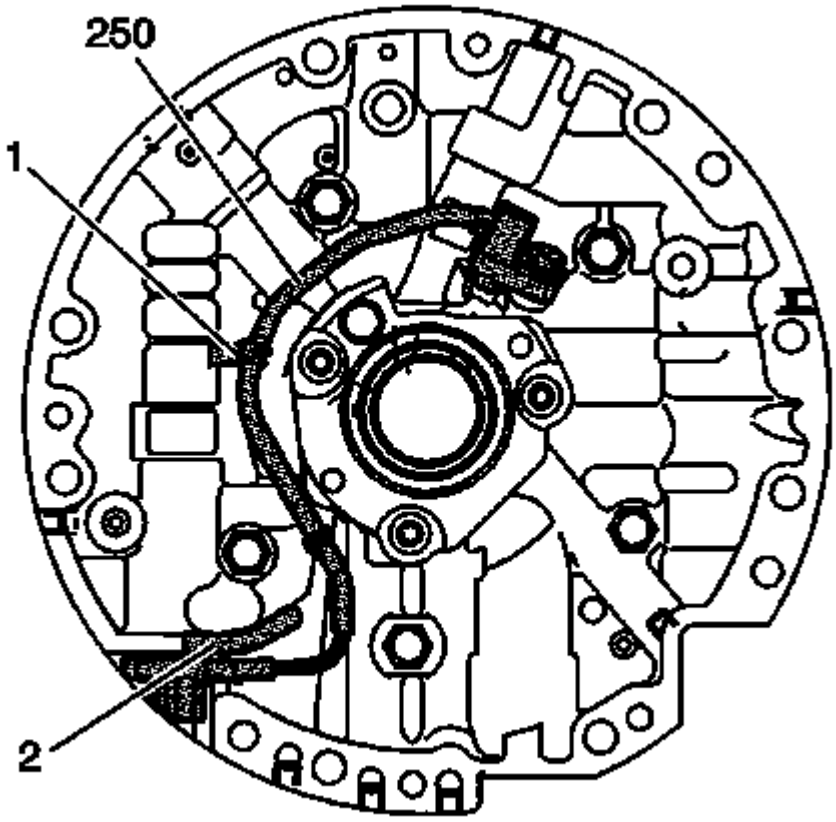


Fig. 238: View Of Manual Shift Detent Spring Assembly
Courtesy of GENERAL MOTORS CORP.

8. Install the manual shift detent spring assembly (711).

 © 2011 Mitchell Repair Information Company, LLC.

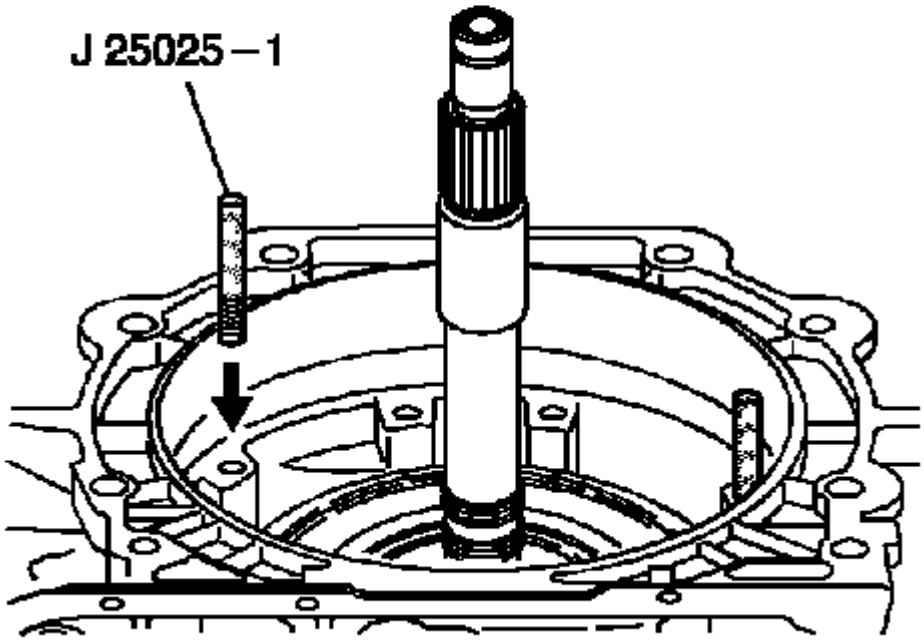


Fig. 239: View Of Manual Shift Detent Lever Spring Bolt/Screw & Park Pawl Actuator Bracket Bolt/Screw
Courtesy of GENERAL MOTORS CORP.

9. Install and hand tighten the 14 mm manual shift detent lever spring bolt (712) and the 16.7 mm park pawl actuator bracket bolt (715).

Tighten:

- Tighten the 14 mm manual shift detent lever spring bolt (712) to 5 N.m (44 lb in).
- Tighten the 16.7 mm park pawl actuator bracket bolt (715) to 10 N.m (89 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

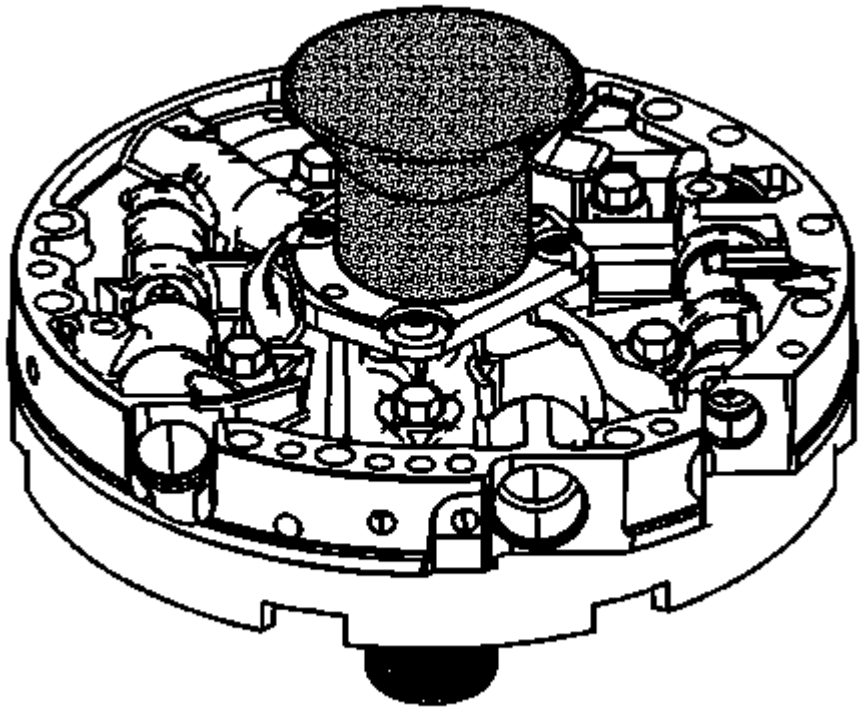


Fig. 240: View Of Park Pawl Actuator Rod
Courtesy of GENERAL MOTORS CORP.

10. Install the park pawl actuator rod (709).

 © 2011 Mitchell Repair Information Company, LLC.

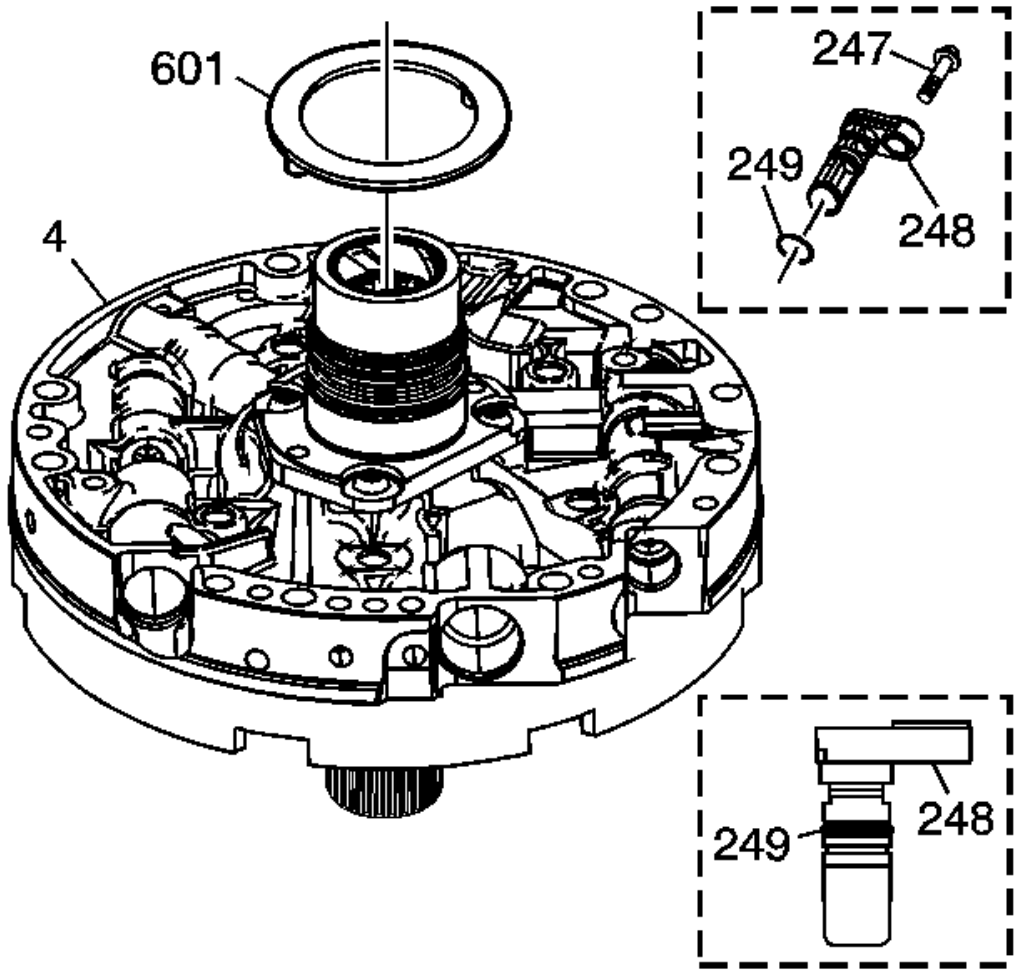


Fig. 241: View Of Manual Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

11. Install the manual shift detent lever assembly (710).

IMPORTANT: The park pawl actuator rod (709) must be installed with the rod between the case and the manual shift detent lever.

12. Connect the park pawl actuator rod (709) to the manual shift detent lever assembly (710).

 © 2011 Mitchell Repair Information Company, LLC.

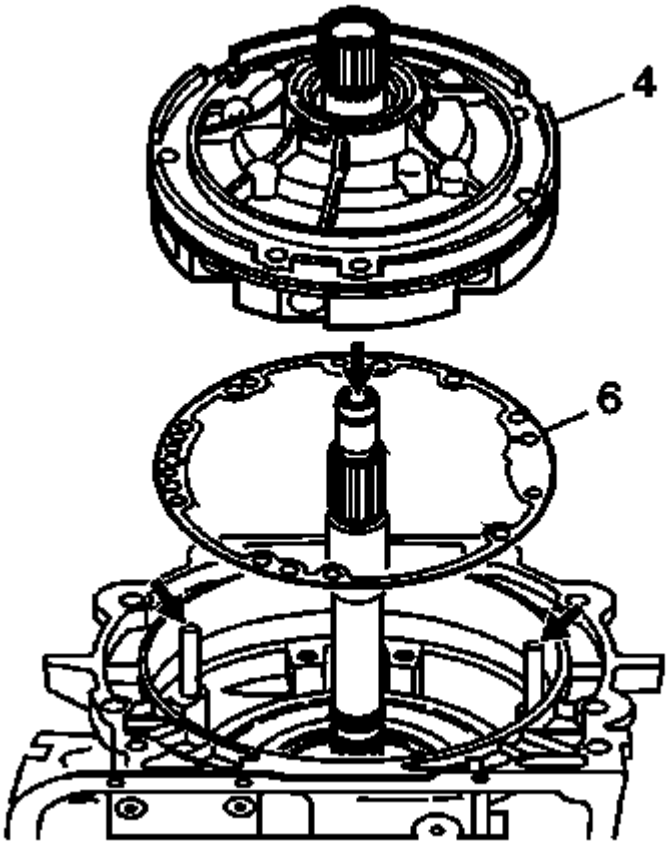


Fig. 242: Lifting Manual Shift Detent Lever Spring
Courtesy of GENERAL MOTORS CORP.

13. Using a screwdriver, lift the manual shift detent lever spring (711) and rotate the manual shift detent lever assembly (710) into position.

THIRD GEAR BAND APPLY TUBE INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

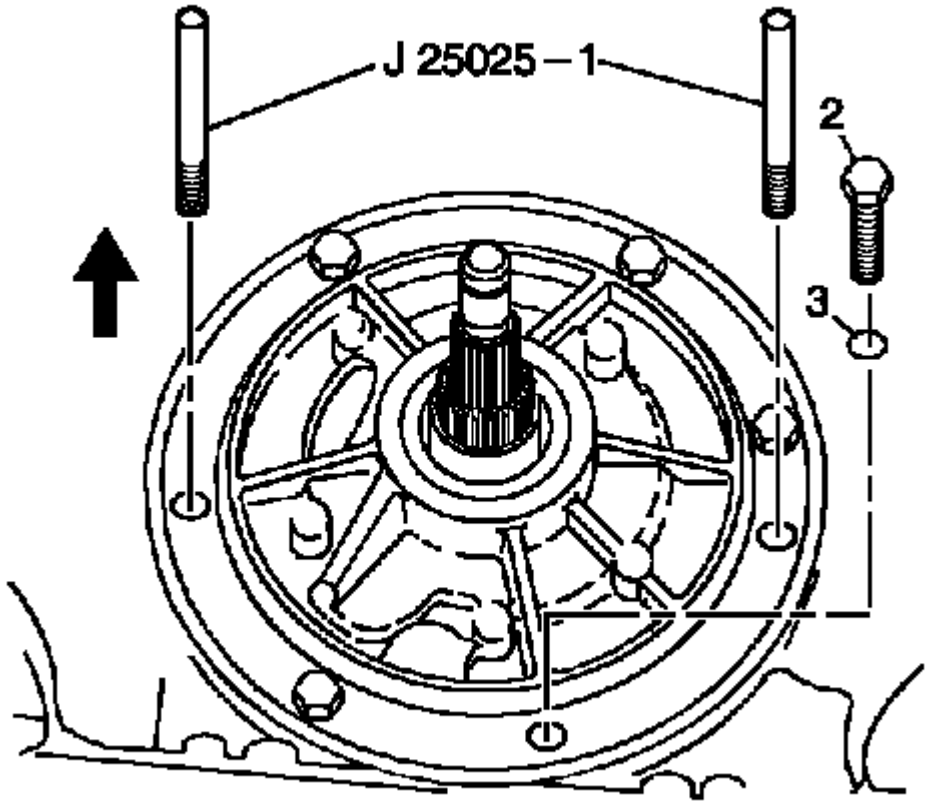


Fig. 243: View Of 3rd Gear Band Apply Tube & Seals
Courtesy of GENERAL MOTORS CORP.

1. Install the 2 third gear band apply tube O-ring seals (53).
2. Install the third gear band apply tube (52).
3. If needed, lightly seat the third gear band apply tube into the transmission case assembly with a soft mallet.

 © 2011 Mitchell Repair Information Company, LLC.

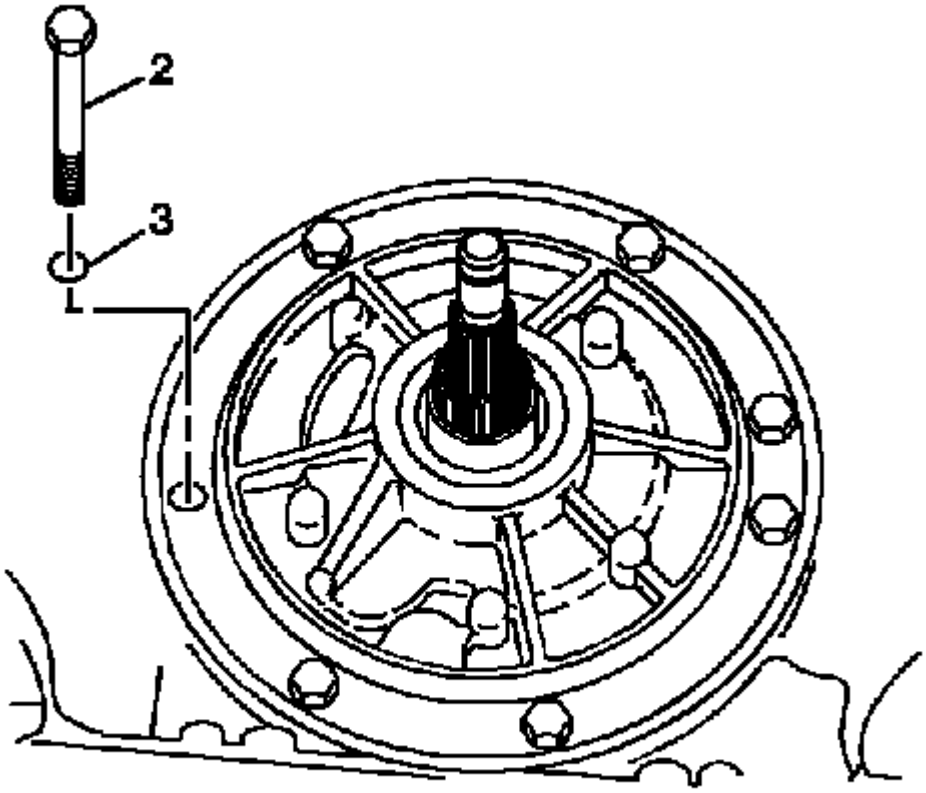


Fig. 244: View Of 3rd Gear Band Apply Tube Retainer
Courtesy of GENERAL MOTORS CORP.

4. Install the third gear band apply tube retainer (51).

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

5. Install the 2 - M6 x 1.0 x 14 mm third gear band apply tube retainer bolts (50).

Tighten: Tighten the third gear band apply tube retainer bolts to 5 N.m (44 lb in).

TRANSMISSION FLUID BAFFLE INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

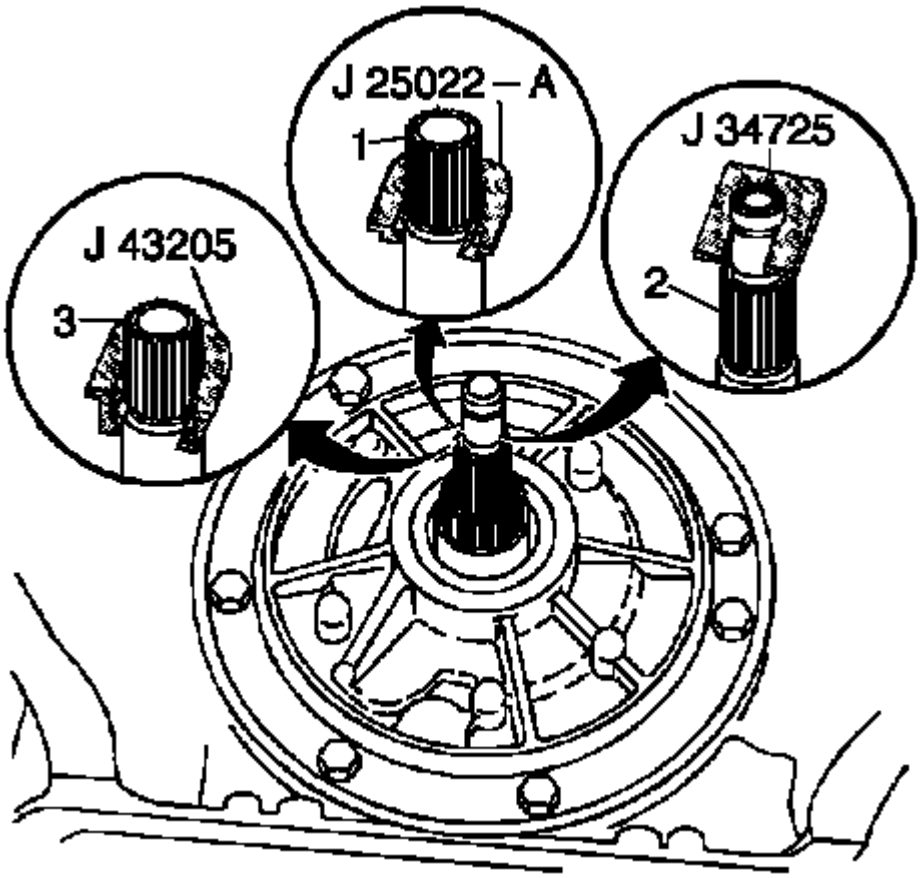


Fig. 245: View Of Automatic Transmission Case Fluid Passage Cover
Courtesy of GENERAL MOTORS CORP.

1. Install the transmission case fluid passage cover (40).

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

2. Install the 2 - M6 x 1.0 x 14 mm transmission case fluid passage cover bolts (41).

Tighten: Tighten the transmission case fluid passage cover bolts to 5 N.m (44 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

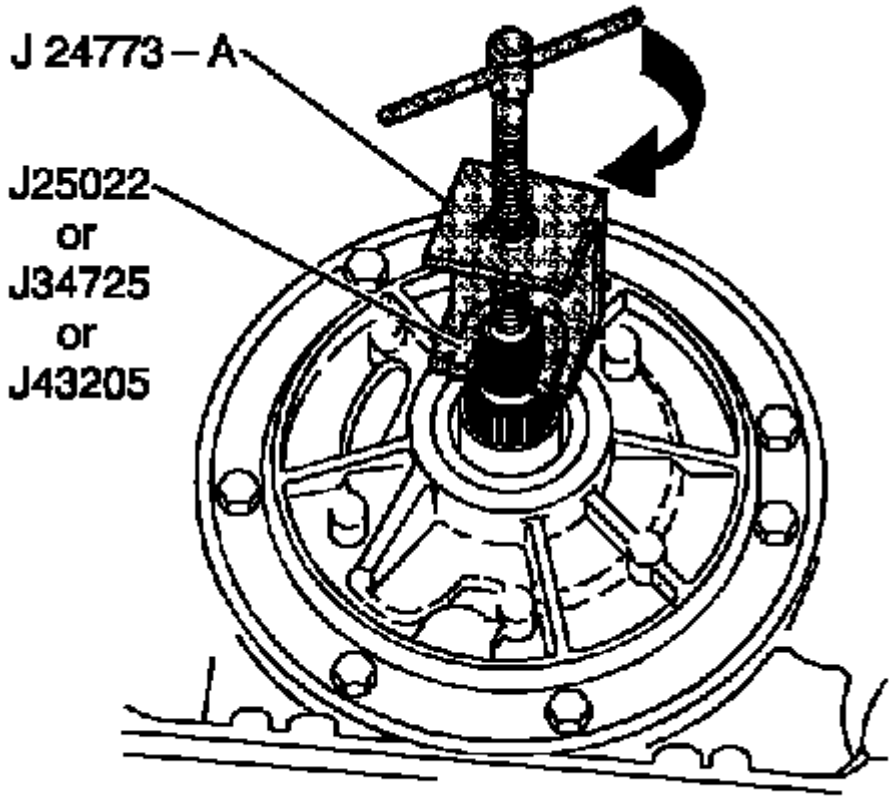


Fig. 246: View Of Automatic Transmission Fluid Baffle
Courtesy of GENERAL MOTORS CORP.

3. Install the transmission fluid baffle (44).
4. Install the 3 - M6 x 1.0 x 14 mm transmission fluid baffle bolts (45).

Tighten: Tighten the transmission fluid baffle bolts to 5 N.m (44 lb in).

FLUID FILTER INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

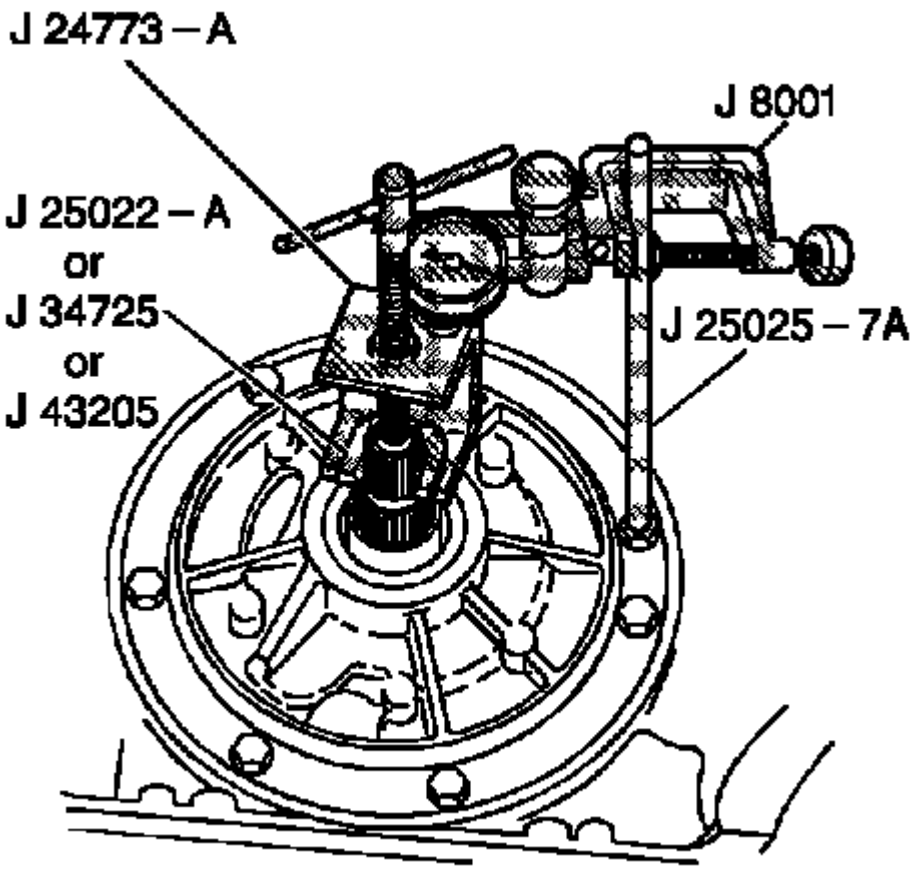


Fig. 247: View Of Fluid Filter
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

Install the transmission fluid filter assembly (42) and the M6 x 1.0 x 16.7 mm transmission fluid filter bolt (43) into the transmission case assembly.

Tighten: Tighten the transmission fluid filter bolt to 5 N.m (44 lb in).

FRONT DIFFERENTIAL ASSEMBLY CLEANING AND INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

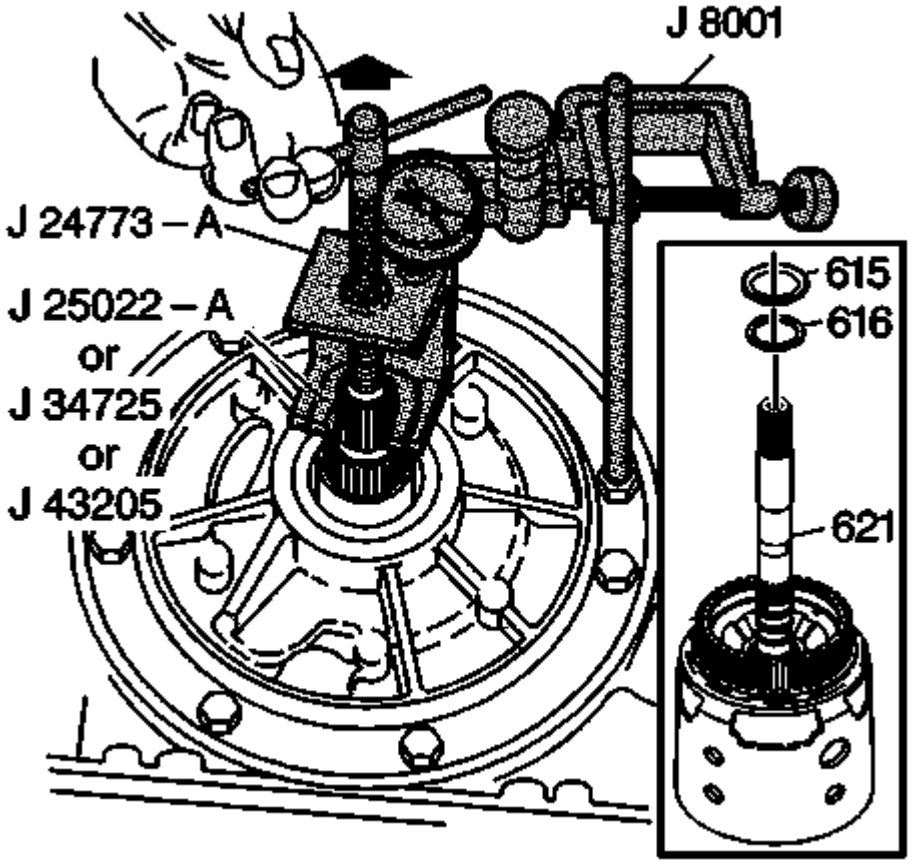


Fig. 248: Inspecting Front Differential Assembly
Courtesy of GENERAL MOTORS CORP.

1. Clean the front differential assembly in solvent and air dry.
2. Inspect the front differential ring gear for the following conditions:
   - Chipped teeth
   - Excessive wear
   - Metal debris embedded in the teeth
   - Abnormal wear pattern
3. Inspect the pinion gears and the side gears for damage or excessive wear.
4. Inspect the tapered roller bearings for the following conditions:
   - Excessive wear
   - Pits
   - Brinneling
   - Bent cages
5. On AWD models, inspect the splined stub shaft for excessive wear or damage.
6. If any of the above, conditions are found replace the front differential assembly. The front differential assembly is serviced only as a complete assembly.

FRONT DIFFERENTIAL ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

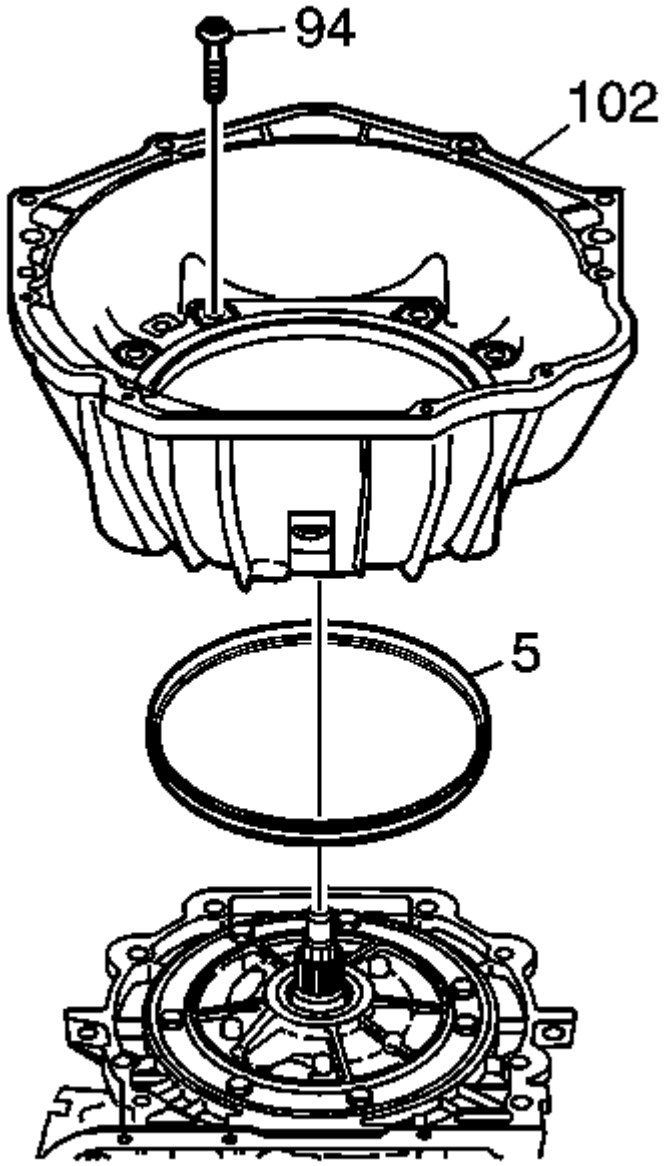


Fig. 249: Installing Front Differential Assembly
Courtesy of GENERAL MOTORS CORP.

Install the front differential assembly (13) into the transmission case assembly.

TORQUE CONVERTER HOUSING CLEANING AND INSPECTION

 © 2011 Mitchell Repair Information Company, LLC.

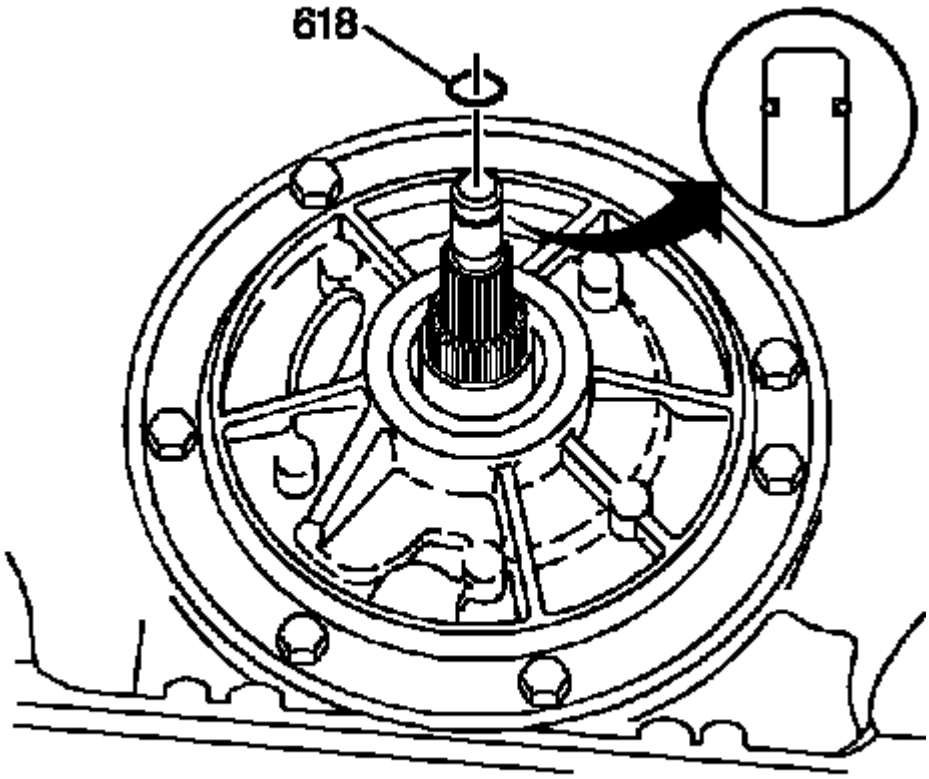


Fig. 250: View Of Transmission Fluid Baffle
Courtesy of GENERAL MOTORS CORP.

1. Remove the transmission fluid baffle bolts/screws (807) and the transmission fluid baffle (803).
2. Remove the lube fluid pipe retainer bolt/screw (806).
3. Remove the lube fluid pipe retainer (805).

 © 2011 Mitchell Repair Information Company, LLC.

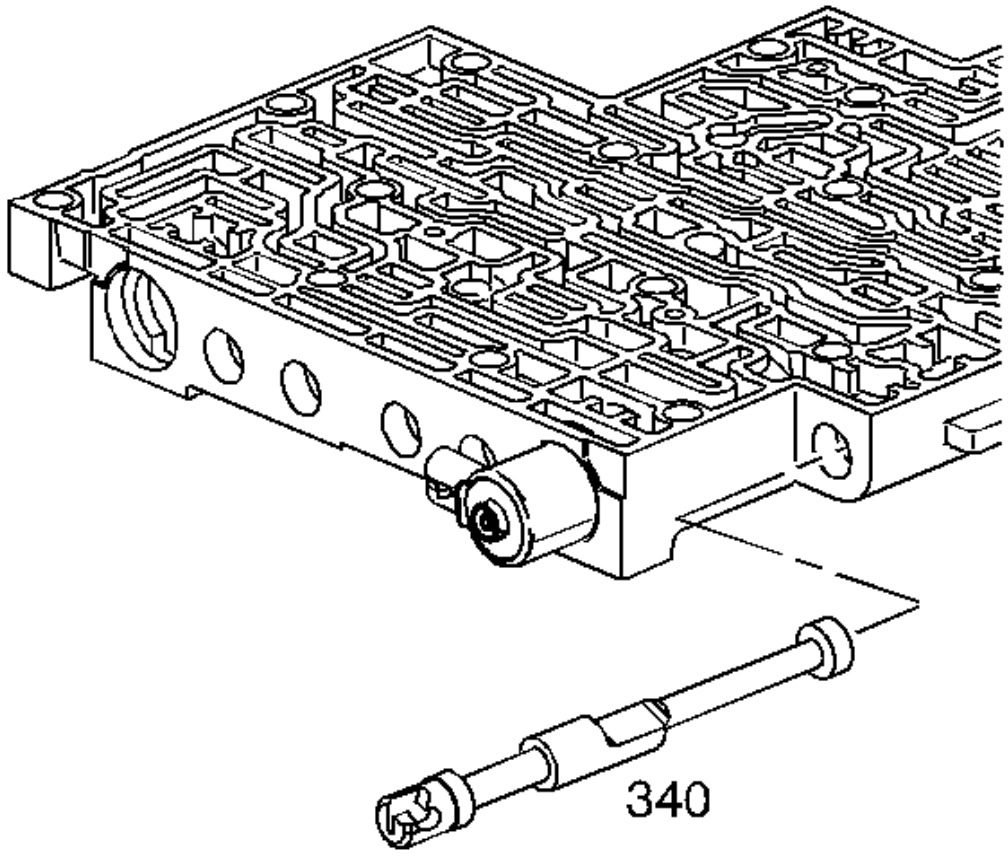


Fig. 251: Identifying Lube Fluid Pipe
Courtesy of GENERAL MOTORS CORP.

4. Remove the lube fluid pipe (804).

 © 2011 Mitchell Repair Information Company, LLC.

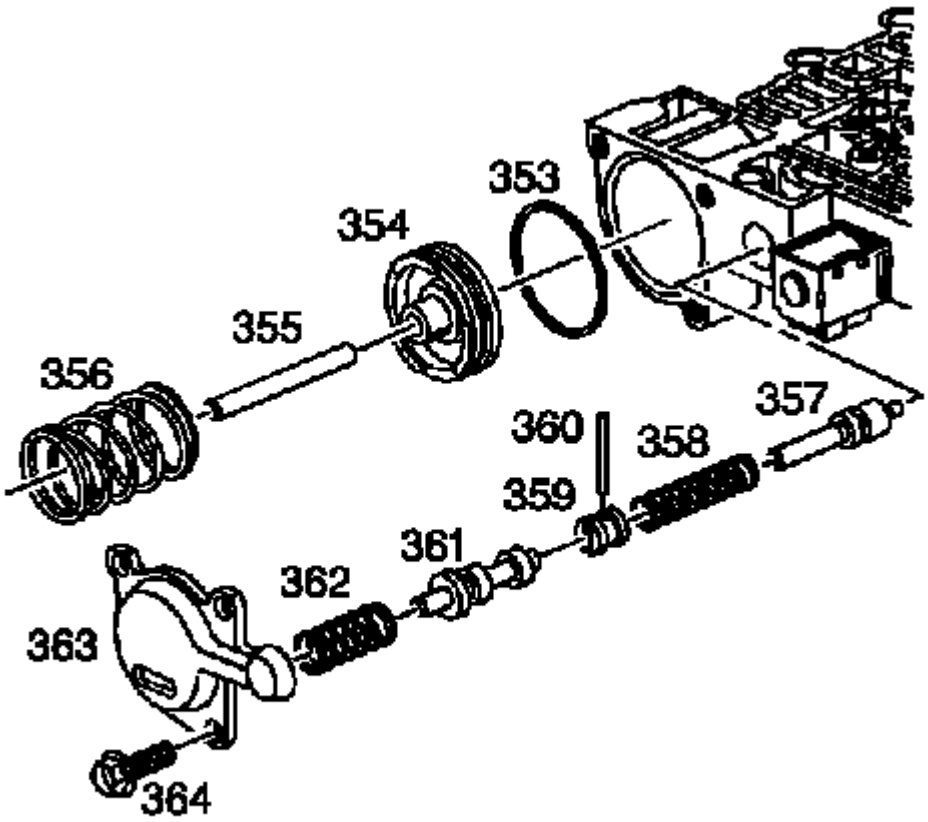


Fig. 252: Inspecting Torque Converter Housing
Courtesy of GENERAL MOTORS CORP.

5. Inspect the torque converter housing for damage. If the bearings are faulty, the converter housing requires replacement.

 © 2011 Mitchell Repair Information Company, LLC.

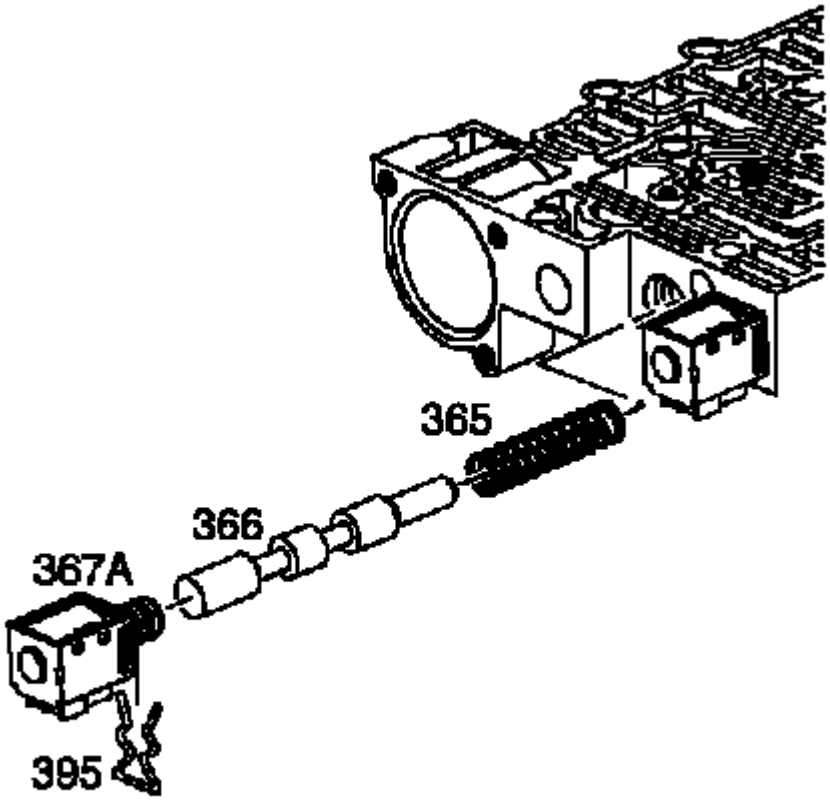


Fig. 253: Identifying Lube Fluid Pipe
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not bend or damage the lube fluid pipe (804).

6. Using a plastic hammer, install the lube fluid pipe (804).

 © 2011 Mitchell Repair Information Company, LLC.

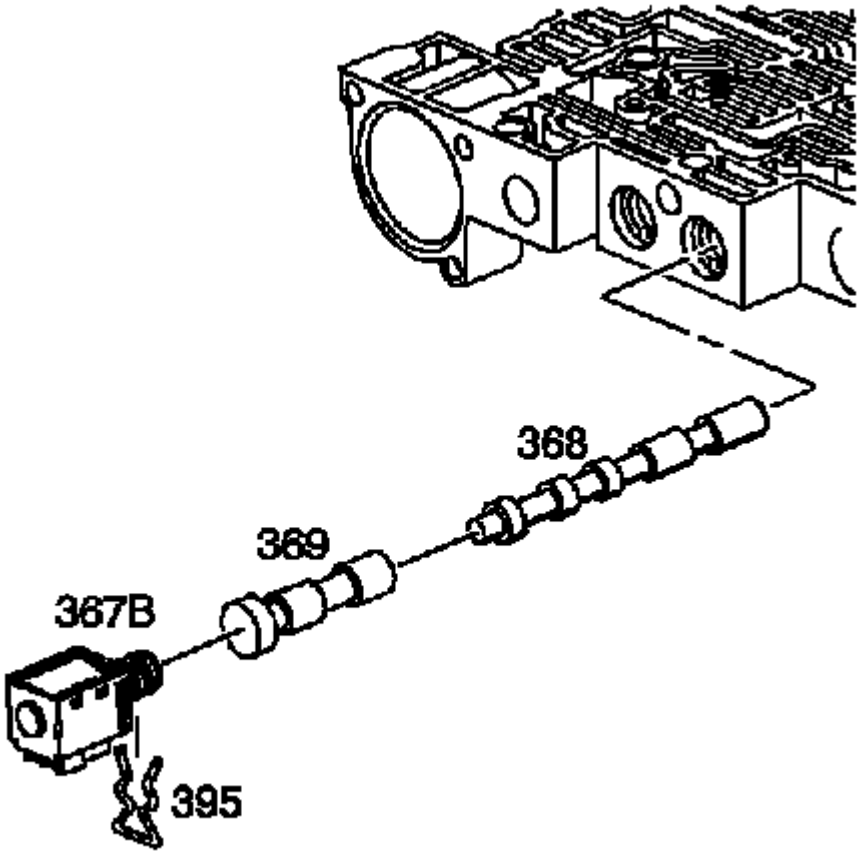


Fig. 254: View Of Chip Collector Magnets
Courtesy of GENERAL MOTORS CORP.

7. Place the 3 chip collector magnets (808) onto the transmission fluid baffle (803).

 © 2011 Mitchell Repair Information Company, LLC.

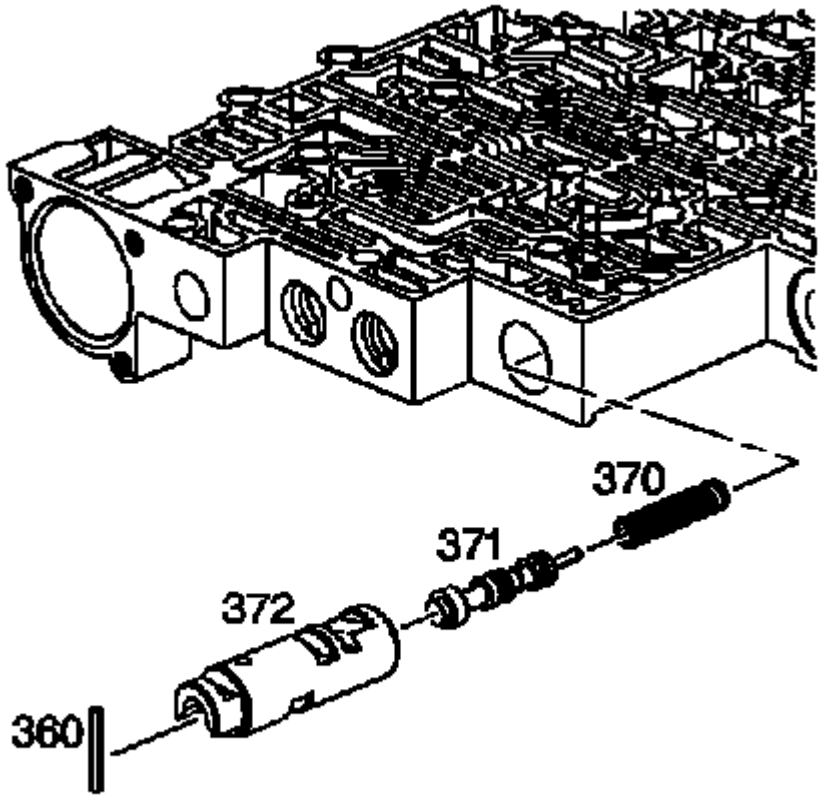


Fig. 255: View Of Transmission Fluid Baffle
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

8. Install the transmission fluid baffle (803) and the 3 - M6 x 1.0 x 14 mm transmission fluid baffle bolts (807).

   Tighten: Tighten the 3 transmission fluid baffle bolts to 5 N.m (44 lb in).

9. Install the lube fluid pipe retainer (805) and the M6 x 1.0 x 14 mm lube fluid pipe retainer bolt (806) into the torque converter housing assembly.

   Tighten: Tighten the bolt to 5 N.m (44 lb in).

TORQUE CONVERTER HOUSING INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

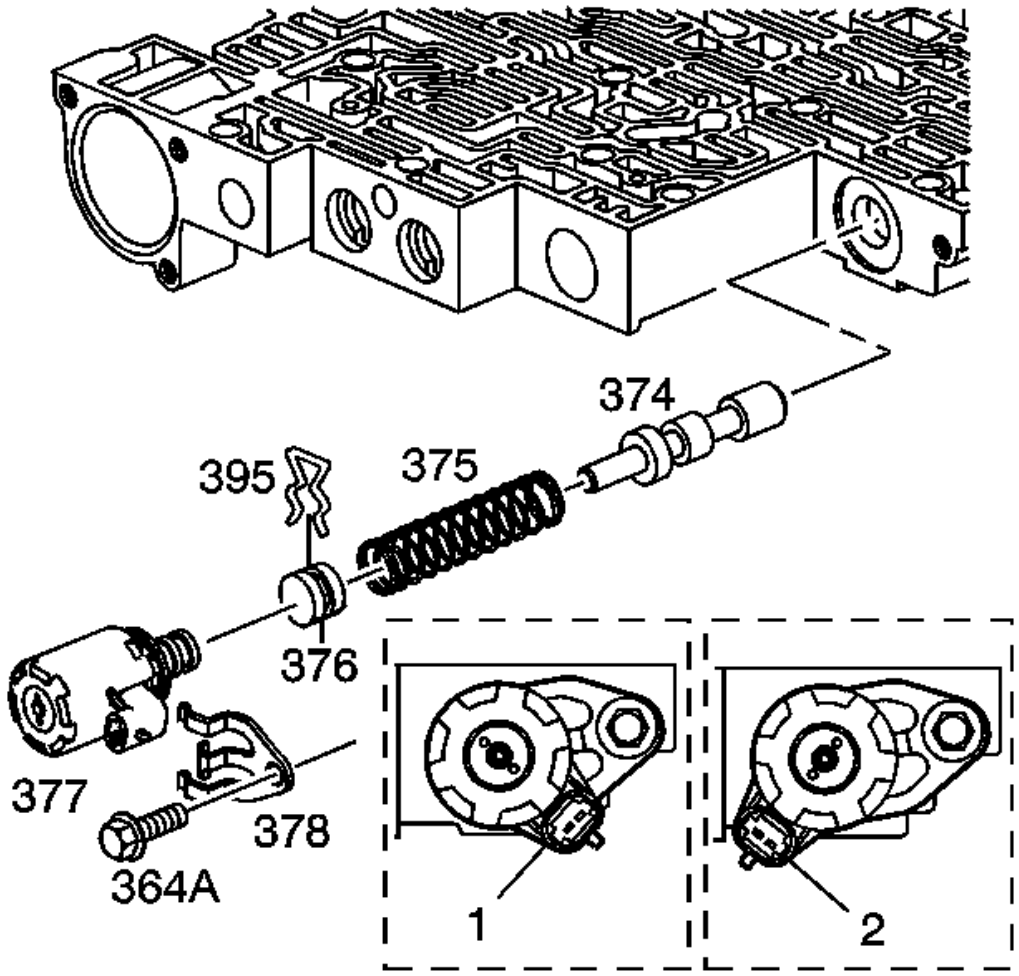


Fig. 256: Locating Case Fluid Passage Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove the case fluid passage seal (89).
2. Install a NEW case fluid passage seal (89) into the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

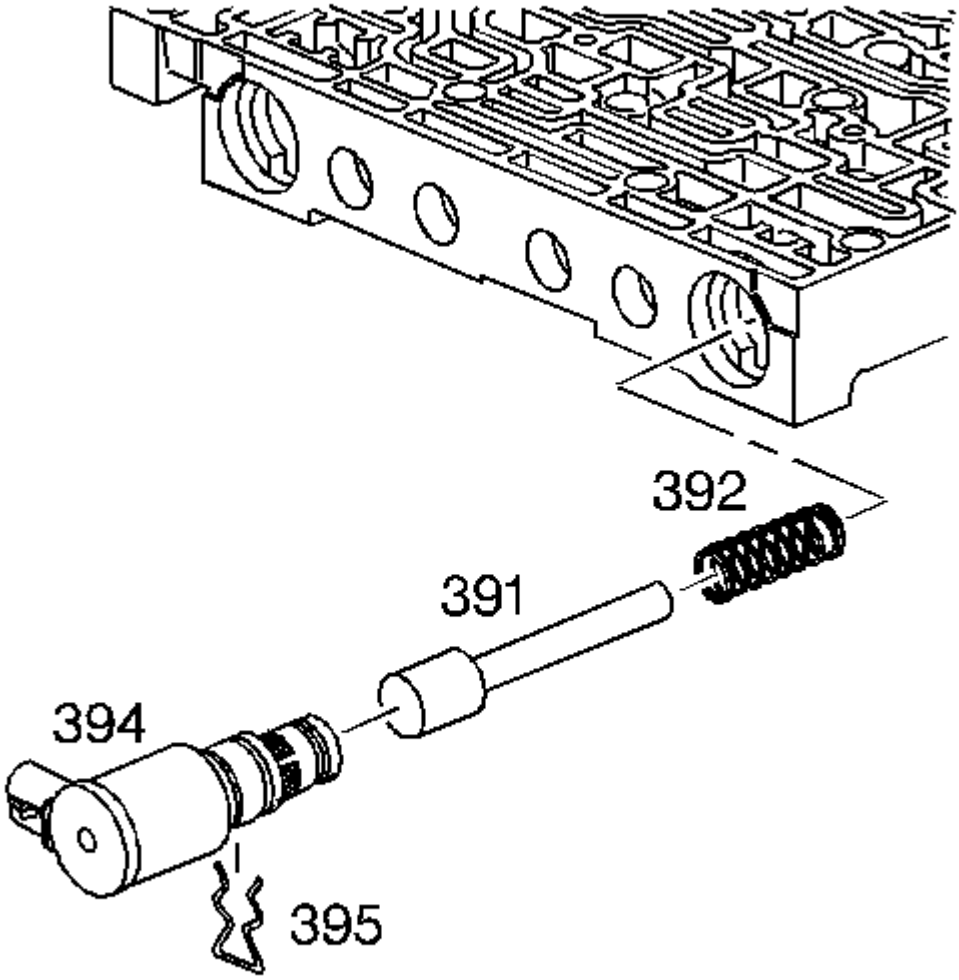


Fig. 257: Applying Sealant To Torque Converter Housing Assembly
Courtesy of GENERAL MOTORS CORP.

3. Apply a 3 mm (1/8 in) bead of sealant GM P/N 89020326 (Canadian P/N 89021188) on the inside of the bolt holes of the scaling flange of the torque converter housing assembly.
4. Install the torque converter housing assembly to the transmission case assembly.

 © 2011 Mitchell Repair Information Company, LLC.

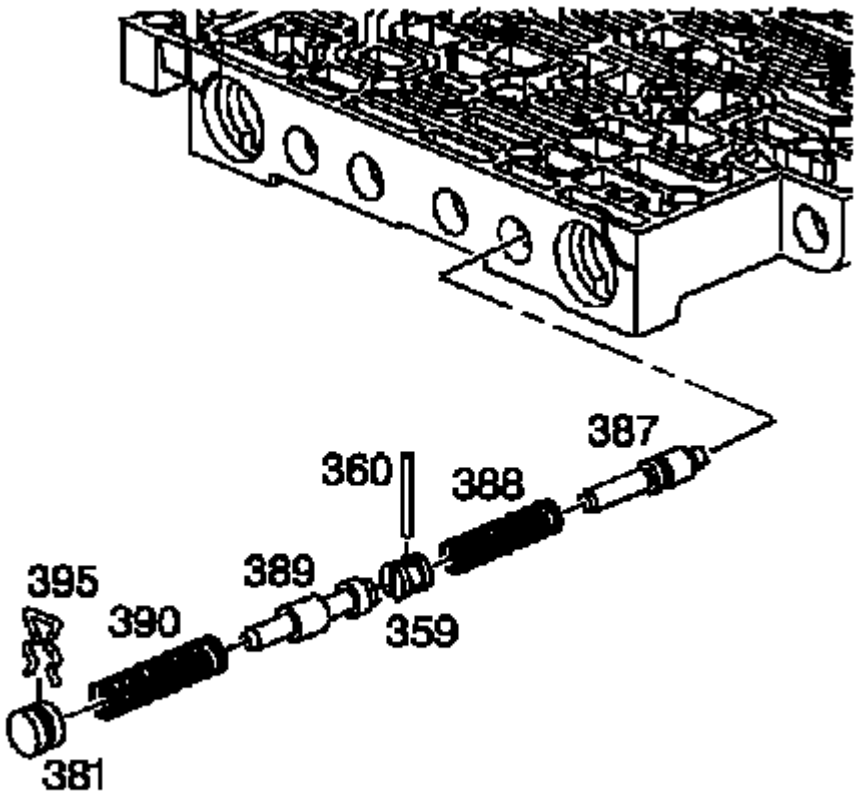


Fig. 258: Installing Torque Converter Housing Bolts
Courtesy of GENERAL MOTORS CORP.

5. Apply threadlocker GM P/N 12345382 (Canadian P/N 10953499), to the threads of all the torque converter housing bolts.
6. Install the 11 - M8 x 1.25 x 30 mm bolts (4) and hand tighten.
7. Install the 2 - M8 x 1.25 x 30 mm bolt/studs (3) and hand tighten.
8. Install the 2 - M8 x 1.25 x 35 mm bolts (6) and hand tighten.
9. Install the 1 - M8 x 1.25 x 45 mm bolt (7) and hand tighten.
10. Install the 1 - M8 x 1.25 x 30 mm TORX 40 bolt (8) and hand tighten.

 © 2011 Mitchell Repair Information Company, LLC.

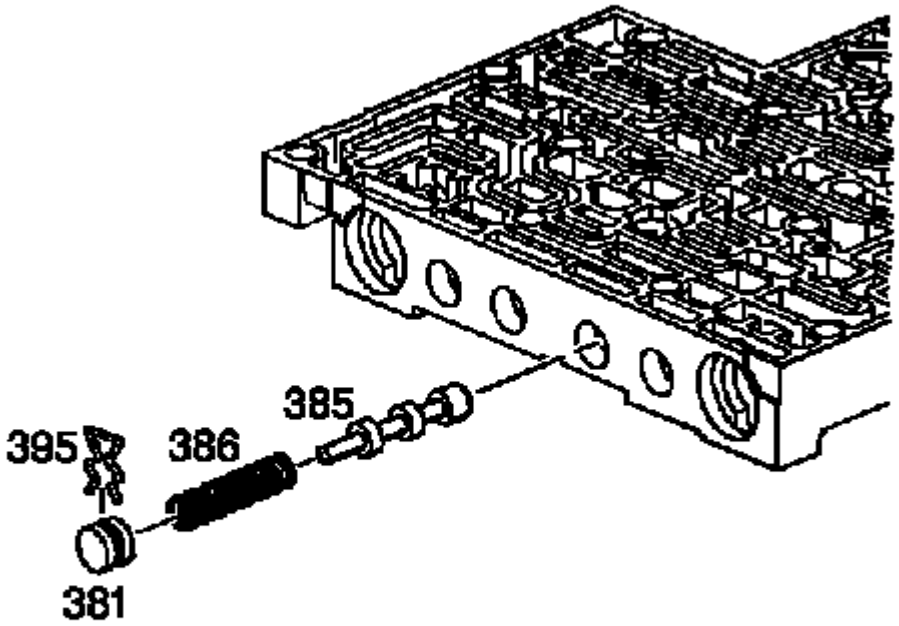


Fig. 259: Tightening Torque Converter Housing Bolts In Sequence
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

11. Tighten the 17 torque converter housing bolts in sequence.

    Tighten: Tighten the torque converter housing bolts to 29 N.m (21 lb ft).

SECOND COAST CLUTCH DISASSEMBLE

Tools Required

- **J 23327** Clutch Spring Compressor
- **J 28585** Snap Ring Remover
- **J 41236** Coast Clutch Spring Compressor
- **J 45164** Spring Compressor Bridge. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

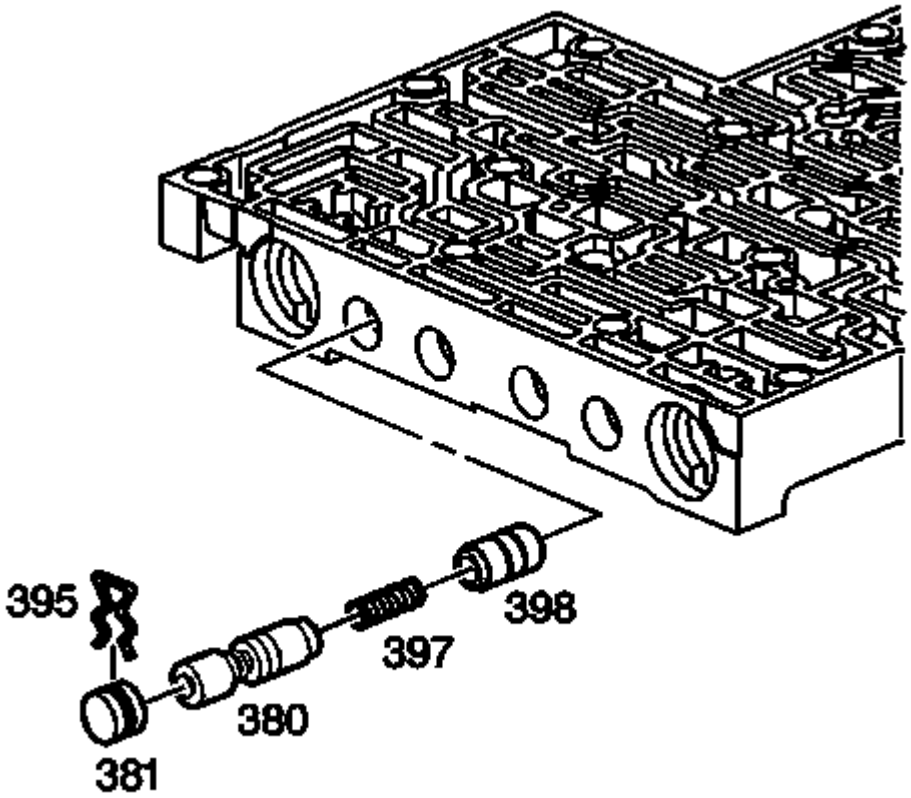


Fig. 260: Removing/Installing Second Coast Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Using **J 45164** (2), J 21420-2 (4) and J 23327-2 (1), which are part of **J 23327** , compress the second clutch spring. See **Special Tools**.
2. Using **J 28585** (3), remove the second coast clutch backing plate retaining ring (230) from the fluid pump assembly.

 © 2011 Mitchell Repair Information Company, LLC.

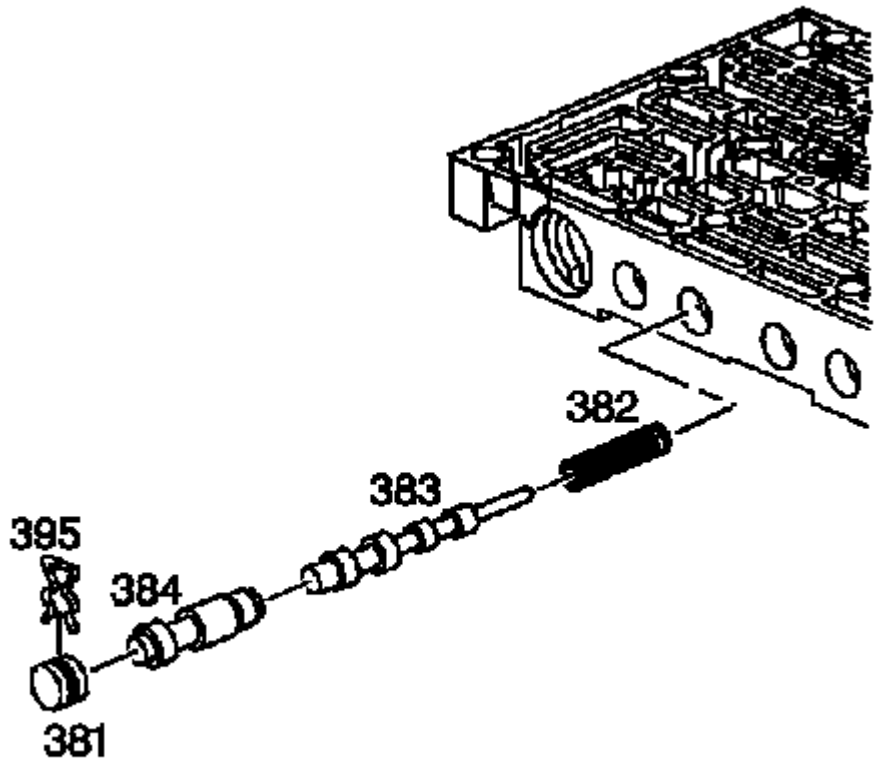


Fig. 261: View Of Second Coast Plates
Courtesy of GENERAL MOTORS CORP.

3. Remove the clutch plates (227, 228, 229).

 © 2011 Mitchell Repair Information Company, LLC.

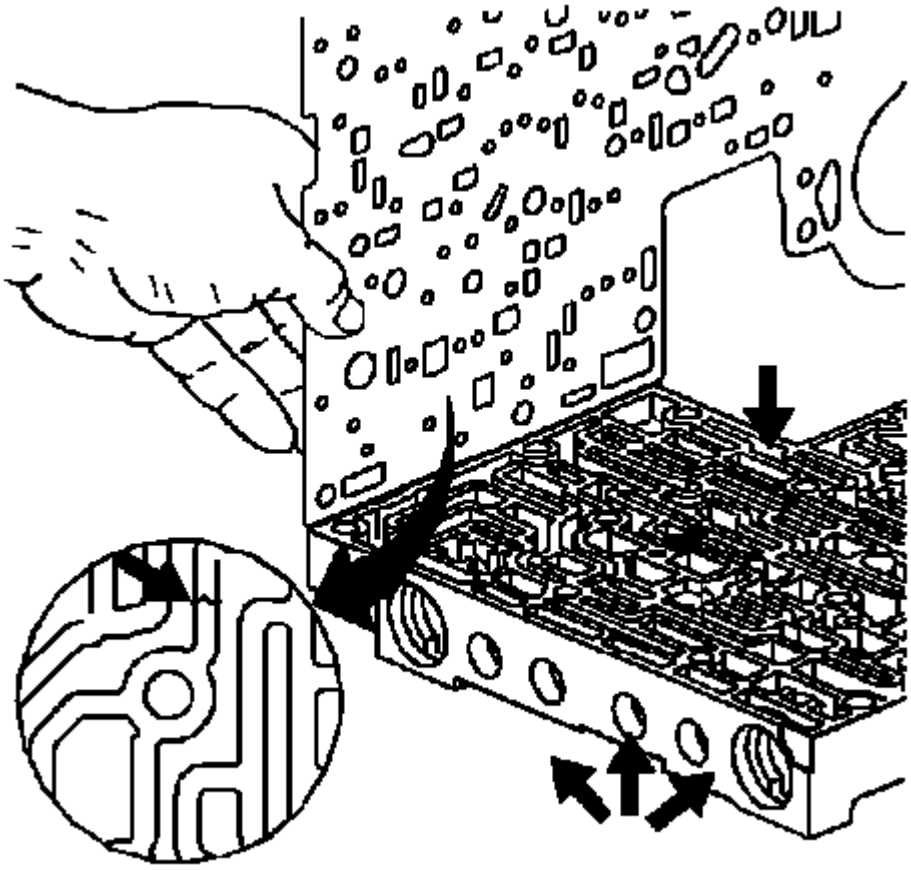


Fig. 262: Removing/Installing Second Coast Clutch Spring Retaining Ring
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not let the tools contact the bushing surfaces.

4. Install J 21420-2 (1) and J 23327-2 (3), which are part of **J 23327** , and **J 41236** (2) and compress the second coast clutch spring (224).
5. Remove the second coast clutch spring retaining ring (225) using snap ring pliers.
6. Remove the second coast clutch spring (224) from the fluid pump assembly.

 © 2011 Mitchell Repair Information Company, LLC.

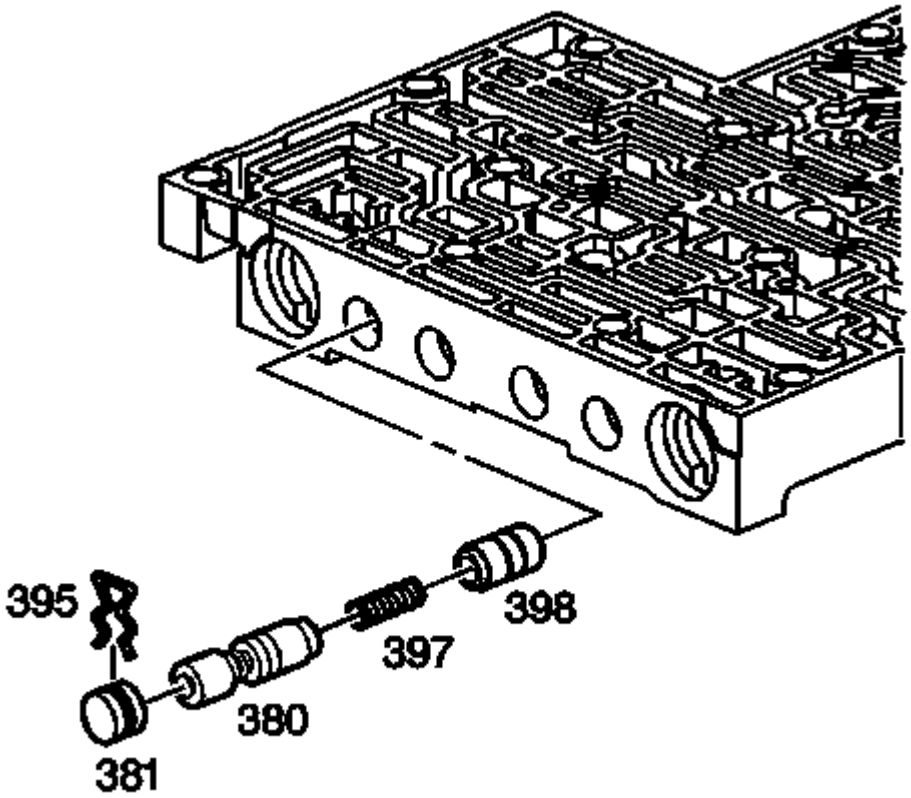


Fig. 263: Removing Second Coast Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

7. While pulling upward on the piston by hand, apply compressed air into the fluid passage in the fluid pump assembly and remove the second coast clutch piston (222).
8. Remove the inner seal (221) and the outer seal (223) from the second coast clutch piston (222).

SECOND CLUTCH DISASSEMBLE

Tools Required

J 28585 Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

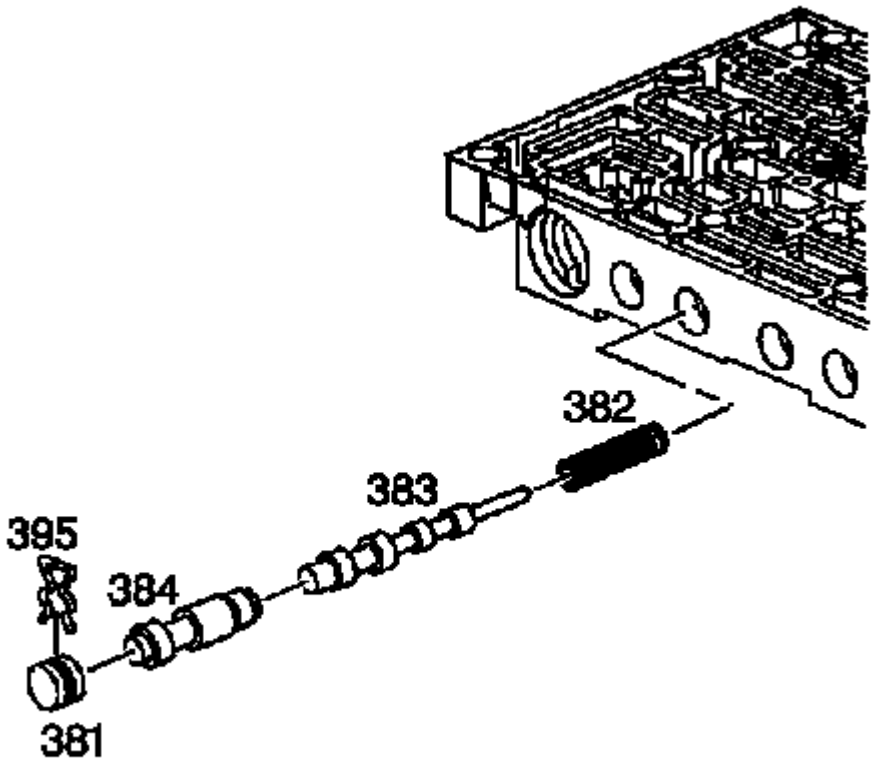


Fig. 264: Removing/Installing Second Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

1. Using **J 28585** remove the second clutch backing plate retaining ring (220) from the fluid pump assembly.

 © 2011 Mitchell Repair Information Company, LLC.

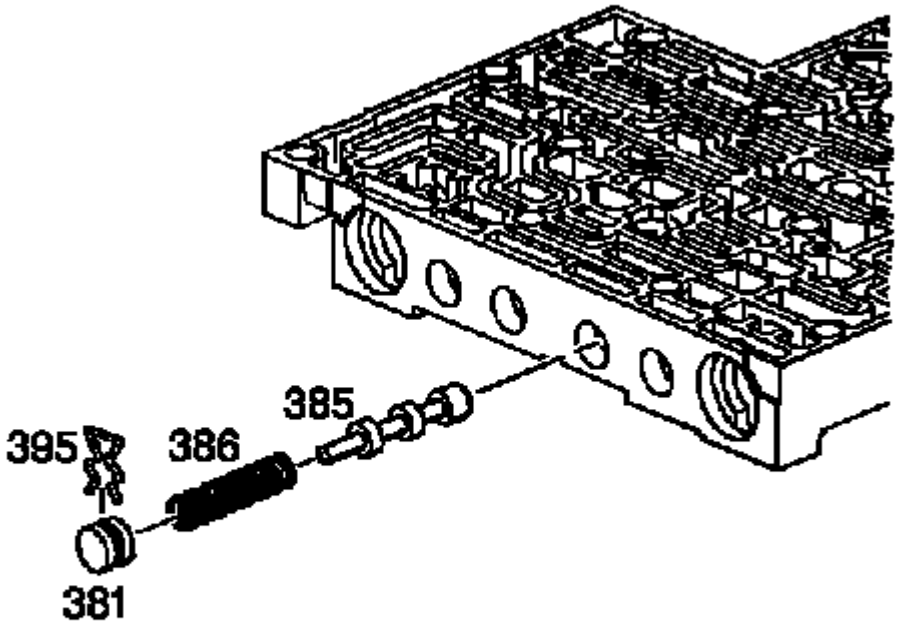


Fig. 265: View Of Second Clutch Plates
Courtesy of GENERAL MOTORS CORP.

2. Remove the second clutch backing plate (219).
3. Remove the 3 fiber plates (217).
4. Remove the 3 steel plates (218).

 © 2011 Mitchell Repair Information Company, LLC.

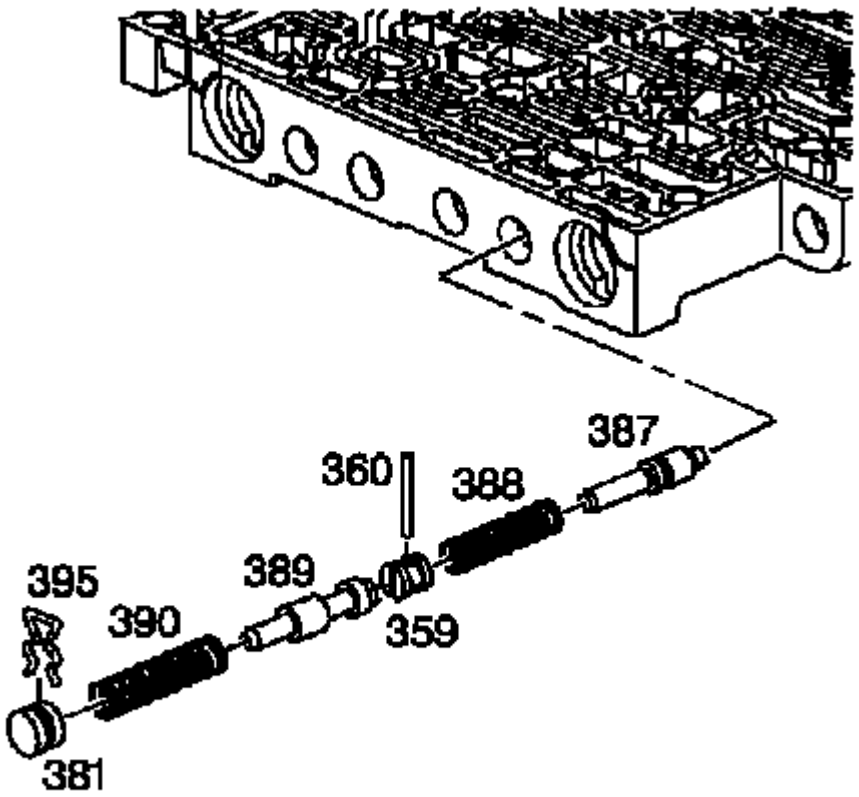


Fig. 266: View Of Second Clutch Spring Assembly
Courtesy of GENERAL MOTORS CORP.

5. Remove the second clutch spring assembly (215).

 © 2011 Mitchell Repair Information Company, LLC.

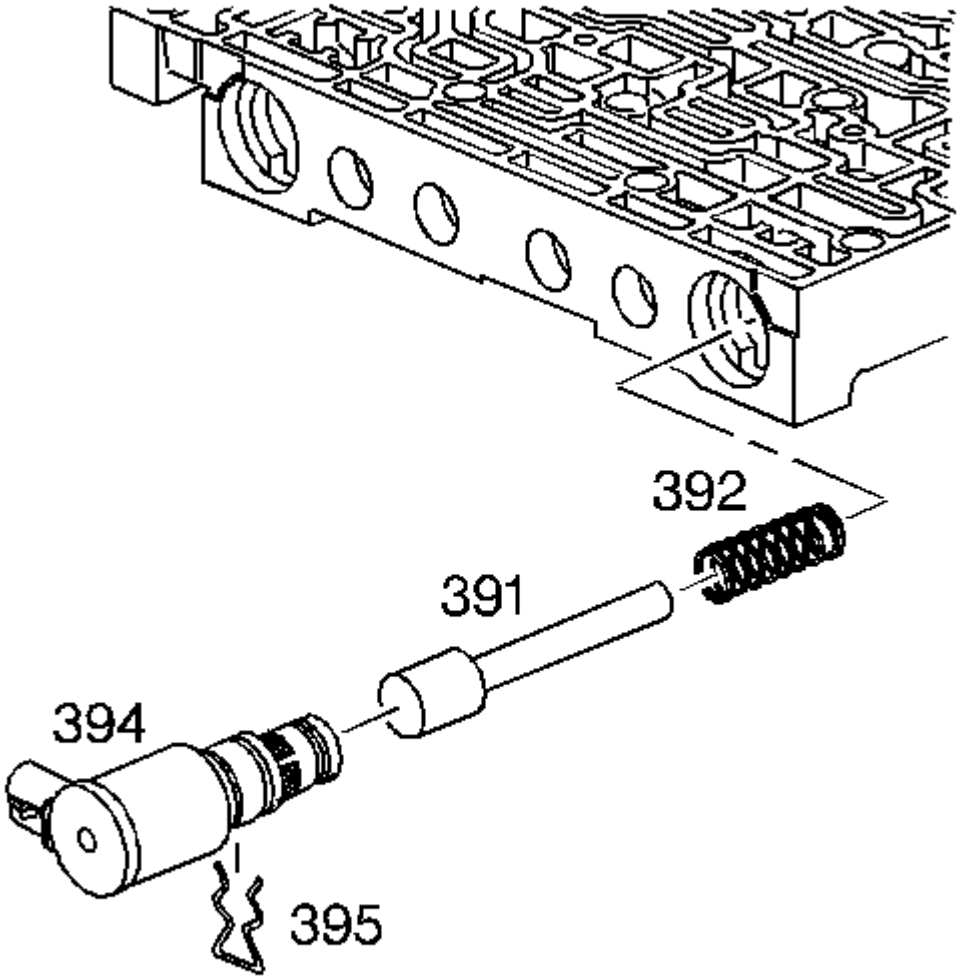


Fig. 267: View Of Second Clutch Spring Assembly Retaining Ring
Courtesy of GENERAL MOTORS CORP.

6. Remove the second clutch spring assembly retaining ring (214).

 © 2011 Mitchell Repair Information Company, LLC.

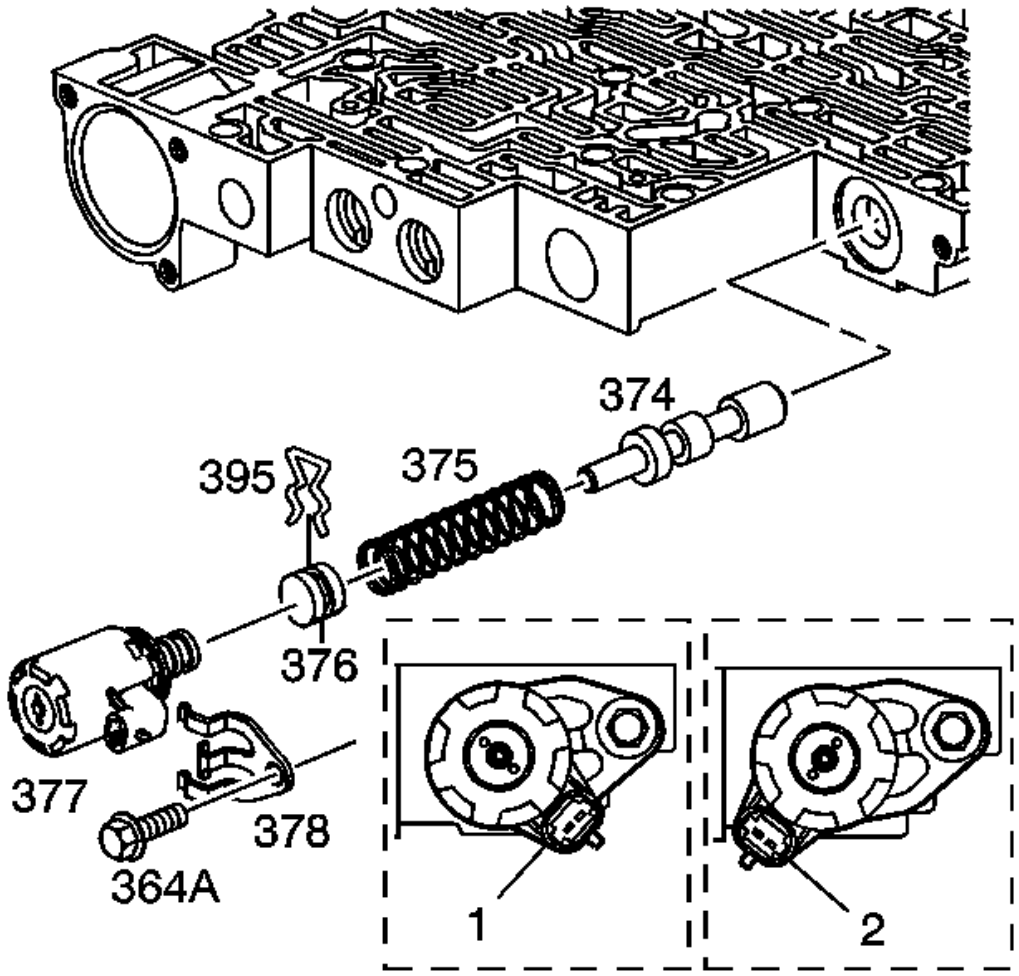


Fig. 268: Removing Second Clutch Piston
Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

7. While pulling on the piston by hand, apply compressed air into the fluid passage and remove the second clutch piston (210) and the second clutch piston sleeve (212).
8. Remove the second clutch piston outer seal (209) from the second clutch piston (210).
9. Remove the second clutch piston sleeve seals (211, 213) from the second clutch piston sleeve (212).

FLUID PUMP DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

Tools Required

J 45000 Seal Remover

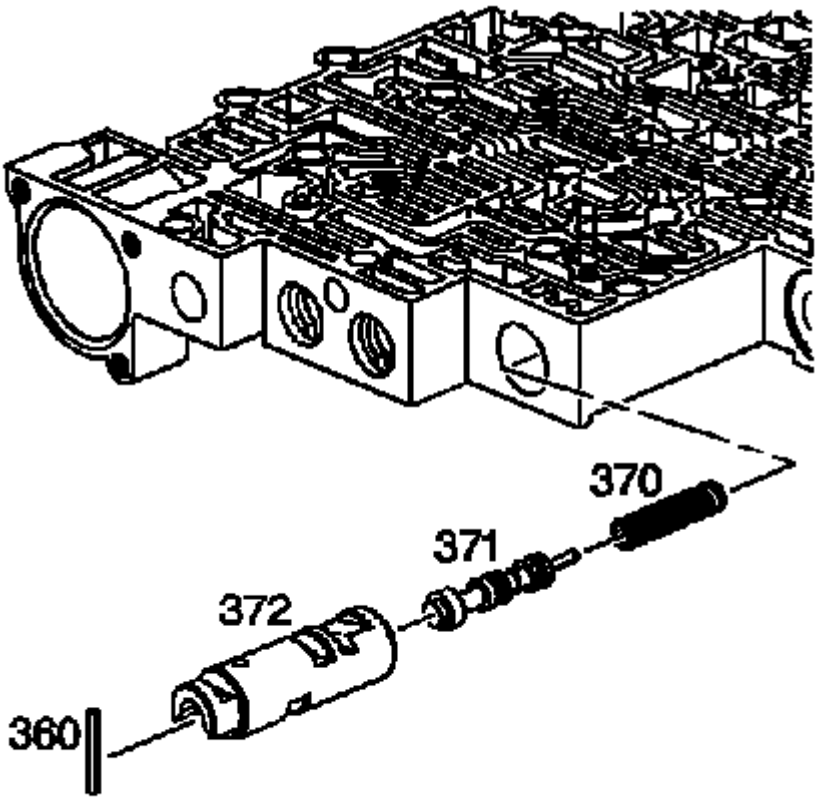


Fig. 269: View Of Fluid Pump Stator Shaft Assembly & Fluid Pump Plate
Courtesy of GENERAL MOTORS CORP.

1. Remove 13 transmission fluid pump cover bolts (231) and 1 transmission fluid pump cover bolt (232) to separate the fluid pump body from the fluid pump stator shaft assembly (208).

 © 2011 Mitchell Repair Information Company, LLC.

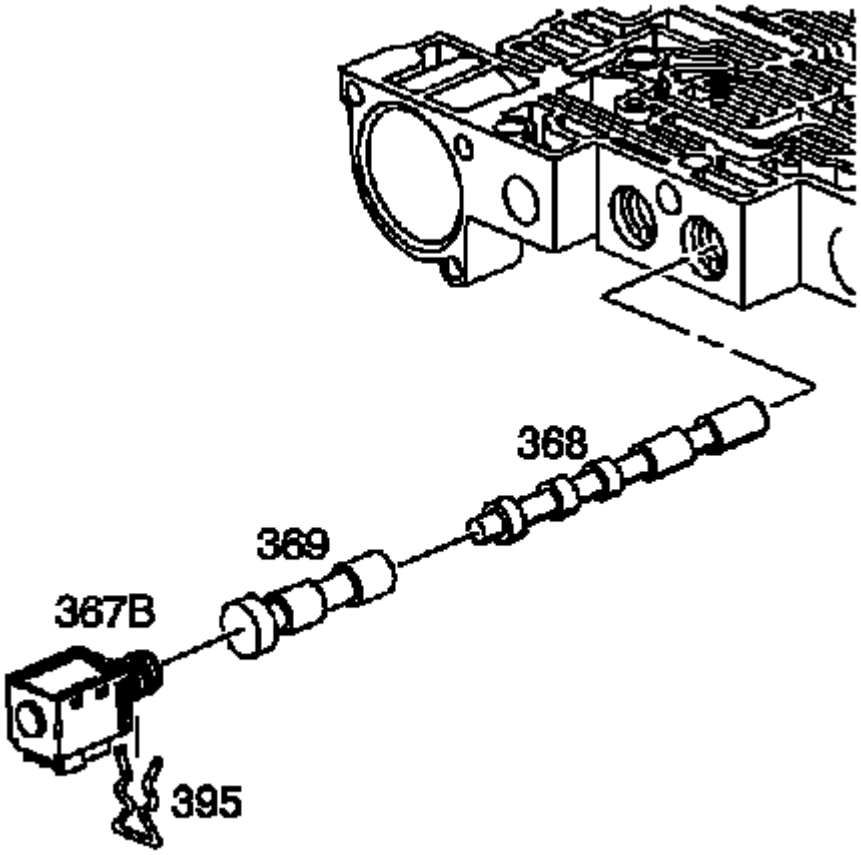


Fig. 270: View Of Fluid Pump Plate & Body
Courtesy of GENERAL MOTORS CORP.

2. Remove the fluid pump plate (207) from the fluid pump body (202).
3. Remove the fluid pump O-ring seal (206) from the fluid pump body (202).

 © 2011 Mitchell Repair Information Company, LLC.

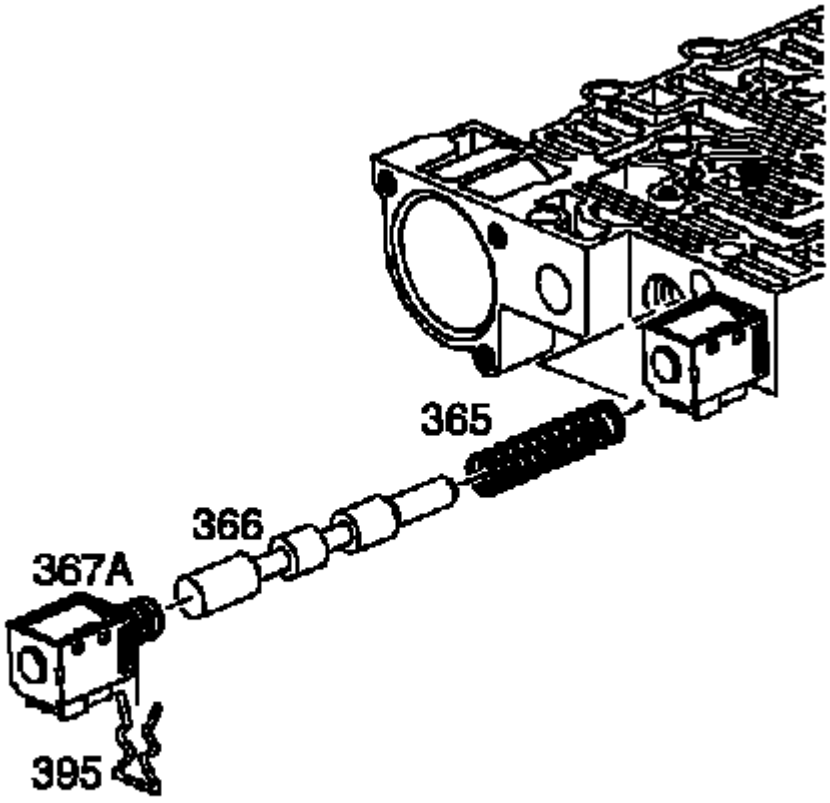


Fig. 271: Measuring Clearance Between Fluid Pump Driven Gear & Fluid Pump Body
Courtesy of GENERAL MOTORS CORP.

4. Push the fluid pump driven gear (204) to one side of the fluid pump body (202). Using a feeler gage, measure the clearance between the fluid pump driven gear (204) and the fluid pump body (202).

   Specification: Driven gear to body clearance: 0.075 - 0.20 mm (0.002 - 0.007 in)

 © 2011 Mitchell Repair Information Company, LLC.

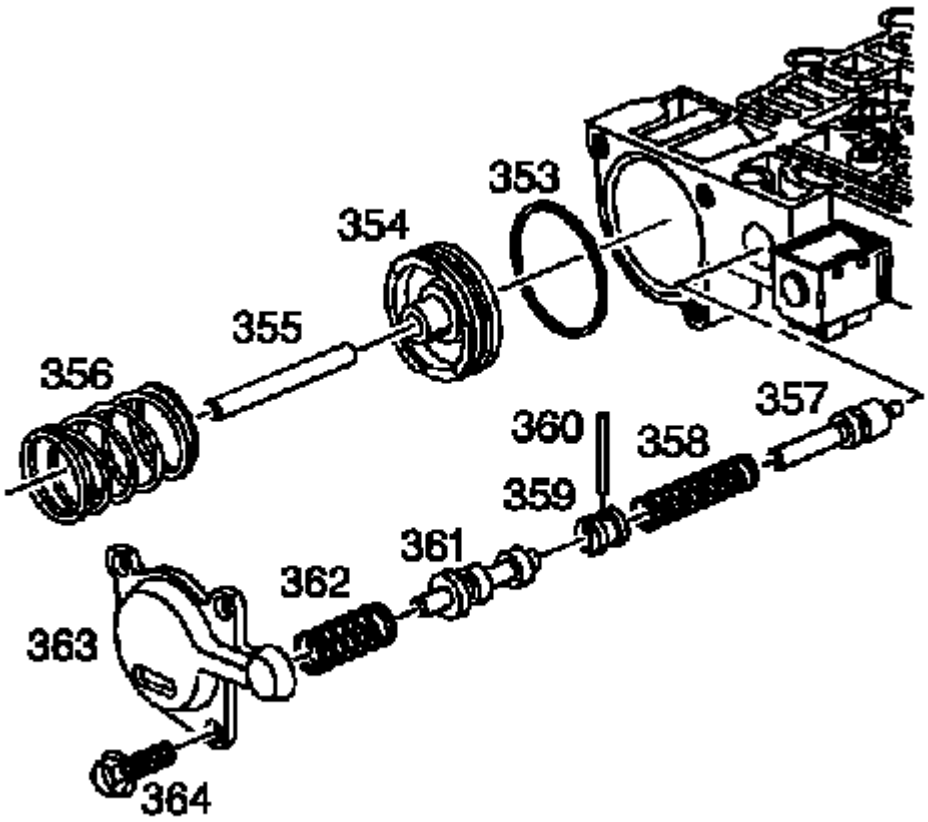


Fig. 272: Measuring Between Fluid Pump Drive Gear Teeth & Fluid Pump Body
Courtesy of GENERAL MOTORS CORP.

5. Using a feeler gage, measure between the fluid pump drive gear (205) teeth and the crescent shaped part of the fluid pump body (202).

   Specification: Drive gear tip to body clearance: 0.013 - 0.342 mm (0.0005 - 0.014 in)

 © 2011 Mitchell Repair Information Company, LLC.

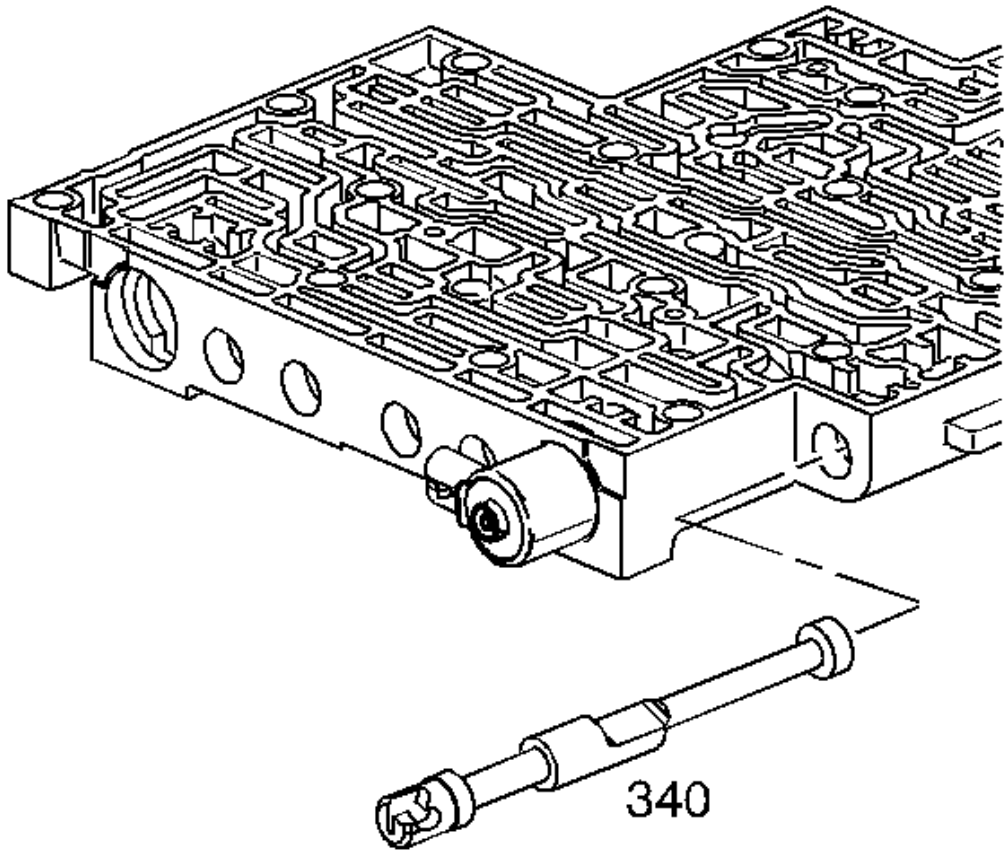


Fig. 273: Measuring Between Fluid Pump Driven Gear & Fluid Pump Body
Courtesy of GENERAL MOTORS CORP.

6. Using a feeler gage, measure between the fluid pump driven gear (204) teeth and the crescent shaped part of the fluid pump body (202).

   Specification: Driven gear tip to body clearance: 0.004 - 0.298 mm (0.0001 - 0.618 in)

 © 2011 Mitchell Repair Information Company, LLC.

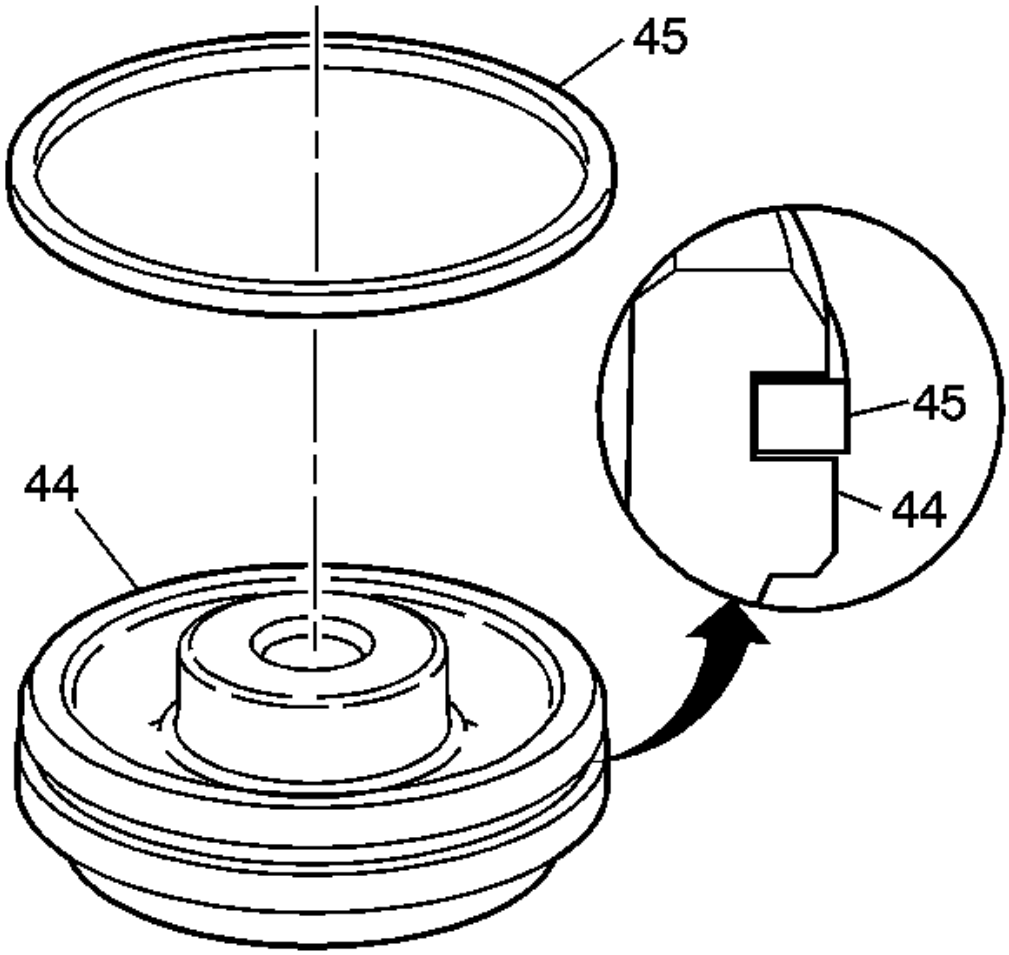


Fig. 274: Measuring Side Clearance Of Fluid Pump Gears To Fluid Pump Body
Courtesy of GENERAL MOTORS CORP.

7. Using a steel straight edge and a feeler gage, measure the side clearance of both fluid pump gears in relationship to the fluid pump body.

   Specification: Side clearance of drive and driven gear to body: 0.03 - 0.10 mm (0.0012 - 0.004 in)

8. If any of the above measurements are not within specifications, replace the fluid pump assembly.

 © 2011 Mitchell Repair Information Company, LLC.

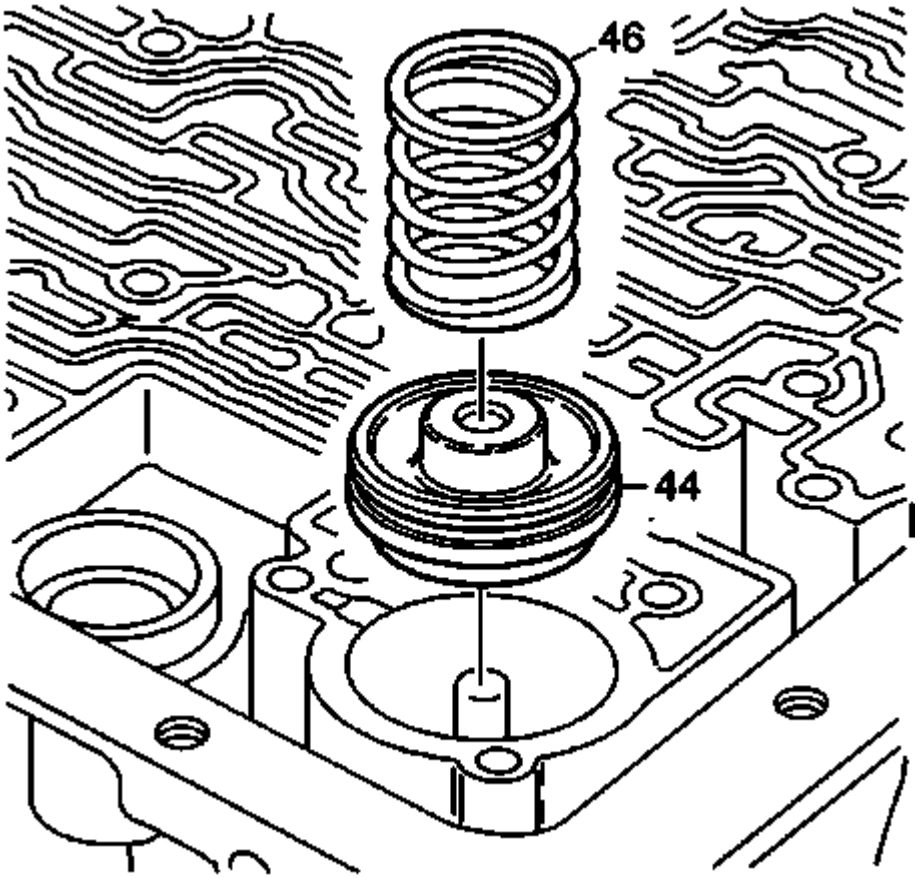


Fig. 275: View Of Fluid Pump Drive & Driven Gears
Courtesy of GENERAL MOTORS CORP.

9. Remove the fluid pump drive gear (205) and the fluid pump driven gear (204).

 © 2011 Mitchell Repair Information Company, LLC.

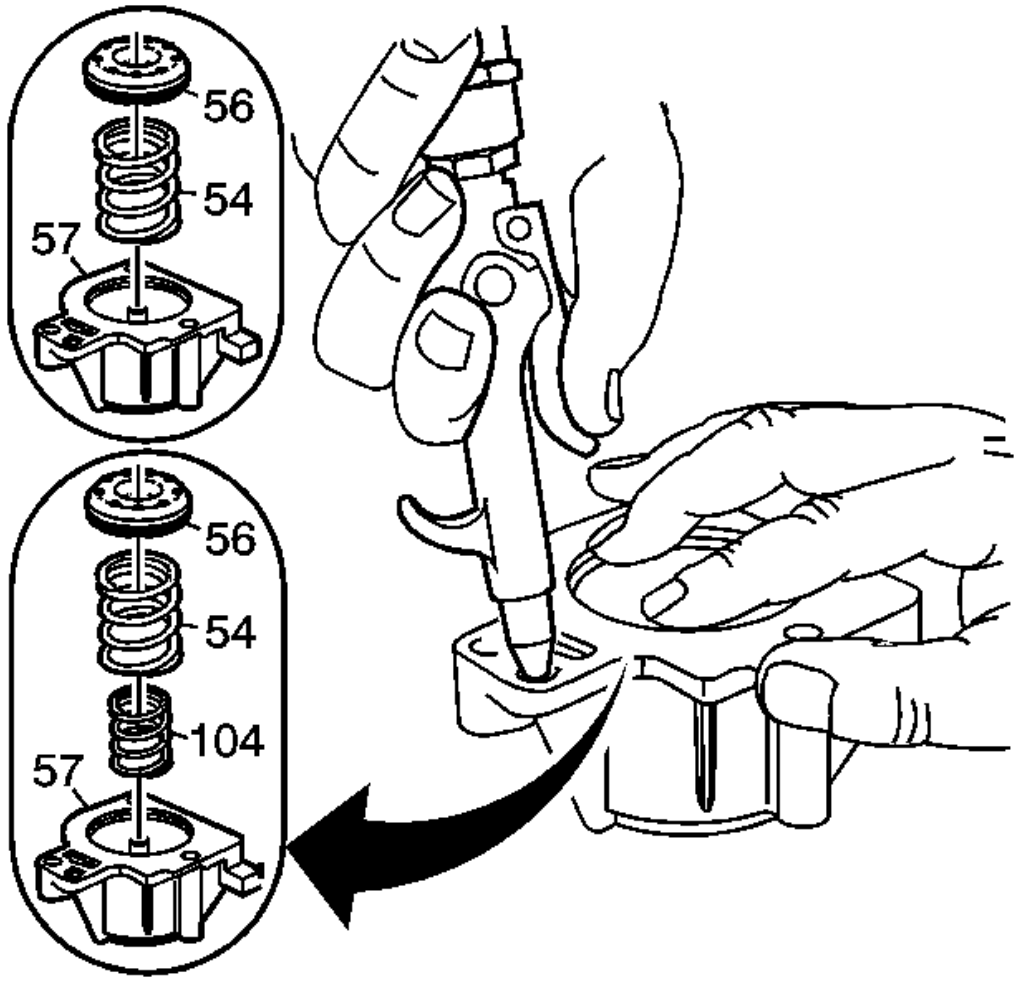


Fig. 276: Removing Fluid Pump Seal Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not damage the fluid pump body bushing.

10. Using **J 45000** , remove the fluid pump seal assembly (200) from the fluid pump body (202).

FLUID PUMP CLEANING AND INSPECTION

Tools Required

J 45185 Bore Gage Set. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

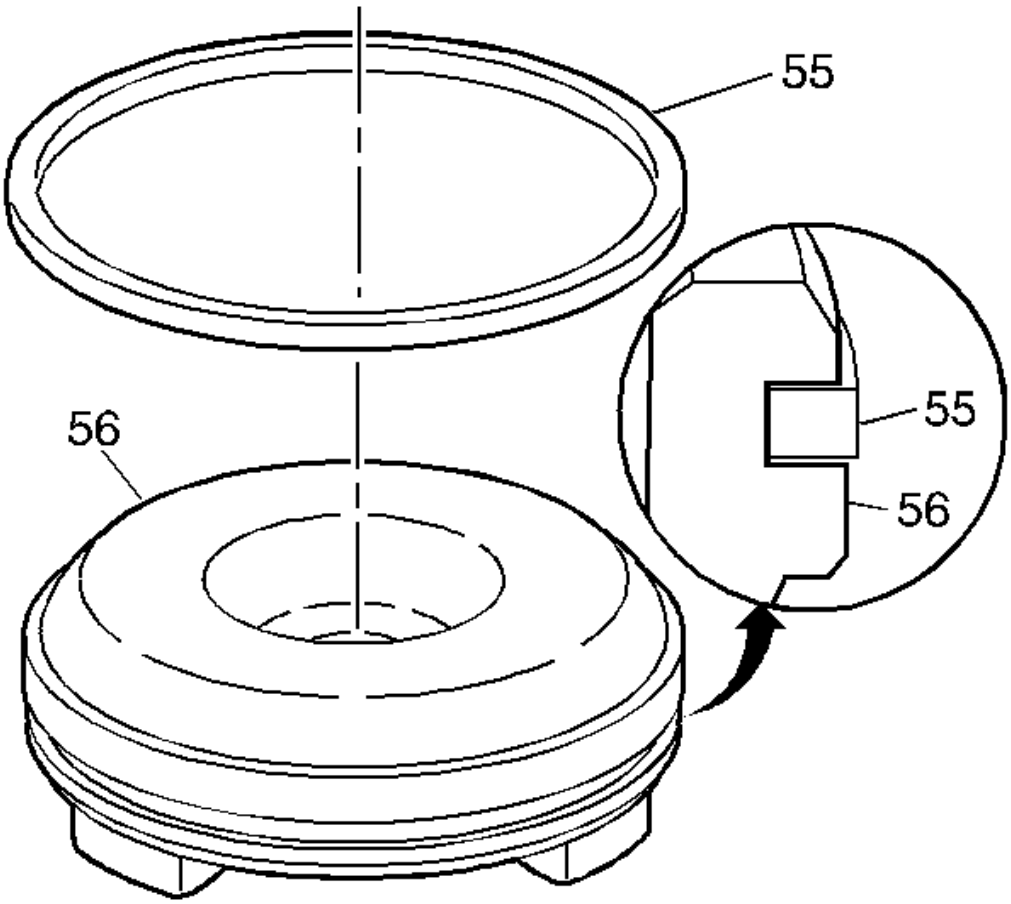


Fig. 277: Measuring Inner Diameter Of Fluid Pump Body Bushing
Courtesy of GENERAL MOTORS CORP.

1. Using the **J 45185** , measure the inner diameter of the fluid pump body bushing. See **Special Tools**. Measure the bushing in different locations and take the average.
2. Use micrometer to measure **J 45185** reading. See **Special Tools**.

Specification: Fluid pump body bushing I.D: 38.113 - 38.188 mm (1.500 - 1.503 in)

 © 2011 Mitchell Repair Information Company, LLC.

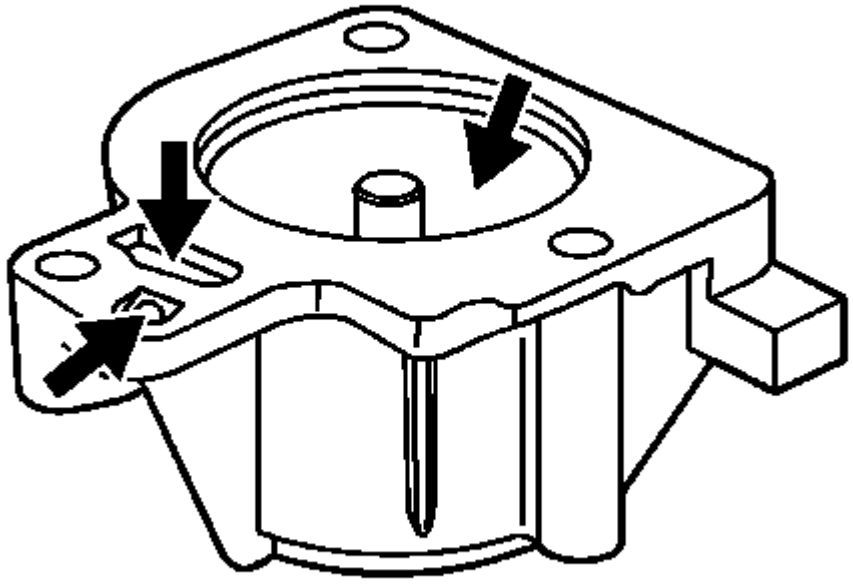


Fig. 278: Measuring Inner Diameter Of Stator Shaft Bushing
Courtesy of GENERAL MOTORS CORP.

3. Using the **J 45185** , measure the inner diameter of the stator shaft bushing. See **Special Tools**. Measure the bushing in different locations and take the average.
4. Use micrometer to measure **J 45185** reading. See **Special Tools**.

   Specification: Stator shaft bushing I.D: 22.201 - 22.257 mm (0.874 - 0.876 in)

5. Replace the fluid pump assembly if the measurements are greater than the specification.

FLUID PUMP ASSEMBLE

Tools Required

J 35582 Oil Pump Seal Installer

 © 2011 Mitchell Repair Information Company, LLC.

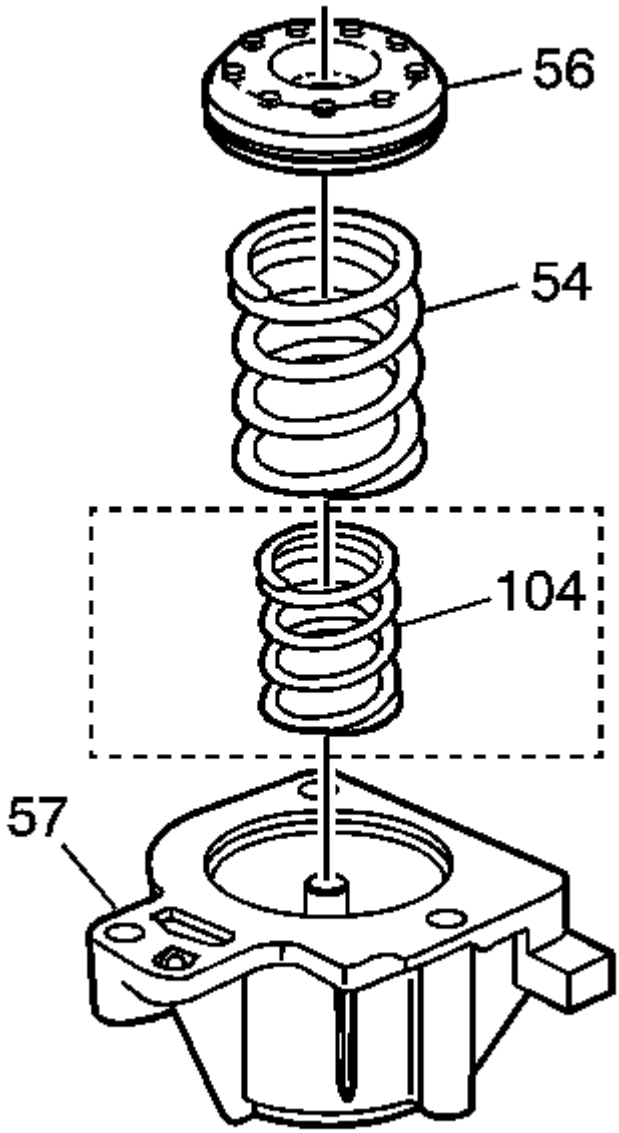


Fig. 279: Installing Fluid Pump Seal Assembly
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to the inner fluid pump seal surface of the fluid pump body.
2. Using **J 35582** , install a new fluid pump seal assembly (200). The seal end should be flush with the outer edge of the fluid pump body.

 © 2011 Mitchell Repair Information Company, LLC.

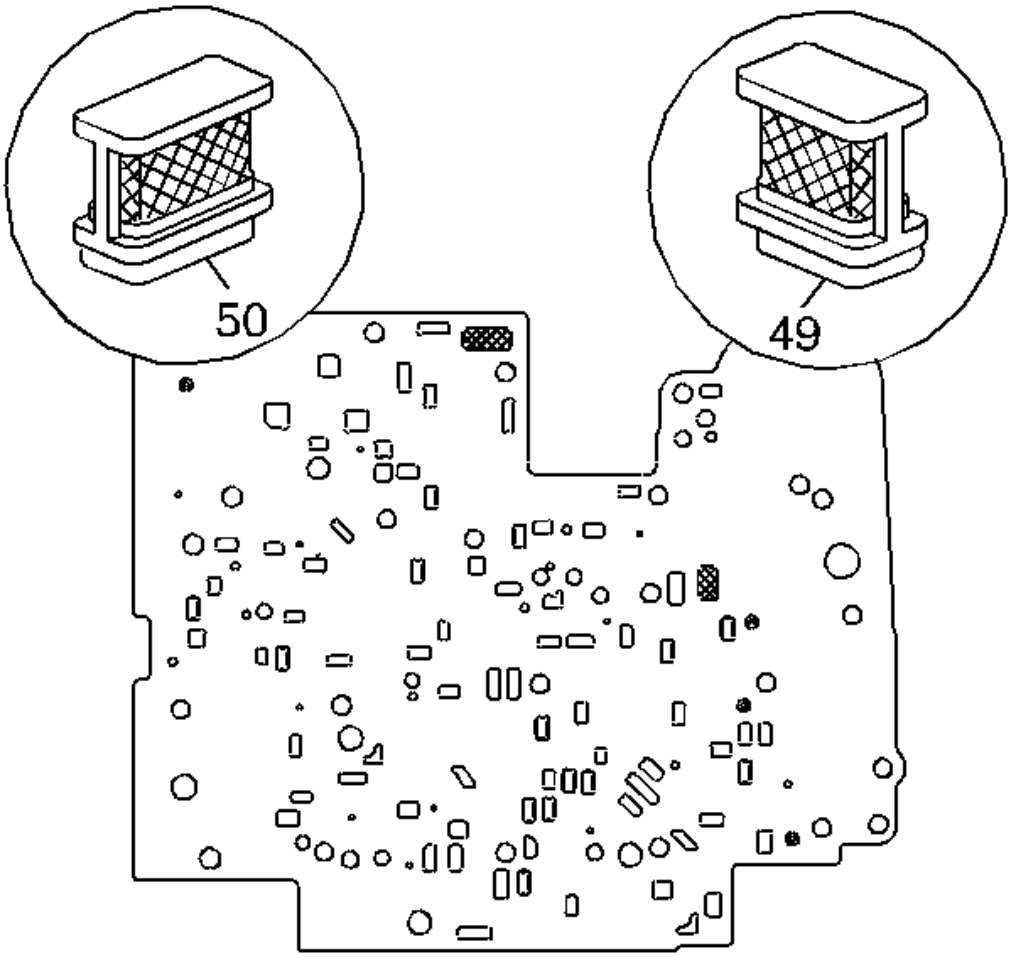


Fig. 280: View Of Fluid Pump Drive & Driven Gears
Courtesy of GENERAL MOTORS CORP.

3. Apply automatic transmission fluid to the surface of the fluid pump body.

IMPORTANT: The index mark (dot) on the fluid pump drive gear (205) is installed down, (see insert). The index mark (dot) on the fluid pump driven gear (204) is installed up.

4. Install the fluid pump drive gear (205) and the fluid pump driven gear (204) to the fluid pump body (202).

 © 2011 Mitchell Repair Information Company, LLC.

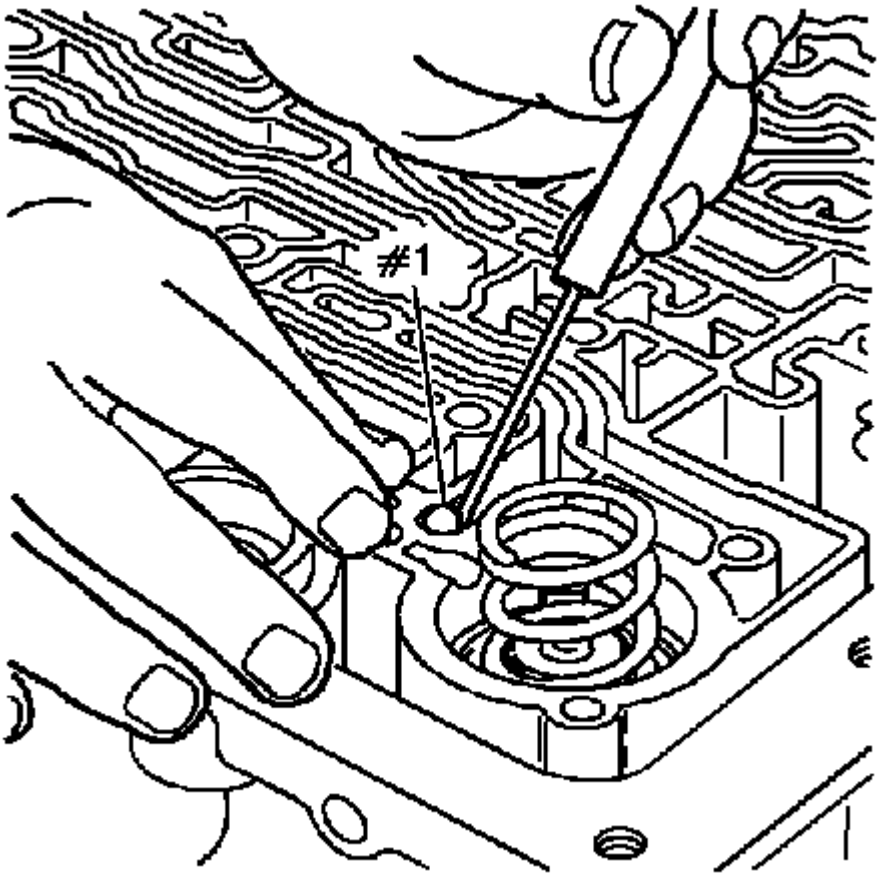


Fig. 281: Aligning Fluid Pump Plate
Courtesy of GENERAL MOTORS CORP.

5. Apply automatic transmission fluid to the new fluid pump O-ring seal (206).
6. Install the new fluid pump O-ring seal (206) onto the fluid pump body (202).

IMPORTANT: Be sure to align the holes properly when installing the fluid pump plate (207).

7. Align the fluid pump plate (207) holes with the alignment pins (203) in the fluid pump body (202).

 © 2011 Mitchell Repair Information Company, LLC.

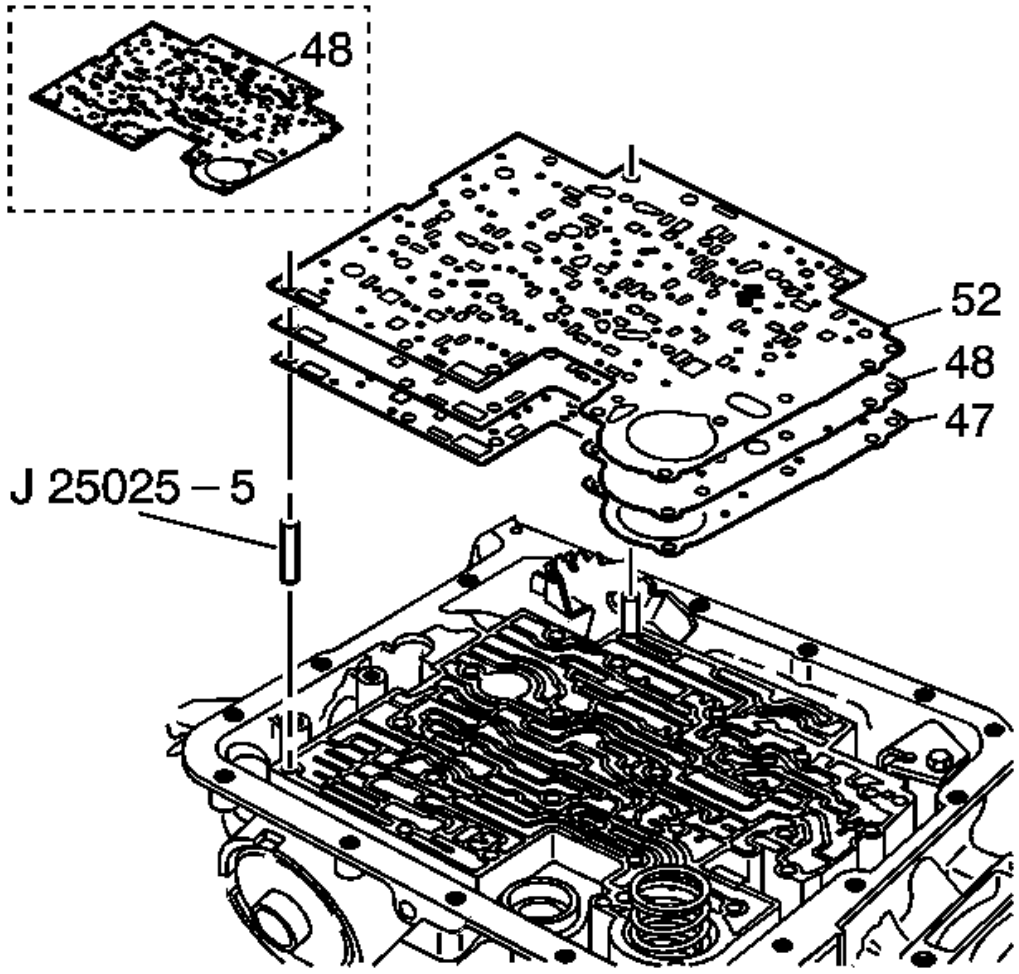


Fig. 282: View Of Fluid Pump Stator Shaft Assembly & Fluid Pump Plate
Courtesy of GENERAL MOTORS CORP.

8. Align the fluid pump stator shaft assembly (208) with each bolt hole of the fluid pump plate (207).
9. Install, and hand tighten, 12 of the 13 - M6 x 1.0 x 14.5 mm fluid pump cover bolts (231) and 1 - M5 x 0.8 x 17 mm fluid pump cover bolt (232).

 © 2011 Mitchell Repair Information Company, LLC.

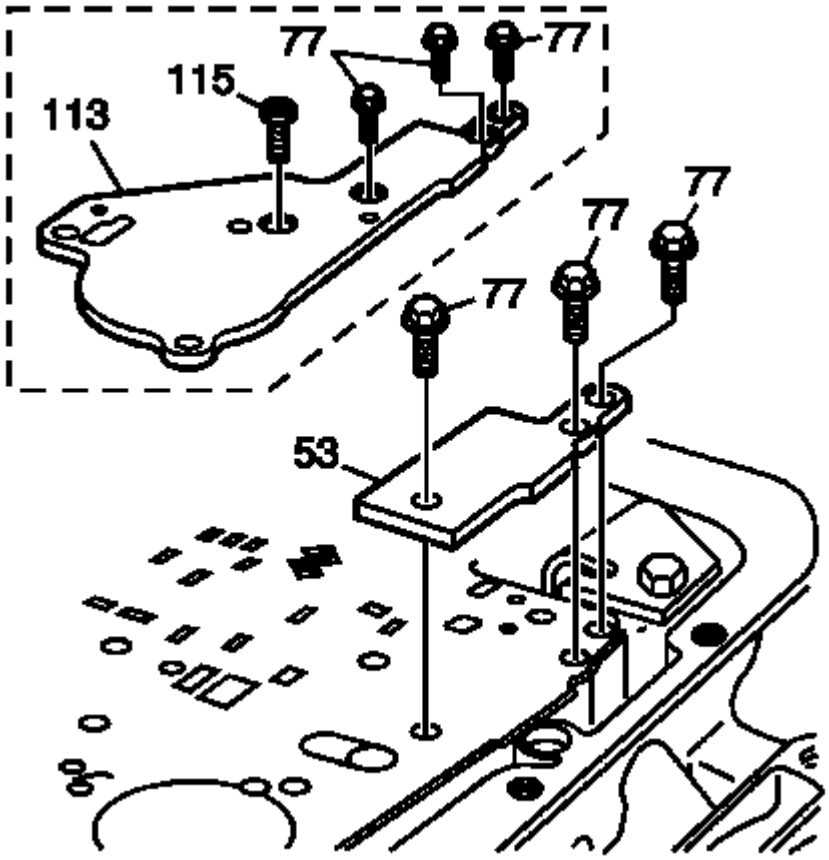


Fig. 283: Installing Fluid Pump Cover Bolts
Courtesy of GENERAL MOTORS CORP.

10. Leave out the remaining M6 x 1.0 x 14.5 mm fluid pump cover bolt (231) from the hole indicated by the arrow in the graphic. Set the bolt aside to be installed later.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

11. Tighten the fluid pump cover bolts in sequence.

Tighten:

- Tighten the 12 - M6 x 1.0 x 14.5 mm fluid pump cover bolts (231) to 12 N.m (106 lb in).
- Tighten the 1 - M5 x 0.8 x 17 mm fluid pump cover bolt (232) to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

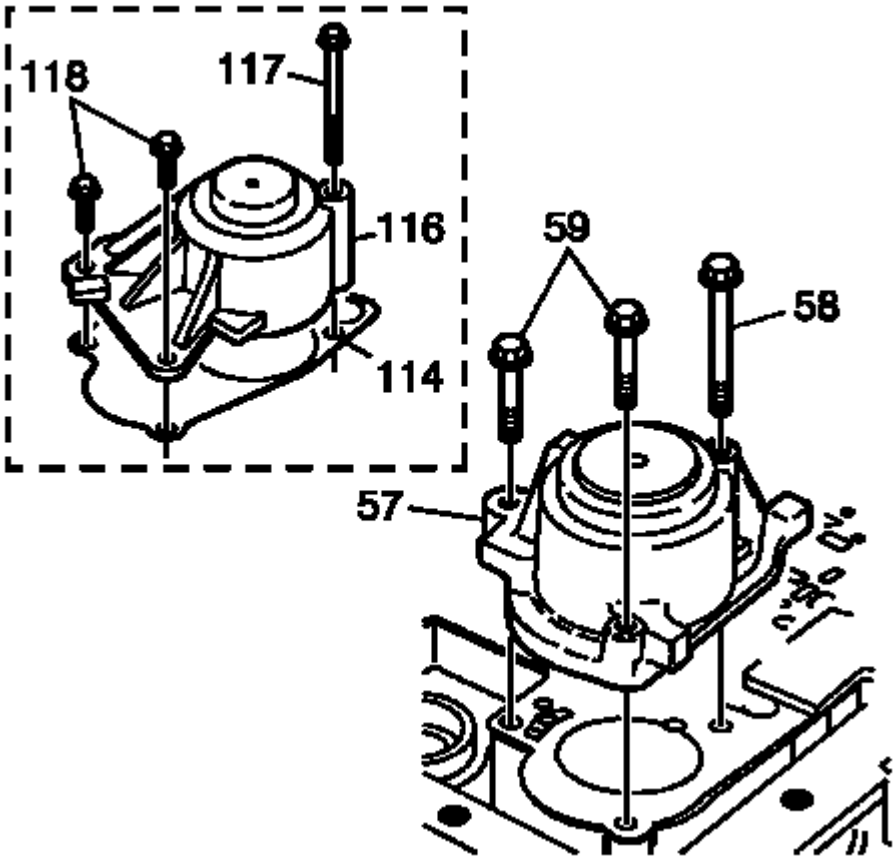


Fig. 284: Inspecting Fluid Pump Gears For Smooth Rotation
Courtesy of GENERAL MOTORS CORP.

12. Inspect the fluid pump gears for rotating smoothly.
    1. Install the fluid pump assembly on the torque converter.
    2. Rotate the body of the fluid pump assembly.
    3. Ensure the fluid pump seal was not damaged.

SECOND CLUTCH ASSEMBLE

Tools Required

J 28585 Snap Ring Remover

 © 2011 Mitchell Repair Information Company, LLC.

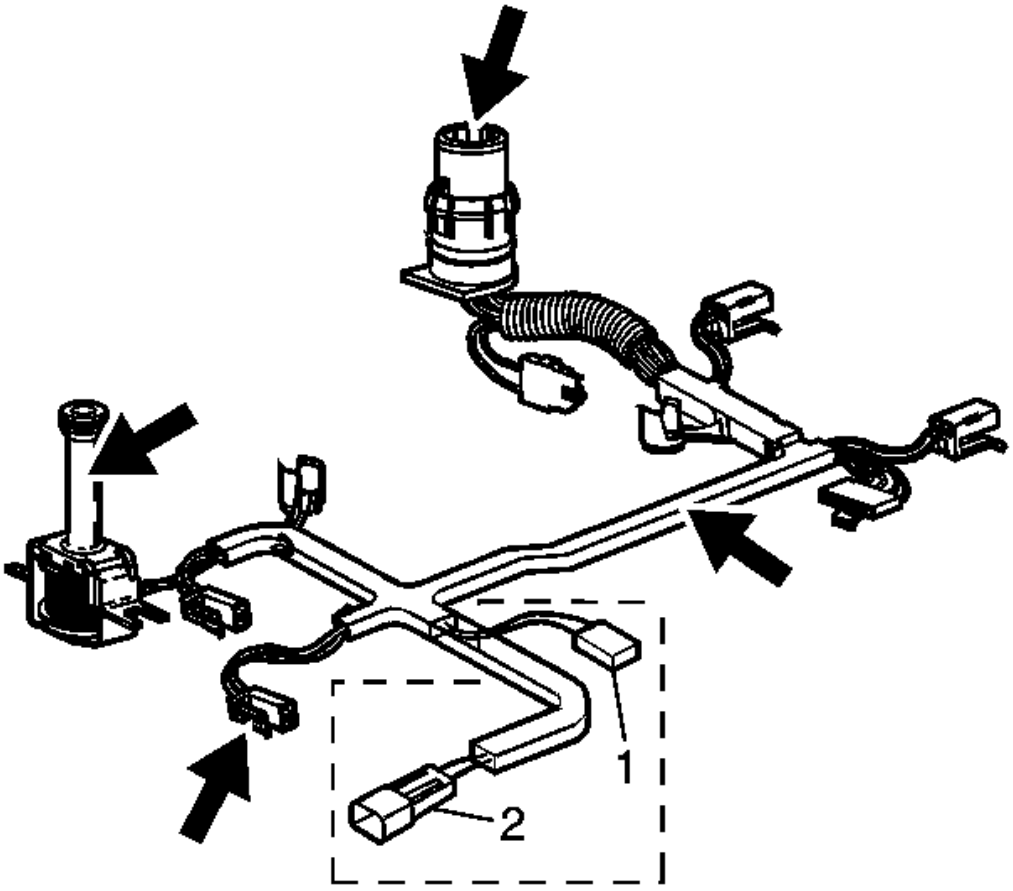


Fig. 285: Identifying Second Clutch Piston, Sleeves & Seals
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Soak the new clutch plates in automatic transmission fluid for at least 2 hours before replacing them.

1. Inspect that the sliding surface of the clutch plates are not worn or burnt. If the clutch plates are worn or burnt, replace them.
2. Apply automatic transmission fluid to the new second clutch piston and second clutch piston sleeve seals.
3. Install the new second clutch piston outer seal (209) onto the second clutch piston (210).
4. Install the new second clutch piston sleeve seals (211, 213) onto the second clutch piston sleeve (212).
5. Apply automatic transmission fluid to the inner surfaces of the fluid pump stator shaft assembly.
6. Press the second clutch piston (210) and the second clutch piston sleeve (212) into the fluid pump stator shaft assembly.

 © 2011 Mitchell Repair Information Company, LLC.

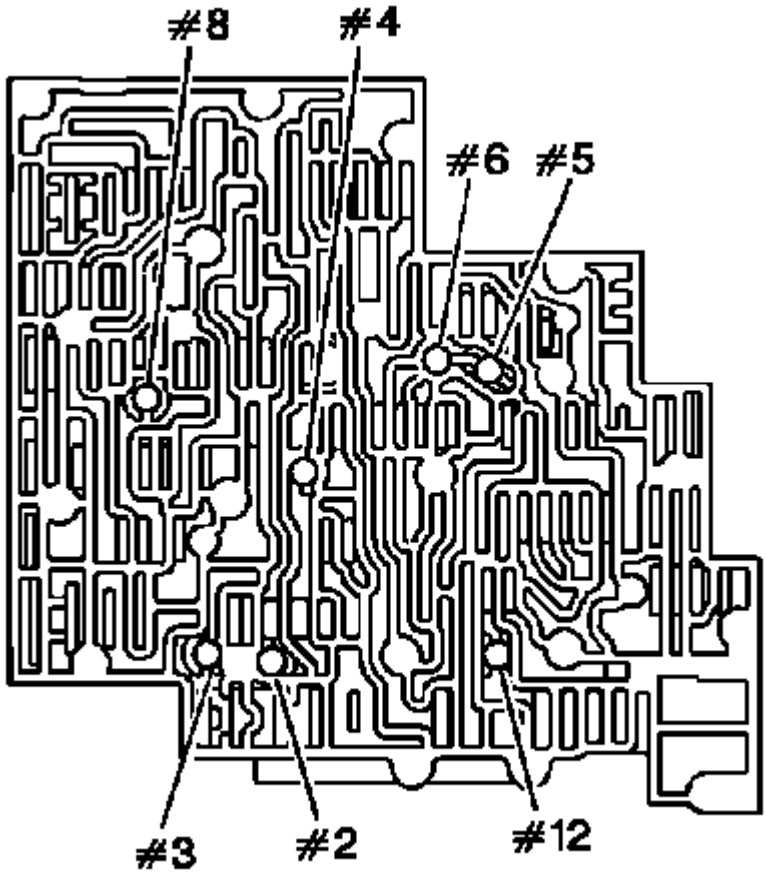


Fig. 286: View Of Second Clutch Spring Assembly Retaining Ring
Courtesy of GENERAL MOTORS CORP.

7. Install the second clutch spring assembly retaining ring (214).

 © 2011 Mitchell Repair Information Company, LLC.

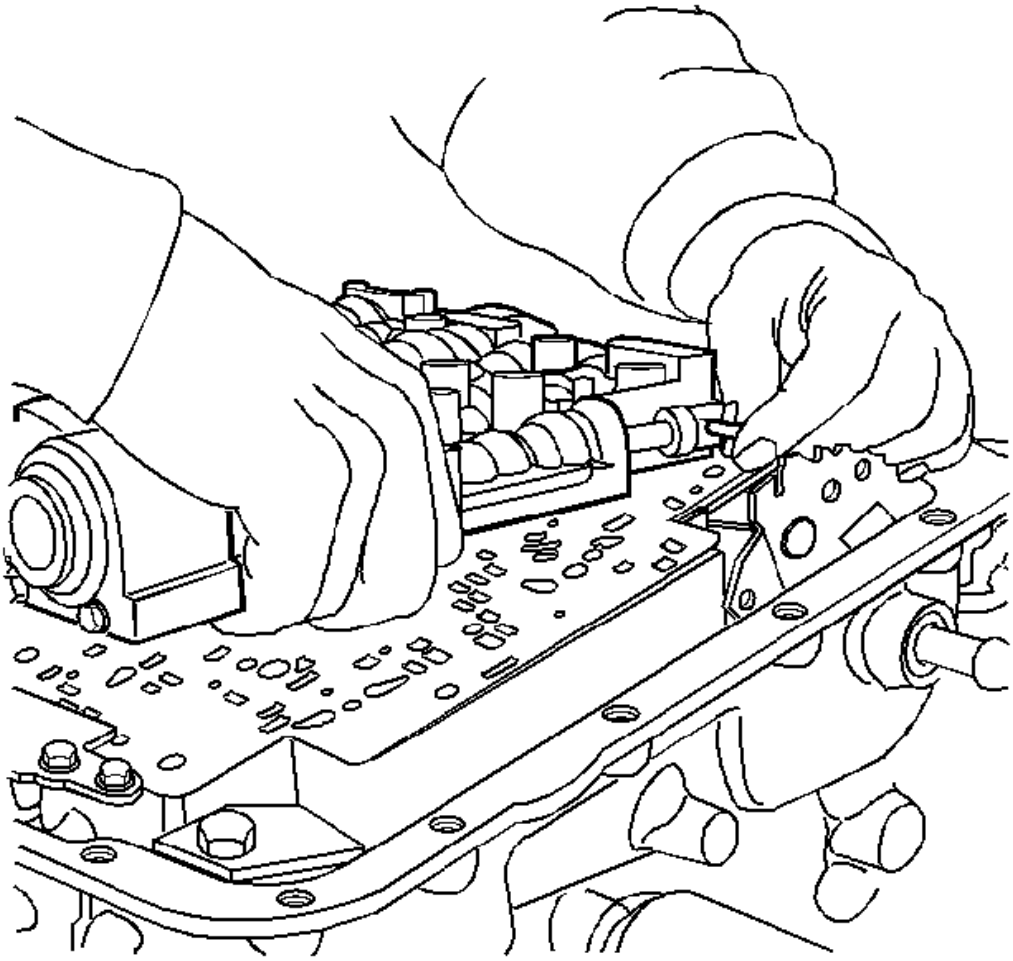


Fig. 287: View Of Second Clutch Spring Assembly
Courtesy of GENERAL MOTORS CORP.

8. Install the second clutch spring assembly (215) onto the second clutch piston with the spring side up.

 © 2011 Mitchell Repair Information Company, LLC.

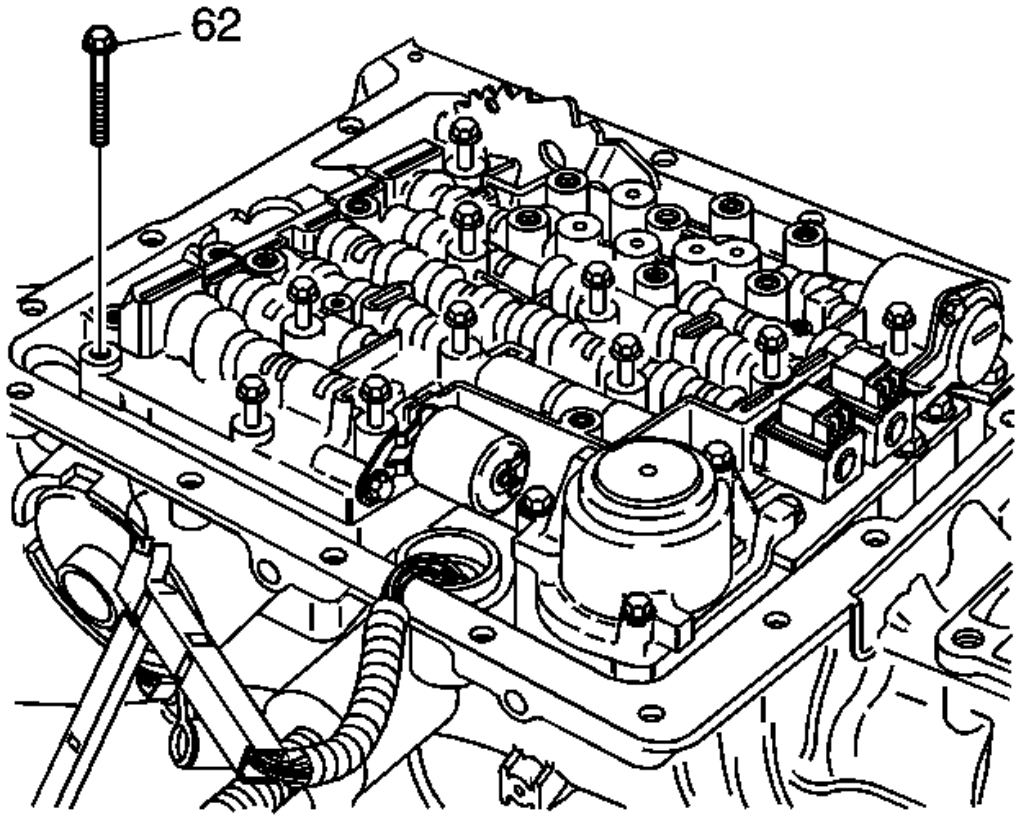


Fig. 288: View Of Second Clutch Plates
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Make sure you have the correct number of clutch plates, and that they are in the correct order.

9. Install the 3 steel plates (218) and the 3 fiber plates (217).
10. Install the second clutch backing plate (219).

 © 2011 Mitchell Repair Information Company, LLC.

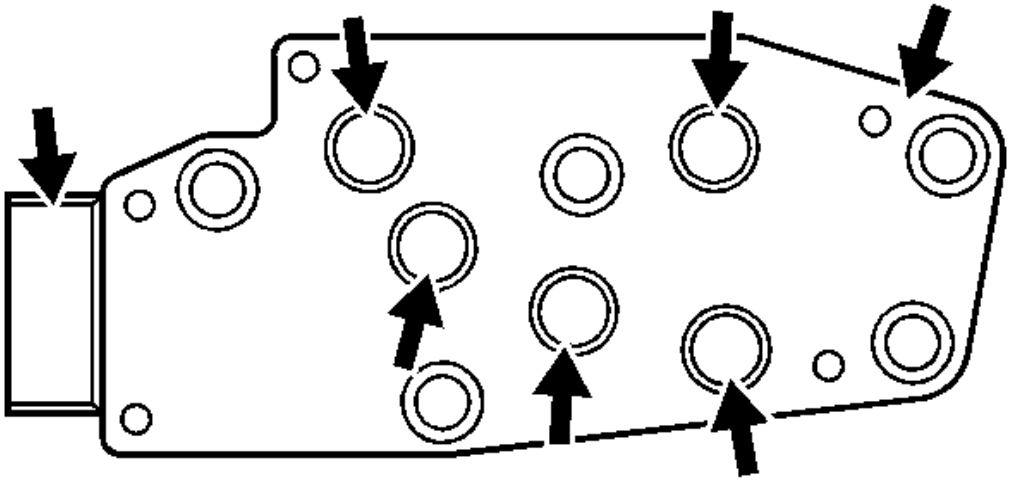


Fig. 289: Removing/Installing Second Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

11. Using **J 28585** install the second clutch backing plate retaining ring (220). Make sure that the end gap of the retaining ring is not aligned with any of the cutouts.

SECOND COAST CLUTCH ASSEMBLE

Tools Required

- **J 28585** Snap Ring Remover
- **J 23327** Clutch Spring Compressor
- **J 41236** Coast Clutch Spring Compressor
- **J 45164** Spring Compressor Bridge. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

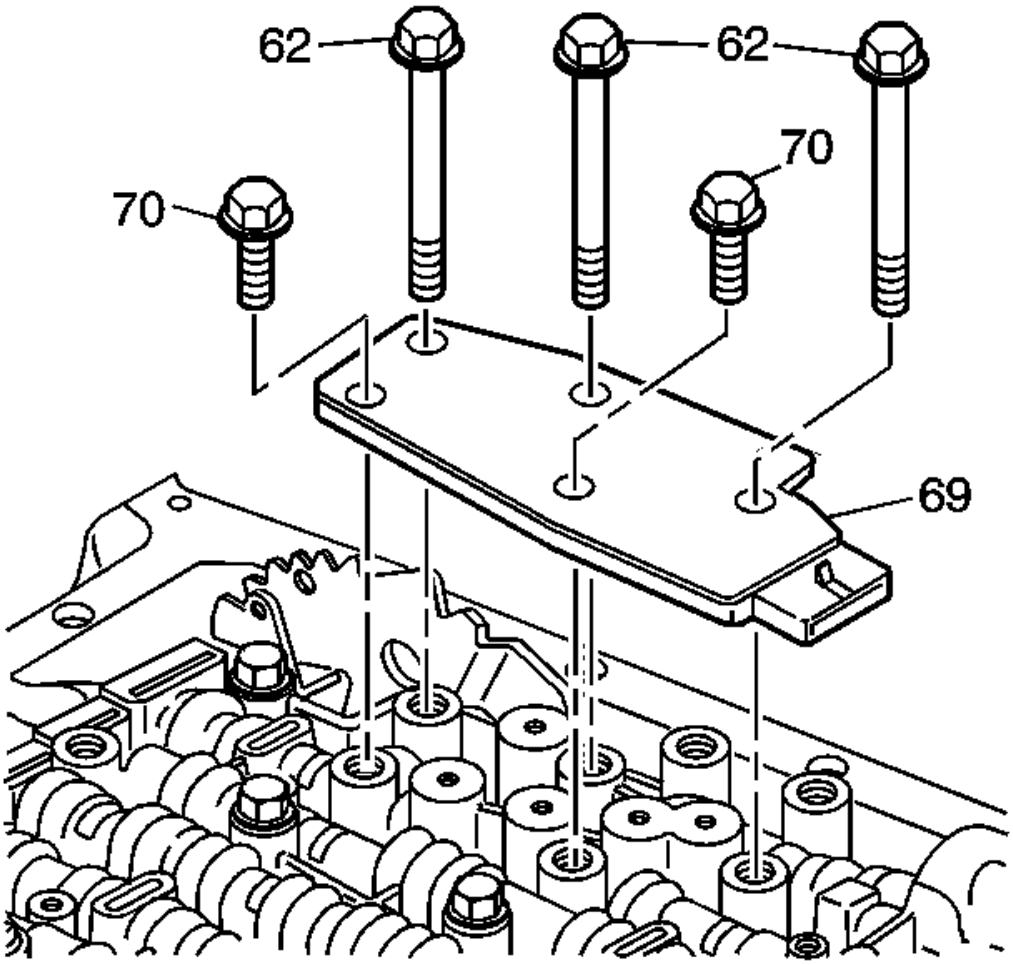


Fig. 290: View Of Second Coast Clutch Piston & Seals
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to the new second coast clutch piston seals.
2. Install the new inner seal (221) and the outer seal (223) onto the second coast clutch piston (222).
3. Apply automatic transmission fluid to the inner surfaces of the fluid pump stator shaft assembly.
4. Press the second coast clutch piston (222) into the fluid pump stator shaft assembly.

 © 2011 Mitchell Repair Information Company, LLC.

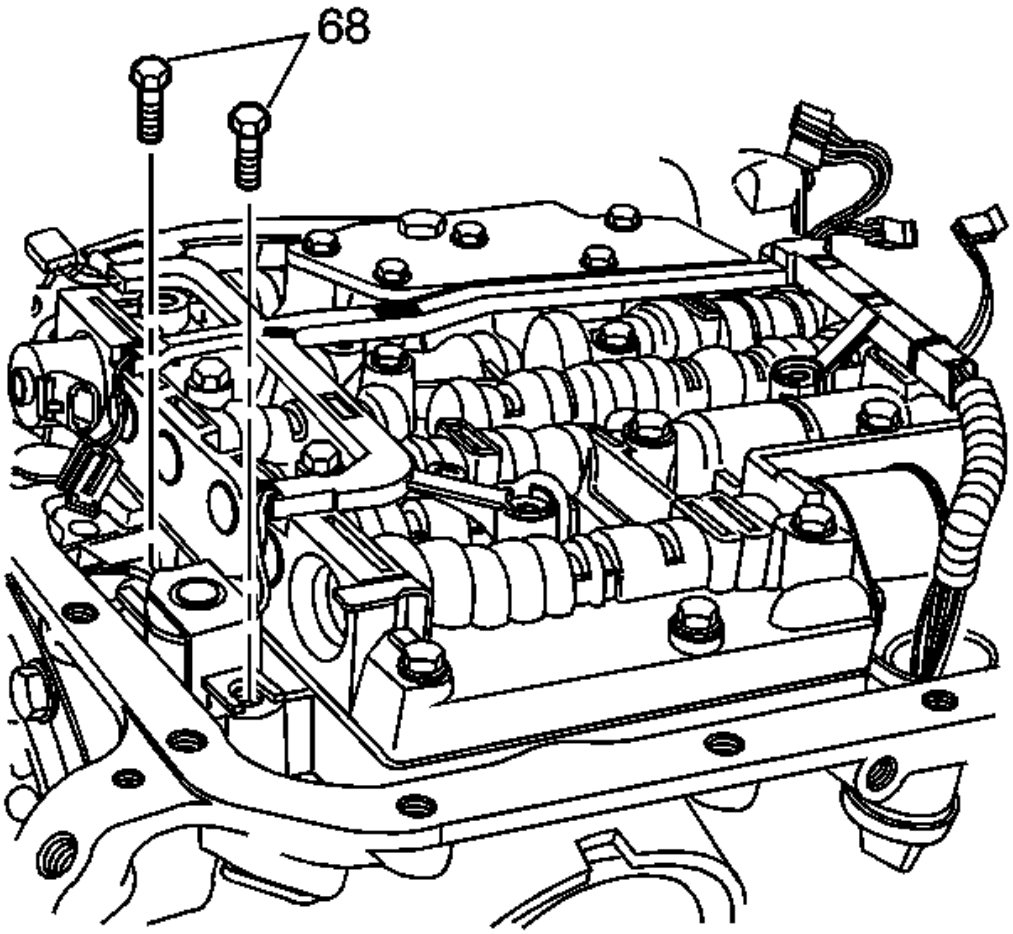


Fig. 291: View Of Second Coast Clutch Spring Assembly
Courtesy of GENERAL MOTORS CORP.

5. Install the second coast clutch spring assembly (224) making sure to index the springs into the notches in the second coast clutch piston.

 © 2011 Mitchell Repair Information Company, LLC.

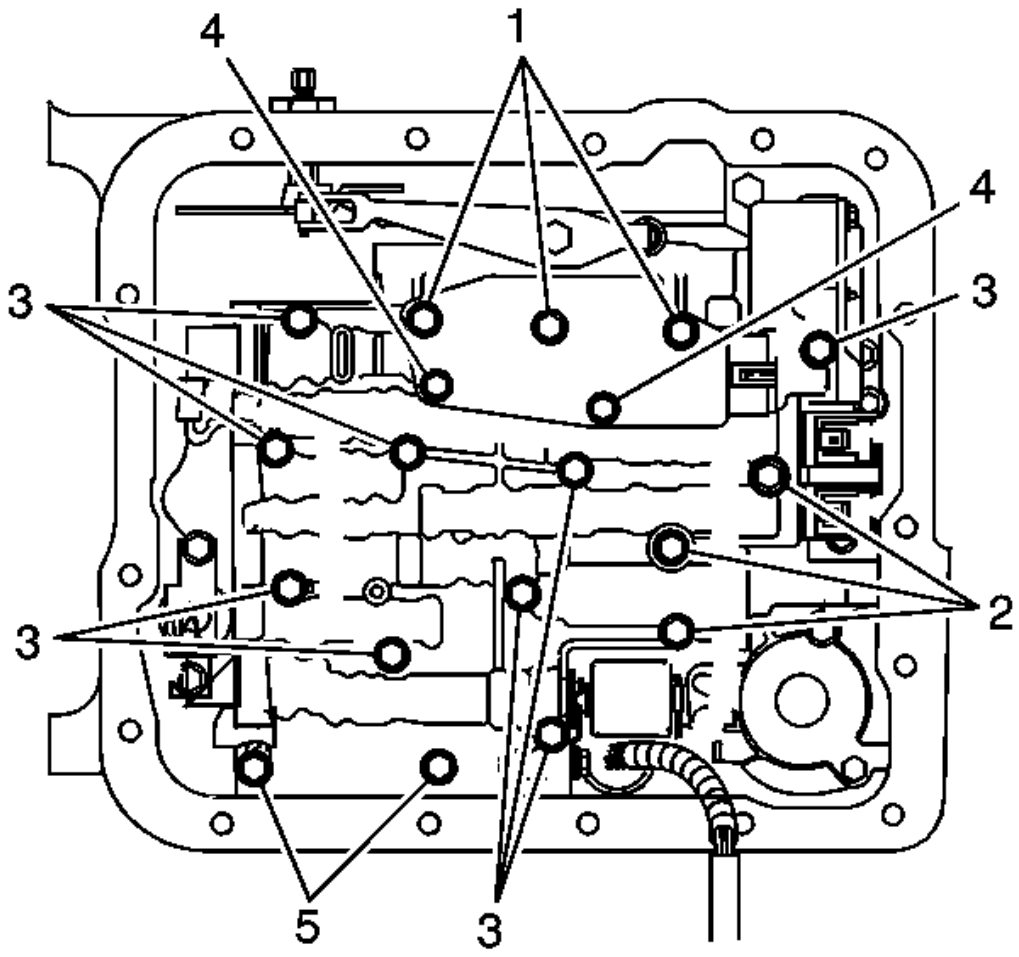


Fig. 292: Removing/Installing Second Coast Clutch Spring Retaining Ring
Courtesy of GENERAL MOTORS CORP.

6. Place the J 21420-2 (1) and J 23327-2 (3), which are part of **J 23327** , and **J 41236** (2) on the second coast clutch spring (224), and compress the springs.
7. Using snap ring pliers, install the second coast clutch spring retaining ring (225) into the groove of the fluid pump stator shaft assembly.

 © 2011 Mitchell Repair Information Company, LLC.

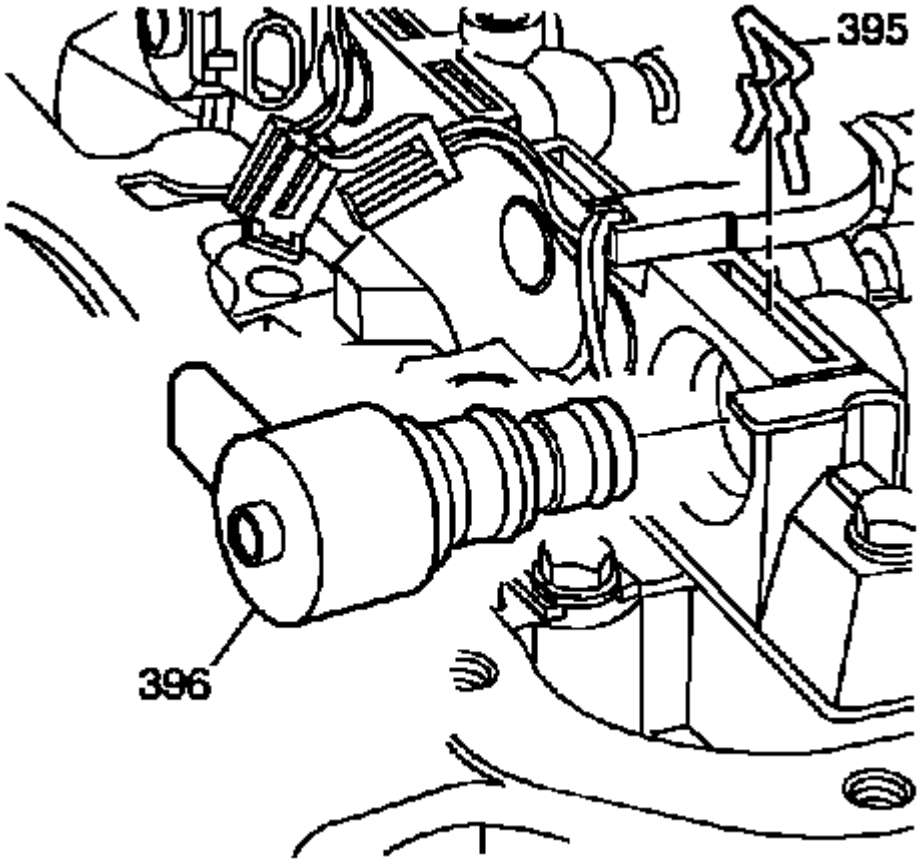


Fig. 293: View Of Second Coast Plates
Courtesy of GENERAL MOTORS CORP.

8. Install a steel plate (227) then a fiber plate (228). Repeat this sequence until all 6 plates have been installed.
9. Install the second coast clutch backing plate (229).

 © 2011 Mitchell Repair Information Company, LLC.

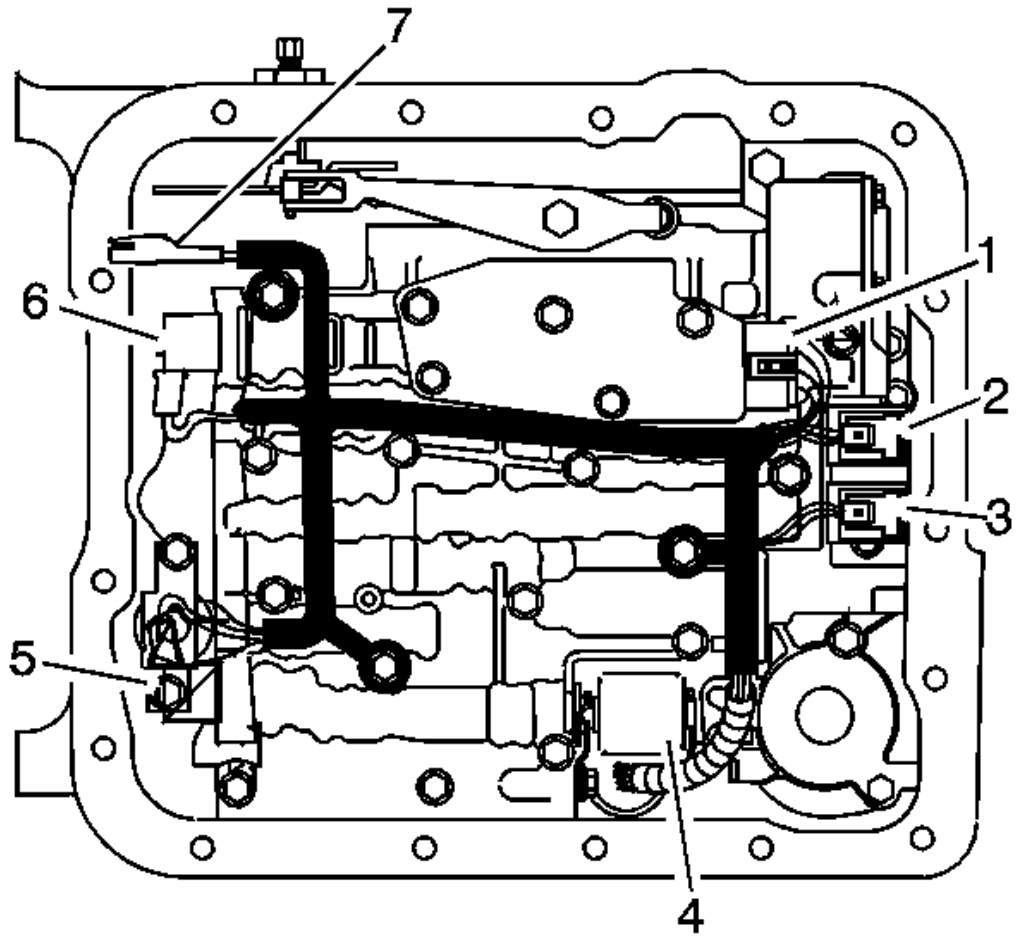


Fig. 294: Removing/Installing Second Coast Clutch Backing Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

10. Using **J 45164** (2), J 21420-2 (4) and J 23327-2 (1), which are part of **J 23327** , compress the second clutch spring. See **Special Tools**.
11. Using **J 28585** (3), install the second coast clutch backing plate retaining ring (230) into the groove of the fluid pump stator shaft assembly.

SECOND CLUTCH PISTON TRAVEL MEASUREMENT

Tools Required

- **J 45166** Dial Indicator Extension Rod - 8 inch". See **Special Tools**.
- **J 45200** Dial Indicator Set. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

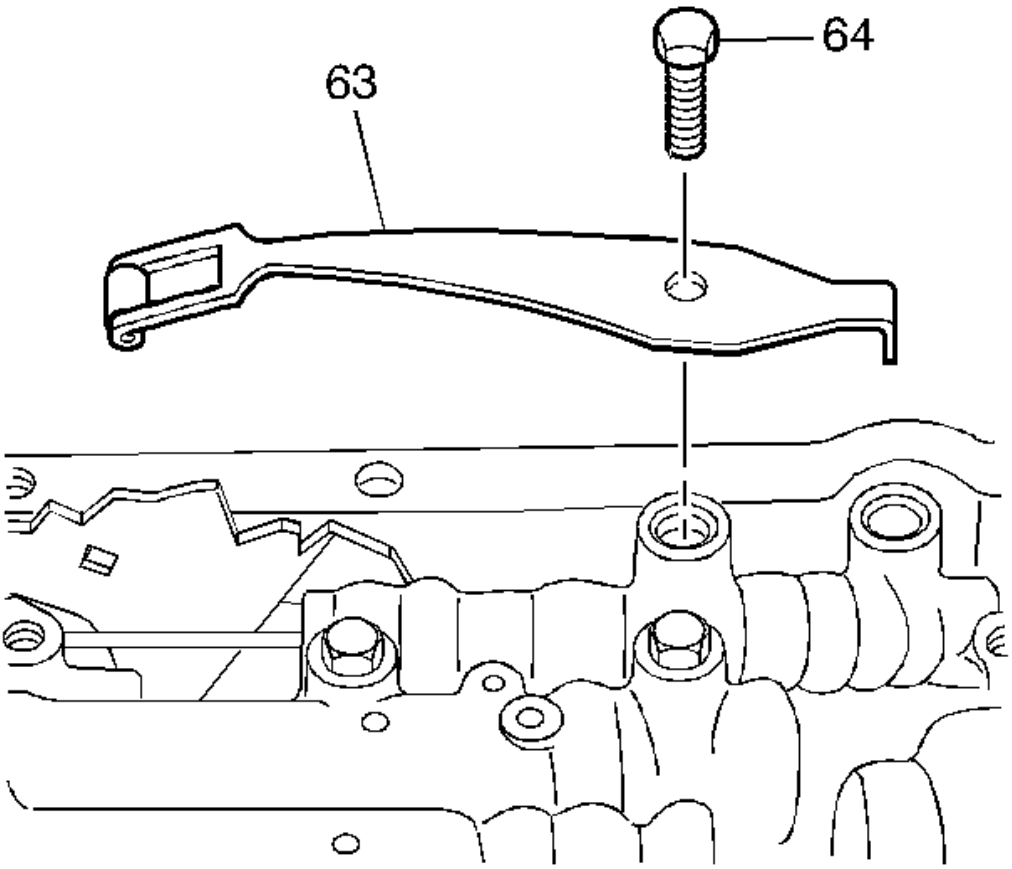


Fig. 295: Locating Fluid Pump Assembly Bolt Hole
Courtesy of GENERAL MOTORS CORP.

1. Install **J 45166** into the fluid pump assembly bolt hole (1) indicated with the arrow. See **Special Tools**.

 © 2011 Mitchell Repair Information Company, LLC.

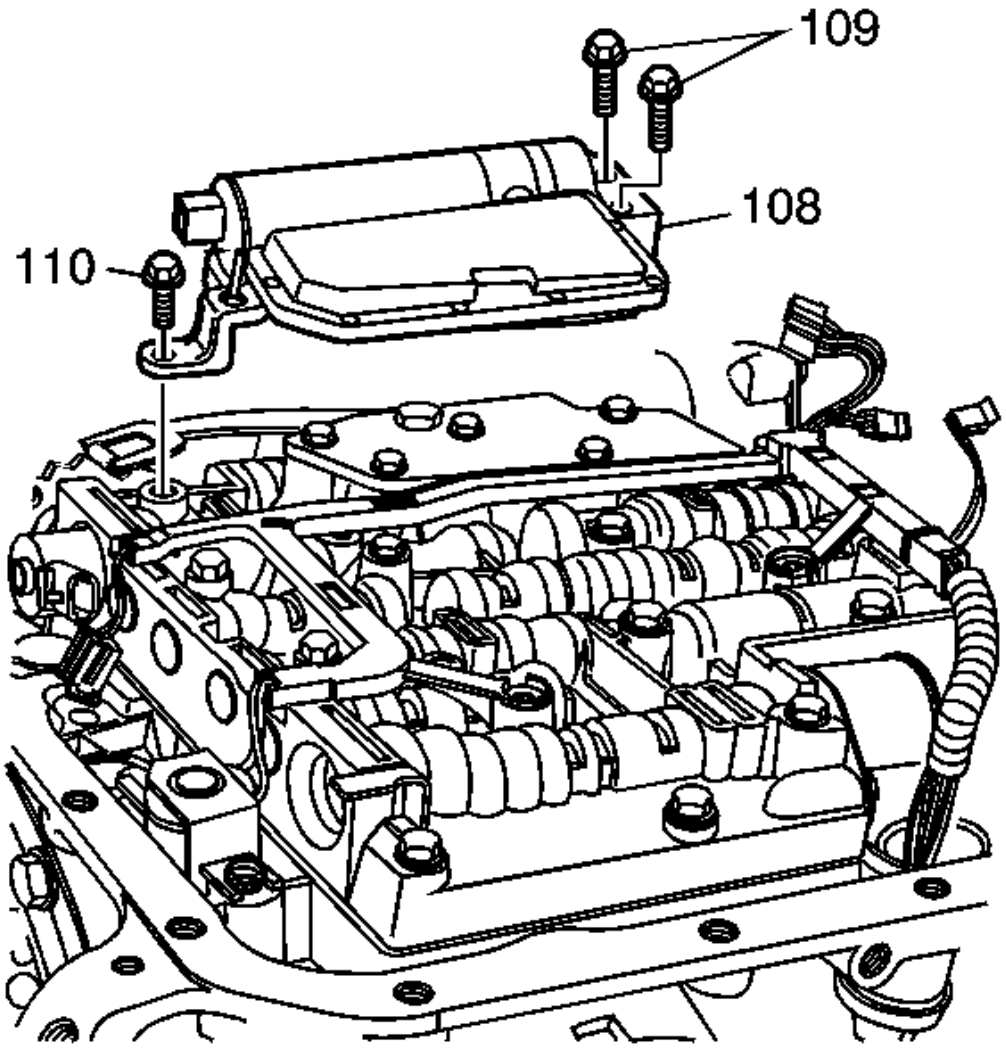


Fig. 296: Measuring Second Clutch Piston Stroke
Courtesy of GENERAL MOTORS CORP.

2. Assemble **J 45200** (1) onto **J 45166** (2) and set the dial indicator to zero on the second clutch piston. See **Special Tools**.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

3. Apply compressed air into the second clutch fluid passage (B2) and measure the piston stroke. Be sure the

 © 2011 Mitchell Repair Information Company, LLC.

piston moves smoothly.

4. If the piston stroke is out of specifications, select another second clutch backing plate.

Specification: Second clutch piston bore stroke: 1.10 - 1.50 mm (0.043 - 0.059 in)

SECOND COAST CLUTCH PISTON TRAVEL MEASUREMENT

Tools Required

- **J 45166** Dial Indicator Extension Rod - 8 inch". See **Special Tools**.
- **J 45200** Dial Indicator Set. See **Special Tools**.

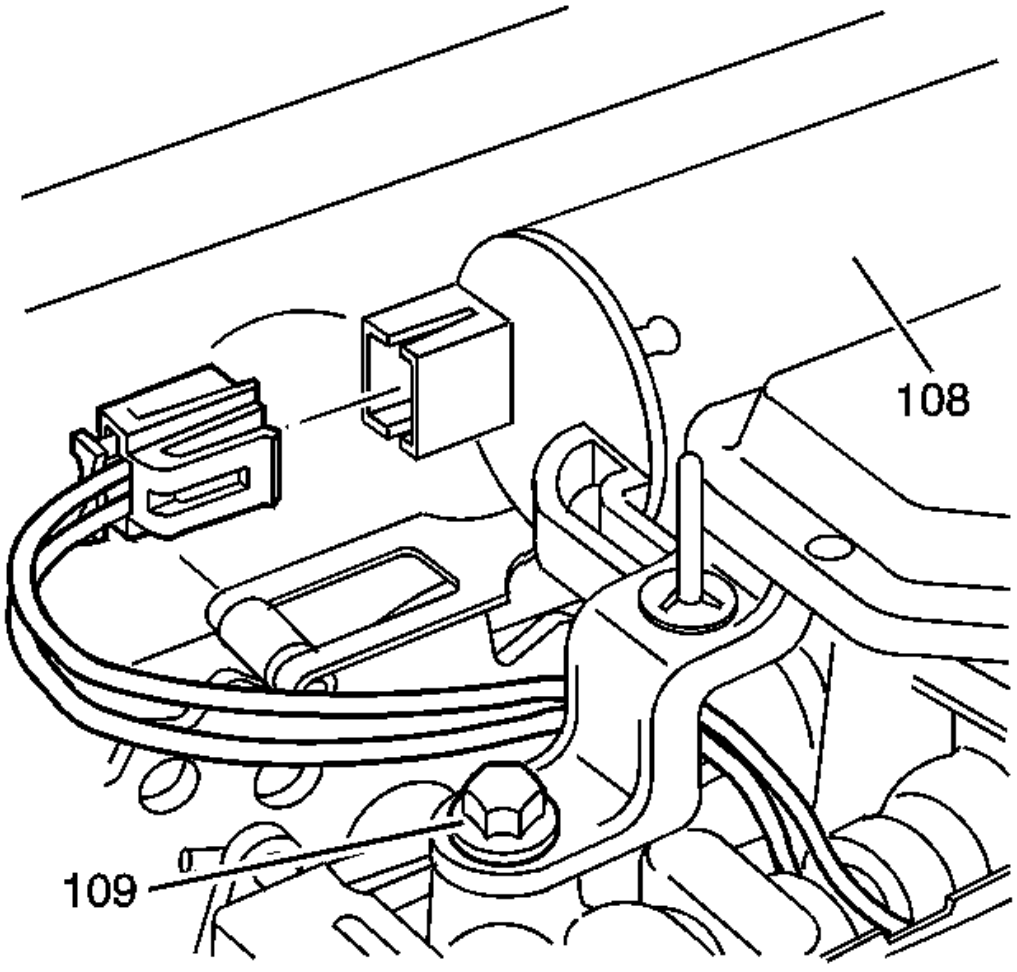


Fig. 297: Measuring Second Coast Clutch Piston Stroke

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

CAUTION: Wear safety glasses when using compressed air in order to prevent eye injury.

1. Using the same special tool setup used to measure the second clutch piston travel, relocate the dial indicator onto the second coast clutch piston and zero the dial indicator.
2. Apply compressed air into the second coast clutch fluid passage (B1) and measure the piston stroke. Be sure the piston moves smoothly.

   Specification: Second coast clutch piston bore stroke: 1.24 - 1.96 mm (0.049 - 0.077 in)

3. If the piston stroke is out of specifications, ensure the clutch plates are assembled correctly and not worn.
4. Remove the tools.
5. Install the remaining M6 x 1.0 x 14.5 mm fluid pump cover bolt (231) into the hole where **J 45166** (2) was located. See **Special Tools**.

   Tighten: Tighten the fluid pump cover bolt (231) to 12 N.m (106 lb in).

SECOND COAST, SECOND CLUTCH HUB AND SECOND CLUTCH SPRAG DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

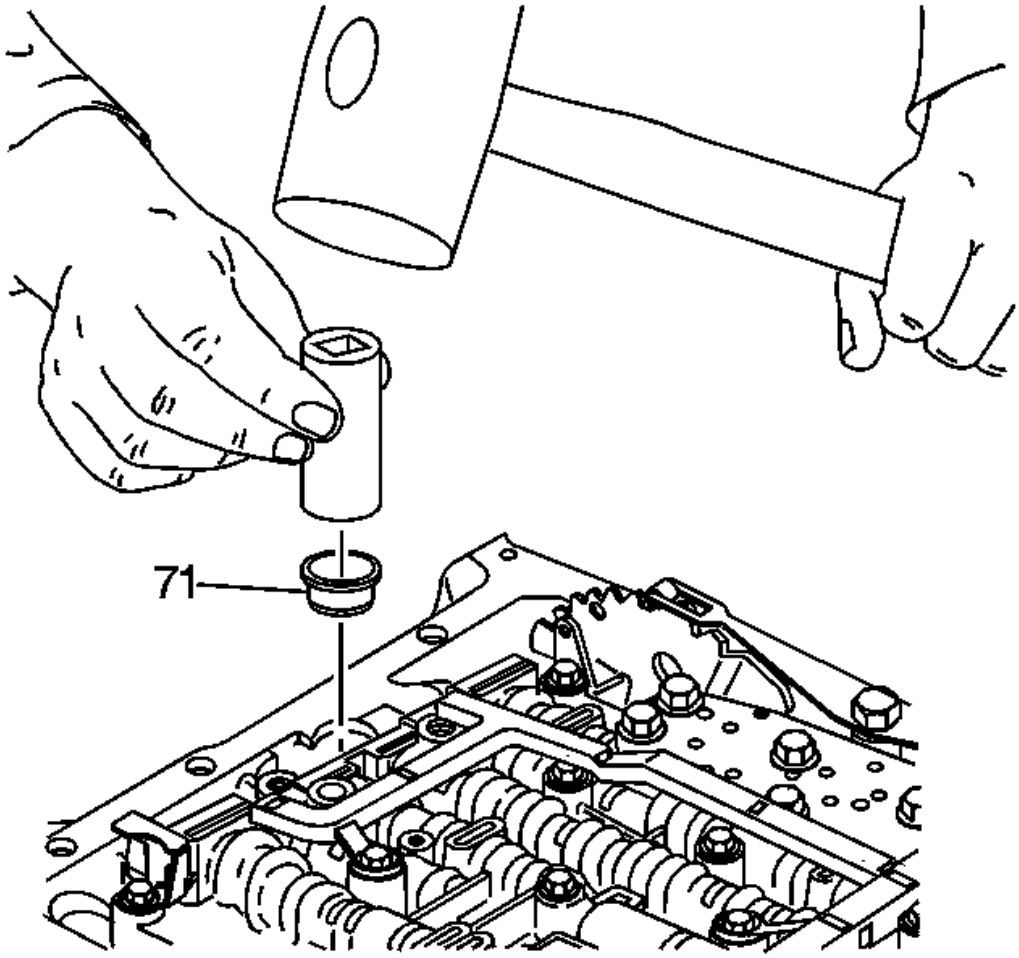


Fig. 298: View Of Second Clutch Sprag Outer Race Assembly & Thrust Washer
Courtesy of GENERAL MOTORS CORP.

1. Remove the second clutch sprag outer race thrust washer (506) from the second clutch sprag outer race assembly (505).

 © 2011 Mitchell Repair Information Company, LLC.

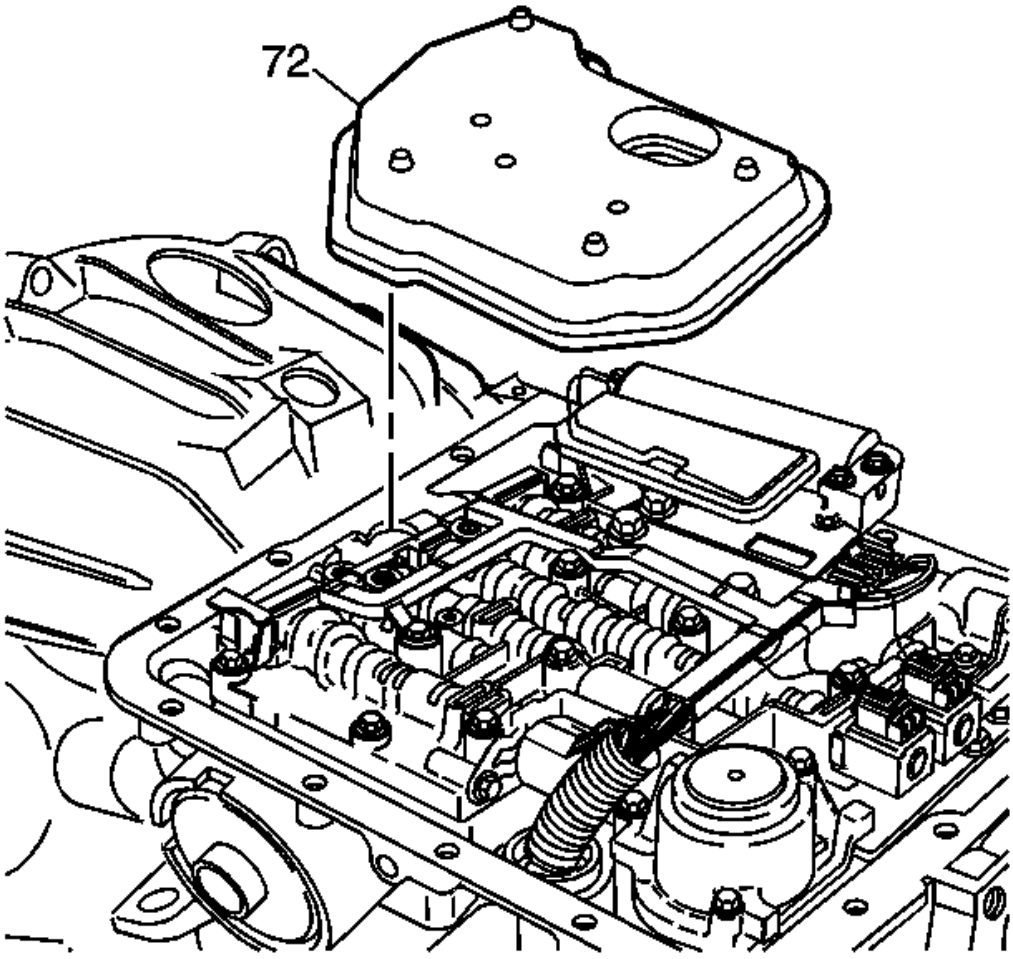


Fig. 299: View Of Second Clutch Sprag Outer Race Assembly, Coast Clutch Hub & Coast Clutch Thrust Washer
Courtesy of GENERAL MOTORS CORP.

2. Remove the second coast clutch hub (500) from the second clutch sprag outer race assembly (505).
3. Remove the coast clutch hub thrust washer (501) from the second clutch sprag outer race assembly (505).

 © 2011 Mitchell Repair Information Company, LLC.

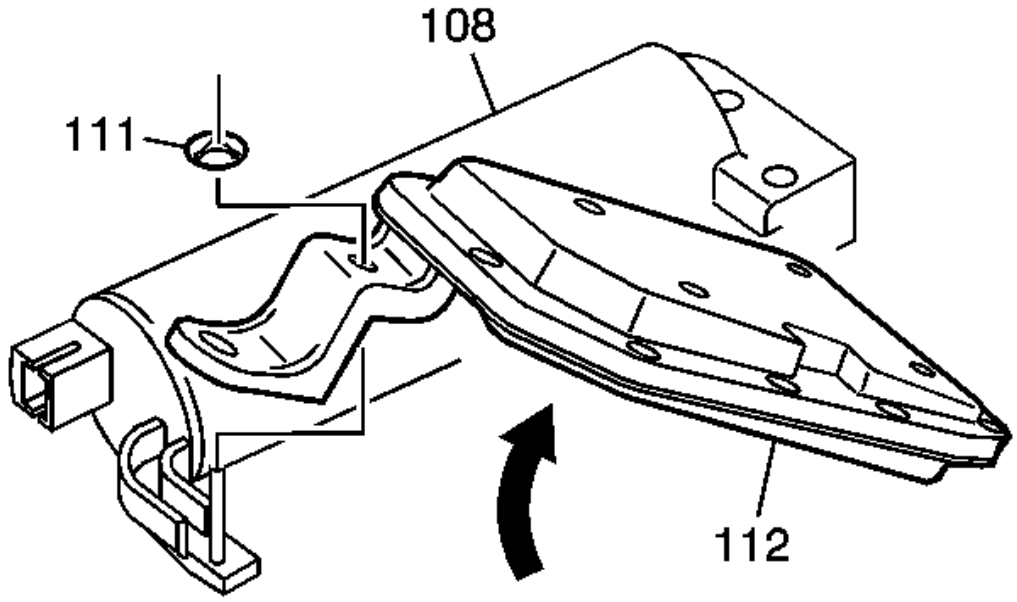


Fig. 300: Second Clutch Sprag End Bearing & Assembly
Courtesy of GENERAL MOTORS CORP.

4. Remove the second clutch sprag end bearing (502).
5. Remove the second clutch sprag assembly (503).
6. Remove the second clutch end bearing (502).

SECOND COAST, SECOND CLUTCH HUB AND SECOND CLUTCH SPRAG ASSEMBLE

Tools Required

J 36850 Transjel Lubricant

 © 2011 Mitchell Repair Information Company, LLC.

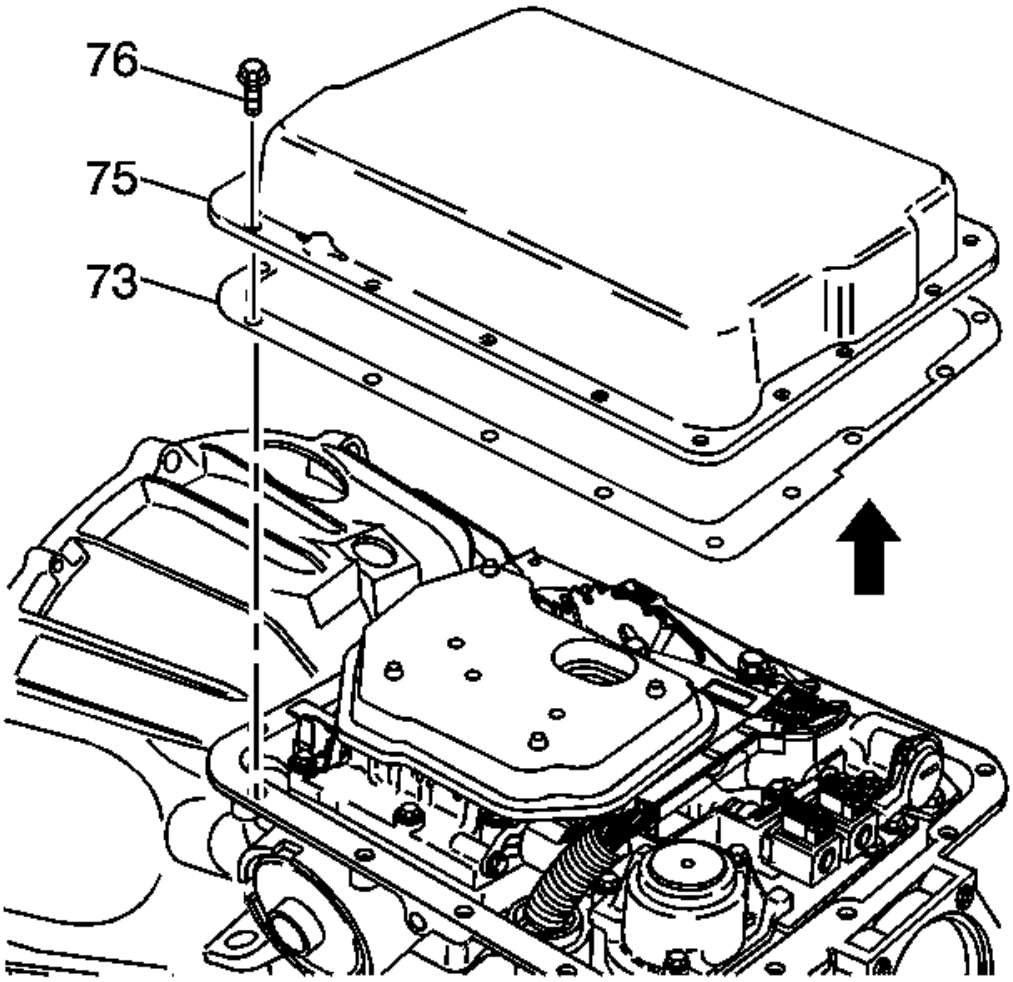


Fig. 301: Installing Second Clutch Sprag Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the second clutch sprag end bearing (502).
2. Install the second clutch sprag assembly (503) rotating counter clockwise while installing. If the sprag assembly will not rotate counter clockwise turn over and install again.
3. Install the second clutch sprag end bearing (502).

 © 2011 Mitchell Repair Information Company, LLC.

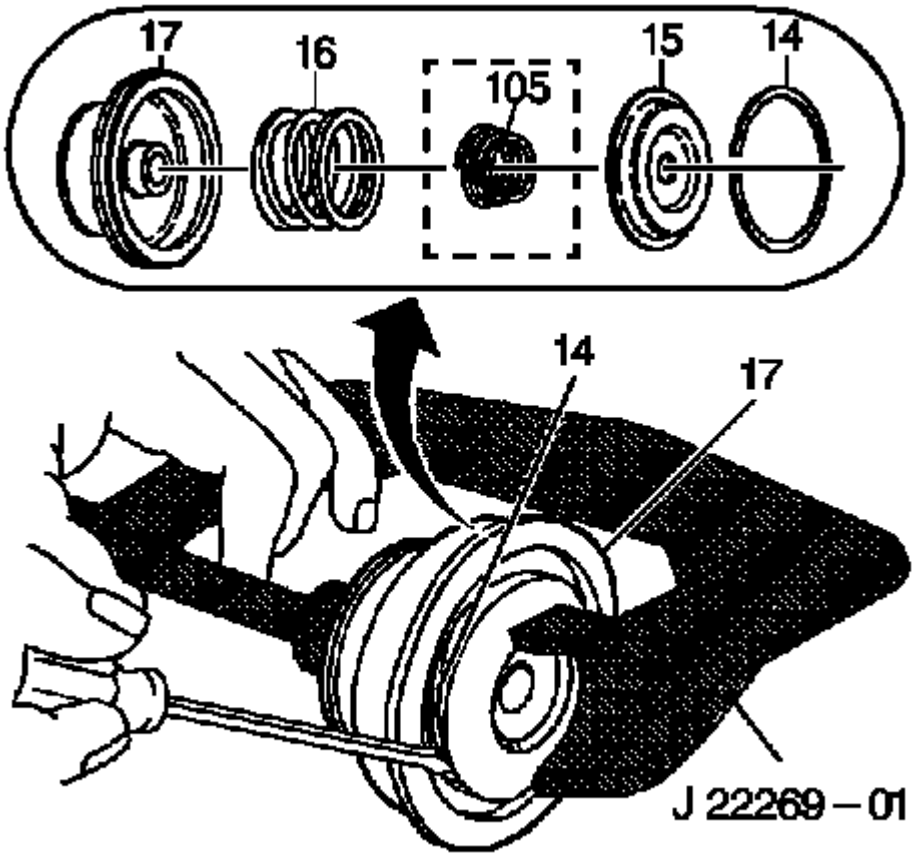


Fig. 302: View Of Second Clutch Sprag Outer Race Assembly, Coast Clutch Hub & Coast Clutch Thrust Washer
Courtesy of GENERAL MOTORS CORP.

4. Apply **J 36850** to the second coast clutch hub thrust washer (501).
5. Align the tab of the washer with the hollow of the second coast clutch hub (500).
6. Install the second coast clutch hub thrust washer (501) onto the second coast clutch hub (500).
7. While turning the second coast clutch hub (500) clockwise, slide it into the second clutch sprag outer race assembly (505).

 © 2011 Mitchell Repair Information Company, LLC.

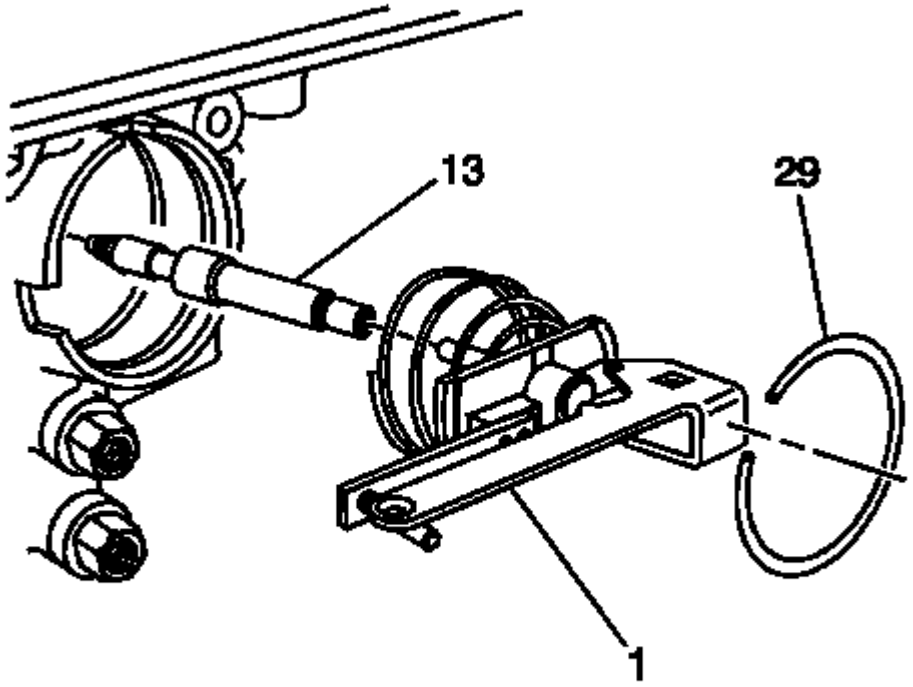


Fig. 303: Inspecting Second Coast Clutch Hub For Proper Movement
Courtesy of GENERAL MOTORS CORP.

8. Hold the second clutch sprag outer race assembly, and inspect that the second coast clutch hub turns freely clockwise (2) and locks counterclockwise (1). If the hub does not turn clockwise turn the sprag race assembly over.

 © 2011 Mitchell Repair Information Company, LLC.

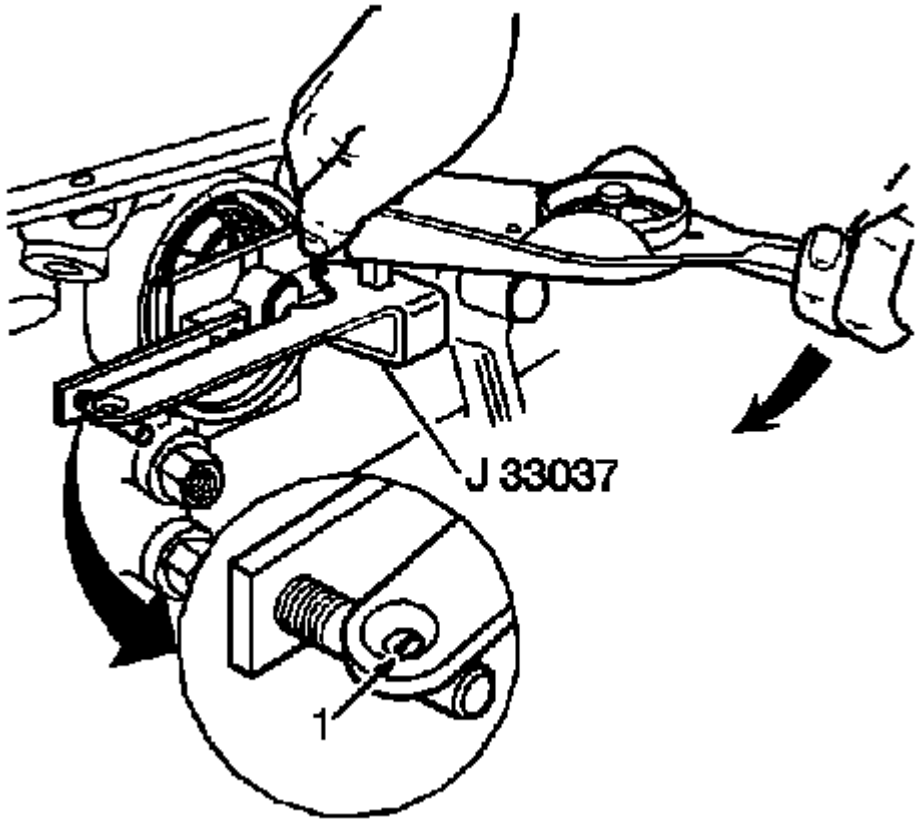


Fig. 304: View Of Second Clutch Sprag Outer Race Assembly & Thrust Washer
Courtesy of GENERAL MOTORS CORP.

9. Install the second clutch sprag outer race thrust washer (506) aligning the tabs with the hollow of the second clutch sprag outer race assembly (505).

FLUID PUMP INSTALLATION

Tools Required

- **J 36850** Transjel Lubricant
- **J 45053** Universal Clamp Press

 © 2011 Mitchell Repair Information Company, LLC.

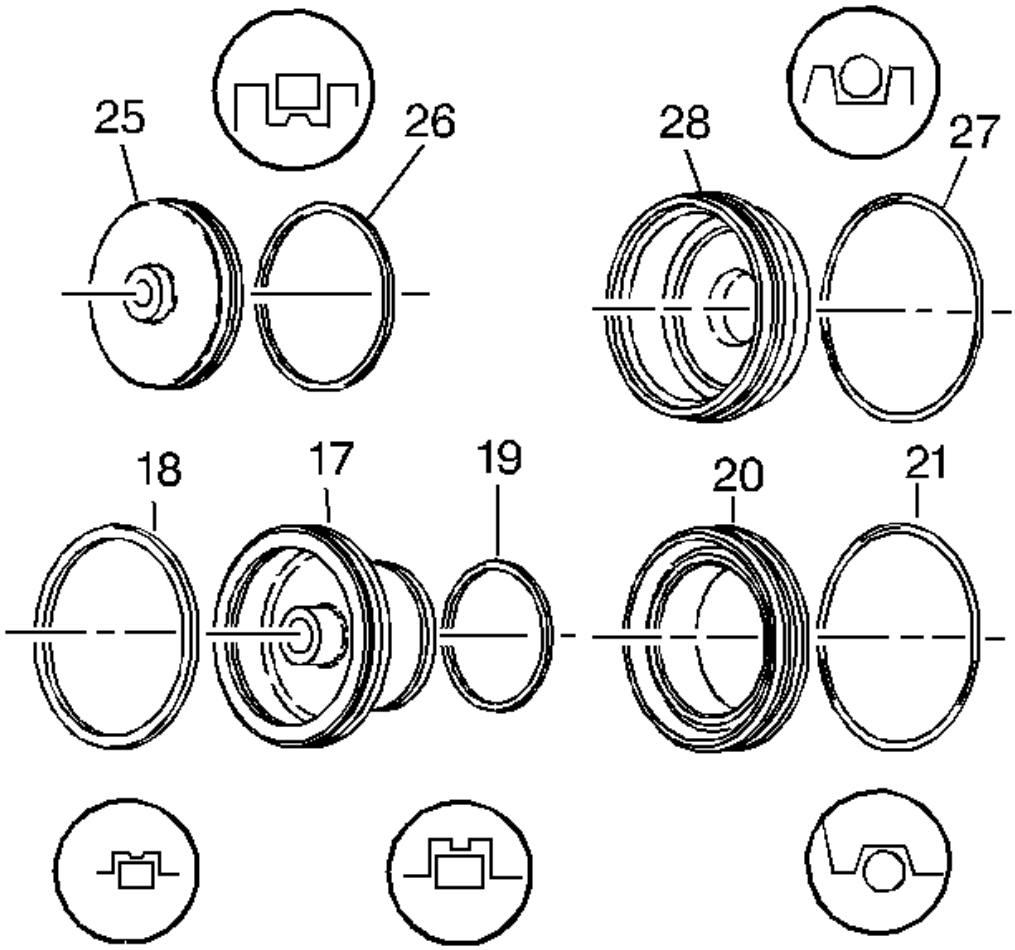


Fig. 305: View Of Coast Clutch Spring & Hub Thrust Washer
Courtesy of GENERAL MOTORS CORP.

1. Apply **J 36850** to the coast clutch hub thrust washer (226).
2. Install the coast clutch hub thrust washer (226) with the flat surface facing up, and with the tangs engaged into the second coast clutch spring (224).

 © 2011 Mitchell Repair Information Company, LLC.

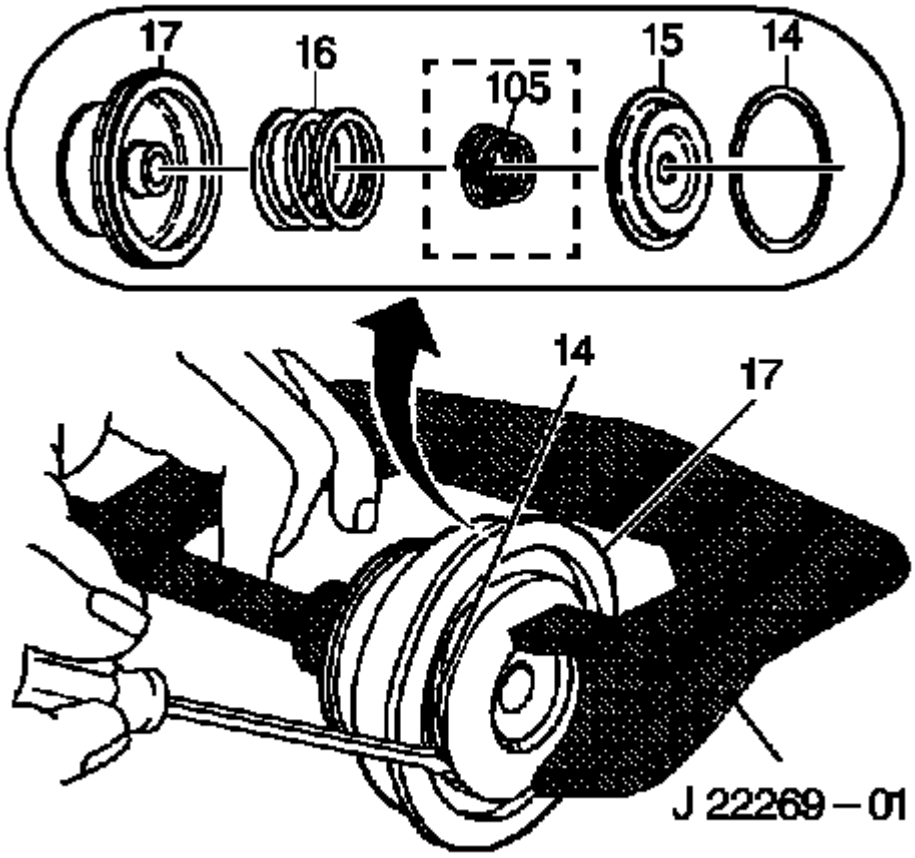


Fig. 306: Identifying Second Clutch Sprag Assembly
Courtesy of GENERAL MOTORS CORP.

3. While holding the second coast clutch hub and sprag assembly (11) together, install into the fluid pump assembly.

 © 2011 Mitchell Repair Information Company, LLC.

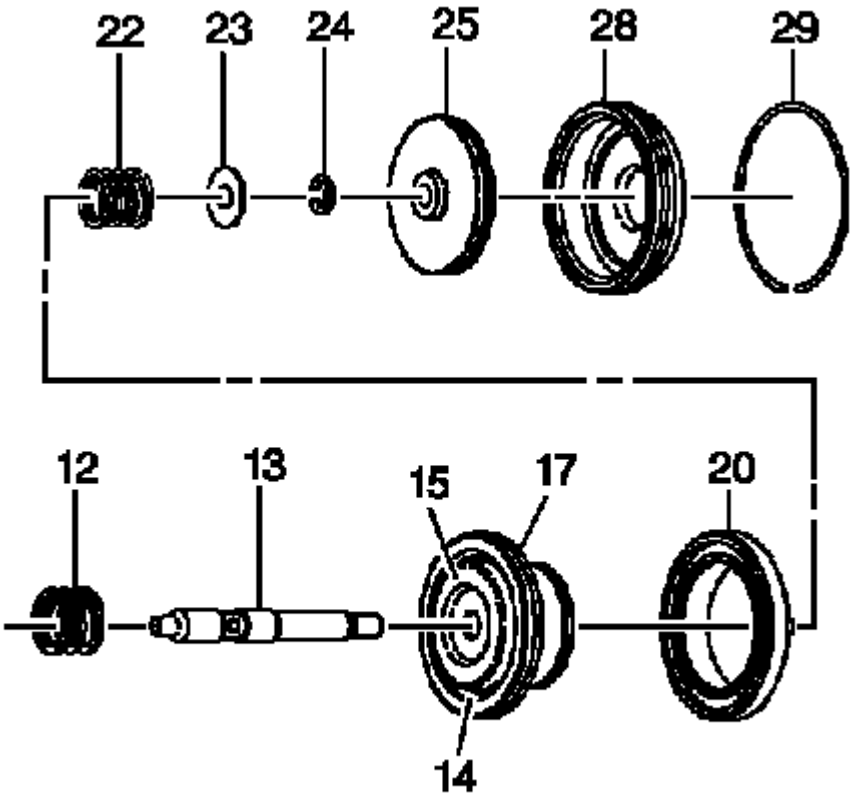


Fig. 307: Measuring Dimension B
Courtesy of GENERAL MOTORS CORP.

4. Place a straight edge on top of the second clutch sprag outer race thrust washer.
5. Measure the distance (b) from the bottom of the straight edge and the fluid pump assembly.

   Specification: Installed height: 51.09 - 51.71 mm (2.011 - 2.036 in)

6. If the installed height is greater than specifications, the second coast clutch hub did not clear all the second clutch fiber plates. Index again the clutch hub and plates until within specifications.

 © 2011 Mitchell Repair Information Company, LLC.

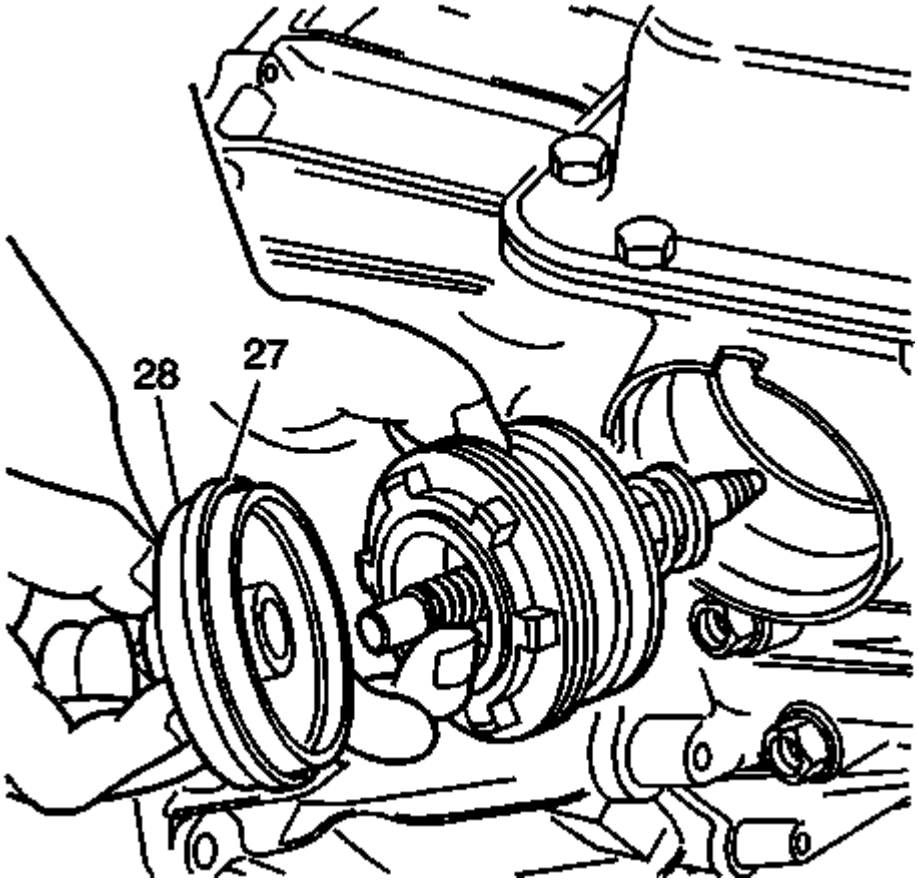


Fig. 308: Installing Fluid Pump Assembly Onto Input Shaft
Courtesy of GENERAL MOTORS CORP.

7. Rotate the transmission assembly as shown.
8. Install the **J 45053** on the fluid pump assembly.
    - Do not allow the second clutch sprag assembly to separate from the clutch plates.
    - Back out the forcing screw of the **J 45053** to ensure, ample clearance of the input shaft.
9. Install the fluid pump assembly.
    - Do not allow the input shaft splines to touch the bushings in the fluid pump assembly.
    - Align the holes of the fluid pump assembly to the transmission case.
    - Do not allow the second clutch sprag assembly to separate from the clutch plates.
10. Lightly press the fluid pump body into the transmission case assembly in order to seat the fluid pump assembly in place.

 © 2011 Mitchell Repair Information Company, LLC.

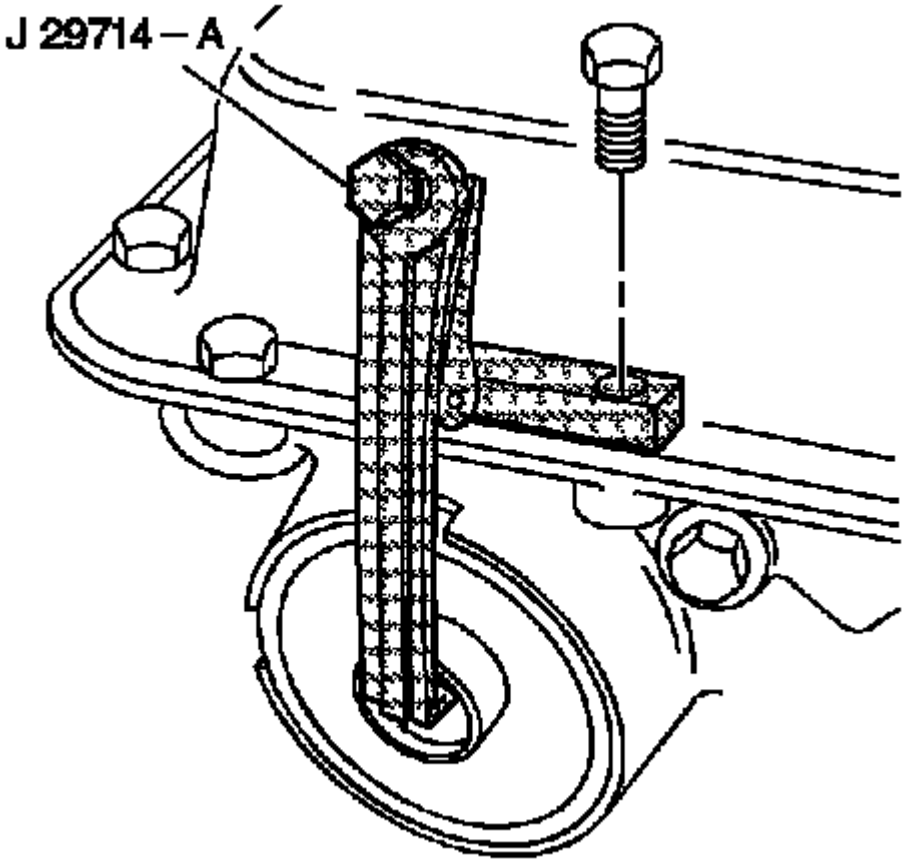


Fig. 309: View Of Fluid Pump Case Bolt
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not use bolts longer than 28 mm. Using bolts longer than 28 mm will cause internal damage to the transmission.

11. Install the 8 - M8 x 1.25 x 28 mm fluid pump to case bolts (5) and hand tighten.

 © 2011 Mitchell Repair Information Company, LLC.

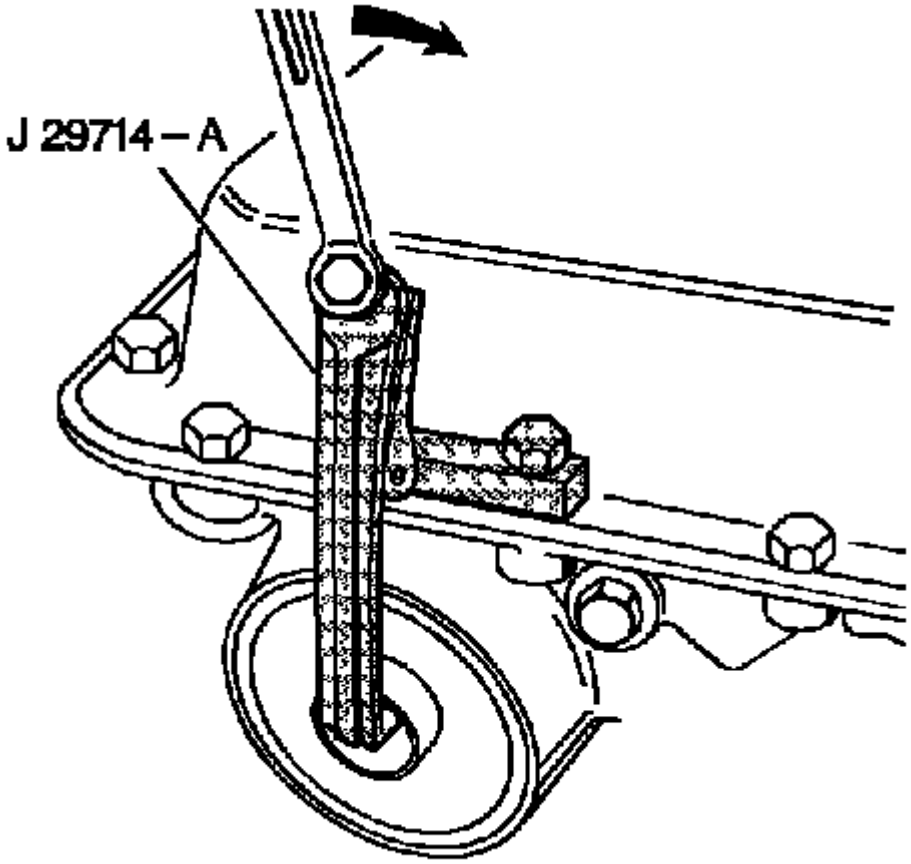


Fig. 310: Locating Fluid Pump Bolts
Courtesy of GENERAL MOTORS CORP.

12. Rotate the transmission assembly so that the fluid pump assembly is facing up.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

13. Tighten the fluid pump to case bolts in the correct sequence.

Tighten: Tighten the fluid pump to case bolts to 25 N.m (18 lb ft).

CONTROL VALVE BODY ASSEMBLY DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

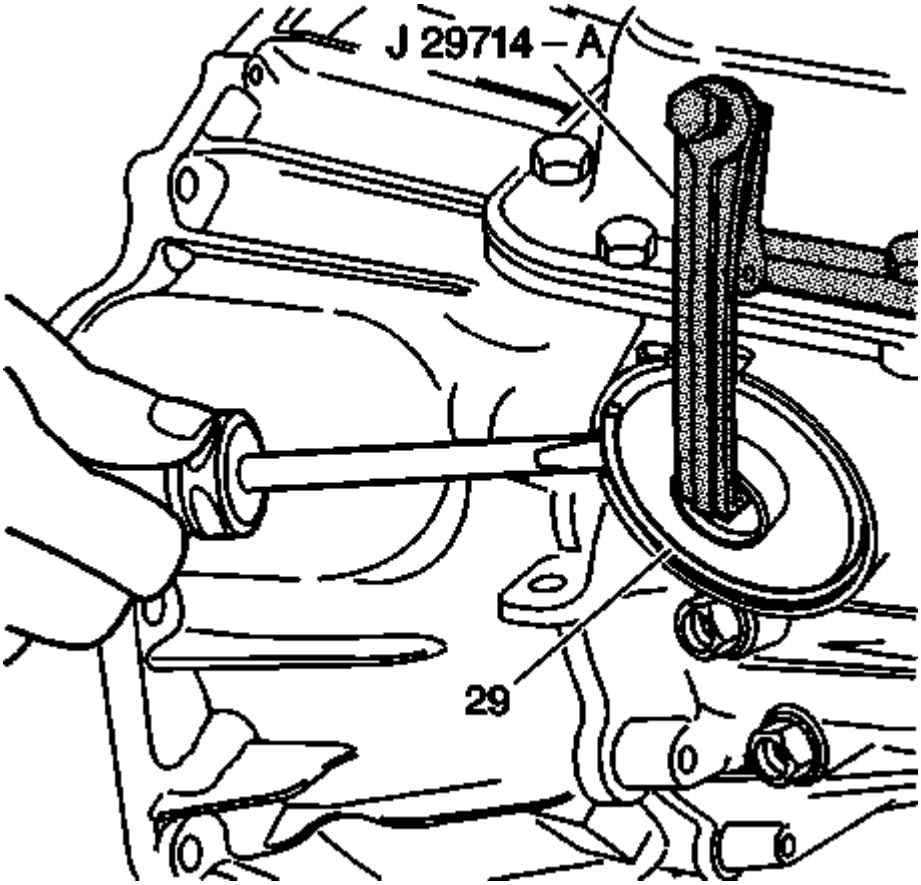


Fig. 311: View Of Manual Valve
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The control valve body is serviced only as an assembly. Only the following components are serviced on the control valve body:

- **The 5 shift solenoid valves**
- **The manual valve**

The control valve body assembly should only be disassembled to confirm a diagnostic symptom.

1. Remove the manual valve (337).

 © 2011 Mitchell Repair Information Company, LLC.

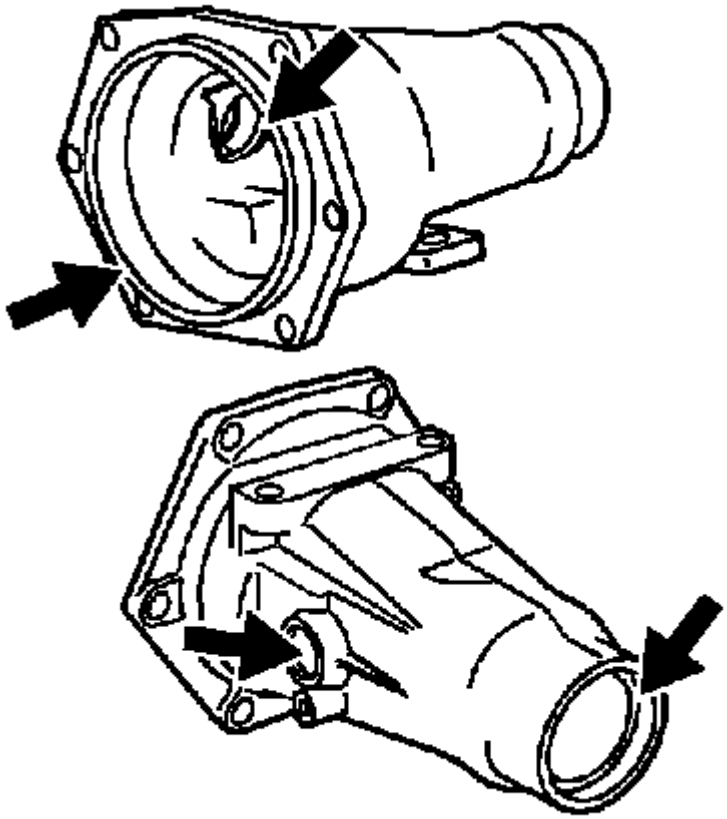


Fig. 312: View Of TCC Lock Up Pressure Control Solenoid Valve Assembly
Courtesy of GENERAL MOTORS CORP.

2. Remove the bolt (307), the wiring harness clip (318), and the TCC lock up pressure control solenoid valve retainer (319).
3. Remove the TCC lock up pressure control solenoid valve assembly (339).

 © 2011 Mitchell Repair Information Company, LLC.

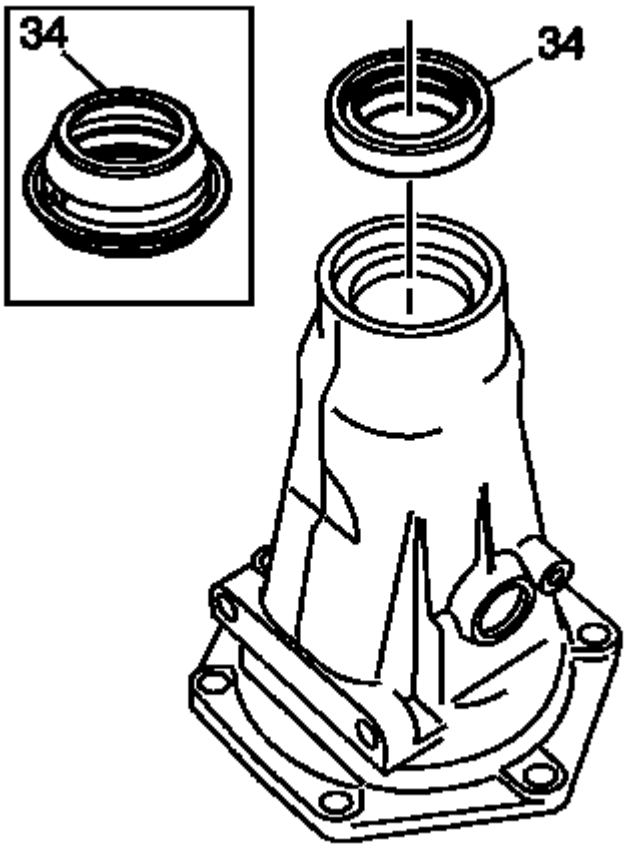


Fig. 313: View Of Line Pressure Control Solenoid Valve Assembly & Shift Pressure Control Solenoid Valve Assembly
Courtesy of GENERAL MOTORS CORP.

4. Remove the bolt (311), and control valve body solenoid valve retainer (312).
5. Remove the line pressure control solenoid valve assembly (316) and the shift pressure control solenoid valve assembly (340).

 © 2011 Mitchell Repair Information Company, LLC.

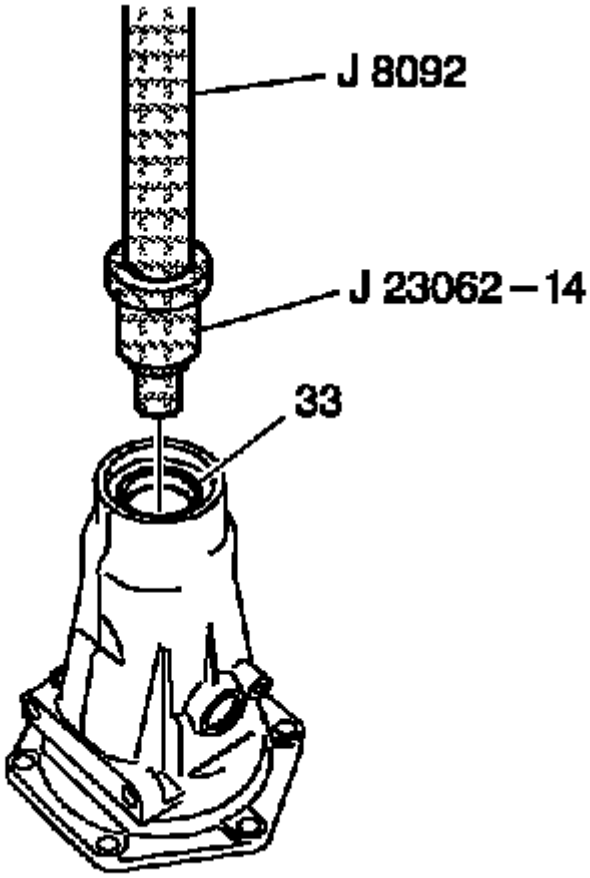


Fig. 314: Identifying Shift Solenoid Valves
Courtesy of GENERAL MOTORS CORP.

6. Remove the 5 solenoid retaining bolts (1-301, 2-302, 2-307).
7. Remove the 5 shift solenoid valves (300, 303, 305, 308, 310), and the 5 shift solenoid valve O-ring seals (306).

 © 2011 Mitchell Repair Information Company, LLC.

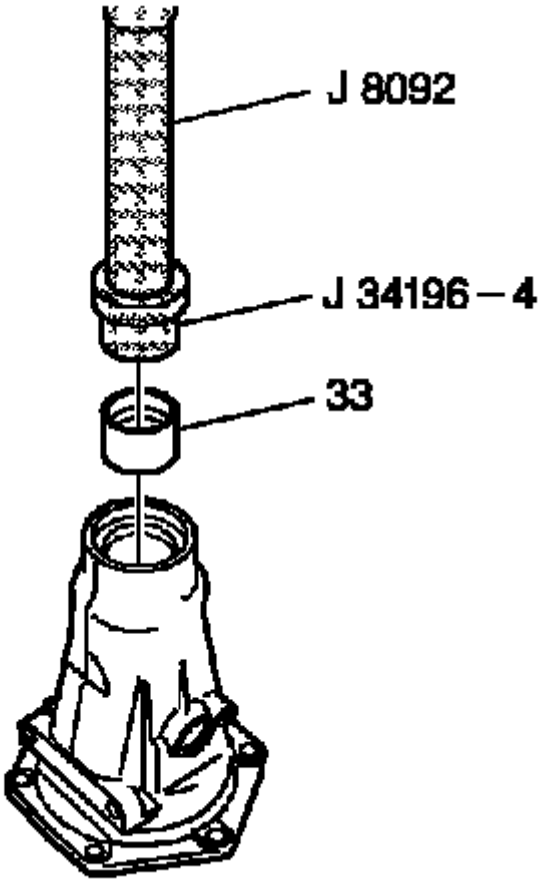


Fig. 315: Locating Front Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

8. Remove the 7 front control valve body bolts (1-304, 4-313, 2-314).

 © 2011 Mitchell Repair Information Company, LLC.

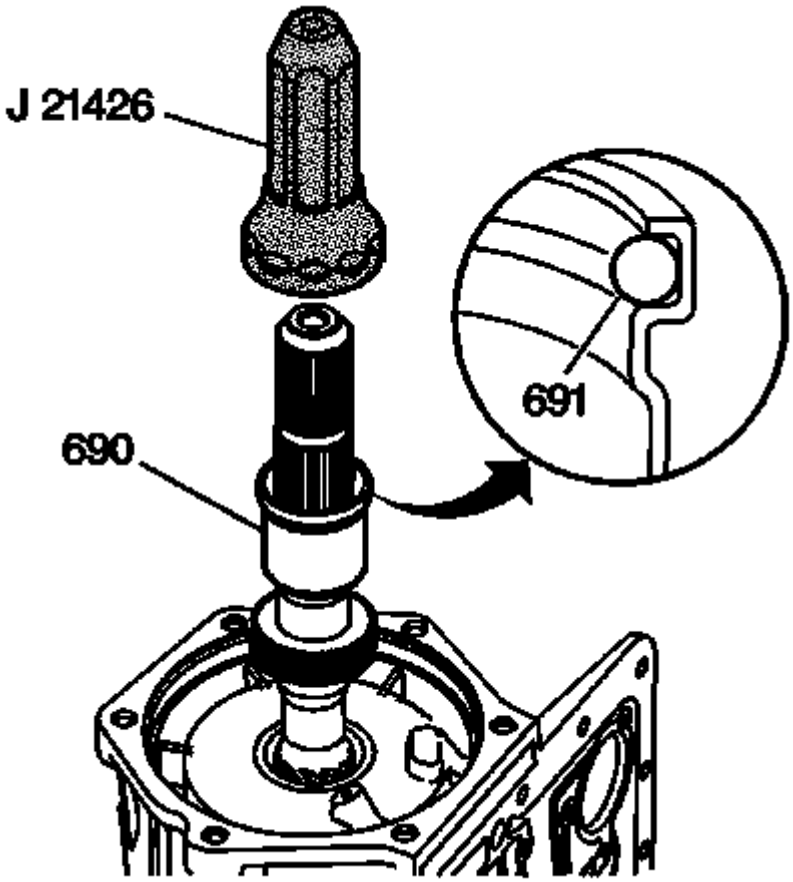


Fig. 316: View Of Front Control Valve Body Assembly & Middle Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

9. Remove the front control valve body assembly (315), spacer plate and gaskets as an assembly from the middle control valve body assembly (323).

 © 2011 Mitchell Repair Information Company, LLC.

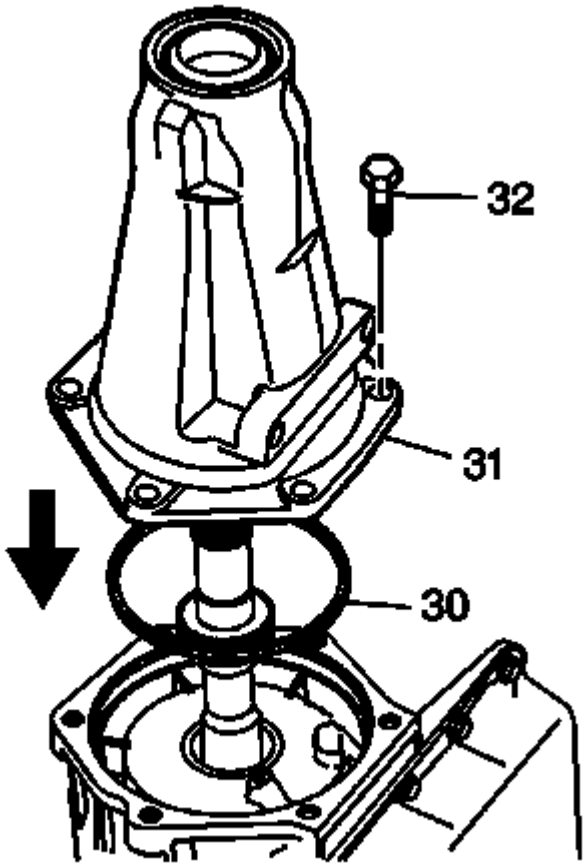


Fig. 317: View Of Fluid Strainers & Check Valve Assemblies
Courtesy of GENERAL MOTORS CORP.

10. Remove the following from the middle control valve body:
    - 3 fluid strainers (371)
    - 1 fluid strainer (372)
    - 2 accumulator check valve assemblies (353)

 © 2011 Mitchell Repair Information Company, LLC.

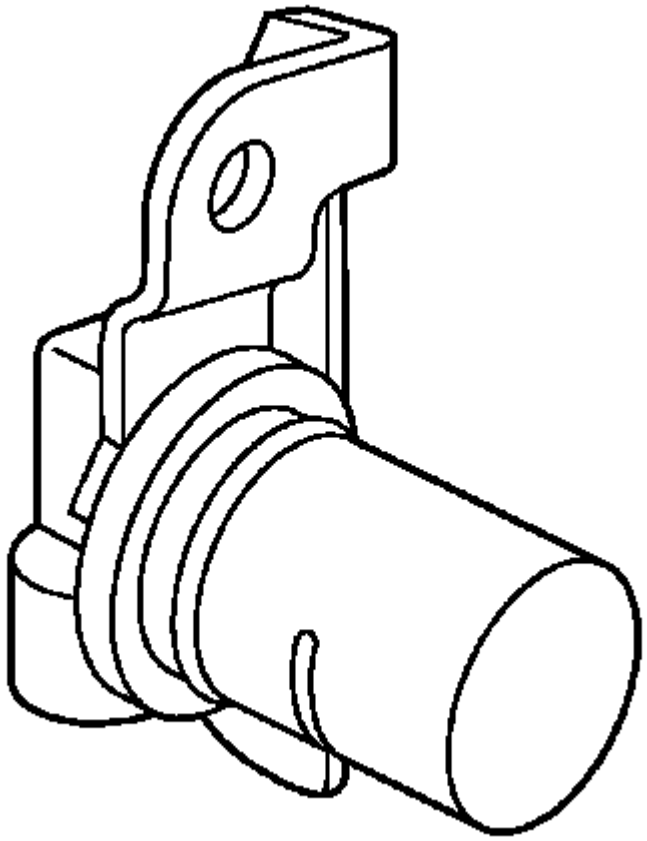


Fig. 318: View Of Middle Control Valve Body Bolt/Screw
Courtesy of GENERAL MOTORS CORP.

11. Remove the bolt (304) from the middle control valve body.

 © 2011 Mitchell Repair Information Company, LLC.

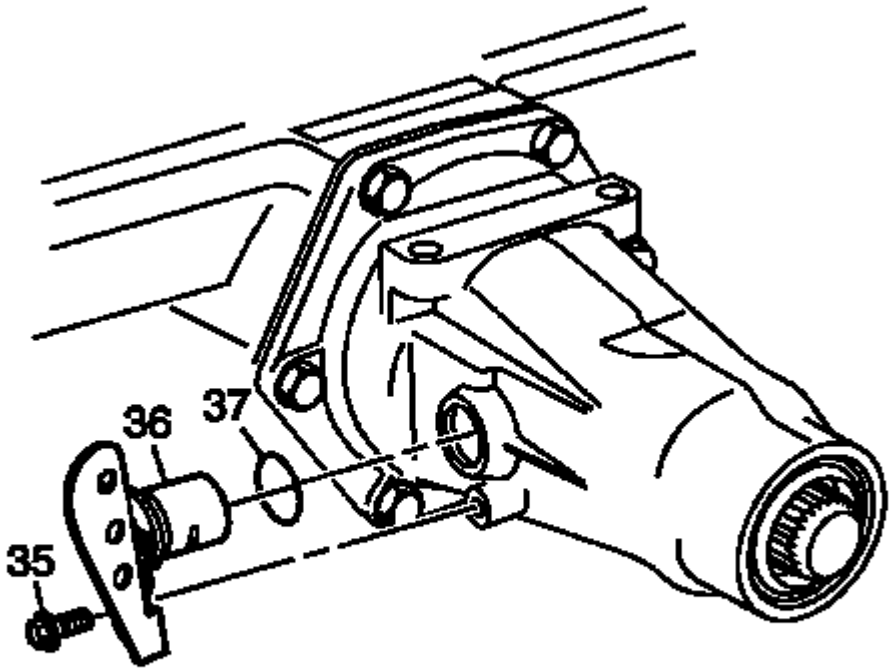


Fig. 319: Turning Over Middle Control Valve Body
Courtesy of GENERAL MOTORS CORP.

12. Turn the middle control valve body over in order to remove the remaining bolts.

 © 2011 Mitchell Repair Information Company, LLC.

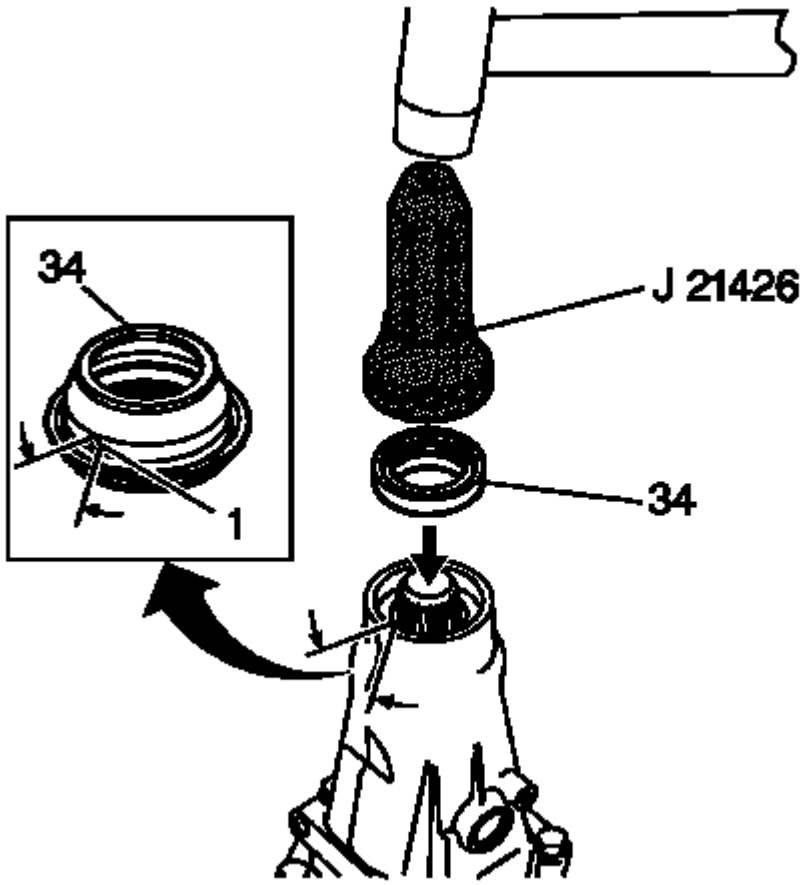


Fig. 320: View Of No. 2 Rear Control Valve Body Assembly Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

13. Remove the 5 bolts (331, 332) from the No. 2 rear control valve body assembly.

 © 2011 Mitchell Repair Information Company, LLC.

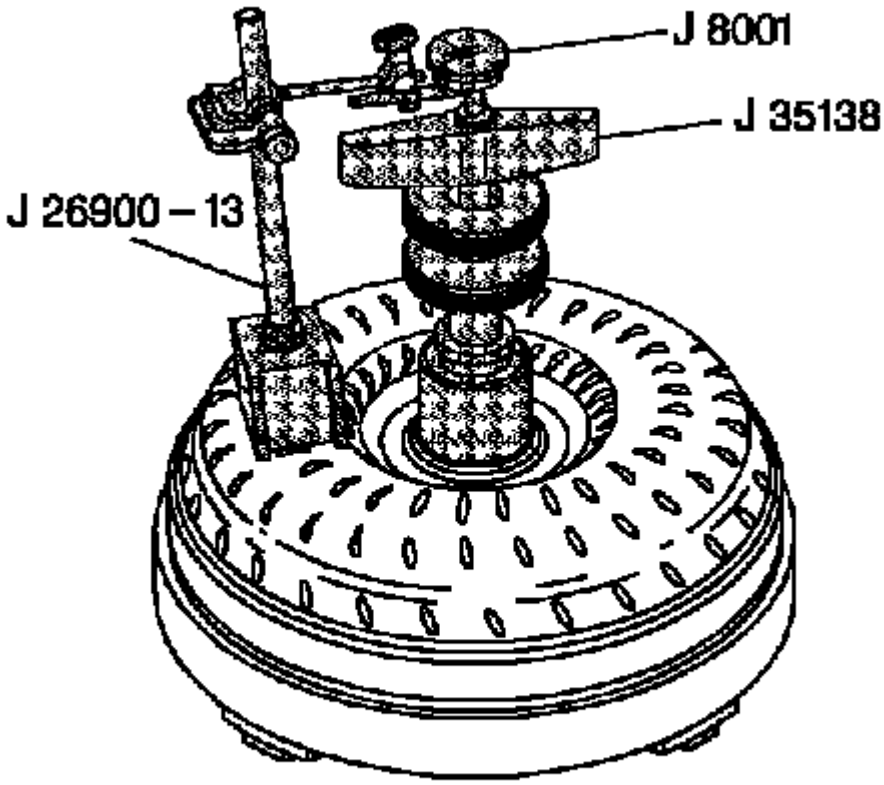


Fig. 321: View Of No. 2 Rear Control Valve Body Assembly & Rear Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

14. Remove the No. 2 rear control valve body assembly (330), the spacer plate and the gaskets as an assembly from the rear control valve body assembly (326).

 © 2011 Mitchell Repair Information Company, LLC.

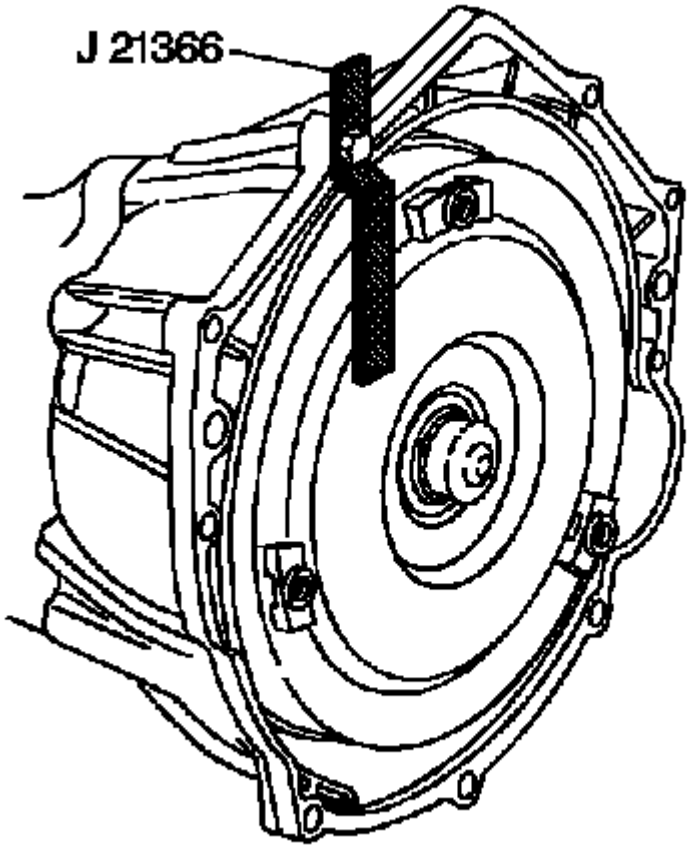


Fig. 322: View Of Rear Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

15. Remove the 3 rear control valve body bolts (333, 335).

 © 2011 Mitchell Repair Information Company, LLC.

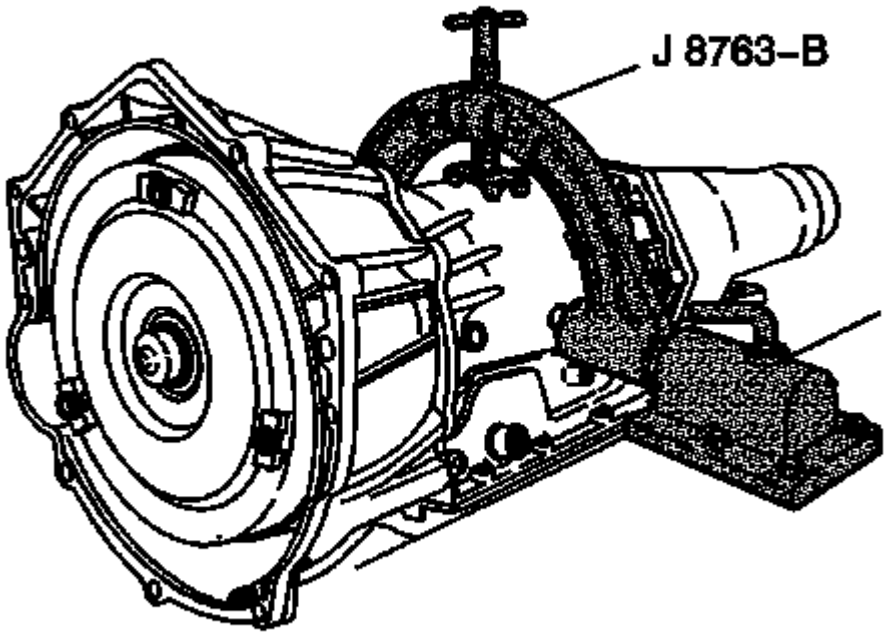


Fig. 323: View Of Rear Control Valve Body & Middle Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

16. Remove the rear control valve body assembly (326) from the middle control valve body assembly (323).

MIDDLE CONTROL VALVE BODY DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

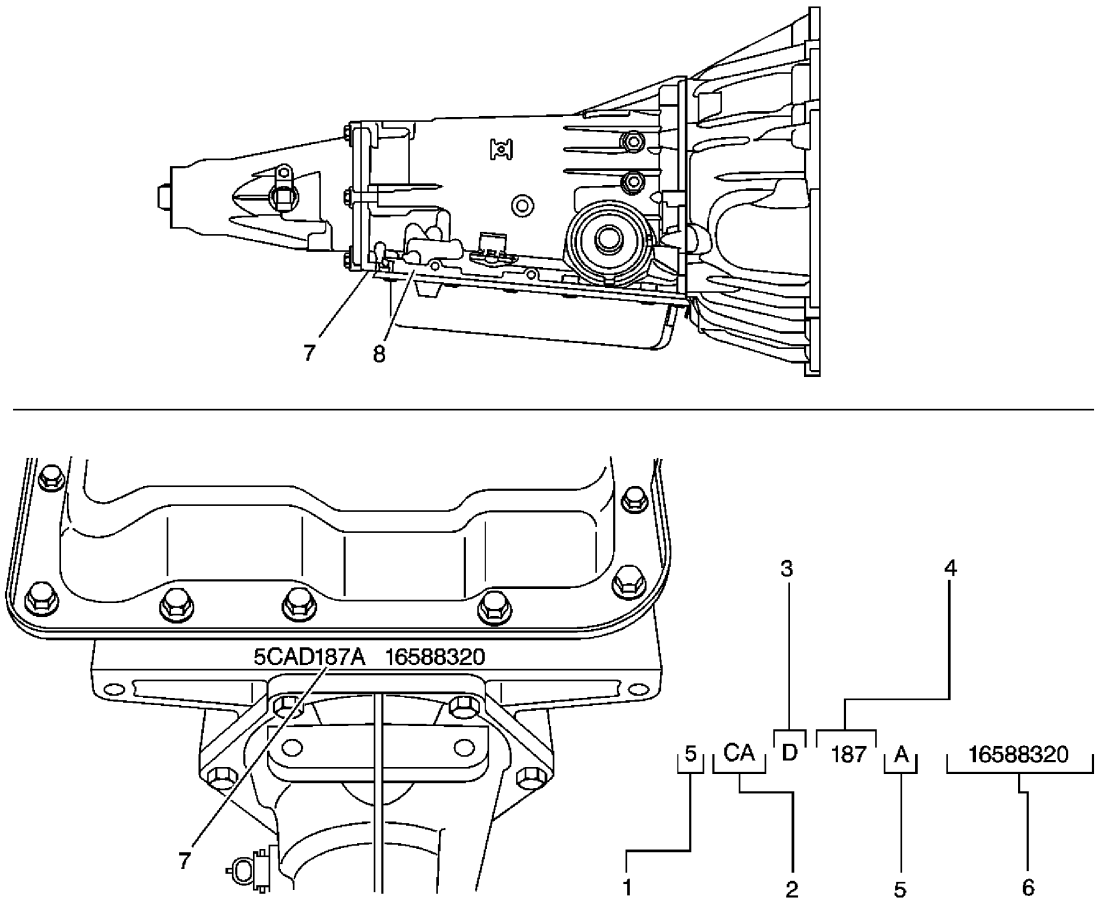


Fig. 324: View Of Check Valve Assemblies, TCC Valve & Cooler By-Pass Valve
Courtesy of GENERAL MOTORS CORP.

CAUTION: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.

1. Remove the TCC check valve (382).
2. Remove the TCC check valve spring (383).
3. Remove the cooler by-pass valve (381).
4. Remove the cooler by-pass valve spring (380).
5. Remove the 5 accumulator check valve assemblies (353).

 © 2011 Mitchell Repair Information Company, LLC.

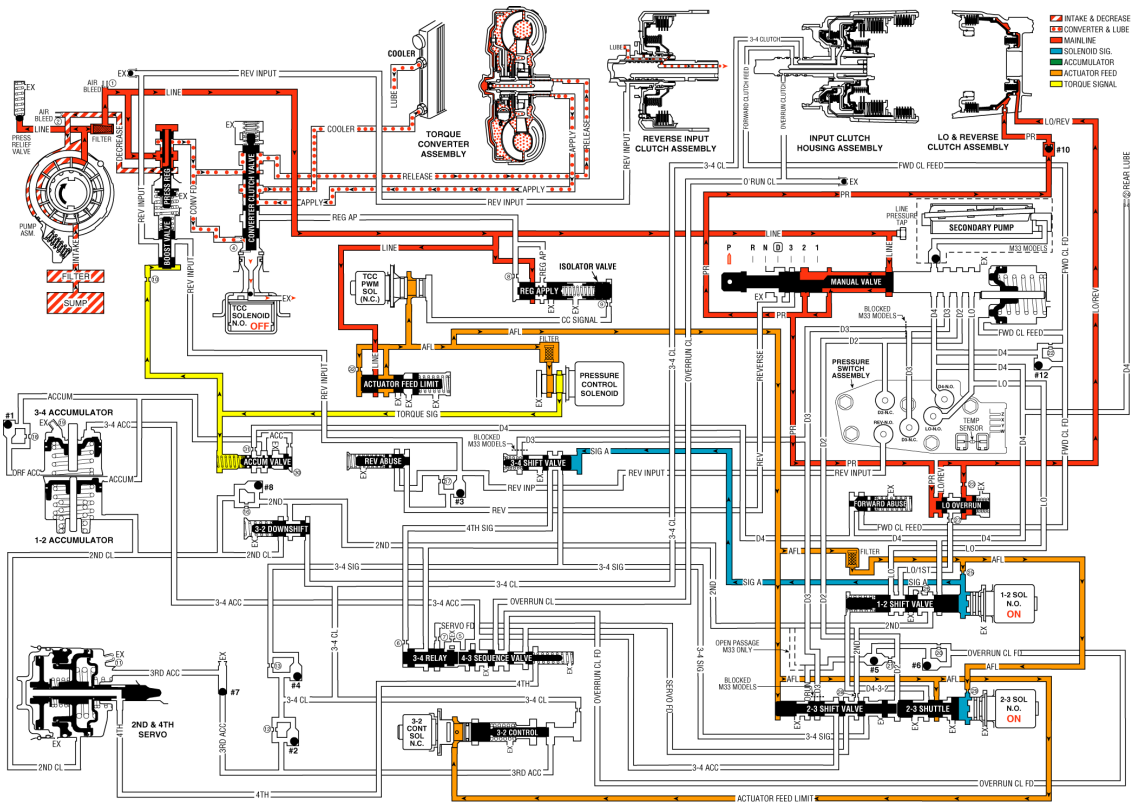


Fig. 325: Exploded View Of Primary Regulator Valve Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the sleeve/bore plug retainer (362).
7. Remove the primary regulator valve sleeve (398).
8. Remove the primary regulator valve plunger (397).
9. Remove the primary regulator valve spring (396).
10. Remove the primary regulator valve (395).

 © 2011 Mitchell Repair Information Company, LLC.

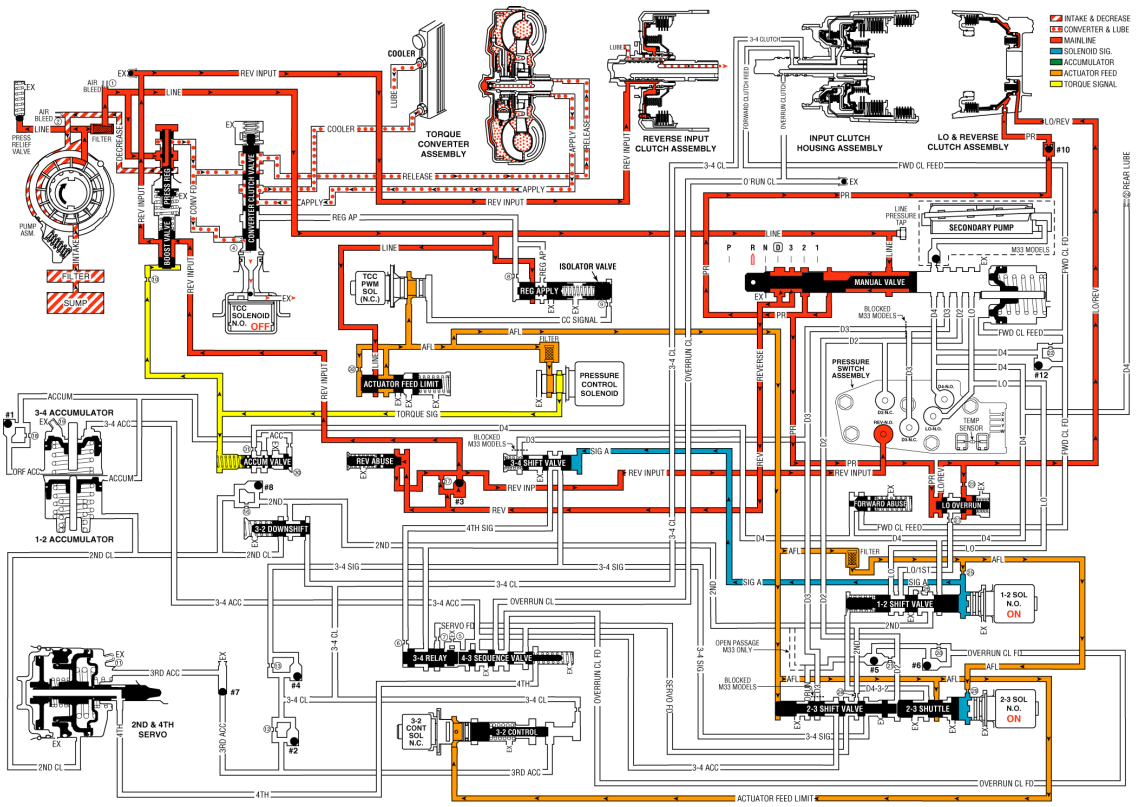


Fig. 326: Exploded View Of U2 Shift Valve Assembly
Courtesy of GENERAL MOTORS CORP.

11. Remove the sleeve/bore plug retainer (362).
12. Remove the U2 shift valve bore plug (394).
13. Remove the U2 shift valve spring (393).
14. Remove the U2 shift valve (392).

 © 2011 Mitchell Repair Information Company, LLC.

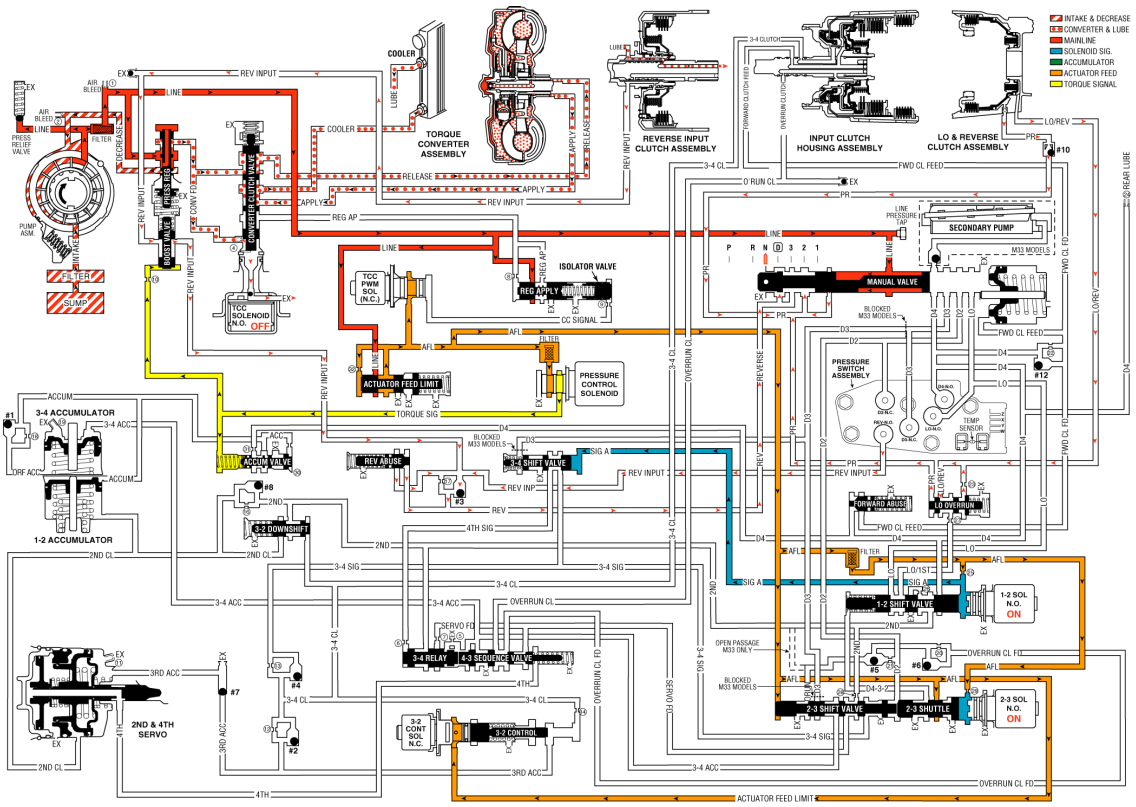


Fig. 327: Exploded View Of M1 Shift Valve Assembly
Courtesy of GENERAL MOTORS CORP.

15. Remove the sleeve/bore plug retainer (362).
16. Remove the M1 shift valve bore plug (391).
17. Remove the M1 shift valve spring (390).
18. Remove the M1 shift valve (389).

 © 2011 Mitchell Repair Information Company, LLC.

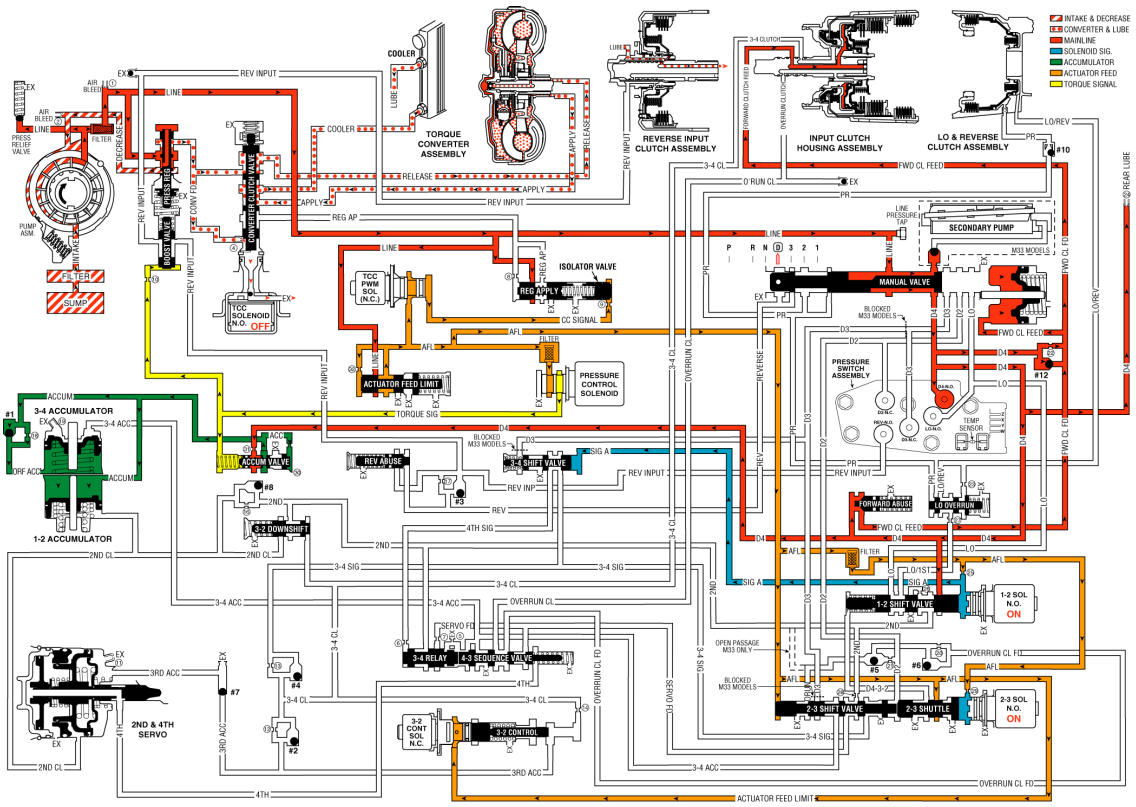


Fig. 328: Exploded View Of U1 Shift Valve Assembly
Courtesy of GENERAL MOTORS CORP.

19. Remove the sleeve/bore plug retainer (362).
20. Remove the U2 shift valve bore plug (394).
21. Remove the U1 shift valve spring (387).
22. Remove the U1 shift valve (386).

 © 2011 Mitchell Repair Information Company, LLC.

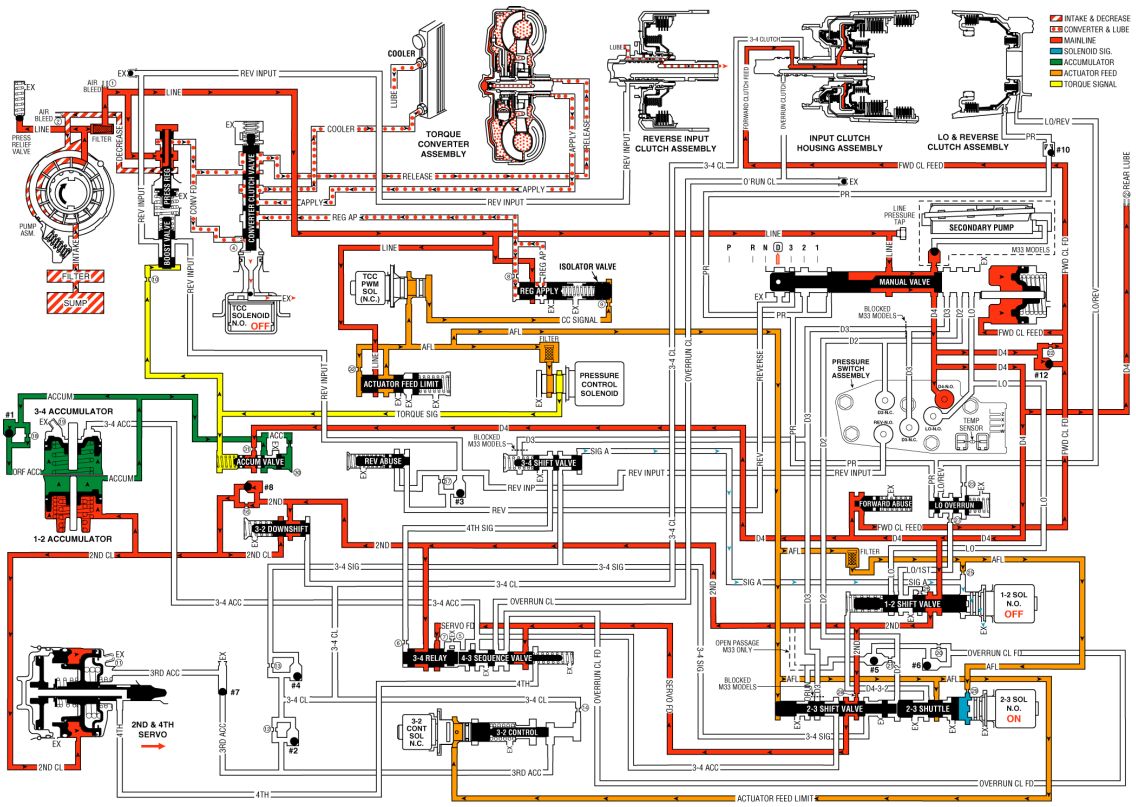


Fig. 329: Exploded View Of 3rd Gear Band (B4) Release Valve Assembly
Courtesy of GENERAL MOTORS CORP.

23. Remove the sleeve/bore plug retainer (362).
24. Remove the U2 shift valve bore plug (394).
25. Remove the 3rd gear band (B4) release valve (385).
26. Remove the 3rd gear band (B4) release valve spring (384).

 © 2011 Mitchell Repair Information Company, LLC.

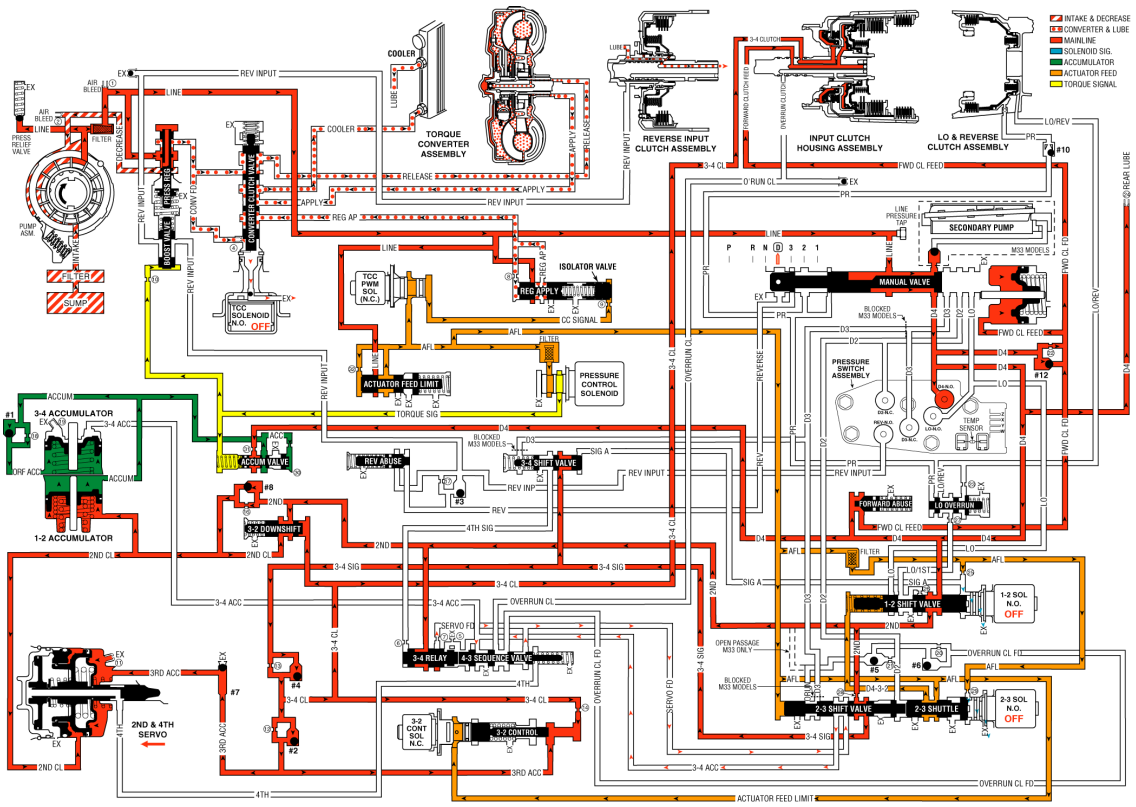


Fig. 330: Exploded View Of Solenoid Relay Valve Assembly
Courtesy of GENERAL MOTORS CORP.

27. Remove the sleeve/bore plug retainer (362).
28. Remove the solenoid relay valve sleeve (376).
29. Remove the solenoid relay valve plunger (377).
30. Remove the solenoid relay valve (378).
31. Remove the solenoid relay valve spring (379).

 © 2011 Mitchell Repair Information Company, LLC.

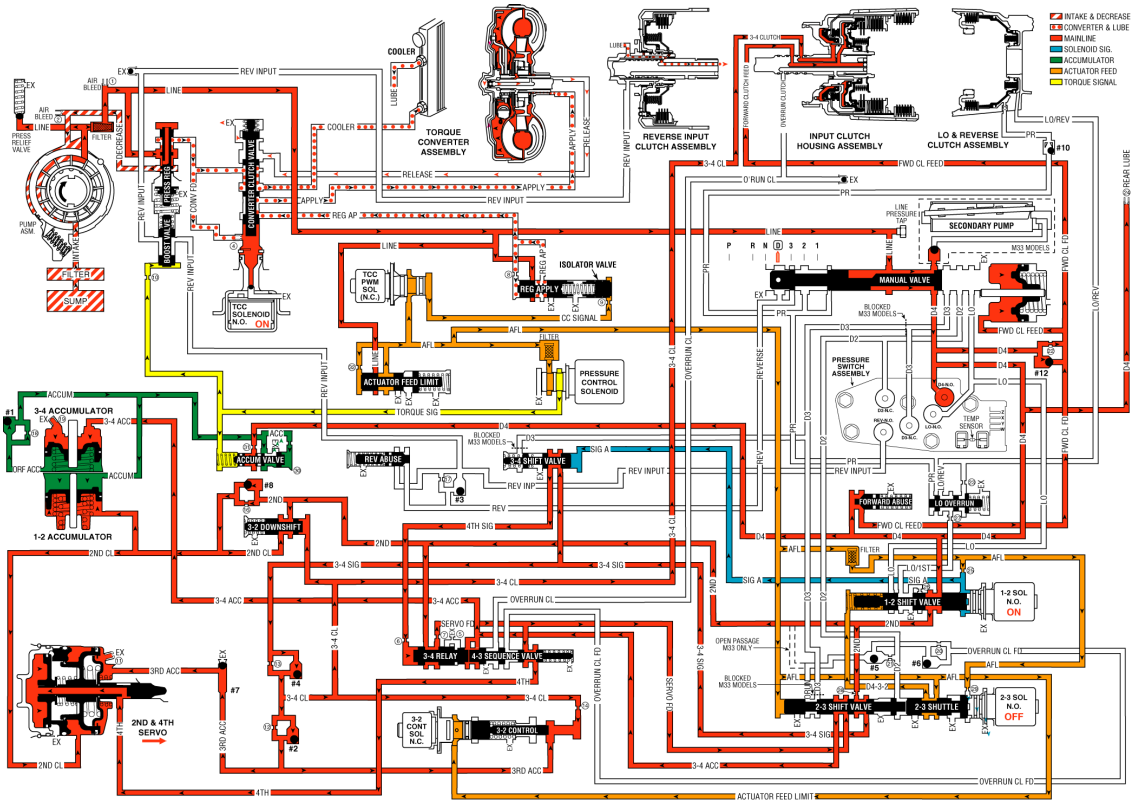


Fig. 331: Exploded View Of Reverse Shift Ball Check Valve Assembly
Courtesy of GENERAL MOTORS CORP.

32. Remove the sleeve/bore plug retainer (362).
33. Remove the reverse shift ball check valve bushing - outer (375).
34. Remove the reverse shift ball check valve (374).
35. Remove the reverse shift ball check valve bushing - inner (373).

MIDDLE CONTROL VALVE BODY ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

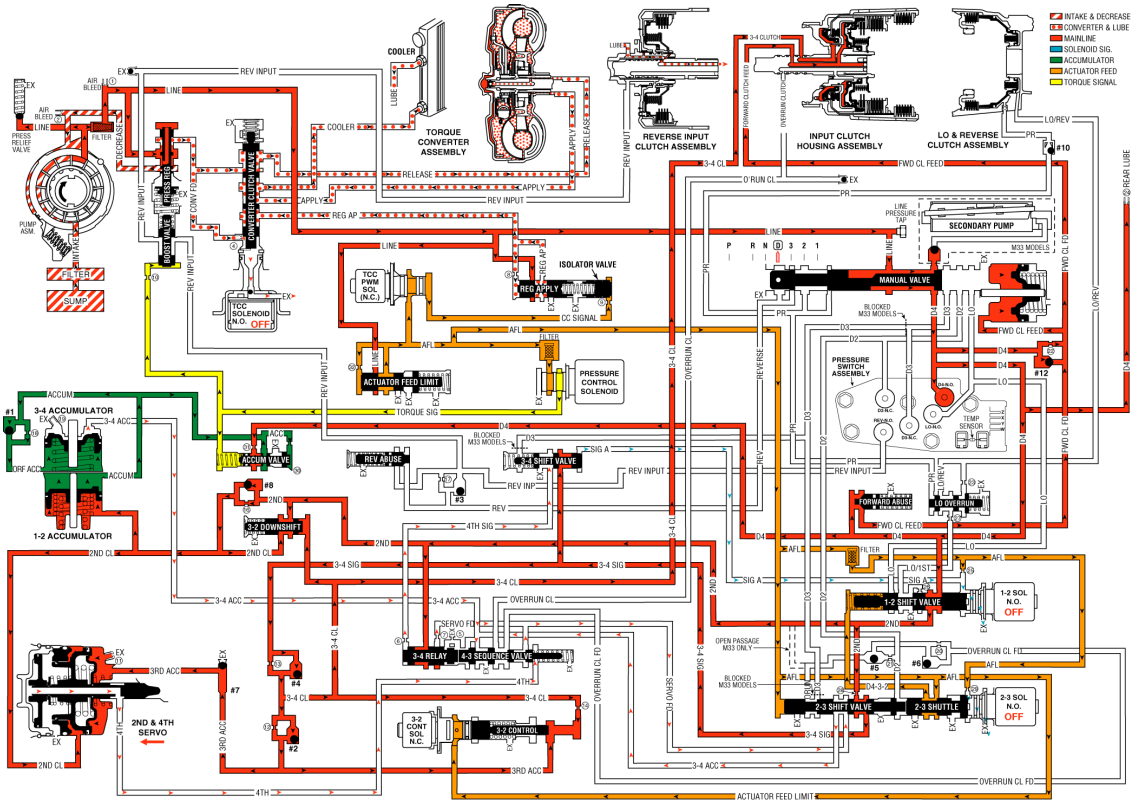


Fig. 332: Inspecting Middle Control Valve Body
Courtesy of GENERAL MOTORS CORP.

1. Inspect the middle control valve body (370) casting for the following conditions:
   - Porosity
   - Cracks
   - Damaged machine surface
   - Chips or debris
   - Damage to valve bores
2. Inspect all valves, springs, bushings, and clean all components in clean solvent.

 © 2011 Mitchell Repair Information Company, LLC.

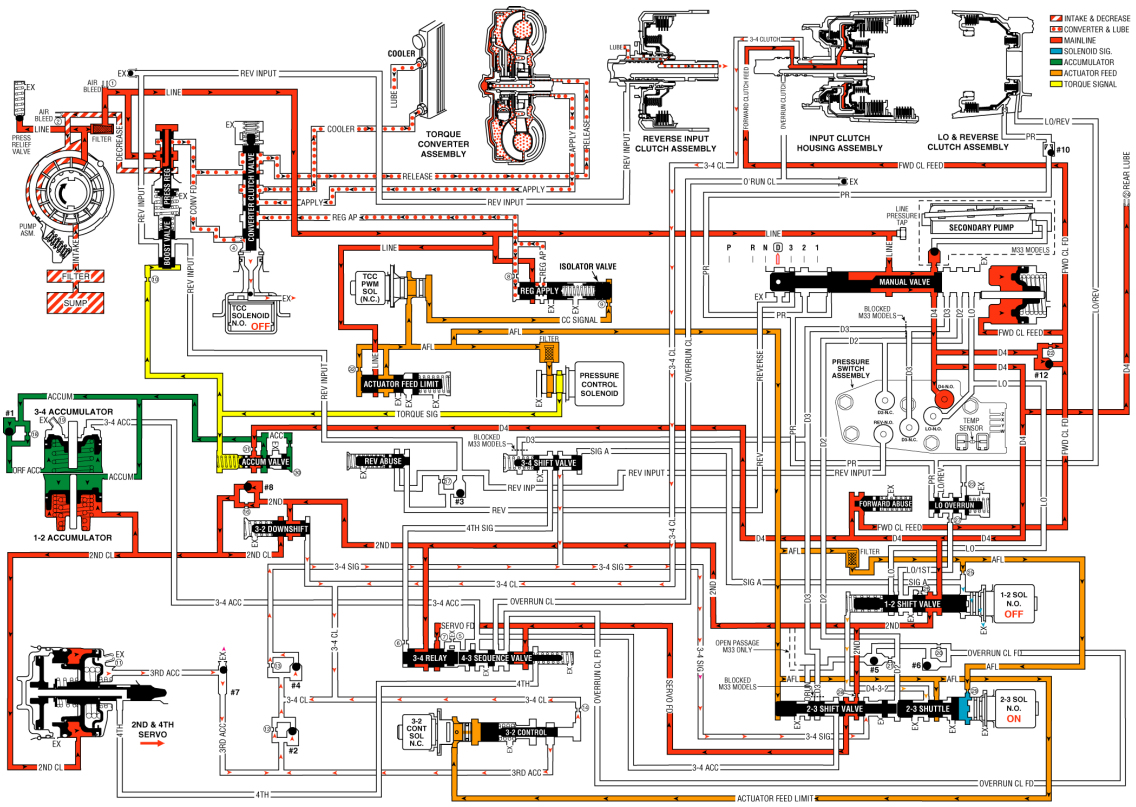


Fig. 333: Exploded View Of Reverse Shift Ball Check Valve Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the reverse shift ball check valve bushing - inner (373).
4. Install the reverse shift ball check valve (374).
5. Install the reverse shift ball check valve bushing - outer (375).
6. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

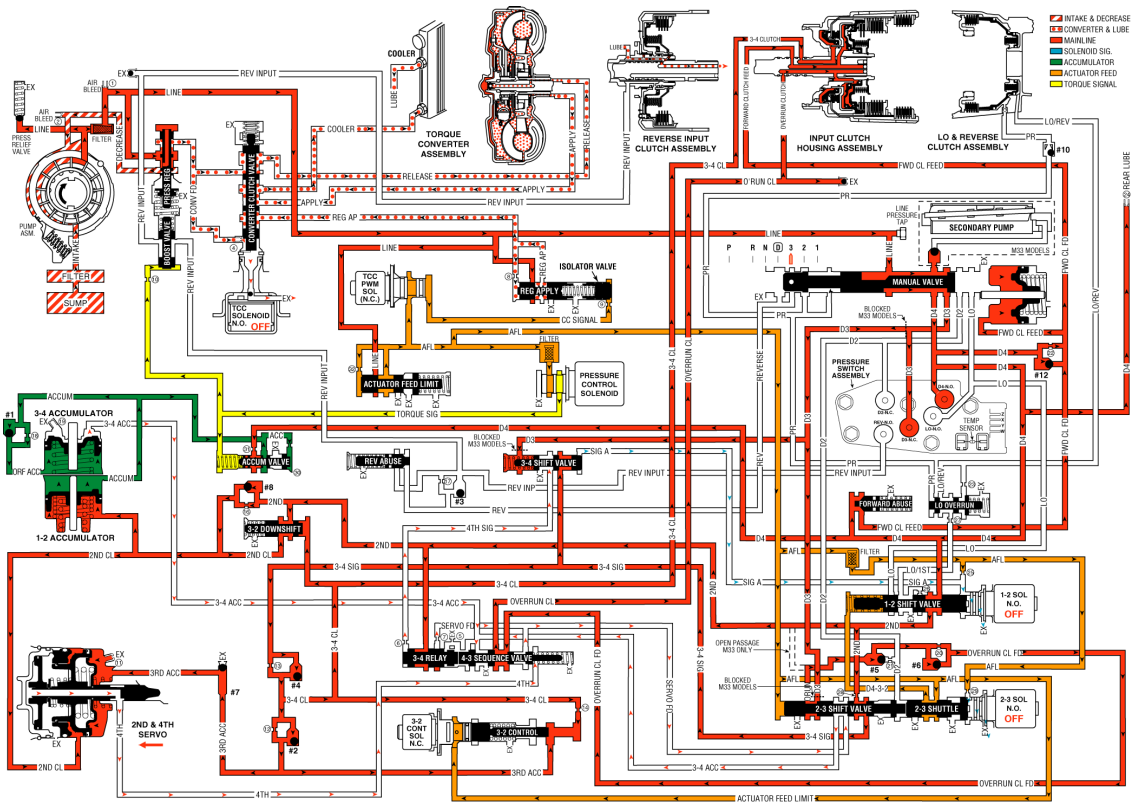


Fig. 334: Exploded View Of Solenoid Relay Valve Assembly
Courtesy of GENERAL MOTORS CORP.

7. Install the solenoid relay valve spring (379).
8. Install the solenoid relay valve (378).
9. Install the solenoid relay valve plunger (377).
10. Install the solenoid relay valve sleeve (376).
11. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

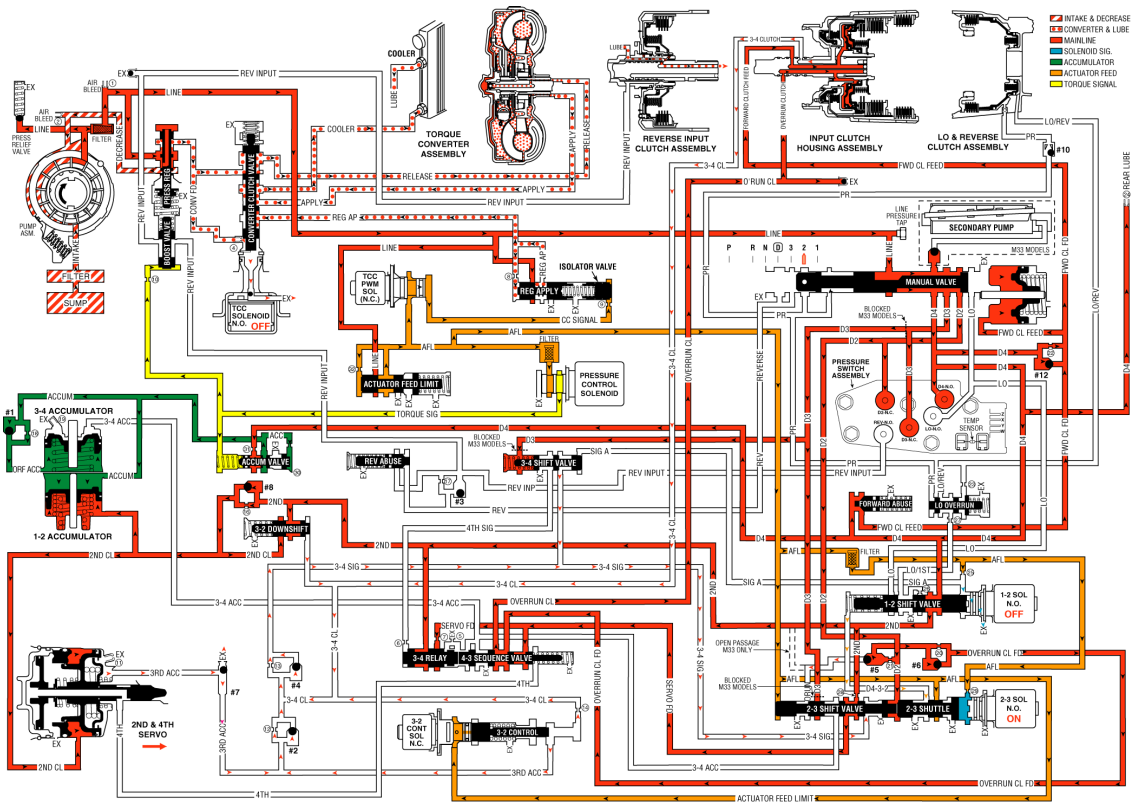


Fig. 335: Exploded View Of 3rd Gear Band (B4) Release Valve Assembly
Courtesy of GENERAL MOTORS CORP.

12. Install the 3rd gear band (B4) release valve spring (384).
13. Install the 3rd gear band (B4) release valve (385).
14. Install the U2 shift valve bore plug (394).
15. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

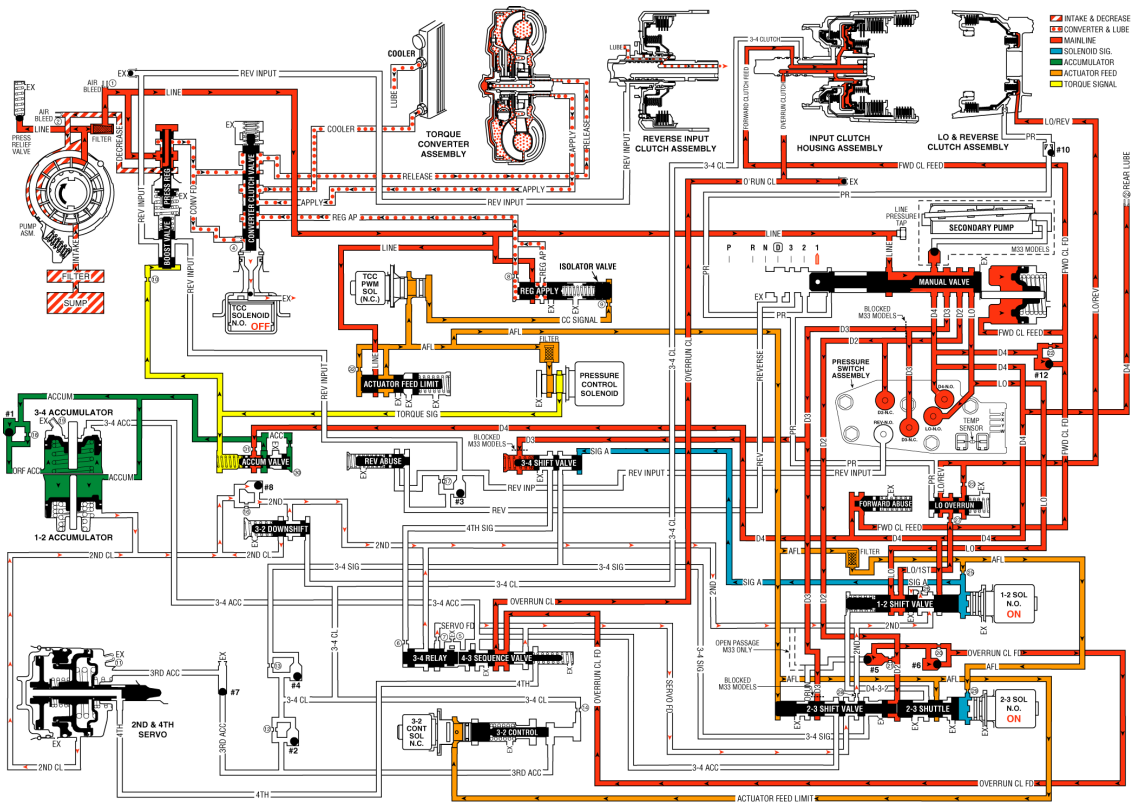


Fig. 336: Exploded View Of U1 Shift Valve Assembly
Courtesy of GENERAL MOTORS CORP.

16. Install the U1 shift valve (386).
17. Install the U1 shift valve spring (387).
18. Install the U2 shift valve bore plug (394).
19. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

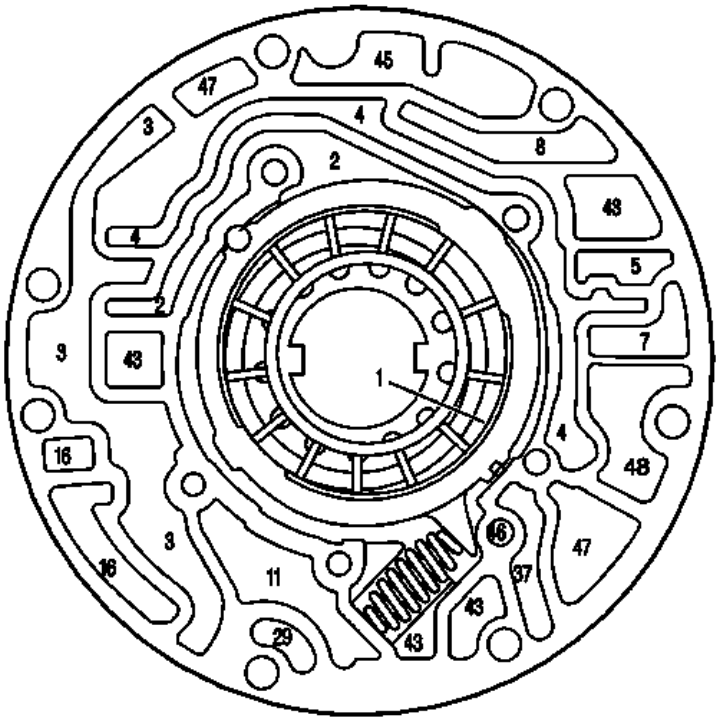


Fig. 337: Exploded View Of M1 Shift Valve Assembly
Courtesy of GENERAL MOTORS CORP.

20. Install the M1 shift valve (389).
21. Install the M1 shift valve spring (390).
22. Install the M1 shift valve bore plug (391).
23. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

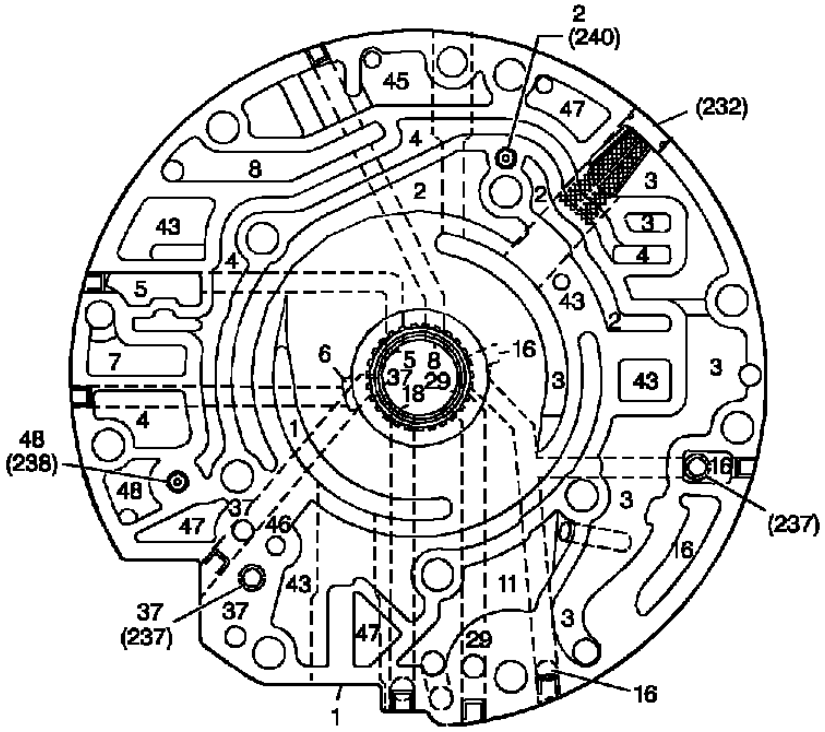


Fig. 338: Exploded View Of U2 Shift Valve Assembly
Courtesy of GENERAL MOTORS CORP.

24. Install the U2 shift valve (392).
25. Install the U2 shift valve spring (393).
26. Install the U2 shift valve bore plug (394).
27. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

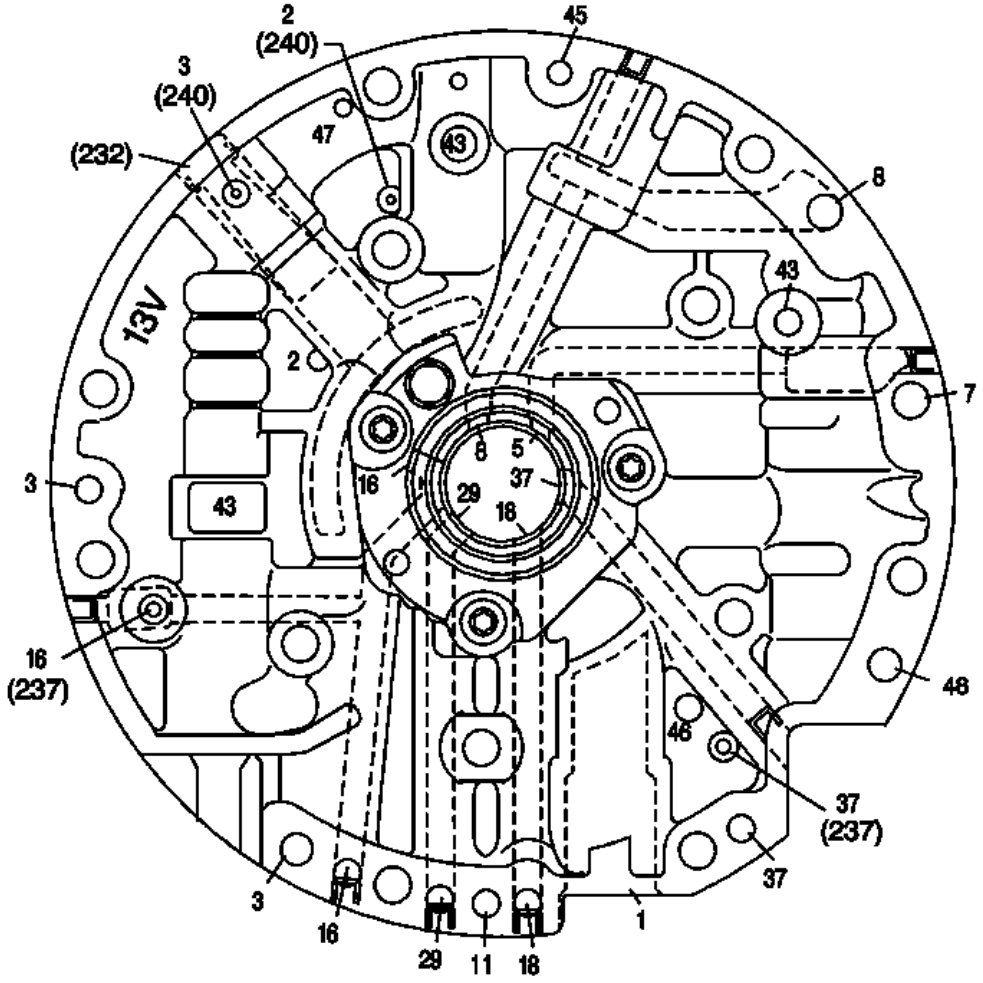


Fig. 339: Exploded View Of Primary Regulator Valve Assembly
Courtesy of GENERAL MOTORS CORP.

28. Install the primary regulator valve (395).
29. Install the primary regulator valve spring (396).
30. Install the primary regulator valve plunger (397).
31. Install the primary regulator valve sleeve (398).
32. Install the sleeve/bore plug retainer (362).

 © 2011 Mitchell Repair Information Company, LLC.

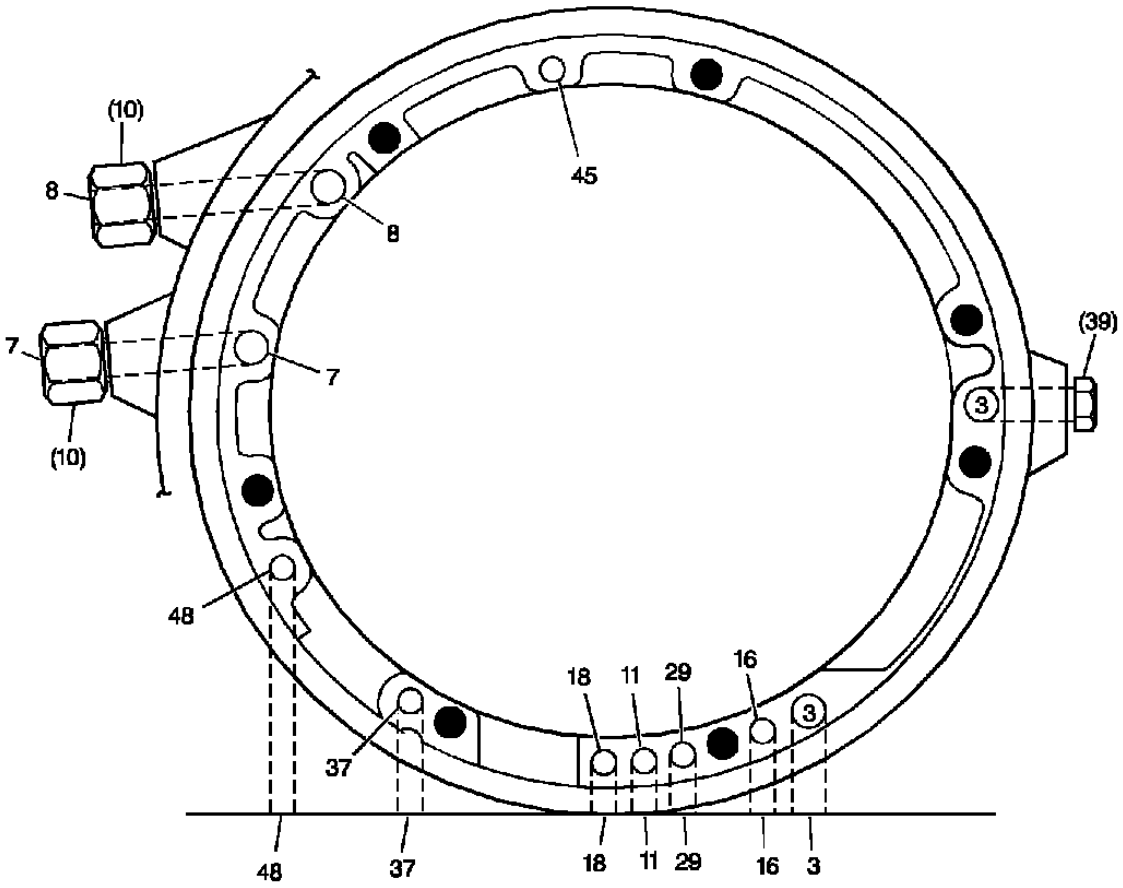


Fig. 340: View Of Check Valve Assemblies, TCC Valve & Cooler By-Pass Valve
Courtesy of GENERAL MOTORS CORP.

33. Install the 5 accumulator check valve assemblies (353).
34. Install the cooler by-pass valve spring (380).
35. Install the cooler by-pass valve (381).
36. Install the TCC check valve spring (383).
37. Install the TCC check valve (382).

REAR CONTROL VALVE BODY DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

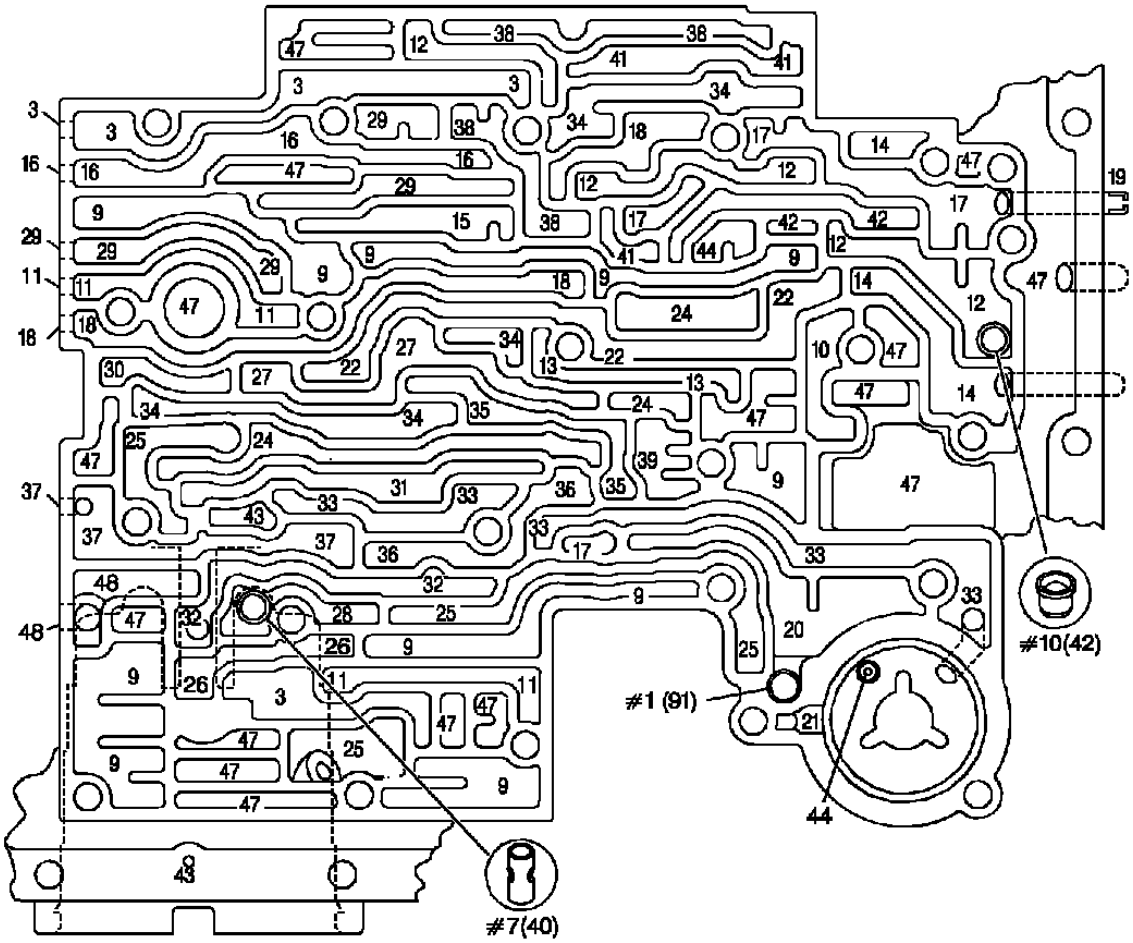


Fig. 341: View Of Spacer Plate & Gasket Assembly & Rear Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

CAUTION: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.

1. Remove the spacer plate and gasket assembly (324) from the rear control valve body assembly (326).

 © 2011 Mitchell Repair Information Company, LLC.

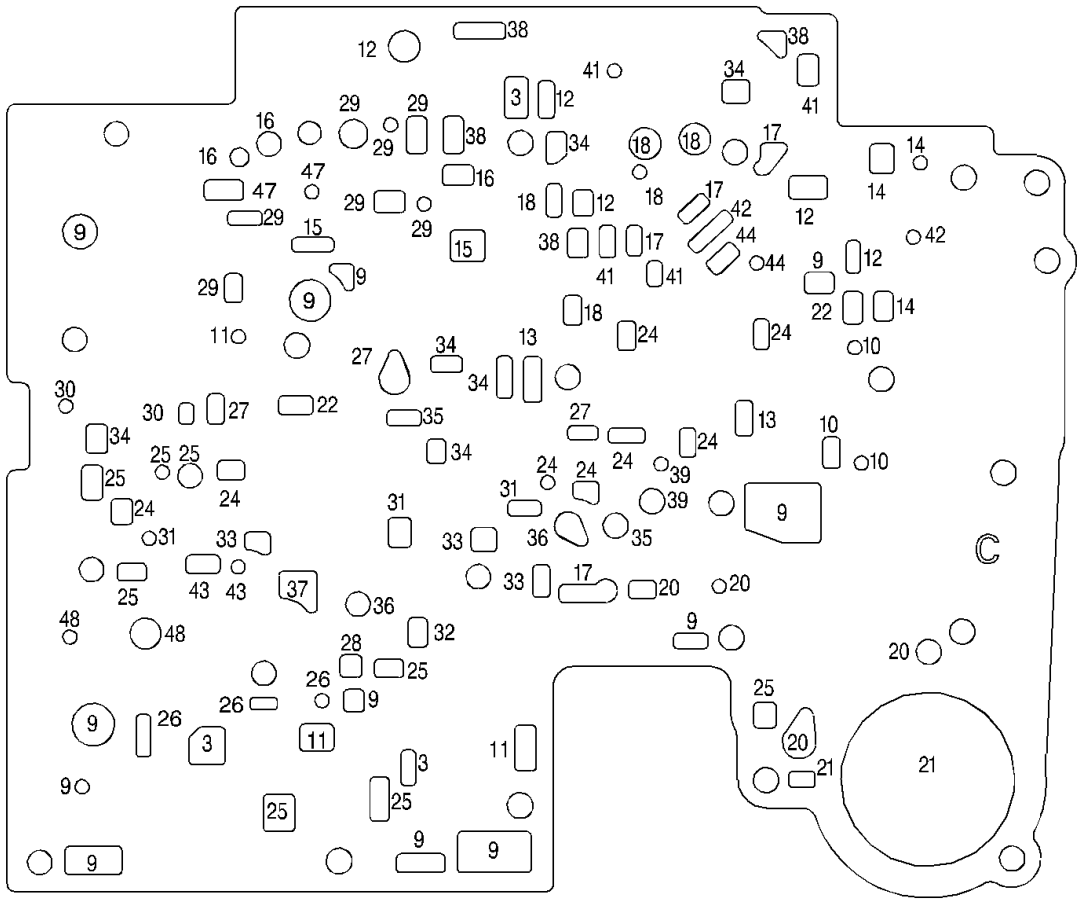


Fig. 342: View Of Rear Valve Body Cover Plate
Courtesy of GENERAL MOTORS CORP.

2. Remove the 7 rear valve body cover plate bolts (421).
3. Remove the rear valve body cover plate (420).
4. Remove the rear valve body cover plate gasket (419).

 © 2011 Mitchell Repair Information Company, LLC.

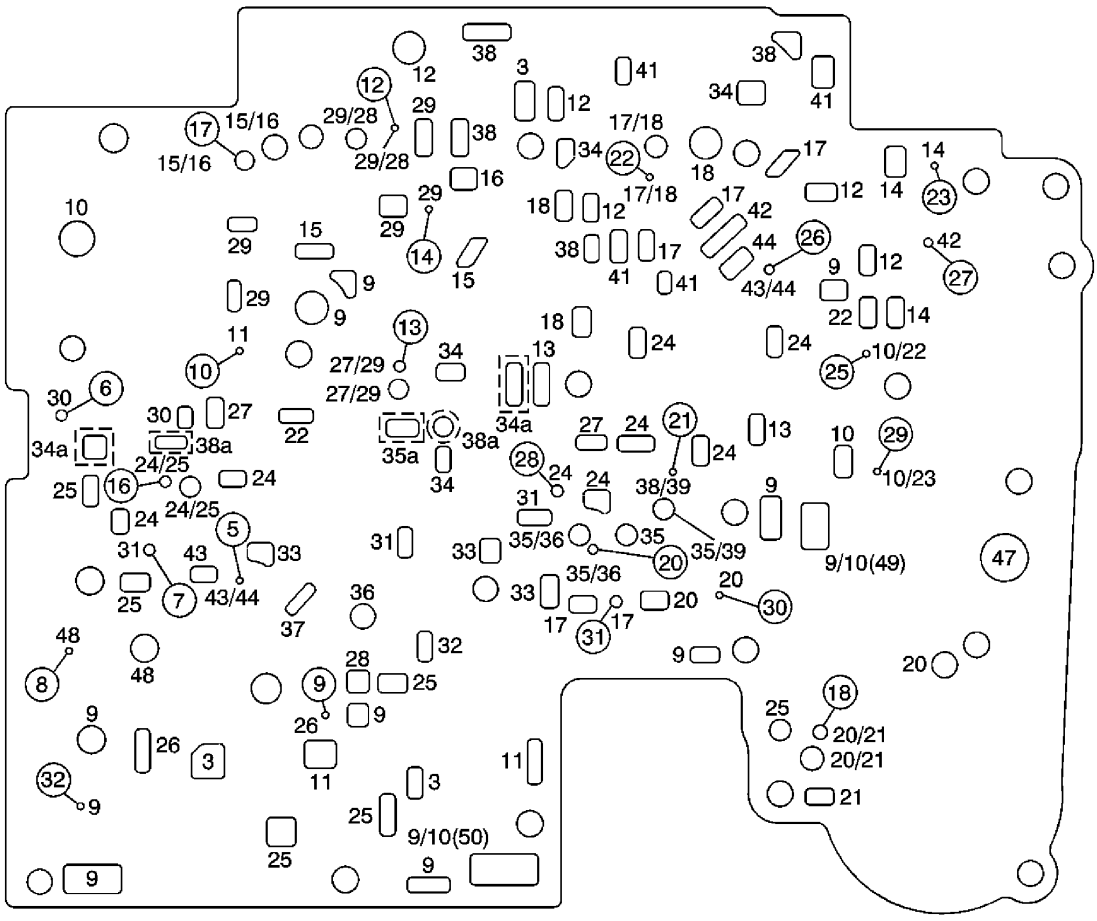


Fig. 343: View Of Secondary Regulator Valve
Courtesy of GENERAL MOTORS CORP.

5. Remove the secondary regulator valve spring (437).
6. Remove the secondary regulator valve (436).

 © 2011 Mitchell Repair Information Company, LLC.

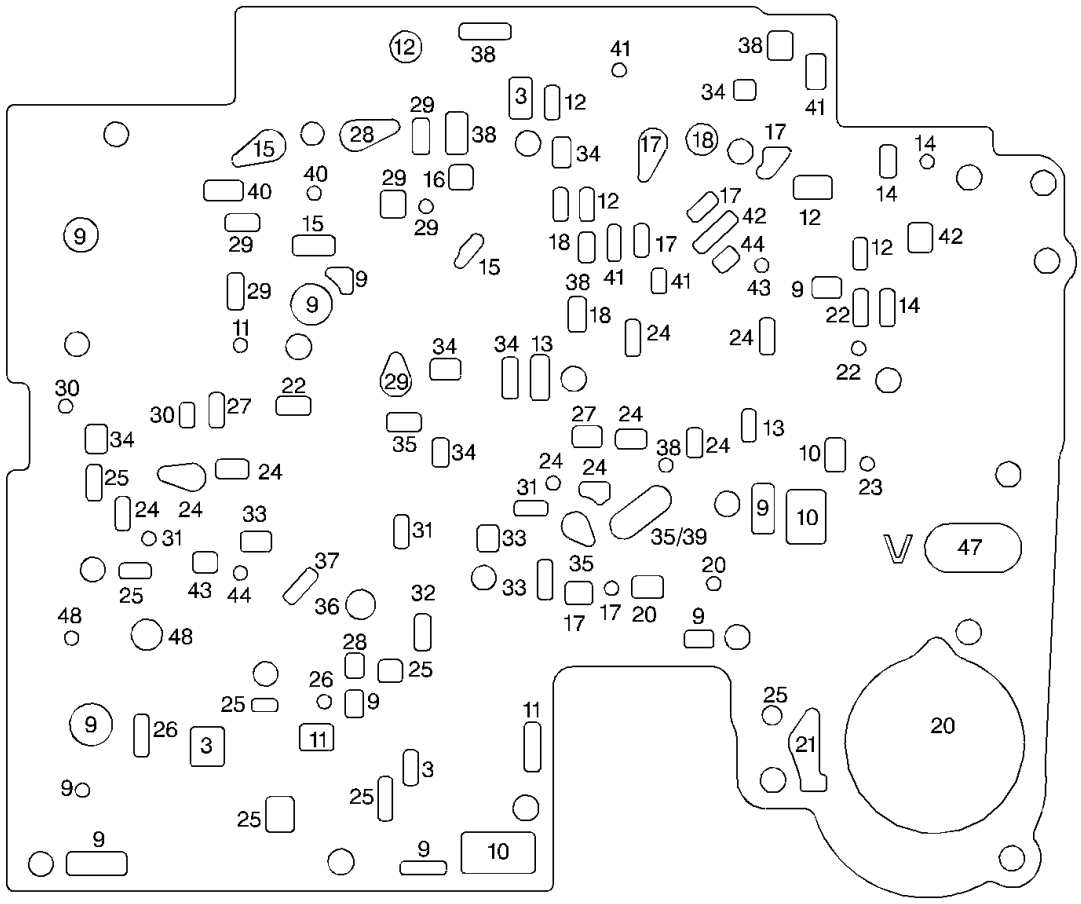


Fig. 344: View Of Line Pressure Control (SLT) Accumulator Piston & Springs
Courtesy of GENERAL MOTORS CORP.

7. Remove the line pressure control (SLT) accumulator piston spring - inner (435).
8. Remove the line pressure control (SLT) accumulator piston spring - outer (434).
9. Remove the line pressure control (SLT) accumulator piston (433).

 © 2011 Mitchell Repair Information Company, LLC.

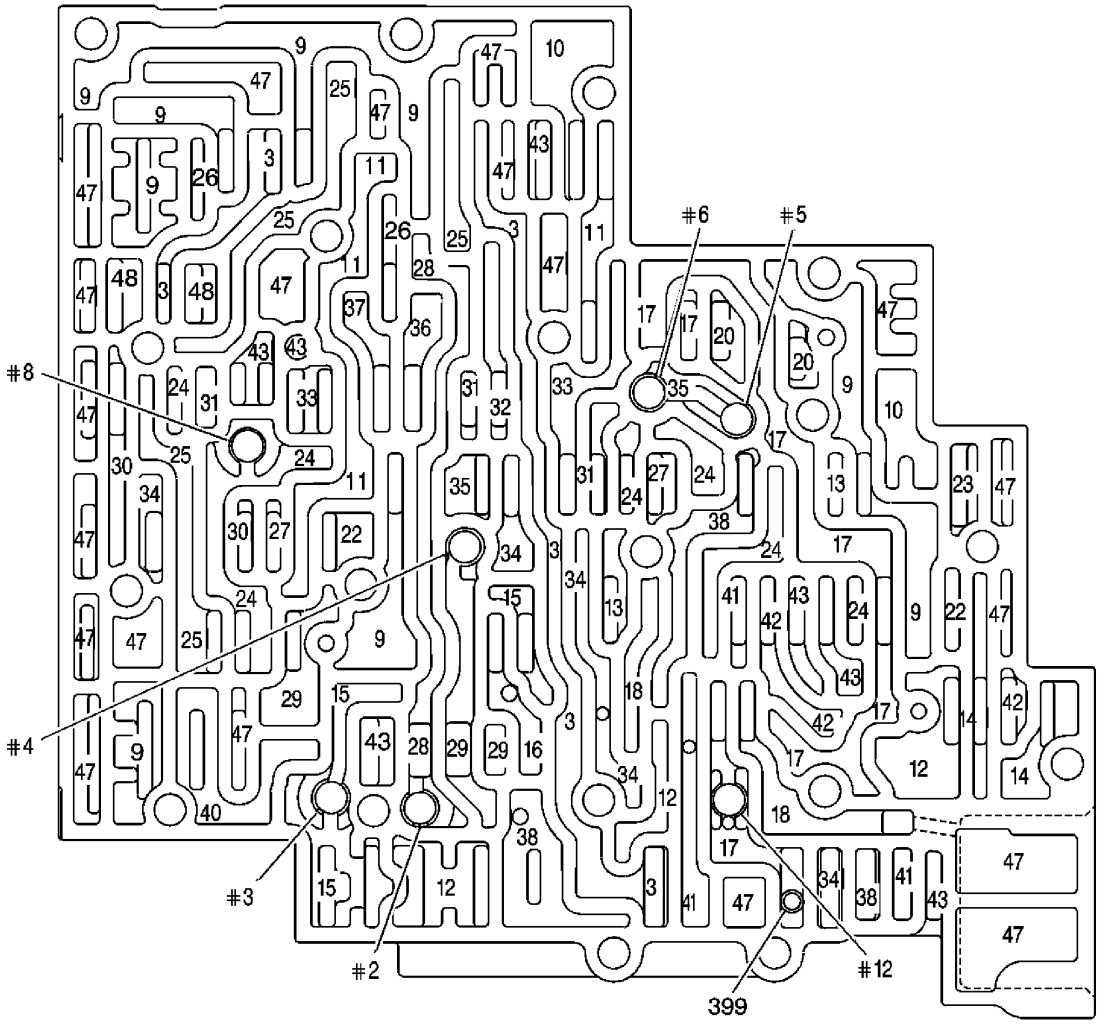


Fig. 345: Exploded View Of Shift Pressure Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

10. Remove the shift pressure control valve plunger sleeve (432).
11. Remove the shift pressure control valve plunger (431).
12. Remove the shift pressure control valve (430).
13. Remove the shift pressure control valve spring (429).
14. Remove the shift pressure control valve sleeve (428).

 © 2011 Mitchell Repair Information Company, LLC.

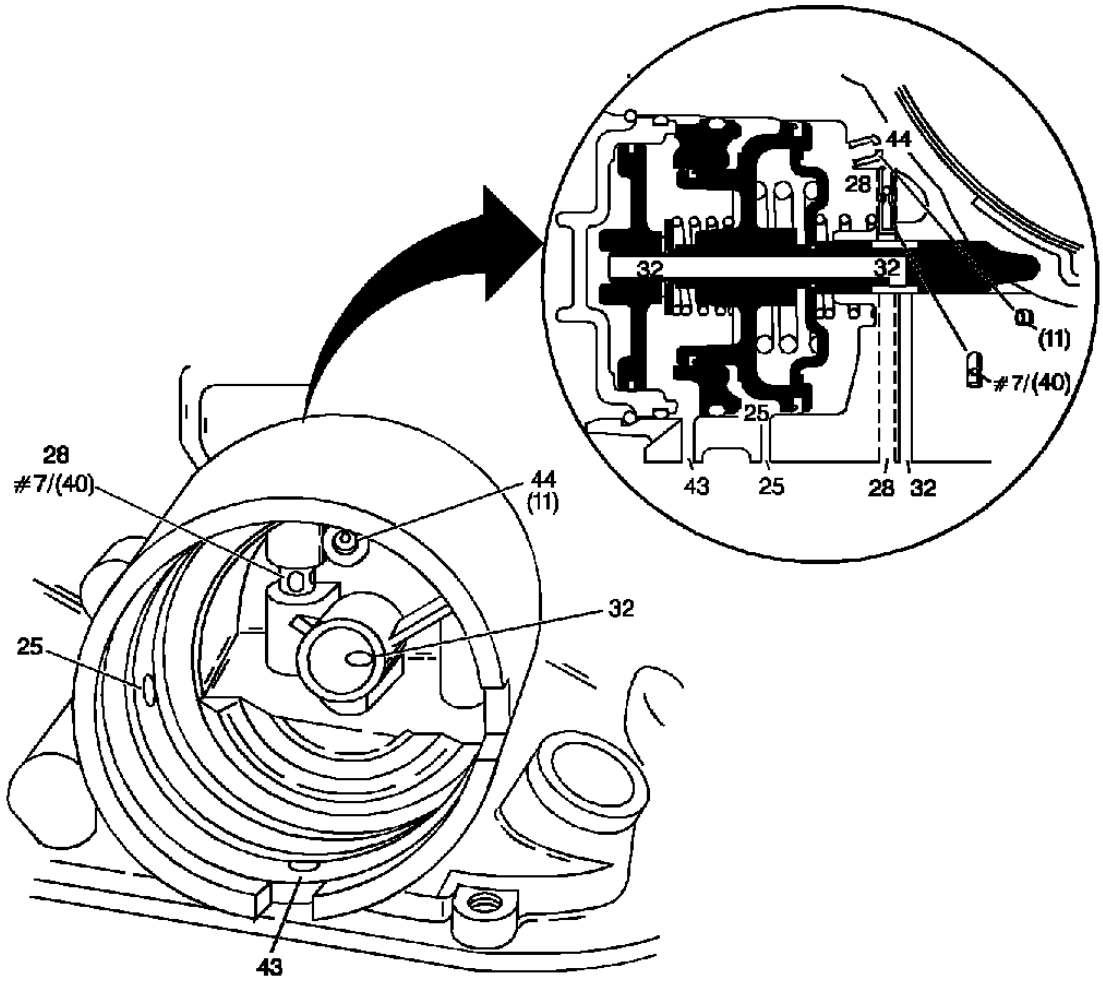


Fig. 346: View Of M2 Shift Valve
Courtesy of GENERAL MOTORS CORP.

15. Remove the M2 shift valve spring (427).
16. Remove the M2 shift valve (426).

 © 2011 Mitchell Repair Information Company, LLC.

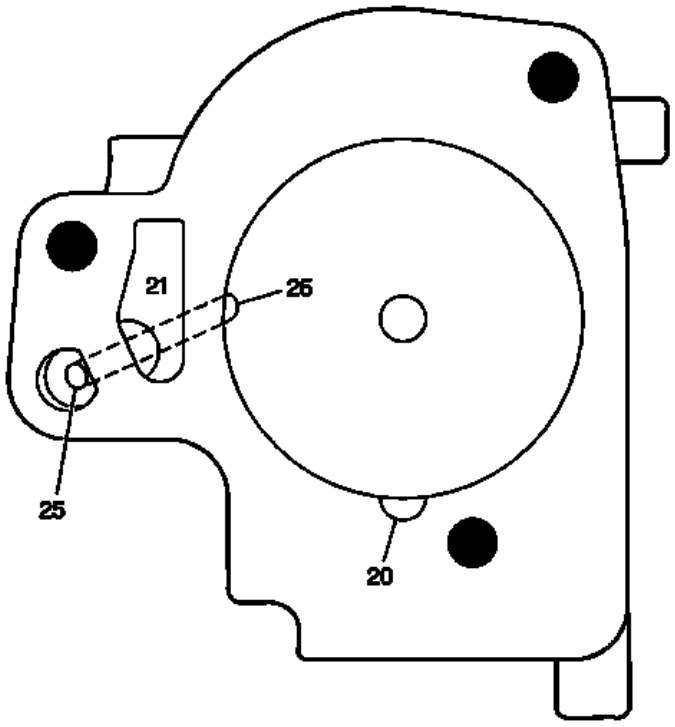
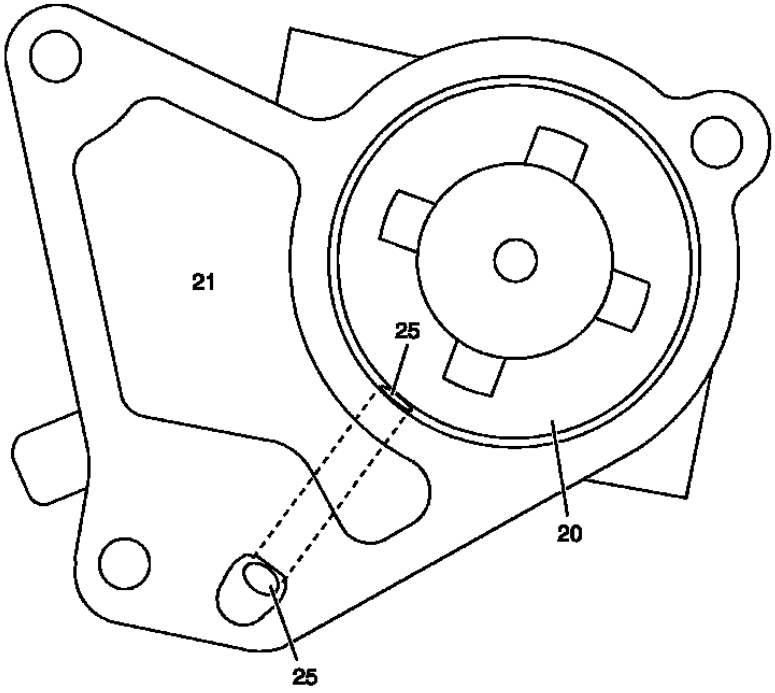


Fig. 347: View Of Shift Pressure Relay Valve
Courtesy of GENERAL MOTORS CORP.

17. Remove the shift pressure relay valve spring (425).
18. Remove the shift pressure relay valve (424).



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 348: View Of 3rd Gear Band (B4) Control Valve
Courtesy of GENERAL MOTORS CORP.

19. Remove the third gear band (B4) control valve (423).
20. Remove the third gear band (B4) control valve spring (422).

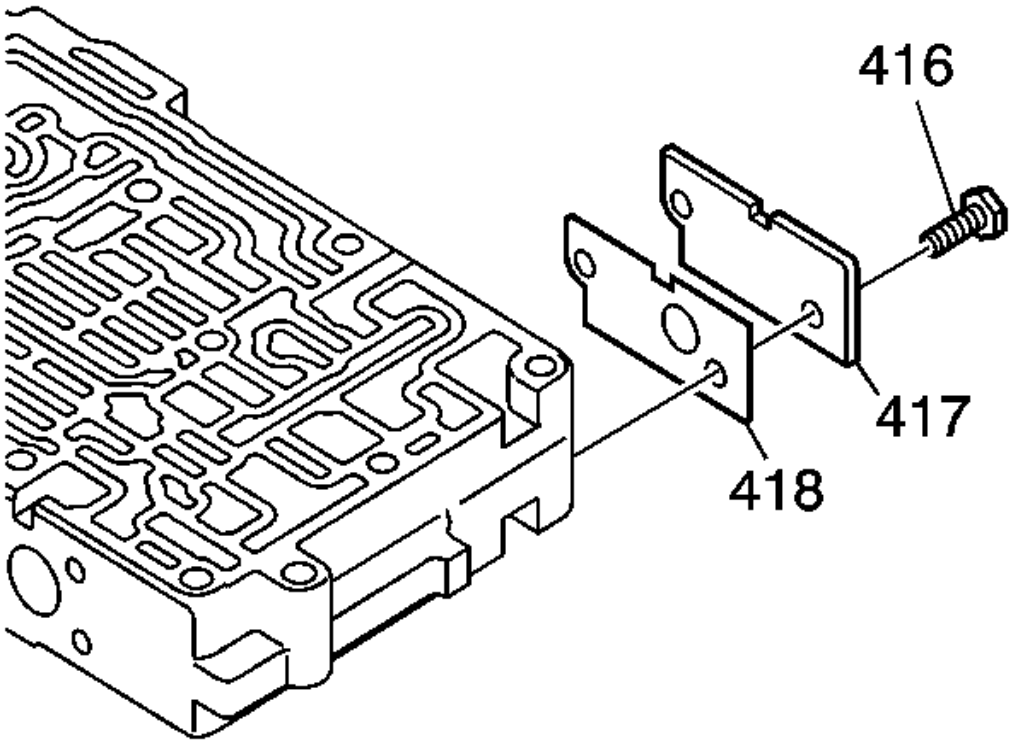


Fig. 349: View Of Rear Valve Body Cover Plate
Courtesy of GENERAL MOTORS CORP.

21. Remove the 2 rear valve body cover plate bolts (416).
22. Remove the rear valve body cover plate (417).
23. Remove the rear valve body cover plate gasket (418).

 © 2011 Mitchell Repair Information Company, LLC.

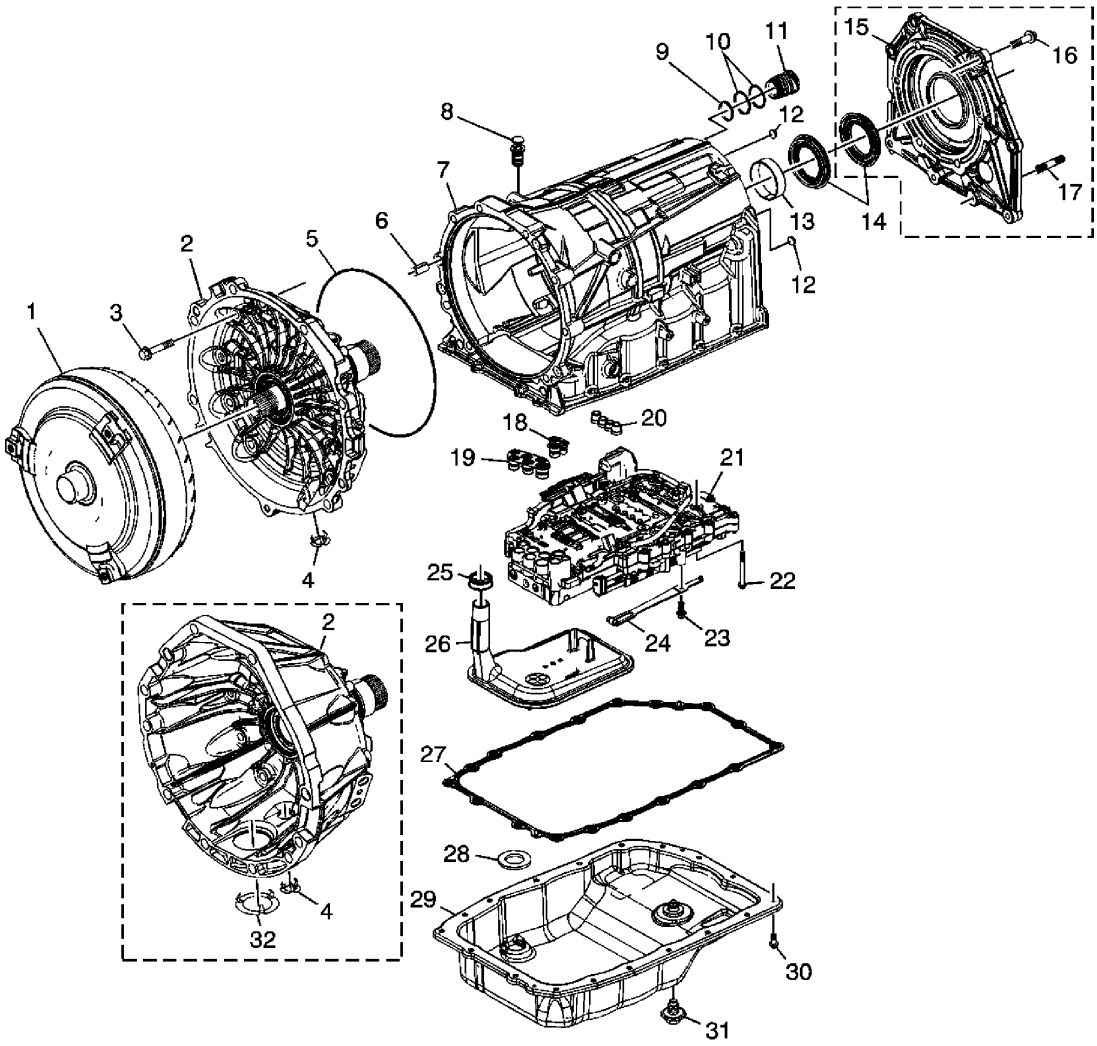


Fig. 350: Exploded View Of Lock Up Relay Valve Assembly
Courtesy of GENERAL MOTORS CORP.

24. Remove the lock up relay control valve sleeve (412).
25. Remove the lock up relay control valve plunger (413).
26. Remove the lock up relay valve spring (414).
27. Remove the lock up relay valve (415).

 © 2011 Mitchell Repair Information Company, LLC.

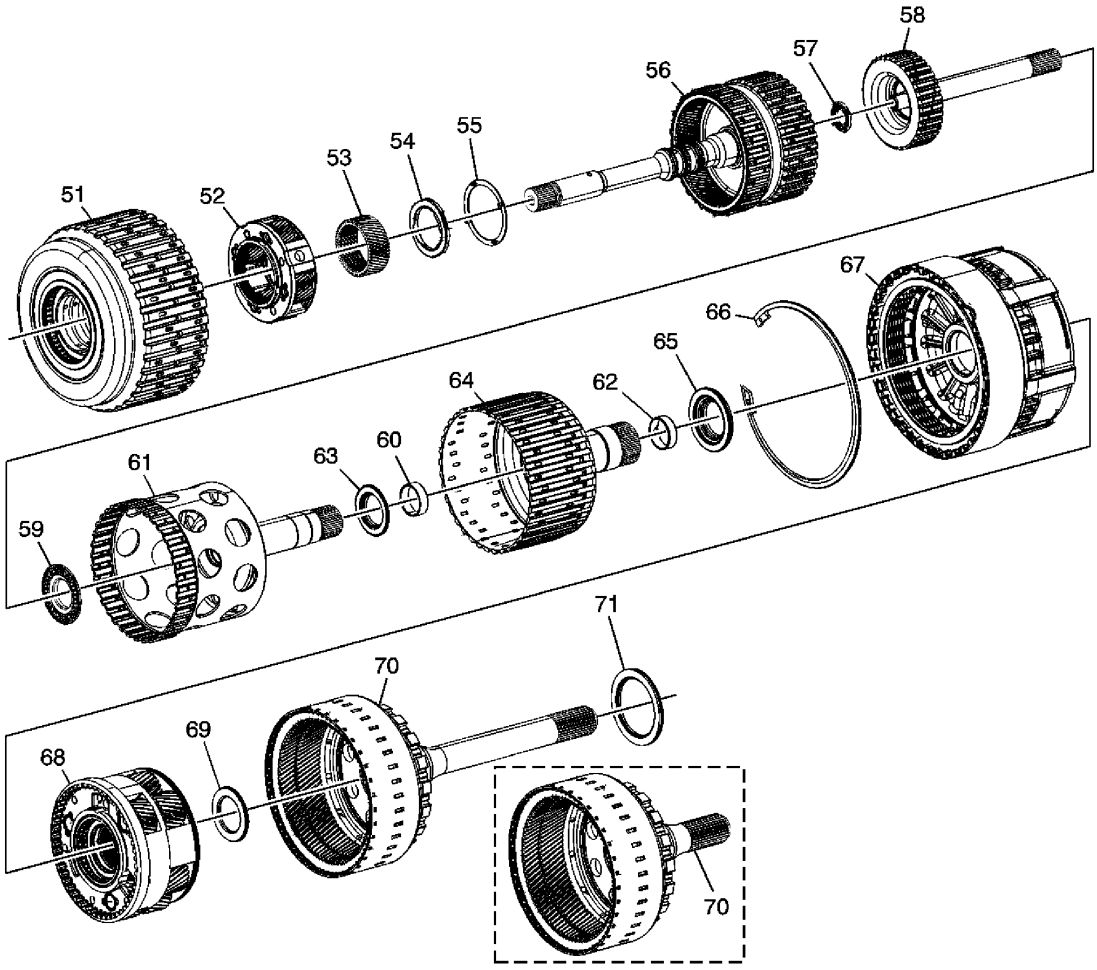


Fig. 351: View Of 1-2 Reverse Clutch (B5) Control Valve
Courtesy of GENERAL MOTORS CORP.

28. Remove the 1-2 reverse clutch (B5) control valve (411).

REAR CONTROL VALVE BODY ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

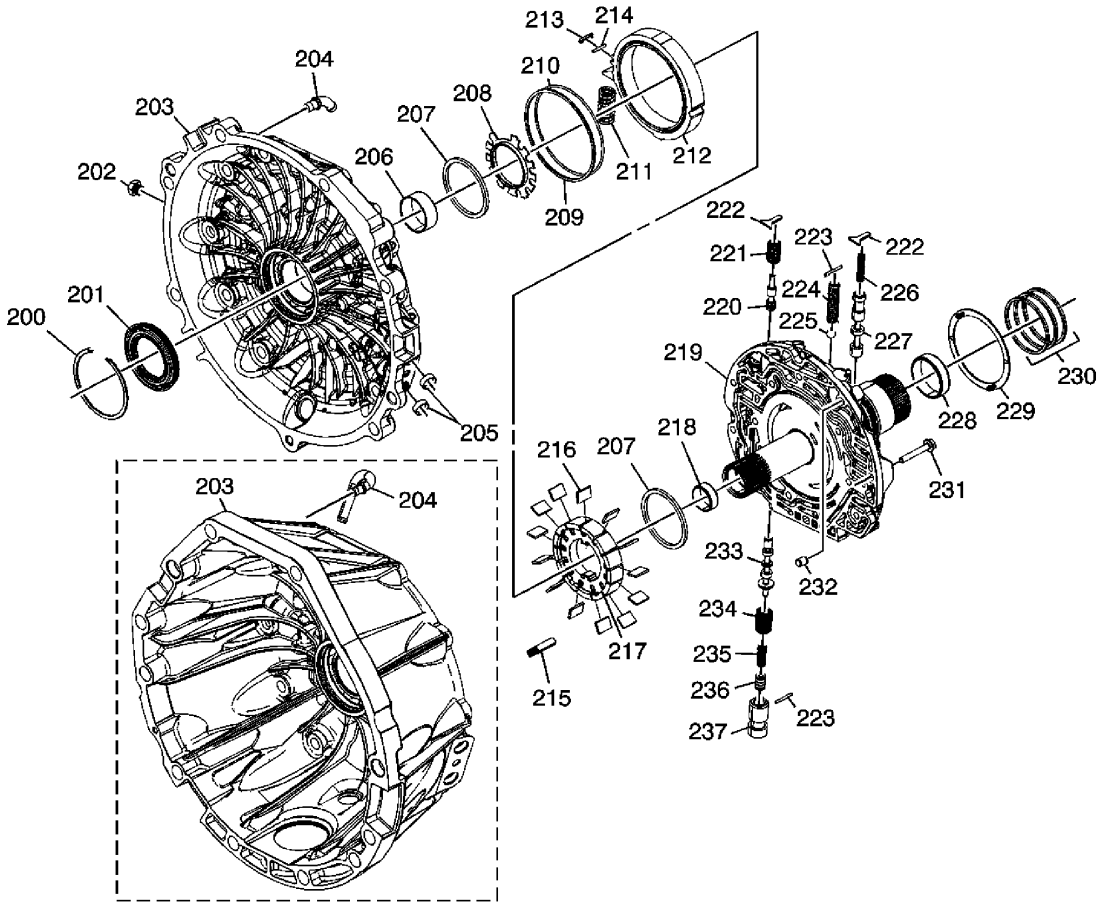


Fig. 352: Inspecting Rear Control Valve Body
Courtesy of GENERAL MOTORS CORP.

1. Inspect the rear control valve body (410) casting for the following conditions:
    - Porosity
    - Cracks
    - Damaged machine surface
    - Chips or debris
    - Damage to valve bores
2. Inspect all valves, springs, bushings, and clean all components in clean solvent.

 © 2011 Mitchell Repair Information Company, LLC.

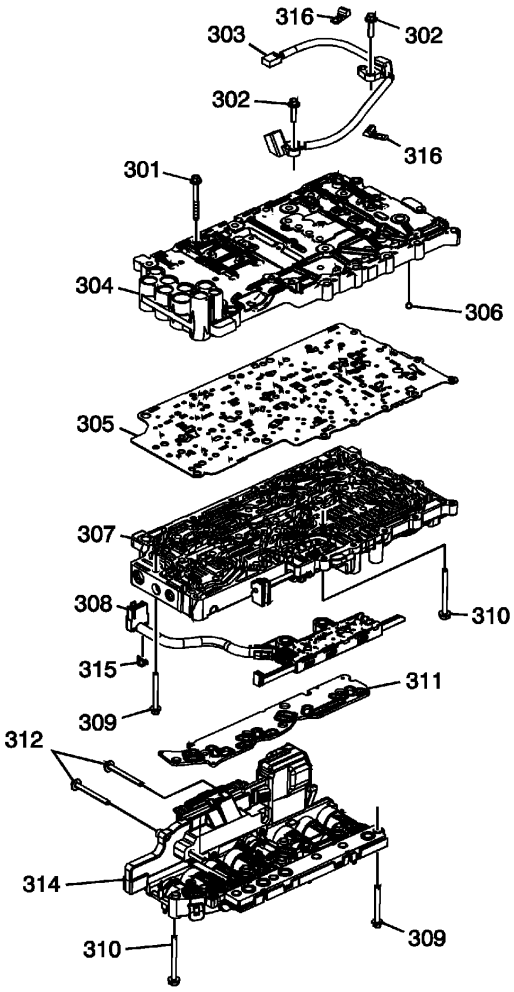


Fig. 353: View Of 1-2 Reverse Clutch (B5) Control Valve
Courtesy of GENERAL MOTORS CORP.

3. Install the 1-2 reverse clutch (B5) control valve (411).

 © 2011 Mitchell Repair Information Company, LLC.

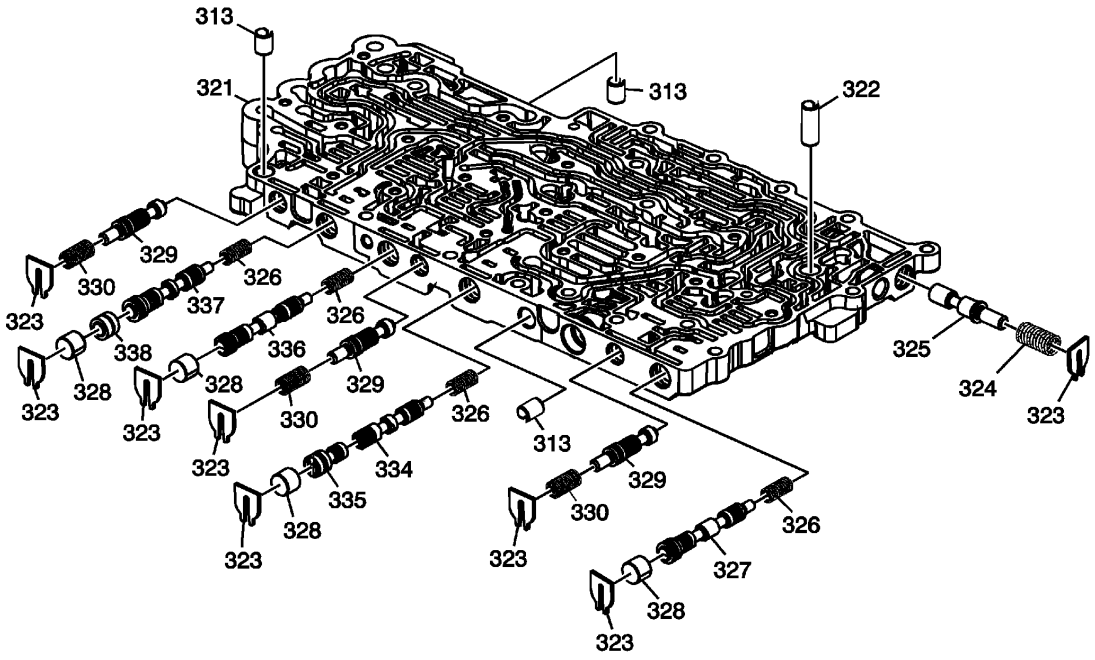


Fig. 354: Exploded View Of Lock Up Relay Valve Assembly
Courtesy of GENERAL MOTORS CORP.

4. Install the lock up relay valve (415).
5. Install the lock up relay valve spring (414).
6. Install the lock up relay control valve plunger (413).
7. Install the lock up relay control valve sleeve (412).

 © 2011 Mitchell Repair Information Company, LLC.

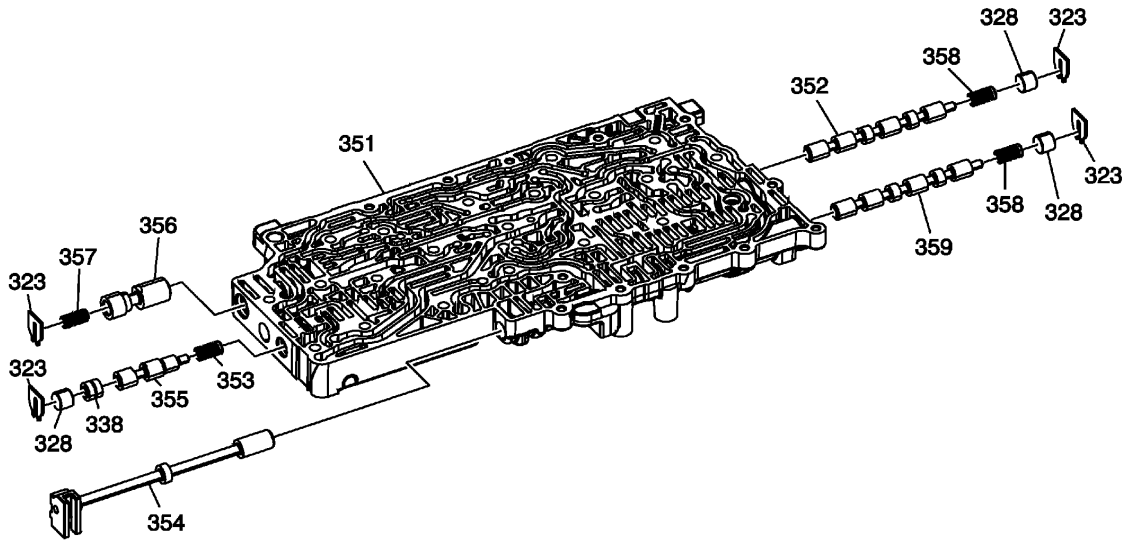


Fig. 355: View Of Rear Valve Body Cover Plate
Courtesy of GENERAL MOTORS CORP.

8. Install the rear valve body cover plate gasket (418).
9. Install the rear valve body cover plate (417).

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

10. Install the 2 - M5 x 0.8 x 13 mm rear valve body cover plate bolts (416).

Tighten: Tighten the cover plate bolts to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

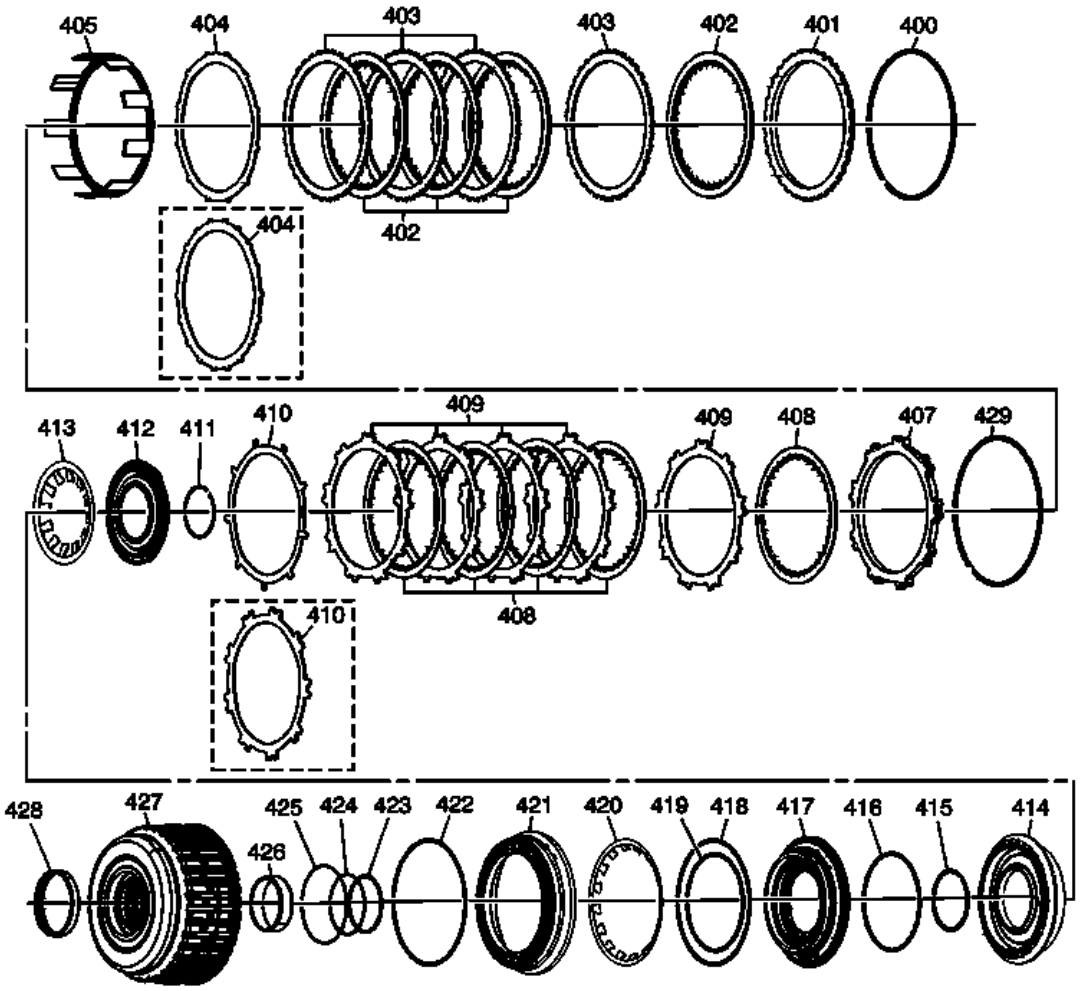


Fig. 356: View Of 3rd Gear Band (B4) Control Valve
Courtesy of GENERAL MOTORS CORP.

11. Install the third gear band (B4) control valve spring (422).
12. Install the third gear band (B4) control valve (423).

 © 2011 Mitchell Repair Information Company, LLC.

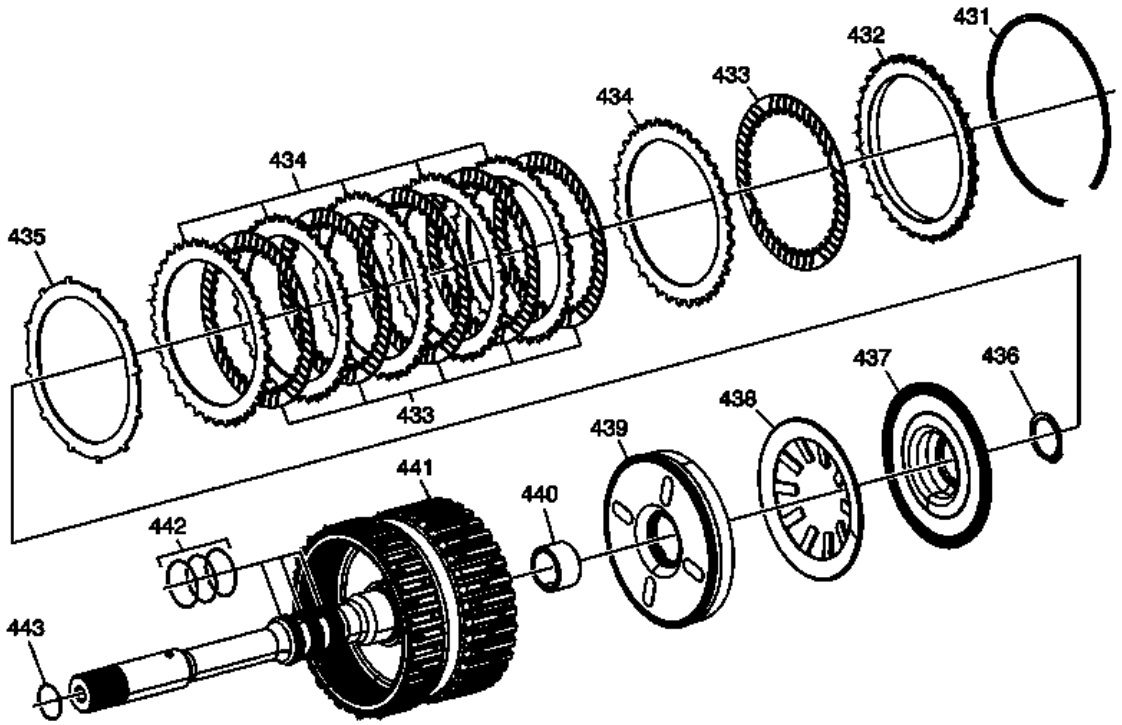
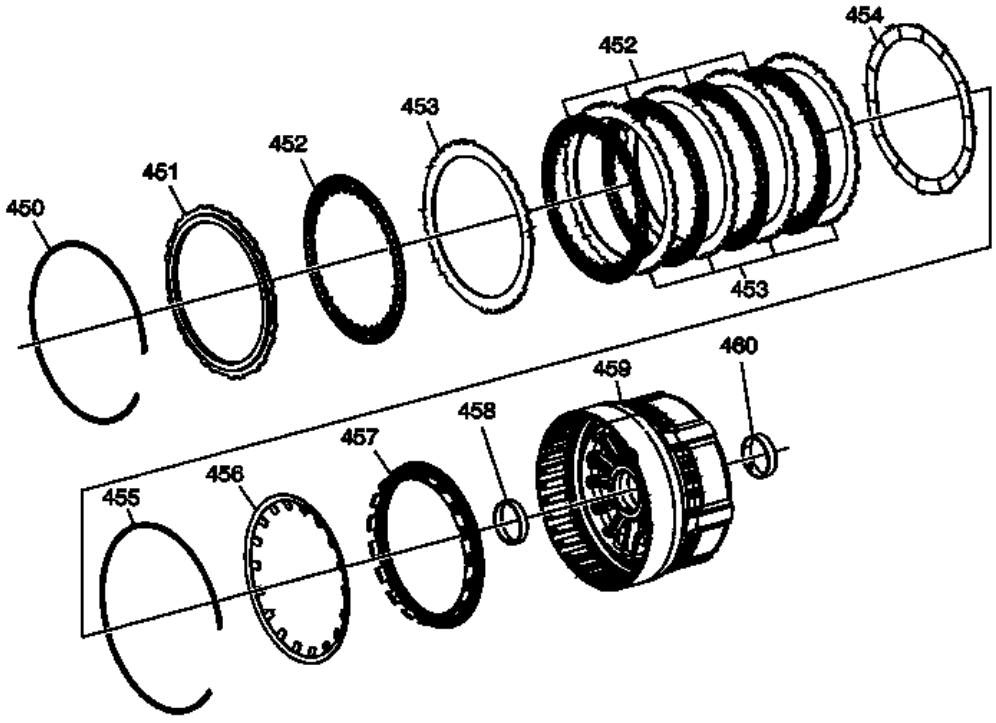


Fig. 357: View Of Shift Pressure Relay Valve
Courtesy of GENERAL MOTORS CORP.

13. Install the shift pressure relay valve (424).
14. Install the shift pressure relay valve spring (425).



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 358: View Of M2 Shift Valve
Courtesy of GENERAL MOTORS CORP.

15. Install the M2 shift valve (426).
16. Install the M2 shift valve spring (427).

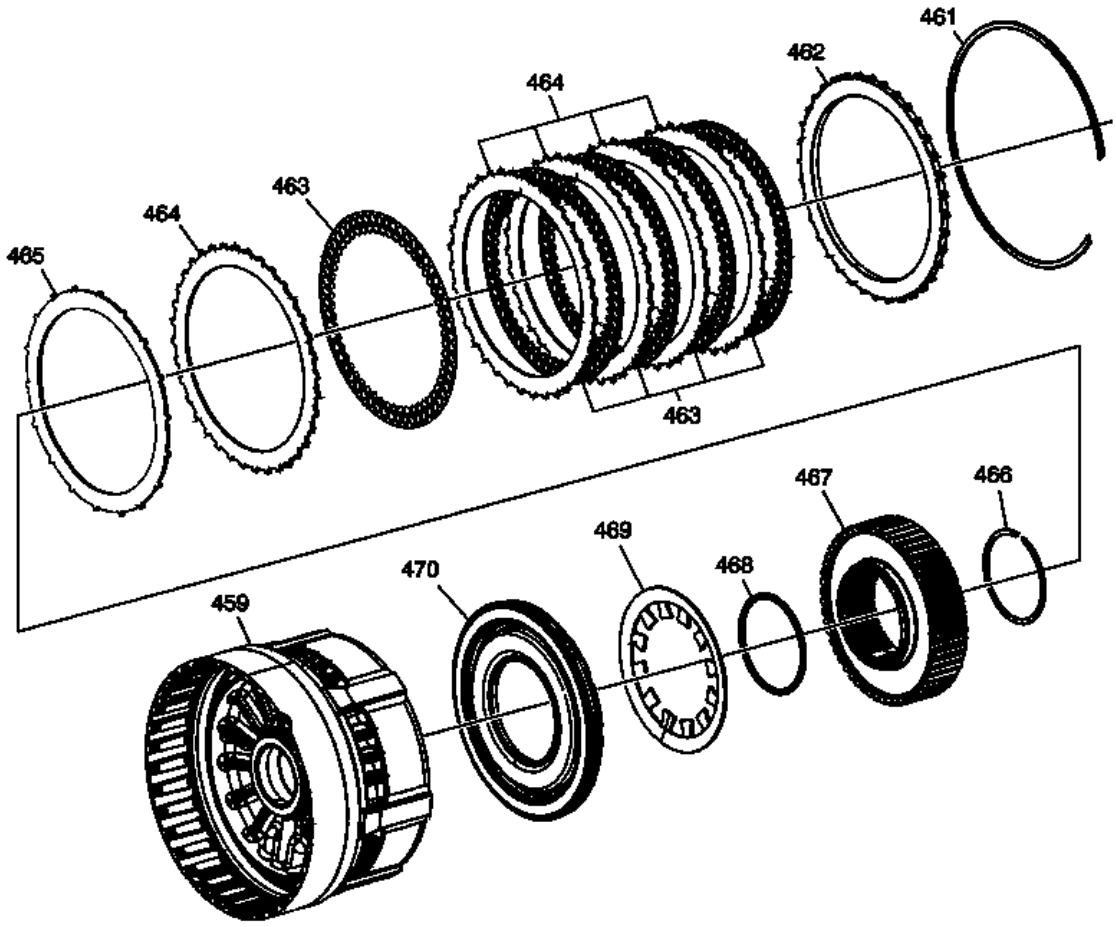


Fig. 359: Exploded View Of Shift Pressure Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

17. Install the shift pressure control valve sleeve (428).
18. Install the shift pressure control valve spring (429).
19. Install the shift pressure control valve (430).
20. Install the shift pressure control valve plunger (431).
21. Install the shift pressure control valve plunger sleeve (432).

 © 2011 Mitchell Repair Information Company, LLC.

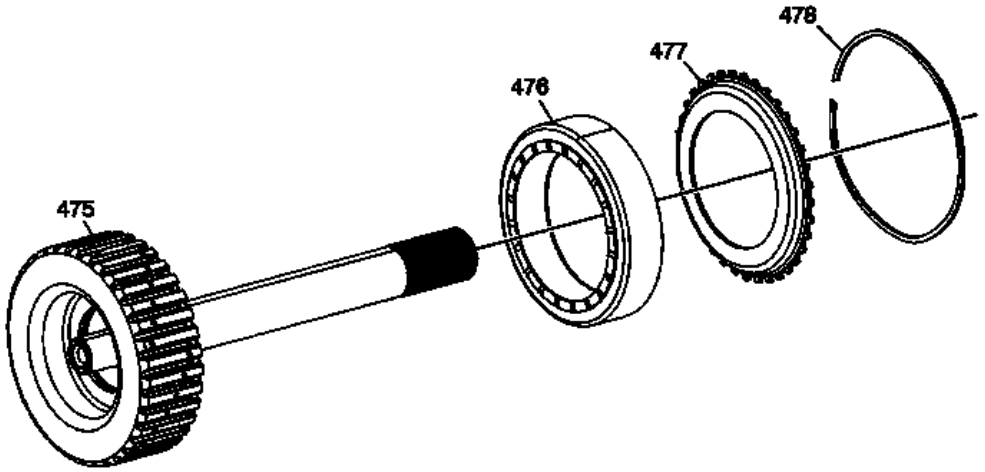


Fig. 360: View Of Line Pressure Control (SLT) Accumulator Piston & Springs
Courtesy of GENERAL MOTORS CORP.

22. Install the line pressure control (SLT) accumulator piston (433).
23. Install the line pressure control (SLT) accumulator piston spring - outer (434).
24. Install the line pressure control (SLT) accumulator piston spring - inner (435).

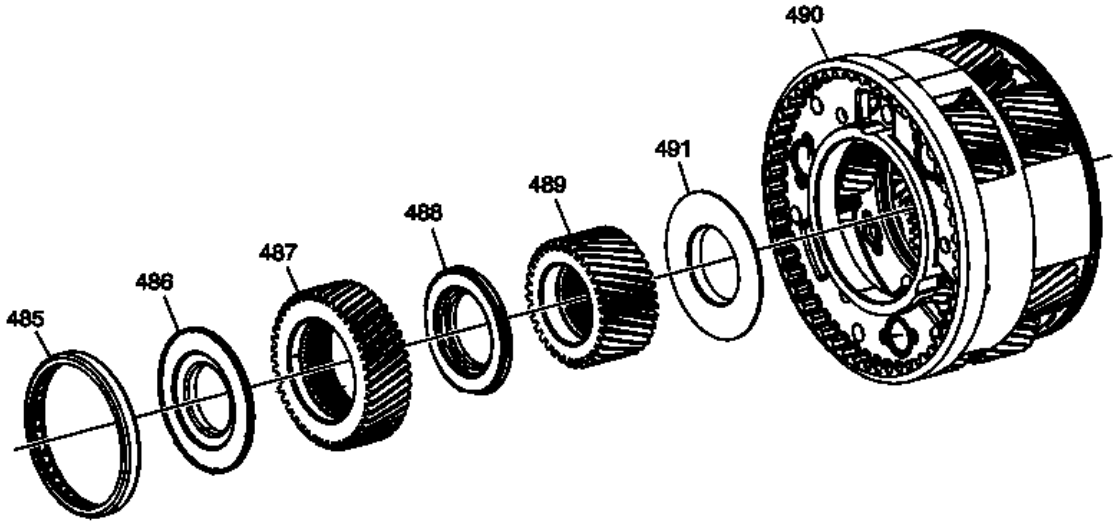


Fig. 361: View Of Secondary Regulator Valve
Courtesy of GENERAL MOTORS CORP.

25. Install the secondary regulator valve (436).
26. Install the secondary regulator valve spring (437).

 © 2011 Mitchell Repair Information Company, LLC.

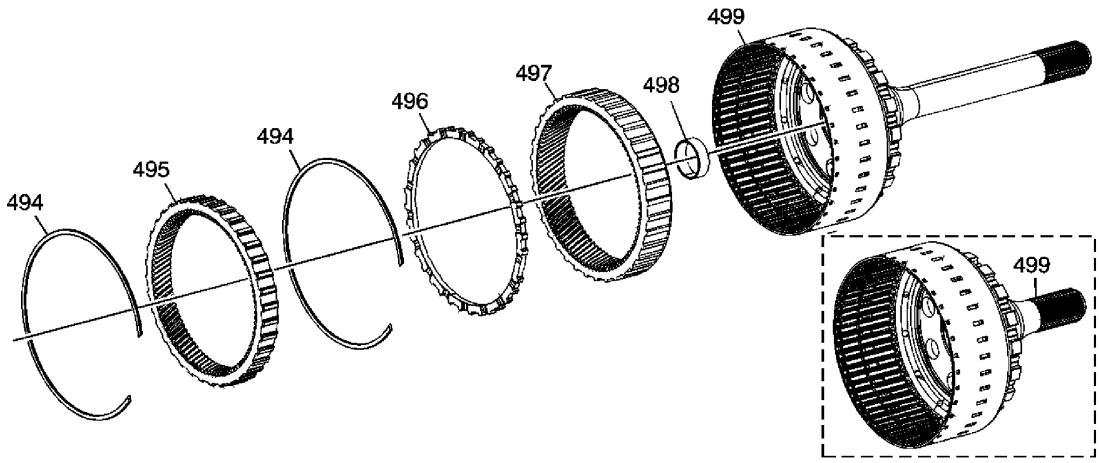


Fig. 362: View Of Rear Valve Body Cover Plate
Courtesy of GENERAL MOTORS CORP.

27. Install the rear valve body cover plate gasket (419).
28. Install the rear valve body cover plate (420).
29. Install the 7 - M5 x 0.8 x 13 mm rear valve body cover plate bolts (421).

Tighten: Tighten the cover plate bolts to 7 N.m (62 lb in).

NO. 2 REAR CONTROL VALVE BODY DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

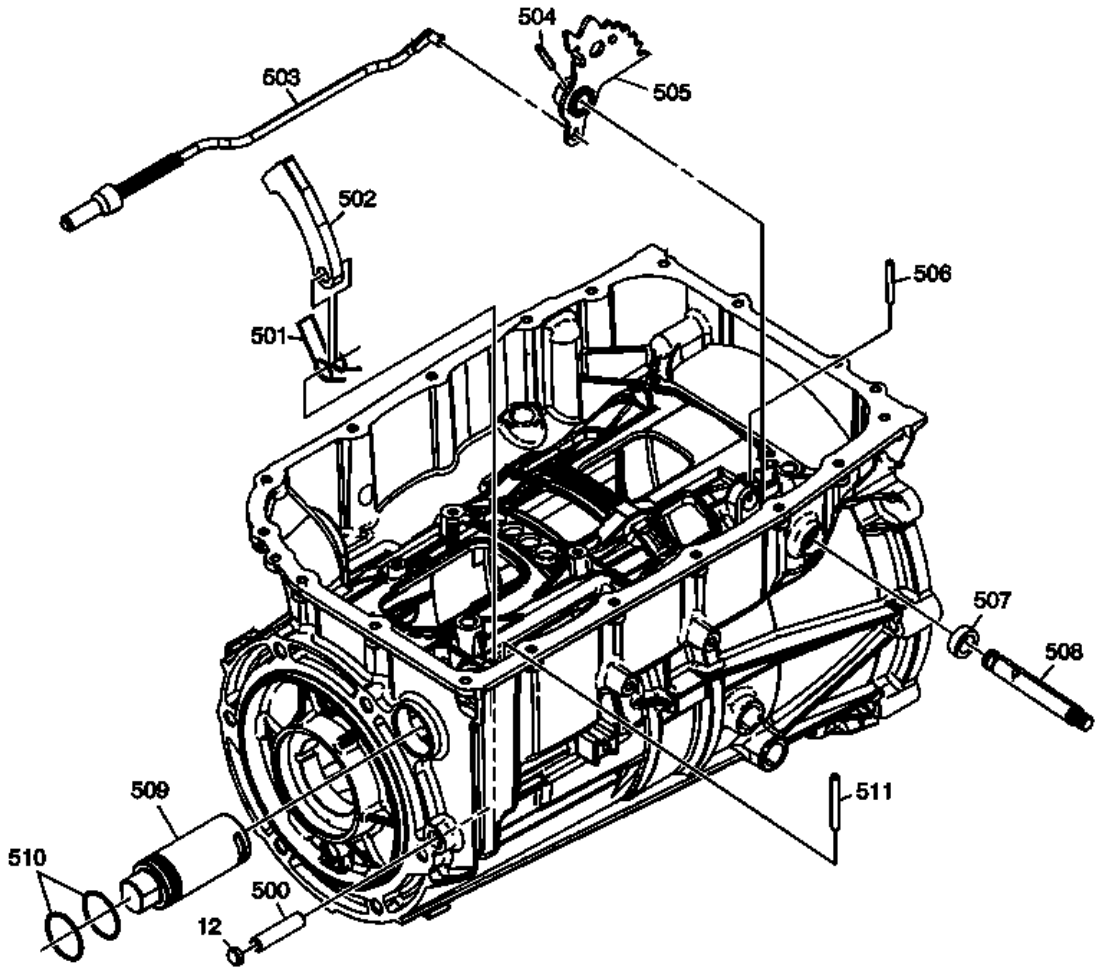


Fig. 363: View Of Rear Control Valve Body Assembly Spacer Plate
Courtesy of GENERAL MOTORS CORP.

CAUTION: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.

1. Remove the gasket (327).
2. Remove the rear control valve body assembly spacer plate (328).
3. Remove the gasket (329).

 © 2011 Mitchell Repair Information Company, LLC.

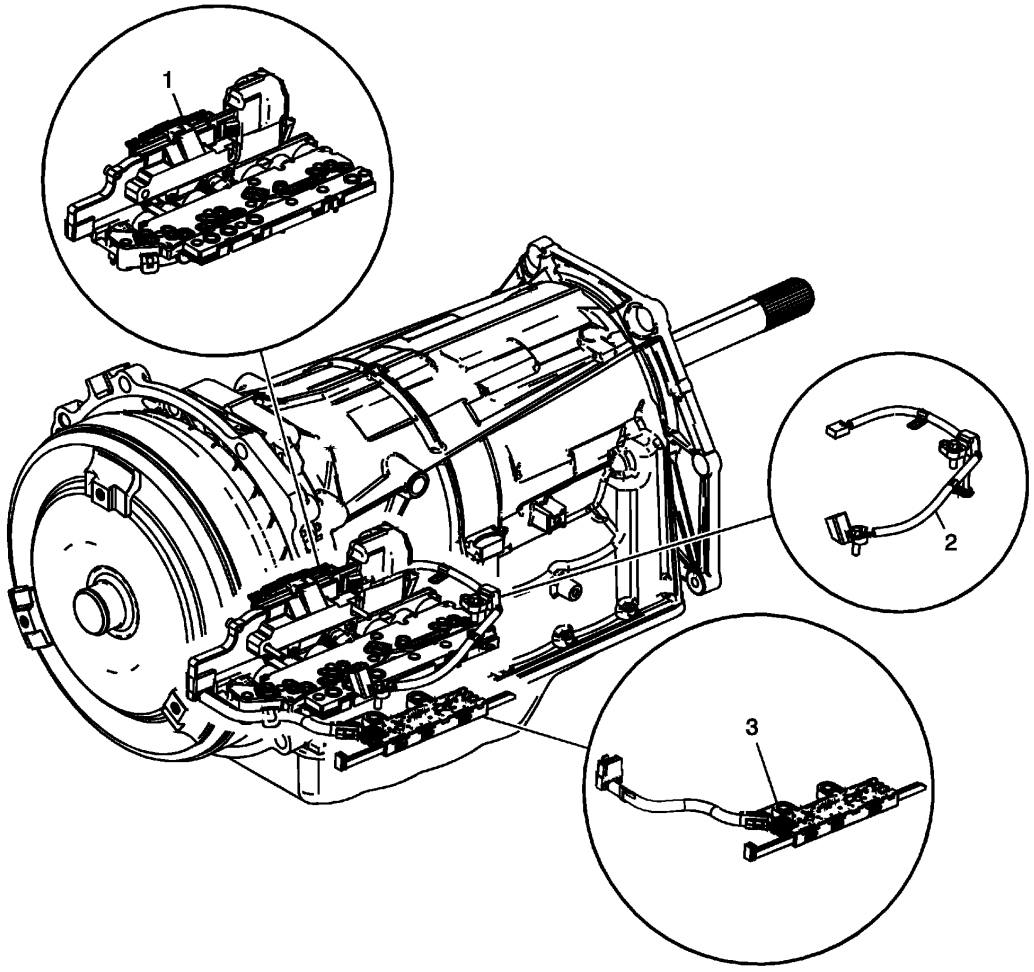


Fig. 364: View Of TCC Check Valve & Accumulator Check Valve Assemblies
Courtesy of GENERAL MOTORS CORP.

4. Remove the TCC check valve (450).
5. Remove the TCC check valve spring (449).
6. Remove the 2 accumulator check valve assemblies (353).

 © 2011 Mitchell Repair Information Company, LLC.

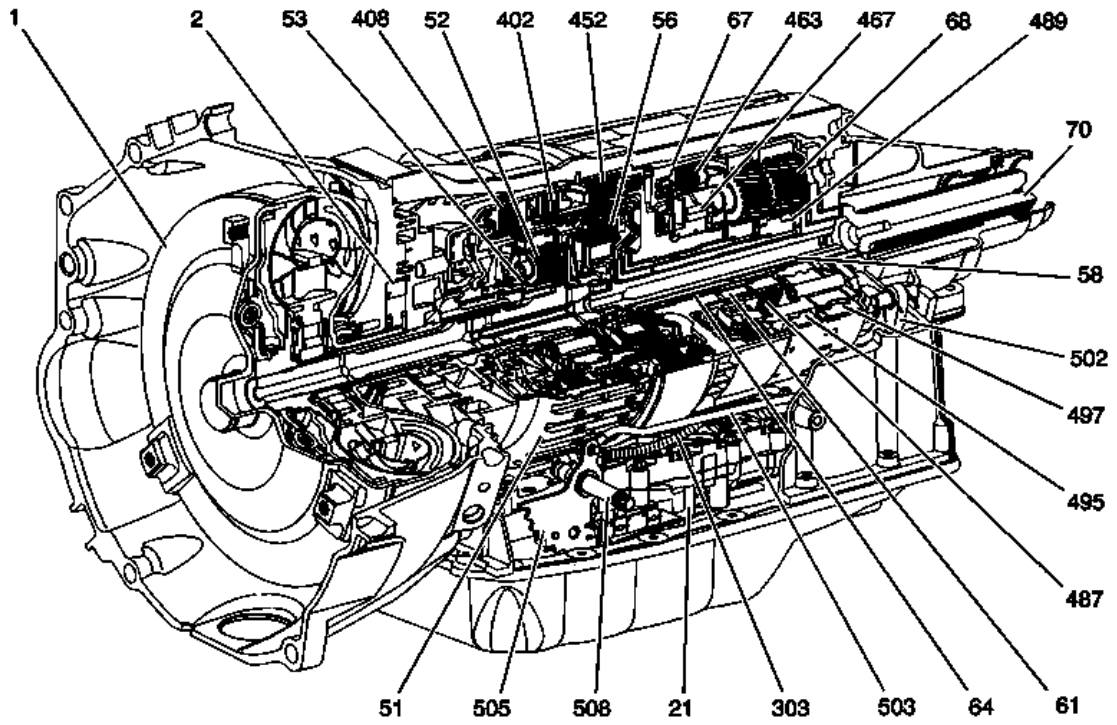


Fig. 365: Exploded view Of Reverse Shift Restrict Ball Check Valve Assembly
Courtesy of GENERAL MOTORS CORP.

7. Remove the sleeve/bore plug retainer (459).
8. Remove the reverse shift restrict ball check valve bushing - outer (453).
9. Remove the reverse shift restrict ball check valve (452).
10. Remove the reverse shift restrict ball check valve bushing - inner (451).

 © 2011 Mitchell Repair Information Company, LLC.

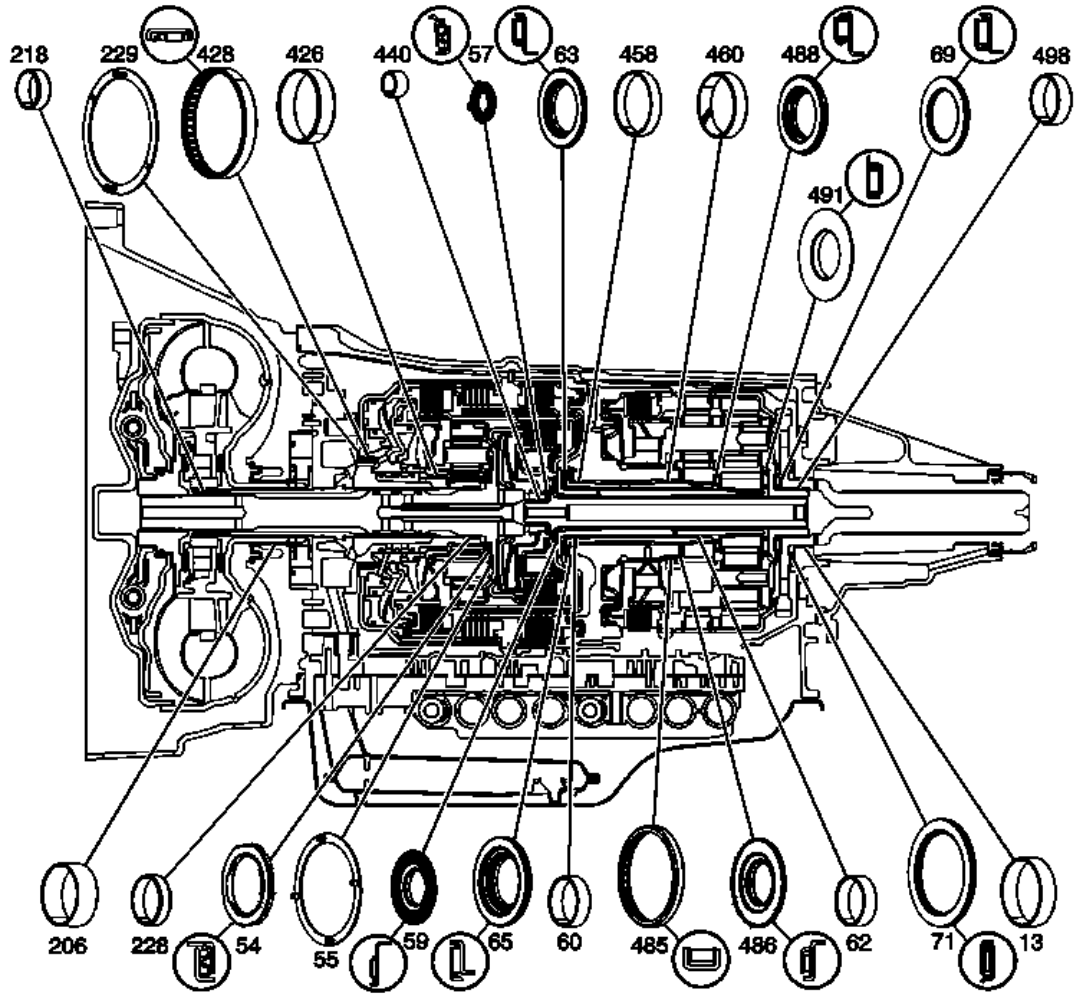


Fig. 366: Exploded View Of Lock Up Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

11. Remove the sleeve/bore plug retainer (458).
12. Remove the lock up control valve sleeve (457).
13. Remove the lock up control valve spring (456).
14. Remove the lock up control valve plunger (455).
15. Remove the lock up control valve (454).

 © 2011 Mitchell Repair Information Company, LLC.

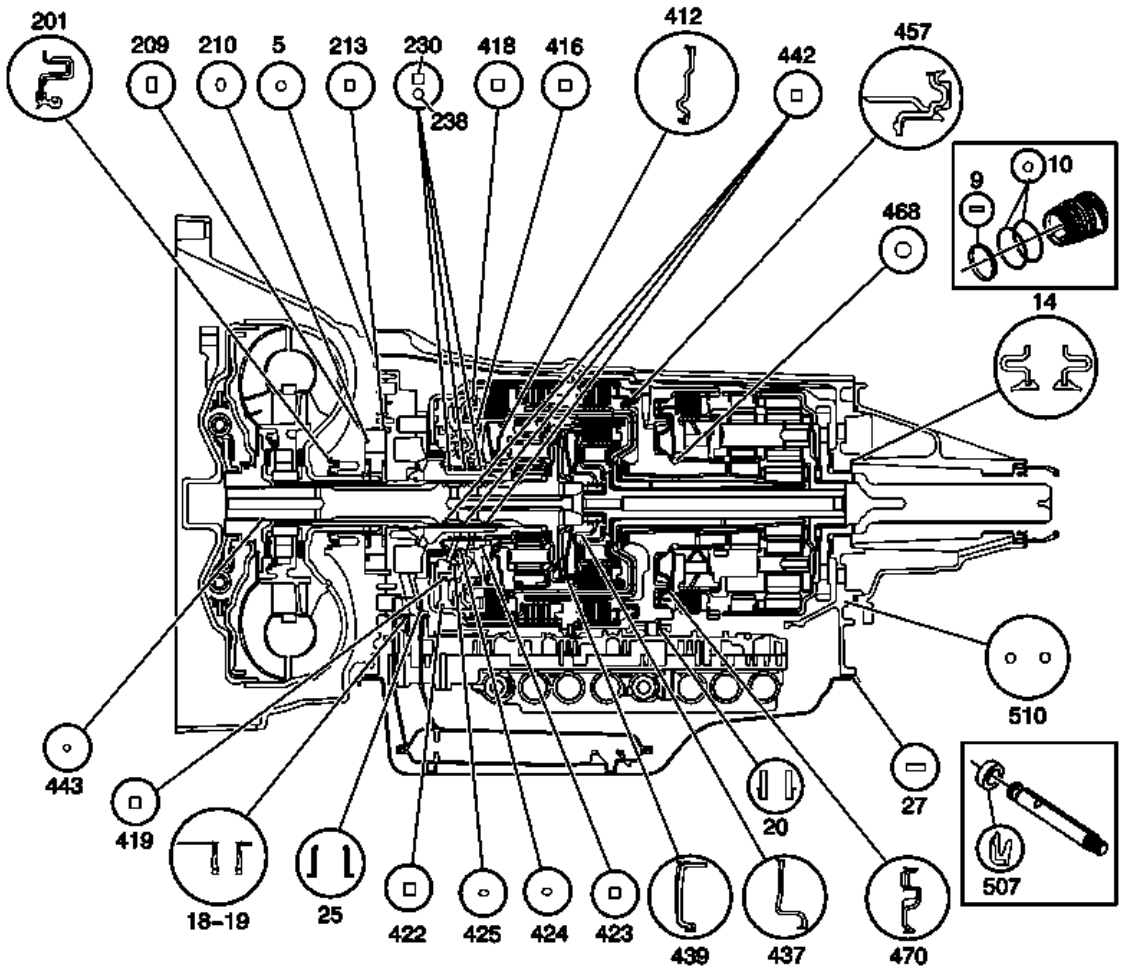


Fig. 367: Exploded View Of Second Clutch (B2) Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

16. Remove the sleeve/bore plug retainer (459).
17. Remove the second clutch (B2) control valve plug (448).
18. Remove the second clutch (B2) control valve spring (447).
19. Remove the second clutch (B2) control valve (446).

NO. 2 REAR CONTROL VALVE BODY ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

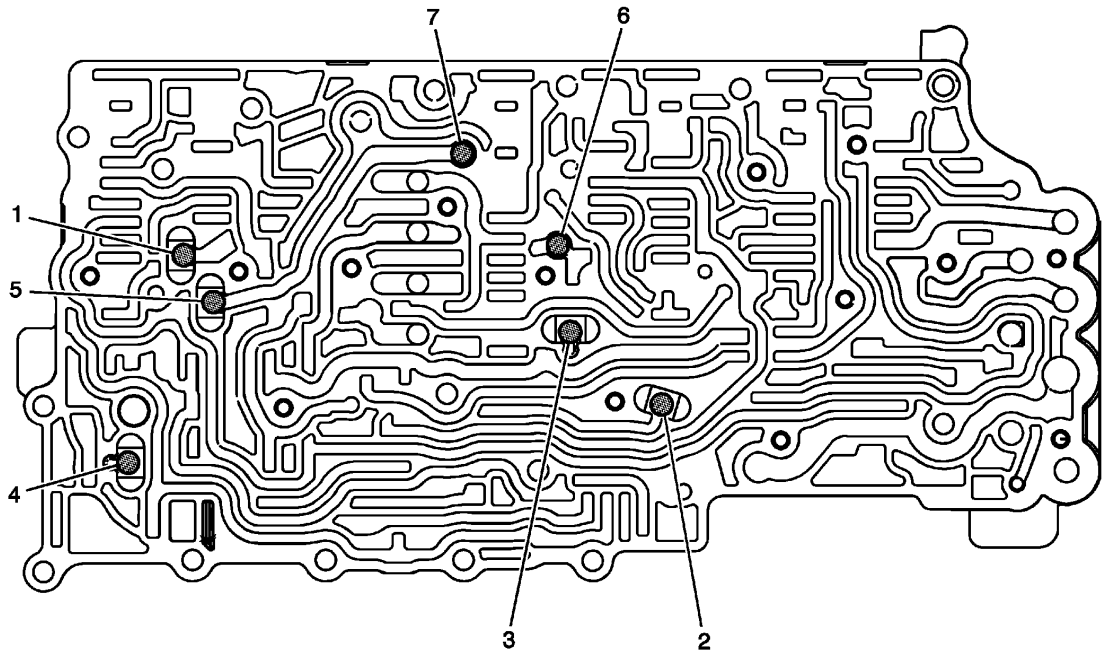


Fig. 368: Inspecting No. 2 Rear Control Valve Body
Courtesy of GENERAL MOTORS CORP.

1. Inspect the No. 2 rear control valve body (445) casting for the following conditions:
   - Porosity
   - Cracks
   - Damaged machine surface
   - Chips or debris
   - Damage to valve bores
2. Inspect all valves, springs, bushings, and clean all components in clean solvent.

 © 2011 Mitchell Repair Information Company, LLC.

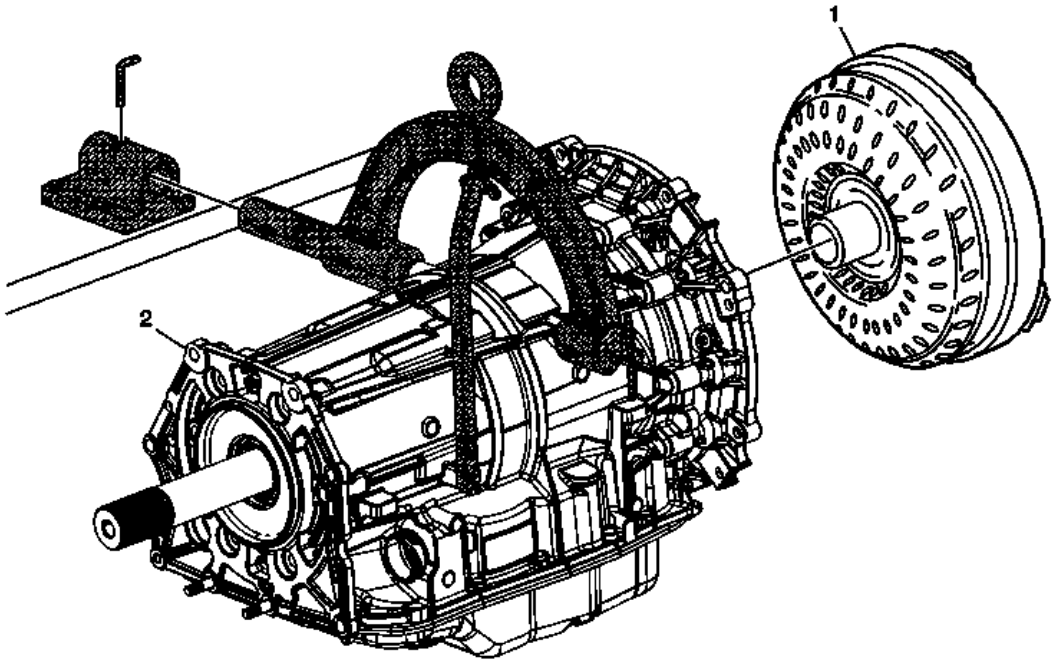


Fig. 369: Exploded View Of Second Clutch (B2) Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the second clutch (B2) control valve (446).
4. Install the second clutch (B2) control valve spring (447).
5. Install the second clutch (B2) control valve plug (448).
6. Install the sleeve/bore plug retainer (459).

 © 2011 Mitchell Repair Information Company, LLC.

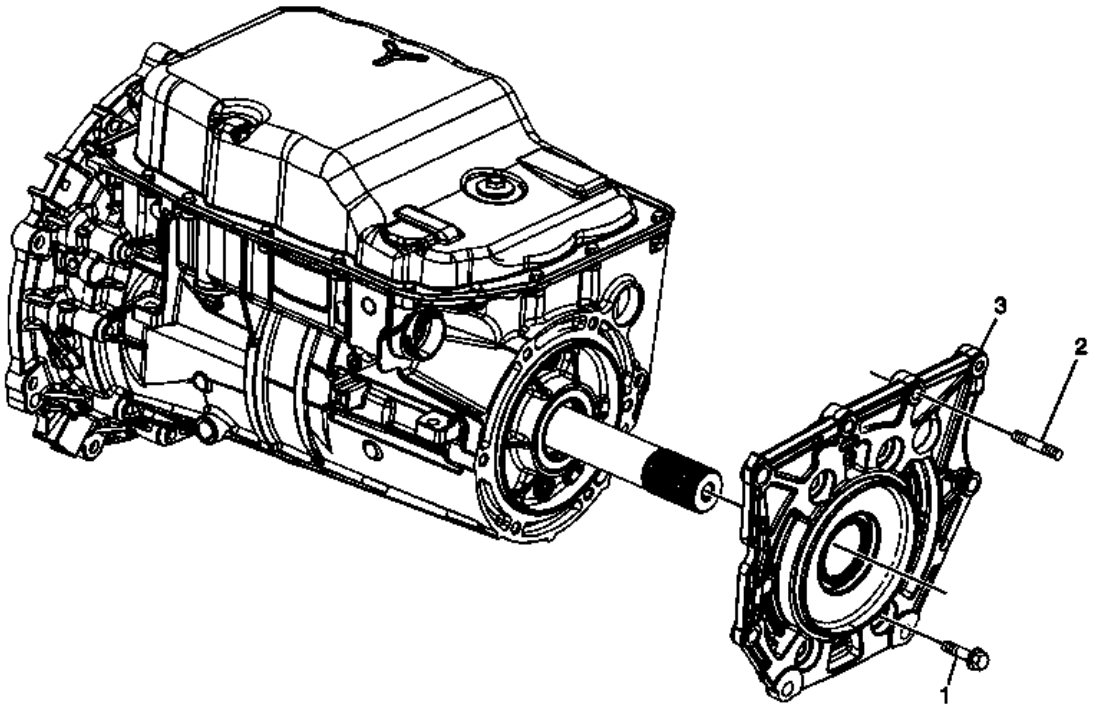


Fig. 370: Exploded View Of Lock Up Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

7. Install the lock up control valve (454).
8. Install the lock up control valve plunger (455).
9. Install the lock up control valve spring (456).
10. Install the lock up control valve sleeve (457).
11. Install the sleeve/bore plug retainer (458).

 © 2011 Mitchell Repair Information Company, LLC.

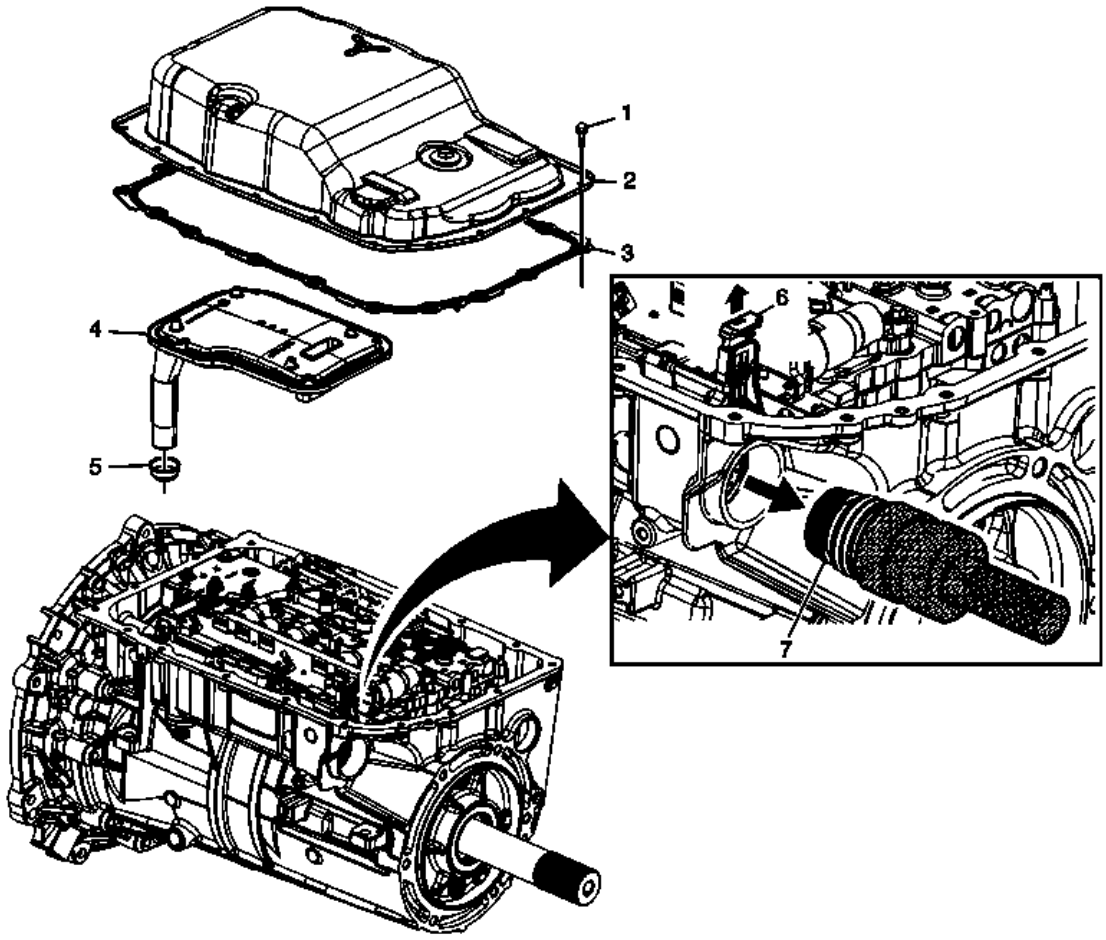


Fig. 371: Exploded view Of Reverse Shift Restrict Ball Check Valve Assembly
Courtesy of GENERAL MOTORS CORP.

12. Install the reverse shift restrict ball check valve bushing - inner (451).
13. Install the reverse shift restrict ball check valve (452).
14. Install the reverse shift restrict ball check valve bushing - outer (453).
15. Install the sleeve/bore plug retainer (459).

 © 2011 Mitchell Repair Information Company, LLC.

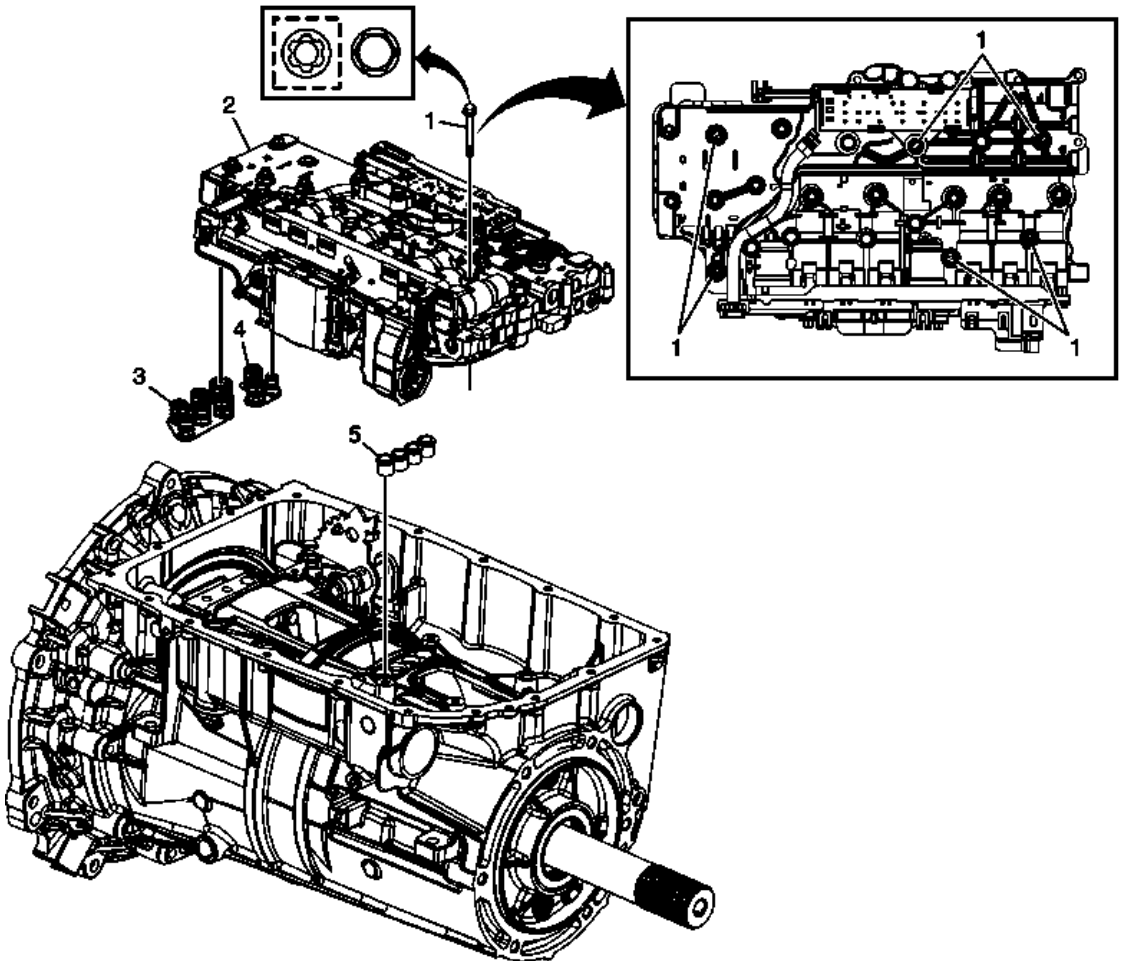


Fig. 372: View Of TCC Check Valve & Accumulator Check Valve Assemblies
Courtesy of GENERAL MOTORS CORP.

16. Install the 2 accumulator check valve assemblies (353).
17. Install the TCC check valve spring (449).
18. Install the TCC check valve (450).

FRONT CONTROL VALVE BODY DISASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

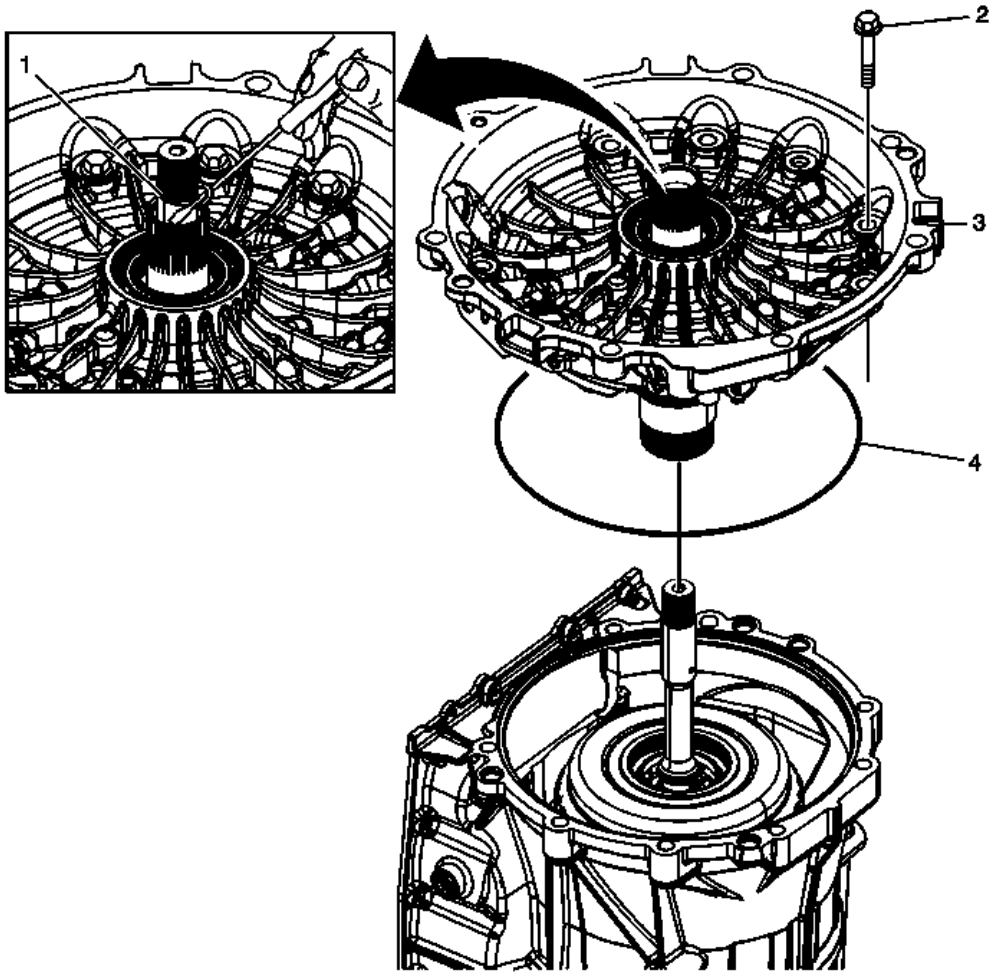


Fig. 373: View Of Front Control Valve Body Spacer Plate
Courtesy of GENERAL MOTORS CORP.

CAUTION: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.

1. Remove the gasket (322).
2. Remove the front control valve body spacer plate (321).
3. Remove the gasket (320).

 © 2011 Mitchell Repair Information Company, LLC.

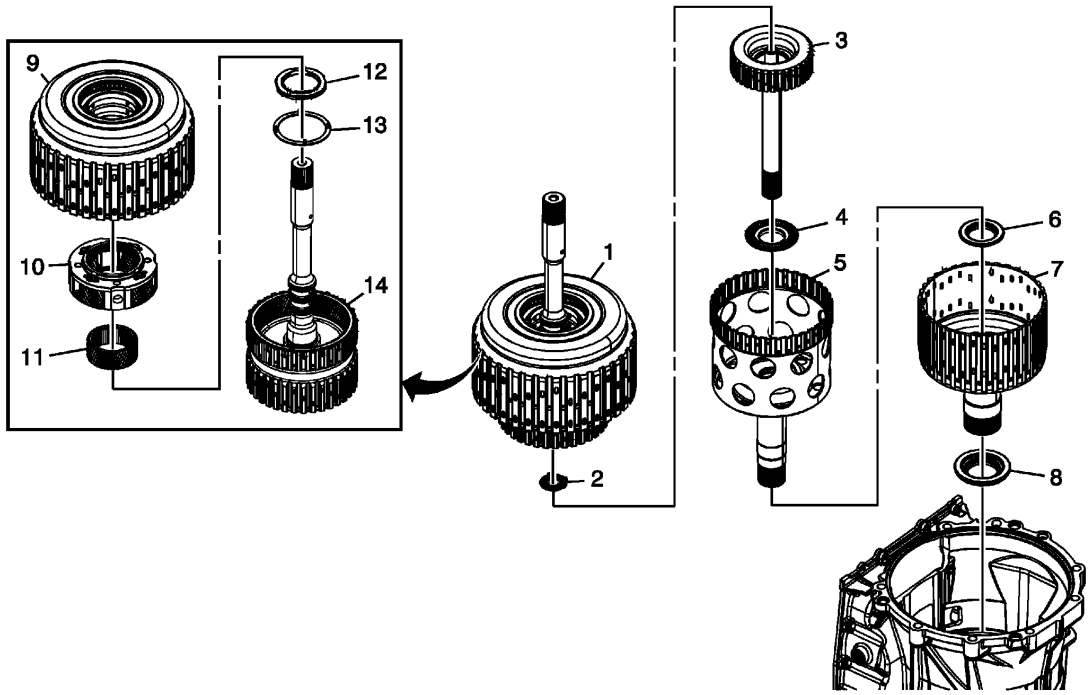


Fig. 374: View Of Ball Check Valve, Fluid Strainer, Pressure Relief Valve & Check Valves
Courtesy of GENERAL MOTORS CORP.

4. Remove the ball check valve (355).
5. Remove the fluid strainer (352).
6. Remove the pressure relief valve (351).
7. Remove the pressure relief valve spring (350).
8. Remove the 2 check valves (360).
9. Remove the 2 check valve compression springs (361).

 © 2011 Mitchell Repair Information Company, LLC.

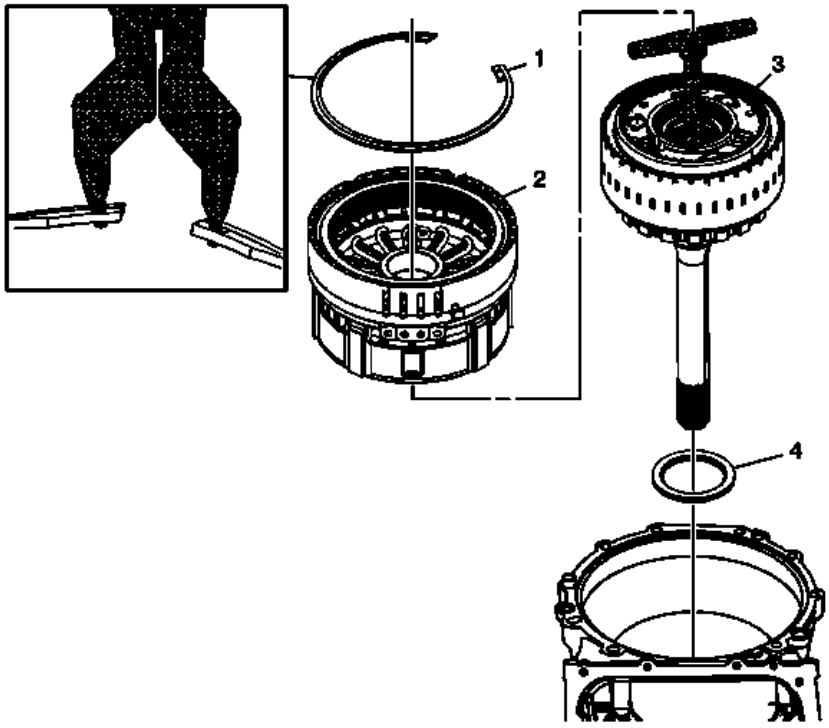


Fig. 375: Exploded View Of Forward Clutch (C1) Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

10. Remove the sleeve/bore plug retainer (349).
11. Remove the solenoid modulator valve bore plug (348).
12. Remove the forward clutch (C1) control valve (354).

 © 2011 Mitchell Repair Information Company, LLC.

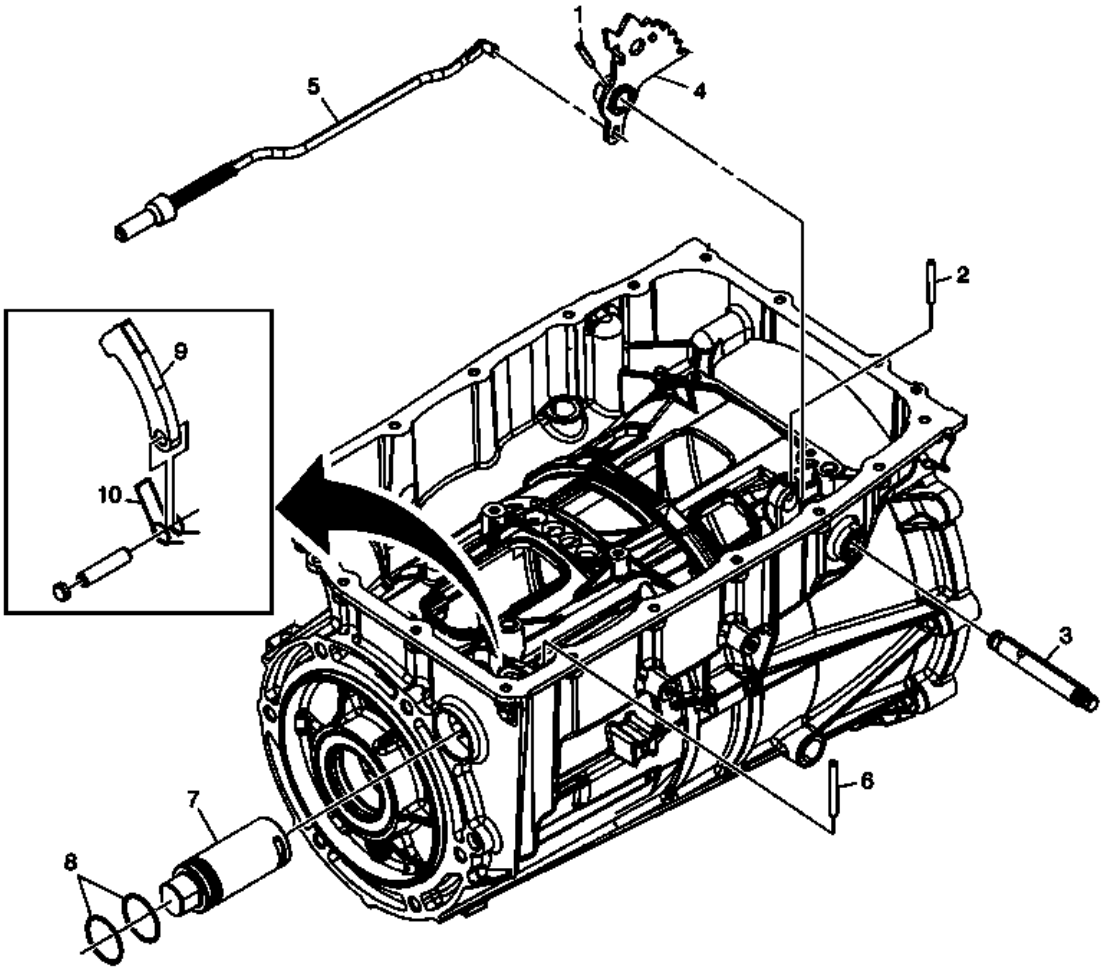


Fig. 376: Exploded View Of Neutral Relay Valve Assembly
Courtesy of GENERAL MOTORS CORP.

13. Remove the sleeve/bore plug retainer (349).
14. Remove the solenoid modulator valve bore plug (348).
15. Remove the neutral relay valve spring (357).
16. Remove the neutral relay valve (356).

 © 2011 Mitchell Repair Information Company, LLC.

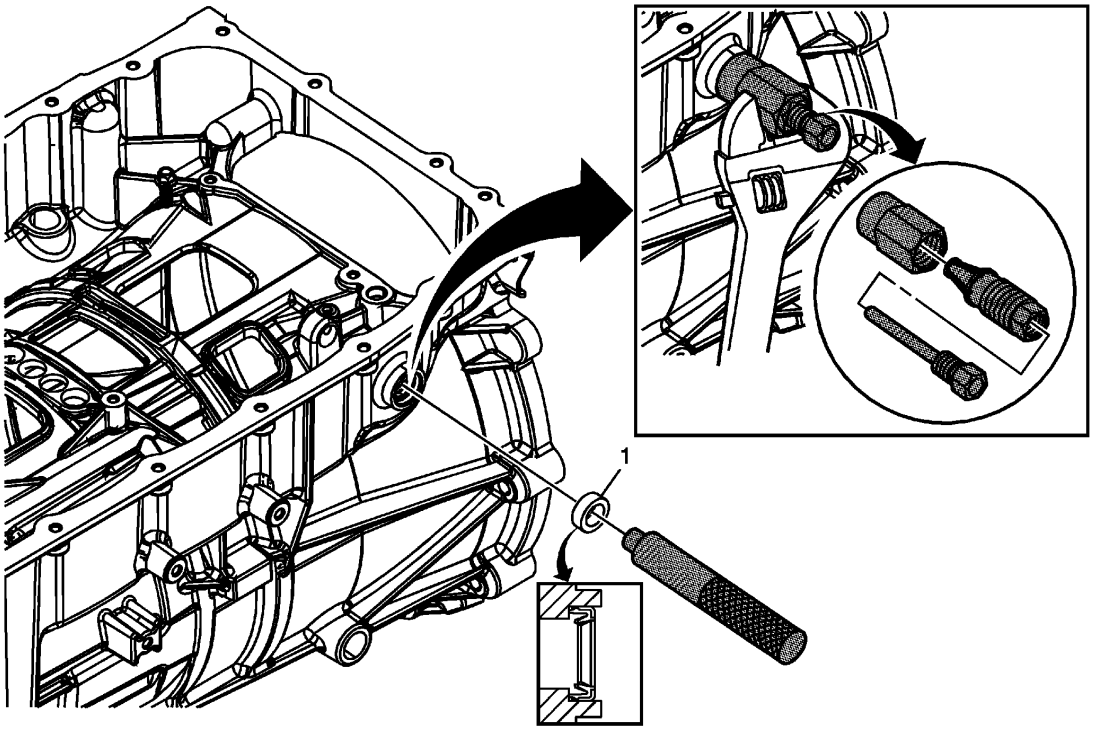


Fig. 377: Exploded View Of Second Coast Clutch (B1) Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

17. Remove the sleeve/bore plug retainer (349).
18. Remove the solenoid modulator valve bore plug (348).
19. Remove the second coast clutch (B1) control valve (359).
20. Remove the second coast clutch (B1) control valve spring (358).

 © 2011 Mitchell Repair Information Company, LLC.

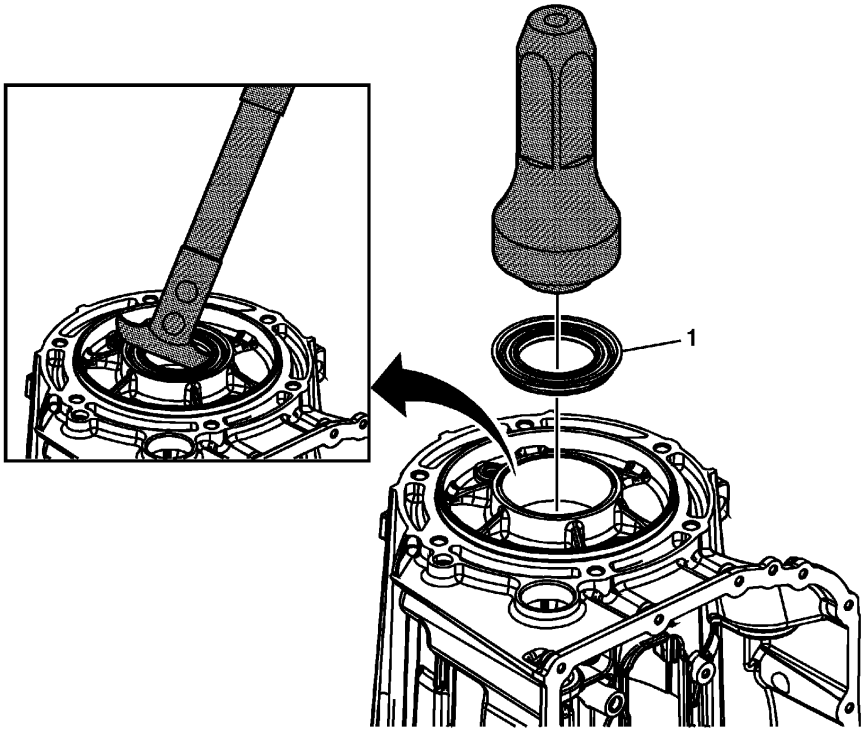


Fig. 378: Exploded View Of Solenoid Modulator Valve Assembly
Courtesy of GENERAL MOTORS CORP.

21. Remove the sleeve/bore plug retainer (349).
22. Remove the solenoid modulator valve bore plug (348).
23. Remove the solenoid modulator valve spring (347).
24. Remove the solenoid modulator valve (346).

FRONT CONTROL VALVE BODY ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

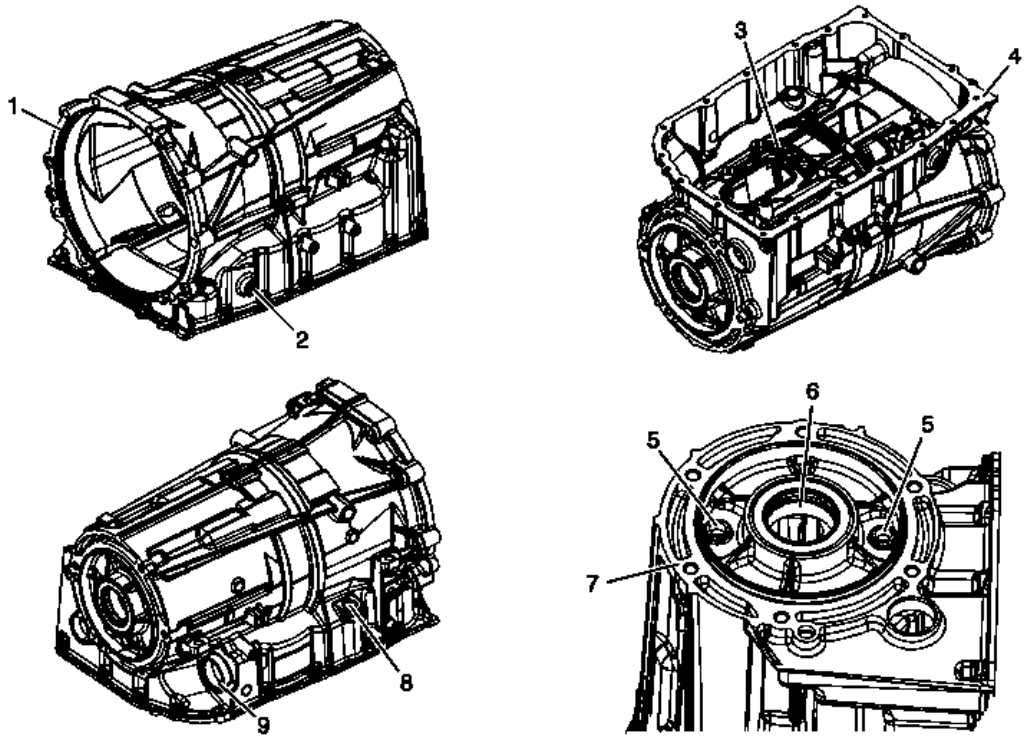


Fig. 379: Inspecting Front Control Valve Body
Courtesy of GENERAL MOTORS CORP.

1. Inspect the front control valve body (345) casting for the following conditions:
   - Porosity
   - Cracks
   - Damaged machine surface
   - Chips or debris
   - Damage to valve bores
2. Inspect all valves, springs, bushings, and clean all components in clean solvent.

 © 2011 Mitchell Repair Information Company, LLC.

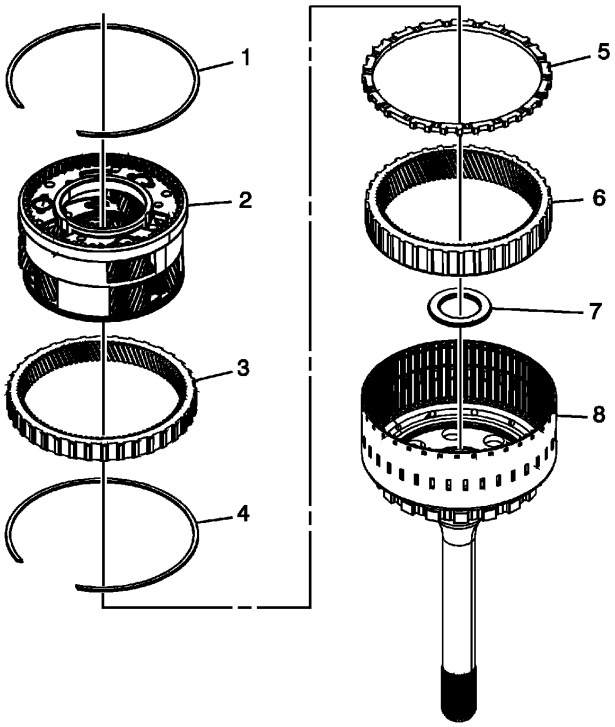


Fig. 380: Exploded View Of Solenoid Modulator Valve Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the solenoid modulator valve (346).
4. Install the solenoid modulator valve spring (347).
5. Install the solenoid modulator valve bore plug (348).
6. Install the sleeve/bore plug retainer (349).

 © 2011 Mitchell Repair Information Company, LLC.

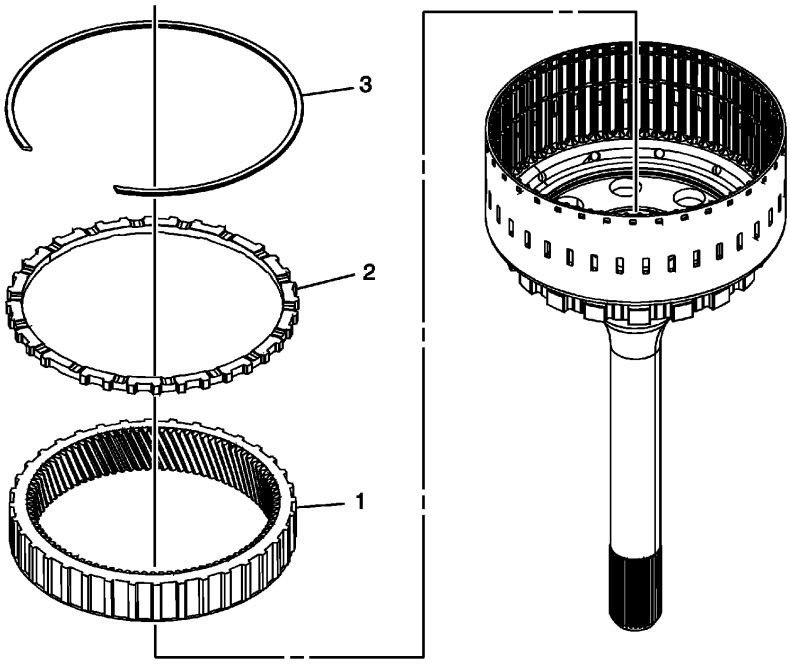


Fig. 381: Exploded View Of Second Coast Clutch (B1) Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

7. Install the second coast clutch (B1) control valve spring (358).
8. Install the second coast clutch (B1) control valve (359).
9. Install the solenoid modulator valve bore plug (348).
10. Install the sleeve/bore plug retainer (349).

 © 2011 Mitchell Repair Information Company, LLC.

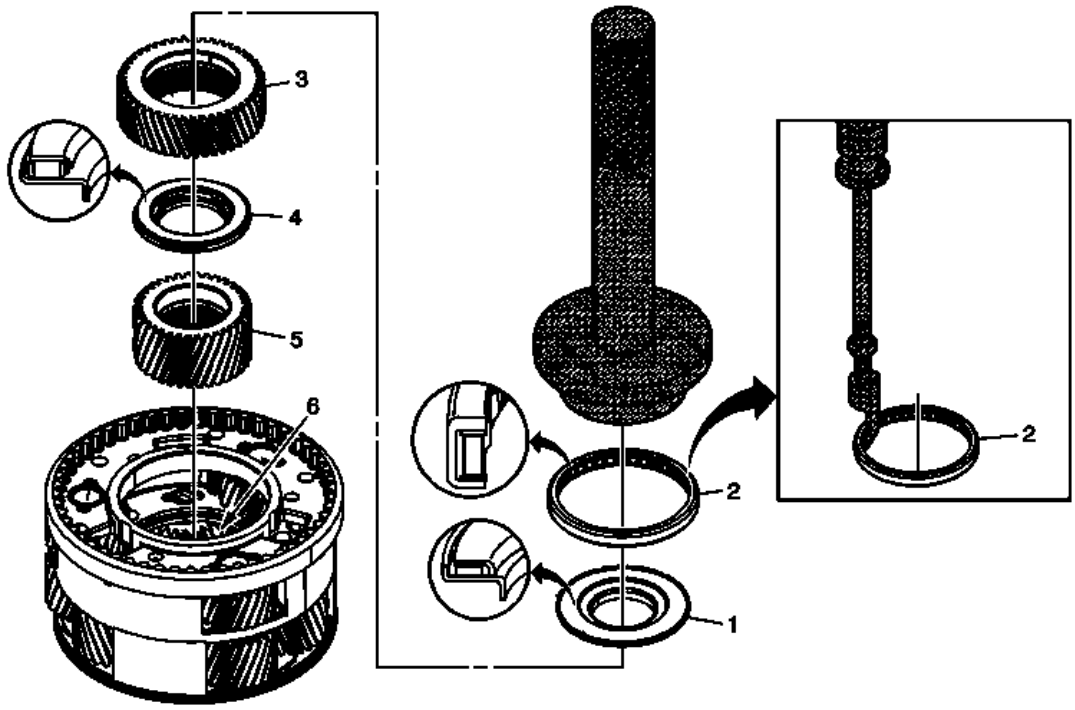


Fig. 382: Exploded View Of Neutral Relay Valve Assembly
Courtesy of GENERAL MOTORS CORP.

11. Install the neutral relay valve (356).
12. Install the neutral relay valve spring (357).
13. Install the solenoid modulator valve bore plug (348).
14. Install the sleeve/bore plug retainer (349).

 © 2011 Mitchell Repair Information Company, LLC.

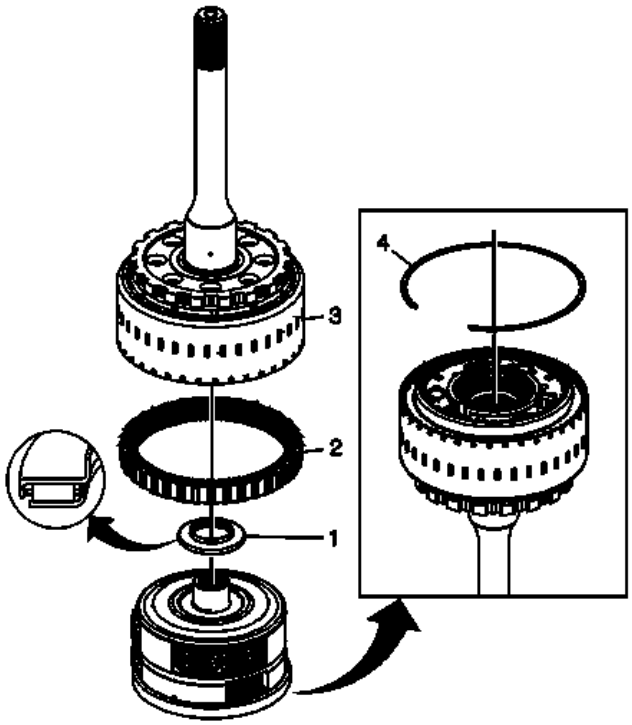


Fig. 383: Exploded View Of Forward Clutch (C1) Control Valve Assembly
Courtesy of GENERAL MOTORS CORP.

15. Install the forward clutch (C1) control valve (354).
16. Install the solenoid modulator valve bore plug (348).
17. Install the sleeve/bore plug retainer (349).

 © 2011 Mitchell Repair Information Company, LLC.

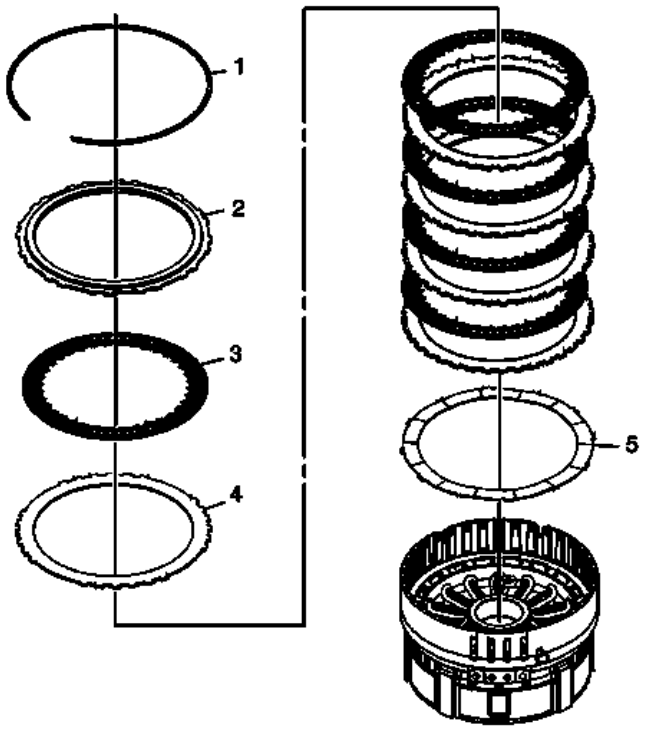


Fig. 384: View Of Ball Check Valve, Fluid Strainer, Pressure Relief Valve & Check Valves
Courtesy of GENERAL MOTORS CORP.

18. Install the pressure relief valve spring (350).
19. Install the pressure relief valve (351).
20. Install the fluid strainer (352).
21. Install the ball check valve (355).
22. Install the 2 check valve compression springs (361).
23. Install the 2 check valves (360).

CONTROL VALVE BODY ASSEMBLY ASSEMBLE

 © 2011 Mitchell Repair Information Company, LLC.

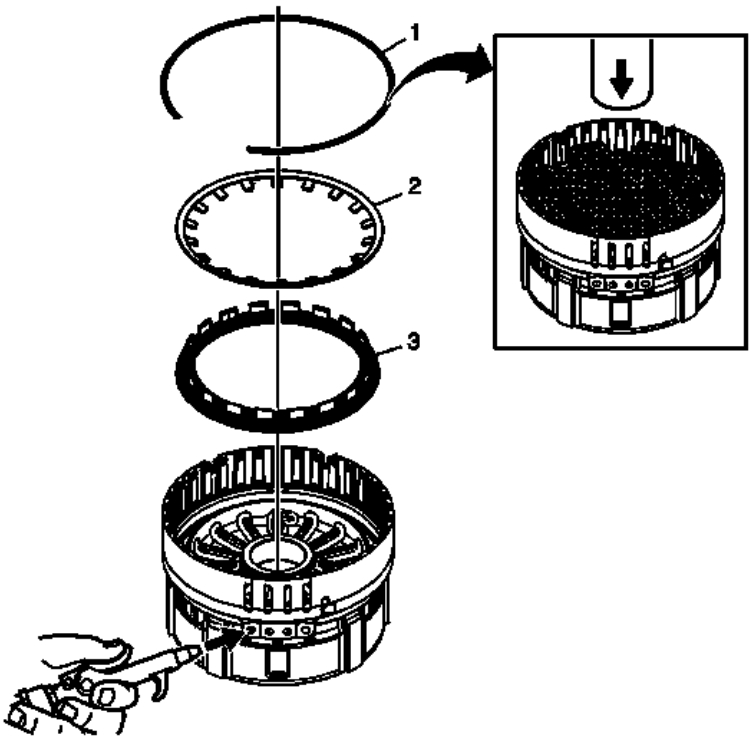


Fig. 385: View Of Spacer Plate & Gasket Assembly & Rear Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Align each bolt hole in the valve body with the holes in the spacer plate and gasket assembly.

1. Install the new spacer plate and gasket assembly (324) onto the rear control valve body assembly (326).

 © 2011 Mitchell Repair Information Company, LLC.

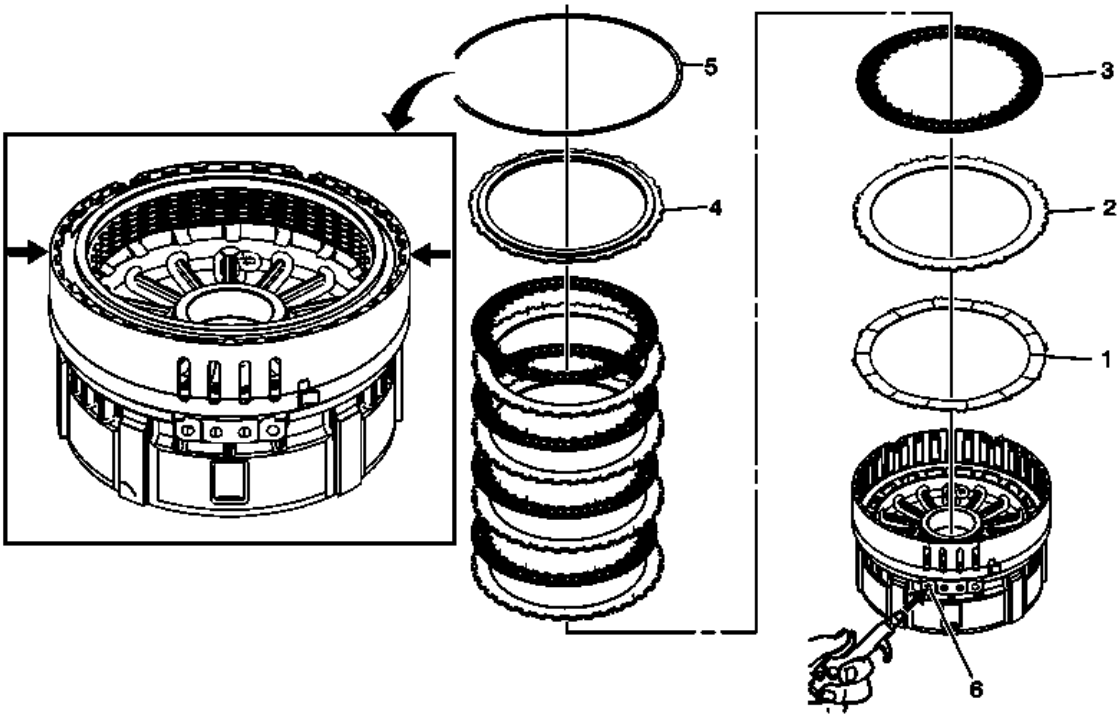


Fig. 386: View Of Rear Control Valve Body & Middle Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Align each bolt hole in the valve body with the holes in the spacer plate and gasket assembly.

2. Install the rear control valve body assembly (326) onto the middle control valve body assembly (323).

 © 2011 Mitchell Repair Information Company, LLC.

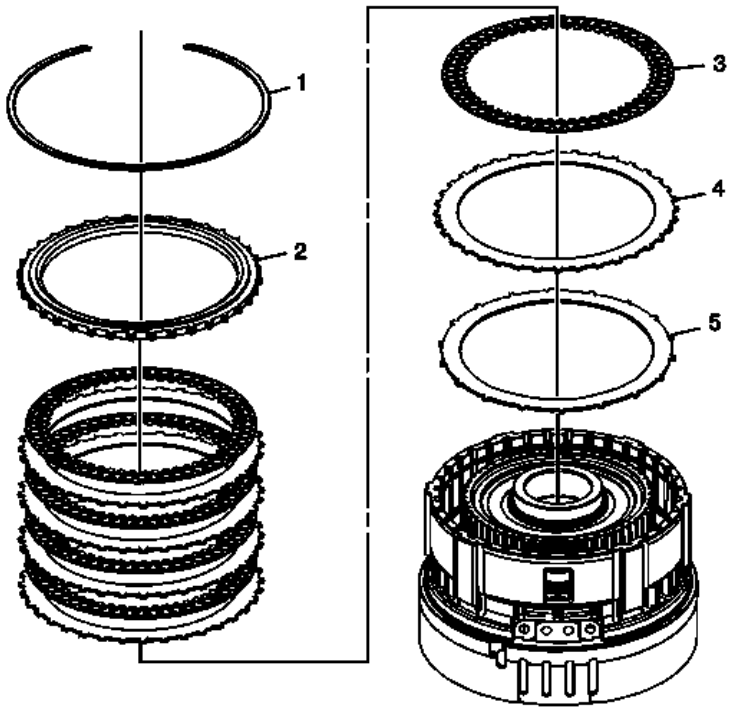


Fig. 387: Locating Rear Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice.

3. Install 2 - M5 x 0.8 x 35 mm rear control valve body bolts (335).
4. Install 1 - M5 x 0.8 x 40 mm rear control valve body bolt (333).

 © 2011 Mitchell Repair Information Company, LLC.

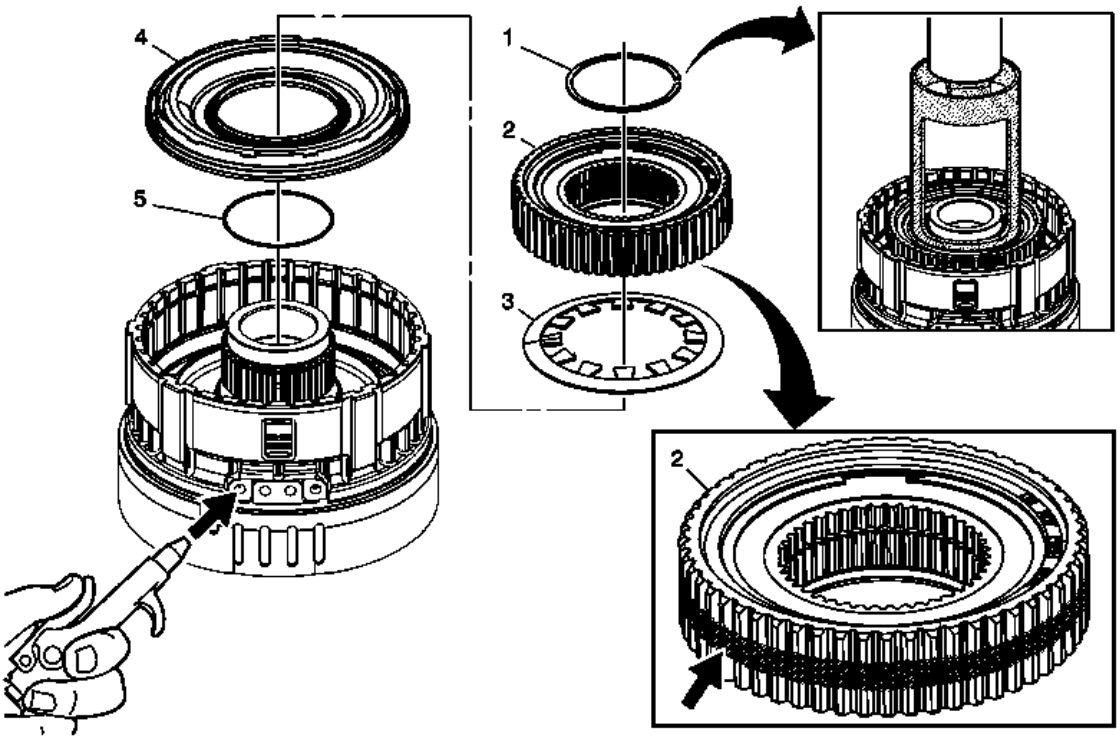


Fig. 388: View Of Rear Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

5. Hand tighten the 3 rear control valve body assembly bolts (333, 335).

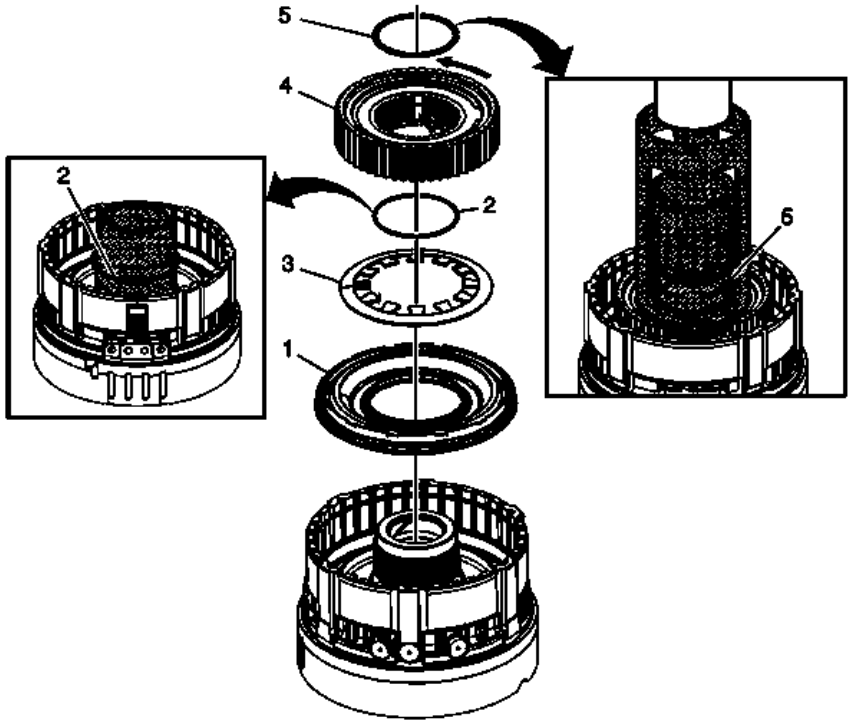


Fig. 389: View Of Rear Control Valve Body Assembly Spacer Plate

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Align each bolt hole on the valve body with the holes in the gaskets and plates.

6. Install the spacer plate (328) and the 2 new gaskets (327, 329) onto the No. 2 rear control valve body assembly (330).

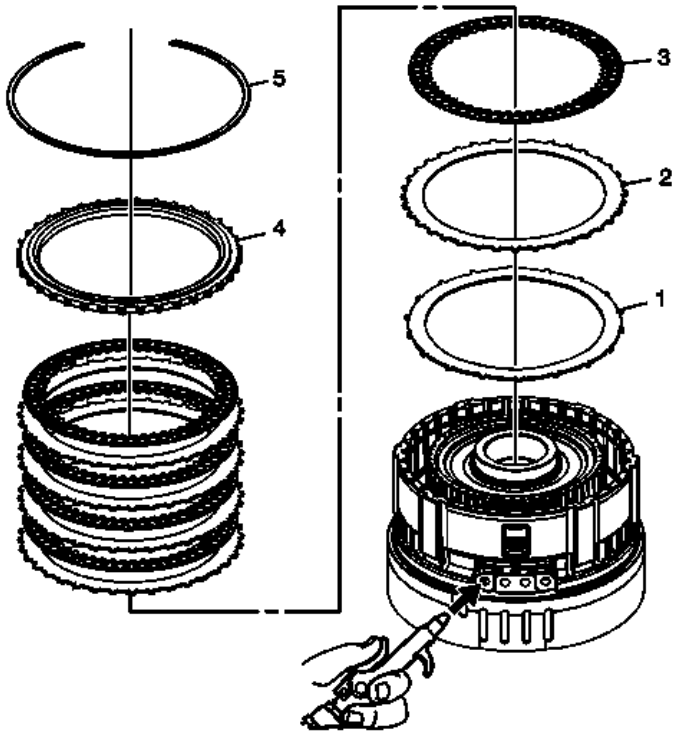


Fig. 390: View Of No. 2 Rear Control Valve Body Assembly & Rear Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Align each bolt hole on the valve body with the holes in the gaskets and plates.

7. Install the No. 2 rear control valve body assembly (330) onto the rear control valve body assembly (326).

 © 2011 Mitchell Repair Information Company, LLC.

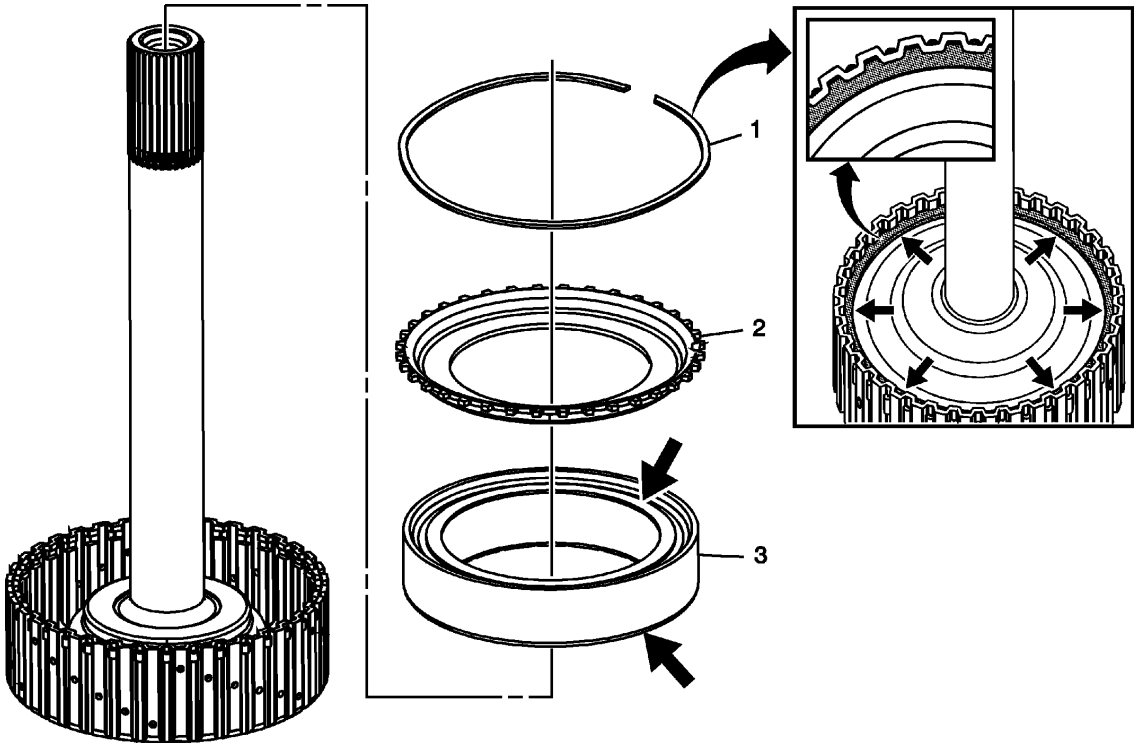


Fig. 391: Locating Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

8. Install 1 - M5 x 0.8 x 76 mm control valve body bolt (331) into the No. 2 rear control valve body assembly.
9. Install 4 - M5 x 0.8 x 49.5 mm control valve body bolts (332) into the No. 2 rear control valve body assembly.

 © 2011 Mitchell Repair Information Company, LLC.

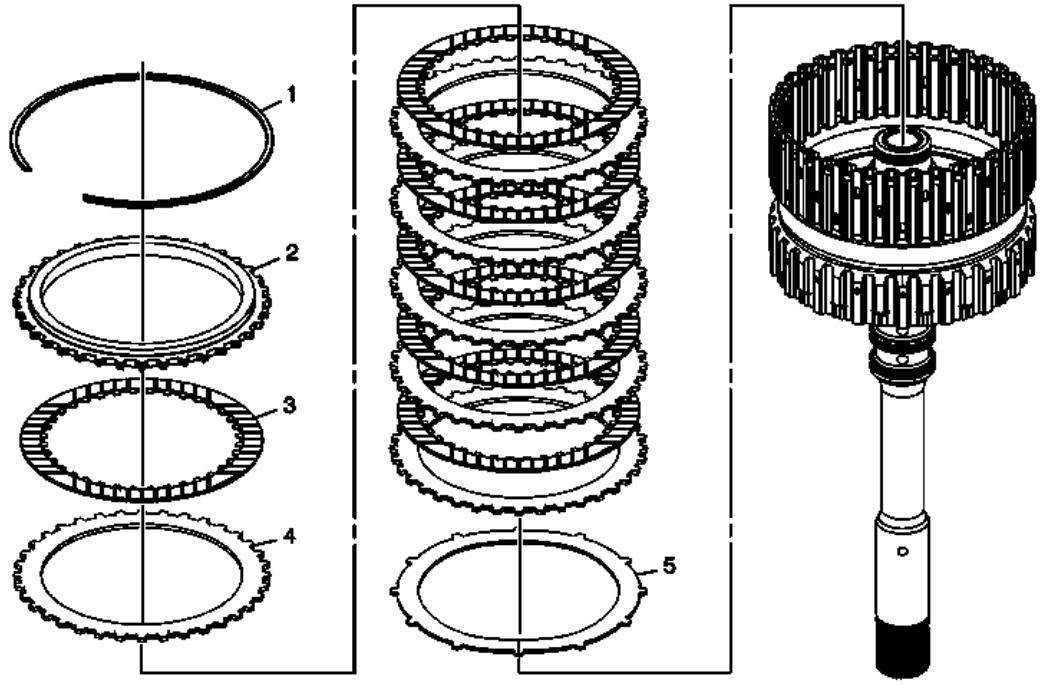


Fig. 392: View Of No. 2 Rear Control Valve Body Assembly Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

10. Hand tighten the 5 control valve body assembly bolts (331, 332).

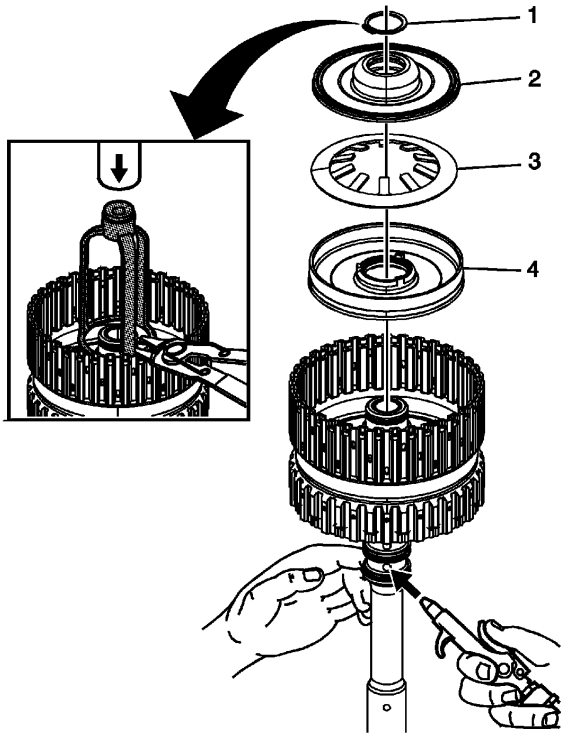


Fig. 393: Turning Over Valve Body Assembly

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

11. Turn the valve body assembly over.

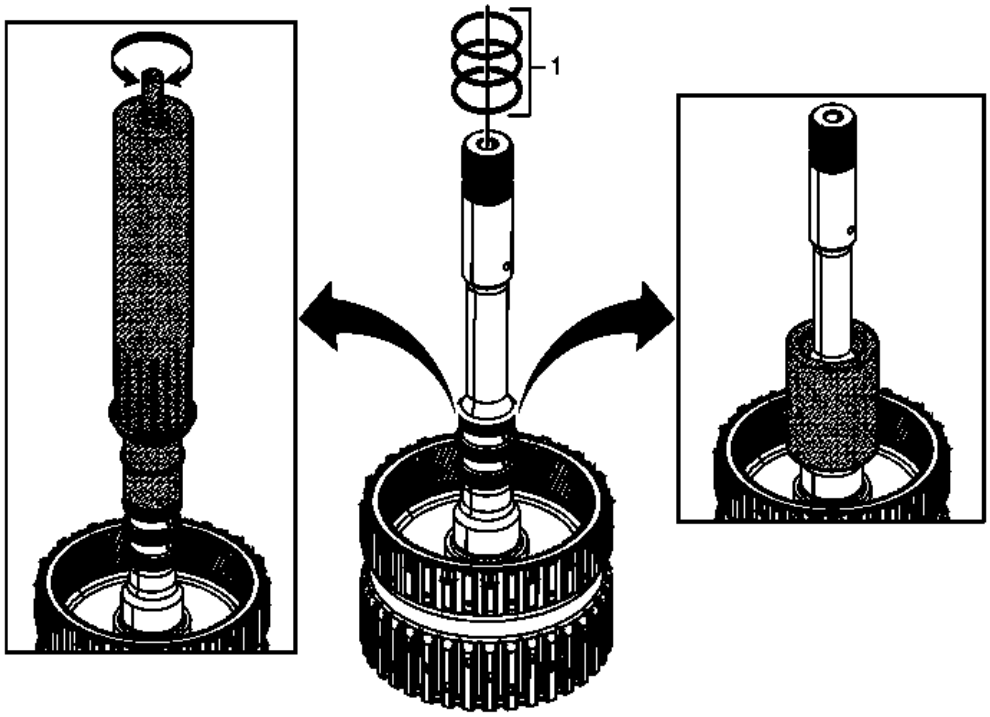


Fig. 394: View Of Middle Control Valve Body Bolt/Screw
Courtesy of GENERAL MOTORS CORP.

12. Install the M5 x 0.8 x 50 mm control valve body bolt (304) and hand tighten.

 © 2011 Mitchell Repair Information Company, LLC.

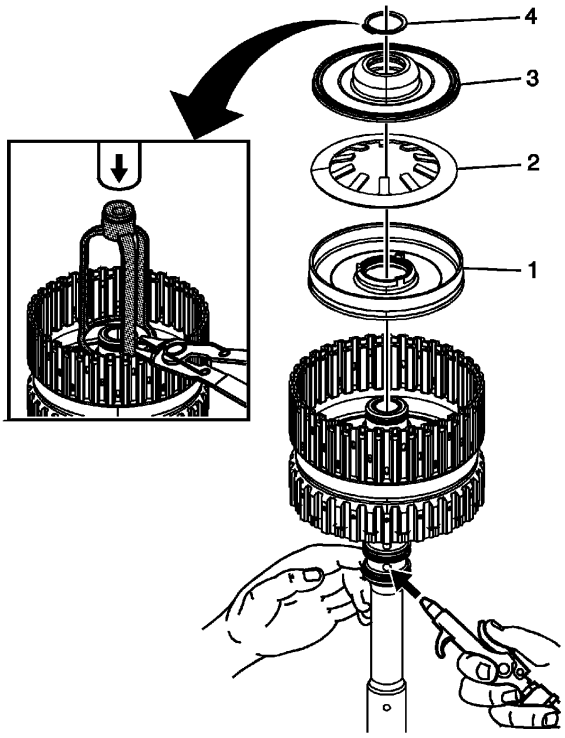
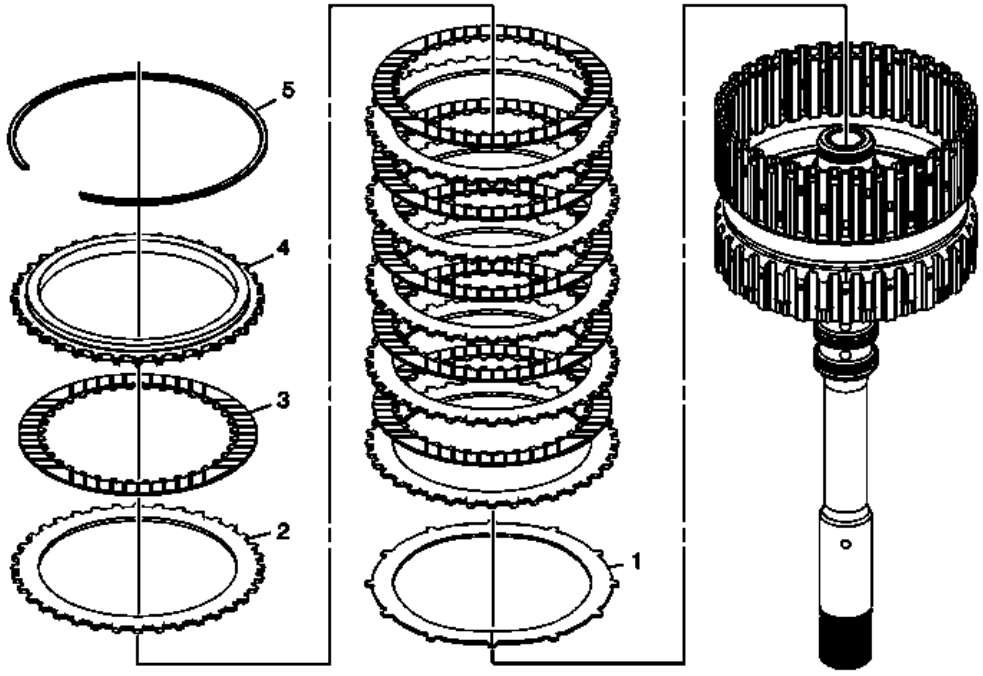


Fig. 395: View Of Fluid Strainers & Check Valve Assemblies
Courtesy of GENERAL MOTORS CORP.

13. Install the 3 fluid strainers (371), 1 fluid strainer (372), and the 2 accumulator check valve assemblies (353) into the middle control valve body assembly.



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 396: View Of Front Control Valve Body Spacer Plate
Courtesy of GENERAL MOTORS CORP.

14. Install the gasket (320) to the front control valve body assembly (315).
15. Install the front control valve body spacer plate (321).
16. Install the gasket (322).

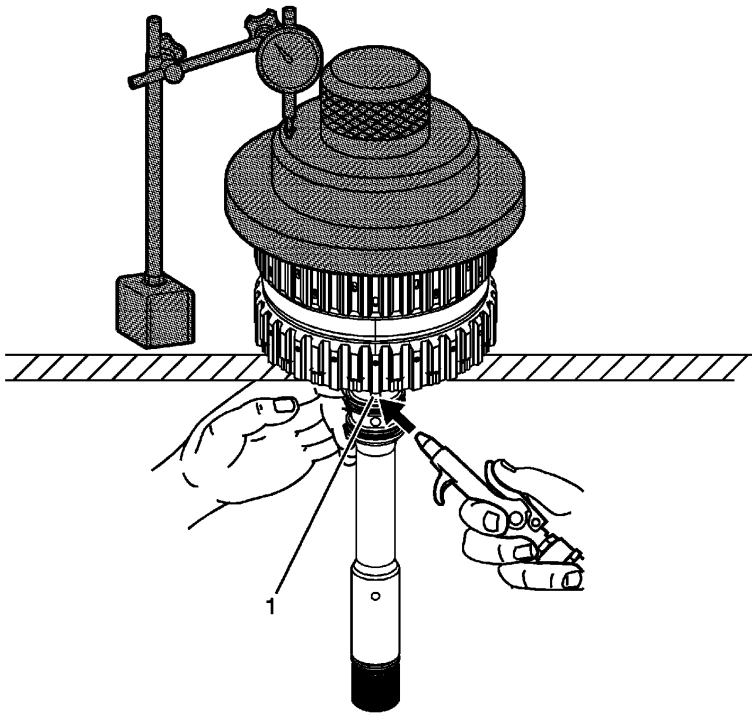


Fig. 397: View Of Front Control Valve Body Assembly & Middle Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Align each bolt hole in the valve body with the holes in the gaskets and spacer plate.

17. Install the spacer plate and gaskets on to the front control valve body assembly (315).

IMPORTANT: Align each bolt hole in the valve body with the holes in the gaskets and spacer plate.

18. Install the front control valve body assembly (315) onto the middle control valve body assembly (323).

 © 2011 Mitchell Repair Information Company, LLC.

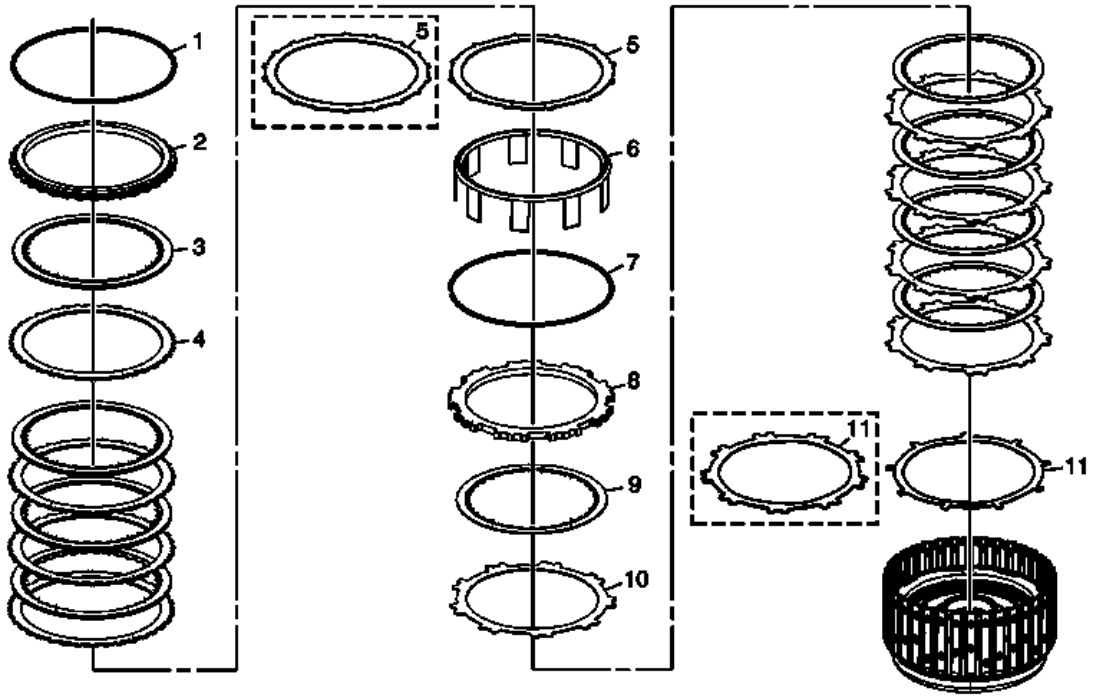


Fig. 398: Locating Front Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

19. Install 1 - M5 x 0.8 x 50 mm control valve body bolt (304) into the front control valve body assembly and hand tighten.
20. Install 4 or 5- M5 x 0.8 x 20 mm control valve body bolts (313) into the front control valve body assembly and hand tighten.
21. Install 2 - M5 x 0.8 x 16 mm control valve body bolts (314) into the front control valve body assembly and hand tighten.

 © 2011 Mitchell Repair Information Company, LLC.

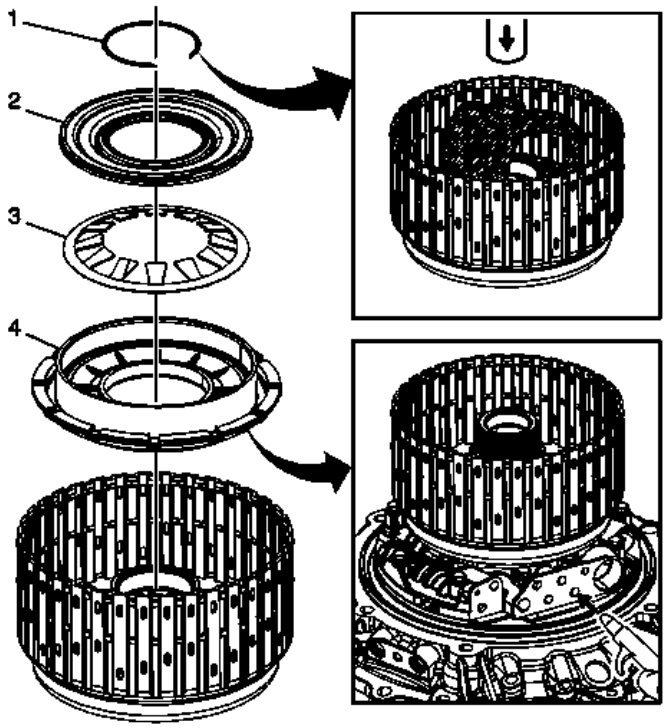


Fig. 399: Installing Control Valve Body Assembly Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice.

22. Tighten all 16 control valve body assembly bolts, evenly and gradually.

    Tighten: Tighten the control valve body assembly bolts to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

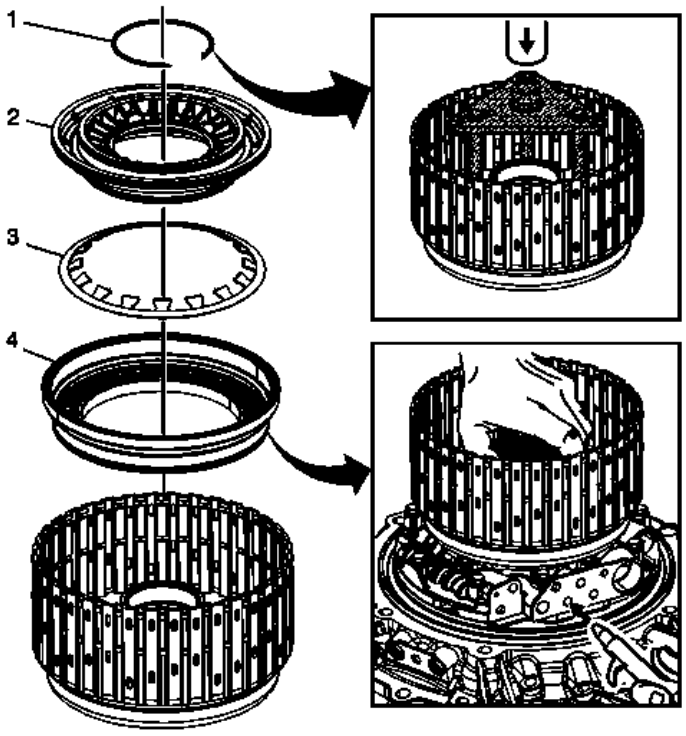


Fig. 400: Identifying Shift Solenoid Valves
Courtesy of GENERAL MOTORS CORP.

IMPORTANT:
- **Use NEW O-ring seals.**
- **Do not damage the O-ring seals.**

23. Replace the O-ring seals (306) on each of the 5 shift solenoid valves (300, 303, 305, 308, 310).
24. Install the 5 shift solenoid valves (300, 303, 305, 308, 310).
25. Install the 5 shift solenoid valve retaining bolts.
    - 1 - (301) - M5 x 0.8 x 62 mm
    - 2 - (302) - M5 x 0.8 x 28 mm
    - 2 - (307) - M5 x 0.8 x 10 mm
26. Tighten the 5 shift solenoid valve retaining bolts (301, 302, 307).

    Tighten: Tighten the shift solenoid valve retaining bolts to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

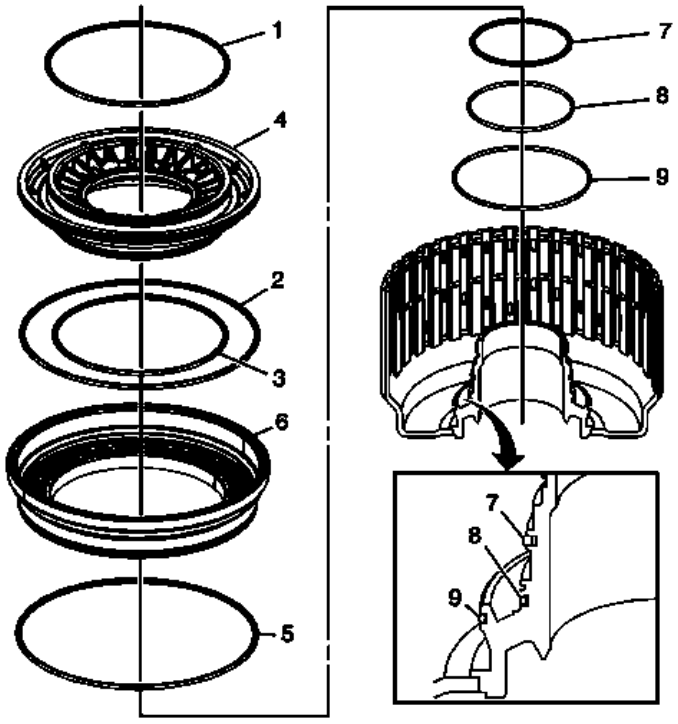


Fig. 401: View Of Line Pressure Control Solenoid Valve Assembly & Shift Pressure Control Solenoid Valve Assembly
Courtesy of GENERAL MOTORS CORP.

27. Install the line pressure control solenoid valve assembly (316) and the shift pressure control solenoid valve assembly (340).
28. Install the control valve body solenoid valve retainer (312) and 1 - M5 x 0.8 x 13 mm control valve body bolt (311).

    Tighten: Tighten the control valve body bolt to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

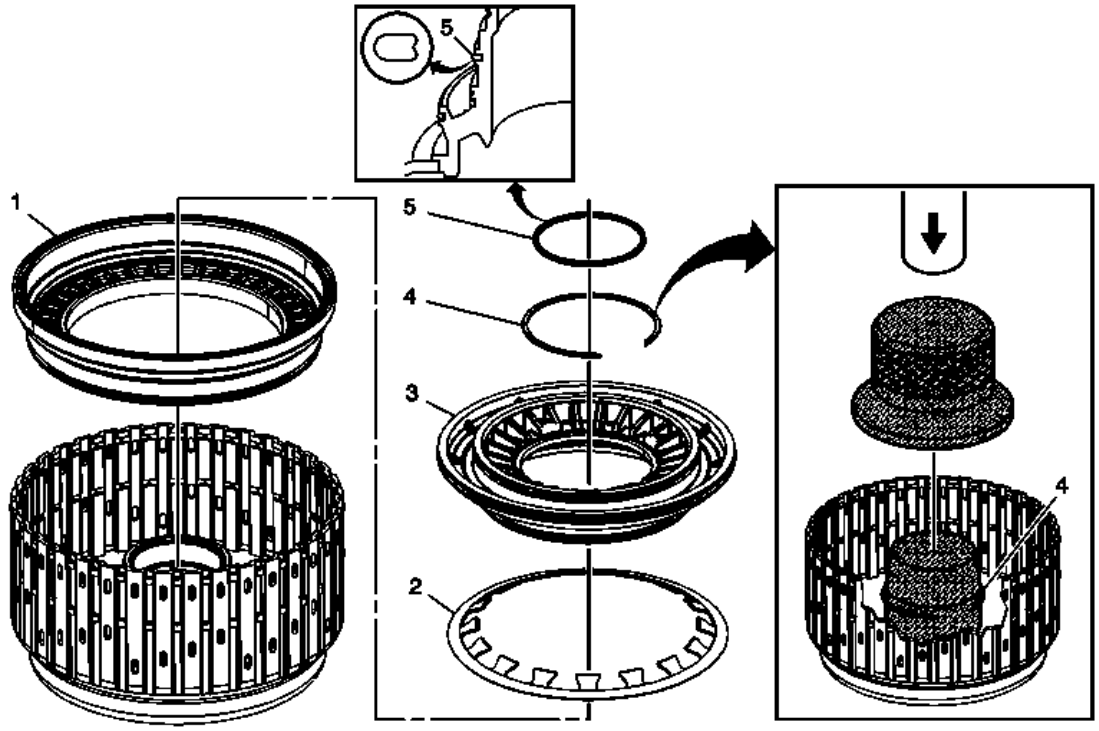


Fig. 402: View Of TCC Lock Up Pressure Control Solenoid Valve Assembly
Courtesy of GENERAL MOTORS CORP.

29. Install the TCC lock up pressure control solenoid valve assembly (339).
30. Install the TCC lock up pressure control solenoid valve retainer (319), the wiring harness clip (318), and 1 - M5 x 0.8 x 10 mm control valve body bolt/screw (307).

    Tighten: Tighten the control valve body bolt to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

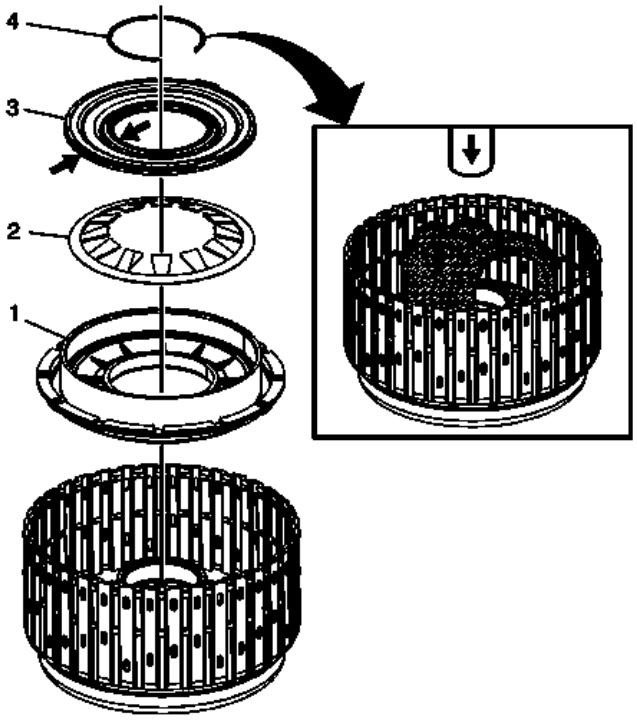


Fig. 403: View Of Manual Valve
Courtesy of GENERAL MOTORS CORP.

31. Install the manual valve (337) into the middle control valve body assembly.

CONTROL VALVE BODY ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

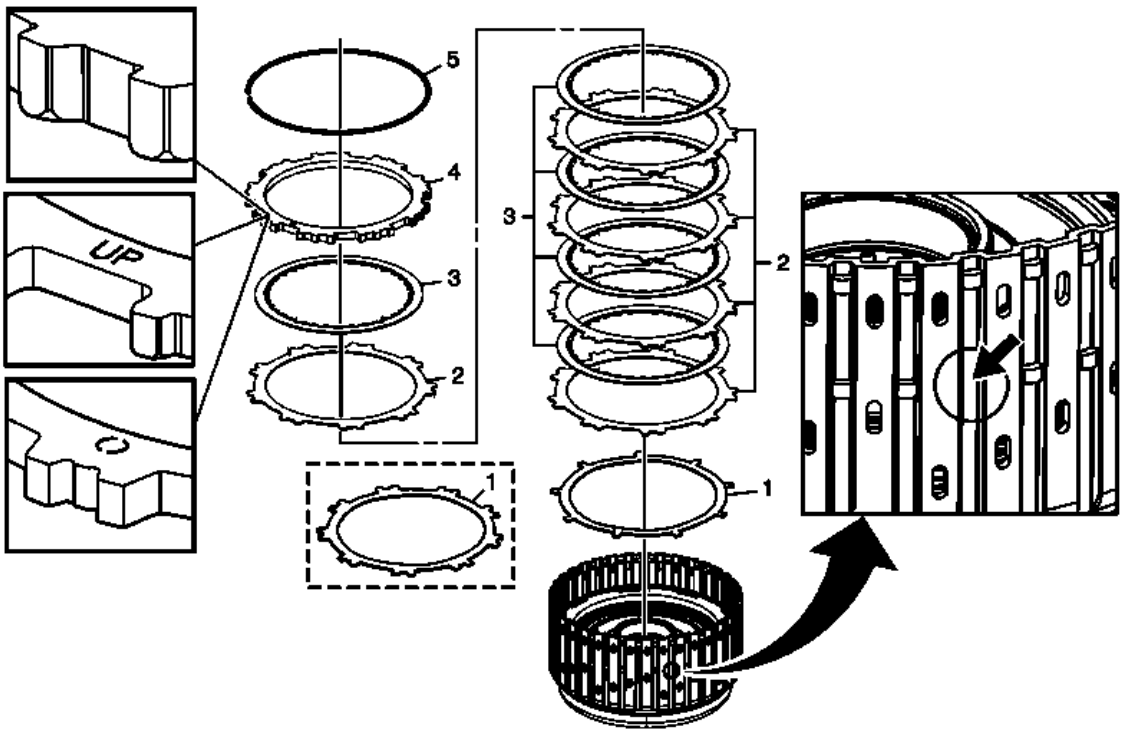
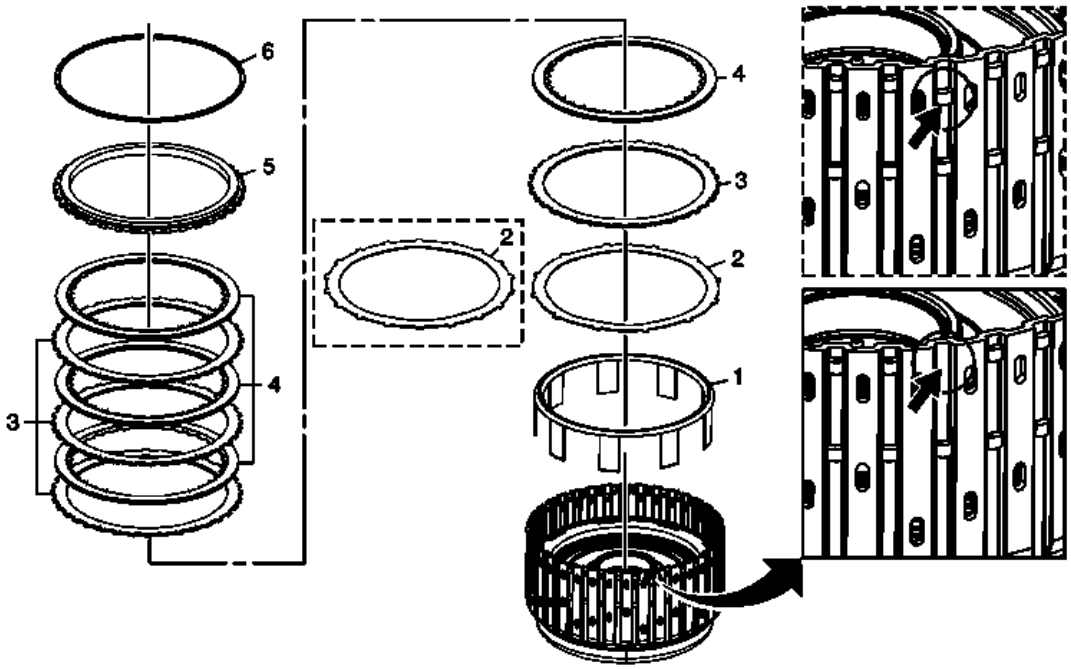


Fig. 404: Identifying Case Fluid Passage Seals
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission assembly so that the I.D. tag is facing up.
2. Install 2 new case fluid passage seals (86) into the transmission case fluid ports.



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 405: View Of Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

3. Shift the transmission into Neutral (N).
4. While holding the control valve body assembly (39), connect the manual valve link (336) to the manual shift detent lever assembly (710).

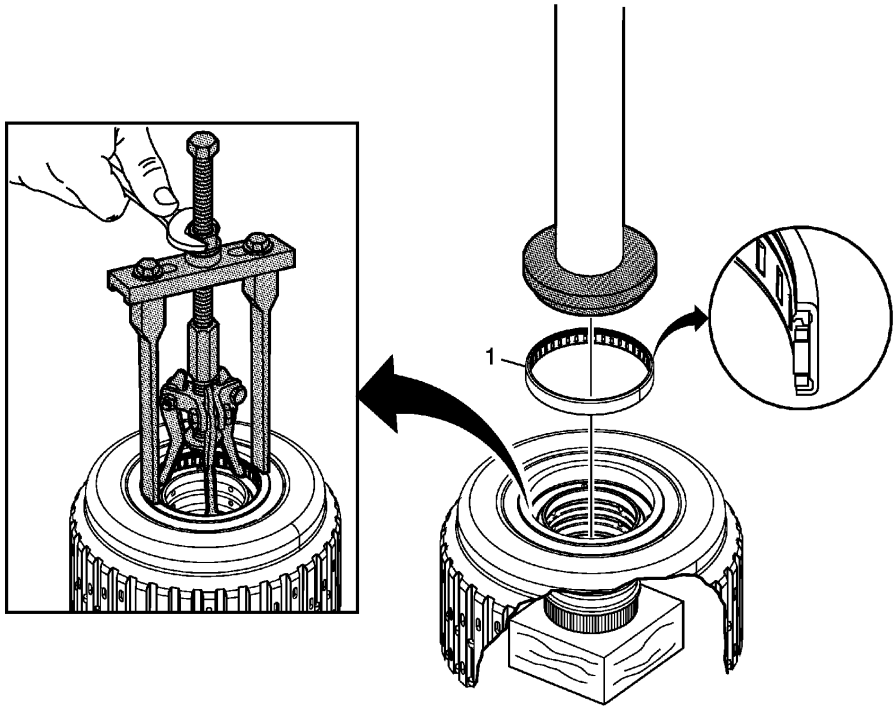


Fig. 406: View Of Valve Body Assembly-To-Transaxle Case Bolts
Courtesy of GENERAL MOTORS CORP.

5. Install the 6 control valve body assembly to transmission case bolts and hand tighten.
    - 2 - M6 x 1.0 x 16 mm (34)
    - 2 - M6 x 1.0 x 28 mm (35)
    - 2 - M6 x 1.0 x 55 mm (47)

 © 2011 Mitchell Repair Information Company, LLC.

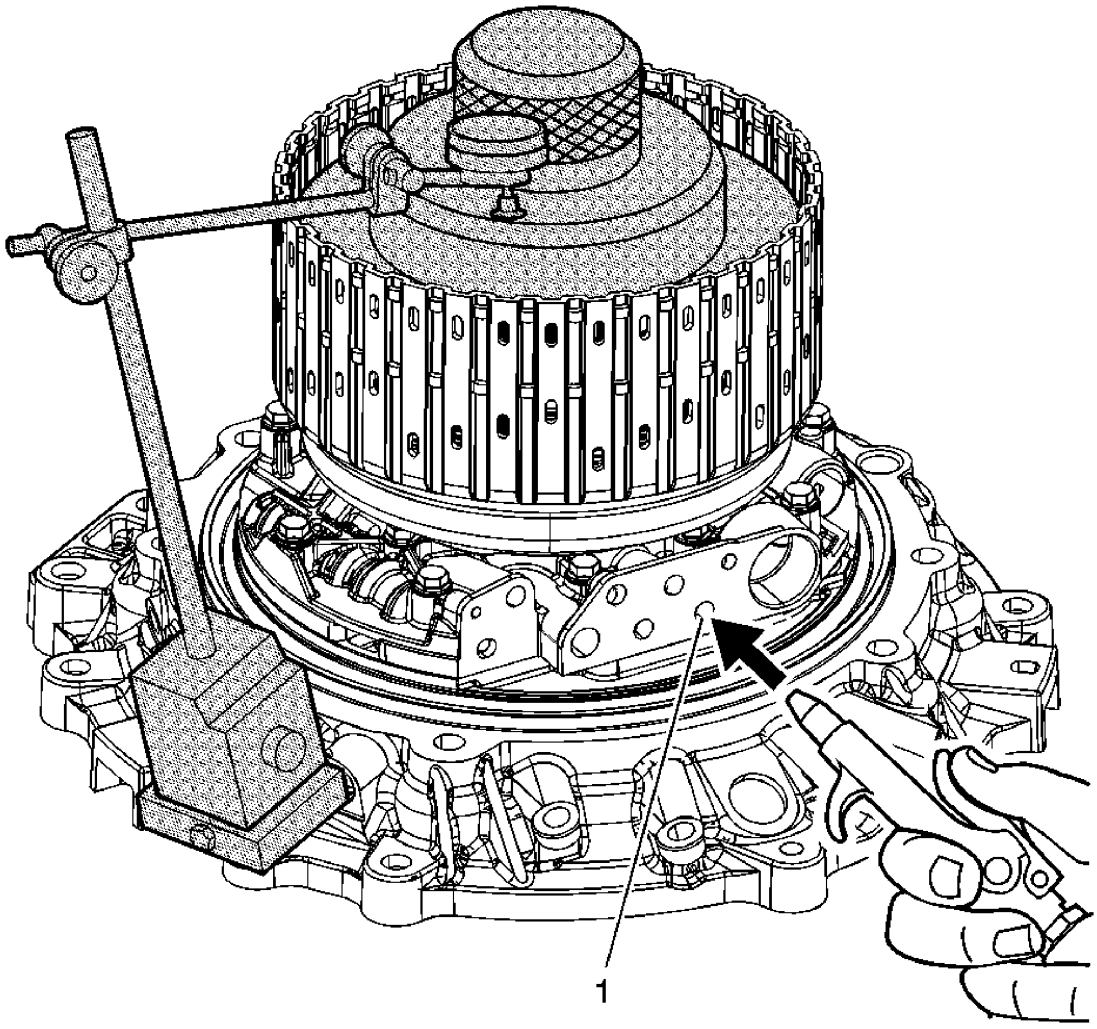


Fig. 407: Installing Control Valve Body Assembly-To-Transmission Case Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

6. Tighten the control valve body assembly to transmission case bolts in sequence.

   Tighten: Tighten the control valve body assembly to transmission case bolts to 10 N.m (89 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

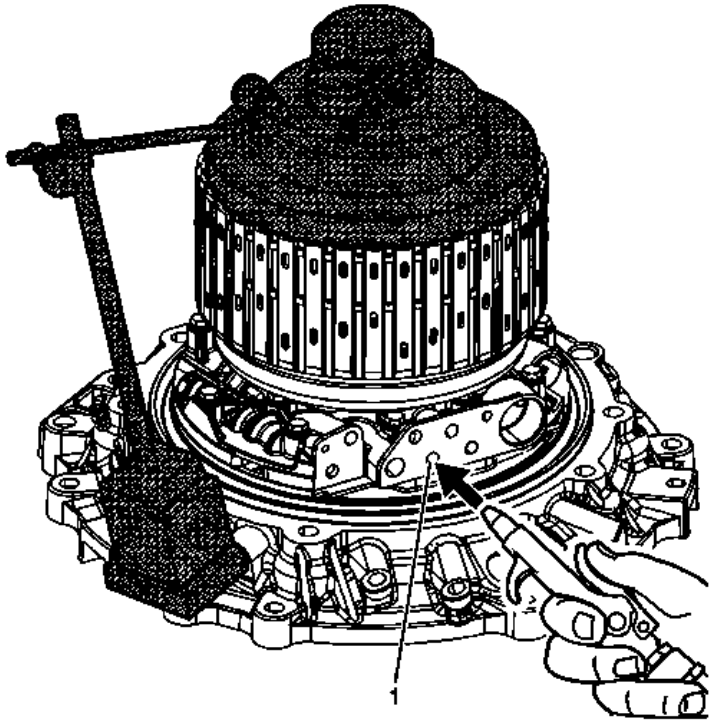


Fig. 408: View Of Control Valve Body Passage Cover Bolts, Cover & Gasket
Courtesy of GENERAL MOTORS CORP.

7. Install a new control valve body fluid passage cover gasket (38).
8. Install the control valve body fluid passage cover (37).
9. Install the 2 - M6 x 1.0 x 50 mm control valve body bolts.

Tighten: Tighten the control valve body bolts to 10 N.m (89 lb in).

WIRING HARNESS INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

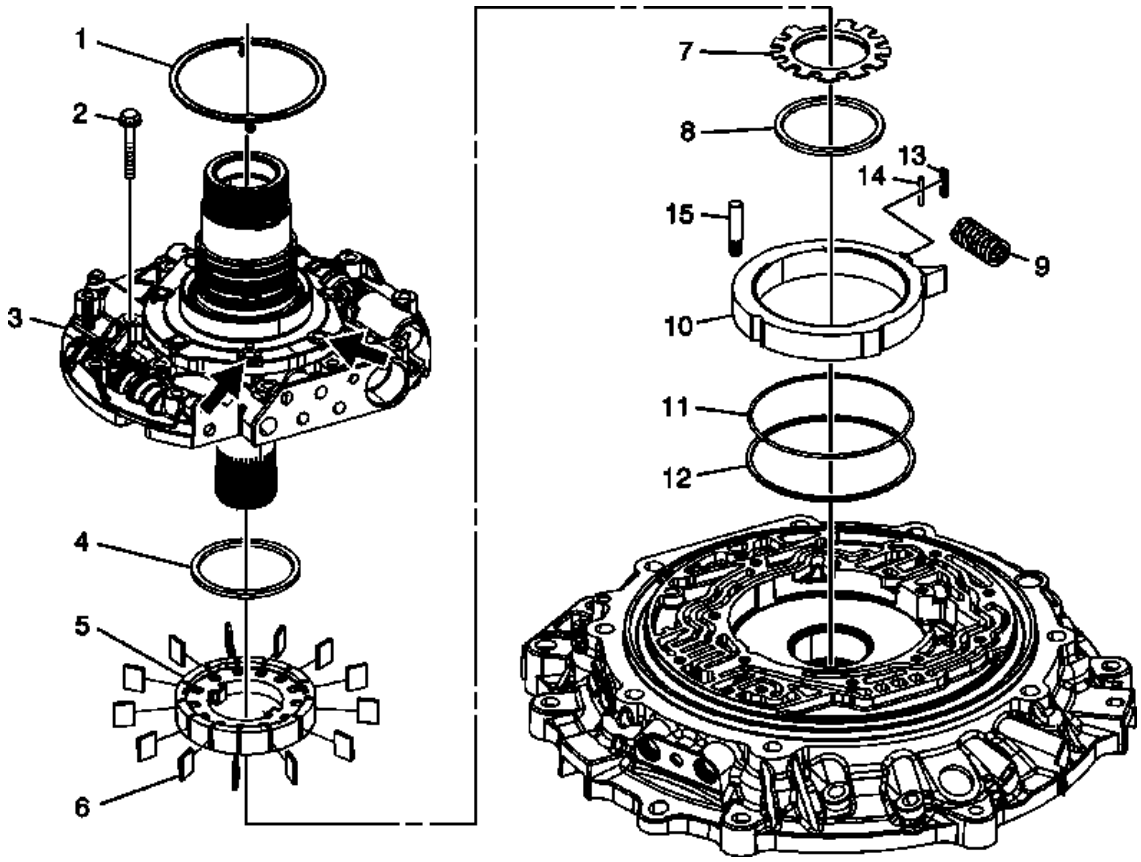


Fig. 409: Installing Transmission Wiring Harness Assembly
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to a new transmission wiring connector O-ring seal (46).
2. Install the new transmission wiring connector O-ring seal (46) onto the transmission wiring harness assembly (33).
3. Install the transmission wiring harness assembly (33) into the transmission case assembly through the wiring harness bore.

 © 2011 Mitchell Repair Information Company, LLC.

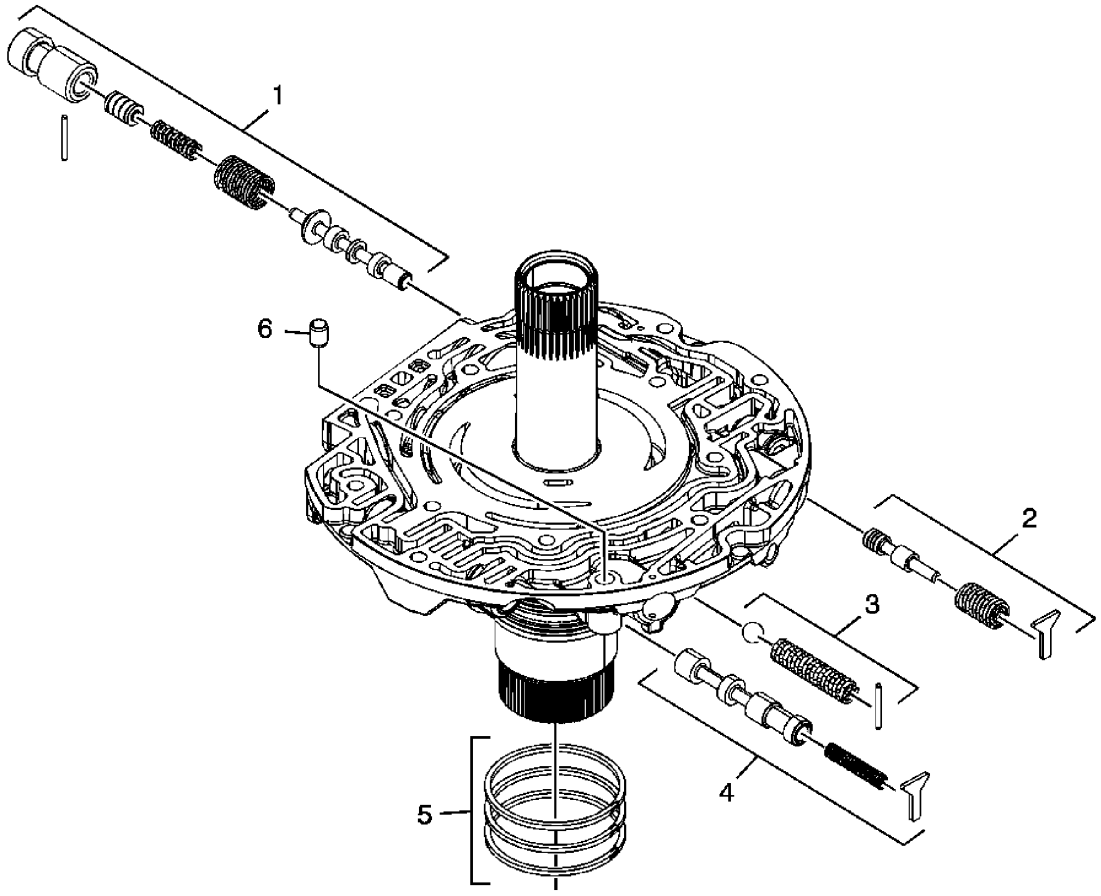


Fig. 410: View Of Fluid Temperature Sensor
Courtesy of GENERAL MOTORS CORP.

4. Apply automatic transmission fluid to the new transmission fluid temperature sensor O-ring seal (32).
5. Install the new transmission fluid temperature sensor O-ring seal (32) into the groove of the transmission fluid temperature sensor (36).
6. Install the transmission fluid temperature sensor (36) into the front control valve body fluid temperature sensor bore.
7. Install the transmission fluid temperature sensor clip (49).
8. Install the 1 - M6 x 1.0 x 55 mm fluid temperature sensor bolt (31).

Tighten: Tighten the fluid temperature sensor bolt to 10 N.m (89 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

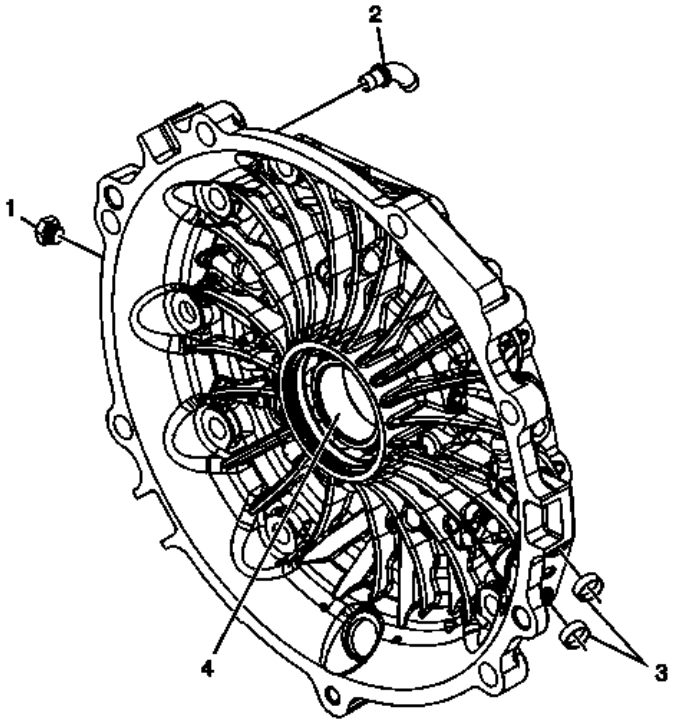


Fig. 411: Locating Solenoid Wire Connectors
Courtesy of GENERAL MOTORS CORP.

9. Connect the 8 solenoid wire connectors as follows:
    - 1 - blue
    - 2 - black
    - 3 - green
    - 4 - black
    - 5 - blue
    - 6 - gray
    - 7 - brown
    - 8 - black
10. Position the wiring harness in the wiring harness clip.

CONTROL VALVE BODY COVER INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

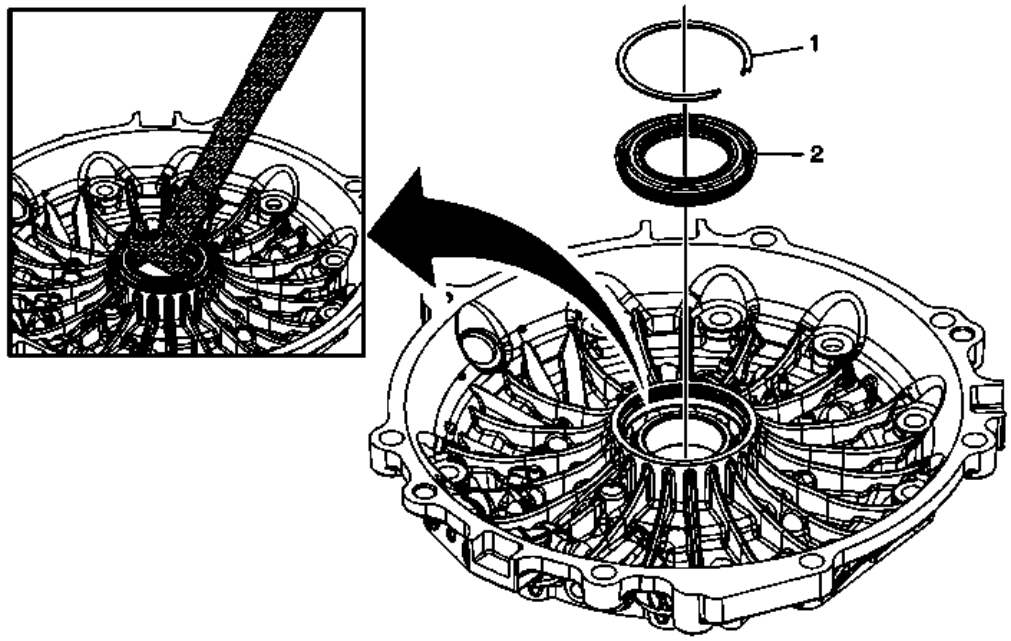


Fig. 412: View Of Control Valve Body Cover
Courtesy of GENERAL MOTORS CORP.

1. Clean any gasket material from the control valve body cover and inspect the gasket mounting surface.
2. Apply a 3 mm (1/8 in) bead of sealant GM P/N 89020326 (Canadian P/N 89021188), to the cover mounting surface.

 © 2011 Mitchell Repair Information Company, LLC.

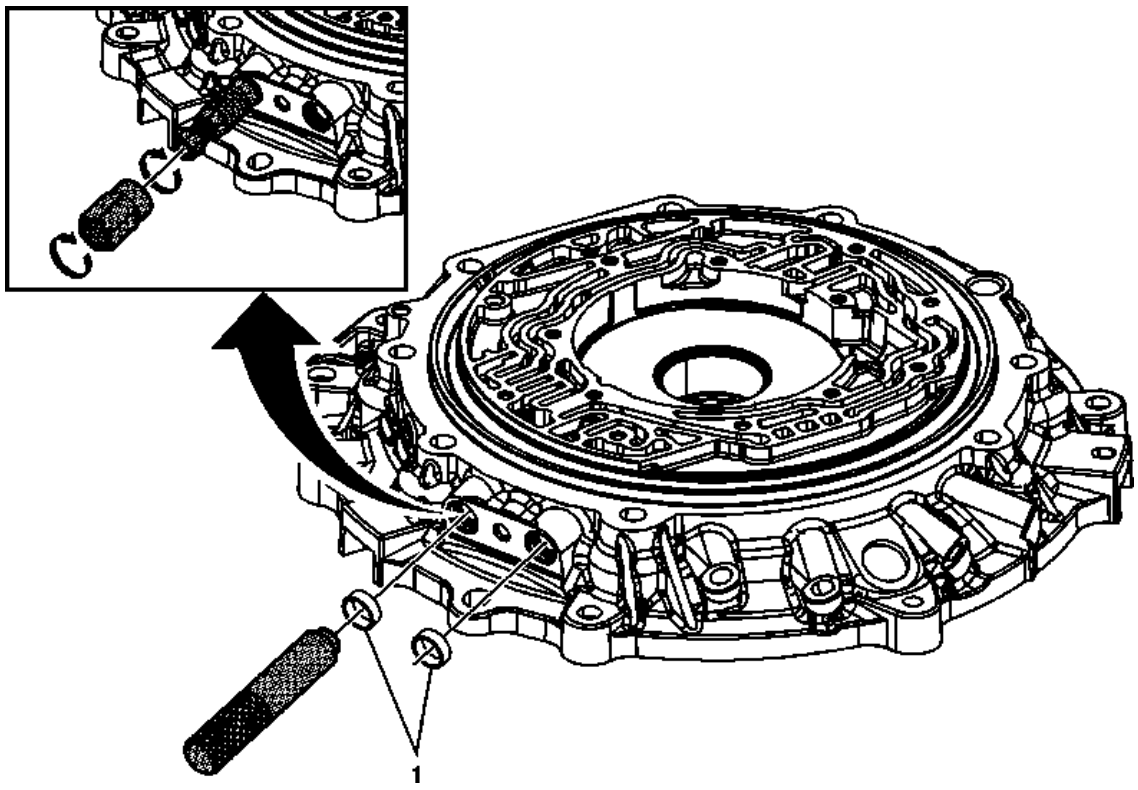


Fig. 413: Identifying Control Valve Body Cover
Courtesy of GENERAL MOTORS CORP.

3. Install the control valve body cover (29) onto the transmission case assembly.
4. Apply threadlocker GM P/N 12345382 (Canadian P/N 10953489), to the threads of all of the cover bolts.
5. Install the 9 - M8 x 1.25 x 15.5 mm control valve body cover bolts (28).

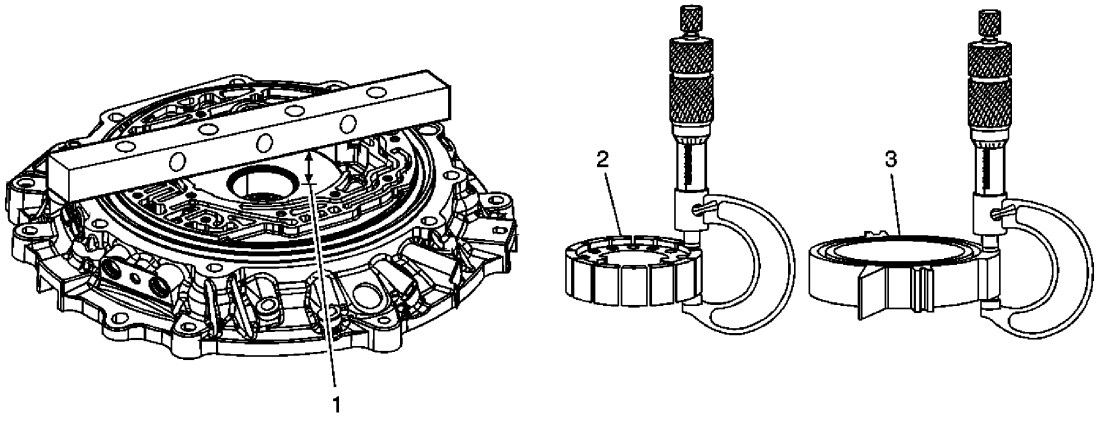


Fig. 414: Installing Control Valve Body Bolts/Screws
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

 © 2011 Mitchell Repair Information Company, LLC.

6. Tighten the 9 control valve body cover bolts in sequence.

   Tighten: Tighten the control valve body cover bolts to 13 N.m (10 lb ft).

PARK/NEUTRAL POSITION SWITCH INSTALLATION

Tools Required

J 45404 Transmission Indicator Alignment Tool. See **Special Tools**.

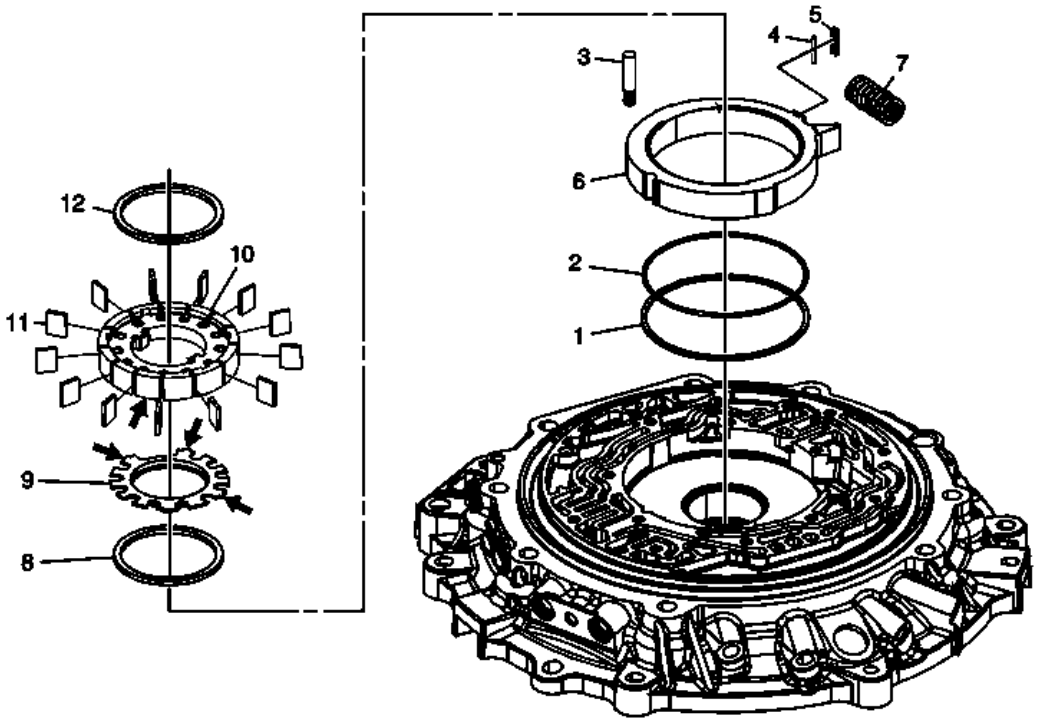


Fig. 415: View Of Park/Neutral Position Switch & Bolt
Courtesy of GENERAL MOTORS CORP.

1. Install the park/neutral position switch (75) to the manual shift detent lever assembly.
2. Install the park/neutral position switch stud (76), bolt (79), and flat washers (69) and hand tighten until tight enough to hold the park/neutral position switch in place, but still loose enough to allow adjustment by hand.

 © 2011 Mitchell Repair Information Company, LLC.

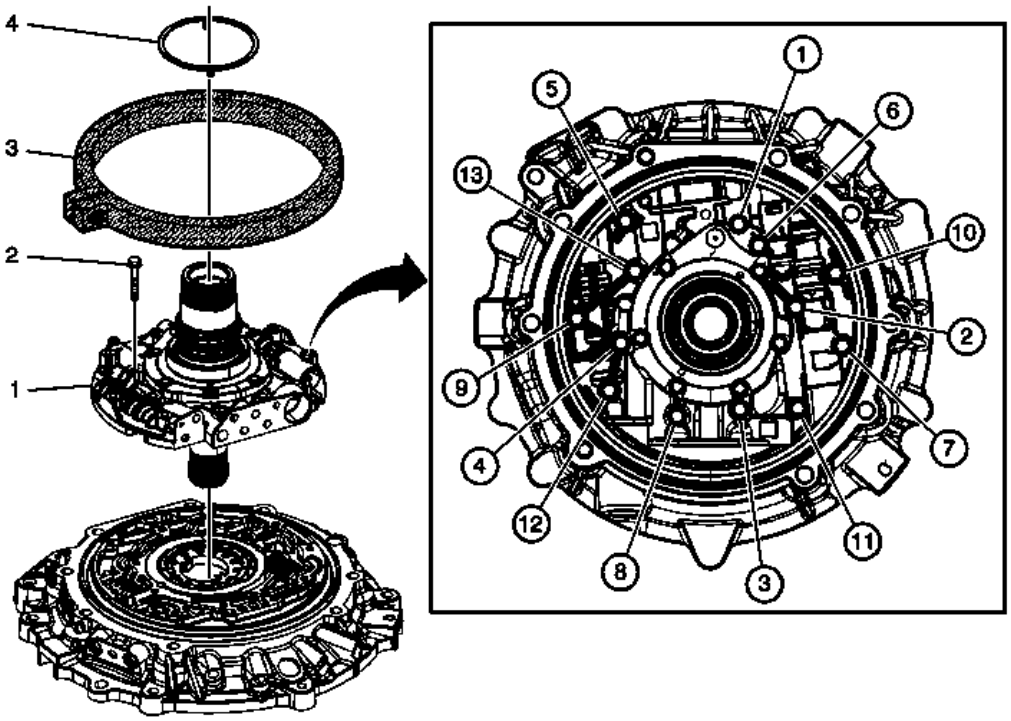


Fig. 416: View Of Flat Washer, Lock Washer & Manual Shaft Nut
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

3. Install the park/neutral position switch flat washer (74), lock tab washer (77), and nut (78).

   Tighten: Tighten the park/neutral position switch nut to 7 N.m (62 lb in).

 © 2011 Mitchell Repair Information Company, LLC.

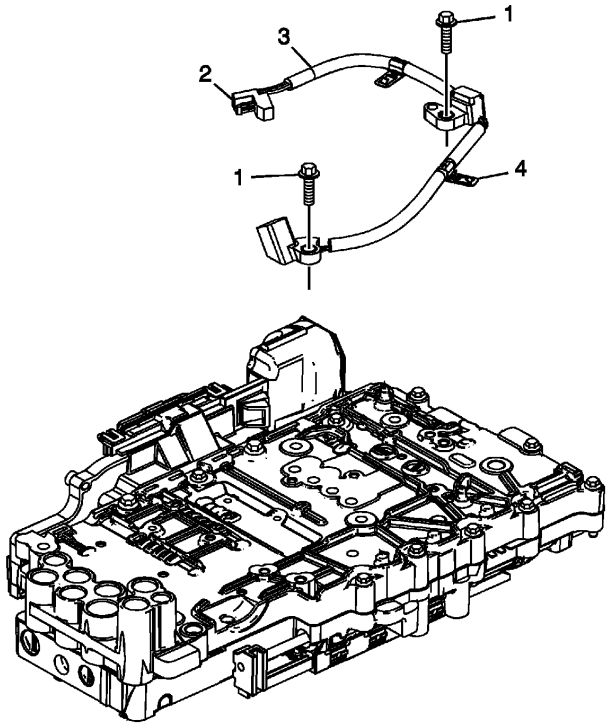


Fig. 417: Securing Nut
Courtesy of GENERAL MOTORS CORP.

4. Bend the tabs on the lock tab washer to secure the nut.

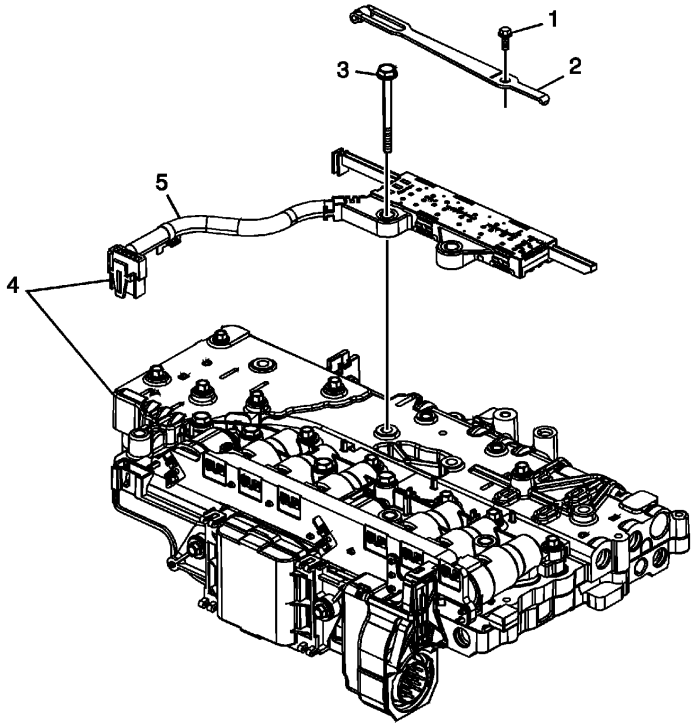


Fig. 418: View Of J 45404 Installed On Manual Shaft

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

5. Place the manual shift detent lever assembly in the Neutral (N) position.
6. Install the **J 45404** to the manual shift detent lever assembly. See **Special Tools**.
7. Rotate the park/neutral position switch until the neutral base line on the switch assembly lines up with the indicator line on **J 45404** . See **Special Tools**.
8. Tighten the park/neutral position switch stud (76) and the park/neutral position switch bolt (79).

   Tighten: Tighten the park/neutral position switch stud and bolt to 25 N.m (18 lb in).

9. Remove **J 45404** from the manual shift detent lever assembly. See **Special Tools**.

INPUT SPEED SENSOR INSTALLATION

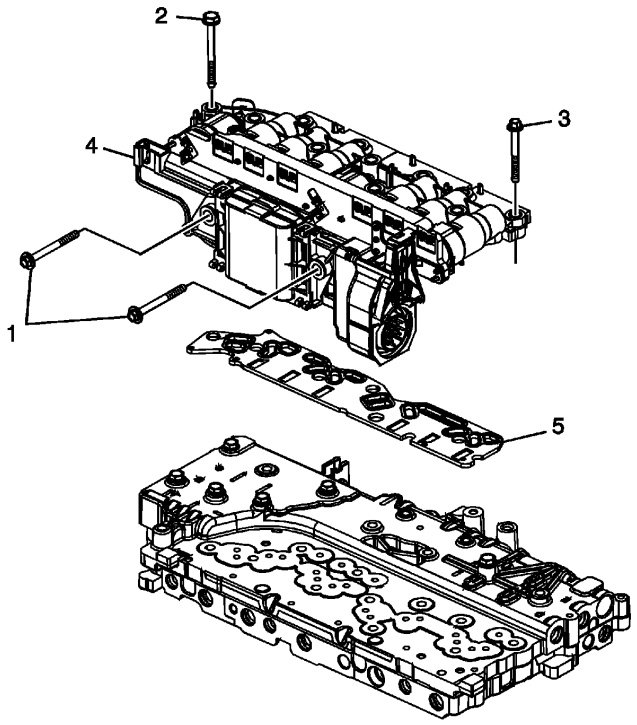


Fig. 419: View Of Input Shaft Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to the new input speed sensor O-ring seal (71).
2. Install the new input speed sensor O-ring seal (71) onto the input speed sensor (73).
3. Install the input speed sensor (73) into the transmission case assembly (17).

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

4. Install the M6 x 1.0 x 16 mm input speed sensor bolt (72).

 © 2011 Mitchell Repair Information Company, LLC.

Tighten: Tighten the input speed sensor bolt (72) to 5 N.m (44 lb in).

OUTPUT SPEED SENSOR INSTALLATION

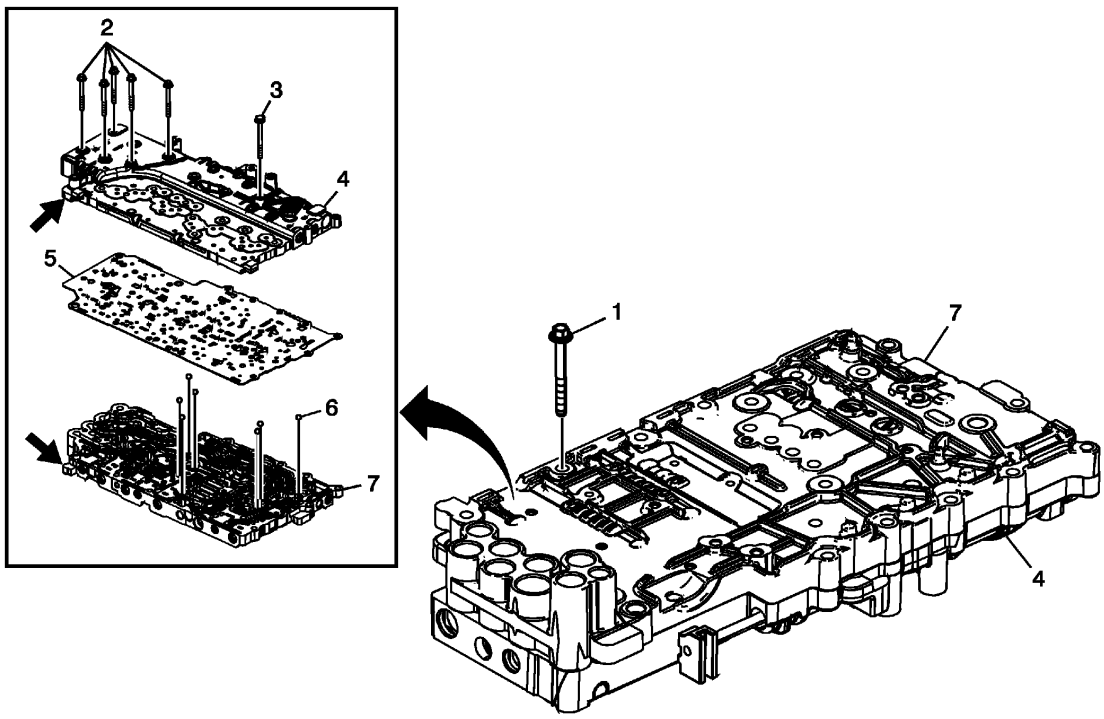


Fig. 420: Output Shaft Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Apply automatic transmission fluid to the new output speed sensor O-ring seal (63).
2. Install the new output speed sensor O-ring seal (63) onto the output speed sensor (62).
3. Install the output speed sensor (62) into the transmission case assembly (17).

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

4. Install the M6 x 1.0 x 16 mm output speed sensor bolt (61).

Tighten: Tighten the output speed sensor bolt to 5 N.m (44 lb in).

DRAIN PLUG INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

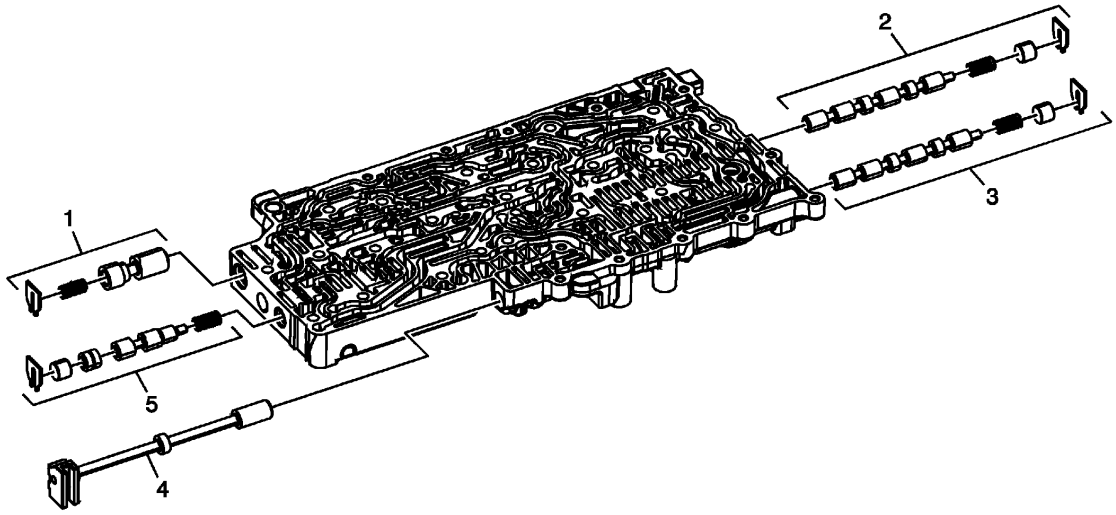


Fig. 421: View Of Transmission Drain Plug & Gasket
Courtesy of GENERAL MOTORS CORP.

1. Install a new gasket (820) on the drain plug (819).

NOTE: Refer to Fastener Notice.

2. Install the drain plug (819) into the case assembly (17).

Tighten: Tighten the drain plug to 39 N.m (29 lb ft).

 © 2011 Mitchell Repair Information Company, LLC.

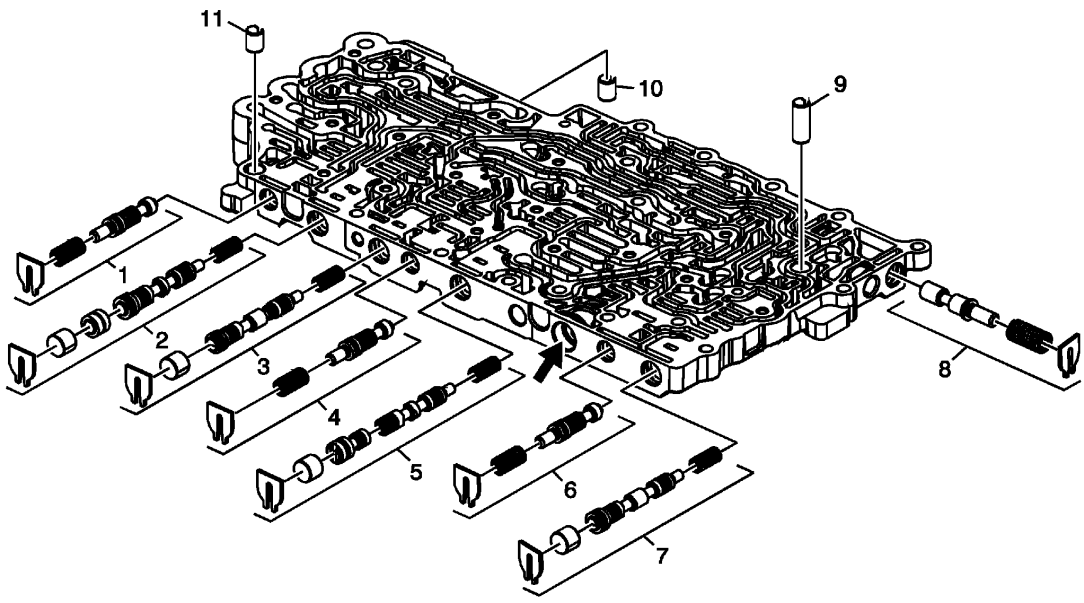


Fig. 422: View Of Vent Hose Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the vent hose assembly.

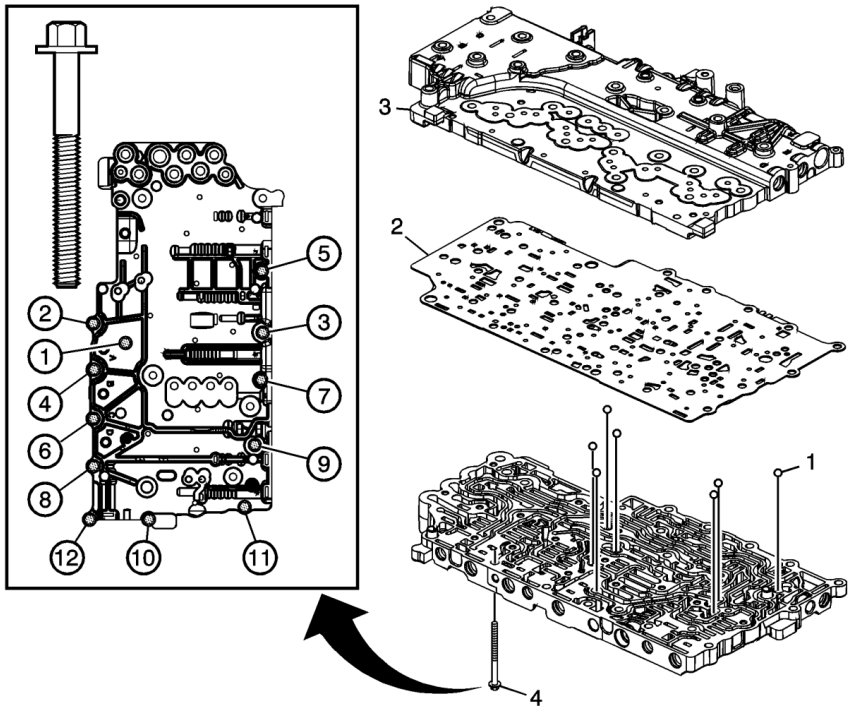


Fig. 423: View Of Transmission Oil Level Indicator, O-Ring & Bolt

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

4. Install a new o-ring (824) on the transmission fluid level indicator and lubricate with transmission fluid.
5. Install the transmission fluid level indicator.
6. Install the transmission fluid level indicator bolt.

Tighten: Tighten the indicator bolt to 10 N.m (89 lb in).

HOLDING FIXTURE REMOVAL

Tools Required

J 45159 Holding Fixture. See **Special Tools**.

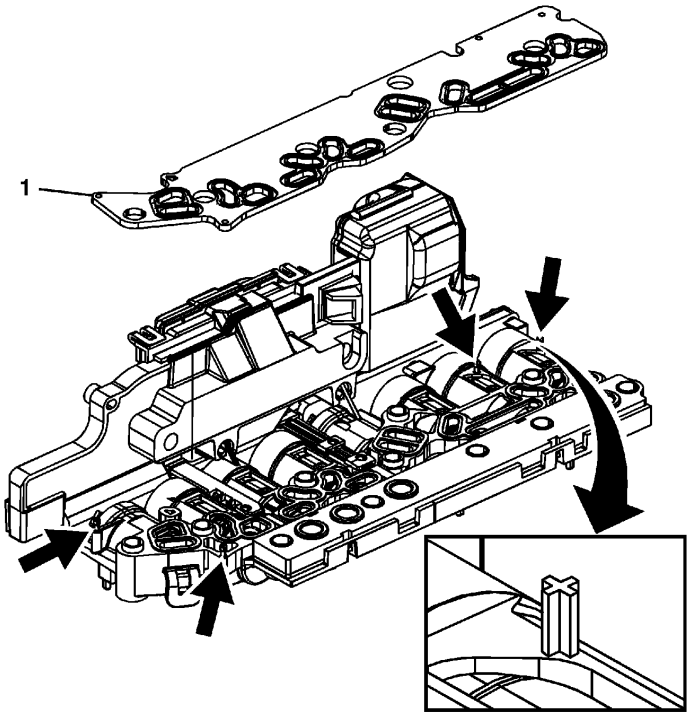


Fig. 424: View Of Holding Fixture
Courtesy of GENERAL MOTORS CORP.

1. Loosen the bolt (2) holding the bracket to the fixture body.
2. Remove the bracket bolt (3) from the transaxle.
3. Remove the 2 bolts (1) holding the fixture to the transaxle.
4. Remove the **J 45159** from the transaxle. See **Special Tools**.

TORQUE CONVERTER ASSEMBLY INSTALLATION

 © 2011 Mitchell Repair Information Company, LLC.

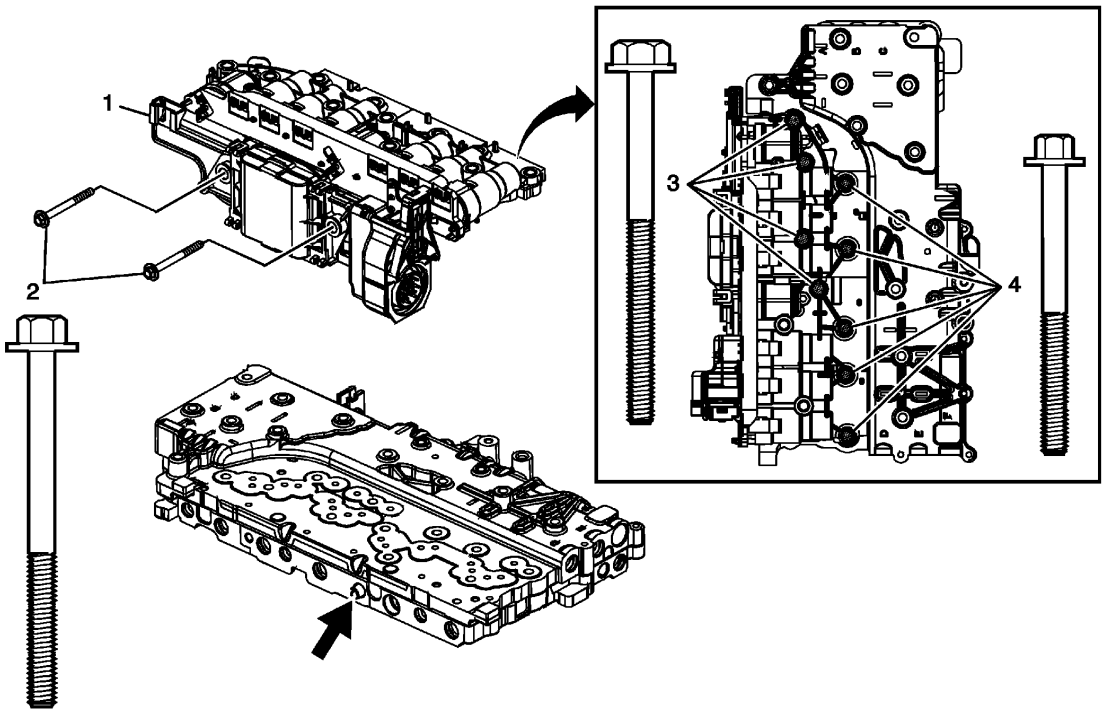


Fig. 425: View Of Torque Converter Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the torque converter.

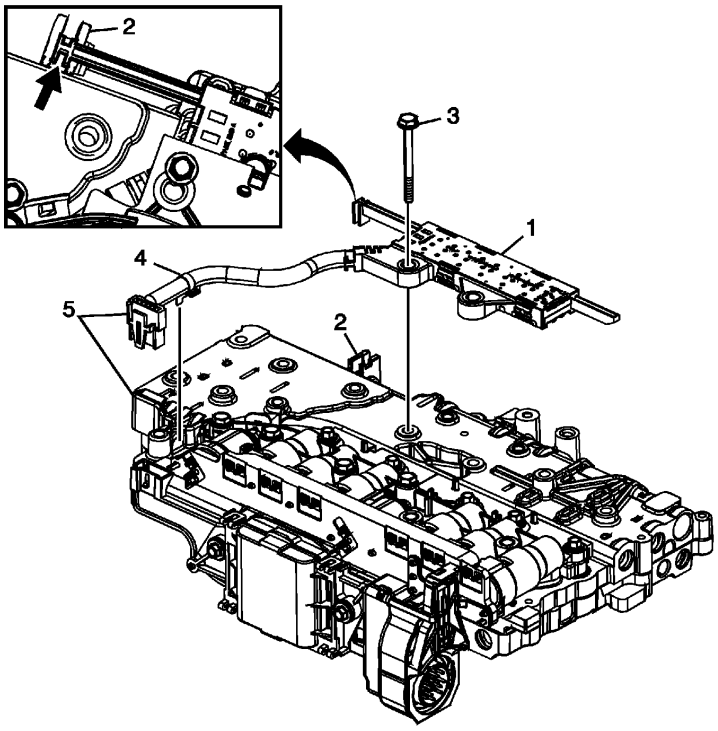


Fig. 426: Measuring Dimension C

 © 2011 Mitchell Repair Information Company, LLC.

Courtesy of GENERAL MOTORS CORP.

2. Measure dimension C.
3. If dimension C is not within specifications, rotate the torque converter to index it to the pump.

Installation Height: Dimension C should be 12.5 mm (0.492 in).

DESCRIPTION AND OPERATION

AUTOMATIC TRANSMISSION HYDRAULIC DIAGRAMS

Park - Engine Running

With the gear selector lever in the PARK (P) position and the engine running, the line pressure from the fluid pump assembly is directed to various components in the control valve body assembly and the transmission case assembly.

FLUID PRESSURE DIRECTED IN PREPARATION FOR A SHIFT

Manual Valve

Mechanically controlled by the gear selector lever, the manual valve is in the PARK (P) position and prevents line (2) pressure from the primary regulator valve from entering the drive (19) and reverse (22) fluid circuits.

Reverse, 1st Shift Solenoid (SS) Valve Assembly (S1)

Line (2) fluid passes through orifice #3 into the S1 signal (14) fluid circuit in preparation for a shift. The normally open reverse, 1st SS valve assembly is OFF, allowing any fluid pressure in the S1 signal (14) fluid circuit to exhaust through the solenoid.

3-4, 4-5 Shift Solenoid (SS) Valve Assembly (S4)

Line (2) fluid passes through orifice #4 into the S4 signal (17) fluid circuit in preparation for a shift. The normally open 3-4, 4-5 SS valve assembly is OFF, allowing any fluid pressure in the S4 signal (17) fluid circuit to exhaust through the solenoid.

Reverse Shift Solenoid (SS) Valve Assembly (S5)

Line (2) fluid passes through orifice #5 into the S5 signal (18) fluid circuit. The normally closed reverse SS valve assembly is OFF, causing fluid pressure to build-up in the S5 signal (18) fluid circuit.

Shift Pressure Relay Valve

S5 signal (18) fluid is routed to the shift pressure relay valve and applies the valve against spring force.

1-2 REVERSE CLUTCH (B5) APPLIES

U1 Shift Valve

 © 2011 Mitchell Repair Information Company, LLC.

Line (2) fluid is also routed to the U1 shift valve and passes through the valve into the 1-2 reverse clutch (39) fluid circuit.

1-2 Reverse Clutch (B5) Assembly

1-2 reverse clutch (39) fluid enters the automatic transmission case cover assembly and moves the 1-2 reverse clutch piston against spring force to apply the 1-2 reverse clutch plates. In PARK range, the 1-2 reverse clutch has no effect. However, when REVERSE or a forward range is selected, only one apply device has to be energized, which helps create a smooth starting motion.

FLUID PRESSURE DIRECTED TO PREVENT TCC APPLY

Lock Up Relay Valve

1-2 reverse clutch (39) fluid is also routed to the lock up relay valve. Here it assists converter feed (3) fluid pressure and spring force to hold the valve in the released position, thus preventing torque converter clutch apply.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE

 © 2011 Mitchell Repair Information Company, LLC.

23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

 © 2011 Mitchell Repair Information Company, LLC.

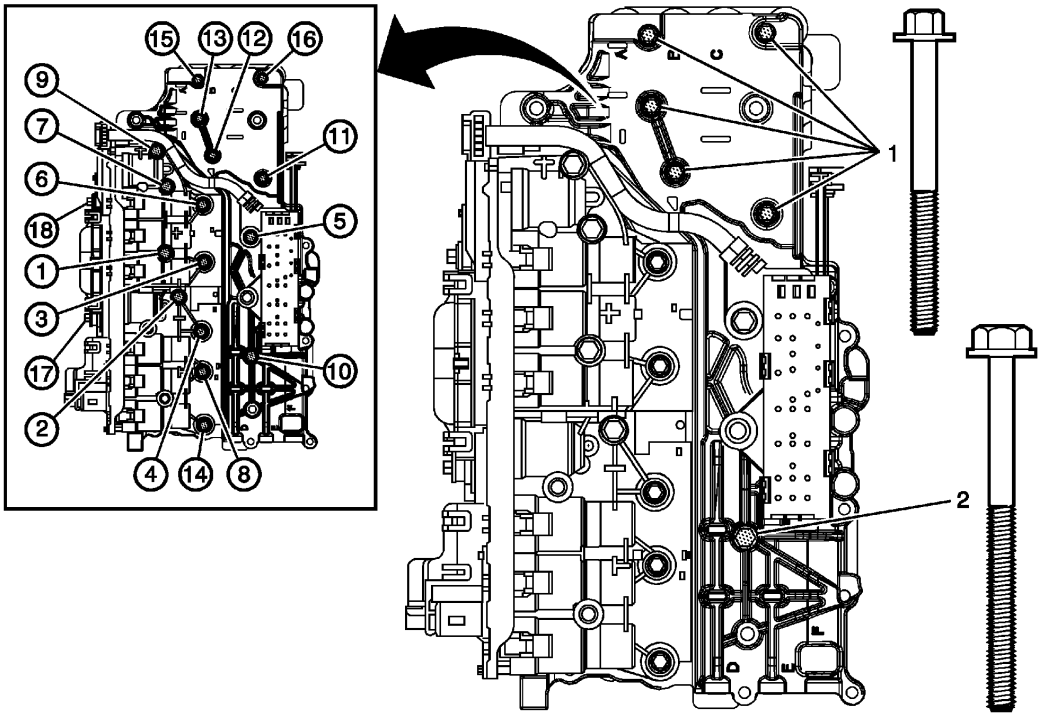


Fig. 427: Park - Engine Running
Courtesy of GENERAL MOTORS CORP.

Reverse

When the gear selector lever is moved to the REVERSE (R) position (from the PARK position) the following changes occur in the transmission's hydraulic and electrical systems.

PRESSURE REGULATION

Manual Valve

With the manual valve in the REVERSE position, line (2) pressure is directed into the reverse (22) fluid circuit.

Primary Pressure Regulator Valve

Reverse (22) fluid pressure, at the primary regulator valve plunger, boosts line (2) pressure for the additional torque requirements in REVERSE. Throttle signal (10) fluid pressure from the line pressure control solenoid valve (SLT) acting on the primary regulator valve plunger also helps determine line (2) pressure in REVERSE depending on throttle position and other TCM input signals.

LOW AND REVERSE CLUTCH (B3) ASSEMBLY APPLIES

#7 Accumulator Check Valve Assembly

Reverse (22) fluid pressure is routed to the #7 accumulator check valve assembly where it passes into the reverse clutch (23) circuit. Reverse (22) fluid pressure moves the check valve against spring force in order to cushion the apply of the low and reverse clutch.

 © 2011 Mitchell Repair Information Company, LLC.

M1 Shift Valve

Reverse clutch (23) fluid passes through the M1 shift valve into the low and reverse clutch (24) fluid circuit.

Low and Reverse Clutch (B3) Assembly

Low and reverse clutch (24) fluid is routed to the low and reverse clutch piston to apply the low and reverse clutch plates.

DIRECT CLUTCH (C2) ASSEMBLY APPLIES

Reverse Shift Solenoid (SS) Valve Assembly (S5)

The normally closed reverse SS valve assembly is energized, allowing fluid pressure in the S5 signal (18) fluid circuit to exhaust through the solenoid.

#6 Reverse Shift Ball Check Valve

Reverse (22) fluid seats the reverse shift ball check valve against the drive (19) fluid passage and enters the drive or reverse (20) fluid passage.

Shift Pressure Relay Valve

S5 signal (18) fluid is exhausted from the shift pressure relay valve and spring force moves the valve to the released position to allow drive or reverse (20) fluid to enter the direct clutch feed 1 (27) fluid circuit.

M1 Shift Valve

Direct clutch feed 1 (27) fluid passes through the M1 shift valve into the direct clutch feed 2 (28) fluid circuit.

M2 Shift Valve

Direct clutch feed 2 (28) fluid passes through the M2 shift valve into the direct clutch (29) fluid circuit.

#1 Accumulator Check Valve Assembly

Direct clutch (29) fluid pressure is routed to the #1 accumulator check valve assembly and moves the check valve against spring force in order to cushion the apply of the direct clutch.

Direct Clutch (C2) Assembly

Direct clutch (29) fluid is routed to the direct clutch piston to apply the direct clutch plates.

1-2, 2-3, Reverse Shift Solenoid (SS) Valve Assembly (S3)

The normally closed 1-2, 2-3, reverse SS valve assembly is energized. However, because there is no fluid supplied to the circuit, the 1-2, 2-3, reverse SS valve assembly has no effect in REVERSE.

PASSAGES

 © 2011 Mitchell Repair Information Company, LLC.

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2

 © 2011 Mitchell Repair Information Company, LLC.

39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

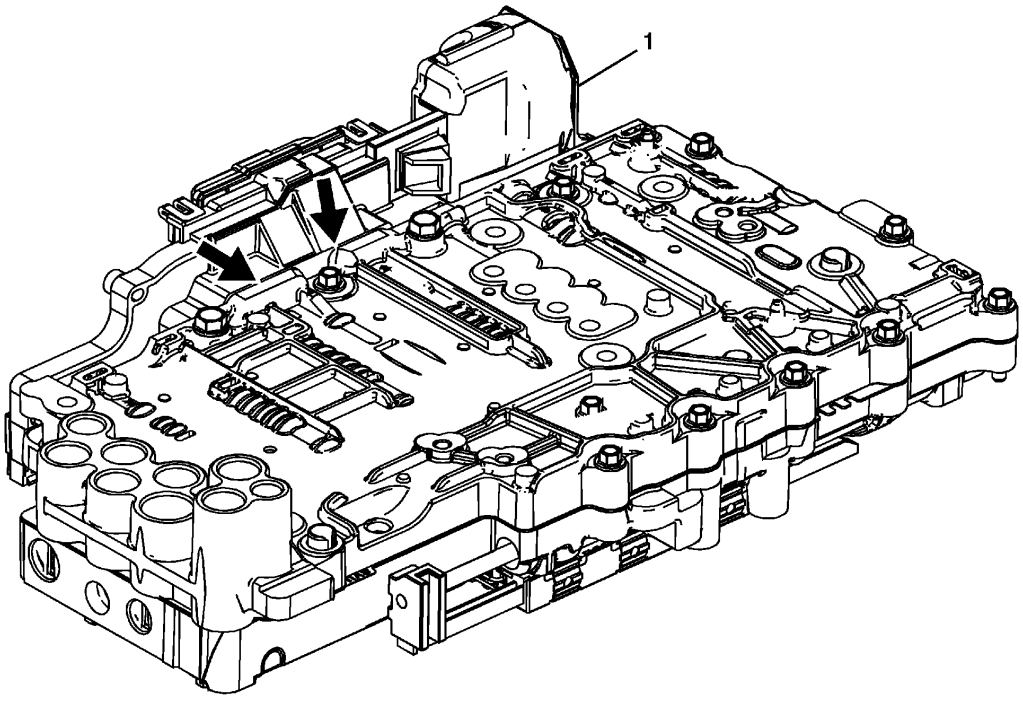


Fig. 428: Reverse
Courtesy of GENERAL MOTORS CORP.

 © 2011 Mitchell Repair Information Company, LLC.

Reverse Inhibit

If vehicle speed becomes greater than 12 km/h (7 mph) while the transmission is operating in REVERSE, the TCM commands the following changes to the transmission's hydraulic and electrical systems in order to inhibit reverse operation and prevent damage to the transmission.

LOW AND REVERSE CLUTCH (B3) ASSEMBLY RELEASES

Reverse, 1st Shift Solenoid (SS) Valve Assembly (S1)

The reverse, 1st SS valve assembly is energized, causing fluid pressure to build-up in the S1 signal (14) fluid circuit.

U1 Shift Valve

S1 signal (14) fluid is routed to the U1 shift valve and passes through the valve into the reverse inhibit (52) fluid circuit.

M1 Shift Valve

Reverse inhibit (52) fluid is routed to the M1 shift valve and applies the valve against spring force.

Reverse Shift Solenoid (SS) Valve Assembly (S5)

The reverse SS valve assembly is de-energized, causing fluid pressure to build-up in the S5 signal (18) fluid circuit.

Shift Pressure Relay Valve

S5 signal (18) fluid is routed to the shift pressure relay valve and applies the valve against spring force.

Low and Reverse Clutch (B3) Assembly

When the M1 shift valve is shifted to the applied position, reverse clutch (23) fluid is blocked and low and reverse clutch (24) fluid exhausts through the valve allowing the low and reverse clutch assembly to release.

Shift Pressure Relay Valve

Exhausting low and reverse clutch (24) fluid is routed into the B5 control 2 (38) fluid passage at the M1 shift valve, the B5 control 1 (37) fluid passage at the solenoid relay valve, the reverse control (25) fluid passage at the B5 control valve, and on to the shift pressure relay valve where it exhausts.

1-2, 2-3, Reverse Shift Solenoid (SS) Valve Assembly (S3)

The 1-2, 2-3, reverse SS valve assembly is de-energized. However, because there is no fluid supplied to the circuit, the 1-2, 2-3, reverse SS valve assembly has no effect in REVERSE INHIBIT.

DIRECT CLUTCH (C2) ASSEMBLY RELEASES

 © 2011 Mitchell Repair Information Company, LLC.

Direct Clutch (C2) Assembly

When the M1 shift valve is shifted to the applied position, direct clutch feed 1 (27) fluid is blocked and direct clutch (29) fluid pressure exhausts, allowing the direct clutch assembly to release.

M2 Shift Valve

Exhausting direct clutch (29) fluid passes through the M2 shift valve into the direct clutch feed 2 (28) fluid circuit and on to the M1 shift valve where it exhausts.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH

 © 2011 Mitchell Repair Information Company, LLC.

30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

 © 2011 Mitchell Repair Information Company, LLC.

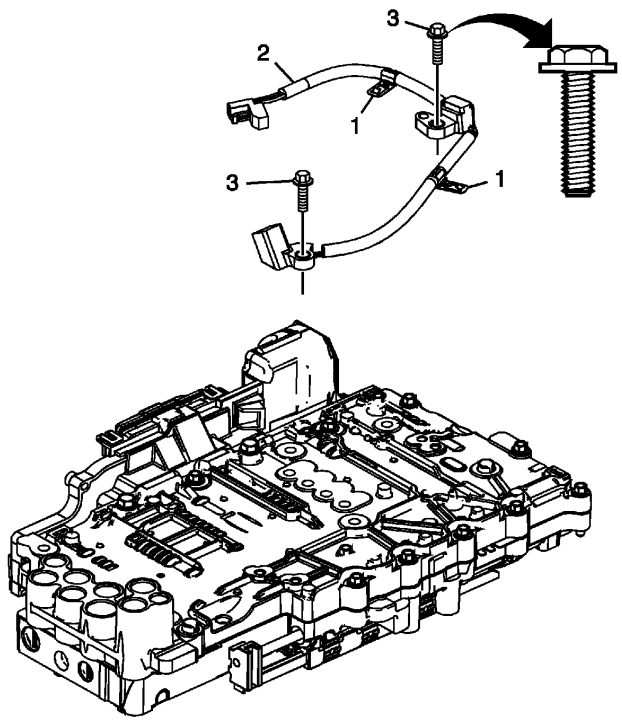


Fig. 429: Reverse - Inhibit
Courtesy of GENERAL MOTORS CORP.

Neutral - Engine Running

When the gear selector lever is moved to the NEUTRAL (N) position, the hydraulic and electrical system operation is identical to PARK (P) range. However, if NEUTRAL is selected after the vehicle was operating in REVERSE (R), the following changes would occur in the hydraulic system.

LOW AND REVERSE CLUTCH RELEASES

Manual Valve

The manual valve is moved to the NEUTRAL position and blocks line (2) pressure from entering the reverse (22) fluid circuit. The reverse (22) fluid circuit is opened to an exhaust at the manual valve.

Low and Reverse Clutch (B3) Assembly

Low and reverse clutch (24) fluid exhausts from the low and reverse clutch assembly allowing the low and reverse clutch to release.

M1 Shift Valve

Exhausting low and reverse clutch (24) fluid is routed into the reverse clutch (23) circuit at the M1 shift valve, the reverse (22) circuit at the #7 accumulator check valve assembly, and on to the manual valve where it exhausts.

Primary Pressure Regulator Valve

 © 2011 Mitchell Repair Information Company, LLC.

Reverse (22) fluid pressure also exhausts from the primary regulator valve plunger, allowing line (2) pressure to return to the normal operating range as in PARK, NEUTRAL and DRIVE gear ranges.

DIRECT CLUTCH (C2) ASSEMBLY RELEASES

Reverse Shift Solenoid (SS) Valve Assembly (S5)

The reverse SS valve assembly is de-energized, causing fluid pressure to build-up in the S5 signal (18) fluid circuit.

Shift Pressure Relay Valve

S5 signal (18) fluid is routed to the shift pressure relay valve and applies the valve against spring force.

Direct Clutch (C2) Assembly

Direct clutch (29) fluid exhausts from direct clutch assembly to the M2 shift valve allowing the direct clutch assembly to release.

M2 Shift Valve

Exhausting direct clutch (29) fluid passes through the M2 shift valve into the direct clutch feed 2 (28) fluid circuit and on to the M1 shift valve.

M1 Shift Valve

At the M1 shift valve exhausting direct clutch fluid passes from the direct clutch feed 2 (28) fluid circuit into the direct clutch feed 1 (27) fluid circuit and continues on to the shift pressure relay valve.

Shift Pressure Relay Valve

Exhausting direct clutch feed 1 (27) fluid passes through the shift pressure relay valve and enters the regulated drive or reverse (21) circuit.

Shift Pressure Control Valve

Exhausting regulated drive or reverse (21) fluid passes through the shift pressure control valve and enters the drive or reverse (20) circuit.

#6 Reverse Shift Ball Check Valve

Exhausting drive or reverse (20) fluid seats the reverse shift ball check valve against the drive (19) fluid passage, enters the reverse (22) fluid passage and continues on to an exhaust at the manual valve.

1-2, 2-3, Reverse Shift Solenoid (SS) Valve Assembly (S3)

The 1-2, 2-3, reverse SS valve assembly is de-energized. However, because there is no fluid supplied to the circuit, the 1-2, 2-3, reverse SS valve assembly has no effect in NEUTRAL.

 © 2011 Mitchell Repair Information Company, LLC.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH

 © 2011 Mitchell Repair Information Company, LLC.

37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

 © 2011 Mitchell Repair Information Company, LLC.

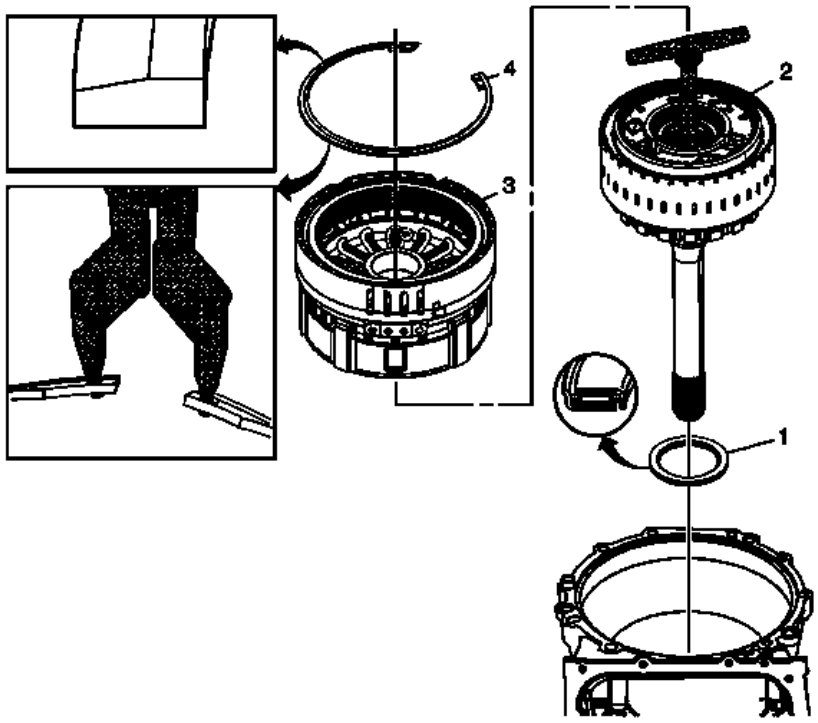


Fig. 430: Neutral - Engine Running
Courtesy of GENERAL MOTORS CORP.

Drive and Intermediate Range - First Gear

When the gear selector lever is moved to the DRIVE Range (D) position from the NEUTRAL (N) position, the following hydraulic and electrical system changes occur to shift the transmission into Drive Range - First Gear.

MANUAL VALVE

In the DRIVE position, the manual valve routes line (2) pressure into the drive (19) fluid circuit. Drive (19) fluid is routed to the neutral relay valve, the C1 control valve, the B1 control valve, the reverse shift ball check valve (#6), the B2 control valve, the U1 shift valve, the U2 shift valve, the 2-3, 3-4 shift solenoid valve assembly (S2), and the 1-2, 2-3, reverse shift solenoid valve assembly (S3).

FORWARD CLUTCH (C1) ASSEMBLY APPLIES

C1 Control Valve

Drive (19) fluid pressure is regulated through the C1 control valve into the forward clutch (26) fluid circuit.

Neutral Relay Valve

Drive (19) fluid pressure also passes through the neutral relay valve into the forward clutch (26) fluid circuit.

#12 Ball Check Valve

Located in the front control valve body assembly, drive (19) fluid pressure seats the #12 ball check valve

 © 2011 Mitchell Repair Information Company, LLC.

against the forward clutch fluid passage.

#8 Accumulator Check Valve Assembly

Forward clutch (26) fluid pressure is routed to the #8 accumulator check valve assembly and moves the check valve against spring force in order to help cushion the apply of the forward clutch.

Forward Clutch (C1) Assembly

Forward clutch (26) fluid is routed to the forward clutch piston to apply the forward clutch plates.

SHIFT ACCUMULATION

Forward Clutch (C1) Accumulator

Forward clutch (26) fluid is also directed to the forward clutch accumulator assembly. Forward clutch (26) fluid pressure moves the forward clutch accumulator piston against spring force to cushion the apply of the forward clutch.

FLUID PRESSURE DIRECTED IN PREPARATION FOR A SHIFT TO SECOND GEAR

Reverse, 1st Shift Solenoid (SS) Valve Assembly (S1)

The reverse, 1st SS valve assembly is energized, causing fluid pressure to build-up in the S1 signal (14) fluid circuit.

U1 Shift Valve

S1 signal (14) fluid is routed to the U1 shift valve and passes through the valve into the reverse inhibit (52) fluid circuit.

M1 Shift Valve

Reverse inhibit (52) fluid is routed to the M1 shift valve and applies the valve against spring force.

B2 Control Valve

Drive (19) fluid pressure is regulated through the B2 control valve into the B2 control 1 (30) fluid circuit. B2 control 1 (30) fluid pressure is routed through the U1 shift valve into the B2 control 2 (31) fluid circuit and on to the M1 shift valve where it is blocked by the valve in preparation for an upshift to second gear.

#6 Reverse Shift Ball Check Valve

Drive (19) fluid seats the reverse shift ball check valve against the reverse (22) fluid passage and enters the drive or reverse (20) fluid passage.

Shift Pressure Control Valve

The shift pressure control valve regulates drive or reverse (20) fluid pressure into the regulated drive or reverse

 © 2011 Mitchell Repair Information Company, LLC.

(21) fluid circuit. Regulated drive or reverse fluid (21) is routed to shift pressure relay valve, enters the B1 control 2 (34) fluid circuit and continues on to the M1 shift valve where it is blocked by the valve in preparation for an upshift to second gear.

IMPORTANT: Power flow for Intermediate Range - First Gear is exactly the same as Drive Range - First Gear.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1

 © 2011 Mitchell Repair Information Company, LLC.

31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

 © 2011 Mitchell Repair Information Company, LLC.

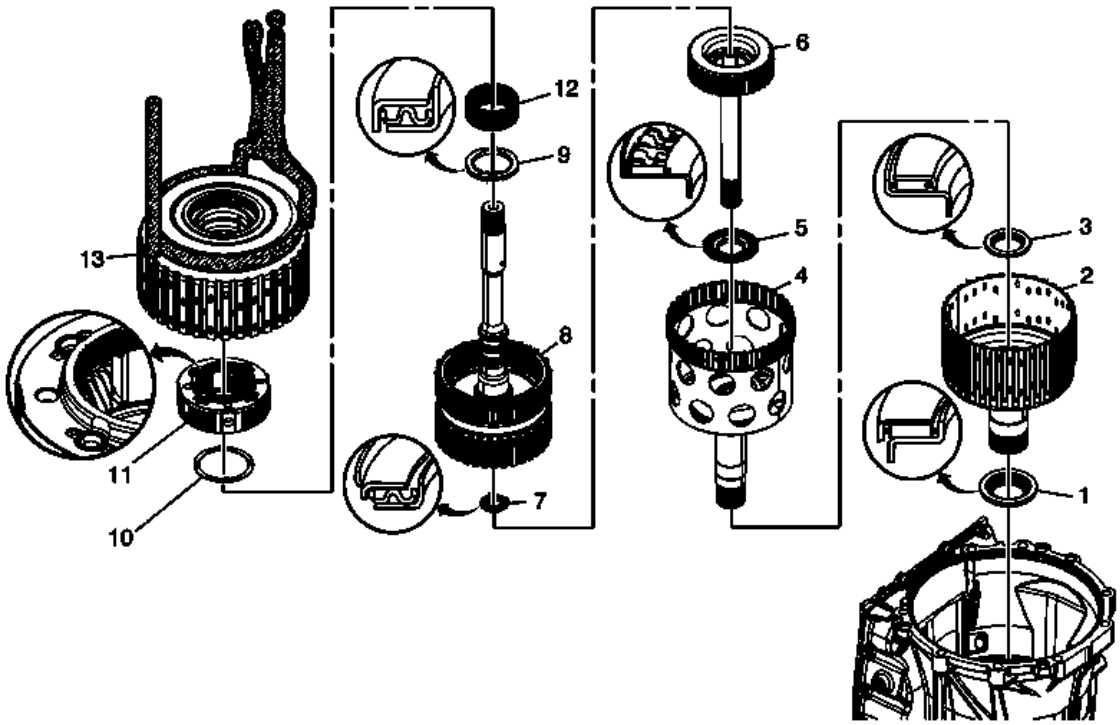


Fig. 431: Drive and Intermediate Range - First Gear
Courtesy of GENERAL MOTORS CORP.

Low Range - First Gear, Engine Braking

Low Range - First Gear is commanded by the TCM when vehicle speed is low enough not to overrev the engine (calibratable in the TCM). Changes to the hydraulic and electrical system are as follows.

IMPORTANT: Power flow for Low Range - First Gear is exactly the same as Drive Range and Intermediate Range - First Gear, with the exception that the low and reverse clutch (B3) assembly is applied in order to achieve maximum engine braking. To minimize the amount of repetitive text, the description of Low Range - First Gear includes only those components that are different from the description of Drive and Intermediate Range - First Gear. For the remaining description of First gear hydraulic power flow, refer to Drive and Intermediate Range - First Gear.

MANUAL VALVE

In the LOW (L) position, the manual valve routes line (2) pressure into the drive (19) fluid circuit exactly the same as in DRIVE (D) or INTERMEDIATE (I) range.

LOW AND REVERSE CLUTCH (B3) ASSEMBLY APPLIES

Reverse Shift Solenoid (SS) Valve Assembly (S5)

 © 2011 Mitchell Repair Information Company, LLC.

The normally closed reverse SS valve assembly is energized, allowing fluid pressure in the S5 signal (18) fluid circuit to exhaust through the solenoid.

Shift Pressure Relay Valve

S5 signal (18) fluid is exhausted from the shift pressure relay valve and spring force moves the valve to the released position to allow drive or reverse (20) fluid to enter the reverse control (25) fluid circuit. Reverse control (25) fluid pressure is routed through the B4 control valve and on to the B5 control valve.

B5 Control Valve

Reverse control (25) fluid is regulated through the B5 control valve into the B5 control 1 (37) fluid passage.

#5 Accumulator Check Valve Assembly

B5 control 1 (37) fluid pressure is routed to the #5 accumulator check valve assembly and moves the check valve against spring force in order to help cushion the apply of the low and reverse clutch.

Solenoid Relay Valve

B5 control 1 (37) fluid pressure passes through the solenoid relay valve into the B5 control 2 (38) fluid circuit. B5 control 2 (38) fluid pressure is then routed through the U1 shift valve and on to the M1 shift valve.

M1 Shift Valve

B5 control 2 (38) fluid passes through the M1 shift valve into the low and reverse clutch (24) fluid circuit.

Low and Reverse Clutch (B3) Assembly

Low and reverse clutch (24) fluid is routed to the low and reverse clutch piston to apply the low and reverse clutch plates.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)

 © 2011 Mitchell Repair Information Company, LLC.

13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE

 © 2011 Mitchell Repair Information Company, LLC.

51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

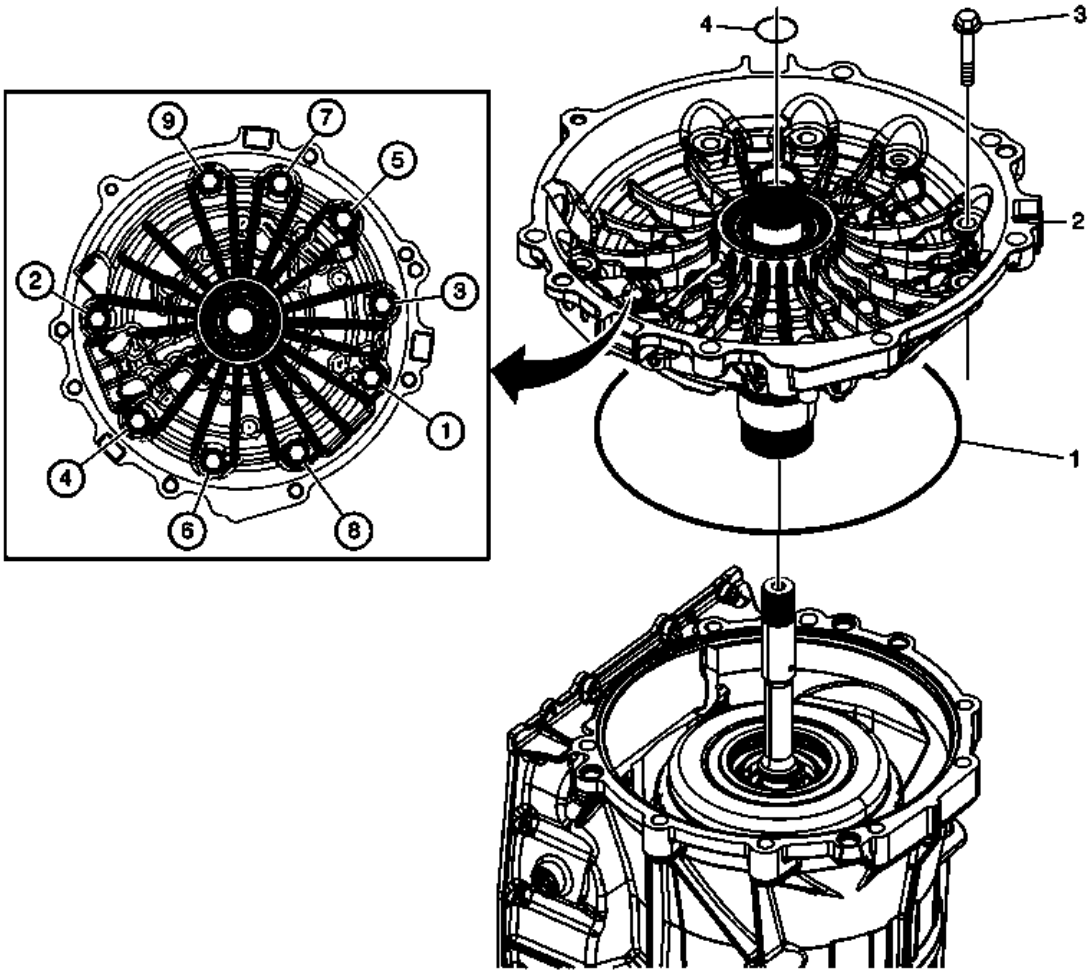


Fig. 432: Low Range - First Gear, Engine Braking
Courtesy of GENERAL MOTORS CORP.

Drive, Intermediate and Low Range - Second Gear

As vehicle speed increases and operating conditions become appropriate, the TCM de-energizes the reverse, 1st shift solenoid valve assembly (S1) and energizes the 2-3, 3-4 shift solenoid valve assembly (S2) to shift the transmission into Second gear. The manual valve remains in the DRIVE (D) position and line (2) pressure continues to feed the drive (19) fluid circuit.

 © 2011 Mitchell Repair Information Company, LLC.

SECOND CLUTCH (B2) ASSEMBLY APPLIES

Reverse, 1st Shift Solenoid (SS) Valve Assembly (S1)

The reverse, 1st SS valve assembly is de-energized, allowing fluid pressure in the S1 signal (14) fluid circuit and the reverse inhibit (52) fluid circuit to exhaust through the solenoid.

M1 Shift Valve

When reverse inhibit (52) fluid exhausts, spring force shifts the M1 shift valve to the released position. This allows B2 control 2 (31) fluid to pass through the valve into the second clutch (32) fluid circuit.

#2 Accumulator Check Valve Assembly

Second clutch (32) fluid pressure is routed to the #2 accumulator check valve assembly and moves the check valve against spring force in order to help cushion the apply of the second clutch.

Second Clutch (B2) Assembly

Second clutch (32) fluid is routed to the second clutch piston to apply the second clutch plates.

SECOND COAST CLUTCH (B1) ASSEMBLY APPLIES

M1 Shift Valve

B1 control 2 (34) fluid is routed through the M1 shift valve into the B1 control 3 (35) fluid circuit.

2-3, 3-4 Shift Solenoid (SS) Valve Assembly (S2)

The 2-3, 3-4 SS valve assembly is energized, causing fluid pressure to build-up in the S2 signal (15) fluid circuit.

M2 Shift Valve

S2 signal (15) fluid is routed to the M2 shift valve and applies the valve against spring force, allowing B1 control 3 (35) fluid to pass through the valve into the second coast clutch (36) fluid circuit.

Second Coast Clutch (B1) Assembly

Second coast clutch (36) fluid is routed to the second coast clutch piston to apply the second coast clutch plates.

FLUID PRESSURE DIRECTED IN PREPARATION FOR A SHIFT TO THIRD GEAR

Shift Pressure Relay Valve

Drive or reverse (20) fluid passes through the shift pressure relay valve into the PN12345 (47) fluid circuit.

U1 Shift Valve

PN12345 (47) fluid is routed to the U1 shift valve where it is blocked by the valve in preparation for an upshift

 © 2011 Mitchell Repair Information Company, LLC.

to third gear.

IMPORTANT: Power flow for Intermediate and Low Range - Second Gear is exactly the same as Drive Range - Second Gear.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH

 © 2011 Mitchell Repair Information Company, LLC.

33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

 © 2011 Mitchell Repair Information Company, LLC.

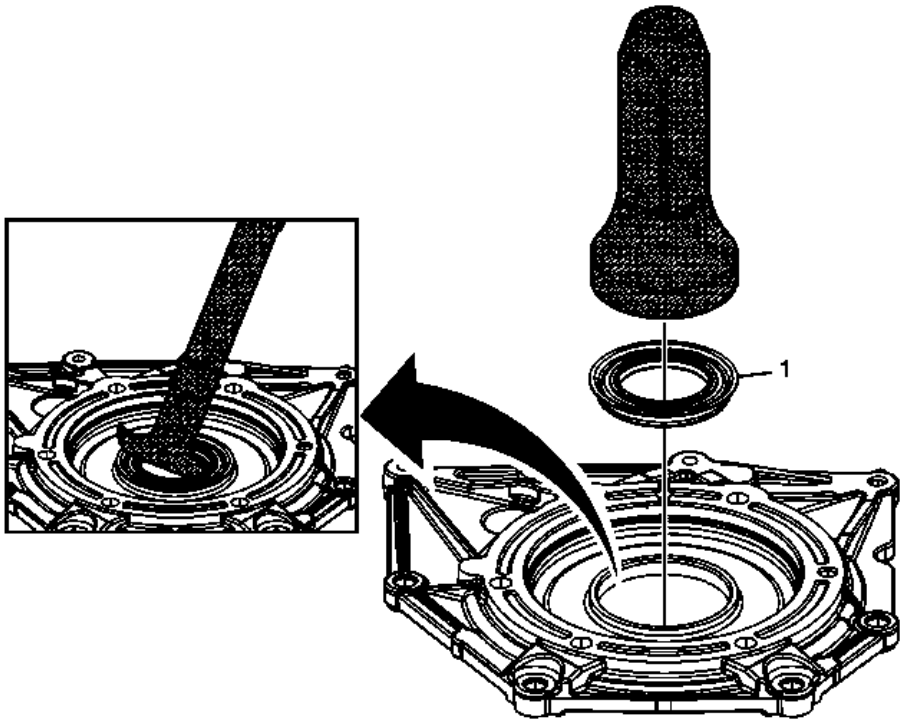


Fig. 433: Drive, Intermediate and Low Range - Second Gear
Courtesy of GENERAL MOTORS CORP.

Drive and Intermediate Range - Third Gear

As vehicle speed increases and operating conditions become appropriate, the TCM energizes the 3-4, 4-5 shift solenoid valve assembly (S4) to shift the transmission into Third gear. The manual valve remains in the DRIVE (D) position and line (2) pressure continues to feed the drive (19) fluid circuit.

3RD GEAR BAND (B4) ASSEMBLY APPLIES

3-4, 4-5 Shift Solenoid (SS) Valve Assembly (S4)

The 3-4, 4-5 SS valve assembly is energized, causing fluid pressure to build-up in the S4 signal (17) fluid circuit.

U2 Shift Valve

S4 signal (17) fluid is routed through the U2 shift valve into the 345 enable (50) fluid circuit.

U1 Shift Valve

345 enable (50) fluid is routed to the U1 shift valve and applies the valve against spring force, allowing PN12345 (47) fluid to pass through the valve into the servo feed (44) fluid circuit.

U2 Shift Valve

Servo feed (44) fluid is routed through the U2 shift valve into the servo apply (45) fluid circuit.

 © 2011 Mitchell Repair Information Company, LLC.

#9 Reverse Shift Restrict Ball Check Valve

Servo apply (45) fluid seats the reverse shift restrict ball check valve against the servo release (43) fluid passage and enters the 3rd gear band apply (46) fluid passage.

3rd Gear Band (B4) Servo Piston Assembly

3rd gear band apply (46) fluid is routed to the 3rd gear band servo piston assembly which applies the 3rd gear band assembly to hold the 4-5 clutch drum assembly.

1-2 REVERSE CLUTCH (B5) ASSEMBLY RELEASES

Solenoid Relay Valve

3rd gear band apply (46) fluid also passes through orifice #30 and, together with spring force, overcomes solenoid modulator (9) fluid pressure and moves the solenoid relay valve to the released position. This allows 1-2 reverse clutch (39) fluid to exhaust through the B5 control 2 (38) fluid circuit.

1-2 Reverse Clutch (B5) Assembly

1-2 reverse clutch (39) fluid exhausts from the 1-2 reverse clutch assembly allowing the 1-2 reverse clutch to release.

TORQUE CONVERTER CLUTCH RELEASED

Lock Up Relay Valve

1-2 reverse clutch (39) fluid also exhausts from the lock up relay valve in preparation for a possible torque converter clutch apply.

Solenoid Relay Valve

With the solenoid relay valve in the released position, lock up control (12) fluid is allowed to enter the TCC signal (13) fluid circuit.

Lock Up Control Valve

TCC signal (13) fluid is routed through the lock up relay valve and on to the lock up control valve in preparation for a possible torque converter clutch apply.

FLUID PRESSURE DIRECTED IN PREPARATION FOR A SHIFT TO FOURTH GEAR

1-2, 2-3, Reverse Shift Solenoid (SS) Valve Assembly (S3):

Drive (19) fluid passes through orifice #24 into the S3 signal (16) fluid circuit in preparation for a shift. The normally closed 1-2, 2-3, reverse SS valve assembly is energized (ON), allowing any fluid pressure in the S3 signal (16) fluid circuit to exhaust through the solenoid.

IMPORTANT: Power flow for Intermediate Range - Third Gear is exactly the same as Drive

 © 2011 Mitchell Repair Information Company, LLC.

Range - Third Gear.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2

 © 2011 Mitchell Repair Information Company, LLC.

35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

 © 2011 Mitchell Repair Information Company, LLC.

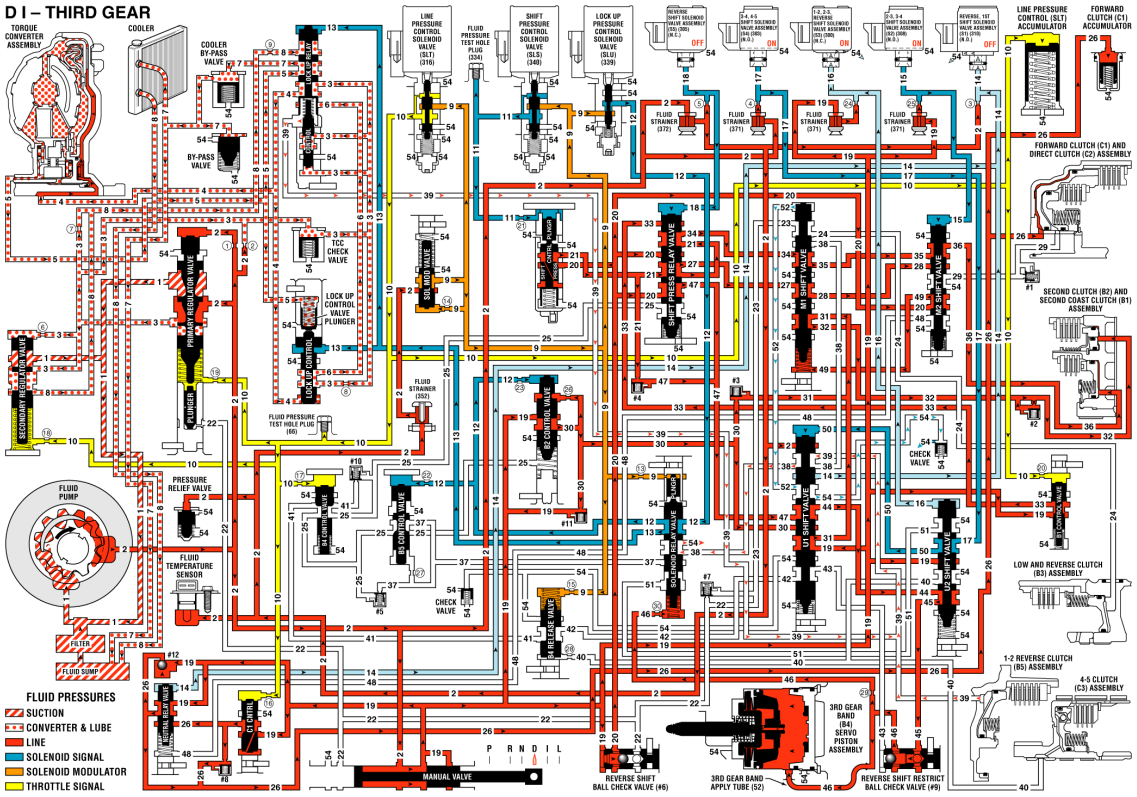


Fig. 434: Drive and Intermediate Range - Third Gear
Courtesy of GENERAL MOTORS CORP.

Drive Range - Fourth Gear

When operating conditions are appropriate, the TCM de-energizes the 1-2, 2-3, reverse shift solenoid valve assembly (S3) to shift the transmission into Fourth gear. The manual valve remains in the DRIVE (D) position and line (2) pressure continues to feed the drive (19) fluid circuit.

4-5 CLUTCH (C3) ASSEMBLY APPLIES

1-2, 2-3, Reverse Shift Solenoid (SS) Valve Assembly (S3)

The 1-2, 2-3, reverse SS valve assembly is de-energized, allowing fluid pressure to build-up in the S3 signal (16) fluid circuit.

U2 Shift Valve

S3 signal (14) fluid is routed to the U2 shift valve and shifts the valve against spring force to the applied position. This allows servo feed (44) fluid to pass into the 4-5 clutch (40) fluid circuit.

4-5 Clutch (C3) Assembly

4-5 clutch (40) fluid is routed to the 4-5 clutch piston to apply the 4-5 clutch plates.

B4 Release Valve

 © 2011 Mitchell Repair Information Company, LLC.

4-5 clutch (40) fluid is also routed through orifice #28 to the B4 release valve and shifts the valve against spring force to the applied position.

3RD GEAR BAND (B4) ASSEMBLY RELEASES

3rd Gear Band (B4) Servo Piston Assembly

When the U2 shift valve shifts to the applied position, 3rd gear band apply (46) fluid and servo apply (45) fluid exhaust through the valve allowing the 3rd gear band servo piston assembly and the 3rd gear band assembly to release.

#9 Reverse Shift Restrict Ball Check Valve

Exhausting 3rd gear band apply (46) fluid seats the reverse shift restrict ball check valve against the servo release (43) fluid passage and enters the servo apply (45) fluid passage.

U2 Shift Valve

Servo apply (45) fluid is routed to the U2 shift valve where it exhausts

TORQUE CONVERTER CLUTCH RELEASED

U2 Shift Valve

With the U2 shift valve in the applied position, S4 signal (17) fluid passes through the valve into the 45 enable (51) fluid circuit.

Solenoid Relay Valve

45 enable (51) fluid is routed to the solenoid relay valve and replaces exhausting 3rd gear band apply (46) fluid to hold the valve in the released position. With the solenoid relay valve in the released position, lock up control (12) fluid is allowed to enter the TCC signal (13) fluid circuit. TCC signal (13) fluid is routed through the lock up relay valve and on to the lock up control valve in preparation for a possible torque converter clutch apply.

FLUID PRESSURE DIRECTED IN PREPARATION OR A SHIFT TO FIFTH GEAR

M2 Shift Valve

Direct clutch feed 2 (28) fluid is routed to the M2 shift valve where it is blocked by the valve in preparation for an upshift to fifth gear.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY

 © 2011 Mitchell Repair Information Company, LLC.

6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE

 © 2011 Mitchell Repair Information Company, LLC.

44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

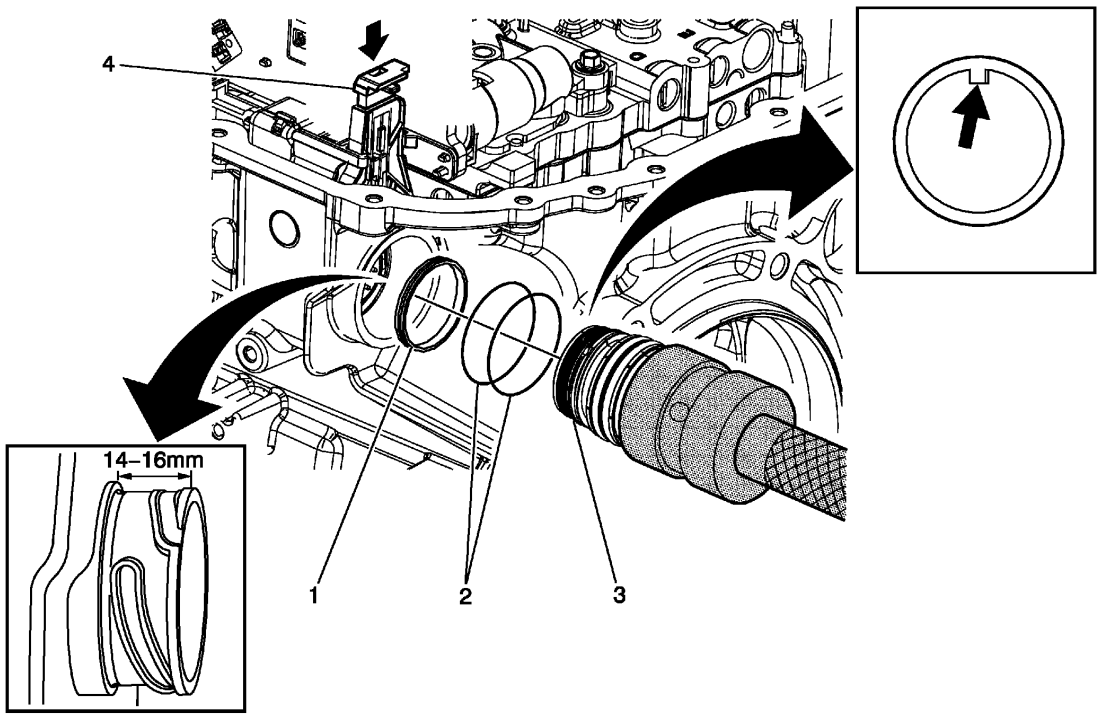


Fig. 435: Drive Range - Fourth Gear
Courtesy of GENERAL MOTORS CORP.

Drive Range Fifth Gear - Torque Converter Clutch Released

Drive Range - Fifth Gear is used to maximize engine efficiency and fuel economy under most normal driving conditions. When operating conditions are appropriate, the TCM de-energizes the 2-3, 3-4 shift solenoid valve assembly (S2) to shift the transmission into Fifth gear. The manual valve remains in the DRIVE (D) position

 © 2011 Mitchell Repair Information Company, LLC.

and line (2) pressure continues to feed the drive (19) fluid circuit.

DIRECT CLUTCH (C2) ASSEMBLY APPLIES

2-3, 3-4 Shift Solenoid (SS) Valve Assembly (S2)

The 2-3, 3-4 SS valve assembly is de-energized, allowing fluid pressure in the S2 signal (15) fluid circuit to exhaust through the solenoid.

M2 Shift Valve

When S2 signal (15) fluid exhausts, spring force shifts the M2 shift valve to the released position, allowing direct clutch feed 2 (28) fluid to pass through the valve into the direct clutch (29) fluid circuit.

#1 Accumulator Check Valve Assembly

Direct clutch (29) fluid pressure is routed to the #1 accumulator check valve assembly and moves the check valve against spring force in order to cushion the apply of the direct clutch.

Direct Clutch (C2) Assembly

Direct clutch (29) fluid is routed to the direct clutch piston to apply the direct clutch plates.

SECOND COAST CLUTCH (B1) ASSEMBLY RELEASES

Second Coast Clutch (B1) Assembly

When the M2 shift valve shifts to the released position, second coast clutch (36) fluid exhausts through the valve allowing the second coast clutch to release.

TORQUE CONVERTER CLUTCH RELEASED

At this time, the torque converter clutch remains released and TCC signal (13) fluid remains available at the lock up control valve in preparation for a possible torque converter clutch apply. When conditions are appropriate, the TCM ramps up the duty cycle of the lock up pressure control solenoid valve (SLU) to initiate the TCC apply. Refer to **Drive Range Fifth Gear - Torque Converter Clutch Applied**.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE

 © 2011 Mitchell Repair Information Company, LLC.

9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY

 © 2011 Mitchell Repair Information Company, LLC.

47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

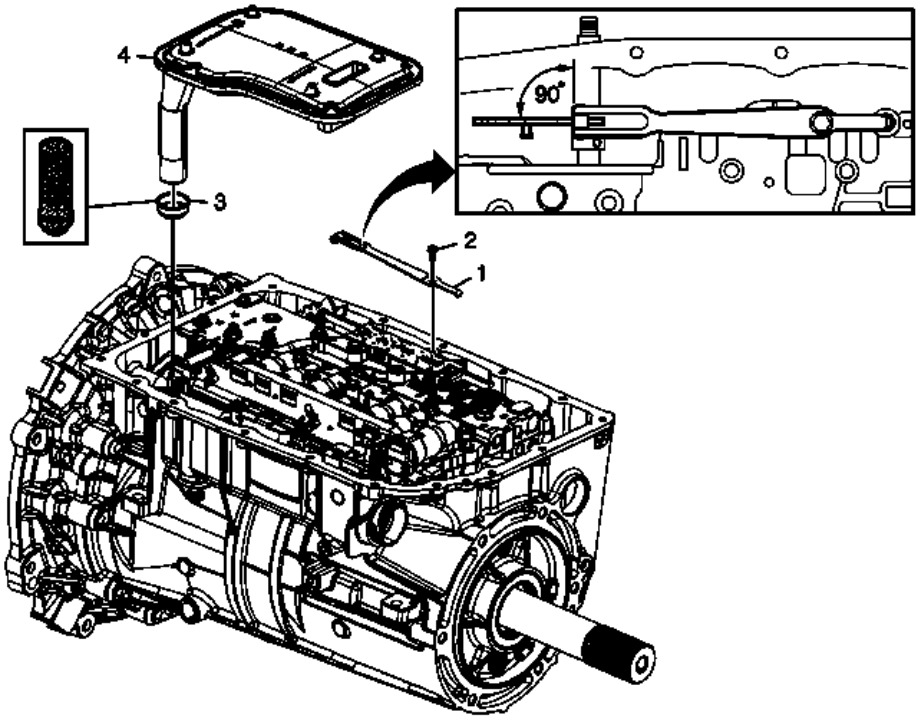


Fig. 436: Drive Range Fifth Gear - TCC Released
Courtesy of GENERAL MOTORS CORP.

Drive Range Fifth Gear - Torque Converter Clutch Applied

When the transmission control module (TCM) determines that the engine and transmission are operating properly to engage the torque converter clutch (TCC), the TCM regulates the duty cycle of the lock up pressure control solenoid valve (SLU).

At this time the Torque Converter Clutch is considered to be disengaged (OFF), lock up pressure control solenoid valve maintains a 90 percent duty cycle.

 © 2011 Mitchell Repair Information Company, LLC.

TCM decision to apply the TCC. The following events occur in order to apply the torque converter clutch.

Stage 1

The TCM immediately decreases the lock up pressure control solenoid valve duty cycle to 0 percent and then pulses the lock up pressure control solenoid valve to approximately 25 percent duty cycle. Solenoid modulator (9) fluid at the lock up pressure control solenoid valve is pulsed into the lock up control (12) fluid circuit. Lock up control (12) fluid is routed to the solenoid relay valve and passes through the valve into the TCC signal (13) fluid circuit. TCC signal (13) fluid is then directed to the lock up relay valve and the lock up control valve. The TCC signal (13) fluid pressure at this point is strong enough to move the lock up relay, and lock up control valves against spring force. The lock up relay valve moves and allows release (4) fluid to begin to exhaust from the torque converter and enter the exhaust enable (6) fluid circuit. The lock up control valve moves and allows release (4)/exhaust enable (6) fluid to exhaust into the sump. This stage is designed to move the lock up relay and lock up control valves from the released position toward the applied position; there is not yet enough pressure to apply the TCC.

Stage 2

The lock up pressure control solenoid valve duty cycle is ramped up to approximately 50 percent. Apply (5) fluid pressure is now strong enough to cause the converter apply to occur. Converter feed (3) pressure enters the apply (5) circuit at the lock up relay valve. The pressure value in the apply (5) circuit should now be high enough to fully apply the TCC pressure plate. Slip speed should be at the correct value (near "0"). In vehicles equipped with the Electronically Controlled Clutch Capacity (ECCC) system, the pressure plate does not fully lock to the torque converter cover. It is instead precisely controlled to maintain a small amount of slippage between the engine and the turbine, reducing driveline torsional disturbances.

Stage 3

If it is determined by the TCM that it is desirable to fully lock the TCC, apply (5) fluid pressure is increased. This is caused by the lock up pressure control solenoid valve duty cycle being increased to approximately 98 percent. This extra pressure ensures that the apply force on the TCC pressure plate is not at the slip threshold, but in the condition of full lock up. TCC plate material is therefore protected from excessive heat.

When the TCC pressure plate is applied, it is held against the torque converter cover. Since it is splined to the converter turbine hub, it provides a mechanical coupling (direct drive) of the engine to the transmission gear sets. This mechanical coupling eliminates the small amount of slippage that occurs in the fluid coupling of a torque converter, resulting in a more efficient transfer of engine torque through the transmission and to the drive wheels.

At this time the Torque Converter Clutch is considered to be engaged (ON).

IMPORTANT: Under normal operating conditions the torque converter clutch is in the released position while the transmission is operating in the INTERMEDIATE or LOW Ranges. However, when the transmission fluid temperatures exceed approximately 121°C (250°F), the TCM will apply the torque converter clutch in INTERMEDIATE or LOW Range to help reduce fluid temperatures.

PASSAGES

 © 2011 Mitchell Repair Information Company, LLC.

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)
13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2

 © 2011 Mitchell Repair Information Company, LLC.

39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE
51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

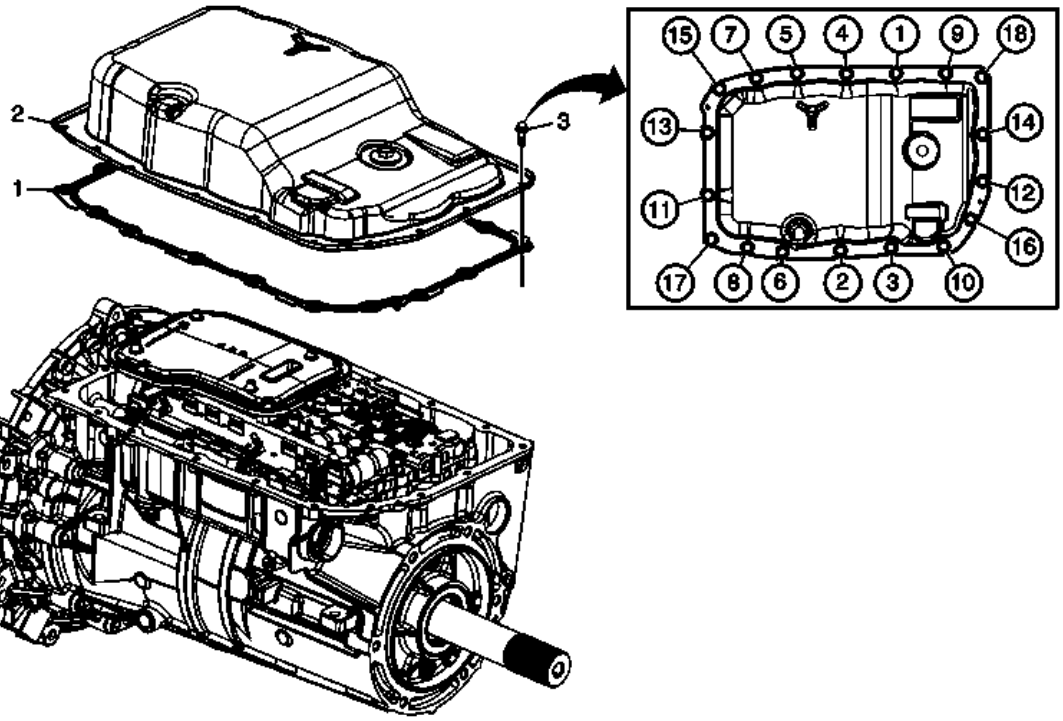


Fig. 437: Drive Range Fifth Gear - TCC Applied
Courtesy of GENERAL MOTORS CORP.

 © 2011 Mitchell Repair Information Company, LLC.

Drive Range - Emergency Fifth Gear

If for any reason the entire electronic control system of the transmission become disabled, all five of the shift solenoid valves will be de-energized (OFF). This EMERGENCY MODE operating state of the solenoids forces the transmission to operate in Fifth gear regardless of other vehicle operating conditions when the gear selector lever is in a forward range. Also, in EMERGENCY MODE, the lock up pressure control solenoid valve is turned OFF in order to prevent TCC apply. This allows the vehicle to be operated safely, despite the disabled controls, until the condition can be corrected.

If EMERGENCY MODE is enabled while the transmission is operating in DRIVE Range, the transmission will assume a Fifth gear hydraulic power flow state with the following exceptions.

3-4, 4-5 SHIFT SOLENOID VALVE ASSEMBLY (S4) DE-ENERGIZED

3-4, 4-5 Shift Solenoid (SS) Valve Assembly (S4)

The 3-4, 4-5 SS valve assembly is de-energized, allowing fluid pressure in the S4 signal (17) fluid circuit to exhaust through the solenoid.

Solenoid Relay Valve

45 enable (51) fluid pressure exhausts from the solenoid relay valve, passes through the U2 shift valve into the S4 signal (17) fluid circuit and continues on to the 3-4, 4-5 SS valve assembly where it exhausts into the sump.

LOCK UP PRESSURE CONTROL SOLENOID VALVE (SLU) DE-ENERGIZED

Lock Up Pressure Control Solenoid Valve (SLU)

The lock up pressure control solenoid valve is de-energized, allowing lock up control (12) fluid and TCC signal (13) fluid to exhaust through the solenoid.

PASSAGES

1. SUCTION
2. LINE
3. CONVERTER FEED
4. RELEASE
5. APPLY
6. EXHAUST ENABLE
7. COOLER
8. LUBE
9. SOLENOID MODULATOR
10. THROTTLE SIGNAL (SLT)
11. SHIFT CONTROL (SLS)
12. LOCK UP CONTROL (SLU)

 © 2011 Mitchell Repair Information Company, LLC.

13. TCC SIGNAL
14. S1 SIGNAL
15. S2 SIGNAL
16. S3 SIGNAL
17. S4 SIGNAL
18. S5 SIGNAL
19. DRIVE
20. DRIVE OR REVERSE
21. REGULATED DRIVE OR REVERSE
22. REVERSE
23. REVERSE CLUTCH
24. LOW AND REVERSE CLUTCH
25. REVERSE CONTROL
26. FORWARD CLUTCH
27. DIRECT CLUTCH FEED 1
28. DIRECT CLUTCH FEED 2
29. DIRECT CLUTCH
30. B2 CONTROL 1
31. B2 CONTROL 2
32. SECOND CLUTCH
33. B1 CONTROL 1
34. B1 CONTROL 2
35. B1 CONTROL 3
36. SECOND COAST CLUTCH
37. B5 CONTROL 1
38. B5 CONTROL 2
39. 1-2 REVERSE (B5) CLUTCH
40. 4-5 CLUTCH
41. B4 CONTROL
42. B4 RELEASE
43. SERVO RELEASE
44. SERVO FEED
45. SERVO APPLY
46. 3RD GEAR BAND APPLY
47. PN12345
48. PRN15
49. 234NCON
50. 345 ENABLE

 © 2011 Mitchell Repair Information Company, LLC.

51. 45 ENABLE
52. REVERSE INHIBIT
53. VENT
54. EXHAUST
55. SUMP
56. VOID
57. TORQUE CONVERTER SEAL DRAINBACK

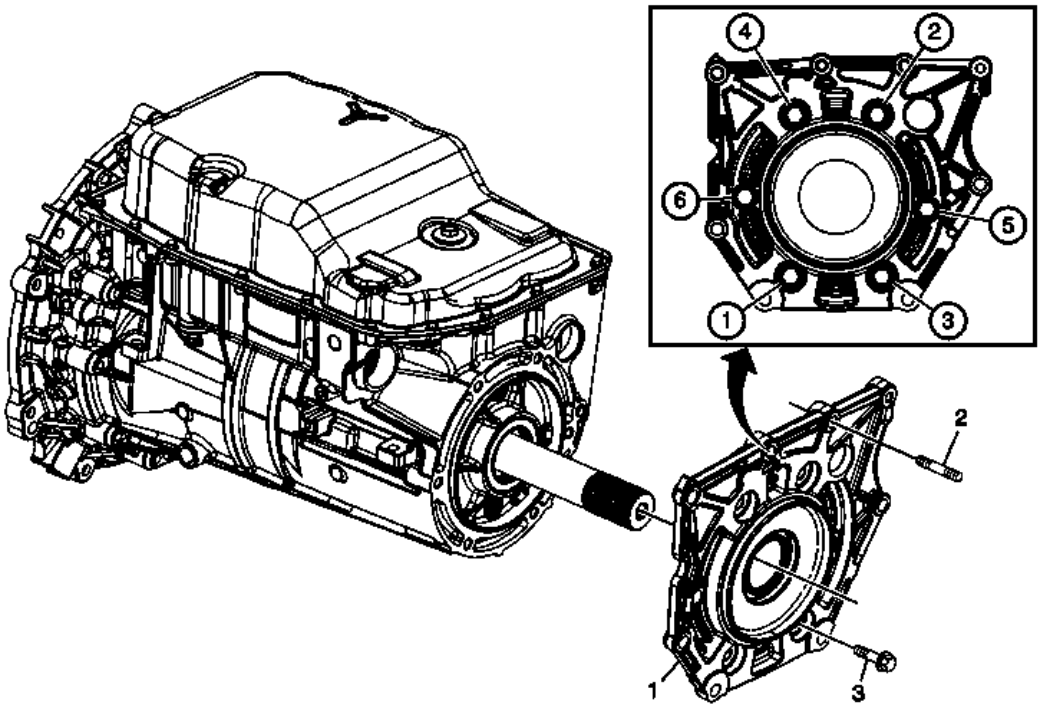


Fig. 438: Drive Range - Emergency Fifth Gear
Courtesy of GENERAL MOTORS CORP.

FLUID PASSAGES

 © 2011 Mitchell Repair Information Company, LLC.

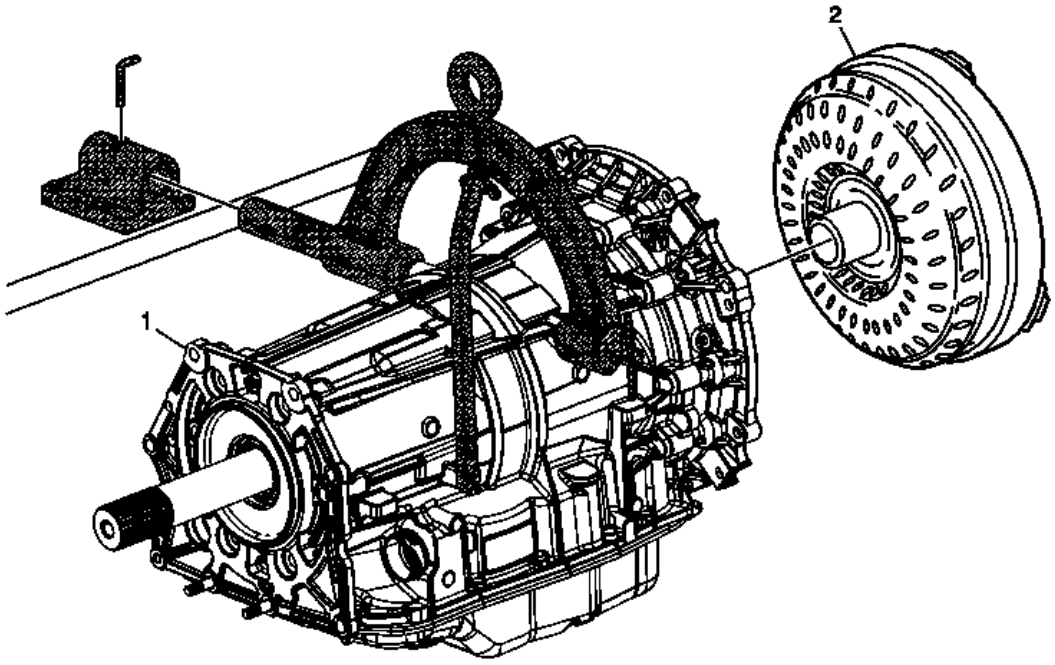


Fig. 439: Torque Converter Housing Assembly & Fluid Pump Body Fluid Passages (Transmission Case Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
66	Automatic Transmission Fluid Pressure Test Hole Plug - UNF 5/16-24-2A
202	Fluid Pump Body
804	Lube Fluid Pipe
815	Automatic Transmission Vent Assembly
819	Transmission Fluid Drain Plug
1	Suction
1	Suction
2	Line
2	Line
2	Line
2	Line
2	Line
4	Release
4	Release
5	Apply
8	Lube
8	Lube
8	Lube
8	Lube

 © 2011 Mitchell Repair Information Company, LLC.

32	Second Clutch
36	Second Coast Clutch
46	3rd Gear Band Apply
46	3rd Gear Band Apply
53	Vent
53	Vent
55	Sump
55	Sump
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
57	Torque Converter Seal Drainback
57	Torque Converter Seal Drainback

 © 2011 Mitchell Repair Information Company, LLC.

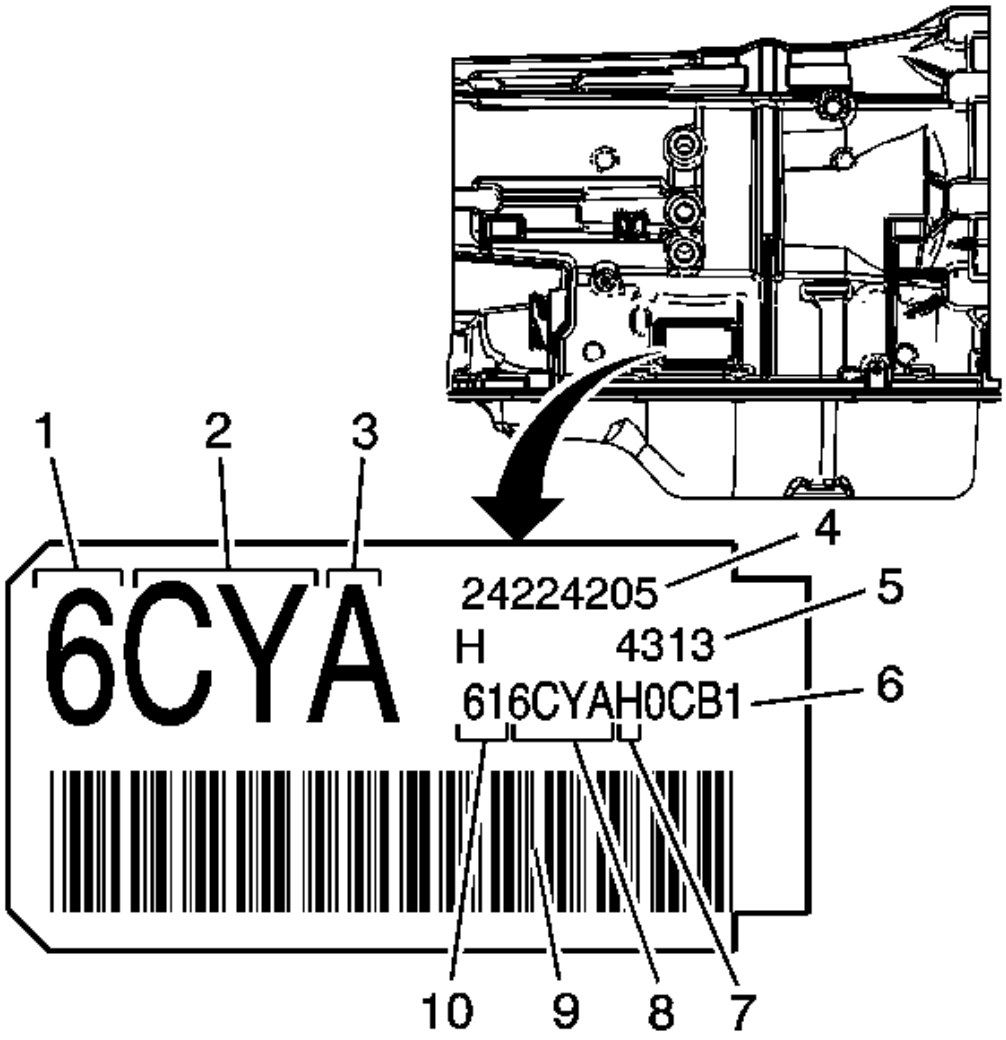
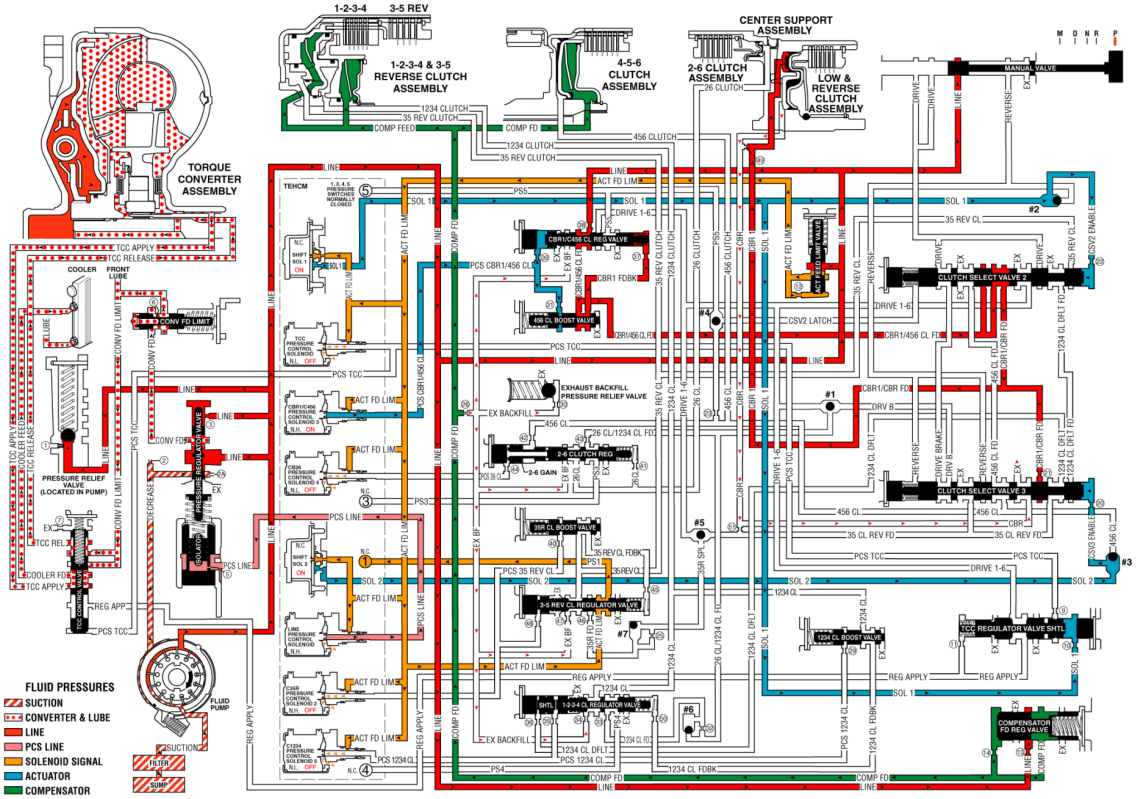


Fig. 440: Fluid Pump Plate Fluid Passages (Fluid Pump Body Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Suction
1	Suction
1	Suction
2	Line
2	Line
2	Line

 © 2011 Mitchell Repair Information Company, LLC.

4	Release
4	Release
5	Apply
5	Apply
32	Second Clutch
32	Second Clutch
36	Second Coast Clutch
36	Second Coast Clutch
46	3rd Gear Band Apply
46	3rd Gear Band Apply
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
57	Torque Converter Seal Drainback



 © 2011 Mitchell Repair Information Company, LLC.

Fig. 441: Fluid Pump Stator Shaft Assembly Fluid Passages (Fluid Pump Body Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Suction
1	Suction
2	Line
2	Line
4	Release
4	Release
5	Apply
5	Apply
5	Apply
32	Second Clutch
36	Second Coast Clutch
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
57	Torque Converter Seal Drainback
57	Torque Converter Seal Drainback
57	Torque Converter Seal Drainback

© 2011 Mitchell Repair Information Company, LLC.

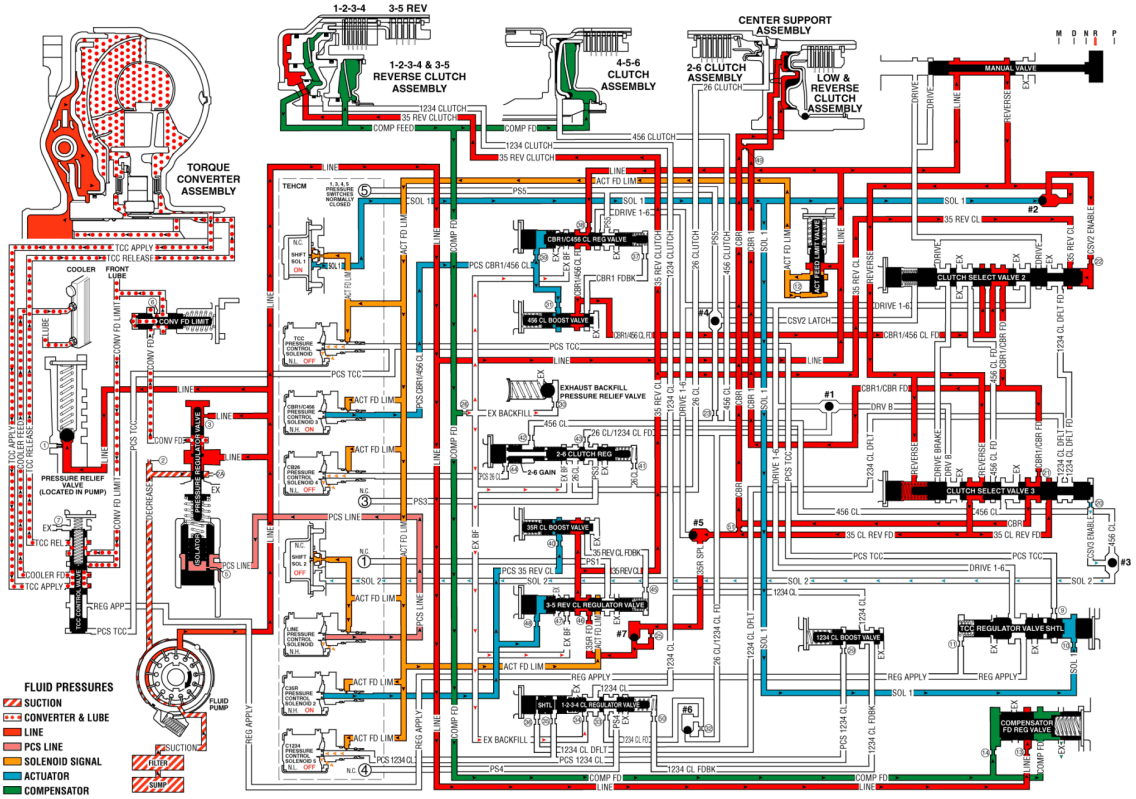


Fig. 442: Transmission Case Assembly Fluid Passages (Fluid Pump Stator Shaft Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
52	3rd Gear Band Apply Tube
54	Automatic Transmission Case Plug (M20 x 1.5 x 13.5)
66	Automatic Transmission Fluid Pressure Test Hole Plug (UNF 5/16-24-2A)
1	Suction
1	Suction
2	Line
2	Line
4	Release
4	Release
5	Apply
5	Apply
7	Cooler
7	Cooler
7	Cooler
8	Lube
8	Lube
8	Lube
32	Second Clutch

© 2011 Mitchell Repair Information Company, LLC.

32	Second Clutch
36	Second Coast Clutch
36	Second Coast Clutch
46	3rd Gear Band Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
53	Vent
53	Vent
53	Vent
54	Exhaust
54	Exhaust
55	Sump
55	Sump
55	Sump
55	Sump
56	Void

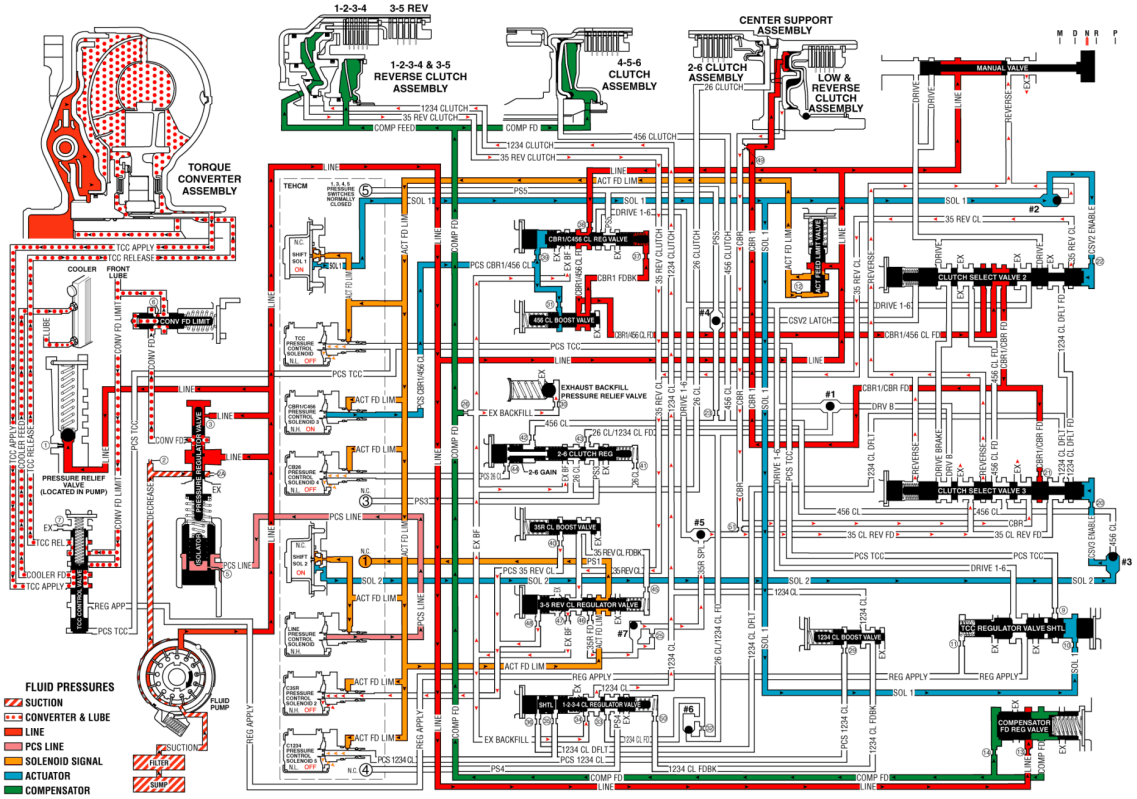


Fig. 443: Transmission Case Assembly Fluid Passages (Transmission Case Cover Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
54	Automatic Transmission Case Plug - M20 x 1.5 x 13.5

 © 2011 Mitchell Repair Information Company, LLC.

64	3rd Gear Band Anchor Bolt/Screw - M20 x 1.5 x 21
66	Automatic Transmission Fluid Pressure Test Hole Plug - UNF 5/16-24-2A
66	Automatic Transmission Fluid Pressure Test Hole Plug - UNF 5/16-24-2A
85	Lube Fluid Pipe
8	Lube
8	Lube
8	Lube
10	Throttle Signal - SLT
24	Low and Reverse Clutch
26	Forward Clutch
29	Direct Clutch
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
56	Void

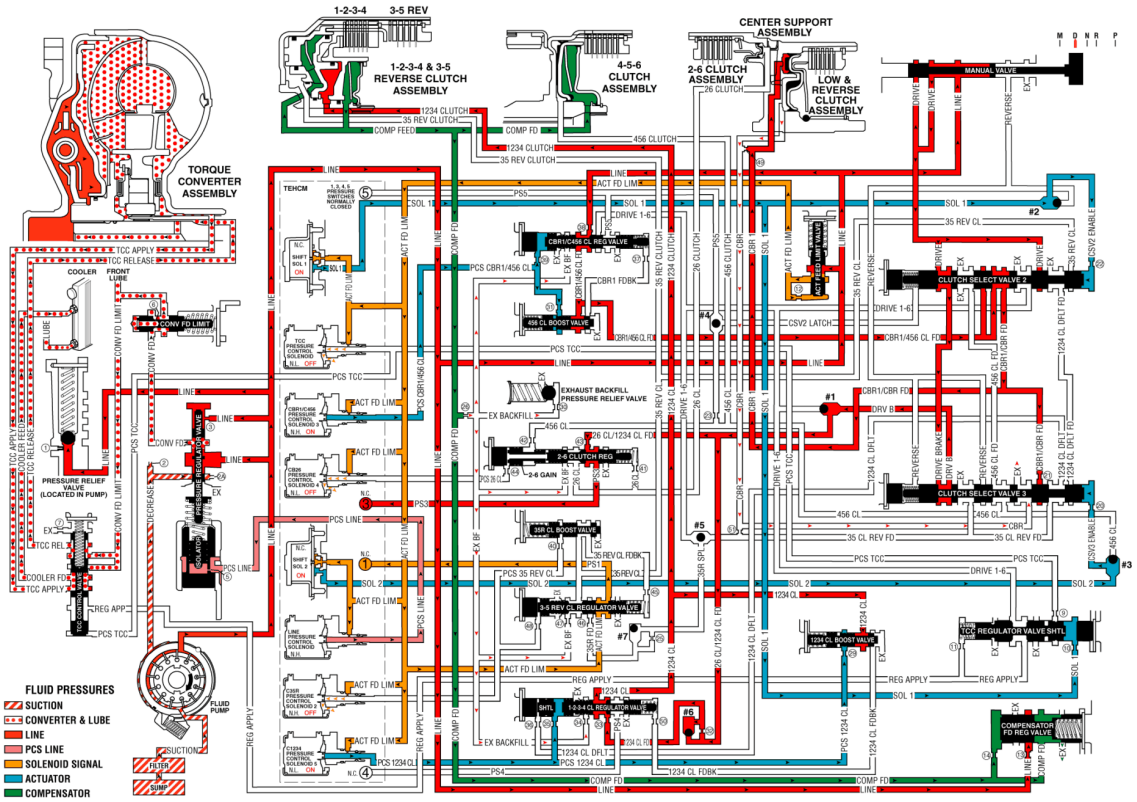


Fig. 444: Transmission Case Cover Assembly Fluid Passages (Transmission Case Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
66	Automatic Transmission Fluid Pressure Test Hole Plug - UNF 5/16-24-2A
66	Automatic Transmission Fluid Pressure Test Hole Plug - UNF 5/16-24-2A
609	4-5 Clutch Apply Pipe

 © 2011 Mitchell Repair Information Company, LLC.

8	Lube
8	Lube
26	Forward Clutch
26	Forward Clutch
26	Forward Clutch
29	Direct Clutch
29	Direct Clutch
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
40	4-5 Clutch

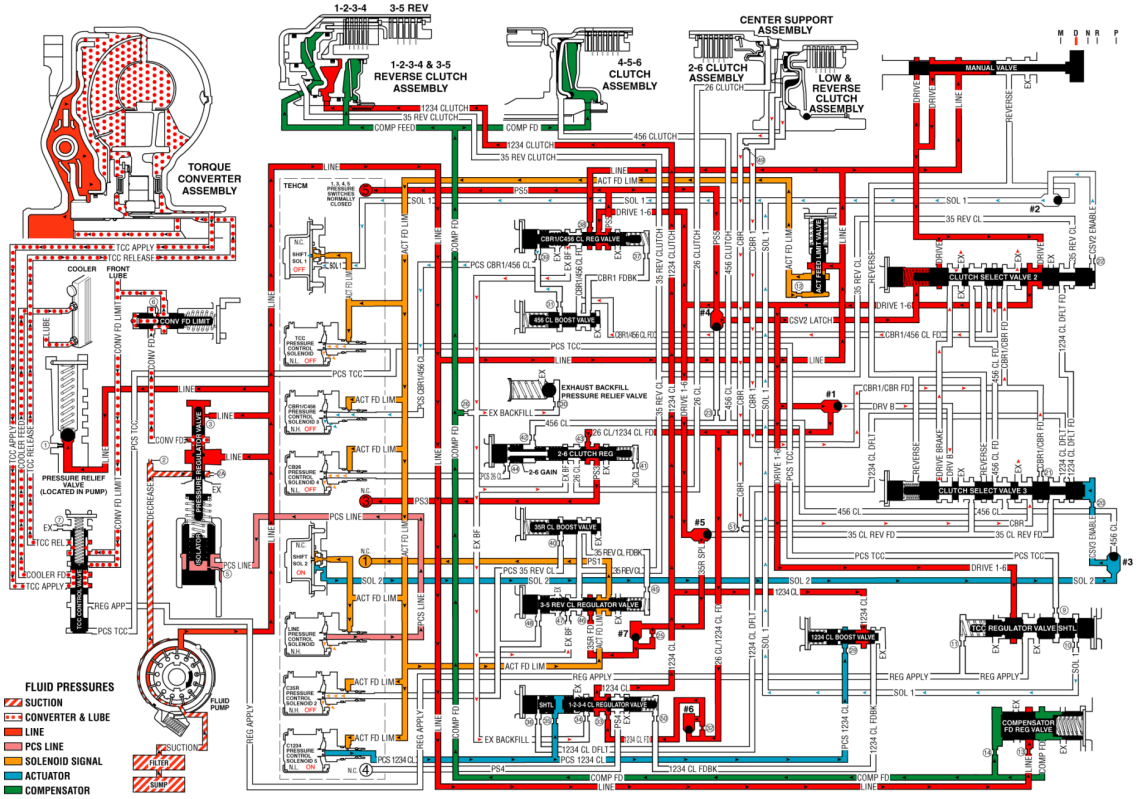


Fig. 445: Transmission Case Assembly Fluid Passages (Transmission Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
66	Automatic Transmission Fluid Pressure Test Hole Plug - UNF 5/16-24-2A
1	Suction
1	Suction
2	Line
2	Line

 © 2011 Mitchell Repair Information Company, LLC.

4	Release
5	Apply
7	Cooler
7	Cooler
8	Lube
8	Lube
8	Lube
8	Lube
8	Lube
8	Lube
10	Throttle Signal - SLT
24	Low and Reverse Clutch
26	Forward Clutch
26	Forward Clutch
29	Direct Clutch
29	Direct Clutch
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
40	4-5 Clutch
40	4-5 Clutch
46	3rd Gear Band Apply
56	Void

 © 2011 Mitchell Repair Information Company, LLC.

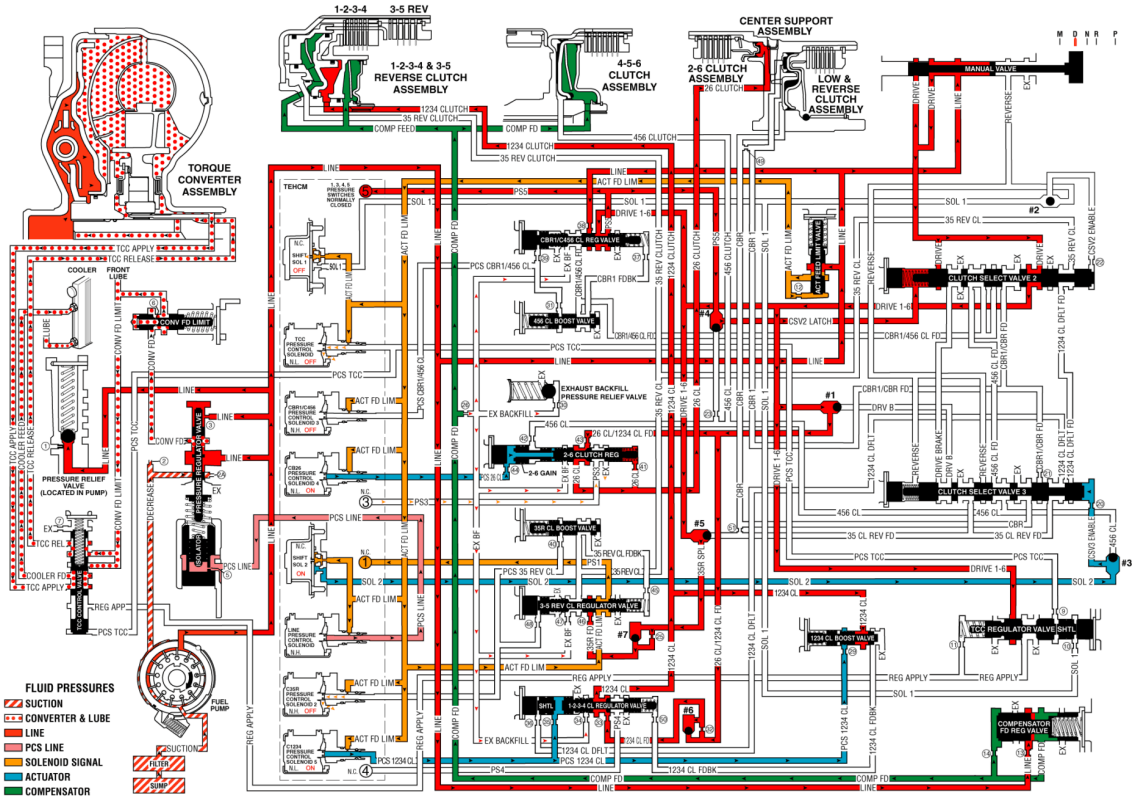


Fig. 446: No. 2 Rear Control Valve Body Assembly Fluid Passages (Rear Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
#9	Accumulator Check Valve Assembly
#10	Accumulator Check Valve Assembly
#11	Accumulator Check Valve Assembly
3	Converter Feed
3	Converter Feed
4	Release
5	Apply
6	Exhaust Enable
7	Cooler
10	Throttle Signal - SLT
12	Lock Up Control - SLU
12	Lock Up Control - SLU
13	TCC Signal
19	Drive
19	Drive
25	Reverse Control
25	Reverse Control

© 2011 Mitchell Repair Information Company, LLC.

30	B2 Control 1
30	B2 Control 1
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
56	Void
56	Void
56	Void
56	Void
56	Void

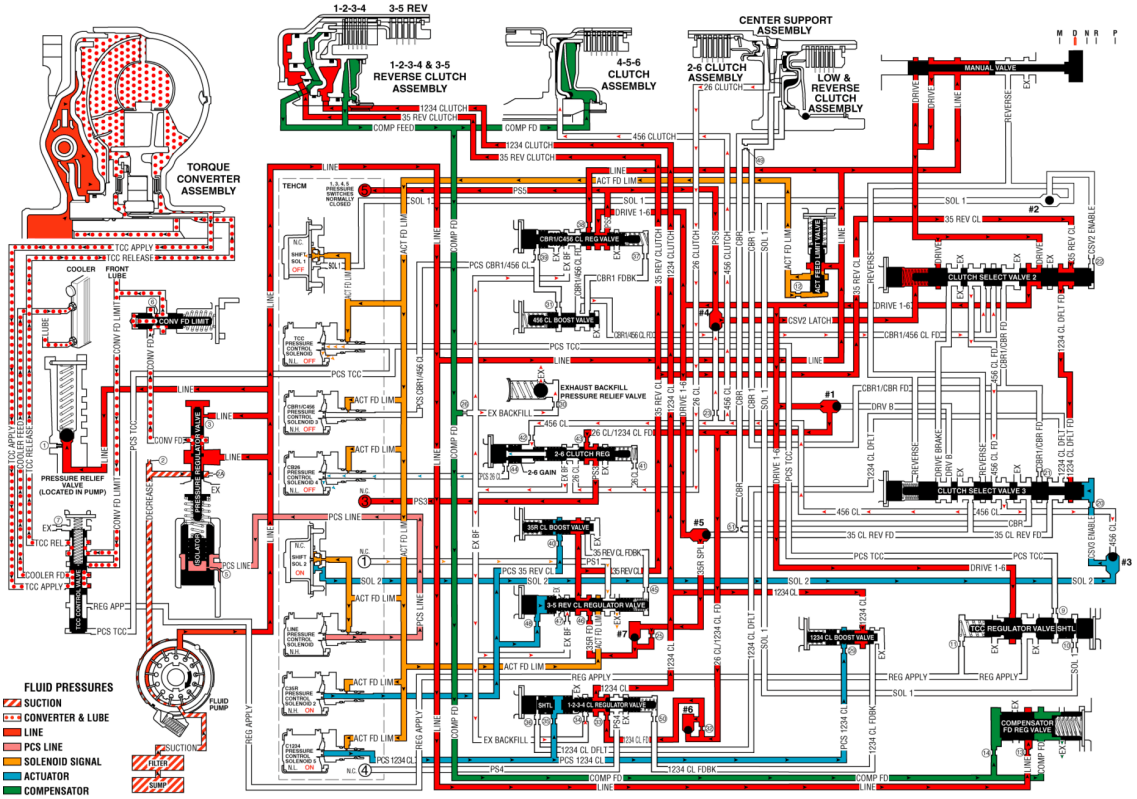


Fig. 447: Rear Control Valve Body Assembly Spacer Plate To No. 2 Rear Control Valve Body Gasket Fluid Passages (Rear Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
3	Converter Feed
3	Converter Feed

 © 2011 Mitchell Repair Information Company, LLC.

4	Release
5	Apply
6	Exhaust Enable
7	Cooler
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
12	Lock Up Control - SLU
12	Lock Up Control - SLU
12	Lock Up Control - SLU
13	TCC Signal
19	Drive
19	Drive
19	Drive
25	Reverse Control
25	Reverse Control
25	Reverse Control
25	Reverse Control
30	B2 Control 1
30	B2 Control 1
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
54	Exhaust
54	Exhaust

 © 2011 Mitchell Repair Information Company, LLC.

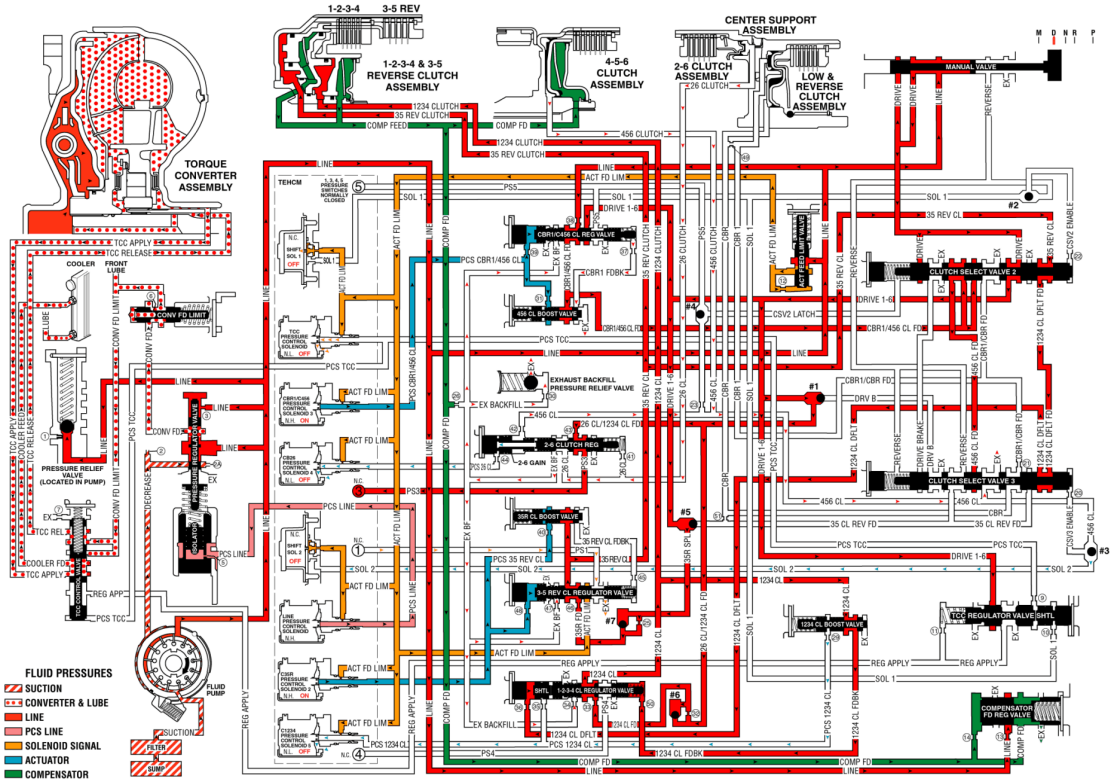


Fig. 448: Rear Control Valve Body Assembly Spacer Plate Fluid Passages (Rear Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
3	Converter Feed
3	Converter Feed
3	Converter Feed
3	Converter Feed
4	Release
5	Apply
6	Exhaust Enable
7	Cooler
7	Cooler
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
12	Lock Up Control - SLU
12	Lock Up Control - SLU
12	Lock Up Control - SLU
13	TCC Signal
19	Drive

© 2011 Mitchell Repair Information Company, LLC.

19	Drive
19/30	Drive/B2 Control 1
25	Reverse Control
25	Reverse Control
25	Reverse Control
30	B2 Control 1
30	B2 Control 1
41/25	B4 Control/Reverse Control
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
54	Exhaust
54	Exhaust

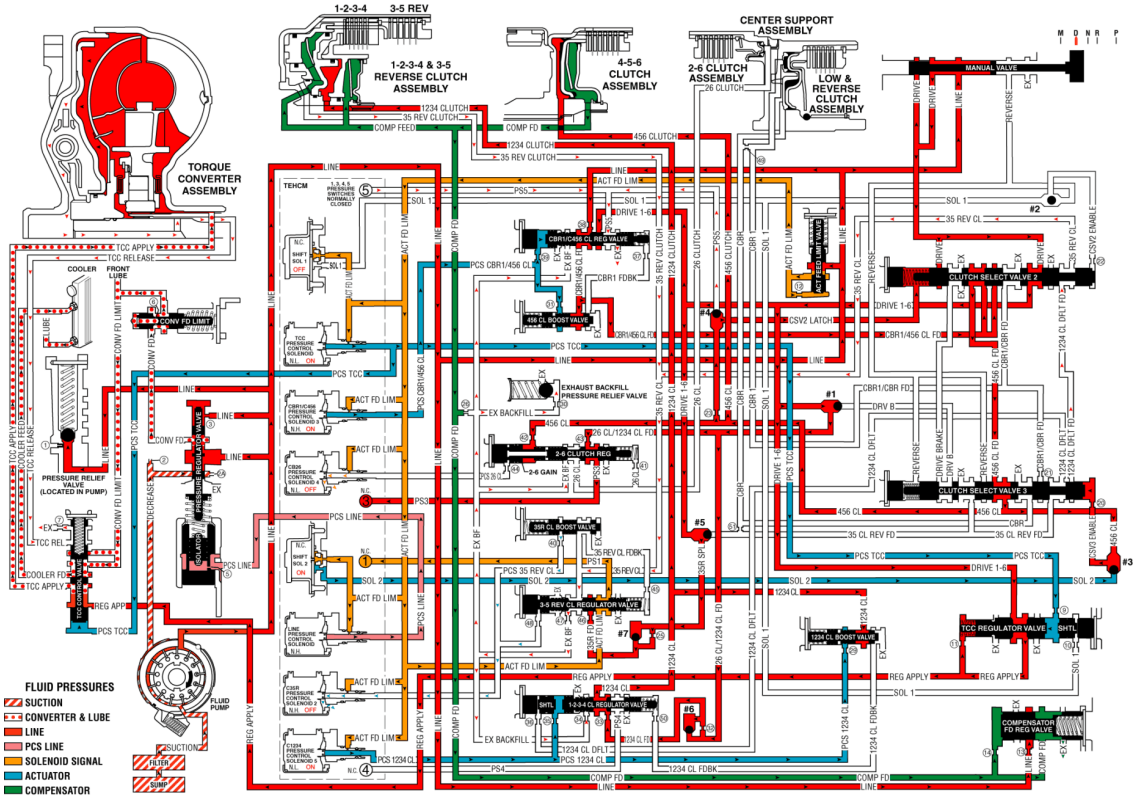


Fig. 449: Rear Control Valve Body To Rear Control Valve Body Spacer Plate Gasket Fluid Passages (Rear Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
3	Converter Feed
3	Converter Feed
3	Converter Feed

 © 2011 Mitchell Repair Information Company, LLC.

4	Release
5	Apply
6	Exhaust Enable
7	Cooler
7	Cooler
10	Throttle Signal - SLT
10	Throttle Signal SLT
10	Throttle Signal - SLT
12	Lock Up Control - SLU
12	Lock Up Control - SLU
12	Lock Up Control - SLU
13	TCC Signal
19	Drive
19	Drive
25	Reverse Control
25	Reverse Control
25	Reverse Control
30	B2 Control 1
30	B2 Control 1
30	B2 Control 1
41	B4 Control
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
54	Exhaust
54	Exhaust

 © 2011 Mitchell Repair Information Company, LLC.

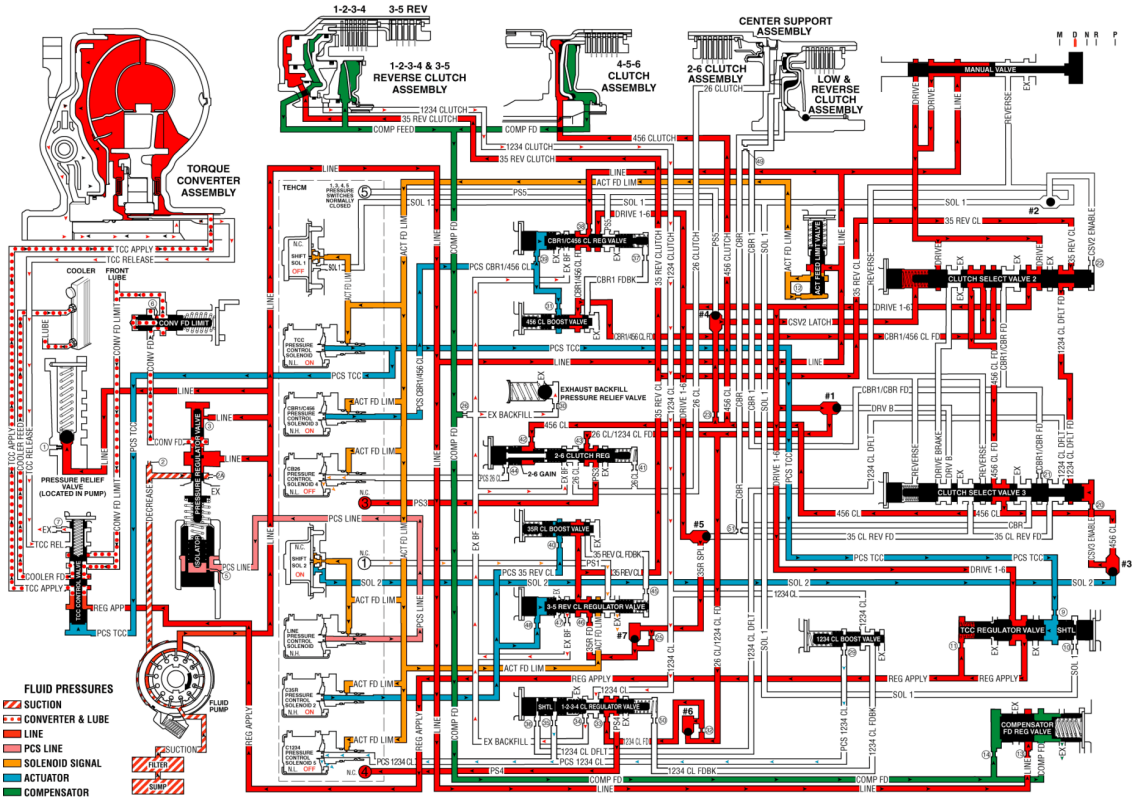


Fig. 450: Rear Control Valve Body Assembly Fluid Passages (No. 2 Rear Control Valve Body Assembly Side)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
334	Control Valve Body Assembly Pressure Test Hole Bolt/Screw Pressure Tap - M6 x 1.0 x 12
3	Converter Feed
3	Converter Feed
3	Converter Feed
3	Converter Feed
4	Release
5	Apply
6	Exhaust Enable
7	Cooler
7	Cooler
7	Cooler
8	Lube
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
12	Lock Up Control - SLU

 © 2011 Mitchell Repair Information Company, LLC.

12	Lock Up Control - SLU
12	Lock Up Control - SLU
13	TCC Signal
19	Drive
21	Regulated Drive or Reverse
24	Low and Reverse Clutch
25	Reverse Control
25	Reverse Control
25	Reverse Control
30	B2 Control 1
41	B4 Control
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust

 © 2011 Mitchell Repair Information Company, LLC.

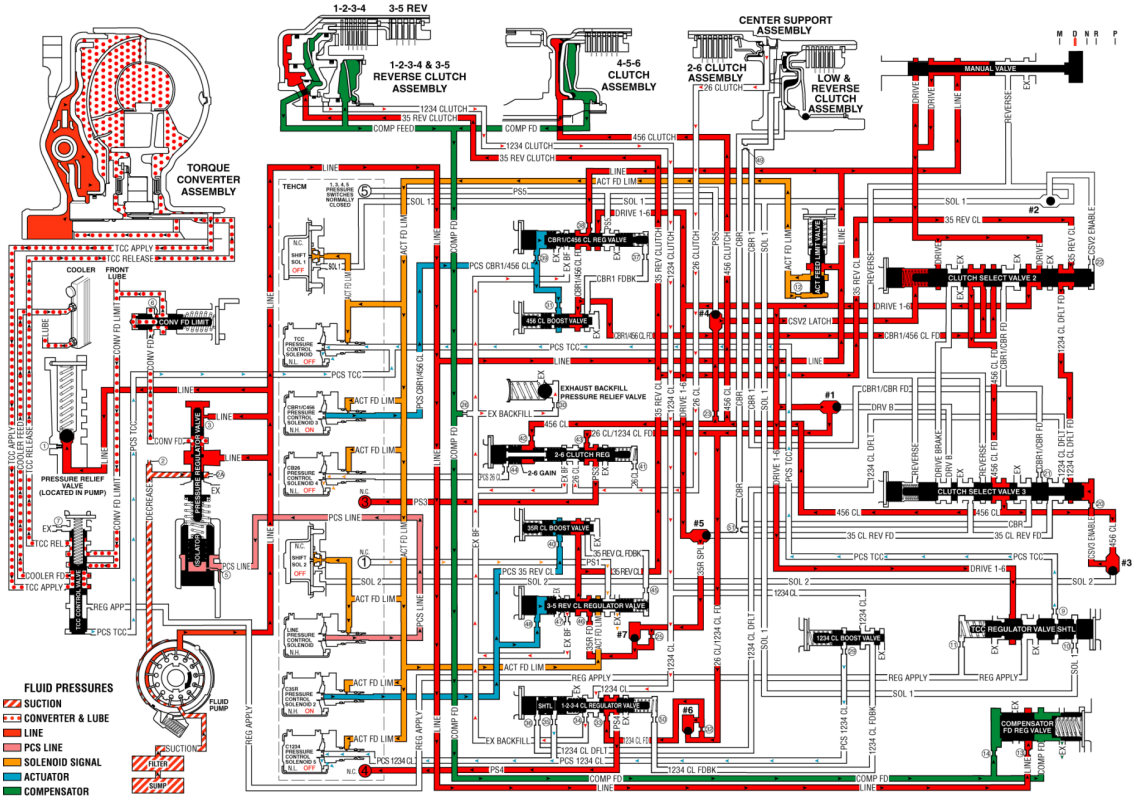


Fig. 451: Rear Control Valve Body Assembly Fluid Passages (Middle Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Suction
2	Line
3	Converter Feed
3	Converter Feed
3	Converter Feed
3	Converter Feed
3	Converter Feed
4	Release
4	Release
5	Apply
7	Cooler
7	Cooler
7	Cooler
8	Lube
8	Lube
8	Lube
10	Throttle Signal - SLT
10	Throttle Signal - SLT

 © 2011 Mitchell Repair Information Company, LLC.

10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
11	Shift Control - SLS
12	Lock Up Control - SLU
13	TCC Signal
15	S2 Signal
18	S5 Signal
19	Drive
20	Drive or Reverse
20	Drive or Reverse
20	Drive or Reverse
20	Drive or Reverse
21	Regulated Drive or Reverse
21	Regulated Drive or Reverse
21	Regulated Drive or Reverse
24	Low and Reverse Clutch
25	Reverse Control
25	Reverse Control
25	Reverse Control
27	Direct Clutch Feed 1
28	Direct Clutch Feed 2
29	Direct Clutch
30	B2 Control 1
32	Second Clutch
32	Second Clutch
33	B1 Control 1
34	B1 Control 2
35	B1 Control 3
36	Second Coast Clutch
37	B5 Control 1
37	B5 Control 1
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
41	B4 Control
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
47	PN12345

 © 2011 Mitchell Repair Information Company, LLC.

	PRN15
49	234NCON
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust

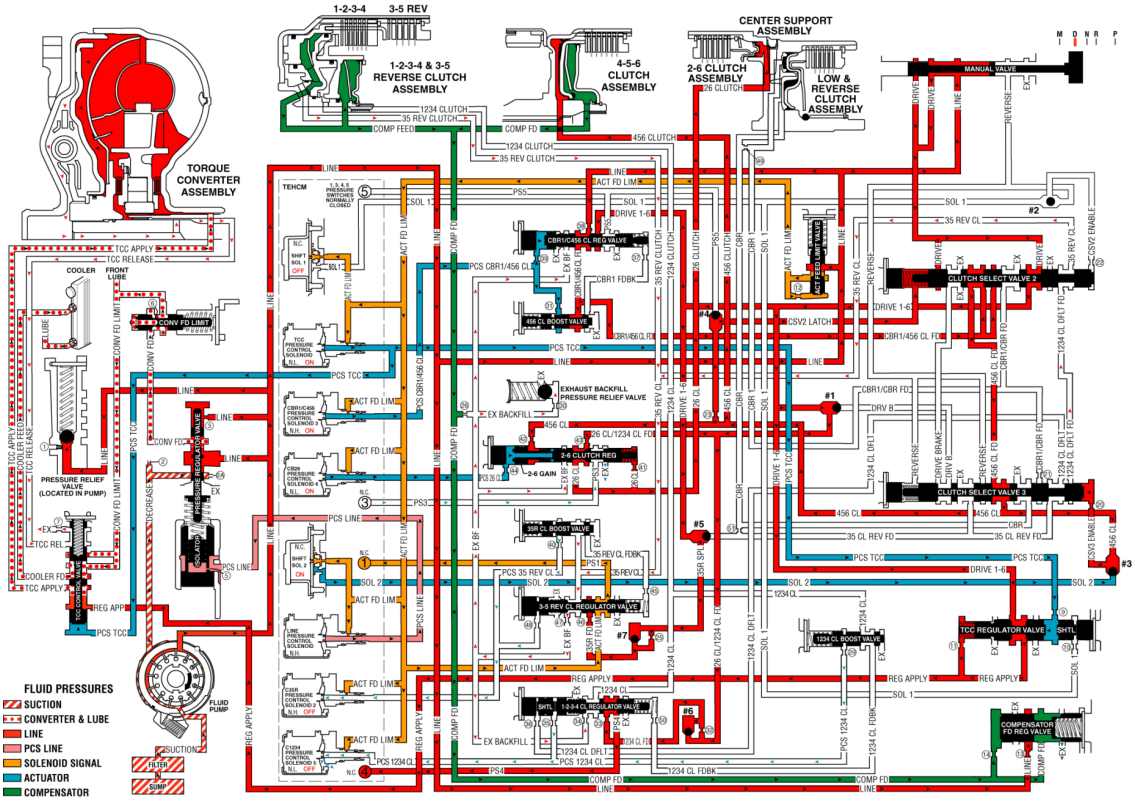


Fig. 452: Middle Control Valve Body Assembly To Rear Control Valve Body Spacer Plate & Gasket Assembly Fluid Passages (Rear Control Valve Body Assembly and Case Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Suction
1	Suction
2	Line
2	Line
2	Line
2/3	Line/Converter Feed
3	Converter Feed
3	Converter Feed
3/8	Converter Feed/Lube

© 2011 Mitchell Repair Information Company, LLC.

4	Release
4	Release
4	Release
5	Apply
5	Apply
7	Cooler
7	Cooler
7	Cooler
8	Lube
8	Lube
8	Lube
8	Lube
8	Lube
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
11	Shift Control - SLS
12	Lock Up Control - SLU
13	TCC Signal
15	S2 Signal
18	S5 Signal
19	Drive
20	Drive or Reverse
20	Drive or Reverse
20	Drive or Reverse
20	Drive or Reverse
24	Low and Reverse Clutch
25	Reverse Control
25	Reverse Control
25/37	Reverse Control/B5 Control 1
26	Forward Clutch
27	Direct Clutch Feed 1
28	Direct Clutch Feed 2

 © 2011 Mitchell Repair Information Company, LLC.

	Direct Clutch
29	Direct Clutch
29	Direct Clutch
30	B2 Control 1
31/30	B2 Control 2/B2 Control 1
32	Second Clutch
32	Second Clutch
32	Second Clutch
32	Second Clutch
33	B1 Control 1
34	B1 Control 2
35	B1 Control 3
36	Second Coast Clutch
36	Second Coast Clutch
37	B5 Control 1
37	B5 Control 1
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
40	4-5 Clutch
41	B4 Control
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
47	PN12345
47/21	PN12345/Regulated Drive or Reverse
48	PRN15
49	234NCON
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust

 © 2011 Mitchell Repair Information Company, LLC.

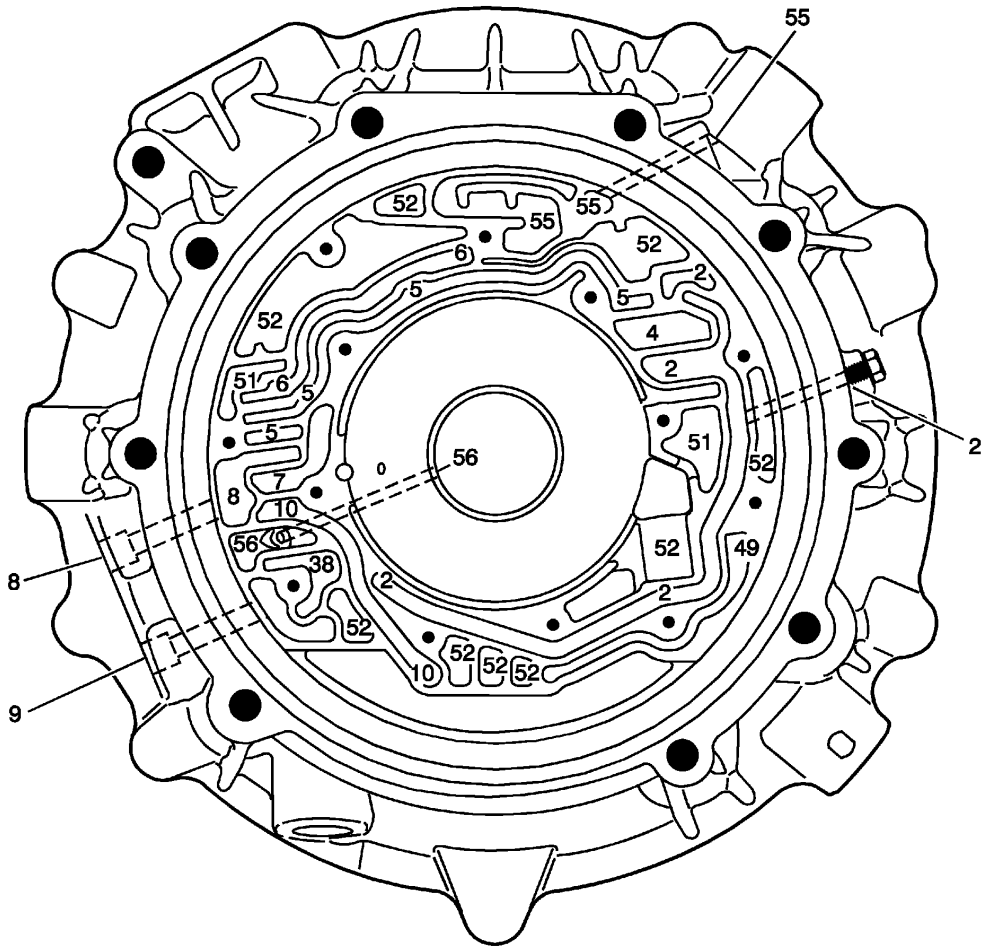


Fig. 453: Middle Control Valve Body Assembly To Rear Control Valve Body Spacer Plate & Gasket Assembly Fluid Passages (Middle Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Suction
1	Suction
2	Line
2	Line
2	Line
2/3	Line/Converter Feed
3	Converter Feed
3	Converter Feed
3/8	Converter Feed/Lube
4	Release
4	Release
4	Release

 © 2011 Mitchell Repair Information Company, LLC.

5	Apply
5	Apply
7	Cooler
7	Cooler
7	Cooler
8	Lube
8	Lube
8	Lube
8	Lube
8	Lube
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
11	Shift Control - SLS
12	Lock Up Control - SLU
13	TCC Signal
15	S2 Signal
18	S5 Signal
19	Drive
20	Drive or Reverse
20	Drive or Reverse
20	Drive or Reverse
20	Drive or Reverse
24	Low and Reverse Clutch
25	Reverse Control
25	Reverse Control
25/37	Reverse Control/B5 Control 1
26	Forward Clutch
27	Direct Clutch Feed 1
28	Direct Clutch Feed 2
29	Direct Clutch
29	Direct Clutch
29	Direct Clutch
29	Direct Clutch

 © 2011 Mitchell Repair Information Company, LLC.

	B2 Control 1
31/30	B2 Control 2/B2 Control 1
32	Second Clutch
32	Second Clutch
32	Second Clutch
32	Second Clutch
33	B1 Control 1
34	B1 Control 2
35	B1 Control 3
36	Second Coast Clutch
36	Second Coast Clutch
37	B5 Control 1
37	B5 Control 1
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
40	4-5 Clutch
41	B4 Control
43	Servo Release
45	Servo Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
47	PN12345
47/21	PN12345/Regulated Drive or Reverse
48	PRN15
49	234NCON
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust

 © 2011 Mitchell Repair Information Company, LLC.

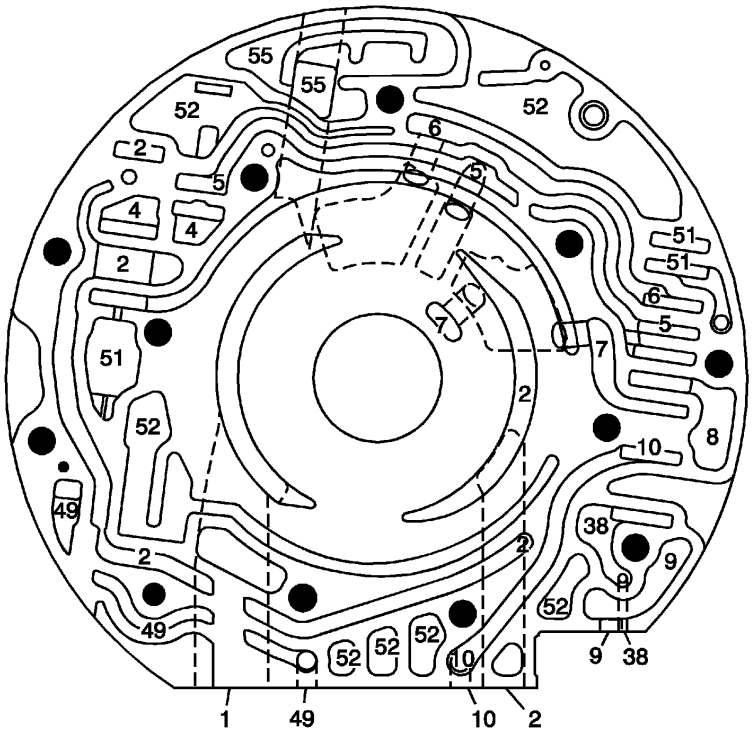


Fig. 454: Middle Control Valve Body Assembly Fluid Passages (Rear Control Valve Body Assembly & Case Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
#1	Accumulator Check Valve Assembly
#2	Accumulator Check Valve Assembly
#3	Accumulator Check Valve Assembly
#4	Accumulator Check Valve Assembly
#5	Accumulator Check Valve Assembly
#6	Accumulator Check Valve Assembly
1	Suction
1	Suction
1	Suction
2	Line
2	Line
3	Converter Feed
4	Release
4	Release
5	Apply
5	Apply
7	Cooler
7	Cooler
8	Lube

© 2011 Mitchell Repair Information Company, LLC.

8	Lube
8	Lube
8	Lube
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
11	Shift Control - SLS
12	Lock Up Control - SLU
13	TCC Signal
13	TCC Signal
15	S2 Signal
18	S5 Signal
19	Drive
20	Drive or Reverse
20	Drive or Reverse
24	Low and Reverse Clutch
25	Reverse Control
26	Forward Clutch
27	Direct Clutch Feed 1
28	Direct Clutch Feed 2
29	Direct Clutch
29	Direct Clutch
30	B2 Control 1
31	B2 Control 2
32	Second Clutch
32	Second Clutch
32	Second Clutch
33	B1 Control 1
34	B1 Control 2
35	B1 Control 3
36	Second Coast Clutch
37	B5 Control 1
38	B5 Control 2
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
40	4-5 Clutch

 © 2011 Mitchell Repair Information Company, LLC.

	4-5 Clutch
41	B4 Control
43	Servo Release
45	Servo Apply
45	Servo Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
47	PN12345
48	PRN15
49	234NCON
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
56	Void
56	Void
56	Void

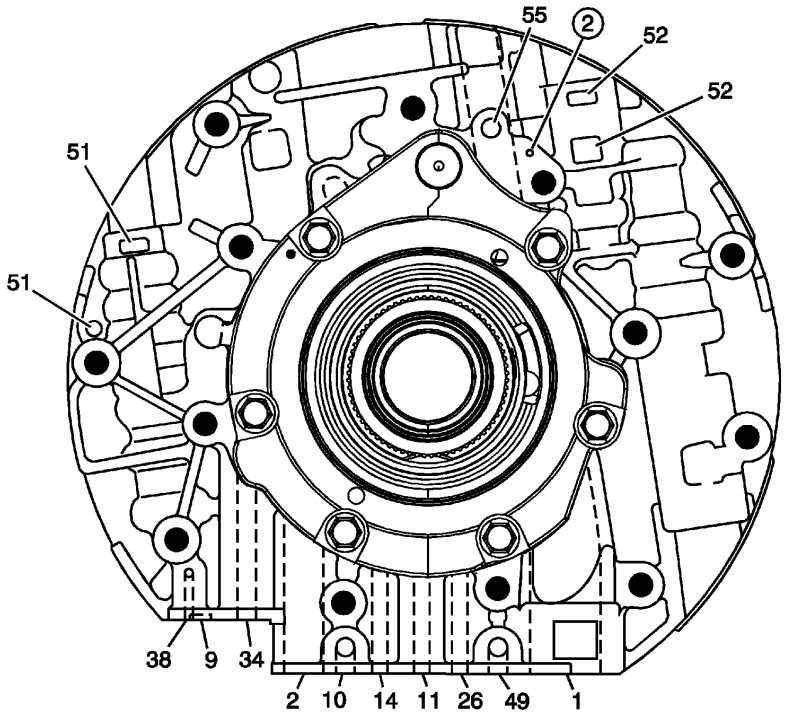


Fig. 455: Middle Control Valve Body Assembly & Control Valve Body Fluid Passage Cover Fluid

 © 2011 Mitchell Repair Information Company, LLC.

Passages (Front Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
#6	Accumulator Check Valve Assembly
#7	Accumulator Check Valve Assembly
#8	Accumulator Check Valve Assembly
37	Control Valve Body Fluid Passage Cover
371	Fluid Strainer
371	Fluid Strainer
371	Fluid Strainer
372	Fluid Strainer
1	Suction
1	Suction
1	Suction
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
12	Lock Up Control - SLU
14	S1 Signal
15	S2 Signal
16	S3 Signal
17	S4 Signal
18	S5 Signal
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive

 © 2011 Mitchell Repair Information Company, LLC.

22	Reverse
22	Reverse
22	Reverse
23	Reverse Clutch
24	Low and Reverse Clutch
26	Forward Clutch
27	Direct Clutch Feed 1
28	Direct Clutch Feed 2
30	B2 Control 1
31	B2 Control 2
33	B1 Control 1
33	B1 Control 1
34	B1 Control 2
35	B1 Control 3
37	B5 Control 1
38	B5 Control 2
38	B5 Control 2
39	1-2 Reverse - B5 Clutch
40	4-5 Clutch
40	4-5 Clutch
41	B4 Control
42	B4 Release
43	Servo Release
44	Servo Feed
44	Servo Feed
45	Servo Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
46	3rd Gear Band Apply
47	PN12345
48	PRN15
49	234NCON
50	345 Enable
50	345 Enable
50	345 Enable
51	45 Enable
51	45 Enable
52	Reverse Inhibit
52	Reverse Inhibit
54	Exhaust
54	Exhaust

 © 2011 Mitchell Repair Information Company, LLC.

	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void

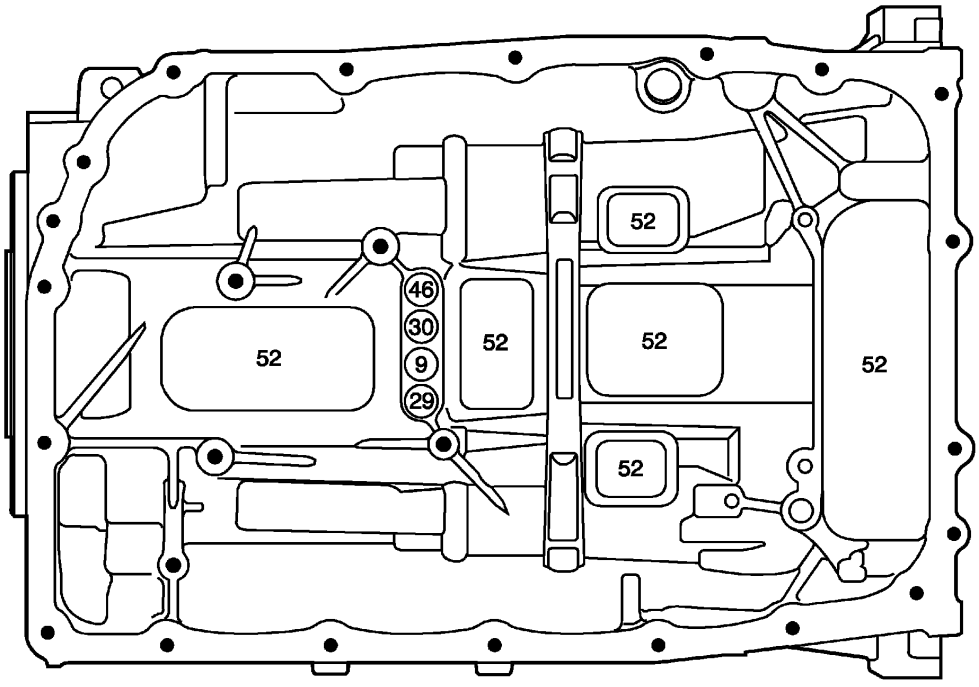


Fig. 456: Front Control Valve Body Spacer Plate To Middle Control Valve Body Gasket Fluid Passages (Front Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

 © 2011 Mitchell Repair Information Company, LLC.

Callout	Component Name
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
12	Lock Up Control - SLU
14	S1 Signal
15	S2 Signal
16	S3 Signal
17	S4 Signal
18	S5 Signal
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
22	Reverse
22	Reverse
22	Reverse

 © 2011 Mitchell Repair Information Company, LLC.

	Reverse Clutch
26	Forward Clutch
26	Forward Clutch
26	Forward Clutch
33	B1 Control 1
33	B1 Control 1
33	B1 Control 1
37	B5 Control 1
37	B5 Control 1
38	B5 Control 2
38	B5 Control 2
38	B5 Control 2
39	1-2 Reverse - B5 Clutch
39	1-2 Reverse - B5 Clutch
44	Servo Feed
44	Servo Feed
46	3rd Gear Band Apply
46	3rd Gear Band Apply
48	PRN15
50	345 Enable
50	345 Enable
50	345 Enable
50	345 Enable
51	45 Enable
51	45 Enable
52	Reverse Inhibit
52	Reverse Inhibit
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust

© 2011 Mitchell Repair Information Company, LLC.

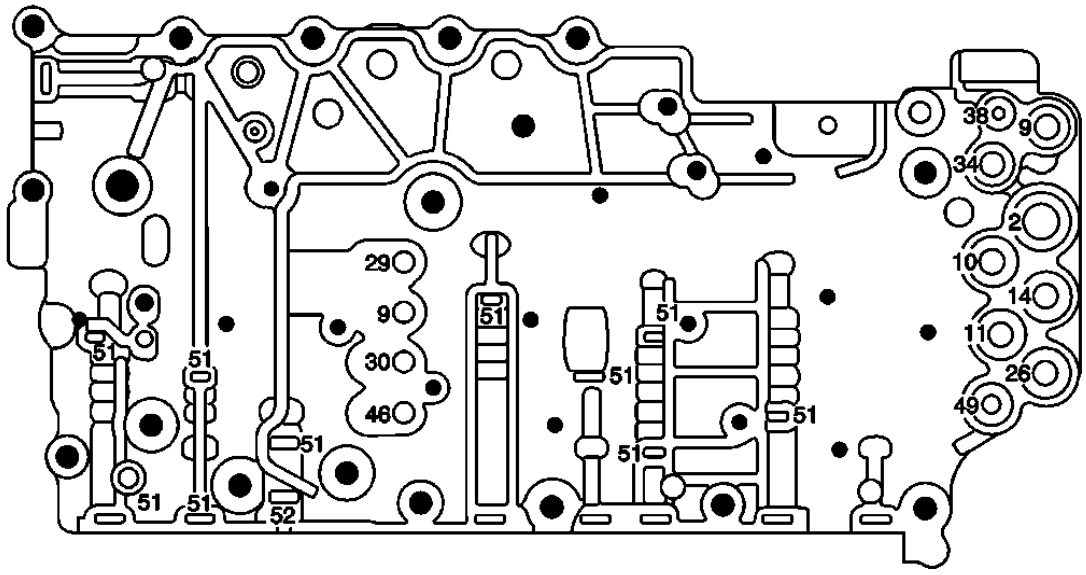


Fig. 457: Front Control Valve Body Spacer Plate Fluid Passages (Front Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
352	Fluid Strainer
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2/14	Line/S1 Signal
2/17	Line/S4 Signal
2/18	Line/S5 Signal
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT

© 2011 Mitchell Repair Information Company, LLC.

10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
12	Lock Up Control - SLU
14	S1 Signal
15	S2 Signal
16	S3 Signal
17	S4 Signal
18	S5 Signal
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19/15	Drive/S2 Signal
19/16	Drive/S3 Signal
22	Reverse
22	Reverse
22	Reverse
22	Reverse
23/22	Reverse Clutch/Reverse
23/22	Reverse Clutch/Reverse
26	Forward Clutch
26	Forward Clutch
26/19	Forward Clutch/Drive
33	B1 Control 1
33	B1 Control 1
33	B1 Control 1
44	Servo Feed
44	Servo Feed
46	3rd Gear Band Apply
46	3rd Gear Band Apply
48	PRN15
50	345 Enable
50	345 Enable
50	345 Enable
50	345 Enable
51	45 Enable

 © 2011 Mitchell Repair Information Company, LLC.

	45 Enable
52	Reverse Inhibit
52	Reverse Inhibit
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
56	Void

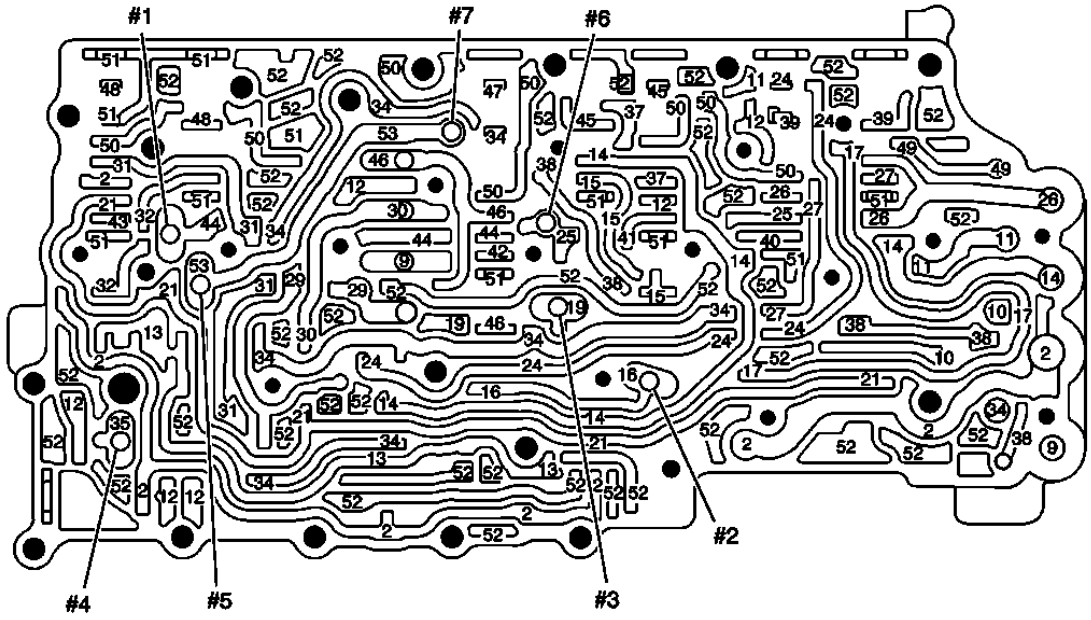


Fig. 458: Front Control Valve Body To Front Control Valve Body Spacer Plate Gasket Fluid Passages (Front Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
2	Line
2	Line
2	Line
2	Line
2	Line
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator

© 2011 Mitchell Repair Information Company, LLC.

9	Solenoid Modulator
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
12	Lock Up Control - SLU
14	S1 Signal
14	S1 Signal
15	S2 Signal
15	S2 Signal
16	S3 Signal
16	S3 Signal
17	S4 Signal
17	S4 Signal
18	S5 Signal
18	S5 Signal
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
22	Reverse
22	Reverse
22	Reverse
22	Reverse
22	Reverse
26	Forward Clutch
26	Forward Clutch
33	B1 Control 1
33	B1 Control 1
33	B1 Control 1
44	Servo Feed
44	Servo Feed
46	3rd Gear Band Apply
48	PRN15

 © 2011 Mitchell Repair Information Company, LLC.

	345 Enable
50	345 Enable
50	345 Enable
50	345 Enable
51	45 Enable
51	45 Enable
52	Reverse Inhibit
52	Reverse Inhibit
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
56	Void
56	Void

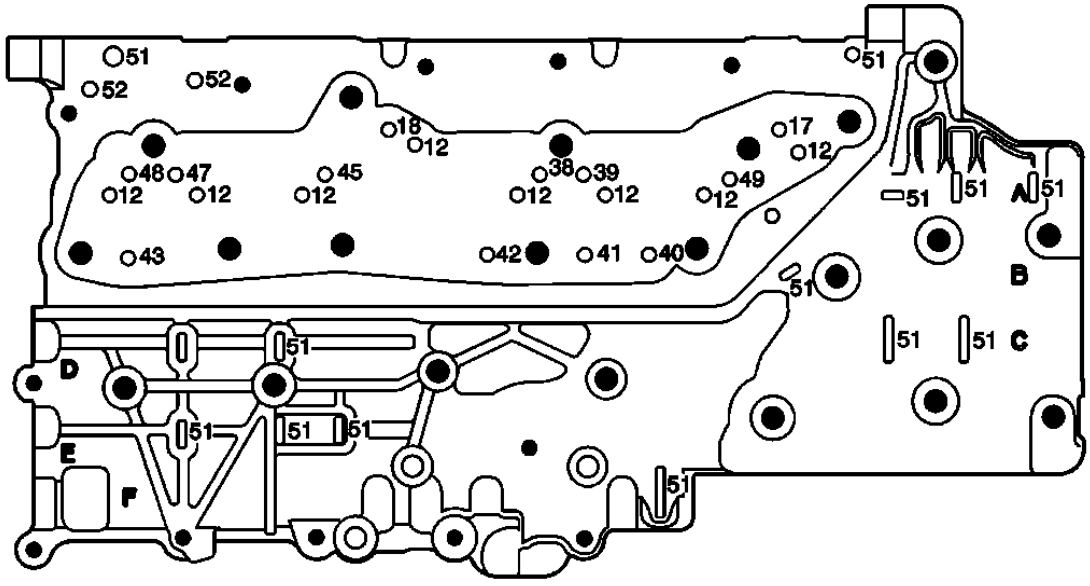


Fig. 459: Front Control Valve Body Assembly Fluid Passages (Middle Control Valve Body Assembly Side)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

 © 2011 Mitchell Repair Information Company, LLC.

#12	Ball Check Valve
36	Automatic Transmission Fluid Temperature Sensor
300	1-2, 2-3, Reverse Shift Solenoid Valve Assembly - S3 - Dark Gray
300	1-2, 2-3, Reverse Shift Solenoid Valve Assembly - S3 - Dark Gray
303	3-4, 4-5, Shift Solenoid Valve Assembly - S4 - Blue
305	Reverse Shift Solenoid Valve Assembly - S5 - Green
308	2-3, 3-4 Shift Solenoid Valve Assembly - S2 - Light Gray
310	Reverse, 1st Shift Solenoid Valve Assembly - S1 - Black
2	Line
2	Line
2	Line
2	Line
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
9	Solenoid Modulator
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
10	Throttle Signal - SLT
11	Shift Control - SLS
12	Lock Up Control - SLU
14	S1 Signal
14	S1 Signal
14	S1 Signal
15	S2 Signal
16	S3 Signal
17	S4 Signal
17	S4 Signal
18	S5 Signal
18	S5 Signal
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
19	Drive
22	Reverse
22	Reverse
22	Reverse
22	Reverse

 © 2011 Mitchell Repair Information Company, LLC.

	Reverse
22	Reverse
26	Forward Clutch
26	Forward Clutch
26	Forward Clutch
33	B1 Control 1
33	B1 Control 1
44	Servo Feed
44	Servo Feed
46	3rd Gear Band Apply
48	PRN15
50	345 Enable
50	345 Enable
50	345 Enable
51	45 Enable
52	Reverse Inhibit
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
54	Exhaust
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void
56	Void

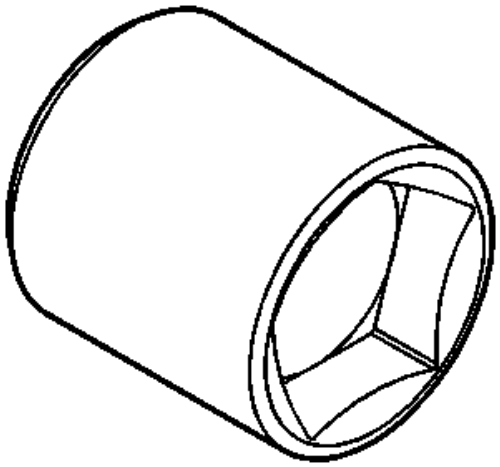
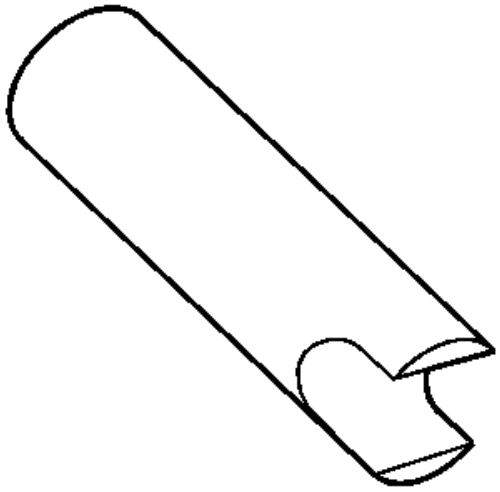
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

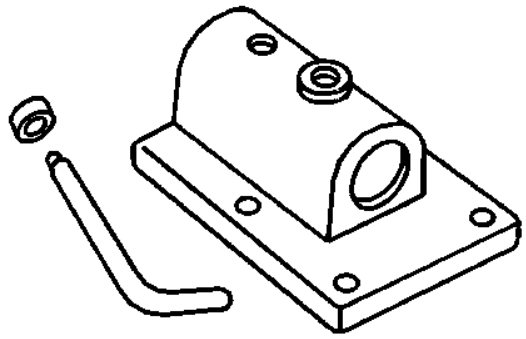
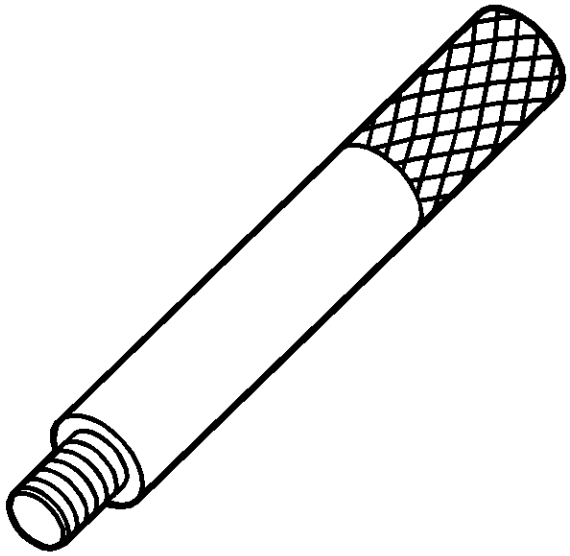
Special Tools

Illustration	Tool Number/Description

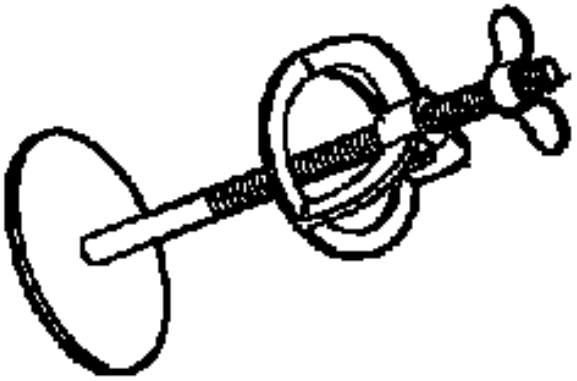
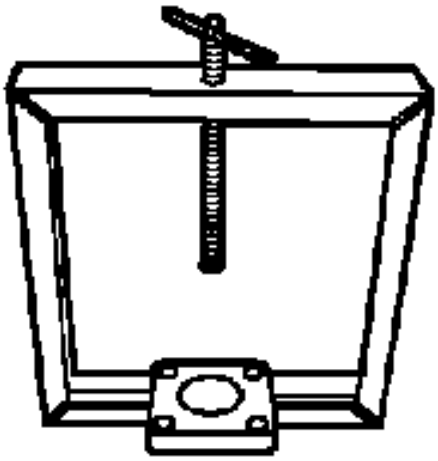
© 2011 Mitchell Repair Information Company, LLC.

	DT 47599 Anchor Bolt Socket
	DT 47687 Rotational Torque Adapter

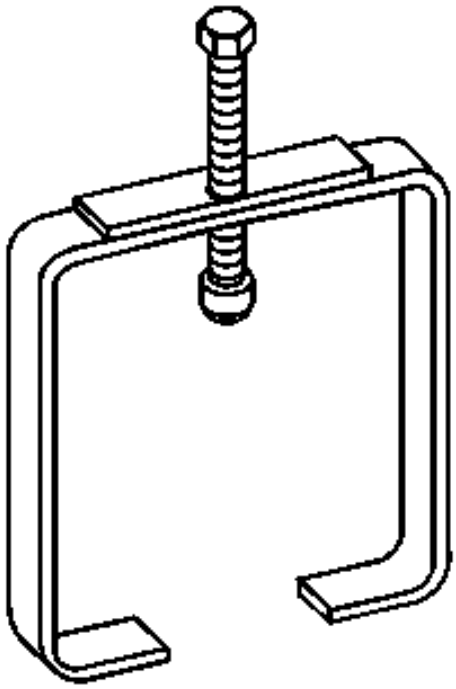
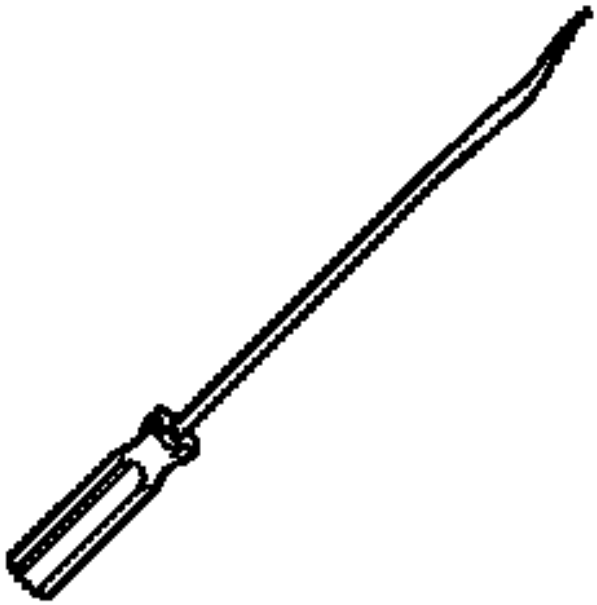
 © 2011 Mitchell Repair Information Company, LLC.

	J 3289-20 Holding Fixture
	J 8092 Driver Handle
	J 23327 Clutch Spring Compressor

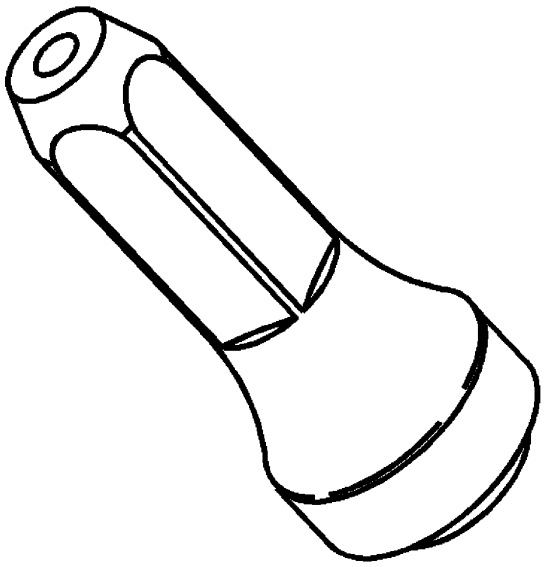
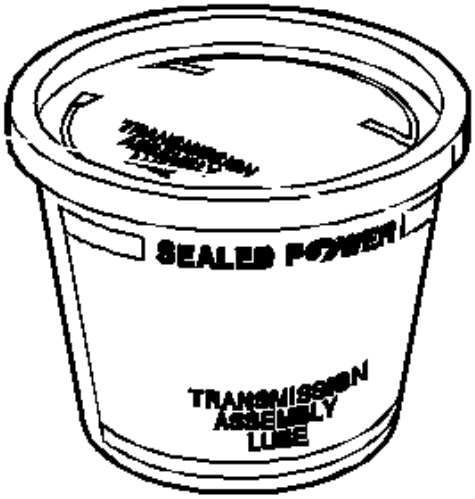
 © 2011 Mitchell Repair Information Company, LLC.

	
	J 23456 Booster and Clutch Pack Compressor

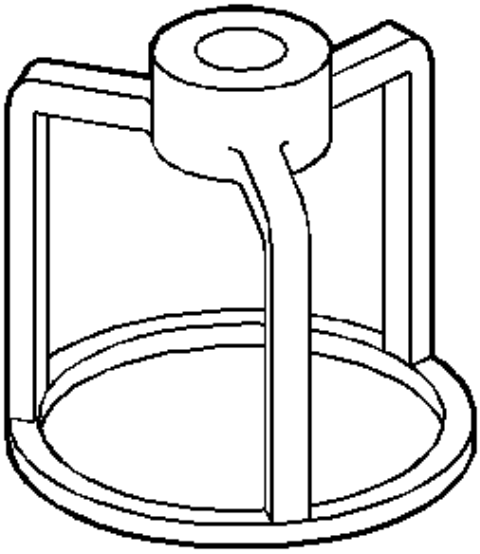
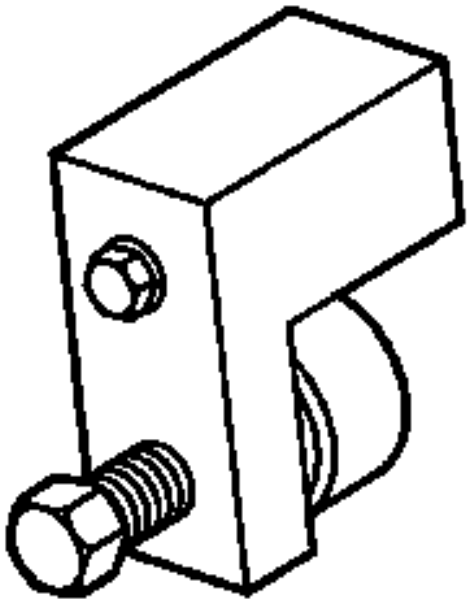
 © 2011 Mitchell Repair Information Company, LLC.

	J 25024-A Servo Piston/Clutch Spring Compressor
	J 28585 Snap Ring Remover

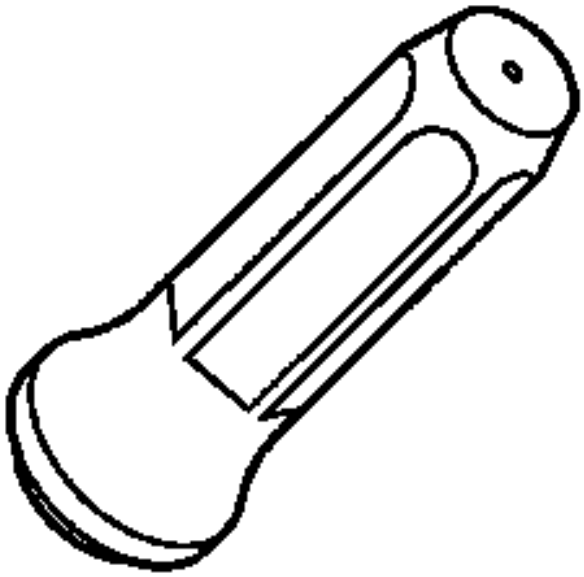
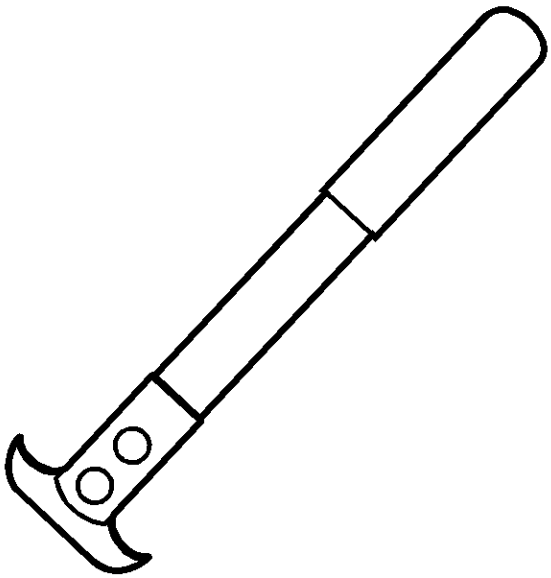
 © 2011 Mitchell Repair Information Company, LLC.

	J 35582 Oil Pump Seal Installer
	J 36850 Transjel Lubricant
	J 41236 Coast Clutch Spring Compressor

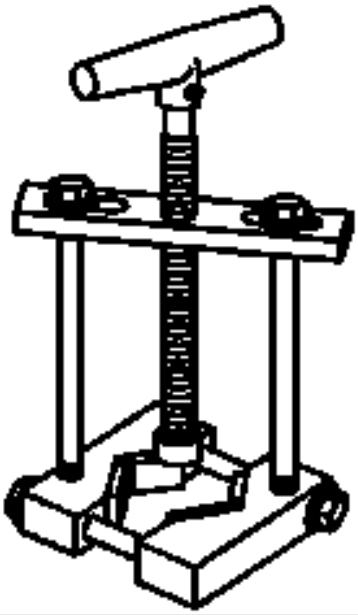
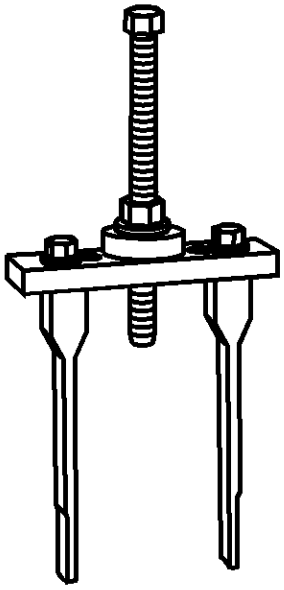
 © 2011 Mitchell Repair Information Company, LLC.

	
	J 41239-1A Cooler Line Seal Installer

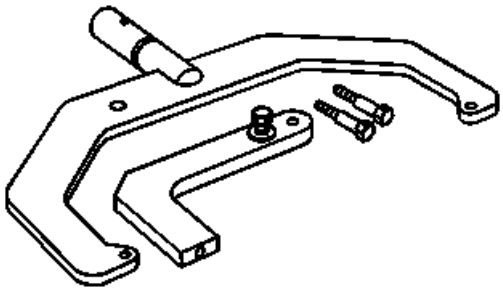
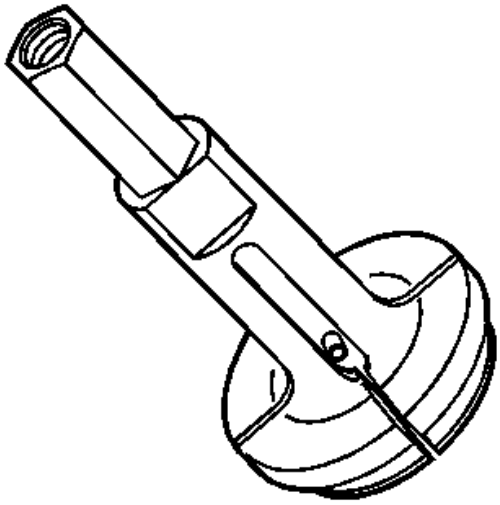
 © 2011 Mitchell Repair Information Company, LLC.

	J 44809 Output Shaft Seal Installer
	J 45000 Seal Remover
	J 45053 Universal Clamp Press

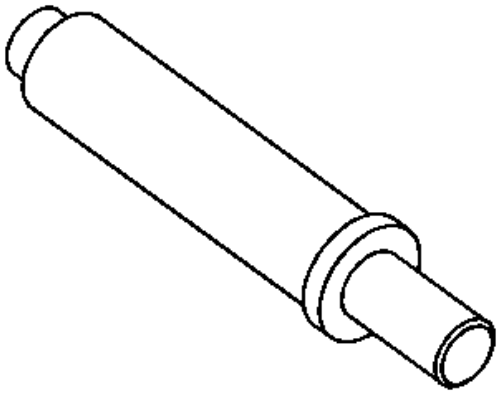
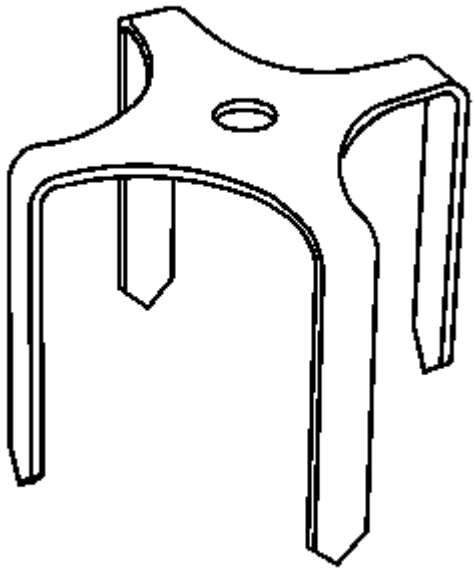
 © 2011 Mitchell Repair Information Company, LLC.

	
	J 45124 Removal Bridge
	J 45159 Holding Fixture

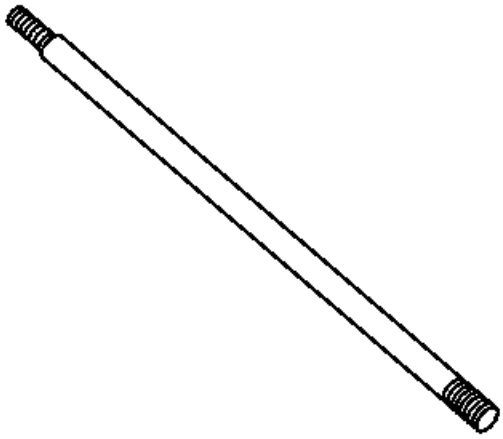
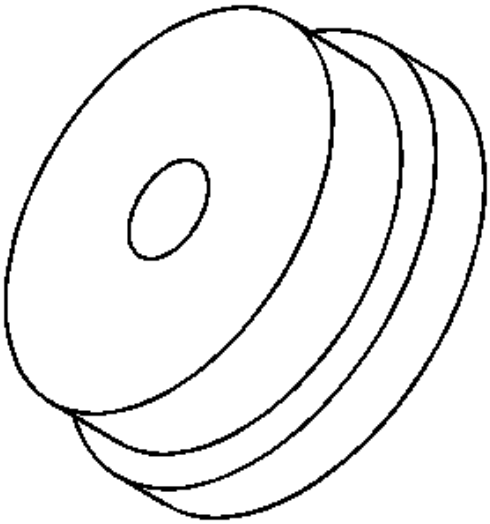
© 2011 Mitchell Repair Information Company, LLC.

	
	J 45160 Differential Bearing Race Remover
	J 45161 Manual Shift Shaft Bearing Replacer

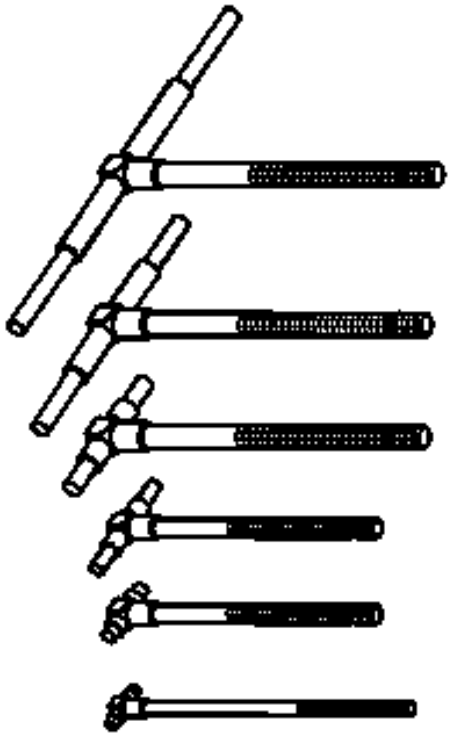
© 2011 Mitchell Repair Information Company, LLC.

	
	J 45164 Spring Compressor Bridge

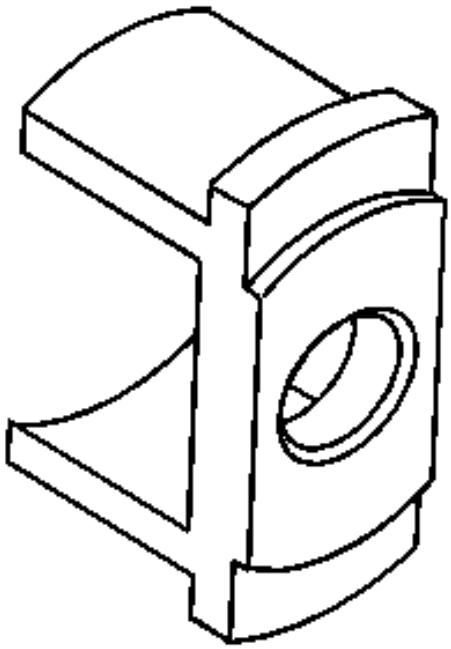
 © 2011 Mitchell Repair Information Company, LLC.

	J 45166 Dial Indicator Extension Rod - 8 inch"
	J 45184 Differential Bearing Race Installer

 © 2011 Mitchell Repair Information Company, LLC.

	J 45185 Bore Gage Set
	J 45186 Forward and Direct Clutch Spring Compressor

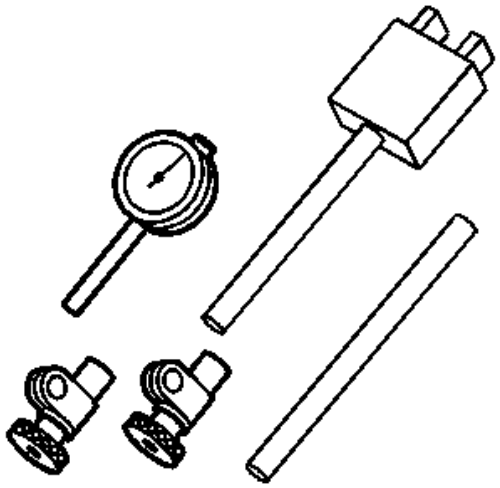
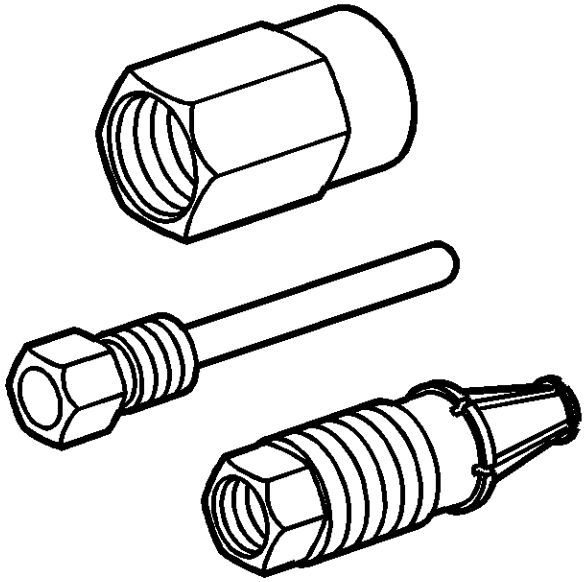
 © 2011 Mitchell Repair Information Company, LLC.



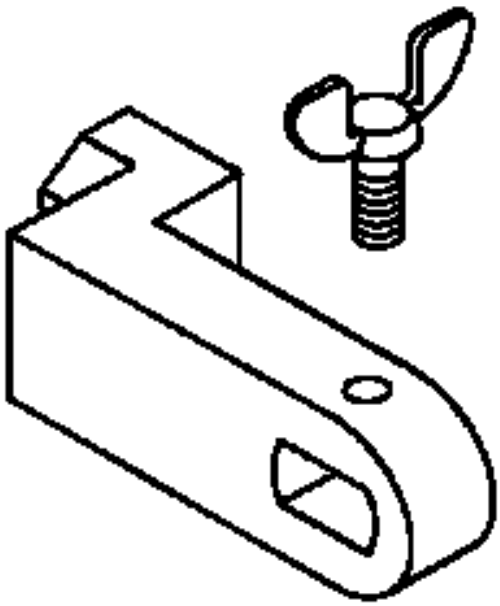


J 45187
Differential Output Shaft Oil Seal Installer

 © 2011 Mitchell Repair Information Company, LLC.

	J 45200 Dial Indicator Set
	J 45201 Cooler Line Seal Remover
	J 45404

 © 2011 Mitchell Repair Information Company, LLC.

	Transmission Indicator Alignment Tool

 © 2011 Mitchell Repair Information Company, LLC.