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DESCRIPTION OF OPERATION AND POWERFLOW

The new Hydra-matic 6T70/75 (6 Speed) is a fully automatic, six speed, rear wheel drive, electronically controlled transmission (See Figure 3), that features clutch to clutch shifting. It consists primarily of a four element torque converter, three planetary gear sets, five clutch packs, one mechanical one-way clutch and a hydraulic pressurization and control system.

The three planetary gear sets provide the six forward gear ratios and reverse. Changing gear ratios is fully automatic and is accomplished through the use of a Transmission Control Module (TCM) located within the transmission. The TCM receives and monitors various electronic sensor inputs, and uses this information to shift the transmission at the optimum time.

The TCM commands shift solenoids and variable bleed Clutch Pressure Control (CPC) solenoids within the transmission to control shift timing. The TCM controls shift feel through the CPC solenoids. The TCM also controls the apply and release of the torque converter clutch which allows the engine to deliver the maximum fuel efficiency without sacrificing vehicle performance.

The hydraulic system primarily consists of a vane type pump, two control valve bodies, converter housing and case. The pump maintains the working pressures needed to apply the clutch pistons that apply or release the friction components. These friction components, when applied or released, support the shifting qualities of the transmission.

The friction components used in this transmission consist of five multiple disc clutches. The multiple disc clutches combine with one mechanical sprag clutch, to deliver seven different gear ratios through the gearsets that then transfer torque through the output shaft.

Refer to Figure 4 for the component application chart for this transmission.

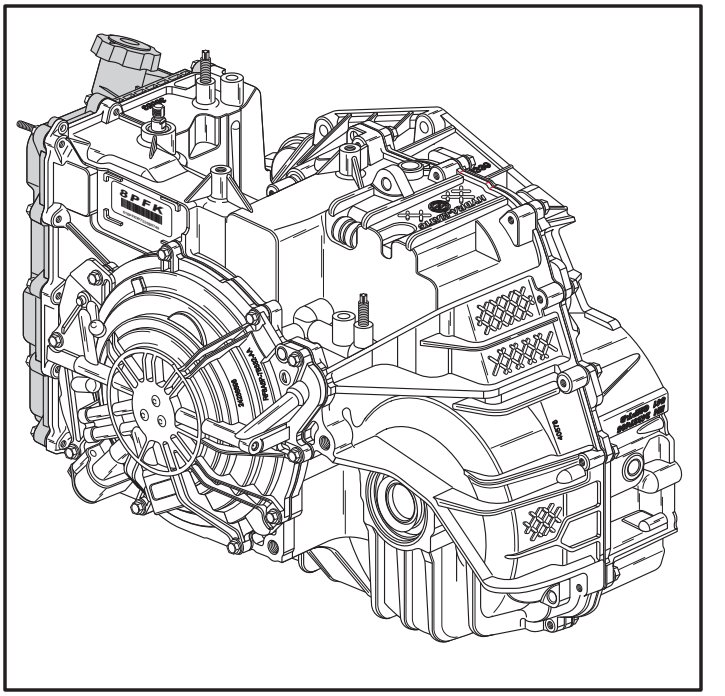


Figure 3

COMPONENT APPLICATION CHART

RANGE	GEAR	RATIO	SHIFT SOL 1 (On/Off)	SHIFT SOL 2 (On/Off)	1-2-3-4CL PC SOL 5 N.L.	2-6 CL PC SOL 4 N.L.	3-5 REV CL PC SOL 2 N.H.	LO/REV 4-5-6 CL PC SOL 3 N.H.	4-5-6 CLUTCH	3-5 REV CLUTCH	2-6 CLUTCH	LO/REV CLUTCH	1-2-3-4 CLUTCH	LOW ONE-WAY CLUTCH
PARK	P		ON	ON	OFF	OFF	ON	OFF				APPLIED*		
REV	R	2.880	ON	OFF	OFF	OFF	OFF	OFF		APPLIED		APPLIED		
NEUT	N		ON	ON	OFF	OFF	OFF	ON				APPLIED*		
DRIVE	1ST BRAKING	4.484	ON	ON	ON	OFF	ON	OFF				APPLIED	APPLIED	
	1ST	4.484	OFF	ON	ON	OFF	ON	ON					APPLIED	HOLD
	2ND	2.872	OFF	ON	ON	ON	ON	ON			APPLIED		APPLIED	
	3RD	1.842	OFF	ON	ON	OFF	OFF	ON		APPLIED			APPLIED	
	4TH	1.414	OFF	ON	ON	OFF	ON	OFF	APPLIED				APPLIED	
	5TH	1.000	OFF	ON	OFF	OFF	OFF	OFF	APPLIED	APPLIED				
	6TH	0.742	OFF	ON	OFF	ON	ON	OFF	APPLIED		APPLIED			

* APPLIED WITH NO LOAD

Figure 4

ELECTRONIC COMPONENTS (CONT'D)

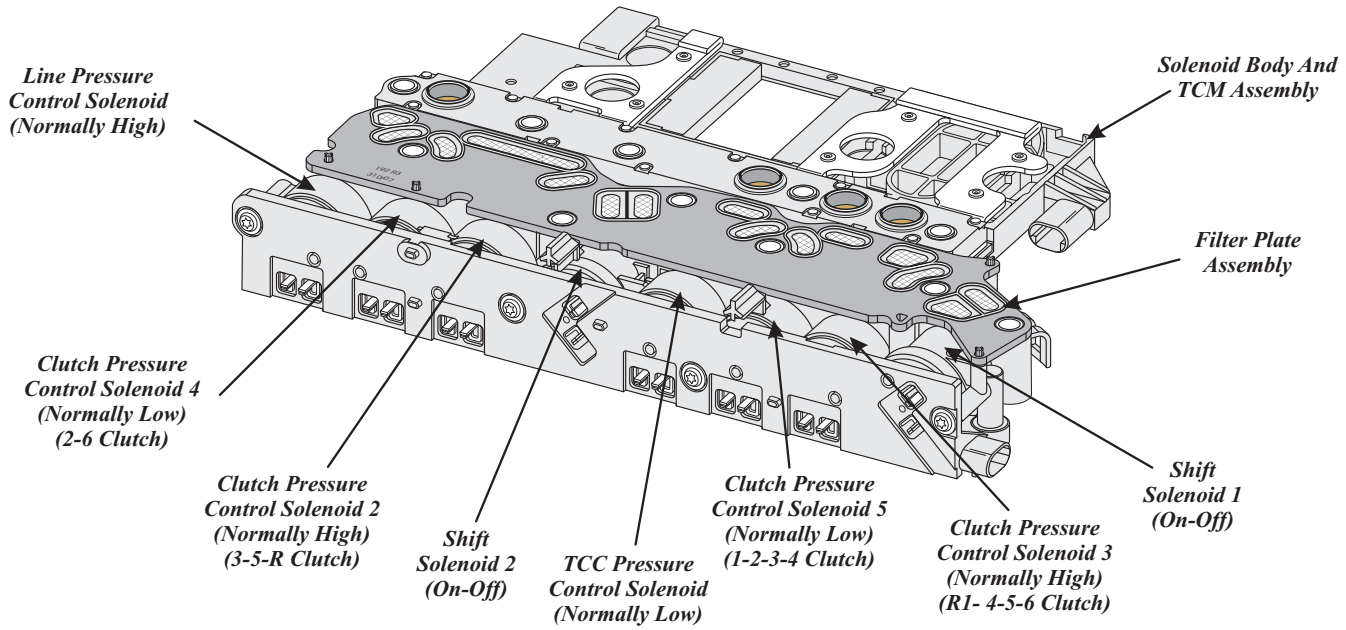
Control Solenoid Body And TCM Assembly

The Solenoid Body & TCM Assembly utilizes a lead frame system to connect the components to the TCM, as shown in Figure 11. There are no wires used for these components. The Control Solenoid Body and TCM Assembly connect to the external harness 20 way connector using a pass-thru sleeve.

All fluid passages to the switches and solenoids are protected from debris by a serviceable filter plate assembly, as shown in Figure 11.

Continued on Page 12

SOLENOID LOCATIONS AND IDENTIFICATION



SOLENOID APPLICATION CHART

RANGE	Shift Sol. 1	Shift Sol. 2	N.L. CPC Sol. 5 1-2-3-4 CL.	N.L. CPC Sol. 4 2-6 CL.	N.H. CPC Sol. 2 3-5 Rev CL.	N.H. CPC Sol. 3 4-5-6, Low/Rev CL.	TCC PC Sol. Torq Conv CL.	LINE PC Sol. Line Pres Cont	GEAR RATIO
Park	ON	ON	OFF	OFF	ON	OFF	OFF	ON**	——
Reverse	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON**	2.880
Neutral	ON	ON	OFF	OFF	ON	OFF	OFF	ON**	——
"D"-1st Braking	ON	ON	ON	OFF	ON	OFF	OFF		4.484
"D"-1st	OFF	ON	ON	OFF	ON	ON	OFF	ON**	4.484
"D"-2nd	OFF	ON	ON	ON	ON	ON	ON*	ON**	2.872
"D"-3rd	OFF	ON	ON	OFF	OFF	ON	ON*	ON**	1.842
"D"-4th	OFF	ON	ON	OFF	ON	OFF	ON*	ON**	1.414
"D"-5th	OFF	ON	OFF	OFF	OFF	OFF	ON*	ON**	1.000
"D"-6th	OFF	ON	OFF	ON	ON	OFF	ON*	ON**	0.742

FOR SHIFT SOLENOIDS 1 AND 2: "ON" = ENERGIZED (PRESSURIZED), "OFF" = DE-ENERGIZED (NO PRESSURE).
FOR CPC SOLENOIDS 2, 3: "ON = NO PRESSURE, "OFF" = PRESSURIZED.
FOR CPC SOLENOIDS 4, 5: "ON = PRESSURIZED, "OFF" = NO PRESSURE.
** TCC IS AVAILABLE IN 2ND THRU 6TH GEAR, BASED ON THROTTLE POSITION, FLUID TEMP AND VEHICLE SPEED.*
*** CONSTANTLY VARIES LINE PRESSURE BASED ON THROTTLE POSITION, FLUID TEMP, AND GEAR STATE.*

Figure 11

ELECTRONIC COMPONENTS (CONT'D)

Torque Converter Clutch (TCC) Solenoid

The Torque Converter Clutch (TCC) Solenoid is a ***"normally-low"amperage***, electronic pressure regulator used to control the apply and release of the torque converter clutch based on current flow through its coil windings. The TCC solenoid regulates actuator feed limit fluid pressure to the TCC regulator valve, located in the upper valve body, and provides a signal pressure to shift the TCC control valve, located in the upper valve body, to the apply position, as shown in Figure 14. When the TCM determines to apply the TCC, the TCC solenoid is commanded to specific pressures, dependent on vehicle operating conditions, resulting in a smooth apply or release of the TCC. The solenoid's ability to "Ramp" the TCC apply and release pressures results in a smoother TCC operation.

When vehicle operating conditions are appropriate to apply the TCC, the TCM increases current flow to allow the TCC solenoid to increase PCS TCC fluid pressure, to move the TCC control valve to the apply position, as shown in Figure 14, and move the TCC regulator valve to the regulating position to regulate fluid pressure proportional to solenoid pressure. Release pressure is directed to exhaust, and regulated apply pressure is directed to the apply side of the converter clutch plate and damper assembly. The TCM then increases the pressure to control a slippage of 20-80 RPM between the clutch plate and converter cover. This "Ramping" procedure for improved dampening of engine vibrations and allows the TCC to apply at low engine speeds in 2nd, 3rd, 4th, 5th and 6th gear.

Release of the TCC is achieved by decreasing TCC solenoid pressure to a level low enough to allow spring force to move the TCC control valve and TCC regulating valve to the release position.

There are also some operating conditions that may prevent or enable TCC apply, such as engine temp, transmission temperature, brake switch activation.

If the TCM detects that the TCC system is stuck ON or OFF, a DTC will be activated.

The TCC Solenoid is part of the Control Solenoid Body And TCM Assembly and is not serviced separately.

Continued on Page 15

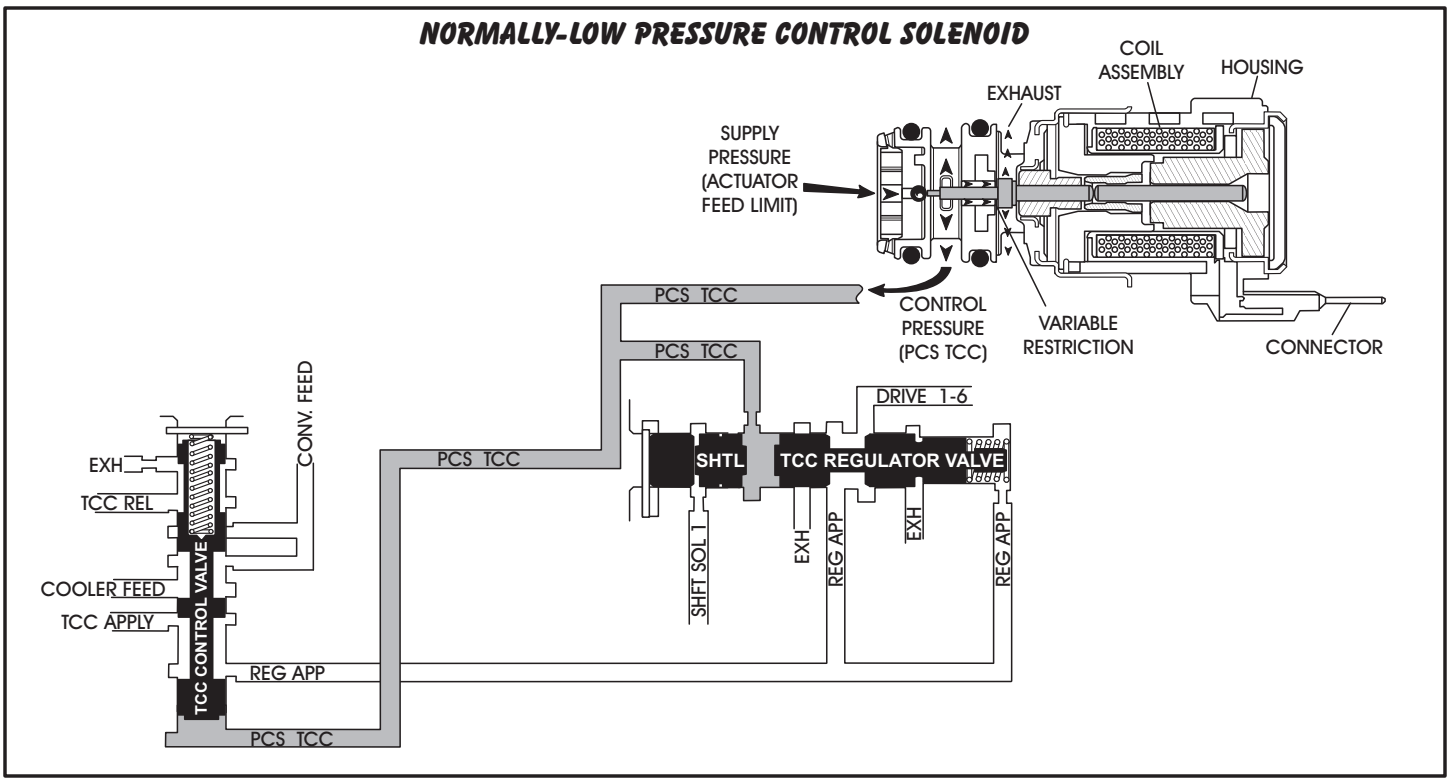


Figure 14

DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION		
DTC	**DESCRIPTION**	**DTC TYPE***
P0218	*Transmission Fluid Over temperature, Over 270°F for 10 minutes.*	C
P0562	*System Voltage Low, 11 volts or less for 10 seconds.*	C
P0563	*System Voltage High, Greater than 18 volts for 12 seconds.*	C
P0601	*TCM (Internal), Read Only Memory (ROM).*	A
P0602	*TCM, Not Programmed.*	A
P0603	*TCM (Internal), Long term memory reset.*	A
P0604	*TCM (Internal), Random Access Memory (RAM).*	A
P0634	*TCM (Internal), Over temperature.*	A
P0667	*TCM (Internal), Temperature Sensor Performance.*	C
P0668	*TCM (Internal), Temperature Sensor circuit voltage low.*	C
P0669	*TCM (Internal), Temperature Sensor circuit voltage high.*	C
P0703	*Brake Switch Circuit, signal is invalid for 4 seconds.*	A
P0711	*Transmission Fluid Temperature (TFT), Sensor performance.*	C
P0712	*Transmission Fluid Temperature (TFT), Sensor circuit voltage low.*	C
P0713	*Transmission Fluid Temperature (TFT), Sensor circuit voltage high.*	C
P0716	*Input Speed Sensor (ISS), Sensor performance.*	A
P0717	*Input Speed Sensor (ISS), Sensor circuit voltage low.*	A
P0719	*Brake Switch Circuit, Circuit voltage low.*	A
P0722	*Output Speed Sensor (OSS), Sensor circuit voltage low.*	A
P0723	*Output Speed Sensor (OSS), Sensor intermittent.*	A
P0724	*Brake Switch Circuit, Circuit voltage high.*	A
P0729	*Incorrect 6th Gear Ratio.*	C
P0731	*Incorrect 1st Gear Ratio.*	A
P0732	*Incorrect 2nd Gear Ratio.*	A
P0733	*Incorrect 3rd Gear Ratio.*	A
P0734	*Incorrect 4th Gear Ratio.*	A
P0735	*Incorrect 5th Gear Ratio.*	A
P0736	*Incorrect Reverse Gear Ratio.*	A
P0741	*Torque Converter Clutch (TCC), System Stuck OFF.*	B
P0742	*Torque Converter Clutch (TCC), System Stuck ON.*	B
P0751	*Shift Solenoid (SS) 1 Valve Performance, Stuck OFF.*	C
P0752	*Shift Solenoid (SS) 1 Valve Performance, Stuck ON.*	A

***DTC TYPES**

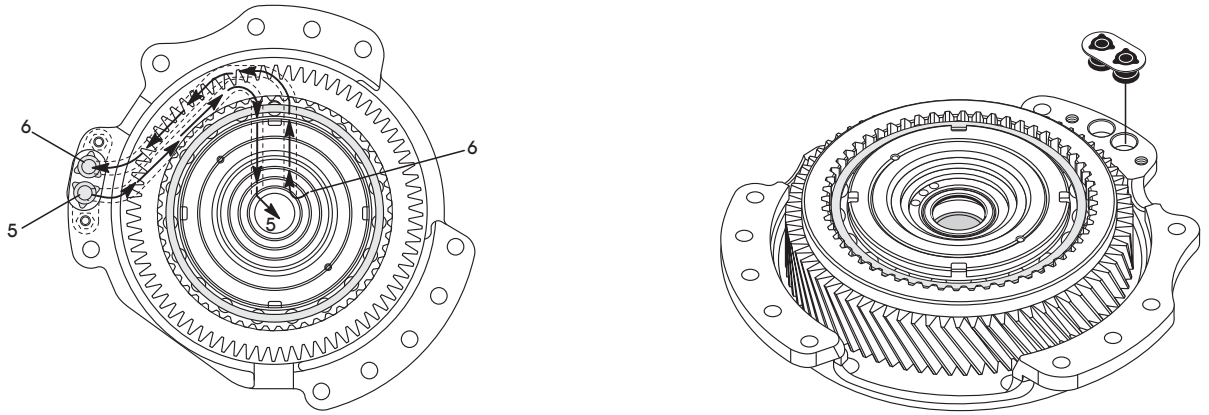
A - Emission-related, turns the MIL "ON" immediately after the 1st failure.

B - Emission-related, turns the MIL "ON" after two consecutive drive cycles with failure.

C - Non-emission-related, no lamps and may display message on driver information center.

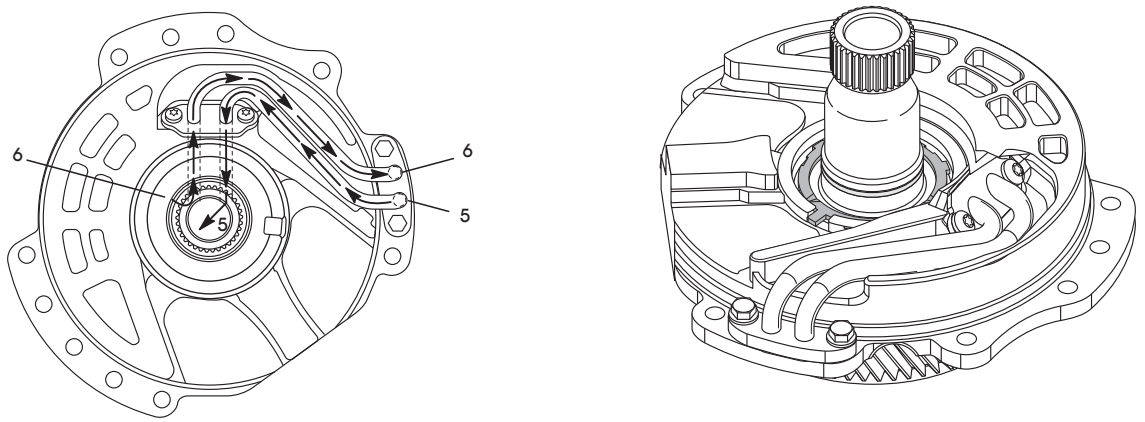
Figure 30

PASSAGE IDENTIFICATION



Transfer Drive Gear Support Assembly (Transmission Case Side)

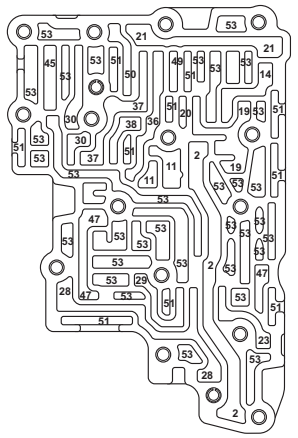
See Figure 37 For Legend



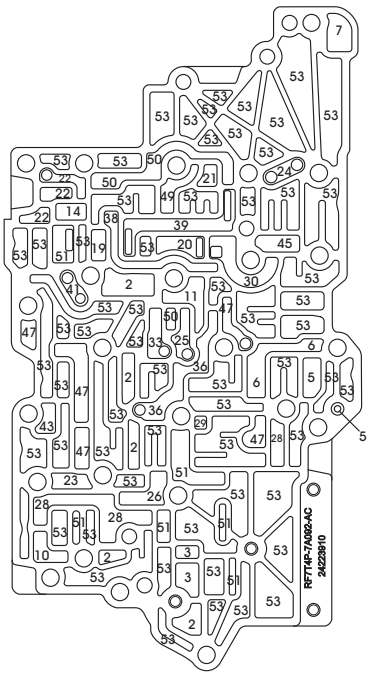
Transfer Drive Gear Support Assembly (Torque Converter Side)

Figure 39

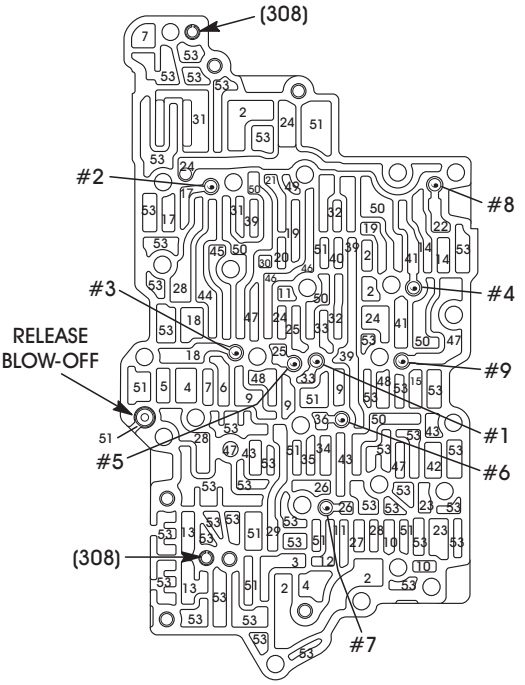
PASSAGE IDENTIFICATION



Lower Valve Body
(Lower Spacer Plate Side)

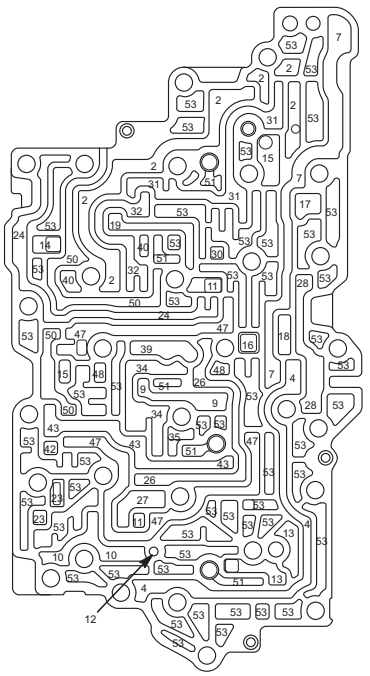


Upper Valve Body
(Lower Spacer Plate Side)

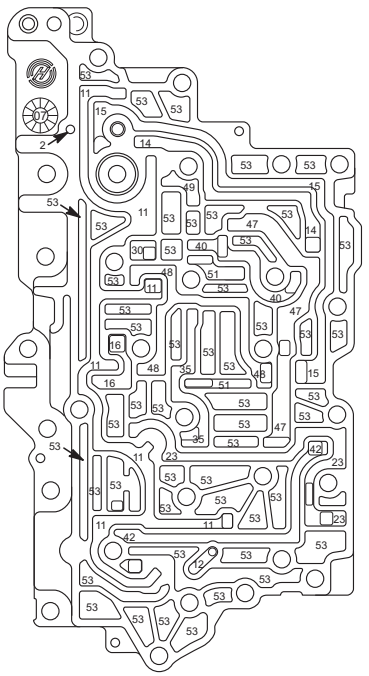


Upper Valve Body
(Upper Spacer Plate Side)

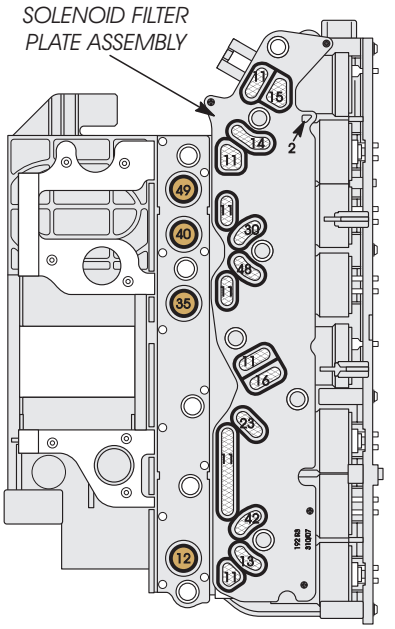
See Figure 37 For Legend



Channel Plate
(Upper Spacer Plate Side)



Channel Plate
(Upper Support Plate Side)



Solenoid Body and TCM
With Filter Plate Assembly
(Upper Support Plate Side)

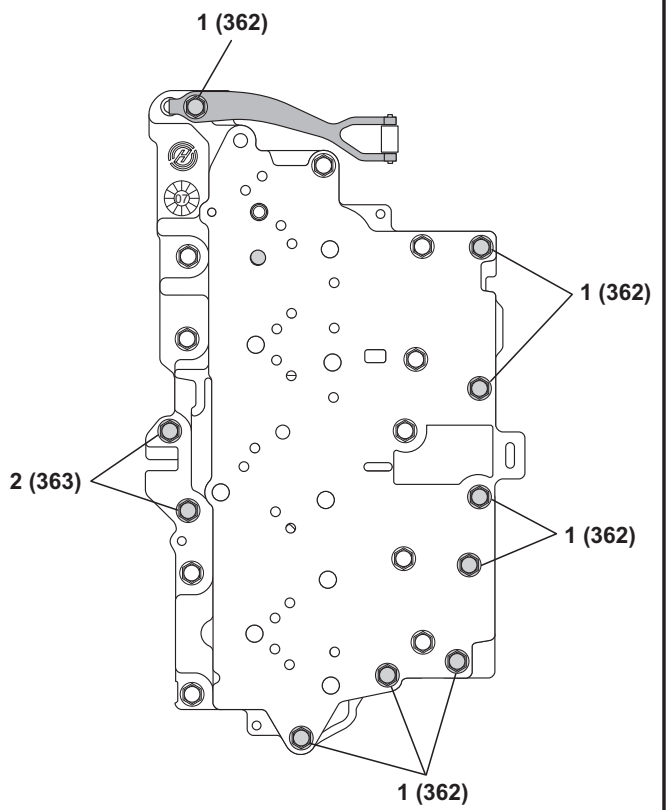
Figure 41

TRANSMISSION DISASSEMBLY (CONT'D)

17. Remove only the valve body retaining bolts that are shown in Figure 50 and 51.
18. Remove the detent spring and roller assembly, as shown in Figure 51.
19. Remove the valve body assembly, as shown in Figure 51.
20. Set the complete valve body assembly aside for the component rebuild section.

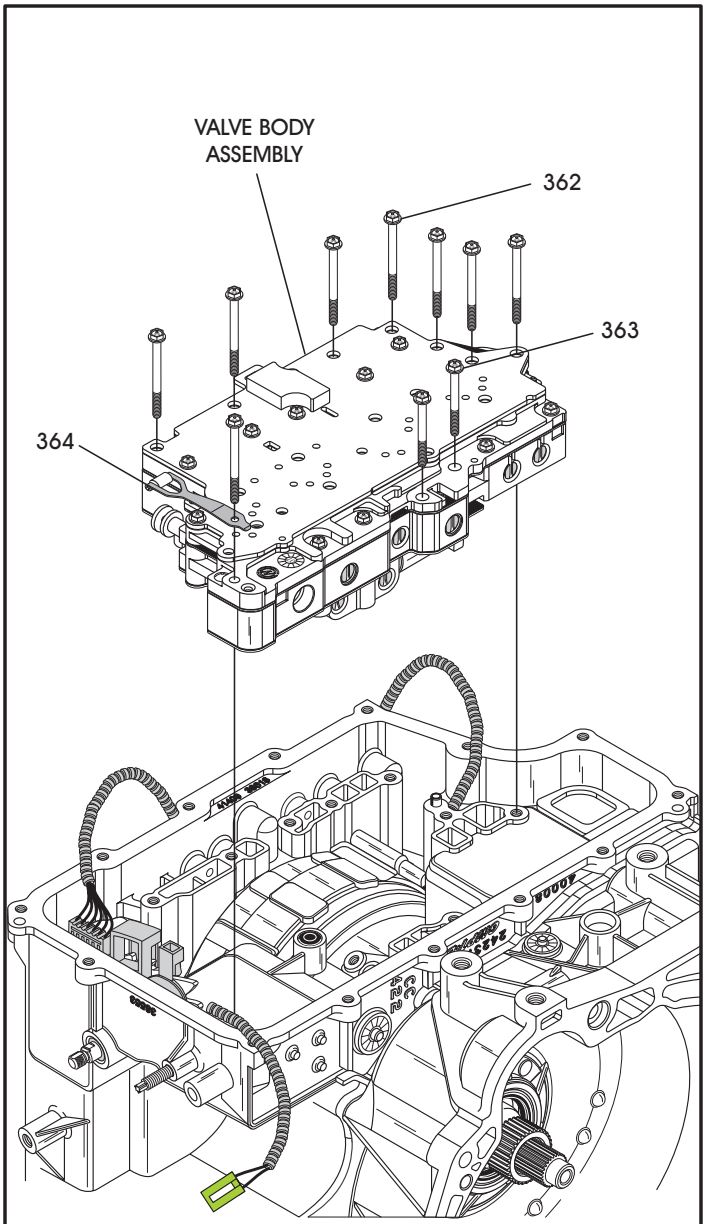
Continued on Page 41

Valve Body Retaining Bolt Identification And Locations



1 VALVE BODY BOLT (362), M6 X 65 (8 REQUIRED).
2 VALVE BODY BOLT (363), M6 X 55 (2 REQUIRED).

Figure 50



362 VALVE BODY BOLT), M6 X 65 (8 REQUIRED).
363 VALVE BODY BOLT), M6 X 55 (2 REQUIRED).
364 DETENT SPRING AND ROLLER ASSEMBLY.

Figure 51

COMPONENT REBUILD

Differential Carrier Assembly

1. Special tools needed for differential and pinion bearing service are shown in Figure 84.
   Note: Bearings on the differential carrier are different between left and right sides.
2. Disassemble the differential carrier assembly using Figure 85 as a guide.
   Note: Keep the conical thrust washer with the gear it is mated to. The conical thrust washers are all selective sizes and it is difficult to identify the proper washer thickness. Recommend marking them when disassembled. If improperly assembled it may cause premature failure of the differential assembly.
3. Inspect the differential assembly, pinion gears and thrust washers for scoring, wear or damage.
   Note: Bearings are the only item serviced. The differential carrier is only serviced as an assembly.

Continued on Page 61

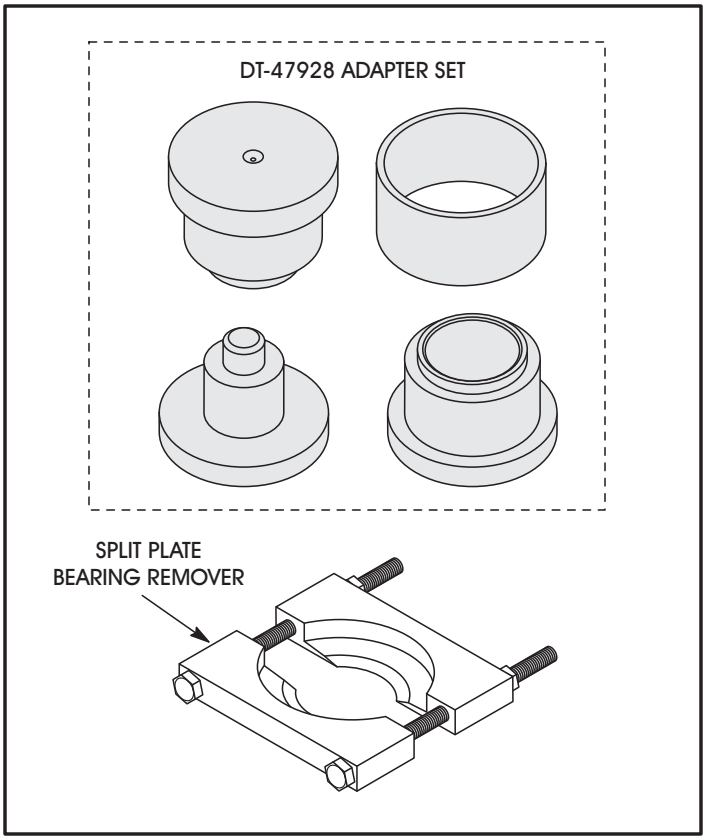
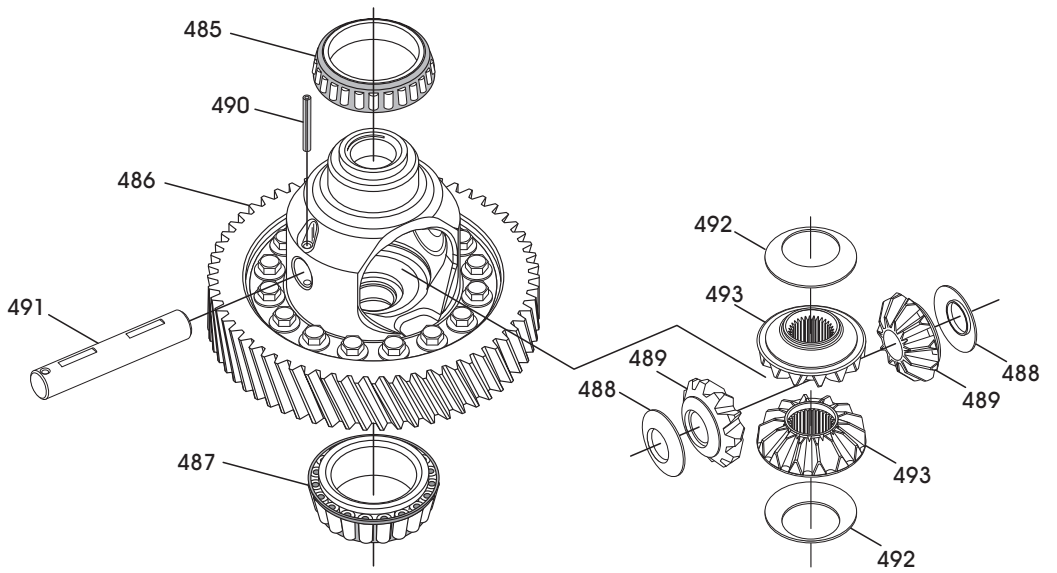


Figure 84

DIFFERENTIAL CARRIER ASSEMBLY, EXPLODED VIEW



485 DIFFERENTIAL CARRIER BEARING (SHORT ROLLERS).
486 DIFFERENTIAL CARRIER ASSEMBLY.
487 DIFFERENTIAL CARRIER BEARING (LONG ROLLERS).
488 DIFFERENTIAL CARRIER PINION GEAR CONICAL THRUST WASHER.
489 DIFFERENTIAL CARRIER PINION GEAR.
490 DIFFERENTIAL CARRIER PINION GEAR SHAFT RETAINER.
491 DIFFERENTIAL CARRIER PINION GEAR SHAFT.
492 DIFFERENTIAL CARRIER SIDE GEAR CONICAL THRUST WASHER.
493 DIFFERENTIAL CARRIER SIDE GEAR.

Figure 85

COMPONENT REBUILD

Torque Converter Housing Assembly (Cont'd)

22. Torque the ten transfer drive gear support bolts to 41 N•m (30 ft. lb.), as shown in Figure 125, using the sequence shown in Figure 125.
23. Set the completed torque converter housing aside for the final assembly process (See Figure 126).

Component Rebuild
Continued on Page 79

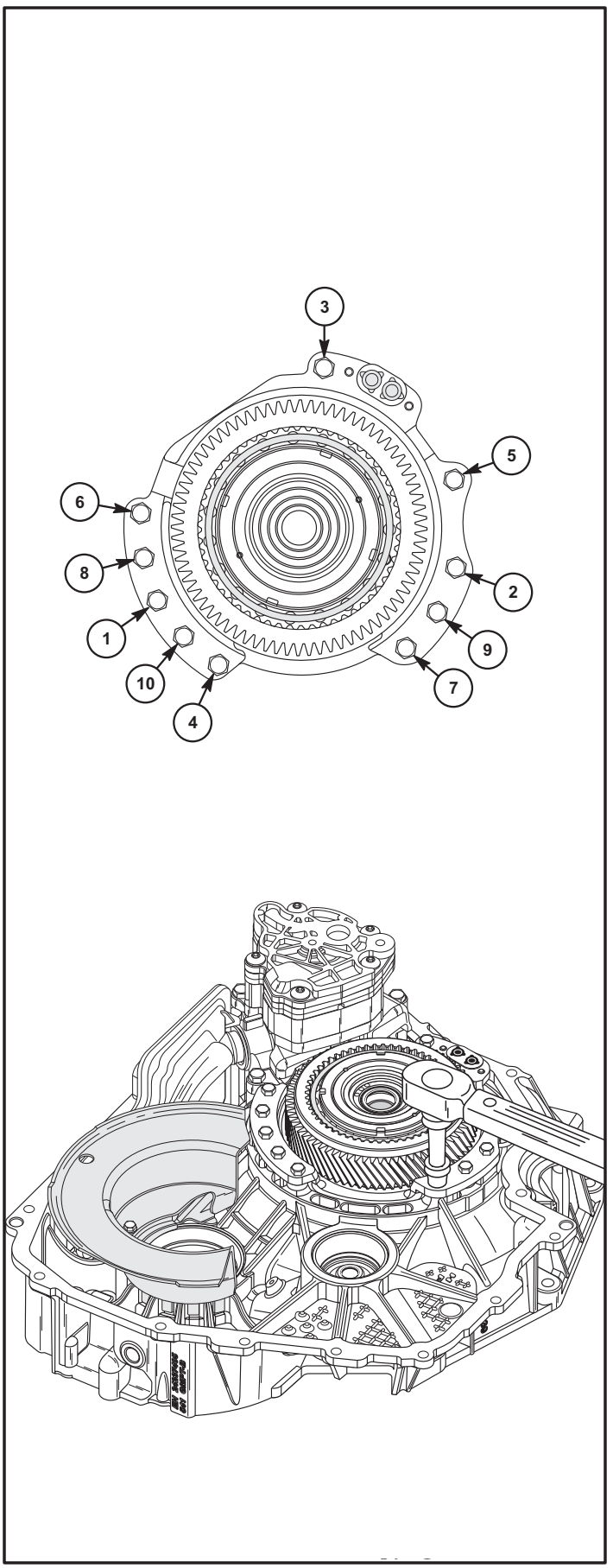


Figure 125

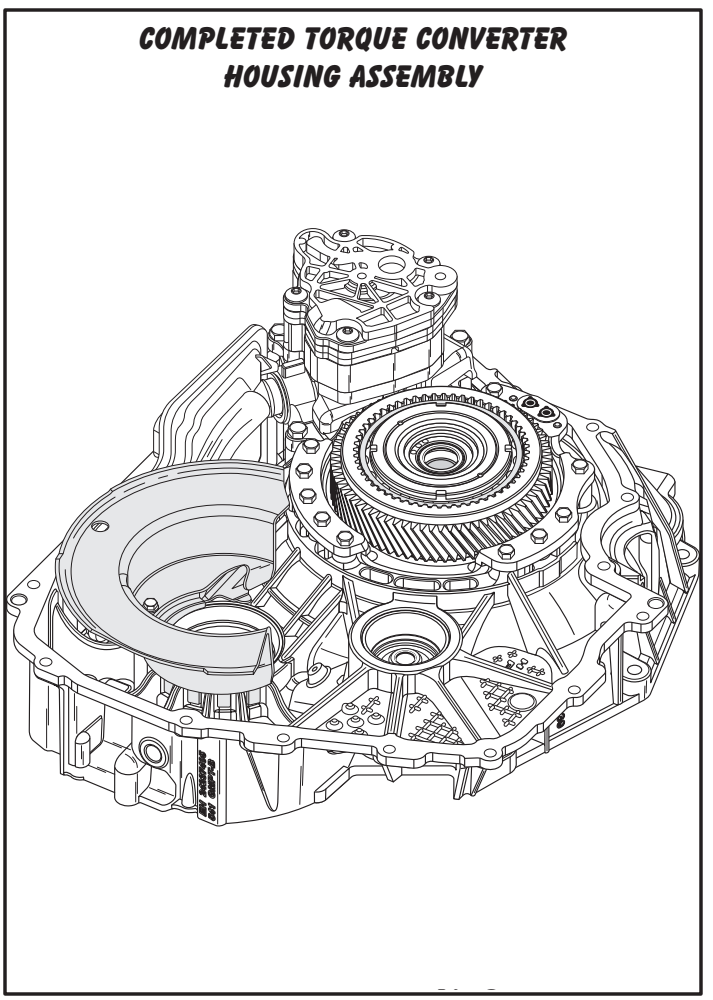


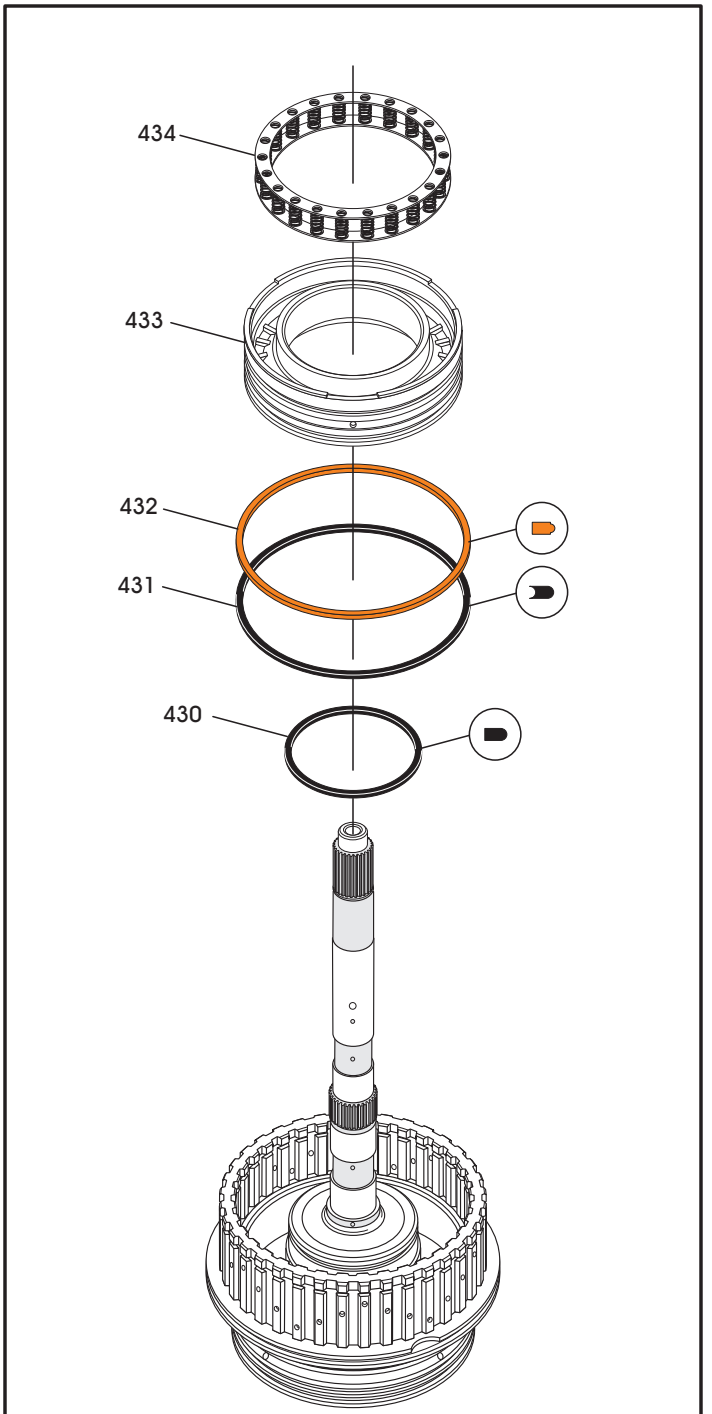
Figure 126

COMPONENT REBUILD

3-5-Rev & 4-5-6 Clutch Housing (Cont'd)

22. Remove the 4-5-6 clutch piston return spring, as shown in Figure 147.
23. Remove the 4-5-6 clutch piston, as shown in Figure 147.
    Note: You can install the housing into the completed rear cover with the number 11 thrust bearing in place, as shown in Figure 148, and carefully apply shop air to the 4-5-6 clutch feed hole to dislodge the piston.
24. Remove and discard the 4-5-6 clutch piston outer seal (Stepped & Orange), as shown in Figure 147.
25. Remove and discard the 4-5-6 clutch piston outer seal (Rounded & Black), as shown in Figure 147.
26. Remove and discard the 4-5-6 clutch piston inner seal from the housing, as shown in Figure 147.

Continued on Page 91



430 4-5-6 CLUTCH PISTON INNER SEAL.
431 4-5-6 CLUTCH PISTON OUTER SEAL (ROUNDED & BLACK).
432 4-5-6 CLUTCH PISTON OUTER SEAL (STEPPED & ORANGE).
433 4-5-6 CLUTCH PISTON.
434 4-5-6 CLUTCH PISTON RETURN SPRING.

Figure 147

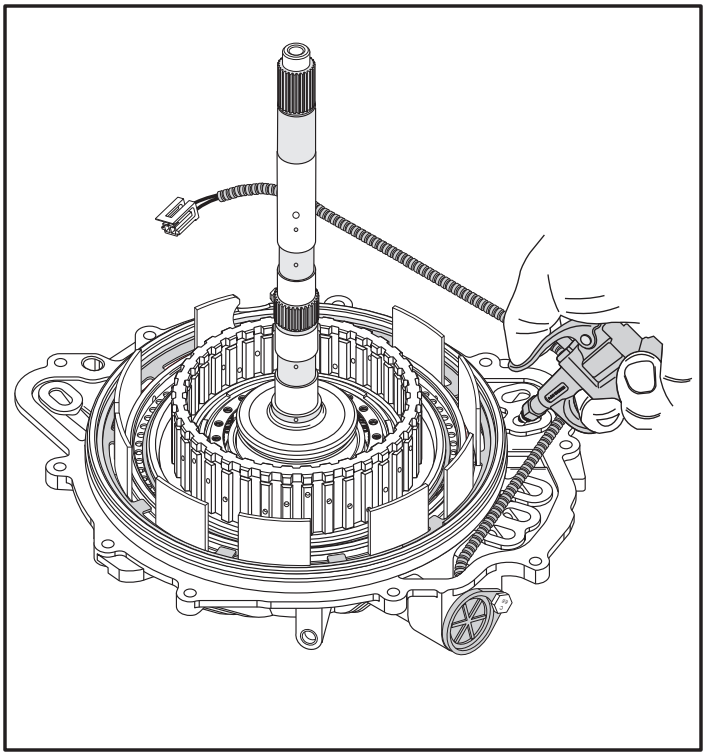


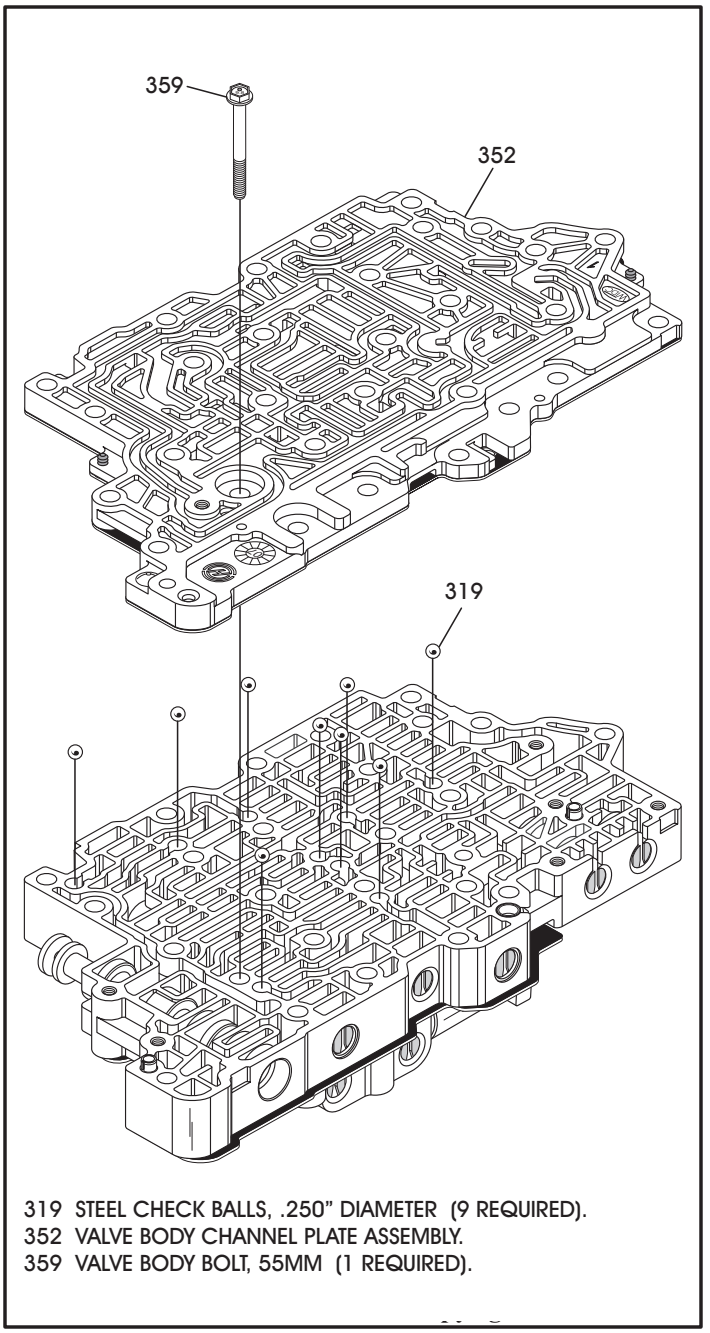
Figure 148

COMPONENT REBUILD

Valve Body Assembly (Cont'd)

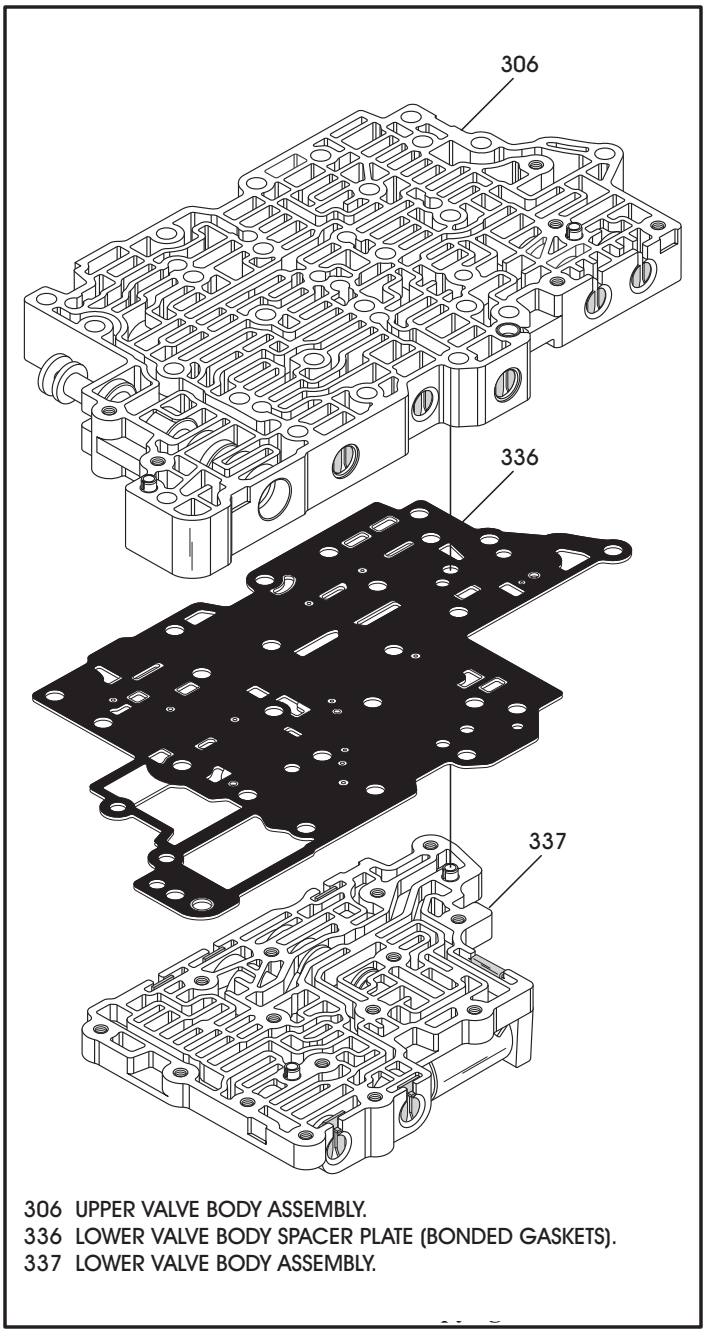
5. Remove one 55 mm bolt that is left, as shown in Figure 172, and remove the valve body channel plate and upper spacer plate assembly.
   Note: Upper spacer plate is held in place on the channel plate with two plastic retainers.
6. Remove the nine 1/4" steel check balls from the upper valve body, as shown in Figure 172.
7. Remove upper valve body assembly, as shown in Figure 173.
8. Remove the lower valve body spacer plate, as shown in Figure 173.

Continued on Page 103



319 STEEL CHECK BALLS, .250" DIAMETER (9 REQUIRED).
352 VALVE BODY CHANNEL PLATE ASSEMBLY.
359 VALVE BODY BOLT, 55MM (1 REQUIRED).

Figure 172



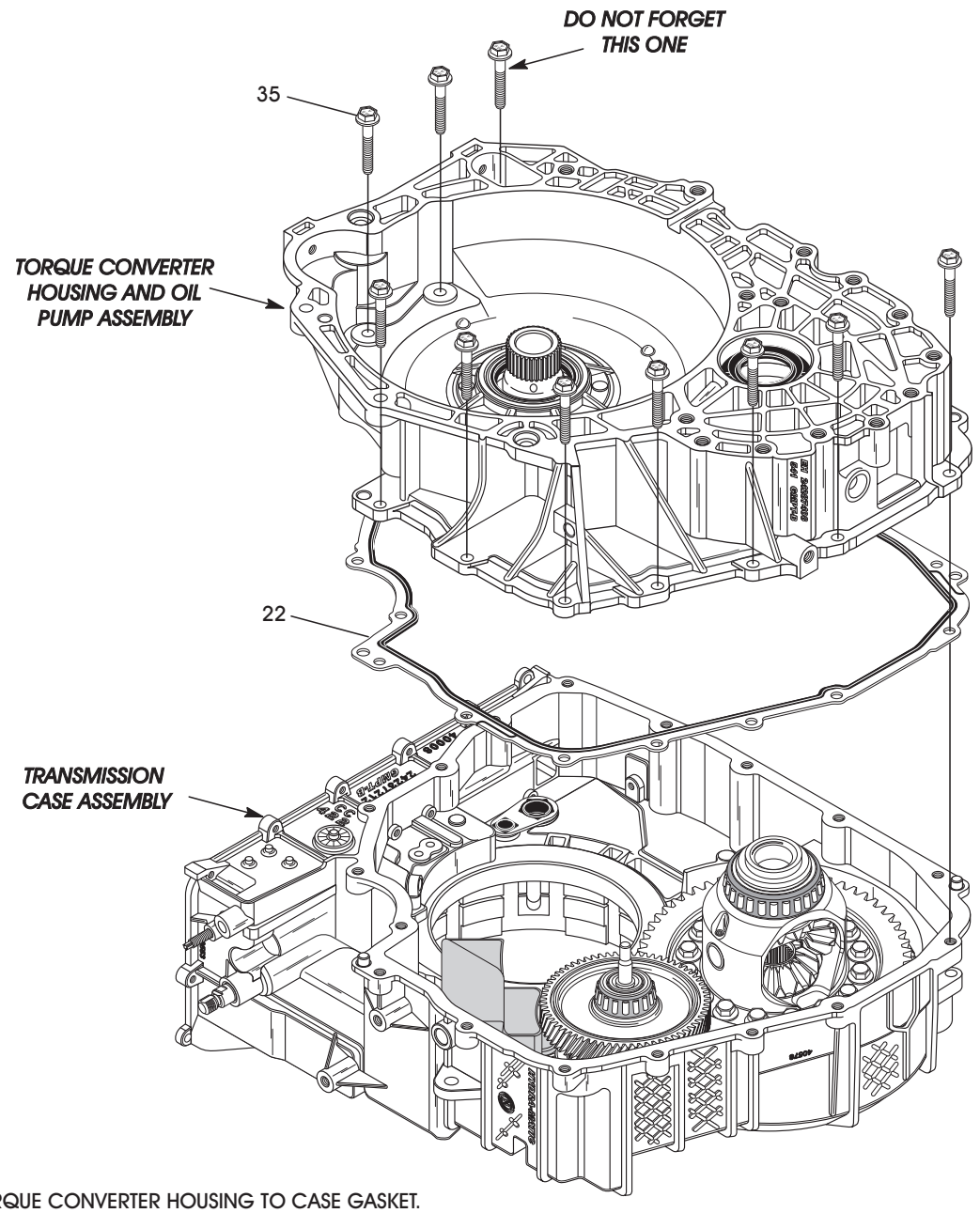
306 UPPER VALVE BODY ASSEMBLY.
336 LOWER VALVE BODY SPACER PLATE (BONDED GASKETS).
337 LOWER VALVE BODY ASSEMBLY.

Figure 173

TRANSMISSION ASSEMBLY (CONT'D)

8. Install new converter housing to case gasket onto the case, as shown in Figure 189, and over the locating dowels.
9. Install previously completed converter housing onto case, as shown in Figure 189, and ensure that it is fully engaged on locating dowels.
10. Install the 17 converter housing to case retaining bolts, as shown in Figure 189.
    Note: Don't forget the semi-hidden bolt.

Continued on Page113



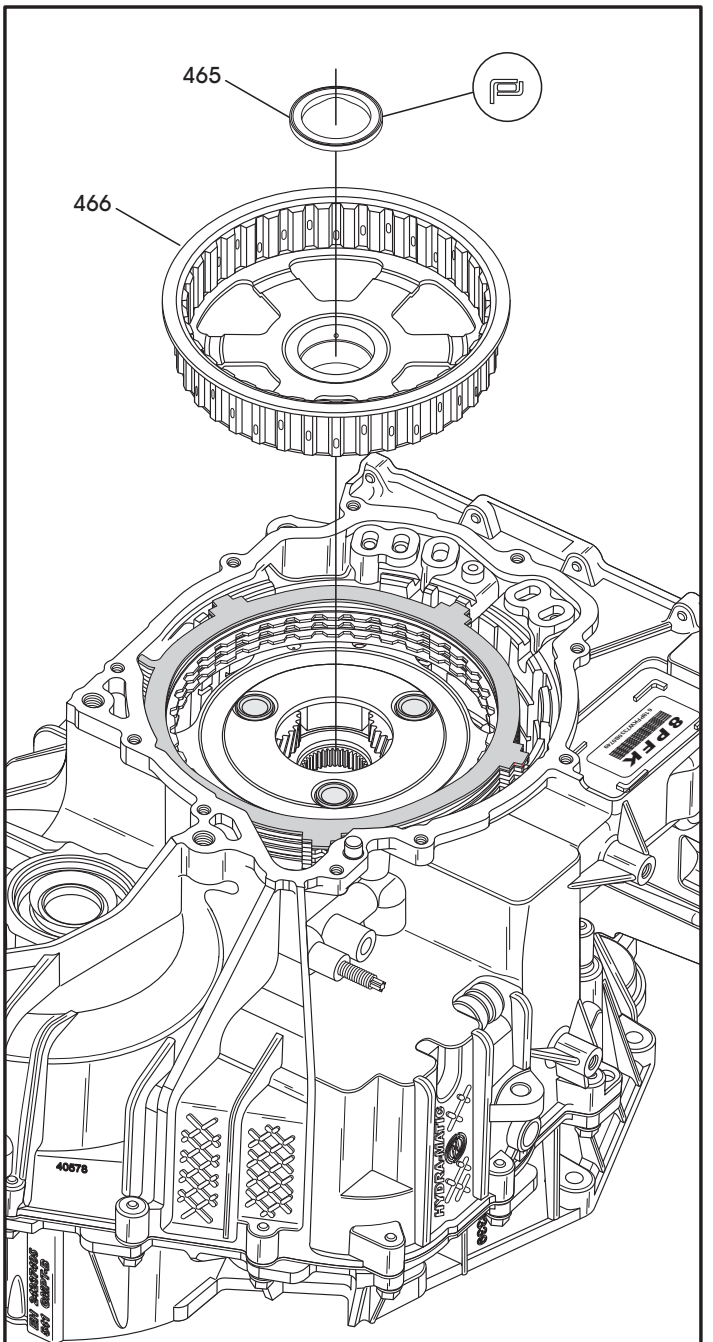
22 TORQUE CONVERTER HOUSING TO CASE GASKET.
35 TORQUE CONVERTER HOUSING TO CASE BOLTS (17 REQ.).

Figure 189

TRANSMISSION ASSEMBLY (CONT'D)

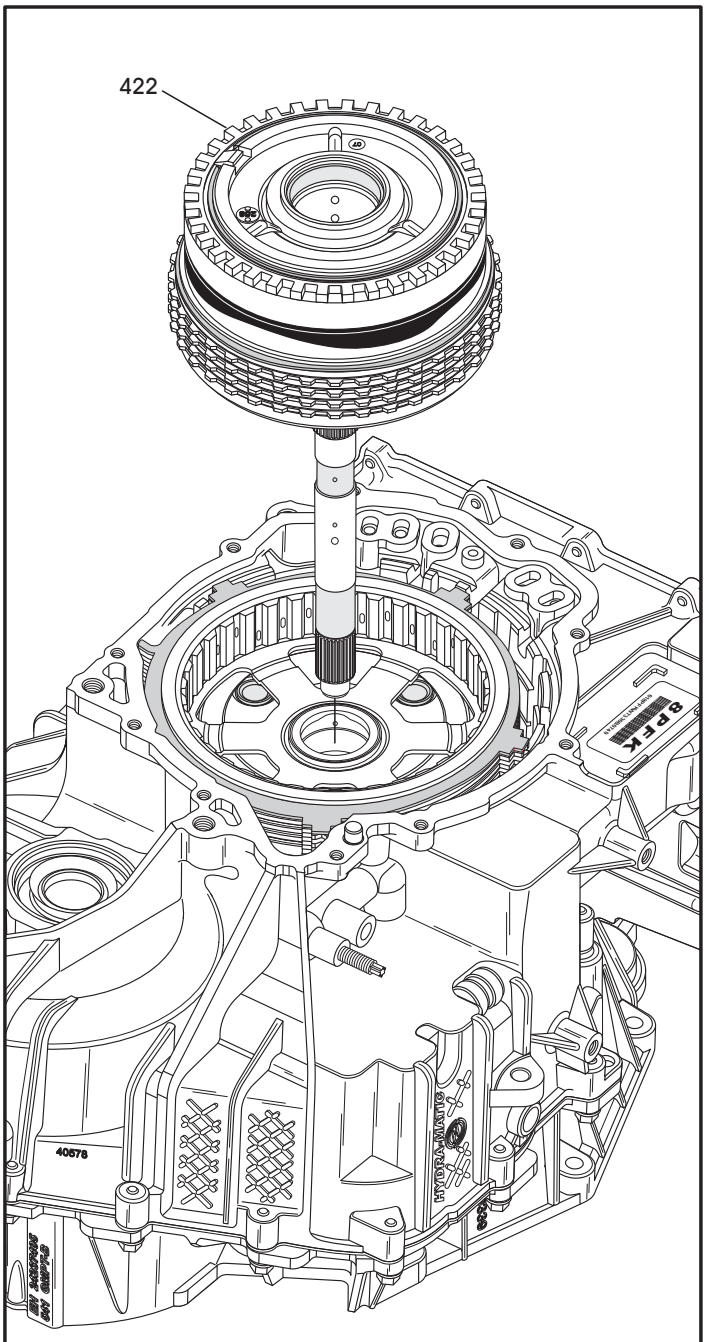
40. Install the reaction sun gear & 2-6 clutch hub assembly, as shown in Figure 206, by rotating back and forth to engage the friction plates until fully seated.
41. Install the number 9 thrust bearing onto the 2-6 clutch hub in direction shown in Figure 206.
42. Install the completed 3-5-Rev & 4-5-6 clutch housing, as shown in Figure 207, by rotating back and forth to engage input sun gear with the input shaft and the 3-5-Rev clutches into the 2-6 clutch hub and ensure it is fully seated.

Continued on Page123



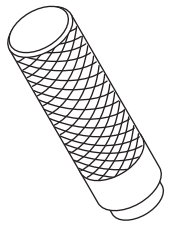
465 NUMBER 9 THRUST BEARING.
466 REACTION SUN GEAR & 2-6 CLUTCH HUB ASSEMBLY.

Figure 206

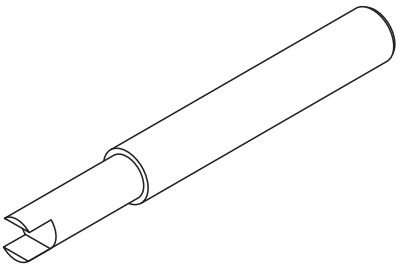


422 3-5-REV & 4-5-6 CLUTCH HOUSING ASSEMBLY.

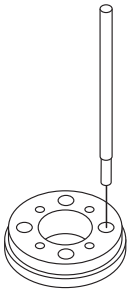
Figure 207



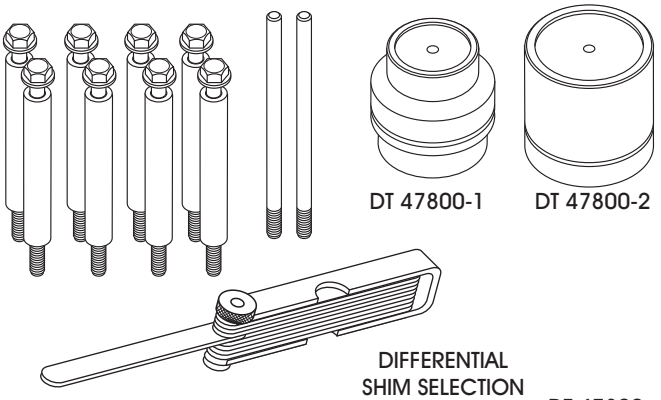
DRIVE SPROCKET SEAL INSTALLER DT 46627 J 46627



DIFFERENTIAL ROTATING TOOL DT 47793

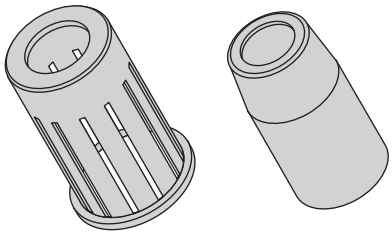


DRIVE SPROCKET SEAL STAKING TOOL DT 49131

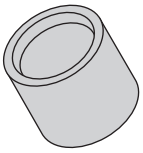


DT 47800-1 DT 47800-2

DIFFERENTIAL SHIM SELECTION GAUGE KIT DT-47800

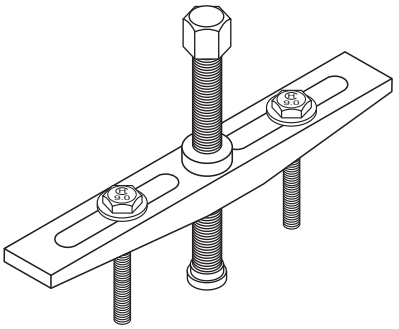


DT-46624 SEAL INSTALLER FOR STATOR SHAFT

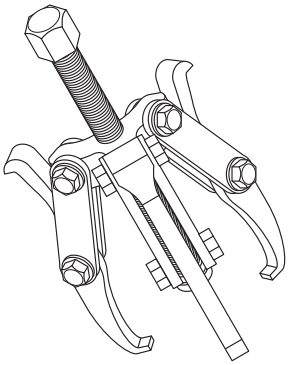


DT 46624-1 SEAL RESIZING TOOL

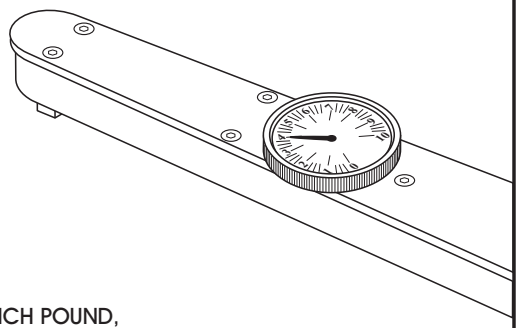
DT 46624 J 46624



UNIVERSAL DIFFERENTIAL LARGE BEARING REMOVER



THREE LEGGED BEARING PULLER DT 41816 J 41816



UNIVERSAL INCH POUND, DIAL TYPE TORQUE WRENCH

Figure 231