



INFINITI/NISSAN RE5R05A

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*"External TCM"
2002 - Mid 2004 Models*

*"Internal TCM"
Mid 2004 - 2008 Models*

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INTRODUCTION INFINITI/NISSAN RE5R05A

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The RE5R05A is a 5 speed, rear wheel drive transmission. It uses full electronic controls for the upshifts and downshifts, with 5th gear being overdrive. The individual gear ratios are achieved through 3 planetary gear sets connected one behind the other. The components of the planetary gear sets are driven or held by means of six multiple plate clutch packs, 1 band, and three sprags. The RE5R05A comes in 2WD and 4WD versions, and is manufactured by JATCO.

To minimize fuel consumption, the torque converter clutch is controlled by the TCM, depending on throttle position and vehicle speed. These units are currently found in Infiniti and Nissan vehicles, 2002-Up models, equipped with 3.5L, 4.0L, 4.5L, and 5.6L engines, as listed below.

*Infiniti FX35, 3.5L V6, 2003-2007
Infiniti FX45, 4.5L V8, 2003-2007
Infiniti G35, 3.5L V6, 2003-2007
Infiniti M35, 3.5L V6, 2005-2007
Infiniti M45, 4.5L V8, 2005-2007
Infiniti Q45, 4.5L V8, 2002-2007
Infiniti QX56, 5.6L V8, 2004-2007*

*Nissan 350Z, 3.5L V6, 2003-2006
Nissan Armada, 5.6L V8, 2004-2007
Nissan Frontier, 2.5L L4, 2005-2007
Nissan Frontier, 4.0L V6, 2005-2007
Nissan Pathfinder, 4.0L V6, 2005-2007
Nissan Titan, 5.6L V8, 2004-2007
Nissan Xterra, 4.0L V6, 2005-2007*

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

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GENERAL DESCRIPTION

The RE5R05A is a 5 speed, rear wheel drive transmission. It uses full electronic control for the upshifts and downshifts, with 5th gear being overdrive. The individual gear ratios are achieved through 3 planetary gear sets connected one behind the other. The components of the planetary gear sets are driven or held by means of six multiple plate clutch packs, 1 band, and three sprag type one-way clutches. Component names and locations can be seen in Figure 2, and the apply chart for each component is shown in Figure 3. The RE5R05A comes in both 2WD and 4WD versions, and is manufactured by JATCO.

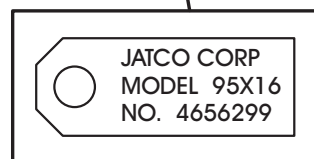
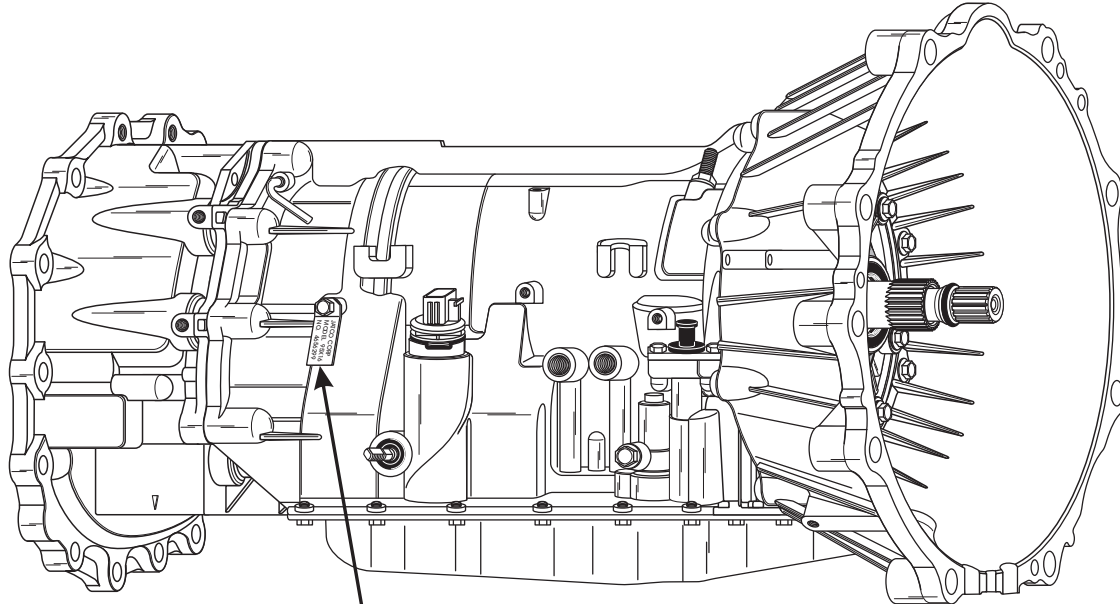
To minimize fuel consumption, the torque converter clutch is controlled by the TCM, depending on throttle position and vehicle speed.

These units are currently found in Infiniti and Nissan vehicles, 2002-Up models, equipped with 3.5L, 4.0L, 4.5L, and 5.6L engines, as shown in Figure 1.

RE5R05A FOUND IN THE FOLLOWING:

Infiniti FX35, 3.5L V6, 2003-2007
Infiniti FX45, 4.5L V8, 2003-2007
Infiniti G35, 3.5L V6, 2003-2007
Infiniti M35, 3.5L V6, 2005-2007
Infiniti M45, 4.5L V8, 2005-2007
Infiniti Q45, 4.5L V8, 2002-2007
Infiniti QX56, 5.6L V8, 2004-2007

Nissan 350Z, 3.5L V6, 2003-2006
Nissan Armada, 5.6L V8, 2004-2007
Nissan Frontier, 2.5L L4, 2005-2007
Nissan Frontier, 4.0L V6, 2005-2007
Nissan Pathfinder, 4.0L V6, 2005-2007
Nissan Titan, 5.6L V8, 2004-2007
Nissan Xterra, 4.0L V6, 2005-2007



IDENTIFICATION TAG LOCATION

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Figure 1

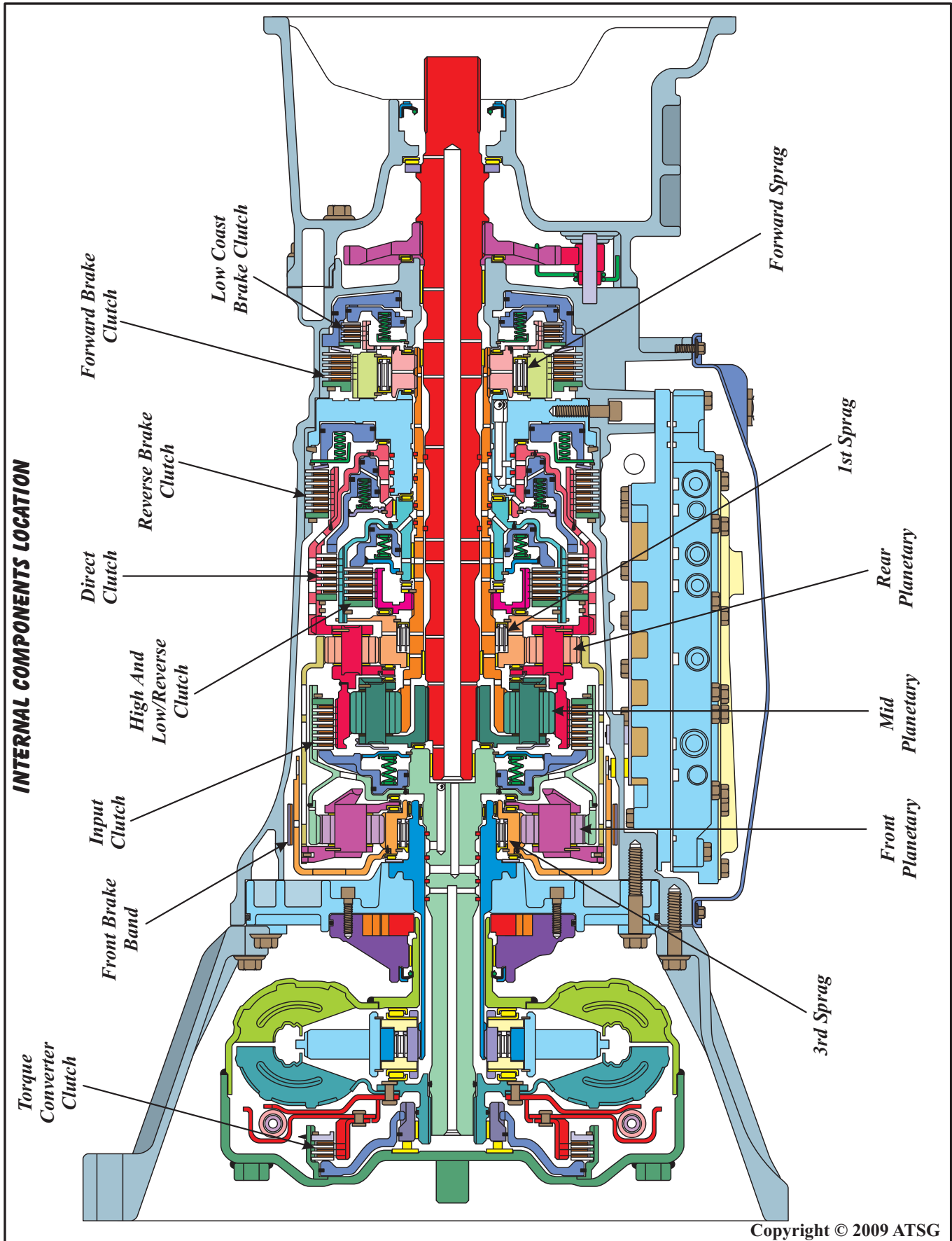


Figure 2

COMPONENT APPLICATION CHART

Range	High & Low Reverse Clutch	Direct Clutch	Input Clutch	Reverse Brake Clutch	Front Brake Band	Forward Brake Clutch	Low Coast Brake Clutch	1st Sprag	Forward Sprag	3rd Sprag	Gear Ratio
<i>P</i>	**ON				**ON						
<i>R</i>	<i>ON</i>			<i>ON</i>	<i>ON</i>			<i>Hold</i>		<i>Hold</i>	2.613
<i>N</i>	**ON				**ON						
<i>"D"-1st</i>	<i>ON</i>				**ON	<i>ON</i>	<i>*ON</i>	<i>Hold</i>	<i>Hold</i>	<i>Hold</i>	3.827
<i>"D"-2nd</i>		<i>ON</i>			**ON	<i>ON</i>			<i>Hold</i>	<i>Hold</i>	2.368
<i>"D"-3rd</i>	<i>ON</i>	<i>ON</i>			<i>ON</i>	**ON		<i>*Hold</i>		<i>Hold</i>	1.520
<i>"D"-4th</i>	<i>ON</i>	<i>ON</i>	<i>ON</i>			**ON		<i>*Hold</i>			1.000
<i>"D"-5th</i>	<i>ON</i>		<i>ON</i>		<i>ON</i>	**ON		<i>*Hold</i>		<i>*Hold</i>	0.834
<i>"4"-1st</i>	<i>ON</i>				**ON	<i>ON</i>	<i>*ON</i>	<i>Hold</i>	<i>Hold</i>	<i>Hold</i>	3.827
<i>"4"-2nd</i>		<i>ON</i>			**ON	<i>ON</i>			<i>Hold</i>	<i>Hold</i>	2.368
<i>"4"-3rd</i>	<i>ON</i>	<i>ON</i>			<i>ON</i>	**ON		<i>*Hold</i>		<i>Hold</i>	1.520
<i>"4"-4th</i>	<i>ON</i>	<i>ON</i>	<i>ON</i>			**ON		<i>*Hold</i>			1.000
<i>"3"-1st</i>	<i>ON</i>				**ON	<i>ON</i>	<i>*ON</i>	<i>Hold</i>	<i>Hold</i>	<i>Hold</i>	3.827
<i>"3"-2nd</i>		<i>ON</i>			**ON	<i>ON</i>			<i>Hold</i>	<i>Hold</i>	2.368
<i>"3"-3rd</i>	<i>ON</i>	<i>ON</i>			<i>ON</i>	**ON		<i>*Hold</i>		<i>Hold</i>	1.520
<i>"2"-1st</i>	<i>ON</i>				**ON	<i>ON</i>	<i>*ON</i>	<i>Hold</i>	<i>Hold</i>	<i>Hold</i>	3.827
<i>"2"-2nd</i>		<i>ON</i>			<i>ON</i>	<i>ON</i>	<i>ON</i>		<i>Hold</i>	<i>Hold</i>	2.368
<i>"1"-1st</i>	<i>ON</i>				<i>ON</i>	<i>ON</i>	<i>ON</i>	<i>Hold</i>	<i>Hold</i>	<i>Hold</i>	3.827

** Effective, only when coasting.*

*** ON, but not effective.*

Fluid Requirements = NISSAN Matic Fluid J

TORQUE CONVERTER CLUTCH CONTROL

The torque converter clutch is applied in 4th and 5th gears, depending on fluid temperature, throttle position, and vehicle speed, to eliminate slippage and increase fuel efficiency. The current output from the TCM to the TCC solenoid is varied, to gradually increase the torque converter clutch apply pressure and reduce the shock.

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Figure 3

ELECTRONIC COMPONENTS

Transmission Control Module (TCM)

The location of the Transmission Control Module (TCM) varies, depending on the model year of the vehicle. This applies to both Infiniti and Nissan.

2002 - Mid 2004 model year vehicles, have the TCM located "externally", and mounted behind the right kick panel.

Mid 2004 - 2008 model year vehicles, all have the TCM located "internally", and mounted to the valve body, as shown in Figure 5.

External identification between the two units is easily done by observing the external pass-thru case connector, as shown in Figure 4.

The "Internal TCM" models have a single 10 pin connector, and the "External TCM" models have 3 different connectors with "pig-tails" coming out of the pass-thru connector, as shown in Figure 4.

The function of the TCM is to receive input signals from various sensors and switches, which will allow the TCM to determine line pressure, shift points, lock-up operation, and engine braking operation. The TCM will then send the required output signals to the respective solenoids.

Continued on Page 7

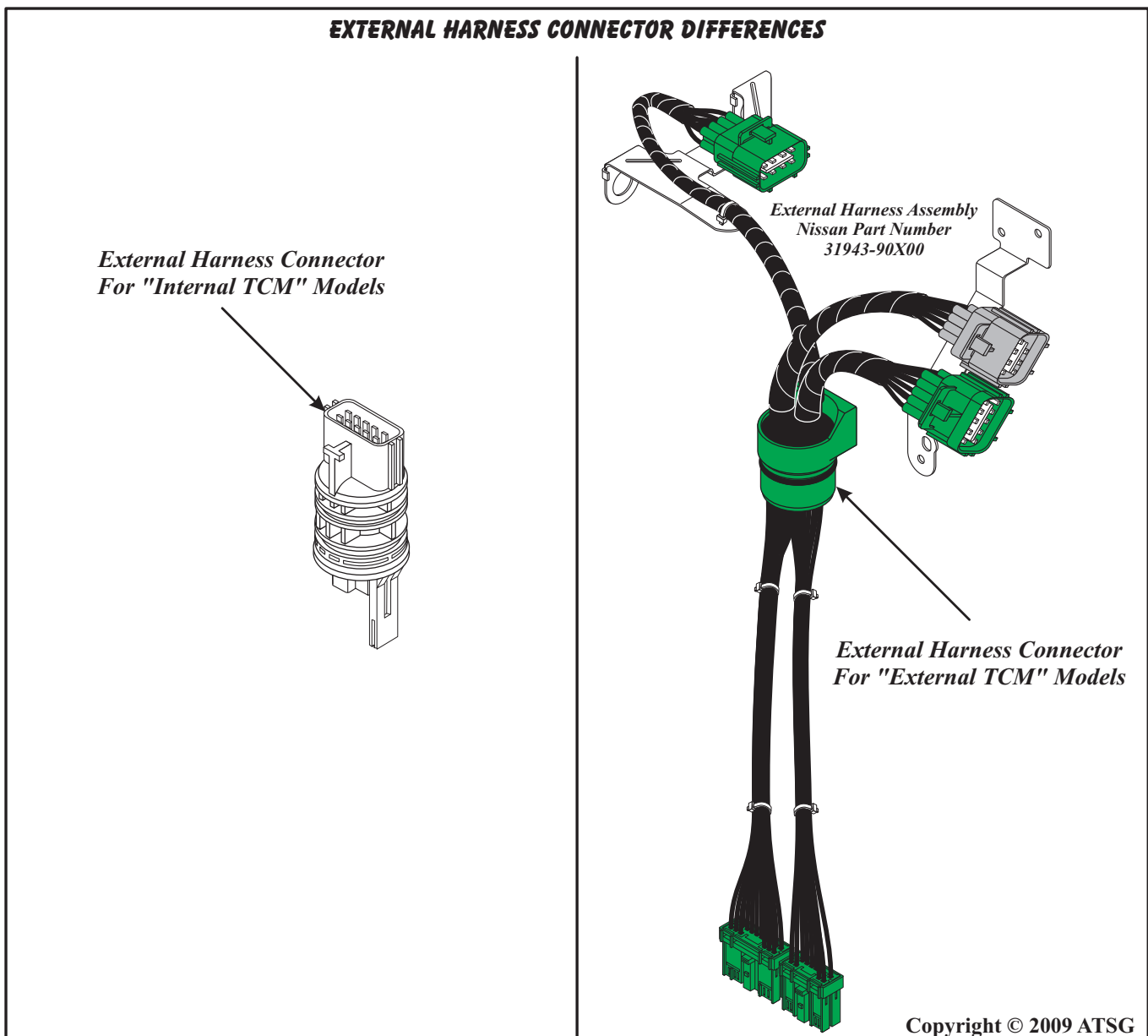


Figure 4

ELECTRONIC COMPONENTS (CONT'D)

"Fail-Safe" Operation

The TCM has an electrical "fail-safe" mode. This mode makes it possible to operate the vehicle even if there is a problem with one of the main electronic control input or output signal circuits.

When in the "fail-safe" mode the transmission is locked in 2nd, 4th, or 5th, depending on the failure position, so the operator should feel "slipping" or "poor acceleration". Even when all the electronic circuits are normal, under certain conditions for example, when slamming on the brakes with the wheels spinning rapidly (stuck) and stopping the tire rotation, the transmission may go into the "fail-safe" mode. When this happens, turning off the ignition switch for 10 seconds will return the vehicle to the normal shift pattern when restarted.

Solenoid Locations And Identification

Both models of the RE5R05A transmissions use a total of seven solenoids mounted on the valve body, as shown in Figure 5.

There are three different types of solenoids. The High & Low Reverse Clutch, Input Clutch, and Direct Clutch are all "normally applied", duty cycle type solenoids. The Line Pressure, TCC, and Front Brake Band are all "normally vented", duty cycle type solenoids. The Low Coast Brake Clutch is a "normally open", On/Off type solenoid. All solenoids plug directly into the Shift Control Module mounting plate on "external TCM" models, and directly into the TCM on "internal TCM" models. The solenoids are in the same locations on both models, and their locations on the valve body are shown in Figure 5.

Currently the only way the solenoids are available is with a complete valve body assembly.

Continued on Page 8

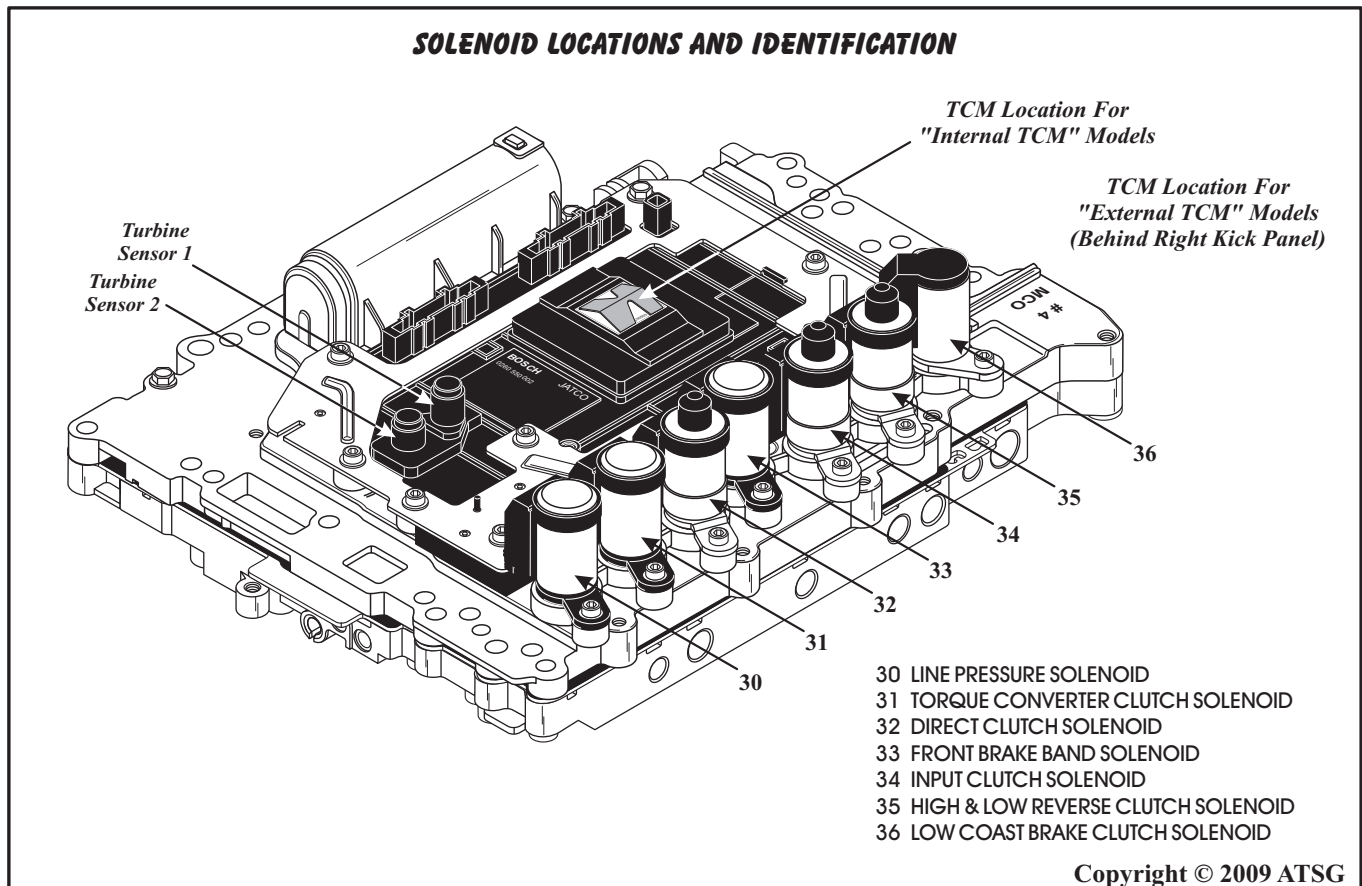


Figure 5

ELECTRONIC COMPONENTS (CONT'D)

"Normally Applied" Duty Cycle Solenoids

The High & Low Reverse Clutch, Input Clutch, and Direct Clutch, are all "Normally Applied" duty cycle type solenoids. This means that when the solenoid is OFF (De-energized), the exhaust passage is blocked, and feed oil pressure is allowed through the solenoid to the appropriate components and valves. When the solenoid is ON (Energized), feed oil pressure is blocked, exhaust is now open, and the components and valves are allowed to drain. Refer to Figure 6.

Note: Resistance specifications for this type of solenoid is 3 - 9 ohms.

"Normally Vented" Duty Cycle Solenoids

The Line Pressure, Torque Converter Clutch, and Front Brake Band, are all "Normally Vented" duty cycle type solenoids. This means that when the solenoid is OFF (De-energized), the feed oil pressure is blocked, the exhaust passage is open and the components and valves are allowed to drain. When the solenoid is ON (Energized), the feed oil pressure port is opened, the exhaust passage is blocked, and feed oil pressure is allowed through the solenoid to the appropriate components and valves. Refer to Figure 7.

Note: Resistance specifications for this type of solenoid is 3 - 9 ohms.

Continued on Page 9

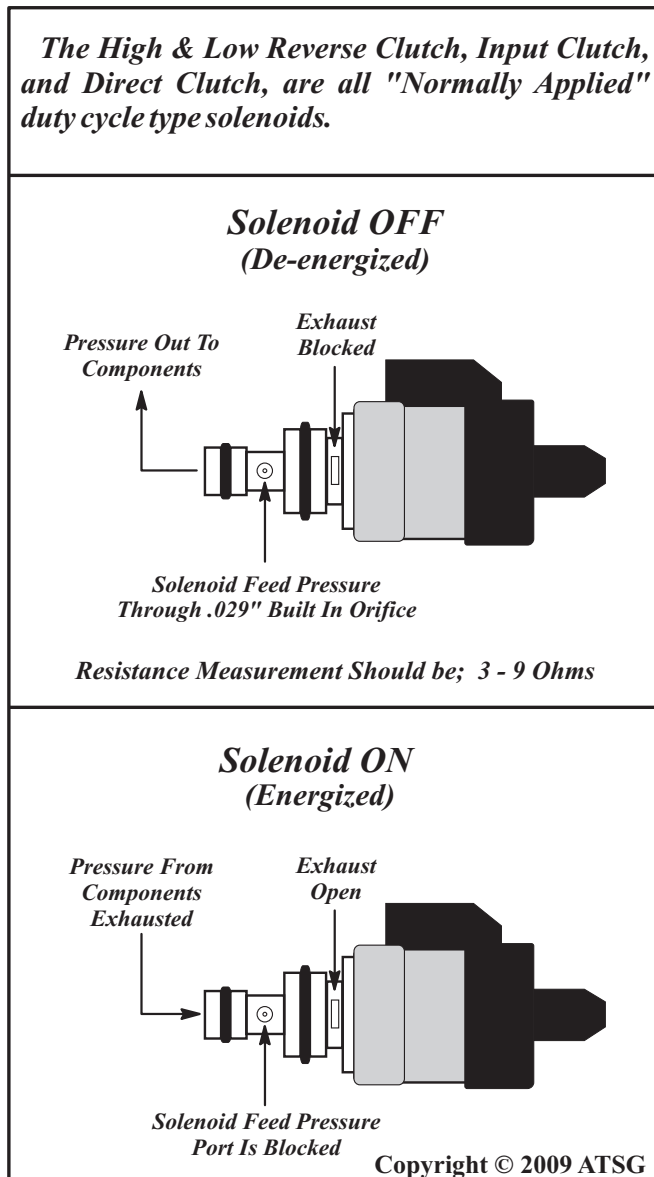


Figure 6

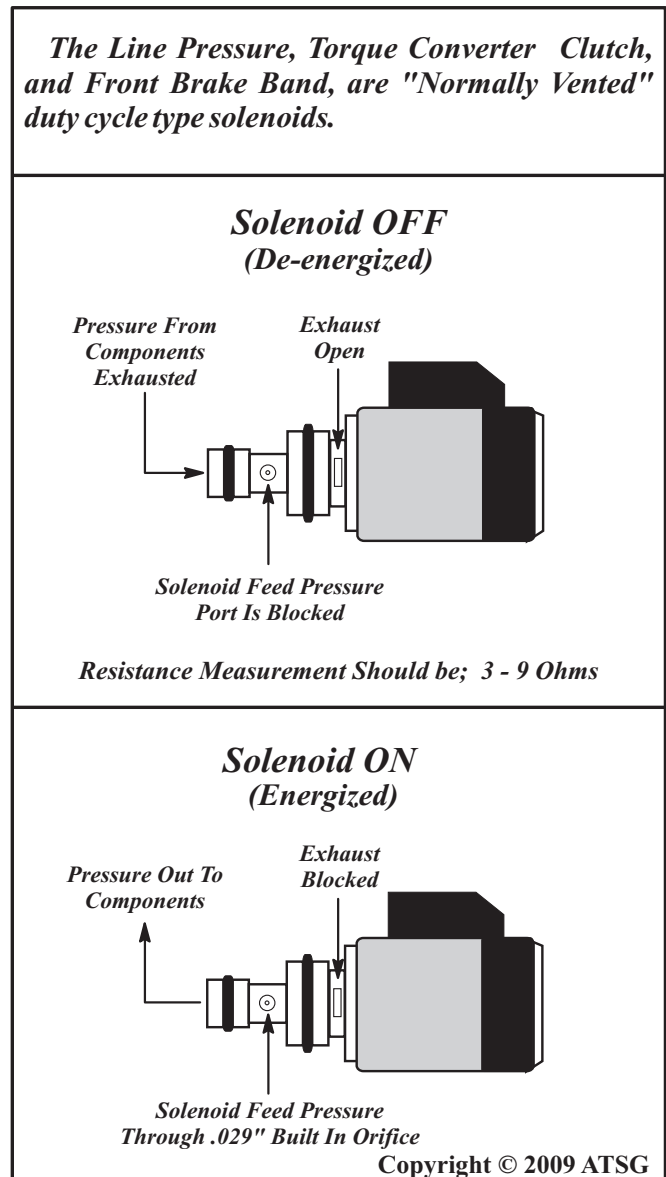


Figure 7

ELECTRONIC COMPONENTS (CONT'D)

"Normally Open" ON/OFF Solenoid

The Low Coast Brake is a "Normally Open", ON/OFF type solenoid. This means that when the solenoid is OFF (De-energized), the feed oil pressure is open to exhaust, and the components and valves are allowed to drain. When the solenoid is ON (Energized), the exhaust passage is blocked, and feed oil pressure is used to apply the components and valves. Refer to Figure 8.

Note: Resistance specifications for this type of solenoid is 20 - 40 ohms.

Turbine Shaft Revolution Sensor(s)

The Turbine Shaft Revolution Sensor is an integral part of the shift control module plate on the "External TCM" models, and an integral part of the TCM on the "Internal TCM" models, as shown in Figure 5.

The Turbine Shaft Revolution Sensor(s) detect input shaft rpm (revolutions per minute) and send this signal to the TCM. The TCM monitors the signal from turbine sensor 1 and turbine sensor 2, for non-standard conditions.

When checking with a scanner, turbine rpm should match approximately the engine rpm.

Currently the only way the turbine sensors are available is with a complete valve body assembly.

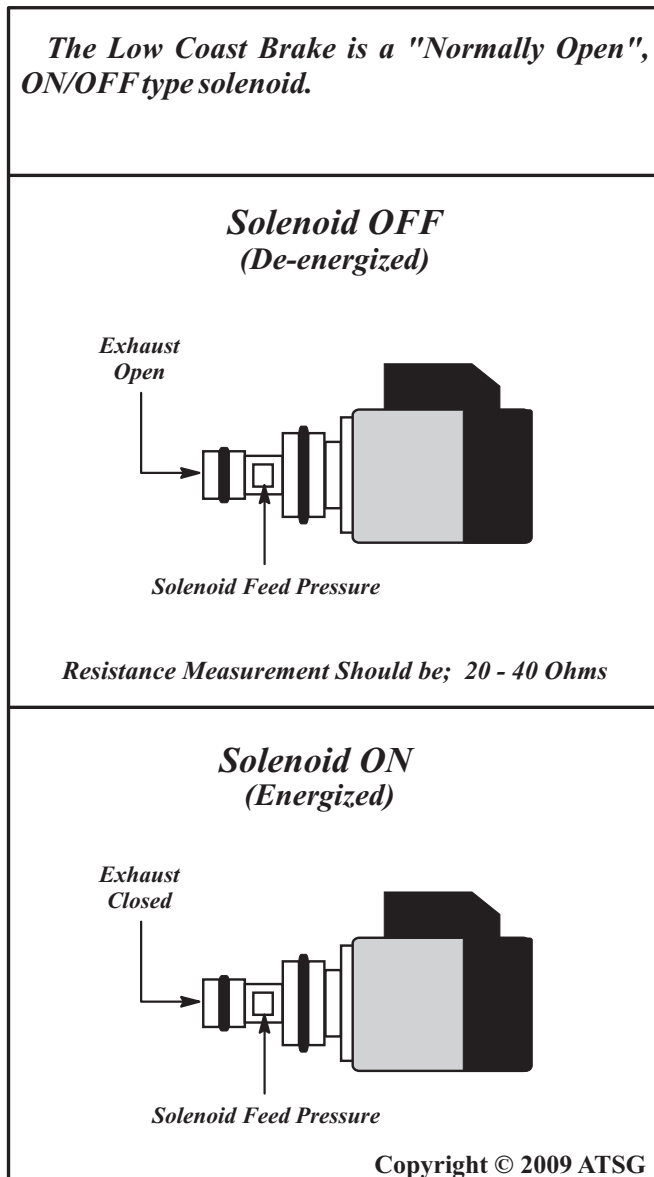


Figure 8

**Electronic Components
Continued on Page 10**

ELECTRONIC COMPONENTS (CONT'D)

Transmission Fluid Temperature 2 (TFT2) Sensor

There are two TFT sensors in the transmission. TFT 1 sensor is located inside the park-neutral position switch. TFT 2 sensor is mounted in a bracket, and mounts with valve body retaining bolts, as shown in Figure 9. Resistance charts are included in Figure 10. Notice that the sensors do not read the same, even when at the same temperature, as they are calibrated differently.

TFT 1 sensor, located in the PNP switch is for sump temperature. TFT 2 sensor mounted in the valve body is actually in the cooler hydraulic circuit, and also requires an "O" ring, as shown in Figure 10.

Only 2002-Mid 2004 "External TCM" models, can be checked for proper resistance, without disassembly.

Continued on Page 11

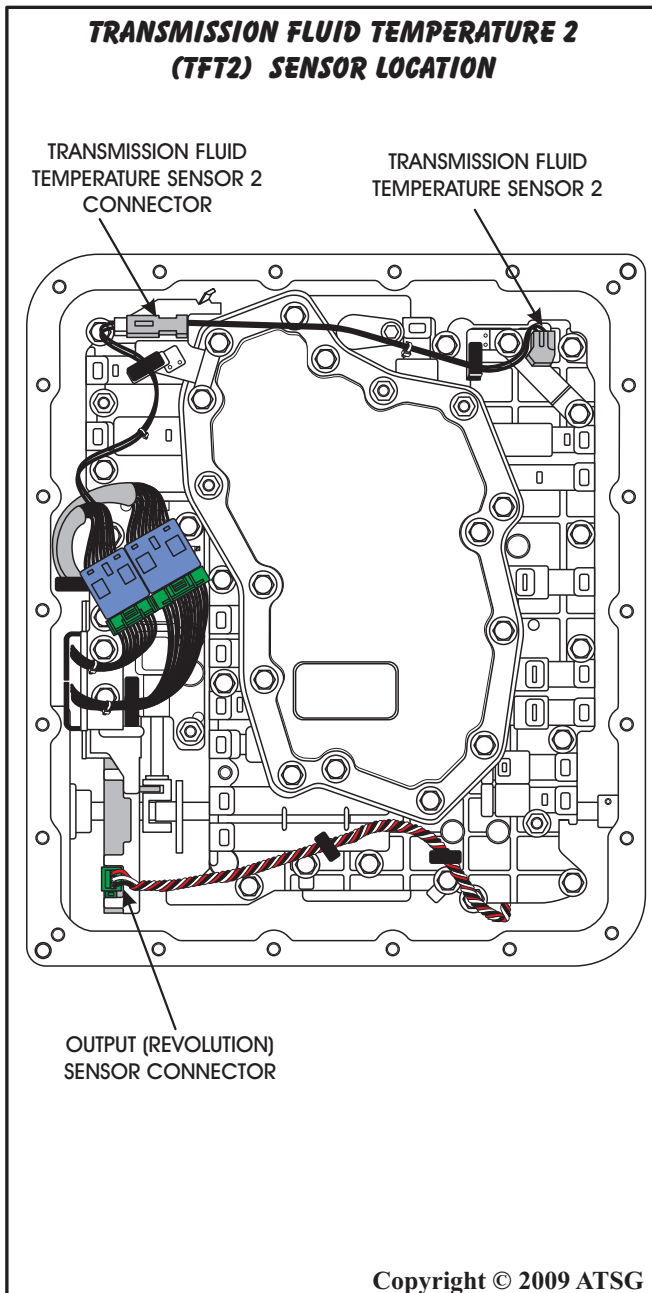


Figure 9

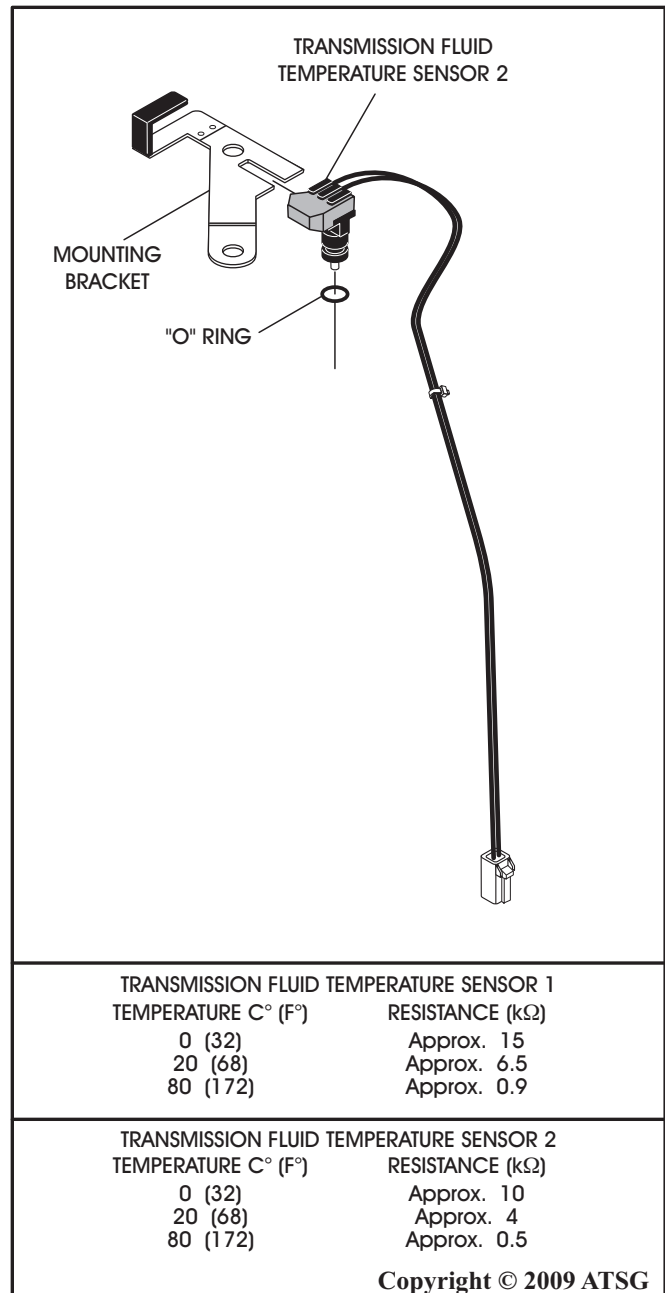


Figure 10

ELECTRONIC COMPONENTS (CONT'D)

Park-Neutral Position (PNP) Switch

The transmission is equipped with an internally mounted Park-Neutral Position (PNP) Switch that will prohibit the engine being started in any position except P and N, as shown in Figure 11, and is equipped with a slider that is moved by the manual valve. The PNP switch is also responsible for sending a signal to the TCM to illuminate the reverse lamps. The PNP switch also detects the selector lever position and sends a signal to the TCM as to which position has been selected by the operator.

Also incorporated into the PNP switch is the Transmission Fluid Temperature 1 (TFT1) sensor and that signal is also sent to the TCM.

The Output Shaft (Revolution) Sensor signal is also routed through the PNP switch, as shown in Figure 9. This carries the vehicle speed sensor (VSS) signal to the TCM.

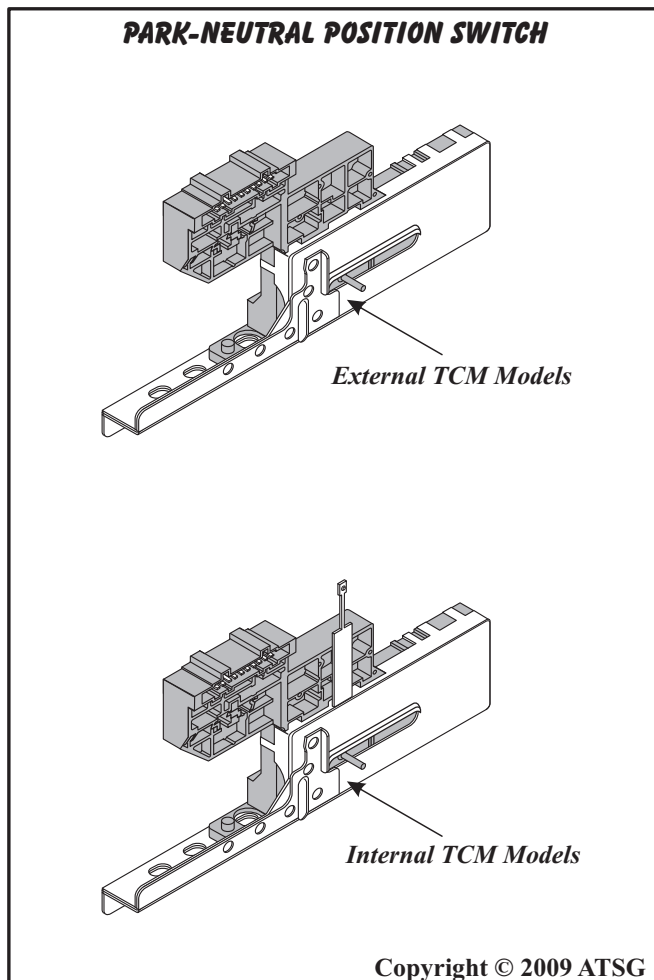


Figure 11

Bench Testing TFT 1 Sensor

There are two TFT sensors in the transmission.

TFT 1 sensor is located inside the park-neutral position switch. Resistance charts are included in Figure 12. Notice that the sensors do not read the same, even when at the same temperature, as they are calibrated differently. TFT 1 sensor can be tested for resistance across pins 6 and 7 of the park/neutral position switch as shown in Figure 12.

Continued on Page 12

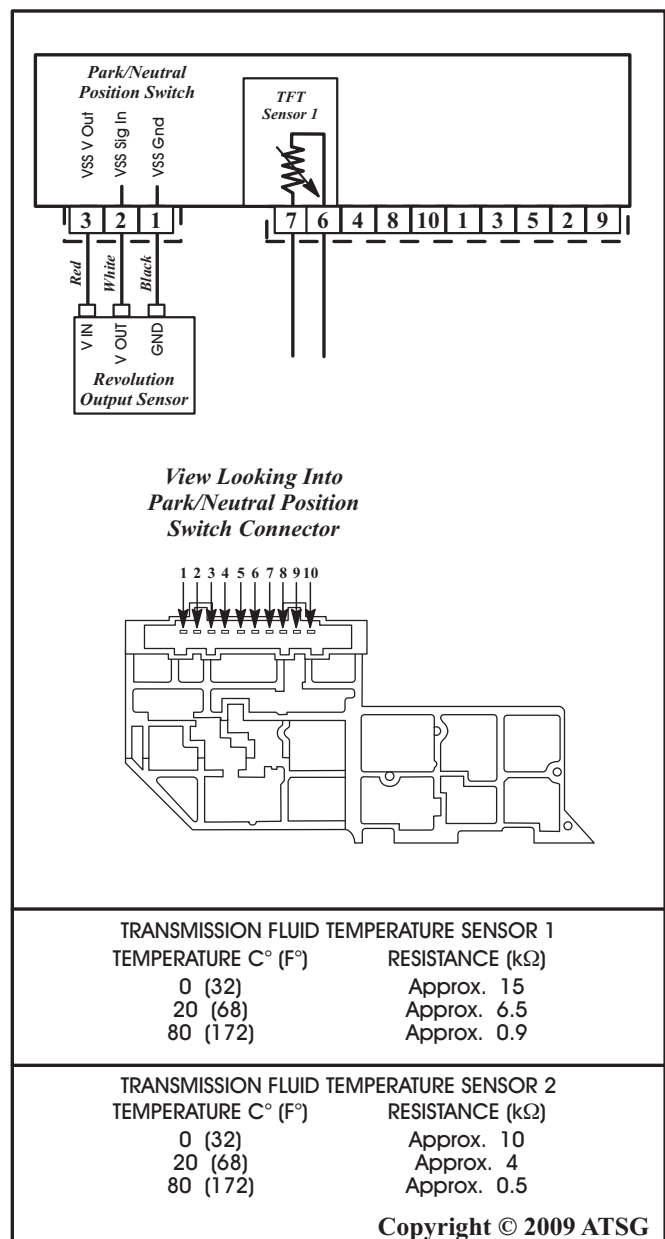


Figure 12

ELECTRONIC COMPONENTS (CONT'D)

Output Shaft (Revolution) Sensor

The Output Shaft (Revolution) Sensor is a Hall Effect type sensor, as shown in Figure 13. It is located in the rear housing of the transmission, as shown in Figure 14. The output shaft sensor obtains its reading off of the park gear, and generates a VSS signal that is used by the TCM to assist in determining shift scheduling.

DTC P0720 is set when the TCM doesn't receive a proper voltage signal from the sensor while driving. This code can also be set when the ignition switch is turned "ON", and an improper signal is received from the Vehicle Speed Sensor MTR before the vehicle begins moving.

The Vehicle Speed Sensor MTR signal is sent from the instrument cluster/combination meter to the TCM by way of CAN bus signal through the CAN communication line. The instrument cluster receives its vehicle speed information through the CAN communication line via the ABS system from the Wheel Speed Sensors.

In the event of a Output/Revolution Shaft Sensor malfunction, the TCM will utilize the MTR signal for Vehicle Speed Input.

The Output Shaft (Revolution) Sensor connector plugs into the Park/Neutral Position Switch, as shown in Figure 9.

"Bench Testing"

Output Shaft (Revolution) Sensor

- (1) Remove the tail housing or transfer case from the transmission, and the transmission oil pan.
- (2) Unplug the F506 Green Connector from the P/N Position Switch.
- (3) Run 12 volts from a battery, to the Red Wire (*Pin 3*) of the F506 Green Connector.
- (4) Run a jumper lead from the Black Wire (*Pin 1*) of the F506 Green Connector to battery ground.
- (5) Using a DVOM or Graphing Meter, place the Red lead of the meter to the White Wire (*Pin 2*) of the F506 Green Connector, place the Black lead of the meter to the Black Wire (*Pin 1*) of the F506 Green Connector.
- (6) Rotate output shaft slowly and you should see the meter toggle from voltage to infinite as the lugs on the park gear pass in front of the Output/Revolution Sensor Pick-up. Refer to Figure 13 and 14.

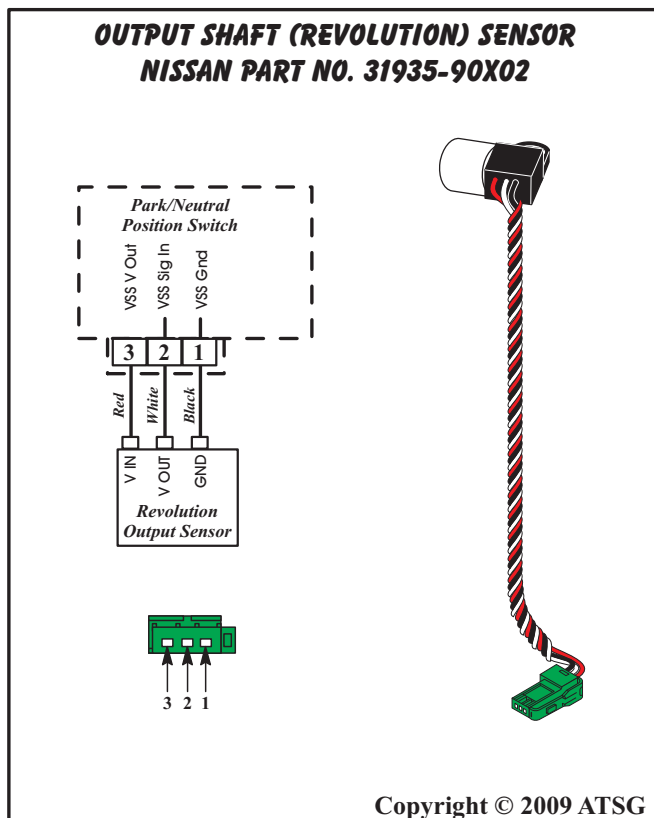


Figure 13

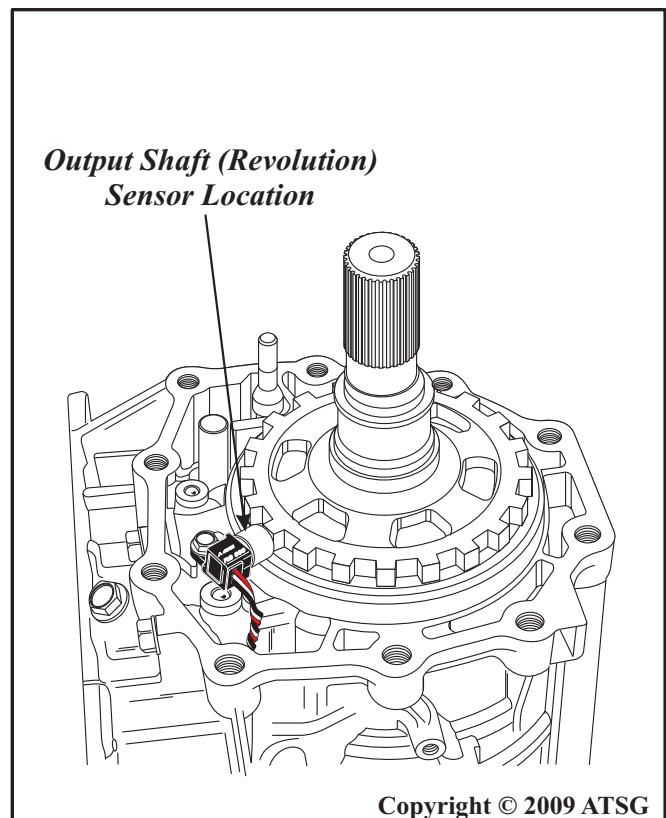


Figure 14

ELECTRONIC COMPONENTS (CONT'D)

Pressure Switches

There are five pressure switches in all models, mounted on and part of the shift control module plate, or the TCM depending on the model year, as shown in Figure 15.

All are normally open "NO" switches and close when the appropriate component pressure is sent to the switch.

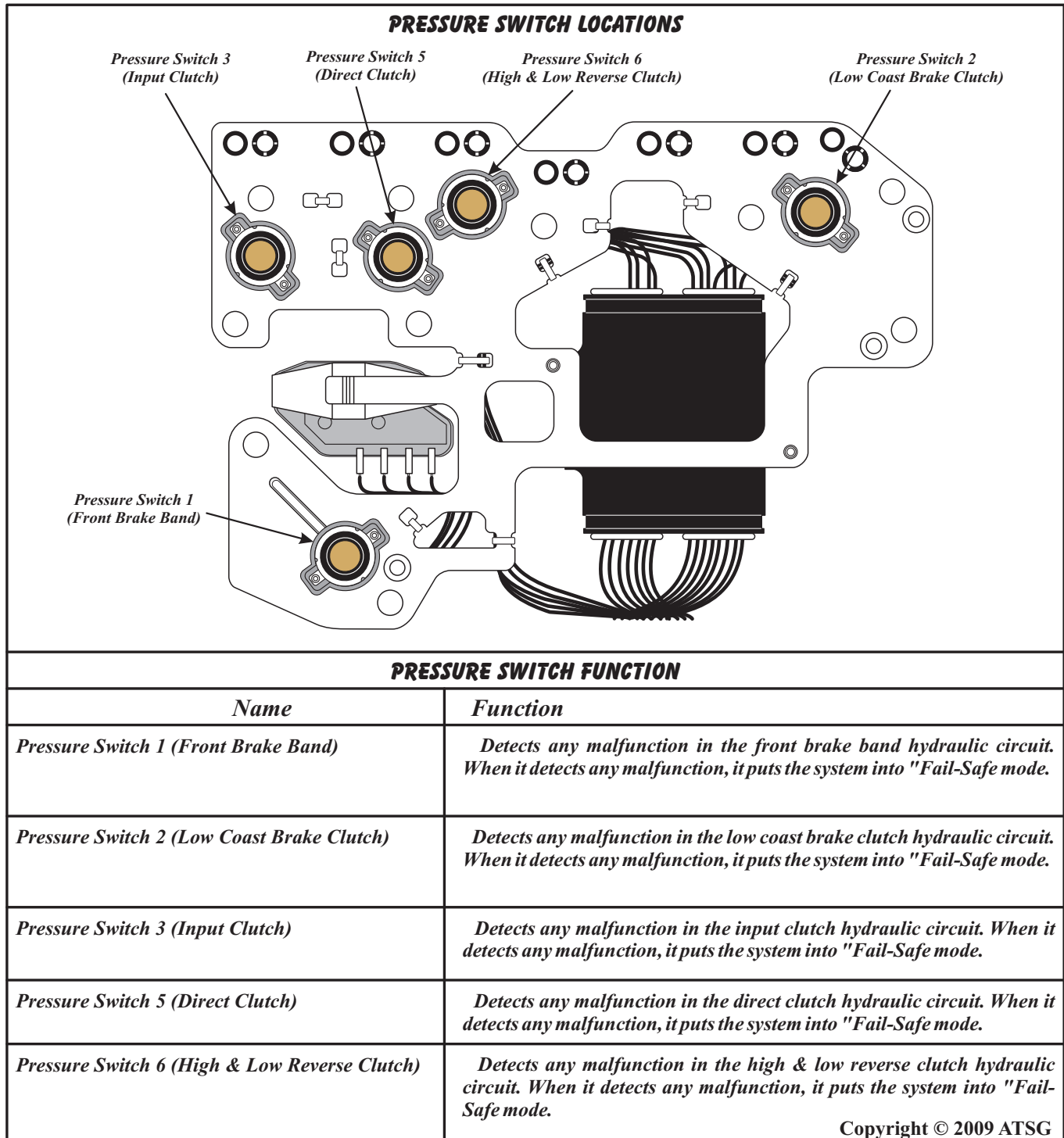


Figure 15

ELECTRONIC COMPONENTS (CONT'D)

Electrical Connectors and Wire Harness 2002-Mid 2004 "External TCM" Models

The RE5R05A models with the "External TCM" have a very complex wire harness set-up. There are a total of three **external** case connectors, as shown in Figure 17. One connector that provides voltage for each of the seven solenoids, and provides the TFT2 sensor signal to the TCM. The other two connectors provide a path for, the 5 pressure switch signals, all park/neutral position switch signals, the turbine revolution sensor signals, the VSS signal, and voltage in to the shift control module, etc.....

All three **external** connectors, with their pig-tails, go through the case pass-thru connector, and once again split into two more connectors **internally**. One connector with ten terminals, for each of the seven solenoids, and turbine sensor signals, and one connector with 15 terminals for the remainder of the signals needed for the TCM to perform properly.

The internal harness and connectors are an integral part of the shift control module mounting plate, as shown in Figure 16, and is currently available only with a complete valve body.

Continued on Page 16

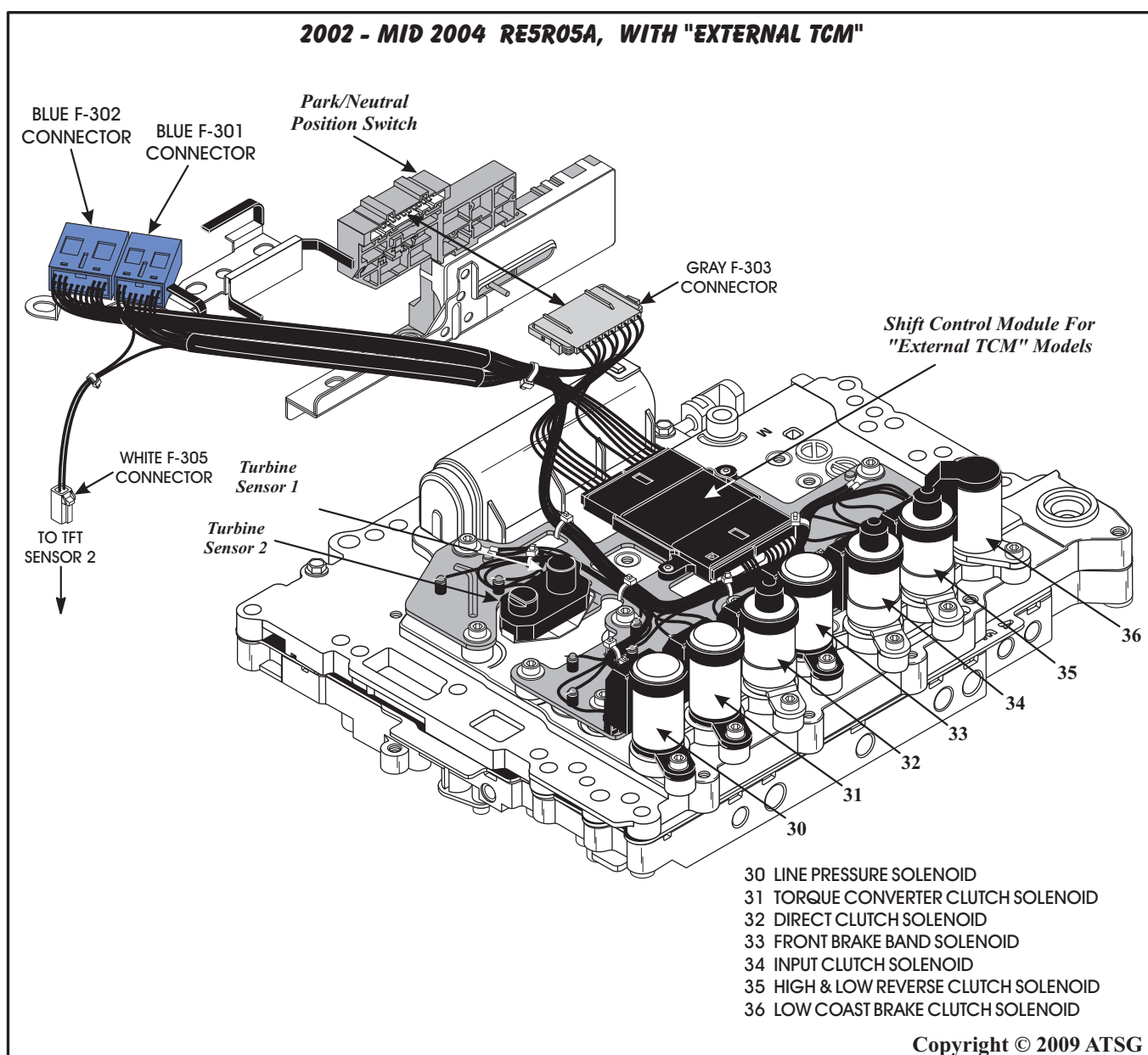
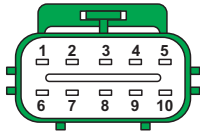
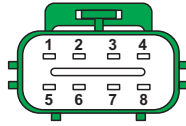


Figure 16

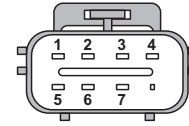
2002 - MID 2004 RE5R05A CONNECTOR AND TERMINAL IDENTIFICATION FOR "EXTERNAL TCM" MODELS



*External Transmission Harness
"Male" Coupler Face View
Connector Number F-26 (Green)*



*External Transmission Harness
"Male" Coupler Face View
Connector Number F-27 (Green)*

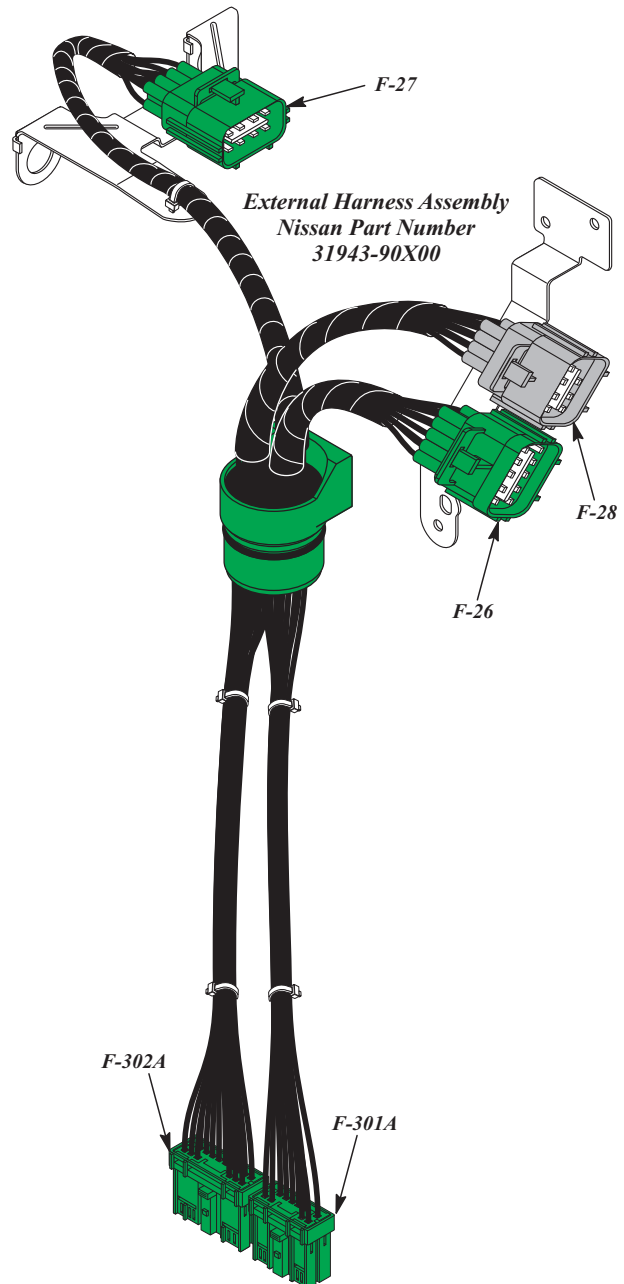


*External Transmission Harness
"Male" Coupler Face View
Connector Number F-28 (Black)*

Connector F26 (Green)	
Term.	Description
1	Ign. voltage signal from TCM to Shift Control Module
2	Data Bit 1 signal from TCM to Shift Control Module
3	PSB2 signal from Shift Control Module to TCM
4	PSC2 signal from Shift Control Module to TCM
5	SEL 1 signal from Shift Control Module to TCM
6	SEL 2 signal from Shift Control Module to TCM
7	SEL 3 signal from Shift Control Module to TCM
8	SEL 4 signal from Shift Control Module to TCM
9	TFT 1 Sensor signal to TCM
10	VSS signal out to TCM

Connector F27 (Green)	
Term.	Description
1	TFT 2 Sensor signal to TCM
2	Voltage signal from TCM to Low Coast Brake Clutch solenoid
3	Voltage signal from TCM to High & Low Reverse Clutch solenoid
4	Voltage signal from TCM to Direct Clutch solenoid
5	Voltage signal from TCM to Front Brake Band solenoid
6	Voltage signal from TCM to Input Clutch solenoid
7	Voltage signal from TCM to Line Pressure solenoid
8	Voltage signal from TCM to TCC solenoid

Connector F28 (Black)	
Term.	Description
1	S1 signal from PNP switch to TCM
2	S2 signal from PNP switch to TCM
3	SW3 signal from Shift Control Module to TCM
4	S4 signal from PNP switch to TCM
5	MON signal from Shift Control Module to TCM
6	Turbine Revolution Sensor 1 signal to TCM
7	Turbine Revolution Sensor 2 signal to TCM
8	(Not Used)



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Figure 17

ELECTRONIC COMPONENTS (CONT'D)

Electrical Connectors and Wire Harness (Cont'd) 2002-Mid 2004 "External TCM" Models

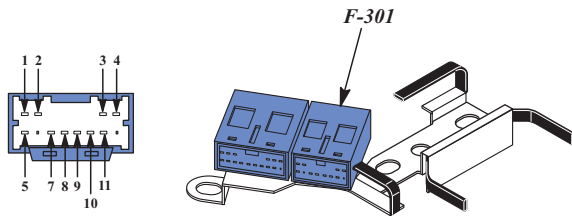
The solenoid connectors are part of the solenoid assembly, and plug directly into the shift control module mounting plate, as shown in Figure 16. The individual solenoids are also available only with a complete valve body.

This makes the electronic diagnostic process very difficult, to say the very least, with a variety of connectors that may have corrosion or damage.

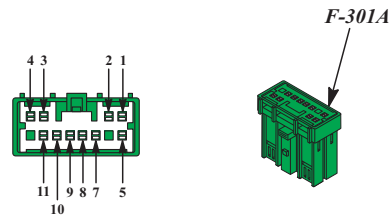
Refer to Figure 16, 17, 18, and 19, for connector and terminal identification.

Continued on Page 17

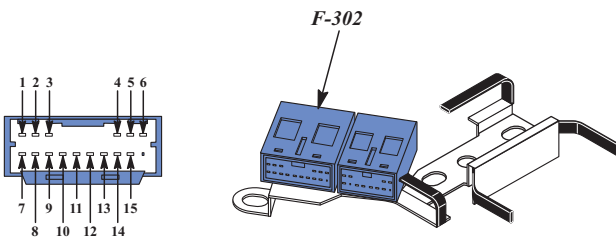
2002 - MID 2004 RE5R05A CONNECTOR AND TERMINAL IDENTIFICATION FOR "EXTERNAL TCM" MODELS



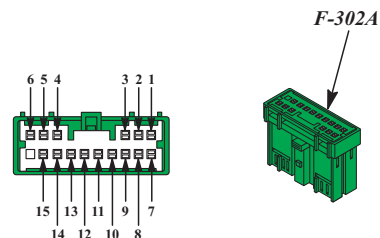
*Internal Transmission Harness
"Male" Coupler Face View
Connector Number F-301 (Blue)*



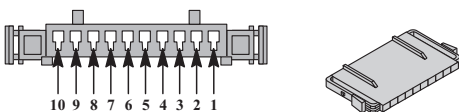
*Internal Transmission Harness
"Female" Coupler Face View
Connector Number F-301A (Green)*



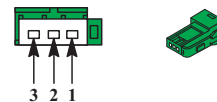
*Internal Transmission Harness
"Male" Coupler Face View
Connector Number F-302 (Blue)*



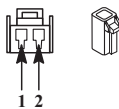
*Internal Transmission Harness
"Female" Coupler Face View
Connector Number F-302A (Green)*



*Internal Park/Neutral Position Switch Harness
"Female" Coupler Face View
Connector Number F-303 (Gray)*



*Internal Revolution/Output Sensor Harness
"Female" Coupler Face View
Connector Number F-304 (Green)*



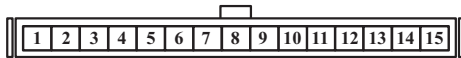
*Internal TFT Harness
"Female" Coupler Face View
Connector Number F-305 (White)*



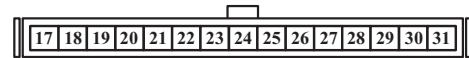
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Figure 18

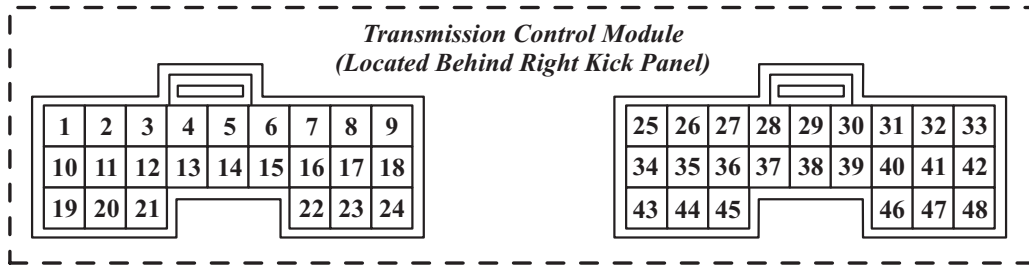
2002 - MID 2004 RE5R05A CONNECTOR AND TERMINAL IDENTIFICATION FOR "EXTERNAL TCM" MODELS



*Internal Shift Control Module
Harness Connector "Wire Side" View
Connector Number F-306 (Black)*



*Internal Shift Control Module
Harness Connector "Wire Side" View
Connector Number F-307 (Black)*



*Transmission Control Module
Harness "Wire Side" View
Connector Number F-103 (White)*

*Transmission Control Module
Harness "Wire Side" View
Connector Number F-104 (Gray)*

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Figure 19

ELECTRONIC COMPONENTS (CONT'D)

Electrical Connectors and Wire Harness (Cont'd) 2002-Mid 2004 "External TCM" Models

Refer to Figure 25, 26, 27, and 28, for the wiring schematics for the 2002-Mid 2004 "External TCM" models, and to Figure 20 for solenoid resistance specifications.

Refer to Figure 29 for Diagnostic Trouble Code (DTC) definitions.

Electronic Components Continued on Page 18

Connector F27 (Green)		
Terminals	Description	Resistance
2 & Good Ground	Low Coast Clutch solenoid	20-40 ohms
3 & Good Ground	High & Low Reverse Clutch solenoid	3-9 ohms
4 & Good Ground	Direct Clutch solenoid	3-9 ohms
5 & Good Ground	Front Brake Band solenoid	3-9 ohms
6 & Good Ground	Input Clutch solenoid	3-9 ohms
7 & Good Ground	Line Pressure solenoid	3-9 ohms
8 & Good Ground	TCC solenoid	3-9 ohms
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Figure 20

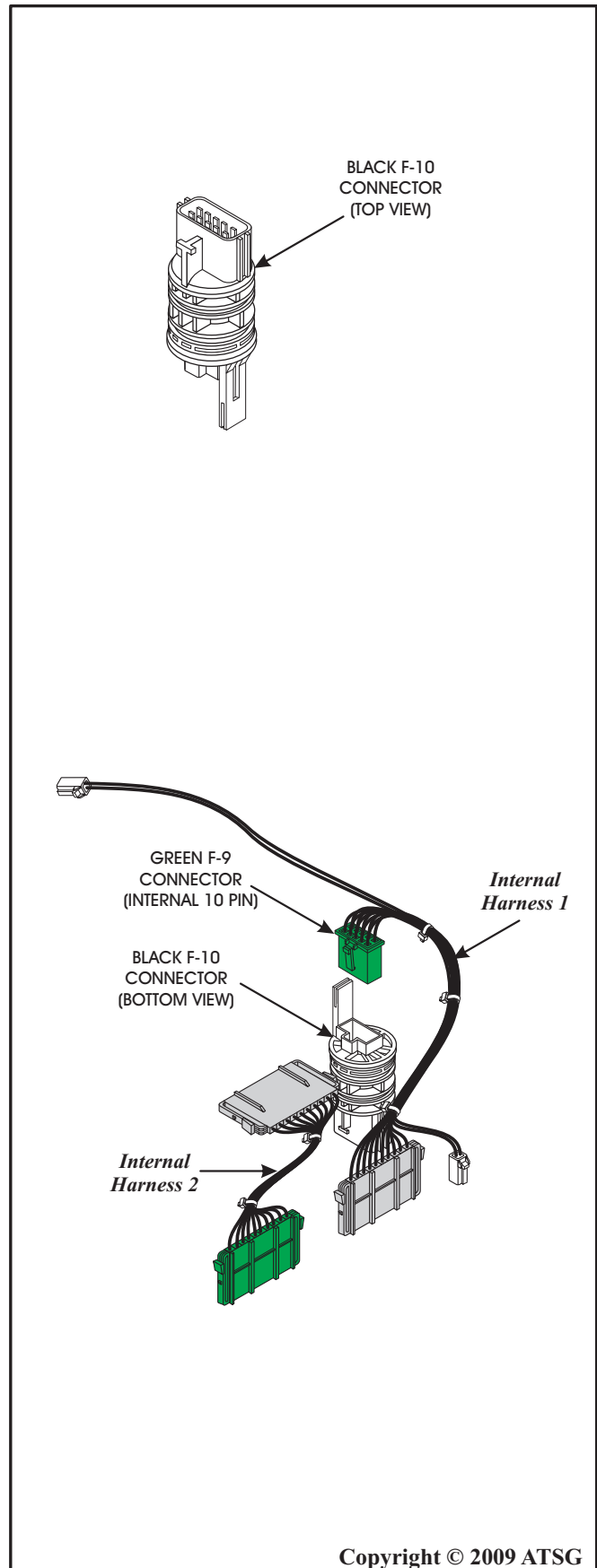
ELECTRONIC COMPONENTS (CONT'D)

Electrical Connectors and Wire Harness (Cont'd) Mid 2004-2008 "Internal TCM" Models

The Mid 2004-2008 "Internal TCM" models have only one ten pin external connector and one ten pin internal connector as shown in Figure 21. There are however two separate internal wiring harness', also shown in Figure 21. There are three wide and short connectors, two gray and one green, that are exactly the same and can be connected in the wrong positions. We have several reports of this happening and the result is, transmission is in "Fail-Safe", no communication, and a blown TCM fuse. You replace the fuse, thinking you found the problem, and the result is another blown fuse. The harness' **must** be connected, **exactly** like they are shown in Figure 22. Refer to Figure 23 for connector and terminal identification for the Mid 2004-2008 "Internal TCM" models.

Checking the solenoids for the proper resistance on the "Internal TCM" models requires disassembly as none of the signals come through the external case connector. The solenoids however, are the same as the early models, so the resistance chart shown in Figure 20 can be used, but not the terminal references. Replacing the solenoids, TCM, or turbine sensors requires a complete valve body, at the time of this printing.

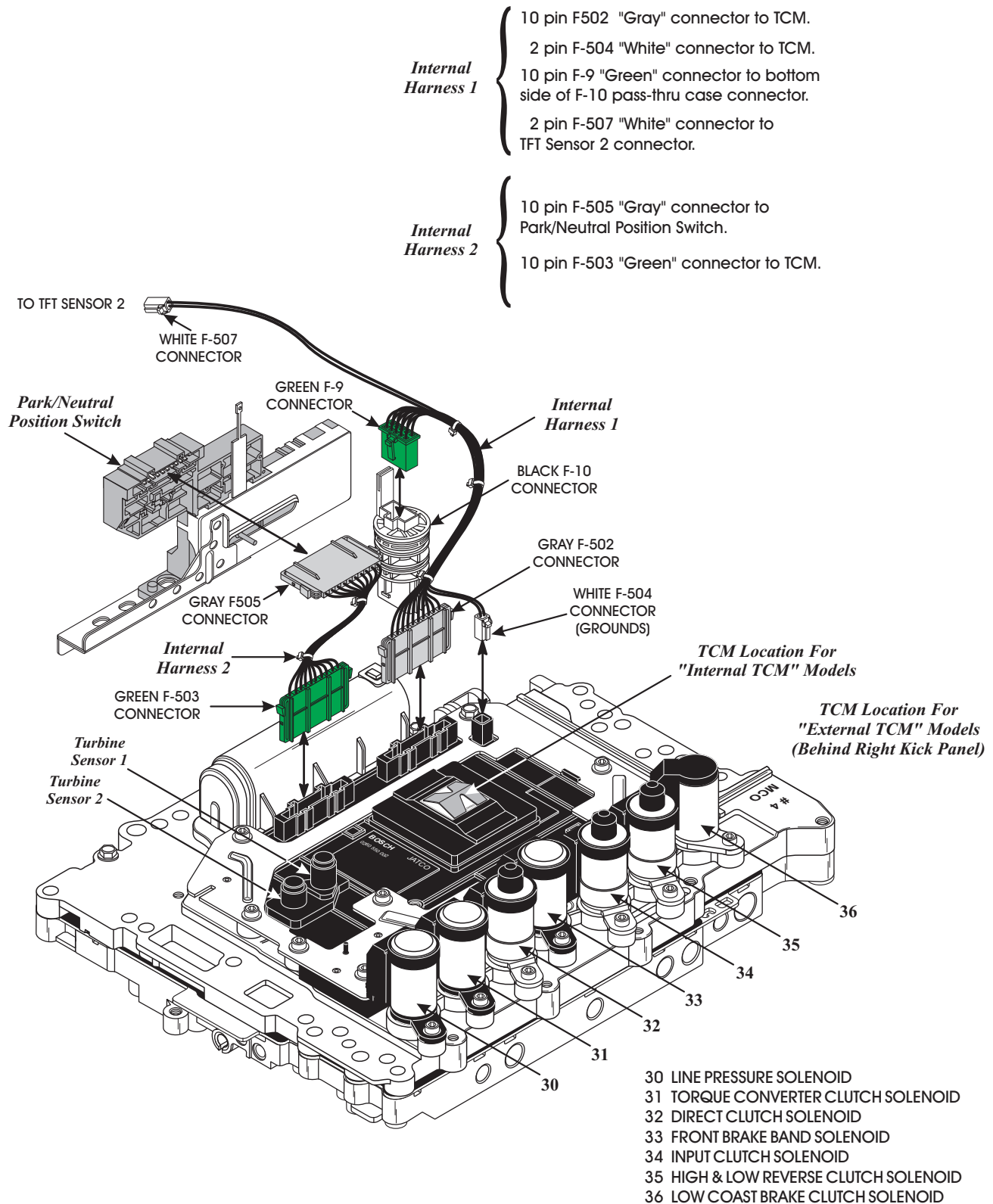
Refer to Figure 24 for wiring schematic for the "Internal TCM" models, and Figure 29 for the Diagnostic Trouble Codes (DTC) definitions.



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Figure 21

MID 2004 - 2008 RE5R05A CONNECTOR AND TERMINAL IDENTIFICATION FOR "INTERNAL TCM" MODELS

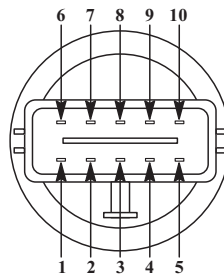


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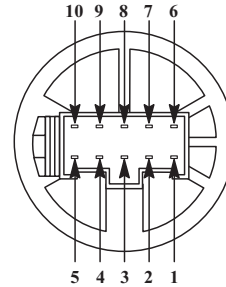
Figure 22

MID 2004 - 2008 RE5R05A CONNECTOR AND TERMINAL IDENTIFICATION FOR "INTERNAL TCM" MODELS

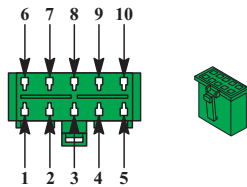
- 1 Battery supply voltage 1 in at all times.
- 2 Battery supply voltage 2 in at all times.
- 3 CAN signal High to ECM and other devices.
- 4 Data line out to Data Link Connector.
- 5 Ground supply 2 to TCM.
- 6 Ignition voltage in from 10A fuse.
- 7 Ground signal to Reverse Lamp Relay.
- 8 CAN signal Low to ECM and other devices.
- 9 Ground signal to Starter Relay.
- 10 Ground supply 1 to TCM.



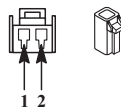
**External Transmission Connector
"Top Side" Face View
Connector Number F-10 (Black)**



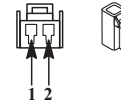
**External Transmission Connector
"Bottom Side" Face View
Connector Number F-10 (Black)**



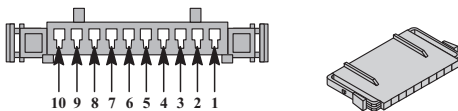
**Internal Transmission Harness
"Female" Coupler Face View
Connector Number F-9 (Green)**



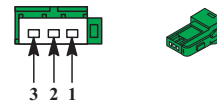
**Internal TFT Harness
"Female" Coupler Face View
Connector Number F-507 (White)**



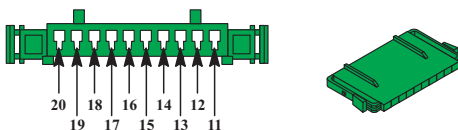
**Internal TCM Harness
"Female" Coupler Face View
Connector Number F-504 (White)**



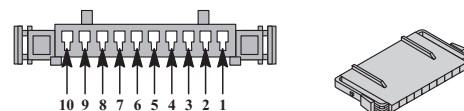
**Internal TCM Harness
"Female" Coupler Face View
Connector Number F-502 (Gray)**



**Internal Revolution/Output Sensor Harness
"Female" Coupler Face View
Connector Number F-506 (Green)**



**Internal TCM Harness
"Female" Coupler Face View
Connector Number F-503 (Green)**



**Internal Park/Neutral Position Switch Harness
"Female" Coupler Face View
Connector Number F-505 (Gray)**

Figure 23





Figure 25

2002 - MID 2004 RE5R05A "EXTERNAL TCM" PARTIAL WIRE SCHEMATIC

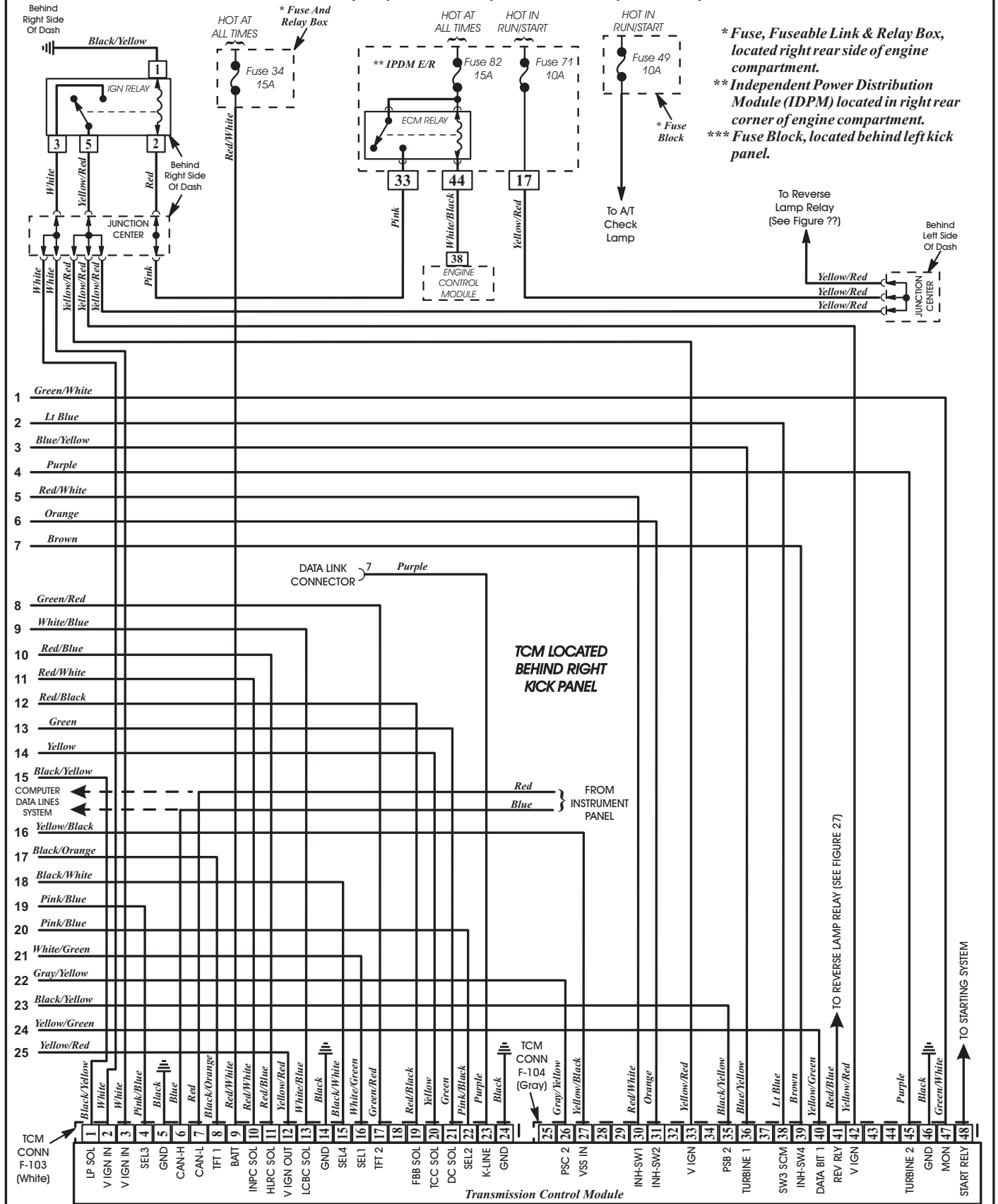


Figure 26

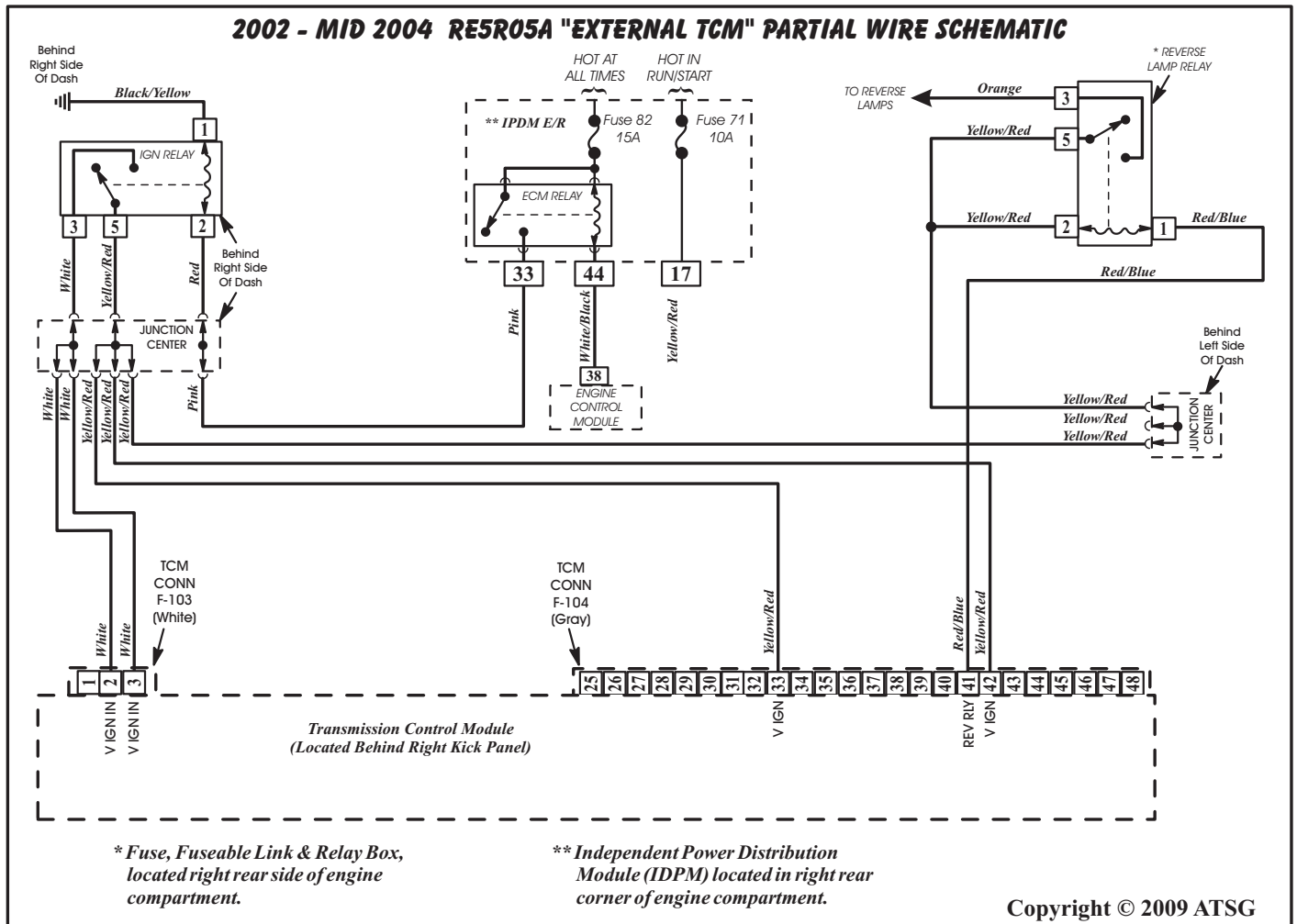
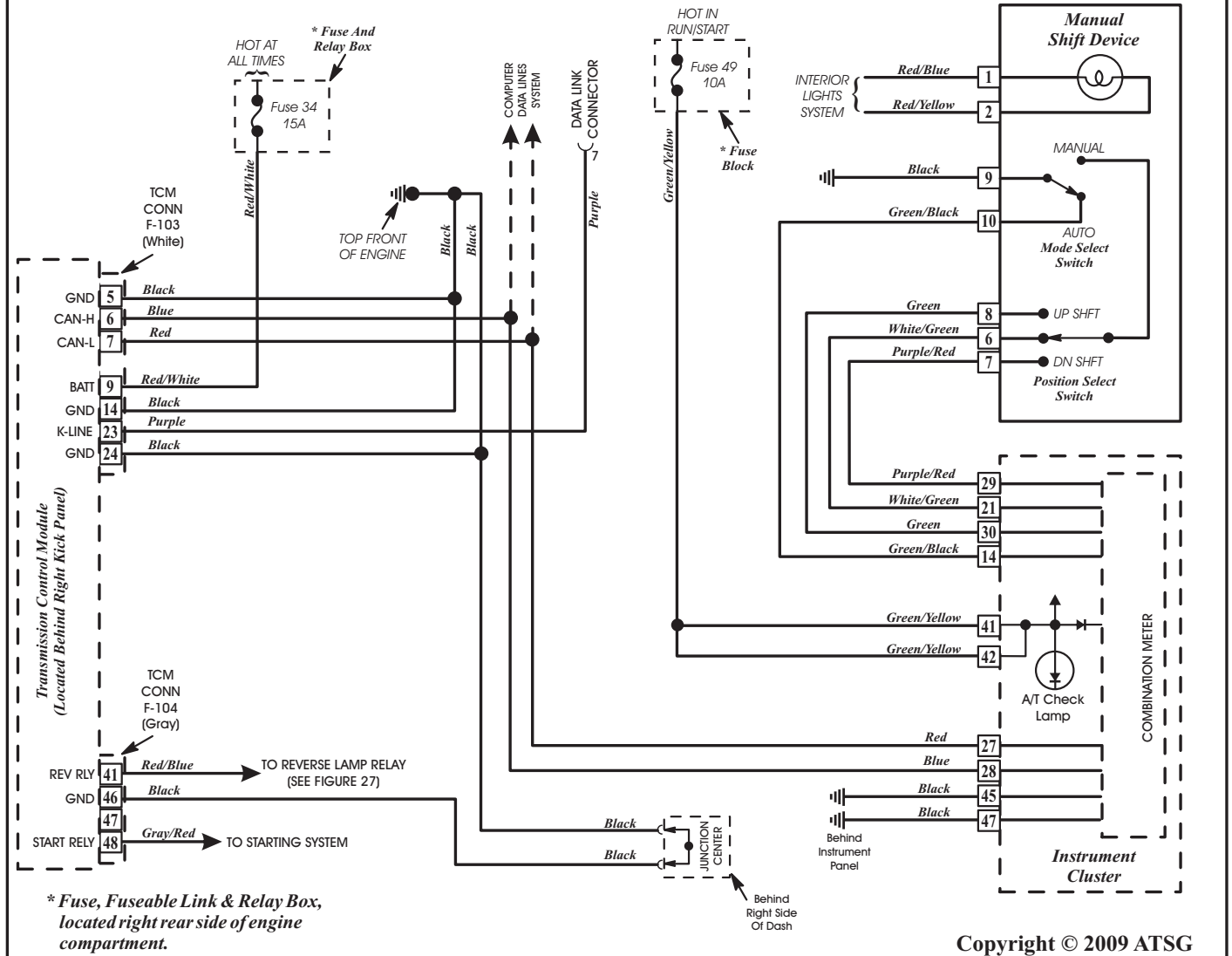


Figure 27

2002 - MID 2004 RE5R05A "EXTERNAL TCM" PARTIAL WIRE SCHEMATIC



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Figure 28

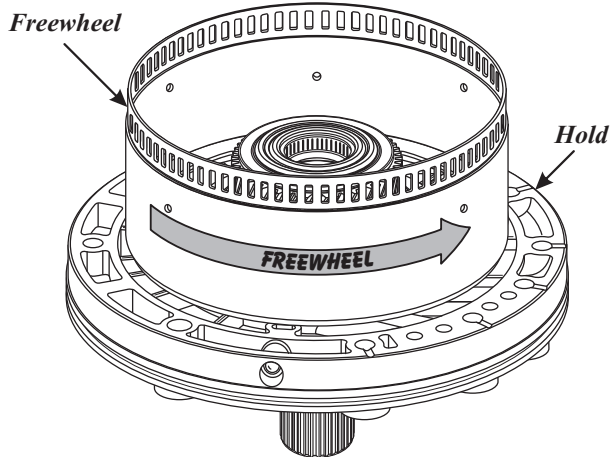
DIAGNOSTIC TROUBLE CODE (DTC) DESCRIPTION		
TCM DTC	OBD II	DESCRIPTION
<i>P0615</i>		<i>Starter Relay Circuit</i>
<i>P0700</i>	<i>P0700</i>	<i>MIL Request, Transmission related trouble code set</i>
<i>P0705</i>	<i>P0705</i>	<i>Park/Neutral Position Switch Circuit</i>
<i>P0720</i>	<i>P0720</i>	<i>Output (Revolution) Speed Sensor Circuit (Transmission)</i>
<i>P0725</i>		<i>Engine Speed Sensor Circuit</i>
<i>P0740</i>	<i>P0740</i>	<i>Torque Converter Clutch Solenoid Circuit</i>
<i>P0744</i>	<i>P0744</i>	<i>Torque Converter Clutch Function Concern</i>
<i>P0745</i>	<i>P0745</i>	<i>Line Pressure Solenoid Circuit</i>
<i>P1702</i>		<i>TCM (Random Access Memory)</i>
<i>P1703</i>		<i>TCM (Read Only Memory)</i>
<i>P1705</i>		<i>Throttle Position Sensor Circuit</i>
<i>P1710</i>	<i>P0710</i>	<i>Transmission Fluid Temperature Sensor Circuit (Could Be 1 or 2)</i>
<i>P1716</i>	<i>P1716</i>	<i>Turbine Revolution Speed Sensor Circuit</i> <i>May be mechanically generated. No input from turbine revolution sensor 2. (No 4th gear)</i>
<i>P1721</i>		<i>Output (Revolution) Speed Sensor Circuit (MTR) (Combination Meter)</i>
<i>P1730</i>	<i>P1730</i>	<i>Transmission Interlock</i>
<i>P1731</i>		<i>First Gear Engine Braking</i>
<i>P1752</i>	<i>P1752</i>	<i>Input Clutch Solenoid Circuit</i>
<i>P1754</i>	<i>P1754</i>	<i>Input Clutch Solenoid Function</i>
<i>P1757</i>	<i>P1757</i>	<i>Forward Brake Clutch Solenoid Circuit</i>
<i>P1759</i>	<i>P1759</i>	<i>Forward Brake Clutch Solenoid Function</i>
<i>P1762</i>	<i>P1762</i>	<i>Direct Clutch Solenoid Circuit</i>
<i>P1764</i>	<i>P1764</i>	<i>Direct Clutch Solenoid Function</i>
<i>P1767</i>	<i>P1767</i>	<i>High And Low/Reverse Clutch Solenoid Circuit</i>
<i>P1769</i>	<i>P1769</i>	<i>High And Low/Reverse Clutch Solenoid Function</i>
<i>P1772</i>	<i>P1772</i>	<i>Low Coast Brake Clutch Solenoid Circuit</i>
<i>P1774</i>	<i>P1774</i>	<i>Low Coast Brake Clutch Solenoid Function</i>
<i>P1815</i>		<i>Manual Mode Switch Circuit</i>
<i>P1841</i>		<i>Fluid Pressure Switch 1 Circuit</i>
<i>P1843</i>		<i>Fluid Pressure Switch 3 Circuit</i>
<i>P1845</i>		<i>Fluid Pressure Switch 5 Circuit</i>
<i>P1846</i>		<i>Fluid Pressure Switch 6 Circuit</i>
<i>U1000</i>	<i>U1000</i>	<i>CAN Communication Circuit</i>
NOTE: Scanner is "Required" for DTC Retrieval.		

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Figure 29

RE5R05A 3RD SPRAG

FRONT SUN GEAR AND DRUM ASSEMBLY SHOULD FREEWHEEL COUNTER-CLOCKWISE AND LOCK CLOCKWISE, WHILE HOLDING OIL PUMP COVER AND STATOR

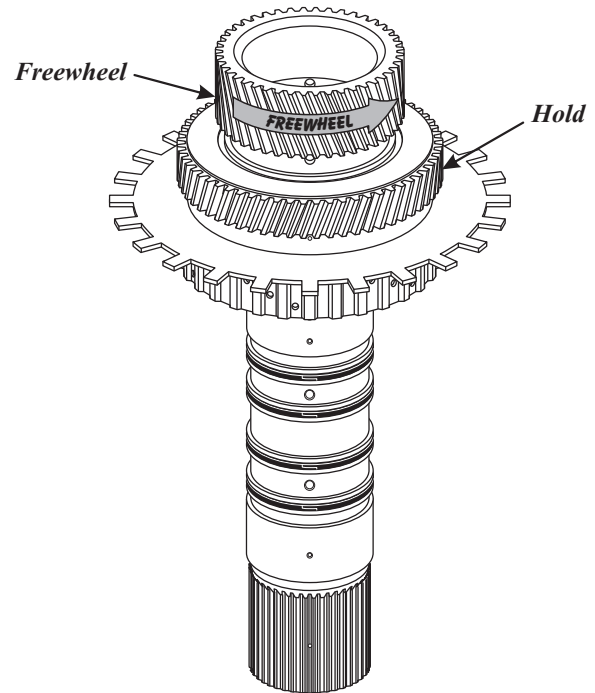


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Figure 30

RE5R05A 1ST SPRAG

SMALL SUN GEAR SHOULD FREEWHEEL COUNTER-CLOCKWISE AND LOCK CLOCKWISE WHILE HOLDING THE LARGE SUN GEAR

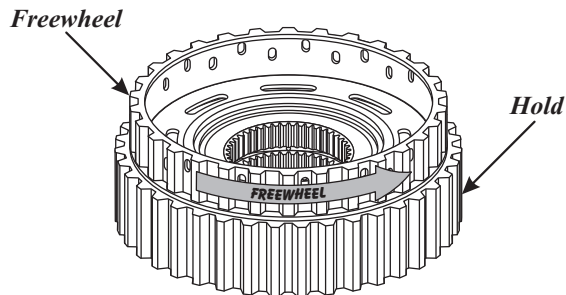


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Figure 32

RE5R05A FORWARD SPRAG

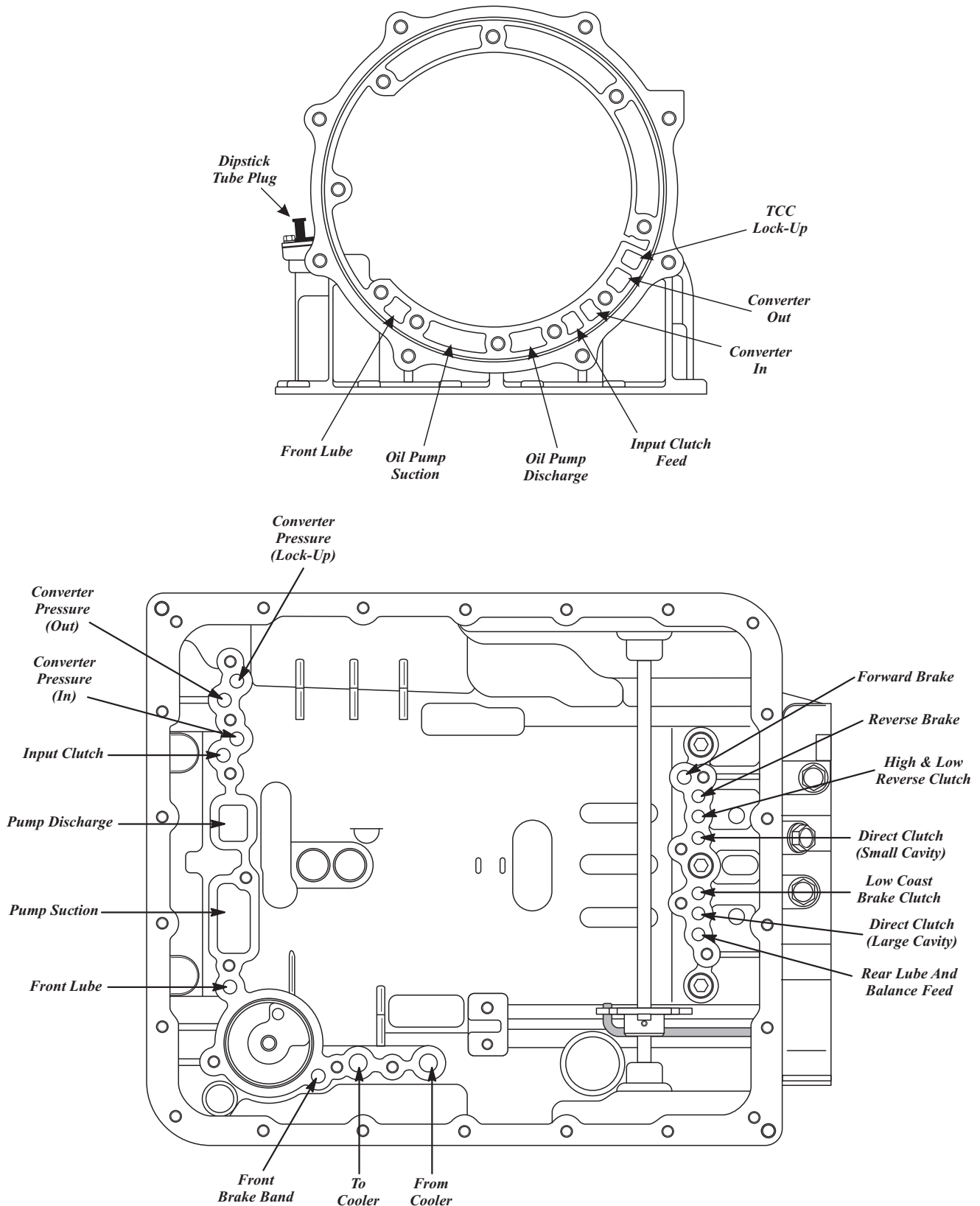
COAST CLUTCH HUB SHOULD FREEWHEEL COUNTER-CLOCKWISE AND LOCK CLOCKWISE, WHILE HOLDING THE FORWARD BRAKE CLUTCH HUB



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Figure 31

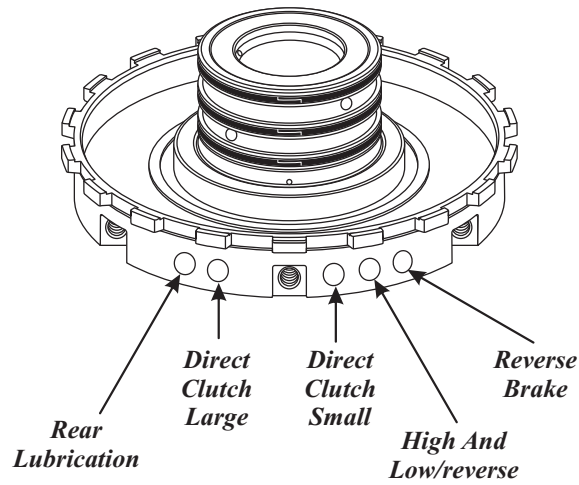
CASE PASSAGE IDENTIFICATION



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Figure 33

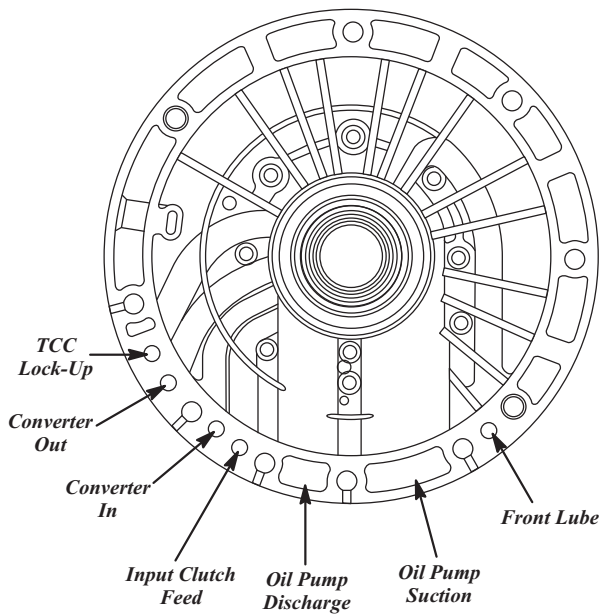
DRUM SUPPORT PASSAGE IDENTIFICATION



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Figure 34

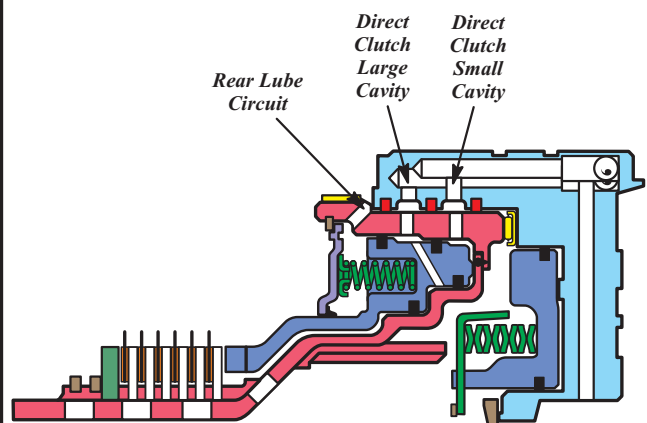
OIL PUMP PASSAGE IDENTIFICATION



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Figure 35

DIRECT CLUTCH PASSAGE IDENTIFICATION



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Figure 36

LINE PRESSURE TAP LOCATION AND SPECIFICATIONS

Line Pressure Test Procedure

1. Check transmission fluid using dip stick and add as necessary.
2. If possible, drive the vehicle for about 10 minutes so that ATF reaches operating temperature, which is 50-80°C (122 - 176°F).
3. Install 300psi pressure gauge in the line pressure tap located on the right hand side of transmission.
4. Securely engage the parking brake.
5. Start the engine and measure line pressure at both idle and stall speed.

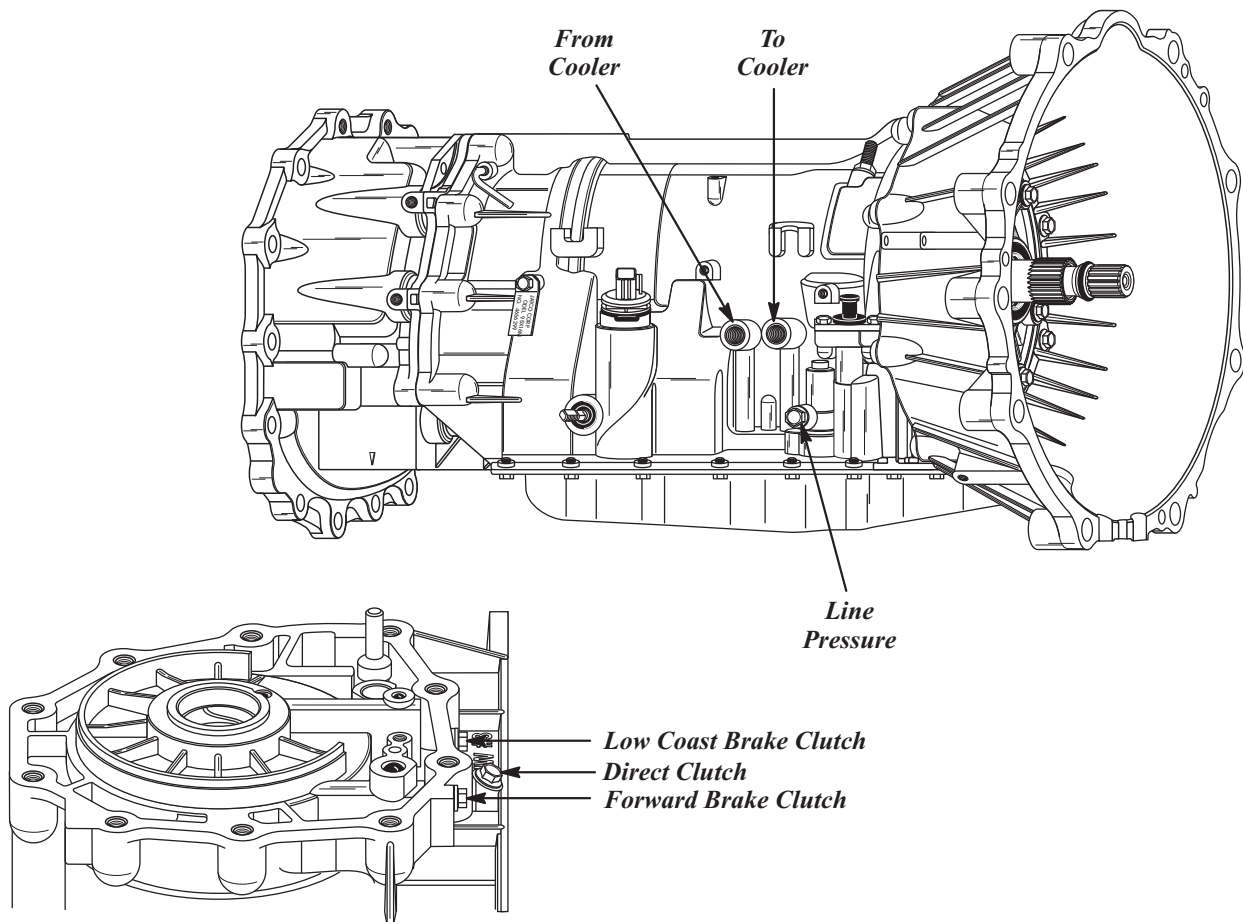
Note: Do not hold accelerator pedal down for more than 5 seconds during stall test.

Keep the service brake applied firmly during the stall test.

6. After line pressure test is complete, install the line pressure plug with a new "O" ring and torque to 7.3 N·m (65 in.lb.). Proper line pressure specifications are listed in the chart below.

LINE PRESSURE SPECIFICATIONS

ENGINE SPEED	DRIVE	REVERSE
Idle	54 - 61 PSI	57 - 64 PSI
Stall	190 - 218 PSI	247 - 274 PSI



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Figure 37

SAFETY PRECAUTIONS

Service information provided in this manual by ATSG is intended for use by professional, qualified technicians. Attempting repairs or service without the appropriate training, tools and equipment could cause injury to you or others.

The service procedures we recommend and describe in this manual are effective methods of performing service and repair on this unit. Some of the procedures require the use of special tools that are designed for specific purposes.

This manual contains **CAUTIONS** that you must observe carefully in order to reduce the risk of injury to yourself or others. This manual also contains **NOTES** that must be carefully followed in order to avoid improper service that may damage the vehicle, tools and/or equipment.

TRANSMISSION DISASSEMBLY

1. The transmission should be steam cleaned on the outside, to remove any dirt and/or grease, before disassembly begins.
2. This transmission can be disassembled very easily on a work bench without the benefit of a holding fixture for rotation.
3. Remove the torque converter from transmission and set aside to drain.

Caution: Use care when removing the torque converter, to avoid personal injury and/or damage to converter, as it is heavy.

4. Remove the 8 converter housing retaining bolts, as shown in Figure 38, and remove converter housing from transmission case.

Continued on Page 32

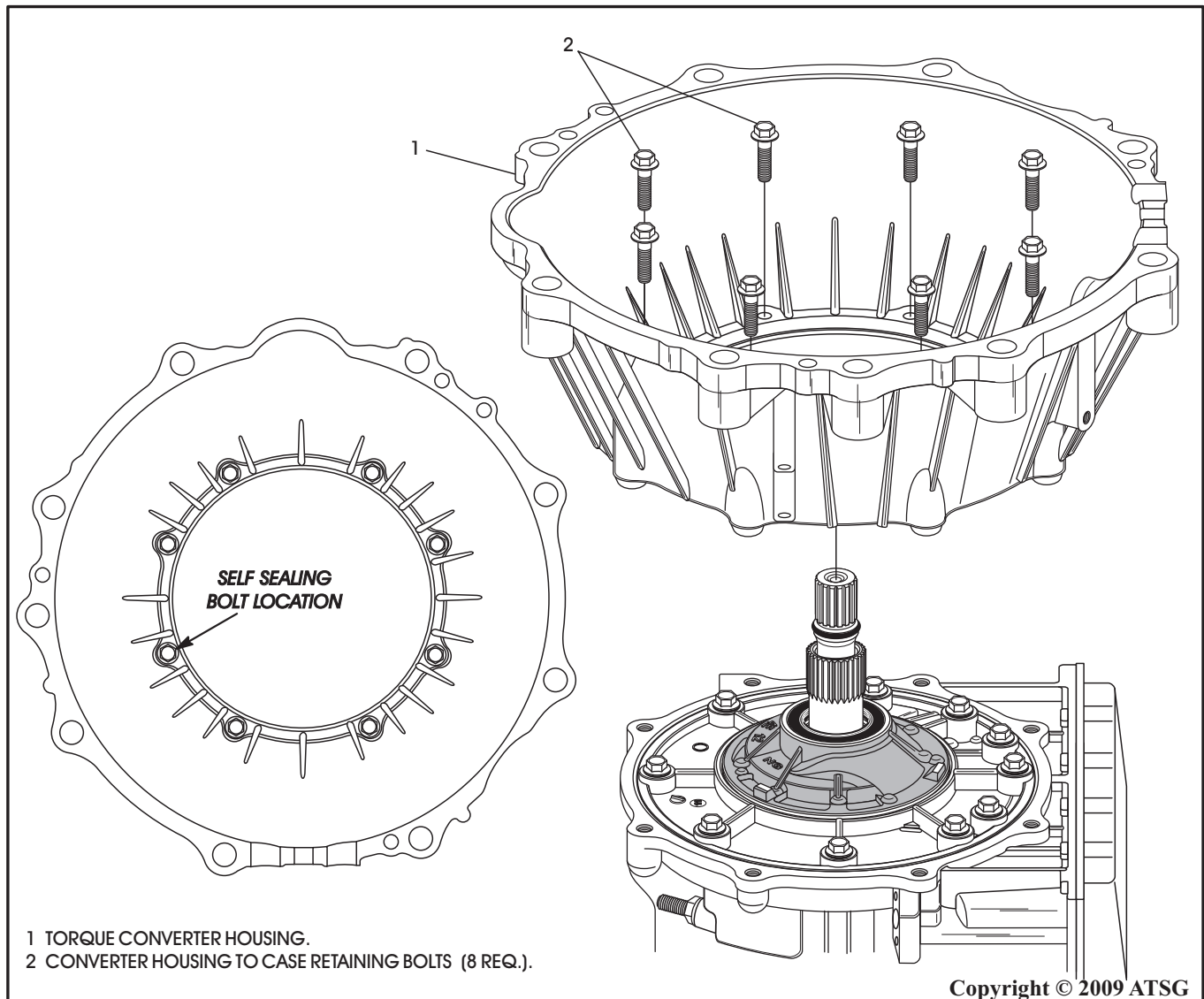


Figure 38

TRANSMISSION DISASSEMBLY (CONT'D)

5. Remove the 22 pan retaining bolts, as shown in Figure 39, and remove oil pan.
6. Remove and discard oil pan gasket, as shown in Figure 39.
7. Disconnect the TFT2 sensor connector, so the valve body retaining bolts can be removed. (See Figure 39).
8. Remove the output/revolution speed sensor connector from PNP switch (See Figure 39).
9. Straighten the wire harness clips to free the output/revolution speed sensor wire harness. (See Figure 39).

Continued on Page 33

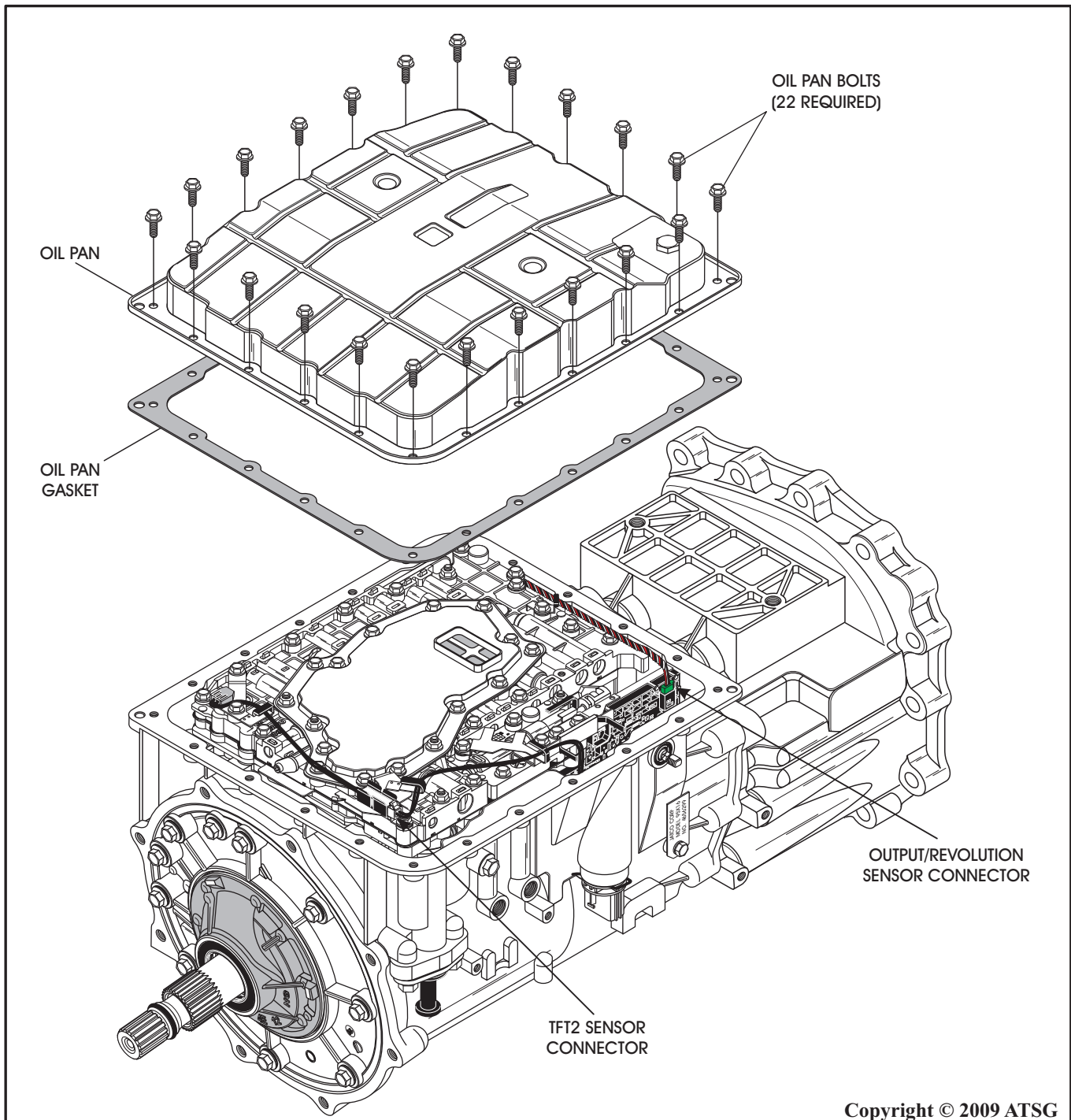


Figure 39

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TRANSMISSION DISASSEMBLY (CONT'D)

10. Remove **only** the 12 valve body retaining bolts that are shown in Figure 40.

Note: Notice there are 3 different lengths and a chart has been provided in Figure 40.

11. Remove the valve body by lifting straight up, as shown in Figure 40.

12. As you lift valve body, you must reach down and disconnect the internal (Green) connector from the "Pass Through" connector, as shown in Figure 40.

13. Set valve body aside for component rebuild.

Continued on Page 34

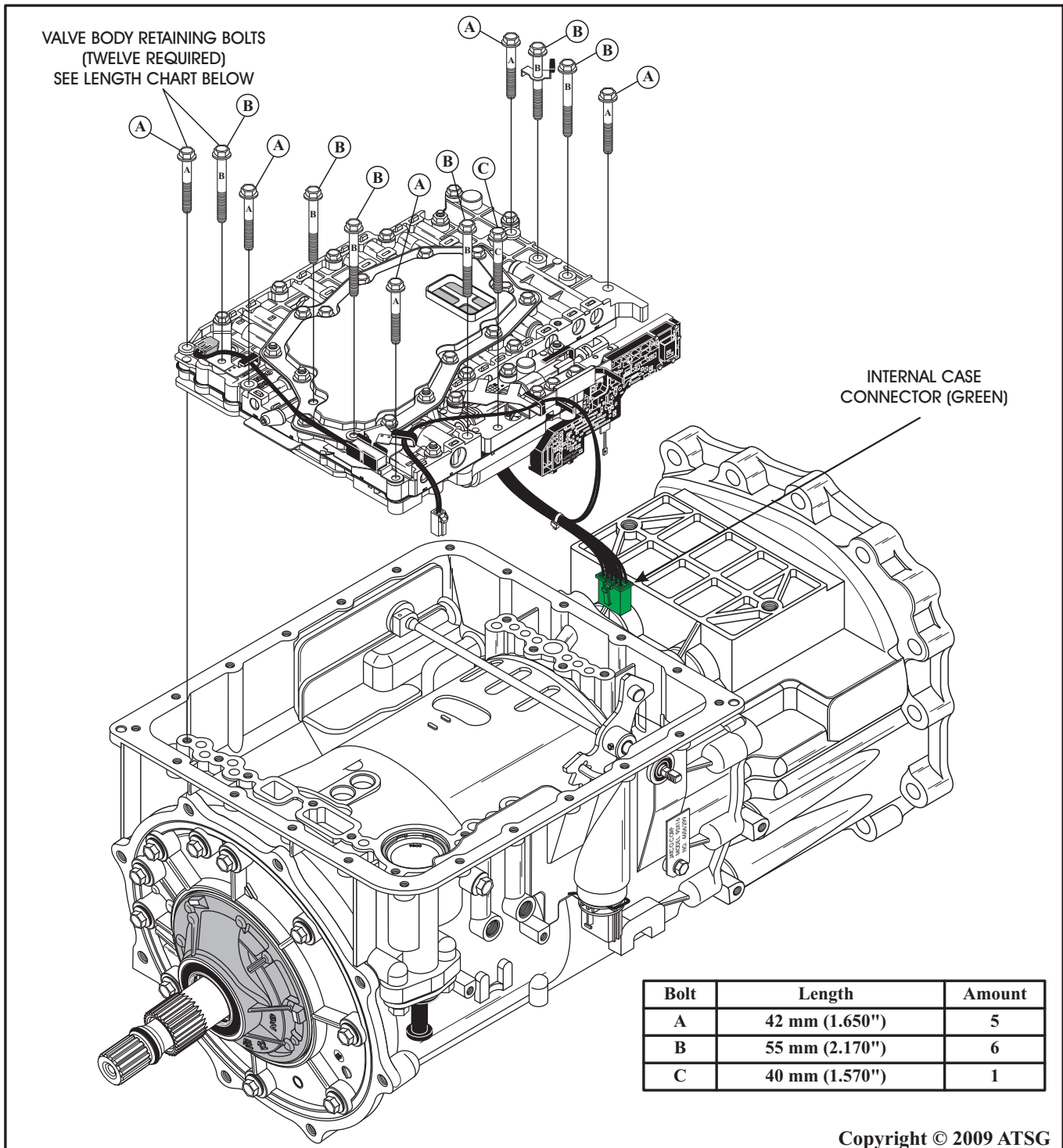


Figure 40

TRANSMISSION DISASSEMBLY (CONT'D)

14. Remove and discard the turbine shaft "O" ring seal from turbine shaft, as shown in Figure 41.
15. Remove the 10 oil pump to case retaining bolts, as shown in Figure 42.
16. Install two slide hammers into positions shown in Figure 43.
17. Use the slide hammers to loosen the oil pump assembly from the case.

Continued on Page 35

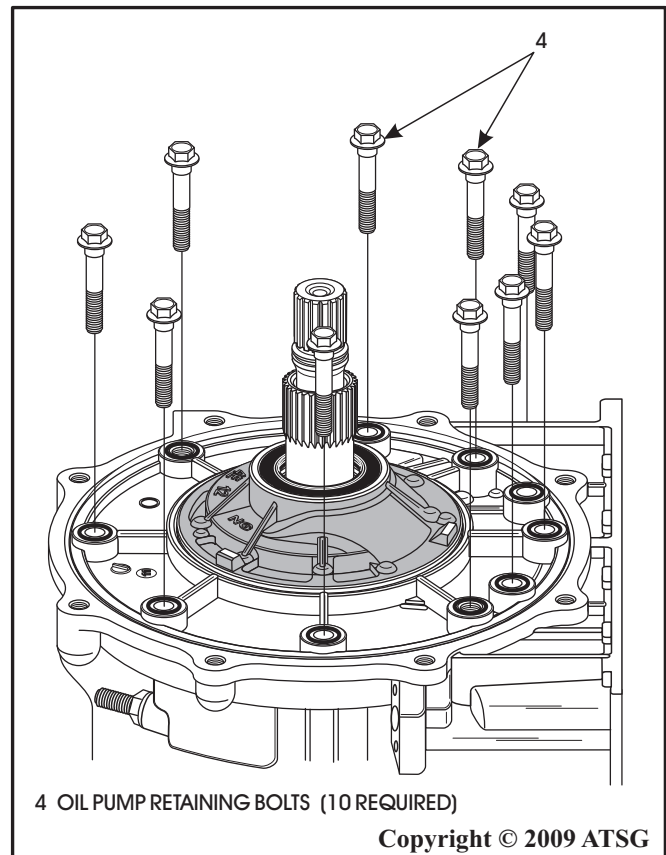


Figure 42

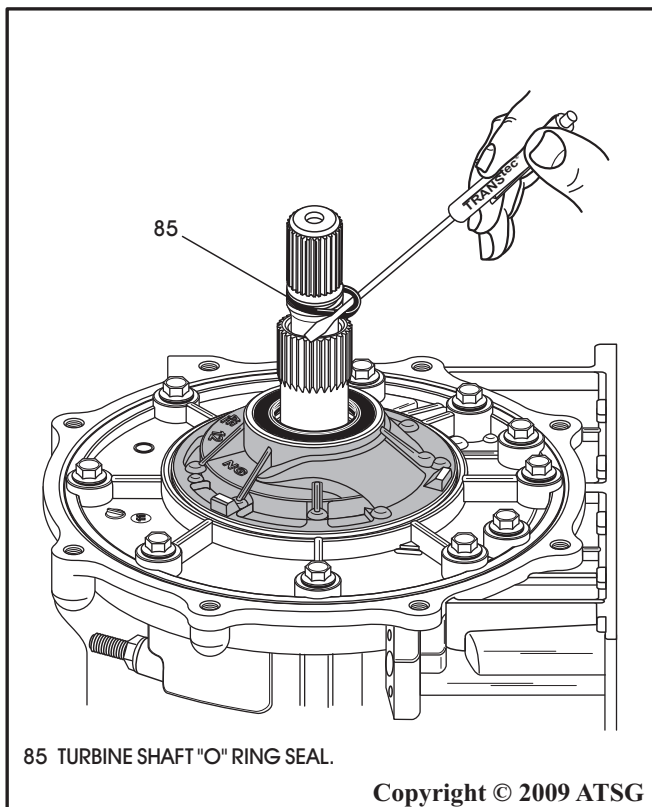


Figure 41

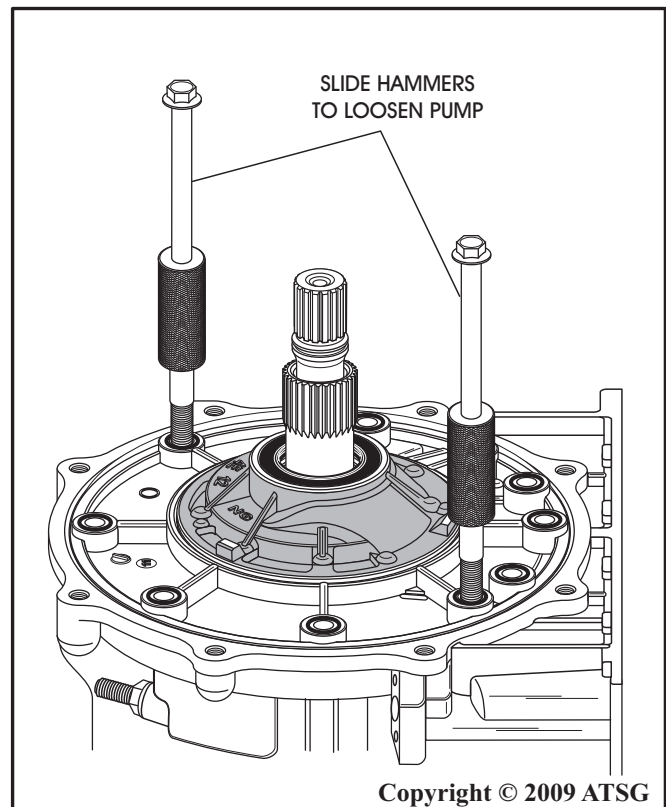


Figure 43

TRANSMISSION DISASSEMBLY (CONT'D)

18. Remove the oil pump assembly from the case, as shown in Figure 44.
 19. Set the oil pump assembly aside for component rebuild section.
 20. Remove the front planet sun gear and drum, as shown in Figure 45, and remove the number 1 and number 2 thrust bearings.
- Note:** *Number 1 selective thrust bearing race may be stuck to the back of oil pump.*
21. Remove the front brake band assembly from the case, as shown in Figure 45.
 22. Set the front planet sun gear drum and front brake band aside for component rebuild.

Continued on Page 36

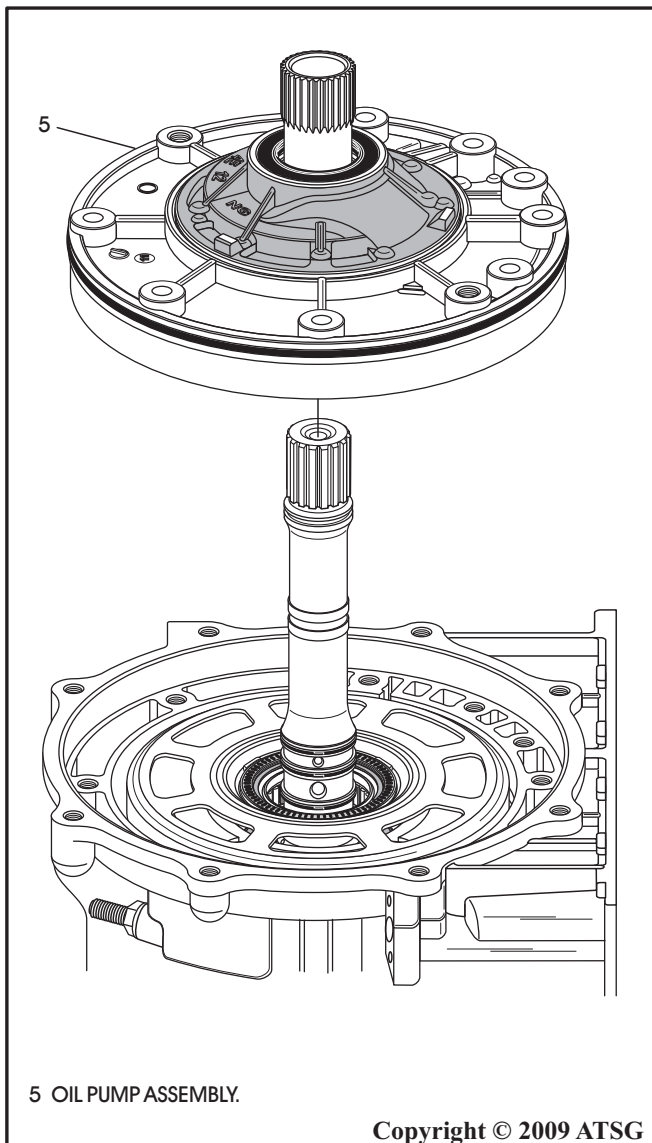


Figure 44

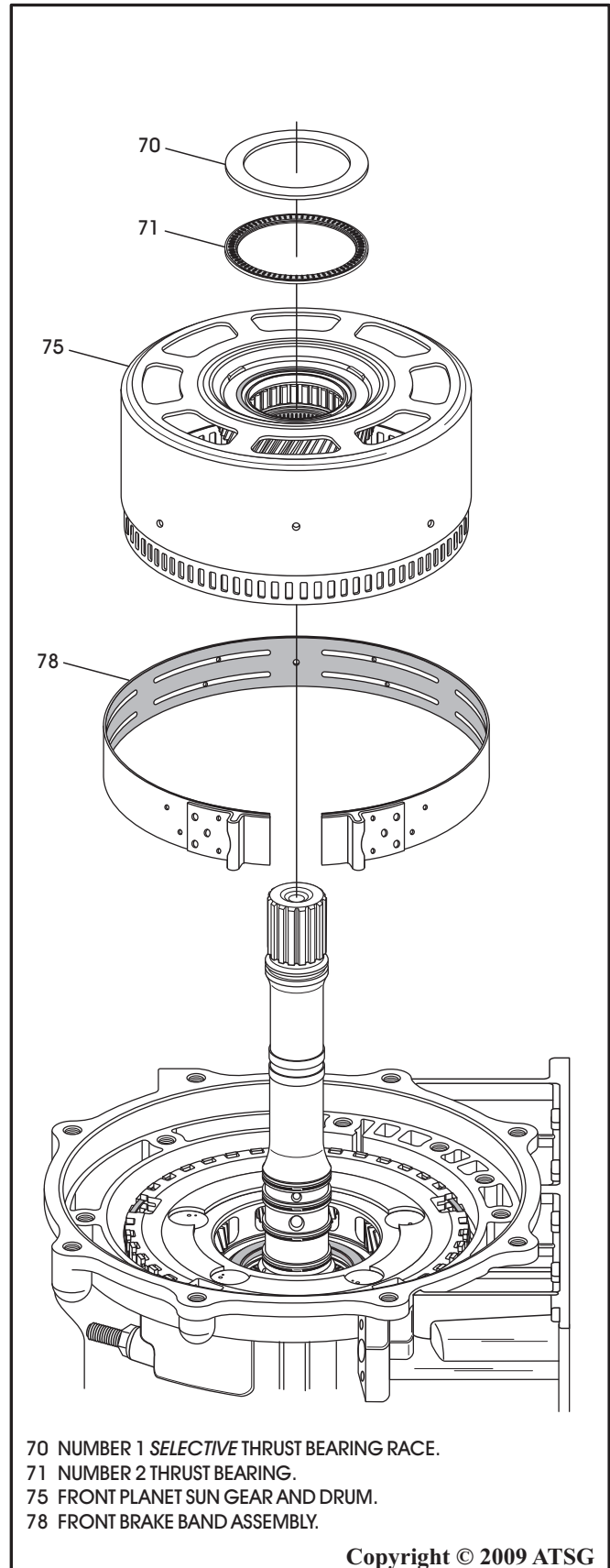


Figure 45

TRANSMISSION DISASSEMBLY (CONT'D)

23. Remove the input clutch and front planetary carrier assembly, along with number 3 thrust bearing, as an assembly (See Figure 46).
24. Set the input clutch and front planetary carrier assembly aside for the component rebuild section.

25. Remove the middle and rear planetary carriers as an assembly, as shown in Figure 47, by lifting straight up on the input clutch hub.

Continued on Page 37

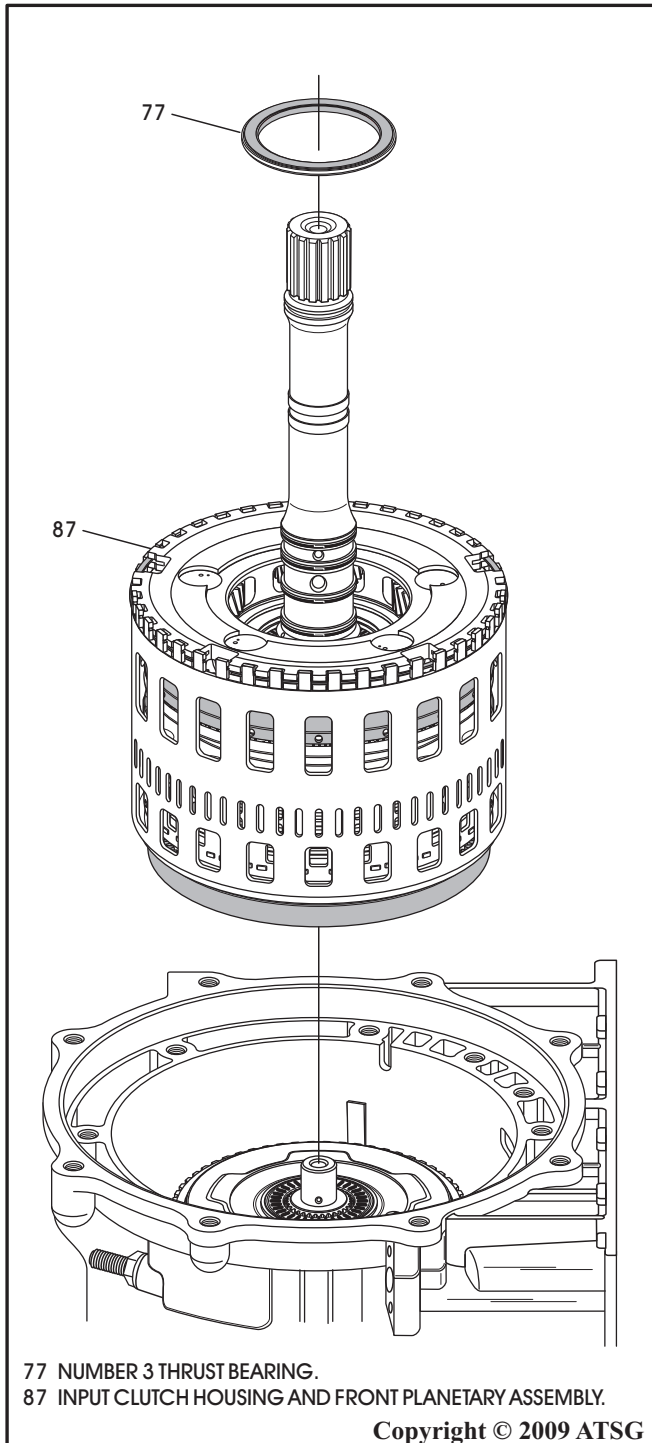


Figure 46

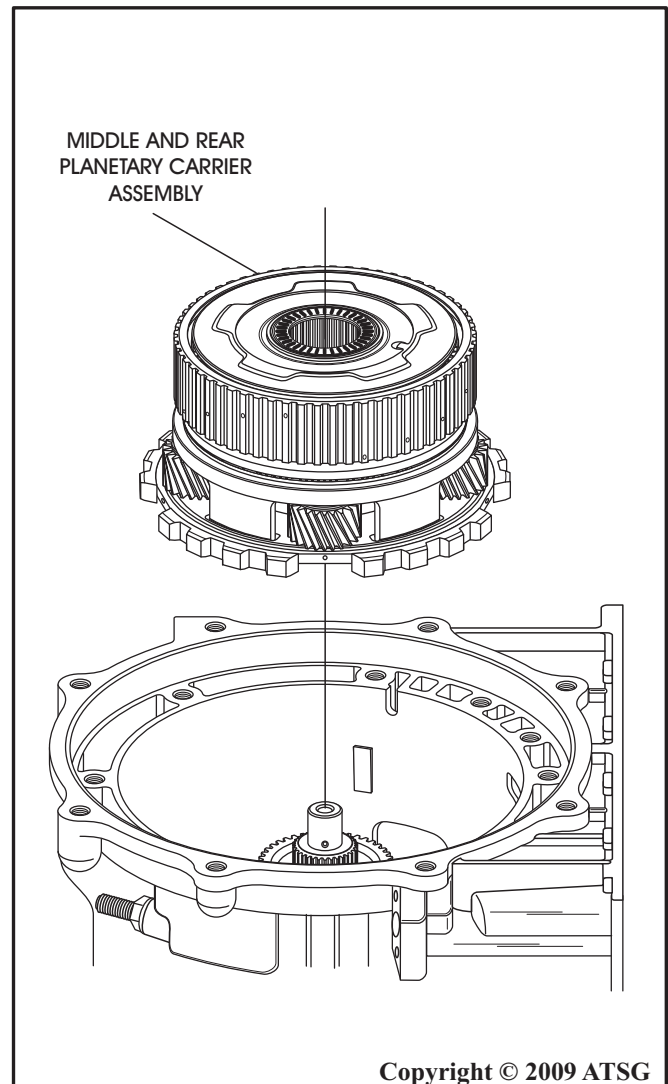


Figure 47

TRANSMISSION DISASSEMBLY (CONT'D)

26. Separate the center and rear planetary carriers, as shown in Figure 48.
27. Separate the number 6 thrust bearing, as shown in Figure 48.
28. Separate the number 7 thrust bearing, as shown in Figure 48.
29. Separate the number 8 thrust bearing race, as shown in Figure 48.
30. Separate the number 9 thrust bearing, as shown in Figure 48.
31. Set the center and rear planetary carriers aside for the component rebuild section.
32. Remove 1st sprag and sun gear shaft assembly from the case, as shown in Figure 49.
33. Set the 1st sprag and sun gear shaft assembly aside for the component rebuild section.

Continued on Page 38

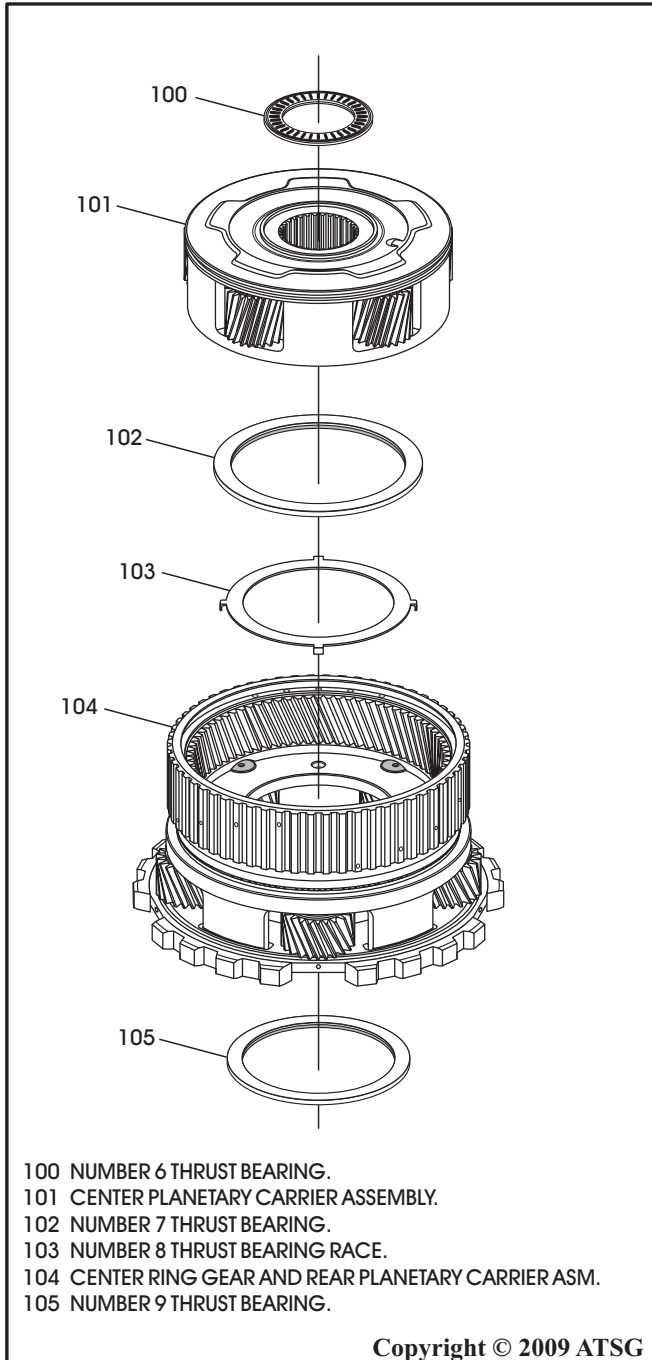


Figure 48

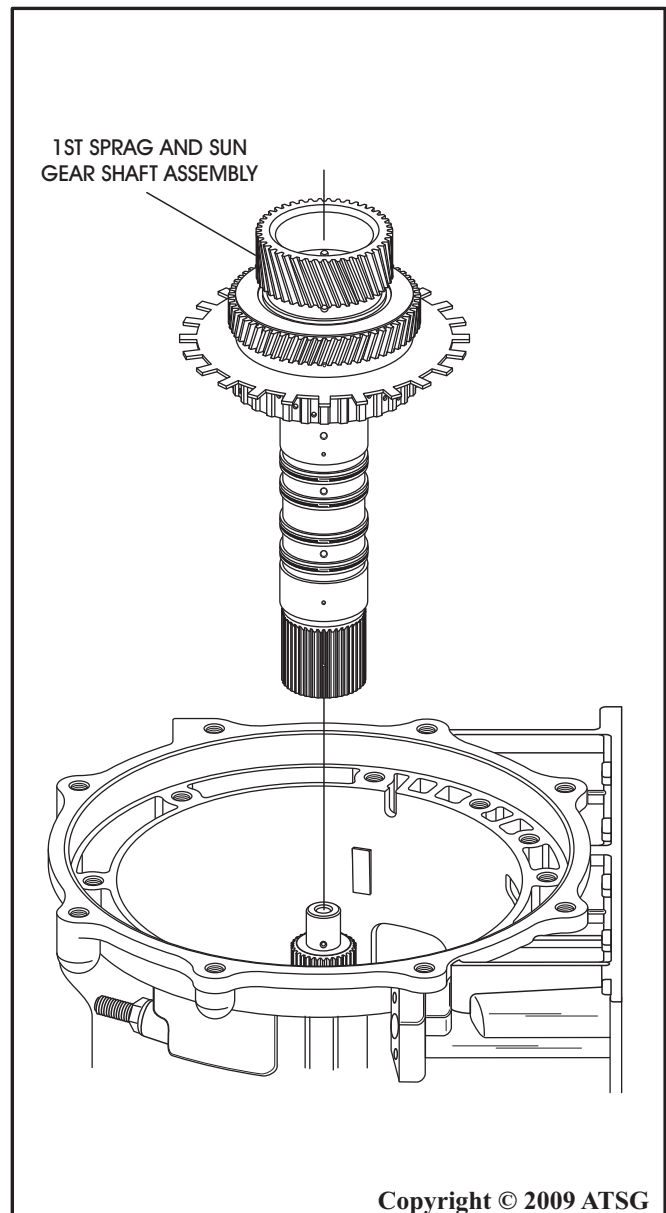


Figure 49

TRANSMISSION DISASSEMBLY (CONT'D)

34. Remove the number 13 thrust bearing race, as shown in Figure 50, from the high and low reverse clutch housing.
35. Remove high and low reverse clutch housing from the case, as shown in Figure 50.
36. Remove the number 14 thrust bearing from the high and low reverse clutch housing, as shown in Figure 50.
37. Remove the direct clutch housing assembly, as shown in Figure 51.

Note: Number 14 thrust bearing may be stuck to direct clutch housing.

38. Set the direct clutch housing assembly aside for the component rebuild section.

Continued on Page 39

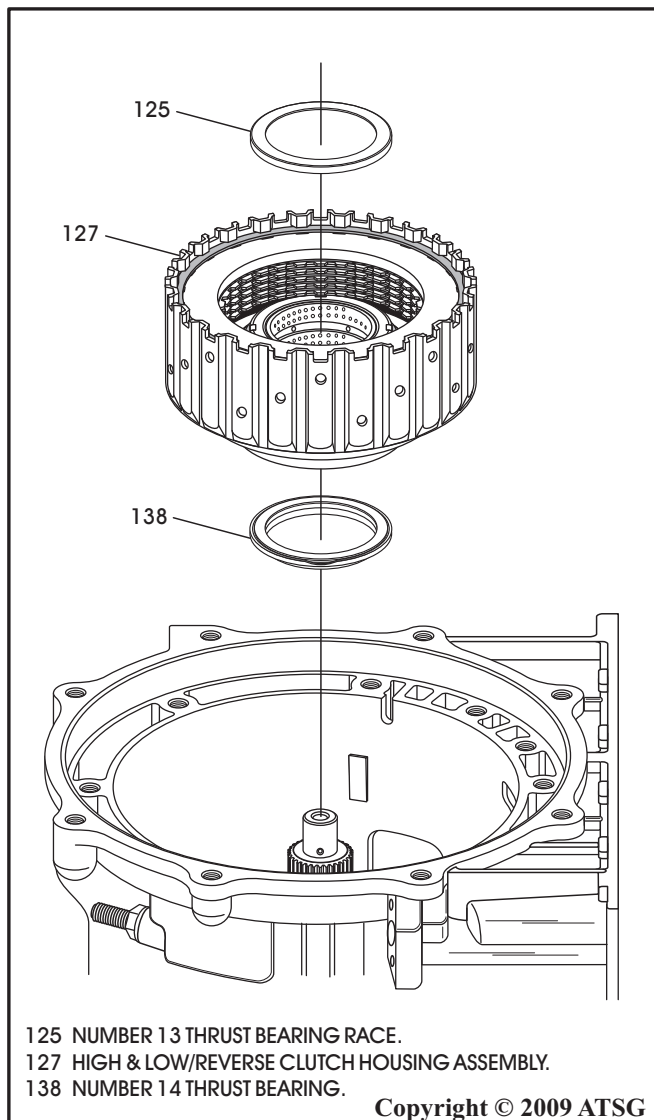


Figure 50

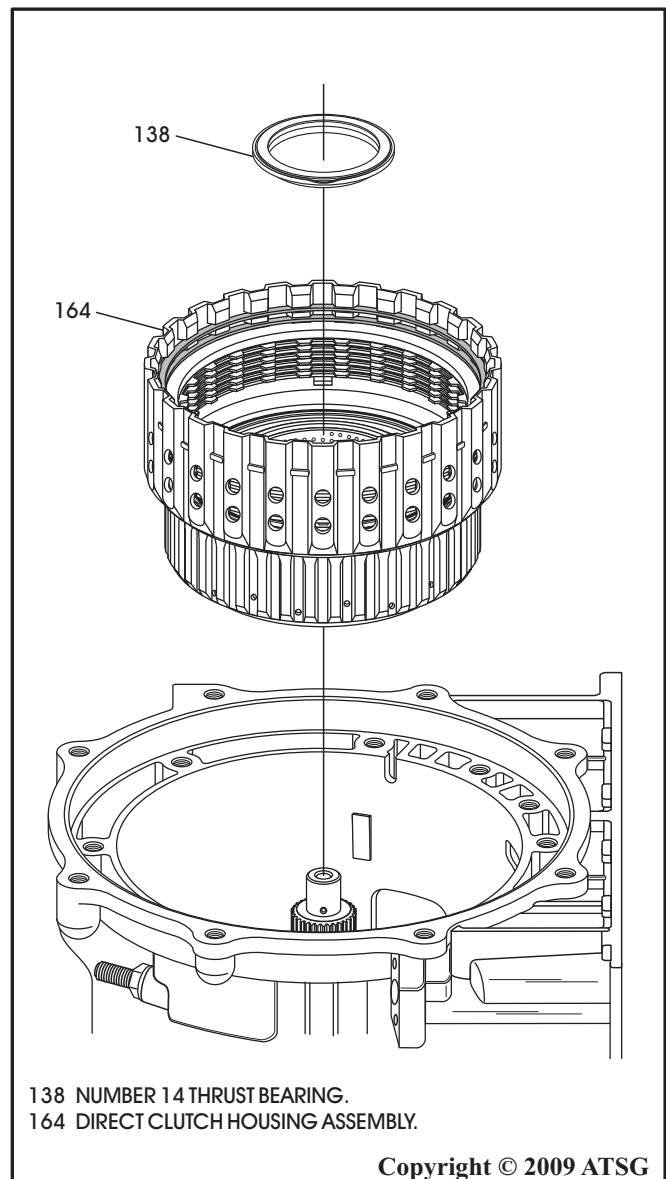


Figure 51

TRANSMISSION DISASSEMBLY (CONT'D)

39. Remove the reverse brake clutch backing plate snap ring from case, as shown in Figure 52.
 40. Remove the reverse brake clutch backing plate from case, as shown in Figure 52.
 41. Remove the reverse brake clutch plates from the case, as shown in Figure 52.
- Note:** Notice there is an "N" spring located in one groove of case, as shown in Figure 52.
42. Remove the "N" spring and make note of its groove location and orientation.
 43. Remove reverse brake clutch "dished" cushion plate, as shown in Figure 52.
 44. Turn the transmission over so that extension housing or 4WD adapter housing is facing up, as shown in Figure 53

Continued on Page 40

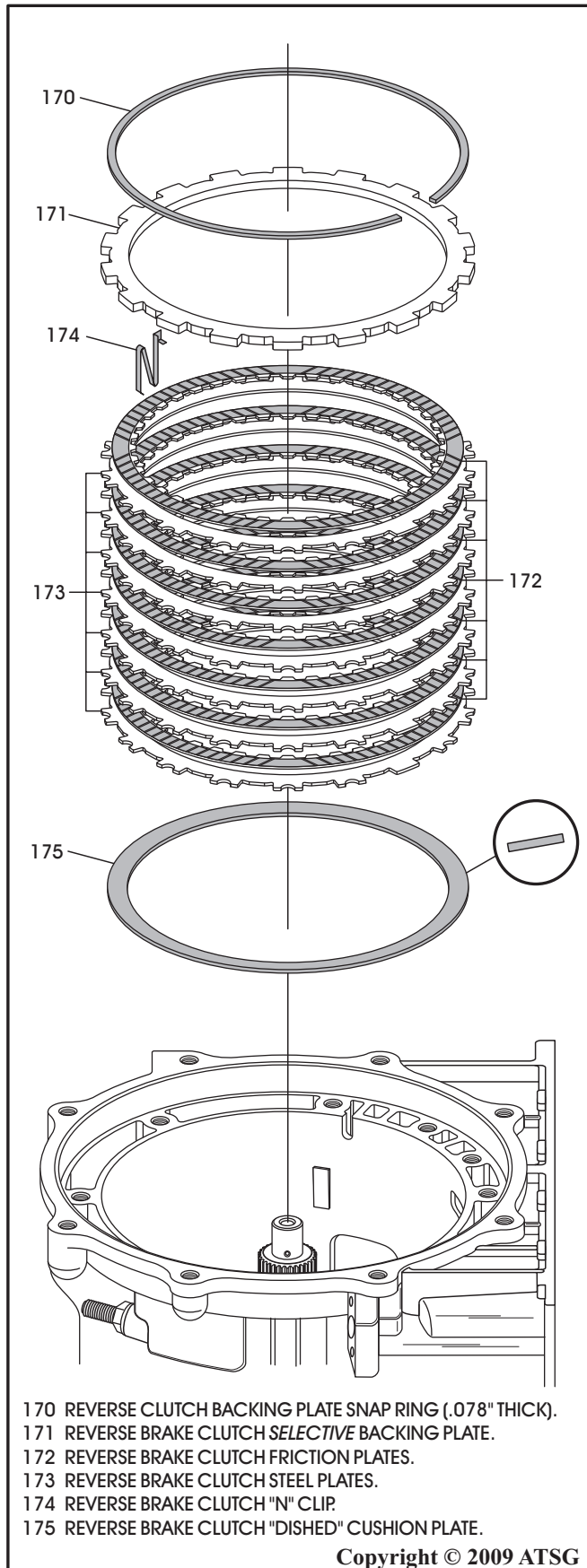


Figure 52

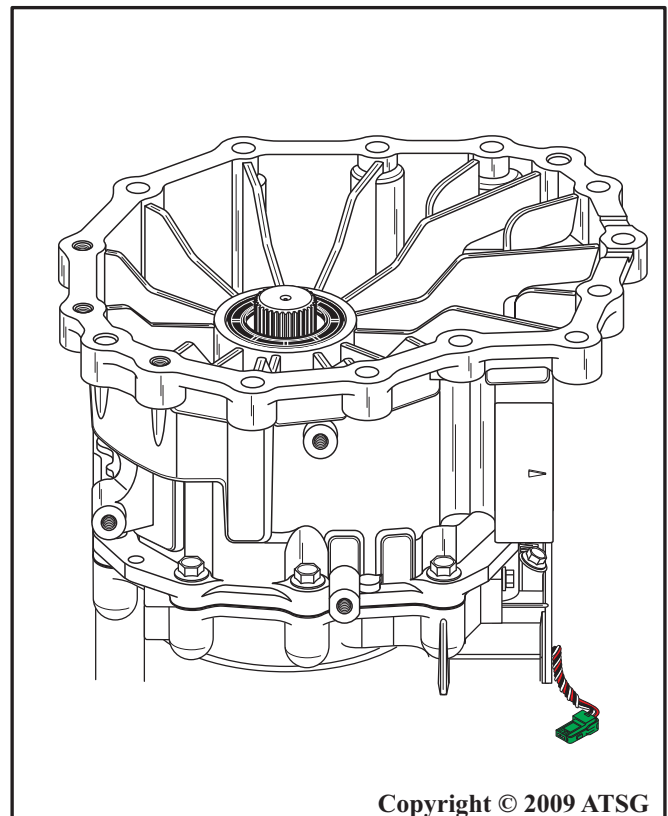


Figure 53

TRANSMISSION DISASSEMBLY (CONT'D)

45. Remove the extension housing or 4WD adapter housing retaining bolts, as shown in Figure 54.
Note: There are 10 required, and on the 4WD adapter housing 4 are located down inside, as shown in Figure 54.
46. Remove the extension housing or 4WD adapter housing, as shown in Figure 54.
47. Remove and discard housing to case gasket.
48. Remove the number 21 thrust bearing race and the number 22 thrust bearing (See Figure 55).
Note: Number 22 thrust bearing may be stuck to adapter housing (See Figure 54)
49. Remove the output/revolution sensor, as shown in Figure 55.

Continued on Page 41

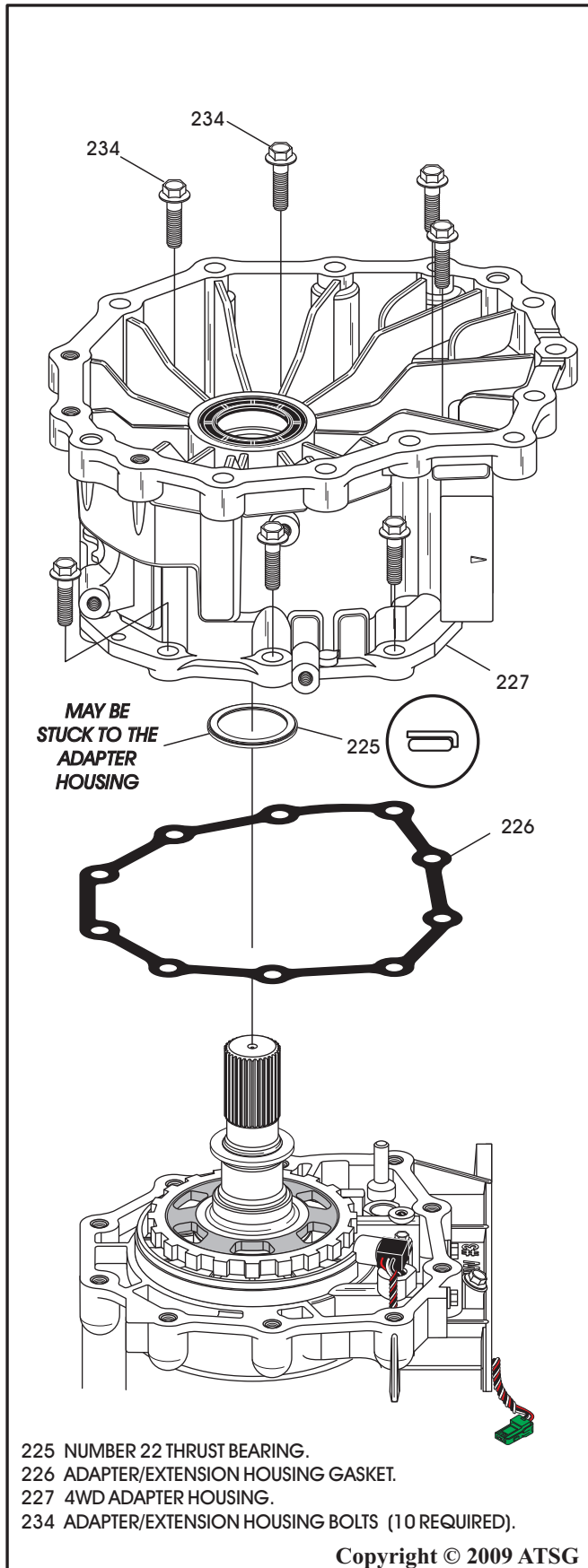


Figure 54

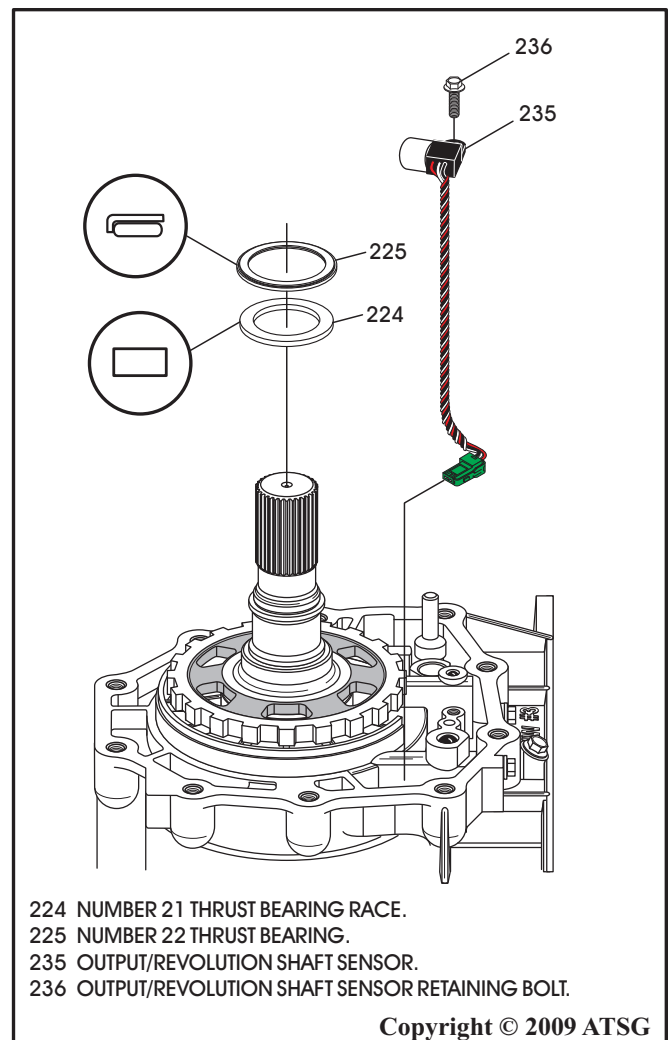


Figure 55

TRANSMISSION DISASSEMBLY (CONT'D)

50. Remove the parking gear and the number 20 thrust bearing, as shown in Figure 56.
51. Remove the output shaft by rotating back and forth as you pull straight up, as shown in Figure 58.
52. Set the output shaft aside for the component rebuild section.
53. Assemble universal spring compressor shown in Figure 57 through the rear of case so we can compress the reverse brake clutch piston return spring.

Continued on Page 42

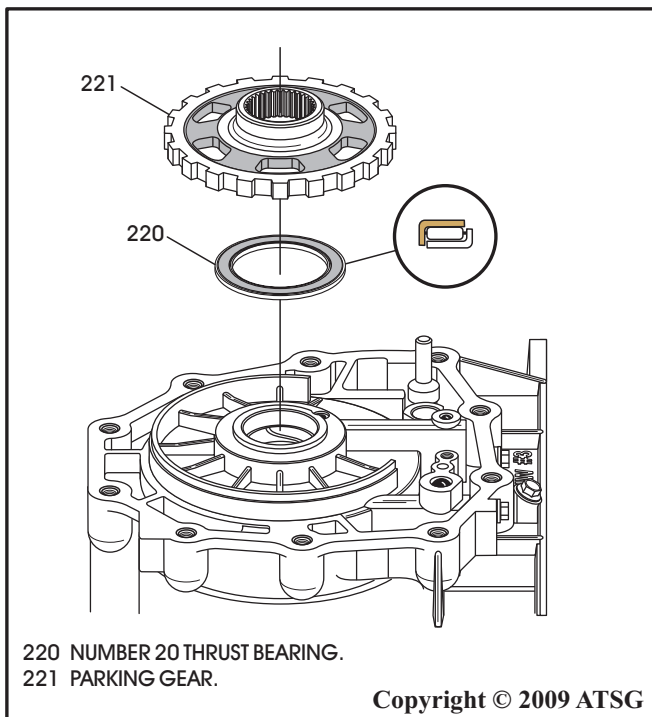


Figure 56

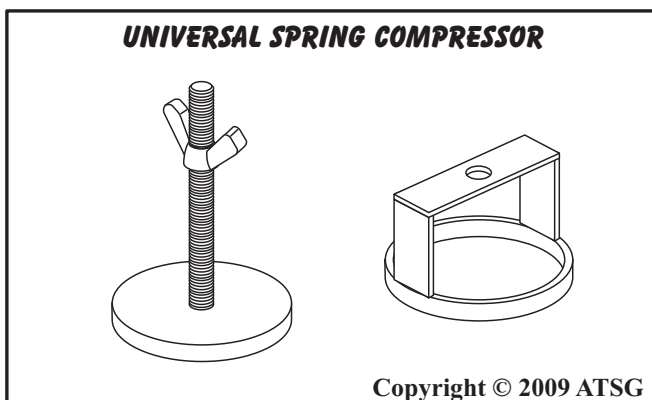


Figure 57

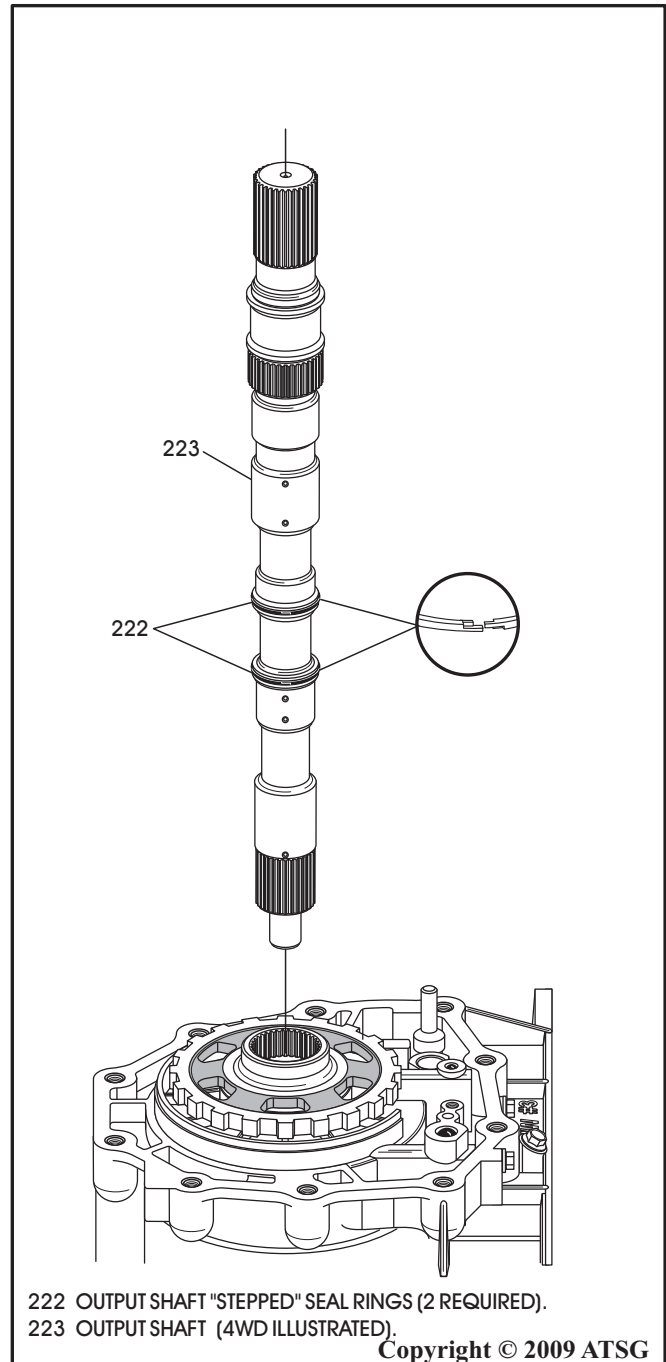


Figure 58

TRANSMISSION DISASSEMBLY (CONT'D)

54. Compress reverse brake clutch piston return spring and remove the snap ring, as shown in Figure 59.
55. Remove the universal spring compressor.
56. Remove reverse brake clutch return spring retainer, as shown in Figure 59.

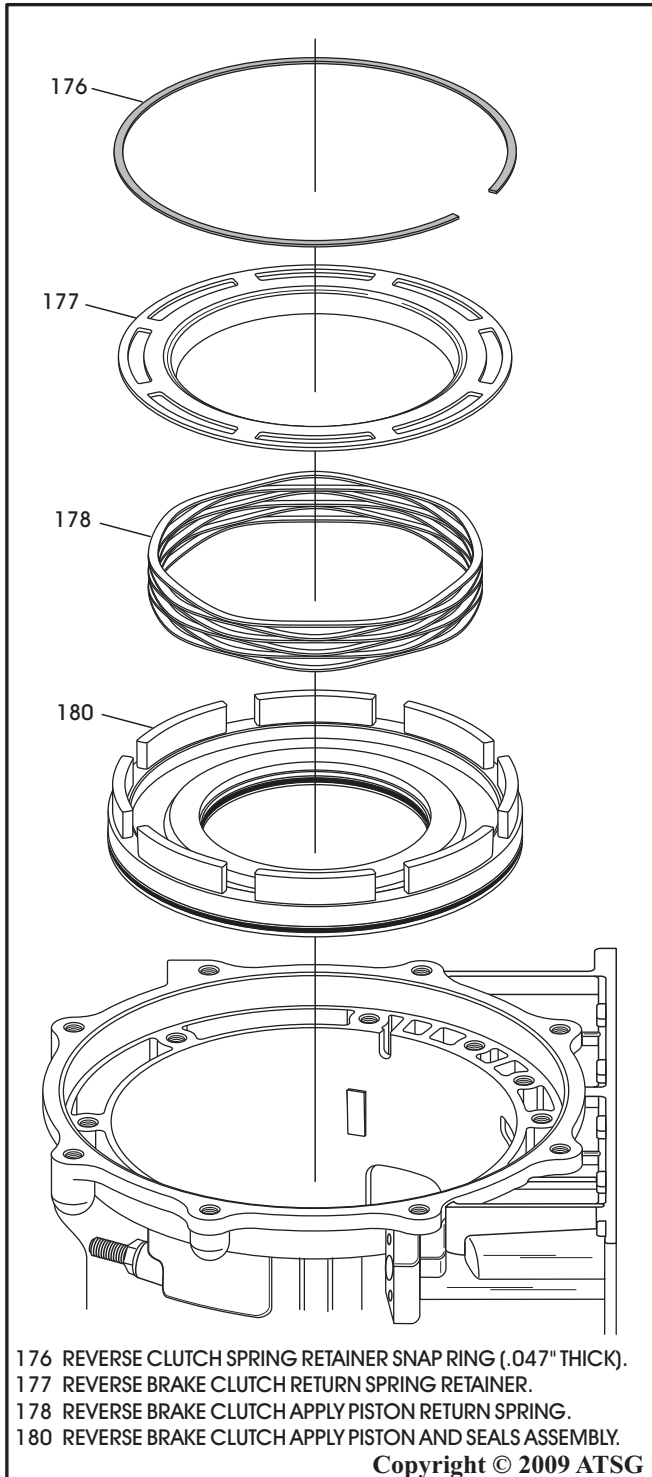


Figure 59

57. Remove the reverse brake clutch return spring, as shown in Figure 59.
58. Remove the reverse clutch brake apply piston, as shown in Figure 59.
- Note: Reverse brake clutch piston must be removed to gain access to the drum support snap ring.**
59. Remove drum support to case "tapered" snap ring, as shown in Figure 60.

Caution: This is a "Very" strong snap ring and will require a very strong pair of snap ring pliers.

Continued on Page 43

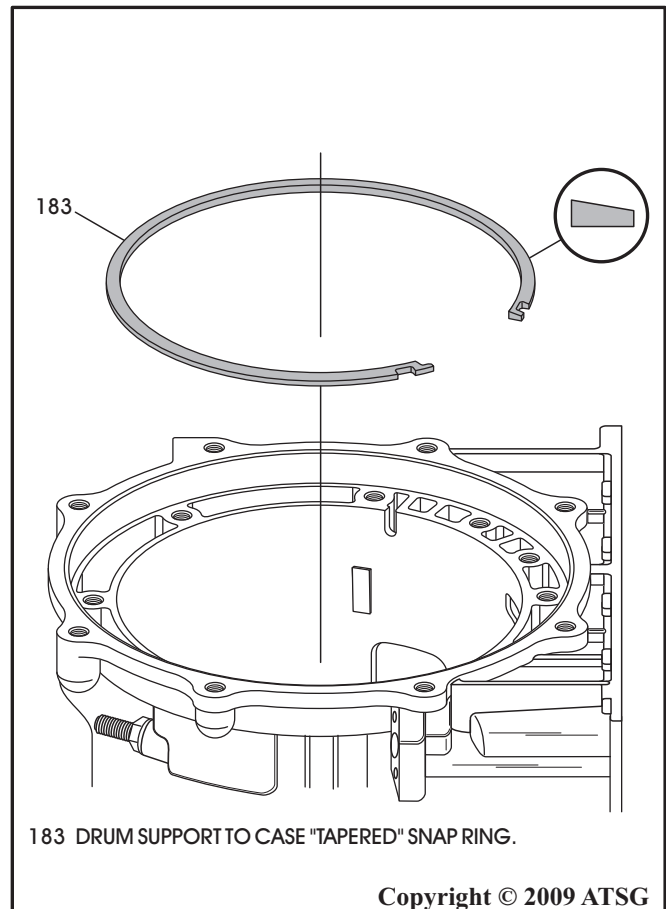


Figure 60

TRANSMISSION DISASSEMBLY (CONT'D)

60. Remove the three drum support retaining bolts from the valve body side of case, as shown in Figure 61, using a 45 "Torx" head socket.
 61. Remove the drum support assembly from the case "carefully", as it is a close fit, as shown in Figure 62.
 62. Remove the number 14 and 15 thrust bearings, as shown in Figure 62.
 63. Remove the number 16 thrust bearing from the back side of support, as shown in Figure 63.
- Note: Number 16 thrust bearing may be stuck on forward sprag, still in case.**
64. Set the drum support assembly aside for the component rebuild section.

Continued on Page 44

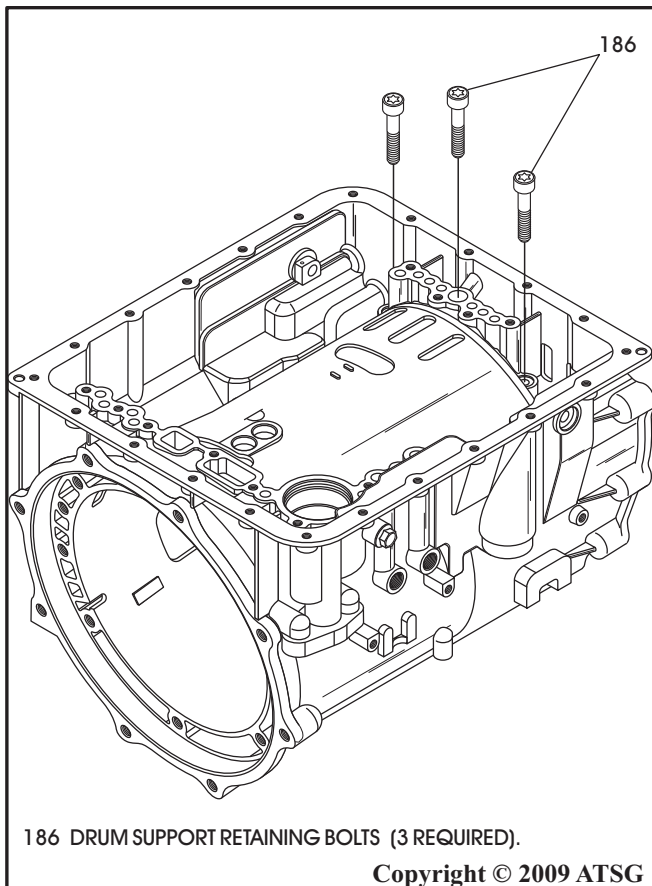


Figure 61

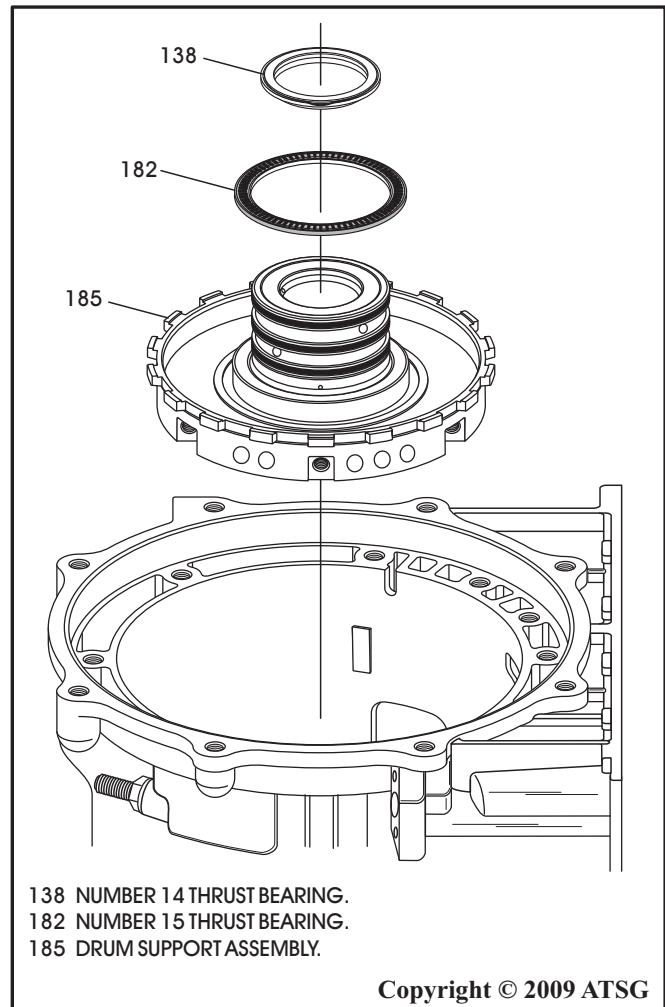


Figure 62

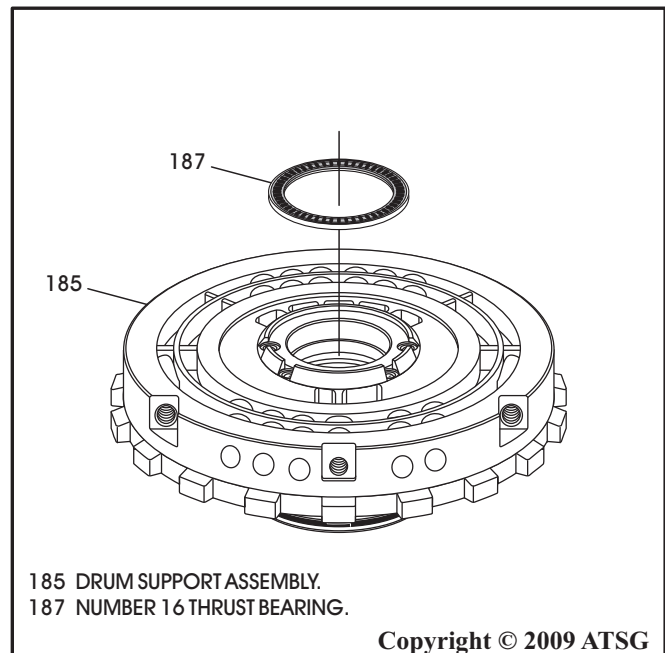


Figure 63

TRANSMISSION DISASSEMBLY (CONT'D)

65. Remove the forward sprag assembly, as shown Figure 64.
66. Remove number 19 thrust bearing race from the hub in case, as shown in Figure 64.
67. Remove number 18 thrust bearing, as shown in Figure 65.
68. Remove the forward brake clutch snap ring and backing plate, as shown in Figure 66.

Note: All snap rings should be tagged for identification, as many are very similar.

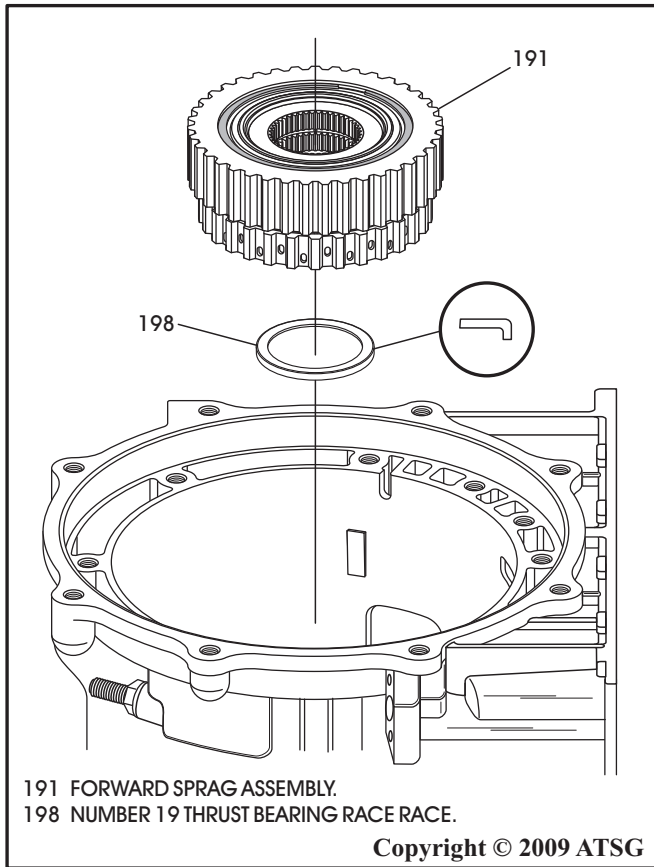


Figure 64

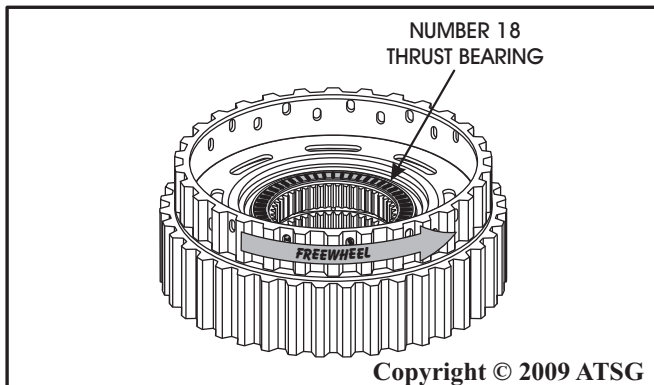


Figure 65

69. Remove the forward brake clutch plates and forward brake clutch "dished" plate, as shown in Figure 66.

Continued on Page 45

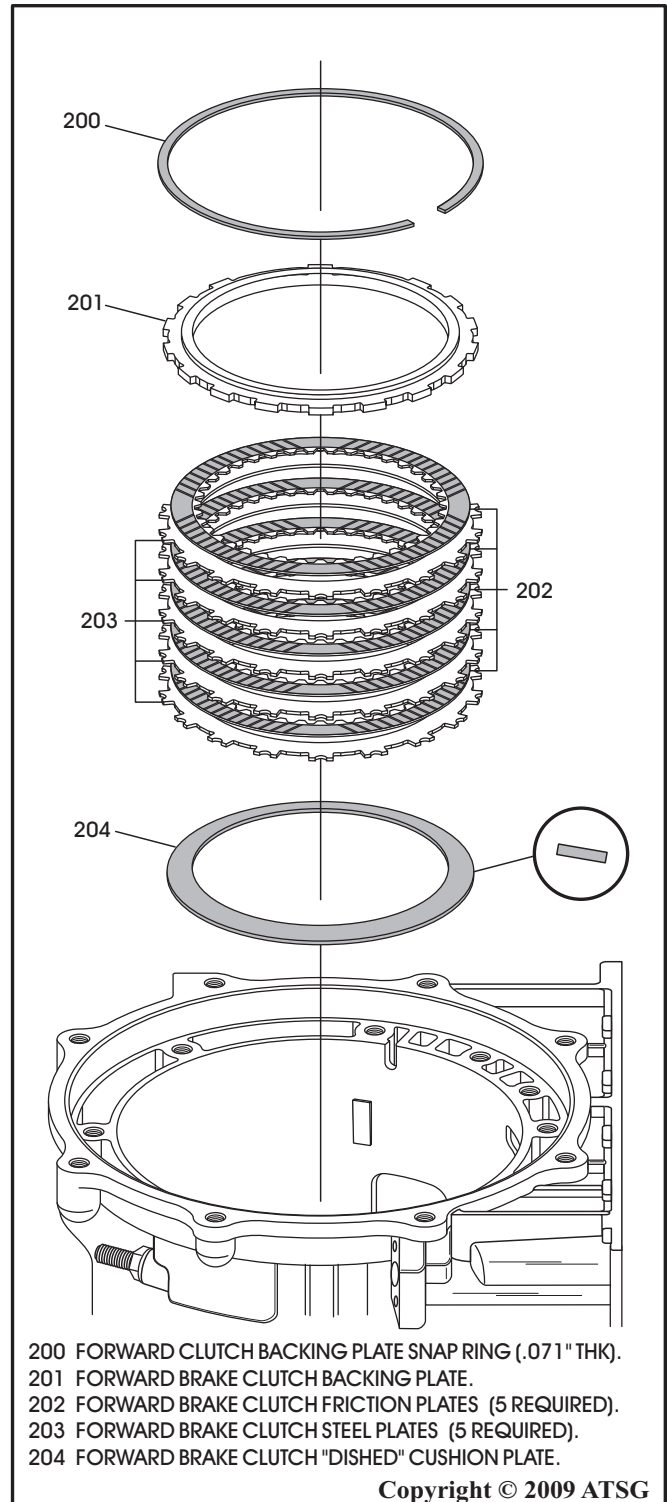


Figure 66

TRANSMISSION DISASSEMBLY (CONT'D)

70. Remove low coast brake clutch backing plate, friction and steel plates, and the apply plate, as shown in Figure 67.
71. Install universal spring compressor through the rear of case to compress the return spring for the low coast brake and forward brake clutch pistons, as shown in Figure 68.
72. Compress the spring retainer and remove the snap ring (See Figure 69).
73. Remove the universal spring compressor.
74. Remove the snap ring and piston return spring assembly from case, as shown in Figure 69.

Continued on Page 46

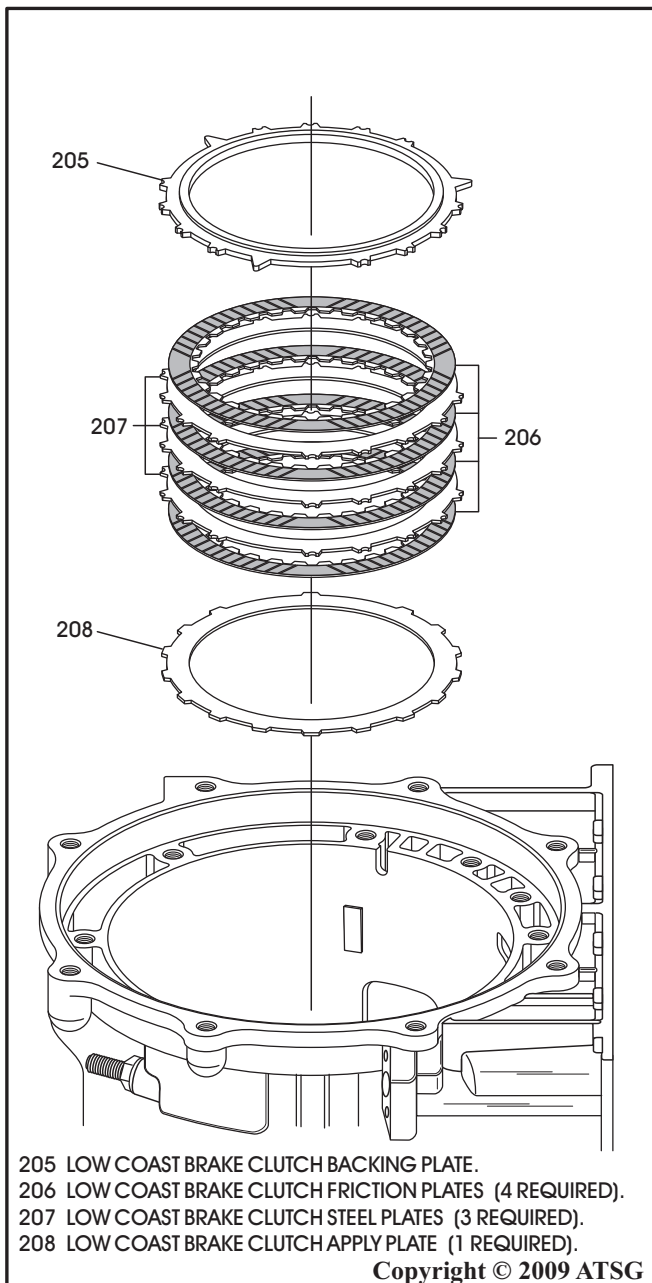


Figure 67

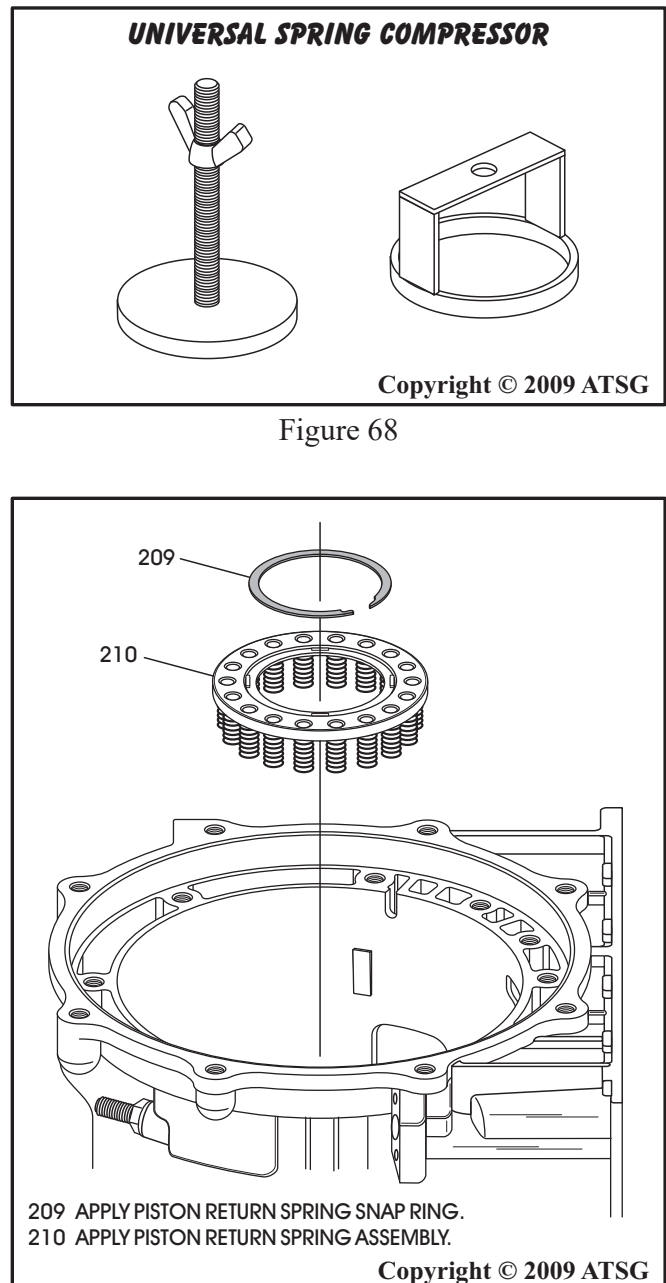


Figure 69

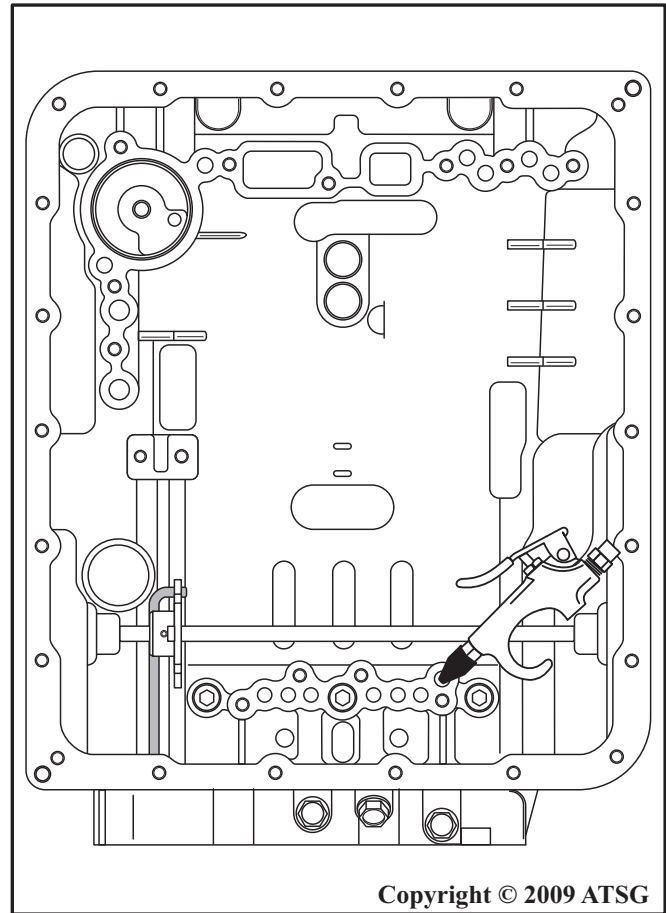
TRANSMISSION DISASSEMBLY (CONT'D)

75. Remove the low coast and forward brake clutch clutch pistons from case together, as shown in Figure 70, using compressed air through the forward brake passage (See Figure 71).

Note: *Compressed air should be applied slowly so as not to "cock" the piston in case. This makes it harder to disassemble. It is best to use air pressure regulated to 50 psi.*

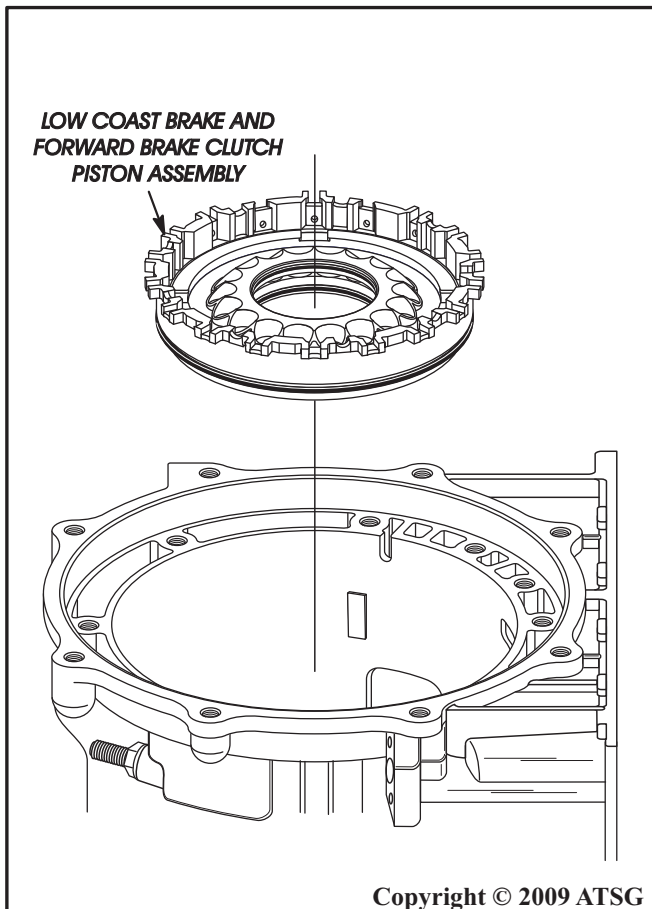
76. After removal from the case, separate the two pistons, as shown in Figure 72.

77. This completes transmission disassembly.



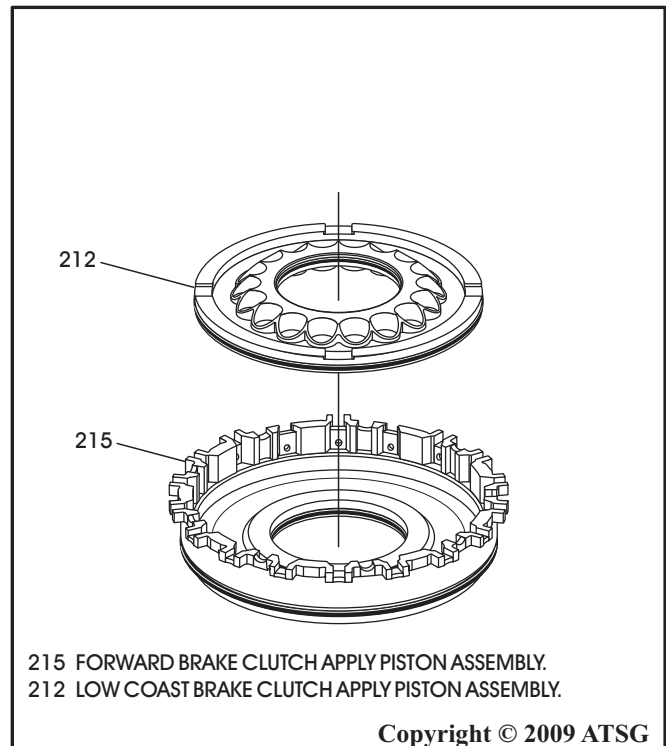
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Figure 71



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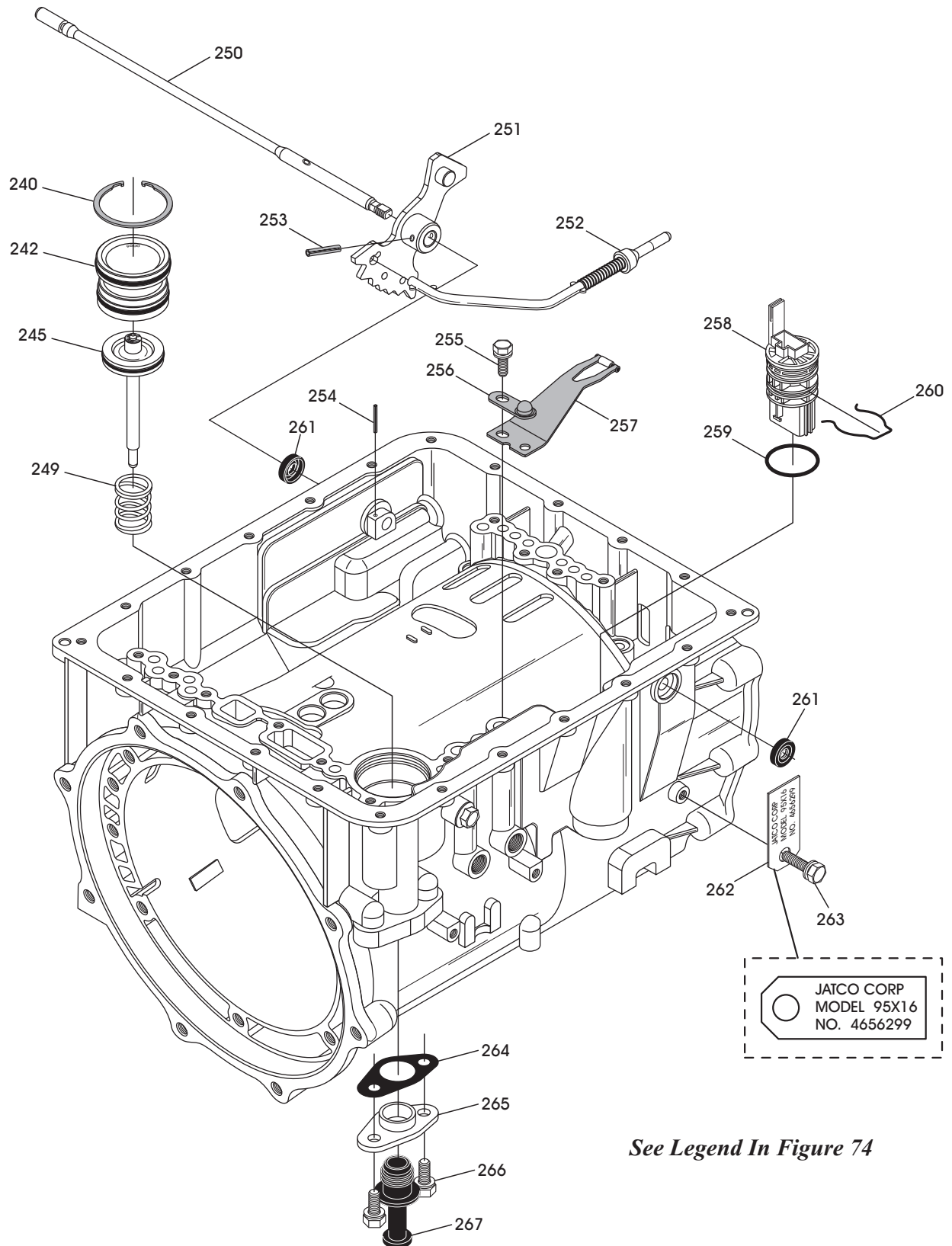
Figure 70



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Figure 72

TRANSMISSION CASE AND RELATED PARTS EXPLODED VIEW



See Legend In Figure 74

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Figure 73

COMPONENT REBUILD

Transmission Case Assembly

1. Disassemble the manual shaft and the parking linkage parts by removing the two retaining pins, and using Figure 73 as a guide.
2. Remove and discard the "two" manual shaft seals using a flat blade screwdriver. Refer to Figure 73.
3. Remove the pass-thru case connector retaining clip, and carefully press the connector toward the pan rail (See Figure 73).
4. Remove the front brake band servo using small internal snap ring pliers (See Figure 73).
5. Remove and discard fill plug adapter gasket, as shown in Figure 73.
6. Clean all case and linkage parts thoroughly and dry with compressed air.
7. Inspect all case and linkage parts thoroughly for any wear and/or damage and replace as necessary.

Note: It is not necessary to remove the inside detent roller and spring assembly from the case, unless there is obvious damage.

Figure 73 Legend

- 240 FRONT BRAKE BAND SERVO RETAINING SNAP RING.
- 242 FRONT BRAKE BAND SERVO COVER ASSEMBLY.
- 245 FRONT BRAKE BAND PISTON AND PIN ASSEMBLY.
- 249 FRONT BRAKE BAND SERVO PISTON RETURN SPRING.
- 250 MANUAL SHAFT.
- 251 INSIDE DETENT LEVER.
- 252 PARKING ROD ASSEMBLY.
- 253 DETENT LEVER RETAINING ROLLED PIN.
- 254 MANUAL SHAFT RETAINING ROLLED PIN.
- 255 DETENT SPRING AND ROLLER RETAINING BOLT.
- 256 DETENT SPRING AND ROLLER SUPPORT PLATE.
- 257 DETENT SPRING AND ROLLER ASSEMBLY.
- 258 TRANSMISSION CASE CONNECTOR.
- 259 TRANSMISSION CASE CONNECTOR "O" RING SEAL.
- 260 TRANSMISSION CASE CONNECTOR RETAINING CLIP.
- 261 MANUAL SHAFT SEALS (2 REQUIRED).
- 262 TRANSMISSION IDENTIFICATION TAG.
- 263 TRANSMISSION IDENTIFICATION TAG RETAINING BOLT.
- 264 FILL PLUG ADAPTER TO CASE GASKET.
- 265 FILL PLUG ADAPTER.
- 266 FILL PLUG ADAPTER RETAINING BOLTS (2 REQUIRED).
- 267 FILL PLUG.

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Figure 74

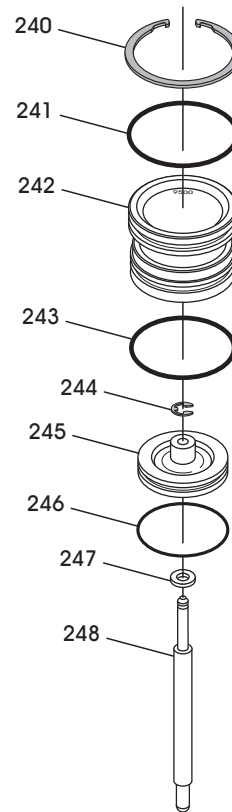
8. Install new "O" rings onto the front brake band servo cover, as shown in Figure 75.

Note: Requires two different size "O" rings, 1 large and 1 small.

9. Install new "O" ring seal on front brake band piston, as shown in Figure 75.
10. Lubricate all of the "O" ring seals with a small amount of Trans-Jel®.
11. Install front brake band servo piston assembly into the servo cover.

Continued on Page 49

FRONT BRAKE BAND SERVO EXPLODED VIEW



- 240 BRAKE BAND SERVO RETAINING SNAP RING.
- 241 BRAKE BAND SERVO COVER LARGE "O" RING SEAL.
- 242 BRAKE BAND SERVO COVER.
- 243 BRAKE BAND SERVO COVER SMALL "O" RING SEAL.
- 244 BRAKE BAND SERVO PISTON RETAINING "E" CLIP.
- 245 BRAKE BAND SERVO PISTON.
- 246 BRAKE BAND SERVO PISTON "O" RING SEAL.
- 247 BRAKE BAND SERVO SPACER.
- 248 BRAKE BAND SERVO APPLY PIN.

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Figure 75

COMPONENT REBUILD (CONT'D)

Transmission Case Assembly (Cont'd)

12. Install the front brake band servo return spring, front brake band servo assembly into the case bore, as shown in Figure 73.
13. Compress the servo cover and install the snap ring, as shown in Figure 73.
14. Install new manual shaft seals into case bores and until flush with case, using proper driver, and lube with Trans-Jel® (See Figure 73).
15. Install the parking rod into the "key-hole" on the inside detent lever, as shown in Figure 73.
16. Install the assembly into the case and install manual shaft through the inside detent lever. Refer to Figure 73.
17. Install the two retaining pins (See Figure 73).
18. Install new "O" ring seal on case connector, lube with small amount of Trans-Jel®, install into case from inside and install the retaining clip, as shown in Figure 73.
19. Install inside detent spring and support plate, if it was removed, and torque the retaining bolt to 8 N·m (70 in.lb.). (See Figure 73).
20. Install fill plug adapter with a new gasket and torque retaining bolts to 8 N·m (70 in.lb.), as shown in Figure 73.
21. Install new "D" ring seals into the grooves of the low coast piston, as shown in Figure 76, and lube with small amount of Trans-Jel®.

22. Install new "D" ring seals into the grooves of the forward brake clutch piston, as shown in Figure 77, and lube with a small amount of Trans-Jel®.
23. Install low coast brake piston into the forward brake clutch piston, as shown in Figure 78.

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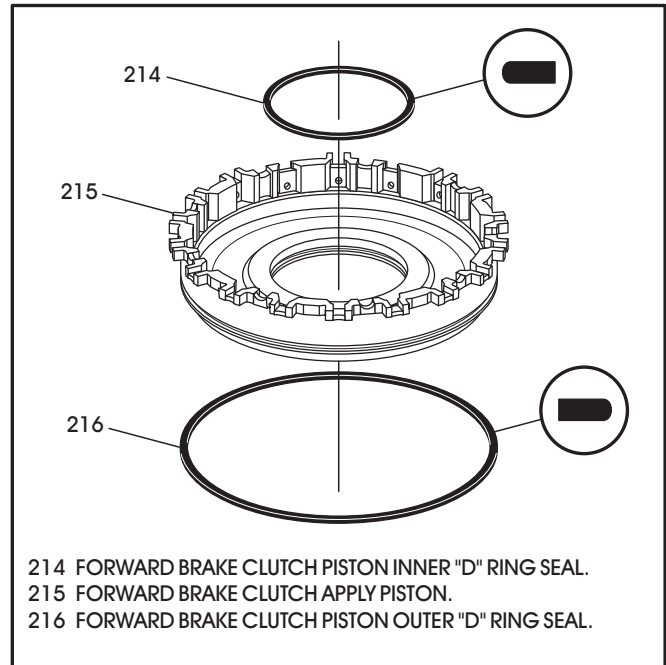


Figure 77

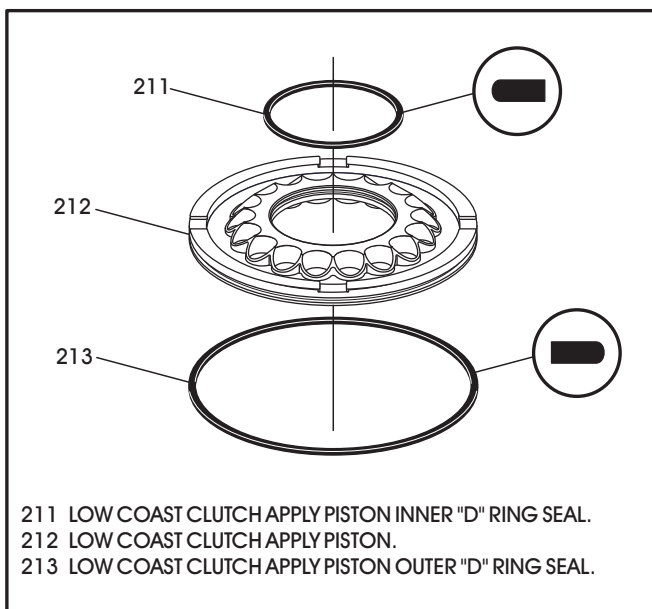


Figure 76

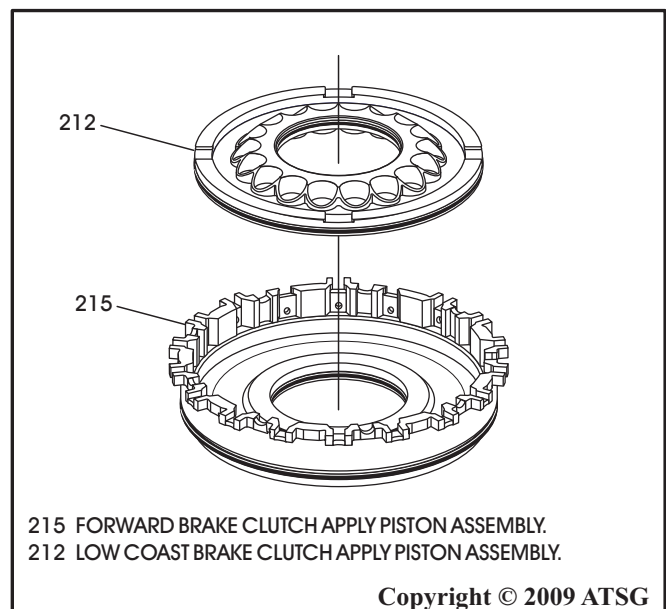


Figure 78

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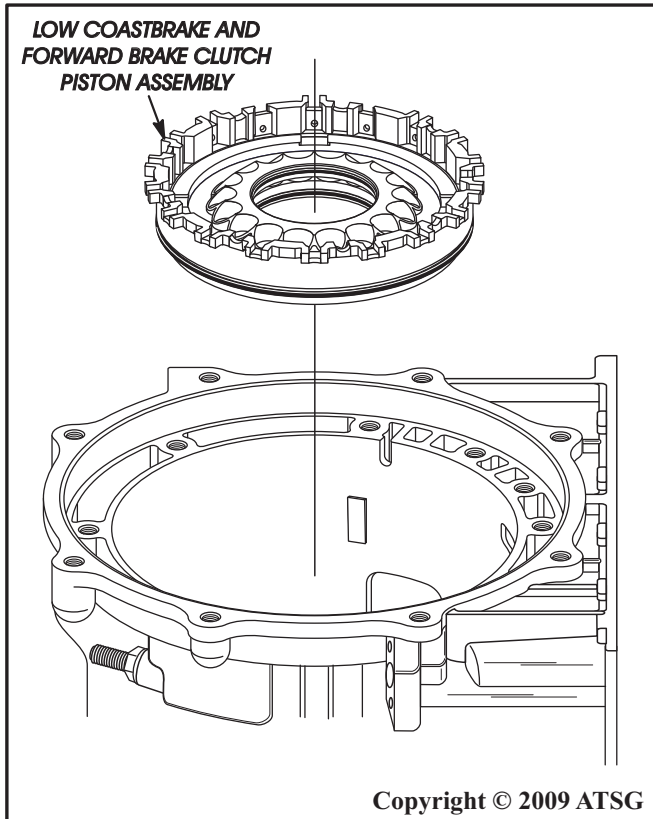


Figure 79

COMPONENT REBUILD (CONT'D)

Transmission Case Assembly (Cont'd)

24. Install the low coast brake and forward brake clutch piston assembly into the transmission case, as shown in Figure 79.

CAUTION: The forward brake clutch piston will go in the case in only one direction. The only "isolated" lug on the piston, must go to the 12-0-clock position in the case, as shown in Figure 80.

Continued on Page 51

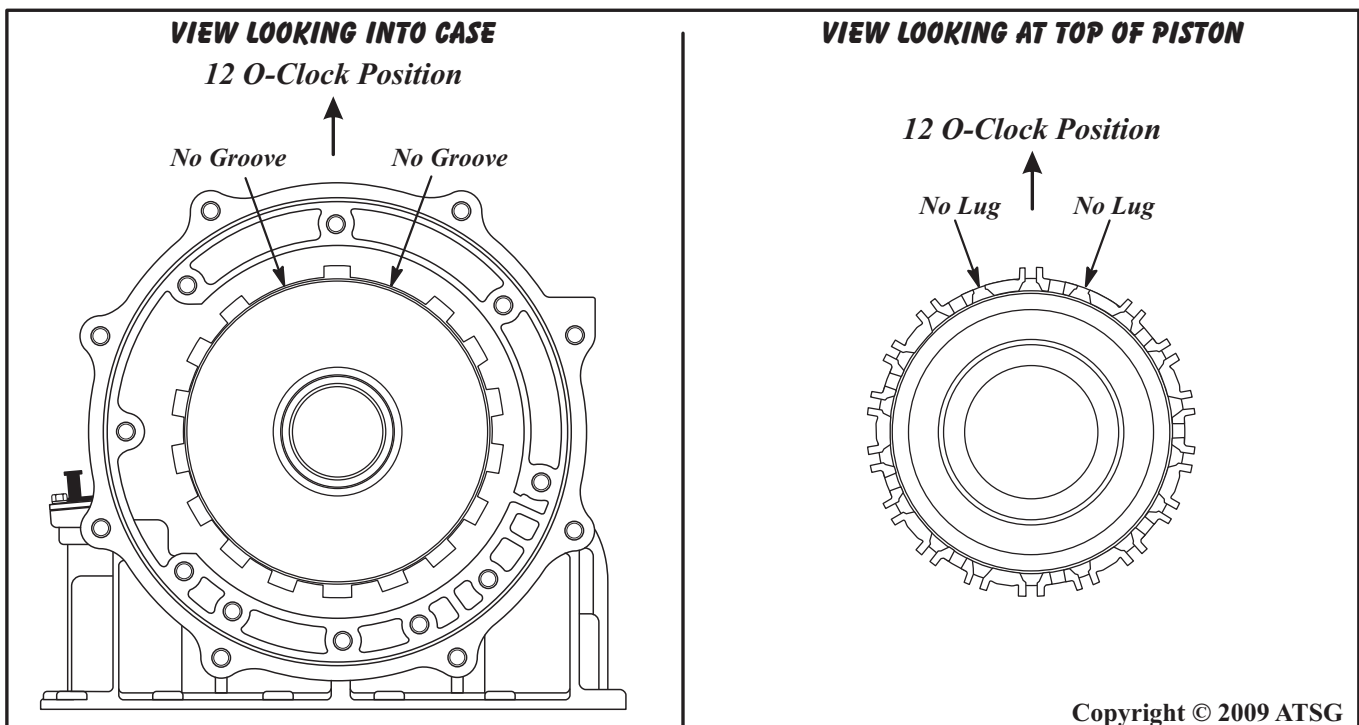


Figure 80

COMPONENT REBUILD (CONT'D)

Transmission Case Assembly (Cont'd)

25. Install the low coast brake and forward brake clutch piston assembly into the transmission case, as shown in Figure 81, with the isolated lug to the 12-0-clock position in the case.
26. Install the piston return spring assembly, with the snap ring, as shown in Figure 82, ensuring the springs are engaged into the piston.
27. Install spring compressor (Figure 83) through rear of case to compress the return spring.
28. Compress the return spring and install the snap ring into the case groove and ensure it is fully seated.
29. Remove the spring compressor.
30. Set the completed transmission case aside for the final assembly process.

**Component Rebuild
Continued on Page 52**

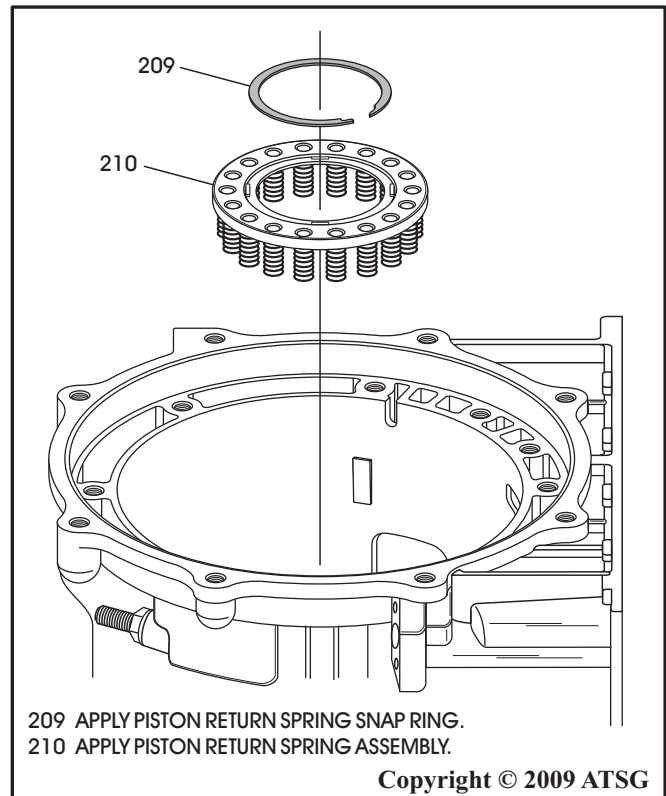


Figure 82

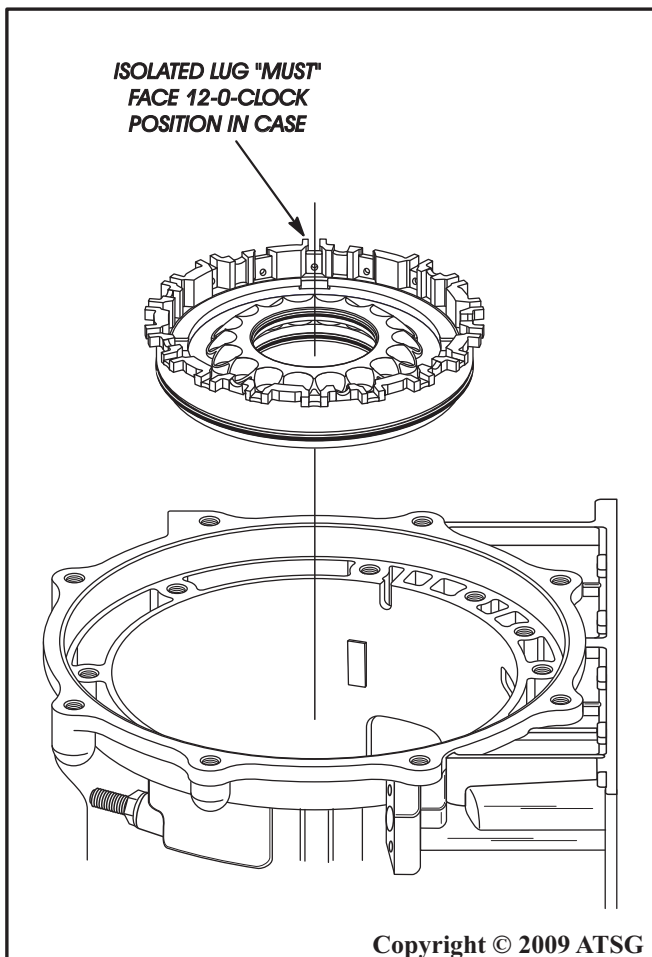


Figure 81

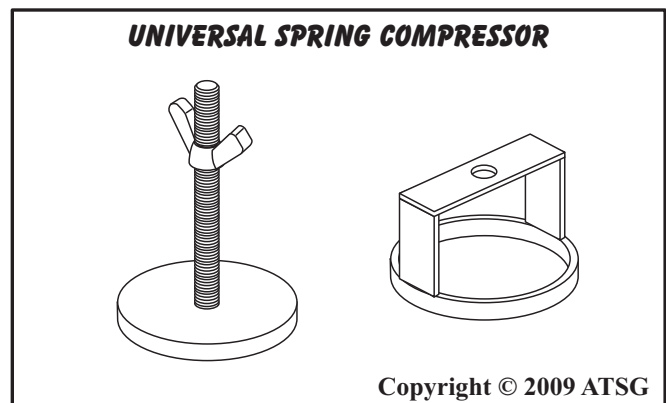


Figure 83

COMPONENT REBUILD (CONT'D)

Oil Pump Assembly

1. Disassemble the oil pump assembly using Figure 84 as a guide.
2. Remove and discard both "O" ring seals and the converter hub seal (See Figure 84).
3. Clean all oil pump parts thoroughly and dry with compressed air.
4. Inspect all oil pump assembly parts thoroughly for any wear and/or damage, and replace as necessary.

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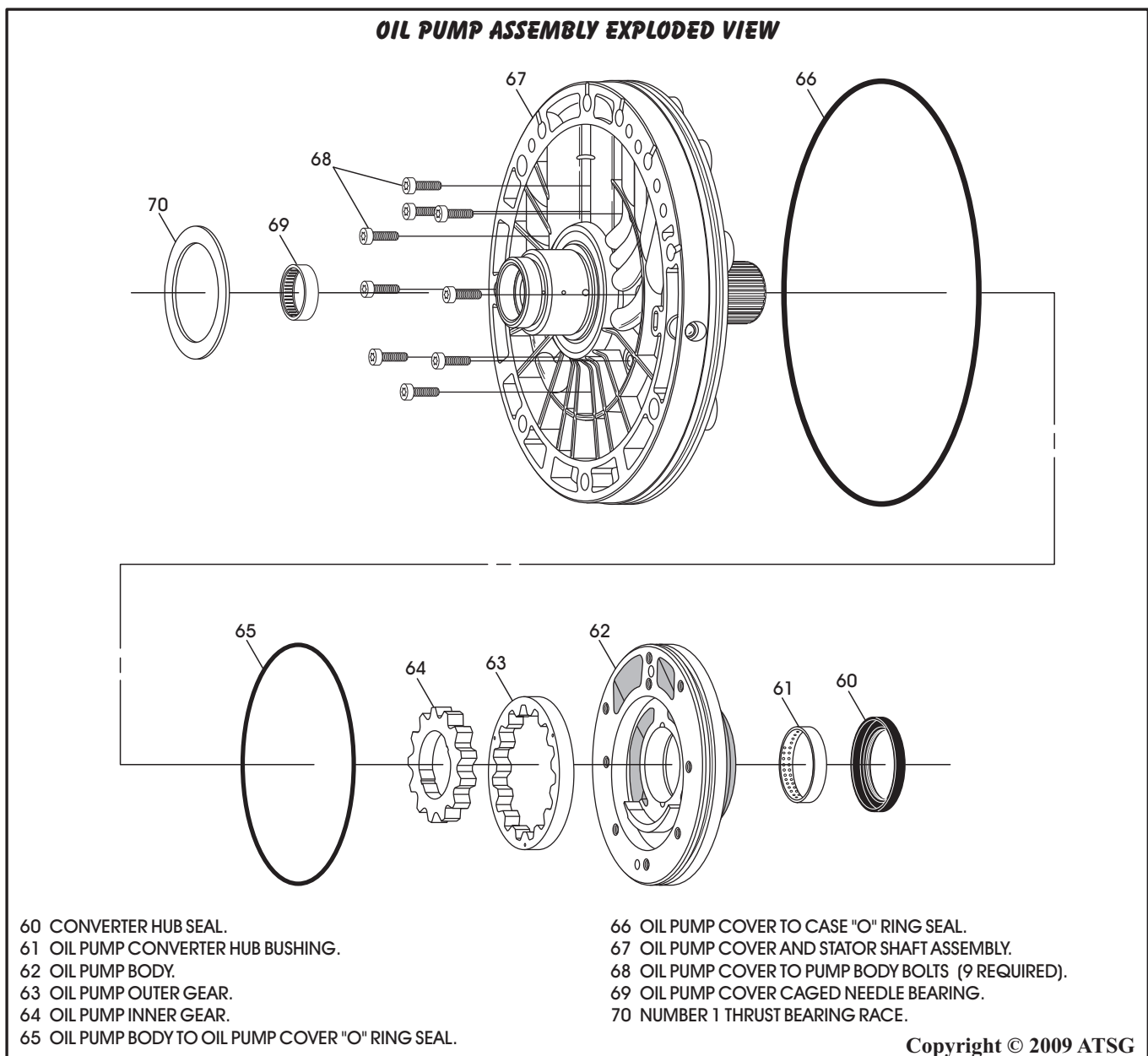


Figure 84

COMPONENT REBUILD (CONT'D)

Oil Pump Assembly (Cont'd)

5. Install a new oil pump bushing as necessary, as shown in Figure 85, using the proper driver.
6. Stake the bushing in place using a pin punch, as shown in Figure 86.
7. Install a new converter hub seal, as shown in Figure 85, using the proper seal driver.
8. Install the outer pump gear into oil pump body, with the "dots" on gear facing up, as shown in Figure 87.
9. Install the inner pump gear into oil pump body, with the step on the inside diameter facing the bushing, as shown in Figure 87.
10. Measure the oil pump gear clearances using a feeler gauge and a straight edge, as shown in Figure 88.

Note: Oil pump clearance specifications are also shown in Figure 88.

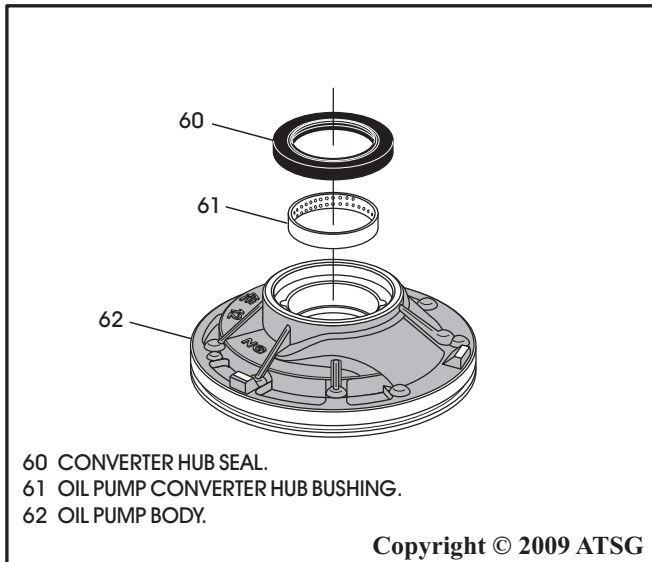


Figure 85

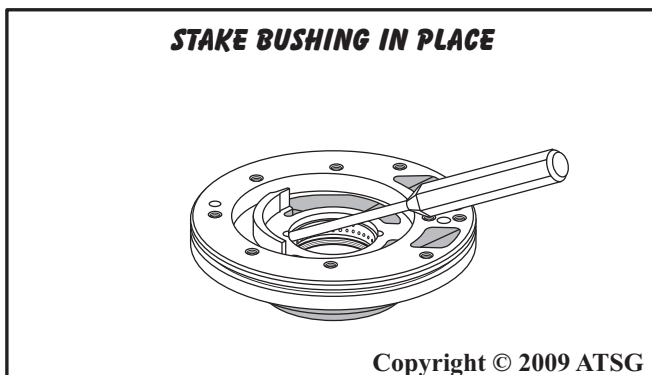


Figure 86

11. Lubricate the oil pump gears and pump pocket with a small amount of the proper fluid.

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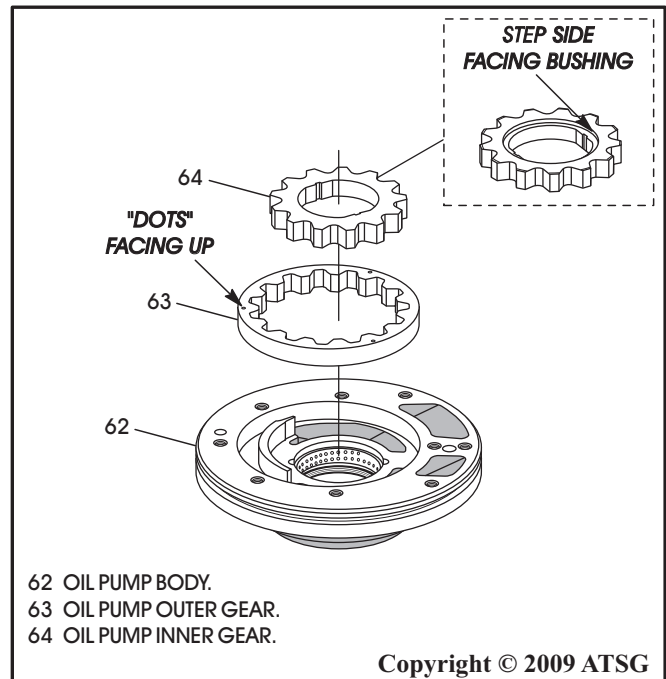


Figure 87

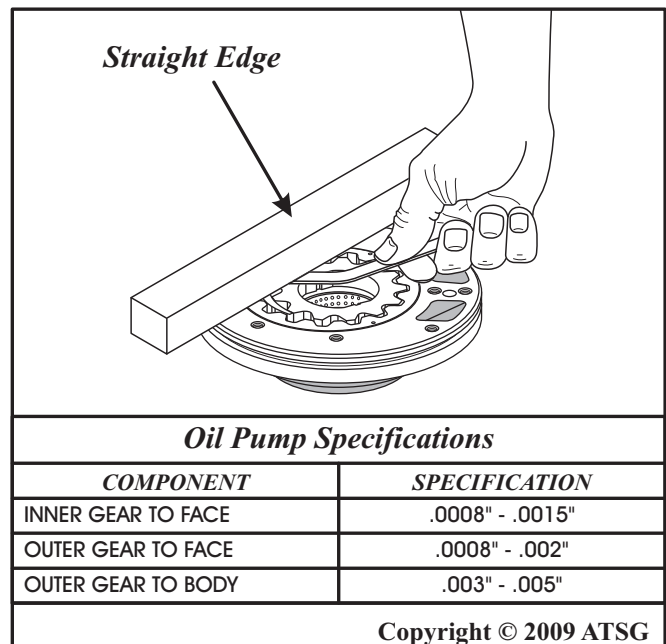


Figure 88

COMPONENT REBUILD (CONT'D)

Oil Pump Assembly (Cont'd)

12. Install new oil pump body to oil pump cover "O" ring seal, as shown in Figure 89, and lube a small amount of Trans-Jel®.
13. Install new caged needle bearing in oil pump cover as necessary, as shown in Figure 90, using the proper driver.
14. Install oil pump cover onto oil pump body, as shown in Figure 91, and install nine retaining bolts finger tight.
15. Torque the nine pump cover to pump body retaining bolts to 9 N·m (80 in.lb.), as shown in Figure 92.

Continued on Page 55

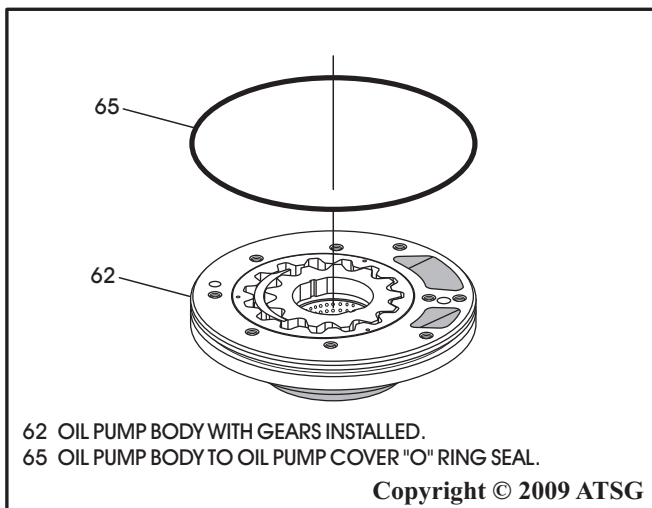


Figure 89

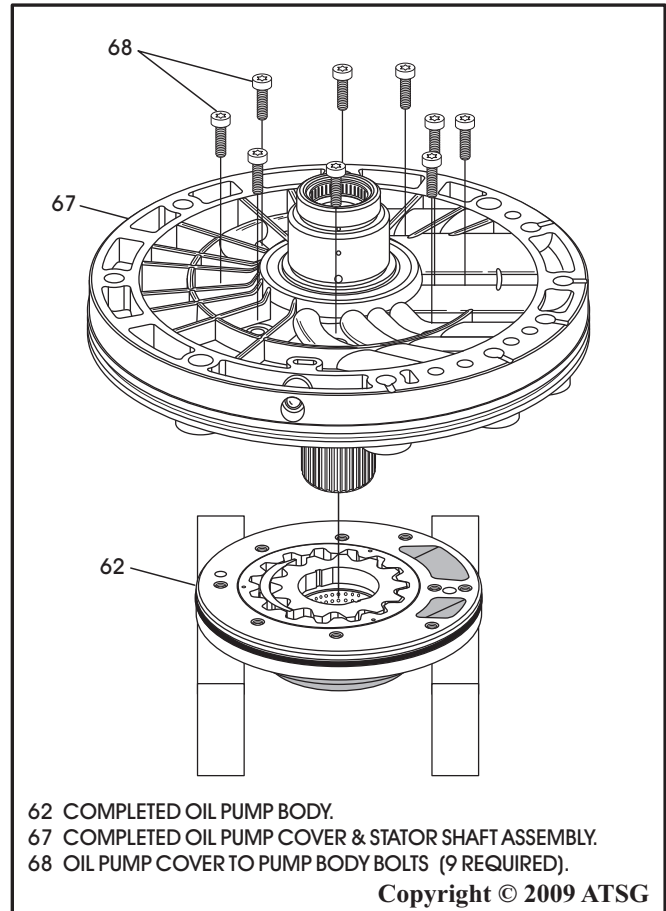


Figure 91

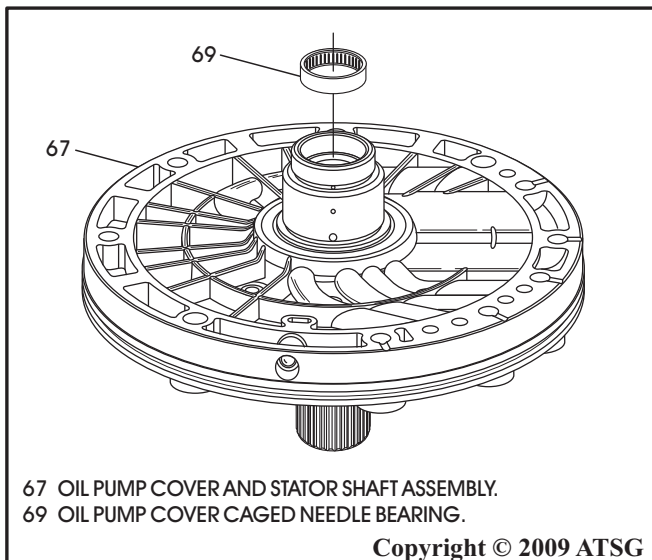


Figure 90

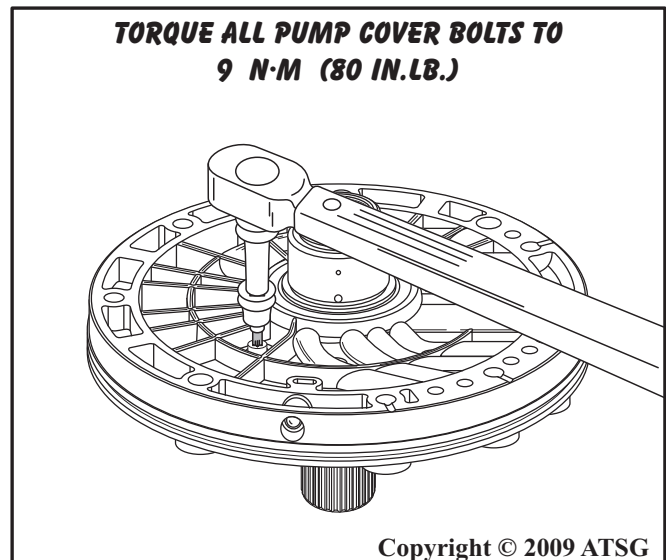


Figure 92

COMPONENT REBUILD (CONT'D)

Oil Pump Assembly (Cont'd)

16. Install new oil pump to case "O" ring seal into groove in pump cover, as shown in Figure 93.
17. Set the completed oil pump assembly aside for the final assembly process (See Figure 94).

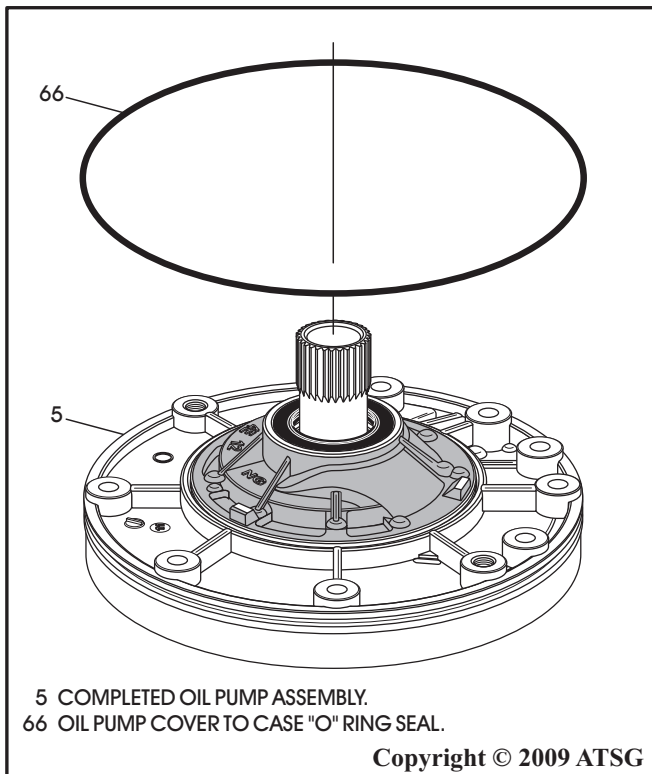


Figure 93

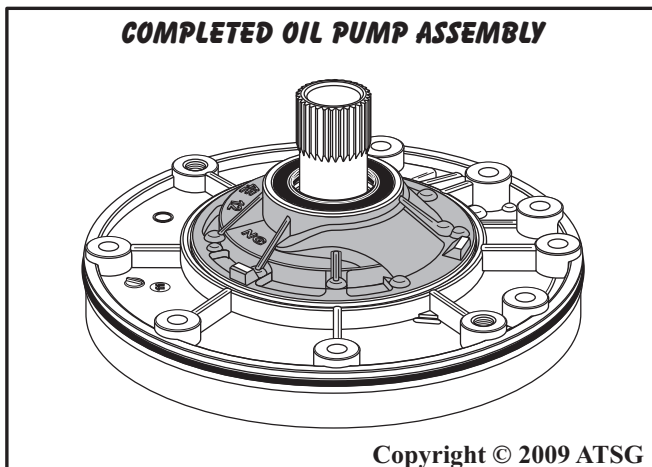


Figure 94

Output Shaft

1. Clean output shaft thoroughly and dry with compressed air.
2. Inspect output shaft thoroughly for any wear and/or damage.
3. Install new output shaft sealing rings, as shown in Figure 95.
4. Ensure they rotate freely in their grooves and the "steps" are properly engaged, as shown in Figure 95.

Component Rebuild Continued on Page 56

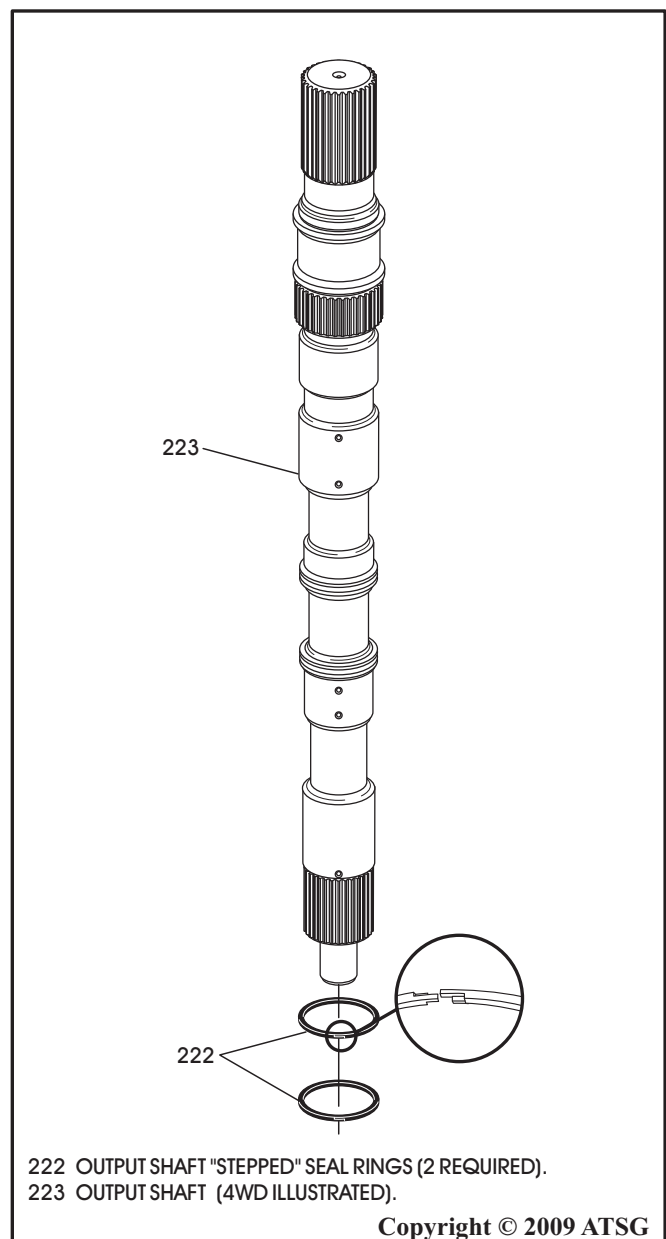
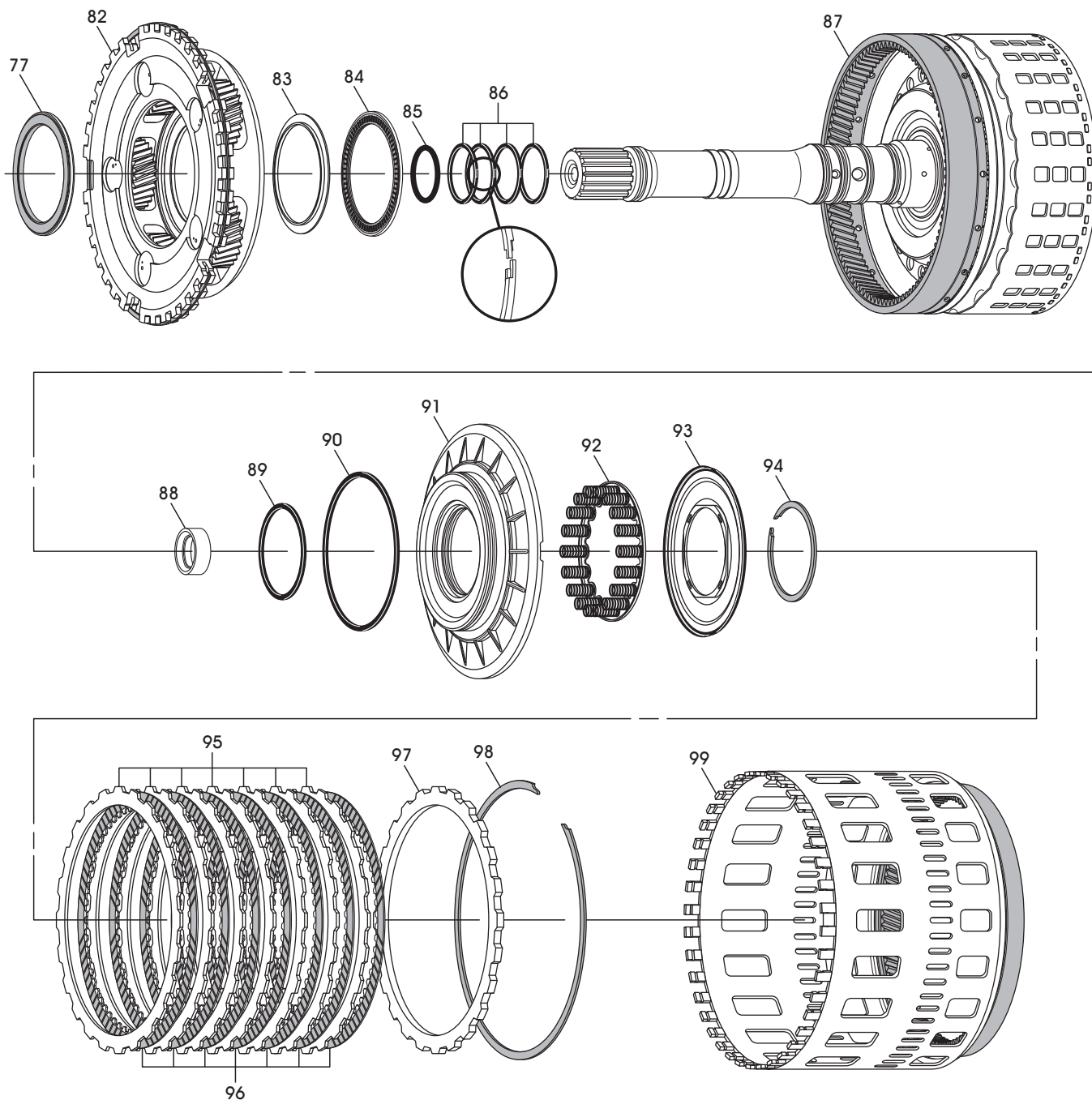


Figure 95

INPUT HOUSING ASSEMBLY EXPLODED VIEW



- 77 NUMBER 3 THRUST BEARING.
- 82 FRONT PLANETARY CARRIER ASSEMBLY, WITH SNAP RING.
- 83 NUMBER 4, THRUST BEARING RACE.
- 84 NUMBER 5 THRUST BEARING.
- 85 TURBINE SHAFT "O" RING SEAL.
- 86 TURBINE SHAFT "STEP-JOINT" SEAL RINGS (4 REQUIRED).
- 87 INPUT CLUTCH HOUSING ASSEMBLY.
- 88 INPUT HOUSING BUSHING.
- 89 INPUT CLUTCH APPLY PISTON INNER "D" RING SEAL.
- 90 INPUT CLUTCH APPLY PISTON OUTER "D" RING SEAL.

- 91 INPUT CLUTCH APPLY PISTON.
- 92 INPUT CLUTCH APPLY PISTON RETURN SPRING ASSEMBLY.
- 93 INPUT CLUTCH BALANCE PISTON.
- 94 INPUT CLUTCH BALANCE PISTON RETAINING SNAP RING.
- 95 INPUT CLUTCH STEEL PLATES (7 REQUIRED).
- 96 INPUT CLUTCH FRICTION PLATES (7 REQUIRED).
- 97 INPUT CLUTCH BACKING PLATE.
- 98 INPUT CLUTCH BACKING PLATE SNAP RING.
- 99 REAR PLANETARY CARRIER RING GEAR AND SHELL ASSEMBLY.

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Figure 96

COMPONENT REBUILD (CONT'D)

Input Housing Assembly

1. Disassemble the input housing assembly using Figure 96 as a guide.
2. Clean all input housing parts thoroughly and dry with compressed air.
3. Inspect all input housing parts thoroughly for any wear and/or damage, replace as necessary.
4. Install new bushing as necessary, Figure 97.
5. Install new "D" ring seals on the input clutch piston, as shown in Figure 98, and lube with a small amount of Trans-Jel®.
6. Install input clutch piston into input housing, as shown in Figure 99.
7. Install return spring assembly into input clutch piston, as shown in Figure 99.
8. Lubricate and install the input clutch balance piston, as shown in Figure 99.
9. Compress balance piston and install snap ring, as shown in Figure 99, and ensure it is fully seated.

Continued on Page 58

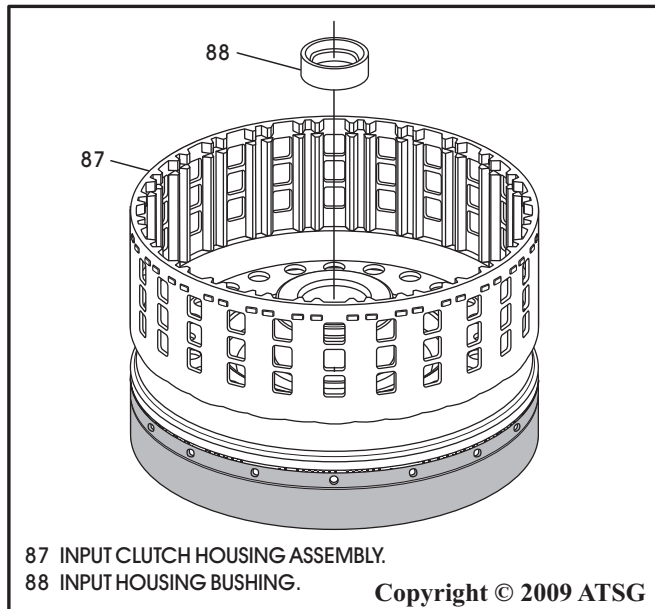


Figure 97

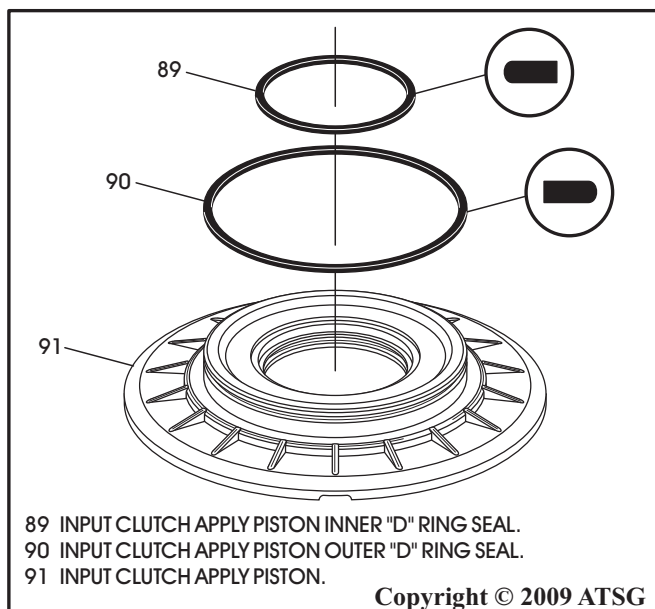


Figure 98

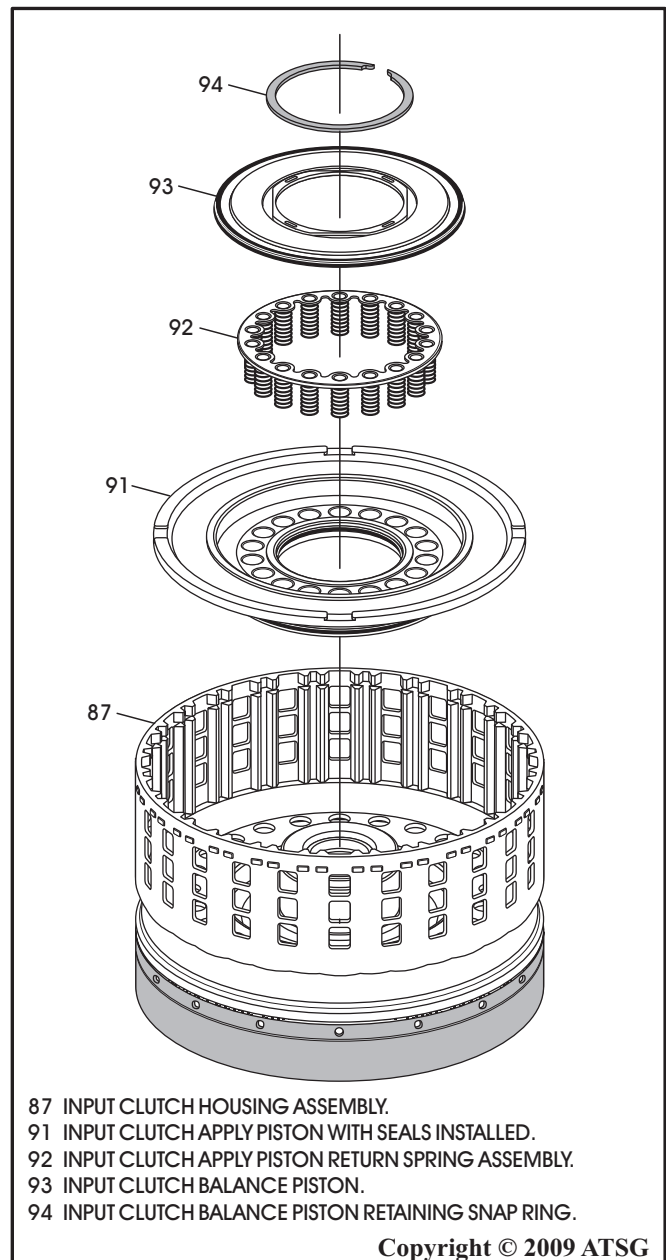


Figure 99

COMPONENT REBUILD (CONT'D)

Input Housing Assembly (Cont'd)

10. Install the input clutches beginning with a steel plate and alternating with a friction plate until you have installed seven of each, as shown in Figure 100.

Note: All clutch plates should be soaked for 30 minutes in proper fluid before assembly.

11. Install the input clutch backing plate with the rounded edge facing friction plate, as shown in Figure 100.

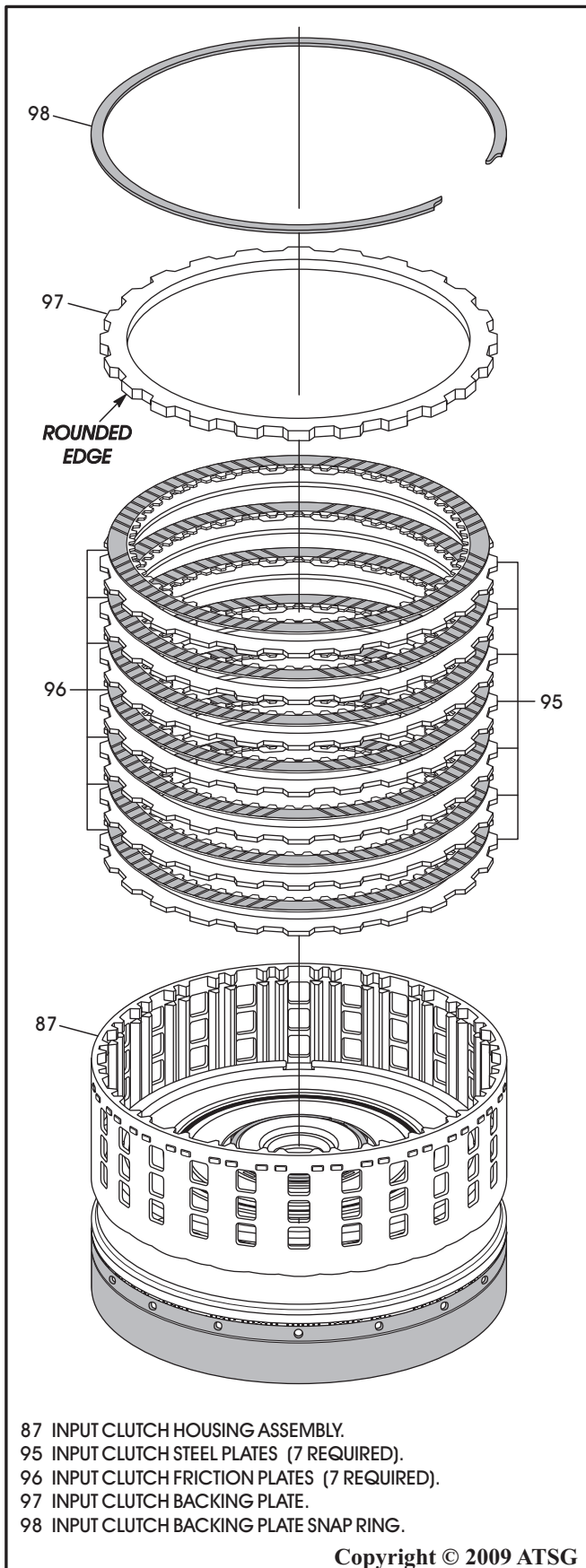
12. Install the input clutch backing plate snap ring, as shown in Figure 100.

13. Measure with a feeler gage between snap ring and the backing plate, as shown in Figure 101.

14. Input clutch clearance should be 0.7-1.8 mm (.028" - .045"), as shown in Figure 101.

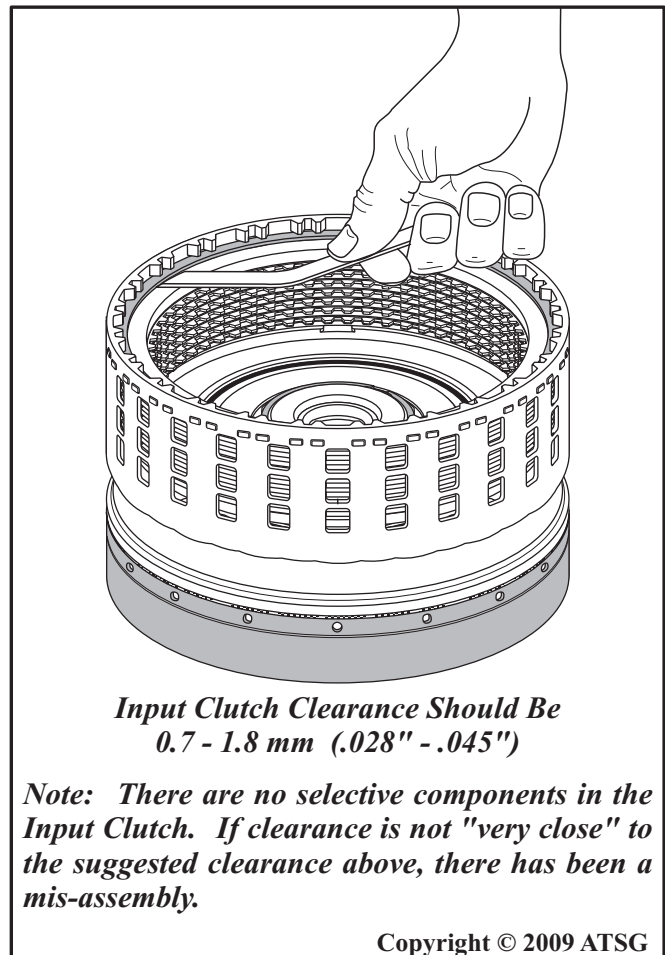
Note: There are no selective components in the input clutch. If clearance is not very close to above, there has been a mis-assembly.

Continued on Page 59



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Figure 100



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Figure 101

COMPONENT REBUILD (CONT'D)

Input Housing Assembly (Cont'd)

15. Install the number 5 thrust bearing, as shown in Figure 102, and retain with a small amount of Trans-Jel®.

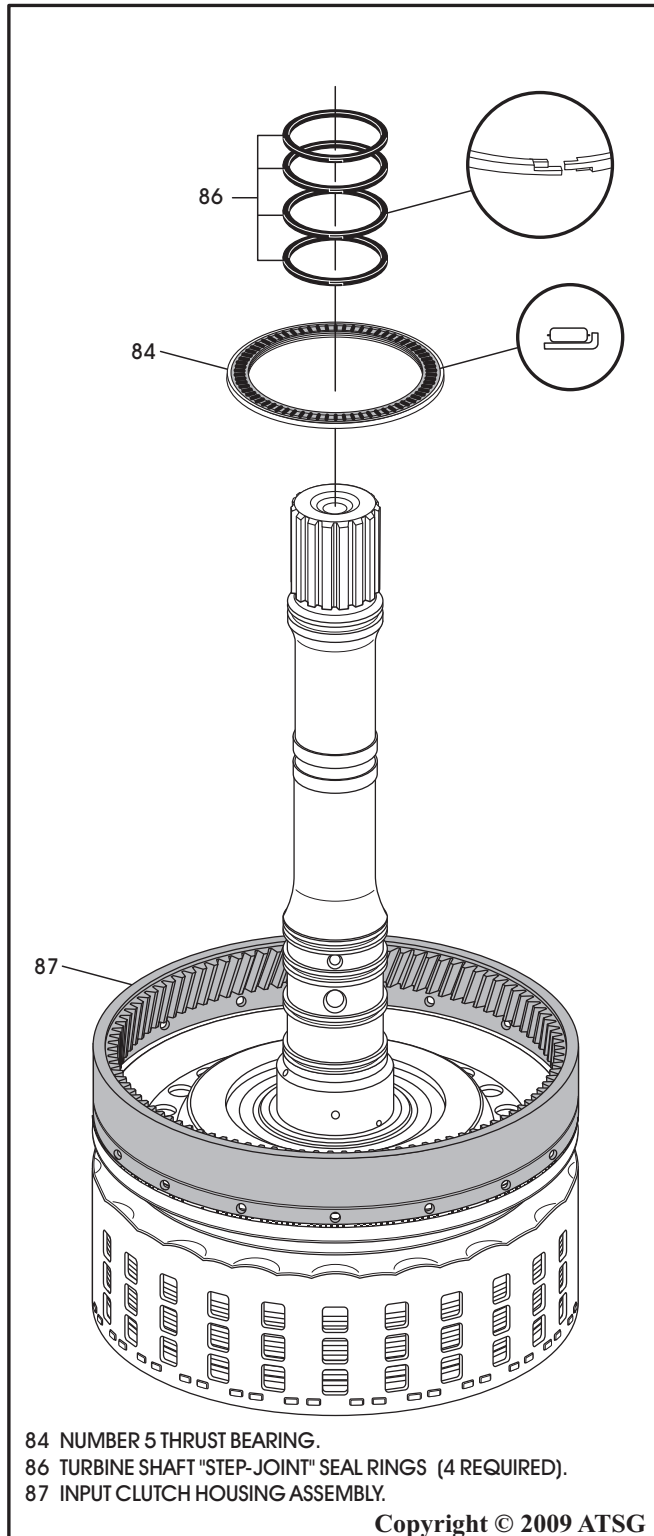


Figure 102

16. Install four new "step-joint" sealing rings into the grooves on the input shaft, as shown in Figure 102.
17. Ensure they rotate freely in their grooves and the "step-joint" is properly engaged, as shown in Figure 102.
18. Lubricate the seal rings with a small amount of Trans-Jel® or proper transmission fluid.
19. Ensure that the snap ring is engaged into the groove of the front planetary carrier, as shown in Figure 103.
20. Install number 4 thrust bearing race onto back side of front planetary carrier and retain with a small amount of Trans-Jel® (See Figure 103).
21. Install the number 3 thrust bearing into front side of front planetary carrier and retain with a small amount of Trans-Jel® (See Figure 103).

Continued on Page 60

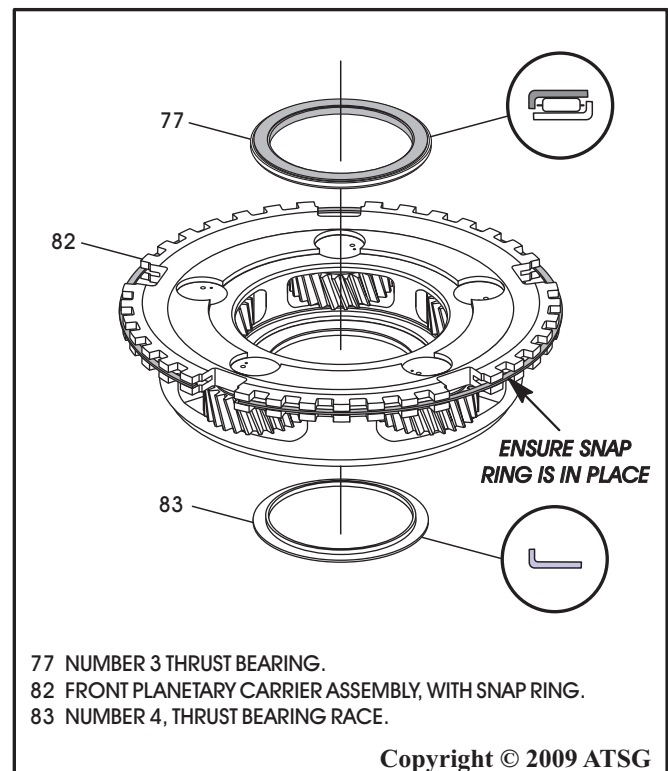


Figure 103

COMPONENT REBUILD (CONT'D)

Input Housing Assembly (Cont'd)

22. Set rear planetary ring gear and shell assembly on a flat work surface, as shown in Figure 104.
23. Install pre-assembled input housing assembly into rear planetary ring gear and shell assembly as shown in Figure 104.
24. Ensure that thrust bearings are still in place and install the completed front planetary carrier assembly into the rear planetary ring gear and shell assembly, as shown in Figure 104.
Note: Use two small screwdrivers, one on each side of carrier, to compress the snap ring so that the front planetary carrier fully seats into the shell with the snap ring fully seated in the snap ring groove.
25. Set completed input housing assembly aside for final assembly process (See Figure 105).

Component Rebuild
Continued on Page 61

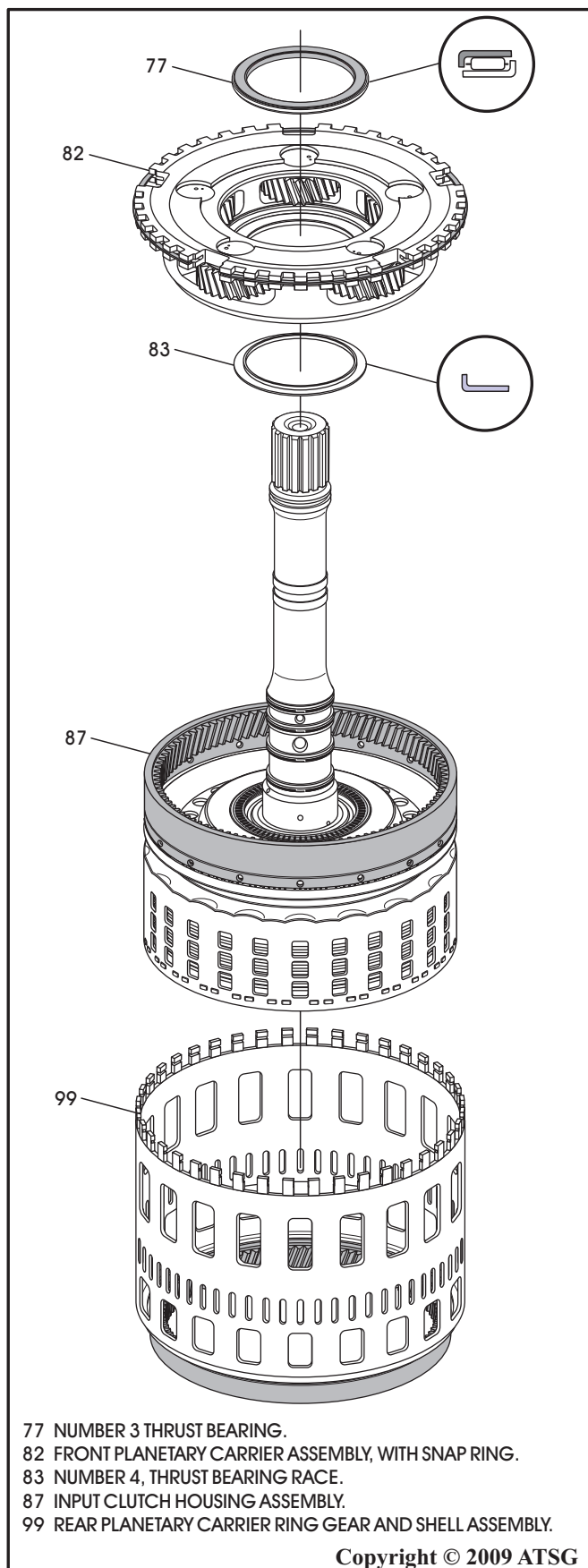


Figure 104

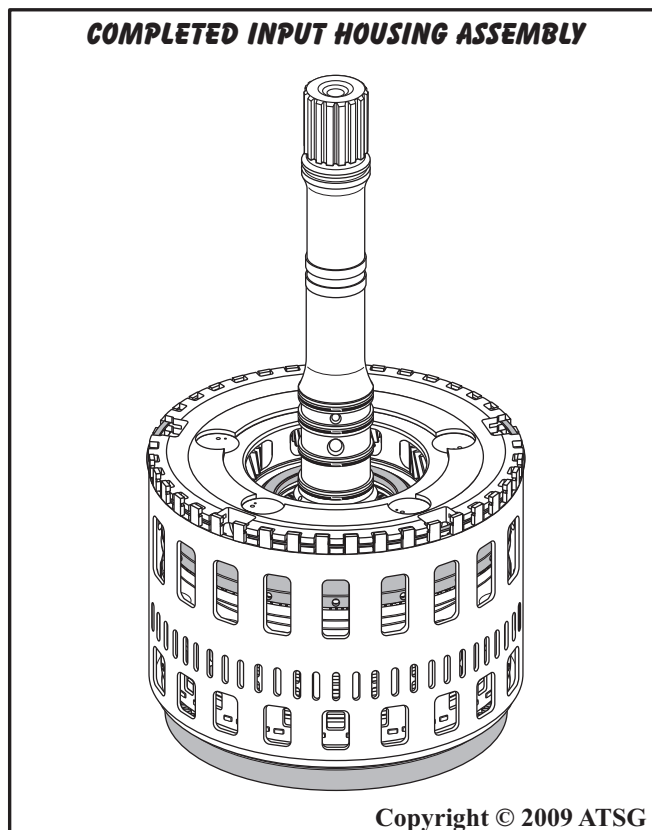


Figure 105

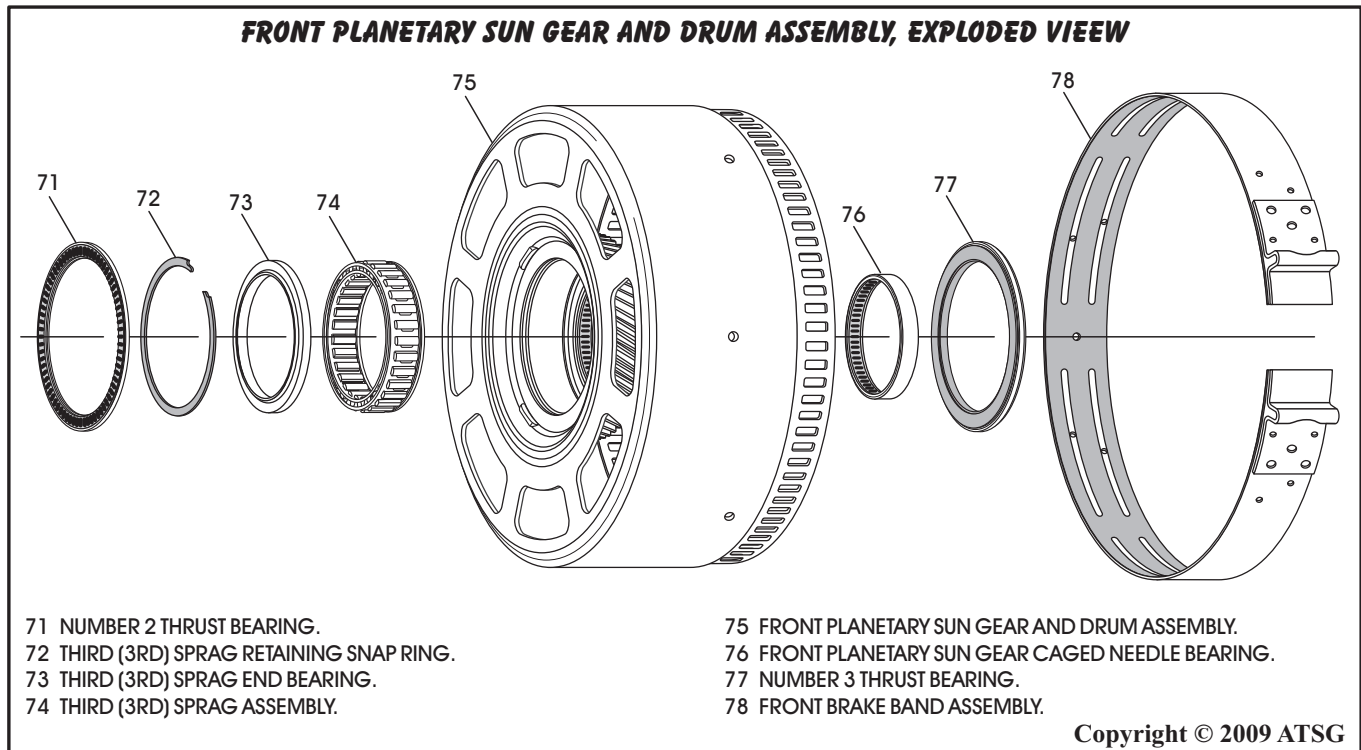


Figure 106

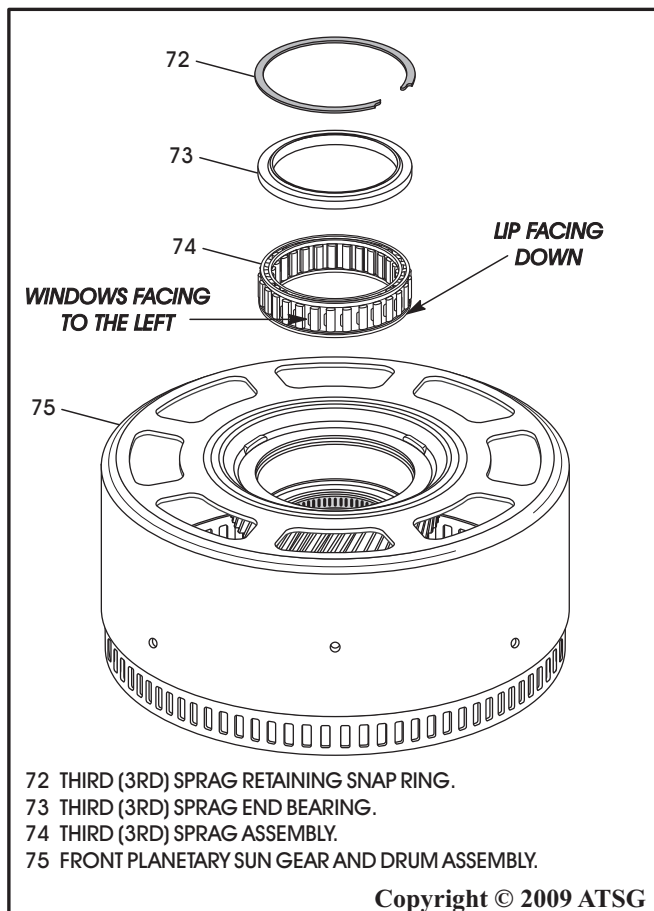


Figure 107

COMPONENT REBUILD (CONT'D)

Front Planet Sun Gear/Drum Assembly

1. Disassemble the front planet sun gear and drum assembly using Figure 106 as a guide.
- Note: Notice that this assembly incorporates the 3rd sprag assembly.**
2. Clean all front planet sun gear and drum parts thoroughly and dry with compressed air.
3. Inspect all front planet sun gear and drum parts thoroughly for any wear and/or damage, and replace as necessary.
4. Install the 3rd sprag into the sun gear and drum assembly, with the "lip" facing down and the "windows" facing to the left, as shown in Figure 107.
5. Install the 3rd sprag end bearing on top of the 3rd sprag assembly, as shown in Figure 107.
- Note: This sprag uses only one end bearing.**
6. Install 3rd sprag retaining snap ring, as shown in Figure 107, and ensure it is fully seated.

Continued on Page 62

COMPONENT REBUILD (CONT'D)

Front Planet Sun Gear/Drum Assembly

7. Replace caged needle bearing as necessary, as shown in Figure 108, using the proper driver.
Note: Bearing should be pressed in to drum 0.90 mm (.035") below surface of drum.
8. Install number 3 thrust bearing in the direction shown in Figure 108, and retain with a small amount of Trans-Jel®.
Note: Disregard if you installed number 3 thrust bearing in the front planetary carrier.
9. Install number 2 thrust bearing on the front planet sun gear and drum assembly, as shown in Figure 109, and retain with a small amount of Trans-Jel®.
10. Install number 1 selective thrust bearing race on the completed oil pump assembly, as shown in Figure 110.

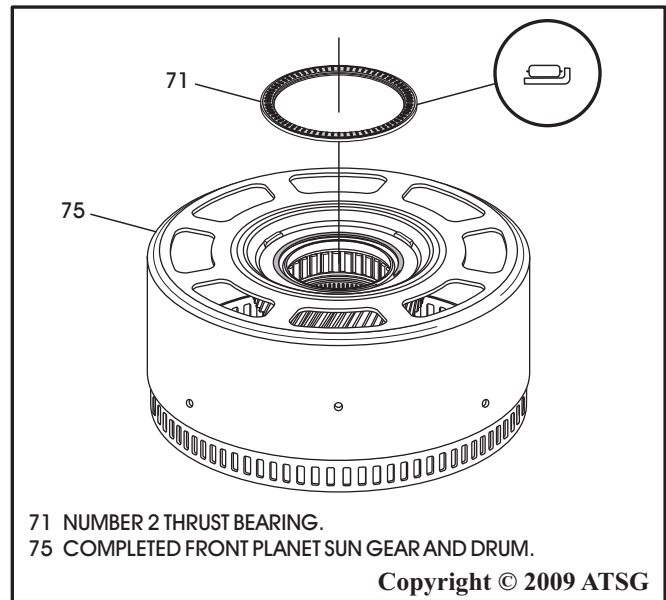


Figure 109

Continued on Page 63

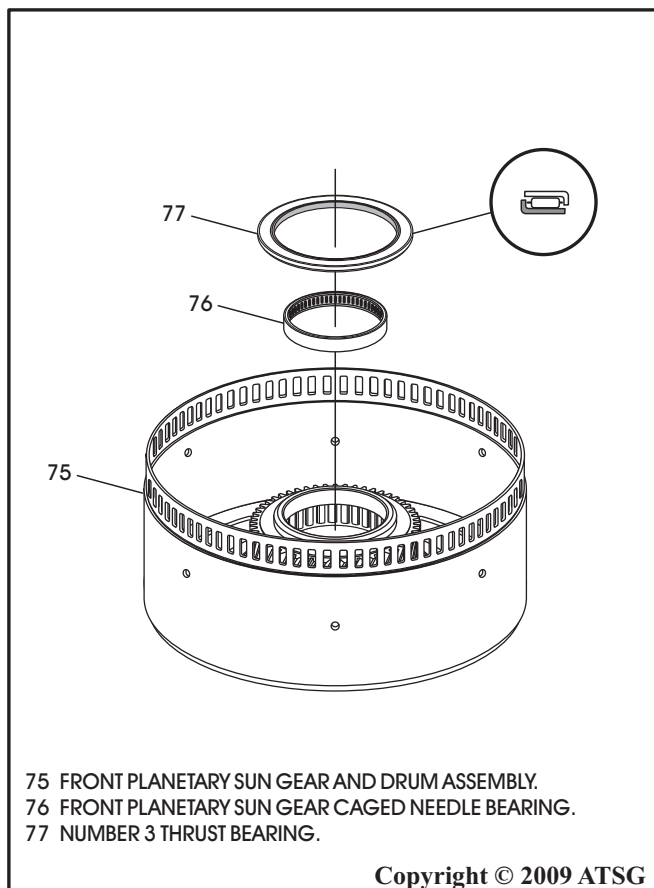


Figure 108

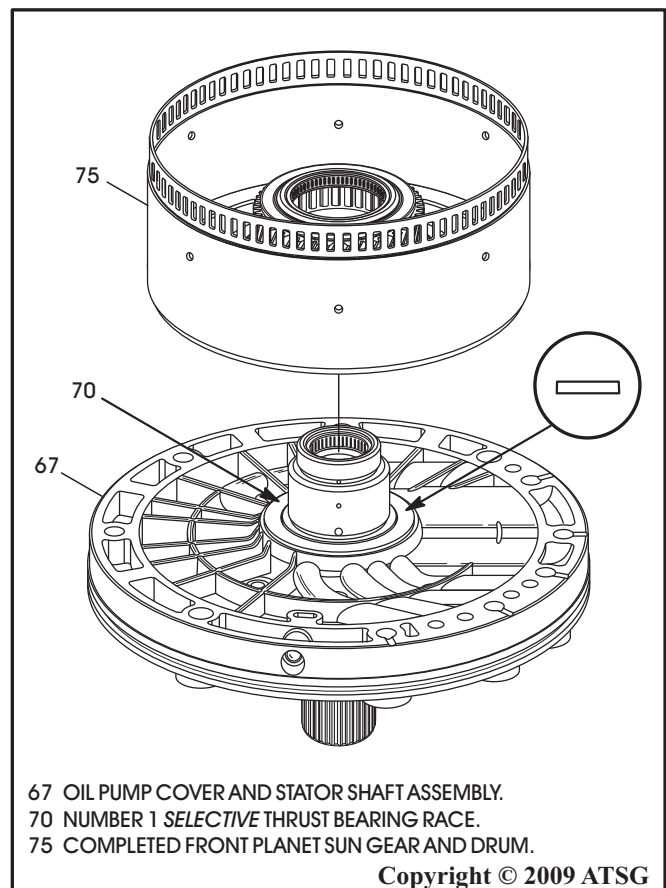


Figure 110

COMPONENT REBUILD (CONT'D)

Front Planet Sun Gear/Drum Assembly

11. Install the completed front sun gear and drum assembly onto completed oil pump assembly, as shown in Figure 111.

Note: *This process is to verify proper sprag rotation before assembly.*

12. Set the completed front sun gear and drum assembly aside for the final process, as shown in Figure 112.

13. Inspect front brake band for any wear and/or damage, as shown in Figure 113, and set aside for the final assembly process.

Component Rebuild Continued on Page 64

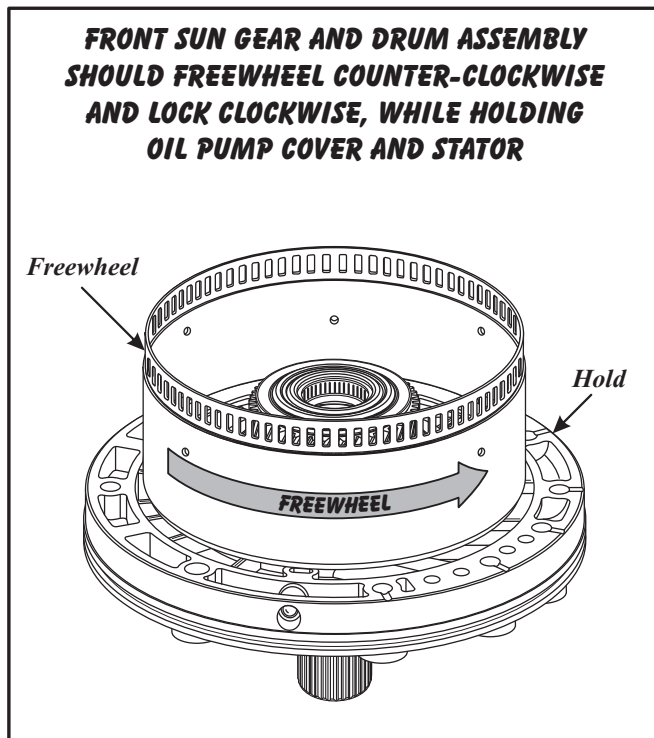


Figure 111

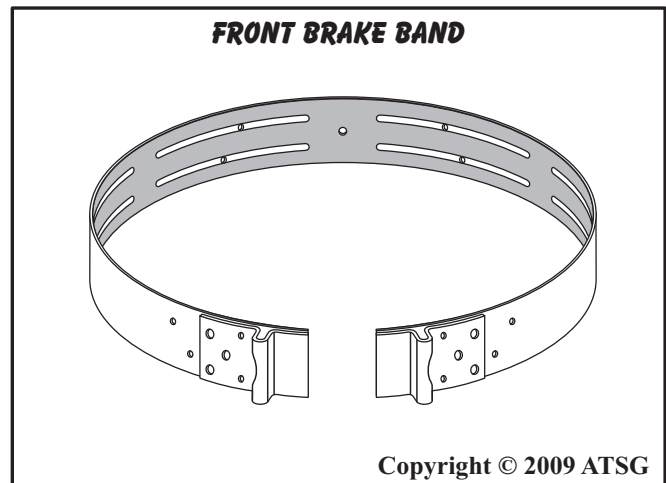


Figure 113

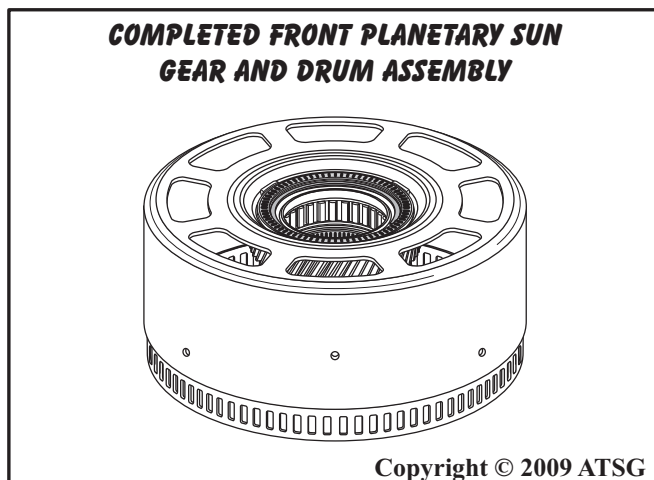


Figure 112

COMPONENT REBUILD (CONT'D)

1st Sprag And Sun Gear Shaft Assembly

1. Disassemble the 1st sprag and sun gear shaft assembly, using Figure 114 as a guide.
2. Clean all 1st sprag and sun gear shaft assembly parts thoroughly and dry with compressed air.
3. Inspect all 1st sprag & sun gear shaft assembly parts thoroughly for any wear and/or damage.
4. Remove and discard the four "stepped" sealing rings, as shown in Figure 114.

Continued on Page 65

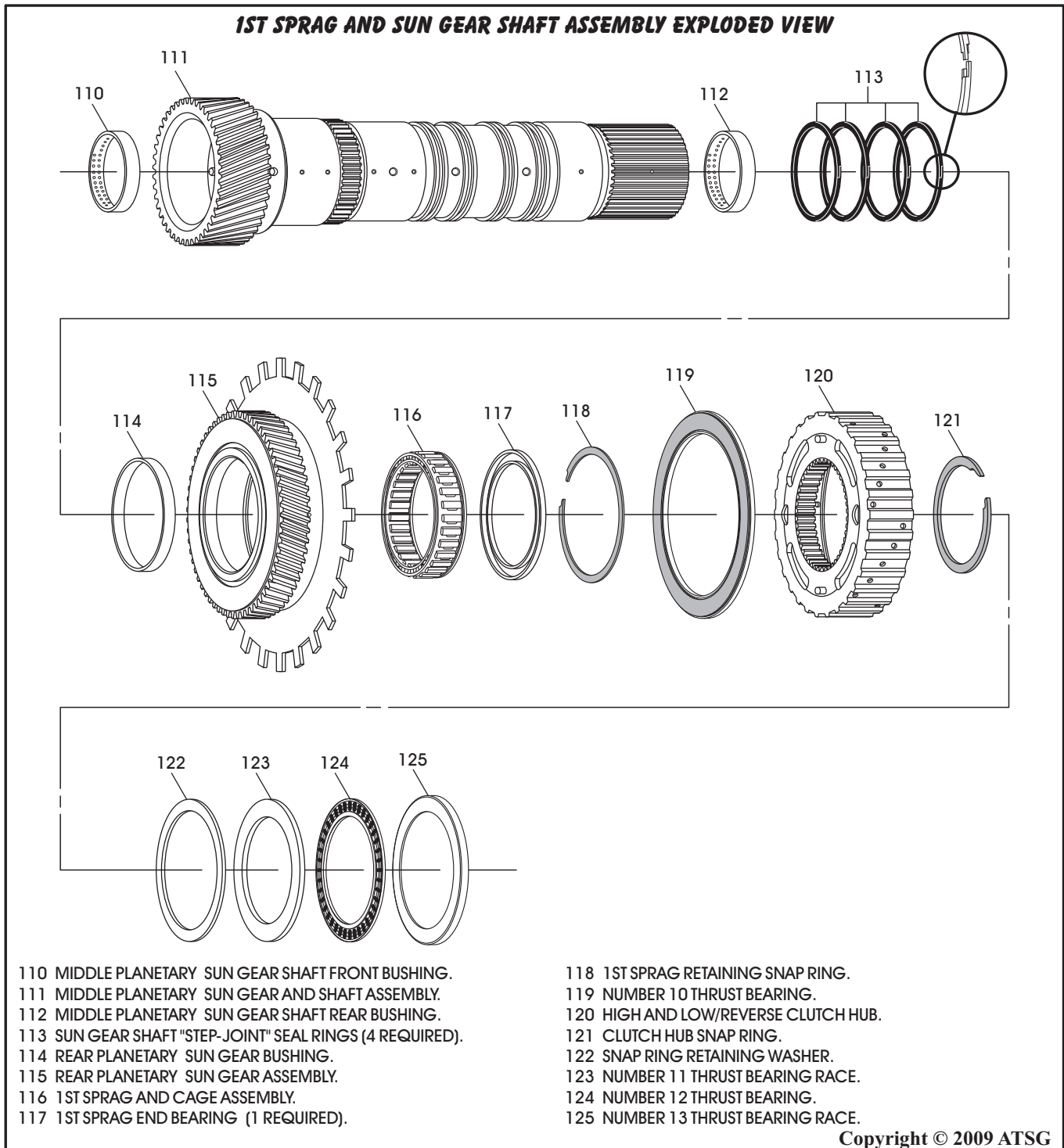


Figure 114

COMPONENT REBUILD (CONT'D)

1st Sprag And Sun Gear Shaft Assembly (Cont'd)

5. Install new bushings as necessary in sun gear shaft assembly, as shown in Figure 115, using the proper driver.
6. Install new bushing as necessary in rear planet sun gear, as shown in Figure 116, using the proper driver.
7. Turn rear planetary sun gear over and install the 1st sprag and cage assembly, as shown in Figure 117.

Note: Install with "lip" facing up and the "windows" facing to the right, as shown in Figure 117.

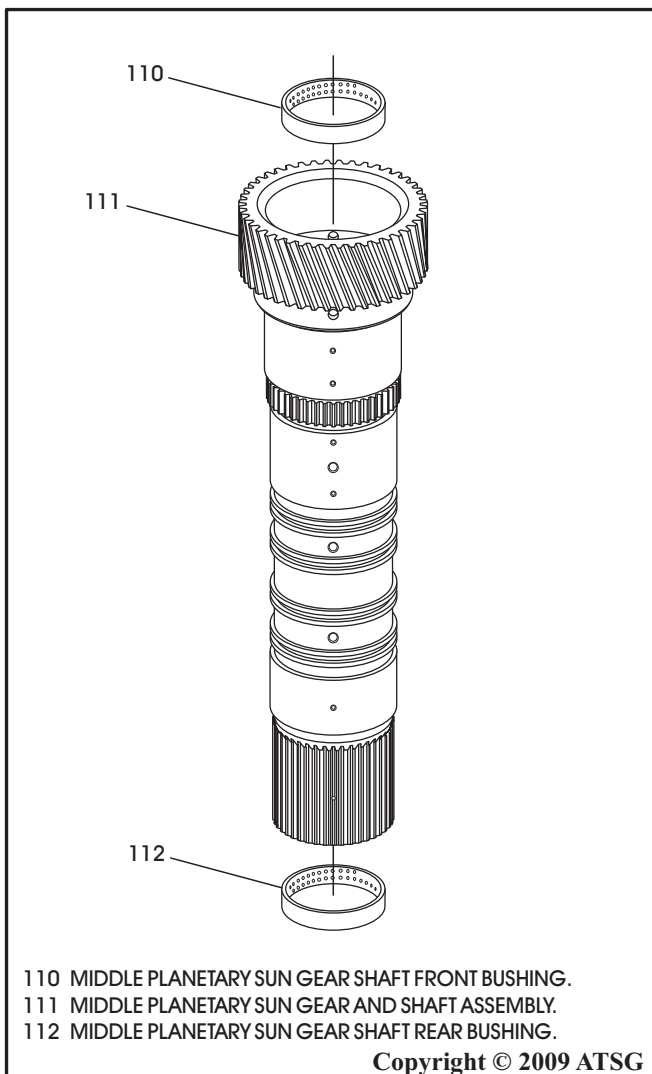


Figure 115

8. Install the 1st sprag end bearing, as shown in Figure 117.
- Note:** There is only one end bearing used in the 1st sprag.
9. Install 1st sprag retaining snap ring, as shown in Figure 117.

Continued on Page 66

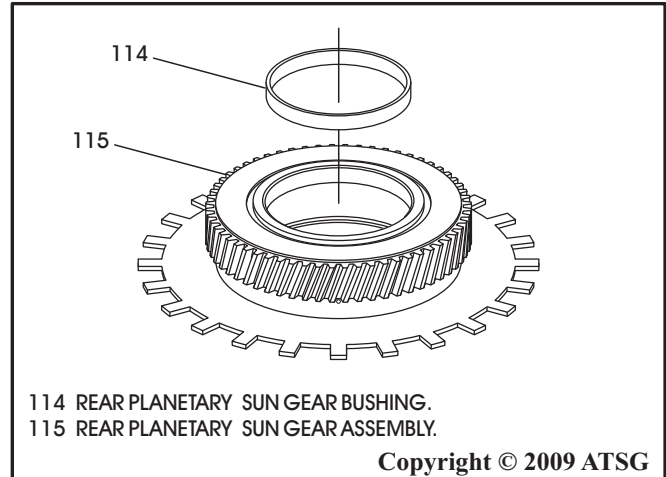


Figure 116

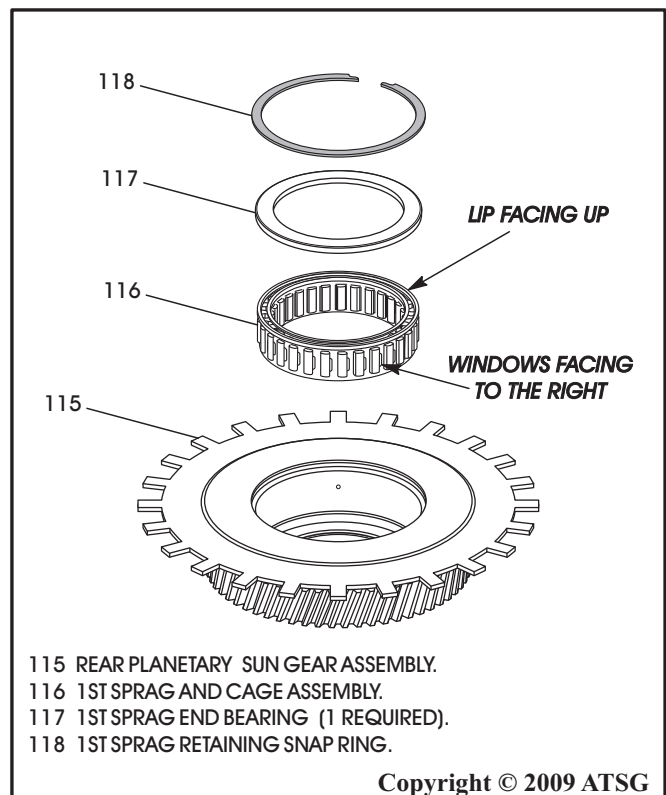


Figure 117

COMPONENT REBUILD (CONT'D)

1st Sprag And Sun Gear Shaft Assembly (Cont'd)

10. Install the number 10 thrust bearing onto the high and low/reverse clutch hub, as shown in Figure 118, with the gold side facing up, and retain with Trans-Jel®.
11. Install the rear planetary sun gear and 1st sprag assembly onto the sun gear shaft, as shown in Figure 119, and rotate into position.
12. Verify proper 1st sprag operation, as shown in Figure 120, before proceeding.

Continued on Page 67

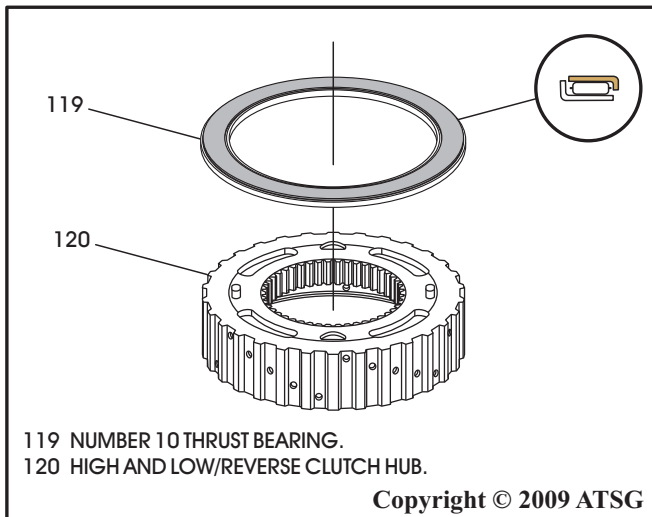


Figure 118

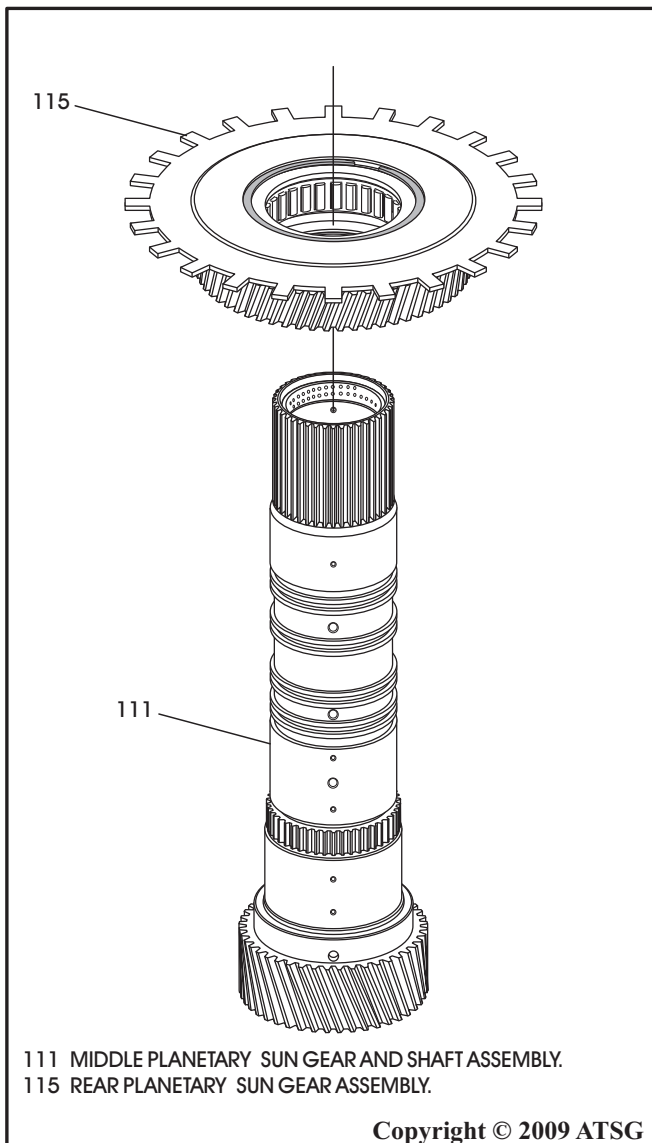


Figure 119

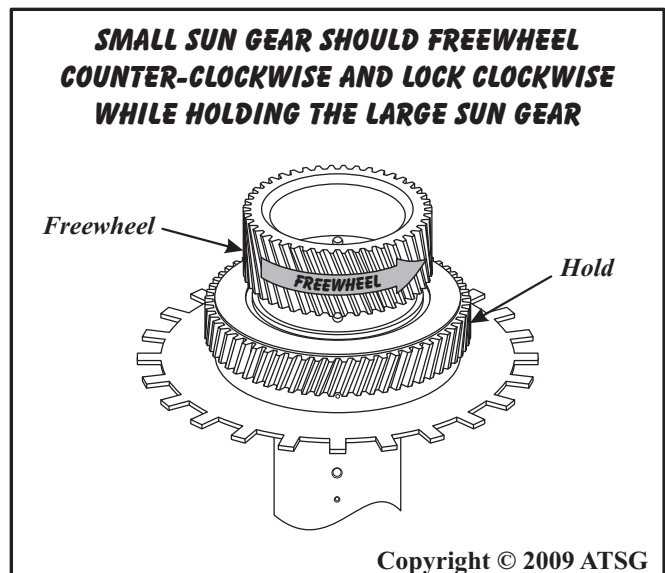


Figure 120

COMPONENT REBUILD (CONT'D)

1st Sprag And Sun Gear Shaft Assembly (Cont'd)

13. Install the high and low/reverse clutch hub with the number 10 thrust bearing as an assembly, as shown in Figure 121, engaging the splines on the sun gear shaft until fully seated.
14. Install the retaining snap ring and ensure it is fully seated, as shown in Figure 121 and 123.
15. Install the snap ring retaining washer, as shown in Figure 123, and retain with Trans-Jel®.

Note: Snap ring retaining washer has larger inside diameter, as shown in Figure 122.

Caution: Thrust washers and thrust bearing, illustration numbers 122, 123, and 124, must be installed in the order shown in Figure 122. Failure to do this will result in transmission damage or gear train locked when oil pump is tightened. The number 13 thrust bearing race will be installed on high & low/reverse clutch housing.

Continued on Page 68

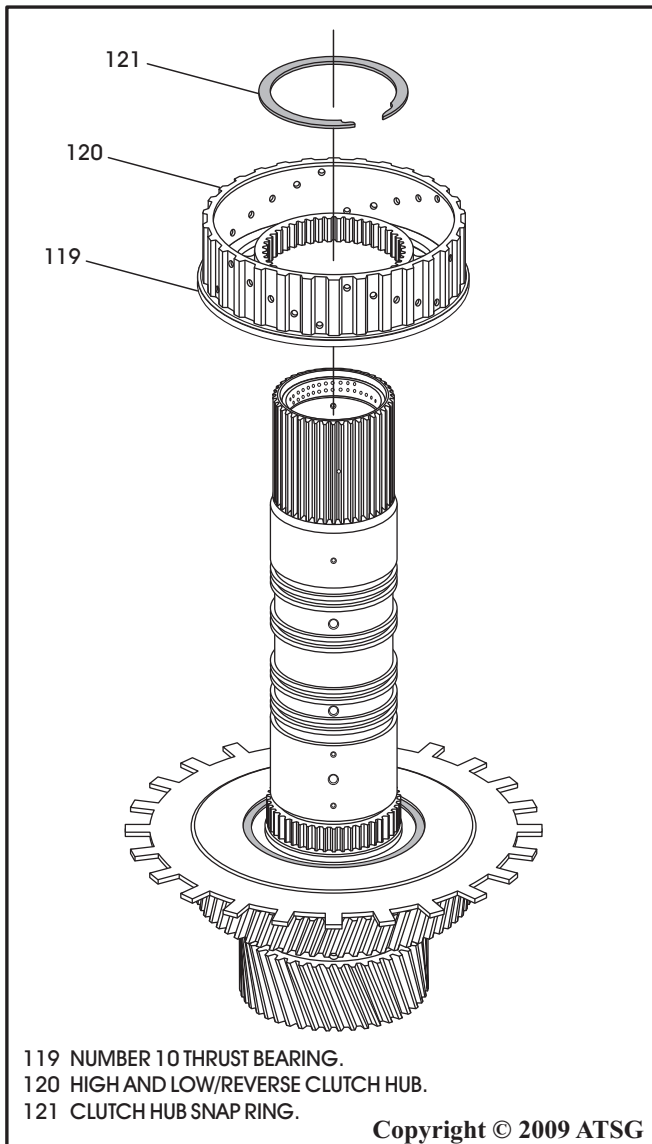


Figure 121

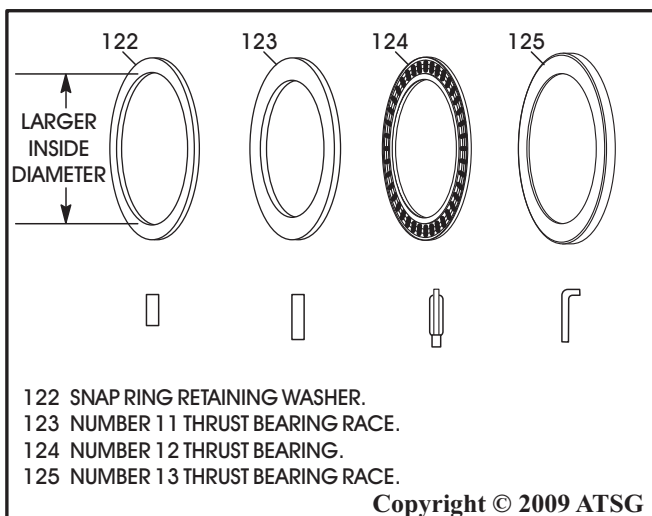


Figure 122

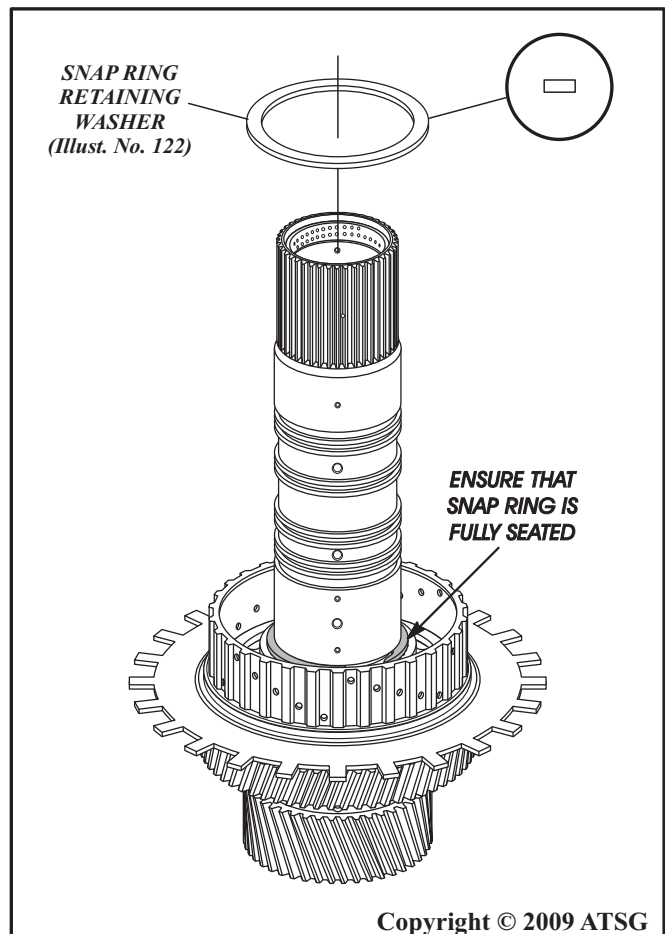


Figure 123

COMPONENT REBUILD (CONT'D)

1st Sprag And Sun Gear Shaft Assembly (Cont'd)

16. Ensure that snap ring retaining washer is fully seated around the outside diameter of the snap ring, as shown in Figure 124.
17. Install number 11 thrust bearing race, as shown in Figure 124, and retain with Trans-Jel®.
18. Install the number 12 thrust bearing, as shown in Figure 124, and retain with Trans-Jel®.
19. Install four new "step-joint" sealing rings into the grooves on the sun gear shaft, as shown in Figure 125, and ensure the steps are properly engaged.
20. Set the completed 1st sprag and sun gear shaft assembly aside for the final assembly process, as shown in Figure 126.

**Component Rebuild
Continued on Page 69**

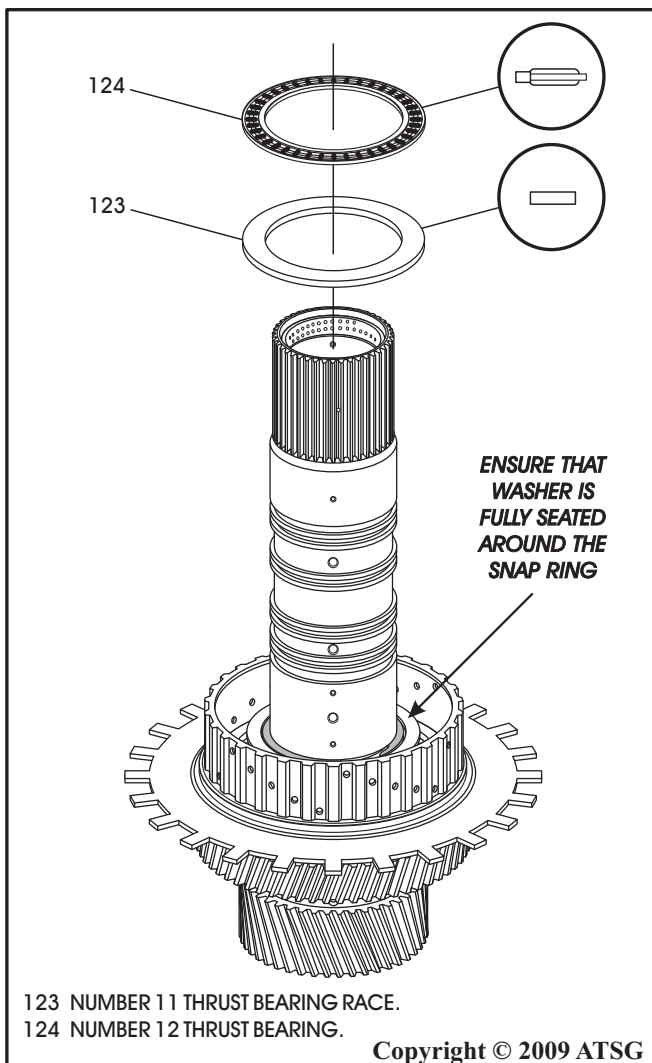


Figure 124

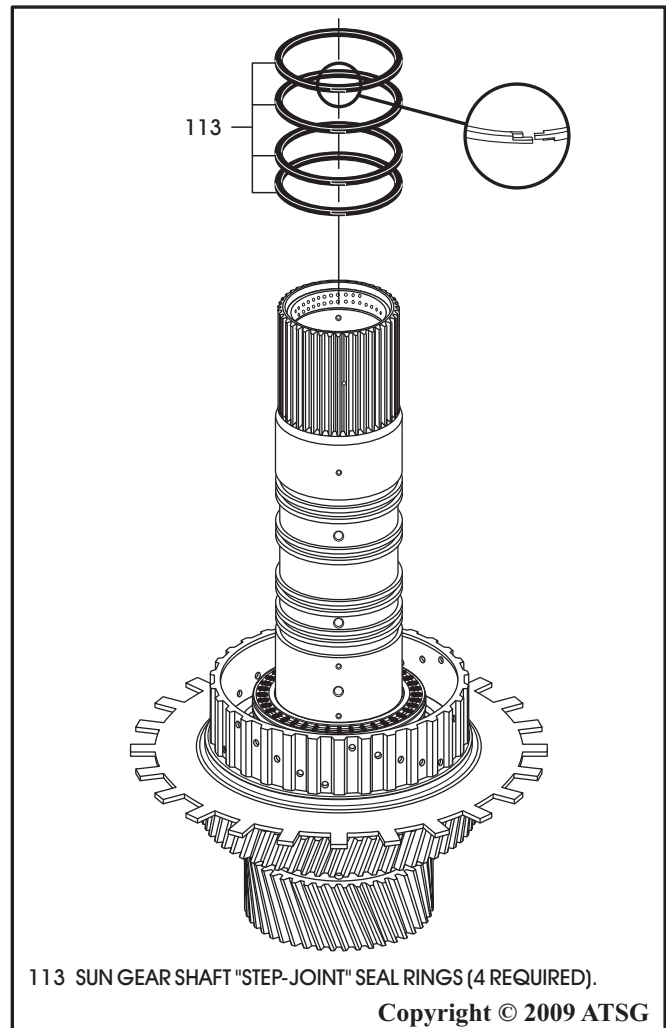


Figure 125

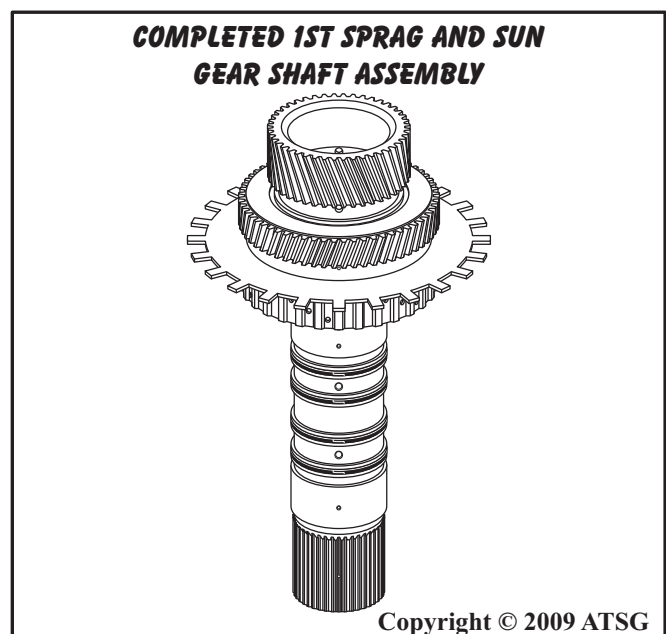


Figure 126

COMPONENT REBUILD (CONT'D)

Drum Support Assembly

1. Remove and discard the three sealing rings from the support, as shown in Figure 127.
2. Clean all drum support parts thoroughly and dry with compressed air.
3. Inspect all drum support parts thoroughly for any wear and/or damage, replace as necessary.
4. Install three new "step-joint" sealing rings into the grooves of the drum support, as shown in Figure 127.
5. Ensure that they rotate freely in the grooves and step joints are properly engaged, as shown in Figure 127.
6. Install the number 16 thrust bearing with the needles facing up, as shown in Figure 128, and retain with small amount of Trans-Jel®.
7. Install new inner and outer "D" ring seals into grooves of the reverse brake clutch piston, as shown in Figure 129.

Note: "Do Not" install reverse brake clutch piston in the drum support. This must be done during final assembly.

8. Set the drum support and reverse brake clutch piston aside for the final assembly process.

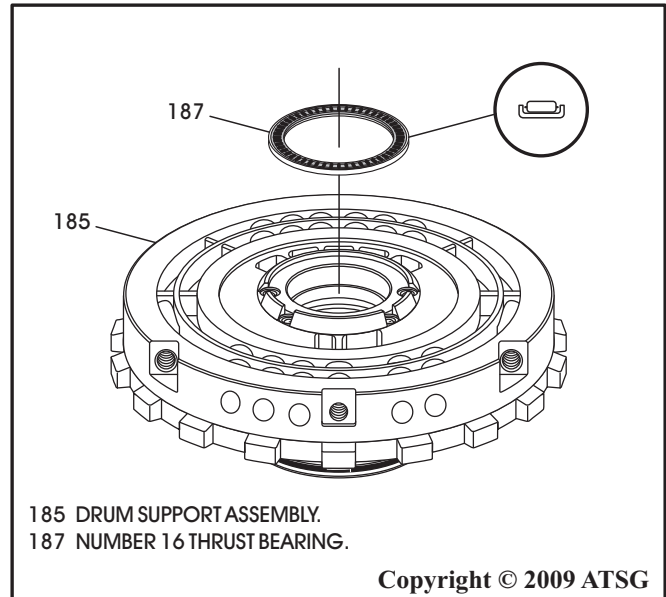


Figure 128

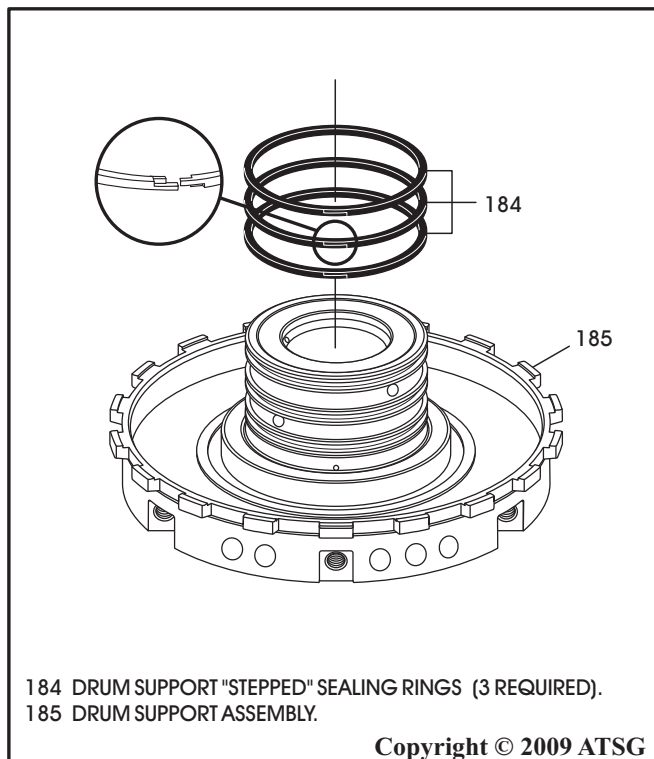


Figure 127

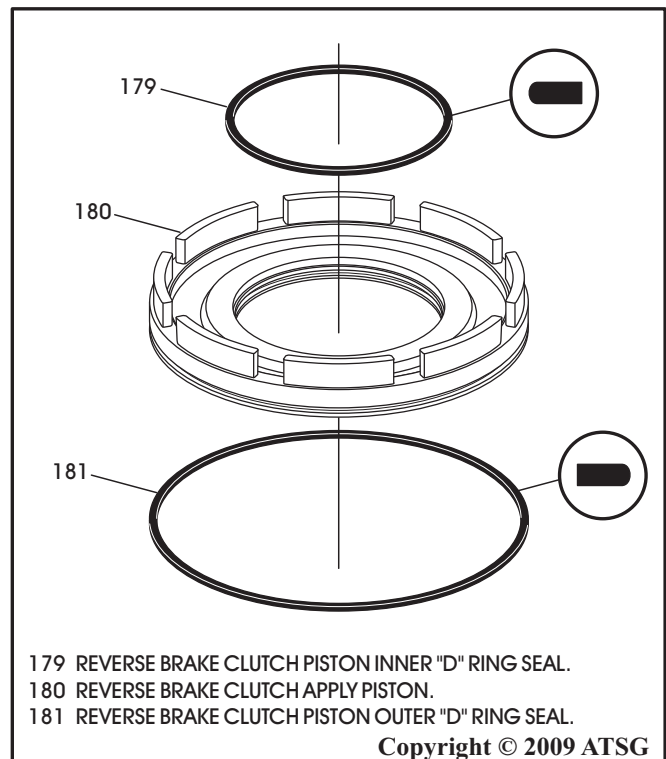
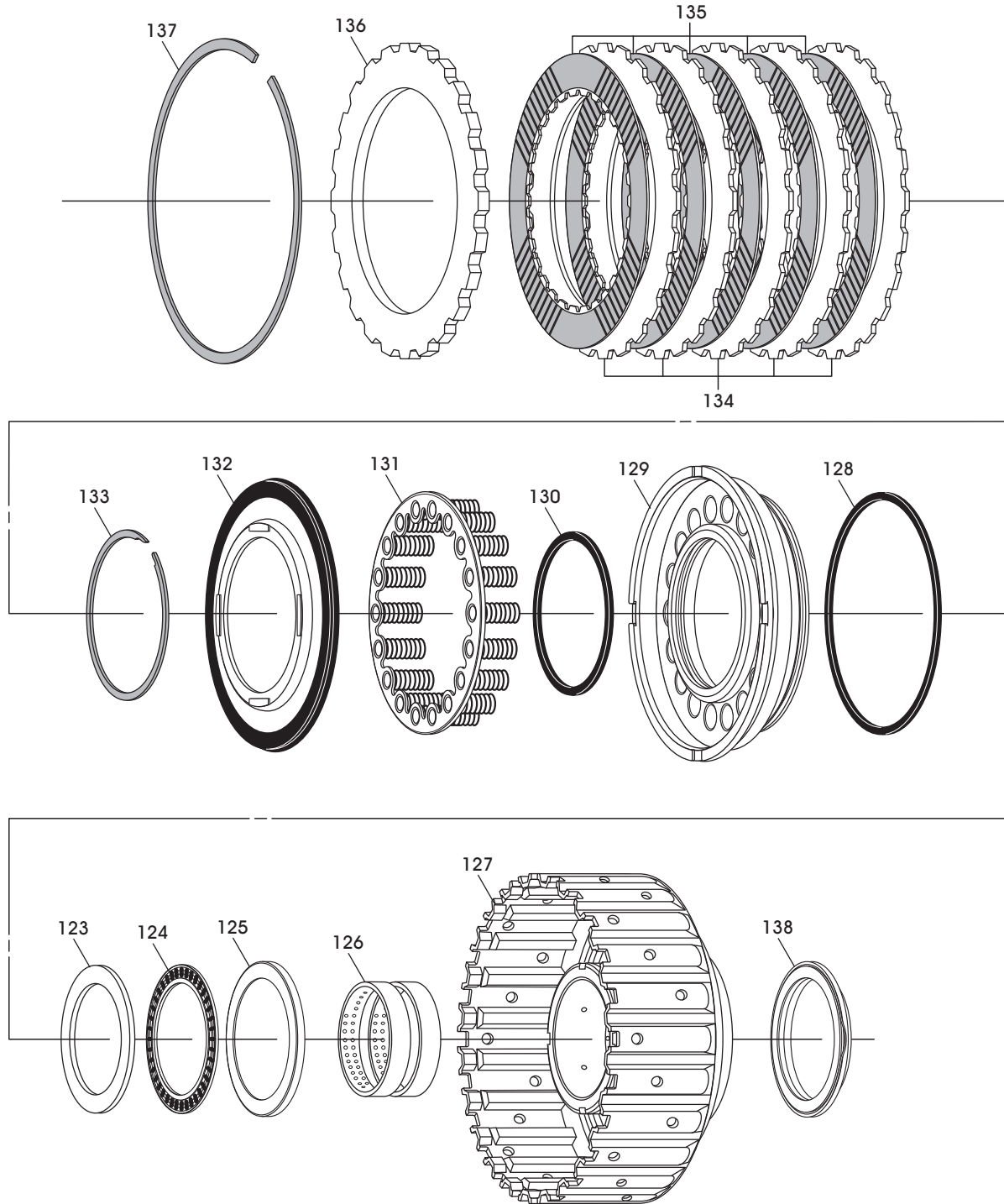


Figure 129

HIGH AND LOW/REVERSE CLUTCH HOUSING EXPLODED VIEW



- 123 NUMBER 11 THRUST BEARING RACE.
- 124 NUMBER 12 THRUST BEARING.
- 125 NUMBER 13 THRUST BEARING RACE.
- 126 HIGH & LOW/REVERSE CLUTCH HOUSING BUSHING (2 REQ.).
- 127 HIGH & LOW/REVERSE CLUTCH HOUSING.
- 128 HIGH & LOW/REVERSE CLUTCH PISTON OUTER "D" RING.
- 129 HIGH & LOW/REVERSE CLUTCH APPLY PISTON.
- 130 HIGH & LOW/REVERSE CLUTCH PISTON INNER "D" RING.

- 131 HIGH & LOW/REVERSE CLUTCH PISTON RETURN SPRING.
- 132 HIGH & LOW/REVERSE CLUTCH BALANCE PISTON.
- 133 HIGH & LOW/REVERSE CLUTCH PISTON SNAP RING.
- 134 HIGH & LOW/REVERSE CLUTCH STEEL PLATES (5 REQUIRED).
- 135 HIGH & LOW/REVERSE CLUTCH FRICTION PLATES (5 REQ.).
- 136 HIGH & LOW/REVERSE CLUTCH BACKING PLATE.
- 137 HIGH & LOW/REVERSE CLUTCH BACKING PLATE SNAP RING.
- 138 NUMBER 14 THRUST BEARING.

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Figure 130

COMPONENT REBUILD (CONT'D)

High And Low/Reverse Clutch Housing

1. Disassemble the high and low/reverse clutch housing using Figure 130 as a guide.
2. Clean all high and low/reverse clutch housing parts thoroughly and dry with compressed air.
3. Inspect all high and low/reverse clutch housing parts thoroughly for any wear and/or damage and replace as necessary.
4. Replace bushings in the high and low/reverse clutch housing, as shown in Figure 131, using the proper driver.
5. Install new "D" ring seals into the grooves of high and low/reverse clutch apply piston, as shown in Figure 132, and lube with a small amount of Trans-Jel®.
6. Install the completed piston into the high and low/reverse clutch housing with a rotating motion, as shown in Figure 133.

Continued on Page 72

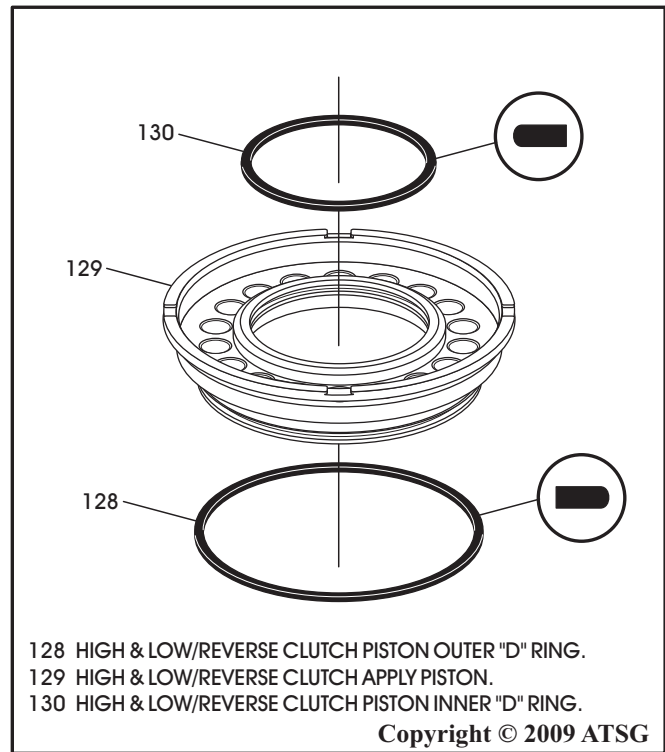


Figure 132

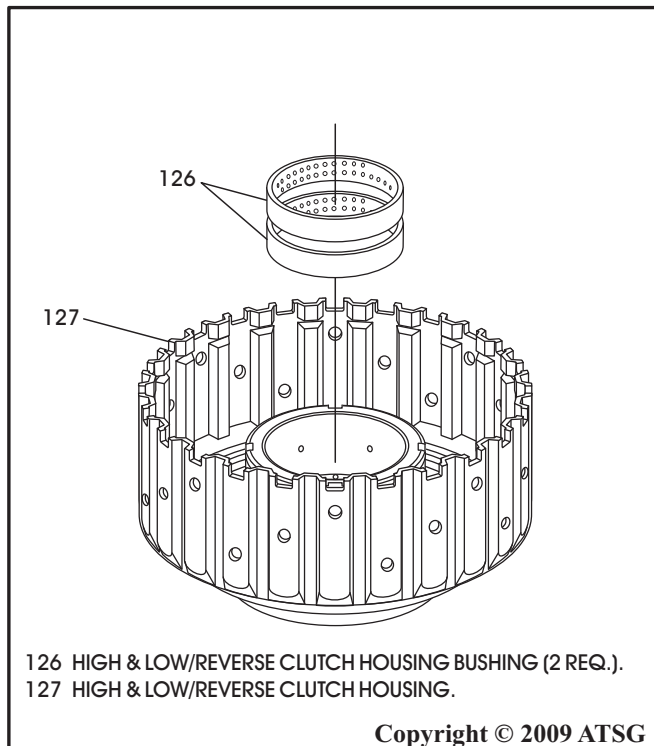


Figure 131

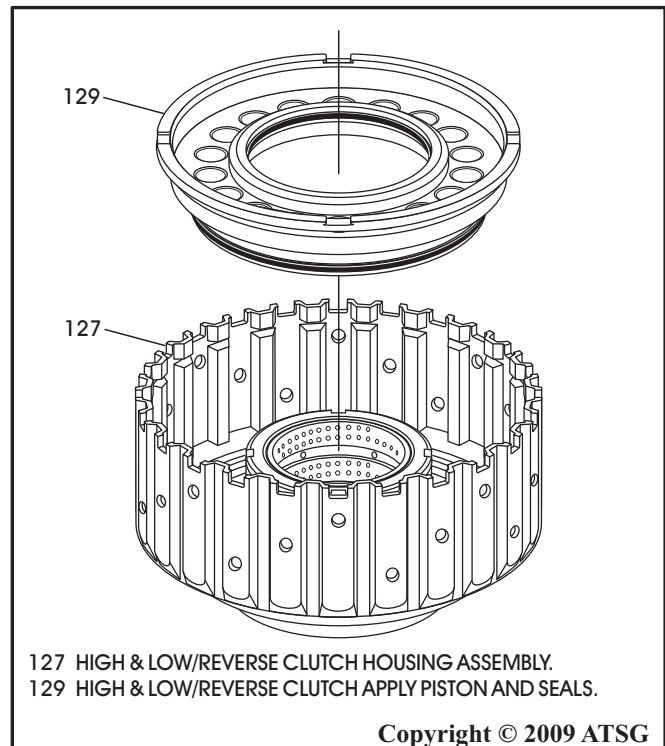


Figure 133

COMPONENT REBUILD (CONT'D)

High And Low/Reverse Clutch Housing (Cont'd)

7. Install the return spring assembly and balance piston into the high and low/reverse clutch housing, as shown in Figure 134.
 8. Compress balance piston and install the snap ring, as shown in Figure 134, and ensure snap ring is fully seated.
 9. Install the high and low/reverse clutch plates beginning with a steel plate and alternating with a friction, as shown in Figure 135.
- Note: All clutch plates should be soaked for 30 minutes in proper fluid before assembly.**
10. Install the high and low/reverse clutch backing plate, as shown in Figure 135, with the rounded edge facing the friction.
 11. Install the high and low/reverse backing plate snap ring, as shown in Figure 135

Continued on Page 73

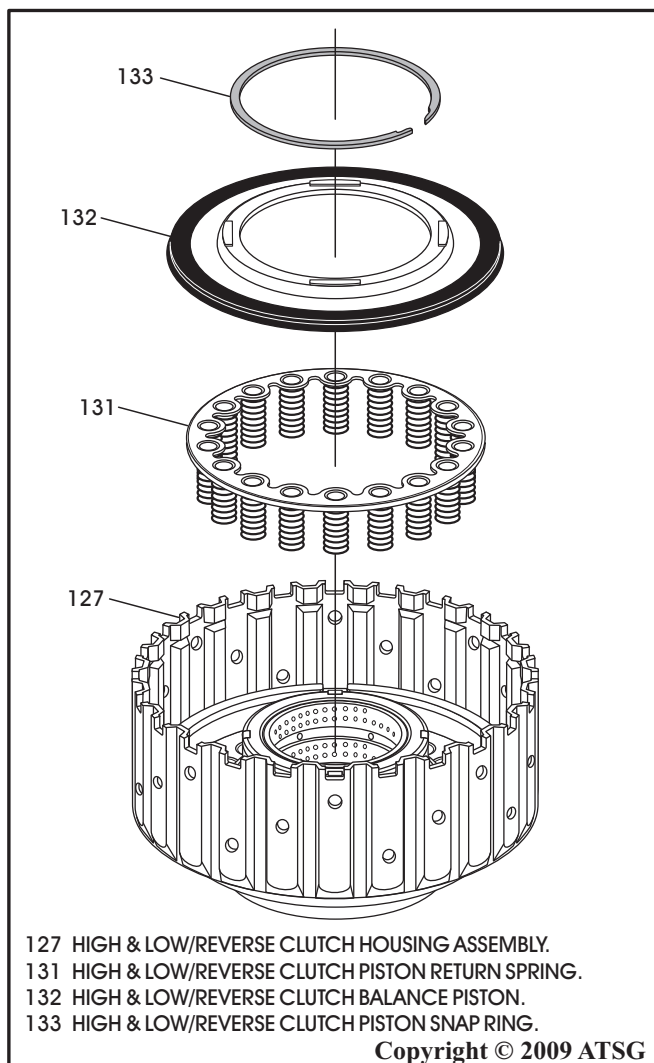


Figure 134

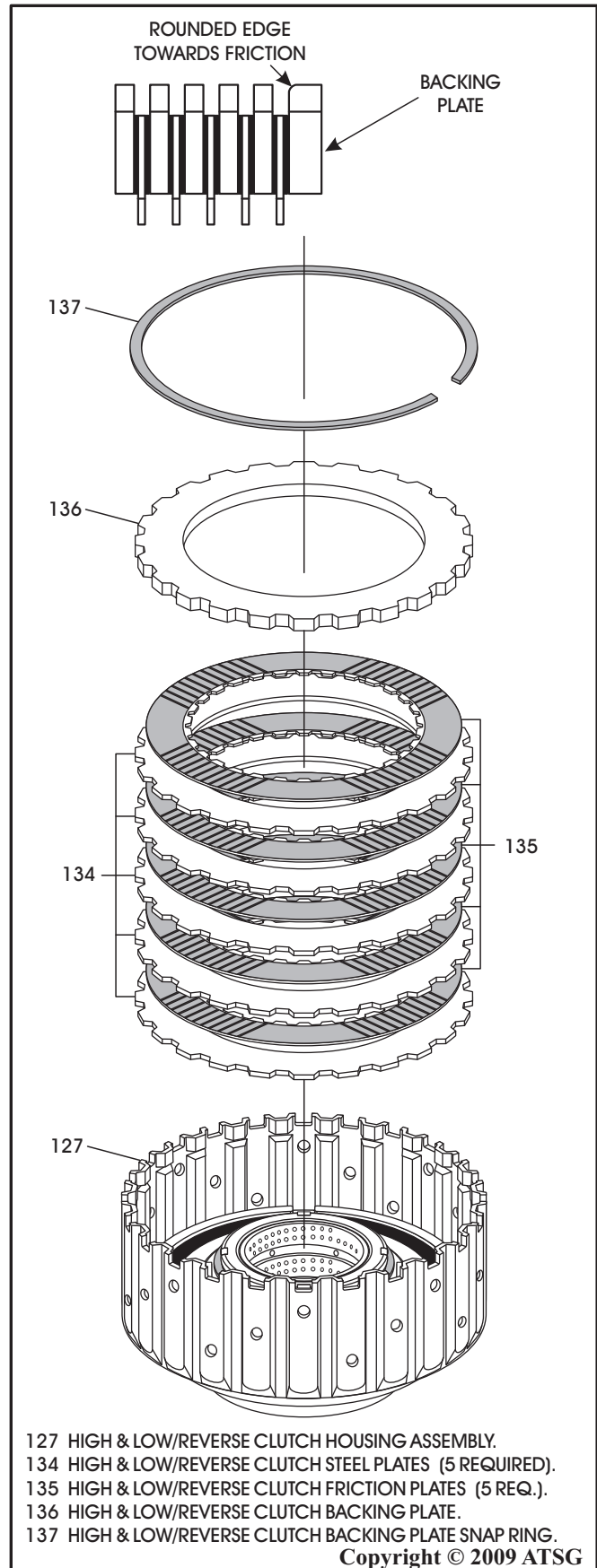


Figure 135

COMPONENT REBUILD (CONT'D)

High And Low/Reverse Clutch Housing (Cont'd)

12. Measure high and low/reverse clutch clearance using a feeler gage between the backing plate and snap ring, as shown in Figure 136.
13. High and low/reverse clutch clearance should be; 1.8 - 2.2 mm (.070" - .087").

Note: *There are no selective components in the High and Low/Reverse clutch. If the clearance is not within specifications listed above, there has been a mis-assembly.*

14. Install the number 13 thrust bearing race onto high and low/reverse clutch housing, as shown in Figure 137, and retain with Trans-Jel®.

Note: *We will install the number 14 thrust bearing on the drum support during final transmission assembly.*

15. Set the completed high and low/reverse clutch housing aside for the final assembly process, as shown in Figure 138.

Component Rebuild Continued on Page 74

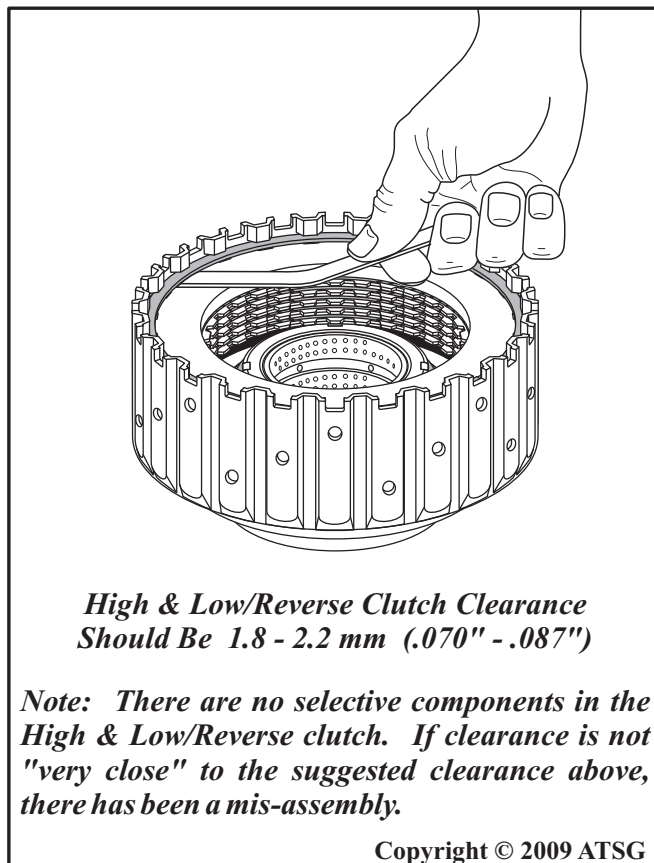


Figure 136

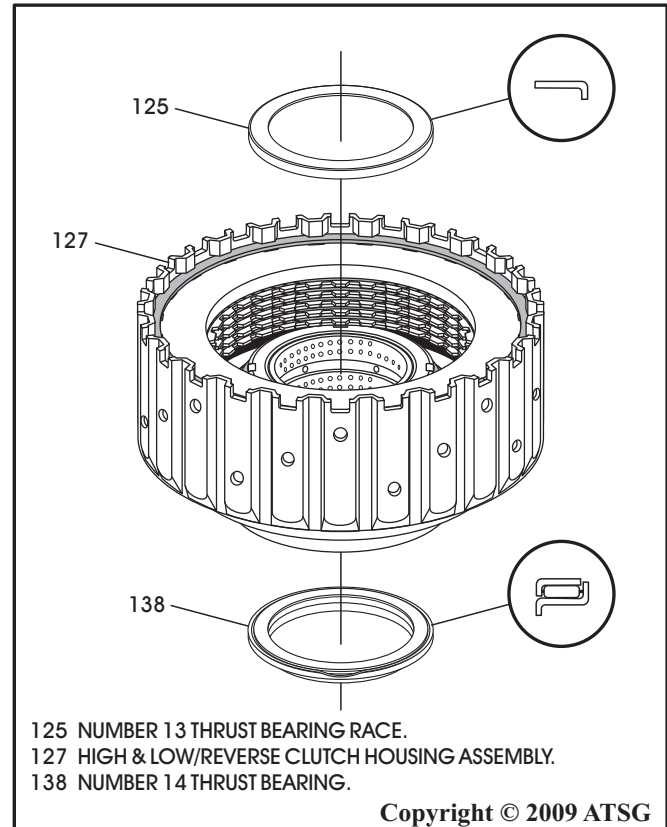


Figure 137

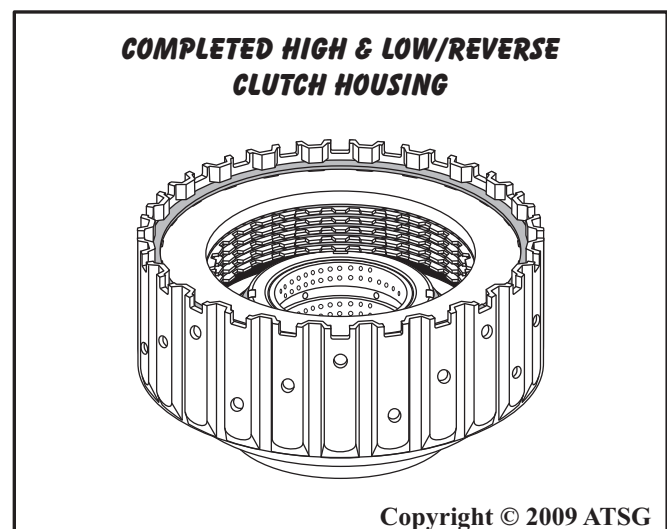
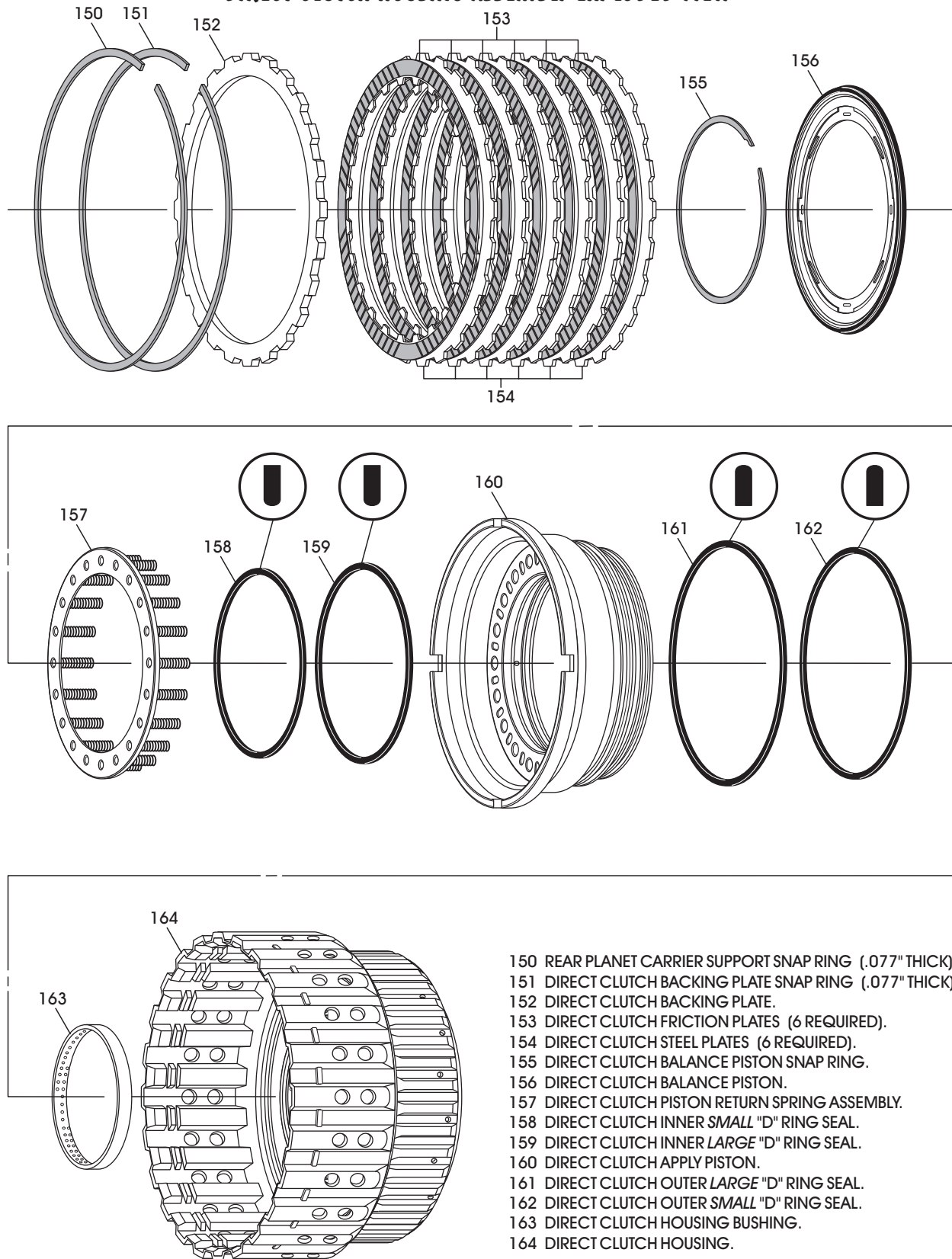


Figure 138

DIRECT CLUTCH HOUSING ASSEMBLY EXPLODED VIEW



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Figure 139

COMPONENT REBUILD (CONT'D)

Direct Clutch Housing Assembly

1. Disassemble the direct clutch housing using Figure 139 as a guide.
- Note: Tag snap rings for identification as several are very similar.*
2. Clean all direct clutch housing parts thoroughly and dry with compressed air.
3. Inspect all direct clutch parts thoroughly for any wear and/or damage, replace as necessary.
4. Install new inner "D" ring seals onto the direct clutch piston, as shown in Figure 140.

Note: Use care as there are two different diameters for the inner seals.

5. Install new outer "D" ring seals onto the direct clutch piston, as shown in Figure 140.

Note: Use care as there are two different diameters for the outer seals.

6. Install new bushing, as necessary, into direct clutch housing, as shown in Figure 141, using the proper bushing driver.

Continued on Page 76

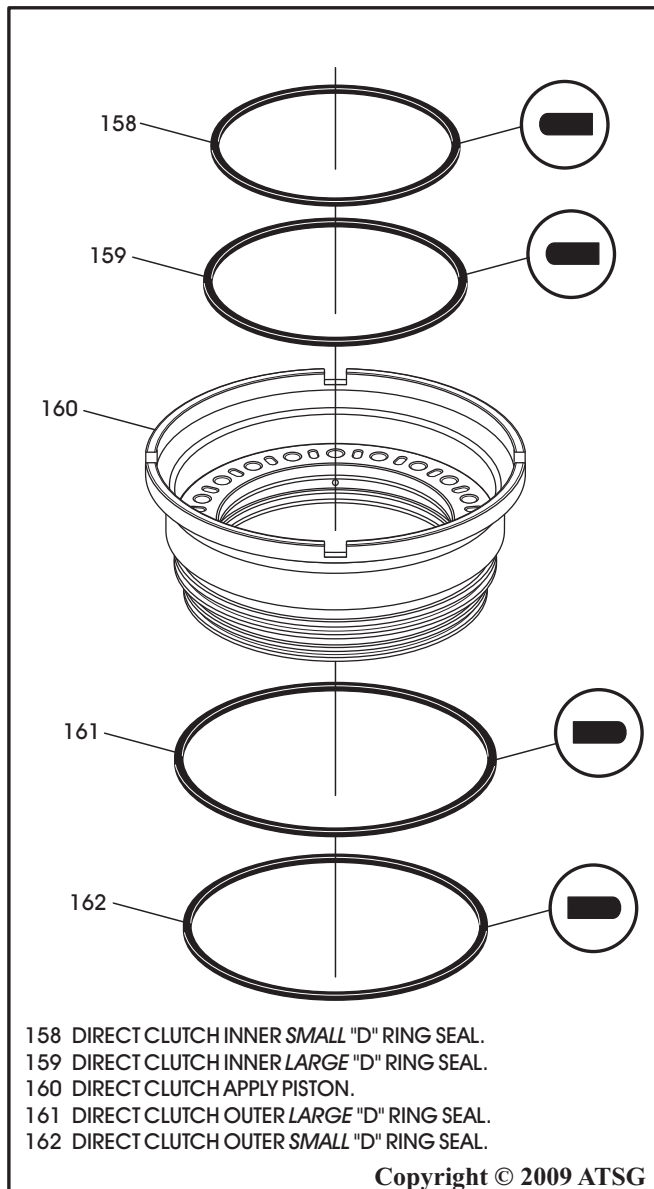


Figure 140

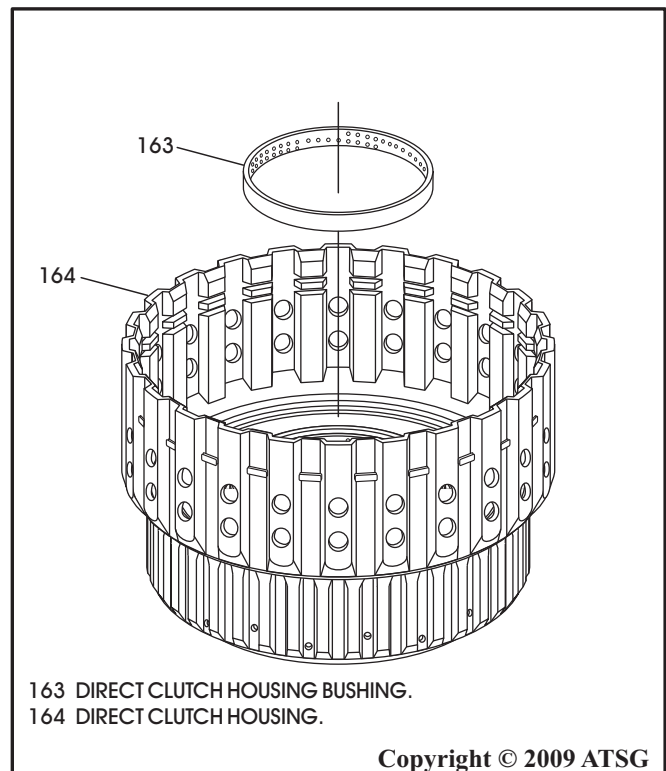


Figure 141

COMPONENT REBUILD (CONT'D)

Direct Clutch Housing Assembly (Cont'd)

7. Lubricate the seals on the direct clutch piston with small amount of Trans-Jel®, and install into the direct clutch housing, as shown in Figure 142.
8. Install the direct clutch piston return spring, as shown in Figure 143, into the direct clutch housing.
9. Lubricate the seal on the direct clutch balance piston and install into the direct clutch piston, as shown in Figure 143.

Note: This is a moulded seal type piston so replace only as necessary.

10. Compress the balance piston using universal spring compressor, or foot press, and install the retaining snap ring, as shown in Figure 143.
11. Remove the universal spring compressor.

Continued on Page 77

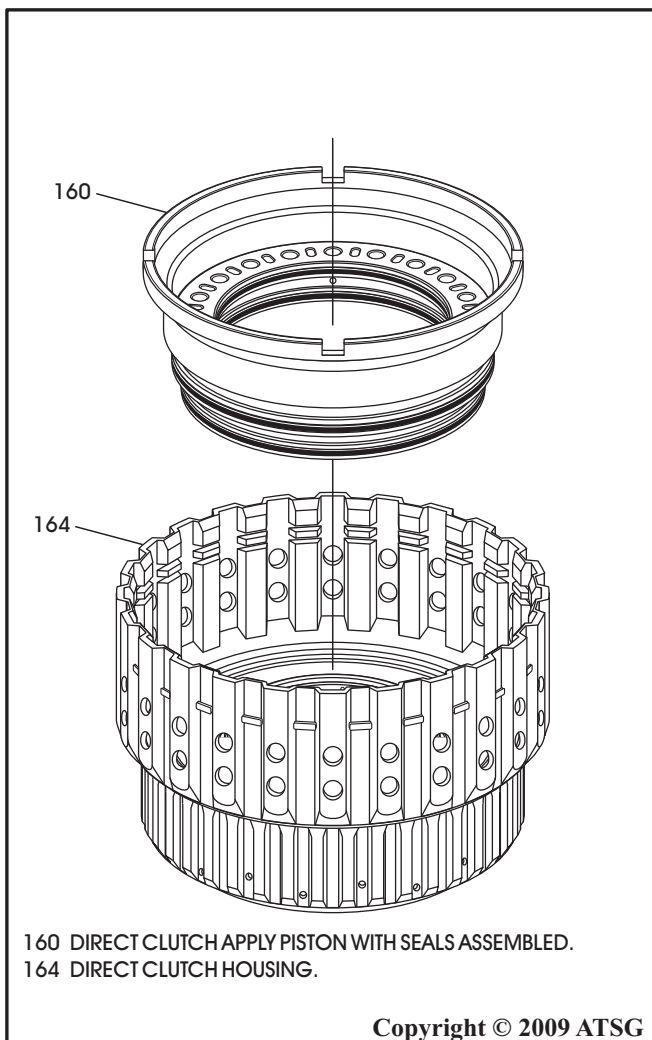


Figure 142

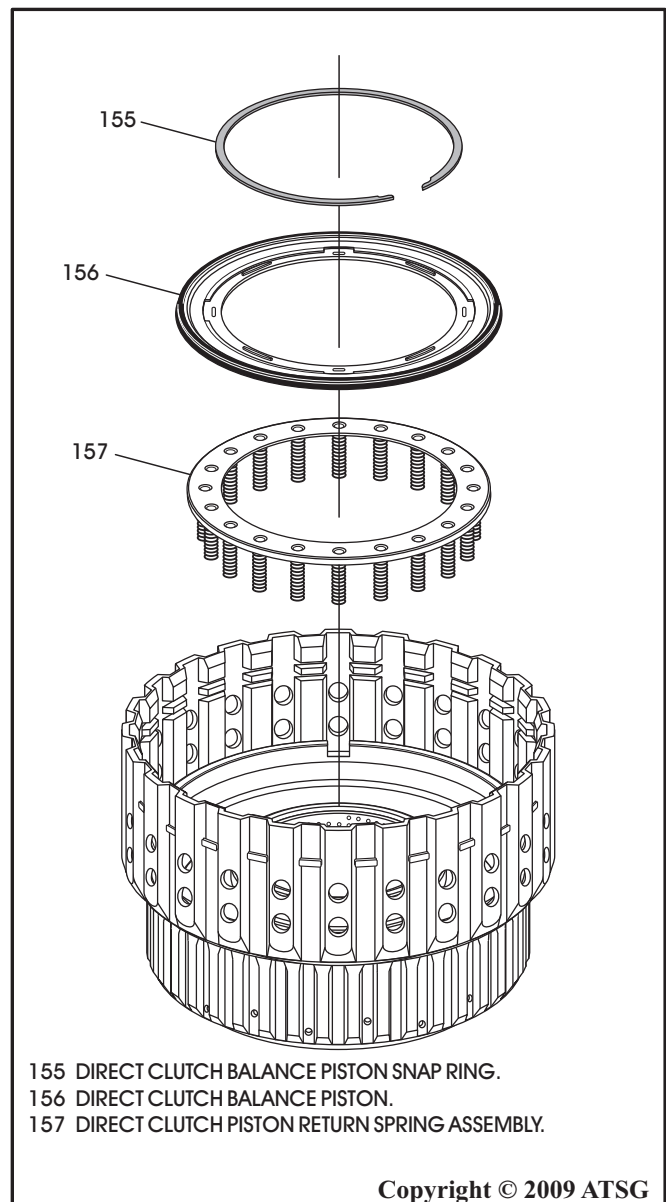


Figure 143

COMPONENT REBUILD (CONT'D)

Direct Clutch Housing Assembly (Cont'd)

12. Install the direct clutches beginning with a steel plate and alternating with a friction plate until you have installed six of each plate, as shown in Figure 144.

Note: All clutch plates should be soaked for 30 minutes in proper fluid before assembly.

13. Install the direct clutch backing plate into direct clutch housing, as shown in Figure 144.

Note: Install backing plate with rounded edge facing the friction plate (See Figure 145).

14. Install the direct clutch backing plate snap ring, as shown in Figure 144.

Note: Do Not install the rear carrier support snap ring until we have verified the direct clutch clearance.

Continued on Page 78

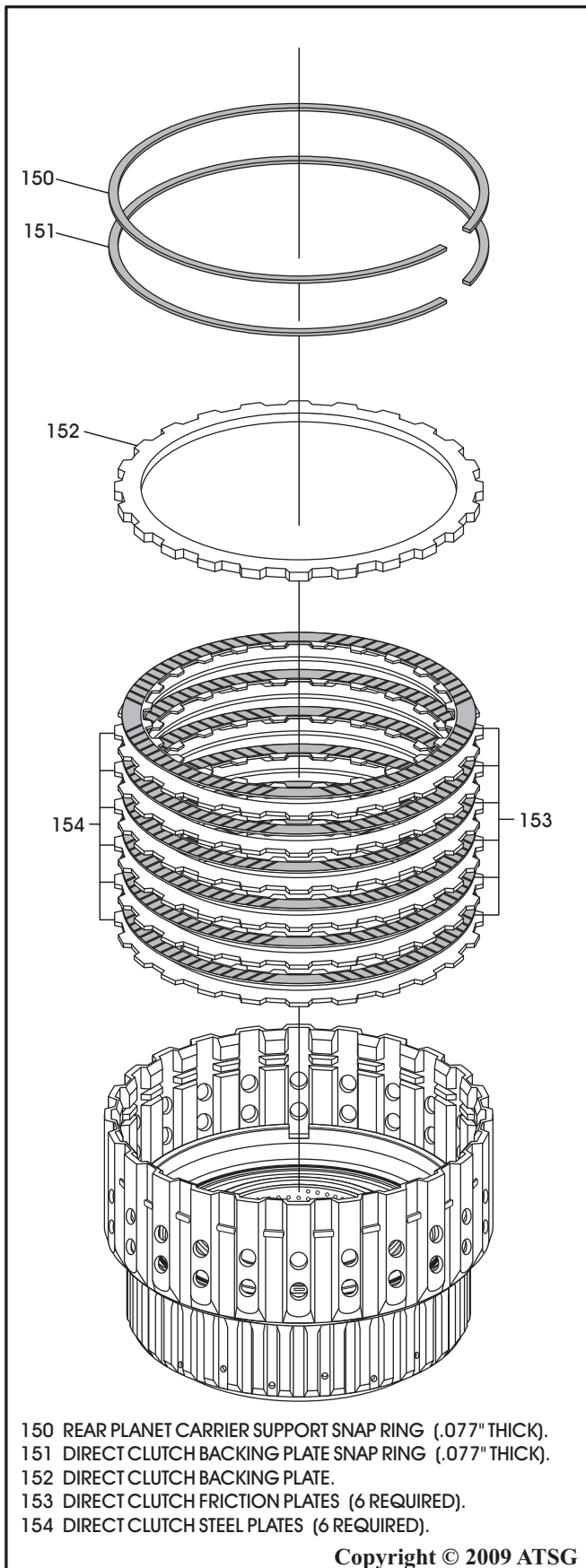


Figure 144

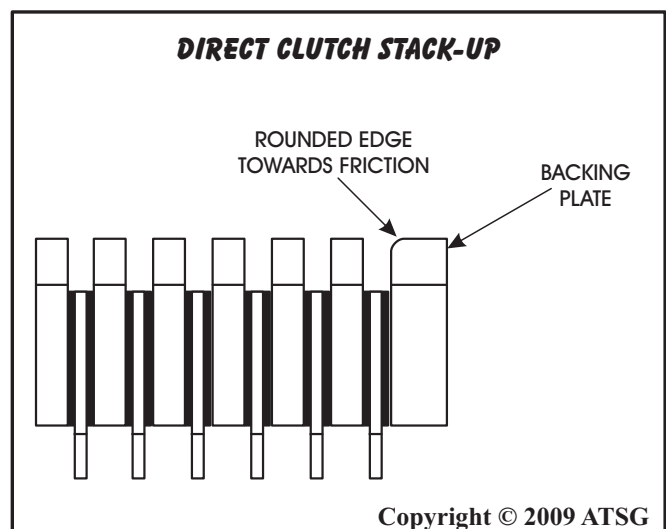


Figure 145

COMPONENT REBUILD (CONT'D)

Direct Clutch Housing Assembly (Cont'd)

15. Measure the direct clutch clearance using a feeler gage between the backing plate and snap ring, as shown in Figure 146.
16. Direct clutch clearance should be 0.6 - 1.0 mm (.028" - .039").

Note: There are no selective components in the direct clutch. If the clearance is not within specifications listed above, there has been a mis-assembly.

17. Now, install the rear planet carrier support snap ring into the direct clutch housing, as shown in Figure 147.
18. Set the completed direct clutch housing aside for the final assembly process.

**Component Rebuild
Continued on Page 79**

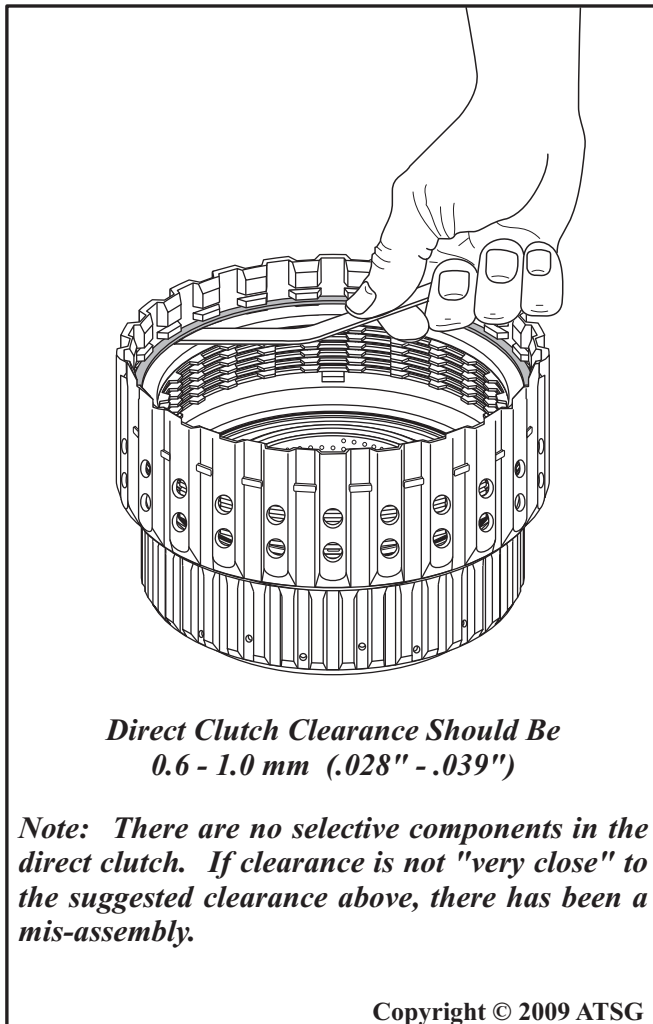


Figure 146

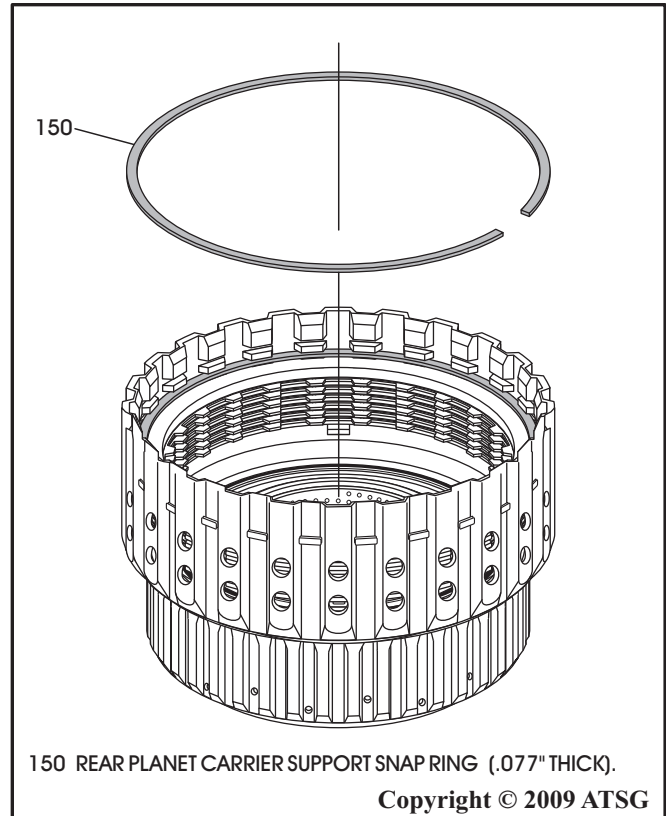


Figure 147

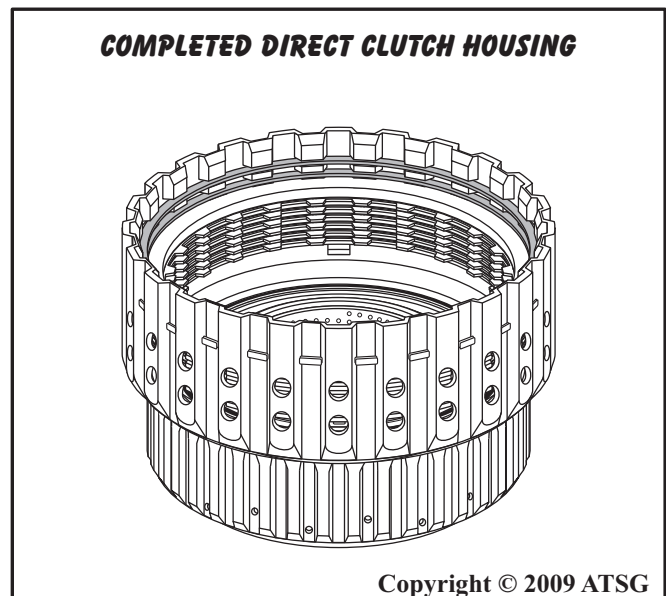


Figure 148

COMPONENT REBUILD (CONT'D)

4WD Adapter Housing

1. Disassemble the 4WD adapter housing using Figure 149 as a guide.
Note: Procedures are the same for the 2WD extension housing. 4WD adapter housing is used in the illustrations.
2. Remove and discard the adapter housing seal.
3. Clean all extension housing parts thoroughly and dry with compressed air.
4. Inspect all extension housing parts thoroughly for any wear and/or damage, and replace as necessary.

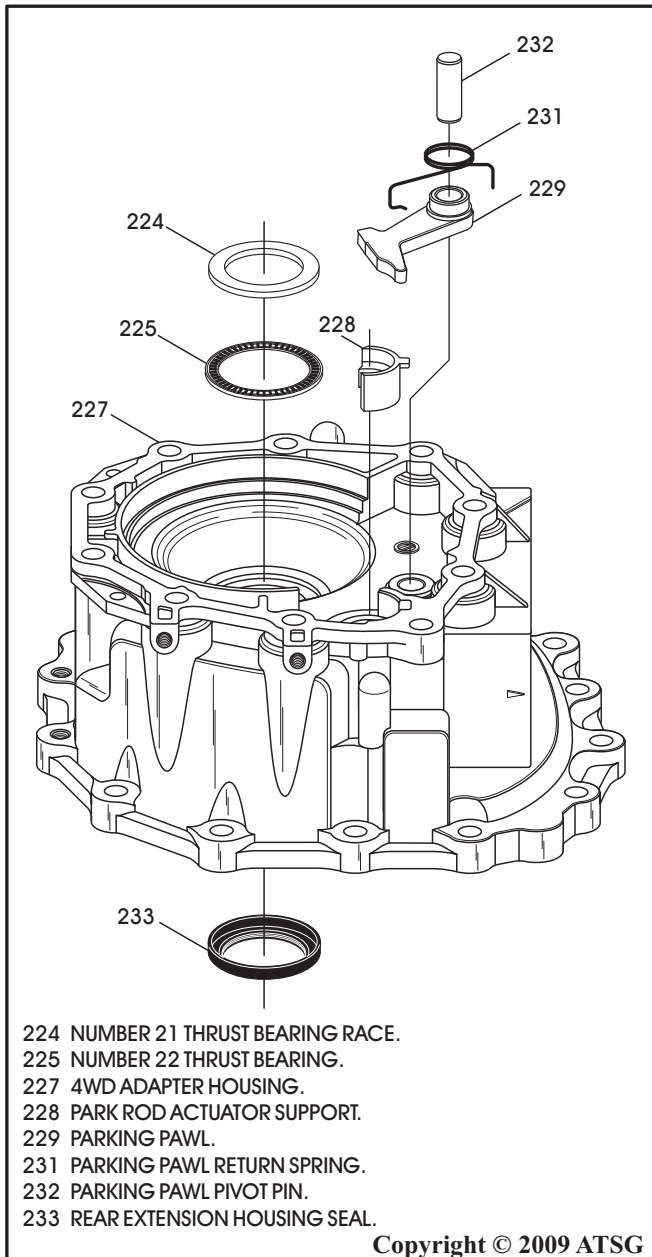


Figure 149

5. Install a new extension housing seal, as shown in Figure 150, using the proper seal driver.
6. Assemble the parking pawl, the parking pawl return spring and parking pawl pivot pin, as shown in Figure 151.

Continued on Page 80

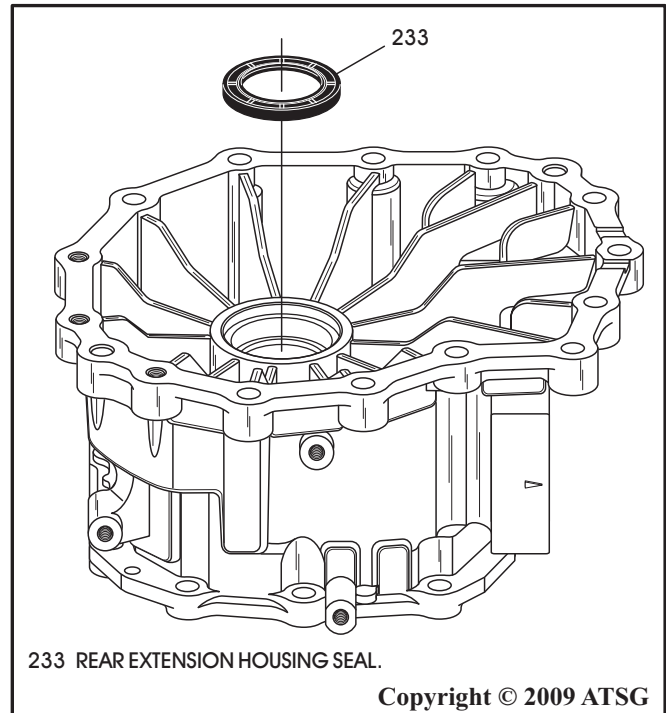


Figure 150

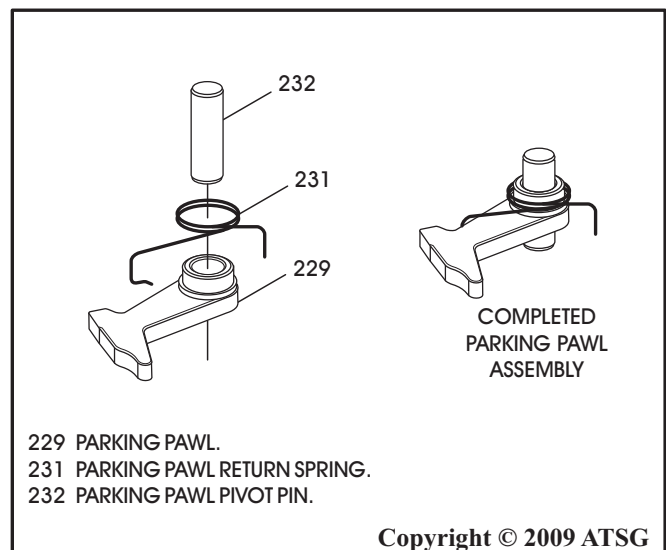


Figure 151

COMPONENT REBUILD (CONT'D)

4WD Adapter Housing (Cont'd)

7. Install the pre-assembled parking pawl, spring and pivot pin into the 4WD adapter housing, as shown in Figure 152, and lock return spring behind the case tab.

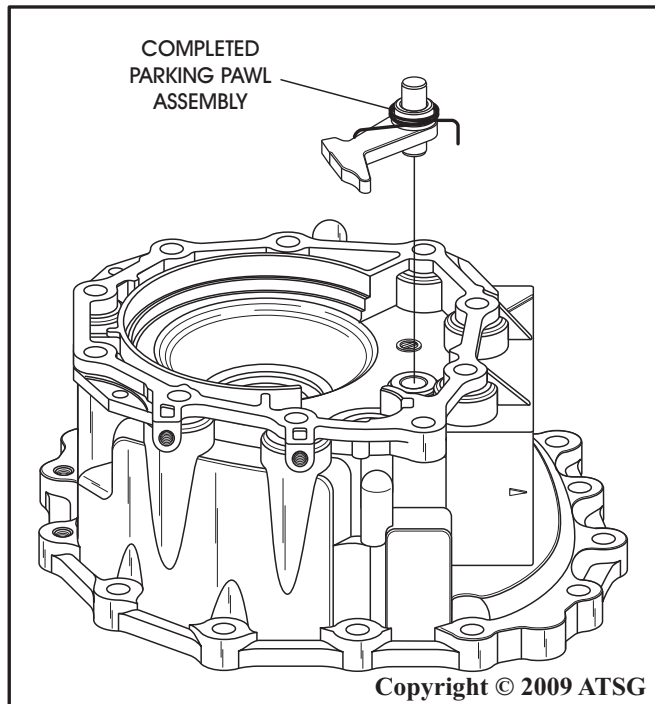


Figure 152

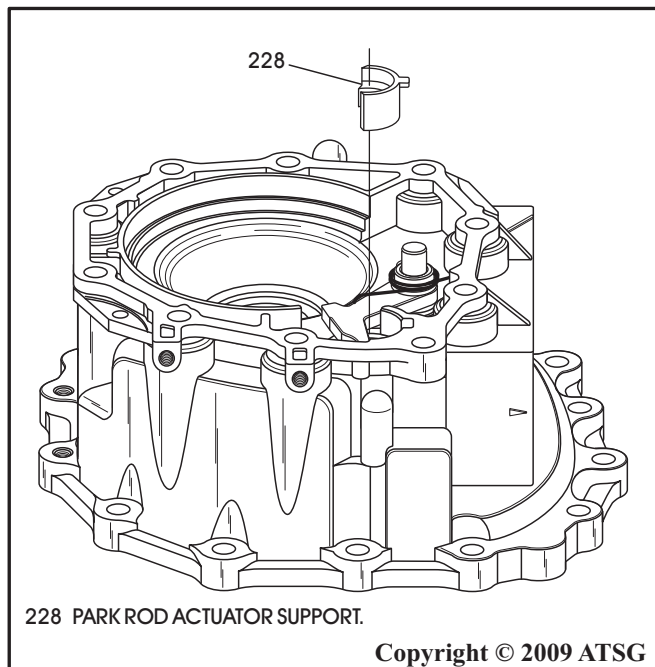


Figure 153

8. Rotate the park pawl clockwise against spring pressure and install the parking rod actuator support into the 4WD adapter housing, as shown in Figure 153.
9. Install the number 22 thrust bearing with the needles facing up, as shown in Figure 154, and retain with Trans-Jel®.
- Note: Do Not install the number 21 thrust bearing race at this time. It will be installed on the output shaft during final assembly.**
10. Set the completed 4WD adapter housing aside for the final assembly process.

Componet Rebuild Continued on Page 81

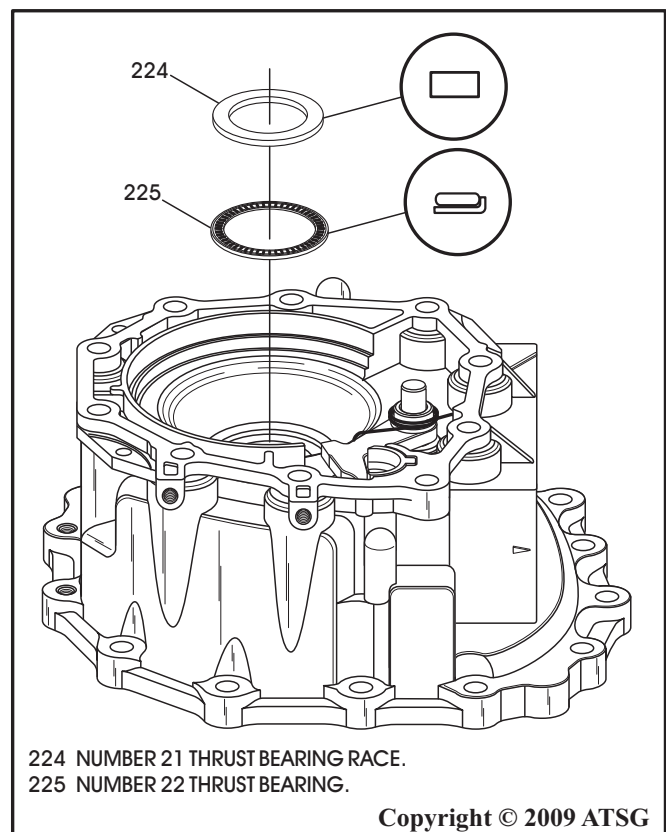


Figure 154

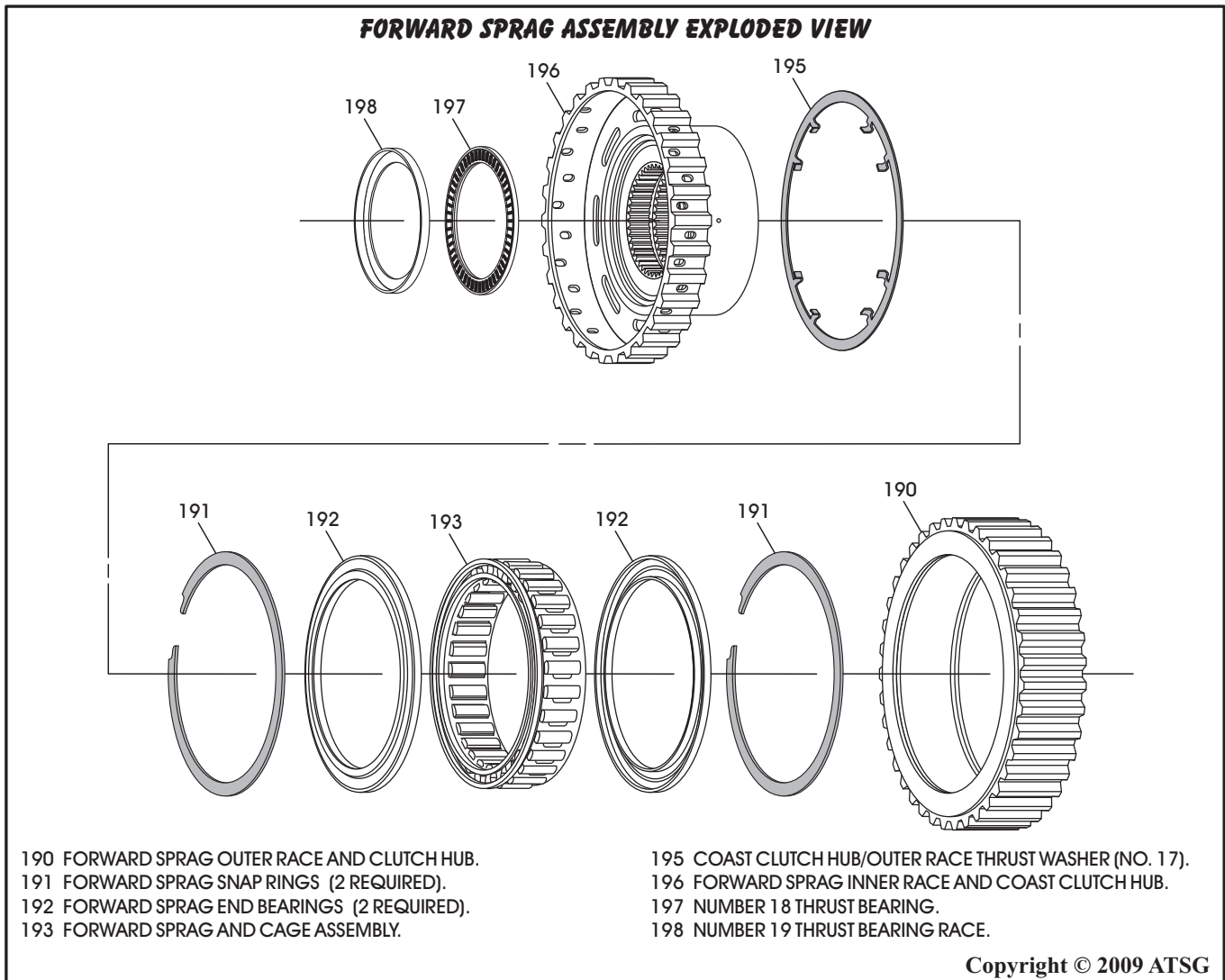


Figure 155

COMPONENT REBUILD (CONT'D)

Forward Sprag Assembly

1. Disassemble the forward sprag assembly using Figure 155 as a guide.
2. Clean all forward sprag parts thoroughly and dry with compressed air.
3. Inspect all forward sprag parts thoroughly for any wear and/or damage, replace as necessary.
4. Place outer sprag race on a flat work surface with the flat side of outer race facing up, as shown in Figure 156.
5. Install one of the snap rings into the upper groove, as shown in Figure 156, and ensure that it is fully seated.

Continued on Page 82

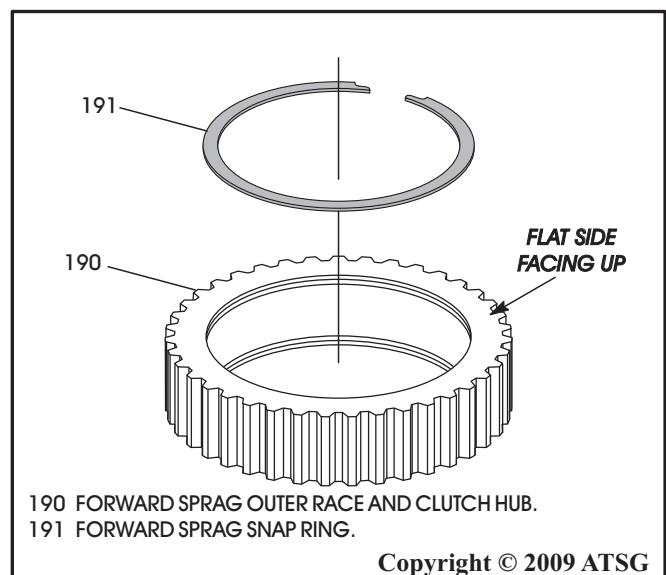


Figure 156

COMPONENT REBUILD (CONT'D)

Forward Sprag Assembly (Cont'd)

6. Turn the outer race over so the "step" side is facing up, as shown in Figure 157.
 7. Install 1st of the end bearings with the "step" facing down, as shown in Figure 157.
 8. Install the forward sprag and cage assembly, as shown in Figure 157.
- Note: Install with the "lip" facing up and the "windows" facing to the left, as shown in Figure 157.**
9. Install the last of the end bearings with "step" facing up, as shown in Figure 157.
 10. Install the last snap ring into the groove in the outer race, as shown in Figure 157.

11. Install the number 17 thrust washer onto the inner race, as shown in Figure 158.

Note: Ensure that number 17 thrust washer is laying flat against coast clutch hub and the tangs are engaged with the spokes, as shown in Figure 159.

Continued on Page 83

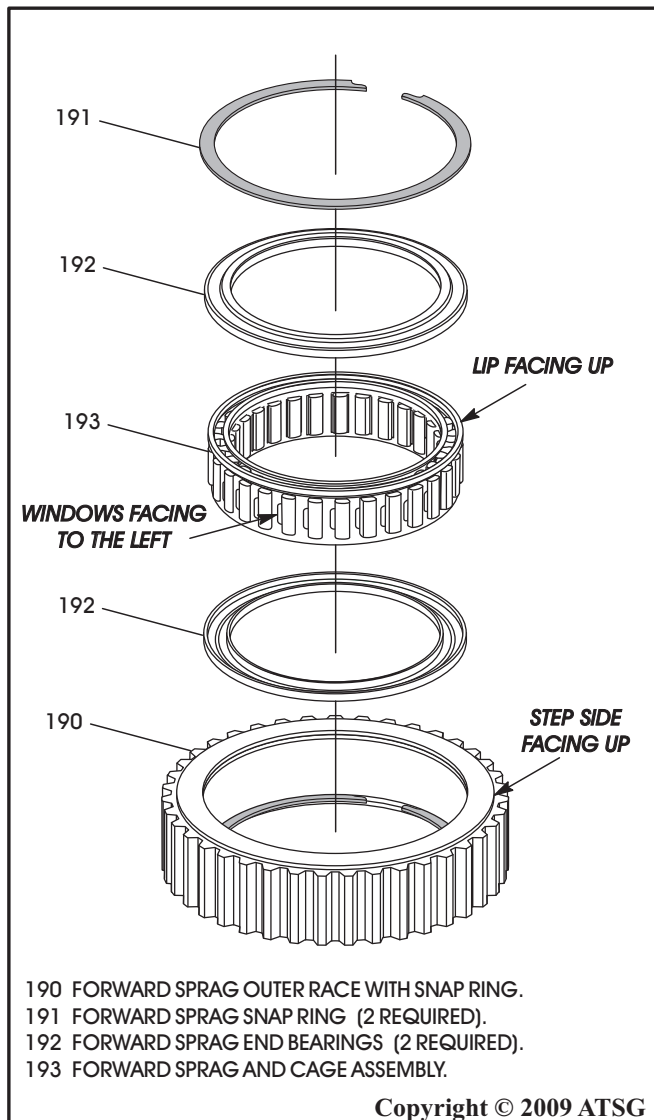


Figure 157

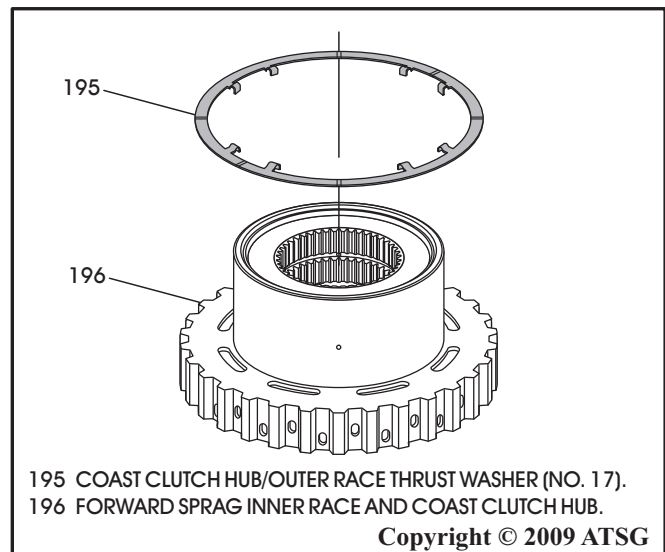


Figure 158

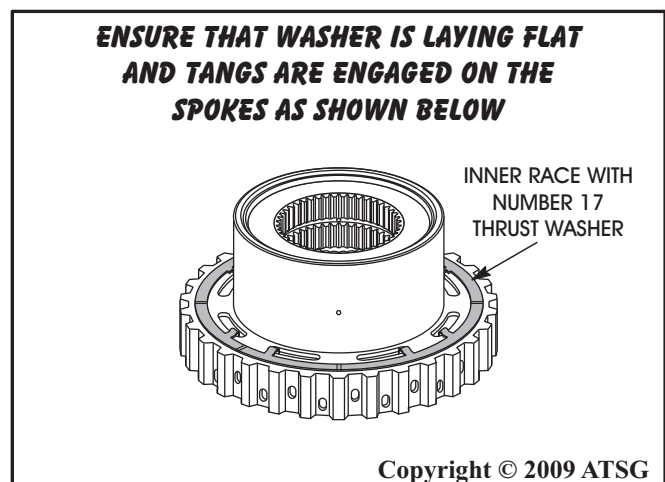


Figure 159

COMPONENT REBUILD (CONT'D)

Forward Sprag Assembly (Cont'd)

12. Lubricate forward sprag and inner race with the proper transmission fluid.
13. Install the inner race and number 17 thrust washer assembly into forward sprag assembly, by rotating counter-clockwise, as shown in Figure 160. Outer race and sprag assembly must have "step side" facing up, as shown.
Note: Check for proper sprag free-wheel, and lock, as shown in Figure 161.

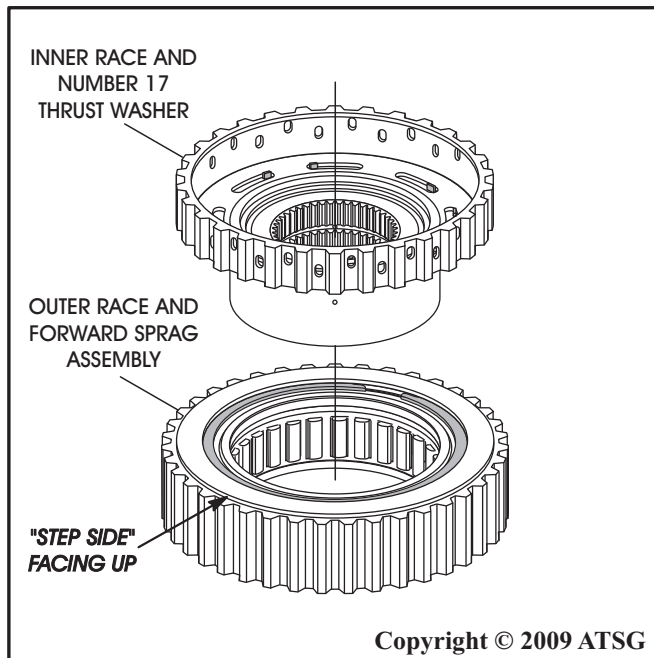


Figure 160

COAST CLUTCH HUB SHOULD FREEWHEEL COUNTER-CLOCKWISE AND LOCK CLOCKWISE, WHILE HOLDING THE FORWARD BRAKE CLUTCH HUB

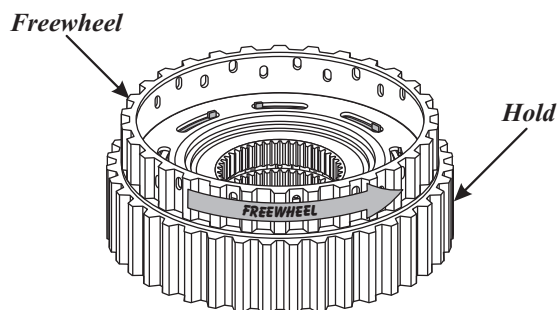


Figure 161

14. Install the number 18 thrust bearing with the needles facing up, as shown in Figure 162, and retain with small amount of Trans-Jel®.
Note: Do Not install the number 19 thrust bearing race. It is installed during the final assembly process.
15. Set completed forward sprag assembly aside for the final assembly process (See Figure 163).

Component Rebuild Continued on Page 84

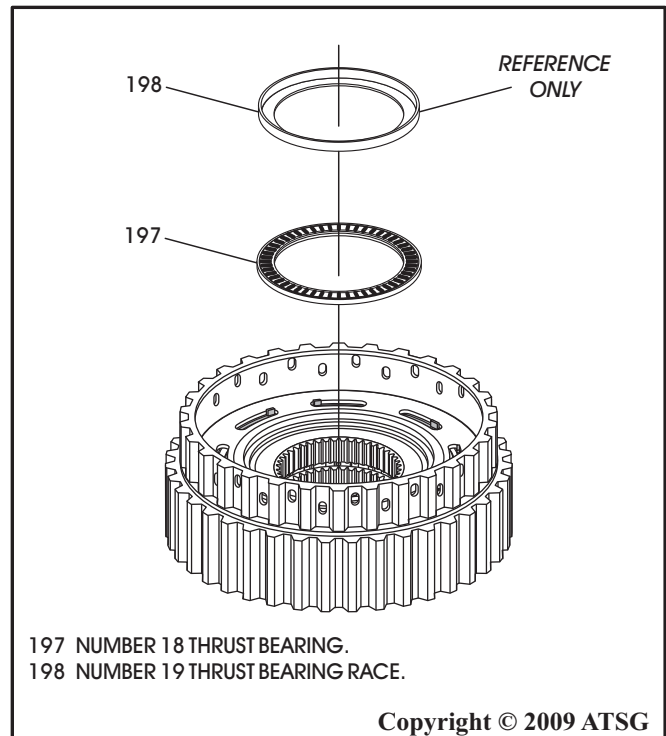


Figure 162

COMPLETED FORWARD SPRAG ASSEMBLY

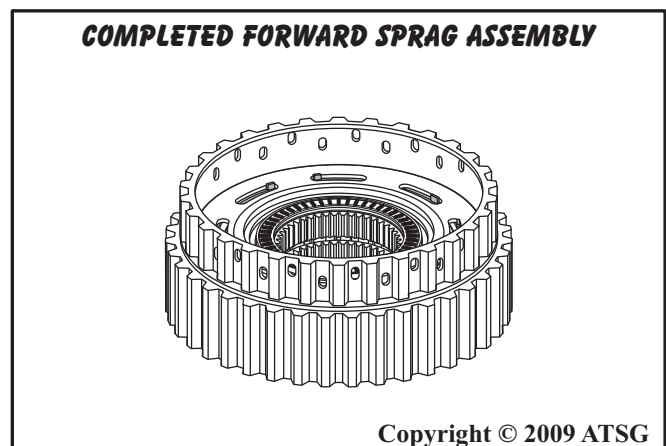


Figure 163



Technical Service Information

COMPONENT REBUILD (CONT'D)

Valve Body Assembly

2002-Mid 2004 "External TCM" Models

1. The number of bolts that hold the valve body assembly together can get very confusing to say the least. There are many different length bolts, with different head configurations, some allen head bolts, some hex head bolts and some of them have nuts on the opposite side of the valve body. We have illustrated where these bolts are located, their length, what type of head and whether there is a nut for that bolt on opposite side of the valve body.
2. Place the valve body assembly on a flat work surface, with the filter side facing down, as shown in Figure 164.
3. Remove all seven solenoids from valve body, as shown in Figure 164.
4. Remove the three allen head bolts identified with the letter E, that have a nut on the opposite side of valve body, as shown in Figure 164.
5. Remove the two allen head bolts identified with the letter F, as shown in Figure 164.
6. Remove the five allen head bolts identified with the letter G, as shown in Figure 164.
7. Remove the shift control module and internal wiring harness from the valve body, as shown in Figure 164.
8. Remove the hex head bolt identified with the letter D, as shown in Figure 164.
9. Remove the two hex head bolts identified with the letter H, that have a nut on the opposite side of valve body, as shown in Figure 164.

Valve Body Disassembly
Continued on Page 87

COMPONENT REBUILD (CONT'D)

Valve Body Assembly

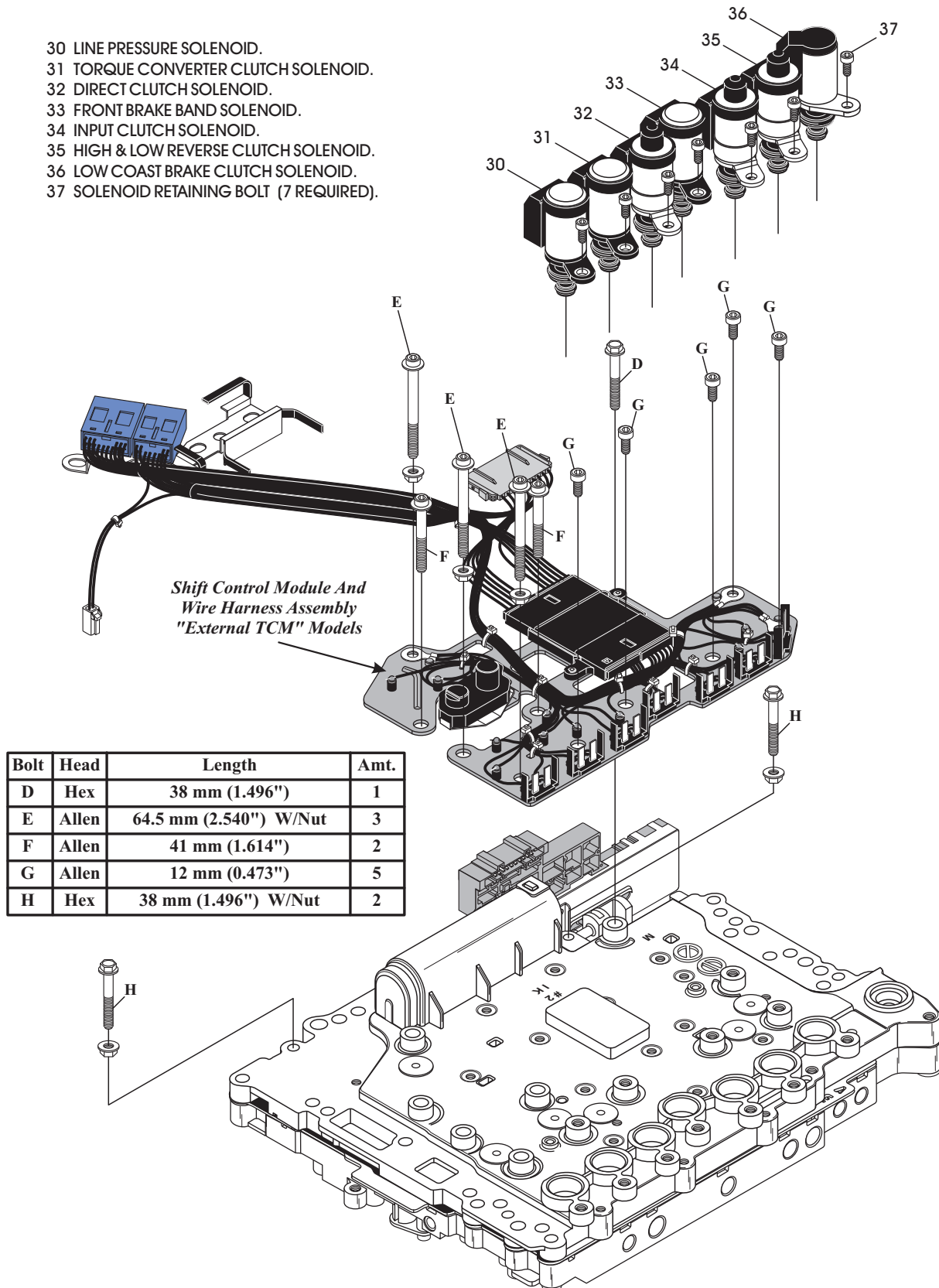
Mid 2004-2008 "Internal TCM" Models

1. The number of bolts that hold the valve body assembly together can get very confusing to say the least. There are many different length bolts, with different head configurations, some allen head bolts, some hex head bolts and some of them have nuts on the opposite side of the valve body. We have illustrated where these bolts are located, their length, what type of head and whether there is a nut for that bolt on opposite side of the valve body.
2. Place the valve body assembly on a flat work surface, with the filter side facing down, as shown in Figure 165, and remove both of the internal wire harness' from the TCM and PNP switch (See Figure 165).
3. Remove all seven solenoids from valve body, as shown in Figure 165.
4. Remove the three allen head bolts identified with the letter E, that have a nut on the opposite side of valve body, as shown in Figure 165.
5. Remove the two allen head bolts identified with the letter F, as shown in Figure 165.
6. Remove the five allen head bolts identified with the letter G, as shown in Figure 165.
7. Remove the hex head bolt identified with the letter D, as shown in Figure 165.
8. Remove transmission control module (TCM) from the valve body, as shown in Figure 165.
9. Remove the two hex head bolts identified with the letter H, that have a nut on the opposite side of valve body, as shown in Figure 165.

Valve Body Disassembly
Continued on Page 87

2002 - MID 2004 INTERNAL HARNESS REMOVAL, WITH "EXTERNAL TCM"

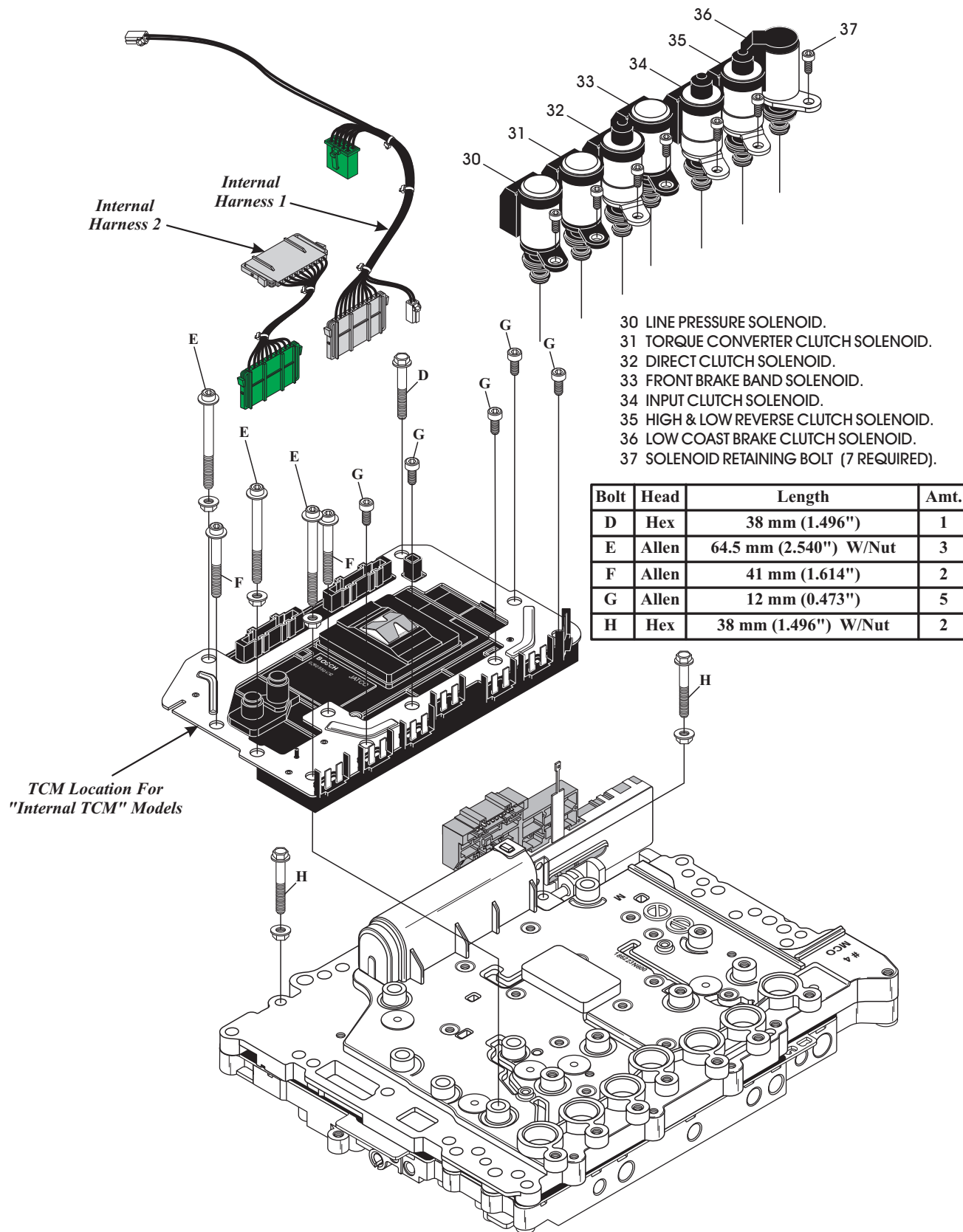
- 30 LINE PRESSURE SOLENOID.
- 31 TORQUE CONVERTER CLUTCH SOLENOID.
- 32 DIRECT CLUTCH SOLENOID.
- 33 FRONT BRAKE BAND SOLENOID.
- 34 INPUT CLUTCH SOLENOID.
- 35 HIGH & LOW REVERSE CLUTCH SOLENOID.
- 36 LOW COAST BRAKE CLUTCH SOLENOID.
- 37 SOLENOID RETAINING BOLT (7 REQUIRED).



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Figure 164

MID 2004 - 2008 TCM AND HARNESS REMOVAL, WITH "INTERNAL TCM"



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Figure 165

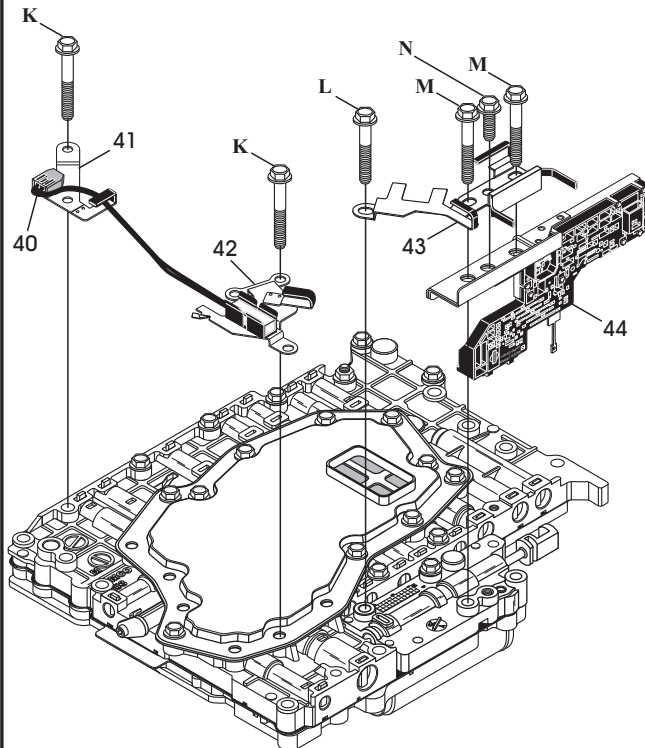
COMPONENT REBUILD (CONT'D)

Valve Body Assembly (Cont'd)

"All Models"

10. Turn valve body assembly over so that filter is facing up, as shown in Figure 166.
11. Remove the two hex head bolts identified with the letter K, as shown in Figure 166, and then remove the TFT2 sensor and two brackets.
12. Remove the hex head bolts identified with the letter L, M, and N, as shown in Figure 166, and remove the wire harness retaining bracket and the park/neutral position switch.
13. Remove the three hex head bolts identified with the letter P from the filter, as shown in Figure 167.

Bolt	Head	Length	Amt.
K	Hex	41 mm (1.614")	2
L	Hex	35 mm (1.378")	1
M	Hex	37 mm (1.457")	2
N	Hex	16 mm (0.630")	1



- 40 TRANSMISSION FLUID TEMPERATURE SENSOR 2.
 41 TFT2 SENSOR MOUNTING BRACKET.
 42 TFT2 SENSOR CONNECTOR MOUNTING BRACKET.
 43 WIRE HARNESS RETAINING BRACKET.
 44 PARK NEUTRAL POSITION SWITCH.

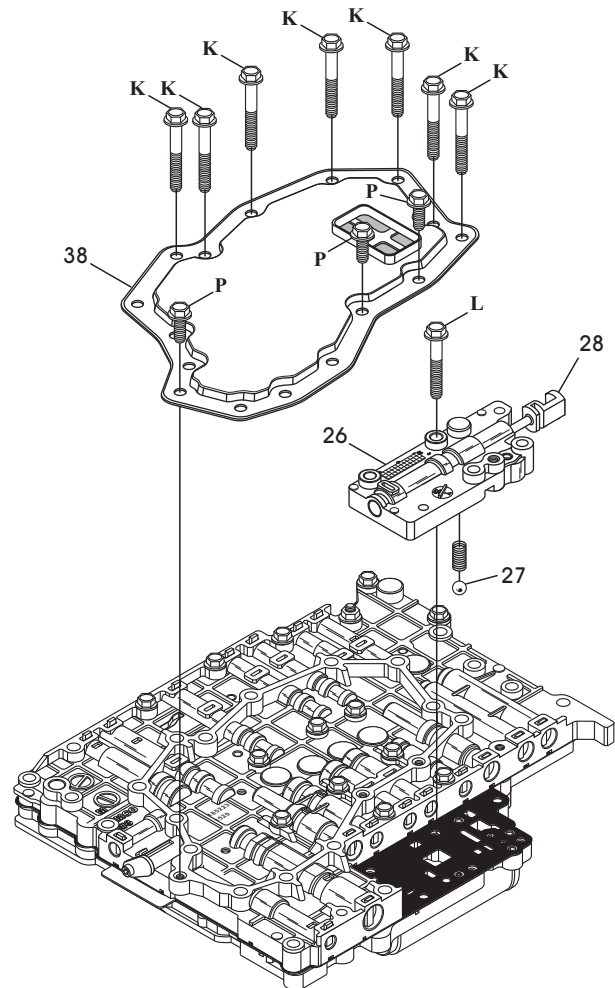
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Figure 166

14. Remove the seven hex head bolts identified with the letter K from the filter, as shown in Figure 167, and remove the filter.
 15. Remove the hex head bolt identified with the letter L from the manual valve body, as shown in Figure 167, and remove manual valve body.
- Note:** Use care when removing so as not to drop the check valve "C" and spring.

Continued on Page 88

Bolt	Head	Length	Amt.
K	Hex	41 mm (1.614")	7
L	Hex	35 mm (1.378")	1
P	Hex	12 mm (0.630")	3



- 26 MANUAL VALVE BODY CASTING.
 27 CHECK VALVE "C" (FORWARD BRAKE).
 28 MANUAL VALVE.
 38 OIL PUMP SCREEN.

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Figure 167

COMPONENT REBUILD (CONT'D)

Valve Body Assembly (Cont'd)

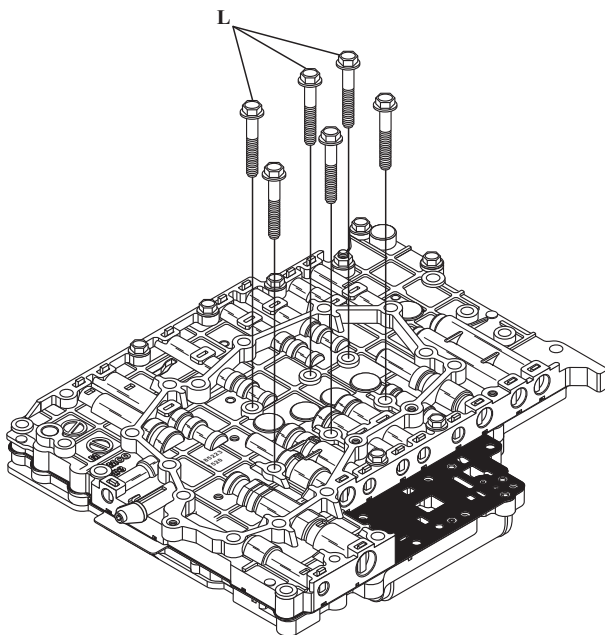
"All Models"

16. Remove the six hex head bolts identified with the letter L, underneath the filter, as shown in Figure 168.
17. Remove the five hex head bolts identified with the letter M from the valve body, as shown in Figure 169.
18. Remove the two hex head bolts identified with the letter L from the valve body, as shown in Figure 169.
19. Remove the nut from the bolt identified with the letter R, as shown in Figure 169, and leave the 49mm bolt "R" in place in the valve body at this time.

Note: Be sure to install new "O" ring on TFT2 sensor, as shown in Figure 169, during the re-assembly process.

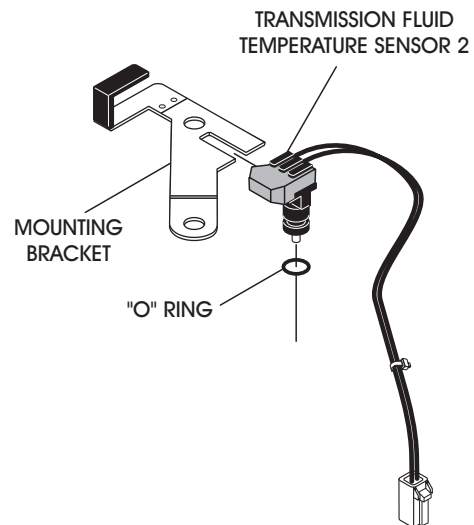
Continued on Page 89

Bolt	Head	Length	Amt.
L	Hex	35 mm (1.378")	6

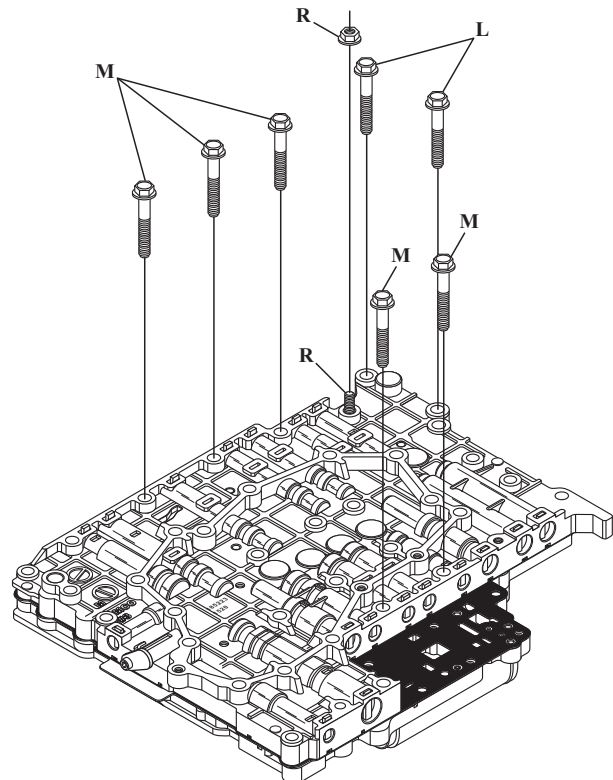


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Figure 168



Bolt	Head	Length	Amt.
L	Hex	35 mm (1.378")	2
M	Hex	37 mm (1.457")	5
R	Hex	49 mm (1.930") W/Nut	1



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Figure 169

COMPONENT REBUILD (CONT'D)

Valve Body Assembly (Cont'd)

"All Models"

20. Remove the lower valve body and spacer plate together off of the remaining bolt and upper valve body, as shown in Figure 170.

Note: *Spacer plate is used to retain the check valves and screens that are inside the lower valve body.*

21. Turn the lower valve body over and remove the spacer plate and gaskets, two check valves and springs, as shown in Figure 173.

Note: *This is where the valve bodies will be different in several ways.*

Refer to Figure 172 thru 177 for exploded views of 2002 - Mid 2004 valve body.

Refer to Figure 178 thru 183 for exploded views of Mid 2004 - 2008 valve body.

22. Disassemble the lower valve body and place the valves, springs, bore plugs and retainers on trays exactly as they were removed, using the appropriate illustration for reference.

2002 - Mid 2004 = Figure 172 thru 177.

Mid 2004 - 2008 = Figure 178 thru 183.

23. Clean all valve body parts thoroughly and dry with compressed air.

24. Inspect all valve body parts thoroughly for any wear and/or damage, and replace as necessary.

25. Assemble lower valve body parts **exactly**, as shown in the appropriate illustration, and lube with the proper ATF as they are installed.

2002 - Mid 2004 = Figure 172 thru 177.

Mid 2004 - 2008 = Figure 178 thru 183.

26. Reverse the disassembly process to assemble the individual valve body components using new valve body gaskets, and torque all valve body bolts to 8 N·m (70 in.lb.).

Note: *Be sure to install new "O" ring on TFT2 sensor, as shown in Figure 169, during the re-assembly process.*

27. Set the completed valve body assembly aside for final assembly, as shown in Figure 171.

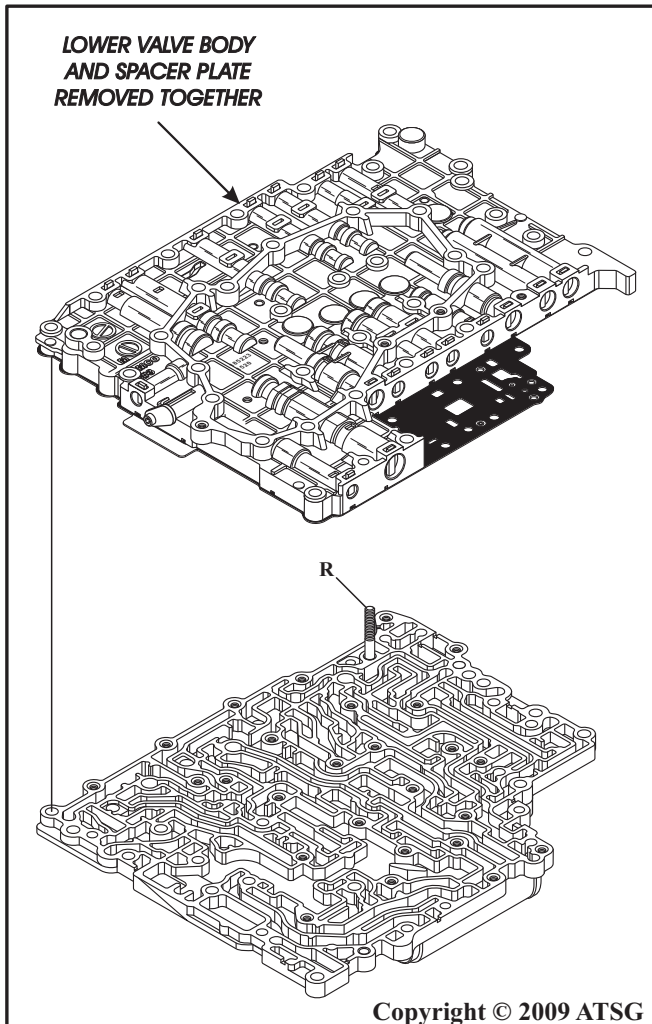


Figure 170

Final Assembly Begins on Page 100

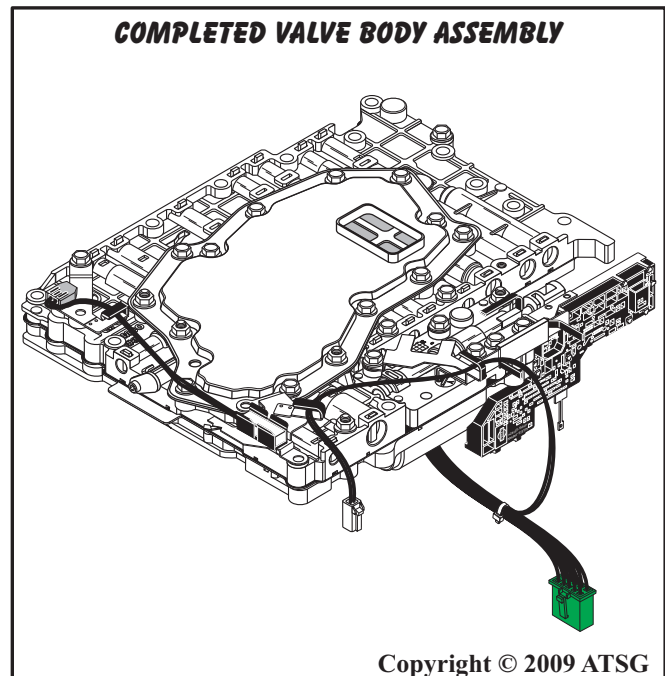
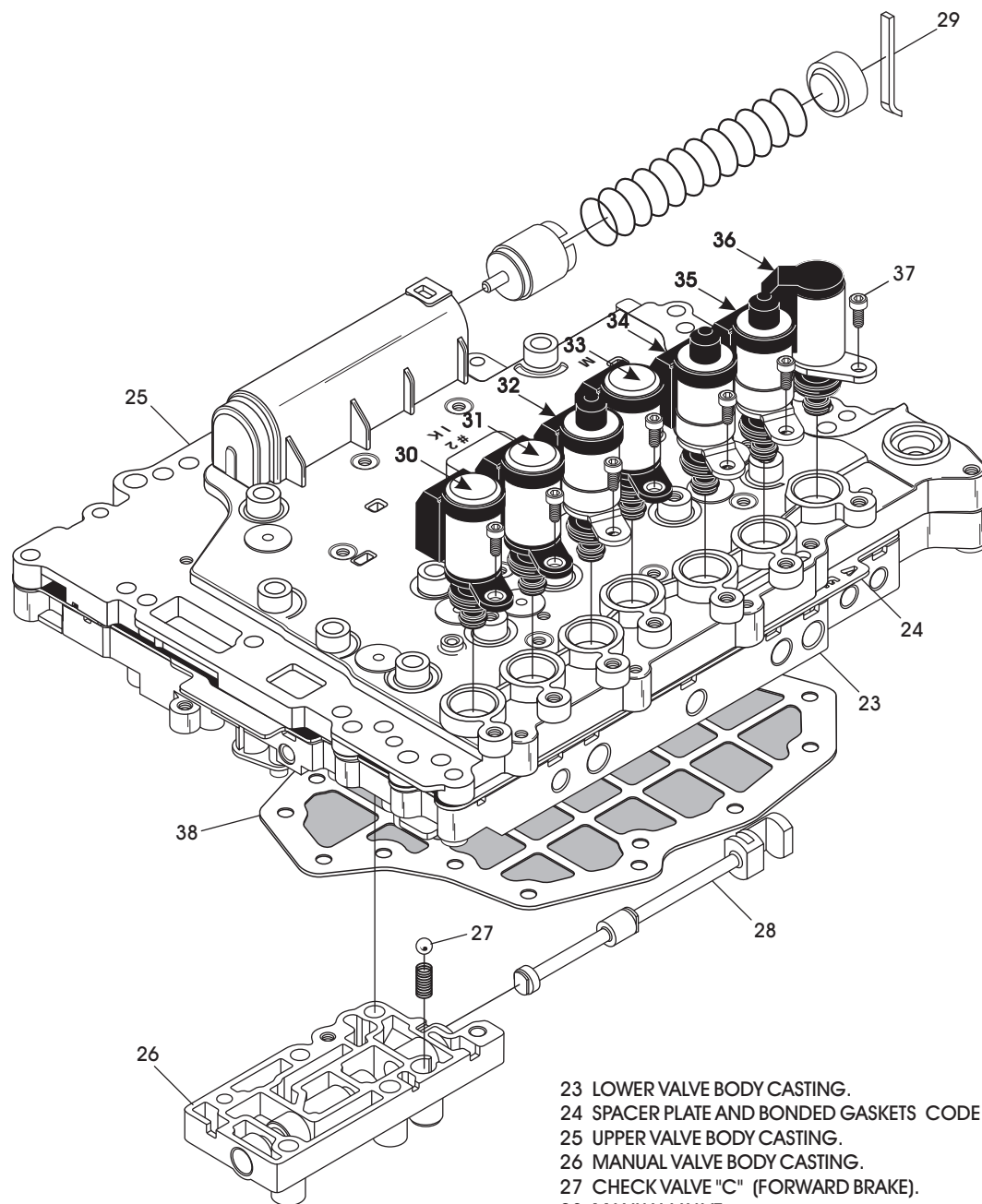


Figure 171

2002 - MID 2004 RE5R05A, VALVE BODY EXPLODED VIEW

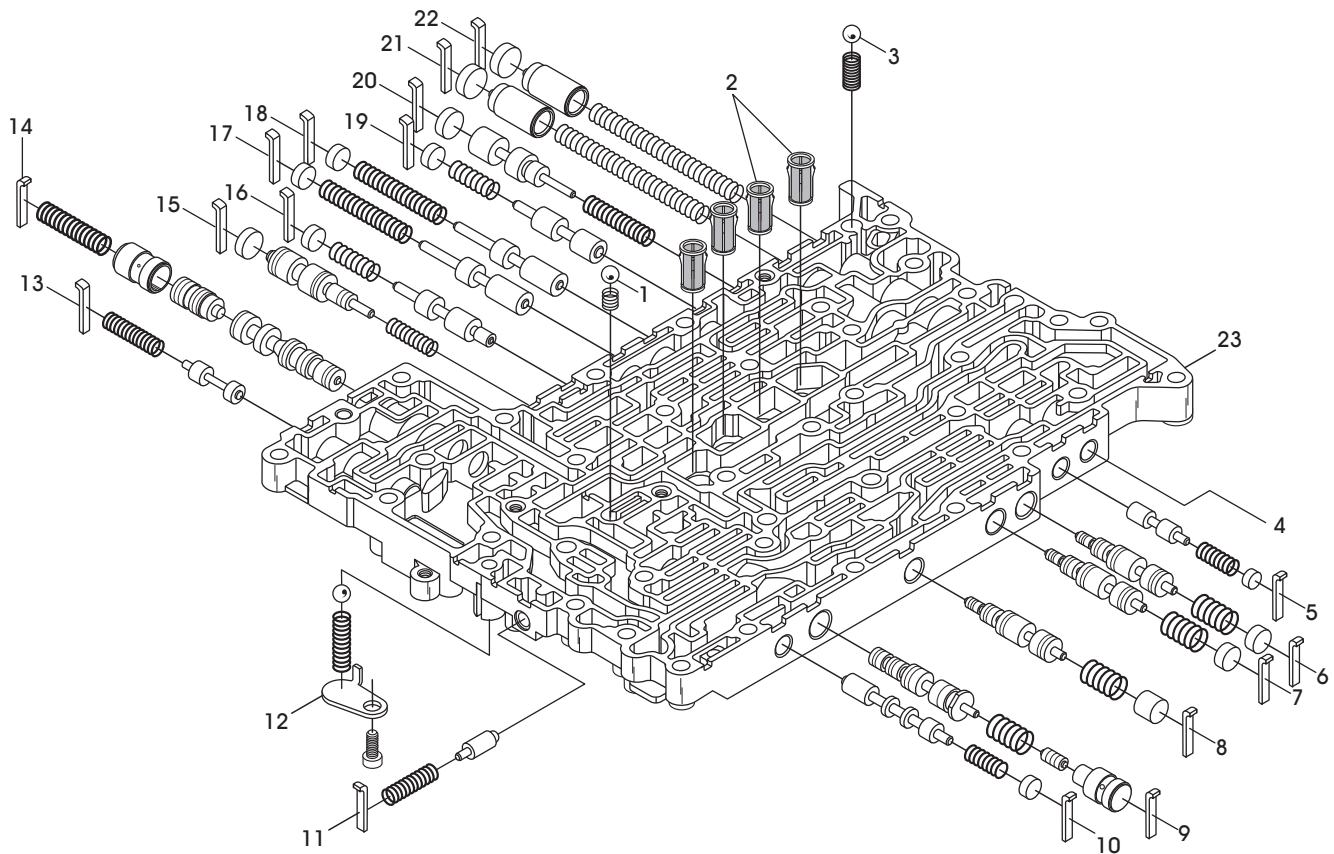


- 23 LOWER VALVE BODY CASTING.
- 24 SPACER PLATE AND BONDED GASKETS CODE "AE".
- 25 UPPER VALVE BODY CASTING.
- 26 MANUAL VALVE BODY CASTING.
- 27 CHECK VALVE "C" (FORWARD BRAKE).
- 28 MANUAL VALVE.
- 29 FORWARD ENGAGEMENT ACCUMULATOR.
- 30 LINE PRESSURE SOLENOID.
- 31 TORQUE CONVERTER CLUTCH SOLENOID.
- 32 DIRECT CLUTCH SOLENOID.
- 33 FRONT BRAKE BAND SOLENOID.
- 34 INPUT CLUTCH SOLENOID.
- 35 HIGH & LOW REVERSE CLUTCH SOLENOID.
- 36 LOW COAST BRAKE CLUTCH SOLENOID.
- 37 SOLENOID RETAINING BOLT (7 REQUIRED).
- 38 OIL PUMP SCREEN.

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Figure 172

2002 - MID 2004 RE5R05A, LOWER VALVE BODY EXPLODED VIEW

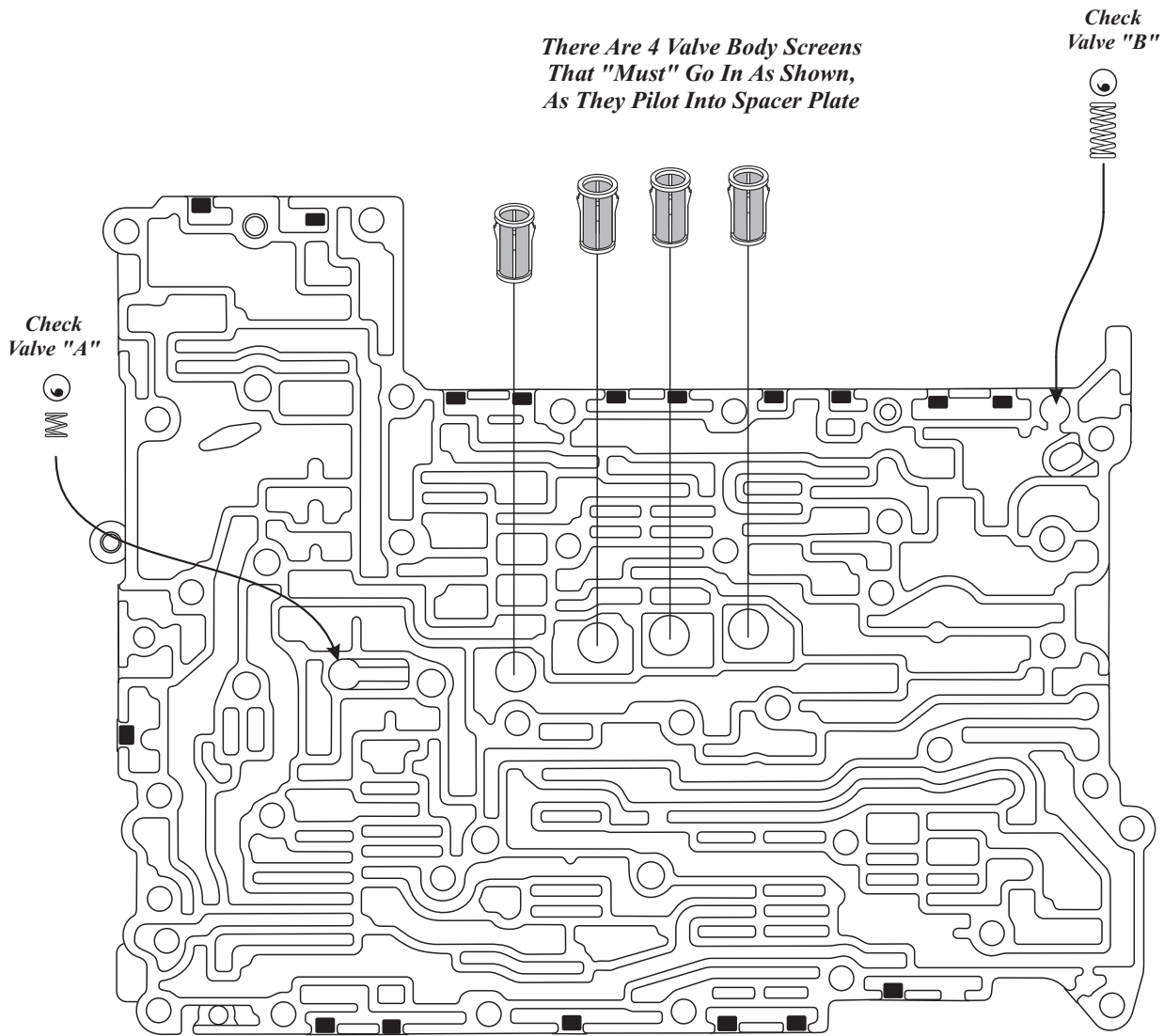


- 1 CHECK VALVE "A" (DRAINBACK).
- 2 VALVE BODY SCREENS (4 REQUIRED).
- 3 CHECK VALVE "B" (REVERSE BRAKE).
- 4 BLANK HOLE BORED WITH NO VALVE TRAIN.
- 5 DIRECT CLUTCH SWITCH VALVE.
- 6 DIRECT CLUTCH PRESSURE CONTROL VALVE.
- 7 INPUT CLUTCH PRESSURE CONTROL VALVE.
- 8 HIGH AND LOW REVERSE CLUTCH PRESSURE CONTROL VALVE.
- 9 TORQUE CONVERTER CLUTCH CONTROL VALVE.
- 10 TORQUE CONVERTER LUBRICATION SWITCH VALVE.
- 11 COOLER BYPASS VALVE.
- 12 LINE PRESSURE RELIEF VALVE.
- 13 TORQUE CONVERTER REGULATOR VALVE.
- 14 LINE PRESSURE REGULATOR VALVE.
- 15 FRONT BRAKE BAND PRESSURE CONTROL VALVE.
- 16 ACCUMMULATOR PRESSURE CONTROL VALVE.
- 17 PILOT VALVE "A".
- 18 PILOT VALVE "B".
- 19 LOW COAST BRAKE SWITCH VALVE.
- 20 LOW COAST BRAKE REDUCING VALVE.
- 21 NEUTRAL TO REVERSE ACCUMMULATOR.
- 22 NEUTRAL TO REVERSE ACCUMMULATOR.
- 23 LOWER VALVE BODY CASTING.

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Figure 173

2002 - MID 2004 RE5R05A, LOWER VALVE BODY SMALL PARTS

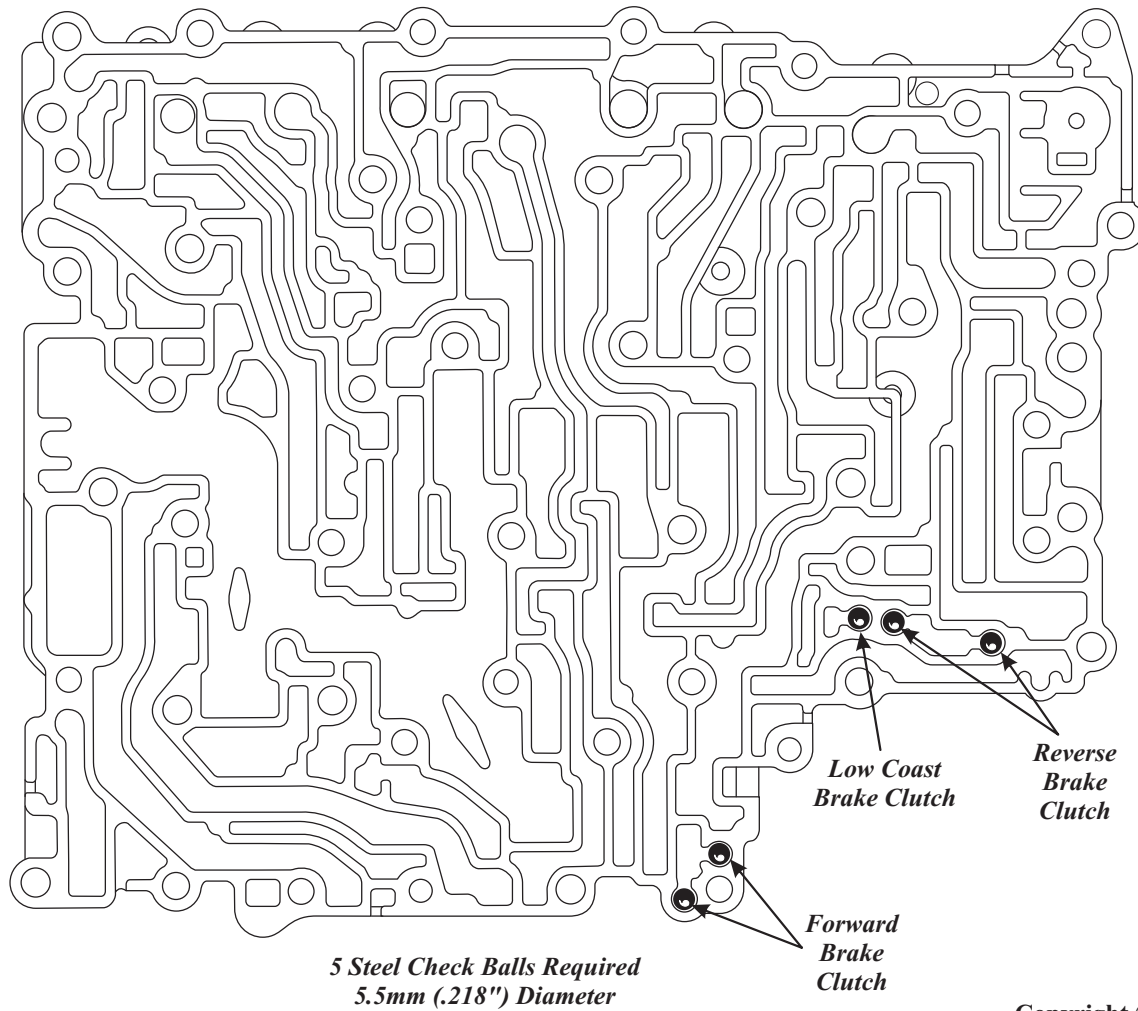


<i>Check Valve "A" (Drainback)</i>	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.350"
SPRING DIAMETER	.285"
WIRE DIAMETER	.016"
APPROX COILS	5

<i>Check Valve "B" (Reverse Brake)</i>	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.705"
SPRING DIAMETER	.316"
WIRE DIAMETER	.039"
APPROX COILS	11

Figure 174

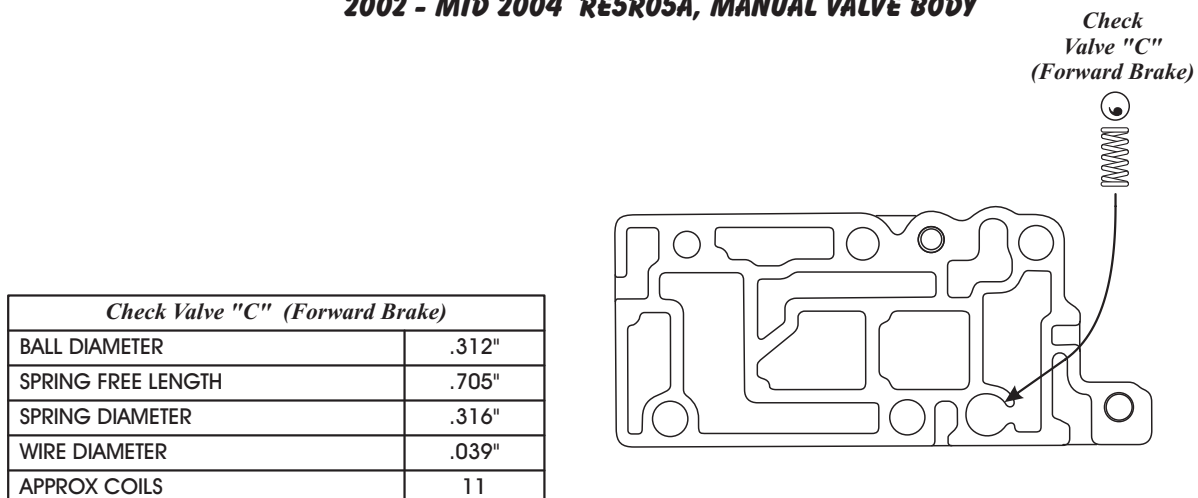
2002 - MID 2004 RE5R05A, UPPER VALVE BODY CHECK BALLS



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Figure 175

2002 - MID 2004 RE5R05A, MANUAL VALVE BODY



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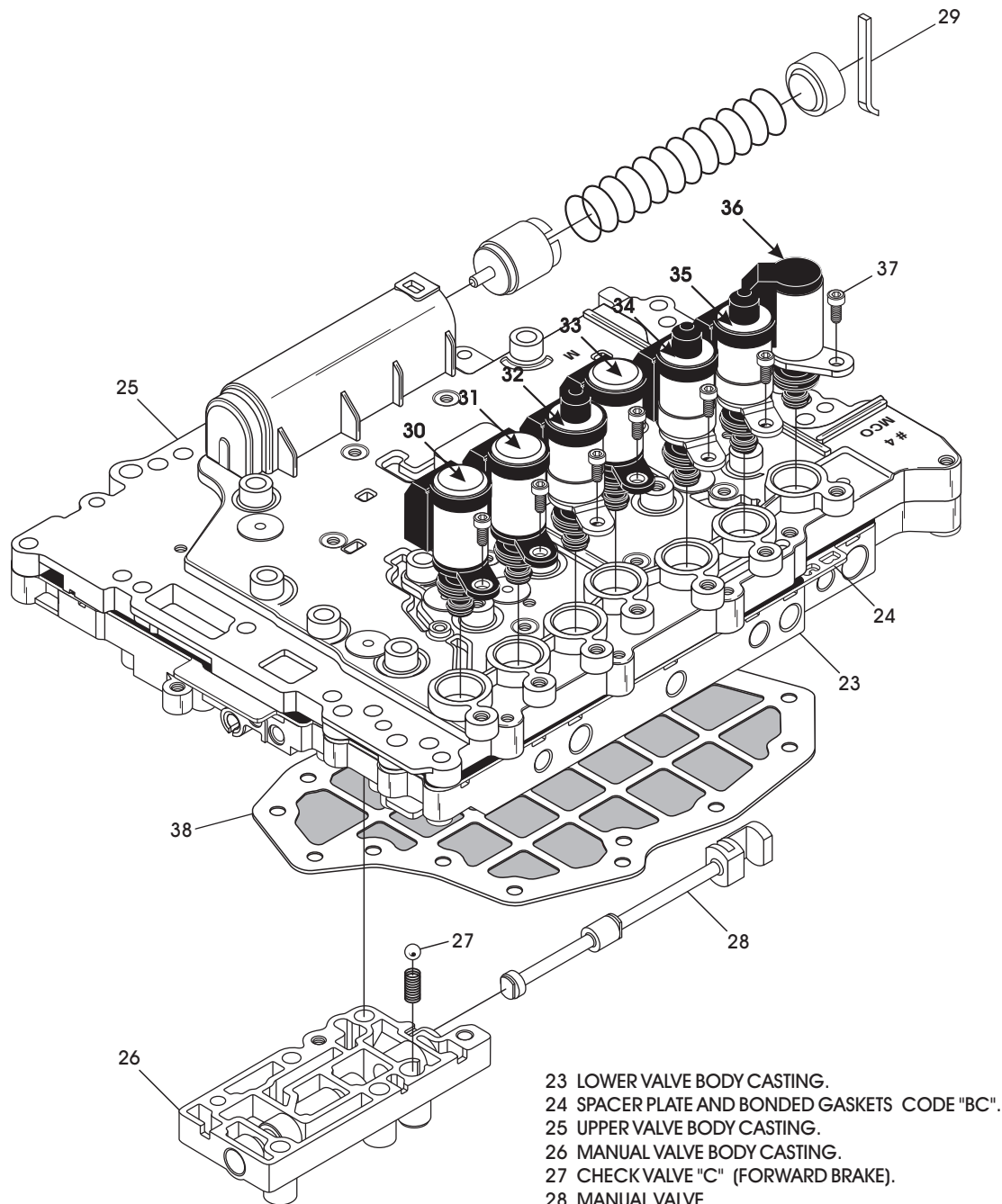
Figure 176

2002 - MID 2004 RE5R05A, CONTROL VALVE FUNCTION		
ILL. NO.	DESCRIPTION	FUNCTION
4	BLANK HOLE BORED WITH NO VALVE TRAIN	
5	DIRECT CLUTCH PISTON SWITCHING VALVE	Operates in 4th and 5th gear to release the large cavity of the direct clutch. This valve is controlled by input clutch feed.
6	DIRECT CLUTCH PRESSURE CONTROL VALVE	When the direct clutch is applied in 2nd, 3rd, and 4th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the direct clutch.
7	INPUT CLUTCH PRESSURE CONTROL VALVE	When the input clutch is applied in 4th, and 5th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the input clutch.
8	HIGH & LOW REVERSE CLUTCH PRESSURE CONTROL VALVE	When the high & low reverse clutch is applied in 1st, 3rd, 4th, & 5th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the high & low reverse clutch.
9	TORQUE CONVERTER CLUTCH CONTROL VALVE	The torque converter clutch control valve engages or releases the torque converter clutch piston, and is controlled by the TCC solenoid.
10	TORQUE CONVERTER LUBRICATION SWITCH VALVE	Operates during the lock-up process to switch the converter cooling and lubrication system oil path to the cooler.
11	COOLER BY-PASS VALVE	Allows excess oil to by-pass the cooler circuit and go directly to the lubrication circuit.
12	LINE PRESSURE RELIEF VALVE	Allows excessive oil pressure to exhaust from the line pressure circuit.
13	TORQUE CONVERTER REGULATOR VALVE	Adjusts the torque converter operating pressure to the optimum pressure for the operating conditions.
14	LINE PRESSURE REGULATOR VALVE	Continuously adjusts the oil pressure discharged from the oil pump to the optimum pressure for the current operating conditions.
15	FRONT BRAKE BAND PRESSURE CONTROL VALVE	When the front brake band is applied in 1st, 2nd, 3rd, and 5th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the front brake band.
16	ACCUMULATOR PRESSURE CONTROL VALVE	Adjusts accumulator pressure acting on the accumulator piston and low coast reducing valve to the optimum pressure for the operating conditions.
17	PILOT VALVE "A"	Adjusts line pressure to a constant pilot pressure required for line pressure control solenoid feed, lock-up control solenoid feed, low coast brake solenoid feed, and numerous shift valves for shift control.
18	PILOT VALVE "B"	Adjusts line pressure to a constant pilot pressure required for the direct solenoid feed, front brake solenoid feed, input clutch solenoid feed, high low reverse solenoid feed for shift control.
19	LOW COAST BRAKE CLUTCH SWITCH VALVE	During engine braking conditions, supplies line pressure to the low coast brake clutch reducing valve.
20	LOW COAST BRAKE CLUTCH REDUCING VALVE	When the low coast brake clutch is applied, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the low coast brake clutch.
21 & 22	NEUTRAL TO REVERSE ACCUMULATOR	Produces a stabilizing pressure when a P/N to reverse shift is selected.
28	MANUAL VALVE	Directs line pressure to the appropriate component for the gear selected.
29	NEUTRAL TO DRIVE ACCUMULATOR	Produces a stabilizing pressure when a P/N to drive shift is selected.

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Figure 177

MID 2004 - 2008 RE5R05A, VALVE BODY EXPLODED VIEW

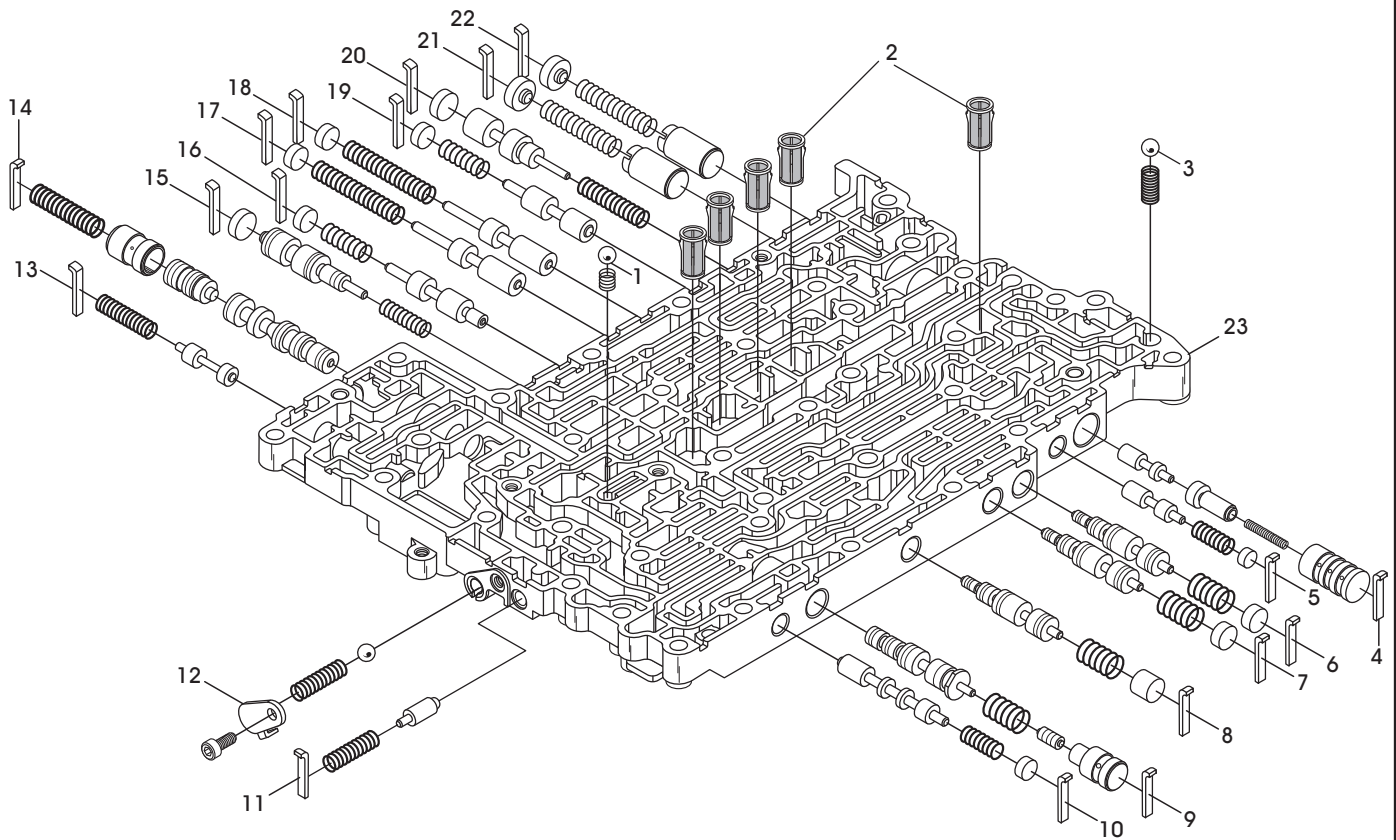


- 23 LOWER VALVE BODY CASTING.
- 24 SPACER PLATE AND BONDED GASKETS CODE "BC".
- 25 UPPER VALVE BODY CASTING.
- 26 MANUAL VALVE BODY CASTING.
- 27 CHECK VALVE "C" (FORWARD BRAKE).
- 28 MANUAL VALVE.
- 29 FORWARD ENGAGEMENT ACCUMULATOR.
- 30 LINE PRESSURE SOLENOID.
- 31 TORQUE CONVERTER CLUTCH SOLENOID.
- 32 DIRECT CLUTCH SOLENOID.
- 33 FRONT BRAKE BAND SOLENOID.
- 34 INPUT CLUTCH SOLENOID.
- 35 HIGH & LOW REVERSE CLUTCH SOLENOID.
- 36 LOW COAST BRAKE CLUTCH SOLENOID.
- 37 SOLENOID RETAINING BOLT (7 REQUIRED).
- 38 OIL PUMP SCREEN.

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Figure 178

MID 2004 - 2008 RE5R05A, LOWER VALVE BODY EXPLODED VIEW



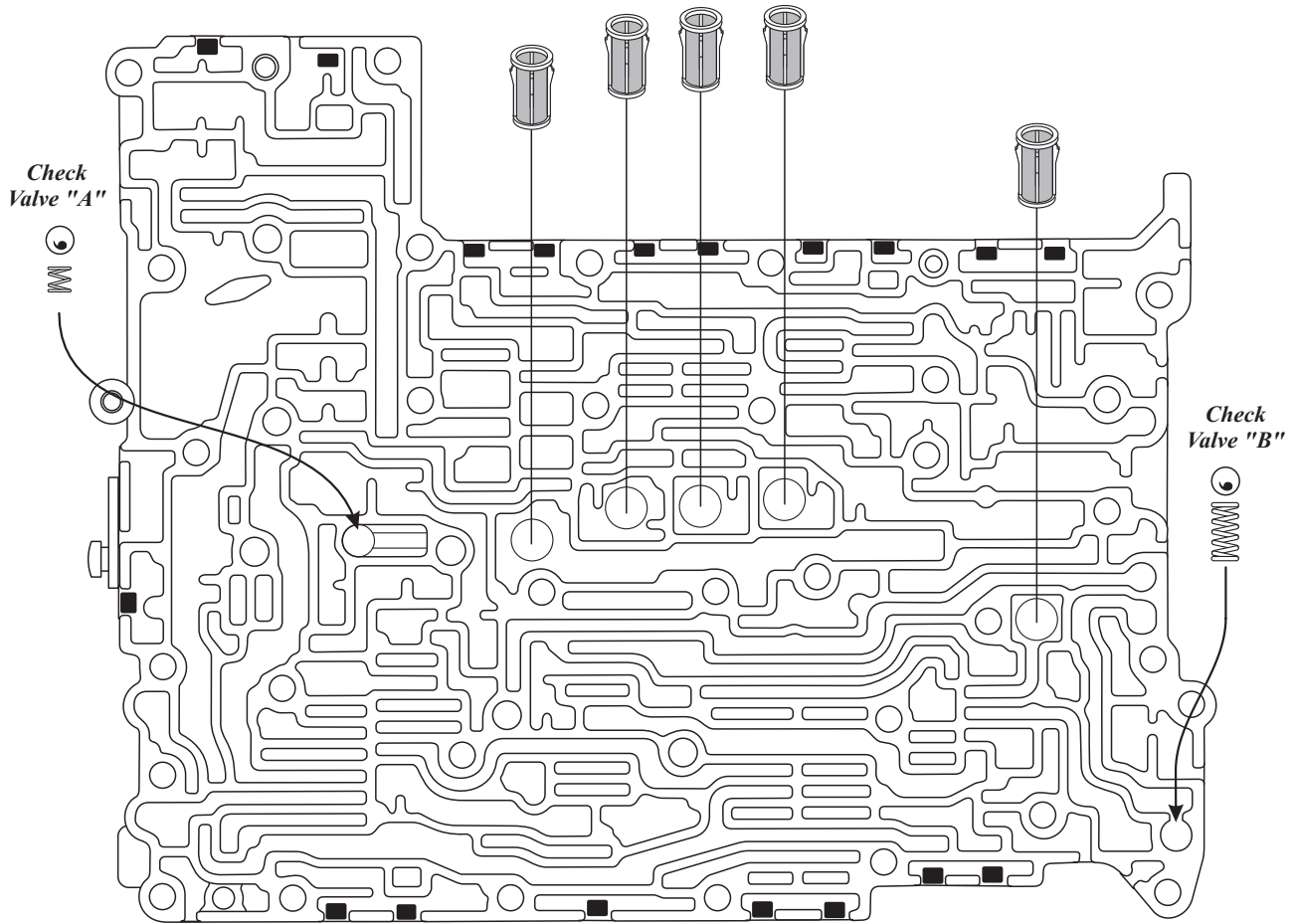
- 1 CHECK VALVE "A" (DRAINBACK).
- 2 VALVE BODY SCREENS (5 REQUIRED).
- 3 CHECK VALVE "B" (REVERSE BRAKE).
- 4 REVERSE BRAKE CLUTCH PRESSURE CONTROL VALVE.
- 5 DIRECT CLUTCH SWITCH VALVE.
- 6 DIRECT CLUTCH PRESSURE CONTROL VALVE.
- 7 INPUT CLUTCH PRESSURE CONTROL VALVE.
- 8 HIGH AND LOW REVERSE CLUTCH PRESSURE CONTROL VALVE.
- 9 TORQUE CONVERTER CLUTCH CONTROL VALVE.
- 10 TORQUE CONVERTER LUBRICATION SWITCH VALVE.
- 11 COOLER BYPASS VALVE.
- 12 LINE PRESSURE RELIEF VALVE.
- 13 TORQUE CONVERTER REGULATOR VALVE.
- 14 LINE PRESSURE REGULATOR VALVE.
- 15 FRONT BRAKE BAND PRESSURE CONTROL VALVE.
- 16 ACCUMULATOR PRESSURE CONTROL VALVE.
- 17 PILOT VALVE "A".
- 18 PILOT VALVE "B".
- 19 LOW COAST BRAKE SWITCH VALVE.
- 20 LOW COAST BRAKE REDUCING VALVE.
- 21 NEUTRAL TO REVERSE ACCUMULATOR.
- 22 NEUTRAL TO REVERSE ACCUMULATOR.
- 23 LOWER VALVE BODY CASTING.

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Figure 179

MID 2004 - 2008 RE5R05A, LOWER VALVE BODY SMALL PARTS

*There Are 5 Valve Body Screens
That "Must" Go In As Shown,
As They Pilot Into Spacer Plate*



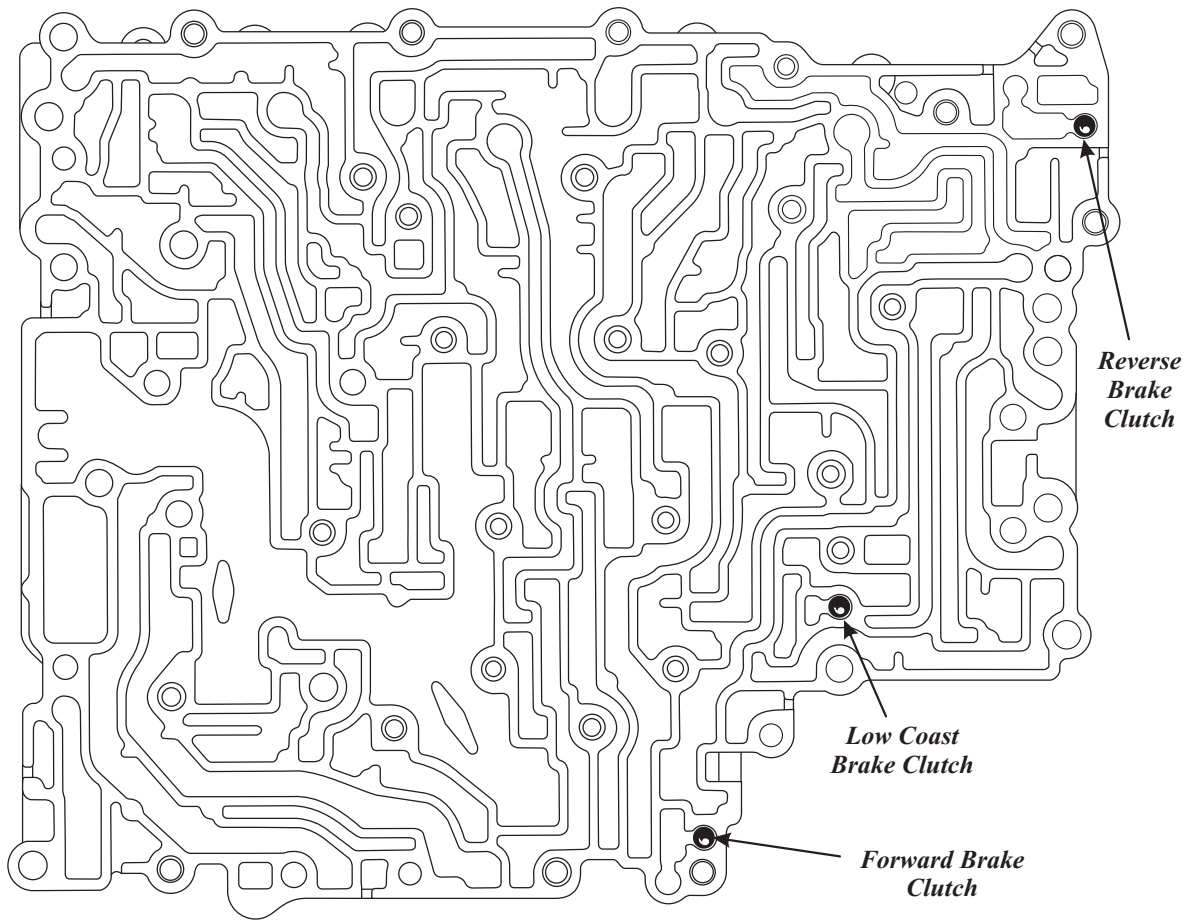
<i>Check Valve "A" Drainback</i>	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.350"
SPRING DIAMETER	.285"
WIRE DIAMETER	.016"
APPROX COILS	5

<i>Check Valve "B" Reverse Brake</i>	
BALL DIAMETER	.312"
SPRING FREE LENGTH	.705"
SPRING DIAMETER	.316"
WIRE DIAMETER	.039"
APPROX COILS	11

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Figure 180

MID 2004 - 2008 RE5R05A, UPPER VALVE BODY CHECK BALLS

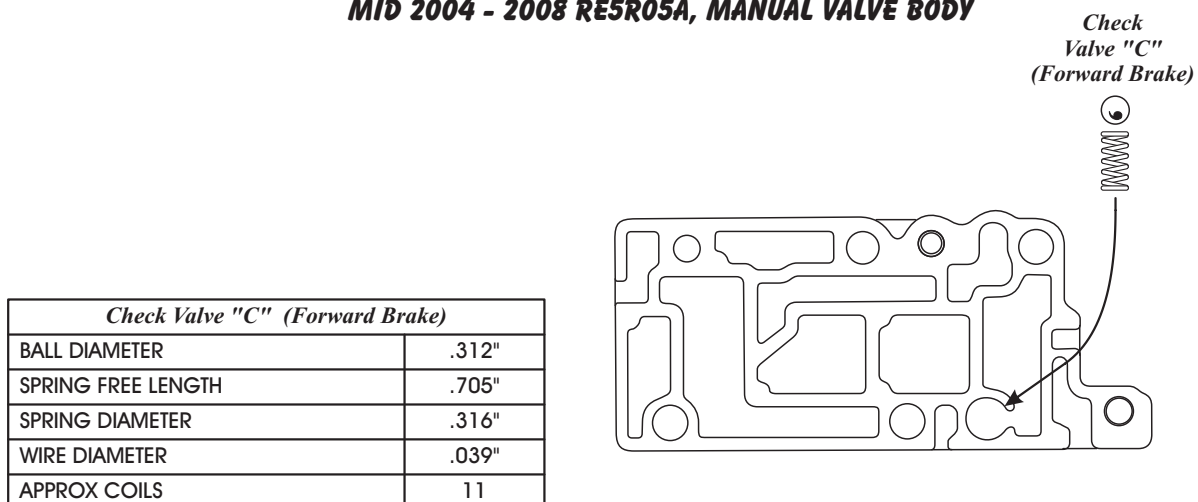


All 3 Steel Check Balls are 5.5mm (.218") in Diameter

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Figure 181

MID 2004 - 2008 RE5R05A, MANUAL VALVE BODY



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Figure 182

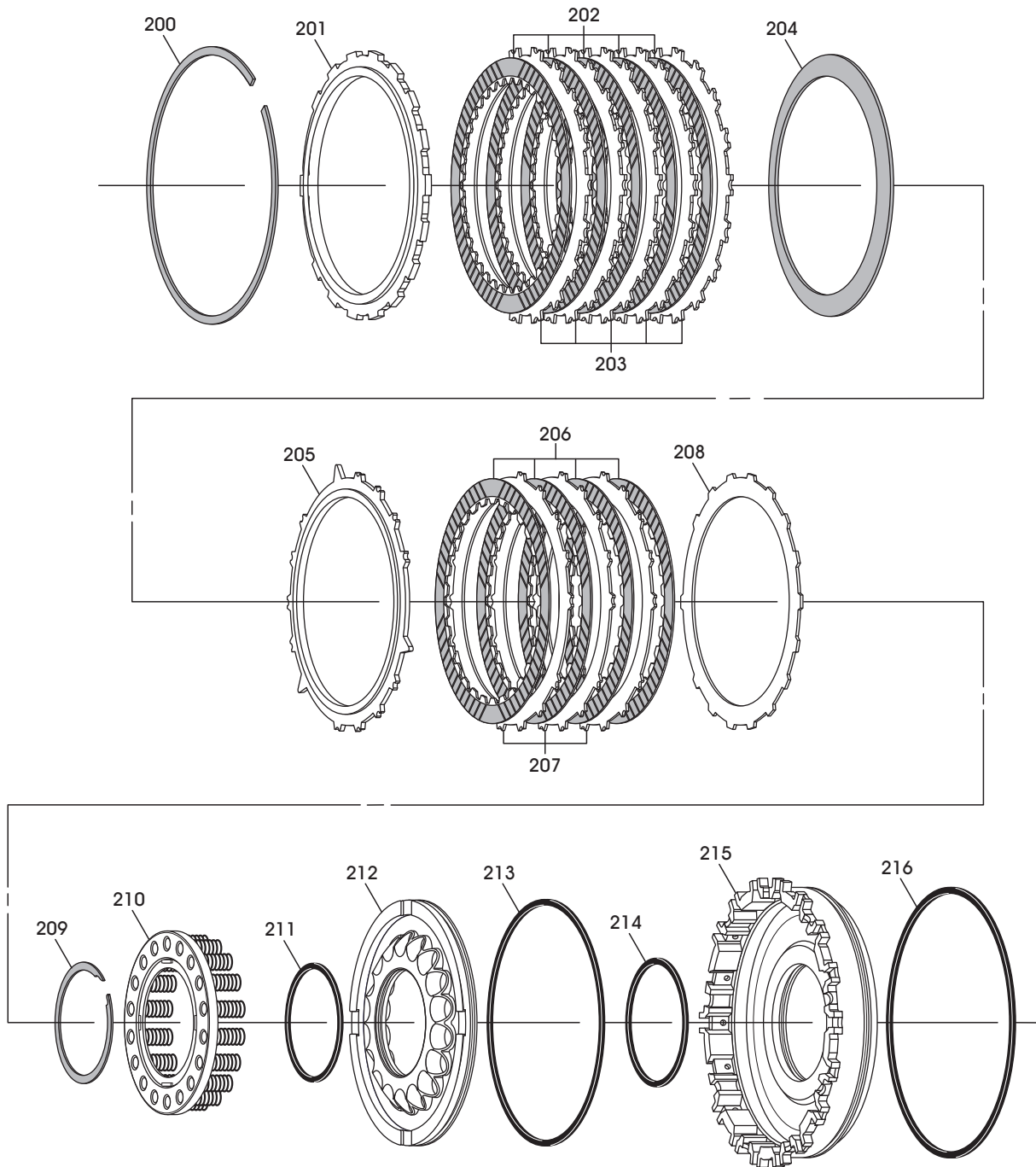
MID 2004 - 2008 RE5R05A, CONTROL VALVE FUNCTION

ILL. NO.	DESCRIPTION	FUNCTION
4	REVERSE BRAKE CLUTCH PRESSURE CONTROL VALVE	Adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the reverse brake clutch, during N/R shift.
5	DIRECT CLUTCH PISTON SWITCHING VALVE	Operates in 4th and 5th gear to release the large cavity of the direct clutch. This valve is controlled by input clutch feed.
6	DIRECT CLUTCH PRESSURE CONTROL VALVE	When the direct clutch is applied in 2nd, 3rd, and 4th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the direct clutch.
7	INPUT CLUTCH PRESSURE CONTROL VALVE	When the input clutch is applied in 4th, and 5th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the input clutch.
8	HIGH & LOW REVERSE CLUTCH PRESSURE CONTROL VALVE	When the high & low reverse clutch is applied in 1st, 3rd, 4th, & 5th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the high & low reverse clutch.
9	TORQUE CONVERTER CLUTCH CONTROL VALVE	The torque converter clutch control valve engages or releases the torque converter clutch piston, and is controlled by the TCC solenoid.
10	TORQUE CONVERTER LUBRICATION SWITCH VALVE	Operates during the lock-up process to switch the converter cooling and lubrication system oil path to the cooler.
11	COOLER BY-PASS VALVE	Allows excess oil to by-pass the cooler circuit and go directly to the lubrication circuit.
12	LINE PRESSURE RELIEF VALVE	Allows excessive oil pressure to exhaust from the line pressure circuit.
13	TORQUE CONVERTER REGULATOR VALVE	Adjusts the torque converter operating pressure to the optimum pressure for the operating conditions.
14	LINE PRESSURE REGULATOR VALVE	Continuously adjusts the oil pressure discharged from the oil pump to the optimum pressure for the current operating conditions.
15	FRONT BRAKE BAND PRESSURE CONTROL VALVE	When the front brake band is applied in 1st, 2nd, 3rd, and 5th gears, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the front brake band.
16	ACCUMULATOR PRESSURE CONTROL VALVE	Adjusts accumulator pressure acting on the accumulator piston and low coast reducing valve to the optimum pressure for the operating conditions.
17	PILOT VALVE "A"	Adjusts line pressure to a constant pilot pressure required for line pressure control solenoid feed, lock-up control solenoid feed, low coast brake solenoid feed, and numerous shift valves for shift control.
18	PILOT VALVE "B"	Adjusts line pressure to a constant pilot pressure required for the direct solenoid feed, front brake solenoid feed, input clutch solenoid feed, high low reverse solenoid feed for shift control.
19	LOW COAST BRAKE CLUTCH SWITCH VALVE	During engine braking conditions, supplies line pressure to the low coast brake clutch reducing valve.
20	LOW COAST BRAKE CLUTCH REDUCING VALVE	When the low coast brake clutch is applied, it adjusts the apply pressure to the optimum pressure for the operating conditions, and supplies it to the low coast brake clutch.
21 & 22	NEUTRAL TO REVERSE ACCUMULATOR	Produces a stabilizing pressure when a P/N to reverse shift is selected.
28	MANUAL VALVE	Directs line pressure to the appropriate component for the gear selected.
29	NEUTRAL TO DRIVE ACCUMULATOR	Produces a stabilizing pressure when a P/N to drive shift is selected.

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Figure 183

FORWARD BRAKE AND LOW COAST BRAKE CLUTCH EXPLODED VIEW



- 200 FORWARD CLUTCH BACKING PLATE SNAP RING (.071" THK).
- 201 FORWARD BRAKE CLUTCH BACKING PLATE.
- 202 FORWARD BRAKE CLUTCH FRICTION PLATES (5 REQUIRED).
- 203 FORWARD BRAKE CLUTCH STEEL PLATES (5 REQUIRED).
- 204 FORWARD BRAKE CLUTCH "DISHED" CUSHION PLATE.
- 205 LOW COAST BRAKE CLUTCH BACKING PLATE.
- 206 LOW COAST BRAKE CLUTCH FRICTION PLATES (4 REQUIRED).
- 207 LOW COAST BRAKE CLUTCH STEEL PLATES (3 REQUIRED).
- 208 LOW COAST BRAKE CLUTCH APPLY PLATE (1 REQUIRED).

- 209 APPLY PISTON RETURN SPRING SNAP RING.
- 210 APPLY PISTON RETURN SPRING ASSEMBLY.
- 211 LOW COAST CLUTCH APPLY PISTON INNER "D" RING SEAL.
- 212 LOW COAST BRAKE CLUTCH APPLY PISTON.
- 213 LOW COAST CLUTCH APPLY PISTON OUTER "D" RING SEAL.
- 214 FORWARD BRAKE CLUTCH PISTON INNER "D" RING SEAL.
- 215 FORWARD BRAKE CLUTCH APPLY PISTON.
- 216 FORWARD BRAKE CLUTCH PISTON OUTER "D" RING SEAL.

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Figure 184

TRANSMISSION ASSEMBLY

1. The forward brake and low coast pistons were installed into the case in the component rebuild section.

Note: The low coast and forward brake clutch plates must also be oriented properly in the case, just like the forward clutch piston.

2. Check once again that the forward clutch piston is in the case properly, with the single lug at the 12-O'clock position, as shown in Figure 186.

3. Install the low coast clutch apply plate into the forward brake clutch piston (See Figure 185).

Note: Ensure that the single lug on the apply plate is at the 12-O'clock position, as shown in Figure 186.

4. Install the low coast clutch plates beginning with a friction plate against the apply plate and alternating with steel plates, as shown in Figure 185.

Note: The low coast steel plates have a small "V" notch in the center of each lug, and one lug eliminated every 120 degrees, as shown in Figure 187.

5. The steel plates **must** be installed with missing lug lined up with "house top" grooves in the forward clutch piston, as shown in Figure 187.

6. The low coast clutch requires one apply plate, three steel plates, and four friction plates, as shown in Figure 185.

Continued on Page 102

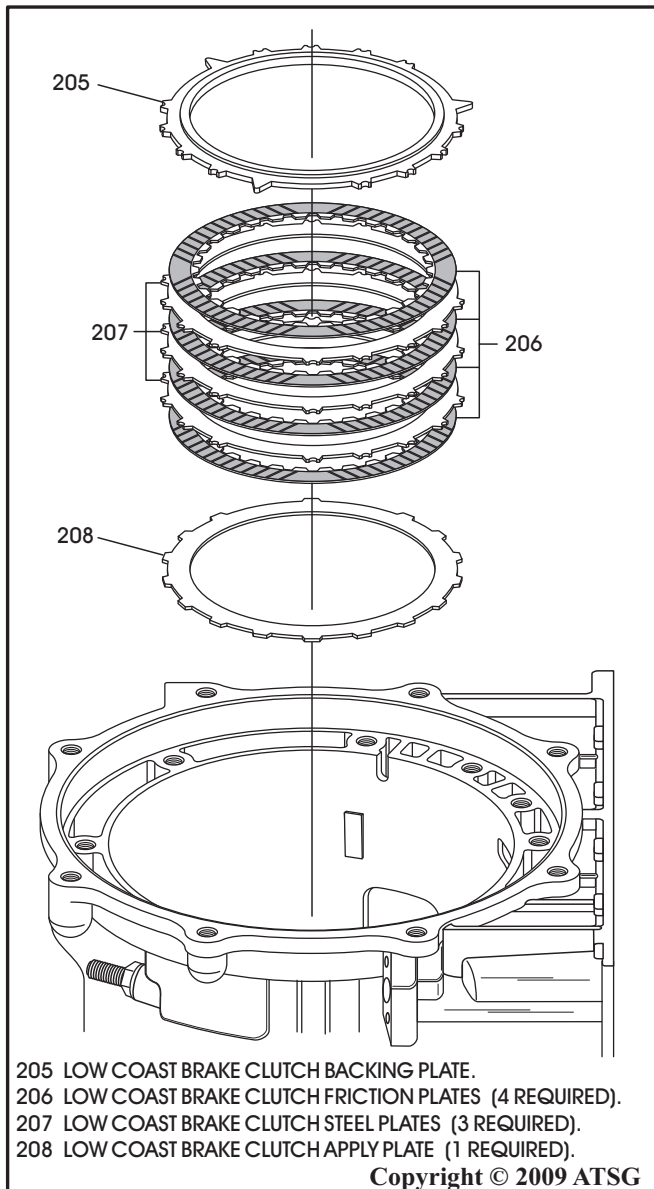


Figure 185

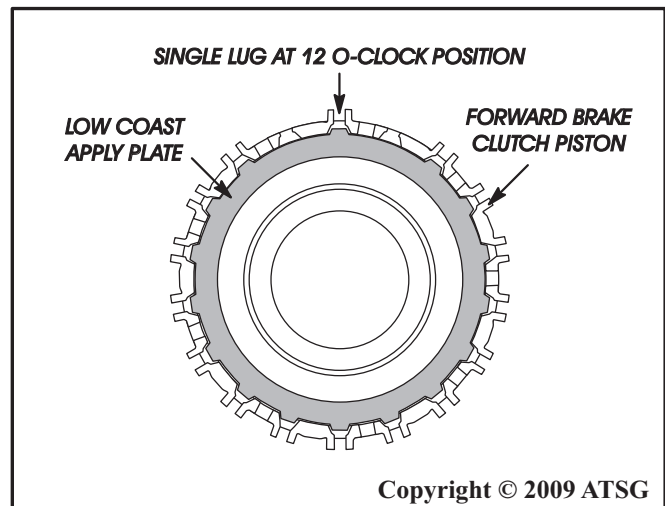


Figure 186

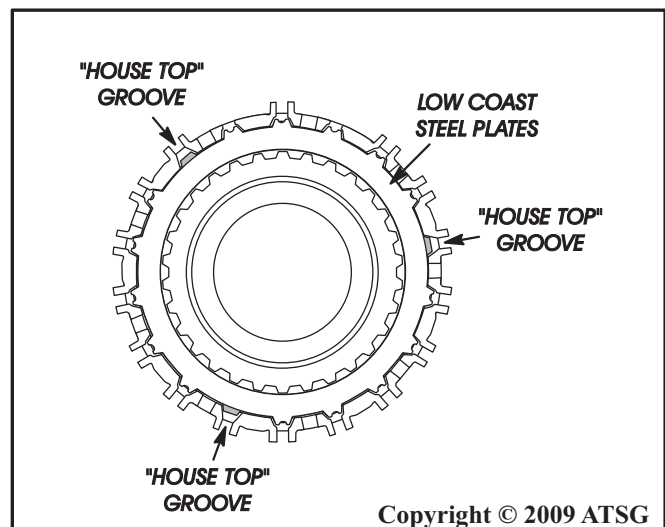


Figure 187

TRANSMISSION ASSEMBLY (CONT'D)

7. Install the low coast clutch backing plate, as shown in Figure 185.
- Note: The low coast backing plate must be installed with the "house top" lugs located in the "house top" grooves of the forward clutch piston, as shown in Figure 188.*
8. Install forward clutch "dished" cushion plate, as shown in Figure 189, with the "dish" facing down towards the forward clutch piston.
9. Install the forward clutch plates beginning with a steel plate and alternating with a friction until you have installed five of each, as shown in Figure 189.
- Note: The forward clutch steel plates must also be oriented properly in the case, with the single lug located at the 12-O-clock position in the case, as shown in Figure 190.*
10. Install the forward clutch backing plate into the case, as shown in Figure 189.
- Note: The forward clutch backing plate must also be oriented properly in the case, with the single lug located at the 12-O-clock position in the case, as shown in Figure 190.*
11. Install the forward clutch backing plate snap ring, as shown in Figure 189, and ensure that it is fully seated in the case.
12. Check forward clutch clearance with a feeler gage between the backing plate and top friction plate for 1.0-1.3 mm (.040" - .050") clearance.
- Note: There are no selective components in the forward clutch. If clearance is not within specifications, there has been a mis-assembly.*

Continued on Page 103

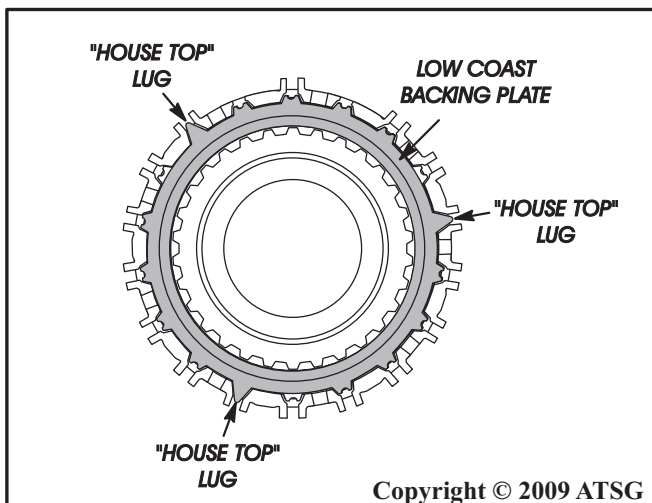


Figure 188

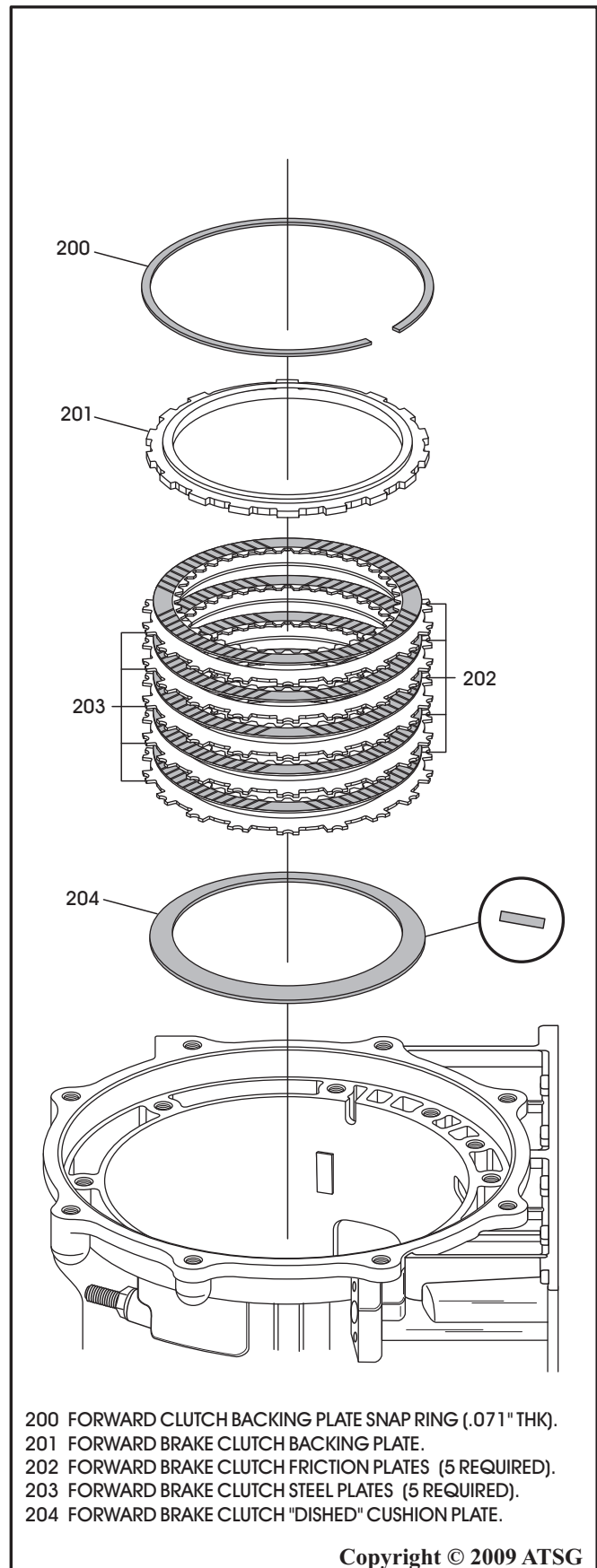


Figure 189

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TRANSMISSION ASSEMBLY (CONT'D)

13. Install the number 19 thrust bearing race onto support in the case, as shown in Figure 192, with the cup side facing down and retain with small amount of Trans-Jel®.
14. Ensure that the number 18 thrust bearing is still in place on the pre-assembled forward sprag assembly, as shown in Figure 191.
15. Ensure that the pre-assembled forward sprag assembly free wheels counter-clockwise and locks clockwise, as shown in Figure 191.
16. Install pre-assembled forward sprag assembly into the low coast brake and the forward brake clutches, as shown in Figure 192.

Note: Rotate the sprag assembly back and forth until fully seated and engaged in both low coast and forward brake clutches.

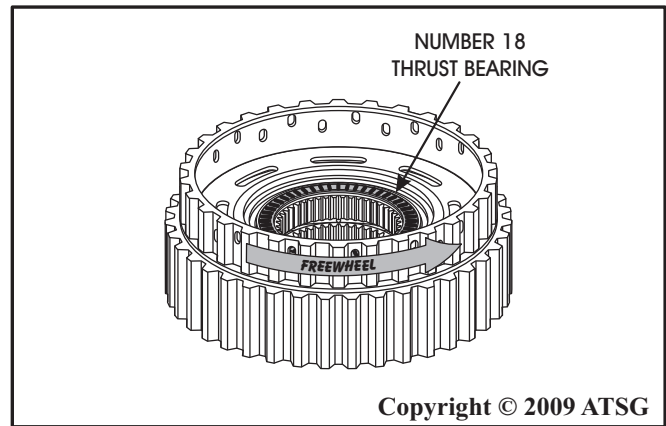


Figure 191

Continued on Page 104

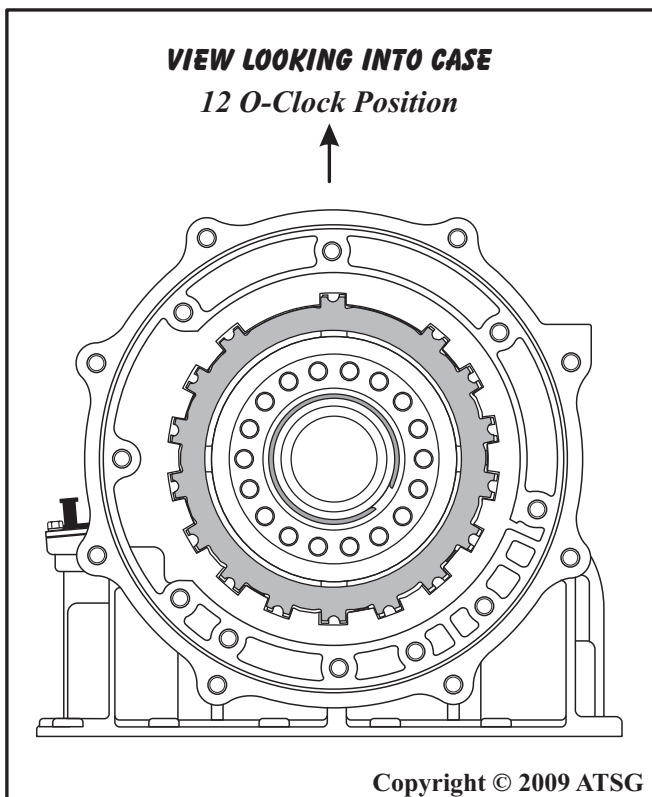


Figure 190

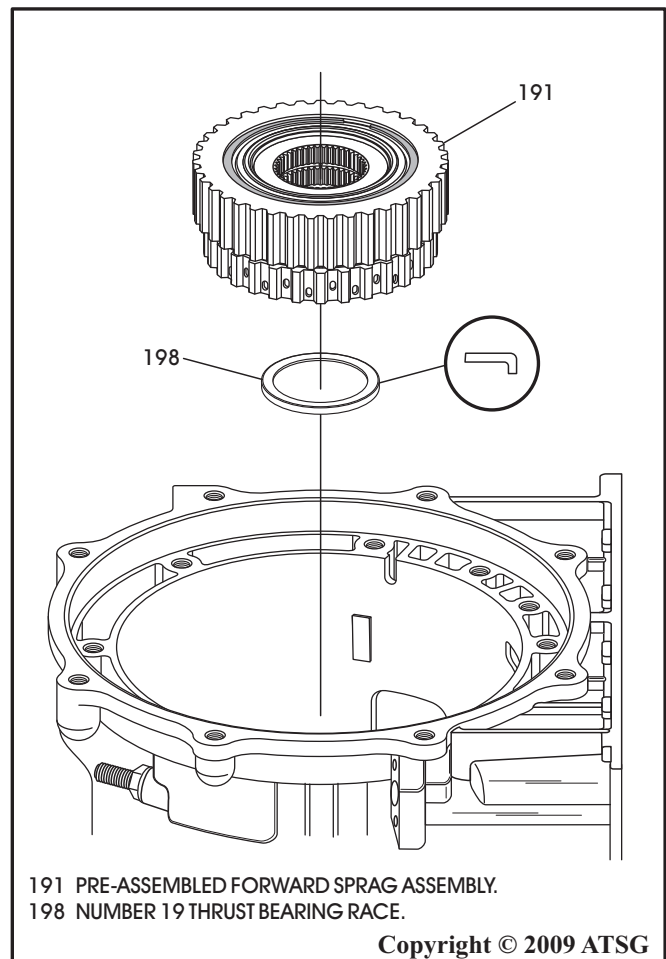
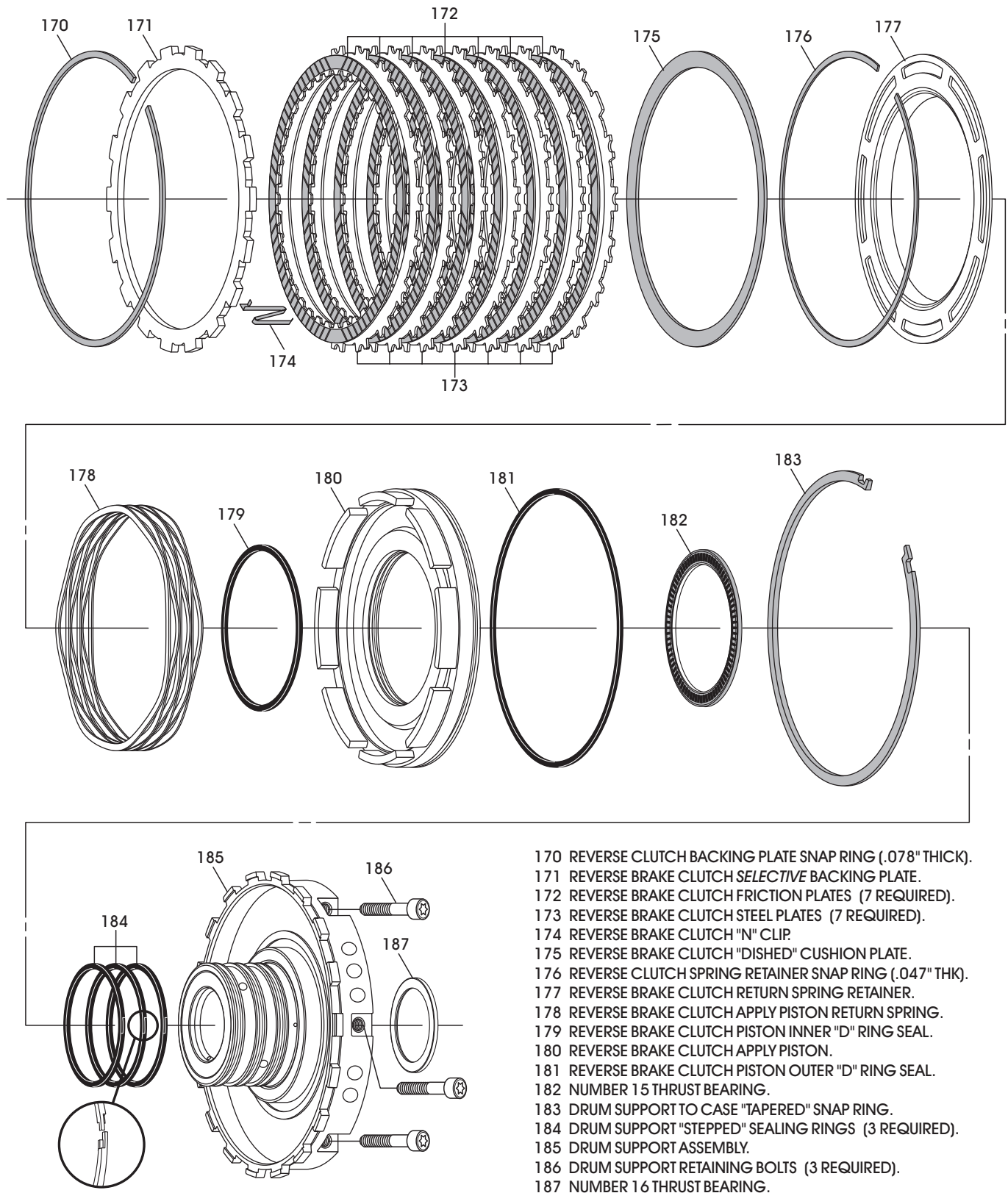


Figure 192

REVERSE BRAKE CLUTCH AND DRUM SUPPORT EXPLODED VIEW



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Figure 193

TRANSMISSION ASSEMBLY (CONT'D)

17. Ensure that the number 16 thrust bearing is still stuck to the pre-assembled drum support, as shown in Figure 194.
18. Install the pre-assembled drum support into the case, as shown in Figure 195.

Note: *The three threaded holes in the drum support must face the valve body surface.*

19. Install the three Torx head drum support bolts, as shown in Figure 196, finger tight only at this time.

Continued on Page 106

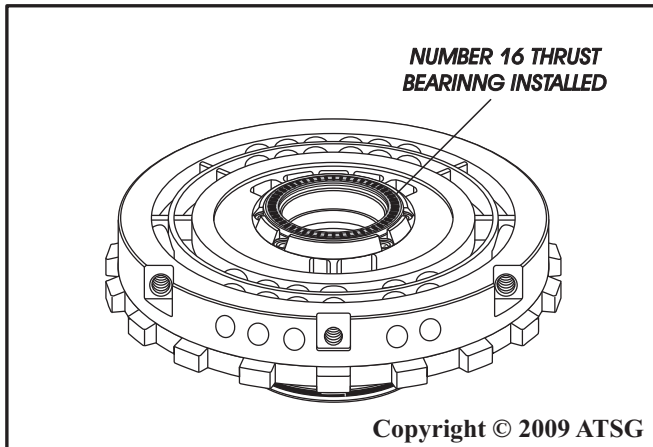


Figure 194

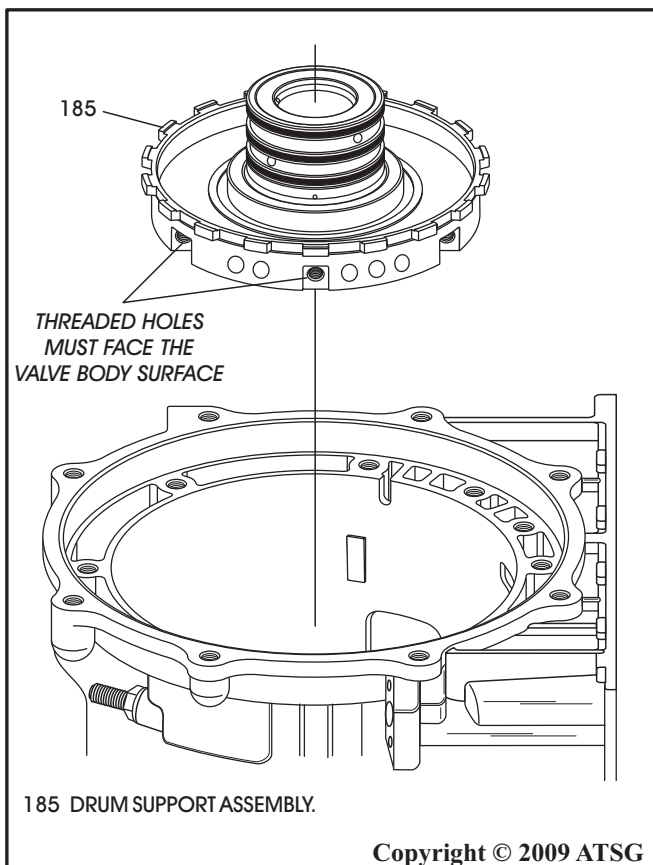


Figure 195

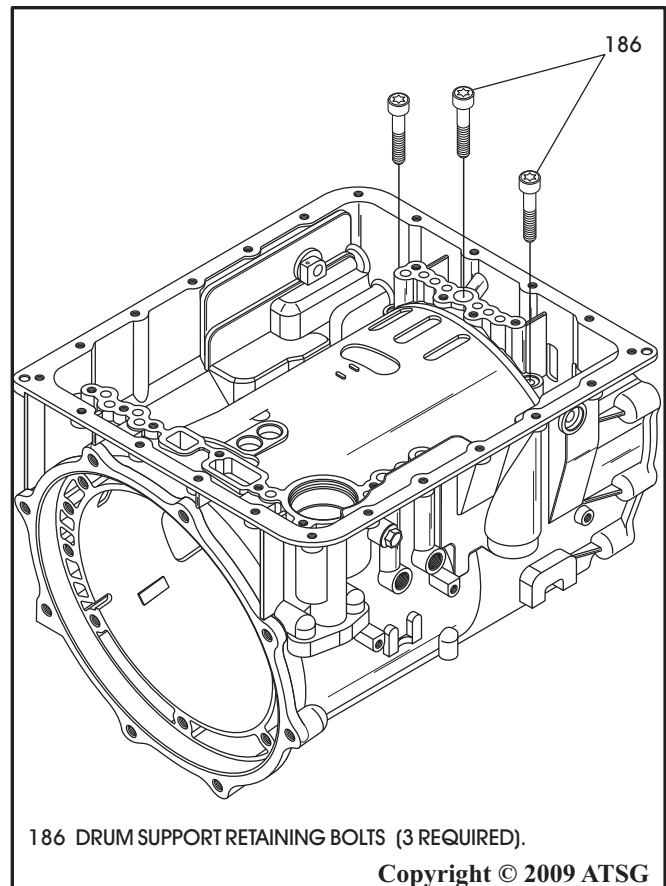


Figure 196

TRANSMISSION ASSEMBLY (CONT'D)

20. Install the tapered snap ring with the taper facing up, as shown in Figure 197, and snap ring opening toward the valve body surface.
Caution: This is a "Very" strong snap ring and will require a very strong pair of snap ring pliers.
21. Now you can torque the 3 drum support bolts to 23 N·m (17 ft.lb), as shown in Figure 198.
22. Lubricate the reverse brake clutch piston seals with a small amount of Trans-Jel® and install piston into support, as shown in Figure 199.

Note: Use care so as not to cut the seals.

Continued on Page 107

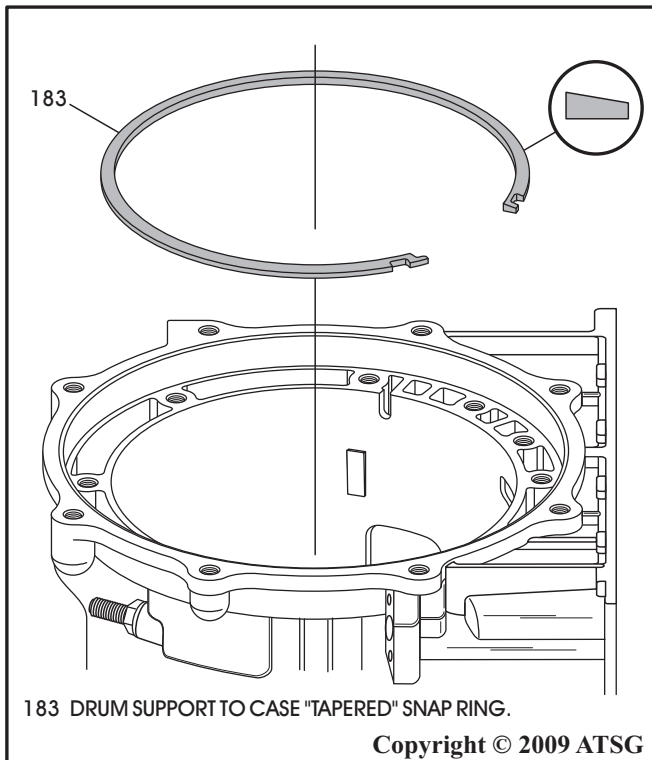


Figure 197

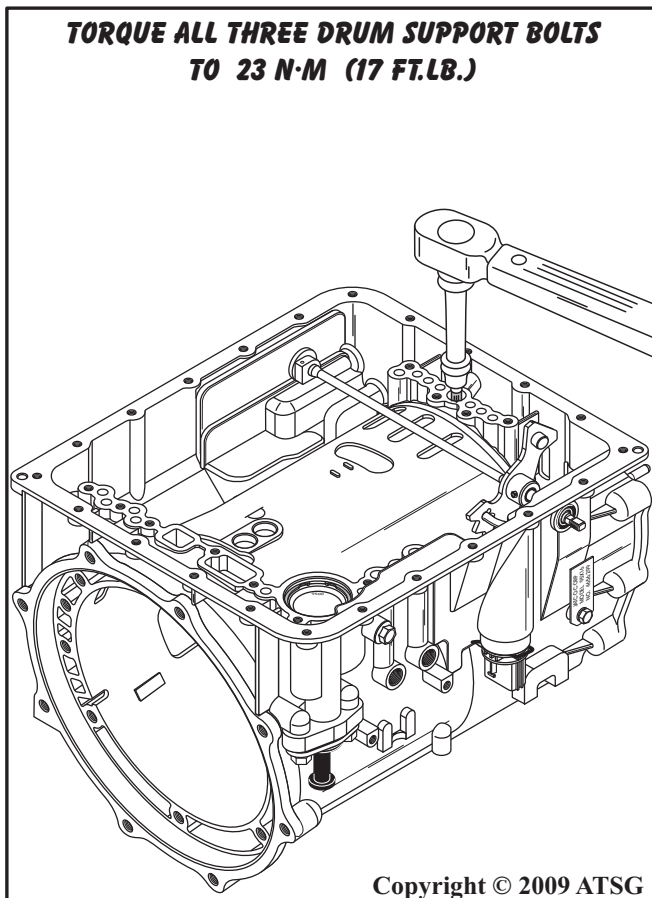


Figure 198

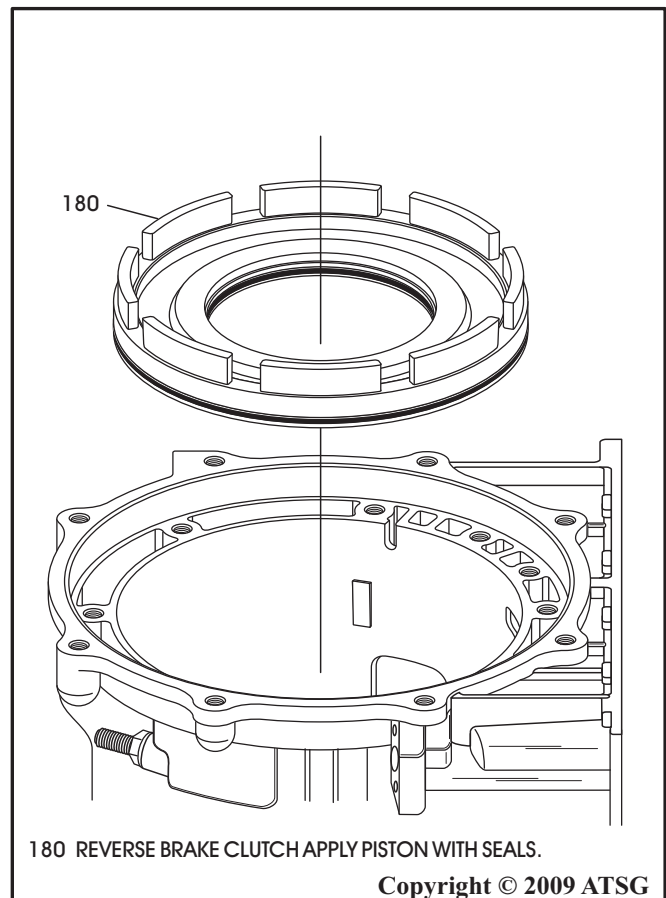


Figure 199

TRANSMISSION ASSEMBLY (CONT'D)

23. Install the reverse brake clutch piston return spring, as shown in Figure 200.
24. Install the reverse brake clutch return spring retainer, as shown in Figure 200.
Note: The slots in the spring retainer must fit over the legs of the piston.
25. Install the universal spring compressor, shown in Figure 201, through the rear of the case.
26. Compress the spring and retainer using the wing nut and install the snap ring, as shown in Figure 200.

27. Remove the universal spring compressor.
28. Install the number 15 thrust bearing with the needles facing up, as shown in Figure 202, and retain with a small amount of Trans-Jel®.
29. Install the number 14 thrust bearing, as shown in Figure 202, and retain with Trans-Jel®.

Continued on Page 108

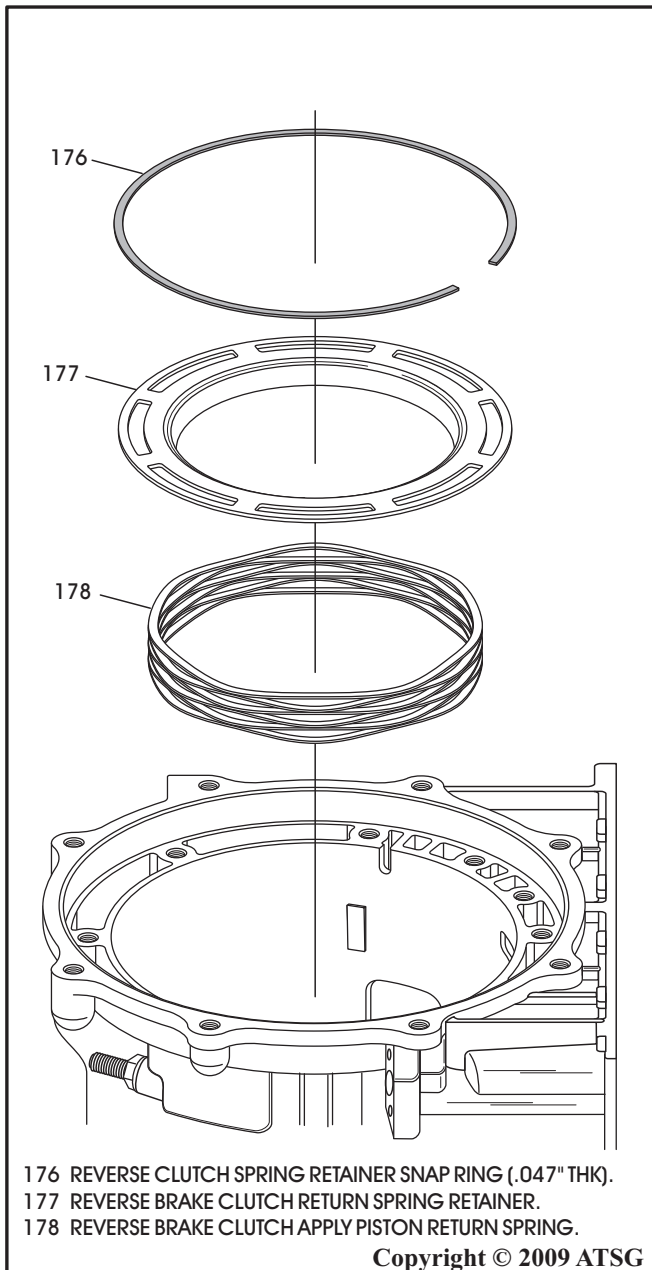


Figure 200

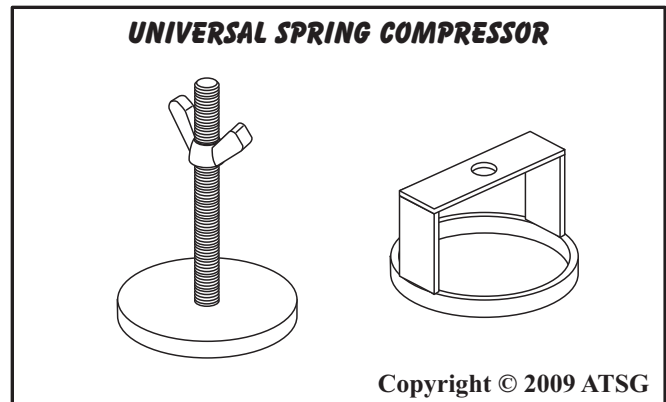


Figure 201

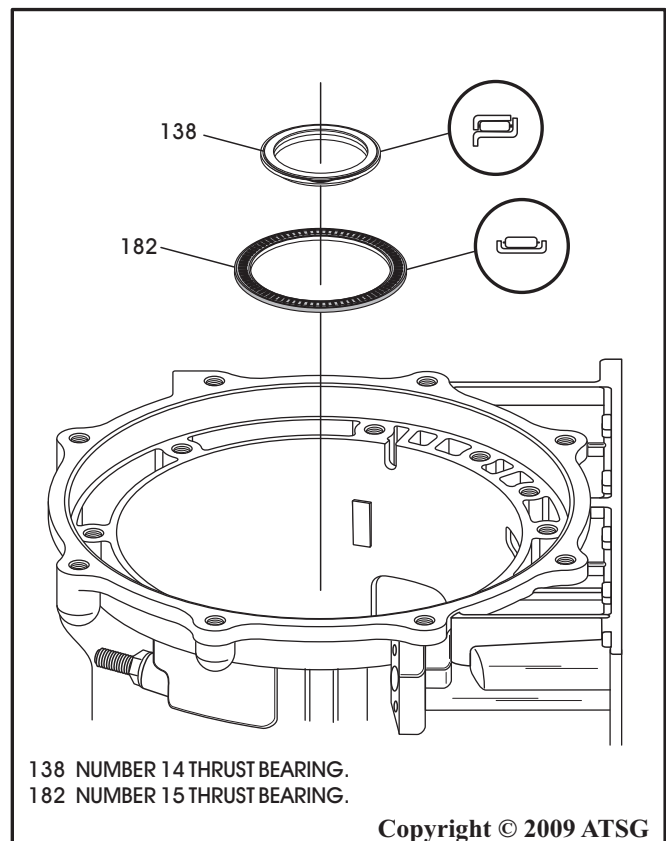


Figure 202

TRANSMISSION ASSEMBLY (CONT'D)

30. Install reverse brake clutch "dished" cushion plate, as shown in Figure 203.
31. Install reverse brake clutches beginning with a steel plate and alternating with friction plates, as shown in Figure 203.

Note: All clutch plates should be soaked for 30 minutes in proper fluid before assembly. The steel plates have two "flat" lugs that must be oriented in case as shown in Figure 204. "Do Not" yet install the last friction.

32. Install the "N" spring between the steel plates and the case, as shown in Figure 203 and 204.
Note: The small tab should rest on top of the last steel plate, as shown in Figure 204, after installation.

Continued on Page 109

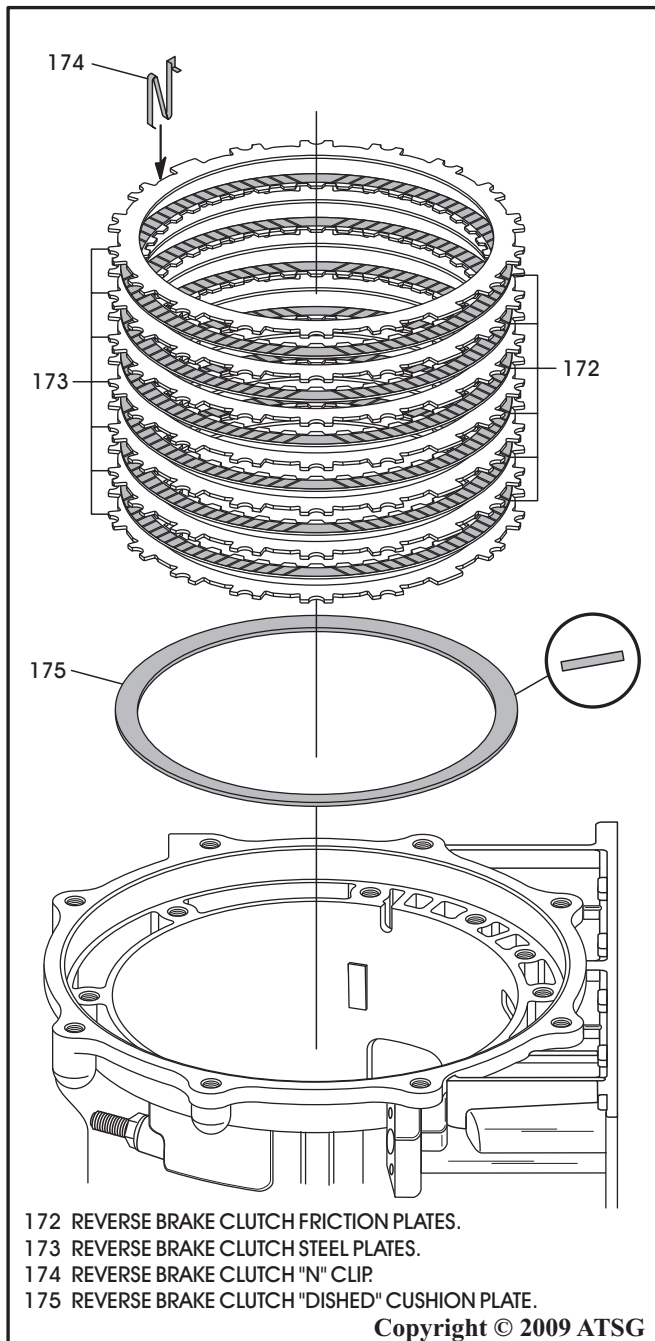


Figure 203

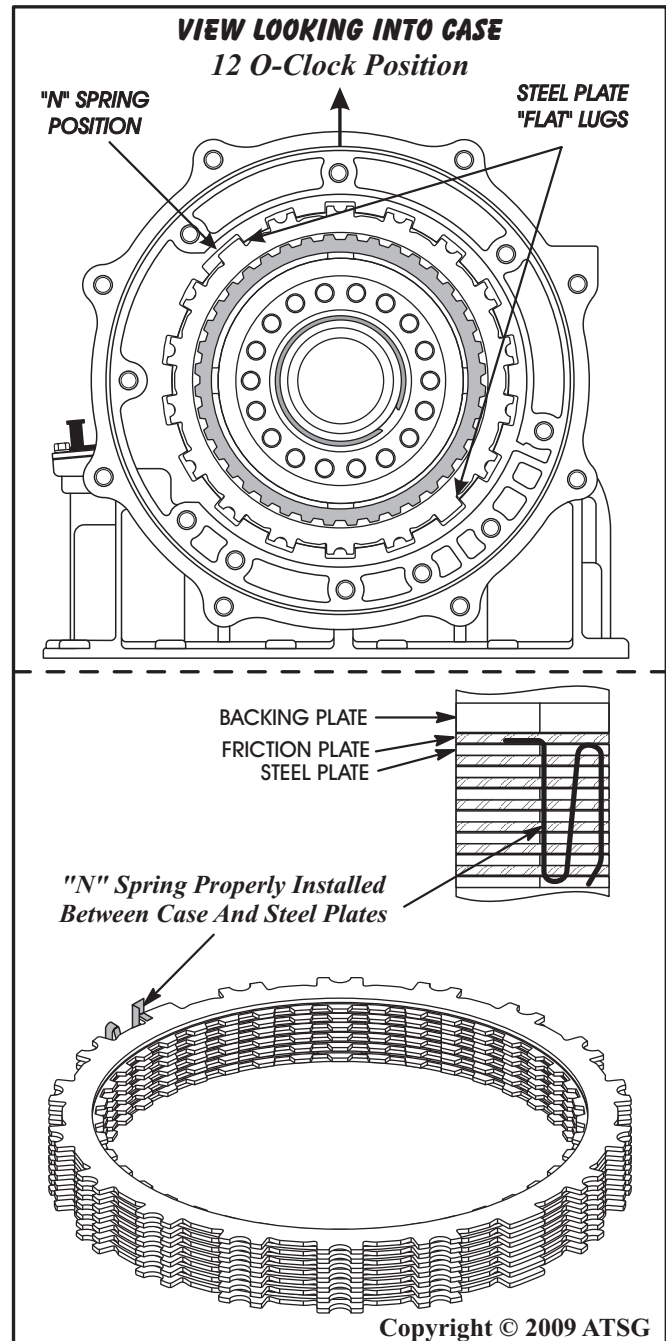


Figure 204

TRANSMISSION ASSEMBLY (CONT'D)

33. Now we can install the last reverse brake clutch friction plate, as shown in Figure 205.
34. Install the reverse brake clutch backing plate, as shown in Figure 205.
35. Install the reverse brake clutch backing plate snap ring, as shown in Figure 205, and ensure that it is fully seated.
36. Measure reverse brake clutch clearance using a feeler gage between the backing plate and the snap ring, as shown in Figure 206.
37. Reverse brake clutch clearance should be; 0.7 - 1.1mm (.028" - .043").

38. Change the selective reverse brake clutch backing plate, using the chart in Figure 206 to achieve the proper clutch clearance.

Continued on Page 110

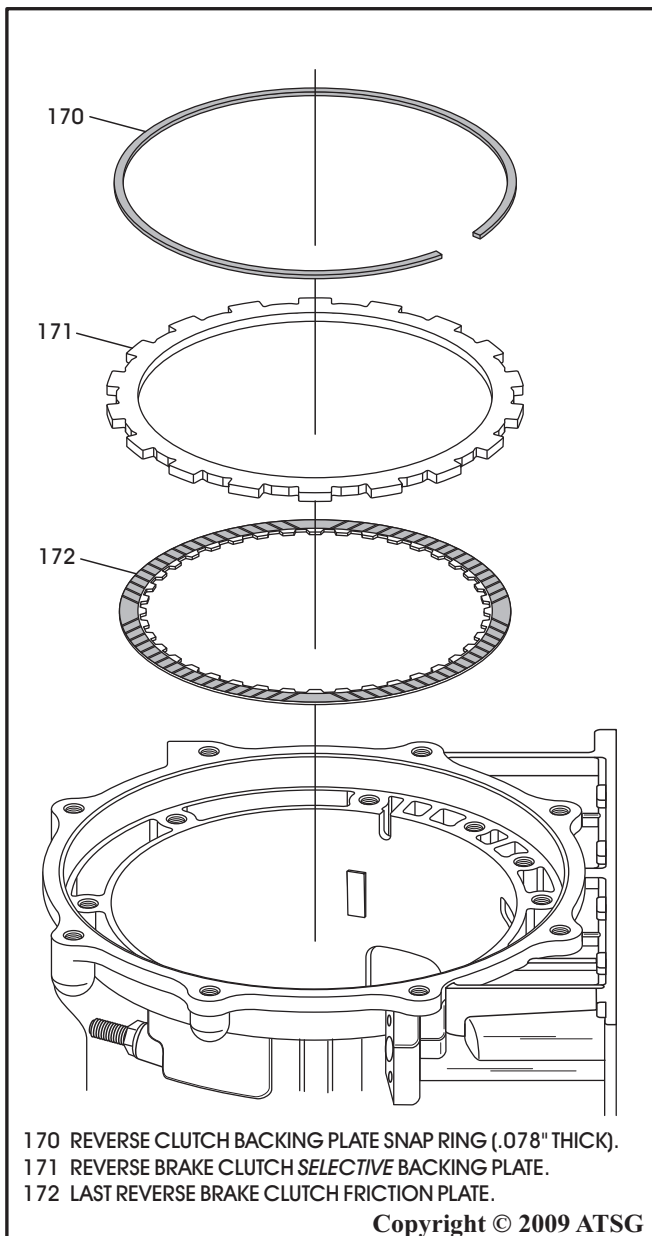


Figure 205

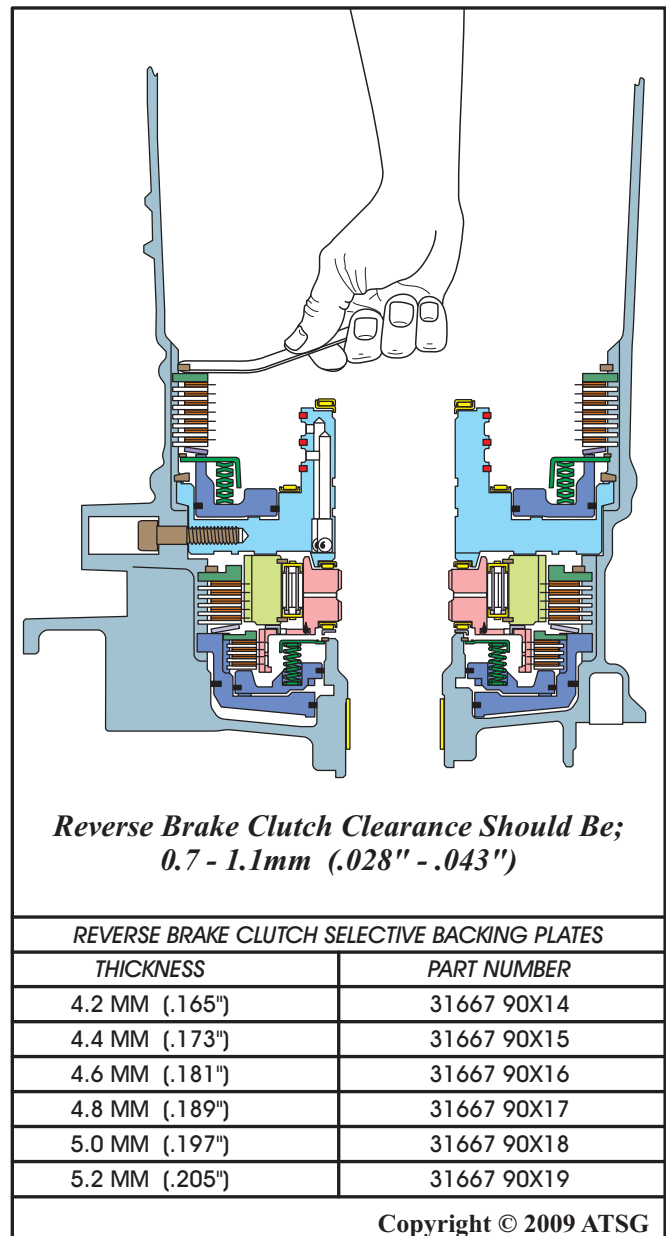
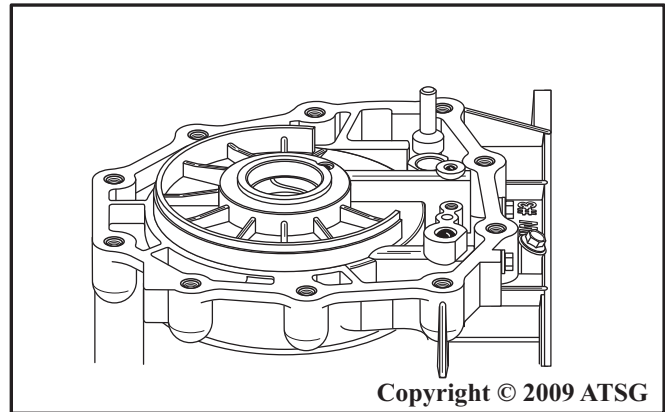


Figure 206

TRANSMISSION ASSEMBLY (CONT'D)

39. Rotate the transmission so that rear of case is facing up, as shown in Figure 207, in order to install the rear case components that are shown in Figure 208.

Continued on Page 111



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Figure 207

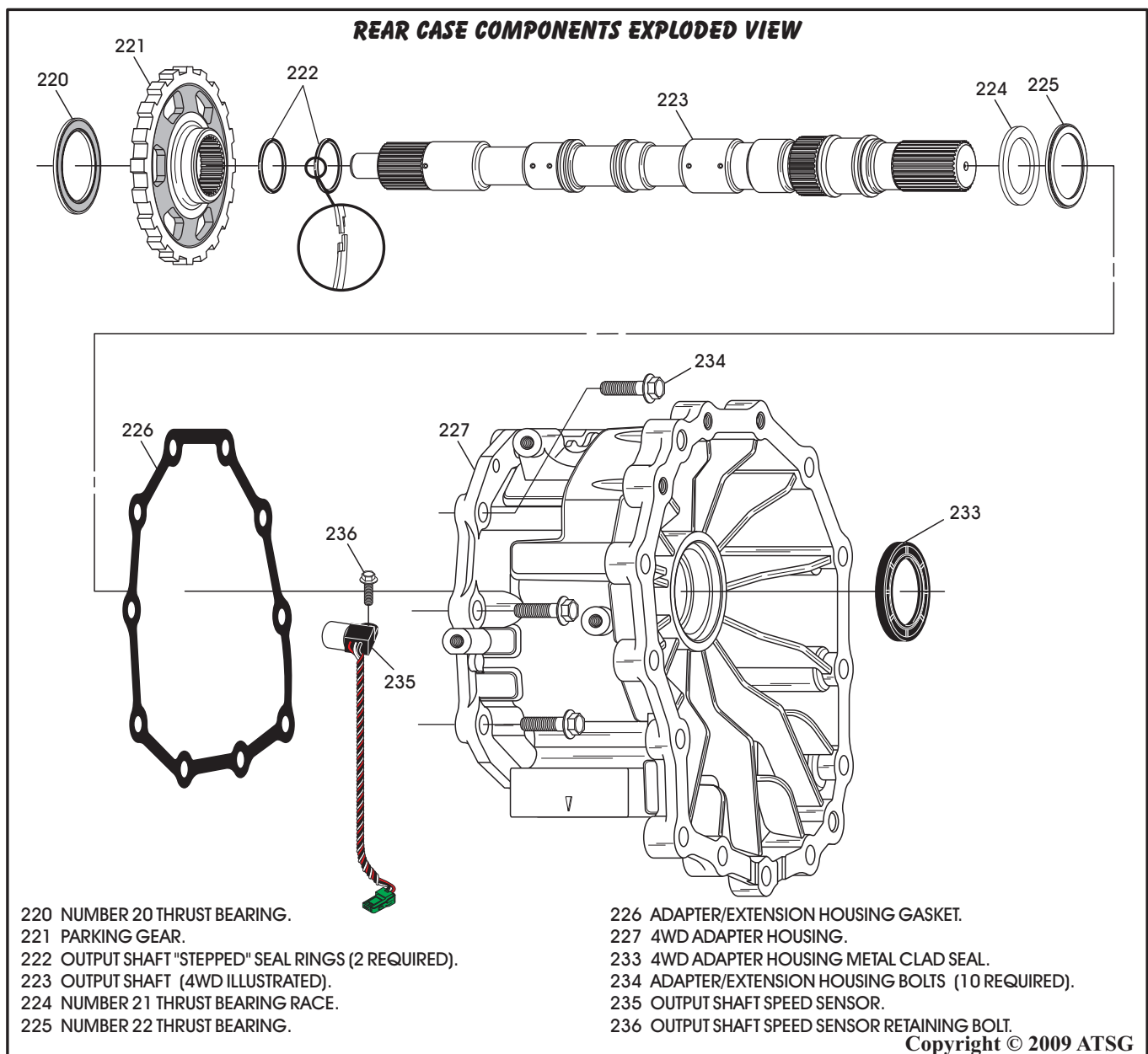


Figure 208

TRANSMISSION ASSEMBLY (CONT'D)

40. Install the number 20 thrust bearing onto the case, as shown in Figure 209, with the gold side facing up.
41. Install the parking gear on top of the bearing, as shown in Figure 209.
42. Lubricate the sealing rings on pre-assembled output shaft with the proper fluid and install the output shaft, as shown in Figure 210.

Note: Rotate back and forth until it is fully seated on the parking gear.

Continued on Page 112

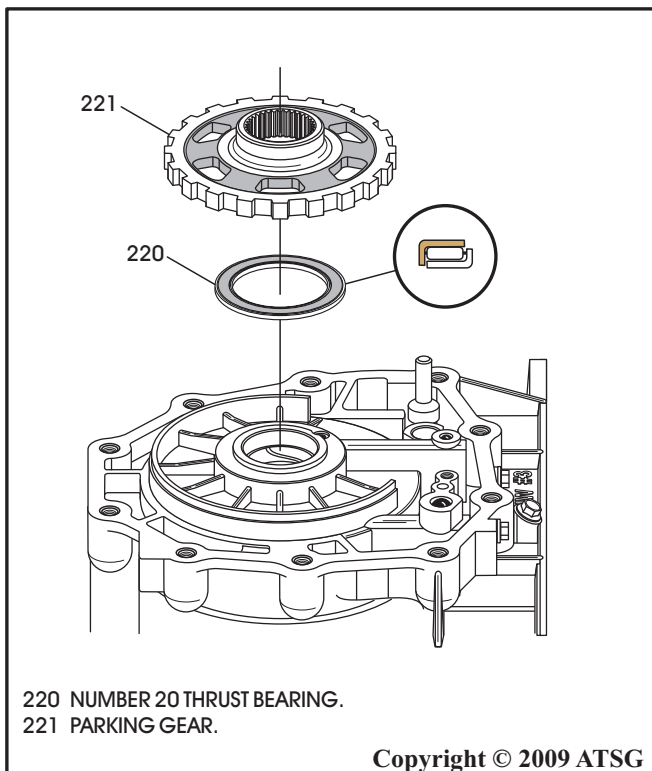


Figure 209

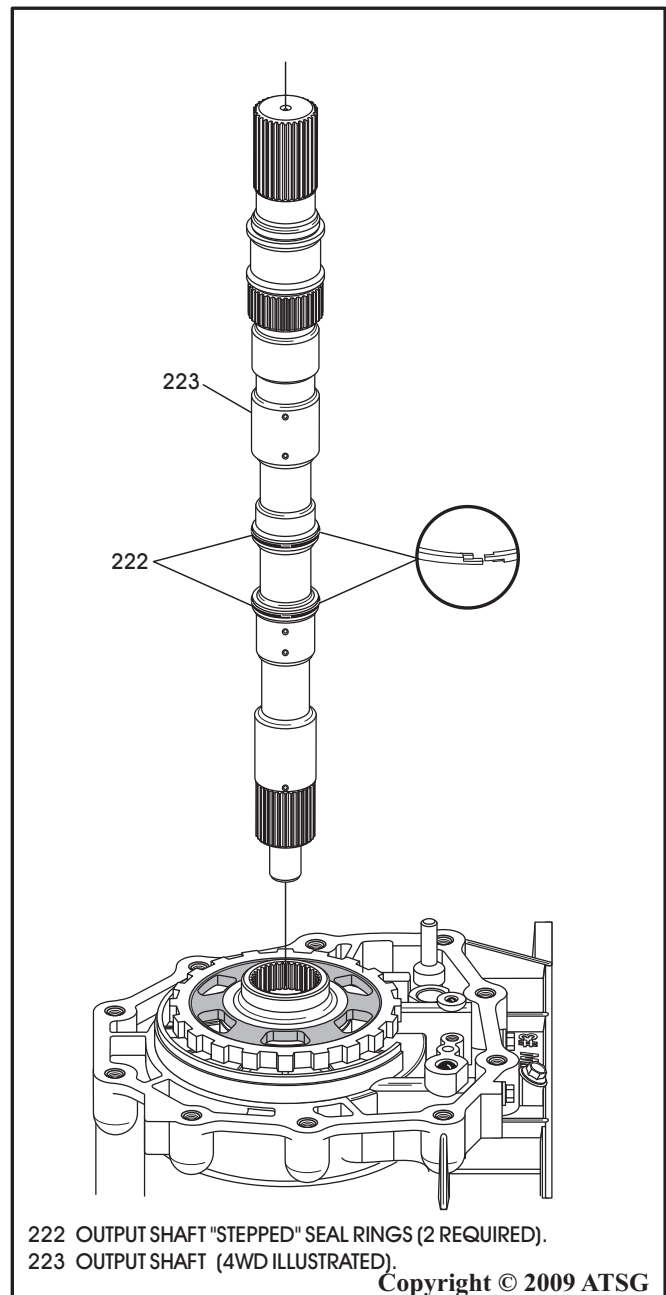


Figure 210

TRANSMISSION ASSEMBLY (CONT'D)

43. Install the number 21 thrust bearing race, as shown in Figure 211.
- Note: The number 22 thrust bearing should be stuck to the 4WD adapter housing, done in component rebuild section.**
44. Install the output/revolution speed sensor, as shown in Figure 211.
- Note: The connector and wire are fed down through the case and exits on the pan side.**
45. Torque the output/revolution speed sensor bolt to 5.8 N·m (51 in.lb.), as shown in Figure 212.

46. If you have not yet tested the output/revolution speed sensor, **now would be the time.** Follow the steps listed below:

- (A) Run 12 volts from a battery, to the Red Wire (Pin 3) of the F506 Green Connector.
- (B) Run a jumper lead from the Black Wire (Pin 1) of the F506 Green Connector to battery ground.
- (C) Using a DVOM or Graphing Meter, place the Red lead of the meter to the White Wire (Pin 2) of the F506 Green Connector, place the Black lead of the meter to the Black Wire (Pin 1) of the F506 Green Connector.
- (D) Rotate output shaft slowly and you should see the meter toggle from voltage to infinite as the lugs on the park gear pass in front of the Output/Revolution Sensor Pick-up.

Note: Replace as necessary with Nissan part number 31935-90X02, all models.

Continued on Page 113

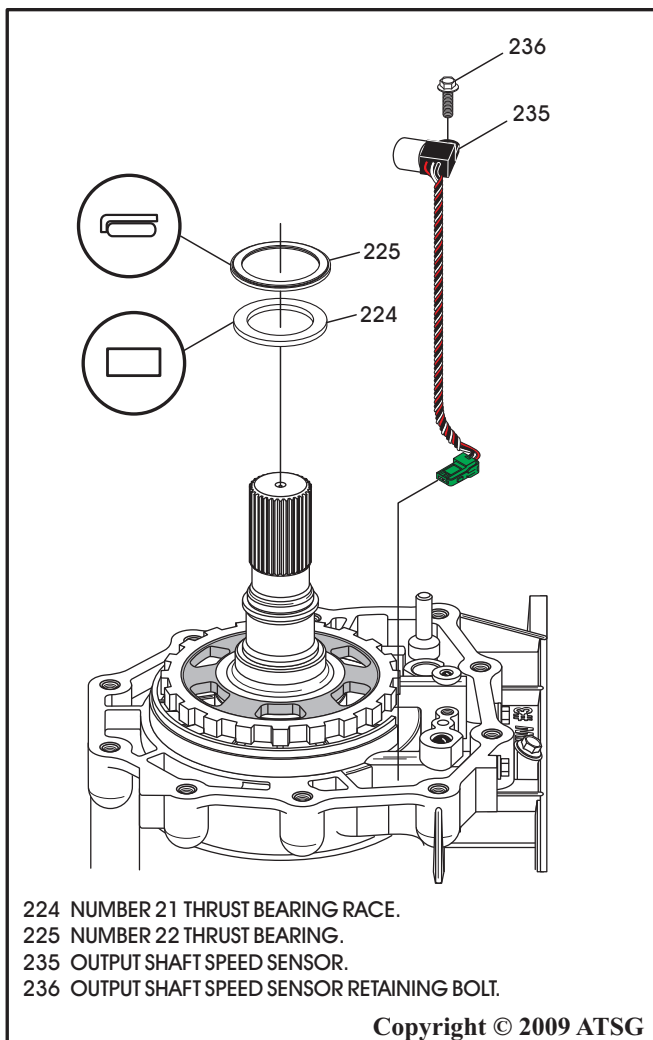


Figure 211

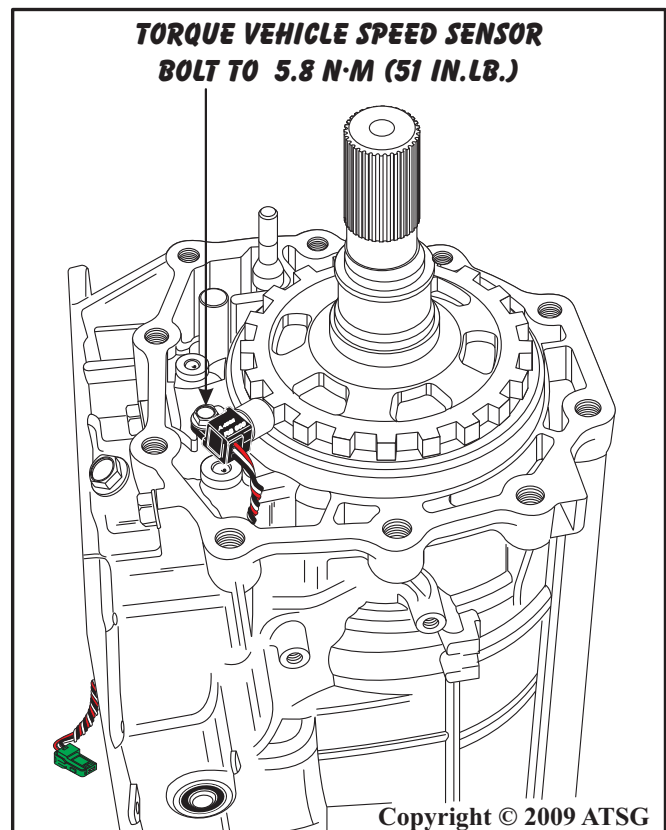


Figure 212

TRANSMISSION ASSEMBLY (CONT'D)

47. Install the proper extension housing to case gasket, as shown in Figure 213, and retain with a small amount of Trans-Jel®.

Note: There are two different extension housing gaskets. Some of the 2WD units use anaerobic sealant as a gasket.

48. Ensure that the number 22 thrust bearing is still stuck to front side of adapter housing, as shown in Figure 213.

49. Install the 4WD adapter housing onto the case, as shown in Figure 213.

50. Install the adapter housing retaining bolts, as shown in Figure 213, ten required.

Note: Notice there is one bolt that requires anaerobic sealant applied to threads.

Procedure is the same if you have the 2WD extension housing.

51. Torque all extension or adapter housing bolts to 61 N·m (45 ft.lb.), as shown in Figure 214.

Continued on Page 114

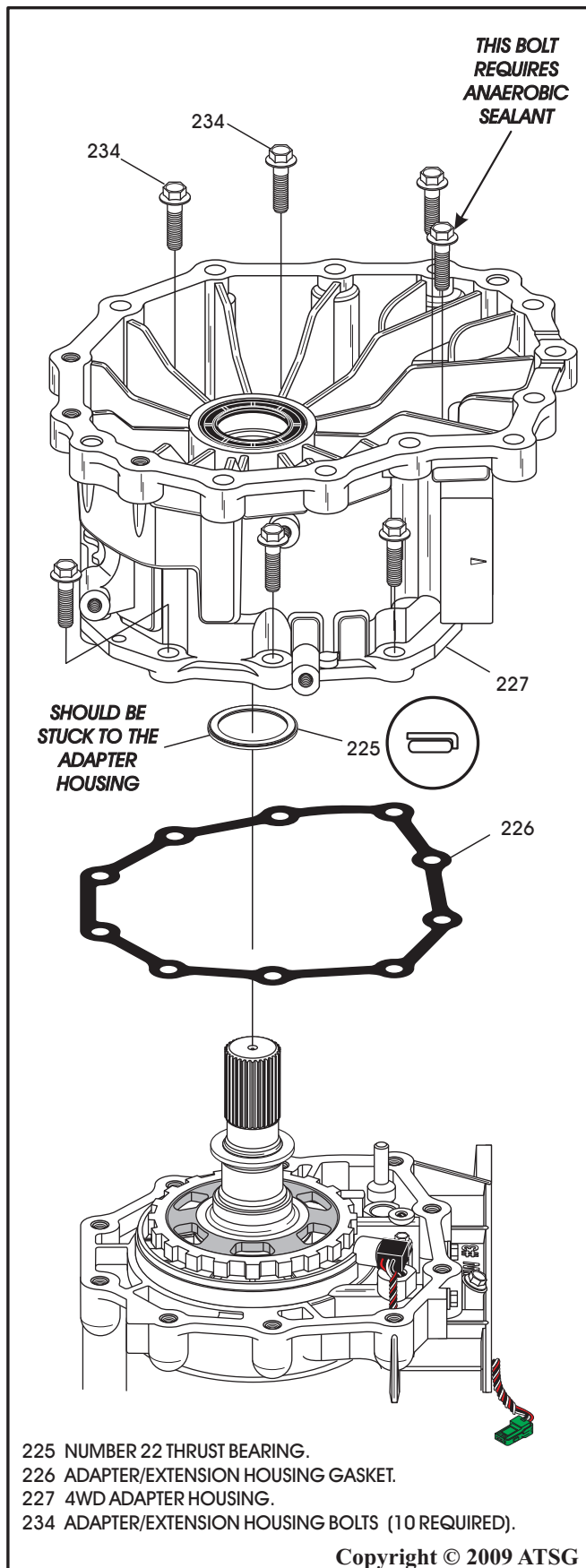


Figure 213

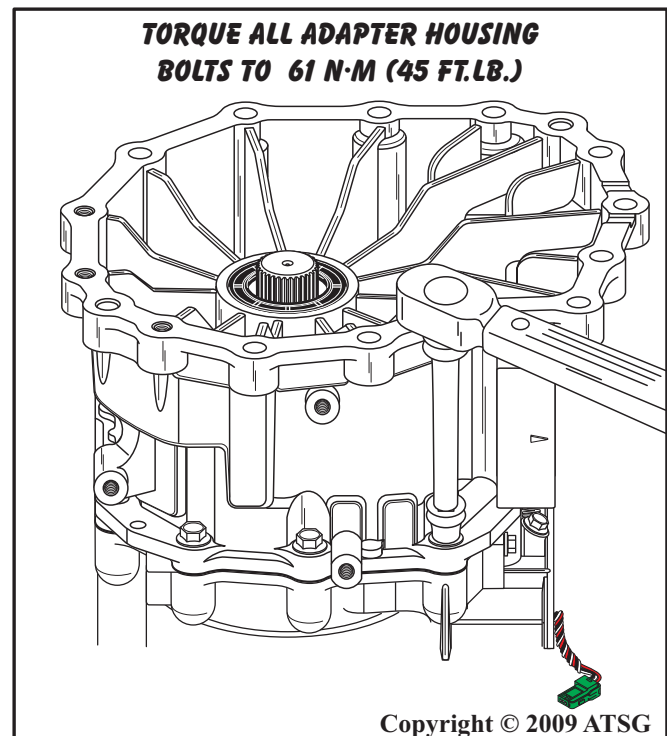


Figure 214

TRANSMISSION ASSEMBLY (CONT'D)

52. Ensure that number 14 and 15 thrust bearings are still in place on the drum support that were installed on step 28 and 29.
53. Install the pre-assembled direct clutch housing into the reverse brake clutches, as shown in Figure 215, by rotating back and forth so that drum engages all of the reverse brake clutches.
54. Ensure that number 13 thrust bearing race is still stuck to the high and low/reverse clutch housing, as shown in Figure 216.
55. Ensure that number 14 thrust bearing is still in place on the drum support in transmission.
56. Install the pre-assembled high and low/reverse clutch housing into direct clutches, as shown in Figure 216, by rotating back and forth until fully seated.

Continued on Page 115

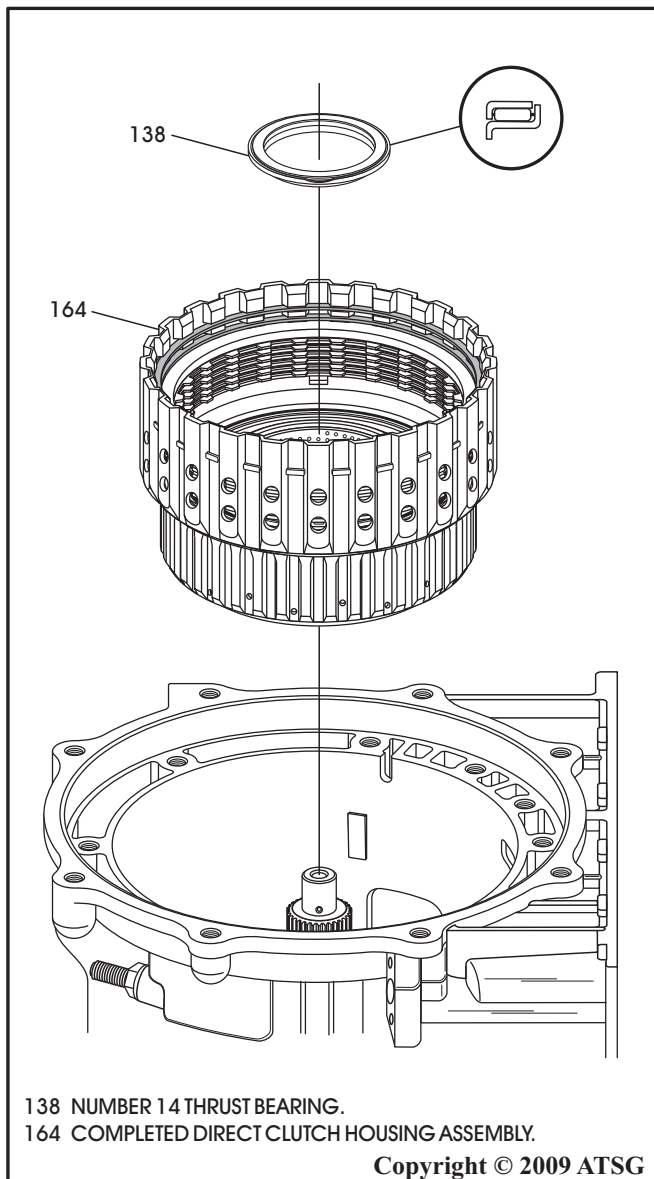


Figure 215

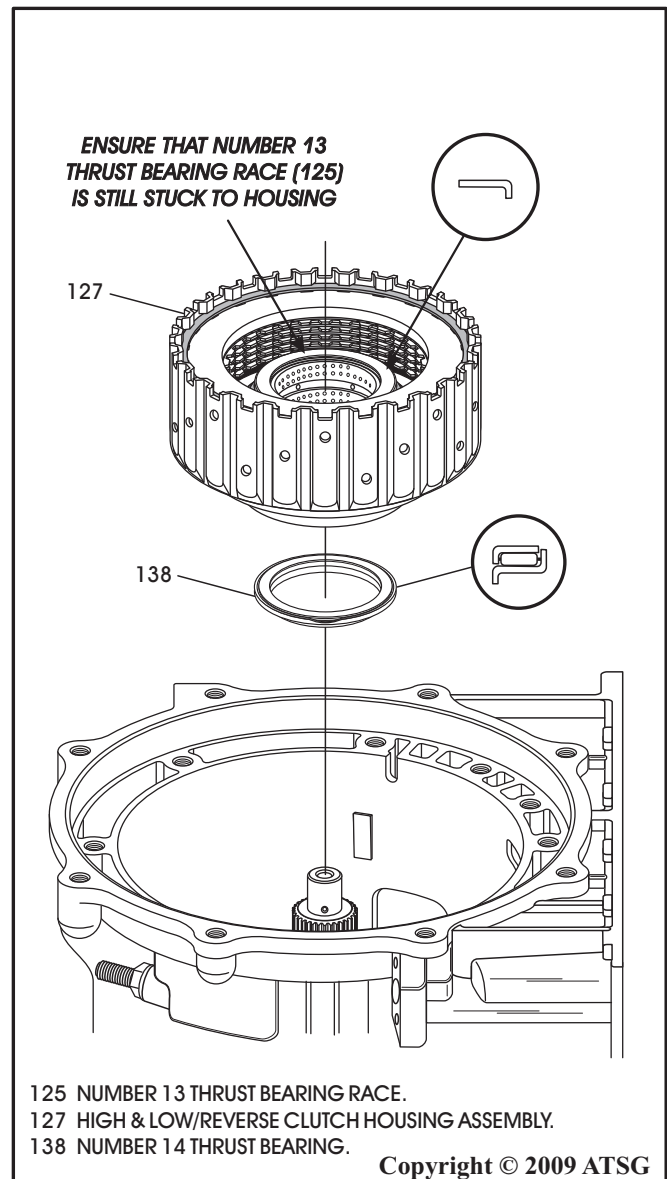


Figure 216

TRANSMISSION ASSEMBLY (CONT'D)

57. Install the pre-assembled 1st sprag and sun gear shaft assembly, as shown in Figure 217, by rotating back and forth to engage the high and low/reverse clutches on the hub.

Note: Ensure that "tangs" on sun gear are engaged into high and low/reverse clutch housing by approximately 2 mm (.080"), as shown in Figure 218. This will ensure that sun gear shaft is fully seated.

Continued on Page 116

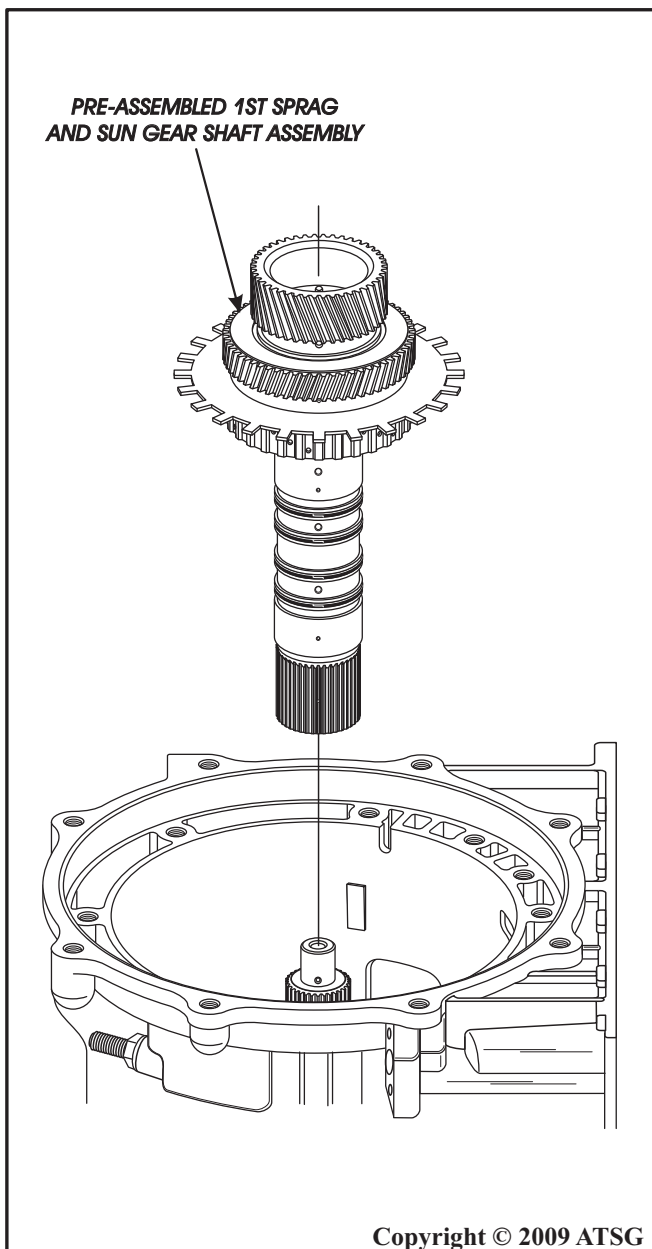


Figure 217

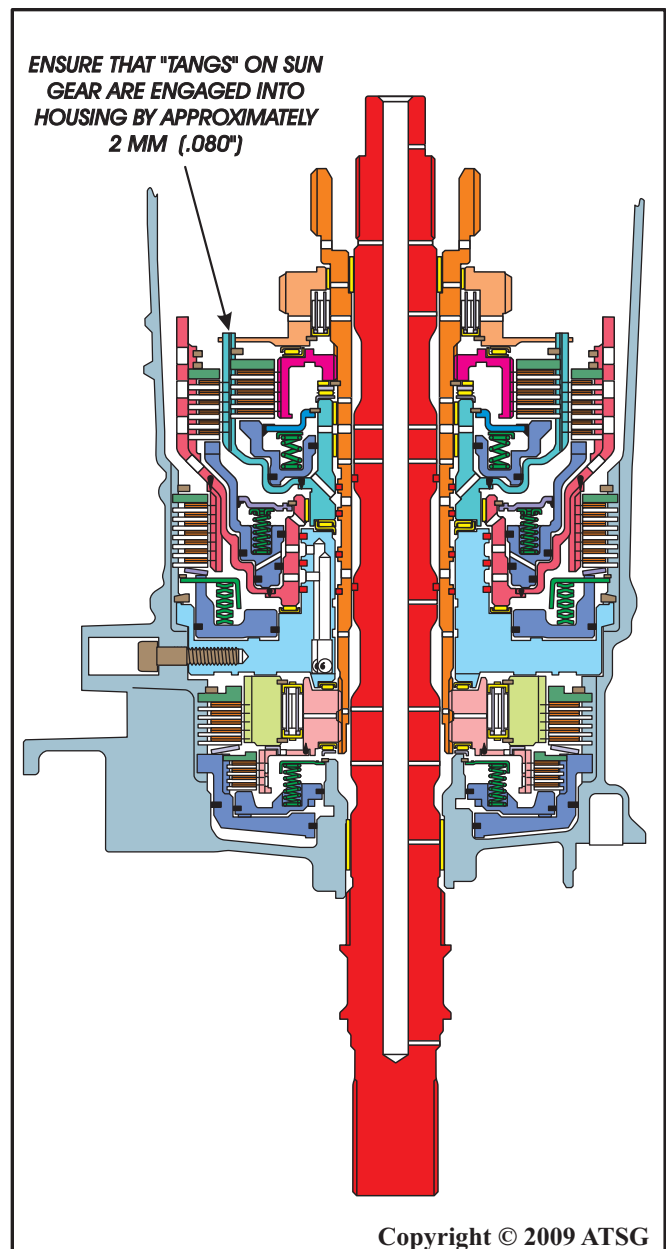


Figure 218

TRANSMISSION ASSEMBLY (CONT'D)

58. Install the number 9 thrust bearing on the back side of the center ring gear and rear planetary carrier assembly, as shown in Figure 220, with needles facing up and retain with Trans-Jel®.
59. Install the number 8 thrust bearing race on the front side of the center ring gear and planetary carrier assembly, as shown in Figure 219, and retain with Trans-Jel®.
60. Install the complete assembly into transmission as shown in Figure 219, by rotating carrier into position until fully seated.

61. Install the number 7 thrust bearing on the back side of the center planetary carrier assembly, as shown in Figure 221, with the needles facing up and retain with Trans-Jel®.

Continued on Page 117

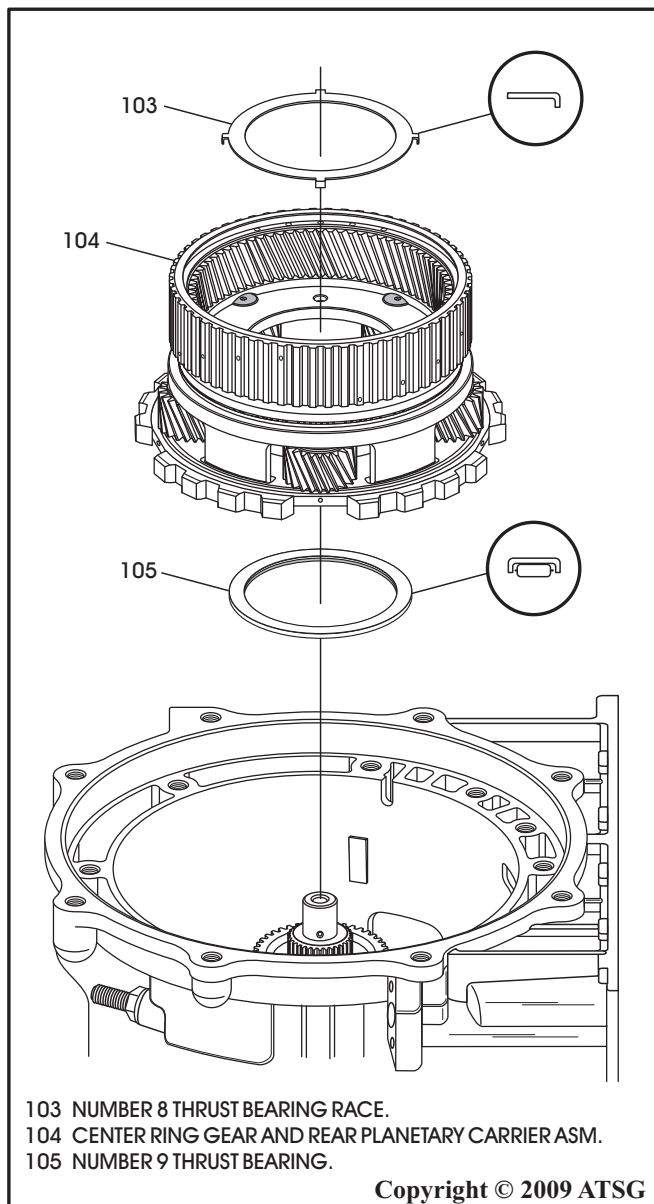


Figure 219

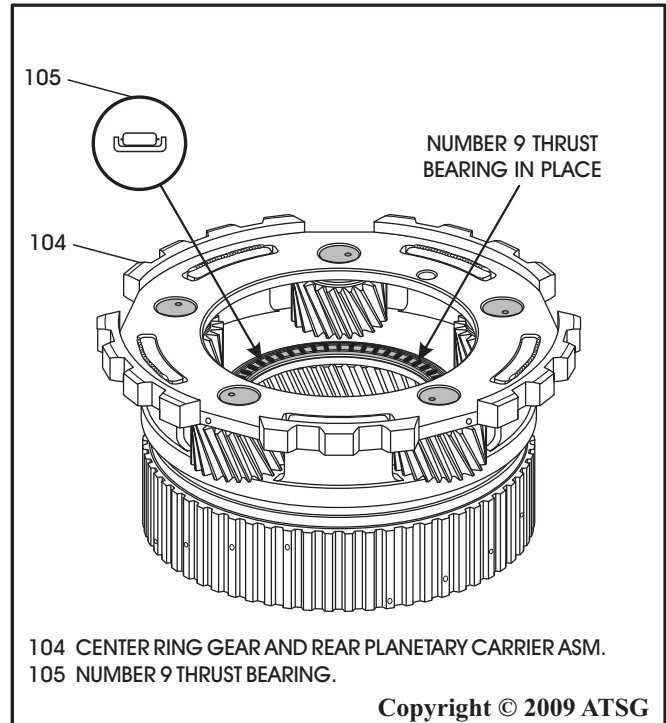


Figure 220

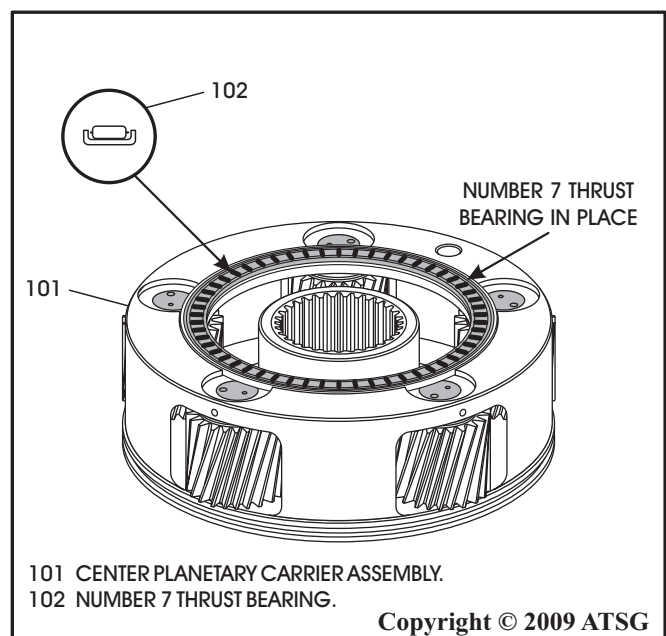


Figure 221

TRANSMISSION ASSEMBLY (CONT'D)

62. Install the number 6 thrust bearing on the front side of the center planetary carrier assembly, as shown in Figure 222, with the needles facing up and retain with Trans-Jel®.
 63. Install the completed center planetary carrier assembly, as shown in Figure 222, by rotating into position until fully seated.
 64. Install the pre-assembled input clutch housing assembly, as shown in Figure 223.
- Note:** *Input housing must be rotated back and forth to engage all input clutches and the rear ring gear onto the rear planetary carrier.*
65. Ensure that number 3 thrust bearing is still in place in the input housing with the black side facing up, as shown in Figure 223.

Continued on Page 118

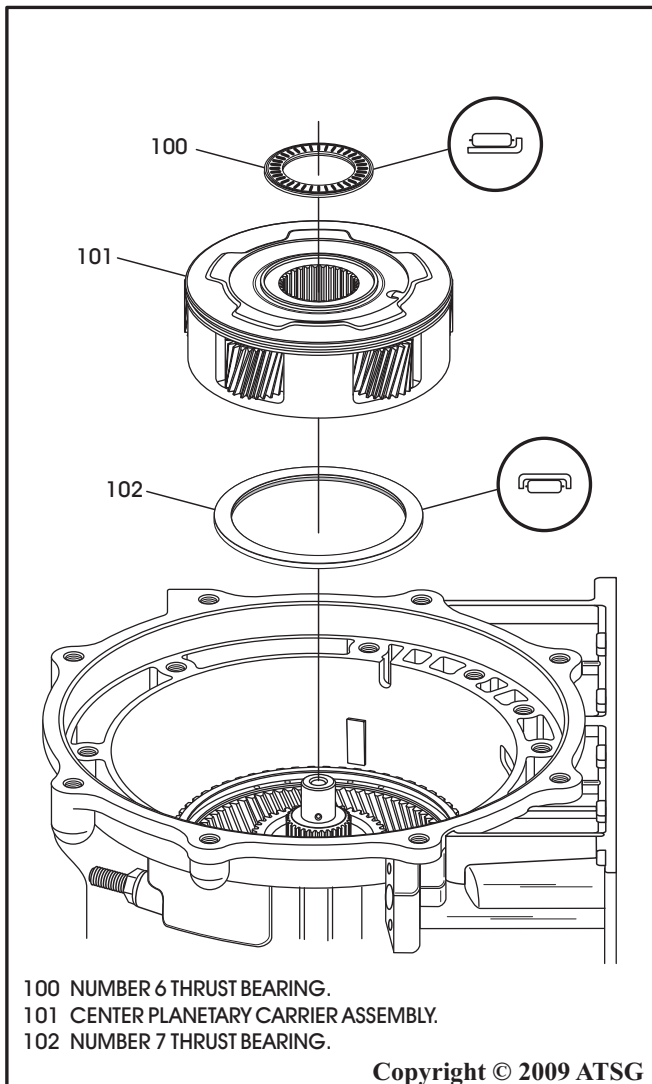


Figure 222

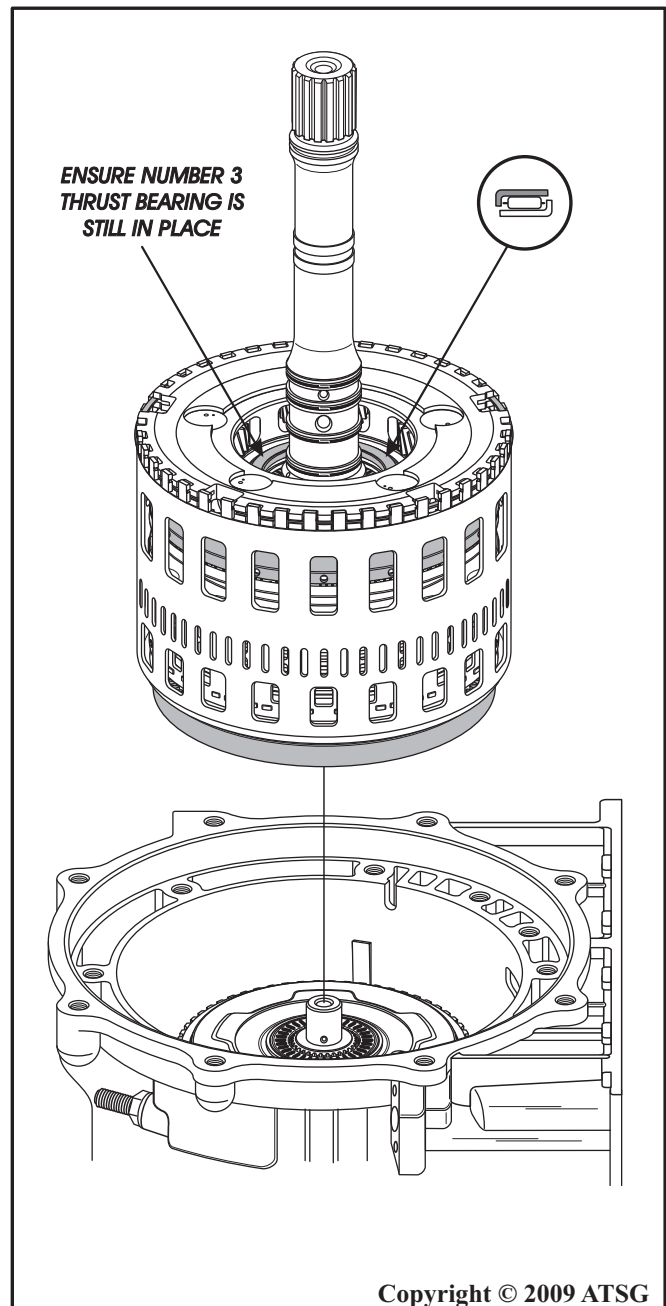


Figure 223

TRANSMISSION ASSEMBLY (CONT'D)

66. Install the front brake band into transmission case, as shown in Figure 224, engaging one end on the servo apply pin and the other end on the adjustable anchor pin.
67. Install pre-assembled front sun gear and drum assembly, as shown in Figure 224, by rotating back and forth until fully seated.
68. Adjust the front brake band "tilting", so that band contacts the sun gear drum evenly.
69. Loosen the band anchor lock nut and torque the servo anchor pin to 5.0 N·m (44 in.lb.).
Note: Nissan recommends replacing the servo anchor pin on all rebuilds.
70. Back servo anchor pin off exactly three turns.
71. While holding the servo anchor pin, torque the locking nut to 46 N·m (34 ft.lb.).
72. Install the number 2 thrust bearing into the sun gear drum with the needles facing up, as shown in Figure 224, and retain with Trans-Jel®.
73. Install "H" gage on transmission, as shown in Figure 225, set adjustment rod on the roller surface of number 2 thrust bearing, and tighten the locking knob.

Note: There is no pump gasket used in this unit, so it does not enter the equation.

Continued on Page 119

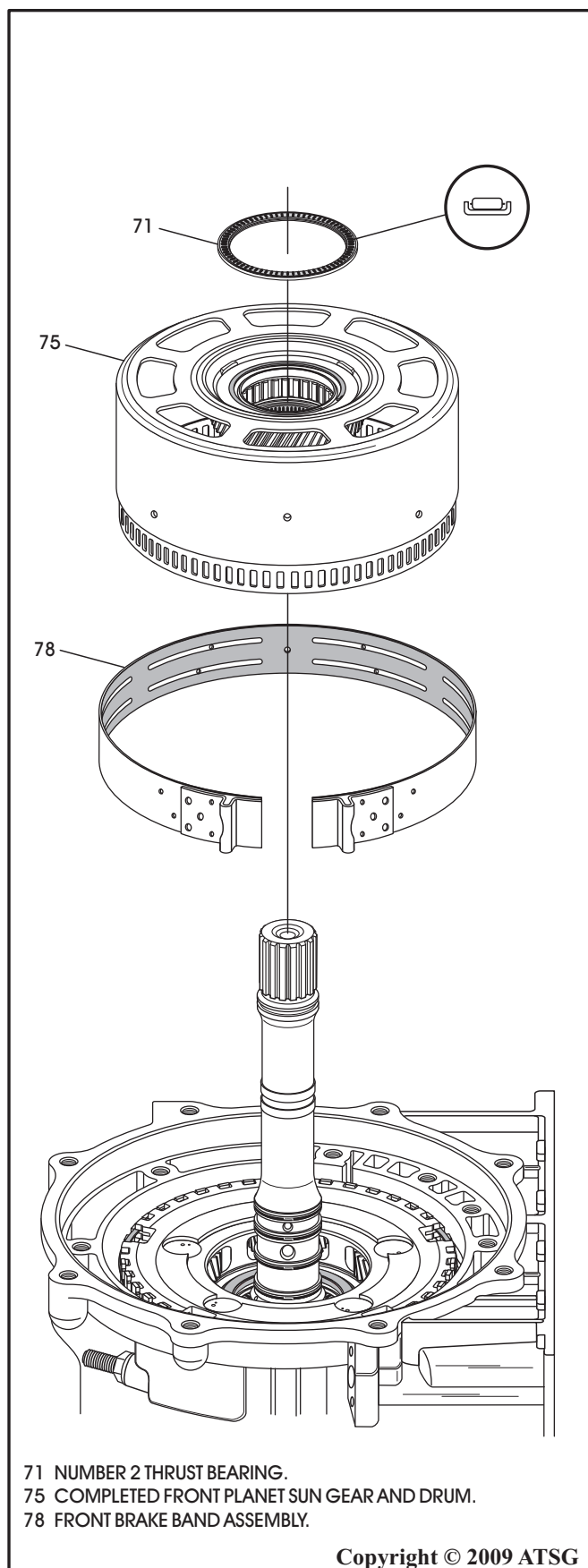


Figure 224

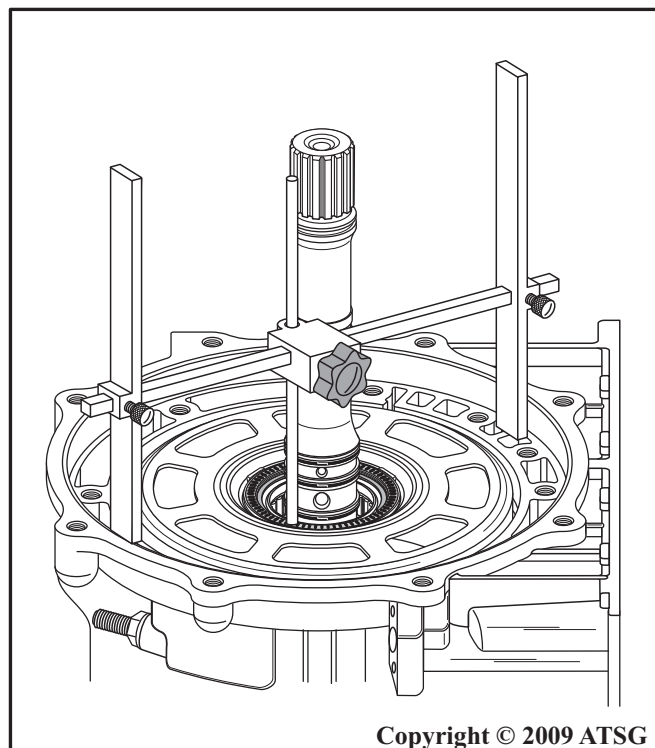


Figure 225

TRANSMISSION ASSEMBLY (CONT'D)

74. Install number 1 selective thrust bearing race on the pre-assembled oil pump assembly, as shown in Figure 226.
75. Now, turn the "H" gage over and set it on the completed oil pump assembly, as shown in Figure 227.
76. Measure with a feeler gage between number 1 selective thrust bearing race and adjustment rod, as shown in Figure 227, for the proper transmission end-play.
77. Proper transmission end-play should be 0.25 - 0.55 mm (.010" - .022").
78. Change the number 1 selective thrust bearing race as necessary, to obtain the specified front end-play, using the chart in Figure 227.
79. Install the proper number 1 selective thrust bearing race, as shown in Figure 226, and retain with a small amount of Trans-Jel®.

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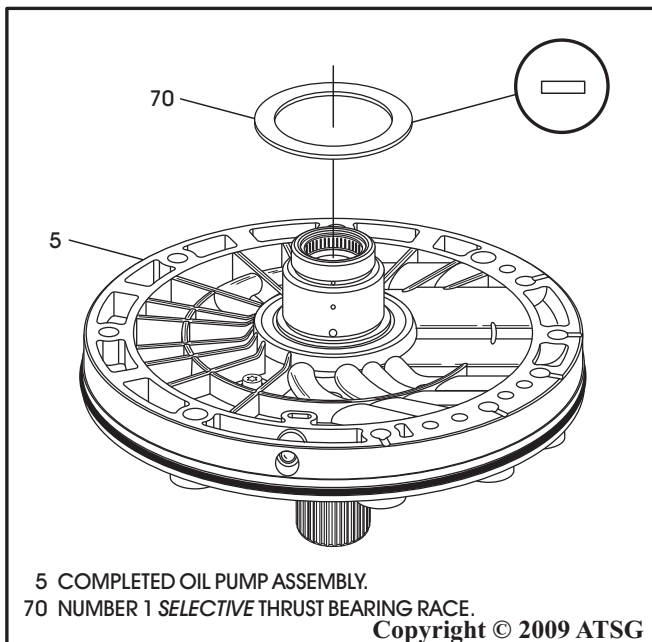


Figure 226

**Transmission End Clearance Should Be;
0.25 - 0.55mm (.010" - .022")**

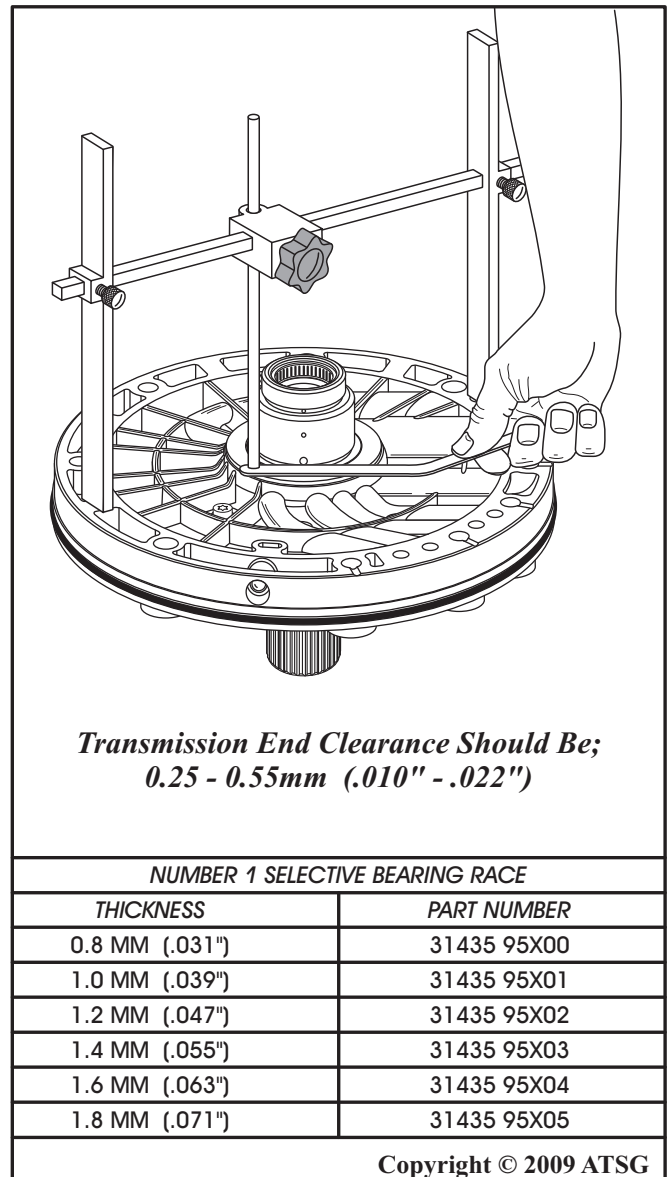


Figure 227

TRANSMISSION ASSEMBLY (CONT'D)

80. Lube the oil pump to case "O" ring and case bore with a small amount of Trans-Jel®, and install oil pump, as shown in Figure 228.

Note: No oil pump to case gasket used in this transmission.

81. Apply genuine RTV silicone, or the equivalent, around each oil pump retaining bolt surface, as shown in Figure 229.

82. Install the ten oil pump to case retaining bolts, as shown in Figure 230.

Continued on Page 121

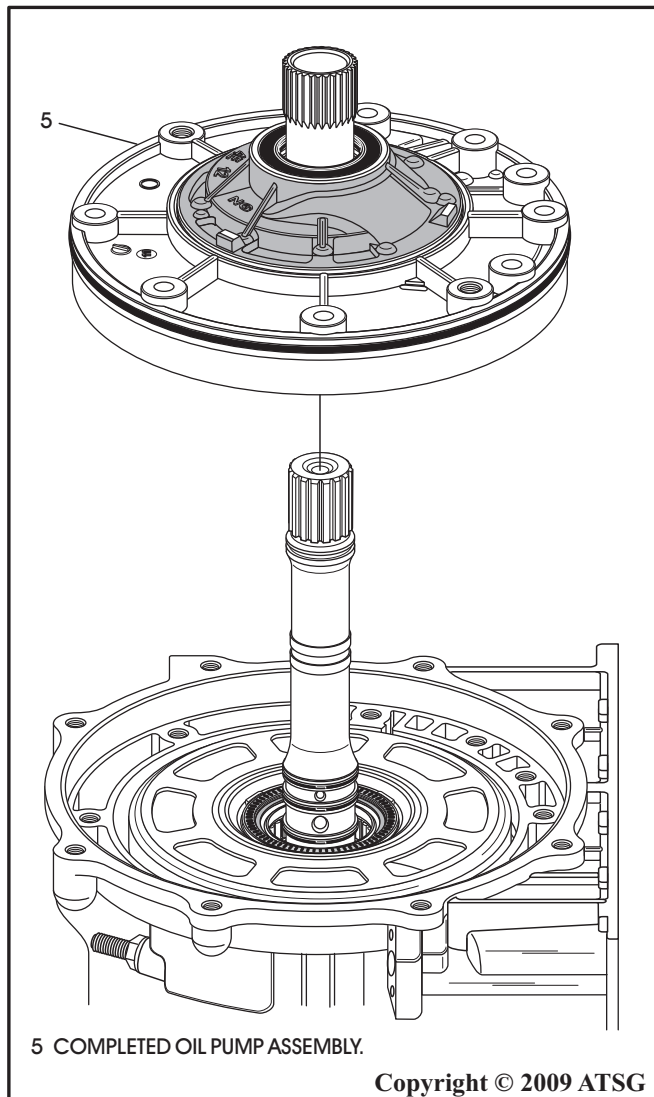


Figure 228

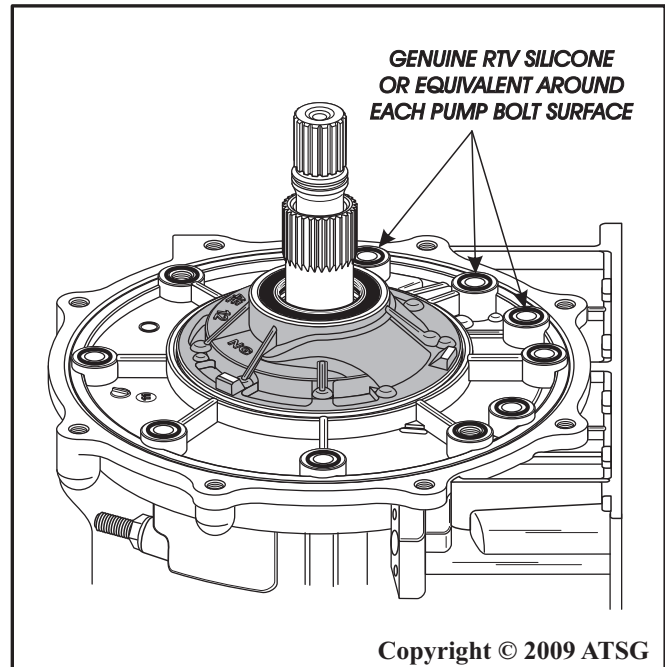


Figure 229

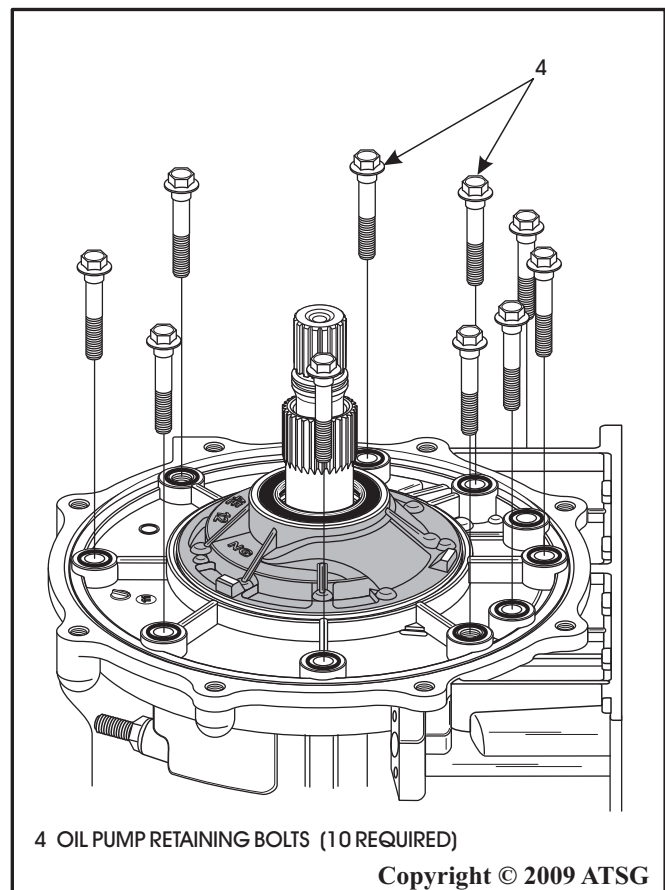


Figure 230

TRANSMISSION ASSEMBLY (CONT'D)

83. Torque all oil pump to case retaining bolts to 48 N·m (35 ft.lb.).
 84. Install new "O" ring into the groove in turbine shaft, as shown in Figure 231.
 85. Retrieve the pre-assembled valve body, and place on a flat work surface with the oil filter facing down, as shown in Figure 232.
- Note:** We want to ensure that wire harness' are connected properly "Before" we install the valve body. If they are connected wrong you will blow fuses, and not know why. This applies to Mid 2004-2008 models only.
86. Ensure that Internal Harness 1 and Internal Harness 2 are connected *exactly*, as shown in Figure 232.

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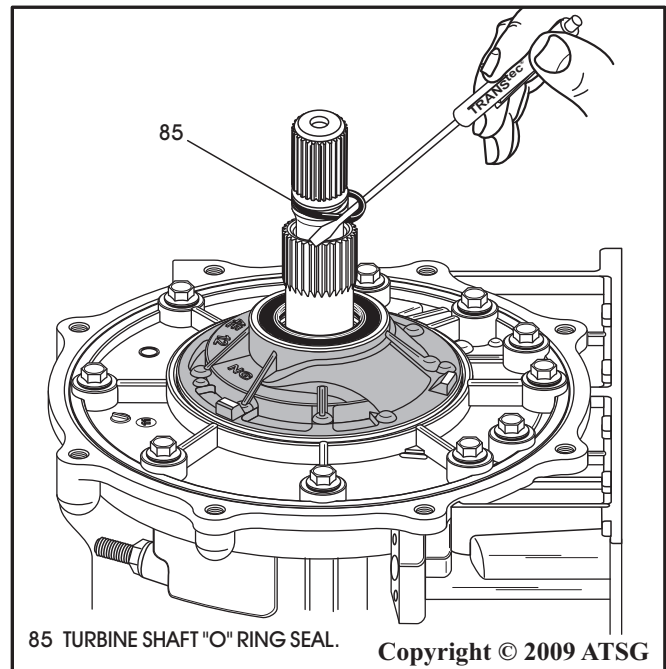
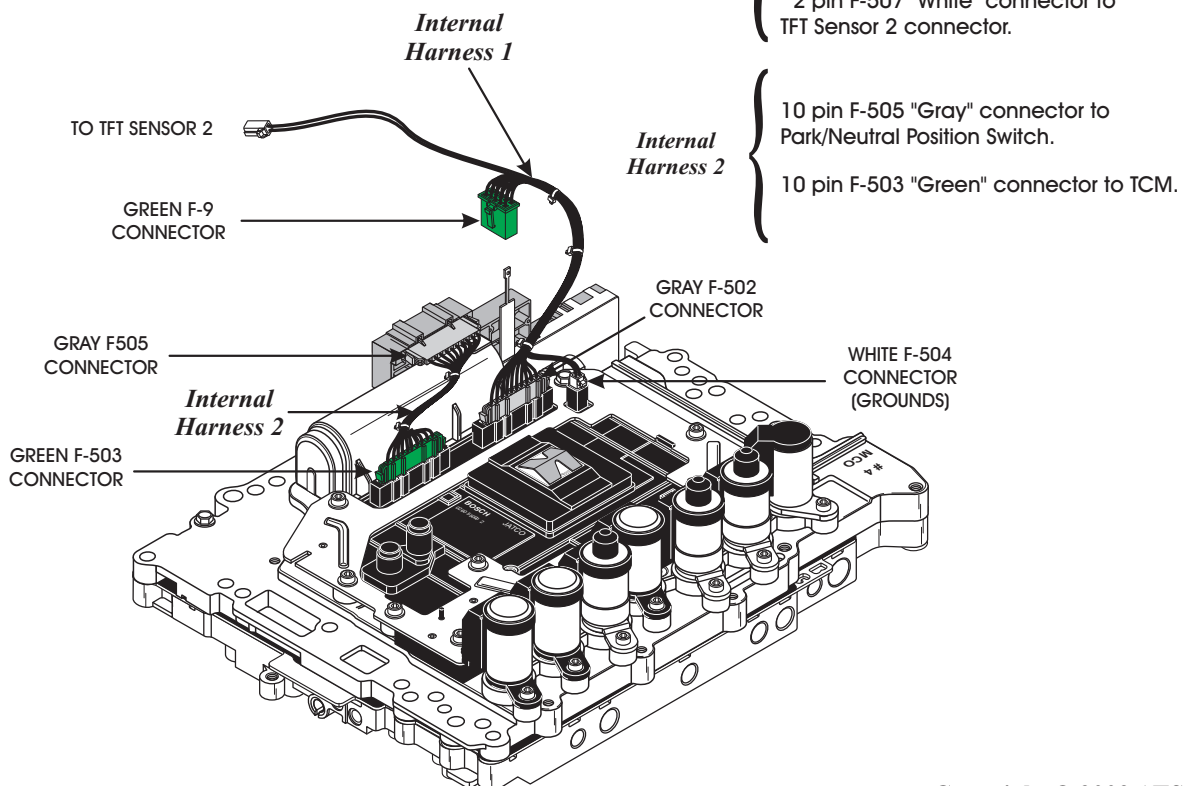


Figure 231

MID 2004 - 2008 RE5R05A CONNECTOR AND TERMINAL IDENTIFICATION FOR "INTERNAL TCM" MODELS



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Figure 232

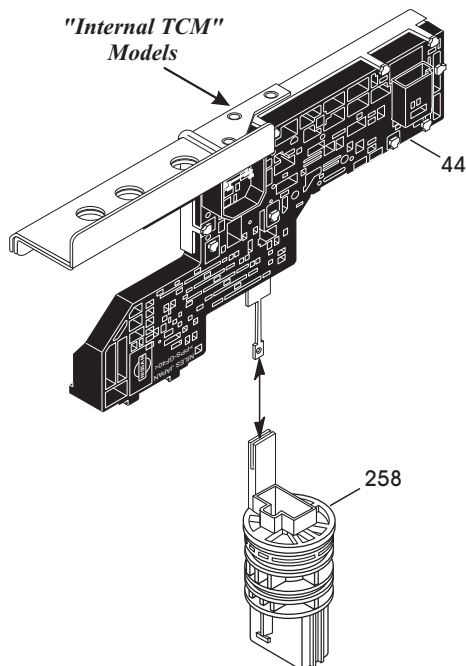
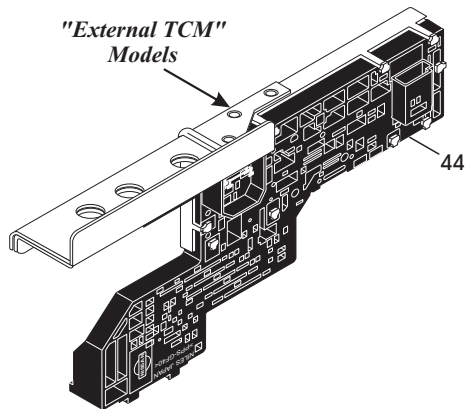
TRANSMISSION ASSEMBLY (CONT'D)

87. There are several things that must be done as the valve body is installed on transmission, and are as follows:

- (A) Lay output/revolution sensor wire over the pan rail, as shown in Figure 235, to avoid any possibility of damage.
- (B) Green case connector on internal wire harness must be connected to pass-thru connector, as shown in Figure 235, as we install valve body.
- (C) The "stem" protruding from the bottom of PNP switch must be guided into "slot" of pass-thru case connector, as shown in Figure 233. This applies to Internal TCM models only.
- (D) We must ensure that manual valve gets properly engaged onto the internal detent lever, as shown in Figure 234.

88. All of the steps above must be monitored "as" the valve body is placed onto the transmission.

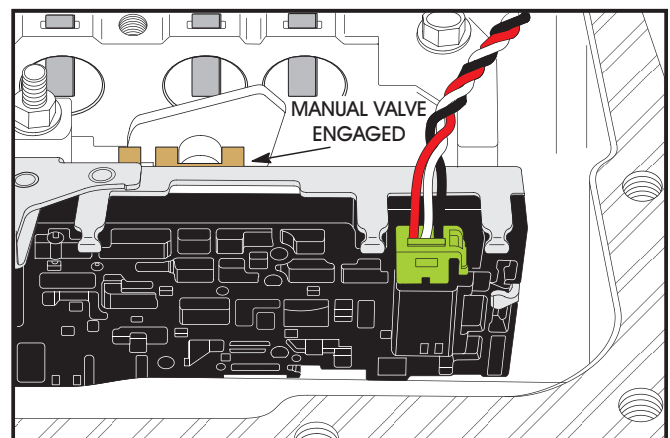
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44 PARK NEUTRAL POSITION SWITCH.
258 TRANSMISSION CASE CONNECTOR (INTERNAL TCM).

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Figure 233



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Figure 234

TRANSMISSION ASSEMBLY (CONT'D)

89. Install the pre-assembled valve body assembly as shown in Figure 235, while monitoring the items covered in step 87 A, B, C, and D.
90. Install the proper length valve body retaining bolts in their proper locations, as shown in Figure 235, using the chart provided.

91. Torque all of the valve body retaining bolts to 8 N·m (70 in.lb.).

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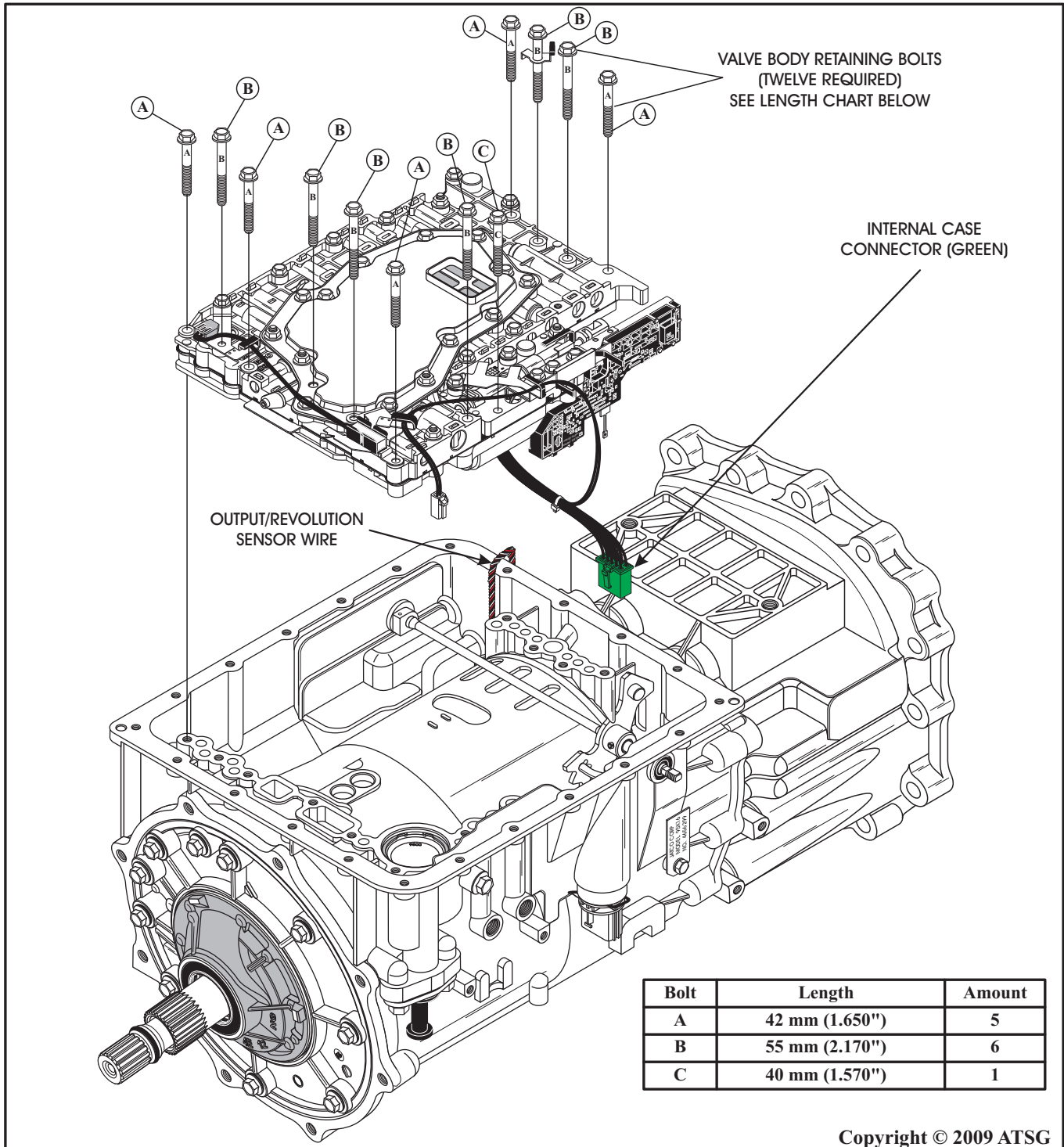
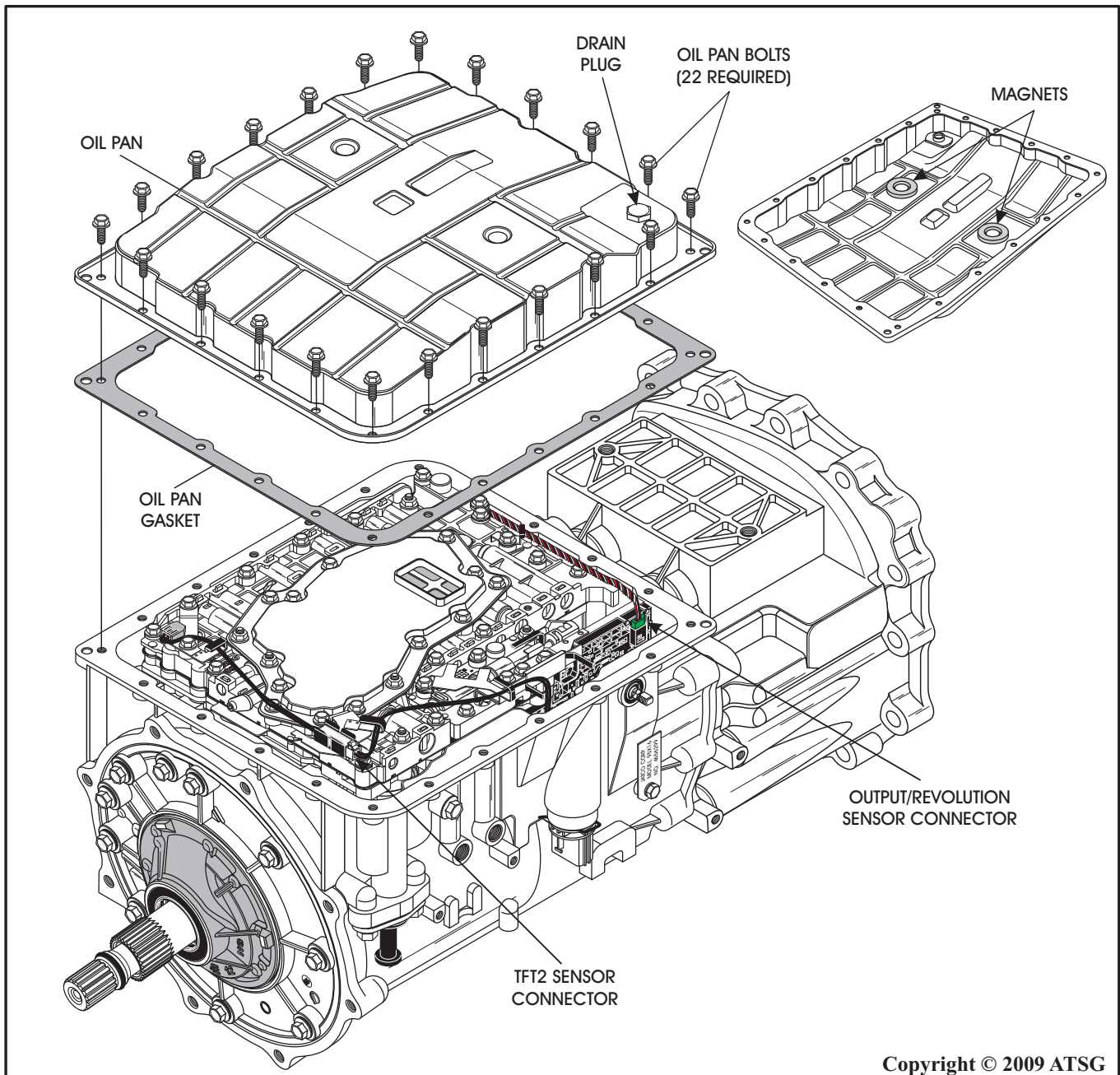


Figure 235

TRANSMISSION ASSEMBLY (CONT'D)

92. Connect the output/revolution speed sensor to the PNP switch, as shown in Figure 236.
93. Connect the transmission fluid temperature 2 connector, as shown in Figure 236.
94. Securely fasten TFT2 sensor wire and output/revolution sensor wire in clips, as shown in Figure 236.
95. Ensure that manual valve is properly engaged on inside detent lever.
96. Install new pan gasket, as shown in Figure 236.
97. Install the two magnets into oil pan, as shown in Figure 236.
98. Install the oil pan onto transmission, as shown in Figure 236.
- Caution:** *Oil pan can be installed backwards. Install with drain plug to rear, as shown in Figure 236.*
99. Install 22 pan bolts and torque all pan bolts to 8 N·m (70 in.lb.).

Continued on Page 125



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Figure 236

TRANSMISSION ASSEMBLY (CONT'D)

100. Install torque converter housing, as shown in Figure 237.

101. Install the eight required converter housing bolts, as shown in Figure 237.

Note: All of the bolts are the same length but one requires anaerobic sealant applied to the threads, as shown in Figure 237.

102. Torque all converter housing to case bolts to 61 N·m (45 ft.lb.).

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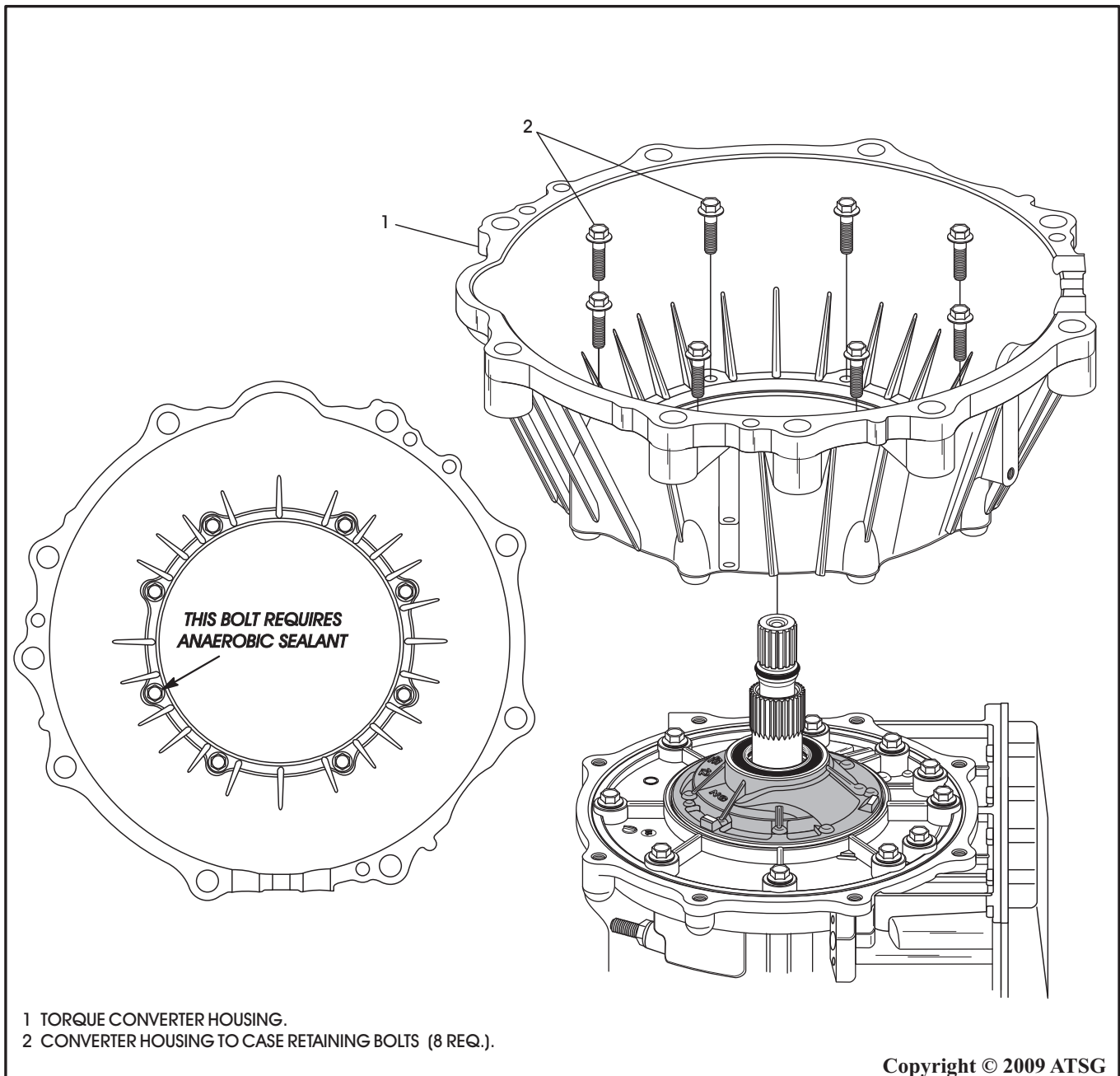
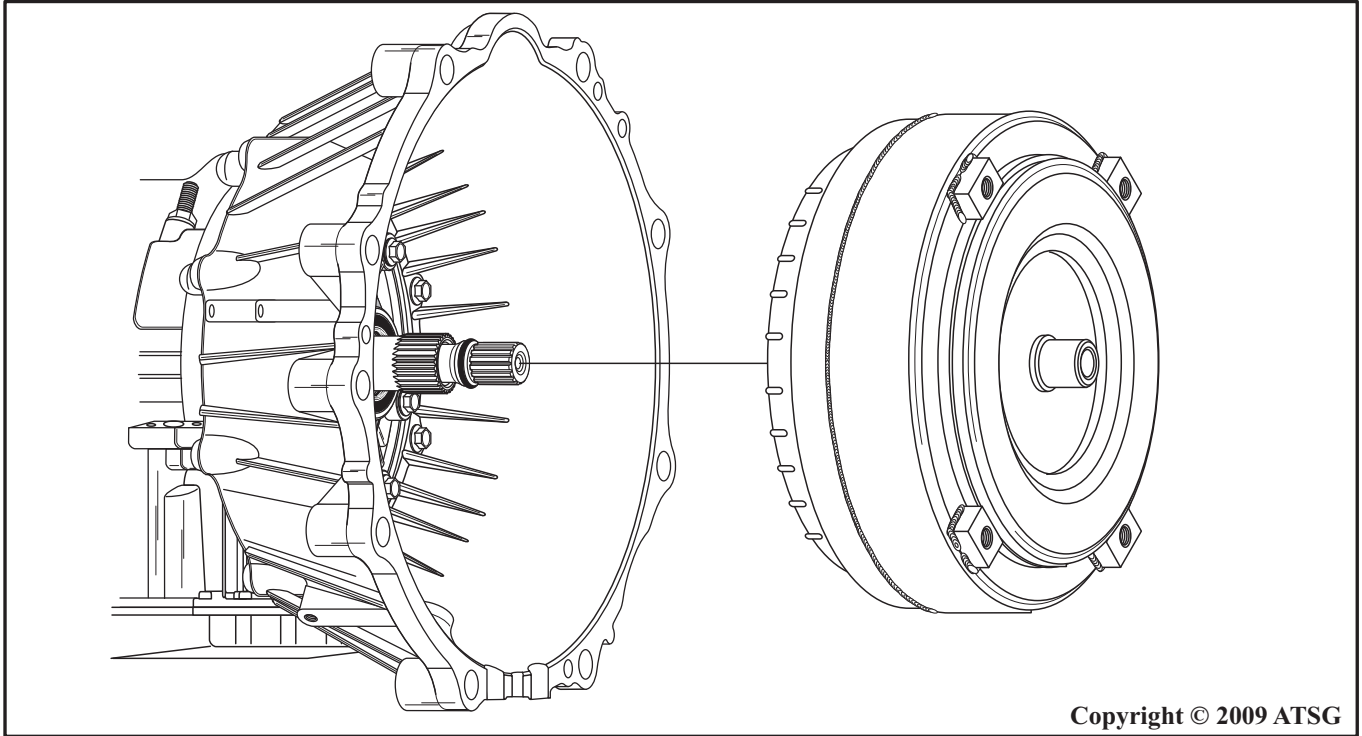
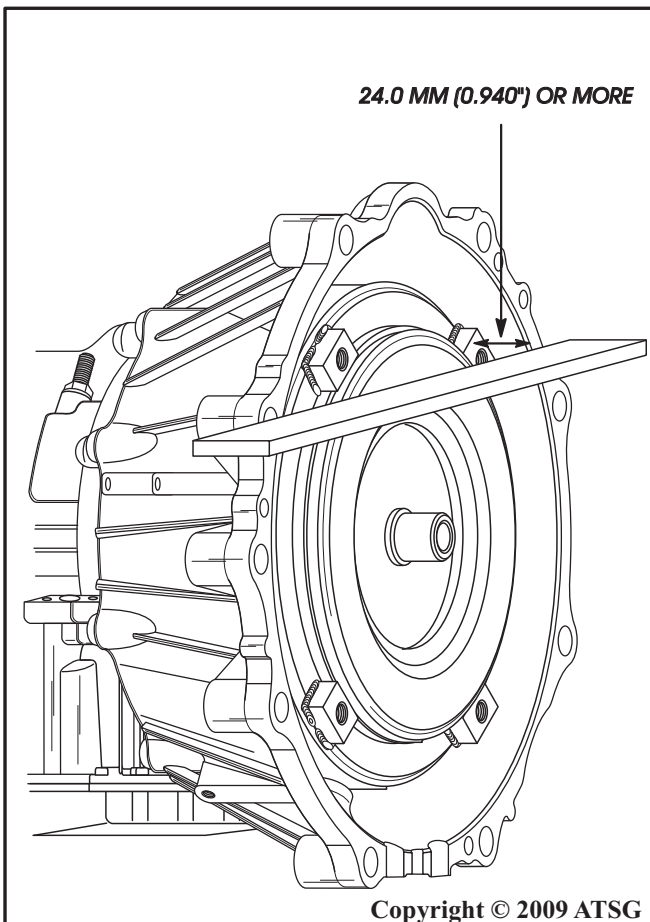


Figure 237



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Figure 238



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Figure 239

TRANSMISSION ASSEMBLY (CONT'D)

103. Pre-fill torque converter with about 2 quarts of the proper transmission fluid.

Note: Nissan ATF Matic Fluid "J", is the required fluid for this transmission.

104. Install the torque converter into transmission, as shown in Figure 238.

105. Use a ruler and straight edge to measure from converter pad to front surface of the converter housing, as shown in Figure 239.

106. This distance should be 24 mm (0.940") or more, as shown in Figure 239.

**CONGRATULATIONS
YOU ARE FINISHED!**

THRUST BEARING, BEARING RACE, AND WASHER IDENTIFICATION



* = ILLUSTRATION NUMBER IN THIS MANUAL.

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Figure 240



Technical Service Information

TORQUE SPECIFICATIONS			
<i>Component</i>	N•m	Ft.Lb.	In.Lb.
Dipstick Tube Adapter to Case	8		70
Oil Pump Assembly to Case	48	35	
Oil Pump Cover to Pump Body	9		80
All Valve Body and Solenoid Bolts	8		70
Drum Support to Case	23	17	
Inside Detent Spring to Case	8		70
Output/Revolution Sensor to Case	5.8		51
4WD Adapter Housing/Extension Housing to Case	61	45	
Band Anchor Adjustment Locking Nut	46	34	
Oil Pan to Case	8		70
Oil Pan Drain Plug	34	25	
Converter Housing to Case	61	45	
Transmission to Engine Bolts	113	83	
External Manual Shift Lever Nut	22		97
Oil Pressure Test Plugs	7.3		65
Cooler Line "Banjo" Fitting Bolts	49	36	
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Figure 241