FORD 5R110W *(Torqshift)*

INDEX

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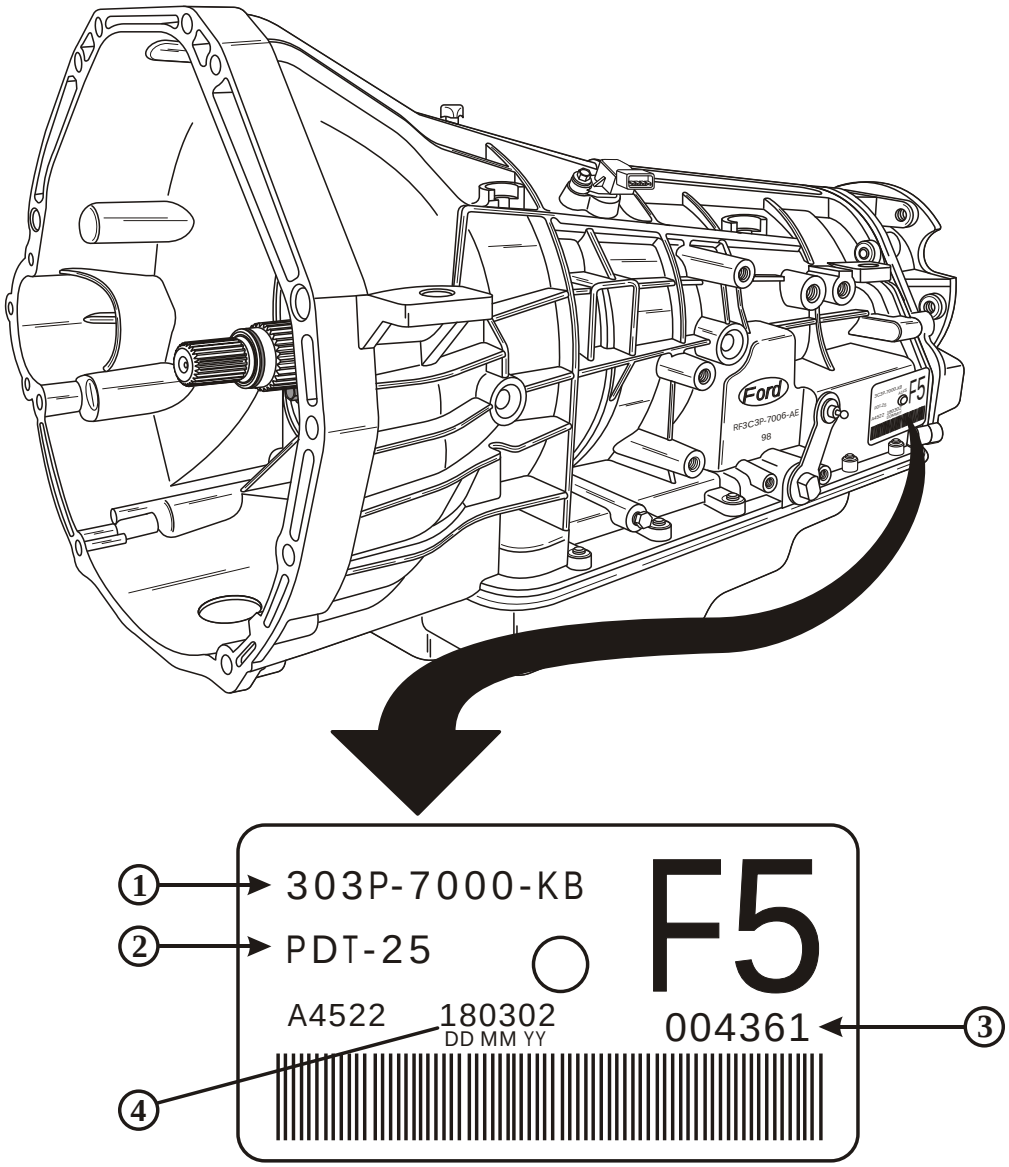
IDENTIFICATION TAG LOCATION AND DESCRIPTION



1	***Assembly Part Number, Prefix And Suffix***
2	***Transmission Model***
3	***Serial Number***
4	***Build Date: DD = Day, MM = Month, YY = Year***

Figure 1

GENERAL TRANSMISSION DESCRIPTION AND OPERATION

The Ford 5R110W "TorqShift" transmission has seven range positions that can be selected with the manual shift lever, P, R, N, (D), 3, 2, 1. Following is a description of each range.

P When the Park position is selected, there is no powerflow through the transmission. The parking pawl is engaged which locks the output shaft to the transmission case. The engine can be started and the ignition key can be removed.

R When the Reverse position is selected, the vehicle can be operated in a rearward direction at a reduced gear ratio.

N When the Neutral position is selected, there is no powerflow through the transmission. The output shaft is not held and is free to turn and the engine can be started. This position can also be selected while vehicle is moving, to restart the engine if that becomes necessary.

(D) The Overdrive position is the normal position for most forward gear operations. The Overdrive position provides automatic upshifts and downshifts, apply and release of the converter clutch, and maximum fuel economy during normal operation.

3 The 3rd Gear position provides third gear start and hold, for improved traction on slippery roads. This position can also be selected at any vehicle speed for improved engine braking. Transmission will not downshift if it will cause an engine overspeed condition.

2 The 2nd Gear position provides second gear start and hold, for improved traction on slippery roads. This position can also be selected at any vehicle speed for improved engine braking. If this position is selected at higher speeds, the transmission will downshift to the next lower gear, and will downshift into second gear after the vehicle decelerates to a vehicle speed that will not create an engine overspeed condition.

1 The Manual Low Gear position provides 1st gear operation only. This position can also be selected at any vehicle speed to provide improved engine braking for descending steep grades. If this position is selected at higher speeds, the transmission will downshift to the next lower gear, and will downshift into first gear after the vehicle decelerates to a vehicle speed that will not create an engine overspeed condition.

Transmission Temperature Gage

There has also been added to the instrument cluster, a transmission temperature gauge that we think is long over-due, and should be on all vehicles.

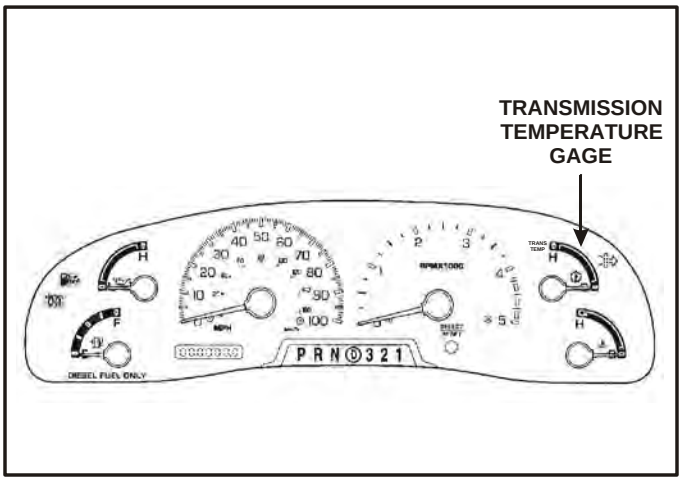


Figure 3

ELECTRICAL COMPONENT DESCRIPTION AND OPERATION (Cont'd)

Transmission Solenoid Body Assembly

The Solenoid Body Assembly is bolted to the transmission case inside the bottom pan and looks similar to what we have previously referred to as a valve body. The Solenoid Body Assembly contains the following:

- ***Seven Variable Force Solenoids***
- ***Five Normally Closed Pressure Switches***
- ***Transmission Fluid Temperature Sensor***
- ***Manual Shift Valve***
- ***Over-Pressurization Relief Ball***

There is a solenoid and a pressure switch dedicated to the function of each clutch pack, except the forward clutch, as it is controlled by the manual valve. There are no other valves in the solenoid body except for the pressure relief ball and spring. All shifts are controlled by five solenoids. Line pressure and the torque converter clutch each have their own solenoid. Four of the solenoids, TCC, OD Clutch, Intermediate Clutch and the Low/Reverse Clutch, are ***directly proportional*** which means the pressure output is directly proportional to the applied DC amps. The current is varied between 0 and 1 amp from the PCM, and 1 amp equals maximum pressure in the oil circuit. Three of the solenoids, Line Pressure, Coast Clutch and Direct Clutch, are ***inversely proportional*** which means the pressure output is inversely proportional to the applied DC amps. The current is varied between 0 and 1 amp from the PCM, and 0 amp equals maximum pressure in the oil circuit.

The different design solenoids are keyed differently to prevent mis-assembly in the solenoid body and all are retained with a large "E" clip. The "Natural" colored wire connectors connect to the solenoids. The "Black" colored connectors connect to the pressure switches. There are separate connectors for the TFT sensor and for the TR-P sensor. All of the solenoids except the line pressure solenoid can be serviced without removing the solenoid body from the case. Refer to Figure 6 for location and identification of the solenoids and switches on the solenoid body. Refer to Figure 8 for the differences and how to identify between the direct and inversely proportional solenoids.

Line Pressure Control Solenoid (PC-A)

The Line Pressure Control Solenoid (PC-A) is an ***inversley proportional*** three port solenoid. The pressure output is inversely proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 0 amp equals maximum pressure in the oil circuit. The PC-A Solenoid controls the line pressure oil circuits (See Figure 8)

Torque Converter Clutch (TCC) Solenoid

The Torque Converter Clutch (TCC) Solenoid is a ***directly proportional*** three port solenoid. The pressure output is directly proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 1 amp equals maximum pressure in the oil circuit. The TCC Solenoid controls the apply and release rates of the converter clutch (See Figure 8).

Shift Solenoid Pressure Control Solenoids (SSPC-B, SSPC-C, SSPC-E)

The overdrive (SSPC-B), intermediate (SSPC-C), and low/reverse (SSPC-E) clutches are each controlled by a ***directly proportional*** three port solenoid. The pressure output is directly proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 1 amp equals maximum pressure in the particular clutch oil circuit. The Shift Solenoid controls the apply and release rates of the particular clutch pack (See Figure 8).

Shift Solenoid Pressure Control Solenoids (SSPC-A, SSPC-D)

The coast (SSPC-A), and direct (SSPC-D) clutch packs are each controlled by an ***inversely proportional*** three port solenoid. The pressure output is inversely proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 0 amp equals maximum pressure in the particular clutch oil circuit. The Shift Solenoid controls the apply and release rates of the particular clutch pack. Refer to Figure 8.

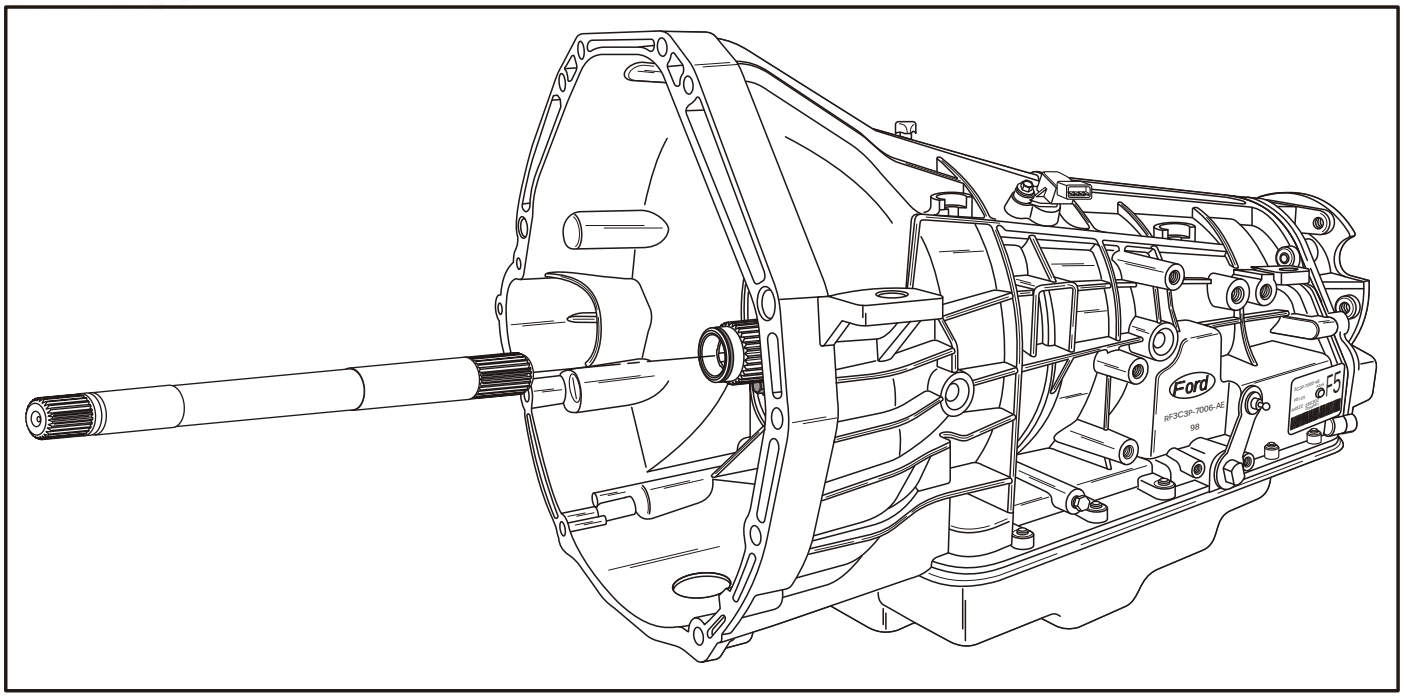


Figure 25

TRANSMISSION DISASSEMBLY

EXTERNAL COMPONENTS

1. Install transmission holding fixture, as shown in Figure 26, that will allow you to rotate the transmission.
2. Remove the input shaft from transmission, as shown in Figure 25.
3. Remove the output shaft speed sensor from the extension housing, as shown in Figure 27.
4. Remove and discard the output shaft speed sensor "O" ring, as shown in Figure 27.

Continued on Page 27

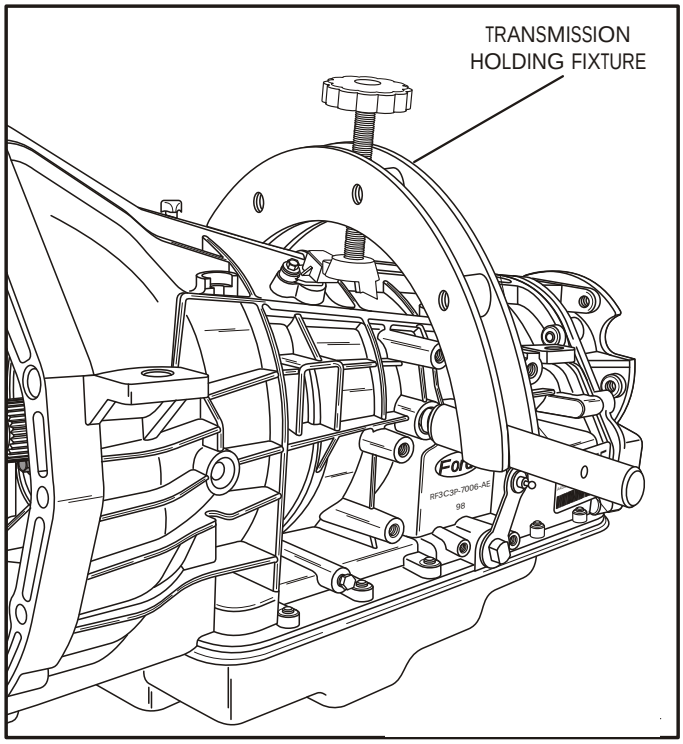


Figure 26

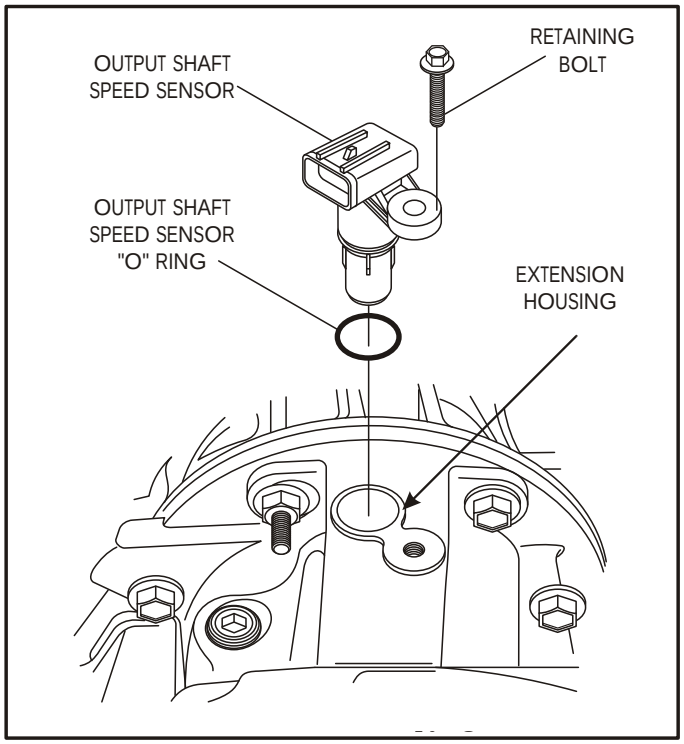


Figure 27

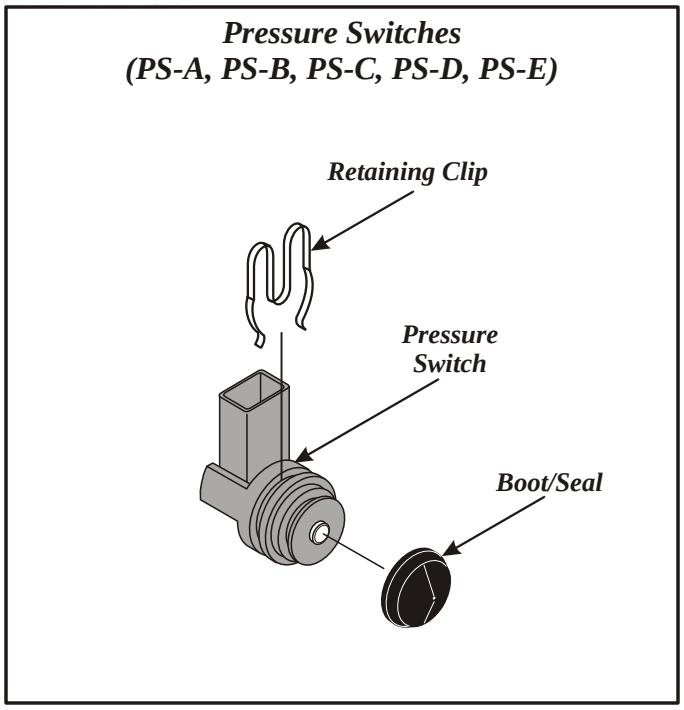


Figure 76

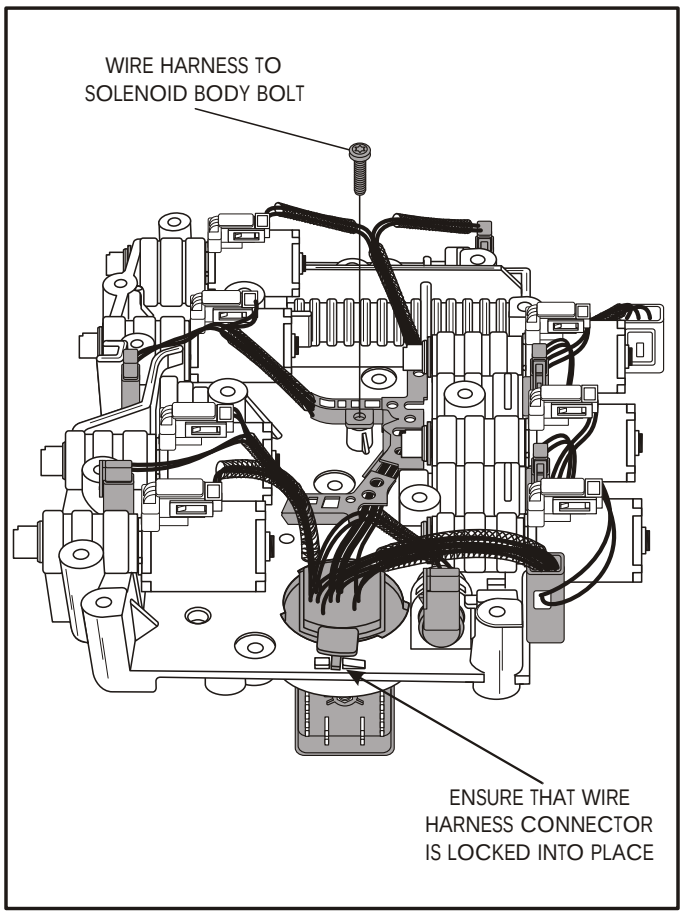


Figure 77

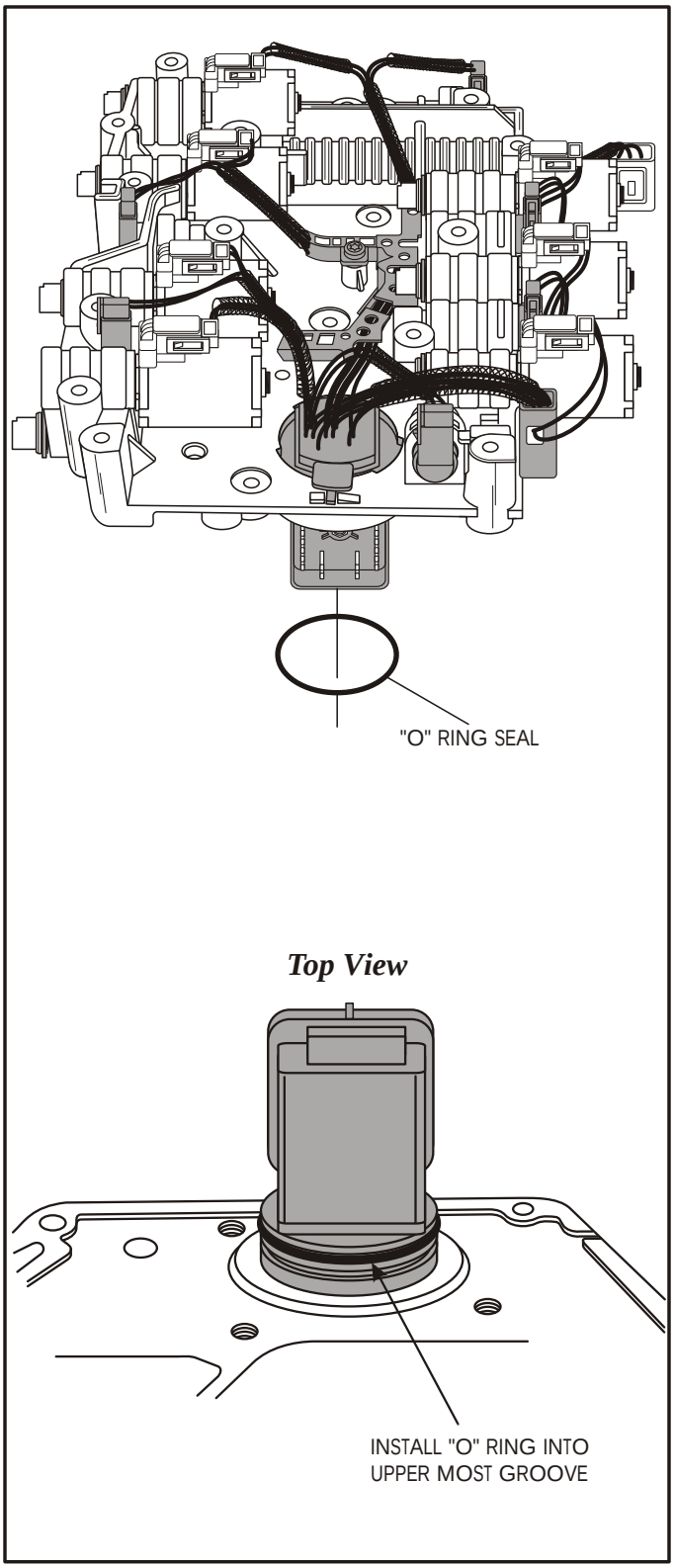


Figure 78

Continued on Page 54

COMPONENT REBUILD

COAST CLUTCH HOUSING

1. Disassemble the coast clutch housing using Figure 96 as a guide.
2. Inspect all coast clutch parts thoroughly for any wear and/or damage.
3. Inspect coast clutch pressure plate which now incorporates the mechanical diode one way clutch, as shown in Figure 97.
   Note: Inside splines should freewheel in the direction shown in Figure 97, and lock in the opposite direction.
4. Clean all coast clutch parts thoroughly and dry with compressed air.
5. Lube and install a new coast clutch piston into the coast clutch housing using the installer, as shown in Figure 98.
6. Remove the seal installer.
7. Install the coast clutch piston return spring assembly, as shown in Figure 99.
8. Compress the return spring using the proper adapters and install the snap ring, as shown in Figure 99.
9. Ensure that snap ring is fully seated in the groove in coast clutch housing.

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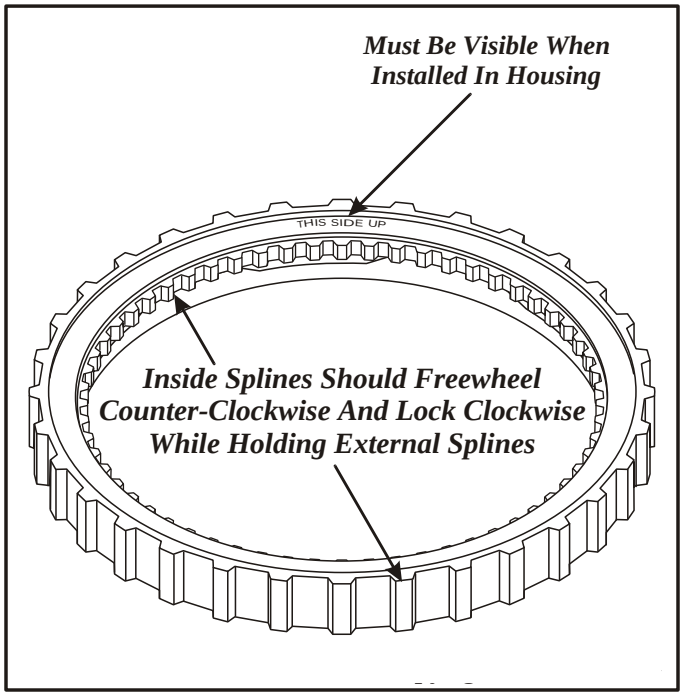

Figure 97

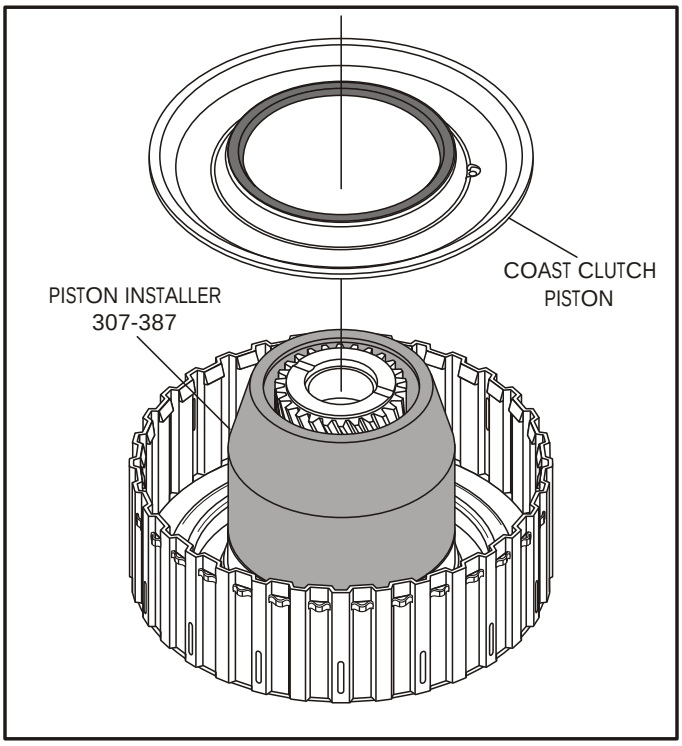

Figure 98

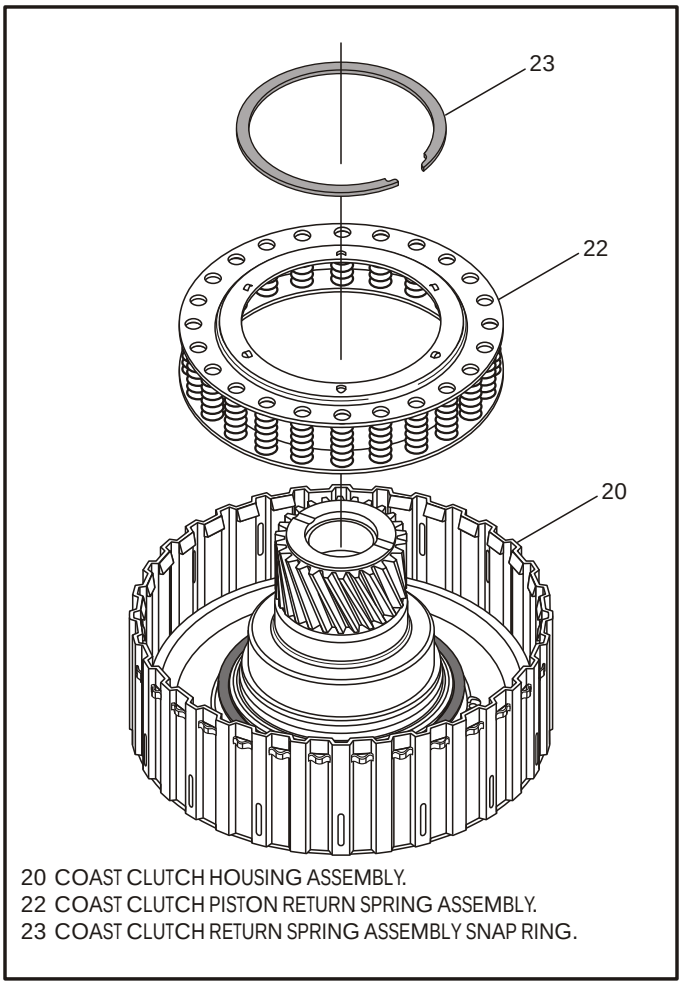

Figure 99

INTERMEDIATE CLUTCH PLATES

1. Inspect intermediate clutch plates and ensure that you have the proper plates in your kit. ***Note: Beginning at start of production for 2005 models, the tooth count on the friction plates changed from 24 to 96, as shown in Figure 116. This also changes the direct clutch housing, which we will show later.***

2. Set the ***"Proper"*** intermediate clutch friction plates, steel plates and backing plate aside for the final assembly process.

Component Rebuild
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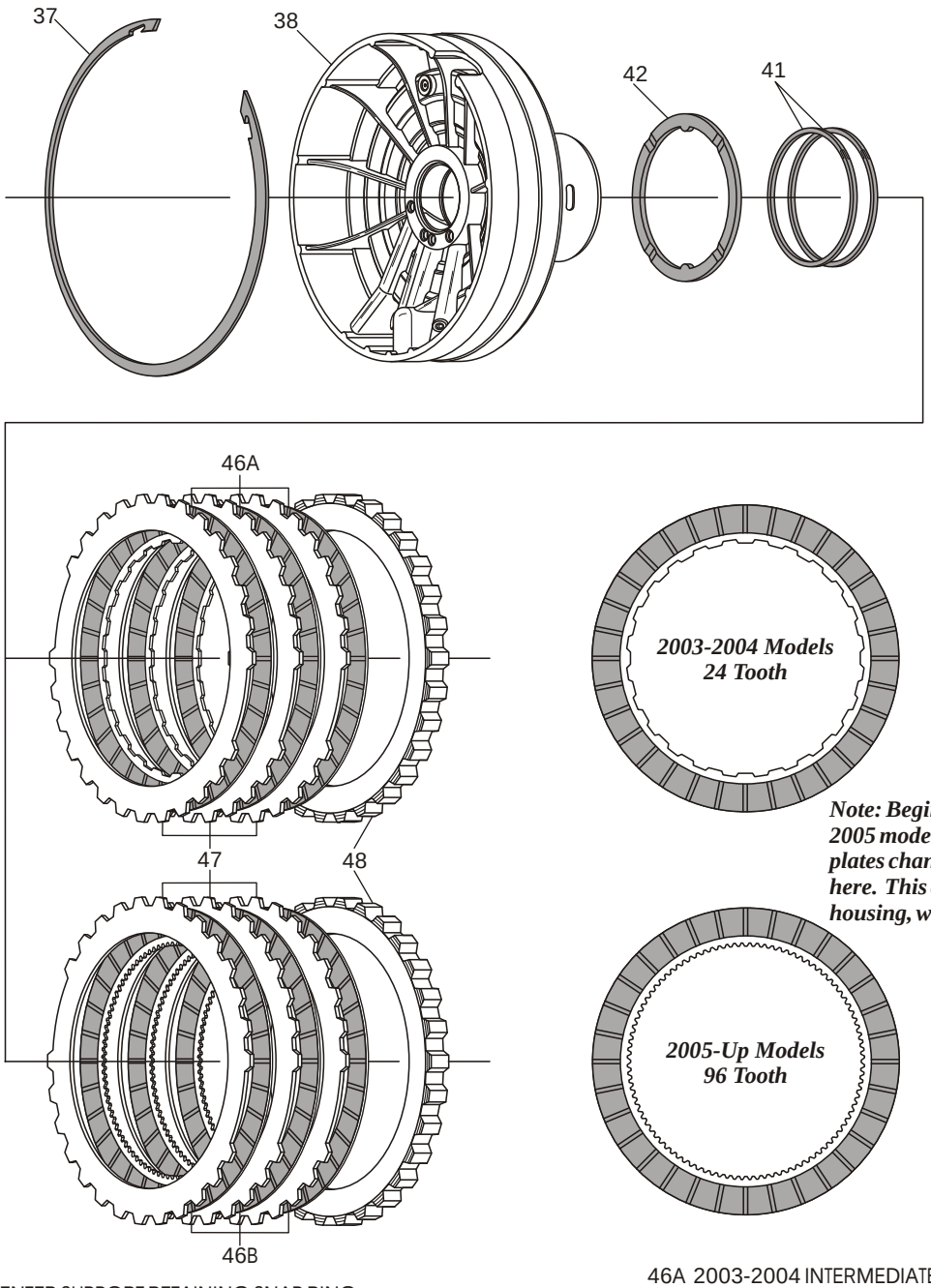
INTERMEDIATE CLUTCH EXPLODED VIEW



Note: Beginning at start of production for 2005 models, the tooth count on the friction plates changed from 24 to 96, as shown here. This also changes the direct clutch housing, which is shown on Page 82.

37 CENTER SUPPORT RETAINING SNAP RING
38 COMPLETE CENTER SUPPORT ASSEMBLY
41 DIRECT CLUTCH TEFLON® SEALING RINGS (2 REQUIRED)
42 NUMBER 6 THRUST WASHER

46A 2003-2004 INTERMEDIATE FRICTION PLATES (24 TOOTH)
46B 2005-UP INTERMEDIATE FRICTION PLATES (96 TOOTH)
47 INTERMEDIATE CLUTCH STEEL PLATES (ALL MODELS)
48 INTERMEDIATE CLUTCH BACKING PLATE (ALL MODELS)

Figure 116

DIRECT CLUTCH HOUSING (CONT'D)

7. Install direct clutch piston "Bellville" return spring on top of the direct clutch piston in the direction shown in Figure 134.
8. Lubricate the seal and install the direct clutch balance piston, as shown in Figure 134.
9. Compress the return spring and balance piston and install snap ring (See Figure 134).
10. Install 4 steel plates and 4 friction plates in the order shown in Figure 135.
11. Install the direct clutch backing plate and the selective snap ring, as shown in Figure 135.

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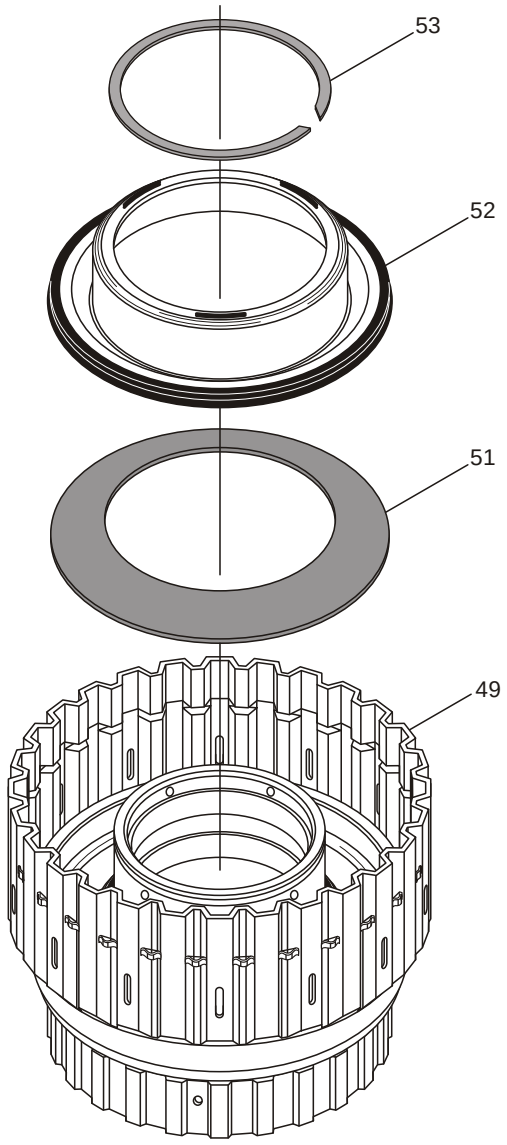
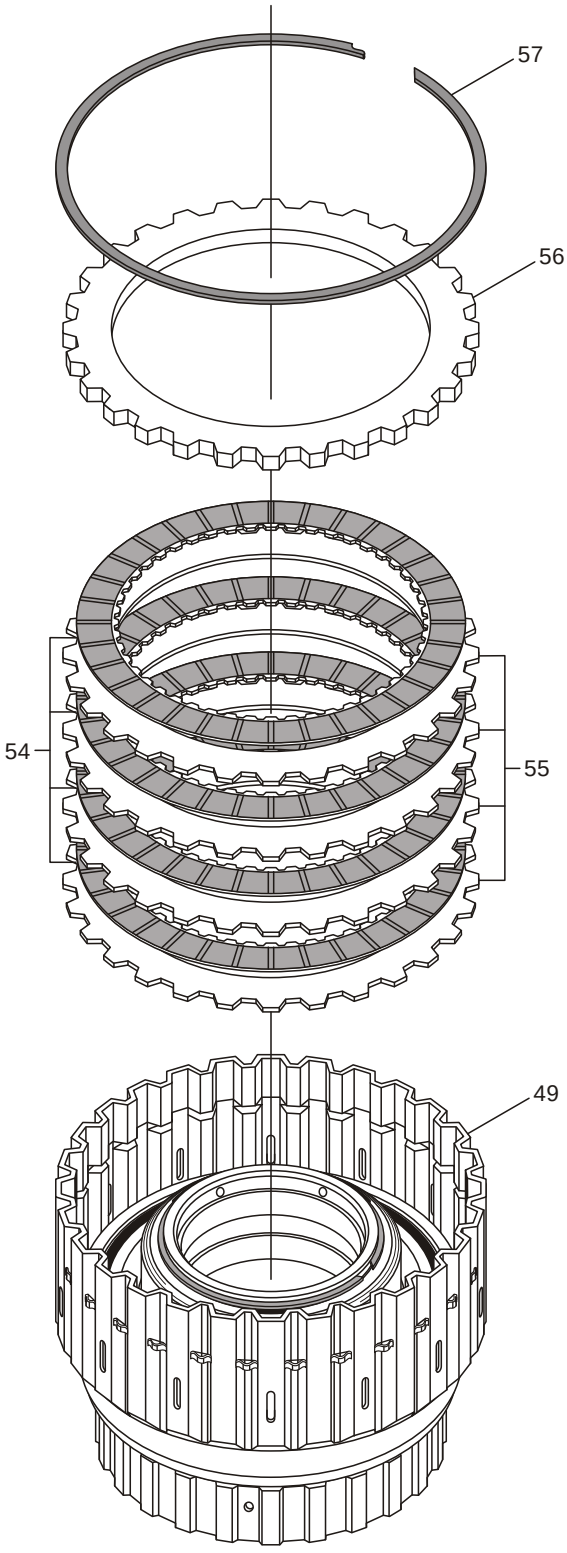


49 DIRECT CLUTCH HOUSING ASSEMBLY
51 DIRECT CLUTCH PISTON "BELLVILLE" RETURN SPRING
52 DIRECT CLUTCH BALANCE PISTON
53 DIRECT CLUTCH BALANCE PISTON SNAP RING

Figure 134



49 DIRECT CLUTCH HOUSING ASSEMBLY
54 DIRECT CLUTCH FRICTION PLATES (4)
55 DIRECT CLUTCH STEEL PLATES (4)
56 DIRECT CLUTCH BACKING PLATE
57 DIRECT CLUTCH BACKING PLATE SNAP RING *(SELECTIVE)*

Figure 135

COMPONENT REBUILD

DRUM AND SUN GEAR SHELL ASSEMBLY

1. Place the completed direct clutch housing on a flat work surface, as shown in Figure 145.
2. Install the completed forward clutch housing assembly, as shown in Figure 145, by rotating back and forth until fully seated and all direct clutch plates engaged on hub.
   Note: Ensure that number 7 thrust washer and number 8 thrust bearing are still in place with the Trans-Jel®, before installing.
3. Ensure that the number 9 thrust bearing is still in place, as shown in Figure 146.
4. Install completed forward ring gear assembly, as shown in Figure 146, by rotating back and forth to engage the forward clutch frictions, until fully seated.
   Note: Ensure that number 10 thrust washer is still in place before installing.

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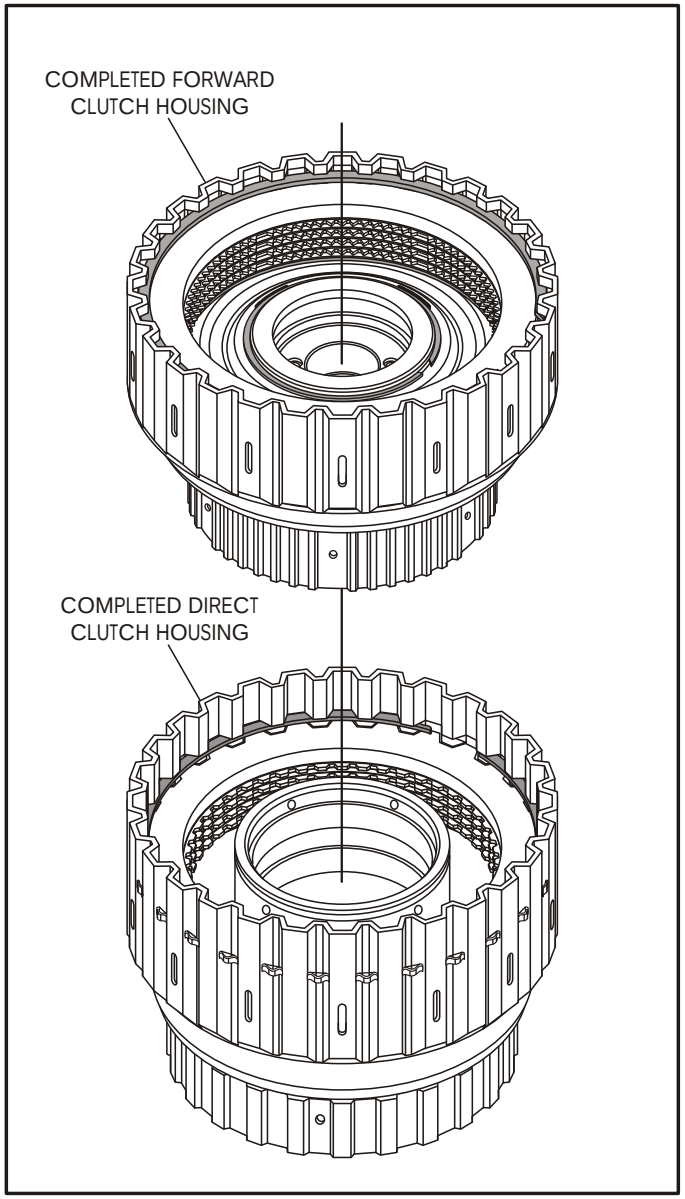


Figure 145

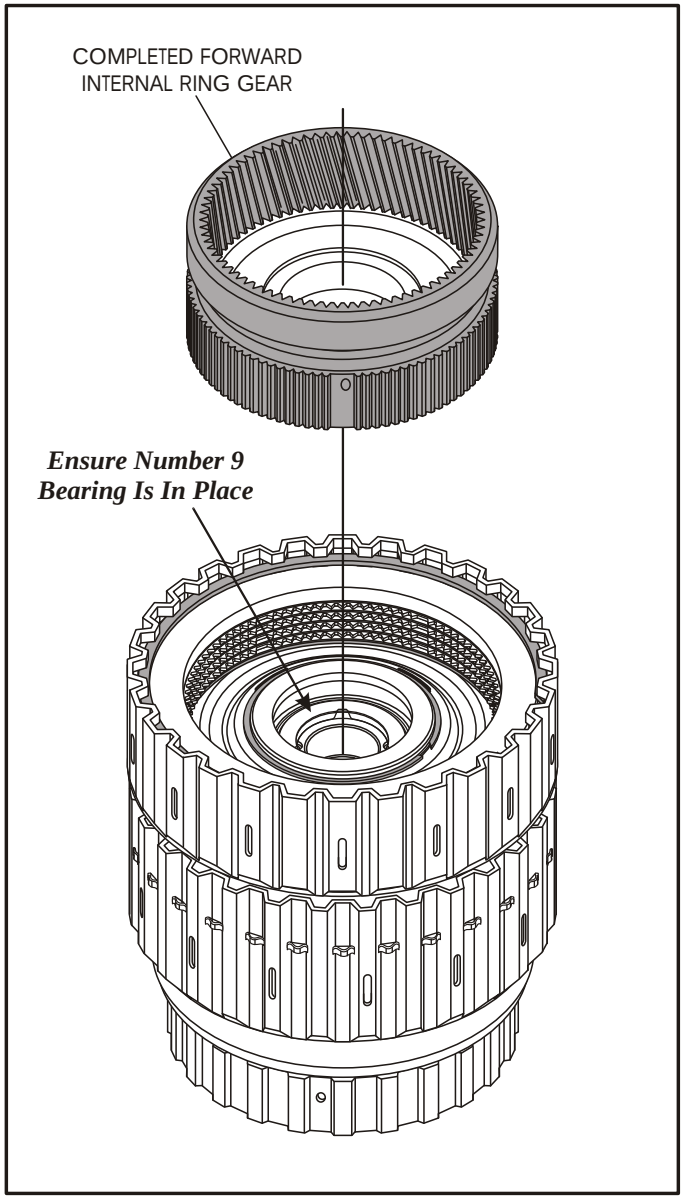
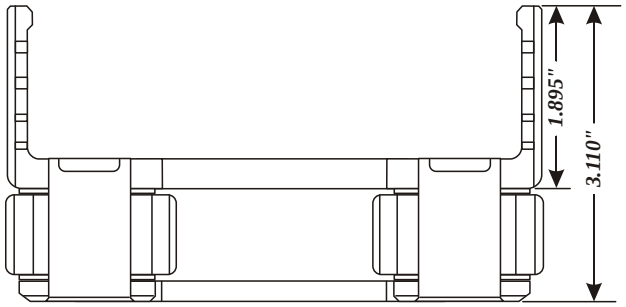


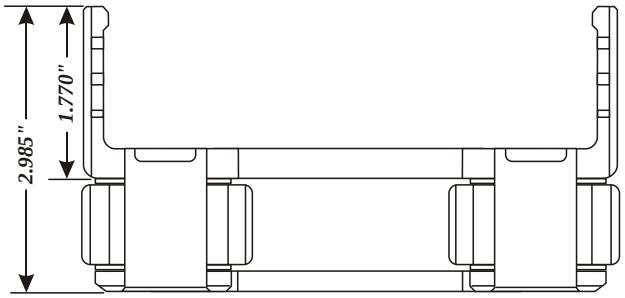
Figure 146

2003/2004 MODEL
"1ST DESIGN"
REAR PLANETARY CARRIER



"DO NOT USE"

2005/UP MODEL
"2ND DESIGN"
REAR PLANETARY CARRIER



PART NUMBER
5C3Z-7DOO6-AB

Figure 153

COMPONENT REBUILD
REAR PLANETARY CARRIER DIFFERENCES

NOTICE: The rear planetary carrier assembly has changed for the 2005 production year because of pinion shafts "walking" in the carrier. The new design rear planetary carrier has a staking process change for the pinion pins to prevent them from "walking" out of the carrier assembly which greatly improves durability and reliability. There have also been some dimensional changes which helps us for identification. The overall height of the carrier has been reduced by .125" (1/8"), as shown in Figure 153. The splines for the low/reverse frictions have also been shortened by .125" (1/8"), as shown in Figure 153.

INTERCHANGEABILITY:

The new design planetary carrier "Will" retro-fit back on all model years, and is required on any rebuild that has the previous design parts.
Note: "Do Not" reuse "Any" previous design rear planetary carriers.

COMPONENT REBUILD
REAR PLANETARY CARRIER (CONT'D)

6. Install the number 13 thrust washer on the rear planetary carrier, as shown in Figure 154, and retain with Trans-Jel®.
   Note: If thrust washers are damaged because of previous carrier damage, use OEM part number 3C3Z-7A166-A

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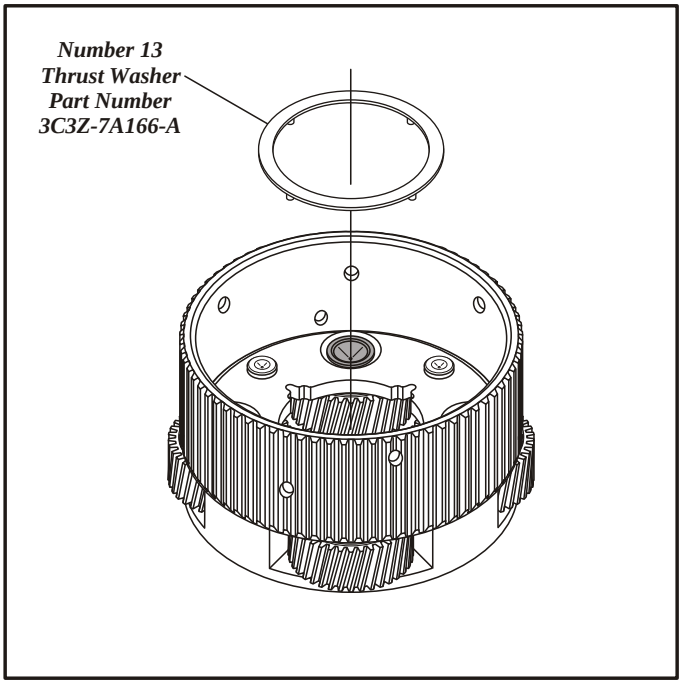
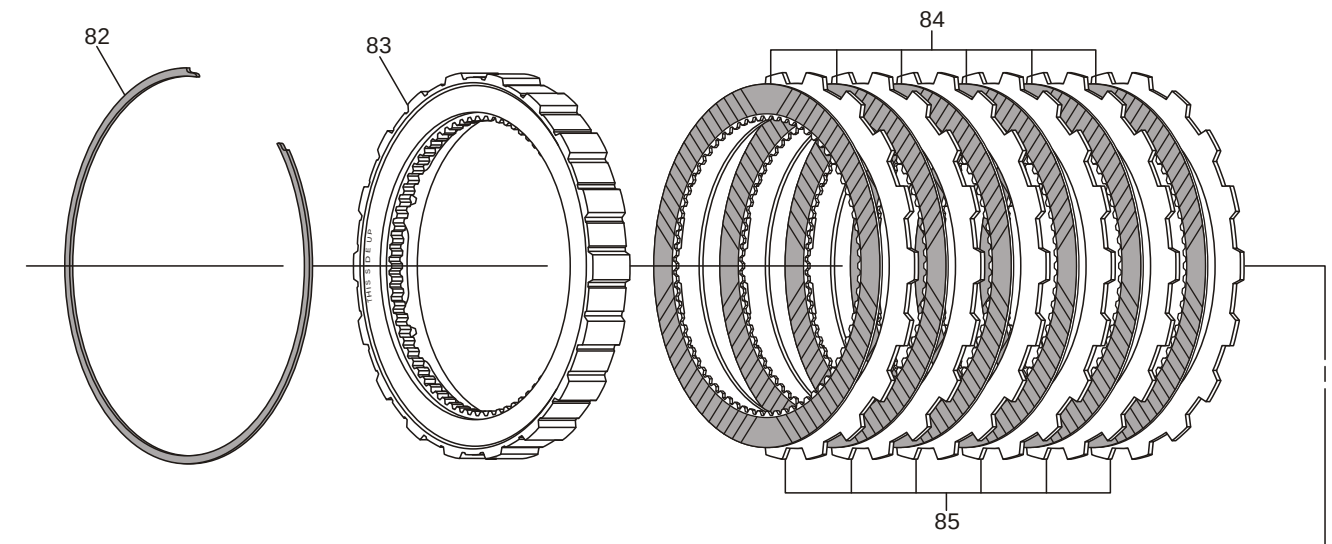
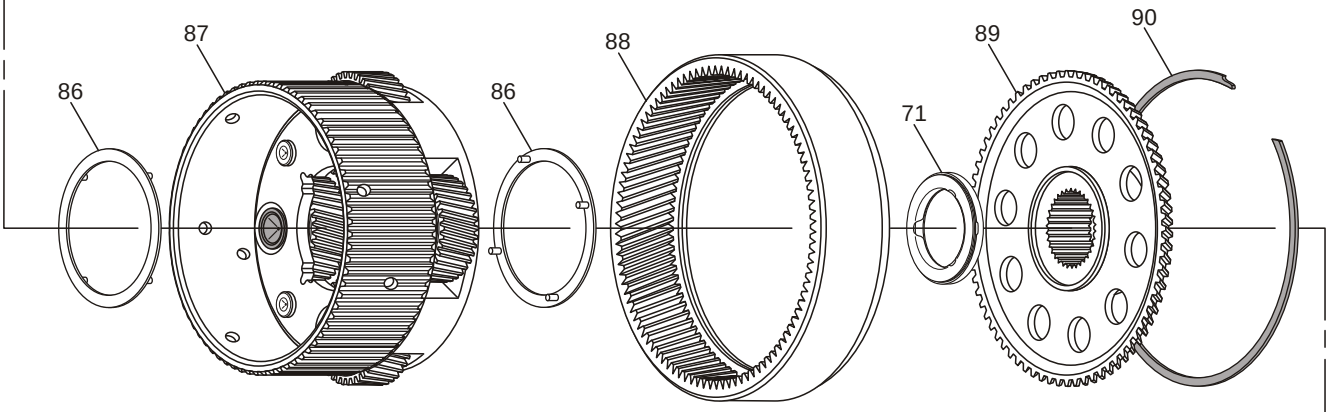
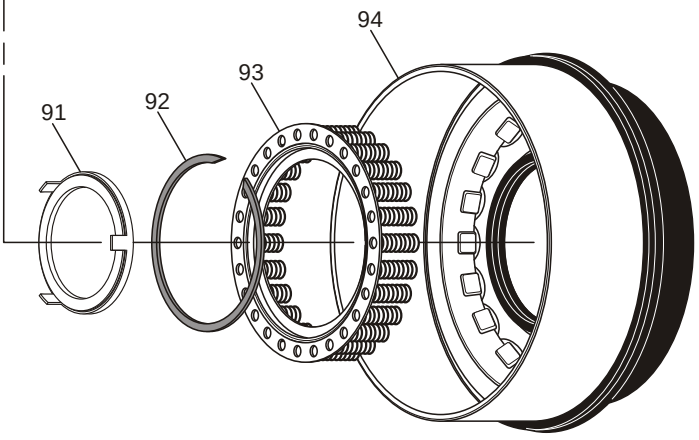


Figure 154

LOW/REVERSE CLUTCH PARTS EXPLODED VIEW







71 NUMBER 15 THRUST BEARING ASSEMBLY
82 LOW OWC DIODE RETAINING SNAP RING
83 LOW OWC DIODE ASSEMBLY
84 LOW/REVERSE CLUTCH FRICTION PLATES (6)
85 LOW/REVERSE CLUTCH STEEL PLATES (6)
86 NUMBER 13 AND 14 REAR CARRIER THRUST WASHERS
87 REAR PL ANETARY CARRIER ASSEMBLY
88 REAR PL ANETARY CARRIER INTERNAL RING GEAR
89 REAR PL ANETARY CARRIER INTERNAL RING GEAR HUB
90 REAR PL ANETARY CARRIER RING GEAR HUB SNAP RING
91 NUMBER 16 THRUST BEARING ASSEMBLY
92 LOW/REVERSE CLUTCH RETURN SPRING SNAP RING
93 LOW/REVERSE CLUTCH RETURN SPRING ASSEMBLY
94 LOW/REVERSE CLUTCH PISTON

Figure 163

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

11. Install the low diode assembly, as shown in Figure 168, with the words "This Side Up" visible after installation.
    Note: If the low diode is installed correctly, the rear carrier should hold when trying to turn it counter-clockwise, and freewheel in a clockwise direction.
12. Install the low OWC diode retaining snap ring, as shown in Figure 168.
    Note: The opening of the snap ring should be placed at the one O' clock position.
13. Install the pre-assembled drums and sun gear shell assembly, as shown in Figure 169, using the special tools and rotating into position to engage the sun gear into the rear planetary.

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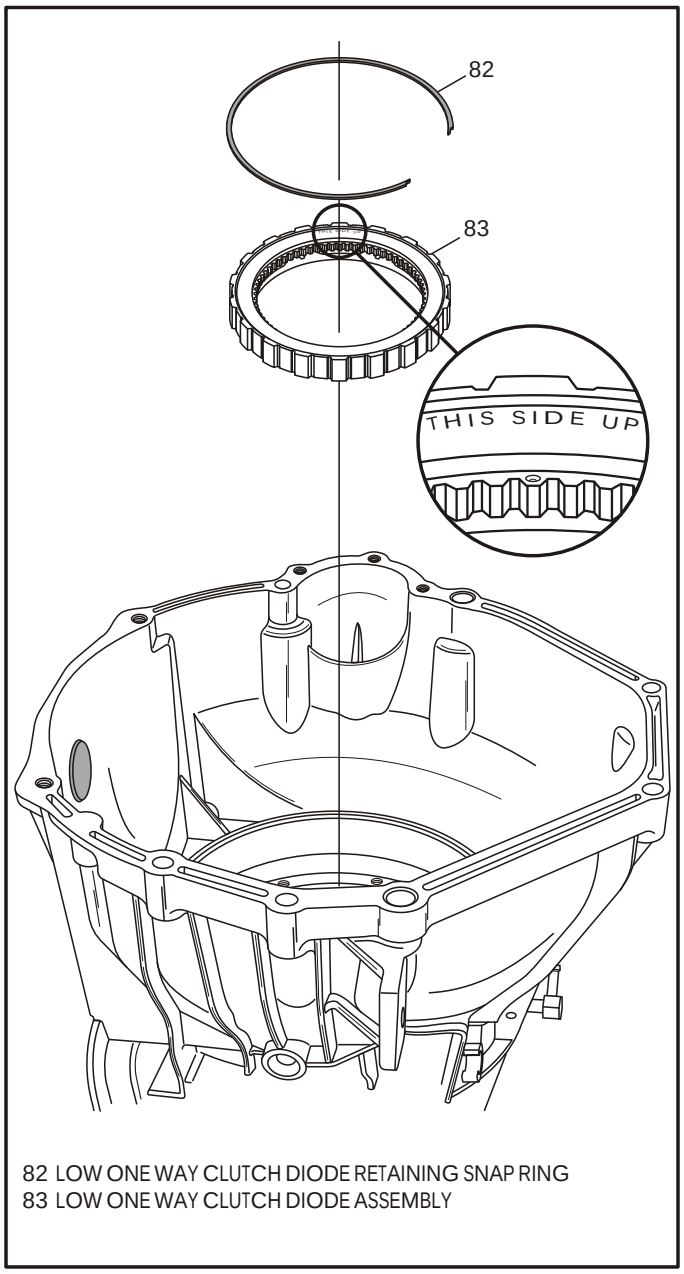

82 LOW ONE WAY CLUTCH DIODE RETAINING SNAP RING
83 LOW ONE WAY CLUTCH DIODE ASSEMBLY

Figure 168

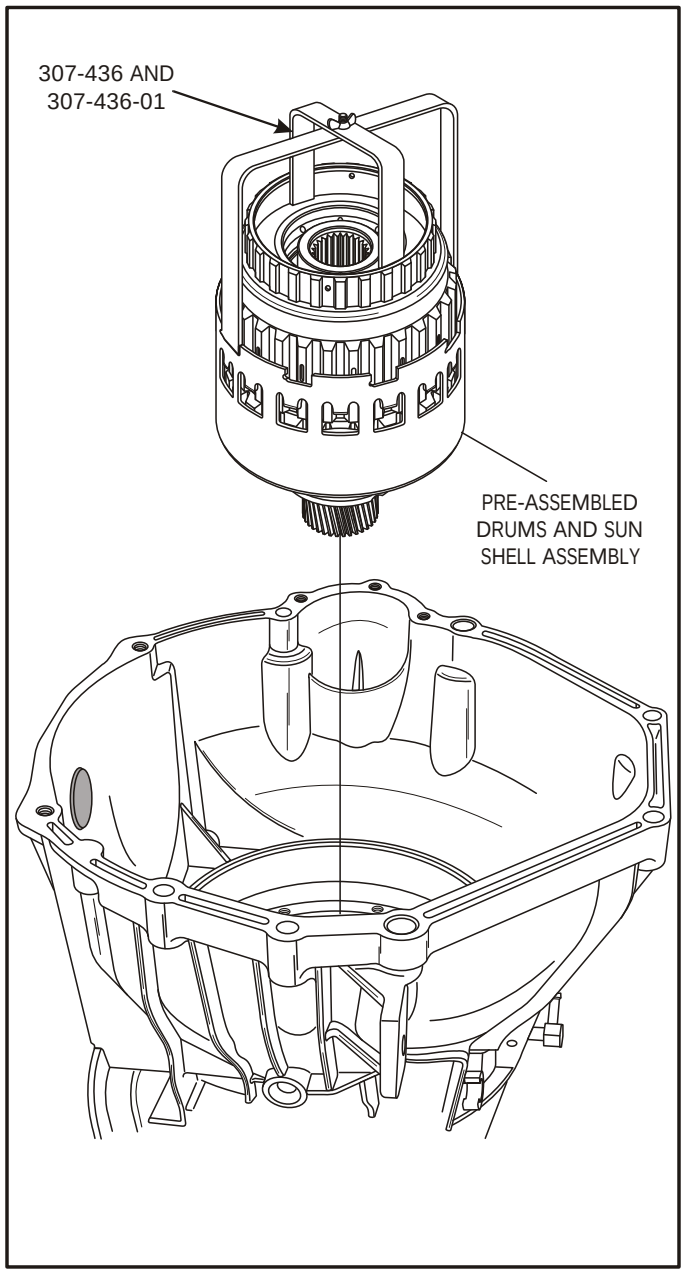

Figure 169

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

29. Rotate the transmission so that the pan surface is facing up, as shown in Figure 178.
30. Now, torque the new center support bolts to, 32 N•m (24 ft.lb.), as shown in Figure 178.
31. Install the forward clutch orifice on top of the center support bolt, as shown in Figure 179. ***Note: Retain forward clutch orifice with a small amount of Trans-Jel®.***
32. Install a new channel plate to case gasket, as shown in Figure 179, over the locating dowels.

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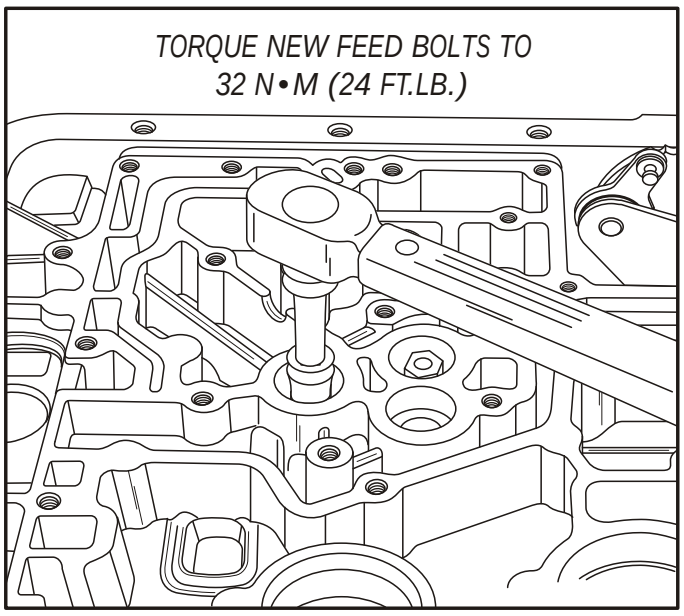

Figure 178

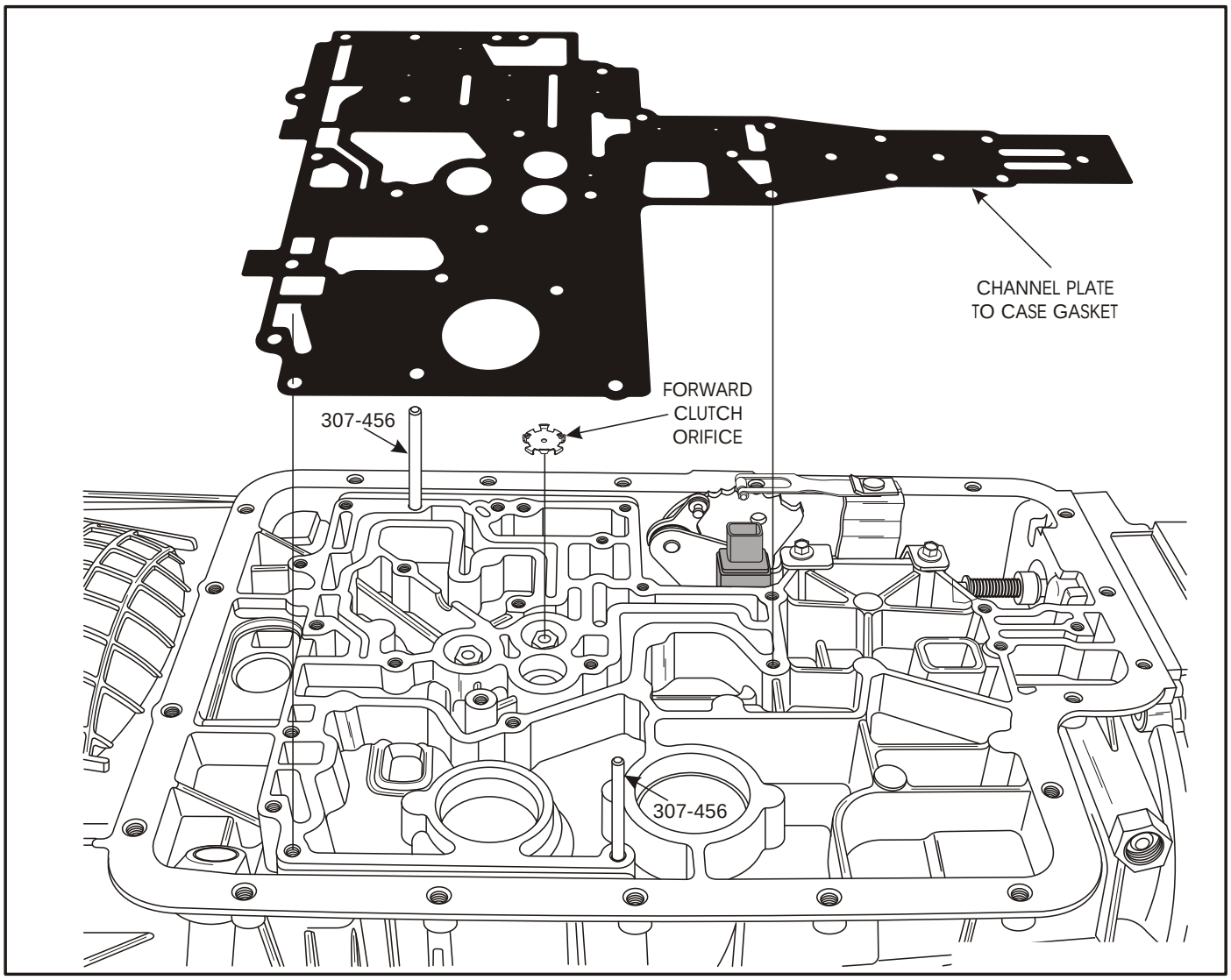

Figure 179

TRANSMISSION ASSEMBLY
INTERNAL COMPONENTS (CONT'D)

42. Install the oil pan, as shown in Figure 183, and install the 20 pan bolts.
43. Torque pan bolts to 15 N•m (11 ft.lb.).

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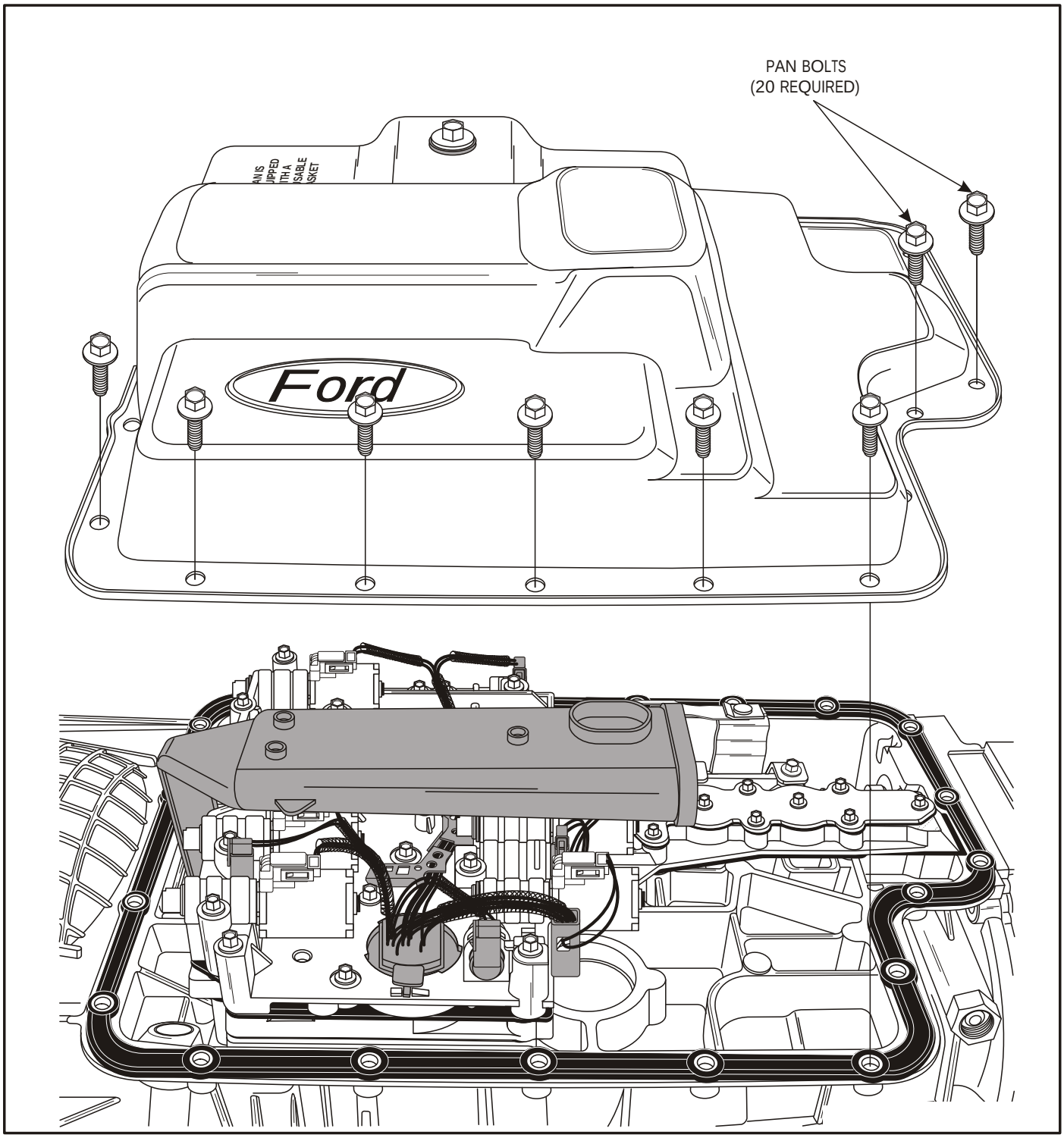

Figure 183