

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

2004 TRANSMISSION/TRANSAXLE**Automatic Transmission - Overhaul - 5L40-E/5L50-E****SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS****Fastener Tightening Specifications**

Description of Usage	Ref No.*	Qty	Size	Specification	
				Metric	English
Accumulator Housing to Valve Body	318	12	M6x1.0x30.0 mm	11 N.m	8 lb ft
Channel Plate to Valve Body	300	7	M6x1.0x38.0 mm	11 N.m	8 lb ft
Converter Housing to Case	2	7	M8x1.25x35.0 mm	22 N.m	16 lb ft
Drain Plug to Fluid Pan	63	1	M14x1.5x10.0 mm	20 N.m	15 lb ft
Extension Housing to Case	35	7	M8x1.25x35.0 mm	22 N.m	16 lb ft
Fluid Pan to Case	65	20	M6x1.0x16.0 mm	11 N.m	8 lb ft
Front Control Valve Body to Top Channel Plate	50	2	M6x1.0x38.0 mm	11 N.m	8 lb ft
Input Speed Sensor to Case	45	1	M6x1.0x20.0 mm	11 N.m	8 lb ft
Output Speed Sensor to Case	43	1	M6x1.0x30.0 mm	11 N.m	8 lb ft
Parking Pawl Actuator Bracket to Case	609	2	M8x1.25x25.0 mm	22 N.m	16 lb ft
Prop Shaft Flange to Output Shaft	34	1	M22x1.5x10.0 mm	57 N.m	42 lb ft
Torque Converter Housing Seal Bolt	228	2	M4x0.7x10.0 mm	3.6 N.m	31.86 lb in
Transmission Fluid Pump Cover to Torque Converter Housing	240	6	M6x1.0x40.0 mm	11 N.m	8 lb ft
Transmission Fluid Pump Cover to Torque Converter Housing	241	5	M8x1.25x40.0 mm	22 N.m	16 lb ft
Transmission Level Hole	36	1	M18x1.5x12.0 mm	20 N.m	15 lb ft

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Plug to Case					
Transmission Pressure Test Plug to Case	40	1	M10x1.0x8.0 mm	11 N.m	8 lb ft
Valve Body to Case	49	2	M6x1.0x50.0 mm	11 N.m	8 lb ft
Valve Body to Case	51	6	M6x1.0x50.0 mm	11 N.m	8 lb ft
Valve Body to Case	53	1	M6x1.0x68.0 mm	11 N.m	8 lb ft
Valve Body to Channel Plate	53	1	M6x1.0x68.0 mm	11 N.m	8 lb ft
* Reference Number refers to the callout number on the disassembled view.					

FLUID CAPACITY SPECIFICATIONS**Fluid Capacity Specifications (5L40-E)**

Application	Specification	
	Metric	English
Transmission Fluid Capacity - Dry	8.5 liters	9.0 quarts
(measurements are approximate)		

END PLAY SPECIFICATIONS (5L40-E)**Output Shaft End Play Chart - 5L40-E**

Dimension B	Washer Thickness (mm)	Washer Thickness (in)
15.99 mm -16.27 mm (0.629 in - 0.640 in)	0.95-1.05	0.037-0.041
16.27 mm -16.47 mm (0.640 in - 0.648 in)	1.15-1.25	0.045-0.049
16.47 mm -16.67 mm (0.648 in - 0.656 in)	1.35-1.45	0.053-0.057
16.67 mm -16.87 mm (0.656 in - 0.664 in)	1.55-1.65	0.061-0.065
16.87 mm -17.07 mm (0.664 in - 0.672 in)	1.75-1.85	0.068-0.073
17.07 mm -17.27 mm (0.672 in - 0.680 in)	1.95-2.05	0.076-0.081
17.27 mm -17.47 mm 0.680 in - 0.688 in)	2.15-2.25	0.084-0.089
17.47 mm -17.67 mm (0.688 in -	2.35-2.45	0.093-0.096

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0.696 in)		
17.67 mm -17.87 mm (0.696 in - 0.704 in)	2.55-2.65	0.100-0.104
17.87 mm -18.07 mm (0.703 in - 0.711 in)	2.75-2.85	0.108-0.112

END PLAY SPECIFICATIONS (5L50-E)**Output Shaft End Play Chart - 5L50-E**

Dimension B	Washer Thickness (mm)	Washer Thickness (in)
4.43 mm -4.68 mm (0.174 in - 0.184 in)	1.55-1.70	0.061-0.066
4.68 mm -4.93 mm (0.184 in - 0.194 in)	1.80-1.95	0.070-0.076
4.93 mm -5.18 mm (0.194 in - 0.203 in)	2.05-2.20	0.080-0.086
5.18 mm -5.43 mm (0.203 in - 0.213 in)	2.30-2.45	0.090-0.096
5.43 mm -5.68 mm (0.213 in - 0.223 in)	2.55-2.70	0.100-0.106
5.68 mm -5.93 mm (0.223 in - 0.233 in)	2.80-2.95	0.110-0.116

CLUTCH PISTON TRAVEL SPECIFICATIONS**Clutch Travel Specifications**

Component	Product	Number Of Clutches	Specification	
			Metric	English
Reverse Clutch (404)	5L40-E/5L50-E	6	0.98-1.43 mm	0.039-0.056 in
Direct Clutch (406)	5L40-E	8	1.41-1.86 mm	0.056-0.073 in
Direct Clutch (406)	5L50-E	10	1.67-2.12 mm	0.066-0.083 in
Low and Reverse Clutch (517)	5L40-E	10	1.72-2.17 mm	0.068-0.085 in
Low and Reverse Clutch (517)	5L50-E	12	1.93-2.38 mm	0.076-0.094 in
2nd Clutch (520)	5L40-E	10	1.47-1.92 mm	0.056-0.076 in
2nd Clutch (520)	5L50-E	12	1.64-2.09 mm	0.065-0.082 in

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2nd Coast Clutch (528)	5L40-E	4	0.94-1.39 mm	0.037-0.055 in
2nd Coast Clutch (528)	5L50-E	6	1.15-1.60 mm	0.045-0.063 in
Intermediate Clutch (495)	5L40-E	6	1.13-1.58 mm	0.044-0.062 in
Intermediate Clutch (495)	5L50-E	8	1.39-1.84 mm	0.055-0.072 in
Overdrive Clutch (487)	5L40-E/5L50-E	6	1.60-2.05 mm	0.063-0.081 in
Forward Clutch (436)	5L40-E	6	1.20-1.65 mm	0.047-0.065 in
Forward Clutch (436)	5L50-E	8	1.41-1.86 mm	0.056-0.073 in
Coast Clutch (438)	5L40-E	6	1.17-1.67 mm	0.046-0.066 in
Coast Clutch (438)	5L50-E	8	1.43-1.93 mm	0.056-0.076 in

CLUTCH PLATE SELECTION SPECIFICATIONS

Clutch Plate Selection Specifications

Clutch	Number of Clutch Plates		
	All Models - except GBG		GBG
	5L40-E	5L50-E	5L40-E
Reverse Clutch (404)	6	6	6
Direct Clutch (406)	10	10	8
Low and Reverse Clutch (517)	10	12	10
2nd Clutch (520)	10	12	10
2nd Coast Clutch (528)	6	6	4
Intermediate Clutch (495)	8	8	6
Overdrive Clutch (487)	6	6	6
Forward Clutch (436)	8	8	6
Coast Clutch (438)	6	8	6

REVERSE CLUTCH HOUSING SELECTIVE THRUST WASHER SPECIFICATIONS

Reverse Clutch Housing Thrust Washer Chart

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Dimension X	Washer Thickness (mm)	Washer Thickness (in)
50.18 mm -50.36 mm (1.975 in - 1.982 in)	2.53-2.68	0.099-0.105
50.36 mm -50.54 mm (1.982 in - 1.989 in)	2.71-2.86	0.106-0.112
50.54 mm -50.72 mm (1.989 in - 1.996 in)	2.89-3.04	0.113-0.119
50.72 mm -50.90 mm (1.996 in - 2.003 in)	3.05-3.20	0.120-0.125
50.90 mm -51.08 mm (2.003 in - 2.011 in)	3.25-3.40	0.127-0.133
51.08 mm -51.26 mm (2.011 in - 2.018 in)	3.43-3.58	0.135-0.140
51.26 mm -51.44 mm (2.018 in - 2.025 in)	3.61-3.76	0.142-0.148
51.44 mm -51.62 mm (2.025 in - 2.032 in)	3.79-3.94	0.149-0.155

INTERMEDIATE AND OVERDRIVE CLUTCH HOUSING RETAINING RING SPECIFICATIONS**Intermediate and Overdrive Clutch Housing Retainer Ring Specification**

Dimension M	Retainer Ring Thickness (mm)	Retainer Ring Thickness (in)
0.85 mm -0.95 mm (0.033 in - 0.037 in)	3.80-3.90	0.149-0.153
0.95 mm -1.05 mm (0.037 in - 0.041 in)	3.70-3.80	0.145-0.149
1.05 mm -1.15 mm (0.041 in - 0.045 in)	3.60-3.70	0.141-0.145
1.15 mm -1.25 mm (0.045 in - 0.049 in)	3.50-3.60	0.137-0.141

FLUID PUMP SPECIFICATIONS**Fluid Pump Specifications**

Size Classification	Thickness (mm)	Thickness (in)
IMPORTANT:		

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- Rotor and slide must be chosen from the same size classification as the oil pump body.
- Allowable rotor and slide to fluid pump body end play is as follows:

Specification:

- Slide to fluid Pump Body End Play - 0.030-0.051 mm (0.0012-0.0020 in)
- Rotor to fluid Pump Body End Play - 0.030-0.051 mm (0.0012-0.0020 in)

The fluid pump assembly has a selective rotor and slide components. These components are chosen based on pump body dimensions. Fluid pump rotor and slide components are available in five size classifications (1, 2, 3, 4, and 5) with the following tolerances:

Rotor Selection

1	17.948-17.961	0.7066-0.7071
2	17.961-17.974	0.7071-0.7076
3	17.974-17.987	0.7076-0.7081
4	17.987-18.000	0.7081-0.7086
5	18.000-18.013	0.7086-0.7091

Slide Selection

1	17.948-17.961	0.7066-0.7071
2	17.991-17.974	0.7071-0.7076
3	17.974-17.987	0.7076-0.7081
4	17.987-18.000	0.7081-0.7086
5	18.000-18.013	0.7086-0.7091

Fluid Pump Body Depth

1	17.978-18.012	0.7077-0.7091
2	17.978-18.025	0.7083-0.7096
3	18.004-18.038	0.7088-0.7101
4	18.017-18.051	0.7093-0.7106
5	18.030-18.064	0.7098-0.7111

TRANSMISSION GENERAL SPECIFICATIONS

Transmission General Specifications

Name	5L40-E/5L50-E
RPO Codes	MV3 AWD, M82, MX5 AWD, M22
Production Location	Strasbourg, France
Vehicle Platform (Engine/Transmission) Usage	D, E, Y

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Transmission Drive	Rear Wheel Drive
1st Gear Ratio	3.42:1
2nd Gear Ratio	2.21:1
3rd Gear Ratio	1.60:1
4th Gear Ratio	1.00:1
5th Gear Ratio	0.75:1
Reverse Ratio	3.03:1
Torque Converter Size (Diameter of Torque Converter Turbine)	245 mm/258 mm
Pressure Taps	Line Pressure
Transmission Fluid Type	Dexron(tm) III
Transmission Fluid Capacity (Approximate)	Bottom Pan Removal Complete Overhaul: Dry 8.5 L (9.0 qt)
Transmission Type: 5	Five Forward Gears
Transmission Type: L	Longitude Mount
Transmission Type: 40	Product Series
Transmission Type: E	Electronic Controls
Position Quadrant	P, R, N, D, 4, 3, 2
Case Material	Die Cast Aluminum
Transmission Weight Dry	(161.0 lb) 73 kg
Transmission Net Weight	(177.0 lb) 80.5 kg
Maximum Trailer Towing Capacity	Domestic: 454 kg Export: 1815 kg
Maximum Gross Vehicle Weight	3,500 kg (7,716 lbs)

COMPONENT LOCATOR**DISASSEMBLED VIEWS**

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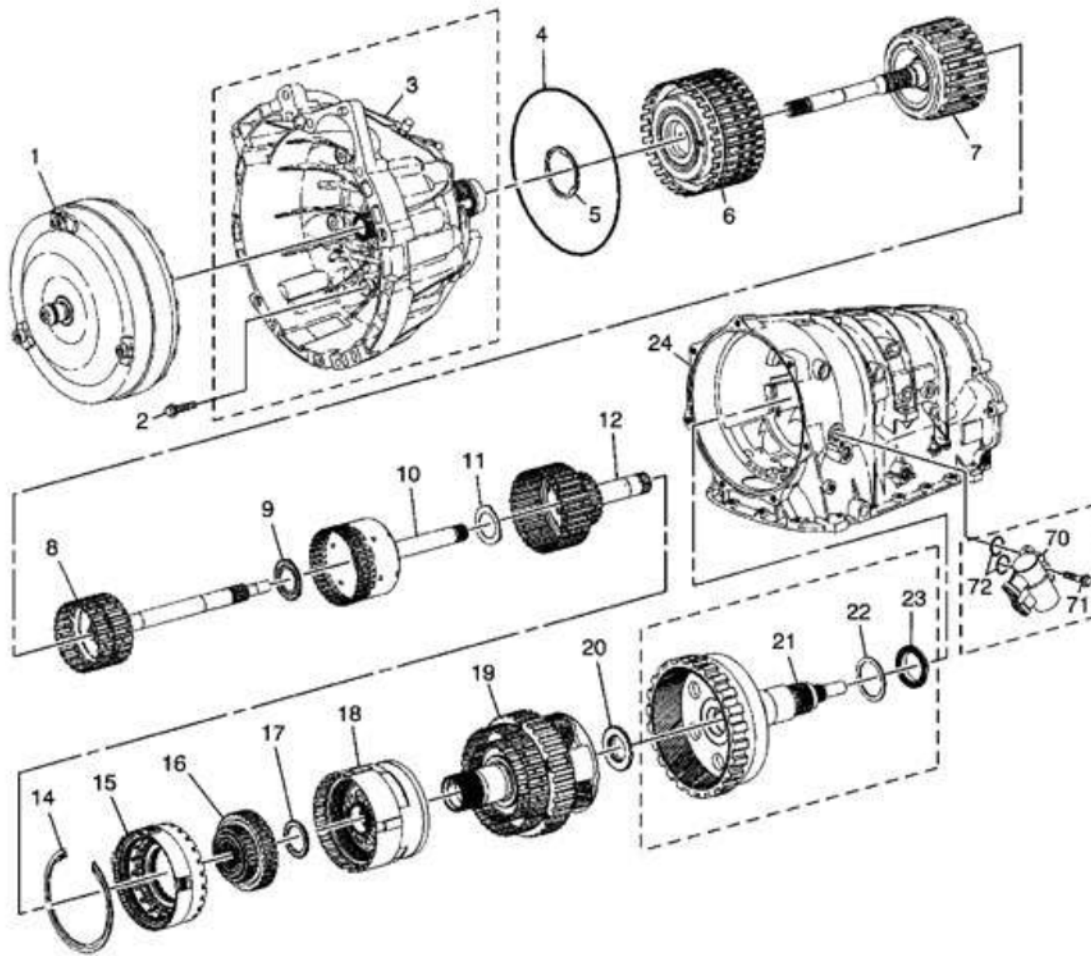


Fig. 1: Case & Associated Parts Disassembled View (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Torque Converter Assembly
2	Torque Converter Housing to Main Case Bolt
3	Torque Converter Housing Assembly - Model Dependent
4	Torque Converter Housing Fluid Seal Assembly
5	Reverse Clutch Housing Thrust Washer - Selective
6	Direct and Reverse Clutch Assembly
7	Forward and Coast Clutch Assembly
8	Input Sun Gear - W/Forward Clutch Roller Inner Race Shaft
9	Direct Clutch Hub Thrust Washer

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10	Direct Clutch Assembly- W/Input and Reaction Carrier in Hub
11	Input and Reaction Carrier Inner Shaft Thrust Washer
12	Intermediate Clutch Sprag Assembly
14	Intermediate and Overdrive Clutch Housing Retainer Ring - Selective
15	Overdrive Clutch Housing Assembly
16	Low Clutch Sprag Assembly
17	Low Clutch Roller Thrust Bearing
18	Center Support
19	Input and Reaction Carrier Assembly
20	Input and Reaction Carrier Thrust Bearing
21	Output Shaft Assembly W/Rear Internal Gear - Model Dependent
22	Input and Reaction Carrier Washer Selective, - Model Dependent
23	Input and Reaction Carrier Thrust Bearing
24	Automatic Transmission Case Assembly
70	Transmission Cooler Bypass Valve - Model Dependent
71	Transmission Cooler Bypass Bolt - Model Dependent
72	Transmission Cooler Bypass Seals - Model Dependent

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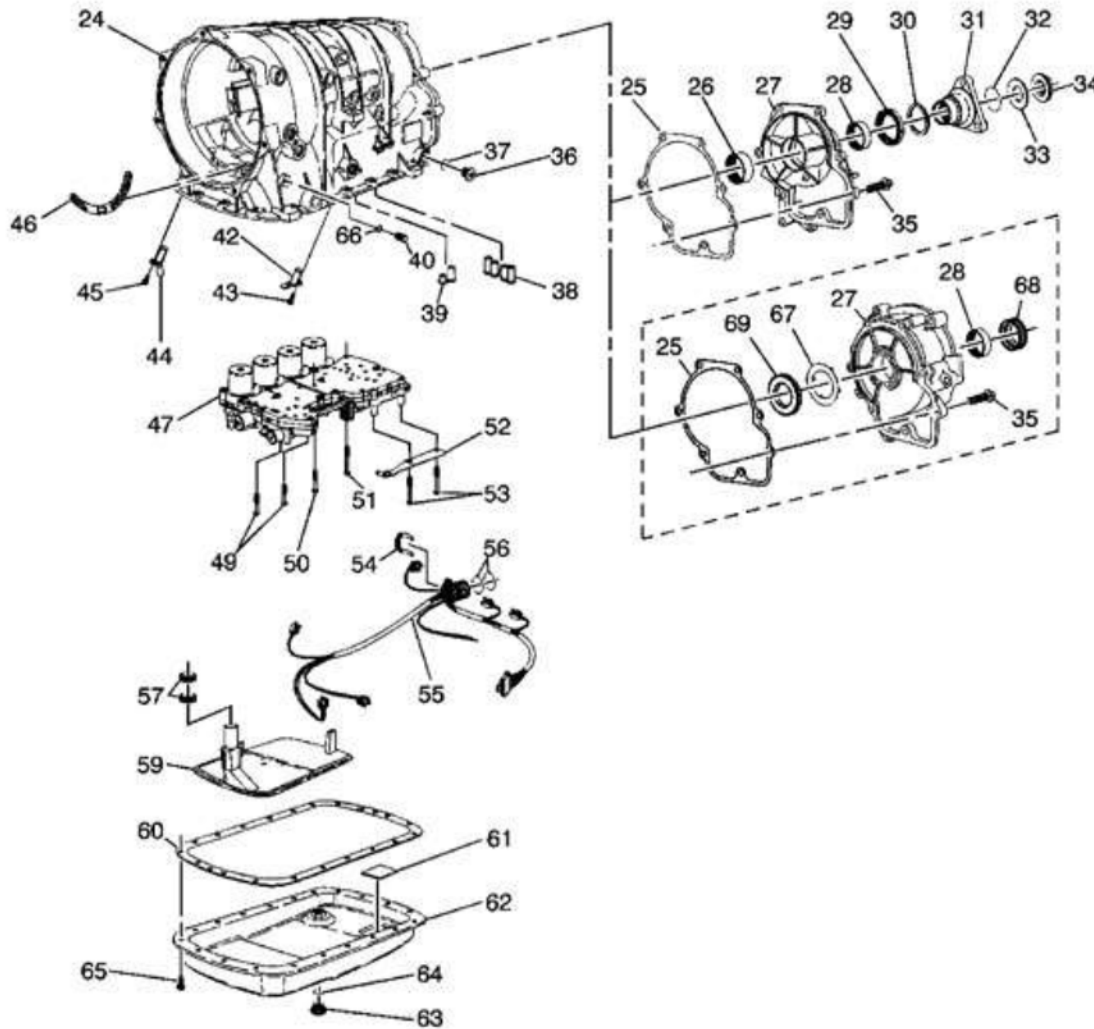


Fig. 2: Case & Associated Parts Disassembled View (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
24	Automatic Transmission Case Assembly
25	Automatic Transmission Case Extension Gasket - Model Dependent
25	Automatic Transmission Case Extension Gasket - Model Dependent
26	Output Shaft Bearing - Model Dependent
27	Automatic Transmission Case Extension - Model Dependent
27	Automatic Transmission Case Extension - Model Dependent
28	Output Shaft Bearing - Model Dependent

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28	Output Shaft Bearing - Model Dependent
29	Automatic Transmission Prop Shaft - Model Dependent
30	Output Shaft Assembly Retainer - Model Dependent
31	Automatic Transmission Prop Shaft Flange - Model Dependent
32	Automatic Transmission Prop Shaft Flange - O-Ring Seal - Model Dependent
33	Automatic Transmission Prop Shaft Thrust Washer - Model Dependent
34	Prop Shaft Flange Nut - Model Dependent
35	Automatic Transmission Case Extension Bolt - Model Dependent
35	Automatic Transmission Case Extension Bolt - Model Dependent
36	Automatic Transmission Fluid Level Hole Plug
37	Automatic Transmission Fluid Level Hole Plug O-Ring Seal
38	Center Support Fluid Passage Sleeve
39	Overdrive Clutch Fluid Passage Sleeve
40	Automatic Transmission Pressure Test Plug
42	Output Speed Sensor
43	Output Speed Sensor Bolt
44	Input Speed Sensor
45	Input Speed Sensor Bolt
46	Automatic Transmission Fluid Pump Cover Gasket
47	Control Valve Body and Accumulator Assembly
49	Control Valve Body Bolt M6 x 1.0 x 50
50	Control Valve Body Bolt M6 x 1.0 x 38
51	Control Valve Body Bolt M6 x 1.0 x 50
52	Manual Shaft Detent Assembly
53	Control Valve Body Bolt M6 x 1.0 x 68
54	Wiring Harness Clip
55	Automatic Transmission Wiring Harness
56	Automatic Transmission Wiring Harness - O-Ring seal - 2
57	Automatic Transmission Filter Seal - 2
59	Automatic Transmission Fluid Filter
60	Automatic Transmission Fluid Pan Gasket
61	Automatic Transmission Fluid Pan Magnet
62	Automatic Transmission Fluid Pan Assembly
63	Automatic Transmission Fluid Pan Drain Plug

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64	Automatic Transmission Fluid Pan Drain Plug Seal
65	Automatic Transmission Fluid Pan Bolt
66	Automatic Transmission Pressure Test Plug O-Ring Seal
67	Input and Reaction Carrier Thrust Washer - Model Dependent
68	Automatic Transmission Prop Shaft Flange Seal - Model Dependent

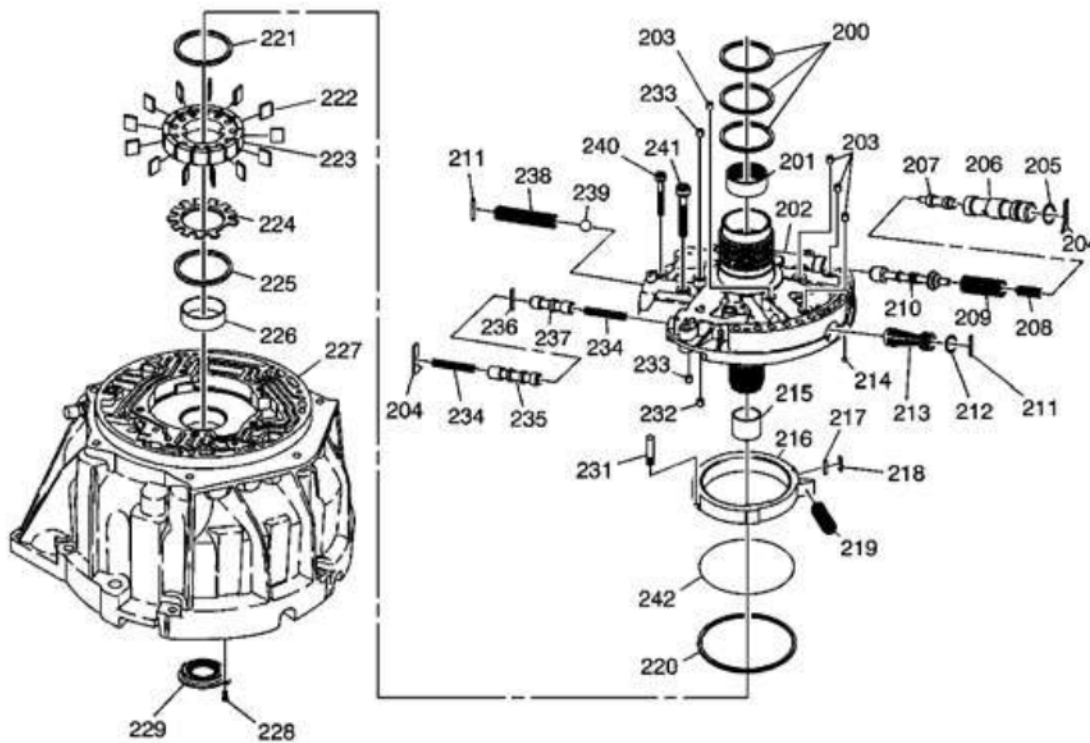


Fig. 3: Fluid Pump Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
200	Reverse Clutch Housing Fluid Seal Ring - 3
201	Input Shaft Bearing Assembly
202	Automatic Transmission Fluid Pump Cover Assembly
203	Check Valve Retainer and Ball Assembly
203	Check Valve Retainer and Ball Assembly
204	Valve Bushing/Spring Retainer
204	Valve Bushing/Spring Retainer
205	Line Boost Valve Bushing Seal

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206	Line Boost Valve Bushing
207	Line Boost Valve
208	Line Boost Valve Spring
209	Pressure Regulator Valve Spring
210	Pressure Regulator Valve
211	Automatic Transmission Fluid Pump Retainer Pin
211	Automatic Transmission Fluid Pump Retainer Pin
212	Automatic Transmission Pump Cover Seal
213	Automatic Transmission Fluid Pump Screen Assembly
214	Brass Orifice Insert
215	Turbine Shaft Bushing
216	Automatic Transmission Fluid Pump Slide - Selective
217	Automatic Transmission Fluid Pump Slide Seal Support
218	Automatic Transmission Fluid Pump Slide Seal
219	Automatic Transmission Fluid Pump Slide Ring
220	Automatic Transmission Fluid Pump Slide Ring
221	Automatic Transmission Fluid Pump Vane Ring
222	Automatic Transmission Fluid Pump Vane
223	Automatic Transmission Fluid Pump Rotor - Selective
224	Automatic Transmission Fluid Pump Rotor Guide
225	Automatic Transmission Fluid Pump Vane Ring
226	Torque Converter Bushing
227	Torque Converter Housing
228	Torque Converter Housing Seal Bolt M4 x 0.7 x 10.0 - 4
229	Torque Converter Housing Seal
231	Automatic Transmission Fluid Pump Slide Pin Assembly
232	Orifice Sleeve
233	Orifice Cup Plug - 2
233	Orifice Cup Plug - 2
234	TCC Control Valve Spring
234	TCC Control Valve Spring
235	TCC Control Valve
236	Automatic Transmission Fluid Pump Retainer Pin
237	TCC Enable Valve
238	Pressure Relief Ball Valve Spring

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	Pressure Relief Ball Valve
240	Automatic Transmission Fluid Pump Bolt M6 x 1.0 x 40
241	Automatic Transmission Fluid Pump Bolt M8 x 1.25 x 40
242	Automatic Transmission Fluid Pump Slide O-ring Seal

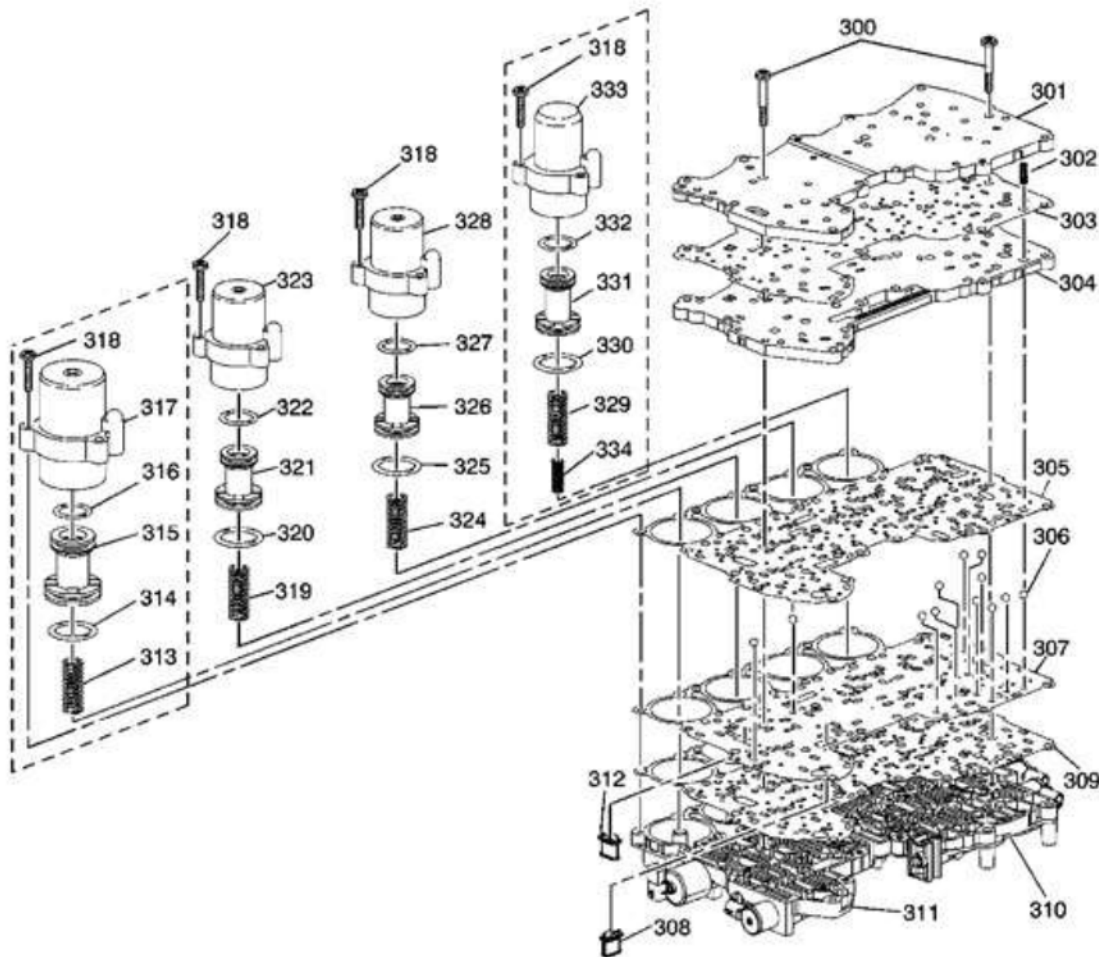


Fig. 4: Control Valve Body & Accumulator Assembly Disassembled View
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
300	Control Valve Body Bolt M6 x 1.0 x 38 - 7
301	Control Valve Top Channel Plate
302	Control Valve Channel Plate Ball Check Spring
303	Control Valve Channel Plate Gasket

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304	Control Valve Bottom Channel Plate
305	Control Valve Body Gasket
306	Control Valve Body Ball Check Valve
307	Control Valve Body Spacer Plate
308	TCC PWM Solenoid Valve Filter Assembly
309	Control Valve Body Spacer Plate Gasket
310	Control Valve Rear Body Assembly
311	Control Valve Front Body Assembly
312	Pressure Control Solenoid Valve Filter Assembly
313	Direct Clutch Accumulator Piston Spring - Model Dependent
314	Direct Clutch Accumulator Piston Fluid Seal Ring - Model Dependent
315	Direct Clutch Accumulator Piston - Model Dependent
316	Direct Clutch Accumulator Piston Fluid Seal Ring - Model Dependent
317	Direct Clutch Accumulator Housing - Model Dependent
318	Accumulator Housing Bolt M6 x 1.0 x 30 - 12 - Model Dependent
318	Accumulator Housing Bolt M6 x 1.0 x 30 - 12
318	Accumulator Housing Bolt M6 x 1.0 x 30 - 12
318	Accumulator Housing Bolt M6 x 1.0 x 30 - 12
319	Overdrive Clutch Accumulator Piston Spring
320	Overdrive Clutch Accumulator Piston Fluid Seal Ring
321	Overdrive Clutch Accumulator Piston
322	Overdrive Clutch Accumulator Piston Fluid Seal Ring
323	Overdrive Clutch Accumulator Housing
324	Intermediate Clutch Accumulator Piston Spring
325	Intermediate Clutch Accumulator Piston Fluid Seal Ring
326	Intermediate Clutch Accumulator Piston
327	Intermediate Clutch Accumulator Piston Fluid Seal Ring
328	Intermediate Clutch Accumulator Housing
329	2nd Clutch Accumulator Piston Spring - Model Dependent
330	2nd Clutch Accumulator Piston Seal Ring - Model Dependent
331	2nd Clutch Accumulator Piston - Model Dependent
332	2nd Clutch Accumulator Piston Seal Ring - Model Dependent
333	2nd Clutch Accumulator Housing - Model Dependent
334	2nd Clutch Accumulator Piston Inner Spring - Model Dependent

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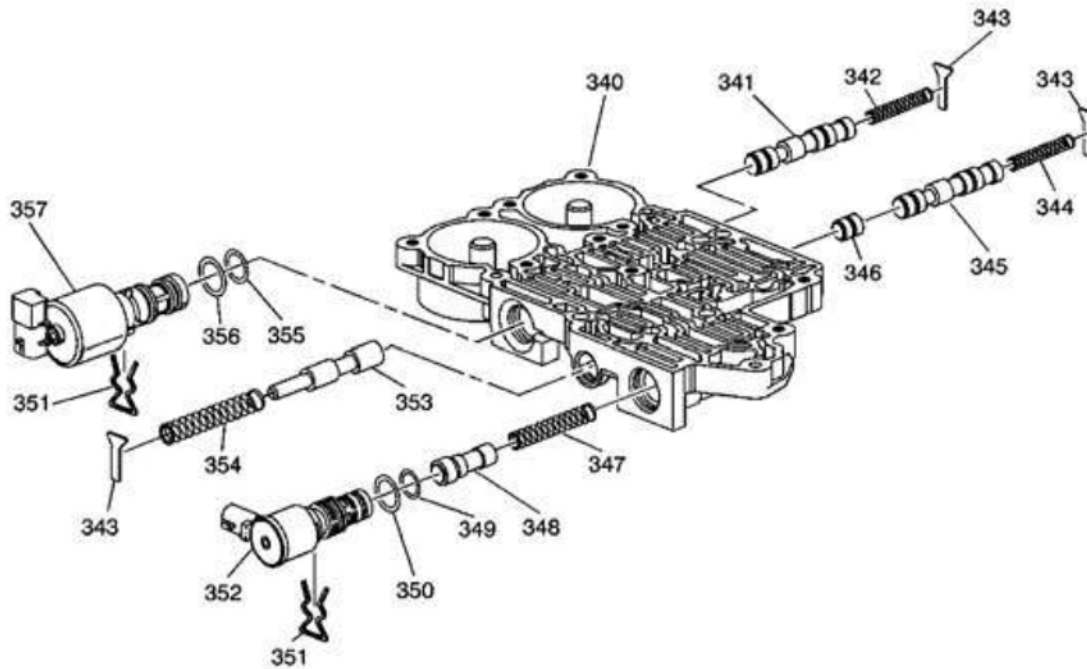


Fig. 5: Front Control Valve Body Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
340	Front Control Valve Body
341	Safety Mode Valve
342	Safety Mode Valve Spring
343	Valve Spring Retainer - 3
343	Valve Spring Retainer - 3
343	Valve Spring Retainer - 3
344	3-4 Shift Valve Spring
345	3-4 Shift Valve
346	3-4 Shift Control Valve
347	TCC Regulator Apply Valve Spring
348	TCC Regulator Apply Valve
349	Solenoid Valve - O-Ring Seal
350	Solenoid Valve - O-Ring Seal
351	Solenoid Valve Retainer - 2
351	Solenoid Valve Retainer - 2

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352	TCC PWM Solenoid Valve
353	Feed Limit Valve
354	Feed Limit Valve Spring
355	Pressure Control Solenoid - O-Ring Seal
356	Pressure Control Solenoid - O-Ring Seal
357	Pressure Control (PC) Solenoid Assembly

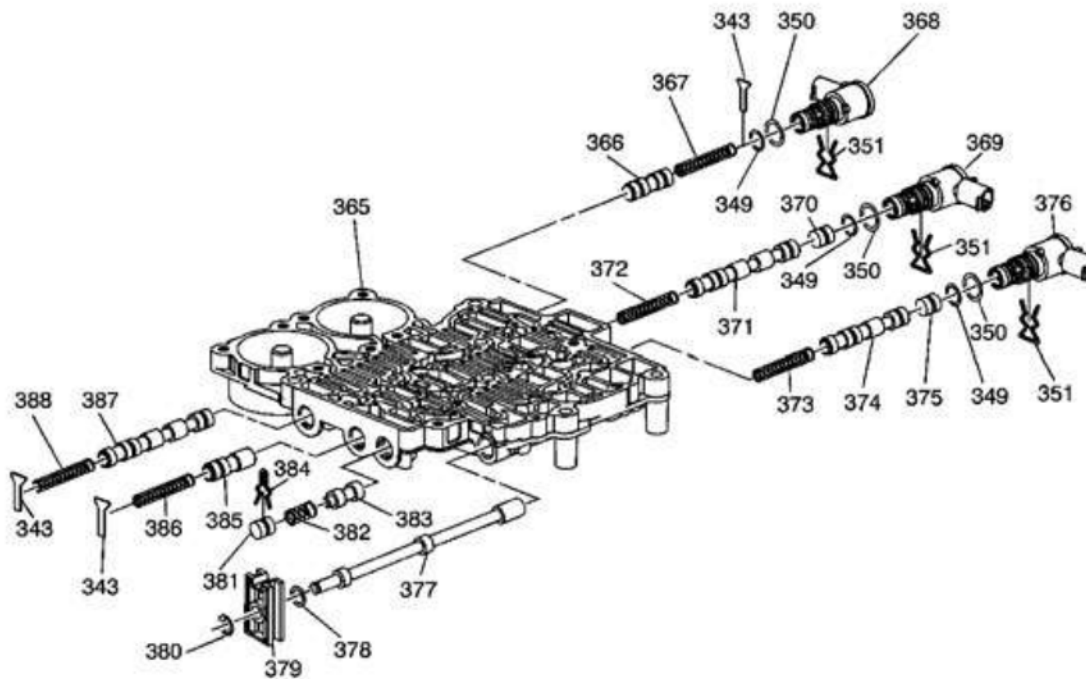


Fig. 6: Rear Control Valve Body Disassembled View
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

Callout	Component Name
343	Valve Spring Retainer
343	Valve Spring Retainer
343	Valve Spring Retainer
349	Solenoid Valve - O-Ring Seal
349	Solenoid Valve - O-Ring Seal
349	Solenoid Valve - O-Ring Seal
350	Solenoid Valve - O-Ring Seal
350	Solenoid Valve - O-Ring Seal

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350	Solenoid Valve - O-Ring Seal
351	Solenoid Valve Retainer
351	Solenoid Valve Retainer
351	Solenoid Valve Retainer
365	Rear Control Valve Body
366	1-2 Shift Control Valve
367	1-2 Shift Control Valve Spring
368	1-2 Shift Solenoid (SS) Valve Assembly
369	2-3 Shift Solenoid (SS) Valve Assembly
370	2-3 Shift Control Valve
371	2-3 Shift Valve
372	2-3 Shift Valve Spring
373	4-5 Shift Valve Spring
374	4-5 Shift Valve
375	4-5 Shift Control Valve
376	4-5 Shift Solenoid (SS) Valve Assembly
377	Manual Valve
378	Manual Valve Link Washer - Waved
379	Manual Valve Link
380	Manual Valve Link Retainer
381	Low Pressure Control Valve Bore Plug
382	Low Pressure Control Valve Spring
383	Low Pressure Control Valve
384	Low Pressure Control Valve Bore Retainer
385	Reverse Lockout Valve
386	Reverse Lockout Valve Spring
387	1-2 Shift Valve
388	1-2 Shift Valve Spring

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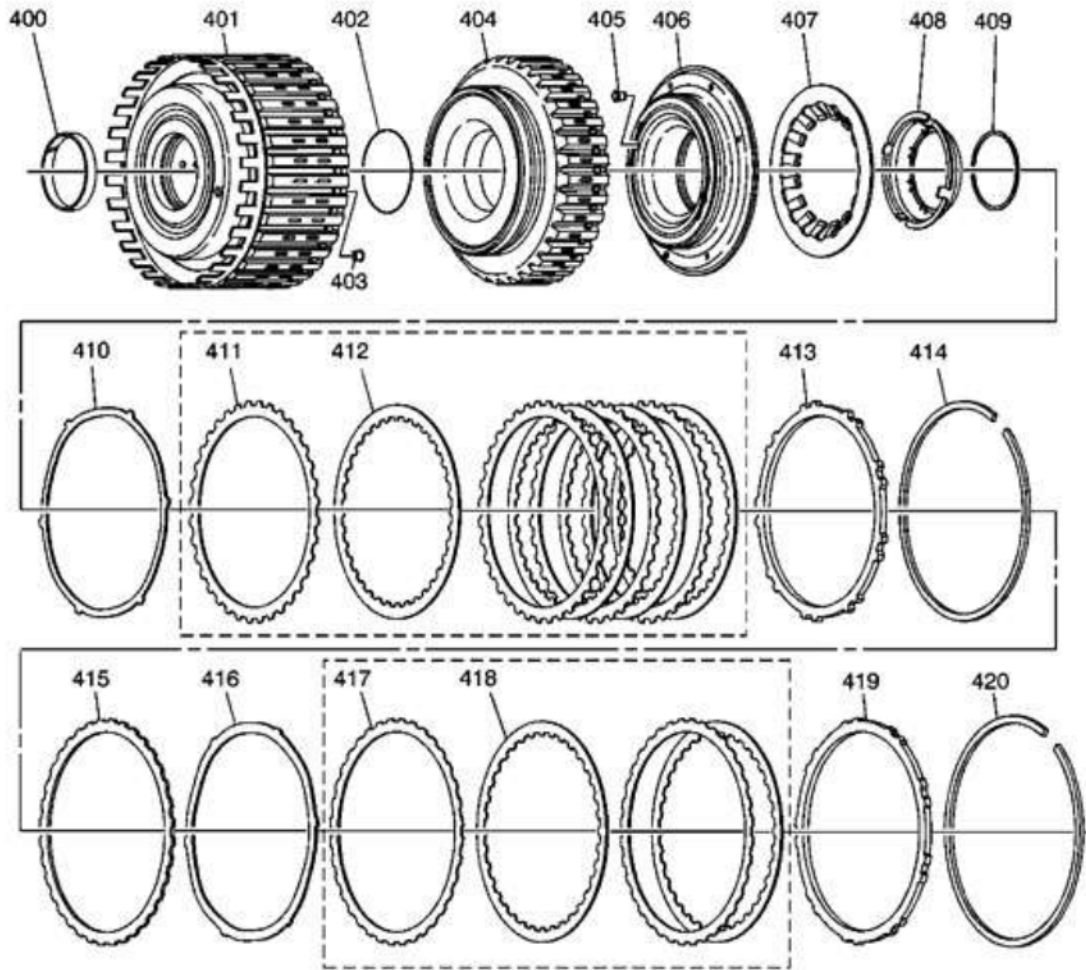


Fig. 7: Direct & Reverse Clutch Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 7

Callout	Component Name
400	Reverse Clutch Housing Bushing
401	Reverse Clutch - W/Input Housing Assembly
402	Reverse Clutch Piston Inner Seal
403	Reverse Clutch Housing Ball Check Valve
404	Reverse Clutch Piston
405	Direct Clutch Housing Ball Check Valve
406	Direct Clutch Piston Assembly
407	Direct and Reverse Clutch Spring
408	Direct and Reverse Clutch Spring Retainer

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409	Direct and Reverse Clutch Spring Retainer Ring
410	Direct Clutch Apply Plate
411	Direct Clutch Plate Assembly - Outer Spline - 4
412	Direct Clutch Plate Assembly - Inner Spline - 4
413	Direct Clutch Backing Plate
414	Direct Clutch Backing Plate Retainer Ring - Selective
415	Reverse Clutch Spacer
416	Reverse Clutch Apply Plate
417	Reverse Clutch Plate Assembly - Outer Spline - 2
418	Reverse Clutch Plate Assembly - Inner Spline - 2
419	Reverse Clutch Backing Plate
420	Reverse Clutch Backing Plate Retainer Ring - Selective

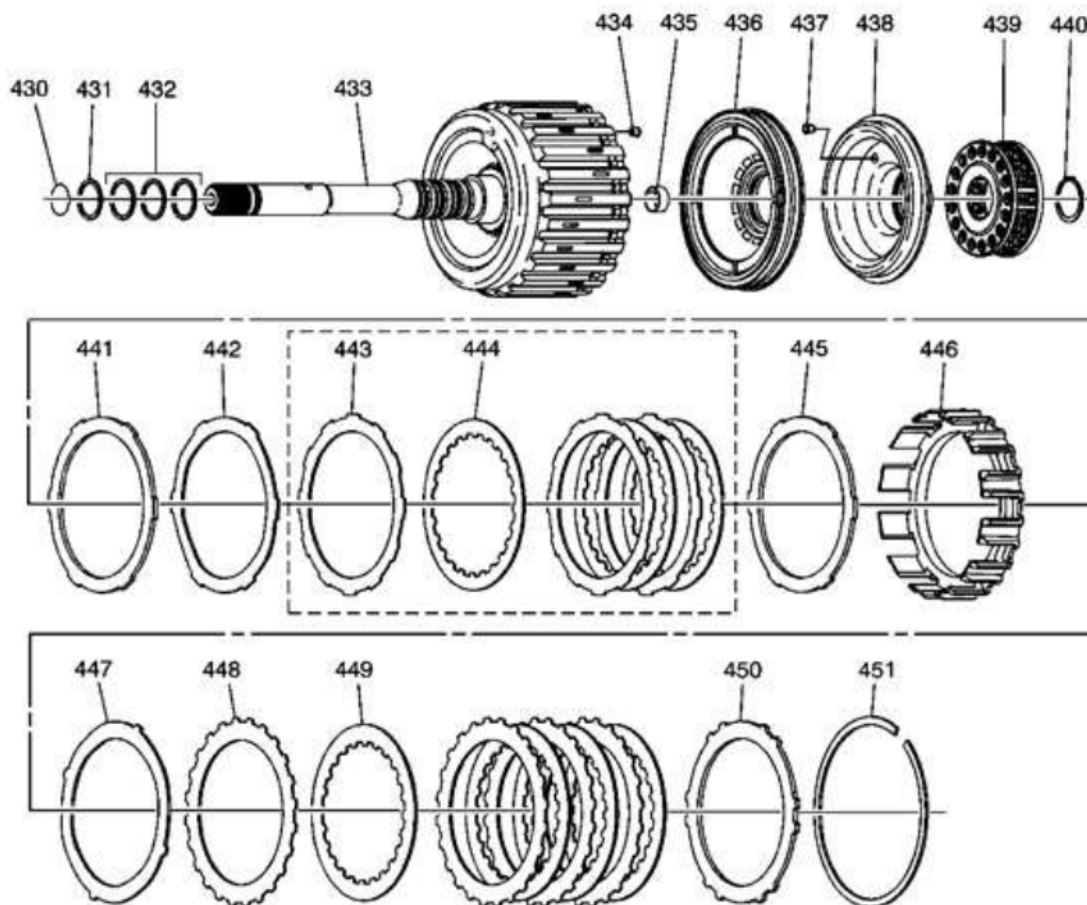


Fig. 8: Forward & Coast Clutch Assembly Disassembled View
 Courtesy of GENERAL MOTORS CORP.

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Callouts For Fig. 8

Callout	Component Name
430	Input Shaft - O-Ring Seal
431	Input Shaft Fluid Seal Ring
432	Input Shaft Fluid Seal Ring - 3
433	Forward Clutch - W/Input Housing Assembly
434	Forward Clutch Housing Ball Check Valve Assembly
435	Forward Clutch Bushing
436	Forward Clutch Piston Assembly
437	Coast Clutch Piston Ball Check Valve Assembly
438	Coast Clutch Piston Assembly
439	Forward and Coast Clutch Spring
440	Forward and Coast Clutch Spring Retainer Ring
441	Coast Clutch Spacer Plate - Selective
442	Coast Clutch Apply Plate
443	Coast Clutch Plate Assembly - Outer Spline - 3
444	Coast Clutch Plate Assembly - Inner Spline - 3
445	Coast Clutch Backing Plate
446	Coast Clutch Housing
447	Forward Clutch Apply Plate
448	Forward Clutch Plate Assembly - Outer Spline - 4
449	Forward Clutch Plate Assembly - Inner Spline - 4
450	Forward Clutch Backing Plate
451	Forward Clutch Backing Plate Retainer Ring - Selective

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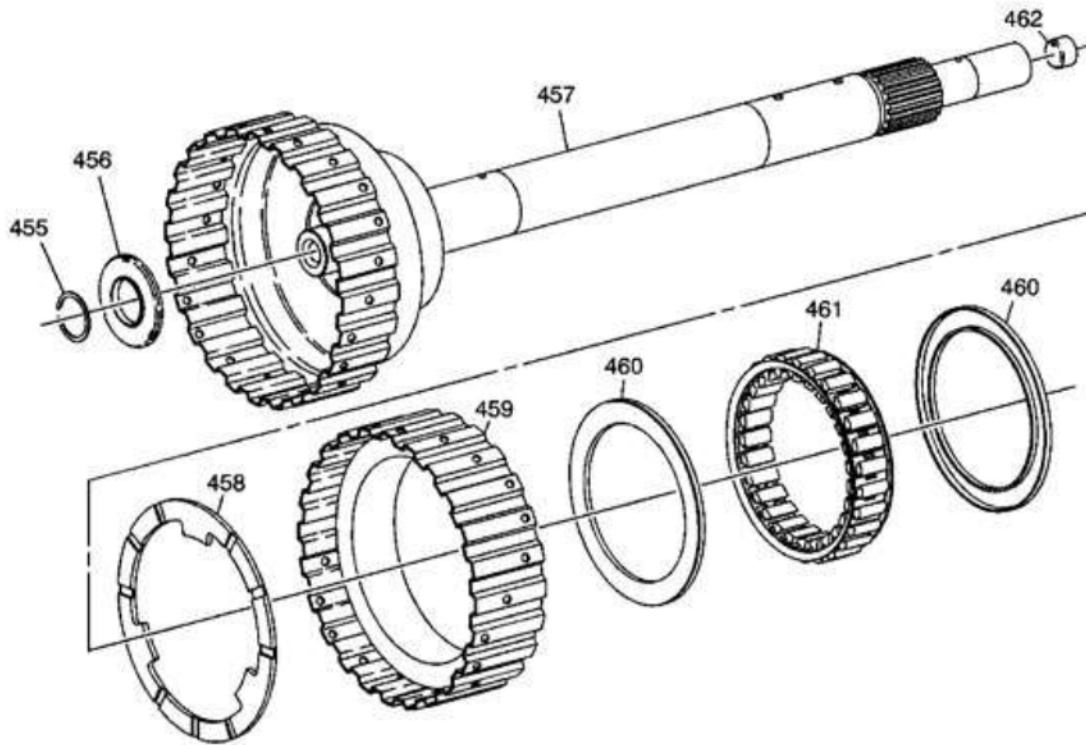


Fig. 9: Input Sun Gear Shaft & Forward Sprag Clutch Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 9

Callout	Component Name
455	Forward Clutch Roller Inner Race Thrust Ring
456	Forward Clutch Roller Inner Bearing
457	Input Sun Gear Shaft Assembly
458	Forward Clutch Roller Outer Race Washer
459	Forward Clutch Sprag Outer Race
460	Forward Clutch Sprag Assembly Retainer Rings - 2
460	Forward Clutch Sprag Assembly Retainer Rings - 2
461	Forward Clutch Sprag Assembly
462	Orificed Cup Plug - Lube

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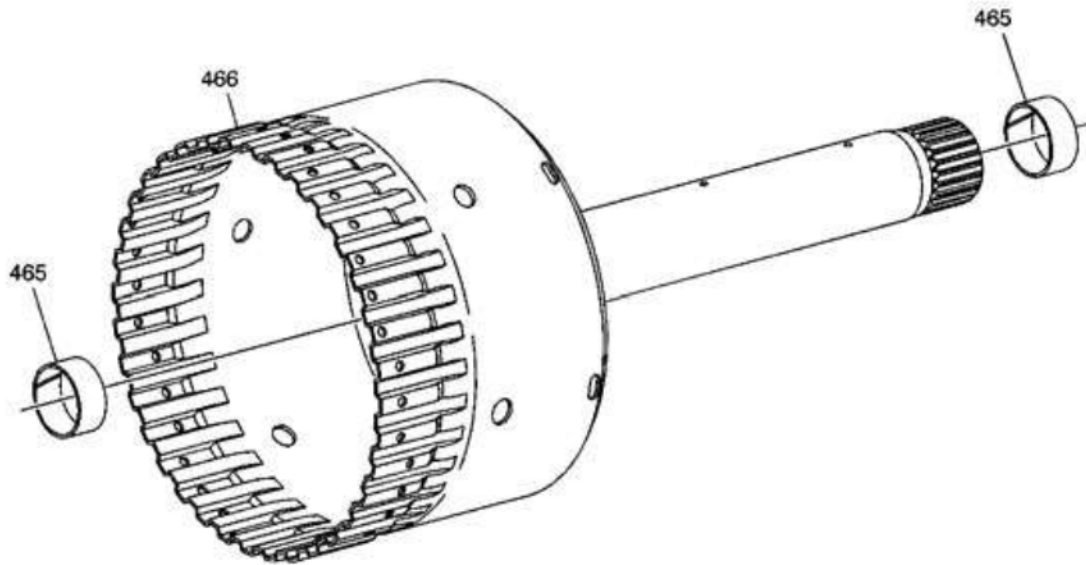


Fig. 10: Direct Clutch Drum & Shaft Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 10

Callout	Component Name
465	Input and Reaction Carrier Bushing - 2
465	Input and Reaction Carrier Bushing - 2
466	Direct Clutch Drum

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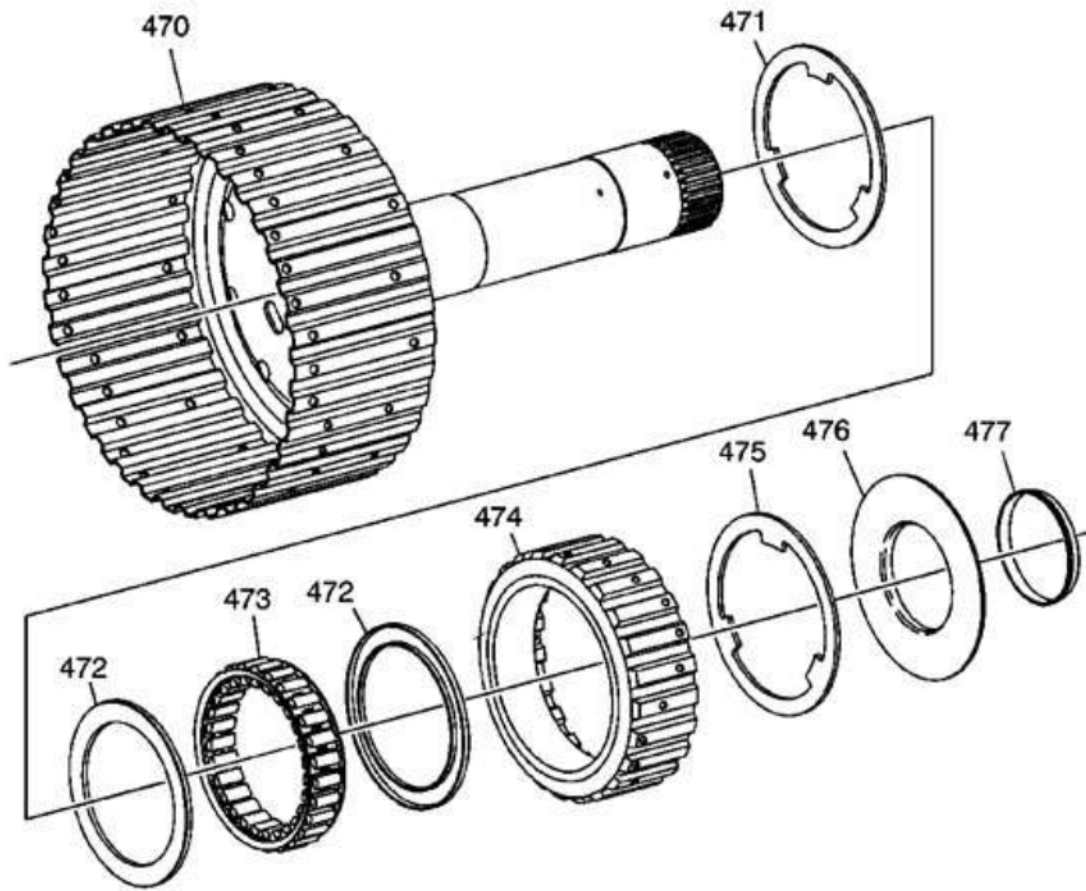


Fig. 11: Intermediate Sprag Clutch Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 11

Callout	Component Name
470	Overdrive and Reverse Clutch - W/Hub Assembly
471	Intermediate Clutch Roller Thrust Washer
472	Intermediate Clutch Sprag Assembly Retainer Rings - 2
472	Intermediate Clutch Sprag Assembly Retainer Rings - 2
473	Intermediate Clutch Sprag Assembly
474	Intermediate Clutch Sprag Outer Race
475	Intermediate Clutch Roller Thrust Washer
476	Intermediate Clutch Roller Thrust Bearing Assembly
477	Intermediate Clutch Roller Thrust Bearing Assembly Retainer

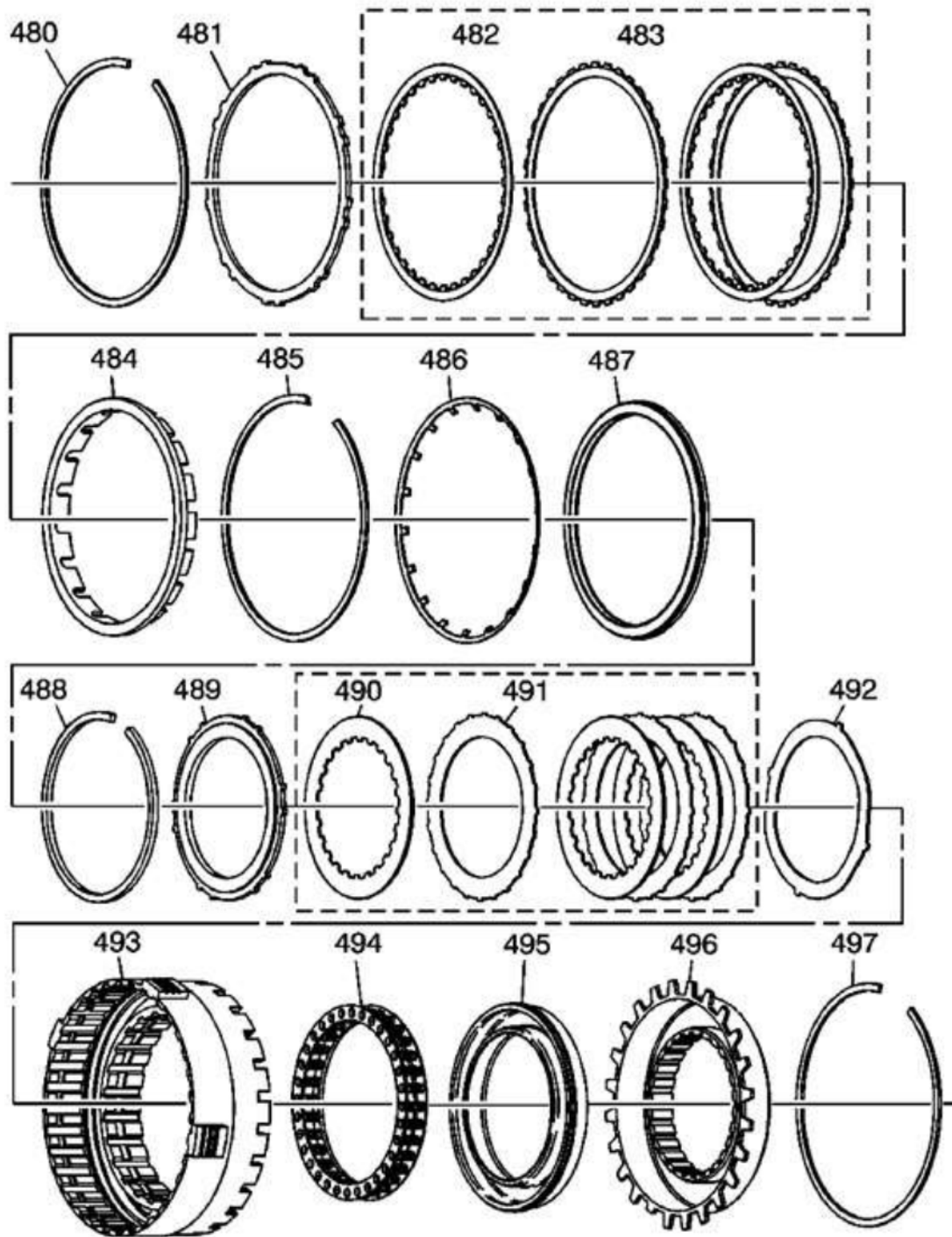


Fig. 12: Overdrive & Intermediate Clutch Assembly Disassembled View
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 12

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Callout	Component Name
480	Overdrive Clutch Backing Plate Retainer Ring - Selective
481	Overdrive Clutch Backing Plate
482	Overdrive Clutch Plate Assembly - Inner Spline
483	Overdrive Clutch Plate Assembly - Outer Spline
484	Overdrive Clutch Spacer
485	Overdrive Clutch Spring Retainer Ring
486	Overdrive Clutch Piston Spring
487	Overdrive Clutch Piston Assembly
488	Intermediate Clutch Backing Plate Retainer Ring - Selective
489	Intermediate Clutch Backing Plate
490	Intermediate Clutch Plate Assembly - Inner Spline - 3
491	Intermediate Clutch Plate Assembly - Outer Spline - 3
492	Intermediate Clutch Apply Plate
493	Overdrive Clutch Housing
494	Intermediate Clutch Spring
495	Intermediate Clutch Piston Assembly
496	Intermediate Clutch Housing
497	Intermediate Clutch Housing Retainer Ring

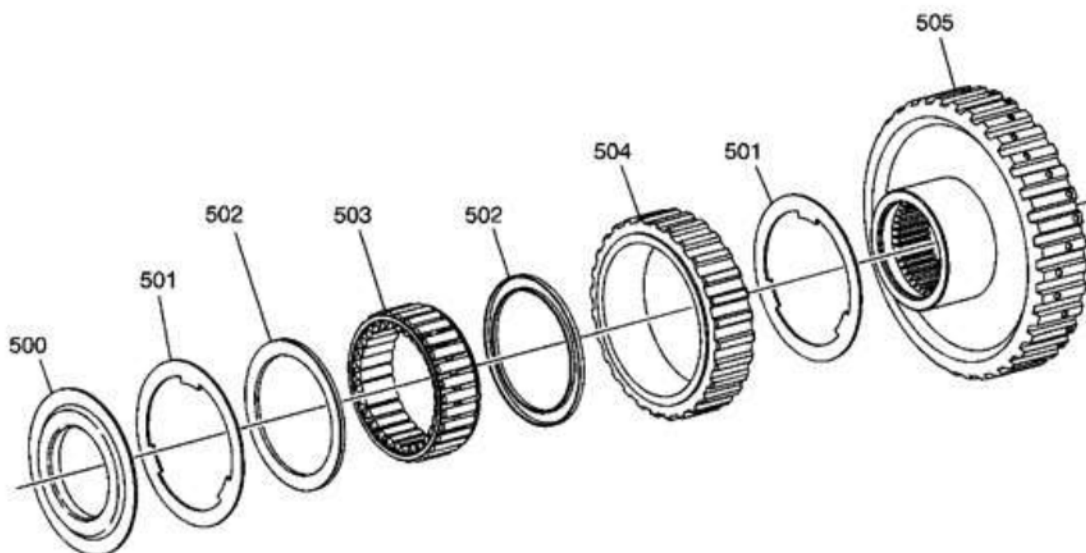


Fig. 13: Low Clutch Sprag Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

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Callouts For Fig. 13

Callout	Component Name
500	Low Clutch Roller Retainer
501	Low Clutch Roller Thrust Washer
501	Low Clutch Roller Thrust Washer
502	Low Clutch Sprag Assembly Retainer Rings - 2
502	Low Clutch Sprag Assembly Retainer Rings - 2
503	Low Clutch Sprag Assembly
504	Low Clutch Sprag Outer Race
505	Low Clutch Sprag Inner Race

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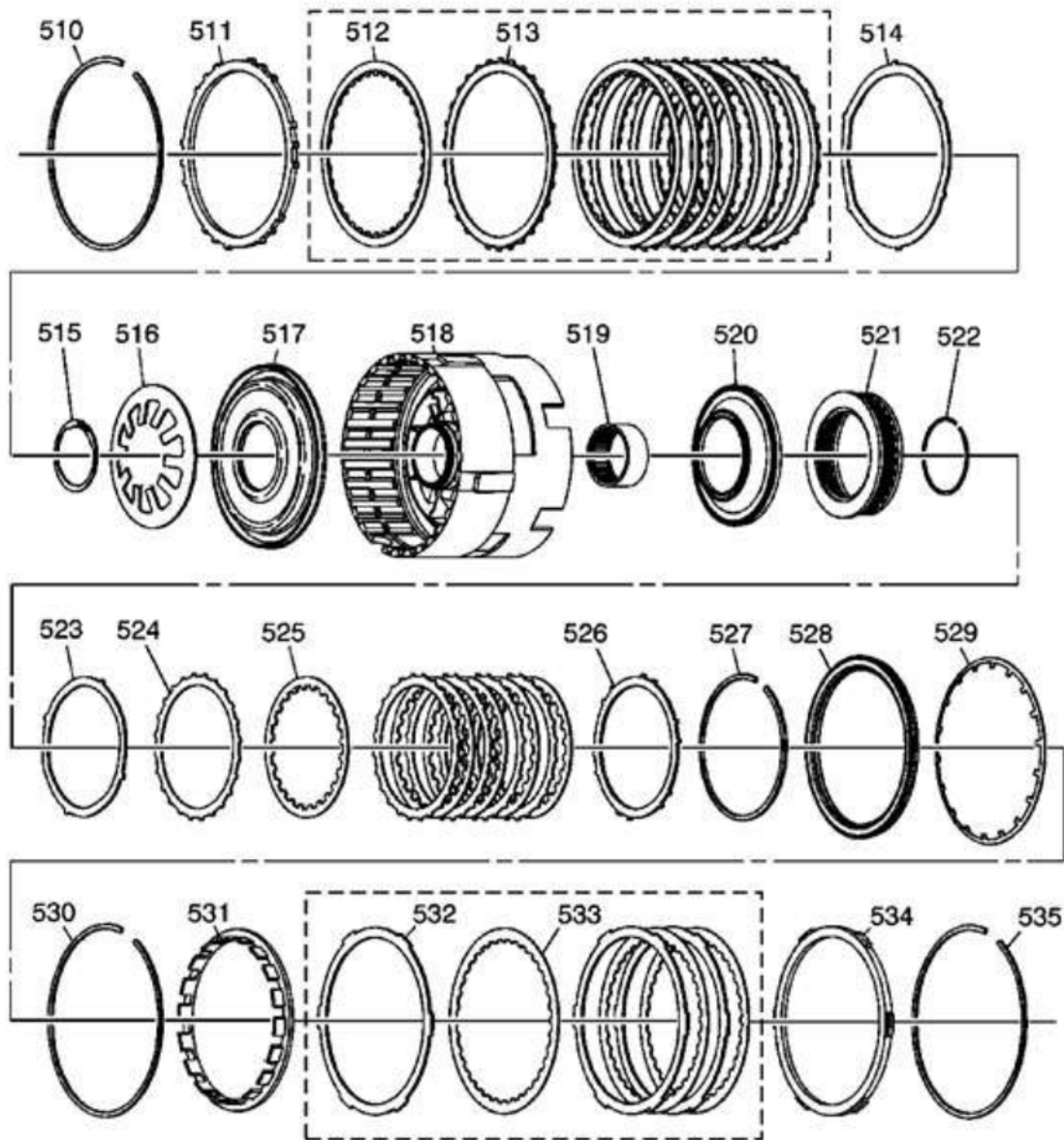


Fig. 14: Center Support Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 14

Callout	Component Name
510	Low and Reverse Clutch Plate Retainer Ring - Selective
511	Low and Reverse Clutch Backing Plate
512	Low and Reverse Clutch Plate Assembly - Inner Spline - 5
513	Low and Reverse Clutch Plate Assembly - Outer Spline - 5

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514	Low and Reverse Clutch Apply Plate
515	Low and Reverse Clutch Spring Retainer Ring
516	Low and Reverse Clutch Spring
517	Low and Reverse Clutch Piston
518	Center Support
519	Input and Reaction Bearing Assembly
520	2nd Clutch Piston
521	2nd Clutch Spring
522	2nd Clutch Spring Retainer Ring
523	2nd Clutch Apply Plate
524	2nd Clutch Plate Assembly - Outer Spline - 5
525	2nd Clutch Plate Assembly - Inner Spline - 5
526	2nd Clutch Backing Plate
527	2nd Clutch Backing Plate Retainer Ring - Selective
528	2nd Coast Clutch Piston Assembly
529	2nd Coast Clutch Spring
530	2nd Coast Clutch Spring Retainer Ring
531	2nd Coast Clutch Spacer
532	2nd Coast Clutch Plate Assembly - Outer Spline - 3
533	2nd Coast Clutch Plate Assembly - Inner Spline - 3
534	2nd Coast Clutch Backing Plate
535	2nd Coast Clutch Plate -Backing Plate -Retainer Ring -Selective

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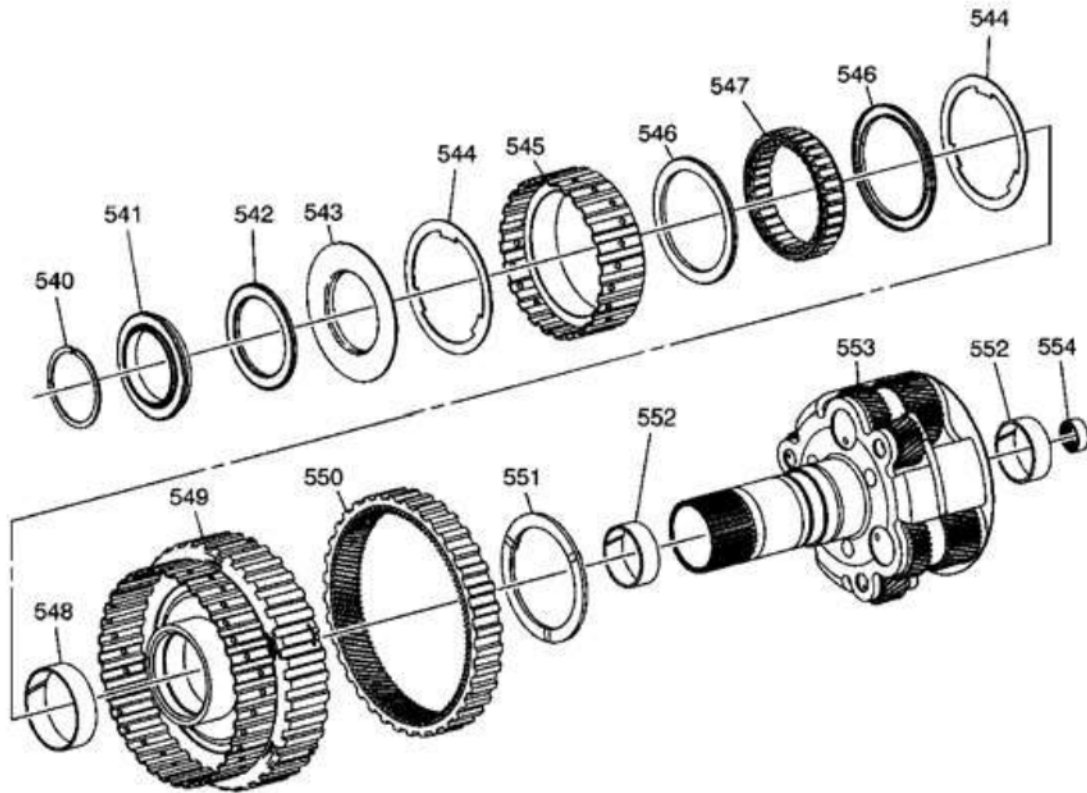


Fig. 15: Planetary Carrier Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 15

Callout	Component Name
540	Input and Reaction Carrier Outer Retainer Ring
541	Input and Reaction Bearing Assembly
542	2nd Clutch Roller Inner Race Bearing Assembly
543	2nd Clutch Sprag Retainer
544	2nd Clutch Roller Outer Race Washer
544	2nd Clutch Roller Outer Race Washer
545	2nd Clutch Sprag Outer Race
546	2nd Clutch Sprag Assembly Retainer - 2
546	2nd Clutch Sprag Assembly Retainer - 2
547	2nd Clutch Sprag Assembly
548	Input and Reaction Carrier Bushing
549	2nd Clutch Sprag Inner Race

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550	Reaction Internal Gear
551	Reaction Internal Gear Flange Washer
552	Reaction Carrier Bushing - 2
552	Reaction Carrier Bushing - 2
553	Input and Reaction Carrier
554	Input and Reaction Bearing Assembly

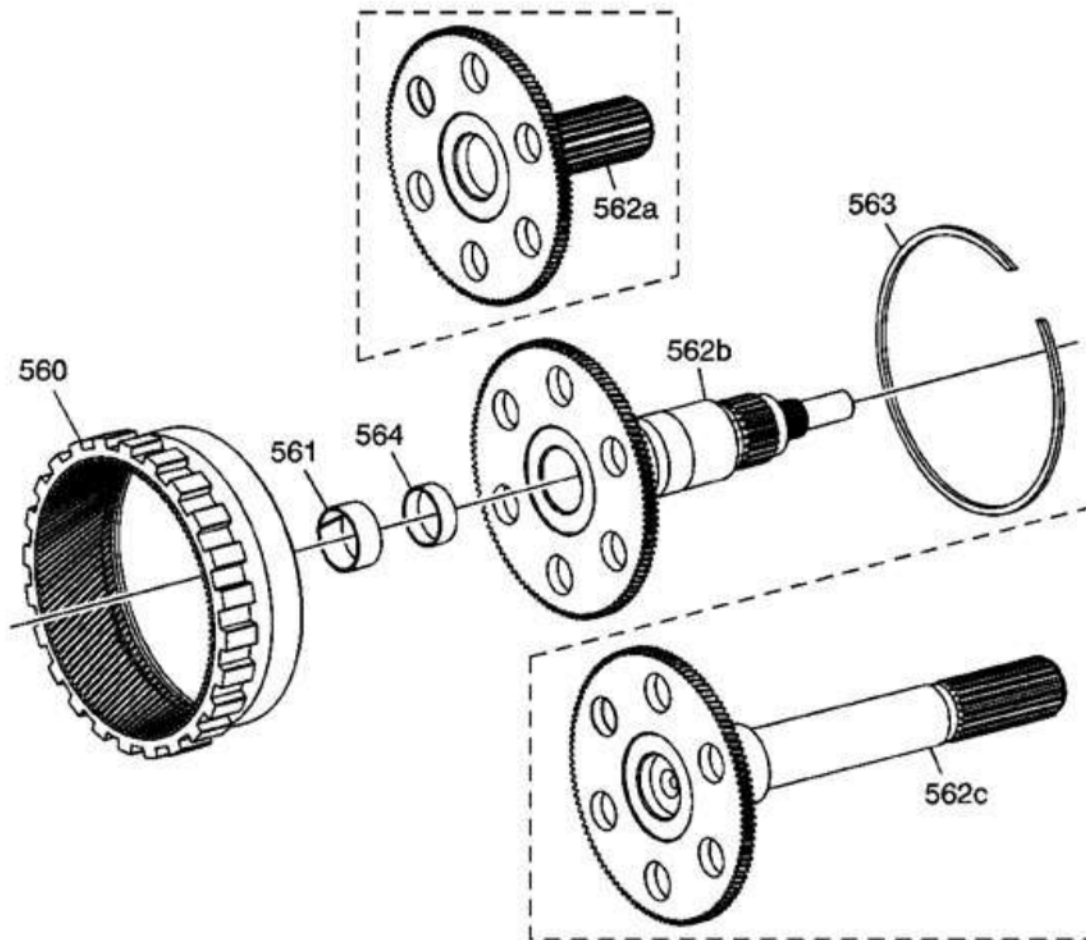


Fig. 16: Rear Internal Gear Output Shaft Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 16

Callout	Component Name
560	Rear Internal Gear
561	Input and Reaction Carrier Bushing

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562a	Output Shaft Assembly - AWD
562b	Output Shaft Assembly - 2WD
562c	Output Shaft Assembly - XLR
563	Rear Internal Retainer Ring
564	Cup Plug

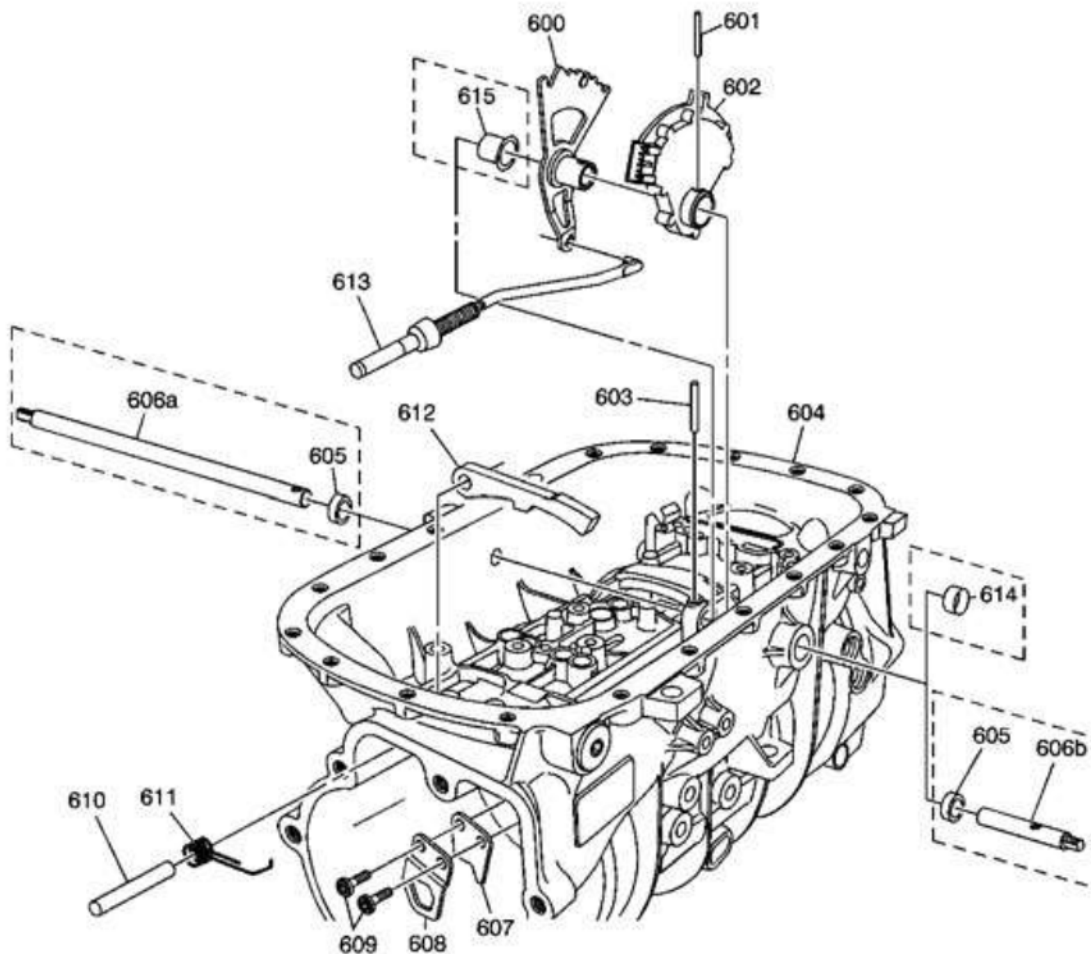


Fig. 17: Park Pawl Assembly Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 17

Callout	Component Name
600	Manual Shaft Detent Lever
601	Manual Shaft Detent Lever Pin
602	Transmission Manual Shift Shaft Switch Assembly

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603	Manual Shaft Detent Lever Pin
604	Transmission Case
605	Manual Shift Shaft Seal - Model Dependent
605	Manual Shift Shaft Seal - Model Dependent
606a	Manual Shift Shaft - 2WD Excluding XLR - Model Dependent
606b	Manual Shift Shaft - AWD and XLR - Model Dependent
607	Park Pawl Actuator Bracket
608	Park Pawl Actuator Bracket
609	Park Pawl Actuator Bracket Bolt M8 x 1.25 x 25 - 2
610	Park Pawl Shaft
611	Park Pawl Spring
612	Park Pawl
613	Park Pawl Actuator Assembly
614	Cup Plug - Model Dependent
615	Transmission Manual Shift Shaft Spacer - Model Dependent

AUTOMATIC TRANSMISSION ELECTRONIC COMPONENT VIEWS

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2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

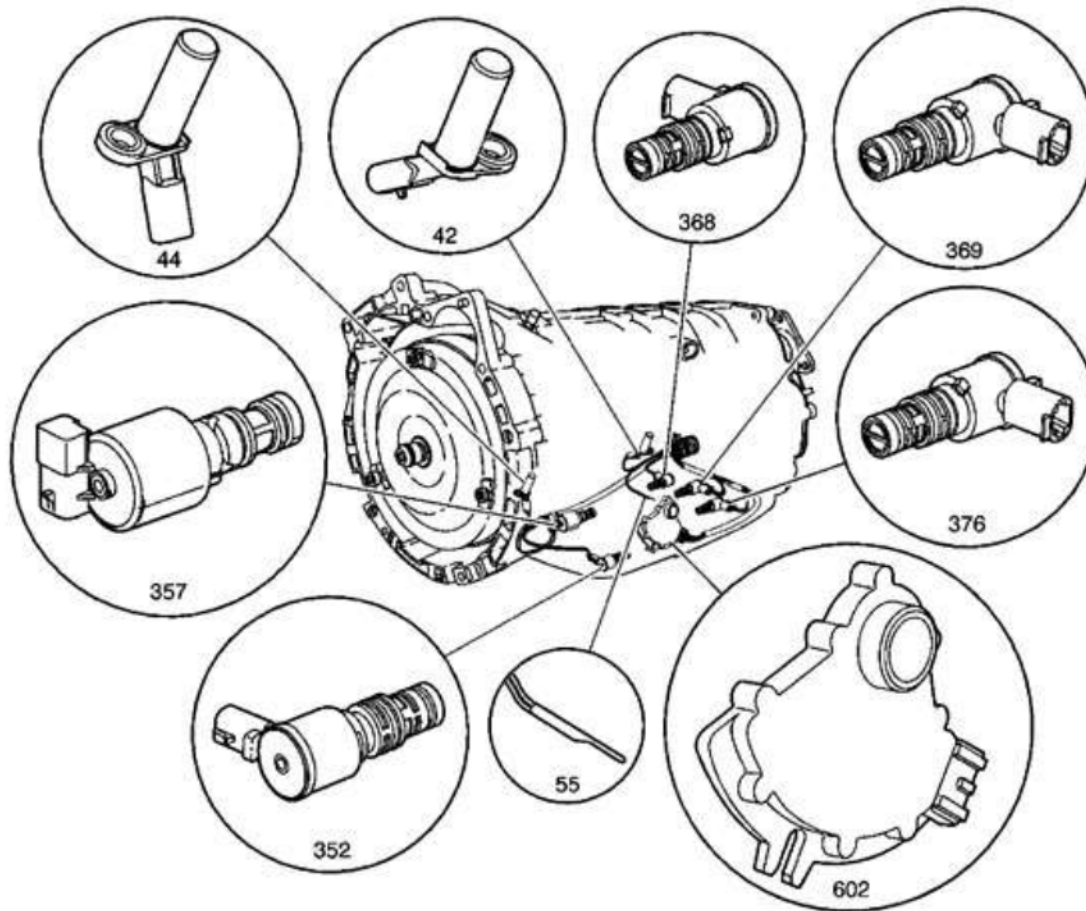


Fig. 18: Automatic Transmission Electronic Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 18

Callout	Component Name
42	Output Speed Sensor (OSS)
44	Input Speed Sensor (ISS)
55	Transmission Fluid Temperature (TFT) Sensor - Part of Automatic Transmission Wiring Harness (55)
352	TCC PWM Solenoid Valve
357	Pressure Control Solenoid (PCS) Assembly
368	1-2 Shift Solenoid (SS) Valve Assembly
369	2-3 Shift Solenoid (SS) Valve Assembly
376	4-5 Shift Solenoid (SS) Valve Assembly
602	Transmission Manual Shift Shaft Switch Assembly

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COMPONENT LOCATION

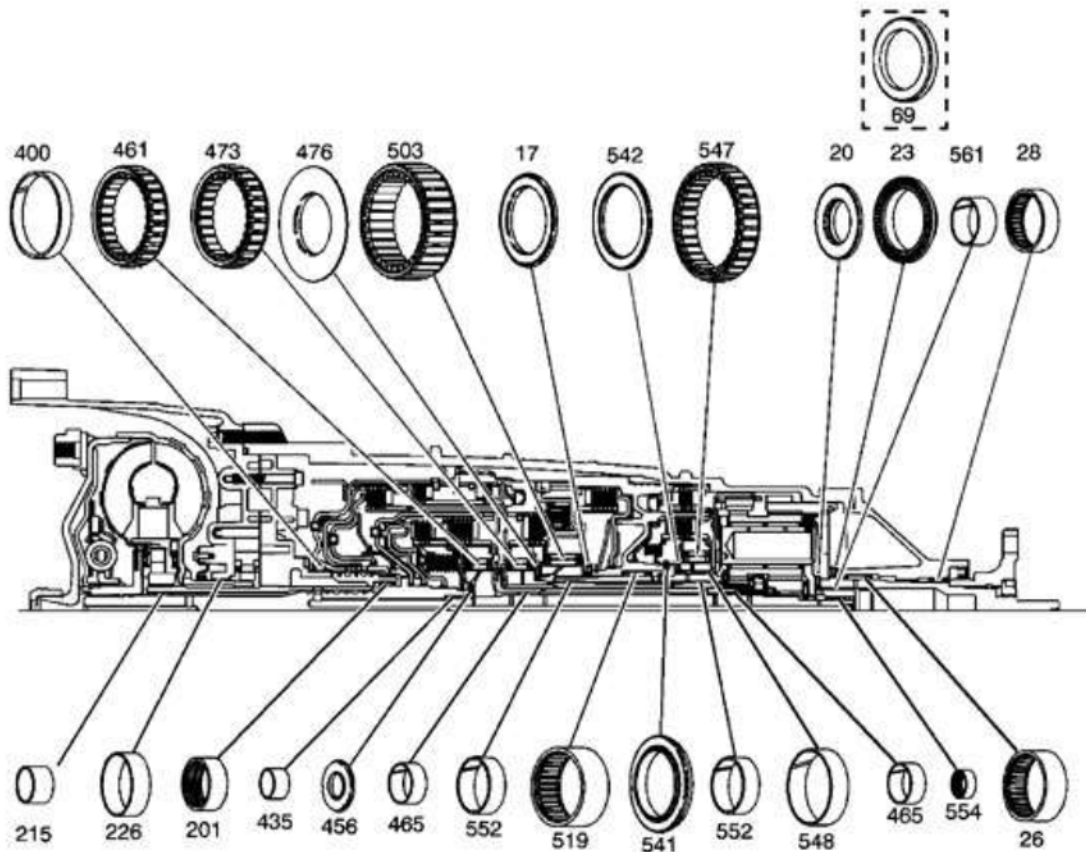


Fig. 19: Bushing & Bearing Locations
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 19

Callout	Component Name
17	Low Clutch Roller Thrust Bearing
20	Input and Reaction Carrier Thrust Bearing
23	Input and Reaction Carrier Thrust Bearing
26	Output Shaft Bearing
28	Output Shaft Bearing
201	Input Shaft Bearing Assembly
215	Turbine Shaft Bushing
226	Torque Converter Bushing
400	Reverse Clutch Housing Bushing
435	Forward Clutch Bushing

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456	Forward Clutch Roller Inner Bearing
461	Forward Clutch Sprag Assembly
465	Input and Reaction Carrier Bushing Assembly - 2
465	Input and Reaction Carrier Bushing Assembly - 2
473	Intermediate Clutch Sprag Assembly
476	Intermediate Clutch Roller Thrust Bearing Assembly
503	Low Clutch Sprag Assembly
519	Input and Reaction Bearing Assembly
541	Input and Reaction Bearing Assembly
542	2nd Clutch Roller Inner Race Bearing Assembly
547	2nd Clutch Sprag Assembly
548	Input and Reaction Carrier Bushing
552	Reaction Carrier Bushing - 2
552	Reaction Carrier Bushing - 2
554	Input and Reaction Bearing Assembly
561	Input and Reaction Carrier Bushing

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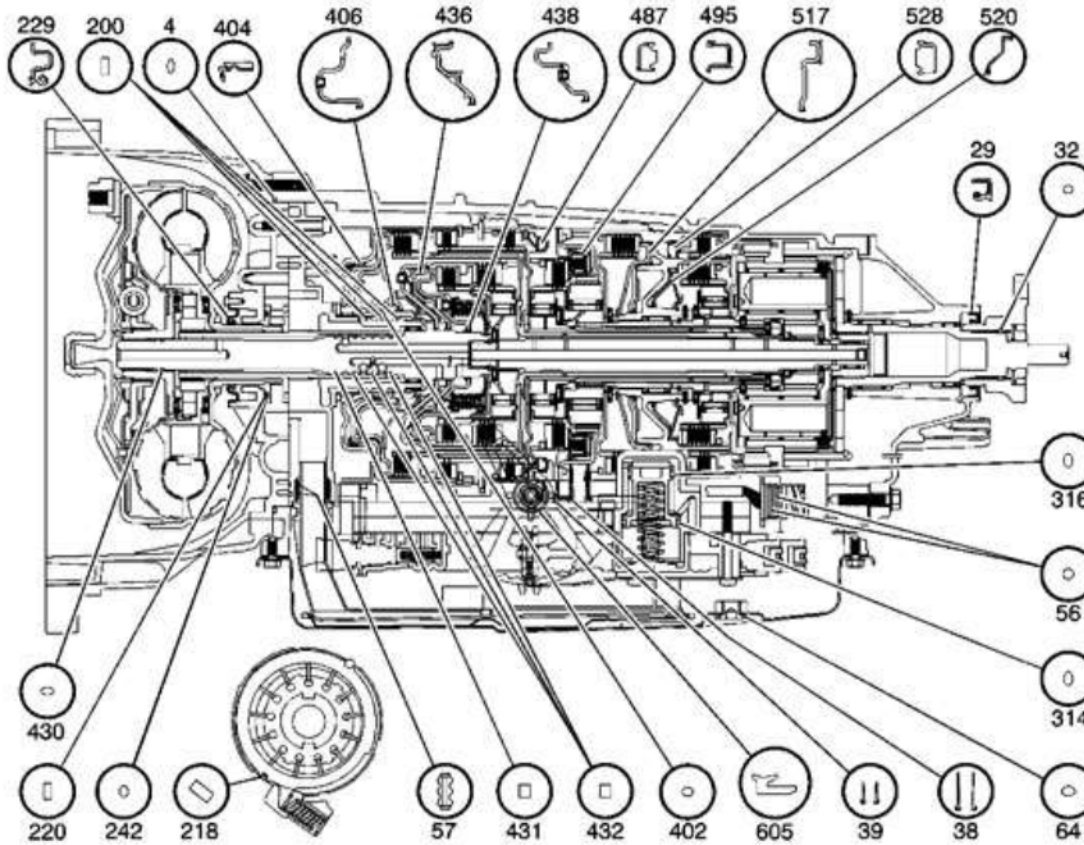


Fig. 20: Seal Locations

Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 20

Callout	Component Name
4	Torque Converter Housing Fluid Seal Assembly
29	Transmission Prop Shaft Flange Seal
32	Transmission Prop Shaft Flange - O-ring Seal
38	Center Support Fluid Passage Sleeve
39	Overdrive Clutch Fluid Passage Sleeve
56	A/Transmission Wiring Harness - O-ring Seal - 2
57	Automatic Transmission Filter Seal - 2
64	Automatic Transmission Fluid Pan Drain Plug Seal
200	Reverse Clutch Housing Fluid Seal Ring - 3
218	Automatic Transmission Fluid Pump Slide Seal
220	Automatic Transmission Fluid Pump Slide Ring

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229	Torque Converter Housing Seal
242	Automatic Transmission Fluid Pump Slide O-ring Seal
314	Clutch Accumulator Piston Fluid Seal Ring
316	Clutch Accumulator Piston Fluid Seal Ring
402	Reverse Clutch Piston Inner Seal
404	Reverse Clutch Piston
406	Direct Clutch Piston Assembly
430	Input Shaft - O-Ring Seal
431	Input Shaft Fluid Seal Ring
432	Input Shaft Fluid Seal Ring - 3
436	Forward Clutch Piston Assembly
438	Coast Clutch Piston Assembly
487	Overdrive Clutch Piston Assembly
495	Intermediate Clutch Piston Assembly
517	Low and Reverse Clutch Piston
520	2nd Clutch Piston
528	2nd Coast Clutch Piston Assembly
605	Manual Shift Shaft Seal

REPAIR INSTRUCTIONS

TORQUE CONVERTER ASSEMBLY REMOVAL

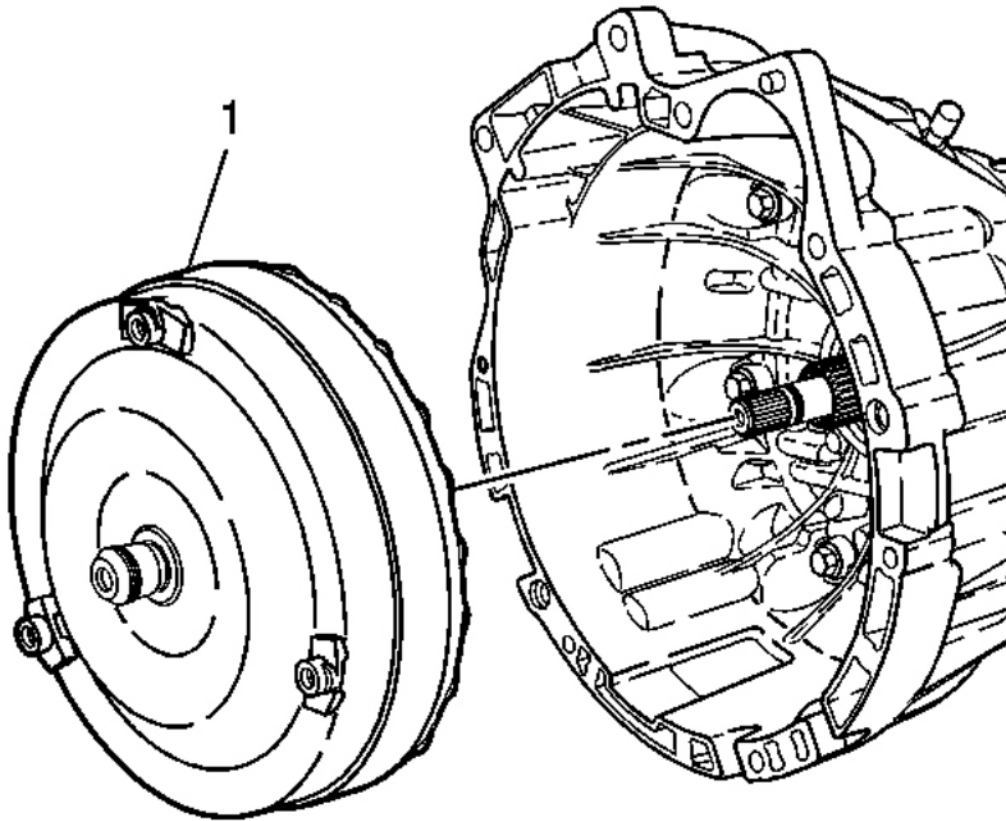


Fig. 21: View Of Torque Converter Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: This component weighs approximately 26 pounds.

1. Remove the torque converter assembly (1).

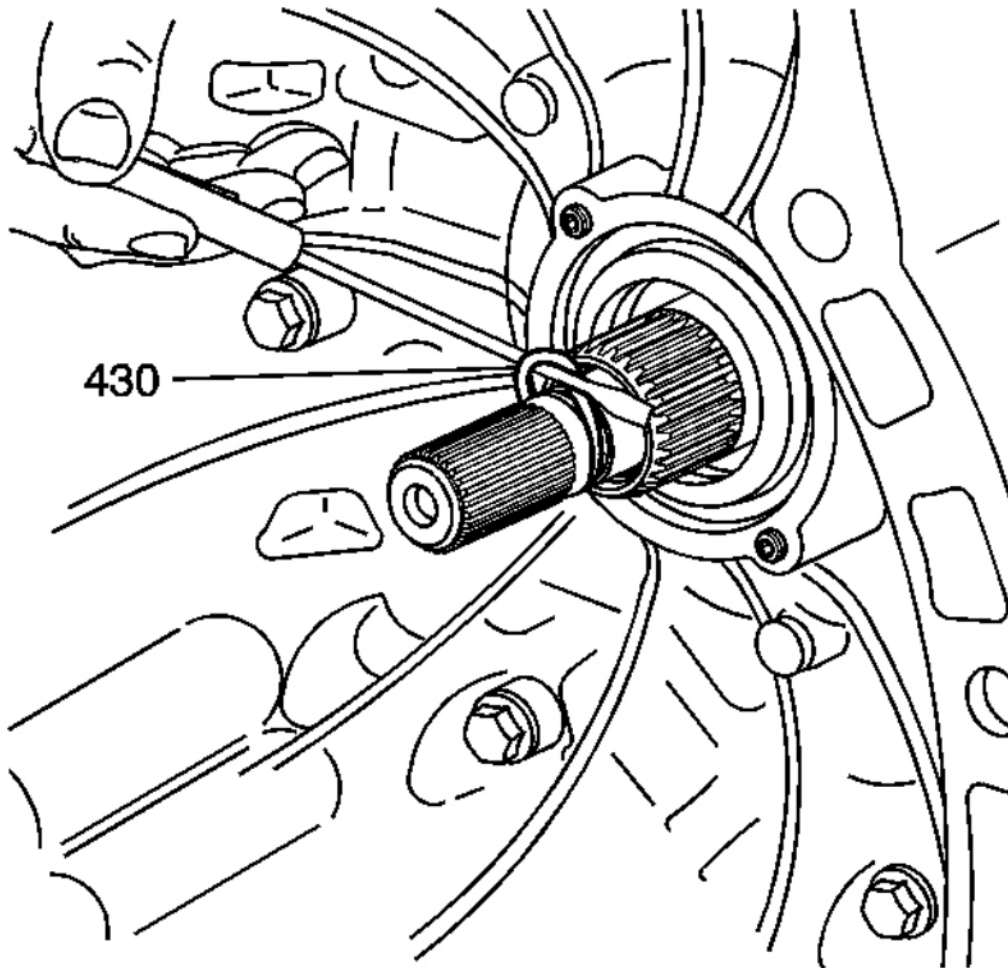


Fig. 22: Locating Turbine Shaft Seal
Courtesy of GENERAL MOTORS CORP.

2. Remove the input turbine shaft seal (430).

HOLDING FIXTURE INSTALLATION

Tools Required

J 8763-B Holding Fixture and Base. See **Special Tools and Equipment** .

Installation Procedure

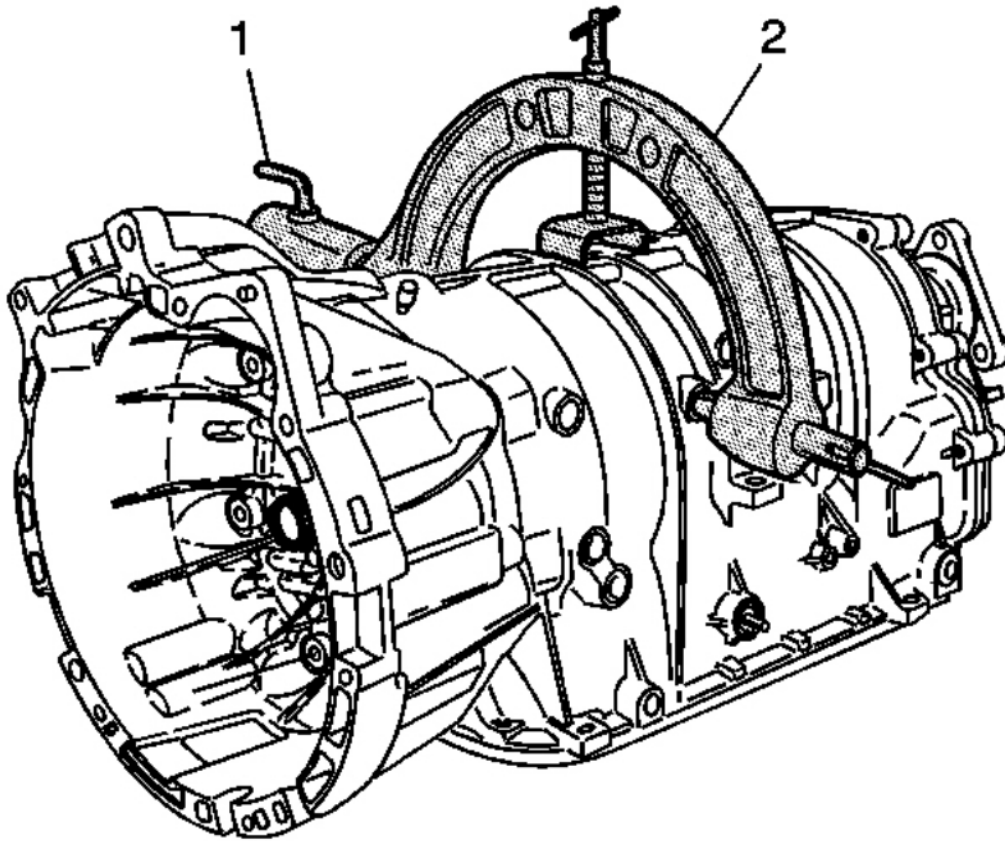


Fig. 23: Identifying J 8763-B
Courtesy of GENERAL MOTORS CORP.

1. Install the **J 8763-B** onto the transmission assembly.
2. Install the transmission assembly into the tool base and use the pin to lock the holding fixture in place.

DRAINING TRANSMISSION FLUID

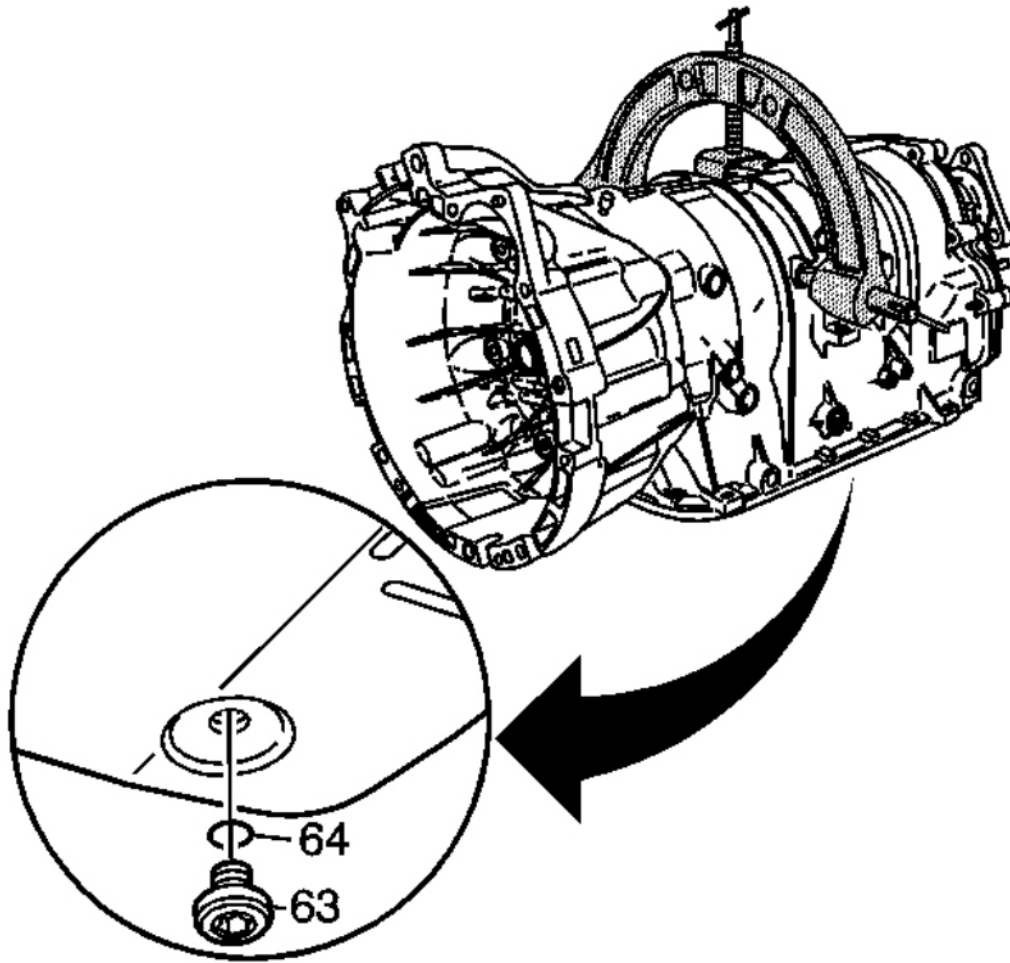


Fig. 24: Locating Fluid Pan Drain Plug & Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove the fluid pan drain plug (63) and seal (64), and allow the transmission fluid to drain.

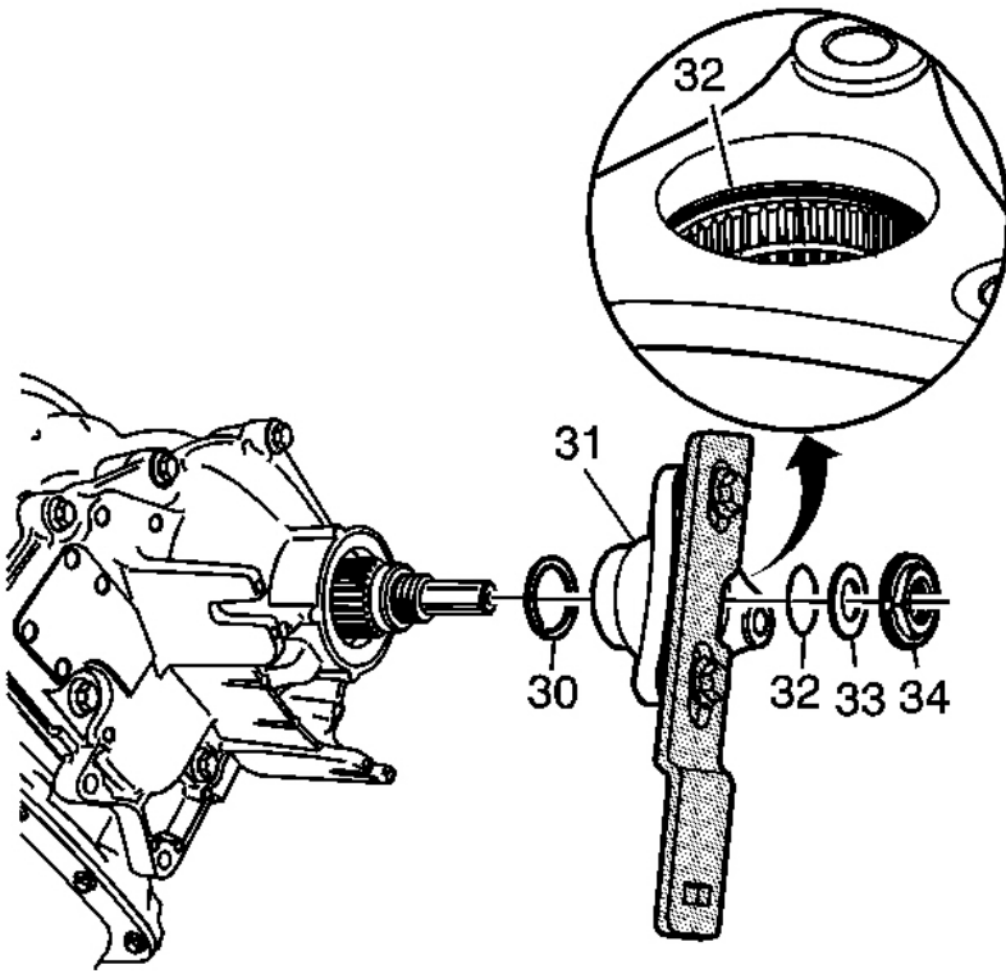


Fig. 25: View Of Prop Shaft Flange O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

2. Put transmission in park.

IMPORTANT: Discard retainer (30), seal (32), washer (33) and nut (34).

3. Remove the prop shaft flange nut (34).
4. Remove the prop shaft flange washer (33) and seal (32).
5. Remove the prop shaft flange (31) and the output shaft assembly retainer (30).

6. Slowly rotate the transmission to a vertical position, with the bell housing facing up, and allow any excess fluid to drain.

EXTENSION HOUSING REMOVAL

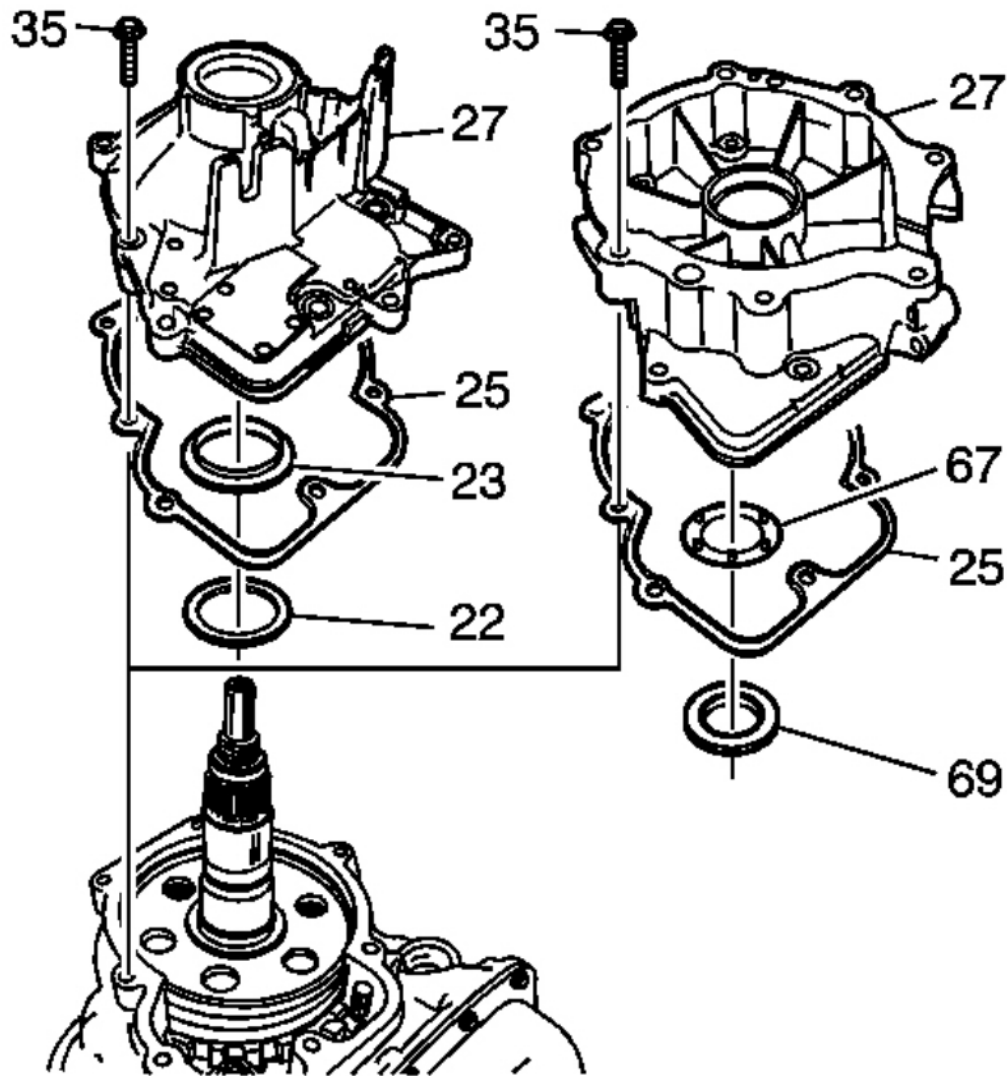


Fig. 26: Identifying Extension Housing Gasket & Bolts
Courtesy of GENERAL MOTORS CORP.

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1. Remove the case extension bolts (35).
2. Remove the case extension (27).
3. Remove the case extension gasket (25).
4. Remove the input and reaction carrier thrust washer (67) - some models.

PAN AND FILTER ASSEMBLY REMOVAL

Tools Required

- **J 23129** Universal Seal Remover. See **Special Tools and Equipment** .
- **J 6125-1B** Slide Hammer Adapter. See **Special Tools and Equipment** .

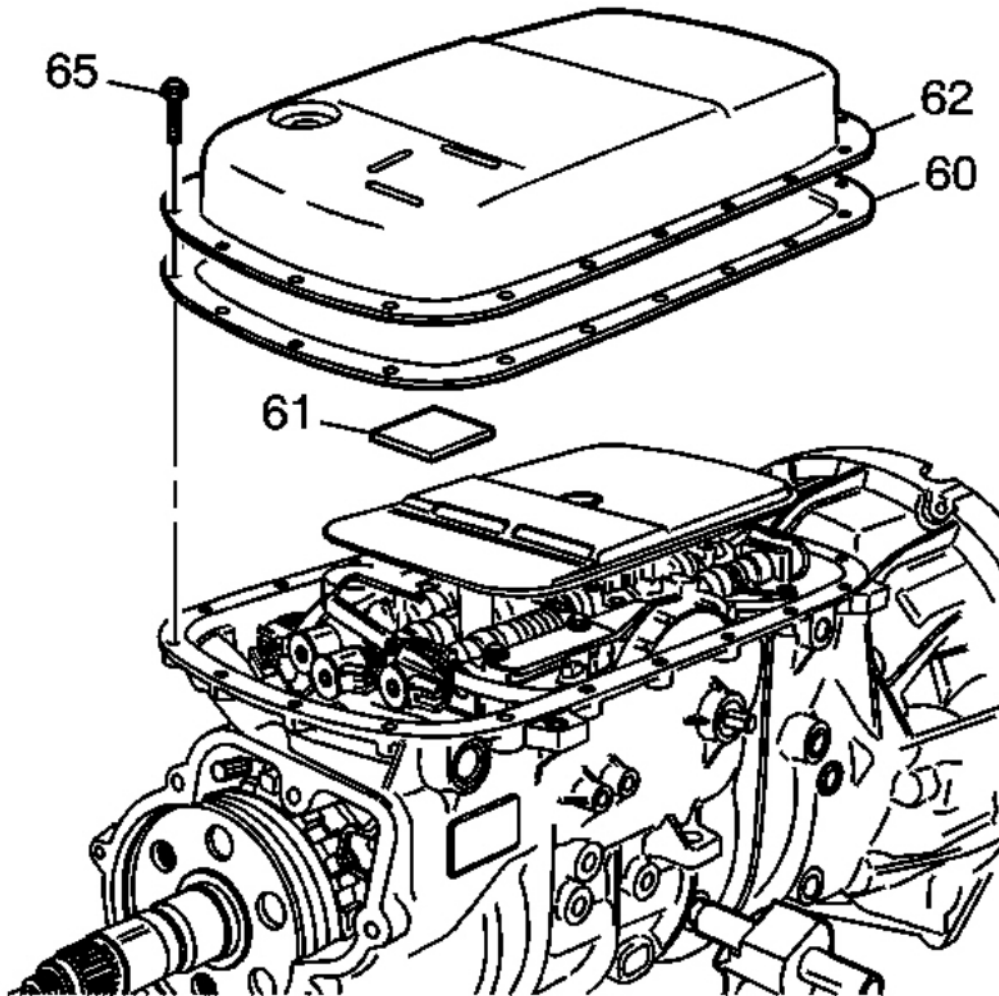


Fig. 27: Identifying Fluid Pan Bolts
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission so that the fluid pan (62) is facing up.
2. Remove the fluid pan bolts (65), the fluid pan (62) and the gasket (60).

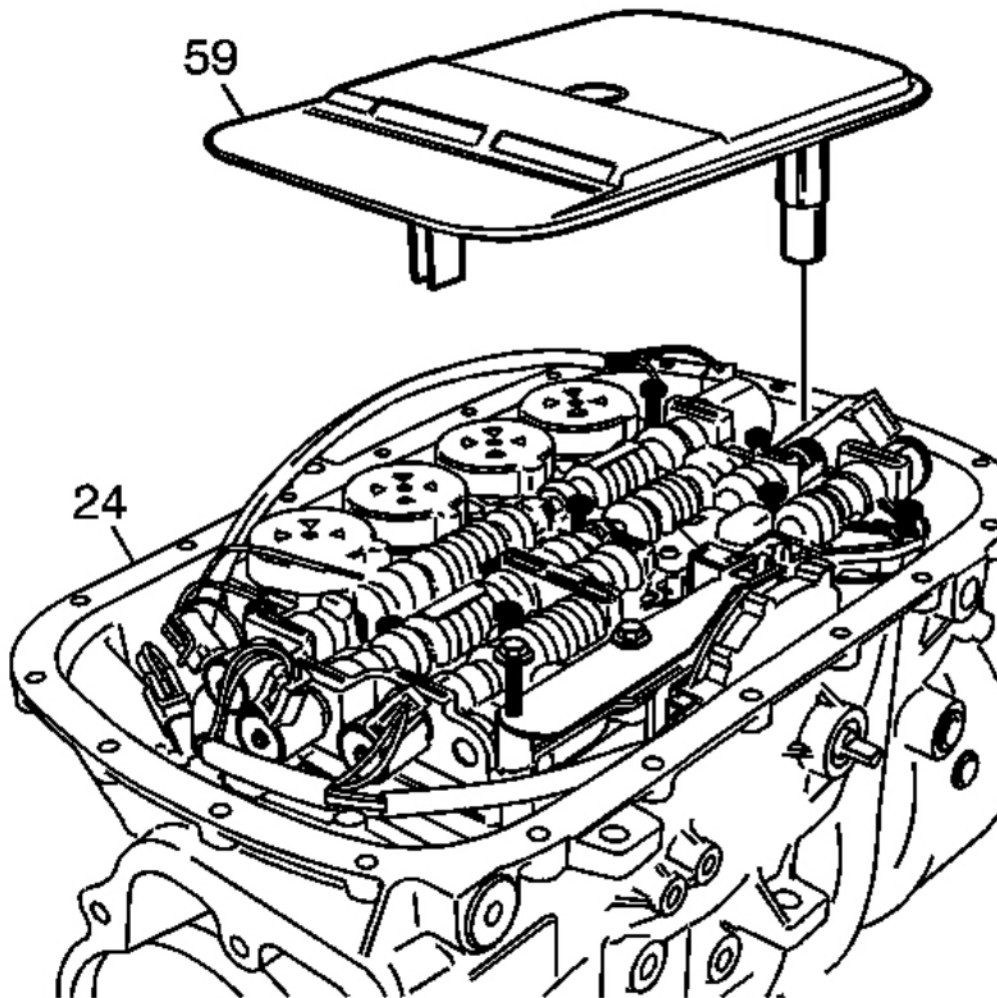


Fig. 28: Locating Fluid Filter

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Fluid seals (57) may remain in case (24) after fluid filter (59) has been removed.

3. Remove the fluid filter (59) from the case (24).

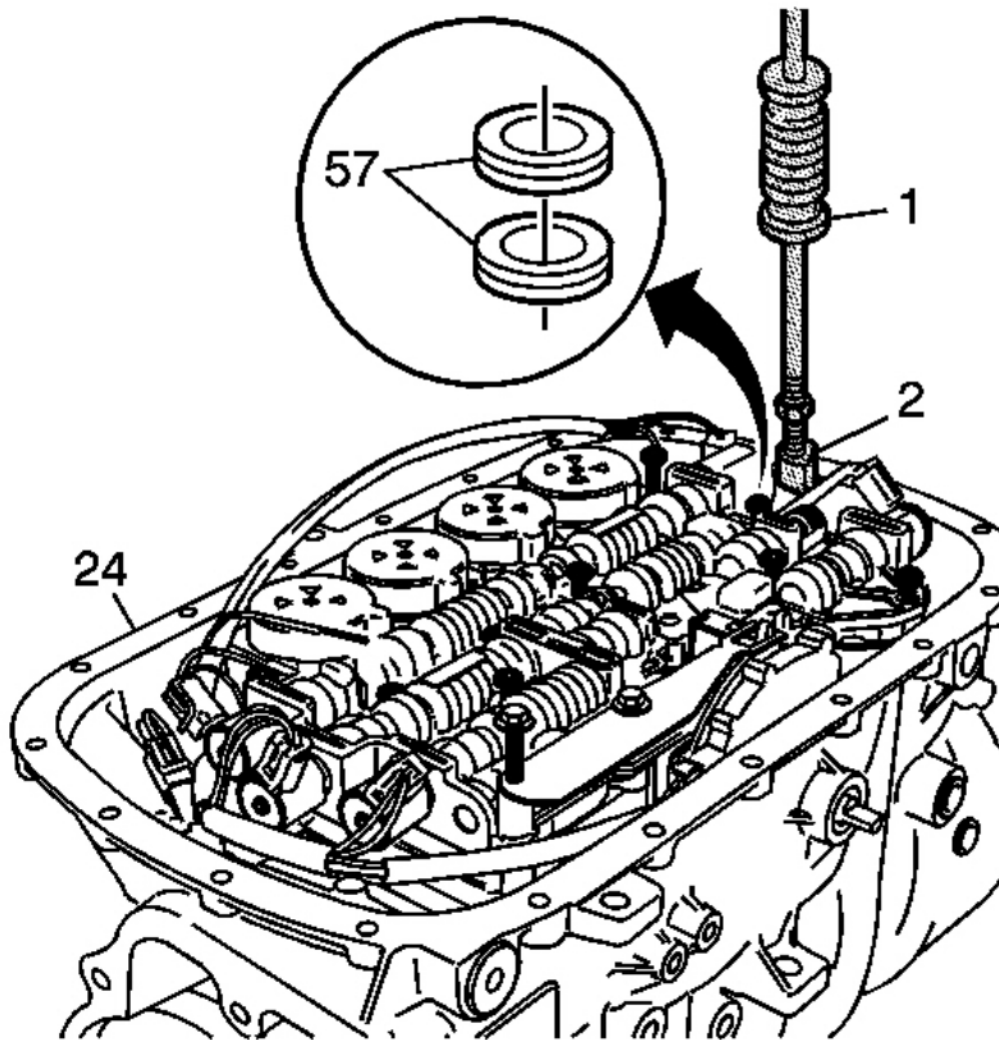


Fig. 29: View Of Fluid Filter Seals
Courtesy of GENERAL MOTORS CORP.

4. Assemble **J 23129** and **J 6125-1B** to remove the fluid filter seals (57) from the case (24).

WIRING HARNESS REMOVAL

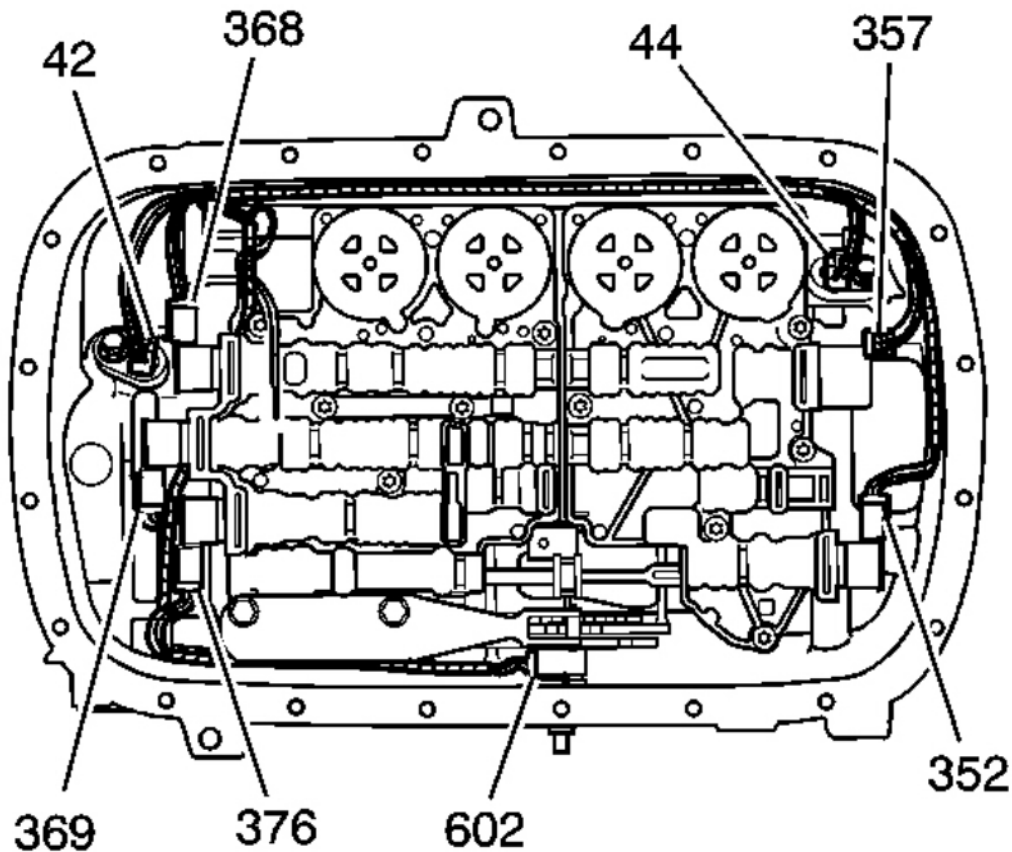


Fig. 30: View Of Wiring Harness To Valve Body Components
Courtesy of GENERAL MOTORS CORP.

1. Using a small screwdriver pry the wiring harness (55) off of the following components:

- Pressure Control Solenoid (357)
- TCC PWM Solenoid (352)
- 1-2 Shift Solenoid (368)
- 2-3 Shift Solenoid (369)
- 4-5 Shift Solenoid (376)
- Manual Shift Shaft Switch (602)
- Input Speed Sensor (44)
- Output Speed Sensor (42)

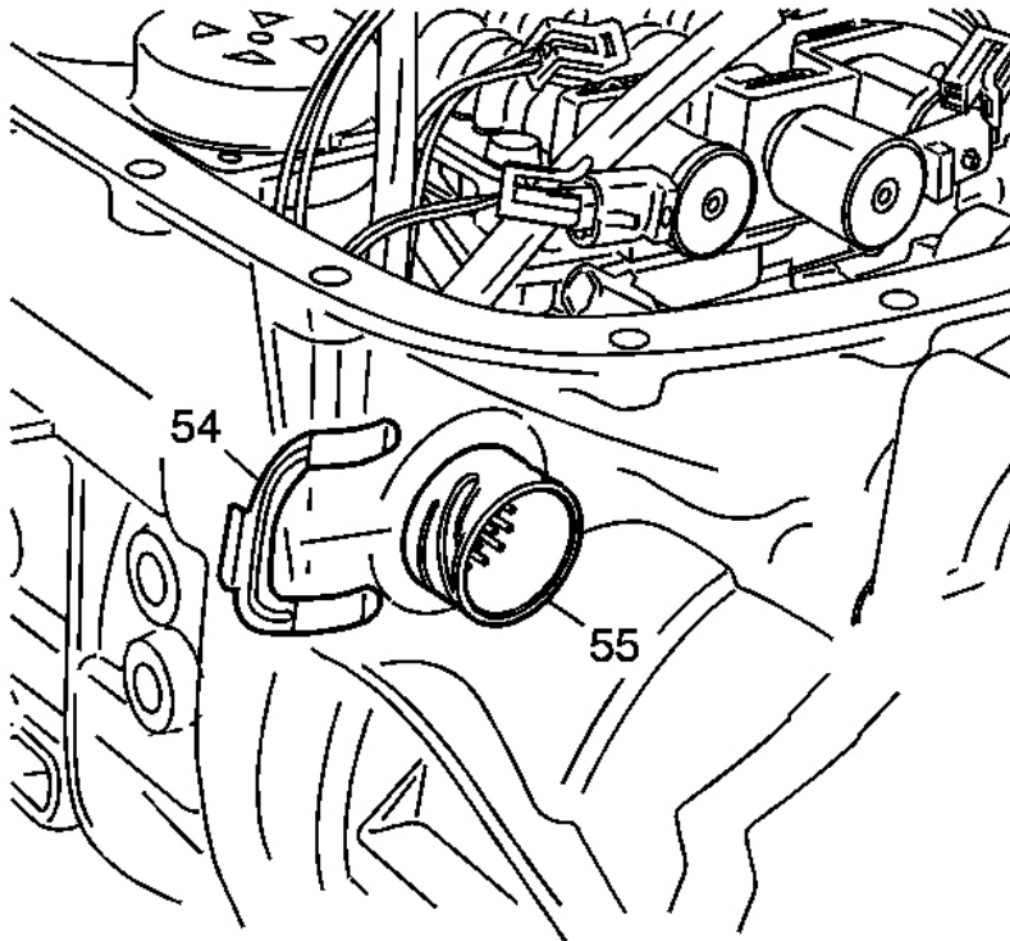


Fig. 31: Identifying Wiring Harness Connector & Retainer
Courtesy of GENERAL MOTORS CORP.

2. Remove the connector retainer (54) from the case (24).

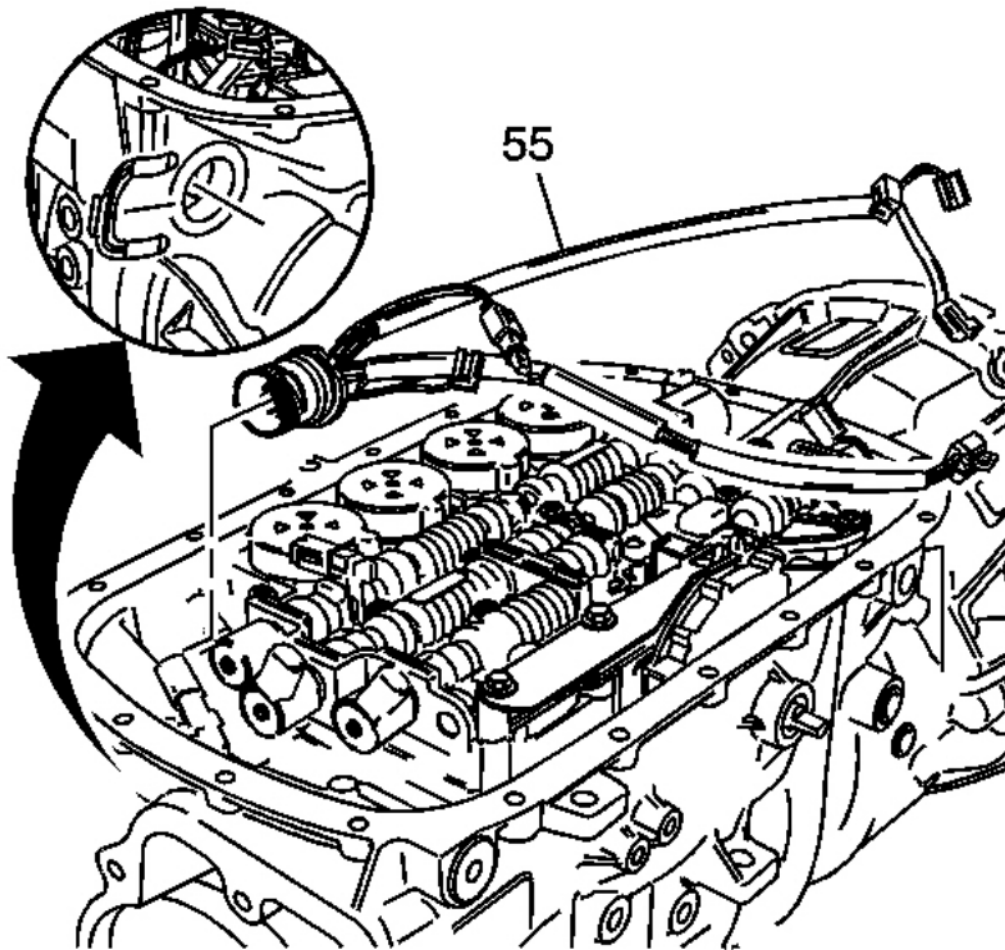


Fig. 32: Removing Wiring Harness
Courtesy of GENERAL MOTORS CORP.

3. Remove the wiring harness (55) from the case (24).

CONTROL VALVE BODY ACCUMULATOR ASSEMBLY REMOVAL

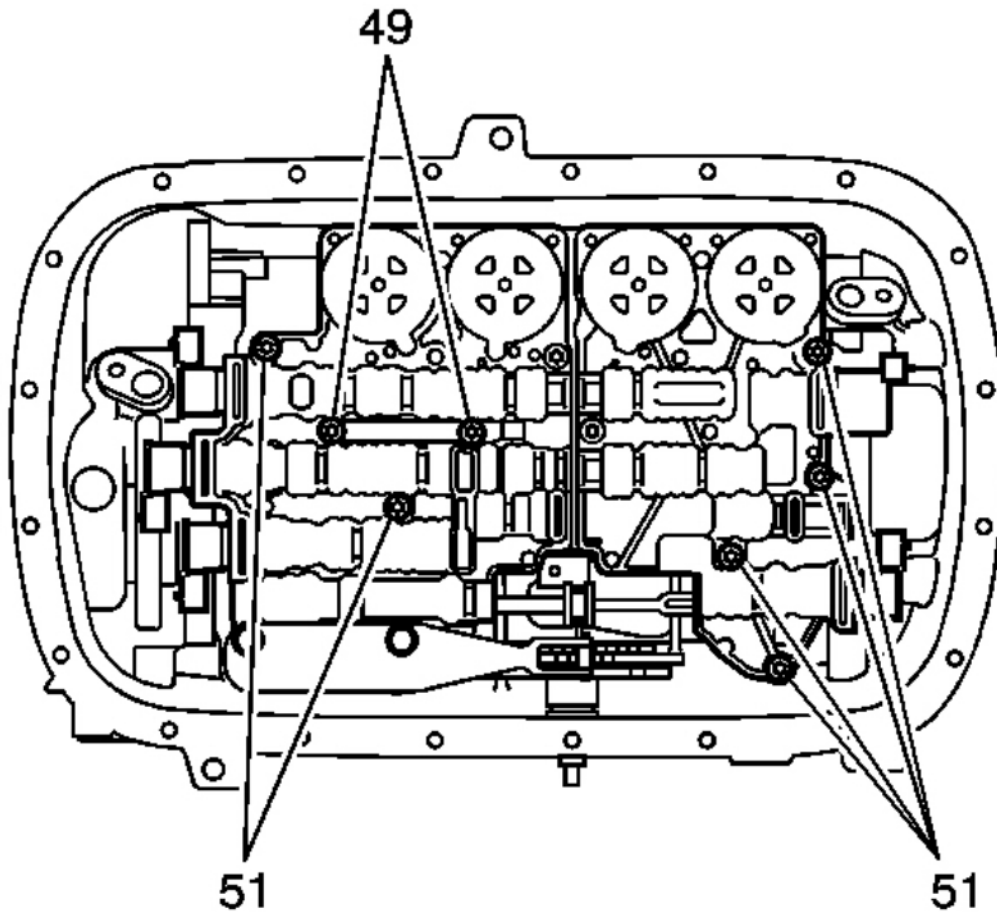


Fig. 33: Identifying Control Valve Body Accumulator Assembly Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Only remove the bolts called out in the graphic, there will be two remaining.

1. Remove the control valve body bolts (49, 51).

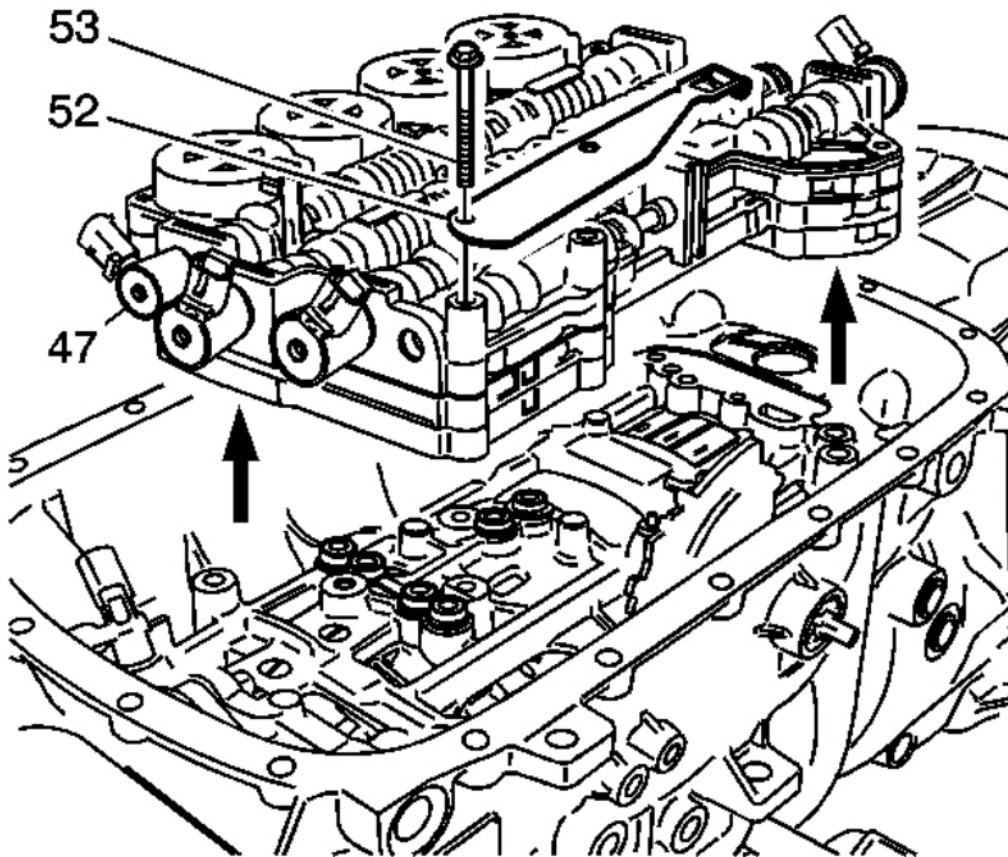


Fig. 34: Locating Control Valve Body
Courtesy of GENERAL MOTORS CORP.

2. Remove the control valve body bolts (53).
3. Remove the manual shaft detent assembly (52).
4. Remove the control valve body (47) from the case (24).

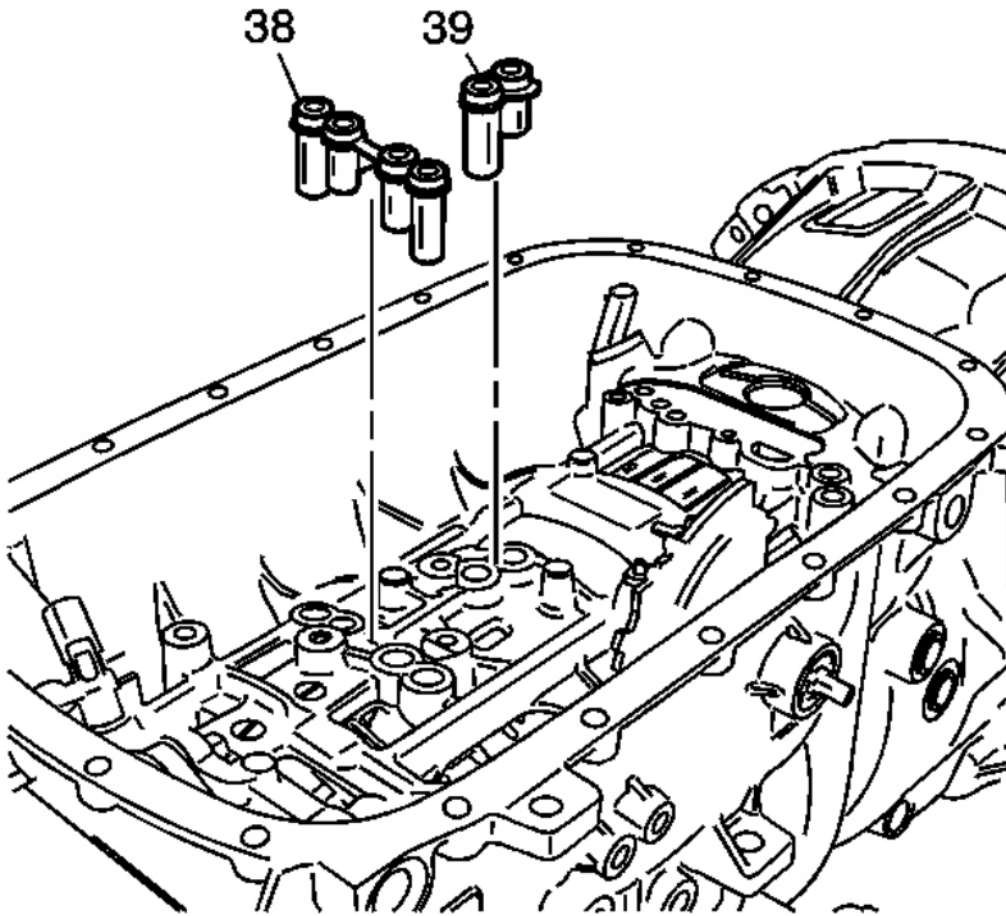


Fig. 35: Locating Overdrive Clutch & Center Support Fluid Passage Sleeve
Courtesy of GENERAL MOTORS CORP.

5. Remove the center support fluid passage sleeve (38) and the overdrive clutch fluid passage sleeve (39) from the case (24).

OUTPUT SHAFT SPEED SENSOR REMOVAL

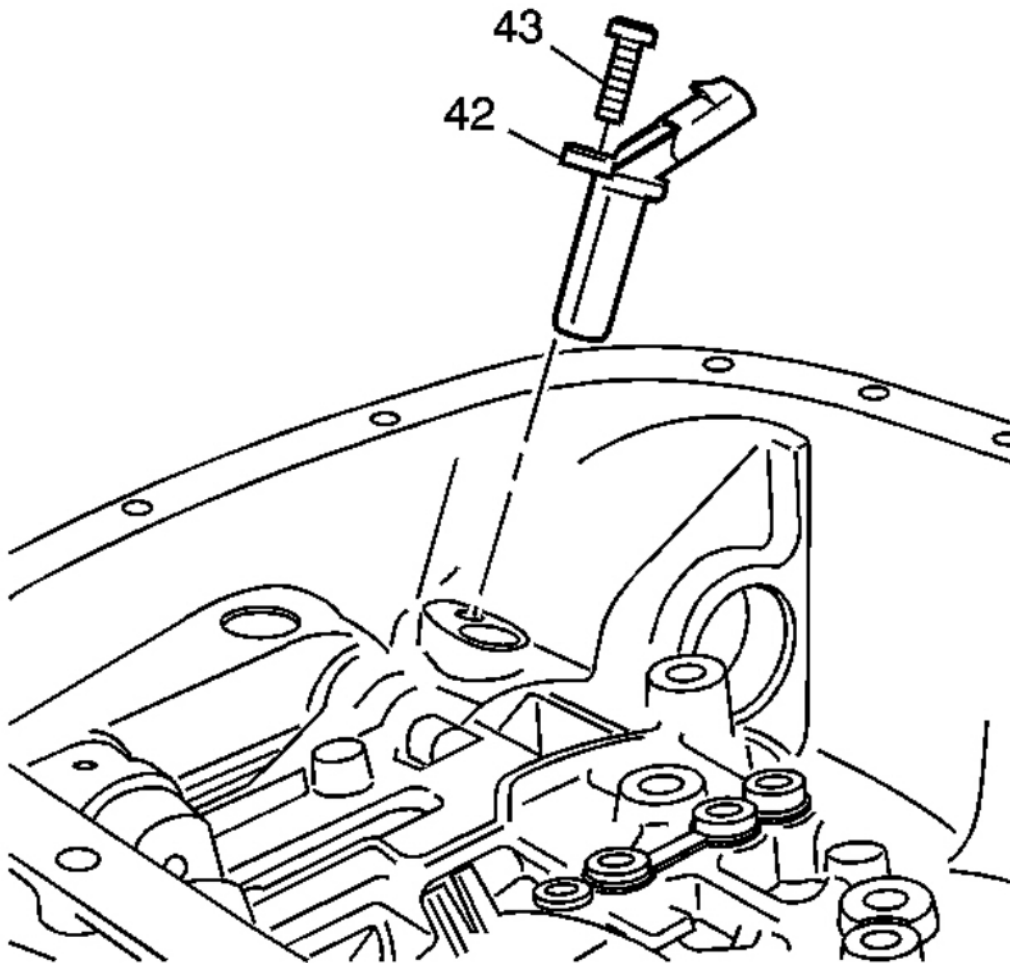


Fig. 36: Identifying Output Shaft Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Remove the output speed sensor bolt (43).
2. Remove the output speed sensor (42) and spacer (41) from the case (24).

INPUT SPEED SENSOR REMOVAL

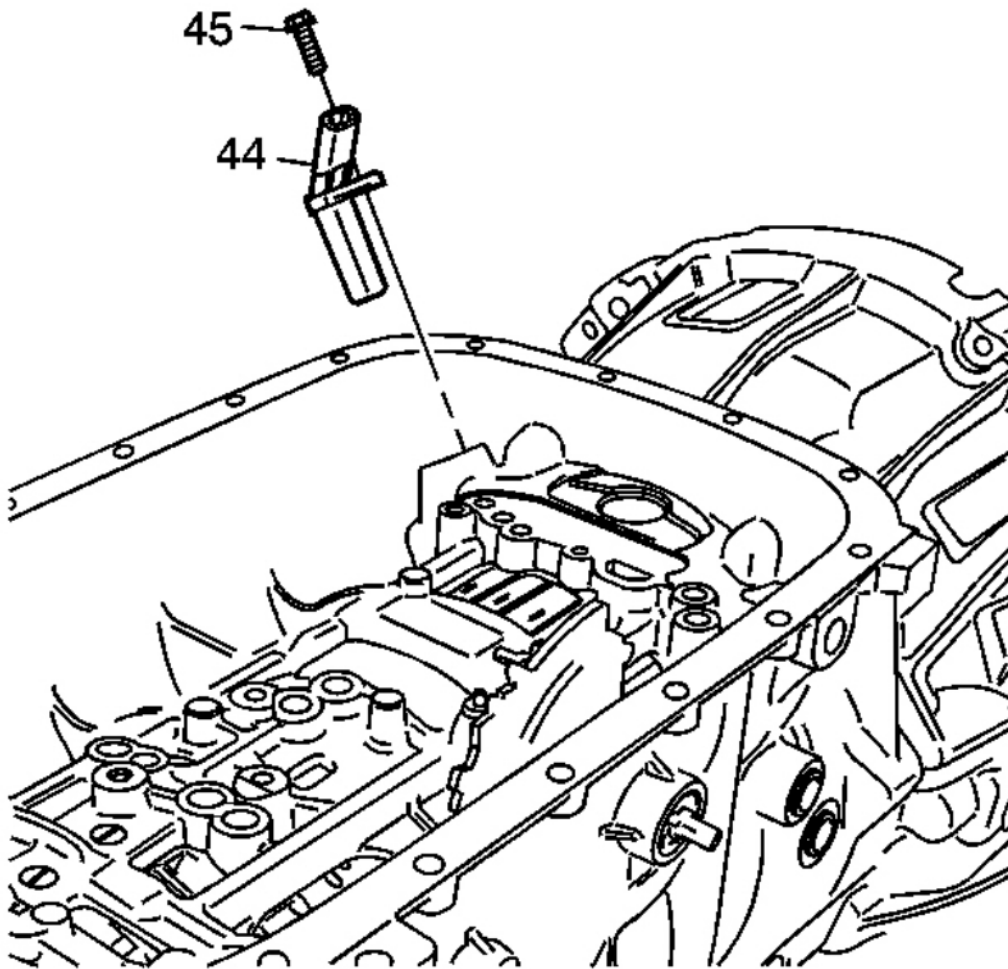


Fig. 37: Locating Input Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Remove the input speed sensor bolt (45).
2. Remove the input speed sensor (44) from the case (24).

TORQUE CONVERTER HOUSING REMOVAL

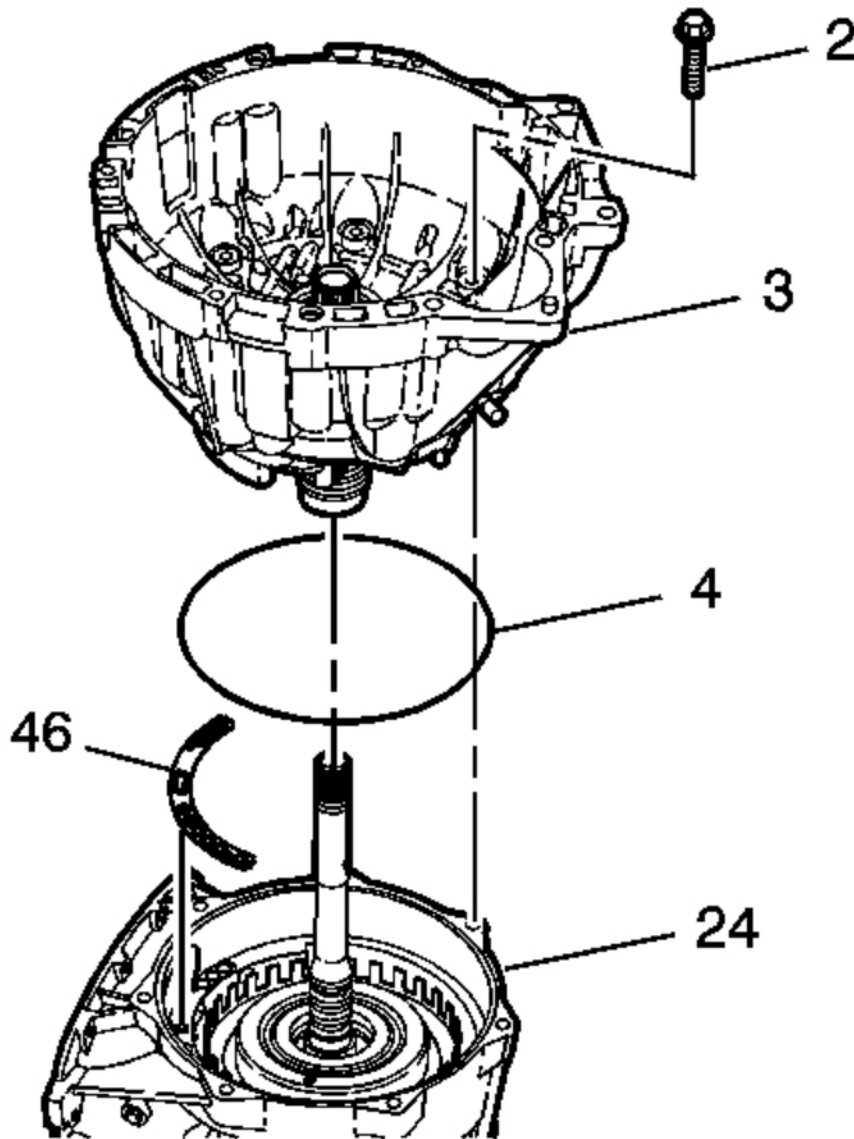


Fig. 38: Torque Converter Housing
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission 90 degrees so that the converter housing is facing up. Remove the torque converter housing bolts (2) from the torque converter housing (3).
2. Remove the torque converter housing assembly (3) from the case (24).

3. Remove the torque converter housing fluid seal assembly (4).
4. Remove the fluid pump cover gasket (46).

DIRECT AND REVERSE CLUTCH - FORWARD AND COAST CLUTCH REMOVAL

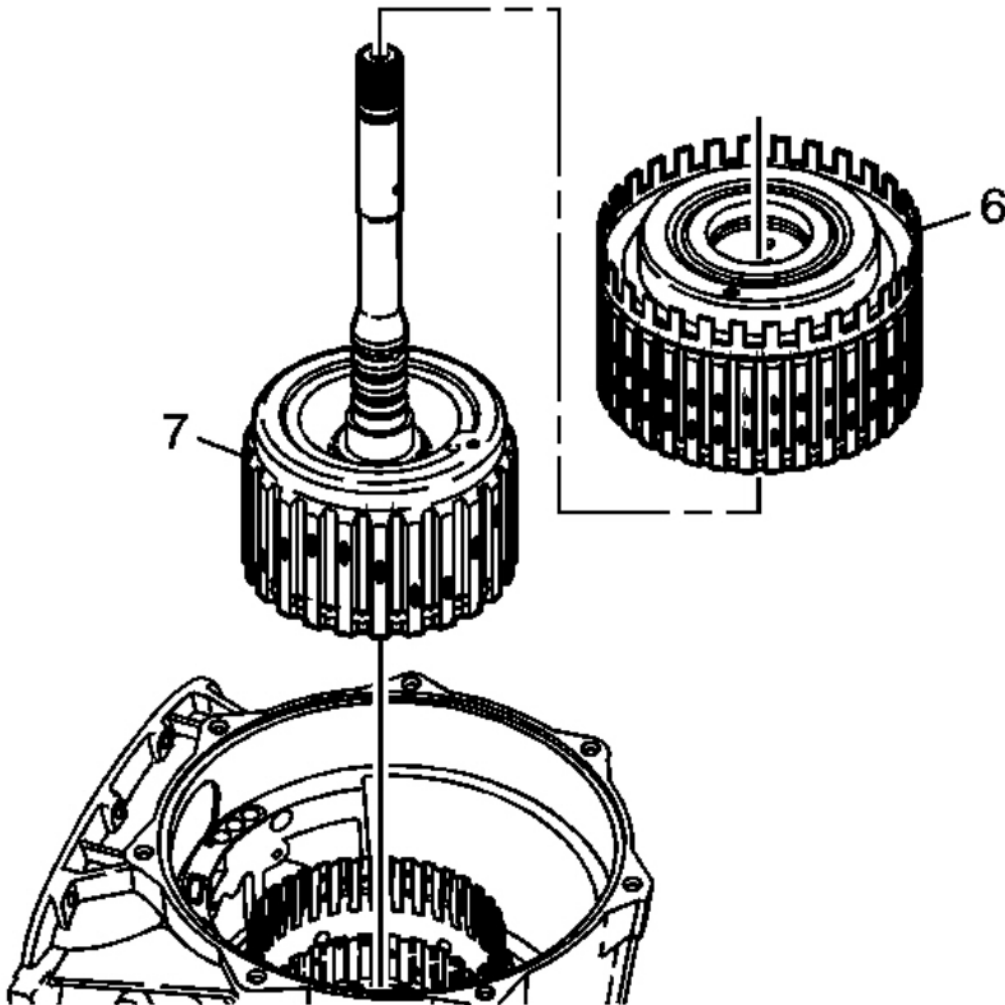


Fig. 39: View Of Forward And Coast Clutch Assembly & Direct And Reverse Clutch Assembly

Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage the input shaft fluid seals when removing or

installing the direct and reverse coast clutch assembly.

1. Remove the forward and coast clutch assembly (7) and the direct and reverse clutch assembly (6) from the case (24).
2. Lift the direct and reverse clutch assembly (6) off of the forward and coast clutch assembly (7).

INPUT SUN GEAR SHAFT REMOVAL

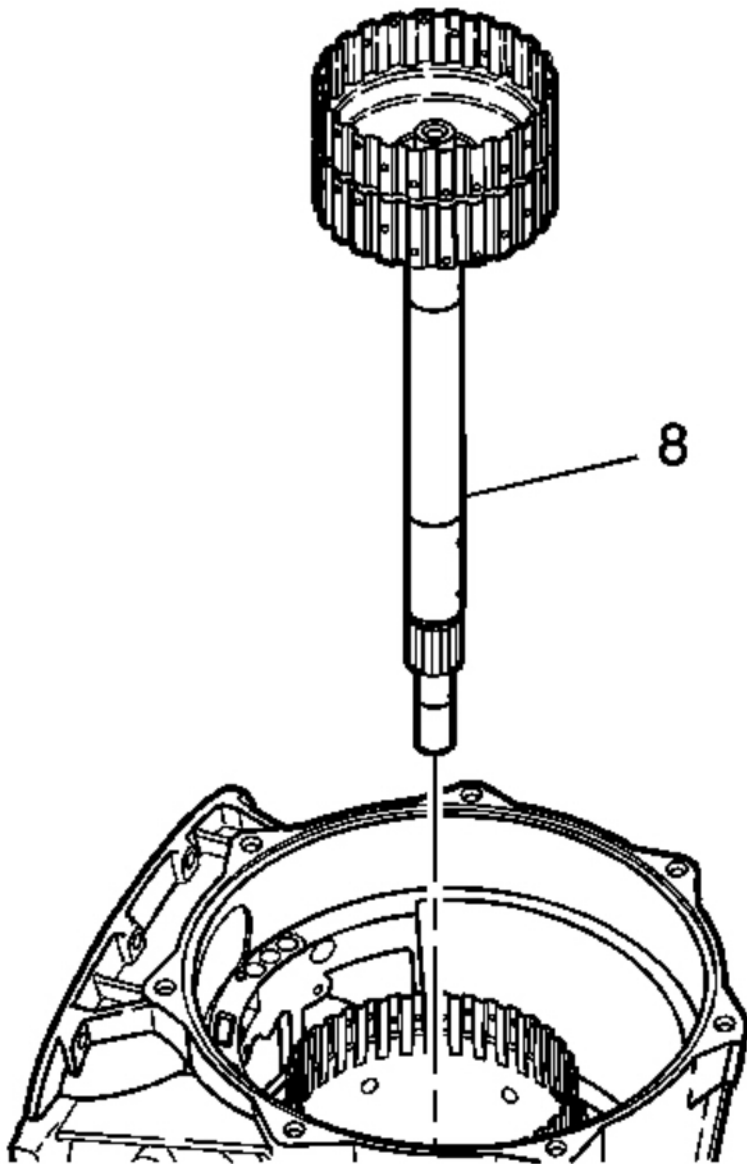


Fig. 40: View Of Input Sun Gear Shaft
Courtesy of GENERAL MOTORS CORP.

Remove the input sun gear shaft (8) from the case (24).

DIRECT CLUTCH HUB REMOVAL

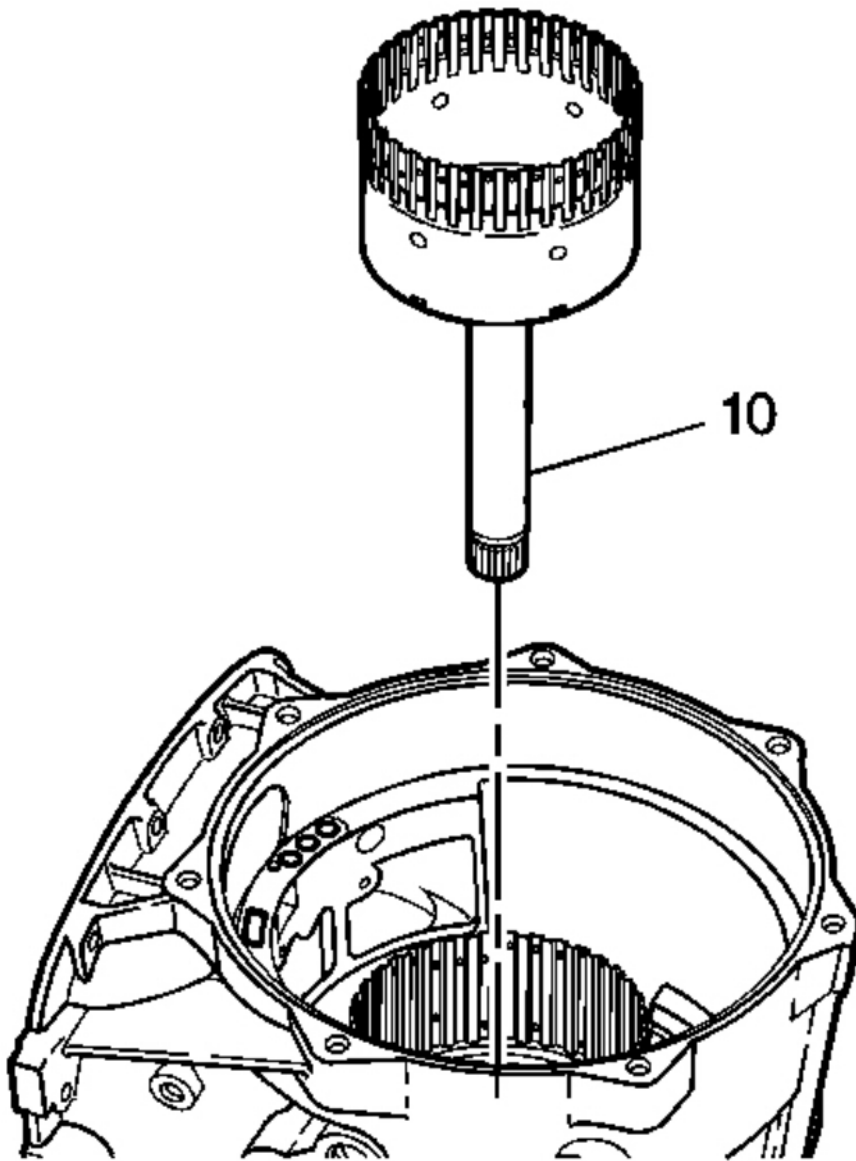


Fig. 41: Identifying Direct Clutch Housing
Courtesy of GENERAL MOTORS CORP.

Remove the direct clutch hub assembly (10) from the case (24).

INTERMEDIATE CLUTCH SPRAG ASSEMBLY REMOVAL

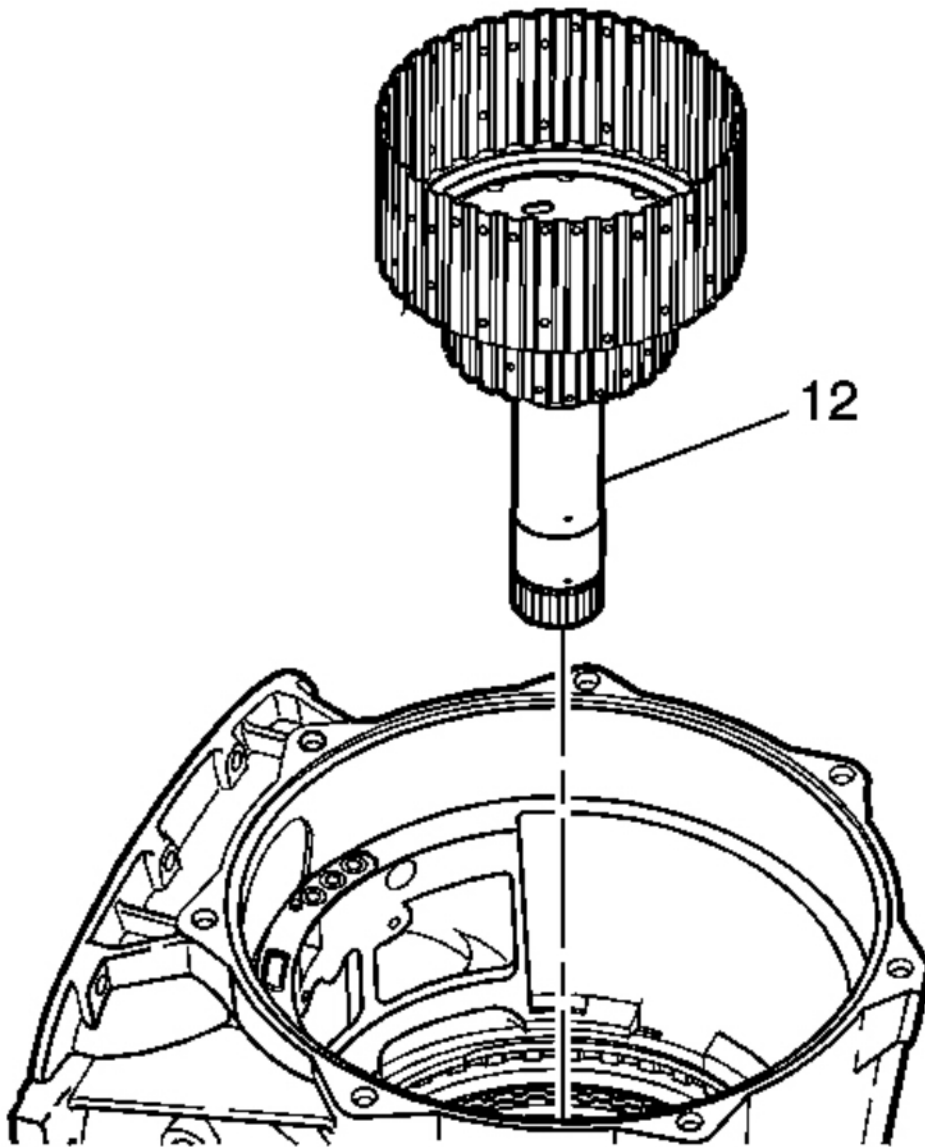


Fig. 42: Locating Intermediate Sprag Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

Remove the intermediate clutch sprag assembly (12) from the case (24).

OVERDRIVE CLUTCH HOUSING REMOVAL

Tools Required

J 45126 Snap Ring Pliers. See **Special Tools and Equipment** .

Removal Procedure

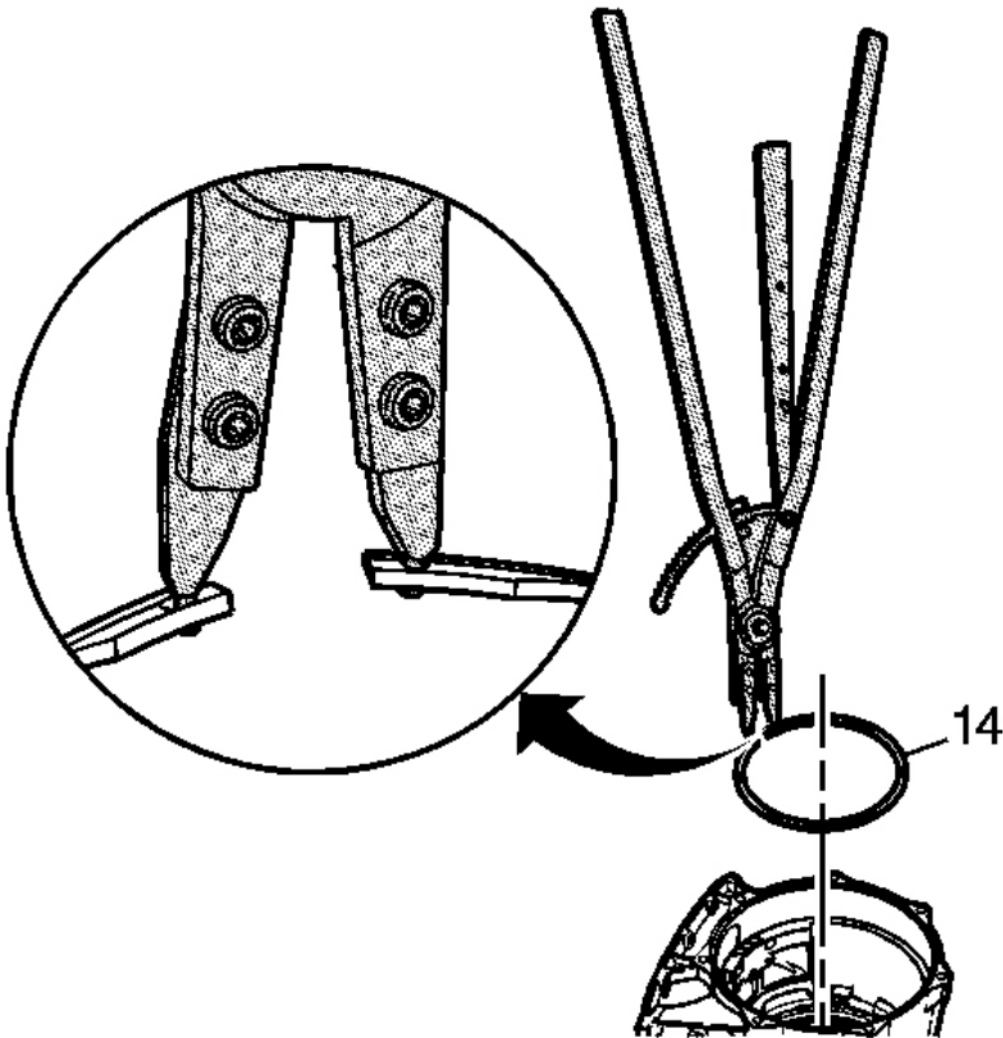


Fig. 43: Identifying J 45126

Courtesy of GENERAL MOTORS CORP.

CAUTION: Use care when removing or installing the snap ring. Be

sure the J 45126 snap ring pliers are installed properly onto the snap ring or bodily injury may occur.

1. Use **J 45126** to remove the snap ring (14).

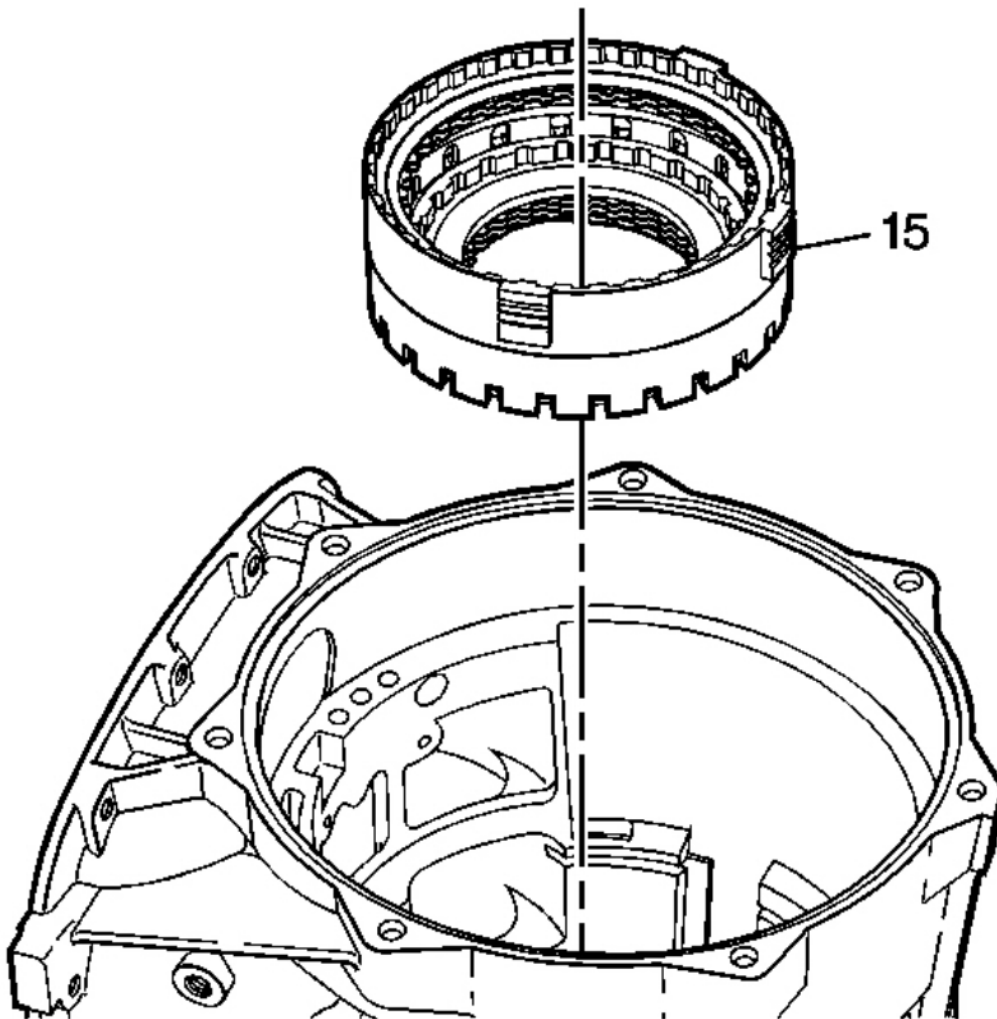


Fig. 44: Identifying Overdrive Clutch Housing
Courtesy of GENERAL MOTORS CORP.

2. Remove the overdrive clutch housing (15) from the case (24).

LOW CLUTCH SPRAG REMOVAL

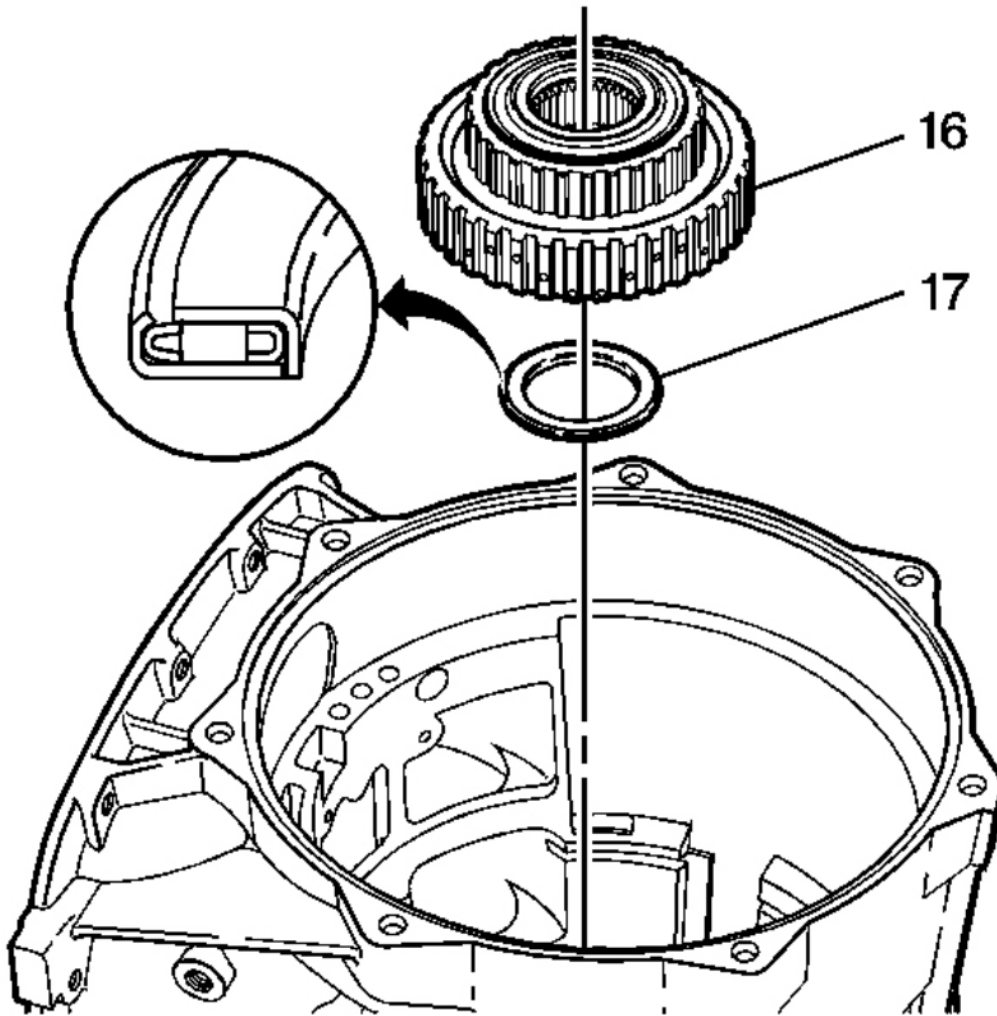


Fig. 45: Locating Low Clutch Roller Thrust Bearing & Sprag
Courtesy of GENERAL MOTORS CORP.

1. Remove the low clutch sprag (16) from the case (24).
2. Remove the low clutch roller thrust bearing (17).

CENTER SUPPORT REMOVAL

Tools Required

J 45127 Center Support Removal Tool

Removal Procedure

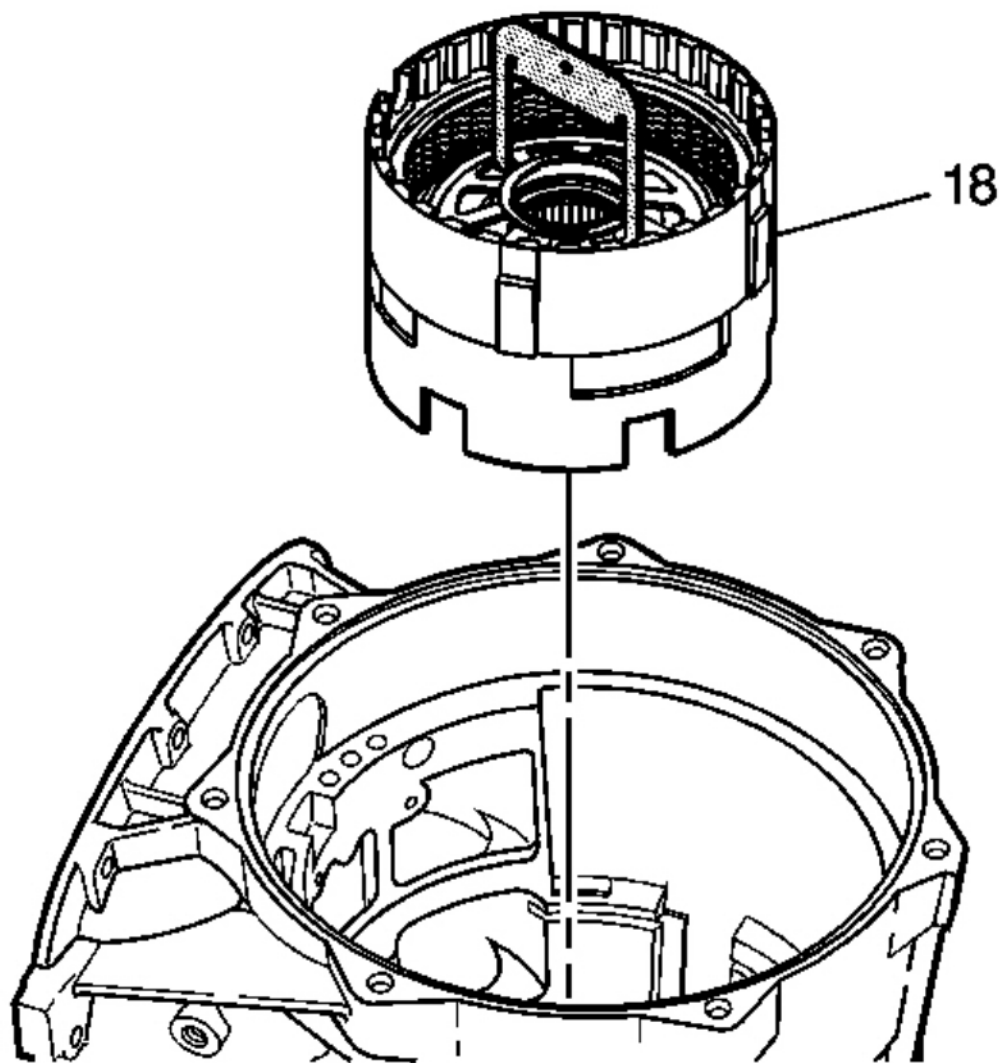


Fig. 46: Center Support With J 45127
Courtesy of GENERAL MOTORS CORP.

Use **J 45127** to remove the center support (18) from the case (24).

INPUT AND REACTION CARRIER REMOVAL

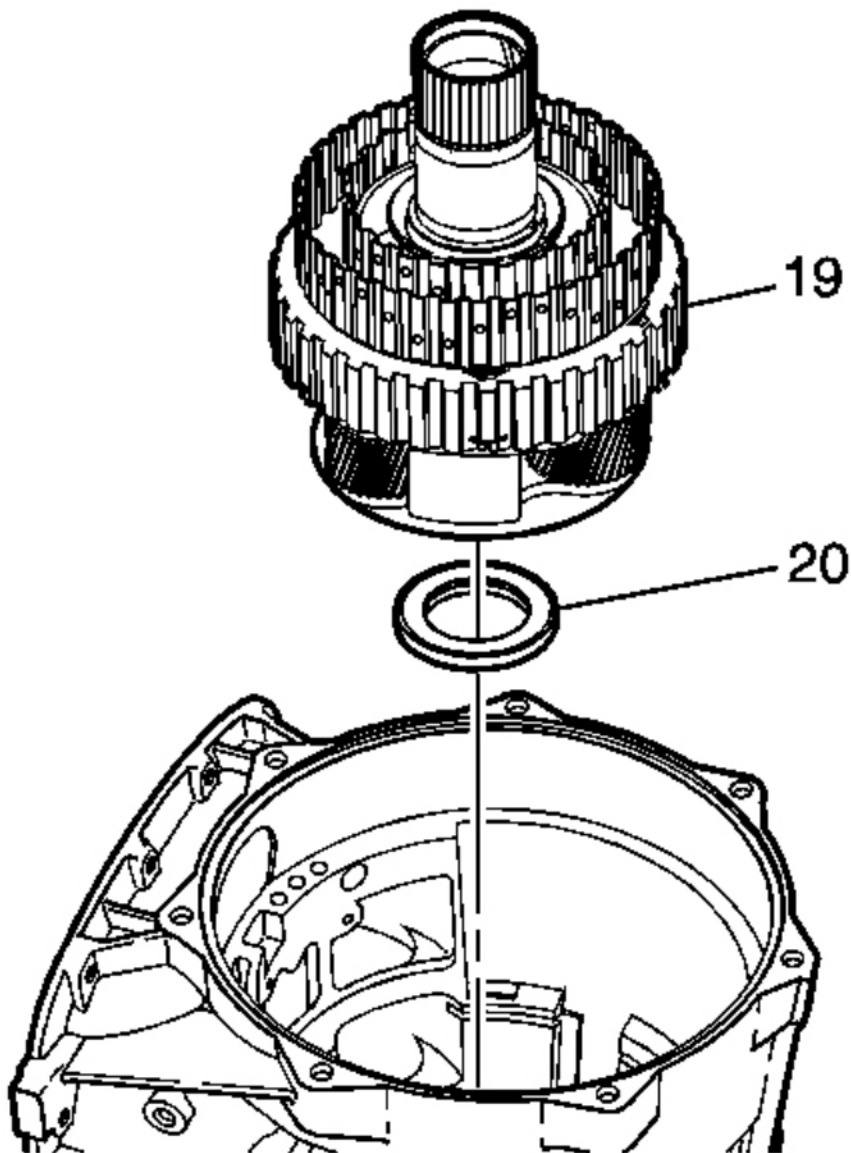


Fig. 47: View Of Input & Reaction Carrier Thrust Bearing & Carrier
Courtesy of GENERAL MOTORS CORP.

1. Remove the input and reaction carrier (19) from the case (24).
2. Remove the input and reaction carrier thrust bearing (20) from the case (24).

OUTPUT SHAFT REMOVAL

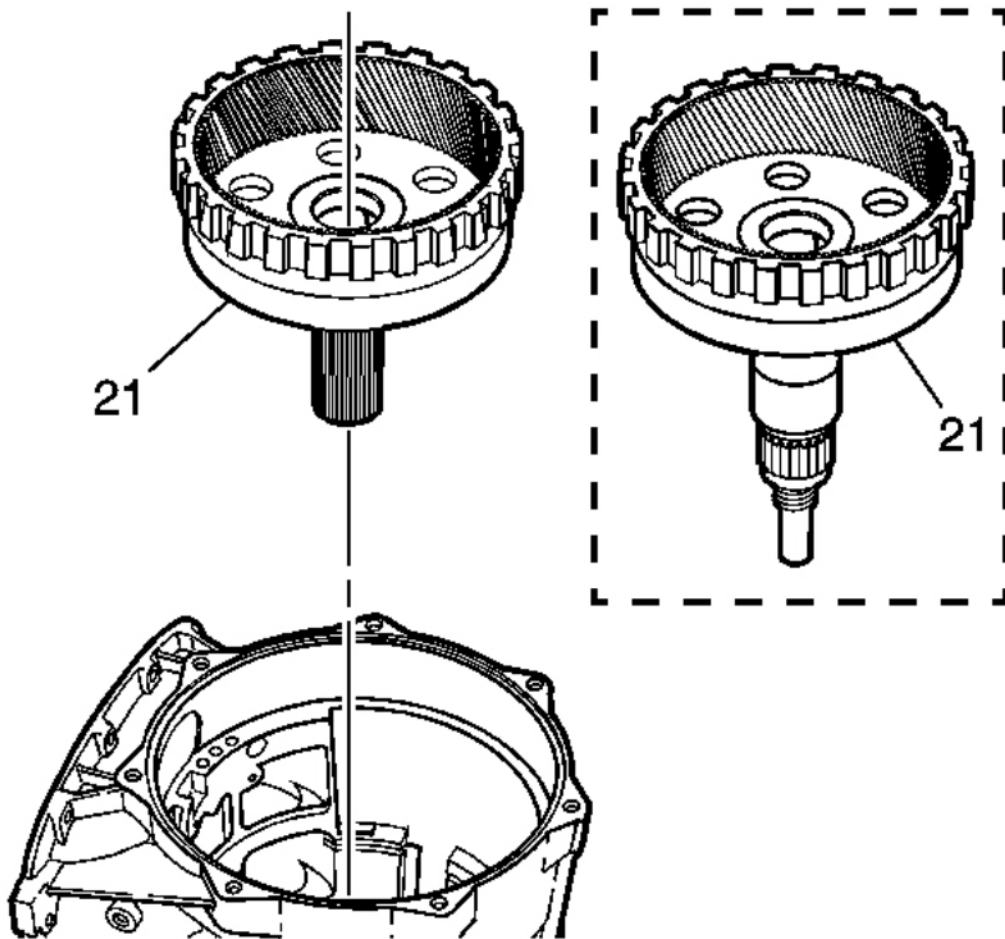


Fig. 48: View Of Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the output shaft assembly (21) from the case (24).
2. Remove the input and reaction carrier washer (22) some models, from the case (24).

IMPORTANT: The reaction carrier thrust bearing (23) may be in the extension housing.

3. Remove the input and reaction carrier thrust bearing (23) some models, from the case (24).

PARKING SYSTEM COMPONENTS REMOVAL

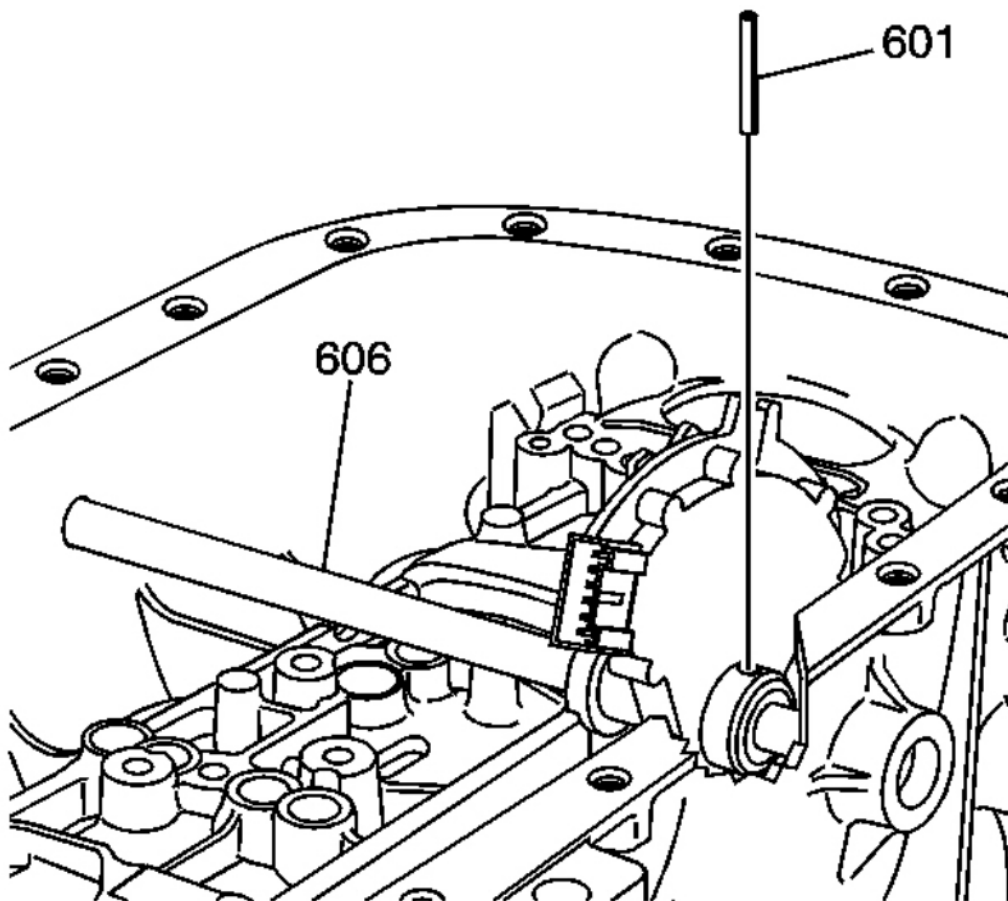


Fig. 49: Locating Manual Shaft Detent Lever Pin
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission 90 degrees. Remove the manual shaft detent lever pin (601) from the case.

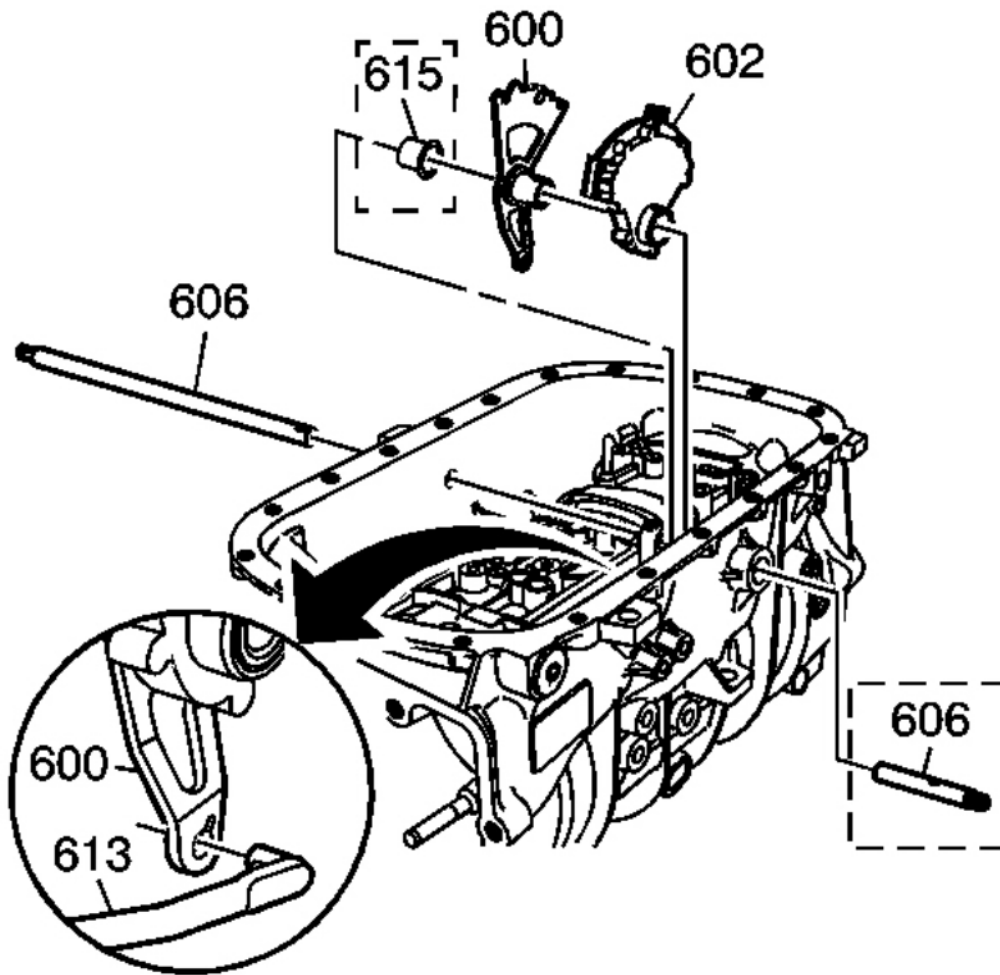


Fig. 50: Identifying Park Pawl Actuator & Shift Switch Assembly
Courtesy of GENERAL MOTORS CORP.

2. Remove the manual shift shaft (606) from the case.
3. Disconnect the park pawl actuator assembly (613) from the manual shaft detent lever (600).
4. Remove the manual shaft detent lever (600), spacer (615) - some models and the manual shaft shift switch assembly (602) from the case.

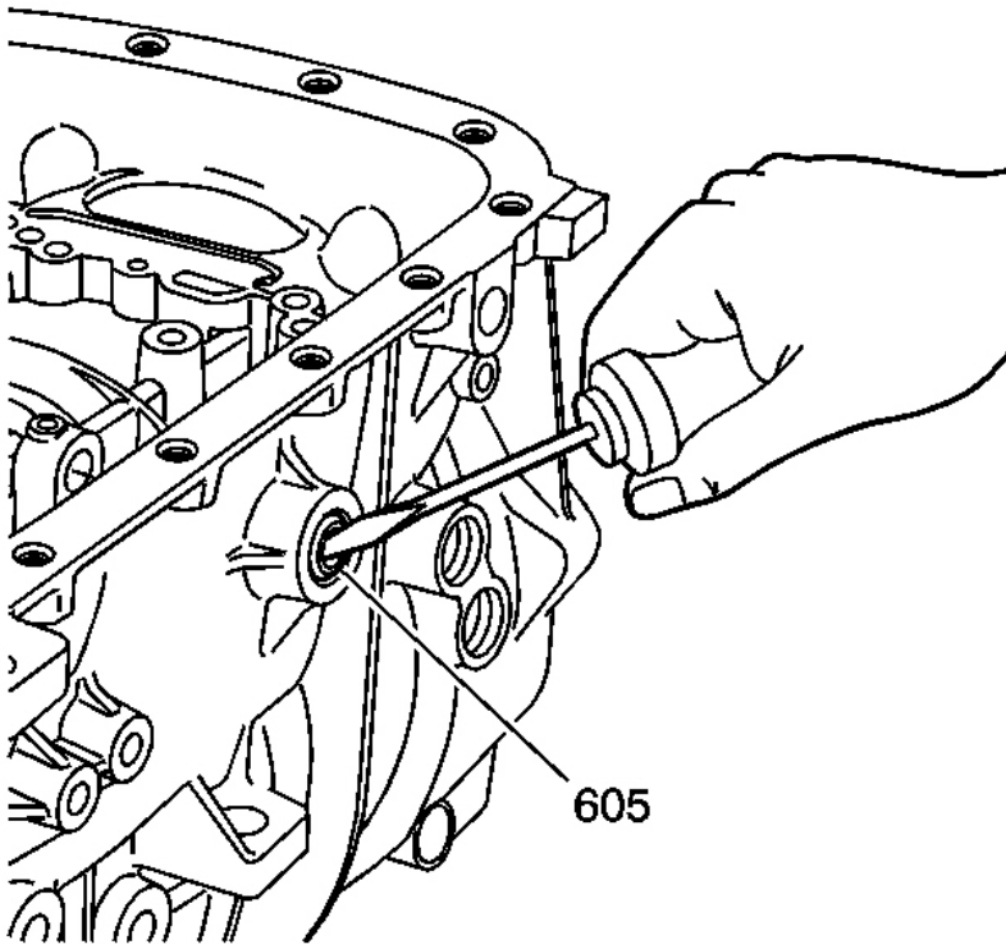


Fig. 51: Removing Manual Shaft Shift Seal
Courtesy of GENERAL MOTORS CORP.

5. Use a small screwdriver in order to pry the manual shaft shift seal (605) from the case.

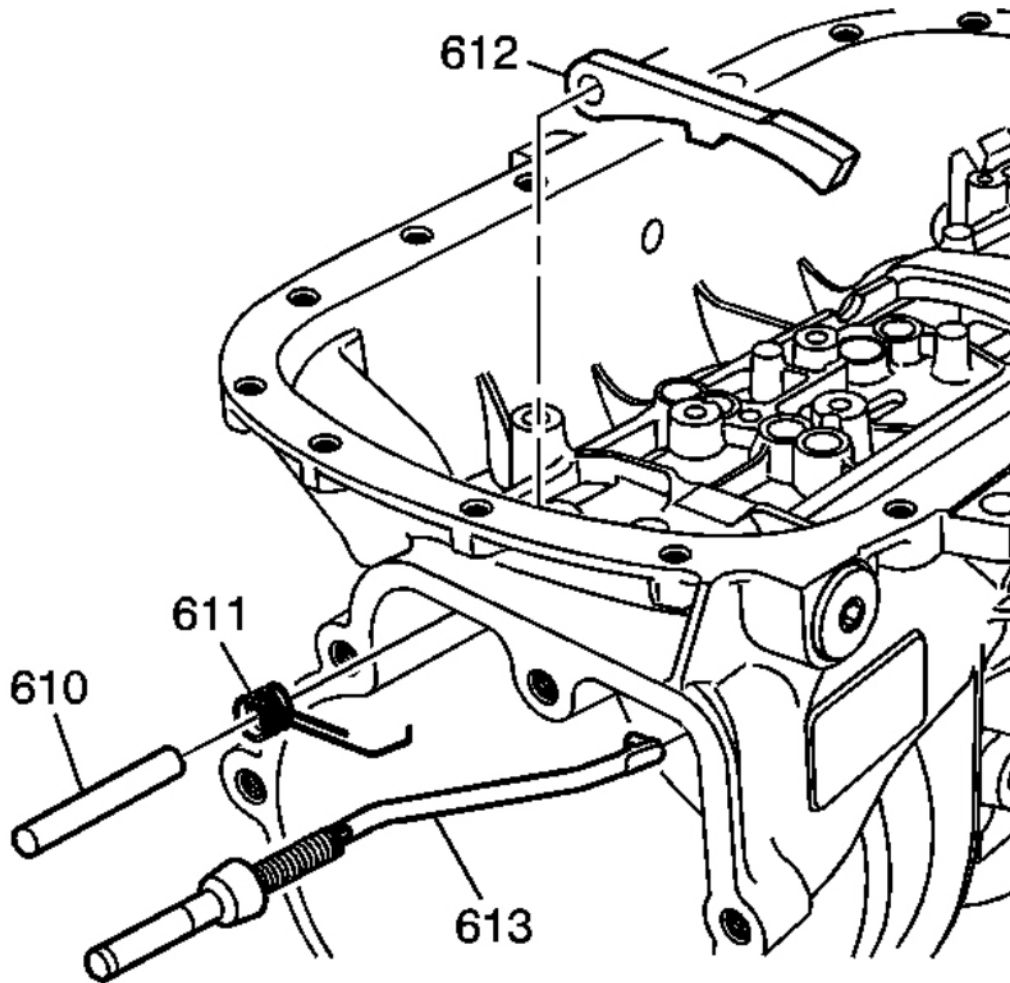


Fig. 52: Locating Parking Pawl Components
Courtesy of GENERAL MOTORS CORP.

6. Remove the park pawl actuator assembly (613) from the case.
7. Remove the park pawl shaft (610), park pawl spring (611) and the park pawl (612) from the case.

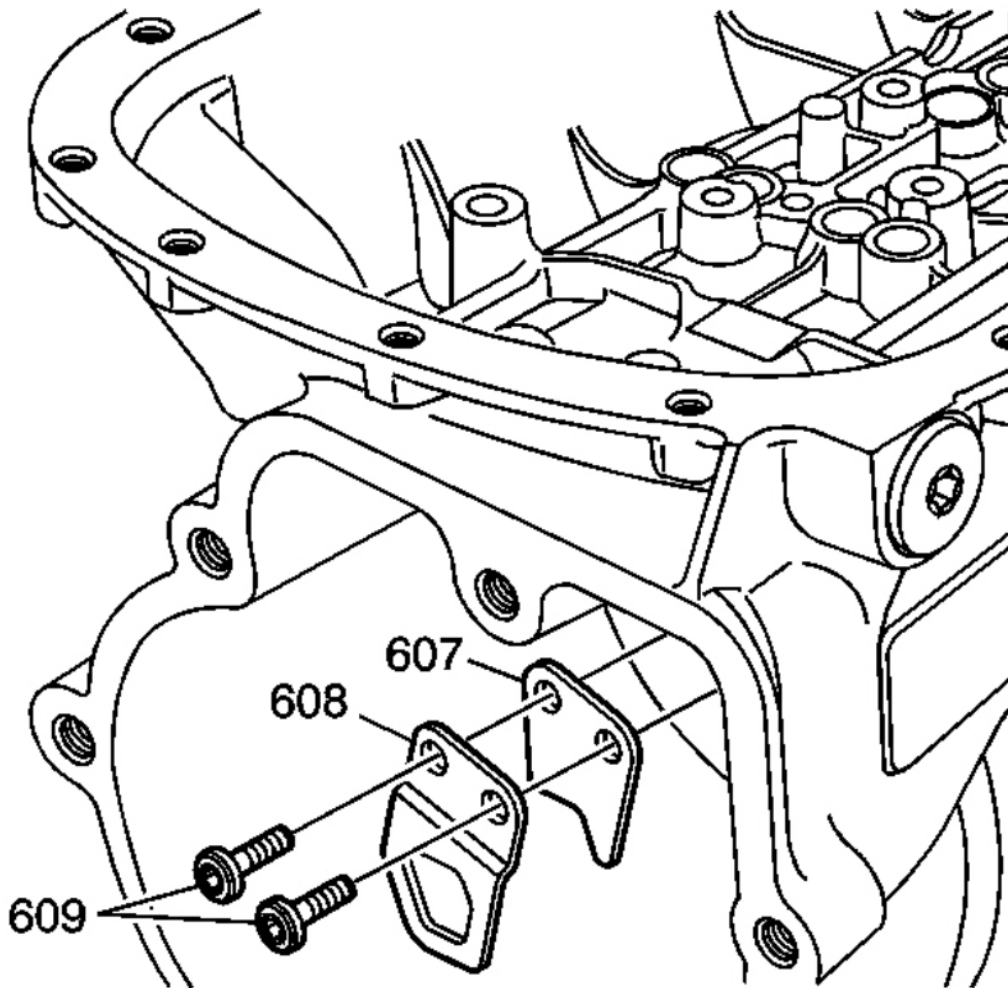


Fig. 53: Identifying Park Pawl Actuator Bracket & Bolts
Courtesy of GENERAL MOTORS CORP.

8. Remove the park pawl actuator bracket bolts (609) from the case.
9. Remove the park pawl actuator brackets (607, 608) from the case.

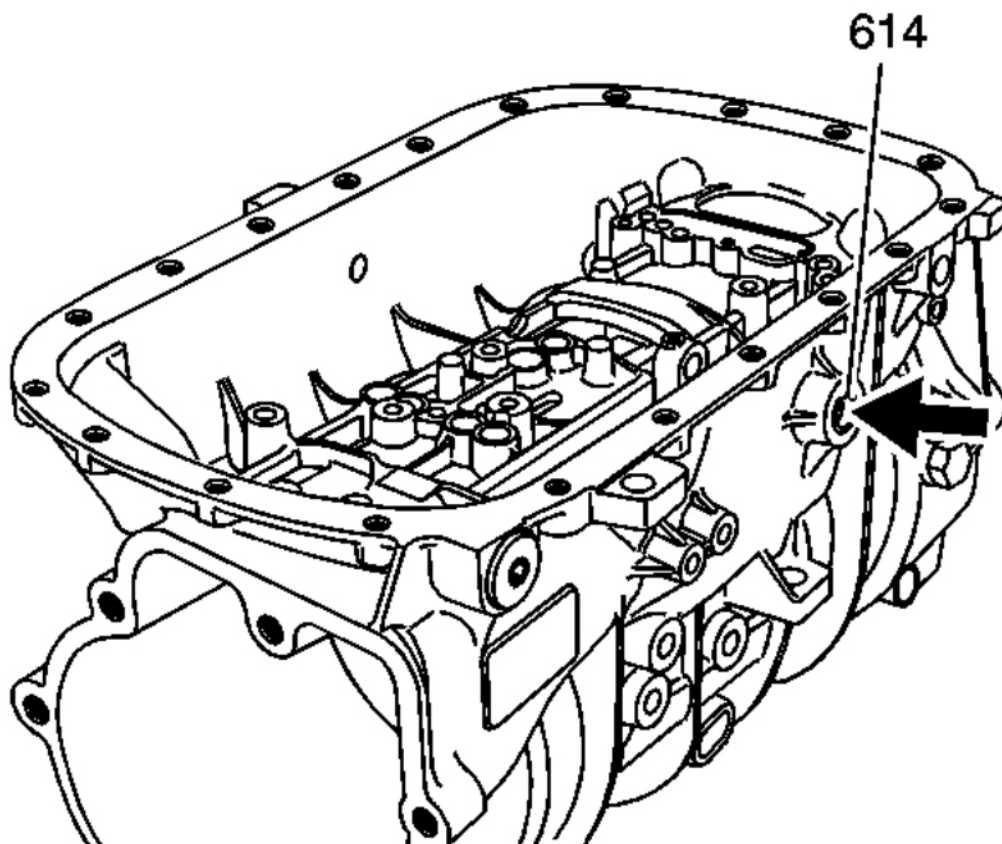


Fig. 54: View Of Cup Plug
Courtesy of GENERAL MOTORS CORP.

10. Inspect the cup plug (614) for signs of leaks.

CASE ASSEMBLY INSPECTION

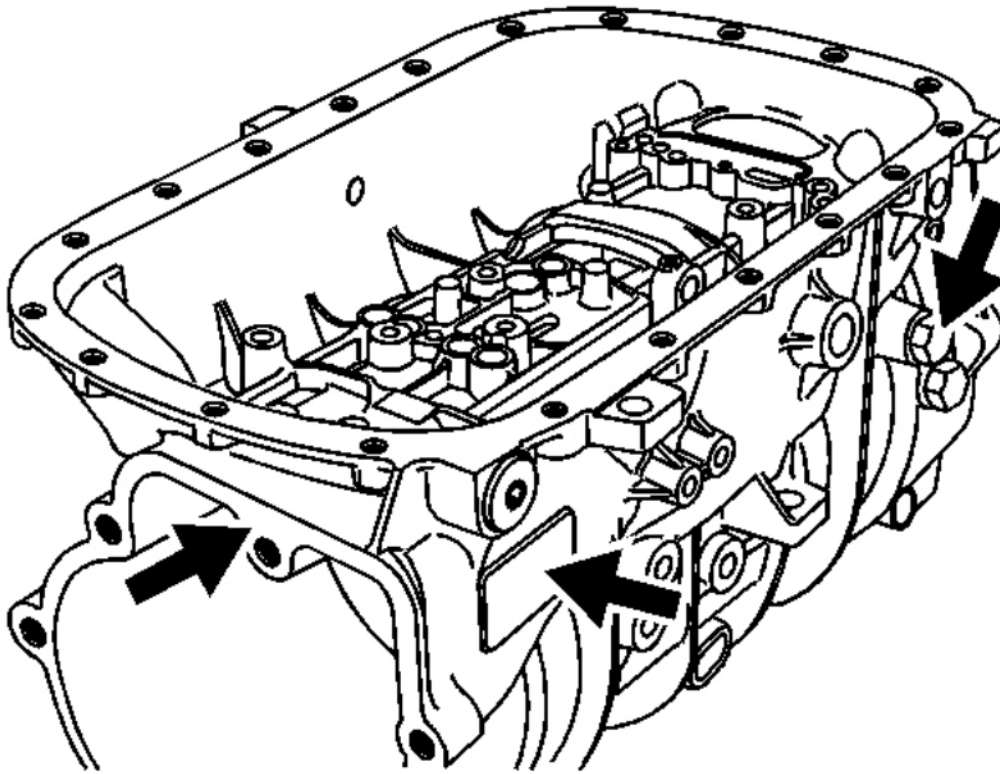


Fig. 55: Inspecting Transmission Name Plate & Oil Cooler Fittings
Courtesy of GENERAL MOTORS CORP.

1. Inspect the components that are still on the transmission case for the following conditions:
 - Loose, cross-threaded, or damaged threads on the transmission oil cooler fittings
 - A loose, missing, or damaged transmission name plate

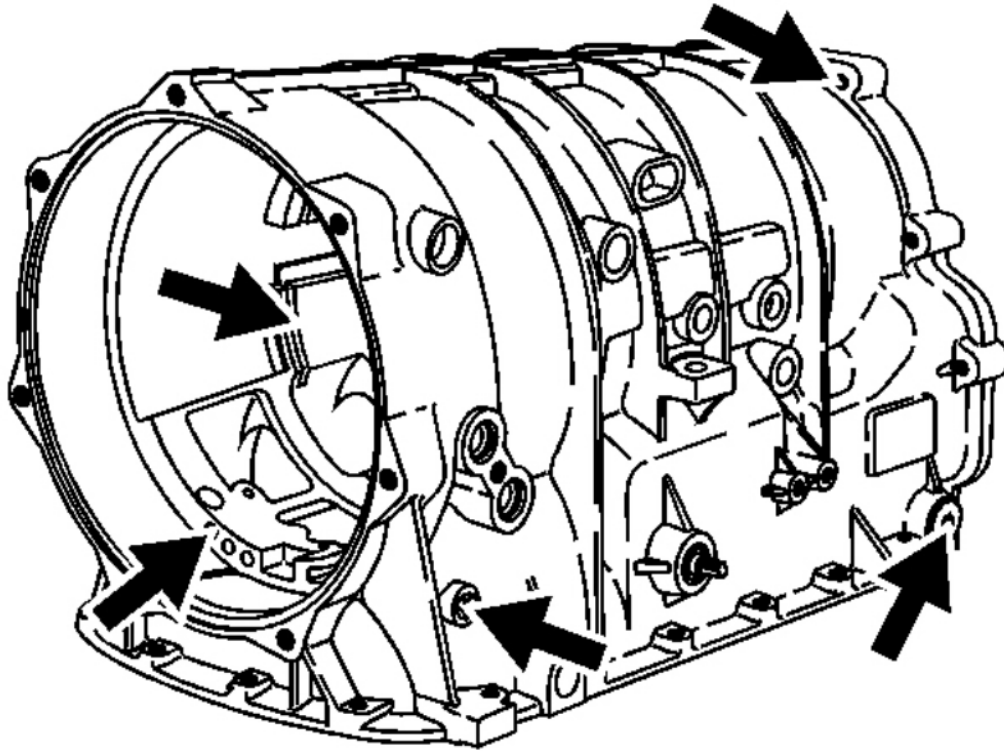


Fig. 56: Inspection Areas On Transmission Case
Courtesy of GENERAL MOTORS CORP.

2. Inspect the transmission case for the following conditions:
 - Gasket sealing surfaces that are damaged or have porosity
 - Bolt and screw holes that are stripped or damaged - repair with thread insert
 - Damaged or porous case and fluid passages
 - Damaged snap ring grooves or housing splines
 - A loose, cross threaded, or damaged pressure test plug and fluid level hole plug

CASE COMPONENTS DISASSEMBLE

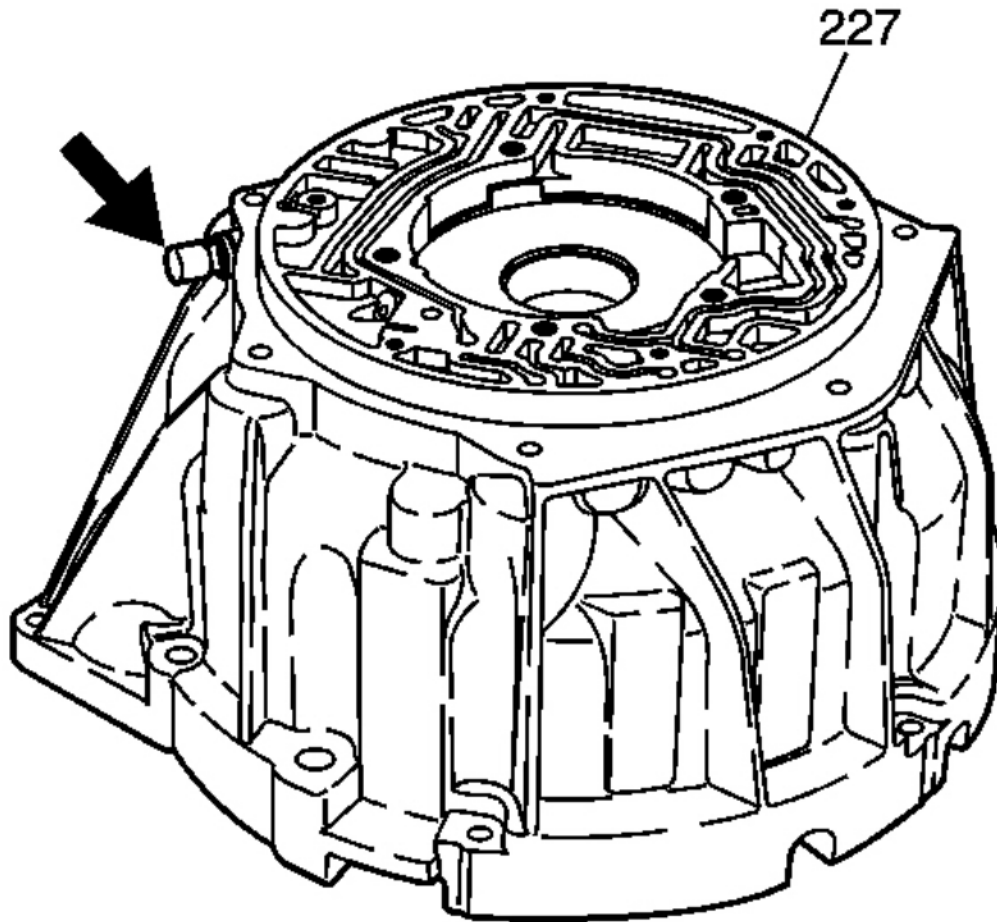


Fig. 57: View Of Transmission Vent Assembly
Courtesy of GENERAL MOTORS CORP.

1. Inspect the transmission vent assembly for damage or being plugged. If the vent is damaged the torque converter housing (227) must be replaced.

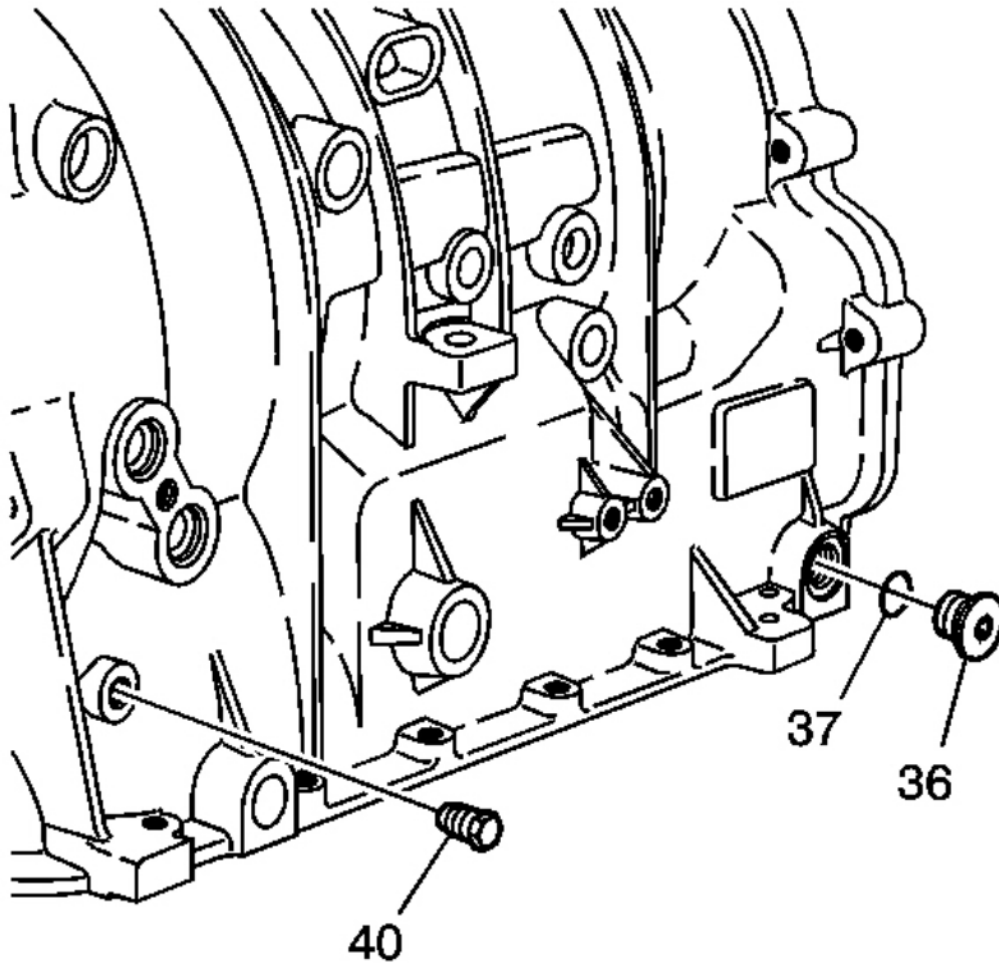


Fig. 58: Locating Fluid Level Hole Plug & Pressure Test Plug
Courtesy of GENERAL MOTORS CORP.

2. Remove the pressure test plug (40).
3. Remove the fluid level hole plug (36) and fluid level hole plug o-ring (37) from the case (604).

CASE COMPONENTS ASSEMBLE

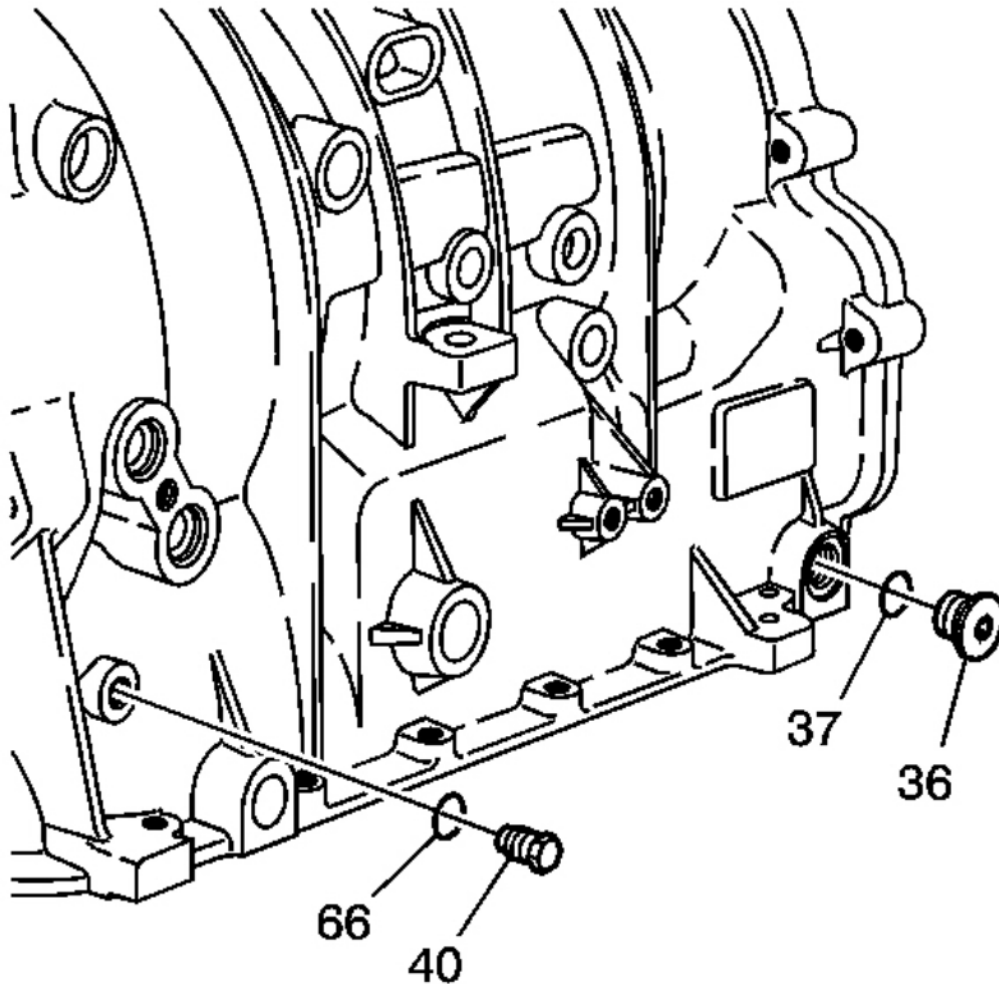


Fig. 59: Identifying Pressure Test Hole Plug & Transmission Fluid Level Hole Plug
 Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: If the pressure test plug (40), O-ring (66), level hole plug (36) and O-ring (37) are not damaged, they should be reused.

1. Inspect the pressure test hole plug (40) and O-ring (66) for damage.
2. Install the pressure test plug (40) and O-ring (66).

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Tighten: Tighten the pressure test plug to 11 .m (8 lb ft).

3. Inspect the level hole plug (36) and O-ring (37) for damage.
4. Install the transmission fluid level hole plug O-ring (37) and the transmission level hole plug (36).

Tighten: Tighten the level hole plug to 20 N.m (15 lb ft).

PARKING SYSTEM COMPONENTS INSTALLATION

Tools Required

J 44767 Seal Installer. See **Special Tools and Equipment** .

Installation Procedure

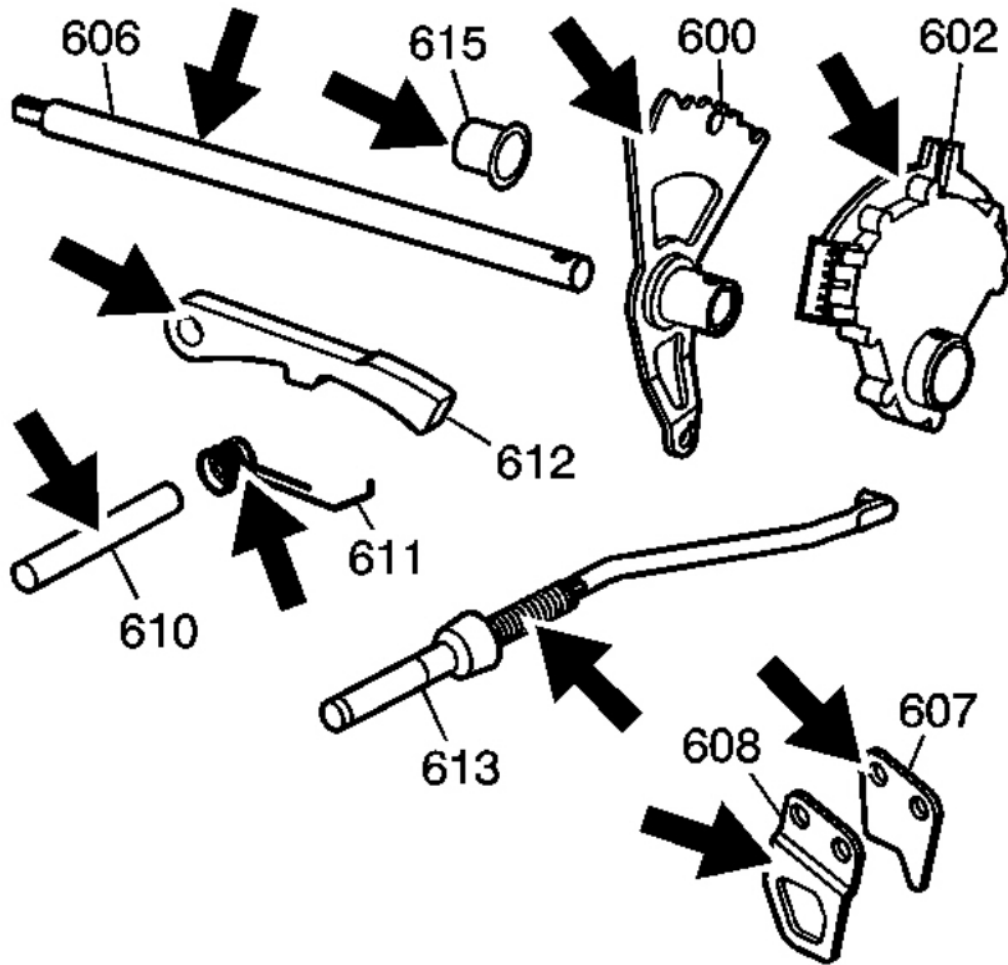


Fig. 60: Parking System Components
Courtesy of GENERAL MOTORS CORP.

1. Inspect the park system components for the following:
 - Worn park pawl actuator brackets (607, 608)
 - A damaged or bent park pawl actuator assembly (613)
 - A damaged manual shaft detent lever (600)
 - A damaged manual shaft shift switch assembly (602)
 - A worn or stripped manual shaft (606)
 - A worn or damaged park pawl shaft (610), park pawl spring (611), and park pawl

(612)

- A worn or damaged spacer (615), - some models.

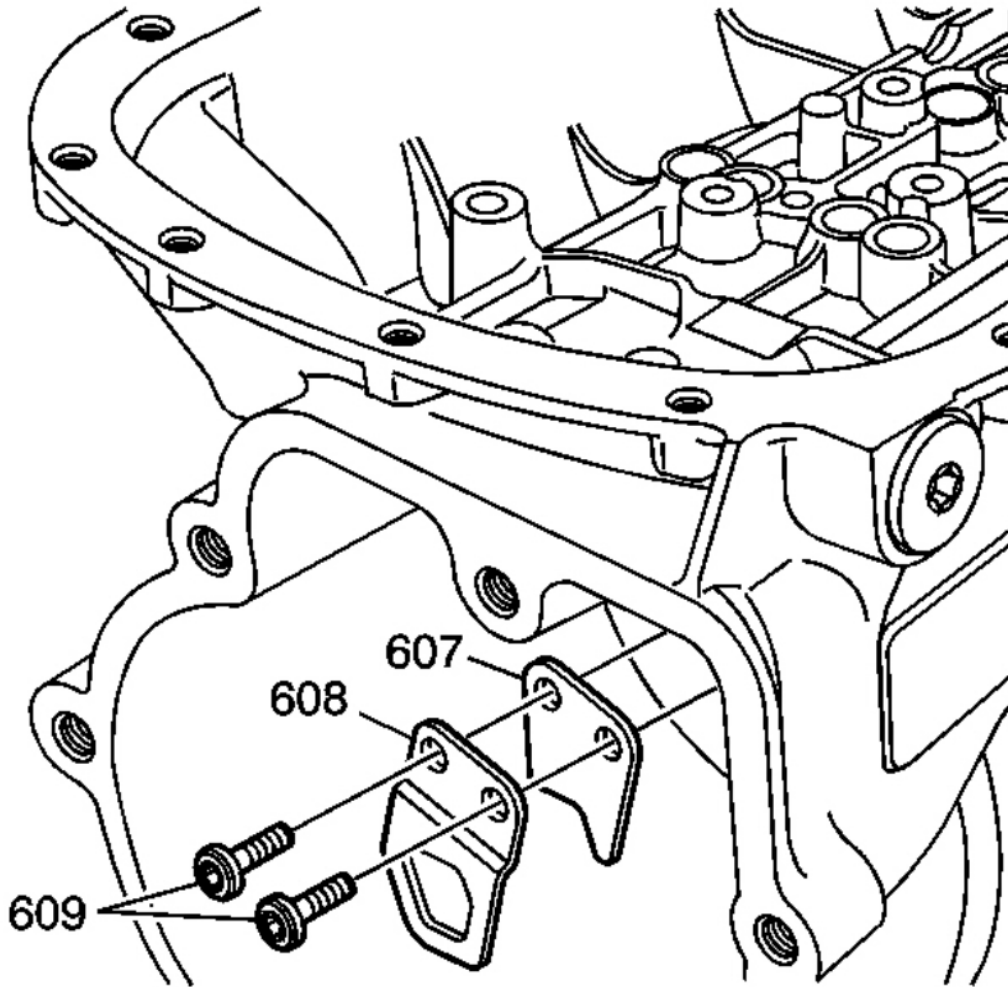


Fig. 61: View Of Park Pawl Actuator Brackets & Bolts
Courtesy of GENERAL MOTORS CORP.

2. Install the park pawl actuator brackets (607, 608) onto the case.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

3. Install the bracket bolts (609).

Tighten: Tighten the bracket bolts to 22 N.m (16 lb ft).

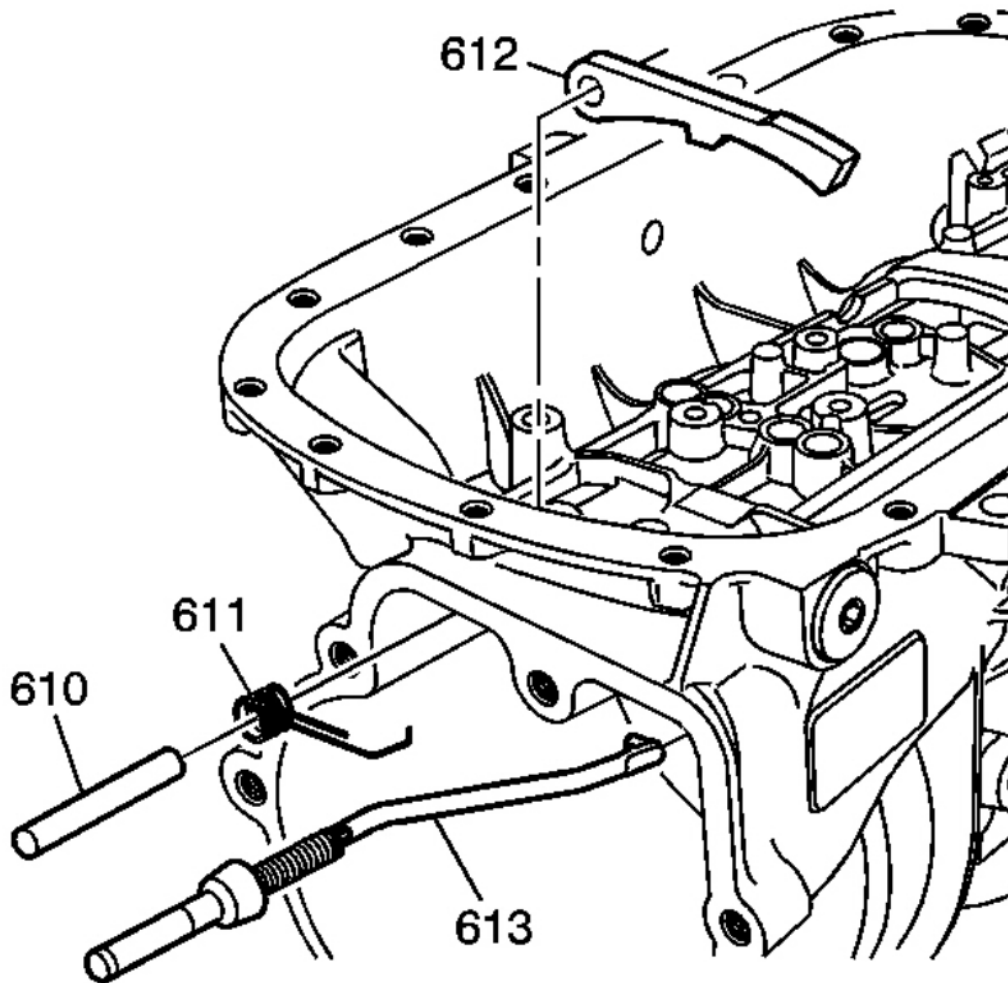


Fig. 62: Locating Parking Pawl Components
Courtesy of GENERAL MOTORS CORP.

4. Install the park pawl (612), the park pawl spring (611), and the park pawl shaft (610) into the case.
5. Install the park pawl actuator (613) into the case.

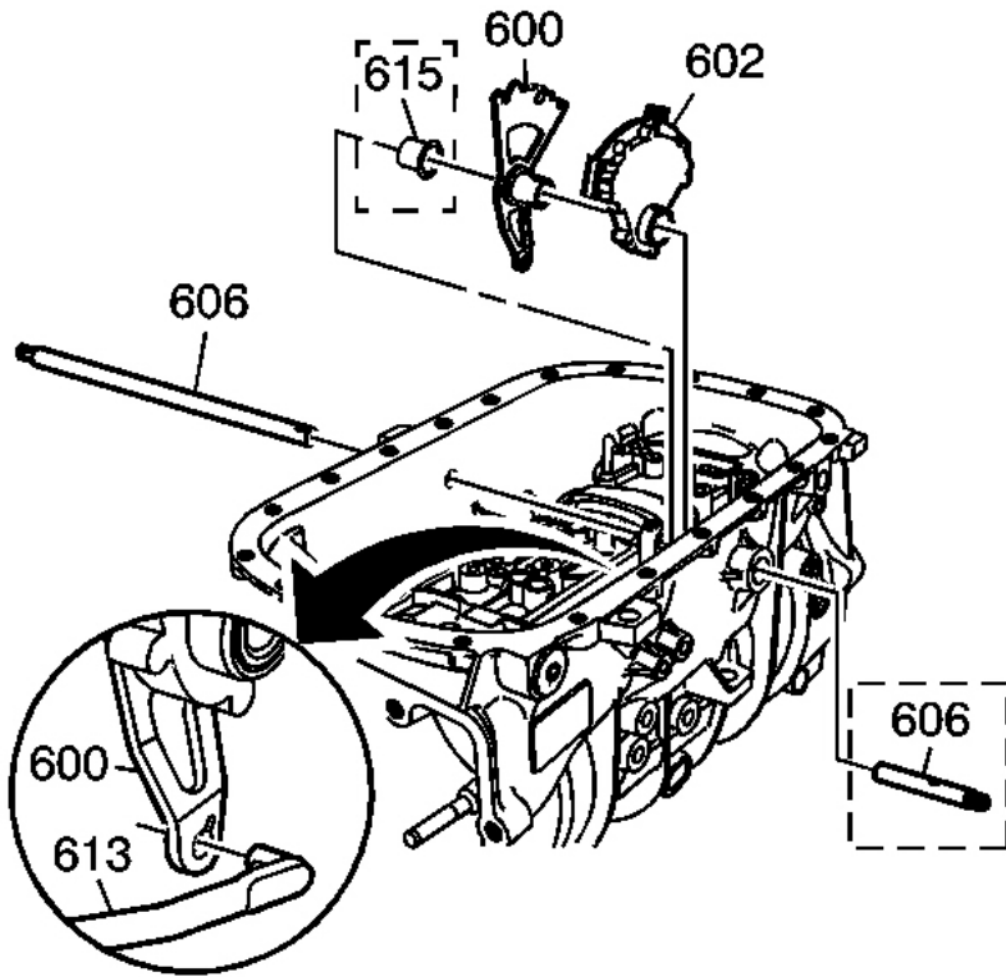


Fig. 63: Identifying Park Pawl Actuator & Shift Switch Assembly
Courtesy of GENERAL MOTORS CORP.

6. Assemble the shift switch assembly (602) and spacer (615) - some models onto the detent lever (600).
7. Assemble the park pawl actuator (613) into the detent lever (600).
8. Install the manual shaft (606) into the case.

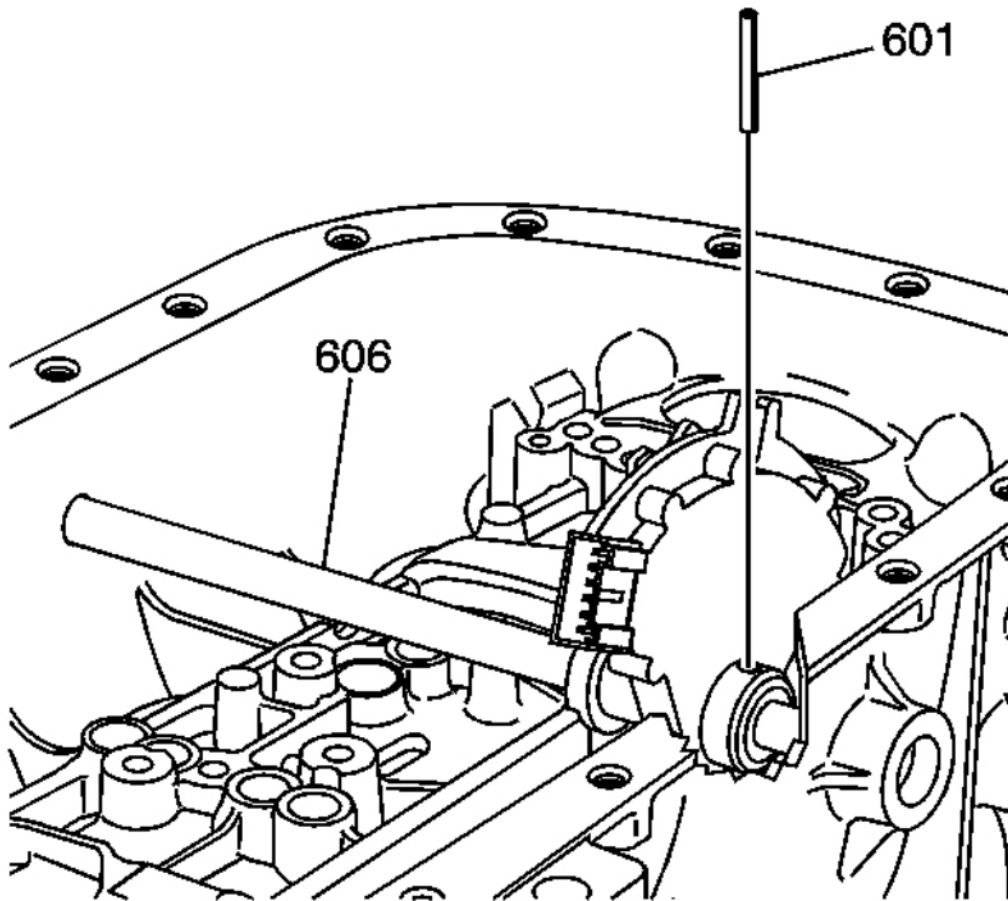


Fig. 64: Aligning Manual Shaft Pin With Pin Hole In Detent Lever/Shift Switch Assembly

Courtesy of GENERAL MOTORS CORP.

9. Align the groove for the new manual shaft pin (601) with the pin hole in the detent lever/shift switch assembly.
10. Install the manual shaft pin (601) into the manual shift shaft (606).

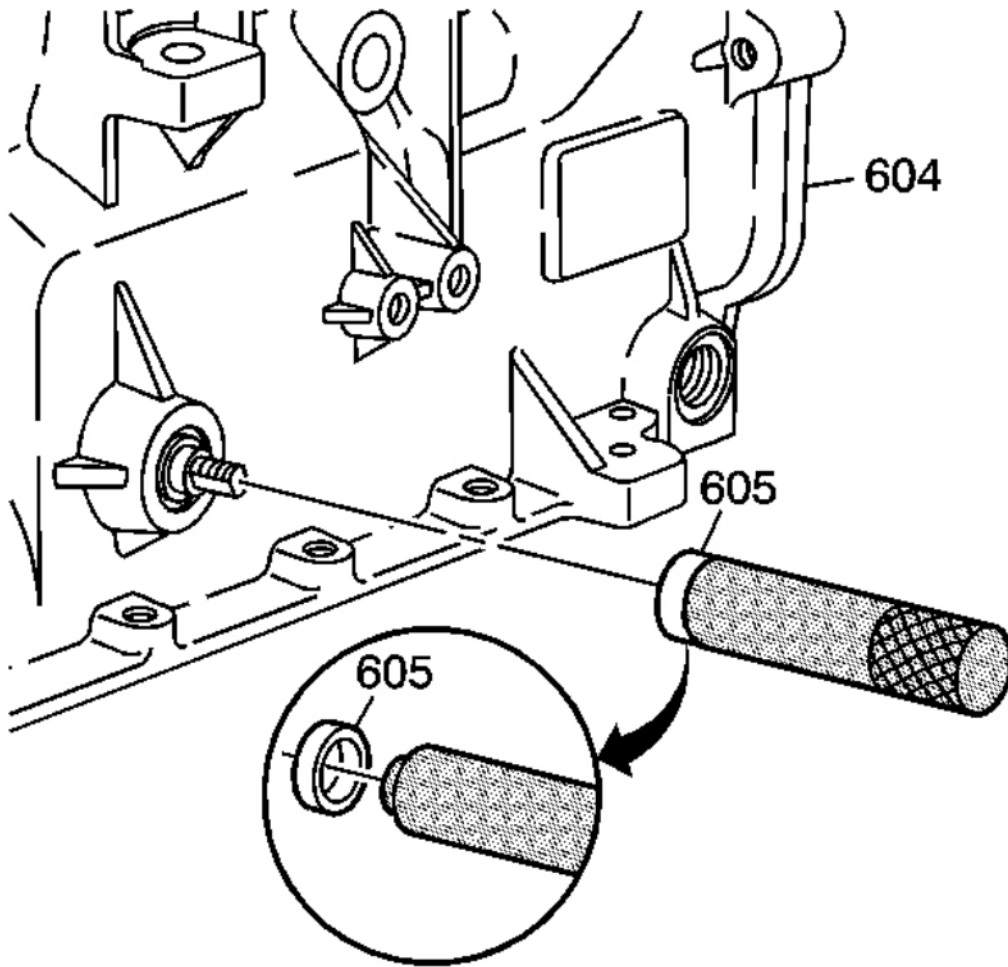


Fig. 65: Installing Manual Shaft Seal With J 44767
Courtesy of GENERAL MOTORS CORP.

11. Install a NEW manual shaft seal (605) onto **J 44767** .
12. Use a **J 44767** to install the NEW manual shaft seal (605) into the case (604).

OUTPUT SHAFT AND REAR INTERNAL RING GEAR DISASSEMBLE

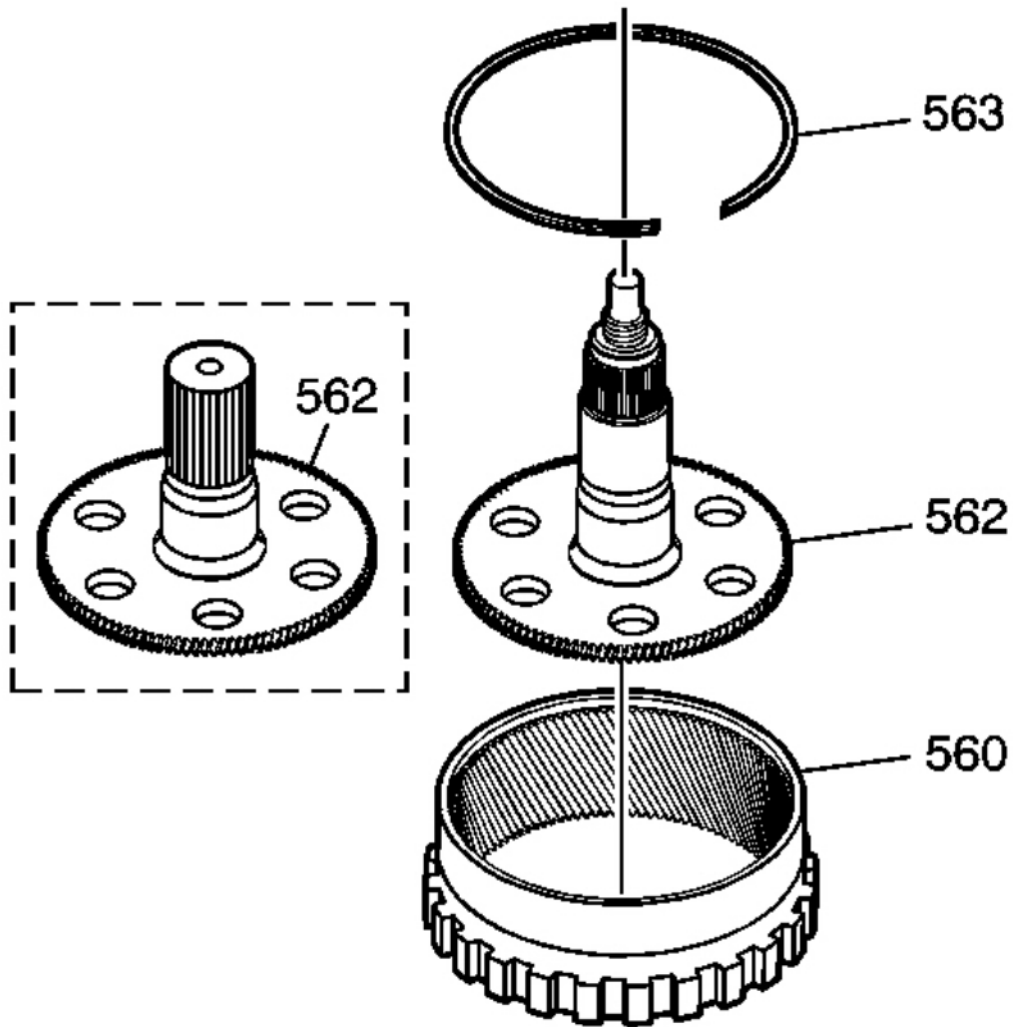


Fig. 66: Locating Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Remove the snap ring (563).
2. Remove the output shaft (562) from the rear internal gear (560).

OUTPUT SHAFT AND REAR INTERNAL RING GEAR ASSEMBLY

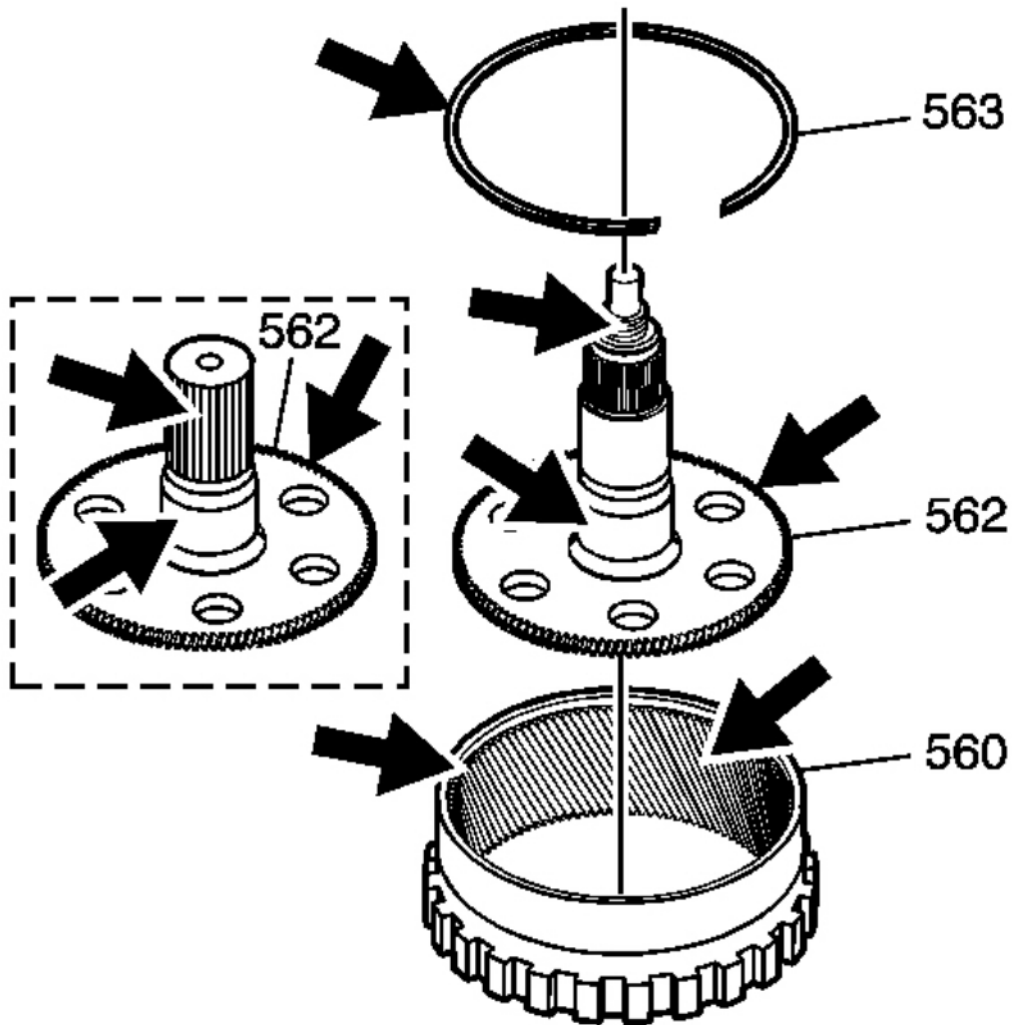


Fig. 67: Output Shaft and Rear Internal Ring Gear Inspection Areas
Courtesy of GENERAL MOTORS CORP.

1. Inspect the output shaft (562) and the rear internal gear (560) for the following:
 - Damaged or worn bushings
 - Damaged splines
 - Damaged or worn snap ring (563)
 - Damaged or worn gear teeth

- Damaged or worn snap ring groove
- Damaged or cross-threaded threads
- Damaged or worn bearings

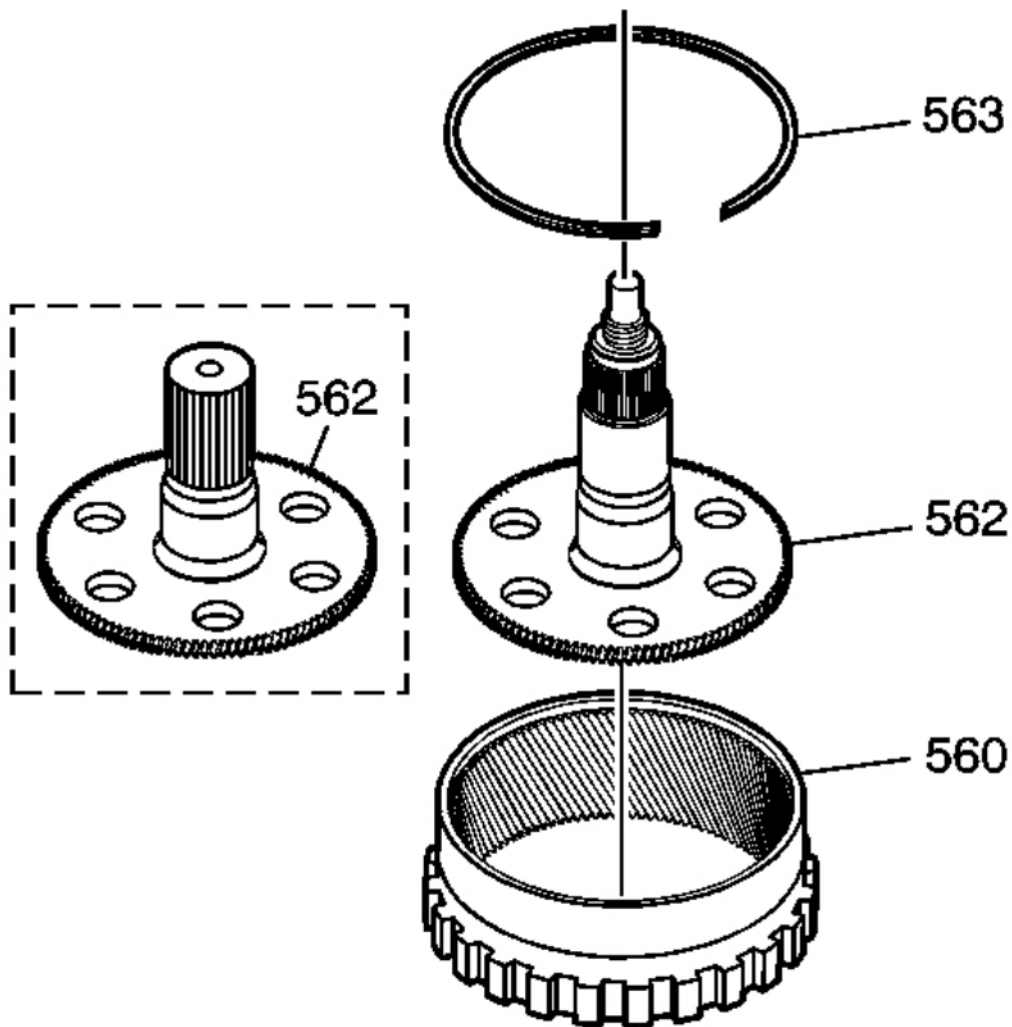


Fig. 68: Locating Output Shaft

Courtesy of GENERAL MOTORS CORP.

2. Install the output shaft (562) onto the rear internal gear (560).
3. Install the snap ring (563) onto the rear internal ring gear (560). Be sure it is seated in the

groove.

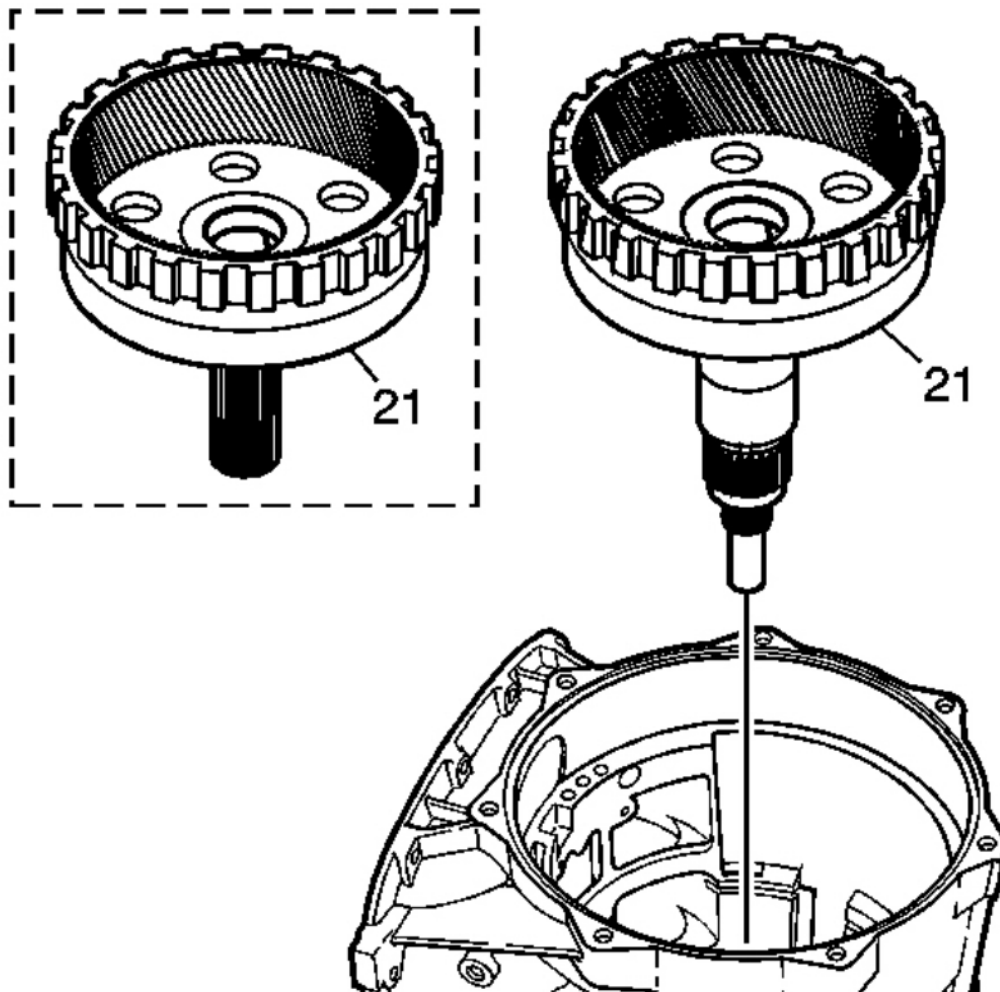


Fig. 69: View Of Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

4. Rotate the transmission 90 degrees.
5. Install the output shaft assembly (21) into the case (24).

INPUT AND REACTION CARRIER DISASSEMBLE

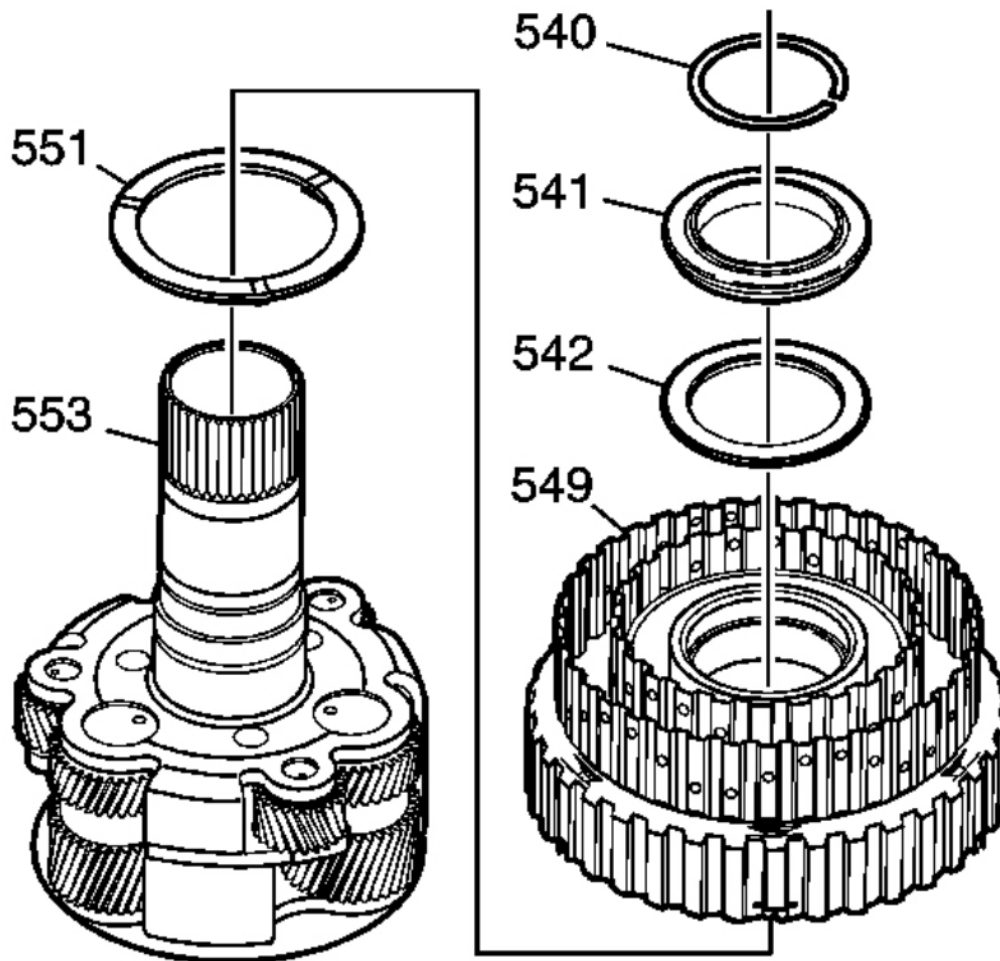


Fig. 70: Input and Reaction Carrier Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the snap ring (540).
2. Remove the input and reaction bearing (541).
3. Remove the 2nd clutch roller inner race bearing (542).
4. Remove the 2nd clutch sprag (549).
5. Remove the reaction internal gear flange washer (551).

INPUT AND REACTION CARRIER ASSEMBLE

Tools Required

J 36850 Assembly Lubricant. See Special Tools and Equipment .

Assembly Procedure

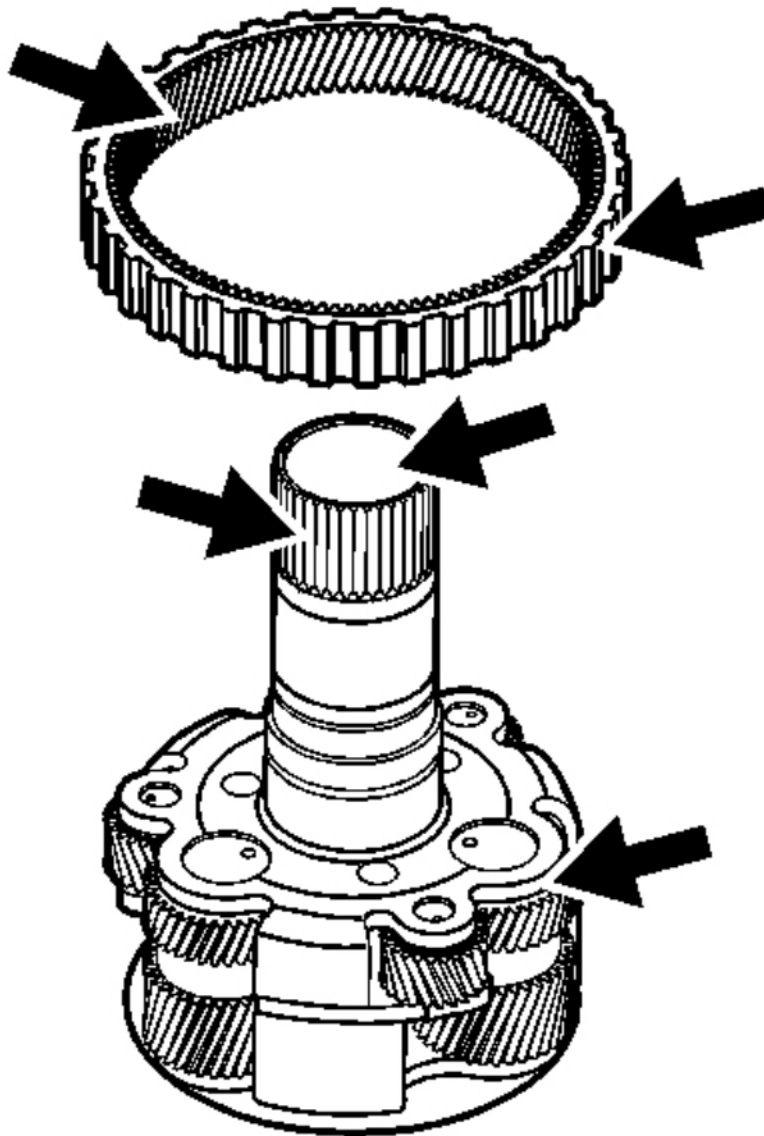


Fig. 71: Inspection Areas On Input And Reaction Carrier

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Courtesy of GENERAL MOTORS CORP.

1. Inspect the reaction internal gear and the 2nd clutch sprag for the following:
 - Damaged or worn gear teeth
 - Damaged or worn splines
2. Inspect the input and reaction carrier for the following:
 - Damaged or worn teeth
 - Damaged or worn splines
 - Worn or nicked bushings
 - Worn or damaged bearings

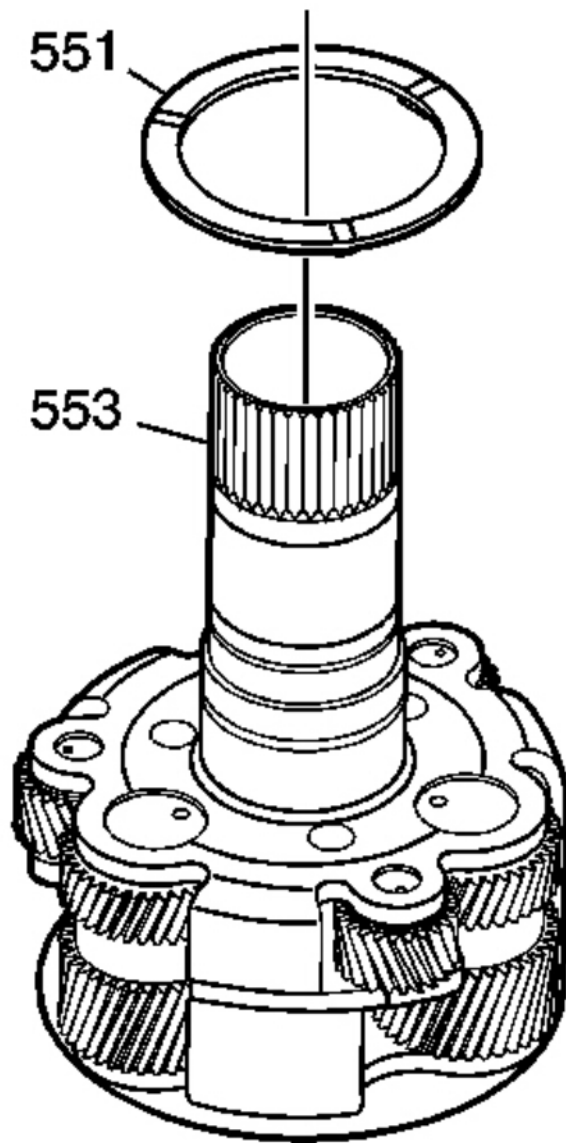


Fig. 72: Installing Reaction Internal Gear Flange Washer
Courtesy of GENERAL MOTORS CORP.

3. Using **J 36850** install the reaction internal gear flange washer (551).

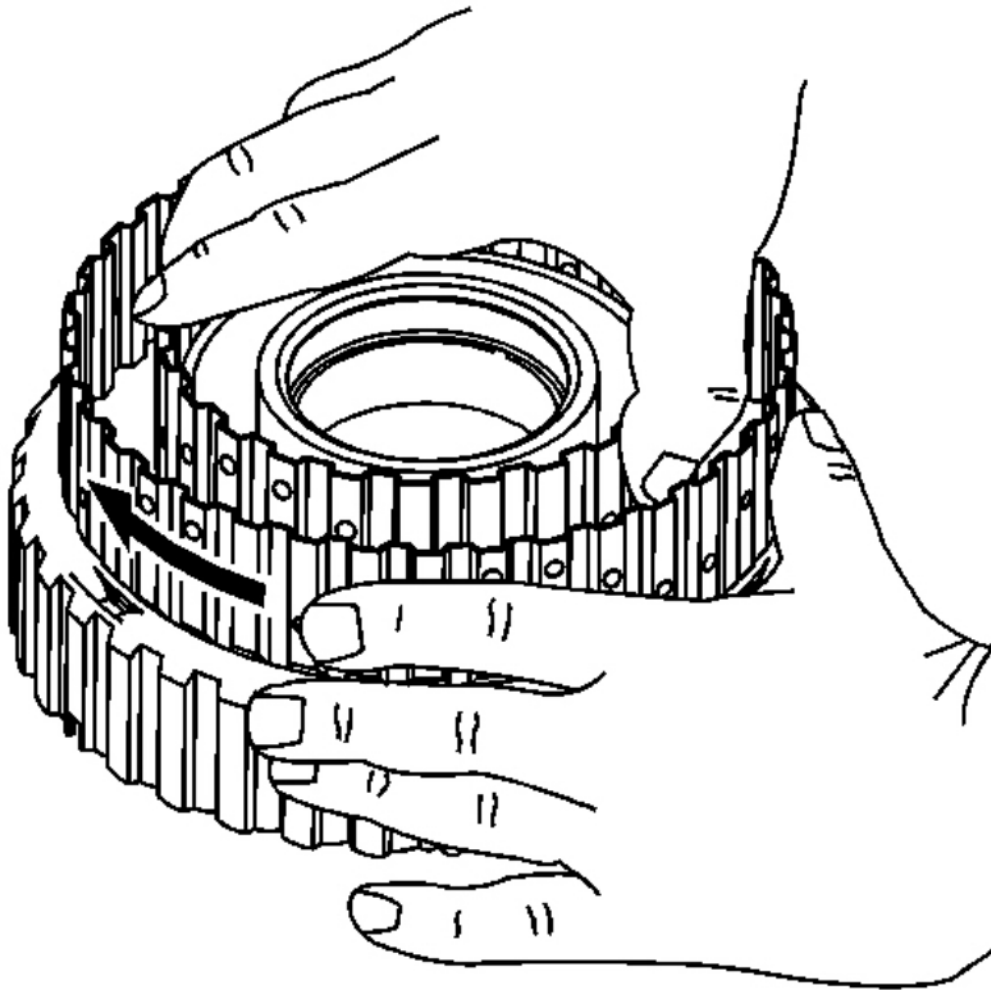


Fig. 73: Checking 2nd Clutch Sprag Rotation
Courtesy of GENERAL MOTORS CORP.

4. Check that the 2nd clutch sprag rotation freewheels and locks up in the correct direction.

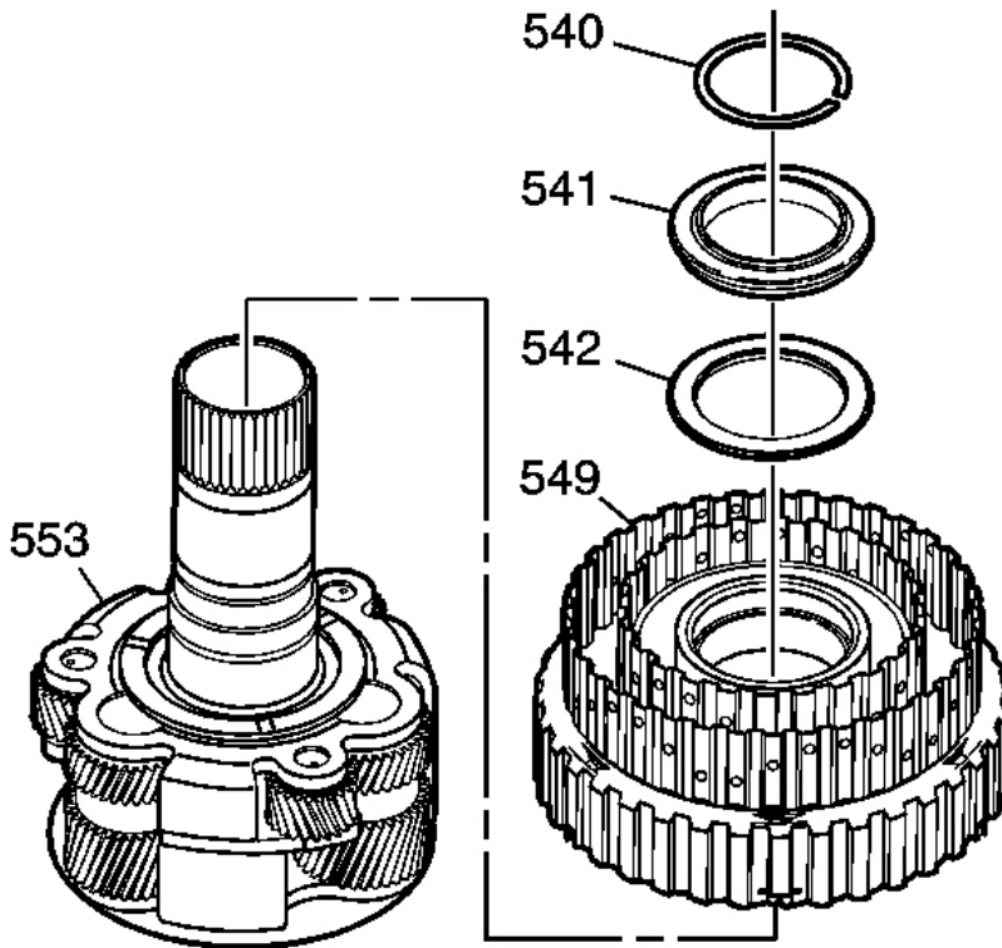


Fig. 74: Locating 2nd Clutch Components
Courtesy of GENERAL MOTORS CORP.

5. Install the 2nd clutch sprag (549) onto the input and reaction carrier (553).
6. Install the 2nd clutch roller inner race bearing assembly (542) onto the input and reaction carrier (553).
7. Install the input and reaction bearing assembly (541) onto the input and reaction carrier (553).
8. Install the input and reaction carrier outer ring (540) onto the input and reaction carrier (553).

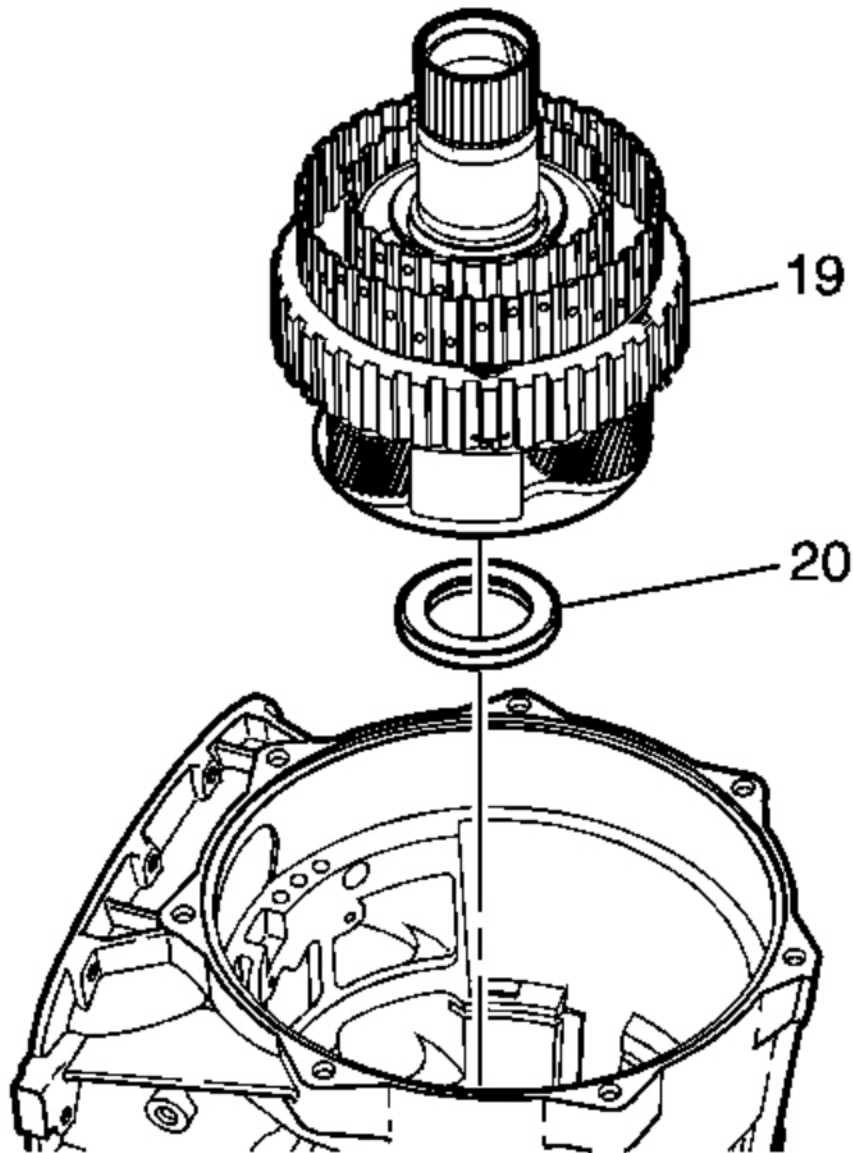


Fig. 75: View Of Input And Reaction Carrier Thrust Bearing & Carrier
Courtesy of GENERAL MOTORS CORP.

9. Install the input and reaction carrier thrust bearing (20) into the case (24).
10. Install the input and reaction carrier (19) into the case (24).

CENTER SUPPORT DISASSEMBLE**Tools Required**

J 23327 Clutch Spring Compressor. See Special Tools and Equipment .

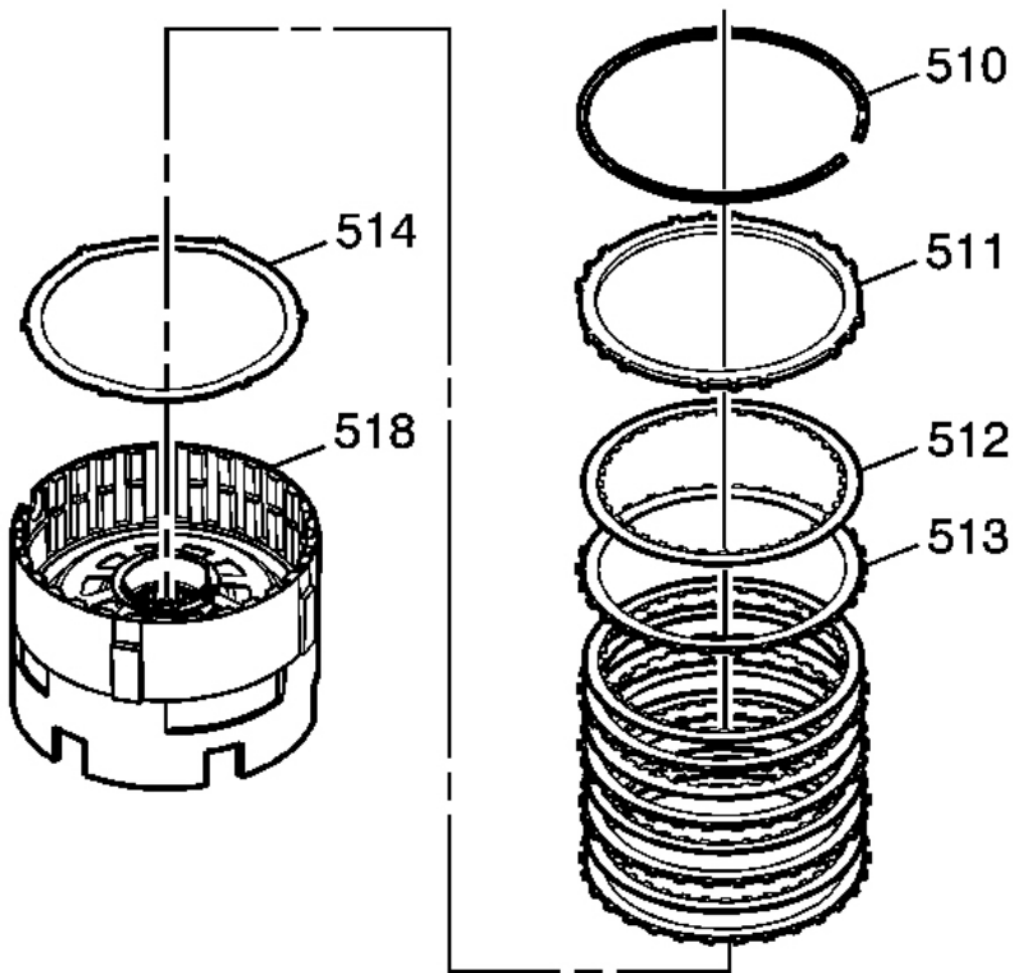
Disassembly Procedure

Fig. 76: Locating Low And Reverse Apply Plates
Courtesy of GENERAL MOTORS CORP.

1. Remove the snap ring (510).

2. Remove the low and reverse backing plate (511).
3. Remove the clutch plates (512, 513). Refer to **Clutch Plate Selection Specifications**.
4. Remove the low and reverse apply plate (514).

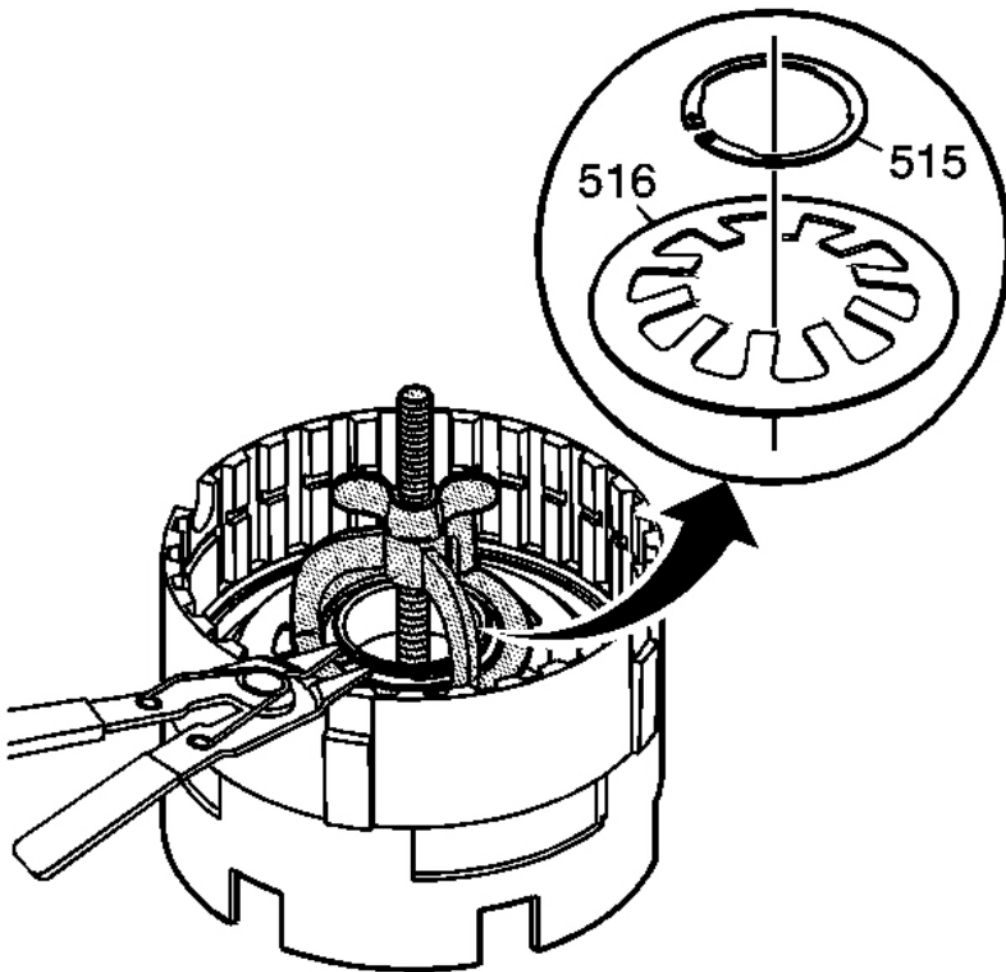


Fig. 77: Identifying Low And Reverse Clutch Spring Retainer Ring
Courtesy of GENERAL MOTORS CORP.

5. Use **J 23327** to compress the low and reverse clutch spring (516).
6. Remove the low reverse clutch spring retainer ring (515).
7. Remove **J 23327** from the center support.

8. Remove the clutch spring (516) from the center support.

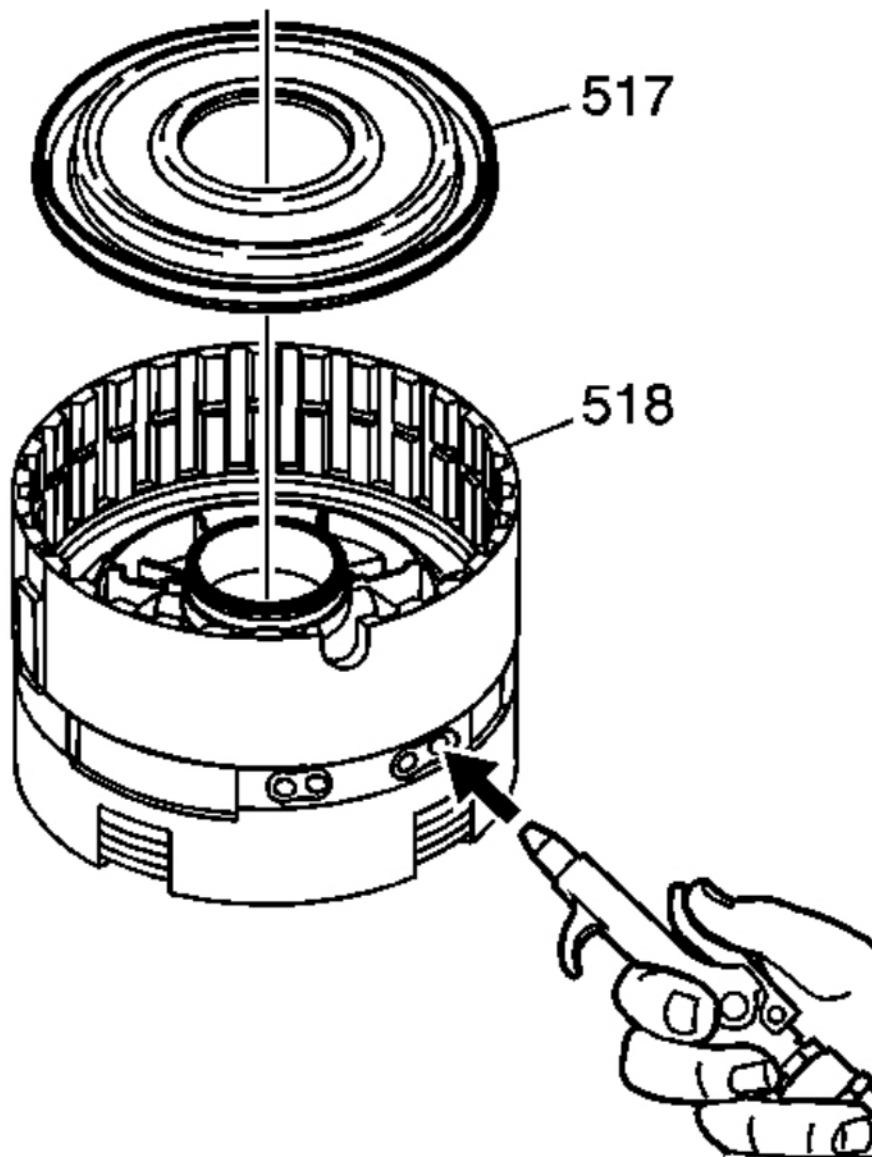


Fig. 78: Removing With Air Pressure The Low And Reverse Piston
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

9. Remove the low and reverse piston (517) from the center support (518).

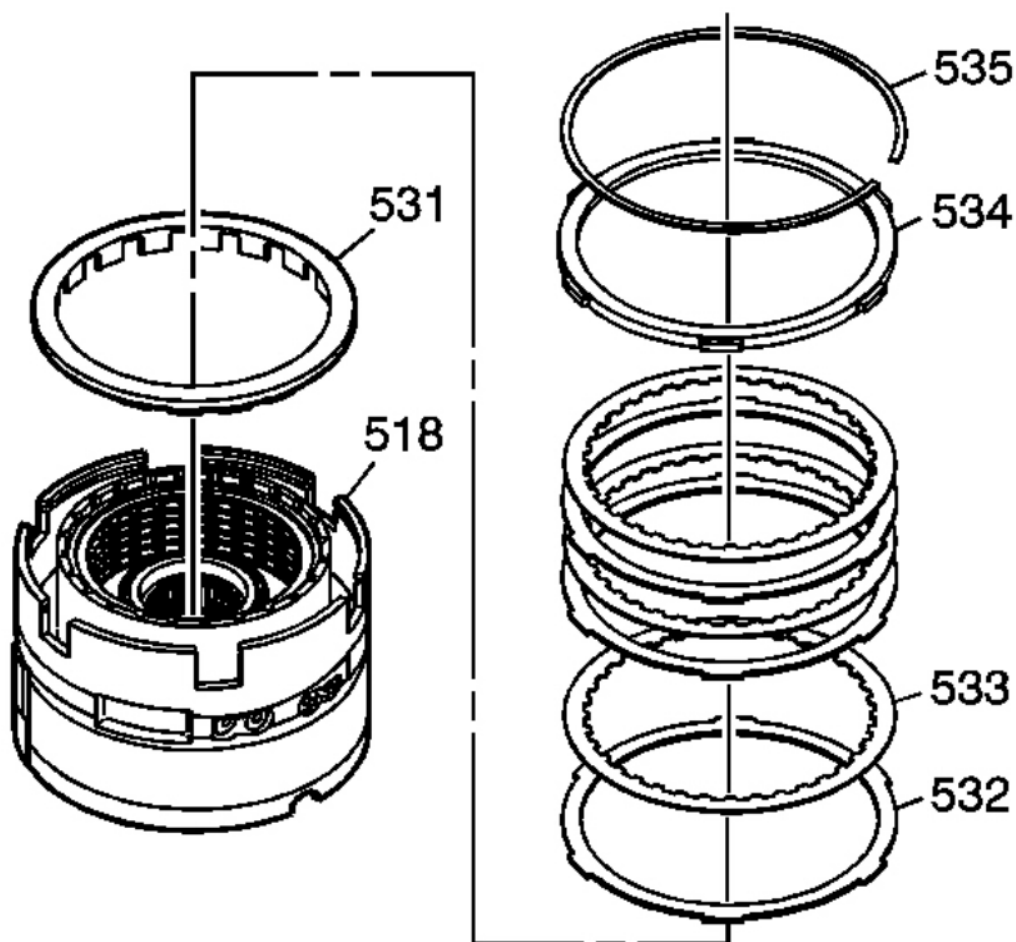


Fig. 79: Identifying 2nd Coast Clutch Plates
Courtesy of GENERAL MOTORS CORP.

10. Remove the 2nd coast clutch plate retainer ring (535) from the center support (518).
11. Remove the 2nd coast clutch backing plate (534) from the center support (518).
12. Remove the clutch plates (532, 533). Refer to **Clutch Plate Selection Specifications**.
13. Remove the 2nd coast clutch spacer (531) from the center support (518).

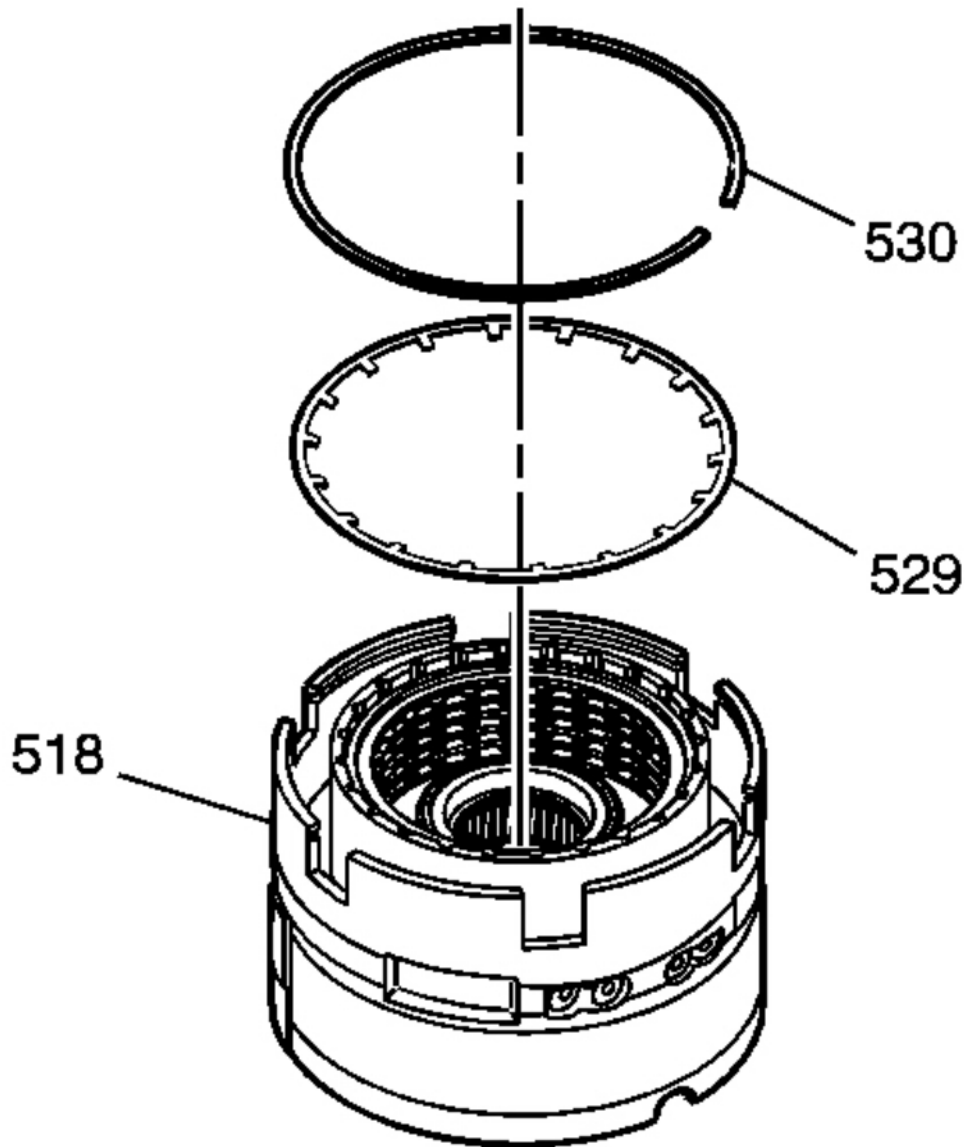


Fig. 80: Locating 2nd Coast Clutch Spring
Courtesy of GENERAL MOTORS CORP.

14. Remove the 2nd coast clutch spring retainer (530).
15. Remove the 2nd coast clutch spring (529) from the center support (518).

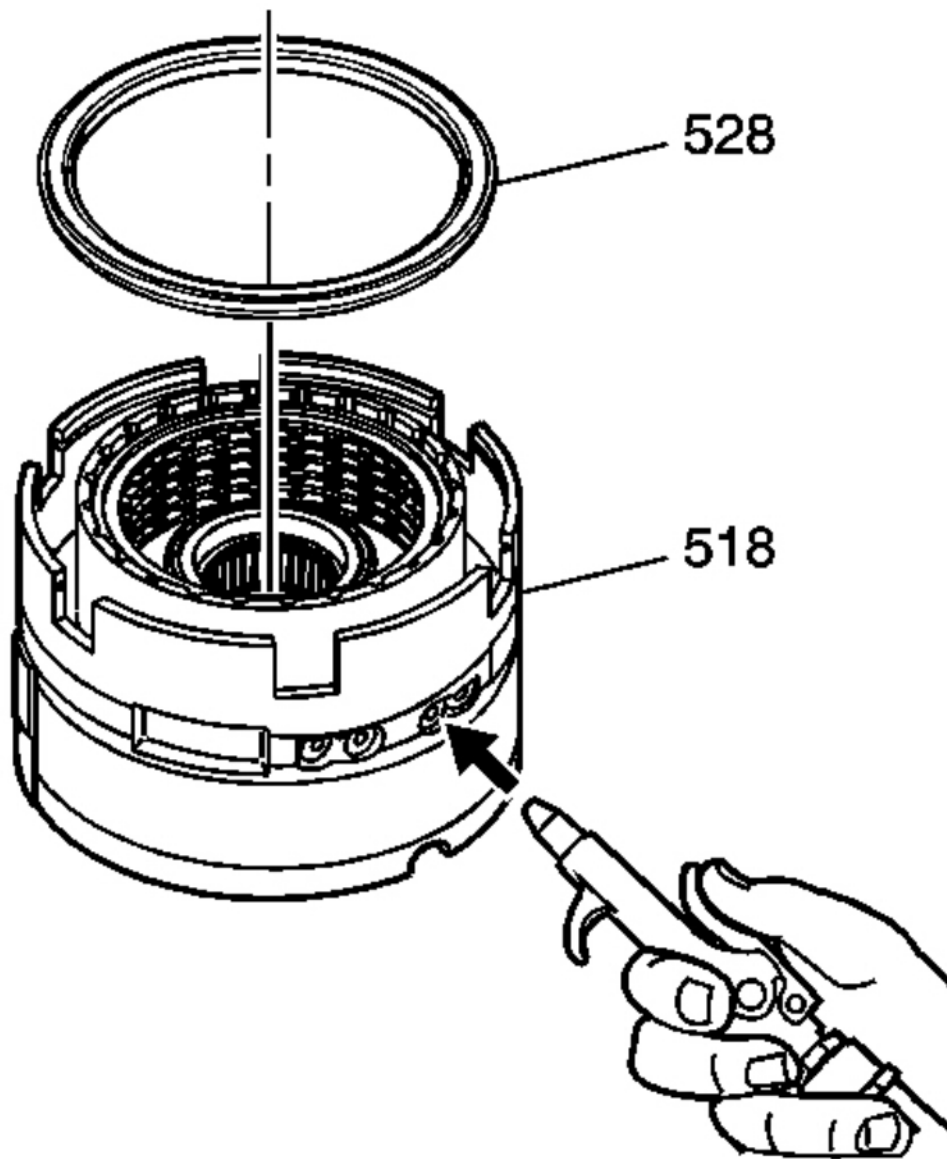


Fig. 81: Removing 2nd Coast Clutch Piston With Air Pressure
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

16. Remove the 2nd coast clutch piston (528) from the center support (518).

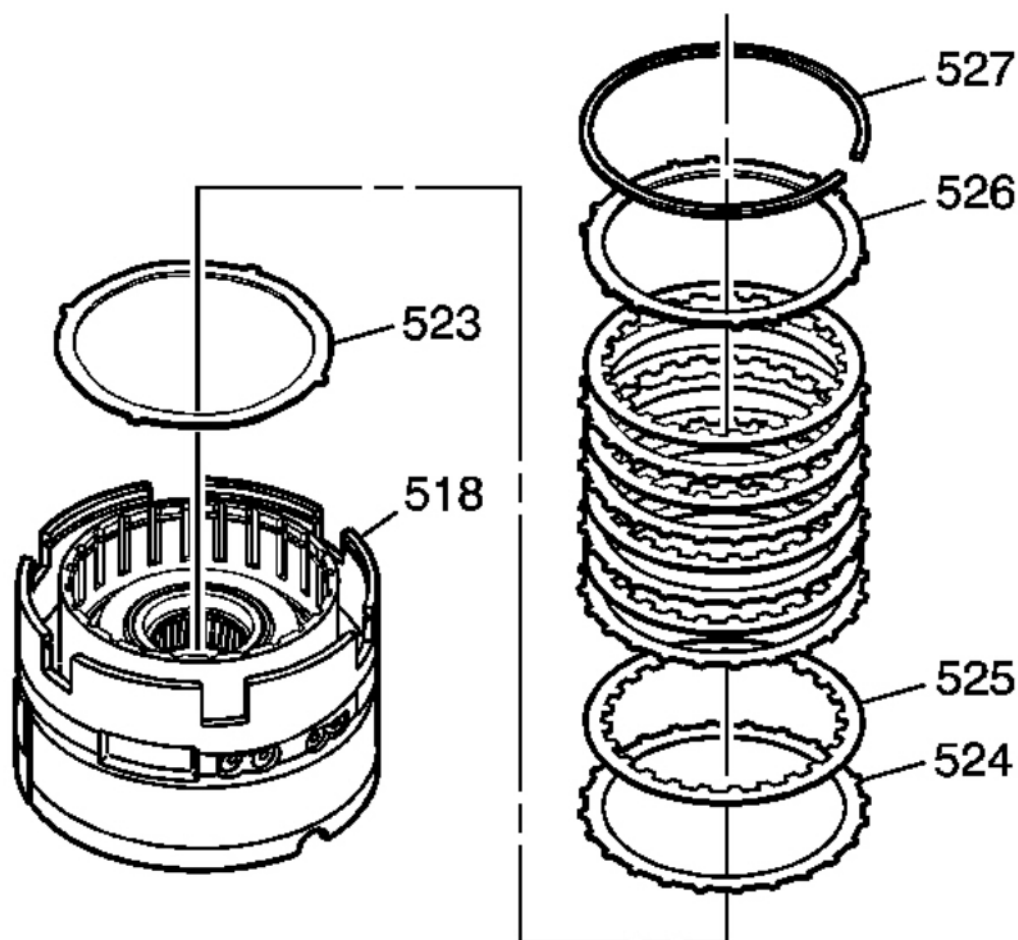


Fig. 82: Identifying 2nd Clutch Apply Plates
Courtesy of GENERAL MOTORS CORP.

17. Remove the retainer ring (527) from the center support (518).
18. Remove the 2nd clutch backing plate (526) from the center support (518).
19. Remove the clutch plates (524, 525) from the center support (518). Refer to **Clutch Plate Selection Specifications**.
20. Remove the 2nd clutch apply plate (523) from the center support (518).

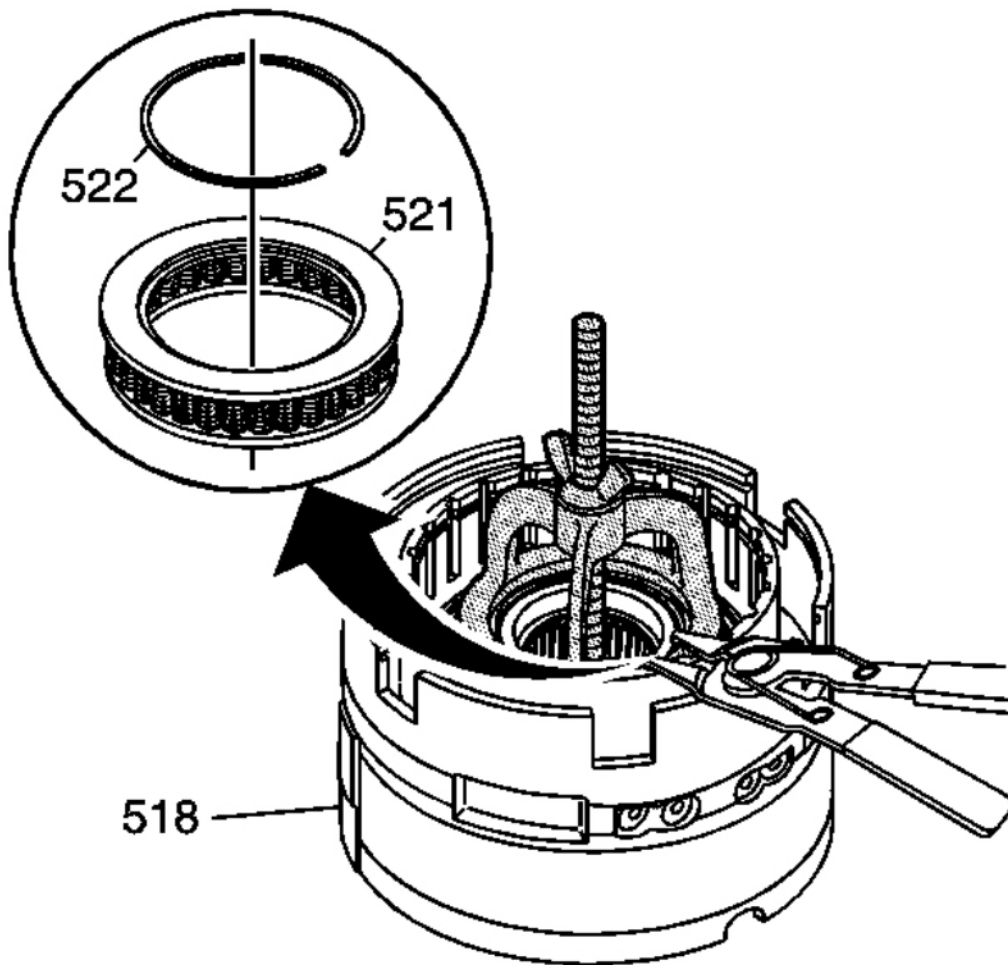


Fig. 83: View Of 2nd Clutch Spring Retainer Ring & Spring
Courtesy of GENERAL MOTORS CORP.

21. Use **J 23327** to compress the 2nd clutch piston spring (521).
22. Remove the retainer ring (522) from the center support (518).
23. Remove the **J 23327** from the center support (518).
24. Remove the 2nd clutch piston spring (521) from the center support (518).

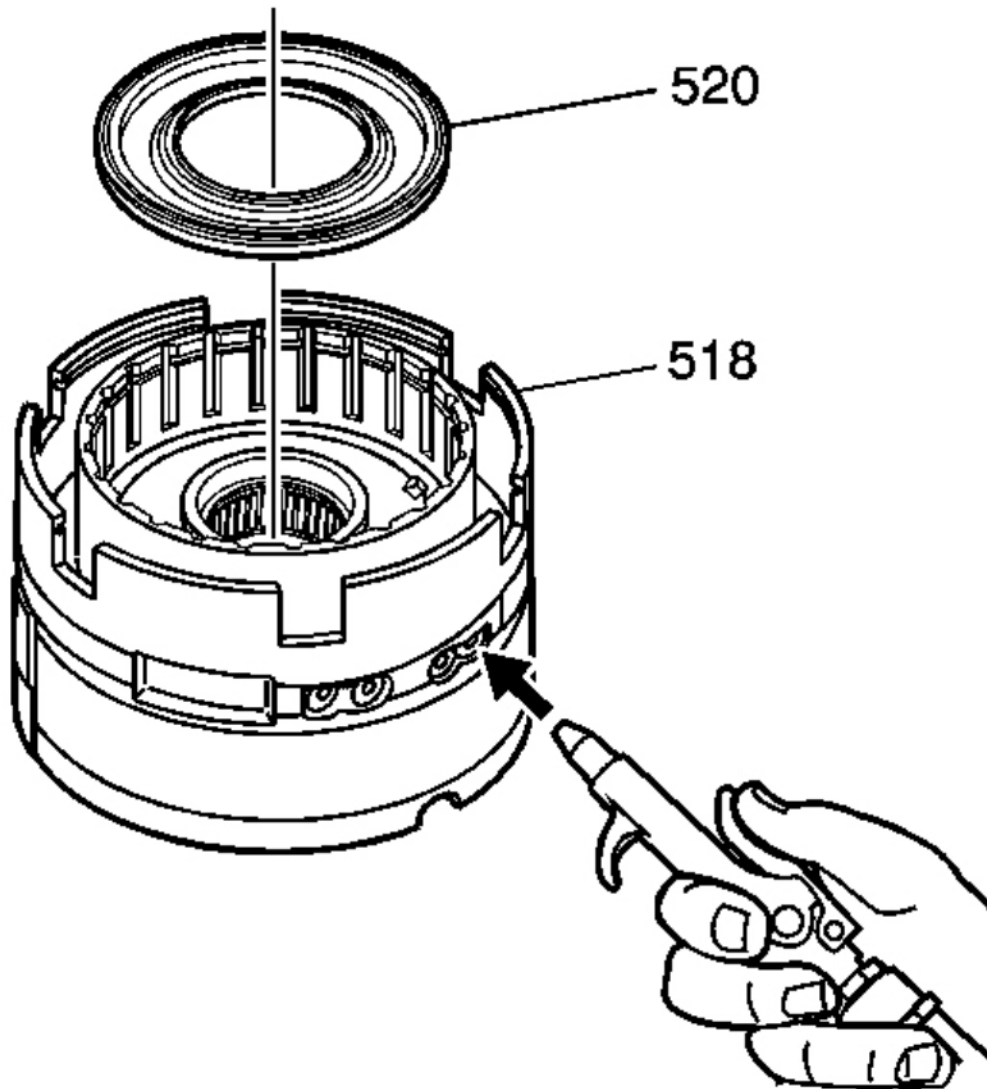


Fig. 84: Removing 2nd Clutch Piston
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

25. Remove the 2nd clutch piston (520) from the center support (518).

CENTER SUPPORT ASSEMBLY

Tools Required

- **J 23327** Clutch Spring Compressor. See **Special Tools and Equipment** .
- **J 45127** Center Support Removal Tool. See **Special Tools and Equipment** .
- **J 45136** Seal Protector. See **Special Tools and Equipment** .
- **J 45140** Seal Protector. See **Special Tools and Equipment** .
- **J-45688** Piston Installer - Pusher. See **Special Tools and Equipment** .
- **J 46239-1** Second Coast Clutch Outer Protector. See **Special Tools and Equipment** .
- **J 46239-2** Second Coast Clutch Inner Protector. See **Special Tools and Equipment** .
- **J 46239-3** Second Coast Clutch Pusher. See **Special Tools and Equipment** .
- **J-46240-1** Seal Protector. See **Special Tools and Equipment** .
- **J 46240-2** Seal Protector. See **Special Tools and Equipment** .

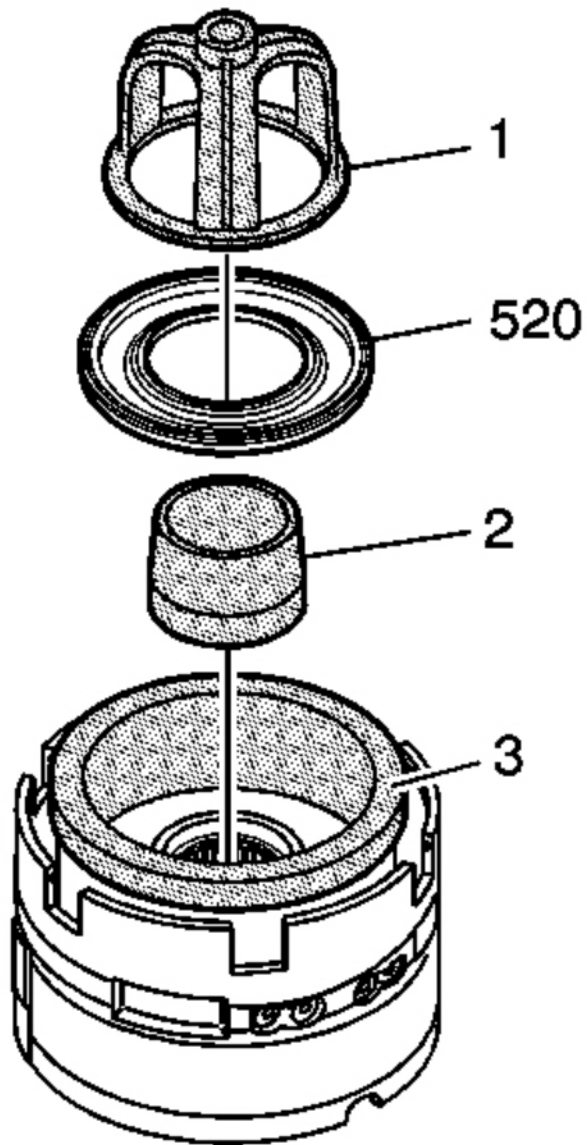


Fig. 85: Inspecting Center Support Components
Courtesy of GENERAL MOTORS CORP.

1. Inspect the center support components for the following:
 - Plugged fluid passages

- Worn or damaged splines
- Worn or damaged pistons
- Worn or damaged clutch plates

2. Install **J-46240-1** (2), and J 45145 (3) into the housing.

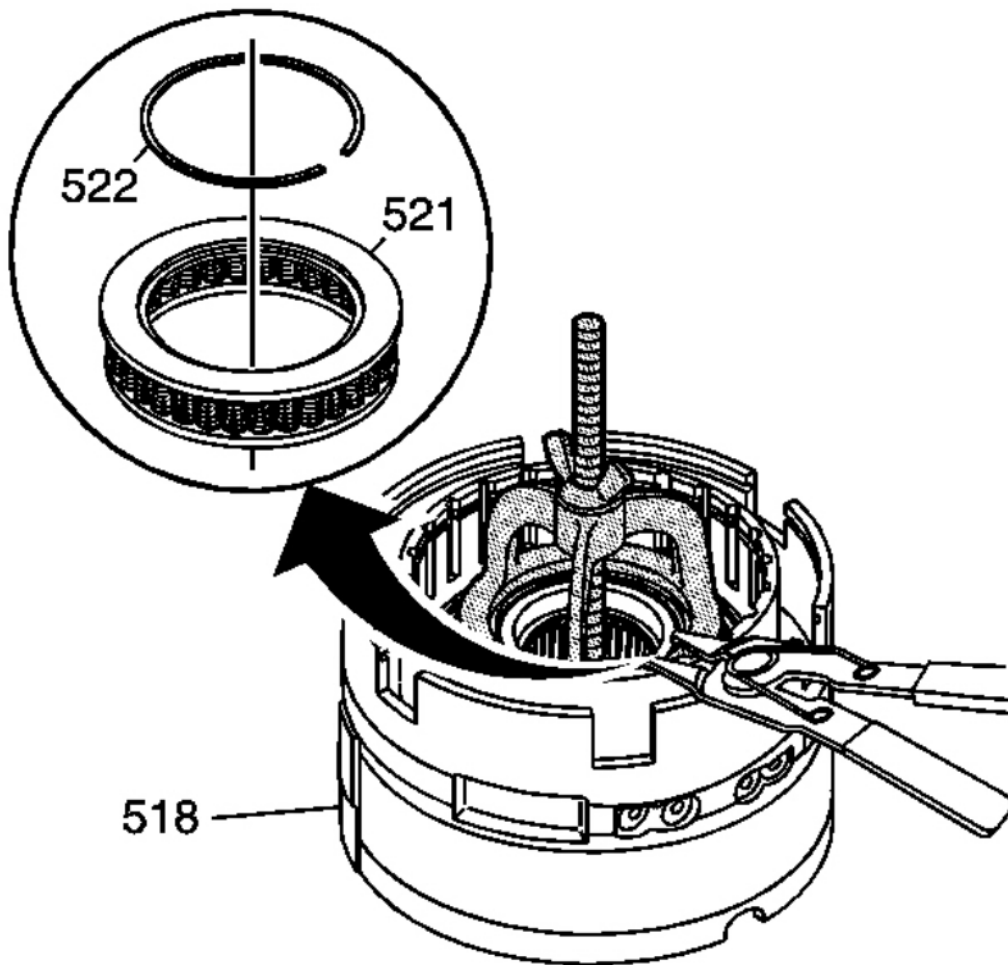


Fig. 86: View Of 2nd Clutch Spring Retainer Ring & Spring
Courtesy of GENERAL MOTORS CORP.

3. Install the 2nd clutch piston (520).
4. Install the 2nd clutch piston spring (521) into the center support (518).

5. Use **J 23327** to compress the 2nd clutch piston spring (521).
6. Install the 2nd clutch spring retainer ring (522) into the center support (518).
7. Remove **J 23327** from the center support (518).

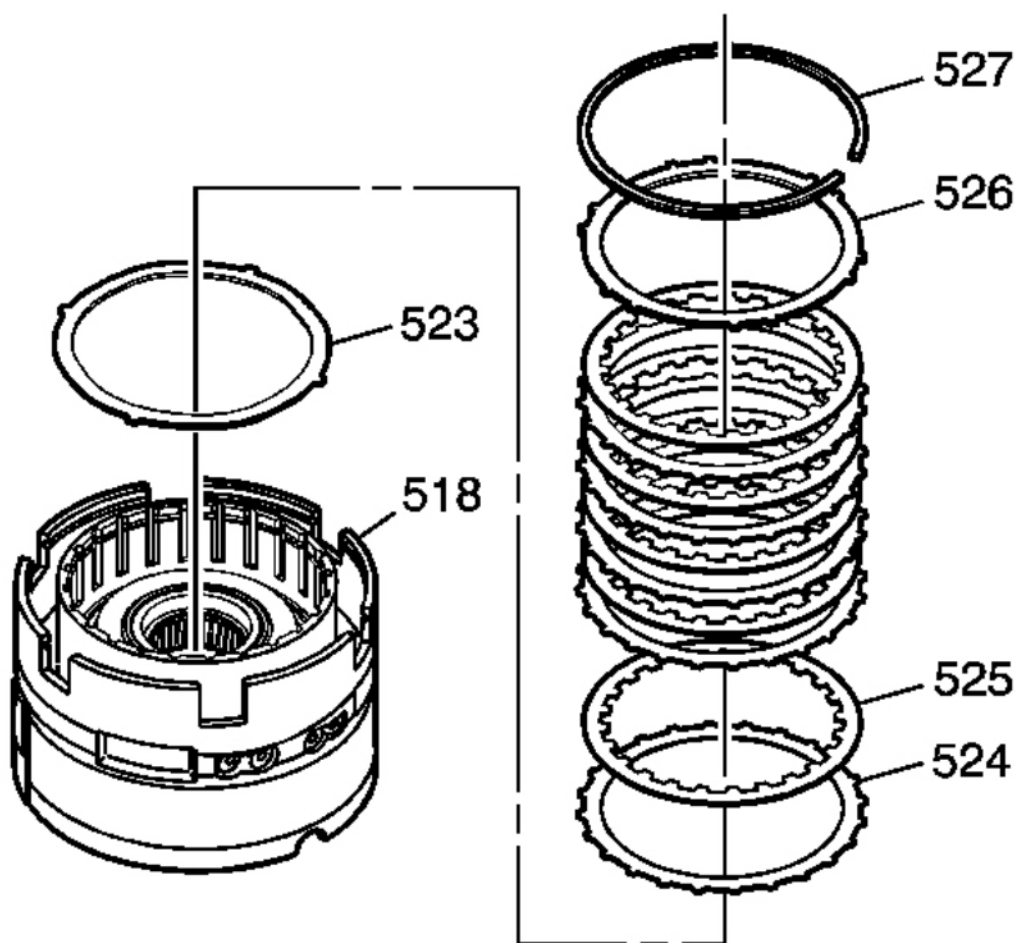


Fig. 87: Identifying 2nd Clutch Apply Plates
Courtesy of GENERAL MOTORS CORP.

8. Install the 2nd clutch apply plate (523) into the center support (518).
9. Install the 2nd clutch plates. Start by installing the 2nd clutch plate (524) with external splines. Alternate with the 2nd clutch plate (525) with internal splines. Refer to **Clutch Plate Selection Specifications**.

10. Install the 2nd clutch backing plate (526) into the center support (518).
11. Install the 2nd clutch backing plate retainer ring (527) into the center support (518).

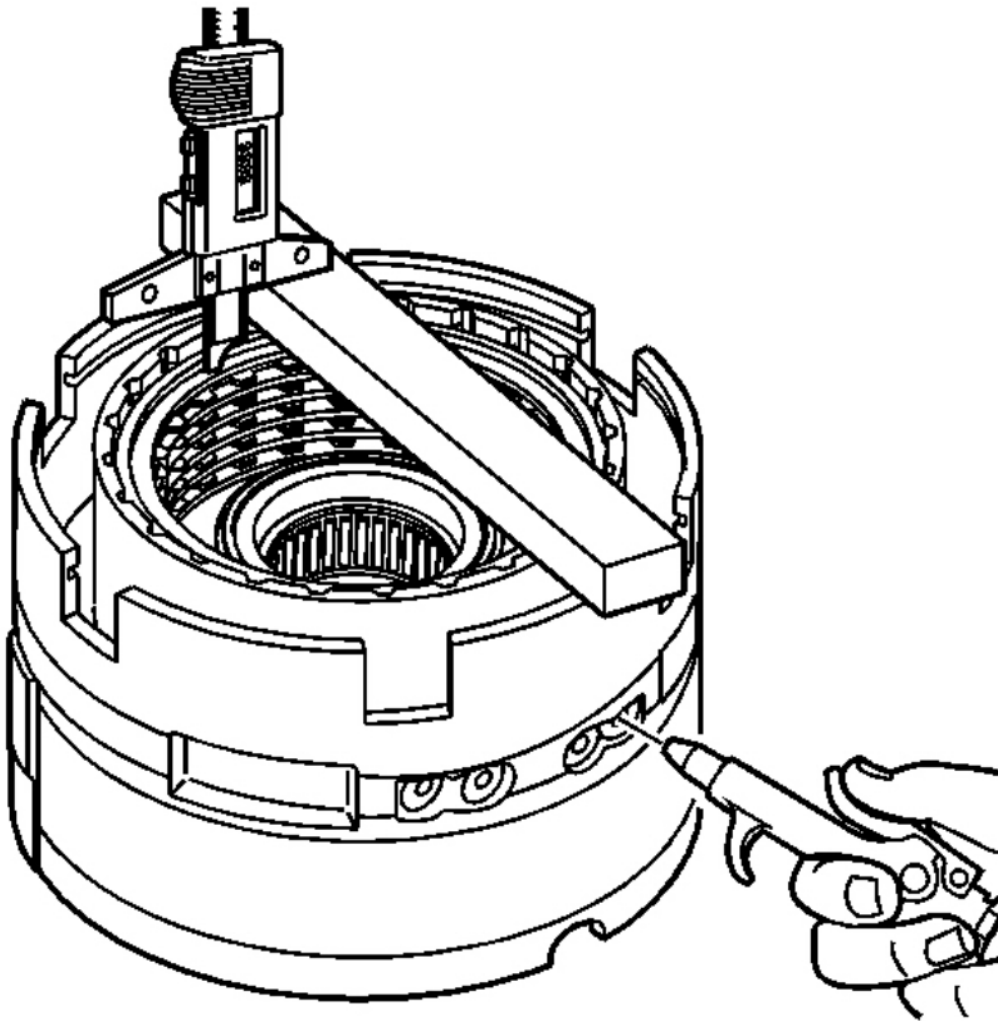


Fig. 88: Measuring 2nd Clutch Pack Travel
Courtesy of GENERAL MOTORS CORP.

12. Measure the distance between the 2nd clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
13. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance

between the 2nd clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.

14. Subtract H2 from H1. This is the 2nd clutch pack travel. Refer to **Clutch Piston Travel Specifications** .

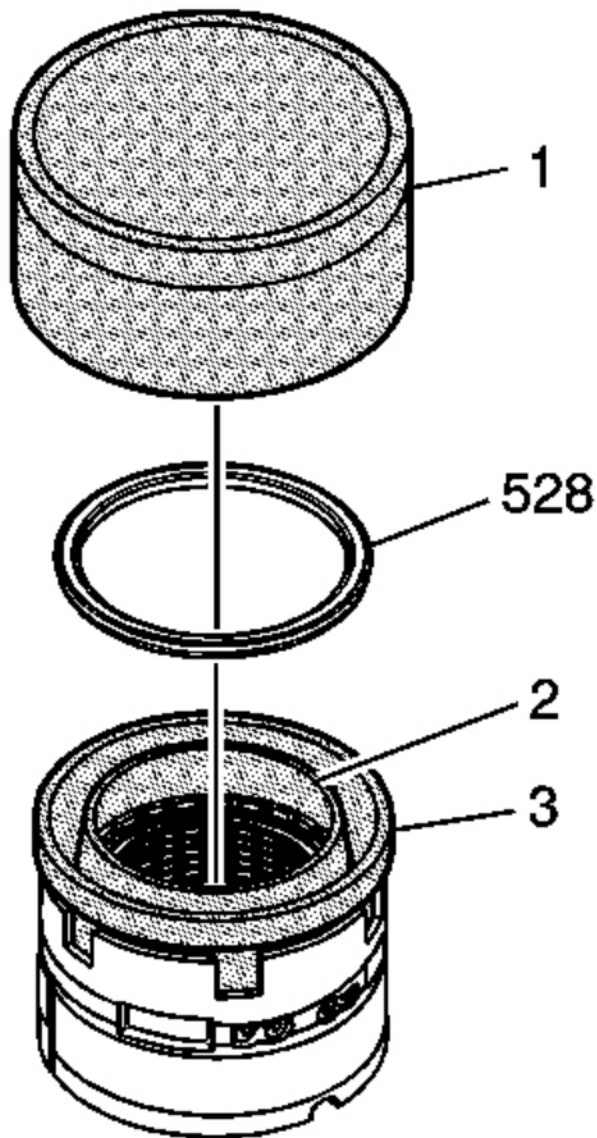


Fig. 89: Installing 2nd Coast Clutch Piston

Courtesy of GENERAL MOTORS CORP.

15. Using J 46239-1 (3), J 46239-2 (2) and J 46239-3 (1), install the 2nd coast clutch piston (528).

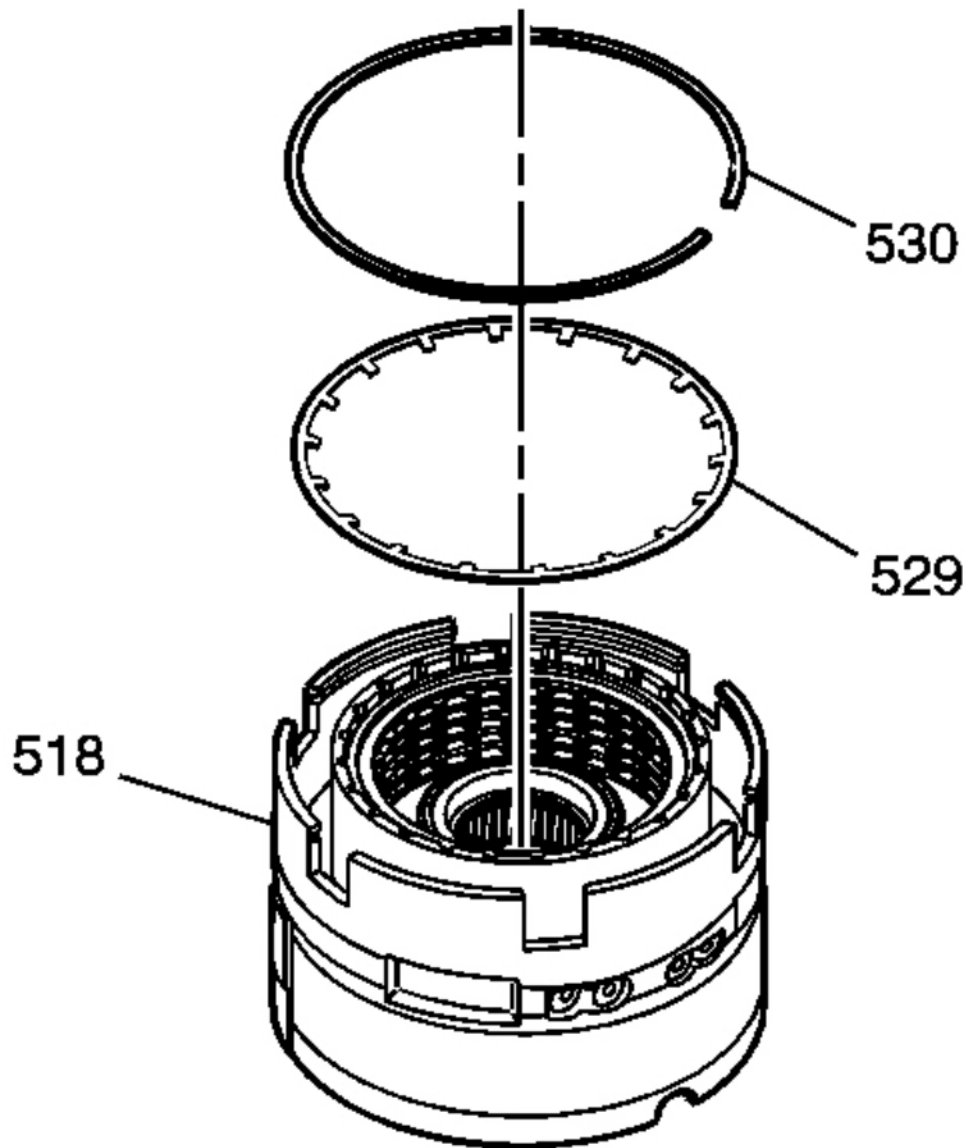


Fig. 90: Locating 2nd Coast Clutch Spring

Courtesy of GENERAL MOTORS CORP.

16. Install the 2nd coast clutch spring (529) into the center support (518).
17. Using **J 23327** compress the 2nd coast clutch spring (529).
18. Install the 2nd coast clutch spring retainer (530) into the center support (518).
19. Remove **J 23327**.

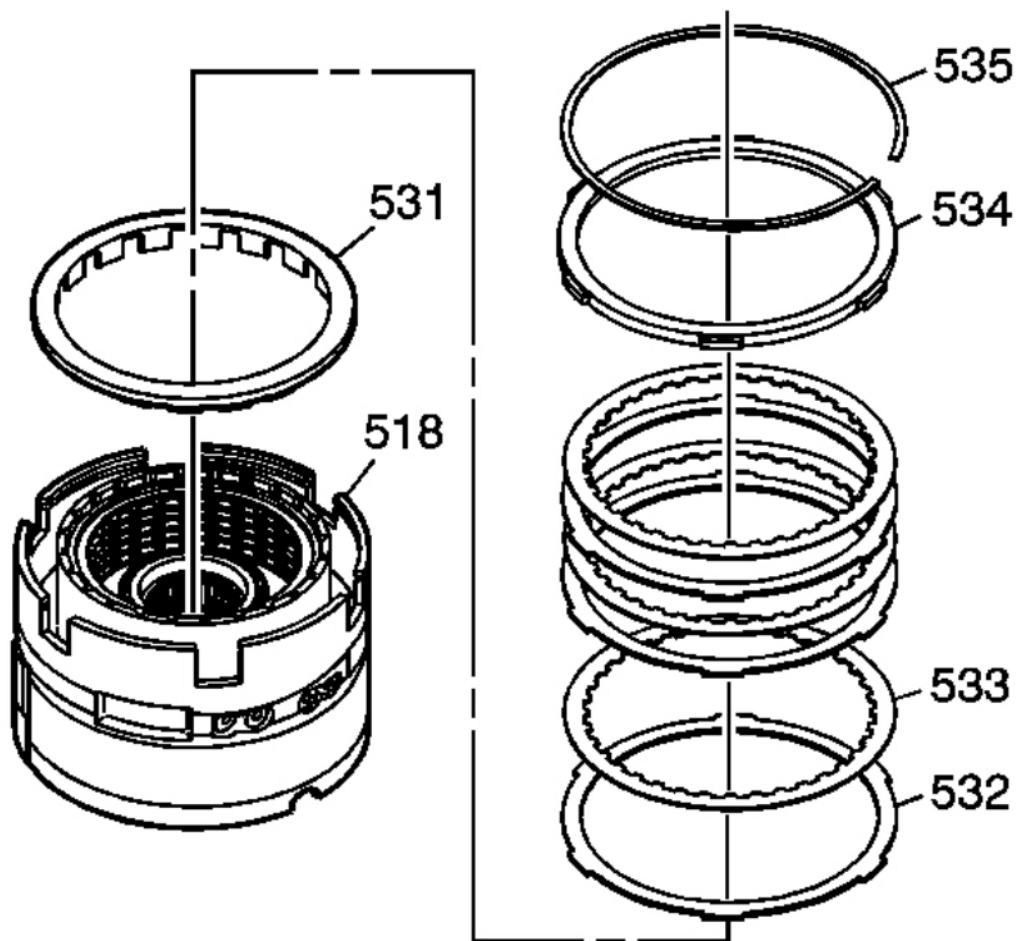


Fig. 91: View Of Coast Clutch Plates
Courtesy of GENERAL MOTORS CORP.

20. Install the 2nd coast clutch spacer (531) into the center support (518).

21. Install the 2nd coast clutch plates. Starting with the 2nd coast clutch plate (532) with external splines. Alternate with the 2nd coast clutch plate (533) with internal splines. Refer to **Clutch Plate Selection Specifications**.
22. Install the 2nd coast clutch backing plate (534).
23. Install the 2nd coast clutch backing plate retainer ring (535).

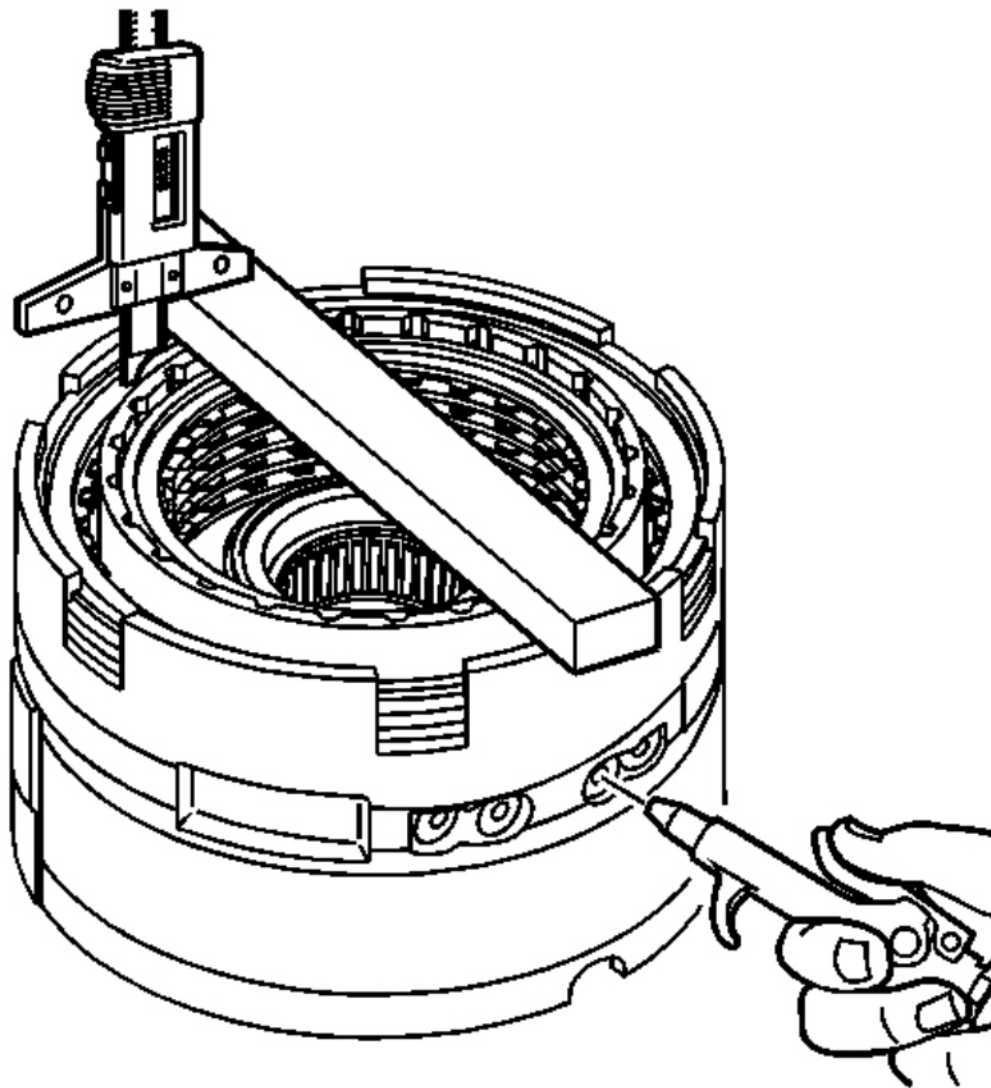


Fig. 92: Measuring 2nd Coast Clutch Pack Travel

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Courtesy of GENERAL MOTORS CORP.

24. Measure the distance between the 2nd coast clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
25. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance between the 2nd coast clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.
26. Subtract H2 from H1. This is the 2nd coast clutch pack travel. Refer to **Clutch Piston Travel Specifications** .

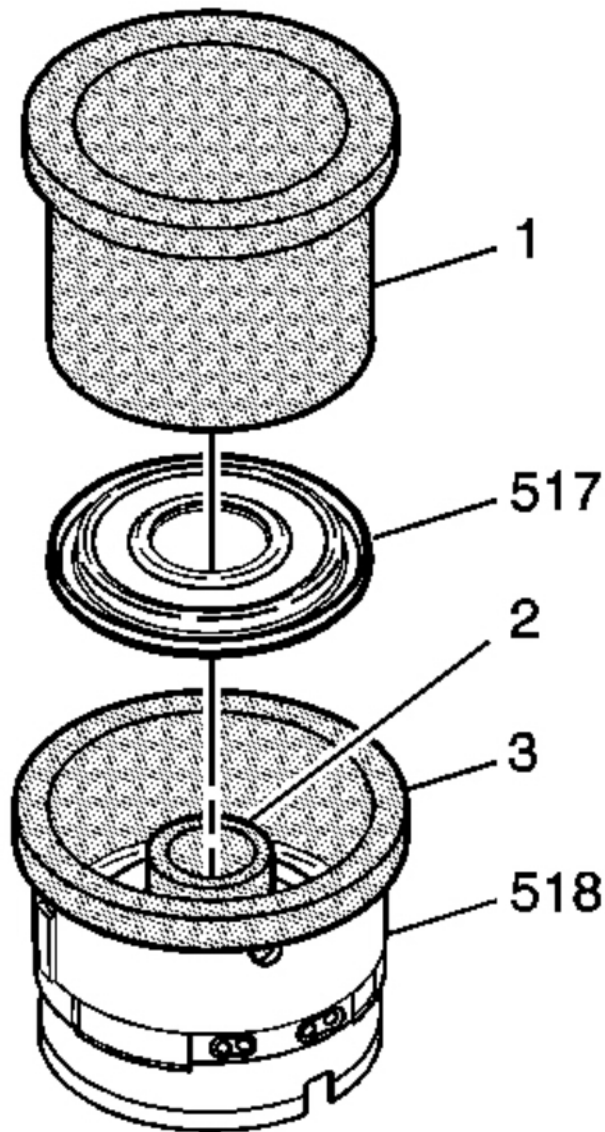


Fig. 93: Installing Low And Reverse Clutch Piston Into Center Support
Courtesy of GENERAL MOTORS CORP.

27. Use the **J-46240-1** (2), **J-45688** (1) and the **J 45136** (3) to install the low and reverse clutch piston (517) into the center support (518).

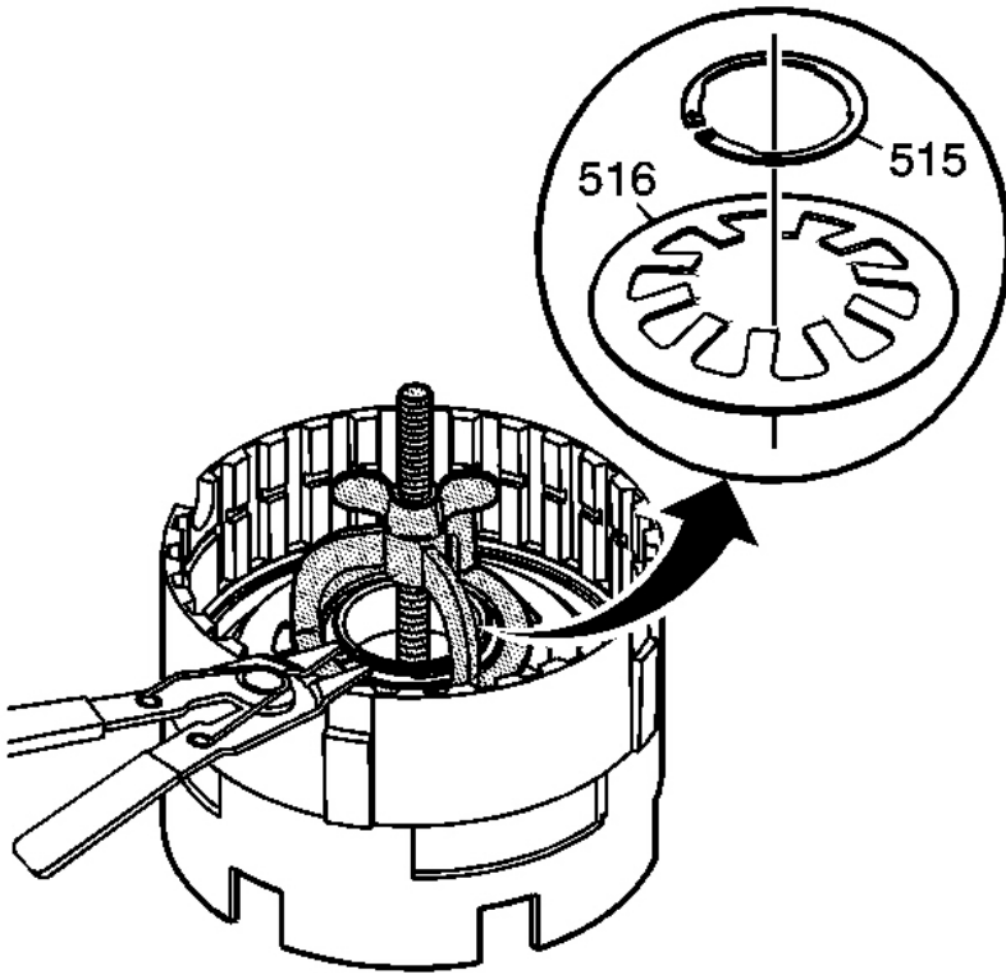


Fig. 94: Identifying Low And Reverse Clutch Spring Retainer Ring
Courtesy of GENERAL MOTORS CORP.

28. Use **J 23327** , compress the low and reverse clutch piston spring (516).
29. Install the low and reverse clutch spring retainer ring (515) into the center support (518).

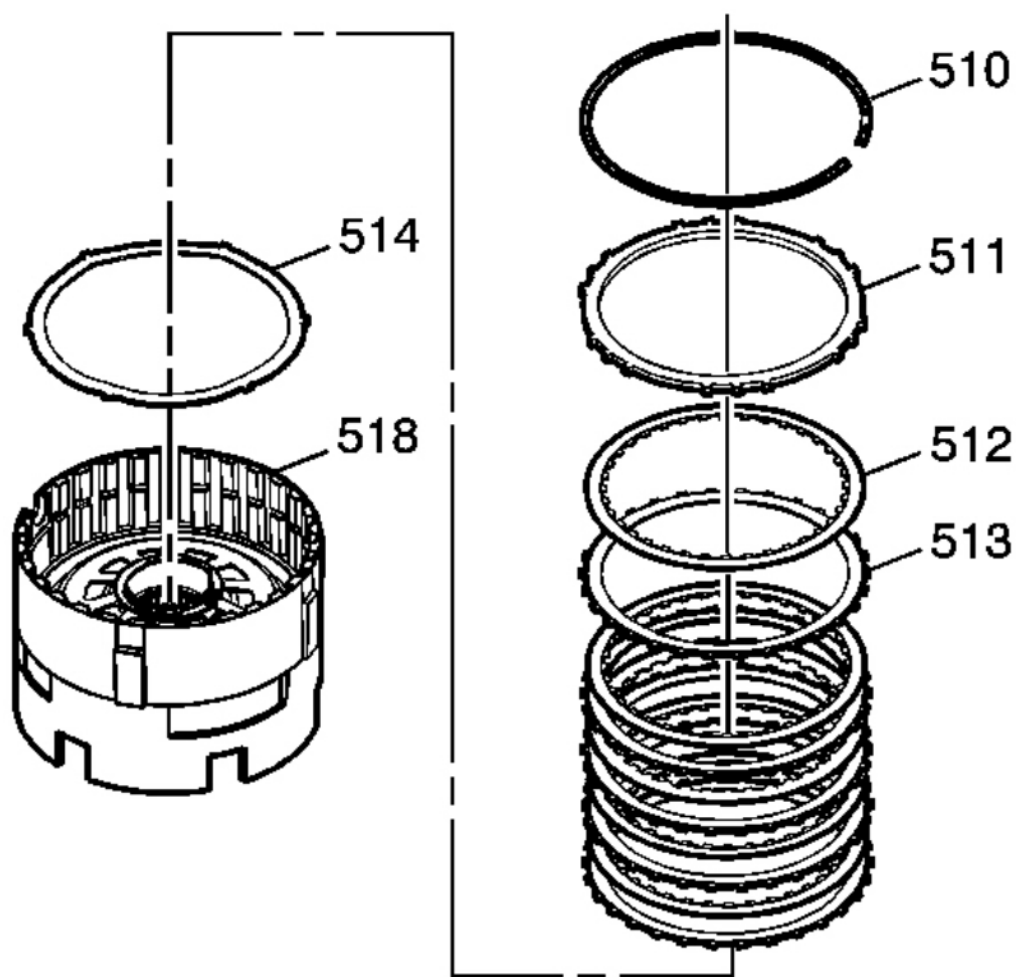


Fig. 95: Locating Low And Reverse Apply Plates
Courtesy of GENERAL MOTORS CORP.

30. Install the low and reverse apply plate (514) into the center support (518).
31. Install the low and reverse clutch plates. Start with the low and reverse clutch plate (513) with external splines. Alternate with the low and reverse clutch plate (512) with internal splines. Refer to **Clutch Plate Selection Specifications**.
32. Install the low and reverse clutch backing plate (511) and the retainer ring (510) into the center support (518).

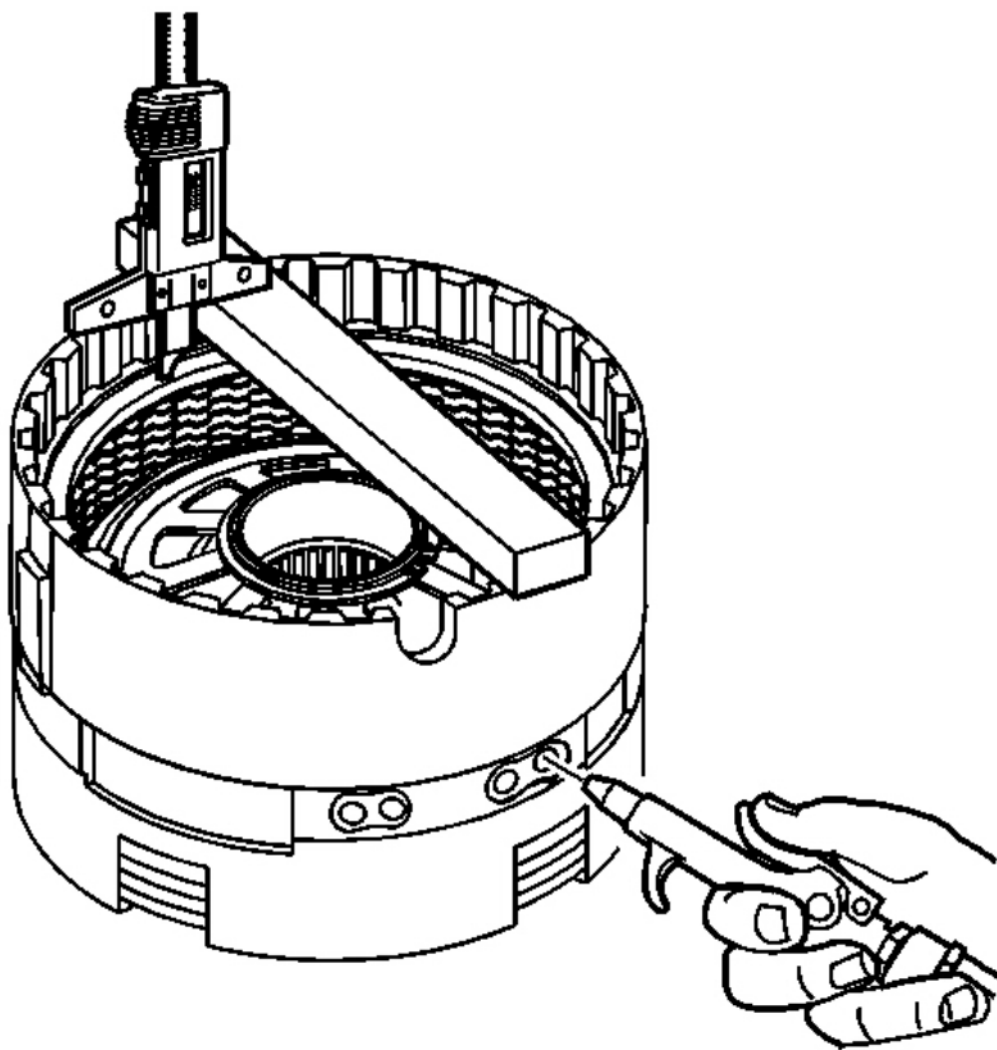


Fig. 96: Measuring Low Reverse Clutch Pack Travel
Courtesy of GENERAL MOTORS CORP.

33. Measure the distance between the low and reverse clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
34. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance between the low and reverse clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.

35. Subtract H2 from H1. This is the low reverse clutch pack travel. Refer to **Clutch Piston Travel Specifications** .

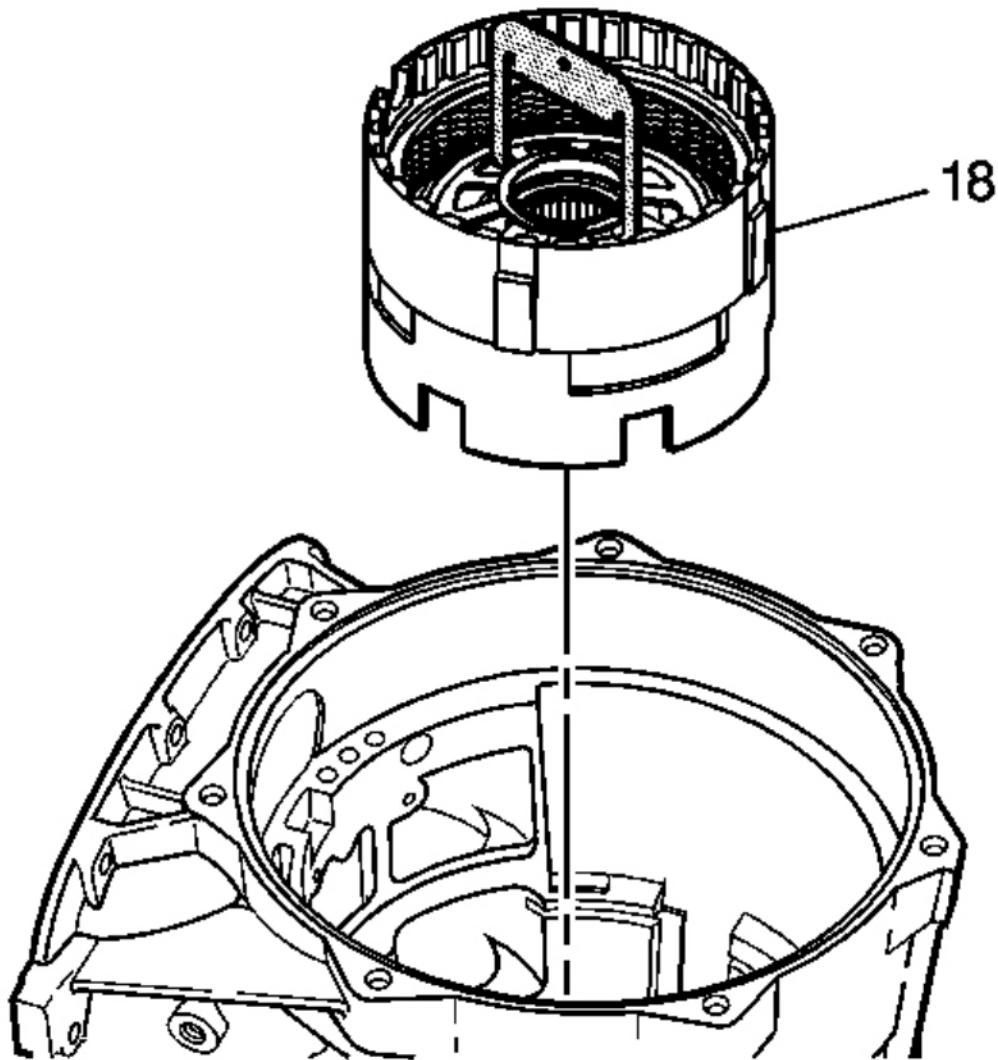


Fig. 97: Center Support With J 45127
Courtesy of GENERAL MOTORS CORP.

36. Using **J 45127** install the center support (18) into the case.

LOW CLUTCH SPRAG ASSEMBLY

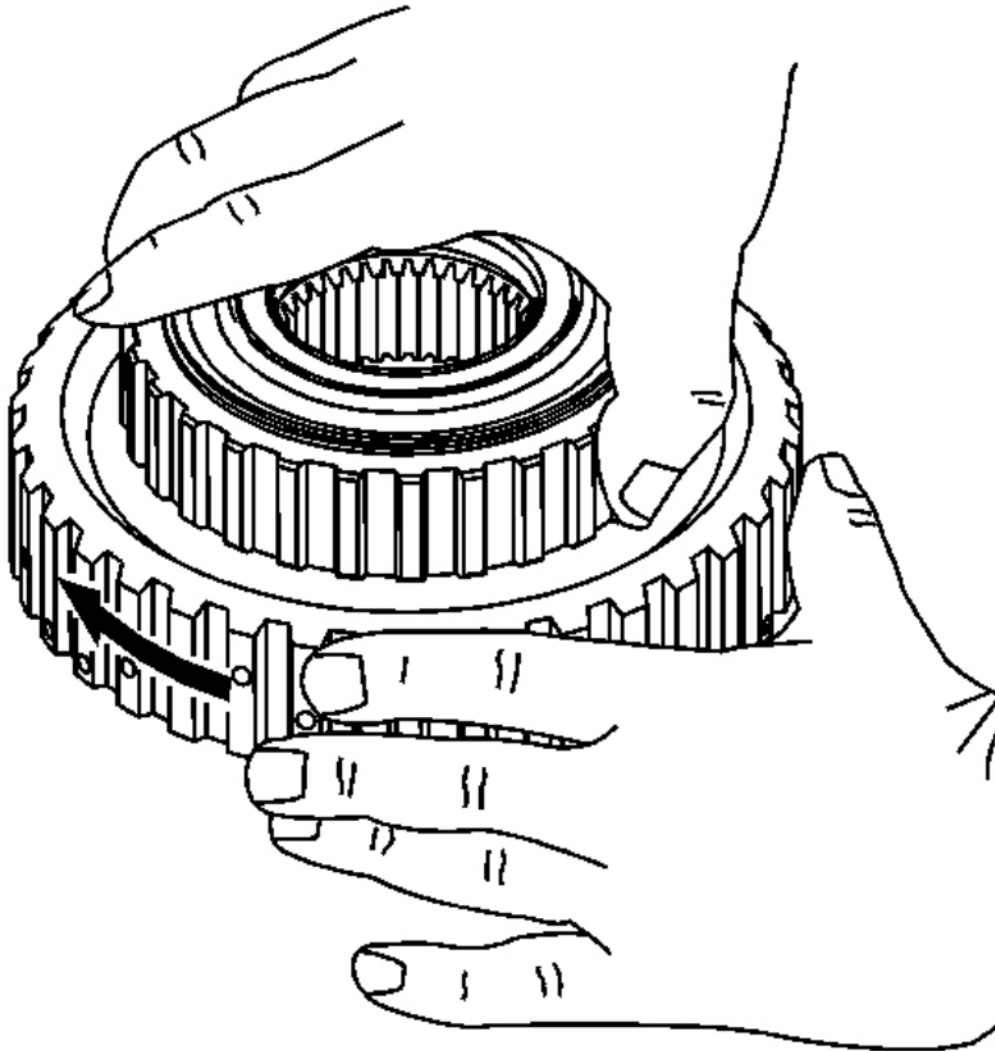


Fig. 98: Checking Low Clutch Sprag Rotation
Courtesy of GENERAL MOTORS CORP.

1. Inspect the low clutch sprag for the following:
 - Worn or damaged splines
 - Scoring on the inside diameter of the races

- Wear or cracks
2. Check that the low clutch sprag rotation freewheels and locks up in the correct direction.

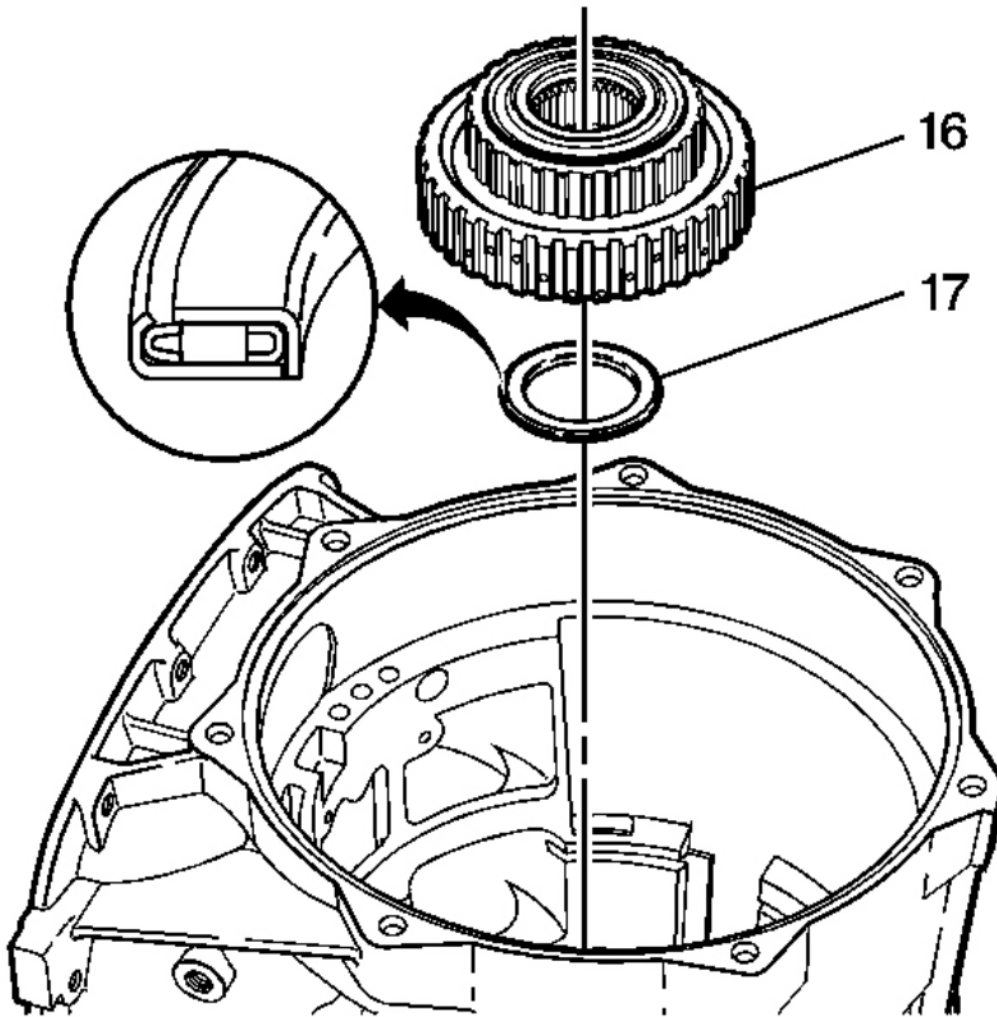


Fig. 99: Locating Low Clutch Roller Thrust Bearing & Sprag
Courtesy of GENERAL MOTORS CORP.

3. Install the low clutch roller thrust bearing (17).
4. Install the low clutch sprag (16) into the case (24).

OVERDRIVE AND INTERMEDIATE CLUTCH DISASSEMBLE**Tools Required**

- **J 23327** Clutch Spring Compressor. See Special Tools and Equipment .
- **J 44764** Clutch Spring Compressor. See Special Tools and Equipment .

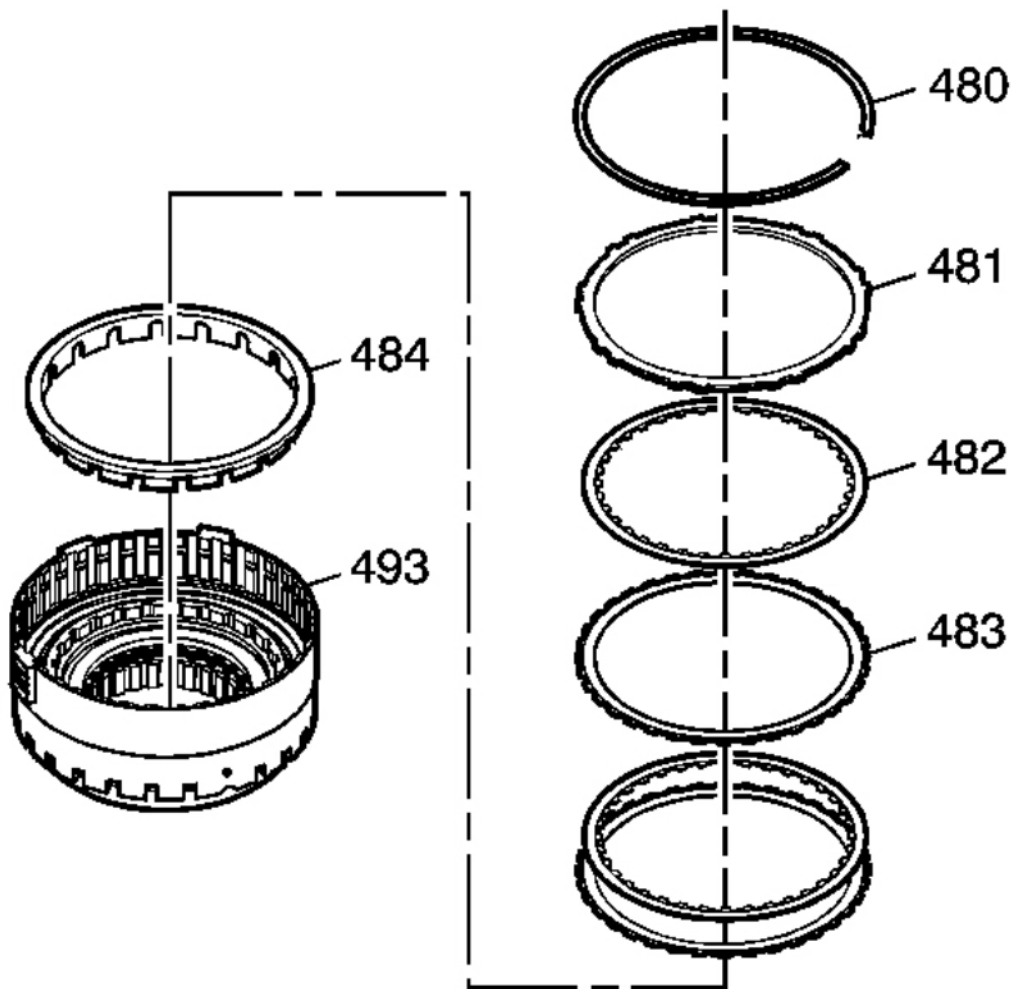


Fig. 100: View Of Overdrive Clutch Spacer
Courtesy of GENERAL MOTORS CORP.

1. Remove the overdrive clutch retainer (480) from the overdrive clutch housing (493).

2. Remove the overdrive clutch backing plate (481) from the overdrive clutch housing (493).
3. Remove the overdrive clutch plates (482, 483). Refer to **Clutch Plate Selection Specifications** .
4. Remove the overdrive clutch spacer (484) from the overdrive clutch housing (493).

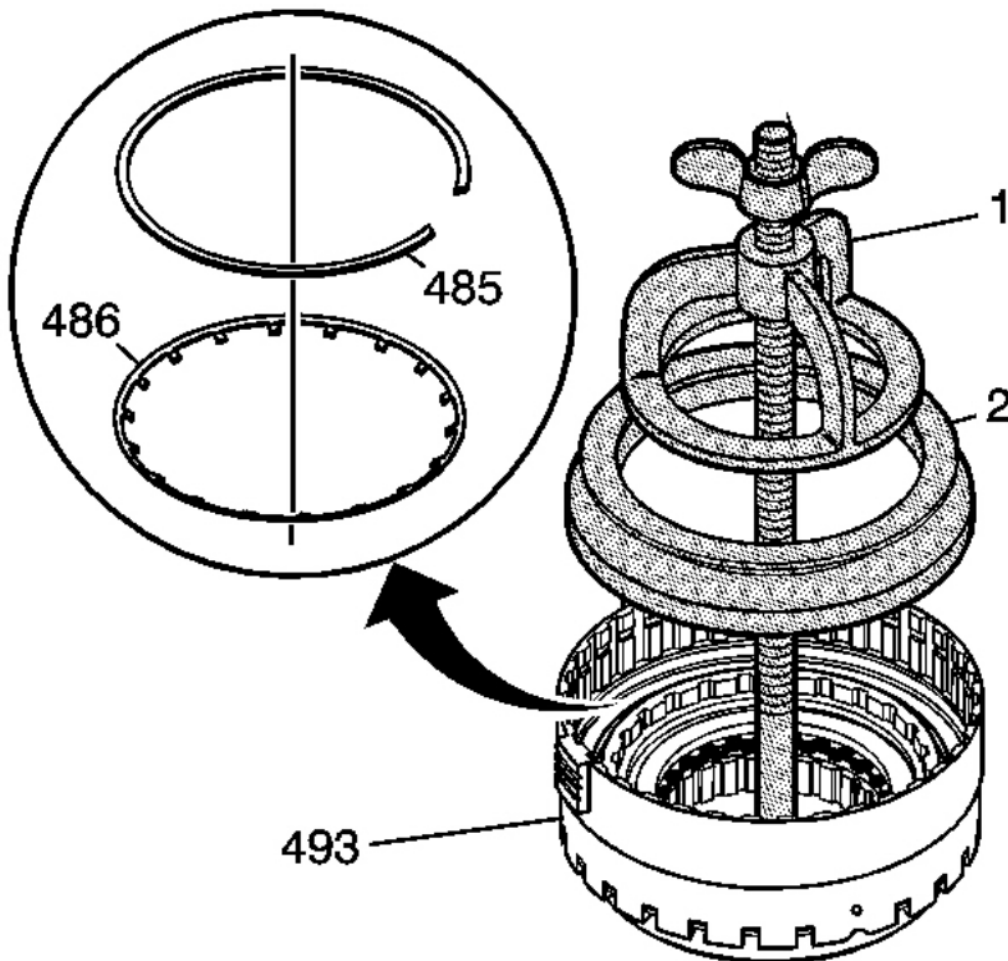


Fig. 101: Locating Overdrive Piston Spring & Retainer
Courtesy of GENERAL MOTORS CORP.

5. Use **J 44764** and **J 23327** to compress the overdrive clutch piston spring (486).
6. Remove the overdrive clutch piston spring retainer ring (485) from the overdrive clutch

housing (493).

7. Remove **J 44764** and **J 23327** from the overdrive clutch housing (493).
8. Remove the overdrive clutch spring (486) from the overdrive clutch housing (493).

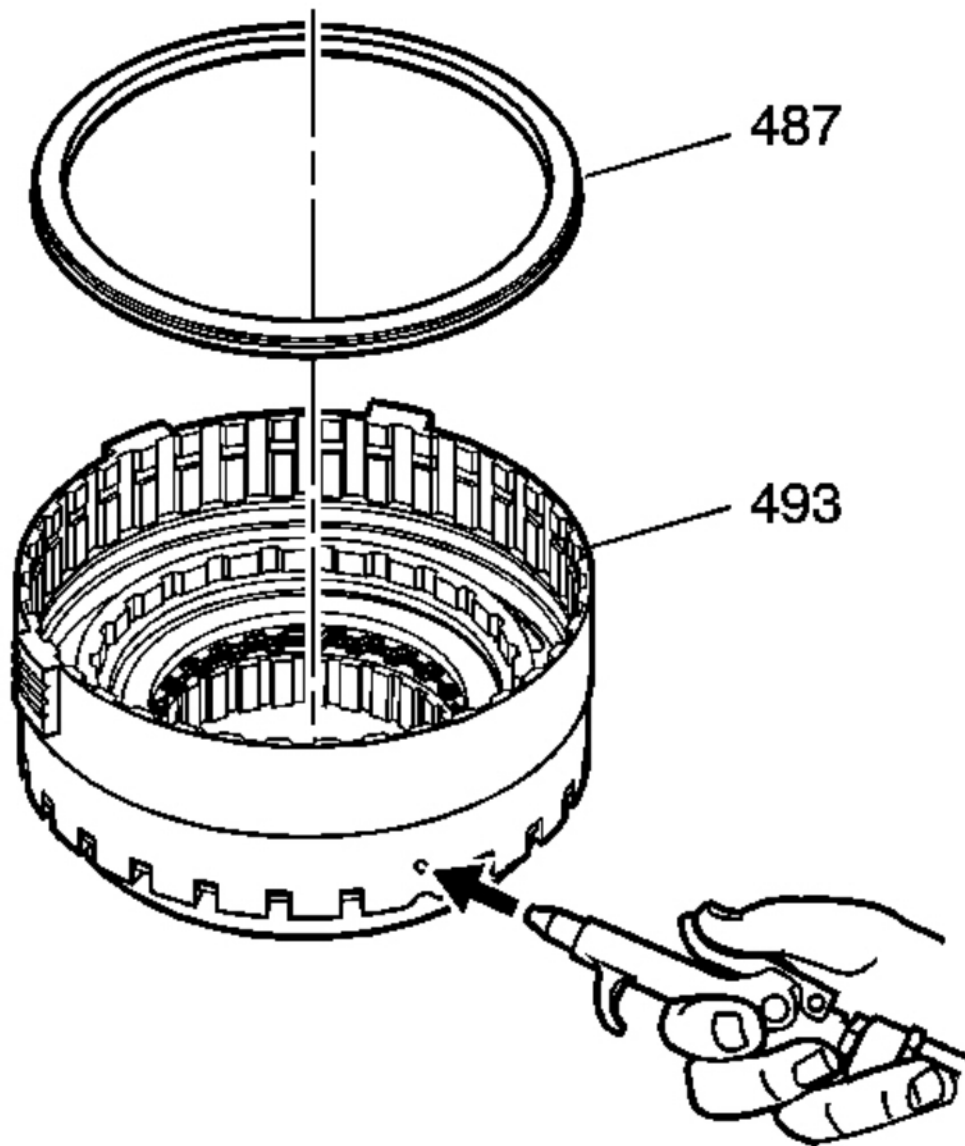


Fig. 102: Removing Overdrive Clutch Piston From Overdrive Clutch Housing

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

9. Remove the overdrive clutch piston (487) from the overdrive clutch housing (493).

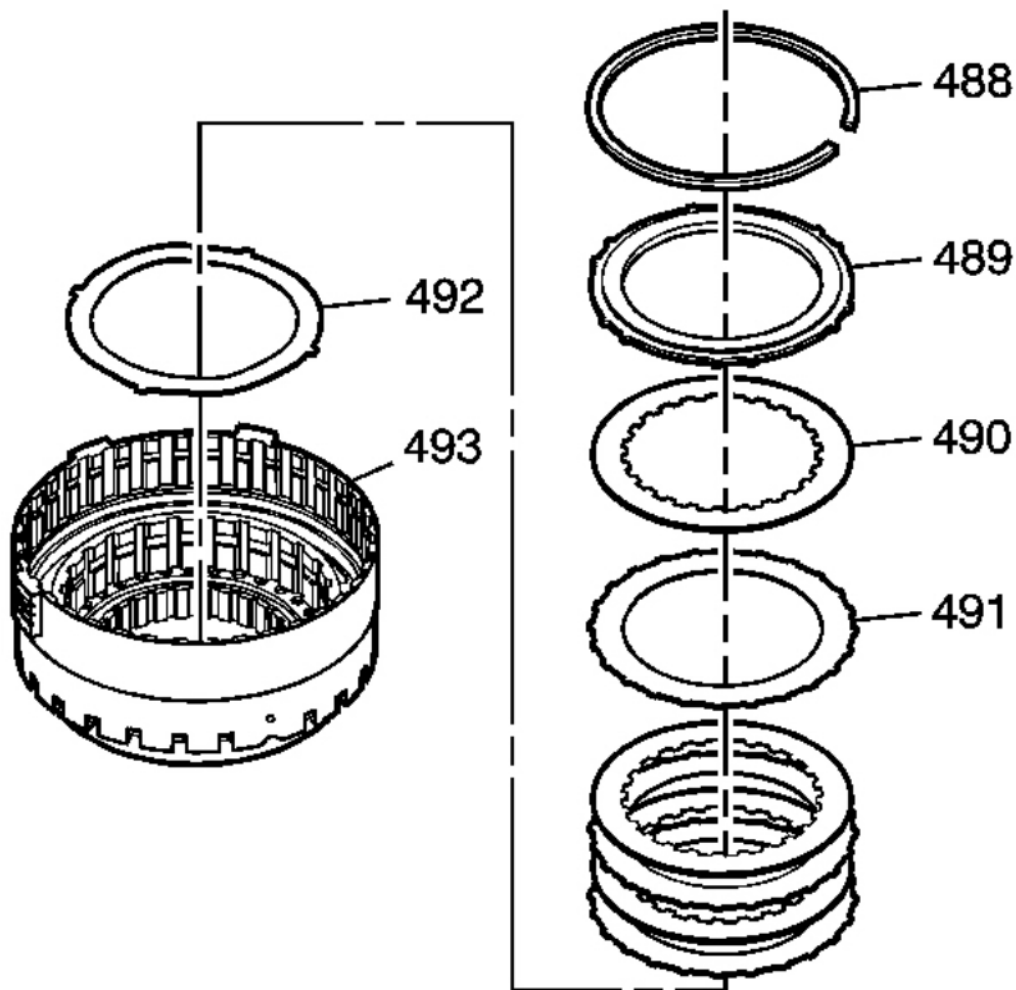


Fig. 103: View Of Intermediate Clutch Plates
Courtesy of GENERAL MOTORS CORP.

10. Remove the intermediate clutch backing plate retainer ring (488) from the overdrive clutch housing (493).

11. Remove the intermediate clutch backing plate (489) from the overdrive clutch housing (493).
12. Remove the intermediate clutch plates (490, 491) from the overdrive clutch housing (493). Refer to **Clutch Plate Selection Specifications** .
13. Remove the intermediate clutch apply plate (492) from the overdrive clutch housing (493).

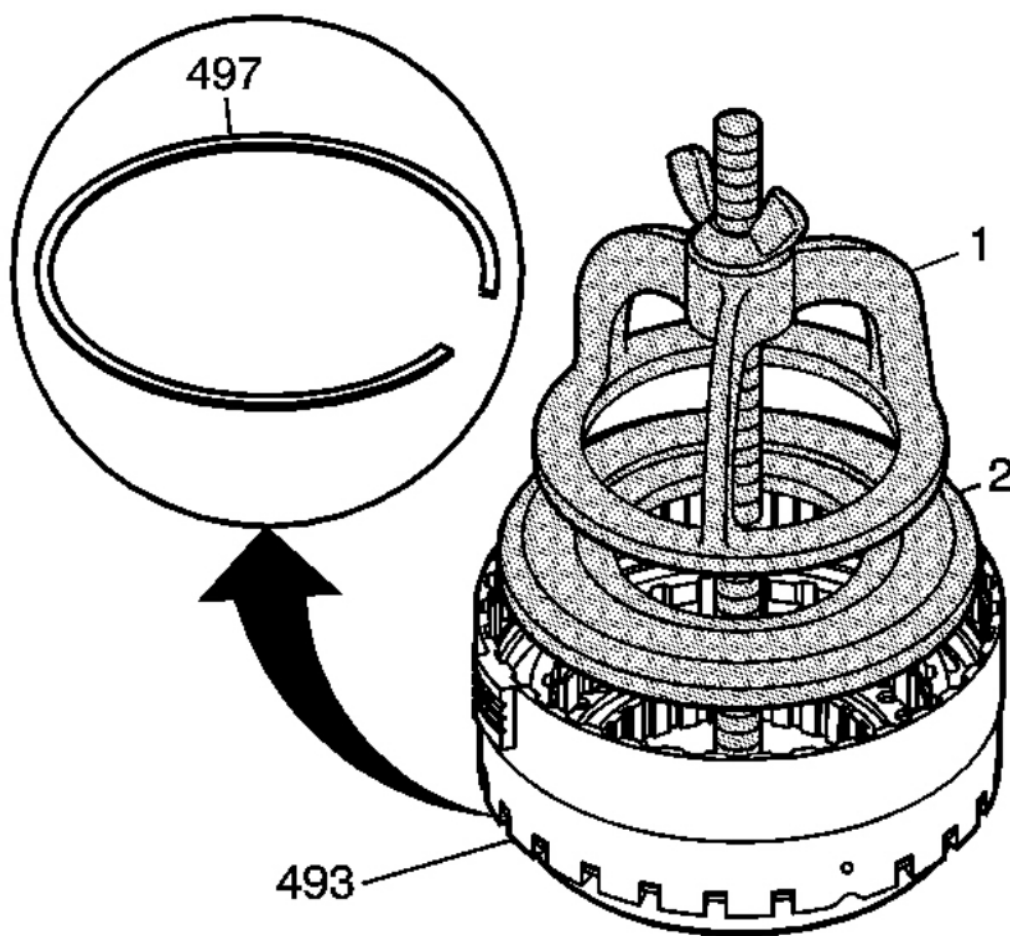


Fig. 104: Identifying Intermediate Clutch Housing Retainer Ring
Courtesy of GENERAL MOTORS CORP.

14. Use **J 44764** and **J 23327** to compress the intermediate clutch housing (496).
15. Remove the intermediate clutch housing retainer ring (497) from the overdrive clutch

housing (493).

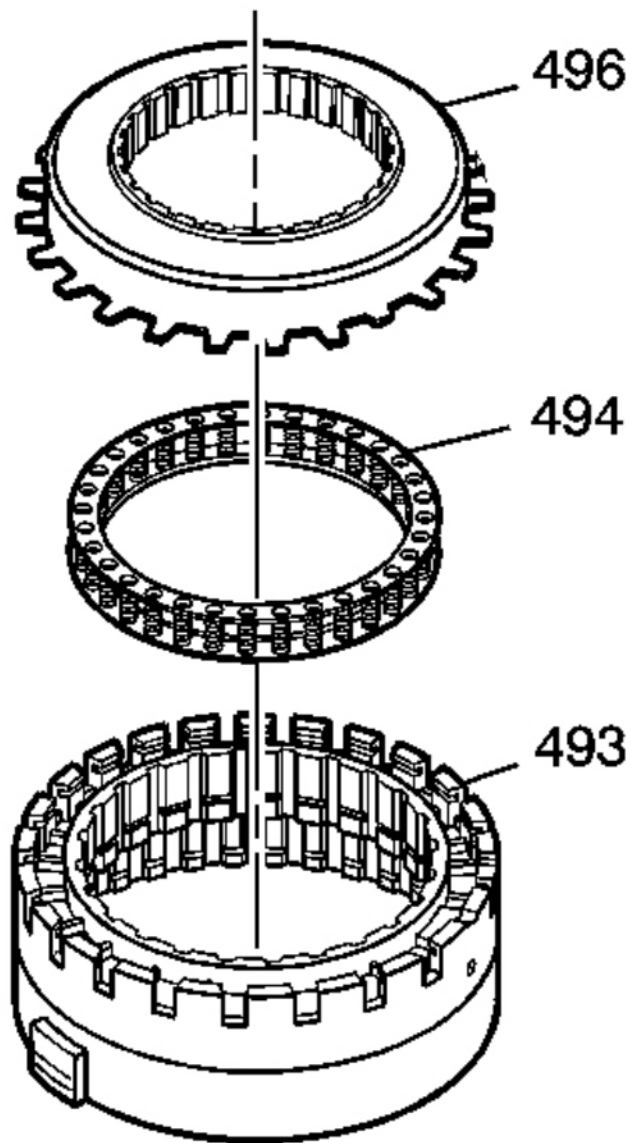


Fig. 105: Locating Intermediate Housing
Courtesy of GENERAL MOTORS CORP.

16. Remove **J 44764** and **J 23327** from the overdrive clutch housing (493).

17. Remove the intermediate clutch housing (496), and the intermediate clutch spring (494) from the overdrive clutch housing (493).

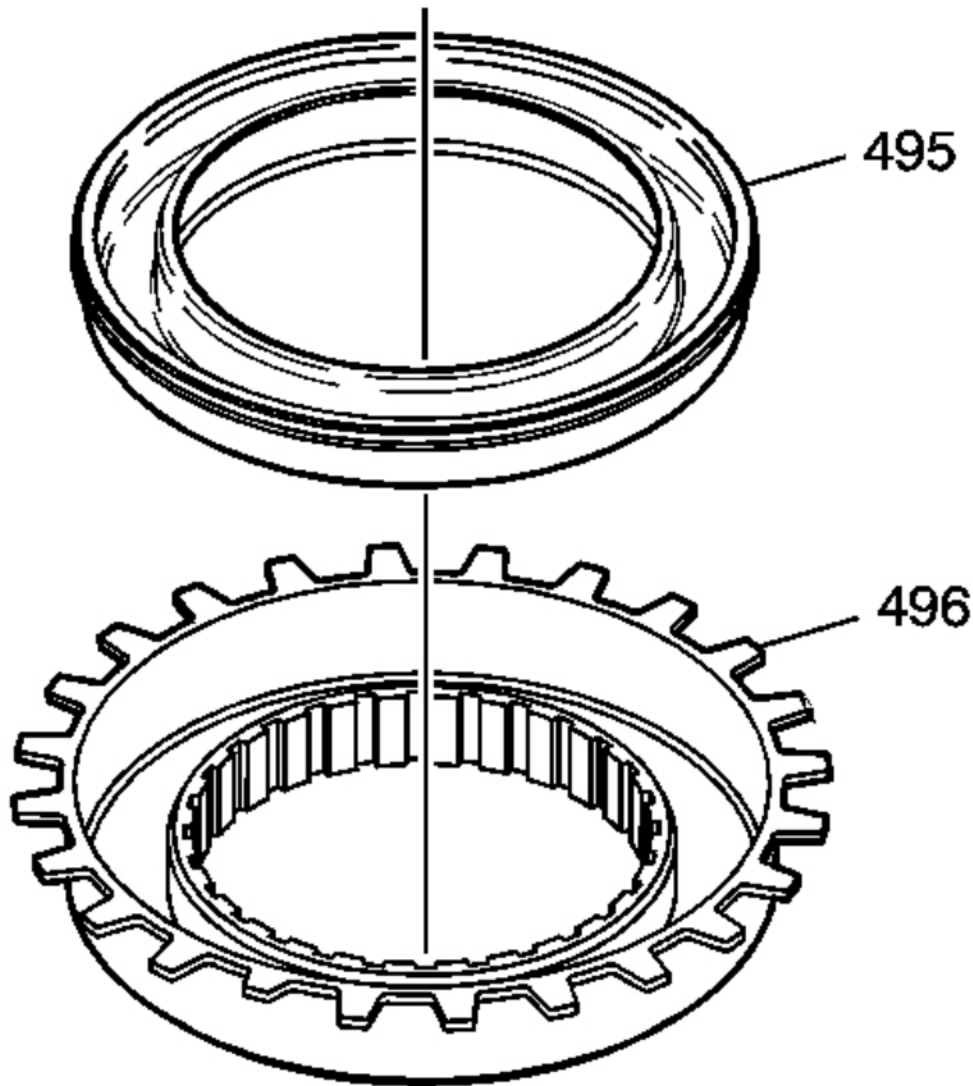


Fig. 106: View Of Intermediate Piston & Intermediate Clutch Housing
Courtesy of GENERAL MOTORS CORP.

18. Remove the intermediate clutch piston (495) from the overdrive clutch housing (496).

OVERDRIVE AND INTERMEDIATE CLUTCH ASSEMBLE**Tools Required**

- **J 23327** Clutch Spring Compressor. See Special Tools and Equipment .
- **J 44764** Clutch Spring Compressor. See Special Tools and Equipment .
- **J 45126** Snap Ring Pliers. See Special Tools and Equipment .
- **J 45135** Seal Protector. See Special Tools and Equipment .

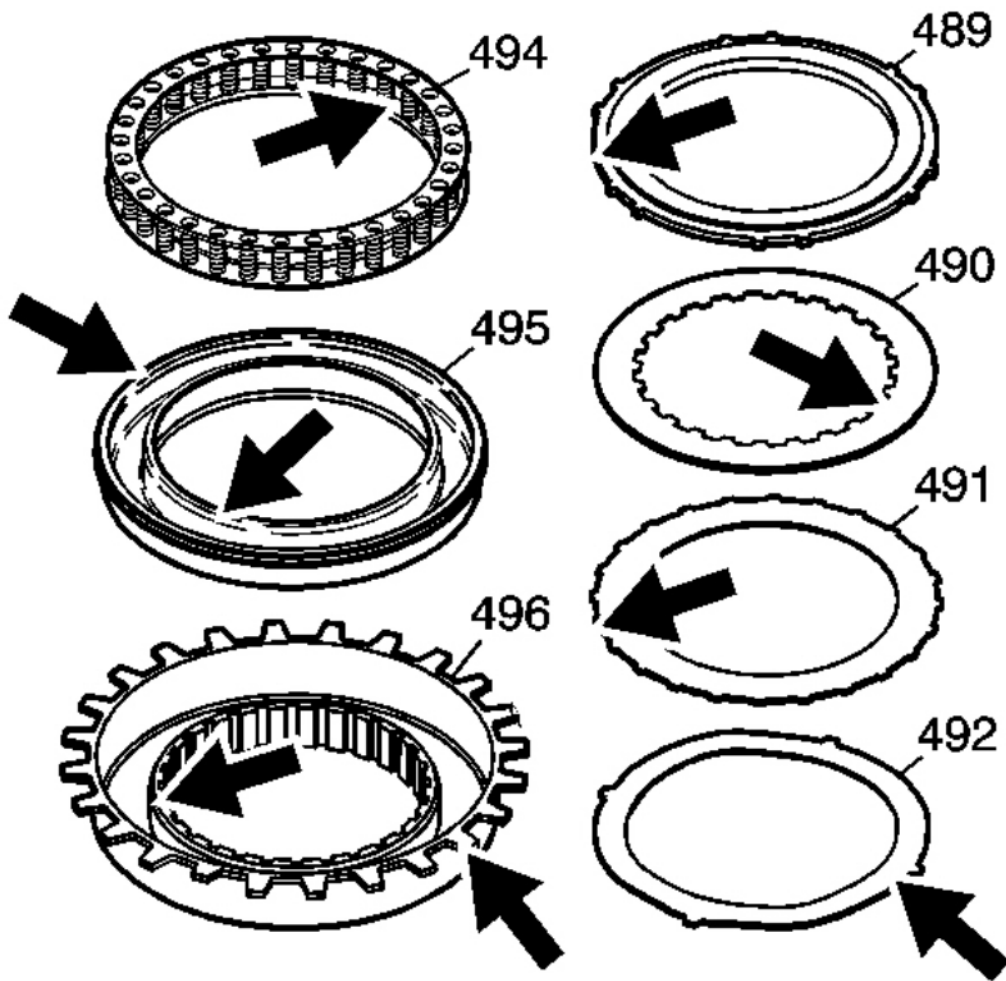


Fig. 107: Overdrive and Intermediate Clutch Housing Inspection Areas

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Courtesy of GENERAL MOTORS CORP.

1. Inspect the housing for the following:

- Plugged feed passages
- Worn or damaged splines
- Damaged or worn springs
- Damaged or worn pistons
- Worn or damaged clutch plates

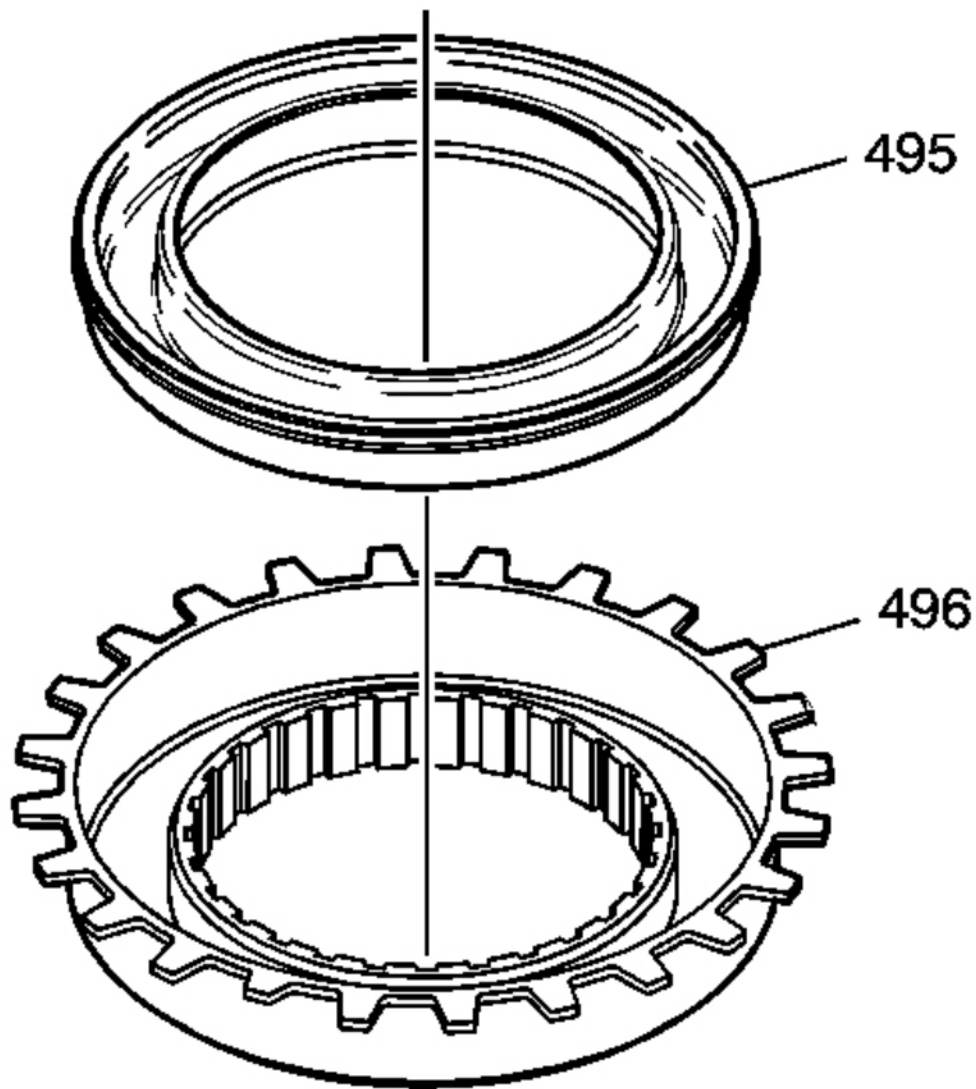


Fig. 108: View Of Intermediate Piston & Intermediate Clutch Housing
Courtesy of GENERAL MOTORS CORP.

2. Install the intermediate piston (495) into the intermediate clutch housing (496).

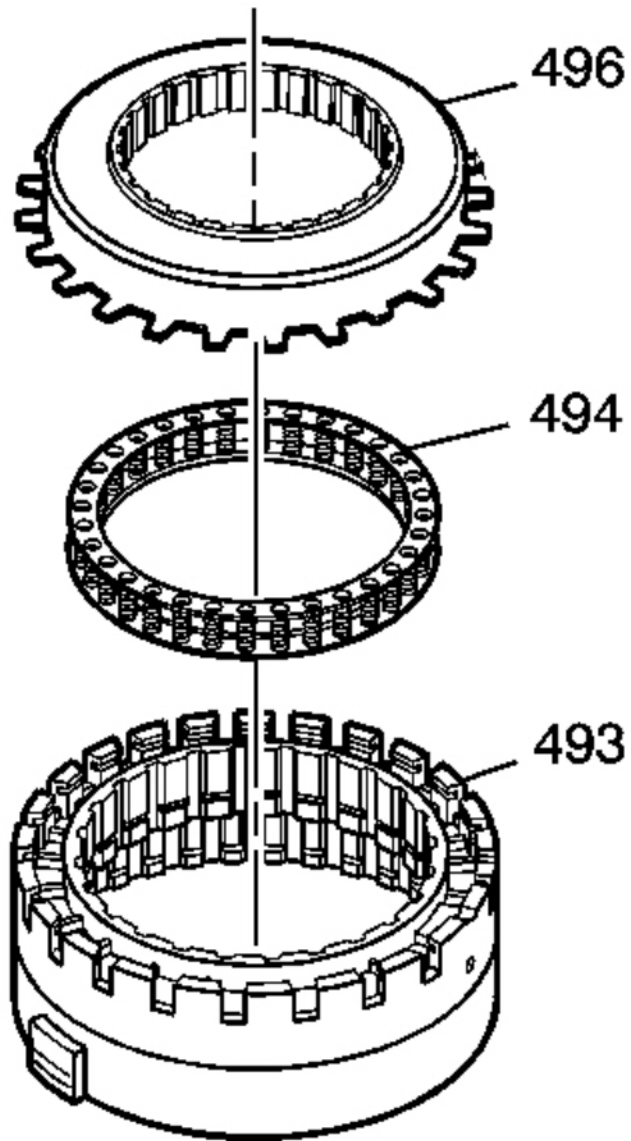


Fig. 109: Locating Intermediate Housing
Courtesy of GENERAL MOTORS CORP.

3. Install the intermediate clutch spring (494).
4. Install the intermediate housing (496).

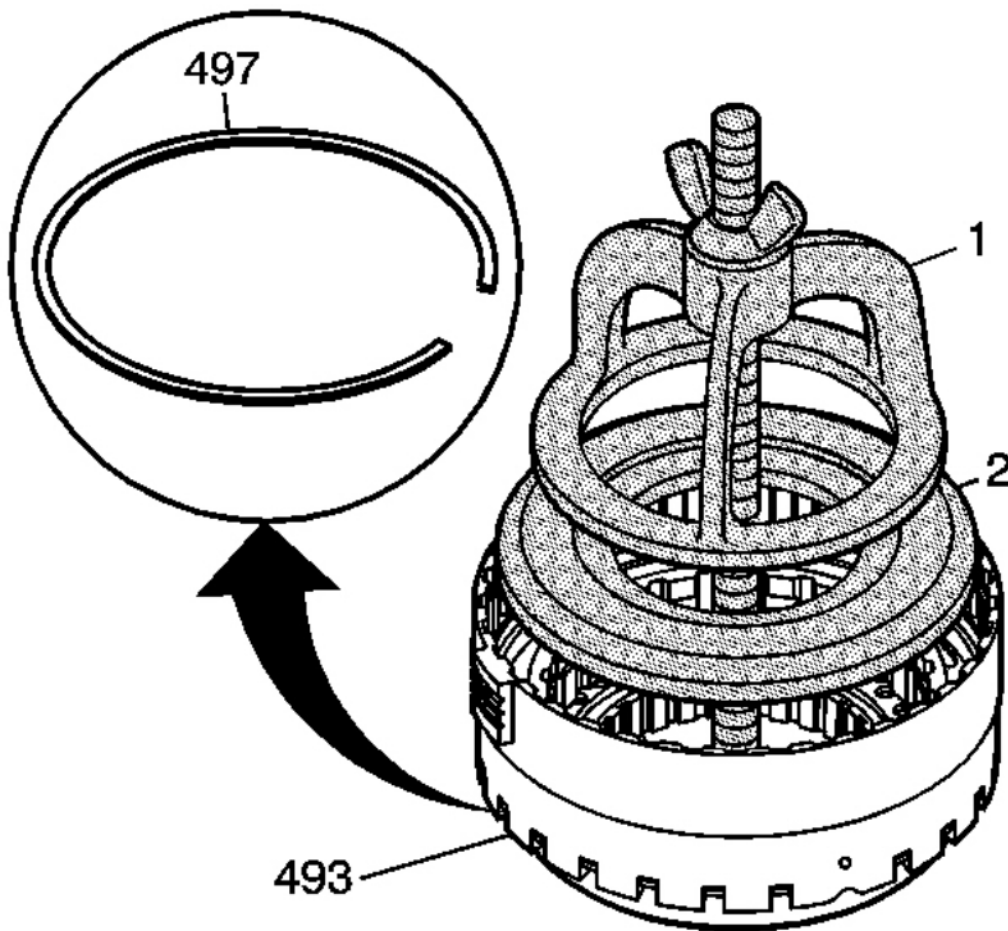


Fig. 110: Identifying Intermediate Clutch Housing Retainer Ring
Courtesy of GENERAL MOTORS CORP.

5. Use **J 44764** and **J 23327** to compress the housing.
6. Install the intermediate clutch housing retainer ring (497).
7. Remove **J 44764** and **J 23327** .

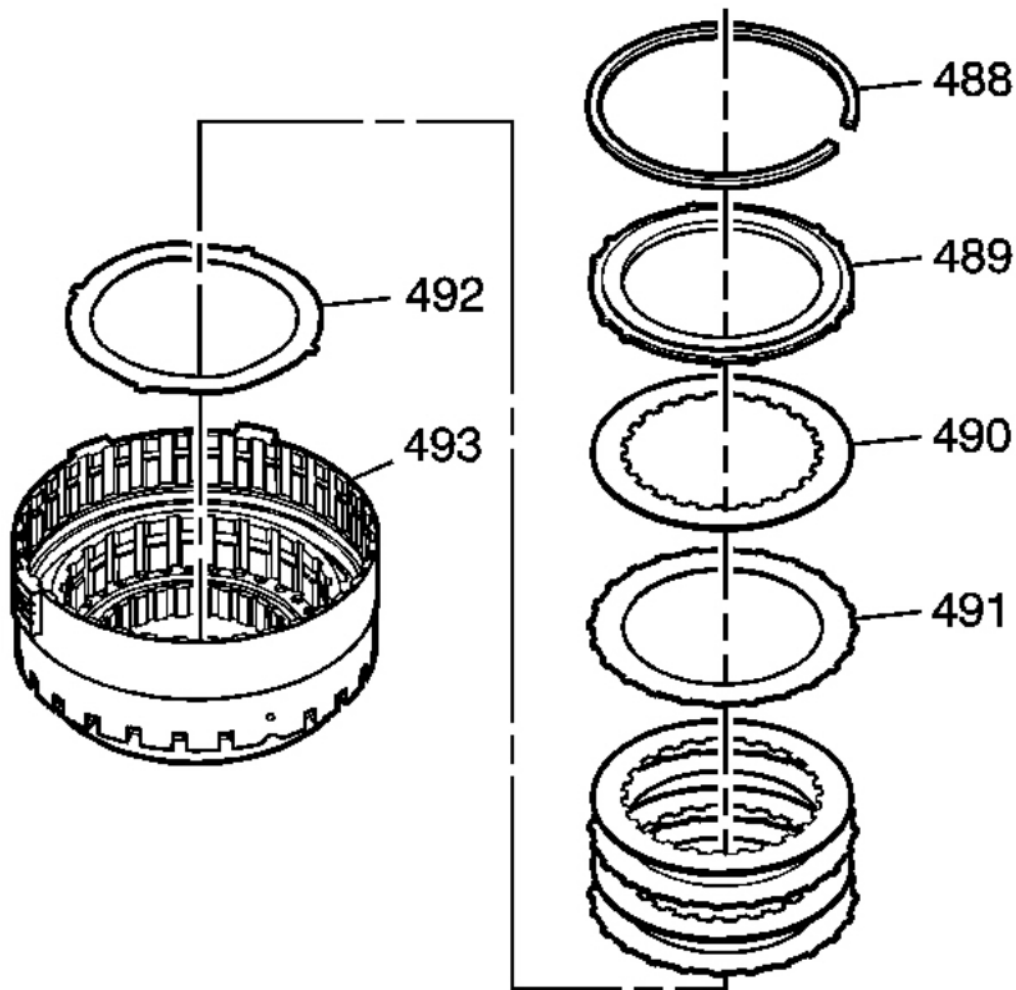


Fig. 111: View Of Intermediate Clutch Plates
Courtesy of GENERAL MOTORS CORP.

8. Install the intermediate apply plate (492).
9. Install the intermediate clutch plates. Starting with the intermediate clutch plates (491) with external splines. Alternating with the intermediate clutch plates (490) internal splines. Refer to **Clutch Plate Selection Specifications** .
10. Install the backing plate (489).
11. Install the intermediate backing plate retainer ring (488).

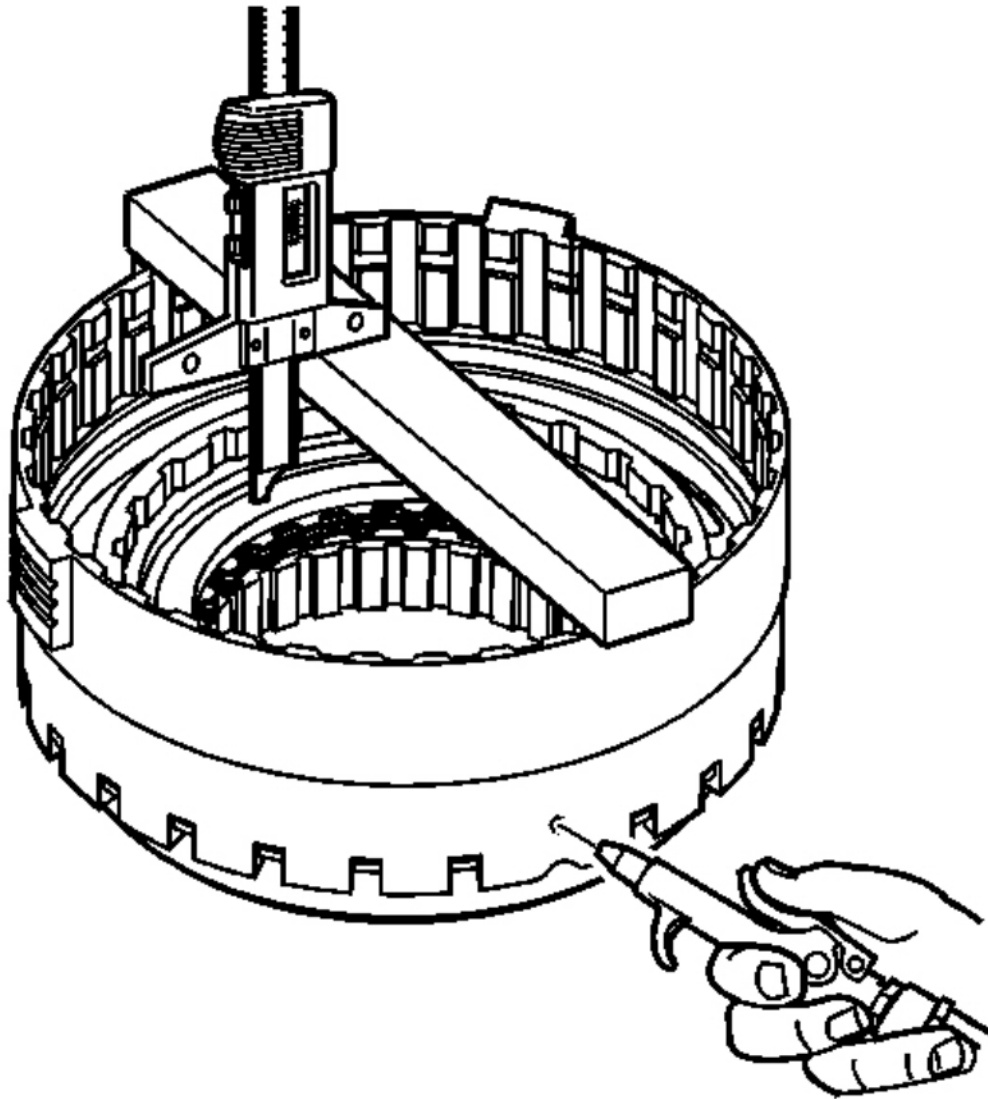


Fig. 112: Blowing Air Into Port In Intermediate Clutch Backing Plate
 Courtesy of GENERAL MOTORS CORP.

12. Measure the distance between the intermediate clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
13. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance between the intermediate clutch backing plate and the bottom of the gage bar. Measure

three times in different locations on the backing plate. Record this as H2.

14. Subtract H2 from H1. This is the clutch pack travel. Refer to **Clutch Piston Travel Specifications** .

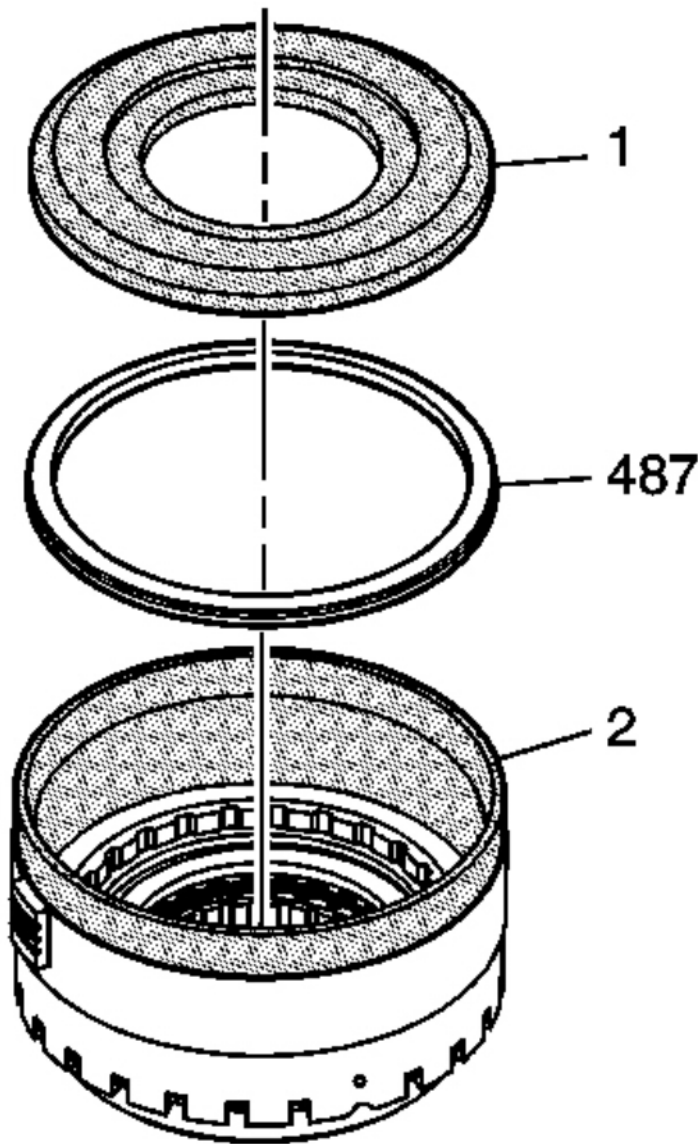


Fig. 113: Installing Overdrive Piston With J 45135 & J 44764
Courtesy of GENERAL MOTORS CORP.

This diagram shows an exploded view of a mechanical assembly. On the right, a vertical assembly is shown, consisting of a base (493) with a gear-like outer edge, a central shaft, and a top component (494) with a cross-shaped handle. A ring (485) is positioned between the base and the top component. To the left, a circular component (486) is shown, which appears to be a ring or a plate with a central hole and a vertical slot. An arrow points from the base (493) towards the circular component (486).

16. Install the overdrive piston spring (486).
17. Use **J 44764** and **J 23327** to compress the overdrive clutch piston spring (486).
18. Install the overdrive clutch spring retainer (485).
19. Remove **J 44764** and **J 23327**.

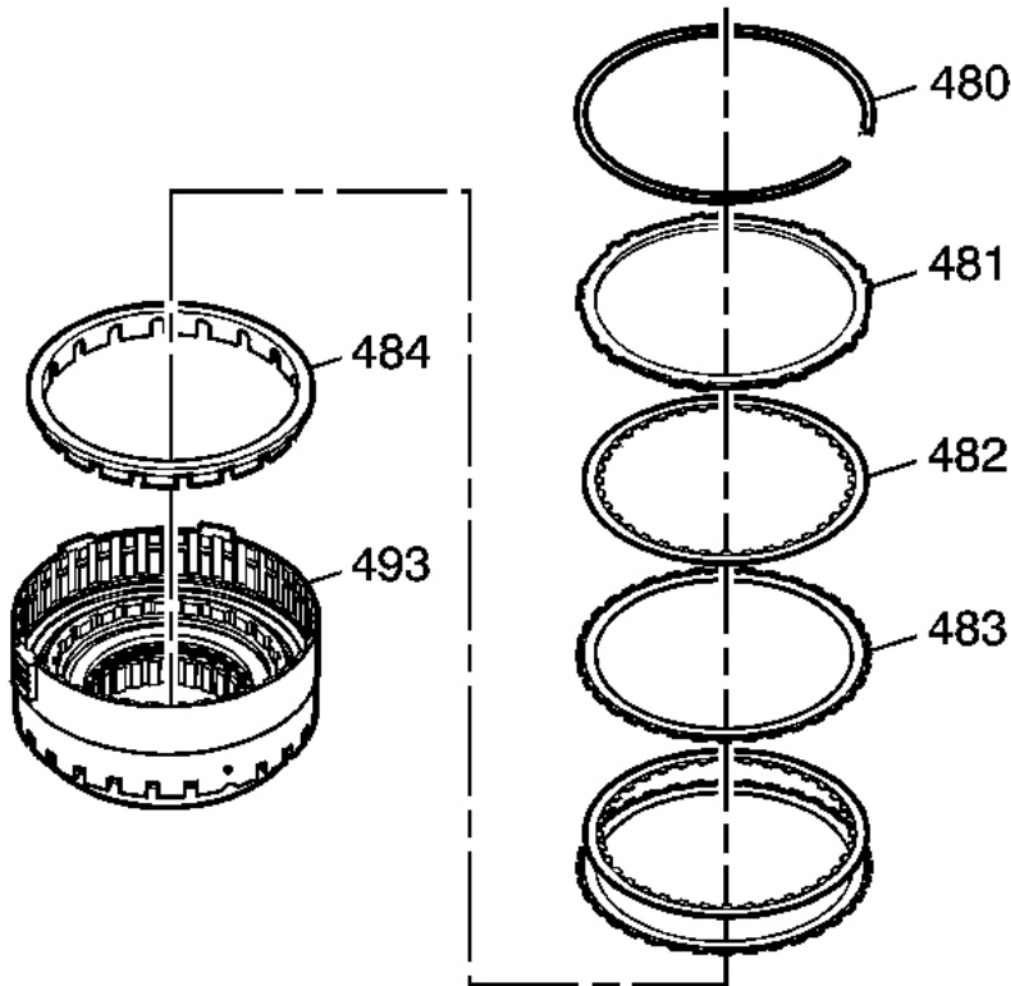


Fig. 115: View Of Overdrive Clutch Spacer
Courtesy of GENERAL MOTORS CORP.

20. Install the overdrive clutch spacer (484).
21. Install the overdrive clutch plates. Starting with the overdrive clutch plates (483) with external splines. Alternating with the overdrive clutch plates (482) with internal splines. Refer to **Clutch Plate Selection Specifications** .
22. Install the overdrive backing plate (481).
23. Install the overdrive clutch retainer ring (480).

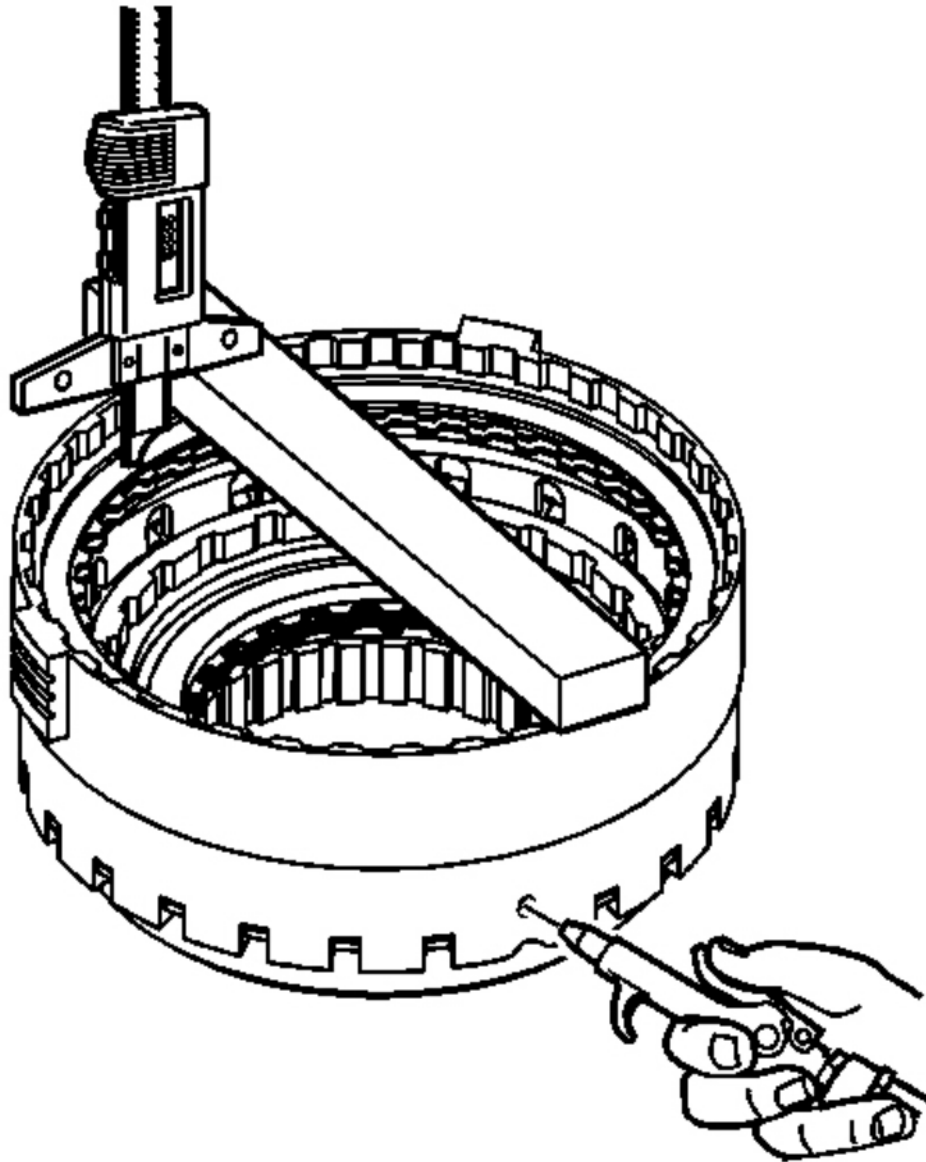


Fig. 116: Blowing Air Into Backing Plate Port
Courtesy of GENERAL MOTORS CORP.

24. Measure the distance between the overdrive clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.

25. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance between the overdrive clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.
26. Subtract H2 from H1. This is the clutch pack travel. Refer to **Clutch Piston Travel Specifications** .

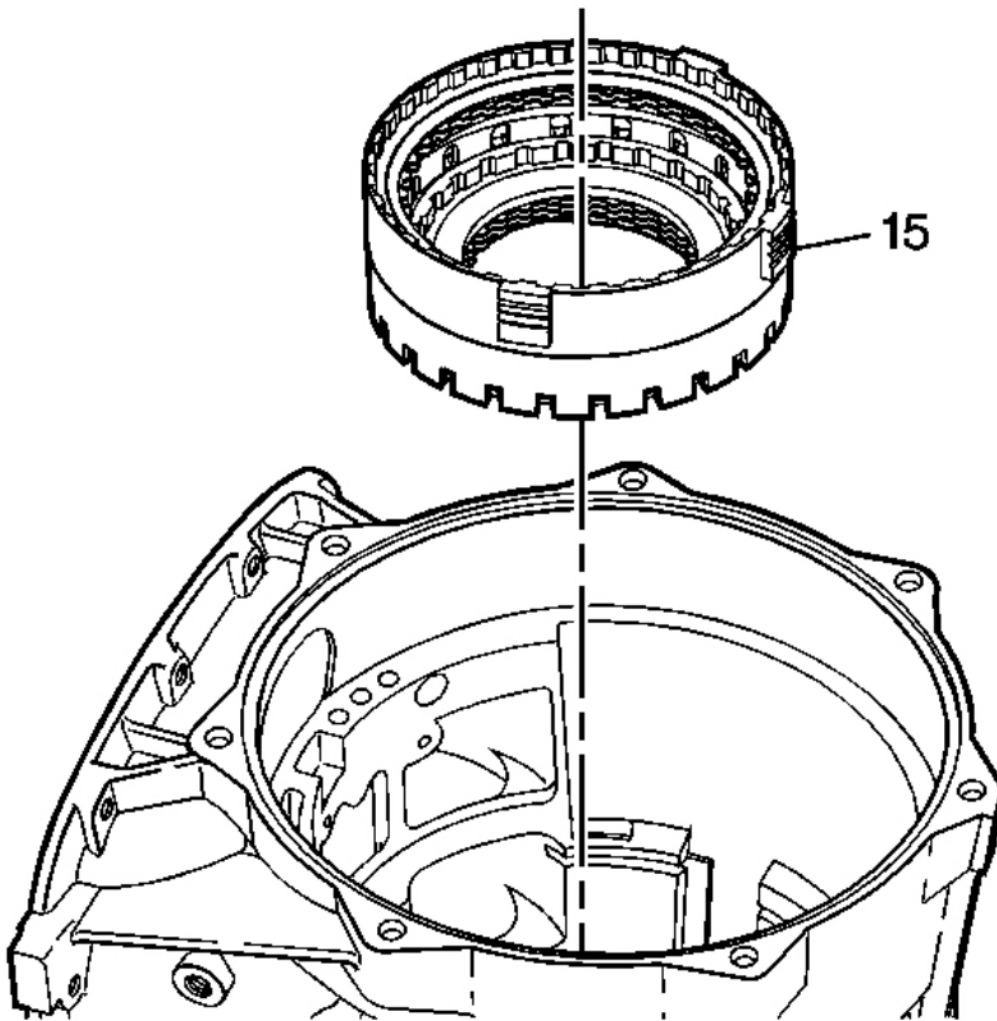


Fig. 117: Identifying Overdrive Clutch Housing
Courtesy of GENERAL MOTORS CORP.

27. Install the overdrive clutch housing (15) into the case (24).

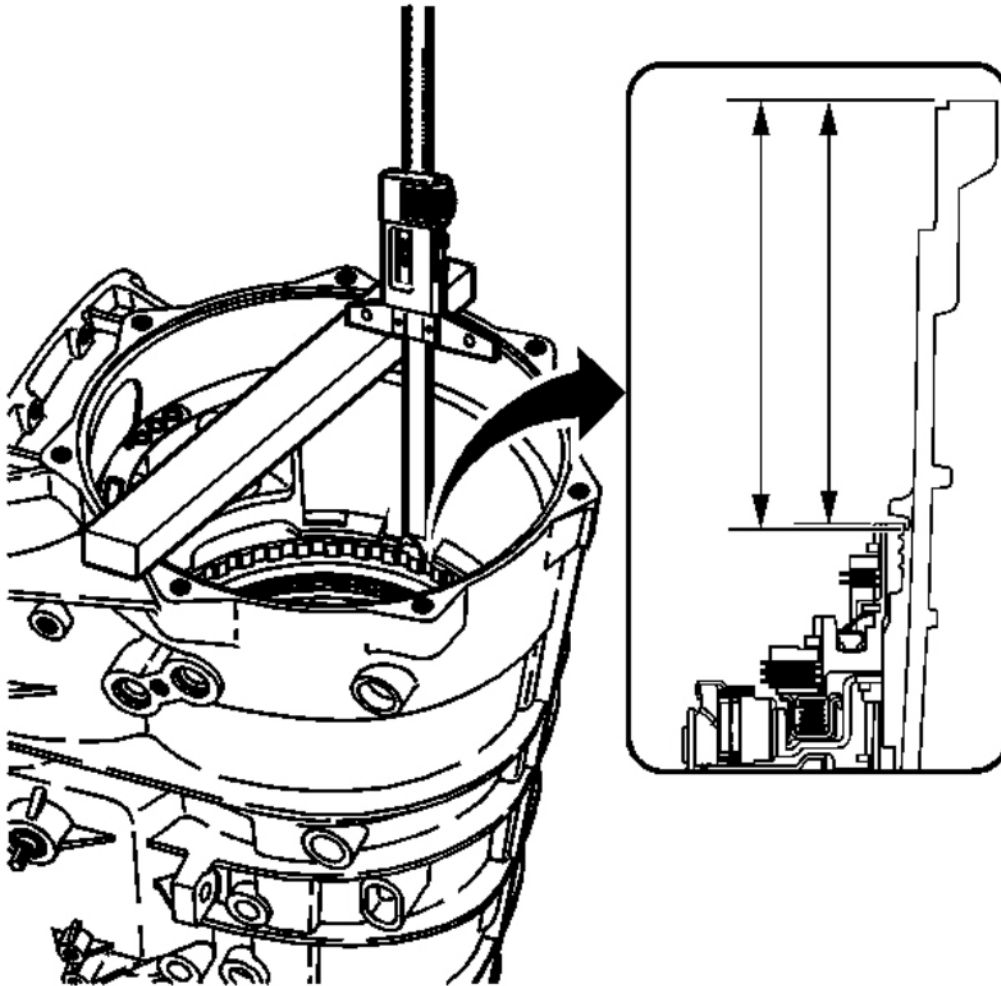


Fig. 118: Measuring Dimension M
Courtesy of GENERAL MOTORS CORP.

28. Measure the distance from the bottom of the gauge bar to the top of the overdrive and intermediate clutch. Record this as M1.
29. Measure the distance from the bottom of the gage Bar to the bottom of the intermediate and overdrive retainer ring groove in the case. Record this as M2.
30. Subtract M2 from M1. This will be dimension M.

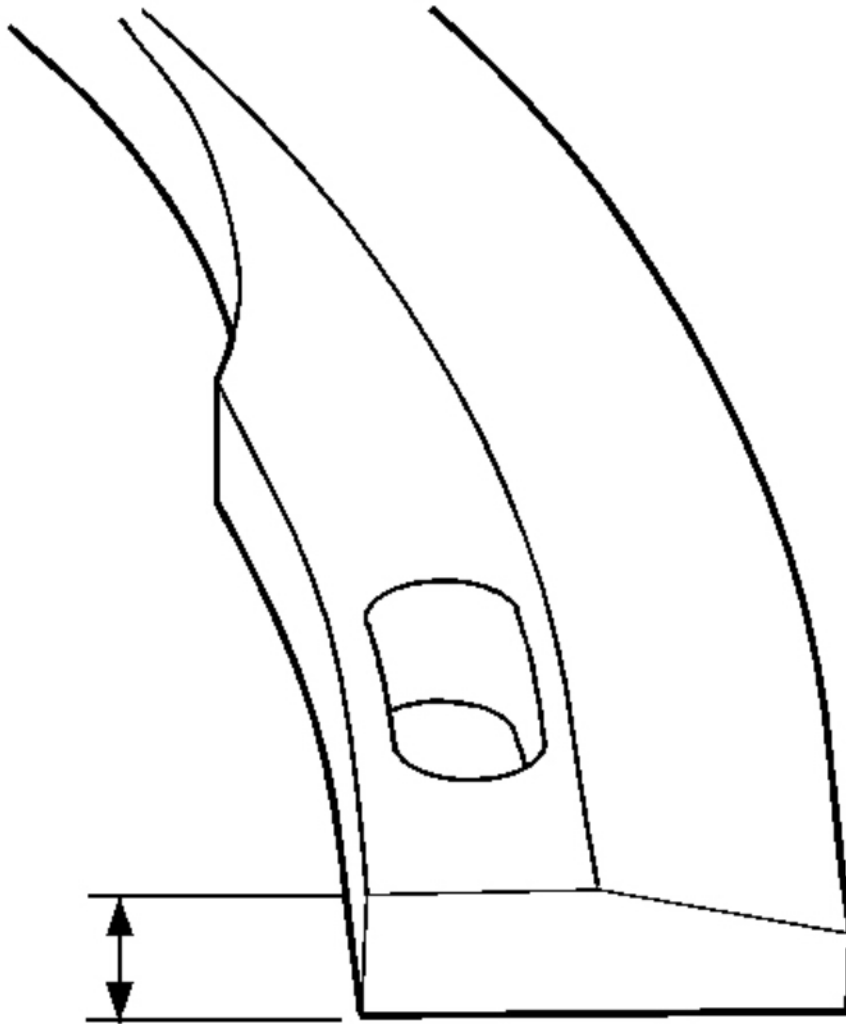


Fig. 119: Measuring Intermediate And Overdrive Clutch Housing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

31. Measure the intermediate and overdrive clutch housing retaining ring (14). Refer to **Intermediate and Overdrive Clutch Housing Retaining Ring Specifications** for the correct size washer.

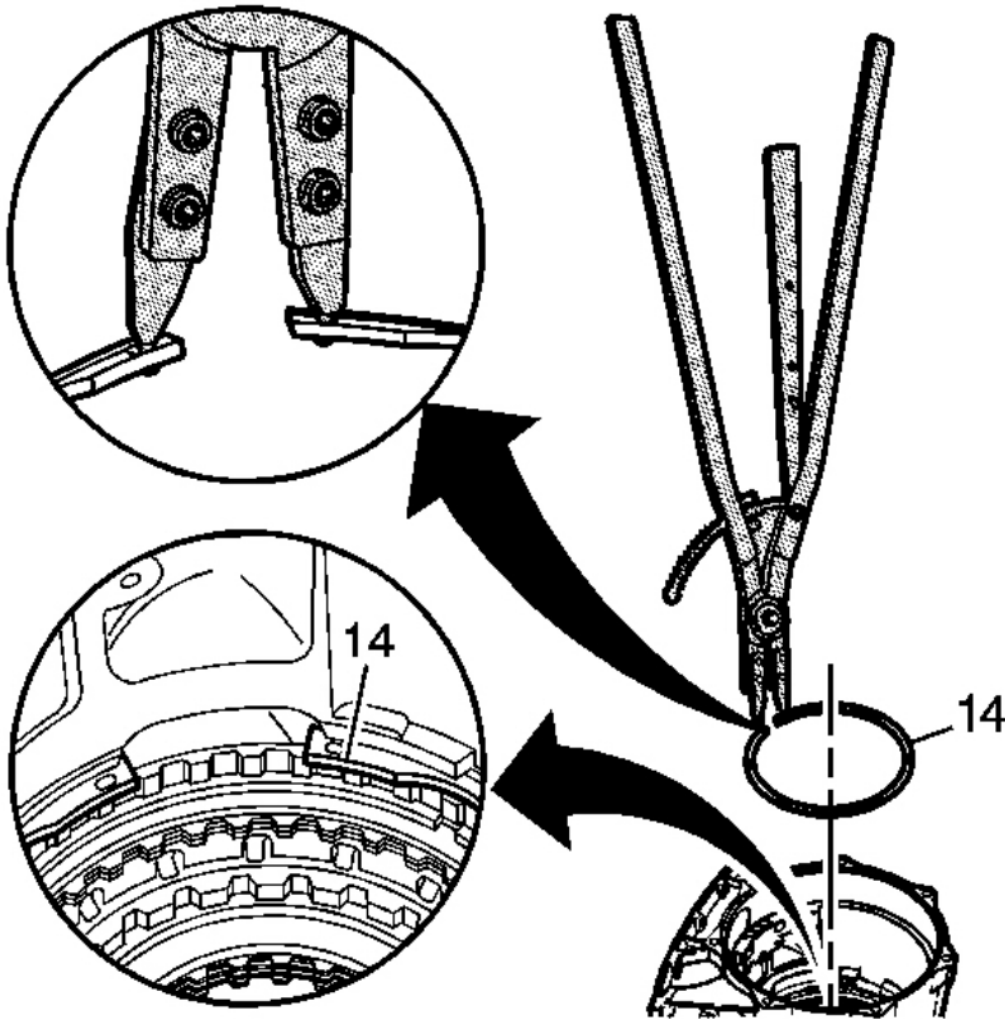


Fig. 120: Installing J 45126 Onto Intermediate And Overdrive Clutch Housing Retainer Ring

Courtesy of GENERAL MOTORS CORP.

CAUTION: Use care when removing or installing the snap ring. Be sure the J 45126 snap ring pliers are installed properly onto the snap ring or bodily injury may occur.

IMPORTANT: If housings is replaced a measurement must be taken for end

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play.

32. Using **J 45126** install the intermediate and overdrive clutch housing retainer ring (14) into the case (24).

INTERMEDIATE CLUTCH SPRAG INSPECTION

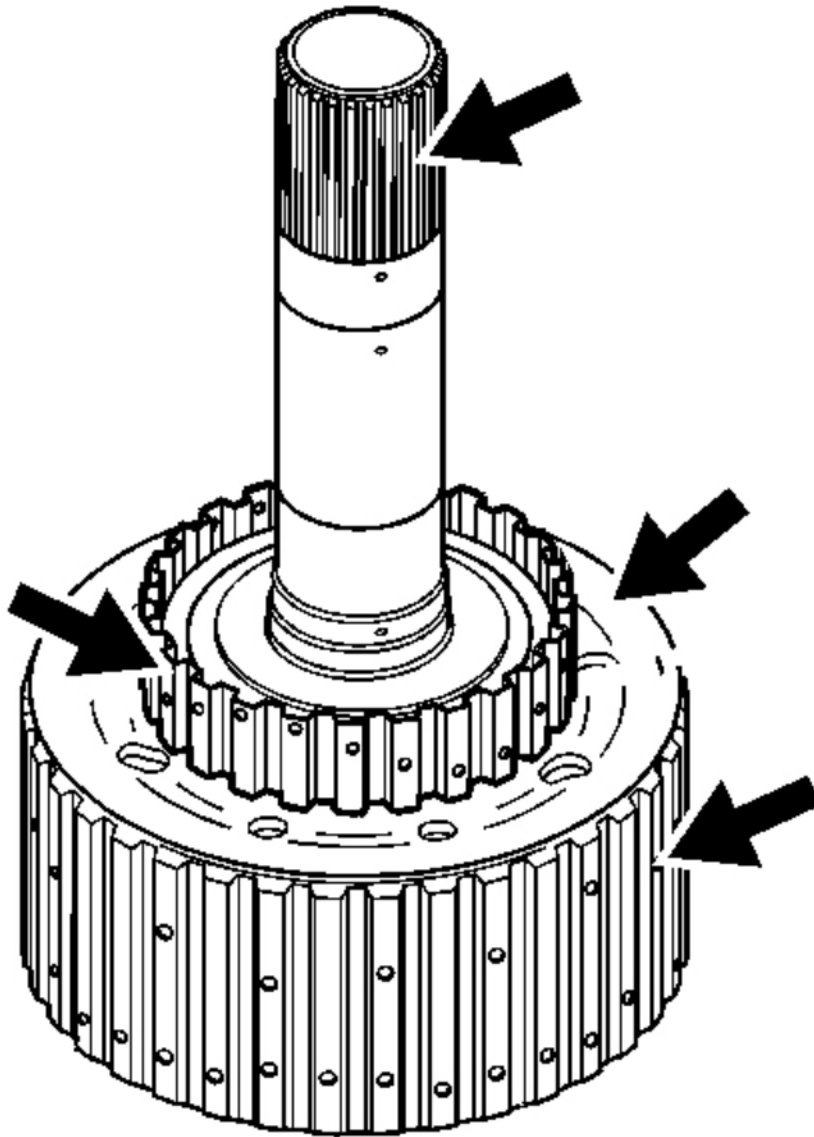


Fig. 121: View Of Intermediate Sprag Clutch Inspection Areas
Courtesy of GENERAL MOTORS CORP.

1. Inspect the intermediate sprag clutch for the following conditions:
 - Scoring
 - Wear or cracks

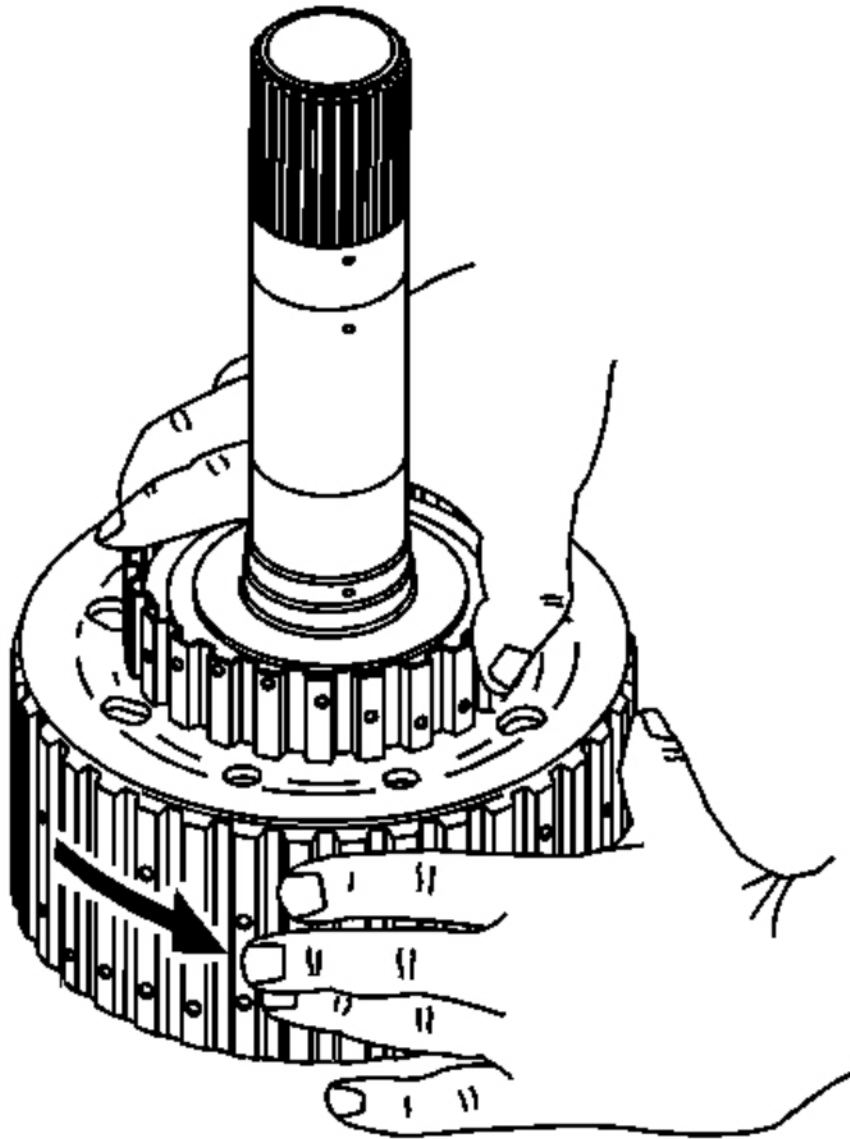


Fig. 122: Checking Intermediate Sprag Clutch Rotation
Courtesy of GENERAL MOTORS CORP.

2. Check that the intermediate sprag clutch rotation freewheels and locks up in the correct direction.

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INTERMEDIATE CLUTCH SPRAG ASSEMBLE

Tools Required

J 36850 Transjel Lubricant. See **Special Tools and Equipment** .

Assembly Procedure

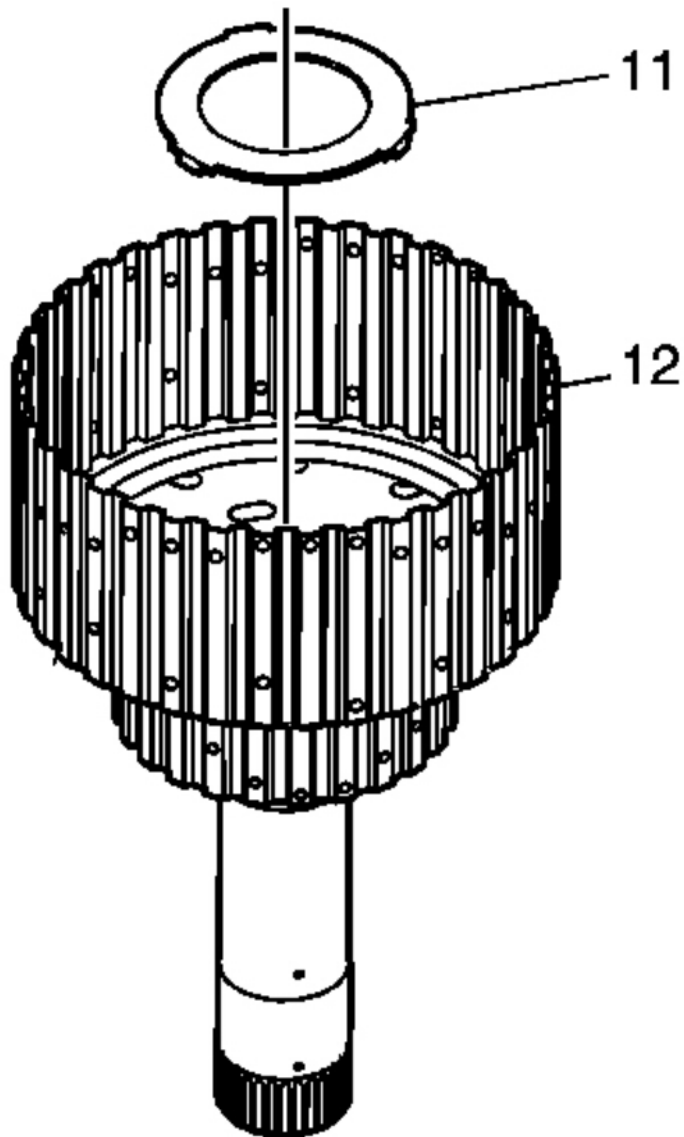


Fig. 123: View Of Intermediate Sprag Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

1. Apply **J 36850** to the input and reaction carrier inner shaft thrust washer (11) and install into the intermediate sprag clutch assembly (12).

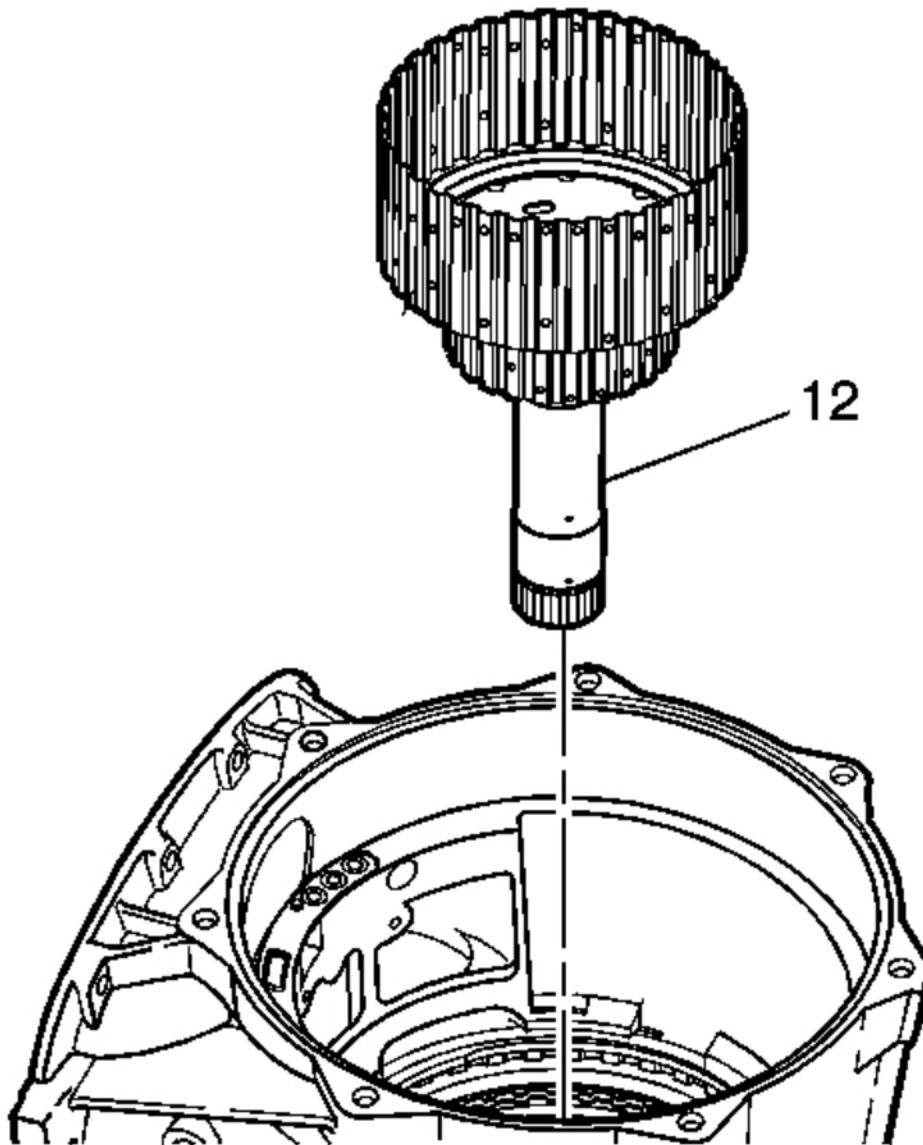


Fig. 124: Locating Intermediate Sprag Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

2. Install the intermediate sprag clutch assembly (12) into the case (24).

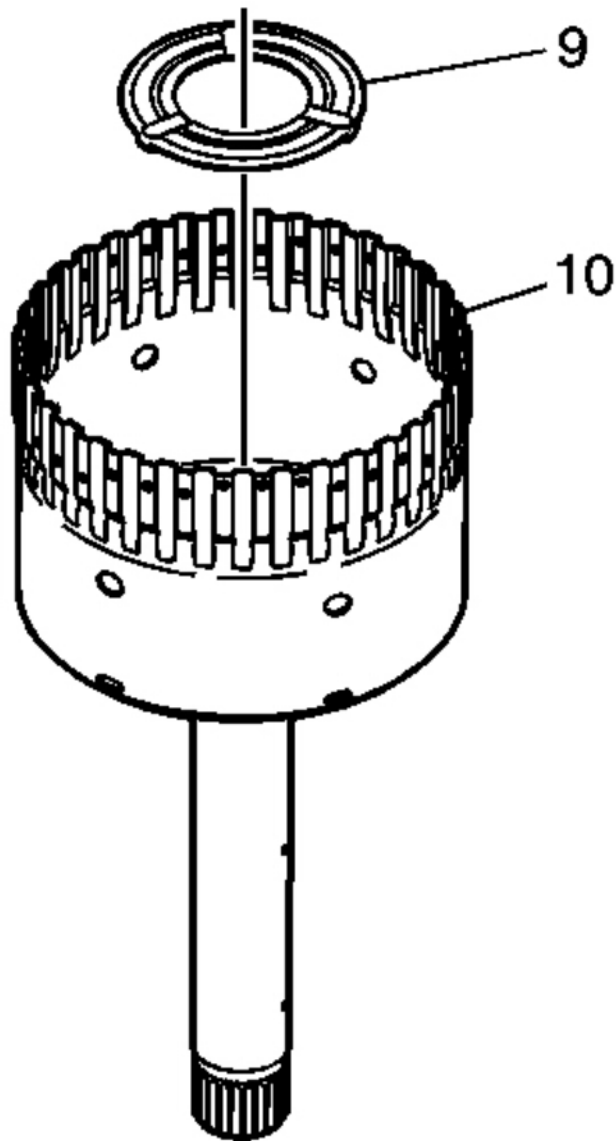


Fig. 125: Identifying Inspection Areas Direct Clutch Housing
Courtesy of GENERAL MOTORS CORP.

1. Inspect the housing for the following:
 - Worn or damaged splines

- Worn or damaged bushings
 - Wear, cracks and scoring on the shaft
2. Install the direct clutch housing hub thrust washer (9) into the housing (10).

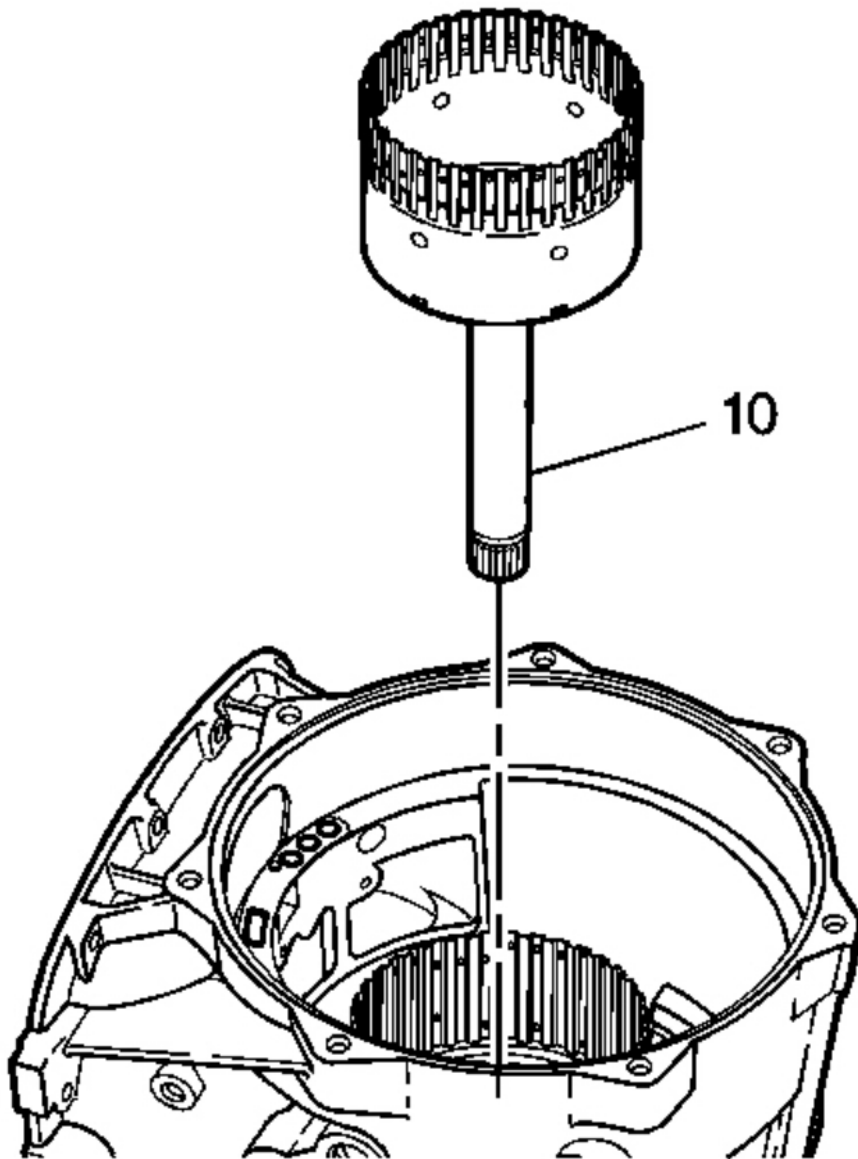


Fig. 126: Identifying Direct Clutch Housing

Courtesy of GENERAL MOTORS CORP.

3. Install the direct clutch housing (10) into the case (24).

INPUT SUN GEAR SHAFT DISASSEMBLE

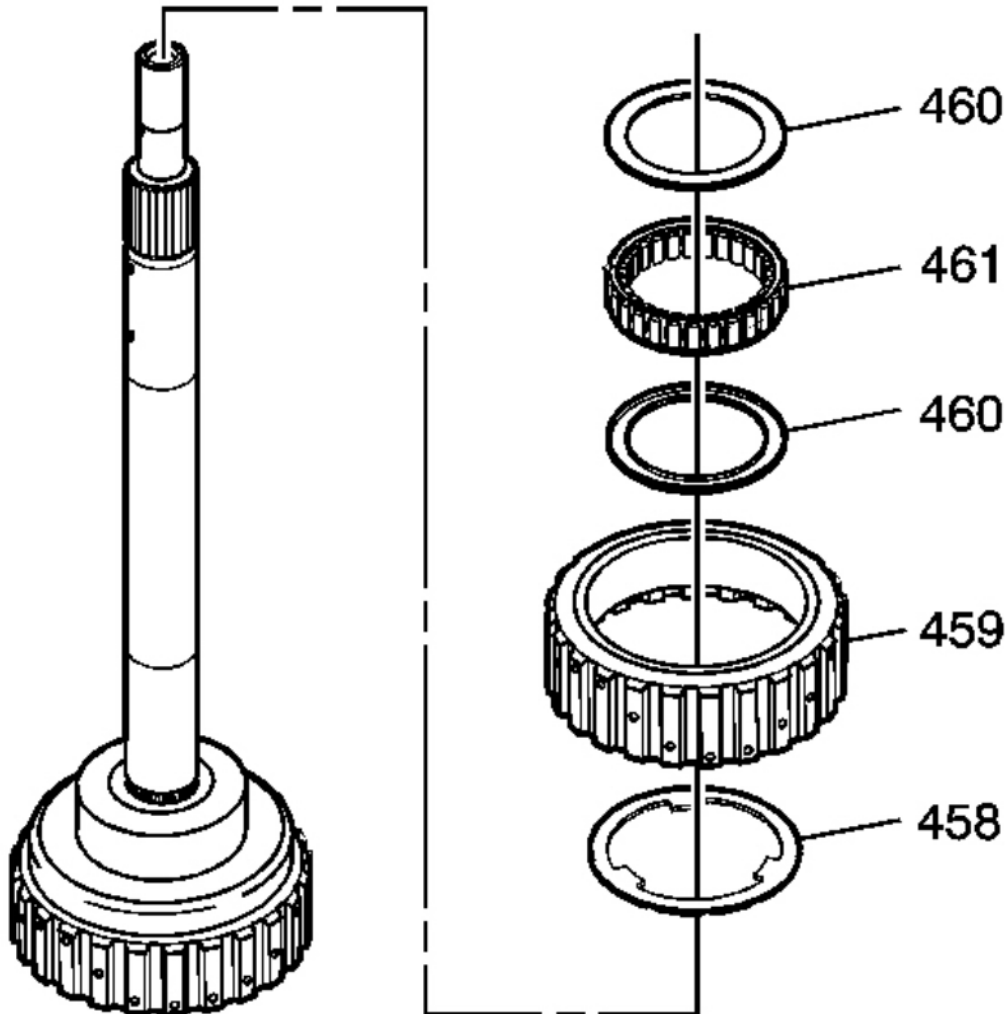


Fig. 127: View Of Sprag Assembly

Courtesy of GENERAL MOTORS CORP.

1. Remove the forward clutch sprag outer race (459).

2. Remove the forward clutch outer race washer (458).
3. Remove the forward clutch sprag assembly retaining rings (460).
4. Remove the forward clutch sprag (461).

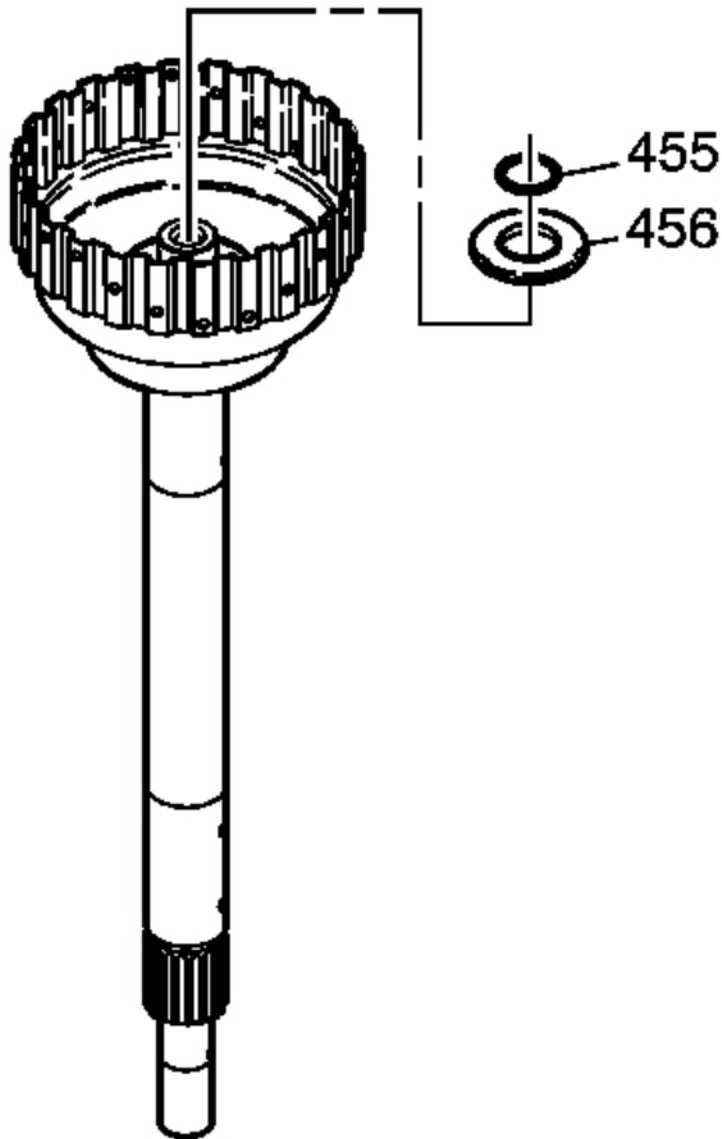


Fig. 128: Locating Inner Roller Bearing & Inner Race Thrust Ring

Courtesy of GENERAL MOTORS CORP.

5. Remove the forward clutch roller inner race thrust ring (455).
6. Remove the inner bearing (456).

INPUT SUN GEAR SHAFT ASSEMBLY

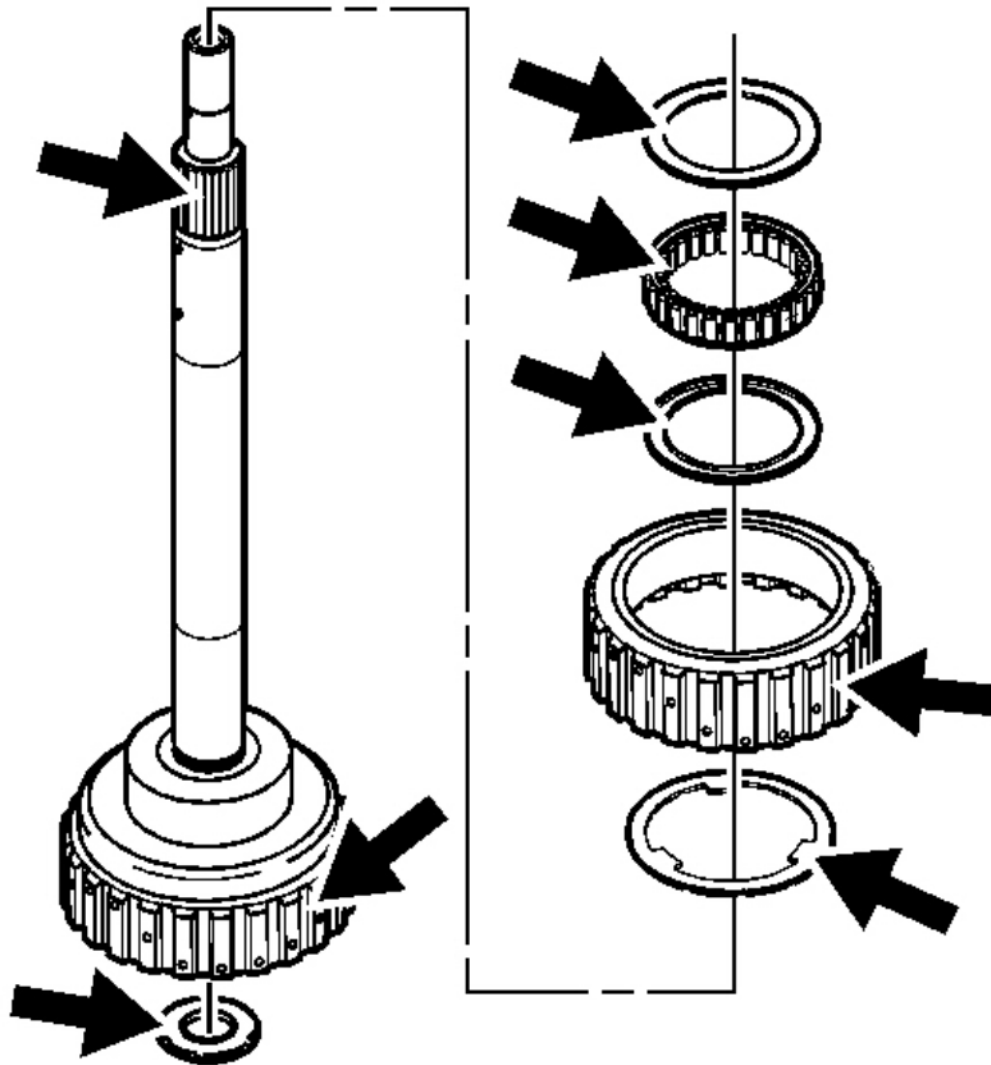


Fig. 129: Input Sun Gear Shaft Inspection Areas

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Courtesy of GENERAL MOTORS CORP.

1. Inspect the outer race and input shaft for the following:
 - Worn or damaged splines
 - Scoring inside the diameter of the race
 - Wear or cracks
2. Inspect the sprag elements for flat spots.
3. Inspect the cage for distortion or broken ribbon tabs.
4. Inspect the inner bearing for cracks.

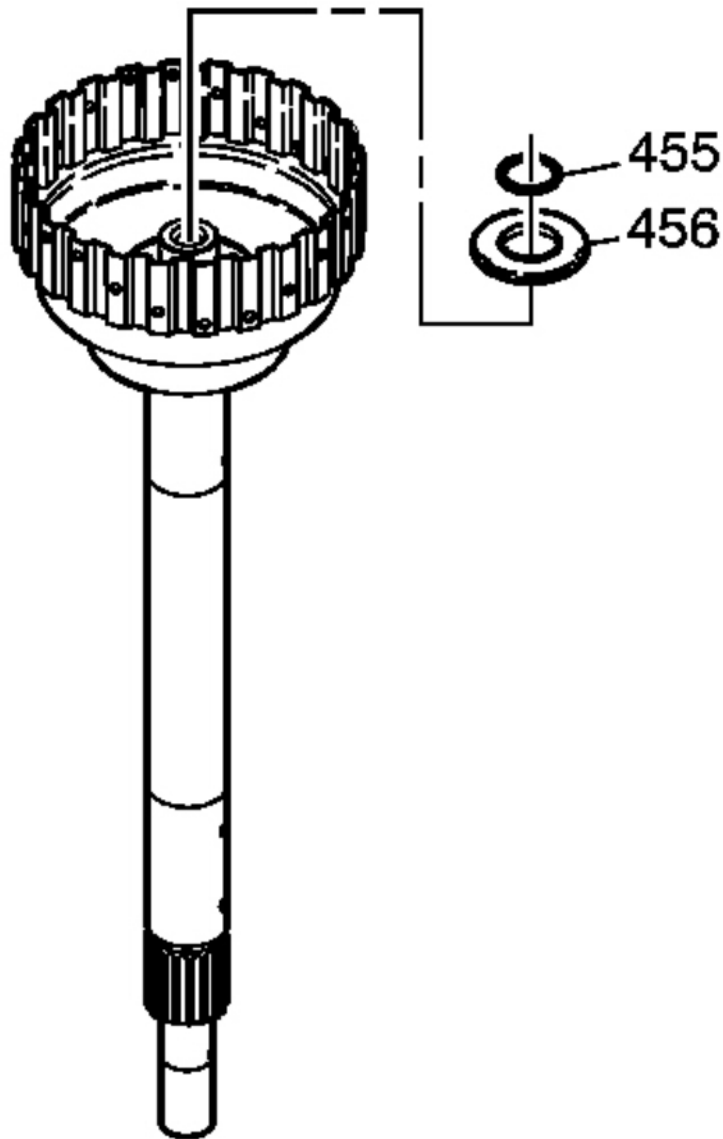


Fig. 130: Locating Inner Roller Bearing & Inner Race Thrust Ring
Courtesy of GENERAL MOTORS CORP.

5. Install the inner roller bearing (456).
6. Install the new inner race thrust ring (455).

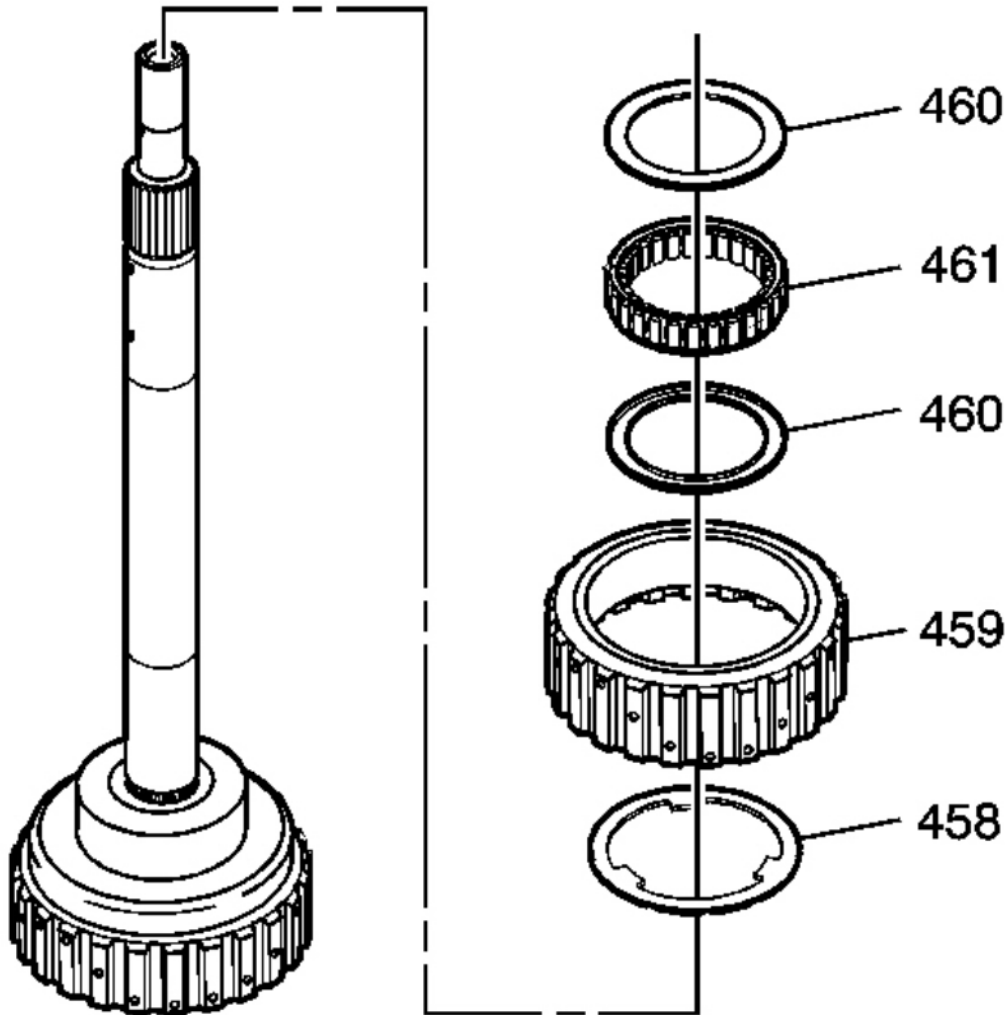


Fig. 131: View Of Sprag Assembly
Courtesy of GENERAL MOTORS CORP.

7. Install the outer race washer (458) onto the outer race (459).
8. Install the retaining rings (460) and the forward clutch sprag (461) onto the outer race (459).
9. Install the sprag assembly (460, 461, 459) onto the sun gear shaft (457).

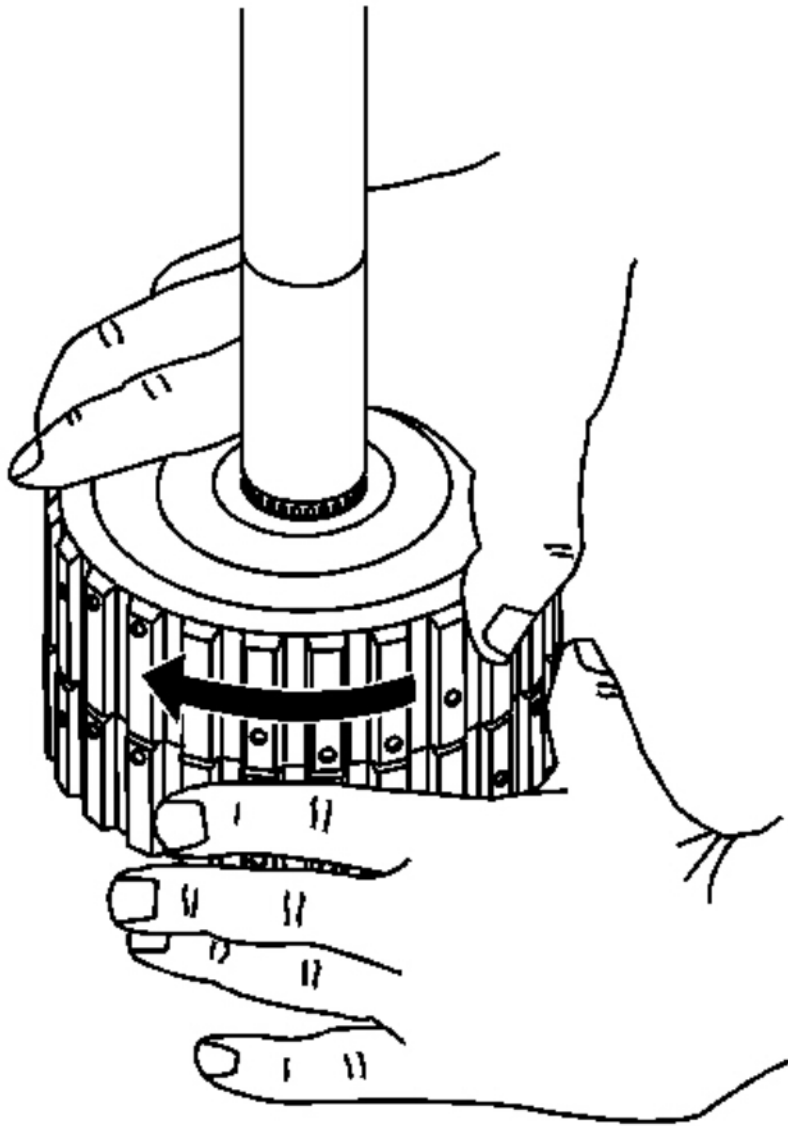


Fig. 132: Checking Forward Clutch Sprag Rotation
Courtesy of GENERAL MOTORS CORP.

10. Check that the forward clutch sprag rotation freewheels and locks up in the correct direction.

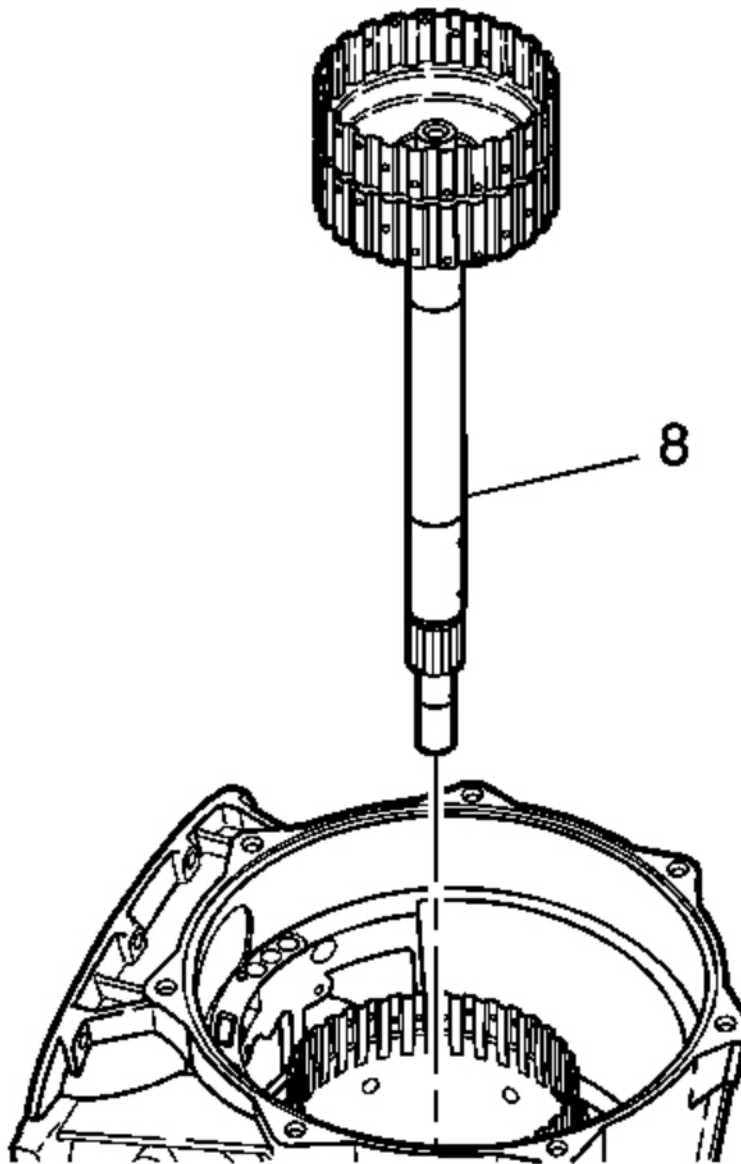


Fig. 133: View Of Input Sun Gear Shaft
Courtesy of GENERAL MOTORS CORP.

11. Install the input sun gear shaft (8) into the case (24).

Tools Required

J 43074 Forward Clutch Piston Spring Compressor

Disassembly Procedure

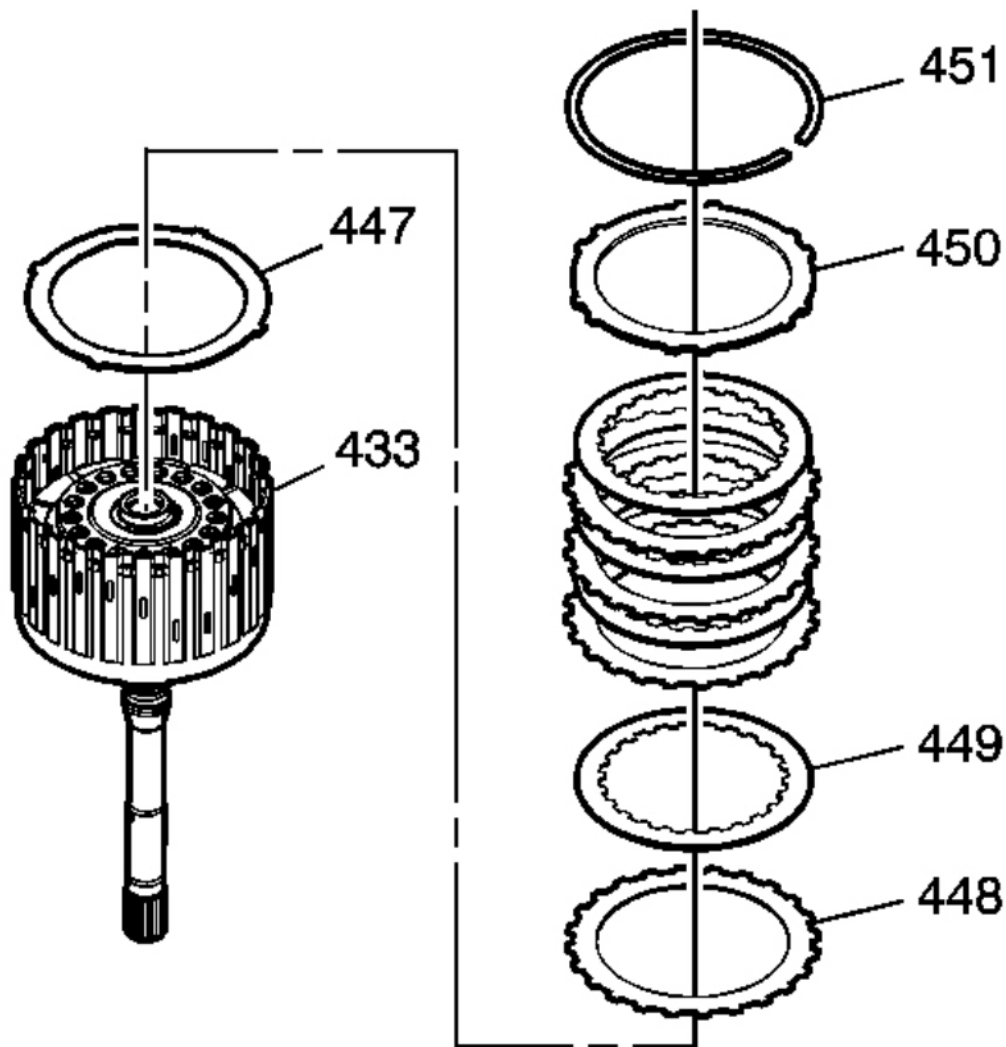


Fig. 134: View Of Forward Clutch Apply Plates
Courtesy of GENERAL MOTORS CORP.

1. Remove the forward clutch backing plate retainer ring (451).

2. Remove the forward clutch backing plate (450).
3. Remove the forward clutch plates (448, 449). Refer to **Clutch Plate Selection Specifications**.
4. Remove the forward apply plate (447).

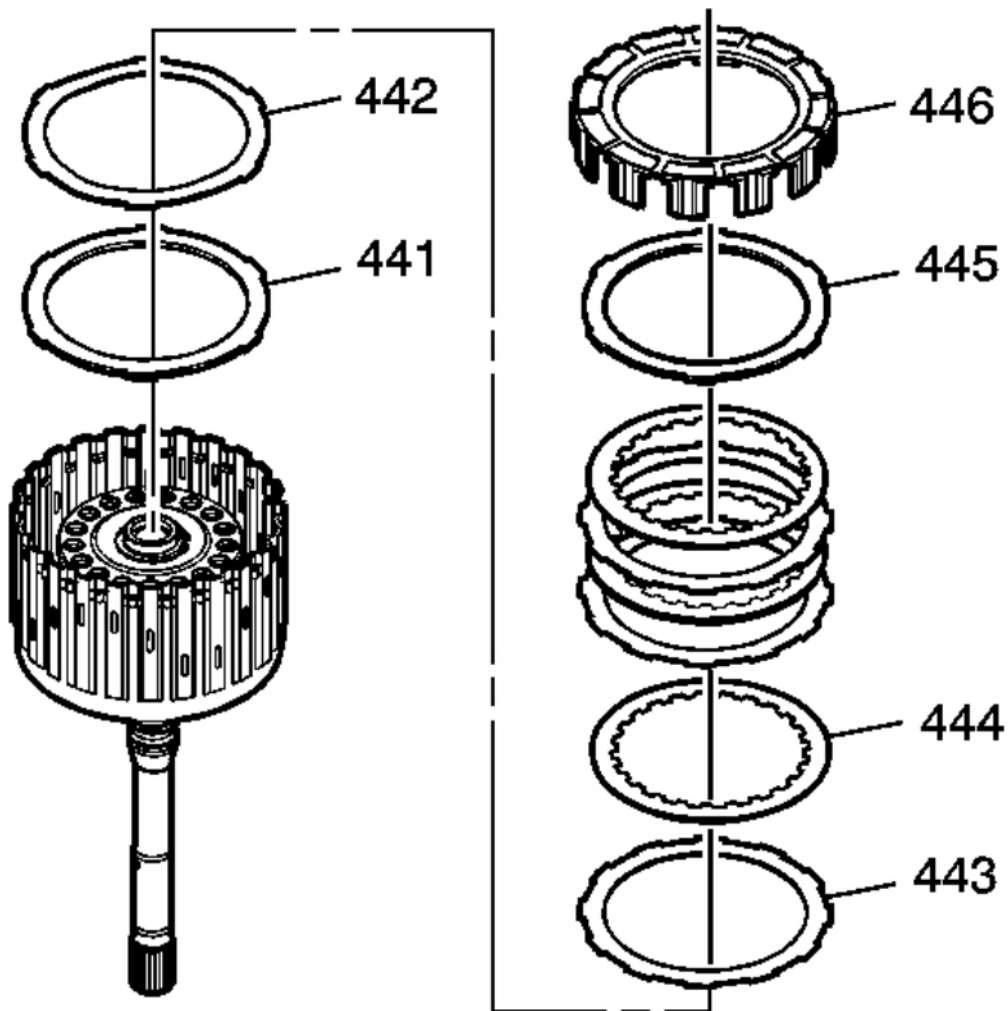


Fig. 135: Identifying Coast Clutch Apply Components
Courtesy of GENERAL MOTORS CORP.

5. Remove the coast clutch housing (446).

6. Remove the coast backing plate (445).
7. Remove the coast clutch plates (443, 444). Refer to **Clutch Plate Selection Specifications**.
8. Remove the coast apply plate (442).
9. Remove the coast clutch spacer plate (441).

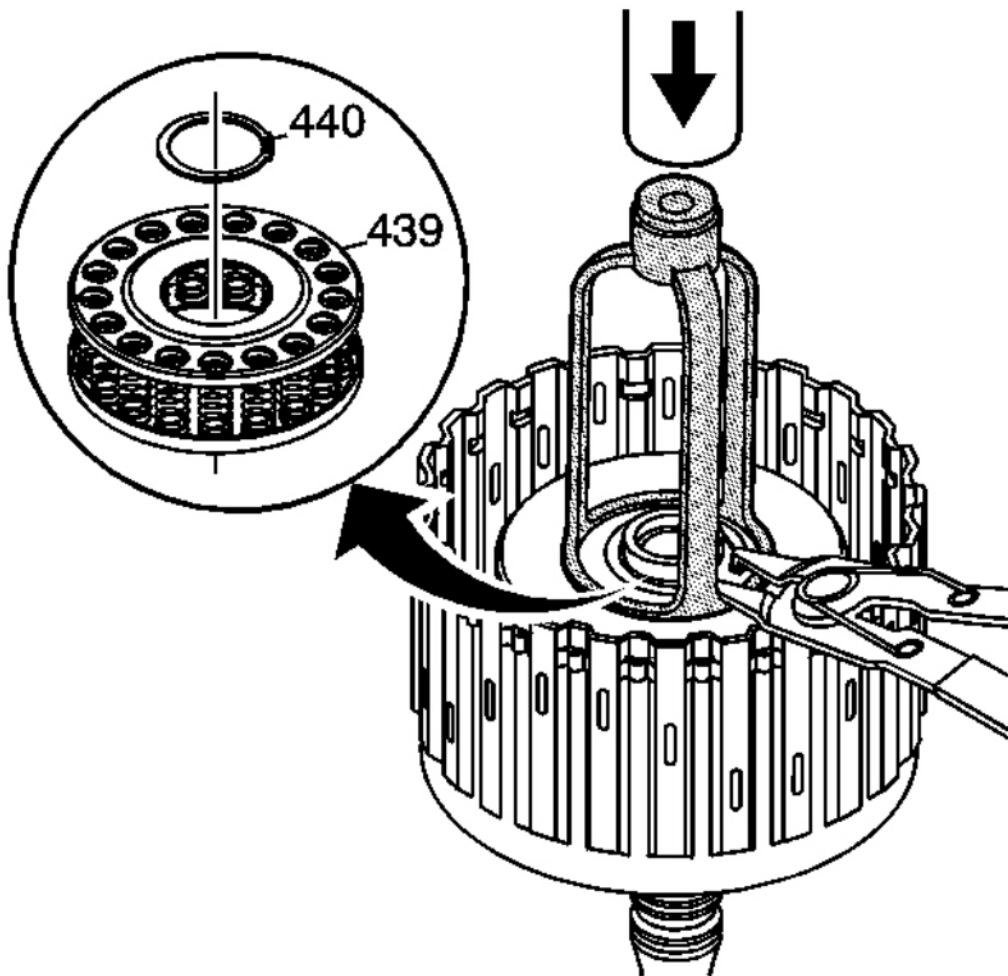


Fig. 136: Compressing Coast Clutch Piston Spring With J 43074
Courtesy of GENERAL MOTORS CORP.

10. Use the J 43074 to compress the forward and coast clutch spring (439).

11. Remove the retainer ring (440).
12. Remove J 43074 .
13. Remove the clutch spring (439).

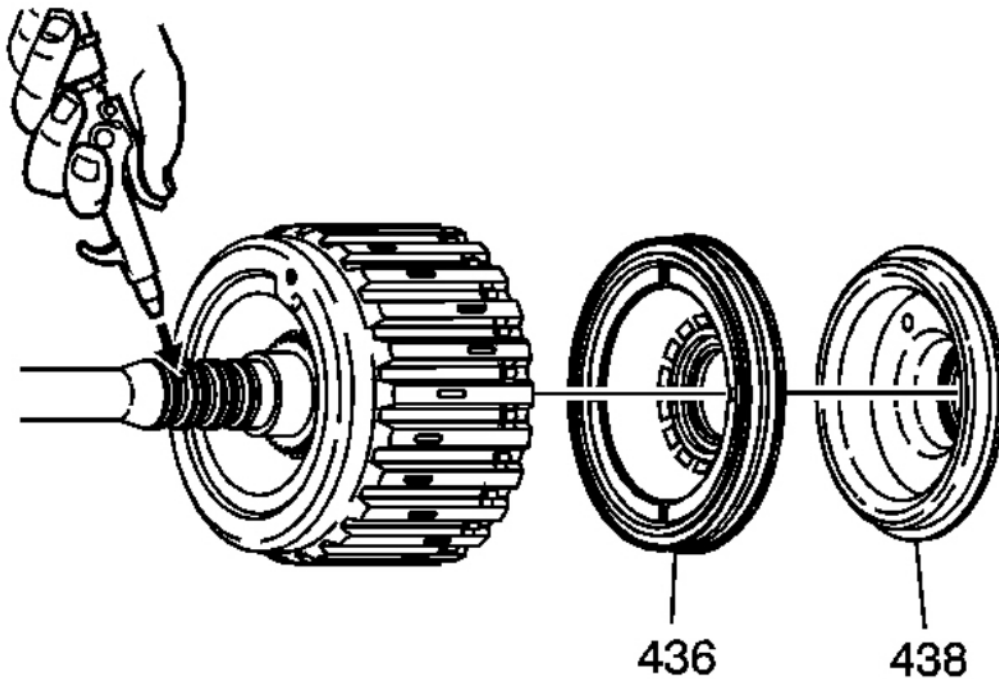


Fig. 137: Locating Forward & Coast Clutch Piston
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to apply air pressure to remove the piston.

14. Remove the coast clutch piston (438).
15. Remove the forward clutch piston (436).

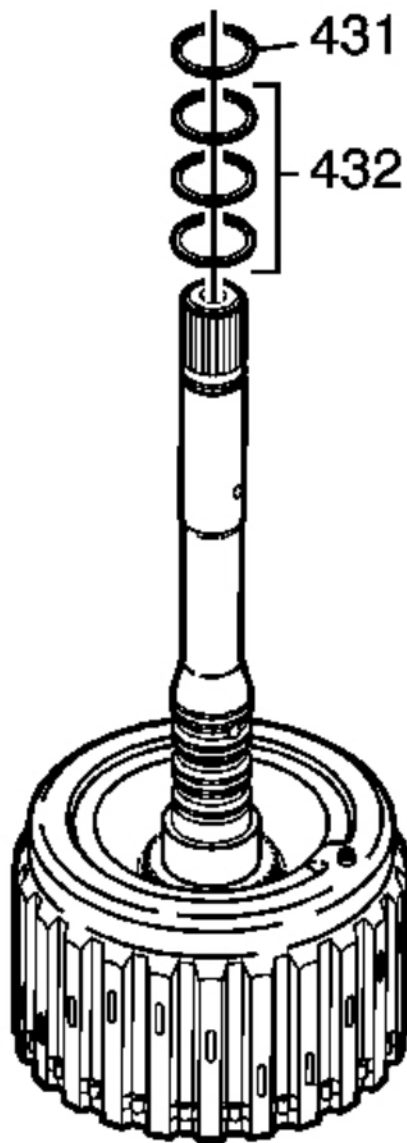


Fig. 138: Identifying Input Shaft Fluid Seals
Courtesy of GENERAL MOTORS CORP.

16. Remove the input shaft fluid seal (431).
17. Remove the input shaft fluid seals (432).

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FORWARD AND COAST CLUTCH ASSEMBLE

Tools Required

- J 43074 Forward Clutch Piston Spring Compressor
- **J 45130-1** Seal Installer Sizer. See **Special Tools and Equipment** .
- **J 45130-2** Seal Installer Pusher. See **Special Tools and Equipment** .
- **J 45130-3** Seal Protector. See **Special Tools and Equipment** .
- **J 45132** Seal Protector. See **Special Tools and Equipment** .
- **J 45134** Seal Protector. See **Special Tools and Equipment** .

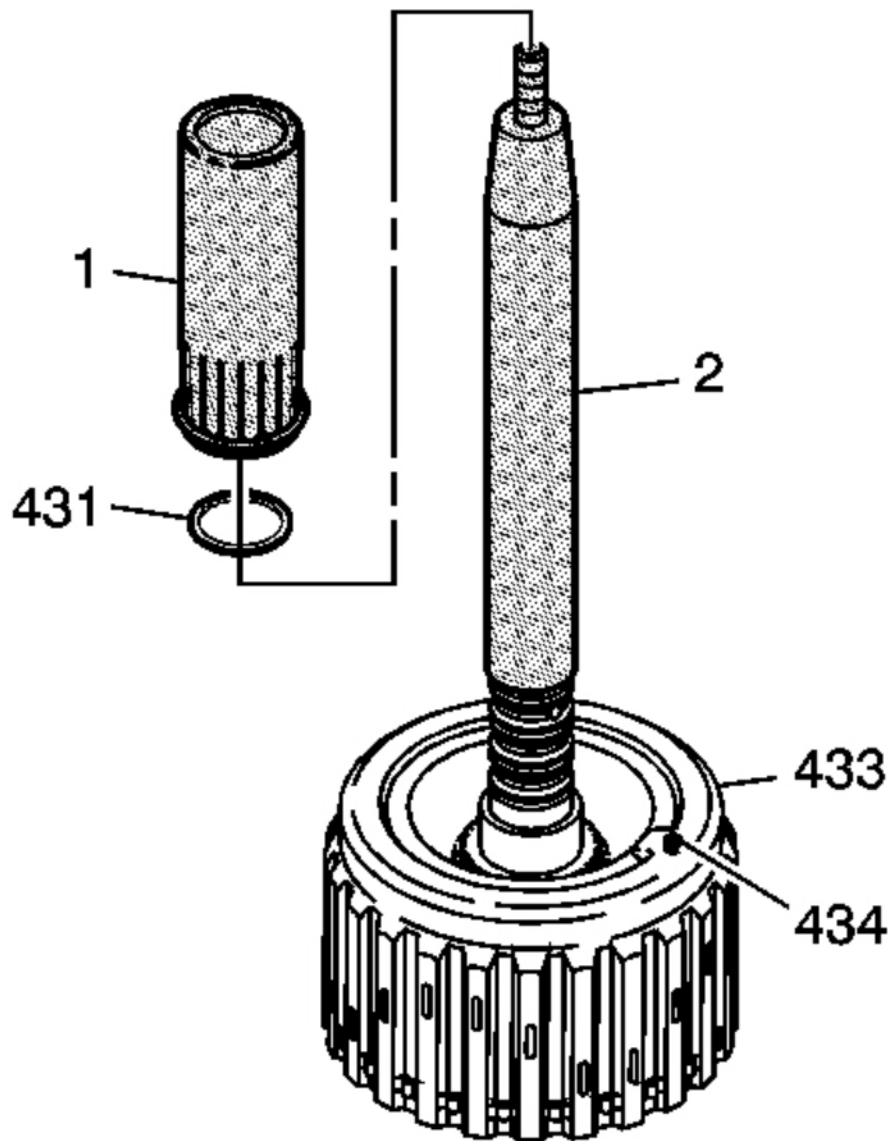


Fig. 139: View Of Forward Clutch Housing
Courtesy of GENERAL MOTORS CORP.

1. Inspect the forward clutch housing (433) for the following:
 - Plugged feed passages

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- Damaged ball check valve (434)
 - Worn or damaged splines
 - Seal ring groove nicks or burrs
 - Cracked or blocked fluid passages in the input shaft
 - Worn or damaged clutch plates
2. Inspect the input shaft fluid seals (431, 432) for worn or damaged seals.
 3. Slide **J 45130-3** (2) over the input shaft, and position **J 45130-3** (2) at the seal groove closest to the housing. Coat **J 45130-3** (2) with transmission fluid.
 4. Guide a NEW seal (431) onto **J 45130-3** (2) and slide the seal into the groove with **J 45130-2** (1).

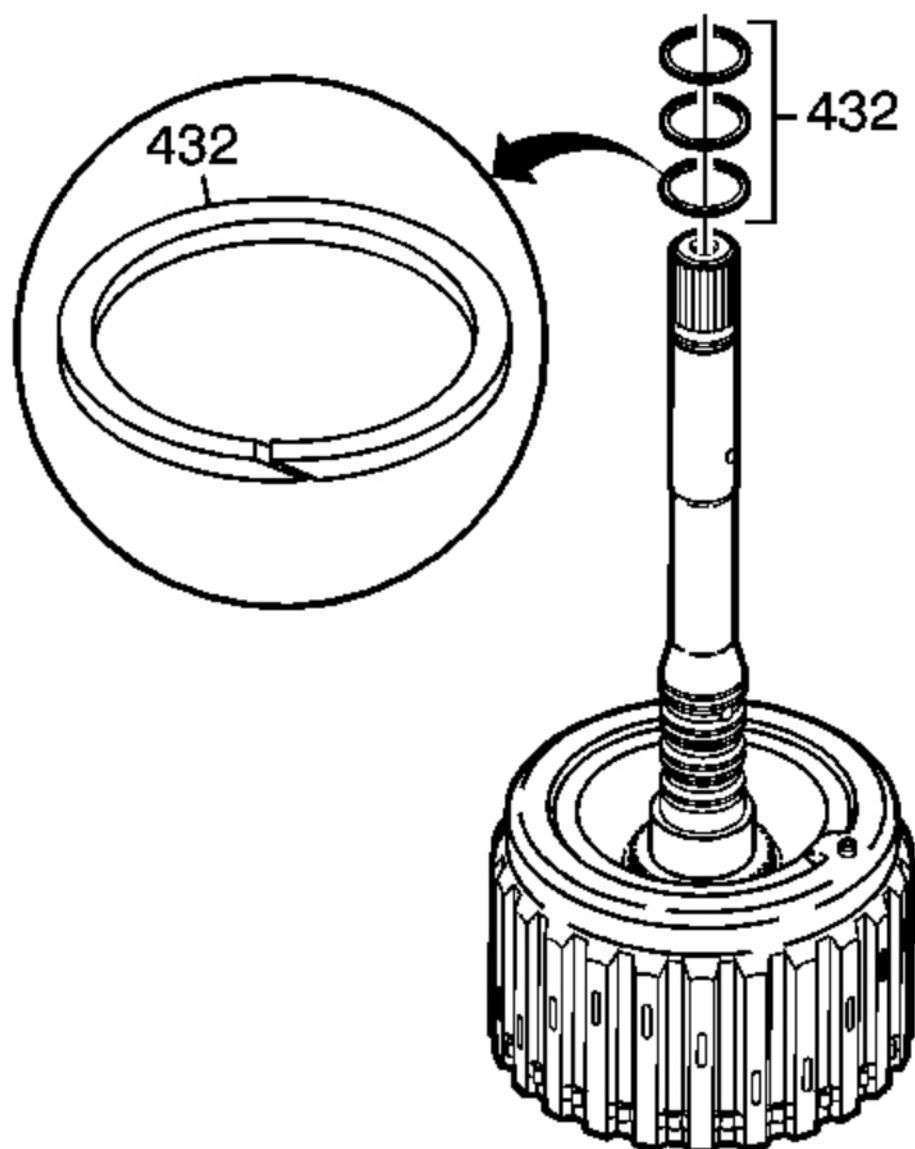


Fig. 140: Locating Input Shaft Fluid Seals
Courtesy of GENERAL MOTORS CORP.

5. Remove **J 45130-3** (2).
6. Install the input shaft fluid seals (432).

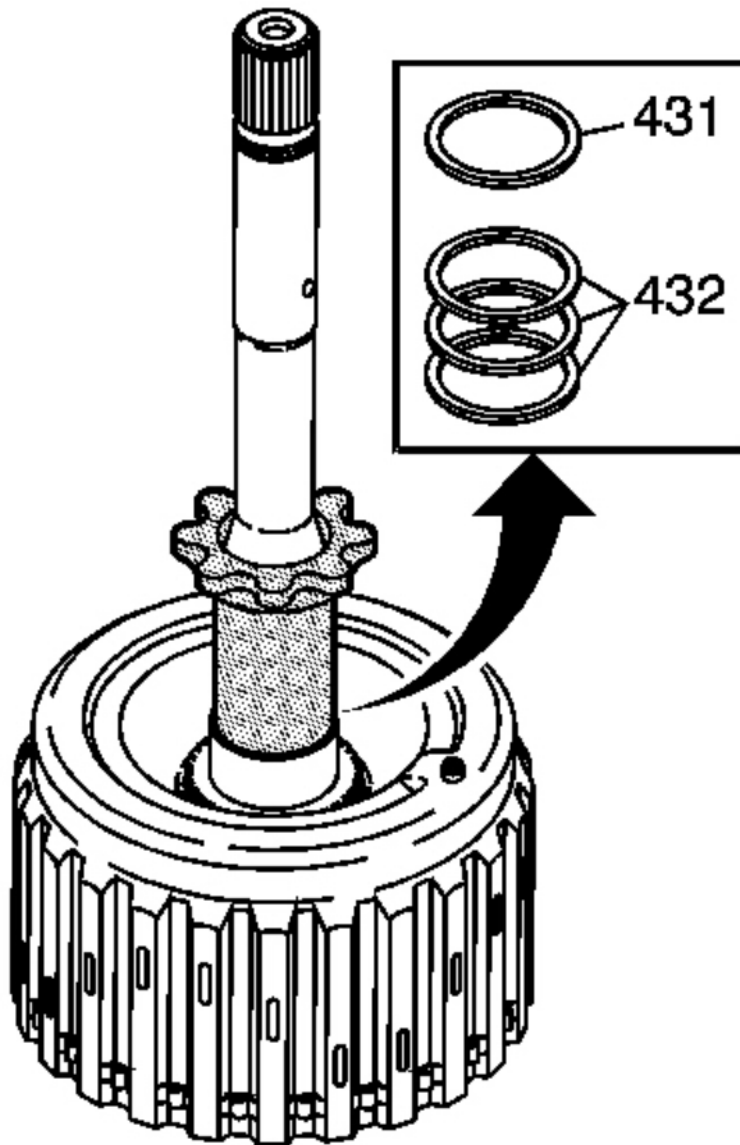


Fig. 141: Identifying J 45130-1
Courtesy of GENERAL MOTORS CORP.

7. Size the seals (431, 432) with **J 45130-1** .
8. Leave **J 45130-1** in place for at least five minutes. If possible, leave **J 45130-1** in place until you install the assembly into the transmission case.

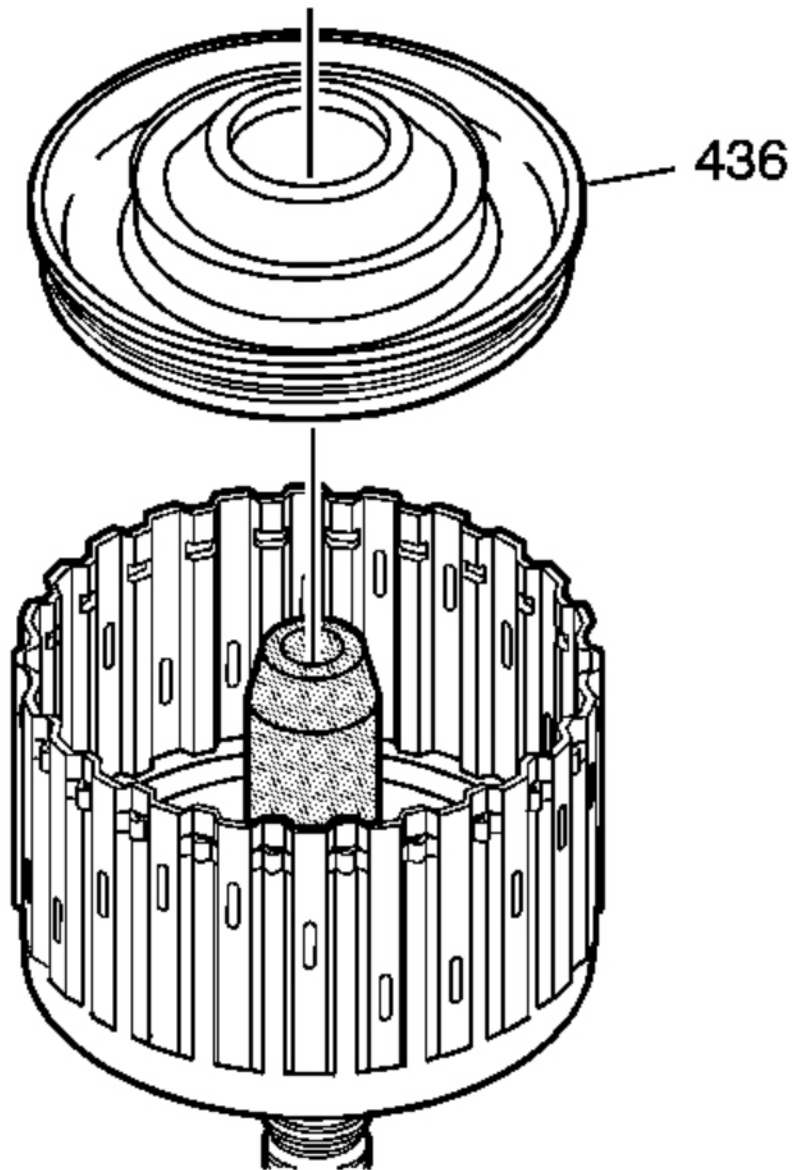


Fig. 142: Inspecting Forward Clutch Piston
Courtesy of GENERAL MOTORS CORP.

9. Inspect the forward piston and the coast clutch piston for the following:
 - Cracks or damage to seal grooves

- Wear on the piston
- Worn or damaged clutch plates

10. Use **J 45134** to install the forward clutch piston (436).

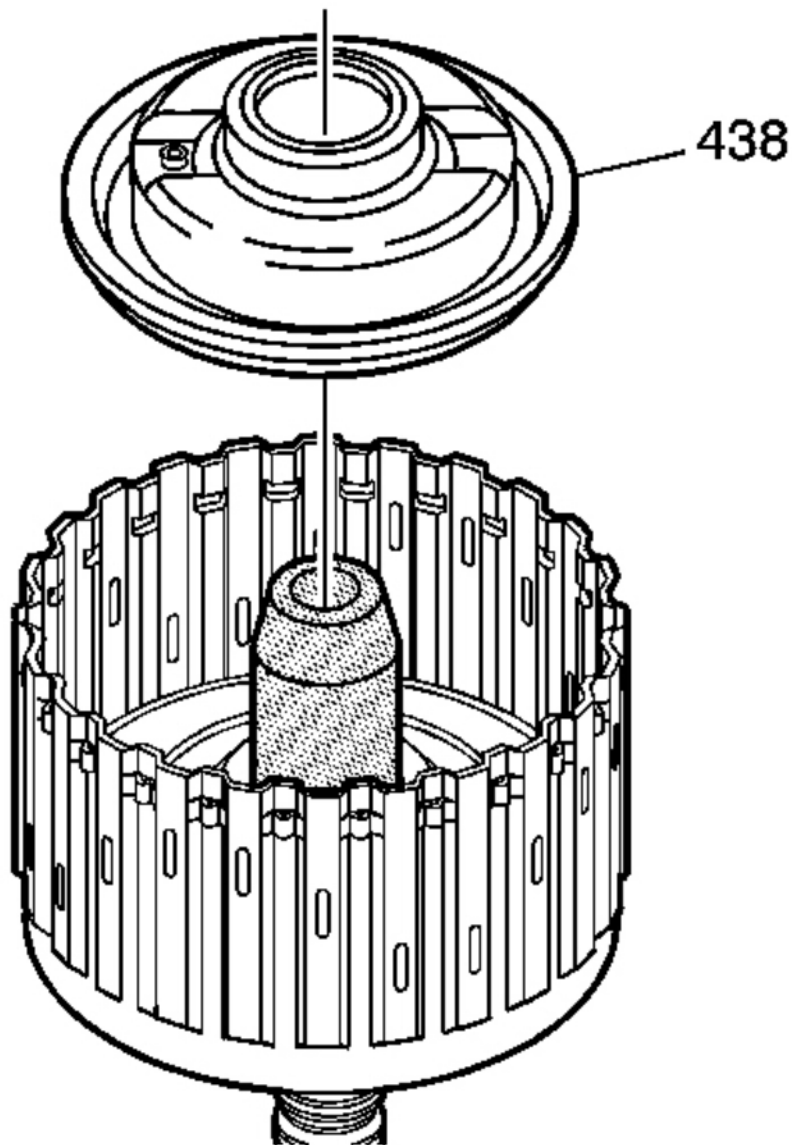


Fig. 143: Locating Coast Clutch Piston

Courtesy of GENERAL MOTORS CORP.

11. Use **J 45132** to install the coast clutch piston (438).

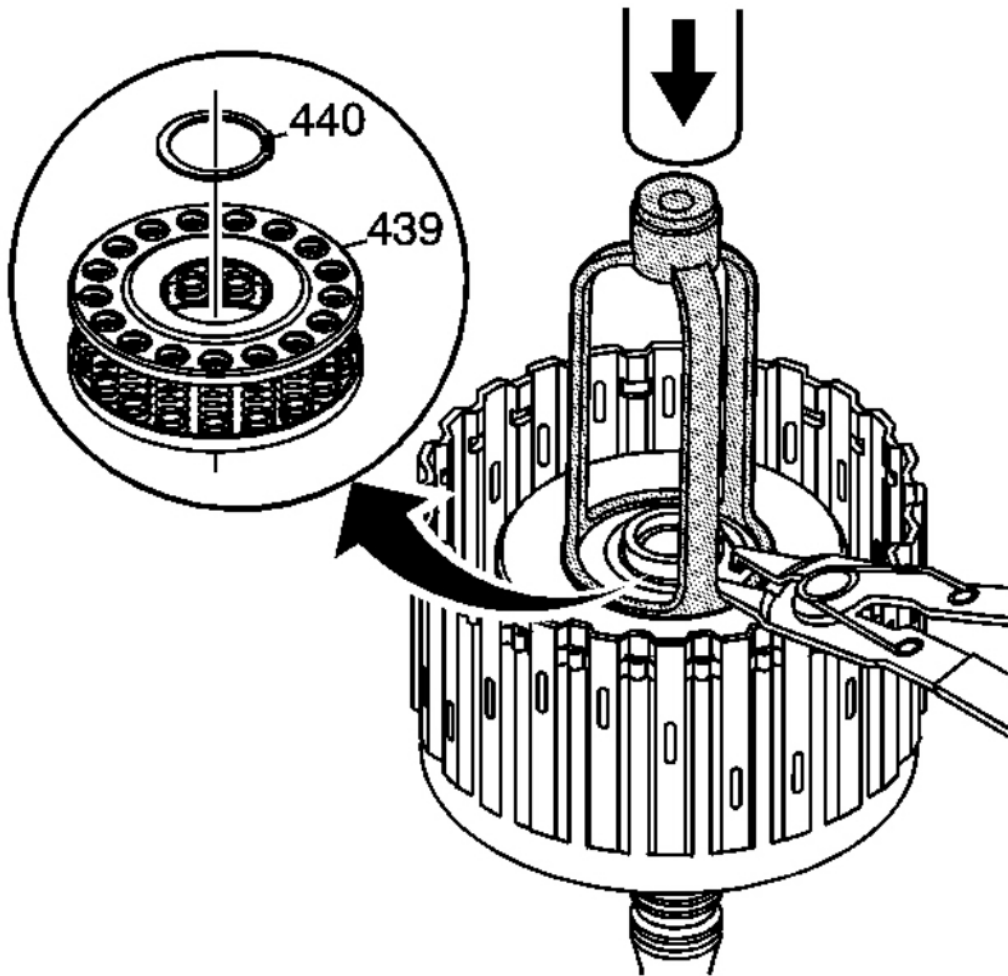


Fig. 144: Compressing Coast Clutch Piston Spring With J 43074
Courtesy of GENERAL MOTORS CORP.

12. Inspect the forward and coast clutch piston spring for the following:
- Damaged cage
 - Distorted or missing springs
13. Install the piston spring (439).

14. Use J 43074 to compress the spring and install the retainer ring (440).

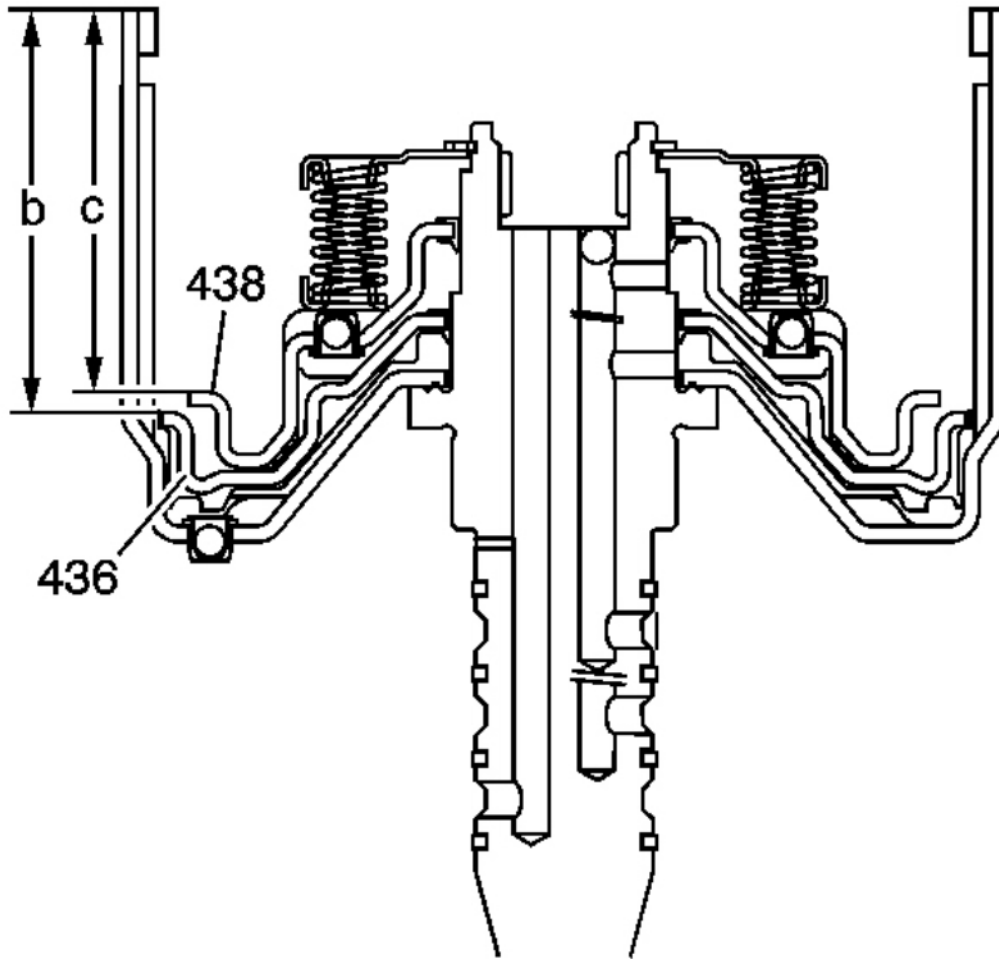


Fig. 145: Measuring Dimension A
Courtesy of GENERAL MOTORS CORP.

15. Measure the distance from the top of the forward clutch housing to the coast clutch piston (438), record this as dimension C.
16. Measure the distance from the top of the forward clutch housing to the forward clutch piston (436), record this as dimension B.
17. Subtract dimension C from dimension B. This is now dimension A.

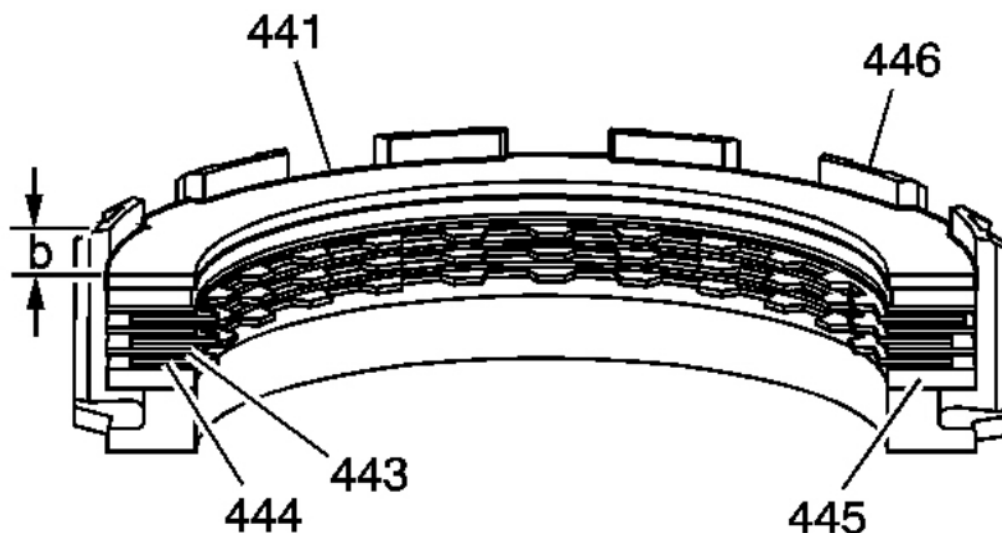


Fig. 146: Measuring Coast Clutch Pack Travel
Courtesy of GENERAL MOTORS CORP.

18. Install the coast clutch backing plate (445) into the coast clutch housing (446).
19. Install the coast clutch plates into the coast clutch housing (446). Starting with the coast clutch plate (443) with outer splines. Alternating with the coast clutch plate (444) with inner splines. Refer to **Clutch Plate Selection Specifications** .
20. Install the coast clutch apply plate into the coast clutch housing (446).
21. Install the coast clutch spacer plate (441) into the coast clutch housing (446).
22. Measure the distance from the top of the coast clutch housing (446) to the top of the coast clutch spacer plate (441), record this as dimension B.
23. Subtract dimension B from dimension A, this is clutch pack travel.

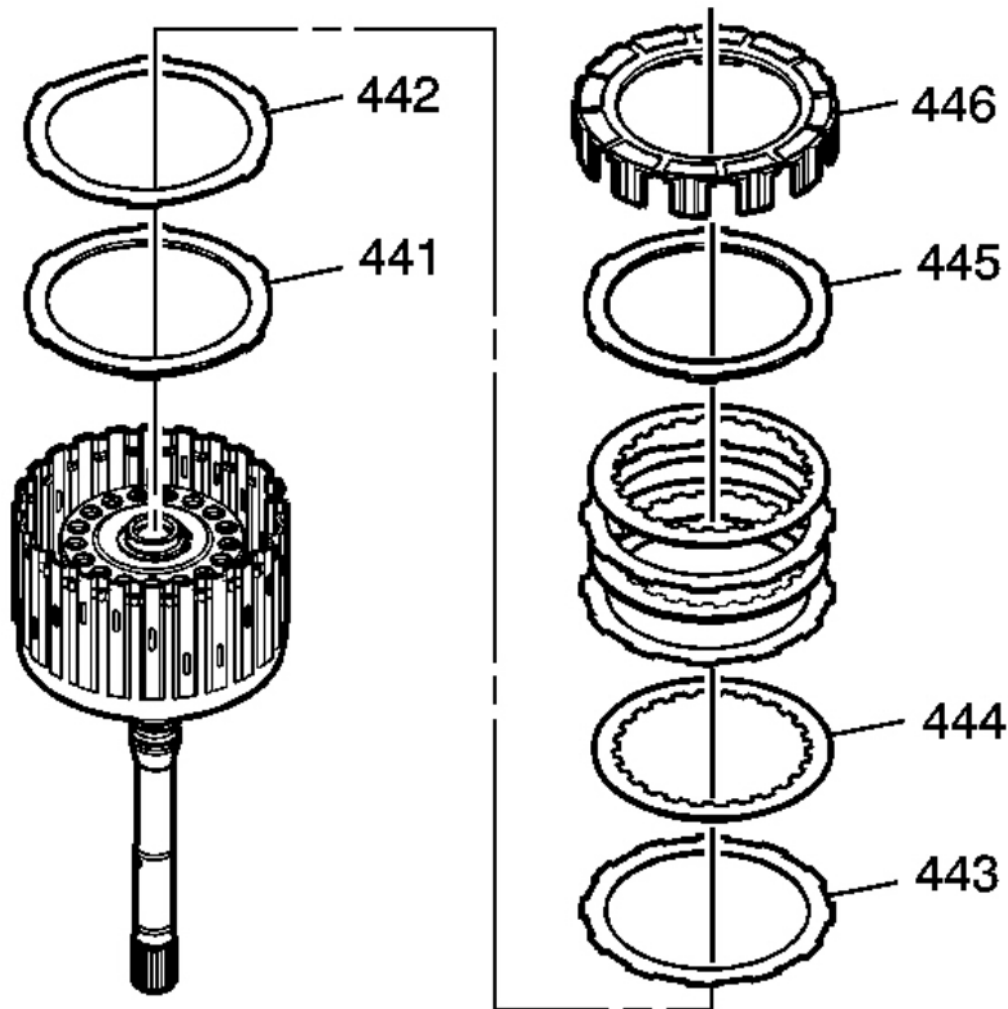


Fig. 147: Identifying Coast Clutch Apply Components
Courtesy of GENERAL MOTORS CORP.

24. Install the coast clutch spacer plate (441).
25. Install the coast clutch apply plate (442).
26. Install the coast clutch plates. Starting with the coast clutch plate (443) with the outer splines. Refer to **Clutch Plate Selection Specifications** .
27. Alternating with the coast clutch plate (444) with inner splines.
28. Install the coast clutch backing plate (444).

29. Install the coast clutch housing (446).

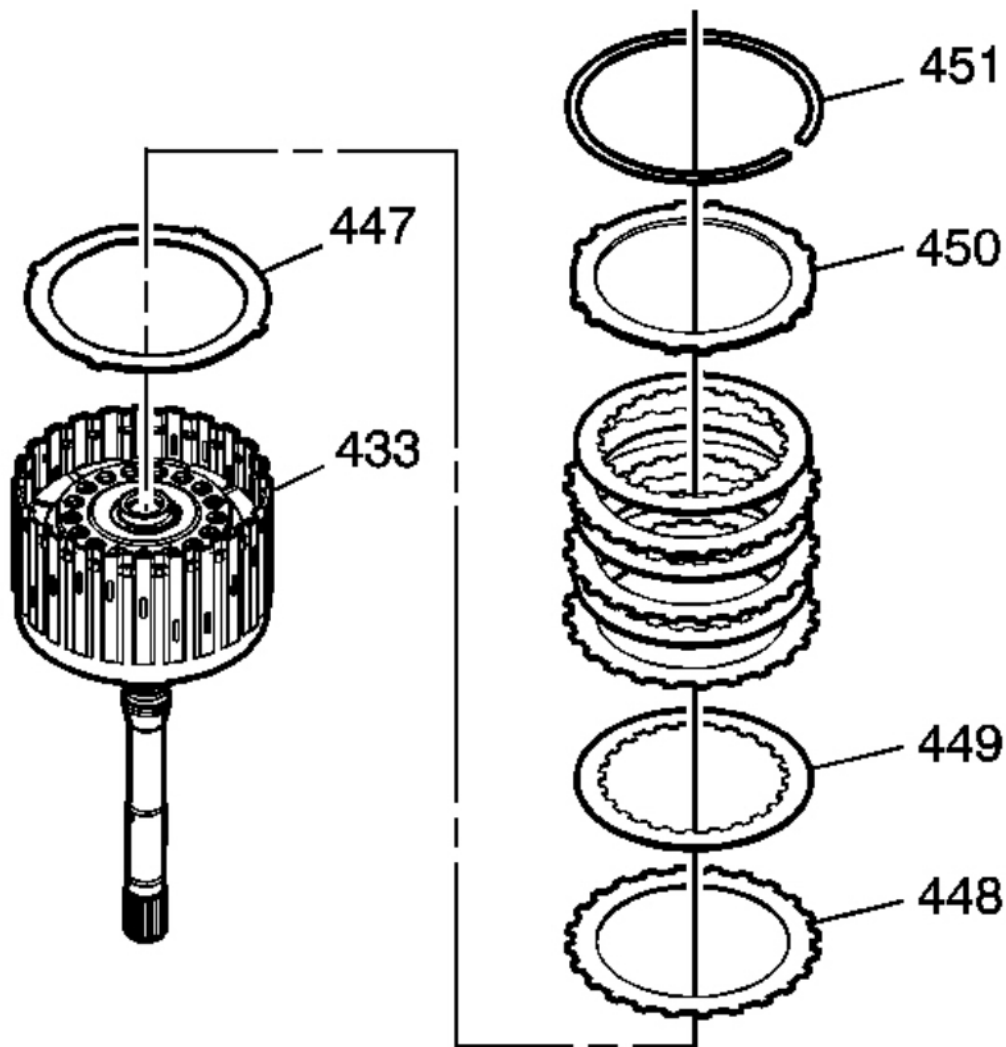


Fig. 148: View Of Forward Clutch Apply Plates
Courtesy of GENERAL MOTORS CORP.

30. Install the forward clutch apply plate (447).
31. Install the forward clutch plates. Starting with the forward clutch plate (448) with outer splines. Alternating with the forward clutch plate (449) with inner splines. Refer to **Clutch**

Plate Selection Specifications .

32. Install the forward clutch backing plate (450).
33. Install the forward clutch backing plate retainer ring (451).

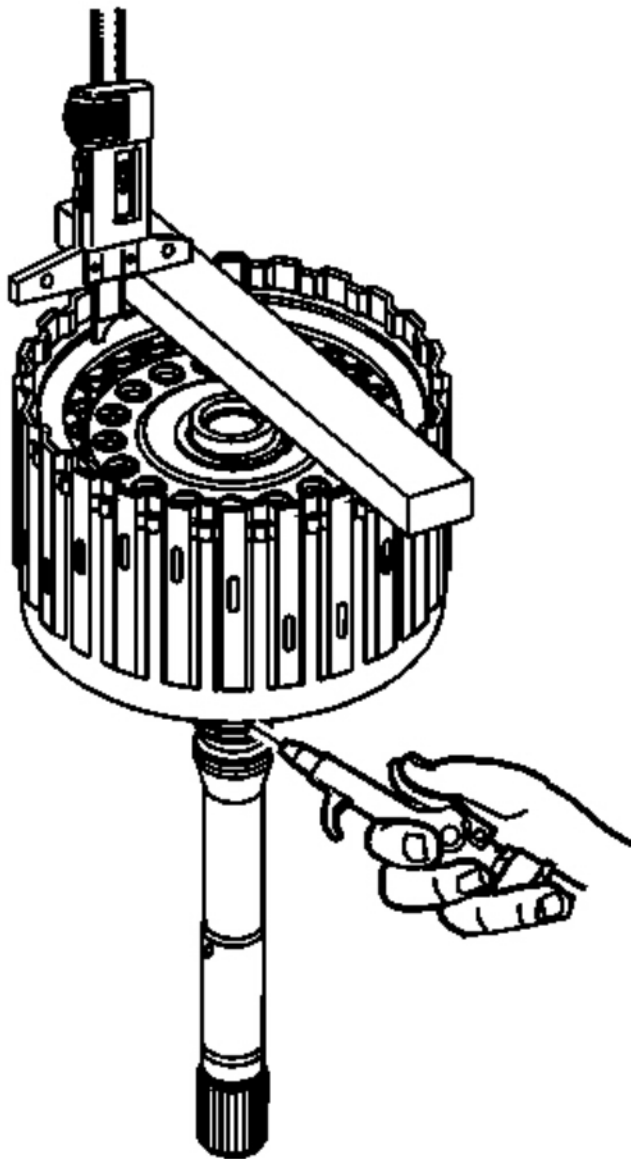


Fig. 149: Measuring H1 & H2 To Calculate Clutch Pack Travel

Courtesy of GENERAL MOTORS CORP.

34. Measure the distance between the forward clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
35. Apply air pressure to the specified port. Measure the distance between the forward clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.
36. Subtract H2 from H1. This is the clutch pack travel. Refer to **Clutch Piston Travel Specifications** .
37. At this time you do not install the forward and coast clutch assembly (7) into the transmission case. Set aside until told to do so.

DIRECT AND REVERSE CLUTCH DISASSEMBLE

Tools Required

- **J 38734** Intermediate Spring Compressor Adapter. See **Special Tools and Equipment** .
- **J 45139** Compressor Plate. See **Special Tools and Equipment** .

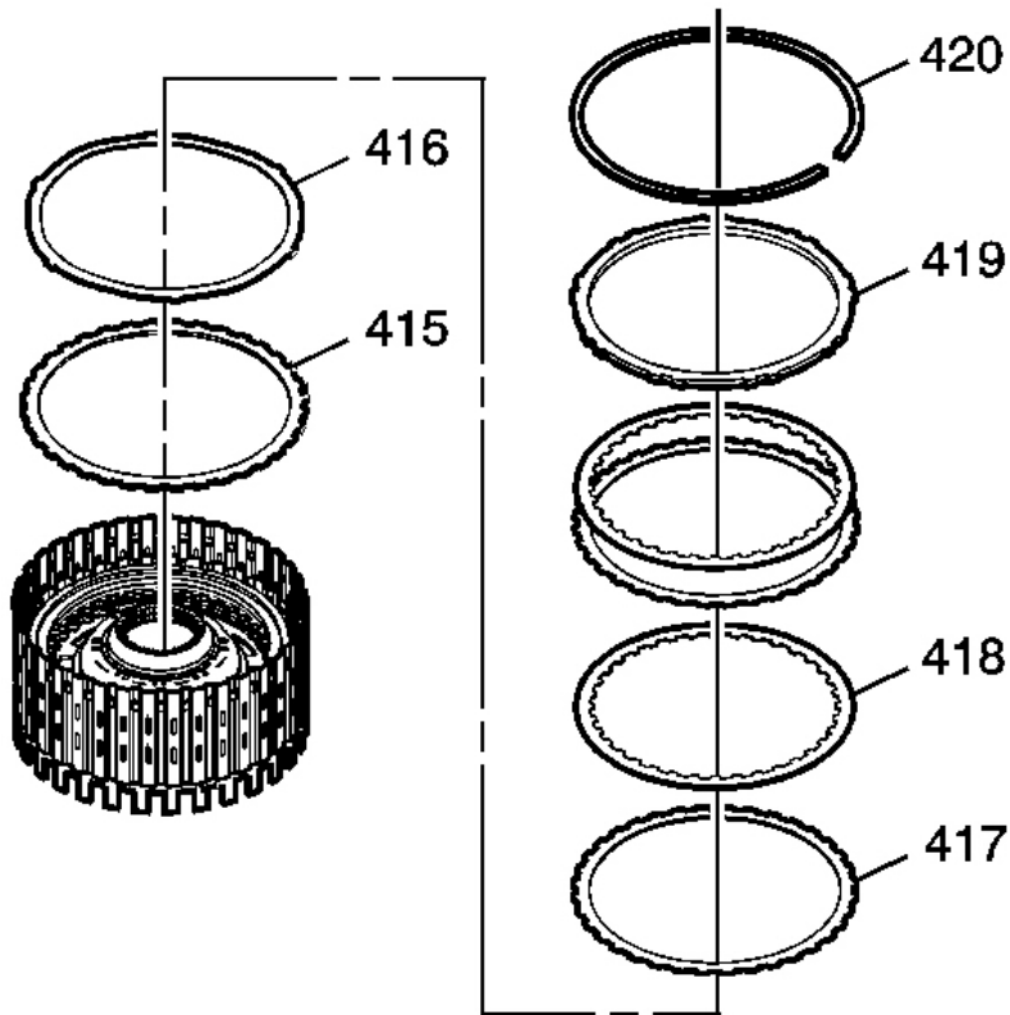


Fig. 150: View Of Reverse Clutch Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the reverse clutch backing plate retainer (420).
2. Remove the backing plate (419).
3. Remove the clutch plates (418, 417). Refer to **Clutch Plate Selection Specifications** .
4. Remove the apply plate (416).
5. Remove the reverse clutch spacer (415).

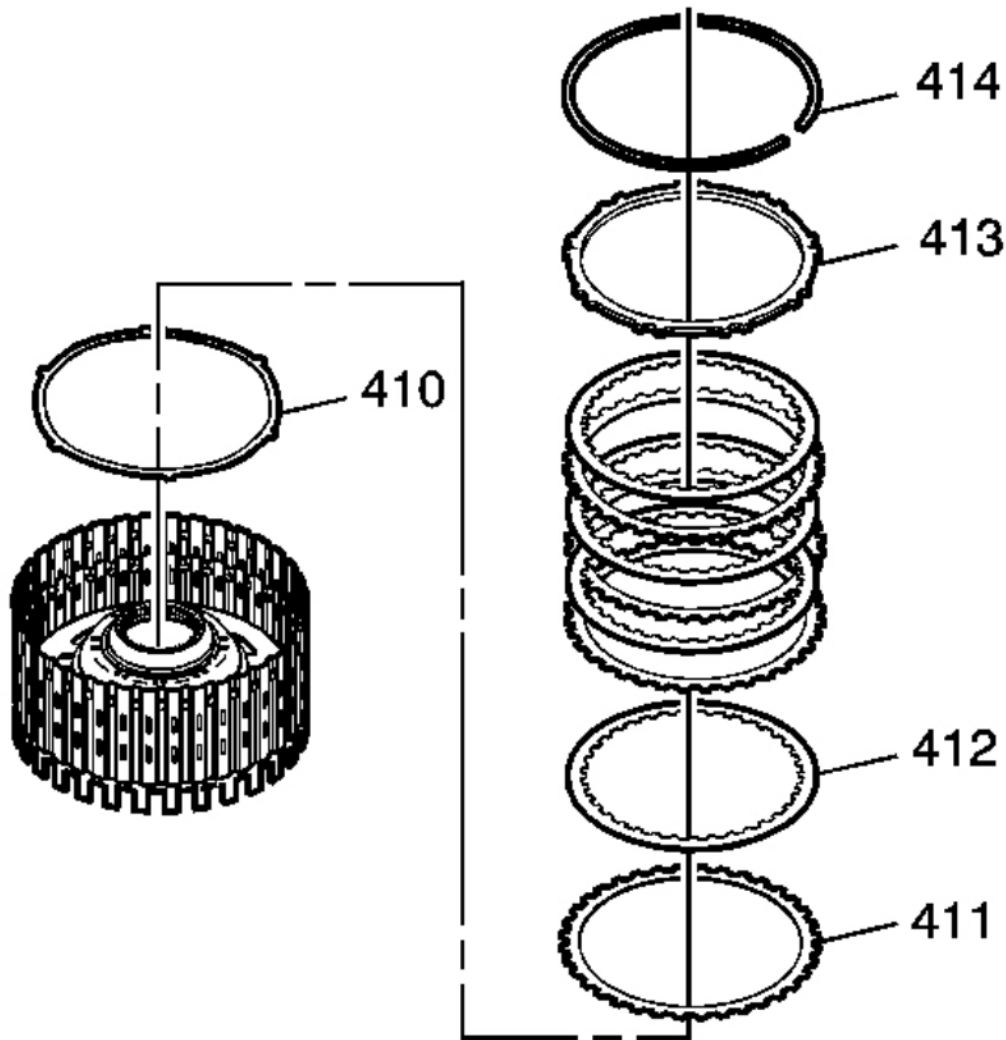


Fig. 151: Locating Direct Clutch Plates
Courtesy of GENERAL MOTORS CORP.

6. Remove the direct clutch backing plate retainer ring (414).
7. Remove the backing plate (413).
8. Remove the clutch plates (412, 411). Refer to Clutch Plate Selection Specifications.
9. Remove the apply plate (410).

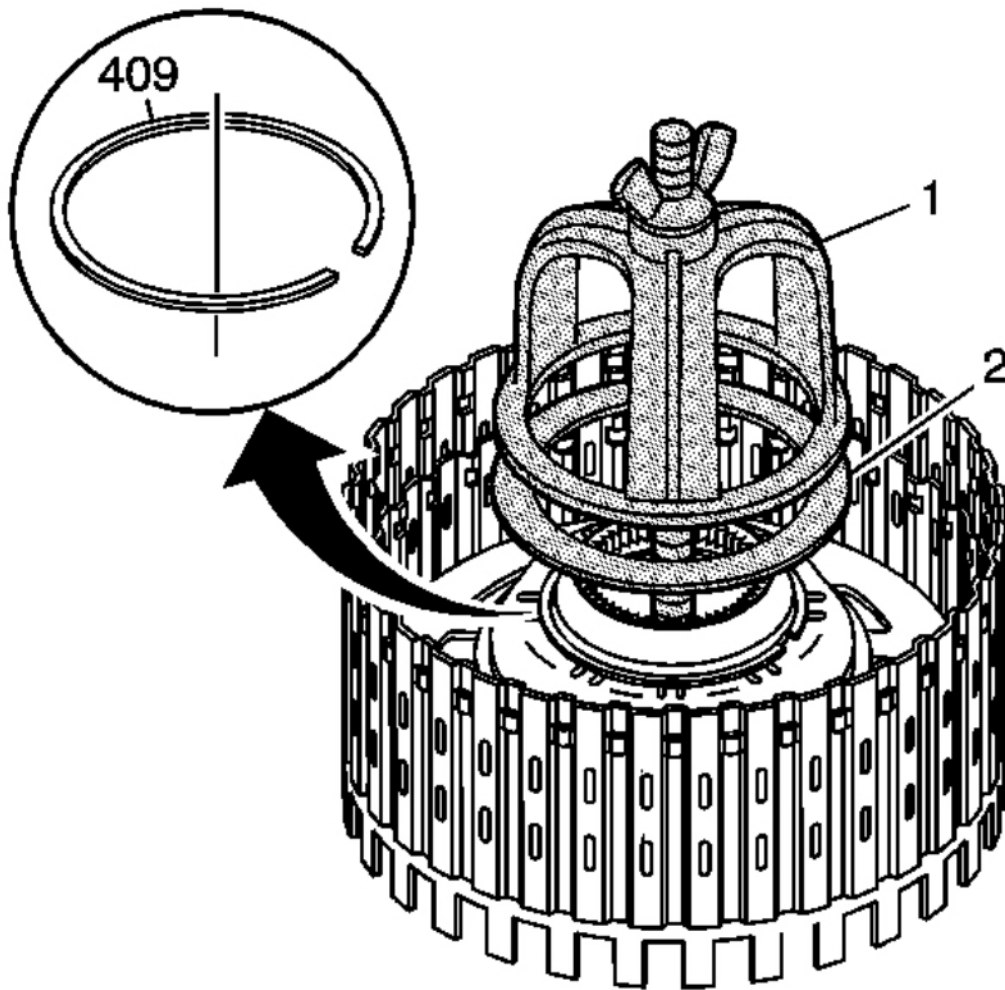


Fig. 152: Identifying Direct And Reverse Clutch Spring Retainer Ring
Courtesy of GENERAL MOTORS CORP.

10. Use **J 38734** and **J 45139** to compress the direct and reverse piston spring (407).
11. Remove the direct and reverse clutch spring retainer ring (409).
12. Remove **J 38734** and **J 45139** .

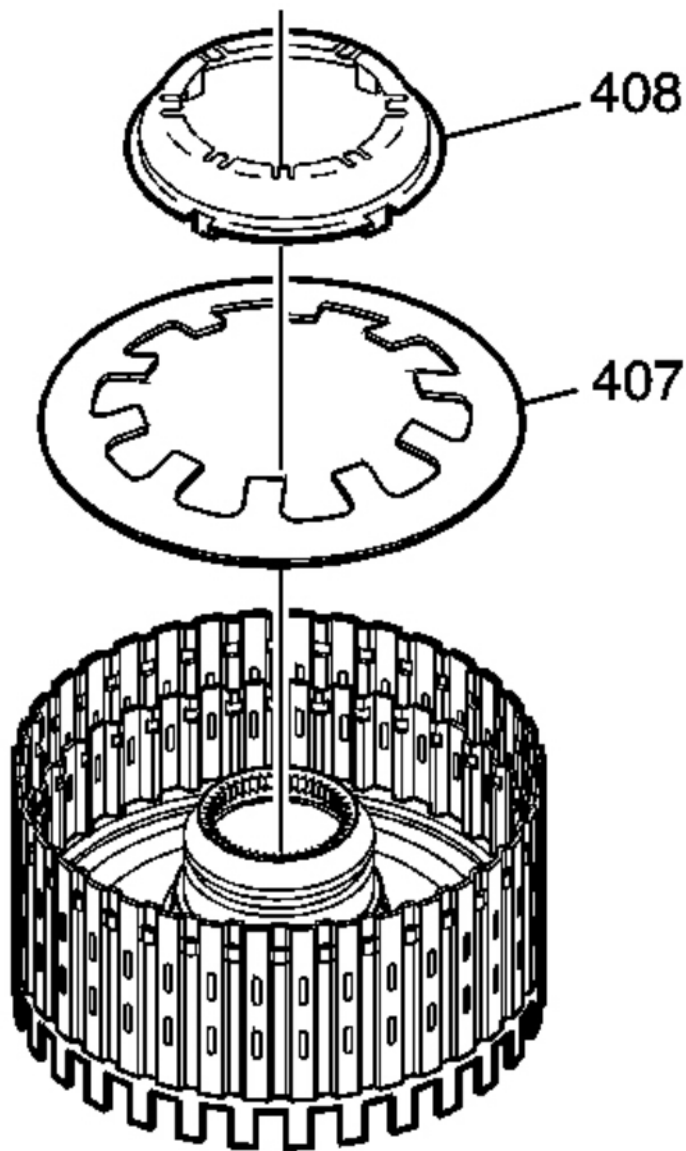


Fig. 153: View Of Piston Spring & Retainer
Courtesy of GENERAL MOTORS CORP.

13. Remove the spring retainer (408).
14. Remove the spring (407).

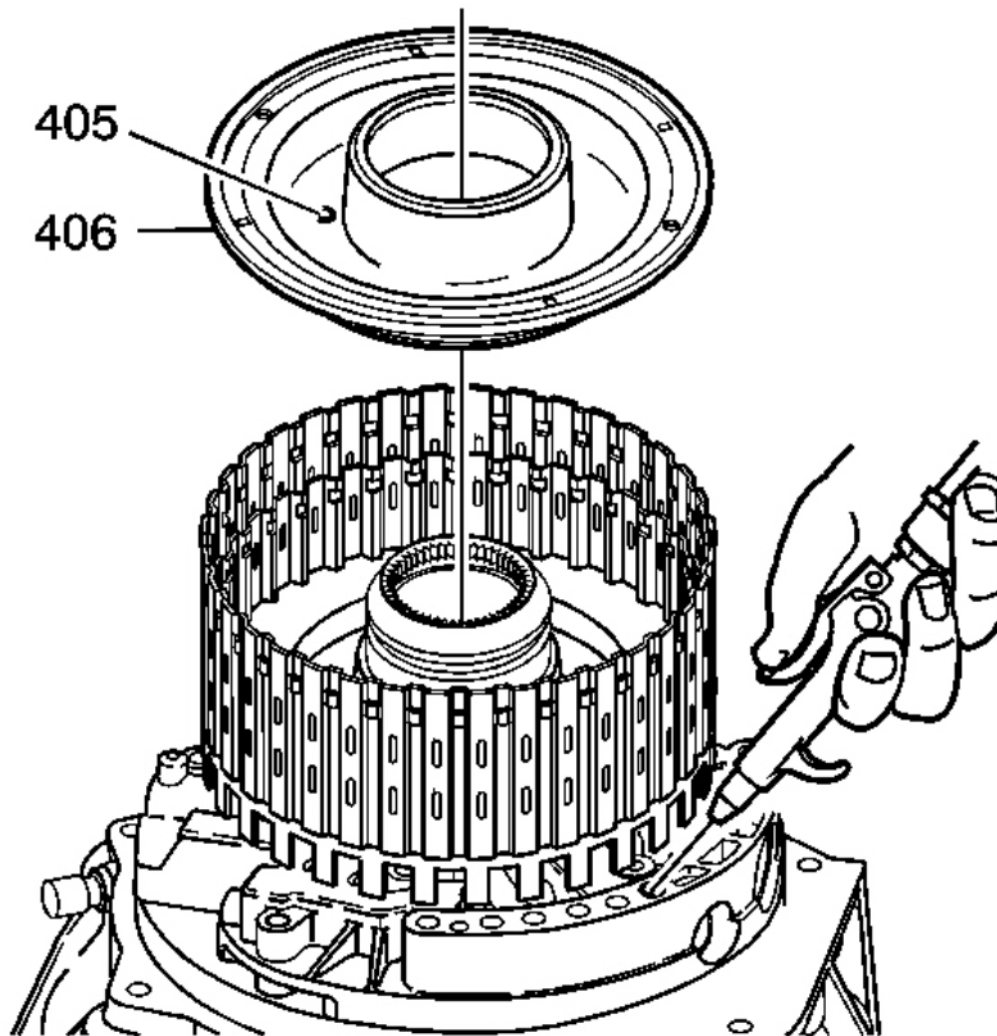


Fig. 154: Locating Direct Clutch Piston
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

15. Remove the direct clutch piston (406).

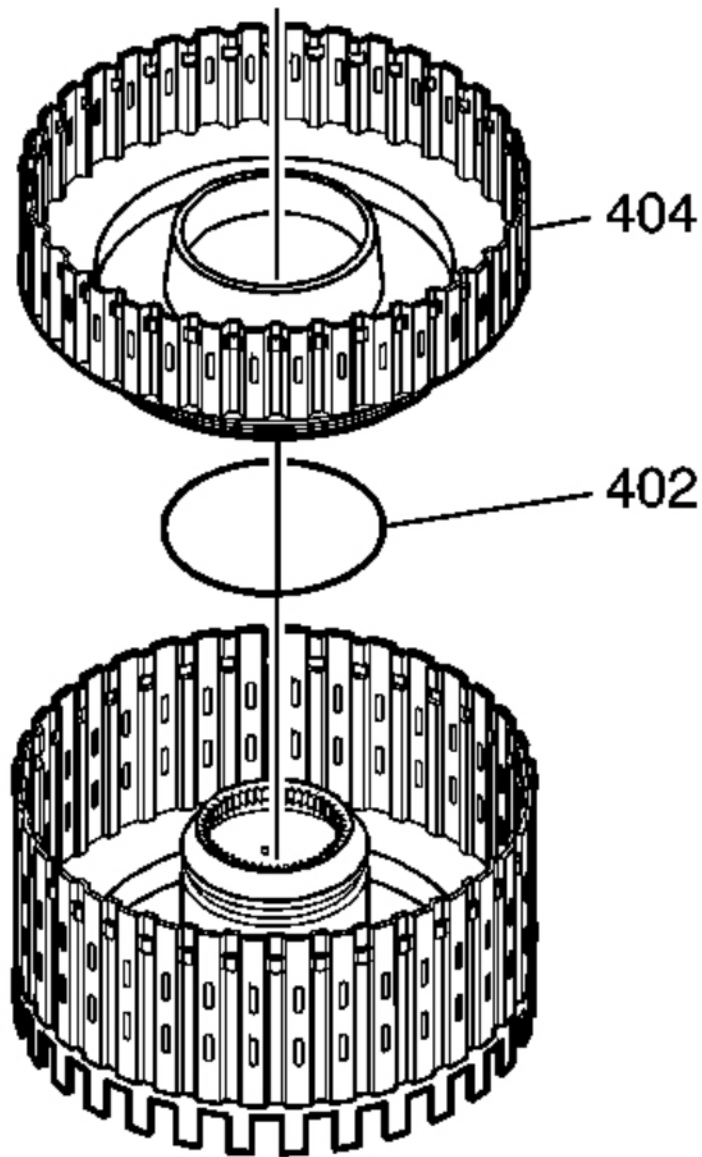


Fig. 155: Identifying Reverse Clutch Piston & Seal
Courtesy of GENERAL MOTORS CORP.

16. Remove the reverse clutch piston (404).
17. Remove the reverse clutch piston inner seal (402).

DIRECT AND REVERSE CLUTCH ASSEMBLE

Tools Required

- **J 38734** Intermediate Spring Compressor Adapter. See **Special Tools and Equipment** .
- **J 45133** Seal Protector. See **Special Tools and Equipment** .
- **J 45139** Compressor Plate. See **Special Tools and Equipment** .

1. Inspect the reverse clutch housing for the following:
 - Plugged feed passages
 - Worn or damaged splines
 - Seal ring groove nicks or burrs
 - Cracked or blocked fluid passages
 - Worn or damaged bushing

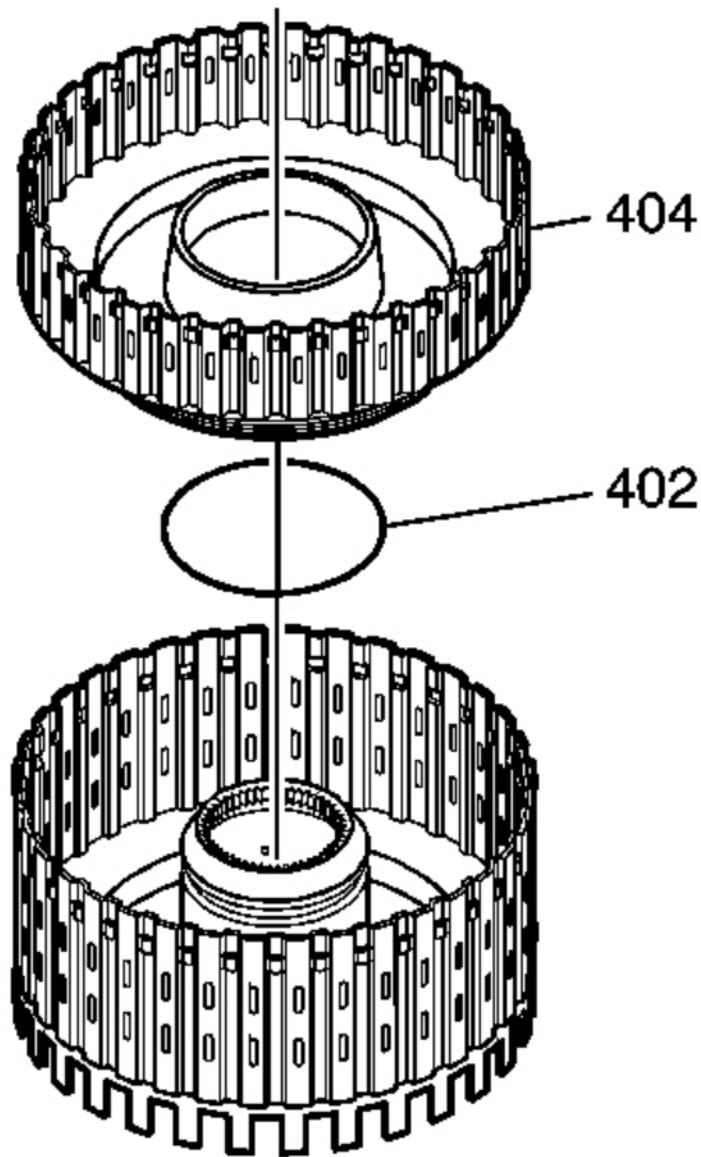


Fig. 156: Identifying Reverse Clutch Piston & Seal
Courtesy of GENERAL MOTORS CORP.

2. Inspect the reverse clutch piston and the direct clutch piston for the following:
 - Cracks or damage to seal grooves

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- Wear on the piston
 - Inner seal damage
 - Damaged ball check valve
 - Worn or damaged clutch plates
3. Install the reverse clutch piston inner seal (402).
 4. Install the reverse clutch piston (404).

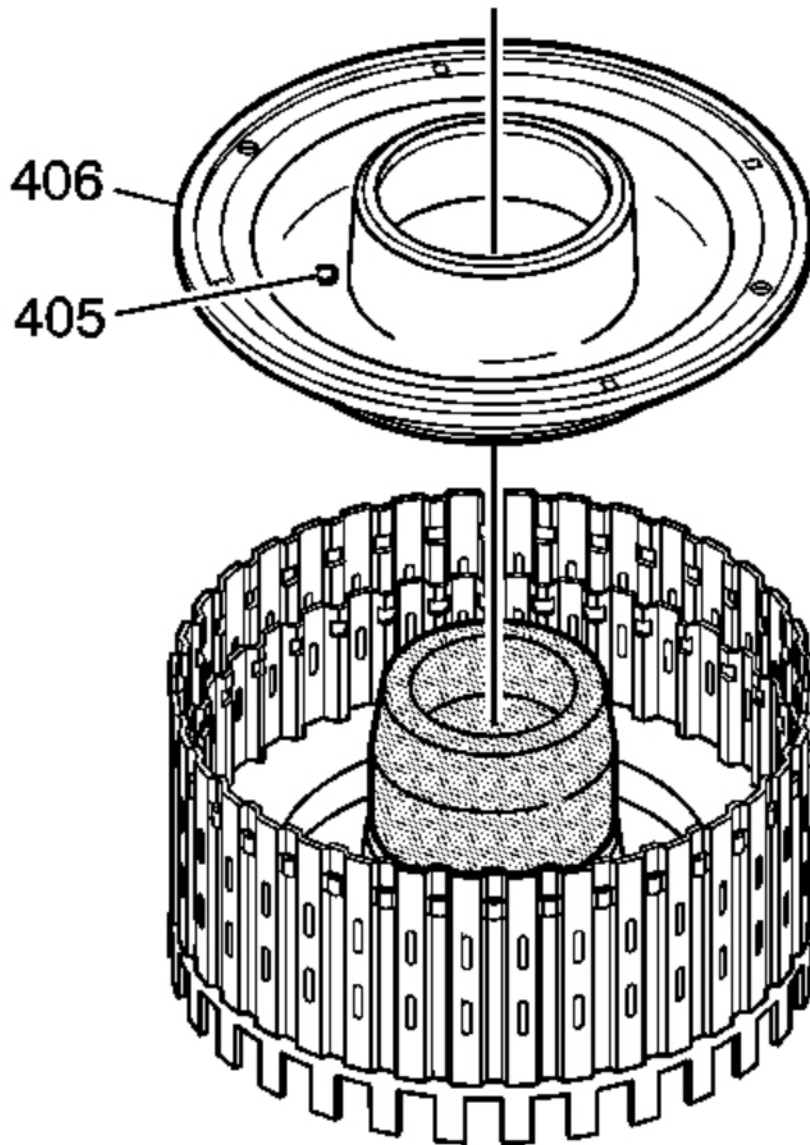


Fig. 157: Installing J 45133 On Direct And Reverse Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

5. Install **J 45133** onto the direct and reverse clutch assembly (6).
6. Install the direct clutch piston (406).

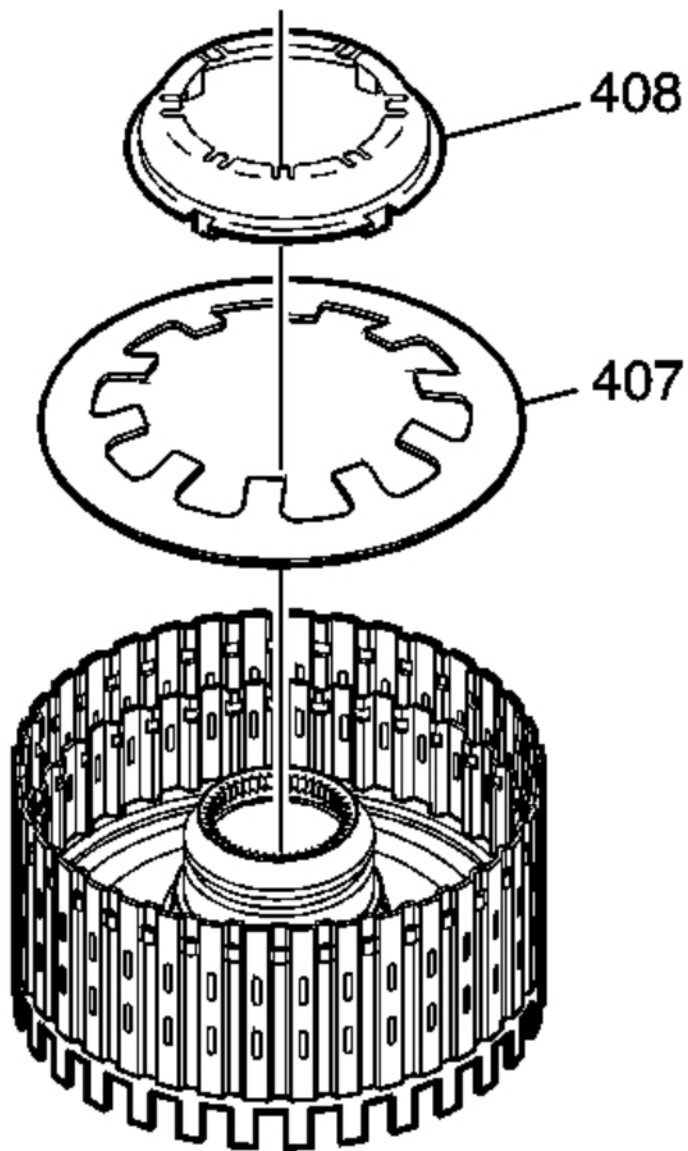


Fig. 158: View Of Piston Spring & Retainer
Courtesy of GENERAL MOTORS CORP.

7. Install the piston spring (407).
8. Install the piston spring retainer (408).

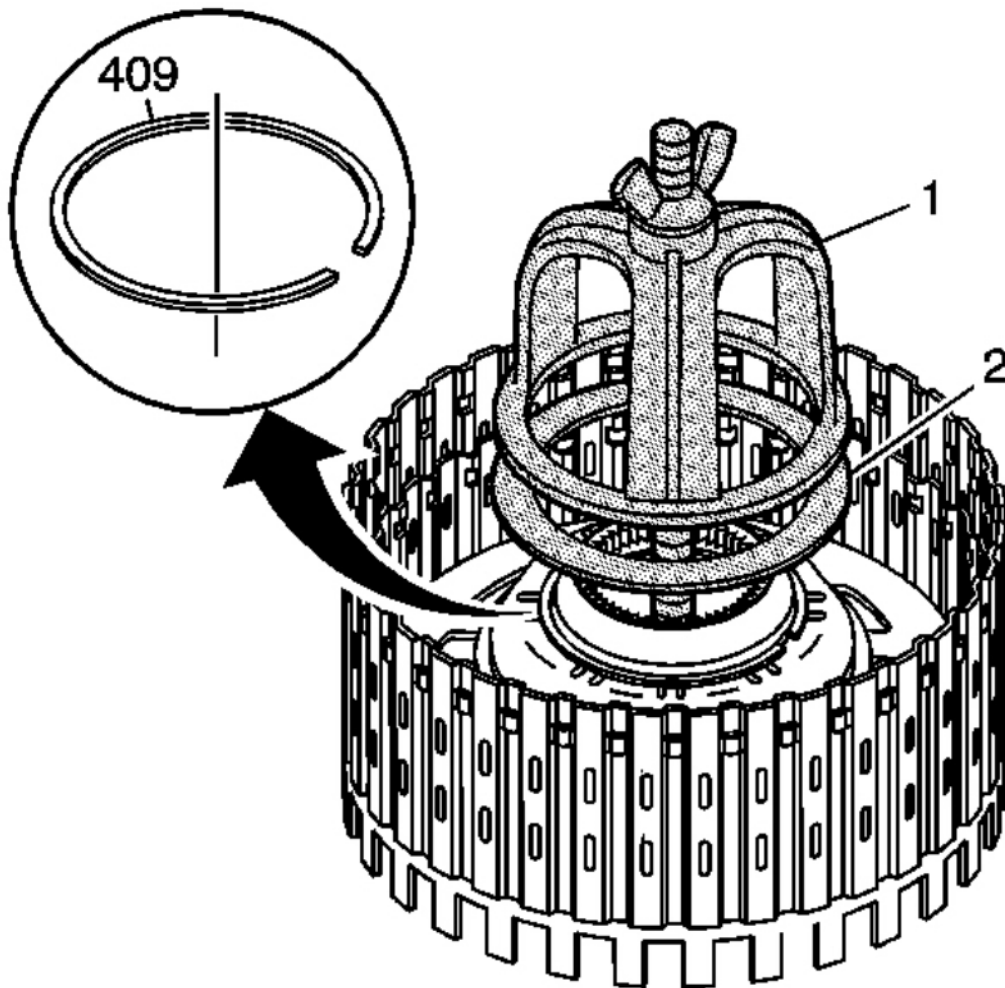


Fig. 159: Identifying Direct And Reverse Clutch Spring Retainer Ring
Courtesy of GENERAL MOTORS CORP.

9. Use **J 38734** (1) and **J 45139** (2) to compress the direct and reverse piston spring.
10. Install the direct and reverse clutch spring retainer ring (409).

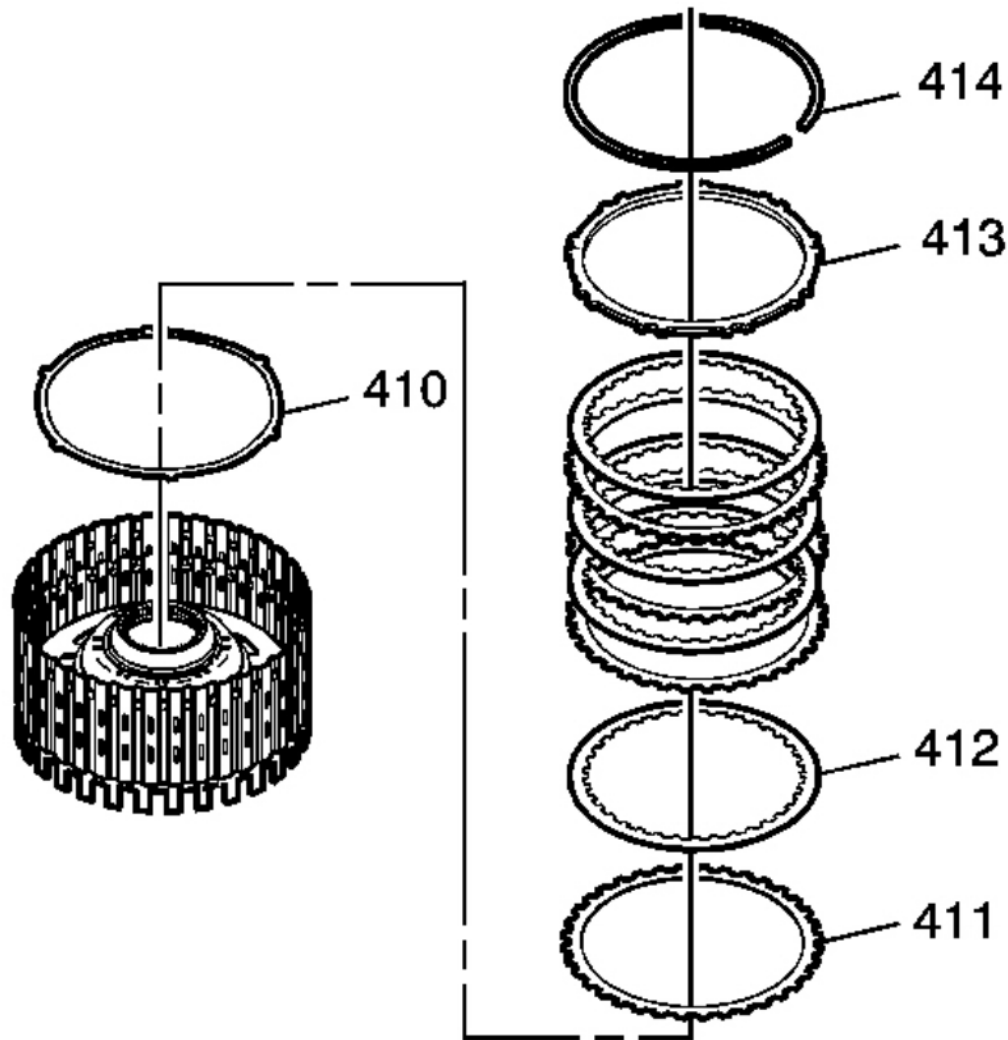


Fig. 160: Locating Direct Clutch Plates
Courtesy of GENERAL MOTORS CORP.

11. Install the apply plate (410).
12. Install the clutch plates (412, 411), starting with the direct clutch plate (411) with outer splines, alternating with the direct clutch plate (412) with inner splines. Refer to **Clutch Plate Selection Specifications** .
13. Install the backing plate (413).

14. Install the backing plate retainer (414).

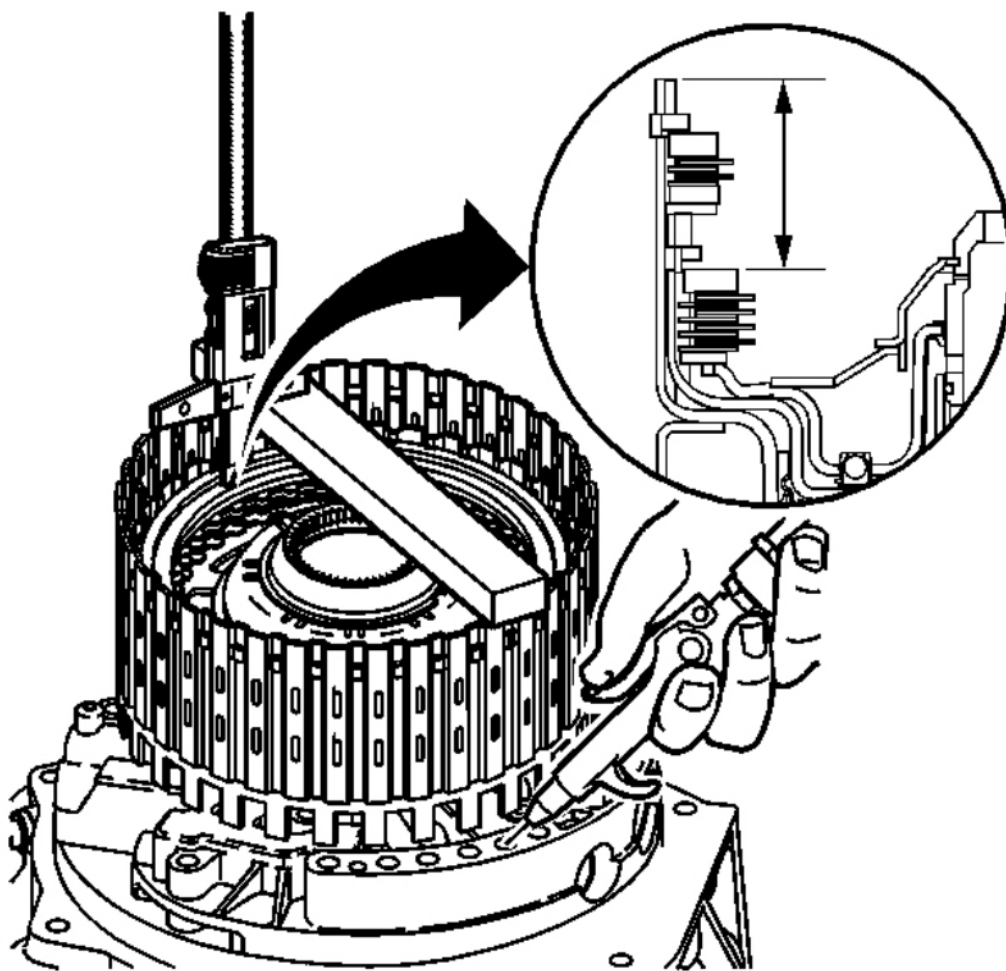


Fig. 161: Measuring Clutch Pack Travel
Courtesy of GENERAL MOTORS CORP.

15. Measure the distance between the direct clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
16. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance between the direct clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.
17. Subtract H2 from H1. This is the clutch pack travel. Refer to **Clutch Piston Travel**

Specifications .

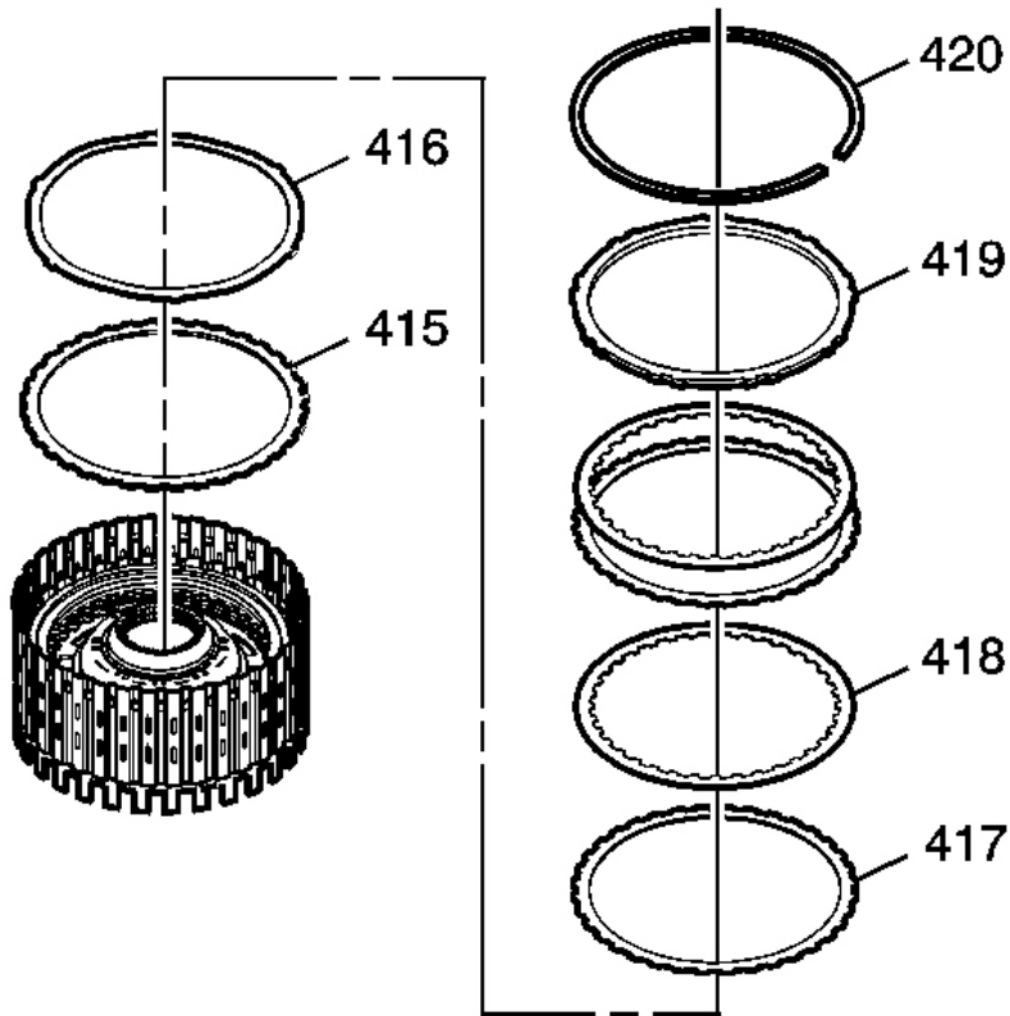


Fig. 162: View Of Reverse Clutch Components
Courtesy of GENERAL MOTORS CORP.

18. Install the reverse clutch spacer (415).
19. Install the apply plate (416).
20. Install the clutch plates (417, 418), starting with clutch plates (417) with outer splines, alternating with clutch plates (418) with inner splines. Refer to **Clutch Plate Selection**

Specifications .

21. Install the reverse clutch backing plate (419).
22. Install the reverse clutch backing plate retainer (420).

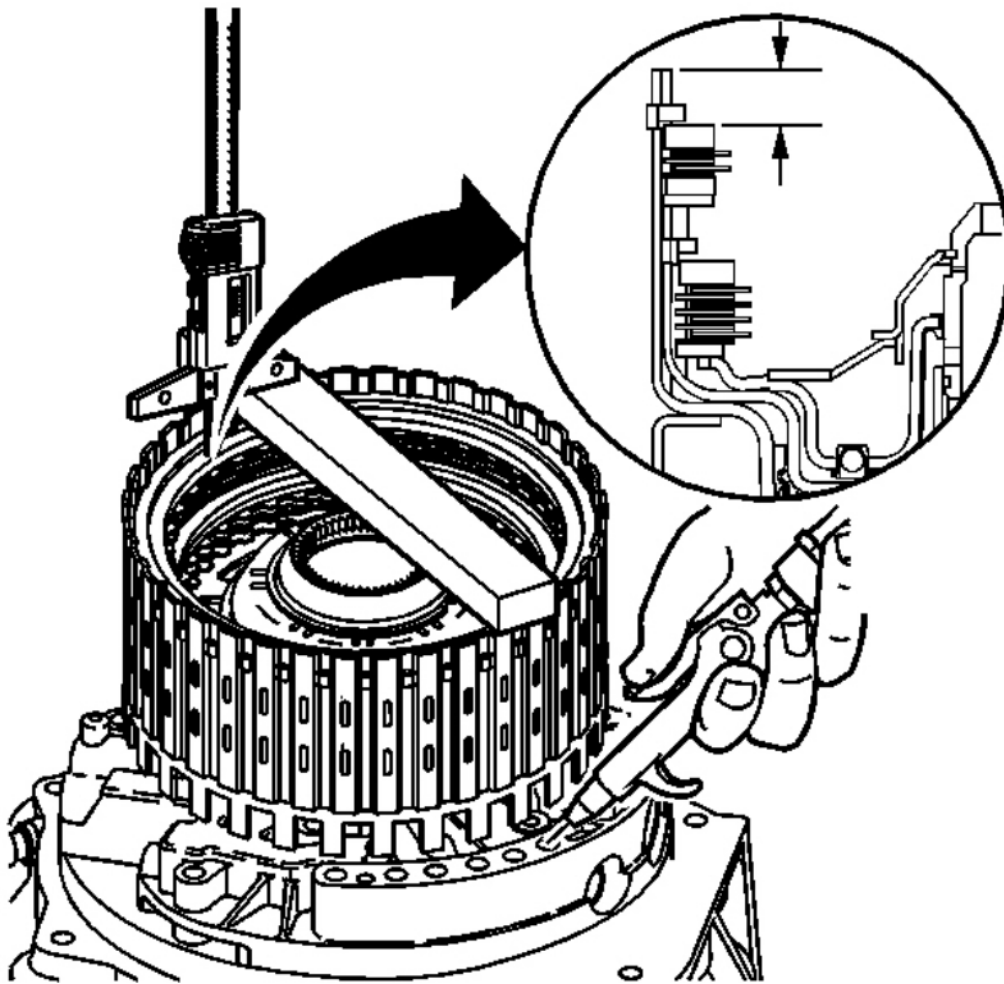


Fig. 163: Checking Dimension H1 & Dimension H2
Courtesy of GENERAL MOTORS CORP.

23. Measure the distance between the reverse clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H1.
24. Apply 65 PSI (448.17 kPa) of air pressure to the specified port. Measure the distance

between the reverse clutch backing plate and the bottom of the gage bar. Measure three times in different locations on the backing plate. Record this as H2.

25. Subtract H2 from H1. This is the clutch pack travel. Refer to Clutch Piston Travel Specifications .

DIRECT AND REVERSE CLUTCH - FORWARD AND COAST CLUTCH INSTALLATION

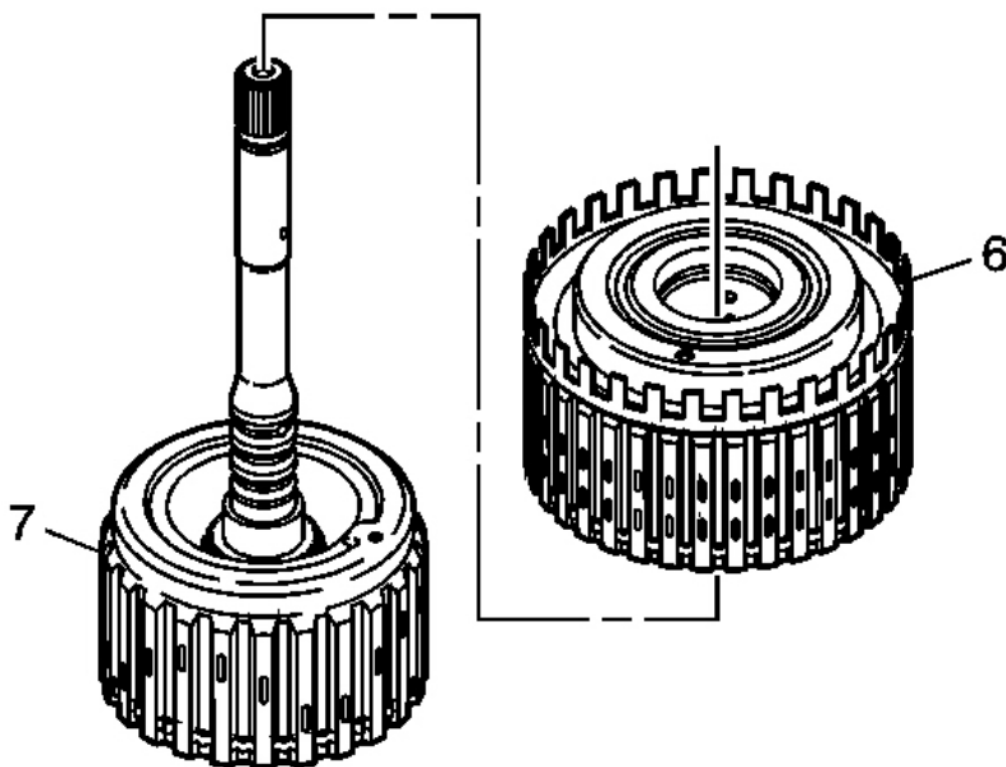


Fig. 164: Installing Direct And Reverse Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage the input shaft fluid seals when removing or installing the direct and reverse coast clutch assembly.

1. Place the direct and reverse clutch assembly (6) onto the forward and coast clutch assembly (7).

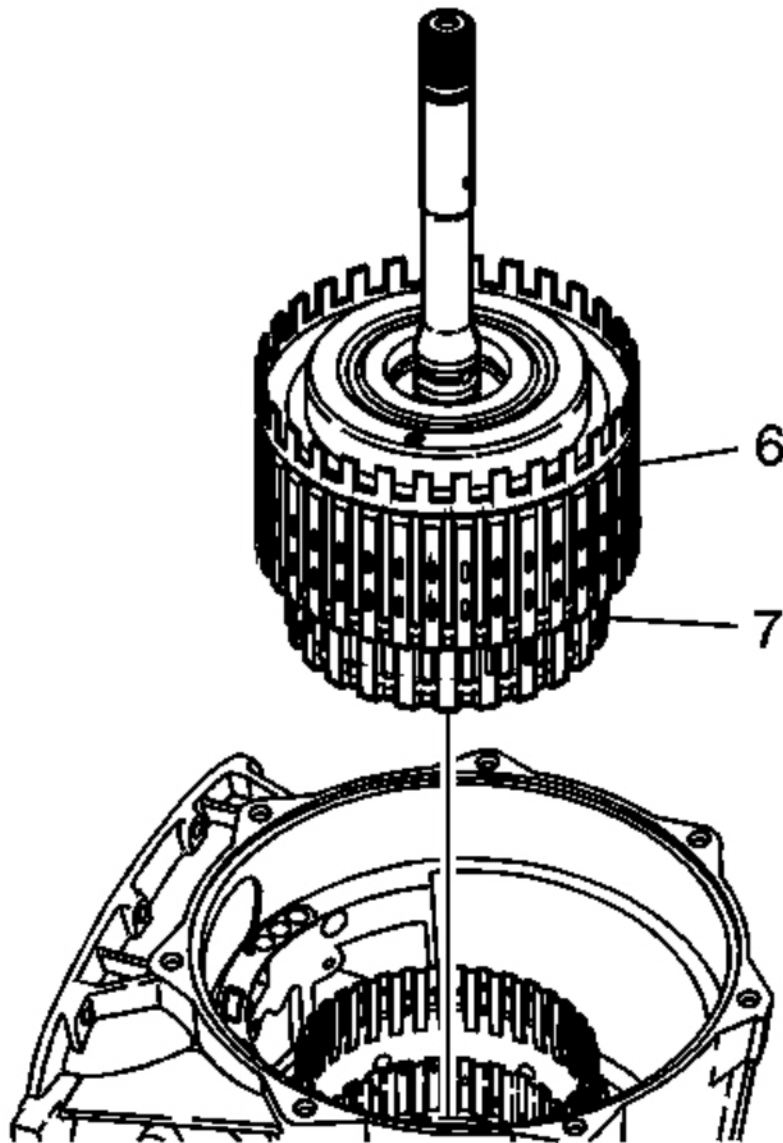


Fig. 165: Identifying Direct And Reverse Clutch Assembly & Forward And Coast Clutch Assembly

Courtesy of GENERAL MOTORS CORP.

2. Install the direct and reverse clutch assembly (6) and the forward and coast clutch assembly (7) into the case (24).

FLUID PUMP REMOVAL

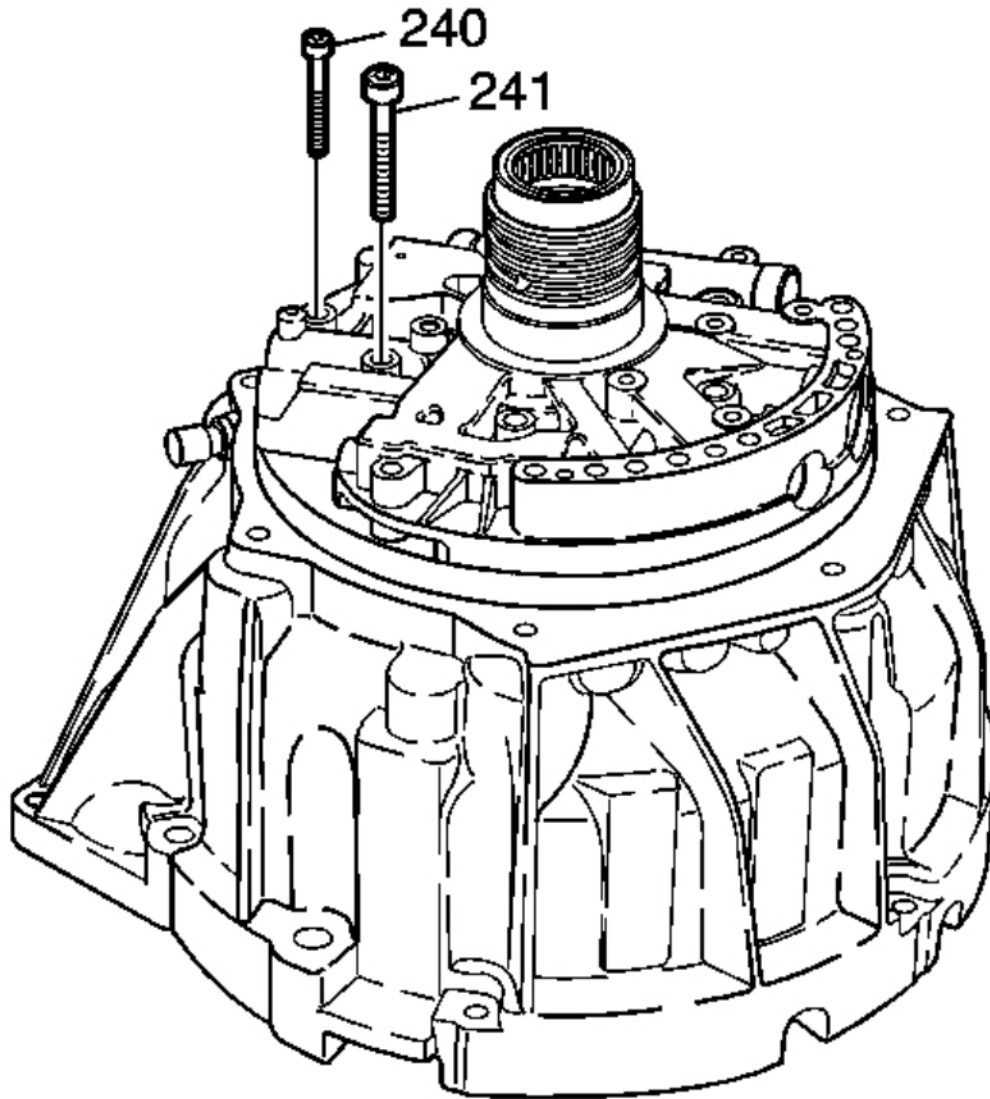


Fig. 166: Locating Oil Pump To Torque Converter Housing Bolts
Courtesy of GENERAL MOTORS CORP.

1. Remove the oil pump to torque converter housing bolts (240, 241).

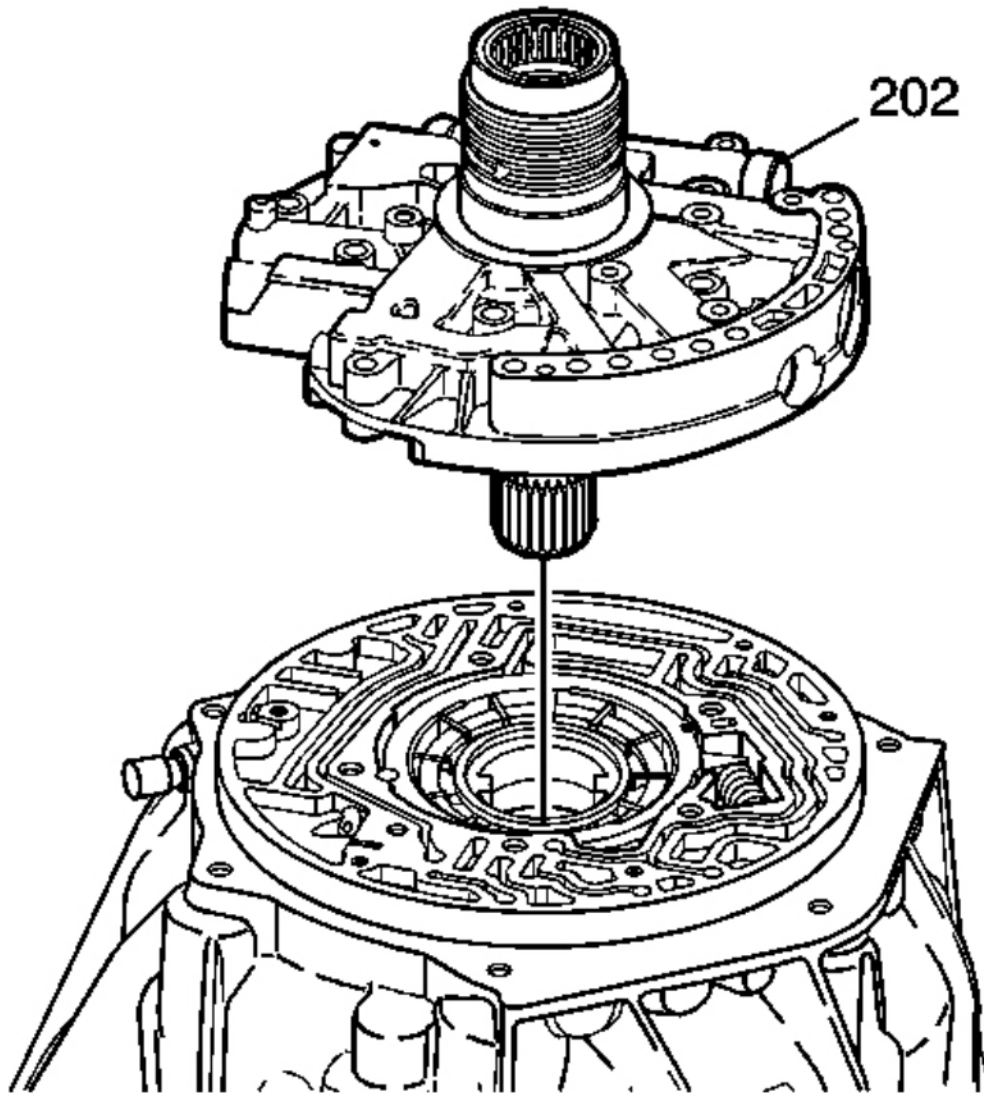


Fig. 167: View Of Pump Cover Housing
Courtesy of GENERAL MOTORS CORP.

2. Remove the oil pump cover (202).

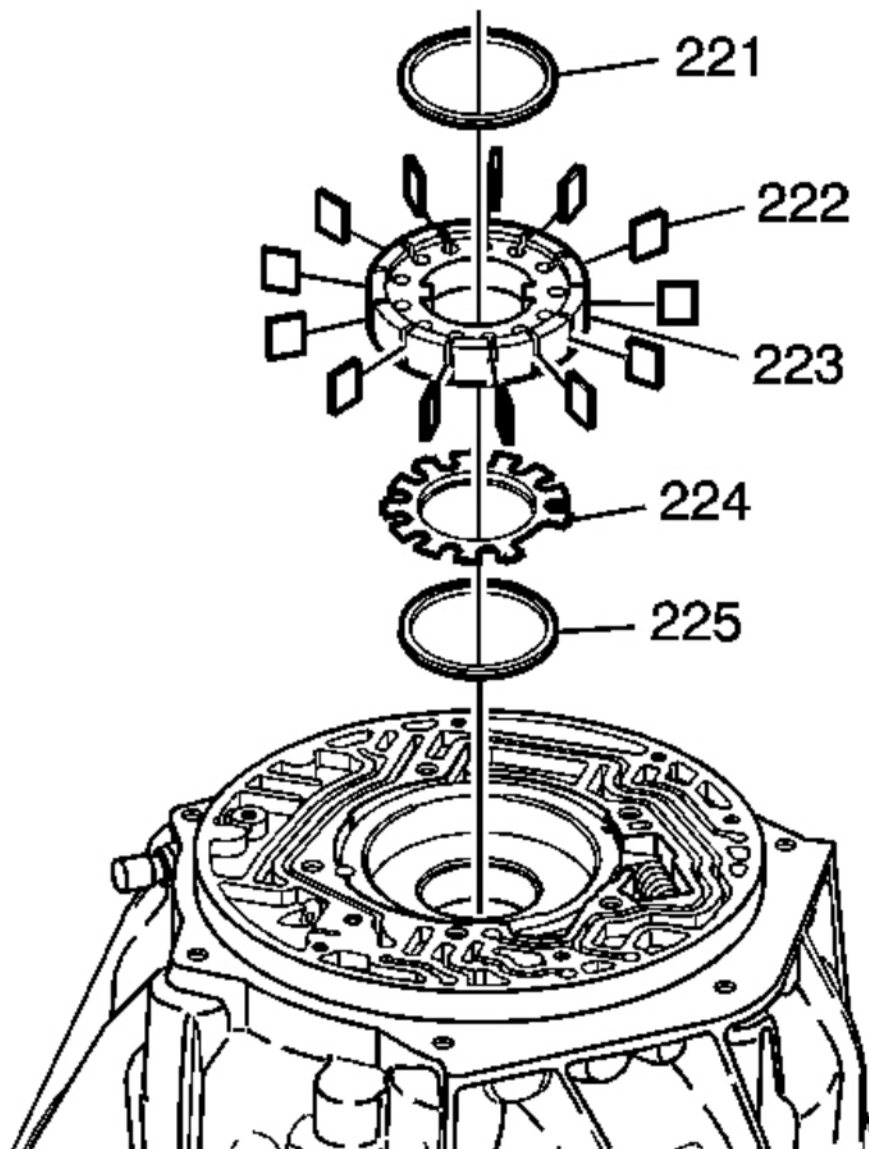


Fig. 168: Locating Fluid Pump Vane Ring
Courtesy of GENERAL MOTORS CORP.

3. Remove the pump vane ring (221).
4. Remove the pump vanes (222).

-
- This diagram shows an exploded view of a circular component assembly. The main base is a circular plate with a complex internal pattern of raised features and recesses. Above this base, there is a cylindrical ring component labeled 220. A smaller cylindrical ring, labeled 242, is positioned between the base and the ring 220. Above the ring 220, there is a larger cylindrical component labeled 216. A small cylindrical pin or plug, labeled 217, is shown to the right of component 216. A small cylindrical component, labeled 218, is shown to the right of component 216. A coiled spring, labeled 219, is shown to the right of component 216. A small cylindrical component, labeled 231, is shown to the left of component 216. The diagram is a technical drawing with a vertical center line and dashed lines indicating the assembly path.

Fig. 169: Identifying Fluid Pump Components
Courtesy of GENERAL MOTORS CORP.

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8. Remove the pump slide spring (219).
9. Remove the pump slide (216).
10. Remove the fluid pump slide pin (231).
11. Remove the pump slide ring (220, 242).
12. Remove the fluid pump support (217) and the fluid pump slide seal (218).

FLUID PUMP DISASSEMBLE

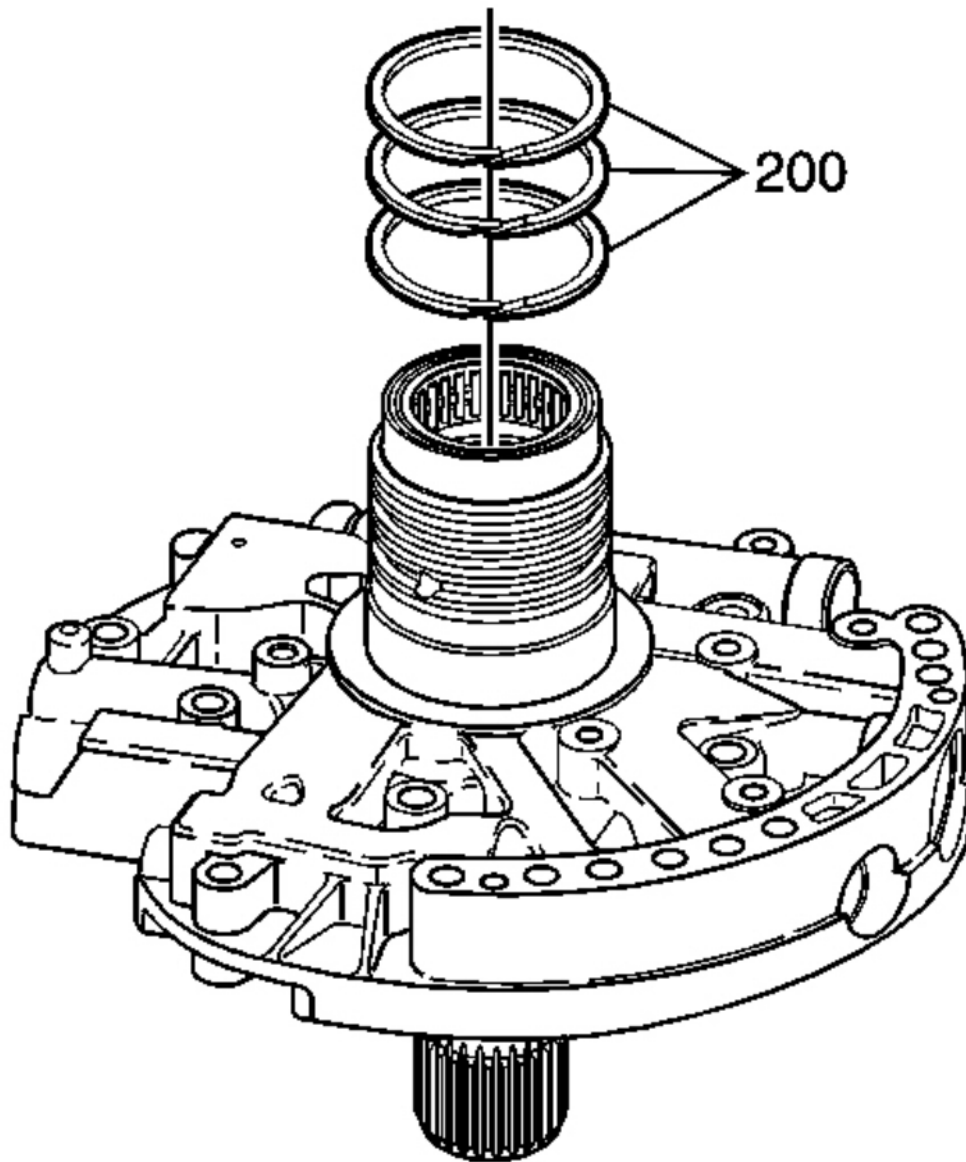


Fig. 170: Locating Reverse Clutch Housing Fluid Seal Rings
Courtesy of GENERAL MOTORS CORP.

1. Remove the reverse clutch housing seal rings (200).

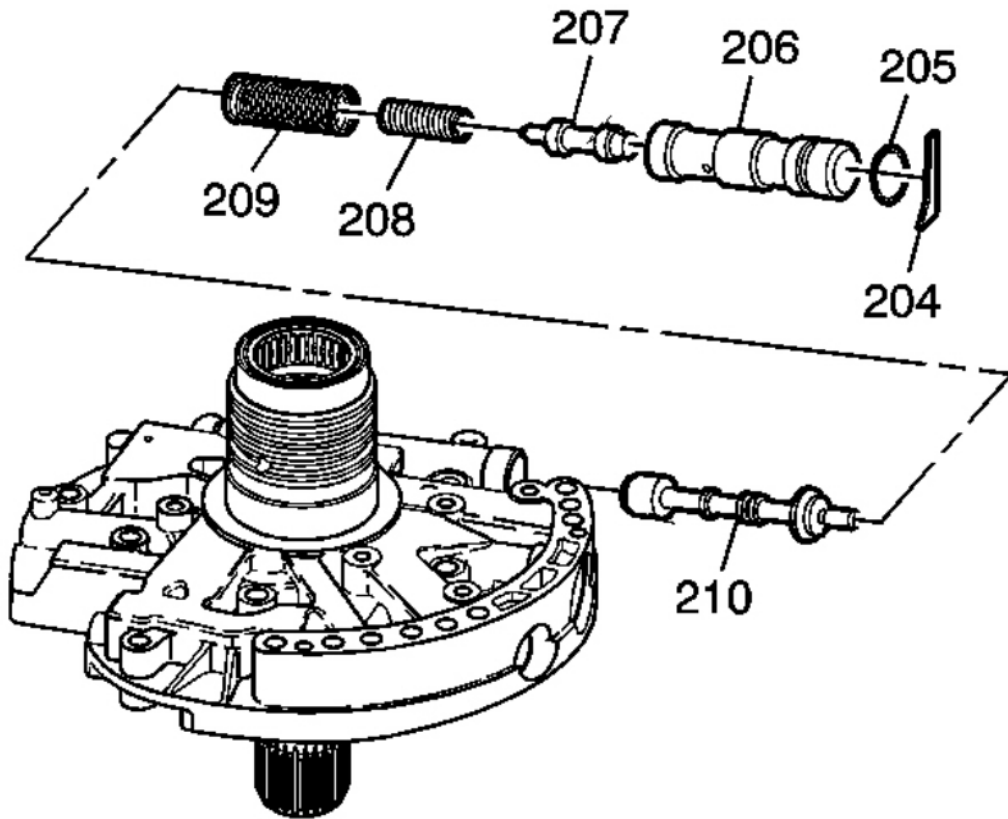


Fig. 171: Identifying Pressure Regulator Valve & Line Boost Valve
 Courtesy of GENERAL MOTORS CORP.

2. Remove the line boost valve retainer (204).
3. Remove the line boost valve bushing (206) and the line boost valve (207).
4. Remove the line boost valve bushing seal (205).
5. Remove the line boost valve spring (208) and the pressure regulator valve spring (209).
6. Remove the pressure regulator valve (210).

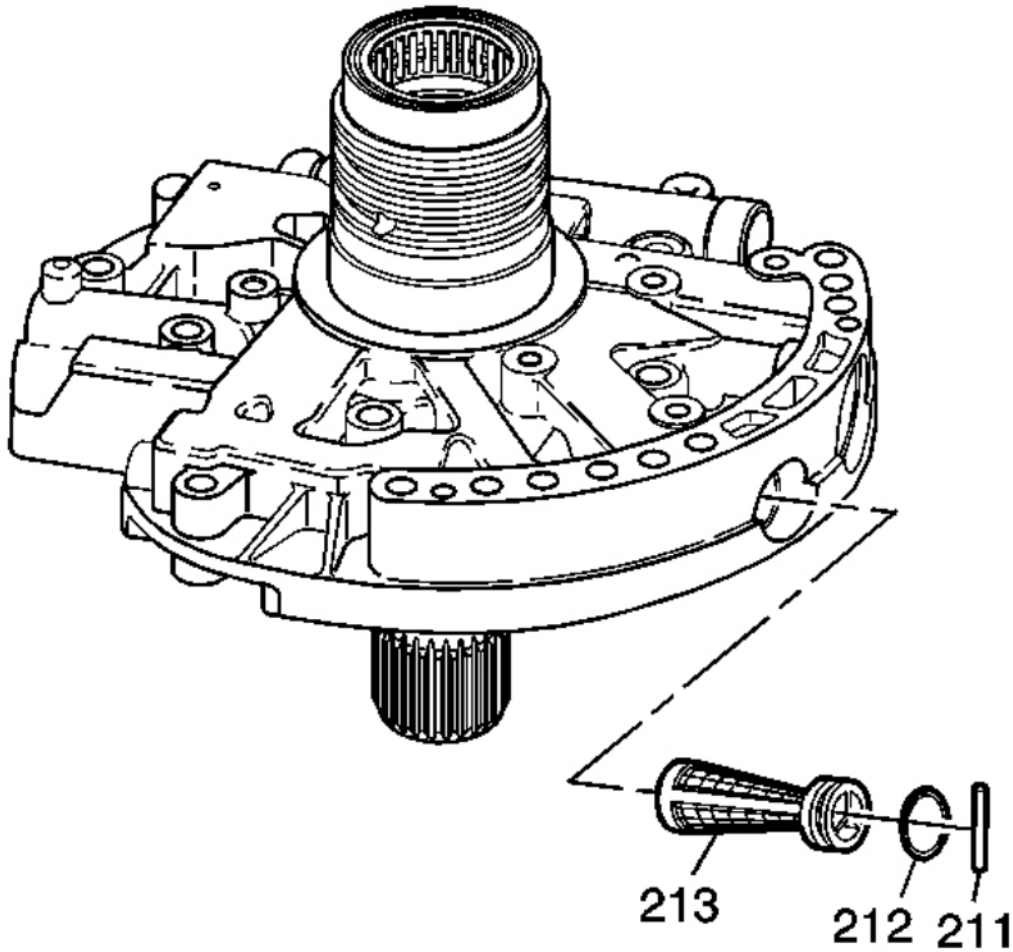


Fig. 172: View Of Pump Cover Screen
Courtesy of GENERAL MOTORS CORP.

7. Remove the fluid pump cover screen pin (211).
8. Remove the pump cover screen (213).
9. Remove the fluid pump cover seal (212).

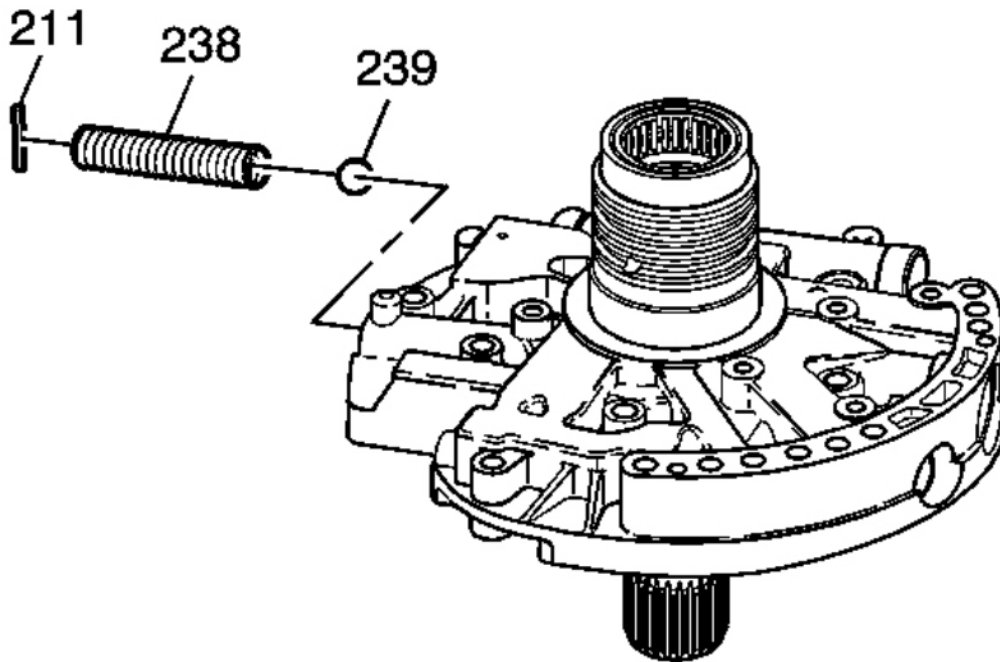


Fig. 173: Identifying Pressure Relief Valve & Spring
Courtesy of GENERAL MOTORS CORP.

10. Remove the pressure relief ball pin (211).
11. Remove the pressure relief spring (238) and the pressure relief ball (239).

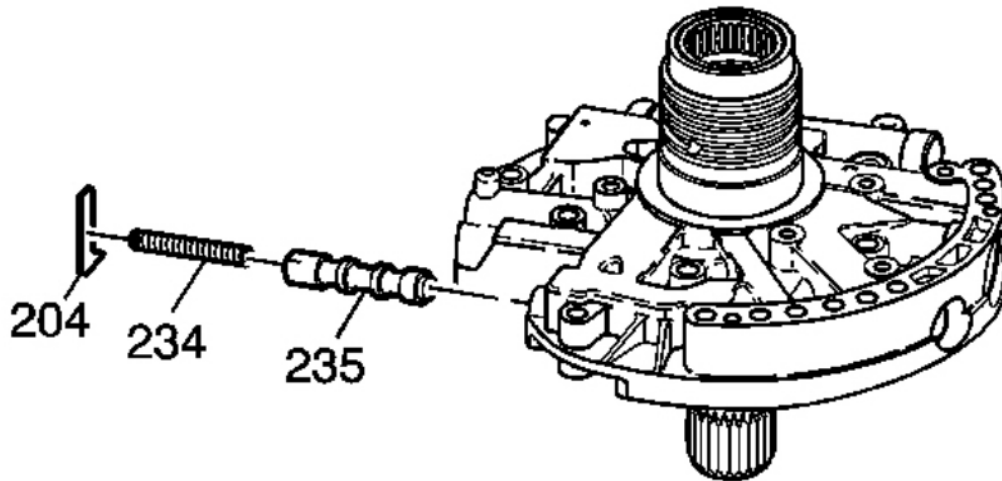


Fig. 174: TCC Control Valve, Retainer & Spring
Courtesy of GENERAL MOTORS CORP.

12. Remove the TCC control valve pin (204).
13. Remove the TCC control valve spring (234) and the TCC control valve (235).

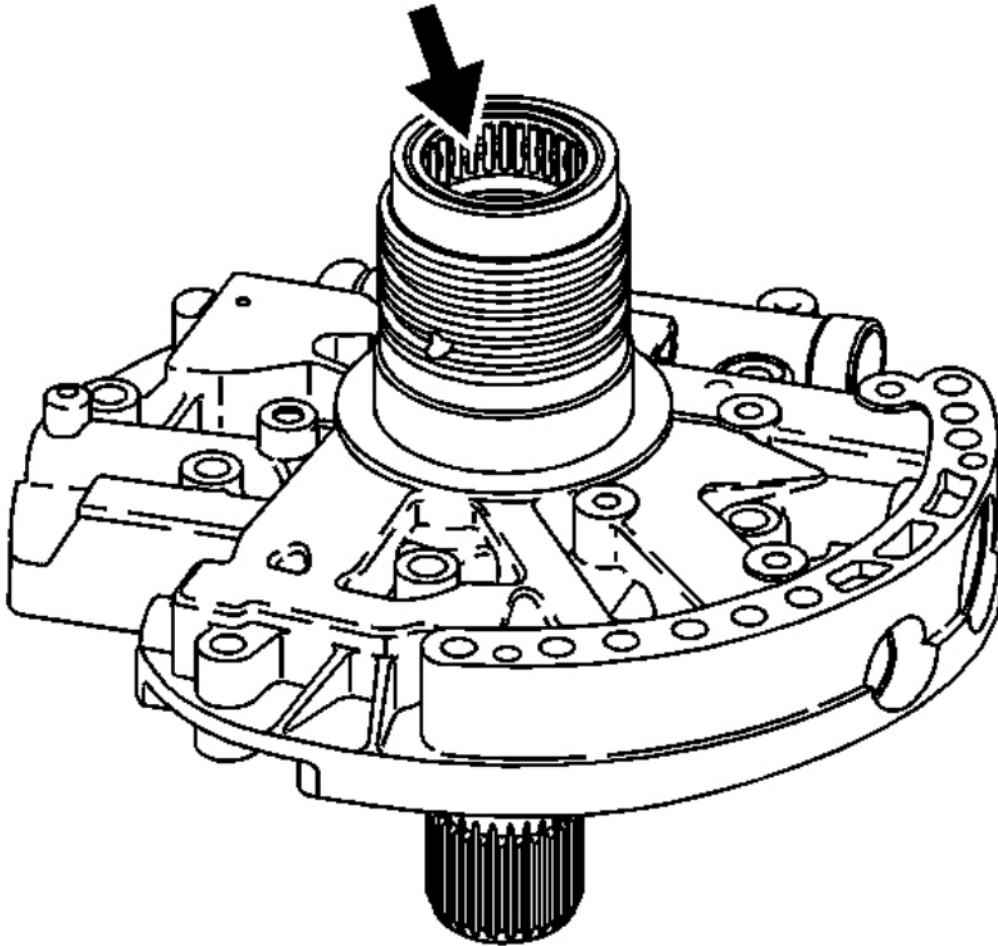


Fig. 175: Locating Inspection Areas On Input Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

14. Inspect the input shaft bearing (201) for the following:
- Damaged bearing cage
 - Pitted bearings
 - Scored bearings

TORQUE CONVERTER SEAL REMOVAL

Tools Required

J 45000 Seal Remover. See Special Tools and Equipment .

Removal Procedure

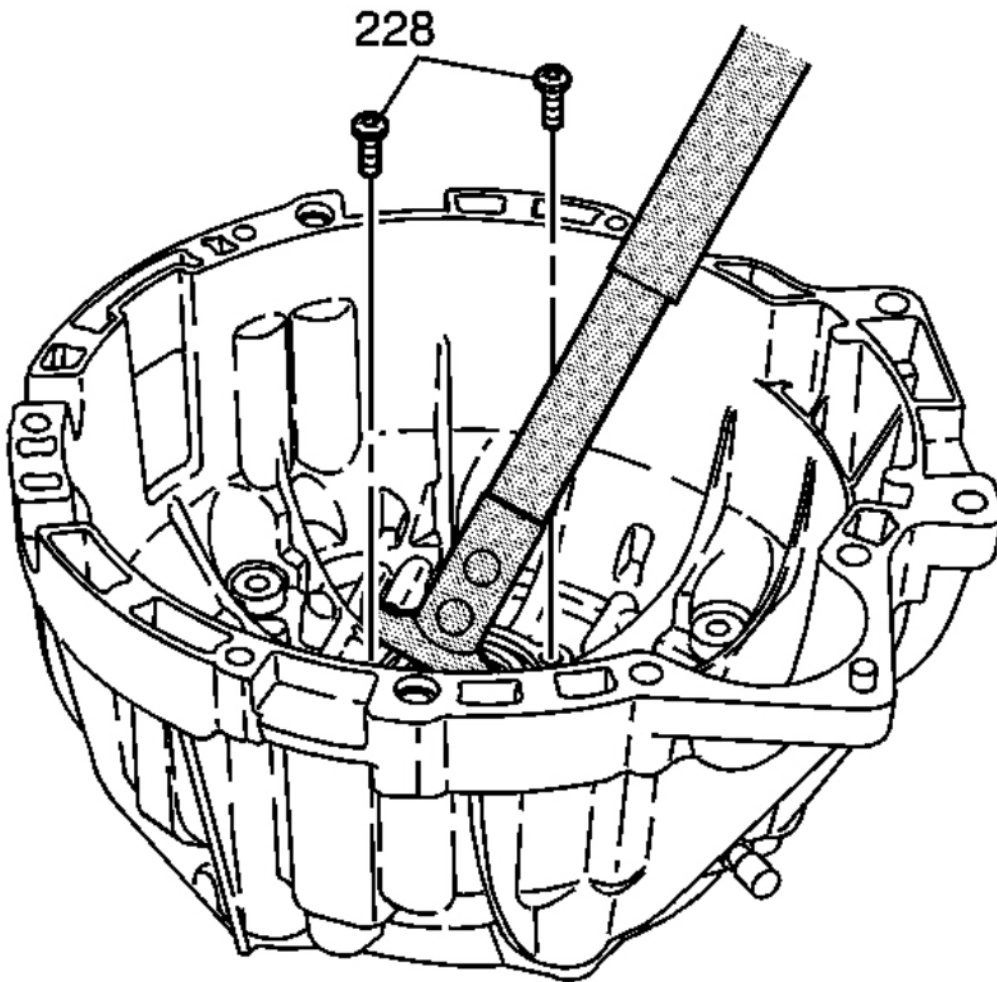


Fig. 176: Identifying Torque Converter Seal Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

1. Remove the two bolts (228).
2. Remove the torque converter seal using **J 45000** .

Tools Required

J 21368 Pump Body Cover Alignment Band. See **Special Tools and Equipment** .

Assembly Procedure

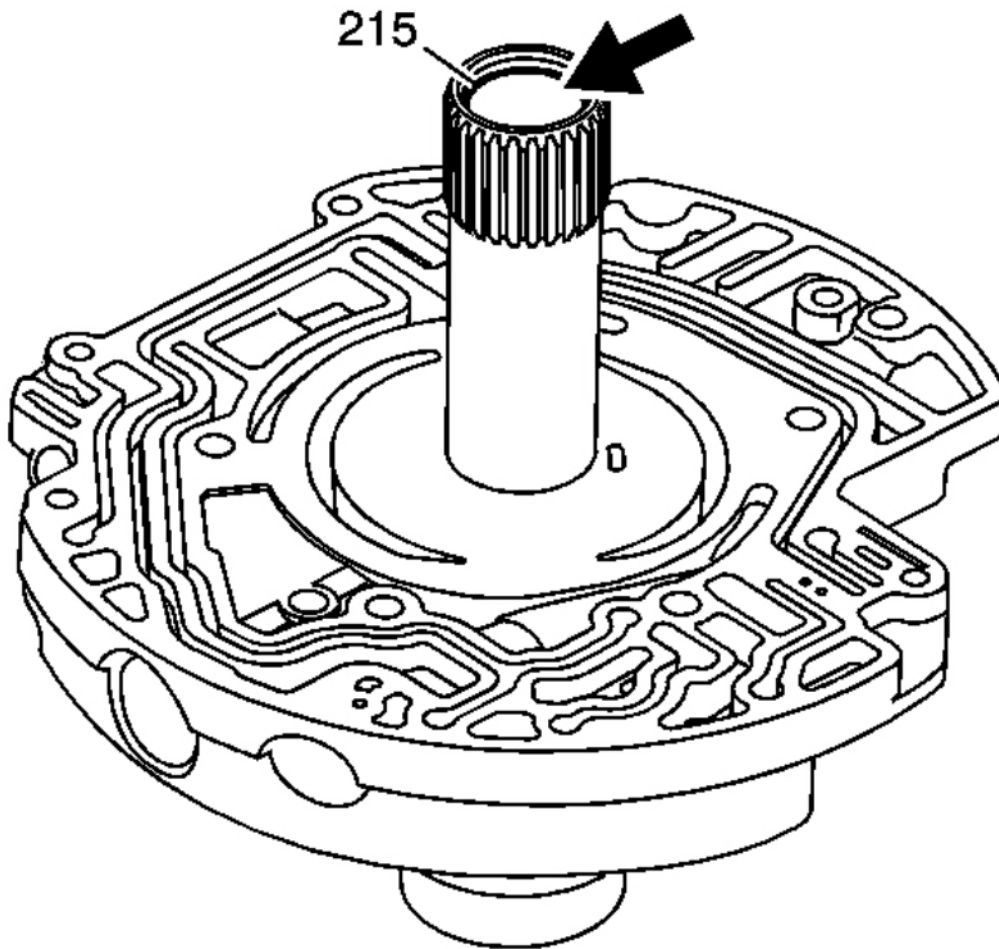


Fig. 177: Inspecting Oil Pump Bushing For Wear
Courtesy of GENERAL MOTORS CORP.

1. Inspect the bushing (215) for wear - not serviceable.

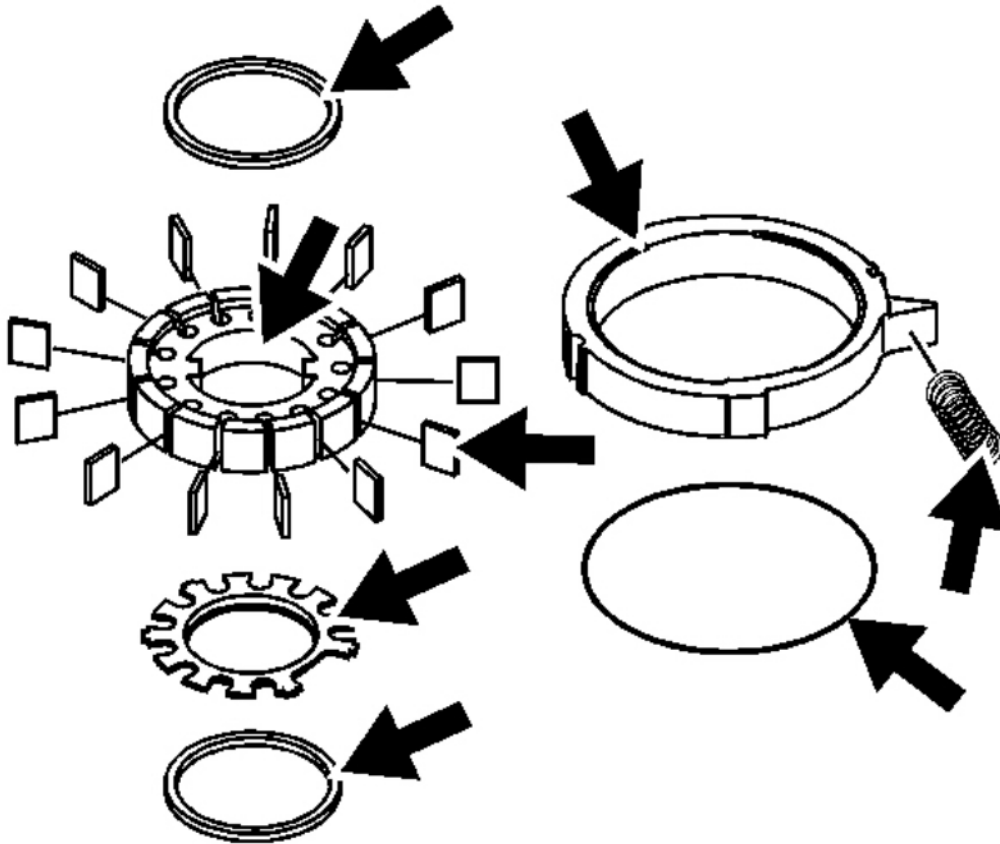


Fig. 178: View Of Oil Pump Components
Courtesy of GENERAL MOTORS CORP.

2. Inspect the oil pump parts for the following:
 - Worn, scored or gouged pump slide
 - Cracks, wear or damage to the rotor or vanes
 - Cuts or damage to the seals
 - Broken priming springs

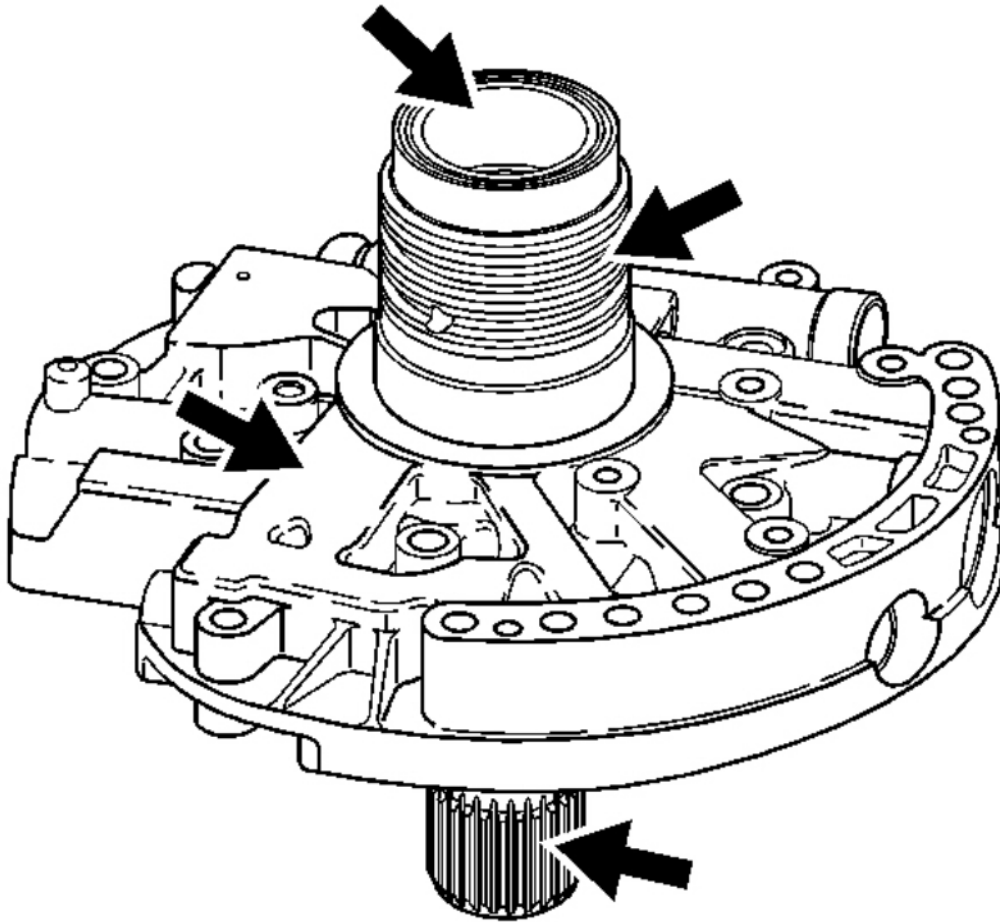


Fig. 179: Identifying Oil Pump Housing Inspection Areas
Courtesy of GENERAL MOTORS CORP.

3. Inspect the oil pump housing for the following:
 - Porosity
 - Interconnected oil passages
 - Damaged machined surfaces

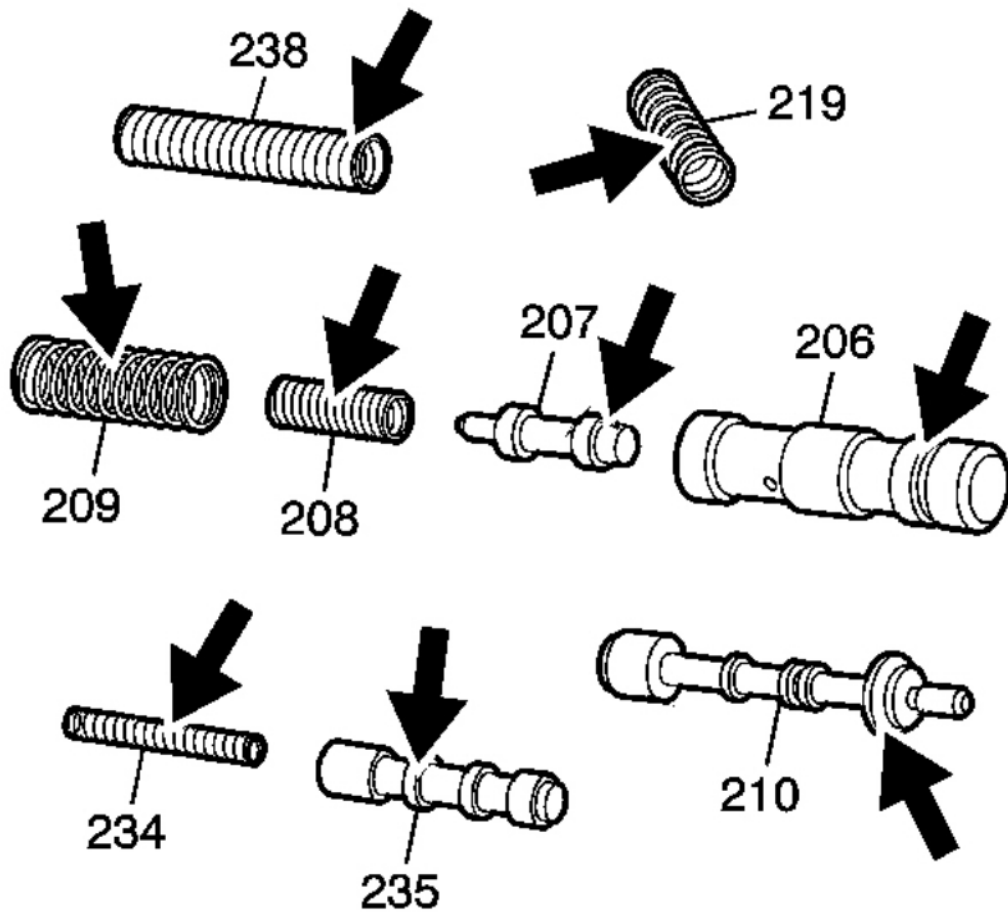


Fig. 180: Locating Oil Pump Valves

Courtesy of GENERAL MOTORS CORP.

4. Inspect the valves (207, 210, 235) and springs (208, 209, 234, 238, 219) for the following:
 - Nicks or burrs on the valves
 - Worn, distorted or cracked springs

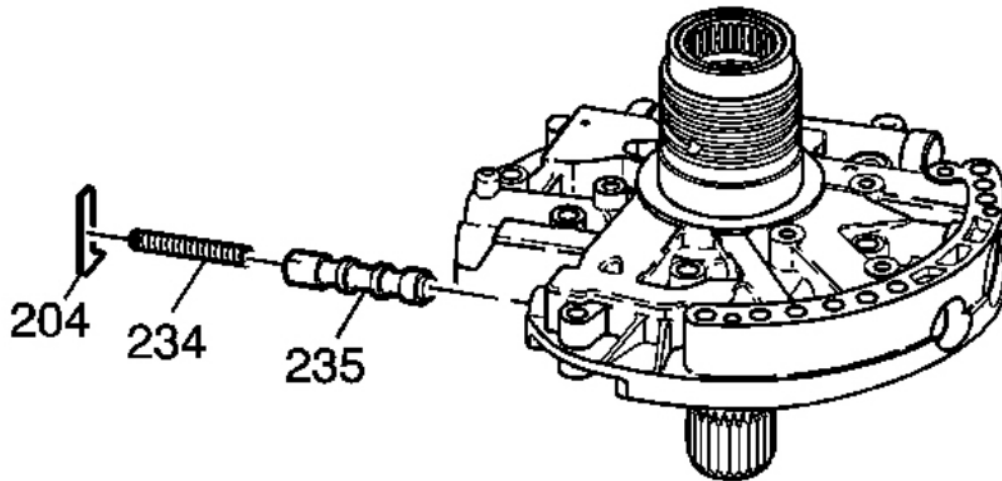


Fig. 181: TCC Control Valve, Retainer & Spring
Courtesy of GENERAL MOTORS CORP.

5. Install the TCC control valve (235) and the TCC control valve spring (234).
6. Install the TCC control valve spring retainer (204).

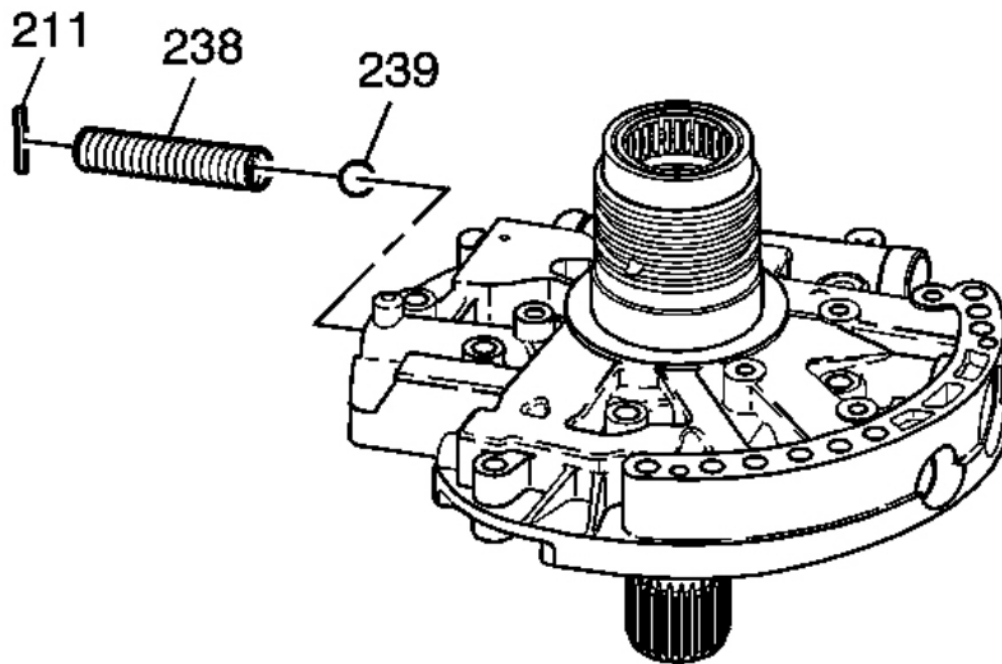


Fig. 182: Identifying Pressure Relief Valve & Spring
Courtesy of GENERAL MOTORS CORP.

7. Install the pressure relief valve (239) and spring (238).
8. Install the pressure valve spring retainer (211).

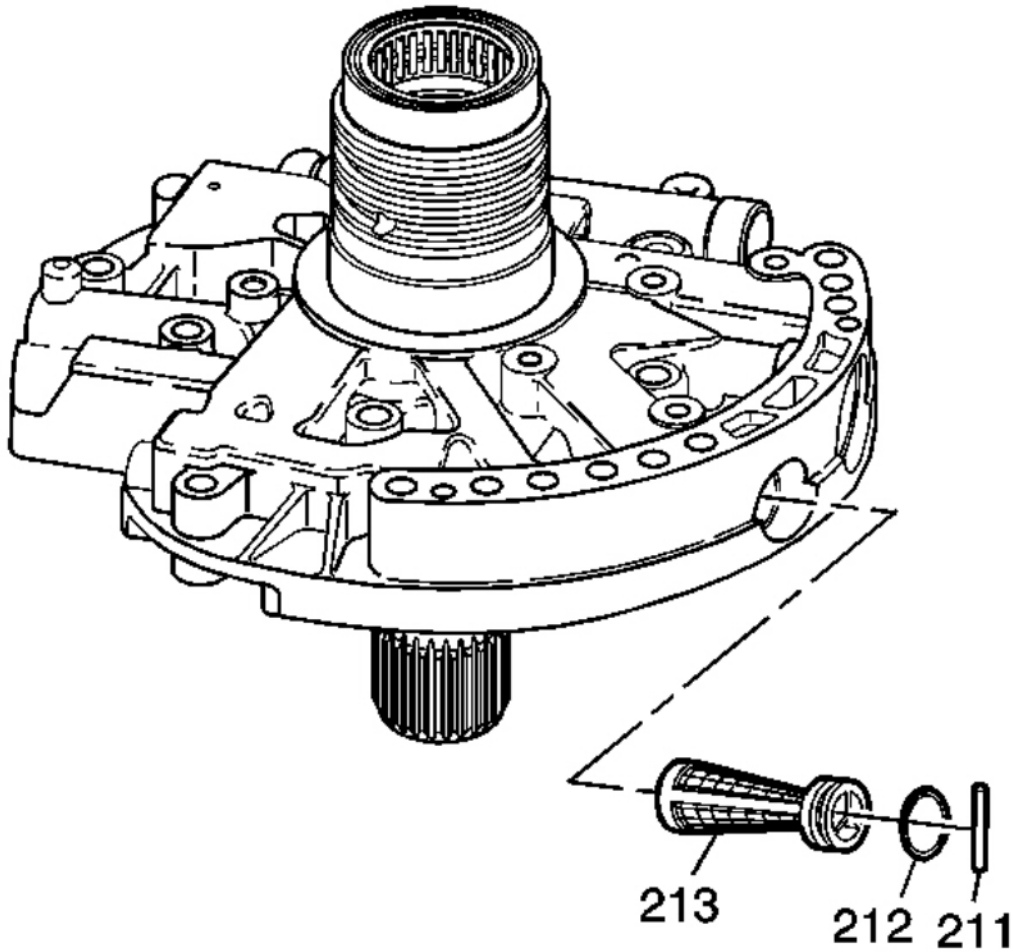


Fig. 183: View Of Pump Cover Screen
Courtesy of GENERAL MOTORS CORP.

9. Install the pump cover seal (212) onto the new pump cover screen (213).
10. Install the pump cover screen (213).
11. Install the pump cover screen pin (211).

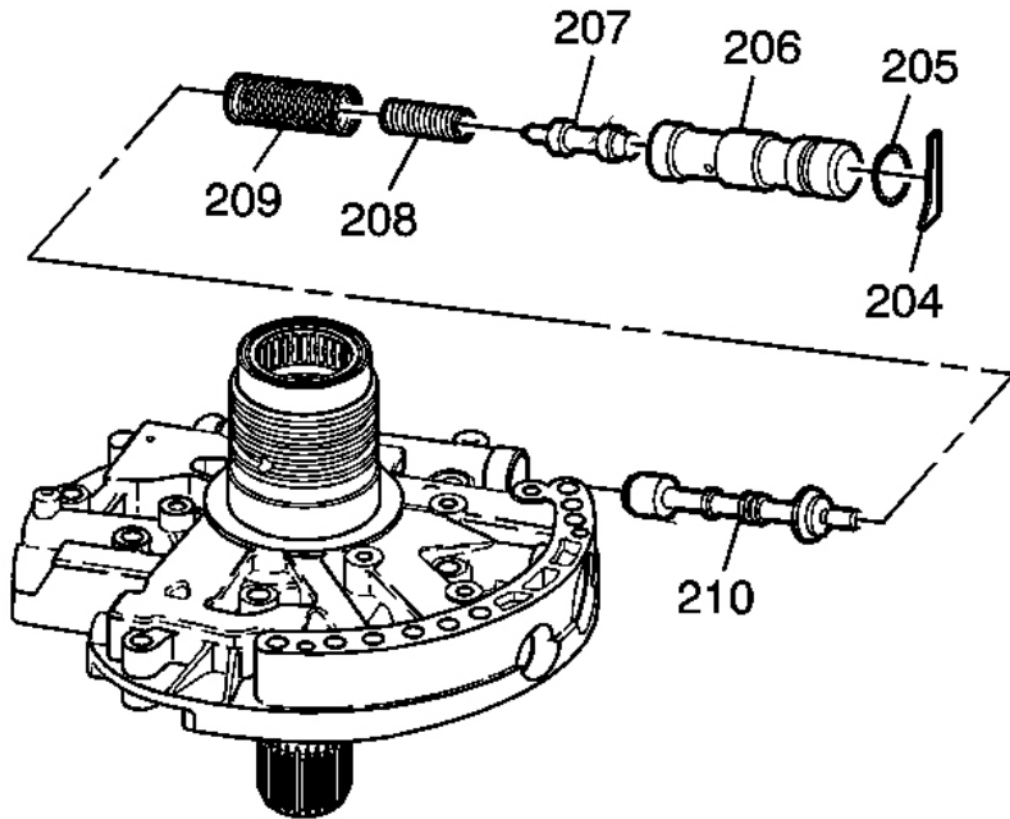


Fig. 184: Identifying Pressure Regulator Valve & Line Boost Valve
Courtesy of GENERAL MOTORS CORP.

12. Install the pressure regulator valve (210), the pressure regulator valve spring (209), and the line boost valve spring (208).
13. Install the line boost valve bushing seal (205) onto the bushing (206).
14. Install the line boost valve (207) and the bushing (206).
15. Install the line boost valve bushing retainer (204).

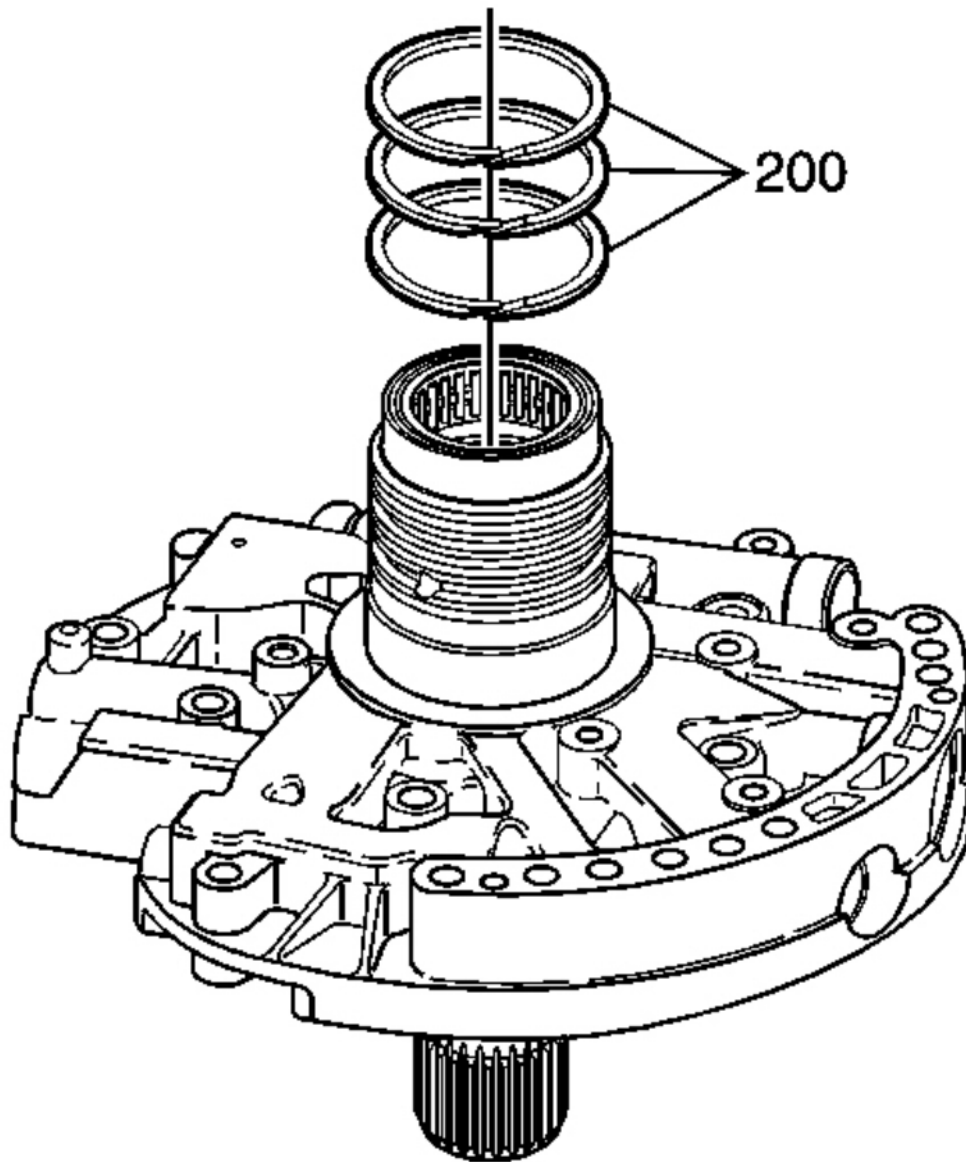


Fig. 185: Locating Reverse Clutch Housing Fluid Seal Rings
Courtesy of GENERAL MOTORS CORP.

16. Install the reverse clutch housing fluid seal rings (200).

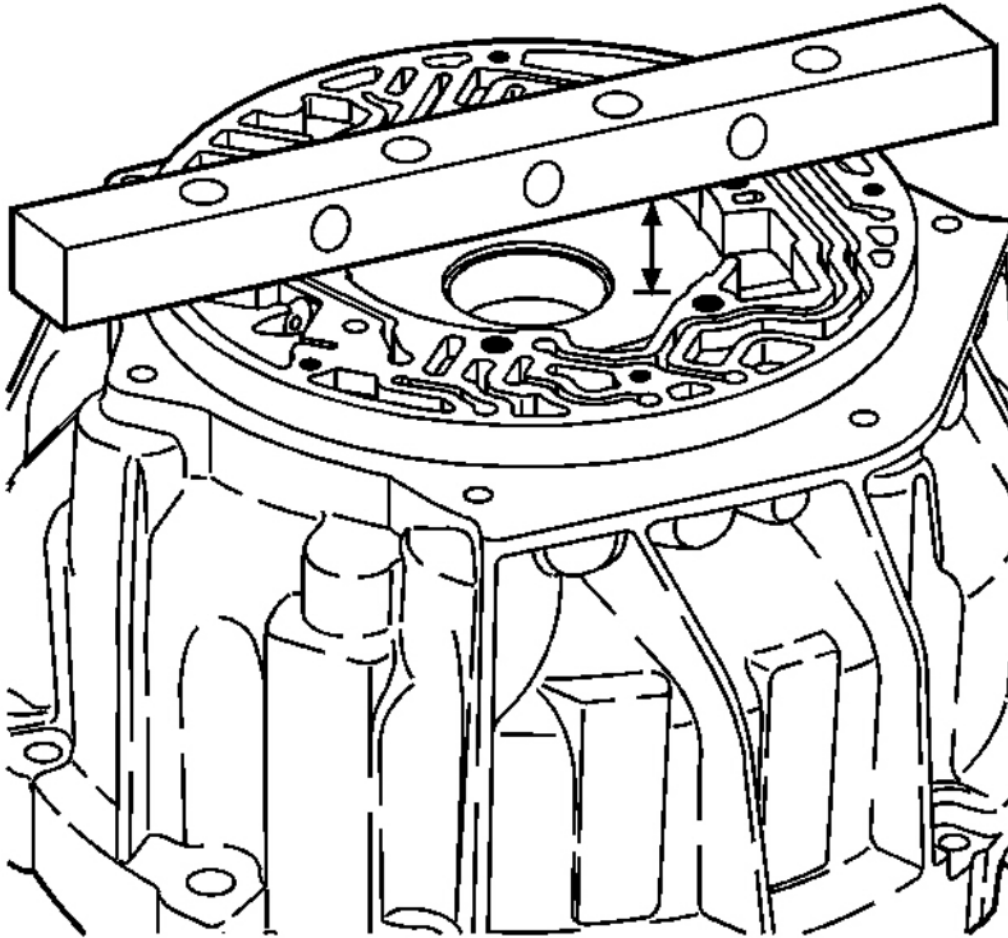


Fig. 186: Measuring Gage Bar To Pump Body Gap
Courtesy of GENERAL MOTORS CORP.

17. Measure the distance from the bottom of the gage bar to the pump body. Refer to **Fluid Pump Specifications** .
18. Measure the thickness of pump slide (216).
19. Select the proper size, refer to **Fluid Pump Specifications** .
20. Measure the thickness of the pump rotor (223).
21. Select the proper size rotor refer to **Fluid Pump Specifications** .

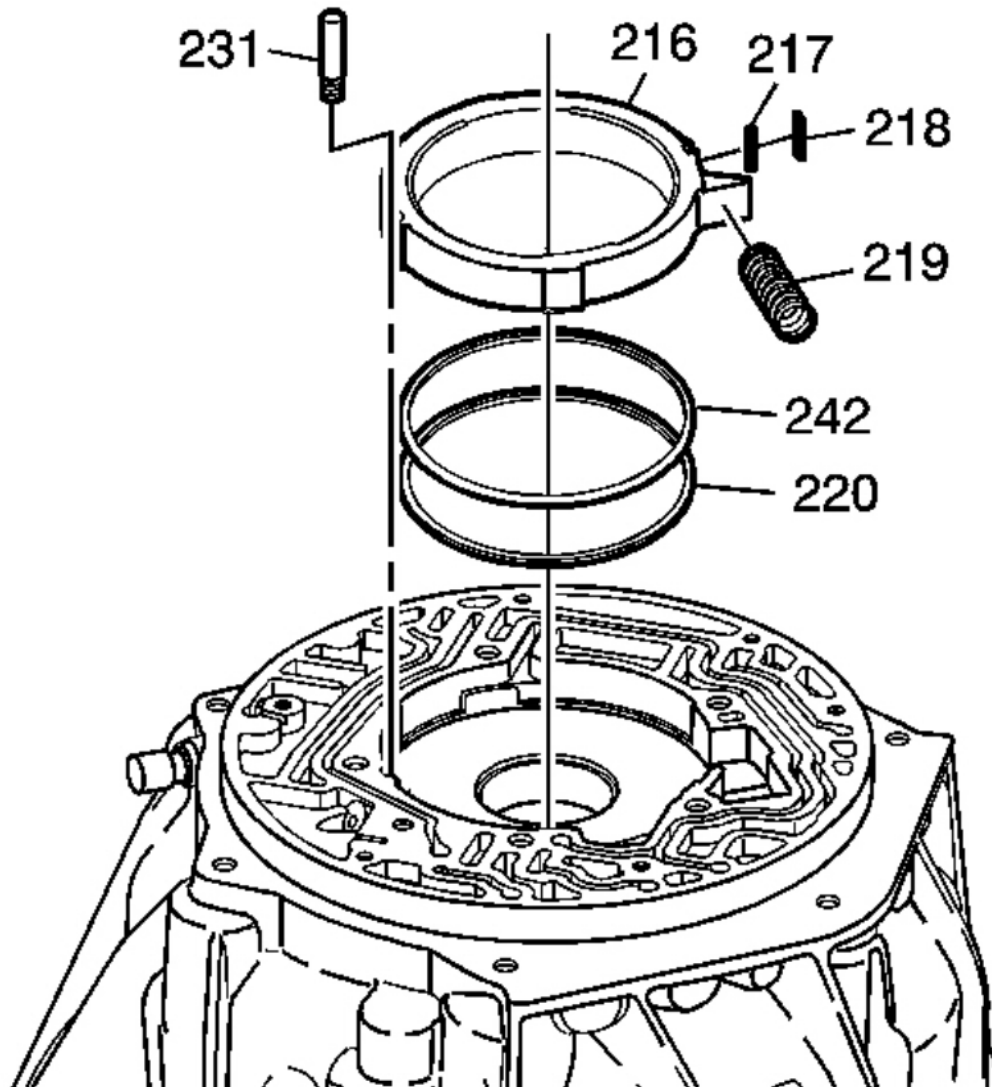


Fig. 187: Identifying Fluid Pump Components
 Courtesy of GENERAL MOTORS CORP.

22. Install the fluid pump support (217), the slide seal (218) and the fluid pump slide rings (220), and the fluid pump slide o-ring seal (242) onto the pump slide (216).
23. Install the slide pin (231).

IMPORTANT: The fluid pump slide (216) is selective.

24. Install the pump slide (216).
25. Using a screwdriver install the slide spring (219).

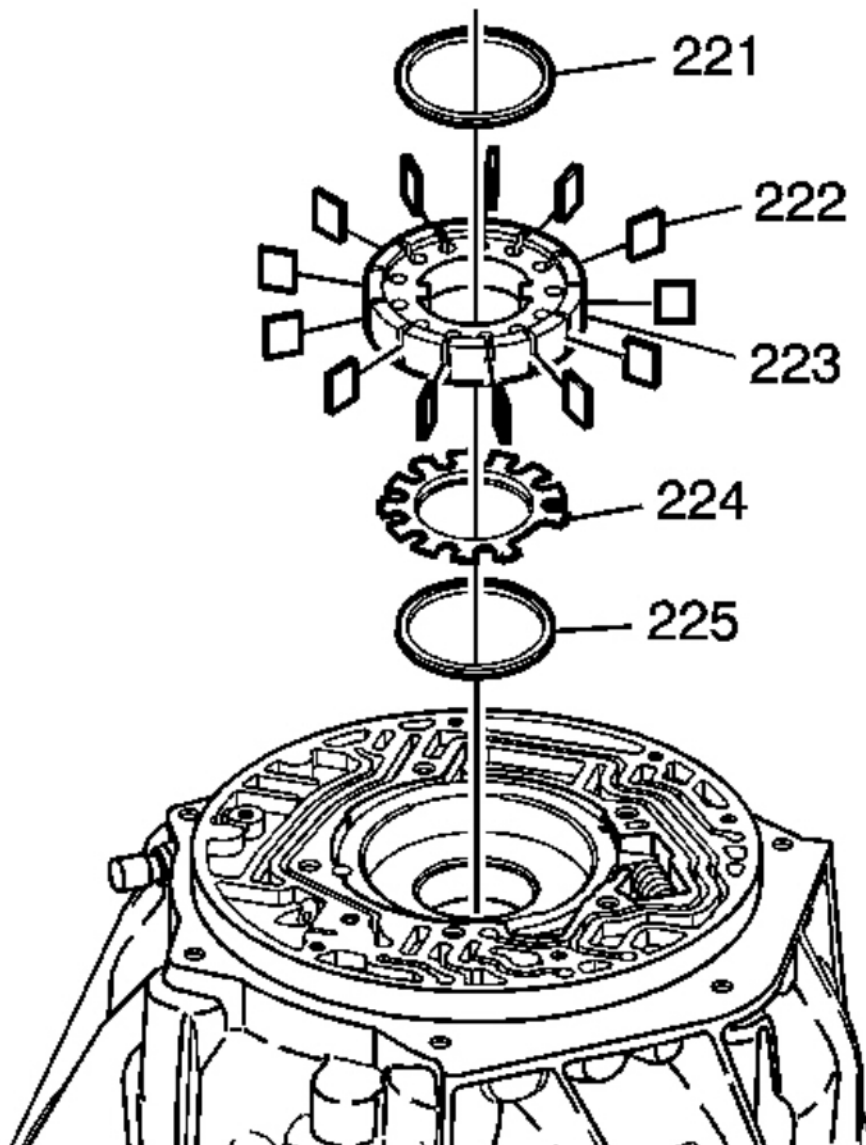


Fig. 188: Locating Fluid Pump Vane Ring
Courtesy of GENERAL MOTORS CORP.

26. Install the fluid pump vane ring (225).
27. Install the pump rotor guide (224).

IMPORTANT: The fluid pump rotor (223) is selective.

28. Install the pump rotor (223).
29. Install the pump vanes (222).
30. Install the pump vane ring (221).

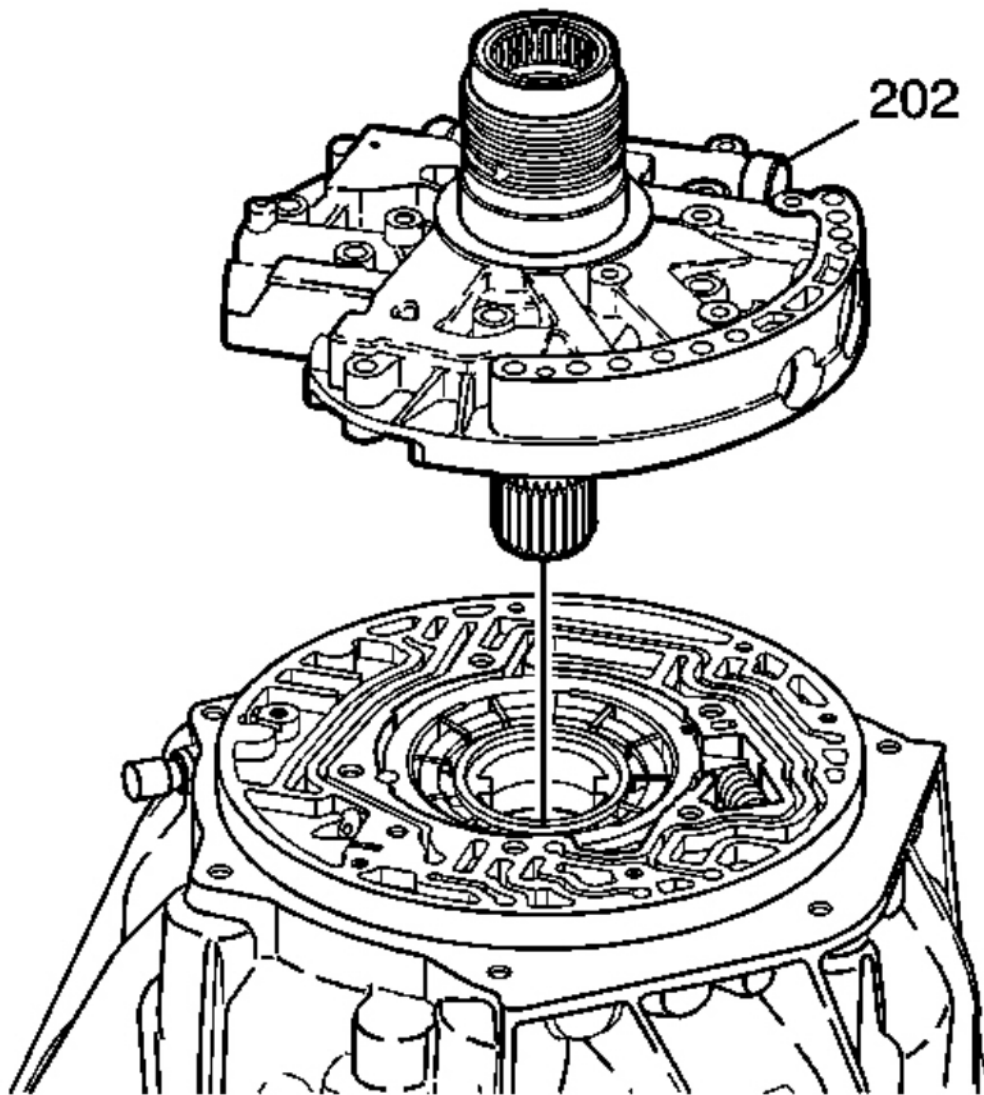


Fig. 189: View Of Pump Cover Housing
Courtesy of GENERAL MOTORS CORP.

31. Install the pump cover housing (202) onto the converter housing (224).

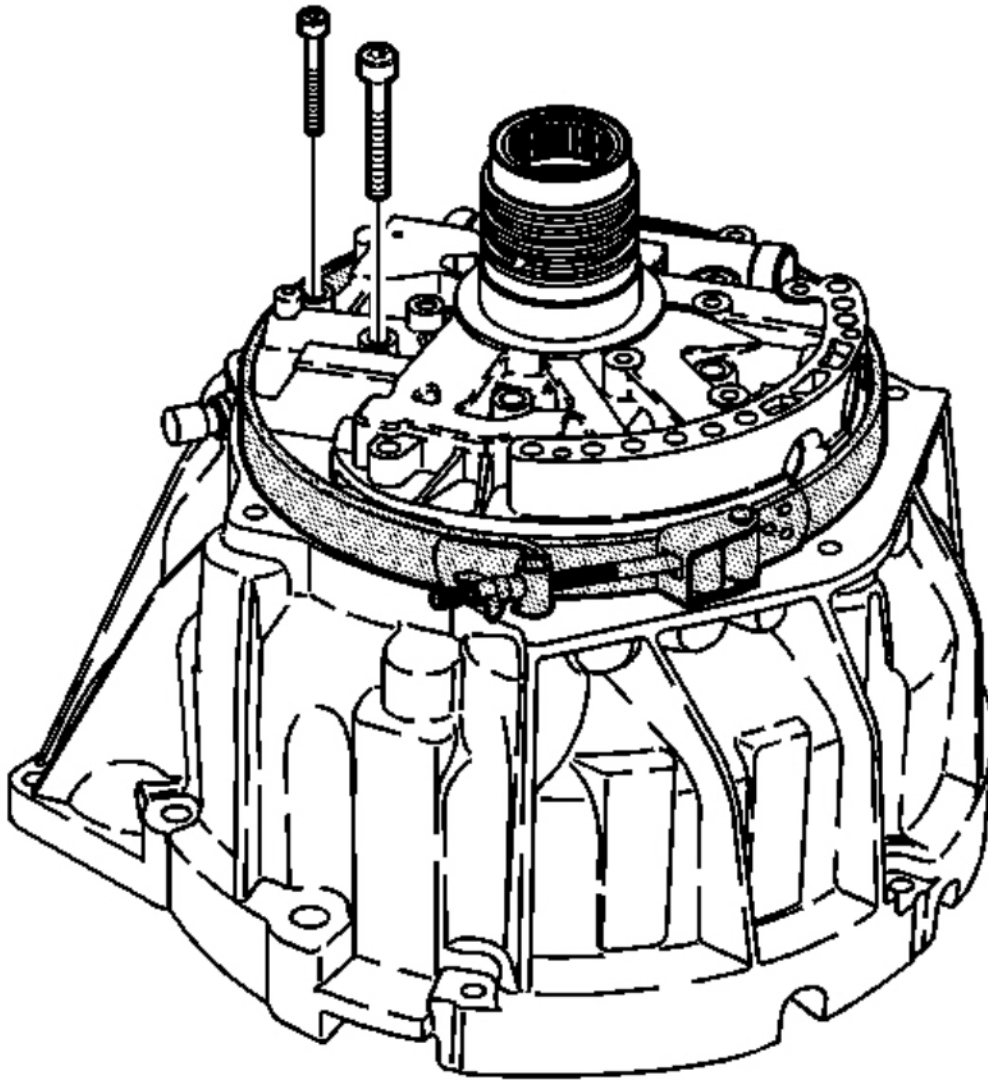


Fig. 190: Identifying J 21368
Courtesy of GENERAL MOTORS CORP.

32. Install **J 21368** and tighten.

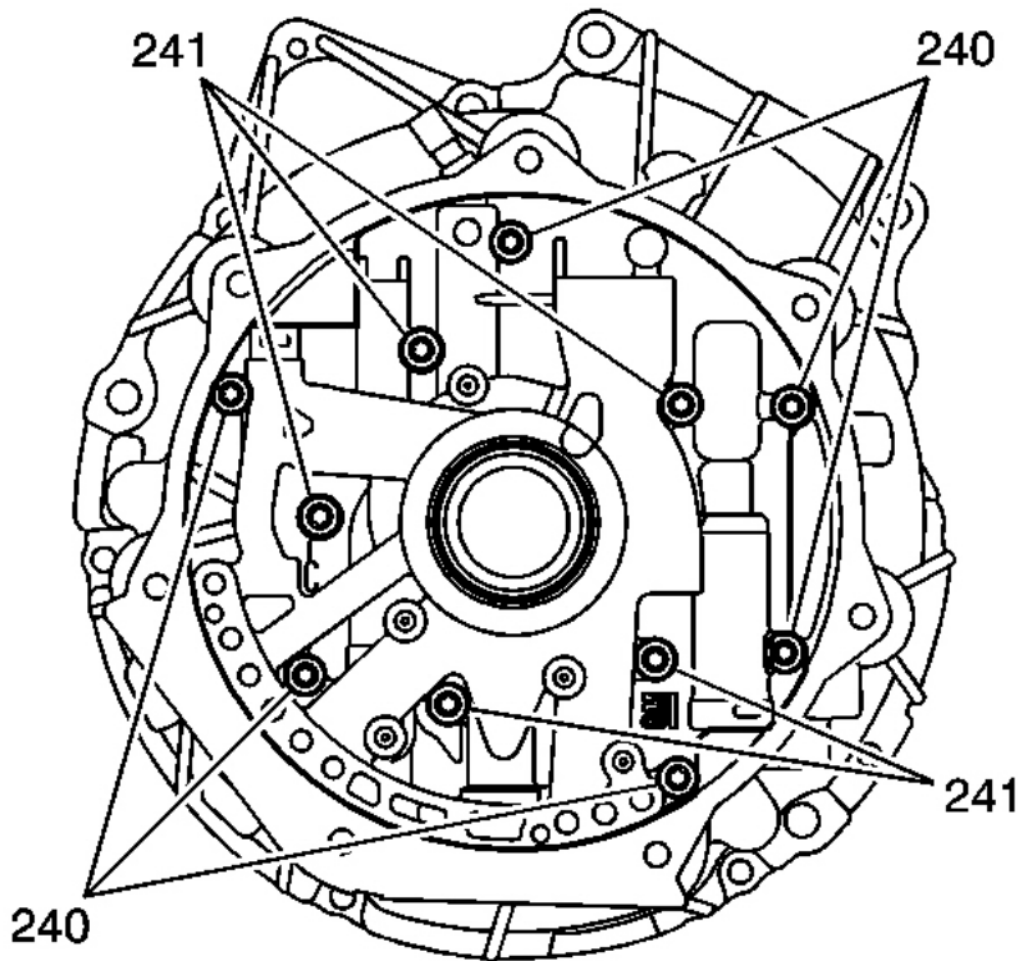


Fig. 191: Installing Oil Pump Housing Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

33. Install the oil pump housing bolts (240, 241).

Tighten:

- Tighten the fluid pump housing bolts (240) to 11 N.m (8 lb ft).
- Tighten the fluid pump housing bolts (241) to 22 N.m (16 lb ft).

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34. Remove **J 21368** .

TORQUE CONVERTER HOUSING INSTALLATION

Tools Required

J 36850 Transjel Lubricant. See **Special Tools and Equipment** .

Installation Procedure

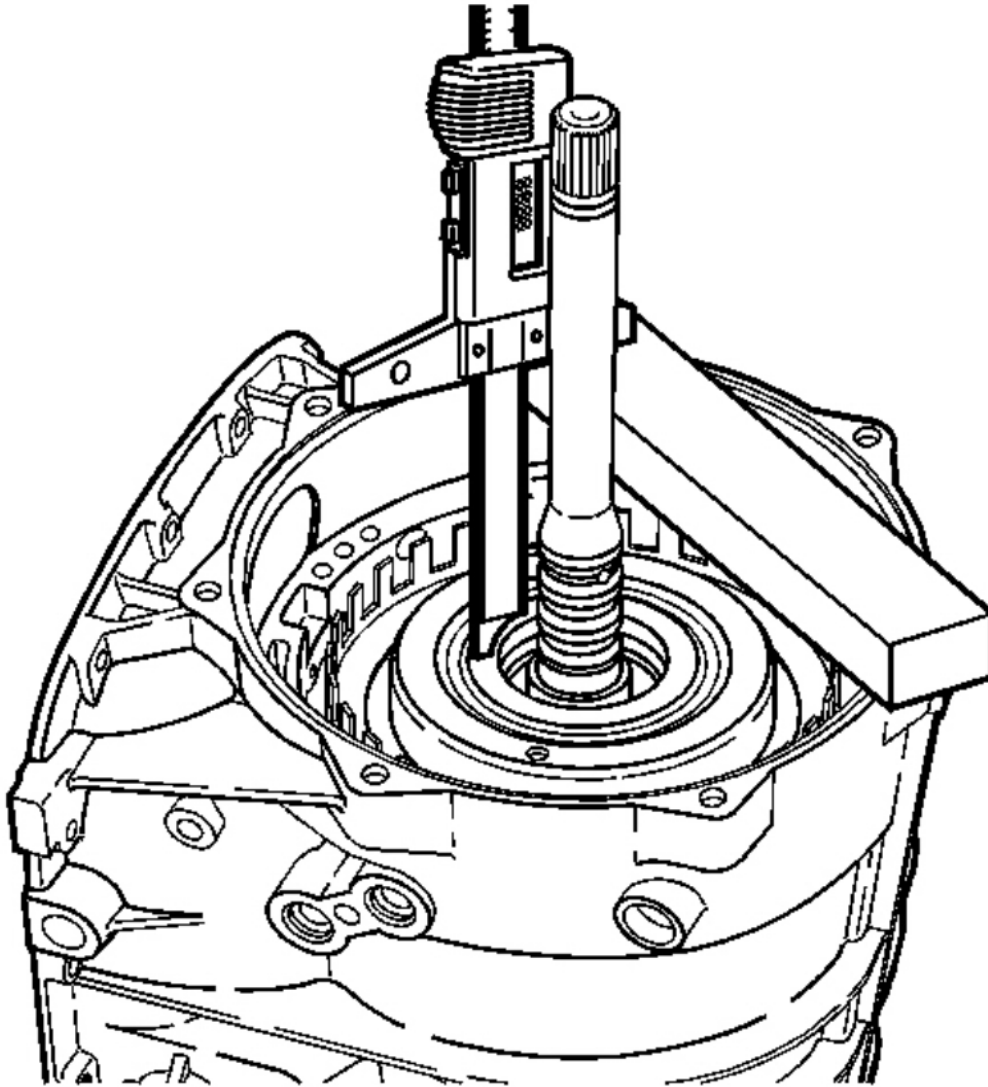


Fig. 192: Measuring Dimension X
Courtesy of GENERAL MOTORS CORP.

1. Measure the distance from the bottom of the gage bar to the top of the direct and reverse clutch assembly (6). Record this as dimension X. Refer to the **Reverse Clutch Housing Selective Thrust Washer Specifications** to determine the correct size to use.

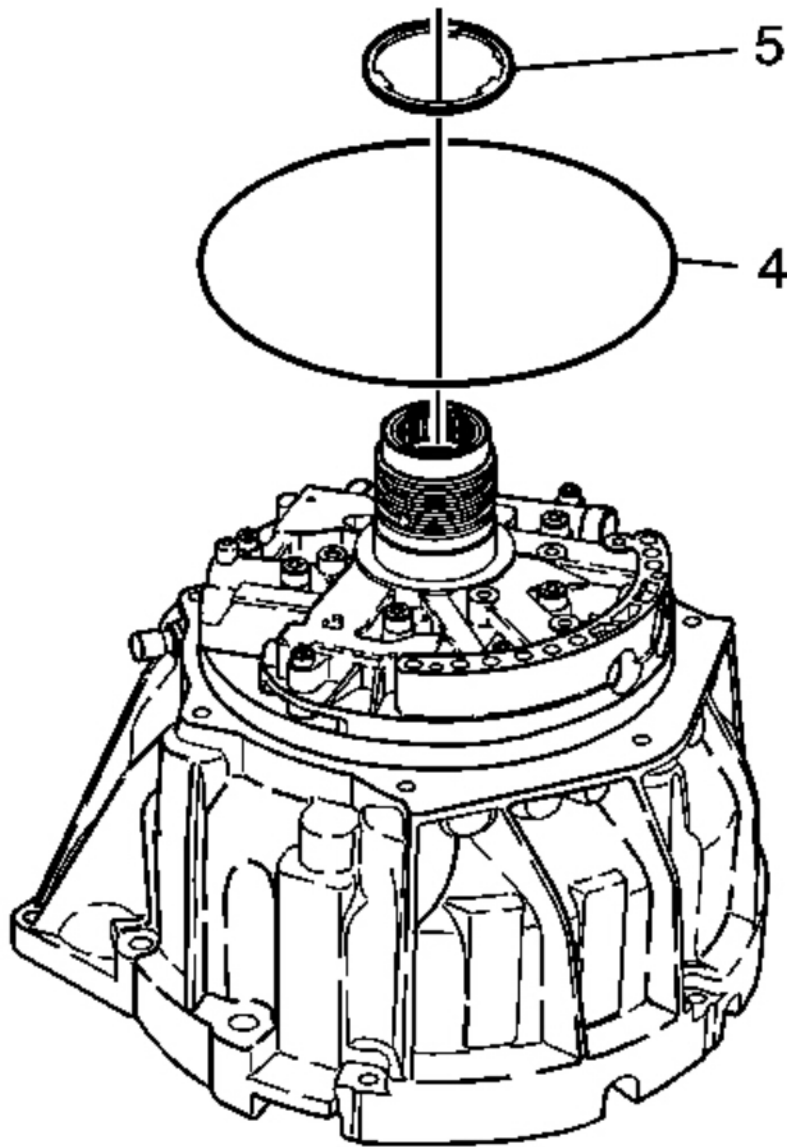


Fig. 193: Locating Torque Converter Fluid Seal
Courtesy of GENERAL MOTORS CORP.

2. Use **J 36850** to install the NEW torque converter fluid seal (4) onto the torque converter housing.

Use **J 36850** to install the reverse clutch housing thrust washer (5).

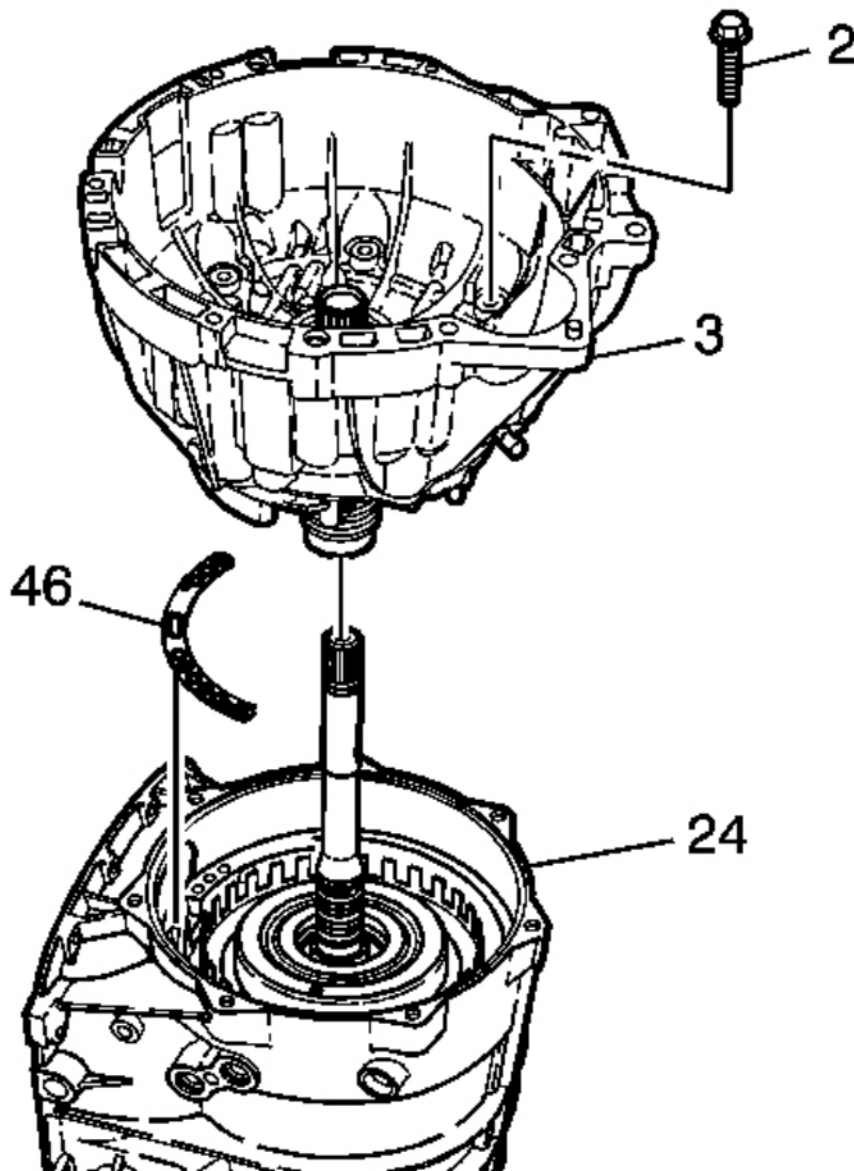


Fig. 194: Installing Fluid Pump Cover Gasket
Courtesy of GENERAL MOTORS CORP.

3. Install the NEW fluid pump cover gasket (46).
4. Install the torque converter housing (3) onto the case (24).
5. Install the torque converter housing bolts (2) and hand tighten.

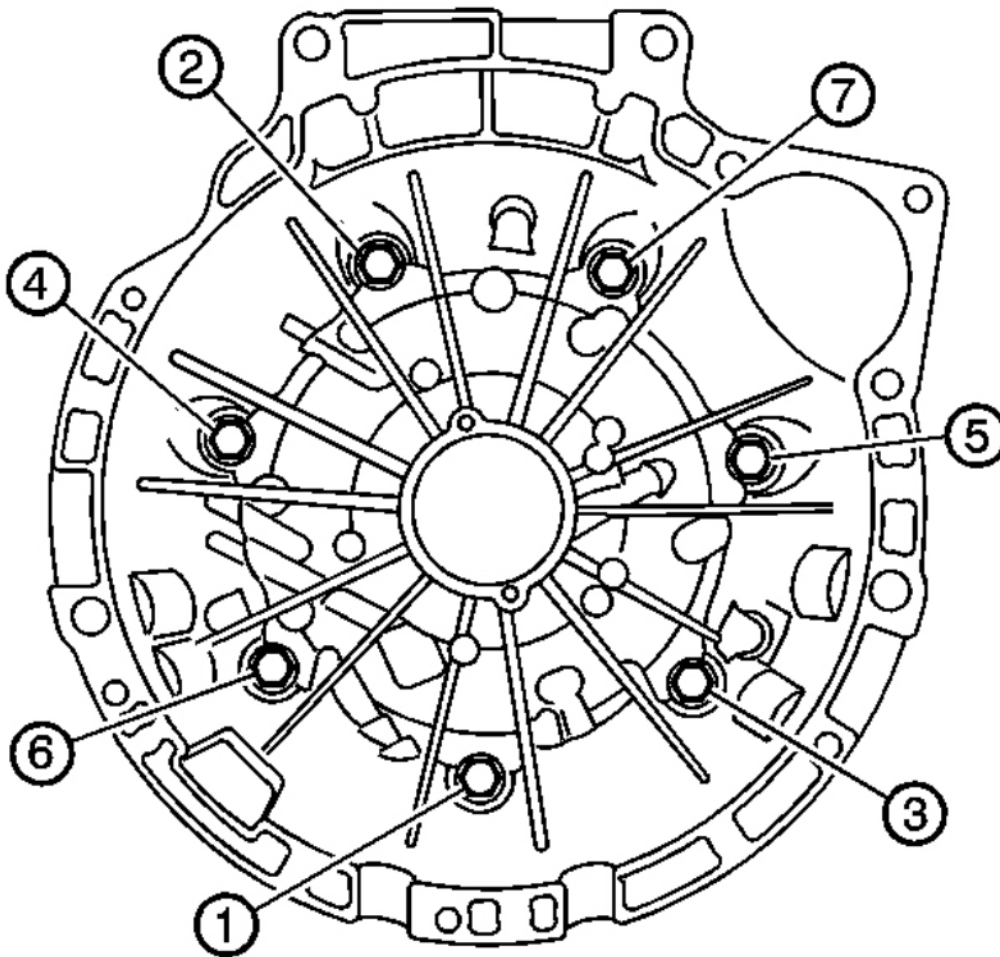


Fig. 195: Identifying Torque Converter Housing Bolts Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Tighten the torque converter housing bolts in sequence.

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Tighten: Tighten the housing bolts to 22 N.m (16 lb ft).

TORQUE CONVERTER SEAL INSTALLATION

Tools Required

- **J 8092** Universal Driver Handle. See Special Tools and Equipment .
- **J 44766** Seal Installer. See Special Tools and Equipment .

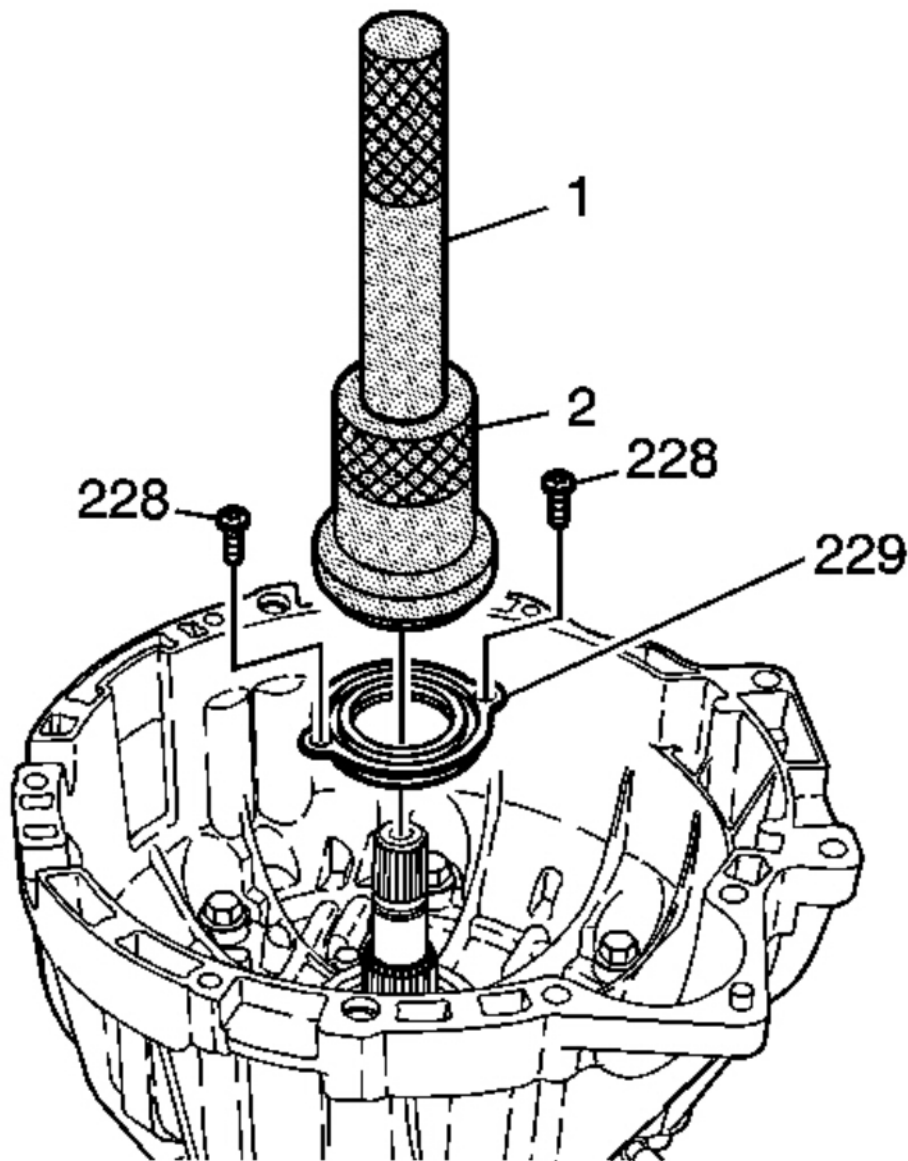


Fig. 196: Installing Torque Converter Seal With J 8092 & J 44766
Courtesy of GENERAL MOTORS CORP.

1. Assemble J 8092 onto J 44766 .

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NOTE: Install the seal onto the installation tool before installing into the case to prevent damage to the seal.

2. Install the seal (229) onto **J 44766** .

IMPORTANT: Align the torque converter seal with the bolt holes.

3. Install the NEW seal (229) into the housing (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the NEW seal bolts (228).

Tighten: Tighten the seal bolts to 3.6 N.m (31.86 lb in).

5. Install the NEW input shaft seal (430).

CONTROL VALVE BODY ACCUMULATOR ASSEMBLY DISASSEMBLE

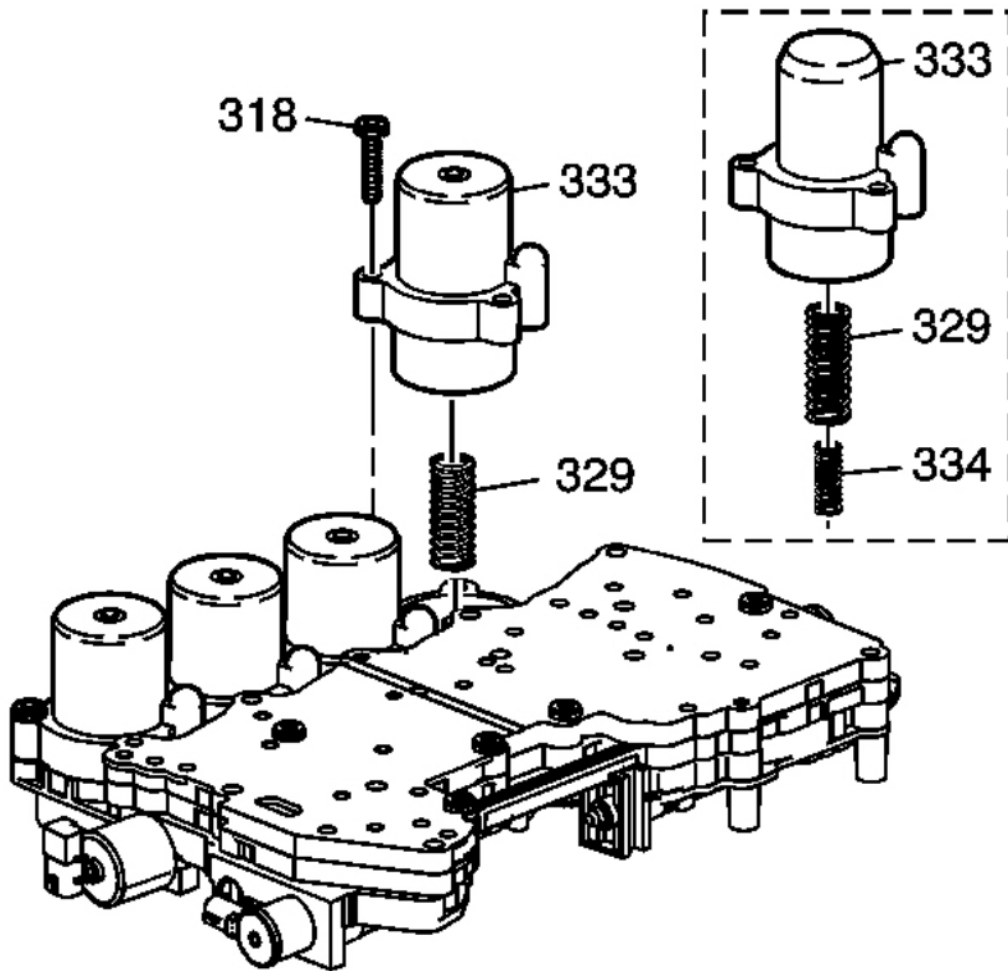


Fig. 197: View Of 2nd Clutch Accumulator Components
 Courtesy of GENERAL MOTORS CORP.

NOTE: Note the position of each accumulator before removal. The accumulators must be assembled in the same positions, or damage may occur.

1. Remove the 2nd clutch accumulator housing bolts (318).

IMPORTANT: The 5L50-E has a unique stackup on the 2nd clutch accumulator housing.

2. Remove the 2nd clutch accumulator housing (333) and spring (329).

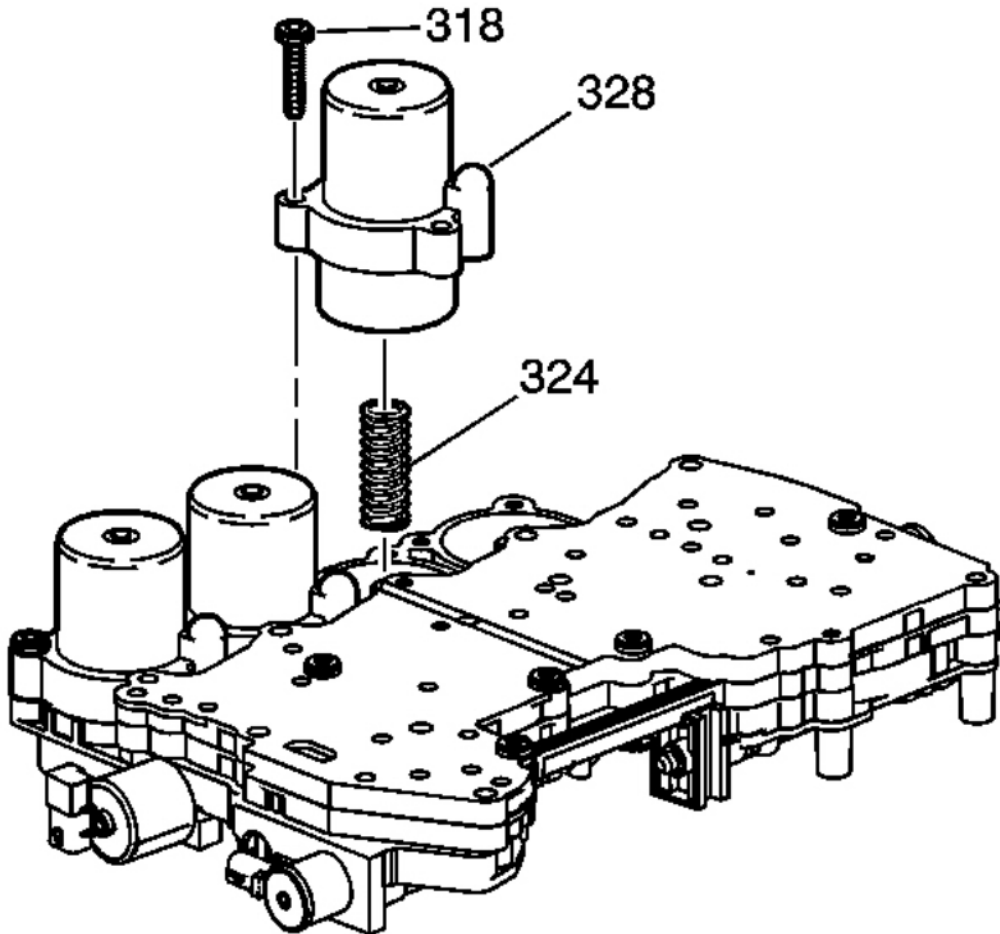


Fig. 198: View Of Intermediate Clutch Housing Bolts
Courtesy of GENERAL MOTORS CORP.

3. Remove the intermediate clutch housing bolts (318).
4. Remove the intermediate clutch accumulator housing (328), and spring (324).

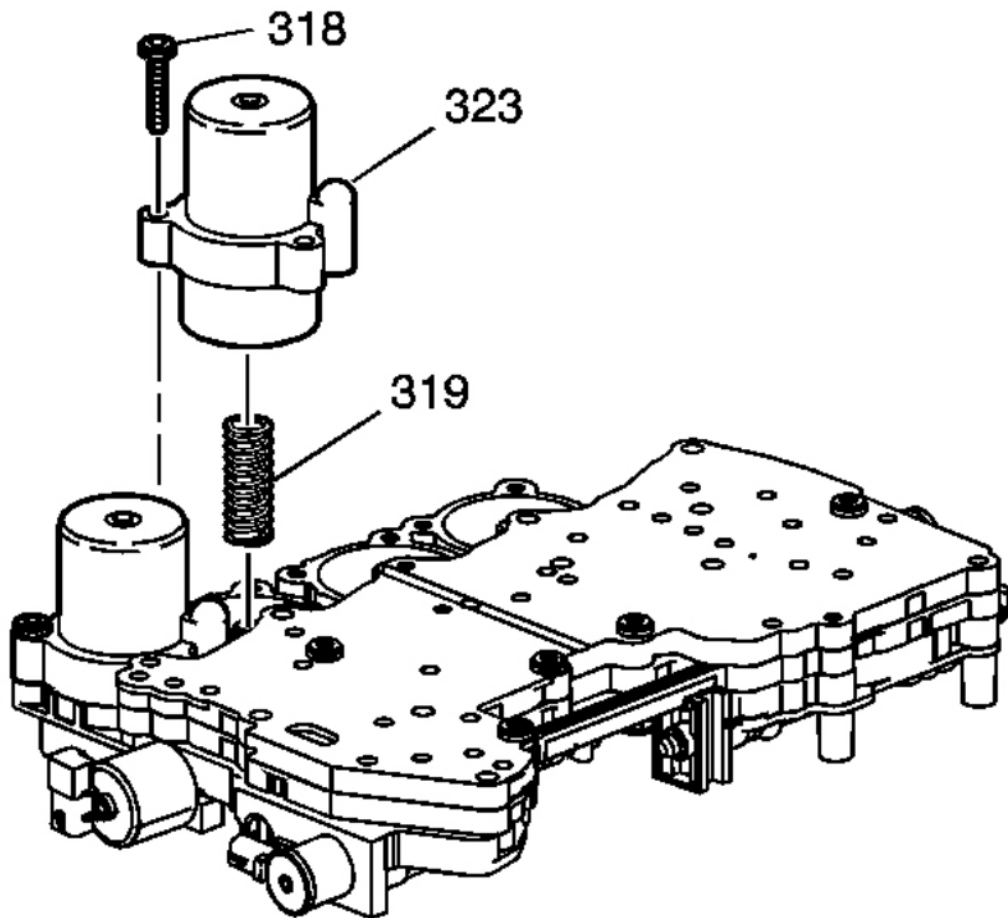


Fig. 199: Locating Overdrive Clutch Accumulator Housing Bolts
Courtesy of GENERAL MOTORS CORP.

5. Remove the overdrive clutch accumulator housing bolts (318).
6. Remove the overdrive clutch accumulator housing (323), and spring (319).

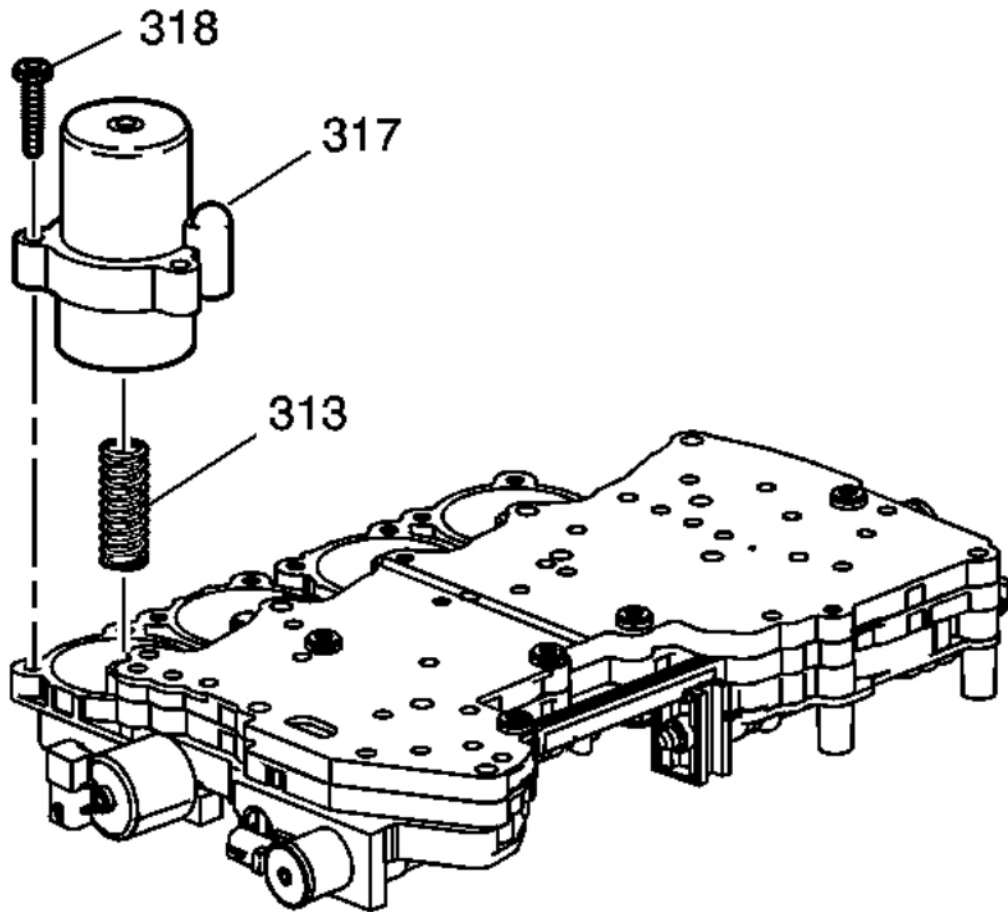


Fig. 200: Identifying Direct Accumulator Housing
Courtesy of GENERAL MOTORS CORP.

7. Remove the direct clutch accumulator housing bolts (318).
8. Remove the direct accumulator housing (317), and spring (313).

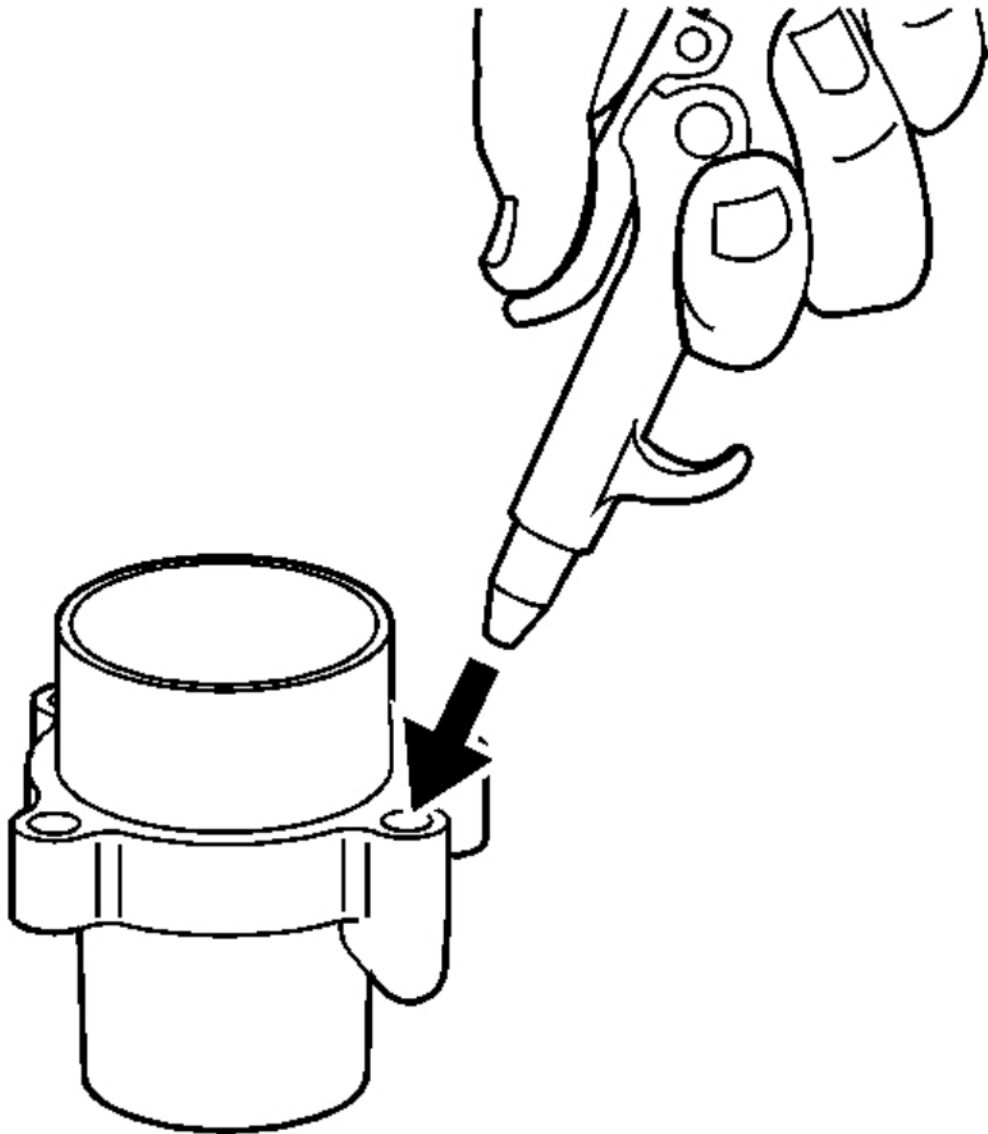


Fig. 201: Removing Piston With Air Pressure
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

9. Release the piston with air pressure.

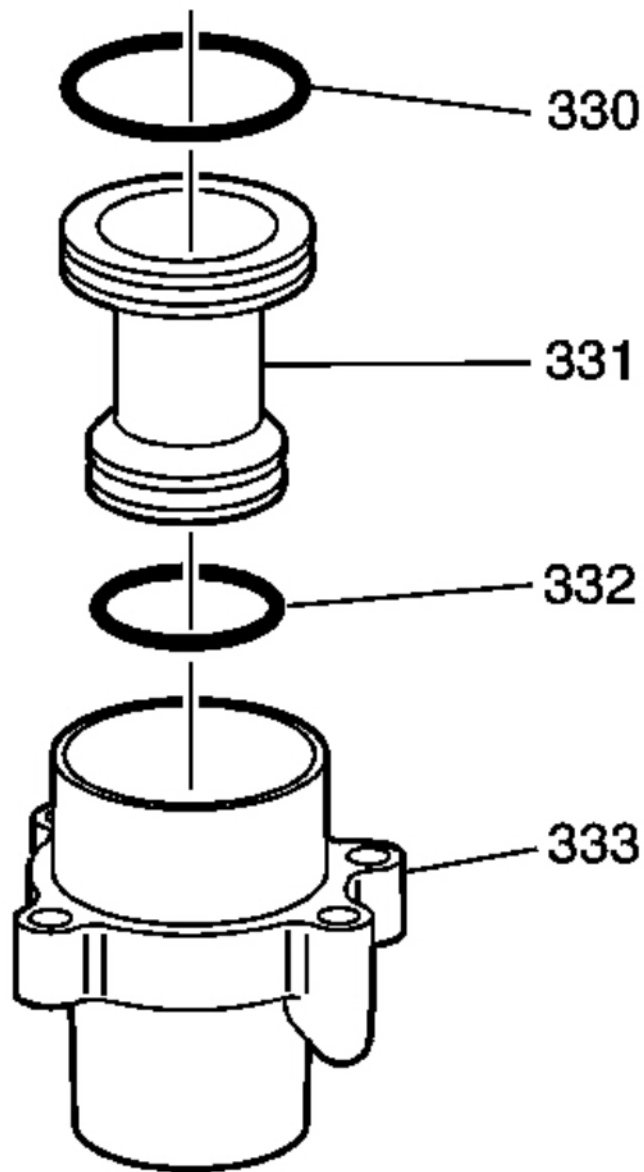


Fig. 202: View Of 2nd Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

10. Remove the 2nd clutch accumulator piston (331) from the 2nd clutch accumulator housing (333).

11. Remove the 2nd clutch accumulator piston rings (332, 330).

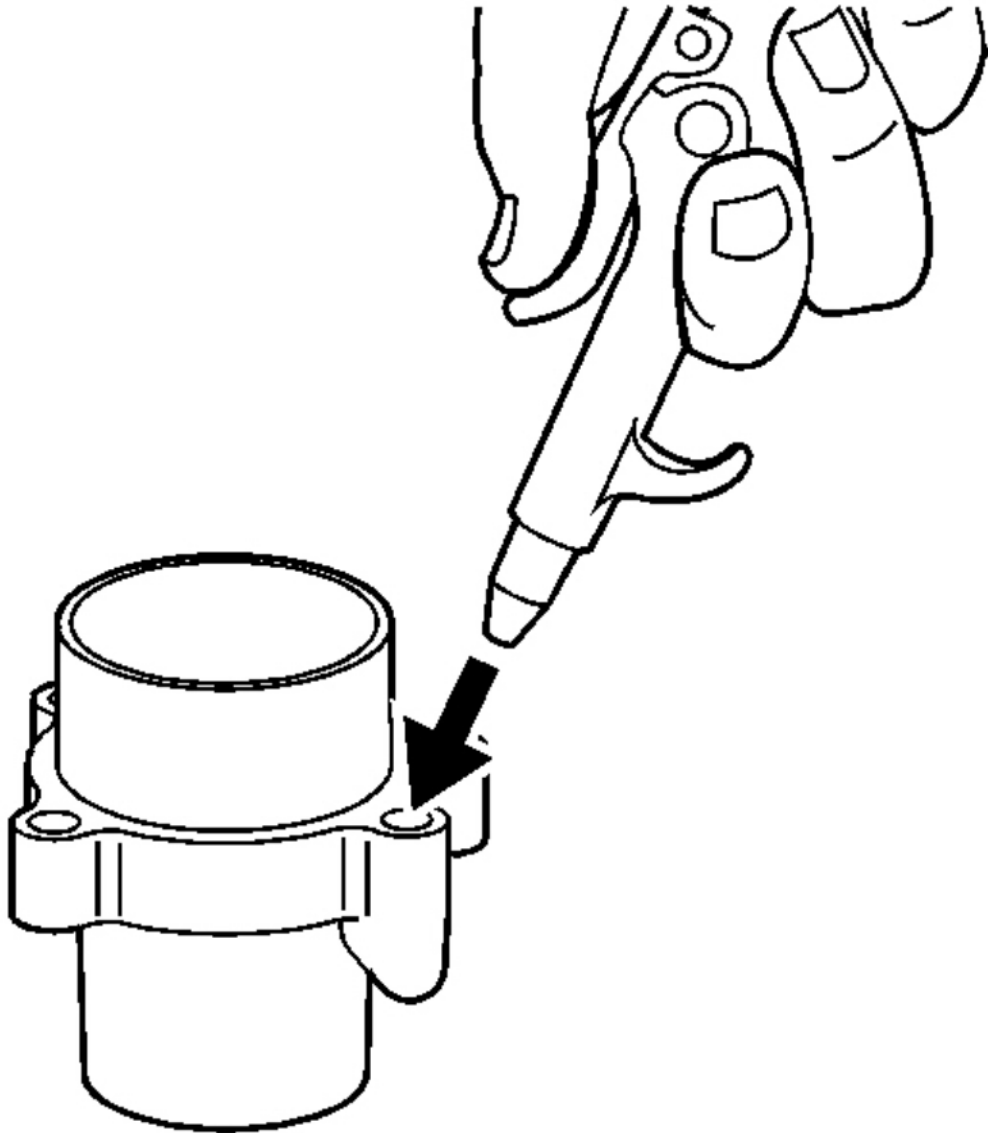


Fig. 203: Removing Piston With Air Pressure
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

12. Release the piston with air pressure.

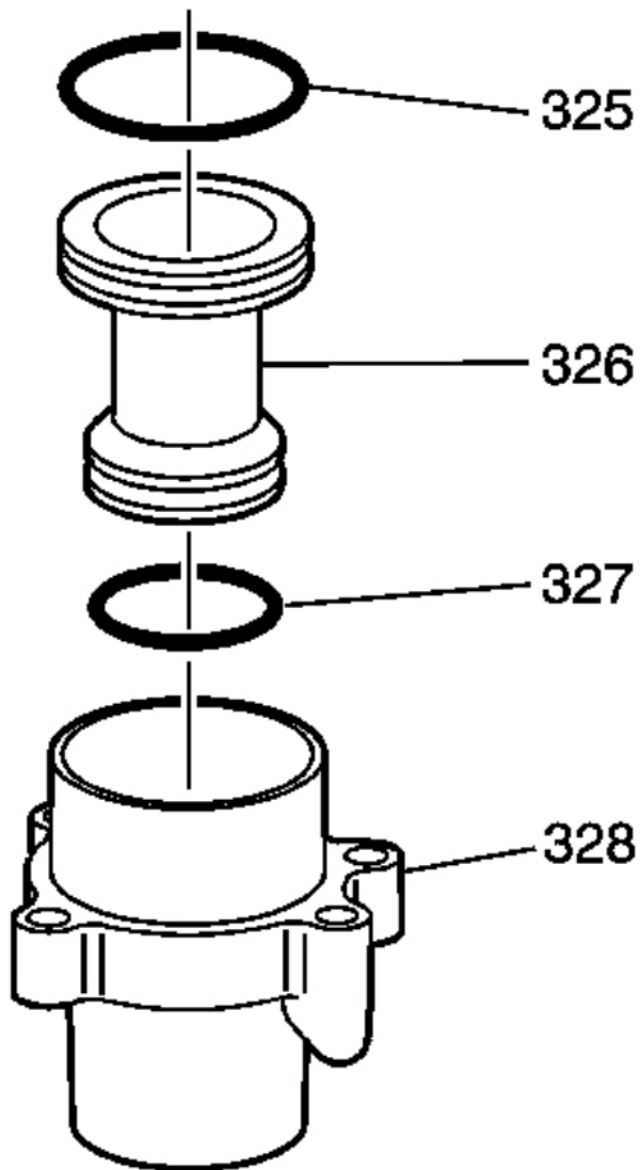


Fig. 204: Locating Intermediate Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

13. Remove the intermediate clutch accumulator piston (326) from the intermediate clutch accumulator housing (328).
14. Remove the intermediate clutch accumulator piston fluid seal rings (325, 327).

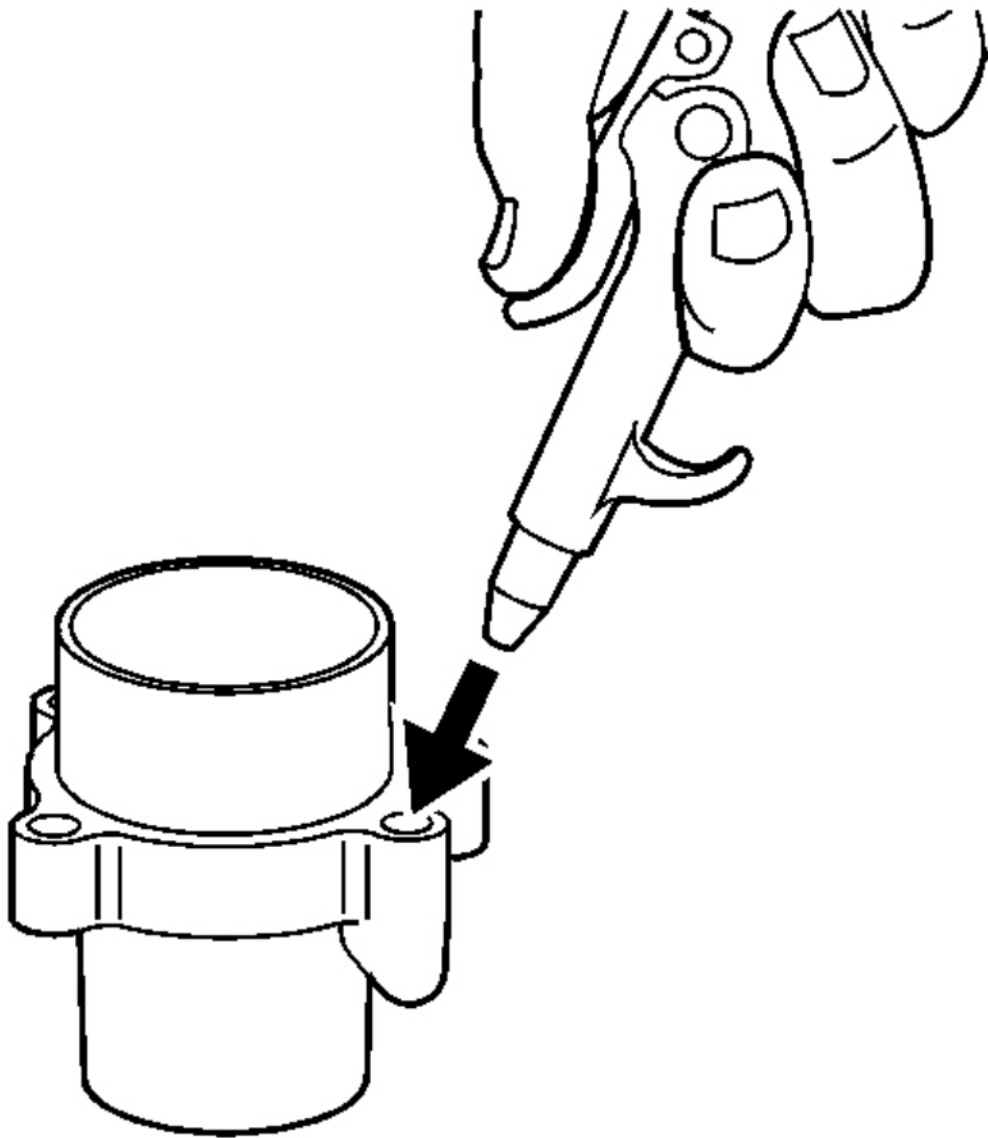


Fig. 205: Removing Piston With Air Pressure
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

15. Release the piston with air pressure.

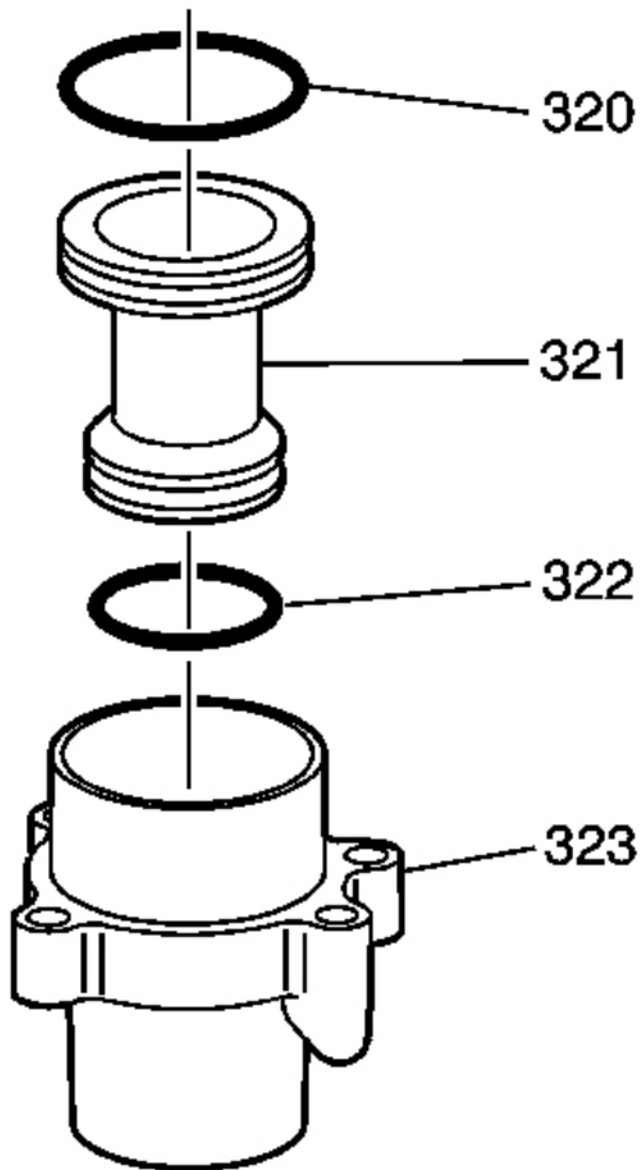


Fig. 206: Identifying Overdrive Clutch Accumulator Components

Courtesy of GENERAL MOTORS CORP.

16. Remove the overdrive clutch accumulator piston (321) from the overdrive clutch accumulator housing (323).
17. Remove the overdrive clutch accumulator piston fluid seal ring (320, 322).

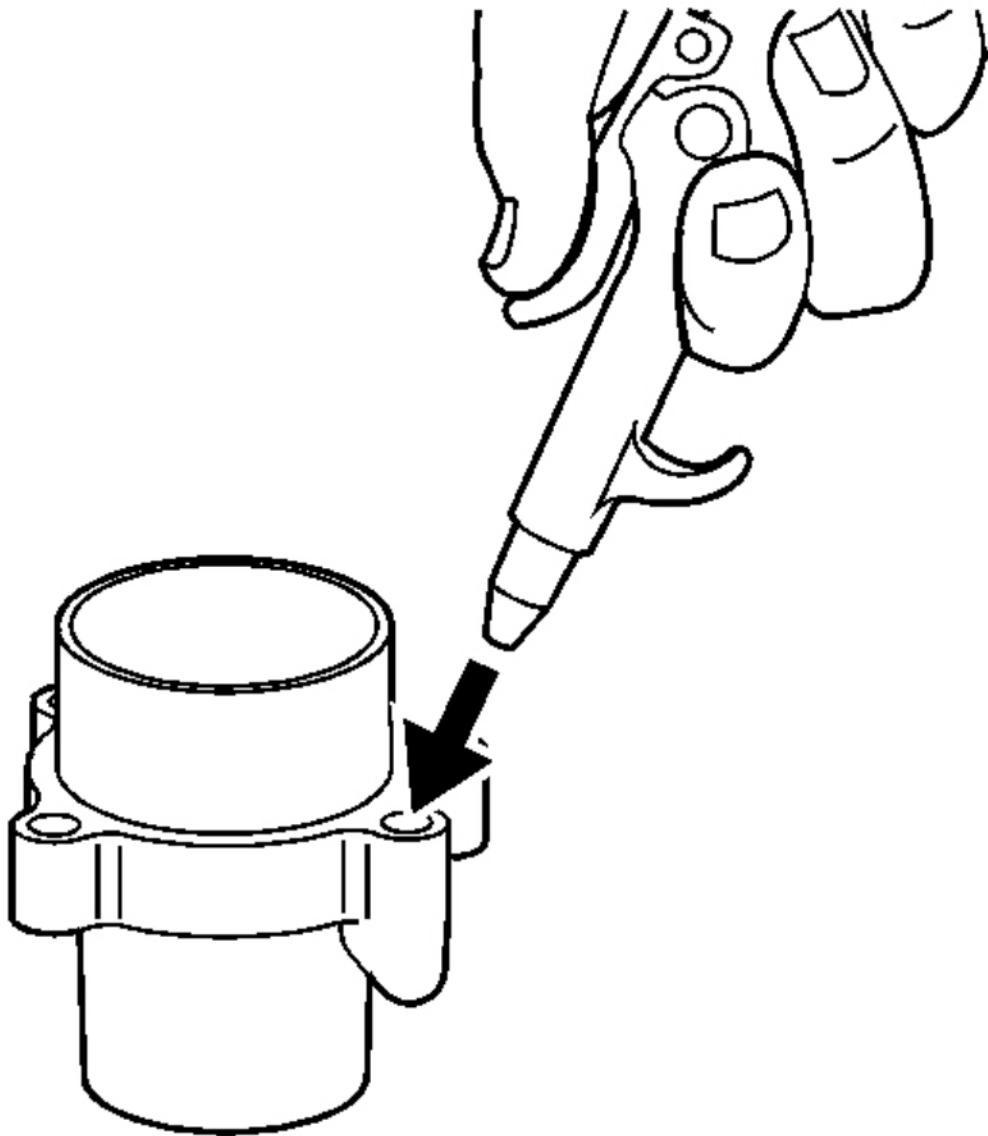


Fig. 207: Removing Piston With Air Pressure
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: It may be necessary to use air pressure to remove the piston.

18. Release the piston with air pressure.

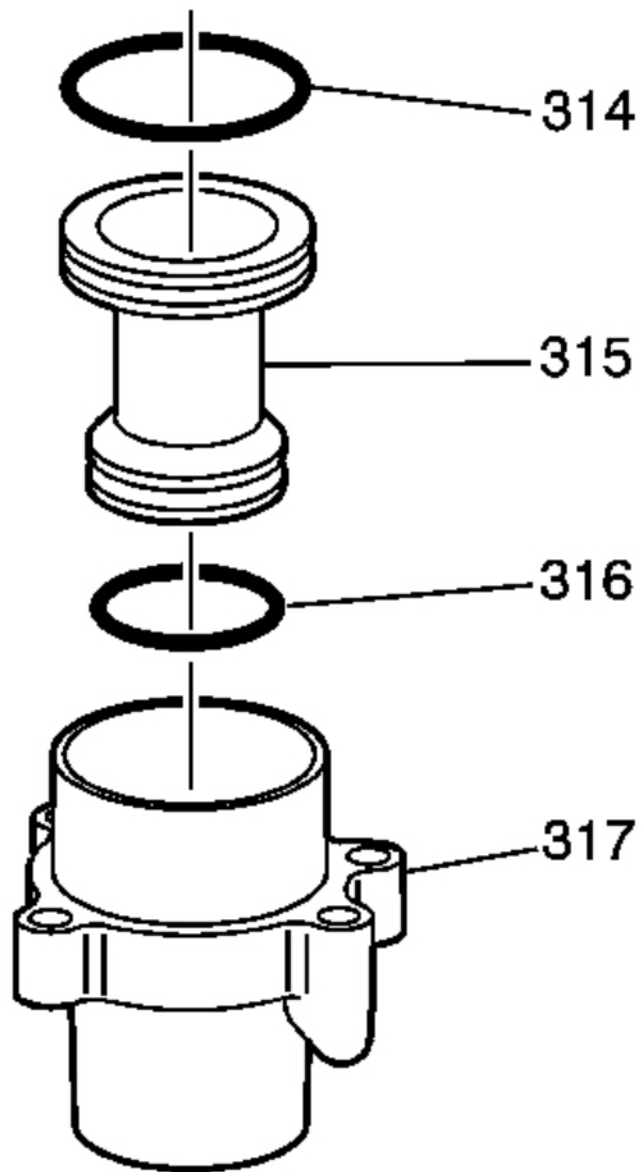


Fig. 208: View Of Direct Clutch Accumulator Components
Courtesy of GENERAL MOTORS CORP.

19. Remove the direct accumulator housing piston (315) from the direct accumulator housing (317).

20. Remove the direct clutch accumulator piston fluid seal rings (314, 316).

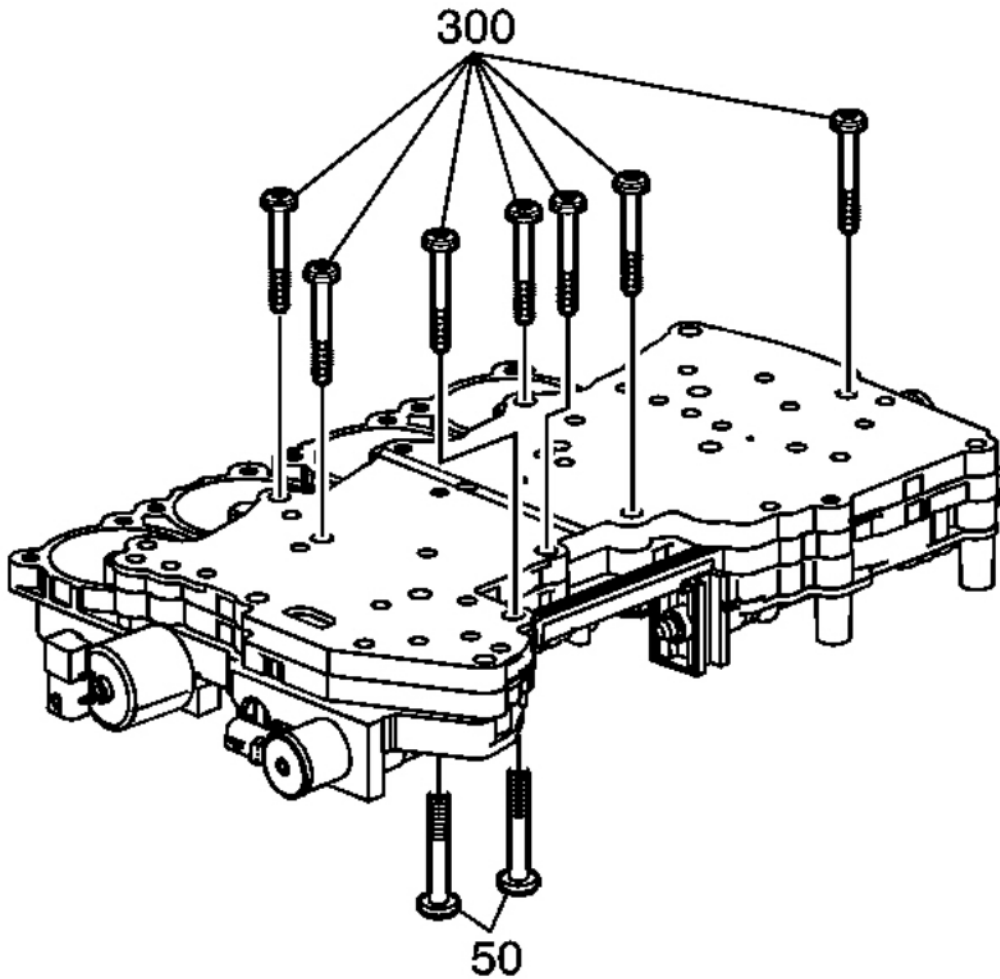


Fig. 209: View Of Control Valve Body Bolts
Courtesy of GENERAL MOTORS CORP.

21. Remove the control valve body bolts (50, 300).

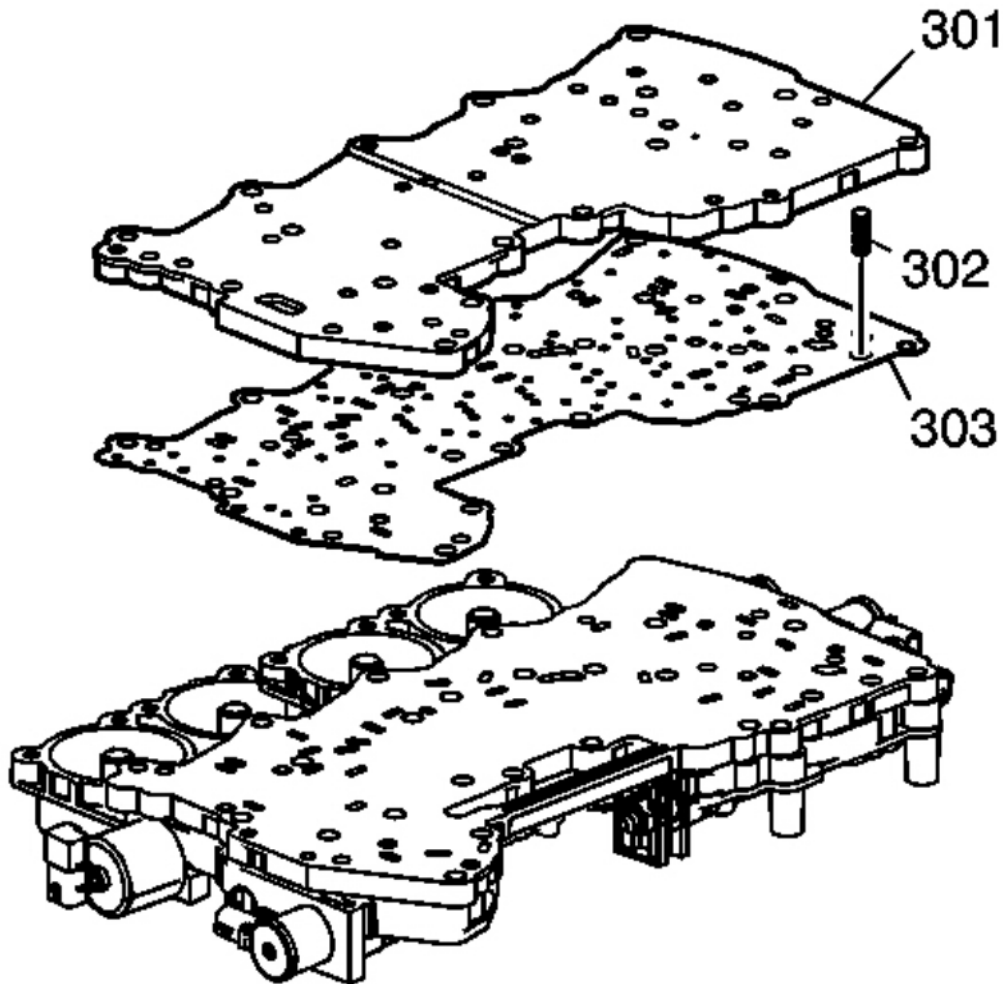


Fig. 210: Locating Channel Plate Ball Check Spring
Courtesy of GENERAL MOTORS CORP.

22. Remove the control valve body channel plate (301).
23. Remove the channel plate ball check spring (302) and the gasket (303).

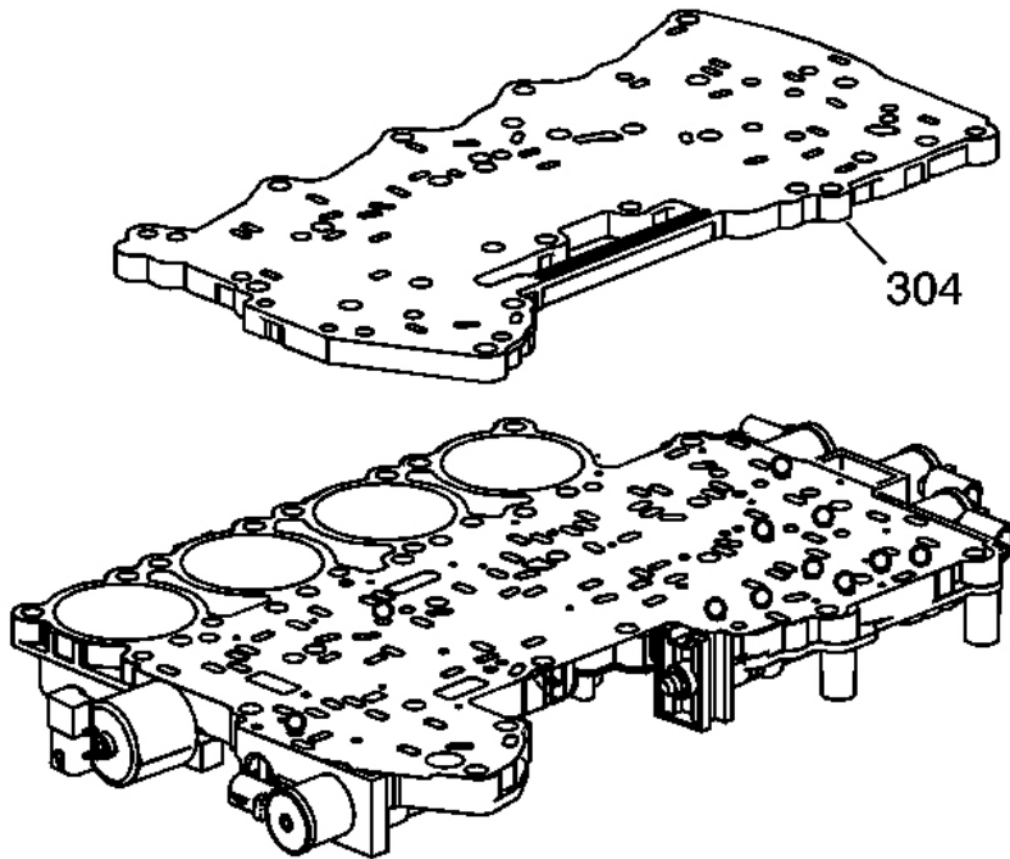


Fig. 211: Identifying Control Valve Body Channel Plate
Courtesy of GENERAL MOTORS CORP.

24. Remove the control valve body channel plate (304).

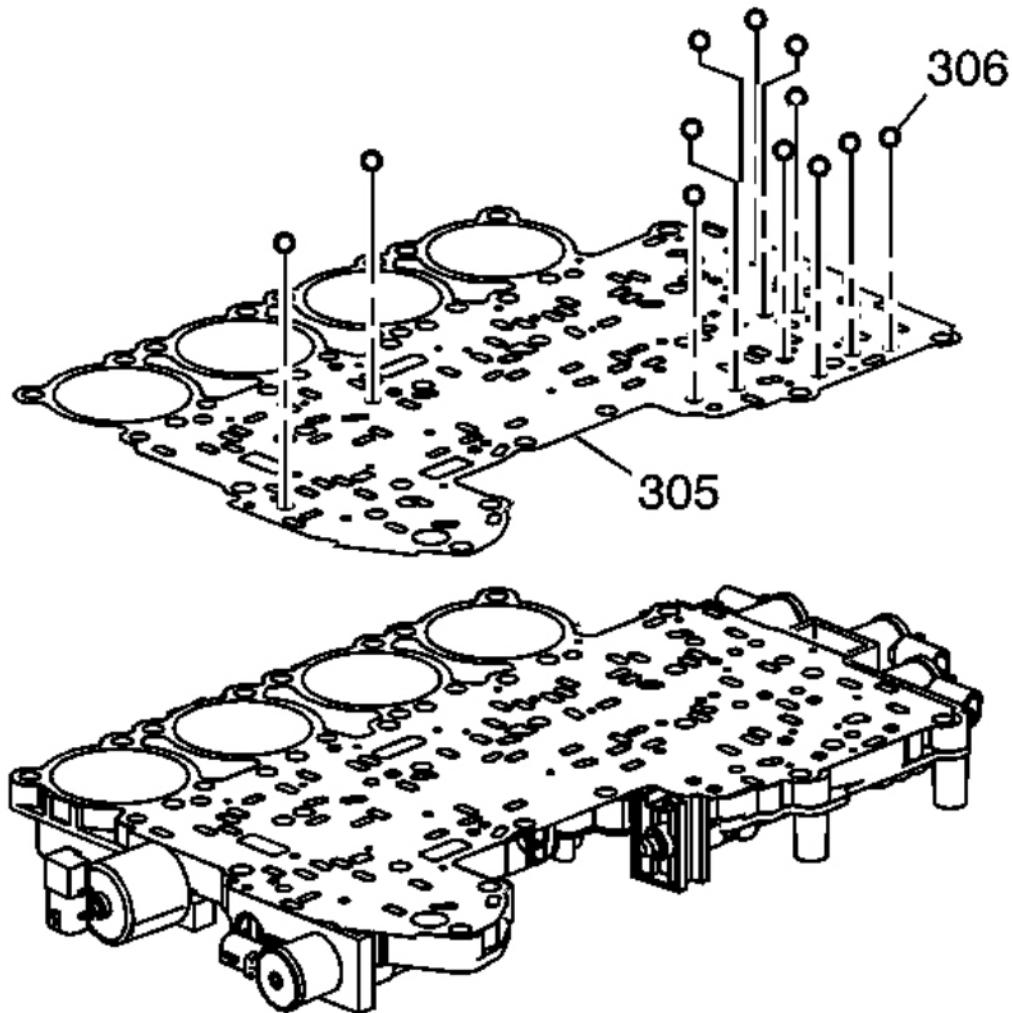


Fig. 212: Removing Checkballs & Gaskets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The checkballs (306) may be inside the bottom channel plate (304), or may be sitting on gasket (305).

25. Remove the checkballs (306) and the gasket (305).

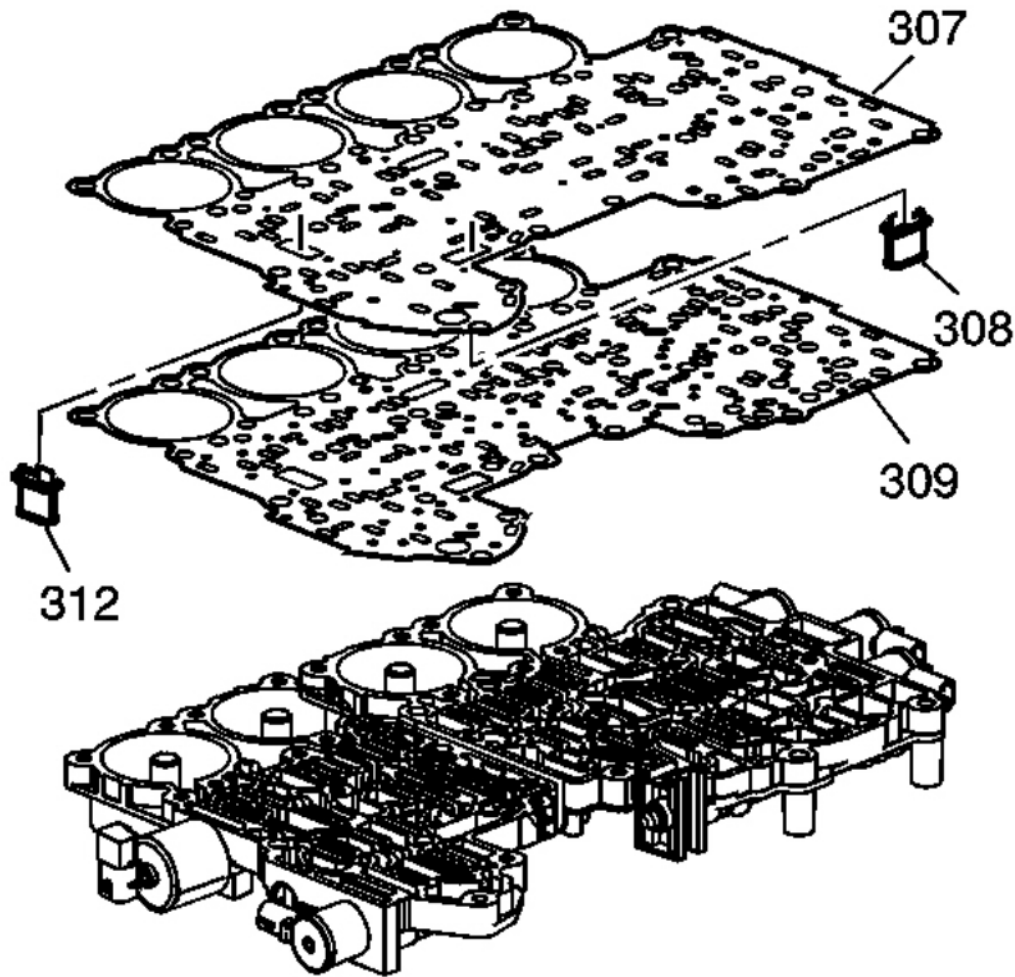


Fig. 213: Removing Control Valve Body Spacer Plate
Courtesy of GENERAL MOTORS CORP.

26. Remove the control valve body spacer plate (307).
27. Remove the filters (308, 312).
28. Remove the spacer plate gasket (309).

REAR CONTROL VALVE BODY INSPECTION

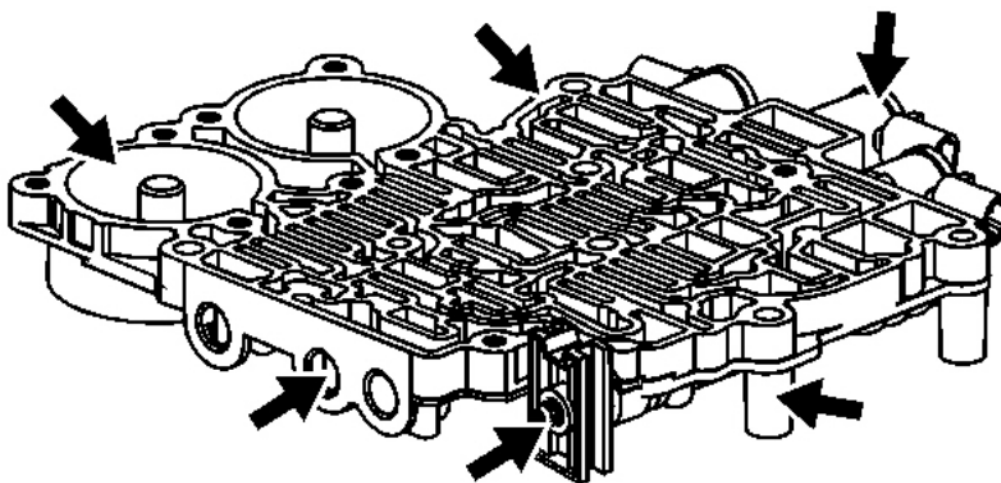


Fig. 214: Locating 1-2 Shift Valve
Courtesy of GENERAL MOTORS CORP.

1. Inspect the rear control valve body (365) for the following conditions:
 - Damaged or porous casting
 - Damaged sealing surfaces
 - Debris in fluid passages
2. Use a small pick or screwdriver, before disassembly, to inspect the rear control valve body (365) components for the following conditions:
 - Valves binding or sticking in their bores or bushings
 - Broken missing or damaged springs
 - Missing or damaged retainers
 - Damaged solenoid valves
 - Debris in valve line ups or solenoid valves
3. During disassembly, inspect the rear control valve body (365) for the following conditions:
 - Worn or damaged valves, valve bores or bushings
 - Broken, missing or damaged springs
 - Missing or damaged retainers
 - Damaged solenoid valves

- Debris in valve line ups or solenoid valve

REAR CONTROL VALVE BODY DISASSEMBLE

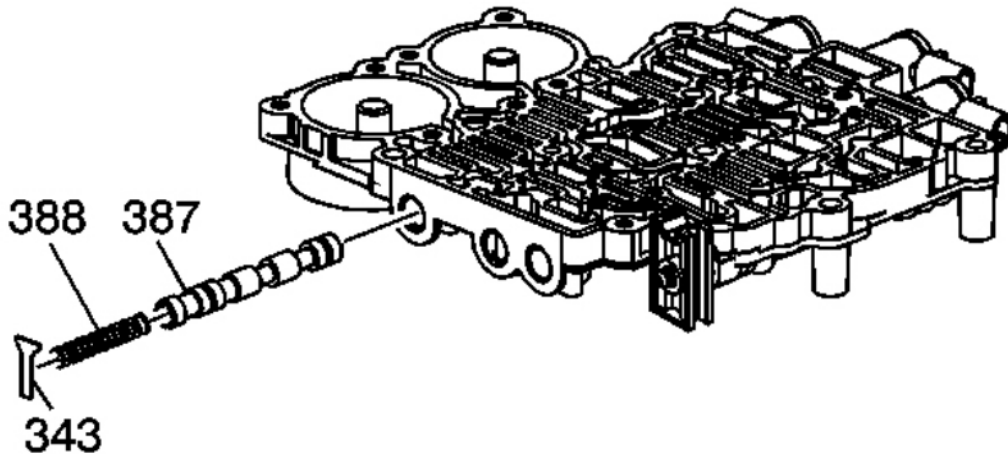


Fig. 215: Locating 1-2 Shift Valve
Courtesy of GENERAL MOTORS CORP.

1. Remove the 1-2 shift valve retainer (343).
2. Remove the 1-2 shift valve spring (388).
3. Remove the 1-2 shift valve (387).

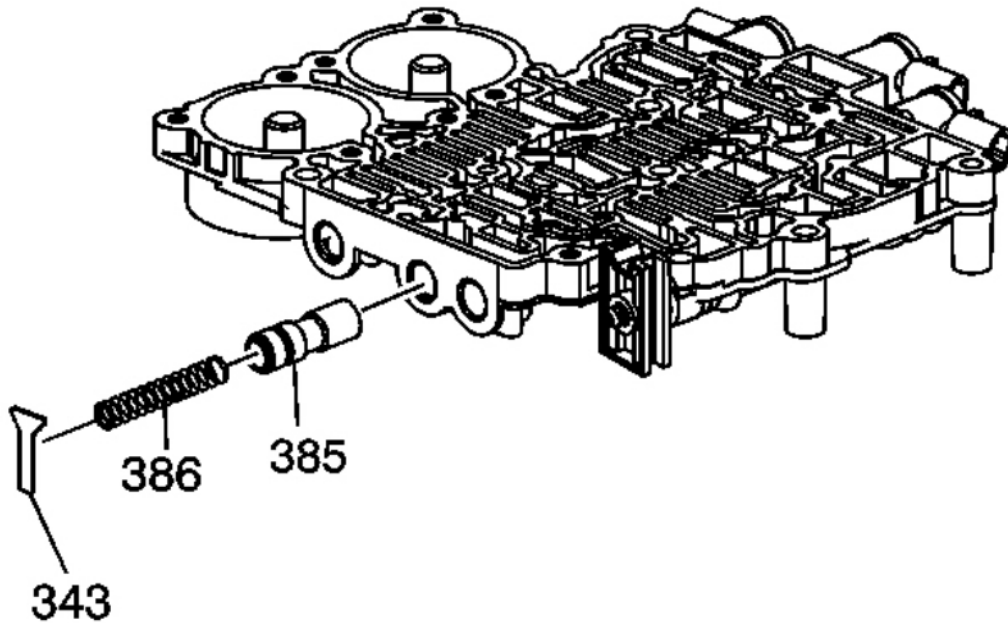


Fig. 216: Identifying Reverse Lock Out Valve
Courtesy of GENERAL MOTORS CORP.

4. Remove the reverse lock out valve retainer (343).
5. Remove the reverse lock out spring (386).
6. Remove the reverse lock out valve (385).

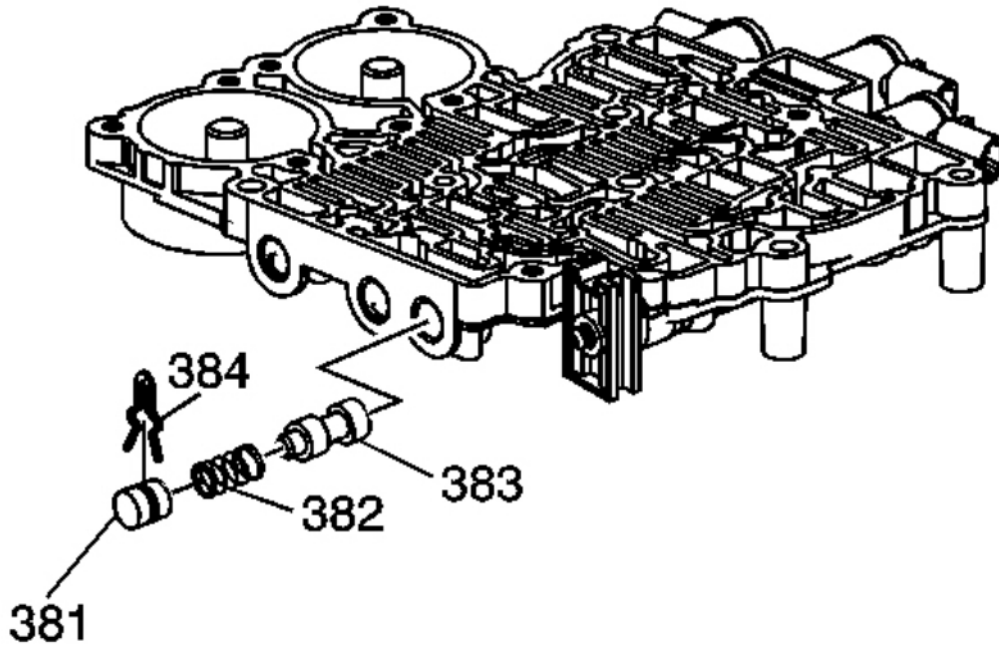


Fig. 217: View Of Low Pressure Control Valve
Courtesy of GENERAL MOTORS CORP.

7. Remove the low pressure control valve bore retainer (384).
8. Remove the bore plug (381).
9. Remove the low pressure control valve spring (382).
10. Remove the low pressure control valve (383).

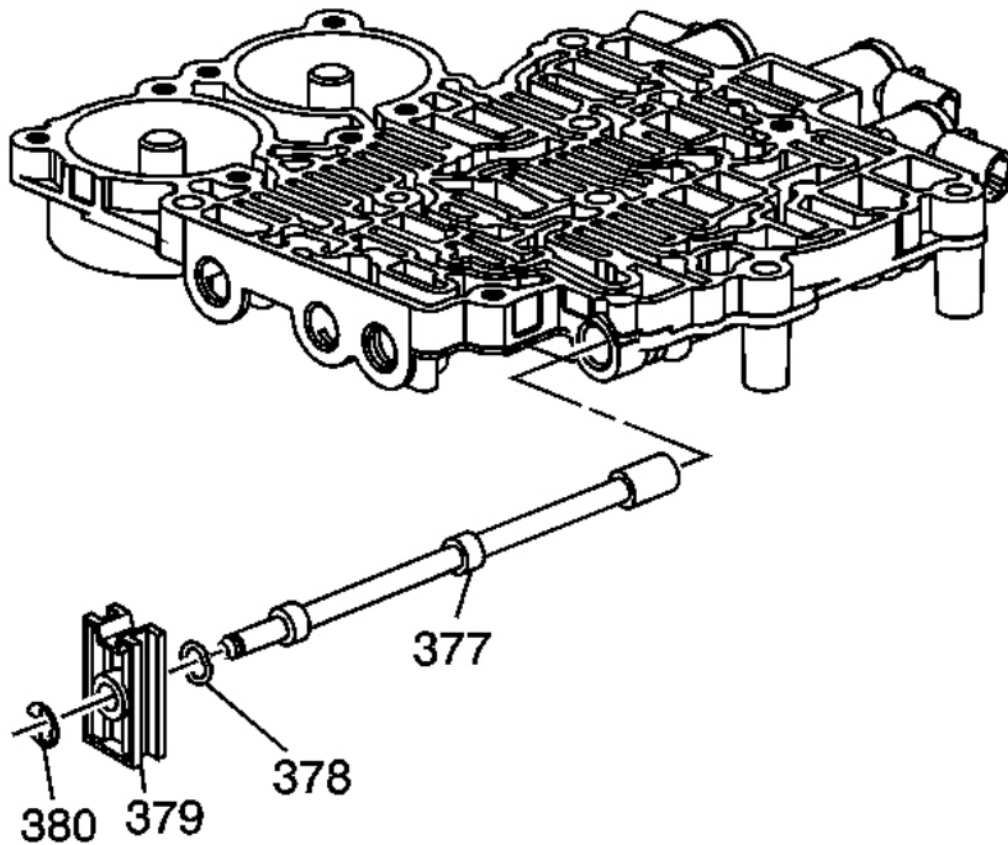


Fig. 218: Locating Manual Valve Link
Courtesy of GENERAL MOTORS CORP.

11. Remove the manual valve link retainer (380).
12. Remove the manual valve link (379).
13. Remove the manual valve link retainer (378).
14. Remove the manual valve (377).

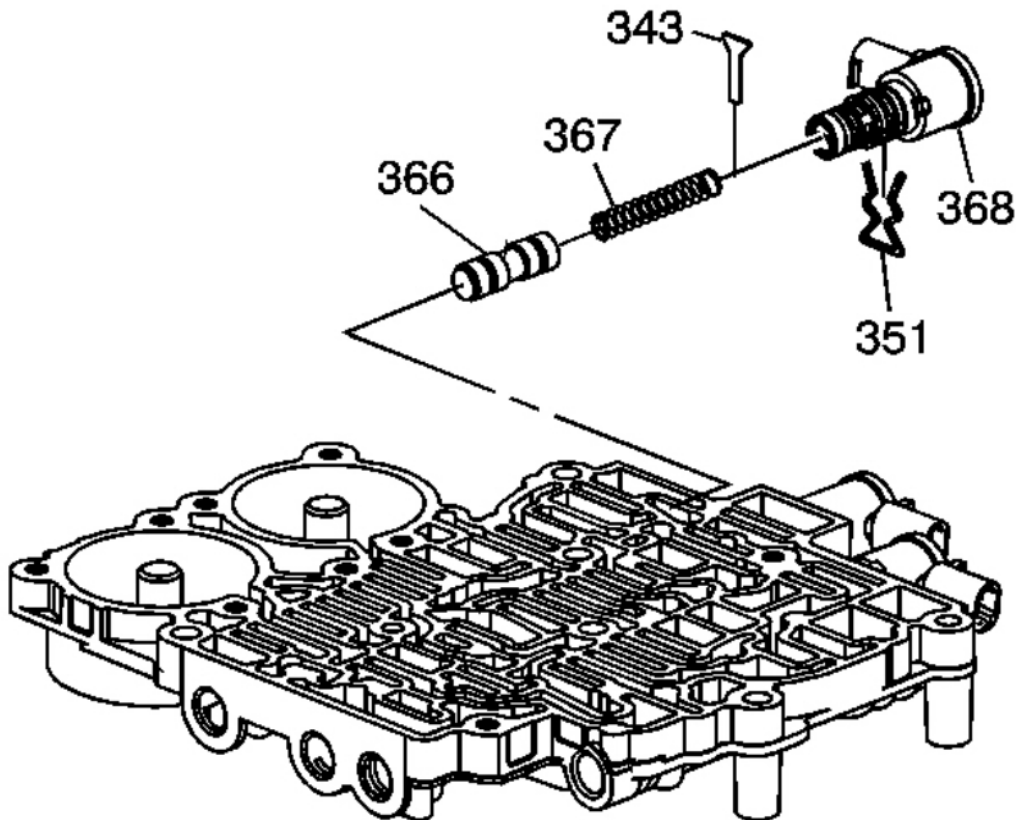


Fig. 219: Identifying 1-2 Shift Control Valve
 Courtesy of GENERAL MOTORS CORP.

15. Remove the 1-2 shift solenoid retainer (351).
16. Remove the 1-2 shift solenoid (368).
17. Remove the 1-2 shift control valve retainer (343).
18. Remove the 1-2 shift control valve spring (367).
19. Remove the 1-2 shift control valve (366).

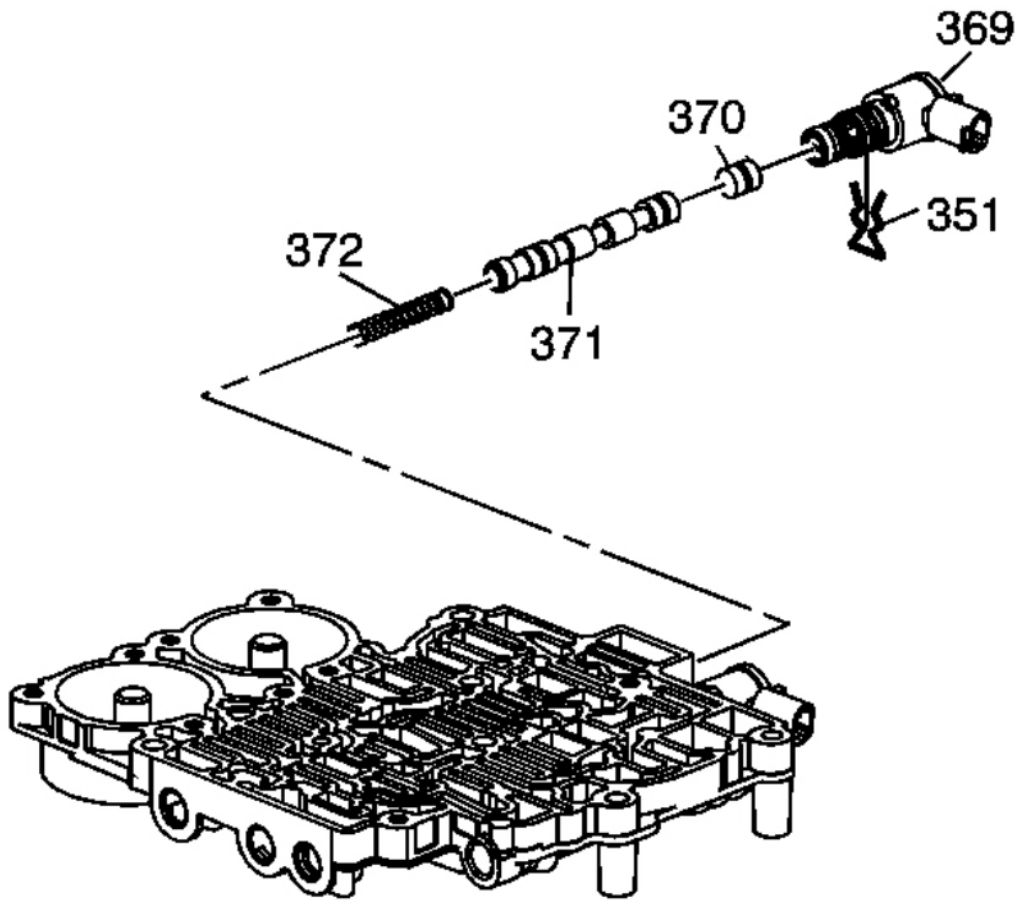


Fig. 220: View Of 2-3 Shift Valve
Courtesy of GENERAL MOTORS CORP.

20. Remove the 2-3 shift solenoid retainer (351).
21. Remove the 2-3 shift solenoid (369).
22. Remove the 2-3 shift control valve (370).
23. Remove the 2-3 shift valve (371).
24. Remove the 2-3 shift valve spring (372).

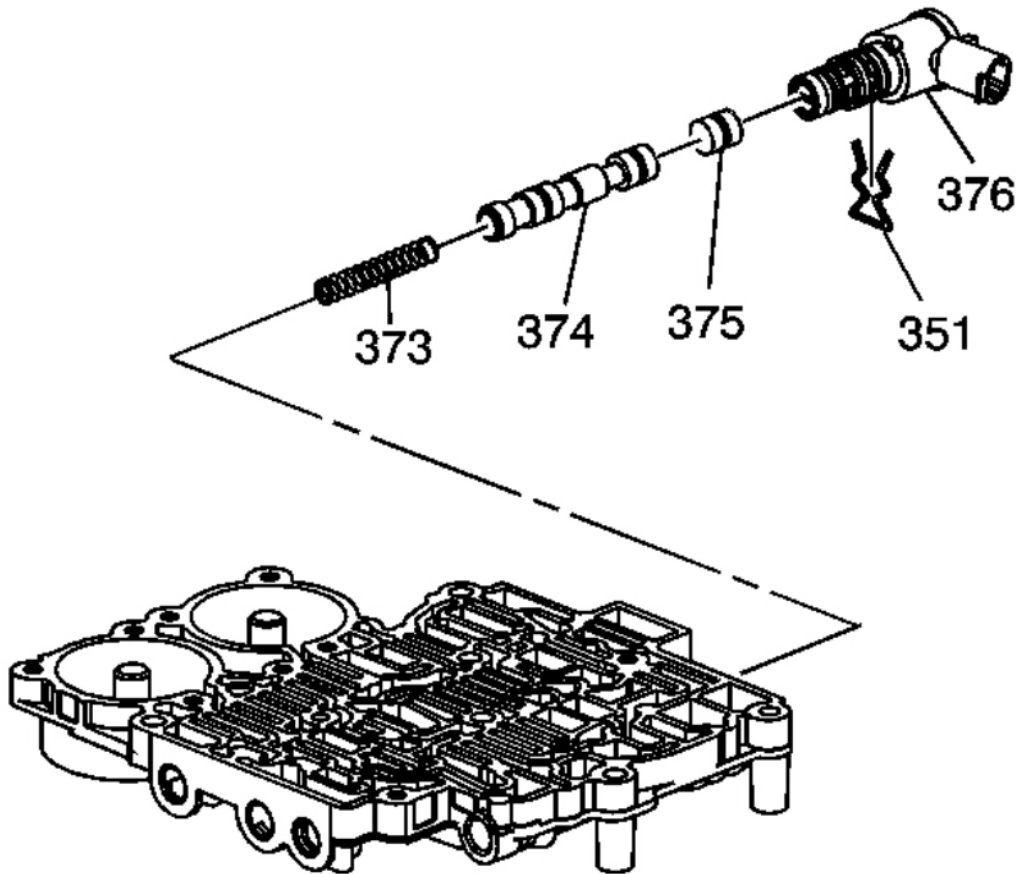


Fig. 221: Locating 4-5 Shift Valve
Courtesy of GENERAL MOTORS CORP.

25. Remove the 4-5 shift solenoid retainer (351).
26. Remove the 4-5 shift solenoid (376).
27. Remove the 4-5 shift control valve (375).
28. Remove the 4-5 shift valve (374).
29. Remove the 4-5 shift valve spring (373).

REAR CONTROL VALVE BODY ASSEMBLY

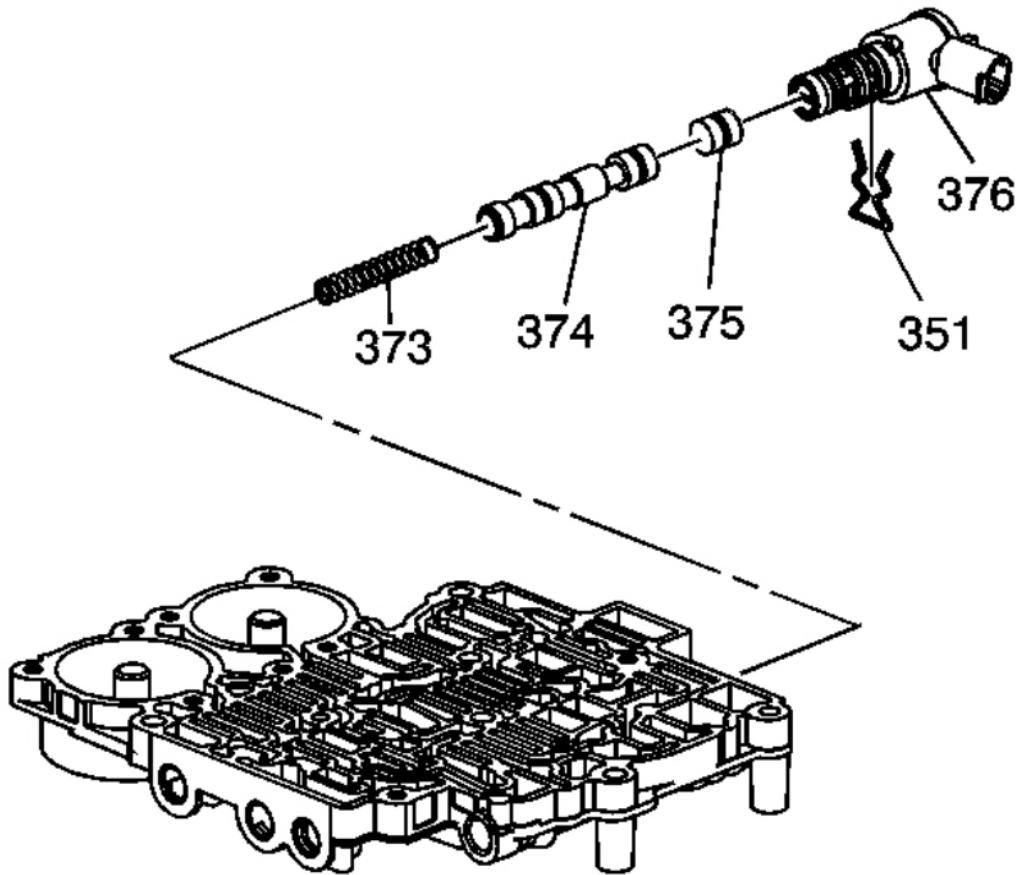


Fig. 222: Locating 4-5 Shift Valve
Courtesy of GENERAL MOTORS CORP.

1. Install the 4-5 shift valve spring (373).
2. Install the 4-5 shift valve (374).
3. Install the 4-5 shift control valve (375).
4. Install the 4-5 shift solenoid (376).
5. Install the 4-5 shift solenoid retainer (351).

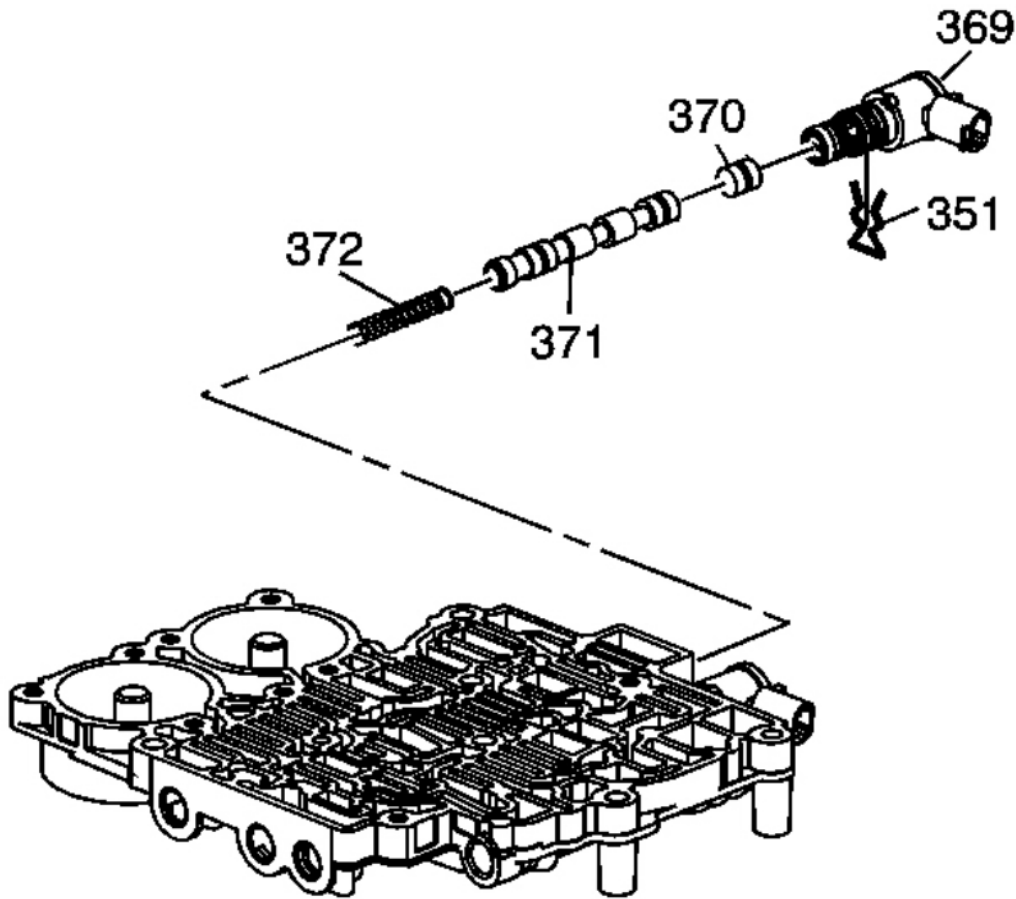


Fig. 223: View Of 2-3 Shift Valve
Courtesy of GENERAL MOTORS CORP.

6. Install the 2-3 shift valve spring (372).
7. Install the 2-3 shift valve (371).
8. Install the 2-3 shift control valve (370).
9. Install the 2-3 shift solenoid (369).
10. Install the 2-3 shift solenoid retainer (351).

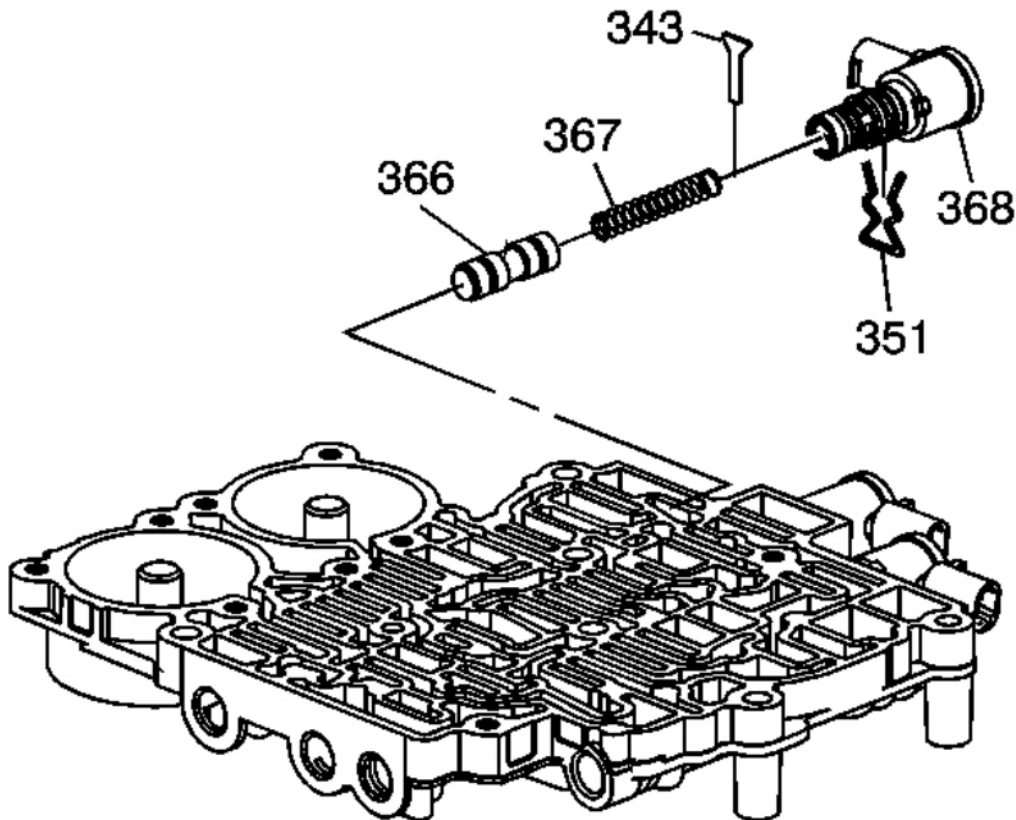


Fig. 224: Identifying 1-2 Shift Control Valve
Courtesy of GENERAL MOTORS CORP.

11. Install the 1-2 shift control valve (366).
12. Install the 1-2 shift control valve spring (367).
13. Install the 1-2 shift control valve retainer (343).
14. Install the 1-2 shift solenoid (368).
15. Install the 1-2 shift solenoid retainer (351).

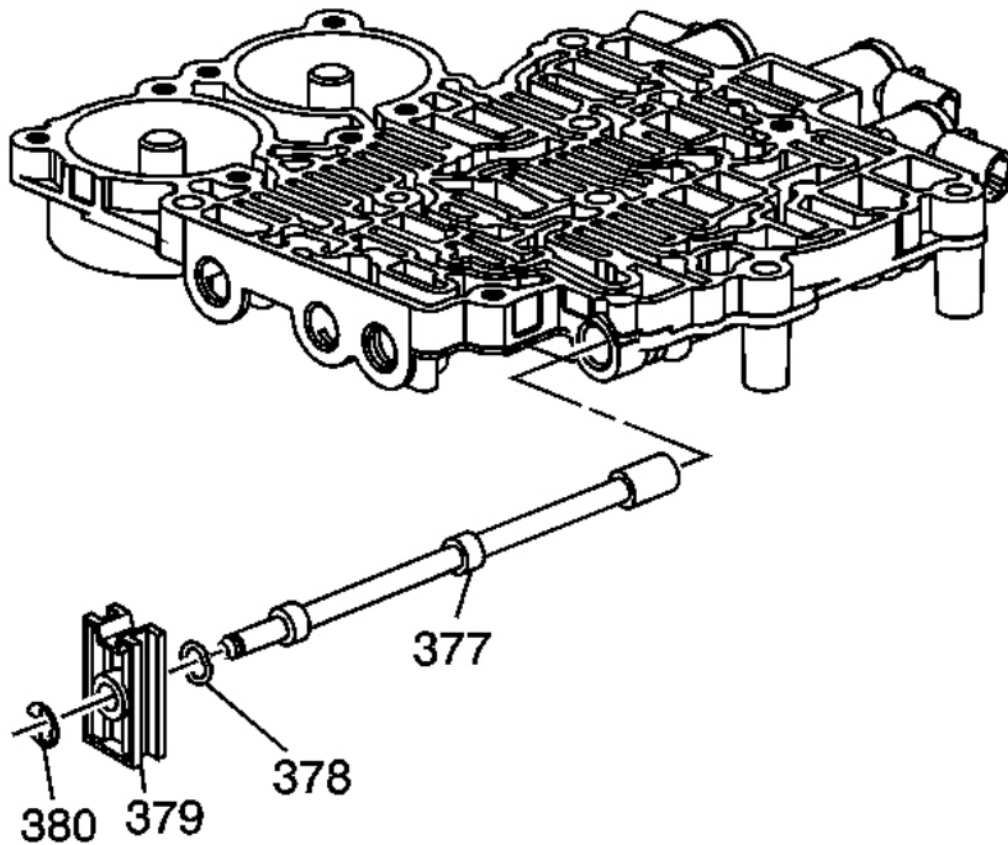


Fig. 225: Locating Manual Valve Link
Courtesy of GENERAL MOTORS CORP.

16. Install the manual valve link retainer (380).
17. Install the manual valve link (379).
18. Install the manual valve link retainer (378).
19. Install the manual valve (377).

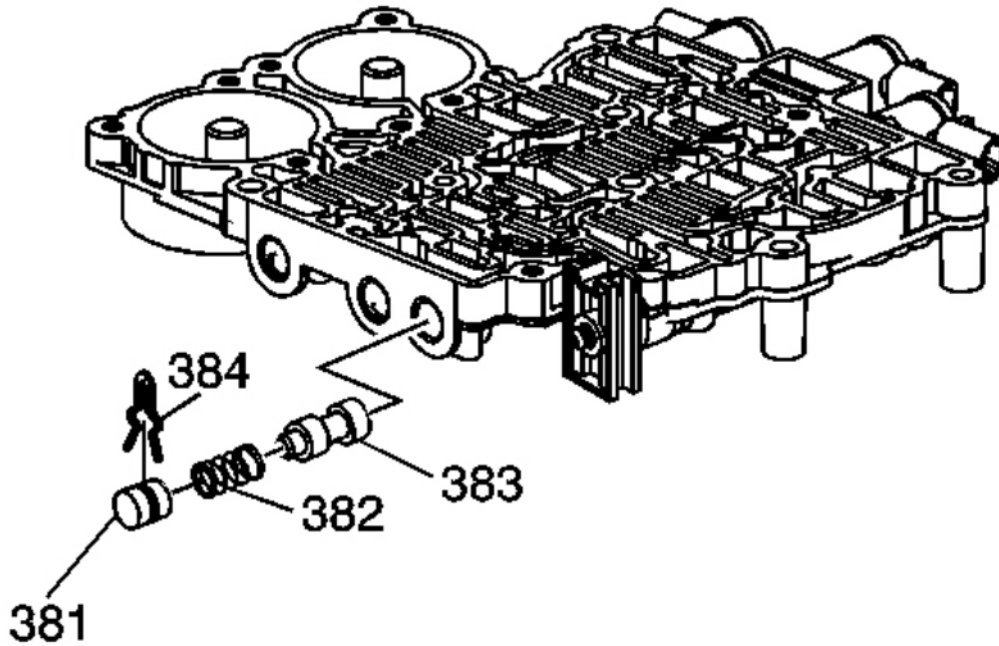


Fig. 226: View Of Low Pressure Control Valve
Courtesy of GENERAL MOTORS CORP.

20. Install the low pressure control valve (383).
21. Install the low pressure control valve spring (382).
22. Install the bore plug (381).
23. Install the low pressure control valve bore retainer (384).

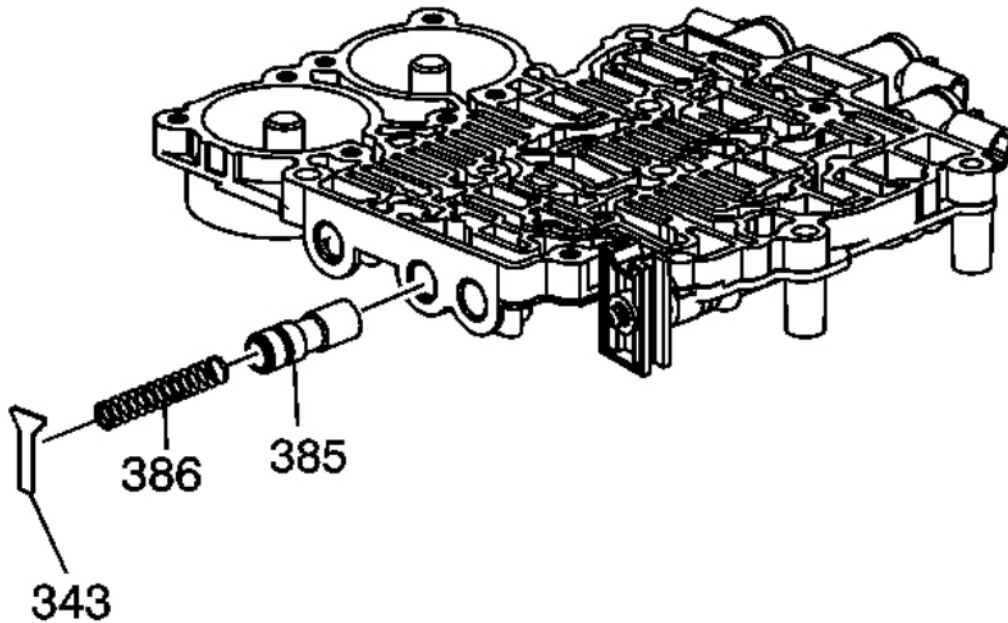


Fig. 227: Identifying Reverse Lock Out Valve
Courtesy of GENERAL MOTORS CORP.

24. Install the reverse lock out valve (385).
25. Install the reverse lock out spring (386).
26. Install the reverse lock out valve retainer (343).

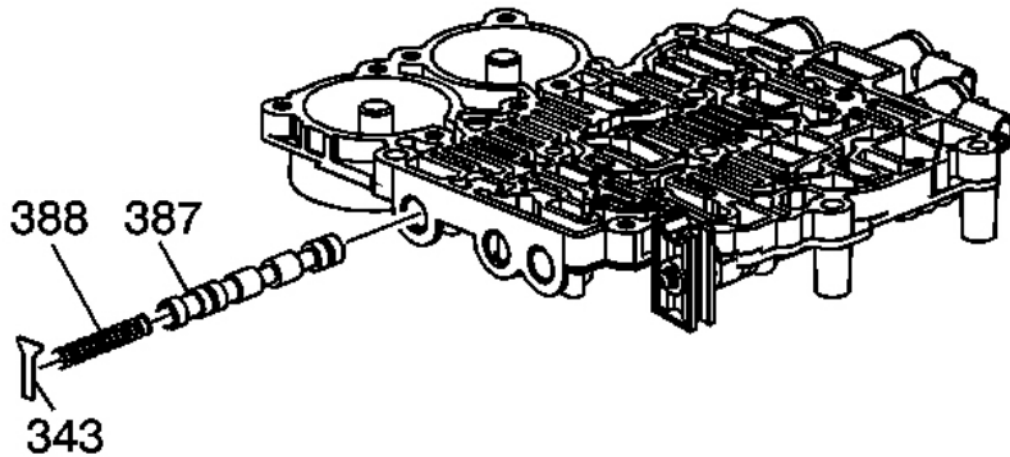


Fig. 228: Locating 1-2 Shift Valve
Courtesy of GENERAL MOTORS CORP.

27. Install the 1-2 shift valve (387).
28. Install the 1-2 shift valve spring (388).
29. Install the 1-2 shift valve retainer (343).

FRONT CONTROL VALVE BODY INSPECTION

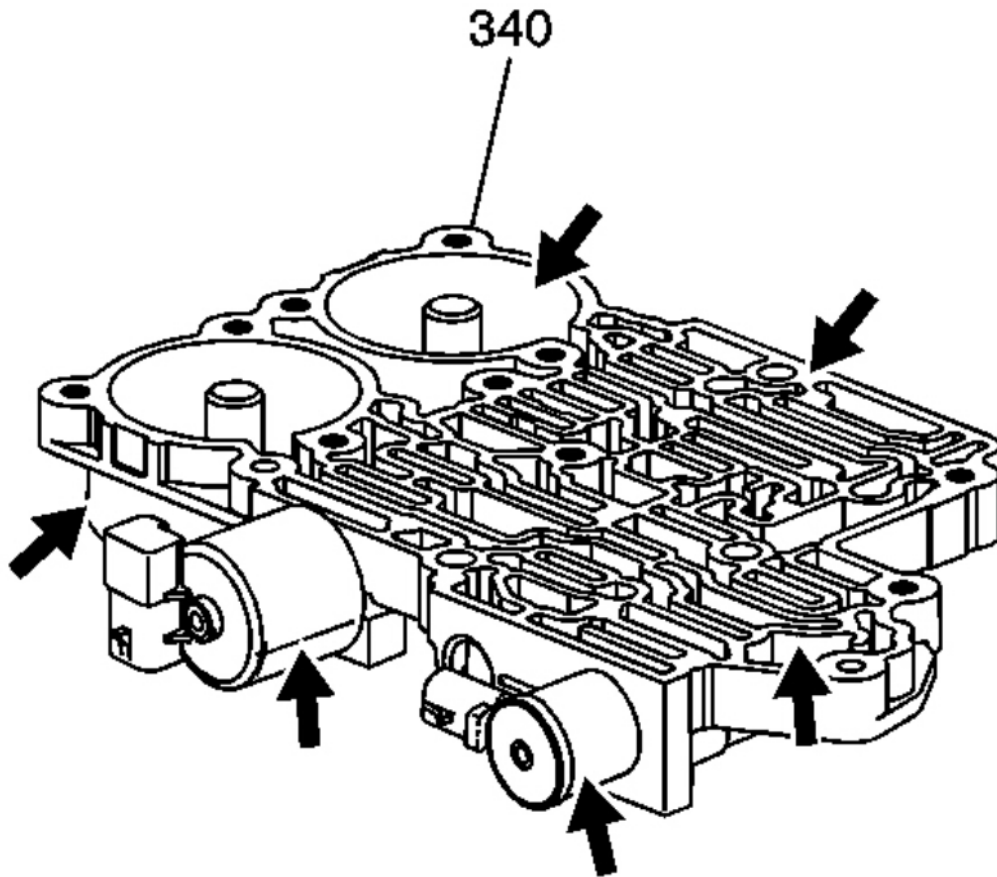


Fig. 229: Identifying Front Control Valve Body
Courtesy of GENERAL MOTORS CORP.

1. Inspect the front control valve body (340) for the following conditions:
 - Damaged or porous casting
 - Damaged sealing surfaces
 - Debris in fluid passages
2. Use a small pick or screwdriver, before disassembly, to inspect the front control valve body (340) components for the following conditions:
 - Valves binding or sticking in their bores or bushings
 - Broken missing or damaged springs

- Missing or damaged retainers
 - Damaged solenoid valves
 - Debris in valve line ups or solenoid valves
3. During disassembly, inspect the front control valve body for the following conditions:
- Worn or damaged valves, valve bores or bushings
 - Broken, missing or damaged springs
 - Missing or damaged retainers
 - Damaged solenoid valves
 - Debris in valve line ups or solenoid valve

FRONT CONTROL VALVE BODY DISASSEMBLE

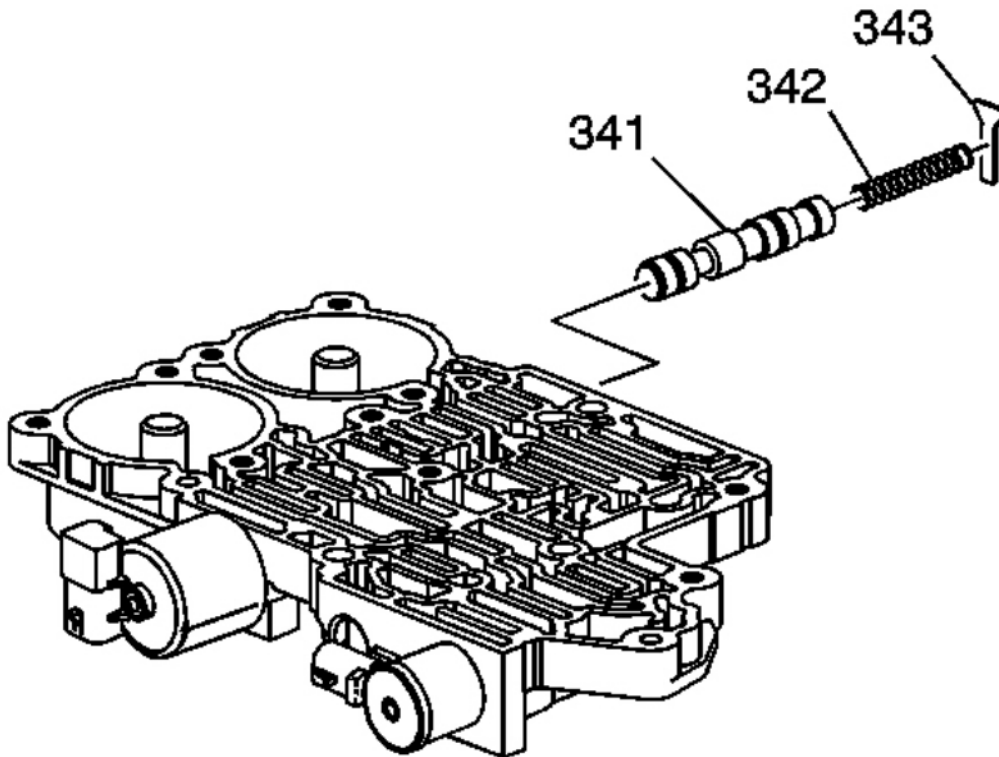


Fig. 230: View Of Safety Mode Valve Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the safety mode valve retainer (343).
2. Remove the safety mode valve spring (342).
3. Remove the safety mode valve (341).

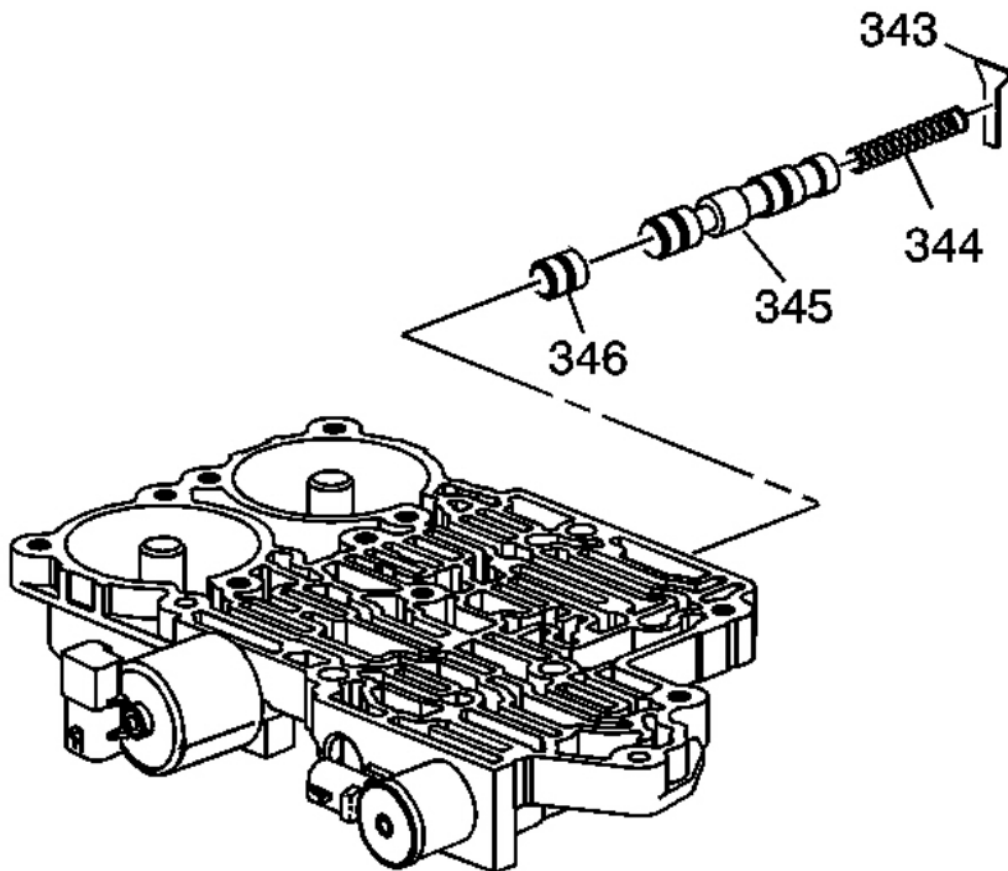


Fig. 231: Locating 3-4 Shift Valve
Courtesy of GENERAL MOTORS CORP.

4. Remove the 3-4 shift valve retainer (343).
5. Remove the 3-4 shift valve spring (344).
6. Remove the 3-4 shift valve (345).
7. Remove the 3-4 shift control valve (346).

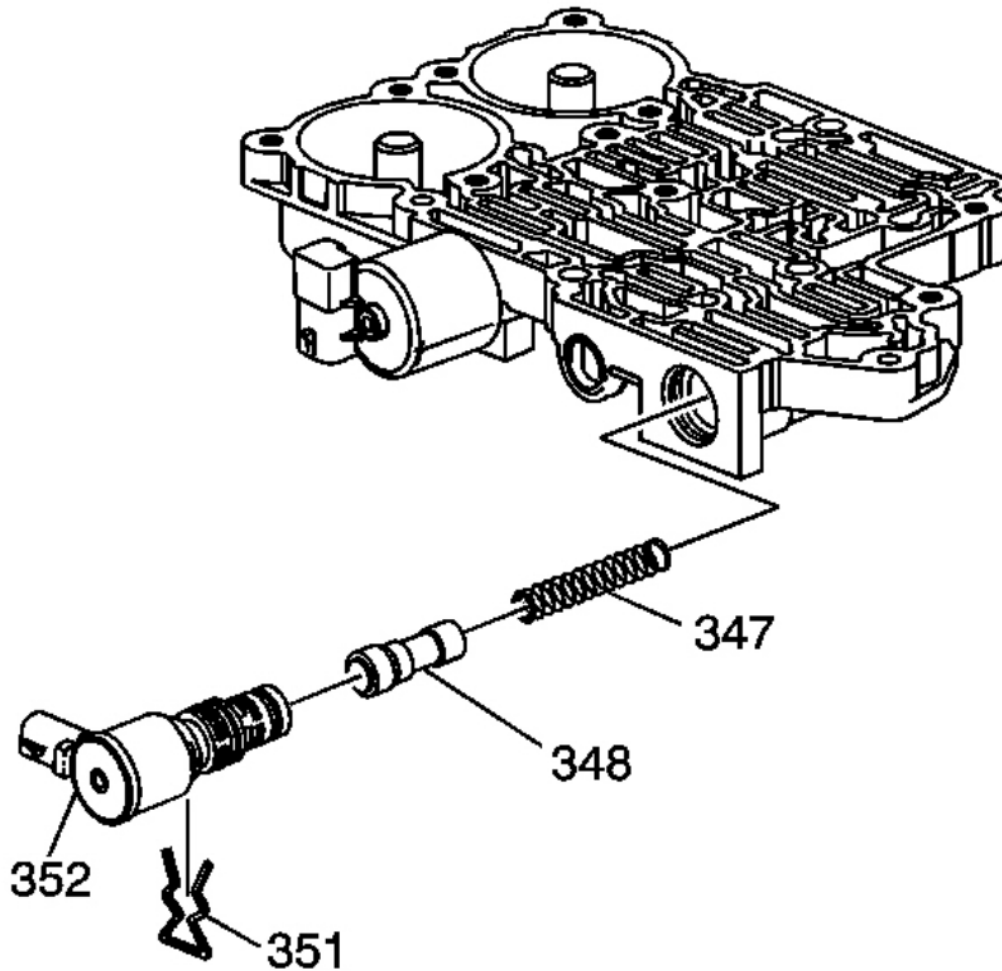


Fig. 232: Expanded View Of TCC PWM Solenoid & TCC Regulator Apply Valve
Courtesy of GENERAL MOTORS CORP.

8. Remove the TCC PWM solenoid valve retainer (351).
9. Remove the TCC PWM solenoid (352).
10. Remove the TCC regulator apply valve (348).
11. Remove the TCC regulator apply valve spring (347).

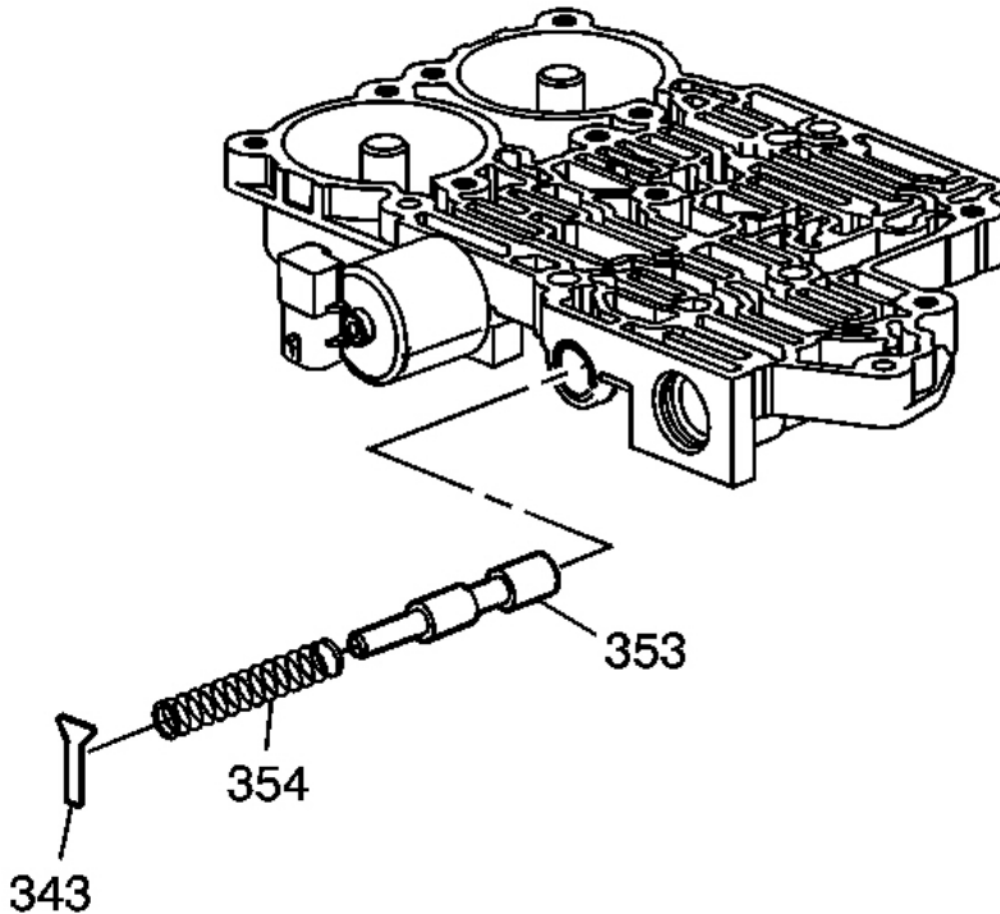


Fig. 233: Identifying Feed Limit Valve
Courtesy of GENERAL MOTORS CORP.

12. Remove the feed limit valve retainer (343).
13. Remove the feed limit valve spring (354).
14. Remove the feed limit valve (353).

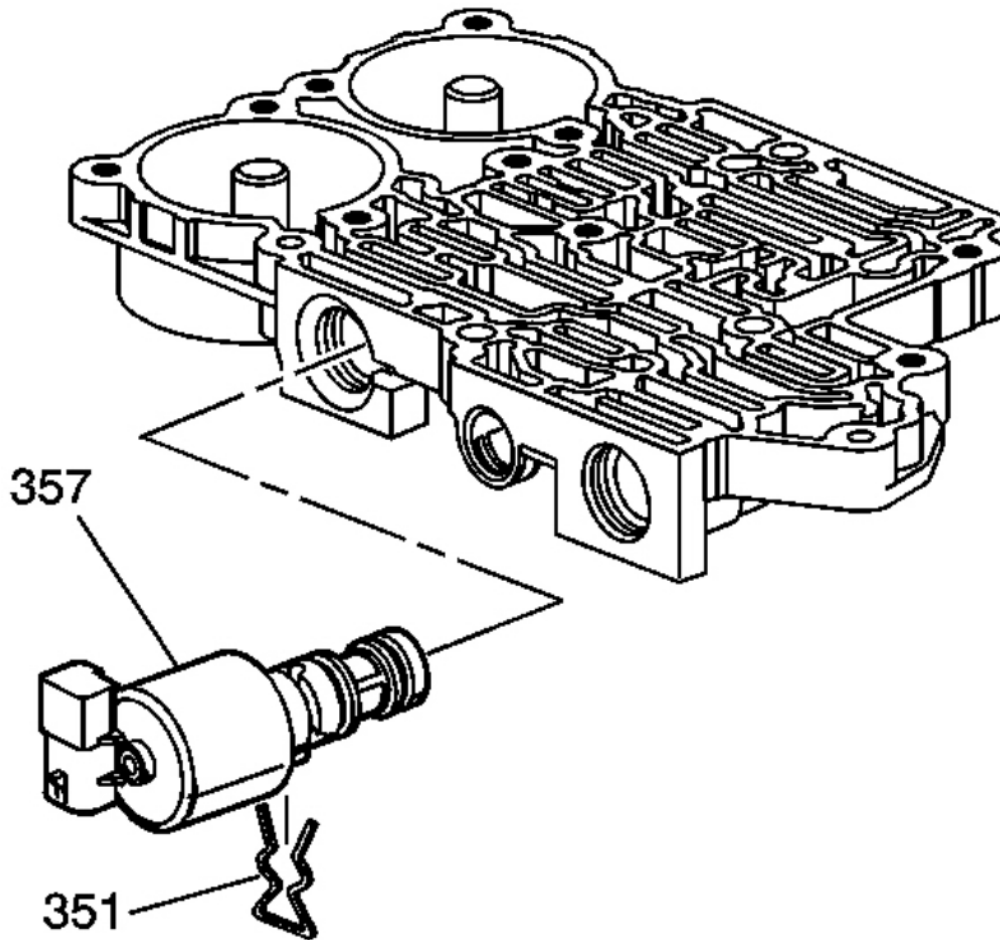


Fig. 234: View Of Pressure Control Solenoid
Courtesy of GENERAL MOTORS CORP.

15. Remove the pressure control solenoid retainer (351).
16. Remove the pressure control solenoid (357).

FRONT CONTROL VALVE BODY ASSEMBLE

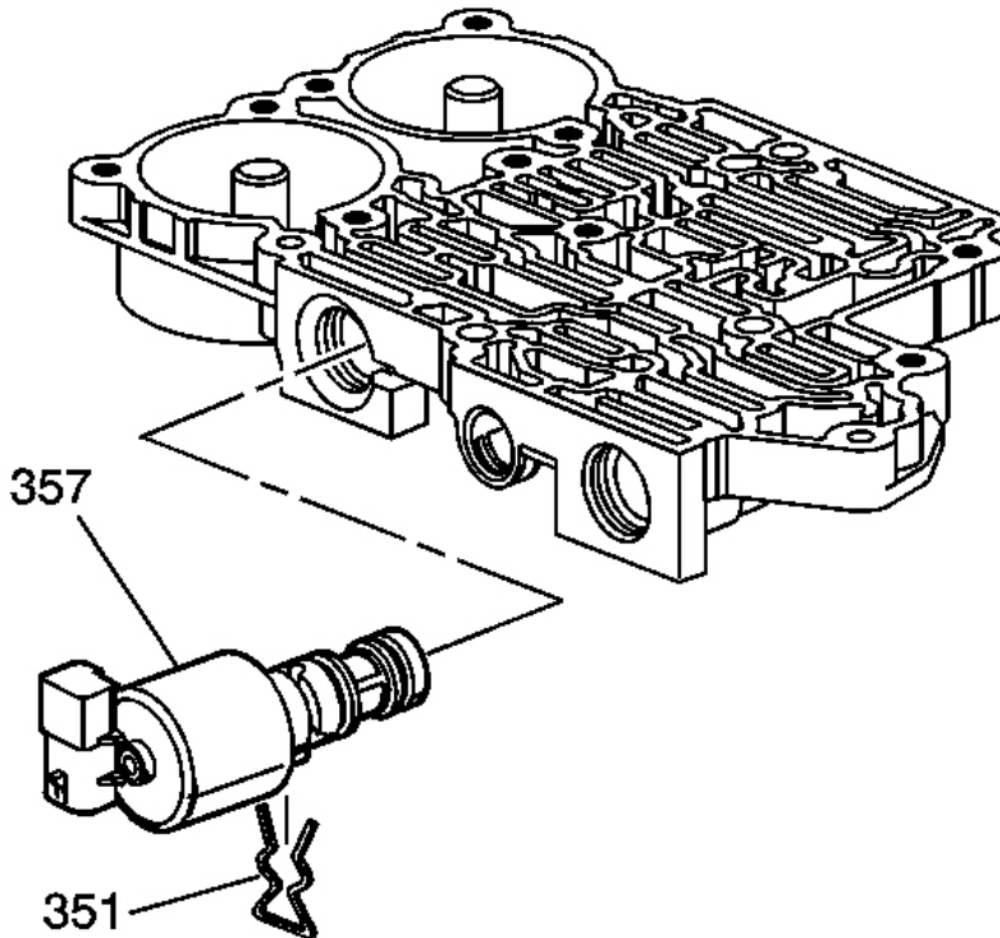


Fig. 235: View Of Pressure Control Solenoid
Courtesy of GENERAL MOTORS CORP.

1. Install the pressure control solenoid (357).
2. Install the pressure control solenoid retainer (351).

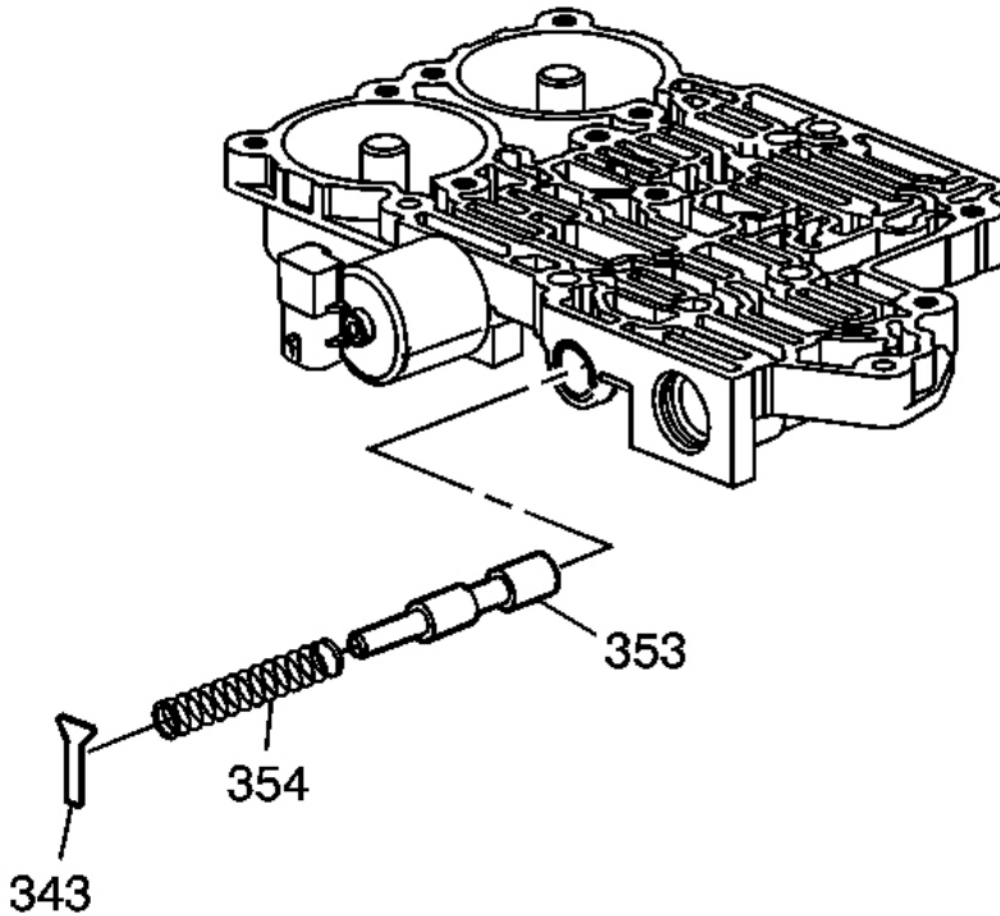


Fig. 236: Identifying Feed Limit Valve
Courtesy of GENERAL MOTORS CORP.

3. Install the feed limit valve (353).
4. Install the feed limit valve spring (354).
5. Install the feed limit valve retainer (343).

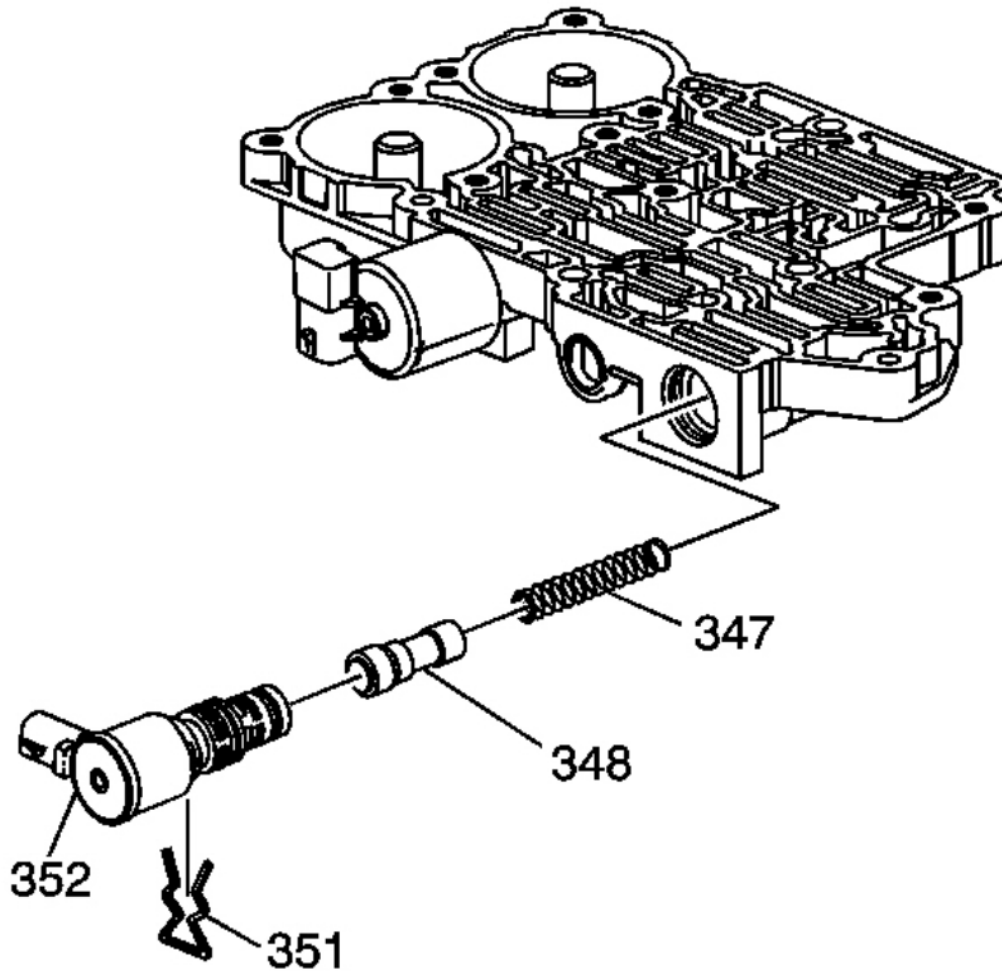


Fig. 237: Expanded View Of TCC PWM Solenoid & TCC Regulator Apply Valve
Courtesy of GENERAL MOTORS CORP.

6. Install the TCC PWM solenoid valve spring (347).
7. Install the TCC regulator apply valve (348).
8. Install the TCC PWM solenoid (352).
9. Install the TCC PWM solenoid retainer (351).

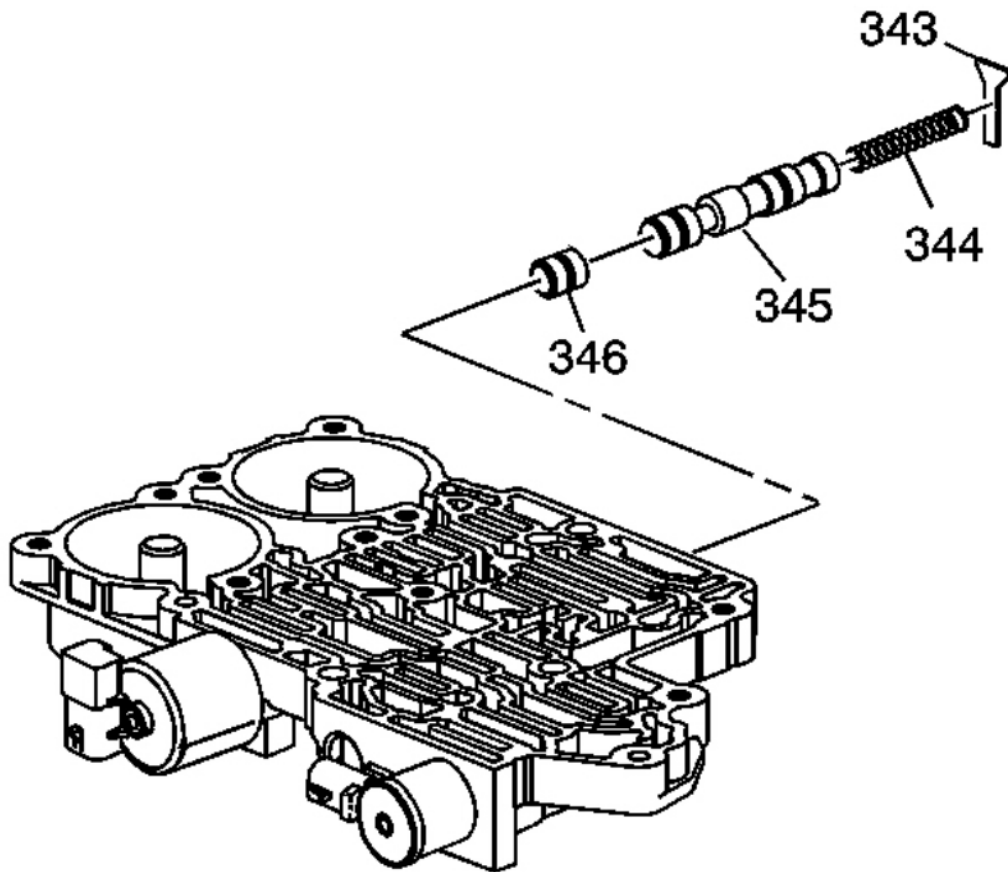


Fig. 238: Locating 3-4 Shift Valve
Courtesy of GENERAL MOTORS CORP.

10. Install the 3-4 shift control valve (346).
11. Install the 3-4 shift valve (345).
12. Install the 3-4 shift valve spring (344).
13. Install the 3-4 shift control valve retainer (343).

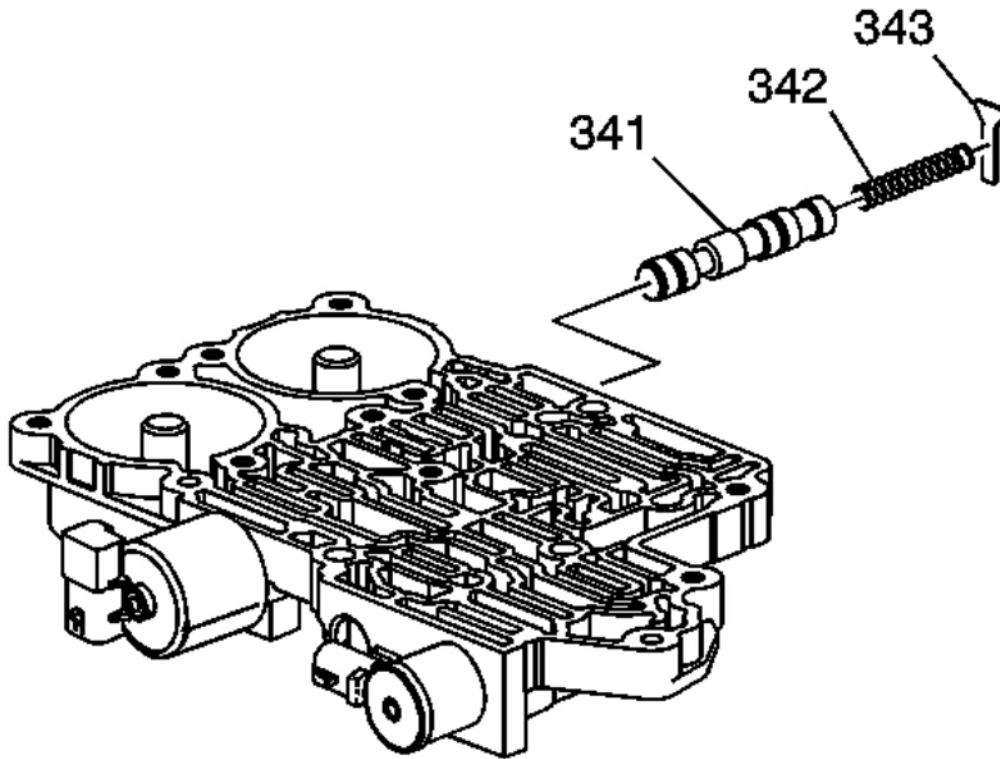


Fig. 239: View Of Safety Mode Valve Components
Courtesy of GENERAL MOTORS CORP.

14. Install the safety mode valve (341).
15. Install the safety mode valve spring (342).
16. Install the safety mode valve retainer (343).

CONTROL VALVE BODY ACCUMULATOR ASSEMBLY ASSEMBLE

Tools Required

- **J 36850** Transjel Lubricant. See **Special Tools and Equipment** .
- **J 39068** Valve Body Guide Pins. See **Special Tools and Equipment** .

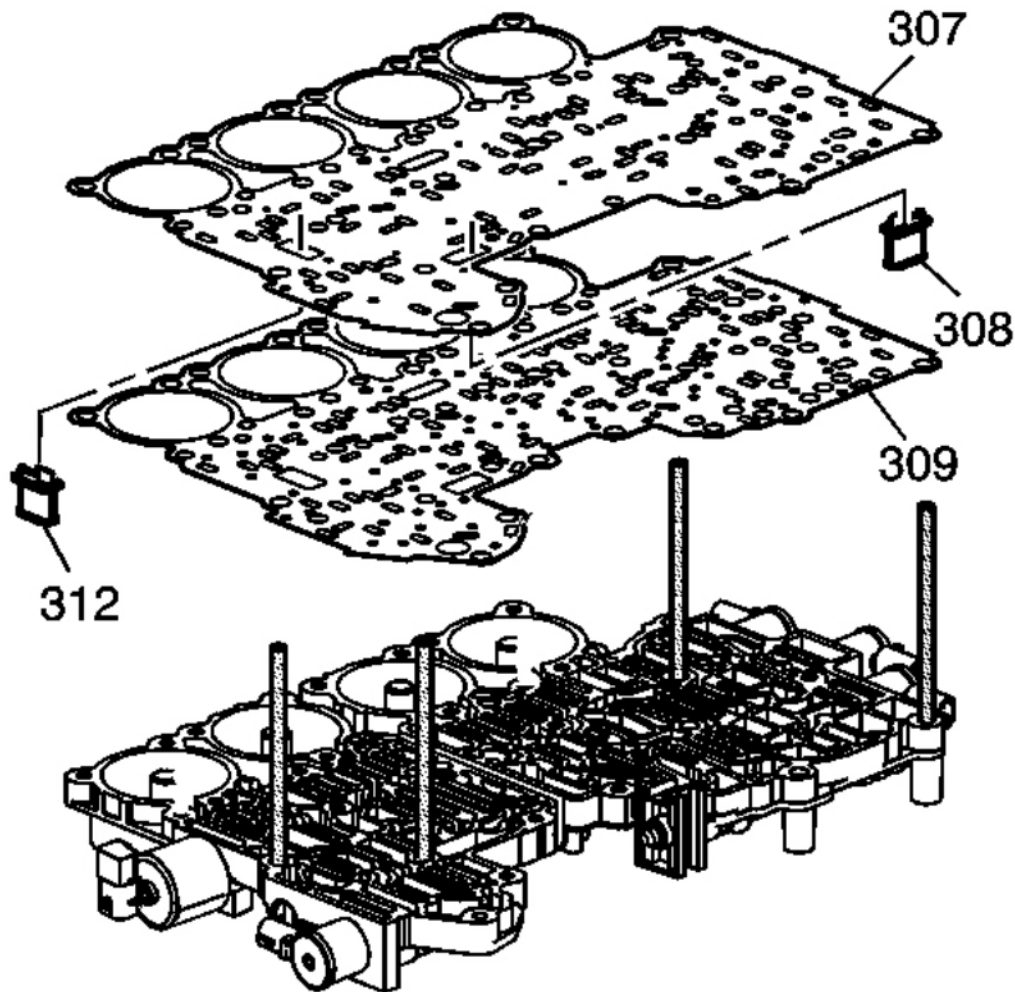


Fig. 240: View Of Solenoid Valve Filter Assemblies
Courtesy of GENERAL MOTORS CORP.

1. Install **J 39068** onto the front and rear control valve bodies.
2. Install the NEW control valve body spacer plate gasket (309) onto the valve bodies.
3. Install the new solenoid valve filter assemblies (308, 312) onto the control valve body spacer plate (307).
4. Install the control valve body spacer plate (307) onto the valve bodies.

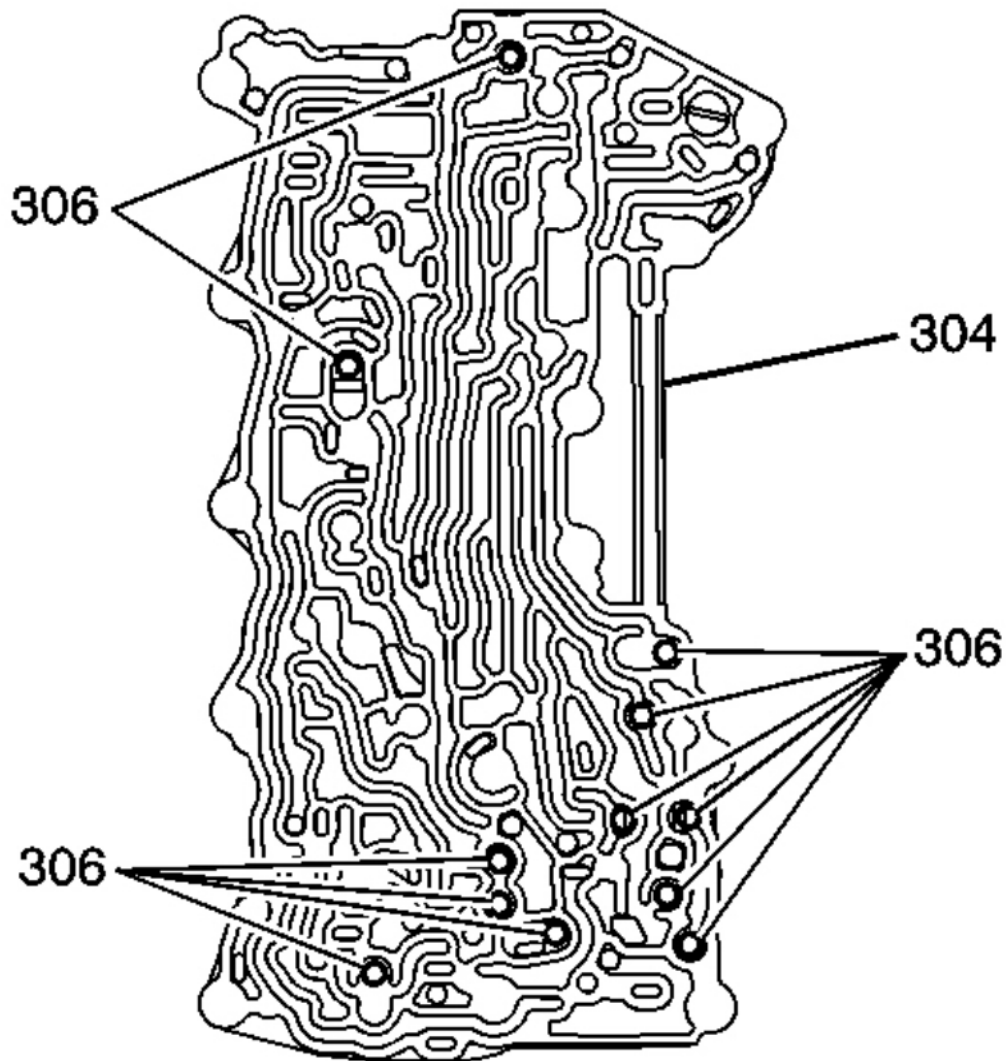


Fig. 241: Installing Checkballs Into Spacer Plate
Courtesy of GENERAL MOTORS CORP.

5. Use **J 36850** to install the 12 checkballs (306) onto the spacer plate (304).

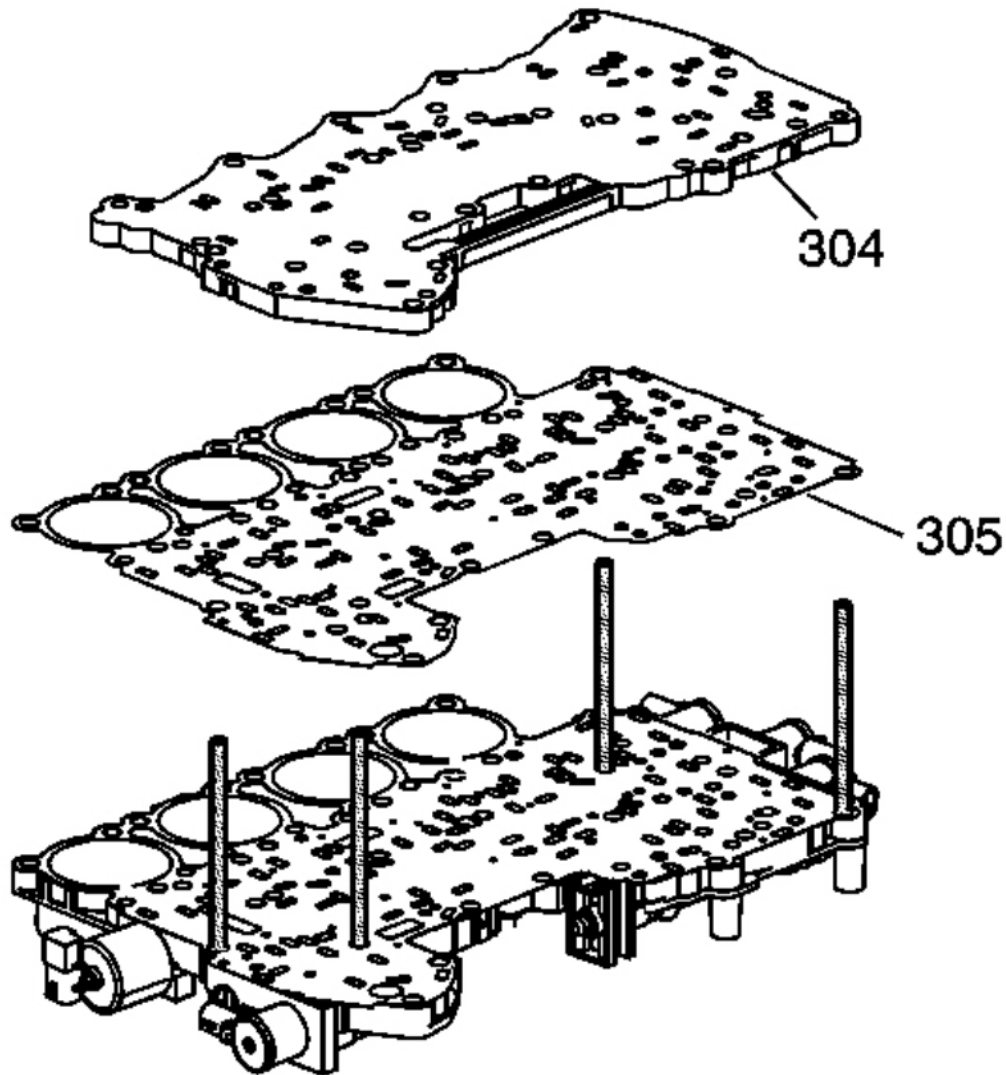


Fig. 242: Locating Control Valve Body Gasket
Courtesy of GENERAL MOTORS CORP.

6. Install the new control valve body gasket (305) onto the spacer plate (307).
7. Install the control valve body channel plate (304).

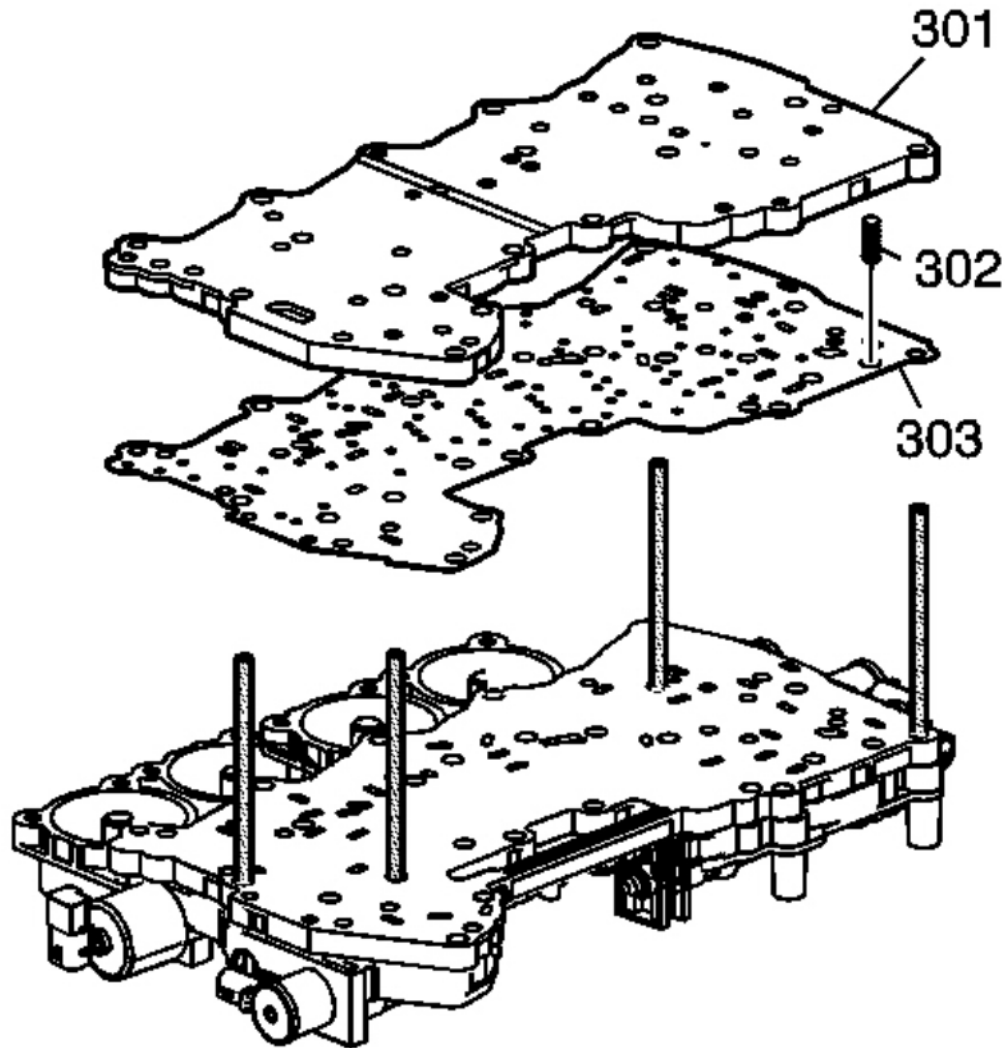


Fig. 243: Installing Control Valve Channel Plate Check Ball Spring
 Courtesy of GENERAL MOTORS CORP.

8. Use **J 36850** to install the control valve channel plate check ball spring (302) onto the channel plate (304).
9. Install the NEW control valve body channel plate gasket (303) onto the channel plate (304).
10. Install the control valve channel plate (301) onto the channel plate gasket (303).

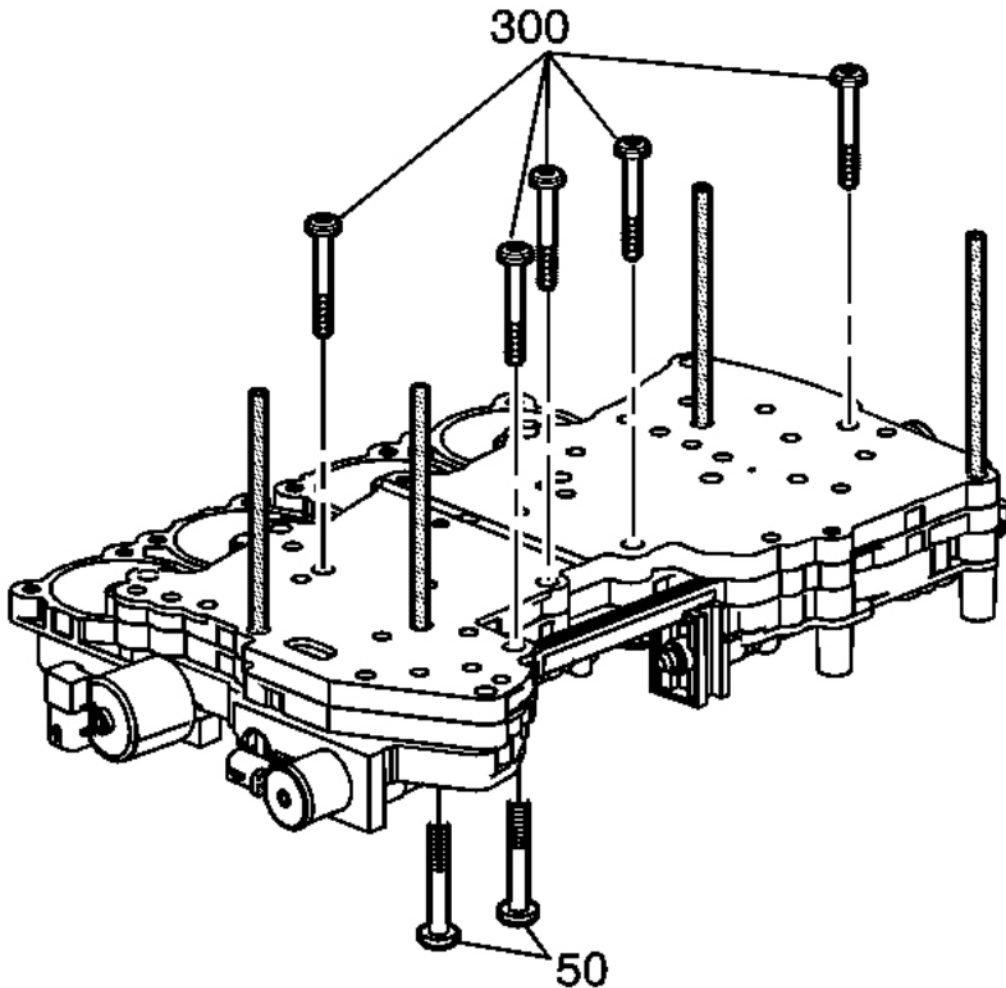


Fig. 244: Identifying Control Valve Body Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

11. Install the control valve body bolts (50, 300) into the valve body.

Tighten: Tighten the control valve body bolts (50, 300) to 11 N.m (8 lb ft).

12. Remove the **J 39068** from the valve body (47).

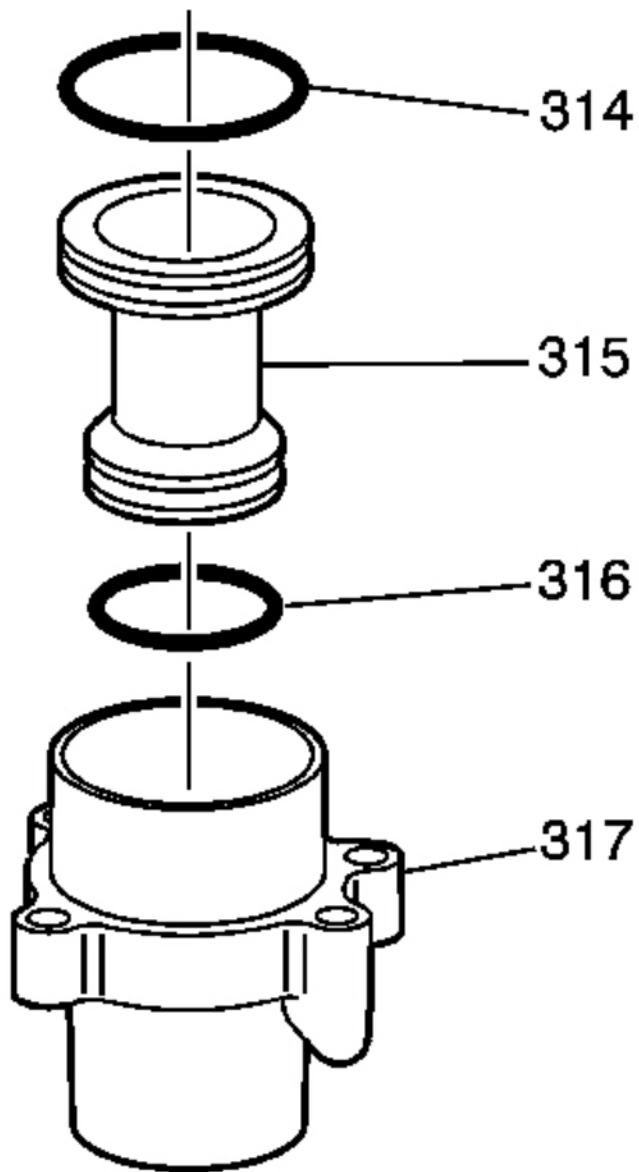


Fig. 245: View Of Direct Clutch Accumulator Components
Courtesy of GENERAL MOTORS CORP.

13. Install the direct clutch accumulator piston fluid seal rings (314, 316) onto the direct clutch accumulator piston (315).

14. Install the direct clutch accumulator piston (315) into the direct clutch accumulator housing (317).

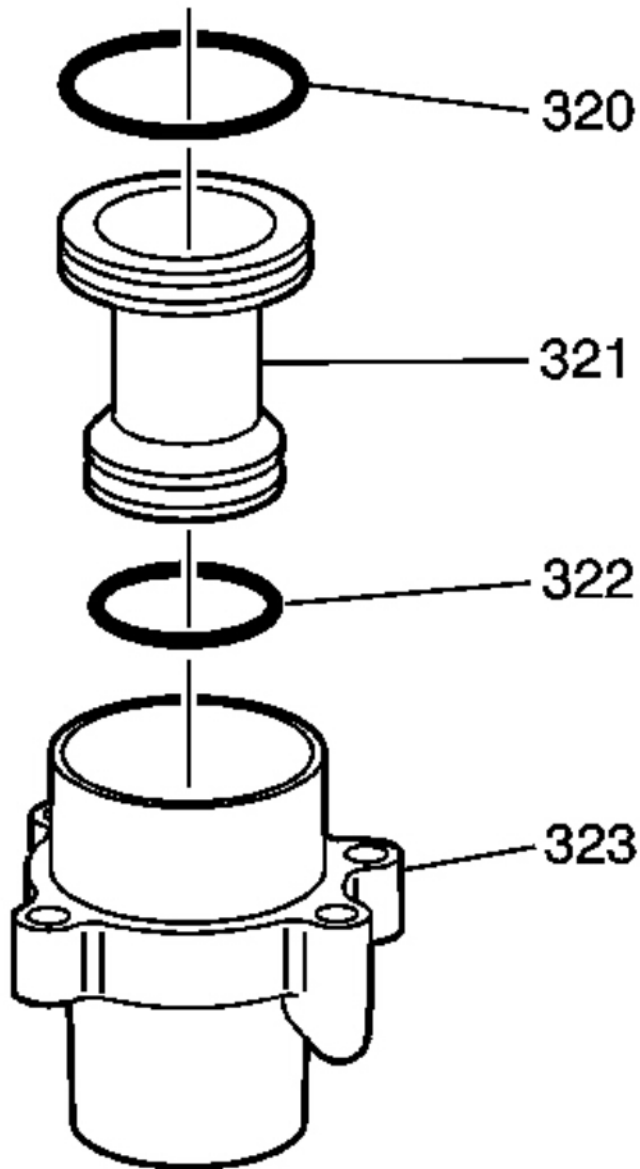


Fig. 246: Identifying Overdrive Clutch Accumulator Components
Courtesy of GENERAL MOTORS CORP.

15. Install the overdrive clutch accumulator piston fluid seal rings (320, 322) onto the overdrive clutch accumulator piston (321).
16. Install the overdrive accumulator piston (321) into the overdrive clutch accumulator housing (323).

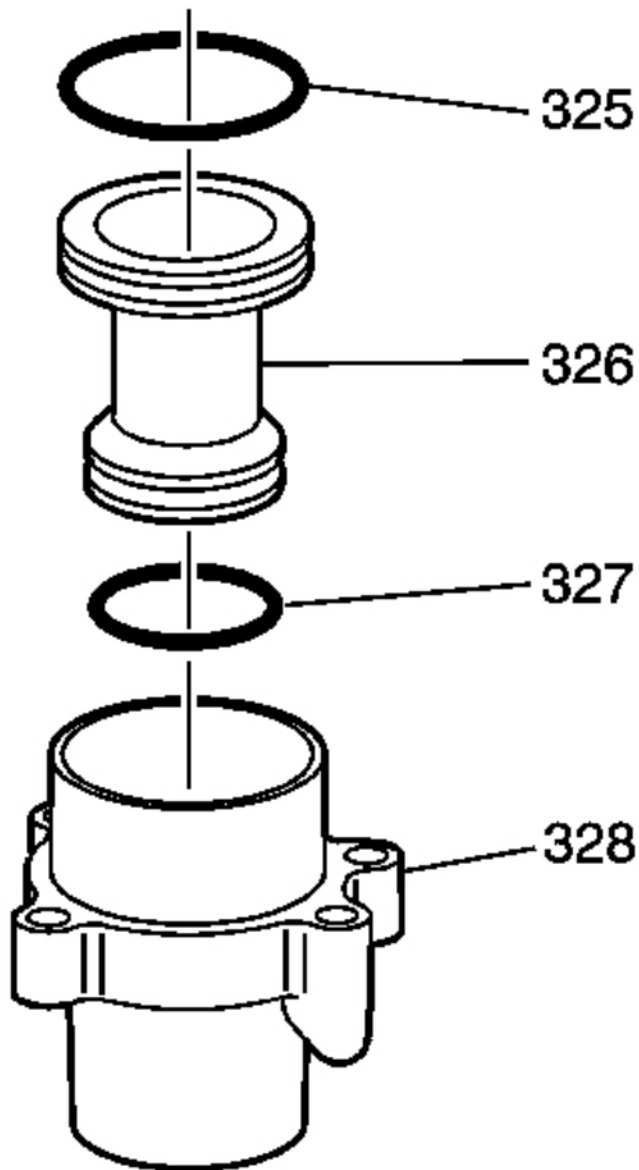


Fig. 247: Locating Intermediate Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

17. Install the intermediate clutch accumulator fluid seal rings (325, 327) onto the intermediate clutch accumulator piston (326).
18. Install the intermediate clutch accumulator piston (326) into the intermediate clutch accumulator housing (328).

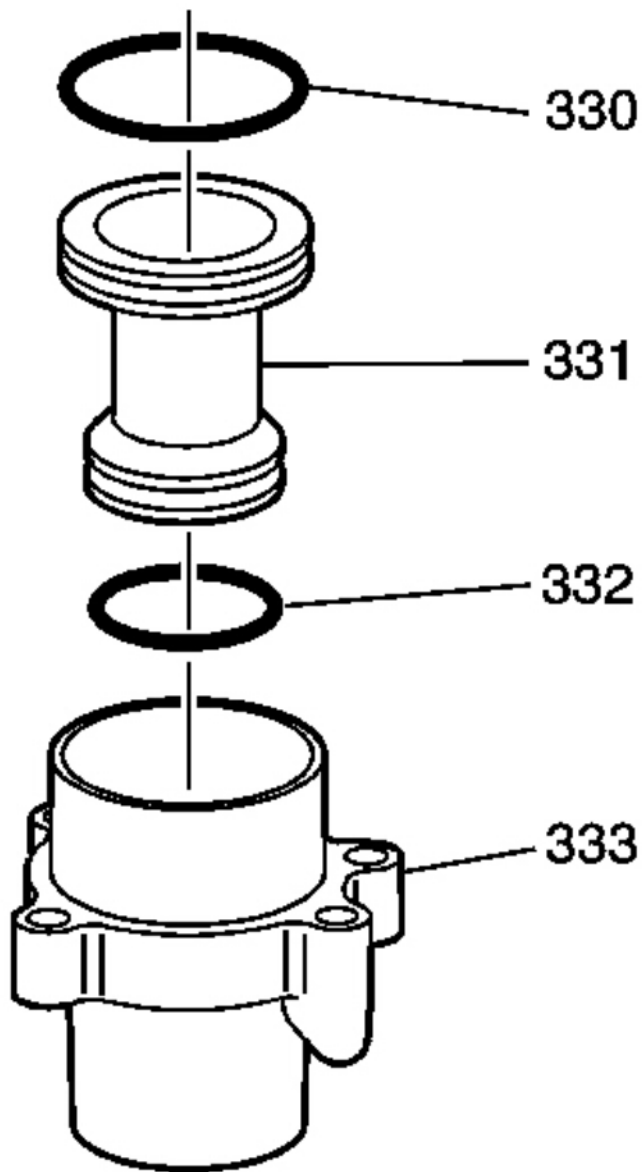


Fig. 248: View Of 2nd Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

19. Install the 2nd clutch accumulator piston fluid seal rings (330, 332) onto the 2nd clutch accumulator piston (331).

20. Install the 2nd clutch accumulator piston (331) into the 2nd clutch accumulator housing (333).

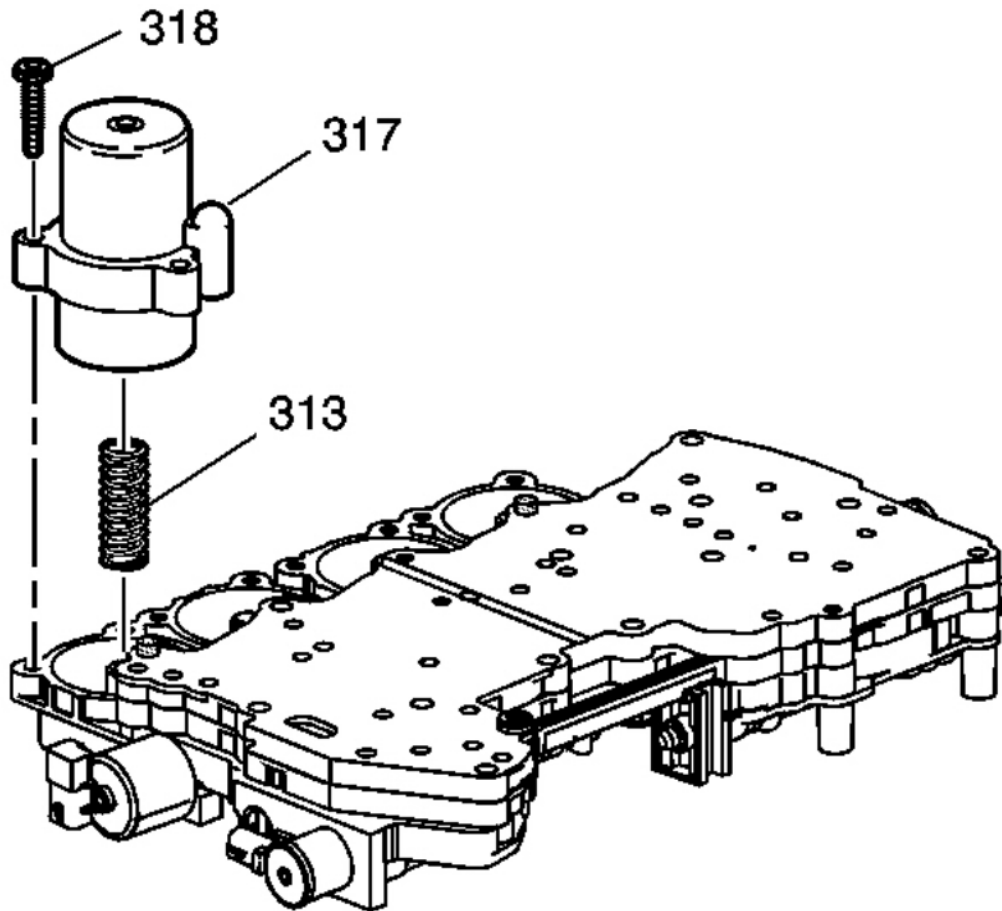


Fig. 249: Installing Direct Clutch Accumulator Housing
Courtesy of GENERAL MOTORS CORP.

21. Install the direct clutch accumulator spring (313).
22. Install the direct clutch accumulator housing (317) onto the valve body (47).
23. Install the direct clutch accumulator housing bolts (318) into the valve body (47).

Tighten: Tighten the accumulator housing bolts (318) to 11 N.m (8 lb ft).

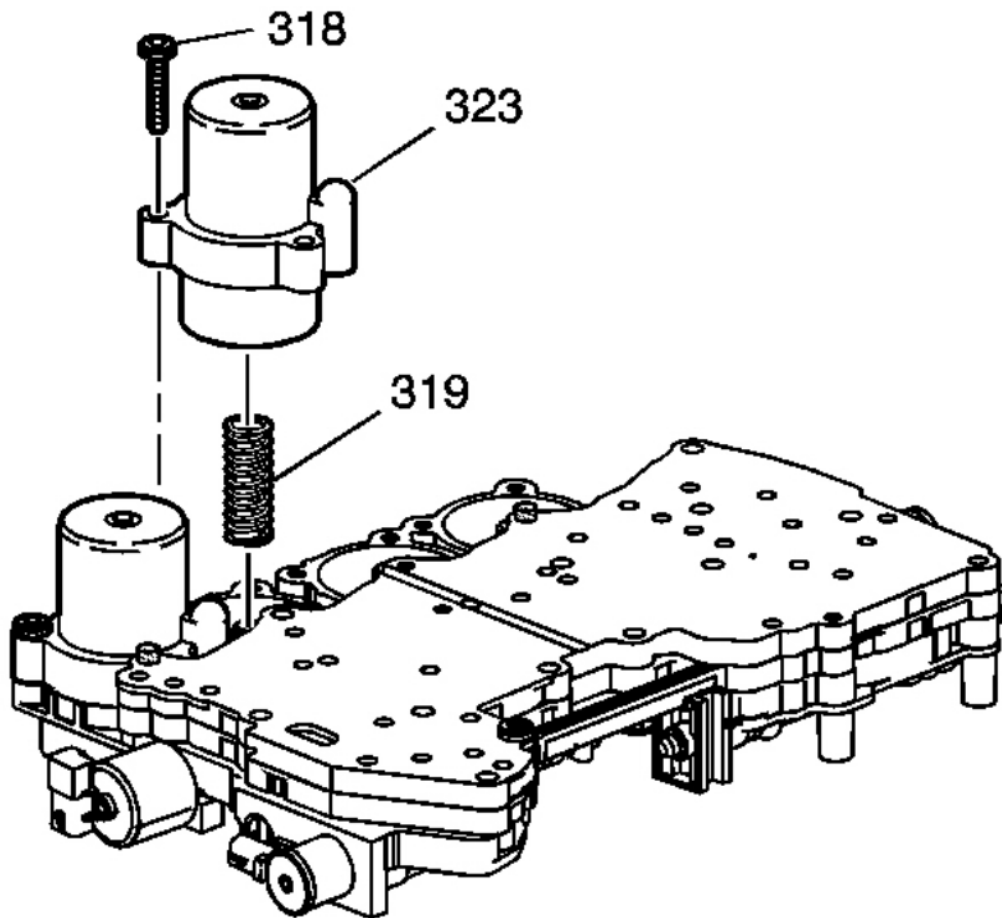


Fig. 250: View Of Overdrive Clutch Accumulator Components
Courtesy of GENERAL MOTORS CORP.

24. Install the overdrive clutch accumulator spring (319).
25. Install the overdrive clutch accumulator housing (323) onto the valve body.
26. Install the overdrive clutch accumulator housing bolts (318) into the valve body.

Tighten: Tighten the accumulator housing bolts (318) to 11 N.m (8 lb ft).

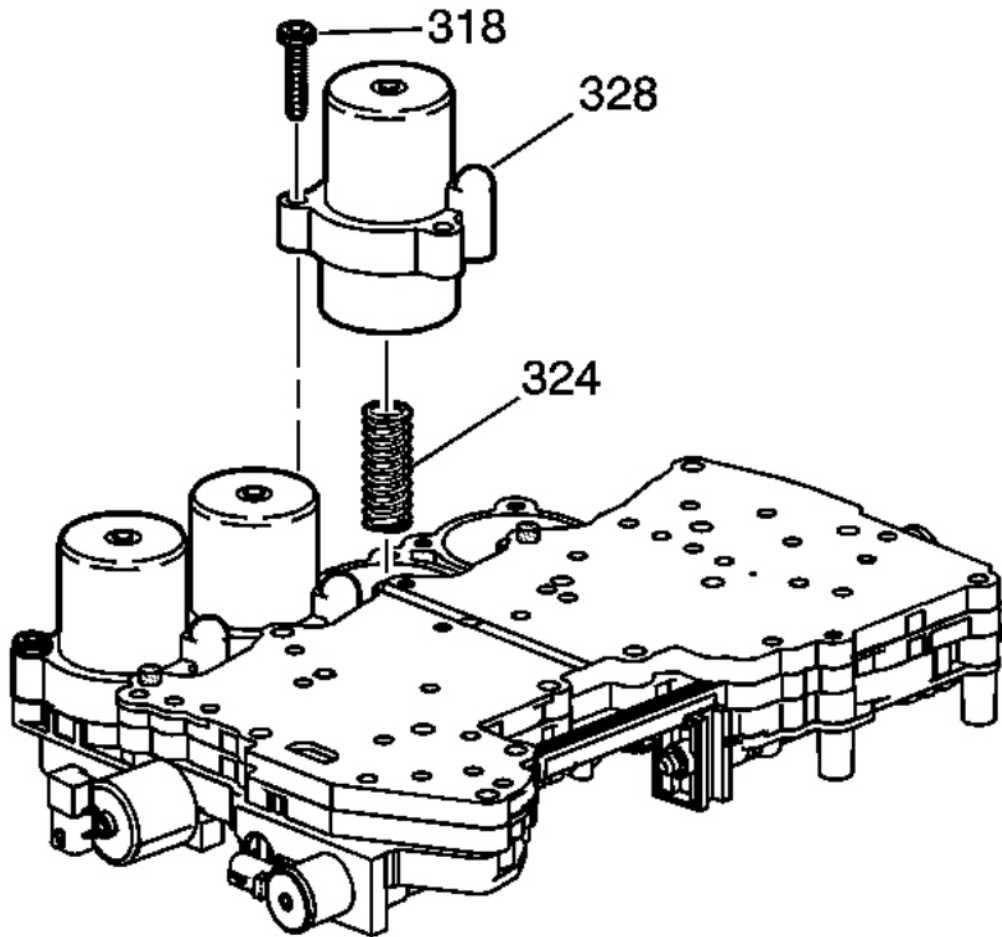


Fig. 251: Installing Intermediate Clutch Accumulator Components
Courtesy of GENERAL MOTORS CORP.

27. Install the intermediate clutch accumulator spring (324).
28. Install the intermediate clutch accumulator housing (328) onto the valve body.
29. Install the intermediate clutch accumulator housing bolts (318) into the valve body.

Tighten: Tighten the accumulator housing bolts (318) to 11 N.m (8 lb ft).

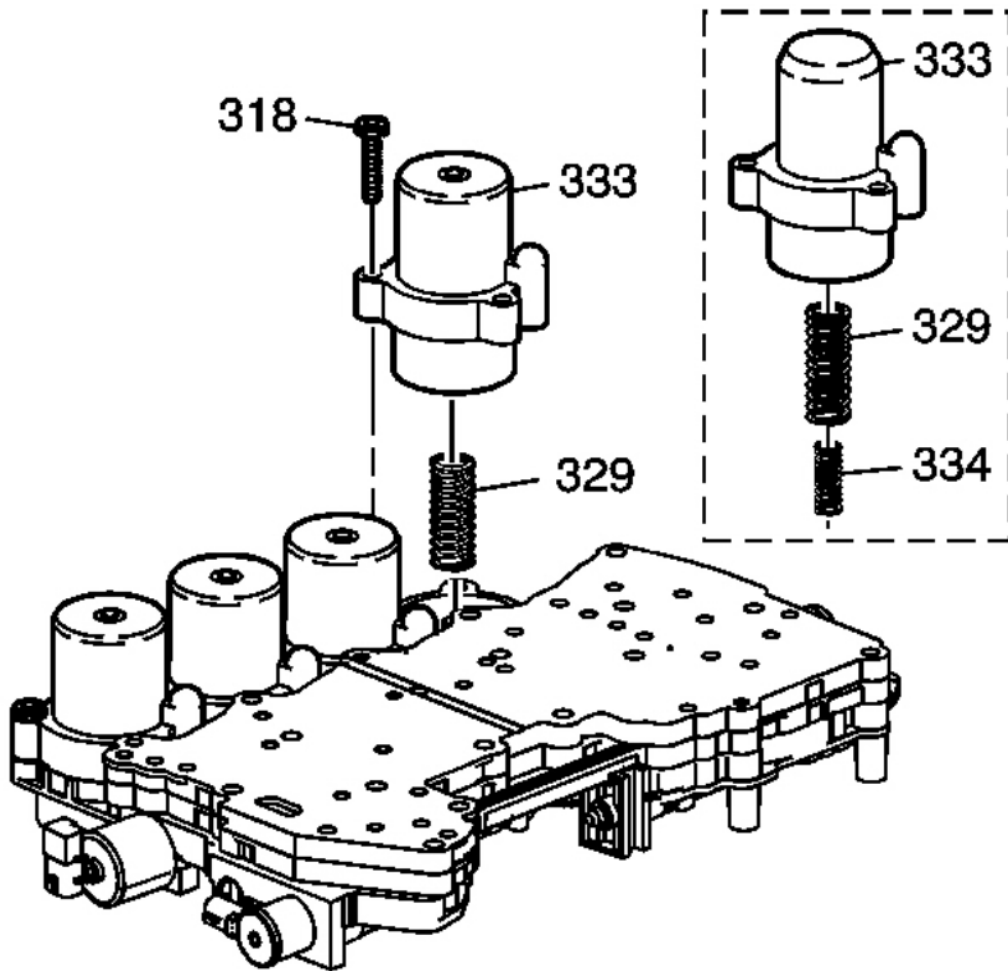


Fig. 252: Identifying 2nd Clutch Accumulator Housing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The 5L50-E has a unique stackup on the 2nd clutch accumulator housing.

30. Install the 2nd clutch accumulator spring (329).
31. Install the 2nd clutch accumulator housing (333) onto the valve body.
32. Install the 2nd clutch accumulator housing bolts (318) into the valve body.

Tighten: Tighten the accumulator housing bolts (318) to 11 N.m (8 lb ft).

INPUT SPEED SENSOR INSTALLATION

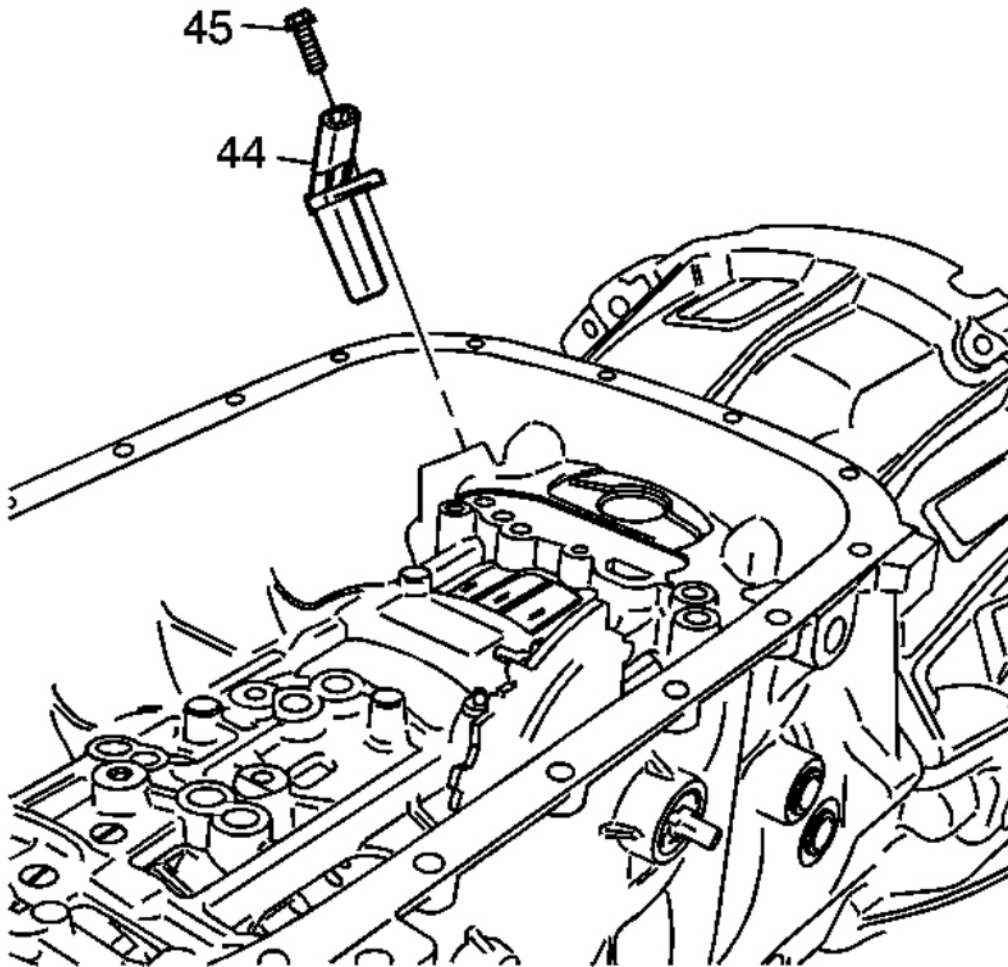


Fig. 253: Locating Input Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transmission 90 degrees.
2. Install the input speed sensor (44) into the case (24).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the input speed sensor bolt (45) into the case (24).

Tighten: Tighten the input speed sensor bolt (45) to 11 N.m (8 lb ft).

OUTPUT SHAFT SPEED SENSOR INSTALLATION

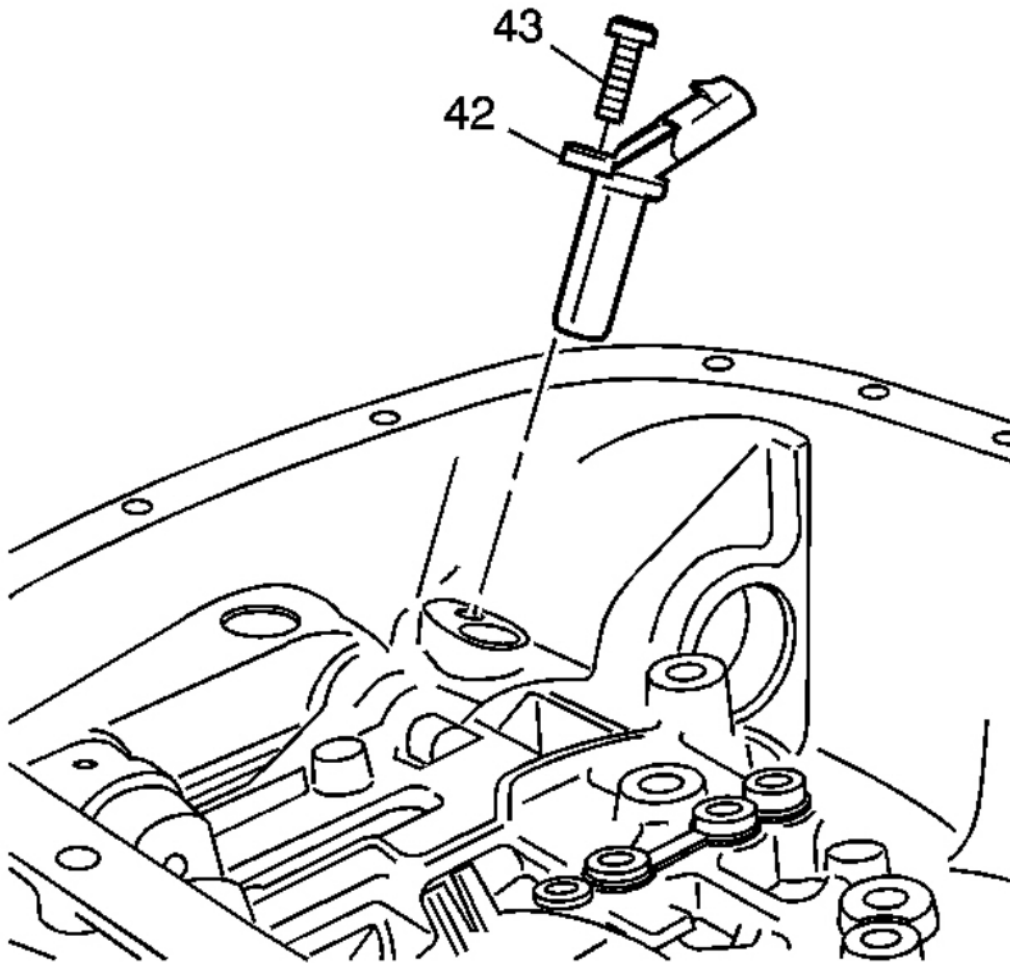


Fig. 254: Identifying Output Shaft Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Install the output speed sensor (42) into the case.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the output speed sensor bolt (43) into the case.

Tighten: Tighten the output speed sensor bolt (43) to 11 N.m (8 lb ft).

CONTROL VALVE BODY ACCUMULATOR ASSEMBLY INSTALLATION

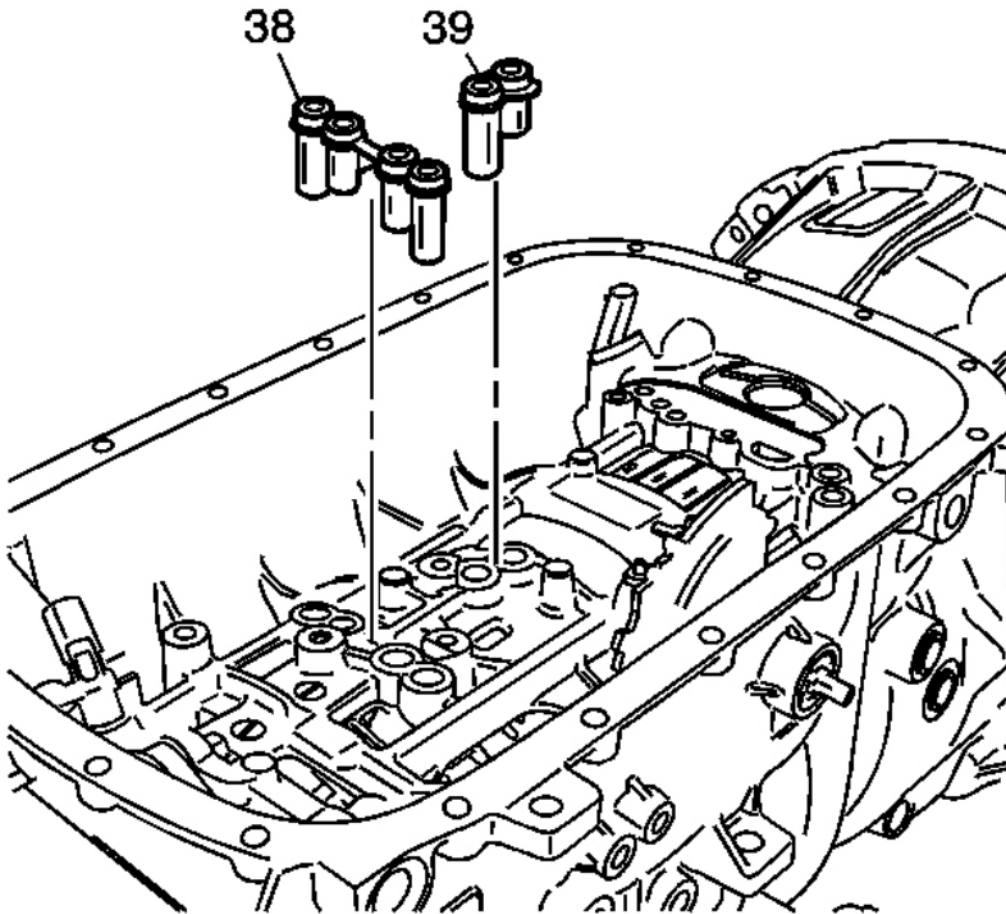


Fig. 255: Locating Overdrive Clutch & Center Support Fluid Passage Sleeve
Courtesy of GENERAL MOTORS CORP.

1. Install the NEW overdrive clutch fluid passage sleeve (39) into the case (24).
2. Install the NEW center support fluid passage sleeve (38) into the case (24).

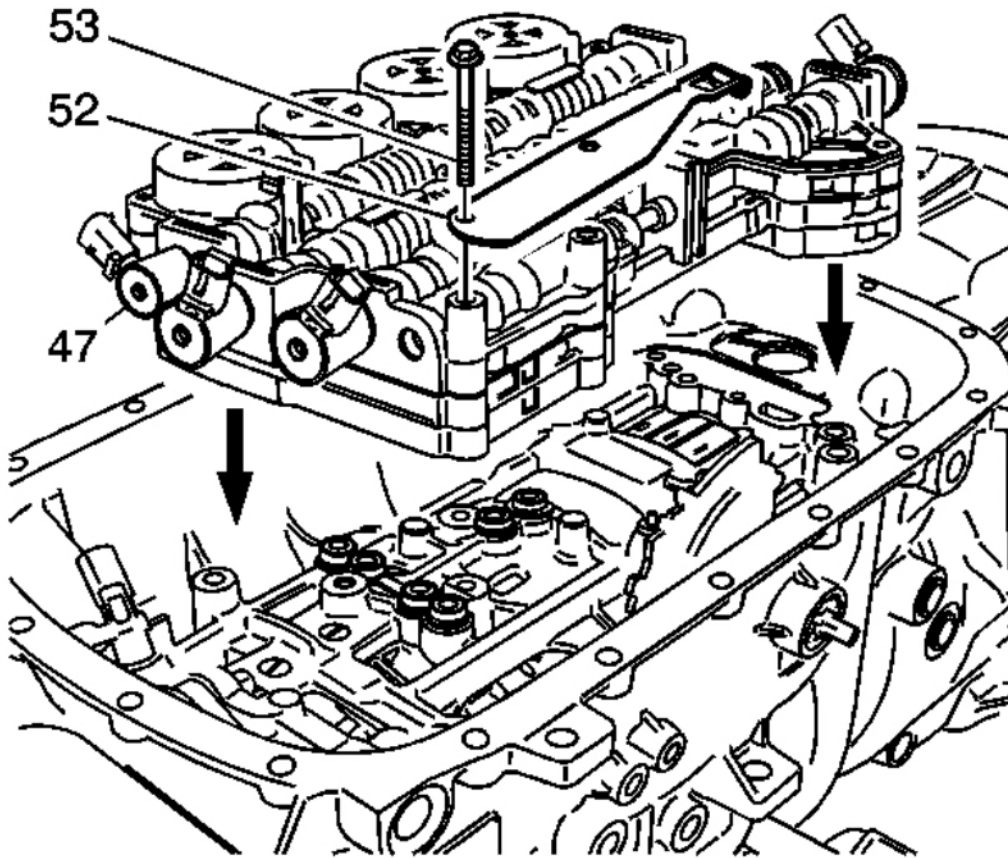


Fig. 256: View Of Control Valve Body Accumulator Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the control valve body accumulator assembly (47) onto the case (24).
4. Install the detent lever spring (52) onto the case (24).
5. Install the control valve body bolts (53) into the case (24) and hand tighten.

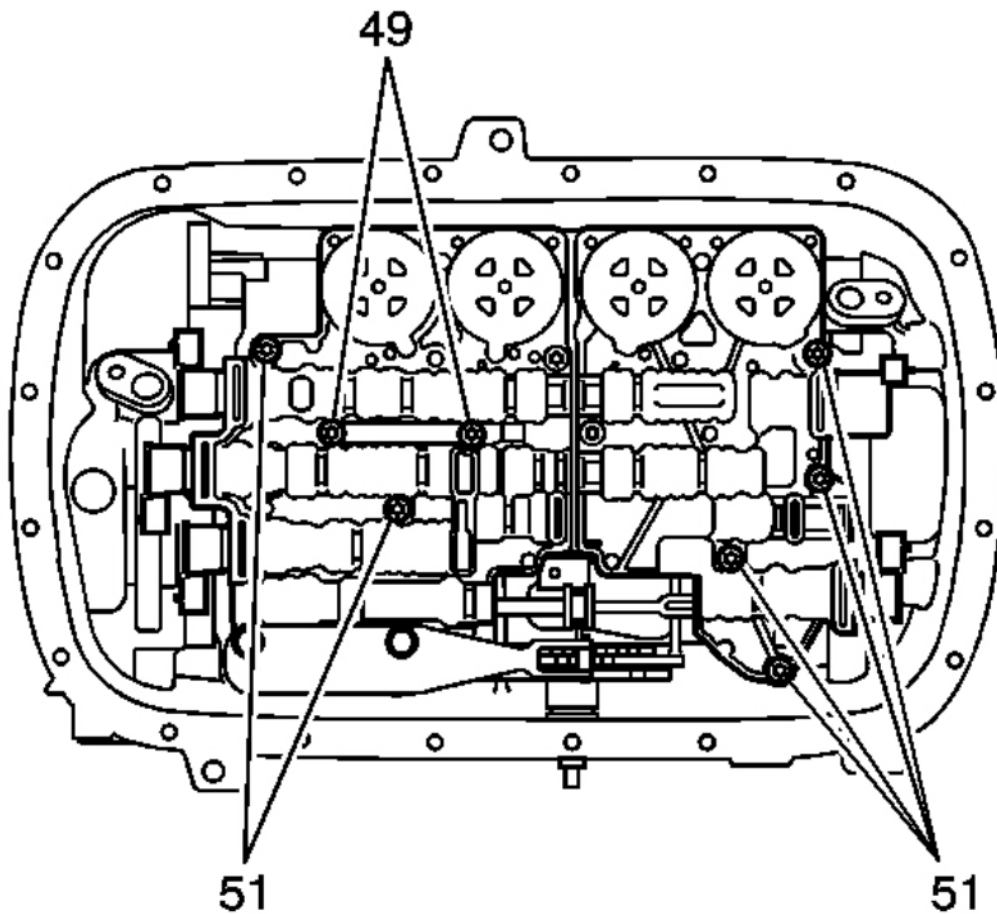


Fig. 257: Identifying Control Valve Body Accumulator Assembly Bolts
Courtesy of GENERAL MOTORS CORP.

6. Install the (49, 51) into the case (24) and hand tighten.

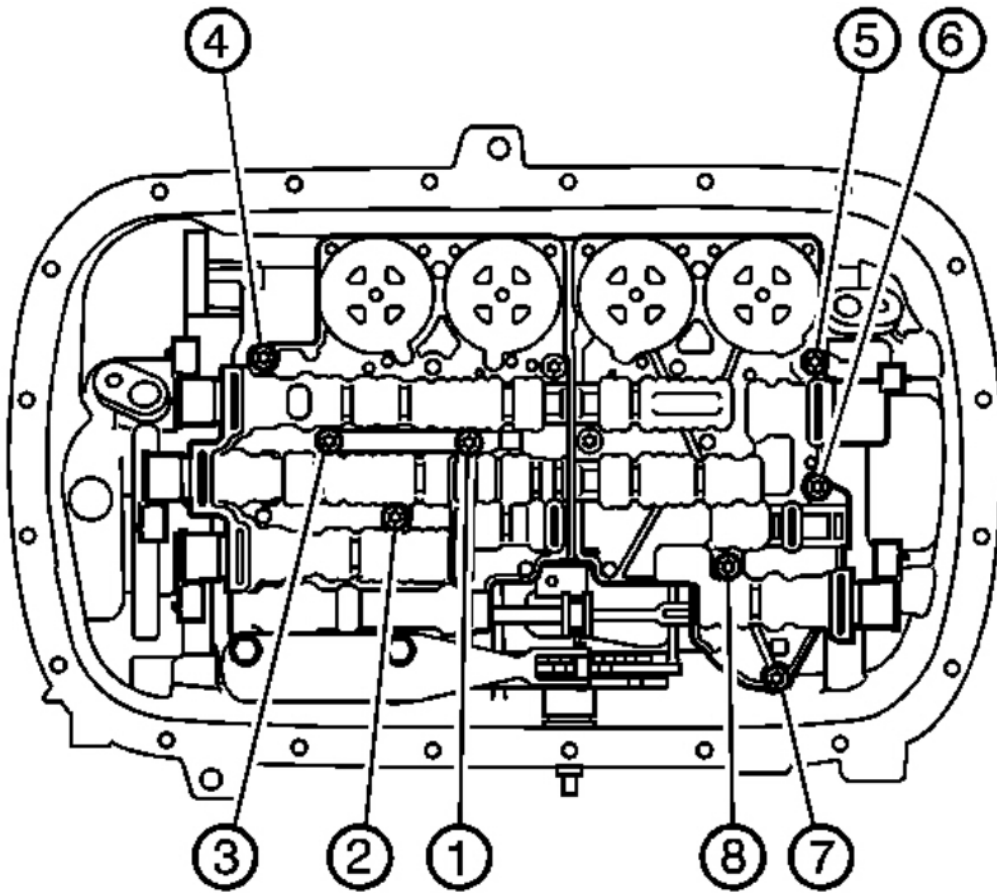


Fig. 258: Locating Control Valve Body Accumulator Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

7. Tighten the control valve body accumulator bolts (49, 50, 51) in sequence.

Tighten: Tighten the control valve body accumulator bolts (49, 50, 51) to 11 N.m (8 lb ft).

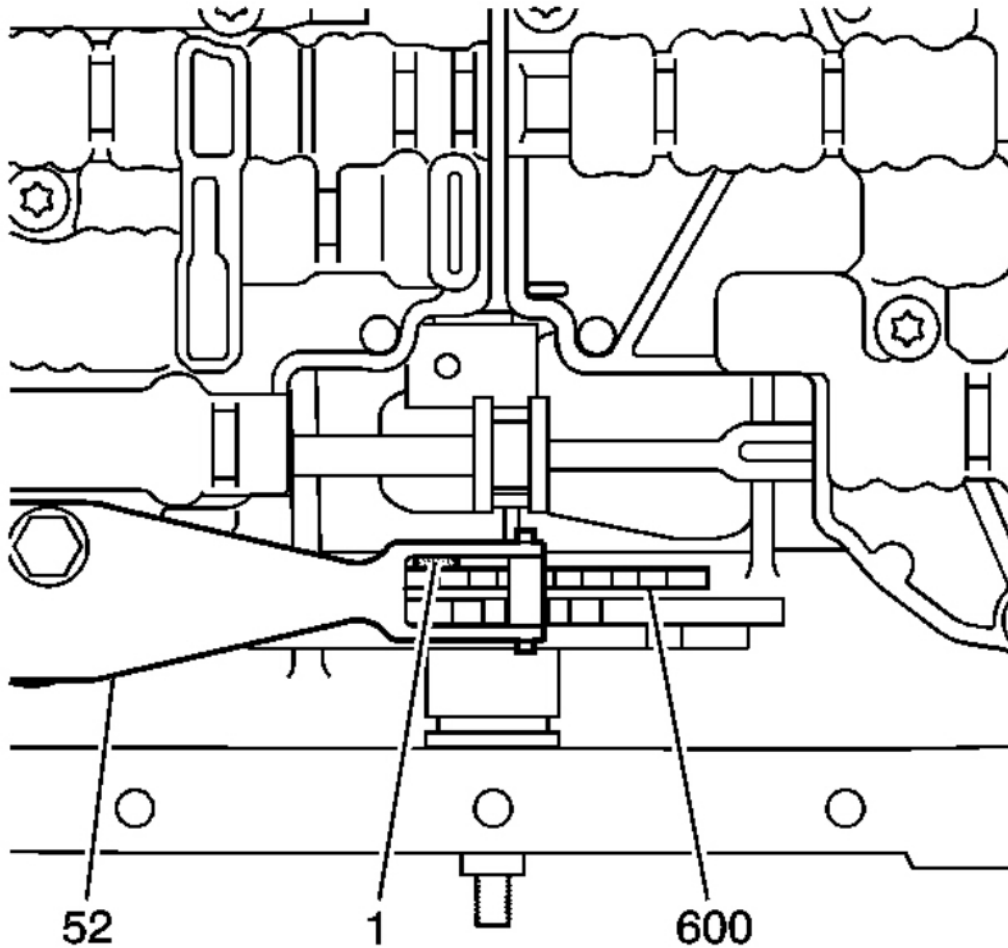


Fig. 259: Installing Spacer Between Manual Shaft Detent Lever & Detent Assembly
Courtesy of GENERAL MOTORS CORP.

8. Install a 0.8 mm spacer (1) between the manual shaft detent lever (600) and the manual shaft detent assembly (52).
9. Tighten the detent assembly bolts (53).

Tighten: Tighten the control valve body bolts (53) to 11 N.m (8 lb ft).

10. Remove the spacer (1).

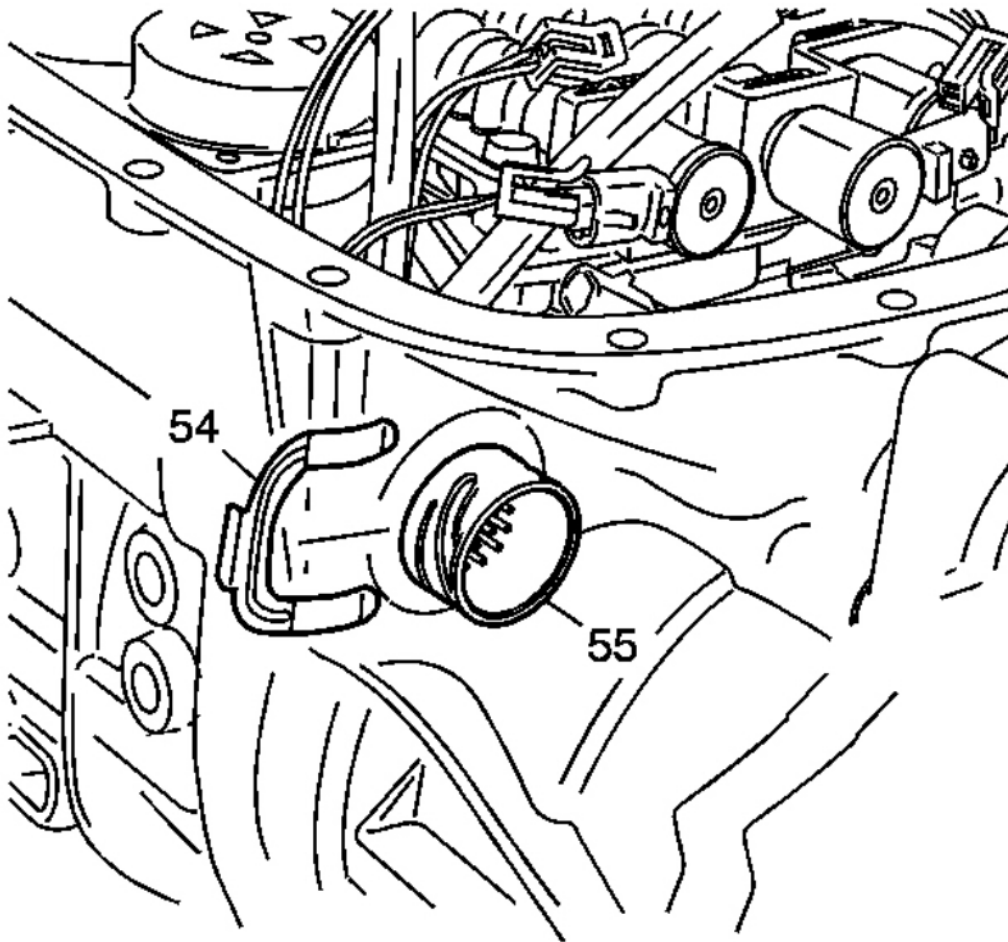


Fig. 260: Identifying Wiring Harness Connector & Retainer
Courtesy of GENERAL MOTORS CORP.

1. Install the wiring harness connector (55) thru the case (24). Hold the connector and install the wiring harness connector retainer (54).

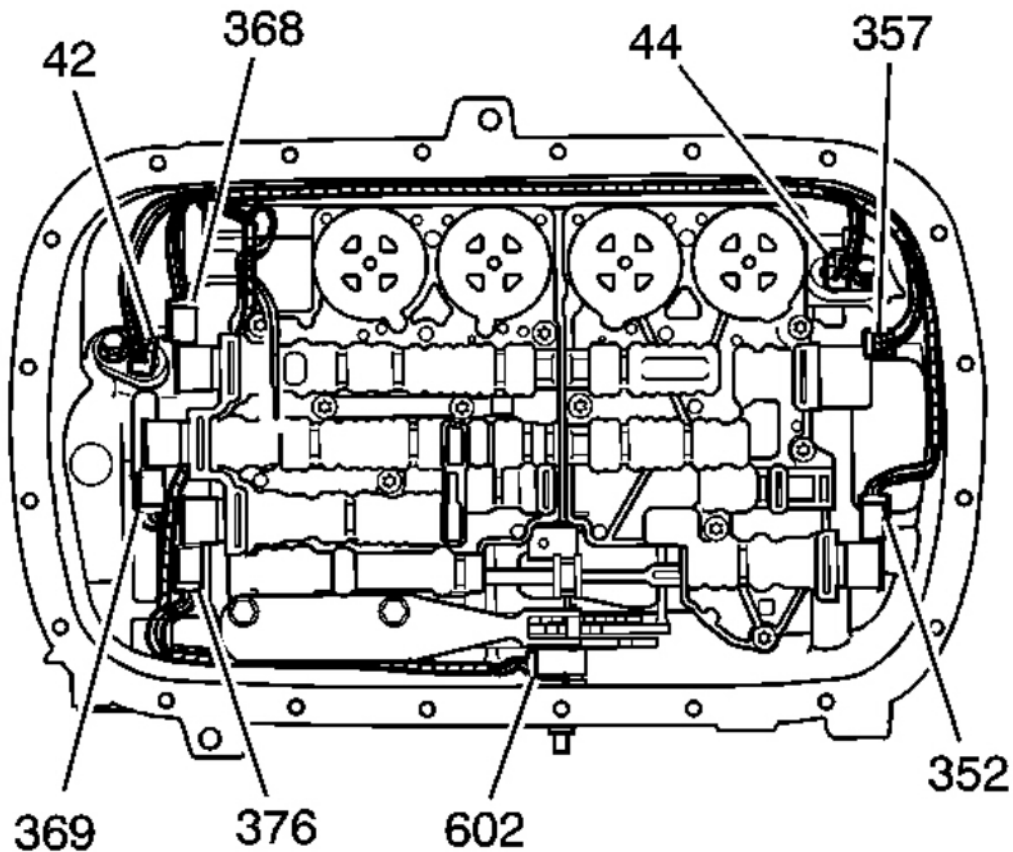


Fig. 261: View Of Wiring Harness To Valve Body Components
Courtesy of GENERAL MOTORS CORP.

2. Route the harness to the valve body and connect the following components:

- Pressure Control Solenoid (357)
- TCC PWM Solenoid (352)
- 1-2 Shift Solenoid (368)
- 2-3 Shift Solenoid (369)
- 4-5 Shift Solenoid (376)
- Internal Mode Switch - IMS (602)
- Input Speed Sensor (44)
- Output Speed Sensor (42)

PAN AND FILTER ASSEMBLY INSTALLATION

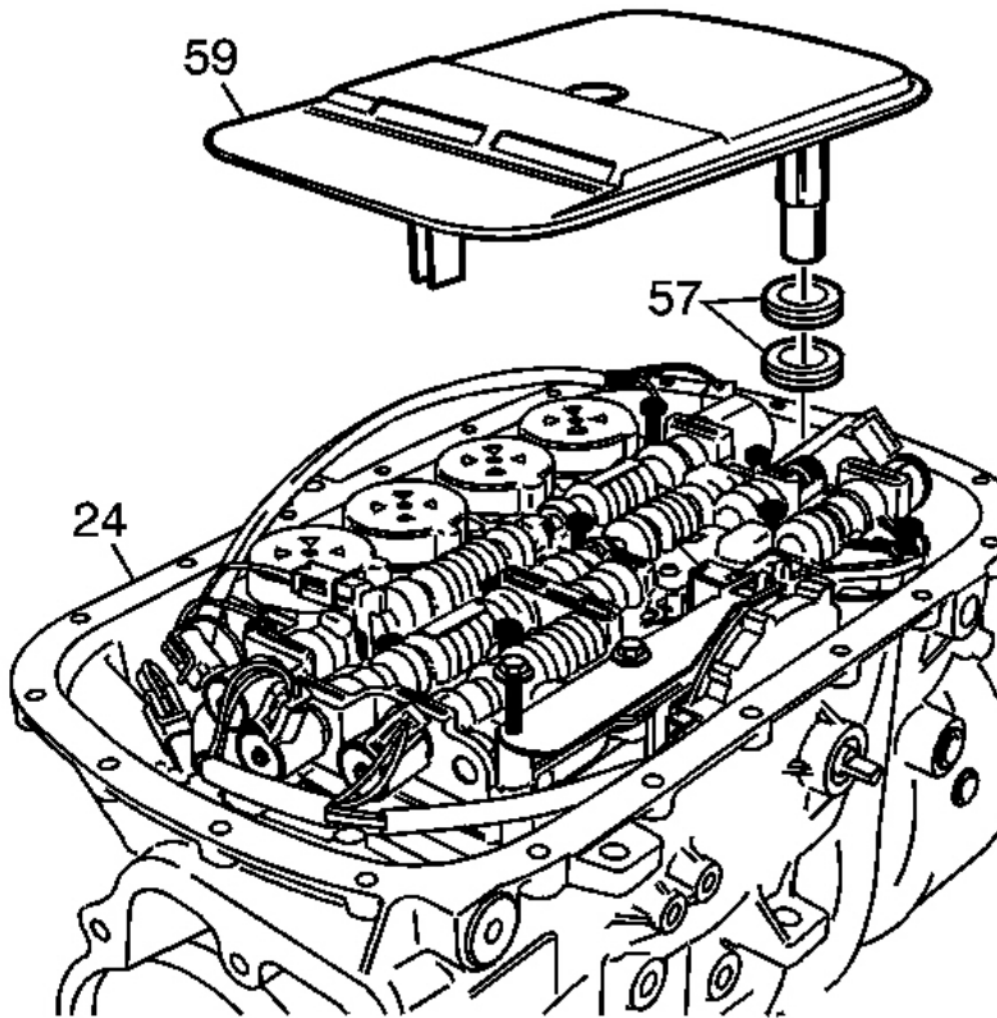


Fig. 262: Inspecting Pan and Filter Assembly
Courtesy of GENERAL MOTORS CORP.

1. Inspect the following components:
 - Transmission fluid pan for distortion, cracks, score marks
 - Inspect the fluid pan bolts for thread damage
 - Inspect the transmission pan magnet for cracks and tears

2. Install the transmission fluid filter (59) and fluid filters seals (57) into the case (24).

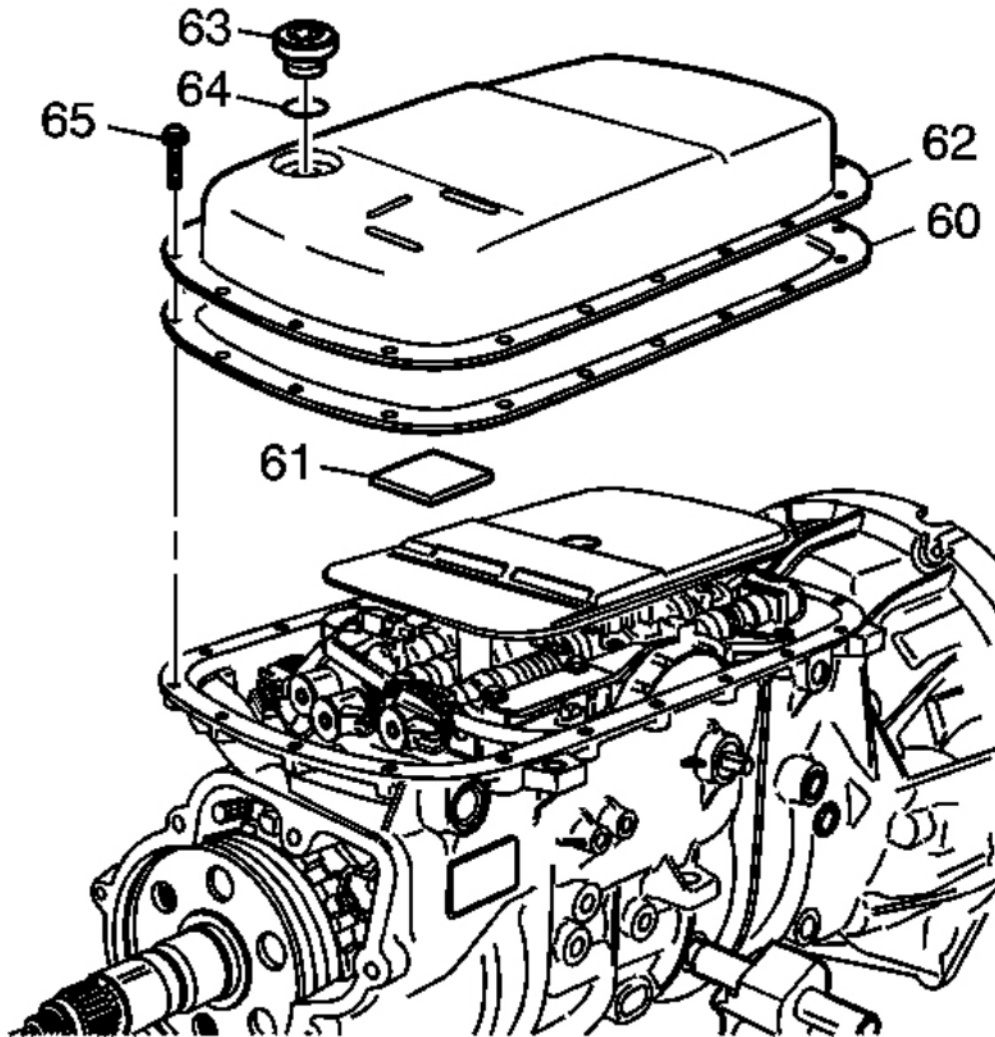


Fig. 263: Locating Fluid Pan Drain Plug
 Courtesy of GENERAL MOTORS CORP.

3. Install the drain plug seal (64) into the fluid pan drain plug (63).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

4. Install the fluid pan drain plug (63).

Tighten: Tighten the fluid pan drain plug to 20 N.m (15 lb ft).

5. Install the fluid pan magnet (61) onto the fluid pan (62).
6. Install the NEW fluid pan gasket (60) onto the fluid pan (62).
7. Install the fluid pan (62) onto the case.
8. Install the fluid pan bolts (65) into the case

Tighten: Tighten the fluid pan bolts to 11 N.m (8 lb ft).

EXTENSION HOUSING INSTALLATION (5L40-E/5L50-E 2WD EXCLUDING XLR)

Tools Required

J 44765 Seal Installer. See Special Tools and Equipment .

Installation Procedure

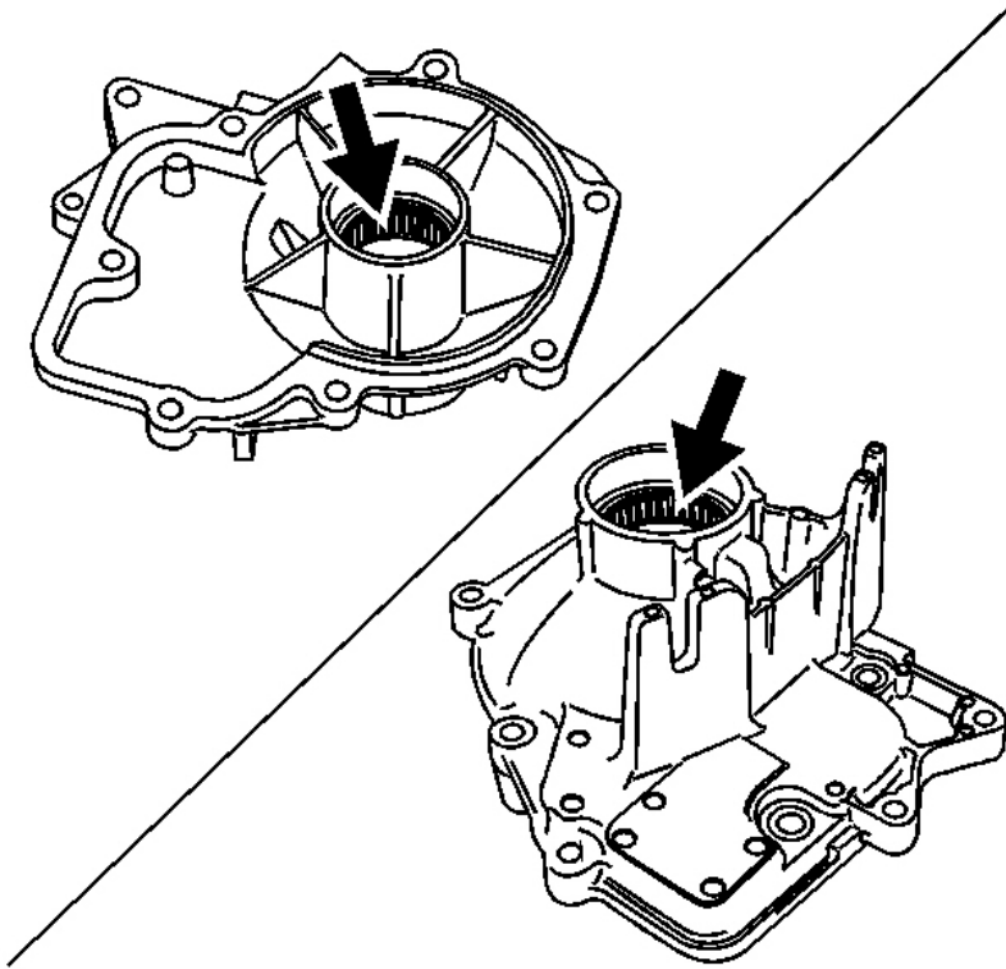


Fig. 264: View Of Inner & Outer Shaft Bearing Inspection Areas
Courtesy of GENERAL MOTORS CORP.

1. Inspect both inner and outer output shaft bearings for the following:
 - Damaged cage
 - Roller pitted
2. If either bearing is damaged replace extension housing.

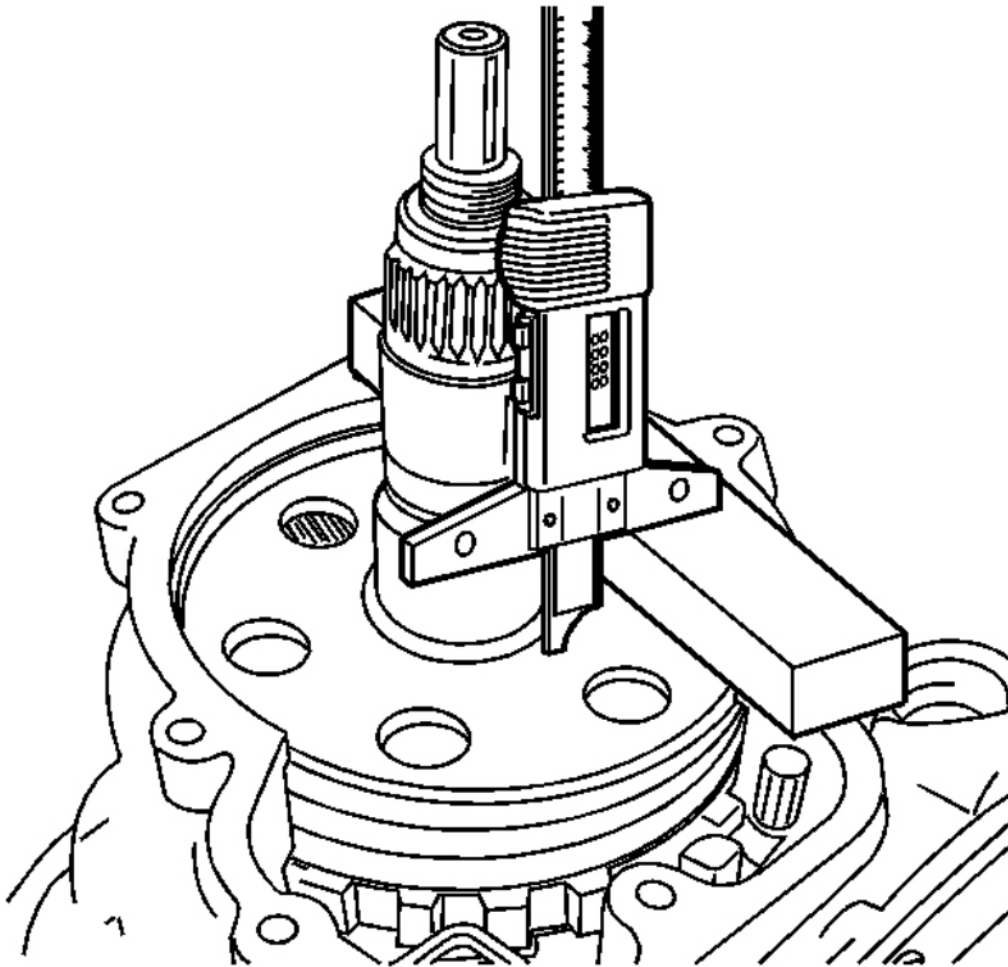


Fig. 265: Measuring Dimension B
Courtesy of GENERAL MOTORS CORP.

3. Rotate the transmission 90 degrees.
4. Measure from the bottom to the face of the output shaft. Record this as dimension B. Refer to the **End Play Specifications (5L40-E)** or **End Play Specifications (5L50-E)** to determine the correct washer size.

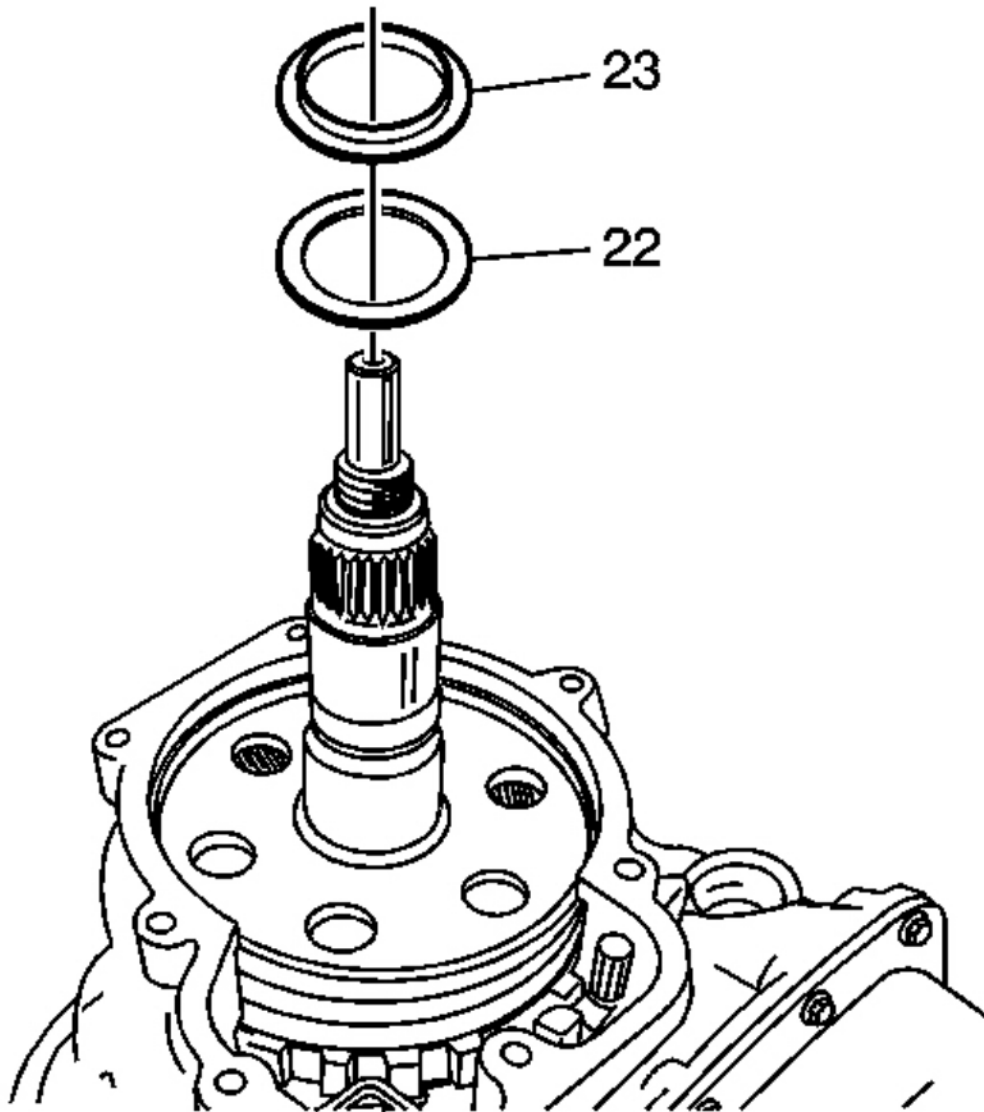


Fig. 266: Locating Input And Reaction Carrier Thrust Bearing & Thrust Washer
Courtesy of GENERAL MOTORS CORP.

5. Install the input and reaction carrier washer (22).
6. Install the input and reaction carrier thrust bearing (23) onto the extension housing.

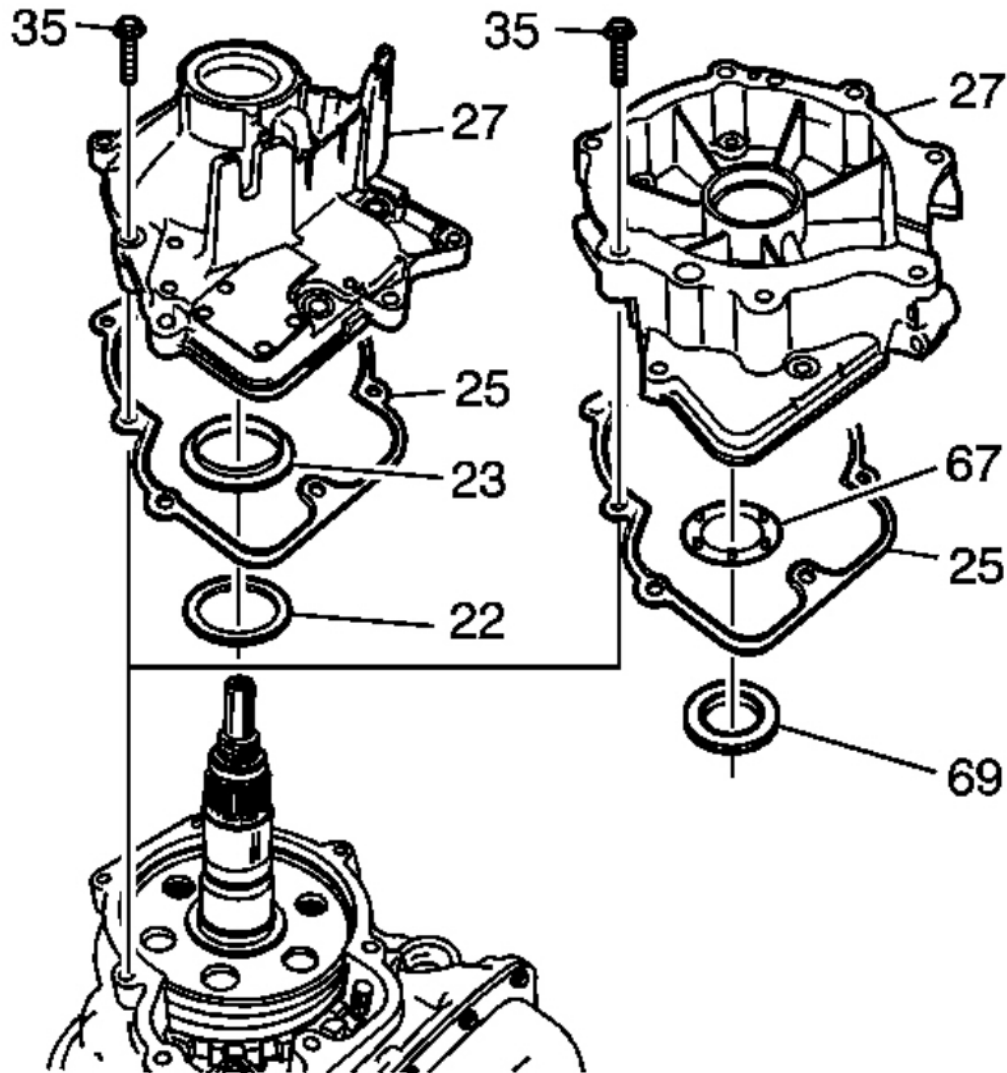


Fig. 267: Identifying Extension Housing Gasket & Bolts
Courtesy of GENERAL MOTORS CORP.

7. Install the extension housing gasket (25) onto the extension housing (27).
8. Install the extension housing (27) onto the case.

NOTE: Refer to Fastener Notice in Cautions and Notices.

9. Install the extension housing bolts (35).

Tighten: Tighten the extension housing bolts to 22 N.m (16 lb ft).

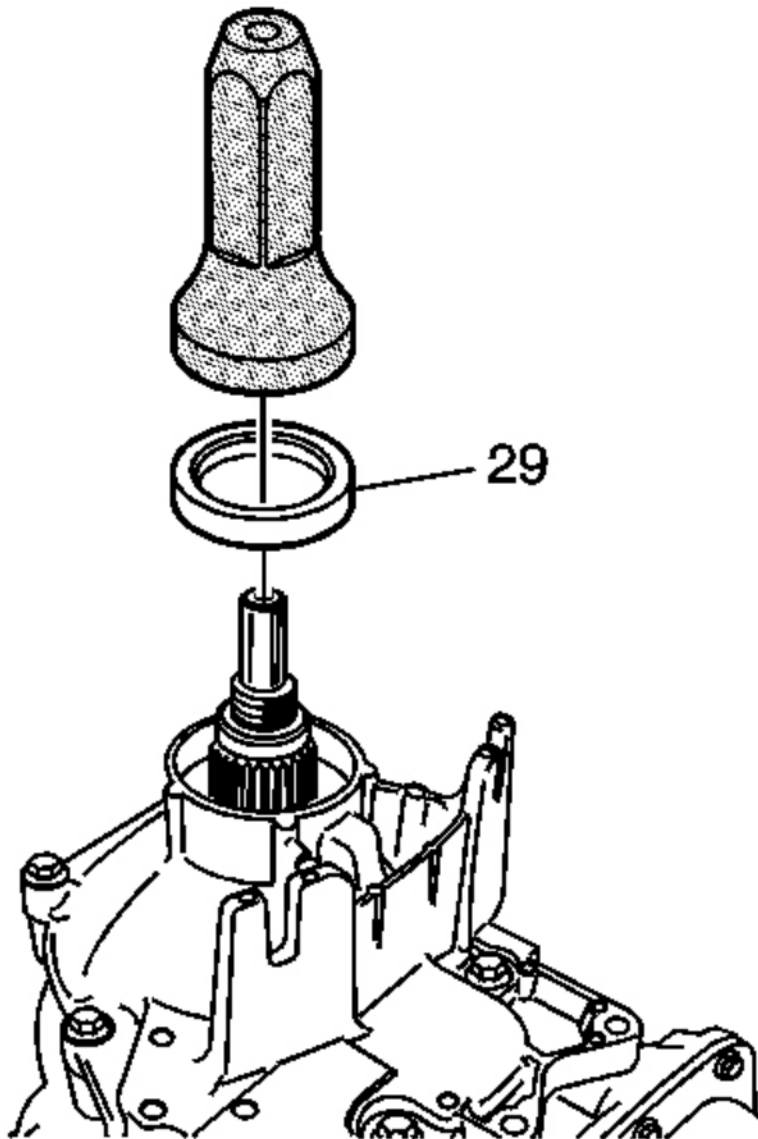


Fig. 268: Identifying Prop Shaft Flange Seal
Courtesy of GENERAL MOTORS CORP.

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

IMPORTANT: Install the seal onto the tool before installing into the case to prevent damage to the seal.

10. Using **J 44765** install the prop shaft flange seal (29).

EXTENSION HOUSING INSTALLATION (5L50-E/5L50-E AWD INCLUDING XLR)

Tools Required

J 44765 Seal Installer. See Special Tools and Equipment .

Installation Procedure

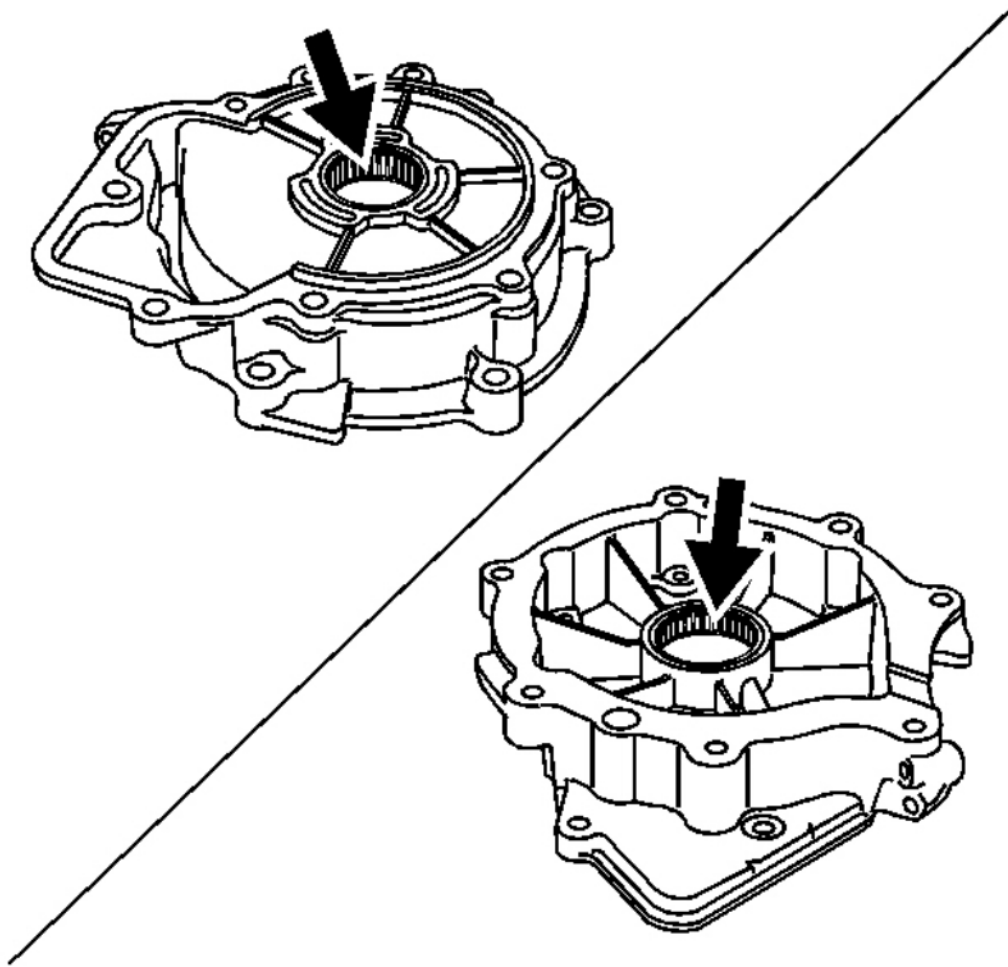


Fig. 269: Locating Inspection Areas On Inner & Outer Bearings
Courtesy of GENERAL MOTORS CORP.

1. Inspect both inner and outer output shaft bearings for the following:
 - Damaged cage
 - Roller pitted
2. If either bearing is damaged, replace the extension housing.

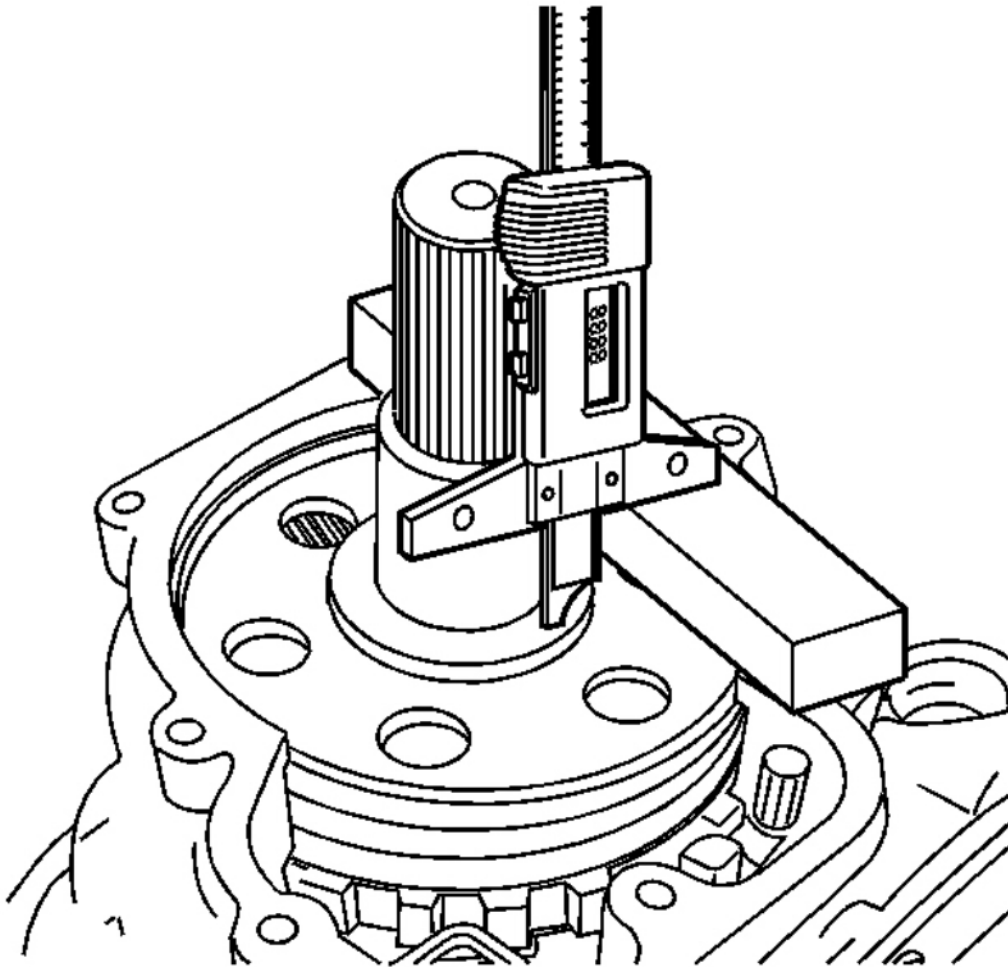


Fig. 270: Measuring Dimension B
Courtesy of GENERAL MOTORS CORP.

3. Rotate the transmission 90 degrees.
4. Measure from the bottom to the face of the bearing. Record this as dimension B. Refer to the **End Play Specifications (5L40-E)** or **End Play Specifications (5L50-E)** to determine the correct washer size.

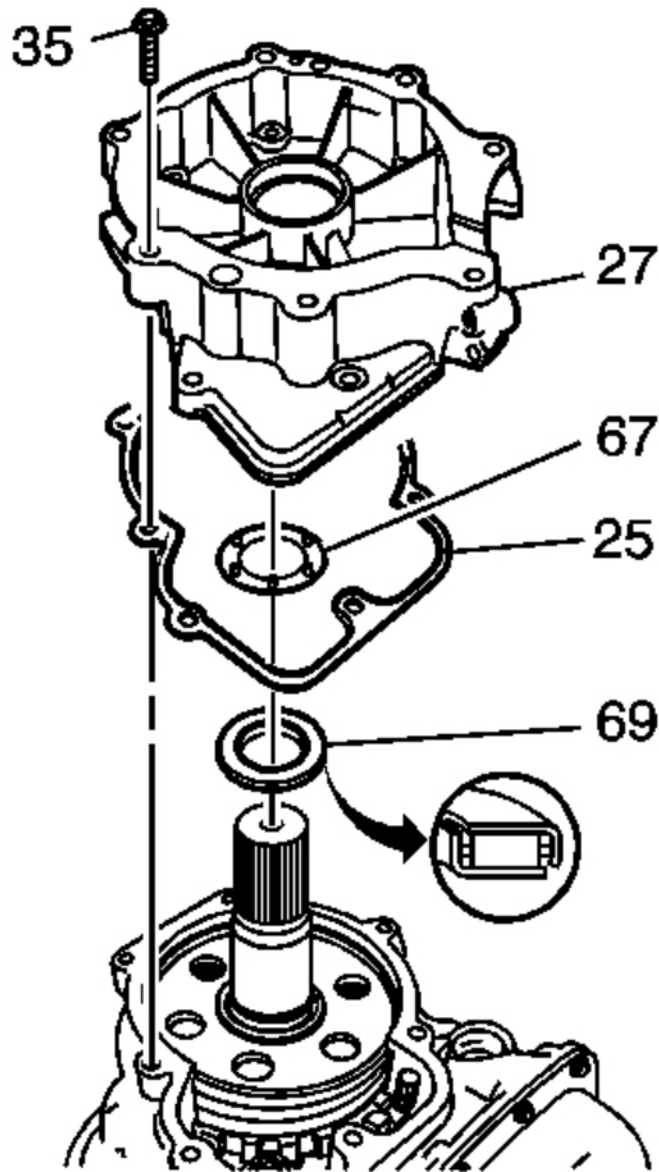


Fig. 271: Installing Extension Housing
Courtesy of GENERAL MOTORS CORP.

5. Install the extension housing gasket (25) onto the extension housing (27).
6. Install the extension housing (27) onto the case.

NOTE: Refer to Fastener Notice in Cautions and Notices.

7. Install the extension housing bolts (35).

Tighten: Tighten the extension housing bolts to 22 N.m (16 lb ft).

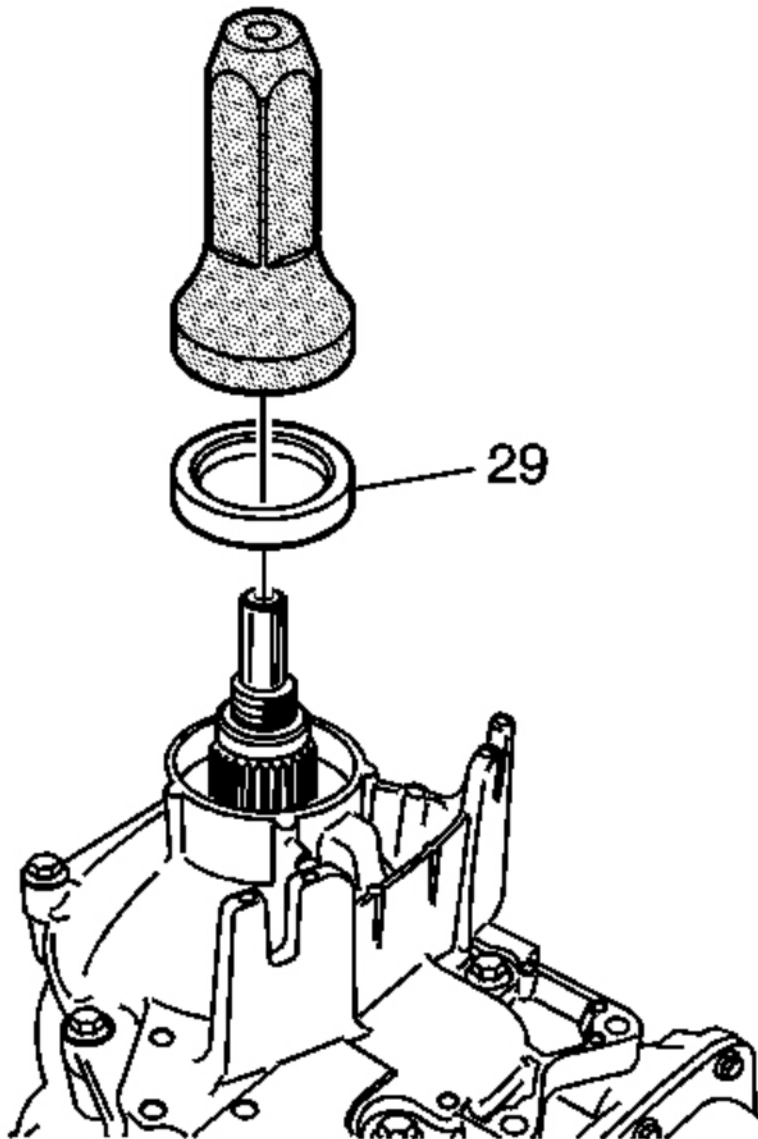


Fig. 272: Identifying Prop Shaft Flange Seal
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Install the seal onto the tool before installing into the case to prevent damage to the seal.

8. Using **J 44765** install the prop shaft flange seal (29) - 5L40-E/5L50-E AWD.

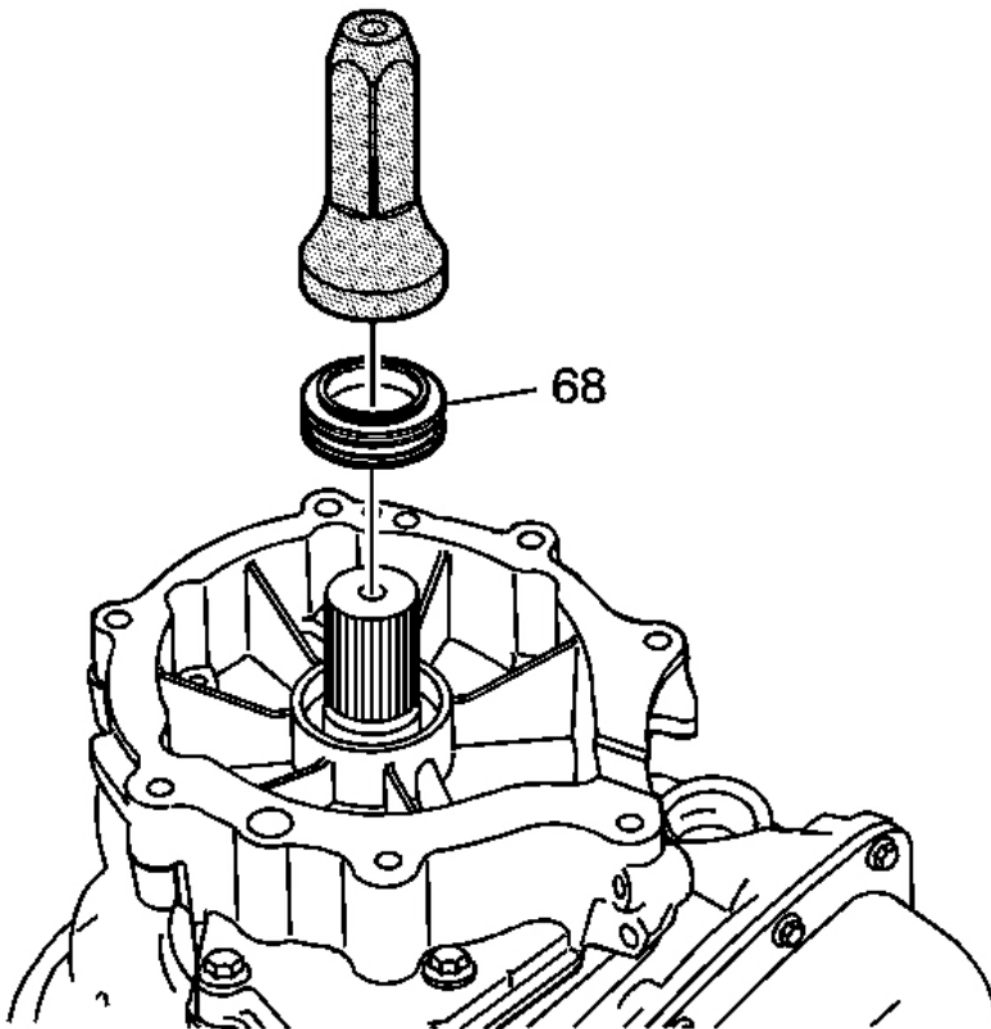


Fig. 273: Locating Prop Shaft Flange Seal

Courtesy of GENERAL MOTORS CORP.

9. Using **J 46741** install the prop shaft flange seal (68) - XLR only.

PROP FLANGE ASSEMBLE

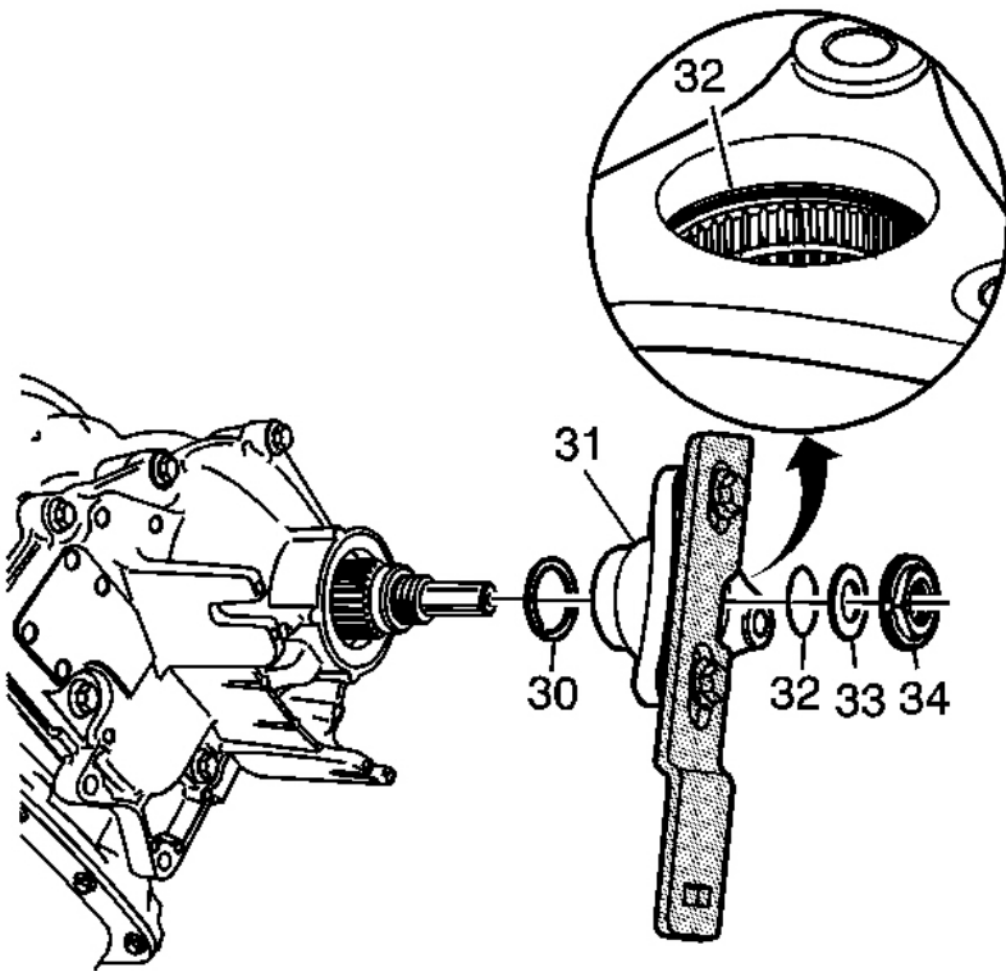


Fig. 274: View Of Prop Shaft Flange O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

1. Install the NEW output shaft assembly retainer (30).
2. Install the NEW prop shaft flange o-ring seal (32) into the prop shaft flange (31).

3. Install the prop shaft flange (31).
4. Put the transmission in Park.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the NEW prop shaft flange thrust washer (33) and NEW prop shaft flange nut (34) using GM P/N 89021297.

Tighten: Tighten the prop shaft flange nut (34) to 57 N.m (42 lb ft).

HOLDING FIXTURE REMOVAL

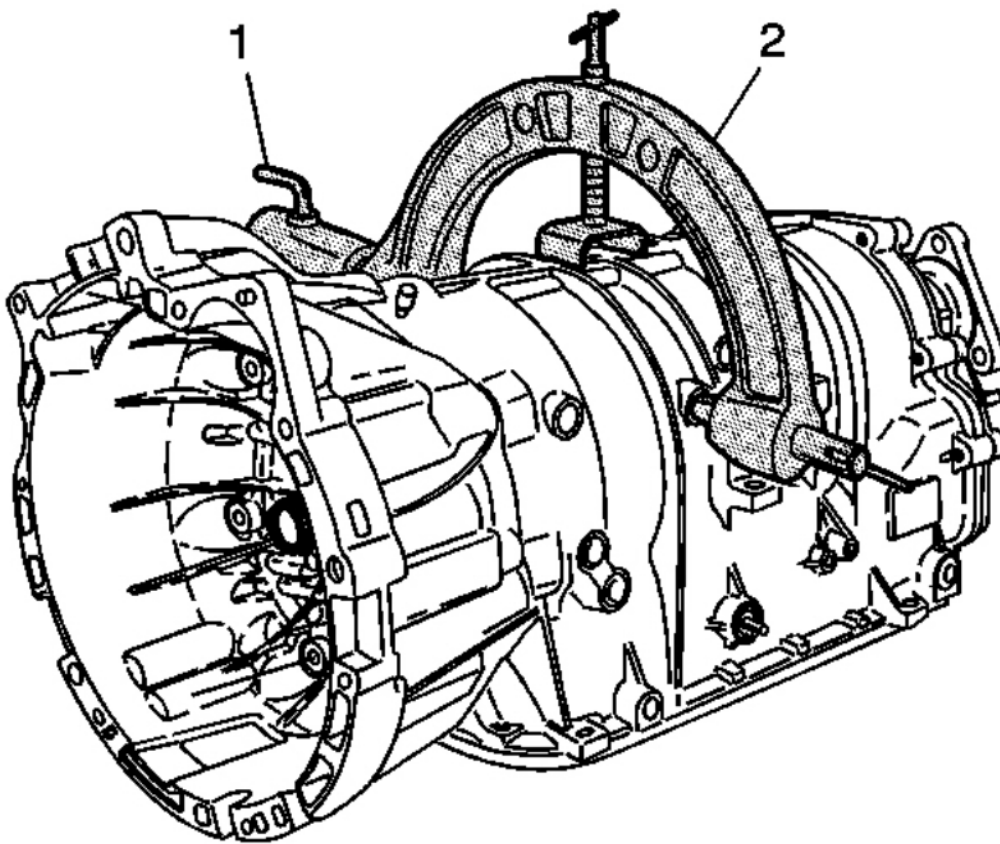


Fig. 275: Identifying J 8763-B
Courtesy of GENERAL MOTORS CORP.

Remove **J 8763-B** from the transmission.

TORQUE CONVERTER ASSEMBLY INSTALLATION

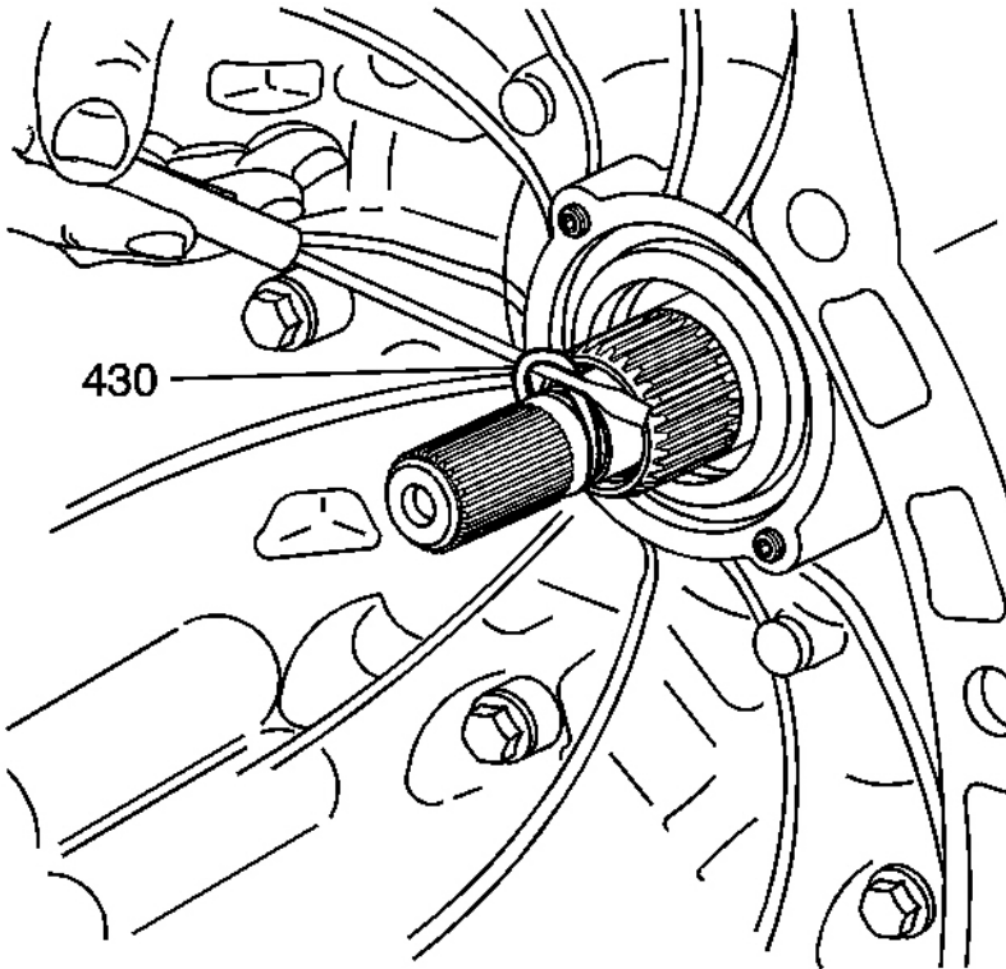


Fig. 276: Locating Turbine Shaft Seal
Courtesy of GENERAL MOTORS CORP.

1. Install the turbine shaft seal (430).

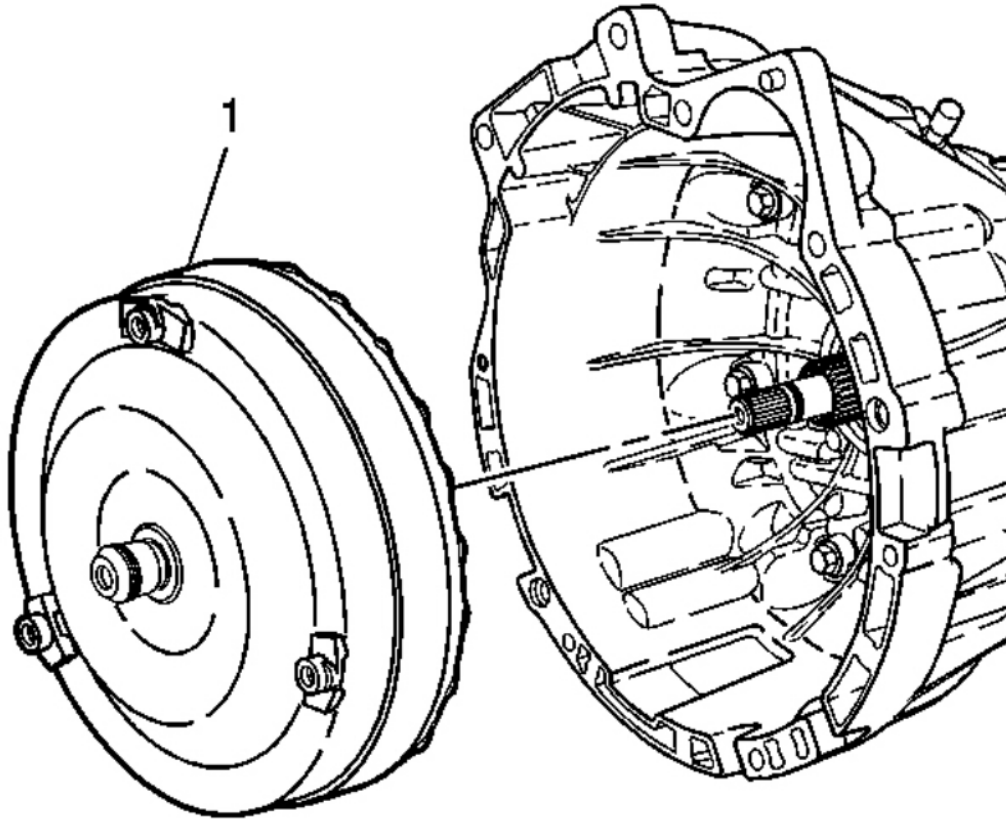


Fig. 277: View Of Torque Converter Assembly
Courtesy of GENERAL MOTORS CORP.

2. Install the torque converter assembly (1).

DESCRIPTION AND OPERATION

PARK - ENGINE RUNNING

When the gear selector lever is in the Park (P) position and the engine is running, fluid is drawn into the oil pump and line pressure is directed to the pressure regulator valve.

Pressure Regulation

Pressure Regulator Valve:

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2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

Regulates pump output - line pressure in response to throttle signal fluid pressure acting on the line boost valve, spring force, and line pressure acting on the end of the valve. Line pressure is directed to the manual valve, the TCC regulator valve, feed limit valve, and the safety mode valve. Line pressure also feeds the converter feed circuit through the pressure regulator valve, and the accumulator fluid circuits.

Feed Limit Valve:

Line pressure is routed through the valve and into the feed limit fluid circuit. The valve limits feed limit fluid pressure to a maximum pressure. Feed limit fluid is routed to the pressure control solenoid valve, the safety mode valve, the 1-2 control valve, and also feeds the 1-2 signal, the 2-3 signal, and the 4-5 signal fluid circuits.

Pressure Control (PC) Solenoid Valve:

Controlled by the TCM, the PC solenoid valve regulates filtered feed limit fluid pressure into the throttle signal fluid circuit.

Shift Accumulation

Direct, Overdrive, Intermediate, and Second Clutch Accumulator Assemblies:

Accumulator fluid is routed to each of the accumulator assemblies in preparation for upshifts and downshifts.

Torque Converter - Released Position Only

Pressure Regulator Valve:

Line pressure is routed through the pressure regulator valve and into the converter feed fluid circuit. Converter feed fluid is routed to the TCC control valve and to the TCC enable valve.

TCC Regulator Valve:

Spring force holds the valve in the release position, thereby blocking line pressure from entering the regulated apply fluid circuit.

TCC Enable Valve:

Converter feed fluid is routed through the TCC enable valve and into the converter FDL circuit. Converter FDL fluid is routed to the TCC control valve.

TCC Control Valve:

Spring force holds the valve in the release position allowing converter feed fluid to enter the release circuit.

Torque Converter:

Release fluid pressure is routed to the torque converter to keep the TCC released. Fluid leaves the converter in the apply fluid circuit and returns to the cooler through the TCC control valve.

Safety Mode:**Safety Mode Valve:**

When the first 1-2 shift occurs, the safety mode valve shifts from the released position to the applied position and remains there until the engine is switched OFF. If safety mode occurs - no TCM signal to the shift solenoid valve, the transmission will shift to safety - fifth gear. If the engine is then switched OFF and ON, still with no TCM signal, the safety mode valve will return to, and remain in, the released position. Line pressure fluid will pass through the safety mode valve into the line safety mode fluid circuit. Line safety mode fluid is routed to the 4-5 shift valve train.

4-5 Shift Valve and 4-5 Shift Control Valve:

Line safety mode fluid forces the 4-5 shift valve to downshift to the fourth gear position allowing - after the engine has been switched OFF, a fourth gear start - instead of fifth, in the event of safety mode.

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 pressure from the pressure regulator valve from entering the reverse, D432 and 32 fluid circuits.

1-2 Shift Solenoid (SS) Valve and 1-2 Shift Control Valve:

Feed limit fluid from the feed limit valve is routed to the 1-2 SS valve and to the 1-2 Shift control valve in preparation for a shift.

2-3 Shift Solenoid (SS) Valve:

Feed limit fluid from the feed limit valve is routed to the 2-3 SS valve in preparation for a shift.

4-5 Shift Solenoid (SS) Valve:

Feed limit fluid from the feed limit valve is routed to the 4-5 SS valve in preparation for a shift.

Direct Clutch, Overdrive Clutch, Intermediate Clutch, and Second Clutch Accumulators:

Line fluid fills the accumulator circuits and accumulator assemblies in preparation for an upshift.

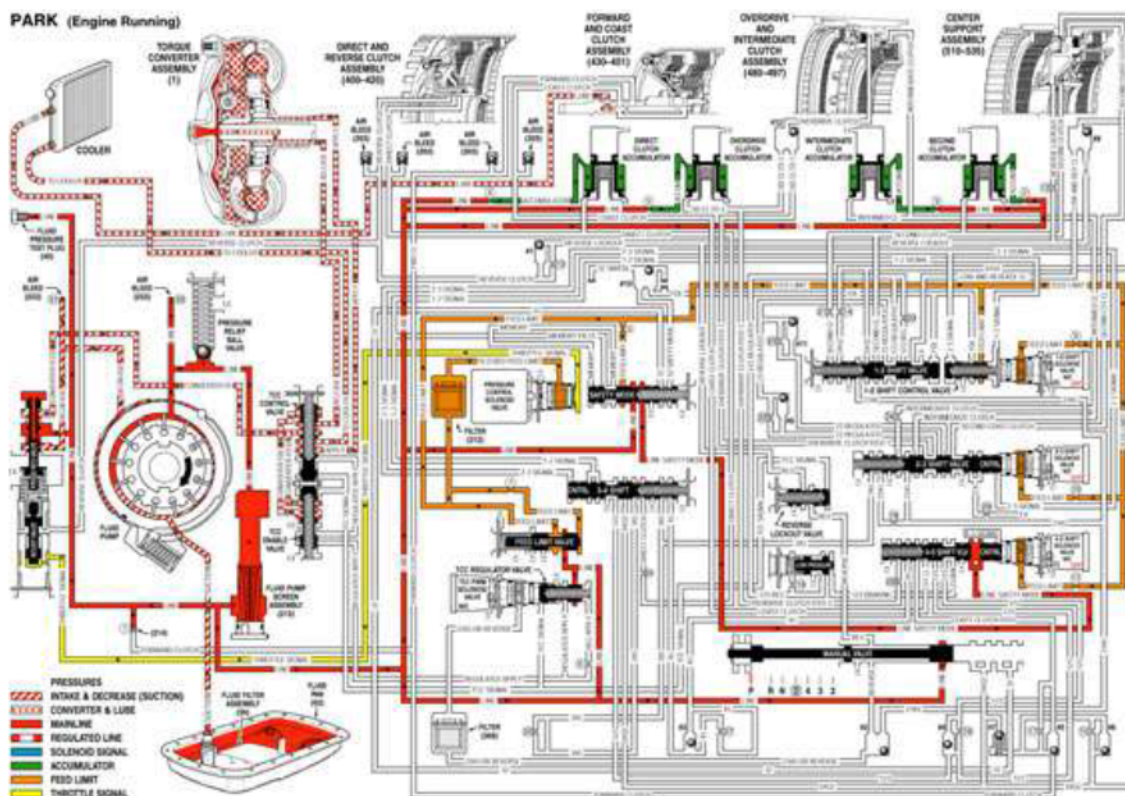


Fig. 278: Park Engine Running
Courtesy of GENERAL MOTORS CORP.

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:

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Pressure Regulation

Manual Valve:

With the manual valve in the reverse position, line pressure is directed into the reverse fluid circuit.

Reverse Lockout Valve:

Reverse fluid is routed through the reverse lockout valve into the reverse lockout fluid circuit.

Pressure Regulator and Line Boost Valves:

Reverse clutch fluid at the line boost valve boosts line pressure for the additional torque requirements in Reverse. Throttle signal fluid pressure from the pressure control - PC solenoid acting on the line boost valve also helps determine line pressure in Reverse depending on throttle position and other TCM input signals.

Low and Reverse Clutch Applies

#8 Ball Check Valve and Orifice #12:

Located in the bottom channel plate, reverse lockout fluid seats the #8 ball check valve against the low and reverse clutch fluid passage and directs fluid into the low and reverse clutch or reverse lockout fluid passage. Reverse lockout fluid pressure is also orificed, through orifice #12, to provide a controlled apply of the low and reverse clutch.

Low and Reverse Clutch:

Low and reverse clutch or reverse lockout fluid pressure enters the outer area of the low and reverse clutch piston and moves the piston against spring force to apply the low and reverse clutch plates. In addition, reverse lockout fluid pressure is orificed into the inner area of the low and reverse clutch piston and provides additional force to apply the low and reverse clutch plates.

Reverse Clutch Applies

IMPORTANT: Remember that the function of an orifice is to control the flow rate of fluid and rate of apply or release of a clutch.

#1 Ball Check Valve:

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

Located in the bottom channel plate, reverse lockout fluid seats the #1 ball check valve and is forced through orifice #13 in the control valve body spacer plate into the reverse clutch fluid passage.

Reverse Clutch:

Reverse clutch fluid enters the reverse clutch housing and acts on the reverse clutch piston to apply the reverse clutch plates.

Fluid Pressure Directed in Preparation for TCC Apply

#2 Ball Check Valve:

Located in the bottom channel plate, reverse fluid seats the #2 ball check valve against the 2345 fluid passage and directs fluid into the 2345 or reverse fluid passage.

Torque Converter Clutch Pulse Width Modulation - TCC PWM Solenoid Valve:

The TCC PWM solenoid valve remains de-energized - OFF. 2345 or reverse fluid is prevented from entering the TCC signal fluid circuit. Under normal circumstances the TCC PWM solenoid valve is not energized. In the event the TCC PWM solenoid valve is energized - when engaging Reverse while driving in Forward above a certain speed, TCC signal fluid will shift the reverse lockout valve to block reverse fluid from entering the reverse lockout circuit and the reverse clutch and the low and reverse clutch will release to prevent damage to the transmission.

Reverse clutch fluid unseats the #1 ball check valve and enters the reverse lockout fluid circuit. Reverse lockout fluid then flows to the reverse lockout valve where it enters the reverse fluid circuit.

Reverse Lockout Valve:

Reverse lockout fluid passes through the reverse lockout valve and into the reverse fluid circuit and on to the manual valve where it exhausts.

Line Boost Valve:

Reverse clutch fluid exhausts from the line boost valve, allowing line pressure to return to the normal operating range as in Park, Neutral and Overdrive gear ranges.

Low and Reverse Clutch Releases

IMPORTANT: Allowing fluid to bypass an orifice when exhausting ensures a quick release of the clutch. This prevents the friction material from "dragging" and creating excess fluid temperatures or damaging the clutch.

IMPORTANT: In Park, Reverse and Neutral the shift solenoid valves are shown de-energized. This is the normal operating state when the vehicle is stationary or at low vehicle speeds. However, the TCM will change the shift solenoid valve states depending on vehicle speed. For example, if Neutral range is selected when the vehicle is operating in Second gear, the shift solenoid valves will remain in a Second gear state. But with the manual valve in Neutral, line pressure is blocked, D432 fluid exhausts and the transmission will shift into Neutral.

Low and Reverse Clutch:

Low and reverse clutch or reverse lockout fluid exhausts from the outer area of the low and reverse clutch piston to the #8 ball check valve. Reverse lockout fluid also exhausts from the inner area of the low and reverse clutch piston through orifice #12. The exhaust of these fluids allows the low and reverse clutch to release.

#8 Ball Check Valve:

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Low and reverse clutch or reverse lockout fluid seats the #8 ball check valve against the low and reverse clutch fluid circuit and enters the reverse lockout fluid circuit where it exhausts along with reverse clutch fluid past the manual valve.

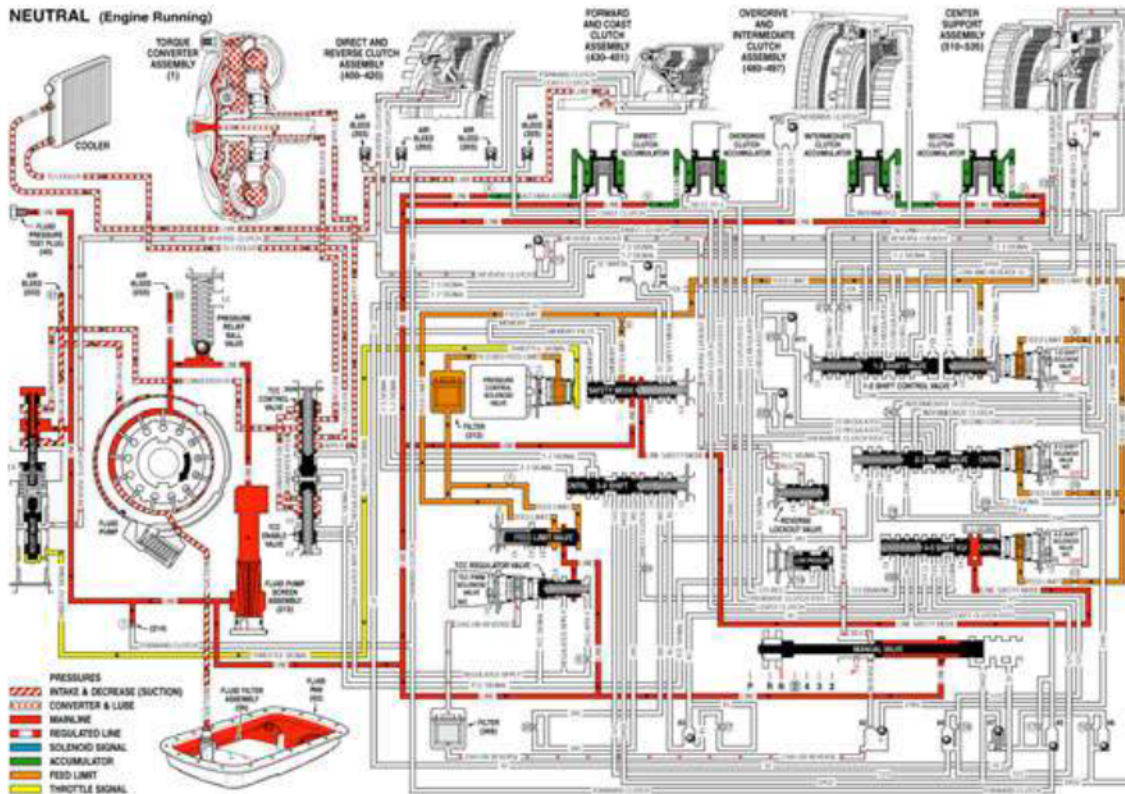


Fig. 280: Neutral Engine Running
Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, FIRST GEAR (BEFORE FIRST 1-2 SHIFT)

When the gear selector lever is moved to the Overdrive range position (D), from the Neutral (N) position, before the first 1-2 shift has occurred, the following changes occur to shift the transmission into Overdrive Range - First Gear.

Manual Valve:

In the Overdrive position the manual valve routes line pressure into the D432 fluid circuit. D432 fluid is routed to the 1-2 shift valve and to the 3-4 shift valve.

Forward Clutch Applies

#6 and #7 Ball Check Valves:

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

D432 fluid seats the #6 ball check valve and passes through orifice #15 into the forward clutch fluid circuit. D432 fluid also passes by the spring loaded #7 ball check valve to feed the forward clutch circuit as necessary to help control forward clutch apply.

Forward Clutch Assembly:

Forward clutch fluid is routed to the forward clutch piston to apply the forward clutch plates.

Coast Clutch Applies

#5 Ball Check Valve:

Forward clutch fluid seats the #5 ball check valve and passes through orifice #17 into the coast clutch feed circuit. This orifice helps to control coast clutch apply.

Safety Mode Valve:

Before the first 1-2 shift has occurred, the safety mode valve (34)1 remains in the released position, allowing line fluid pressure to enter the line safety mode fluid circuit.

4-5 Shift Valve:

Line safety mode fluid applies the 4-5 shift valve (374) against 4-5 shift valve spring (373) force. This allows coast clutch feed fluid to enter the coast clutch fluid circuit.

Coast Clutch Assembly:

Coast clutch fluid is routed to the coast clutch piston to apply the coast clutch plates.

Low and Reverse Clutch Applies

2-3 Shift Solenoid (SS) Valve:

The 2-3 SS valve is energized, allowing feed limit fluid to enter the 2-3 signal fluid circuit. 2-3 signal fluid overcomes spring force and applies the 2-3 shift valve (371).

3-4 Shift Control Valve and 3-4 Shift Valve:

2-3 signal fluid is routed to the 3-4 shift control valve (346) and applies the valve against spring force. This allows D432 fluid to enter the 123 fluid circuit.

#4 Ball Check Valve:

123 fluid seats the #4 ball check valve and passes through orifice #16. This orifice helps to control low and reverse clutch apply.

4-5 Shift Valve:

Orificed 123 fluid is routed to the 4-5 shift valve (374) where it passes into the 123 braking fluid circuit.

Low Pressure Control Valve:

123 braking fluid is routed to the low pressure control valve (383). This valve regulates 123 braking fluid into the 123 regulated fluid circuit against spring force and orificed 123 regulated fluid pressure.

1-2 Shift Control Valve and 1-2 Shift Valve:

2-3 signal fluid is also routed to the 1-2 shift control valve (366) and applies the valve against spring force. This allows feed limit fluid to enter the FDL fluid circuit. FDL fluid is routed to the 1-2 shift valve (387) and applies the valve against spring force. 123 regulated fluid is routed through orifice #20 to the 1-2 shift valve where it passes into the low and reverse clutch fluid circuit.

#8 Ball Check Valve:

Low and reverse clutch fluid seats the #8 ball check valve against the reverse lockout fluid passage and enters the low and reverse clutch or reverse lockout fluid passage.

Low and Reverse Clutch:

Low and reverse clutch or reverse lockout fluid pressure enters the outer area of the low and reverse clutch piston and moves the piston against spring force to apply the low and reverse clutch plates.

Fluid Pressure Directed in Preparation for a Shift to Second Gear**1-2 Shift Valve:**

D432 fluid is routed to the 1-2 shift valve (387) where it is blocked by the valve in preparation for an upshift to second gear.

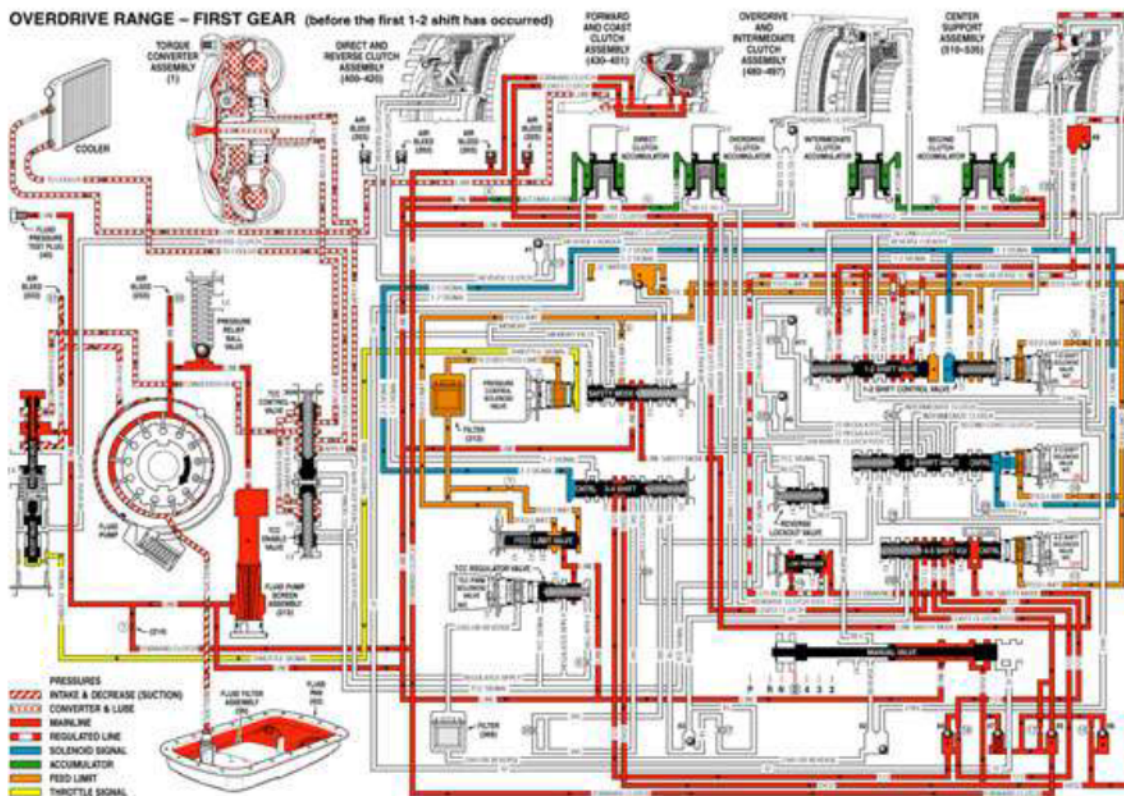


Fig. 281: Overdrive Range, First Gear
 Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, FIRST GEAR (AFTER FIRST 1-2 SHIFT)

When the gear selector lever is moved to the Overdrive range position (D), from the Neutral (N) position, after the first 1-2 shift has occurred, the following changes occur to shift the transmission into Overdrive Range - First Gear.

Manual Valve:

In the Overdrive position the manual valve routes line pressure into the D432 fluid circuit. D432 fluid is routed to the 1-2 shift valve and to the 3-4 shift valve.

Forward Clutch Applies

#6 and #7 Ball Check Valves:

D432 fluid seats the #6 ball check valve and passes through orifice #15 into the forward clutch fluid circuit. D432 fluid also passes by the spring loaded #7 ball check valve to feed the forward clutch circuit as necessary to help control forward clutch apply.

#5 Ball Check Valve:

Forward clutch fluid seats the #5 ball check valve and passes through orifice #17 into the coast clutch feed circuit.

Forward Clutch Assembly:

Forward clutch fluid is routed to the forward clutch piston to apply the forward clutch plates.

Coast Clutch Applies**2-3 Shift Solenoid (SS) Valve:**

The 2-3 SS valve is energized, allowing feed limit fluid to enter the 2-3 signal fluid circuit. 2-3 signal fluid overcomes 2-3 shift valve spring (372) force and moves the 2-3 shift valve (371) to the applied position.

1-2 Shift Control Valve and 1-2 Shift Valve:

2-3 signal fluid is routed to the 1-2 shift control valve (366) and moves the valve against 1-2 shift control valve spring (367) force to the applied position. This allows feed limit fluid to enter the FDL fluid circuit. FDL fluid is routed to the 1-2 shift valve (387) and moves the valve against 1-2 shift valve spring (388) force to the applied position to block D432 fluid at the valve.

3-4 Shift Control Valve and 3-4 Shift Valve:

2-3 signal fluid is also routed to the 3-4 shift control valve (346) and moves the valve against 3-4 shift valve spring (344) force to the applied position. This allows D432 fluid to enter the 123 fluid circuit at the 3-4 shift valve (345).

#4 Ball Check Valve:

123 fluid seats the #4 ball check valve and passes through orifice #16. This orifice helps to control coast clutch apply.

4-5 Shift Valve:

Orificed 123 fluid is routed to the 4-5 shift valve (374) where it passes into the coast clutch fluid circuit.

Coast Clutch Assembly:

Coast clutch fluid is routed to the coast clutch piston to apply the coast clutch plates.

Fluid Pressure Directed in Preparation for a Shift to Second Gear

1-2 Shift Valve:

D432 fluid is routed to the 1-2 shift valve (387) where it is blocked by the valve in preparation for an upshift to second gear.

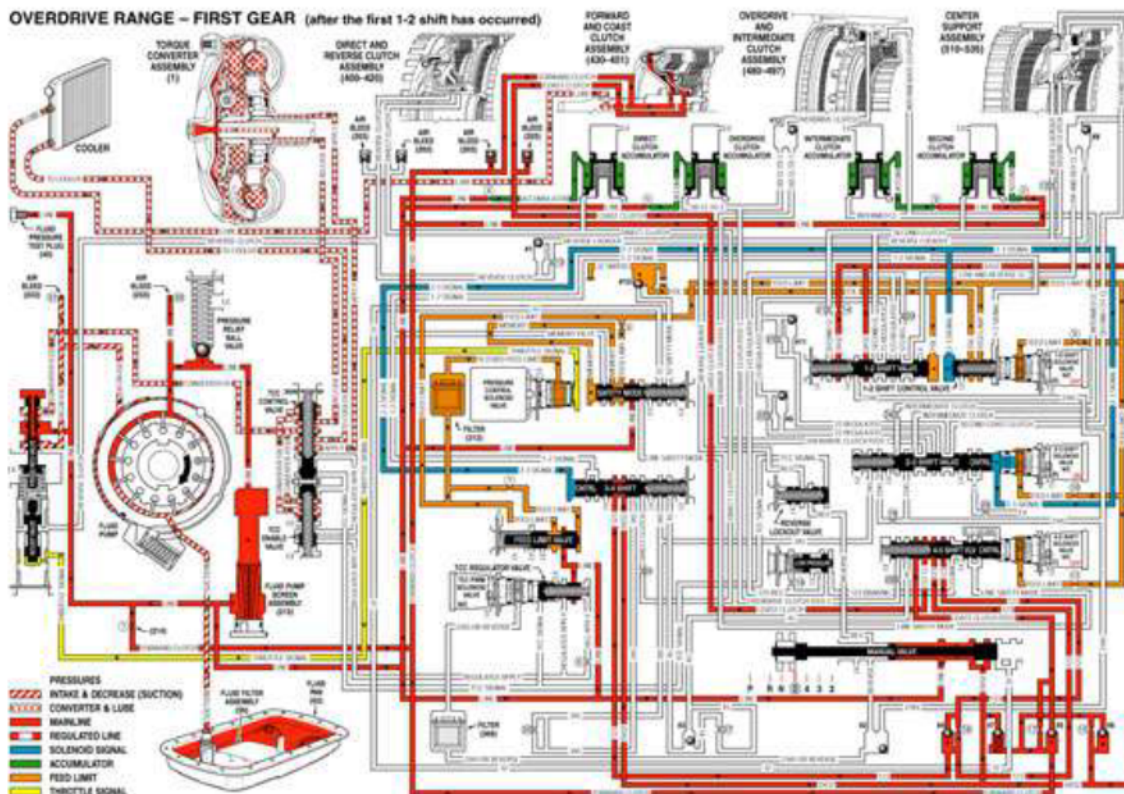


Fig. 282: Overdrive Range, First Gear
Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, SECOND GEAR

As vehicle speed increases, the transmission control module (TCM) receives input signals from both the input and output speed sensors, the throttle position (TP) sensor and other vehicle sensors to determine the precise moment to energize or "turn ON" the 1-2 shift solenoid (SS) valve.

Second Clutch Applies

1-2 Shift Solenoid (SS) Valve:

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The 1-2 SS valve is energized, allowing feed limit fluid to enter the 1-2 signal fluid circuit. 1-2 signal fluid, together with 1-2 shift control valve spring (367) force, overcomes 2-3 signal fluid pressure and moves the 1-2 shift control valve (366) to the released position. This blocks feed limit fluid from entering the FDL fluid circuit.

1-2 Shift Valve:

FDL fluid is exhausted from the 1-2 shift valve (387) and 1-2 shift valve spring (388) force moves the valve to the released position to allow D432 fluid to enter the second clutch and 2345 fluid circuits.

Second Clutch:

Second clutch fluid is directed to the second clutch piston to apply the second clutch plates and achieve Second gear.

Shift Accumulator

Second Clutch Accumulator:

Second clutch fluid is also sent to the second clutch accumulator assembly. Second clutch fluid, together with accumulator spring force, moves the second clutch accumulator piston against accumulator fluid pressure to cushion the apply of the second clutch.

Fluid Pressure Directed in Preparation for a Shift to Third Gear

2-3 Shift Valve:

2345 fluid is routed to the 2-3 shift valve (371) where it is blocked by the valve in preparation for an upshift to third gear.

Torque Converter Clutch Released

#2 Ball Check Valve:

2345 fluid seats the ball check valve against the reverse passage and enters the 2345 or reverse fluid circuit.

TCC PWM Solenoid Valve:

2345 or reverse fluid is directed through the TCC PWM solenoid valve filter to the TCC PWM solenoid valve. However, depending on the shift pattern, the TCM keeps the pulse

width modulated (PWM) solenoid de-energized blocking filtered 2345 or reverse fluid from entering the TCC signal fluid circuit, thereby keeping the torque converter clutch released.

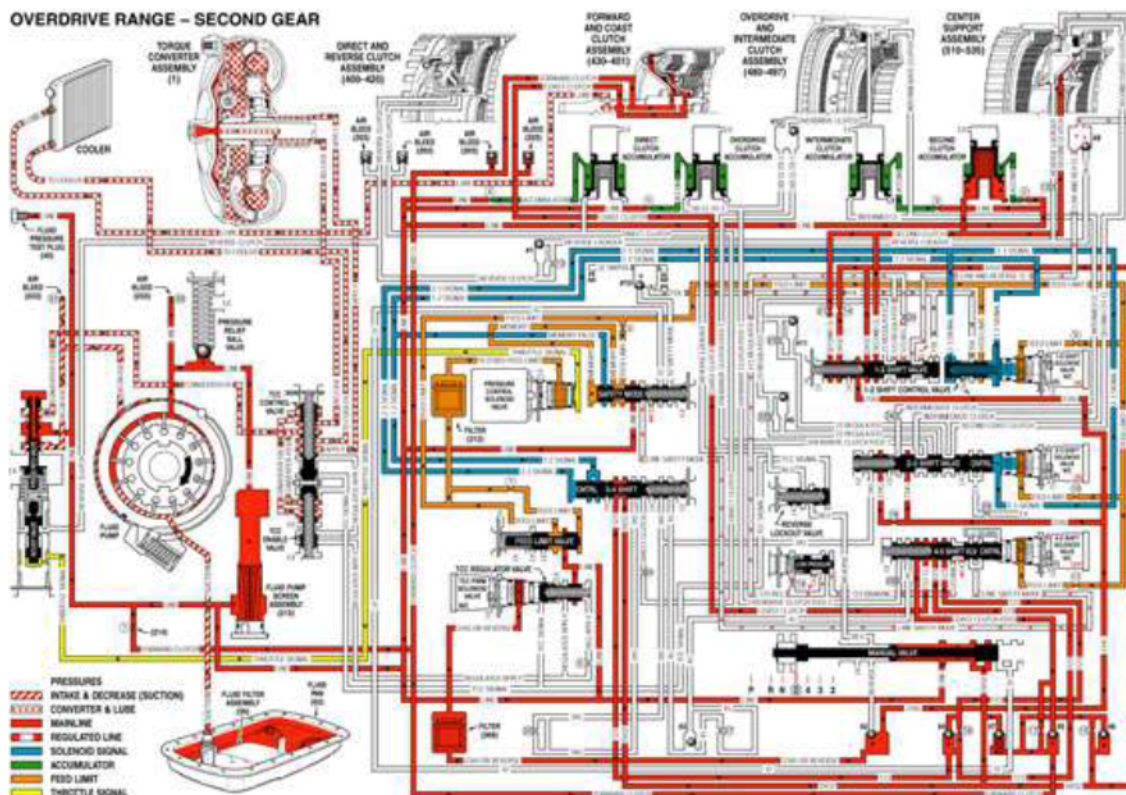


Fig. 283: Overdrive Range, Second Gear
Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, THIRD GEAR

As vehicle speed increases, the TCM receives input signals from both speed sensors, the TP sensor and other vehicle sensors to determine the precise moment to de-energize or "turn OFF" the 2-3 shift solenoid (SS) valve. The 2-3 solenoid is OFF when the TCM removes the path to ground for that electrical circuit. This allows 2-3 signal fluid to exhaust at the 2-3 SS valve.

Intermediate Clutch Applies

2-3 Shift Solenoid (SS) Valve:

The 2-3 SS valve is de-energized, blocking feed limit fluid from entering the 2-3 signal fluid circuit. 2-3 signal fluid pressure exhausts through the 2-3 SS valve and 2-3 shift valve spring (372) force moves the 2-3 shift valve (371) to the released position.

2-3 Shift Valve:

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2345 fluid is routed through the 2-3 shift valve and enters the intermediate clutch circuit.

Intermediate Clutch:

Intermediate clutch fluid is directed to the intermediate clutch piston to apply the intermediate clutch plates and achieve Third gear.

Shift Accumulation

Intermediate Clutch Accumulator:

Intermediate clutch fluid is also sent to the intermediate clutch accumulator assembly. Intermediate clutch fluid, together with accumulator spring force, moves the intermediate clutch accumulator piston against accumulator fluid pressure to cushion the apply of the intermediate clutch.

Torque Converter Clutch Released

TCC PWM Solenoid Valve:

Filtered 2345 or reverse fluid is still available at the TCC PWM solenoid valve. However, depending on the shift pattern, the TCM keeps the pulse width modulated (PWM) solenoid de-energized blocking filtered 2345 or reverse fluid from entering the TCC signal fluid circuit, thereby keeping the torque converter clutch released.

Fluid Pressure Directed in Preparation for a Shift to Fourth Gear

2-3 Shift Valve:

2345 fluid is routed through the 2-3 shift valve (371) into the 345 fluid circuit.

X-4 Ball Check Valve:

345 fluid is routed through the X-4 ball check valve pocket. In some transmission models there is a ball check valve present which would force 345 fluid through orifice #25.

3-4 Shift Valve:

345 fluid is routed to the 3-4 shift valve (345) where it is blocked by the valve in preparation for an upshift to fourth gear.

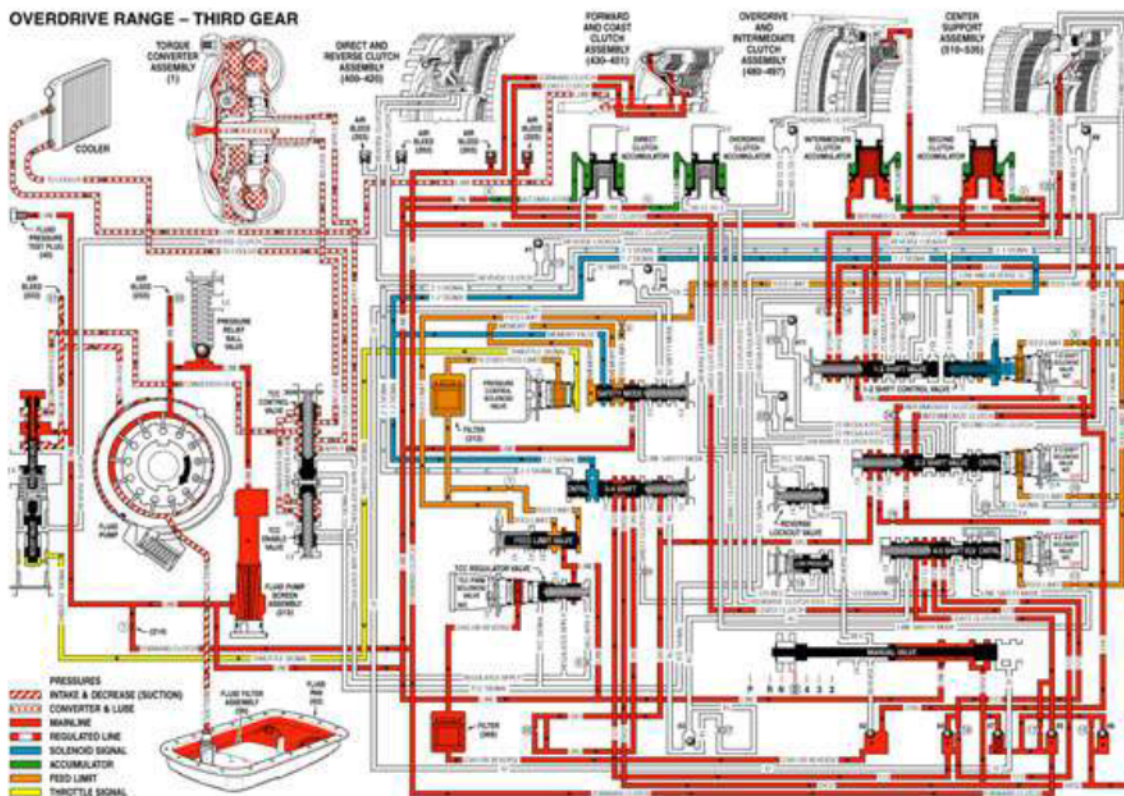


Fig. 284: Overdrive Range, Third Gear - Torque Converter Clutch (TCC) Applied
 Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, FOURTH GEAR

As vehicle speed increases, the TCM receives input signals from both speed sensors, the TP sensor and other vehicle sensors to determine the precise moment to de-energize or "turn OFF" the 1-2 shift solenoid (SS) valve, and to energize or "turn ON" the 4-5 SS valve.

Direct Clutch Applies

1-2 Shift Solenoid (SS) Valve:

The 1-2 SS valve is de-energized, blocking feed limit fluid from entering the 1-2 signal fluid circuit and 1-2 signal fluid pressure exhausts through the 1-2 SS valve.

3-4 Shift Valve:

When 1-2 signal fluid pressure exhausts from the 3-4 shift valve (345), the 3-4 shift valve spring (344) moves the valve to the released position. 345 fluid from the 2-3 shift valve flows through the 3-4 shift valve and enters the direct clutch circuit.

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Direct Clutch:

Direct clutch fluid is routed to the direct clutch piston to apply the direct clutch plates and obtain Fourth gear.

3-4 Shift Accumulation

Direct Clutch Accumulator:

Direct clutch fluid is also sent to the direct clutch accumulator assembly. Direct clutch fluid, together with accumulator spring force, moves the direct clutch accumulator piston against accumulator fluid pressure to cushion the apply of the direct clutch.

Coast Clutch Feed

4-5 Shift Solenoid (SS) Valve:

The 4-5 SS valve is energized, allowing feed limit fluid to enter the 4-5 signal fluid circuit. 4-5 signal fluid overcomes 4-5 shift valve spring (373) force and moves the 4-5 shift control valve (375) and the 4-5 shift valve (374) to the applied position.

4-5 Shift Valve:

In first through third gears, the coast clutch has been fed by 123 fluid. In fourth gear the 4-5 shift valve (374) is applied in preparation for a shift to fifth gear. This causes the coast clutch fluid circuit to be supplied by coast clutch feed fluid, and 123 fluid to exhaust.

Torque Converter Clutch Released

TCC PWM Solenoid Valve:

Filtered 2345 or reverse fluid is still available at the TCC PWM solenoid valve. However, depending on the shift pattern, the TCM keeps the pulse width modulated (PWM) solenoid de-energized blocking filtered 2345 or reverse fluid from entering the TCC signal fluid circuit, thereby keeping the torque converter clutch released.

Fluid Pressure Directed in Preparation for a Shift to Fifth Gear

3-4 Shift Valve:

345 fluid is routed through the 3-4 shift valve (345) into the 45 fluid circuit.

#3 Ball Check Valve:

45 fluid seats the #3 ball check valve and passes through orifice #27. This orifice helps to control overdrive clutch apply in fifth gear.

4-5 Shift Valve:

45 fluid is routed to the 4-5 shift valve (374) where it is blocked by the valve in preparation for an upshift to fifth gear.

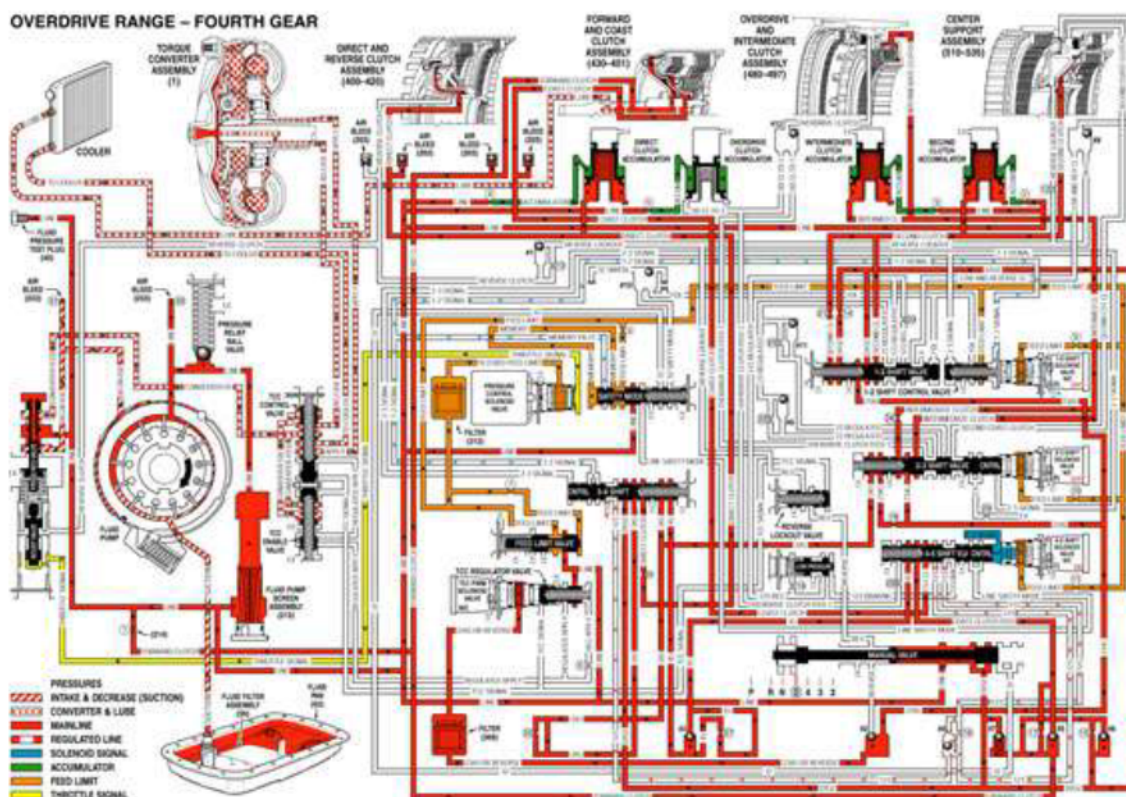


Fig. 285: Overdrive Range, Fourth Gear - Torque Converter Clutch (TCC) Applied
Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, FIFTH GEAR - TORQUE CONVERTER CLUTCH (TCC) RELEASED

Overdrive Range - Fifth Gear is used to maximize engine efficiency and fuel economy under most normal driving conditions. In order to shift the transmission into Fifth gear, the TCM receives input signals from both speed sensors, the TP sensor and other vehicle sensors to determine the precise moment to de-energize or "turn OFF" the 4-5 shift solenoid (SS) valve.

Overdrive Clutch Applied

4-5 Shift Solenoid (SS) Valve:

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The 4-5 SS valve is de-energized, blocking feed limit fluid from entering the 4-5 signal fluid circuit. 4-5 signal fluid pressure exhausts through the 4-5 SS valve and 4-5 shift valve spring (373) force moves the 4-5 shift valve (374) and the 4-5 shift control valve (375) to the released position.

4-5 Shift Valve:

45 fluid is routed through the 4-5 shift valve and enters the overdrive clutch feed 2 fluid circuit through orifice #28.

#12 Ball Check Valve:

Overdrive clutch feed 2 fluid seats the #12 ball check valve against the overdrive clutch feed 1 passage and enters the overdrive clutch fluid circuit.

Overdrive Clutch:

Overdrive clutch fluid is then directed to the overdrive clutch piston to apply the overdrive clutch plates and achieve Fifth gear.

4-5 Shift Accumulation

Overdrive Clutch Accumulator:

Overdrive clutch fluid is also sent to the overdrive clutch accumulator assembly. Overdrive clutch fluid, together with accumulator spring force, moves the overdrive clutch accumulator piston against accumulator fluid pressure to cushion the apply of the overdrive clutch.

Coast Clutch Releases

Coast Clutch:

When the 4-5 shift valve is shifted to the released position, coast clutch feed fluid is blocked and coast clutch fluid exhausts through the valve allowing the coast clutch to release.

4-5 Shift Valve:

Coast clutch fluid passes through the 4-5 shift valve and into the 123 circuit and on to the 3-4 shift valve where it exhausts.

Torque Converter Clutch Released

TCC PWM Solenoid Valve:

Filtered 2345 or reverse fluid is still available at the TCC PWM solenoid valve. However, depending on the shift pattern, the TCM keeps the pulse width modulated (PWM) solenoid de-energized blocking filtered 2345 or reverse fluid from entering the TCC signal fluid circuit, thereby keeping the torque converter clutch released.

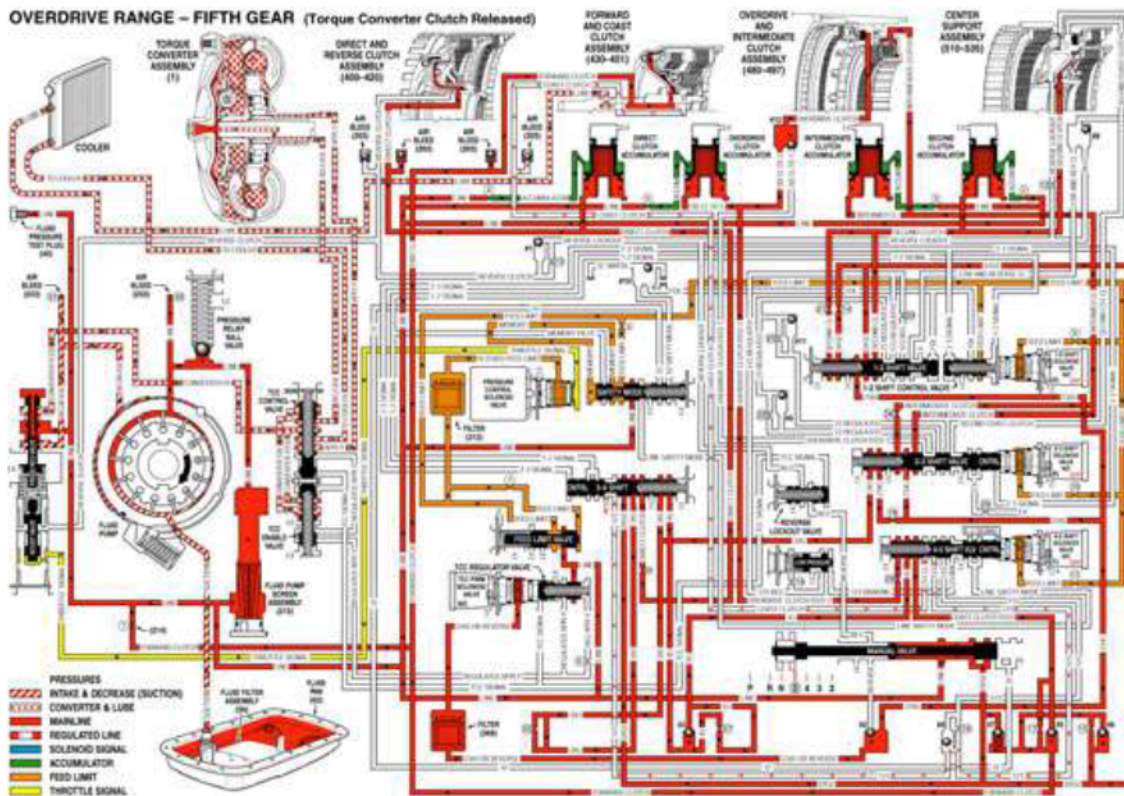


Fig. 286: Overdrive Range, Fifth Gear - Torque Converter Clutch (TCC) Released
Courtesy of GENERAL MOTORS CORP.

OVERDRIVE RANGE, FIFTH GEAR - TORQUE CONVERTER CLUTCH (TCC) APPLIED

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.

On:

At this time the Torque Converter Clutch is considered to be engaged - ON.

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Stage 4:

During this stage, the apply pressure from the TCC Regulator valve is decreased by the TCC PWM solenoid valve duty cycle dropping. Spring force pushes the valve back and reduces the Regulated Apply pressure. This reduces the apply force on the TCC pressure plate to the slip threshold. This gets the TCC pressure plate ready for a smooth release.

Stage 5:

The TCC PWM solenoid valve duty cycle is ramped down through this stage. This action allows the Regulated Apply pressure to start at the slip threshold, and decrease to near "0" pressure over a very short time. The Regulated Apply pressure value from the TCC Regulator valve at this duty cycle should fully release the TCC pressure plate. Slip speed should be at the maximum value.

Stage 6:

The TCM pulses the TCC PWM solenoid valve to a value of "0". Now the TCC Control and TCC Enable valves return to their released positions - away from the spring. Release fluid is now directed back to the torque converter. This stage is designed to move the TCC Control and TCC Enable valves to the released position.

OFF:

At this time the Torque Converter Clutch is considered to be disengaged - OFF.

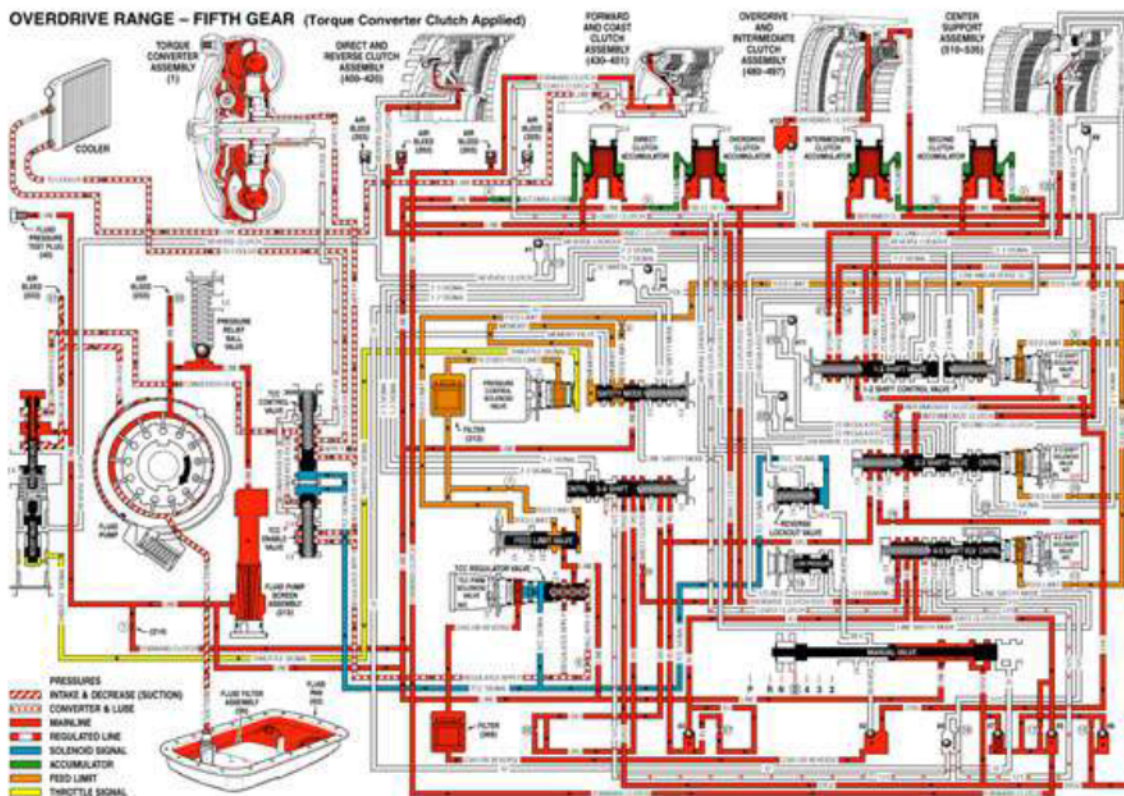


Fig. 287: Overdrive Range, Fifth Gear - Torque Converter Clutch (TCC) Applied
 Courtesy of GENERAL MOTORS CORP.

MANUAL FOURTH GEAR

Manual Fourth - Fourth Gear - Drive Range may be selected at any time while the vehicle is being operated in a forward gear range. However, TCM control prevents the transmission from shifting into Fifth gear. When the gear selector lever is moved to Drive Range (4) from Overdrive Range (D), the manual valve also moves. Changes to the hydraulic and electrical systems are as follows:

Overdrive Clutch Releases

Manual Valve:

The manual valve moves only to activate the transmission manual shift shaft switch assembly. The transmission manual shift shaft switch assembly signals the TCM that the transmission is in Manual Fourth Range. There is no hydraulic difference between Overdrive Range and Manual Fourth Range at the manual valve.

4-5 Shift Solenoid (SS) Valve:

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The 4-5 SS valve is energized, allowing feed limit fluid to enter the 4-5 signal fluid circuit. 4-5 signal fluid overcomes 4-5 shift valve spring (373) force and moves the 4-5 shift control valve (375) and the 4-5 shift valve (374) to the applied position.

4-5 Shift Valve:

4-5 fluid is blocked at the 4-5 shift valve (374) allowing overdrive clutch feed 2 fluid to exhaust.

Overdrive Clutch Assembly:

Overdrive clutch fluid exhausts from the overdrive clutch piston, allowing the overdrive clutch plates to disengage.

#12 Ball Check Valve:

Overdrive clutch fluid seats the #12 ball check valve against the overdrive clutch feed 1 passage and enters the overdrive clutch feed 2 fluid circuit where it exhausts at the 4-5 shift valve.

Shift Accumulation

Overdrive Clutch Accumulator:

Overdrive clutch fluid also exhausts from the overdrive clutch accumulator assembly. Accumulator fluid moves the overdrive clutch accumulator piston against accumulator spring force in preparation for another application of the overdrive clutch.

Coast Clutch Applies

4-5 Shift Valve:

Coast clutch feed fluid passes through the 4-5 shift valve (374) and into the coast clutch circuit.

Coast Clutch:

Coast clutch fluid is routed to the coast clutch piston to apply the coast clutch plates.

In Manual Fourth - Fourth Gear, the TCC will not release if Manual Fourth was selected while the vehicle was operating in Overdrive Range - Fifth Gear with the TCC applied. Under normal operating conditions, the converter clutch operates the same way in Manual Fourth - Fourth Gear

as in Overdrive Range - Fourth Gear.

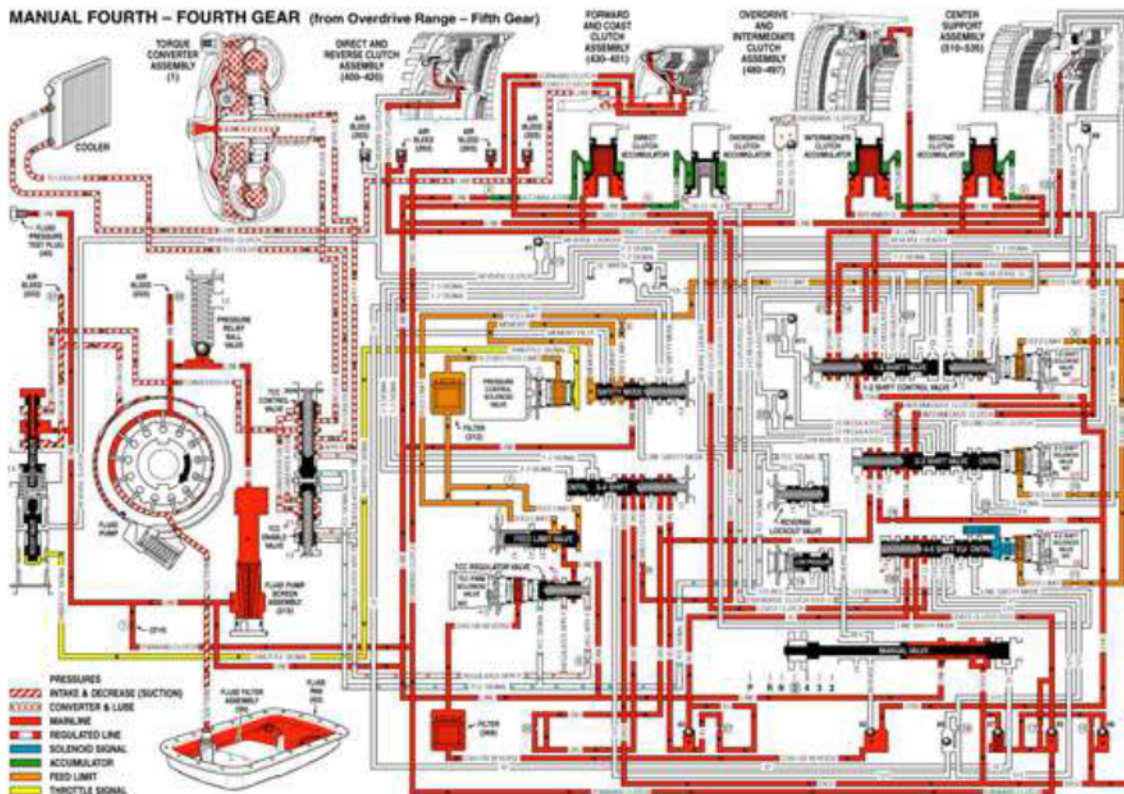


Fig. 288: Manual Fourth
Courtesy of GENERAL MOTORS CORP.

MANUAL THIRD GEAR

Manual Third - Third Gear may be selected at any time while the vehicle is being operated in a forward gear range. However, TCM control prevents the transmission from shifting above Third gear. When the gear selector lever is moved to Manual Third range from Manual Fourth - Fourth Gear, the manual valve also moves. Changes to the hydraulic and electrical systems are as follows:

Overdrive Clutch Applies

Manual Valve:

Line pressure enters the 32 fluid circuit at the manual valve. 32 fluid is routed to the safety mode valve.

1-2 Shift Solenoid (SS) Valve:

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The 1-2 SS valve is energized, allowing feed limit fluid to enter the 1-2 signal fluid circuit. 1-2 signal fluid is routed to the safety mode valve and to the 3-4 shift valve.

3-4 Shift Valve:

1-2 signal fluid overcomes 3-4 shift valve spring force and moves the 3-4 shift valve to the applied position. This allows D432 fluid to enter the 123 fluid circuit, and allows direct clutch and 45 fluids to exhaust.

#4 Ball Check Valve:

123 fluid seats the #4 ball check valve and passes through orifice #16 on the way to the 4-5 shift valve.

4-5 Shift Valve:

123 fluid passes through the 4-5 shift valve (333) into the 123 braking fluid circuit.

Low Pressure Control Valve:

123 braking fluid is regulated into the 123 regulated fluid circuit through the low pressure control valve (383).

1-2 Shift Valve:

123 regulated fluid passes through the 1-2 shift valve into the 23 regulated fluid circuit.

#9 and #11 Ball Check Valve:

23 regulated fluid seats the #9 and the #11 ball check valves and is forced through orifices #22 and #23.

2-3 Shift Valve:

23 regulated fluid passes through the 2-3 shift valve into the overdrive clutch feed 1 fluid circuit.

#12 Ball Check Valve:

Overdrive clutch feed 1 fluid seats the #12 ball check valve against the overdrive clutch feed 2 passage and enters the overdrive clutch fluid circuit.

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Overdrive Clutch:

Overdrive clutch fluid is then directed to the overdrive clutch piston to apply the overdrive clutch plates.

Direct Clutch Releases

Direct Clutch:

Direct clutch fluid exhausts from the direct clutch piston to release the direct clutch plates.

3-4 Shift Valve:

Direct clutch fluid flows through orifice #26 to the 3-4 shift valve where it exhausts.

Shift Accumulation

Direct Clutch Accumulator:

Direct clutch fluid also exhausts from the direct clutch accumulator assembly. Accumulator fluid moves the direct clutch accumulator piston against accumulator spring force in preparation for another application of the direct clutch.

In Manual Third - Third Gear, the TCC will not release if Manual Third was selected while the vehicle was operating in Overdrive Range - Fifth Gear with the TCC applied. Under normal operating conditions, the converter clutch operates the same way in Manual Third - Third Gear as in Overdrive Range - Third Gear.

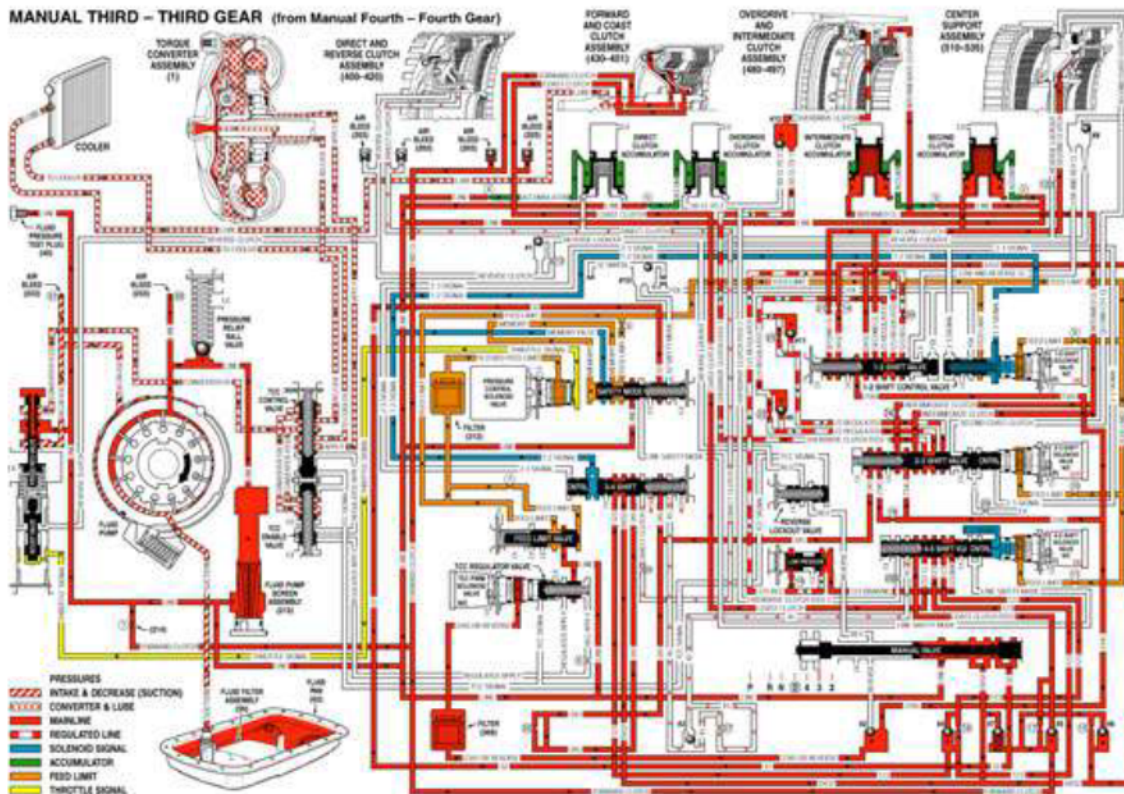


Fig. 289: Manual Third
 Courtesy of GENERAL MOTORS CORP.

MANUAL SECOND GEAR

Manual Second - Second Gear may be selected at any time while the vehicle is being operated in a forward gear range. However, TCM control prevents the transmission from upshifting above Second gear. When the gear selector lever is moved to Manual Second from Manual Third - Third Gear, the manual valve also moves. Changes to the hydraulic and electrical systems are as follows:

Second Coast Clutch Applied

Manual Valve:

The volume of line pressure entering the 32 fluid circuit at the manual valve is increased to accommodate the added torque requirements for engine braking or increased engine load.

2-3 Shift Solenoid (SS) Valve:

The 2-3 SS valve is energized, allowing feed limit fluid to enter the 2-3 signal fluid circuit. 2-3 signal fluid overcomes 2-3 shift valve spring (372) force and moves the 2-3 shift valve

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(371) to the applied position. This allows 23 regulated fluid to enter the second coast clutch fluid circuit and also opens the overdrive clutch feed 1, intermediate clutch and 345 fluid circuits to exhaust.

3-4 Shift Control Valve:

2-3 signal fluid is also routed to the 3-4 shift control valve (346) and moves the valve against 1-2 signal fluid pressure to keep the 3-4 shift valve (345) in the applied position.

Second Coast Clutch:

Second coast clutch fluid is directed to the second coast clutch piston to apply the second coast clutch plates.

IMPORTANT: If the vehicle operating conditions are such that the TCM signals a Third, Fourth or Fifth gear state, the 2-3 solenoid will be de-energized. Thus a downshift will not occur until the vehicle speed is low enough not to overrev the engine - calibratable in the TCM.

Overdrive Clutch Releases

Overdrive Clutch Assembly:

Overdrive clutch fluid exhausts from the overdrive clutch piston, allowing the overdrive clutch plates to disengage.

#12 Ball Check Valve:

Overdrive clutch fluid seats the #12 ball check valve against the overdrive clutch feed 2 passage and enters the overdrive clutch feed 1 fluid circuit.

2-3 Shift Valve:

Exhausting overdrive clutch feed 2 fluid is routed through the 2-3 shift valve into the intermediate clutch fluid circuit.

Intermediate Clutch Releases

Intermediate Clutch Assembly:

Intermediate clutch fluid exhausts from the intermediate clutch piston, allowing the intermediate clutch plates to disengage.

2-3 Shift Valve:

Intermediate clutch fluid is routed through orifice #24 to the 2-3 shift valve where it exhausts.

Shift Accumulation

Intermediate Clutch Accumulator:

Intermediate clutch fluid also exhausts from the intermediate clutch accumulator assembly. Accumulator fluid moves the intermediate clutch accumulator piston against accumulator spring force in preparation for another application of the intermediate clutch.

If the converter clutch was applied when Manual Second was selected it will release during downshifting. Under normal operating conditions the converter clutch will not re-apply in Second gear.

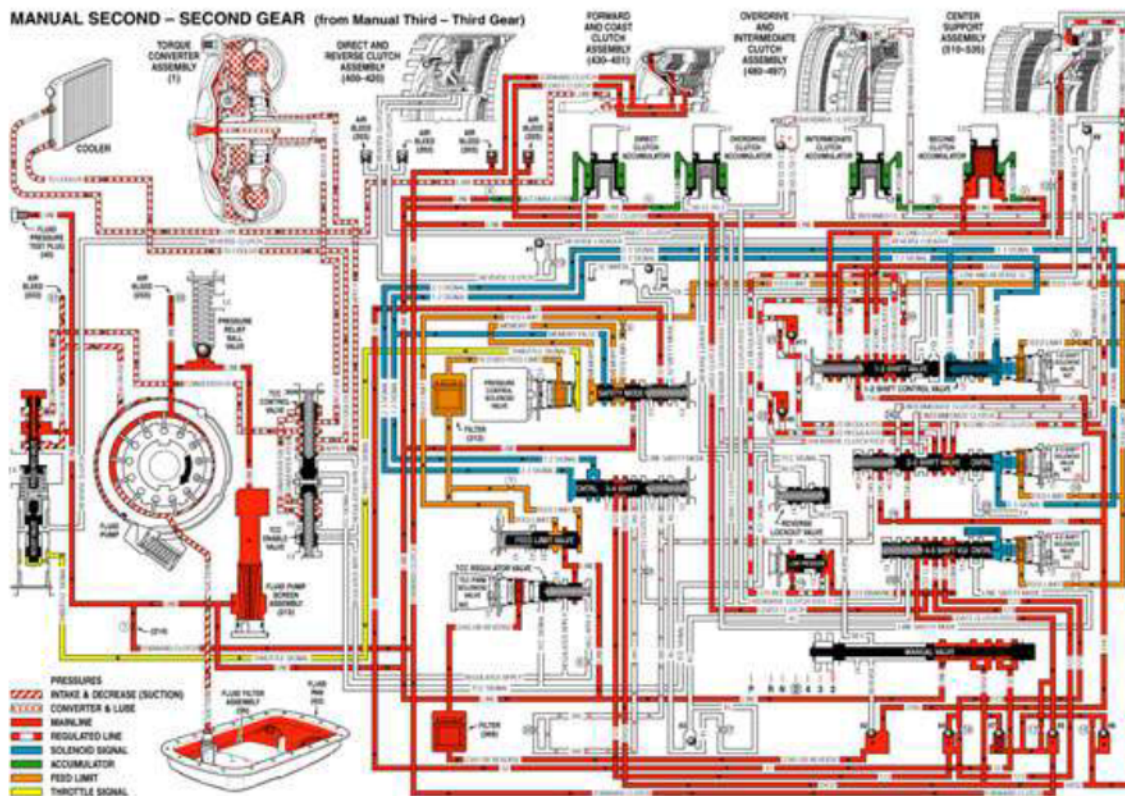


Fig. 290: Manual Second Gear
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MANUAL SECOND - FIRST GEAR

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Manual Second - First Gear is commanded by the TCM, when vehicle speed is low enough not to overrev the engine - calibratable in the TCM, in order to achieve maximum engine braking. Changes to the hydraulic and electrical systems are as follows:

Manual Valve:

Manual Second - First Gear is commanded by the TCM only, there is no movement of the manual valve.

Low and Reverse Clutch Applied

1-2 Shift Solenoid (SS) Valve:

The 1-2 SS valve is de-energized, blocking feed limit fluid from entering the 1-2 signal fluid circuit and 1-2 signal fluid pressure exhausts through the 1-2 SS valve.

1-2 Shift Control Valve:

With 1-2 signal fluid exhausted, 2-3 signal fluid is able to move the 1-2 shift control valve (366) against 1-2 shift control valve spring (367) force to the applied position. This allows feed limit fluid to enter the FDL fluid circuit.

1-2 Shift Valve:

FDL fluid is routed to the 1-2 shift valve (387) and moves the valve against 1-2 shift valve spring (388) force to the applied position. This allows 123 regulated fluid to enter the low and reverse clutch fluid circuit.

#8 Ball Check Valve:

Low and reverse clutch fluid seats the #8 ball check valve against the reverse lockout fluid passage and enters the low and reverse clutch or reverse lockout fluid passage.

Low and Reverse Clutch:

Low and reverse clutch or reverse lockout fluid pressure enters the outer area of the low and reverse clutch piston and moves the piston against spring force to apply the low and reverse clutch plates.

Second Clutch and Second Coast Clutch Release

Second Clutch Assembly:

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Second clutch fluid exhausts from the second clutch piston, allowing the second clutch plates to disengage.

Second Coast Clutch Assembly:

Second coast clutch fluid exhausts from the second coast clutch piston, allowing the second coast clutch plates to disengage.

1-2 Shift Valve:

Second coast clutch fluid is routed through the 2-3 shift valve to the 1-2 shift valve where it enters the second clutch fluid circuit. Second clutch fluid is routed through orifice #21 to the 1-2 shift valve where it exhausts.

Shift Accumulation

Second Clutch Accumulator:

Second clutch fluid also exhausts from the second clutch accumulator assembly. Accumulator fluid moves the second clutch accumulator piston against accumulator spring force in preparation for another application of the second clutch.

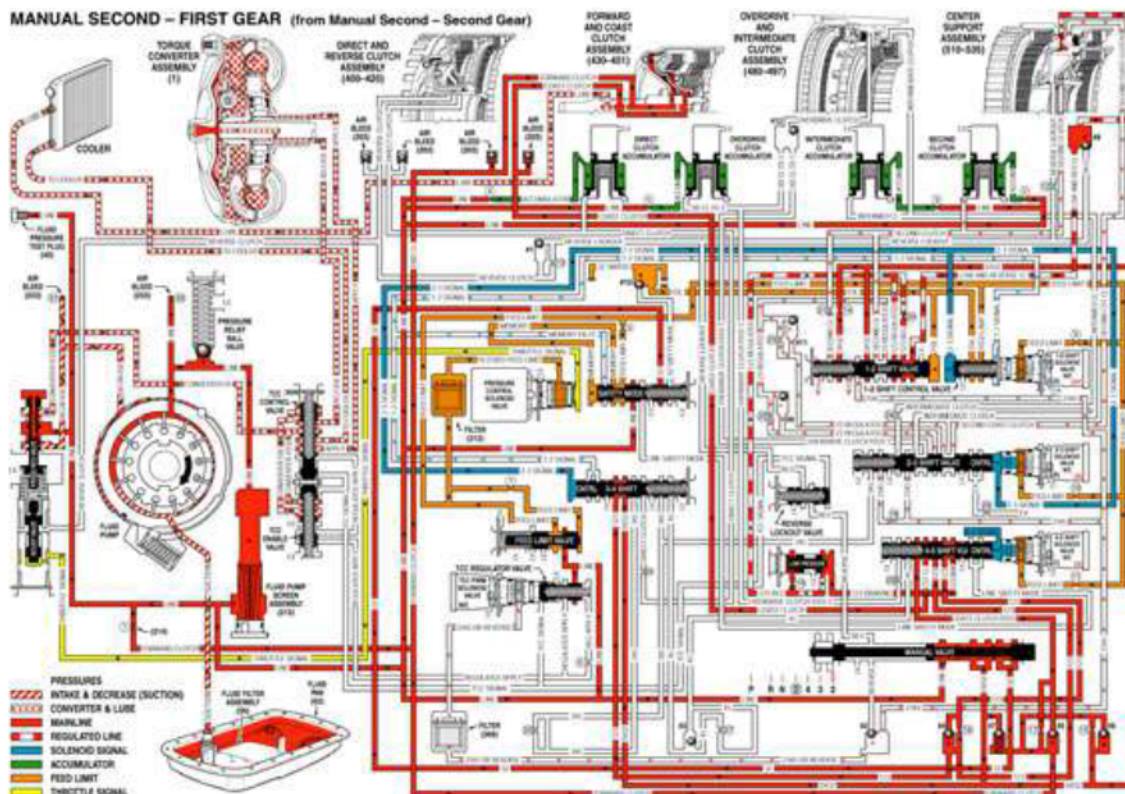


Fig. 291: Manual Second - First Gear
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

FLUID PASSAGES

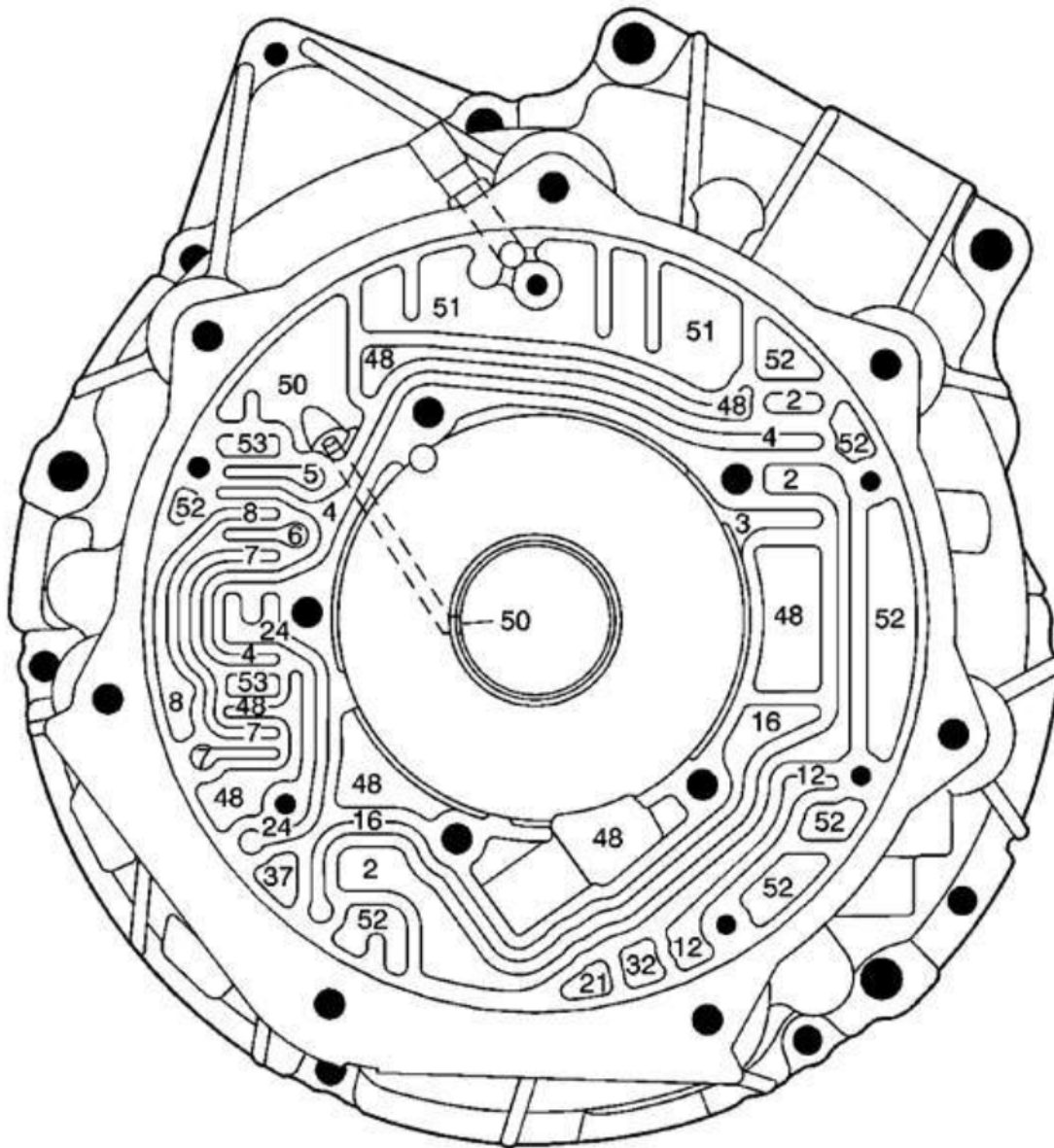


Fig. 292: Torque Converter Housing - Fluid Pump Cover Side
Courtesy of GENERAL MOTORS CORP.

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Callouts For Fig. 292

Callout	Component Name
2	Line
2	Line
2	Line
3	Decrease
4	Converter Feed
4	Converter Feed
4	Converter Feed
5	Release
6	Apply
7	Regulated Apply
7	Regulated Apply
7	Regulated Apply
8	To Cooler
8	To Cooler
12	Throttle Signal
12	Throttle Signal
16	Reverse Clutch
16	Reverse Clutch
21	Forward Clutch
24	TCC Signal
24	TCC Signal
32	Coast Clutch
37	Direct Clutch
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
50	Torque Converter Seal Drain Back
50	Torque Converter Seal Drain Back
51	Vent

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51	Vent
52	Void
52	Void
52	Void
52	Void
52	Void
52	Void
52	Void
52	Void
53	Converter FDL
53	Converter FDL

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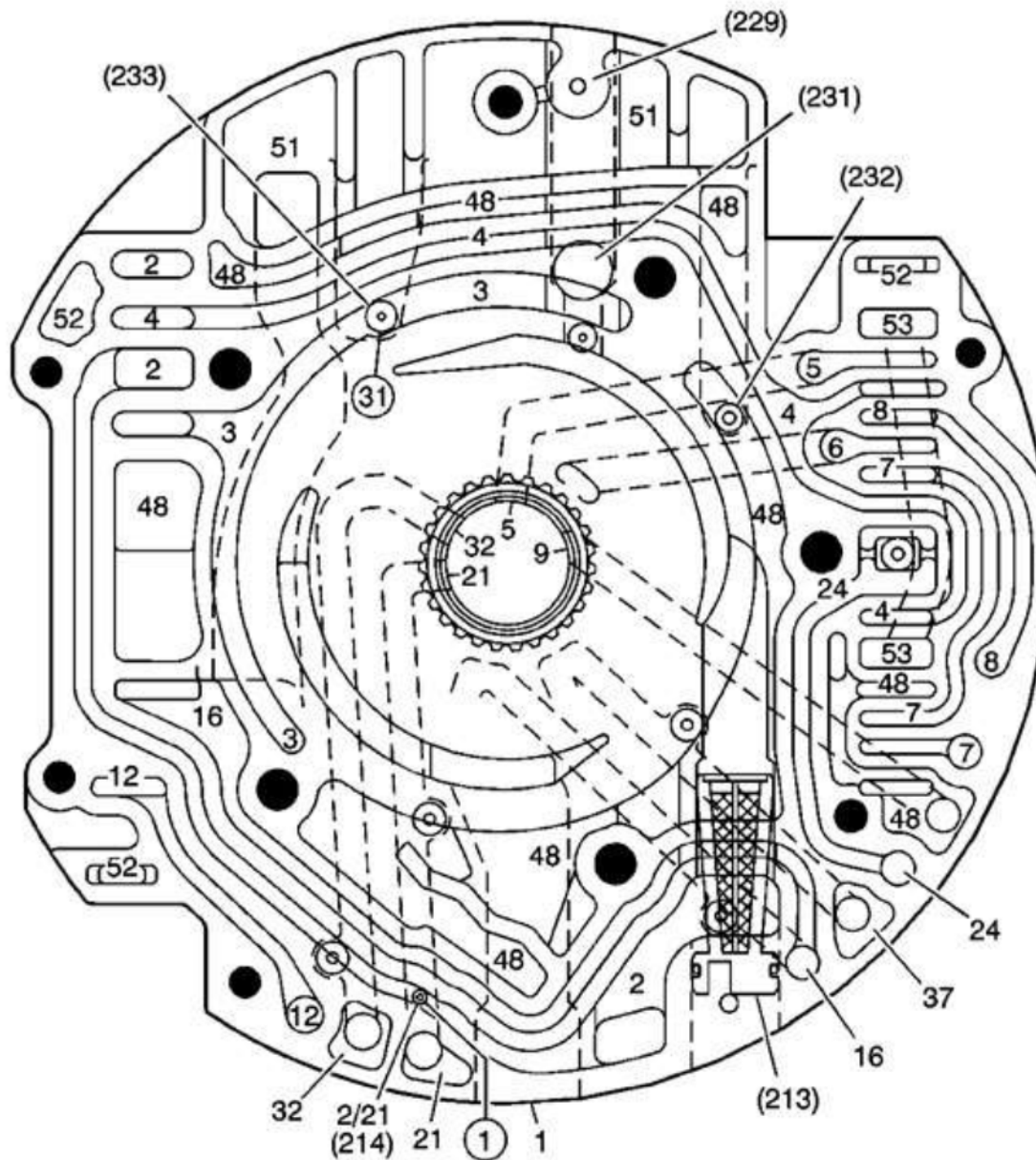


Fig. 293: Fluid Pump Cover - Torque Converter Housing Side
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 293

Callout	Component Name
1	Suction
2	Line
2	Line
2	Line

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[illegible]

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	Exhaust
48	Exhaust
48	Exhaust
51	Vent
51	Vent
52	Void
52	Void
52	Void
53	Converter FDL
53	Converter FDL

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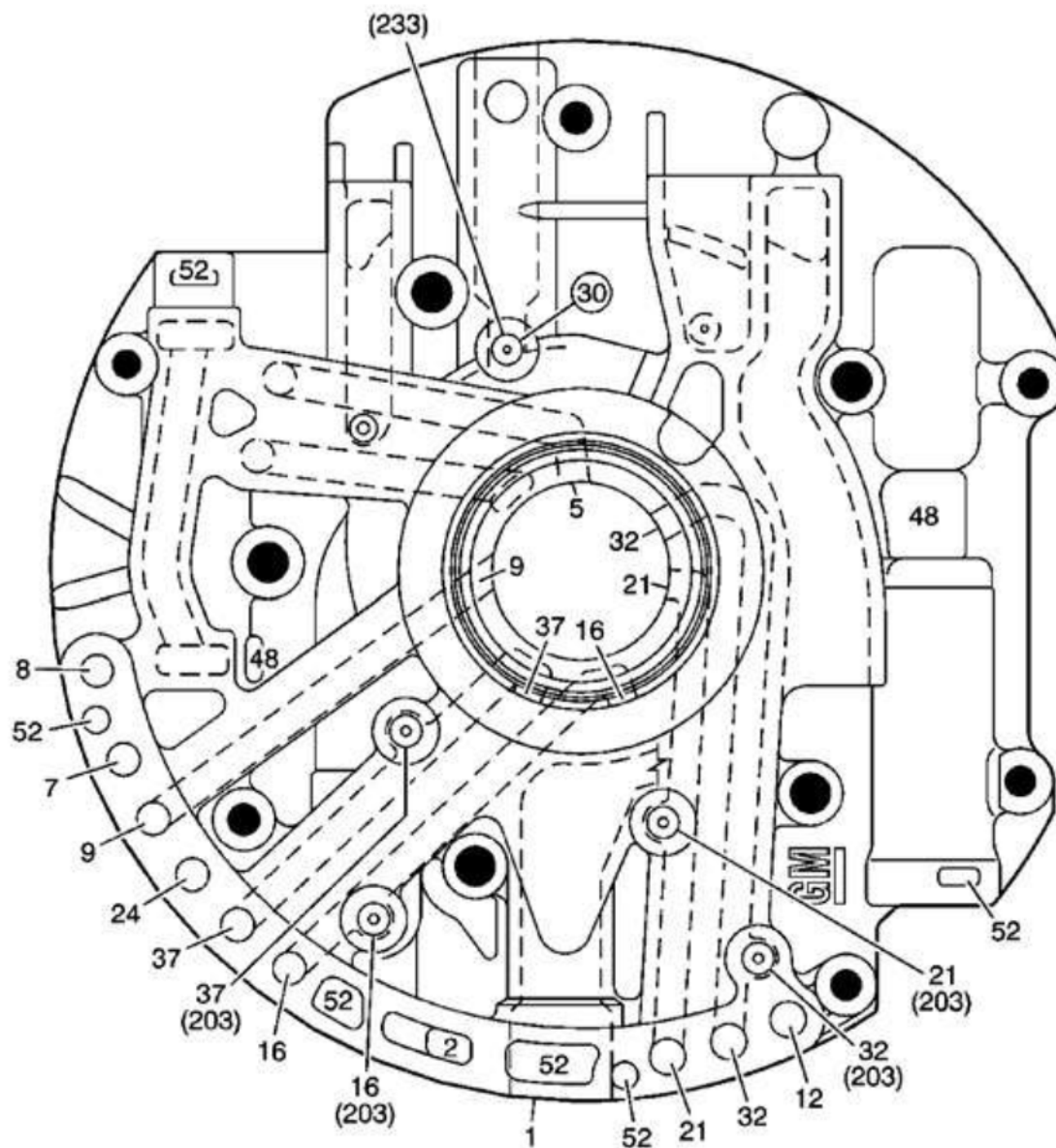


Fig. 294: Fluid Pump Cover - Case Side
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 294

Callout	Component Name
1	Suction
2	Line
5	Release
7	Regulated Apply

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[illegible]

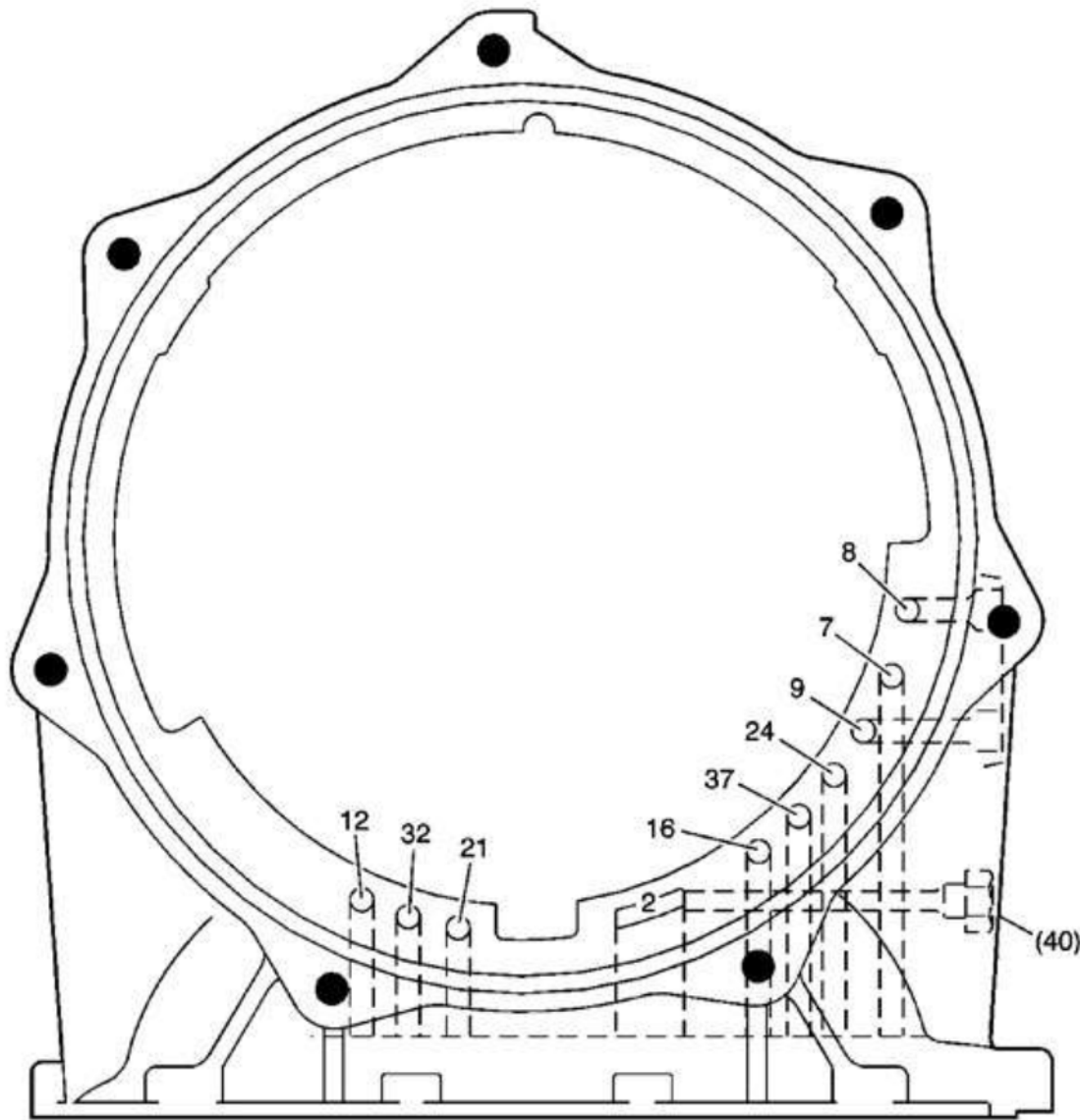


Fig. 295: Case - Fluid Pump Cover Side
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 295

Callout	Component Name
2	Line
7	Regulated Apply
8	To Cooler
9	Lube
12	Throttle Signal

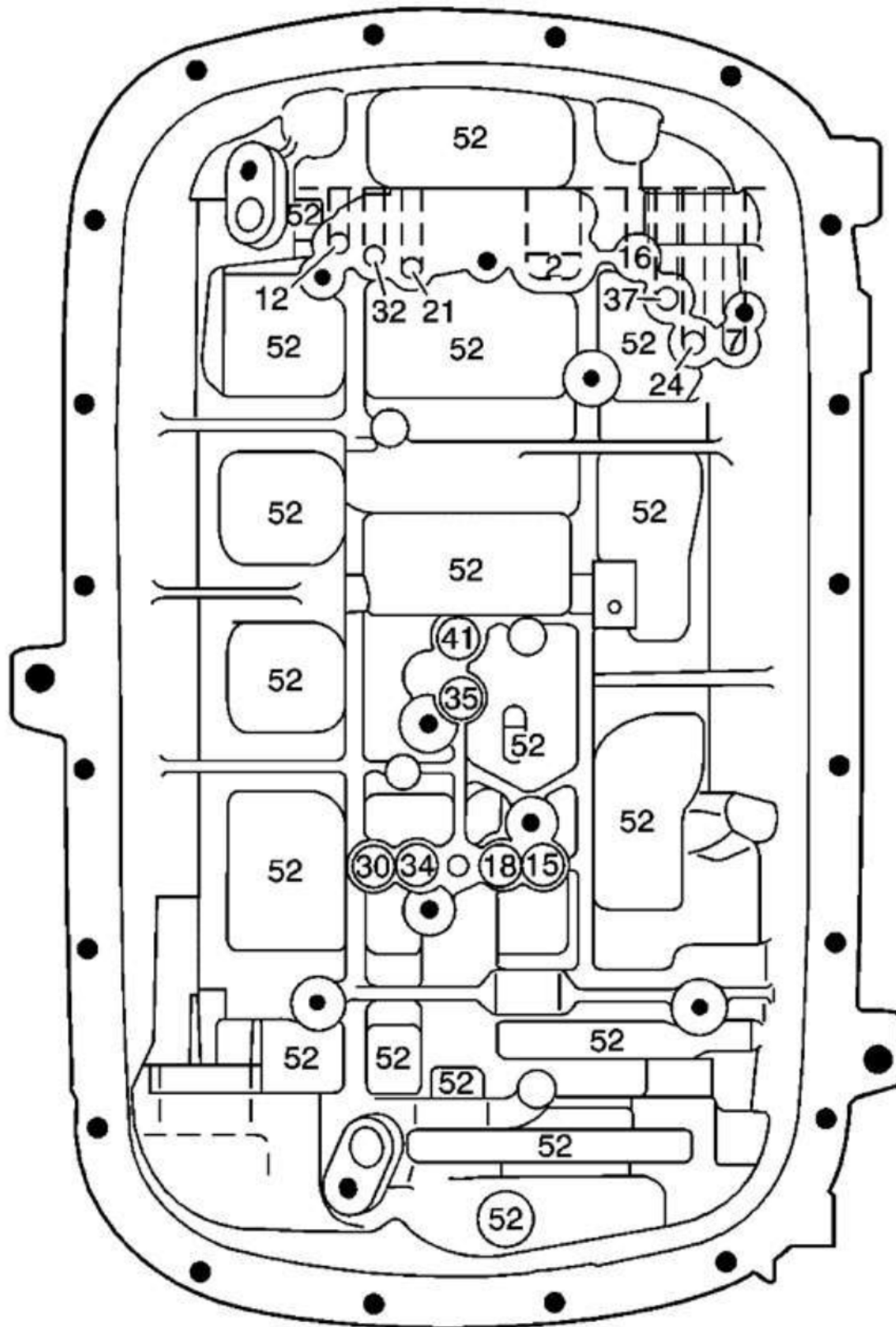
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16	Reverse Clutch
21	Forward Clutch
24	TCC Signal
32	Coast Clutch
37	Direct Clutch

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Fig. 296: Case - Top Channel Plate Side
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 296

[illegible]

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52	Void
52	Void

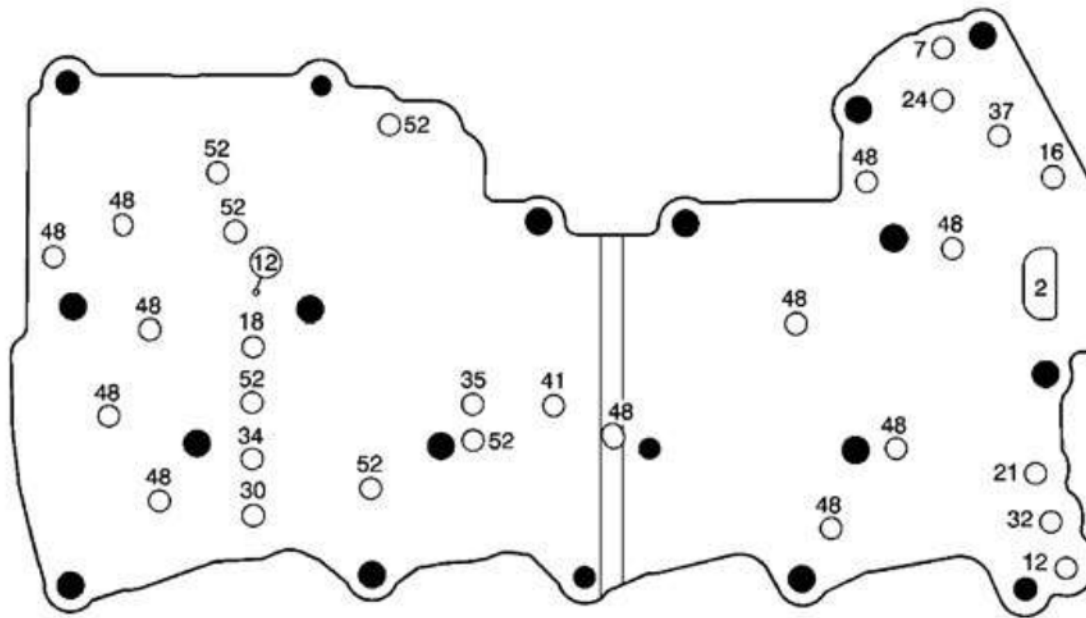


Fig. 297: Top Channel Plate - Case Side
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 297

Callout	Component Name
2	Line
7	Regulated Apply
12	Throttle Signal
16	Reverse Clutch
18	Low and Reverse Clutch or RLO
21	Forward Clutch
24	TCC Signal
30	Second Clutch
32	Coast Clutch
34	Second Coast Clutch
35	Intermediate Clutch
37	Direct Clutch
41	Overdrive Clutch

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48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
52	Void
52	Void
52	Void
52	Void
52	Void
52	Void

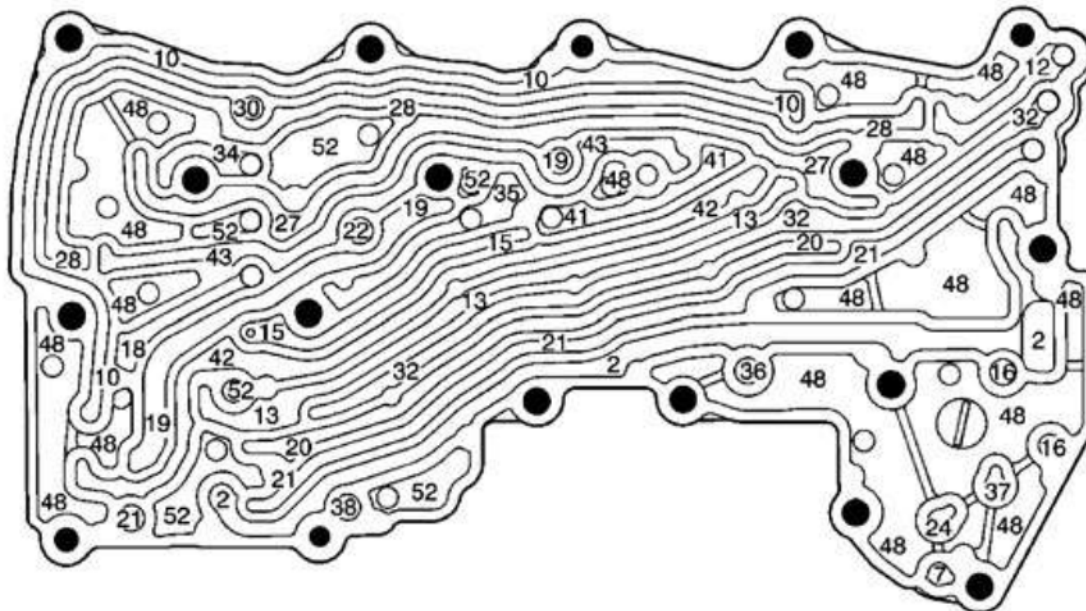


Fig. 298: Top Channel Plate - Bottom Channel Plate Side
Courtesy of GENERAL MOTORS CORP.

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Callouts For Fig. 298

Callout	Component Name
2	Line
2	Line
2	Line
7	Regulated Apply
10	Feed Limit
10	Feed Limit
10	Feed Limit
10	Feed Limit
12	Throttle Signal
13	Line Safety Mode
13	Line Safety Mode
13	Line Safety Mode
15	Reverse Lockout - RLO
15	Reverse Lockout - RLO
16	Reverse Clutch
16	Reverse Clutch
18	Low and Reverse Clutch or RLO
19	D432
19	D432
19	D432
20	123
20	123
21	Forward Clutch
21	Forward Clutch
21	Forward Clutch
21	Forward Clutch
22	2345
24	TCC Signal
27	1-2 Signal
27	1-2 Signal
28	2-3 Signal
28	2-3 Signal
28	2-3 Signal

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30	Second Clutch
32	Coast Clutch
32	Coast Clutch
32	Coast Clutch
34	Second Coast Clutch
35	Intermediate Clutch
36	345
37	Direct Clutch
38	45
41	Overdrive Clutch
41	Overdrive Clutch
42	32
42	32
43	32 Safety Mode
43	32 Safety Mode
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
52	Void
52	Void

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	Void
52	Void
52	Void
52	Void

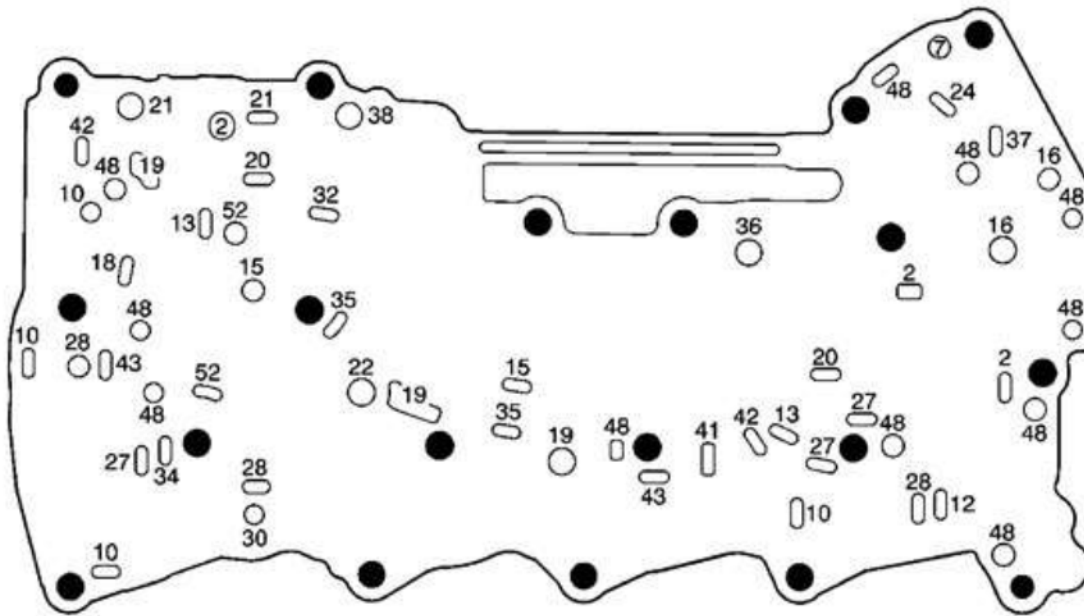


Fig. 299: Bottom Channel Plate - Top Channel Plate Side
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 299

Callout	Component Name
2	Line
2	Line
2	Line
7	Regulated Apply
10	Feed Limit
10	Feed Limit
10	Feed Limit
10	Feed Limit
12	Throttle Signal
13	Line Safety Mode
13	Line Safety Mode

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2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

15	Reverse Lockout - RLO
15	Reverse Lockout - RLO
16	Reverse Clutch
16	Reverse Clutch
18	Low and Reverse Clutch or RLO
19	D432
19	D432
19	D432
20	123
20	123
21	Forward Clutch
21	Forward Clutch
22	2345
24	TCC Signal
27	1-2 Signal
27	1-2 Signal
27	1-2 Signal
28	2-3 Signal
28	2-3 Signal
28	2-3 Signal
30	Second Clutch
32	Coast Clutch
34	Second Coast Clutch
35	Intermediate Clutch
35	Intermediate Clutch
36	345
37	Direct Clutch
38	45
41	Overdrive Clutch
42	32
42	32
43	32 Safety Mode
43	32 Safety Mode
48	Exhaust
48	Exhaust

	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
52	Void
52	Void

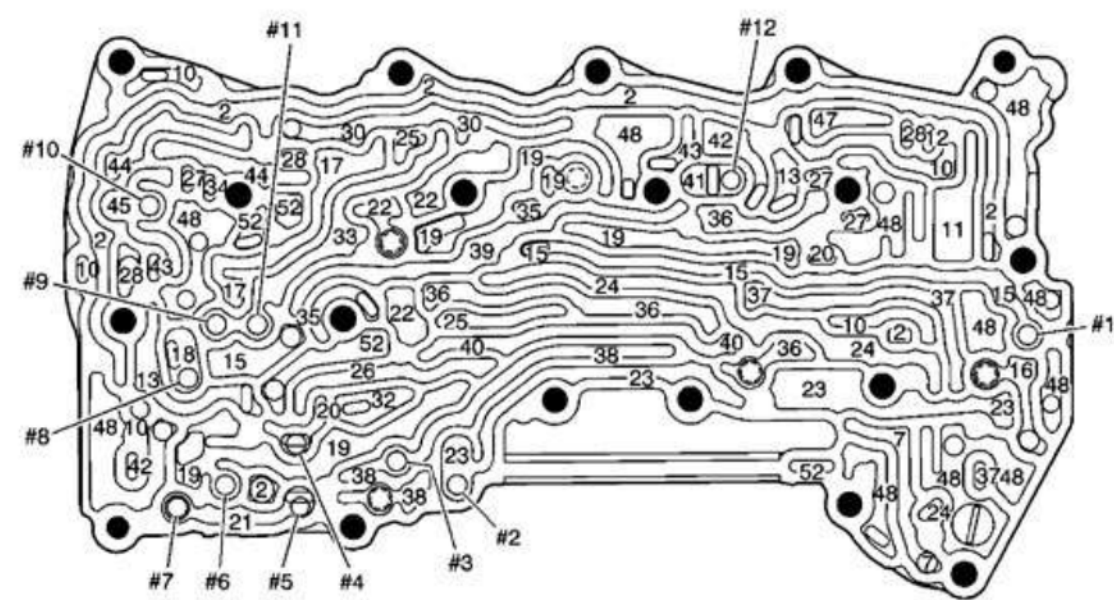


Fig. 300: Bottom Channel Plate - Control Valve Body Side
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 300

Callout	Component Name
2	Line
2	Line
2	Line
2	Line
2	Line

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

2	Line
2	Line
7	Regulated Apply
7	Regulated Apply
10	Feed Limit
10	Feed Limit
10	Feed Limit
10	Feed Limit
10	Feed Limit
11	Filtered Feed Limit
12	Throttle Signal
13	Line Safety Mode
13	Line Safety Mode
15	Reverse Lockout - RLO
15	Reverse Lockout - RLO
15	Reverse Lockout - RLO
15	Reverse Lockout - RLO
16	Reverse Clutch
17	Low and Reverse Clutch
17	Low and Reverse Clutch
18	Low and Reverse Clutch or RLO
19	D432
19	D432
19	D432
19	D432
19	D432
19	D432
19	D432
20	123
20	123
21	Forward Clutch
22	2345
22	2345
22	2345
23	2345 or Reverse

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

	2345 or Reverse
23	2345 or Reverse
23	2345 or Reverse
24	TCC Signal
24	TCC Signal
24	TCC Signal
25	123 Regulated
25	123 Regulated
26	123 Braking
27	1-2 Signal
27	1-2 Signal
27	1-2 Signal
28	2-3 Signal
28	2-3 Signal
28	2-3 Signal
30	Second Clutch
30	Second Clutch
32	Coast Clutch
33	23 Regulated
34	Second Coast Clutch
35	Intermediate Clutch
35	Intermediate Clutch
36	345
36	345
36	345
36	345
37	Direct Clutch
37	Direct Clutch
37	Direct Clutch
38	45
38	45
38	45
39	Overdrive Clutch Feed 1
40	Overdrive Clutch Feed 2
40	Overdrive Clutch Feed 2

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

	Overdrive Clutch
42	32
42	32
43	32 Safety Mode
43	32 Safety Mode
44	FDL
44	FDL
45	32 Safety Model FDL
47	Memory
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
52	Void
52	Void
52	Void
52	Void

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



Callout	Component Name
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
2	Line
7	Regulated Apply
7	Regulated Apply
10	Feed Limit
10	Feed Limit

2004 Cadillac SRX
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

[illegible]

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

	D432
20	123
20	123
20	123
20	123
20	123
21	Forward Clutch
21	Forward Clutch
21	Forward Clutch
21	Forward Clutch
21	Forward Clutch
22	2345
22	2345
22	2345
22	2345
22	2345
22	2345
22	2345
23	2345 or Reverse
23	2345 or Reverse
23	2345 or Reverse
23	2345 or Reverse
23	2345 or Reverse
24	TCC Signal
24	TCC Signal
24	TCC Signal
25	123 Regulated
25	123 Regulated
25	123 Regulated
25	123 Regulated
25	123 Regulated
26	123 Braking
26	123 Braking
27	1-2 Signal
27	1-2 Signal

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

	1-2 Signal
28	2-3 Signal
28	2-3 Signal
28	2-3 Signal
30	Second Clutch
30	Second Clutch
30	Second Clutch
30	Second Clutch
31	Coast Clutch Feed
31	Coast Clutch Feed
32	Coast Clutch
33	23 Regulated
33	23 Regulated
33	23 Regulated
33	23 Regulated
33	23 Regulated
34	Second Coast Clutch
35	Intermediate Clutch
35	Intermediate Clutch
35	Intermediate Clutch
35	Intermediate Clutch
36	345
36	345
36	345
36	345
36	345
36	345
37	Direct Clutch
37	Direct Clutch
37	Direct Clutch
37	Direct Clutch
38	45
38	45
38	45
38	45

2004 Cadillac SRX
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

[illegible]

2004 Cadillac SRX
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

2004 Cadillac SRX
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

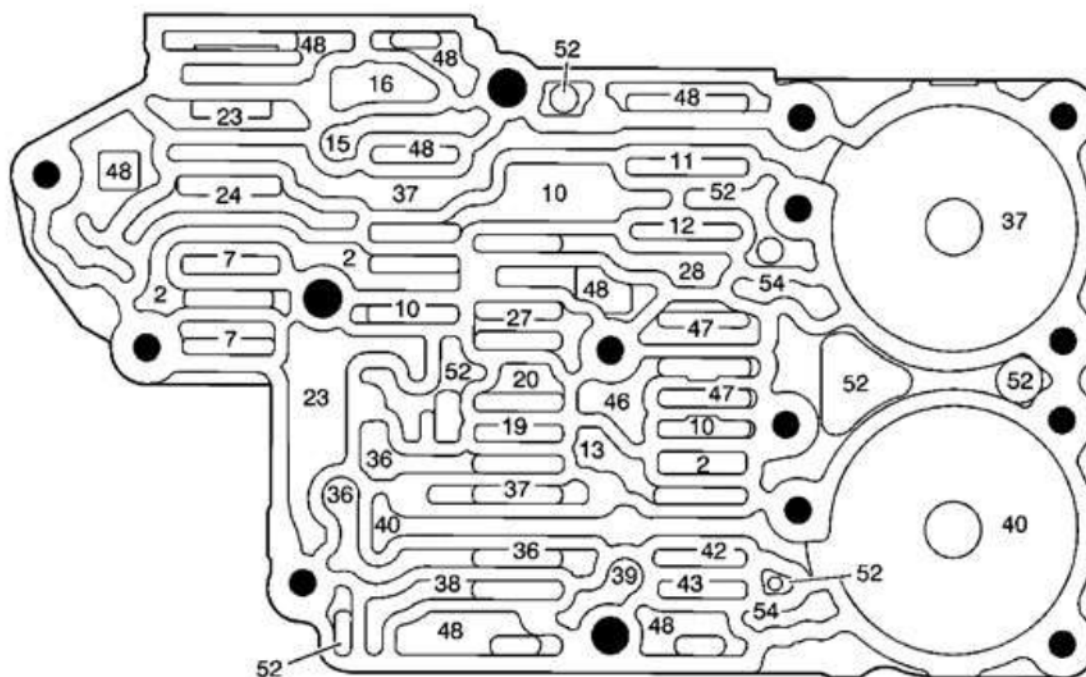
[illegible]

Fig. 302: Front Control Valve Body - Bottom Channel Plate Side

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

Courtesy of GENERAL MOTORS CORP.**Callouts For Fig. 302**

Callout	Component Name
2	Line
2	Line
2	Line
7	Regulated Apply
7	Regulated Apply
10	Feed Limit
10	Feed Limit
10	Feed Limit
11	Filtered Feed Limit
12	Throttle Signal
13	Line Safety Mode
15	Reverse Lockout - RLO
16	Reverse Clutch
19	D432
20	123
23	2345 or Reverse
23	2345 or Reverse
24	TCC Signal
27	1-2 Signal
28	2-3 Signal
36	345
36	345
36	345
37	Direct Clutch
37	Direct Clutch
37	Direct Clutch
38	45
39	Overdrive Clutch Feed 1
40	Overdrive Clutch Feed 2
40	Overdrive Clutch Feed 2
42	32

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

43	32 Safety Mode
46	Memory Pilot
47	Memory
47	Memory
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
48	Exhaust
52	Void
52	Void
52	Void
52	Void
52	Void
52	Void
52	Void
54	Accumulator
54	Accumulator

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

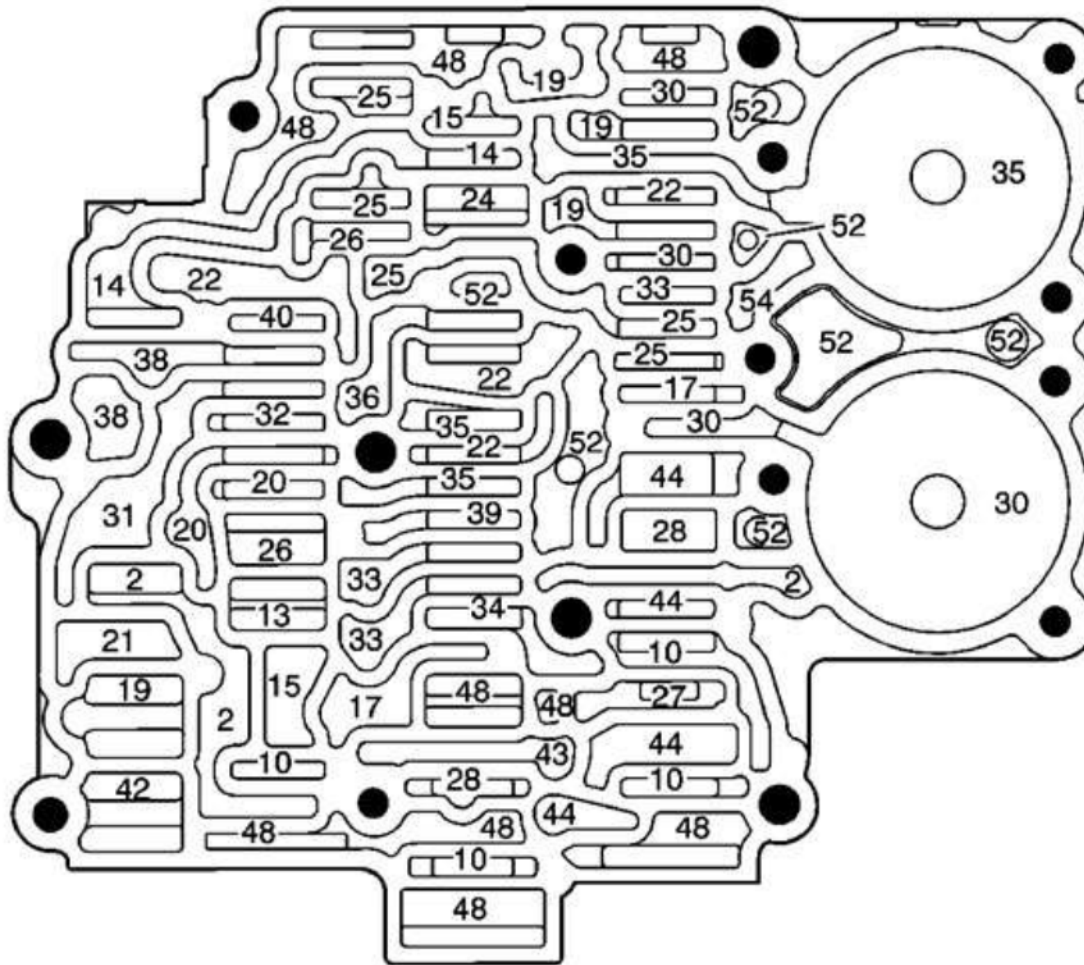


Fig. 303: Rear Control Valve Body - Bottom Channel Plate Side
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 303

Callout	Component Name
2	Line
2	Line
2	Line
10	Feed Limit
10	Feed Limit
10	Feed Limit
10	Feed Limit
13	Line Safety Mode
14	Reverse

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

14	Reverse
15	Reverse Lockout - RLO
15	Reverse Lockout - RLO
17	Low and Reverse Clutch
17	Low and Reverse Clutch
19	D432
19	D432
19	D432
19	D432
20	123
20	123
21	Forward Clutch
22	2345
22	2345
22	2345
22	2345
24	TCC Signal
25	123 Regulated
25	123 Regulated
25	123 Regulated
25	123 Regulated
25	123 Regulated
26	123 Braking
26	123 Braking
27	1-2 Signal
28	2-3 Signal
28	2-3 Signal
30	Second Clutch
30	Second Clutch
30	Second Clutch
30	Second Clutch
31	Coast Clutch Feed
32	Coast Clutch
33	23 Regulated
33	23 Regulated

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

[illegible]

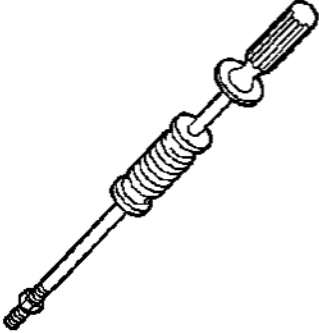
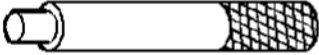
2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

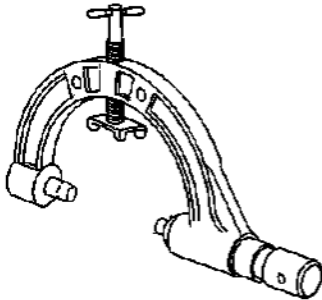
Special Tools

Illustration	Tool Number/Description
	J 6125-1B Slide Hammer Adapter
	J7079-2 Universal Driver Handle
	J 8092 Universal Driver Handle
	J 8763-02

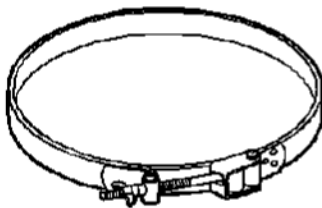
2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E

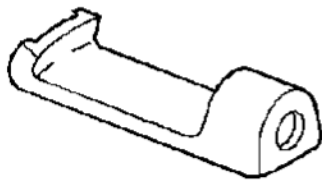
Holding Fixture and Base



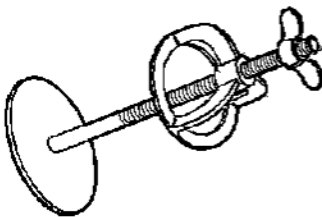
J 21368
Pump Body Cover Alignment Band



J 23129
Universal Seal Remover



J 23327
Clutch Spring Compressor

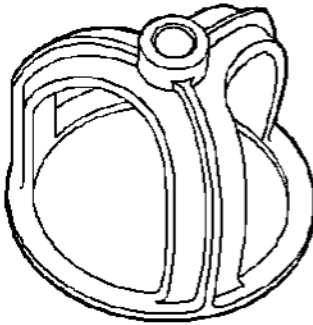


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J 36850
Transjel Lubricant



J 38734
Intermediate Spring Compressor Adapter

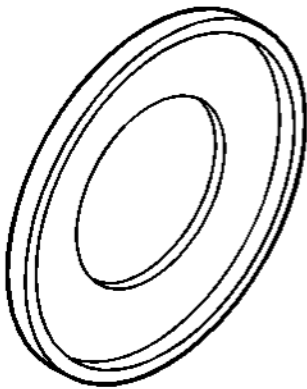
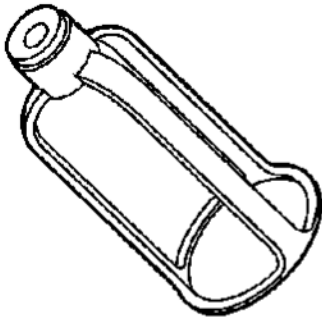


J 39068
Valve Body Guide Pins

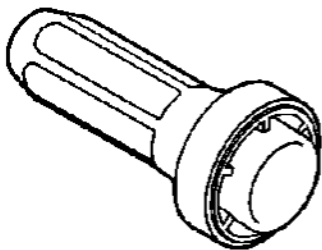
J 43074
Clutch Spring Compressor

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2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



J 44764
Clutch Spring Compressor

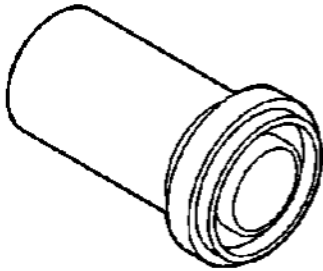


J 44765
Seal Installer

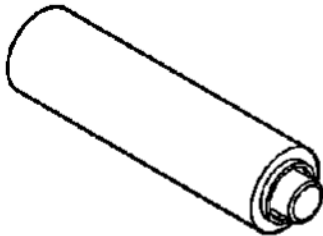
J 44766

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



Seal Installer



J 44767
Seal Installer

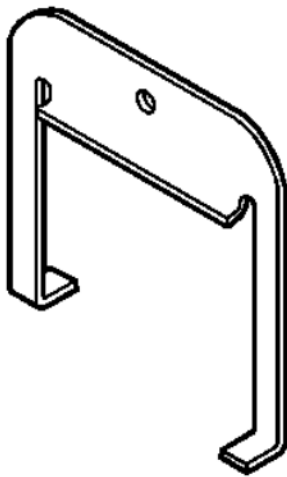
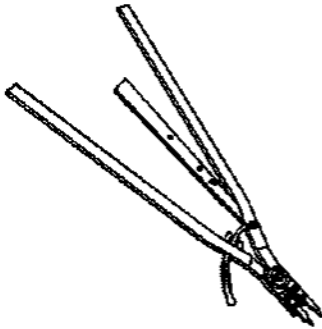


J 45000
Seal Remover

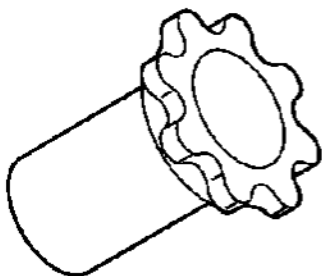
J 45126
Snap Ring Pliers

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



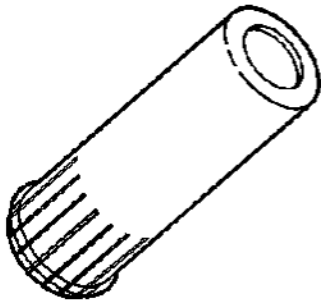
J 45127
Center Support Removal Tool



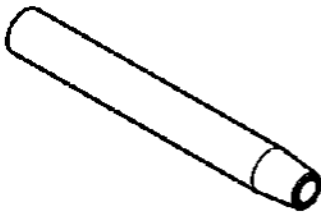
J 45130-1
Seal Installer Sizer

2004 Cadillac SRX

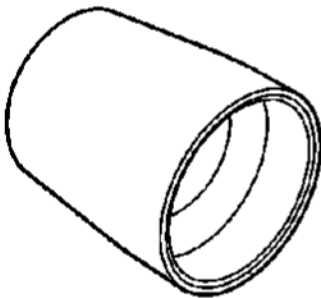
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



J 45130-2
Seal Installer Pusher



J 45130-3
Seal Protector

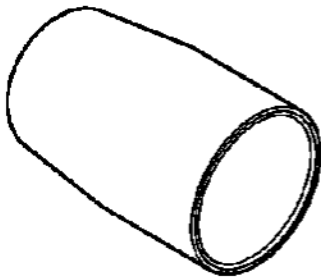
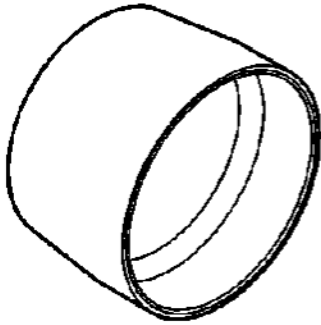


J 45132
Seal Protector

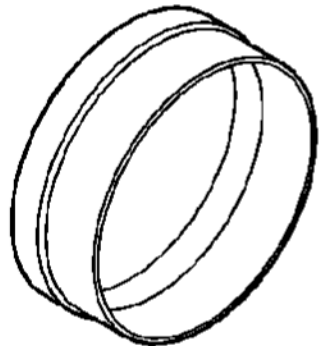
J 45133
Seal Protector

2004 Cadillac SRX

2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



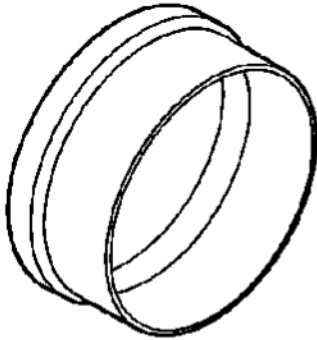
J 45134
Seal Protector



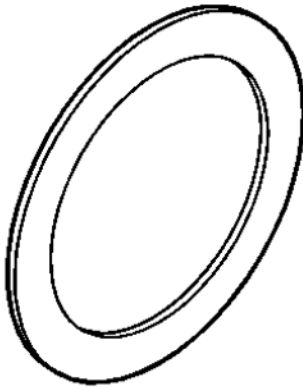
J 45135
Seal Protector

2004 Cadillac SRX

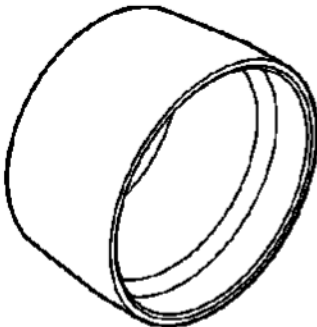
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



J 45136
Seal Protector



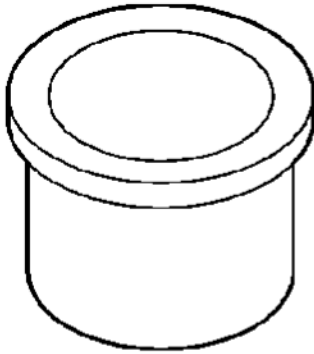
J 45139
Compressor Plate



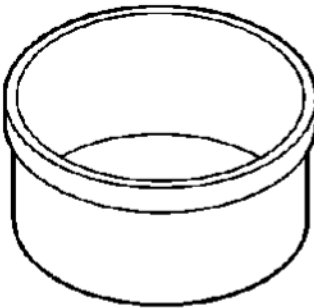
J 45140
Seal Protector

2004 Cadillac SRX

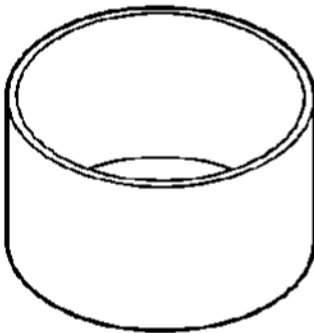
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



J 45688
Piston Installer - Pusher



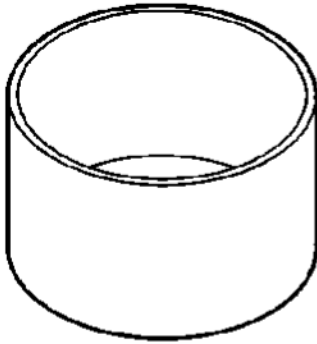
J 46239-1
Second Coast Clutch Outer Protector



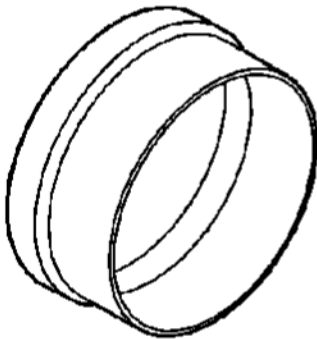
J 46239-2
Second Coast Clutch Inner Protector

2004 Cadillac SRX

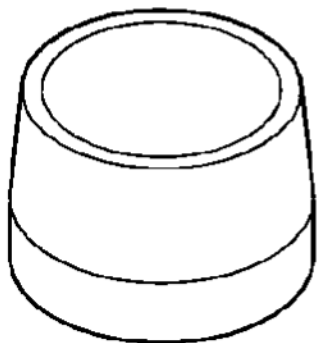
2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



J 46239-3
Second Coast Clutch Pusher



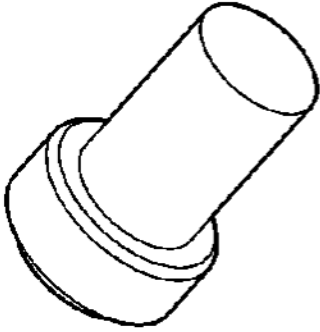
J 46240-1
Seal Protector



J 46240-2
Seal Protector

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2004 TRANSMISSION/TRANSAXLE Automatic Transmission - Overhaul - 5L40-E/5L50-E



J 46741
Seal Protector