



# "2009" SEMINAR INFORMATION INDEX

## *Ford & Chrysler*

### *Ford*

4F27E.....	5
FNR5.....	11
CFT30(CVT).....	25

### *Chrysler*

41TE.....	43
41TES.....	48
42RLE.....	70
42/44/46/47/48RE.....	71
(5)45RFE.....	73
62TE.....	87
Data Bus Line Checks.....	114

## **ADVERTISERS**

Many thanks to the following advertisers for subsidizing seminar costs making your fees to attend affordable.

Transtar.....	IFC	TRNW.....	62
Sonnax.....	2	Zoom.....	102
A & Reds.....	4	Ratio Tek.....	103
Transtec.....	18	Natpro.....	119
ATSG.....	19	Alto.....	120
.	20	Precision International.....	IBC
Automotive Test Solutions (ATS).....	59	Lubegard.....	BC
Valve Body Pro.....	60 & 61		
Techpac (Centerfold).....			

**AUTOMATIC TRANSMISSION SERVICE GROUP**

18635 SW 107th AVENUE  
Miami, Florida 33157

WWW.ATSG.BIZ

(305) 670-4161

WWW.ATSG.COM



# "Tech in Time for 2009" Seminar Information

## ATSG Seminars

With the White manual covering GM and medium duty trucks with the new Allison 6 speed transmission, this Red manual picks up where we left off continuing with Ford. These seminars are arranged where we present information on new transmissions, complaint, cause and correction information on transmissions that visit the shops for repairs, computer reprogramming corrections, sometimes a new tool, electrical problems and new or updated parts with interchangeability information for GM, Ford, Chrysler and Imports. In this way we cover a little of everything across the board. In this manual, Ford and Chrysler information is provided with a very informative section on Ford's CVT noise problem. This is a nice job to do and there are parts for them to do it. Just this section alone reimbursed you of all your time and expenses to be here today many times over. And there is still much more to come!

No part of any ATSG publication may be reproduced, stored in any retrieval system or transmitted in any form or by any means, including but not limited to electronic, mechanical, photocopying, recording or otherwise, without *written* permission of Automatic Transmission Service Group. This includes all text illustrations, tables and charts.

*The information and part numbers contained in this booklet have been carefully compiled from industry sources known for their reliability, but ATSG does not guarantee its accuracy.*

Copyright © ATSG 2009

**PETER LUBAN**  
TECHNICAL CONSULTANT

**GERALD CAMPBELL**  
TECHNICAL CONSULTANT

**GABE DE LOS REYES**  
TECHNICAL CONSULTANT

**ROLAND ALVAREZ**  
TECHNICAL CONSULTANT

**JON GLATSTEIN**  
TECHNICAL CONSULTANT

**RICHARD GRAHAM**  
TECHNICAL CONSULTANT

**WAYNE COLONNA**  
TECHNICAL CONSULTANT

**DALE ENGLAND**  
TECHNICAL CONSULTANT

**JIM DIAL**  
TECHNICAL CONSULTANT

**ED KRUSE**  
TECHNICAL CONSULTANT

**GREGORY LIPNICK**  
TECHNICAL CONSULTANT

**DAVID CHALKER**  
TECHNICAL CONSULTANT

**GREG CATANZARO**  
TECHNICAL CONSULTANT

**AUTOMATIC TRANSMISSION SERVICE GROUP**  
18635 SW 107th AVENUE  
MIAMI, FLORIDA 33157  
(305) 670-4161

# Sonnax Has the Answer for Your Out-of-Control 5R55W/S Valve Body

6 Sonnax kits allow you to repair the most common areas of valve body wear and restore pressure control.



## PROBLEM

- Excess TCC Slip
- Code 741
- TCC lining comes off
- Overheated converters

- Excess TCC slippage
- Codes 741 & 1783
- Transmission overheating

- High TCC slip RPM at increasing load
- Slip codes
- Elevated fluid temperature

- High TCC slip RPM at increasing load
- Slip codes
- Elevated fluid temperature

- Line pressure concerns
- Slipping upshifts
- Low line pressure

- Delayed engagements
- High line pressure in reverse
- Soft shifts

## SOLUTION

### Oversized TCC Control Valve Kit

**1**



**56947J-05K**

F-56947J-TL2 Tool Kit &  
VB-RX Fixture Required

### TCC Modulator Valve & Sleeve

**2**



**56947J-15K**

F-56947J-TL15 Tool Kit &  
VB-RX Fixture Required

### TCC Modulator Sleeve & Plunger Kit *(Increased Ratio)*

**3**



**56947J-03K**

### TCC Modulator Sleeve & Plunger Kit *(OEM Ratio)*

**4**



**56947J-01K**

### VFS Modulator Control Sleeve & Valve Kit

**5**



**56947J-19K**

F-56947J-TL19 Tool Kit &  
VB-RX Fixture Required

### Pressure Regulator Sleeve & Clip

**6**



**56947J-09K**

56947J-TL9 Tool Kit Required



More information on all our products is available at  
[www.sonnax.com](http://www.sonnax.com)

800-843-2600 • 802-463-9722  
Fax: 802-463-4059  
Email: [info@sonnax.com](mailto:info@sonnax.com)

**sonnax®**  
TIME TESTED • INDUSTRY TRUSTED™

Automatic Drive • P.O. Box 440 • Bellows Falls, VT 05101-0440 USA

# A & REDS

TRANSMISSION PARTS

*Ask for the Impossible – we might surprise you.*



## LOCATIONS

### WICHITA, KANSAS 800-835-1007

Sales Personnel	Years of experience	
Dylan Autry	19	ext. 103
Randy Reusser	11	ext. 104
Roger Fredrickson	22	ext. 106
Nolan Autry	35	ext. 107
William Sherwood	18	ext. 122
Kevin Seymore	7	ext. 123
Rob Rasmussen	28	ext. 124

Next day service area: KS-NE-IA-MO-AR-OK-TX  
Same day shipping to 5 pm



### KANSAS CITY, MISSOURI 866-780-7337

Sales Personnel	Years of experience
Gale Autry	47
Vee Autry	18
Bob Belzer	17
Josh Maley	6
Corkey Turley	28

Next day service area: MO-KS-NE-IA-IL-SD-MN  
Same day shipping to 4pm

Owners: Pam & Leon Autry

## WHY CHOOSE A & REDS?

For over 36 years we have done one thing and we do it well. We help transmission rebuilders get the job done.

We are a full line distributor stocking all soft parts, rebuilding kits, and new and used hard parts for automatic transmissions, manual transmissions, and transfer cases. Domestic and imported. We also have a full machine shop to handle any special needs, i.e. pump rebuilding, case resleeving, and custom machine work.

## PRODUCTS

We stock top OEM quality products. Products that we are proud to sell and you will be proud to use.

Sonnax - Borg Warner - Trans Tec - Raybestos - Sealed Power Life - MPC - Valeo - Auto Gear - Southeast - Shaffer Kentmore - Raymark Ind. - B & M - Atec Trans Tool Transco - Dacco - Teckpack - TransMotive-DT Components Superior - Parker - SPX Tools - Lube Gard - Loctite

Call today and get your copy of A & Reds Digital Catalog. This catalog contains a detailed automatic, manual transmission, transfer case and flywheel parts listing. A handy suggested list and net price guide plus all the features found in the hard copy of our regular catalog, transmission vehicle index, cooler line return charts, band adjustments and much more.



## FORD/MAZDA 4F27E FN4A-EL DELAYED ENGAGEMENT/LOW PRESSURE

**COMPLAINT:** After overhaul, Ford and Mazda vehicles equipped with the 4F27E/FN4A-EL transaxle may exhibit a delayed engagement or a low pressure condition. *Note:* Pressure will be normal in the Park position but when the selector is moved to Reverse or any forward range, the gage will drop to 25 to 35 psi producing the delayed engagement.

**CAUSE:** The cause may be that during valve body overhaul, the solenoid body to spacer plate gasket with screens was assumed to be the updated bonded gasket and plate assembly because with the incorporated screens in the gasket, it becomes much stiffer. When this gasket alone is used thinking it is the bonded plate, there is not enough support in the gasket with the absence of the small spacer plate. As a result, it cannot seal off the D, Second, Low and Reverse circuit from an exhaust port in the solenoid body (See Figure 1). This condition will allow for normal line pressure in Park but low pressure in Reverse and all forward ranges.

**CORRECTION:** Install the missing spacer plate with new individual gaskets as shown in figure 2. If the valve body came with the bonded solenoid gasket assembly, replace it with the part number in service information as aftermarket kits do not supply the updated bonded plate, only the individual gaskets. Refer to Figure 3 for the remainder of the valve body assembly.

### SERVICE INFORMATION:

BONDED SOLENOID GASKET (Ford part number).....YS4Z-7Z490-AA

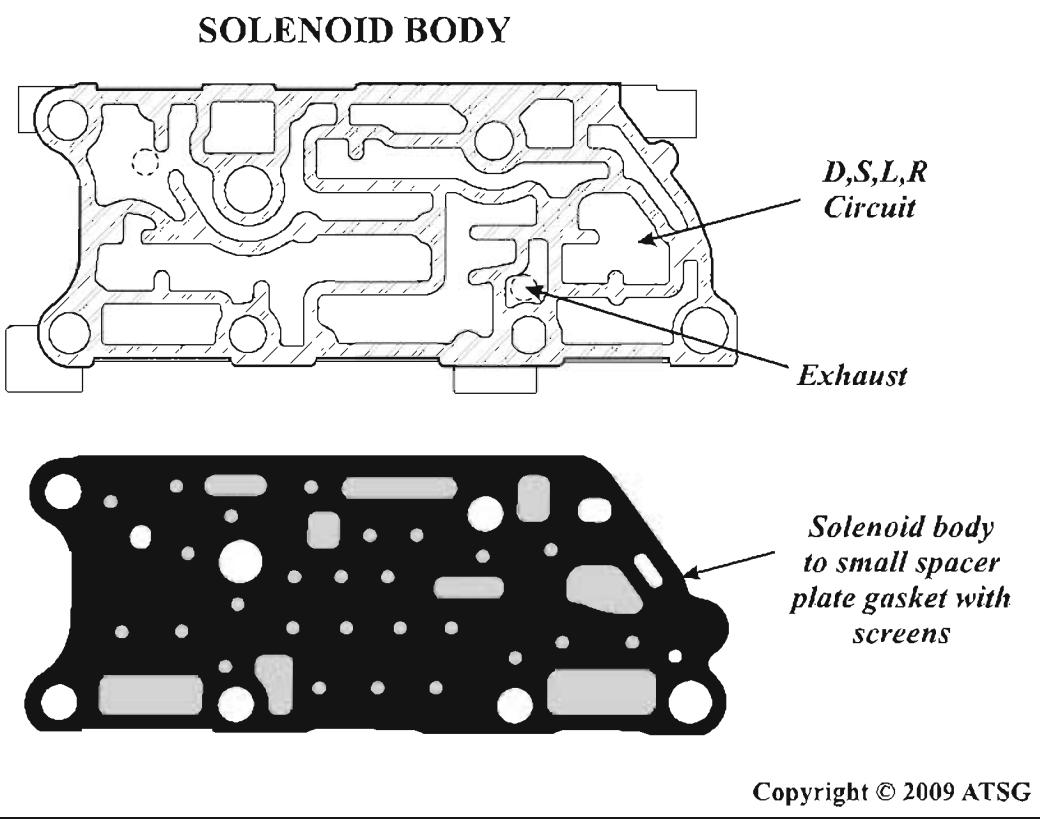
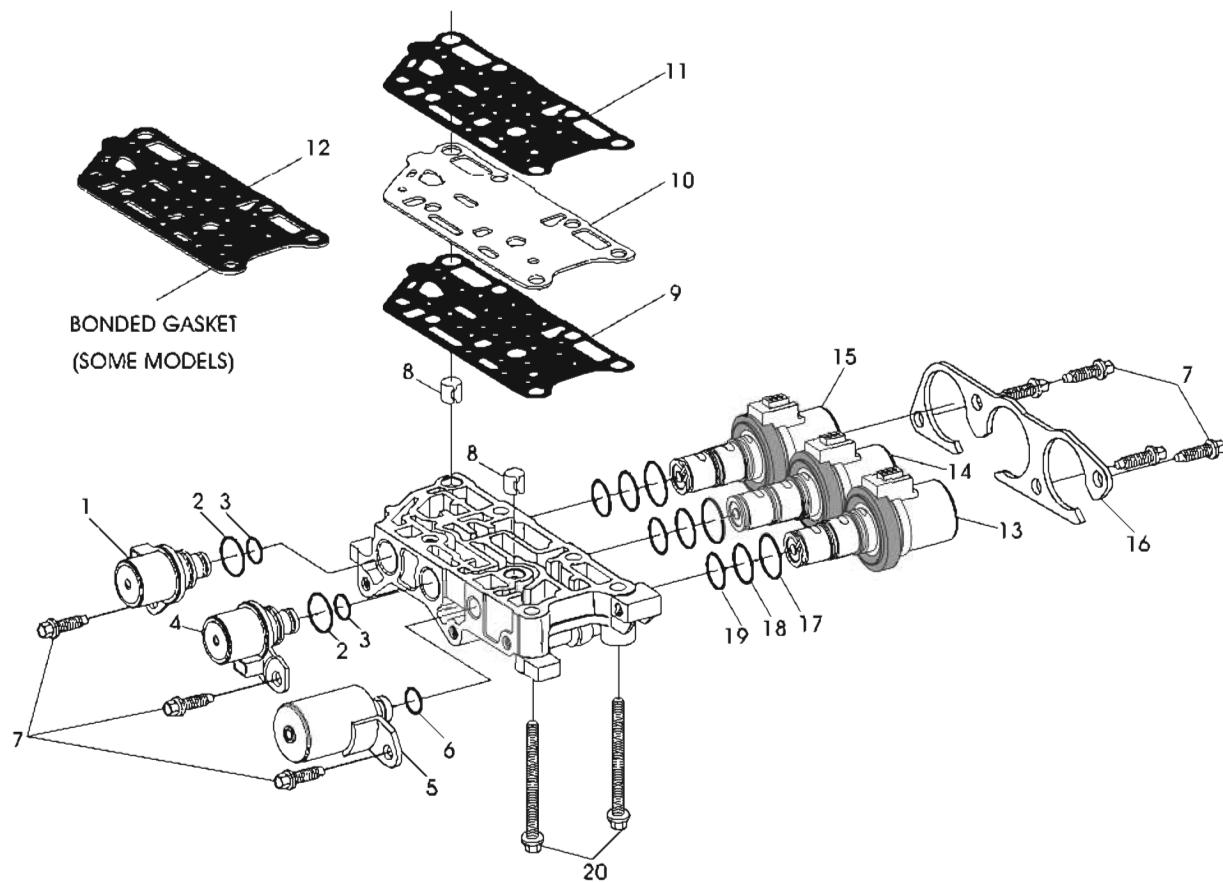


Figure 1

**SOLENOID BODY EXPLODED VIEW**


- 1 SHIFT SOLENOID "B"
- 2 SHIFT SOLENOID "A" AND "B" LARGE "O" RING SEAL
- 3 SHIFT SOLENOID "A" AND "B" SMALL "O" RING SEAL
- 4 SHIFT SOLENOID "A"
- 5 ELECTRONIC PRESSURE CONTROL (EPC) SOLENOID
- 6 EPC SOLENOID "O" RING SEAL
- 7 SOLENOID RETAINING BOLTS (7 REQUIRED)
- 8 SOLENOID BODY TO LOWER V. B. ALIGNMENT DOWELS (2 REQ)
- 9 SOLENOID BODY TO SPACER PLATE GASKET, WITH SCREENS
- 10 SOLENOID BODY SPACER PLATE
- 11 SOLENOID BODY SPACER PLATE TO LOWER V. B. GASKET
- 12 SPACER PLATE WITH BONDED GASKETS (SOME MODELS)
- 13 PWM SHIFT SOLENOID "C"
- 14 PWM SHIFT SOLENOID "E"
- 15 PWM SHIFT SOLENOID "D"
- 16 PWM SHIFT SOLENOID RETAINING PLATE
- 17 PWM SHIFT SOLENOID LARGE "O" RING SEAL (3 REQUIRED)
- 18 PWM SHIFT SOLENOID MEDIUM "O" RING SEAL (3 REQUIRED)
- 19 PWM SHIFT SOLENOID SMALL "O" RING SEAL (3 REQUIRED)
- 20 SOLENOID BODY TO CASE BOLTS, 71mm LENGTH (2 REQUIRED)
- 21 MANUAL SHIFT VALVE
- 22 SOLENOID BODY RETAINING BOLTS, 59MM LENGTH (5 REQUIRED)
- 23 UPPER VALVE BODY CASTING
- 24 VALVE BODY TO CASE SEALS (2 REQUIRED)
- 25 UPPER V. B. TO LOWER V. B. BOLTS, 32MM LENGTH (5 REQUIRED)
- 26 UPPER V. B. TO LOWER V. B. BOLTS, 40MM LENGTH (9 REQUIRED)

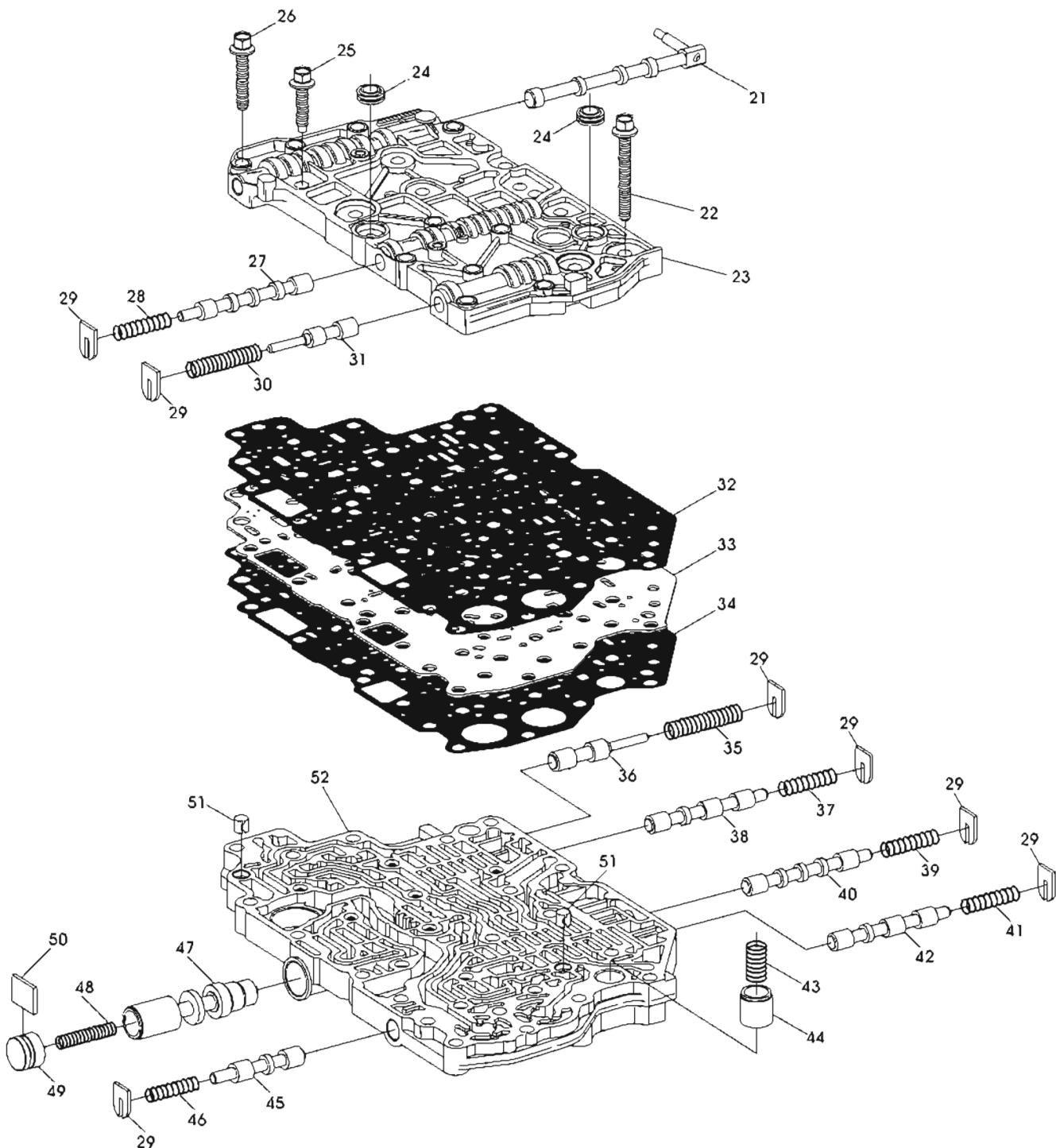
- 27 LOW/REVERSE SHIFT VALVE
- 28 LOW/REVERSE SHIFT VALVE SPRING
- 29 VALVE LINE-UP RETAINER (7 REQUIRED)
- 30 SOLENOID PRESSURE REGULATOR VALVE SPRING
- 31 SOLENOID PRESSURE REGULATOR VALVE
- 32 UPPER VALVE BODY TO SPACER PLATE GASKET
- 33 VALVE BODY SPACER PLATE
- 34 LOWER VALVE BODY TO SPACER PLATE GASKET
- 35 TORQUE CONVERTER RELIEF VALVE SPRING
- 36 TORQUE CONVERTER RELIEF VALVE
- 37 TORQUE CONVERTER CLUTCH CONTROL VALVE SPRING
- 38 TORQUE CONVERTER CLUTCH CONTROL VALVE
- 39 CLUTCH CONTROL VALVE SPRING
- 40 CLUTCH CONTROL VALVE
- 41 3-4 SHIFT VALVE SPRING
- 42 3-4 SHIFT VALVE
- 43 SHIFT SOLENOID "C" ACCUMULATOR SPRING
- 44 SHIFT SOLENOID "C" ACCUMULATOR PISTON
- 45 SOLENOID SHIFT VALVE
- 46 SOLENOID SHIFT VALVE SPRING
- 47 MAIN PRESSURE REGULATOR VALVE
- 48 MAIN PRESSURE REGULATOR VALVE SPRING
- 49 MAIN PRESSURE REGULATOR VALVE BORE PLUG
- 50 MAIN PRESSURE REGULATOR VALVE BORE PLUG RETAINER
- 51 LOWER V. B. TO UPPER V. B. ALIGNMENT DOWELS (2 REQUIRED)
- 52 LOWER VALVE BODY CASTING

Copyright © 2009 ATSG

Figure 2



## UPPER AND LOWER VALVE BODY EXPLODED VIEW



Solenoid Body and  
Legend Found in Figure 2



## FORD 4F27E 2-3 UP SHIFT CONCERNS

**COMPLAINT:** Before or after overhaul, a Ford vehicle equipped with the 4F27E transaxle may exhibit a complaint of a sliding or flared 2-3 up shift. The direct clutches or band may show signs of slipping by being darkened or burned.

**CAUSE:** One cause may be a worn servo bore in the case.

Refer to the partial hydraulic schematic shown in figure 1. The schematic illustrates that during the 2-3 up shift, shift solenoid E (PWM) is pulsed off by the PCM. When this occurs, line pressure from the manual valve is not exhausted at the solenoid. Instead it travels through the solenoid and is directed to the L/R shift valve. The fluid passes through the L/R shift valve and is then directed to the clutch control valve (*passes through the clutch control valve as direct clutch oil to apply the direct clutch*) and the 3-4 shift valve (*passes through the 3-4 shift valve as servo release pressure to release the 2-4 Band*).

When this transmission is commanded to make an up shift into 3rd gear, servo release pressure is fed to the spring side of the 2-4 band servo and direct clutch pressure is fed to the direct clutch. If the case is worn in the servo bore where the servo piston pin travels a leak will occur. If the leak becomes great enough, a reduction in direct clutch pressure may occur allowing the band to release before the direct clutch is fully applied, causing an over speed condition, or, the band may not release completely when the direct clutch is applied creating a slight tie up causing the band to burn.

**CORRECTION:** Repair the case servo bore using the reamer tool and bushing kit from "Northland Transmission."

In order to install the bushing in the case, it will be necessary to remove the oil pan, valve body assembly, and internal shifter linkage. The servo can then be removed and the boring tool installed to perform the fix. Refer to figure 2 for an exploded view of the servo and internal linkage parts.

### SERVICE INFORMATION:

Northland Transmission INC.  
105 E. Poplar Ave.  
Cameron, WI 54822  
Phone: 715-458-2617  
Fax: 715-458-2611  
Website: [www.servobore.com](http://www.servobore.com)



**THIRD GEAR  
TCC RELEASED**

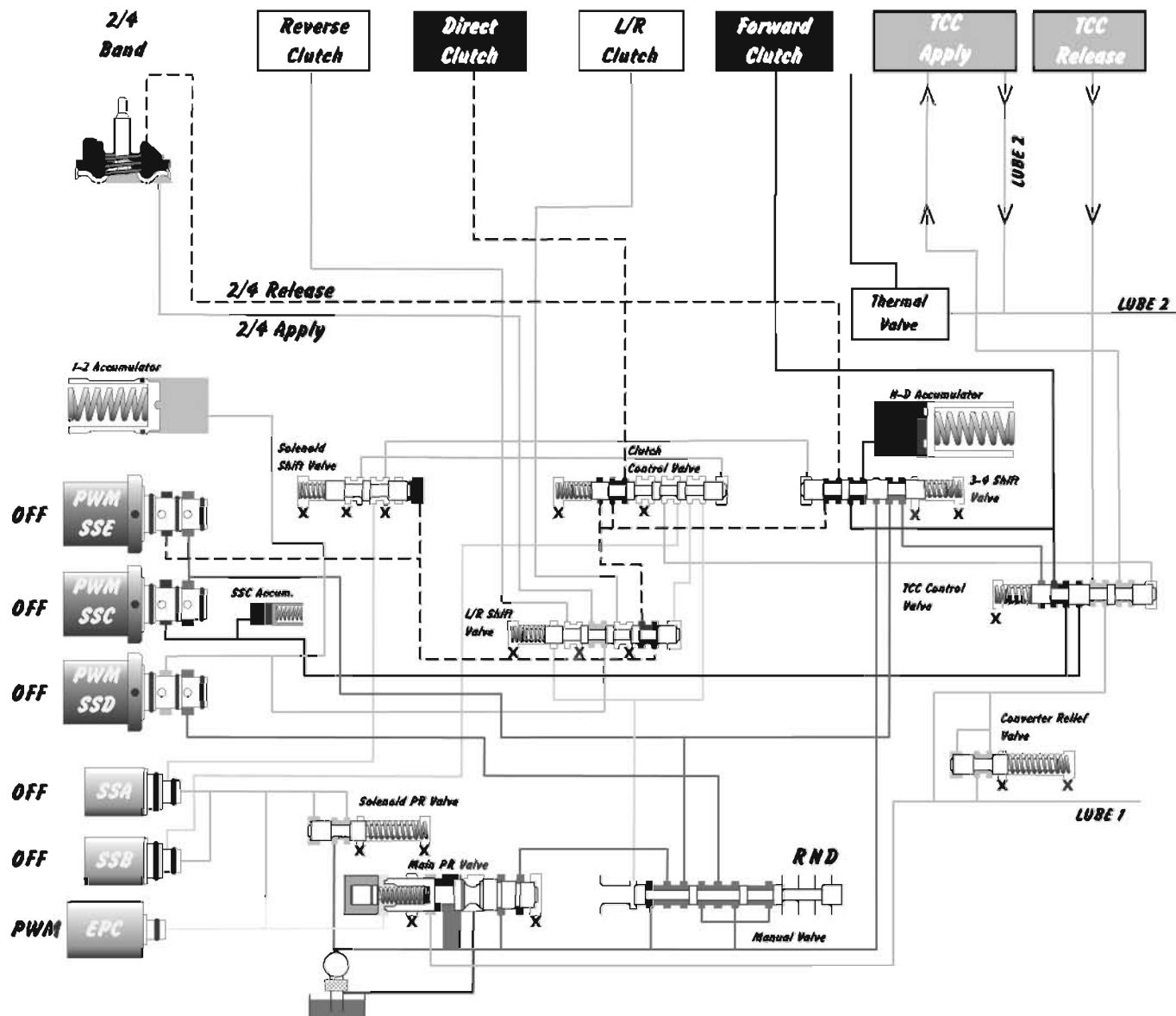
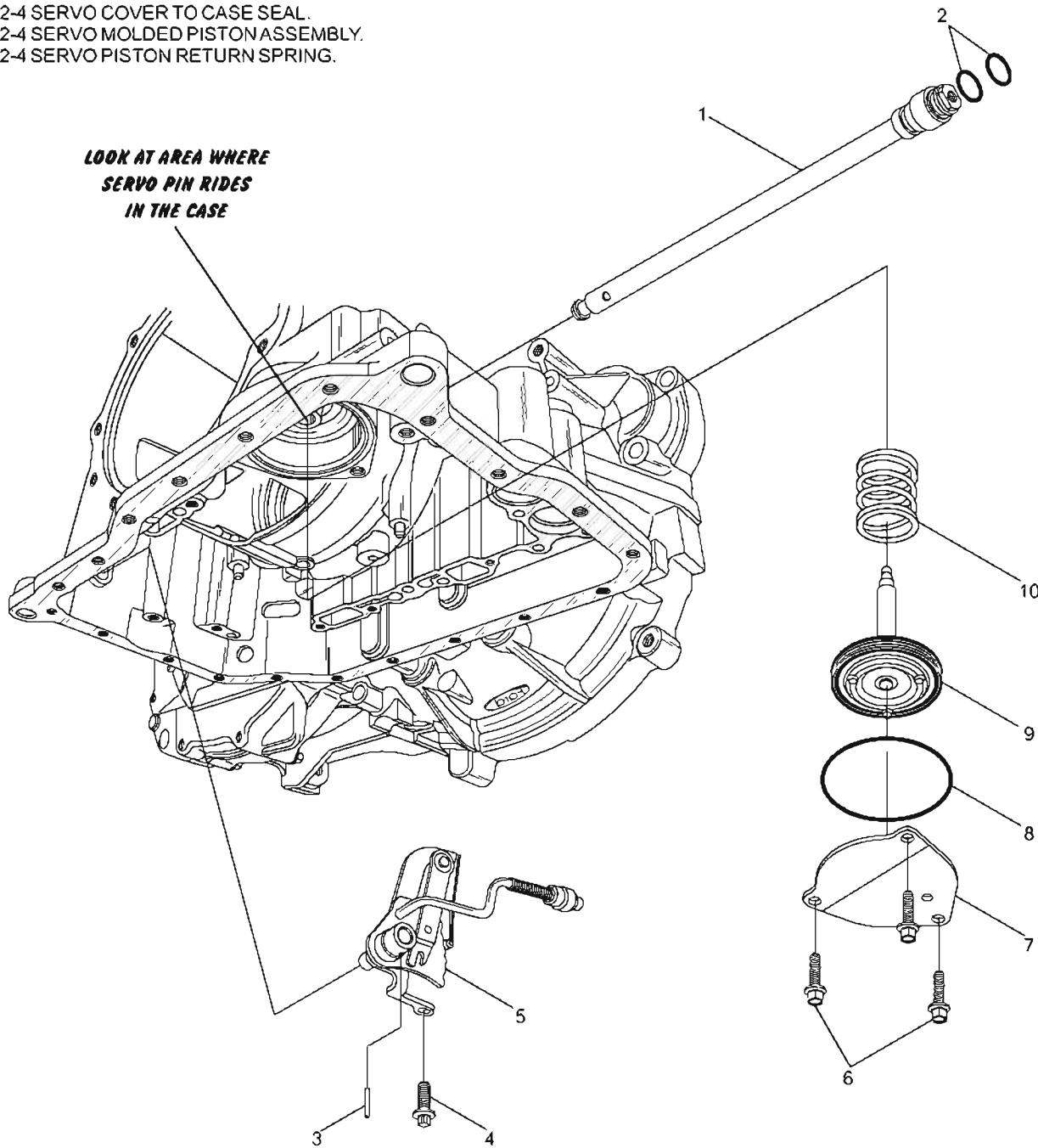


Figure 1

**SERVO AND INTERNAL LINKAGE PARTS EXPLODED VIEW**

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



## FORD/MAZDA FNRS/5NRS PRELIMINARY INFORMATION

Beginning at the start of production for the 2006 model year, four cylinder applications in Ford Fusion, Mercury Milan, Lincoln MKZ, Zephyr, and Mazda 3 and 6 series, now utilize a new version of the 4F27E/FN4A-EL transaxle which goes by the name of the FNRS/5NRS. This new transaxle has been redesigned to accommodate five forward ratios thru a new intermediate gear set. This gear set has been split up into a planetary assembly capable of placing the pinion shaft into a reduction, or 1:1 ratio. Mechanical control of the intermediate shaft is comprised of a reduction brake, a one-way roller clutch and a direct (5th) clutch. Hydraulic and electronic control of this new gear set are located under the pan on the side of the transmission. The TCM monitors applications, gear changes and ratios with the added forward clutch pressure switch and the intermediate shaft speed sensor, which reads the driven transfer gear. The TCM has incorporated Electronic Synchronous Shift Control (ESSC), which provides greater adaptive control of the shift elements to avoid abrupt gear changes and downshifts. The ESSC is also capable of adapting shift control as wear accumulates in the Transaxle to prolong it's life.

Refer to the following figures to see the changes that took place in the electronics, gear train, the added valve body, and the casing to make this possible.

*Refer to Figure 1 to see 4F27E/FN4A-EL and FNRS/5NRS application charts to show the similarity between them.*

*Refer to Figure 2 to see a view of the 4F27E/FN4A-EL and FNRS/5NRS for external identification, and location of the added Intermediate Shaft Speed Sensor.*

*Refer to Figure 3 to see the location of the Forward Clutch Pressure switch and it's function as well as pressure tap information on the front side of the case.*

*Refer to Figure 4 to see an exploded view of the Intermediate shaft and all of its components.*

*Refer to Figure 5 to see the power-flow of the Intermediate shaft in Reduction, 1st, 2nd, 3rd and 4th gears.*

*Refer to Figure 6 to see the power-flow of the Intermediate shaft in 1:1, 5th gear.*

*Refer to Figure 7 to see the Location of the Pressure Control Solenoid "B" and Shift solenoid "F" and their ohm test values.*

*Refer to Figure 8 to see case passage identification of the Secondary Valve Body.*

*Refer to Figure 9 for Main Case Rear Cover side Passage identification.*

*Refer to Figure 10 for Rear Cover Passage identification.*

*Refer to Figure 11 for Main Case Valve Body side Passage identification.*

*Refer to Figure 12 for Secondary Valve Body Passage identification.*

*Refer to Figure 13 for Hydraulic schematics of the Secondary Valve Body in Forward ranges 1st thru 4th Gears.*

*Refer to Figure 14 for Hydraulic schematics of the Secondary Valve Body in Forward ranges 5th Gear.*

*Refer to Figure 15 for Hydraulic schematics of the Secondary Valve Body in Reverse range, as well as a description of hydraulic flow.*



## TRANSAXLE COMPONENT APPLICATION CHART AND RATIO INFORMATION

## 4F27E/FN4A-EL TRANSAXLE COMPONENT APPLICATION CHART

RANGE	Forward Clutch	2nd-4th Band	Direct Clutch	Reverse Clutch	Low/Rev Clutch	Low One-Way Clutch	Gear Ratio
PARK							
REVERSE				ON	ON		2.65
NEUTRAL							
DRIVE-1st	ON					HOLD	2.82
DRIVE-2nd	ON	ON					1.50
DRIVE-3rd	ON		ON				1.00
DRIVE-4th		ON	ON				0.73
MANUAL-2nd	ON	ON					1.50
MANUAL-1st	ON				ON		2.82

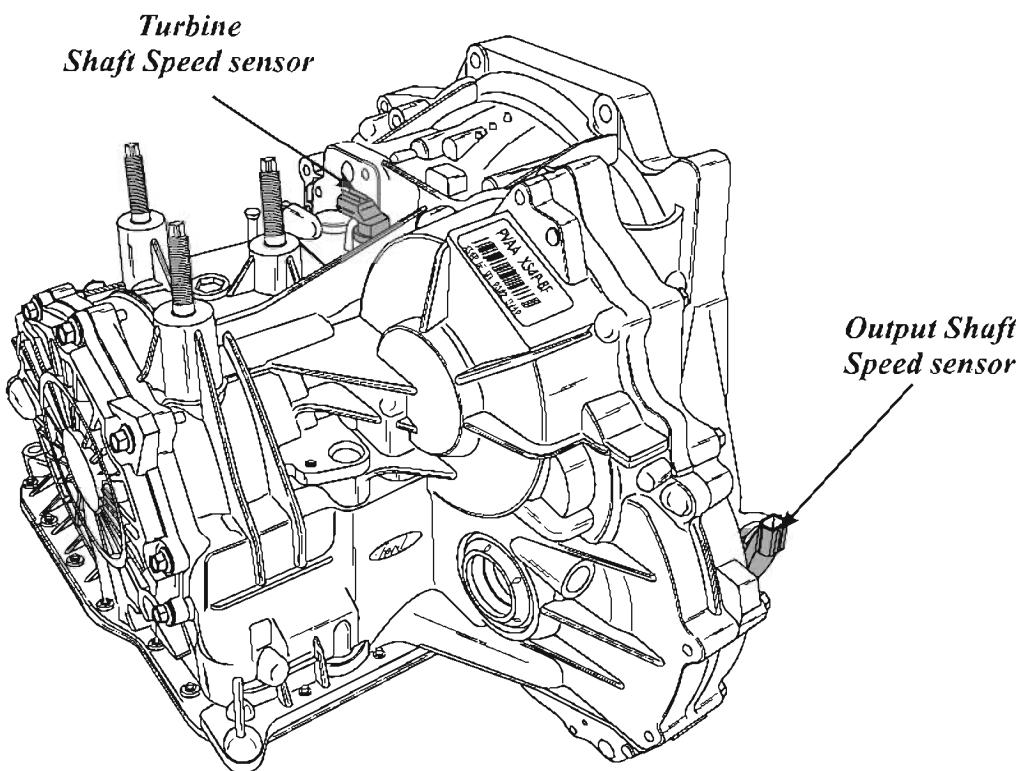
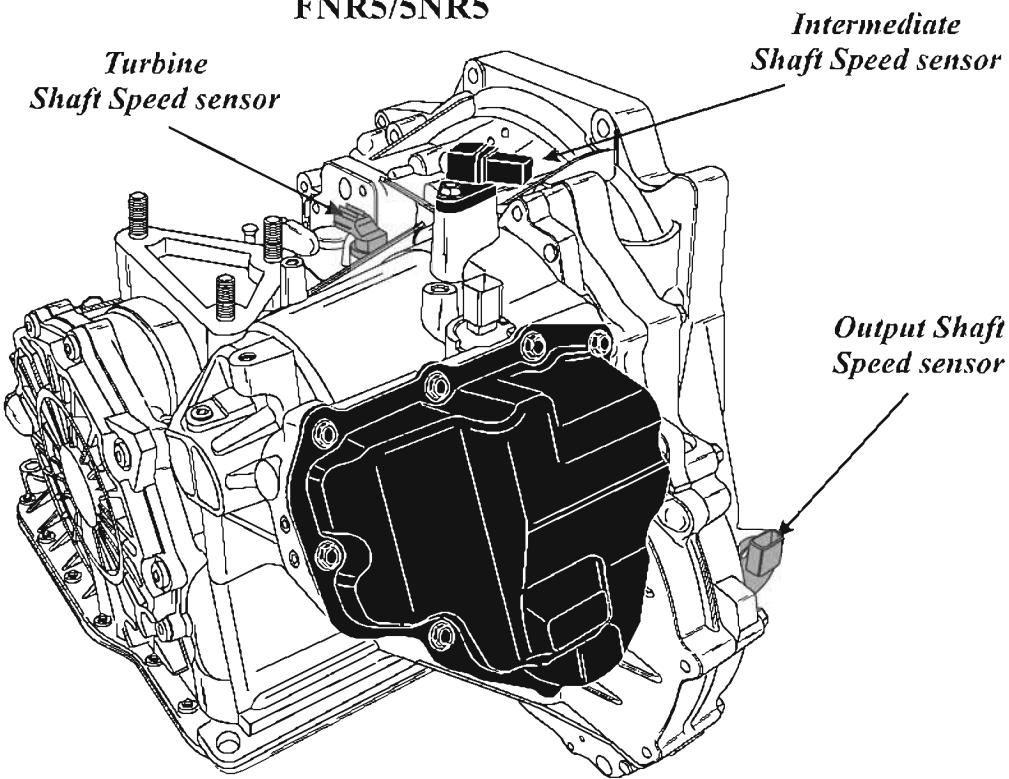
NOTE: Failsafe on this unit is 3rd gear in all forward ranges.

## FNR5/5NR5 TRANSAXLE COMPONENT APPLICATION CHART

RANGE	Forward Clutch	2-4 Brake Band	3rd&4th Clutch	Reverse Clutch	Low/Rev Clutch	Low One-Way Clutch	Direct Clutch 5th	Reduction Brake & OWC*	Gear Ratio
PARK								ON	
REVERSE				ON	ON			ON	3.40
NEUTRAL								ON	
DRIVE-1st	ON					HOLD		ON	3.61
DRIVE-2nd	ON	ON						ON	1.92
DRIVE-3rd	ON		ON					ON	1.28
DRIVE-4th		ON	ON					ON	0.93
DRIVE-5th		ON	ON				ON		0.69
MANUAL-2nd	ON	ON						ON	1.92
MANUAL-1st	ON				ON			ON	3.61

NOTE: Failsafe on this unit is 3rd gear in all forward ranges.

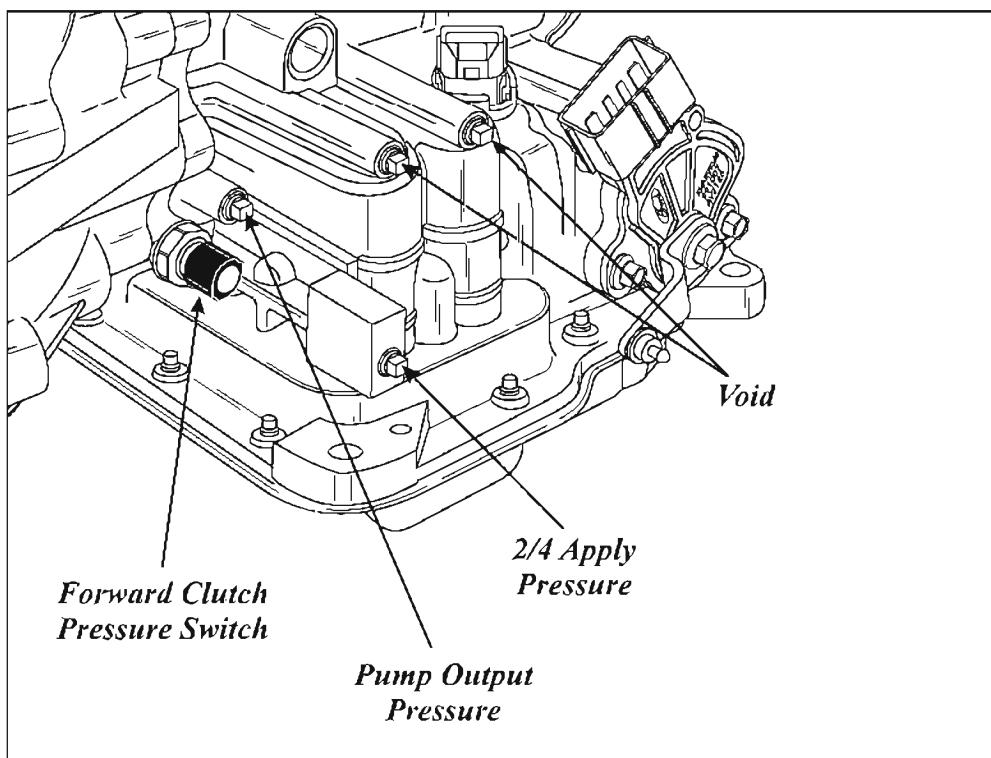
\*OWC = One Way Clutch, which is locked when the Reduction Brake is ON

FORD/MAZDA  
4F27E/FN4A-ELFORD/MAZDA  
FNR5/5NR5

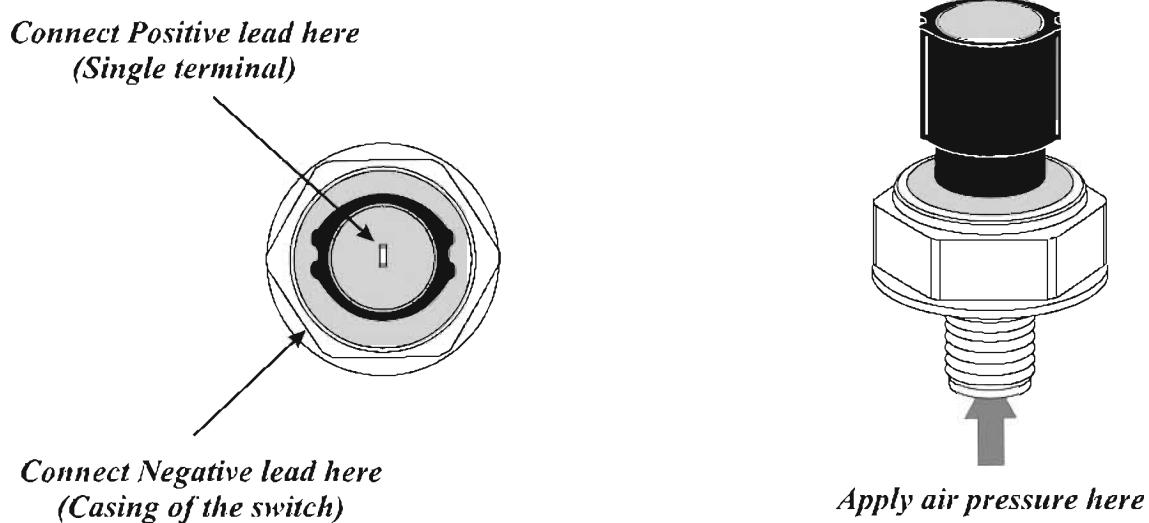
Copyright © 2009 ATSG

Figure 2  
Automatic Transmission Service Group

## FORWARD CLUTCH PRESSURE SWITCH LOCATION



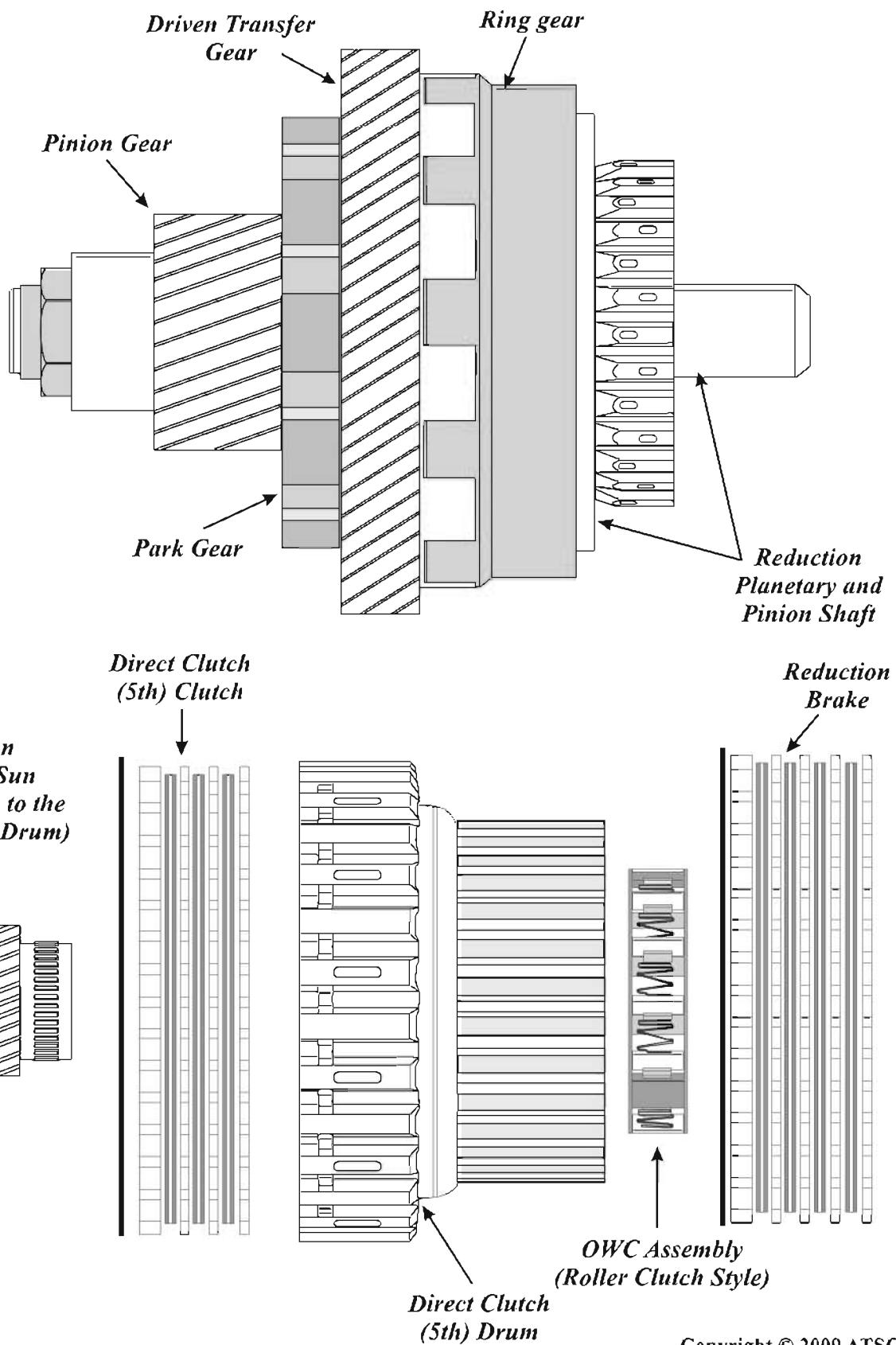
## FORWARD CLUTCH PRESSURE SWITCH OPERATION

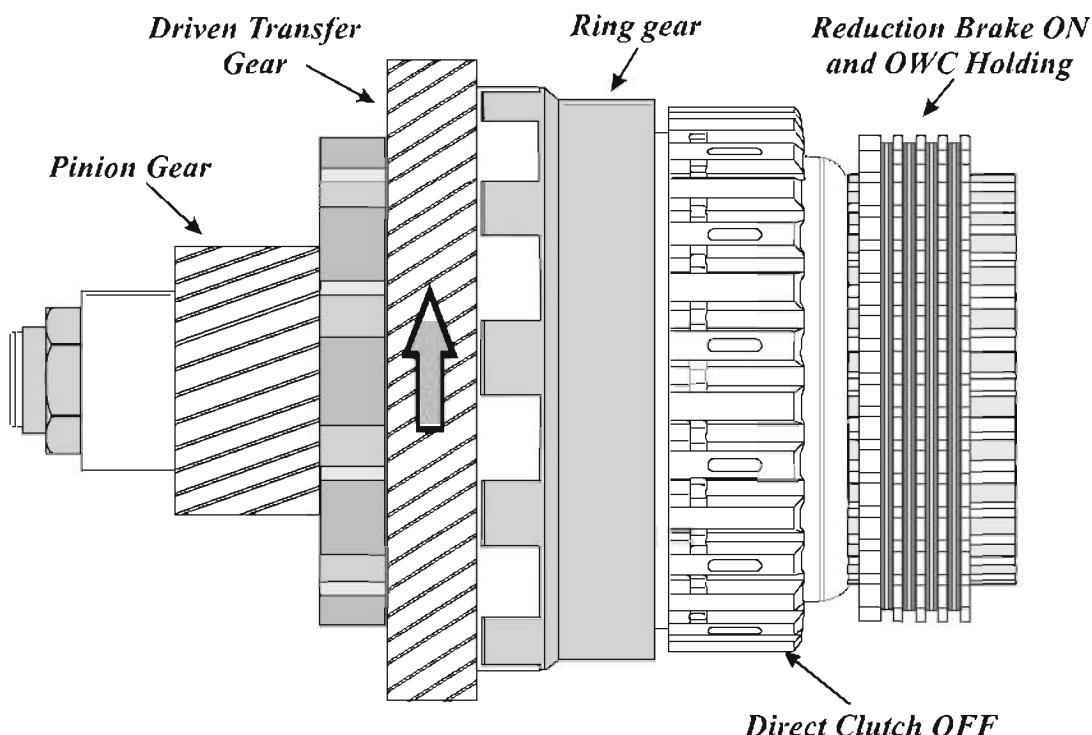


*The Forward Clutch Pressure switch is a Normally Open switch. It closes at approximately 40 psi. This switch provides information to the TCM during Drive engagement and for passing gear, to ensure smooth engagements and downshifts.*

Copyright © 2009 ATSG

Figure 3  
Automatic Transmission Service Group

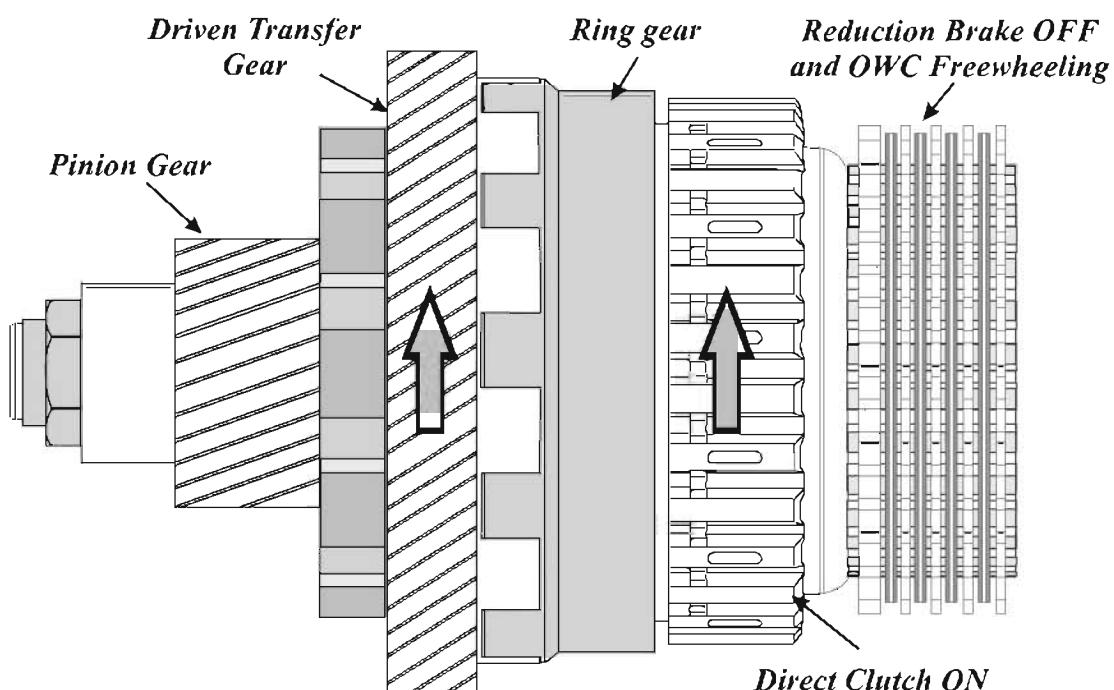
**INTERMEDIATE SHAFT COMPONENTS**


**REDUCTION 1st, 2nd, 3rd AND 4th GEARS**


*Summary: The Driven transfer gear drives the ring gear around the planetary pinions and the sun-gear which is held by the Direct Clutch housing creating a gear reduction.*

Copyright © 2009 ATSG

Figure 5

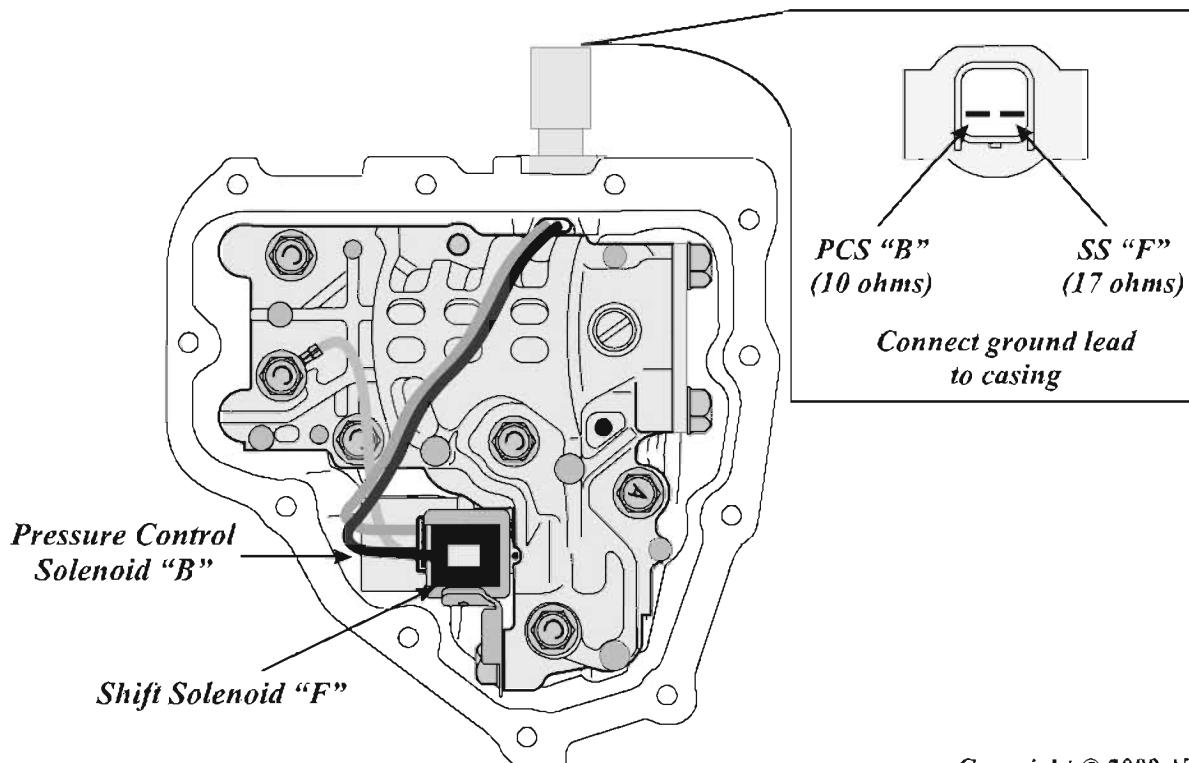
**1:1 5th GEAR**


*Summary: The Direct Clutch is ON and the Driven transfer gear drives the planetary at a 1:1 ratio.*

Copyright © 2009 ATSG

Figure 6

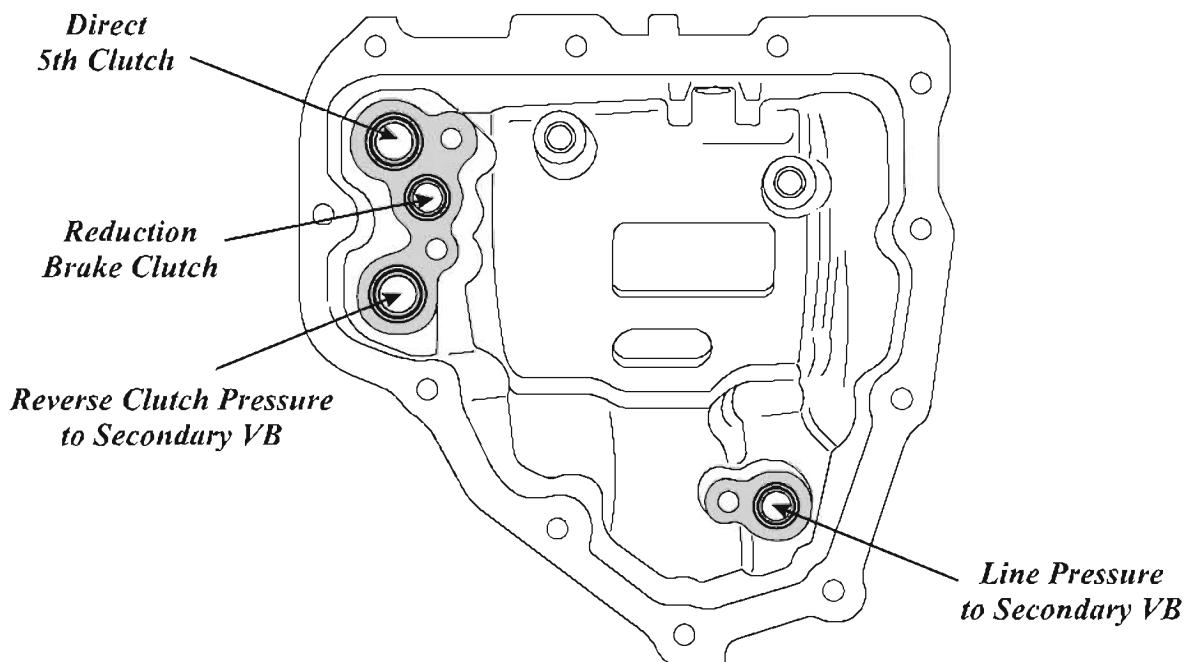
## SECONDARY VALVE BODY SOLENOID LOCATION



Copyright © 2009 ATSG

Figure 7

## SECONDARY VALVE BODY CASE PASSAGE IDENTIFICATION



Copyright © 2009 ATSG

Figure 8

# **IF IT COMES BACK, WHO GIVES A DAMN? WHAT YOU PAID FOR IT!**



Inside every TransTec® kit you'll always find the highest quality components, the most complete technical information and logical sub-packaging. Nobody makes transmission parts more dependable. Better parts and better performance means less chance of a comeback, so insist on rebuilding with the best. Insist on TransTec® kits from Freudenberg-NOK, the O.E. supplier with aftermarket vision.

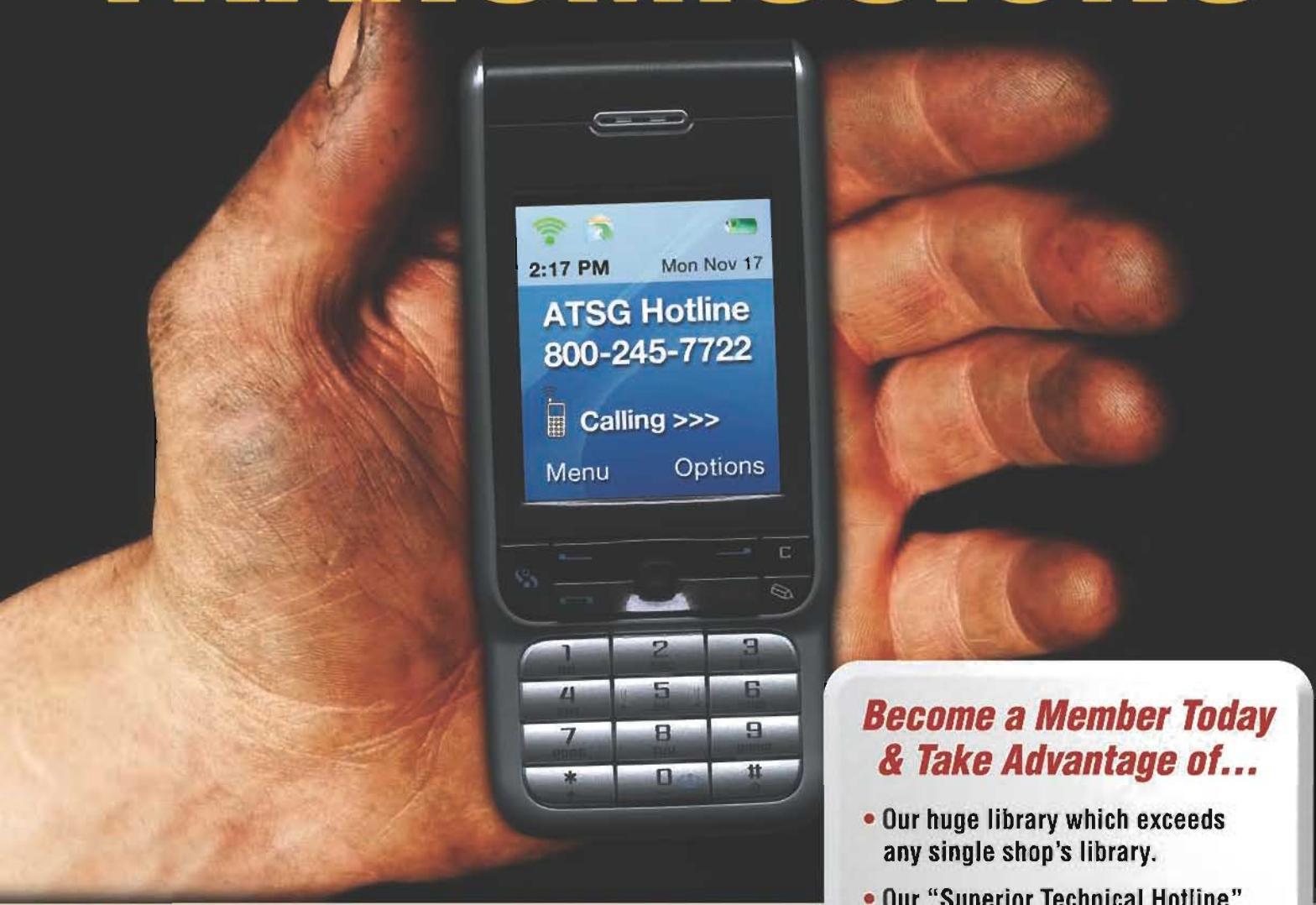
**TRANS**tec®



T: 419.499.2502 • F: 419.499.2804 • [www.TransTec.com](http://www.TransTec.com) • Milan, OH 44846

A Division of Freudenberg-NOK

# Your Most Valuable Tool to Fix TRANSMISSIONS



Thousands of transmission shops and general repair facilities world-wide count on the experienced staff and resources at ATSG to help them get the job done right and on time. All of ATSG's certified technicians have years of hands-on experience and are available to answer your tech problems on both foreign and domestic automatic transmissions.

In addition to our Technical Hotline, ATSG offers the latest Books, Software, Bulletins, Seminars and Technical Courses to the Automatic Transmission Professional.

So, stop turning away transmission repair work! ATSG is here to help you solve all your automatic transmission repair problems.

**Call us today at (800) 245-7722**  
or visit us online at  
**[www.atsg.biz](http://www.atsg.biz)**

## Become a Member Today & Take Advantage of...

- Our huge library which exceeds any single shop's library.
- Our "Superior Technical Hotline" which outranks the rest.
- 10 knowledgeable technicians which are there to assist you with any problems.
- The savings we provide by solving your transmission problems. One answered question can surpass the value of your subscription fee.

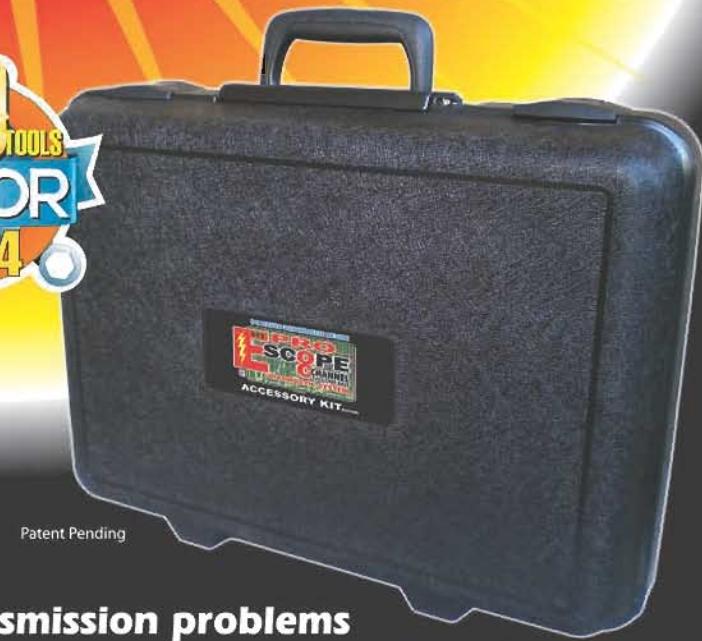


*Expert Help is Just a Phone Call Away.*

# Losing Valuable Diagnostic Time?

# ESCOPE PRO is the EASY Solution!

- Free Updates
- Live Internet Tech Support
- Complete Kit Ready for Use  
(with your PC)



Patent Pending

Transmission problems  
create defaults in milliseconds. Scan tools  
are useless in these conditions. The EScope Pro is the only  
scope that allows you to view 8 different inputs and outputs of the transmission  
controller on dual time bases; seeing transmission problems in seconds.

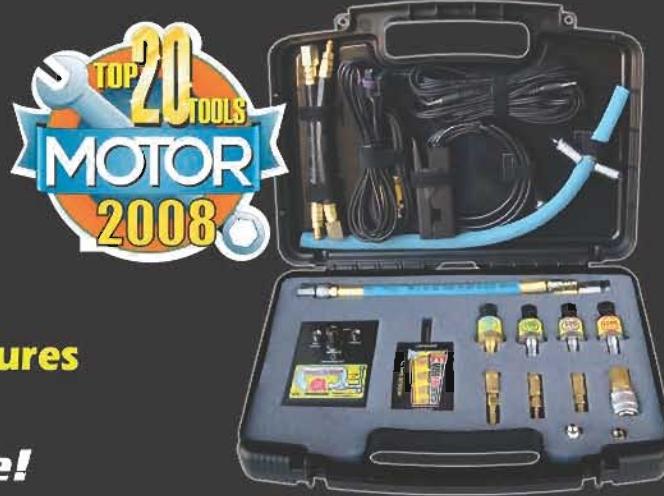
Increase the POWER of  
ESCOPE PRO with ATS  
PRESSURE TRANSDUCERS

ATS Transducers monitor hydraulic pressures  
while watching electronic controls.

Quick to Connect and Easy to Use!

Checks Camshaft Timing Through The Spark Plug Hole!

Checks Misfiring Cylinders Through The Exhaust Pipe!

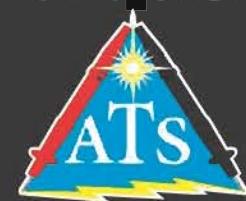


Patent Pending

The most POWERFUL diagnostic systems available!

**1-800-572-6112**

[www.AutomotiveTestSolutions.com](http://www.AutomotiveTestSolutions.com)



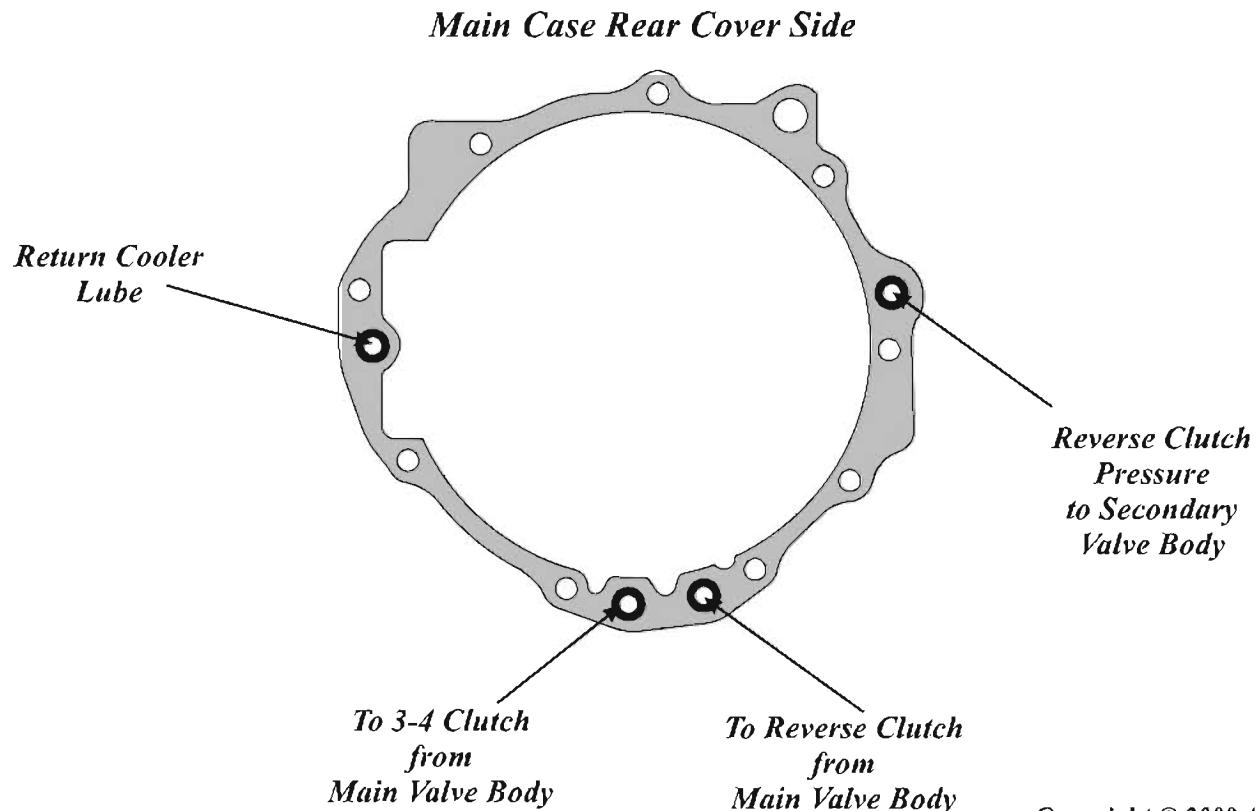
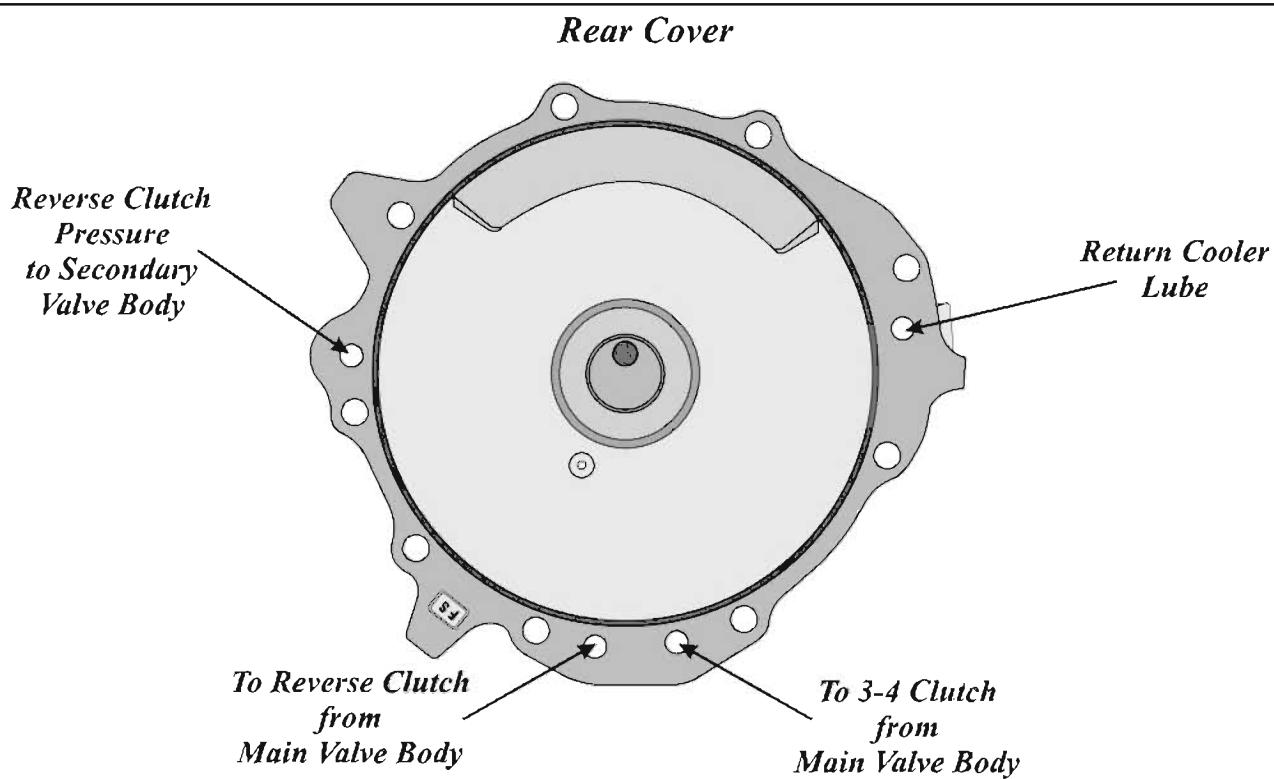


Figure 9



Copyright © 2009 ATSG

Figure 10

Automatic Transmission Service Group

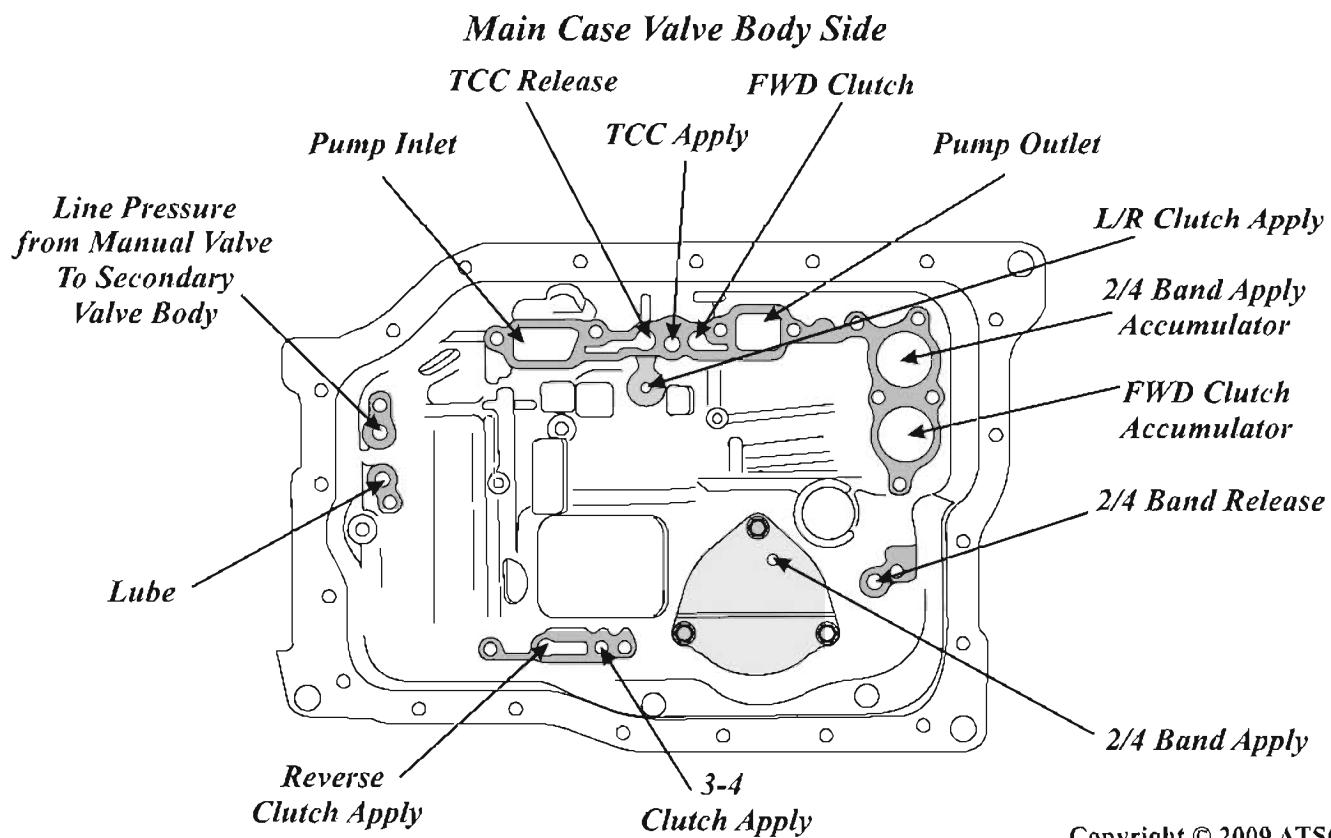
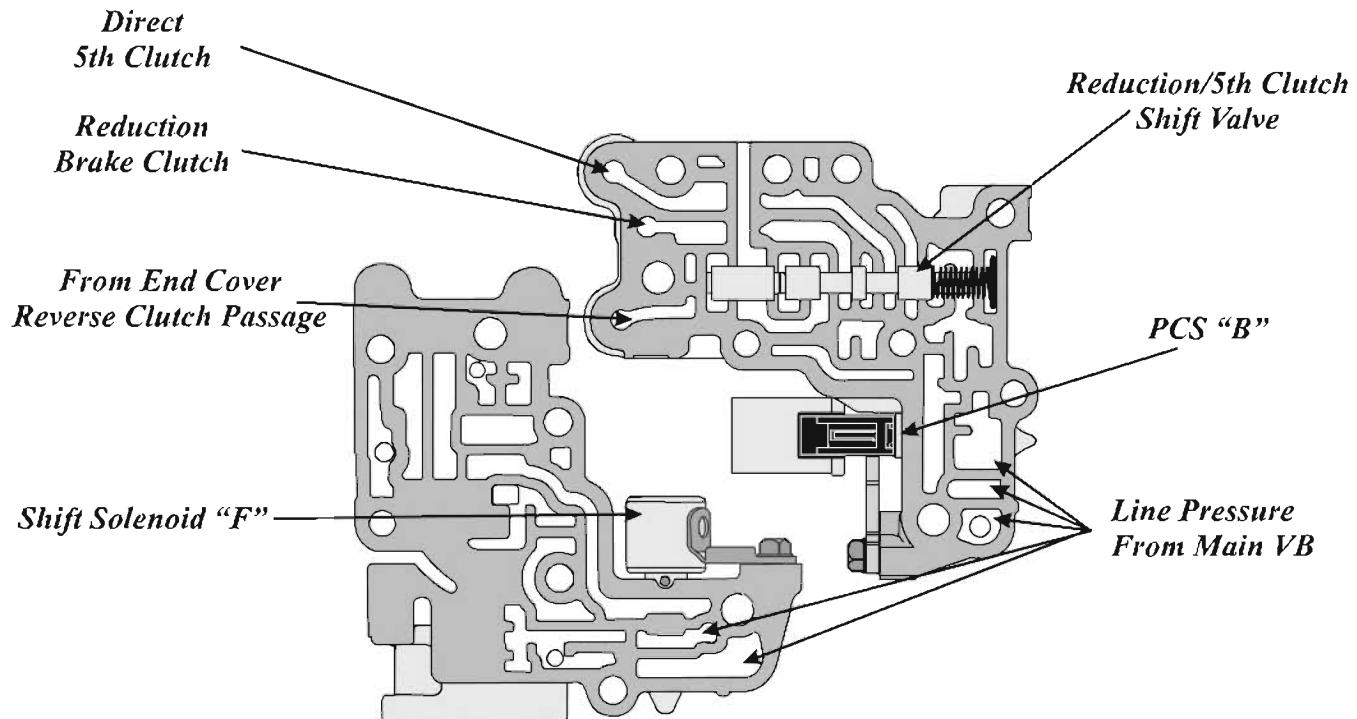


Figure 11

### Secondary Valve Body Assemblies

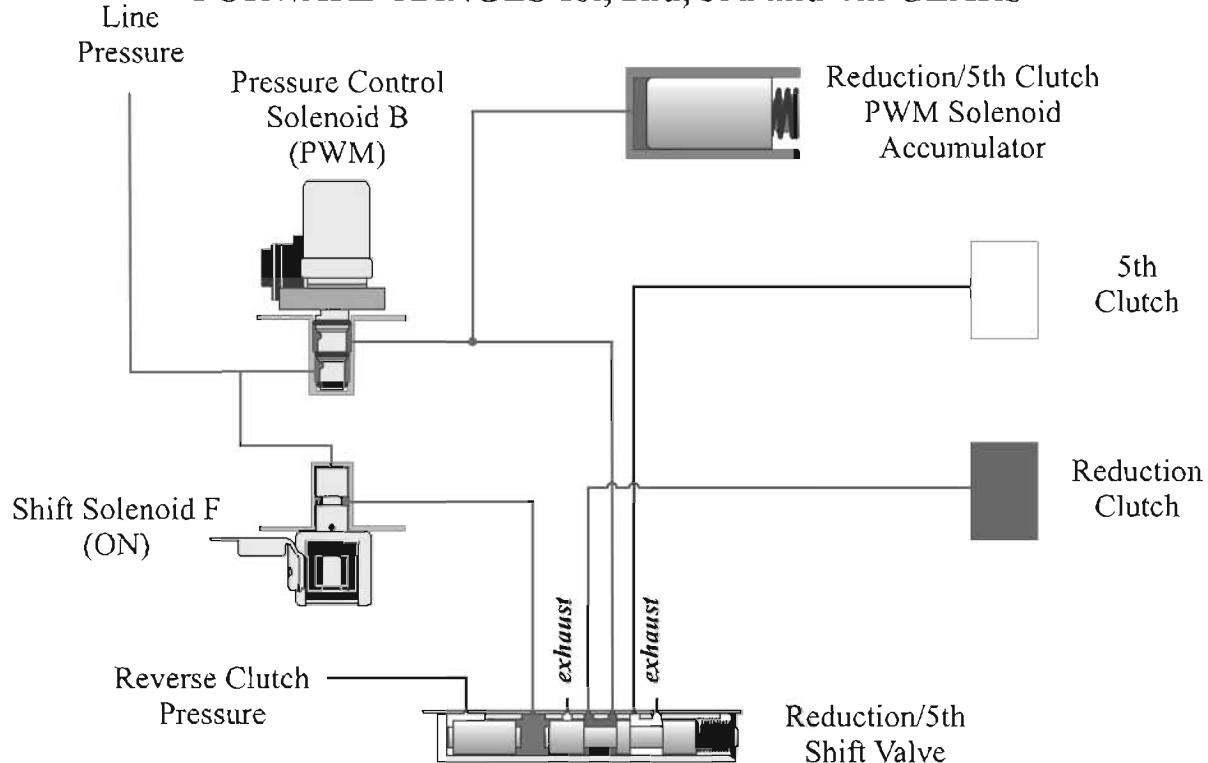


Copyright © 2009 ATSG

Figure 12



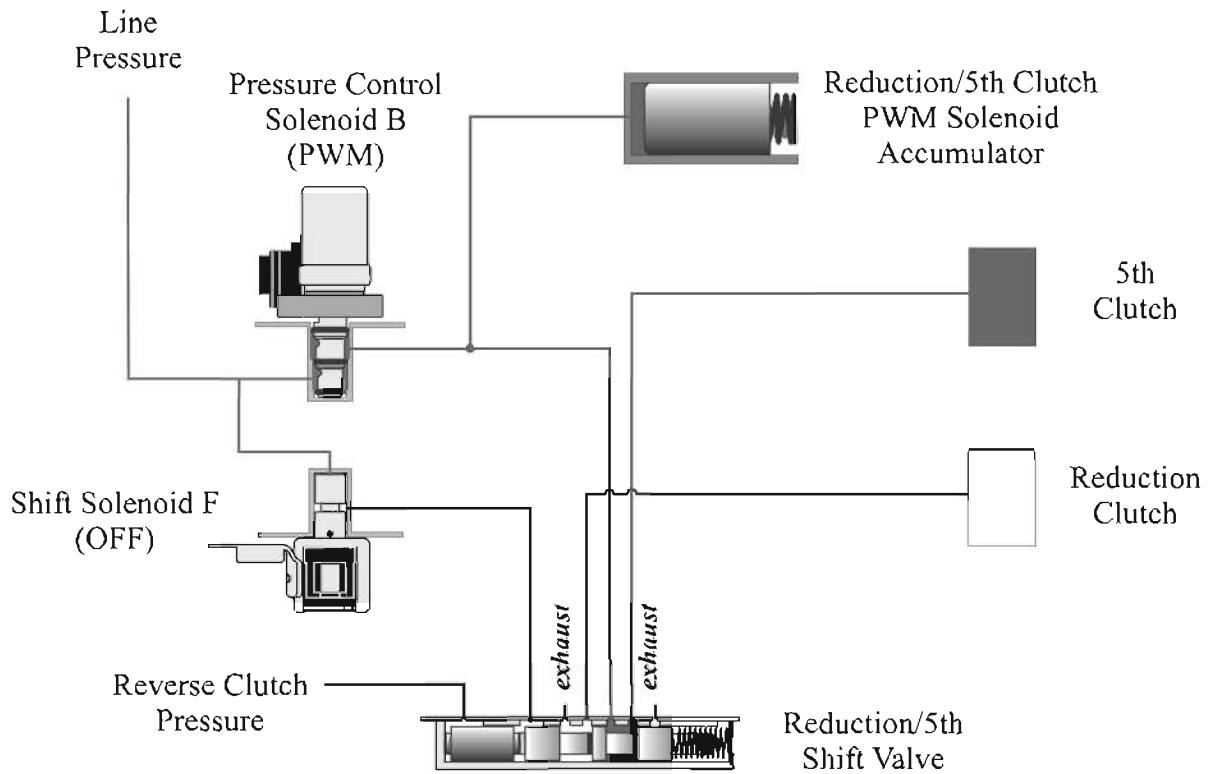
## FORWARD RANGES 1st, 2nd, 3rd and 4th GEARS



Copyright © 2009 ATSG

Figure 13

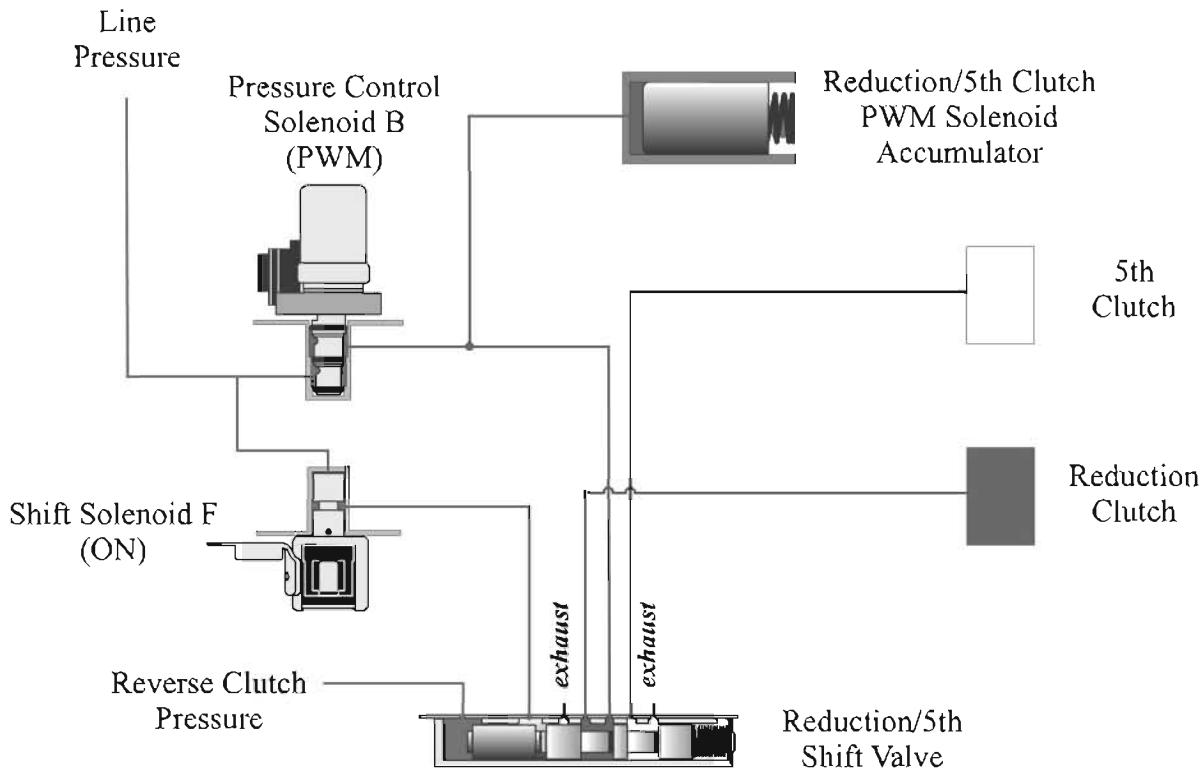
## FORWARD RANGE 5th GEAR



Copyright © 2009 ATSG

Figure 14

## REVERSE RANGE



Copyright © 2009 ATSG

Figure 15

**NOTE:** When the Reduction/5th clutch shift valve is held closed by spring tension, the valve is in the 5th clutch apply position. When the valve is stroked by Shift Solenoid F, the valve is in the Reduction clutch apply position. PCS B controls the apply of both clutches and a sprag assists in the 4-5 & 5-4 timing. The accumulator is used to absorb the pulsing from PCS B. Reverse clutch oil is used to stroke the Reduction/5th Clutch Shift Valve to ensure that the valve is in the Reduction Brake Clutch apply position and also allows for a Reverse engagement in failsafe conditions.

Many thanks for the good folks at Alto for providing ATSG with an FNR5 transmission.



## FORD FIVE HUNDRED/FREESTYLE/MONTEGO CFT30/CVT TRANSMISSION VARIOUS NOISES FROM THE CVT TRANSAXLE

**COMPLAINT:** Before or after overhaul, Ford Five Hundred/Freestyle/Montego vehicles equipped with the CVT transaxle may exhibit various noises as related to **FORD Technical Service Bulletin TSB 06-11-4.**

**COMPLAINT #1:** Vehicle may exhibit whining/thumping/knocking noise in park or neutral. Noise may also be apparent during driving. Refer to **CAUSE #1.**

**COMPLAINT #2:** Vehicle may exhibit a ticking noise on deceleration from approximately 20 MPH (32 Km/h) to a stop. Refer to **CAUSE #2.**

**COMPLAINT #3:** Vehicle may exhibit a whining noise on deceleration. Refer to **CAUSE #3.**

**CAUSE #1:** Whining/thumping/knocking noise in Park and Neutral or while driving, may be caused by mis-machining of the input shaft/front planetary carrier or flat spots on the input shaft/front planetary carrier roller bearing.

If noise is isolated to transaxle area, monitor the RPM of the turbine shaft speed sensor in PID (TSS\_SRC) using an appropriate scan tool. In Park and Neutral, (TSS\_SRC) should indicate RPM. When the transaxle is placed into either Reverse or Drive with brake applied, the (TSS\_SRC) RPM should drop to 0. If the noise is eliminated as the RPM drops to 0, proceed to **CORRECTION #1.**

**CAUSE #2:** A ticking noise on deceleration from approximately 20 MPH (32 Km/h) to a stop may be caused by the differential ring gear. On Front Wheel Drive (FWD) vehicles, if noise is isolated to the transaxle, proceed to **CORRECTION #2.** On All Wheel Drive (AWD) vehicles it may be necessary to isolate noise to the AWD or CVT system.

To isolate the CVT system, (*referring to appropriate factory manual*), remove the Power Transfer Unit (PTU) assembly, reinstall the halfshafts, disconnect the Differential Electronic Module (DEM) and road test vehicle. If the noise is eliminated, the noise is isolated to the All Wheel Drive (AWD) system. If noise is still present, proceed to **CORRECTION #2.**

*Special thanks to Sam  
at Powers Transmissions.*



# "2009" SEMINAR INFORMATION

26

Cont'd from previous page.

**CAUSE #3:** Gear whining noise during deceleration may be caused by the transfer gear assembly. Check for noise during following driving conditions:

Noise during deceleration 42 - 35 MPH (68 - 56 Km/h). *Noise loudest approximately 37 MPH (59 Km/h).*

Noise during deceleration 32 - 25 MPH (51 - 40 Km/h). *Noise loudest approximately 27 MPH (43 Km/h).*

Noise during deceleration 11 - 16 MPH (18 - 26 Km/h). *Noise loudest approximately 15 MPH (24 Km/h).*

If noise falls into one of the above categories, proceed to **CORRECTION #3**.

**CORRECTION #1:** Replace the input shaft roller bearing and related parts shown in figures 20-21. Refer to the disassembly and reassembly procedure on the following pages to properly disassemble and reassemble the Ford CVT transaxle for input shaft bearing replacement.

**CORRECTION #2:** Replace the differential assembly. The ring gear is not sold or serviced separately. Use the disassembly and reassembly procedure and refer to Figure 13 for proper disassembly and reassembly of the Ford CVT transaxle for the differential assembly. Refer to factory manual section 307-01A for proper shim and pre-load procedures for the differential assembly.

*Note: Inspect the mating surface of the transfer gear if the differential assembly is to be replaced. Replace as necessary.*

**CORRECTION #3:** Replace transfer gear assembly as shown in figure 18. Refer to the disassembly and reassembly procedure on the following pages to properly disassemble and reassemble the Ford CVT transaxle for transfer gear assembly.

## SERVICE INFORMATION:

Input Shaft/Front Planetary.....	7F9Z-7015-A
Input Bearing (Caged Needle Bearing).....	5F9Z-7N168-C
Input Bearing (Flat Needle Bearing).....	5F9Z-7D090-AA
Thrust Washer (2.8 mm, Selective).....	5F9Z-7D014-B
Sun Gear (Front Planetary).....	5F9Z-7D063-AA
Snap Ring (Sun Gear).....	5F9Z-7C122-C
Washer (Sun Gear).....	5F9Z-7D090-B
Differential Assembly AWD.....	5F9Z-7F465-AA
Differential Assembly FWD.....	5F9Z-7F465-BA
Differential Bearing Race.....	5F9Z-4222-BA
Differential Bearing Race.....	5F9Z-4222-CA
Side Shaft Gear Assembly 5.19 (Transfer Gear).....	7F9Z-7H348-A
Side Shaft Gear Assembly 5.24 (Transfer Gear).....	7F9Z-7H348-B
Dust Cap.....	5F9Z-7J309-AA
O-Ring.....	5F9Z-7L280-CA
Case Gasket.....	5F9Z-7B353-AA
Oil Pan Gasket.....	5F9Z-7A191-AA
Oil Filter.....	5F9Z-7A098-B

**SAFETY PRECAUTIONS**

*Service information provided in this procedure 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 to others.*

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

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

**TRANSAXLE DISASSEMBLY****EXTERNAL COMPONENTS**

1. This transaxle can be disassembled quite easily on a suitable workbench without the aid of any holding fixture for rotation, however the technician may prefer to utilize the transaxle holding fixture Ford Special Tool # 307-003 (T57L-500-B).
2. Remove the torque converter from transaxle as shown in figure 1.  
*Caution: The torque converter is heavy, use caution when removing to avoid personal injury or damage to torque converter.*
3. Using a #40 Torx bit, remove the transfer gear assembly attaching bolts (4 required) as shown in figure 2.
4. Remove the transfer gear assembly from the transaxle case by lifting straight up as shown in figure 2.

Continued on Next Page.

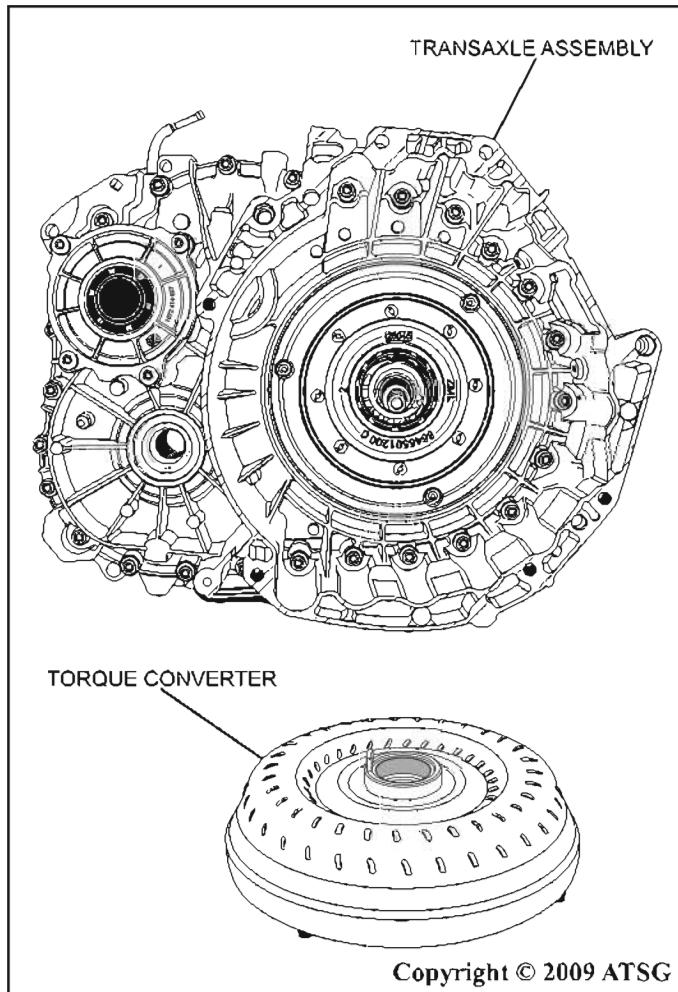


Figure 1

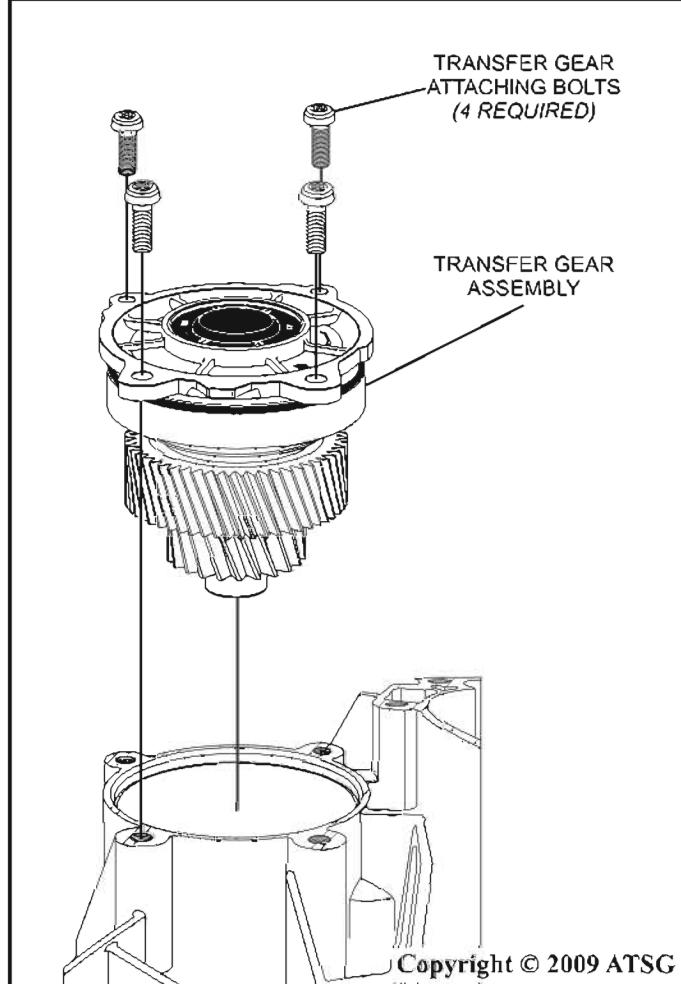


Figure 2

**TRANSAXLE DISASSEMBLY****EXTERNAL COMPONENTS**

5. Remove the outer shell hold down bolt from the transaxle case using a #27 Torx bit as shown in figure 3.
6. Rotate the outer shell in the direction of the arrow to unlock it from the mechatronic unit assembly as shown in figure 4.

*Note: Use care to not damage the pins of the mechatronic unit assembly or touch them when removing the outer shell. This could create electrostatic discharge and can cause damage to the mechatronic unit assembly.*

Continued on Next Page.

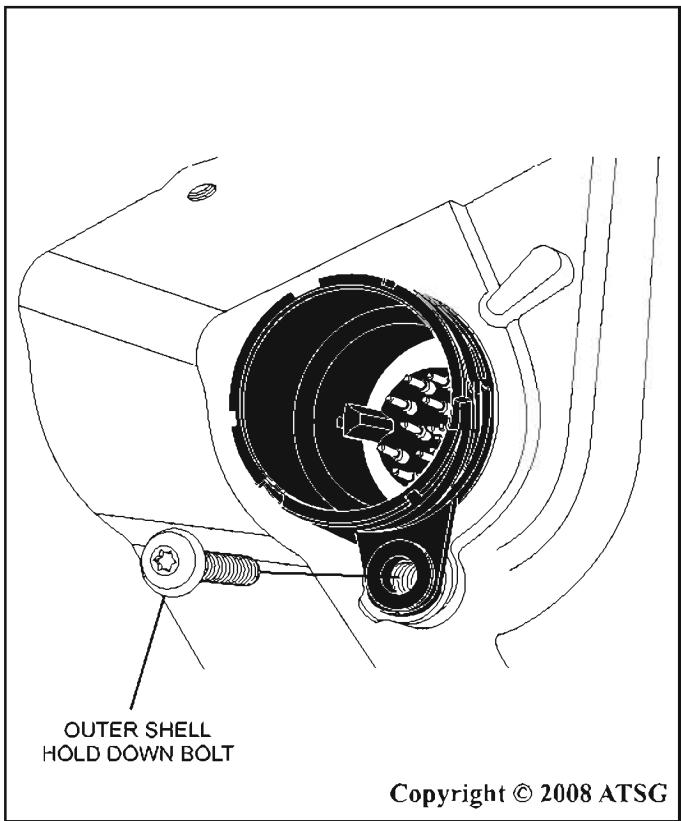


Figure 3

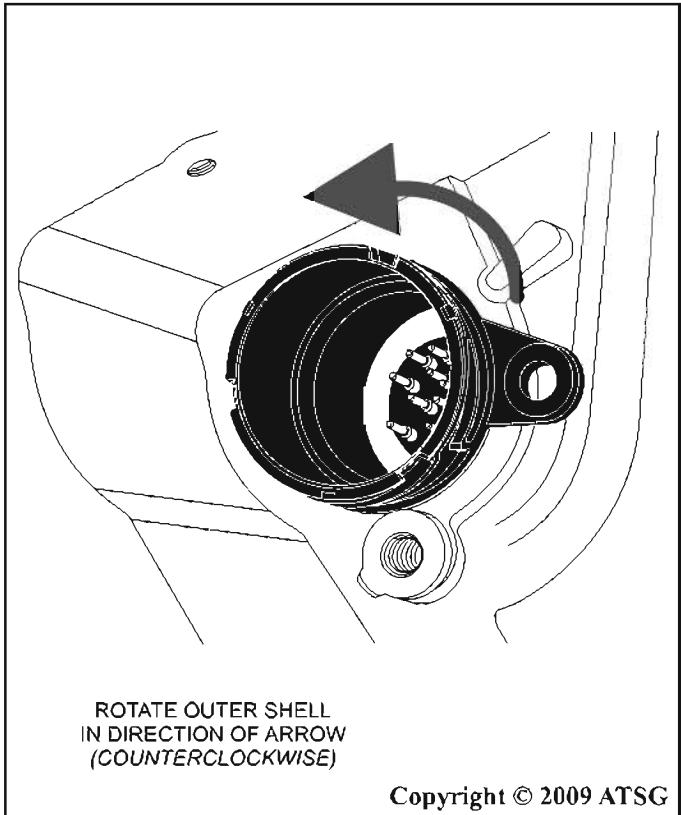


Figure 4

**TRANSAXLE DISASSEMBLY CONT'D**
**INTERNAL COMPONENTS**

7. Using a 5/16 socket, and suitable air wrench, remove the transaxle oil pan attaching bolts (*22 required*) as shown in figure 5.
8. Remove the transaxle oil pan by lifting straight up as shown in figure 5.
9. Remove the transaxle oil pan gasket and discard as shown in figure 5.
10. Remove the transaxle oil filter by twisting and lifting straight up and discard filter as shown in figure 6.
11. If filter seal remains in the case, carefully remove using a small scribe or screwdriver using care to not scratch the case surface, and discard the seal.

Continued on Next Page.

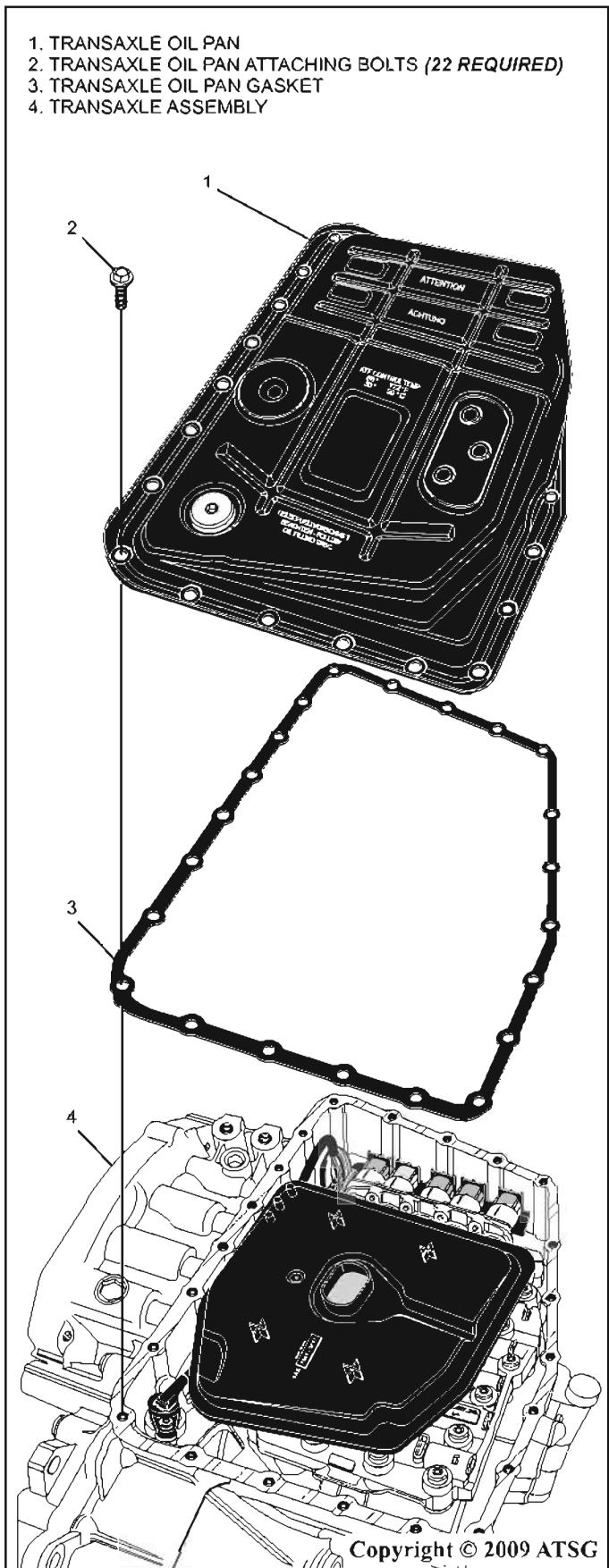


Figure 5

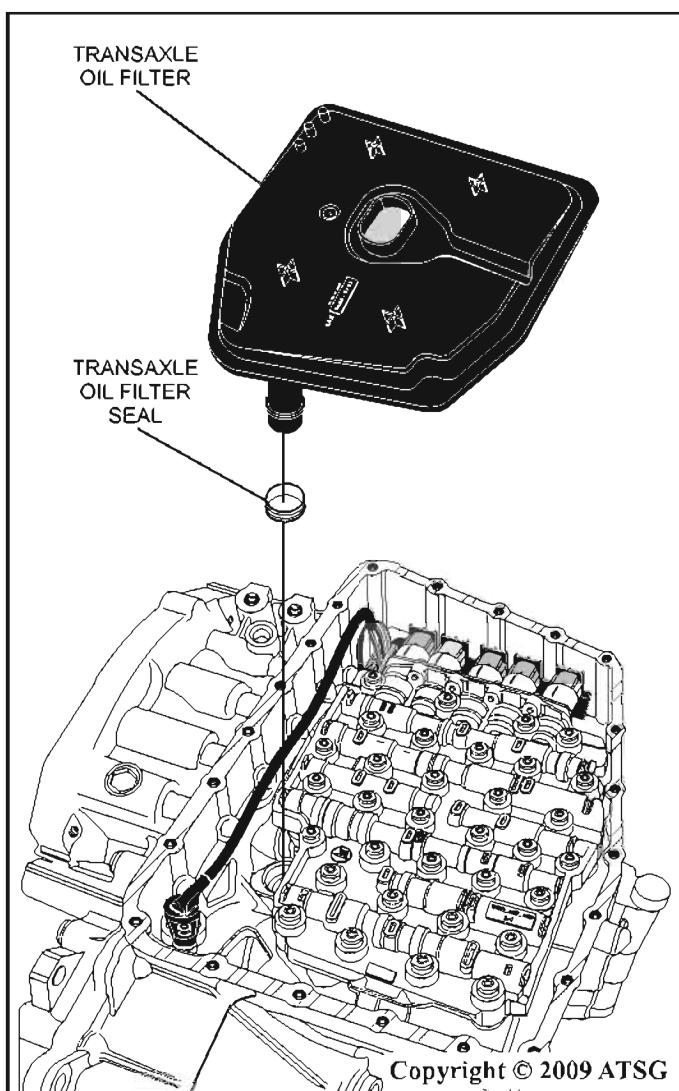


Figure 6

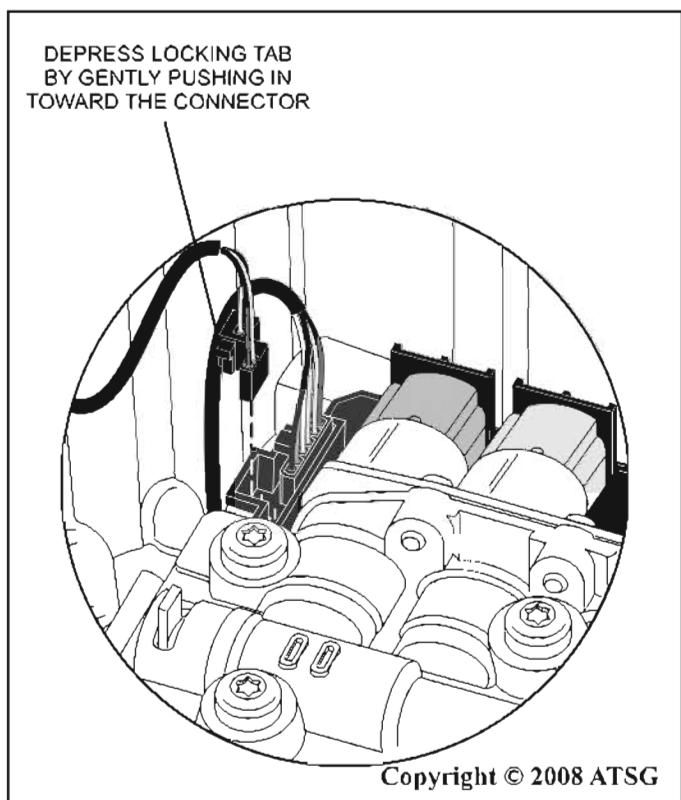


Figure 7

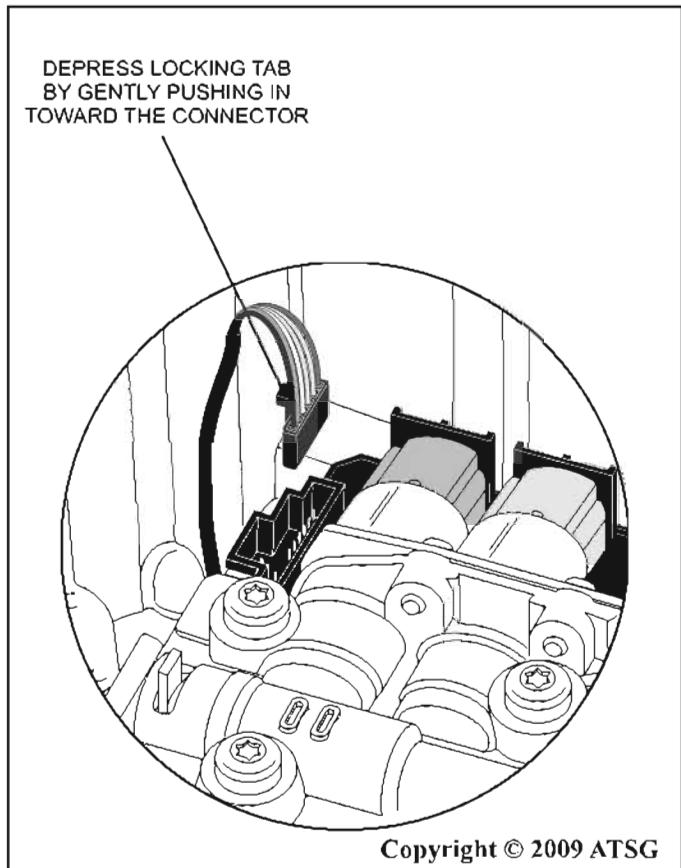


Figure 8

## TRANSAXLE DISASSEMBLY CONT'D

### INTERNAL COMPONENTS

12. Depress the locking tab for the output shaft speed sensor connector by pressing in toward the connector gently and carefully remove the connector by lifting straight up as shown in figure 7.
- 13 Depress the locking tab for the transmission range sensor by pressing toward the connector gently and carefully remove the connector by lifting straight up as shown in figure 8.
14. Remove the output speed sensor hold down bolt using a #27 Torx bit as shown in figure 9.
15. Remove the output speed sensor with a twisting motion lifting upward and remove the output speed sensor spacer as shown in figure 9.

Continued on Next Page.

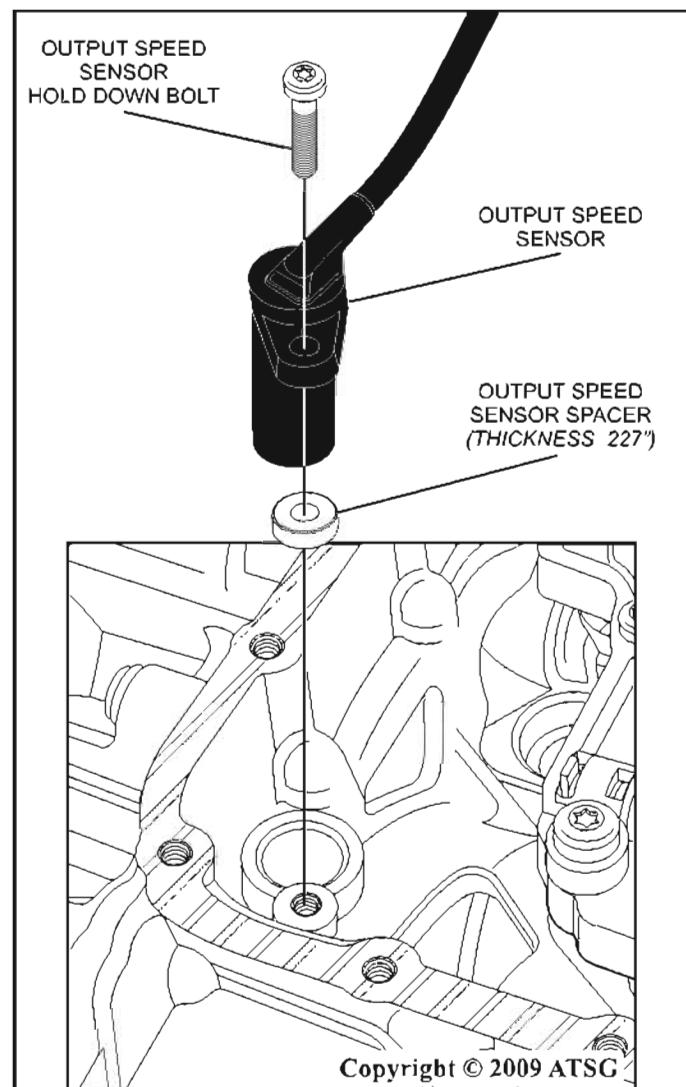


Figure 9



## TRANSAXLE DISASSEMBLY CONT'D

## INTERNAL COMPONENTS

16. Using a #40 Torx bit, remove the mechatronic unit assembly attaching bolts  
*(8 required)* as shown in figure 10.
17. Remove the torque converter clutch feed tube from the case as shown in figure 11.
18. Remove the main pump pressure feed tube from the case as shown in figure 11.
19. Remove the secondary pressure feed tube from the case as shown in figure 11.
20. Remove the primary pressure feed tube from the case as shown in figure 11.
21. Remove the manual valve supply feed tube from the case as shown in figure 11.

Continued on Next Page.

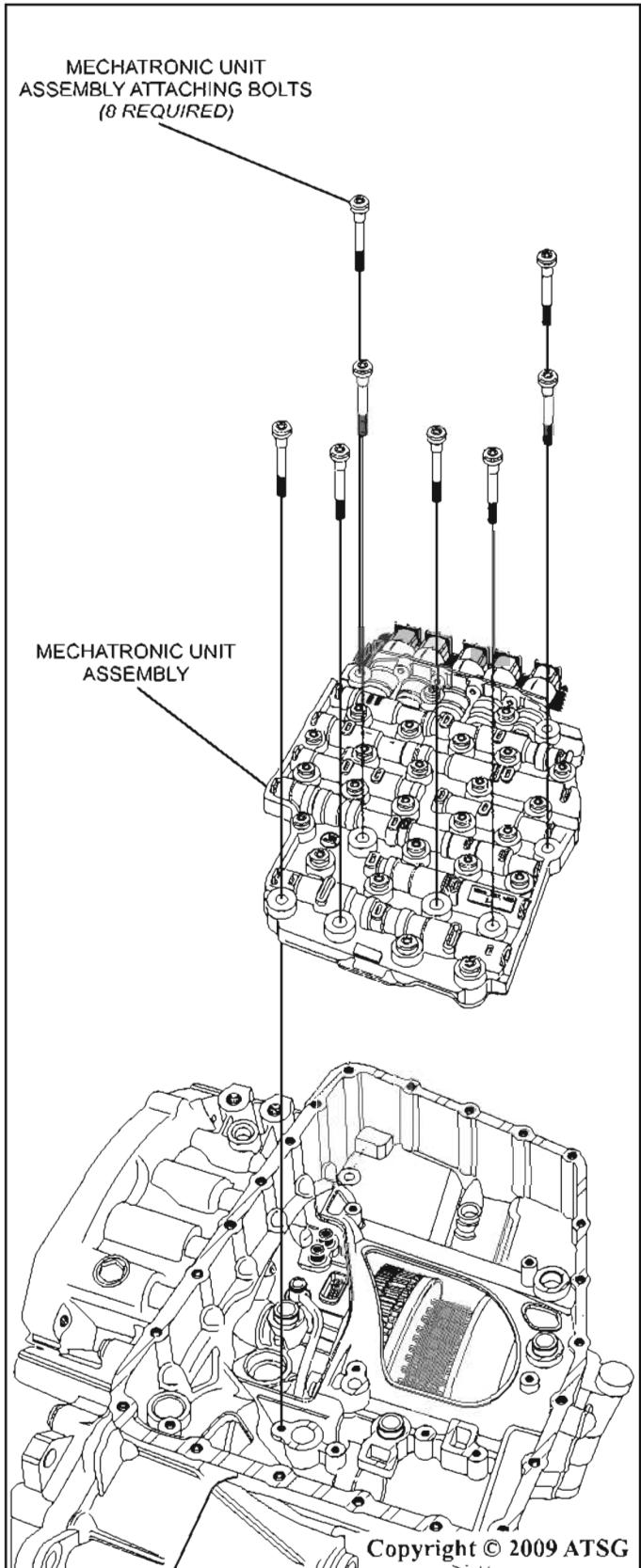


Figure 10

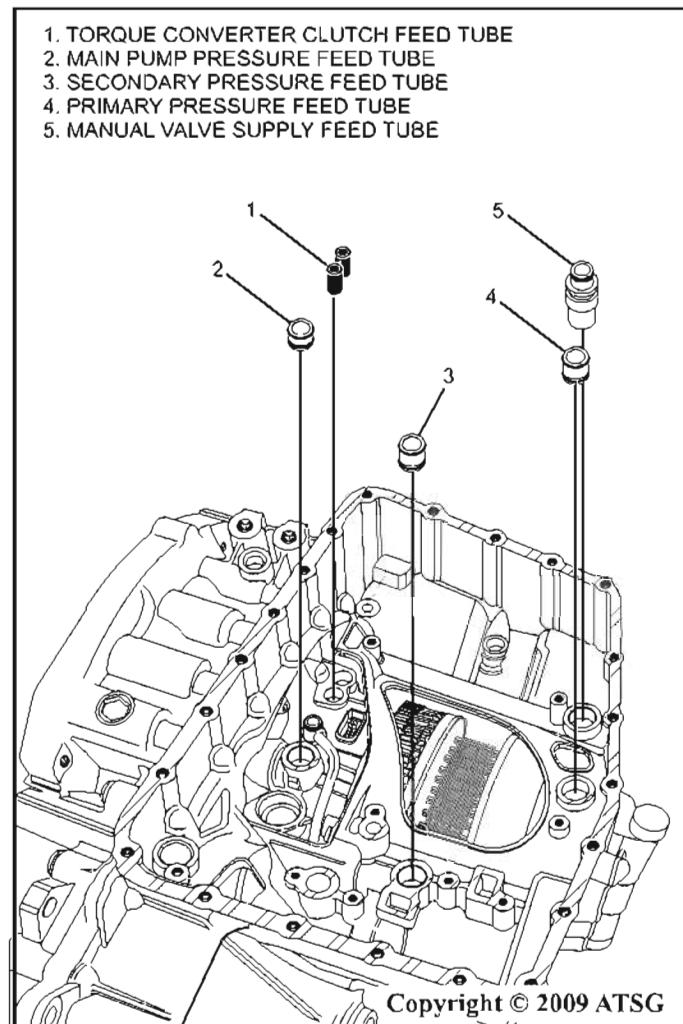


Figure 11

**TRANSAXLE DISASSEMBLY CONT'D****INTERNAL COMPONENTS**

22. Using a #45 Torx bit, remove the transaxle converter housing attaching bolts (*26 required*) as shown in figure 12.
23. Using two screwdrivers, remove the transaxle converter housing from the transaxle by lifting straight up.
24. Remove the differential carrier assembly by lifting straight up as shown in figure 13.

Continued on Next Page.

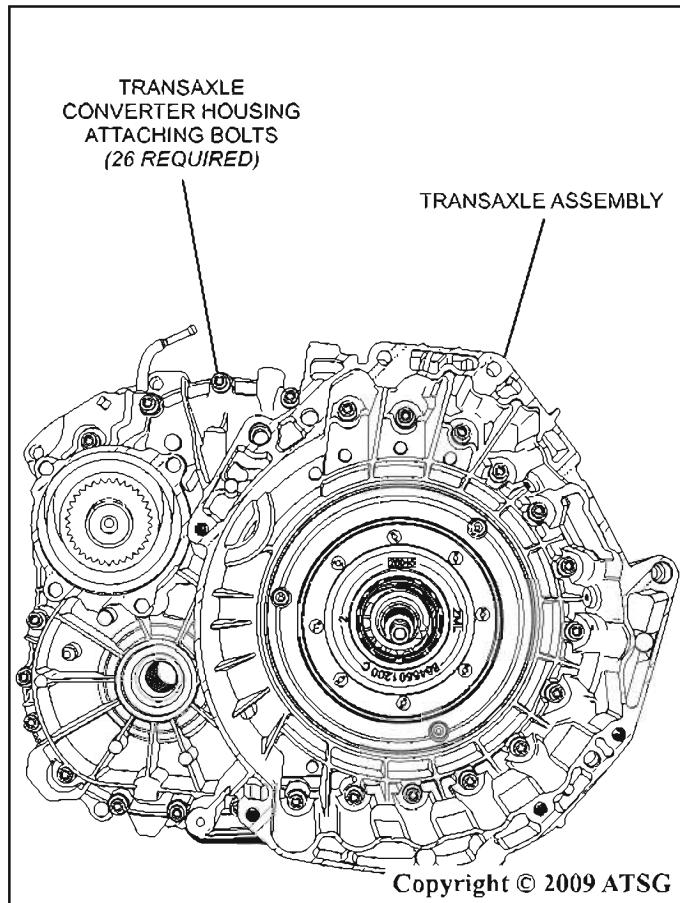


Figure 12

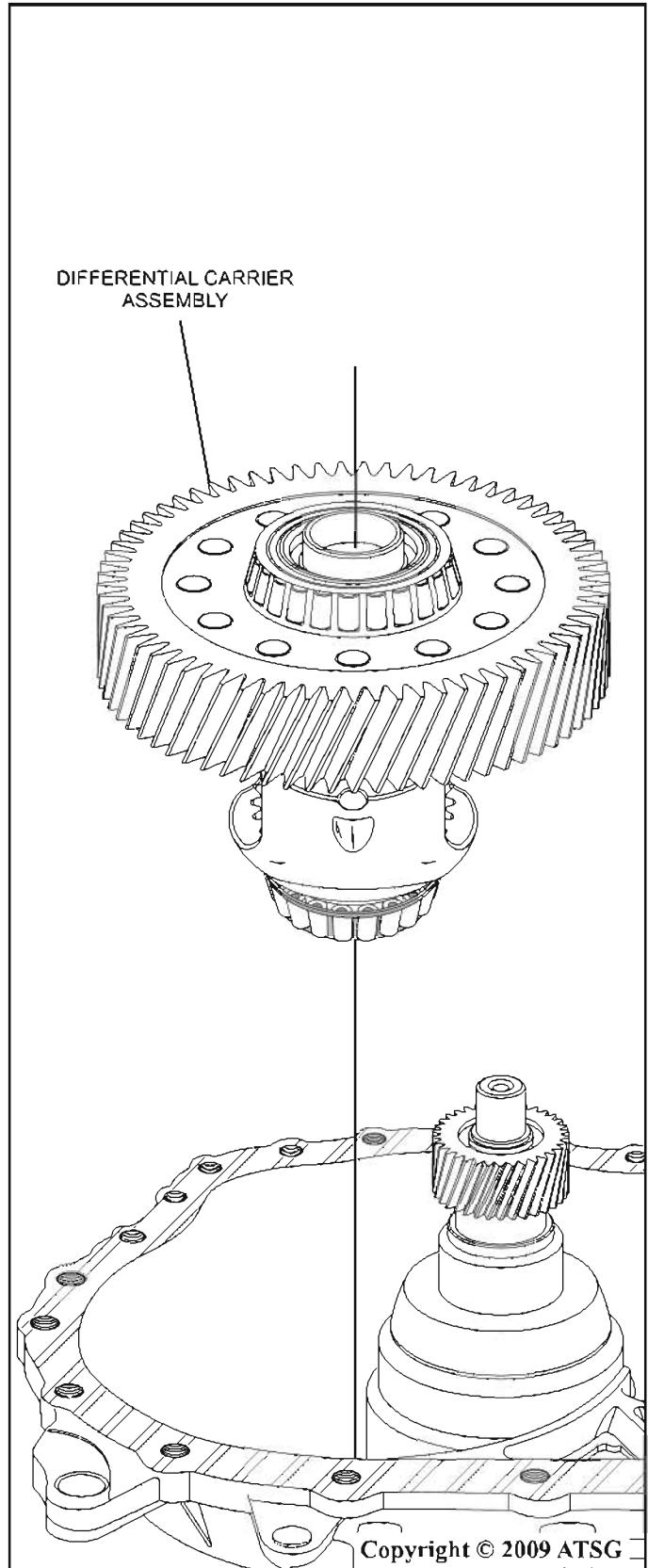


Figure 13

## TRANSAXLE DISASSEMBLY CONT'D

## INTERNAL COMPONENTS

1. INPUT SHAFT/FRONT PLANETARY THRUST WASHER
2. INPUT SHAFT/FRONT PLANETARY CARRIER ASSEMBLY
3. INPUT BEARING (CAGED NEEDLE BEARING)
4. INPUT BEARING (FLAT NEEDLE BEARING)
5. THRUST WASHER (SELECTIVE)

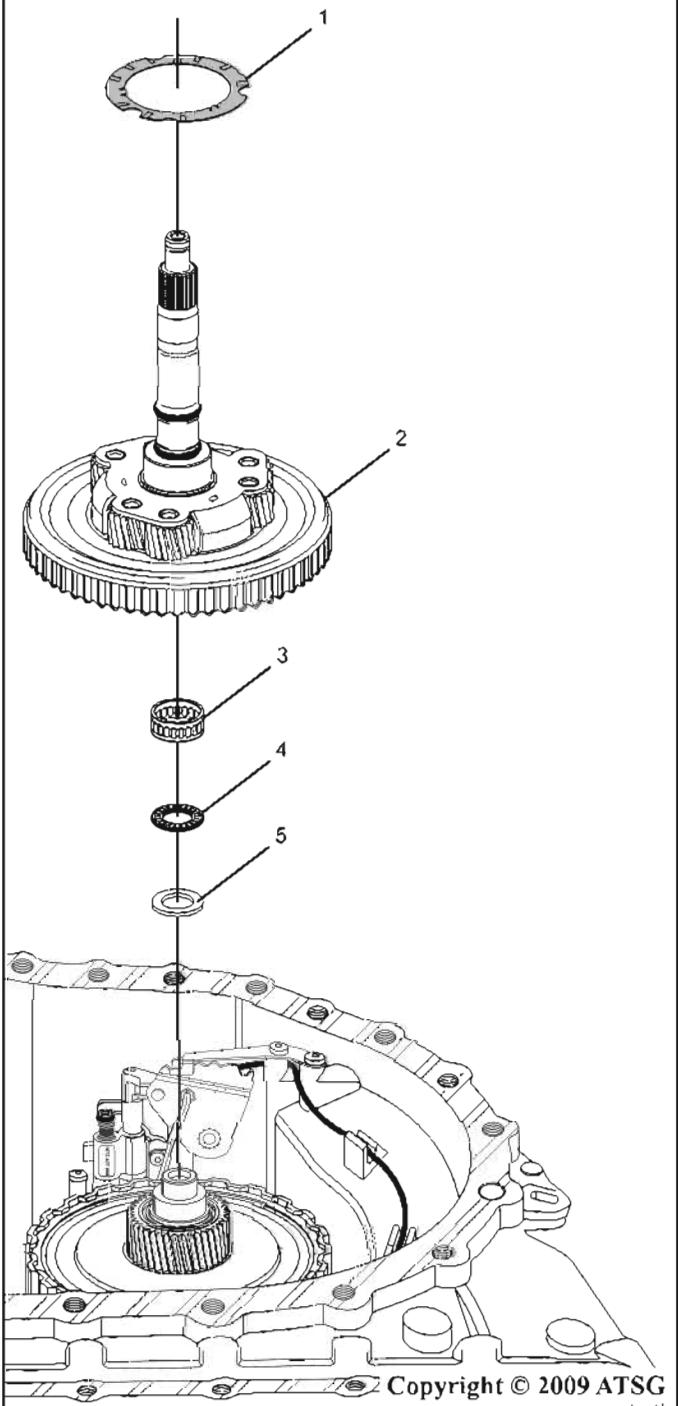


Figure 14

25. Remove the input shaft/front planetary carrier thrust washer as shown in figure 14.
26. Remove the input shaft/front planetary carrier as shown in figure 14.
27. Remove the input bearing (*caged needle bearing*) as shown in figure 14.
28. Remove the input bearing (*flat needle bearing*) as shown in figure 14.
29. Remove the thrust washer (*selective*) as shown in figure 14.
30. Using a suitable pair of snap ring pliers, remove the front planetary sun gear retaining snap ring as shown in figure 15.
31. Remove the front planetary spacer as shown in figure 15.
32. Remove the front planetary sun gear as shown in figure 15.

Continued on Next Page.

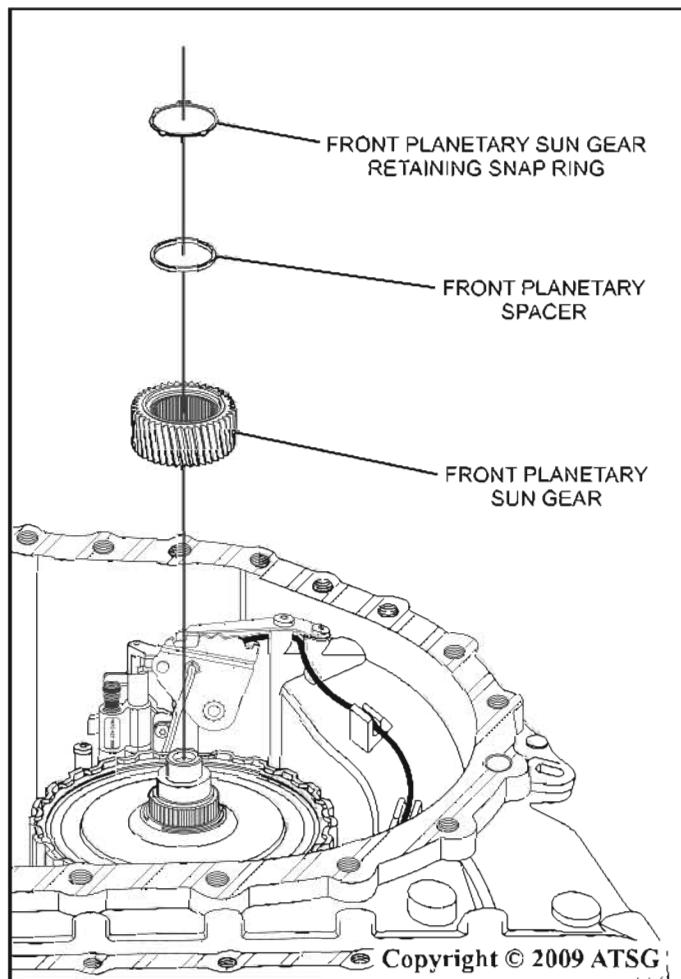
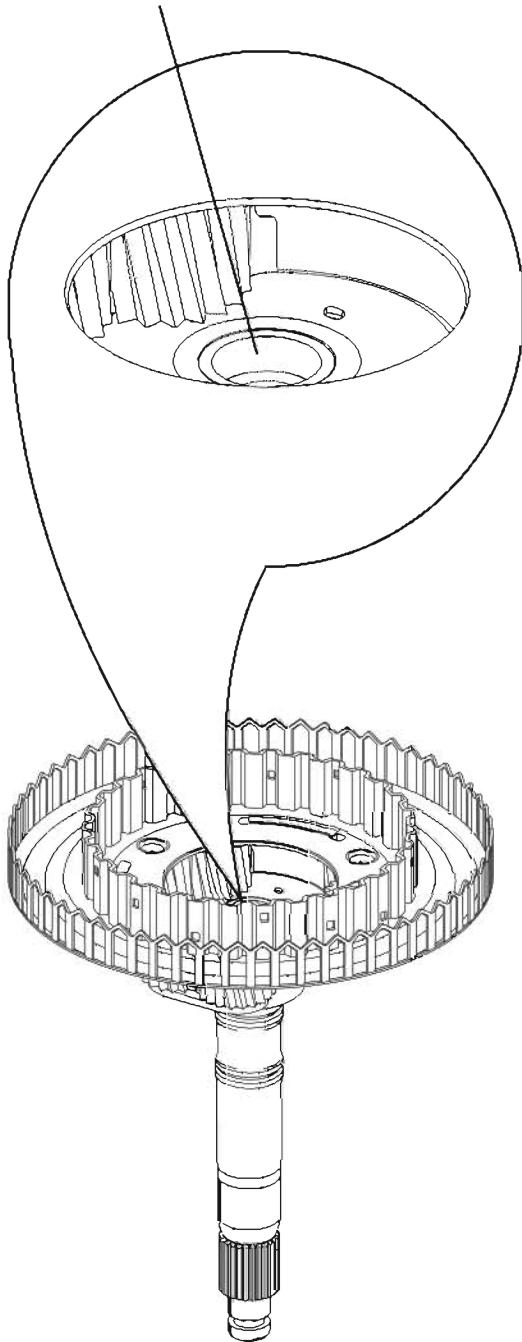


Figure 15

**COMPONENT DISASSEMBLY/INSPECTION****INPUT SHAFT/FRONT PLANETARY**

CAREFULLY INSPECT BEARING CONTACT SURFACE IN THIS AREA.



Copyright © 2009 ATSG

Figure 16

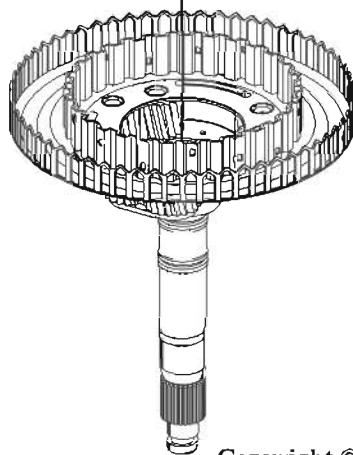
33. Thoroughly wash the input shaft/front planetary carrier assembly with solvent and inspect the bearing contact area as shown in figure 16. Replace the input shaft/front planetary carrier as necessary.
34. Inspect the input bearing (*caged needle bearing*) and replace as necessary as shown in figure 17.
35. Inspect the input bearing (*flat needle bearing*) and replace as necessary as shown in figure 17.
36. Inspect the thrust washer (*selective*) and replace as necessary as shown in figure 17.
37. Set input shaft/front planetary assembly aside for final assembly.  
*Note: install bearings and thrust washers using the diagram in figure 21.*

Continued on Next Page.

THRUST WASHER (SELECTIVE)

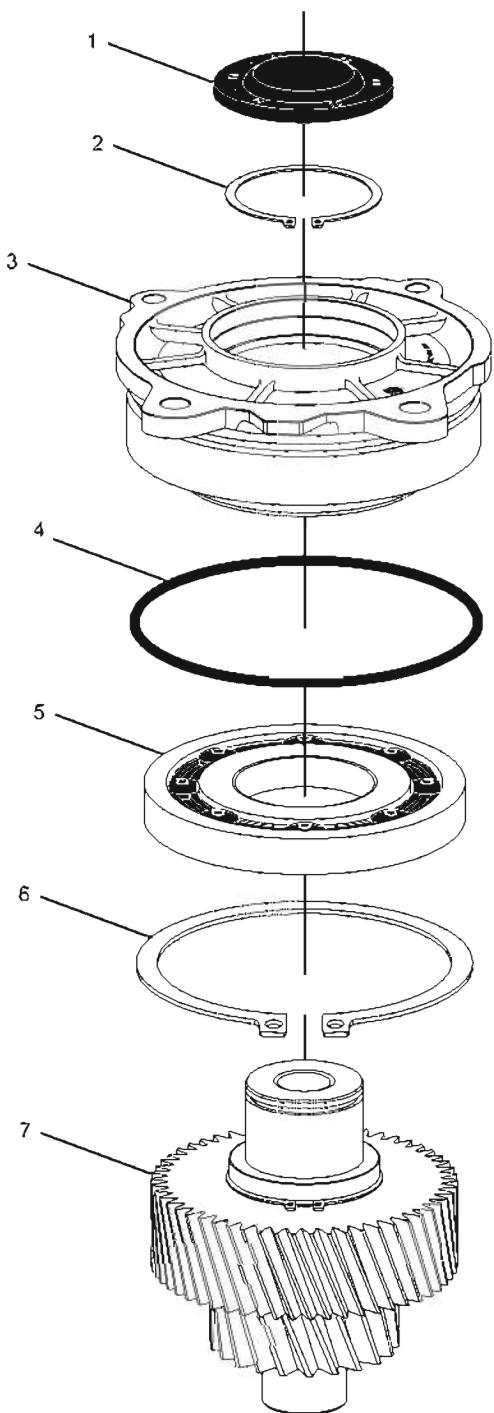
INPUT BEARING (FLAT NEEDLE BEARING)

INPUT BEARING (CAGED NEEDLE BEARING)



Copyright © 2009 ATSG

Figure 17

**TRANSFER GEAR ASSEMBLY  
EXPLODED VIEW**

1. DUST COVER
2. TRANSFER GEAR RETAINING SNAP RING
3. TRANSFER GEAR BEARING HOUSING
4. TRANSFER GEAR BEARING HOUSING O-RING
5. TRANSFER GEAR BALL BEARING
6. TRANSFER GEAR BALL BEARING RETAINING SNAP RING
7. TRANSFER GEAR ASSEMBLY

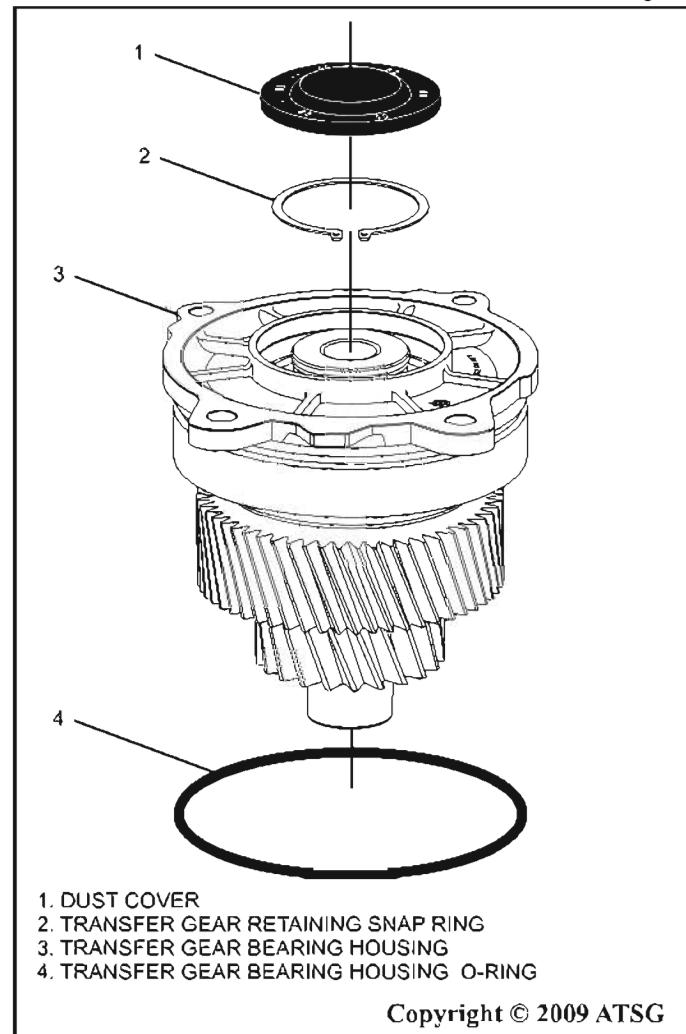
Copyright © 2009 ATSG

Figure 18

**COMPONENT DISASSEMBLY/INSPECTION  
TRANSFER GEAR ASSEMBLY**

38. Disassemble the transfer gear assembly using the diagram in figure 18 as a reference.
39. Clean all transfer gear assembly parts with good solvent and dry thoroughly with compressed air.
40. Using a suitable press, install a new transfer gear ball bearing, as necessary, into the transfer gear bearing housing and install the roller bearing retaining snap ring using figure 18 as a reference. Using the press, press the transfer gear assembly
41. into the transfer gear bearing housing and install the retaining snap ring as shown in figure 19. Install a new transfer gear bearing housing o-ring
42. as shown in figure 19.
43. Set the completed transfer gear assembly aside for final assembly.

Continued on Next Page.



Copyright © 2009 ATSG

Figure 19

## TRANSAXLE REASSEMBLY

### INTERNAL COMPONENTS

44. Install the front planetary sun gear as shown in figure 20.
45. Install the front planetary spacer as shown in figure 20.
46. Install the front planetary sun gear retaining snap ring as shown in figure 20.
47. Coat the thrust washer (selective) with a small amount of Trans-Jel® and install onto the variator shaft as shown in figure 21.
48. Coat the input bearing (flat needle bearing) with a small amount of Trans-Jel® and install onto the variator shaft as shown in figure 21.
49. Coat the input bearing (caged needle bearing) with a small amount of Trans-Jel® and install onto the variator shaft as shown in figure 21.
50. Install the input shaft/front planetary with a twisting motion as shown in figure 21.
51. Coat the input shaft/front planetary thrust washer with a small amount of Trans-Jel® and install onto the input shaft as shown in figure 21.

Continued on Next Page.

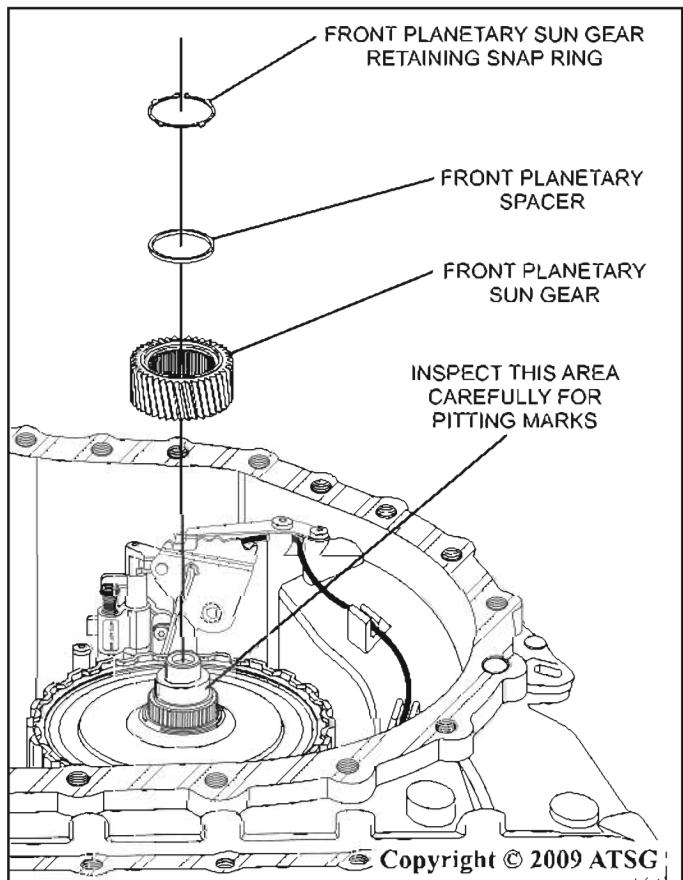


Figure 20

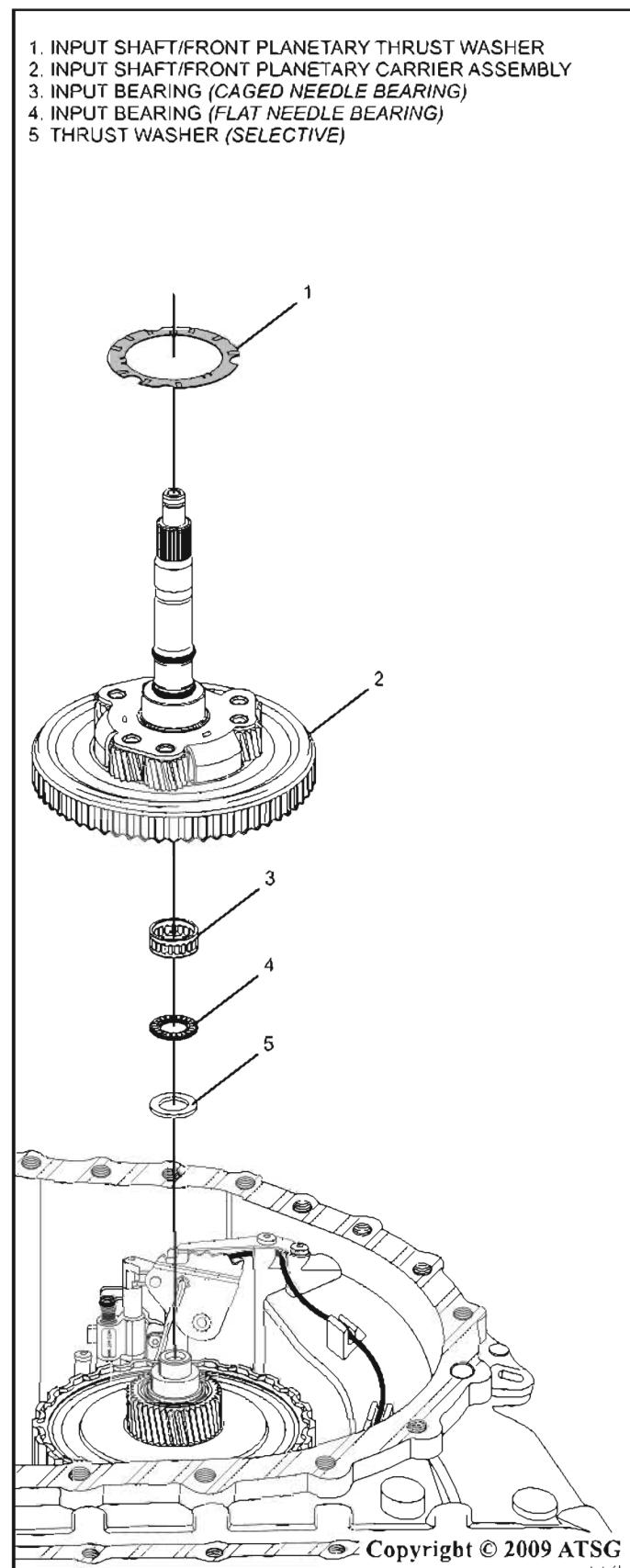


Figure 21

**TRANSAXLE REASSEMBLY CONT'D****INTERNAL COMPONENTS**

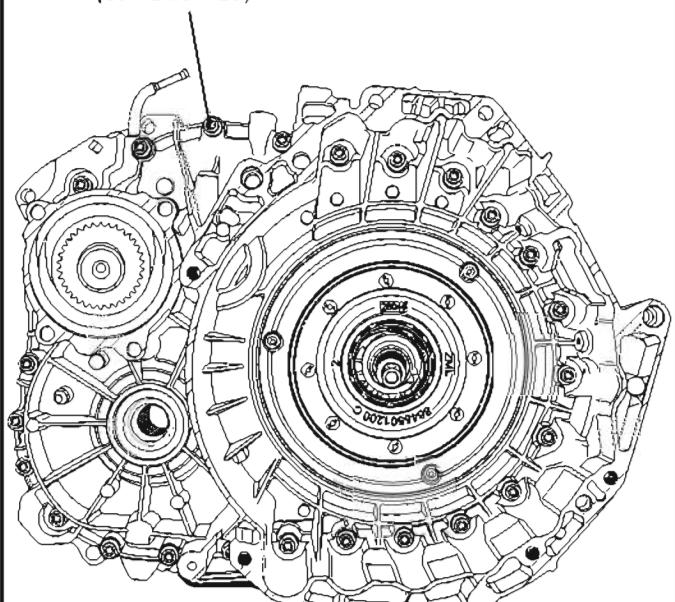
52. Clean the differential carrier assembly with solvent and dry thoroughly with compressed air.
53. Inspect and replace the differential carrier assembly or the bearings as necessary.
54. Lubricate the differential carrier bearings with a small amount of ATF.
55. Install the differential carrier assembly into the transaxle case as shown in figure 22.
56. Install a new converter housing to case gasket.
57. Install new converter housing attaching bolts (26 required) as shown in figure 23.
58. Tighten the bolts evenly in a side to side/cross cross manner. Tighten all bolts to 71 in. lb. (8 Nm).

*Note: After all bolts are tightened to proper torque, tighten 1/4 turn more, using the same side to side/cross cross manner.*

Continued on Next Page.

**TORQUE ALL CONVERTER  
HOUSING BOLTS TO  
71 IN. LB. (8 Nm)  
THEN TURN IN 1/4 TURN MORE**

TRANSAXLE  
CONVERTER HOUSING  
ATTACHING BOLTS  
(26 REQUIRED)



Copyright © 2009 ATSG

Copyright © 2009 ATSG

Figure 22

Automatic Transmission Service Group

Figure 23

## TRANSAXLE REASSEMBLY CONT'D

### INTERNAL COMPONENTS

59. Coat the transfer gear bearing housing o-ring with a small amount of ATF and carefully install the transfer gear into the transmission by twisting until the cover sits flush with the case as shown in figure 24.
60. Install the 4 transfer gear attaching bolts as shown in figure 24.
61. Torque the 4 bolts to 17 ft. lb. (23 N m) as shown in figure 25.
62. Coat the o-rings on the feed tubes with a small amount of atf and install into the case as shown in figure 26.
63. Install the torque converter clutch feed tube into the case as shown in figure 26.
64. Install the main pump pressure feed tube into the case as shown in figure 26.
65. Install the secondary pressure feed tube into the case as shown in figure 26.
66. Install the primary pressure feed tube into the case as shown in figure 26.
67. Install the manual valve supply feed tube into the case as shown in figure 26.

Continued on Next Page.

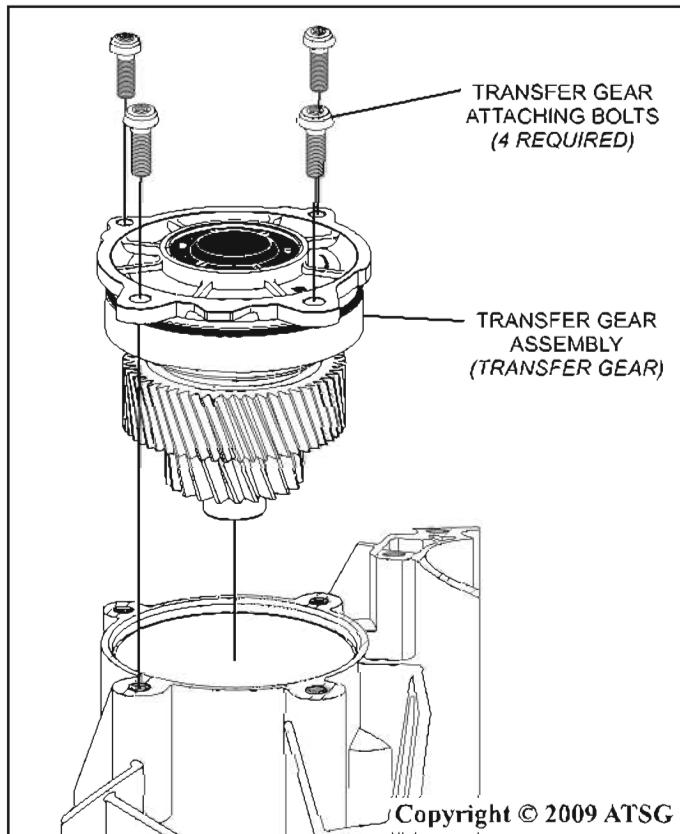


Figure 24

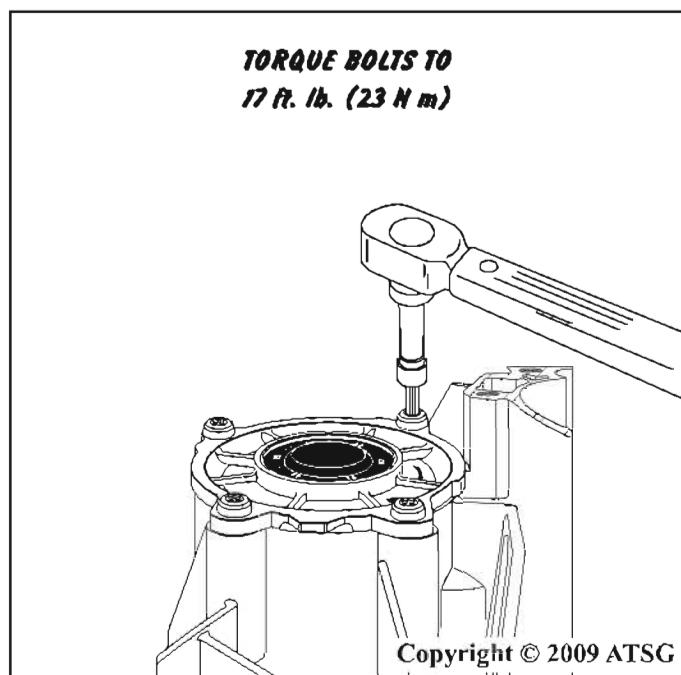


Figure 25

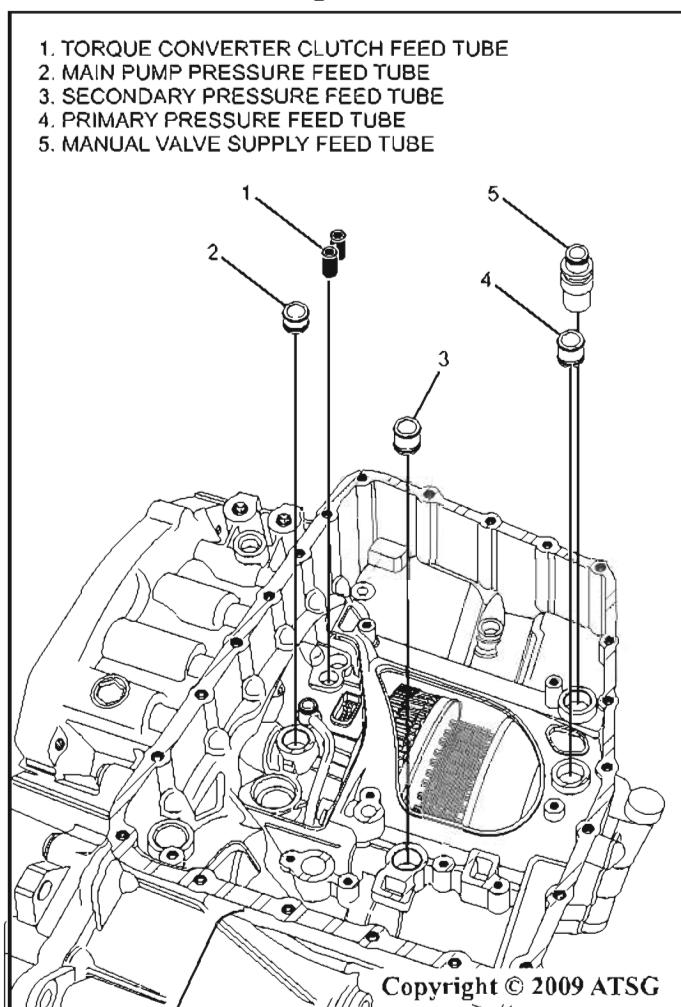


Figure 26



## TRANSAXLE REASSEMBLY CONT'D

## INTERNAL COMPONENTS

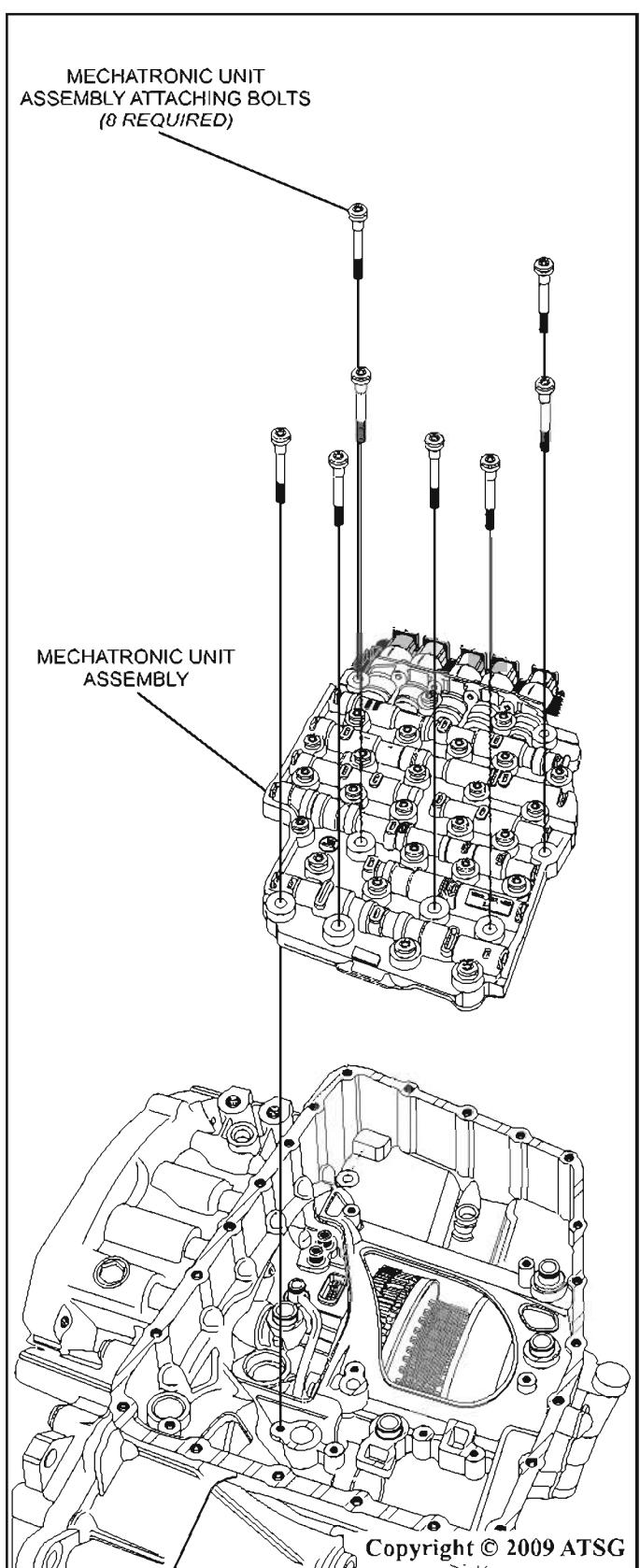


Figure 27

68. Install the mechatronic unit assembly onto the transaxle case as shown in figure 27. Use care to not cut the o-rings on the feed tubes as the mechatronic unit assembly is placed down.
69. Install the mechatronic unit assembly attaching bolts (*8 required*) as shown in figure 27.
70. Torque the mechatronic unit assembly attaching bolts in the numerical sequence pattern shown in figure 28.
71. Bolt torque is 44 in. lb. (5 N m), then turn the bolts following the same numerical sequence 1/8 turn more.

Continued on Next Page.

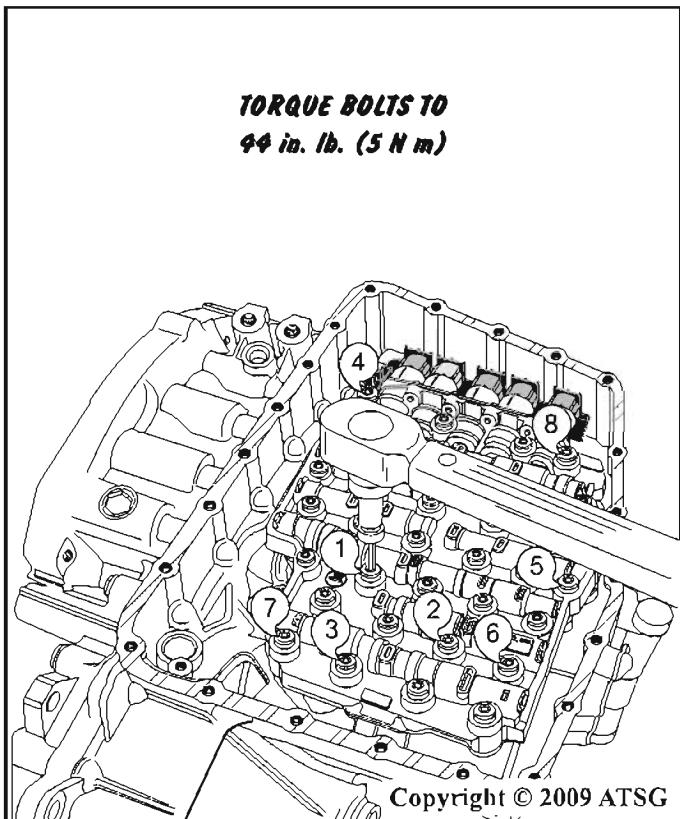


Figure 28

## TRANSAXLE REASSEMBLY CONT'D

### INTERNAL COMPONENTS

72. Install the output speed sensor into the case as shown in figure 29.
73. Install the output speed sensor spacer under the speed sensor as shown in figure 29.
74. Install the output speed sensor hold down bolt as shown in figure 29.
75. Tighten the output speed sensor hold down bolt and torque to 71 in. lb. (8 N m) as shown in figure 30.
76. Install the output speed sensor connector into the mechatronic unit assembly connector as shown in figure 31.
77. Install the transmission range sensor connector into the mechatronic unit assembly connector as shown in figure 31.

Continued on Next Page.

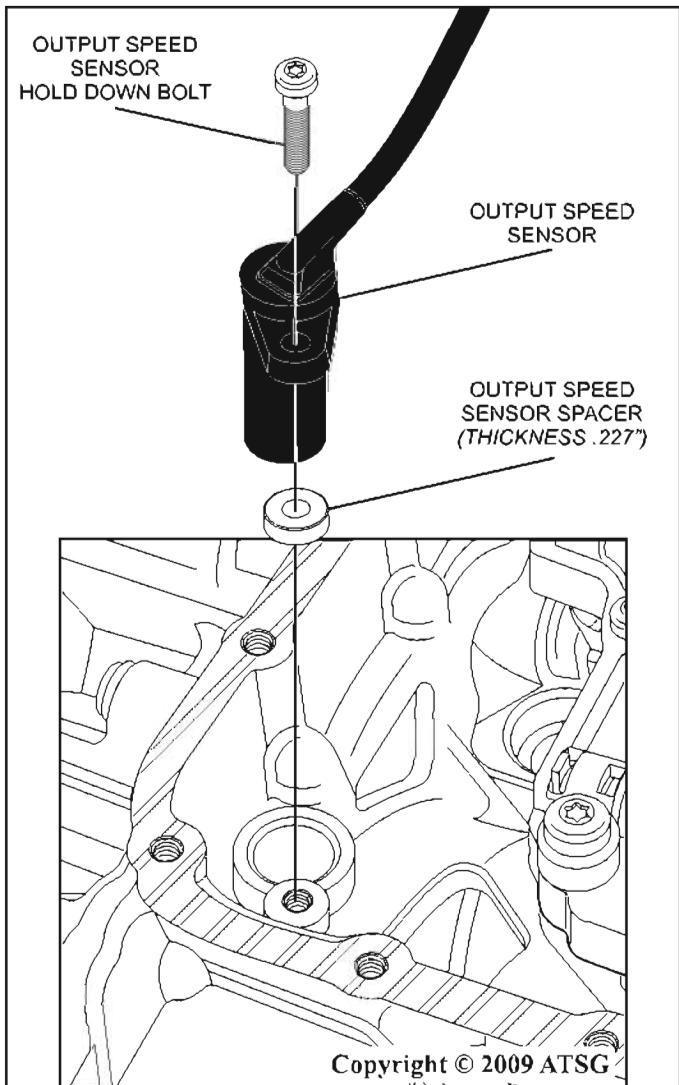


Figure 29

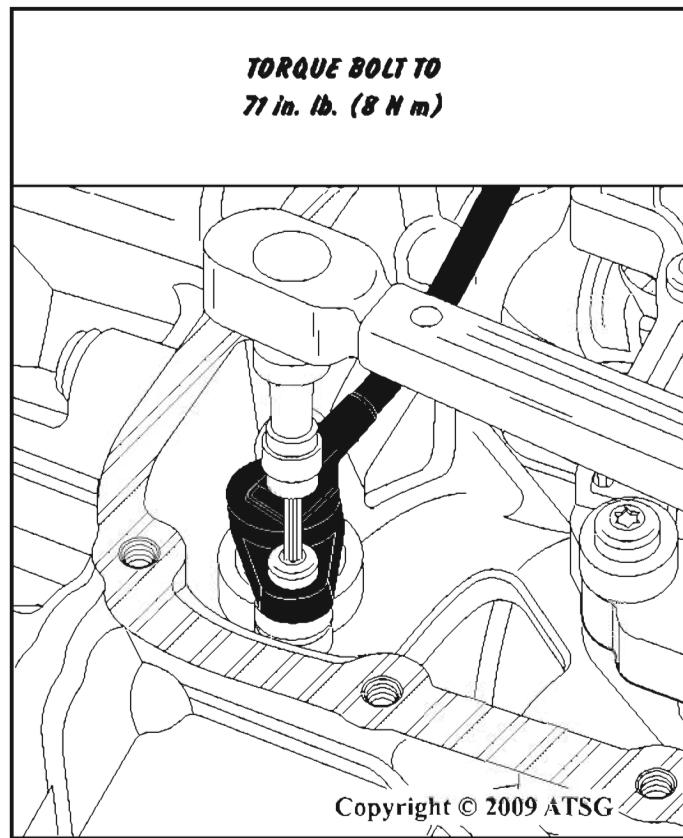


Figure 30

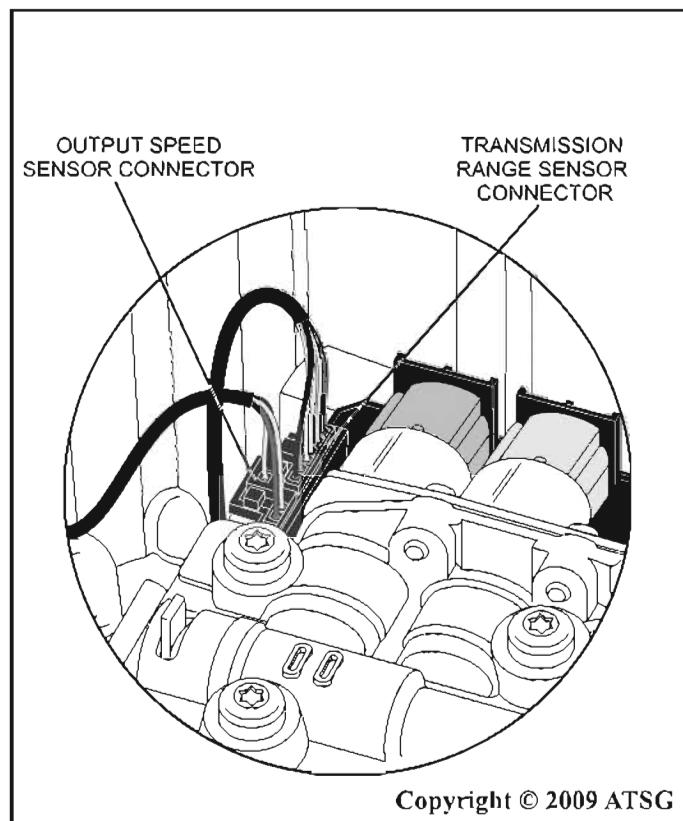


Figure 31

**TRANSAXLE REASMBLY CONT'D****INTERNAL COMPONENTS**

78. Install a new transaxle oil filter and transaxle oil filter seal as shown in figure 32.
79. Install a new transaxle oil pan gasket onto the case as shown in figure 33.
80. Install the transaxle oil pan onto the case as shown in figure 33.
81. Install the transaxle oil pan attaching bolts (22 required) as shown in figure 33.

Continued on Next Page.

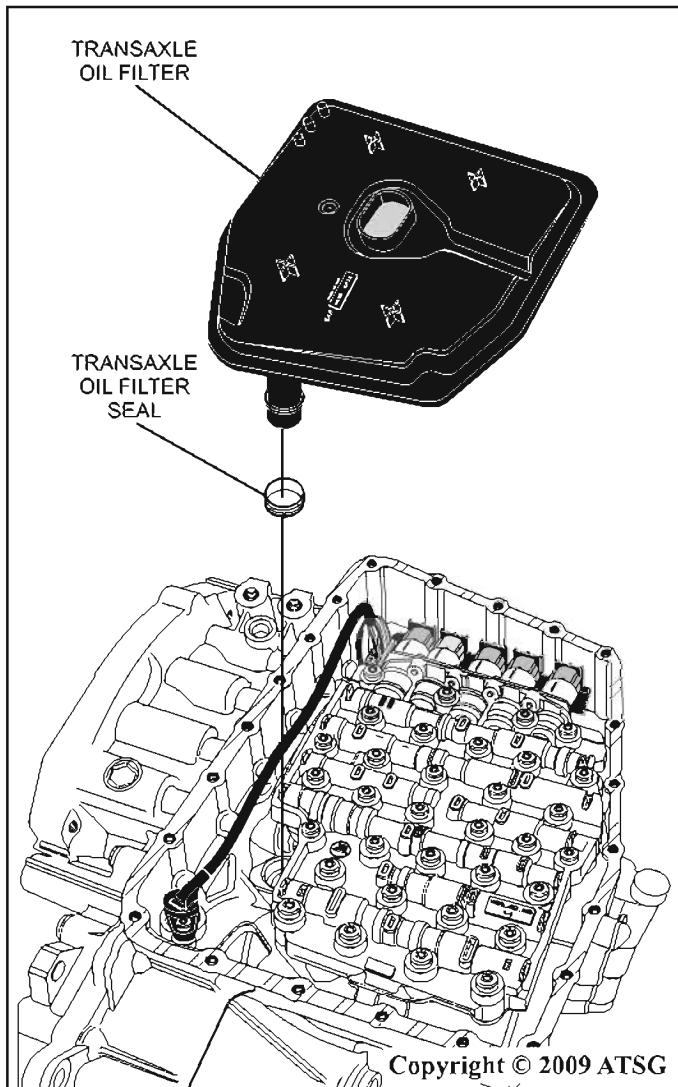


Figure 32

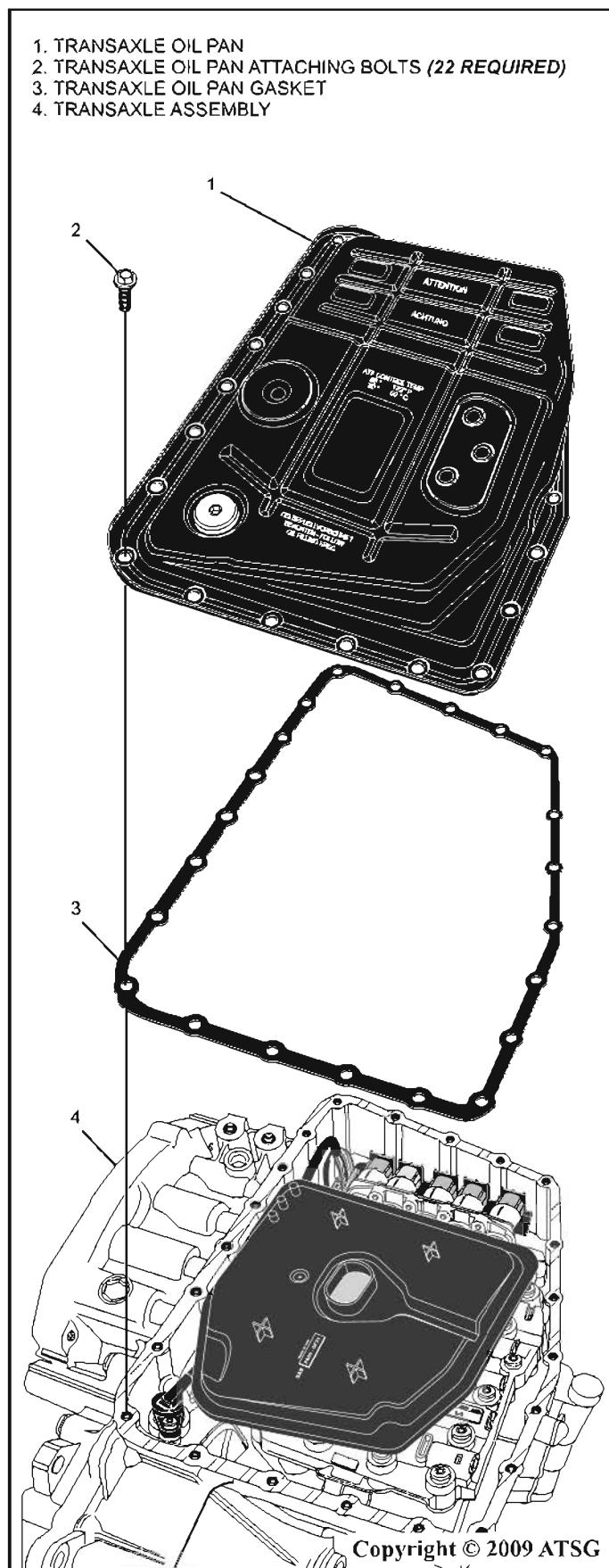


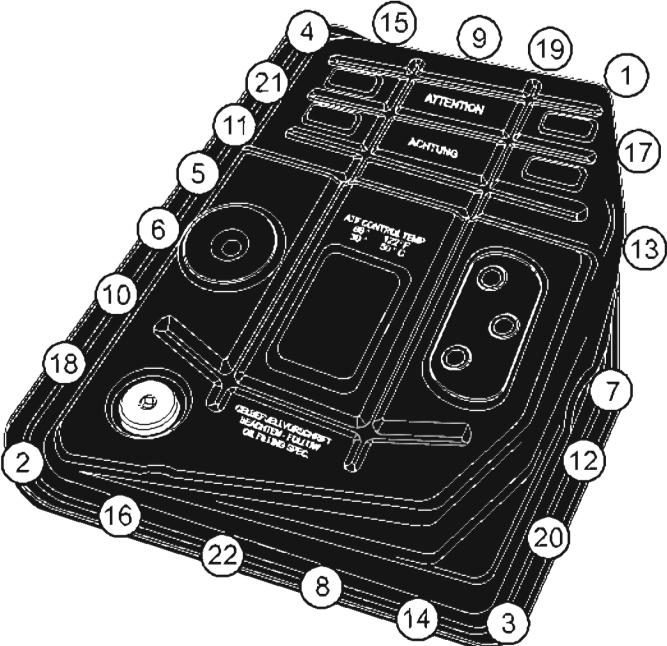
Figure 33

## TRANSAXLE REASMBLY CONT'D

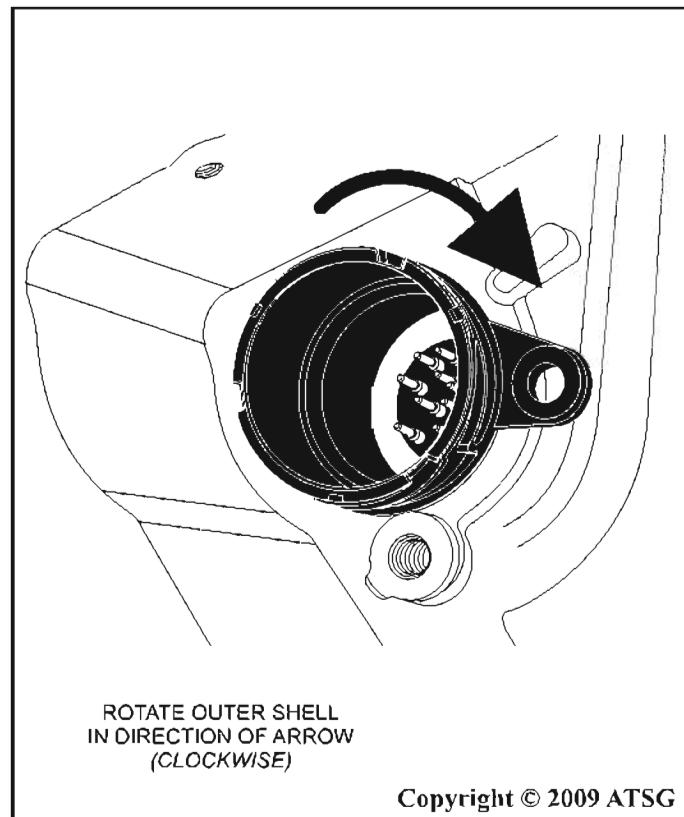
### INTERNAL COMPONENTS

82. Tighten all 22 oil pan attaching bolts using the numerical sequence shown in figure 34.
83. Torque all 22 oil pan attaching bolts to 9 ft. lb. (12 N m) using the numerical sequence shown in figure 34.
84. Install the outer shell into the transaxle case assembly and rotate clockwise to latch it into the case and lock it into the mechatronic unit assembly as shown in figure 35.  
*Note: Use care to not damage the pins of the mechatronic unit assembly or touch them when installing the outer shell. This could create electrostatic discharge and can cause damage to the mechatronic unit assembly.*
85. Install the outer shell hold down bolt and torque to 53 in. lb. (6 N m) as shown in figure 36.

**TORQUE THE OIL PAN  
ATTACHING BOLTS  
IN THE NUMERICAL SEQUENCE  
BELOW TO 9 FT. LB. (12 N M)**



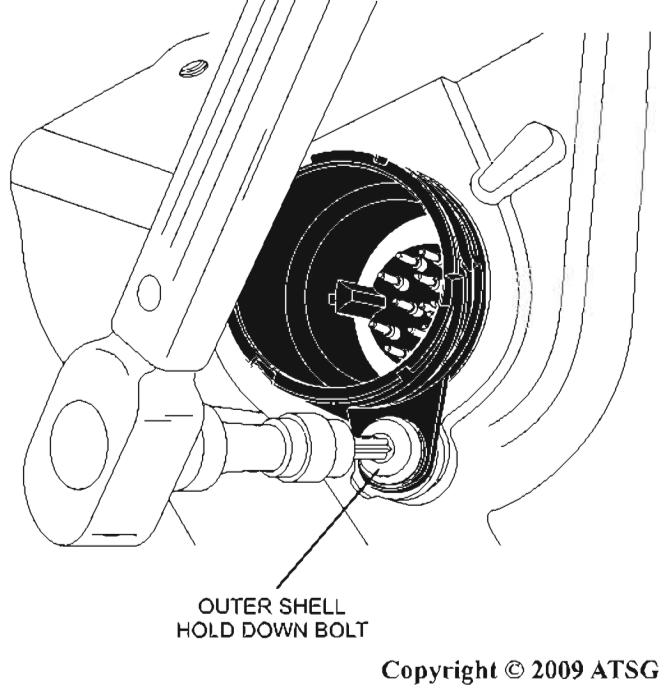
Copyright © 2009 ATSG



Copyright © 2009 ATSG

Figure 35

**TORQUE THE OUTER SHELL  
HOLD DOWN BOLT  
TO 53 in. lb. (6 N m)**



Copyright © 2009 ATSG

Figure 34

Figure 36

## 41TE ERRATIC FLUID LEVEL AND/OR FLUID FOAMING

**COMPLAINT:** After rebuild and a road test, checking the fluid level proves difficult at best. Sometimes it is too high and then it is too low. You may also notice that the fluid is a little foamy. On a test drive it feels like the fluid level is low and the pump has a slight whine.

**CAUSE:** The differential lube feed orifice in the pump gasket was made too large. This orifice is located in the pump gasket output port as seen in figure 1. The O.E. slotted orifice is approximately 0.025" while some aftermarket gaskets could measure as wide as 0.100". This would allow an excessive amount of fluid to spray onto the pinion gear causing the fluid to foam when the gears are turning. The aeration of the fluid causes the difficulty in checking the level.

**CORRECTION:** Replace the gasket with the 0.025" slotted orifice.

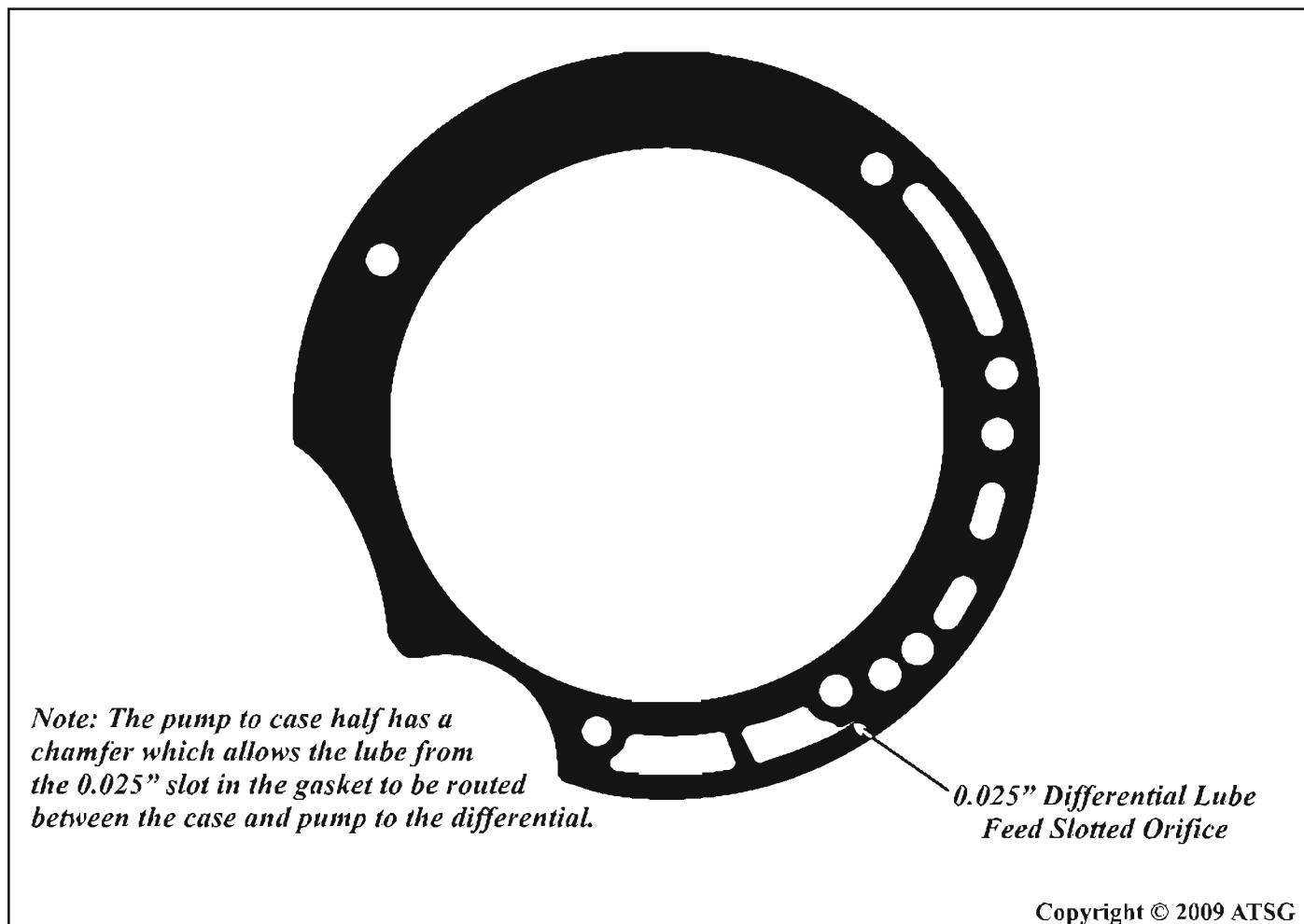
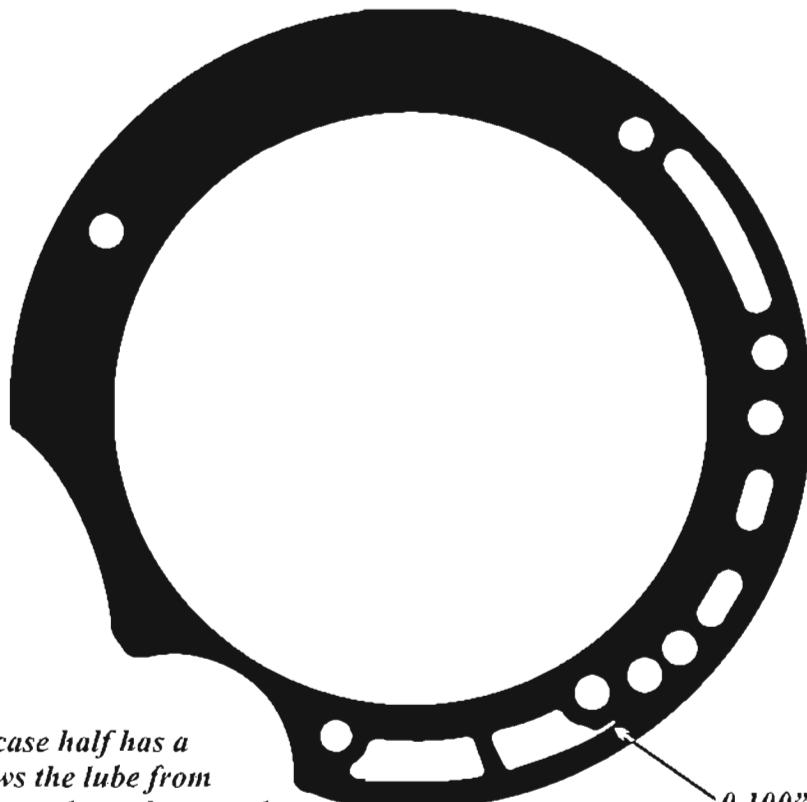


Figure 1



*Note: The pump to case half has a chamfer which allows the lube from the 0.025" slot in the gasket to be routed between the case and pump to the differential.*

*0.100" Differential Lube  
Feed Slotted Orifice*

Copyright © 2009 ATSG

Figure 2



## "2009" SEMINAR INFORMATION

45

### 40TE, 41TE, 42LE, 42RLE CLUTCH OVERLAP ISSUES

- COMPLAINT:**
- (1) The transmission has a momentary tie-up on the 1-2 shift and a coastdown clunk when coming to a stop.
  - (2) The transmission has a double engagement forward and a flair on the 1-2 shift, a high low-reverse CVI is also present.

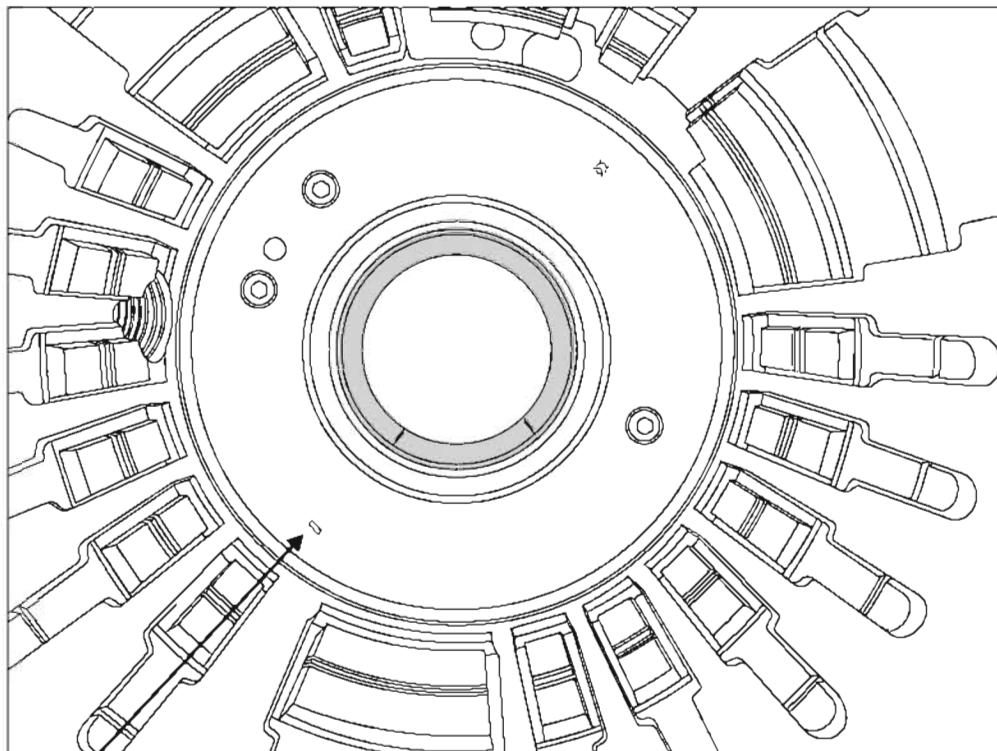
- CAUSE:**
- (1) A low/reverse molded piston that has no bleed orifice, was installed with a low/reverse retainer with no bleed orifice.
  - (2) A low/reverse aluminum piston with a bleed orifice was installed with a low/reverse retainer with a bleed orifice.

- CORRECTION:**
- (1) A low/reverse molded piston must be installed with a low/reverse retainer that has the bleed orifice in it to avoid clutch overlap issues (refer to figure 1).
  - (2) A low/reverse aluminum piston with the bleed orifice must be installed with a low/reverse retainer with no bleed orifice in it so that the low/reverse clutch circuit does not have a double orifice (refer to figure 2).

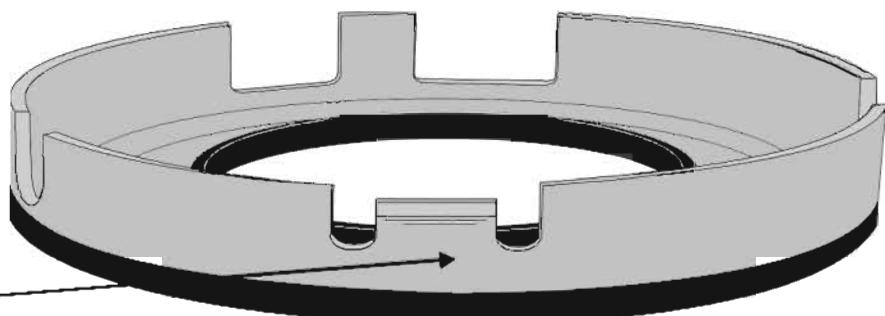
#### SERVICE INFORMATION:

Be careful when interchanging low/reverse pistons. There are different heights.  
The 40TE low/reverse piston is 1.2" in height.  
The 41TE piston is 1.060" in height.  
The 42RLE piston is 1.160" in height.

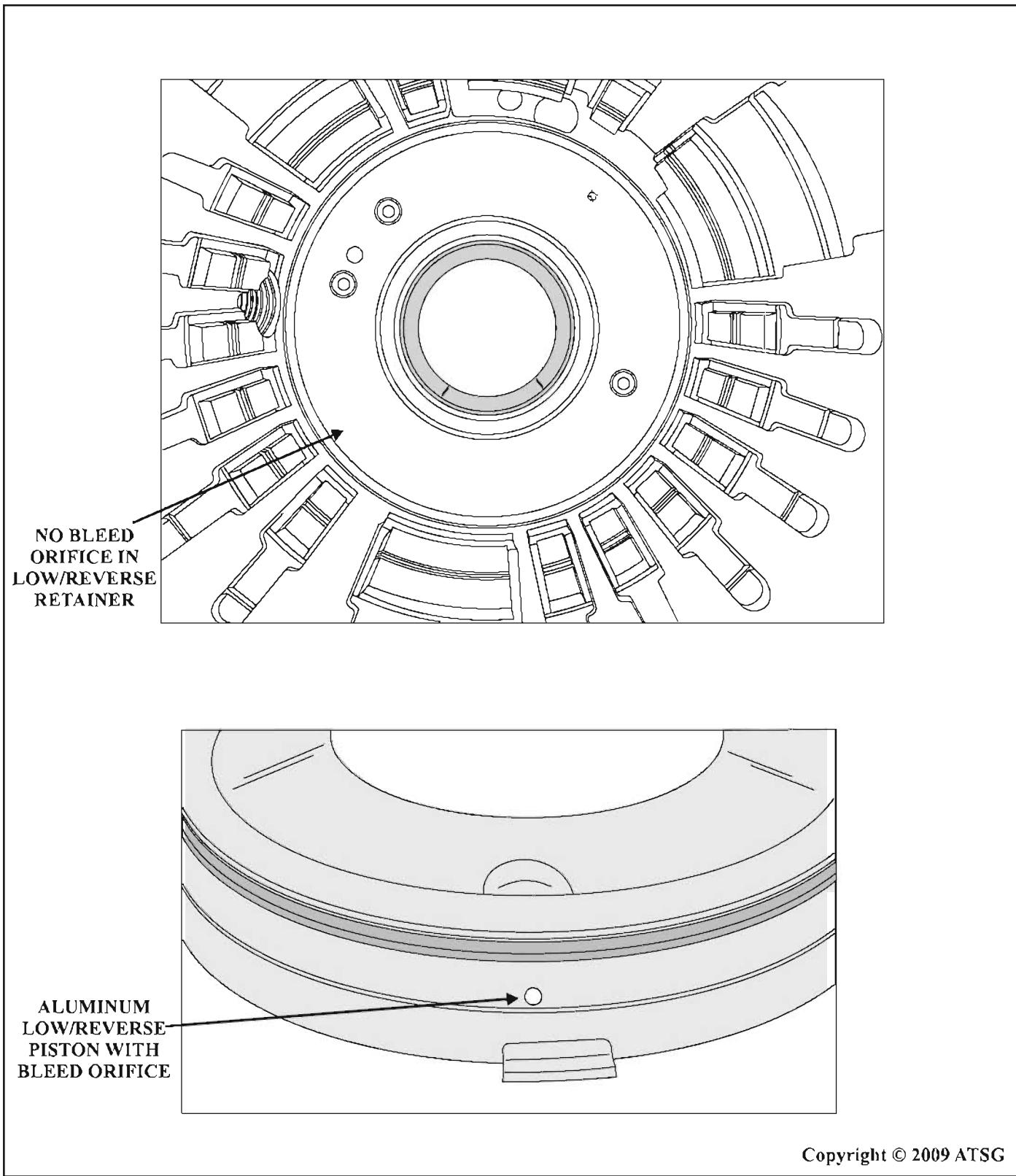
The molded pistons went into production for the 2004 model year as well as the orificed low/reverse retainer

**40TE, 41TE, 42LE, 42RLE  
CLUTCH OVERLAP ISSUES**

**BLEED ORIFICE  
IN LOW/REVERSE  
RETAINER**



**MOLDED  
LOW/REVERSE  
PISTON WITHOUT  
BLEED ORIFICE**

**40TE, 41TE, 42LE, 42RLE  
CLUTCH OVERLAP ISSUES**

Copyright © 2009 ATSG

Figure 2  
Automatic Transmission Service Group



## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

**Change:** The 41TE (A604) transmission underwent a hydraulic revision that accommodated the use of a variable line pressure control solenoid (VLPS) (Figure 1) and is now called the 41TES transmission.

**Application:** 2007 and up Chrysler Sebring 2.4, 2.7L  
2008 and up Dodge Avenger, SE, SXT 2.4, 2.7L  
2009 and up Dodge Journey 2.4L

**Reason:** To reduce main line pressure during idle engagements which lessens engine load improving fuel economy.

**Part Changes:** The implementation of this solenoid caused changes to be made to the transfer plate, valve body, spacer plate, case, vehicle harness and computer strategy in order to facilitate the use of this solenoid. It also introduced the use of a pressure transducer to monitor the VLPS.

**Case:** The case was changed to accommodate an additional pass through connector for the VLPS and Transducer mounted on the valve body (Figure 1).

**Vehicle Harness:** An additional connector was added to the vehicle harness to the transmission to accommodate the added pass through connector mounted on the valve body. The harness plugging into the PCM contains the added wiring for the VLPS and Transducer (Figure 1).

**PCM:** The PCM is programmed with a strategy to operate the solenoid under various conditions to reduce line pressure. It also observes the Transducer to monitor and tailor solenoid operation.

**Valve Body:** Changes were made to the casting of the valve body to provide the fitting of the solenoid and transducer as well has passages for the hydraulics allowing the solenoid to influence the pressure regulator valve (Figure 2).

**Spacer Plate:** Changes were made to the spacer plate by the addition and changes to orifices located within the plate (Figure 3).

**Transfer Plate:** Similar to the valve body, the casting of the transfer plate received changes to the hydraulic passages to accommodate the use of the added solenoid (Figure 4).

**Pressure Regulator Valve:** The pressure regulator valve was changed to a single anodized valve and spring arrangement.

**Part Added:** **Variable Line Pressure Solenoid:** The VLPS is a variable force style solenoid that is duty cycled to reduce line pressure. When the solenoid is off, it blocks pressure from passing through the solenoid. When it is duty cycled, pressure passes through the solenoid and acts on the end of the pressure regulator valve to reduce line pressure output (Figure 5).



## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

**Part Added:** **VLPS Transducer:** The VLPS Transducer (Line Pressure Sensor - LPS) is the same style transducer used in the 45RFE, 62TE and 42RE transmissions in that it is a 3 wire sensor (5 volt supply, ground and signal) which monitors the activity of the VLPS via main line pressure (Figure 2). This information provided by this sensor to the PCM is also used by the PCM to tailor the solenoids operation.

**Diagnostic Codes:** With the addition of the VLPS and Transducer, additional diagnostic codes have been added to reflect failures related to these items. The codes added are as follows:

### *Code P0868 - Line Pressure Low*

The PCM continuously monitors Actual Line Pressure (the transducer signal-LPS) and compares it to Desired Line Pressure (VLPS command). If the Actual Line Pressure is more than 10 psi below Desired Line Pressure, this DTC will set.

#### **Possible Causes (no specific order):**

- Check for related DTC's
- Low Fluid Level
- Transducer (LPS) 5 volts supply circuit open
- Transducer (LPS) 5 volts supply circuit shorted to ground
- Transducer (LPS) 5 volts supply circuit short to voltage
- VLPS control circuit shorted to another circuit
- Internal transmission failure
- Malfunctioning Transducer (LPS)
- Malfunctioning VLPS
- Cracked, plugged, or mis-installed Primary Oil Filter
- Stuck or Sticking Pressure Regulator Valve
- Malfunctioning PCM

#### **Theory of Operation**

Line pressure is monitored by the Transducer and regulation is achieved by changing the duty cycle of the VLPS controlled by the Transmission Control System in the PCM. 5% duty cycle = solenoid OFF which equals maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure. The Transmission Control System calculates the desired line pressure based on inputs from both engine load and transmission.

The Transmission Control System calculates torque input to the transmission and uses it as the primary input to the desired pressure calculation. This is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 or 931 kPa (120 or 135 psi) during shifts and in Park and Neutral to ensure consistent shift quality. The desired line pressure is continuously being compared to the actual line pressure. If the actual line pressure is consistently lower than the target while driving, the line pressure low DTC P0868 will set.

Park, Reverse, Neutral, Drive and up-shift hydraulics are provided in figures 6 through 13.



## CHRYSLER/DODGE 41TES/42RLE-VLP PRESSURE CONTROL SOLENOID AND SENSOR

**Part Added:** *Code P0869 - Line Pressure High*

The PCM continuously monitors Actual Line Pressure (the transducer signal). If the Actual Line Pressure reading is greater than the highest Desired Line Pressure (VLPS command) ever used in the current gear, while the VLPS duty cycle is at or near maximum value (which should result in minimum line pressure), this DTC will set.

**Possible Causes (no specific order):**

- Transducer (LPS) 5 volts supply circuit open
- Transducer (LPS) 5 volts supply circuit shorted to ground
- Transducer (LPS) ground circuit open
- Transducer (LPS) connection faulty
- Malfunctioning Transducer (LPS)
- VLPS control circuit open
- Transmission Control Relay Output Circuit Open
- Mechanical failure of the VLPS
- Stuck or Sticking Pressure Regulator Valve
- Malfunctioning PCM

**Theory of Operation**

Line pressure is measured by the Transducer and regulation is achieved by changing the duty cycle of the VLPS controlled by the Transmission Control System in the PCM. 5% duty cycle = solenoid OFF which equals Maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure. The Transmission Control System calculates the desired line pressure based on inputs from both engine load and transmission.

The Transmission Control System calculates torque input to the transmission and uses it as the primary input to the desired pressure calculation. This is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 or 931 kPa (120 or 135 psi) during shifts and in Park and Neutral to ensure consistent shift quality. The desired line pressure is continuously being compared to the actual line pressure. If the actual line pressure is consistently higher than the highest desired line pressure ever used in the current gear, the line pressure high DTC P0869 will set.

***Code P0932 - Line Pressure Sensor Circuit***

The PCM continuously monitors Actual Line Pressure (the transducer signal) and compares it to the Desired Line Pressure (VLPS command). If the Actual Line Pressure reading is more than 172.4 kPa (25 psi) higher than the Desired Line Pressure, but is less than the highest Line Pressure ever used in the current gear, DTC P0932 will set.

**Possible Causes (no specific order):**

- Check for related DTC's
- Faulty VLPS connector and wiring
- Internal transmission failure
- Malfunctioning PCM



## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

**Part Added:** *Code P0932 - Line Pressure Sensor Circuit continued:*

### Theory of Operation

Line pressure is electronically controlled by the Transmission Control System and is measured by the Transducer (Line Pressure Sensor - LPS). The desired line pressure is continuously being compared to the Actual Line Pressure and is regulated electronically changing the duty cycle of the VLPS. 5% duty cycle = solenoid OFF which equals maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure.

The Transmission Control System calculates the desired pressure based on inputs from the transmission and engine. A calculated torque input to the transmission is used as the primary input of the desired line pressure calculation and is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 to 931 kPa (120 to 135 psi) during shifts and in Park and Neutral to ensure shift quality.

### *Code P0934 - Line Pressure Sensor Circuit Low*

The DTC will set when the monitored Transducer (Line Pressure Sensor - LPS) signal voltage is less than or equal to 0.35 volts for 0.18 seconds.

### Possible Causes (no specific order):

- Transducer (LPS) 5 volts supply circuit open
- Transducer (LPS) 5 volts supply circuit shorted to ground
- Transducer (LPS) signal circuit shorted to ground.
- Malfunctioning Transducer (LPS)
- Malfunctioning PCM

### Theory of Operation

Line pressure is electronically controlled by the Transmission Control System and is measured by the Transducer (Line Pressure Sensor - LPS). The desired line pressure is continuously being compared to the Actual Line Pressure and is regulated electronically changing the duty cycle of the VLPS. 5% duty cycle = solenoid OFF which equals maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure.

The Transmission Control System calculates the desired pressure based on inputs from the transmission and engine. A calculated torque input to the transmission is used as the primary input of the desired line pressure calculation and is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 to 931 kPa (120 to 135 psi) during shifts and in Park and Neutral to ensure shift quality.

The monitored Transducer (LPS) signal voltage should always be between 0.35 and 4.75 volts. Any monitored voltages outside of these parameters indicate a faulty Transducer or associated wiring and will cause either DTC P0934 or P0935 to set.



## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

**Part Added:** *Code P0935 - Line Pressure Sensor Circuit High*

The DTC will set when the monitored Transducer (Line Pressure Sensor - LPS) signal voltage is greater than or equal to 4.75 volts for the period of 0.18 seconds.

**Possible Causes (no specific order):**

- Transducer (LPS) sensor ground circuit open
- Transducer (LPS) signal circuit shorted to power
- Malfunctioning Transducer (LPS)
- Malfunctioning PCM

**Theory of Operation**

Line pressure is electronically controlled by the Transmission Control System and is measured by the Transducer (Line Pressure Sensor - LPS). The desired line pressure is continuously being compared to the Actual Line Pressure and is regulated electronically changing the duty cycle of the VLPS. 5% duty cycle = solenoid OFF which equals maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure.

The Transmission Control System calculates the desired pressure based on inputs from the transmission and engine. A calculated torque input to the transmission is used as the primary input of the desired line pressure calculation and is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 to 931 kPa (120 to 135 psi) during shifts and in Park and Neutral to ensure shift quality.

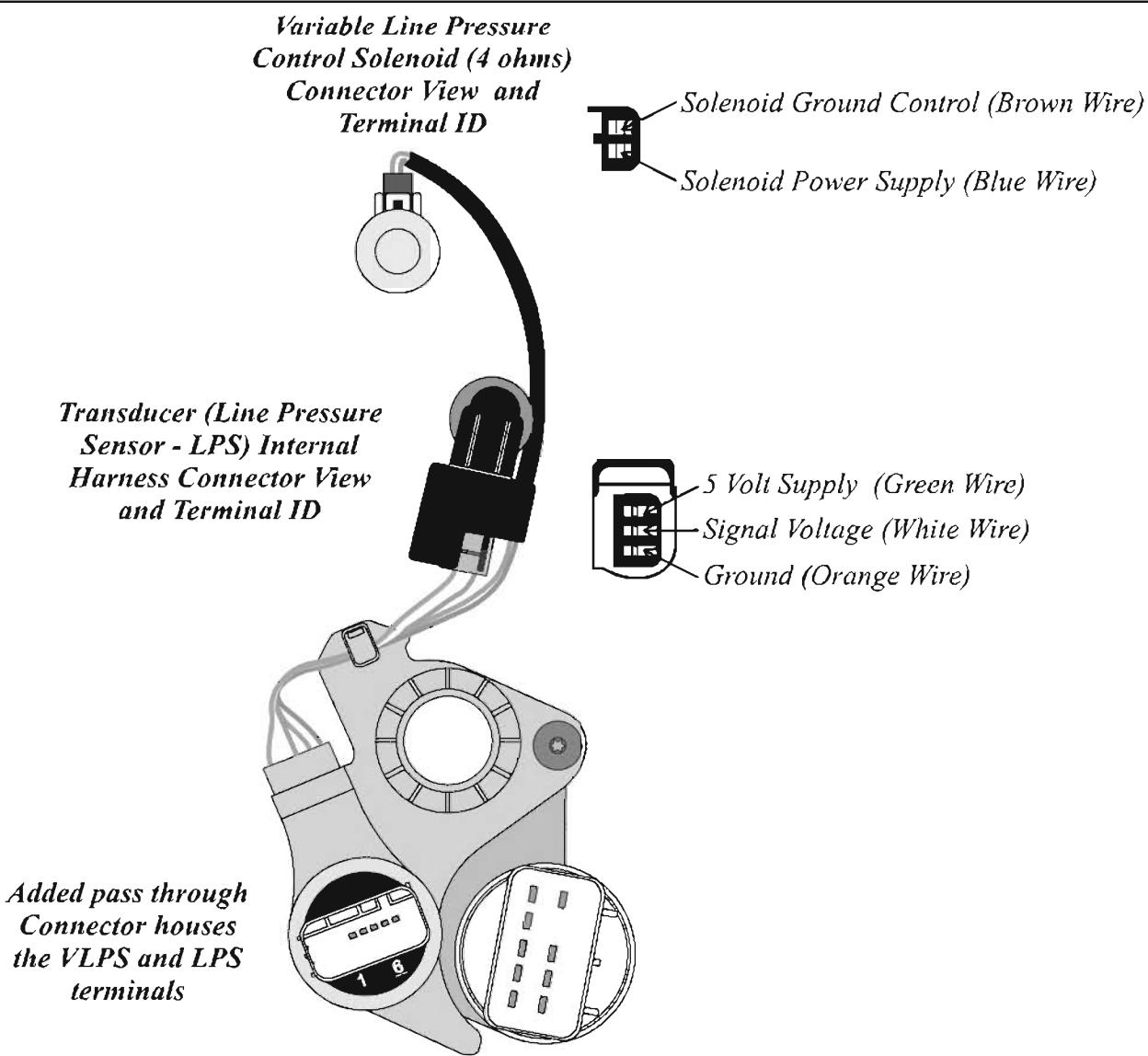
The monitored Transducer (LPS) signal voltage should always be between 0.35 and 4.75 volts. Any monitored voltages outside of these parameters indicate a faulty Transducer or associated wiring and will cause either DTC P0934 or P0935 to set.

**Parts Interchangeability:**

None of the parts listed are interchangeable with previous models nor are previous model parts interchangeable with the new 41TES transmission

*We would like to thank the good folks at WIT for providing ATSG with a 41TES valve body.*

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR



Terminal	Circuit	Wire Color
1	Not Used	
2	LP Sensor 5 Volt Supply	Green
3	LP Sensor Signal	White
4	LP Sensor Ground	Orange
5	LP Solenoid Relay Power	Blue
6	LP Solenoid Ground	Brown

Copyright © 2009 ATSG

Figure 1

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

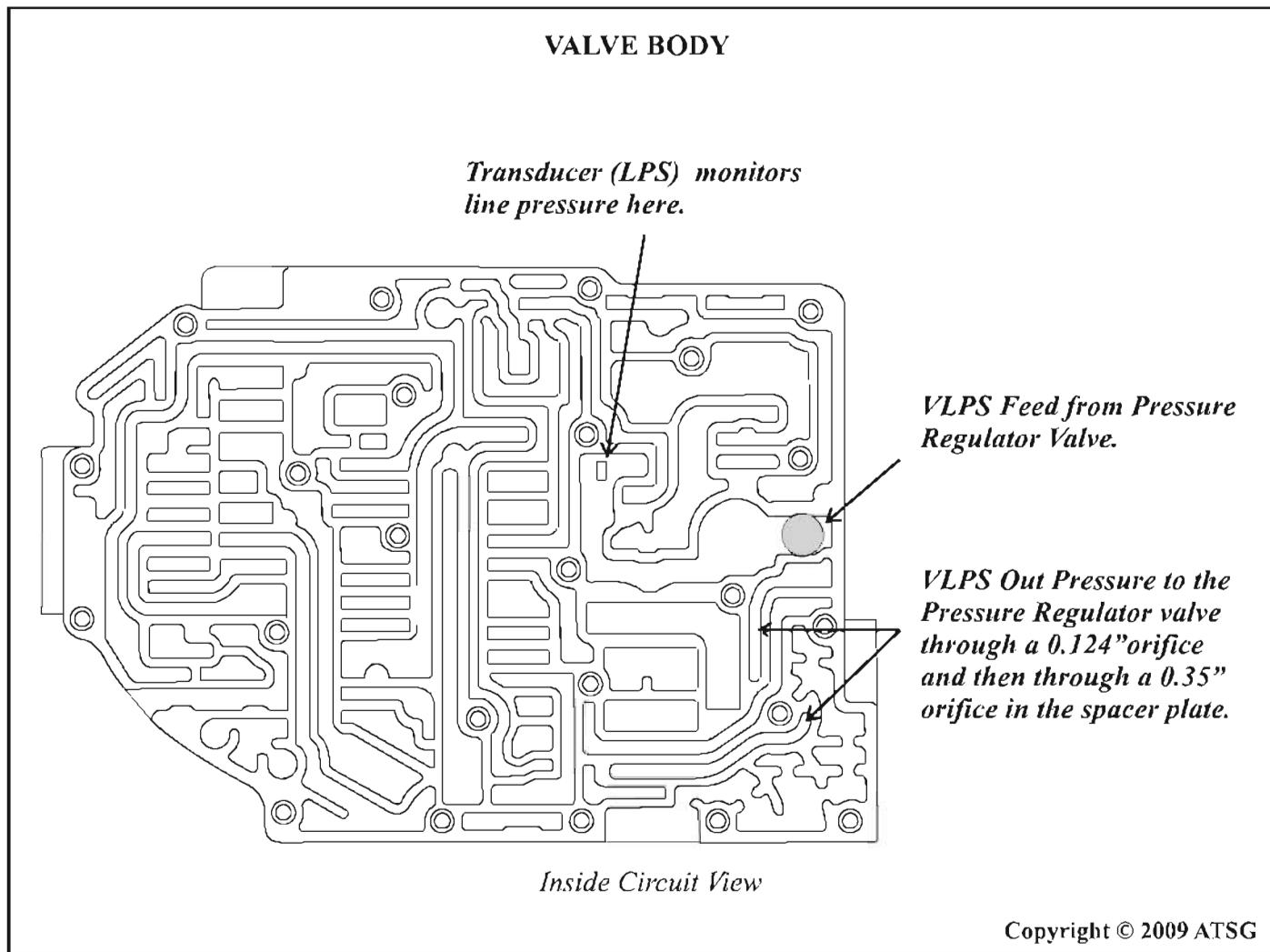


Figure 2

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

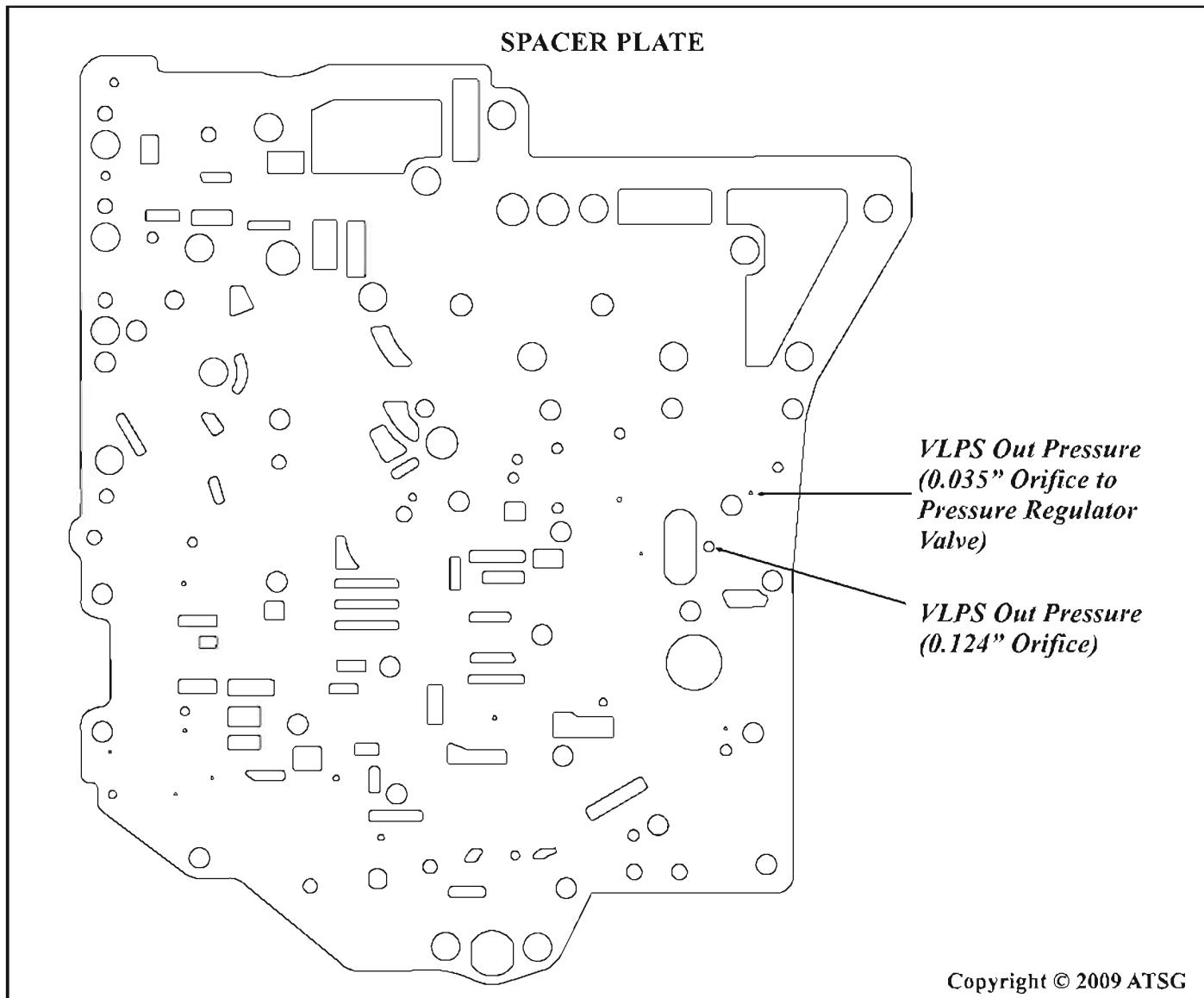


Figure 3

**CHRYSLER/DODGE 41TES/42RLE-VLP  
VARIABLE LINE PRESSURE SOLENOID AND SENSOR**

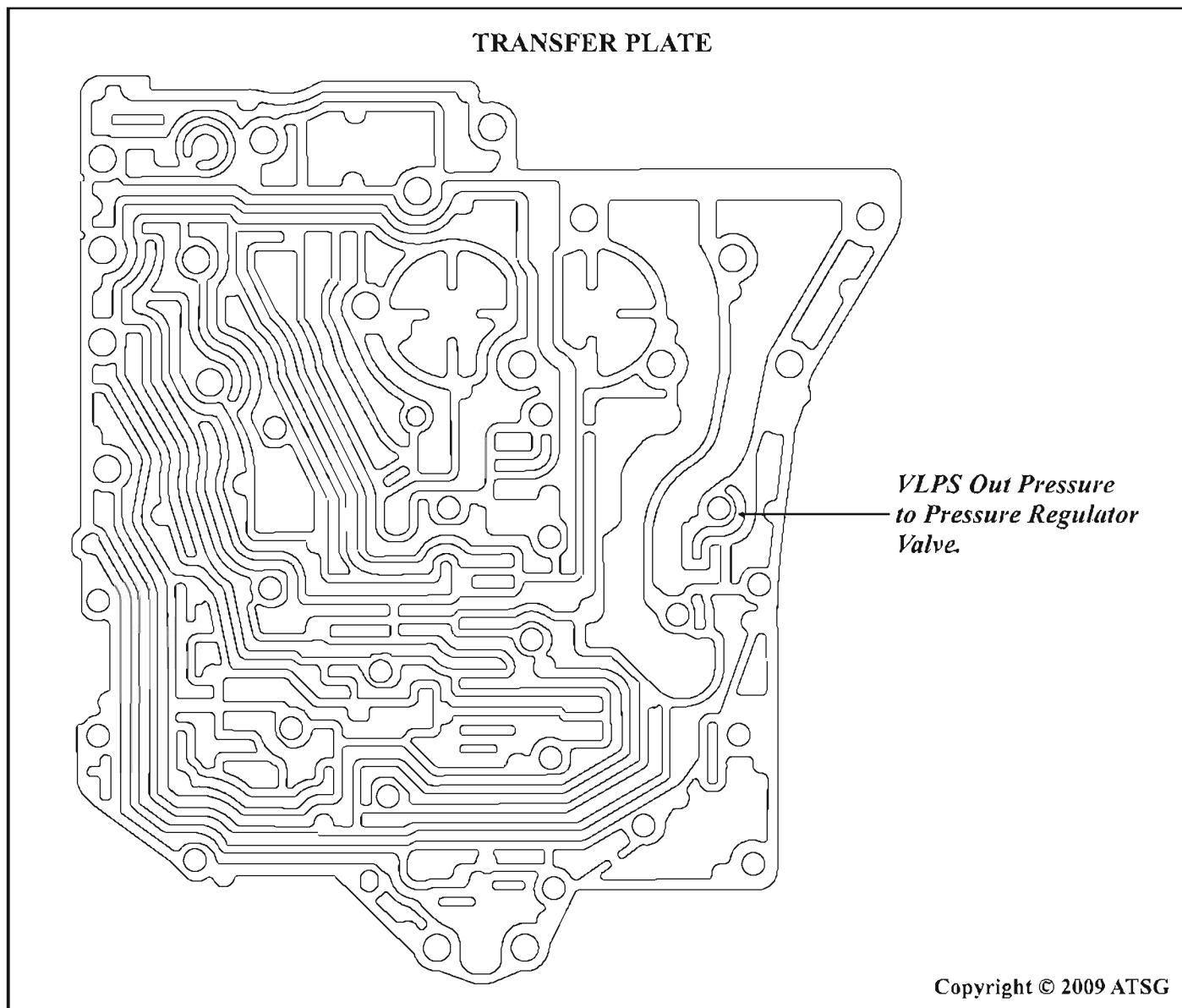


Figure 4

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

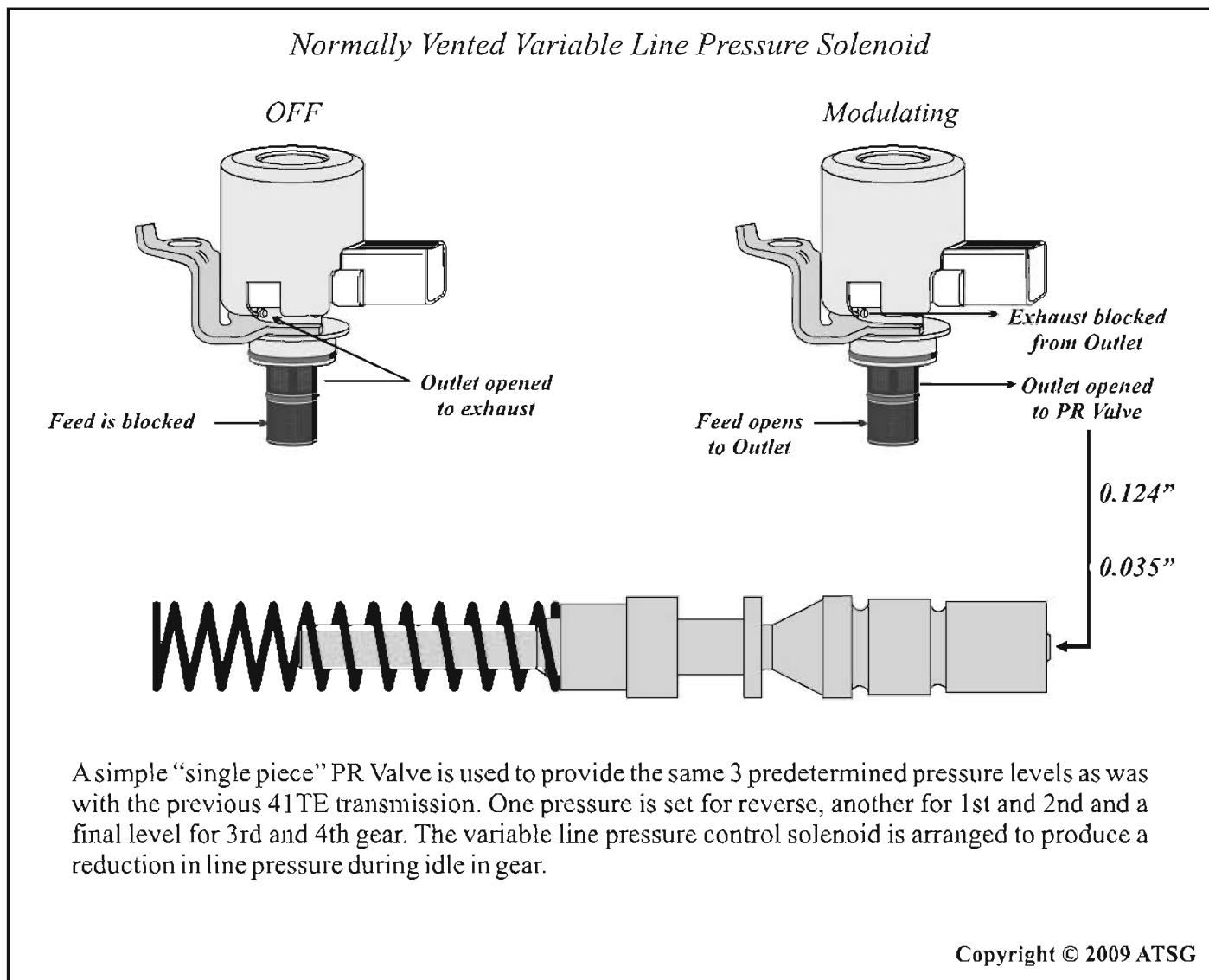


Figure 5

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

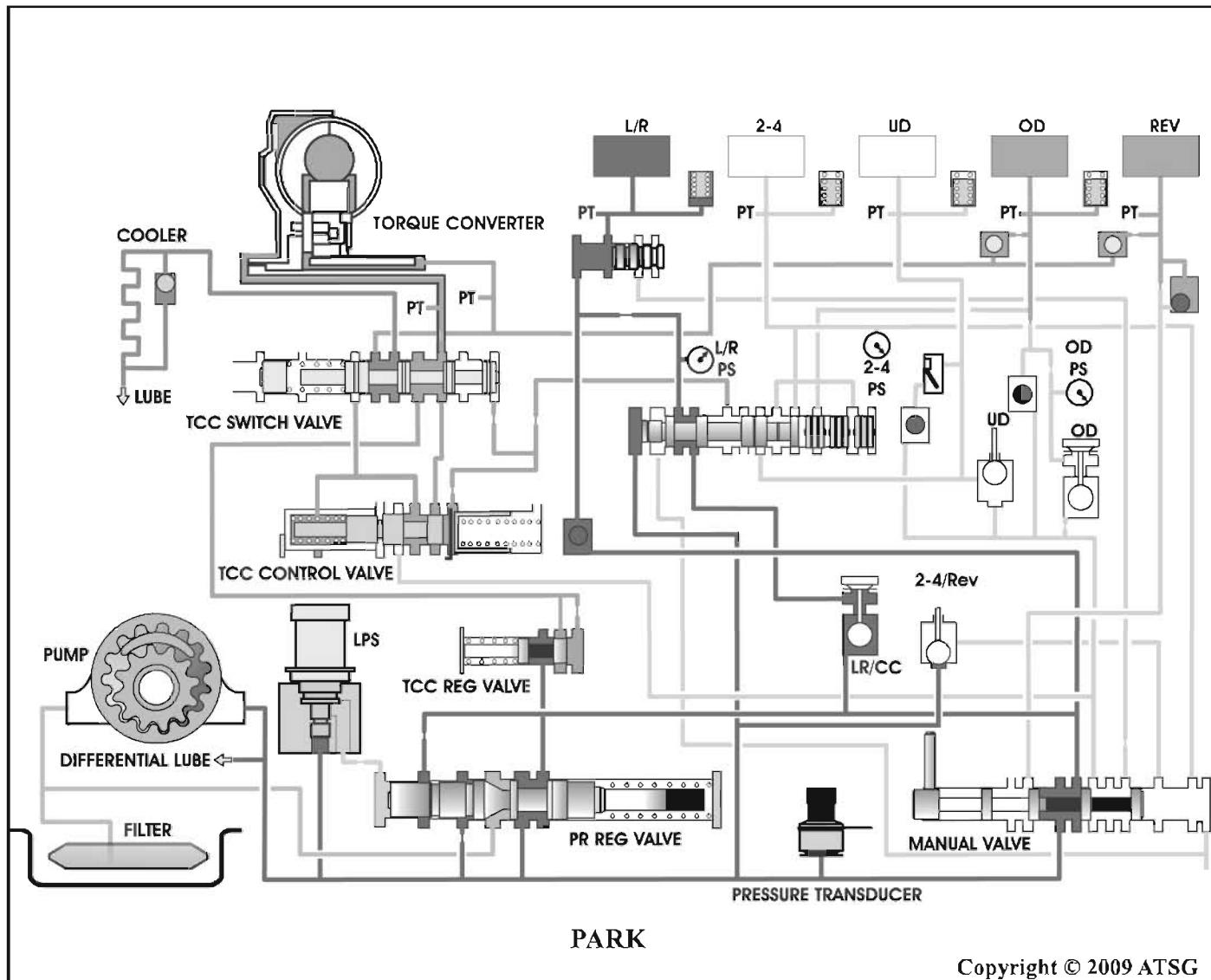
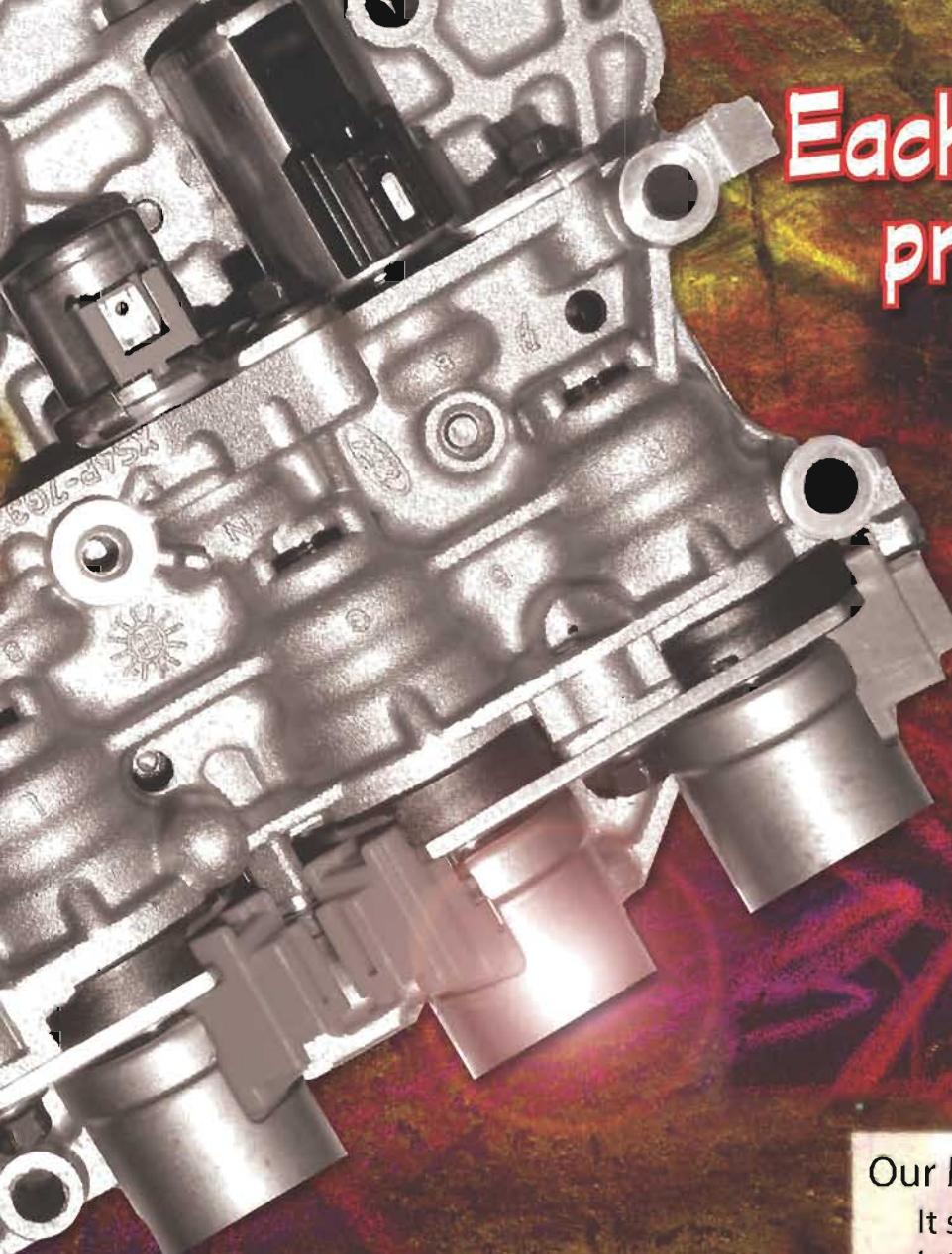
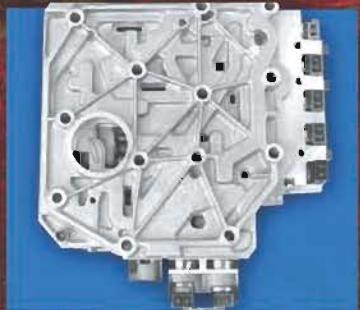


Figure 6



**Each of our  
products is a  
work of art.**



### Our Mission: **Your Satisfaction!**

It started with a vision, continued into a concept and manifested itself into **Valve Body Pro**, with true beliefs in 110% customer satisfaction and the absolute best quality. Because of that, we are able to provide to you, our customer, a one year warranty and pre and post tech support on our valve bodies.

# VALVE BODY **VPRO**

BUILT BY THE PROS FOR THE PROS

So, When Quality Matters,  
Call TOLL FREE 1.877.611.PRO (7767)  
[www.valvebodypro.com](http://www.valvebodypro.com)

- Reconstructed with the latest **PROVEN** industry components
- Valve bodies include solenoids and switches that are new or quality tested
- All valve bodies are run thru multiple shift cycles on the VBT 4000 tester
- Unparalleled Product support
- 12 Month unlimited warranty
- Shift kit® installations available upon request
- Custom applications available
- CD-ROM and Printed Catalog available
- Hundreds of valve bodies ready to ship

**fitzall**™  
By: TeckPak USA

**ESCOJA LA MARCA QUE QUEDA!**



**K56836**

A4LD LU Solenoide



**31285- GM Fittings**

Conecotor para 4L80E/4T80E posterior



**TFD-BJR**

98-presente para Ford,  
removedor de rótulas



**K77978SP**

Cable universal de 72" para  
700 y Mod. Mecanicos



**SF460XX-B**

Ajustador para bolante trans.  
standard para Ford duty mediano



**#7-35A** - 4x4 700-R4 a 350

Ninguna modificación adicional es necesaria  
'82-'92

**BUENAS IDEAS  
QUE TE MANTIENEN  
EN LA CARRETERA!**

**PREGUNTE**

**POR LOS  
PRODUCTOS  
GENUINOS DE**



**SOLUCIONES  
ELÉCTRÓNICAS**

**CONEXIONES  
DE CABLE**

**CONNECTOR PARA LINEA  
DE ENFRIAMIENTO**

**SOLUCIONES PARA  
PROBLEMAS MANUALES**

**ENRAMIENTAS**

**PROJECTO ESPECIALES  
CONVERSION**

**SOLUCIONES PARA  
PROBLEMAS AUTOMÁTICOS  
Y MÁS**



**A7474IQ**

Válvula ayuda a coregir  
TCC P1870 código adaptado  
para 4L60E '95-'00

**POR FAVOR, VISITE NUESTRA PAGINA DE WEB PARA VER NUESTROS NUEVOS PRODUCTOS TECKPAK/FITZALL**

Toll Free: 1.800.527.2544 • Voice: 573.785.8238 • Fax: 573.785.3303 • [www.teckpak-fitzall.com](http://www.teckpak-fitzall.com)

**fitzall**™  
By: TeckPak USA

**CHOOSE THE BRAND THAT FITS!**



**K56836**

A4LD LU Solenoid



**31285- GM Fittings**

Fits AL80E Rear Case Fitting  
4T80E Second Design



**TFD-BJR** - 98-up Late Model  
Front Wheel Drive Ball Joint Remover



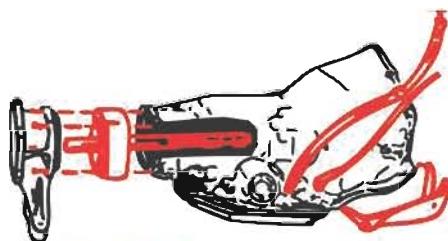
**K77978SP**

New Longer 72" Cable for  
Performance Applications



**SF460XX-B**

Ford Medium Duty Flywheel Shim



**#7-35A** - 4x4 700-R4 to 350  
No Speedometer Change Necessary  
'82-'92

**GREAT IDEAS  
THAT KEEP YOU  
ON THE ROAD!**

**ASK**

FOR GENUINE  
**fitzall**™  
By: TeckPak USA  
PRODUCTS

ELECTRONIC  
SOLUTIONS

CABLE  
CONNECTIONS

COOLER LINE FITTING

MANUAL  
PROBLEM SOLUTIONS

TOOLING

SPECIALTY CONVERSION

AUTOMATIC  
PROBLEM SOLUTIONS  
AND MORE!



**A7474IQ**

4L60E '95-'00 Also  
Available for 2001 & Up

PLEASE VISIT OUR WEBSITE TO CHECKOUT OUR **NEW PRODUCTS**

**TECKPAK/FITZALL**

Toll Free: 1.800.527.2544 • Voice: 573.785.8238 • Fax: 573.785.3303 • [www.teckpak-fitzall.com](http://www.teckpak-fitzall.com)

# When is the last time a group of techs agreed on anything?



We certainly can't remember, but one thing they do agree on—TRNW is a must-have service for today's transmission repair facilities.

TRNW is a world-wide network of transmission technicians and transmission shop owners who discuss every aspect of running a transmission repair facility.

Members interact on everything from rebuilding tips, diagnostic help, parts locating, and the art of operating and managing a full-service transmission shop.

TRNW is like having 500 years of experience at your fingertips. No job is too difficult!

TRNW members unite together to help solve the most complicated problems from today's complex, fully electronic, automatic transmissions.

Becoming a member is easy, convenient, and safe. We use the latest Verisign™ secure encryption technology currently available. View our Privacy and our Refund Policies on our website.



<http://www.trnw.net>

© 2007 Transmission Rebuilders Network Worldwide

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

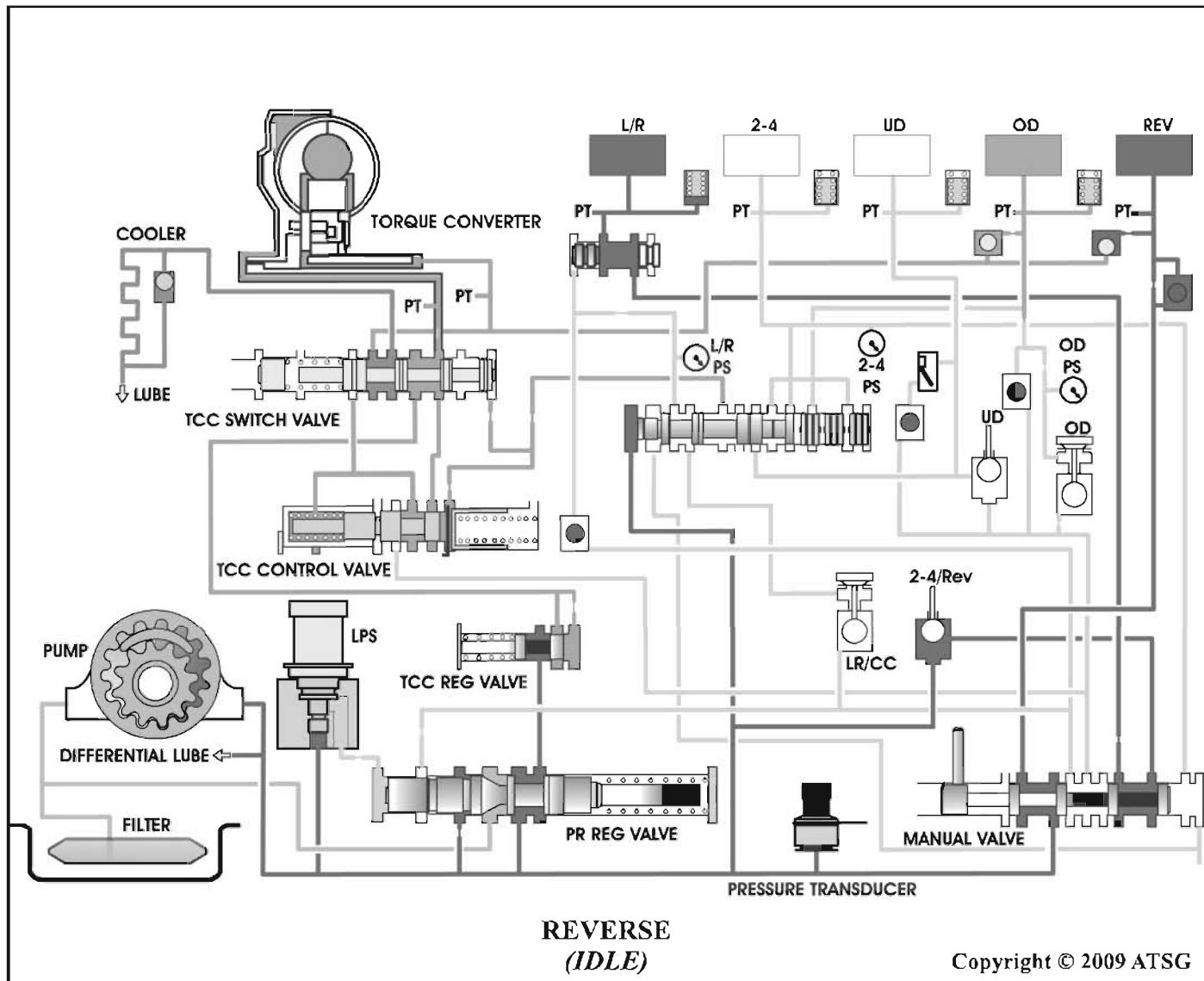


Figure 7

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

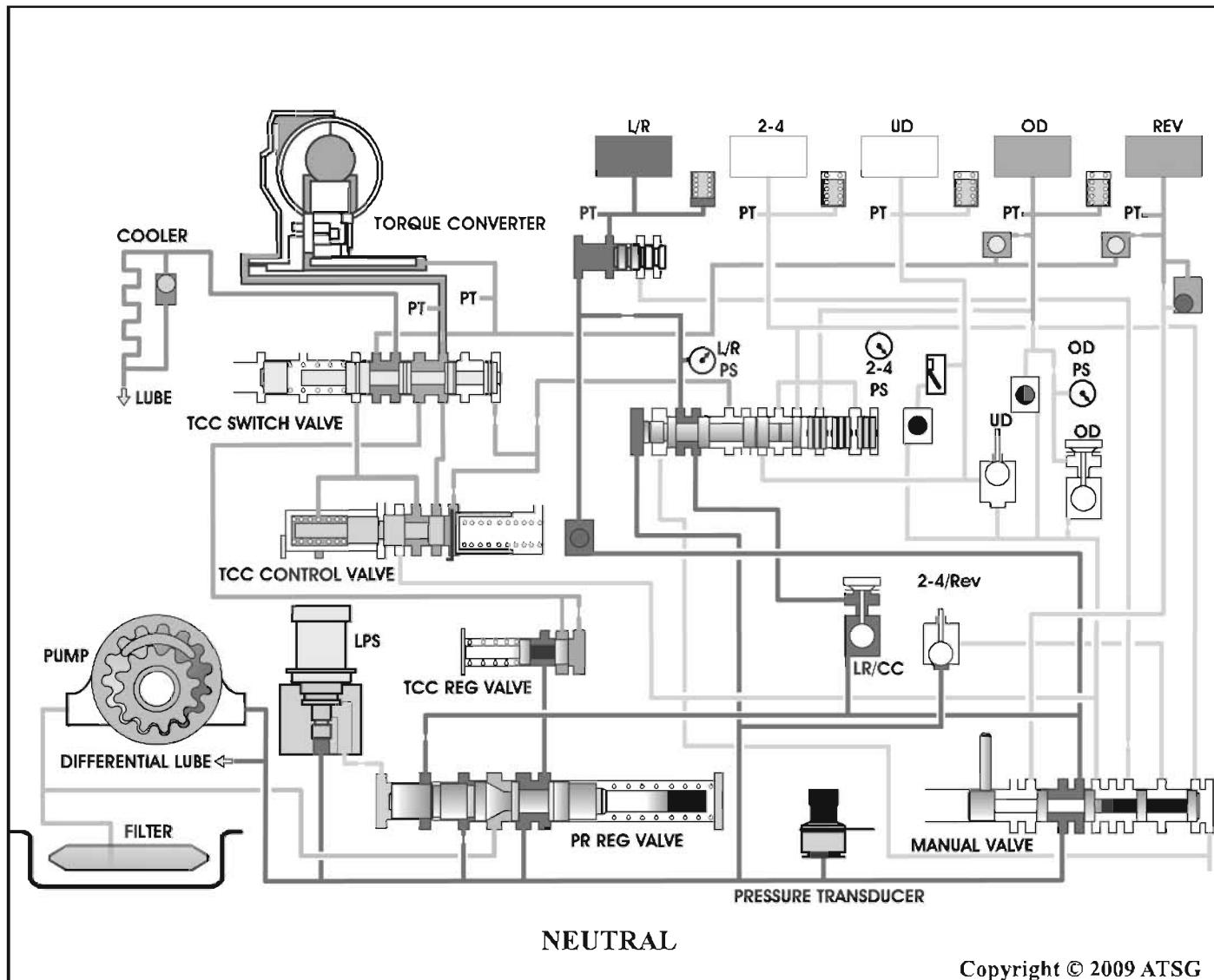


Figure 8

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

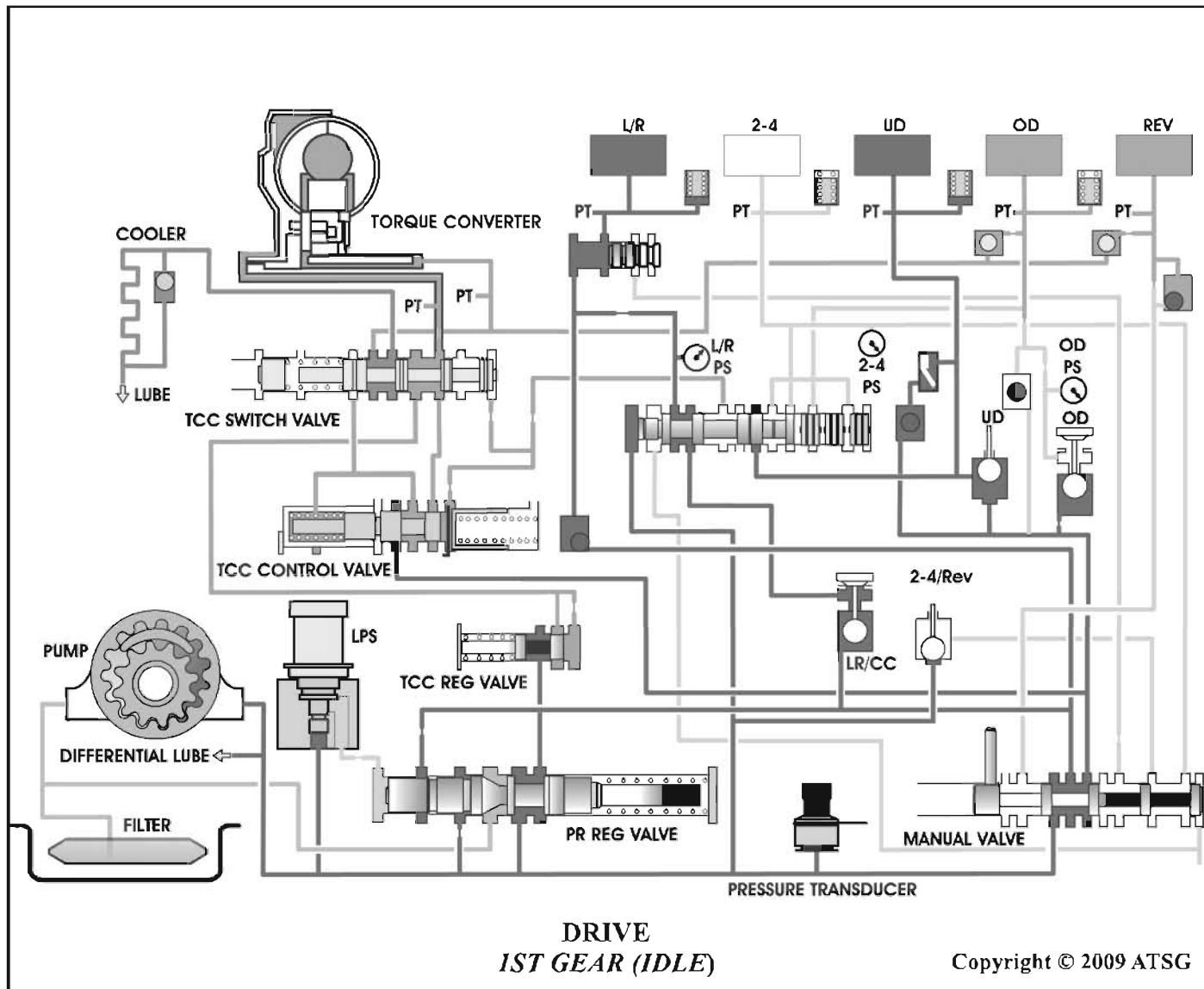


Figure 9

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

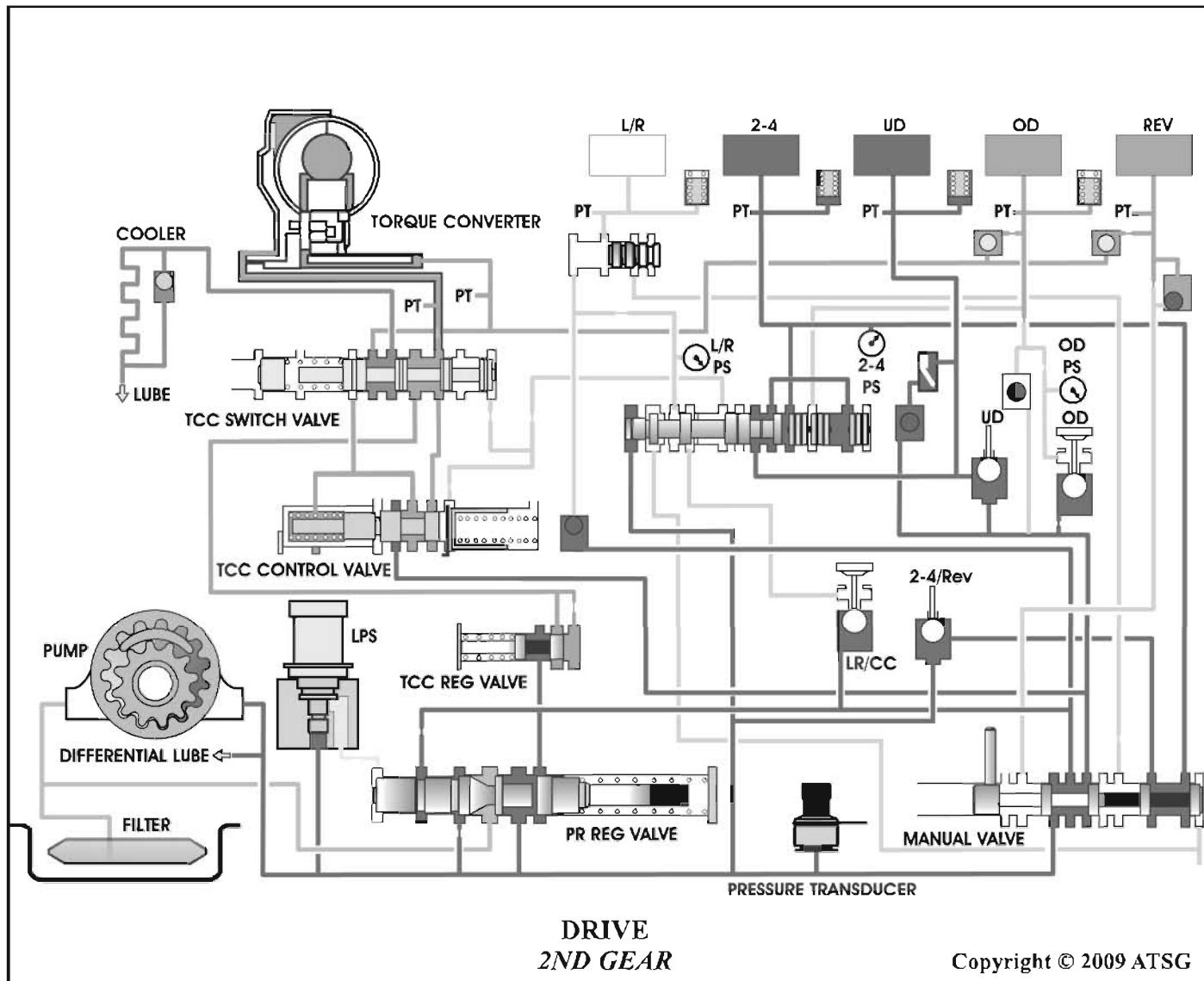


Figure 10

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

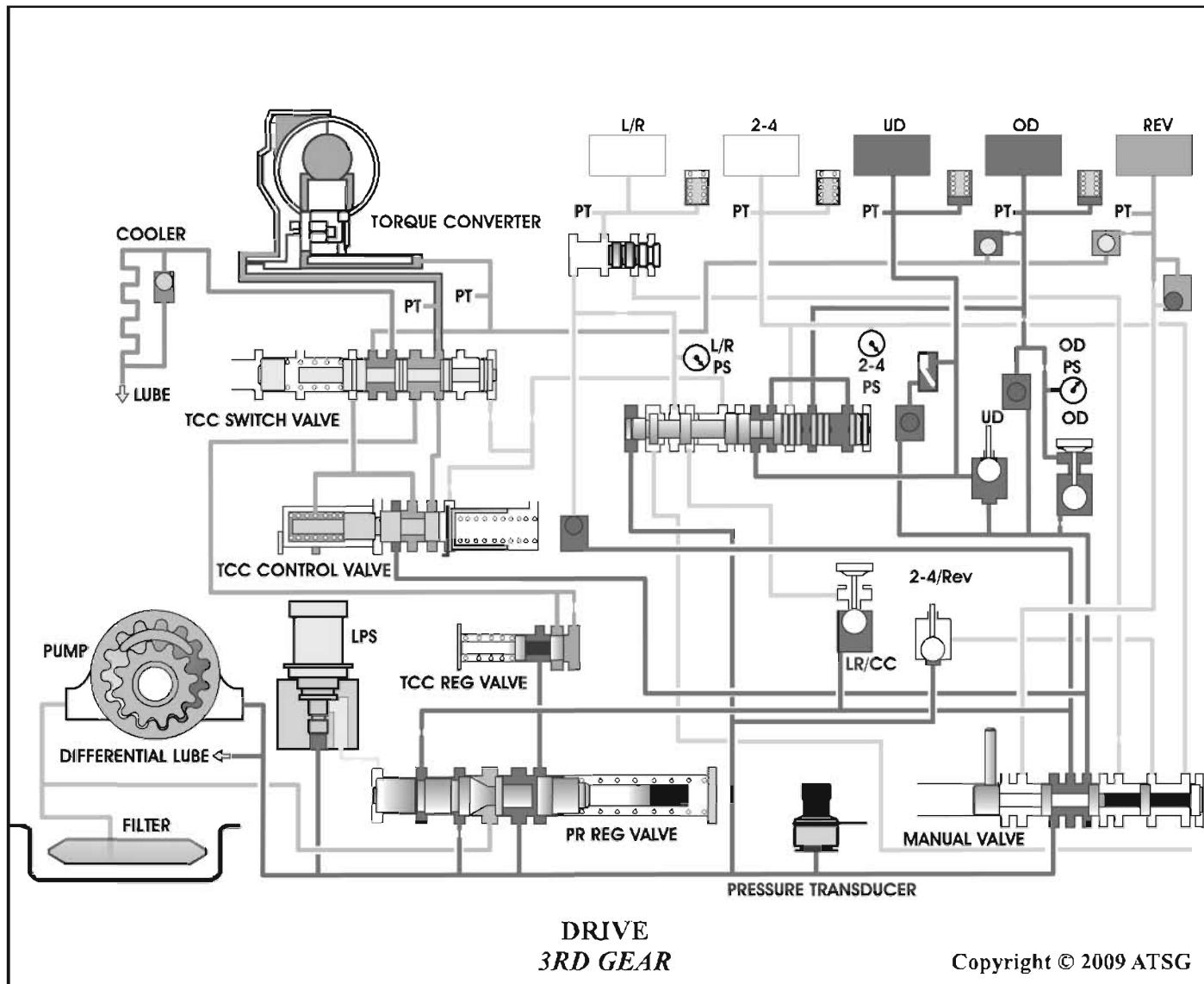


Figure 11

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

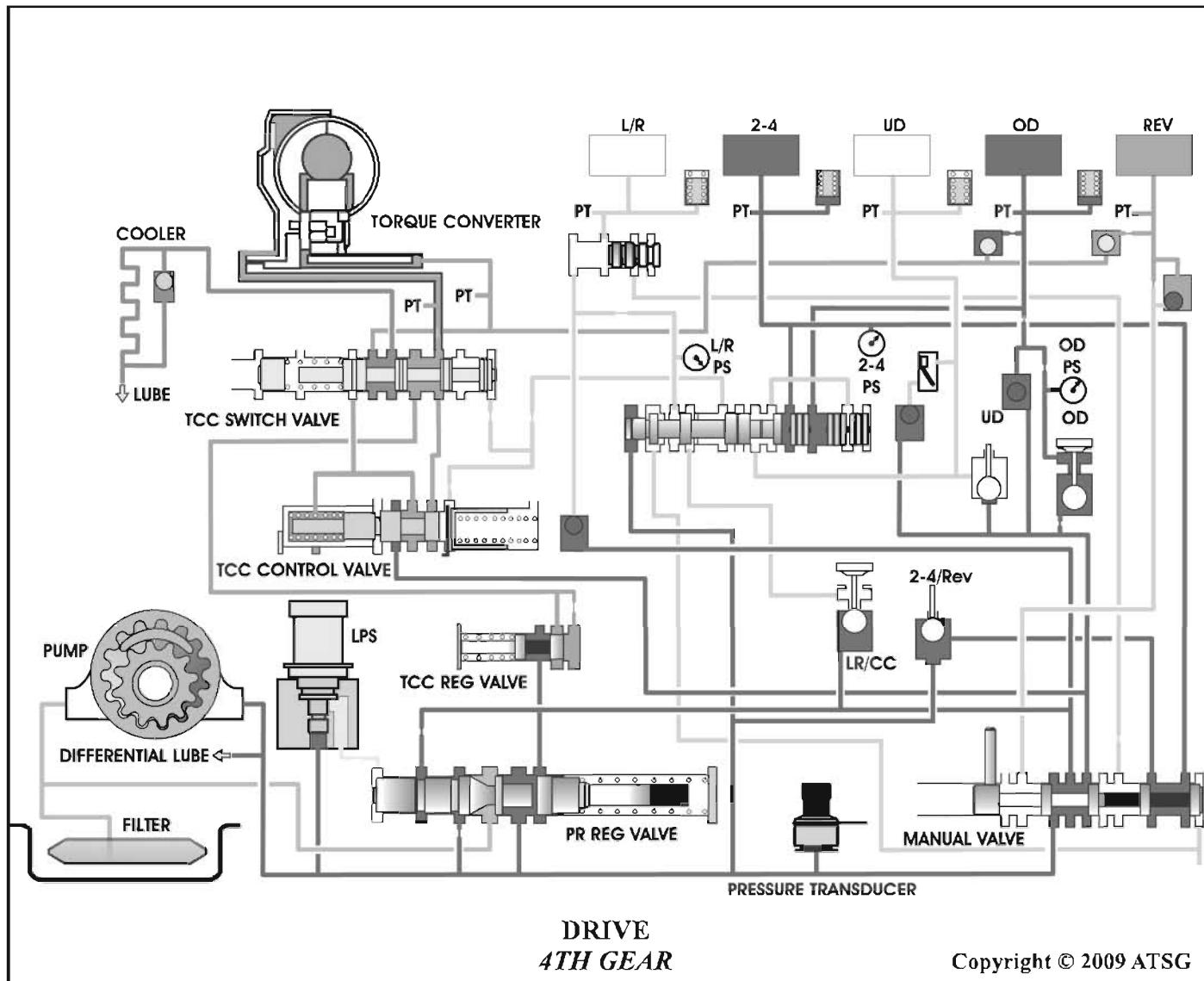


Figure 12

## CHRYSLER/DODGE 41TES/42RLE-VLP VARIABLE LINE PRESSURE SOLENOID AND SENSOR

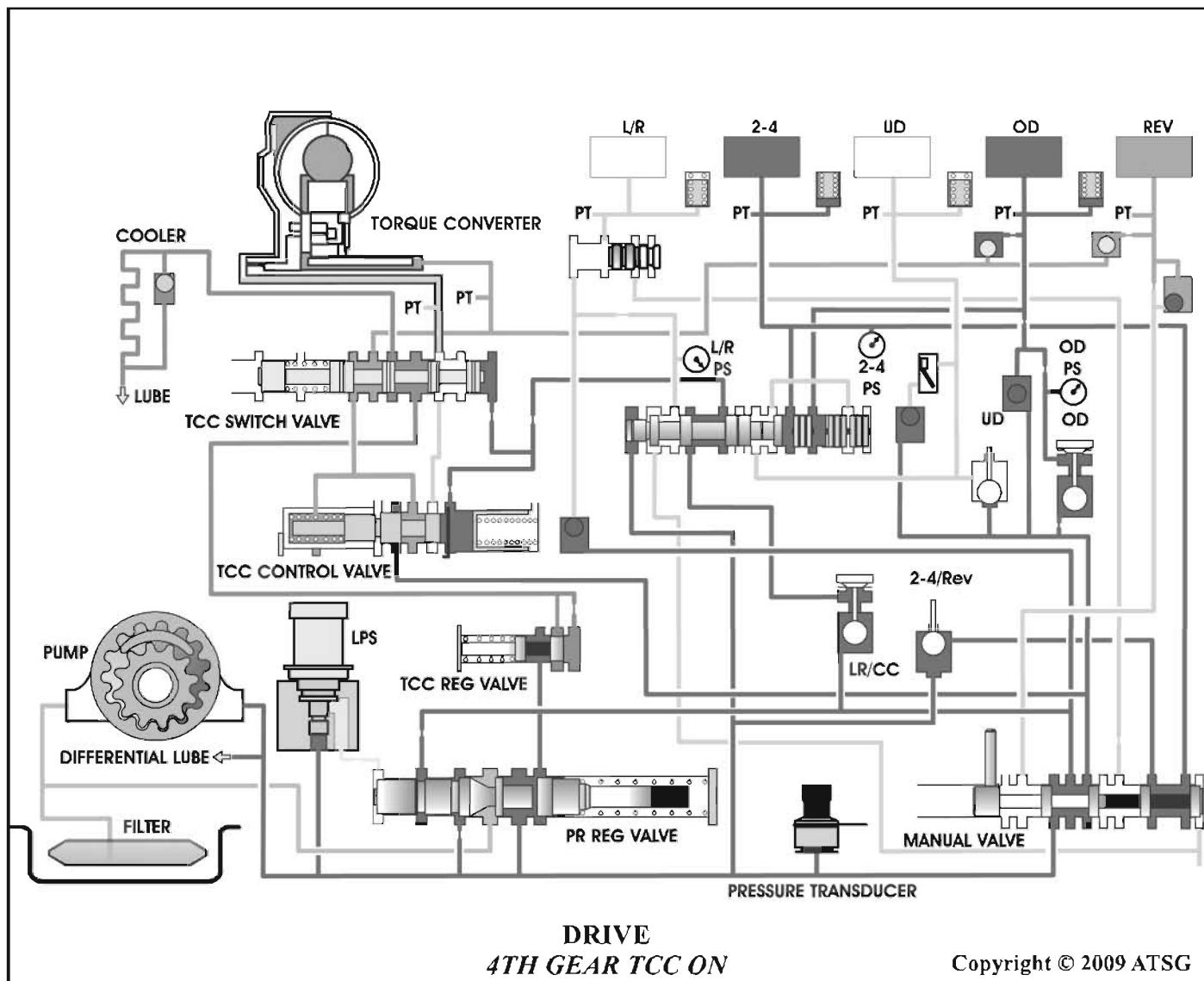


Figure 13

**DODGE/JEEP 42RLE  
LOW POWER IN REVERSE**

**COMPLAINT:** A 2005-2006 Dodge truck or Jeep equipped with the 42RLE transmission comes in with a complaint of a lack of power when backing up an incline with the vehicle loaded or when pulling a trailer. A scan of the PCM may produce Code P1713 "Restricted Manual Valve In T2 Range" or P1776 "Solenoid Switch Valve Latched In The L/R Position".

**CAUSE:** Incorrect PCM software hinders hill climb capability in reverse.

**CORRECTION:** Selectively erase and reprogram the PCM with new software revision level 63.3 or higher.

**SERVICE INFORMATION:**

*Chrysler TSB .....* **21-005-07**



**CHRYSLER  
CORPORATION**

**P/N:**

**0000000000**

**DLR CODE:**

**XXXXXXX**

**DATE:**

**03/20/07**

**AUTHORIZED SOFTWARE UPDATE LABEL**

Copyright © 2009 ATSG

## NEW PRODUCT

**D-CF1 Transtar part number A12432H**

### **Chrysler "RE" Governor Solenoid to GM Pressure Control Solenoid Conversion**

This kit was specifically designed to improve the reliability of the Governor solenoid in normal use and to handle higher base pressure in high performance applications.

*Refer to figure 1 for the contents of the new Governor Solenoid and Manifold.*

*Refer to figure 2 for a view of the previous design Governor Solenoid and it's components.*

*Refer to figure 3 to see that the new Manifold can be used with early and late Transducer.*

*Refer to figure 4 for a view of the new Manifold and Solenoid installed.*

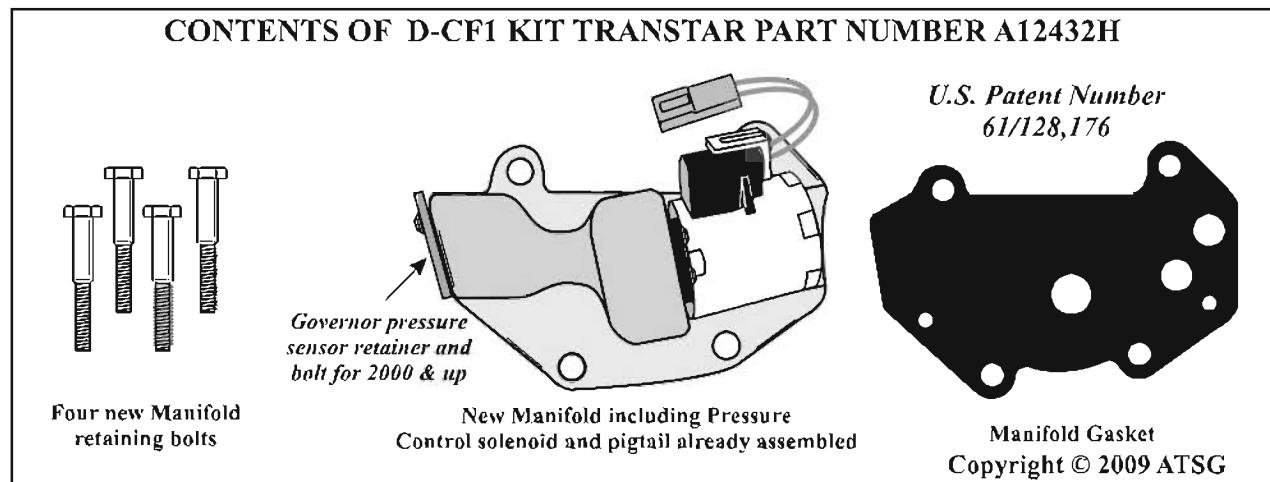


Figure 1

### *Previous Design Governor Solenoid*

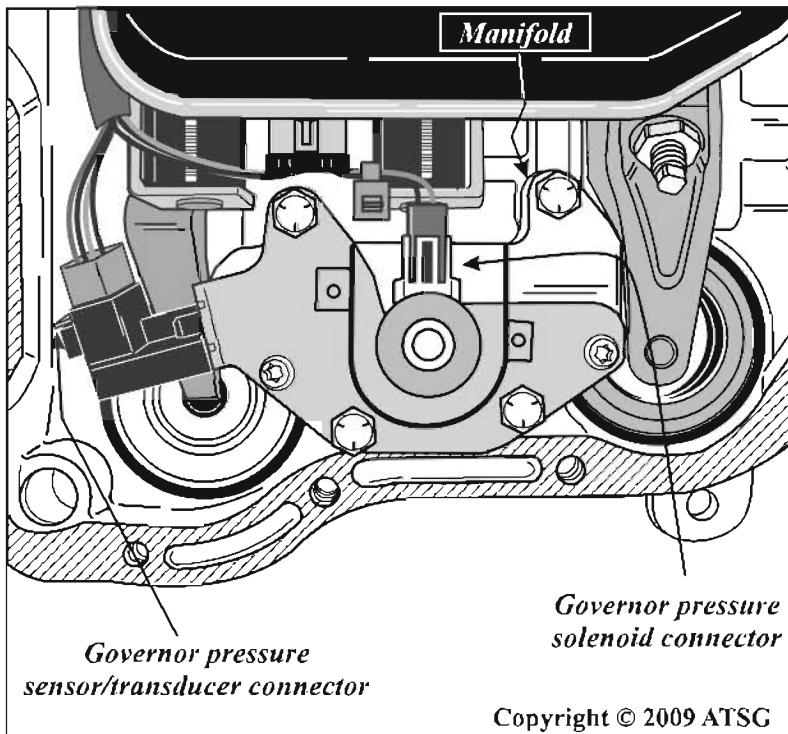


Figure 2

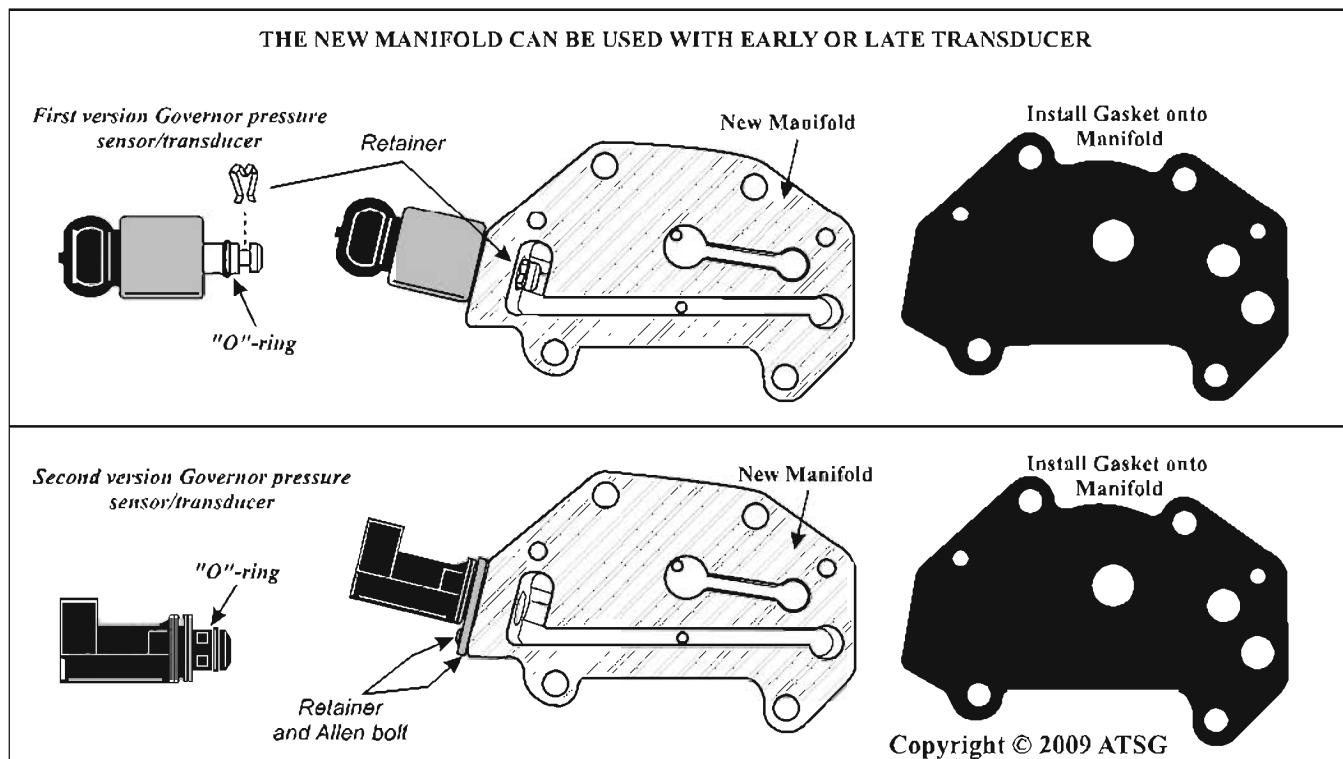


Figure 3

### *New Design Governor Solenoid and Manifold Installed*

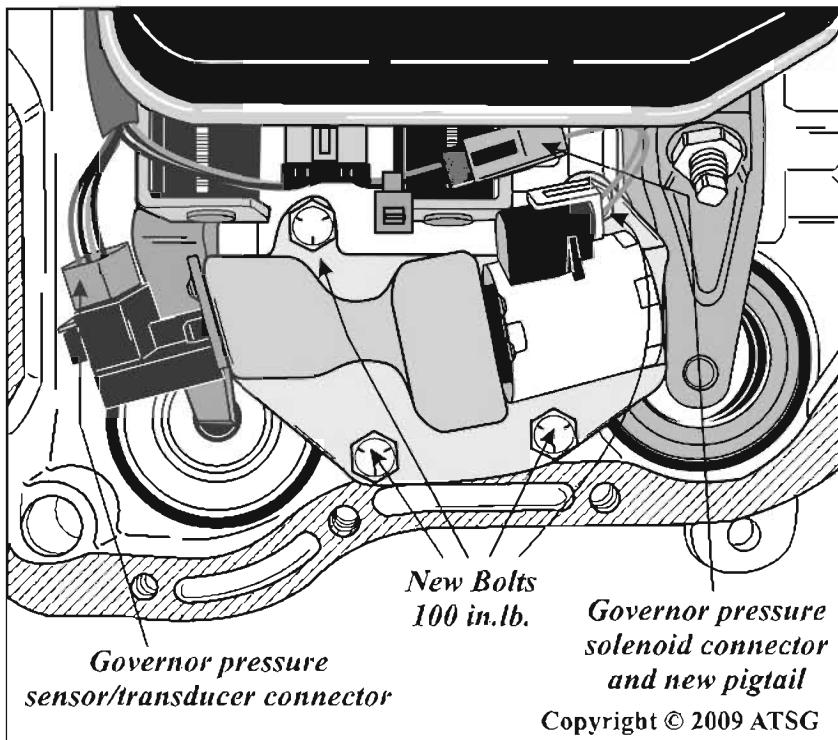


Figure 4



## DODGE TRUCKS 45RFE DTC P0715 AND/OR SLOW PRNDL RESPONSE

**COMPLAINT:** 2000-02 Dodge trucks equipped with the 4.7L V-8 and the 45RFE transmission may exhibit a loss of Turbine shaft signal resulting in a DTC P0715 and or a complaint of slow PRNDL response on the indicator in the dash. **Note:** this problem can be intermittent or happen more frequently when hot.

**CAUSE:** The cause may be a faulty capacitor in the auto shutdown relay circuit, allowing a small short to power on the Transmission Control Module main ground circuit at G115 ground location. **Note:** The capacitor ground strap is installed on top of the TCM grounds at ground location G115. When the capacitor fails, the main TCM grounds will be faulty, which can be checked at terminal 53, 39, 37 and 57 at the TCM, voltage to ground should be below 0.1 volt. See figure 1 for a partial TCM wire schematic. Ground problems typically will show up on terminal 13 at the TCM which is the internal ground provided for the turbine and output shaft speed sensors as well as the transmission fluid temp sensor. This terminal has shown up readings as high as 1.0v. This can cause problems with the Turbine shaft speed sensor signal to be erratic or fall off at high rpm. There have also been complaints of a slow response in the PRNDL display on the dash, because of the main ground problems. Figure 2 shows a wiring diagram of the capacitor in the auto shutdown relay circuit, and notice that the feed to the capacitor is from a 30 amp fuse. The capacitor is used as a noise filter for the injectors and coil over plug circuits. The problems that are listed above have shown up as the capacitor and its internal diode are failing.

**CORRECTION:** Using the part number provided below under service information, replace the capacitor (Figure 3). Refer to Figure 4 for a view of the new design capacitor. **Testing:** the capacitor can be tested by simply disconnecting it to see if the symptoms dis-appear. ATSG strongly recommends replacement. **Note:** ATSG has also had situations where the turbine shaft speed signal continued to be a problem even after replacing the capacitor and the harness for the TSS circuit proved good. In these instances the TCM will have to be replaced.

### SERVICE INFORMATION:

CAPACITOR (Dodge part number).....56028644AB

*Special thanks to  
Jim Blatt of Lee Myles*



## TYPICAL 45RFE WIRING (Durango, Dakota and Ram)

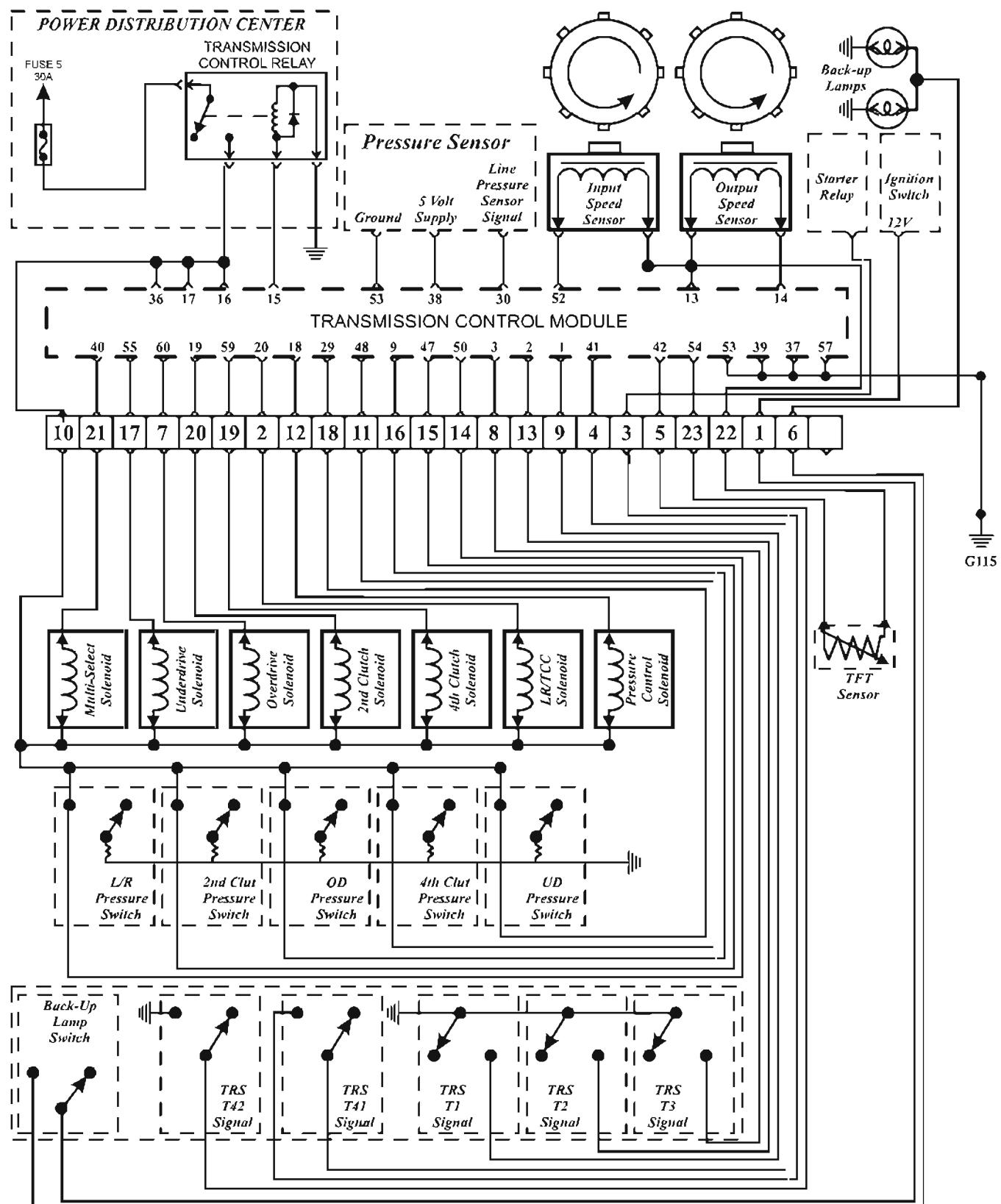
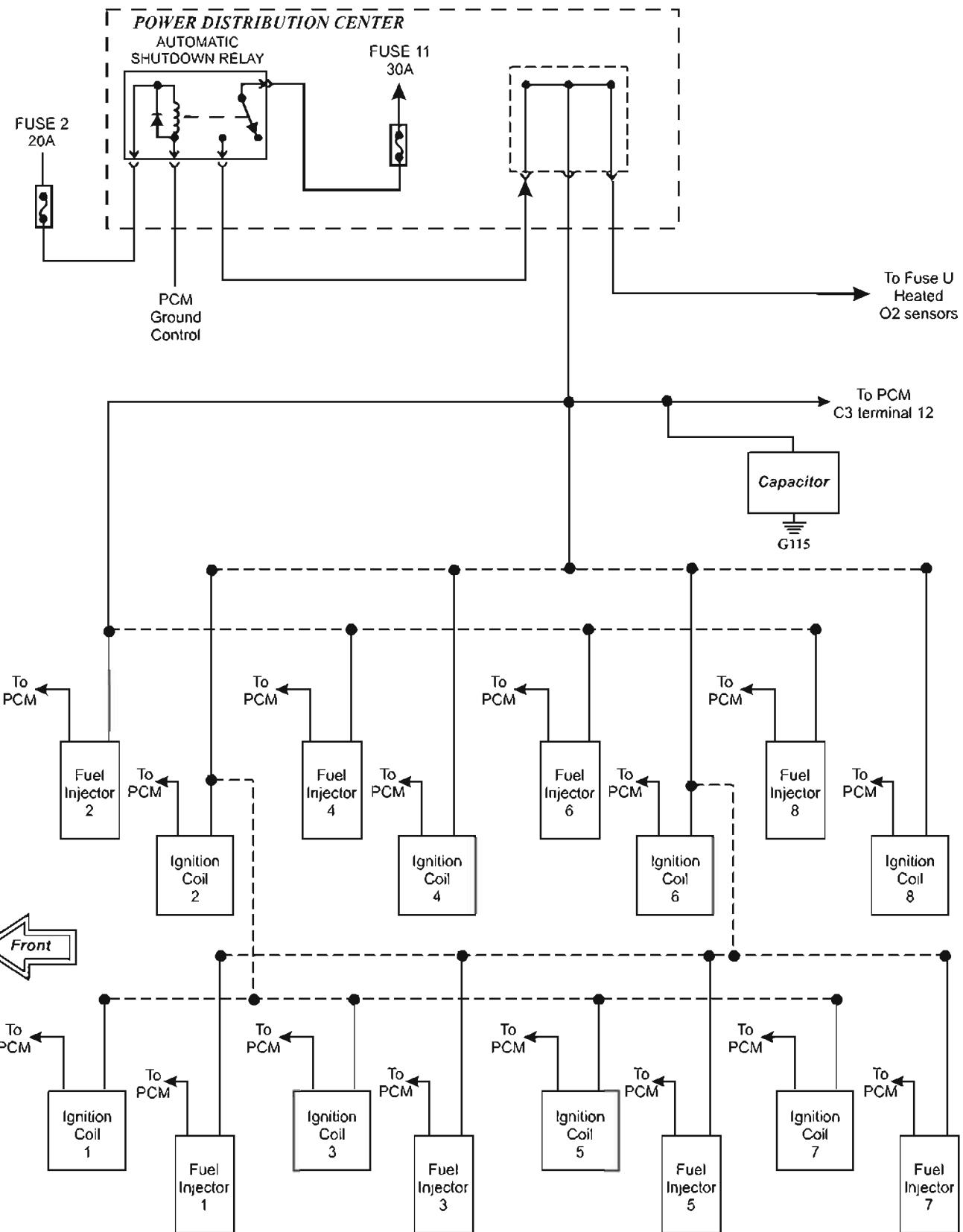


Figure 1



## AUTO SHUTDOWN RELAY PARTIAL CIRCUIT DIAGRAM

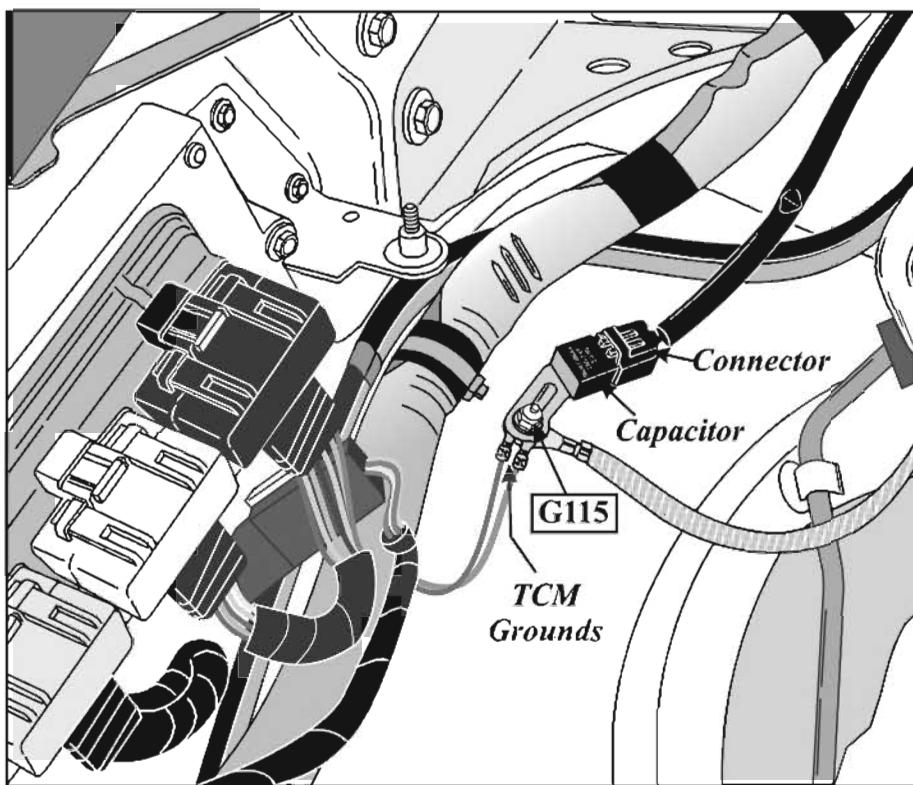


*Note: The splices shown above are vehicle dependant and are shown in a simplified version*

Copyright © 2009 ATSG

Figure 2  
Automatic Transmission Service Group

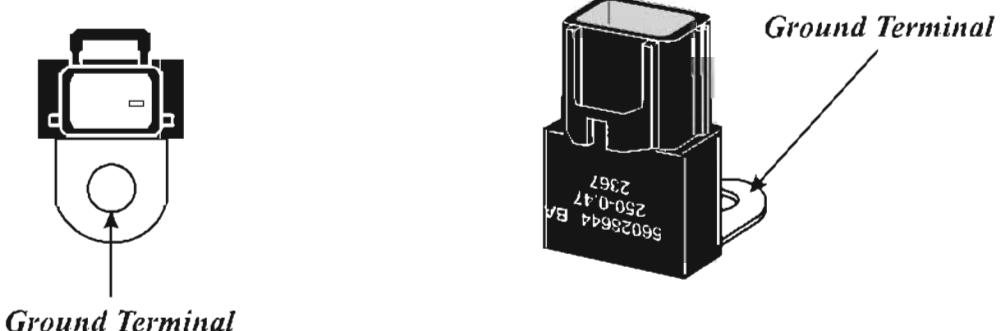
## CAPACITOR AND G115 LOCATION



Copyright © 2009 ATSG

Figure 3

## CAPACITOR 56028644AB

*Face view*

Copyright © 2009 ATSG

Figure 4



## 45RFE

### PUMP & PUMP COVER CHANGE

**CHANGE:** A running change was made to the 45/545RFE front pump and pump cover during the 2007 model year.

**PARTS AFFECTED:**

- (1) The previous design pump housing is aluminum and had a machined front hub with the front seal retained by the hub.
- (2) The pump cover an inner and outer seal and was retained by two snap rings at the inside and outside diameters. (Refer to figure 1).
- (3) The new design pump is steel and has no front hub, therefore it does not retain the front seal.
- (4) The pump cover now retains the front seal and is itself retained with only an outer snap ring, (Refer to figure 2).

**INTERCHANGEABILITY:**

The new design pump and cover will back service all models as a complete assembly.

**HOWEVER**, the pressure regulator valve spring for 1999 to 2002 is different than the spring used for 2003 and later models. These springs are **NOT** interchangeable.

If a 1999 to 2002 PR Valve Spring is used in a 2003 or later model, There will be a delayed engagement into drive and reverse.

Some 1999 to 2006 transmissions that have been factory re-manufactured, and have had the pump and cover replaced, may have the new design parts installed.

**NOTE:** The Steel pump cover will be stamped "45RFE" in order to differentiate it from the similar in appearance "68RFE" pump cover.

**SERVICE INFORMATION:**

<i>2007 &amp; Later Pump &amp; Steel Pump Cover.....</i>	<i>68009879AB</i>
<i>2003 - 2006 Aluminum Pump &amp; Cover.....</i>	<i>5073004AB</i>
<i>1999 - 2002 Aluminum Pump &amp; Cover.....</i>	<i>5072589AC</i>

## 45RFE

### PUMP & PUMP COVER CHANGE

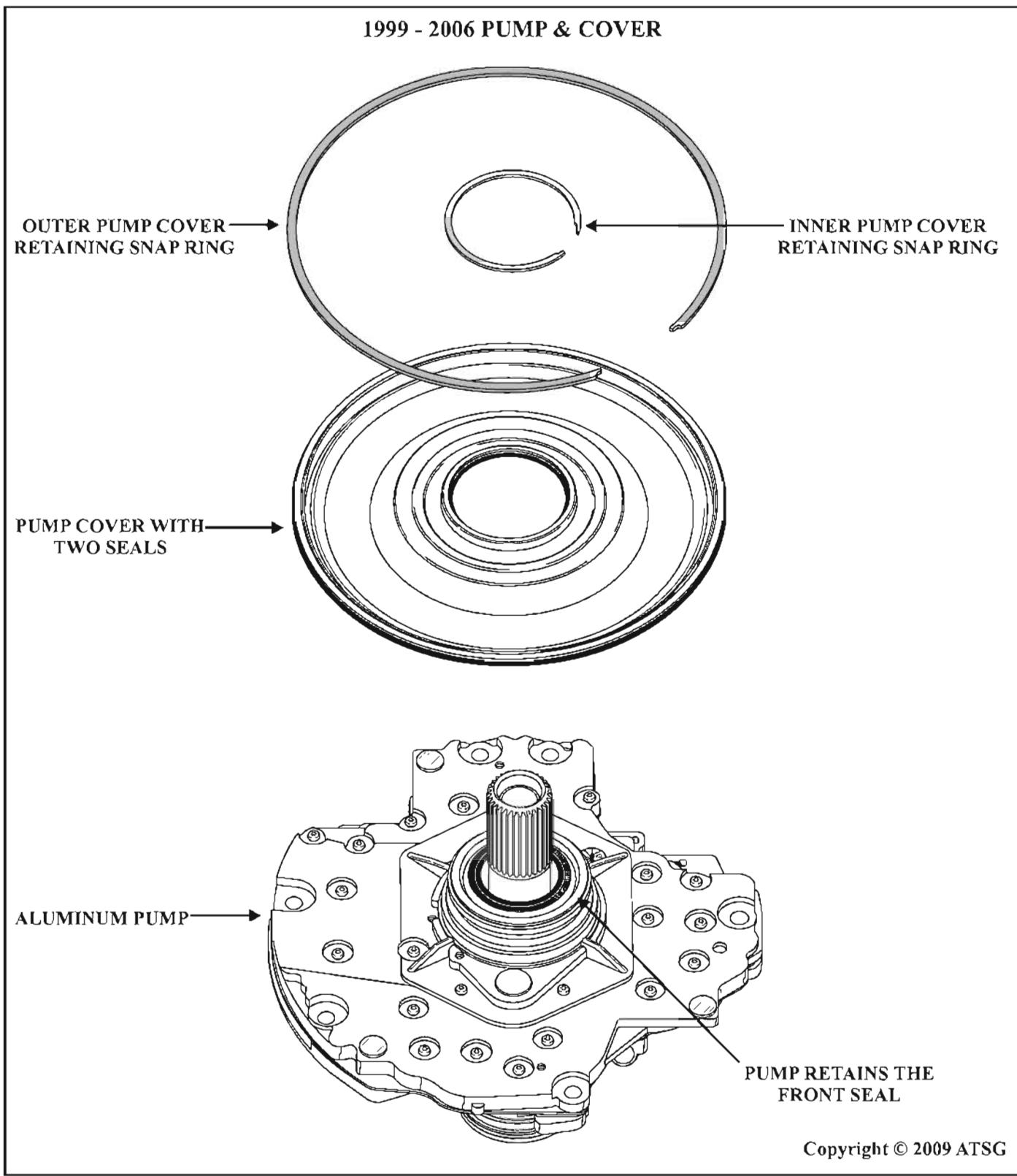


Figure 1

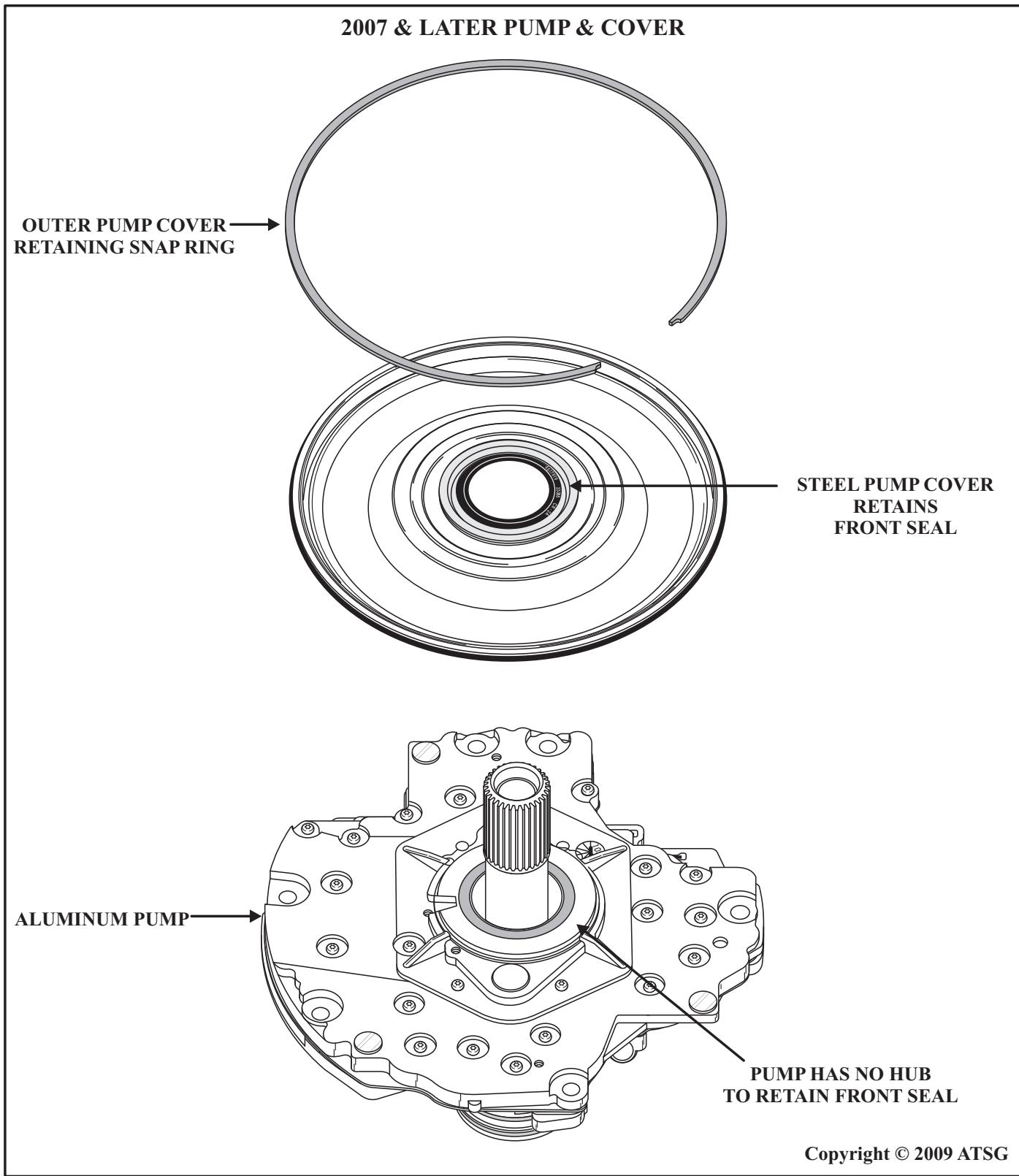
**45RFE**  
**PUMP & PUMP COVER CHANGE**

Figure 2



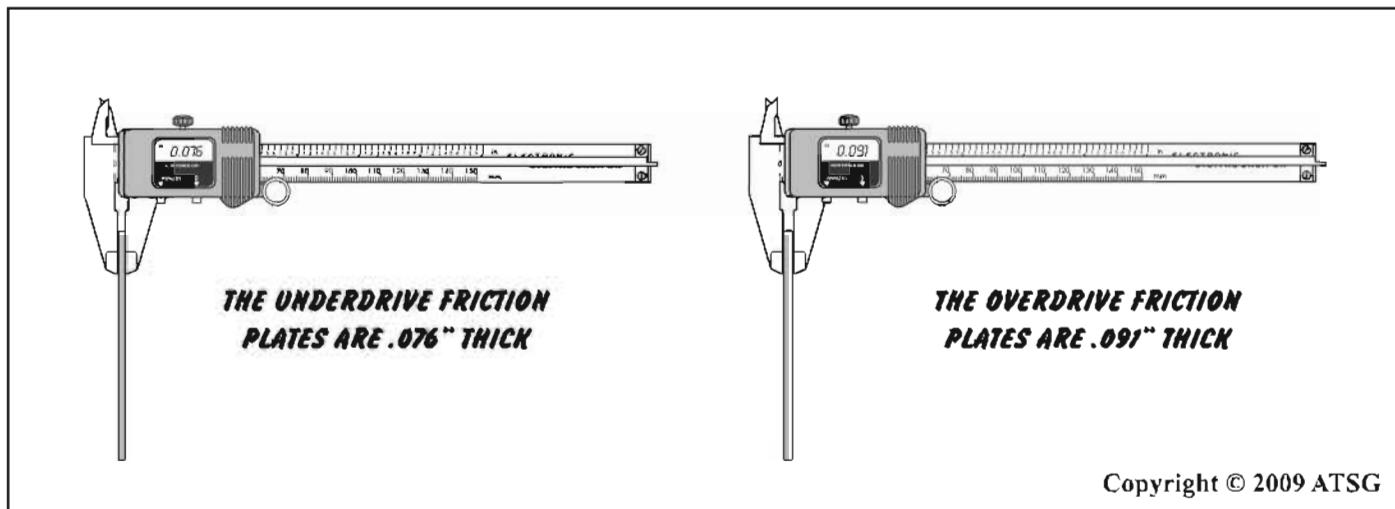
## 45RFE-545RFE PULLS FORWARD IN NEUTRAL

**COMPLAINT:** After overhaul, the transmission moves forward with the manual shift lever in the neutral position. When reverse is selected, the transmission is bound up.

**CAUSE:** The underdrive friction plates are .076" thick and the overdrive friction plates are .091" thick, (Refer to figure 1). The internal tooth configuration is identical on both,(Refer to figure 2), therefore they can easily be swapped with one another. When this is done the underdrive clutch is mechanically locked on resulting in the above complaints.

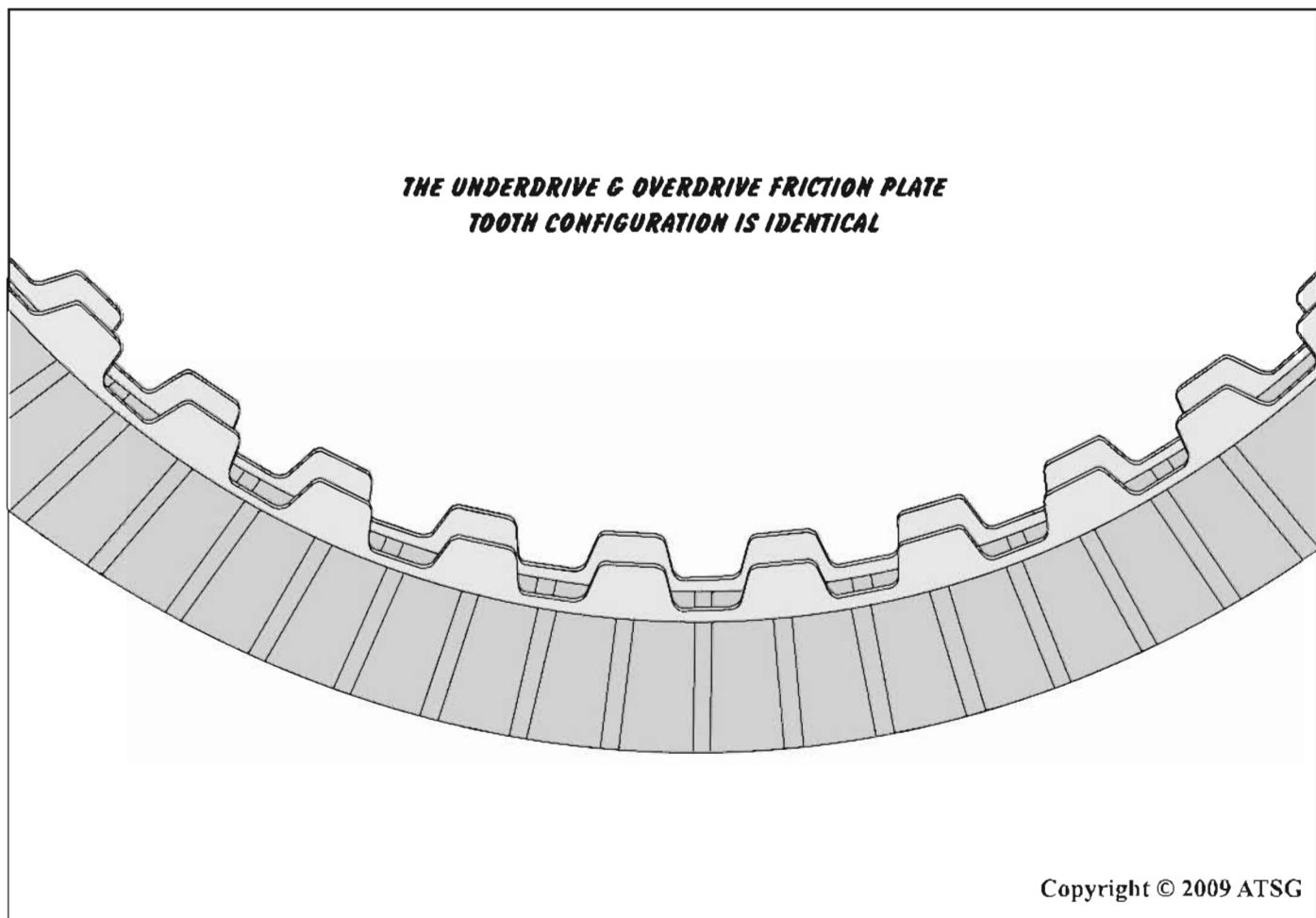
**CORRECTION:** Make certain that the thinner underdrive friction plates are stacked in the underdrive clutch pack, (Refer to figure 3).

Care must also be taken with the steel plates as they both have the same 12 tooth configuration and has an approximate 5.440" outer diameter. However, the underdrive steel plates are .067" thick and the overdrive steel plates are .086" thick. In addition, the reverse clutch steel plates are the same thickness as the underdrive steel plates.

**45RFE-545RFE  
PULLS FORWARD IN NEUTRAL**

Copyright © 2009 ATSG

Figure 1



Copyright © 2009 ATSG

Figure 2  
Automatic Transmission Service Group



## 45RFE-545RFE

PULLS FORWARD IN NEUTRAL

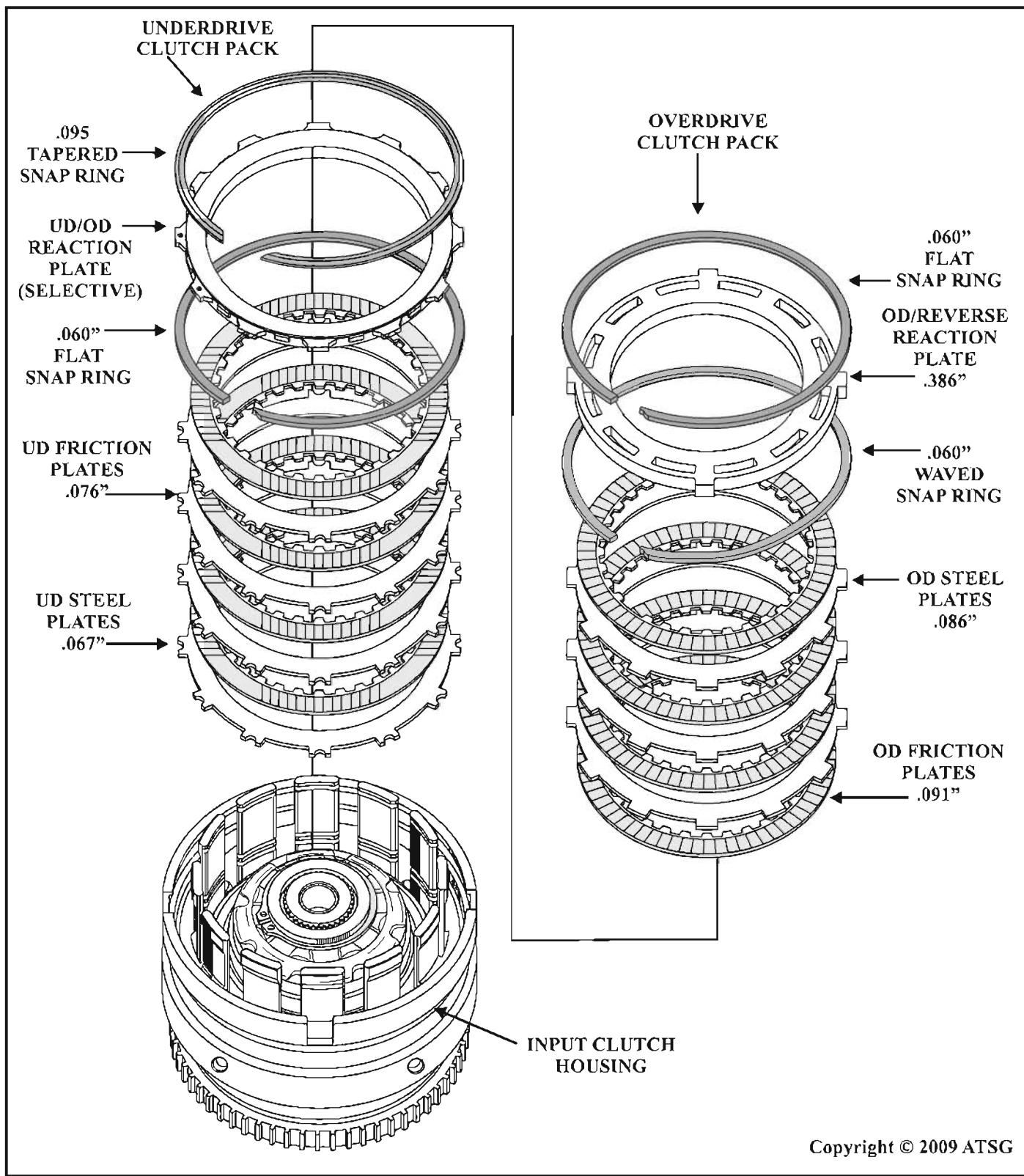


Figure 3

Automatic Transmission Service Group

## **45RFE-545RFE**

### **ASSEMBLY TIP**

**COMPLAINT:** There may be assembly problems when replacing the input sun gear and/or thrust bearings.

**CAUSE:** There are two dimensionally different input sun gears and two different reverse planet to input sun gear bearings, (Refer to Figure 1).

**CORRECTION:** Both input sun gears have the same angle with 42 teeth and has an outer diameter of 2.650".

One sun gear has an overall height of 2.065" which includes a .142" lip with a bearing that is .150" thick with an outer diameter of 2.360"(Refer to figure 2).

The other input sun gear has a .085" lip with an overall height of 2.012". The bearing has a 2.517" outside diameter and is .204" thick, (Refer to figure 2).

Either sun gear will interchange with the other as long as the input sun gear and the reverse carrier to input sun gear bearing is used as a matching set.

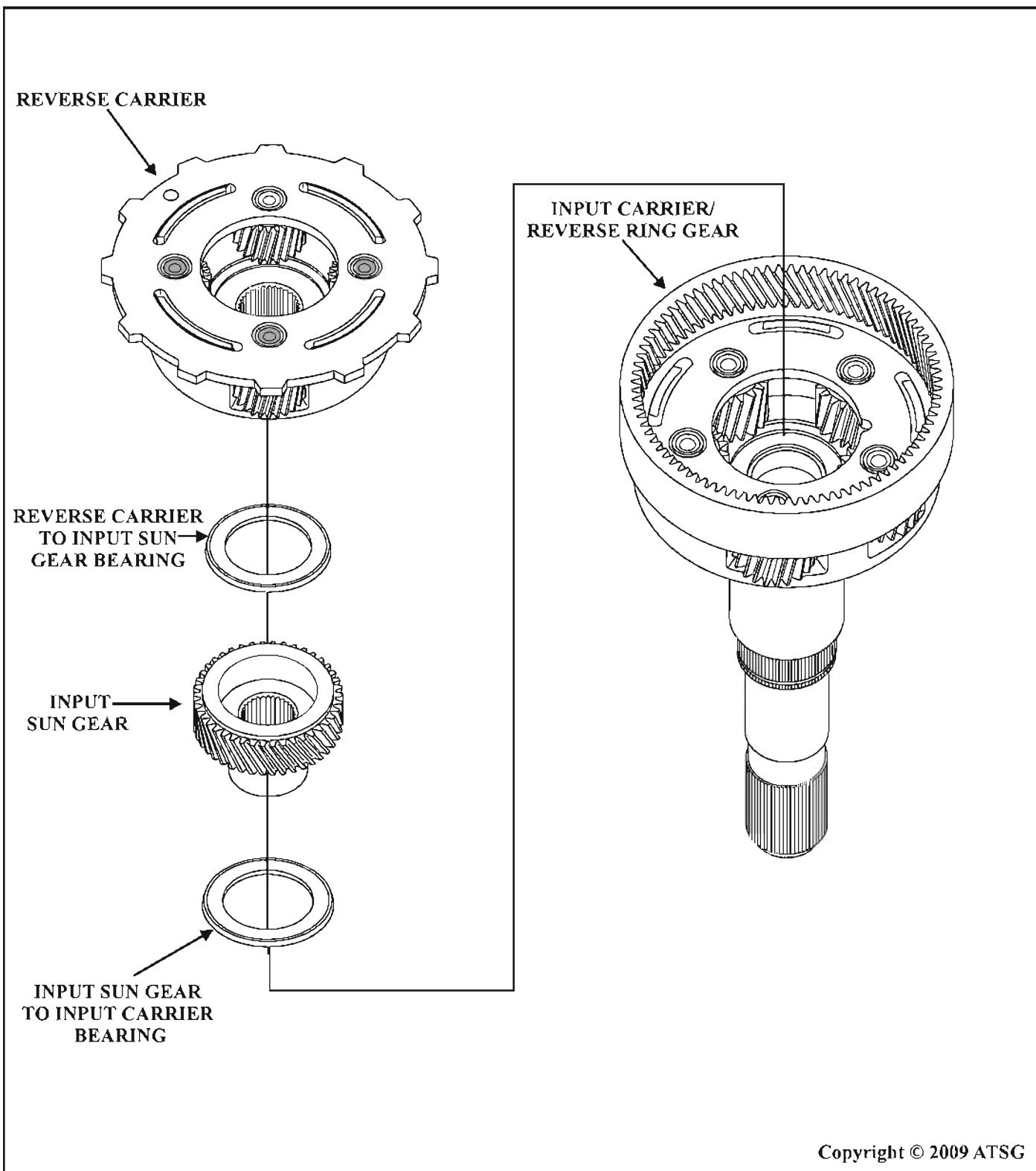
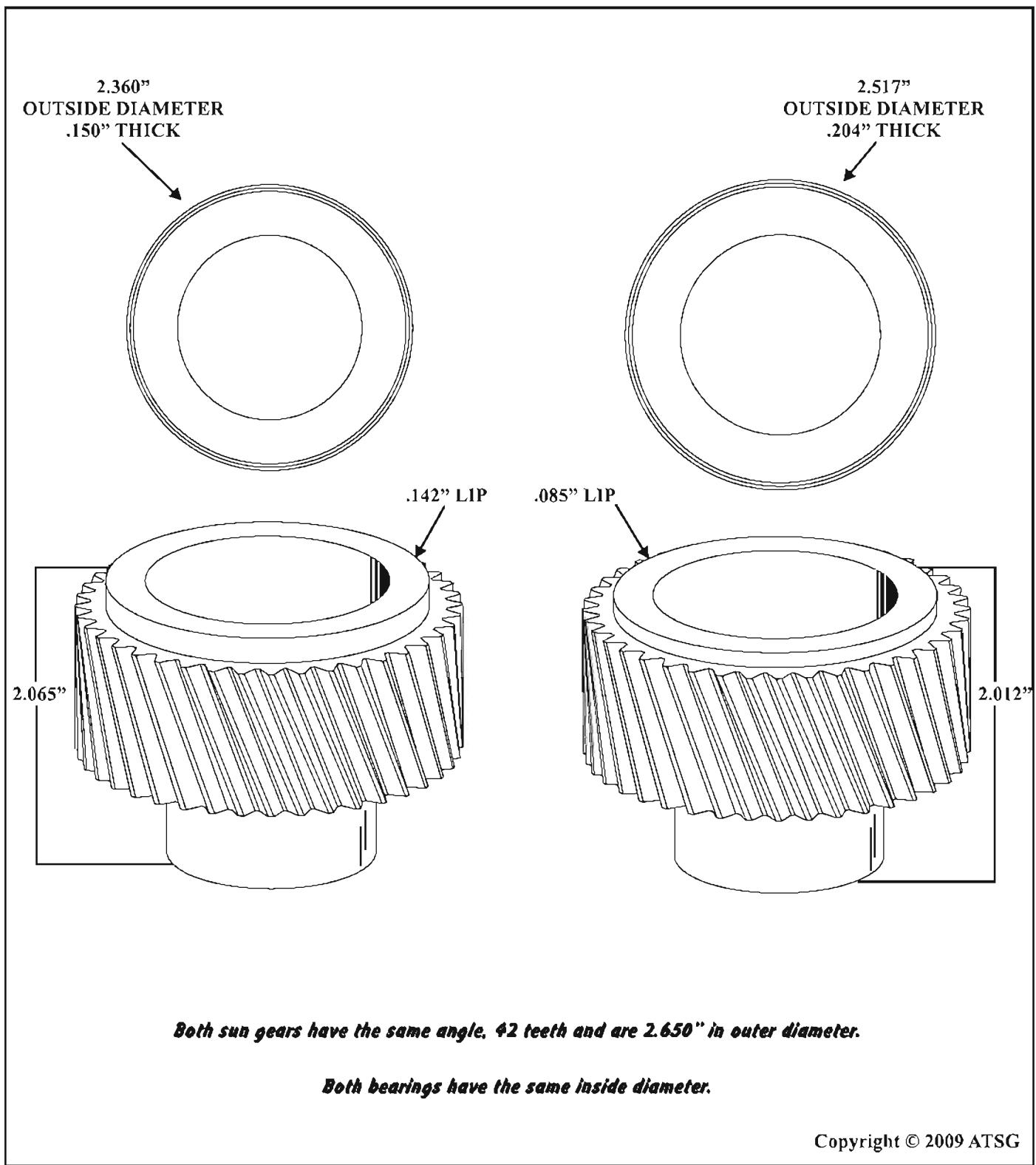
45RFE-545RFE  
ASSEMBLY TIP

Figure 1

## 45RFE-545RFE ASSEMBLY TIP



Copyright © 2009 ATSG

Figure 2



## JEEP 545RFE MISLEADING CODES

**COMPLAINT:** Some 2004-2005 Jeep Grand Cherokee and Liberty models may come in with the following Diagnostic Trouble Codes stored in the TCM memory:

P0868 - Line Pressure Low  
P0731 - Gear Ratio Error In 1st  
P0732 - Gear Ratio Error In 2nd  
P0733 - Gear Ratio Error In 3rd  
P0734 - Gear Ratio Error In 4th  
P0735 - Gear Ratio Error In 5th  
P0736 - Gear Ratio Error In Reverse  
P01736 - Gear Ratio Error In 2 Prime  
The vehicle may have the MIL illuminated and the transmission may be in "Limp Mode." These conditions may be intermittent.

**CAUSE:** Jeep Grand Cherokee and Liberty models built between April 7, 2004 and February 27, 2005 were equipped with TCMs that have an internal electronic circuit failure. The suspect TCMs have build dates from April 4, 2004 (Julian Date 0984) to February 9, 2005 (Julian Date 0405).

**NOTE:** The Julian Date of 0984 translates as follows: 098 is the day of the year that the TCM was built. 4 is the year, this means the TCM was built on the 98th day of the 2004 model year. The Julian Dates can be found on the TCM Bar Code tag.

**CORRECTION:** Make certain that line pressure is not low and that no friction damage has occurred, repair as necessary.  
Replace the TCM and perform the "Quick Learn" procedure, then road test to insure proper vehicle operation.

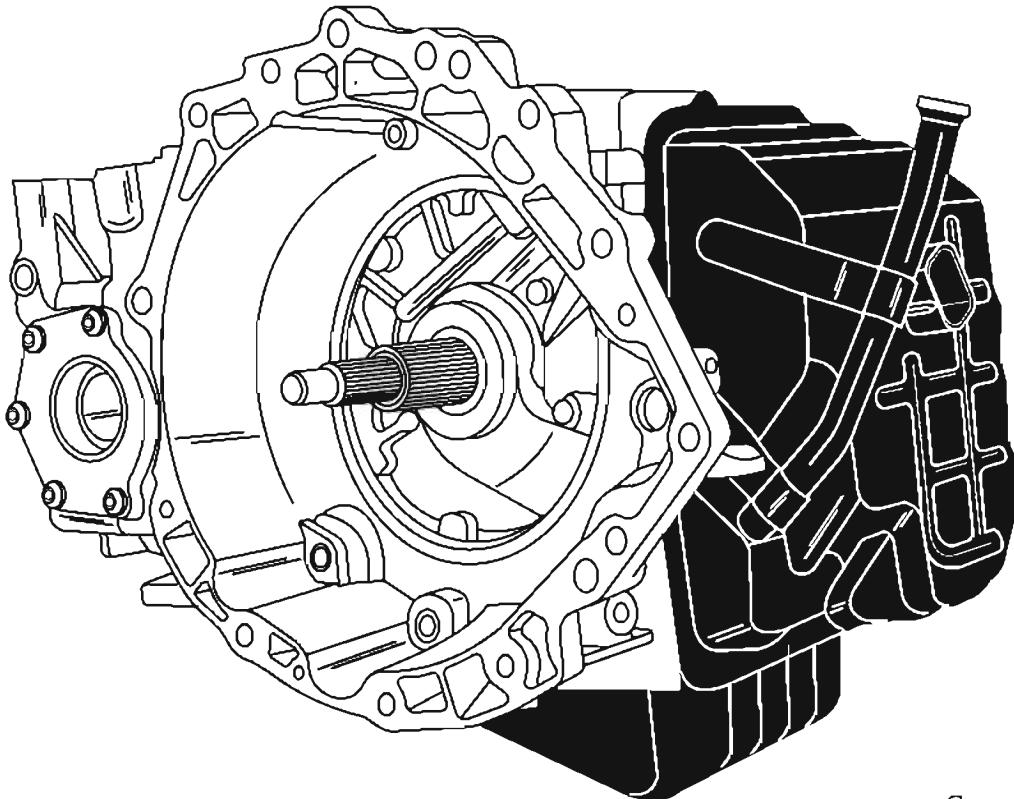
### SERVICE INFORMATION:

2004 <i>Jeep Grand Cherokee Transmission Control Module</i> .....	56044574AC
2005 <i>Jeep Liberty Transmission Control Module</i> .....	56044737AF

## THE 62TE

### PRELIMINARY INFORMATION

2007-Present Chrysler Pacifica  
2007-Present Chrysler Sebring  
2008-Present Dodge Avenger



Copyright © 2009 ATSG

#### Introduction

The new 62TE transaxle by the Chrysler Group is fitted behind a 3.5L V6 engine in the Avenger, Sebring and Sebring Convertibles (JS Body) and the 4.0L V6 engines in Pacifica (CS Body) vehicles. It has 6 forward speeds with a 7th gear used in a specific downshift sequence known as the "four prime (4')." Four prime ratio is 1.573:1 which is a ratio between third gear (2.284:1) and fourth gear (1:452:1). Refer to Figure 1. Four prime is used for a smoother highway speed kick-down from sixth gear and to provide a better ratio for climbing grades under certain conditions.

#### Double-Swap Shifts

This transmission is another technical first for Chrysler in that this transmission introduces the double-swap shifts where there is an exchange of two shift elements for two other shift elements. This occurs on the 2-3, 3-2 and 4-2 shifts (Figure 1). A freewheel device (one-way clutch or sprag) is used to assist in smoother shifts with its nonsynchronous application and release properties. It holds in first, third and fourth assisting in a smoother 1-2, 2-1, 4-5 and 5-4 shifts (Figures 1 and 2).



## THE 62TE PRELIMINARY INFORMATION

### EMCC

The Torque Converter has been redesigned from a circular geometry to an elliptical geometry of the torus making the converter dimensionaly shorter longitudinally by 12 mm and weighing less. This new converter allows the use of precise Electronically Modulated Converter Clutch (EMCC) lockup strategy that allows the clutch to slip continuously under certain driving combinations.

### Internal Components

This 62TE replaces the 41TE but retained a large percentage of parts from the 4 speed design so many of the internal parts will be very familiar. The geartrain consists of a Main Centerline Shaft that is very close to the 41TE transmission having a turbine shaft that connects to an Underdrive/Overdrive/Reverse Clutch drum assembly, followed by the 2/4 Clutch Retainer and Piston, two planetary gear sets and the L/R clutch. The Underdrive Centerline (transfer shaft) consists of the Direct Clutch, the Low Clutch and a Freewheel device (one-way clutch [OWC] or sprag). With the added Underdrive Centerline Shaft combined with a transmission having shift adapt strategies, it required the addition of a new speed sensor to accompany the Input Shaft Speed (ISS) sensor and the Output Shaft Speed (OSS) sensor and it is called the Transfer Shaft Speed (TSS) sensor (Figure 1).

### Solenoids

The 41TE transmission was operated through only 4 clutch control solenoids; the UD, L/R, 2/4 and OD. The 62TE uses the same solenoids as well as 4 others; the Direct Clutch Solenoid (DC), Low Clutch Solenoid (LC), a Pressure Control (PC) Solenoid and an Electronic Modulated Converter Clutch (MCC) Solenoid. With a more efficient pump and a pressure control solenoid, pressure supply can be matched to torque requirements which is essential during both low speeds and heavy throttle conditions. A pressure control sensor (transducer) is also used to increase pressure control efficiency (Figure 2, 3 and 4).

### Failsafe

The Underdrive and 2/4 Solenoids are Normally Applied Solenoids while the remaining clutch control solenoids are Normally Vented. As a result of this, when the electrical system shuts down, failsafe or limp-in mode is third gear. This mode was chosen by the engineers for several reasons:

1. Most importantly, the default gear is on a freewheel (OWC) removing the danger posed by a high speed downshift on slippery road surfaces.
2. The gear ratio obtained is sufficient enough without having jeopardized the operation in hilly terrain.
3. The friction elements applied have proved to be highly reliable.

As previously mentioned in the Internal Components paragraph, with the added underdrive shaft consisting of a Direct Clutch, a Low Clutch and the Freewheel One-Way Clutch, an additional speed sensor was required on the output called the Transfer Shaft Speed Sensor. It may also be referred to as the Intermediate Speed Sensor ( $N_c$ ). The rpm information this sensor provides to the computer is used for control purposes of the underdrive unit shifts and double swap shifts. It is also used for ratio checks of the underdrive unit. There are 2 underdrive unit ratios, 1.4537 when the underdrive unit is in the low ratio and 1.00 when it is in the direct ratio.

## THE 62TE PRELIMINARY INFORMATION

With having a total of three speed sensors, the 62TE utilizes three possible ratio checks. One is the ratio check of the overall Turbine Shaft Speed Sensor ( $N_t$ ) to the Output Shaft Speed Sensor ( $N_o$ ). This measures the overall transmission ratio. A second ratio check is made between the Turbine Shaft Speed Sensor ( $N_t$ ) and the Transfer Shaft Speed Sensor ( $N_e$ ) which checks the main transmission centerline ratio. And then a check is made between the Transfer Shaft Speed Sensor ( $N_e$ ) and the Output Shaft Speed Sensor ( $N_o$ ). The control logic is to continuously check the three ratios while in gear. Should any of the three ratios fall outside of the tolerance range due to clutch slippage or clutch failure for a given period of times, the transmission is intelligently put into 3rd gear failsafe.

Another type of failsafe feature built into the 62TE transmission is a hydraulic blocker that will prevent the possibility of the Direct Clutch and Low Clutch being applied at the same time. If this were to happen a complete bind up would occur. The hydraulic blocker is designed to block the Low Clutch circuit whenever the pressure in the Direct Clutch circuit reaches a level high enough to begin to apply the Direct Clutch. It is not until the Direct Clutch circuit has minimal pressure that the blocker is released. The same action will occur when the Low Clutch is applied, the blocker valve will block pressure from entering the Direct Clutch circuit.

As an additional safety measure, the control logic is capable of simulating the blocker valve by the way in which it will control the Direct Clutch and Low Clutch Solenoid should the blocker valve get stuck in a mid position.

Another failsafe feature is that the Direct Clutch and Low Clutch circuit each have a pressure switch signal. If both pressure switches report an applied state simultaneously to the computer, the computer will initiate failsafe.

### Temperature Based Shift Schedules

Temperature based shift schedules are used to deliver acceptable driveability and shift quality among other reasons. There are Extreme Cold, Super Cold, Cold, Warm and Hot mode strategies.

#### Extreme Cold

For start-ups below -16°F, the controller will declare a neutral state placing the transmission in default causing third gear in all Drive or AutoStick ranges and reverse gear in the Reverse range. Shifting of the transmission will resume when temperature warms to a level greater than -12°F.

#### Supercold

For start-ups below 0°F or transitions from Extreme Cold to Supercold, an elevated shift schedule will be selected by the computer to prevent excessive shifting to facilitate quicker warm-ups. AutoStick will be operational enabling the driver to launch the vehicle in higher gears for reduced traction on slippery surfaces. The Supercold range clears when temperatures warms to greater than +10°F.

#### Cold/Warm/Hot

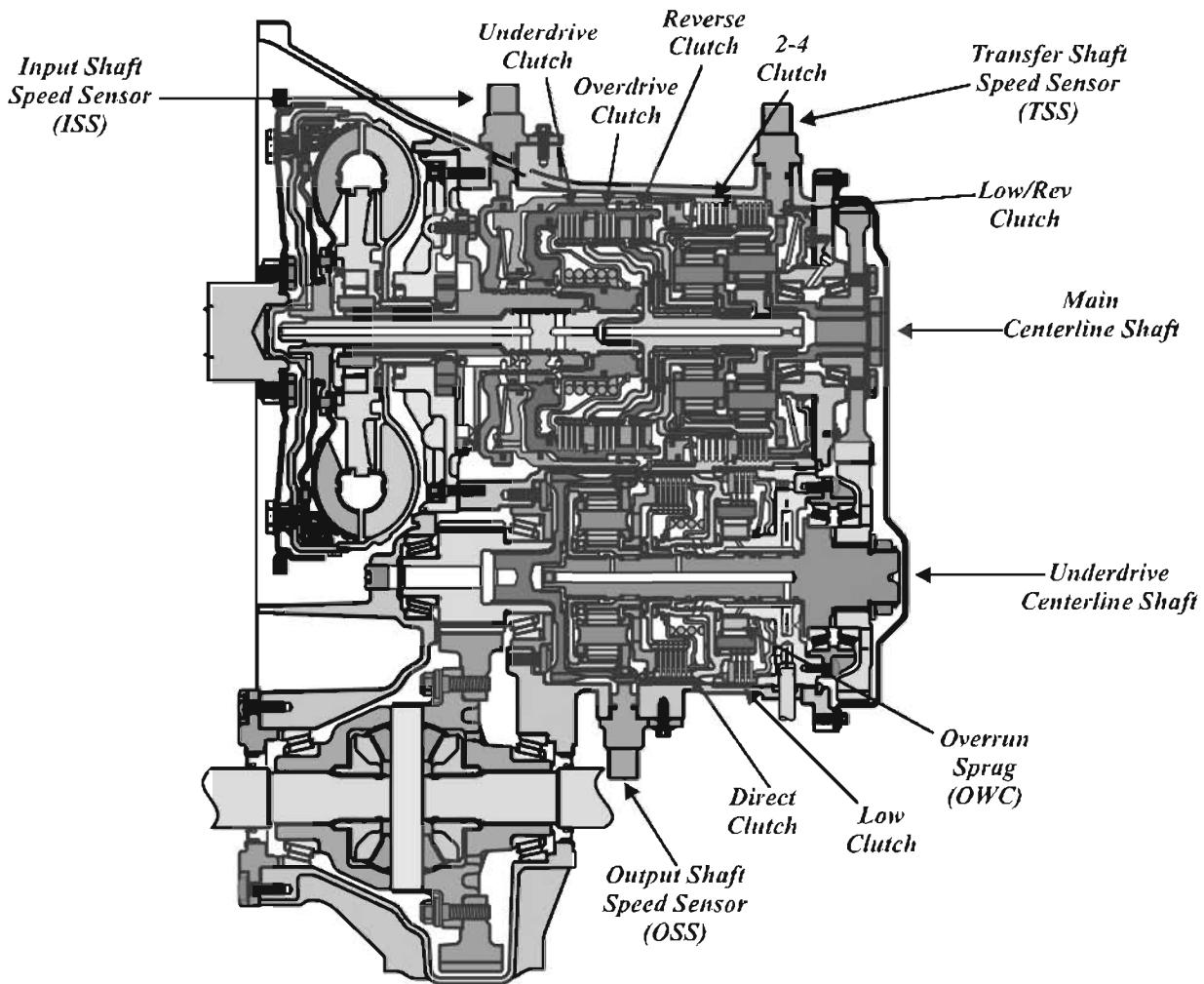
For start-ups where initial transmission fluid temperatures are greater than +10°F as well as when the transmission warms during a drive cycle, then it will pass into and through the cold, warm and hot operating ranges. Shift and TCC scheduling will adjust accordingly. Cold is defined as being in the range of above +10°F and below +36°F and clears when transmission temperature exceeds +40°F. Warm is between +40°F and +80°F while hot is greater than +80°F.

*We would like to thank the good folks at ALTO for the use of their transmission in putting this material together!*

## THE 62TE

### PRELIMINARY INFORMATION

#### CLUTCH APPLICATION CHART & COMPONENT LOCATIONS



62TE		ELEMENTS APPLIED								
GEAR	RATIO	UD	OD	R	2-4	L-R	LC	DC	OWC	
1	4.127	X				X	(X)		H	
2	2.842	X				X		X		
3*	2.284	X			X		X <sup>#</sup>		H	
4'	1.573	X			X			X		
4	1.452	X	X				X <sup>#</sup>		H	
5	1.000	X	X					X		
6	0.689		X		X			X		
R	3.215			X		X	X			

\* Limp-in Mode

<sup>#</sup> Applied in coast only

(X) On in manual low. In OD-1 "On" at launch;

"Off" at 150 rpm output speed

4' - Four Prime

Copyright © 2009 ATSG

Figure 1

## THE 62TE PRELIMINARY INFORMATION

### SOLENOID, PRESSURE SWITCH AND CLUTCH APPLICATION CHART

			Solenoid Status									Pressure Switch Status				Clutch Status								
GEAR	RATIO	LP (PSI)	VFS	PWM	PWM	PWM	PWM	PWM	PWM	PWM	VFS	OD	L/R	2-4	LC	DR	UD	OD	L/R	2-4	LC	DR	REV	
			LP	UD	OD	PND	L/R	2-4	R-L/R	LC	DR	LU						UD	OD	L/R	2-4	LC	DR	
			%DC	NA	NV	NV	NA	NV	NV	NV	%DC													
P/N	135	dcc			X								X								X			
Rev	3.215	235	dcc																		X	X	X	
OD-1	4.127	135	dcc	X		X	X	X(a)					X		X(a)		X	X	X	X(a)				
OD-2	2.842	135	dcc	X		X	X			X			X				X	X	X	X			X	
OD-3	2.284	135	dcc					X		(dcc)			X	X			X	X	X	X	X			
Default	2.284	135	dcc															X		X				
OD-4'	1.573	135	dcc							X	(dcc)		X		X	X			X		X		X	
OD-4	1.452	95	dcc		X		X	X		dc	X		X		X	X				X				
OD-5	1.000	95	dcc		X		X		X	dc	X				X	X	X						X	
OD-6	0.689	95	dcc	X	X					X	dc	X	X		X		X	X	X	X	X	X		

(a) released after output exceeds 150rpm. Not released in Manual-1

dc - duty cycle control

(dc) - overheat strategy only

4' - fourth prime

← - 2-3, 3-2, 4-2 - Double Swap Shifts

← - 6-4' - Kickdown to fourth prime

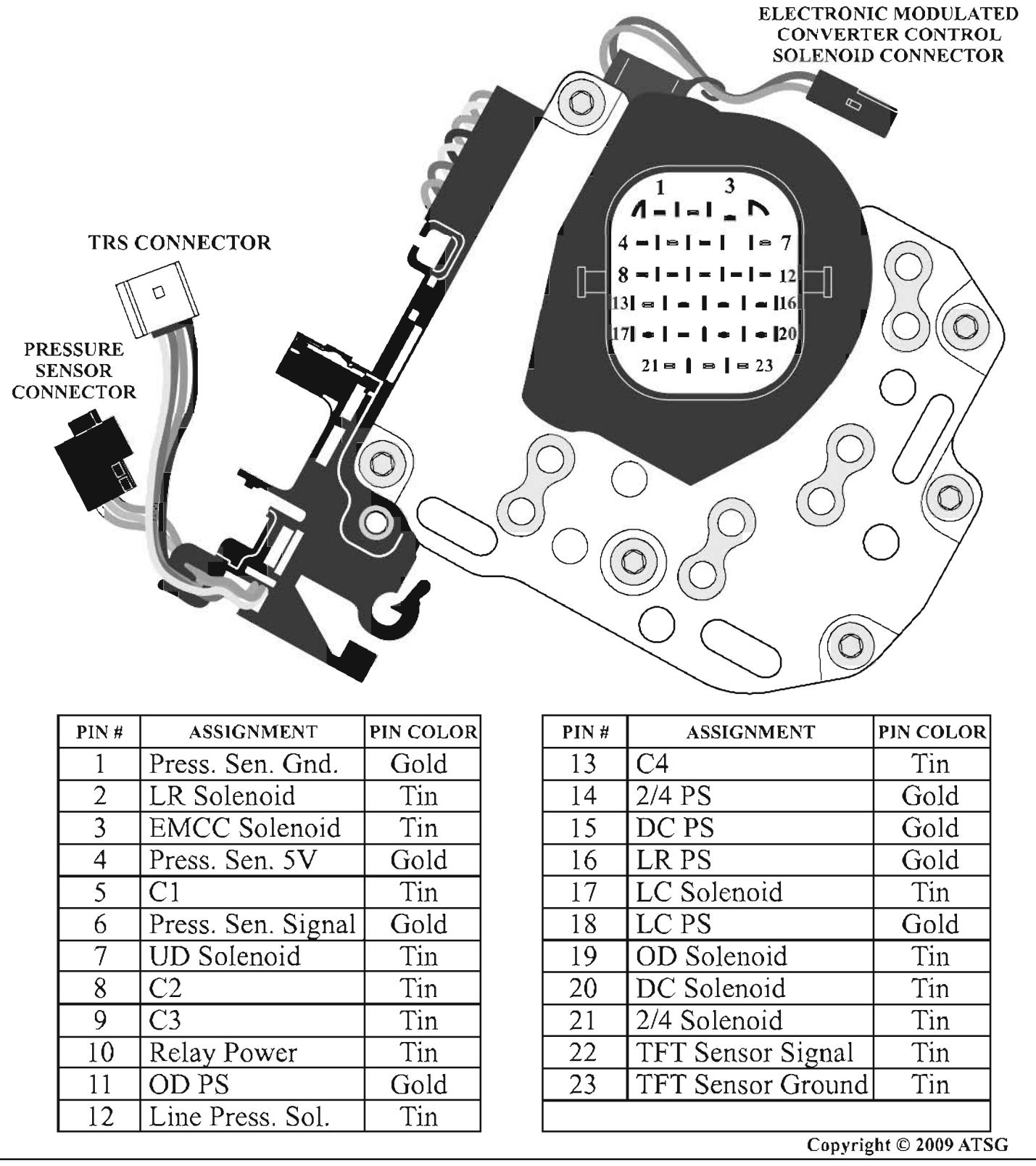
Copyright © 2009 ATSG

Figure 2

## THE 62TE

### PRELIMINARY INFORMATION

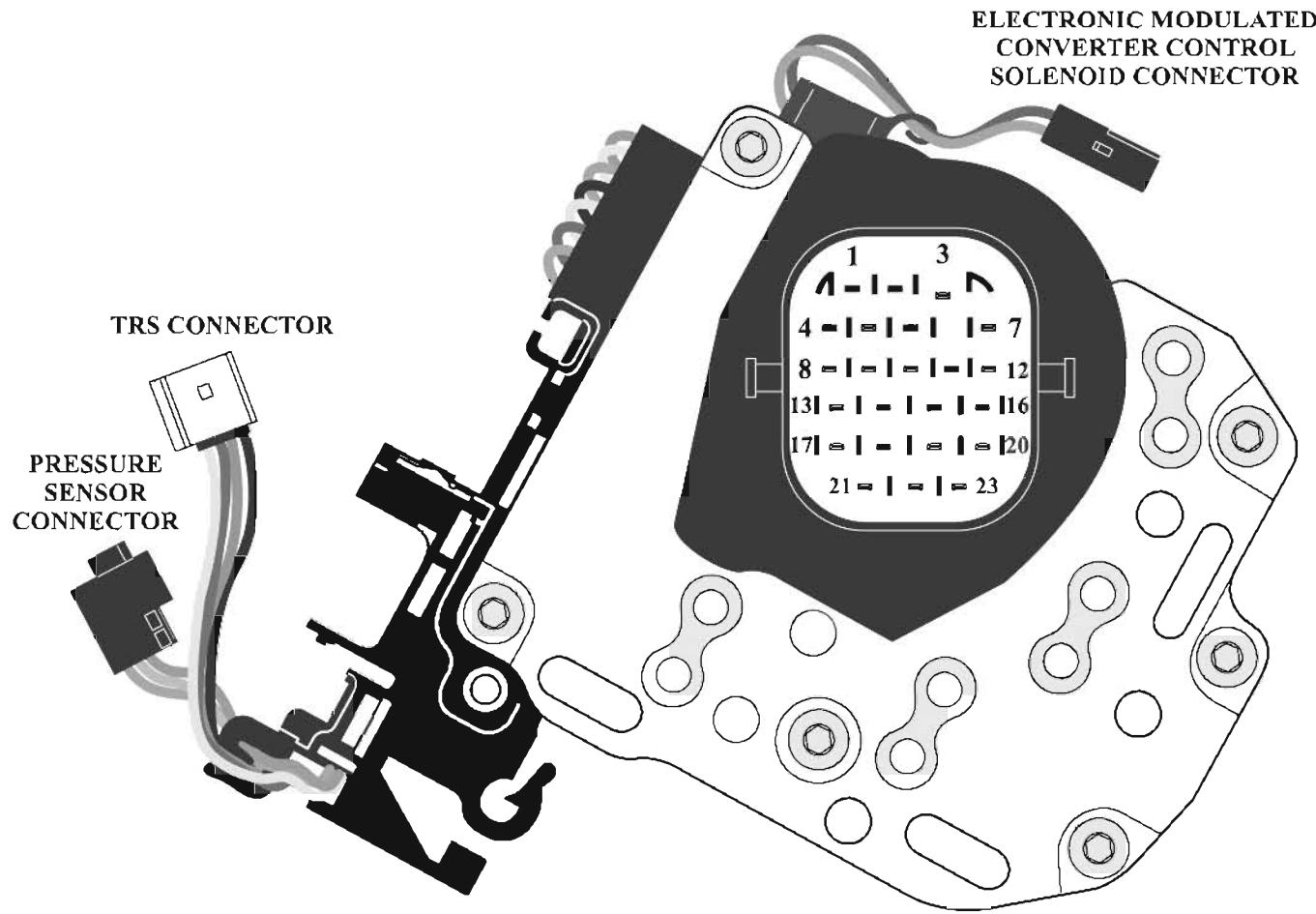
#### SOLENOID BODY TERMINAL LOCATION AND IDENTIFICATION



Copyright © 2009 ATSG

Figure 3

**THE 62TE**  
**PRELIMINARY INFORMATION**  
**SOLENOID RESISTANCE CHECK**



POSITIVE METER LEAD	NEGATIVE METER LEAD	COMPONENT	APPROXIMATE RESISTANCE (OHMS)
10	2	L/R Solenoid	2
	3	EMCC Solenoid	5
	7	UD Solenoid	2
	11	OD PS Resistor	300
	12	LP Solenoid	6
	14	2-4 PS Resistor	300
	15	DC PS Resistor	300
	16	L/R PS Resistor	300
	17	LC Solenoid	2
	18	LC PS Resistor	300
	19	OD Solenoid	2
	20	DC solenoid	2
	21	2-4 Solenoid	2
22	23	TFT Sensor	11k @ room temp

Copyright © 2009 ATSG

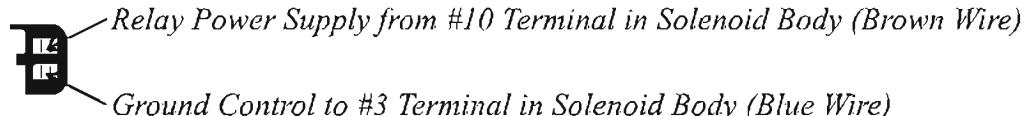
Figure 4

Automatic Transmission Service Group

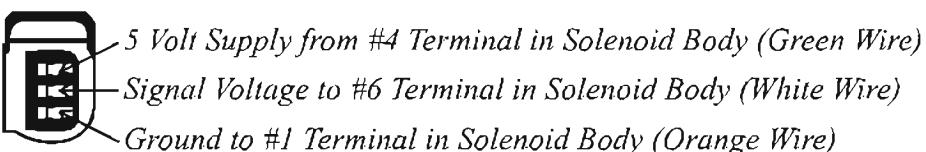
## THE 62TE PRELIMINARY INFORMATION

### INTERNAL HARNESS TERMINAL IDENTIFICATION

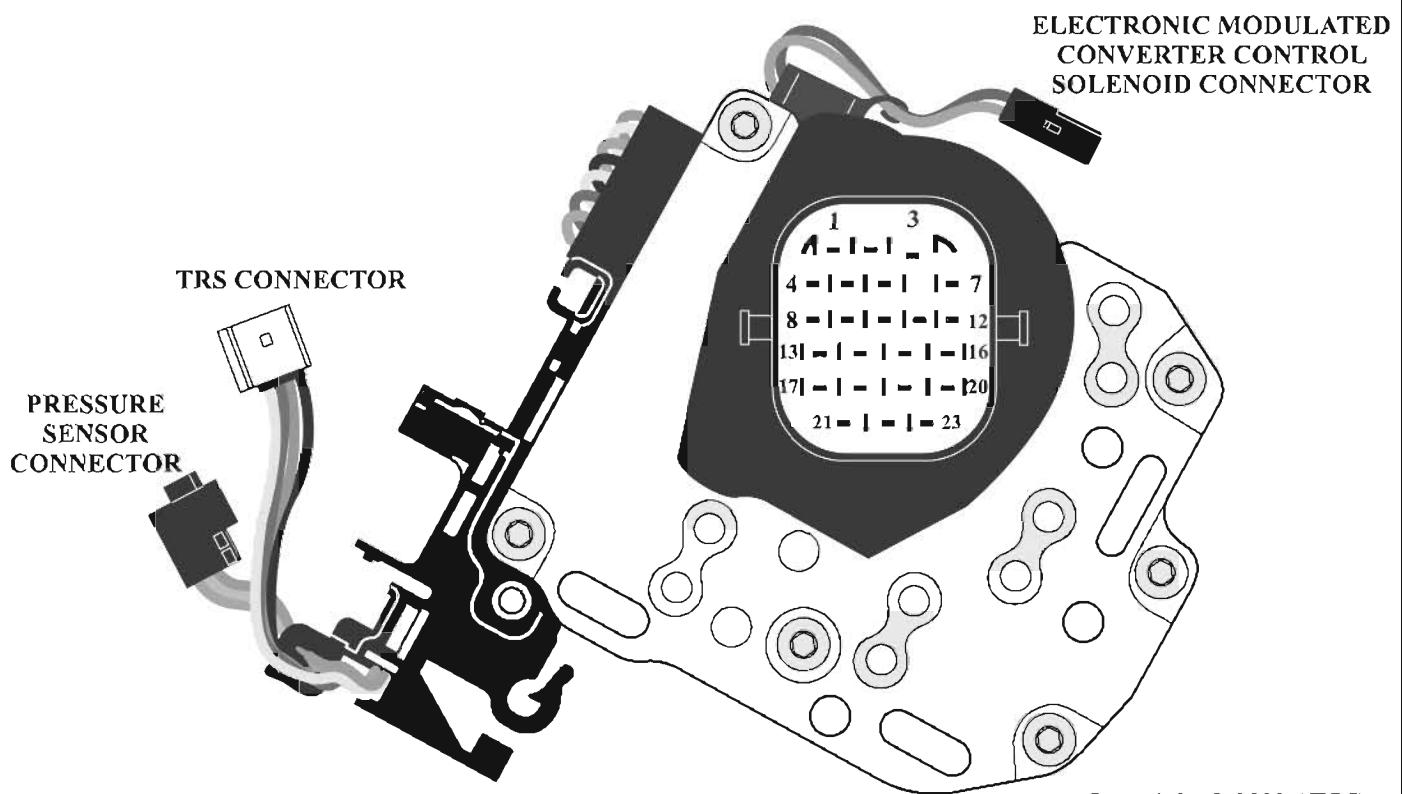
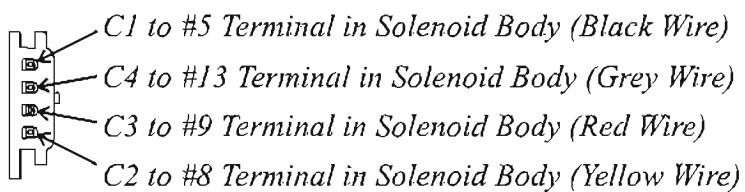
**EMCC Solenoid  
Internal Harness  
Connector View  
and ID**



**Line Pressure Sensor  
Internal Harness  
Connector View  
and ID**



**TRS Internal  
Harness Connector  
View and ID**



Copyright © 2009 ATSG

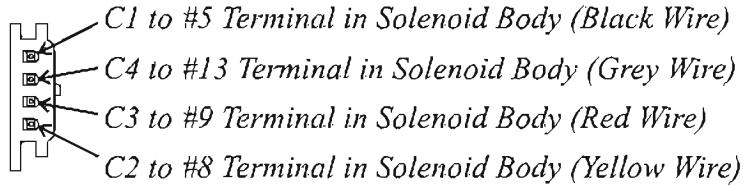
Figure 5

## THE 62TE

### PRELIMINARY INFORMATION

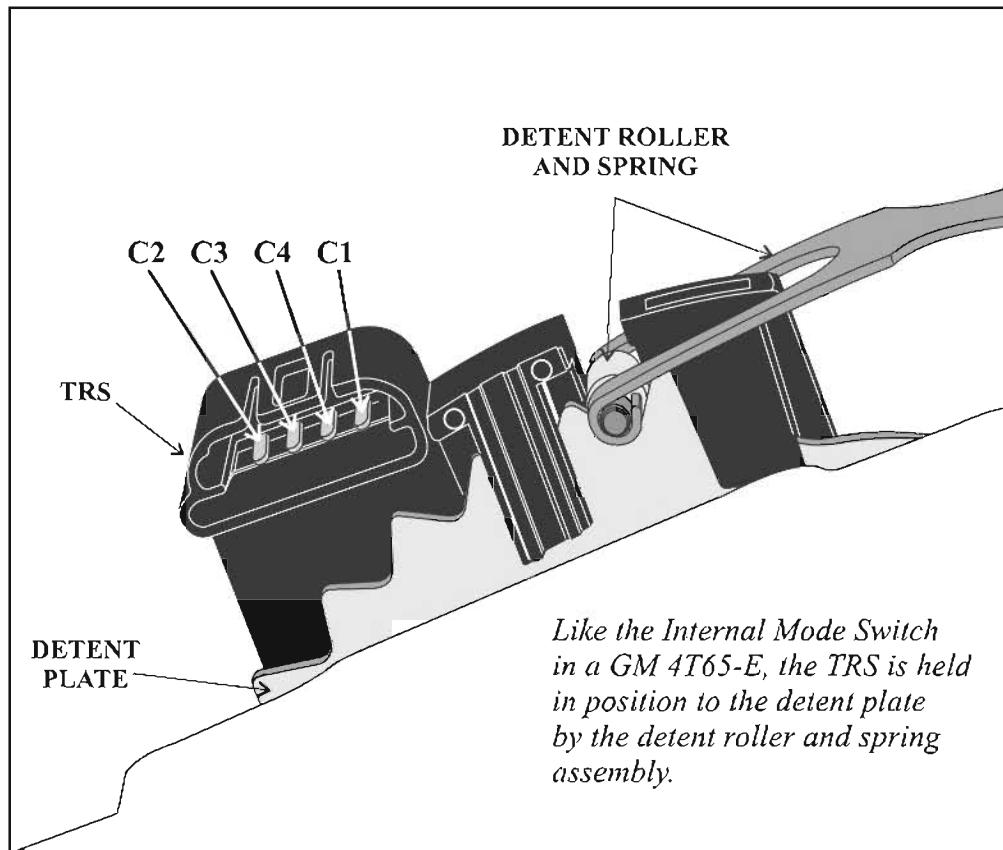
#### TRANSMISSION RANGE SENSOR OPEN/CLOSED SIGNAL CHART

*TRS Internal  
Harness Connector  
View and ID*



The Transmission Range Sensor can be bench tested using a DVOM set to ohms. Place the negative anywhere on the valve body as close to the detent plate as possible. With the positive lead, check each circuit one at a time through all of its ranges either through the main transmission case connector or at the sensor itself. Refer to the chart below. C represents "Closed or Continuity" while O represent "Open."

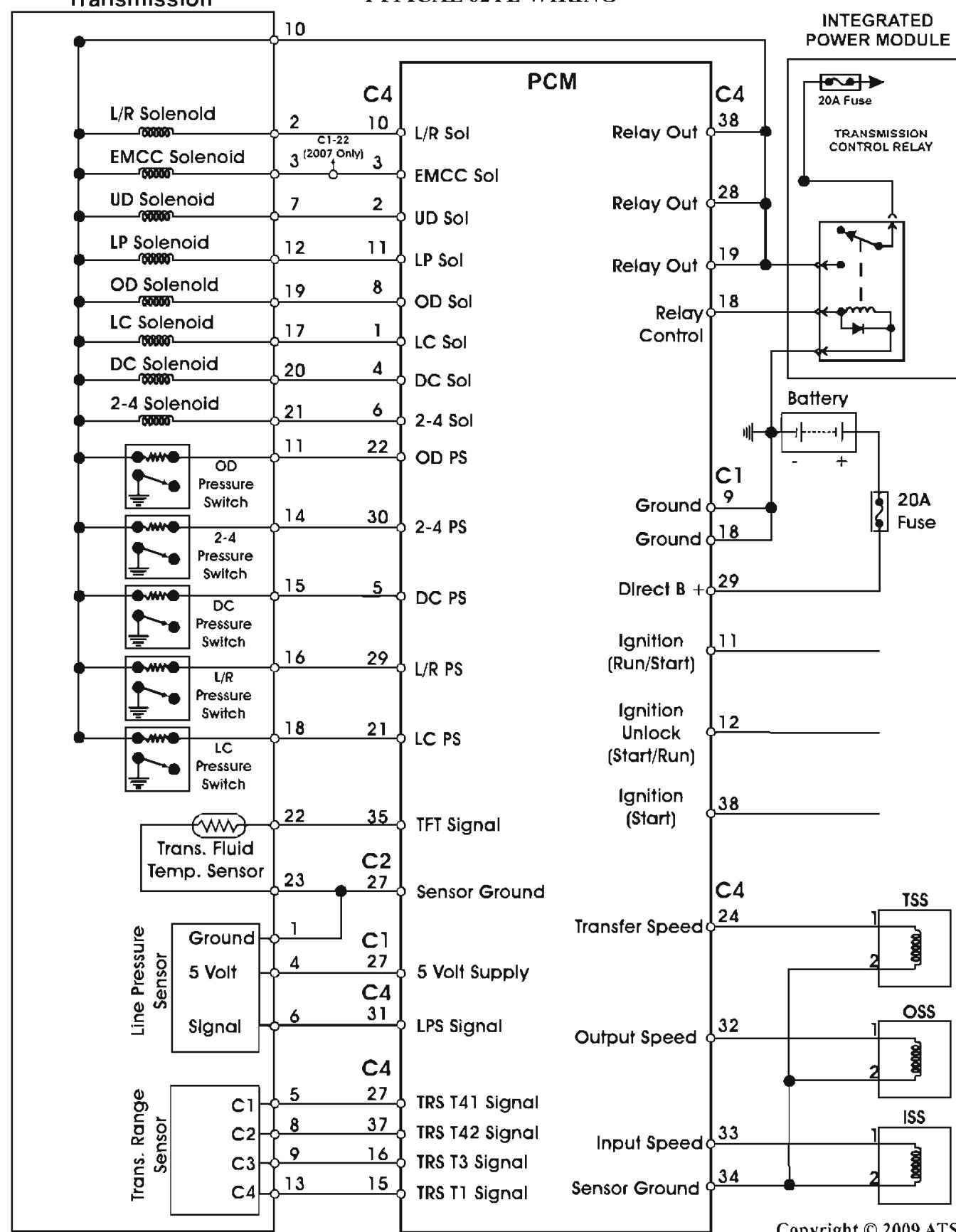
	P	R	N	OD	D	SM
C2	C	C	C	O	O	O
C3	C	O	O	O	C	O
C4	O	O	C	C	O	O
C1	C	O	C	O	O	O





## Transmission

## TYPICAL 62TE WIRING

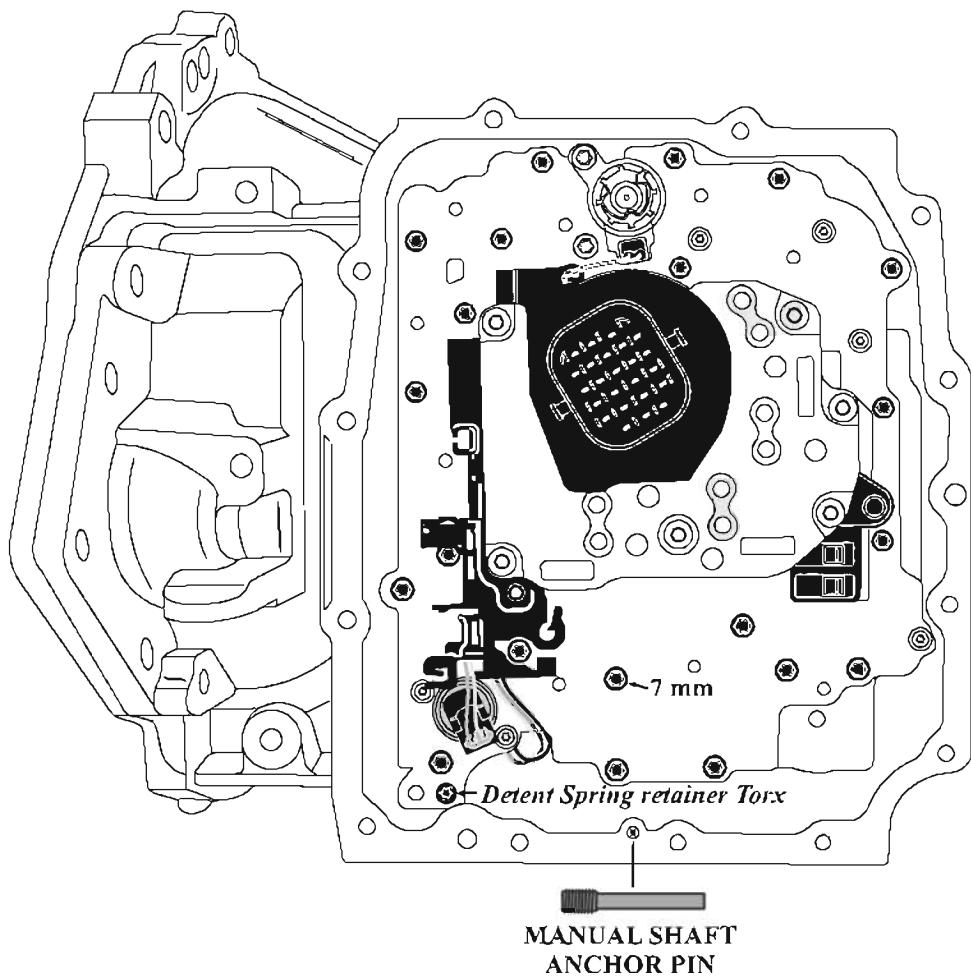


Copyright © 2009 ATSG

Figure 7

Automatic Transmission Service Group

## THE 62TE PRELIMINARY INFORMATION



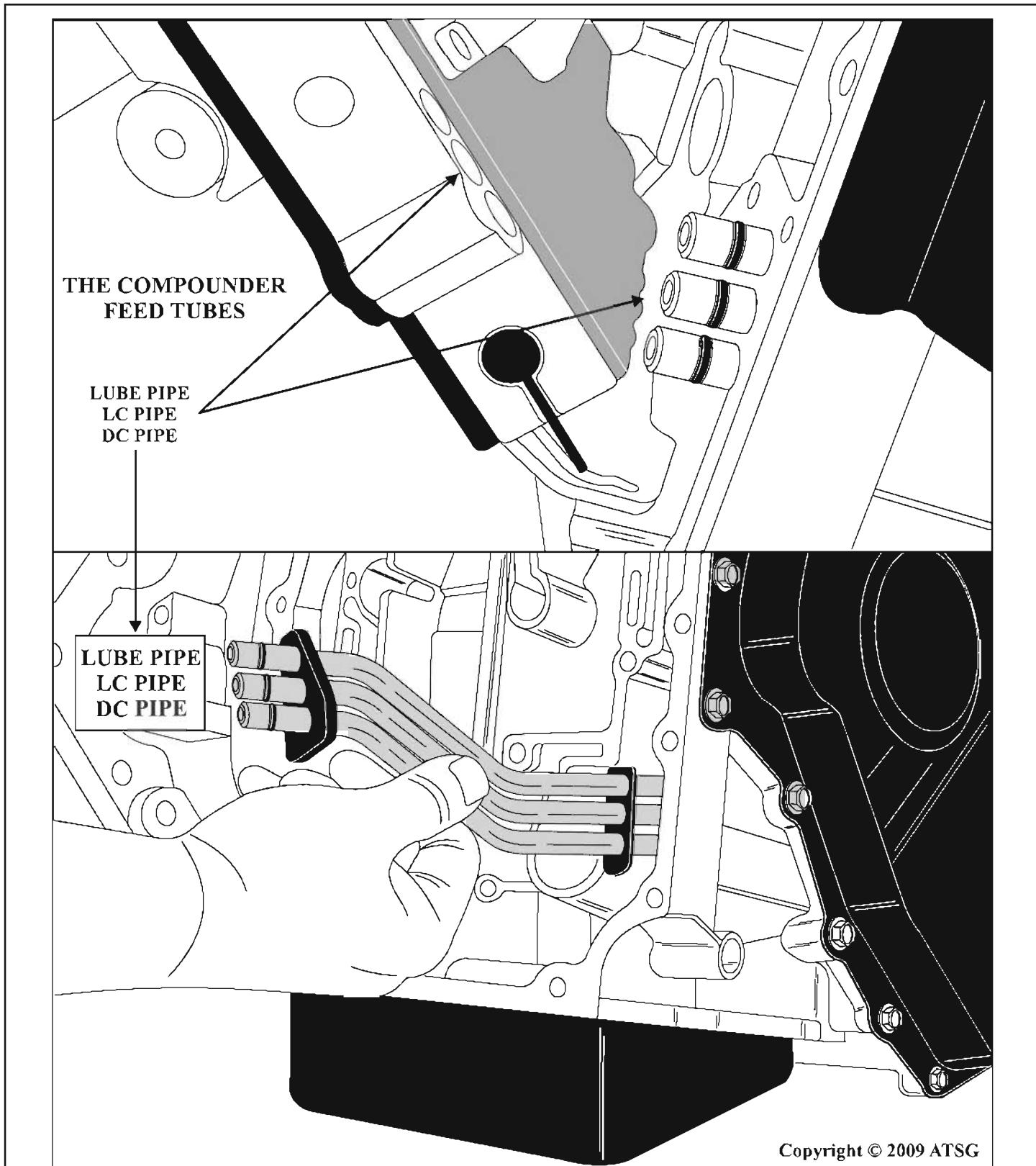
There are twenty one 7 mm hex-head bolts securing the valve body to the case as seen above in black along with one T25 Torx shoulder screw (grey) for the detent spring. Only these bolts need to be unfastened in order to remove the Valve Body assembly from the case.

If the manual shaft needs to be removed from the case, there is a manual shaft anchor pin that will need to be removed and it has the smallest Torx this tech has ever seen in an automatic transmission. It took a # 8 Torx with a slight tap in to get this little guy out. It is very easy to strip it so be careful.

Copyright © 2009 ATSG

Figure 8

## THE 62TE PRELIMINARY INFORMATION



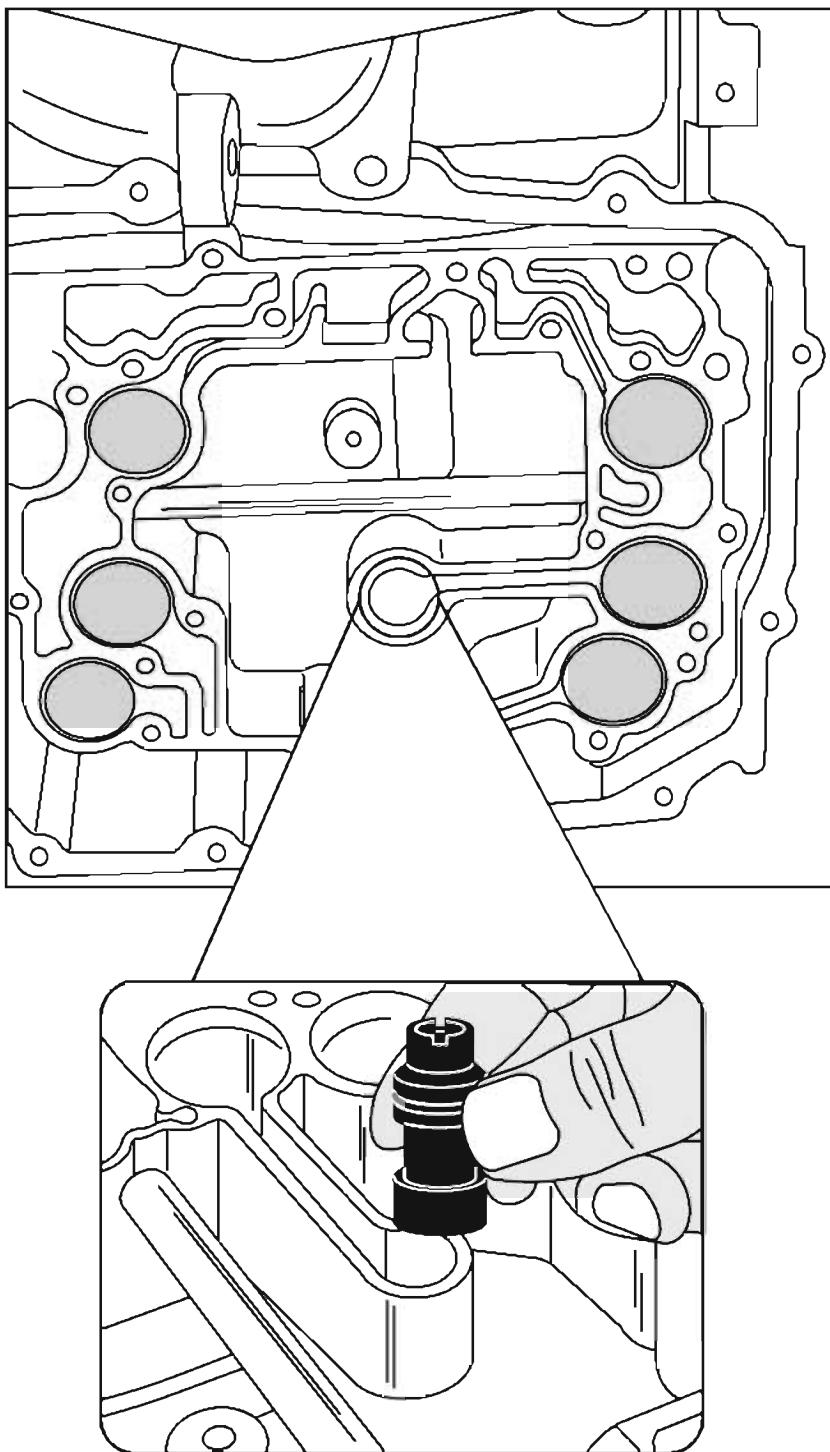
Copyright © 2009 ATSG

Figure 9

Automatic Transmission Service Group

## THE 62TE PRELIMINARY INFORMATION

### 2-4 CLUTCH OIL SUPPLY PIPE LOCATION



2-4 CLUTCH OIL SUPPLY PIPE AND O'RING

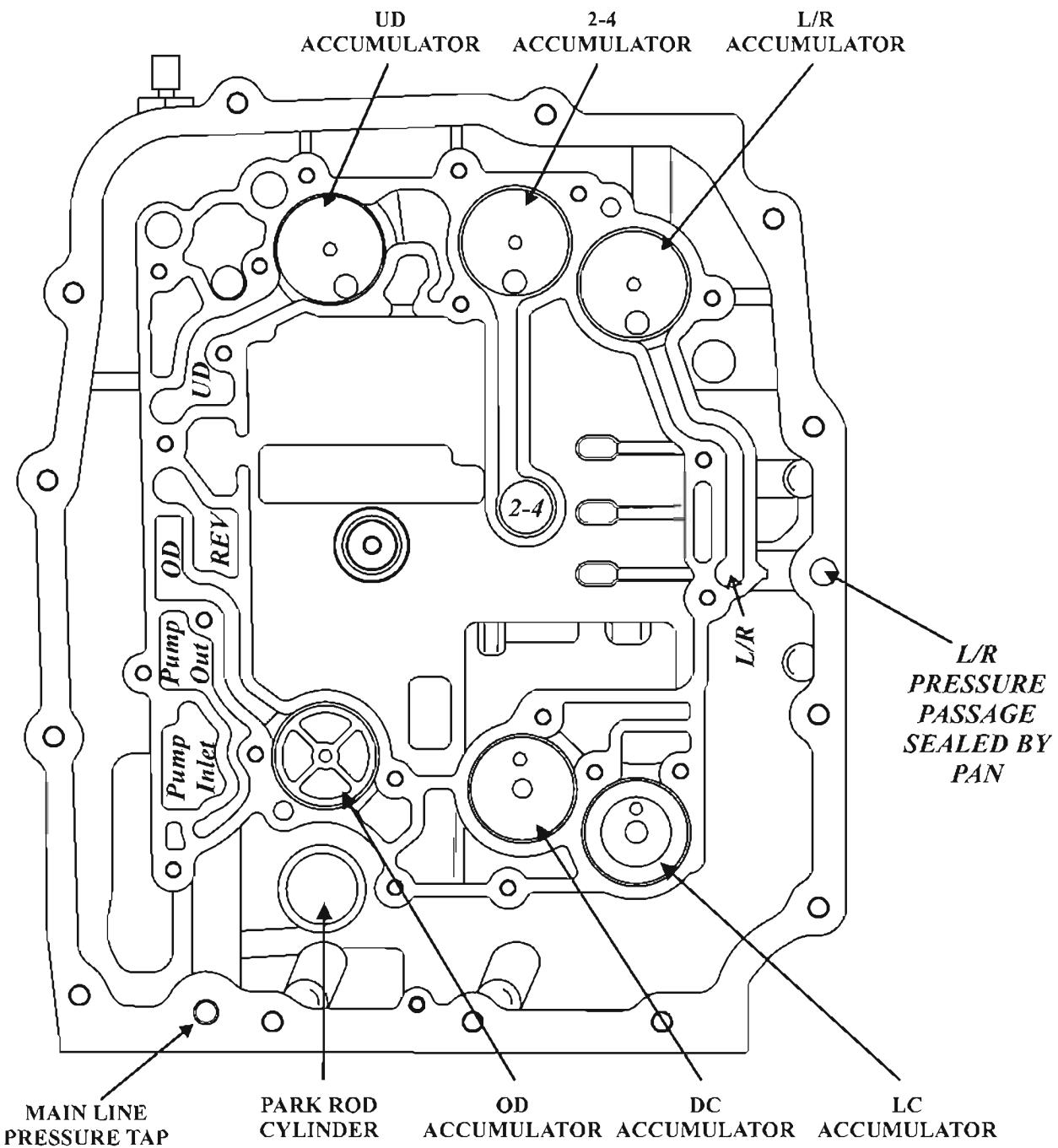
Copyright © 2009 ATSG

Figure 10

Automatic Transmission Service Group

## THE 62TE PRELIMINARY INFORMATION

### ACCUMULATOR LOCATION AND IDENTIFICATION (CASE PASSAGE I.D.)

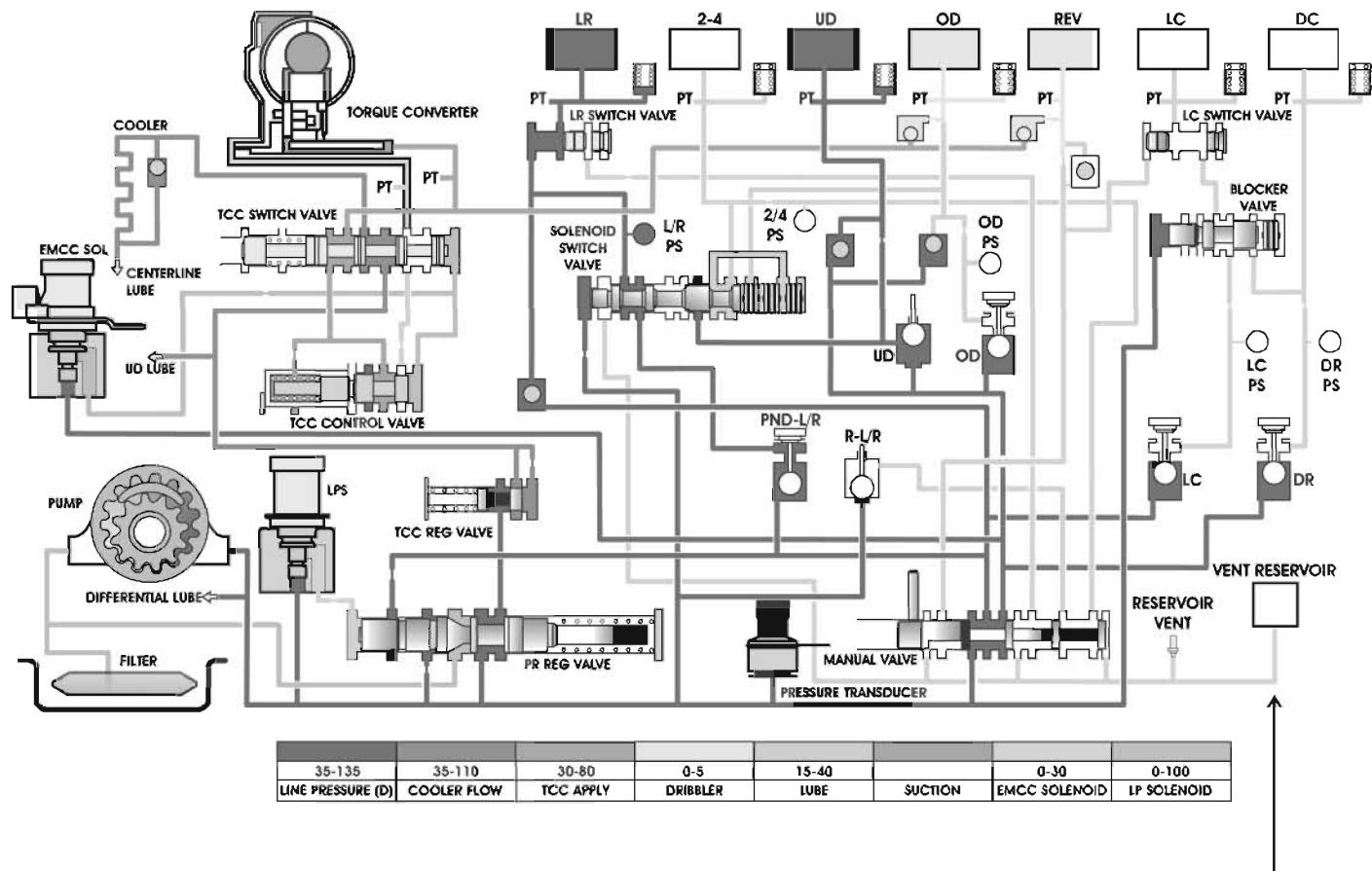


Copyright © 2009 ATSG

Figure 11

## THE 62TE PRELIMINARY INFORMATION

### DRIVE FIRST GEAR EMCC



### THE VENT RESERVOIR

The 62TE is a clutch control system based on volume tracking. For this reason it is desirable to minimize or exclude air in the clutch circuits as a prerequisite for optimal pressure control needed for precision shift control. The hydraulic circuit was designed to prevent pockets of trapped air with an additional step to route the clutch vent circuit into a common exhaust chamber called a "vent reservoir." The vent reservoir's exit path is located at the top of the valve body (See Figure 13) allowing a fluid trap to be maintained above the clutch circuits venting all air when the clutch circuits vent.

Copyright © 2009 ATSG

Figure 12

# PROFITS:



## WHEN YOU ESTIMATE.

No one likes surprises. Separate electrical, hydraulic and friction problems quickly. **Estimate accurately!**



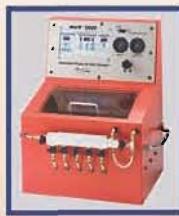
## TranX™ 2000

TRANSMISSION ANALYZER



## TRASH OR CASH.

Stop putting your profits in the trash. Use Solenoids and sensors with confidence. **Keep your profits!**



## SolX 2000™

SOLENOID FLUSHER TESTER  
&  
TRANSMISSION CIRCUIT TESTER



## WHEN IT GOES BACK TOGETHER.

Even the best of us make mistakes. It only takes a minute to double check your work but it can take hours if you don't!

**Reduce warranty costs!**



## AMI™

TRANSMISSION HYDRAULIC  
CIRCUIT TESTER



## VBT 4000™

VALVE BODY TESTER



## BEFORE IT DRIVES OUT THE DOOR.

Stop the no goes and comebacks before they happen. Our hydraulic test equipment will discover faults that even the best builder will miss.

# CALL ZOOM TECHNOLOGY REBUILD YOUR PROFITS!



112 Burrs Road  
Mt. Holly, New Jersey 08060 U.S.A.

**1.800.443.8130**

1.609.267.9620 ~ Fax 1.609.267.6973

[www.zoom-tech.com](http://www.zoom-tech.com)

# RatioTek™

A better way of shifting gears™

## NEW PRODUCTS

# Valve Body Kits

Easy to Install - Low Cost - Great Results



Fix Code 1870 Fast

Provides 20% more torque for Lockup.  
Has parts that stabilize line pressure reducing TCC  
shudder, booster valve wear and bump 1-2 shift.

### RT™ 4L60E

**Improves:** Shift firmness - Fix TCC Slip Code 1870 - Eliminates the need to replace TCC Regulator and Isolator valves - No reaming. Restores pressure regulator booster valve function. Includes "Booster Recovery System™" Patent Pending Eliminates the need to replace TCC PWM solenoid due to sticky valve. TCC will have full apply even if solenoid has failed - saves \$\$.  
Adjust 1-2 shift firmness without removing VB.

For Hot Rods use kit # RT-4L60E-HD  
Includes Pan and Valve Body Gaskets.



### RT™ AX4S

Also fits  
AXODE

Both kits include a bypass booster valve sleeve assembly and the **Patent Pending** "Booster Recovery System™" restoring pressure regulator valve function.

Improve shift firmness.  
Billet retainers your gonna love!



### RT™ 4F50N

Also fits  
AX4N



### RT™ E4OD/4R Kit fits E4OD and 4R100

Comes with 3 high tech regulator valves for the "stick free" accumulator body. Improves TCC torque capacity. Provides adjustable shift firmness.



## RatioTek™

Software for the serious transmission rebuilders.

RatioTek™ software has books in color, plus - super fixes, videos, common complaints and tech information. Print pages for the bench.

Software installs to multiple computers.  
Takes 5 seconds to look up VB check balls.

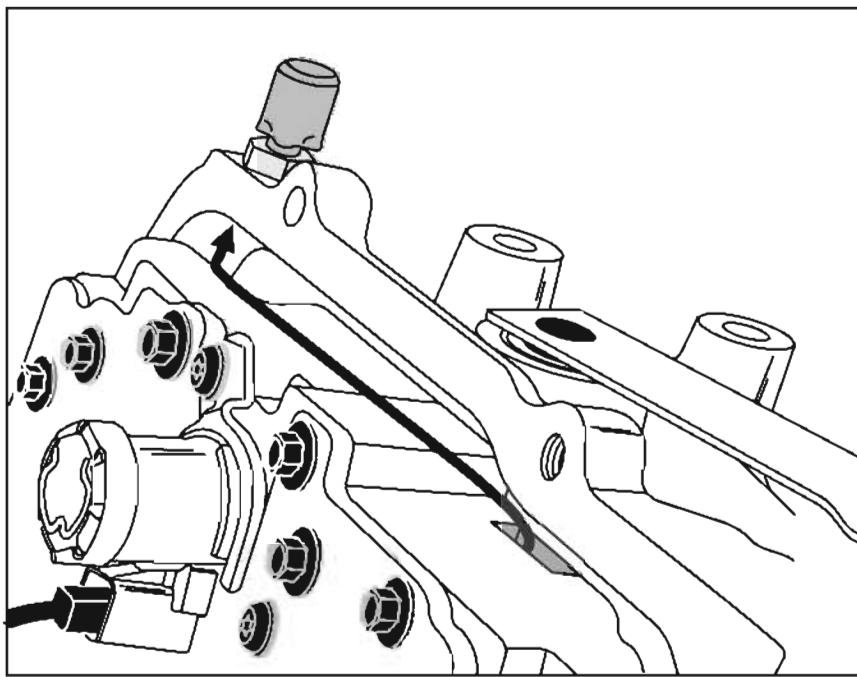
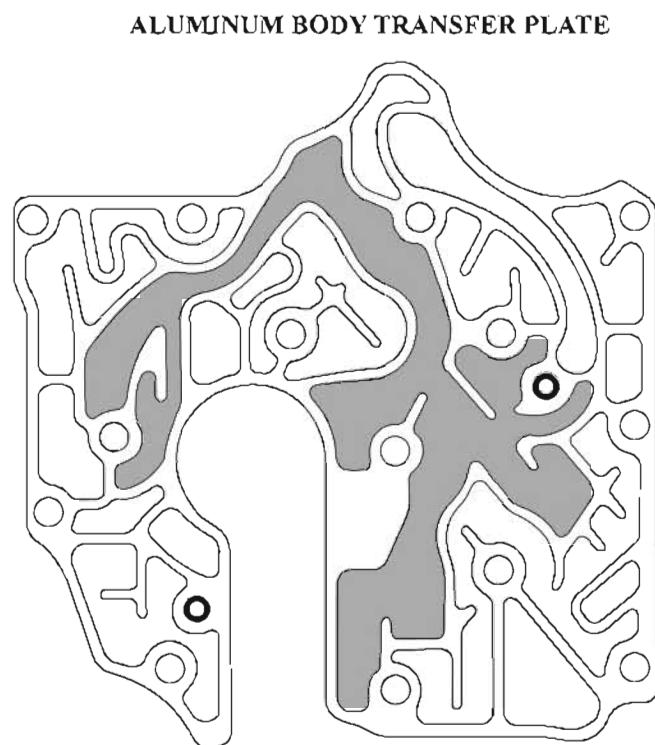
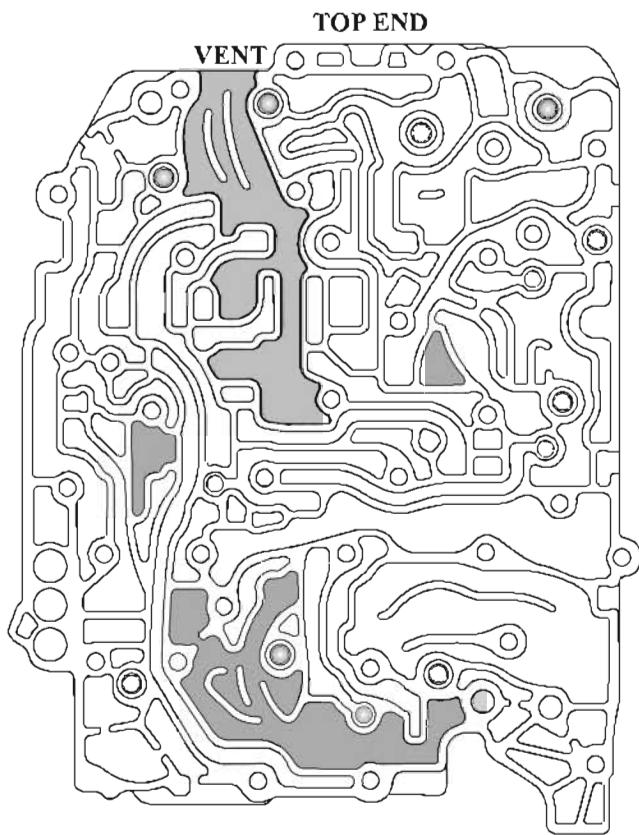
[www.ratiotek.com](http://www.ratiotek.com)

Transcel Inc.

15902 A Halliburton #272 City of Industry, CA 91745

626-968-2754 Fax 626-961-8563

[www.ratiotek.com](http://www.ratiotek.com)

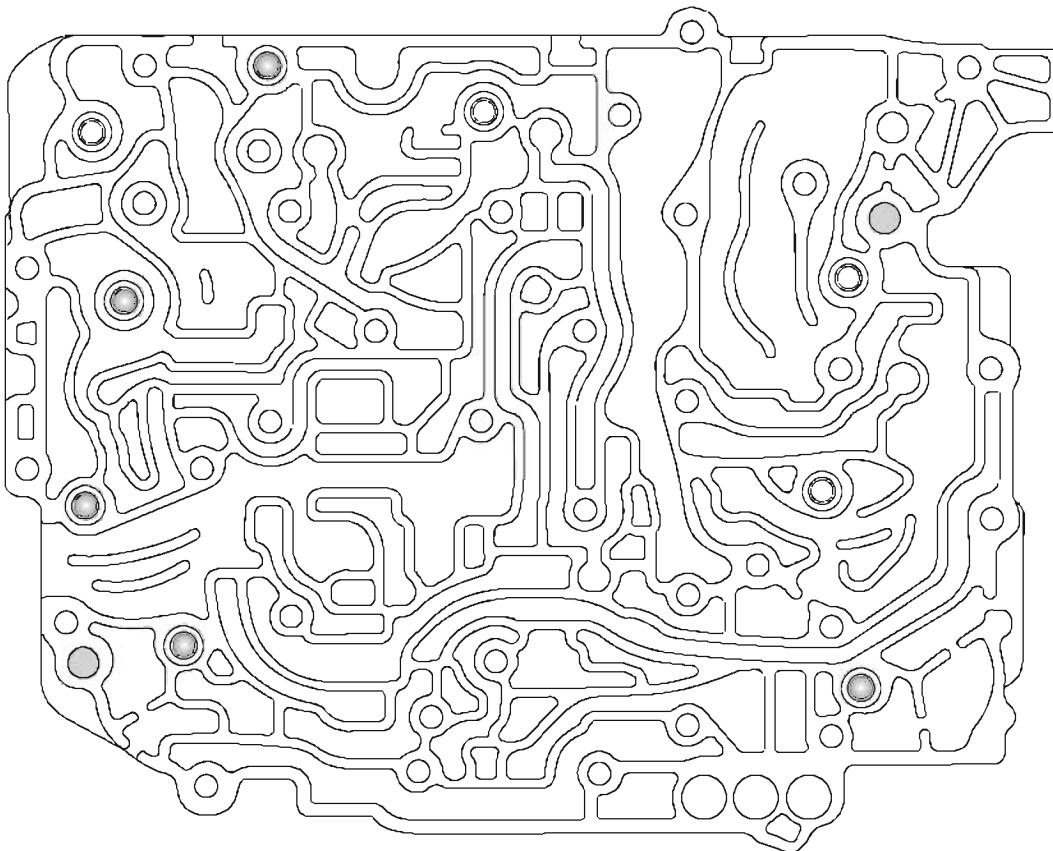
**THE 62TE**  
**PRELIMINARY INFORMATION****VENT RESERVOIR CIRCUIT**

Copyright © 2009 ATSG

Figure 13  
Automatic Transmission Service Group

## THE 62TE PRELIMINARY INFORMATION

### PRESSURE SEALING BALLS



### NO CLUTCH PRESSURE TAPS

The expense of machined pressure taps and the cost of inserting the plug combined with potential areas for leaks gave way to the decision of eliminating all Clutch Pressure Taps. However, the ability to perform clutch circuit pressure testing on the assembly line is necessary to ensure correct assembly and ongoing quality. A design was made which comprised of check balls positioned in specific tapered ports in the valve body that allowed a test machine to come in with a probe and unseat the check balls where measurement of clutch pressure could then be taken. Once the test has been completed and the test machine retracts, the check balls are then used to seal their respective clutch circuit. The 9 check balls seen above are the check balls used during this factory clutch testing procedure. Do not attempt to remove these balls but check to see that they seal pressure.

There are 4 hydraulic shift control balls that are not used for this purpose and they do fall out of the valve body. Refer to Figure 15 for their location and identification.

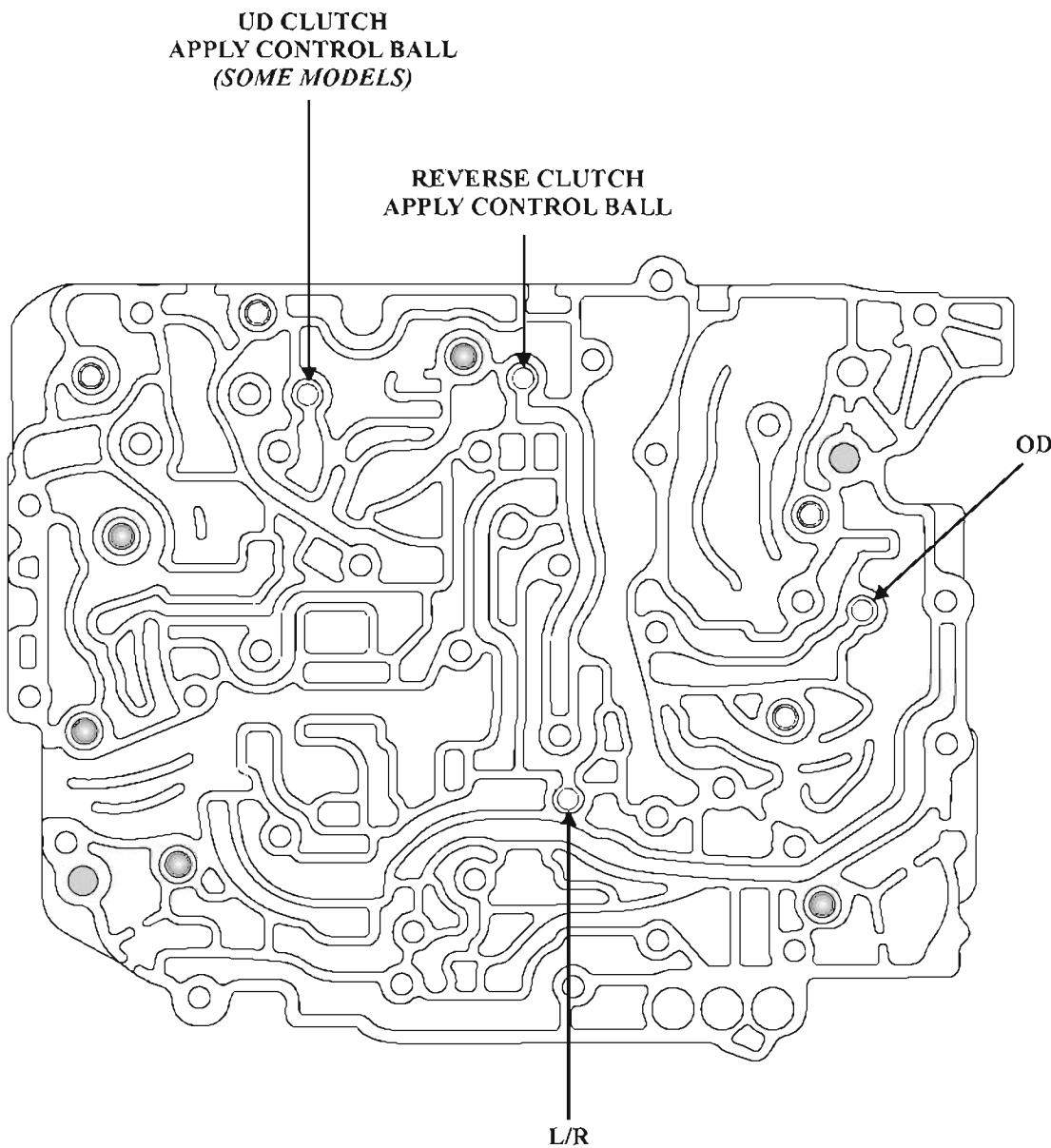
Although there are no Clutch Pressure Taps, there is a main line pressure tap located at the bottom left hand side of the pan along side a pan bolt (See page 109).

Copyright © 2009 ATSG

Figure 14

## THE 62TE PRELIMINARY INFORMATION

### CHECK BALL LOCATION AND IDENTIFICATION

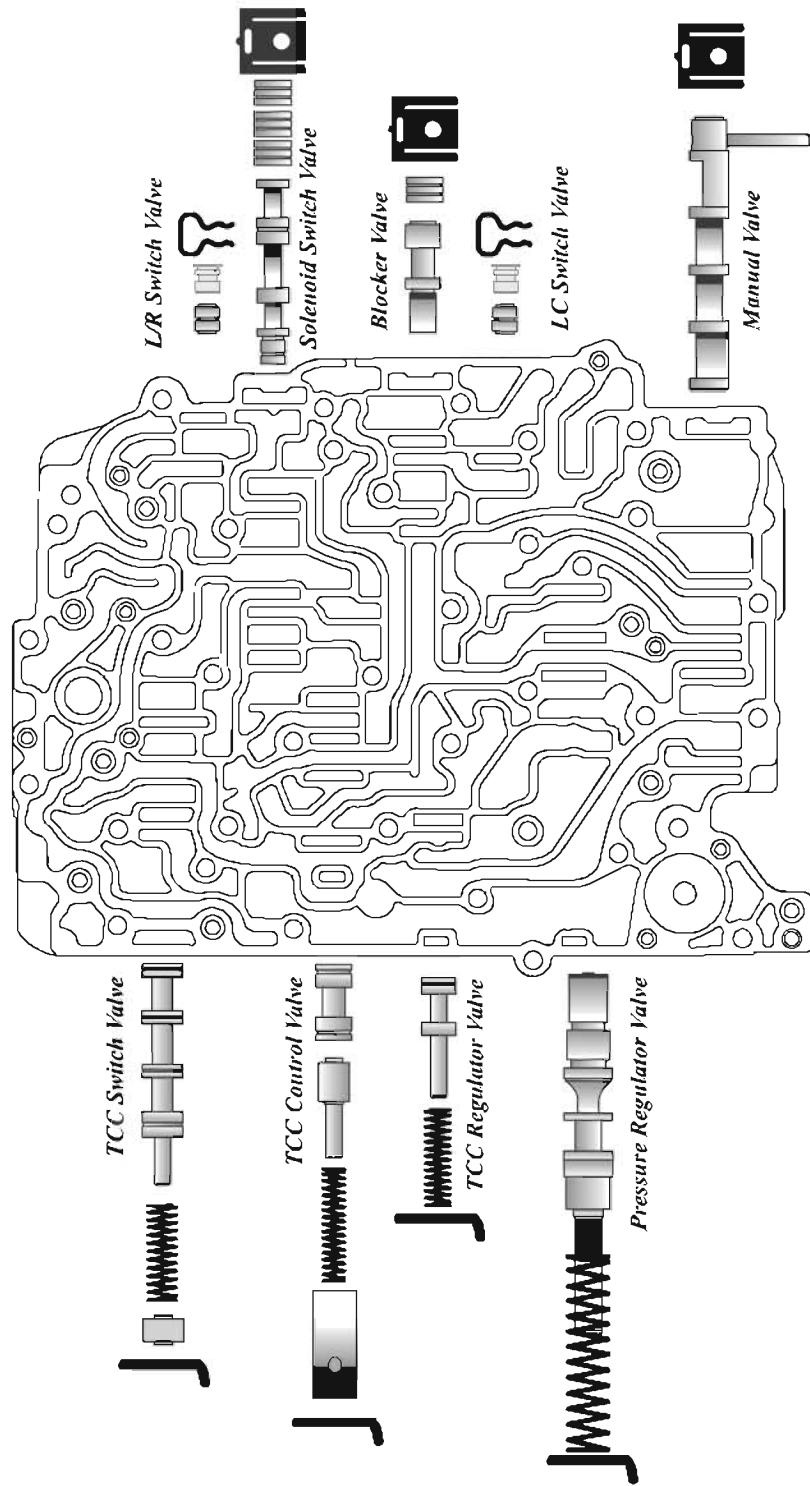


Copyright © 2009 ATSG

Figure 15

## THE 62TE PRELIMINARY INFORMATION

### VALVE LOCATION AND IDENTIFICATION

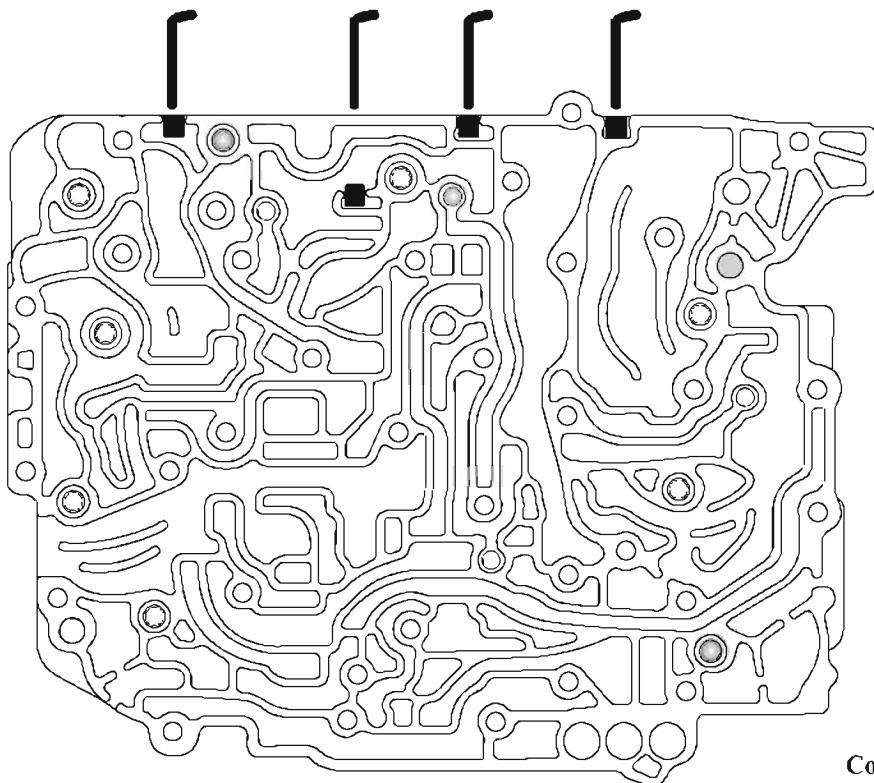
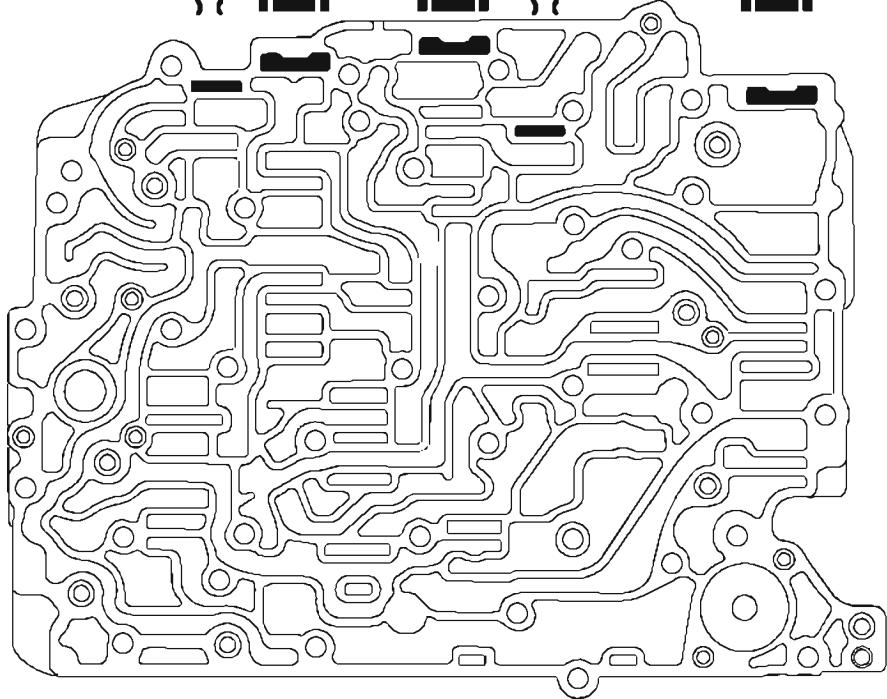


Copyright © 2009 ATSG

Figure 16

## THE 62TE PRELIMINARY INFORMATION

### VALVE RETAINER LOCATIONS

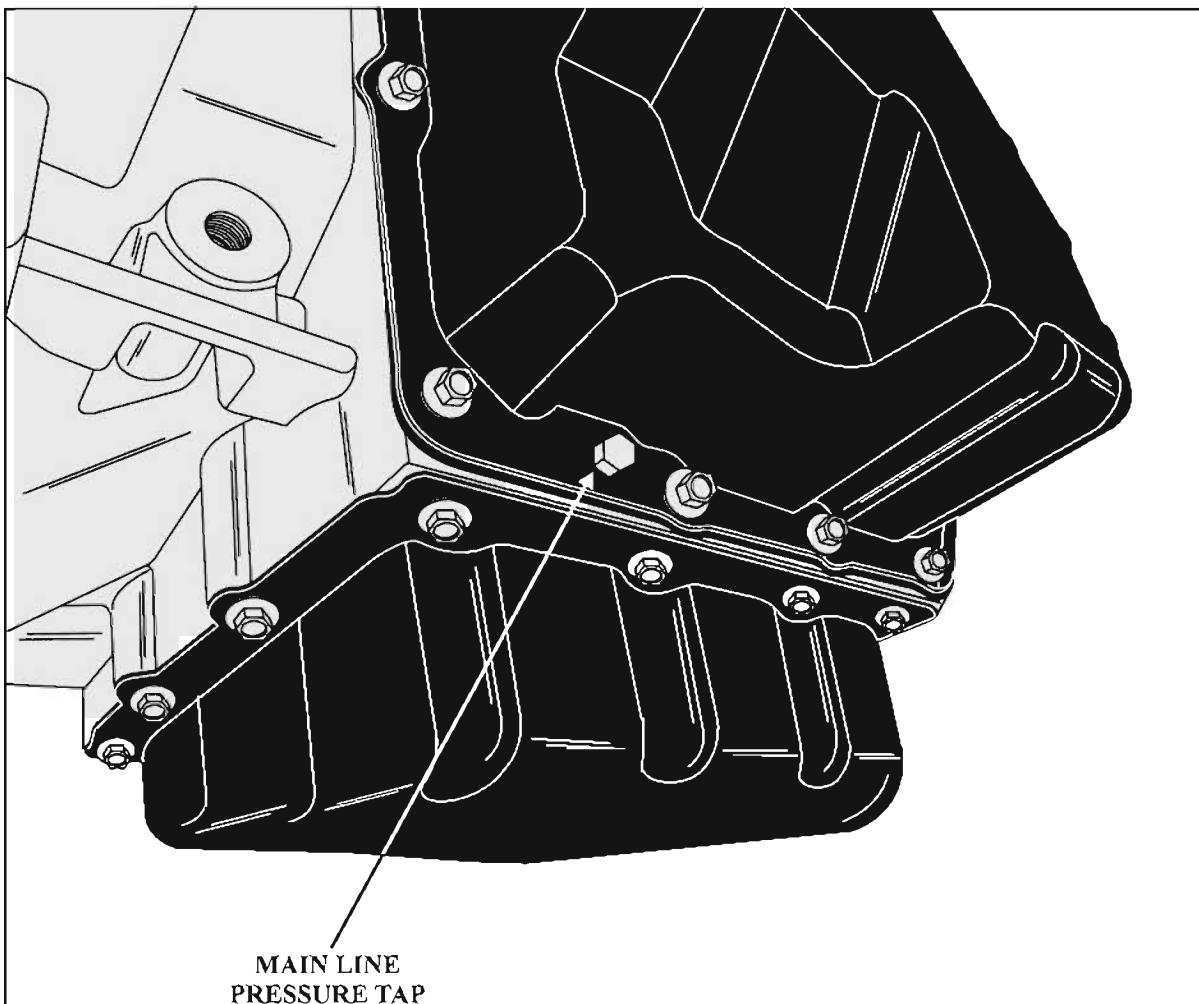


Copyright © 2009 ATSG

Figure 17  
Automatic Transmission Service Group

## THE 62TE PRELIMINARY INFORMATION

### LINE PRESSURE TAP LOCATION



Copyright © 2009 ATSG

Line pressure is monitored by the Transducer and regulation is achieved by changing the duty cycle of the VLPS controlled by the Transmission Control System in the PCM. 5% duty cycle = solenoid OFF which equals maximum line pressure. 62% duty cycle = solenoid ON which equals minimum line pressure. The Transmission Control System calculates the desired line pressure based on inputs from both engine load and transmission.

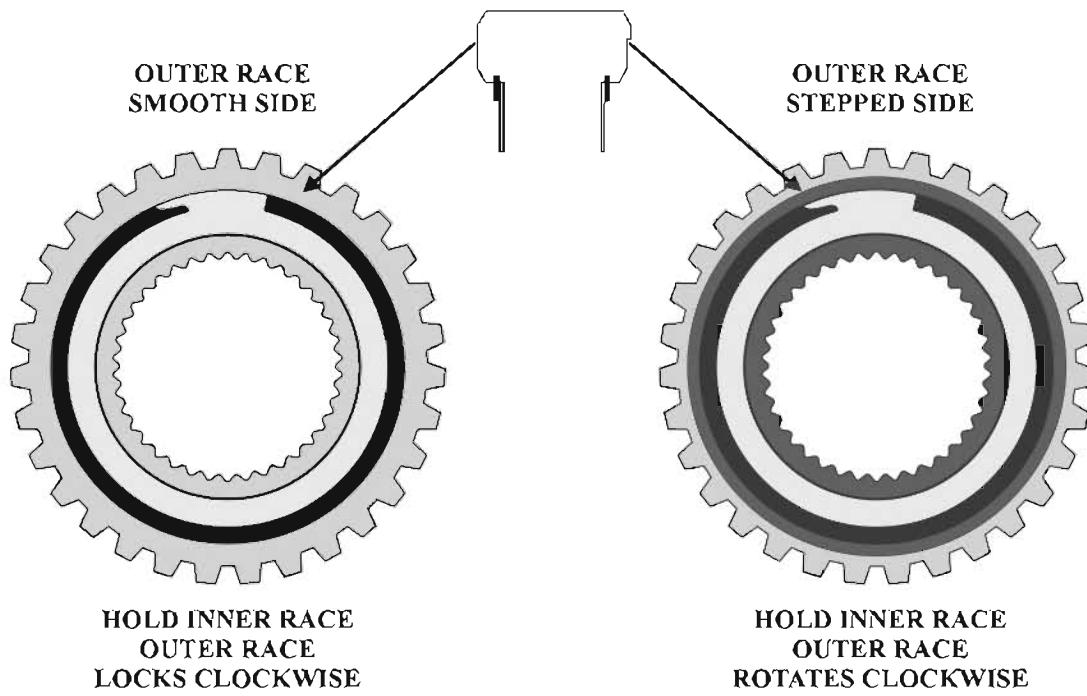
The Transmission Control System calculates torque input to the transmission and uses it as the primary input to the desired pressure calculation. This is called Torque Based Line Pressure. In addition, the line pressure is set to a preset level 827 or 931 kPa (120 or 135 psi) during shifts and in Park and Neutral to ensure consistent shift quality. The desired line pressure is continuously being compared to the actual line pressure. If the actual line pressure is consistently lower than the target while driving, the line pressure low DTC P0868 will set.

Figure 18

## THE 62TE

### PRELIMINARY INFORMATION

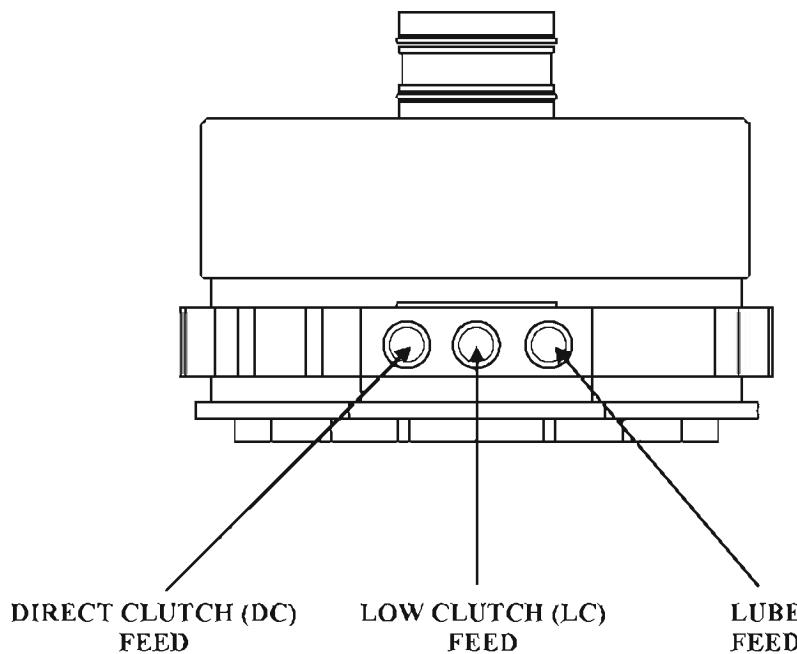
#### ONE-WAY-CLUTCH (OVERRUN SPRAG) FREEWHEEL AND HOLD



Copyright © 2009 ATSG

Figure 19

#### LOW CLUTCH RETAINER PASSAGE IDENTIFICATION

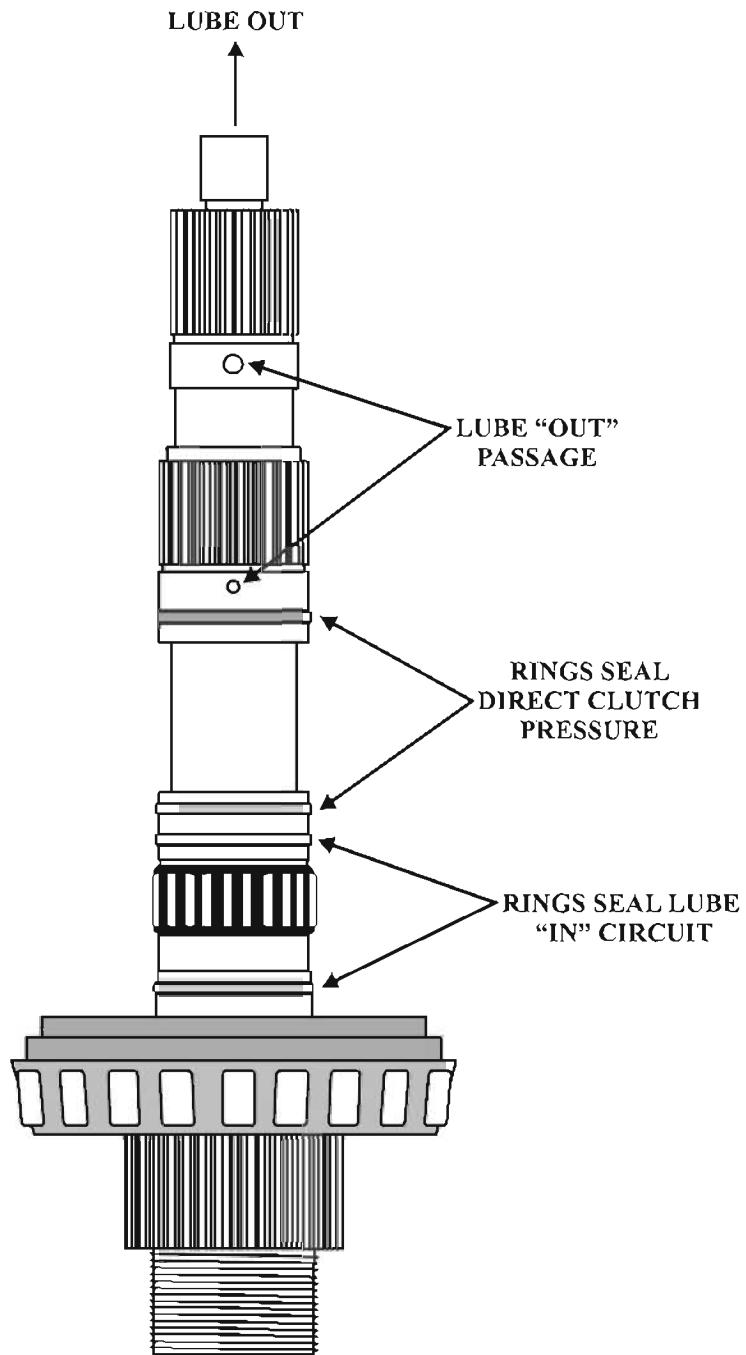


Copyright © 2009 ATSG

Figure 20

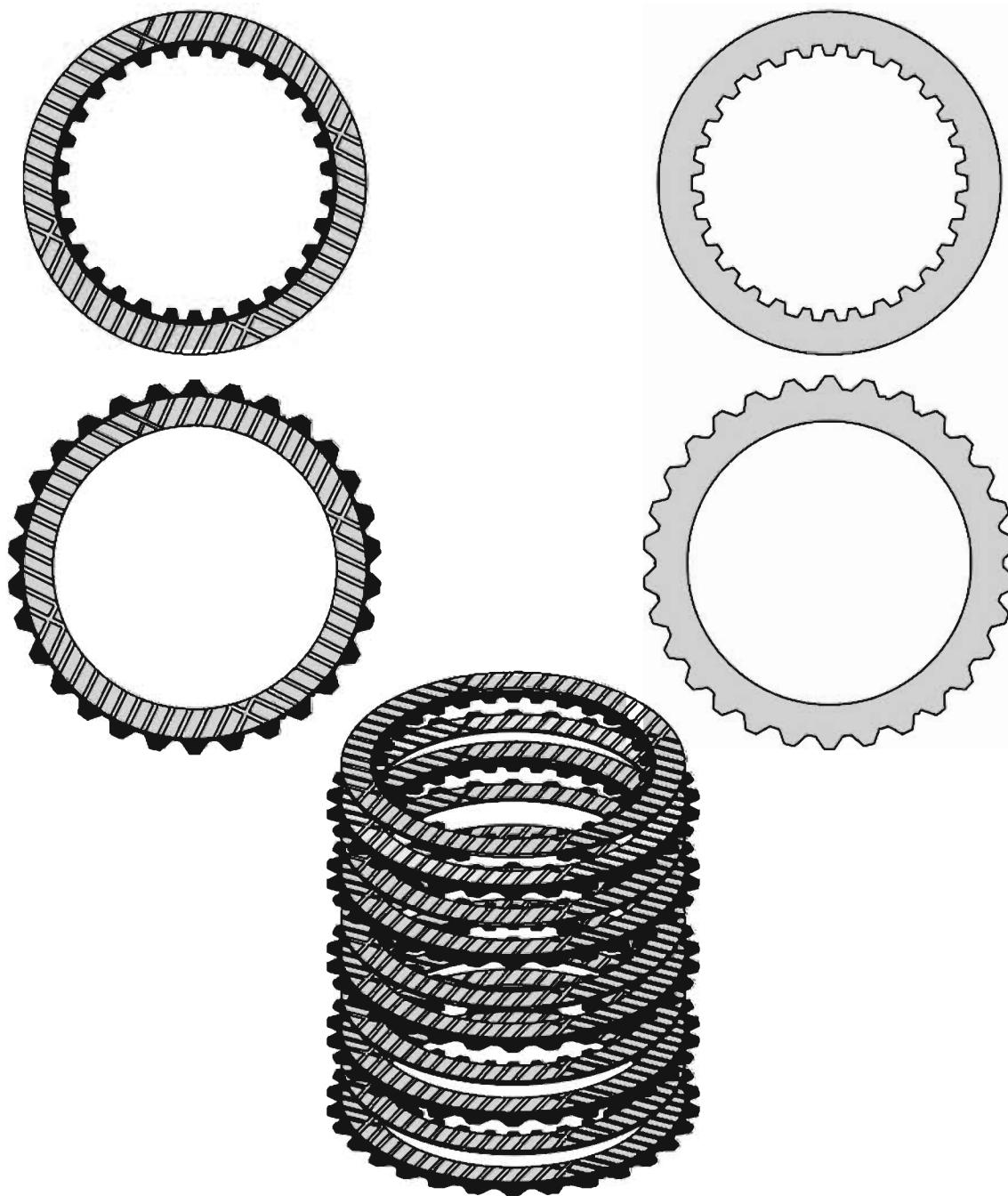
## THE 62TE PRELIMINARY INFORMATION

### UNDERDRIVE CENTERLINE SHAFT RING AND PASSAGE IDENTIFICATION



Copyright © 2009 ATSG

Figure 21

**THE 62TE  
PRELIMINARY INFORMATION****SINGLE SIDED DIRECT CLUTCH FRICTION PLATES**

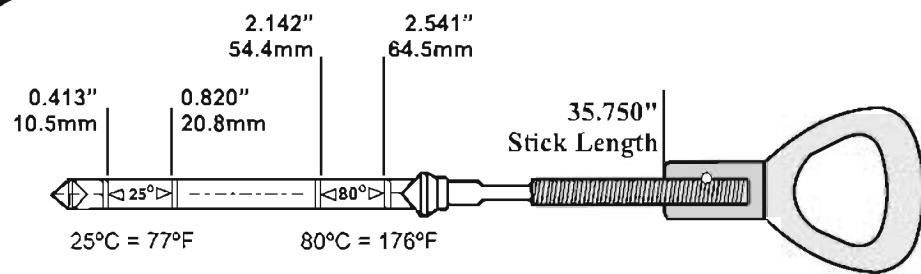
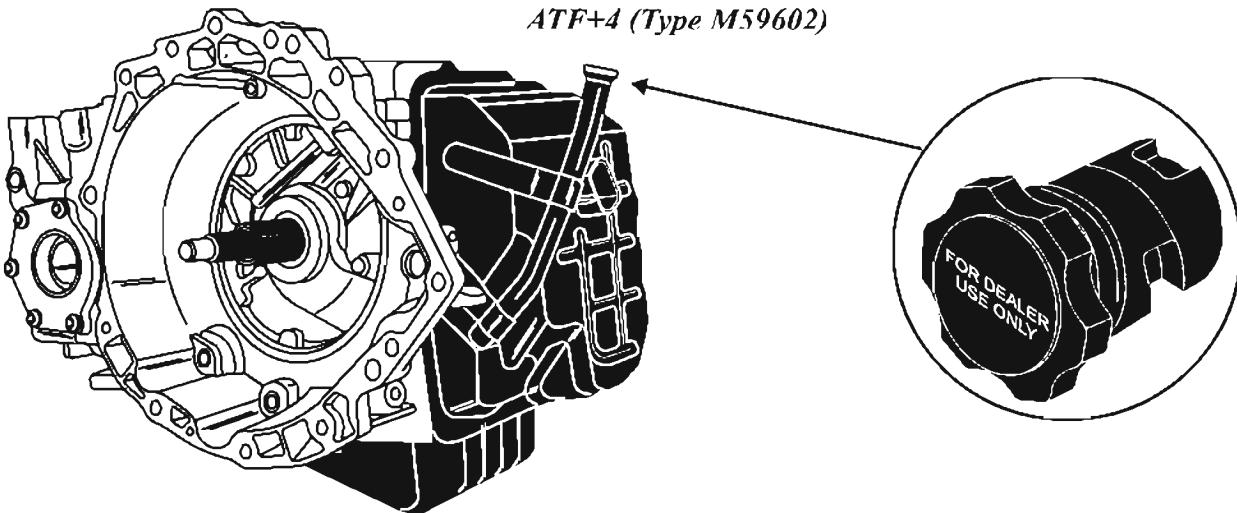
Copyright © 2009 ATSG

Figure 22

## THE 62TE PRELIMINARY INFORMATION

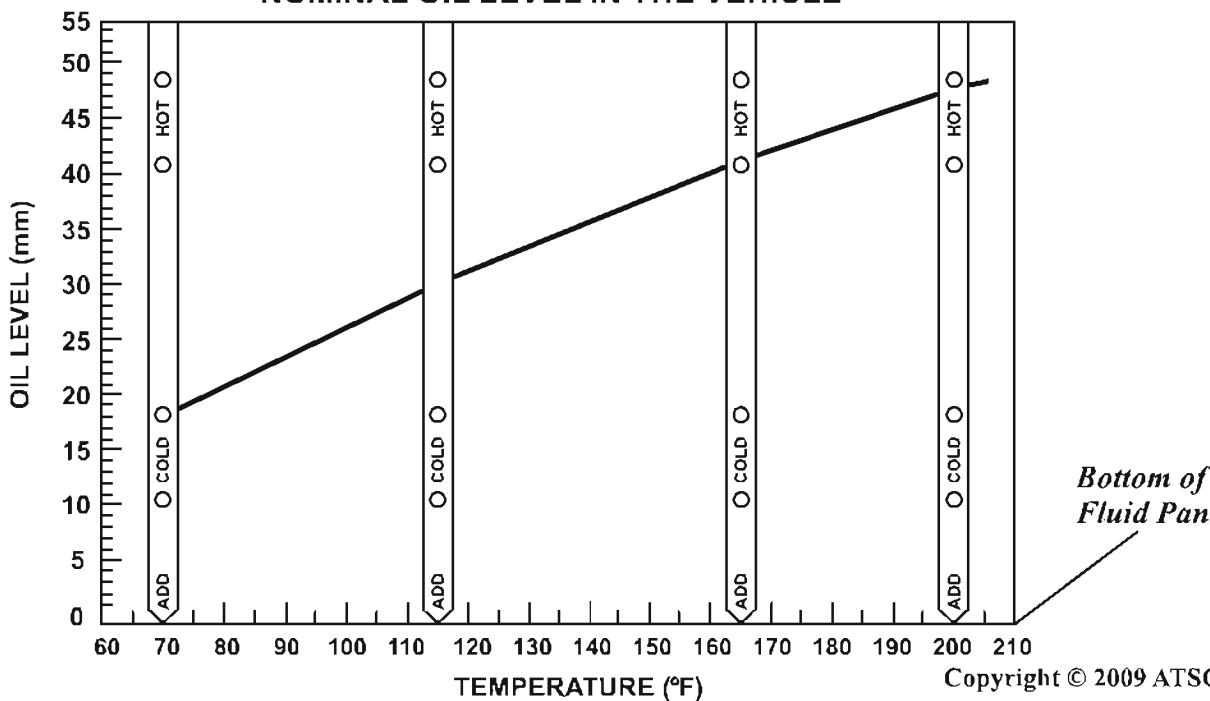
### FLUID CHECKING PROCEDURE

ATF+4 (Type M59602)



### FLUID CHECKING PROCEDURE STICK # 9336

#### NOMINAL OIL LEVEL IN THE VEHICLE



Copyright © 2009 ATSG

Figure 23  
Automatic Transmission Service Group

## **GENERAL INFORMATION**

### **DATA BUS WIRING NETWORK QUICK CHECKS**

**COMPLAINT:** Scanner cannot communicate at all, or with certain modules, or data bus communication fault codes.

**CAUSE:** The cause may be a wiring fault in the data bus wiring, or a bad module. The focus of this bulletin is to show how to monitor signals on the Bus lines regardless of the type of network system used.

**CORRECTION:** If the Bus line reveals activity throughout the entire network, the problem would be that one or more of the computers in the network are not able to send its signal or receive a signal from a companion module. If there are no signals throughout the entire Bus network (voltage stuck high or low), there may be an open or short in the wiring. The Bus wires would then need to be checked like any other wire would be for shorts or open. If there are signals throughout the network except at one module, there is an open or short in the system going to that module and those wires need to be checked and repaired.

#### **SERVICE INFORMATION:**

There are a variety of different data bus systems in vehicles today. Many vehicles have multiple data buses using both the same and different systems. All of them (so far) have one thing in common, wiring (until wireless systems come out).

There are only a few different wiring schemes and topologies. A wiring scheme is the method used to connect modules together (See figure 1). A wiring topology is how the wires are routed between modules (See figure 3).

In the event of a data communications failure, there are several common quick checks that can be made in any type of data bus to determine if the problem is a wiring fault and if so to narrow down and possibly locate the fault.

The first step in checking data bus wiring is to get a wiring diagram of the computer data lines. This will show how many buses there are, and what modules are served by which buses. This will also show where you may gain access to the data bus wiring for testing and what wiring scheme and topology the buses are using.

In most cases, any compromised bus wiring that has a pin in the data link connector can cause a scanner to not communicate with the system. Fortunately, this also makes accessing the wiring for testing very easy. Not all data buses have a pin in the DLC. Some vehicles have all of the buses connected to a common module which then has it's own connection to the DLC (See figure 4).

## **GENERAL INFORMATION DATA BUS WIRING QUICK CHECKS**

Troubleshooting data bus wiring is very similar to troubleshooting any other wiring problem. Check for signal and find the fault. There have been entire books written about the details of the various types of signals you can see in different data buses. For quick wiring troubleshooting there are only three general types of signals to look for (See figure 2).

Signals with normal pulses may be seen in any wiring scheme. Single wire and two wire unidirectional wiring schemes will always have normal pulses. Signal wires labeled HI and LO (or Signal and Return) may be normal pulses or one of the Low Voltage Differential (LVD) variants.

For normal pulse signals only the HI (signal) wire will have signal on it. The other wire (if present) will be ground. In both LVD variants BOTH WIRES MUST HAVE SIGNAL for the bus to work.

It is best to check for signal with the engine running simply to ensure that there will be data traffic on the Bus.

Starting at the DLC, and going wherever else the wiring diagram dictates, check for signal on the bus. If there is zero volts throughout the entire bus, there is probably a short to ground or possibly no power to any modules. If there is signal in some parts of the bus and not in others, follow the wiring diagram module by module checking for signal to determine where the signal stops. There is an open wire at that point. Repair or replace the open wire. If the bus has battery voltage at all points, then there is a short to power.

To verify a grounded bus wire, take a resistance reading from ground to the bus wire. Different busses will have different "normal" values, but they will always be more than 15 ohms. Any resistance reading below 15 ohms may be considered a short. To isolate a shorted bus wire, first disconnect all modules on the Bus and see if the short circuit clears. If it does, the short to ground is in one of the modules. Plug them back in one at a time until your short to ground returns, and replace or repair that module. If the short remains after all modules have been disconnected, begin isolating sections of the Bus wiring until you find the shorted wiring segment and repair or replace it.

Troubleshooting a short to power is the same as a ground except you take voltage readings from ground. When the voltages changes to a Bus signal or zero you have found your problem.

In any of the wiring schemes that support LVD signals it is possible that the two wires may become shorted together. Follow the same general procedure as hunting down a short to ground, only use the LO (return) wire as your ground.

If an actual LVD signal has both wires shorted together, it may appear to be a short to power. If the voltage is not full battery voltage, do a resistance check for a short.

## GENERAL INFORMATION DATA BUS WIRING QUICK CHECKS

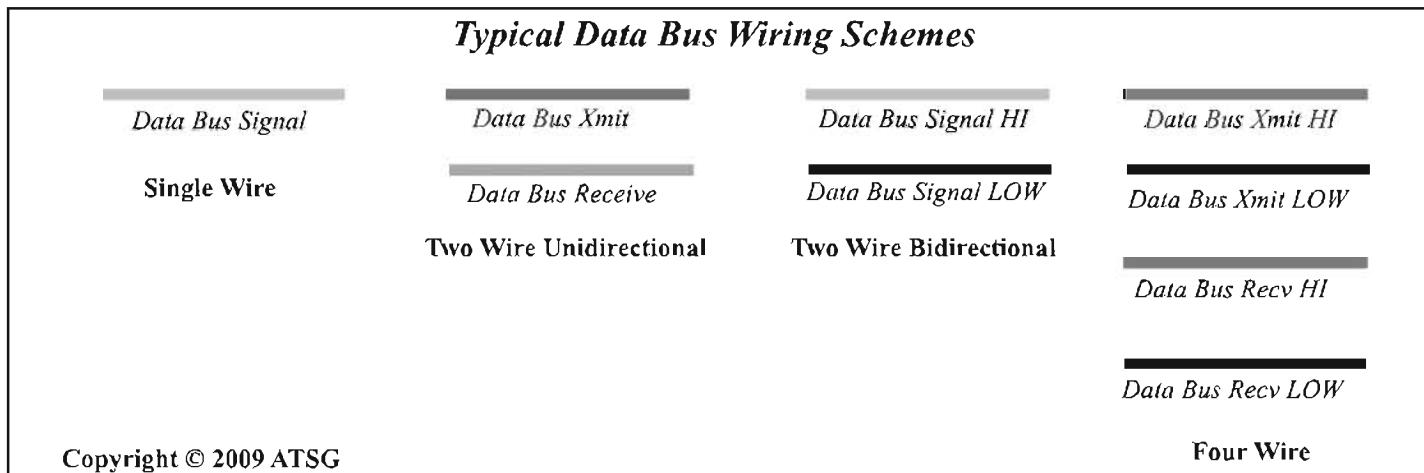


Figure 1

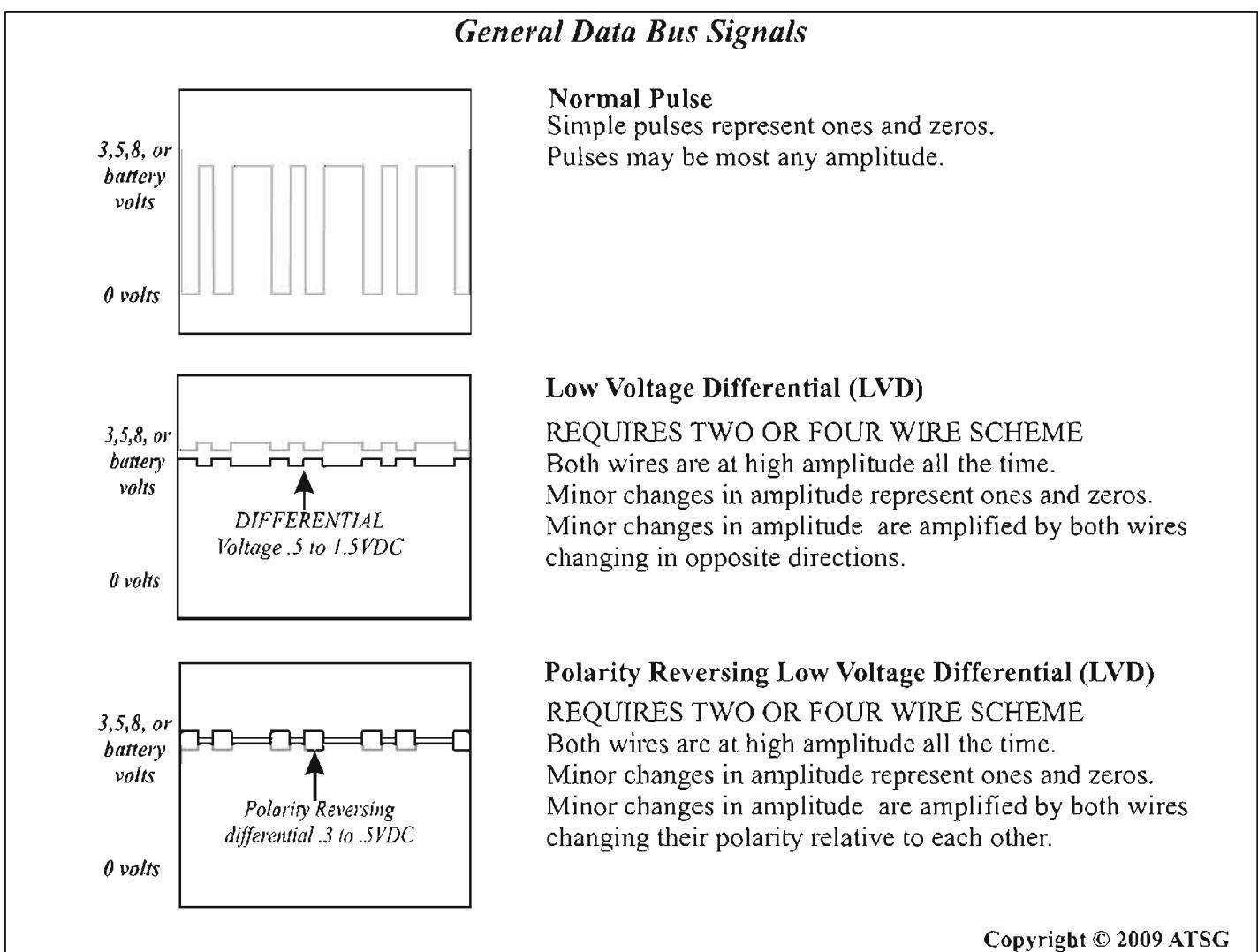
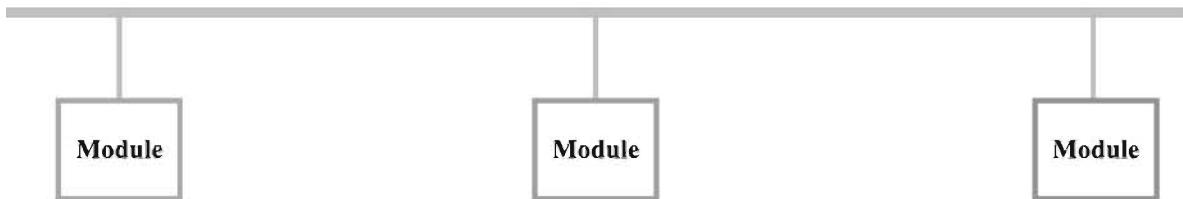


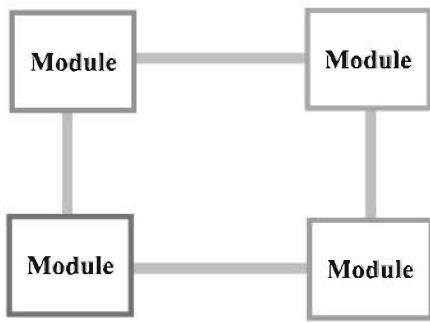
Figure 2

## GENERAL INFORMATION DATA BUS WIRING QUICK CHECKS

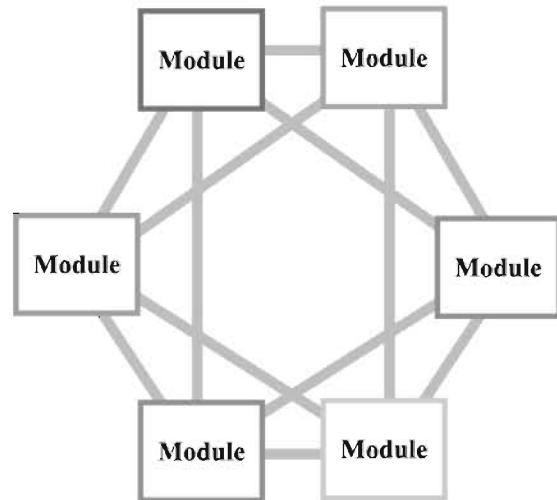
### *Typical Data Bus Topologies*



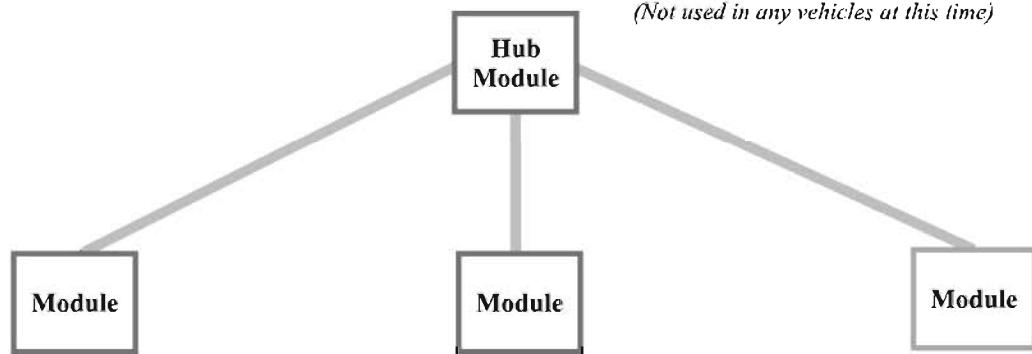
**Straight Bus** May be one wire traveling around vehicle or a single or multiple splice points



**Ring or Daisy Chain**  
Each Module connects to two other modules



**Star**  
Each Module connects to three or more other modules  
*(Not used in any vehicles at this time)*

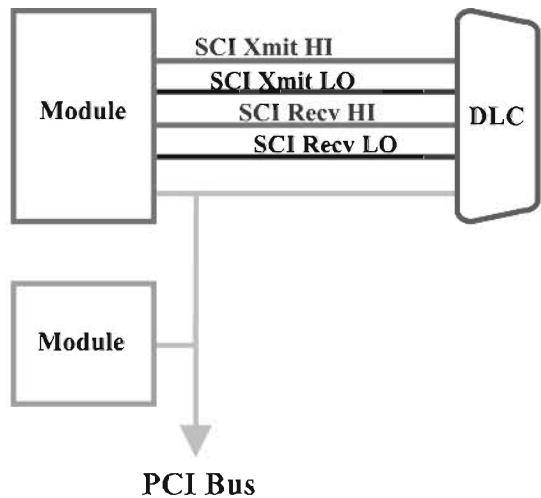


**Hub or Switch**  
Each Module connects to a hub or switch

Copyright © 2009 ATSG

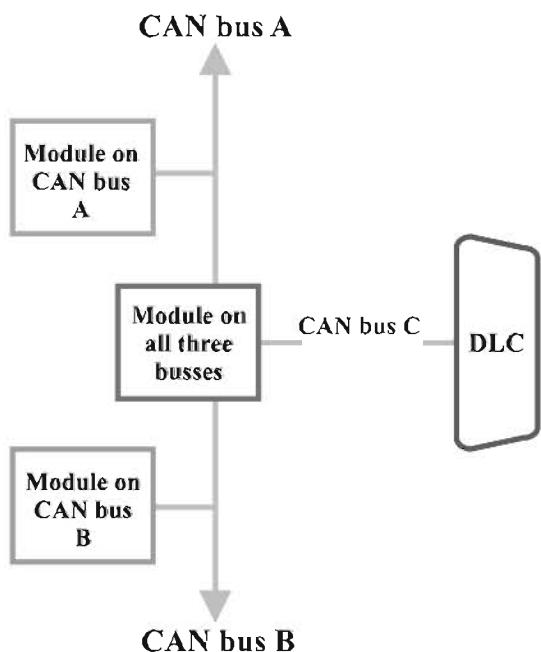
Figure 3

## GENERAL INFORMATION DATA BUS WIRING QUICK CHECKS



**Two Buses with separate DLC pins**

One 4 wire SCI bus and one single wire PCI bus.  
SCI bus is exclusively for DLC/PCM communications.  
(Example from mid 2000's Dodge vehicles)



**Three Buses with a Module in common**

Three separate CAN Buses, all connected to one common module.

CAN bus C is exclusively for DLC/Common Module communications.

(Example from late model Ford)



Automatic Trans  
Kits & Components



Hard Parts



Transfer Case  
Kits & Components



NATIONAL TRANSMISSION PRODUCTS INC

*THE BEST FOR THE BEST*

**Call 1-800-333-2330**



Converters



Accessories



Electrical  
Components



# ALTO PRODUCTS CORP.

## "PACKS THE POWER"

Alto Original Equipment Improvement (OEI®) Diesel Performance PowerPacks® are designed and engineered for superior transmission performance and durability in the most demanding applications.

### FORD POWERSTROKE



Ford® POWERSTROKE

### GMC DURAMAX DIESEL



GMC®  
DURAMAX  
DIESEL

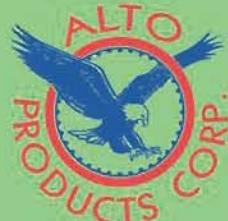
### DODGE CUMMINS



DODGE  
Cummins®

### ALTO OEI REPLACEMENT PARTS

Automatic and Standard Clutches • Rebuilding Kits • OEI Products • Hi-Performance Clutches • Friction Material



# WE HAVE A TRANSMISSION SOLUTION FOR ANY VEHICLE.



(WELL, ALMOST ANY)

AS THE TECHNOLOGICAL LEADER,  
PRECISION INTERNATIONAL'S REPAIR KITS ARE TRULY STATE OF THE PART.

Name any year, make or model. Give us any transmission problem. Chances are we've got a solution. Not just any solution, but one that will really work and keep on working – backed by solid engineering, the latest specs and our reputation for giving you and your customers reliable performance and the utmost peace of mind. When you see the Precision International name on one of our transmission repair kits, you can feel confident you've got the very best. All are cross-checked against OEM specs. All changes are noted and made. And we always use OE parts or better. Plus, our huge inventory virtually assures immediate delivery.

#### THE BEST ADVICE ON THE PLANET

As the technological leader in transmission repair for over 30 years, you can also count on Precision for outstanding tech assistance and support, including our hot new website

**www.transmissionkits.com**. Just a mouse click away is a wealth of information, including continually updated video seminars from leading transmission expert John Parmenter, question and answer forums, complete parts information and much more – that can help you troubleshoot and solve virtually any transmission repair problem.



Spaceships? No, we haven't helped repair one of those yet. But who knows what tomorrow will bring. For more information, give us a call.

**www.transmissionkits.com**

**PRECISION™**  
**INTERNATIONAL**  
**The Problem Solvers.**

14 Todd Court Extension, Yaphank, NY 11980  
(831) 587-2000 • Fax (831) 587-2640 • Toll Free: 800-872-8848  
Florida Office: 8790 Hillsdale Point, Boynton Beach, FL 33487  
(561) 734-2382 • Fax (561) 734-2375  
E-mail: sales@transmissionkits.com www.transmissionkits.com



# OEM'S USE

**LUBE GARD®**  
Shouldn't You?



Official Technical Service Bulletin

## LUBEGARD® AUTOMATIC TRANSMISSION FLUID PROTECTANT

- For use with any required \*ATF's!
  - Prevents overheating, reducing elevated operating temperatures up to 40°F
  - Extends fluid life and eliminates fluid foaming and oxidation
  - Reduces wear throughout the transmission
  - Eliminates clutch and torque converter shudder
  - Optimizes total transmission performance
  - Softens and modifies harsh shifts
  - Provides for smoother shifting, eliminates objectionable noises during shifts
  - Keeps valves and governors free and frees stuck valves in valve bodies
  - Raises the thermal and oxidative stability of the fluid
  - Only protectant that increases the fluid's ability to transfer heat
  - Does not contain any harmful components such as zinc (ZDDP)/Ash, etc.
- \* Except Ford Type F ATF and CVT applications.

Lubegard is the ONLY product of its kind to be Used, Endorsed, Designated and Approved by Multiple OEM's (Original Equipment Manufacturers).  
No other product of its type has ever had such approvals or endorsements.



The Subaru bulletin above was created by ILI to accurately translate the German Subaru recommendation as well as show the back of the product with the official Subaru part number from the dealerships.

## LUBEGARD® HIGHLY FRICTION MODIFIED ATF SUPPLEMENT

- Eliminates the need for multiple OEM fluids
- Converts DEXRON®/MERCON® ATF into any highly friction modified ATF
- Recommended for use in Ford AODE and 4R70W transmissions with shudder problems that do not require MERCON® V ATF
- Does not contain zinc (ZDDP)/ash
- Also contains same benefits as LUBEGARD® ATF Protectant

Lubegard is the PROVEN choice of transmission professionals. LUBEGARD's ATF Protectants alone have won 15 times more product awards.



## DR. TRANNY® KOOLER KLEEN Transmission Cooling Line Flush Cleaner A 3-in-1 Product

- Prevents contamination of a new or rebuilt unit
- Removes grease, dirt, sludge, grime and metal shavings
- No water/soapy residue to contaminate new automatic transmission fluid
- Contains no ozone depleting chemicals or CFC's
- Contains no chlorinated solvents
- Formulated to not harm seals or degrade new automatic transmission fluid
- Prevents costly comebacks



**INTERNATIONAL LUBRICANTS, INC.**

7930 Occidental South ■ Seattle, WA 98108 ■ PO Box 24743 ■ Seattle, WA 98124  
206-762-5343 ■ 800-333-LUBE (5823) ■ Fax: 206-762-7989 ■ [www.Lubegard.com](http://www.Lubegard.com)

©2008 ILI. All Rights Reserved.

# DRIVEN TO BE THE BEST IN...



\* **3 YEAR  
WARRANTY  
INDUSTRY BEST**

## TORQUE CONVERTERS

**TRANSTAR**  
TRANSTAR INDUSTRIES, INC.®

TRANSTAR INDUSTRIES, INC. • 7350 YOUNG DRIVE • CLEVELAND, OHIO 44146 • [WWW.TRANSTAR1.COM](http://WWW.TRANSTAR1.COM)

3  
YEAR

TRANSTAR  
WARRANTY

WHEN IT COMES TO TORQUE CONVERTERS, NO ONE IS MORE COMMITTED TO EXCELLENCE THAN TRANSTAR. WE REMANUFACTURE MORE TORQUE CONVERTERS THAN ANYONE ELSE IN THE INDUSTRY, WITH THE HIGHEST QUALITY MANAGEMENT SYSTEMS, PROPRIETARY PROCESSES AND STATE-OF-THE-ART EQUIPMENT. WITH TRANSTAR'S ENHANCED DELIVERY SYSTEM, YOU CAN DEPEND ON "JUST IN TIME" DELIVERY FOR YOUR TORQUE CONVERTERS AS WELL AS ALL YOUR TRANSMISSION REPAIR NEEDS.  
**DRIVEN TO BE THE BEST FOR YOU.**

800.359.3339 | [www.transtar1.com](http://www.transtar1.com)

\*Recon by Transtar Torque Converter Limited Warranty

