FORD MOTOR CO.
4F27E TRANSAXLE

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AUTOMATIC TRANSMISSION SERVICE GROUP
18639 SW 107TH AVENUE
MIAMI, FLORIDA 33157
(305) 670-4161

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INTRODUCTION
FORD 4F27E

Published
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Ford Motor Company in a joint venture with Mazda in Japan have developed a new design transaxle designed specifically for use in the Ford Focus, with the designation 4F27E, and Mazda designation is FN4A-EL. The new 4F27E transaxle is produced by Ford Motor Company in Sterling Heights, Michigan.

This is a four speed, Front Wheel Drive, with fully electronic controls for the upshifts and downshifts, with 4th gear being overdrive. The individual gear ratios are achieved through two planetary gear sets connected one behind the other. The components of the planetary gear sets are driven or locked by means of four multiple plate clutches, one brake band and a one-way roller clutch. To minimize fuel consumption, the torque converter clutch is applied by the PCM in 3rd and 4th gears, depending on throttle position and vehicle speed. This unit is designed to use Mercon® V automatic transmission fluid.

The manual selector lever gives the driver a choice of "P", "R", "N", "D", "2", "1", and all ranges are explained in detail in this manual. It is also possible to operate an O/D cancel switch, located on the selector lever, to prevent the transaxle from shifting into 4th gear or to shift down to 3rd gear.

We wish to thank Ford Motor Company for the information and illustrations that have made this booklet possible.

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DALE ENGLAND
FIELD SERVICE CONSULTANT

WAYNE COLONNA
TECHNICAL SUPERVISOR

PETER LUBAN
TECHNICAL CONSULTANT

JON GLATSTEIN
TECHNICAL CONSULTANT

ROLAND ALVAREZ
TECHNICAL CONSULTANT

GERALD CAMPBELL
TECHNICAL CONSULTANT

JIM DIAL
TECHNICAL CONSULTANT

ED KRUSE
TECHNICAL CONSULTANT

GREGORY LIPNICK
TECHNICAL CONSULTANT

DAVID CHALKER
TECHNICAL CONSULTANT

JERRY GOTT
TECHNICAL CONSULTANT

MIKE SOUZA
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP
18639 SW 107th Avenue
MIAMI, FLORIDA 33157
(305) 670-4161

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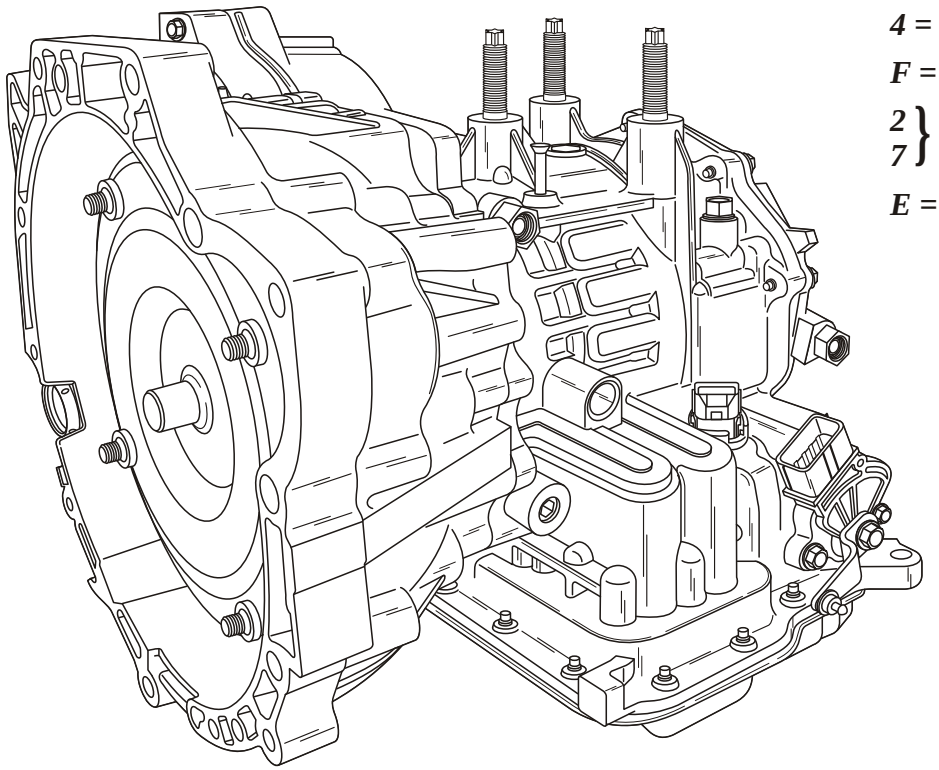
FORD 4F27E



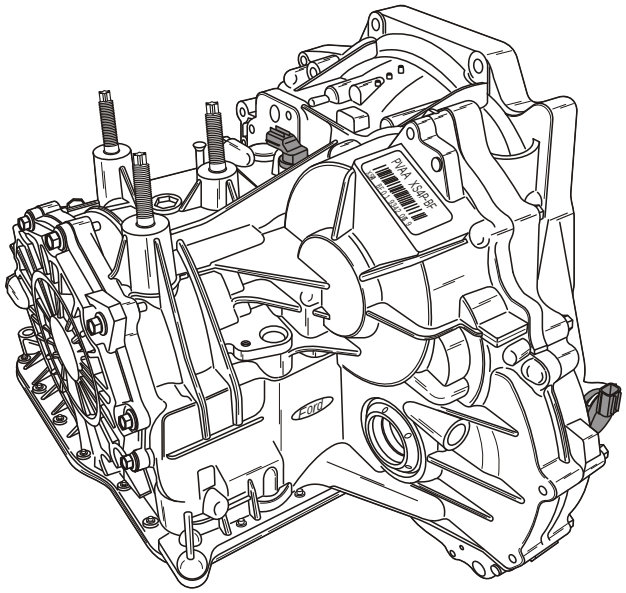
4 = 4 Forward Speeds

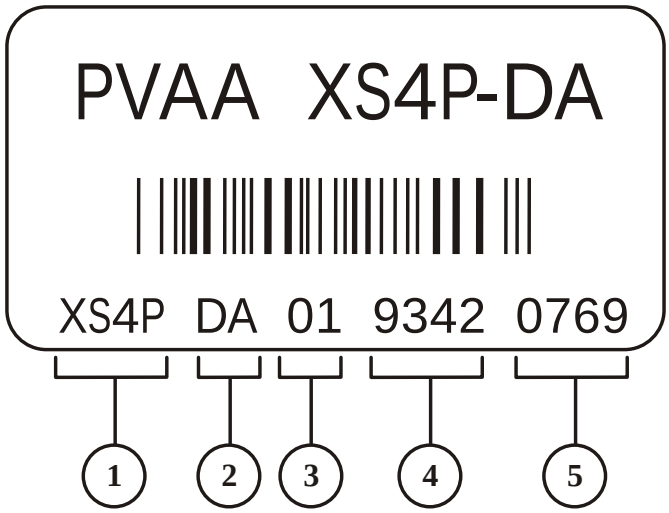
F = Front Wheel Drive

2, 7 } = Relative Torque Capacity

E = Electronic Controlled

I.D. TAG INFORMATION FOUND ON RIGHT SIDE OF TRANSMISSION CASE





1. *Part Number, Basic = 7000 (Example XS4Z-7000-DA)*
2. *Transmission Model Code*
3. *Engineering Level*
4. *Build Date (Year and Julian Date)*
5. *Serial Number*

	Year	Julian Date
BD-	9	342
Build Date	9=1999 0=2000 1=2001 2=2002 3=2003 4=2004	

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Figure 1

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GENERAL DESCRIPTION

This is a four speed, Front Wheel Drive, with fully electronic controls for the upshifts and downshifts, with 4th gear being overdrive. The individual gear ratios are achieved through two planetary gear sets connected one behind the other. The components of the planetary gear sets are driven or locked by means of four multiple plate clutches, one brake band and a one-way roller clutch, and are illustrated in Figure 3, along with the component application chart for each gear. To minimize fuel consumption, the torque converter clutch is applied by the PCM in 3rd and 4th gears, depending on throttle position and vehicle speed. This unit is designed to use Mercon® V automatic transmission fluid.

The manual selector lever, shown in Figure 2, gives the driver a choice of "P", "R", "N", "D", "2", "1", and all ranges are explained in detail below. It is also possible to operate an O/D cancel switch, located on the selector lever, to prevent the transaxle from shifting into 4th gear or to shift down to 3rd gear.

Special Note: This transaxle currently shows two different axle ratios and Page 9 also shows how to identify which ratio belongs in the vehicle that you may have. Surely you must know by now that the PCM will recogonize almost instantly if you install the wrong axle ratio.

The 4F27E transaxle is equipped with six different solenoids to shift the transaxle through the various gears and to control line pressure. Shift Solenoids "A" and "B" are On-Off solenoids and control shift valves in the valve body. Shift Solenoids "C", "D" and "E" are Pulse Width Modulated (PWM) solenoids and control the pressures to the various apply components. The sixth solenoid is the Electronic Pressure Control (EPC) solenoid. Refer to Figure 4 for the solenoid application chart for each gear and for the location and identification of each solenoid on the valve body.

MANUAL SELECTOR LEVER OPERATION

P In manual selector lever position "P" no gear is selected. The parking pawl is engaged manually by the shift shaft linkage and the engine can be started.

R In manual selector lever position "R" reverse gear is selected. Reverse allows the vehicle to be operated in a rearward direction, at a reduced gear ratio.

N In manual selector lever position "N" no gear is selected. The driveline is not locked, so the wheels are free to rotate. The engine may be started in Neutral.

D In manual selector lever position "D" the transmission control system allows upshifts first through fourth gears automatically. When the O/D cancel switch is pressed, shifting into 4th gear is prevented, or if it is already in 4th gear, the transmission shifts down to 3rd gear.

2 In manual selector lever position "2" ***only*** 2nd gear is available. The transmission controls will not allow a shift into first gear.
If the manual selector lever is moved to position "2" at an excessive vehicle speed for 2nd gear, the computer only allows the shift to take place when a safe vehicle speed has been reached.

1 In manual selector lever position "1" ***only*** first is available.. The transmission control system applies the Low/Reverse clutch to provide engine braking effect.
If the manual selector lever is moved to position "1" at an excessive vehicle speed for 1st gear, the computer only allows the down shift to take place when a safe vehicle speed has been reached.

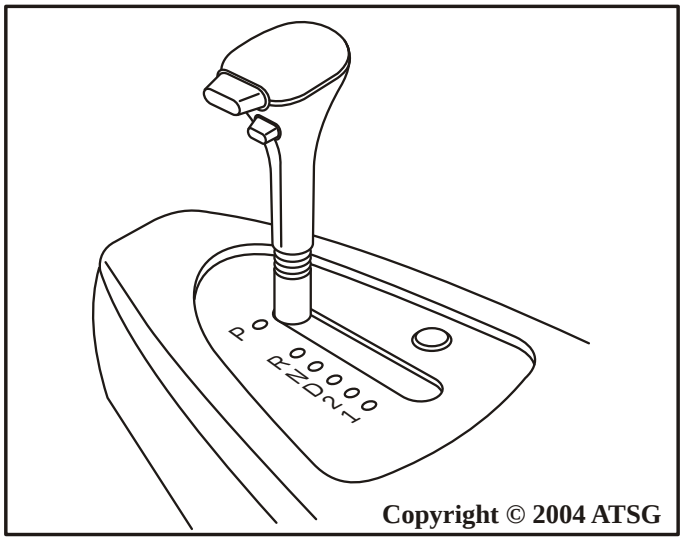

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Figure 2

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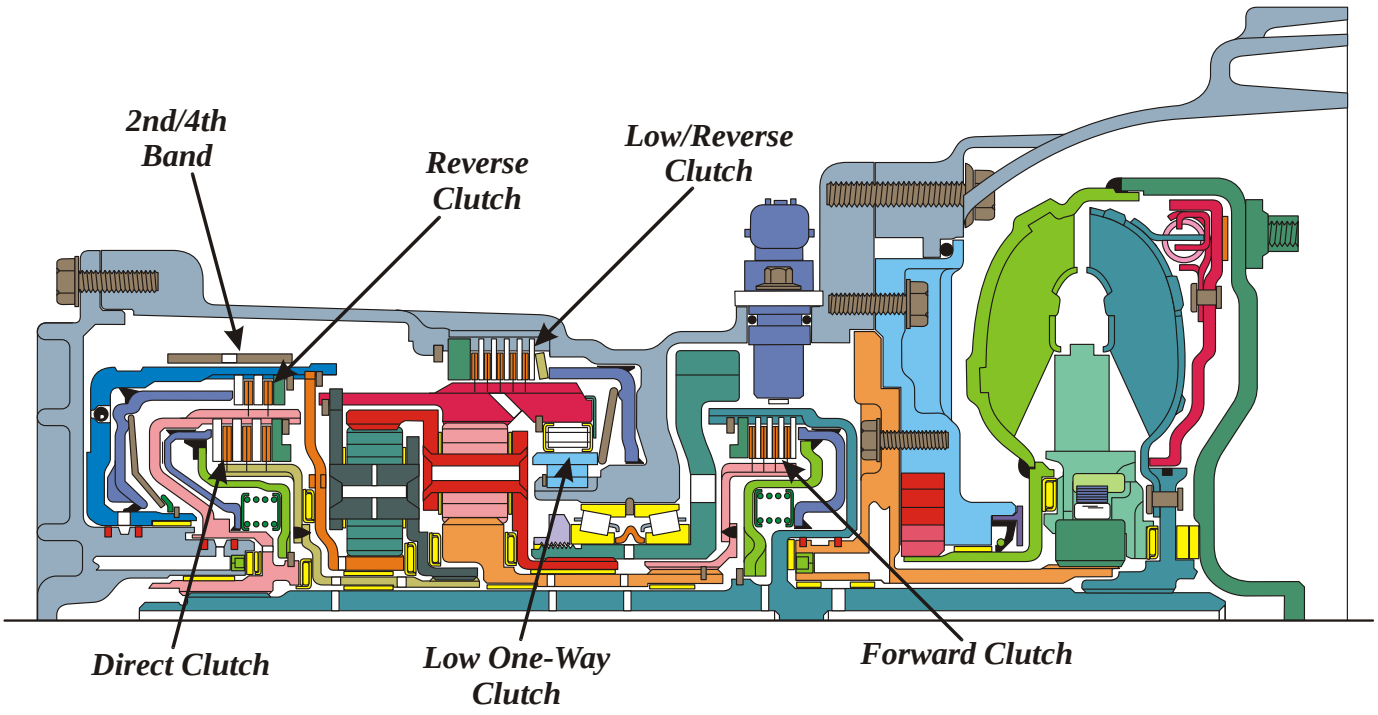

4F27E TRANSAXLE COMPONENT APPLICATION CHART							
RANGE	Forward Clutch	2nd-4th Band	Direct Clutch	Reverse Clutch	Low/Rev Clutch	Low One-Way Clutch	Gear Ratio
PARK							
REVERSE				ON	ON		2.65
NEUTRAL							
DRIVE-1st	ON					HOLD	2.82
DRIVE-2nd	ON	ON					1.50
DRIVE-3rd	ON		ON				1.00
DRIVE-4th		ON	ON				0.73
MANUAL-2nd	ON	ON					1.50
MANUAL-1st	ON				ON		2.82
NOTE: Failsafe on this unit is 3rd gear in all forward ranges							

NOTE: There are two different axle ratios listed for Ford Focus with this transaxle;
NN = 3.693 Automatic
WW = 3.904 Automatic

REFER TO DOOR TAG INFORMATION ON PAGE 9
TO DETERMINE GEAR RATIO FOR YOUR VEHICLE.

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Figure 3

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SHIFT SOLENOID APPLY CHART						
Range	*Shift "A" (On-Off)*	*Shift "B" (On-Off)*	*Shift "C" (PWM)*	*Shift "D" (PWM)*	*Shift "E" (PWM)*	*EPC Solenoid*
Park	*ON*	*OFF*	*Not Fed*	*Not Fed*	*Not Fed*	***
Reverse	*ON*	*ON*	*Not Fed*	*OFF*	*Not Fed*	***
Neutral	*ON*	*OFF*	*Not Fed*	*Not Fed*	*Not Fed*	***
Drive-1st	*OFF*	*OFF*	*OFF*	*ON*	*ON*	***
Drive-2nd	*OFF*	*OFF*	*OFF*	*OFF*	*ON*	***
Drive-3rd	*OFF*	*OFF ** *	*OFF ** *	*OFF*	*OFF*	***
Drive-4th	*ON*	*OFF ** *	*ON*	*OFF*	*OFF*	***
Manual-1st	*ON*	*ON*	*OFF*	*OFF*	*ON*	***

*** EPC Control dependent on throttle position and vehicle speed.*
** TCC control dependent on throttle position, vehicle speed, brake switch.*

SOLENOID AND FLUID TEMPERATURE SENSOR LOCATIONS

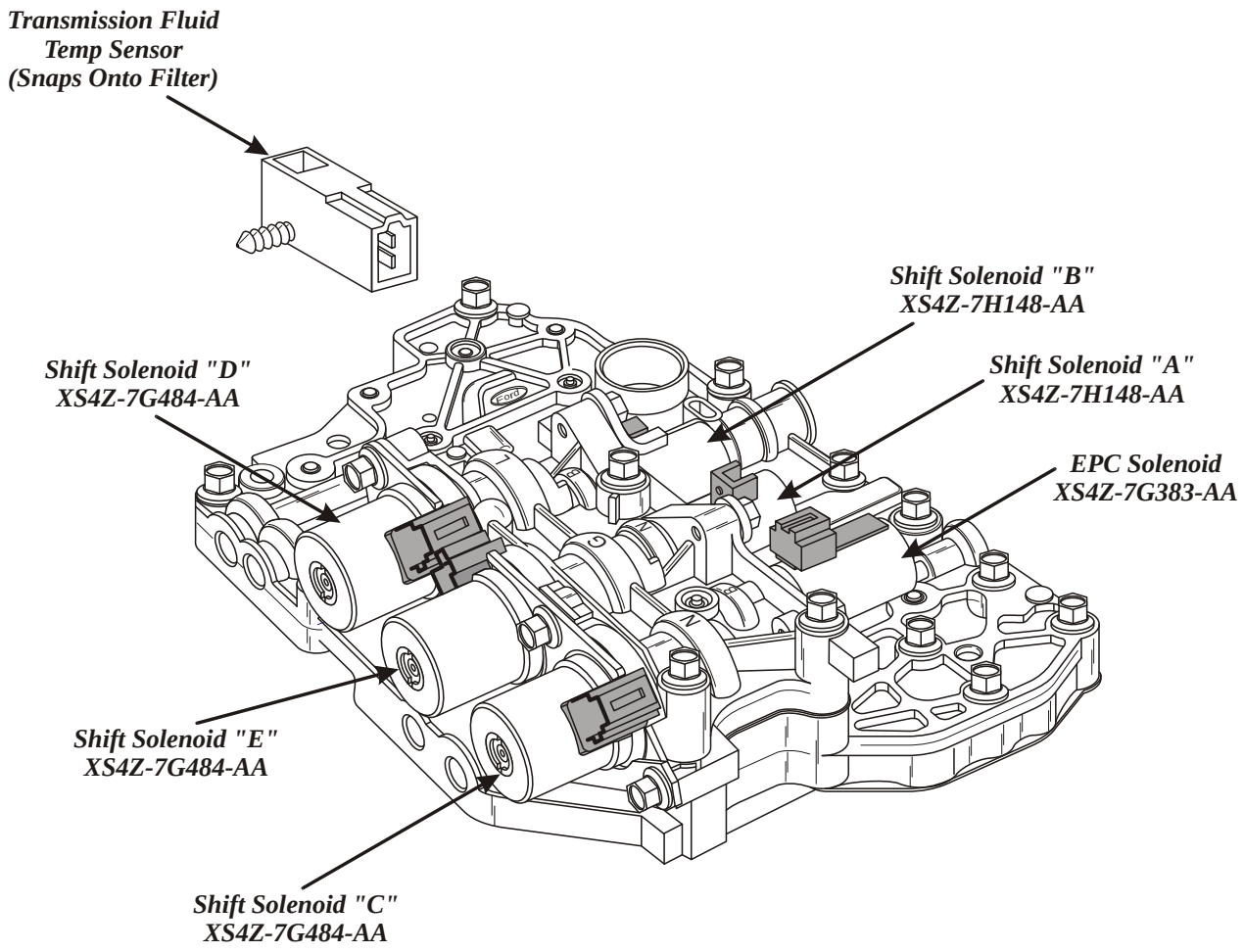

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Figure 4

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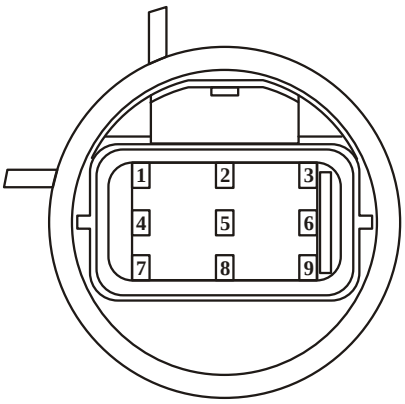
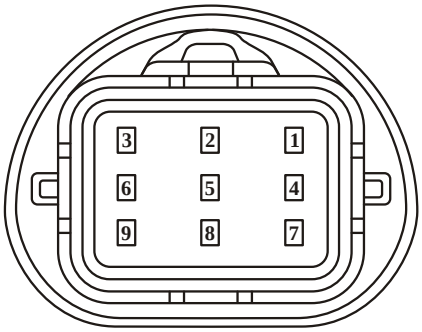
SOLENOID AND TRANSAXLE FLUID TEMP RESISTANCE CHART



Transaxle Case Connector (Face View)



Vehicle Harness Connector (Face View)

INTERNAL TRANSAXLE COMPONENTS RESISTANCE CHART		
Terminals	*Transaxle Component*	*Ohms Resistance At 20°C (70°F)*
6 and Gnd.	*Shift Solenoid "A" (On-Off)*	*10.9 - 26.2*
8 and Gnd.	*Shift Solenoid "B" (On-Off)*	*10.9 - 26.2*
3 and Gnd.	*Shift Solenoid "C" (PWM)*	*1.0 - 4.2*
9 and Gnd.	*Shift Solenoid "D" (PWM)*	*1.0 - 4.2*
1 and Gnd.	*Shift Solenoid "E" (PWM)*	*1.0 - 4.2*
2 and 7	*EPC Solenoid (PWM)*	*2.4 - 7.3*

NOTE: Gnd. = Ground Ohm Meter to the Case

Transaxle Temperature Sensor Resistance Chart Terminals 4 and 5
0°C (32°F) = 83.2k - 107k Ohms
20°C (70°F) = 33.5k - 41.2k Ohms
40°C (104°F) = 14.6k - 17.6k Ohms
60°C (140°F) = 7.08k - 8.01k Ohms
80°C (176°F) = 3.61k - 4.06k Ohms
100°C (212°F) = 1.96k - 2.20k Ohms
120°C (248°F) = 1.13k - 1.25k Ohms
130°C (266°F) = 0.87k - 0.96k Ohms

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Figure 5

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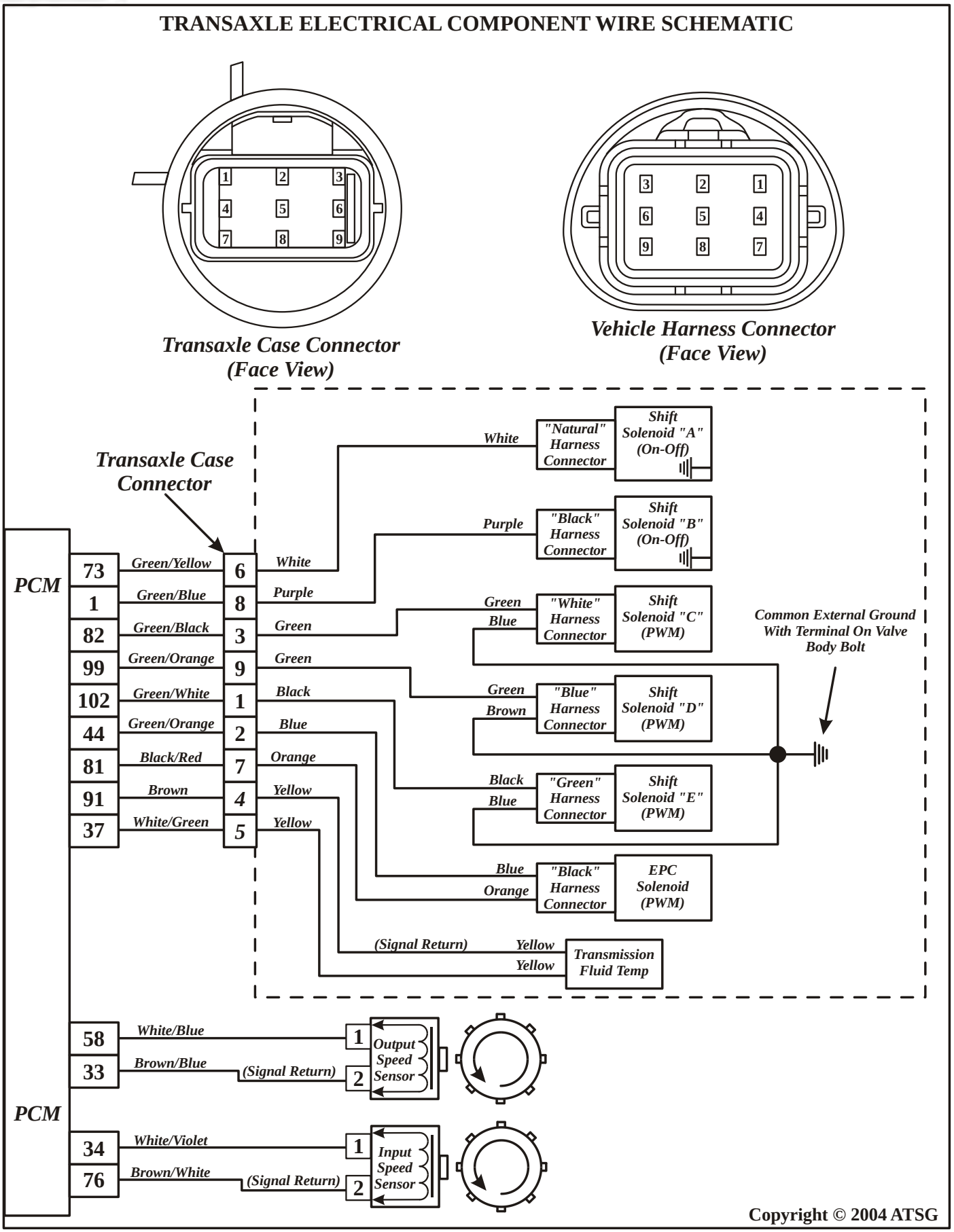

Figure 6

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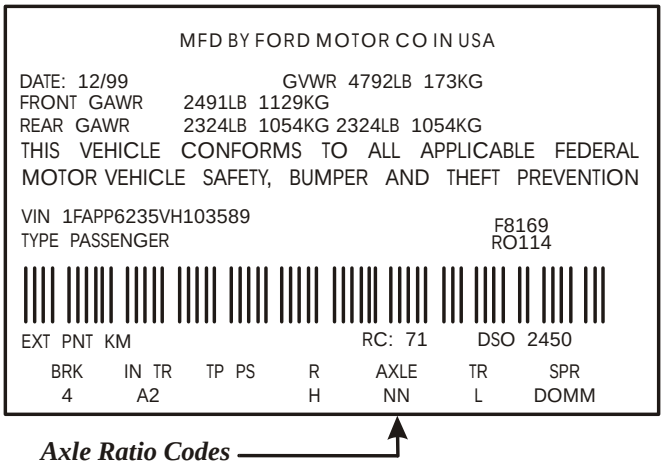
Typical Door I.D. Tag



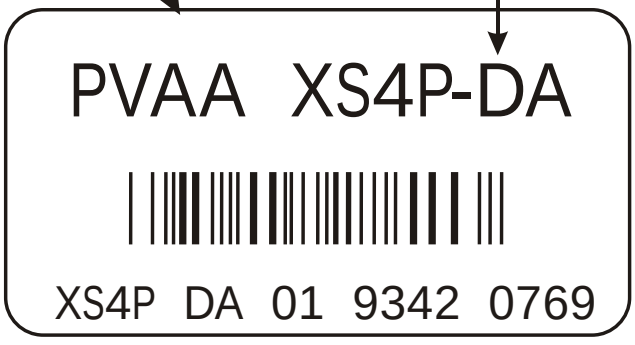
Axle Ratio Codes

NOTE: There are two different axle ratios listed for this transaxle used in the U.S.

NN = 3.693 Automatic
WW = 3.904 Automatic

Typical Transaxle I.D. Tag

1st Digit Of Suffix Also Identifies Ratio And Original Engine



B = Sigma Engine, 4.15 Ratio (Europe Only)
C = 2.0L SPI Engine, 3.69 Ratio
D = 2.0L Z-Tec Eng, 3.90 Ratio

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Figure 7

GEAR RATIO IDENTIFICATION

There are currently two different final drive axle ratios listed for this transaxle, in vehicles that are sold in the United States. The two different axle ratios are tied to the engine size in the vehicle. The easiest means of identification is on the door tag of the vehicle, as shown in Figure 7, and look for the two digit code under the word "AXLE".

Another means of identification is the first digit of the Suffix in the part number that is located on the transaxle identification tag, and is also shown in Figure 7. This will be the only means of identification if someone brings you a transaxle core to purchase. We have also shown you the European ratio, as we have already seen some of these cores in the U.S., and ***will not*** interchange into U.S. vehicles.

ELECTRONIC COMPONENT DESCRIPTION

POWERTRAIN CONTROL MODULE (PCM)

The Powertrain Control Module (PCM) controls engine functions and provides total control of the 4F27E transaxle. The PCM monitors various input signals from several sensors and switches, as shown in Figure 8, and will then respond by operating solenoids for control of the line pressure, the shift scheduling and apply and release of the Torque Converter Clutch (TCC).

The PCM may also store Diagnostic Trouble Codes (DTC's) related to detected transaxle faults. If faults are detected, it will alert the driver by turning ON the Malfunction Indicator Lamp (MIL) located in the instrument cluster, as shown in Figure 8.

"FAIL-SAFE" OPERATION

If the transaxle loses electronic control, as in blown fuse, it will operate in a fail-safe mode with the following features:

- Maximum line pressure in all positions.
- Fully functional P, R and N positions.
- Operation in 3rd gear only with coast braking, when selector is in ***any*** forward range.
- TCC released in all positions.

Continued on Page 11

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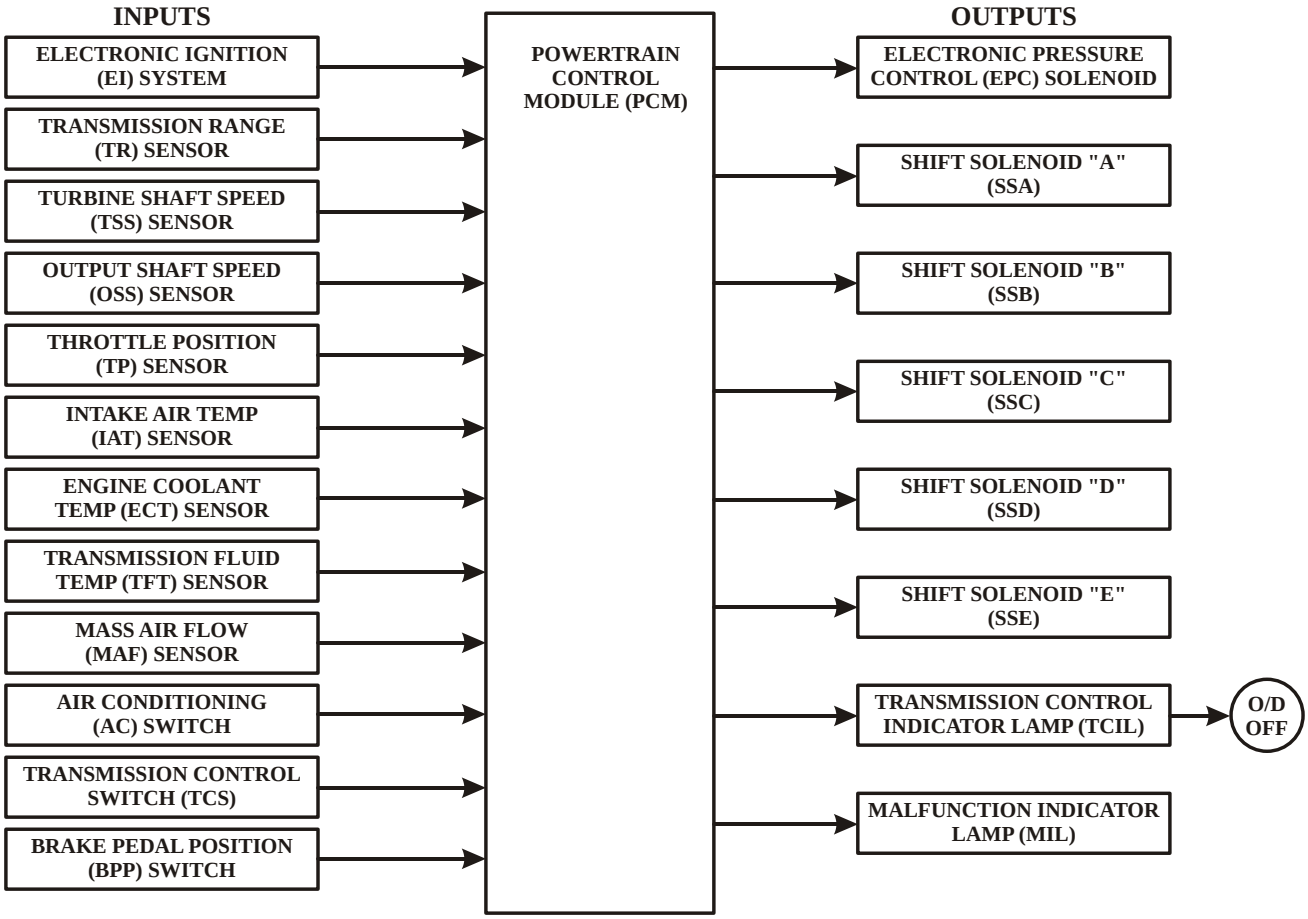

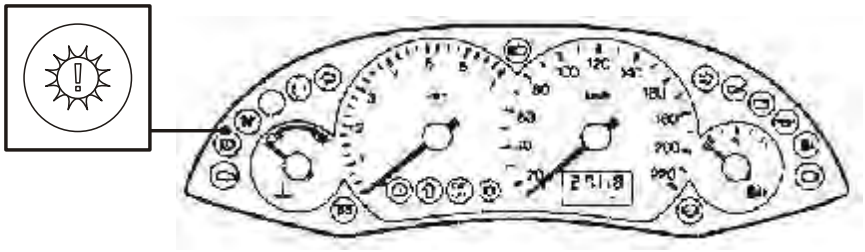

The "Powertrain Warning Indicator" is located on the left side of the instrument cluster as shown above and is Orange in color.

"PCM IS LOCATED BEHIND THE RIGHT HAND KICK PANEL"

PCM PIN IDENTIFICATION

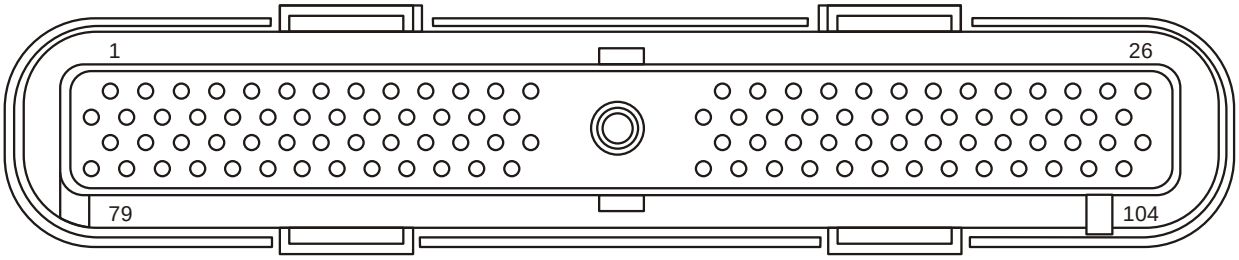

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Figure 8

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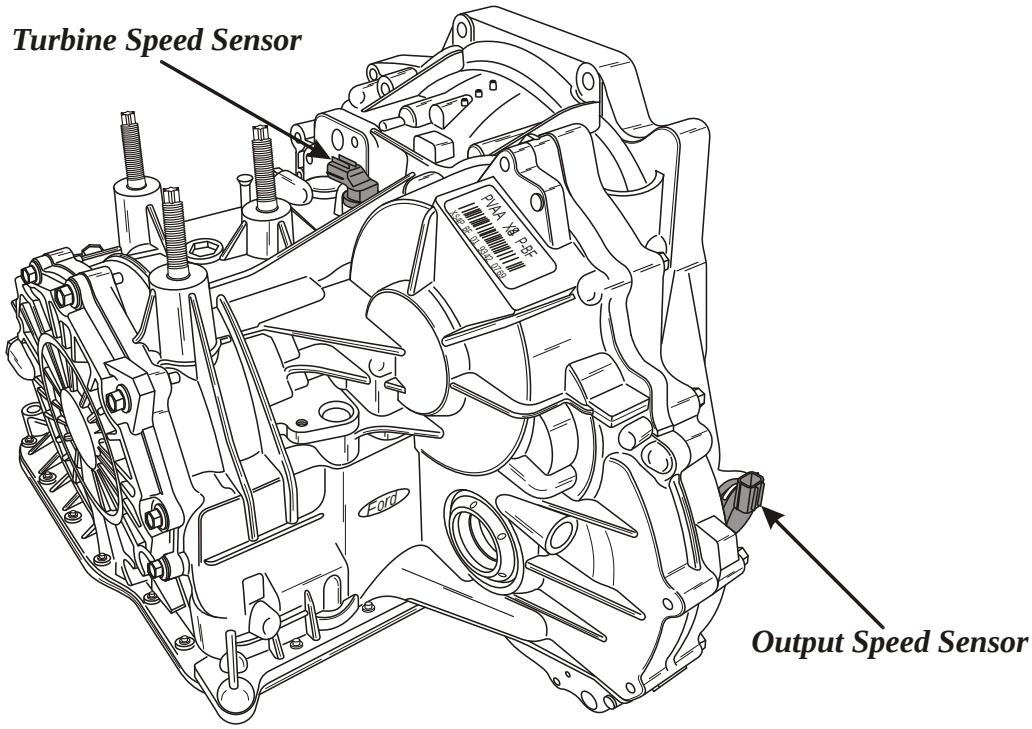
TURBINE AND OUTPUT SPEED SENSORS



TRANSAXLE SPEED SENSOR RESISTANCE CHART	
Transaxle Component	***Ohms Resistance At 20°C (70°F)***
Turbine Speed Sensor (TSS)	***330 - 390 Ohms***
Output Speed Sensor (OSS)	***720 - 800 Ohms***

Figure 9

TURBINE SHAFT SENSOR

The Turbine Shaft Speed (TSS) sensor mounts on the transaxle case externally, as shown in Figure 9, and is a magnetic pickup that the PCM monitors to determine the rotating speed of the input shaft. The PCM uses the TSS sensor signal to determine EPC pressure and TCC control strategy.

There is a resistance chart found in Figure 9 to check the Turbine Shaft Speed sensor.

OUTPUT SHAFT SENSOR

The Output Shaft Speed (OSS) sensor mounts on the transaxle case externally, as shown in Figure 9, and is a magnetic pickup that the PCM monitors to determine the rotating speed of the output shaft. The PCM uses the OSS sensor signal to determine EPC pressure, shift scheduling and TCC control strategy.

There is a resistance chart found in Figure 9 to check the Output Shaft Speed sensor.

TRANSMISSION RANGE (TR) SENSOR

The Transmission Range (TR) sensor is mounted on the transaxle at the manual control lever, as shown in Figure 10. The PCM uses the range sensor for the selected gear, and for EPC pressure control strategy. The TR sensor also contains the Neutral/Start and the backup lamp circuits. We have provided you with a complete range sensor wiring schematic in Figure 10.

Continued on Page 13

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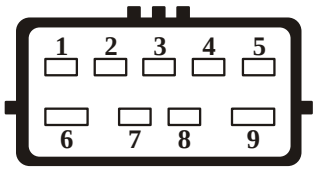
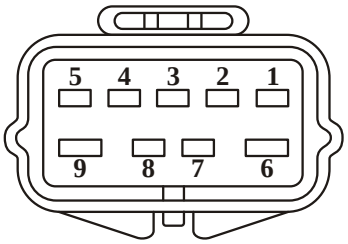
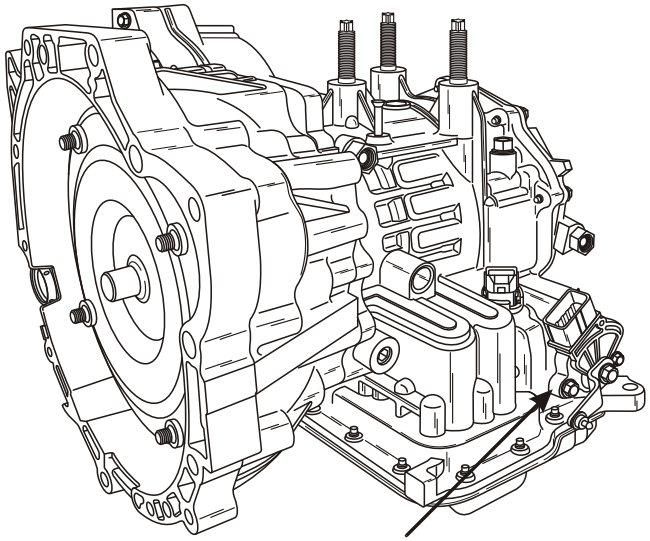
TRANSAXLE RANGE SENSOR WIRE SCHEMATIC



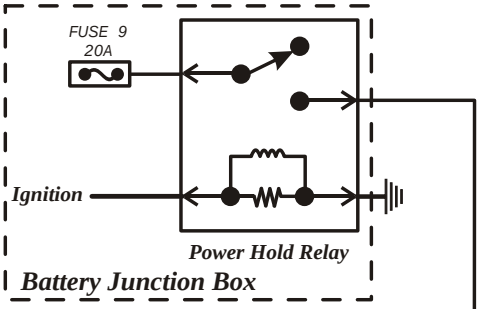
Transaxle Range Sensor Connector (Face View)



Vehicle Harness Connector (Face View)



Transaxle Range Sensor



Transaxle Range Sensor Connector

TRS Pin No.	Function
1	Voltage Power
2	Drive Signal
3	1st Signal
4	Reverse Signal
5	P/N Signal
6	Starting System
7	2nd Signal
8	P/N Signal
9	Starting System

PCM

7 — Green/White — Green/White — 3 — 1

8 — Green/Orange — Green/Orange — 7 — 2

11 — Green/Black — Green/Black — 2 — D

4 — Green/Blue — Green/Blue — 4 — R

Back-up Lamps

Green/Yellow — 5 — P

Green/Red — 8 — N

64 — Green/Yellow

Green/Orange — 1

P

Starting System — Gray — 9 — N

6 — Gray/Red — Starting System

Transaxle Range Sensor

PCM See Page 10

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Figure 10

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ELECTRONIC COMPONENT DESCRIPTION

ELECTRONIC PRESSURE CONTROL (EPC) SOLENOID

The EPC Solenoid is located in the valve body in the location shown in Figure 4, and is a Variable Force Solenoid. A VFS solenoid is an actuator that combines a solenoid and a regulating valve.
The PCM varies the amount of current sent to the EPC solenoid, which varies pressure in hydraulic circuits affecting line pressure. Less current results in higher line pressure. Refer to Figure 5 for the resistance chart for all solenoids and Figure 6 for a complete wiring schematic.

SHIFT SOLENOIDS "A" AND "B"

Shift Solenoids "A" and "B" are ON/OFF solenoids (Normally Closed) that block fluid flow when OFF and allow full fluid flow when ON. They are located on the valve body, as shown in Figure 4.
The PCM affects shift valve positions by turning the shift solenoids ON or OFF. This results in full control of the transaxle in all forward speeds. Refer to Figure 5 for the resistance chart for all solenoids and Figure 6 for a complete wiring schematic.

SHIFT SOLENOIDS "C", "D" AND "E"

Shift Solenoids "C", "D" and "E" are located in the valve body in the locations shown in Figure 4. These solenoids are all Pulse Width Modulated (PWM) that vary fluid flow and pressure to apply components with PWM control strategy.
Refer to Figure 5 for the resistance chart for all solenoids and to Figure 6 for a complete wiring schematic.

ENGINE COOLANT TEMP (ECT) SENSOR

The Engine Coolant Temp (ECT) sensor monitors the temperature of engine coolant and supplies this information to the PCM. The resistance value of the ECT sensor varies with temperature change. The PCM monitors the voltage across the ECT sensor to determine engine coolant temperature.
The ECT is located in an engine coolant passage near the engine thermostat.
The PCM uses the ECT sensor signal to determine TCC control strategy.

AIR CONDITIONING (A/C) CLUTCH SWITCH

The PCM also monitors the AC clutch switch and when energized the PCM adjusts EPC pressure to compensate for additional load on the engine.

TRANSAXLE FLUID TEMP (TFT) SENSOR

The Transaxle Fluid Temp (TFT) sensor is located on the bottom of the fluid filter, and in contact with transaxle fluid at all times (See Figure 4).
The TFT is a temperature sensitive device called a thermister. The resistance value of the TFT sensor varies with temperature change. The PCM uses the voltage signal across the TFT sensor to determine transaxle fluid temperature.
The PCM uses the TFT sensor signal to determine whether a cold start shift schedule is necessary. The cold start shift schedule allows quicker shifts when the transaxle fluid temperature is cold.
Refer to Figure 5 for resistance values at the various temperatures and Figure 6 for a complete wiring schematic.

THROTTLE POSITION (TP) SENSOR

The Throttle Position (TP) sensor is a potentiometer mounted on the engine throttle body. The TP sensor detects the position of the throttle plate and sends this information to the PCM as a varying 0.5 to 5.0 voltage signal. The PCM uses this signal for control of the EPC pressure, the shift scheduling and TCC operation.

MASS AIR FLOW (MAF) SENSOR

The Mass Air Flow (MAF) sensor is mounted in the air cleaner inlet tube, and directly measures the mass of air flowing into the engine. The MAF sensor output is a DC voltage signal ranging from 0.5 volts to 5.0 volts and the PCM uses this signal for EPC control strategy.

BRAKE PEDAL POSITION (BPP) SWITCH

The Brake Pedal Position (BPP) switch is connected to the service brake pedal. The BPP switch has closed contacts, allowing a voltage signal to be sent to the PCM. When the brake pedal is pressed, the voltage signal is interupted and the PCM then knows to release the TCC.

Continued on Page 14

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TRANSMISSION CONTROL SWITCH (TCS)

The Transmission Control Switch (TCS) is located on the manual shift lever, as shown in Figure 11, and is a momentary contact switch. When this switch is pressed, a signal is sent to the PCM to either enable or cancel 4th gear and is often called an "Overdrive Cancel Switch".

Any fault detected with the TCS causes the PCM to enable 4th gear as a default strategy.

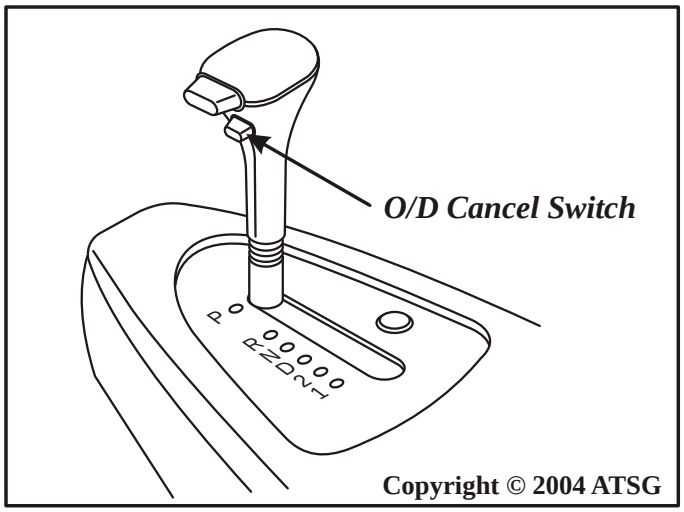

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Figure 11

TRANSMISSION CONTROL SWITCH (TCS)

The Transmission Control Indicator Lamp (TCIL) is used in vehicle applications that use the TCS. The TCIL is located on the instrument panel, as shown in Figure 12.

The PCM controls the operation of the TCIL and results in the PCM turning the TCIL ON or OFF. The TCIL is ON when overdrive is OFF.

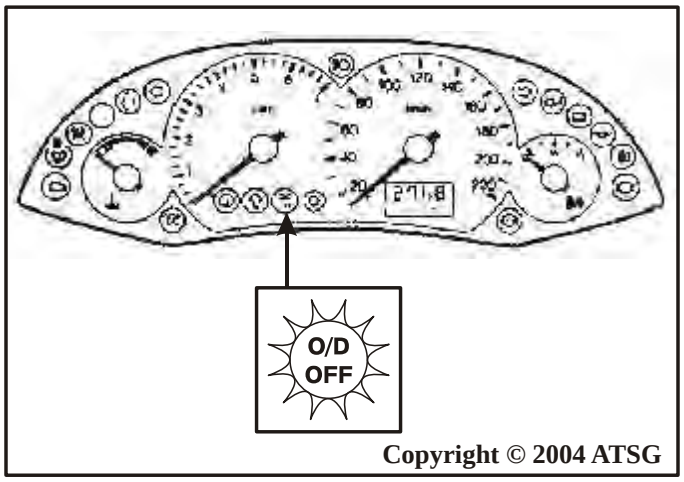

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Figure 12

ELECTRONIC IGNITION (EI) SYSTEM

The Electronic Ignition (EI) system is comprised of three different components, Crankshaft Position (CKP) sensor, Ignition Control Module (ICM) and the coil packs. The CKP sensor sends a signal related to the rotating speed (RPM) and position of the engine crankshaft, to the Ignition Control Module (ICM). The ICM then generates a Profile Ignition Pickup (PIP) signal that it sends to the PCM.

The PCM uses the PIP signal from the EI system to determine EPC pressure, shift scheduling and TCC control strategy.

INTAKE AIR TEMPERATURE (IAT) SENSOR

The Intake Air Temperature (IAT) sensor is located in the air cleaner outlet tube and is a temperature sensitive device called a thermister. The resistance value of the IAT sensor varies with temperature changes. The PCM monitors the voltage across the IAT to determine air temperature.

The PCM uses the IAT sensor signal to determine EPC pressure control strategy.

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DIAGNOSTIC TROUBLE CODE CHARTS	
DTC	**DESCRIPTION**
P0705	***Transmission Range Sensor Circuit Failure***
P0712	***Transmission Fluid Temperature Sensor Circuit Grounded, 315°F Indicated***
P0713	***Transmission Fluid Temperature Sensor Circuit Open, -40°F Indicated***
P0715	***Turbine Shaft Speed Sensor, Insufficient Input***
P0717	***Turbine Shaft Speed Sensor, Intermittent Signal***
P0718	***Turbine Shaft Speed Sensor Erratic***
P0720	***Output Shaft Speed Sensor, Insufficient Input***
P0721	***Output Shaft Speed Sensor Erratic***
P0722	***Output Shaft Speed Sensor, Intermittent Signal***
P0731	***1st Gear Error - Shift Solenoid "A", "B", "C", Or Internal Parts***
P0732	***2nd Gear Error - Shift Solenoid "A", "B", "C", Or Internal Parts***
P0733	***3rd Gear Error - Shift Solenoid "A", "B", "C", Or Internal Parts***
P0734	***4th Gear Error - Shift Solenoid "A", "B", "C", Or Internal Parts***
P0741	***Torque Converter Clutch Slippage Detected***
P0745	***EPC Solenoid Circuit Failure, Circuit Shorted***
P0750	***Shift Solenoid "A" Circuit Failure***
P0751	***Shift Solenoid "A", Mechanical Or Hydraulic Failure***
P0755	***Shift Solenoid "B" Circuit Failure***
P0756	***Shift Solenoid "B", Mechanical Or Hydraulic Failure***
P0760	***Shift Solenoid "C" Circuit Failure***
P0761	***Shift Solenoid "C", Mechanical Or Hydraulic Failure***
P0765	***Shift Solenoid "D" Circuit Failure***
P0766	***Shift Solenoid "D", Mechanical Or Hydraulic Failure***
P0770	***Shift Solenoid "E" Circuit Failure***
P0771	***Shift Solenoid "E", Mechanical Or Hydraulic Failure***
P1700	***Internal Transaxle Mechanical Failure***
P1705	***Transmission Range Sensor, Not In Park Or Neutral During KOEO/KOER***
P1711	***Transmission Fluid Temperature Sensor, Out Of On-Board Diagnostic Range***
P1713	***Transmission Fluid Temperature Sensor, No Change In Low Range***
P1718	***Transmission Fluid Temperature Sensor, No Change In High Range***
P1746	***EPC Solenoid Circuit Failure, Circuit Open***
P1747	***EPC Solenoid Circuit Failure, Circuit Shorted***
P1760	***EPC Solenoid Circuit, Intermittent Short To Ground***
P1780	***Transaxle Control Switch, Input Incorrect For Selected Position***
P1783	***Transaxle Overtemp Condition Indicated*** **Copyright © 2004 ATSG**

Figure 13

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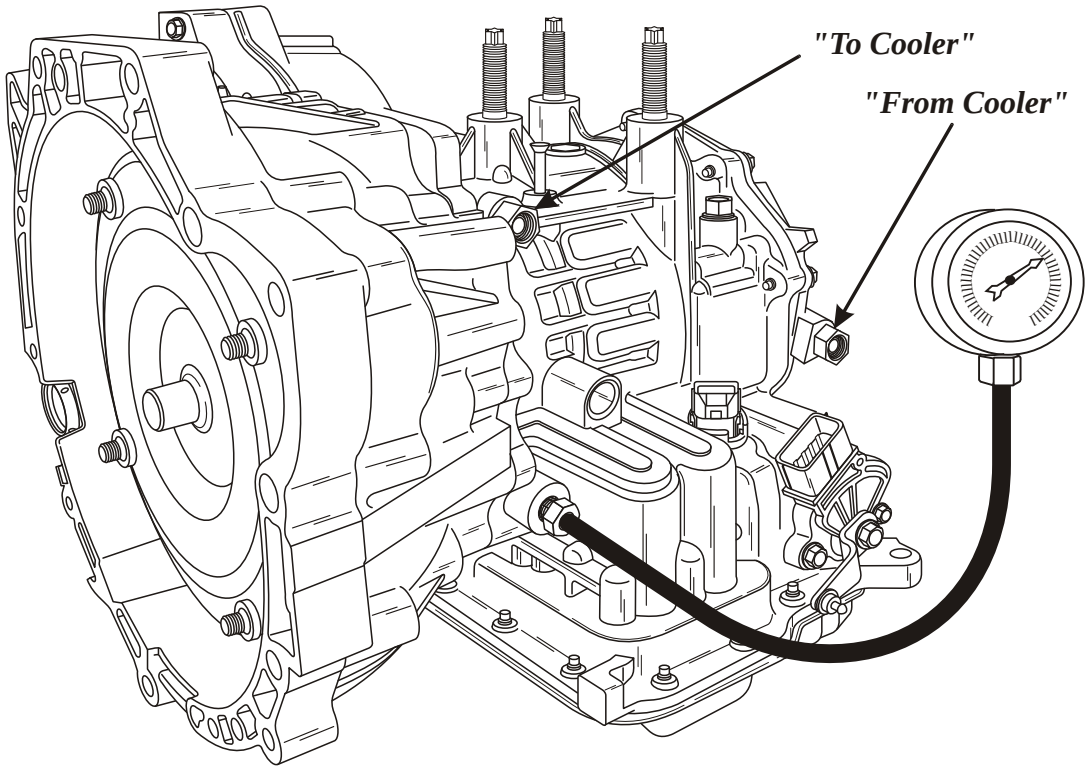
4F27E TRANSAXLE LINE PRESSURE TEST AND COOLER LINE IDENTIFICATION



4F27E TRANSAXLE LINE PRESSURE TEST		
RANGE	**IDLE**	**STALL**
Park/Neutral	**50-65 PSI (345-450 KPA)**	
Reverse	**65-85 PSI (450-585 KPA)**	**280-335 PSI (1930-2310 KPA)**
D, 2, 1	**50-65 PSI (345-450 KPA)**	**180-210 PSI (1240-1450 KPA)**

STALL SPEED CHART		
ENGINE	**VIN**	**RPM**
2.0L SPI (Split Port Induction)	**P**	***2406-2811***
2.0L "Zetec"-E	**3**	***2439-2837***

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Figure 14

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LINE PRESSURE TEST

1. Install 350 PSI pressure gauge into the line pressure tap, as shown in Figure 14.
2. Start engine and check line pressure, ***at idle,*** in each gear range and refer to the chart found in Figure 14.
   Caution: If the line pressure is low at idle, "Do Not" perform the stall test, as further transaxle damage will occur.
3. Press the accelerator pedal to the floor (WOT) in each gear range and refer to the chart found in Figure 14.
   Caution: Do not maintain Wide Open Throttle (WOT) in any gear range for more than five (5) seconds.
4. Record the RPM reached in each range and compare to the stall speed chart in Figure 14.
   Caution: After stall testing each gear range move the selector lever to Neutral and run the engine at 1000 rpm for about 15 seconds to allow the converter to cool, before testing the next gear range.

TRANSAXLE DISASSEMBLY

EXTERNAL COMPONENTS

1. Remove the external shift lever retaining bolt and external shift lever, as shown in Figure 15.
2. Remove the 2 transaxle range sensor retaining bolts, as shown in Figure 15, and remove the range sensor

Continued on Page 18.

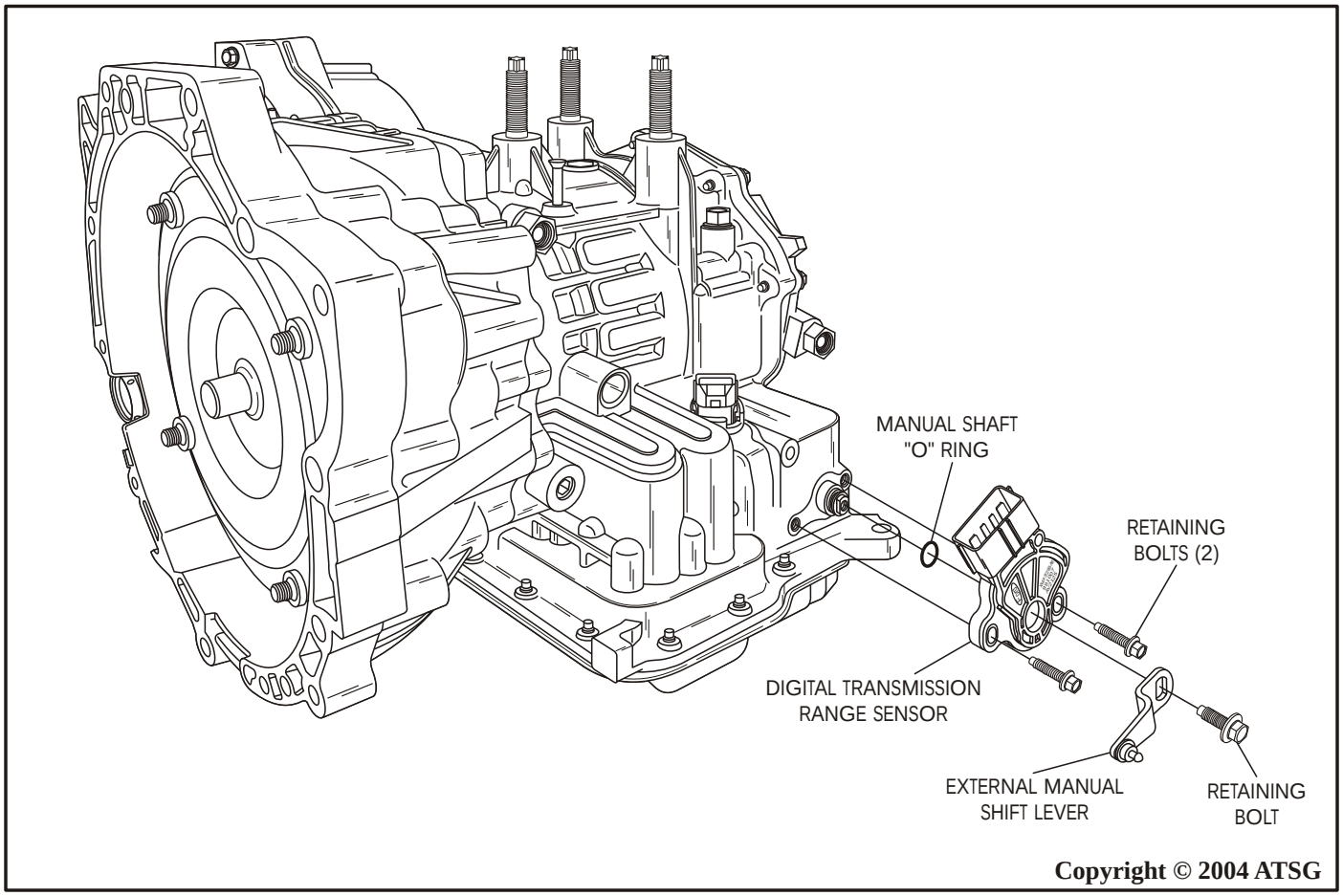

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Figure 15

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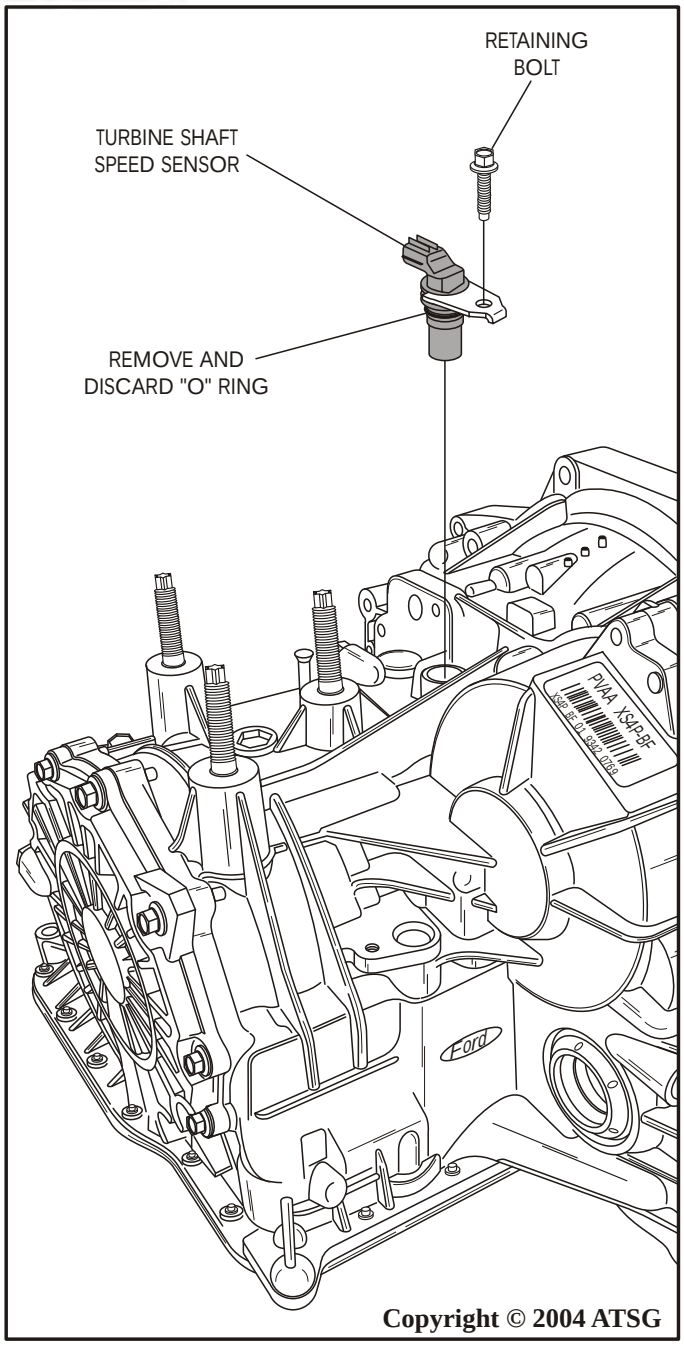

Figure 16

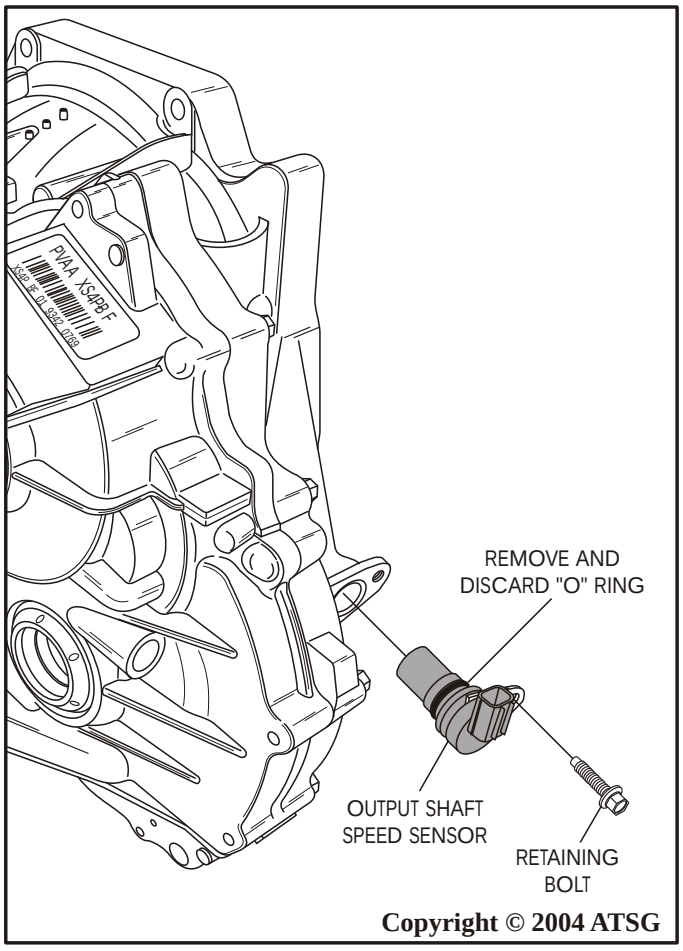

Figure 17

EXTERNAL COMPONENTS (Con't'd)

3. Remove the turbine shaft speed sensor from the case, as shown in Figure 16.
4. Remove the output speed sensor from the case, as shown in Figure 17.
5. Install the converter handles 307-091 onto the converter, as shown in Figure 18, that allows you to rotate the converter as you remove it.

Continued on Page 19.

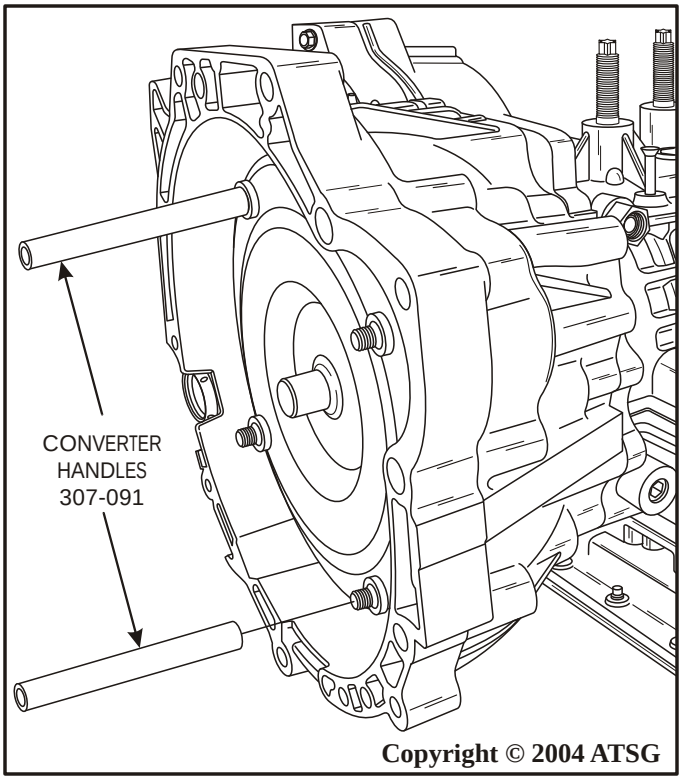

Figure 18

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EXTERNAL COMPONENTS (Con t'd)

Note: To avoid damaging the converter hub, do not tilt the converter when removing it.

7. Install the Mounting Bracket 307-410 onto the transaxle, as shown in Figure 19, and install into a suitable bench mount that will allow you to rotate the transaxle.

INTERNAL COMPONENTS

1. Remove the seven oil pump retaining bolts, as shown in Figure 20.
2. Remove the oil pump assembly using a slide hammer in the pump body holes.
3. Remove the oil pump assembly from transaxle, as shown in Figure 21, and set aside for the component rebuild section.

Continued on Page 20.

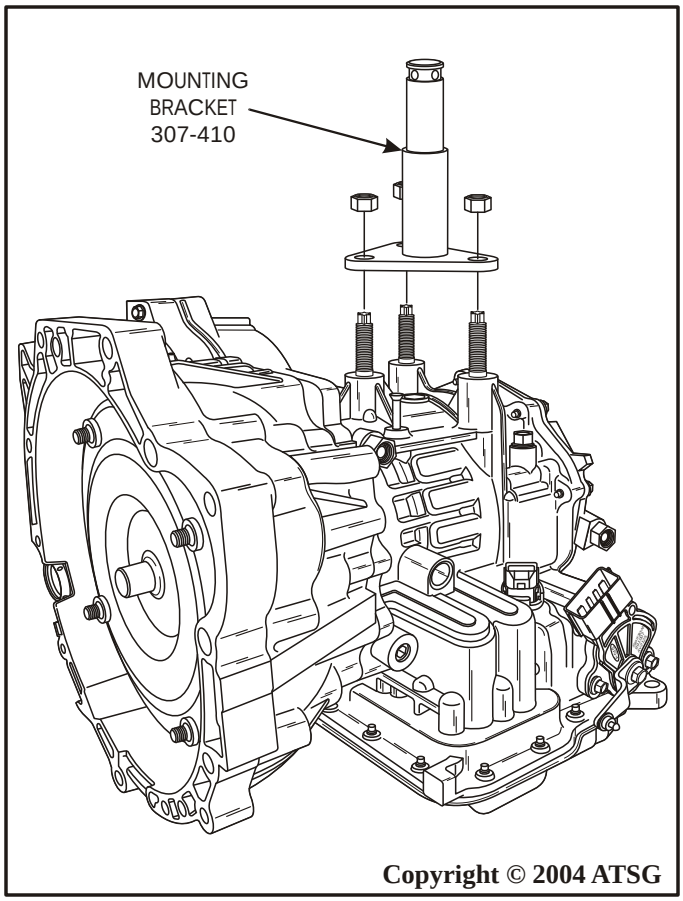

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Figure 19

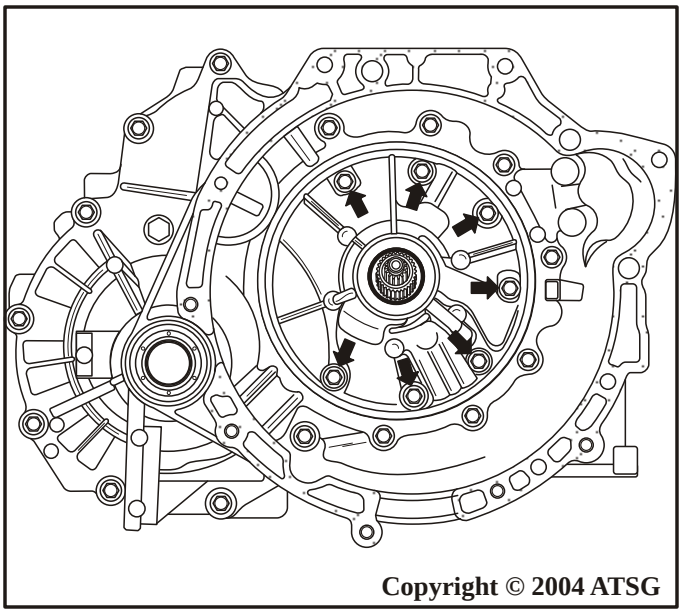

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Figure 20

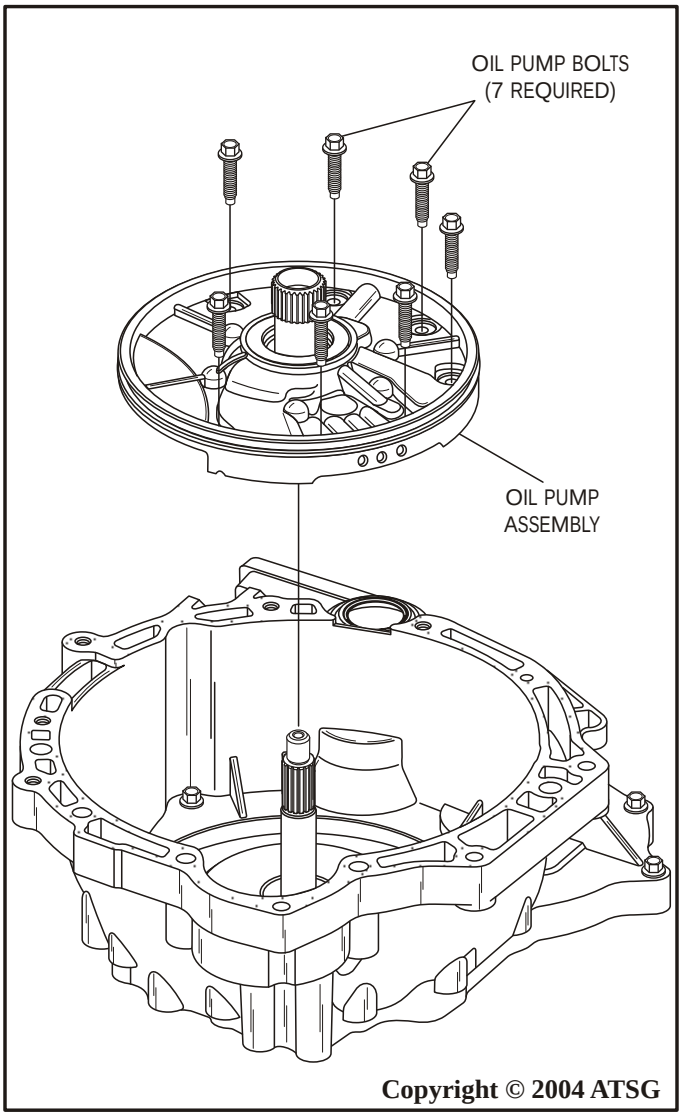

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Figure 21

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INTERNAL COMPONENTS (CONT'D)

4. Remove the forward clutch housing assembly and the housing to oil pump thrust washer by pulling straight up, as shown in Figure 22. ***Note: Thrust washer may stick to oil pump.***
5. Set the forward clutch housing aside for the component rebuild section.
6. Remove the forward clutch hub from transaxle using two scribes as levers to dis-lodge the hub from the cir-clip, as shown in Figure 23. ***Note: Cir-clip is located on front planetary sun gear and shaft shaft.***
7. Remove the intermediate/overdrive band anchor bolt, as shown in Figure 24.
8. Rotate the transaxle so that the end cover is facing up, as shown in Figure 25.
9. Remove the nine end cover retaining bolts, as shown in Figure 26, and remove end cover.
10. Remove and discard the two end cover to case "O" ring seals, as shown in Figure 26.
11. Remove the intermediate/overdrive band, as shown in Figure 26.

Continued on Page 22

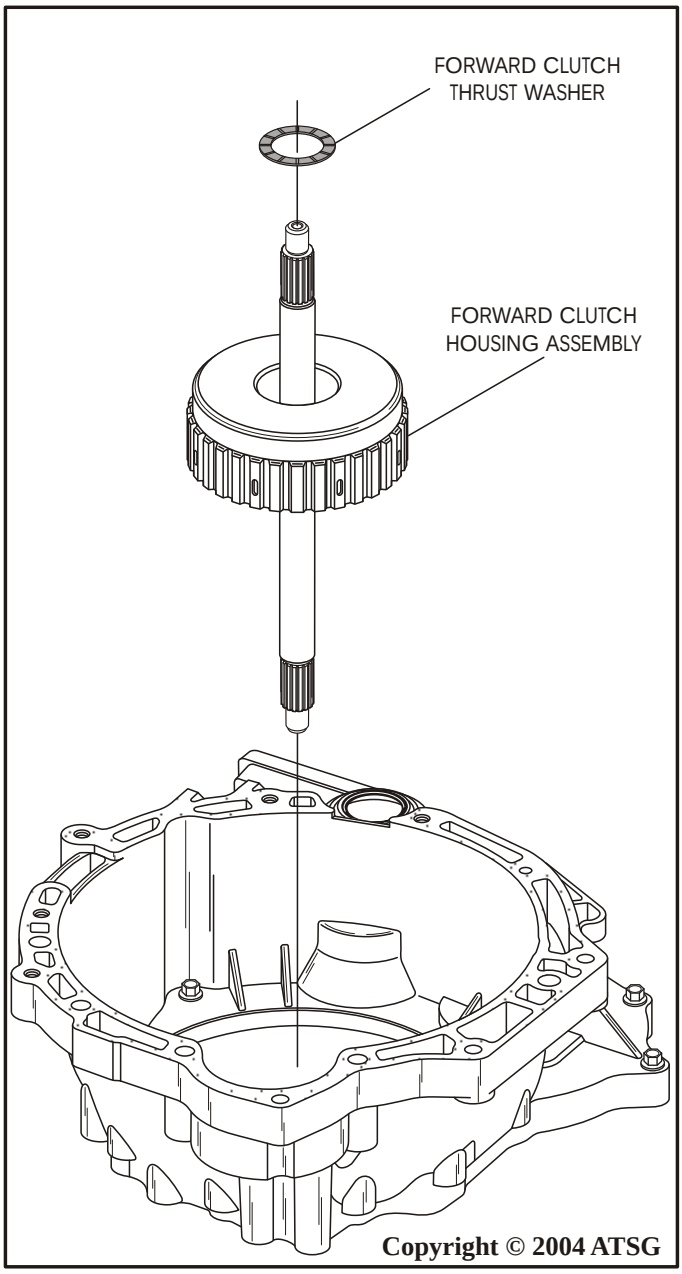

Figure 22

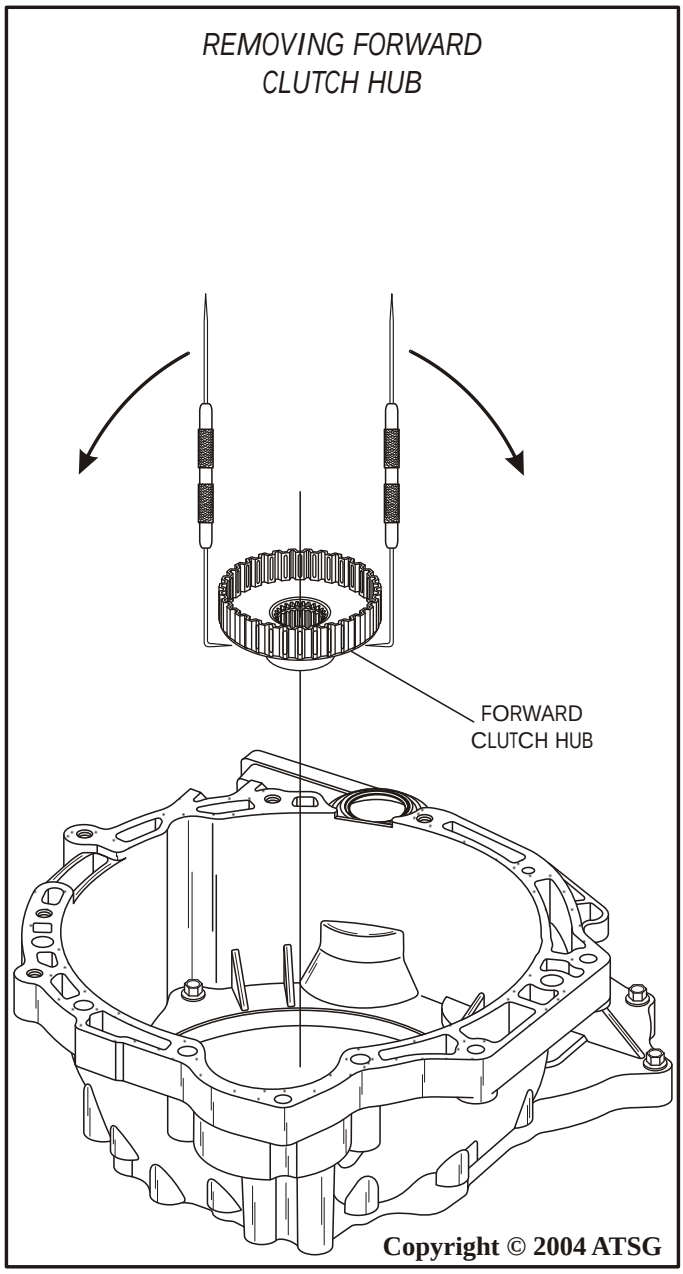

Figure 23

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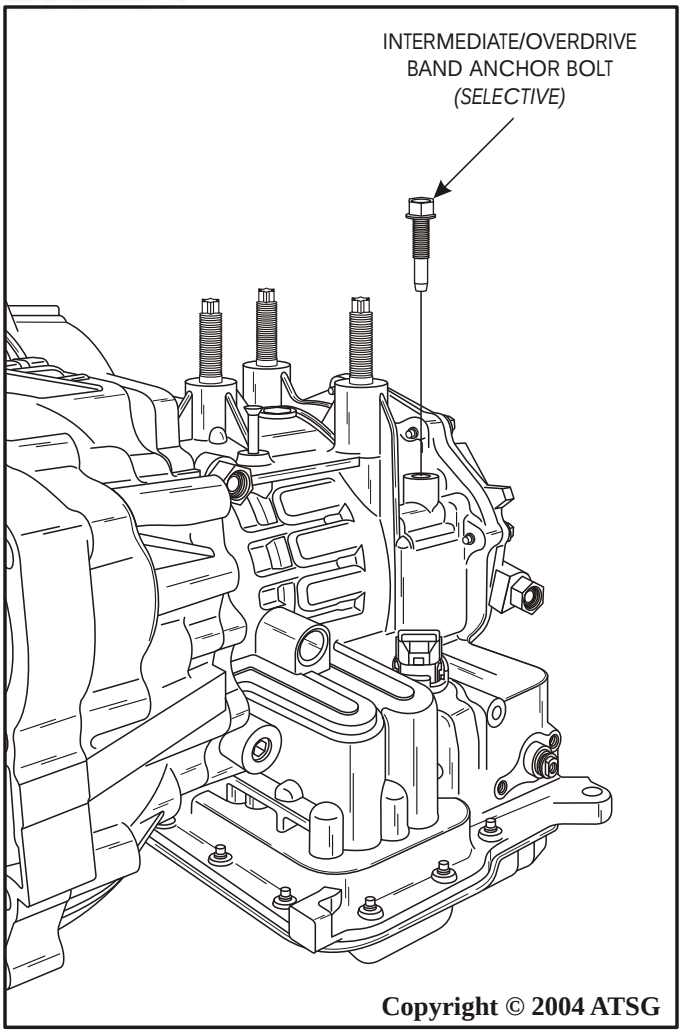

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Figure 24

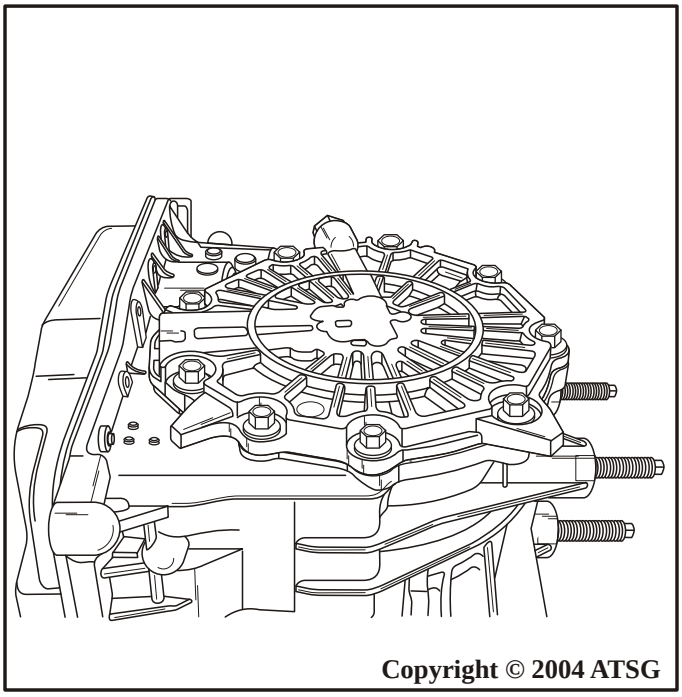

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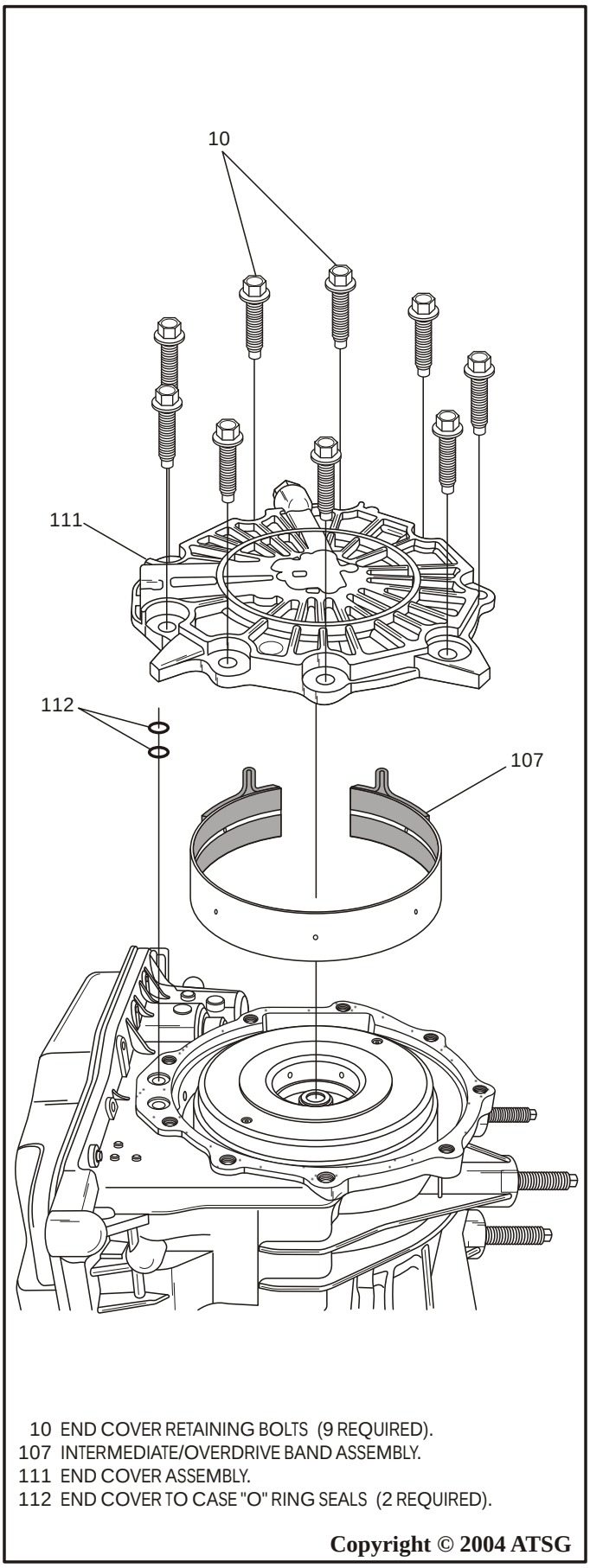
Figure 25



10 END COVER RETAINING BOLTS (9 REQUIRED).
107 INTERMEDIATE/OVERDRIVE BAND ASSEMBLY.
111 END COVER ASSEMBLY.
112 END COVER TO CASE "O" RING SEALS (2 REQUIRED).

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Figure 26

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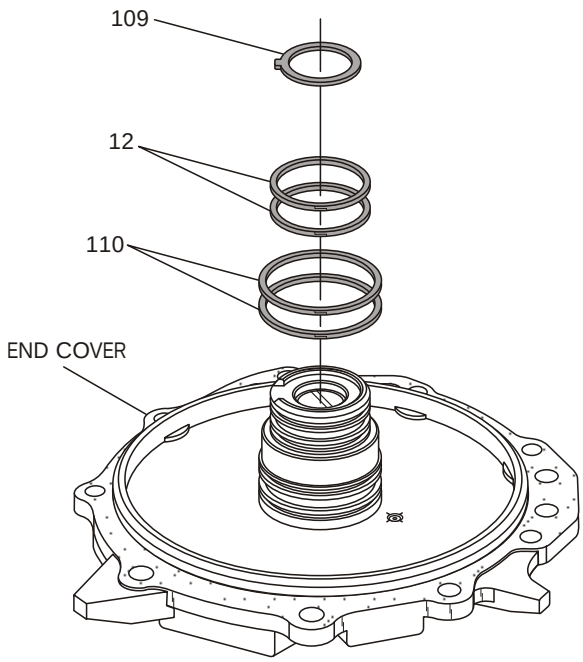

12 DIRECT CLUTCH SEALING RINGS (2 REQUIRED).
109 DIRECT CLUTCH HUB BEARING RACE *(SELECTIVE).*
110 REVERSE CLUTCH SEALING RINGS (2 REQUIRED).

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Figure 27

INTERNAL COMPONENTS (CONT'D)

12. Remove the direct clutch hub bearing race from the end cover, as shown in Figure 27. ***Note: This race is selective to set transaxle end play so do not lose it.***
13. Remove and discard the direct and reverse clutch sealing rings, as shown in Figure 27.
14. Set the end cover aside for the component rebuild section.
15. Remove the direct clutch number 1 thrust bearing, as shown in Figure 28.
16. Remove the direct/reverse clutch housing from transaxle, as shown in Figure 29.
17. Set the direct/reverse clutch housing aside for the component rebuild section.

Continued on Page 23

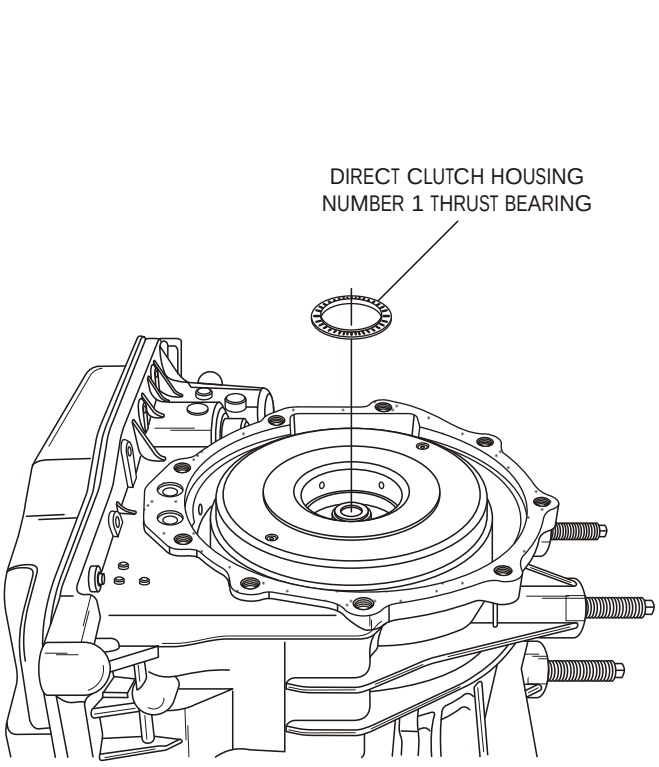

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Figure 28

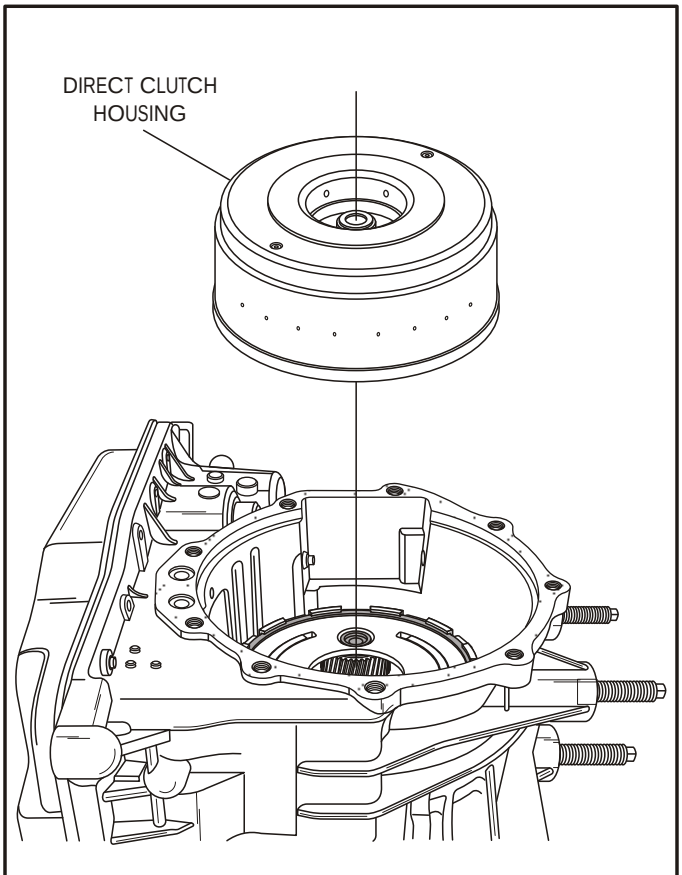

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Figure 29

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INTERNAL COMPONENTS (CONT'D)

18. Remove the planetary gearset from transaxle by lifting straight up, as shown in Figure 30.
19. Set the planetary gearset aside for component rebuild section.
20. Remove the low/reverse clutch backing plate snap ring, as shown in Figure 31.
21. Remove the low/reverse clutch backing plate, as shown in Figure 31.
22. Remove the low/reverse clutch plates, as shown in Figure 31.
    Note: This clutch pack consists of five steel plates and five friction plates.
23. Remove the low/reverse clutch cushion "cone" plate, as shown in Figure 31.

Continued on Page 24

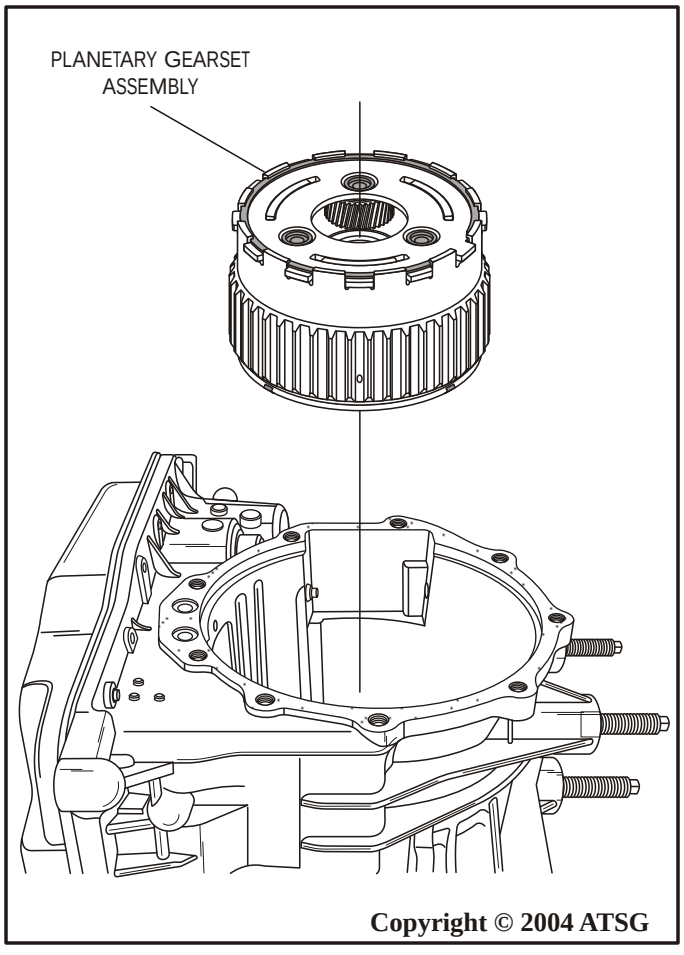

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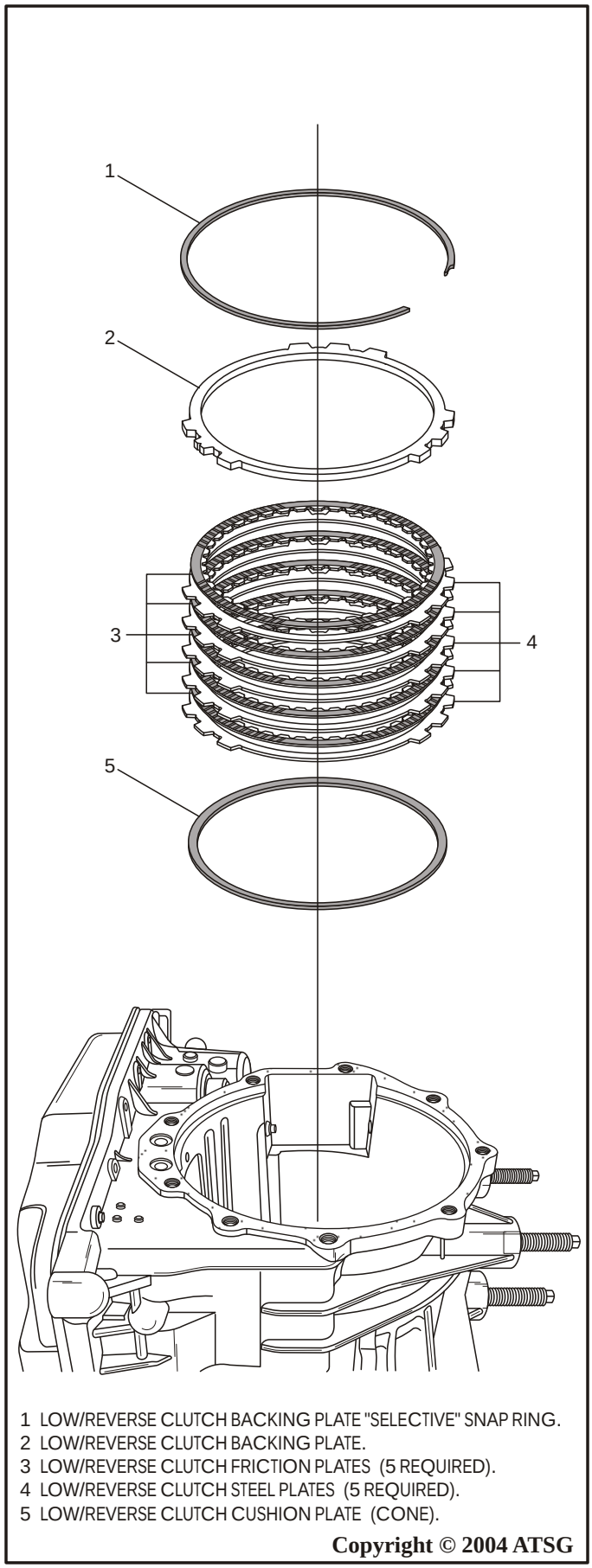
Figure 30



1 LOW/REVERSE CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
2 LOW/REVERSE CLUTCH BACKING PLATE.
3 LOW/REVERSE CLUTCH FRICTION PLATES (5 REQUIRED).
4 LOW/REVERSE CLUTCH STEEL PLATES (5 REQUIRED).
5 LOW/REVERSE CLUTCH CUSHION PLATE (CONE).

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Figure 31

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INTERNAL COMPONENTS (CONT'D)

24. Remove the low sprag inner race retaining snap ring, as shown in Figure 32.
25. Remove the low sprag inner race, as shown in Figure 32.
    Note: The sprag inner race also serves as the bellville spring retainer.
26. Remove the low/reverse clutch piston bellville return spring, as shown in Figure 32.
27. Remove the low/reverse clutch molded piston, as shown in Figure 32.
28. Rotate the transaxle so that the bottom pan is facing up, as shown in Figure 33.
    Note: This is best accomplished by removing from fixture and standing on bell housing and top studs on flat surface work bench.

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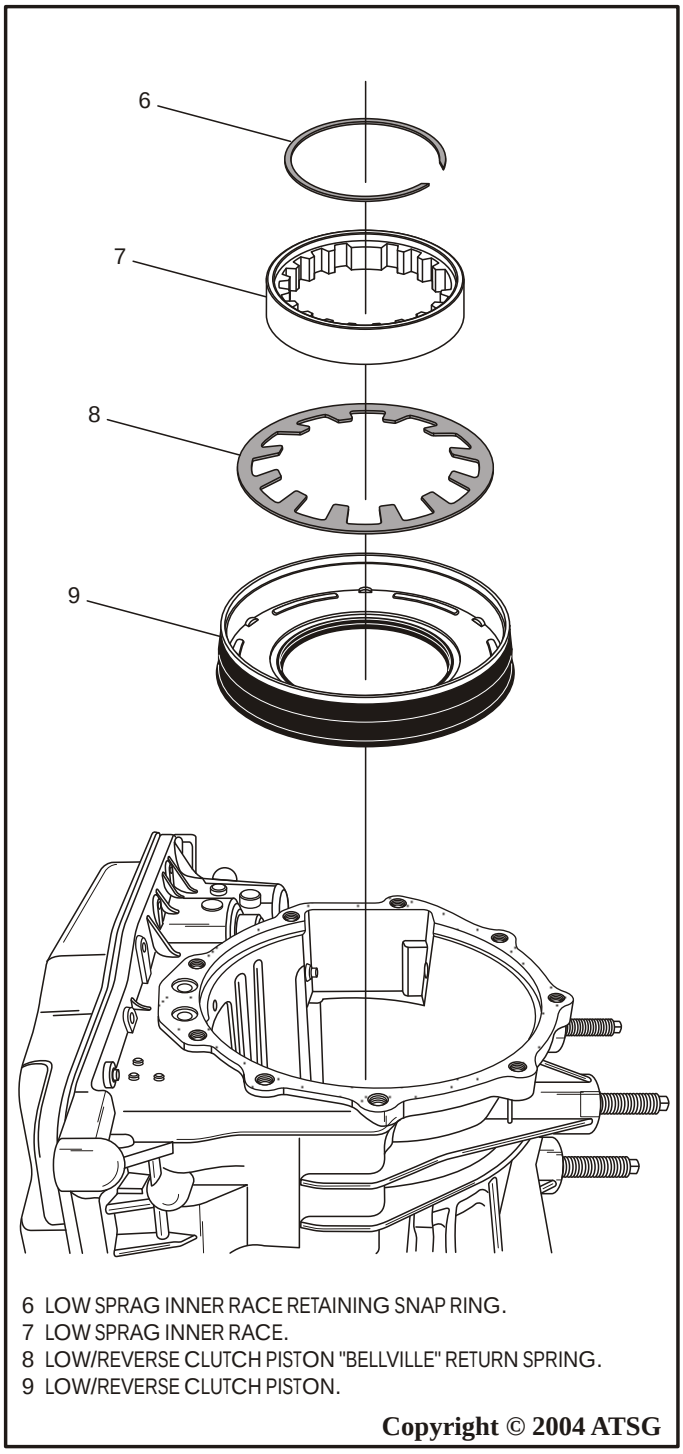

6 LOW SPRAG INNER RACE RETAINING SNAP RING.
7 LOW SPRAG INNER RACE.
8 LOW/REVERSE CLUTCH PISTON "BELLVILLE" RETURN SPRING.
9 LOW/REVERSE CLUTCH PISTON.

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Figure 32

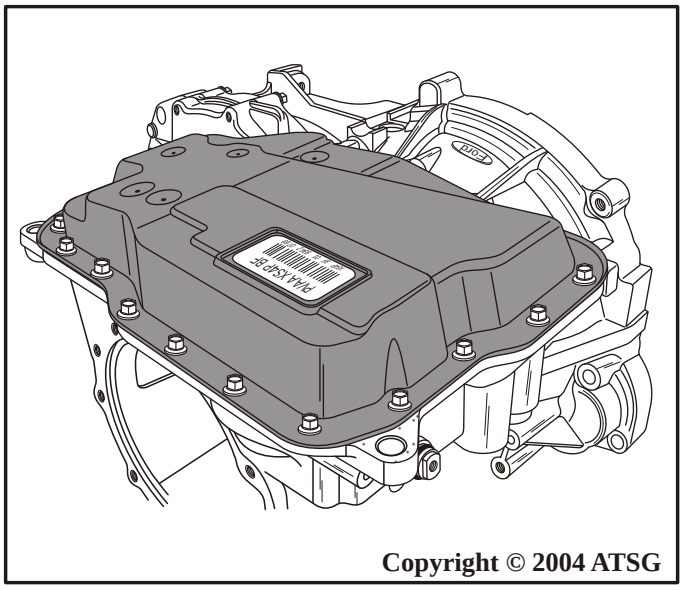

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Figure 33

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INTERNAL COMPONENTS (CONT'D)

29. Remove the 20 bottom pan bolts, as shown in Figure 34, and remove bottom pan.
30. Remove TFT Sensor from filter and lay to one side (See Figure 34).
31. Remove the fluid filter by pulling straight up, as shown in Figure 35.
    Note: Discard filter and "O" ring.
32. Remove the solenoid harness ground wire bolt from the valve body, as shown in Figure 36.
    Note: Remove the ground wire and screw the bolt back into valve body to prevent loss.

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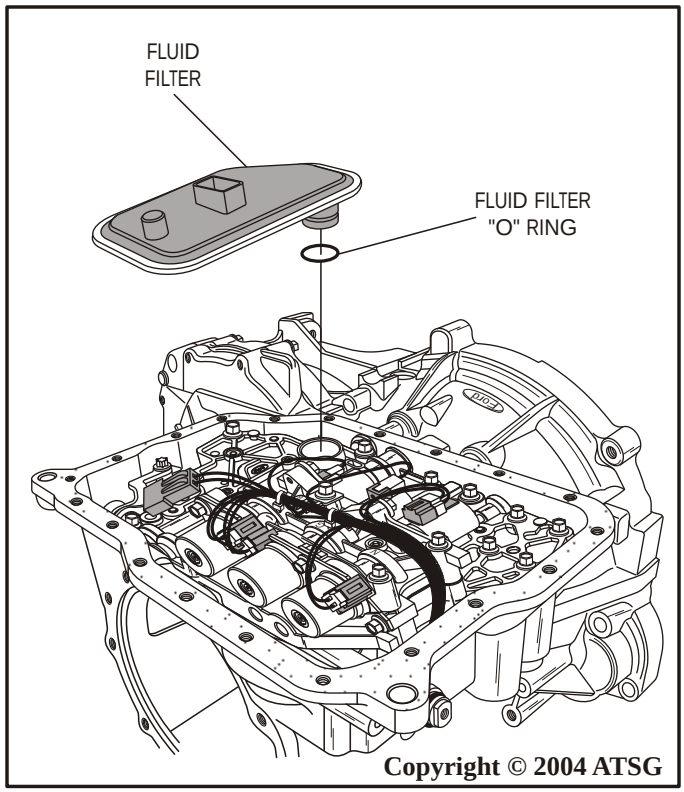

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Figure 35

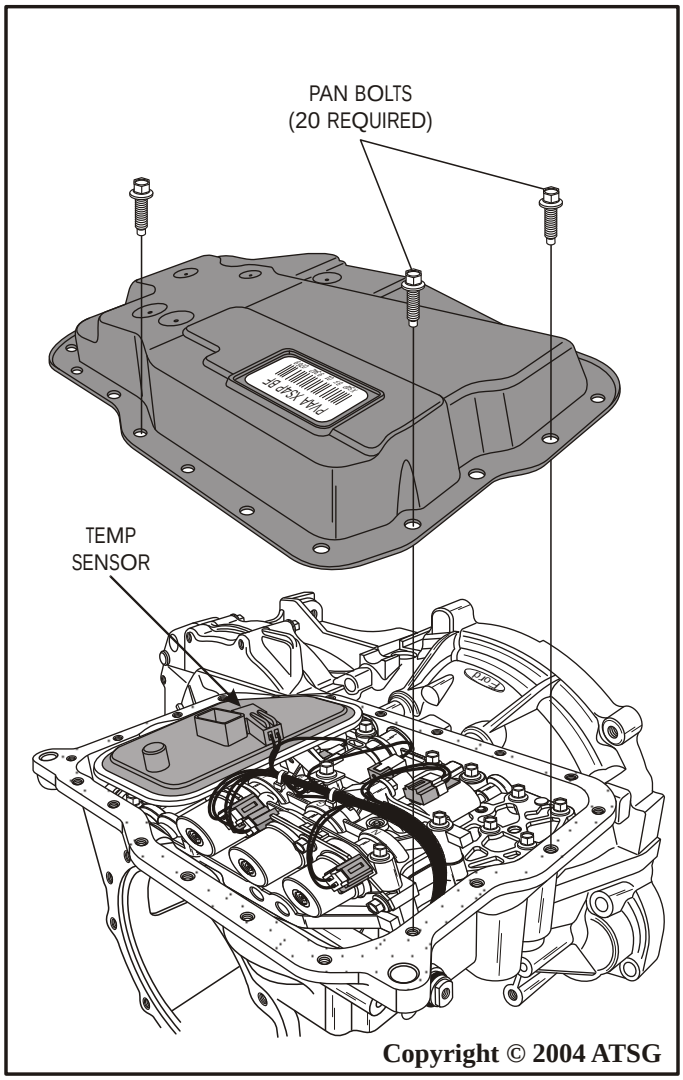

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Figure 34

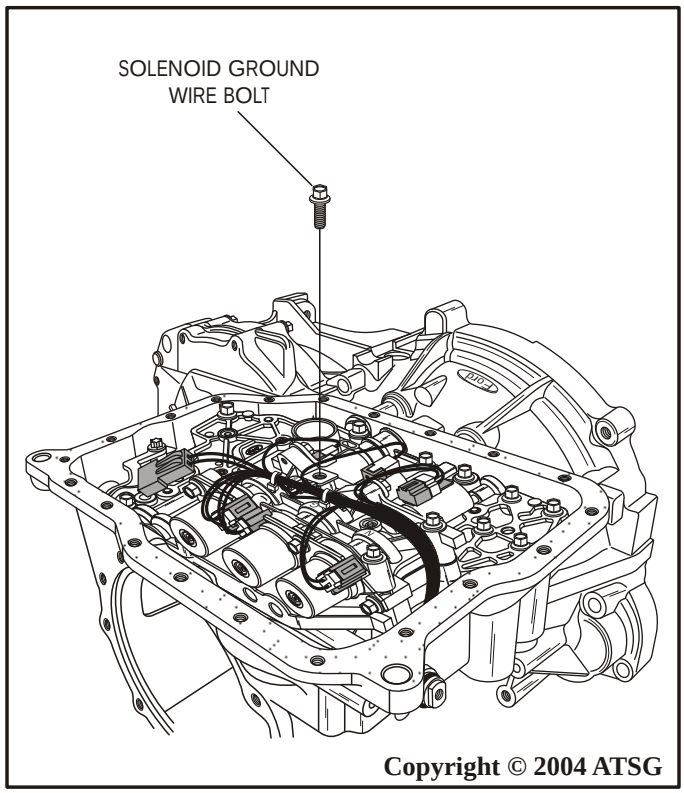

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Figure 36

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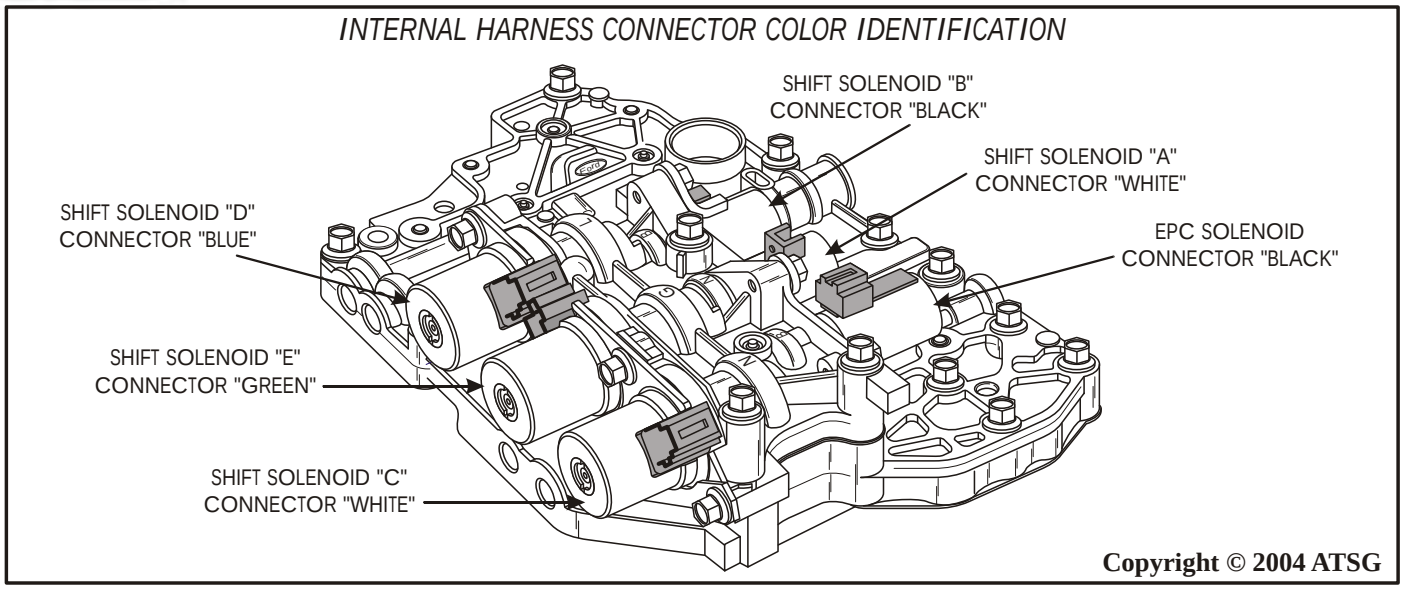

Figure 37

INTERNAL COMPONENTS (CONT'D)

33. Remove individual solenoid internal harness connectors from their respective solenoids, as shown in Figure 38, and lay internal harness off to one side.
Note: It is necessary to note the color of the internal harness connectors so they can be connected in the same positions. Connector color letters are cast into the solenoid body, as shown in Figure 37.
34. Remove the 13 valve body retaining bolts, as shown in Figure 39, and remove valve body.
35. Set the valve body aside for the component rebuild section.

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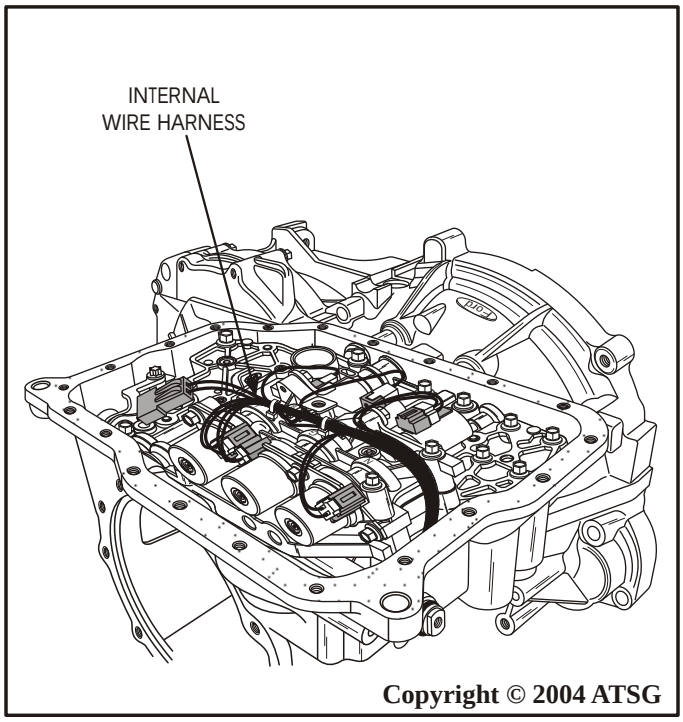

Figure 38

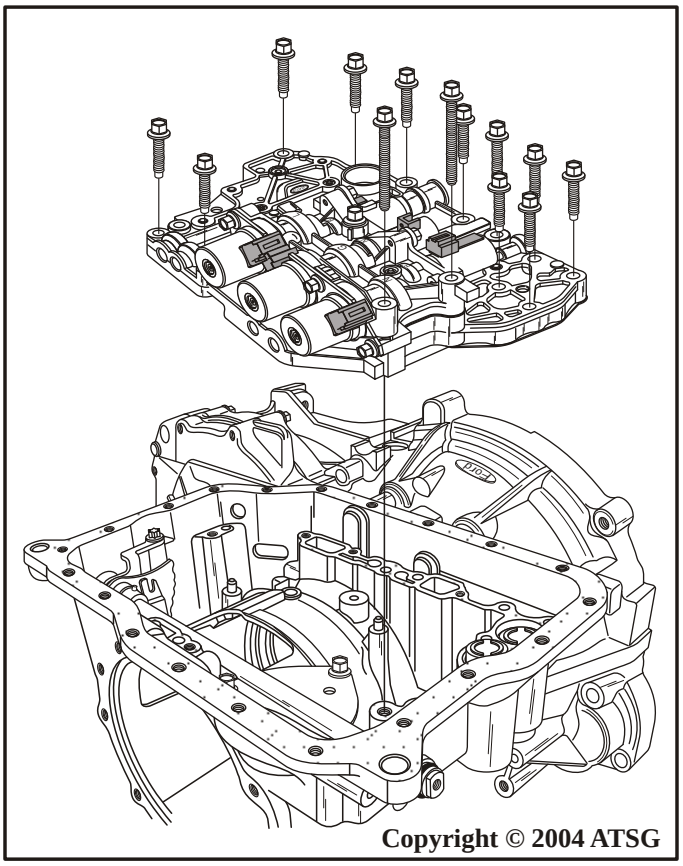

Figure 39

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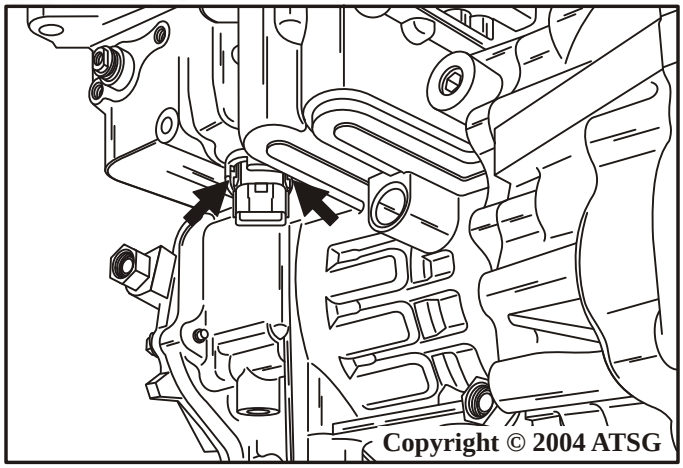
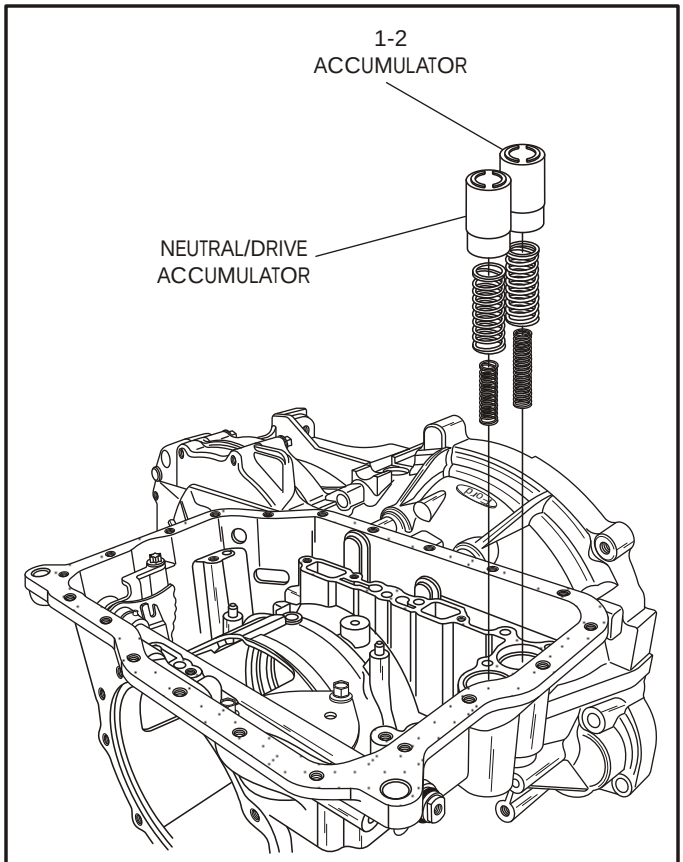


Figure 40

INTERNAL COMPONENTS (CONT'D)

36. Squeeze the tabs on the side of the internal harness case connector, and remove internal harness from transaxle (See Figure 40).
37. Remove the neutral/drive and 1-2 accumulator pistons and springs, as shown in Figure 41. ***Note: Each of the two accumulators have two springs. All four springs are different sizes. Spring specifications are listed in Figure 41.***
38. Remove the manual lever shaft retaining roll pin using a drift punch and small hammer, as shown in Figure 42.

Continued on Page 28



NEUTRAL-DRIVE OUTER	1-2 OUTER
FREE LENGTH ---------- 2.945"	FREE LENGTH ---------- 2.655"
DIAMETER ---------- .824"	DIAMETER ---------- .824"
WIRE DIAMETER --------- .089"	WIRE DIAMETER --------- .137"
COLOR I.D. ---------- NONE	COLOR I.D. ---------- YELLOW
NEUTRAL-DRIVE INNER	**1-2 INNER**
FREE LENGTH ---------- 2.145"	FREE LENGTH ---------- 2.655"
DIAMETER ---------- .610"	DIAMETER ---------- .510"
WIRE DIAMETER --------- .094"	WIRE DIAMETER --------- .087"
COLOR I.D. ---------- NONE	COLOR I.D. ---------- YELLOW

Figure 41

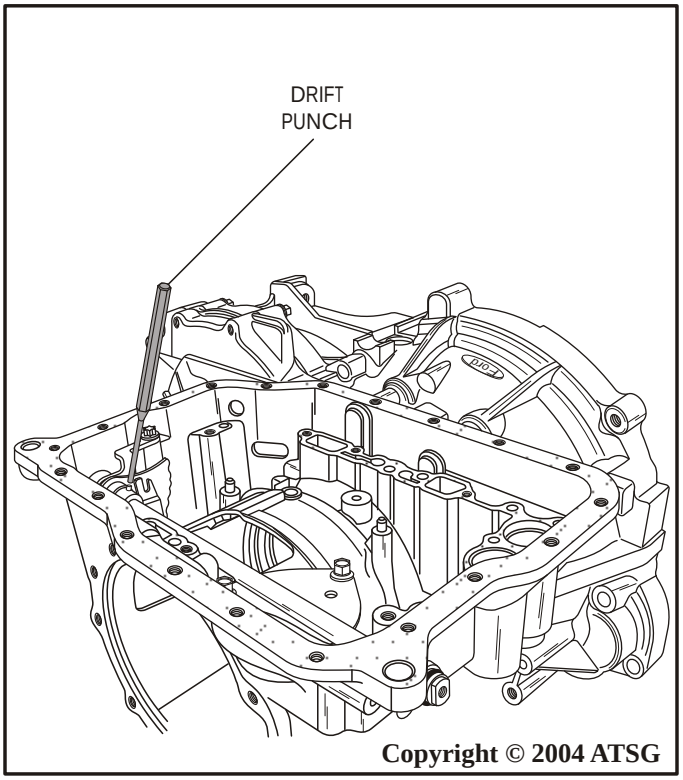


Figure 42

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INTERNAL COMPONENTS (CONT'D)

39. Remove the manual lever shaft from transaxle case, as shown in Figure 43.
40. Remove and discard the two manual lever shaft "O" ring seals, as shown in Figure 43.
41. Remove the internal control lever retaining bolt, as shown in Figure 44, and remove the internal control lever assembly.
42. Remove intermediate/overdrive servo cover, as shown in Figure 45.
    Caution: The 2-4 band servo cover is spring loaded. The bolts should be loosened evenly until cover is unloaded, then remove bolts.

Continued on Page 29

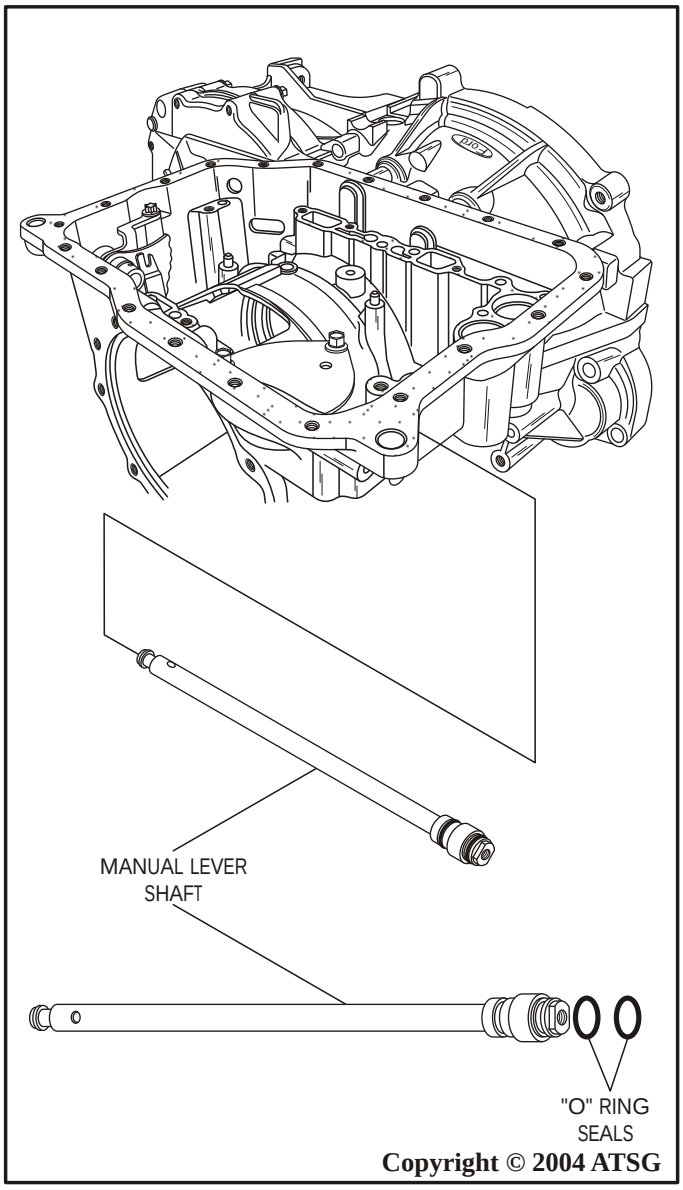

Figure 43

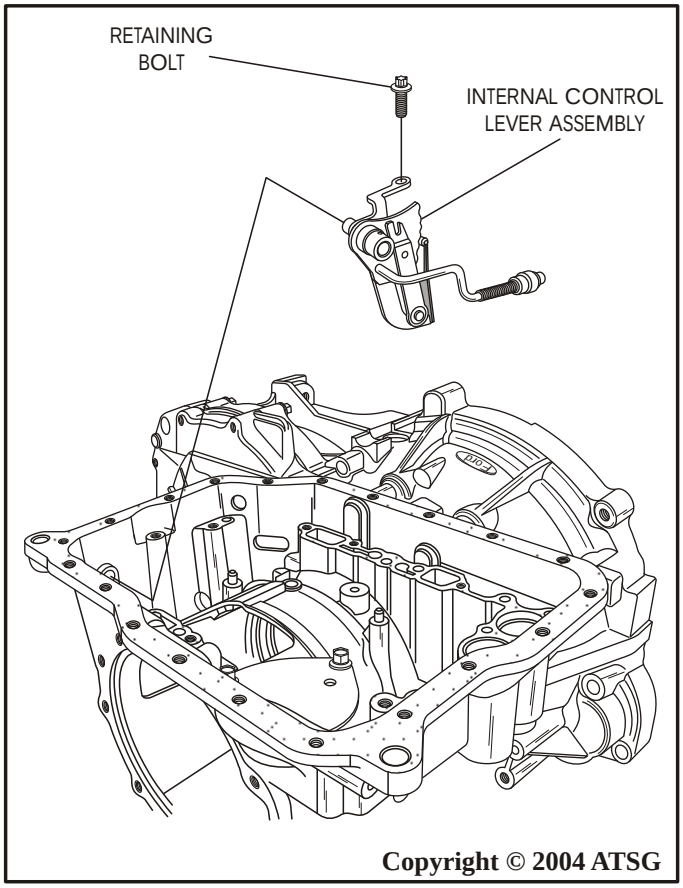

Figure 44

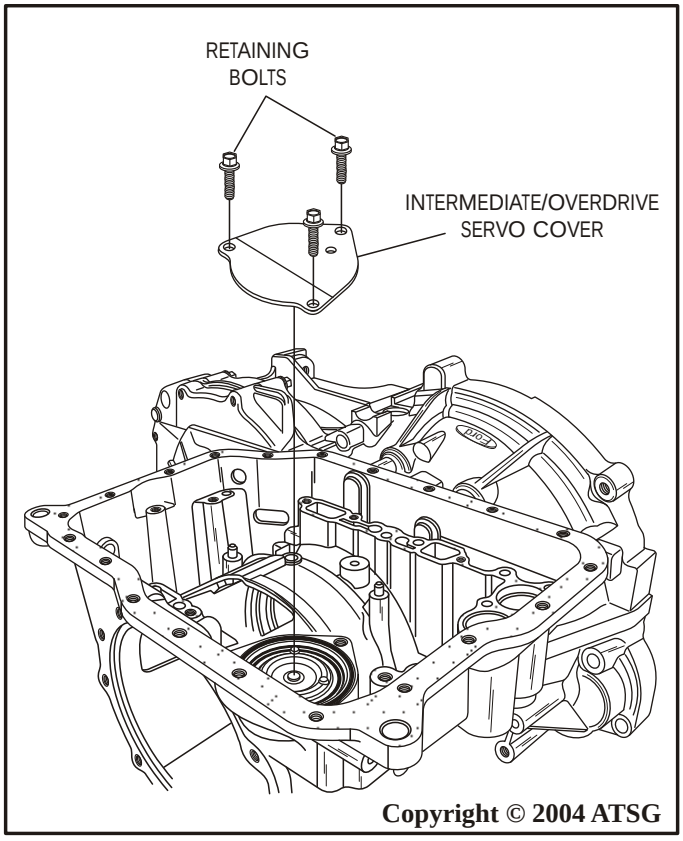

Figure 45

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INTERNAL COMPONENTS (CONT'D)

43. Remove and discard the servo cover "O" ring seal, as shown in Figure 46.
44. Remove the 2-4 servo piston, as shown in Figure 46.
45. Remove the 2-4 servo piston return spring, as shown in Figure 46.
46. Install the transaxle back into the bench fixture and rotate transaxle so that the bell housing is facing up, as shown in Figure 47.
    Caution: Transaxle must be installed back into bench fixture to prevent damage and/or personal injury.
48. Remove the 15 converter housing to case bolts, as shown in Figure 47, and remove converter housing from case, as shown in Figure 48.

Continued on Page 30

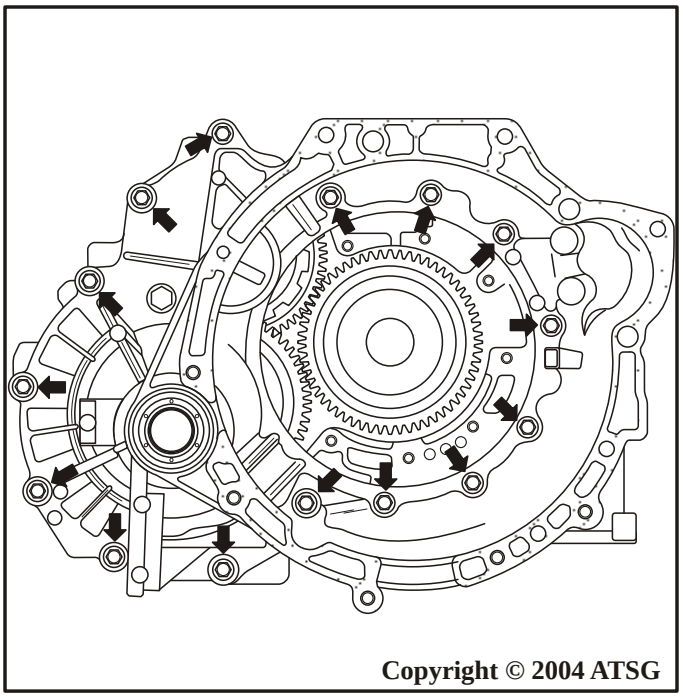
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Figure 47

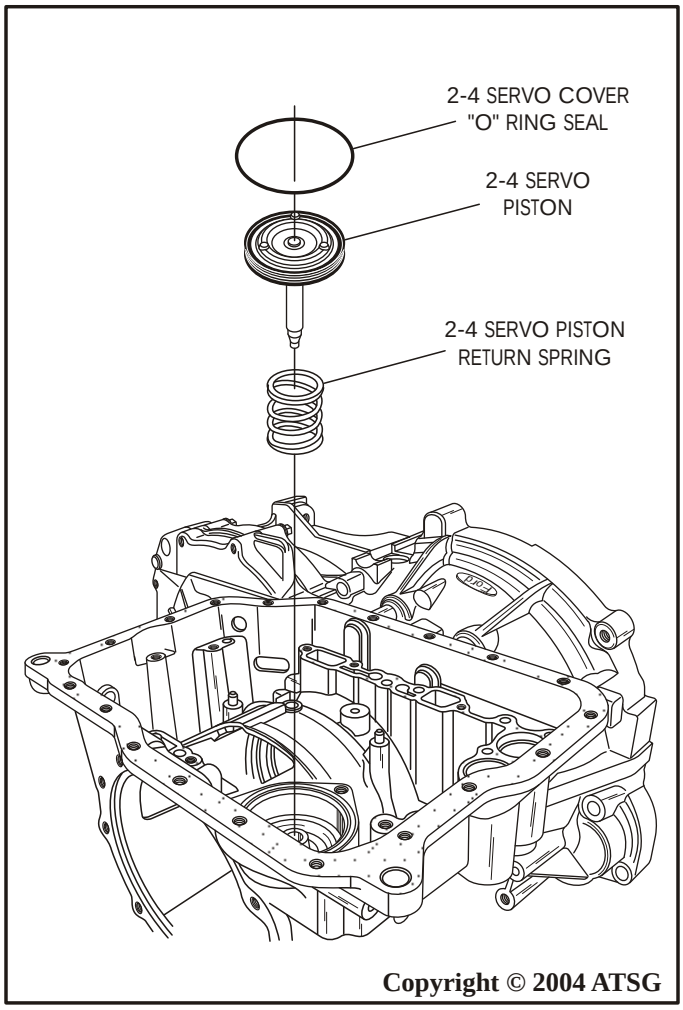

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Figure 46

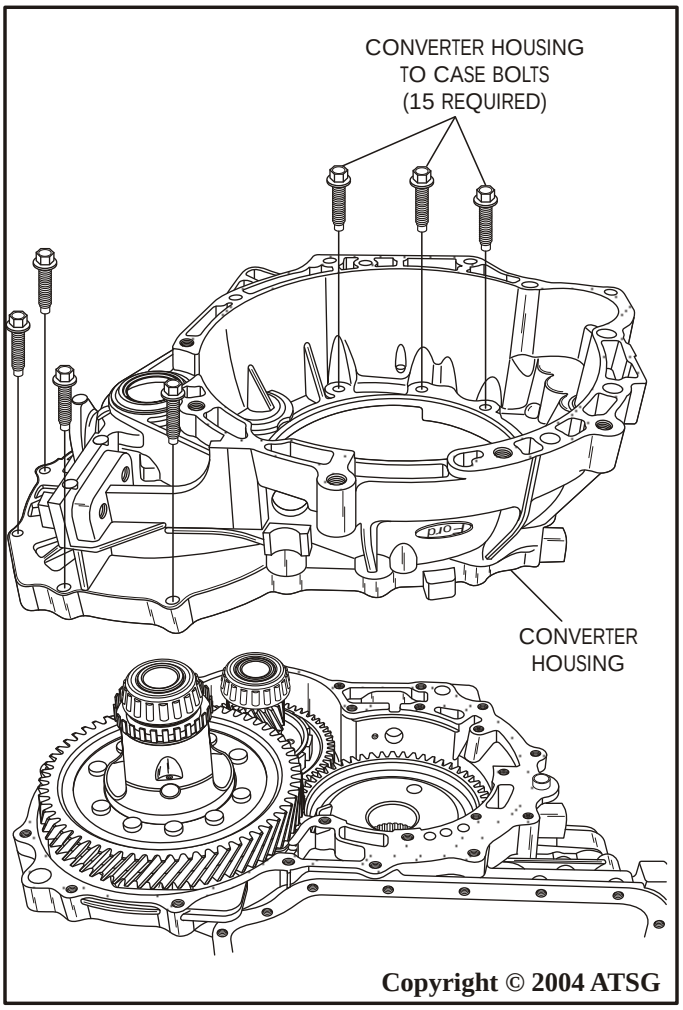

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Figure 48

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INTERNAL COMPONENTS (CONT'D)

49. Remove the differential assembly, as shown in Figure 49, and set aside for component rebuild.
50. Remove the two parking pawl cover retaining bolts, as shown in Figure 50, and remove the parking pawl cover.
51. Release the park pawl spring from the parking pawl using a pair of pliers.
52. Remove the parking pawl pivot pin using a pencil magnet (See Figure 51).
53. Remove the parking pawl from case, as shown in Figure 51.
54. Remove parking pawl spring and abutment, as shown in Figure 51.
55. Remove the transfer shaft assembly, as shown in Figure 52.
56. Set the transfer shaft assembly aside for the component rebuild section.

Continued on Page 31

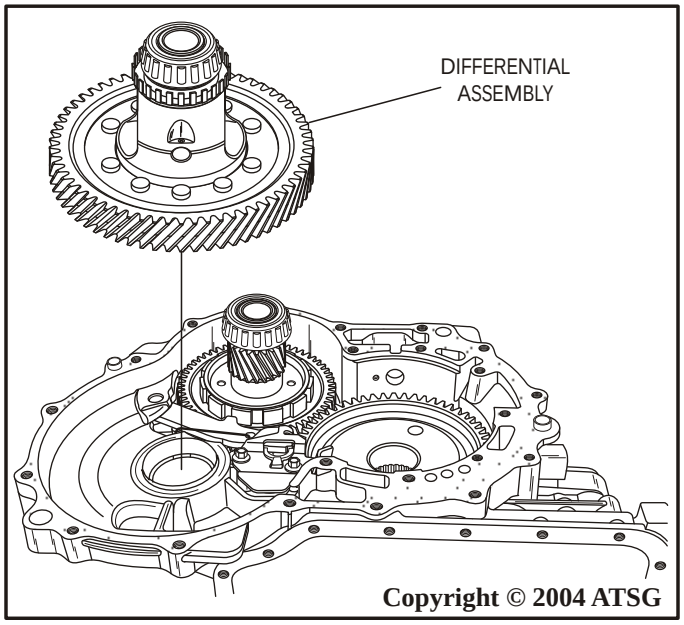

Figure 49

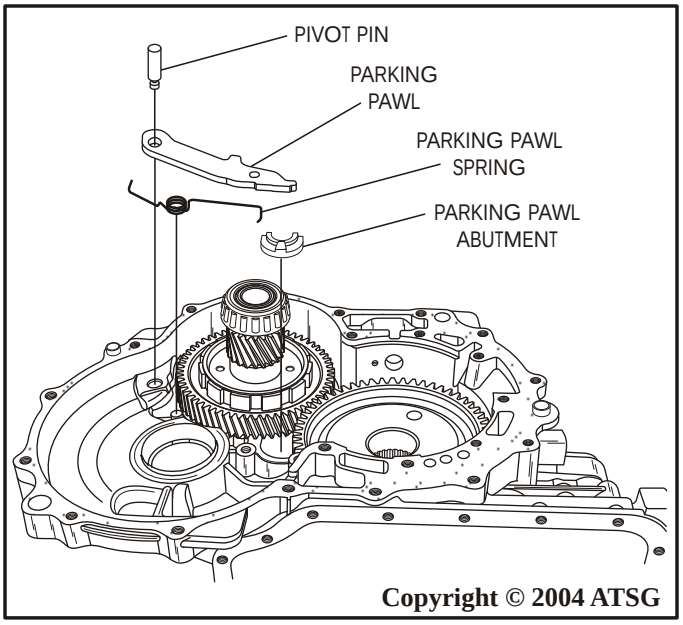

Figure 51

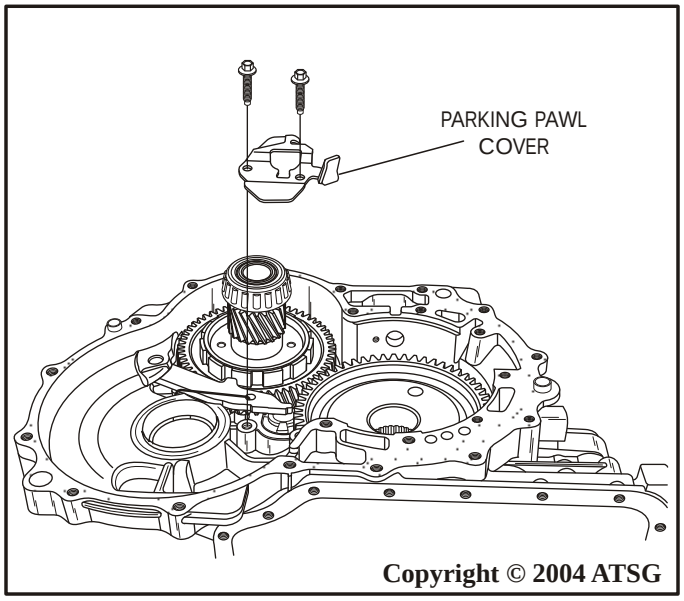

Figure 50

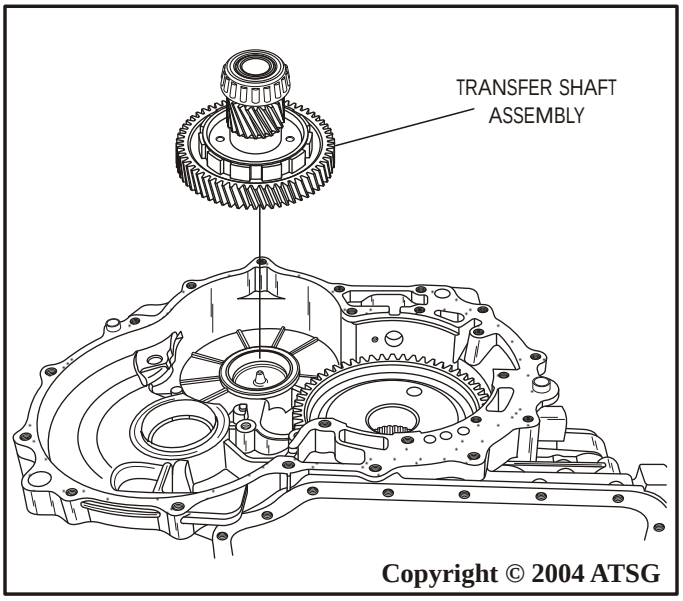

Figure 52

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INTERNAL COMPONENTS (CONT'D)

57. This now leaves nothing in the case except the final drive input gear, as shown in Figure 53. ***Note: This gear involves an exceptional amount of set-up time if it is removed, as it involves a "Crush" sleeve (See Figure 53). Our recommendation is "Not" to remove it, if there is no problem with the bearings. "If there are problems with the bearings", refer to the complete bearing and shim set-up in the Component Rebuild section.***

Transaxle Disassembly Complete

COMPONENT REBUILD SECTION

OIL PUMP ASSEMBLY

1. Disassemble the oil pump assembly using Figure 55 as a guide.
2. Remove and discard the two stator shaft seal rings, as shown in Figure 55.
3. Clean all oil pump parts thoroughly and dry with compressed air.
4. Inspect all oil pump parts thoroughly for any wear and/or damage. Replace as necessary.
5. Place oil pump body on a flat work surface, as shown in Figure 54, and replace bushing using the proper bushing driver, as necessary.

Continued on Page 33

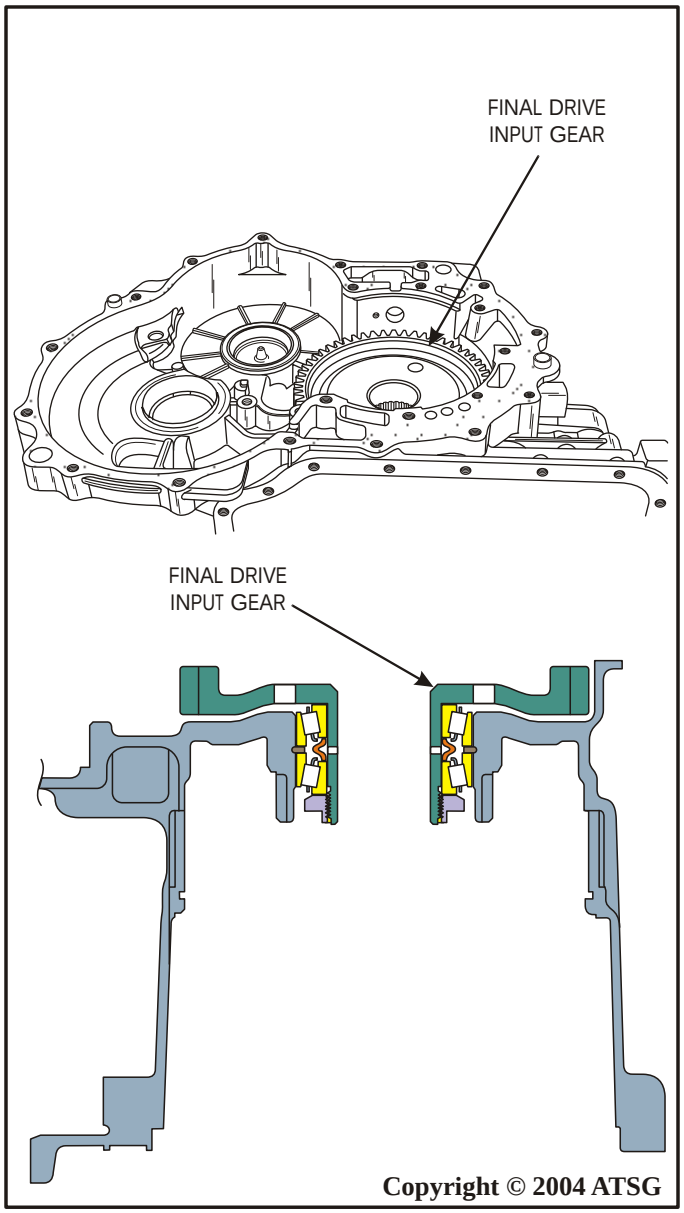

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Figure 53

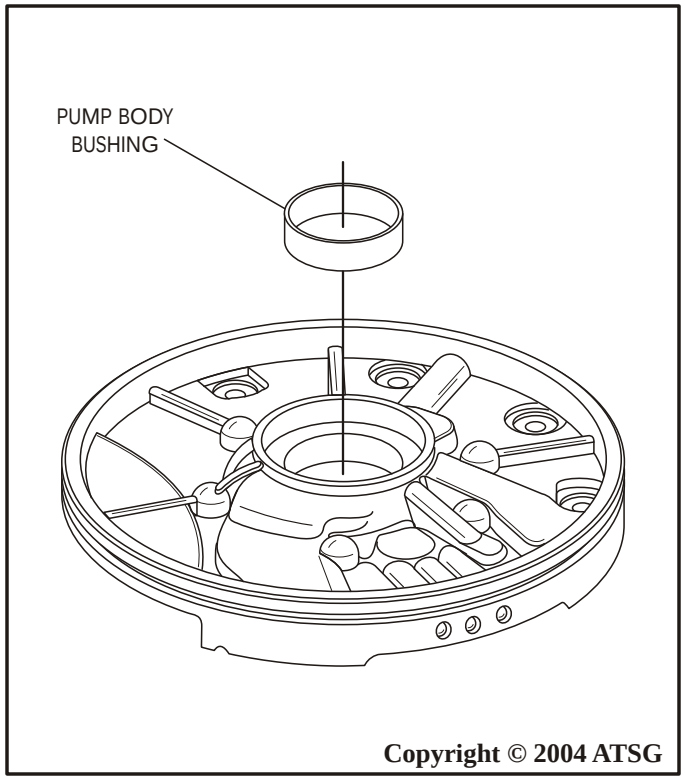

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Figure 54

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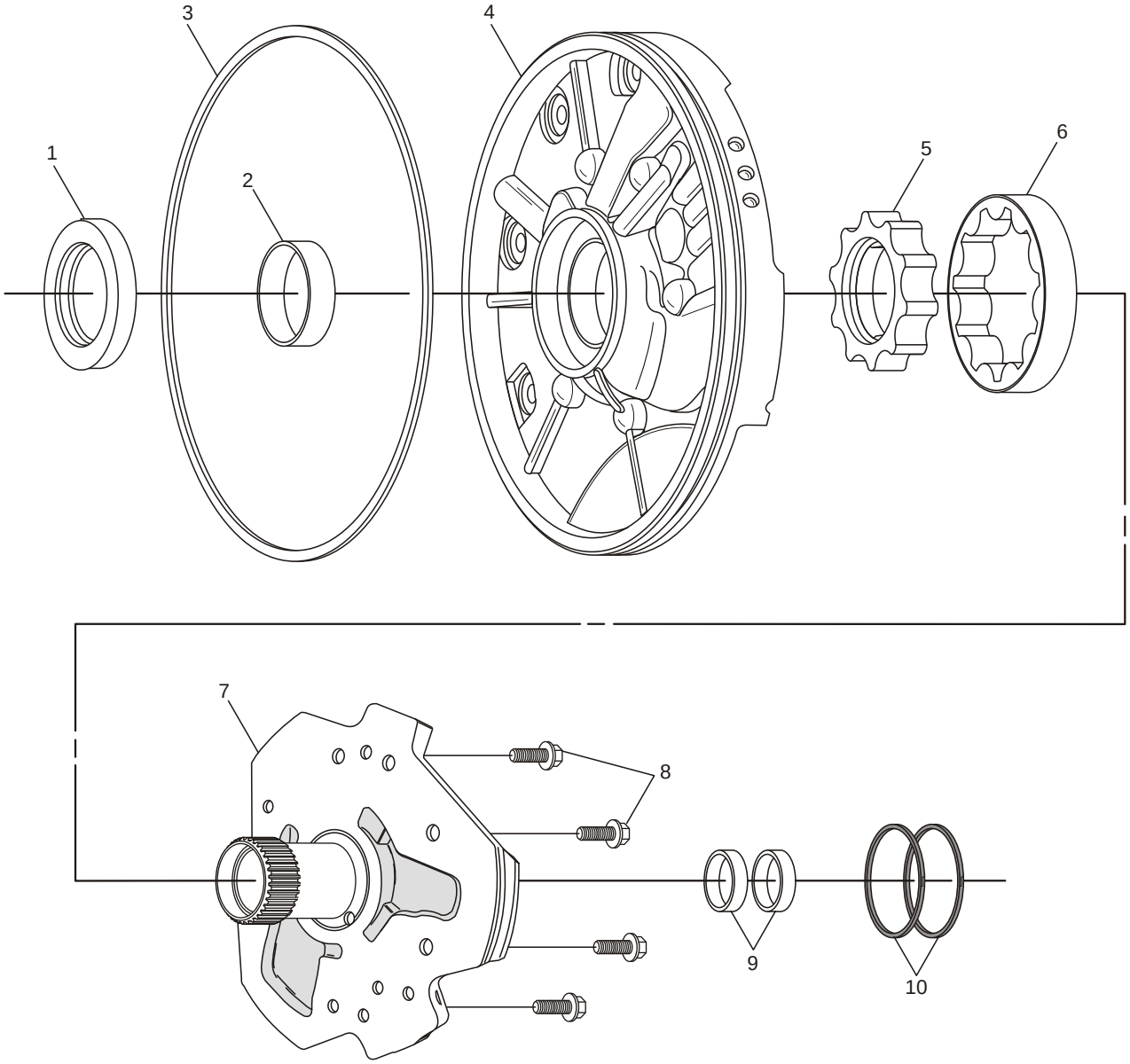
OIL PUMP EXPLODED VIEW



1 OIL PUMP CONVERTER SEAL
2 OIL PUMP BODY BUSHING
3 OIL PUMP BODY TO CASE "D" RING SEAL
4 OIL PUMP BODY
5 OIL PUMP INNER GEAR
6 OIL PUMP OUTER GEAR
7 OIL PUMP STATOR/COVER
8 OIL PUMP COVER TO BODY BOLTS (6 REQUIRED)
9 STATOR SHAFT/COVER BUSHINGS (2 REQUIRED)
10 STATOR SHAFT SEALING RINGS (2 REQUIRED)

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Figure 55

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COMPONENT REBUILD SECTION

OIL PUMP ASSEMBLY

6. Install a new oil pump body converter seal, as shown in Figure 56.
7. Install new oil pump body to converter housing "D" ring seal into the groove (See Figure 56). ***Caution: Ensure that "D" ring seal is not twisted in the groove.***
8. Turn the oil pump body over, with the gear pocket facing up, as shown in Figure 57.
9. Lubricate both pump gears with Mercon® V transmission fluid.
10. Install the outer pump gear into the pocket with the "Notches" facing up, as shown in Figure 57.
11. Install the inner pump gear into the pocket with inside "Lip" facing up, as shown in Figure 57.

Continued on Page 34

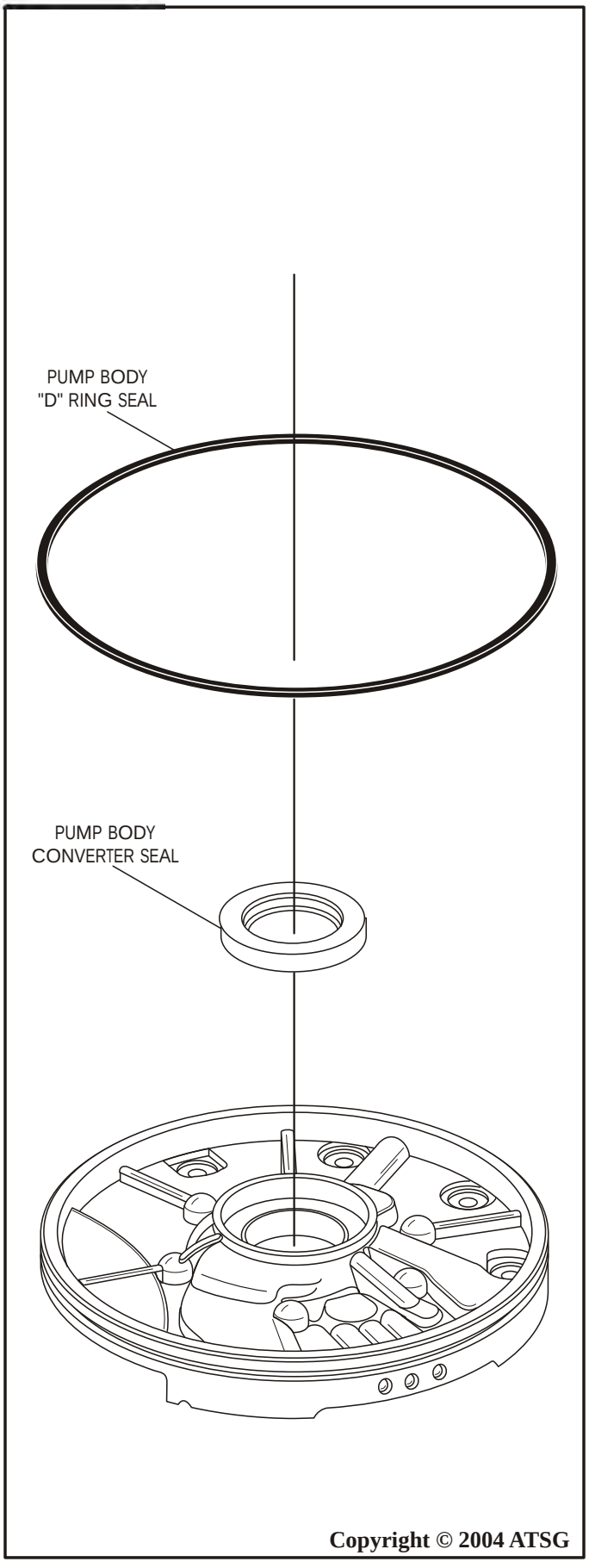

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Figure 56

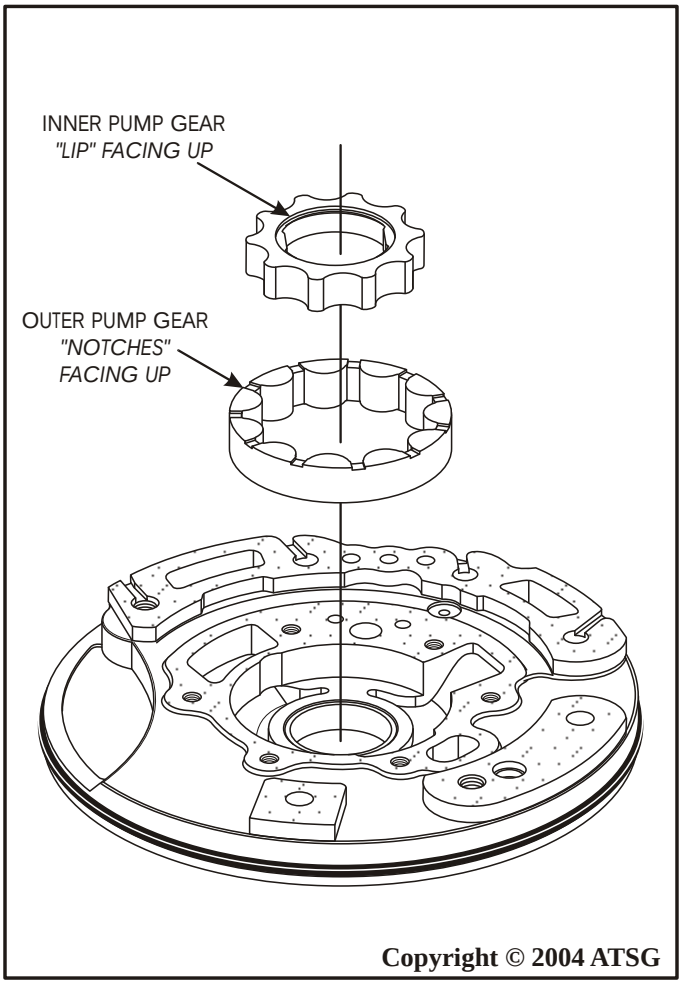

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Figure 57

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COMPONENT REBUILD SECTION

OIL PUMP ASSEMBLY

12. Inspect pump stator bushings ***very carefully,*** as shown in Figure 58.
    Caution: These bushings are very bad about wearing and create TCC code P0741.
13. Air check the stator bushings by placing over the turbine shaft, as shown in Figure 59.
14. Replace the bushings as necessary using the proper drivers.
    Note: We recommend replacement on every rebuild as the bushings are now available from Sonnax® under number 46000-01K.
15. If the bushings are not available, you will have no choice but to replace the complete pump assembly, as the bushings are not serviced by Ford Motor Co.

Continued on Page 35

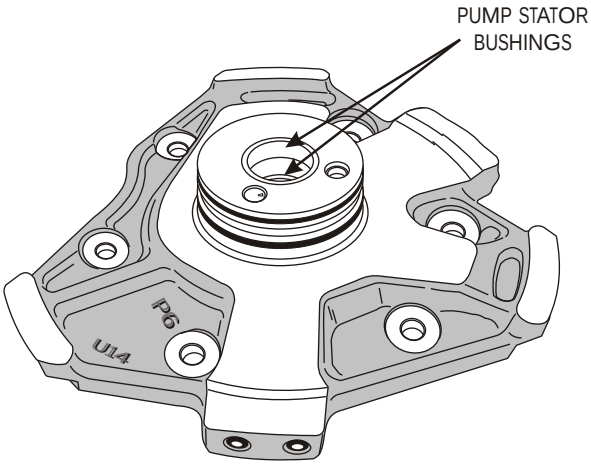

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Figure 58

AIR CHECKING THE STATOR BUSHINGS

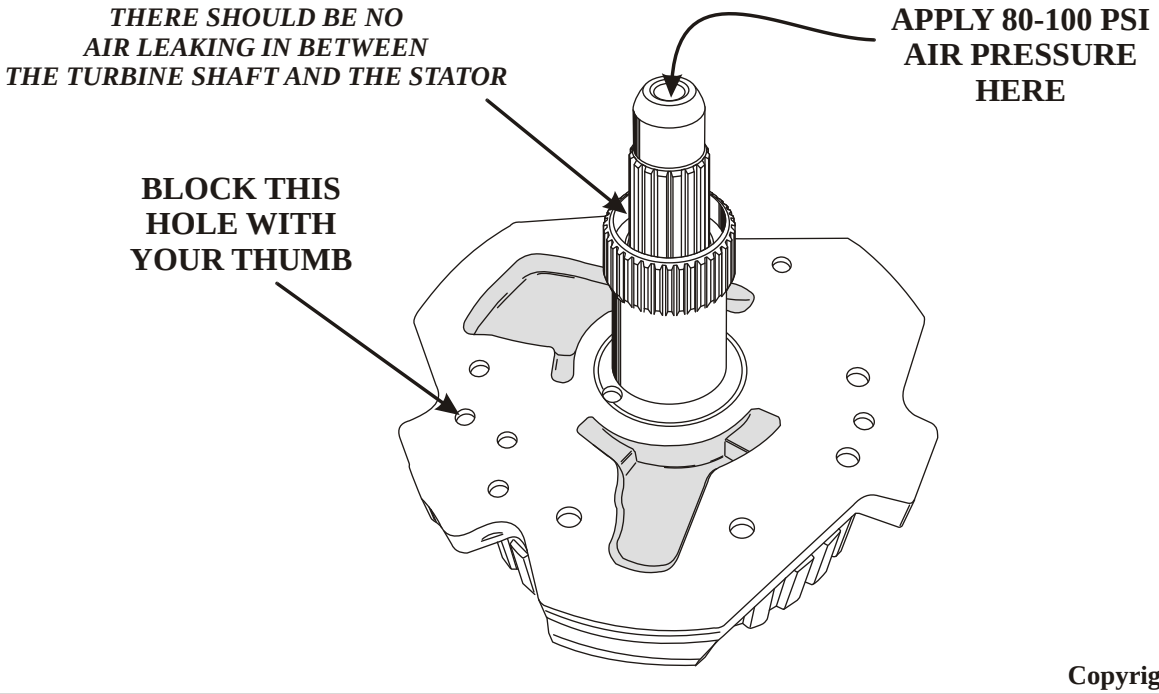

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Figure 59

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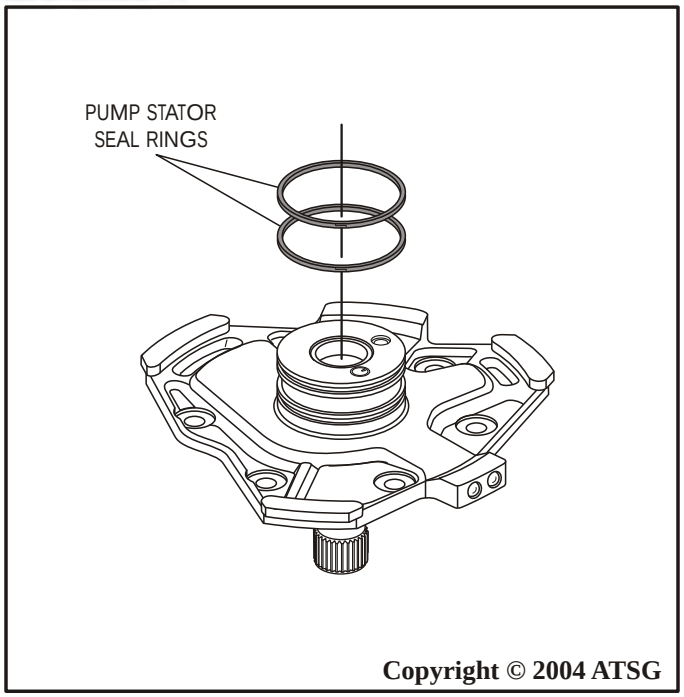

Figure 60

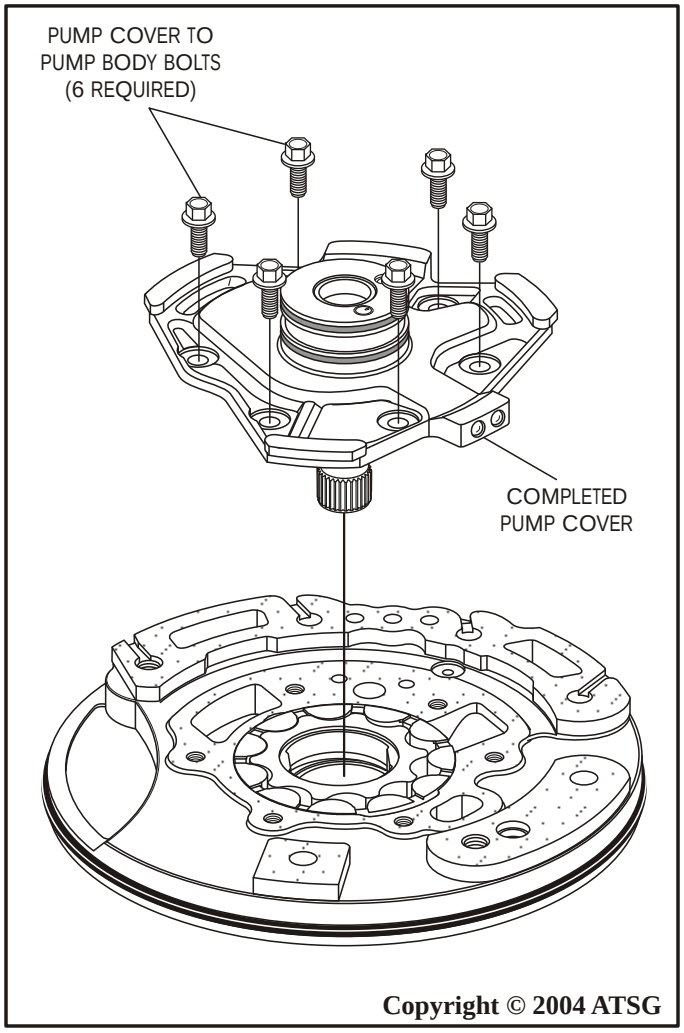

Figure 61

COMPONENT REBUILD SECTION

OIL PUMP ASSEMBLY

16. Install two new sealing rings into the stator grooves, as shown in Figure 60.
17. Install the completed pump stator into pump body, as shown in Figure 61, and install the six retaining bolts.
18. Torque the six pump stator retaining bolts to 13 N•m (10 ft.lb.), as shown in Figure 62.
19. Place the completed oil pump assembly aside for the final assembly process (See Figure 63).

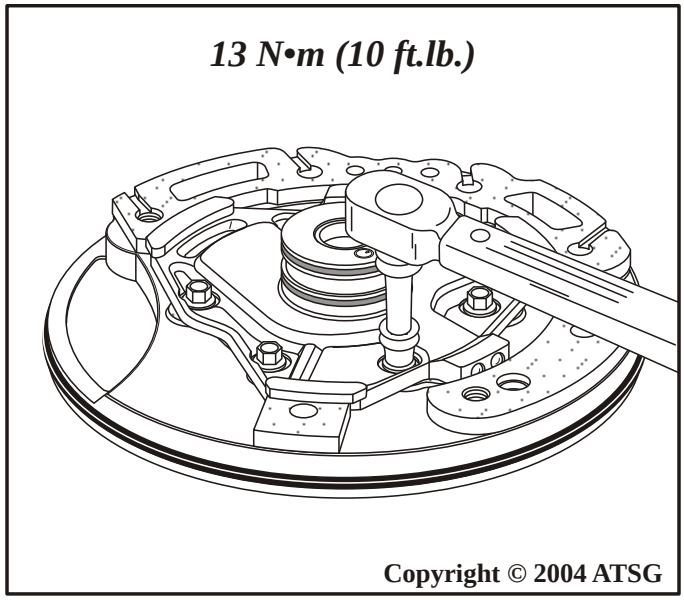

Figure 62

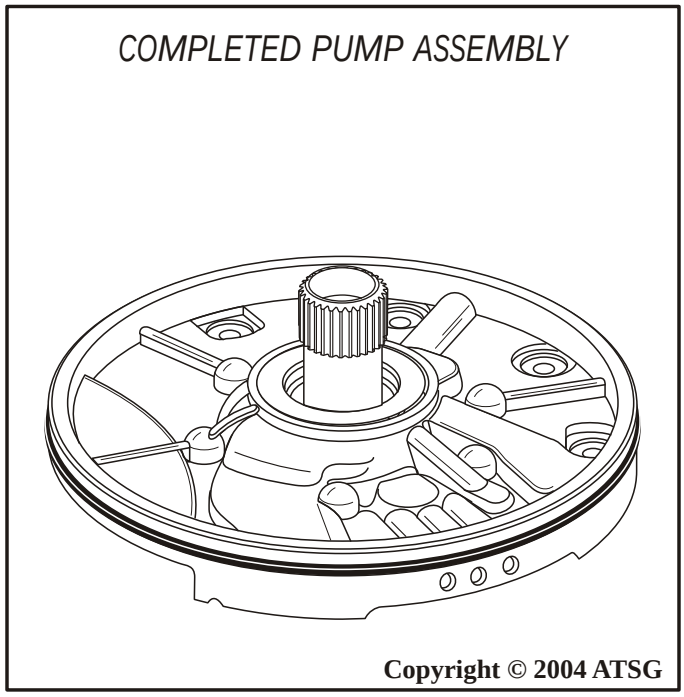

Figure 63

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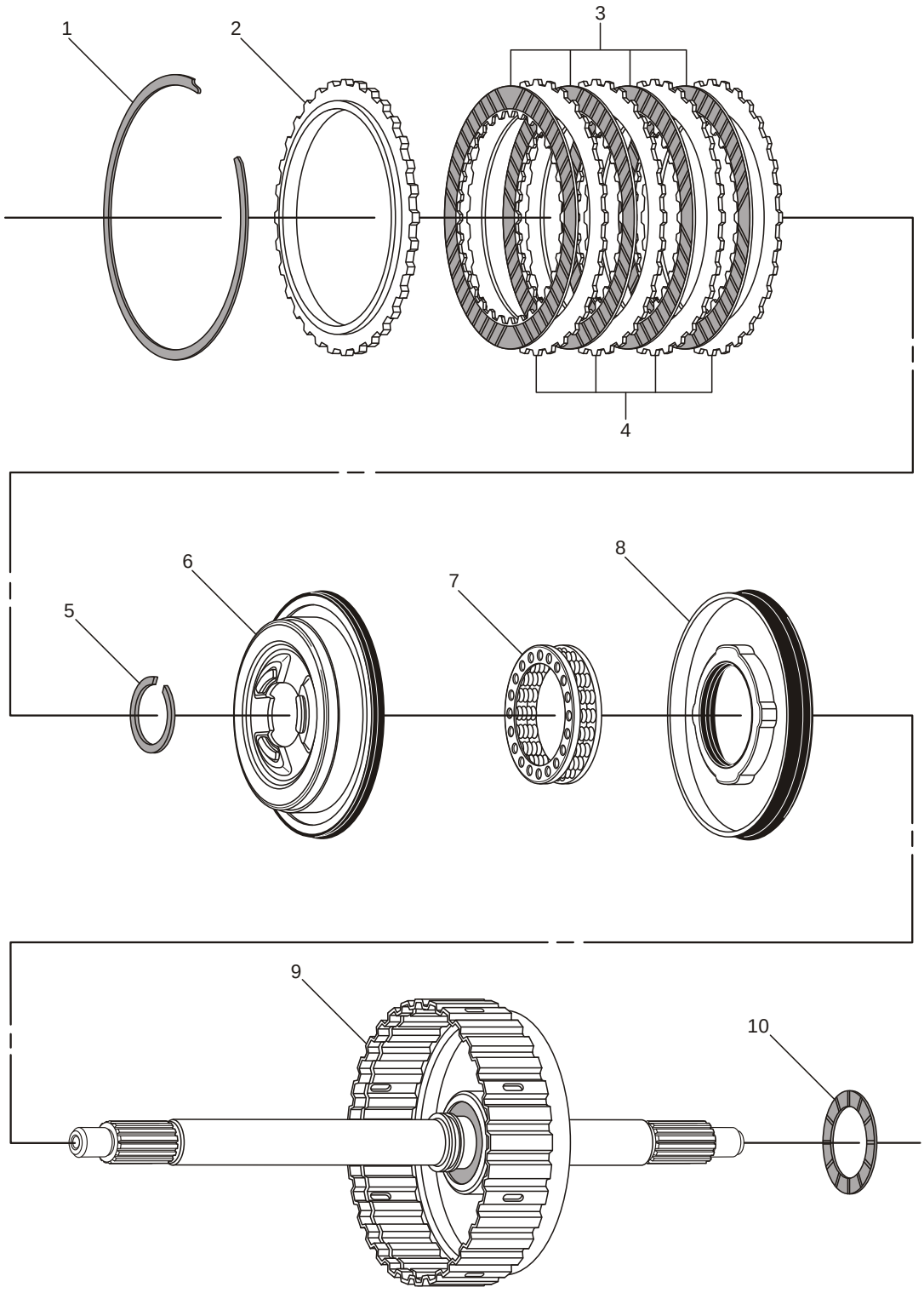
FORWARD CLUTCH EXPLODED VIEW



1. FORWARD CLUTCH BACKING PLATE SNAP RING *(SELECTIVE).*
2. FORWARD CLUTCH BACKING PLATE.
3. FORWARD CLUTCH FRICTION PLATES (4).
4. FORWARD CLUTCH STEEL PLATES (4).
5. RETURN SPRING RETAINER/BALANCE PISTON SNAP RING.
6. RETURN SPRING RETAINER/BALANCE PISTON.
7. FORWARD CLUTCH PISTON RETURN SPRING ASSEMBLY.
8. FORWARD CLUTCH APPLY PISTON.
9. FORWARD CLUTCH HOUSING ASSEMBLY.
10. FORWARD CLUTCH HOUSING TO STATOR THRUST WASHER.

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Figure 64

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COMPONENT REBUILD SECTION

FORWARD CLUTCH HOUSING ASSEMBLY

1. Disassemble the forward clutch housing using Figure 64 as a guide.
2. Clean all of the forward clutch housing parts thoroughly and dry with compressed air.
3. Inspect all of the forward clutch housing parts for any wear and/or damage.
4. Replace forward clutch parts as necessary.
5. Lubricate forward clutch piston seal surfaces with a small amount of Trans-Jel®.
6. Install the forward clutch piston into forward clutch housing, as shown in Figure 65, with a twisting motion.
7. Install the forward clutch piston return spring assembly, as shown in Figure 66.
8. Install the forward clutch balance piston, as shown in Figure 66, compress and install snap ring ensuring that it is fully seated.

Continued on Page 38

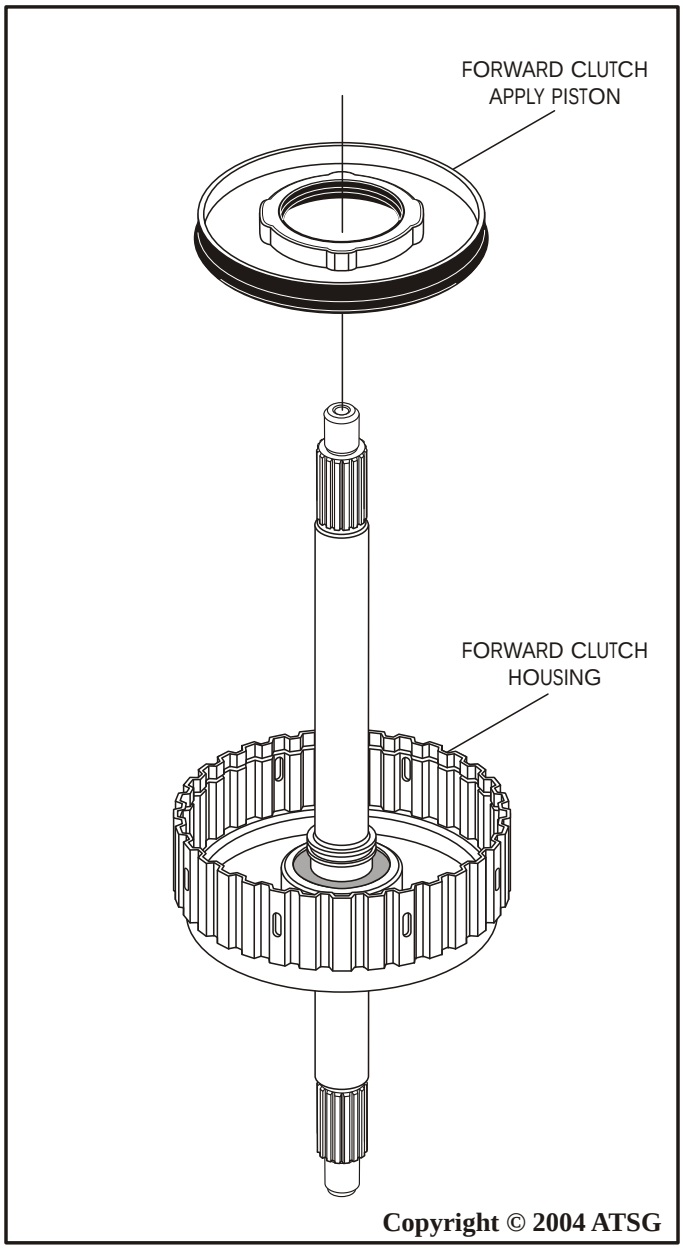

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Figure 65

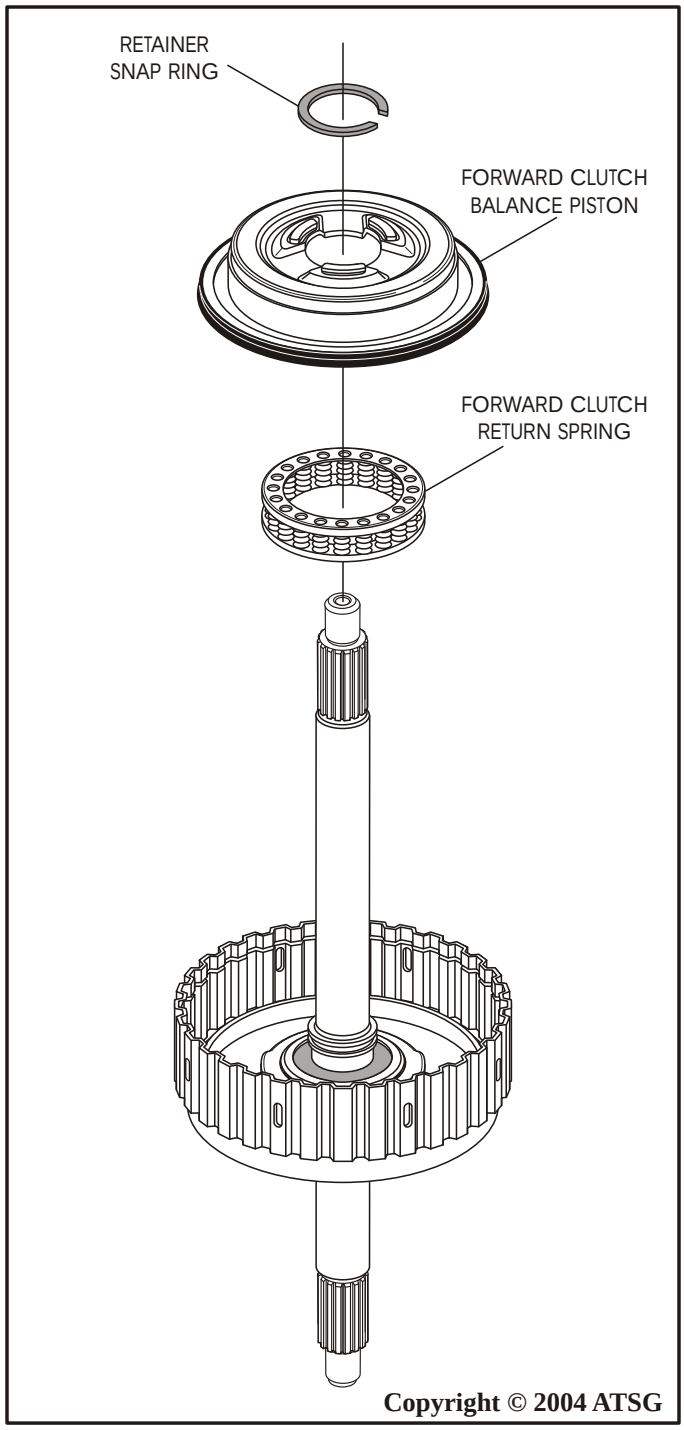

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Figure 66

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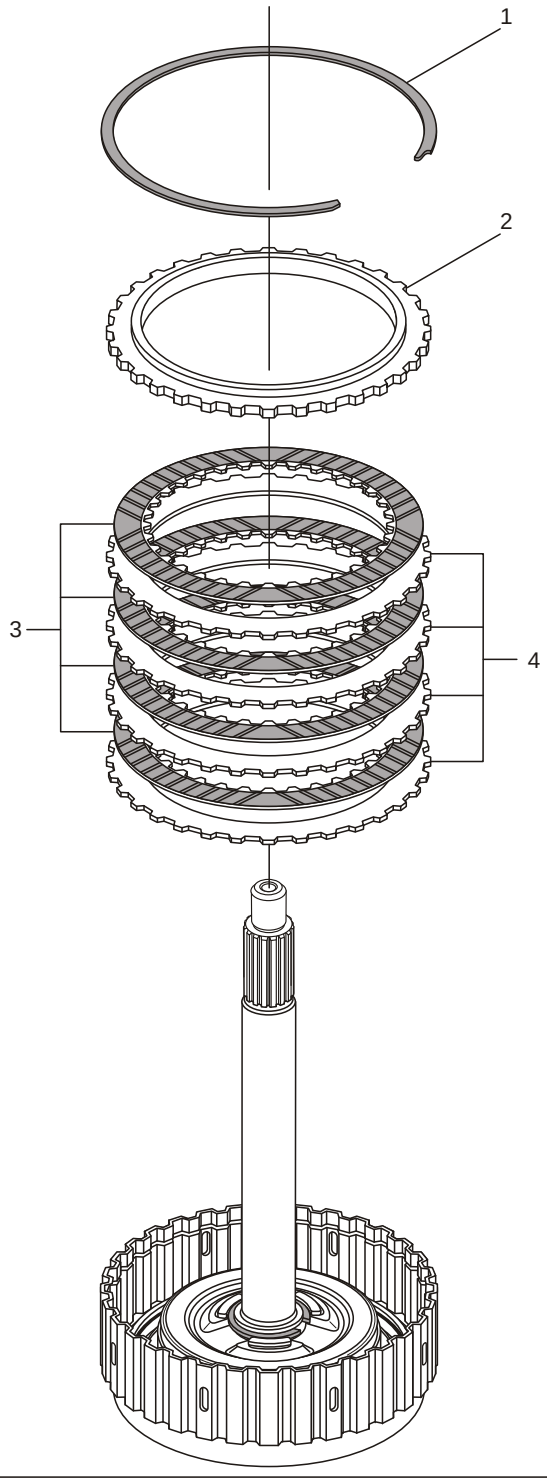

1. FORWARD CLUTCH BACKING PLATE SNAP RING *(SELECTIVE).*
2. FORWARD CLUTCH BACKING PLATE.
3. FORWARD CLUTCH FRICTION PLATES (4 REQUIRED).
4. FORWARD CLUTCH STEEL PLATES (4 REQUIRED).

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Figure 67

COMPONENT REBUILD SECTION
FORWARD CLUTCH HOUSING ASSEMBLY (cont'd)

9. Soak the new forward clutch friction plates in clean Mercon® V trans fluid for 15 minutes.
10. Install the forward clutch plates beginning with a steel plate and alternating with a lined plate, until you have installed 4 of each, as shown in Figure 67.
11. Install the forward clutch backing plate into the housing, as shown in Figure 67.
12. Install the selective forward clutch backing plate snap ring, as shown in Figure 67.
13. Tap the turbine shaft gently on the work bench to seat the snap ring against top of ring groove.

Continued on Page 39

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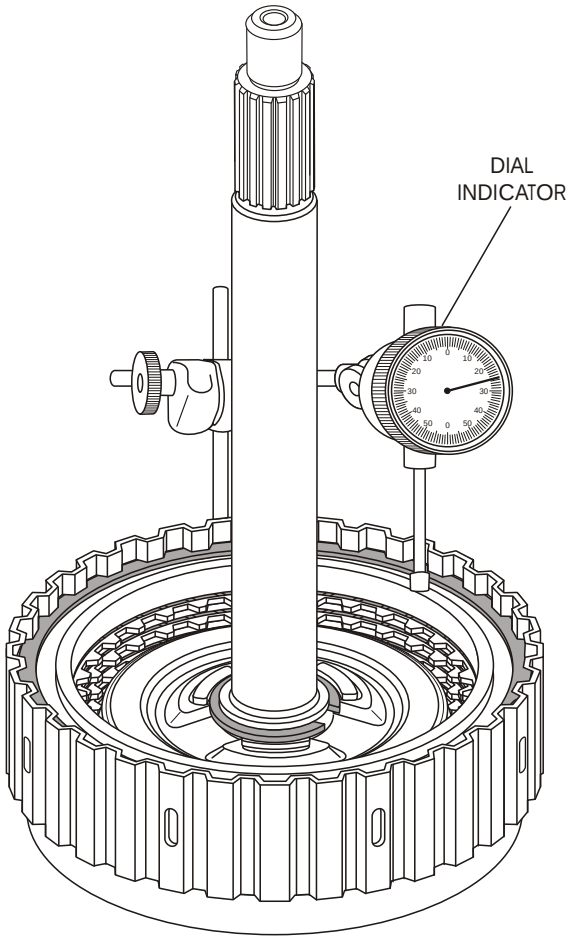
COMPONENT REBUILD SECTION
FORWARD CLUTCH HOUSING ASSEMBLY (con't'd)

14. Install dial indicator, as shown in Figure 68, with the plunger resting on backing plate, and zero the dial indicator.
15. Lift up both sides of clutch pack with scribes to measure for proper clutch pack clearance.
16. Forward clutch pack clearance should be, 1.5 to 1.8 mm (.059" to .071"), as shown in Figure 68.
17. Change the selective snap ring as necessary to obtain the specified clutch clearance and then recheck the clutch pack clearance.
18. Set the completed forward clutch housing aside for the final assembly process (See Figure 69).

FORWARD CLUTCH CLEARANCE SHOULD BE
1.5 - 1.8 MM (.059" - .071")



Selective Snap Ring Thickness Available
1.15 - 1.25 mm (.045" - .049")
1.35 - 1.45 mm (.053" - .057")
1.55 - 1.65 mm (.061" - .065")
1.75 - 1.85 mm (.069" - .073")
1.95 - 2.05 mm (.077" - .081")
2.15 - 2.25 mm (.085" - .089")

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Figure 68

COMPLETED FORWARD CLUTCH HOUSING

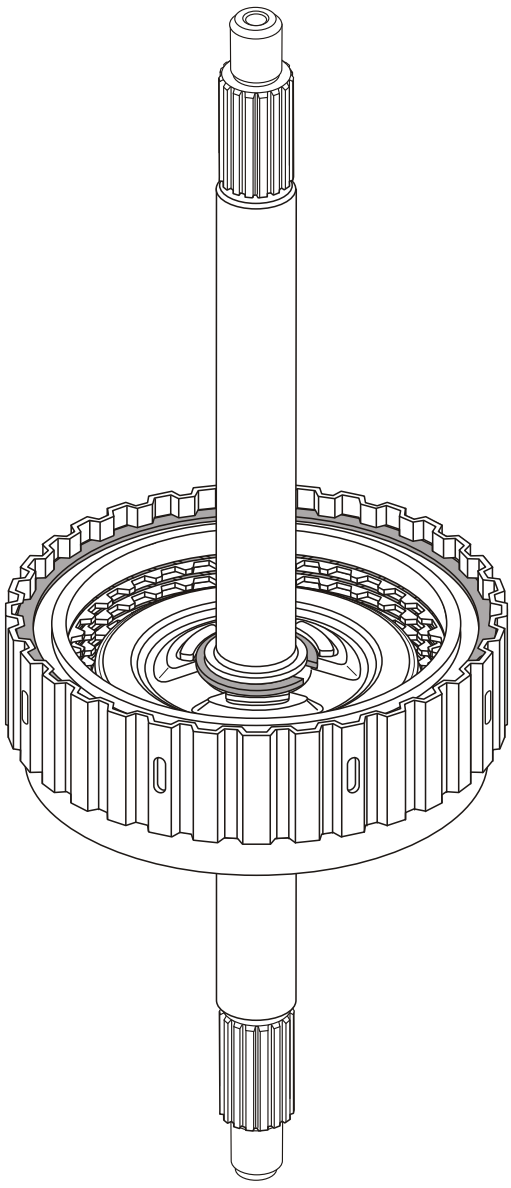

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Figure 69

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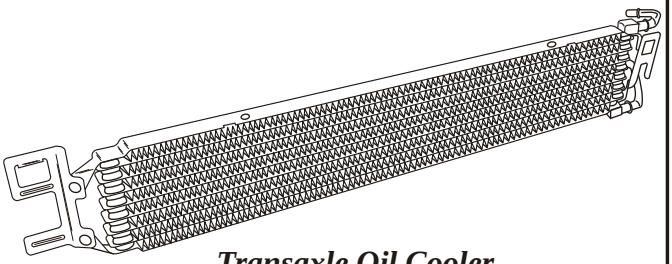
CAUTION - CAUTION - CAUTION

Ford vehicles equipped with the 4F27E transaxle may exhibit Failure due to Lack of Lubrication. The cause may be, a restricted Transmission Oil Cooler limiting the amount of lubrication oil, which is fed to the rear case fitting in the rear cover. The Direct/Reverse Drum bushing and the Sealing Ring Journal on the Rear Cover are the most common failures with lack of lubrication, so inspect these parts with extra care.
If failure of these parts is observed, it will be necessary to replace them with new, along with the transaxle oil cooler. If these parts have not yet failed, it will still be necessary to replace the transaxle oil cooler, as shown below.



Transaxle Oil Cooler
Ford Part Number
XS4Z-7A095-BA

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Figure 70

COMPONENT REBUILD SECTION

Before proceeding with the component rebuild section, it is imperative that the reverse clutch drum bushing and the journal and seal ring area of the end cover be inspected very closely for any wear and/or damage, as shown in Figure 71.

Ford Motor Company recommends replacement of the transaxle cooler on all rebuilds.

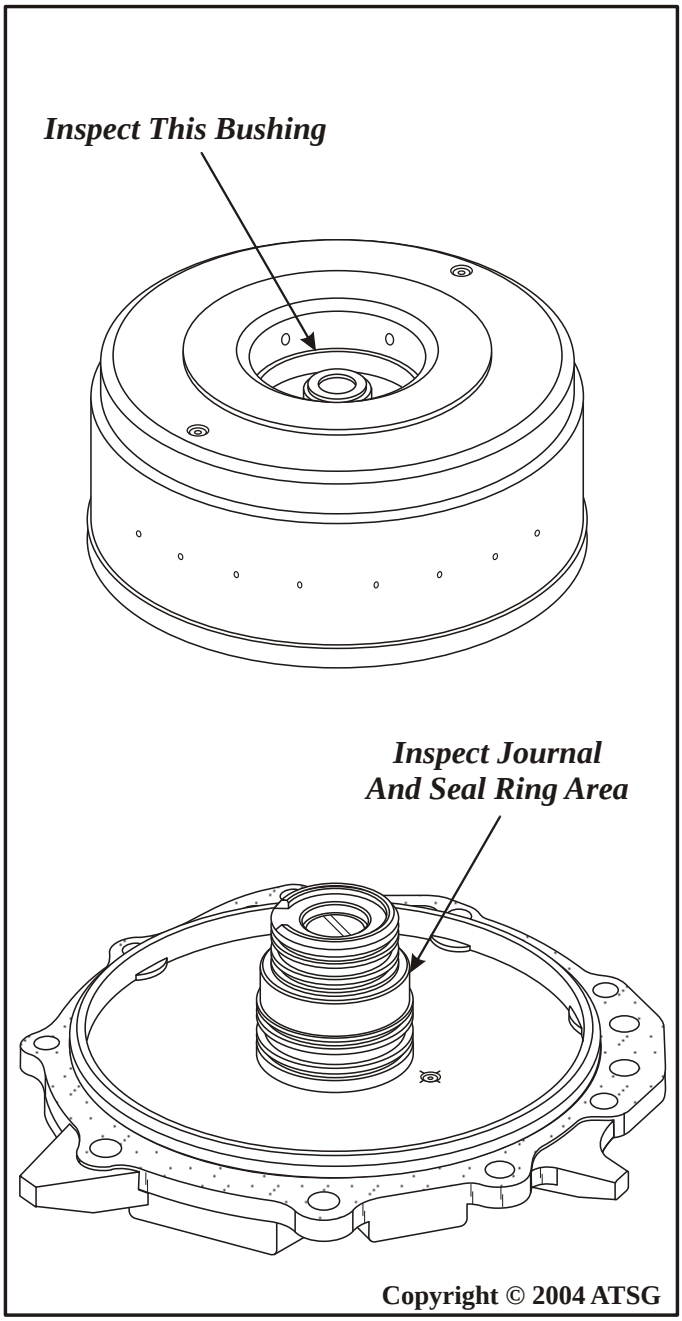

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Figure 71

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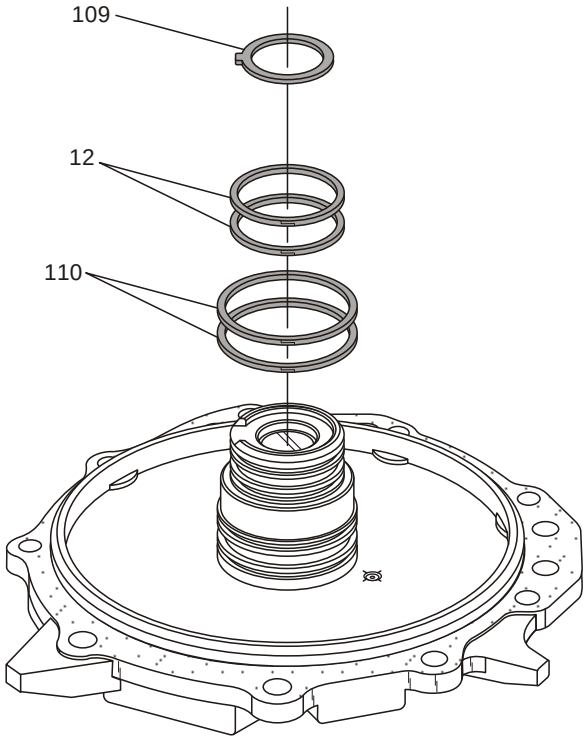
COMPONENT REBUILD SECTION

REAR END COVER

1. Remove and discard the direct clutch seal rings and the reverse clutch seal rings.
2. Inspect the end cover journal and sealing ring area for any wear and/or damage.
3. Clean the end cover thoroughly and dry with compressed air.
4. Install new reverse clutch sealing rings into the grooves, as shown in Figure 72, and ensure that they are properly seated.
5. Install new direct clutch sealing rings into the grooves, as shown in Figure 72, and ensure that they are properly seated.
6. Install the selective direct clutch hub bearing race, as shown in Figure 72, and retain with a small amount of Trans-Jel®.
7. Set the completed end cover assembly aside for the final assembly process (See Figure 73).



12 DIRECT CLUTCH SEALING RINGS (2 REQUIRED).
109 DIRECT CLUTCH HUB BEARING RACE *(SELECTIVE).*
110 REVERSE CLUTCH SEALING RINGS (2 REQUIRED).

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Figure 72

COMPLETED END COVER ASSEMBLY

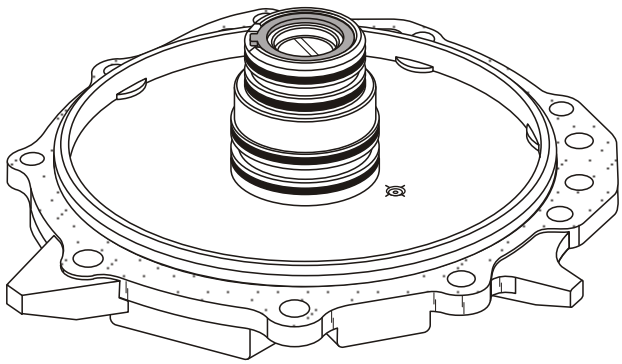

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Figure 73

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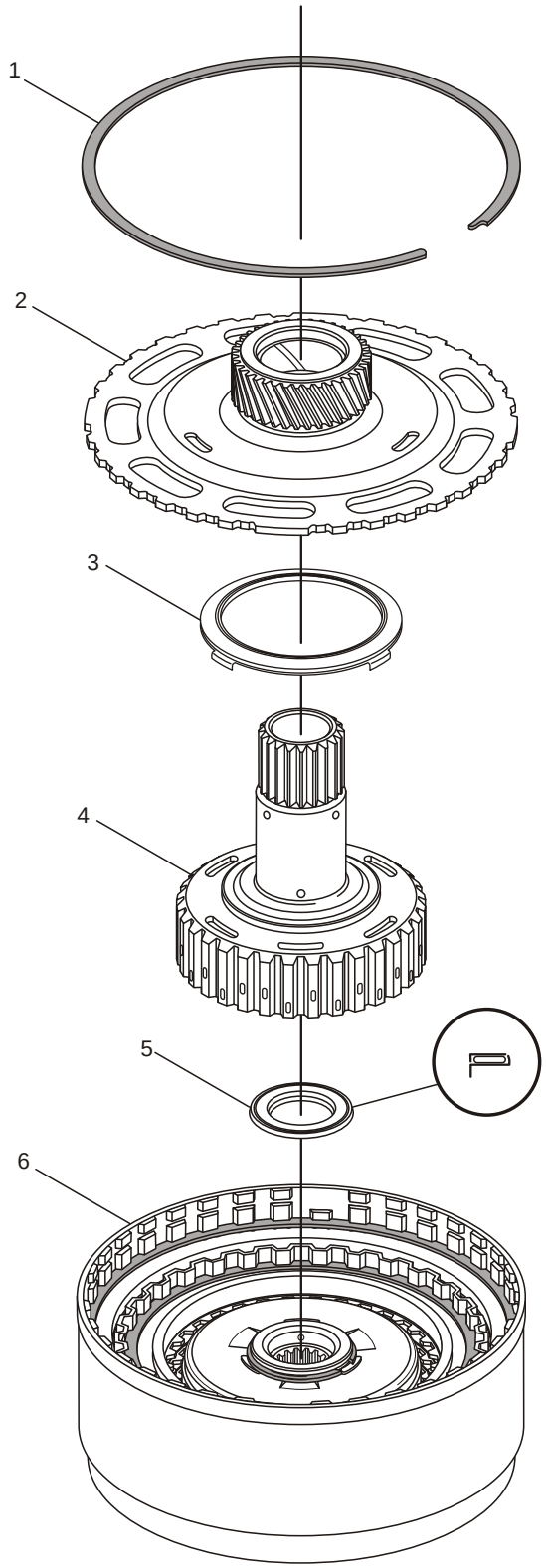

1 REAR SUN GEAR ASSEMBLY RETAINING SNAP RING.
2 REAR SUN GEAR ASSEMBLY.
3 REAR SUN GEAR TO DIRECT HUB, NO. 3, THRUST BEARING.
4 DIRECT CLUTCH HUB.
5 DIRECT HUB TO DIRECT HOUSING, NO. 2, THRUST BEARING.
6 REVERSE CLUTCH HOUSING ASSEMBLY.

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Figure 74

COMPONENT REBUILD SECTION

DIRECT/REVERSE HOUSINGS DISASSEMBLE

1. Lay the direct/reverse clutch housing assembly on flat a work surface, as shown in Figure 74.
2. Remove the snap ring that retains the rear sun gear, as shown in Figure 74.
3. Remove the rear sun gear to direct clutch hub number 3 thrust bearing (See Figure 74).
4. Remove the direct clutch hub, as shown in Figure 74.
5. Remove the direct clutch hub to direct clutch housing number 2 thrust bearing, as shown in Figure 74.
6. Remove the direct clutch housing out of the reverse clutch housing by lifting straight up, as shown in Figure 75.
7. Set the reverse clutch housing aside for the moment and we will rebuild the direct.

Continued on Page 43

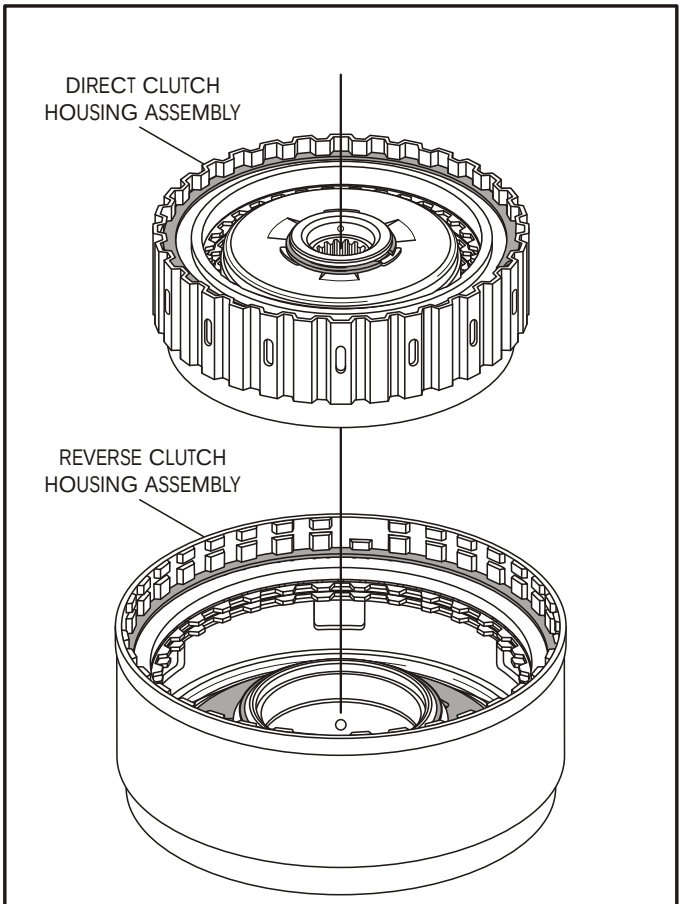

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Figure 75

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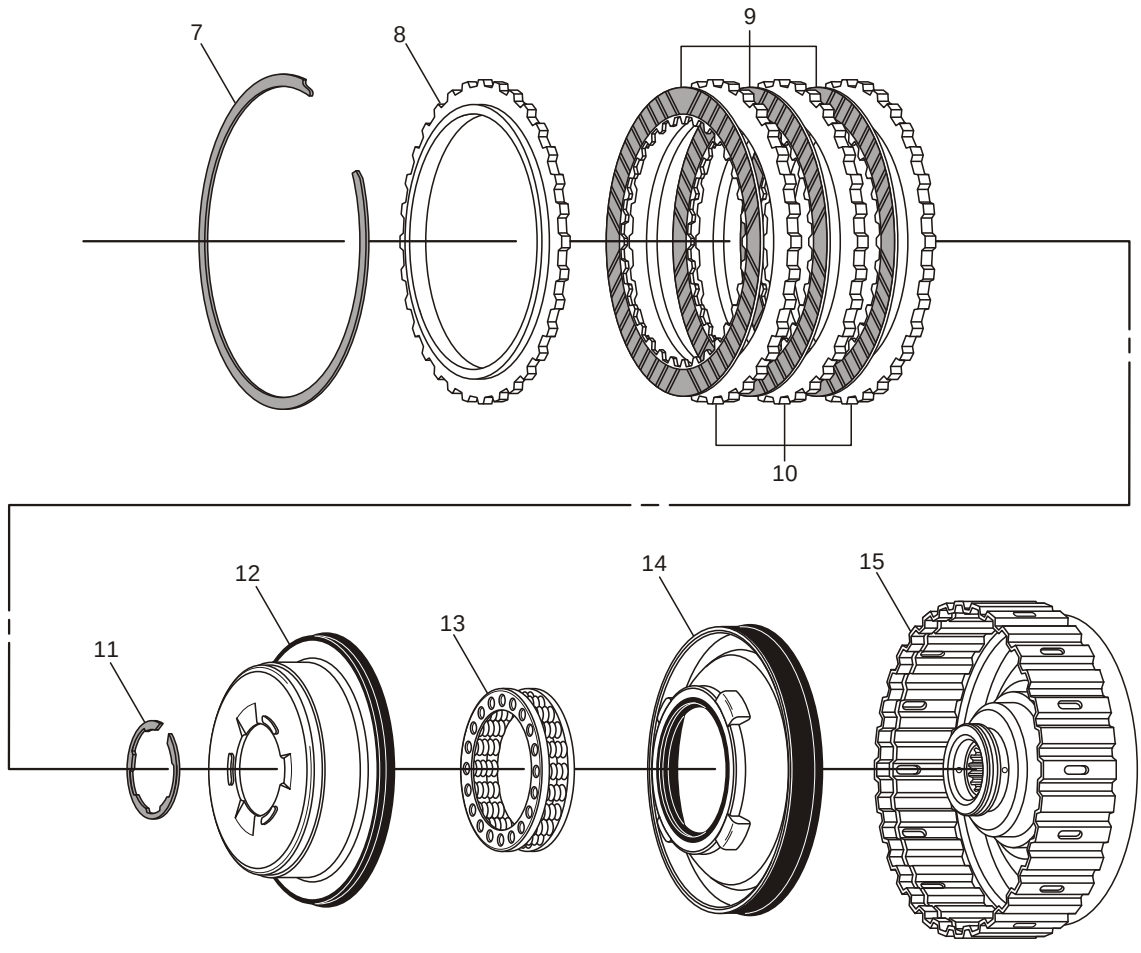
COMPONENT REBUILD SECTION

DIRECT CLUTCH HOUSING ASSEMBLY

1. Disassemble the direct clutch housing using Figure 76 as a guide.
2. Clean all direct clutch housing parts thoroughly and dry with compressed air.
3. Inspect all of the direct clutch housing parts thoroughly for any wear and/or damage.
4. The direct clutch piston and the balance piston have molded rubber seals. If damaged, piston assembly must be replaced.

Continued on Page 44

DIRECT CLUTCH HOUSING EXPLODED VIEW



7 DIRECT CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
8 DIRECT CLUTCH BACKING PLATE.
9 DIRECT CLUTCH FRICTION PLATES (3 REQUIRED).
10 DIRECT CLUTCH STEEL PLATES (3 REQUIRED).
11 DIRECT CLUTCH BALANCE PISTON SNAP RING.
12 DIRECT CLUTCH BALANCE PISTON.
13 DIRECT CLUTCH PISTON RETURN SPRING.
14 DIRECT CLUTCH APPLY PISTON.
15 DIRECT CLUTCH HOUSING.

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Figure 76

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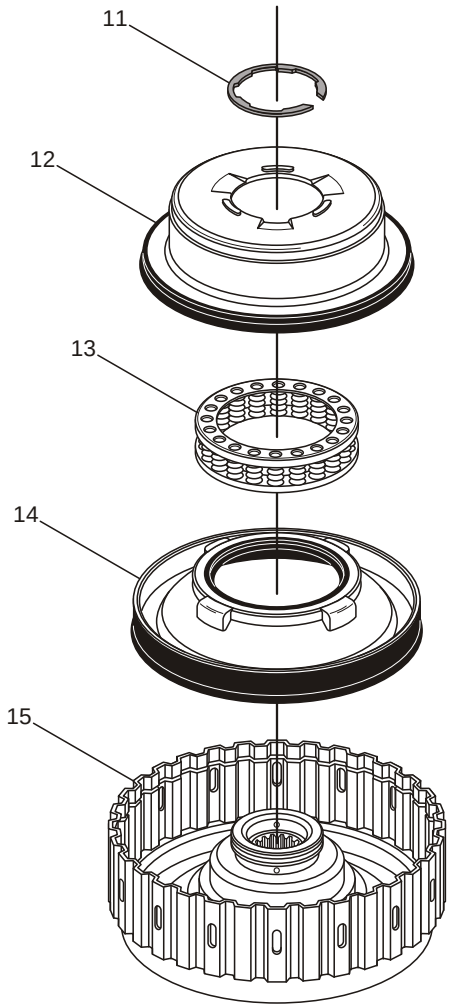
COMPONENT REBUILD SECTION

DIRECT CLUTCH HOUSING ASSEMBLY (CONT'D)

5. Lubricate the direct clutch piston seal surfaces with small amount of Trans-Jel® and install piston, as shown in Figure 77.
6. Install the direct clutch piston return spring assembly, as shown in Figure 77.
7. Lubricate the direct clutch balance piston with small amount of Trans-Jel® and install piston, as shown in Figure 77.
8. Compress the piston and return spring using foot press, install snap ring and ensure that it is fully seated.
9. Install the direct clutch plates beginning with a steel plate and alternating with frictions until you have installed three of each, as shown in Figure 78.
   Note: Friction plates should be soaked in Mercon® V for 15 minutes prior to installing.
10. Install the direct clutch backing plate, as shown in Figure 78.
11. Install the direct clutch backing plate selective snap ring, as shown in Figure 78.

Continued on Page 45



11 DIRECT CLUTCH BALANCE PISTON SNAP RING.
12 DIRECT CLUTCH BALANCE PISTON.
13 DIRECT CLUTCH PISTON RETURN SPRING.
14 DIRECT CLUTCH APPLY PISTON.
15 DIRECT CLUTCH HOUSING.

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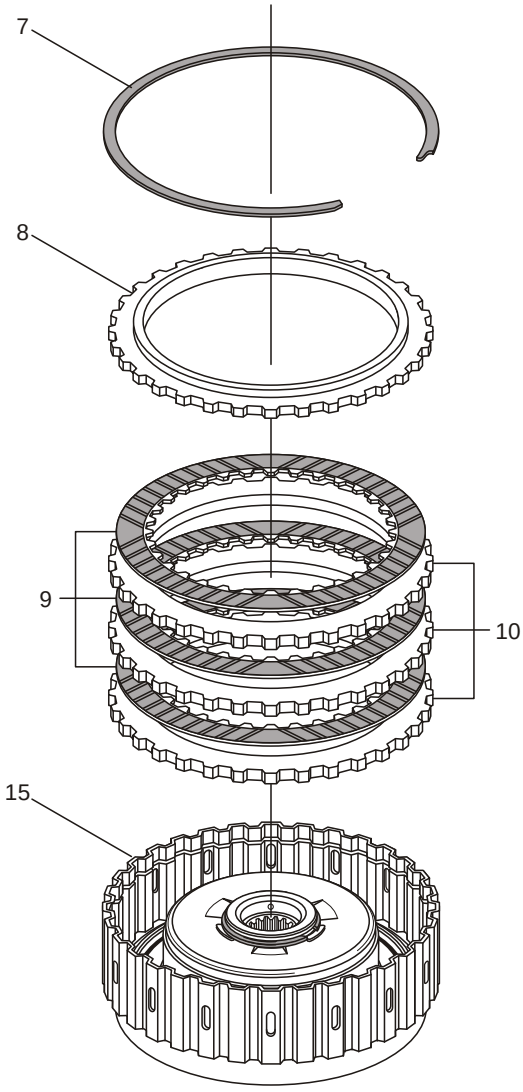
Figure 77



7 DIRECT CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
8 DIRECT CLUTCH BACKING PLATE.
9 DIRECT CLUTCH FRICTION PLATES (3 REQUIRED).
10 DIRECT CLUTCH STEEL PLATES (3 REQUIRED).
15 DIRECT CLUTCH HOUSING.

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Figure 78

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COMPONENT REBUILD SECTION

DIRECT CLUTCH HOUSING ASSEMBLY (CONT'D)

12. Turn the direct clutch housing over and tap on flat work surface to seat snap ring to the top of the groove.
13. Install dial indicator, as shown in Figure 79, with the plunger resting on backing plate, and zero the dial indicator.
14. Lift both sides of clutch pack with scribes to measure for proper clutch pack clearance.
15. The direct clutch pack clearance should be, 1.0 to 1.3 mm (.040" to .051"), as shown in Figure 79.
16. Change the selective snap ring as necessary to obtain the specified clutch clearance.
17. Set the completed direct clutch housing aside while we rebuild the reverse clutch housing.

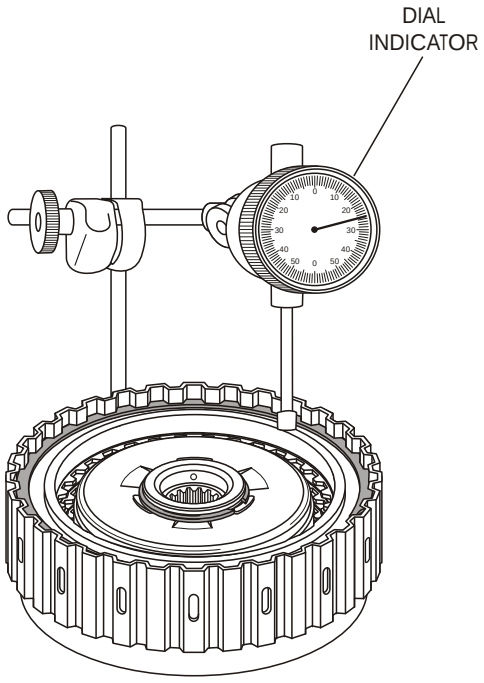
COMPONENT REBUILD SECTION

REVERSE CLUTCH HOUSING ASSEMBLY

1. Disassemble the reverse clutch housing using Figure 81 as a guide.
2. Inspect the bushing area, and the ball capsules for proper operation in reverse clutch housing, as shown in Figure 80.
   Note: Refer to Page 40 for more information.
3. Install the reverse clutch molded piston into reverse clutch housing, as shown in Figure 82.
   Note: There are two different dimension reverse clutch molded pistons, as shown in Figure 82. Ensure that you are installing the proper piston for model you are building.
4. Install the reverse clutch piston "Bellville" return spring, as shown in Figure 82.
5. Install the bellville return spring retainer, as shown in Figure 82.
6. Compress the bellville spring and retainer and install snap ring, as shown in Figure 82, and ensure snap ring is fully seated.

Continued on Page 47

DIRECT CLUTCH CLEARANCE SHOULD BE
1.0 - 1.3 MM (.040" - .051")



Selective Snap Ring Thickness Available
1.15 - 1.25 mm (.045" - .049")
1.35 - 1.45 mm (.053" - .057")
1.55 - 1.65 mm (.061" - .065")
1.75 - 1.85 mm (.069" - .073")
1.95 - 2.05 mm (.077" - .081")
2.15 - 2.25 mm (.085" - .089")

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Figure 79

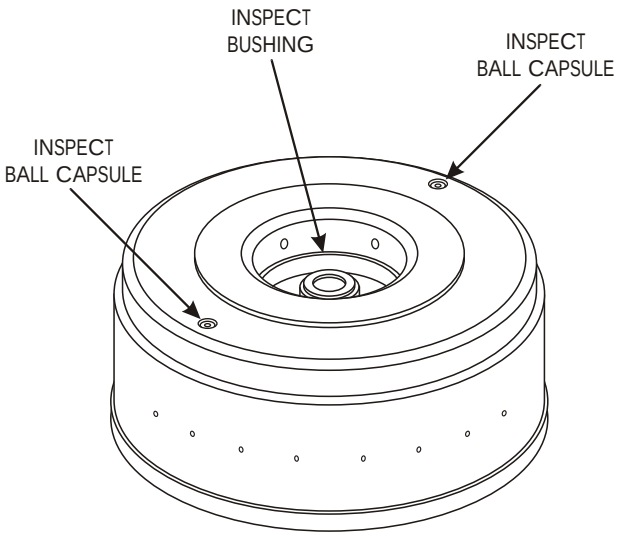

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Figure 80

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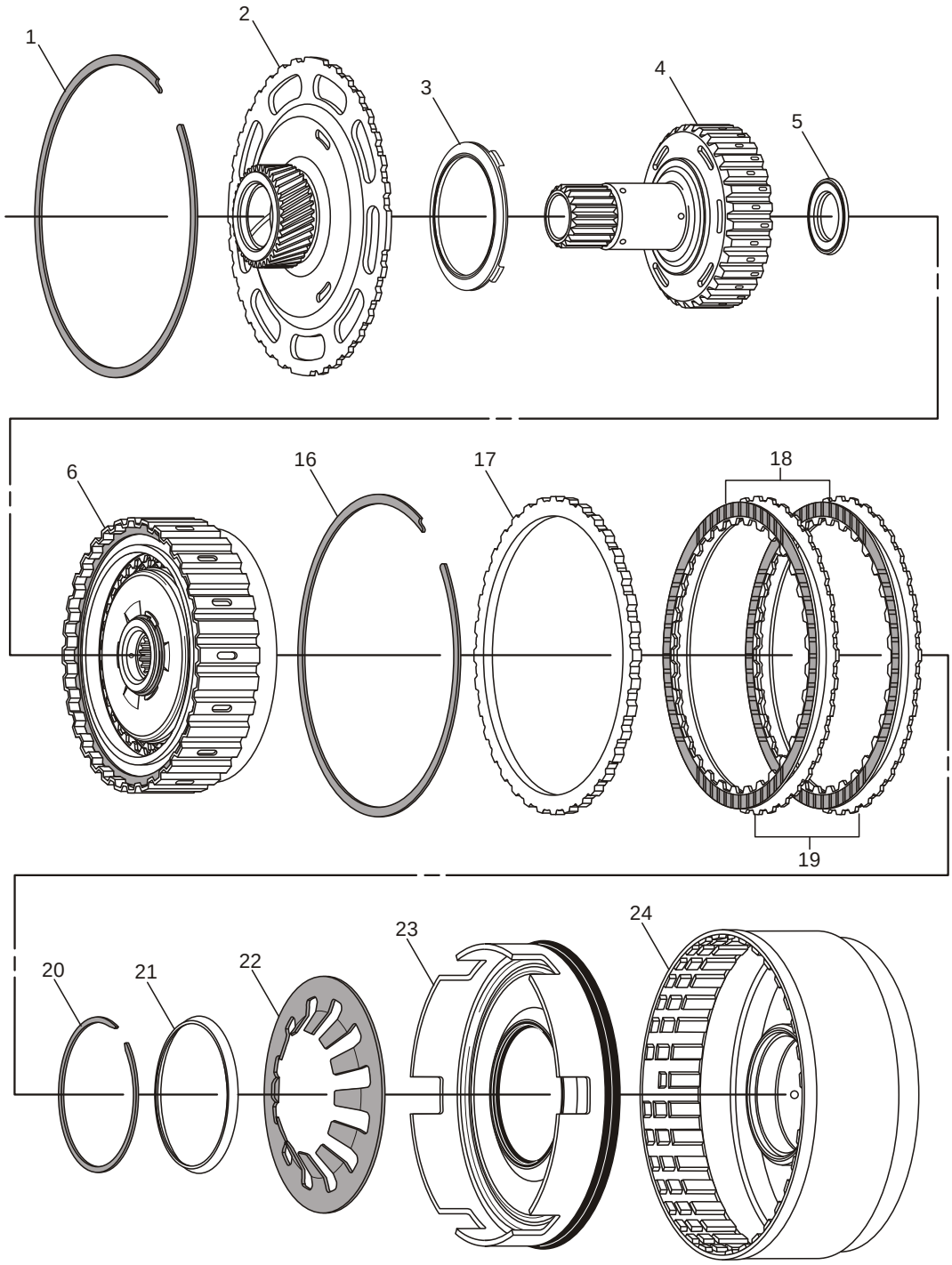
REVERSE CLUTCH HOUSING EXPLODED VIEW



1 REAR SUN GEAR ASSEMBLY RETAINING SNAP RING.
2 REAR SUN GEAR ASSEMBLY.
3 REAR SUN GEAR TO DIRECT HUB, NO. 3, THRUST BEARING.
4 DIRECT CLUTCH HUB.
5 DIRECT HUB TO DIRECT HOUSING, NO. 2, THRUST BEARING.
6 DIRECT CLUTCH HOUSING ASSEMBLY, COMPLETE.
16 REVERSE CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
17 REVERSE CLUTCH BACKING PLATE.
18 REVERSE CLUTCH FRICTION PLATES (2 REQUIRED).
19 REVERSE CLUTCH STEEL PLATES (2 REQUIRED).
20 REVERSE CLUTCH PISTON BELLVILLE RETAINER SNAP RING.
21 REVERSE CLUTCH PISTON BELLVILLE SPRING RETAINER.
22 REVERSE CLUTCH PISTON BELLVILLE RETURN SPRING.
23 REVERSE CLUTCH PISTON.
24 REVERSE CLUTCH HOUSING ASSEMBLY.

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Figure 81

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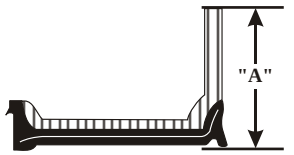
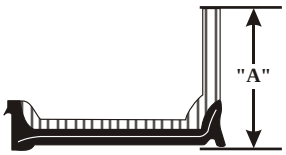


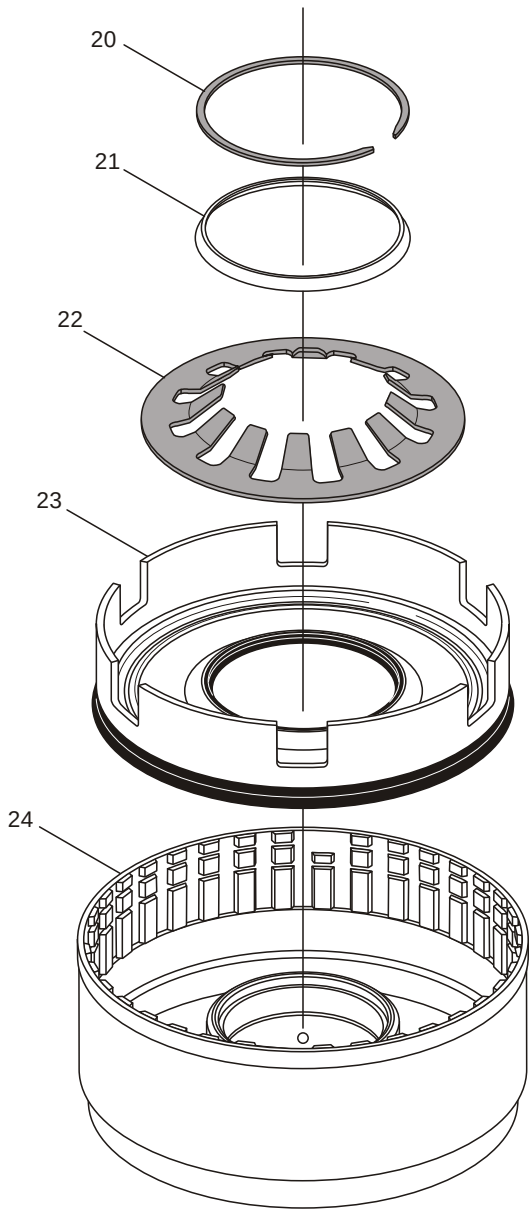
FORD PISTON
XS4Z-7D402-AB

DIMENSION "A" = 1.475"



MAZDA PISTON
FN01-19-SHOA

DIMENSION "A" = 1.375"



20 REVERSE CLUTCH PISTON BELLVILLE RETAINER SNAP RING.
21 REVERSE CLUTCH PISTON BELLVILLE SPRING RETAINER.
22 REVERSE CLUTCH PISTON BELLVILLE RETURN SPRING.
23 REVERSE CLUTCH PISTON.
24 REVERSE CLUTCH HOUSING ASSEMBLY.

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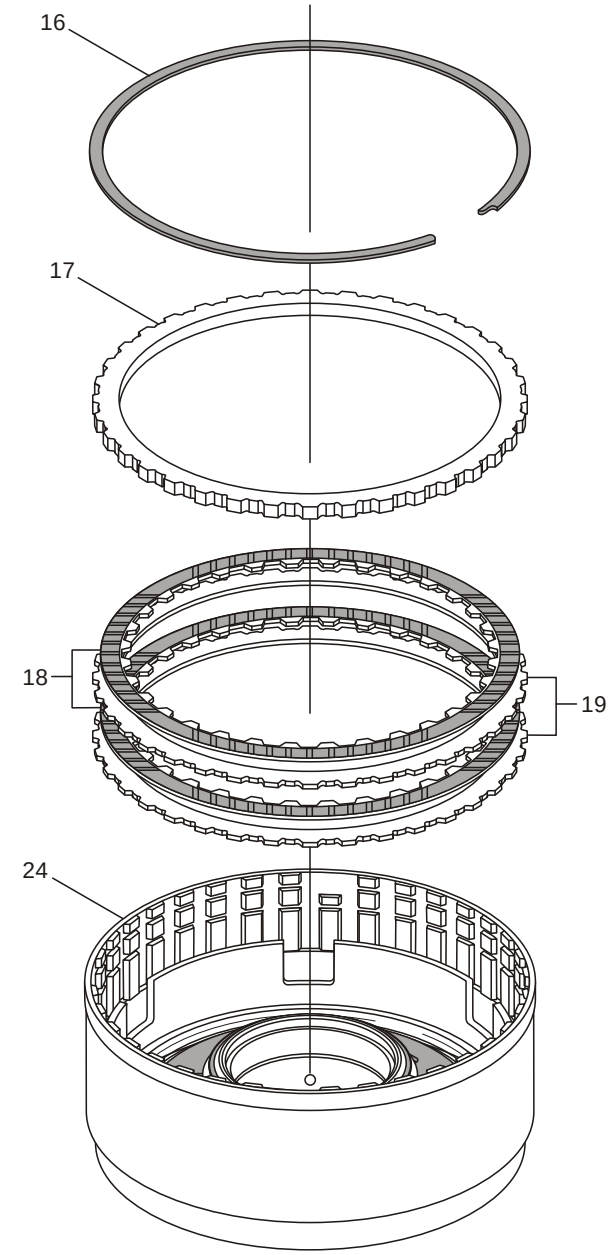
Figure 82

REVERSE CLUTCH HOUSING ASSEMBLY (CONT'D)

7. Install the reverse clutch plates beginning with a steel plate and alternating with friction plates until you have installed two of each, as shown in Figure 83.
Note: Friction plates should be soaked in Mercon® V fluid for 15 minutes prior to installation.

Continued on Page 48



16 REVERSE CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
17 REVERSE CLUTCH BACKING PLATE.
18 REVERSE CLUTCH FRICTION PLATES (2 REQUIRED).
19 REVERSE CLUTCH STEEL PLATES (2 REQUIRED).
24 REVERSE CLUTCH HOUSING ASSEMBLY.

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Figure 83

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COMPONENT REBUILD SECTION
REVERSE CLUTCH HOUSING ASSEMBLY (CONT'D)

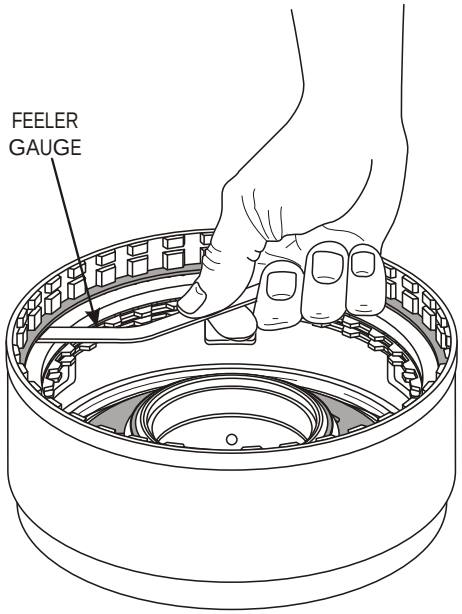
8. Install reverse clutch backing plate, as shown in Figure 83.
9. Install reverse clutch backing plate selective snap ring, as shown in Figure 83.
10. Turn the housing over and tap on work bench to seat the snap ring against top of groove.
11. Check the reverse clutch pack clearance using a feeler gauge between the backing plate and the selective snap ring, as shown in Figure 84.
12. The reverse clutch pack clearance should be 1.0 to 1.3 mm (.040" to .051"), as shown in Figure 84.
13. Change the selective snap ring as necessary to obtain specified clearance and recheck clutch pack clearance (See Figure 84).

COMPONENT REBUILD SECTION
DIRECT/REVERSE HOUSINGS ASSEMBLE

1. Lay the completed reverse clutch housing on a flat work surface, as shown in Figure 85.
2. Install the completed direct clutch housing into the completed reverse clutch housing, rotating back and forth to engage reverse clutches onto the direct clutch housing (See Figure 85).

Continued on Page 49

REVERSE CLUTCH CLEARANCE SHOULD BE
1.0 - 1.3 MM (.040" - .051")



Selective Snap Ring Thickness Available
1.15 - 1.25 mm (.045" - .049")
1.35 - 1.45 mm (.053" - .057")
1.55 - 1.65 mm (.061" - .065")
1.75 - 1.85 mm (.069" - .073")
1.95 - 2.05 mm (.077" - .081")
2.15 - 2.25 mm (.085" - .089")

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Figure 84

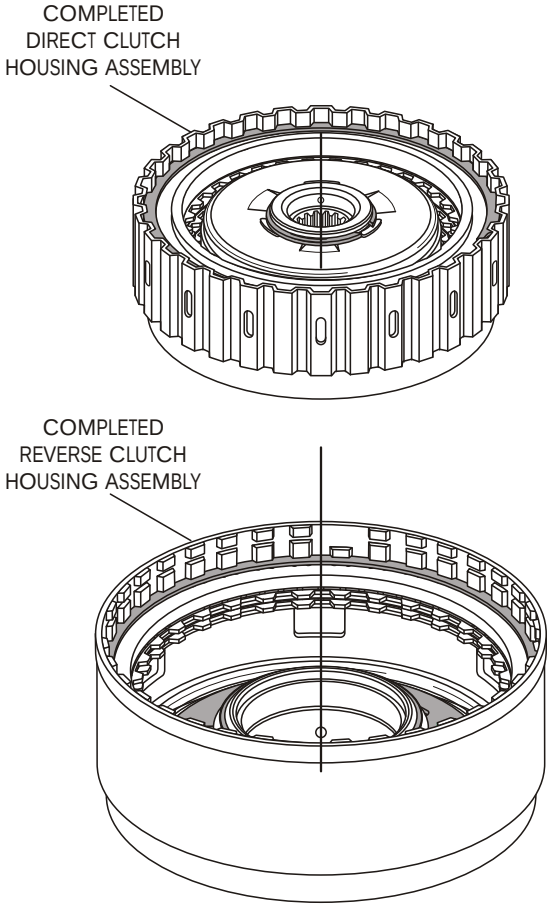

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Figure 85

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COMPONENT REBUILD SECTION
DIRECT/REVERSE HOUSINGS ASSEMBLE (CONT'D)

3. Install the number 2 direct clutch thrust bearing onto the direct clutch housing, in the direction shown in Figure 86, and retain with a small amount of Trans-Jel®.
4. Install number 3 rear sun gear thrust bearing onto the direct clutch hub, in the direction shown in Figure 87, and retain with a small amount of Trans-Jel®.

Continued on Page 50

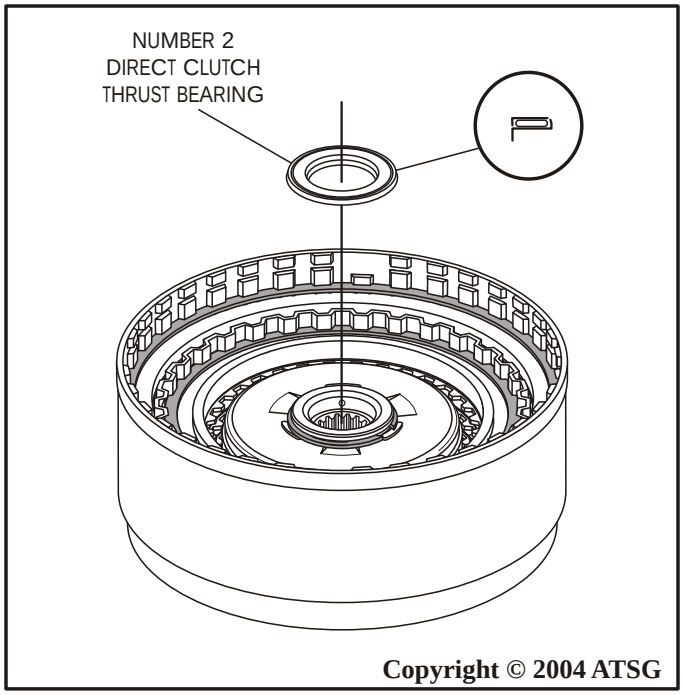

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Figure 86

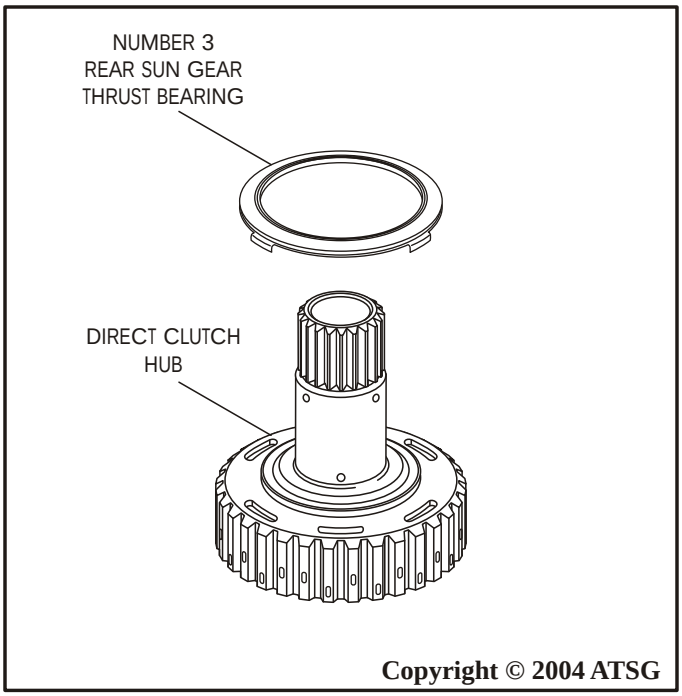

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Figure 87

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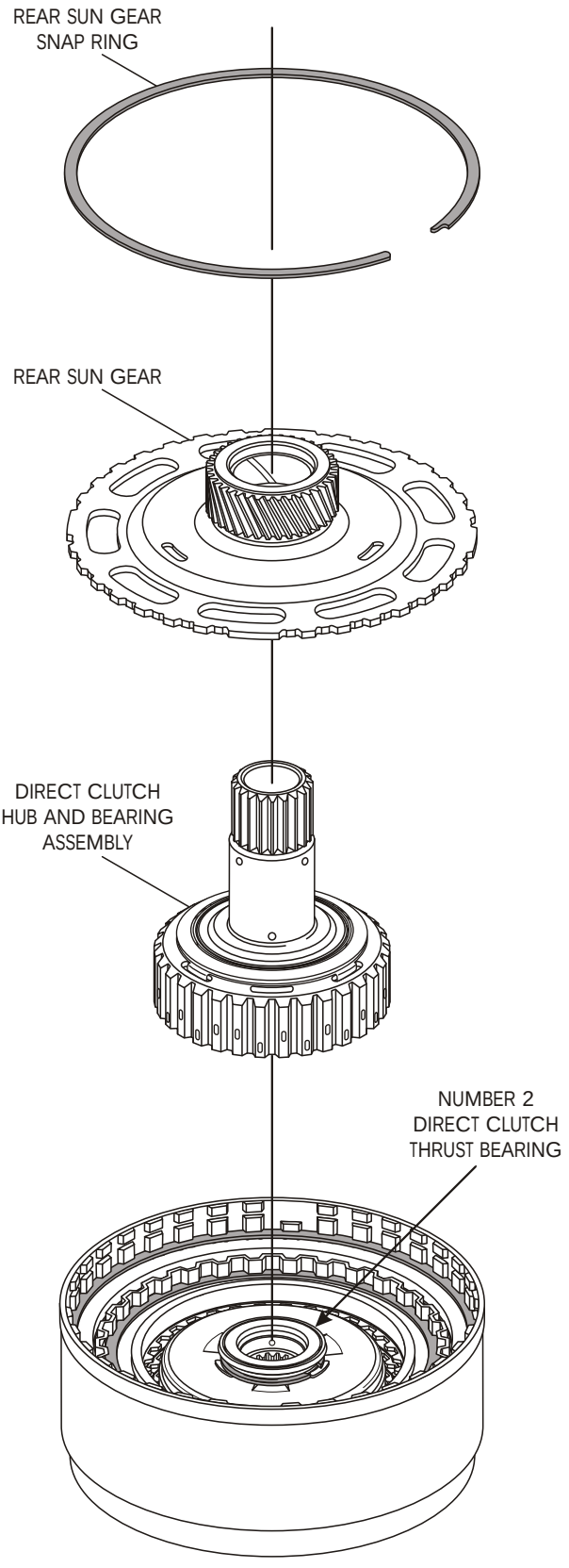

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Figure 88

COMPONENT REBUILD SECTION
DIRECT/REVERSE HOUSINGS ASSEMBLE (CONT'D)

5. Install direct clutch hub and bearing assembly into direct clutches by rotating back and forth until fully seated (See Figure 88).
6. Install the rear sun gear into the reverse clutch housing, as shown in Figure 88.
7. Install the rear sun gear snap ring into reverse clutch housing, as shown in Figure 88, and ensure that it is fully seated.
8. Set the completed direct/reverse assembly aside for the final assembly process (See Figure 89).

COMPLETED DIRECT/REVERSE CLUTCH HOUSING ASSEMBLY

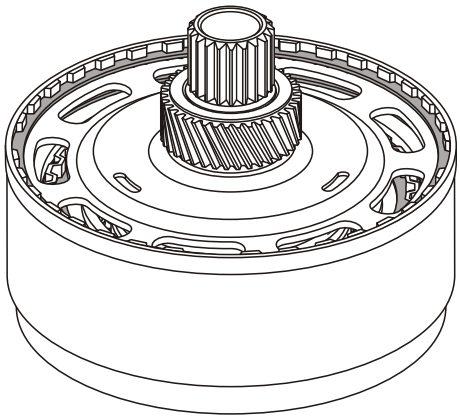

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Figure 89

COMPONENT REBUILD SECTION
PLANETARY ASSEMBLIES

1. Disassemble the planetary gear train assemblies using Figure 90 as a guide.
2. Inspect all planetary gear train parts for any wear and/or damage.
3. Clean all planetary gear train parts thoroughly and dry with compressed air.
   Note: Do not spin planetary gears with the air pressure, as damage will occur.

Continued on Page 52

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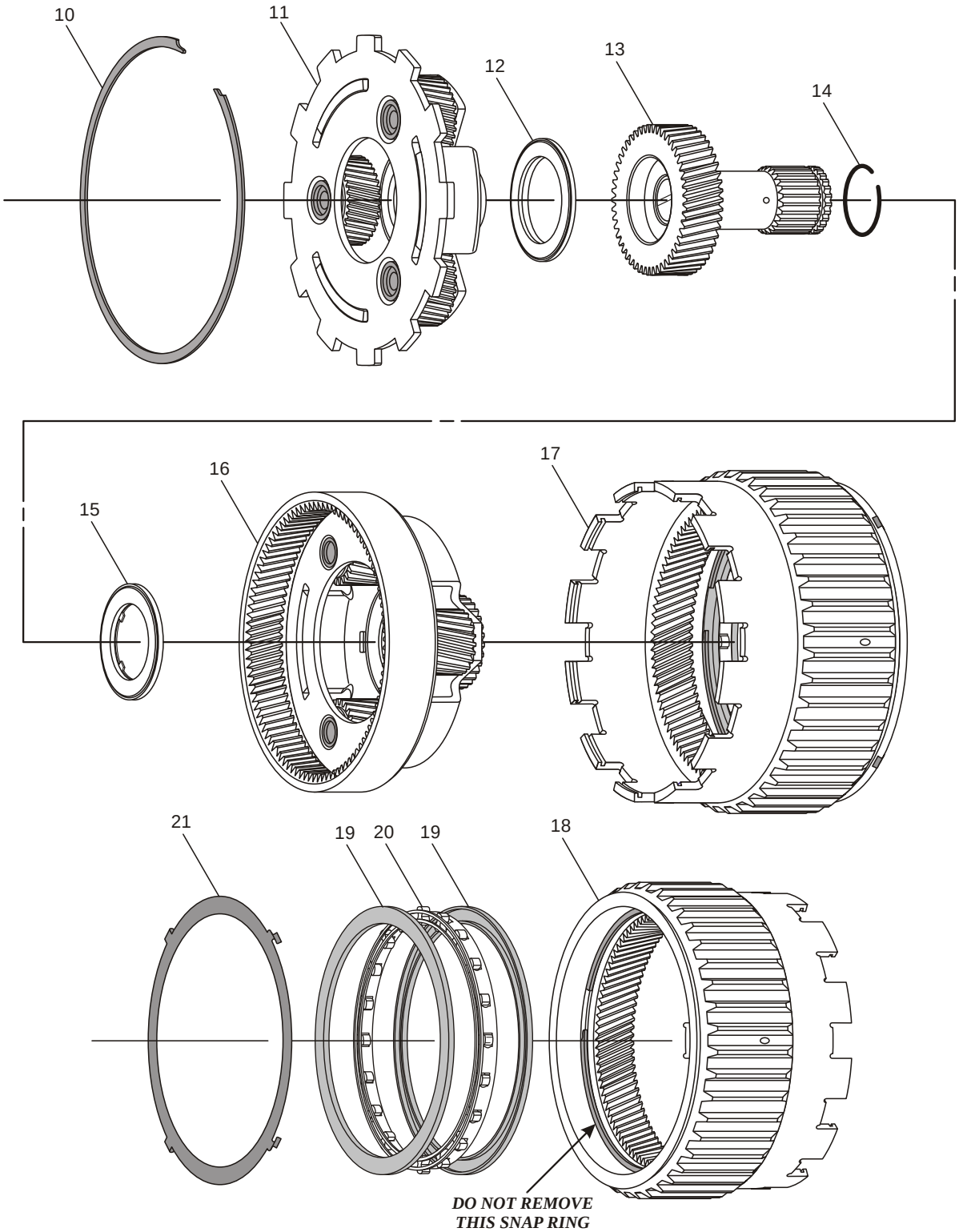
PLANETARY GEAR TRAIN EXPLODED VIEW



10 REAR PLANETARY CARRIER RETAINING SNAP RING.
11 REAR PLANETARY CARRIER ASSEMBLY.
12 FRONT PLANETARY SUN GEAR THRUST BEARING (NUMBER 5).
13 FRONT PLANETARY SUN GEAR.
14 FRONT PLANETARY SUN GEAR SNAP RING (CIR-CLIP).
15 FRONT PLANETARY CARRIER THRUST BEARING (NUMBER 6).
16 FRONT PLANETARY CARRIER/REAR RING GEAR ASSEMBLY.
17 FRONT PLANETARY CARRIER RING GEAR AND HUB ASSEMBLY.
18 FRONT RING GEAR AND HUB ASSEMBLY (REAR VIEW).
19 LOW SPRAG ASSEMBLY END BEARINGS (2 REQUIRED).
20 LOW SPRAG CAGE ASSEMBLY.
21 LOW SPRAG RETAINER.

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Figure 90

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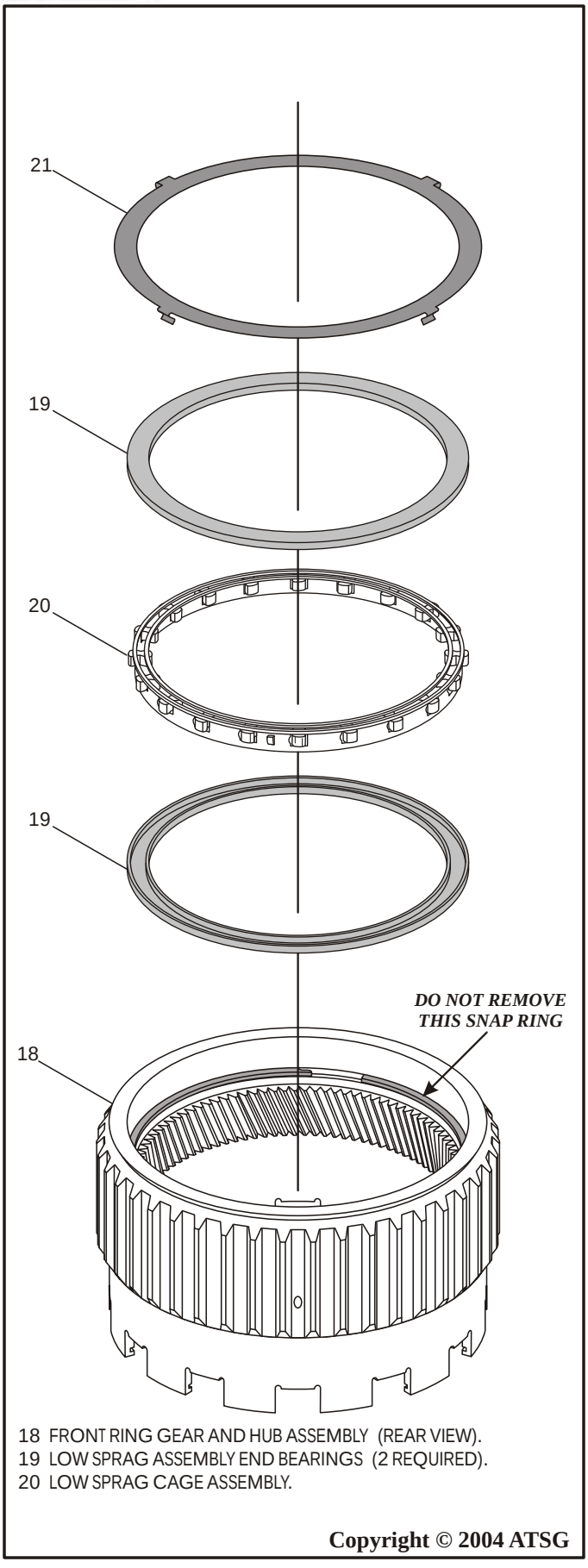

18 FRONT RING GEAR AND HUB ASSEMBLY (REAR VIEW).
19 LOW SPRAG ASSEMBLY END BEARINGS (2 REQUIRED).
20 LOW SPRAG CAGE ASSEMBLY.

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Figure 91

PLANETARY ASSEMBLIES (CONT'D)

4. Position front ring gear and hub assembly on flat work surface, as shown in Figure 91. ***Note: Notice in Figure 90 & Figure 91 that snap ring does not need to be removed.***
5. Install low sprag end bearing in the direction shown in Figure 91, down against snap ring.
6. Install the low sprag into the ring gear with the flat side of the tabs facing up and the windows facing left, as shown in Figure 92.
7. Install the second low sprag end bearing into ring gear with flat side facing up, as shown in Figure 91.
8. Install the low sprag retainer onto the ring gear, as shown in Figure 91, by snapping onto the ring gear and ensure that it is fully seated, as shown in Figure 93.

Continued on Page 52

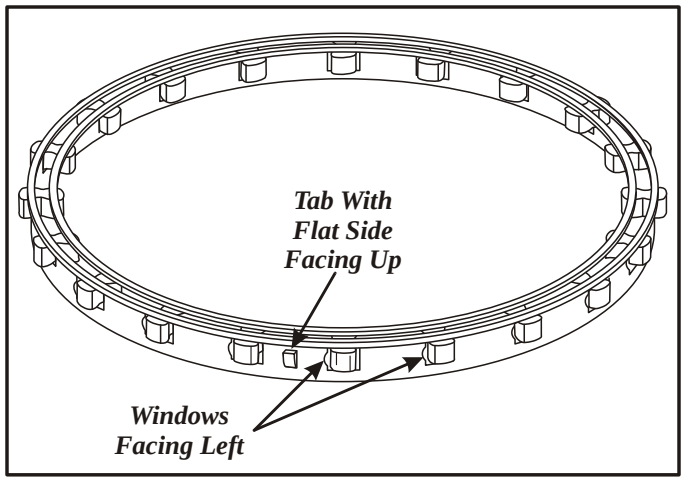

Figure 92

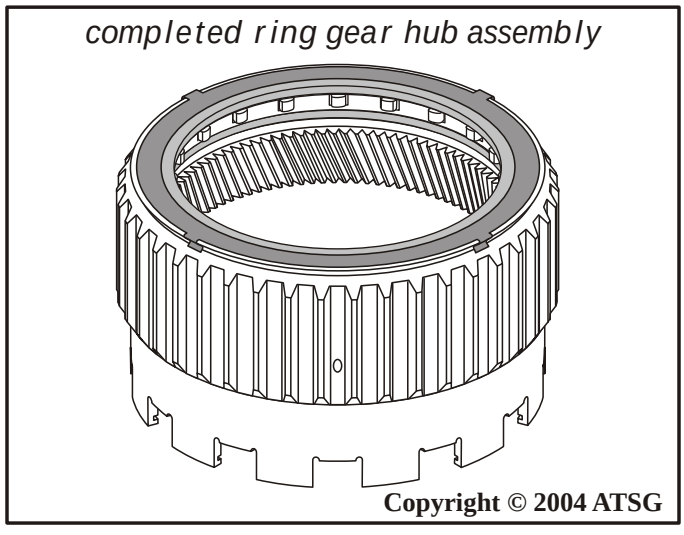

Figure 93

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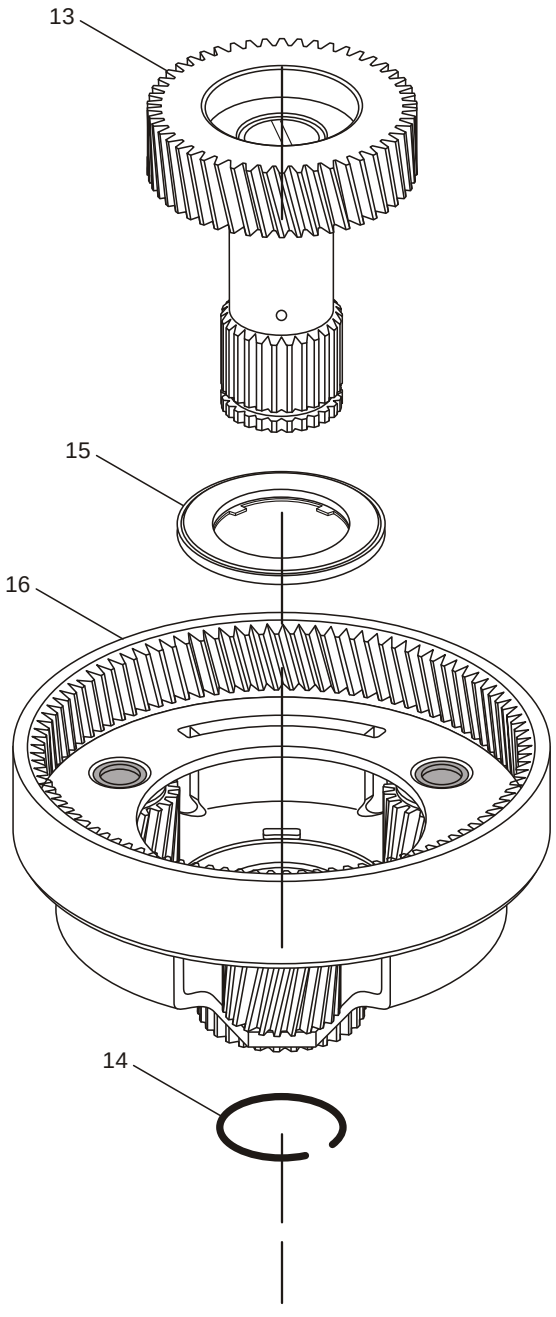
PLANETARY ASSEMBLIES (CONT'D)

9. Install the number 6 front planetary carrier thrust bearing into the front planetary carrier, as shown in Figure 94, with the internal tabs facing down and retain with Trans-Jel®.
10. Install the front planetary sun gear into front planetary carrier by rotating into position, as shown in Figure 94.
11. Now install the snap ring (Cir-Clip) into the groove in the sun gear shaft, as shown in Figure 95, and insure it is fully seated.
    Note: This cir-clip is what retains the forward clutch hub and must be squeezed into the groove far enough to get the forward clutch hub installed during final assembly.

Continued on Page 54



13 FRONT PLANETARY SUN GEAR.
14 FRONT PLANETARY SUN GEAR SNAP RING (CIR-CLIP).
15 FRONT PLANETARY CARRIER THRUST BEARING (NUMBER 6).
16 FRONT PLANETARY CARRIER/REAR RING GEAR ASSEMBLY.

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Figure 94

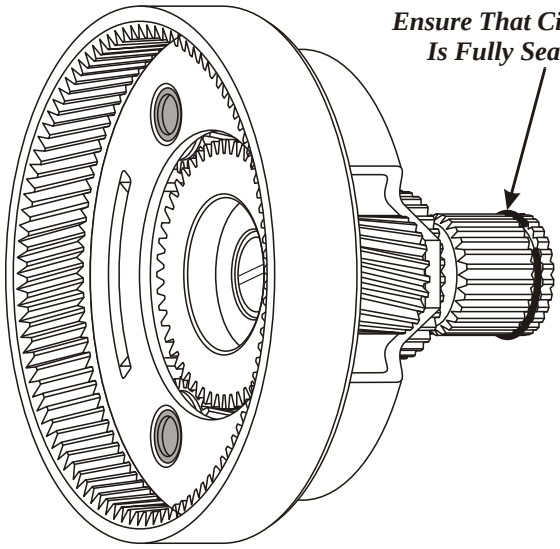

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Figure 95

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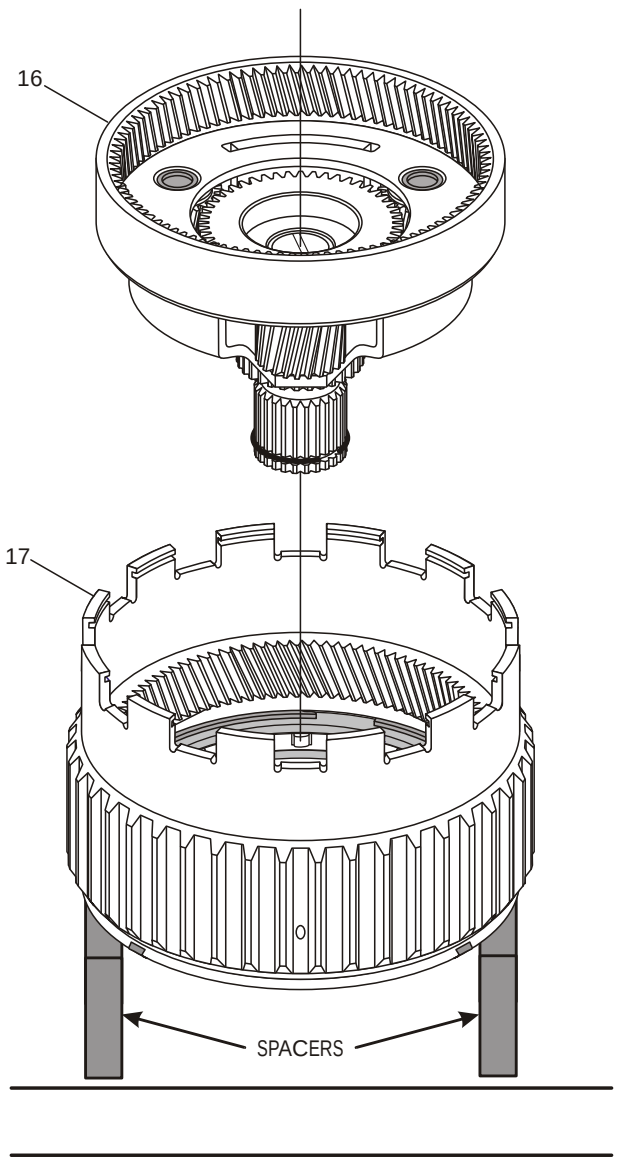
COMPONENT REBUILD SECTION

PLANETARY ASSEMBLIES (CONT'D)

12. Place the pre-assembled ring gear and hub assembly on flat work surface with some type of spacers below ring gear to allow the shaft of the sun gear to protrude through ring gear. Refer to Figure 96.
13. Install the pre-assembled front planet and sun gear assembly into front ring gear by rotating into position, as shown in Figure 96, until fully seated
14. Install the number five, rear planetary carrier thrust bearing, onto the front sun gear in the direction shown in Figure 97, with the inside lip facing down.
15. Install the rear planetary carrier by rotating into position, as shown in Figure 97.
16. Install the rear planetary carrier retaining snap ring, as shown in Figure 97.
17. Set completed planetary gear assembly aside for the final assembly process (See Figure 98).



16 FRONT PLANETARY CARRIER/REAR RING GEAR ASSEMBLY.
17 FRONT PLANETARY CARRIER RING GEAR AND HUB ASSEMBLY.

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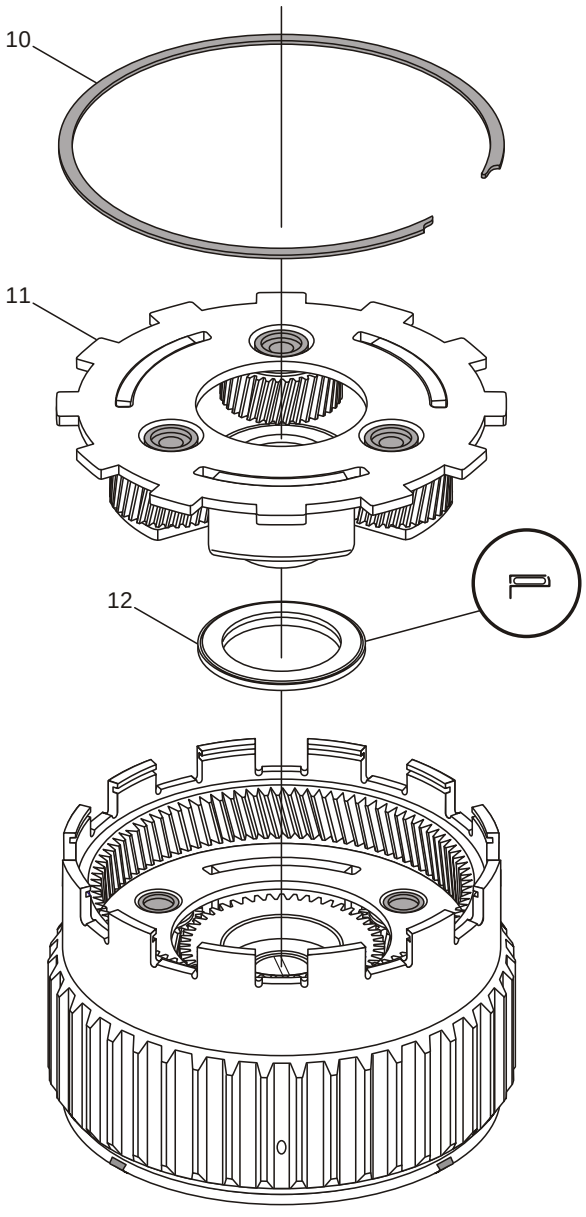
Figure 96



10 REAR PLANETARY CARRIER RETAINING SNAP RING.
11 REAR PLANETARY CARRIER ASSEMBLY.
12 REAR PLANETARY/SUN GEAR THRUST BEARING (NUMBER 5).

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Figure 97

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COMPLETED PLANETARY GEAR ASSEMBLY

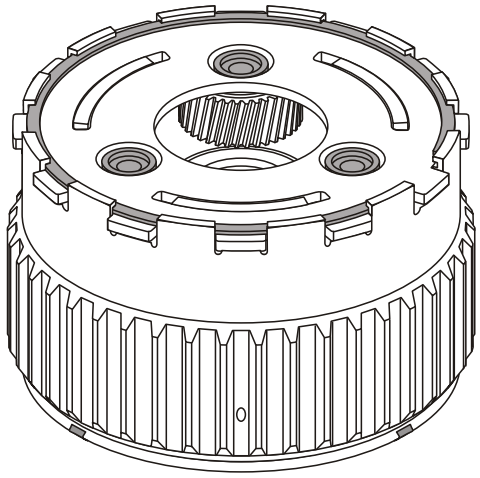

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Figure 98

COMPONENT REBUILD SECTION

MANUAL CONTROL LINKAGE

1. Inspect the internal control detent lever and bracket assembly for any wear and/or damage, as shown in Figure 99.
2. Inspect the detent spring for any wear and/or damage (See Figure 99).
3. Install new "O" ring seals on the manual shaft, as shown in Figure100, and lubricate seals with small amount of Trans-Jel®.
4. Set both parts aside for final assembly process.

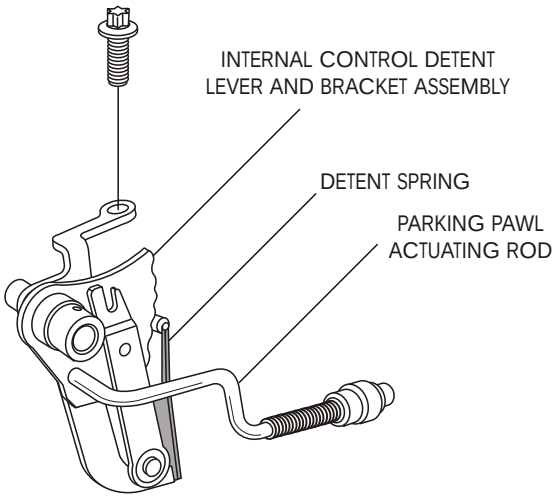

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Figure 99

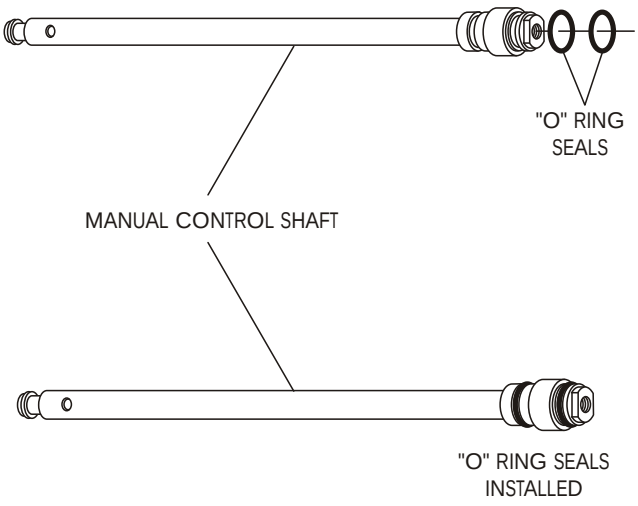

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Figure 100

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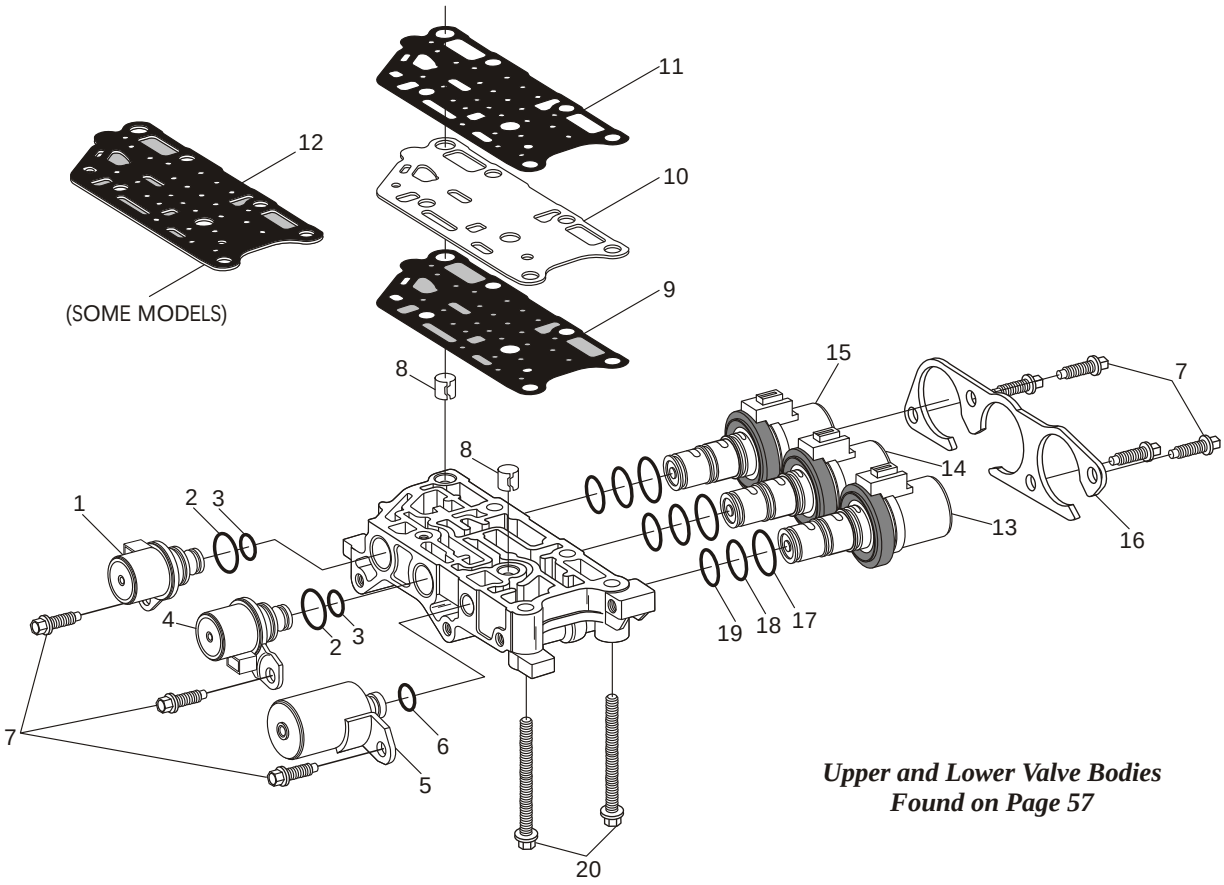
SOLENOID BODY EXPLODED VIEW



Upper and Lower Valve Bodies
Found on Page 57

1 SHIFT SOLENOID "B"
2 SHIFT SOLENOID "A" AND "B" LARGE "O" RING SEAL
3 SHIFT SOLENOID "A" AND "B" SMALL "O" RING SEAL
4 SHIFT SOLENOID "A"
5 ELECTRONIC PRESSURE CONTROL (EPC) SOLENOID
6 EPC SOLENOID "O" RING SEAL
7 SOLENOID RETAINING BOLTS (7 REQUIRED)
8 SOLENOID BODY TO LOWER V. B. ALIGNMENT DOWELS (2 REQ)
9 SOLENOID BODY TO SPACER PLATE GASKET, WITH SCREENS
10 SOLENOID BODY SPACER PLATE
11 SOLENOID BODY SPACER PLATE TO LOWER V. B. GASKET
12 SPACER PLATE WITH MOLDED GASKETS (SOME MODELS)
13 PWM SHIFT SOLENOID "C"
14 PWM SHIFT SOLENOID "E"
15 PWM SHIFT SOLENOID "D"
16 PWM SHIFT SOLENOID RETAINING PLATE
17 PWM SHIFT SOLENOID LARGE "O" RING SEAL (3 REQUIRED)
18 PWM SHIFT SOLENOID MEDIUM "O" RING SEAL (3 REQUIRED)
19 PWM SHIFT SOLENOID SMALL "O" RING SEAL (3 REQUIRED)
20 SOLENOID BODY TO CASE BOLTS, 71mm LENGTH (2 REQUIRED)
21 MANUAL SHIFT VALVE
22 SOLENOID BODY RETAINING BOLTS, 59MM LENGTH (5 REQUIRED)
23 UPPER VALVE BODY CASTING
24 VALVE BODY TO CASE SEALS (2 REQUIRED)
25 UPPER V. B. TO LOWER V. B. BOLTS, 32MM LENGTH (5 REQUIRED)
26 UPPER V. B. TO LOWER V. B. BOLTS, 40MM LENGTH (9 REQUIRED)
27 LOW/REVERSE SHIFT VALVE
28 LOW/REVERSE SHIFT VALVE SPRING
29 VALVE LINE-UP RETAINER (7 REQUIRED)
30 SOLENOID PRESSURE REGULATOR VALVE SPRING
31 SOLENOID PRESSURE REGULATOR VALVE
32 UPPER VALVE BODY TO SPACER PLATE GASKET
33 VALVE BODY SPACER PLATE
34 LOWER VALVE BODY TO SPACER PLATE GASKET
35 TORQUE CONVERTER RELIEF VALVE SPRING
36 TORQUE CONVERTER RELIEF VALVE
37 TORQUE CONVERTER CLUTCH CONTROL VALVE SPRING
38 TORQUE CONVERTER CLUTCH CONTROL VALVE
39 CLUTCH CONTROL VALVE SPRING
40 CLUTCH CONTROL VALVE
41 3-4 SHIFT VALVE SPRING
42 3-4 SHIFT VALVE
43 SHIFT SOLENOID "C" ACCUMULATOR SPRING
44 SHIFT SOLENOID "C" ACCUMULATOR PISTON
45 SOLENOID SHIFT VALVE
46 SOLENOID SHIFT VALVE SPRING
47 MAIN PRESSURE REGULATOR VALVE
48 MAIN PRESSURE REGULATOR VALVE SPRING
49 MAIN PRESSURE REGULATOR VALVE BORE PLUG
50 MAIN PRESSURE REGULATOR VALVE BORE PLUG RETAINER
51 LOWER V. B. TO UPPER V. B. ALIGNMENT DOWELS (2 REQUIRED)
52 LOWER VALVE BODY CASTING

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Figure 101

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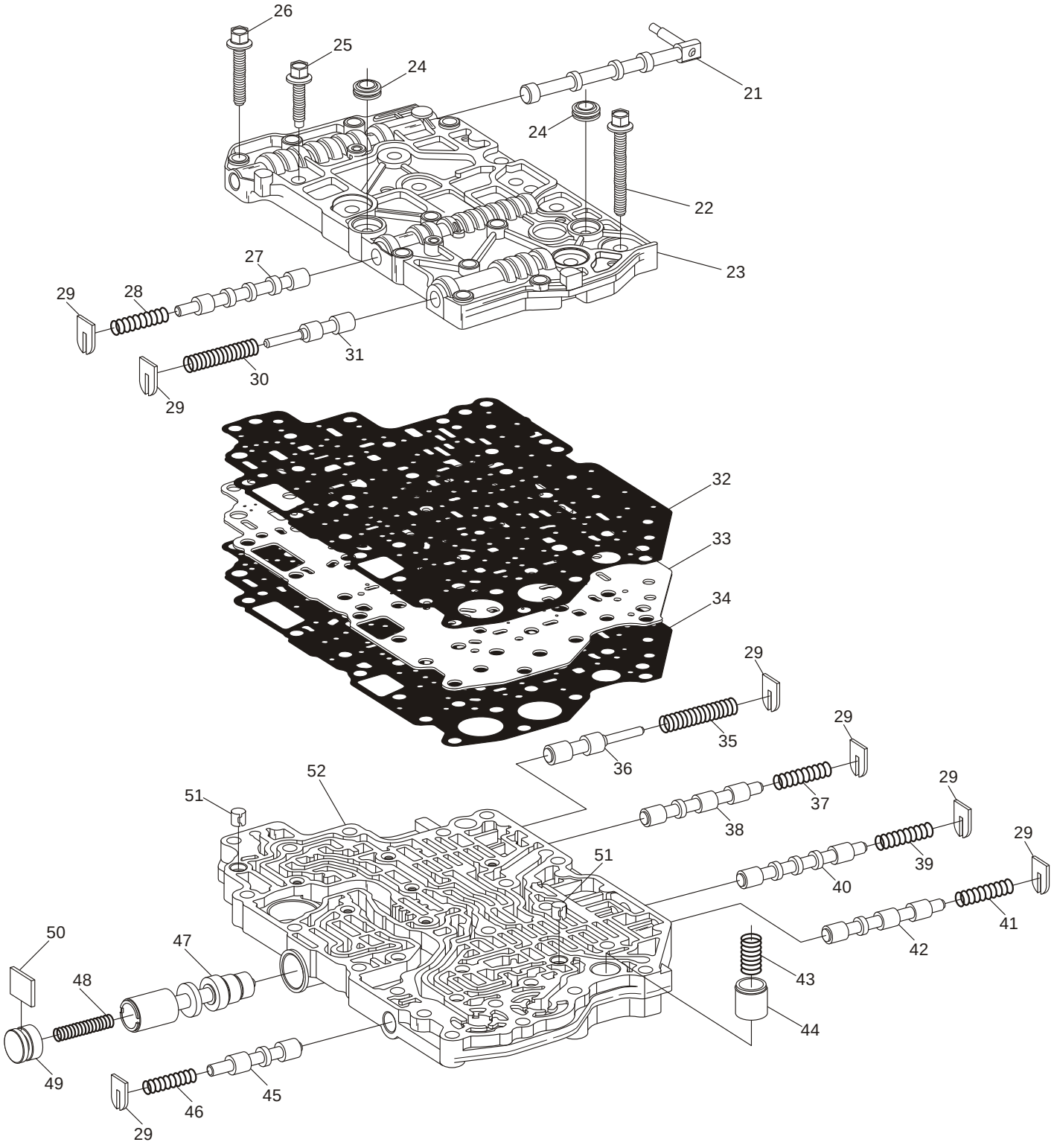
UPPER AND LOWER VALVE BODY EXPLODED VIEW



Solenoid Body and Legend Found on Page 56

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Figure 102

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COMPONENT REBUILD SECTION

SOLENOID BODY

1. Disassemble complete solenoid body assembly using Figure 101 as a guide.
2. Clean all solenoid body parts thoroughly and dry with compressed air.
3. Inspect all solenoid body parts thoroughly for any wear and/or damage.
4. There are three different styles of solenoids in this solenoid body. The locations and styles are identified in Figure 104, along with their OEM part numbers.
5. Mechanically check shift solenoids "A" & "B", as shown in Figure 103, which have had some concerns.
6. Install new "O" rings on each of the solenoids, as shown in Figure 104, and lubricate with a very small amount of Trans-Jel®.
7. Install the solenoids in their proper positions, as shown in Figure 104, and install retaining brackets and bolts. (See Figure 101).
8. Torque the solenoid retaining bolts to 9 N•m (80 in.lb.).
9. Install the ground terminal retaining bolt for shift solenoids "C", "D" and "E", finger tight at this time (See Figure 104).
10. Set the completed solenoid body aside for the valve body sub assembly.

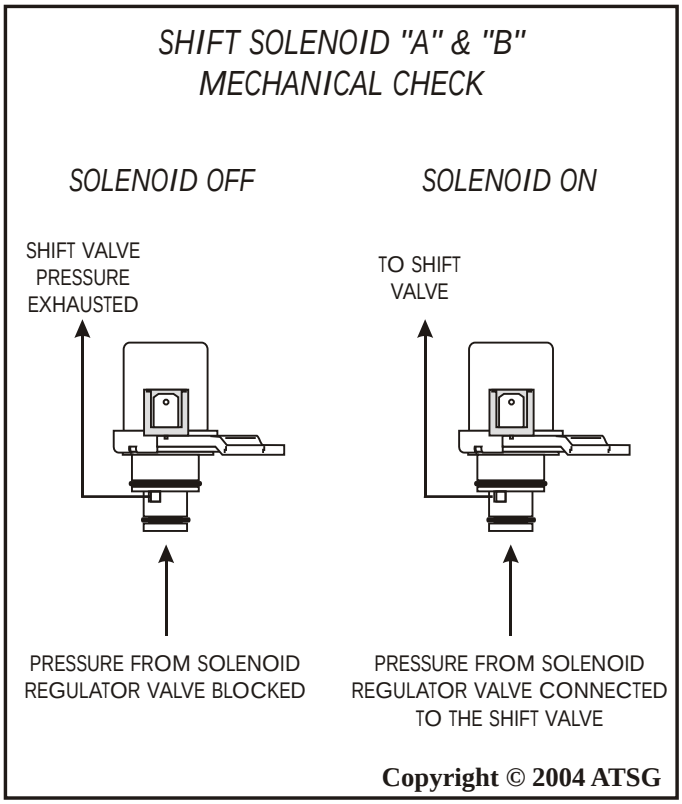

Figure 103

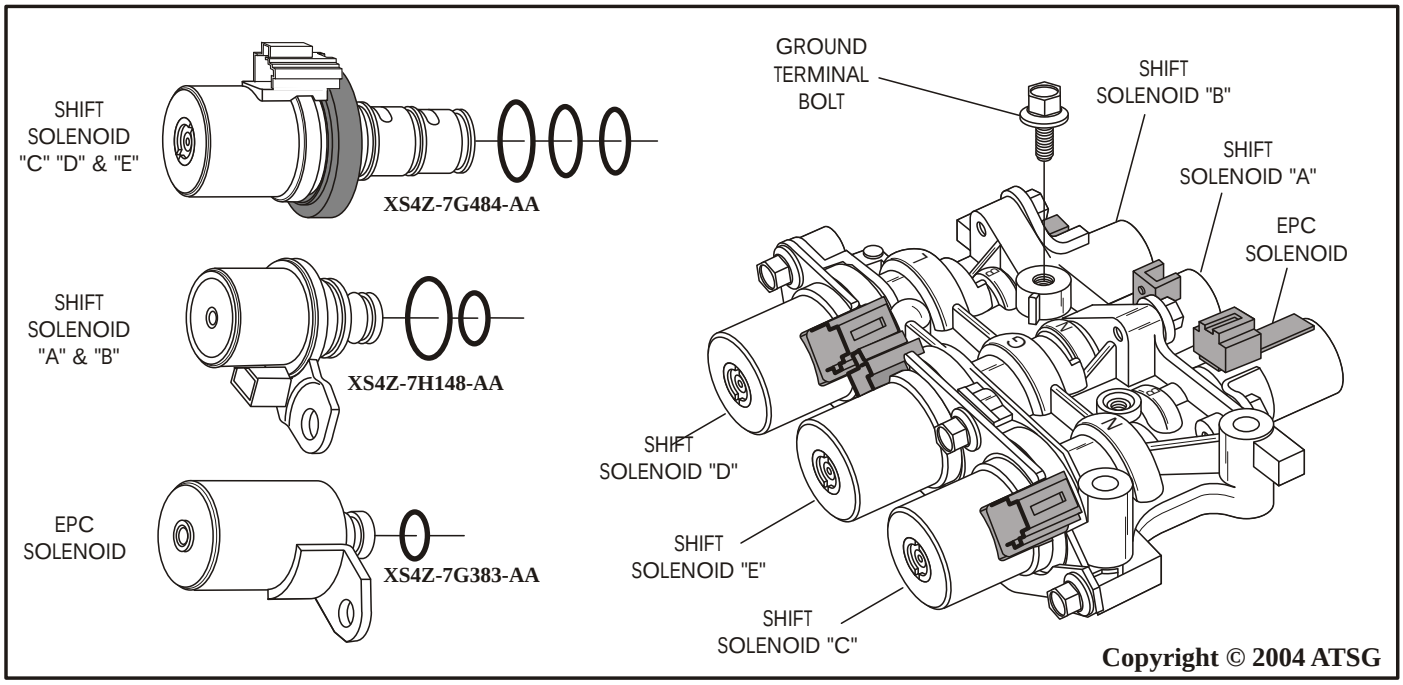

Figure 104

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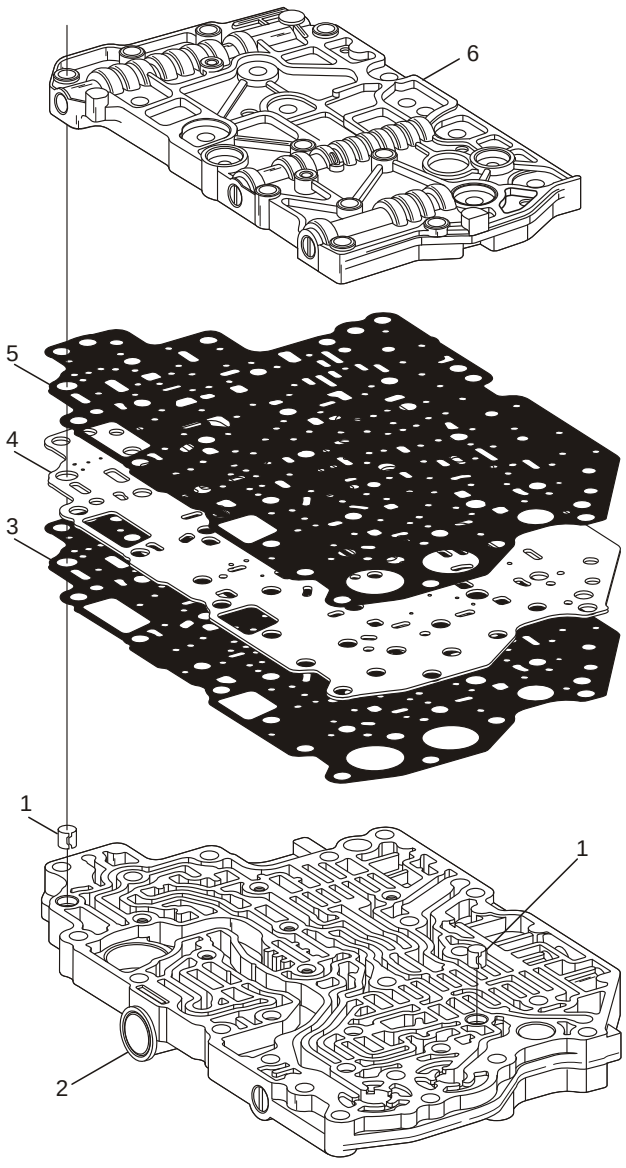
COMPONENT REBUILD SECTION

UPPER AND LOWER VALVE BODIES

1. Disassemble the upper and lower valve bodies using Figure 102 as a guide.
2. Lay each valve line-up out in order as you remove them from the valve body casting.
3. Inspect each valve, valve spring, bore plug and retainer for any wear and/or damage.
4. Clean all upper and lower valve body parts thoroughly and dry with compressed air.
5. Install each valve train back into their bores ***exactly*** as shown in Figure 102, lubricating them with Mercon® V as they are installed.
6. Extra care here will eliminate some of the troublesome problems encountered later.
7. Lay the completed lower valve body on a flat work surface, as shown in Figure 105.
8. Install the two valve body dowels, as shown in Figure 105, if you have not already done so.
9. Install the lower valve body to spacer plate gasket over dowels and onto lower valve body, as shown in Figure 105.
10. Install the valve body spacer plate over dowels onto lower valve body, as shown in Figure 105.
11. Install spacer plate to upper valve body gasket over dowels onto spacer plate (See Figure 105). ***Note: Later models have the upper gasket molded to the spacer plate.***
12. Install the completed upper valve body over dowels and onto the upper gasket, as shown in Figure 105.
13. Install 5 valve body bolts 32 mm length, in the positions shown in Figure 106, and just finger tighten at this time.

Continued on Page 60



1 LOWER VALVE BODY ALIGNMENT DOWELS (2 REQUIRED).
2 COMPLETED LOWER VALVE BODY.
3 LOWER VALVE BODY TO SPACER PLATE GASKET.
4 VALVE BODY SPACER PLATE.
5 SPACER PLATE TO UPPER VALVE BODY GASKET.
6 COMPLETED UPPER VALVE BODY.

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Figure 105

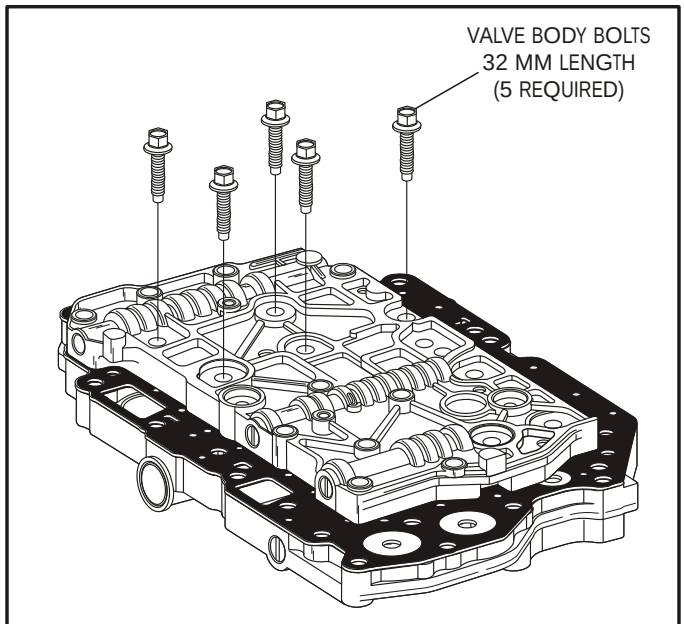

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Figure 106

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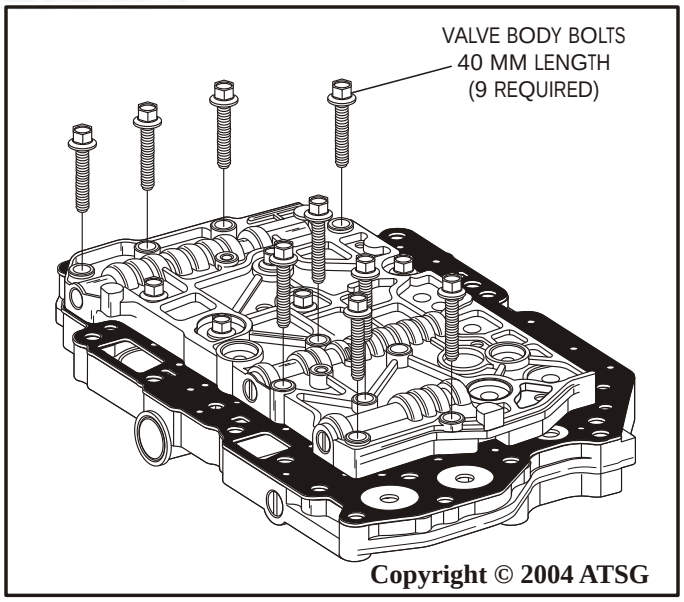

Figure 107

COMPONENT REBUILD SECTION
UPPER AND LOWER VALVE BODIES (CONT'D)

14. Install 9 valve body bolts 40 mm length, in the positions shown in Figure 107, and just finger tighten at this time.
15. Install shift solenoid "C" accumulator spring and piston into lower valve body, as shown in Figure 108.
16. Place the completed solenoid body with gasket into the lower valve body dowel pin holes, as shown in Figure 108.
17. Install 5 solenoid body bolts 59 mm length, in the positions shown in Figure 108, and finger tighten at this time.
18. Now you can torque all valve body bolts to, 9 N•m (80 in.lb.), as shown in Figure 109, and install two new valve body to case seals.
19. Set the completed valve body assembly aside for the final assembly process.

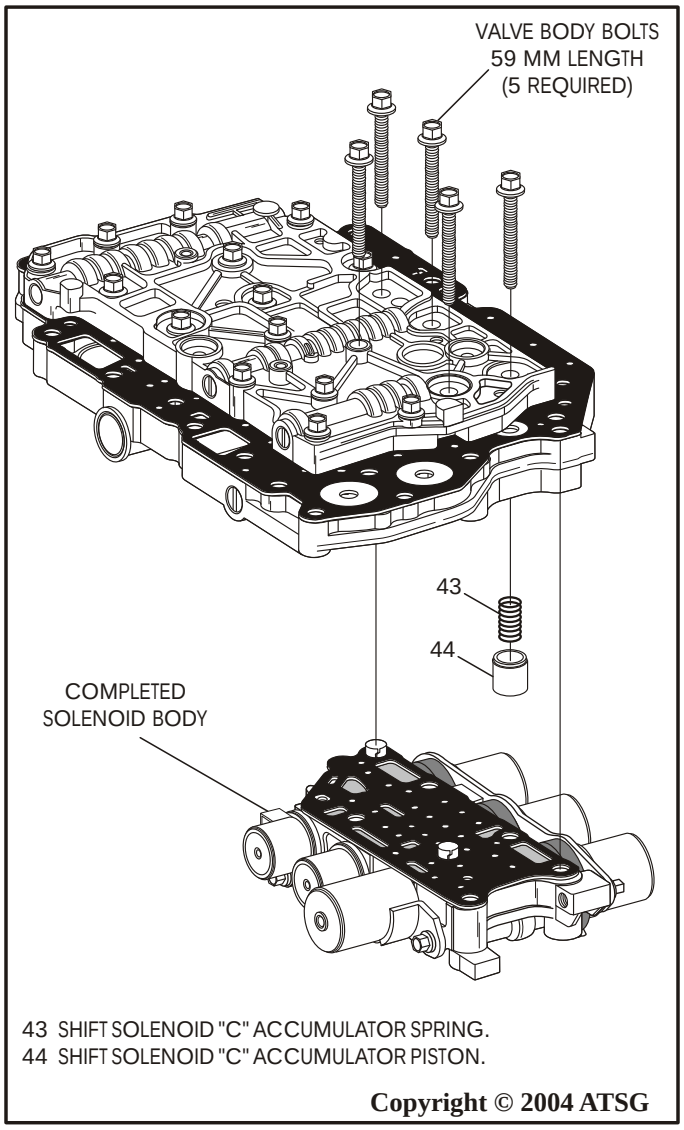

Figure 108

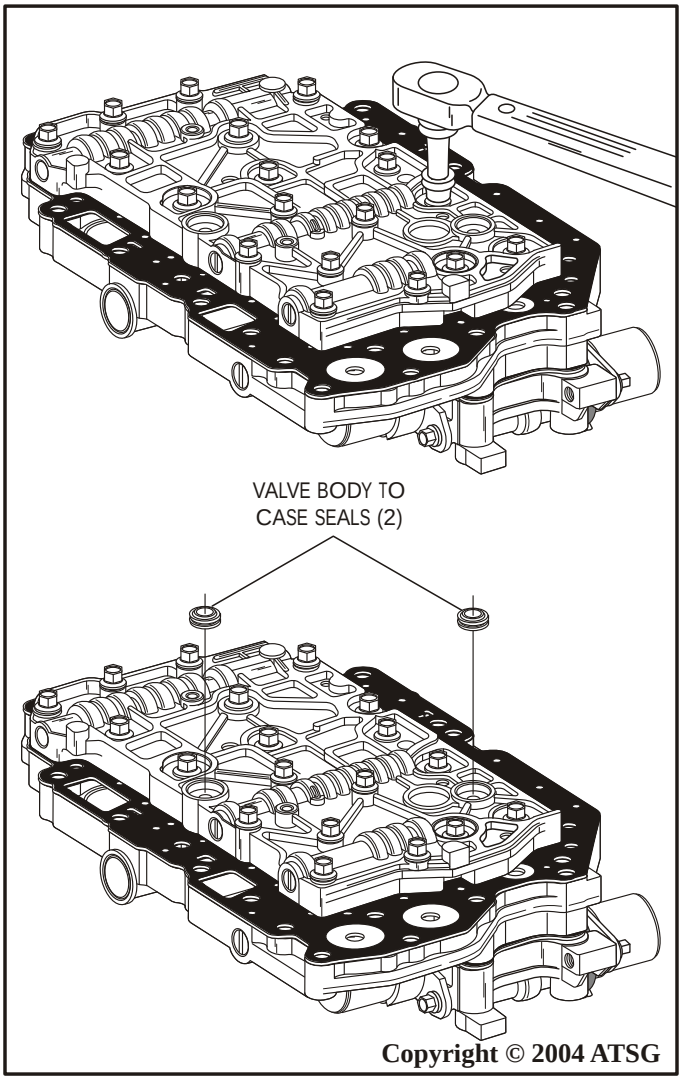

Figure 109

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COMPONENT REBUILD SECTION

BEARING REPLACEMENT AND SET-UP

1. Rotate transaxle case in the fixture, as shown in Figure 110.
2. Secure the final drive input gear assembly, by installing the final drive input gear holding tool 307-413, as shown in Figure 110.
   Note: The transaxle will be rotated several times to remove the bearing retainer nut. To prevent the final drive input gear from falling out, it "Must" be secured.
3. Lock the final drive input gear into position using the pins on the tool that go into holes in the input gear (See Figure 110).
4. Rotate the transaxle 180 degrees so that end cover side is facing up (See Figure 111).
   Note: The two staked areas on the nut must be pushed away from the flats on the final drive input gear before the bearing retainer nut can be removed.
5. Install the final drive input nut socket 307-414 and wrenching plate, as shown in Figure 111.
6. Loosen the retainer nut with the tools.
7. Remove the special tools and remove the final drive input gear retaining nut, as shown in Figure 112.

Continued on Page 62

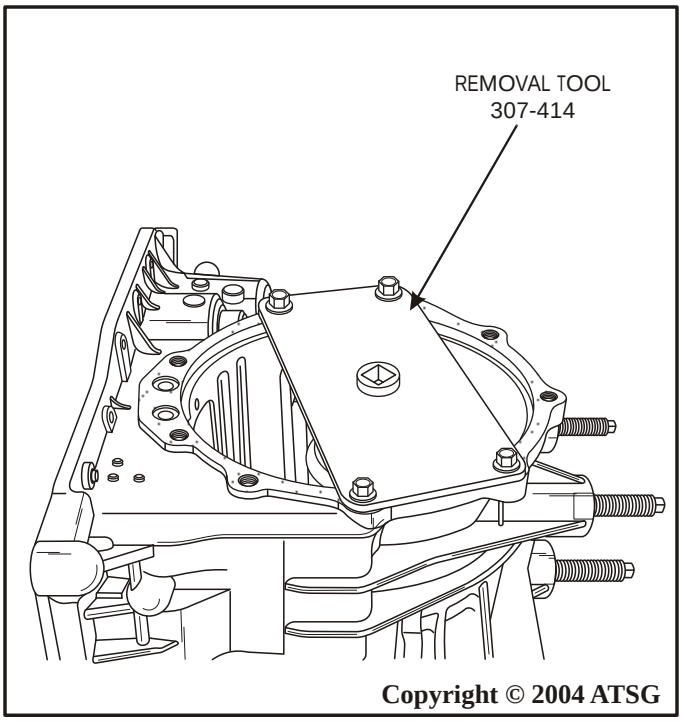

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Figure 111

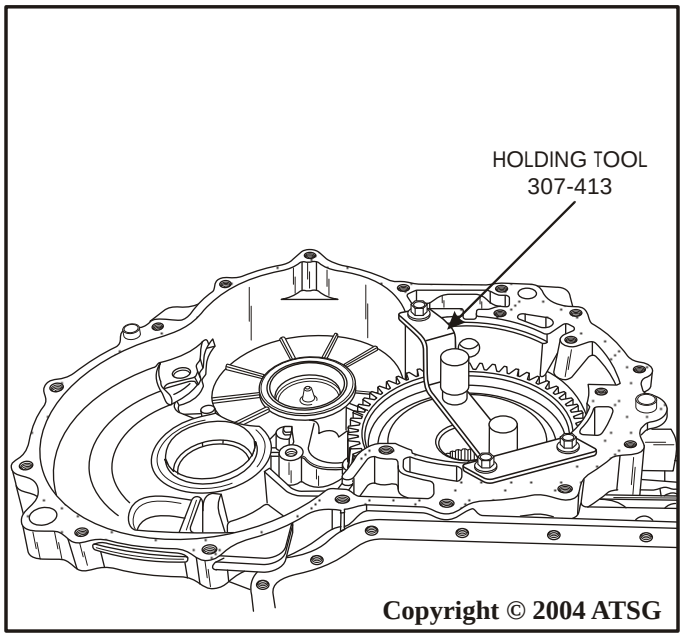

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Figure 110

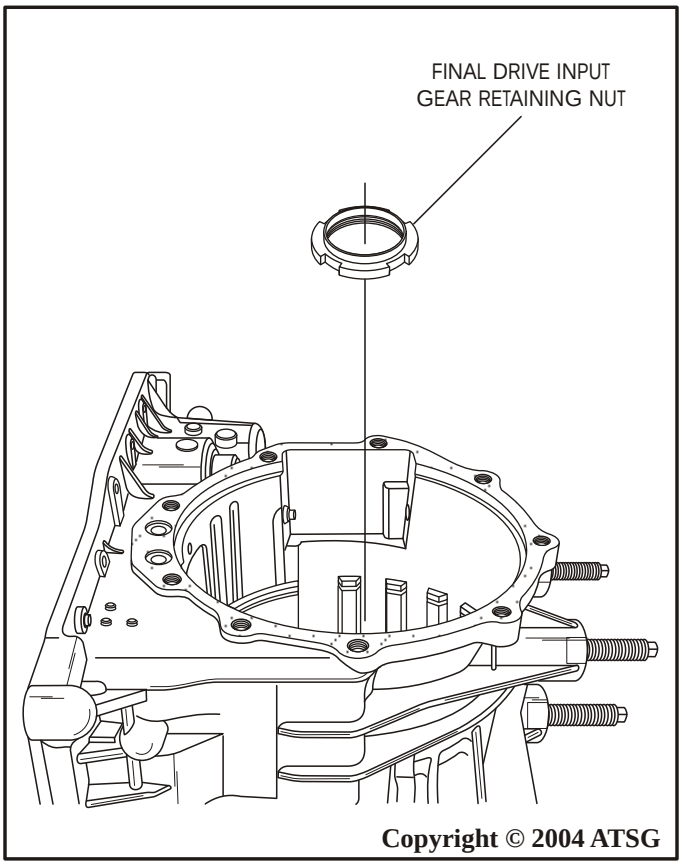

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Figure 112

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COMPONENT REBUILD SECTION

BEARING REPLACEMENT AND SET-UP (CONT'D)

8. Rotate the transaxle 180 degrees and loosen, but do not remove the three bolts retaining the holding tool, as shown in Figure 113.
9. Rotate the transaxle 180 degrees again, and gently tap on the final drive input gear shaft to loosen it from the bearing.
10. Remove the rear bearing from transaxle, as shown in Figure 114.
11. Rotate the transaxle 180 degrees again, remove final drive input gear holding tool, as shown in Figure 115.
12. Remove the final drive input gear from the transaxle case, as shown in Figure 115

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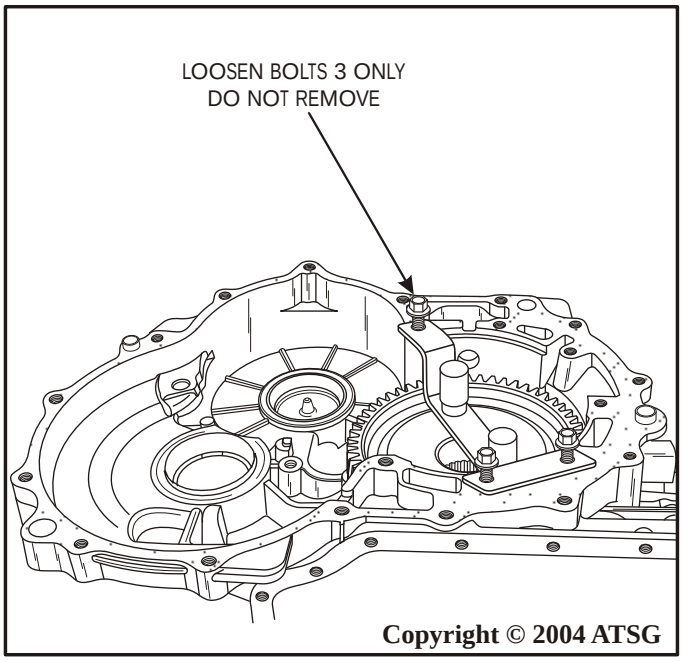

Figure 113

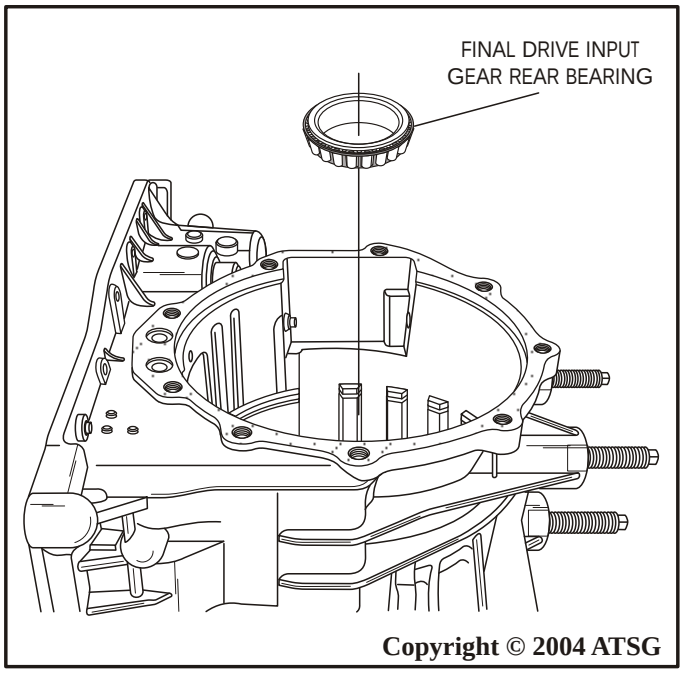

Figure 114

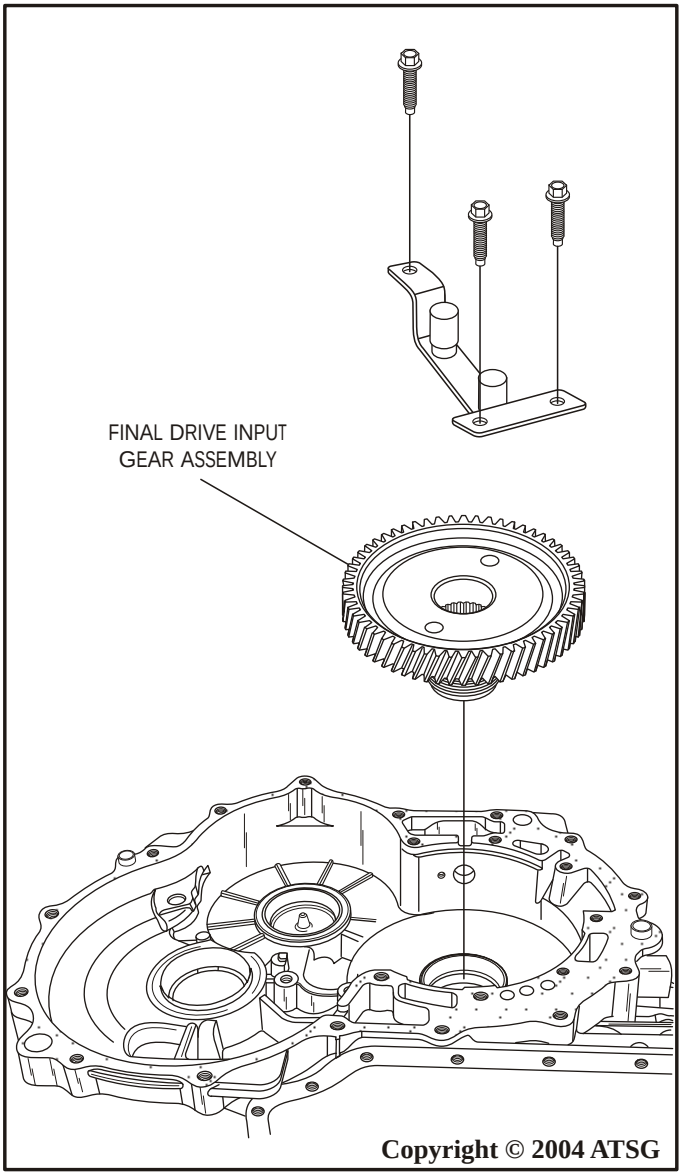

Figure 115

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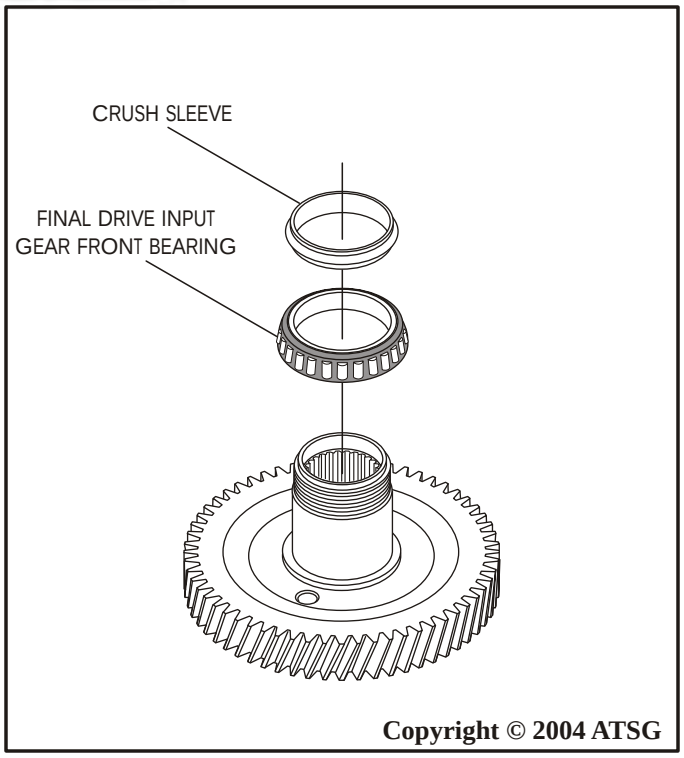

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Figure 116

COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

13. Remove and discard the final drive input gear crush sleeve, as shown in Figure 116.
14. Remove and replace the tapered roller bearing, as shown in Figure 116, using the proper tools and hydraulic press to remove and replace.
15. After new tapered roller bearing is pressed on, install a ***new*** crush sleeve (See Figure 117).
18. Set final drive input gear assembly aside for the moment, while we prepare to install it.
19. Remove all three bearing races from transaxle case using a slide hammer with proper adapter, as shown in Figure 118.
20. Install new final drive input bearing cup using the proper driver, as shown in Figure 118.

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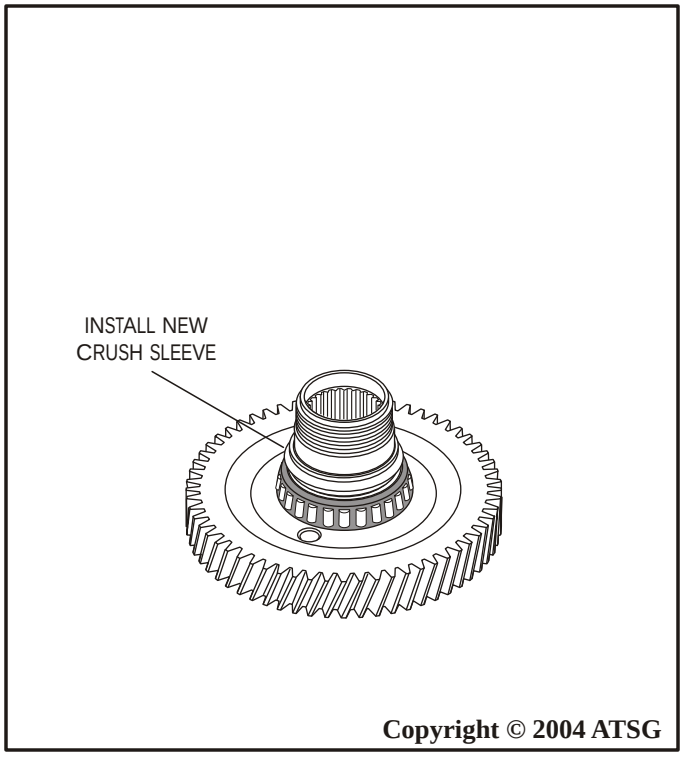

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Figure 117

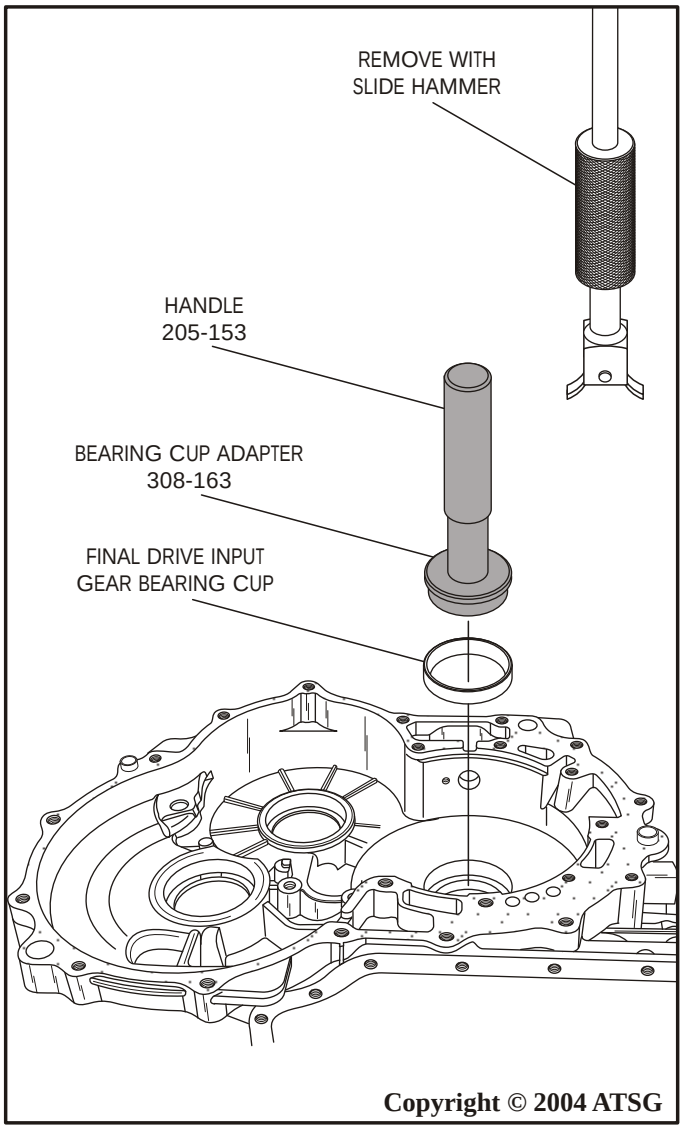

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Figure 118

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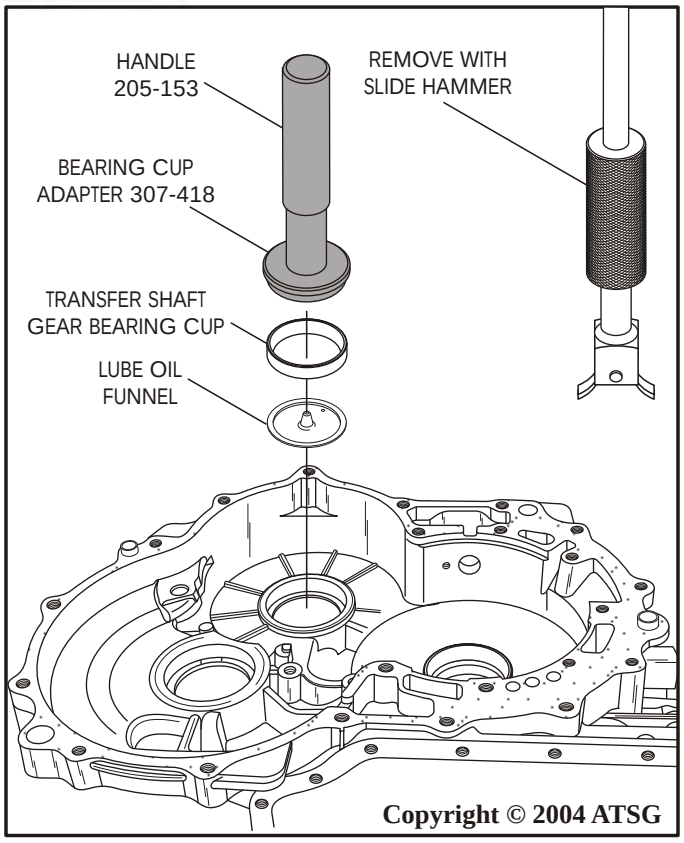

Figure 119

COMPONENT REBUILD SECTION

BEARING REPLACEMENT AND SET-UP (CONT'D)

21. Install lube oil funnel into transfer shaft cup bore in case, as shown in Figure 119.
22. Install new transfer shaft bearing cup into case, using proper driver, as shown in Figure 119.
23. Install new differential case bearing cup into case using proper driver (See Figure 120).
24. Rotate transaxle case in fixture 180 degrees, as shown in Figure 121.
25. Remove rear final drive input gear bearing cup using slide hammer, as shown in Figure 121.

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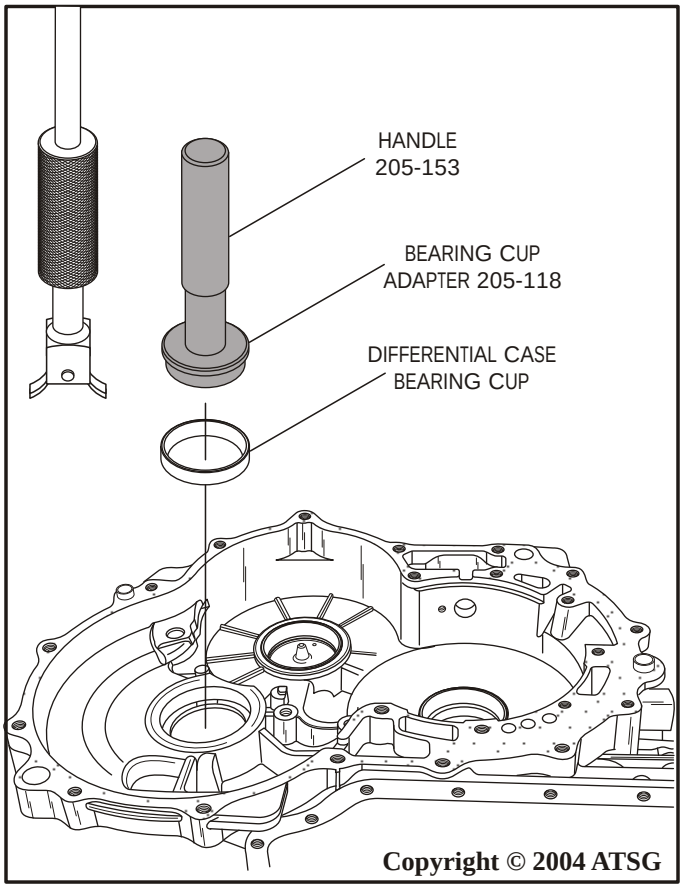

Figure 120

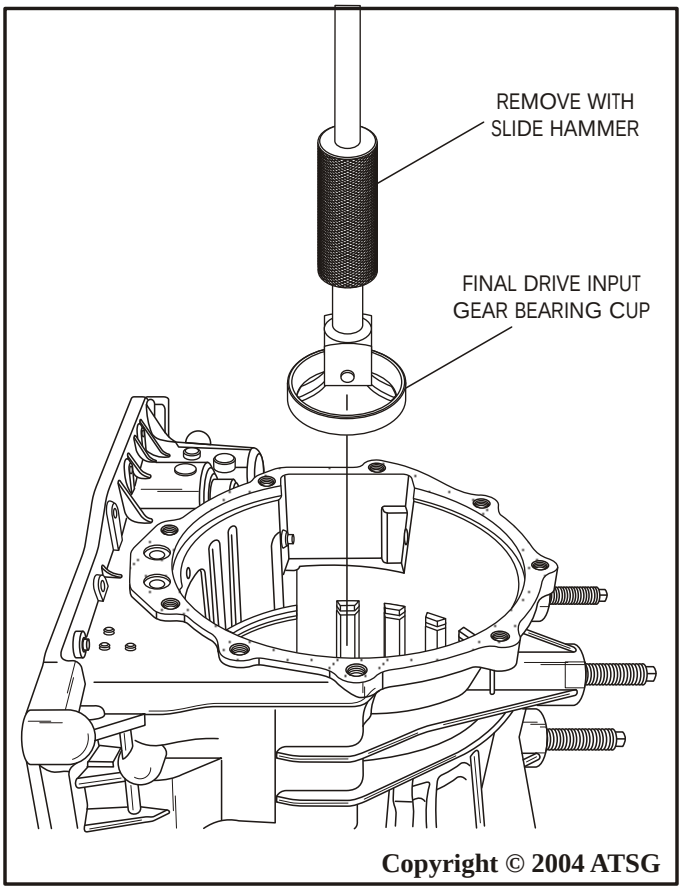

Figure 121

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

26. Install new final drive input gear bearing cup using the installer, as shown in Figure 122.
27. Rotate transaxle case in fixture 180 degrees, as shown in Figure 123.
28. Install the final drive input gear assembly into transaxle case, as shown in Figure 123.
29. Install the final drive input gear holding tool 307-413, as shown in Figure 123, and tighten all three bolts.
30. Lock the final drive input gear into position using the holding tool (See Figure 124).

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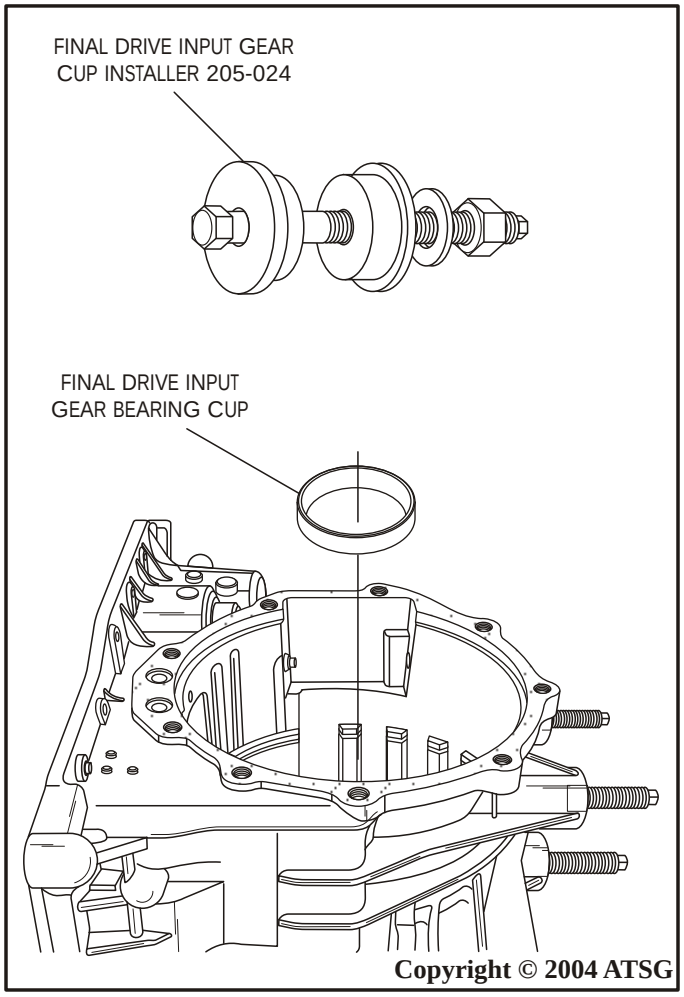

Figure 122

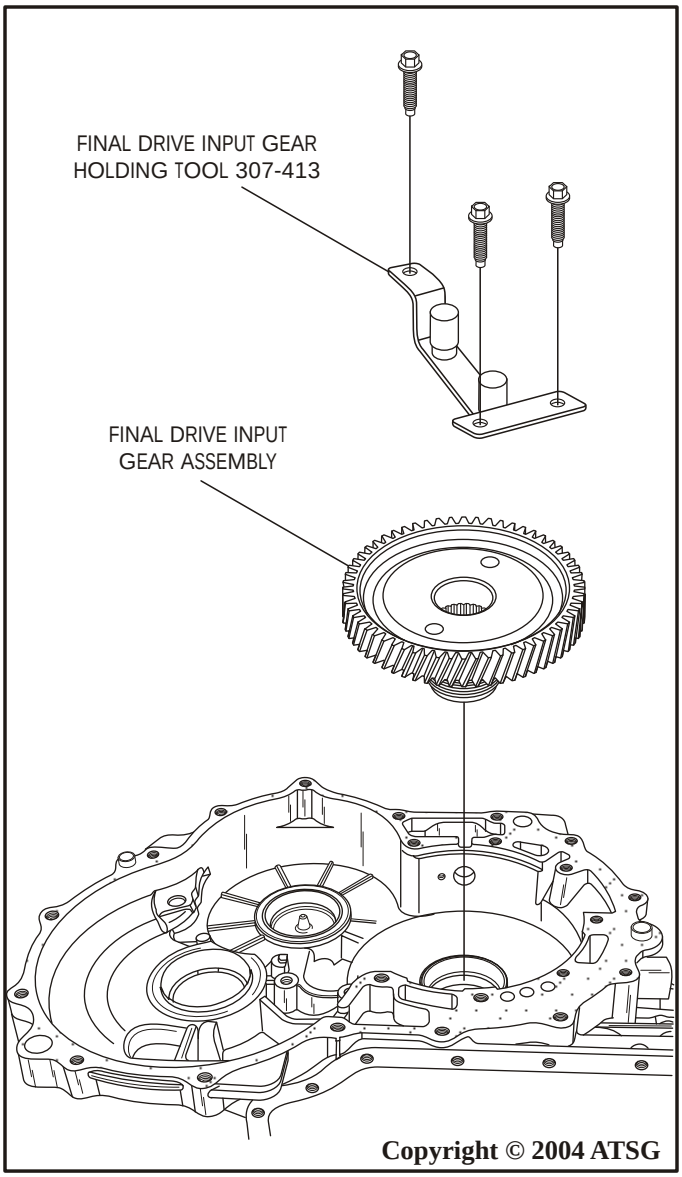

Figure 123

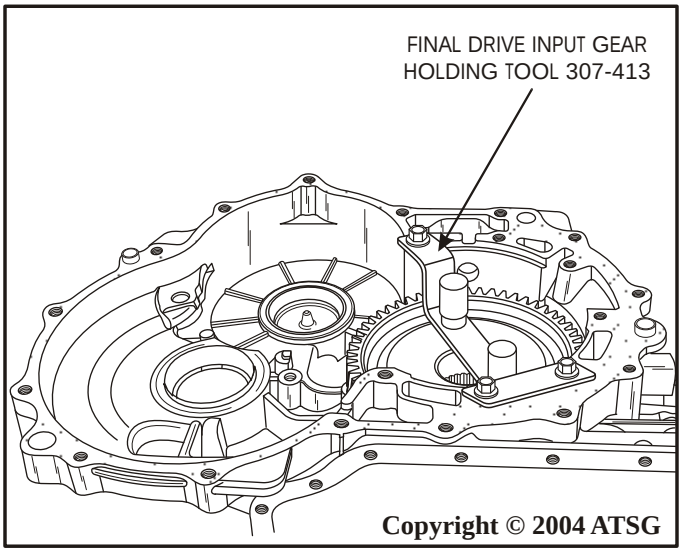

Figure 124

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

31. Rotate the transaxle 180 degrees again so that end cover side is facing up (See Figure 125).
32. Install the new final drive input gear bearing cone, as shown in Figure 125.
33. Install a ***new*** final drive input bearing retainer nut, as shown in Figure 125.
    Note: Requires a new nut as it will once again have to be "staked".
34. Install the final drive input nut socket 307-414 and wrenching plate (See Figure 126).
    Note: A very high tightening torque is required to crush the new collapsible sleeve for correct bearing preload.
35. Torque the final drive input bearing nut to, 450 N•m (332 ft.lb.), as shown in Figure 126.
36. Measure the rotating torque with inch pound torque wrench, as shown in Figure 127, which should be 0.3-0.6 N•m (2.65 to 5.30 in.lb.).
    Note: If rotating torque is too low, tighten the bearing retainer nut and check the rotating torque again.
    Note: If the rotating torque is too high, you must install another new crush sleeve, tighten the bearing retainer nut and check rotating torque again.

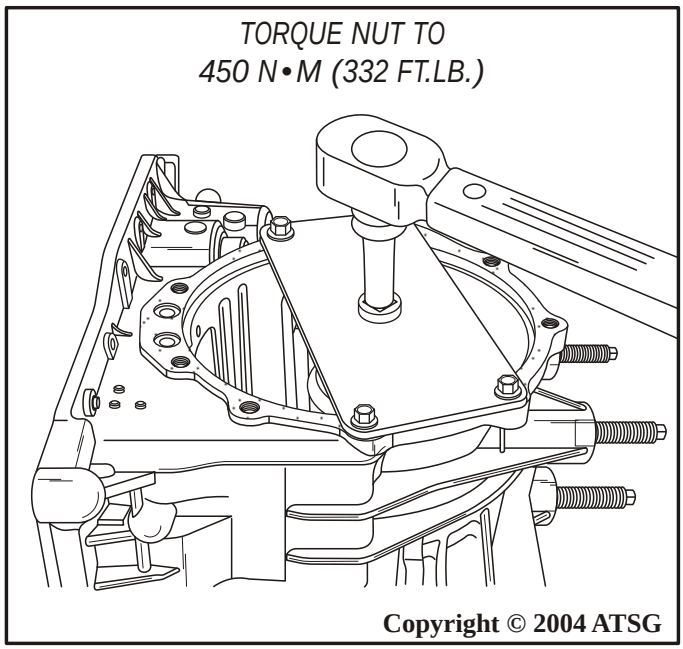

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Figure 126

37. If the rotating torque is within specification, remove the tools, and stake the bearing retainer nut against the flats on final drive input gear shaft using a hammer and punch.

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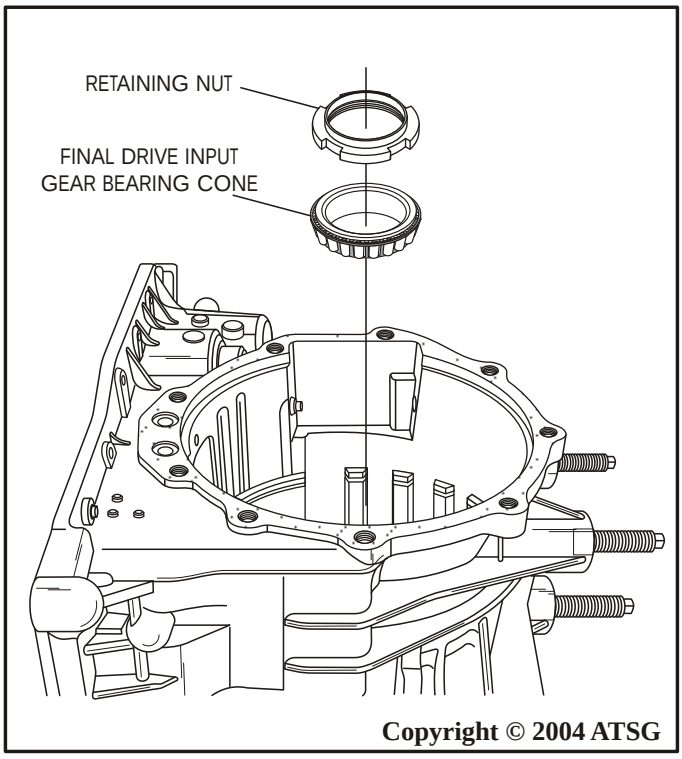

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Figure 125

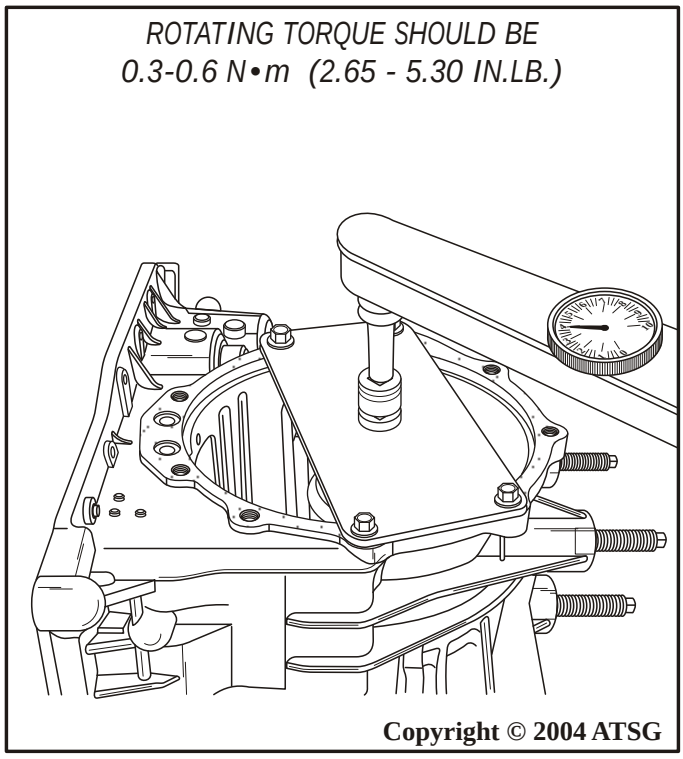

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Figure 127

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

38. Remove the differential bearing cup using the slide hammer, as shown in Figure 128.
39. Remove the differential bearing cup selective shim, as shown in Figure 128.
    Note: Do not install new differential bearing cup at this time. It will be installed later.
40. Remove the transfer shaft bearing cup using the slide hammer, as shown in Figure 128.
41. Remove the transfer shaft bearing cup selective shim, as shown in Figure 128.
    Note: Do not install the new transfer shaft bearing cup at this time. It will be installed later.
42. Turn the empty bell housing over and install a new right hand axle seal using the proper seal installer, as shown in Figure 129.
    Note: The left hand axle seal in case uses the same installer and can be installed now.

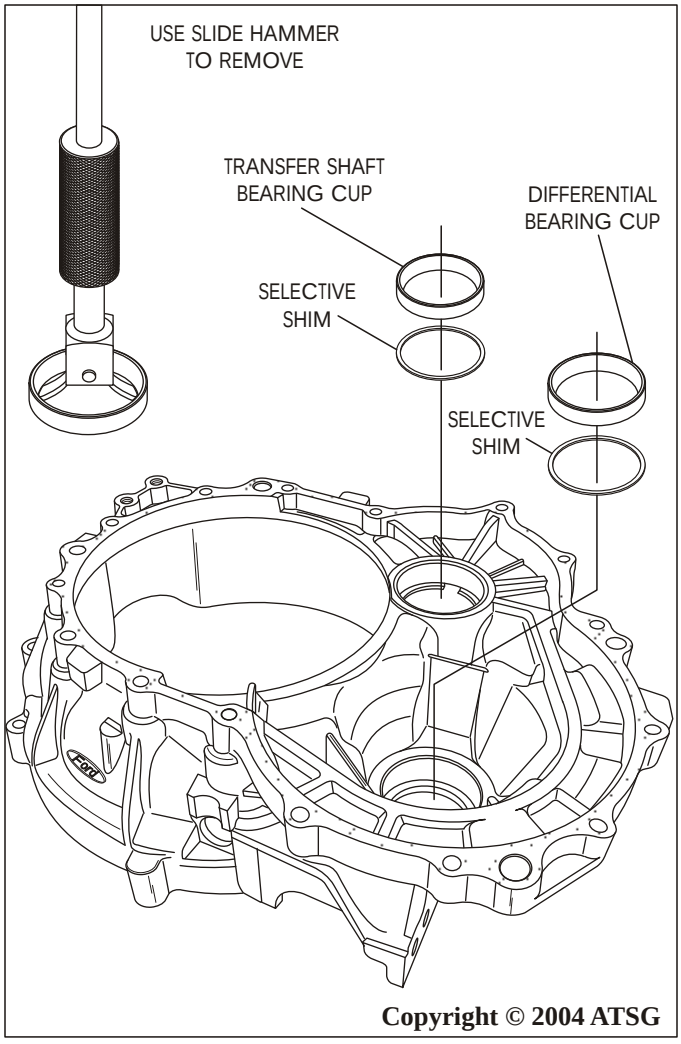

Figure 128

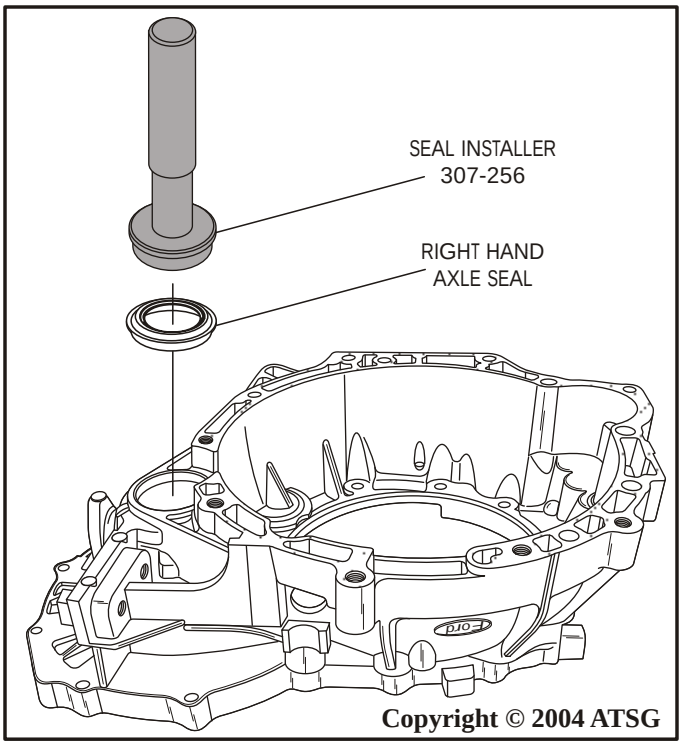

Figure 129

43. Remove and replace the two transfer shaft bearing cones, as shown in Figure 130, using the proper adapters and a hydraulic press.

Continued on Page 68

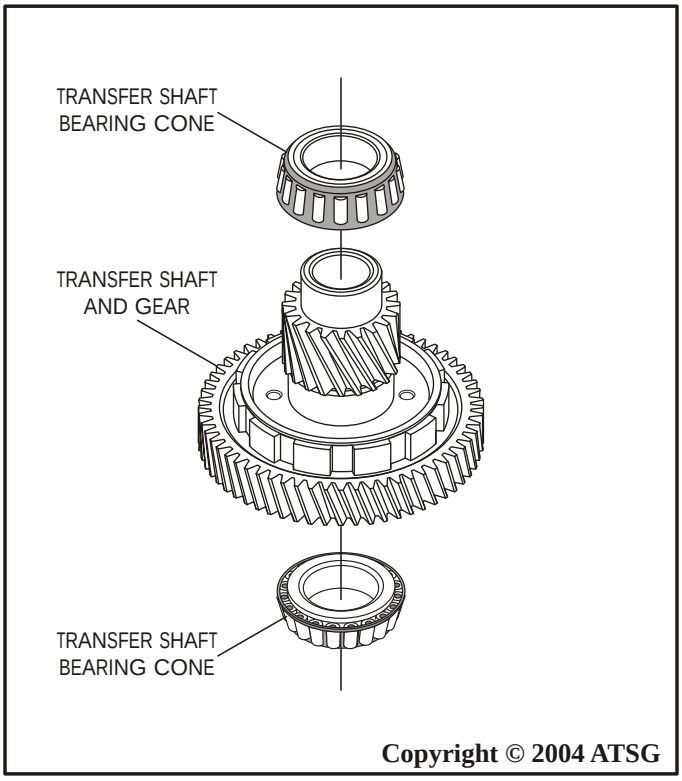

Figure 130

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

43. Remove and replace the two differential case bearing cones, as shown in Figure 131, using the proper adapters and a hydraulic press.
44. Install completed transfer shaft assembly into transaxle case, as shown in Figure 132.
45. Install parking pawl spring into the case and over the case casting dowel (See Figure 133).
46. Install the parking pawl abutment, as shown in Figure 133.
47. Install the parking pawl into case and install the pivot pin, as shown in Figure 133.
48. Install the park pawl spring into hole in parking pawl using a pair of pliers (See Figure 133).
49. Install the parking pawl cover, as shown in Figure 134, install retaining bolts and torque to 13 N•m (10 ft.lb.)

Continued on Page 69

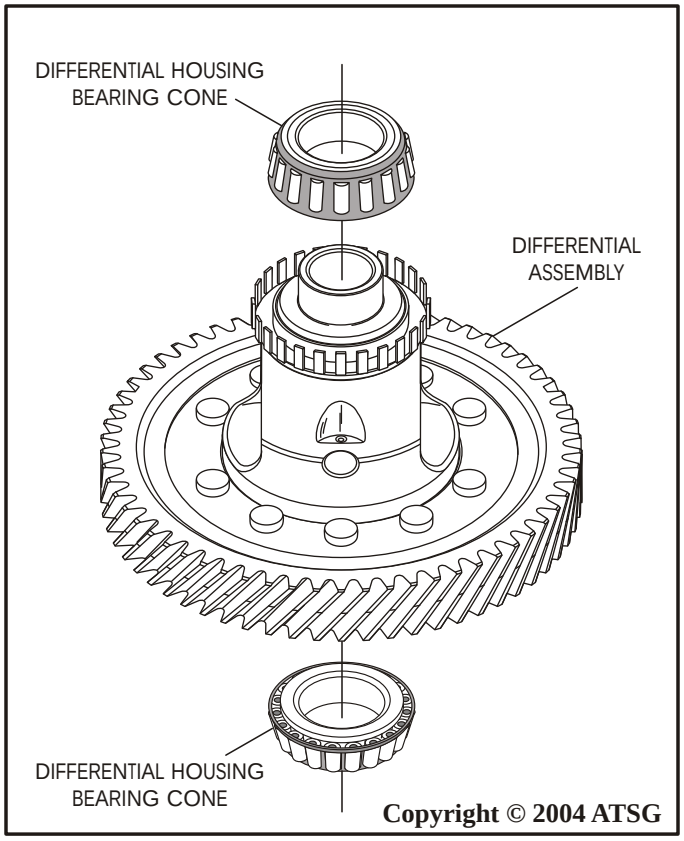

Figure 131

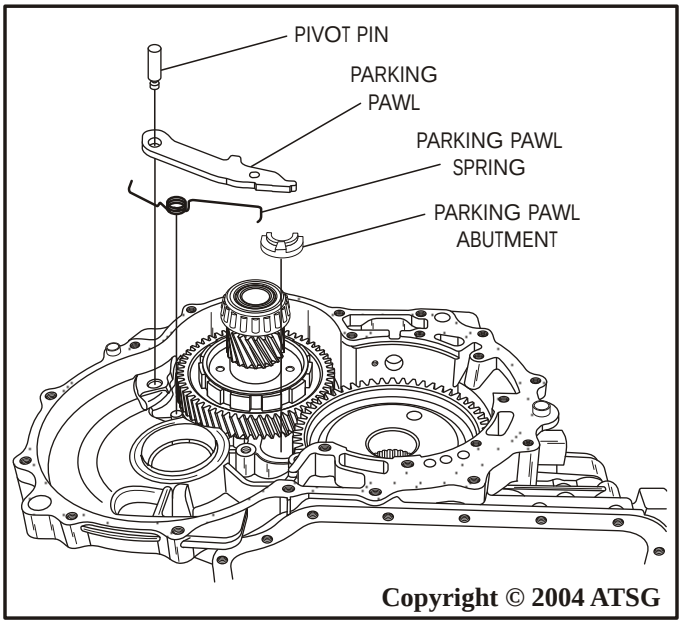

Figure 133

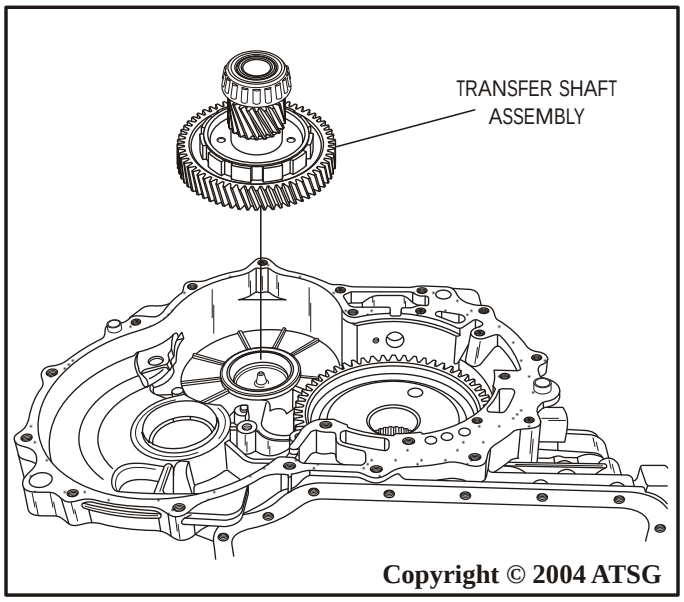

Figure 132

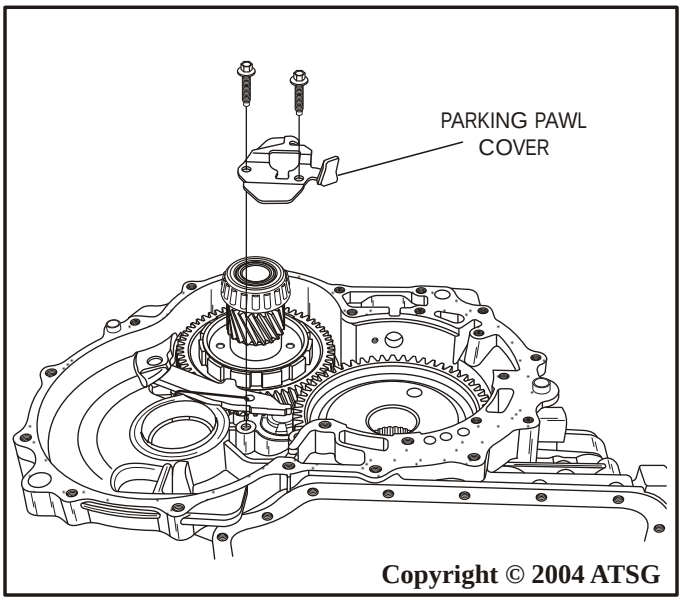

Figure 134

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

50. Install the completed differential assembly into the transaxle case, as shown in Figure 135.
51. Install the new differential bearing cup onto the differential bearing cone, as shown in Figure 136.
52. Install the new transfer shaft bearing cup onto the transfer shaft bearing cone, as shown in Figure 136.
    Note: For the next step you will need the Shim Selection Tool Set (308-164) and the Differential and Transfer Gear Bearing Shim Gauge (307-417).
53. Place the six spacers from the Shim Selection Tool Set (308-164) in the positions that are shown in Figure 137.

Continued on Page 70

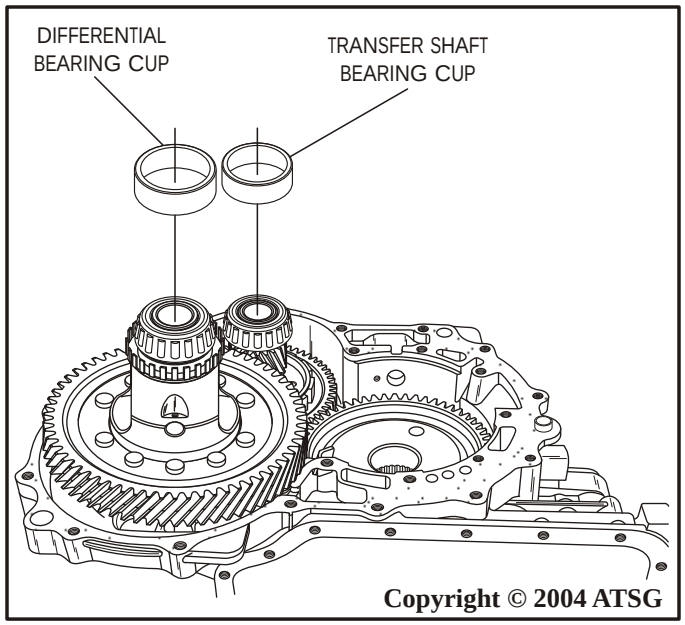

Figure 136

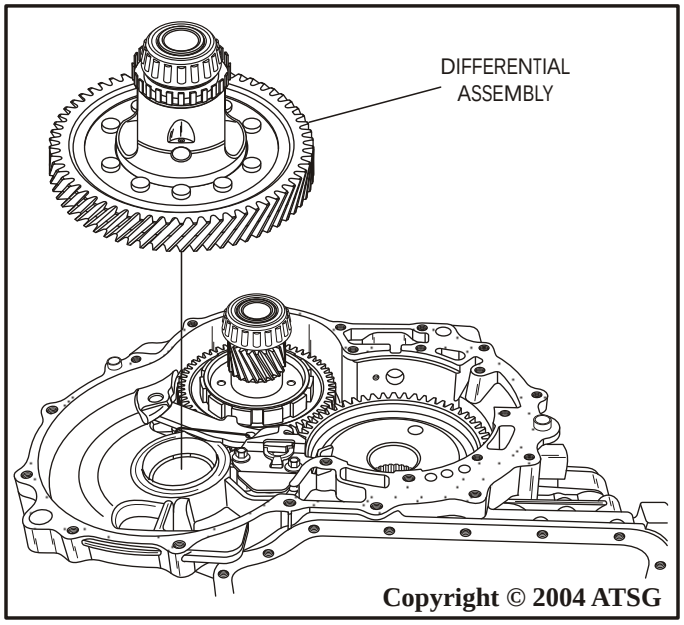

Figure 135

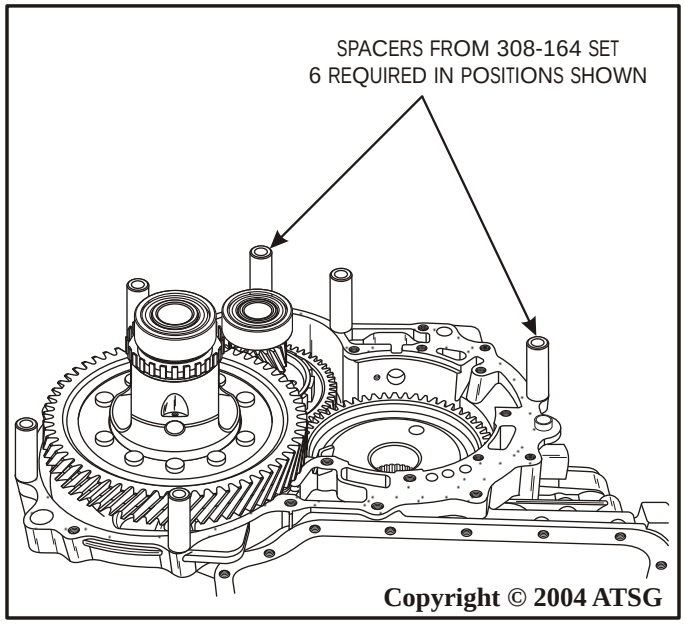

Figure 137

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

54. Install differential case bearing shim selection gauge from 307-417 on the differential case bearing, as shown in Figure 138.
55. Install the transfer shaft bearing shim selection gauge from (307-417) on the transfer shaft bearing, as shown in Figure 138.
56. Place the converter housing carefully over the transaxle case, as shown in Figure 139.
57. Install two long bolts from the Shim Selection Tool Set (308-164) in the positions that are shown in Figure 140.
58. Install four shorter bolts from Shim Selection Tool Set (308-164) in the remaining four positions.
59. Torque these six bolts to 5 N•m (45 in.lb.).

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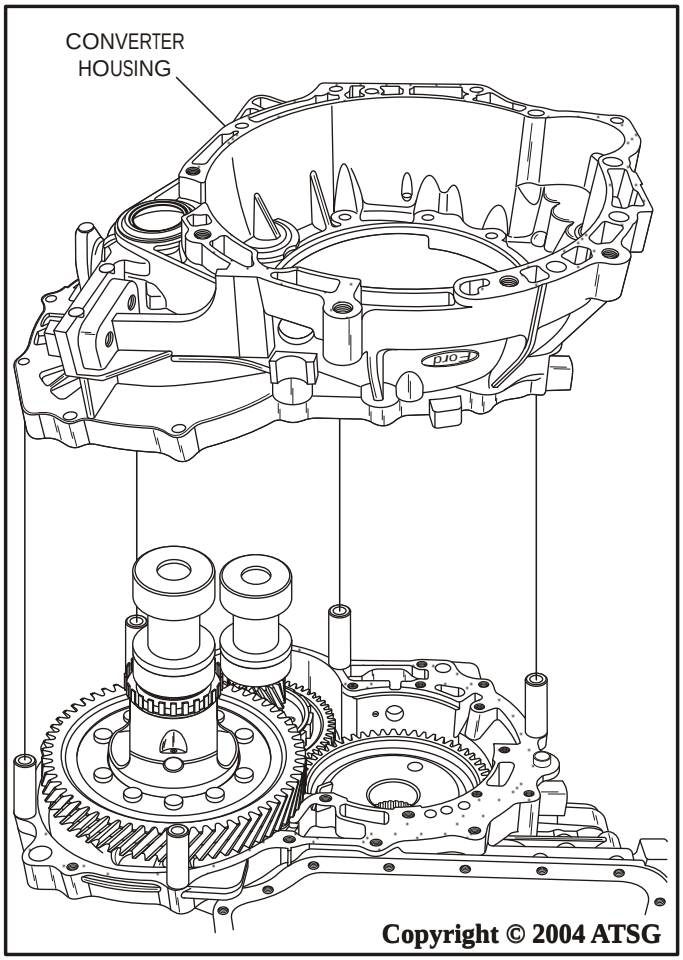

Figure 139

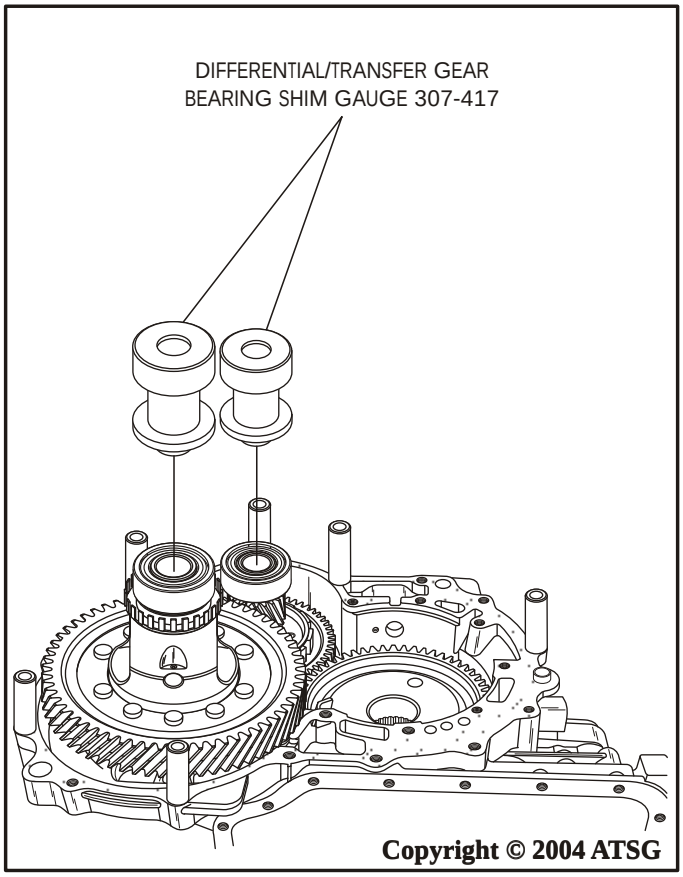

Figure 138

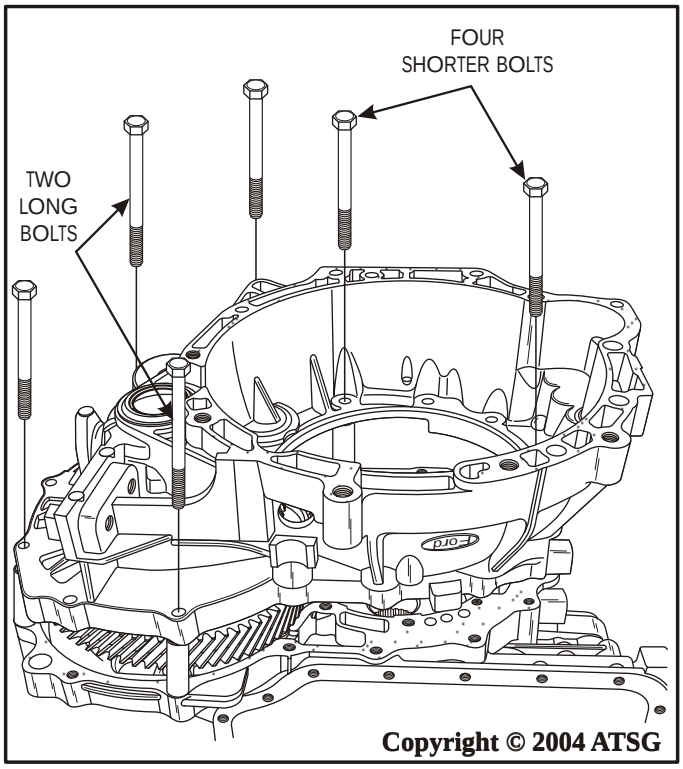

Figure 140

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

60. Remove the six bolts and remove the converter housing from the transaxle (See Figure 140A).
61. Measure the depth of the plunger on the special tool (307-417) for the differential case bearing, using a depth micrometer (See Figure 141). ***Note: Record this dimension for differential.***
62. Measure the depth of the plunger on the special tool (307-417) for the transfer shaft bearing, using a depth micrometer (See Figure 142). ***Note: Record dimension for transfer shaft.***
63. Remove all special tools from transaxle.

Continued on Page 72

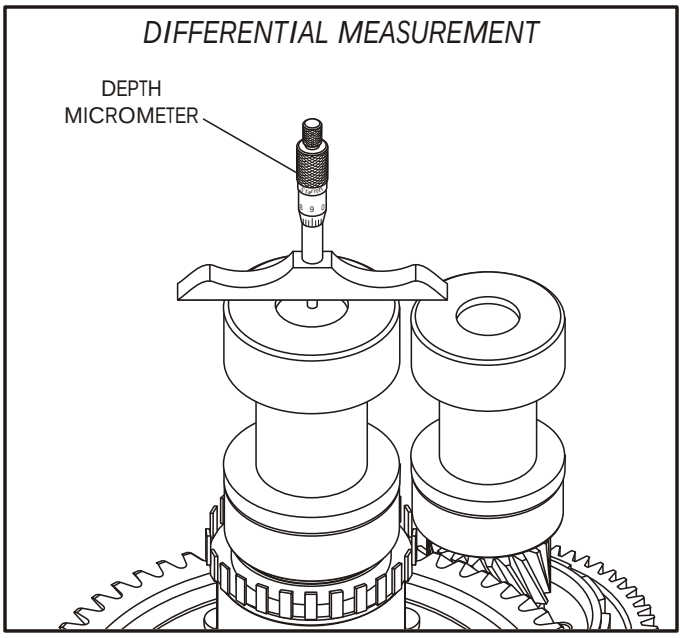

Figure 141

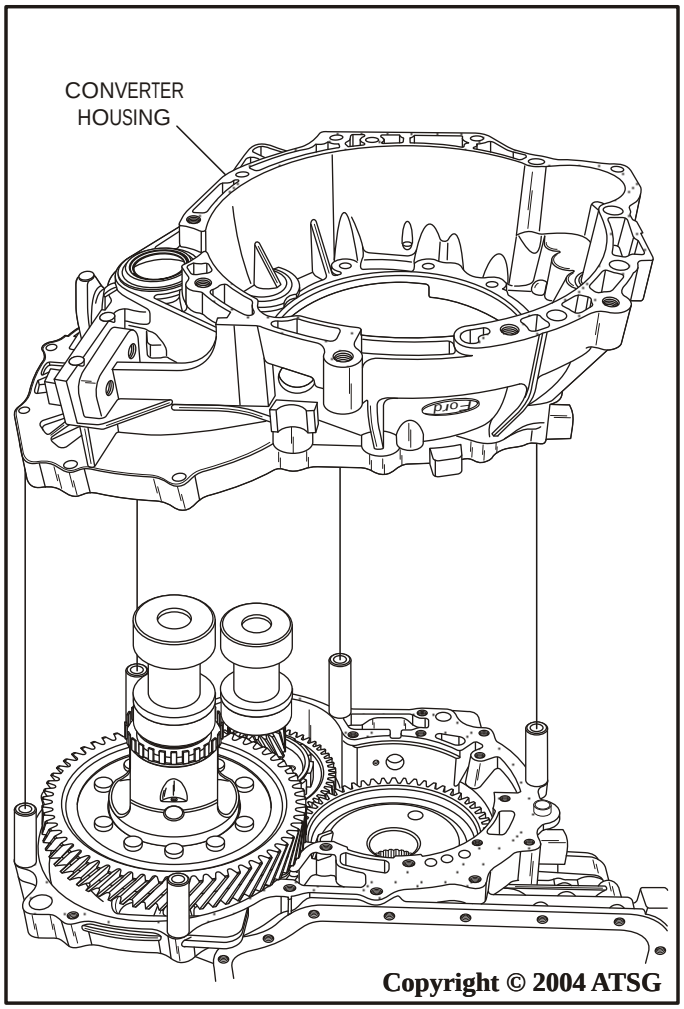

Figure 140A

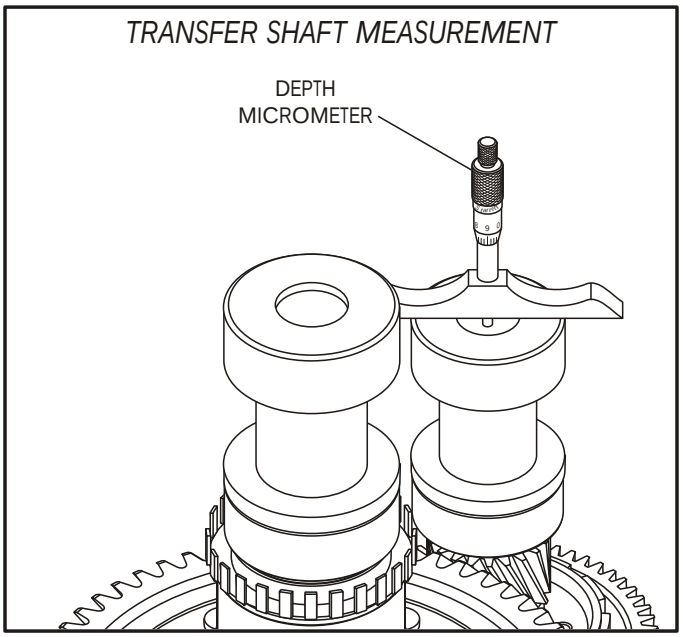

Figure 142

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DIFFERENTIAL BEARING SHIM - SELECTION CHART

Tool Reading	Part Number	Shim Thickness
OVER 0.28 – 0.33 mm	XS4P-7F119-AB	0.48 – 0.52 mm (0.0188 – 0.0204 in)
OVER 0.33 – 0.38 mm	XS4P-7F119-BB	0.53 – 0.57 mm (0.0208 – 0.0224 in)
OVER 0.38 – 0.43 mm	XS4P-7F119-CB	0.58 – 0.62 mm (0.0228 – 0.0244 in)
OVER 0.43 – 0.48 mm	XS4P-7F119-DB	0.63 – 0.67 mm (0.0248 – 0.0263 in)
OVER 0.48 – 0.53 mm	XS4P-7F119-EB	0.68 – 0.72 mm (0.0267 – 0.0283 in)
OVER 0.53 – 0.58 mm	XS4P-7F119-FB	0.73 – 0.77 mm (0.0287 – 0.0303 in)
OVER 0.58 – 0.63 mm	XS4P-7F119-GB	0.78 – 0.82 mm (0.0307 – 0.0322 in)
OVER 0.63 – 0.68 mm	XS4P-7F119-HB	0.83 – 0.87 mm (0.0326 – 0.0342 in)
OVER 0.68 – 0.73 mm	XS4P-7F119-JB	0.88 – 0.92 mm (0.0346 – 0.0362 in)
OVER 0.73 – 0.78 mm	XS4P-7F119-KB	0.93 – 0.97 mm (0.0366 – 0.0381 in)
OVER 0.78 – 0.83 mm	XS4P-7F119-LB	0.98 – 1.02 mm (0.0385 – 0.0401 in)
OVER 0.83 – 0.88 mm	XS4P-7F119-MB	1.03 – 1.07 mm (0.0405 – 0.0421 in)
OVER 0.88 – 0.93 mm	XS4P-7F119-NB	1.08 – 1.12 mm (0.0425 – 0.0440 in)
OVER 0.93 – 0.98 mm	XS4P-7F119-PB	1.13 – 1.17 mm (0.0444 – 0.0460 in)
OVER 0.98 – 1.03 mm	XS4P-7F119-RB	1.18 – 1.22 mm (0.0464 – 0.0480 in)
OVER 1.03 – 1.08 mm	XS4P-7F119-SB	1.23 – 1.27 mm (0.0484 – 0.0500 in)
OVER 1.08 – 1.13 mm	XS4P-7F119-TB	1.28 – 1.32 mm (0.0503 – 0.0519 in)
OVER 1.13 – 1.18 mm	XS4P-7F119-UB	1.33 – 1.37 mm (0.0523 – 0.0539 in)
OVER 1.18 – 1.23 mm	XS4P-7F119-VB	1.38 – 1.42 mm (0.0543 – 0.0559 in)
OVER 1.23 – 1.28 mm	XS4P-7F119-XB	1.43 – 1.47 mm (0.0562 – 0.0578 in)
OVER 1.28 – 1.33 mm	XS4P-7F119-YB	1.48 – 1.52 mm (0.0582 – 0.0598 in)
OVER 1.33 – 1.38 mm	XS4P-7F119-ZB	1.53 – 1.57 mm (0.0602 – 0.0618 in)

Figure 143

COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

64. Using the dimension that you recorded from differential tool, select the correct differential bearing shim from the chart in Figure 143.
65. Install the selected shim for the differential bearing into the converter housing, as shown in Figure 144.

Continued on Page 73

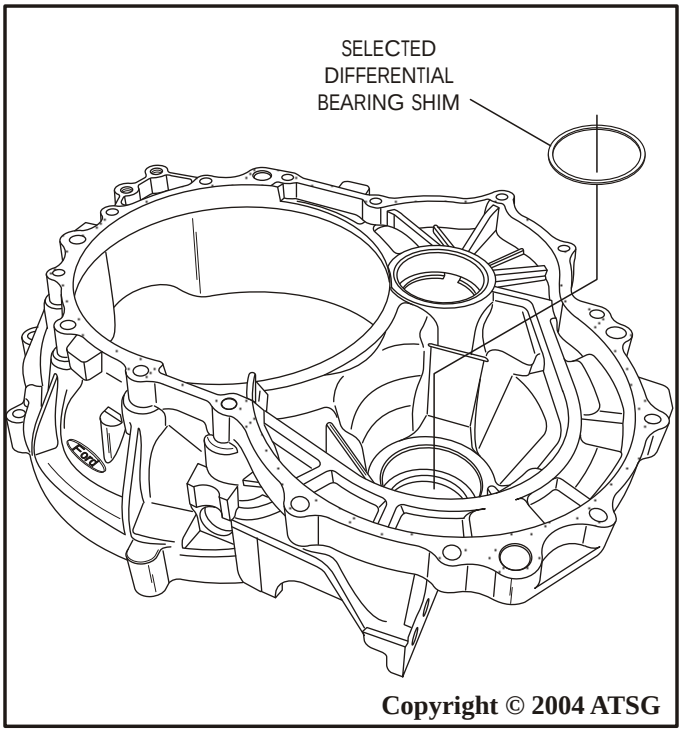

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Figure 144

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TRANSFER SHAFT BEARING SHIM - SELECTION CHART

Tool Reading	Part Number	Shim Thickness
OVER 0.34 – 0.39 mm	XS4P-7H367-AB	0.48 – 0.52 mm (0.0188 – 0.0204 in)
OVER 0.39 – 0.44 mm	XS4P-7H367-BB	0.53 – 0.57 mm (0.0208 – 0.0224 in)
OVER 0.44 – 0.49 mm	XS4P-7H367-CB	0.58 – 0.62 mm (0.0228 – 0.0244 in)
OVER 0.49 – 0.54 mm	XS4P-7H367-DB	0.63 – 0.67 mm (0.0248 – 0.0263 in)
OVER 0.54 – 0.59 mm	XS4P-7H367-EB	0.68 – 0.72 mm (0.0267 – 0.0283 in)
OVER 0.59 – 0.64 mm	XS4P-7H367-FB	0.73 – 0.77 mm (0.0287 – 0.0303 in)
OVER 0.64 – 0.69 mm	XS4P-7H367-GB	0.78 – 0.82 mm (0.0307 – 0.0322 in)
OVER 0.69 – 0.74 mm	XS4P-7H367-HB	0.83 – 0.87 mm (0.0326 – 0.0342 in)
OVER 0.74 – 0.79 mm	XS4P-7H367-JB	0.88 – 0.92 mm (0.0346 – 0.0362 in)
OVER 0.79 – 0.84 mm	XS4P-7H367-KB	0.93 – 0.97 mm (0.0366 – 0.0381 in)
OVER 0.84 – 0.89 mm	XS4P-7H367-LB	0.98 – 1.02 mm (0.0385 – 0.0401 in)
OVER 0.89 – 0.94 mm	XS4P-7H367-MB	1.03 – 1.07 mm (0.0405 – 0.0421 in)
OVER 0.94 – 0.99 mm	XS4P-7H367-NB	1.08 – 1.12 mm (0.0425 – 0.0440 in)
OVER 0.99 – 1.04 mm	XS4P-7H367-PB	1.13 – 1.17 mm (0.0444 – 0.0460 in)
OVER 1.04 – 1.09 mm	XS4P-7H367-RB	1.18 – 1.22 mm (0.0464 – 0.0480 in)
OVER 1.09 – 1.14 mm	XS4P-7H367-SB	1.23 – 1.27 mm (0.0484 – 0.0500 in)
OVER 1.14 – 1.19 mm	XS4P-7H367-TB	1.28 – 1.32 mm (0.0503 – 0.0519 in)

Figure 145

COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

66. Using the dimension that you recorded from transfer shaft tool, select correct transfer shaft bearing shim from the chart in Figure 145.
67. Install the selected shim for the transfer shaft bearing into the converter housing, as shown in Figure 146.

Continued on Page 74

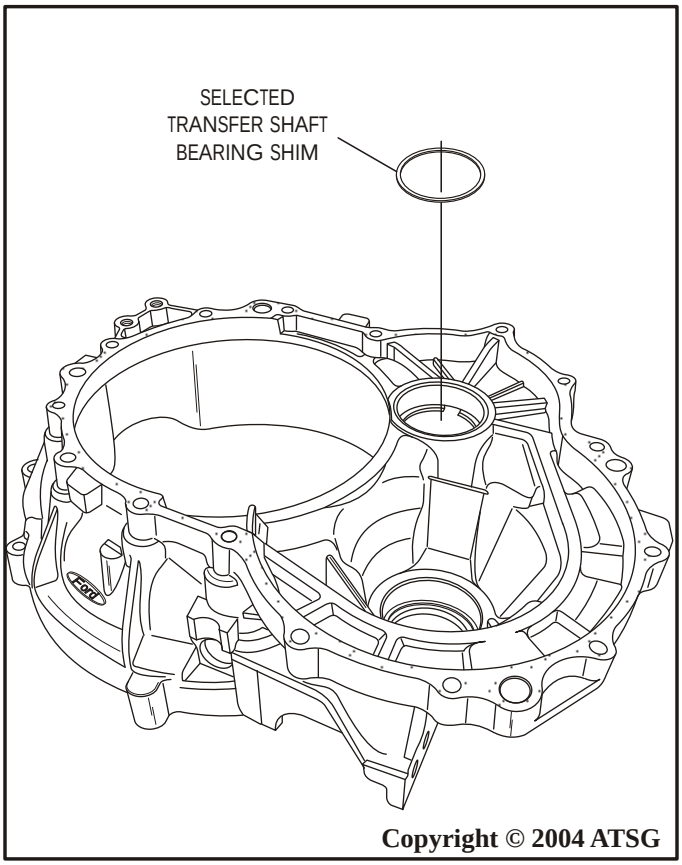

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Figure 146

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COMPONENT REBUILD SECTION
BEARING REPLACEMENT AND SET-UP (CONT'D)

68. Install the differential bearing cup using the proper adapter, as shown in Figure 147.
69. Install the transfer shaft bearing cup using the proper adapter, as shown in Figure 147.
70. Apply a one-millimeter (1 mm) thick bead of Ultra Silicone Sealant (or equivalent) on the transaxle case sealing area for the converter housing, as shown in Figure 148.
71. Install the completed converter housing on the transaxle case, as shown in Figure 148, and ensure it is over alignment dowels.
72. Install 15 converter housing to case bolts in the locations shown in Figure 149.

Continued on Page 75

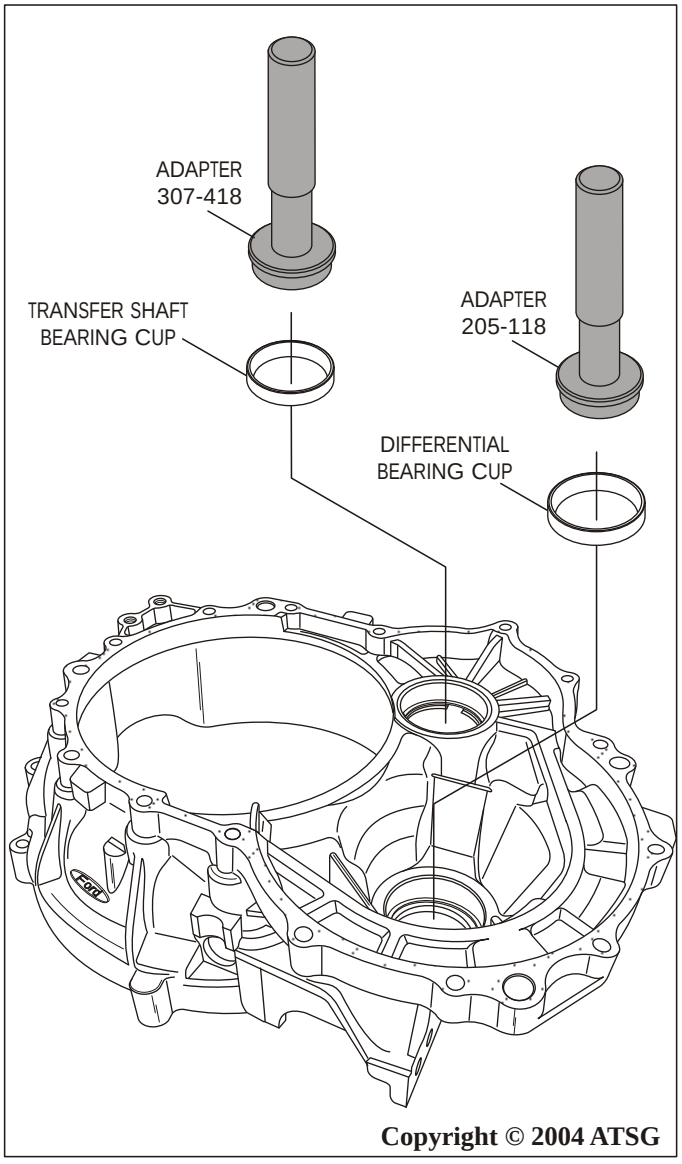

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Figure 147

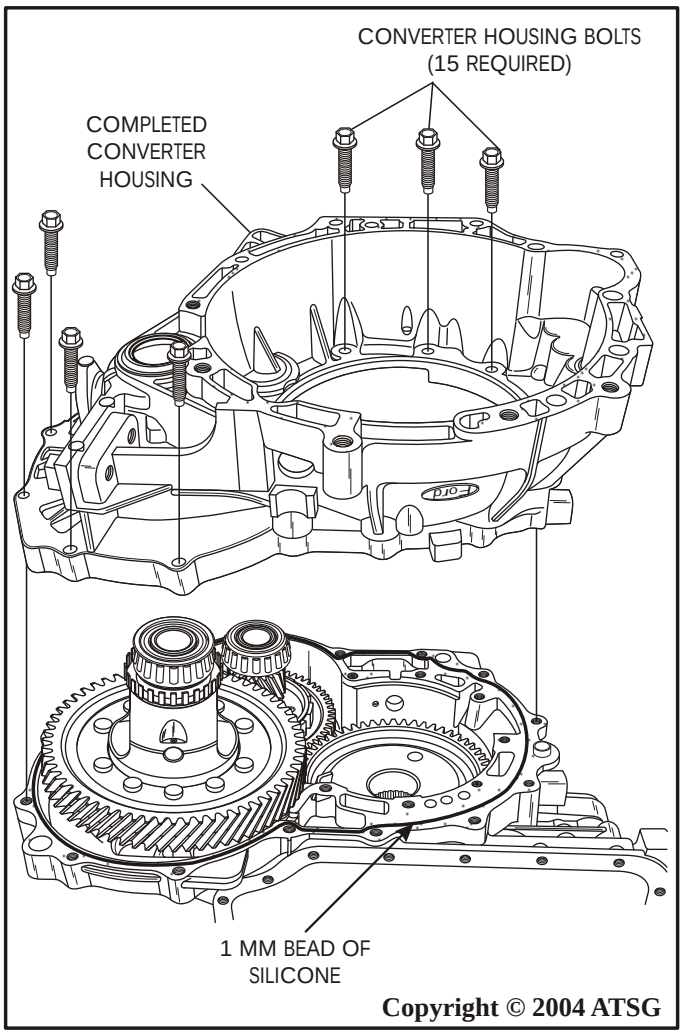

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Figure 148

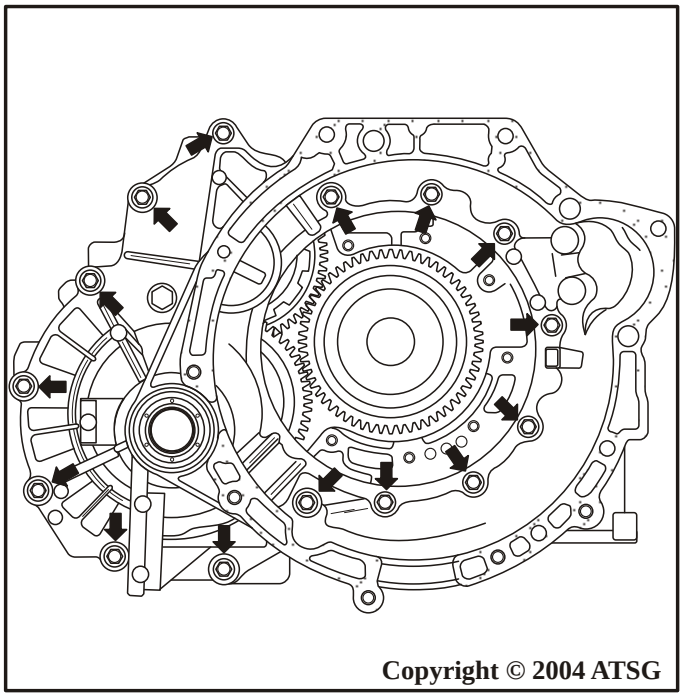

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Figure 149

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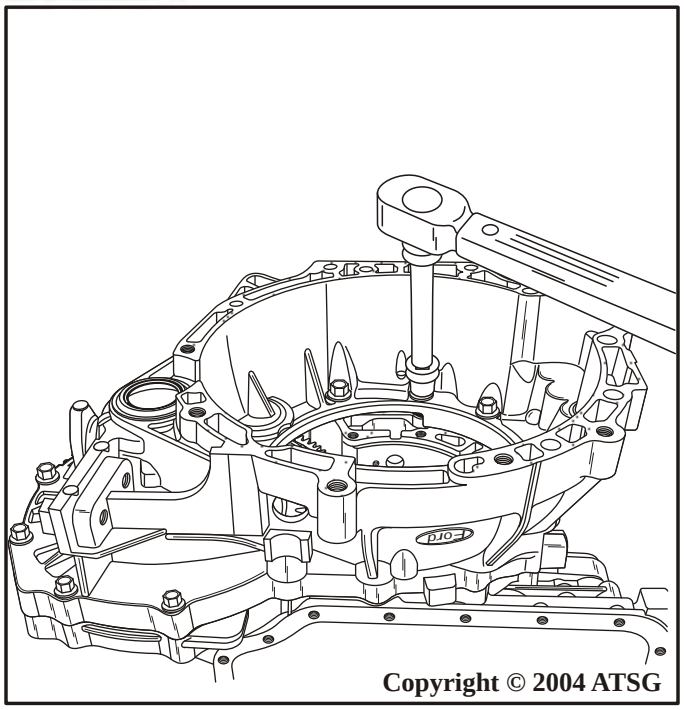
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Figure 150

COMPONENT REBUILD SECTION

BEARING REPLACEMENT AND SET-UP (CONT'D)

72. Torque all 15 converter housing to case bolts to 22 N•m (16 ft.lb.) (See Figure 150).

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS

1. Install 2-4 servo piston return spring into the 2-4 servo bore, as shown in Figure 151.
2. Install a new 2-4 servo piston assembly into the 2-4 servo bore, as shown in Figure 151.
3. Install new 2-4 servo cover "O" ring seal into the groove in case, as shown in Figure 151.
4. Install the 2-4 servo cover and three retaining bolts, as shown in Figure 152.
   Note: The 3 bolts must be loosely installed, then tightened in sequence to compress the 2-4 servo spring evenly.
5. Torque the three 2-4 servo bolts evenly to 13 N•m (10 ft.lb.).

Continued on Page 76

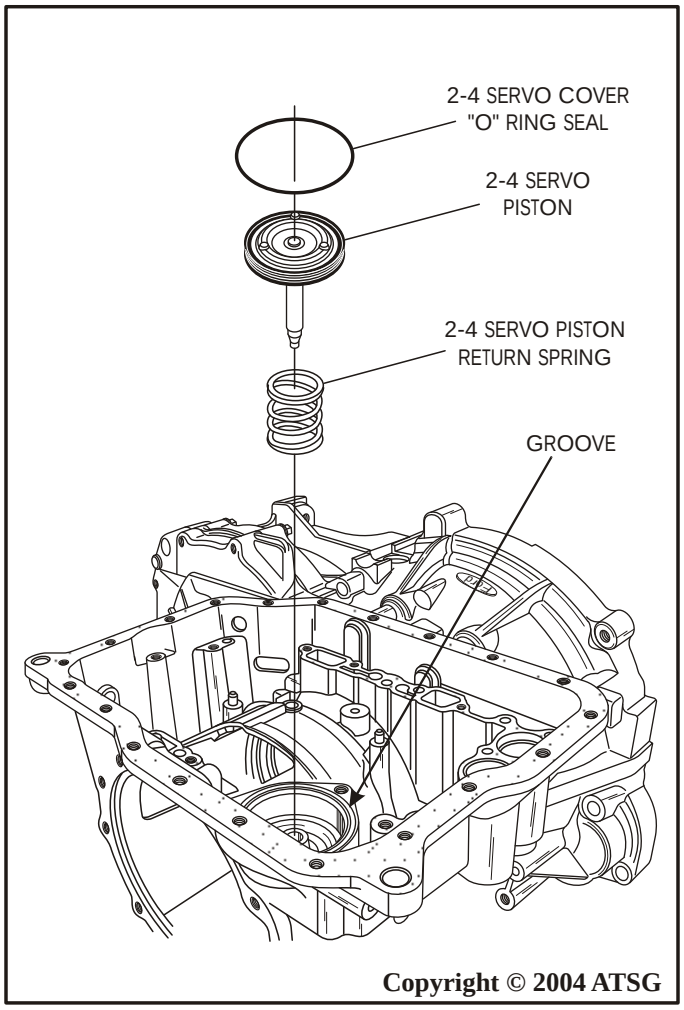

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Figure 151

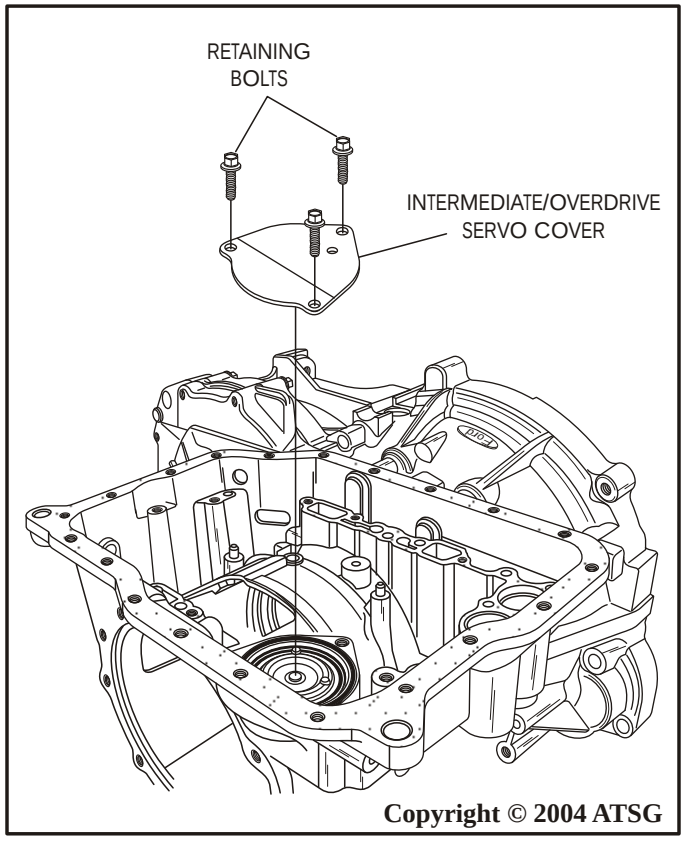

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Figure 152

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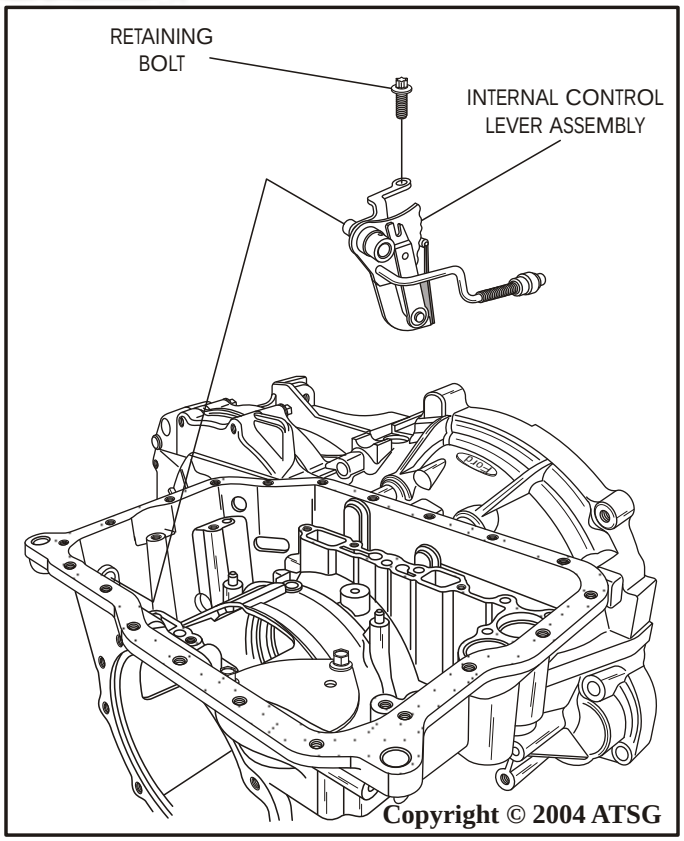

Figure 153

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

6. Install the internal control lever assembly into transaxle case, as shown in Figure 153, and ensure that parking rod is engaged properly with the parking pawl.
7. Install the retaining bolt loosely at this time.
8. Lubricate the manual lever shaft "O" ring seals and install the manual lever shaft, as shown in Figure 154.
9. Align the manual lever shaft inside of internal control lever assembly and install new roll pin, as shown in Figure 155.
10. Check the operation of the manual linkage and ensure that park rod engages the parking pawl without binding. Torque the internal control lever bolt to 13 N•m (10 ft.lb.).

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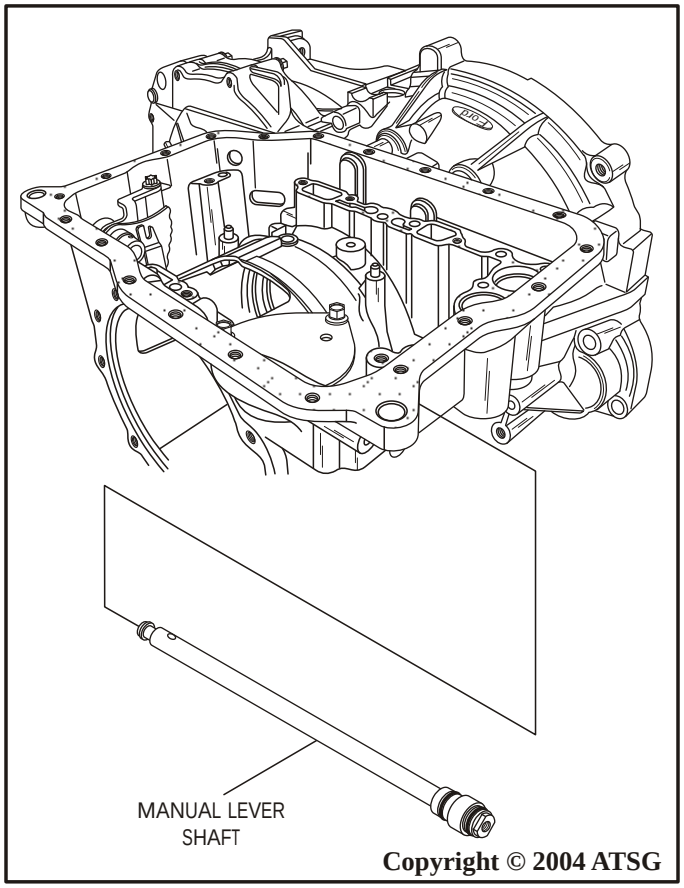

Figure 154

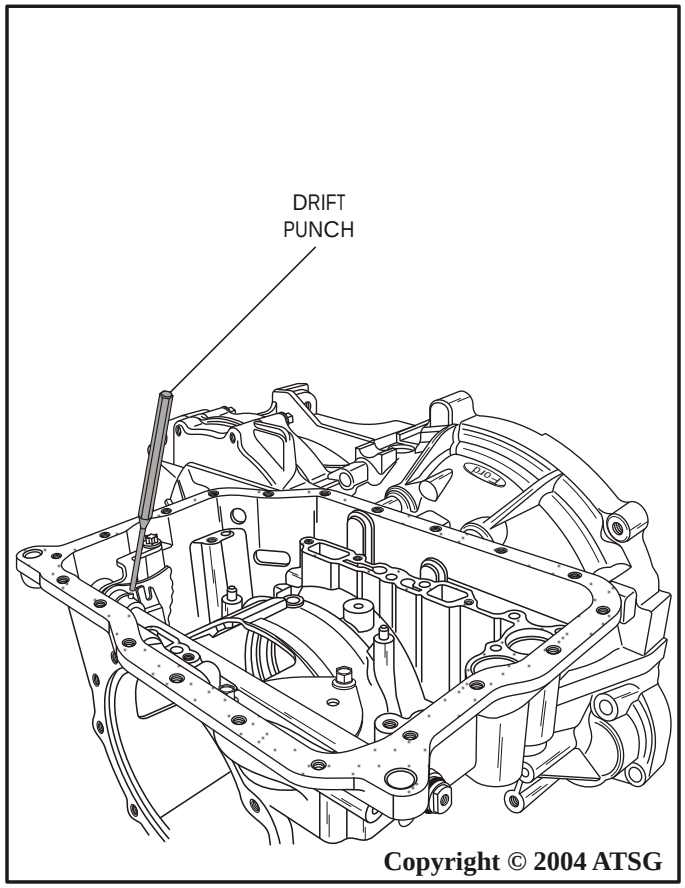

Figure 155

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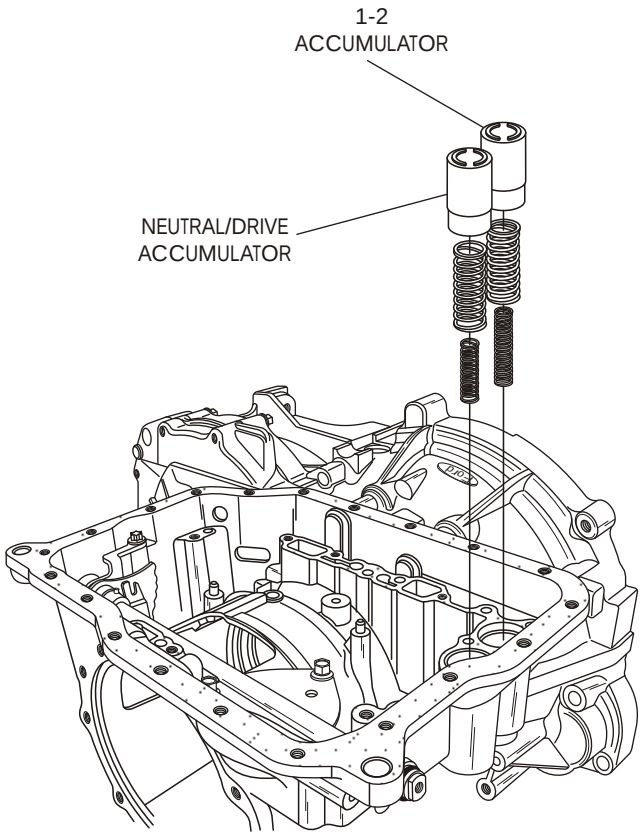

NEUTRAL-DRIVE OUTER		1-2 OUTER	
FREE LENGTH	2.945"	FREE LENGTH	2.655"
DIAMETER	.824"	DIAMETER	.824"
WIRE DIAMETER	.089"	WIRE DIAMETER	.137"
COLOR I.D.	NONE	COLOR I.D.	YELLOW
NEUTRAL-DRIVE INNER		**1-2 INNER**	
FREE LENGTH	2.145"	FREE LENGTH	2.655"
DIAMETER	.610"	DIAMETER	.510"
WIRE DIAMETER	.094"	WIRE DIAMETER	.087"
COLOR I.D.	NONE	COLOR I.D.	YELLOW

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Figure 156

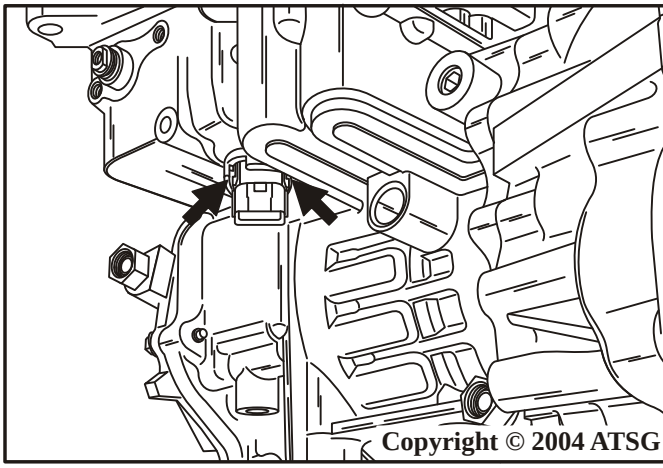

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Figure 157

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

11. Install the 1-2 accumulator piston and springs in the bore closest to the converter housing, as shown in Figure 156.
12. Install the neutral/drive accumulator piston and springs in case bore, as shown in Figure 156. ***Note: Each of the two accumulators have two springs. All four springs are different sizes. Spring specifications are listed in Figure 156. The two accumulator pistons are the same.***
13. Install a new "O" ring on the connector of the internal wire harness, lubricate and install the internal wire harness through the case bore until the tabs lock it into position, as shown in Figure 157.
14. Install the pre-assembled valve body assembly onto transaxle case, as shown in Figure 158. ***Note: Ensure that manual valve is engaged with internal lever and V.B. is over dowels.***
15. Install eleven 40 mm length bolts and two 71 mm length bolts in the positions that are shown in Figure 158.

Continued on Page 78

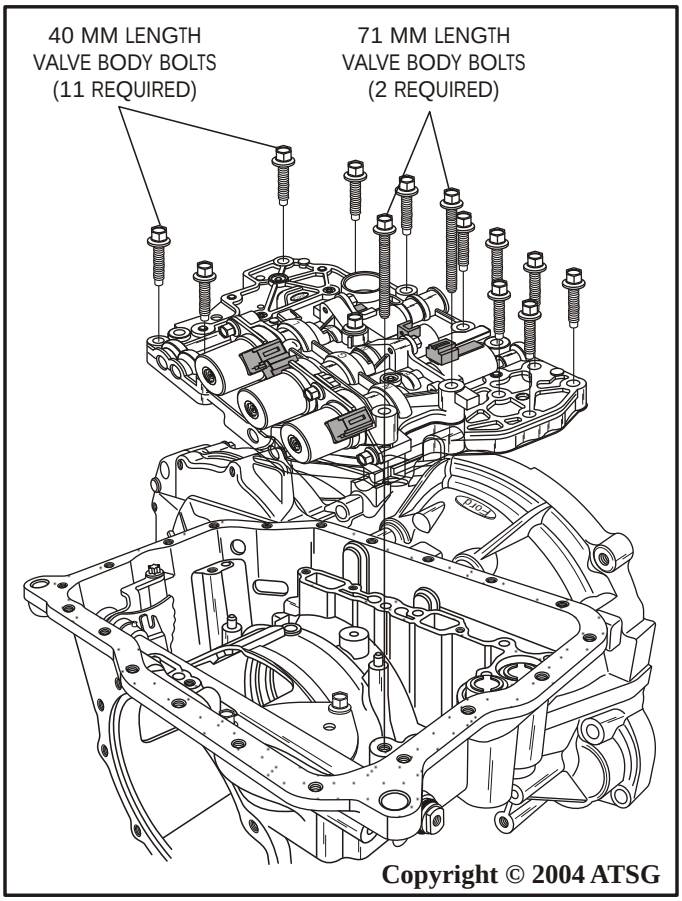

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Figure 158

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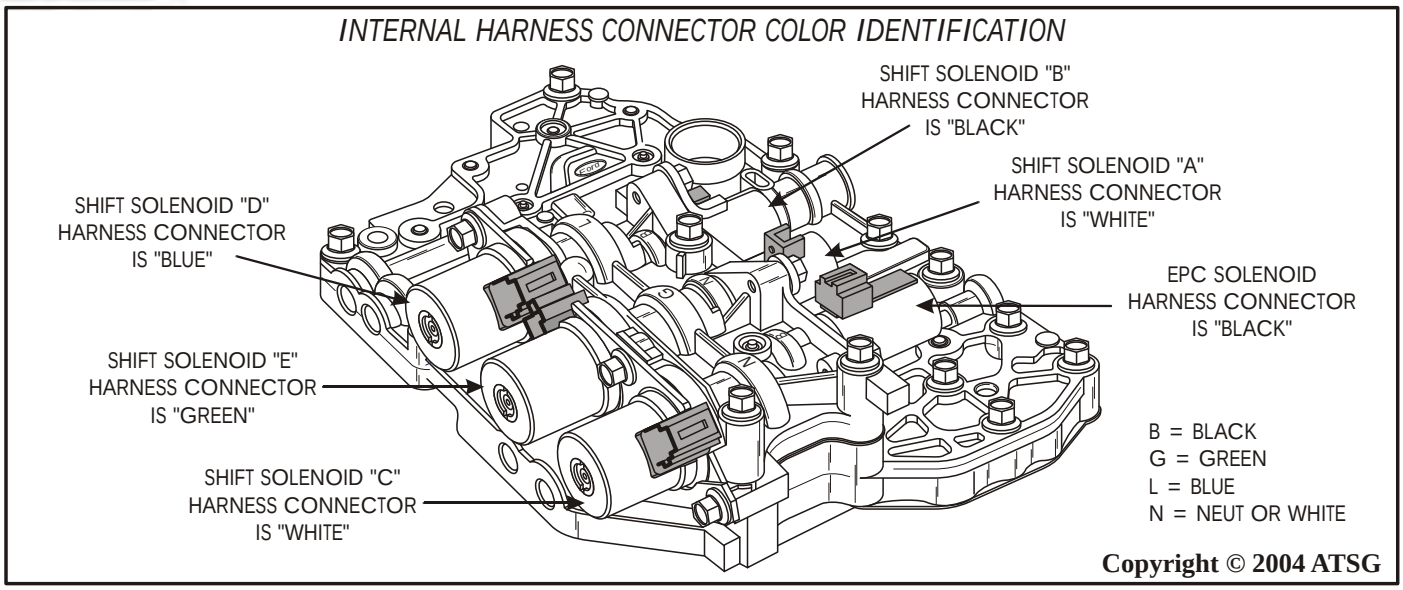

Figure 159

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

16. Torque all of the valve body to case bolts to 9 N•m (80 in.lb.), as shown in Figure 160.
17. Install the individual solenoid internal harness connectors to their respective solenoids, as shown in Figure 159 and 161.
18. Install the solenoid ground wire bolt through the wire terminal, as shown in Figure 161, and torque to 10 N•m (89 in.lb.).

CAUTION: It is mandatory that the internal wire harness connectors be connected to the proper solenoids. Figure 159 provides you the internal harness connector colors that should be connected to the individual solenoids. The color of the connector that should be connected to that solenoid is also cast into the valve body, as shown in Figure 159.

Continued on Page 79

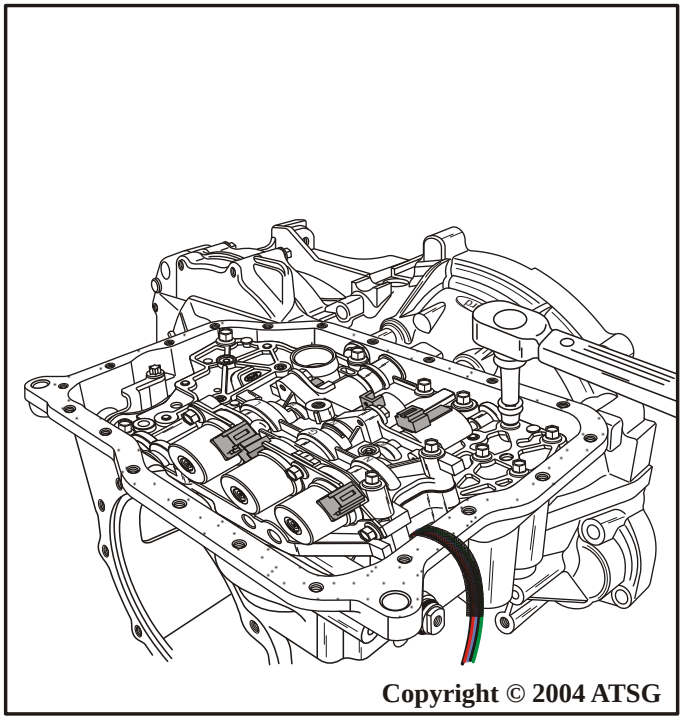

Figure 160

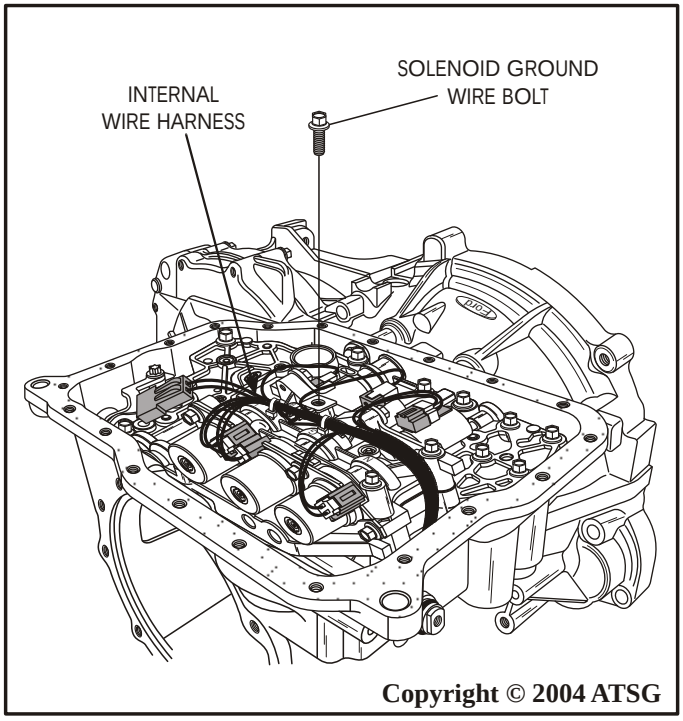

Figure 161

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TRANSMISSION ASSEMBLY
INTERNAL COMPONENTS (CONT'D)

19. Install a new "O" ring onto the new filter, as shown in Figure 162, and lubricate with small amount of Trans-Jel®.
20. Install the fluid filter assembly into the bore of the valve body, as shown in Figure 162.
21. Install the fluid temperature sensor by snapping it into position on the filter (See Figure 163).
22. Apply a one-and-a-half (1.5 mm) bead of Loctite® 5699 sealant (or equivalent) to the transaxle pan surface.
23. Check the filter, solenoid connections, ground wire bolt tight, linkage engage park pawl, one more time before we install the pan.
24. Install the transaxle fluid pan, as shown in Figure 163.
25. Install the twenty fluid pan bolts and torque to 7 N•m (62 in.lb.), as shown in Figure 164.

Continued on Page 80

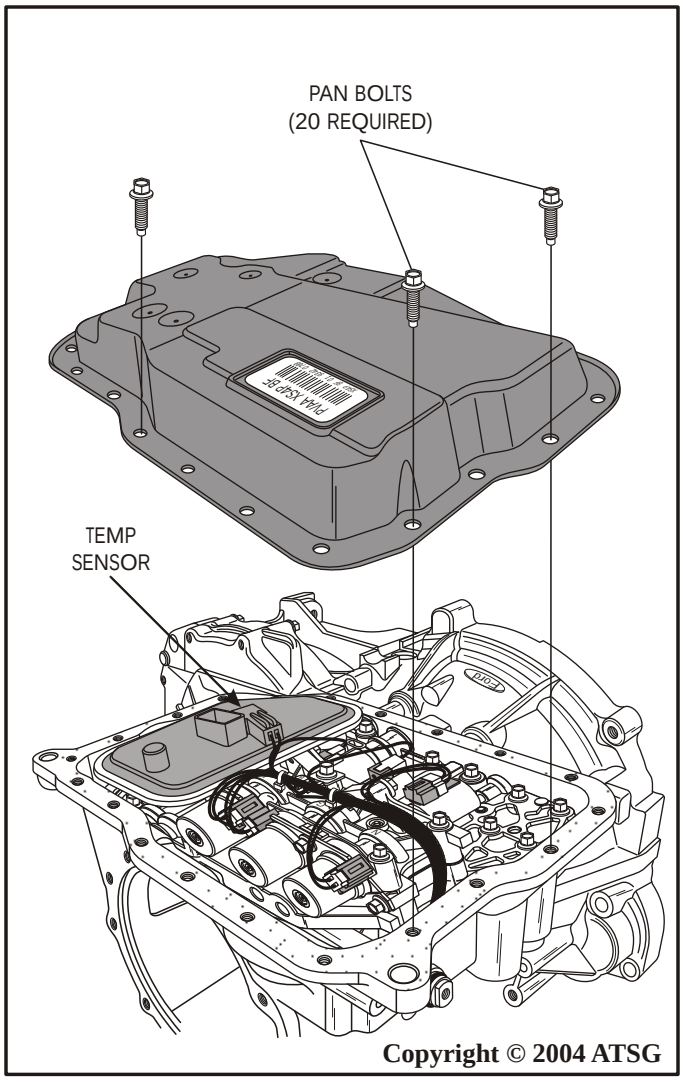

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Figure 163

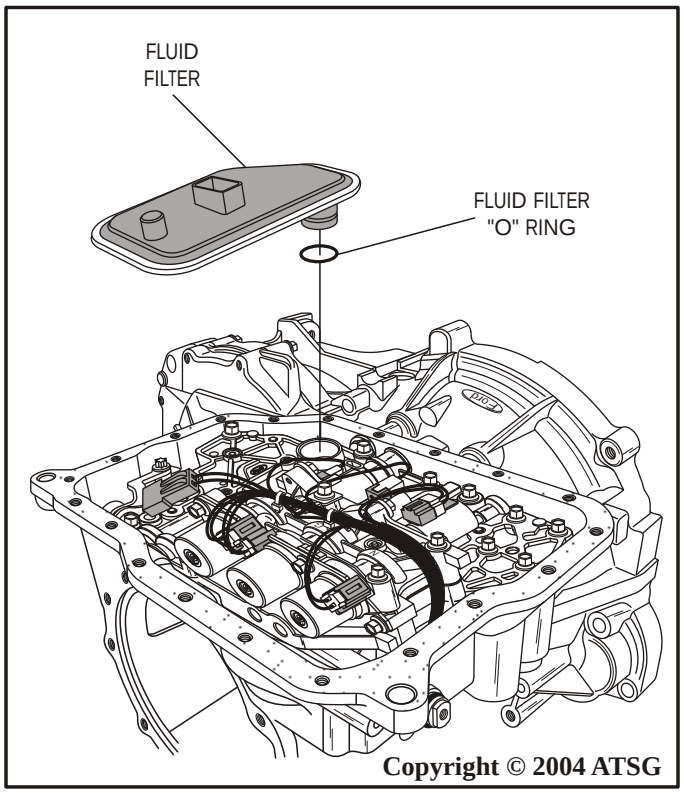

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Figure 162

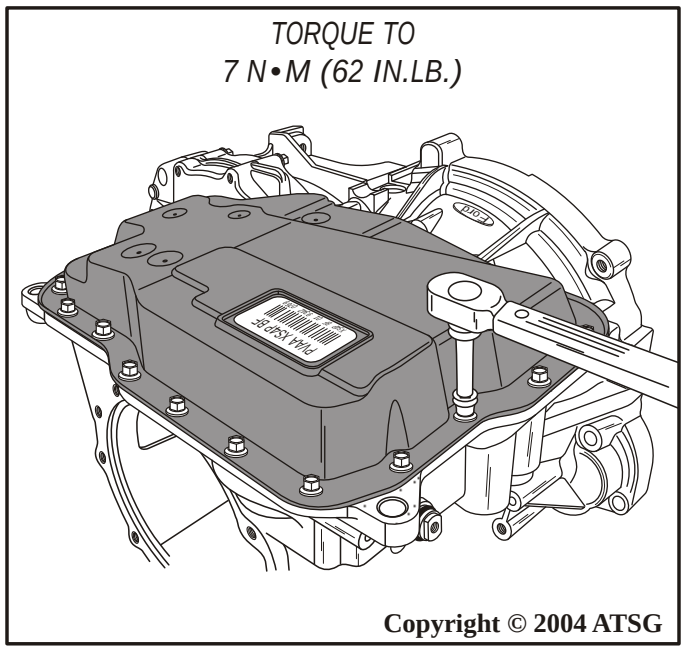

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Figure 164

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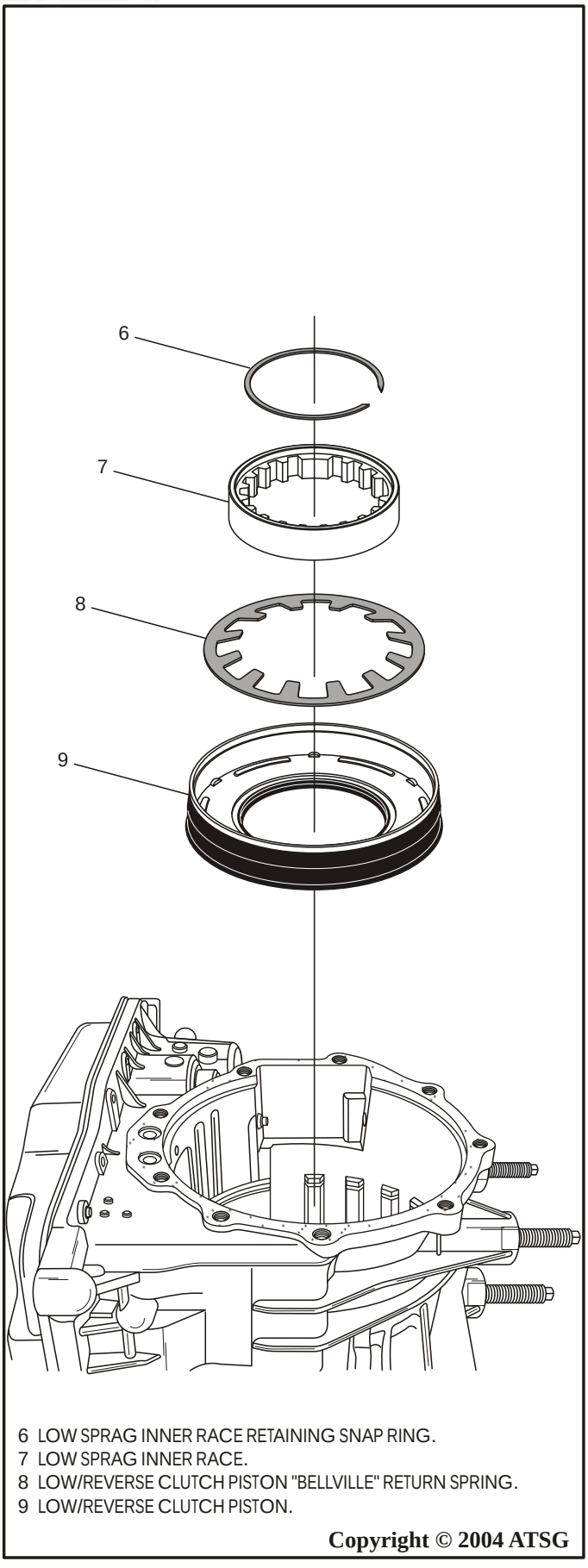

6 LOW SPRAG INNER RACE RETAINING SNAP RING.
7 LOW SPRAG INNER RACE.
8 LOW/REVERSE CLUTCH PISTON "BELLVILLE" RETURN SPRING.
9 LOW/REVERSE CLUTCH PISTON.

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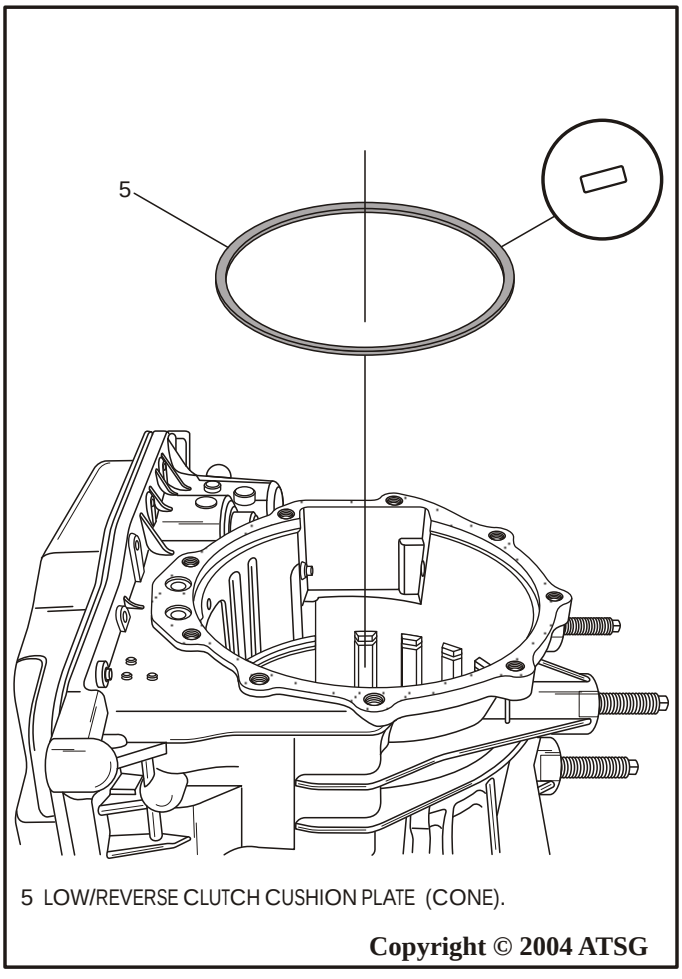
Figure 165

INTERNAL COMPONENTS (CONT'D)

26. Rotate transaxle in fixture so that end cover surface is facing up, as shown in Figure 165.
27. Lubricate and install the low/reverse clutch molded piston, as shown in Figure 165.
28. Install the "Bellville" low/reverse clutch piston return spring, as shown in Figure 165.
29. Install the low sprag inner race, as shown in Figure 165.
    Note: The low sprag inner race also serves as bellville return spring retainer.
30. Install the low sprag race retaining snap ring, as shown in Figure 165, and ensure that it is fully seated in the groove.
31. Install the low/reverse clutch cushion (cone) spring on top of the low reverse clutch piston in the direction shown in Figure 166.

Continued on Page 81



5 LOW/REVERSE CLUTCH CUSHION PLATE (CONE).

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Figure 166

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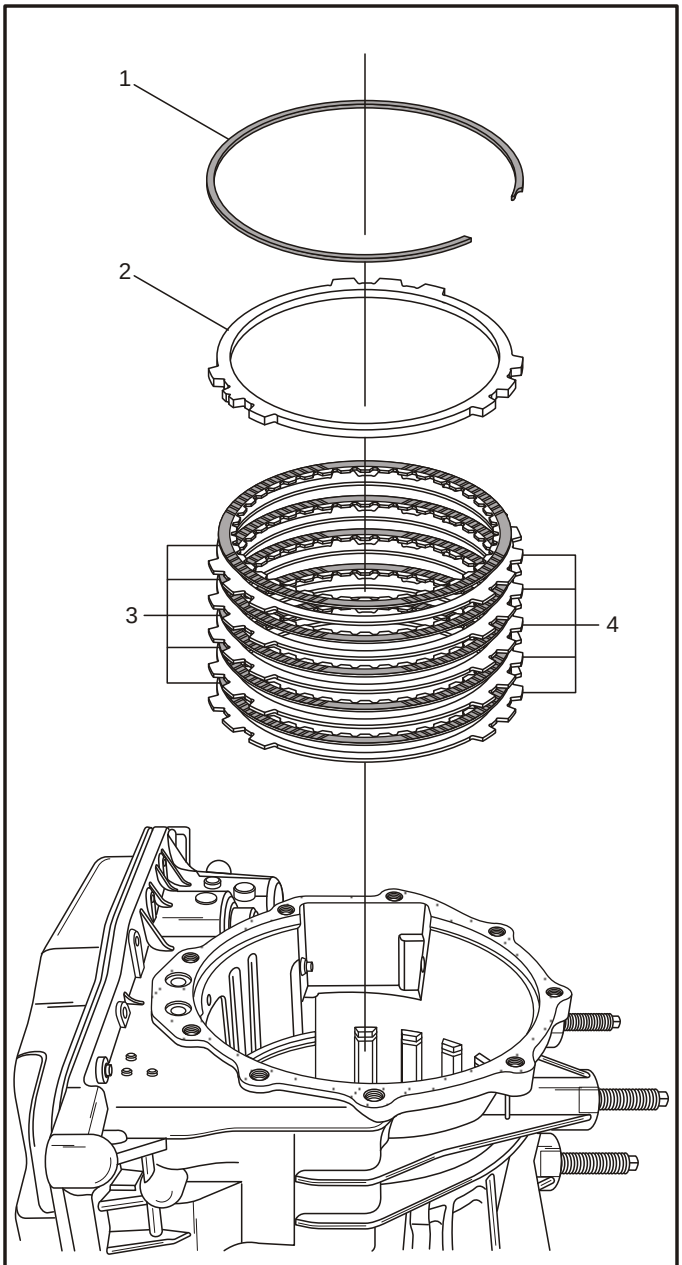
TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

32. Install the low/reverse clutch plates beginning with a steel plate and alternating with frictions until you have installed five of each, as shown in Figure 167.
Note: Friction plates should be soaked in Mercon® V fluid for 15 minutes before installation.
33. Install the low/reverse clutch backing plate, as shown in Figure 167.
34. Install the selective low/reverse clutch backing plate snap ring, as shown in Figure 167.
35. Measure the clearance between the snap ring and the backing plate with a feeler gauge, as shown in Figure 168.
36. The low/reverse clutch clearance should be 2.2 to 2.5 mm (.087" to .098"), as shown in Figure 168.
37. Change the selective snap ring as necessary to obtain the correct specification, as shown in Figure 168.

Continued on Page 82



1 LOW/REVERSE CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
2 LOW/REVERSE CLUTCH BACKING PLATE.
3 LOW/REVERSE CLUTCH FRICTION PLATES (5 REQUIRED).
4 LOW/REVERSE CLUTCH STEEL PLATES (5 REQUIRED).

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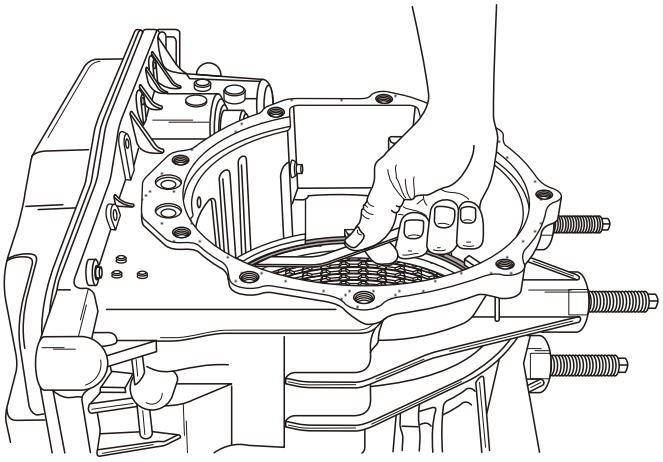
Figure 167

LOW/REVERSE CLUTCH CLEARANCE
2.2 - 2.5 MM (.087" - .098")



Selective Thickness Snap Rings Available
1.75 to 1.85 mm (.069" to .073")
1.95 to 2.05 mm (.077" to .081")
2.15 to 2.25 mm (.085" to .089")
2.35 to 2.45 mm (.093" to .097")
2.55 to 2.65 mm (.100" to .104")
2.75 to 2.85 mm (.108" to .112")
2.95 to 3.05 mm (.116" to .120")

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Figure 168

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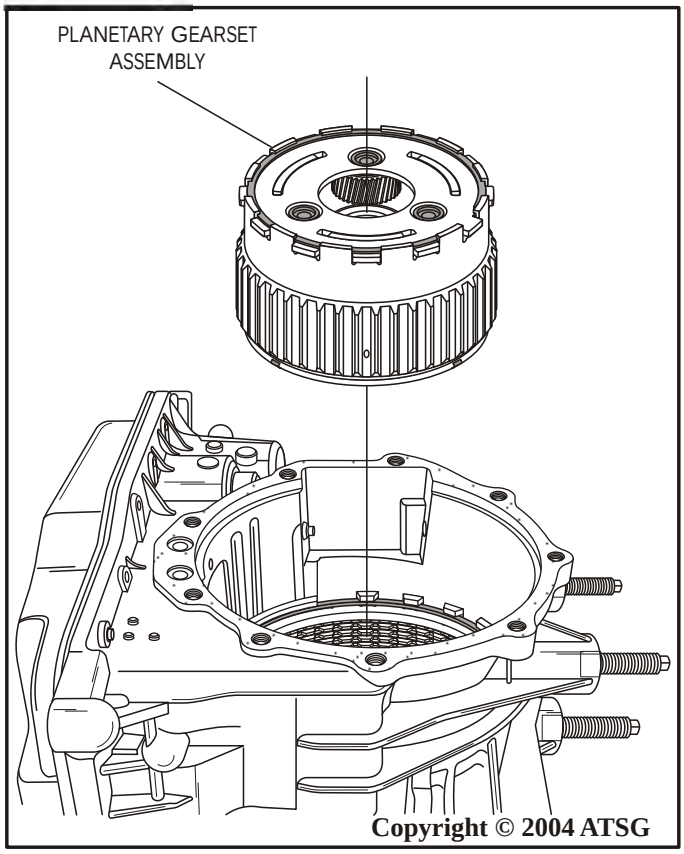

Figure 169

TRANSMISSION ASSEMBLY
INTERNAL COMPONENTS (CONT'D)

38. Install the pre-assembled planetary gearset, as shown in Figure 169, by rotating in a counter-clockwise direction and ensure that it is fully seated over low sprag inner race.
Note: Must engage splines into input gear, splines on low/reverse frictions, and sprag onto inner race.
39. After installation, check for proper rotation of sprag assembly. Gearset should freewheel in a counter-clockwise direction and lock in the clockwise direction, as shown in Figure 170.
40. Install the pre-assembled direct/reverse clutch housing, as shown in Figure 171, by rotating into position.

Continued on Page 83

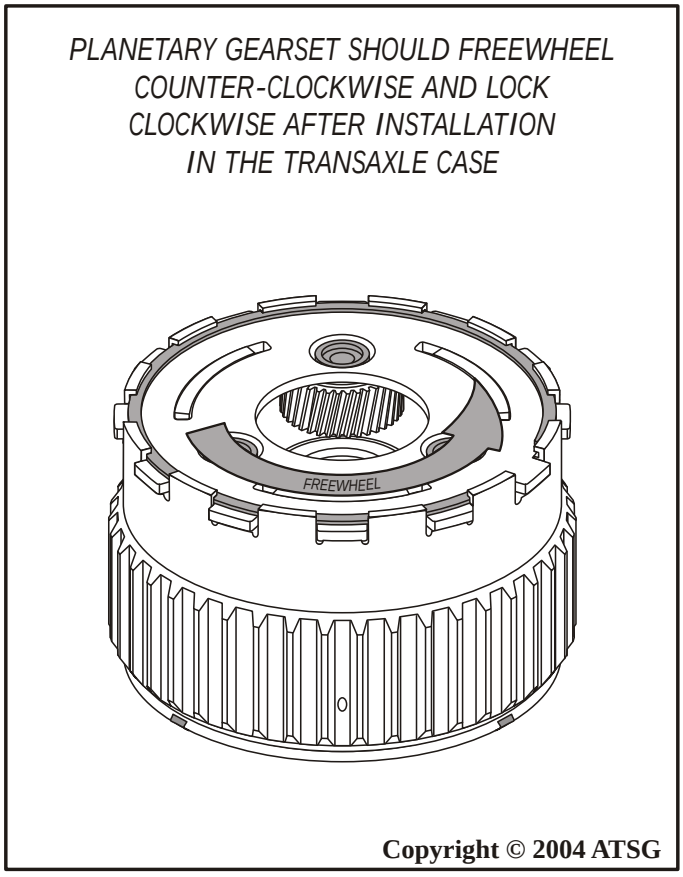

Figure 170

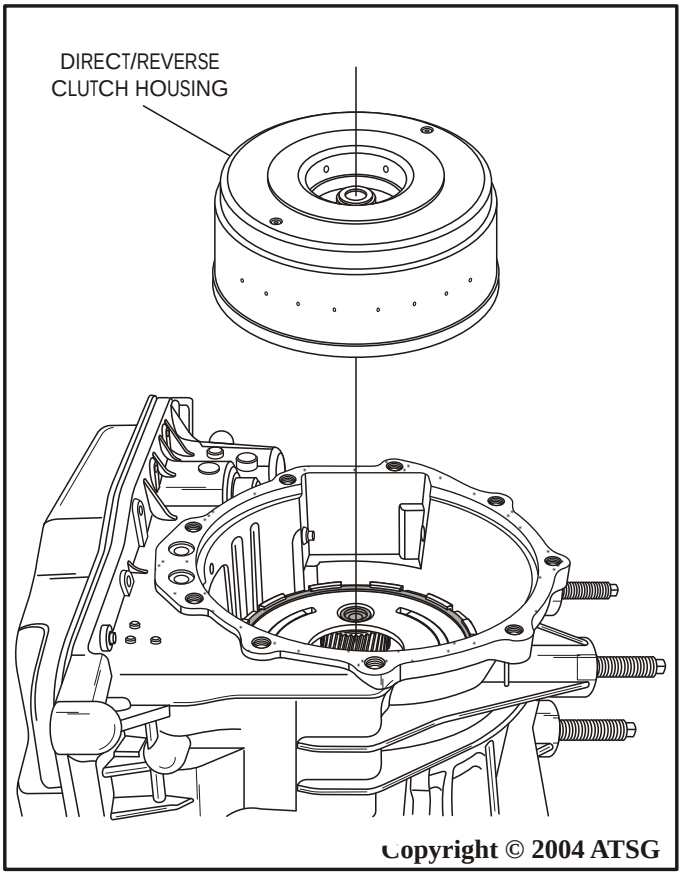

Figure 171

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TRANSMISSION ASSEMBLY
INTERNAL COMPONENTS (CONT'D)

41. Install the direct clutch hub bearing race onto completed end cover, as shown in Figure 172. ***Note: This is the selective race to set the transaxle end play.***
42. Temporarily, install the direct clutch bearing with the needles facing down, as shown in Figure 172.
43. Install the "H" gauge onto the transaxle, as shown in Figure 173, adjust the center stem so that it rests on direct clutch housing bearing surface and tighten locking screw.
44. Turn the "H" gauge over and set on top of the end cover with selective and bearing in place, as shown in Figure 174.
45. Measure between the stem of "H" gauge and the bearing surface, as shown in Figure 174, to check transaxle end play.
46. Transaxle end play should be ,009" to .019", as shown in Figure 174.
47. Change the selective bearing race as necessary to obtain specification. Refer to chart below for available direct clutch bearing races.

Part Number	*Race Thickness*
XS4Z-7G262-AB	***1.775-1.825 mm (.070" to .072")***
XS4Z-7G262-BB	***1.925-2.025 mm (.078" to .080")***
XS4Z-7G262-CB	***2.175-2.225 mm (.086" to .088")***
XS4Z-7G262-DB	***2.375-2.425 mm (.093" to .095")***
XS4Z-7G262-EB	***2.575-2.625 mm (.101" to .103")***

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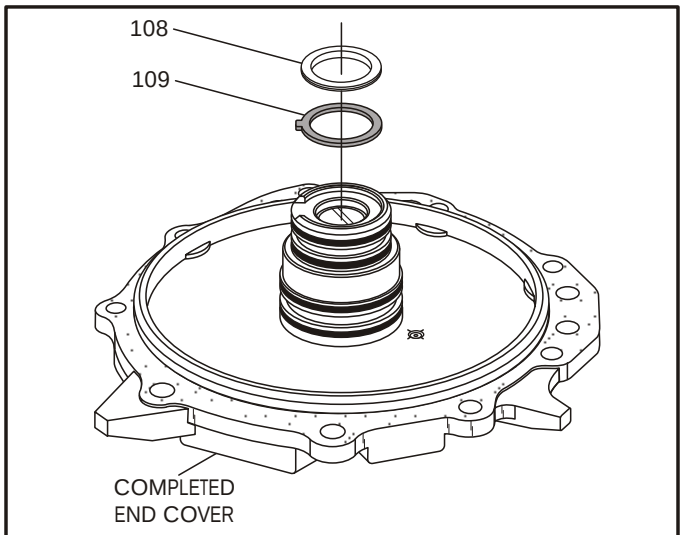

108 NUMBER 1, DIRECT CLUTCH HUB THRUST BEARING
109 DIRECT CLUTCH HUB BEARING RACE *(SELECTIVE).*

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Figure 172

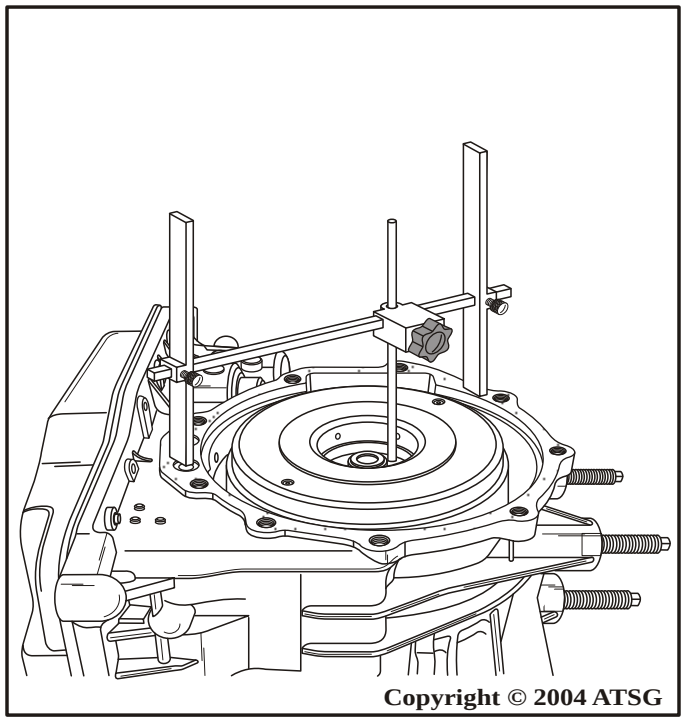

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Figure 173

TRANSAXLE END PLAY SHOULD BE
.009" TO .019"

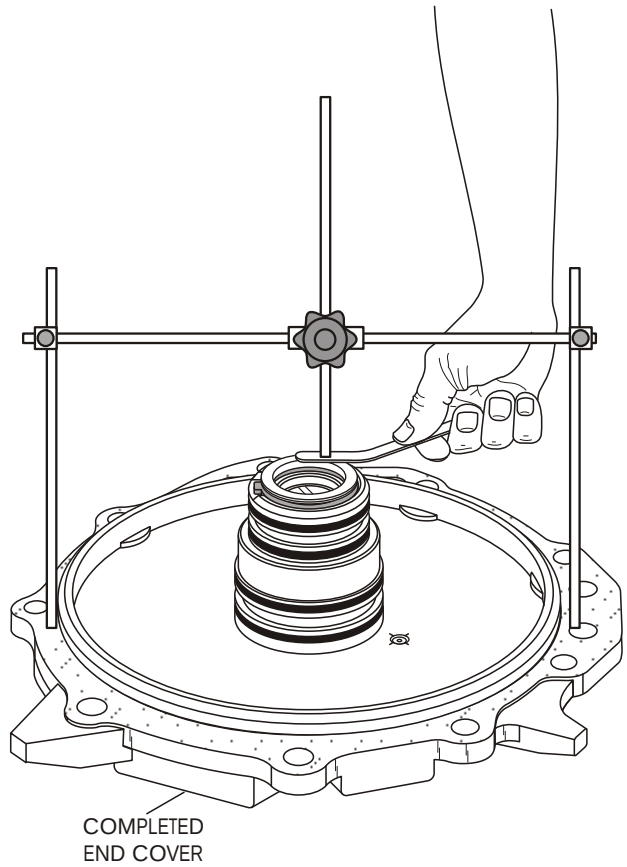

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Figure 174

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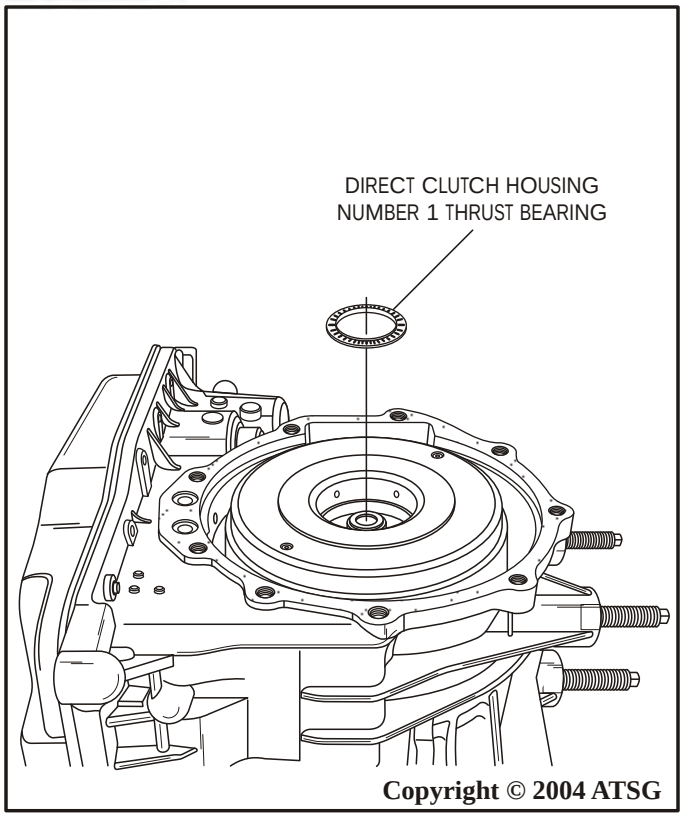

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Figure175

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

48. Install the number 1, direct clutch housing thrust bearing, with the needles facing up, as shown in Figure 175.
49. Install intermediate/overdrive band assembly, as shown in Figure 176.
50. Install two new end cover to case "O" ring seals into the pockets in the case, as shown in Figure 176, and retain with Trans-Jel®.
51. Temporarily install the 2-4 band anchor bolt, as shown in Figure 177.

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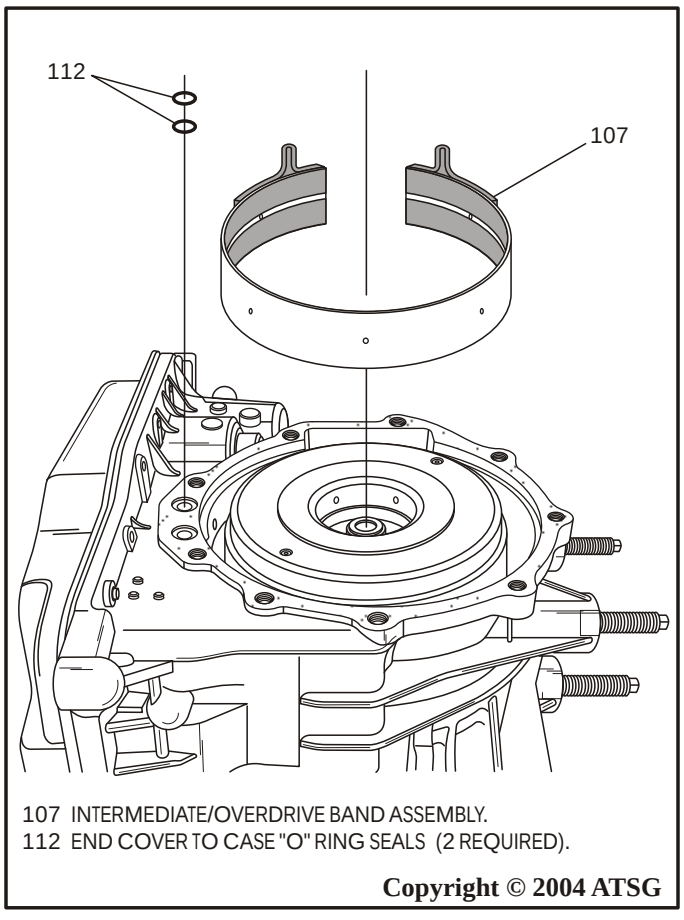

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Figure 176

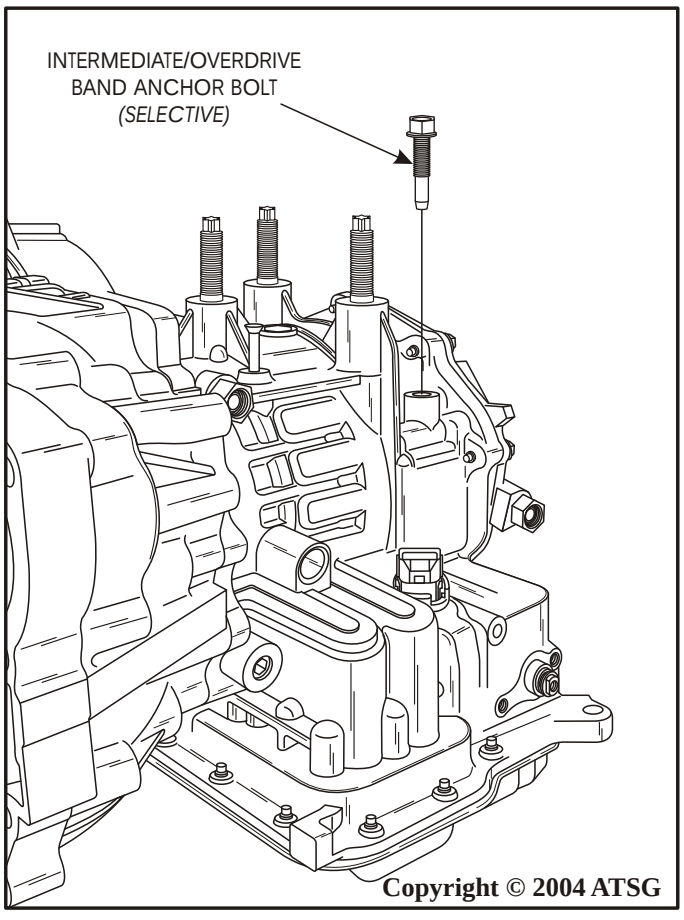

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Figure 177

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TRANSMISSION ASSEMBLY
INTERNAL COMPONENTS (CONT'D)

52. Install the selected bearing race onto the end cover and retain with Trans-Jel®, as shown in Figure 178.
53. Apply one-millimeter (1 mm) thick bead of Ultra Silicone Sealant (or equivalent) to the end cover surface, as shown in Figure 178.
54. Install the completed end cover onto transaxle, as shown in Figure 179.
    Note: Ensure that "O" ring seals are still in place, as shown in Figure 179.
55. Install the nine end cover retaining bolts, as shown in Figure 179.
56. Torque the nine end cover retaining bolts to 22 N•m (16 ft.lb.), as shown in Figure 180.

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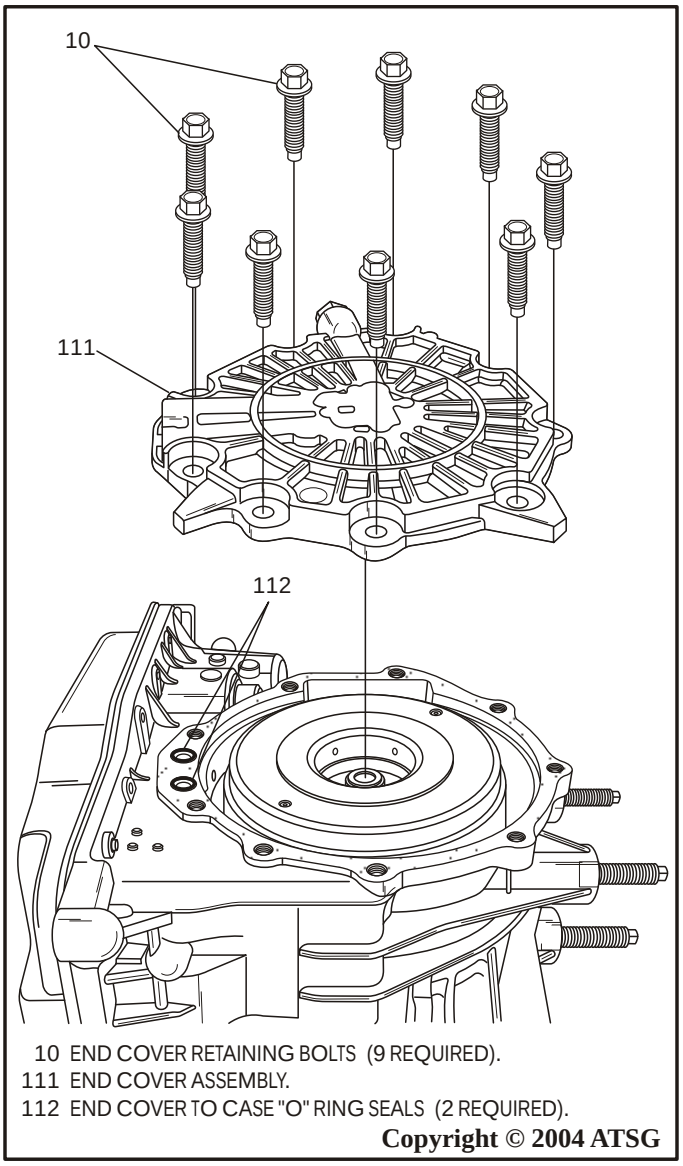

10 END COVER RETAINING BOLTS (9 REQUIRED).
111 END COVER ASSEMBLY.
112 END COVER TO CASE "O" RING SEALS (2 REQUIRED).

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Figure 179

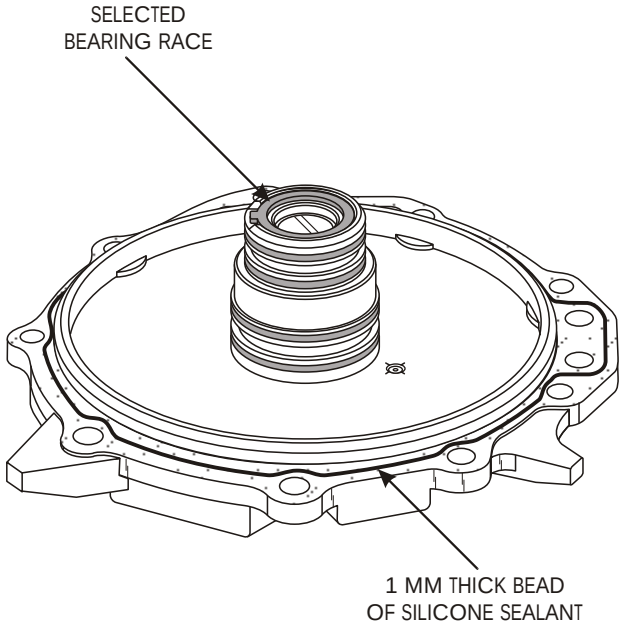

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Figure 178

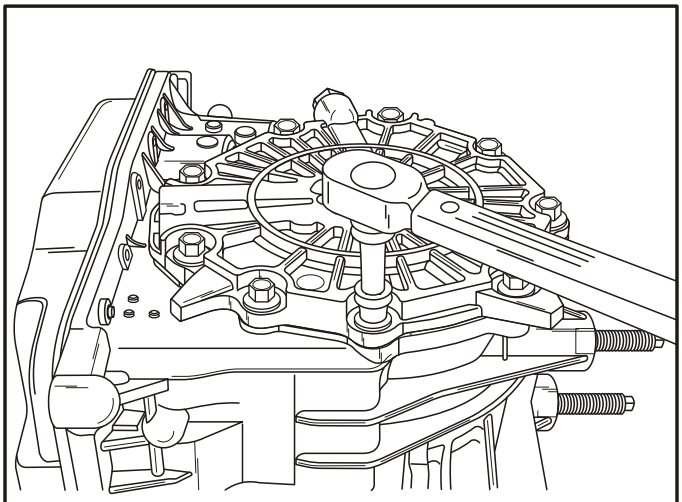

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Figure 180

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TRANSMISSION ASSEMBLY
INTERNAL COMPONENTS (CONT'D)

57. Remove the selective 2-4 band anchor bolt, as shown in Figure 181, and install the 307-416 Band Select Gauge.
58. Tighten the band select gauge bolt down to 5 N•m (45 in.lb.), and then back the bolt out exactly 3-1/2 turns.
59. While holding the band select gauge bolt in that position, lightly seat the nut and washer against the case.
60. Remove the band select gauge from the case, ***without*** changing the position of nut on bolt.
61. Measure the distance from end of the gauge to the washer, as shown in Figure 182.
62. Change the selective bolt as necessary to get the correct anchor using chart in Figure 182.
63. Install the selected band anchor bolt and torque to 45 N•m (33 ft.lb.), as shown in Figure 183.

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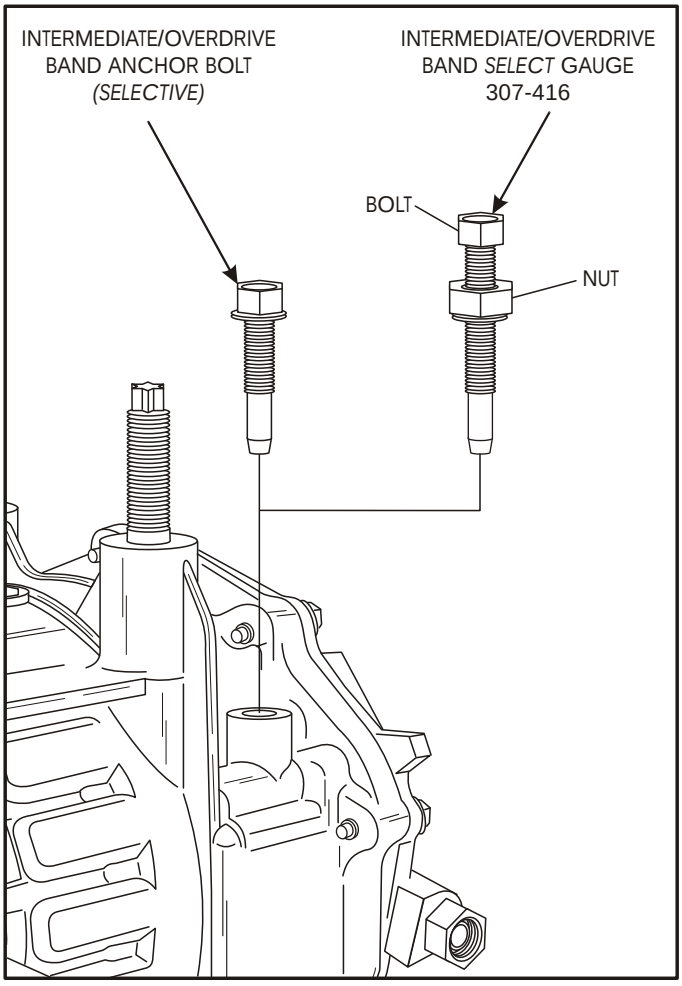
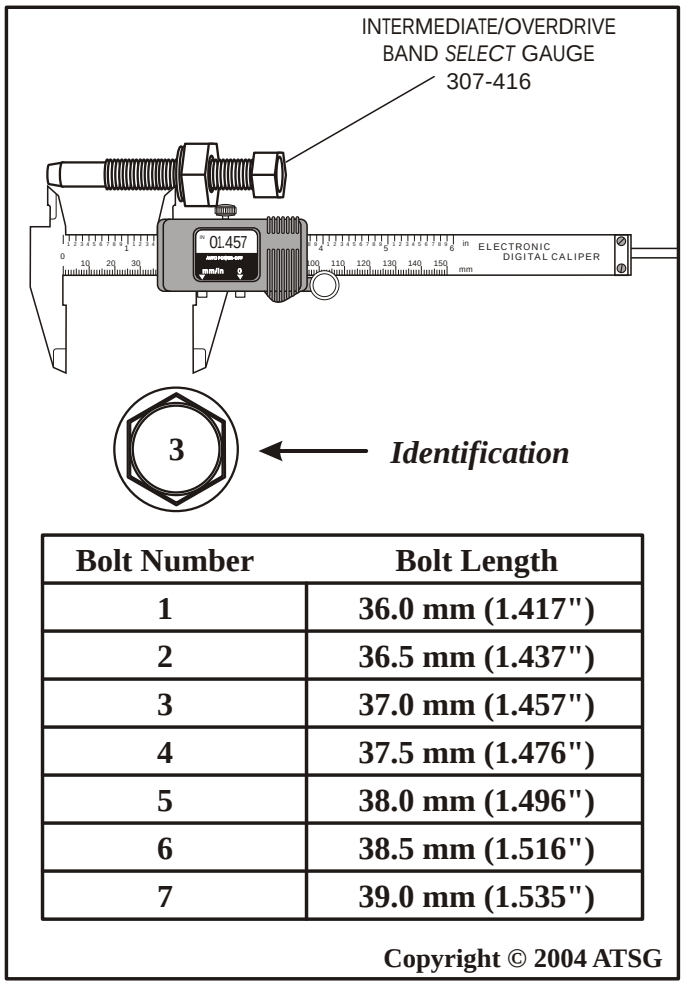


Figure 181



Bolt Number	Bolt Length
1	36.0 mm (1.417")
2	36.5 mm (1.437")
3	37.0 mm (1.457")
4	37.5 mm (1.476")
5	38.0 mm (1.496")
6	38.5 mm (1.516")
7	39.0 mm (1.535")

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Figure 182

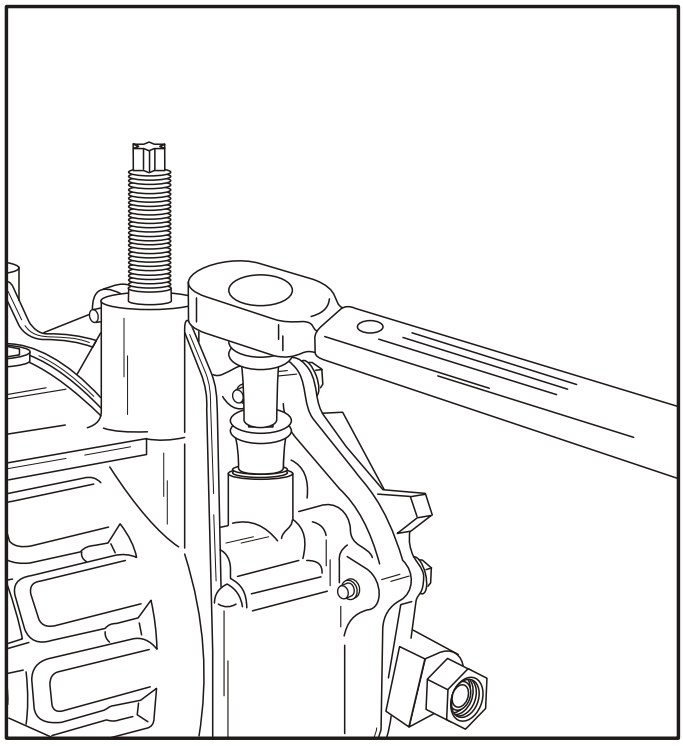

Figure 183

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TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

64. Rotate the transaxle 180 degrees so that bell housing is facing up, as shown in Figure 184.
65. Install the forward clutch hub, as shown in Figure 184, by starting onto the splines and then tapping it down and over the cir-clip.
66. Install the completed forward clutch housing, as shown in Figure 185, by rotating back and forth until all clutch plates are engaged on the forward clutch hub.
67. Install the forward clutch housing to oil pump support thrust washer, as shown in Figure 185.

Continued on Page 88

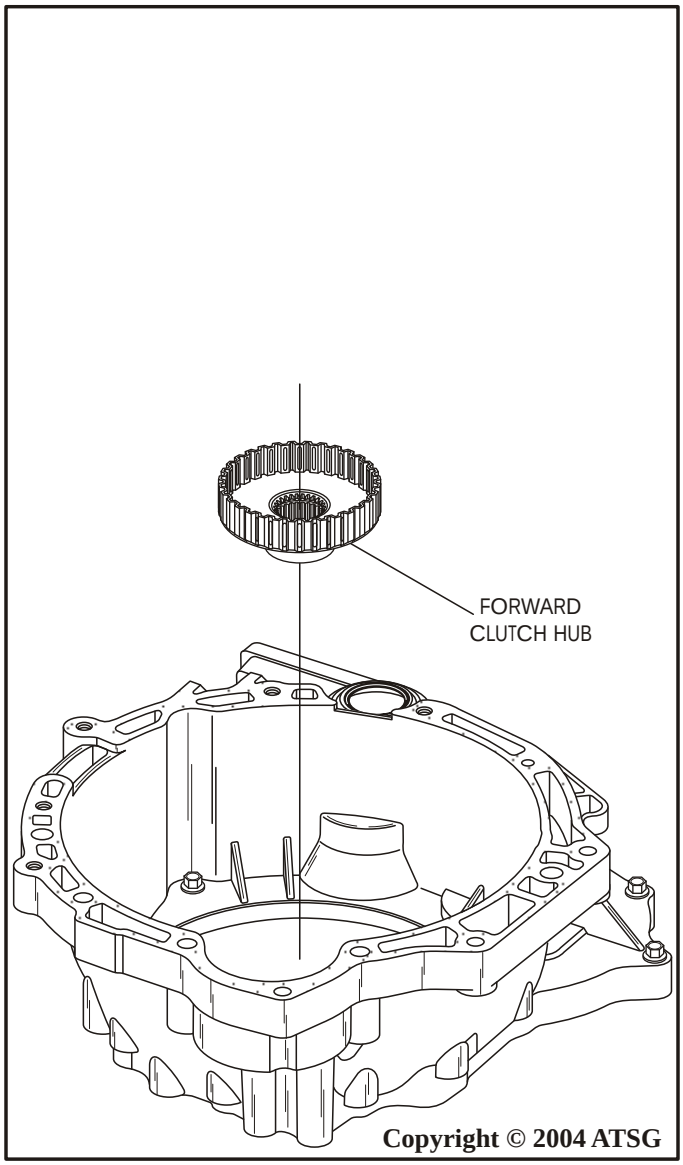

Figure 184

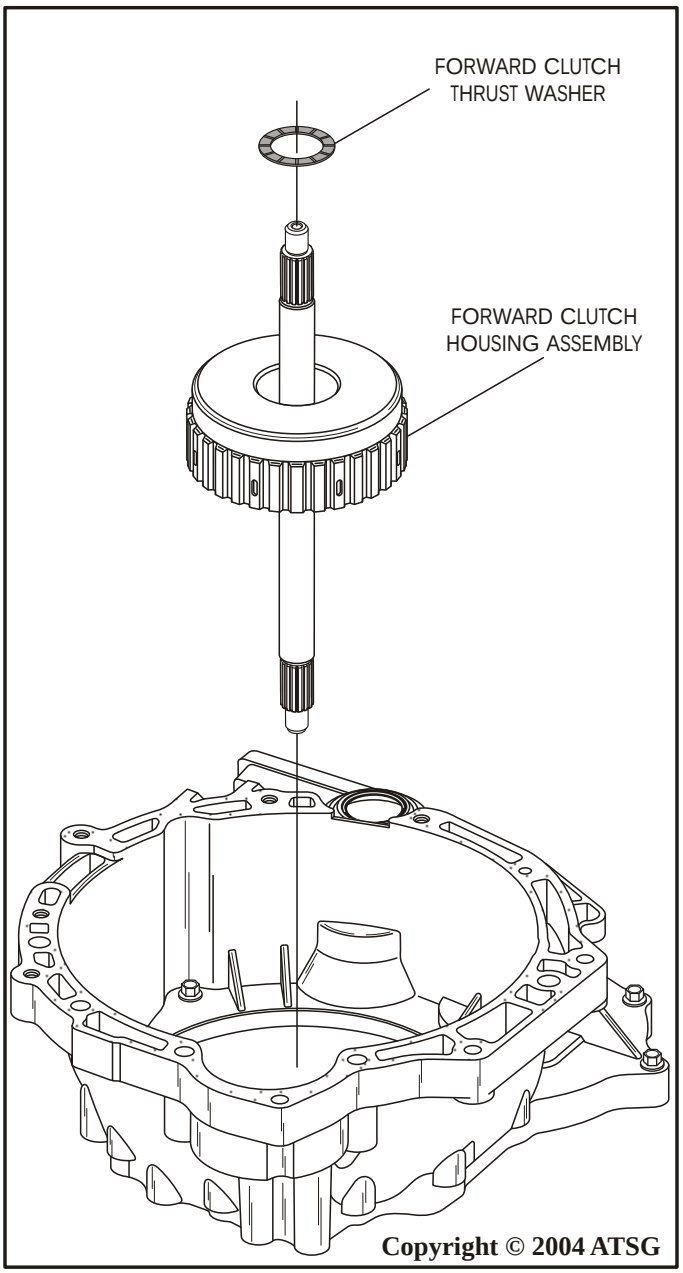

Figure 185

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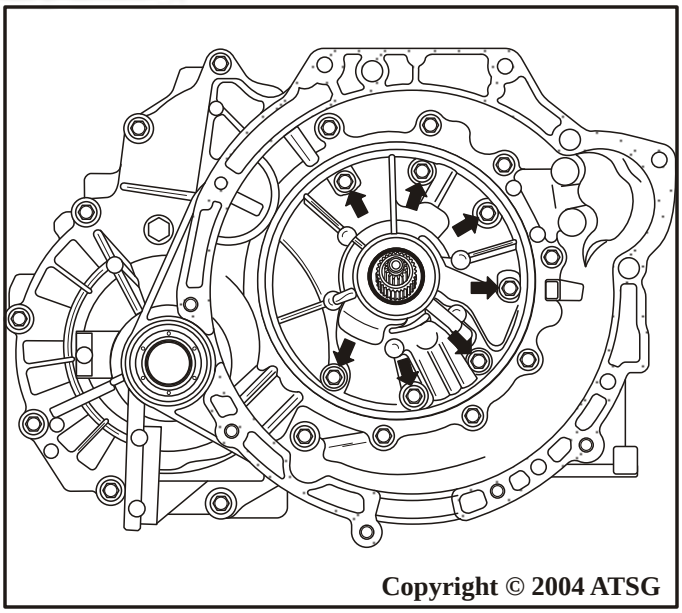
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Figure 186

TRANSMISSION ASSEMBLY

INTERNAL COMPONENTS (CONT'D)

68. Install the completed oil pump assembly, as shown in Figure 187.
Note: Lubricate "O" ring seal with small amount of Trans-Jel® before installation.
69. Install the seven bolts that secure the oil pump to case in the locations shown in Figure 186.
Note: Gradually tighten each bolt equally to pull the oil pump into position.
70. Torque the oil pump to case retaining bolts to 22 N•m (16 ft.lb.), as shown in Figure 188.

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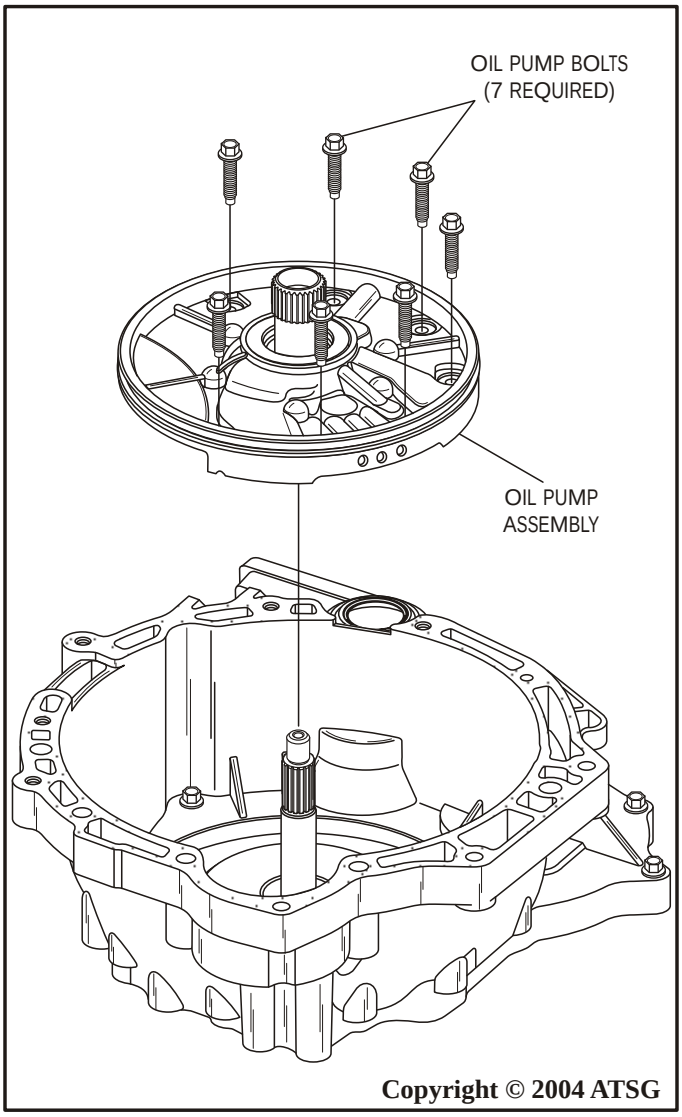

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Figure 187

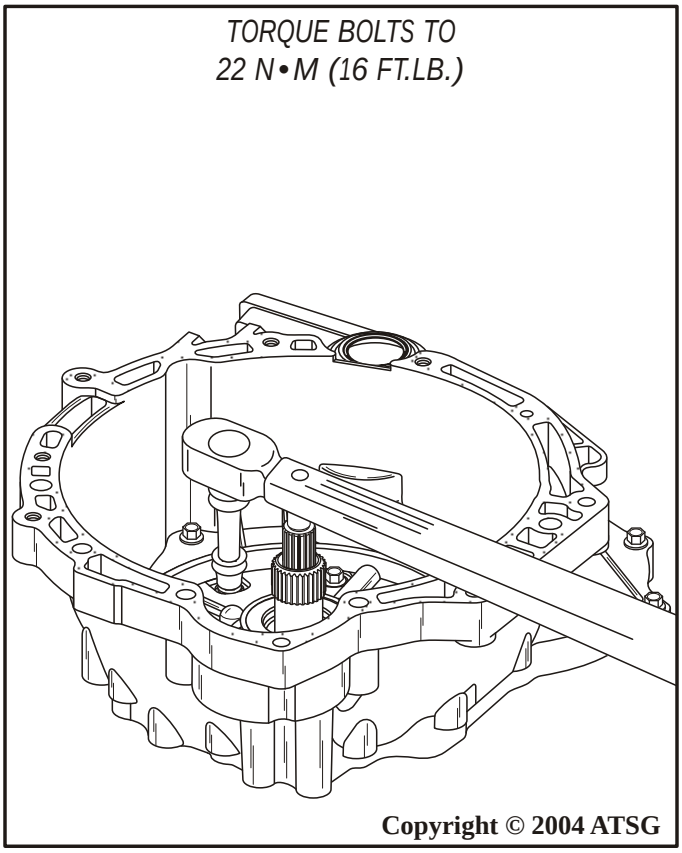

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Figure 188

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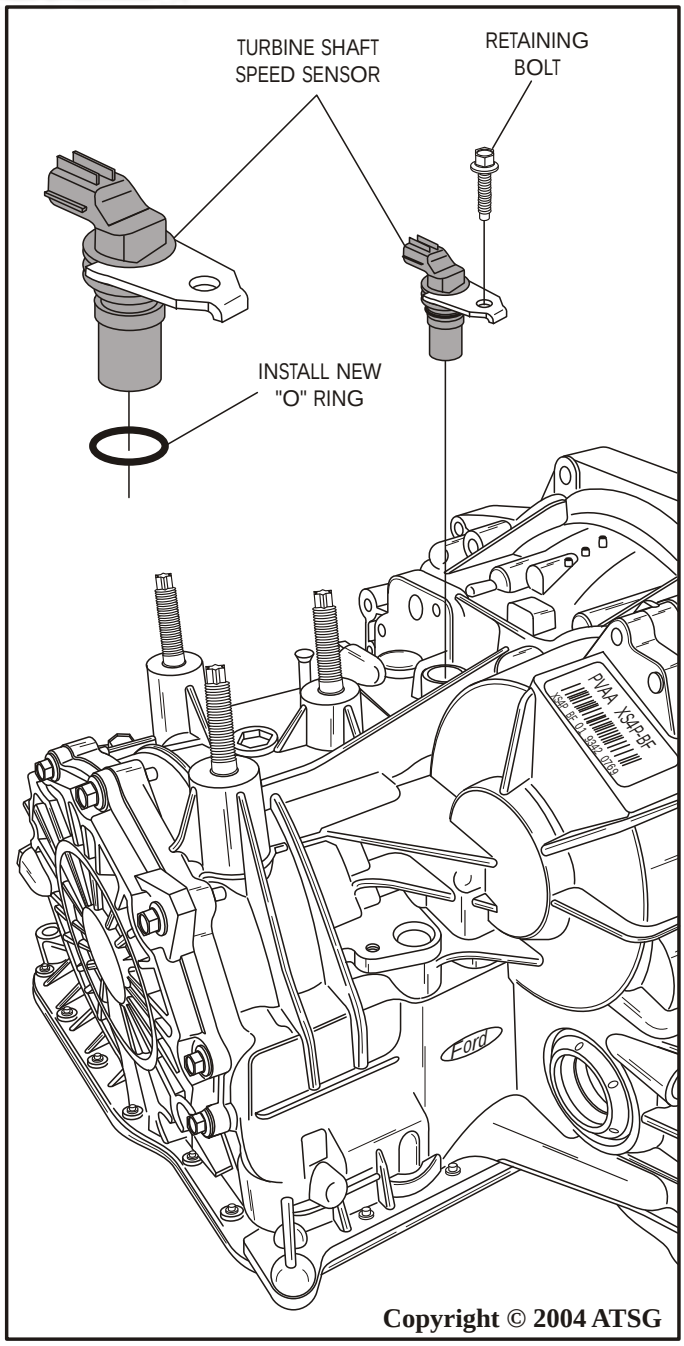

Figure 189

TRANSMISSION ASSEMBLY

EXTERNAL COMPONENTS

1. Install new "O" ring seal onto turbine shaft speed sensor, lubricate with small amount of Trans-Jel® and install into the case bore, as shown in Figure 189.
2. Install speed sensor retaining bolt and torque to 9 N•m (80 in.lb.) (See Figure 189).
3. Install new "O" ring onto output shaft speed sensor, lubricate with Trans-Jel® and install into the case bore, as shown in Figure 190.
4. Install speed sensor retaining bolt and torque to 9 N•m (80 in.lb.) (See Figure 190).

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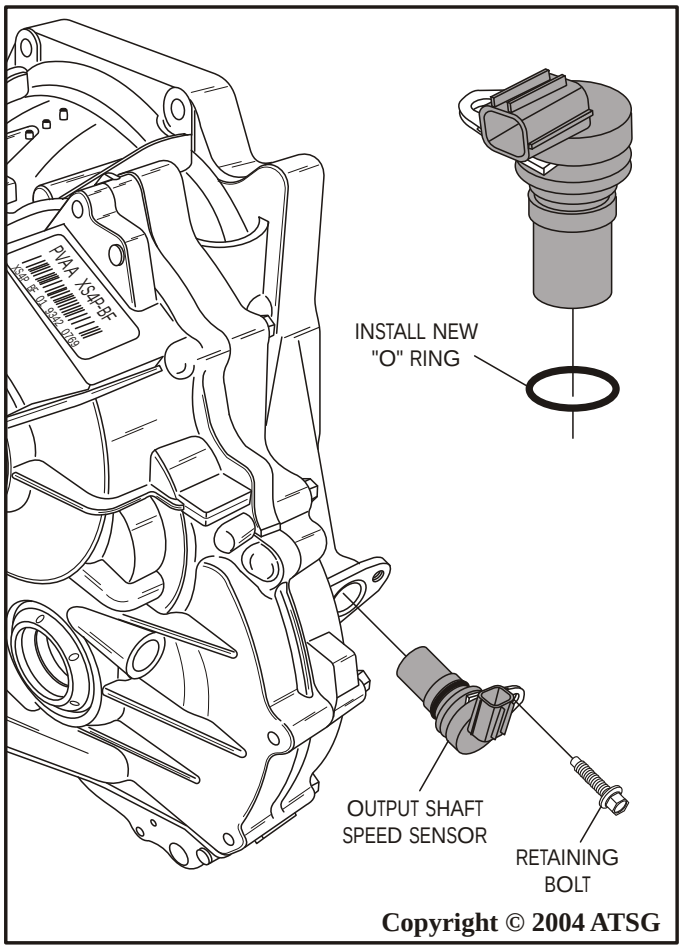

Figure 190

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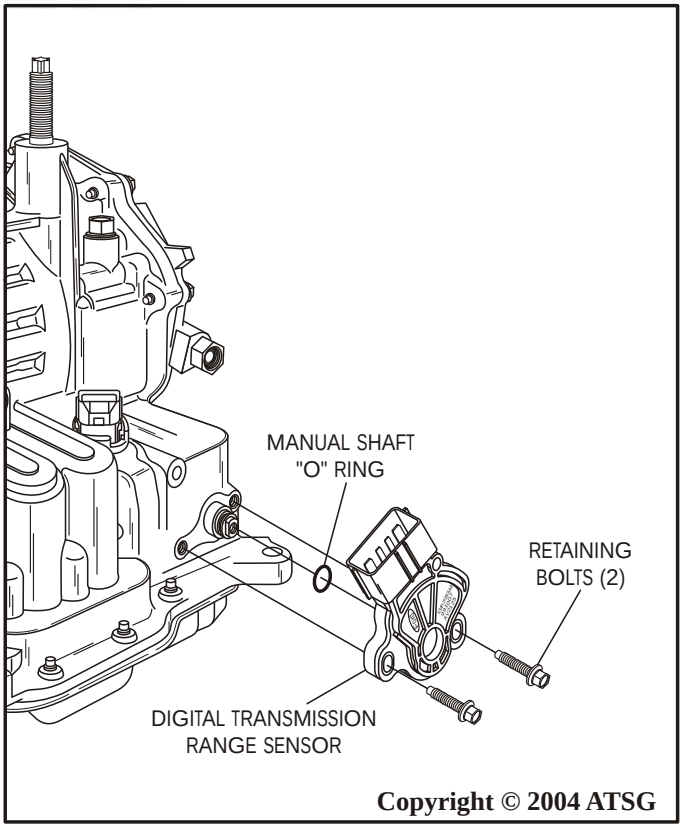

Figure 191

TRANSMISSION ASSEMBLY

EXTERNAL COMPONENTS

5. Loosely install the transaxle range sensor with the two bolts, as shown in Figure 191.
   Note: Ensure that "O" ring is in place on manual shaft (See Figure 191).
6. Install the transaxle range sensor alignment tool 307-415, as shown in Figure 192.
   Note: Alignment tool must be over the flats on manual shaft and dowel in the hole in range sensor (See Figure 192).
7. With the alignment tool in place, torque the two bolts to 10 N•m (89 in.lb.), and remove the alignment tool.
8. Install the external manual control lever and bolt, as shown in Figure 193, and torque bolt to 13 N•m (10 ft.lb.).

Continued on Page 91

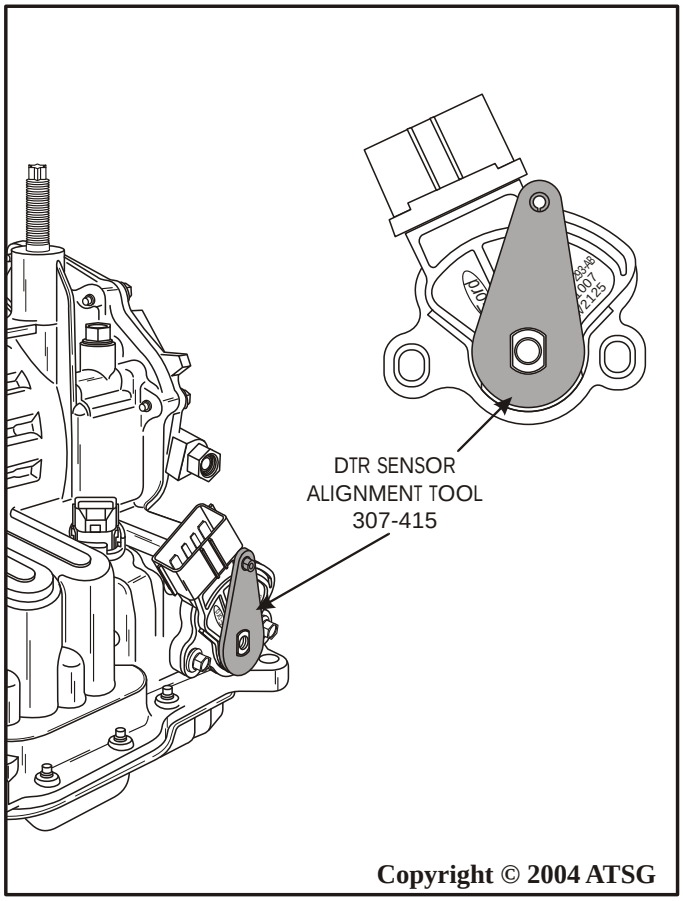

Figure 192

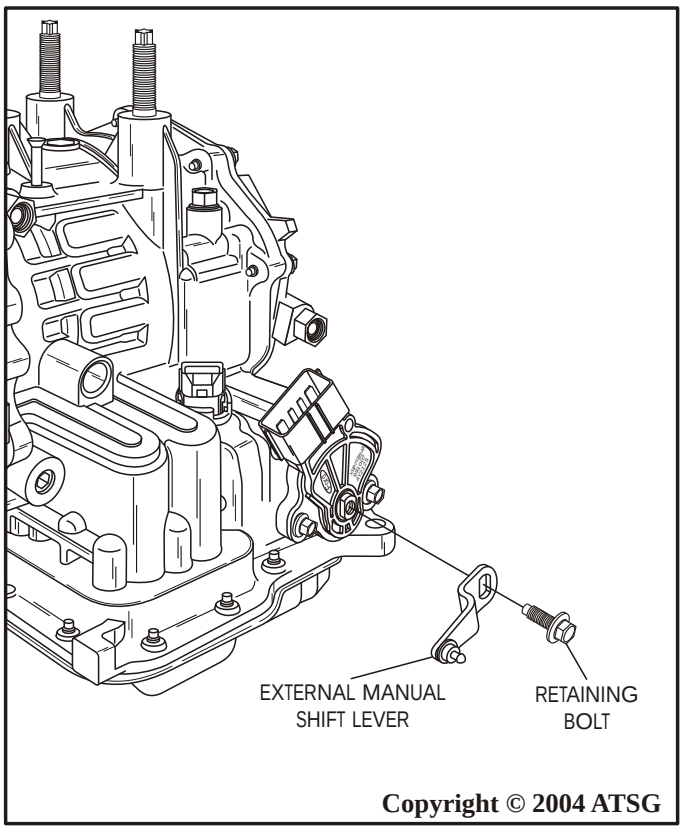

Figure 193

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TRANSMISSION ASSEMBLY

EXTERNAL COMPONENTS

9. Remove the transaxle from bench fixture and remove mounting bracket from transaxle, as shown in Figure 194.
10. Lubricate the converter hub and install torque converter using the 307-091 handles as shown in Figure 195.

CONGRATULATIONS
YOU ARE FINISHED!

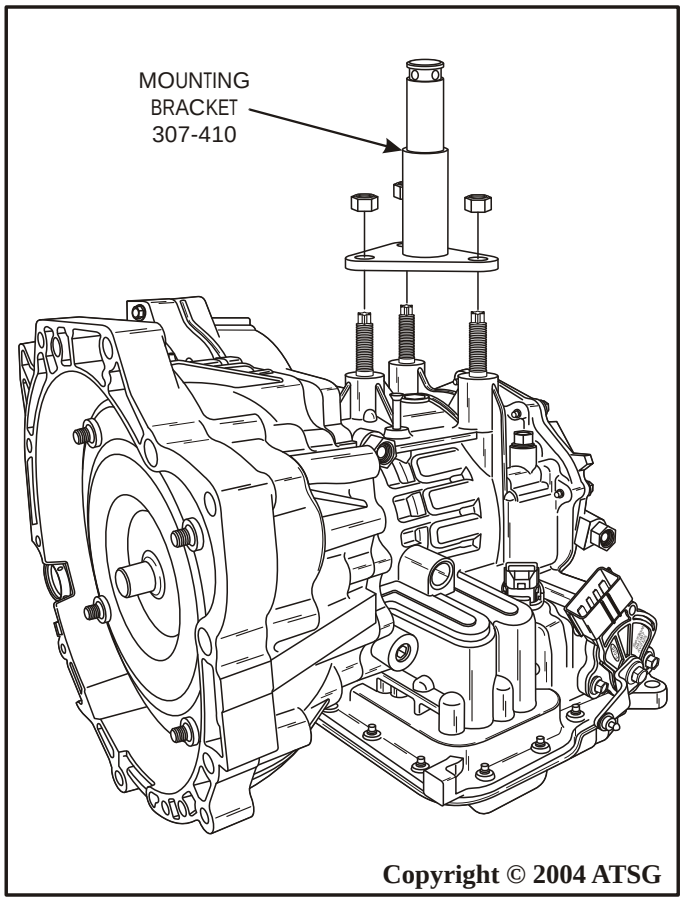

Figure 194

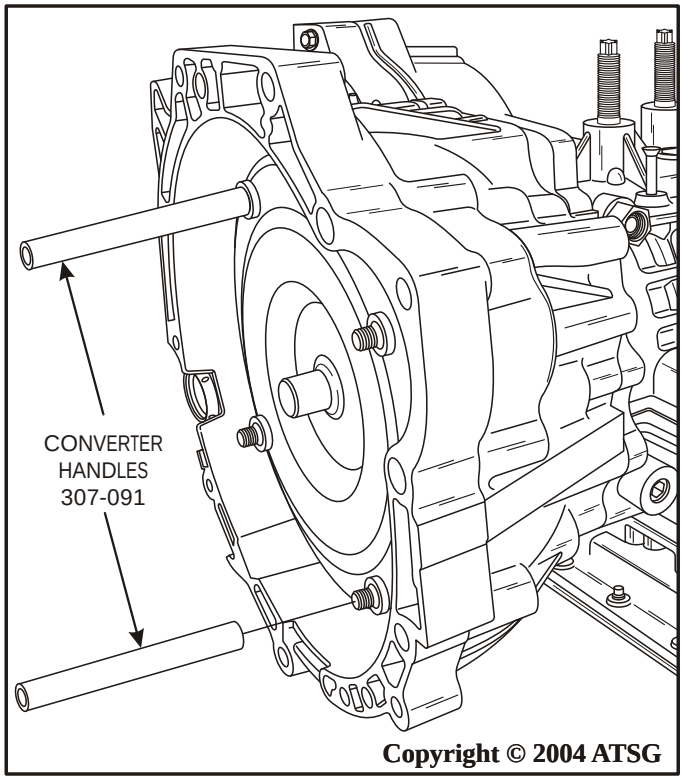

Figure 195

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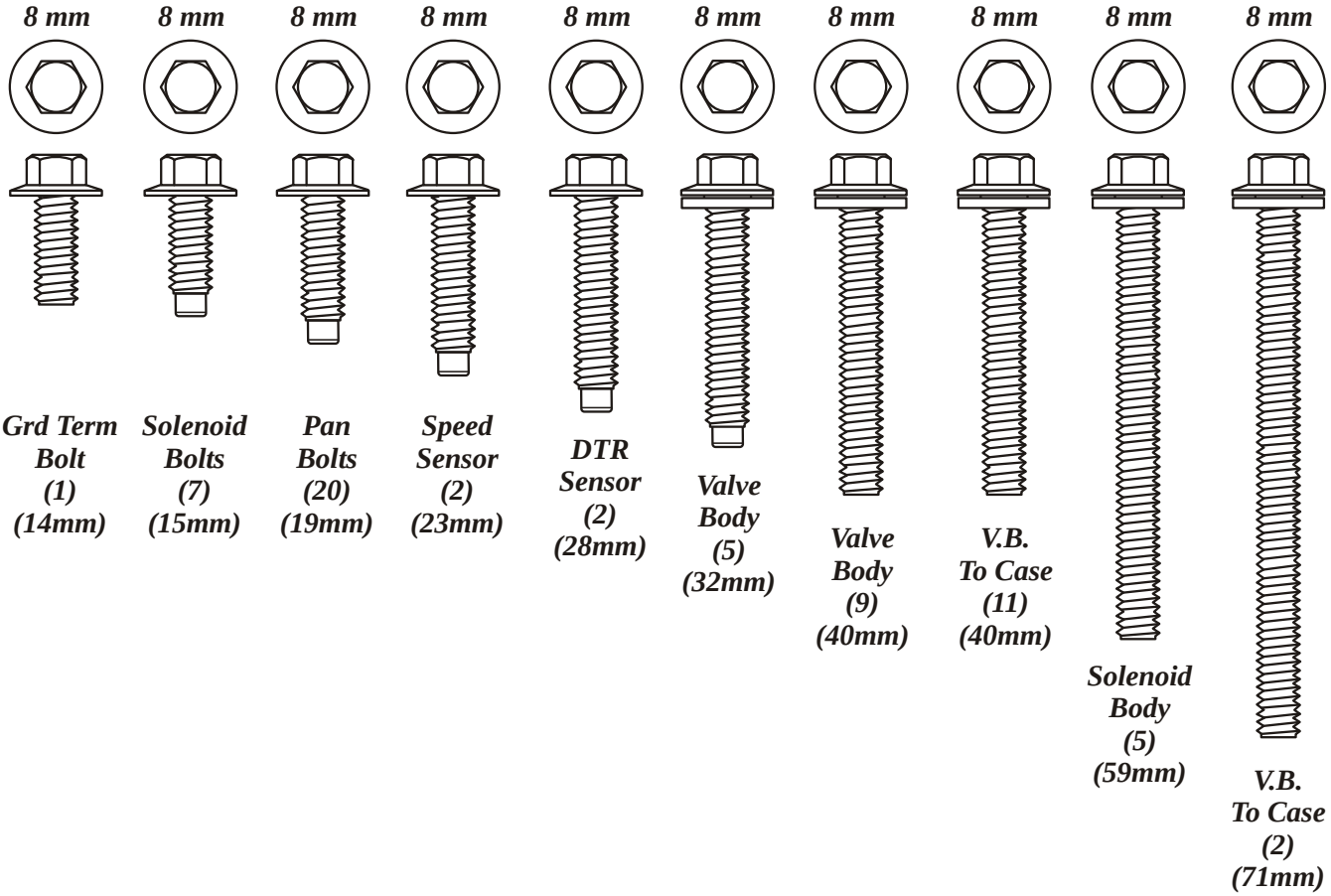
BOLT IDENTIFICATION CHART



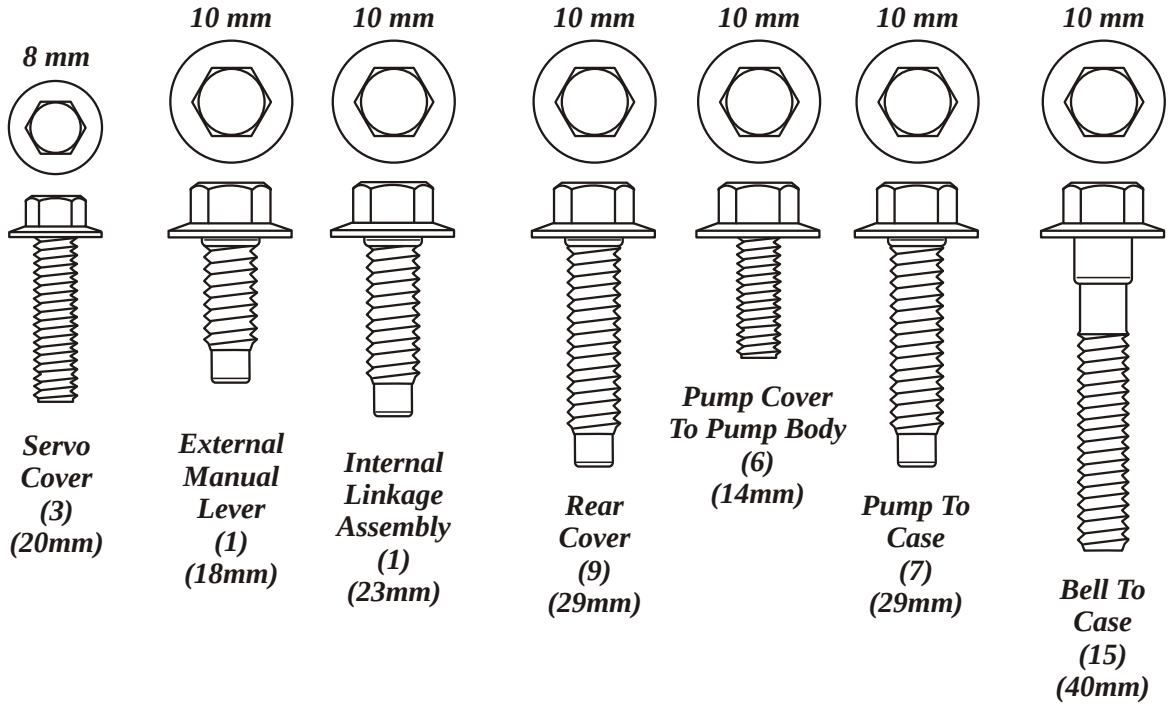


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Figure 196

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TORQUE SPECIFICATIONS			
Description	***N•m***	***lb.ft.***	***lb.in.***
Oil Pump Stator to Oil Pump Body	***13***	***10***	
Oil Pump to Case	***22***	***16***	
Upper Valve Body to Lower Valve Body	***9***		***80***
Solenoid Ground Wire to Valve Body	***10***		***89***
Valve Body to Case	***9***		***80***
Oil Pan to Case	***7***		***62***
Final Drive Input Gear Nut	***450***	***332***	
Converter Housing to Case	***22***	***16***	
2-4 Servo Cover	***13***	***10***	
Internal Linkage Assembly	***13***	***10***	
End Cover to Case	***22***	***16***	
Band Anchor Bolt	***45***	***33***	
Turbine Shaft Speed Sensor	***9***		***80***
Output Shaft Speed Sensor	***9***		***80***
Transaxle Range Sensor to Case	***10***		***89***
External Manual Lever to Shaft	***13***	***10***	
Parking Pawl Cover to Case	***13***	***10***	
Oil Fill Tube to Case	***9***		***80***
Fluid Requirements			***Mercon® V***

Special Note:
When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven for 10 miles (16 km) or more to relearn the strategy.

Figure 197

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SPECIAL TOOLS

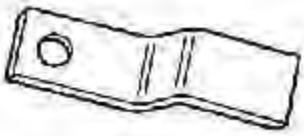
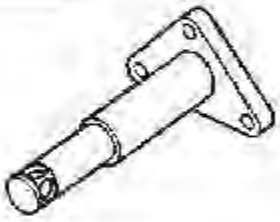
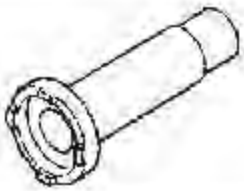
ILLUSTRATION	PART NUMBER	DESCRIPTION
	307-346 (T97T-7902-A)	Torque Converter Holding Tool
	307-091 (T81P-7902-C)	Torque Converter Handles
	307-410	Transmission Mounting Bracket
	307-413	Final Drive Input Gear Holding Tool
	307-414	Final Drive Input Gear Nut Socket

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Figure 198

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SPECIAL TOOLS

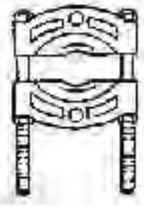
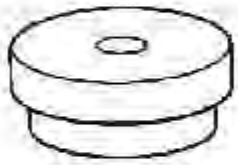
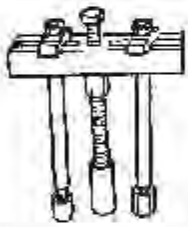
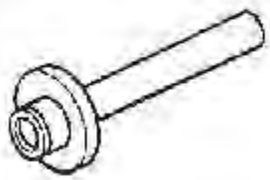
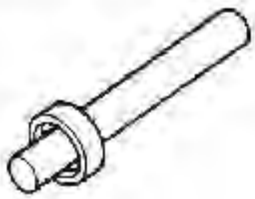
ILLUSTRATION	PART NUMBER	DESCRIPTION
	SR-017233	Wrenching Plate
	205-D064 (D84L-1123-A)	Bearing Puller
	205-D015 (T80L-630-4)	Step Plate
	204-069 (T81P-1104-C)	Front Hub Tool
	303-551 (T96P-6A333-CH)	Shaft Rear Bearing Replacer
	205-062 (15-025-A)	Differential Bearing Installer

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Figure 199

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SPECIAL TOOLS

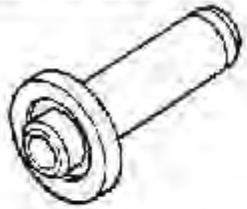
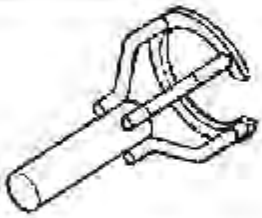
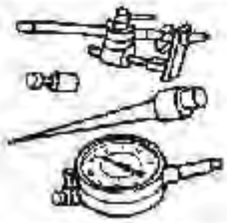
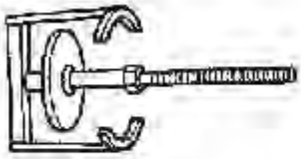
ILLUSTRATION	PART NUMBER	DESCRIPTION
	205-115 (15-058)	Drive Pinion Oil Seal Installer
	307-209 (17-040)	Spring Washer Compressor
	100-002 (TOOL-4201-C)	Dial Indicator with Bracketry
	307-015 (T65L-77515-A)	Clutch Spring Compressor
	308-001 (T58L-101-B)	Puller with Slide Hammer
	307-163 (T86P-70043-A)	Bearing Remover

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Figure 200

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SPECIAL TOOLS

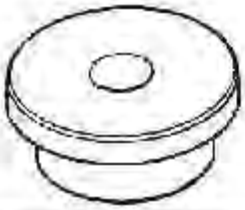
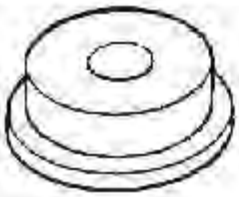
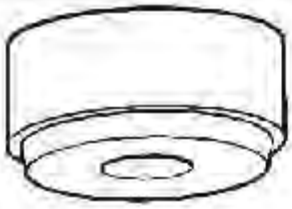
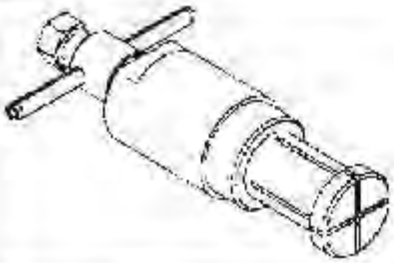
ILLUSTRATION	PART NUMBER	DESCRIPTION
	205-153 (T80T-4000-W)	Handle
	308-163 (T88C-77000-FH)	Differential Bearing Cup Replacer
	205-118 (T77F-4222-AH)	Differential Bearing Cup Replacer
	307-418	Transfer Gear Bearing Cup Replacer
	307-421	Torque Converter Leak Check Tool and Gasket
	307-409	Torque Converter Clutch Gauge

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Figure 201

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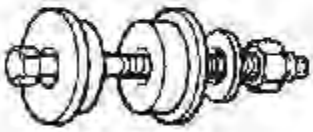
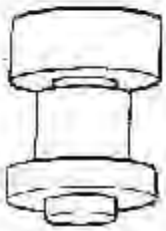
SPECIAL TOOLS

ILLUSTRATION	PART NUMBER	DESCRIPTION
	205-005	Input Gear Bearing Installer
	205-024 (T87P-4616-A)	Pinion Bearing Cup Replacer
	307-256 (T92P-77000-FH)	Differential Oil Seal Replacer
	308-164 (T88C-77000-JF)	Shim Selection Tool Set
	307-417	Differential and Transfer Gear Bearing Shim Gauge

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SPECIAL TOOLS

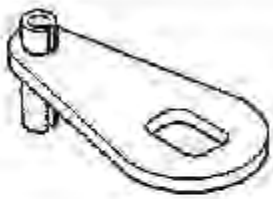
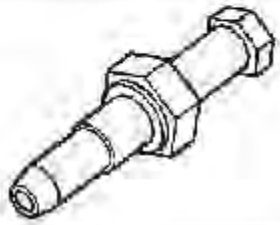
ILLUSTRATION	PART NUMBER	DESCRIPTION
	307-415	TR Sensor Alignment Tool
	307-416	Band Select Gauge

Figure 203

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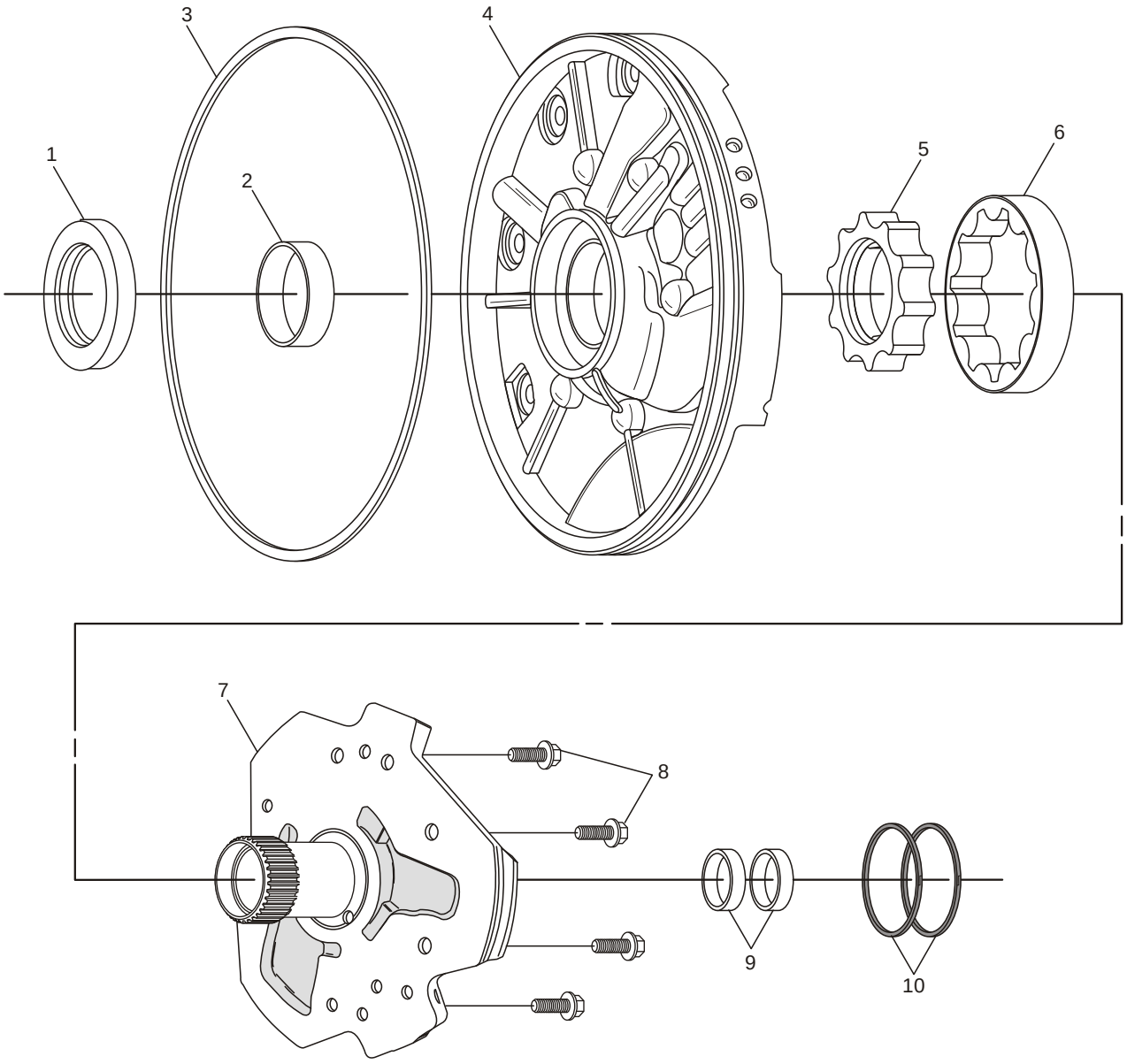
OIL PUMP EXPLODED VIEW



1 OIL PUMP CONVERTER SEAL
2 OIL PUMP BODY BUSHING
3 OIL PUMP BODY TO CASE "D" RING SEAL
4 OIL PUMP BODY
5 OIL PUMP INNER GEAR
6 OIL PUMP OUTER GEAR
7 OIL PUMP STATOR/COVER
8 OIL PUMP COVER TO BODY BOLTS (6 REQUIRED)
9 STATOR SHAFT/COVER BUSHINGS (2 REQUIRED)
10 STATOR SHAFT SEALING RINGS (2 REQUIRED)

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Figure 204

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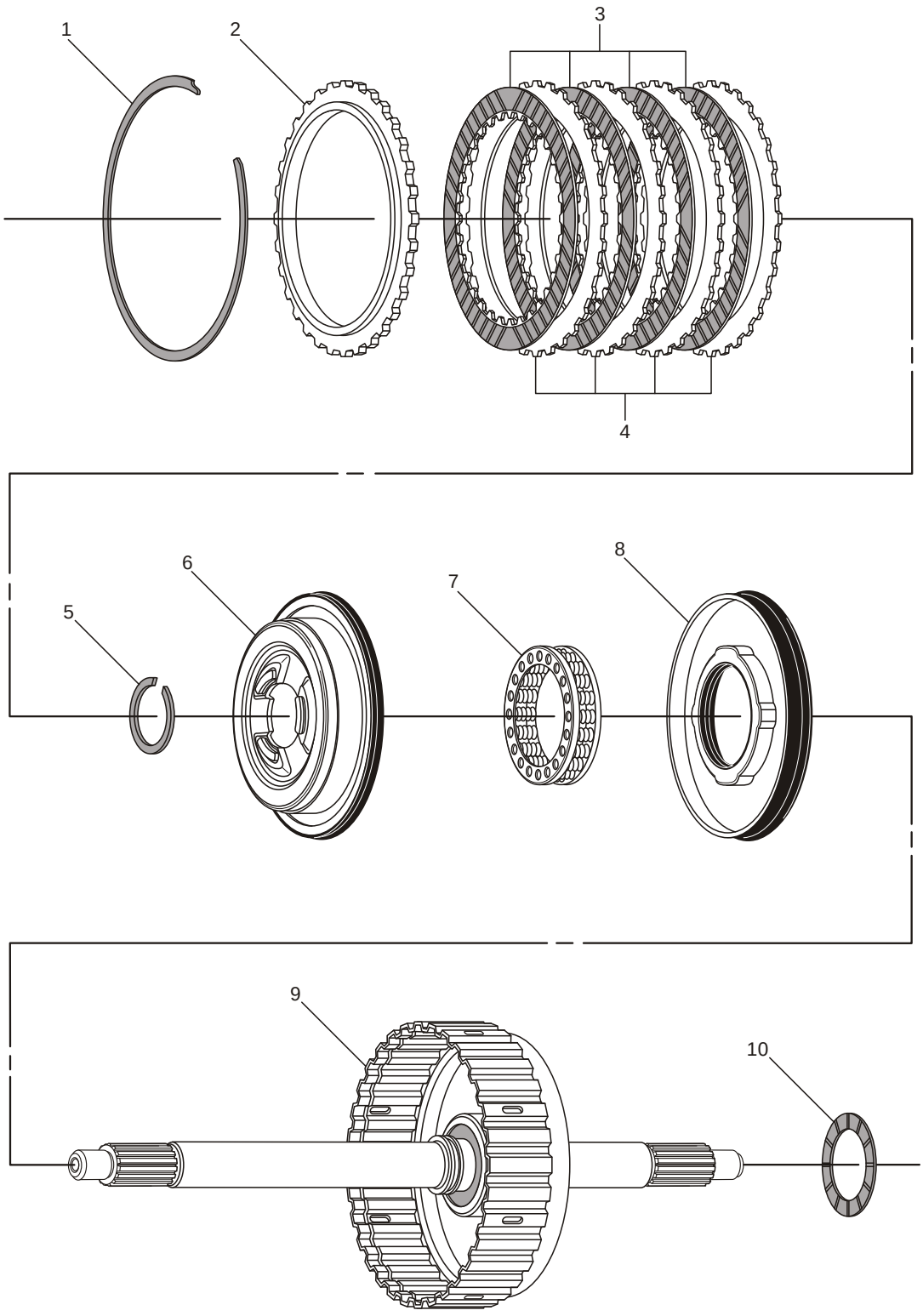
FORWARD CLUTCH EXPLODED VIEW



1. FORWARD CLUTCH BACKING PLATE SNAP RING *(SELECTIVE).*
2. FORWARD CLUTCH BACKING PLATE.
3. FORWARD CLUTCH FRICTION PLATES (4).
4. FORWARD CLUTCH STEEL PLATES (4).
5. RETURN SPRING RETAINER/BALANCE PISTON SNAP RING.
6. RETURN SPRING RETAINER/BALANCE PISTON.
7. FORWARD CLUTCH PISTON RETURN SPRING ASSEMBLY.
8. FORWARD CLUTCH APPLY PISTON.
9. FORWARD CLUTCH HOUSING ASSEMBLY.
10. FORWARD CLUTCH HOUSING TO STATOR THRUST WASHER.

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Figure 205

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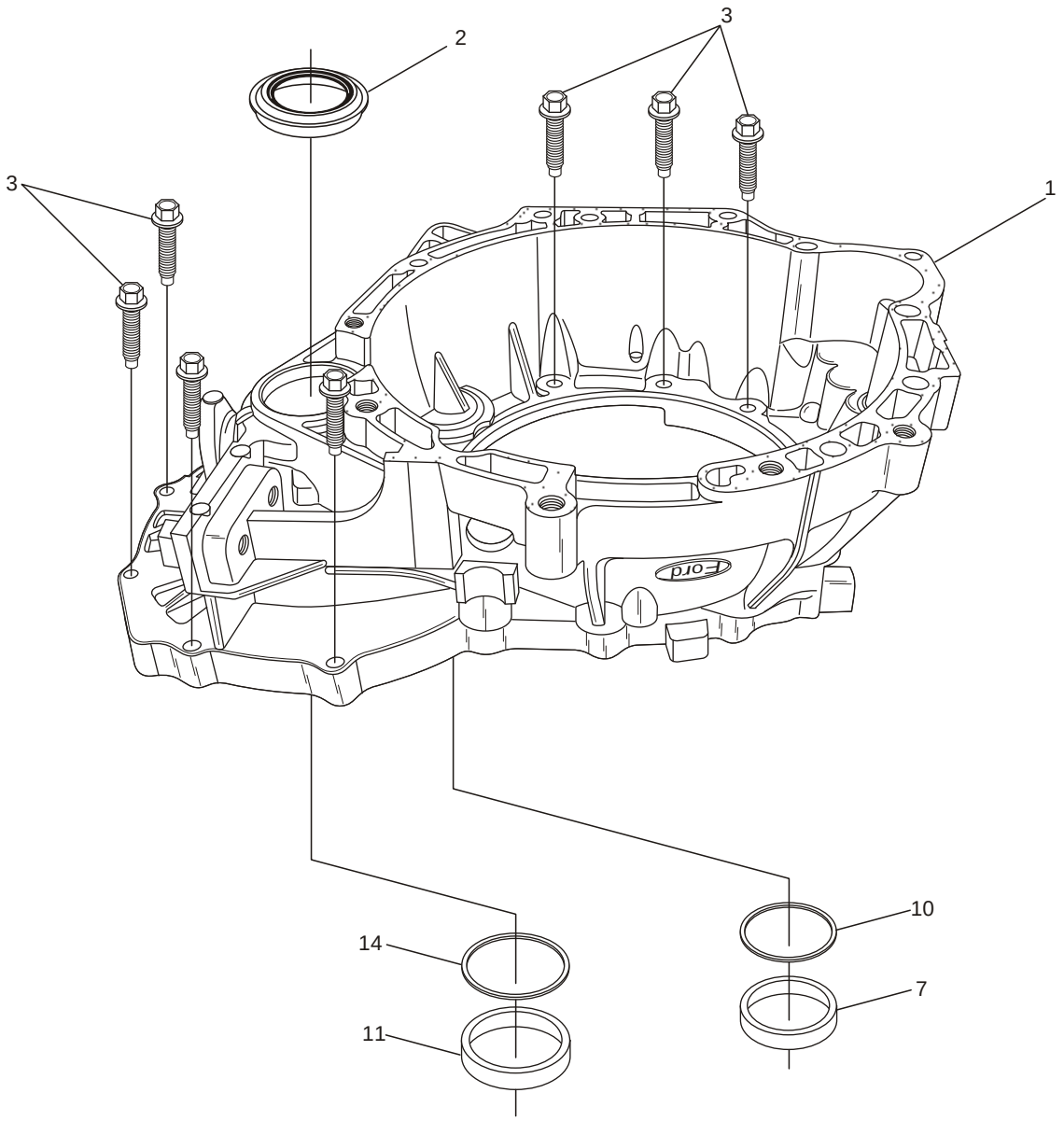
CONVERTER HOUSING PARTS EXPLODED VIEW



1. CONVERTER HOUSING ASSEMBLY.
2. CONVERTER HOUSING AXLE SEAL.
3. CONVERTER HOUSING TO CASE BOLTS (15 REQUIRED).
7. TRANSFER GEAR BEARING CUP (2 REQUIRED).
10. TRANSFER GEAR BEARING SHIM (SELECTIVE).
11. DIFFERENTIAL BEARING CUP (2 REQUIRED).
14. DIFFERENTIAL BEARING SHIM (SELECTIVE).

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Figure 206

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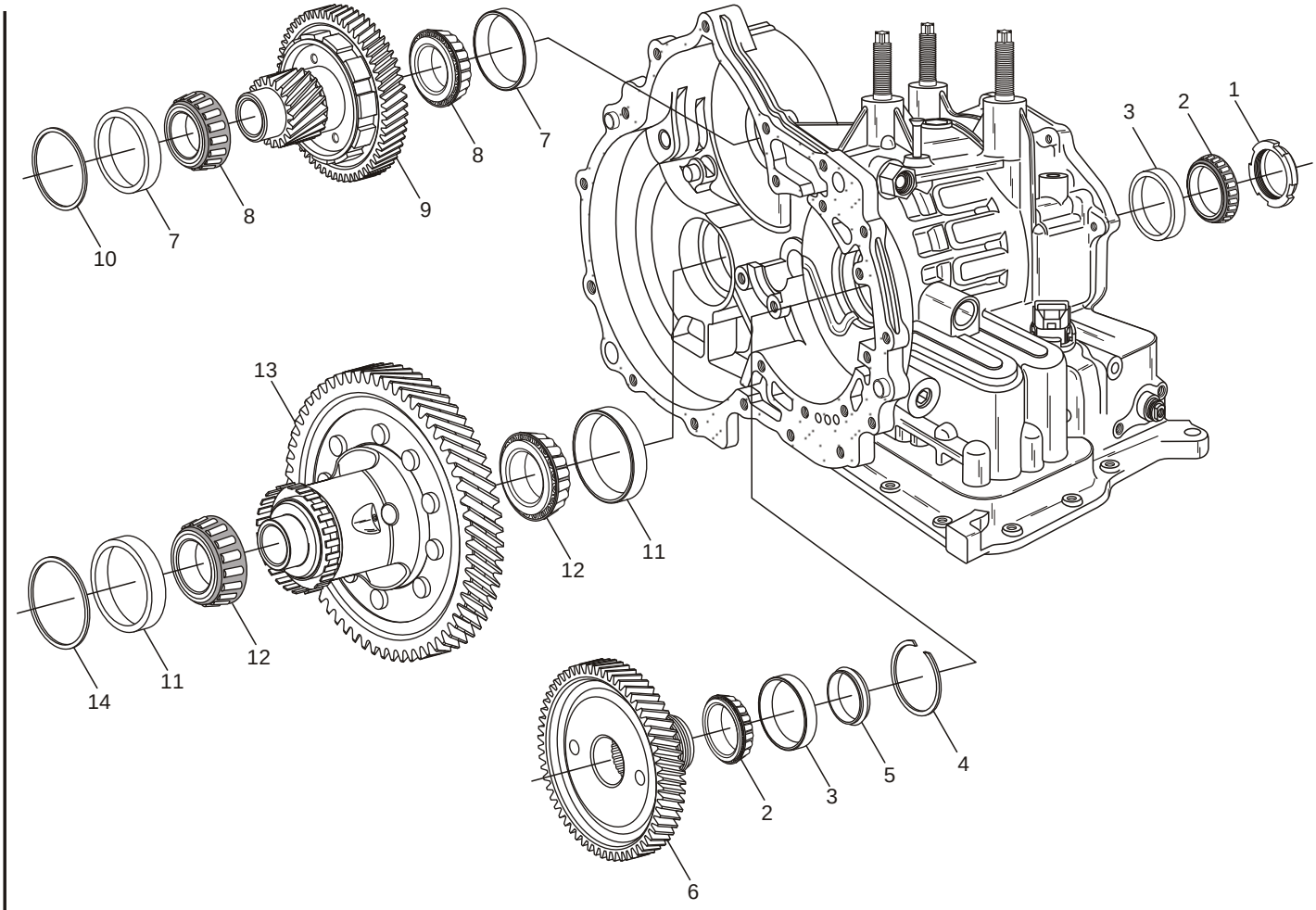
DIFFERENTIAL GEAR PARTS EXPLODED VIEW



1. FINAL DRIVE INPUT GEAR BEARING RETAINING NUT.
2. FINAL DRIVE INPUT GEAR ROLLER BEARING (2 REQUIRED).
3. FINAL DRIVE INPUT GEAR BEARING CUP (2 REQUIRED).
4. TRANSAXLE CASE BEARING CUP SUPPORT SNAP RING.
5. FINAL DRIVE INPUT GEAR CRUSH SLEEVE.
6. FINAL DRIVE INPUT GEAR.
7. TRANSFER GEAR BEARING CUP (2 REQUIRED).
8. TRANSFER GEAR ROLLER BEARING (2 REQUIRED).
9. TRANSFER GEAR AND SHAFT
10. TRANSFER GEAR BEARING SHIM (SELECTIVE).
11. DIFFERENTIAL BEARING CUP (2 REQUIRED).
12. DIFFERENTIAL ROLLER BEARING (2 REQUIRED).
13. DIFFERENTIAL ASSEMBLY.
14. DIFFERENTIAL BEARING SHIM (SELECTIVE).

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Figure 207

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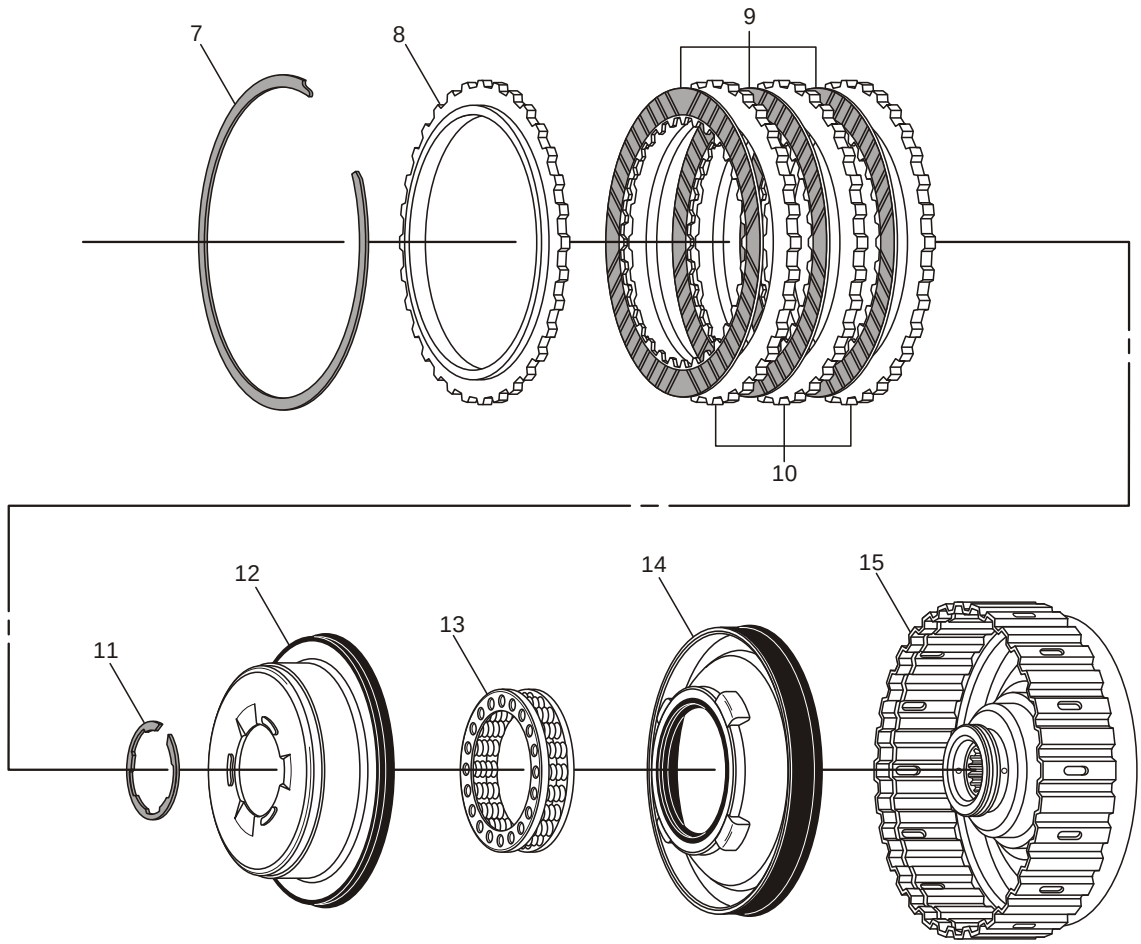
DIRECT CLUTCH HOUSING EXPLODED VIEW



7 DIRECT CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
8 DIRECT CLUTCH BACKING PLATE.
9 DIRECT CLUTCH FRICTION PLATES (3 REQUIRED).
10 DIRECT CLUTCH STEEL PLATES (3 REQUIRED).
11 DIRECT CLUTCH BALANCE PISTON SNAP RING.
12 DIRECT CLUTCH BALANCE PISTON.
13 DIRECT CLUTCH PISTON RETURN SPRING.
14 DIRECT CLUTCH APPLY PISTON.
15 DIRECT CLUTCH HOUSING.

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Figure 208

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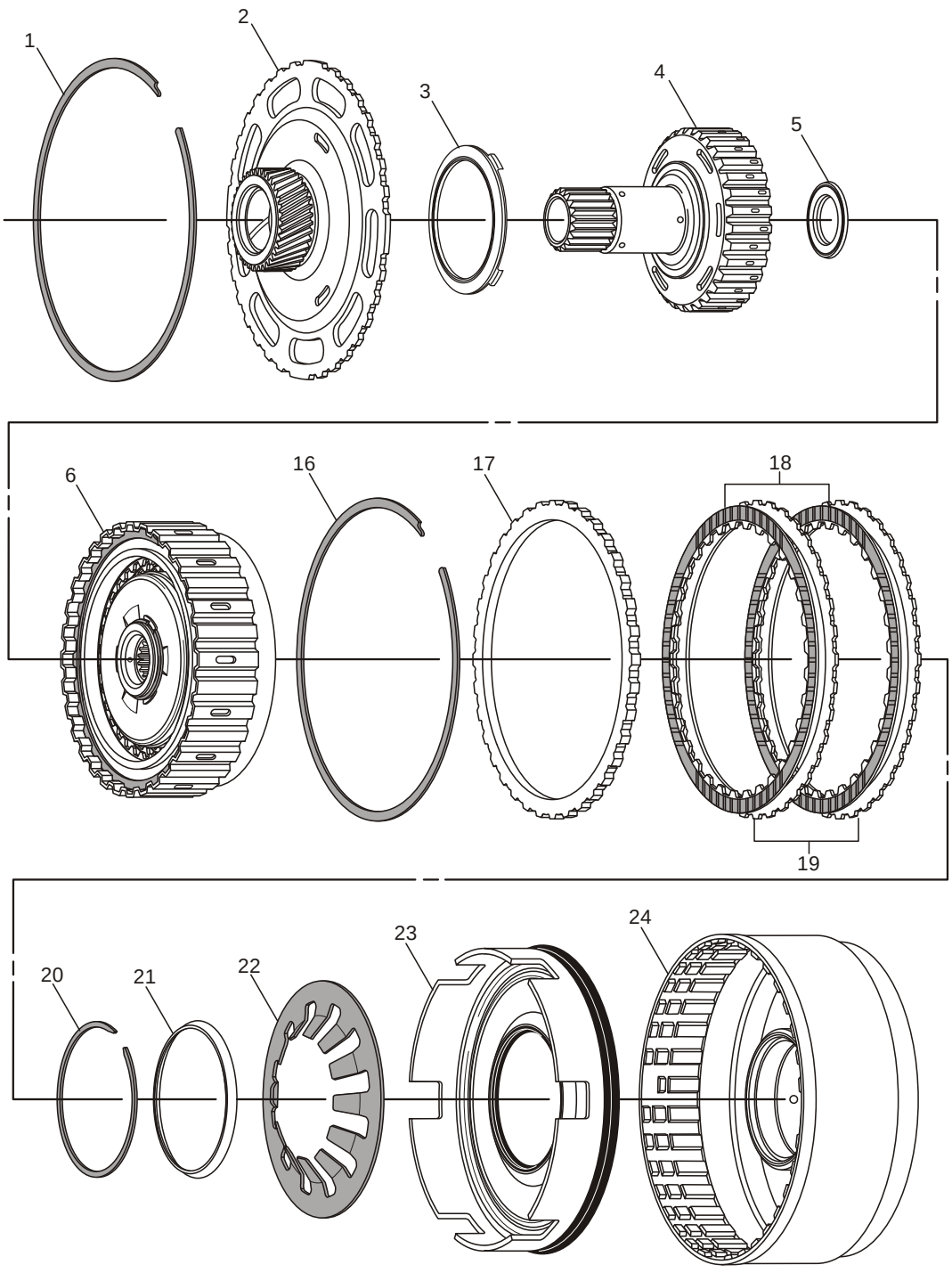
REVERSE CLUTCH HOUSING EXPLODED VIEW



1 REAR SUN GEAR ASSEMBLY RETAINING SNAP RING.
2 REAR SUN GEAR ASSEMBLY.
3 REAR SUN GEAR TO DIRECT HUB, NO. 3, THRUST BEARING.
4 DIRECT CLUTCH HUB.
5 DIRECT HUB TO DIRECT HOUSING, NO. 2, THRUST BEARING.
6 DIRECT CLUTCH HOUSING ASSEMBLY, COMPLETE.
16 REVERSE CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
17 REVERSE CLUTCH BACKING PLATE.
18 REVERSE CLUTCH FRICTION PLATES (2 REQUIRED).
19 REVERSE CLUTCH STEEL PLATES (2 REQUIRED).
20 REVERSE CLUTCH PISTON BELLVILLE RETAINER SNAP RING.
21 REVERSE CLUTCH PISTON BELLVILLE SPRING RETAINER.
22 REVERSE CLUTCH PISTON BELLVILLE RETURN SPRING.
23 REVERSE CLUTCH PISTON.
24 REVERSE CLUTCH HOUSING ASSEMBLY.

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Figure 209

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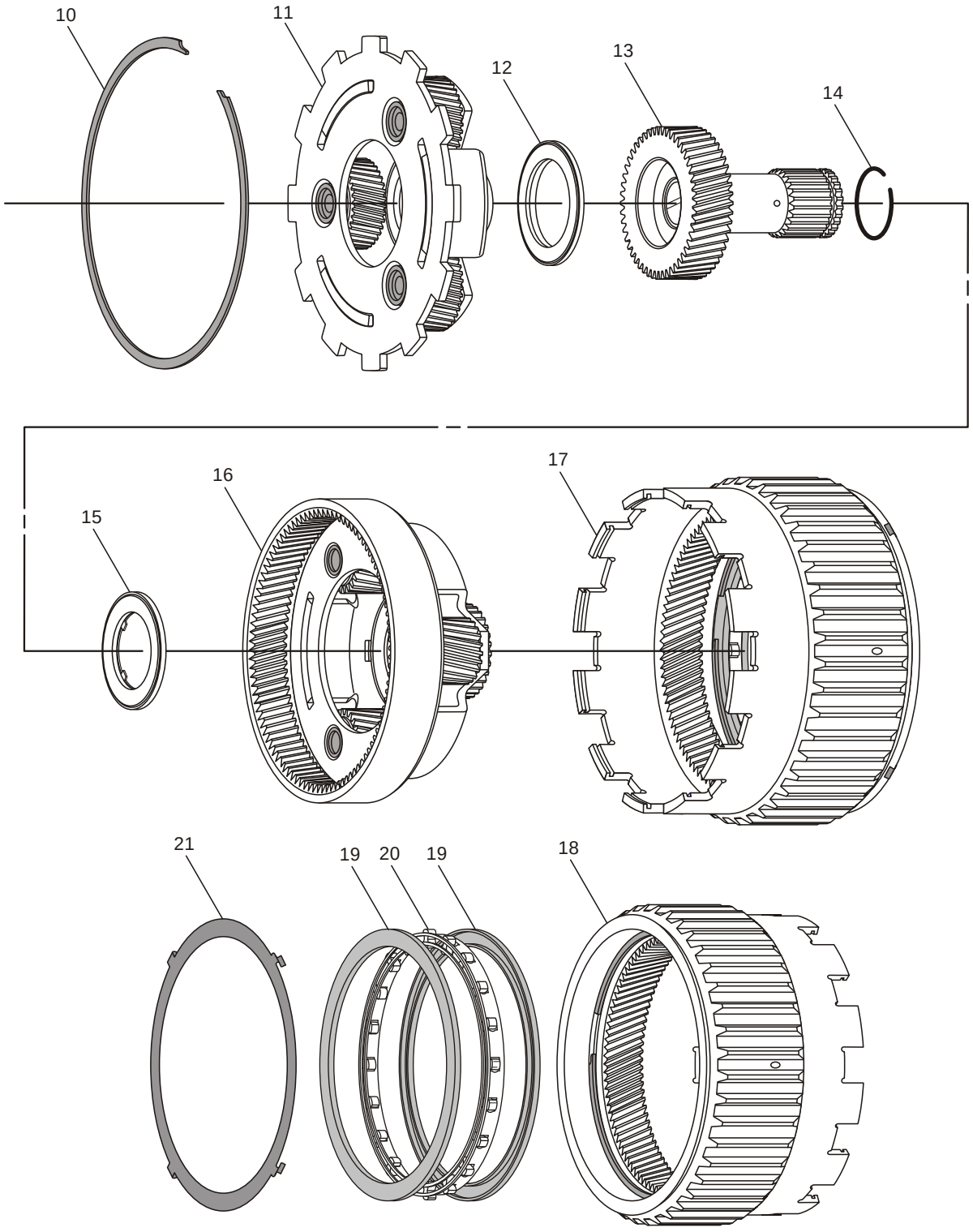
PLANETARY GEAR TRAIN EXPLODED VIEW



10 REAR PLANETARY CARRIER RETAINING SNAP RING.
11 REAR PLANETARY CARRIER ASSEMBLY.
12 FRONT PLANETARY SUN GEAR THRUST BEARING (NUMBER 5).
13 FRONT PLANETARY SUN GEAR.
14 FRONT PLANETARY SUN GEAR SNAP RING (CIR-CLIP).
15 FRONT PLANETARY CARRIER THRUST BEARING (NUMBER 6).
16 FRONT PLANETARY CARRIER/REAR RING GEAR ASSEMBLY.
17 FRONT PLANETARY CARRIER RING GEAR AND HUB ASSEMBLY.
18 FRONT RING GEAR AND HUB ASSEMBLY (REAR VIEW).
19 LOW SPRAG ASSEMBLY END BEARINGS (2 REQUIRED).
20 LOW SPRAG CAGE ASSEMBLY.
21 LOW SPRAG RETAINER.

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Figure 210

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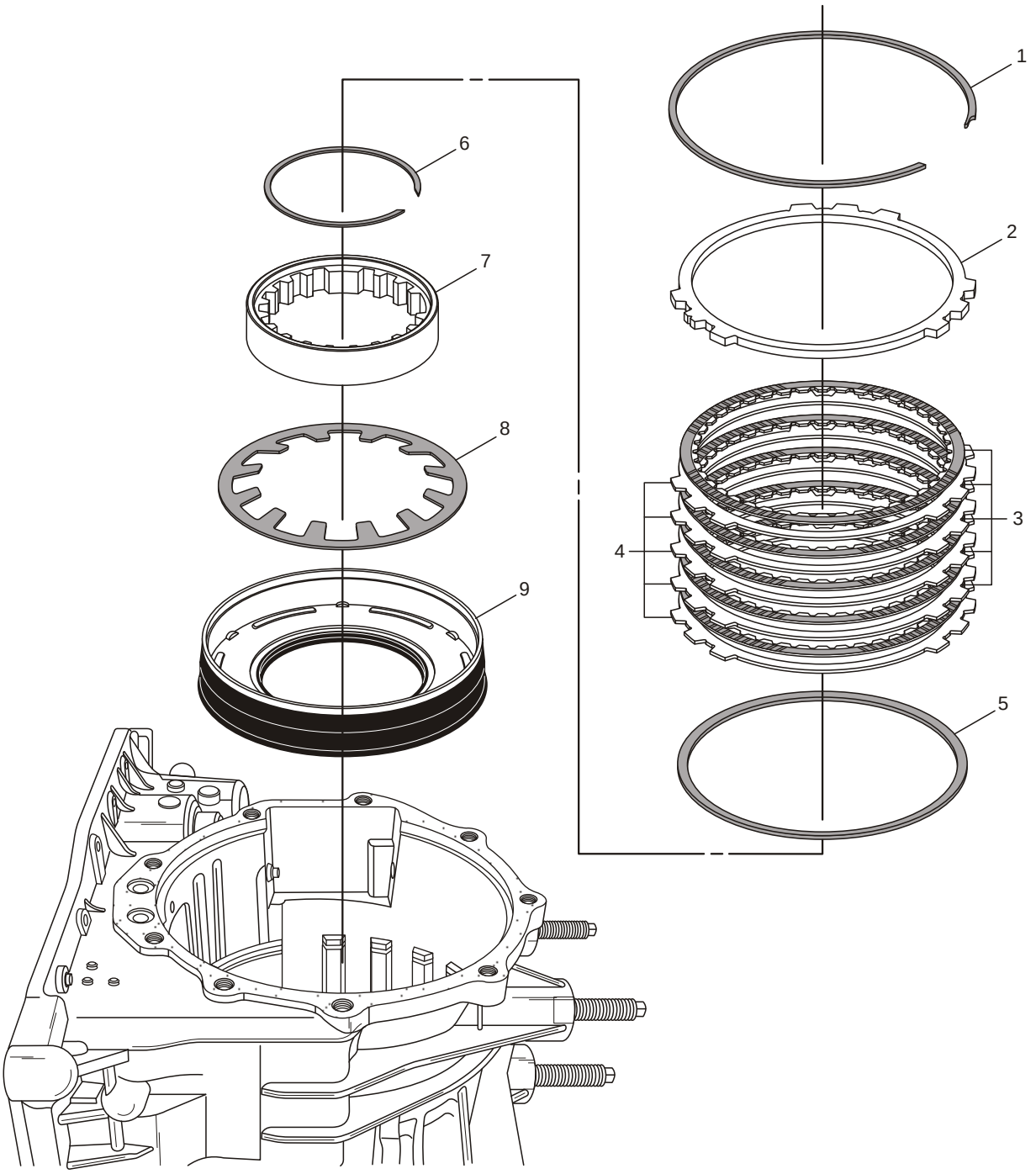
LOW/REVERSE CLUTCH PLATES EXPLODED VIEW



1 LOW/REVERSE CLUTCH BACKING PLATE "SELECTIVE" SNAP RING.
2 LOW/REVERSE CLUTCH BACKING PLATE.
3 LOW/REVERSE CLUTCH FRICTION PLATES (5 REQUIRED).
4 LOW/REVERSE CLUTCH STEEL PLATES (5 REQUIRED).
5 LOW/REVERSE CLUTCH CUSHION PLATE (CONE).
6 LOW SPRAG INNER RACE RETAINING SNAP RING.
7 LOW SPRAG INNER.
8 LOW/REVERSE CLUTCH PISTON "BELLVILLE" RETURN SPRING.
9 LOW/REVERSE CLUTCH PISTON.

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Figure 211

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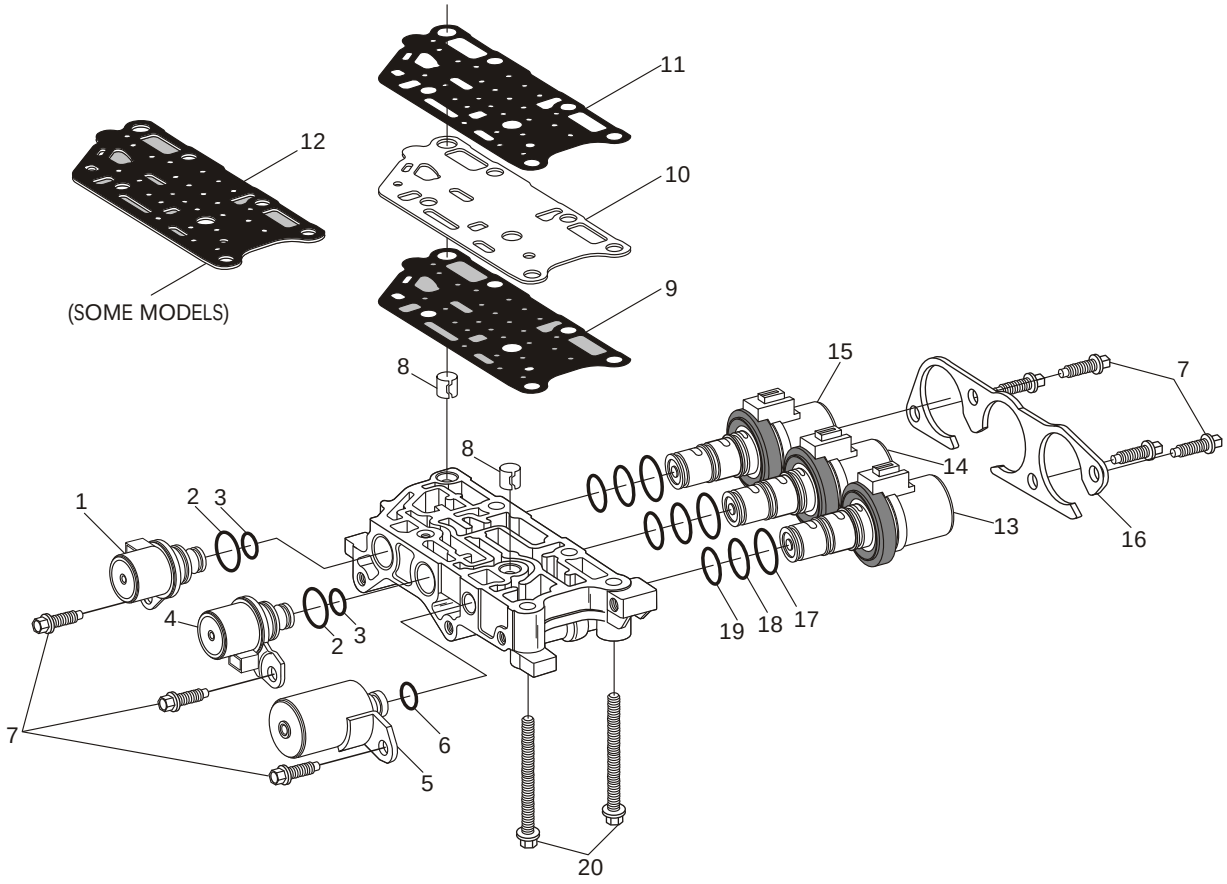
SOLENOID BODY EXPLODED VIEW



1 SHIFT SOLENOID "B"
2 SHIFT SOLENOID "A" AND "B" LARGE "O" RING SEAL
3 SHIFT SOLENOID "A" AND "B" SMALL "O" RING SEAL
4 SHIFT SOLENOID "A"
5 ELECTRONIC PRESSURE CONTROL (EPC) SOLENOID
6 EPC SOLENOID "O" RING SEAL
7 SOLENOID RETAINING BOLTS (7 REQUIRED)
8 SOLENOID BODY TO LOWER V. B. ALIGNMENT DOWELS (2 REQ)
9 SOLENOID BODY TO SPACER PLATE GASKET, WITH SCREENS
10 SOLENOID BODY SPACER PLATE
11 SOLENOID BODY SPACER PLATE TO LOWER V. B. GASKET
12 SPACER PLATE WITH MOLDED GASKETS (SOME MODELS)
13 PWM SHIFT SOLENOID "C"
14 PWM SHIFT SOLENOID "E"
15 PWM SHIFT SOLENOID "D"
16 PWM SHIFT SOLENOID RETAINING PLATE
17 PWM SHIFT SOLENOID LARGE "O" RING SEAL (3 REQUIRED)
18 PWM SHIFT SOLENOID MEDIUM "O" RING SEAL (3 REQUIRED)
19 PWM SHIFT SOLENOID SMALL "O" RING SEAL (3 REQUIRED)
20 SOLENOID BODY TO CASE BOLTS, 71mm LENGTH (2 REQUIRED)
21 MANUAL SHIFT VALVE
22 SOLENOID BODY RETAINING BOLTS, 59MM LENGTH (5 REQUIRED)
23 UPPER VALVE BODY CASTING
24 VALVE BODY TO CASE SEALS (2 REQUIRED)
25 UPPER V. B. TO LOWER V. B. BOLTS, 32MM LENGTH (5 REQUIRED)
26 UPPER V. B. TO LOWER V. B. BOLTS, 40MM LENGTH (9 REQUIRED)
27 LOW/REVERSE SHIFT VALVE
28 LOW/REVERSE SHIFT VALVE SPRING
29 VALVE LINE-UP RETAINER (7 REQUIRED)
30 SOLENOID PRESSURE REGULATOR VALVE SPRING
31 SOLENOID PRESSURE REGULATOR VALVE
32 UPPER VALVE BODY TO SPACER PLATE GASKET
33 VALVE BODY SPACER PLATE
34 LOWER VALVE BODY TO SPACER PLATE GASKET
35 TORQUE CONVERTER RELIEF VALVE SPRING
36 TORQUE CONVERTER RELIEF VALVE
37 TORQUE CONVERTER CLUTCH CONTROL VALVE SPRING
38 TORQUE CONVERTER CLUTCH CONTROL VALVE
39 CLUTCH CONTROL VALVE SPRING
40 CLUTCH CONTROL VALVE
41 3-4 SHIFT VALVE SPRING
42 3-4 SHIFT VALVE
43 SHIFT SOLENOID "C" ACCUMULATOR SPRING
44 SHIFT SOLENOID "C" ACCUMULATOR PISTON
45 SOLENOID SHIFT VALVE
46 SOLENOID SHIFT VALVE SPRING
47 MAIN PRESSURE REGULATOR VALVE
48 MAIN PRESSURE REGULATOR VALVE SPRING
49 MAIN PRESSURE REGULATOR VALVE BORE PLUG
50 MAIN PRESSURE REGULATOR VALVE BORE PLUG RETAINER
51 LOWER V. B. TO UPPER V. B. ALIGNMENT DOWELS (2 REQUIRED)
52 LOWER VALVE BODY CASTING

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Figure 212

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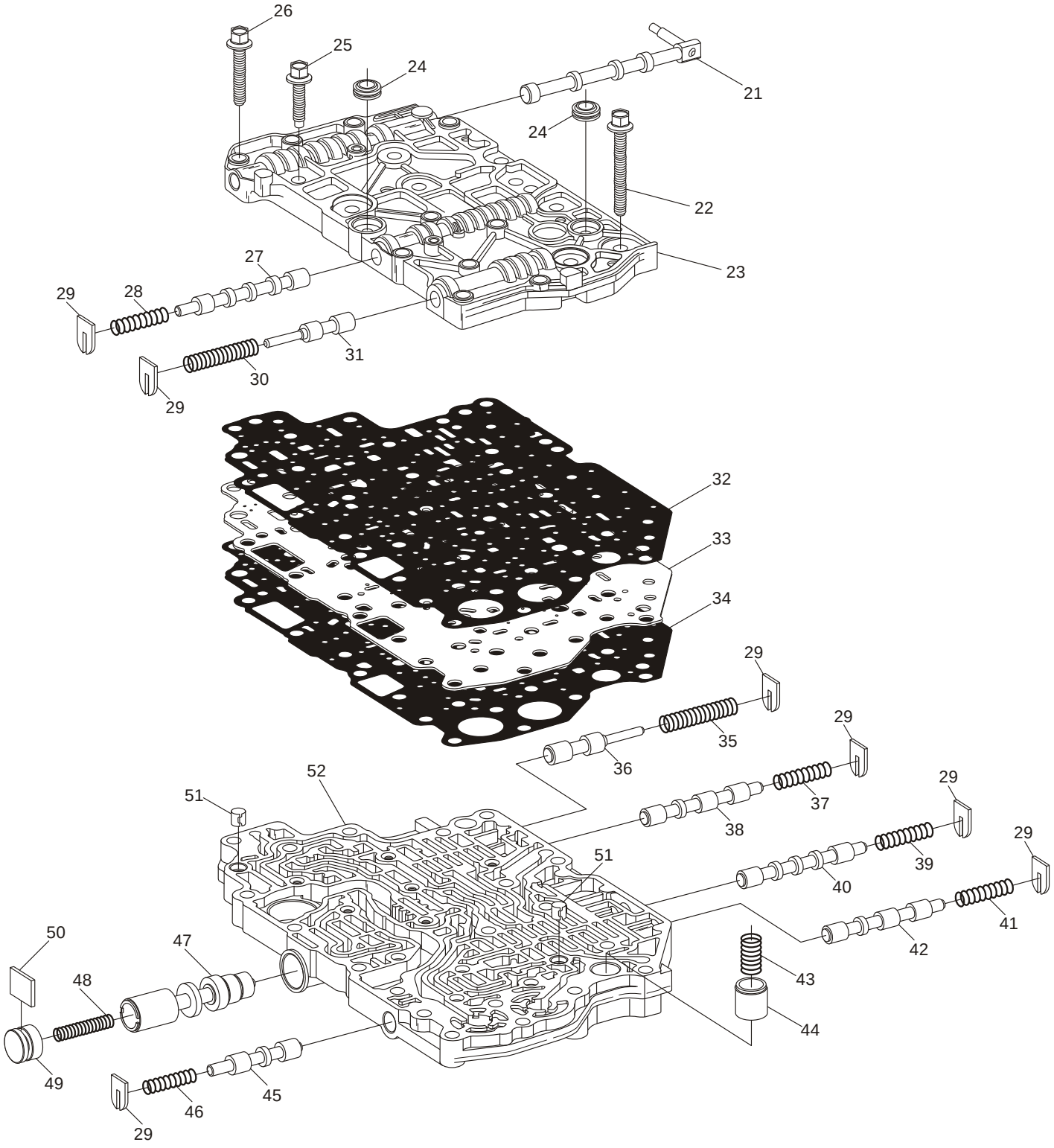
UPPER AND LOWER VALVE BODY EXPLODED VIEW



Legend found on Page 108

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Figure 213

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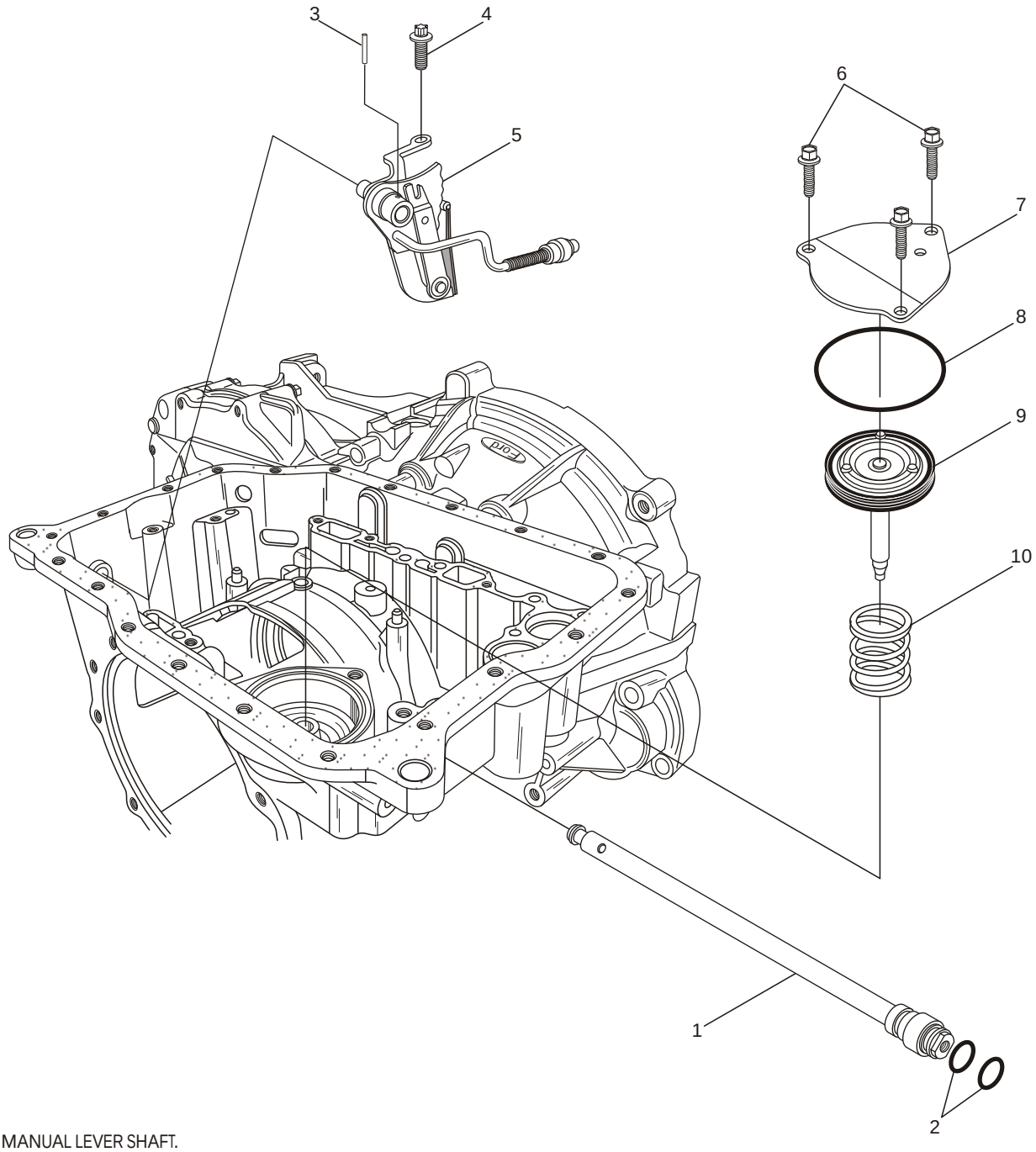
INTERNAL LINKAGE AND SERVO PARTS EXPLODED VIEW



1. MANUAL LEVER SHAFT.
2. MANUAL LEVER SHAFT "O" RINGS (2 REQUIRED).
3. MANUAL LEVER SHAFT ROLL PIN.
4. INTERNAL CONTROL LEVER ASSEMBLY RETAINING BOLT.
5. INTERNAL CONTROL LEVER ASSEMBLY
6. 2-4 SERVO COVER RETAINING BOLTS (3 REQUIRED).
7. 2-4 SERVO COVER.
8. 2-4 SERVO COVER TO CASE SEAL.
9. 2-4 SERVO MOLDED PISTON ASSEMBLY.
10. 2-4 SERVO PISTON RETURN SPRING.

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Figure 214

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AIR PRESSURE CHECKS

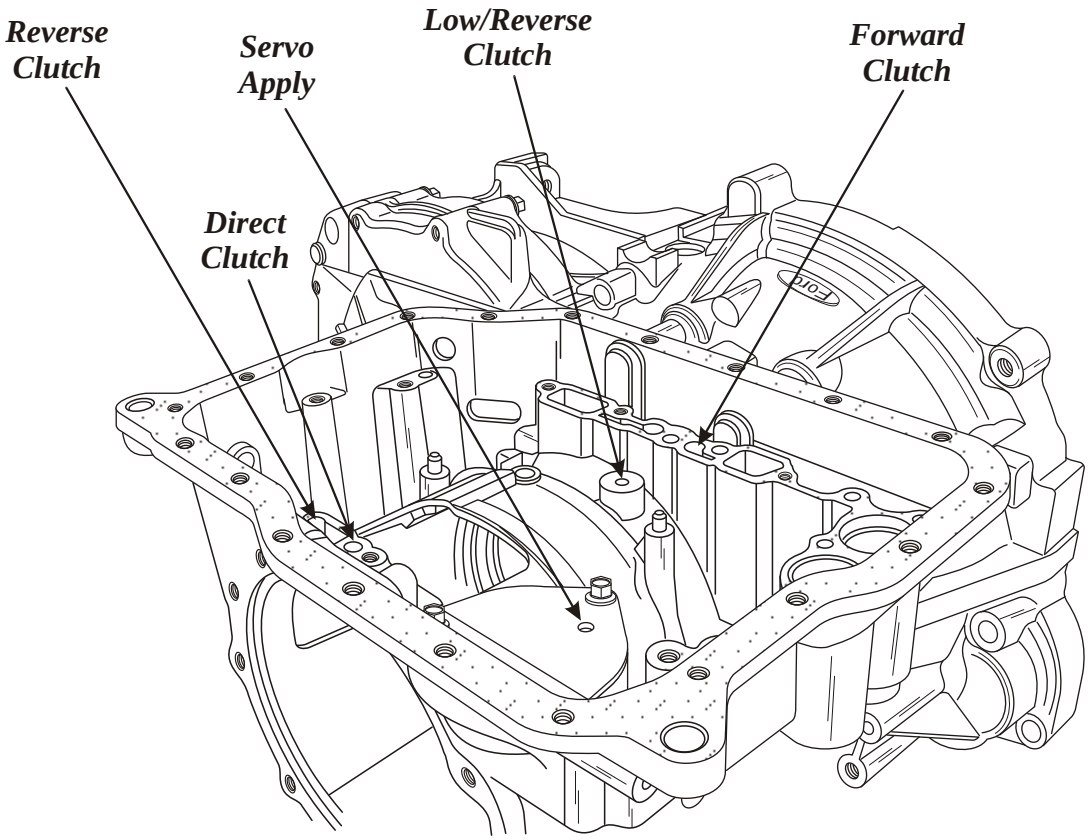

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Figure 215

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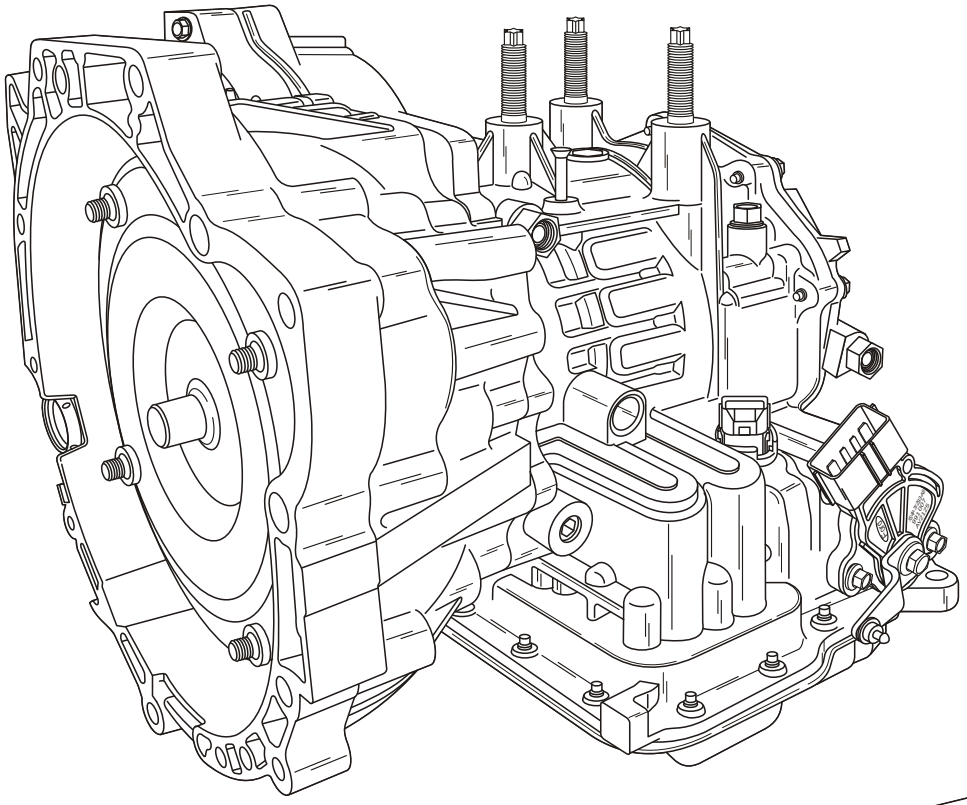

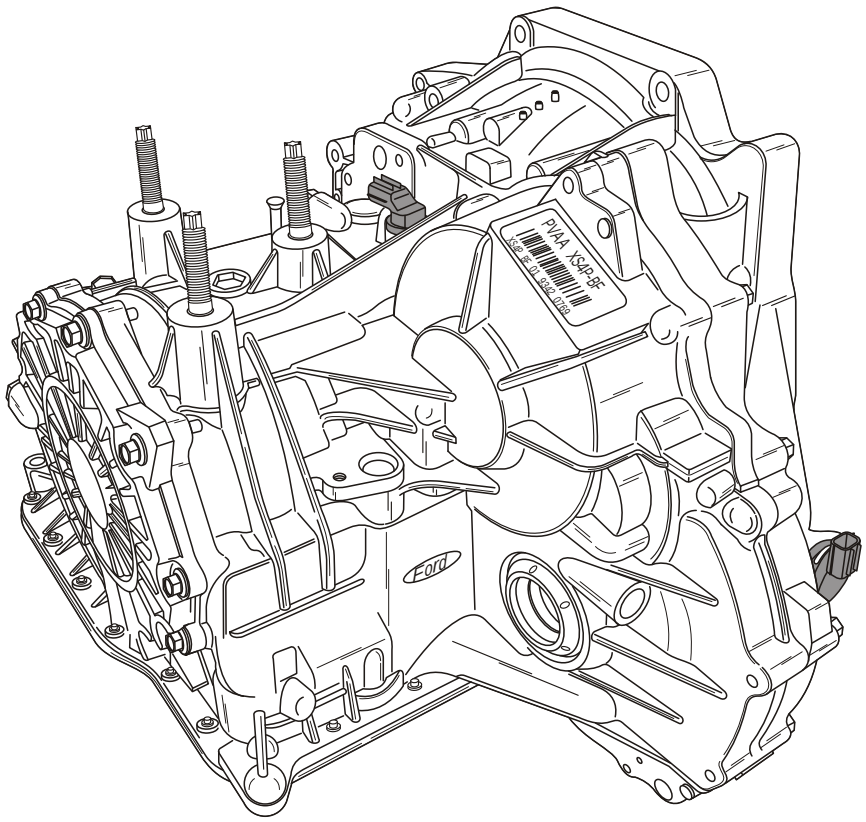

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Figure 216

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