



**25 YEARS OF
TECHNICAL SERVICE**



**"2011" TRANSMISSION SEMINAR
SERVICE INFORMATION**

Raybestos IFC



"25th Seminar Anniversary Silver Edition"

ATSG Seminars

Welcome to ATSG's 25th year anniversary of conducting technical training seminars throughout the United States. In the 1985 October Issue of Transmission Digest there was an article reviewing the second annual all-transmission trade show called TRANS EXPO '85. Its theme was "Let's Show The World." In this review it was announced that Robert Cherrnay was stepping down from his role as ATRA's Technical Director to be involved with a consulting firm that would provide technical expertise to the industry. That firm was ATSG and it has "Shown the World" how it has been faithful to its founding principals. The theme Bob Cherrnay set for this firm was "It helps to belong to a tech service but belong to a tech service that helps.. ATSG...we are the tech service that helps." After 25 years ATSG continues to provide technical expertise to the industry in publications, articles, a hotline service and most notably, ATSG Technical Training Seminars. We want to thank all of you who have supported ATSG making it possible for us to enjoy such a mile stone in its history. And as you will see in this years seminar, we have been faithful to you in our commitment providing information that will assist you in your success as well!

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Lubegard - 2



"2011" SEMINAR INFORMATION

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4L60/4L60E/4L65E/4L70E

SECOND GEAR SERVO

COMPLAINT: The 1-2 and 2-3 shift quality is poor, line pressure is within specs and the 1-2 accumulator assembly is correct for the vehicle application.

CAUSE: One cause may be that the transmission has a soft shift 2nd gear servo in it.

CORRECTION: It is a common practice when the technician wishes to improve 1-2 and 2-3 shift quality without causing a harsh shift complaint is to replace the original soft shift 2nd gear servo assembly with a firmer shift servo assembly.

In some cases a Corvette servo was installed which sometimes results in a 1-2 shift that is too firm, yet the other two servo assemblies that were available did not improve the 1-2 or 2-3 shift quality.

There is now available a fourth 2nd gear servo assembly which was produced to service the 4L70E transmissions which creates a 1-2 & 2-3 shift feel that is in between the soft shift servo and the Corvette servo.

This is possible due to the larger apply area created by the divider ring of the Corvette and 4L70E servo assemblies. The smaller the hole in the divider ring the greater the second gear apply area. The firmer shift servo assemblies also "clean up" the 2-3 shift because accumulation for the 2-3 shift takes place on the release side of the 2nd gear servo assembly.

The soft shift servo assemblies have a casting number on the servo of 8642553 and 8642554 which have a divider hole diameter of 2.312" and 2.520" respectively which are typically used in V6 and small V8 applications, these numbers can be found on the rear of the servo casting as seen in Figure 1.

The Corvette servo has a casting number of 8642093 and has a divider hole diameter of 1.792.

The 4L70E servo has a casting number of 24229159 and has a divider hole diameter of 2.075. All four servo piston and divider rings as well as their dimensions can be seen in Figure 2. There are also available firm shift servo assemblies available from the aftermarket.

A special thank you to Greg Nader of Sonnax for this information which made this bulletin possible.

SERVICE INFORMATION:

4L70E 2nd Gear Servo Piston.....	24230441
4L70E Divider Ring.....	24229157

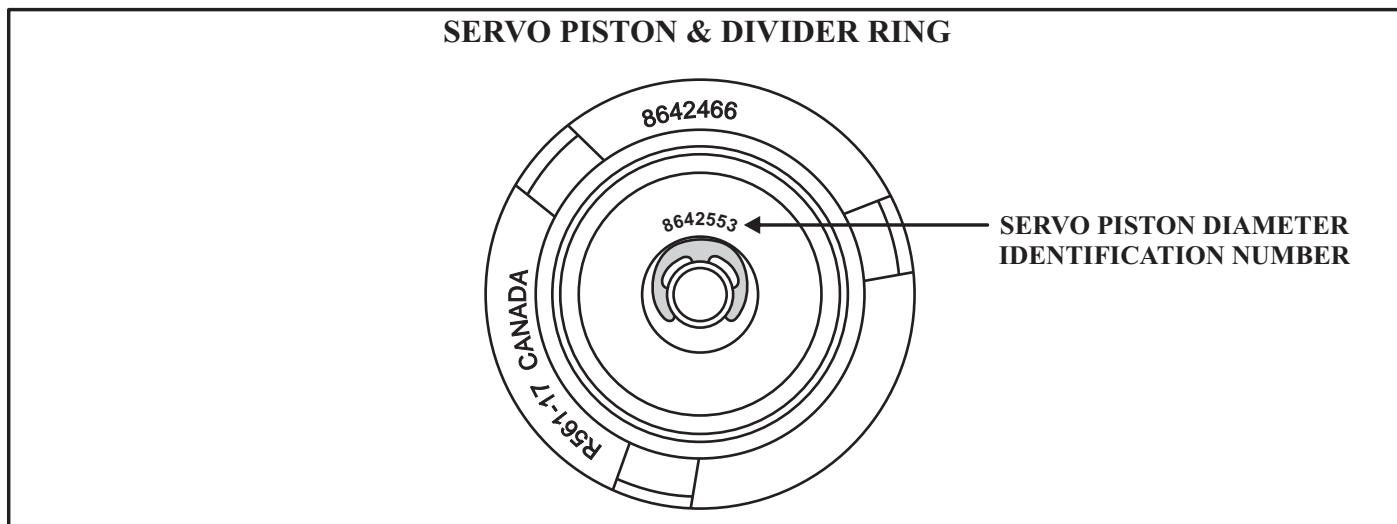
SECOND GEAR SERVO


Figure 1

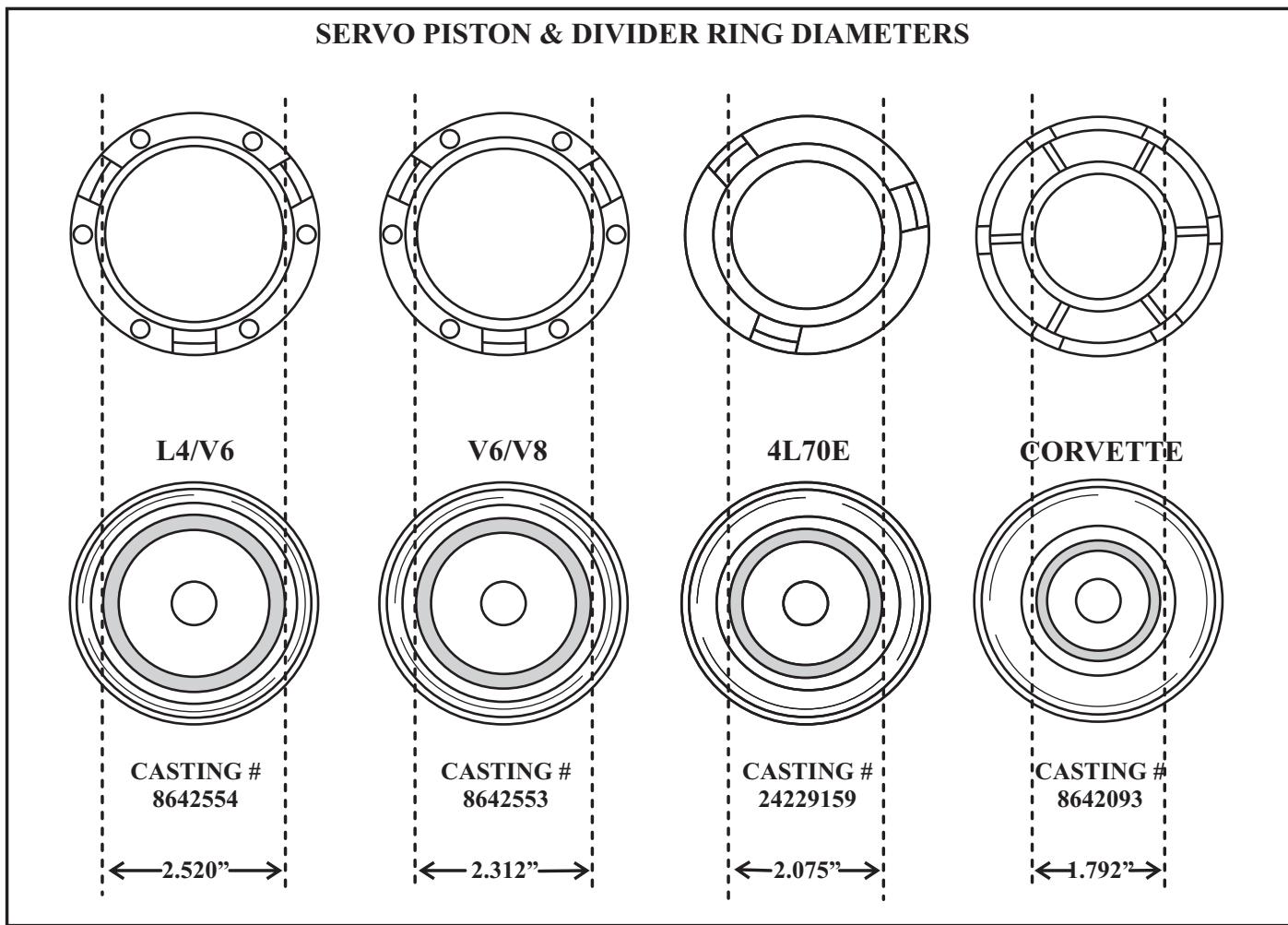


Figure 2

SAP - 6

4L60E/4L65E/4L70E**THIRD GEAR STARTS**

COMPLAINT: The transmission makes a third gear start even though first gear is commanded. It may also bind up in reverse and manual low, after disassembly inspection reveals that the 3-4 clutch is badly burnt.

CAUSE: The rear stator bushing is worn, Figure 1.

CORRECTION: When the rear stator bushing wears, a cross feed takes place across the input shaft sealing rings. The feed hole on the input shaft closest the drum is the lube circuit, the lube circuit oil will cross feed into the feed hole above it which is the 3-4 clutch circuit. The constant flow of lube oil into the 3-4 clutch feed circuit puts a drag on the clutch which not only burns it but causes a third gear start, Figure 2.

The bind in manual low is caused by the fact that when the low/reverse clutch is applied and the 3-4 clutch is applied by lube oil a bind up will occur which will also cause the bind in reverse. This condition gets worse as the transmission warms up to normal operating temperature. It is a good idea to replace both the front and rear stator bushings, Figure 3, not only to prevent the above complaint but to also insure that the input shaft spins centerline to its related components.

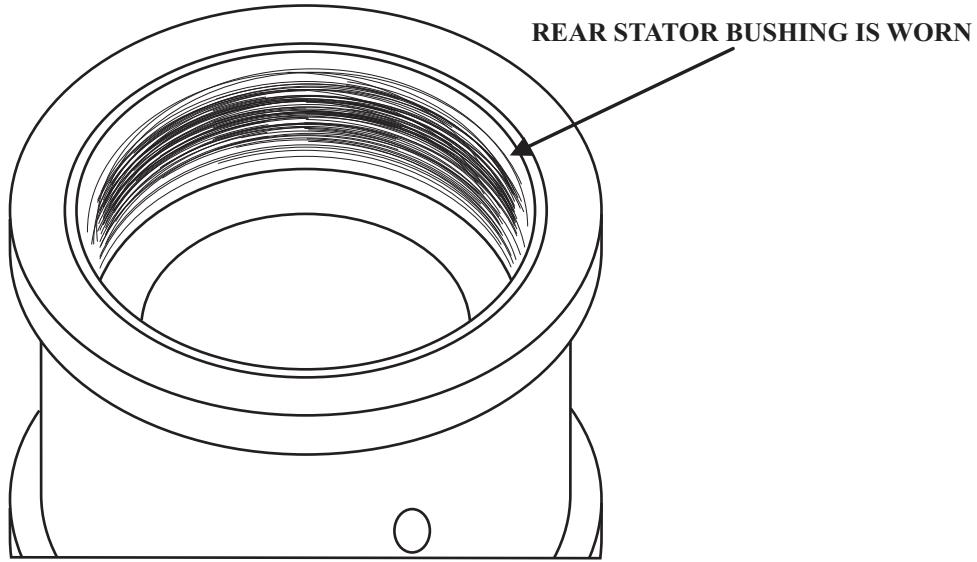
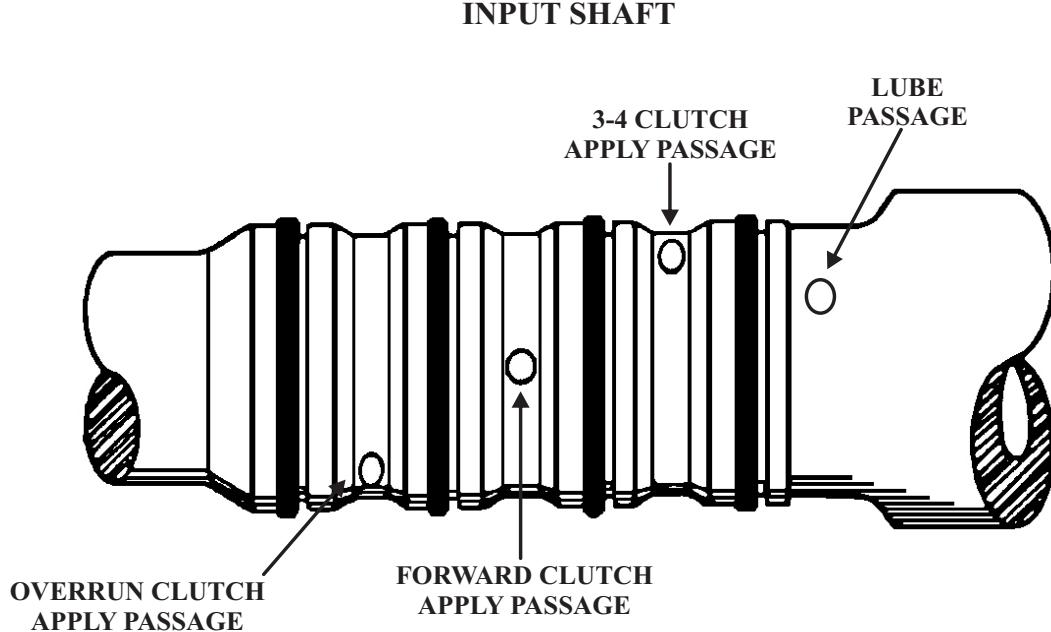


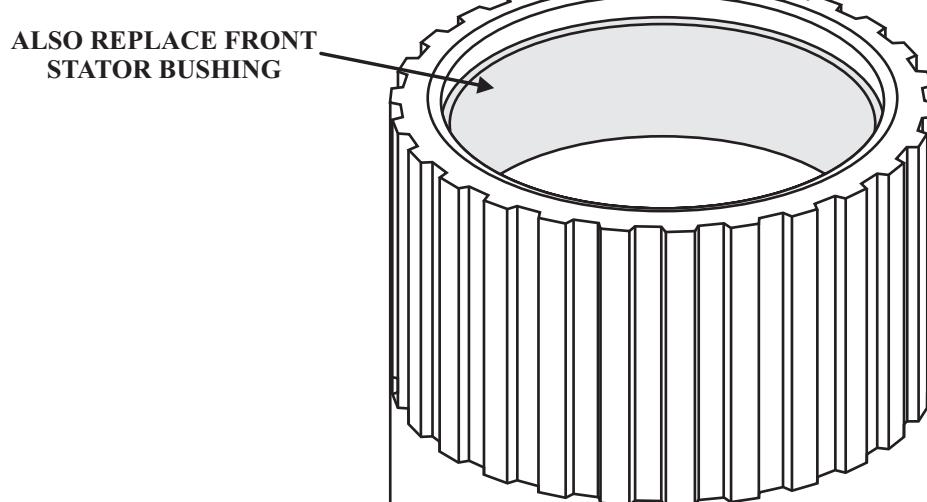
Figure 1

THIRD GEAR STARTS



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Figure 2



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Figure 3



"2011" SEMINAR INFORMATION

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GM 4L60E

CODE P0741 STORED & INOPERATIVE CRUISE CONTROL

COMPLAINT: A 2004 - 2005 Buick Rainier, Chevy Trailblazer, GMC Envoy or a 2004 Olds Bravado with 4.2 engine and 4L60E transmission with a complaint of harsh shifts with code P0741 stored and cruise control is inoperative.

CAUSE: A transmission calibration problem.

CORRECTION: Reprogram the PCM with a new software calibration with TIS update version 10.5 or newer, Figure 1.

SERVICE INFORMATION:

Software Calibration Part Number..... **12597031**

GM Service and Parts Operations							
Vehicle Calibration Information							
VIN: 1GND13S442239971				Calibration Selection			
<input checked="" type="checkbox"/> Operating System	<input checked="" type="checkbox"/> Engine	<input checked="" type="checkbox"/> Engine Diagnostic	<input type="checkbox"/> Transmission	<input type="checkbox"/> Transmission Diagnostic	<input checked="" type="checkbox"/> Fuel System	<input checked="" type="checkbox"/> System	<input checked="" type="checkbox"/> Speedometer
● 12597031							
Calibration History for: Engine							
Part Number	CVN	Bulletin #	Description				
12597031	N/A	04-07-30-041	NEW CALIBRATION TO ADDRESS THE POTENTIAL SETTING OF P0741 AND INOPERATIVE CRUISE CONTROL				

Figure 1

ALTO - 10

5L40-E

PRESSURE INSTABILITY

COMPLAINT: The transmission came in for repairs due to burnt frictions. After rebuild, it may be discovered that line pressure is unstable and worsens as it heats up. If line pressure instability is not noticed during a road test, the transmission comes back with burnt frictions similarly to when it originally came in for repairs.

CAUSE: The cause may be a worn converter housing in the area of the pump slide seal (figure 2) where it seals decrease oil as the slide moves back and forth from high to low volume positions (figure 1). This area of the pump assembly is overlooked when the decision is made to not remove slide, rotor and vanes from the housing (figure 3).

CORRECTION: Replace the converter housing.

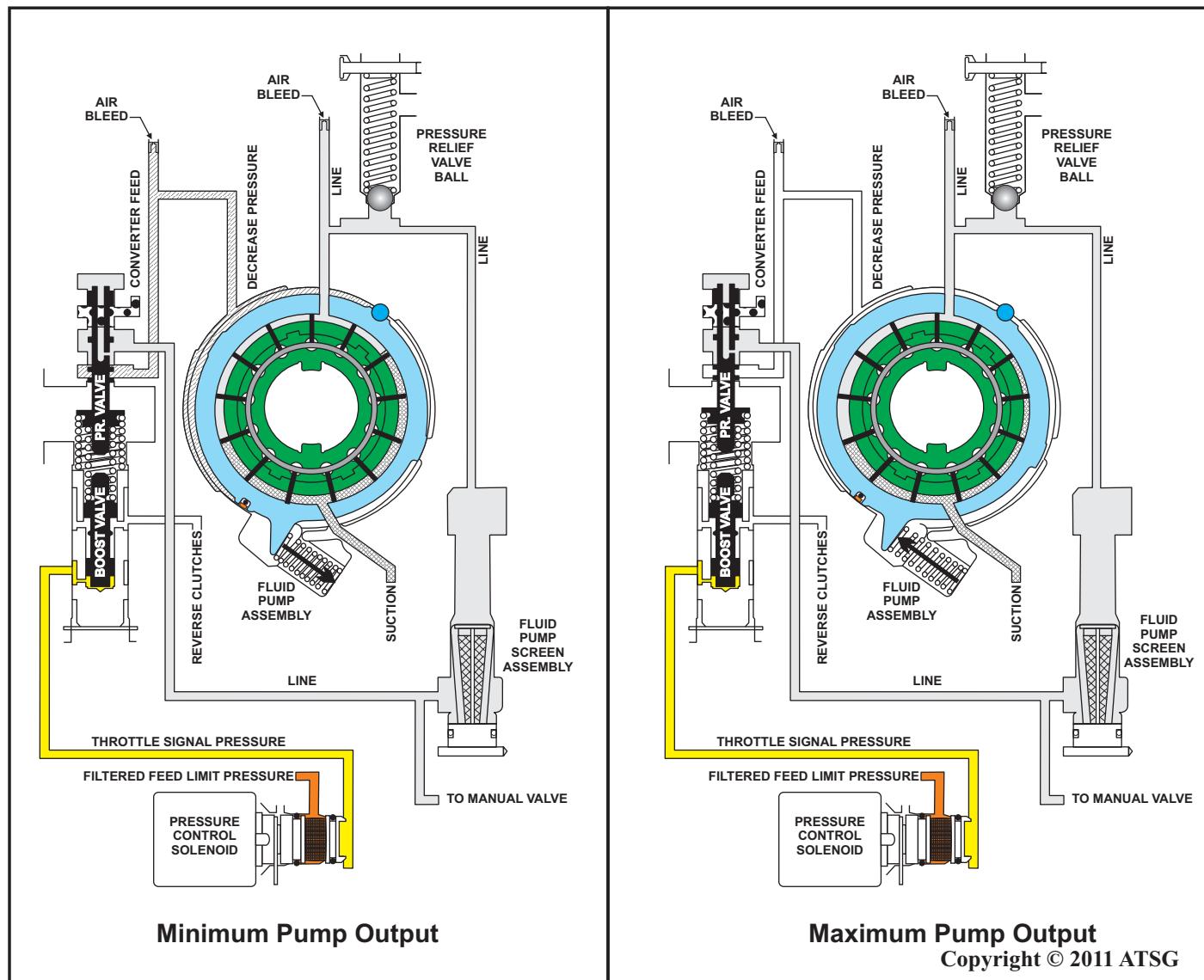


Figure 1

5L40E PRESSURE INSTABILITY

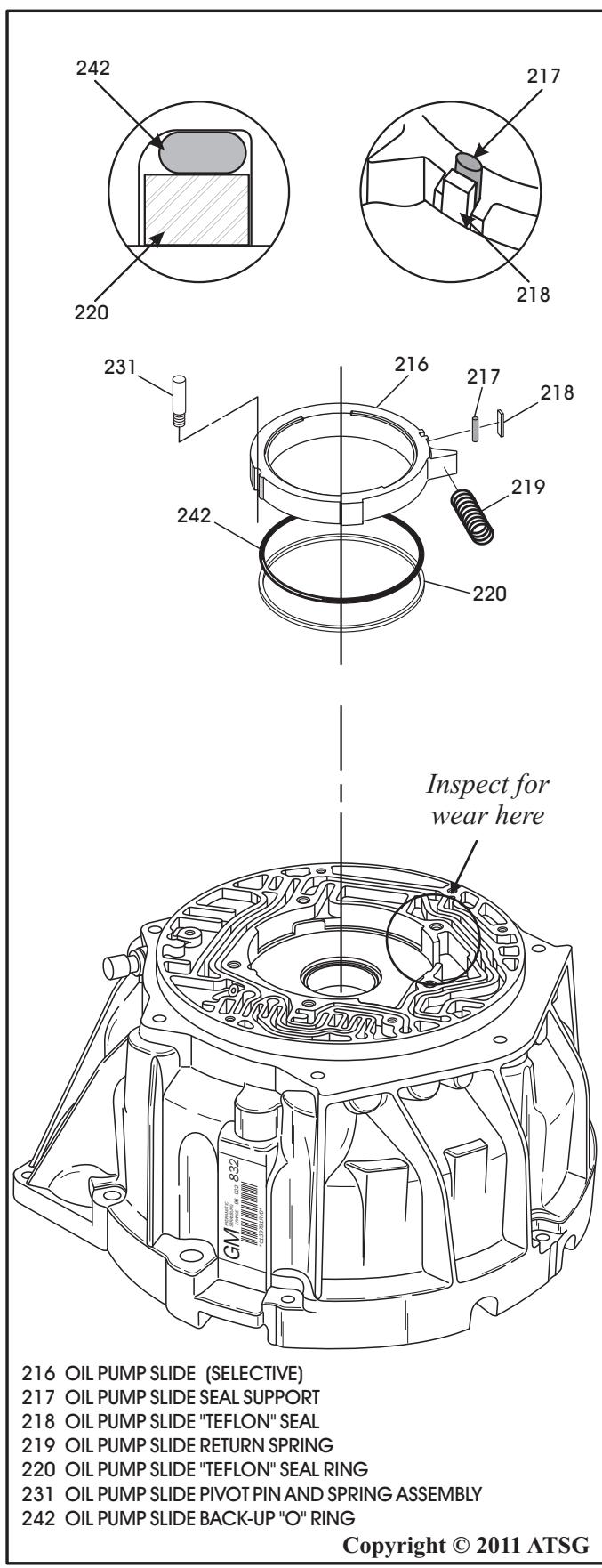


Figure 2

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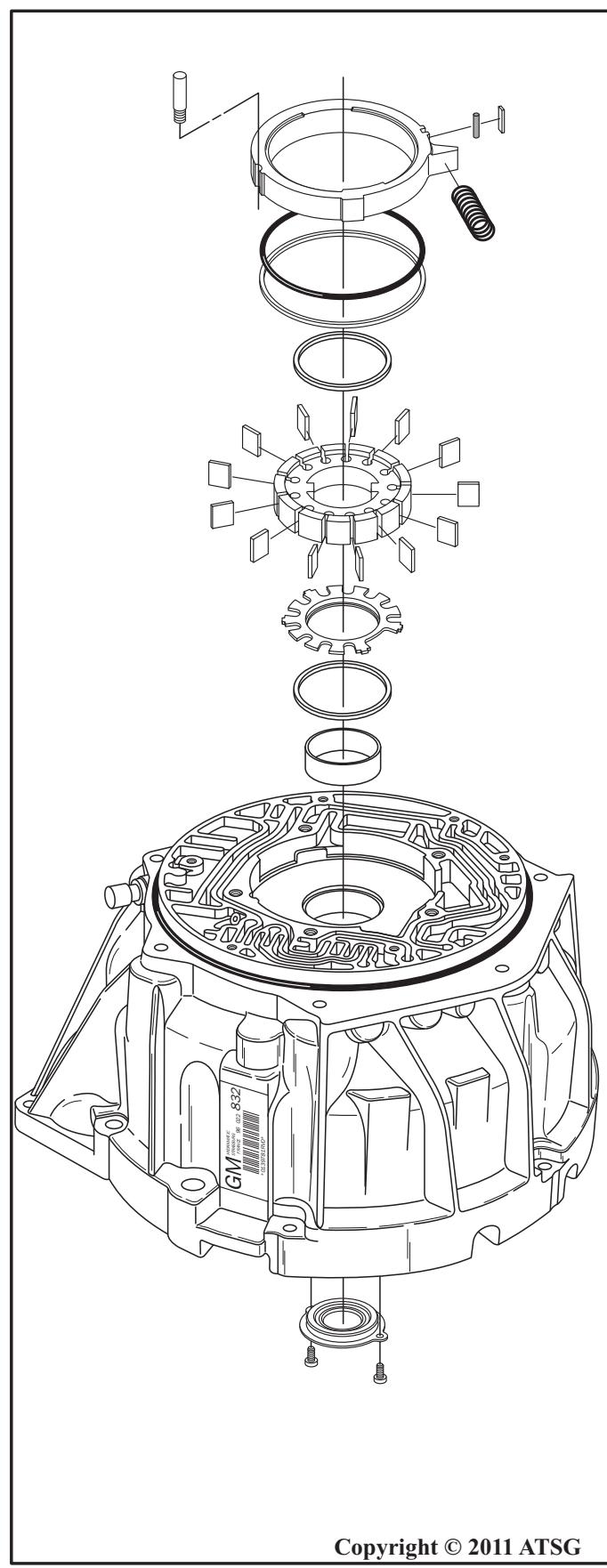


Figure 3

6L40/50/80 - GM6**DELAYED SLIPPING REVERSE AND SLIDE 2-3**

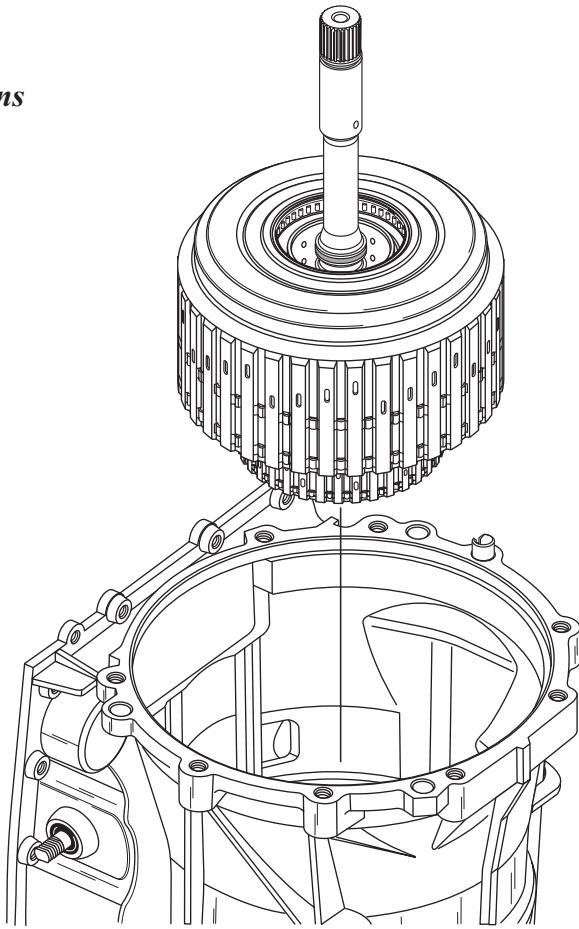
COMPLAINT: A complaint of a delayed reverse accompanied with a slipping reverse as well as a flare or slide 2-3 shift. The problem may be severe enough to produce solenoid performance codes placing the vehicle into a failsafe condition.

CAUSE: One cause may be that a crack developed in the 1-2-3-4 / 3-5 Reverse Clutch Drum (Figure 1) by the bearing seat where the drum sits against the pump (Figure 2). The size of the crack determines the severity of the condition. Air check the drum while observing the bearing seat area for leakage (Figure 3).

CORRECTION: Replace the drum. Refer to Figure 4 for a complete overview of the 1-2-3-4 and 3-5 Reverse Drum assembly components.

THE 1-2-3-4 / 3-5 REVERSE CLUTCH DRUM ASSEMBLY

*Special thanks to
Chris Spick at
Lawrence Transmissions*



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Figure 1

Hayden - 14

WIT - 15

DELAYED SLIPPING REVERSE AND SLIDE 2-3

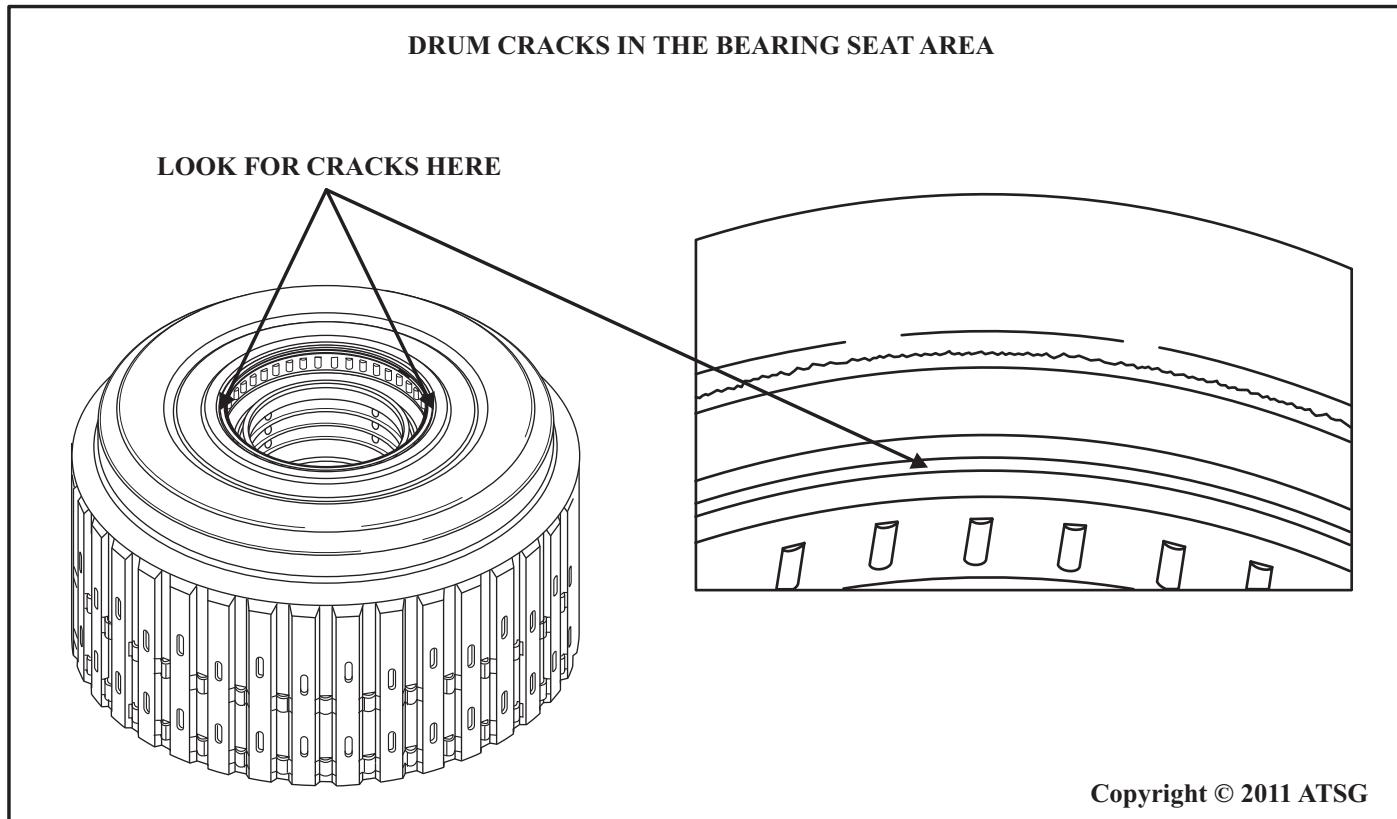


Figure 2

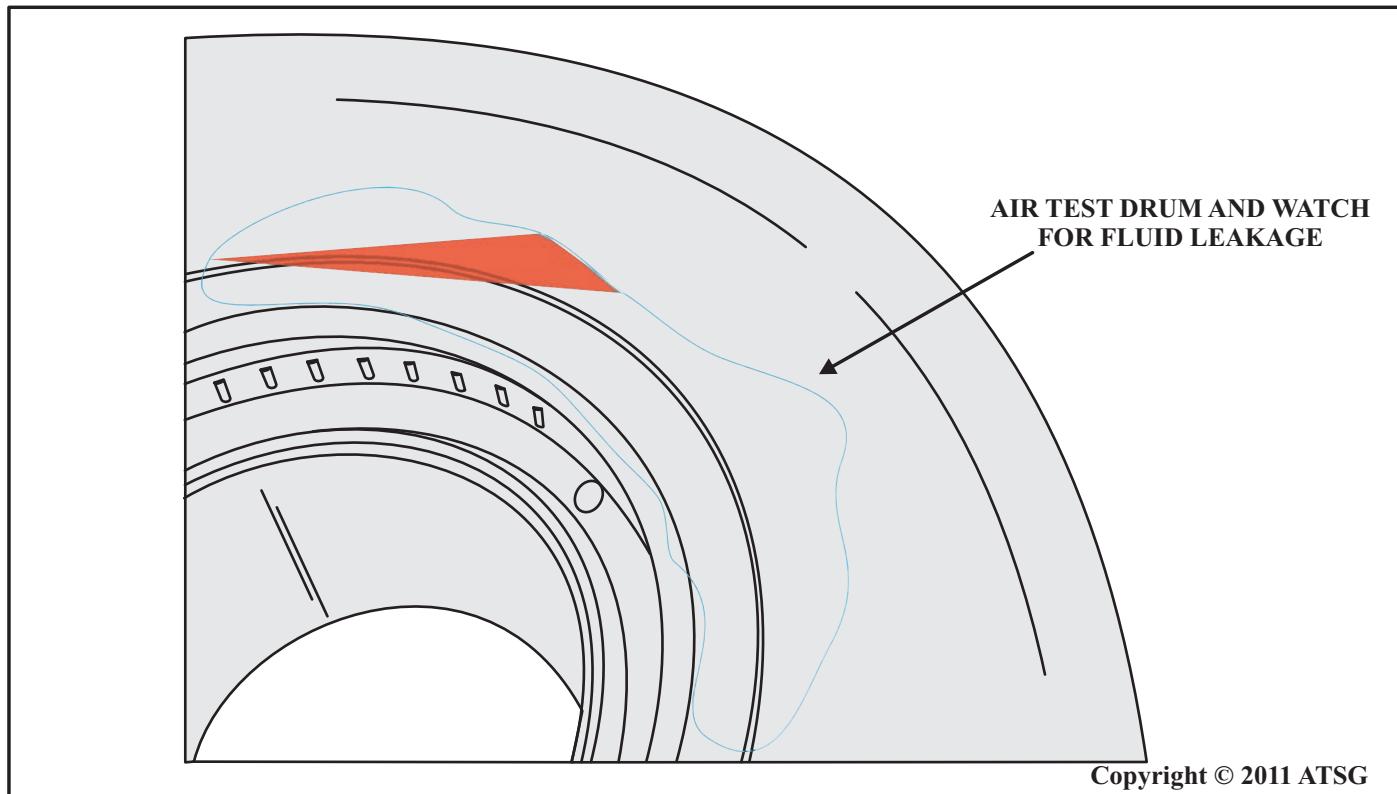


Figure 3

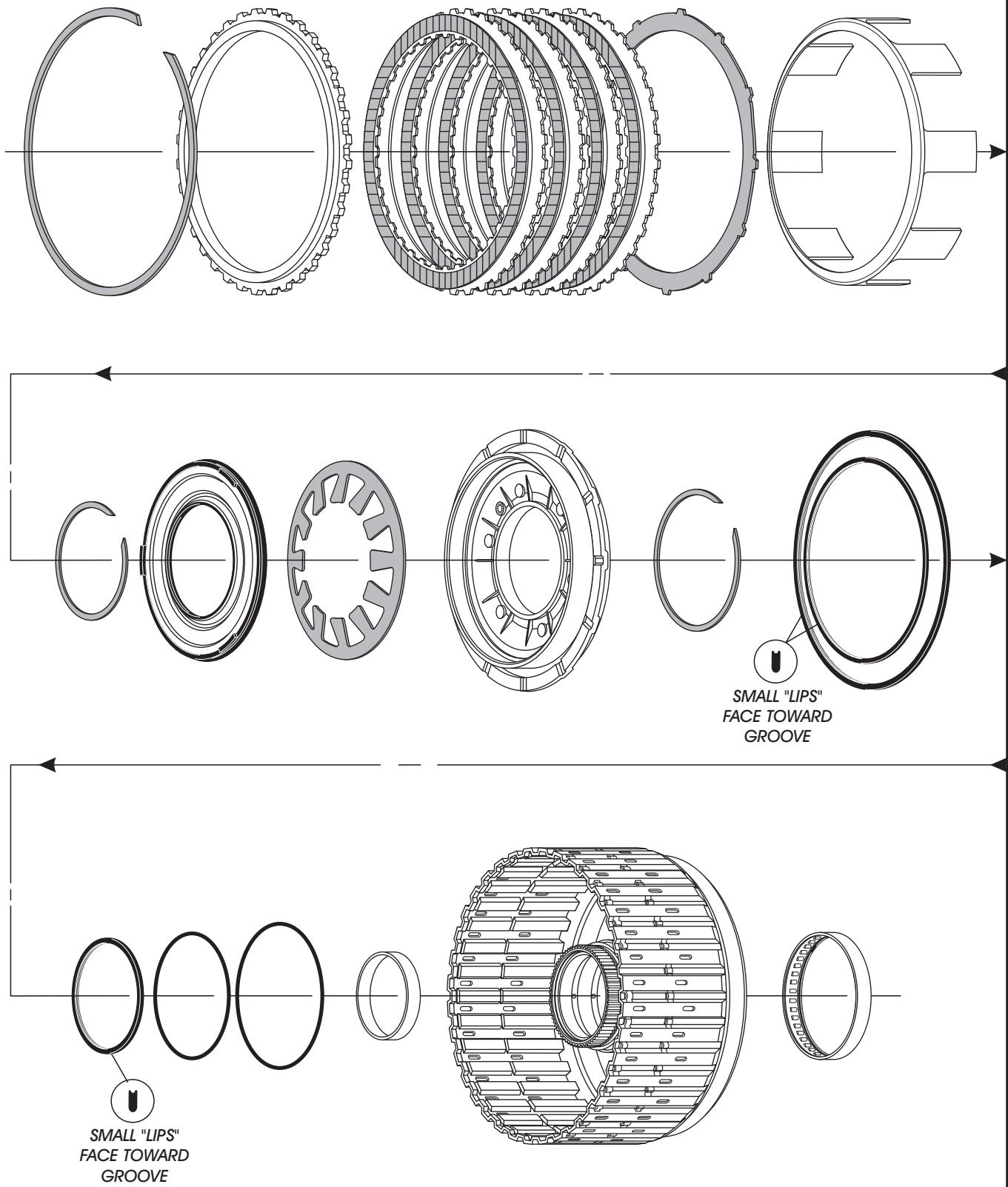
1-2-3-4 AND 3-5 REVERSE CLUTCH HOUSING EXPLODED VIEW


Figure 4
Automatic Transmission Service Group

ATSG - 18

B&W

**6L40/50/80/90 - GM6 - GA6L45R
SOLENOID PERFORMANCE CODES**

COMPLAINT: When solenoid performance codes are stored on vehicles equipped with the above mentioned transmissions, it is difficult to determine if a solenoid is mechanically bad or not. Without definitively knowing if it is a mechanically malfunctioning solenoid, the shop may purchase the entire control unit which the solenoids are a part of for no reason.

CAUSE: Solenoid performance codes are usually mechanically generated. These codes can be caused by mechanically defective solenoids, valve problems, a leak in the component hydraulic circuit or a problem with the component itself.

CORRECTION: Before solenoid testing begins ground pin 5 in the control unit to protect the TCM as shown in Figure 2.

Next, supply power to the control unit shown in Figure 1 and then supply ground to each solenoid one at a time also shown in Figure 1.

At this time air pressure should be applied to the solenoid "IN" circuit in the control unit while the solenoid is grounded to energize it and that air pressure should now exhaust through the solenoid "OUT" circuit in the control unit as seen in Figure 2.

While performing this test remember that some solenoids will exhaust when energized and some will exhaust while not energized.

SERVICE INFORMATION:

Shift Solenoids 1 and 2 are ***Normally Closed***.

Pressure Control Solenoid is ***Normally High***.

TCC Solenoid is ***Normally Low***.

Clutch Pressure Control Solenoids are ***Normally High***.

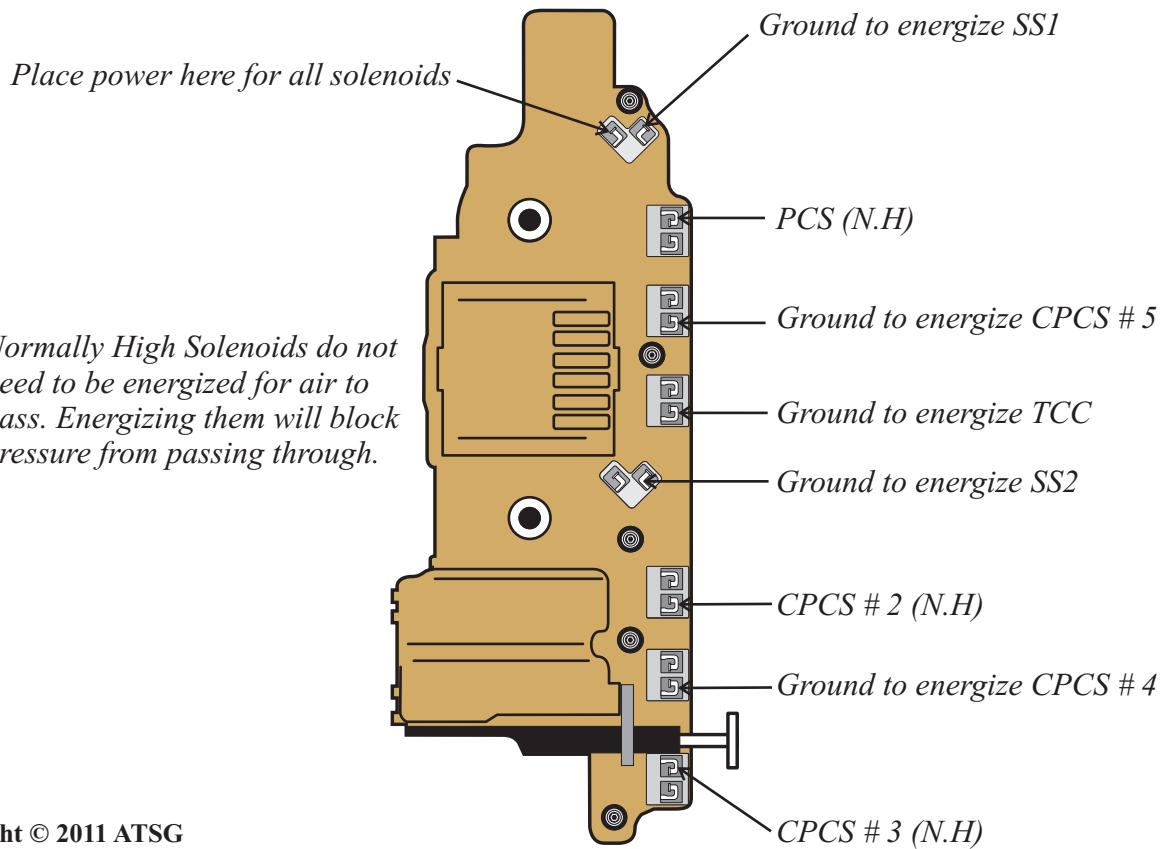


Figure 1

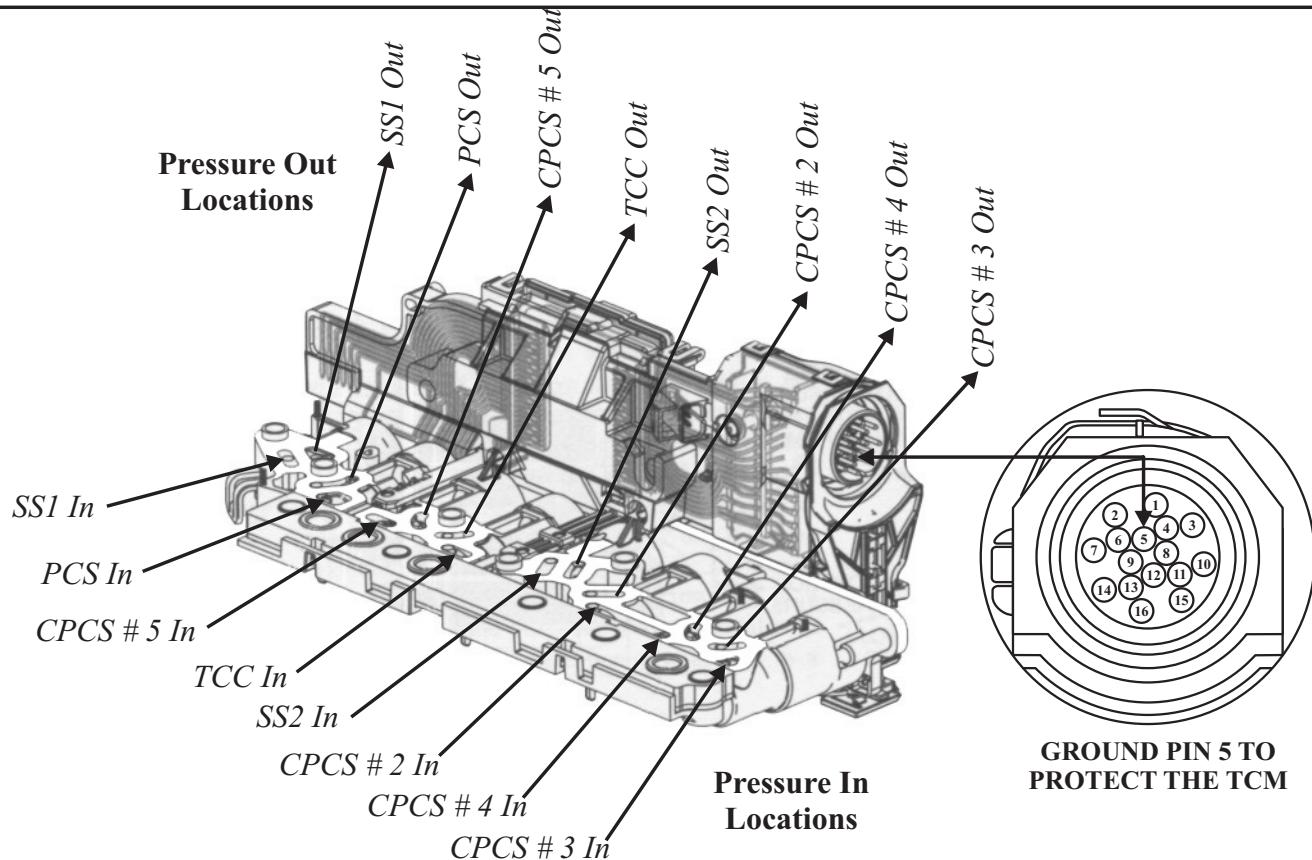


Figure 2
Automatic Transmission Service Group



GM 4T65E

NEW AFTERMARKET CHANNEL PLATE GASKETS

CHANGE: The 4T65E upper and lower channel plate gaskets were previously paper gaskets, they are now rubber coated metal gaskets.

REASON: To prevent gasket blow out due to imperfections in the transmission case and channel plate gasket sealing surfaces, Figure 1.

PARTS AFFECTED:

The upper and lower channel plate gaskets.

INTERCHANGEABILITY:

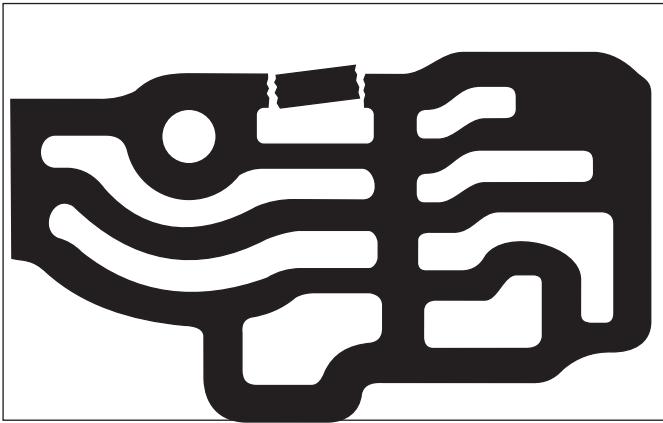
The rubber coated metal channel plate gaskets will back service all 4T65E transmissions, Figure 2.

SERVICE INFORMATION:

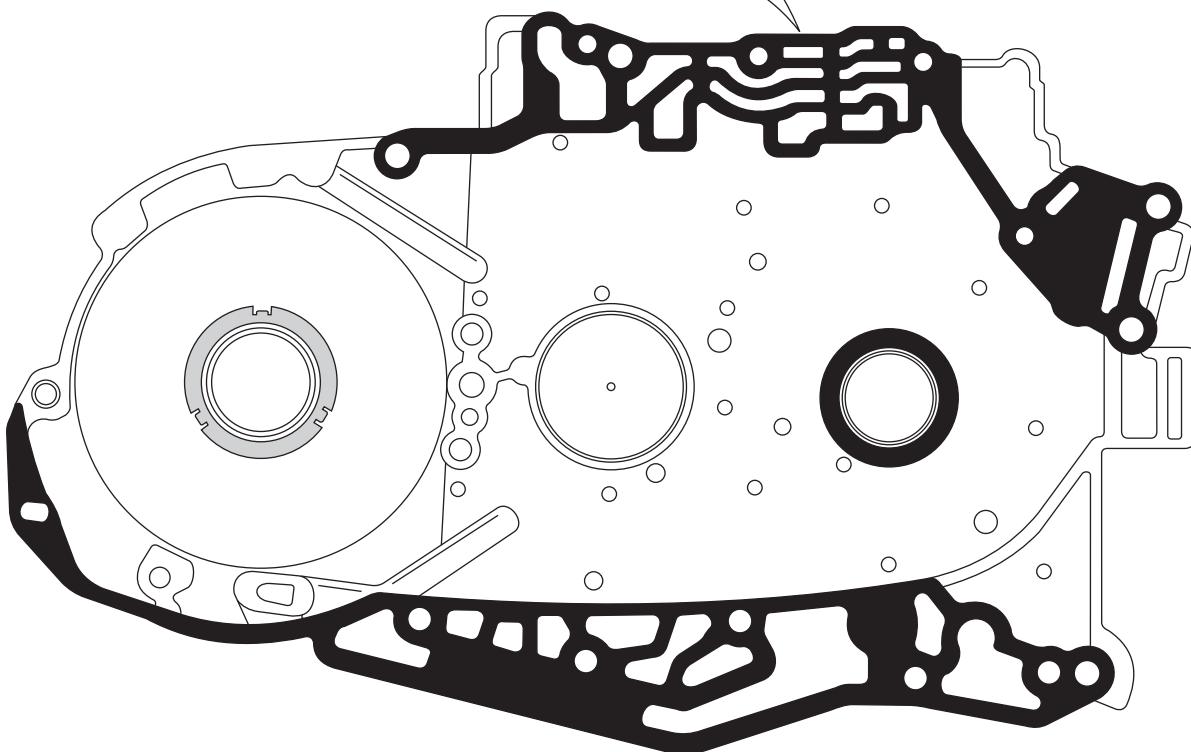
The rubber coated metal channel plate gaskets will be included in most aftermarket overhaul kits once the stock of kits with paper gaskets are depleted.

GM 4T65E NEW CHANNEL PLATE GASKETS

PAPER CHANNEL PLATE GASKETS

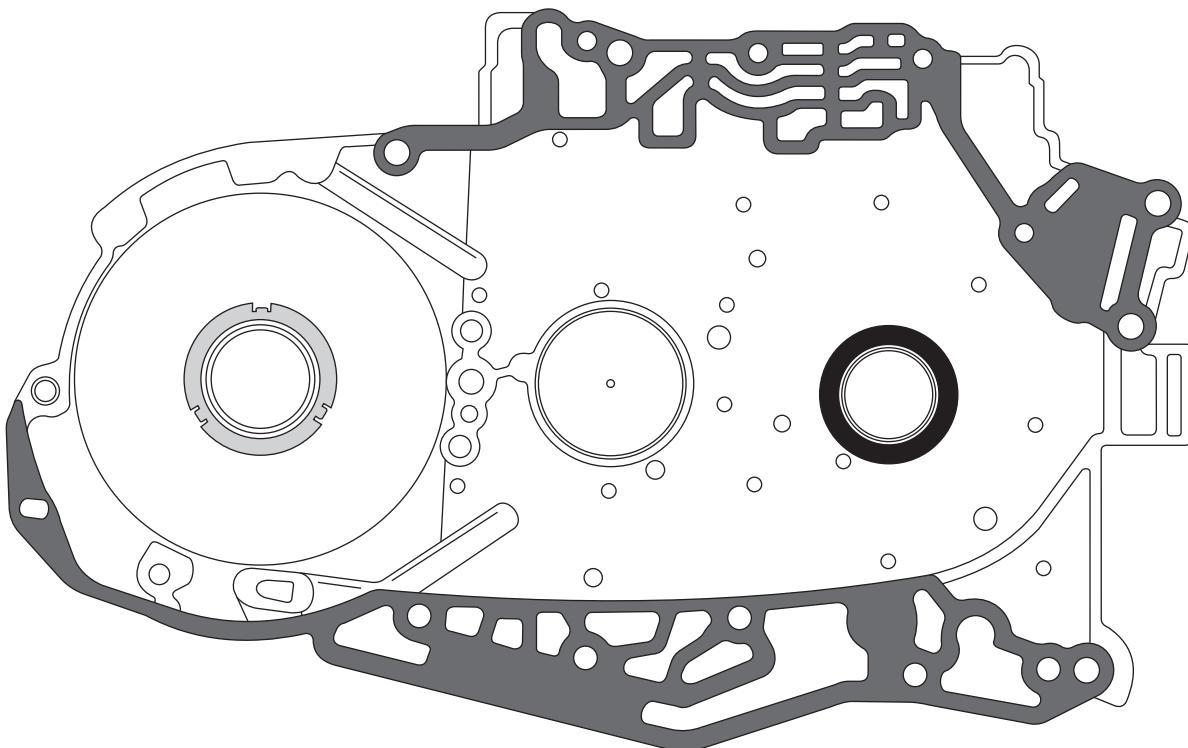


Both upper & lower paper channel plate gaskets blow out causing a variety of problems



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Figure 1

GM 4T65E NEW CHANNEL PLATE GASKETS**RUBBER COATED METAL CHANNEL PLATE GASKETS**

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Figure 2

GM STEYR AWD NOISE & GEAR FAILURE

COMPLAINT: There is gear noise coming from the final drive area when the vehicle is driven.

CAUSE: Excessive final drive clearance due to worn parts as seen in Figure 1.

CORRECTION: Replace the selective washer located as shown in Figure 2. When replacing any of the parts shown in Figure 2, make certain the toothed components match the original components in order to avoid gear ratio errors. Also be aware that the AWD park gear is thinner than the FWD gear.

In order to choose the correct selective washer, an all wheel drive end play procedure must be performed. Figures 3 through 12 show this procedure. The end play tool shown can be obtained from Trans Tool, 800-531-5978. Once the end play procedure is completed, choose the correct selective washer from the chart in Figure 13. Then recheck clearance which should be .020" - .024".

SERVICE INFORMATION:

Sun Gear To Park Gear Selective Washer.....See Chart In Figure 13
Oil Dam.....12571292

A special thanks to Ed Lee from Sonnax and Bobby Mace from Transmission Digest for supplying the photos.

The Steyr AWD system can be found in the following vehicles:

1999 - 2004 Olds Silhouette
2001 - 2005 Pontiac Aztek
1999 - 2008 Pontiac Montana
2003 - 2008 Chevy Uplander
2001 - 2006 Buick Rendezvous
2005 - 2007 Buick Terraza

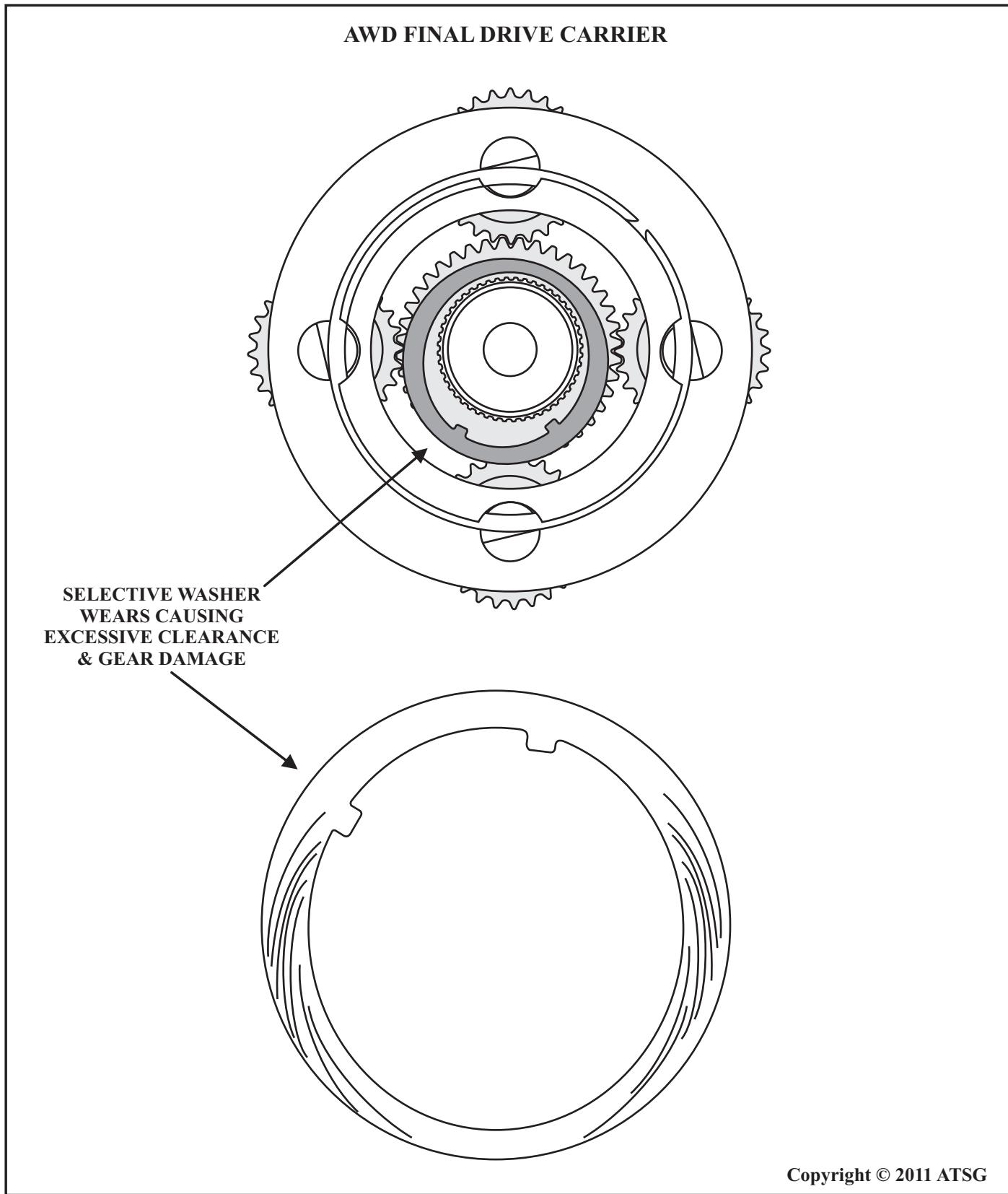
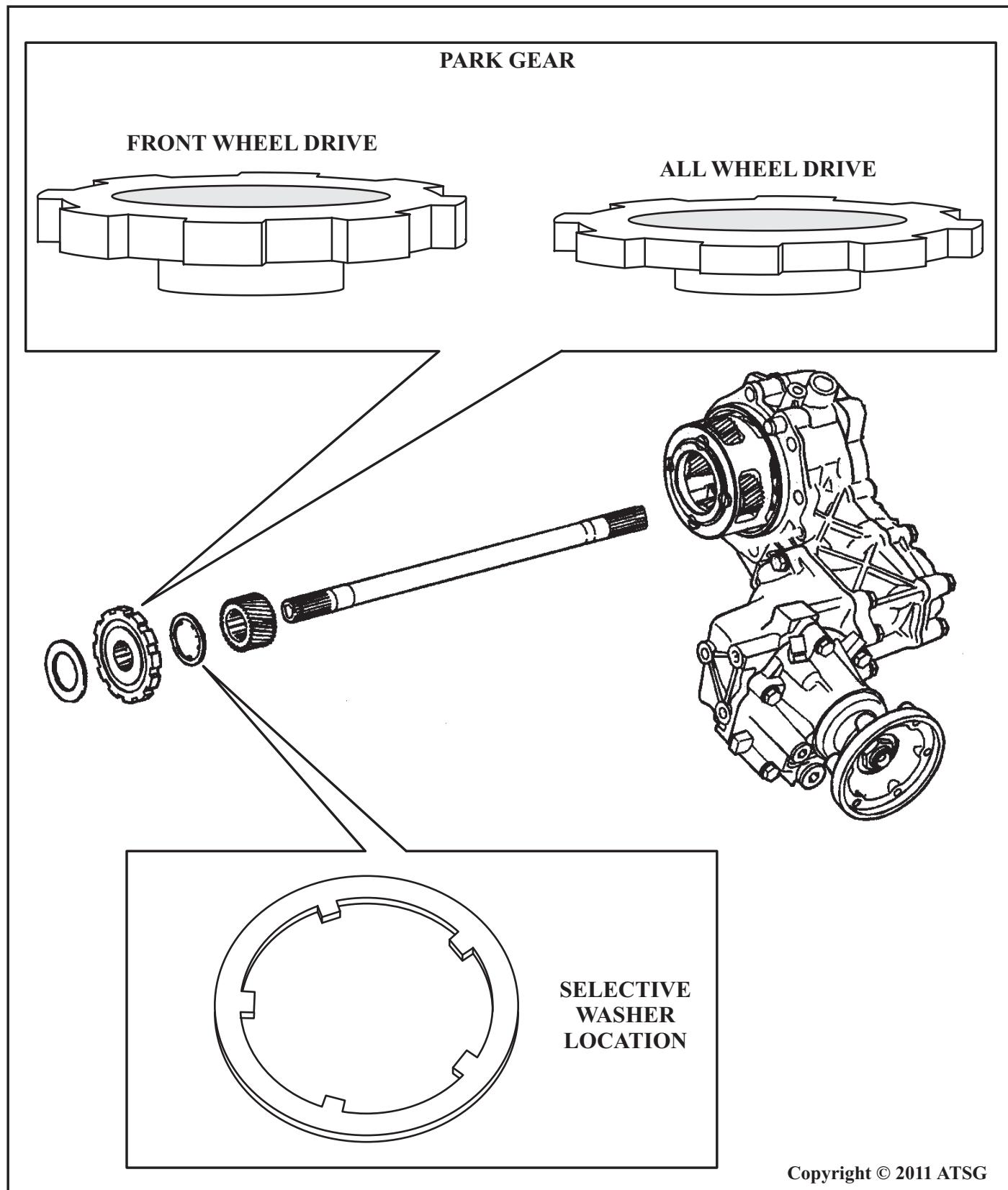
AWD NOISE & GEAR FAILURE

Figure 1

AWD NOISE & GEAR FAILURE



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Figure 2

AWD NOISE & GEAR FAILURE**STEP ONE**

Position the transmission with the case side cover down. Install final drive sun gear shaft.

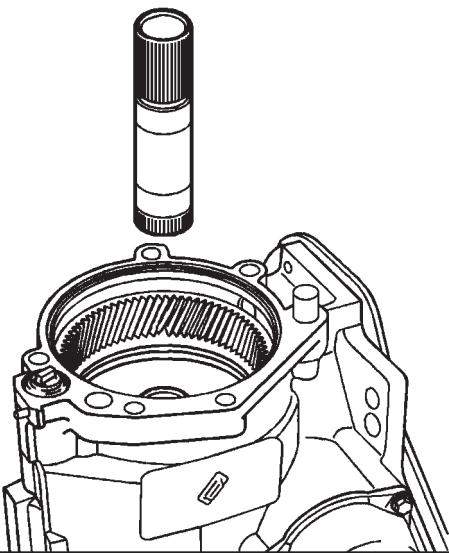


Figure 3

STEP TWO

Install park gear and thrust bearing.

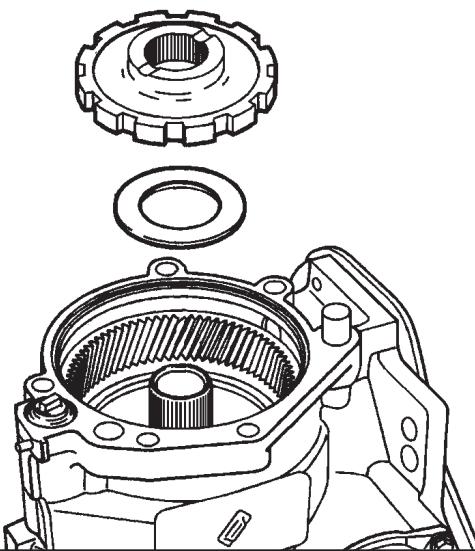


Figure 4

STEP THREE

Install sun gear onto sun gear shaft with step facing down.

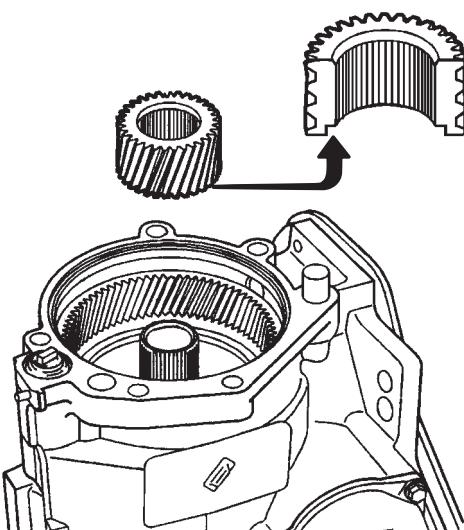


Figure 5

STEP FOUR

Install tool J44472 onto case & hand tighten to remove end play. Place a piece of flat stock across case surface.

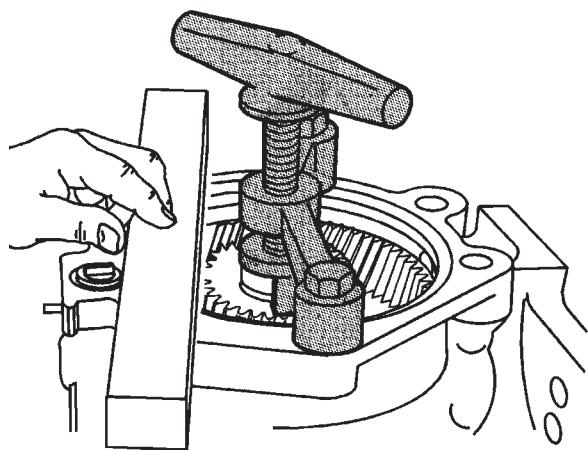


Figure 6

AWD NOISE & GEAR FAILURE

STEP FIVE

Measure the distance from the bottom surface of the flat stock to the top of the sun gear. This measurement is "DIMENSION A". Remove tools from case.

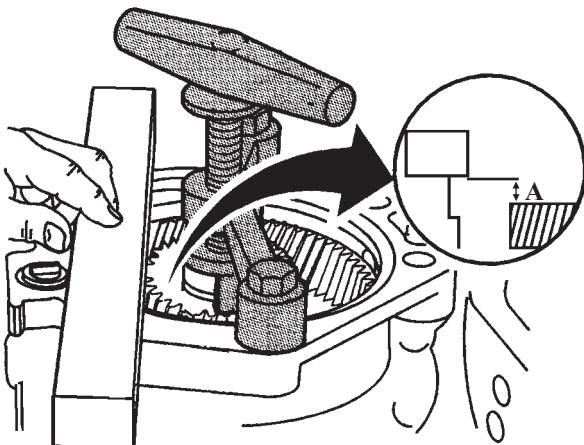


Figure 7

STEP SIX

Install a piece of flat stock onto the final drive carrier. Measure the distance from the bottom surface of the flat stock to the surface of the transfer case. This measurement is DIMENSION "B1".

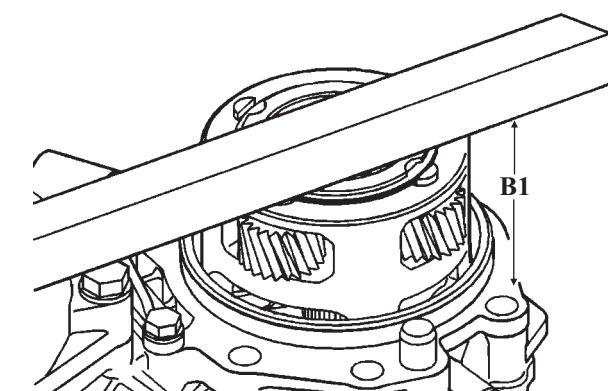


Figure 8

STEP SEVEN

Measure the distance from the bottom of the flat stock to the bearing inside the final drive carrier. This is "DIMENSION B2". Now subtract the B2 measurement from the B1, this is DIMENSION "B". Refer to the selective washer chart in Figure 13 for correct washer selection.

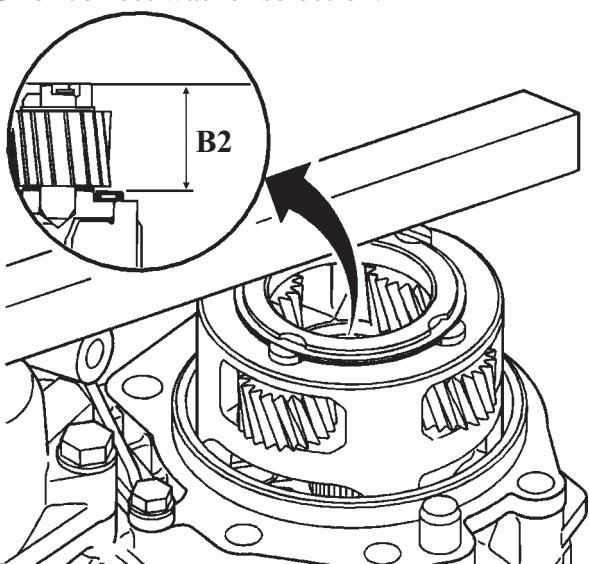


Figure 9

STEP EIGHT

Remove previously installed sun gear and install the selective washer. See Step 9.

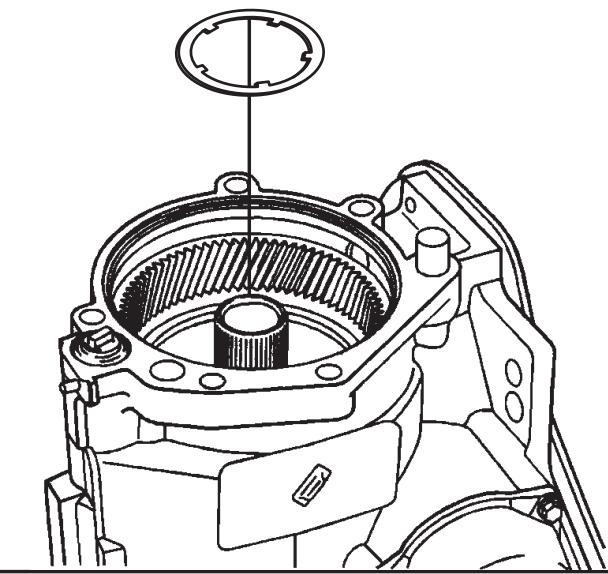


Figure 10

AWD NOISE & GEAR FAILURE

STEP NINE

Reinstall the sun gear on top of selective washer with the step towards the washer.

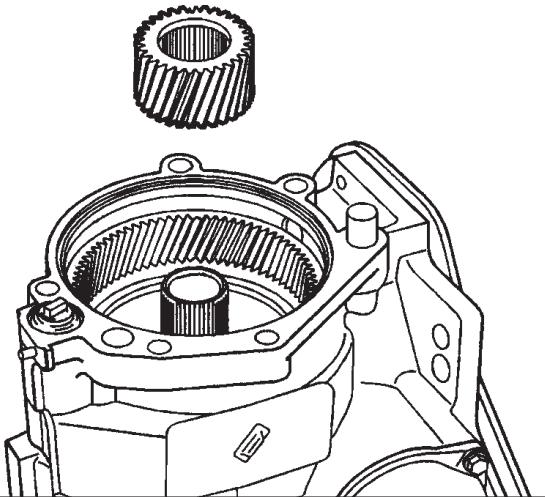


Figure 11

STEP TEN

The oil dam must be installed with the oil passage notch aligned with the hole in the case as shown below. Failure to do so will result in gear damage due to blocked oil flow. Install transfer case with a new seal.

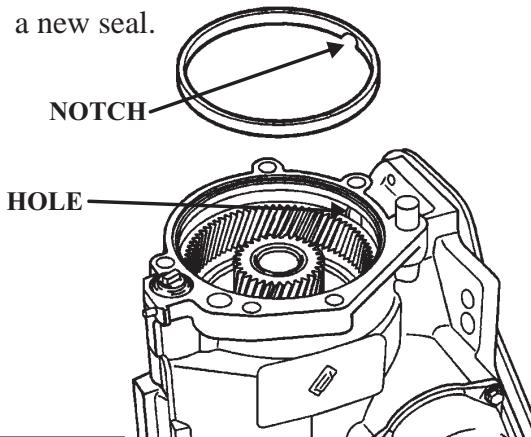


Figure 12

TRANSFER CASE SELECTIVE WASHER SELECTION

DIMENSION "A"		DIMENSION "B"		WASHER COLOR	WASHER SIZE		WASHER PART #
MM	INCH	MM	INCH		MM	INCH	
22.57 - 22.46	.888 - .884	20.48 - 20.72	.806 -.816	DK GREEN	1.57	.061	24213494
22.68 - 22.57	.892 - .888	20.48 - 20.72	.806 -.816	DK BLUE	1.68	.066	24213493
22.57 - 22.46	.888 - .884	20.23- 20.48	.796 - .806	BROWN	1.79	.070	24213492
22.79 - 22.68	.897 - .892	20.48- 20.72	.806 - .816				
22.68 - 22.57	.892 - .888	20.23 - 20.48	.796 - .806	PURPLE	1.90	.074	24213491
22.90 - 22.79	.901 - .897	20.48 - 20.72	.806 - .816				
22.57 - 22.46	.888 - .884	19.98 - 20.23	.786 - .796				
22.79 - 22.68	.897 - .892	20.23 - 20.48	.796 - .806	BLACK	2.01	.079	24213490
23.01 - 22.90	.906 - .901	20.48 - 20.72	.806 - .816				
22.90 - 22.79	.901 - .897	20.23 - 20.48	.796 - .806	NO COLOR	2.12	.083	24213489
23.12 - 23.01	.910 - .906	20.48 - 20.72	.806 - .816				
22.79 - 22.68	.892 - .888	19.98 - 20.23	.786 - .796				
23.01 - 22.90	.906 - .901	20.23 - 20.48	.796 - .806	PINK	2.23	.088	24213488
23.23 - 23.12	.914 - .910	20.48 - 20.72	.806 - .816				
22.90 - 22.79	.901 - .897	19.98 - 20.23	.786 - .796	ORANGE	2.34	.092	24213487
23.12 - 23.01	.910 - .906	20.23 - 20.48	.796 - .806				
23.01 - 22.90	.906 - .901	19.98 - 20.23	.786 - .796	WHITE	2.45	.096	24213486
23.23 - 23.12	.914 - .910	20.23 - 20.48	.796 - .806				
23.12 - 23.01	.910 - .906	19.98 - 20.23	.786 - .796	LT GREEN	2.56	.100	24213485
23.23 - 23.12	.914 - .910	19.98 - 20.23	.786 - .796	LT BLUE	2.67	.105	24213484

Figure 13



GM 6T70/75 NO REVERSE, 3RD OR 5TH GEARS

COMPLAINT: A vehicle equipped with the 6T70/75 may come in with a complaint of no reverse engagement and no third or fifth gears or badly slipping in third and fifth gears. The SES Lamp is illuminated and code P0776 for Pressure Control Solenoid "B" Stuck Off is retrieved.

In addition, any one of the following codes may also be stored:

P0716 - Input Speed Sensor Circuit Range/Performance.

P0717 - Input Speed Sensor - No Signal.

P0777 - Pressure Control Solenoid "B" Stuck On.

P2714 - Pressure Control Solenoid "D" Performance or Stuck Off.

P2715 - Pressure Control Solenoid "D" Stuck On.

P2723 - Pressure Control Solenoid "E" Performance or Stuck Off.

Upon disassembly of the transmission a number of damaged parts are found, but not limited to, including the 3-5-Reverse drum and piston return spring assembly and the transmission end cover shown in Figures 1, 2, and 3.

CAUSE: The 3-5-Reverse wave plate has broken allowing the piston to over stroke.

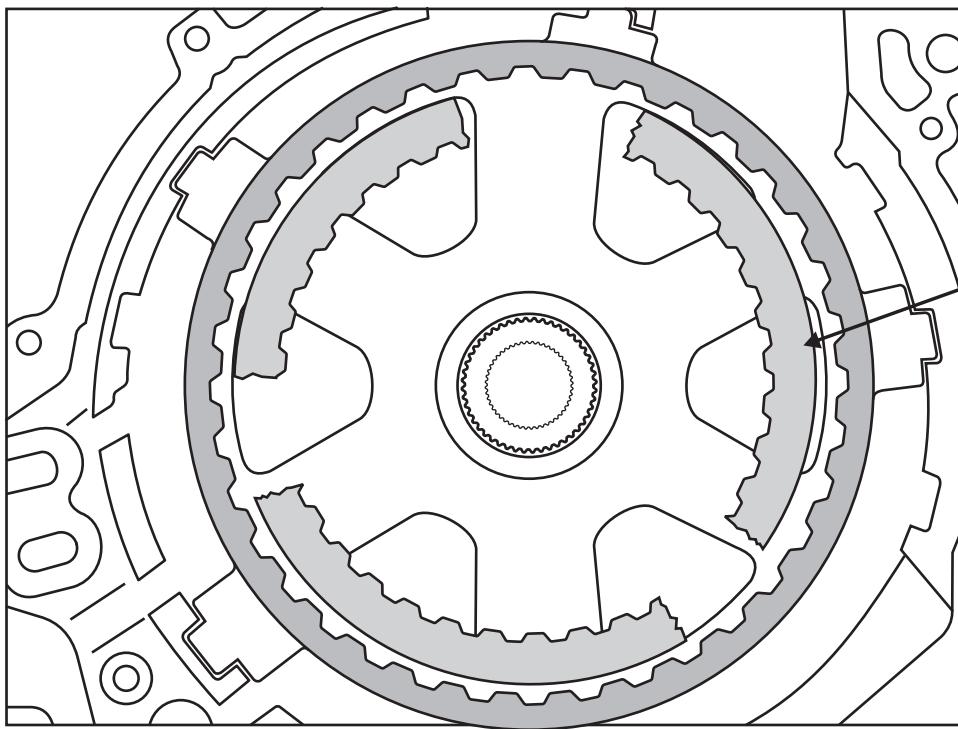
CORRECTION: Replace the damaged parts using the part numbers found under "Service Information".

SERVICE INFORMATION:

<i>3-5-Reverse Waved Cushion Plate.....</i>	<i>24254103</i>
<i>3-5-Reverse Clutch Drum.....</i>	<i>24223798</i>
<i>3-5-Reverse Clutch Piston Return Spring Assembly.....</i>	<i>24243887</i>
<i>Transmission End Cover.....</i>	<i>24241083</i>

Many thanks to Tim Jacobs of Greenville Transmission Clinic, Greenville S.C. for providing the information that made this bulletin possible.

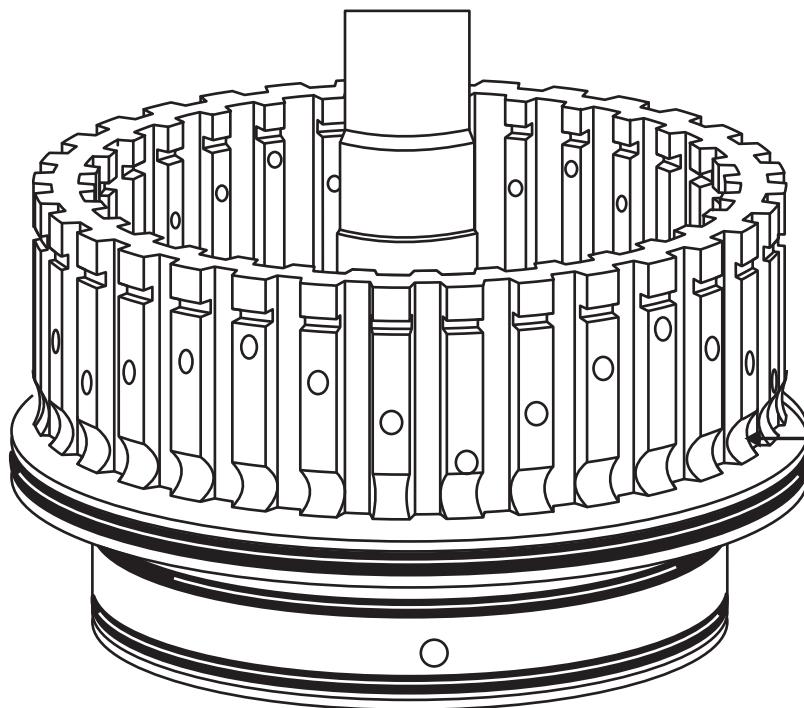
6T70/75 NO REVERSE, 3RD OR 5TH GEARS



THE 3-5-REVERSE
WAVED CUSHION
PLATE BREAKS

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Figure 1



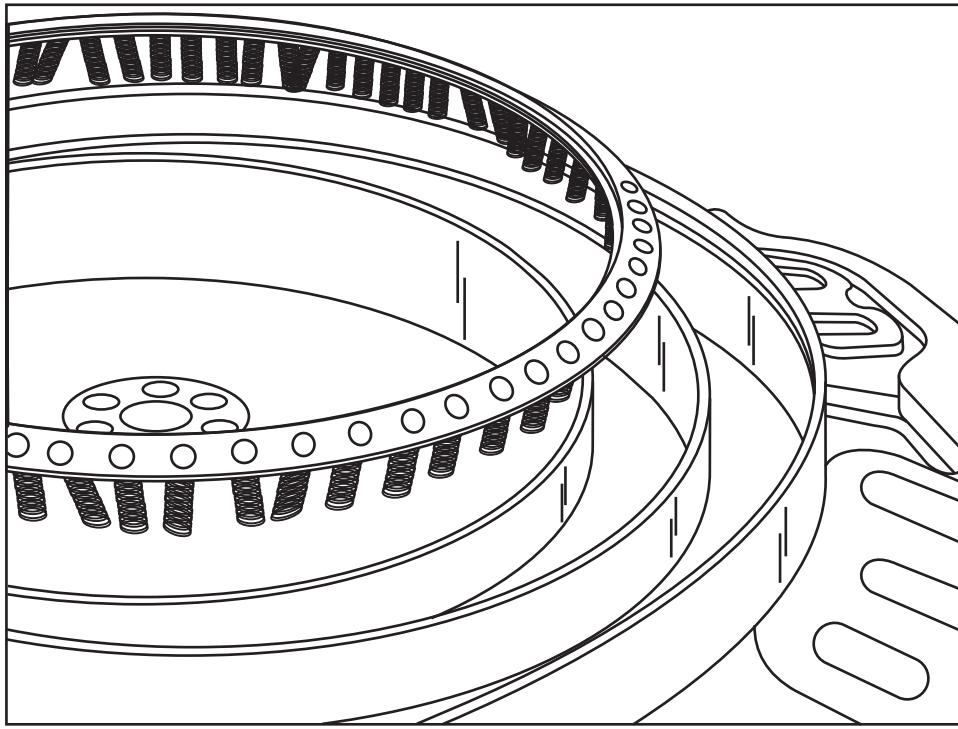
THE 3-5-REVERSE
DRUM IS DAMAGED
IN THE SPLINED AREA
BY THE BROKEN
CUSHION PLATE

Copyright © 2011 ATSG

Figure 2

6T70/75 NO REVERSE, 3RD OR 5TH GEARS

THE 3-5-REVERSE
PISTON RETURN
SPRING ASSEMBLY
& THE TRANSMISSION
END COVER ARE
ALSO DAMAGED



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Figure 3

SATURN VT25E

CVT BELT SLIPPAGE

COMPLAINT: A Saturn vehicle equipped with the VT25E CVT transmission comes in with a complaint of slipping in all ratios as well as reverse.

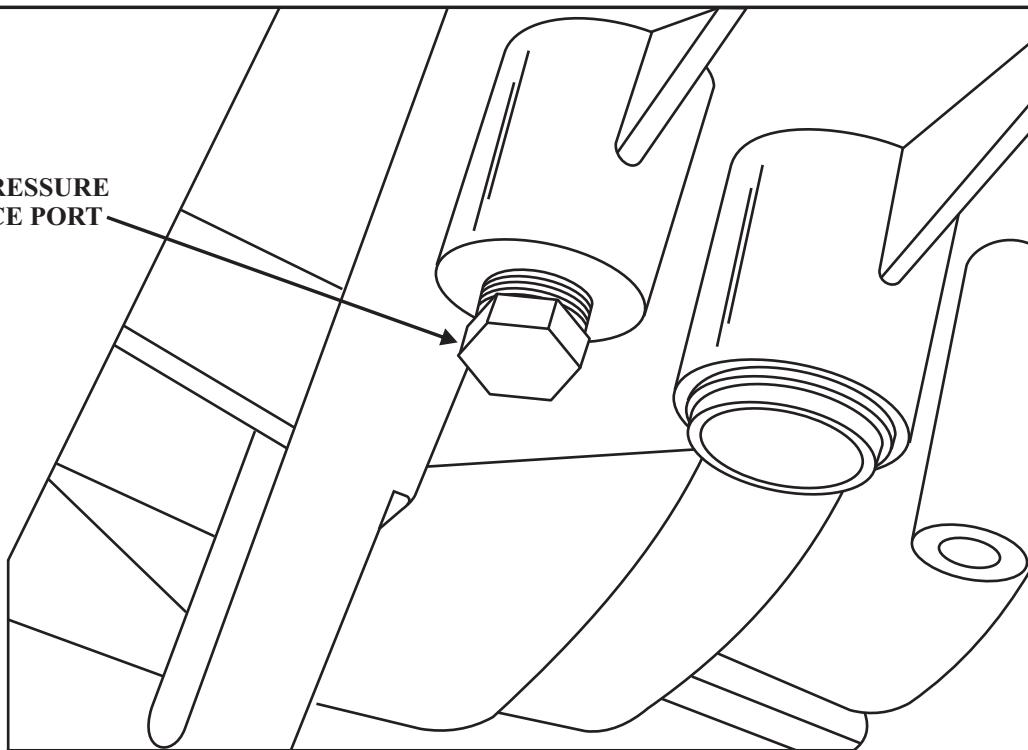
CAUSE: The slippage could be caused by inadequate line pressure, worn inner pulley seals or a slipping drive belt.

CORRECTION: Line pressure can be checked at the line pressure service port located in the side of the transmission case just below the valve body cover on the bell housing end of the transmission, Figure 1.

A common failure is the drive belt which can wear causing it to slip due to it's "Push Belt" design. The belt assembly is comprised of many steel elements which push against the pulley sheaves and therefore holds by compression not by tension, Figure 2. Make certain when installing the drive belt that the arrow on the belt points in the direction of rotation also seen in Figure 2 to avoid premature belt failure.

WARNING: Line pressure at heavy throttle can be extremely high as seen in the chart below. Make certain pressure gauges are adequate enough to handle these pressures and are in good condition.

LINE PRESSURE SERVICE PORT



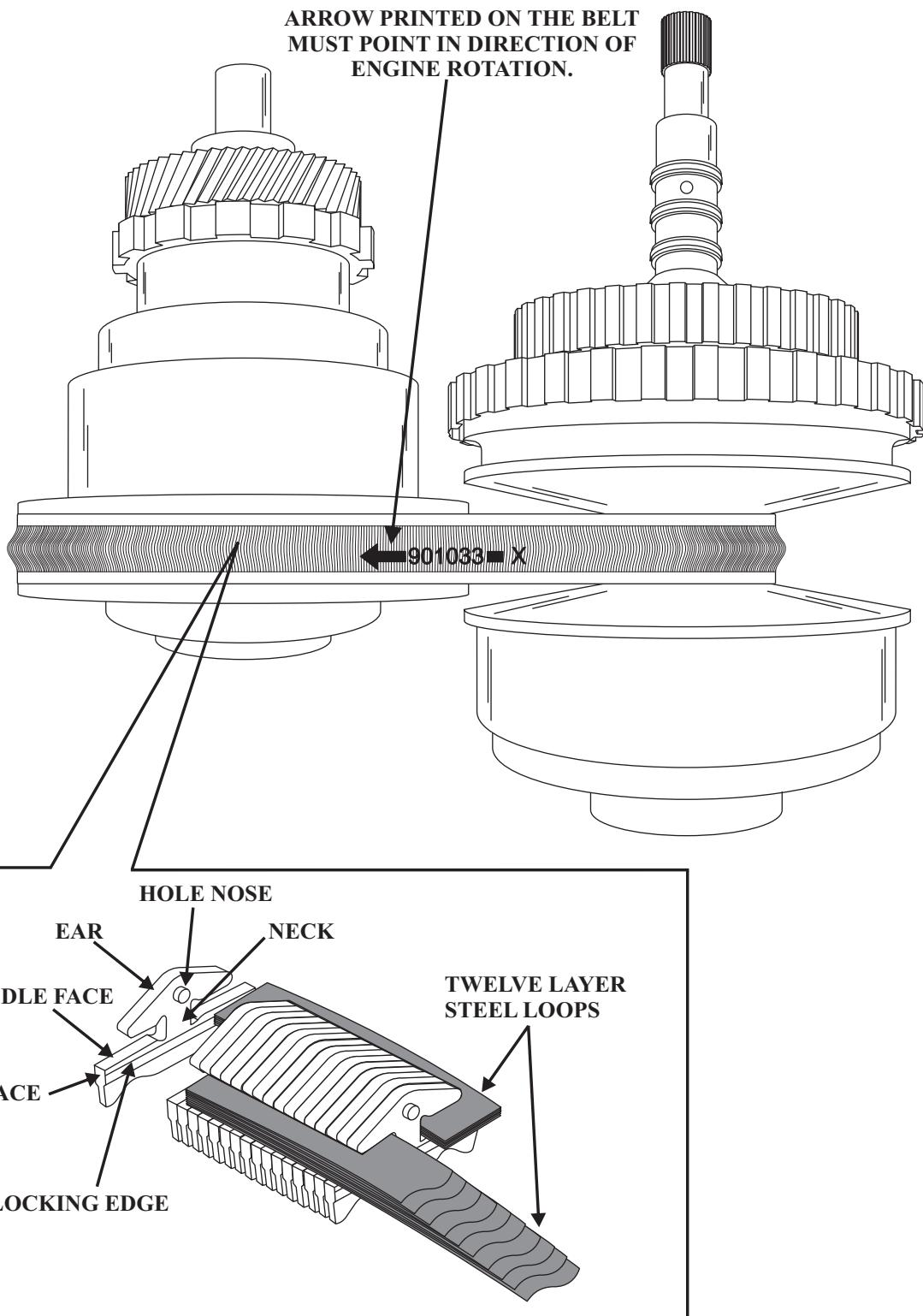
LINE PRESSURE SPECIFICATIONS

ENGINE RPM	PCS AMPS	LINE PRESSURE
IDLE	1.0	152 - 268 PSI 1048 - (1848 kPa)
1300 - 1400	0.2	652 - 798 PSI (4495 - 5502 kPa)

VBX - 34

TRANSTAR - 35

SATURN VT25E BELT SLIPPAGE



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Figure 2

SATURN VT25E

CASE DAMAGE

COMPLAINT: After installation of the transmission a leak is discovered coming from the inside of the bell housing. Once the transmission is removed, it is evident that the case is leaking due to breakage in the area of the top transmission mount bolt holes.

CAUSE: The bolts that hold the top transmission mount in place are different lengths as shown in Figure 1. The installer put a long bolt where a short bolt should go (Refer to Figure 2) which bottomed out in the bolt hole and pushed the case out resulting in the case cracking as seen in Figures 3 and 4.

CORRECTION: In order to avoid case replacement, inform all installation staff of this potential damage hazard.

SATURN VT25E CASE DAMAGE

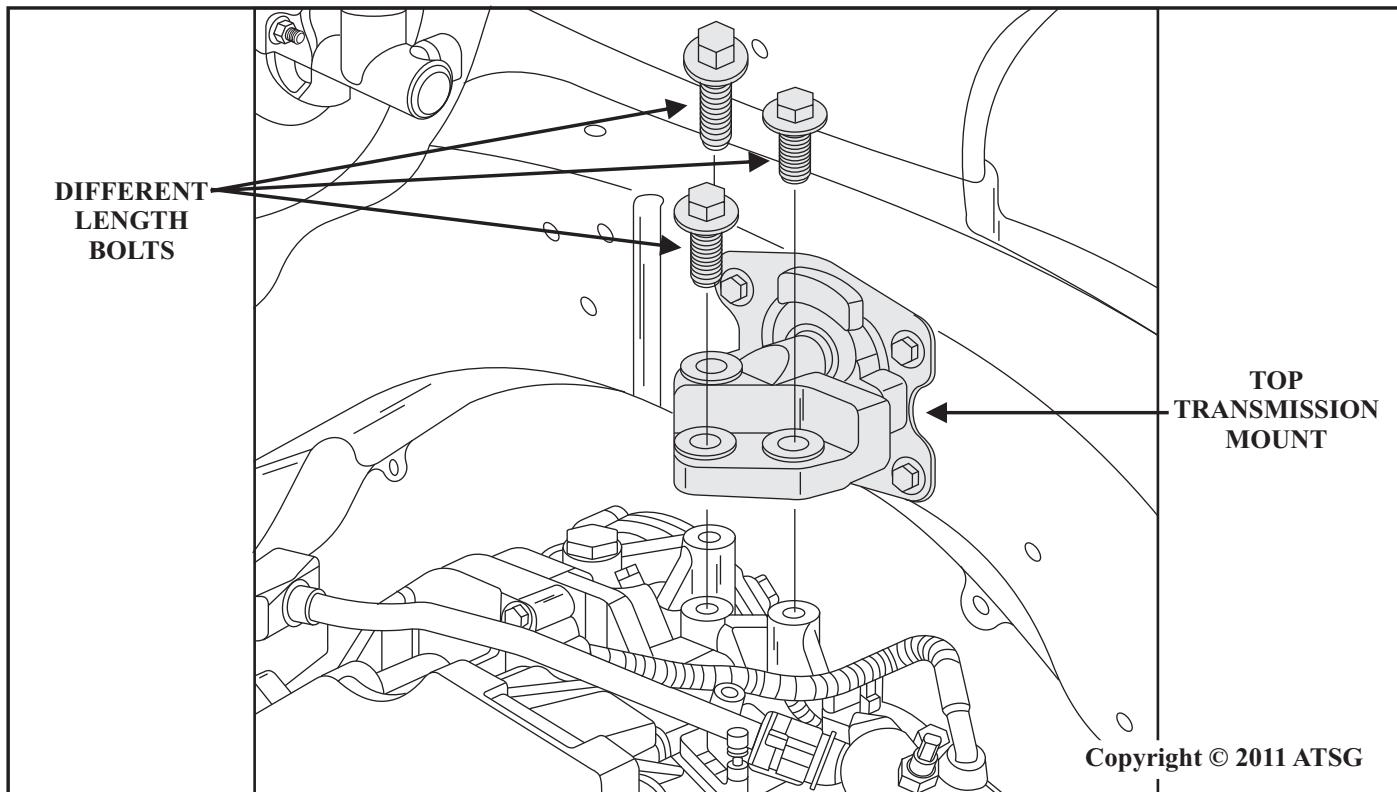


Figure 1

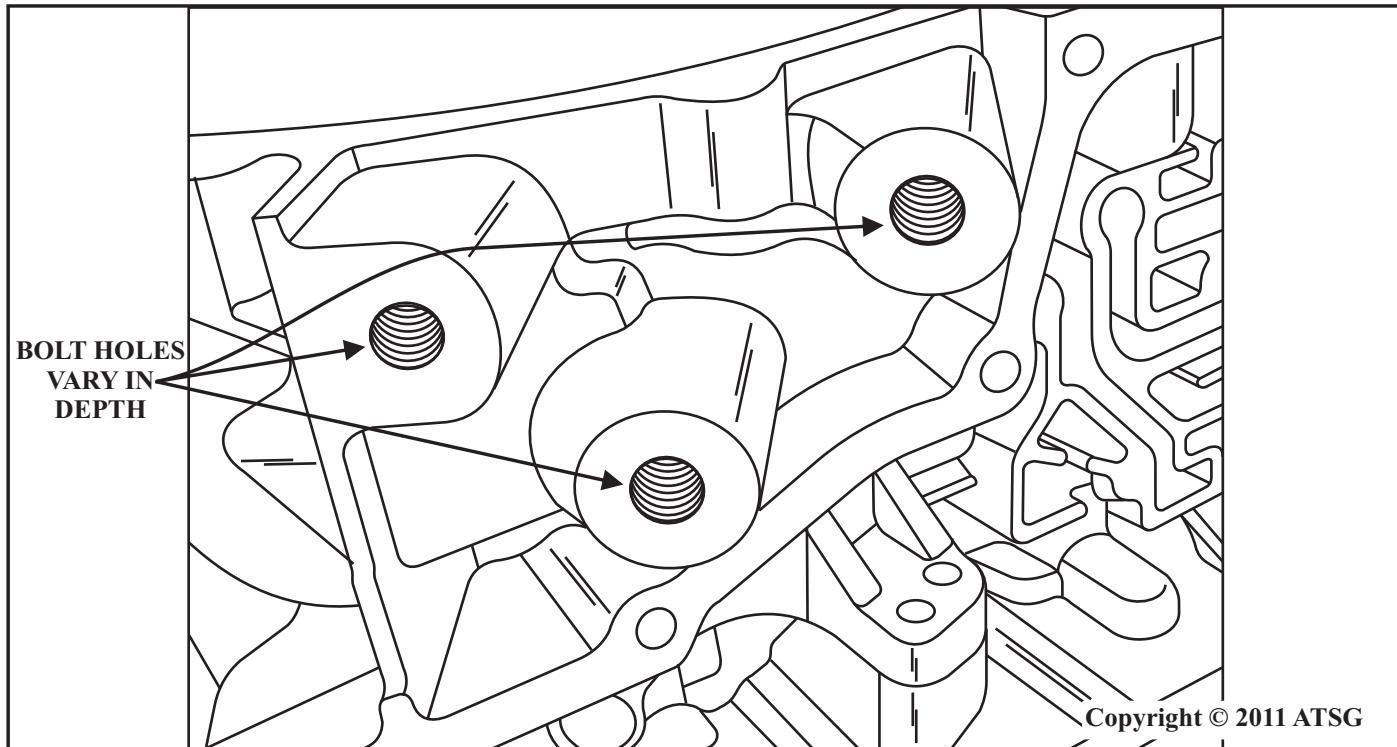


Figure 2

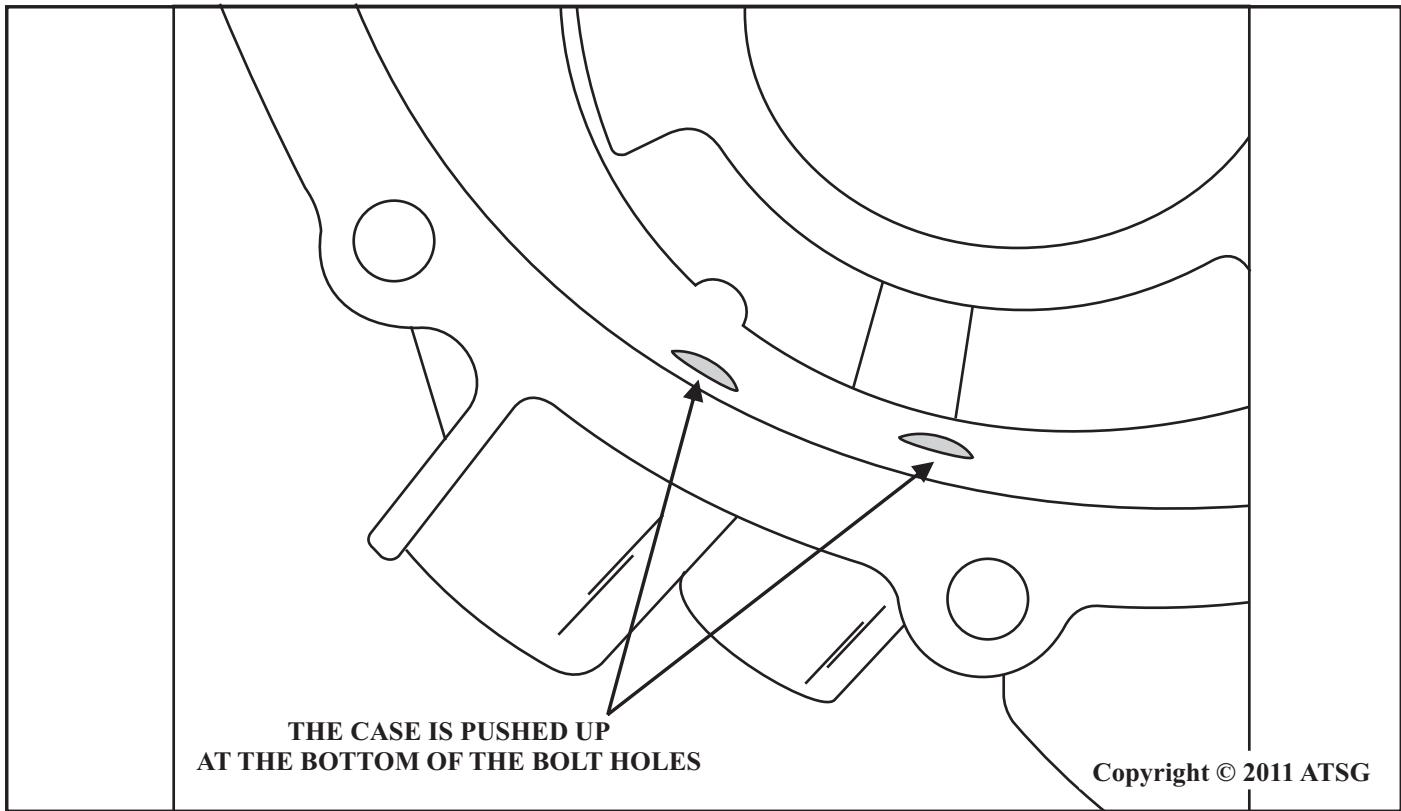
SATURN VT25E CASE DAMAGE

Figure 3

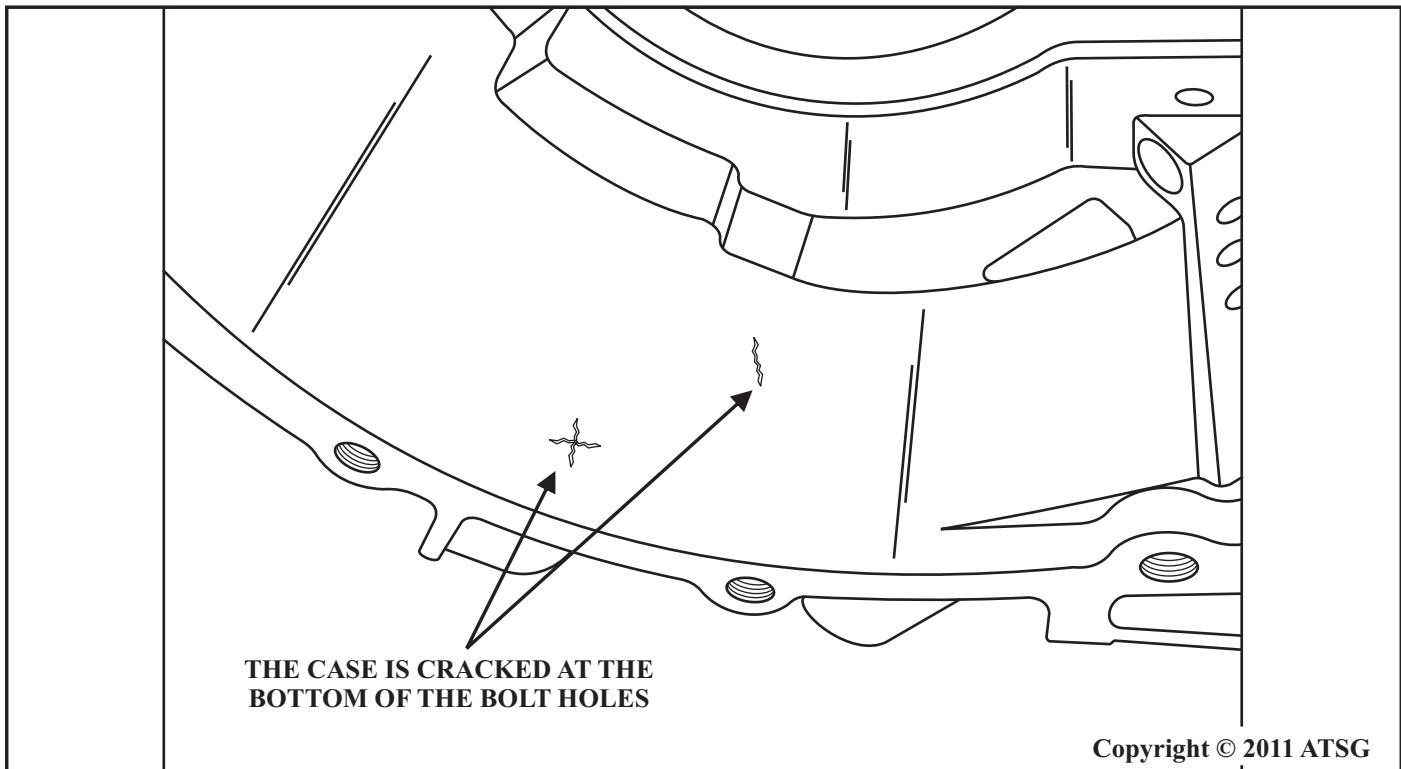


Figure 4

ALLISON 1000/2000

TRANSMISSION FLUID OVERHEAT OR NO ENGAGEMENTS

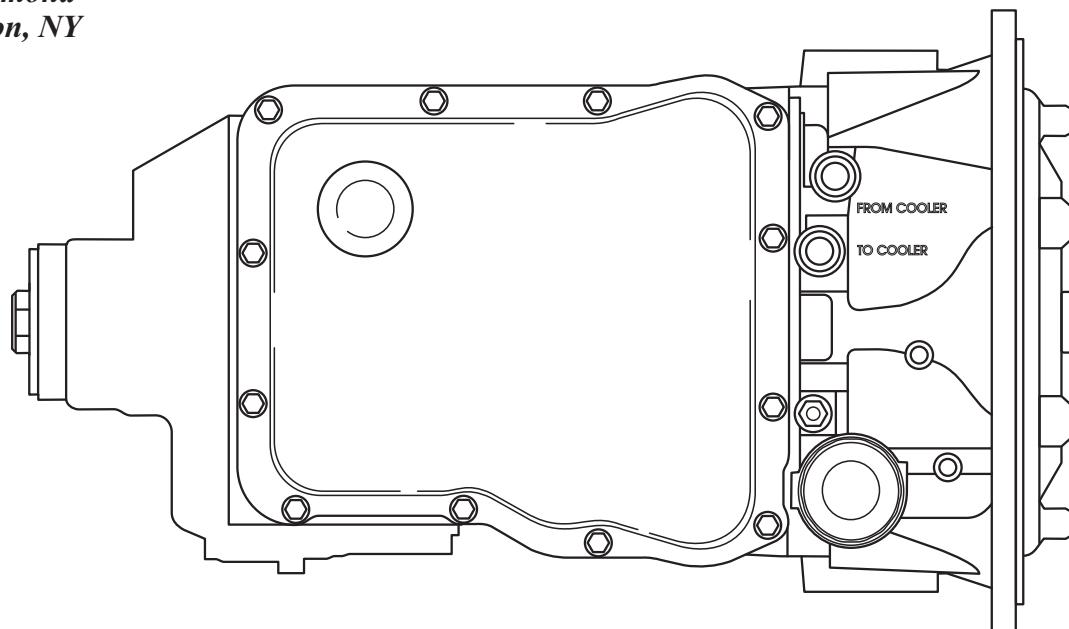
COMPLAINT: Vehicles equipped with the Allison 1000/2000 series transmission may exhibit a complaint of transmission fluid overheat or a No Engagement Condition before or after overhaul. The customer may complain of a Trans temp light illumination or the Trans temp gage is near 300° F.

CAUSE: The cause may be a restricted transmission cooler, and or a mis-positioned Stator Shaft or "Ground Sleeve" as it is named by Allison. To verify, check cooler flow on the ports shown in Figure 1. If the ports are reversed, as in the "FROM COOLER" fitting is pumping oil to the cooler, the transmission will need to be removed and the alignment of the Stator shaft will need to be checked.

CORRECTION: Check the Cooler and if there is a restriction replace or repair as necessary. If the Cooler is free and there is no cooler pressure or the ports are reversed, remove the transmission and pump assembly and refer to Figure 2 to check the alignment of the Stator shaft in the Pump cover. Figure 2 shows the two holes visible in the passage identified as Converter In. Figure 3 shows the Stator shaft removed from the Pump Cover. Notice that there are no splines in the cover, as the Stator shaft is pressed into the cover, if the shaft turned once it will turn again. **DO NOT REUSE.** Figure 4 shows passage identification for the pump cover. Notice that the Converter In, the Converter Out and From Cooler/Lube passages are right next to each other. This area is where the connection is made when the Stator shaft rotates. It is also possible for the Stator shaft to rotate and close off the passages altogether causing No Engagement.

*Special Thanks to
Nick at Diamond
Transmission, NY*

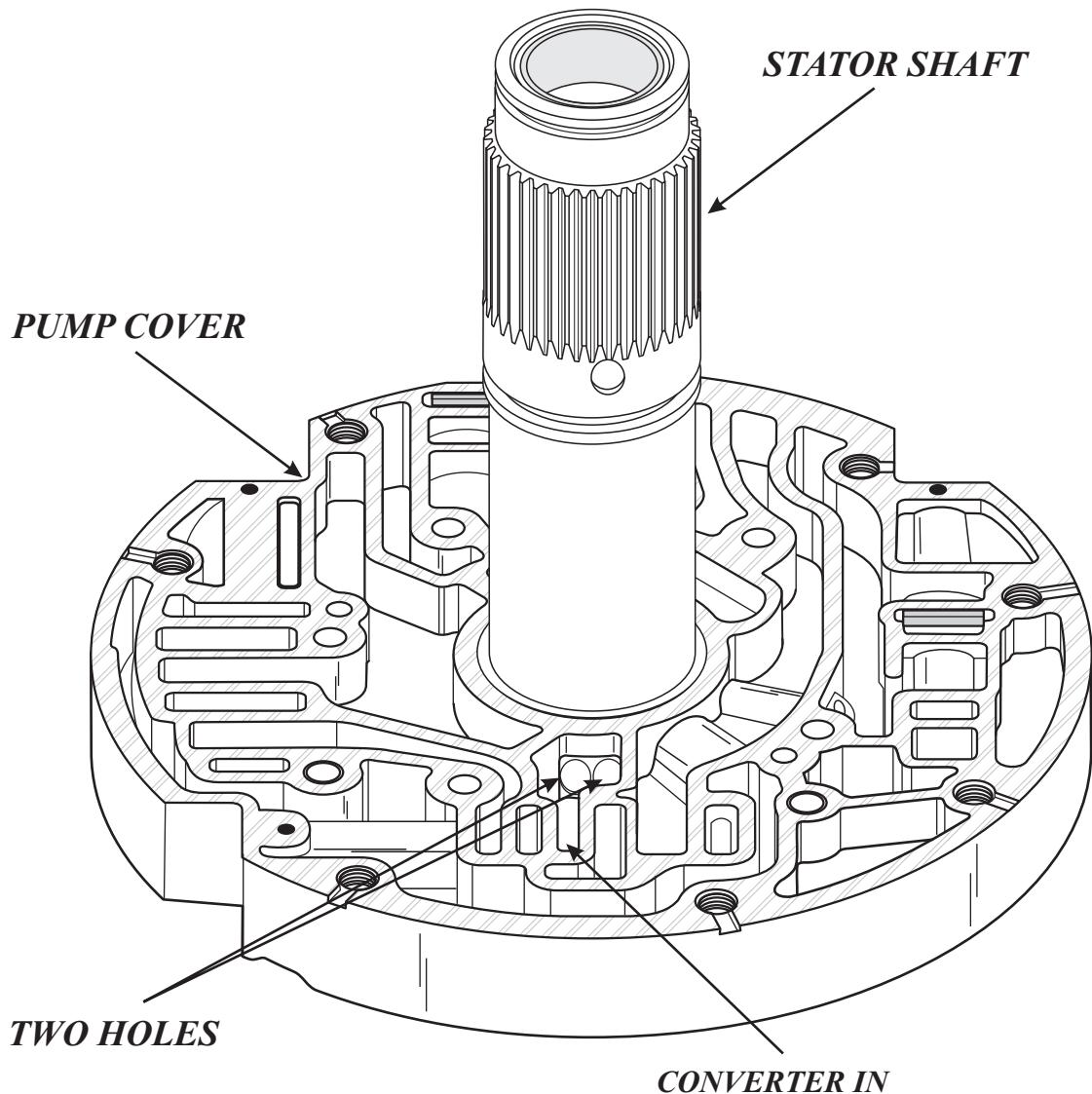
COOLER FITTINGS



Copyright © 2011 ATSG

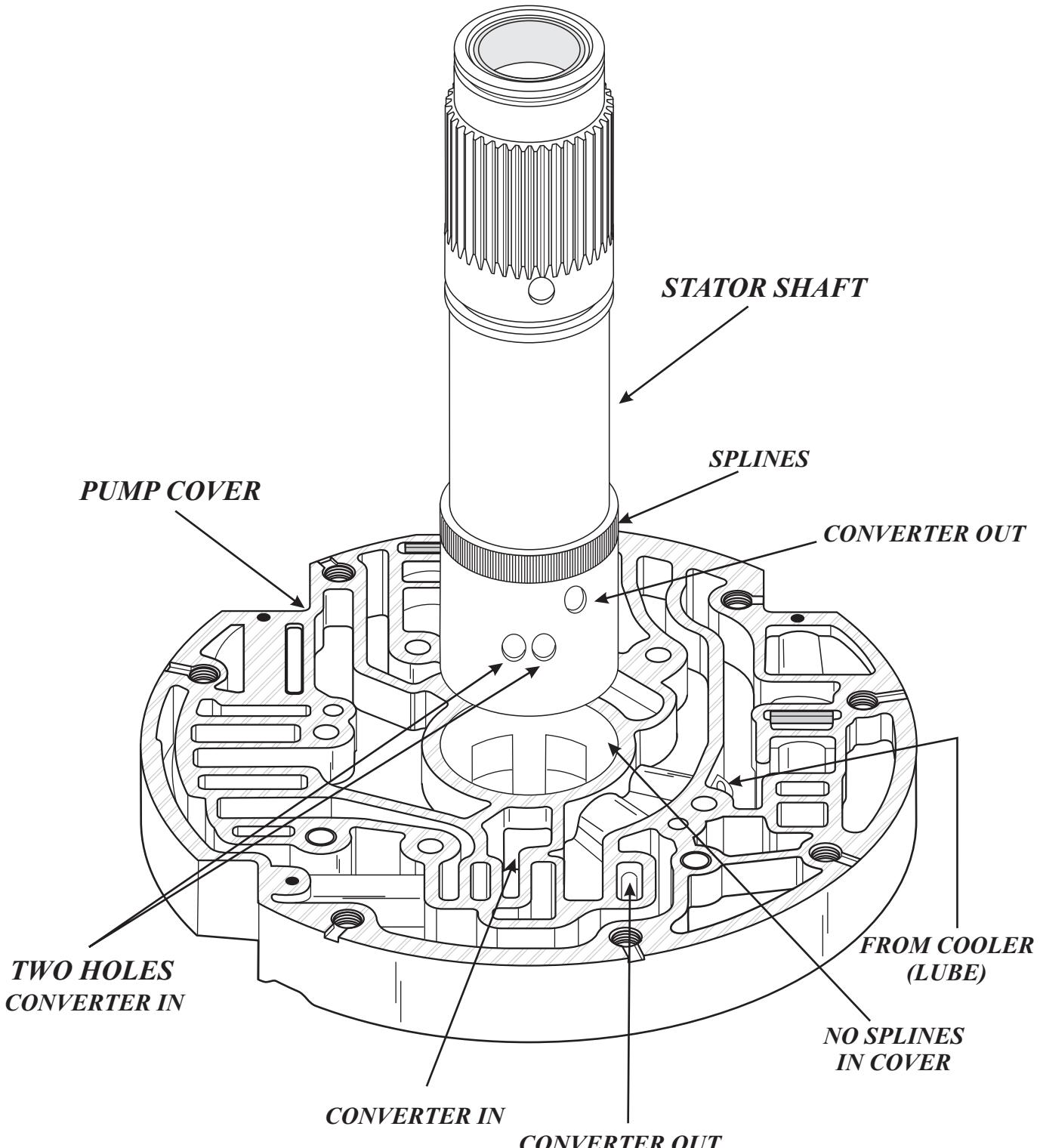
Figure 1

STATOR SHAFT ALIGNMENT IN PUMP COVER



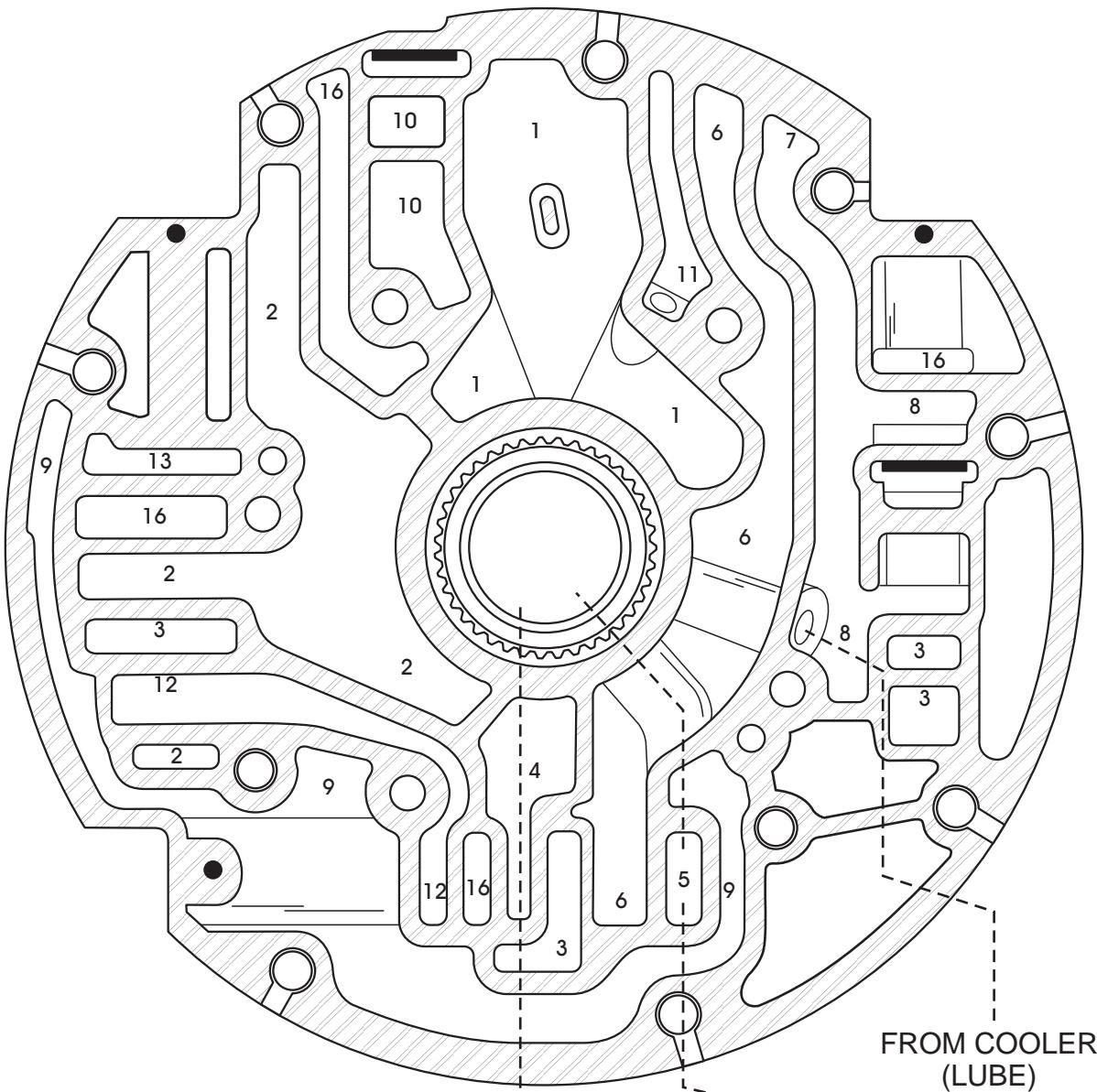
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Figure 2

**STATOR SHAFT ALIGNMENT IN PUMP COVER
STATOR SHAFT REMOVED**

SONNAX - 43

PUMP COVER OIL PASSAGE I.D.



1. PUMP SUCTION
2. LINE PRESSURE
3. OVERAGE (CONV RELEASE)
4. CONVERTER IN
5. CONVERTER OUT
6. TO COOLER
7. FROM COOLER
8. LUBE OIL
9. LOCK-UP APPLY
10. C1 CLUTCH
11. C2 CLUTCH
12. LOCK-UP SIGNAL
13. CUT-BACK (5TH GEAR)
14. EXHAUST

CONVERTER IN
(TCC Release TCC OFF)

CONVERTER OUT
(To Cooler TCC OFF)

When the Stator Shaft rotates it can connect other circuits and can reverse the Cooler ports on the Case. It can also cause a No Move Condition if it rotates and blocks off ports.

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Figure 4
Automatic Transmission Service Group

ALLISON 1000/2000**CODE P0562**

COMPLAINT: A truck with an Allison 1000/2000 Series transmission can come into the shop with any of the following complaints:

1. The MIL Lamp is illuminated and the transmission is in failsafe.
2. Codes P0562, P0872 and on later vehicles U2106 are stored, (Refer to Figure 1). In some instances codes P0871, P0841, P0842, P0846 and P0847 may also be stored.
3. Harsh or delayed engagements.

CAUSE: A faulty ignition switch or TCM.

CORRECTION: Code P0562 indicates system voltage is low, what this really means is the supply voltage to the TCM is low.

Code U2106 indicates the a loss of communication with the TCM.

Codes P0871, P0872, P0841, P0842, P0846 and P0847 indicate no change in the pressure switches when a related solenoid was commanded on or off, (Refer to Figure 2).

When the scan data is reviewed the battery voltage is displaying 14.2 volts, yet the ignition voltage is only 5.2 volts. These two parameters should always match, the fact that they don't leads to a problem with ignition "on" voltage supply also seen in Figure 2.

In order to verify this, connect a jumper lead to the Orange wire at TCM connector C1, terminal 3 and also the Pink wire at TCM connector C1, Terminal 2, (See Figure 3).

If all the codes can be cleared and the transmission operates as it should, then the ignition switch is to blame.

If the installation of the jumper lead results in no improvement then the TCM may be faulty. In some instances this may act up only when the vehicle has been at normal operating temperature, sometimes if the TCM is cooled down the vehicle goes back to normal operation, at this time the TCM is to blame.

SERVICE INFORMATION:

If the shop is looking for an alternative repair for the ignition switch fault, a power relay harness can be installed to bypass the ignition switch as shown in the ATSG 2000 White Seminar Manual on Page 28.

The difference for the Allison application is instead of the relay voltage supply circuit being wired to case connector terminal "E" as it would be on vehicles that are equipped with the 4L60E/4L80E, it will be wired to TCM connector C1, Terminal 2.

NOTE: Some wiring diagrams show a pink power supply wire at Terminal 4 and is spliced to the pink wire at Terminal 2. Your vehicle may not have a wire at Terminal 4.



"2011" SEMINAR INFORMATION

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ALLISON 1000/2000 - CODE P0562

Figure 1



"2011" SEMINAR INFORMATION

47

ALLISON 1000/2000 - CODE P0562

File ECU Interface Diagnostic Reprogram Action Request Snapshot Options Help Print Screen

Connect / Disconnect

ALLISON Transmission

F1 - Help F2 - File F3 - Diagnostic F4 - Snapshot F5 - Connect F6 - Fire Trigger F7 - Stop R

PLAYBACK **DIAGNOSTIC** **NO ACTIVE CODES**

Diagnostic Data	Value	Units	Wire / ...	Function Name	Function ...
Number of Current Malfunctions	0		142 OFF	Input - Secondary Mode	OFF
Check Trans Light	Off		101 Disa...	Input - Auxiliary Function ...	Disable
Engine Run Time	00:17:11	hh:mm:ss	143 OFF	Input - PTO Enable	OFF
Accelerator Position	0.0	%	102 OFF	Input - Engine Brake Enab...	OFF
TPS Voltage	4.88	V	123 Disa...	Input - Auto Neutral Singl...	Disable
Input Speed	648	rpm		Solenoid	
Turbine Speed	649	rpm	+ Shift Solenoid 1		
Output Speed	0	rpm	+ Shift Solenoid 2		
Output Speed Acceleration	0	rpm/Sec	+ Shift Solenoid 3		
Engine Torque	24	nm	+ High Side Driver 1		
Battery (V)	14.2	V	+ High Side Driver 2		
Ignition (V)	5.2	V			
Gear Ratio	8.0				
Current Gear	Neutral				
Gear Selected	Neutral				
Gear Commanded	Neutral				
Previous Gear	Neutral				
PRNDL Range	Neutral				
TCC State	Off				
TCC Slip Speed	0	rpm			

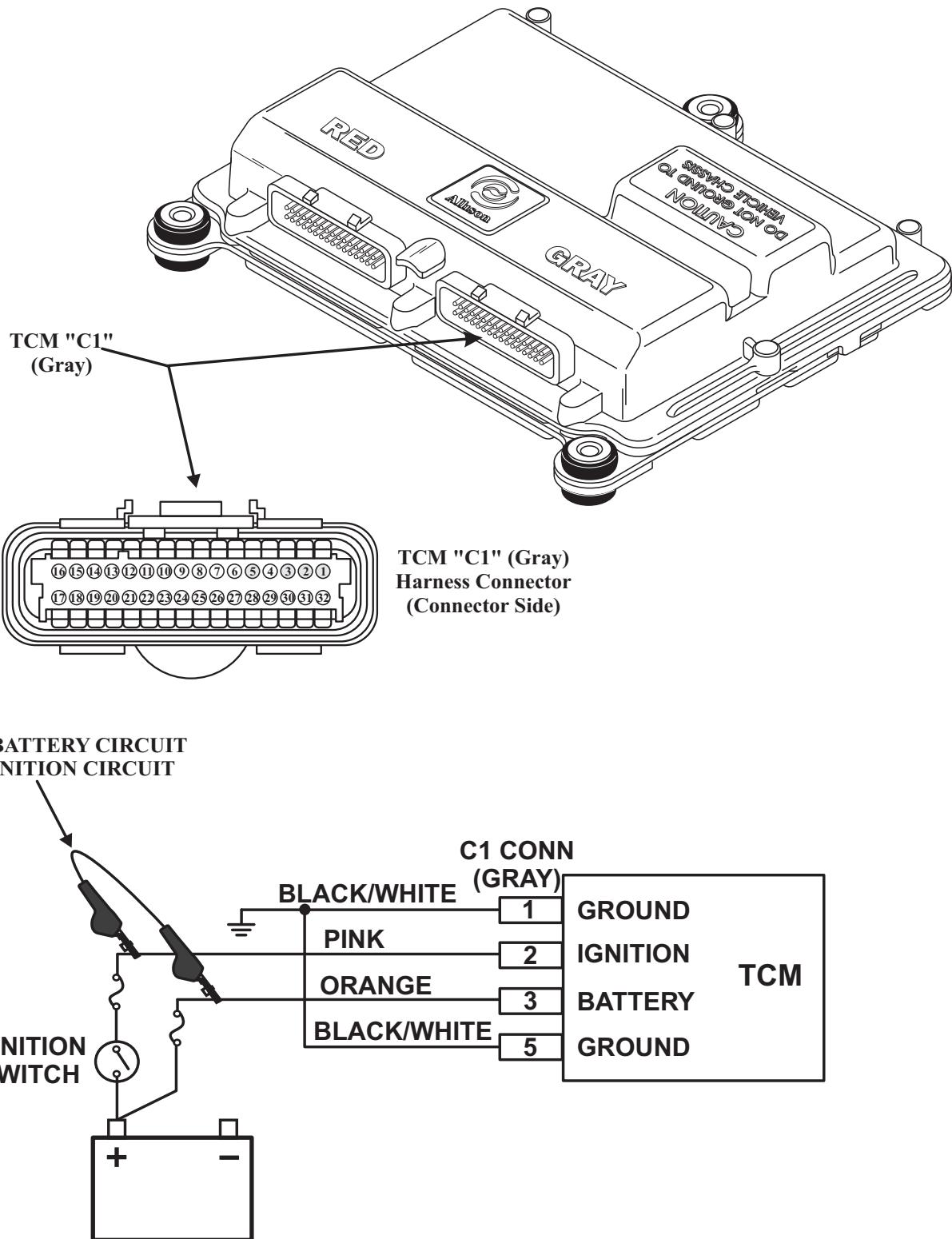
Inhibit	Current Act ..	History
Low Main Pressure	No Inhibit	No Inhibit
Transfer Case Neutral	No Inhibit	No Inhibit
Diagnostic Active	No Inhibit	No Inhibit
Auto Neutral Single Input	No Inhibit	No Inhibit
Reverse Enable	No Inhibit	No Inhibit

PLAYBACK

start

1:36 PM

Figure 2

ALLISON 1000/2000 - CODE P0562


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Figure 3

EXEDY - 49

ALLISON LCT1000

RESETTING SHIFT ADAPTS

COMPLAINT: After transmission repairs, replacement or TCM replacement the vehicle exhibits shift quality concerns such as bind-ups, flared shifts or coast down clunks.

CAUSE: The transmission shift adaptors have not been reset.

CORRECTION: When any of the above mentioned repairs or replacements have been made the TCM must be informed that the vehicle has been repaired. If it is not informed, the TCM Adaptive Controls will attempt to shift the rebuilt transmission as it did with the damaged transmission. The shift data under these conditions will not match the target shift profiles that were programmed into the TCM. ***Do not confuse the shift adapt reset with refresh, they have completely different functions.***

Using a capable scan tool, choose from the menu “Reset Shift Adapts”. After you choose the scan tool will ask if you want to perform a “Fast Adaptive Relearn”. This mode will cause the TCM to make large changes in initial shift conditions to adjust for major system tolerances such as solenoid to solenoid operations, main pressure and clutch to clutch variations.

Once the initial reset has been performed, the TCM will enter a “Slow Adaptive Mode” which will fine tune shift logic as the vehicle is driven. The TCM has the ability to switch back and forth between fast and slow modes when necessary to compensate for shift profile changes.

An example of shift adaptives can be seen in the screen capture in Figure 1. In order to understand what the adaptive information means, the following categories as displayed on the scan tool is as follows:

VALUE - The amount of units that is being provided for a particular shift.

UNITS - The type of measurement for a given value.

ONCOMING CLUTCH VOLUME - Indicates the total amount of fluid being used to apply the shift's oncoming clutch.

MINIMUM ONCOMING CLUTCH - Indicates the minimum amount of fluid being used to apply an oncoming clutch.

ONCOMING PRESSURE - Indicates the hydraulic pressure being applied to the shift's oncoming clutch.

OFF GOING PRESSURE - Indicates the hydraulic pressure remaining in the shift's off going clutch apply circuit.

ONCOMING FILL DELAY - Indicates the lag time between when the clutch is commanded ON by the TCM vs. actual clutch apply time.

ADAPTIVE PATTERN - Indicates the current adaptive logic used by the TCM, fast or slow.

RESETTING SHIFT ADAPTS

Reset Fast Adapt

Item Name	Value	Units
N-R Oncoming Clutch Volume	4	cc
N-R Minimum Oncoming Clutch Volume	0	cc
N-R On Coming Pressure	41.77	psi
R-N Off Going Pressure	58.02	psi
N-1 On Coming Clutch Volume	24	cc
N-1 Minimum On Coming Clutch Volume	23	cc
N-1 On Coming Pressure	26.69	psi
R-1 Oncoming Clutch Volume	20	cc
R-1 Minimum Oncoming Clutch Volume	19	cc
R-1 On Coming Fill Delay	0	Seconds
R-1 On Coming Pressure	24.37	psi
D-R Oncoming Clutch Volume	4	cc
D-R Minimum Oncoming Clutch Volume	0	cc
D-R On Coming Fill Delay	0	Seconds
D-R On Coming Pressure	39.45	psi
R-1 Adaptive Pattern 0	Fast Adapt	
R-2 Adaptive Pattern 0	Fast Adapt	
D-R Adaptive Pattern 0	Fast Adapt	

Garage

Reset Fast Adapt Garage

Close

Figure 1



LCT1000/2000 TRANSMISSION OVERHEATS

COMPLAINT: After servicing the transmission spin-on filter, the transmission now overheats after a short period of time. Solenoid performance or gear ratio codes may be stored as well.

CAUSE: A poor quality spin-on filter was installed which allows the filter magnet to restrict cooler flow because it has a smaller feed hole radius as shown in Figure 1. A quality filter will not allow the filter magnet to restrict cooler flow because it has a larger feed hole radius which the magnet cannot cover up.

The solenoid performance or gear ration codes can be stored as a result of the created restriction causing a drop in line pressure. The spin-on filter manifold passage identification can be seen in Figure 2. The spin-on filter and its related parts are shown in Figure 3.

CORRECTION: When replacing the spin-on filter, be sure to use one that has a large feed hole radius.

SERVICE INFORMATION:

<i>Original Equipment Spin-On Filter.....</i>	29539579
<i>Filtran Spin-On Filter.....</i>	F-349

LCT1000/2000 TRANSMISSION OVERHEATS

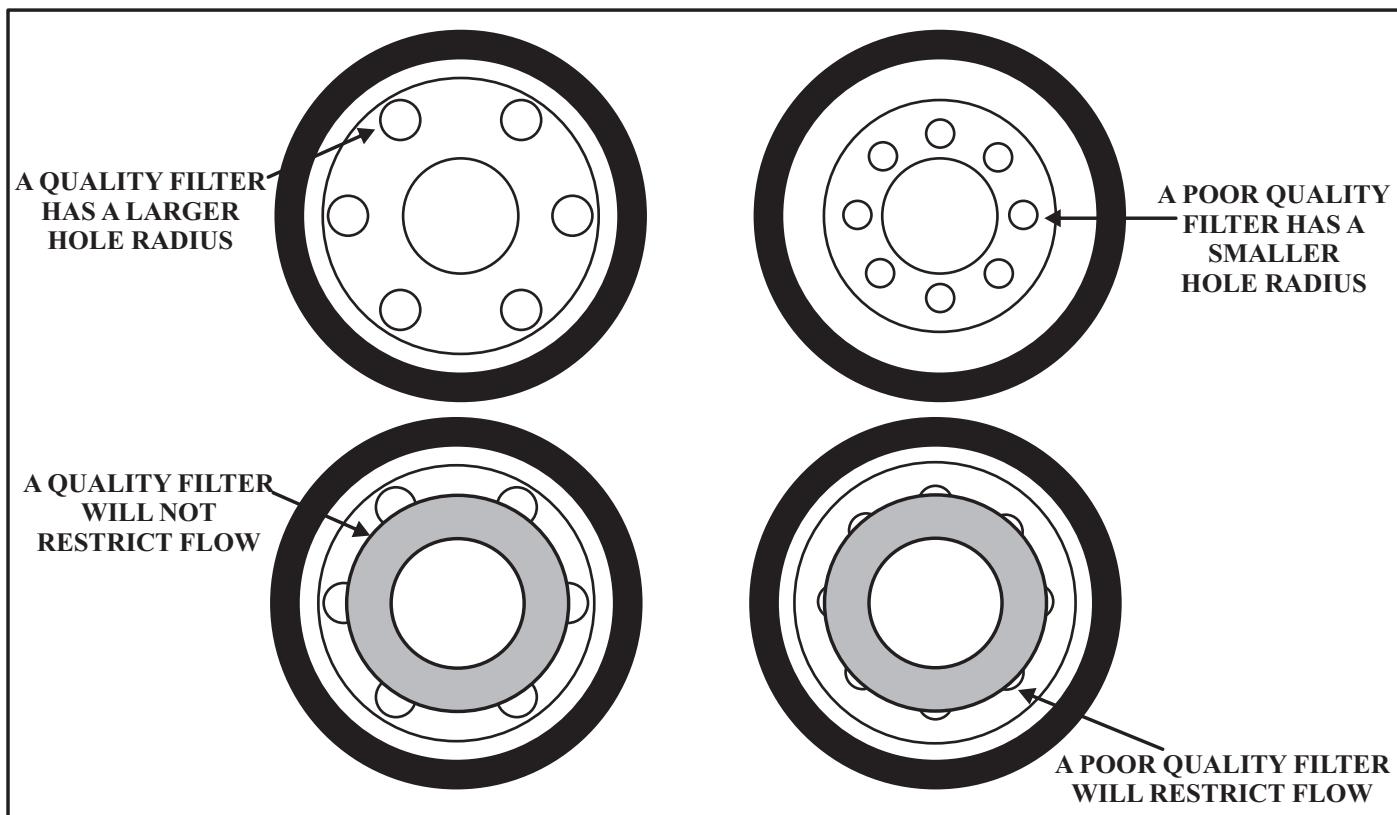
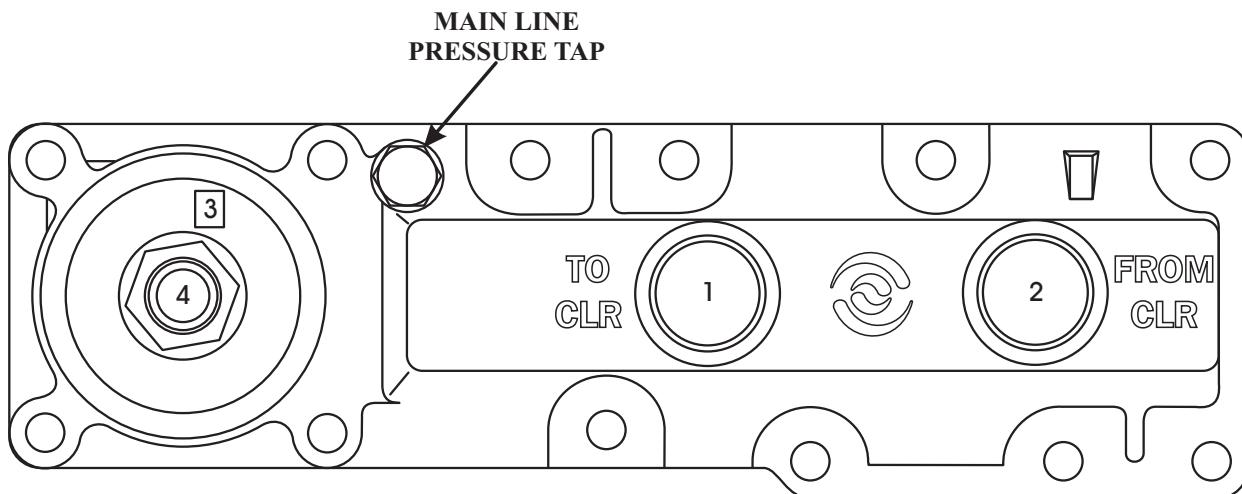


Figure 1

COOLER MANIFOLD PASSAGE I.D.



1. TO COOLER
2. FROM COOLER
3. LINE - TO FILTER
4. LINE - FROM FILTER

Figure 2

LCT1000/2000 TRANSMISSION OVERHEATS

BELL HOUSING WITH MANIFOLD FOR FILTER AND COOLER PORTS

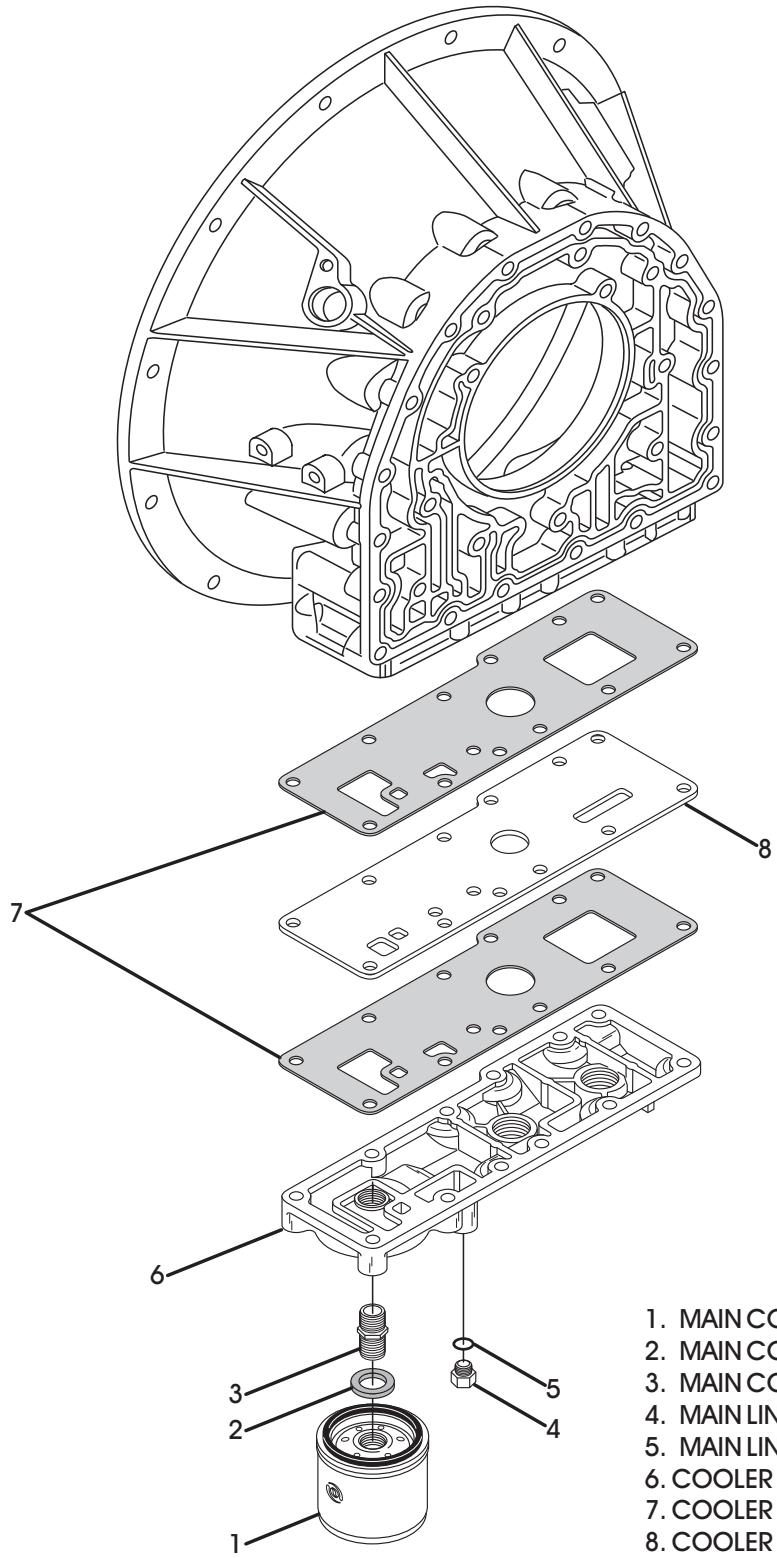


Figure 3

1988 - 98 ISUZU "N" SERIES TRUCKS**JR403E REAR LUBE FAILURE**

COMPLAINT: After auxiliary transmission filter installation, the truck returns to the shop with the rear planets destroyed due to a lack of lubrication.

CAUSE: An incorrect filter application was installed.

CORRECTION: When flow was checked from the transmission to the auxiliary filter, flow was very good, but from the filter assembly to the radiator there was none. With no cooler flow TO the transmission, there will be no rear lube delivered to the geartrain.

This auxiliary filter assembly is not installed at the factory. It is a dealer installed option (Refer to Figure 1). This filter is available only from an Isuzu medium duty truck dealer. If an attempt is made to purchase one from an aftermarket source, what you will receive is an engine oil filter with a one-way check valve. This filter flows in the opposite direction.

In order to make this aftermarket filter work the cooler lines need to be switched at the auxiliary cooler manifold as seen in Figure 2, or use the O.E. filter from Isuzu.

Verify proper cooler flow after repairs!

SERVICE INFORMATION:

1988 - 1998 Isuzu "N" Series Diesel Auxiliary Filter.....97182282

A special thanks to Luis Zabala of WIWI transmissions in Miami, Fl. for sharing this experience with ATSG making this bulletin possible.

ISUZU "N" SERIES TRUCKS JR403E REAR LUBE FAILURE

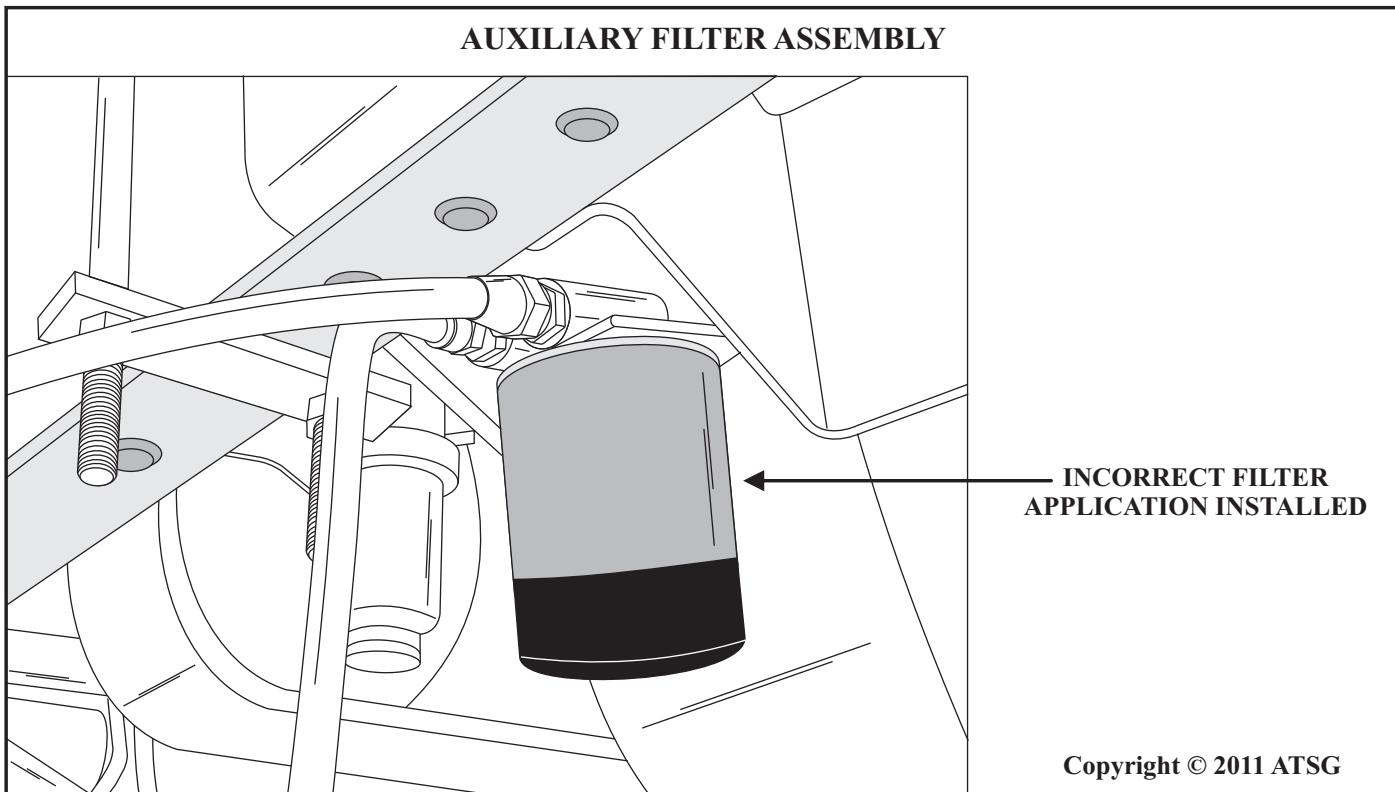


Figure 1

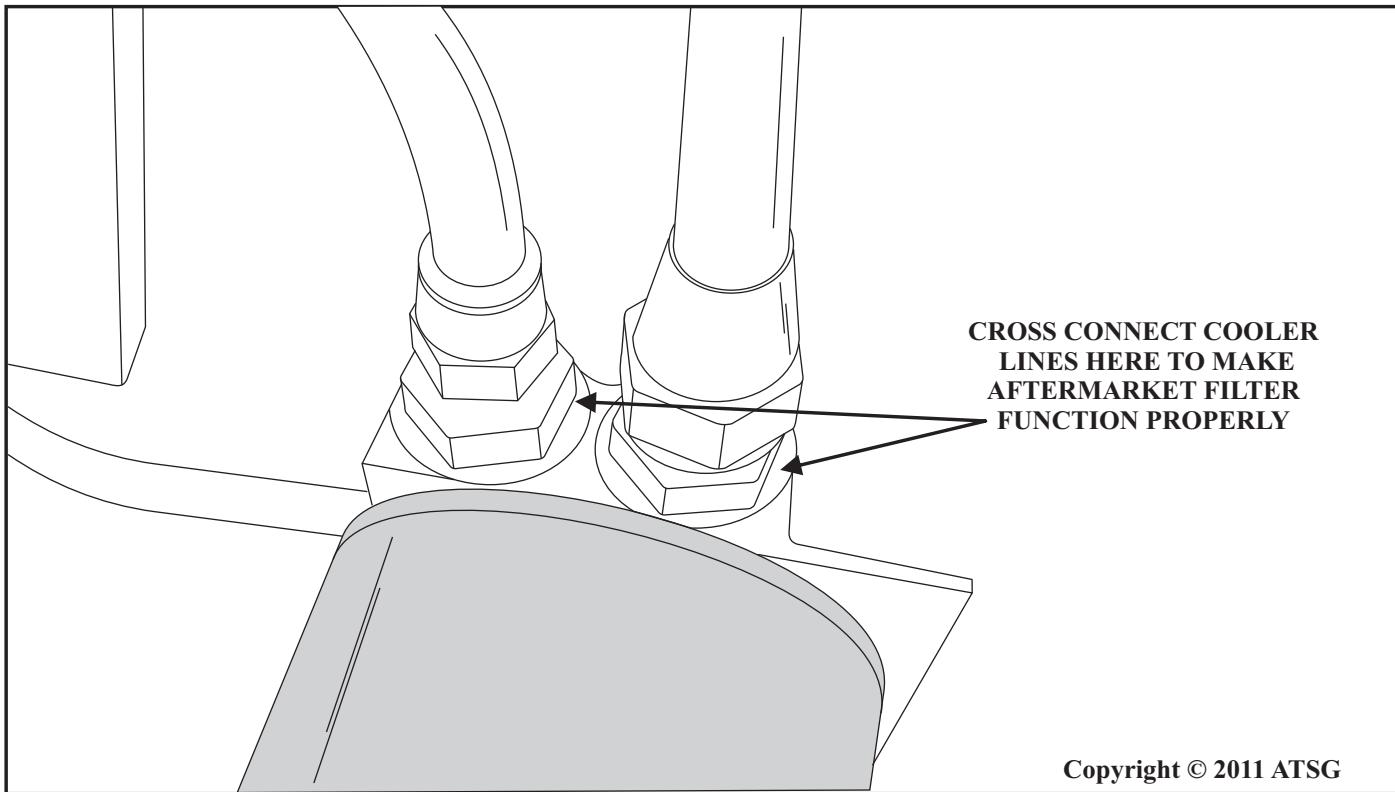


Figure 2

CARLYN - 57

MITSUBISHI FUSO MANUAL CODE RETRIEVAL

COMPLAINT: A 2007 or Later Mitsubishi Fuso equipped with the M036A6 (Aisin 6 speed) comes in with the Transmission Warning Lamp illuminated, Figure 1. The technician's scan tool cannot communicate with this vehicle.

CAUSE: At the time of this printing, no after market scan tool is capable of communicating with this vehicle.

CORRECTION: There is a manual code retrieval procedure available to retrieve two digit codes from the TCM as follows:

Reading Diagnostic Codes:

Observe the number of flashes as well as the duration of each flash as the transmission Warning Lamp will flash out two digit codes. The first digit will be .4 seconds in length while the second digit will be 1.2 seconds in length. **The second digit will flash first, then the first digit.** If a zero is part of the code being flashed only the first digit will be displayed. The diagnostic code 01 will be displayed if the system is free of trouble codes. The same diagnostic code will repeat itself three (3) times before moving on to the next stored code. When all stored codes are displayed, the sequence will begin over again.

Present Diagnostic Codes:

1. Turn the ignition switch ON.
2. Remove the Diagnosis Switch, See Figure 2.
3. Present diagnosis codes will begin to be displayed.
4. When the Diagnosis Switch is connected the TCM will stop the code display.

Present & Historical Codes:

1. Turn the ignition switch ON.
2. Remove the Diagnosis and Memory Clear Switches, See Figure 2.
3. Past and present diagnostic codes will be displayed.
4. Turn the ignition switch OFF and install the Memory Clear and Diagnosis Switches and code display will be terminated.

Clearing Diagnostic Codes:

1. Turn the ignition Switch ON.
2. Remove the Memory Clear Switch and then install it, all stored diagnostic codes will be erased.
3. To cancel code clearing, with the Memory Clear Switch removed, turn the ignition OFF and then install the Memory Clear Switch, See Figure 2.

The Diagnosis and Memory clear switches are dedicated fuses in the fuse box shown in Figure 2, do not exceed the amp rating of the original fuse.

Diagnostic code charts that indicate both the five digit OBD-II codes as well as the two digit flash codes along with the code definition can be found in the charts in Figures 3 and 4.

MANUAL CODE RETRIEVAL

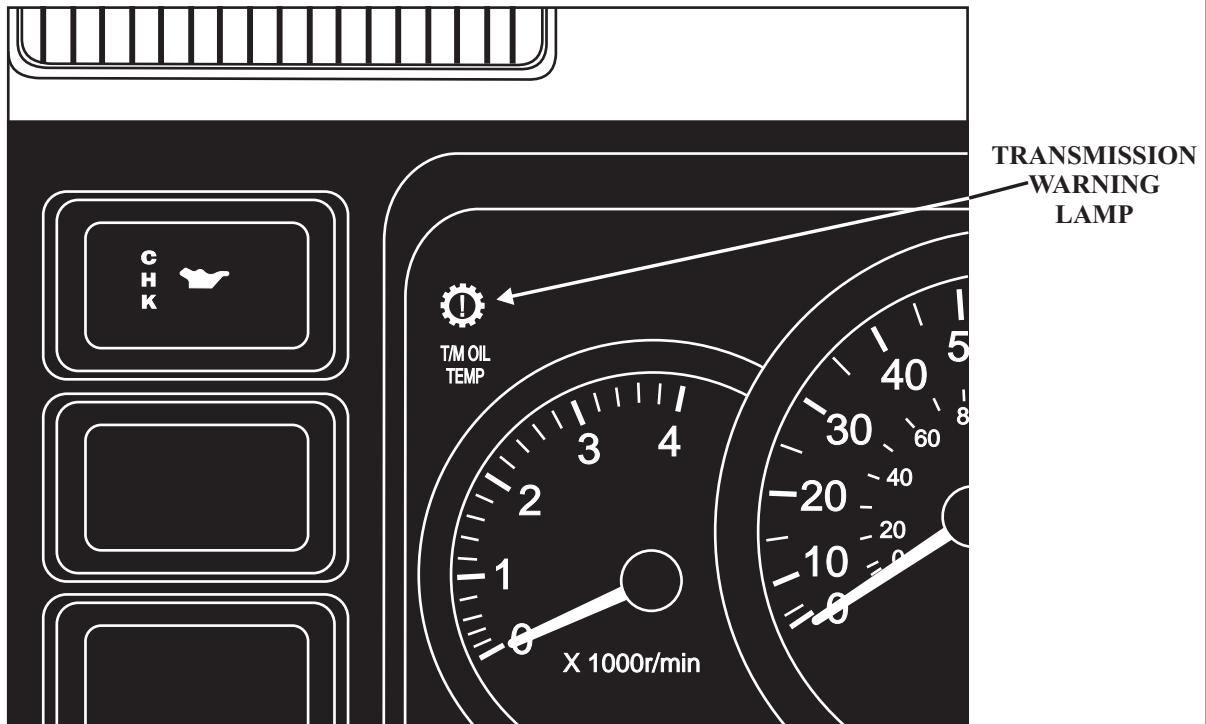
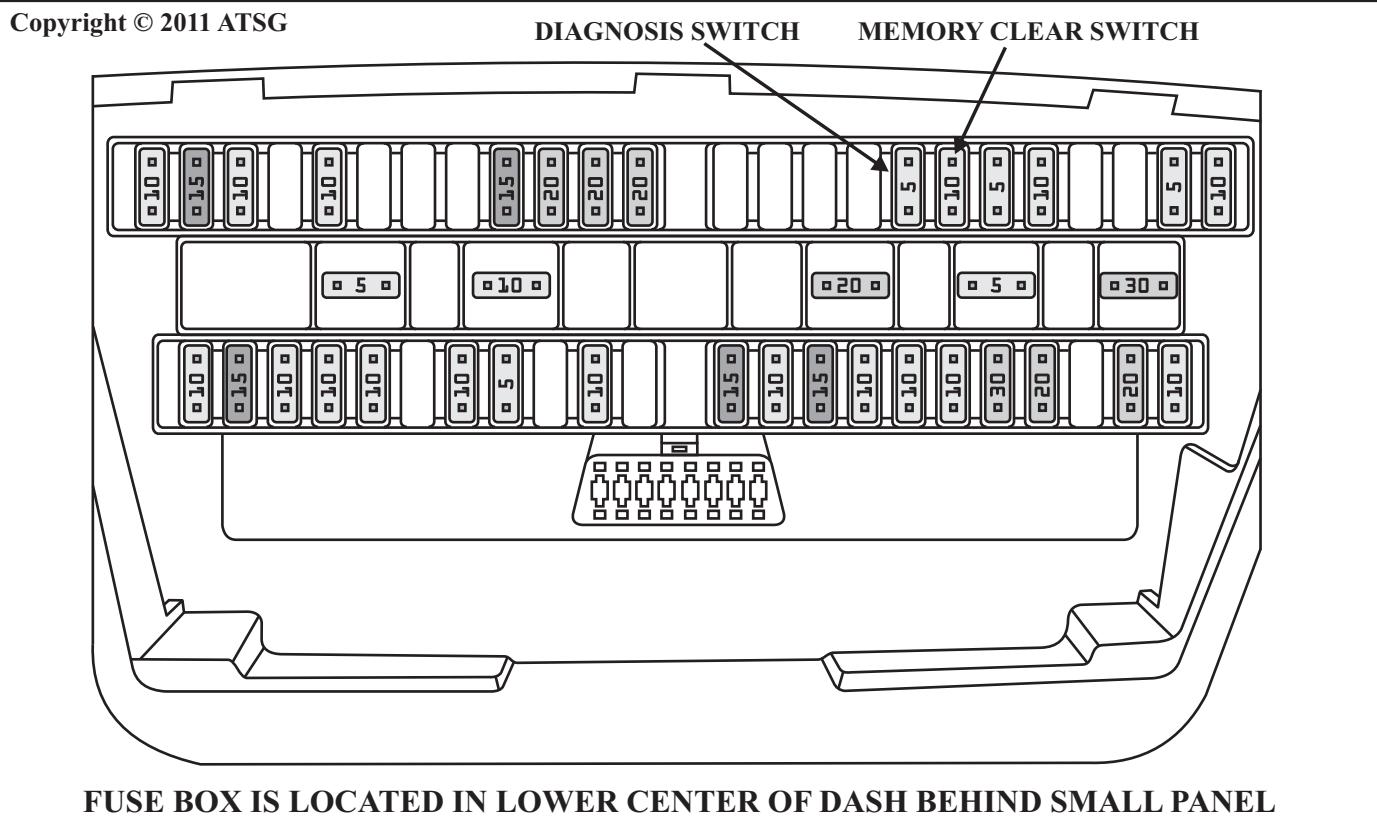


Figure 1



FUSE BOX IS LOCATED IN LOWER CENTER OF DASH BEHIND SMALL PANEL

Figure 2

SUPERIOR - 60

SUPERIOR - 61

MANUAL CODE RETRIEVAL
2007 & LATER MITSUBISHI FUSO DIAGNOSTIC CODE CHART

OBD-II CODE	FLASH CODE	CODE DEFINITION	*FAULT FAILURE PERIOD
P0078	54	Failure of Exhaust Brake Relay	8 TRIPS
P0500	12	Failure of Vehicle Speed Sensor	2DC
P0501	12	Failure of Vehicle Speed Sensor - Performance	IMD or 2DC
P0562	11	Open Circuit of Starter Switch Power Supply Low	IMD
P0604	91	Failure of Transmission Control Module (RAM)	2DC
P0605	92	Failure of Transmission Control Module (Internal Failure)	2DC
P062F	93	Failure of Transmission Control Module (EEPROM)	IMD
P0702	11	Battery Supply Voltage Low	2DC
P0706	49	Failure of Oil Pressure Switch 8 - Performance	IMD
P0707	43	Failure of Inhibitor Switch - Signal Low	IMD
P0708	43	Failure of Inhibitor Switch - Signal Low	IMD
P0711	13	Failure of Sump Oil Temperature Sensor - Performance	IMD
P0712	13	Failure of Sump Oil Temperature Sensor - Signal Low	IMD
P0713	13	Failure of Sump Oil Temperature Sensor - Signal High	IMD
P0714	13	Failure of Sump Oil Temperature Sensor Signal - Intermittent	IMD
P0717	16	Failure of Turbine Speed Sensor - No Signal	2DC
P0721	25	Failure of Output Speed Sensor - Performance	IMD or 2DC
P0722	25	Failure of Output Speed Sensor - No Signal	2DC
P0726	15	Abnormality of Engine Speed Signal	2DC
P0730	37	Incorrect Gear Ratio	IMD
P0746	41	Linear Solenoid 1 Stuck Off	IMD
P0747	41	Linear Solenoid 1 Stuck On	IMD
P0748	26	Linear Solenoid 1 - Shorted or Open	IMD
P0751	45	Shift Solenoid 1 Stuck Off	IMD
P0752	45	Shift Solenoid 1 Stuck On	IMD
P0756	46	Shift Solenoid 2 Stuck Off	IMD
P0757	46	Shift Solenoid 2 Stuck On	IMD
P0761	47	Shift Solenoid 3 Stuck Off	IMD
P0762	47	Shift Solenoid 3 Stuck On	IMD
P0766	55	Shift Solenoid 4 Stuck Off	IMD
P0767	55	Shift Solenoid 4 Stuck On	IMD
P0776	42	Linear Solenoid 2 Stuck Off	IMD
P0777	42	Linear Solenoid 2 Stuck On	IMD

*DC = Drive Cycle - Key ON, Engine Running to Key Off Constitutes One Drive Cycle.

TRIP = Key ON, Engine OFF to Key OFF Constitutes One Trip.

IMD = Immediate Code Storage @ The Time of The Failure.

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MANUAL CODE RETRIEVAL
2007 & LATER MITSUBISHI FUSO DIAGNOSTIC CODE CHART

OBD-II CODE	FLASH CODE	CODE DEFINITION	*FAULT FAILURE PERIOD
P0778	27	Linear Solenoid 2 - Shorted or Open	IMD
P0796	48	Linear Solenoid 3 Stuck Off	IMD
P0797	48	Linear Solenoid 3 Stuck On	IMD
P083D	48	Failure of Pressure Switch 7 - Voltage High	IMD
P0842	41	Failure of Pressure Switch 1 - Voltage Low	IMD
P0843	41	Failure of Pressure Switch 1 - Voltage High	IMD
P0847	42	Failure of Pressure Switch 2 - Voltage Low	IMD
P0848	42	Failure of Pressure Switch 2 - Voltage High	IMD
P0863	88	Abnormality in CAN Communication	IMD
P0872	45	Failure of Pressure Switch 3 - Voltage Low	IMD
P0873	45	Failure of Pressure Switch 3 - Voltage High	IMD
P0877	46	Failure of Pressure Switch 4 - Voltage Low	IMD
P0878	46	Failure of Pressure Switch 4 - Voltage High	IMD
P0973	31	Failure of Shift Solenoid 1 - Voltage Low	IMD
P0974	31	Failure of Shift Solenoid 1 - Voltage High	IMD
P0976	32	Failure of Shift Solenoid 2 - Voltage Low	IMD
P0977	32	Failure of Shift Solenoid 2 - Voltage High	IMD
P0979	33	Failure of Shift Solenoid 3 - Voltage Low	IMD
P0980	33	Failure of Shift Solenoid 3 - Voltage High	IMD
P0985	52	Failure of Shift Solenoid 4 - Voltage Low	IMD
P0986	52	Failure of Shift Solenoid 4 - Voltage High	IMD
P0989	47	Failure of Pressure Switch 5 - Voltage Low	IMD
P0990	47	Failure of Pressure Switch 5 - Voltage High	IMD
P0994	55	Failure of Pressure Switch 6 - Voltage Low	IMD
P0995	55	Failure of Pressure Switch 6 - Voltage High	IMD
P1604	24	Abnormality in Accelerator Pedal Position Sensor Signal	IMD
P2716	34	Failure of Linear Solenoid 4 - Shorted or Open	IMD
P2742	17	Failure of Torque Converter Temperature Sensor - Signal Low	IMD
P2743	17	Failure of Torque Converter Temperature Sensor - Signal High	IMD or 2DC
P2757	61	Mechanical Failure of The Lockup Clutch (TCC Slip)	2DC
P2759	35	Failure of Linear Solenoid 3 - Shorted or Open	IMD
U0100	88	Abnormality in CAN Communication	IMD

*DC = Drive Cycle - Key ON, Engine Running to Key Off Constitutes One Drive Cycle.

TRIP = Key ON, Engine OFF to Key OFF Constitutes One Trip.

IMD = Immediate Code Storage @ The Time of The Failure.

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Figure 4

ADAPT-A-CASE - 64

FORD/INTERNATIONAL MEDIUM TRUCK 5R110W LCF SERIES

MANUAL DIAGNOSTIC CODE RETRIEVAL PROCEDURE

Ford/International Medium Truck LCF series, equipped with the 5R110W transmission, are capable of Diagnostic Trouble code retrieval thru a manual process that does not require a scan tool. Refer to the information below for this procedure and the following pages for Diagnostic Trouble Code descriptions for both the manual process and the scan tool.

MANUAL CODE RETRIEVAL INITIATION

STEP 1: Place vehicle on a level surface and use wheel chocks to prevent vehicle from moving.

STEP 2: Turn ignition "ON" DO NOT start engine.

STEP 3: Place Shift Selector in "2" Position (See Figure 1)

STEP 4: Press Tow/Haul switch 4 times within 4 seconds, this will initiate Manual Code retrieval. (See Figure 1)

READING CODES

STEP 5: The Check Trans, Trans Temp and Tow/Haul all turn ON simultaneously to indicate diagnostic mode has been entered. (See Figure 2)

STEP 6: The Check Trans and Trans Temp turn OFF and the Tow/Haul remains ON.

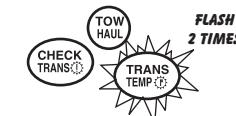
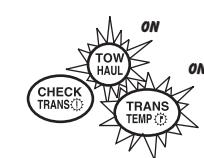
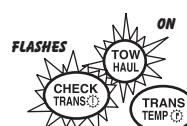
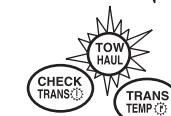
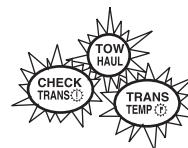
FLASH FORMAT

The Check Trans will communicate each digit of the fault codes by flashing.

Example: 1 Flash-pause-1 Flash-pause 1 Flash= DTC 111
DTC 111= No Codes Present.

If more than one fault code is present the Trans Temp will illuminate between each fault code.

When all Fault Codes have been Flashed, the Trans Temp indicator will Flash twice and the Tow Haul will go OFF.



Special thanks to
Chris Lenox
Camerota Truck Parts
Enfield, CT

CLEARING CODES AFTER REPAIRS

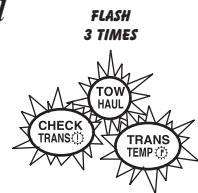
STEP 1: Turn ignition *ON* but do not start engine.

STEP 2: Place shift selector in *D* position and push the *TOW/Haul* switch once.

STEP 3: Place shift selector in *N* position and push the *TOW/Haul* switch once.

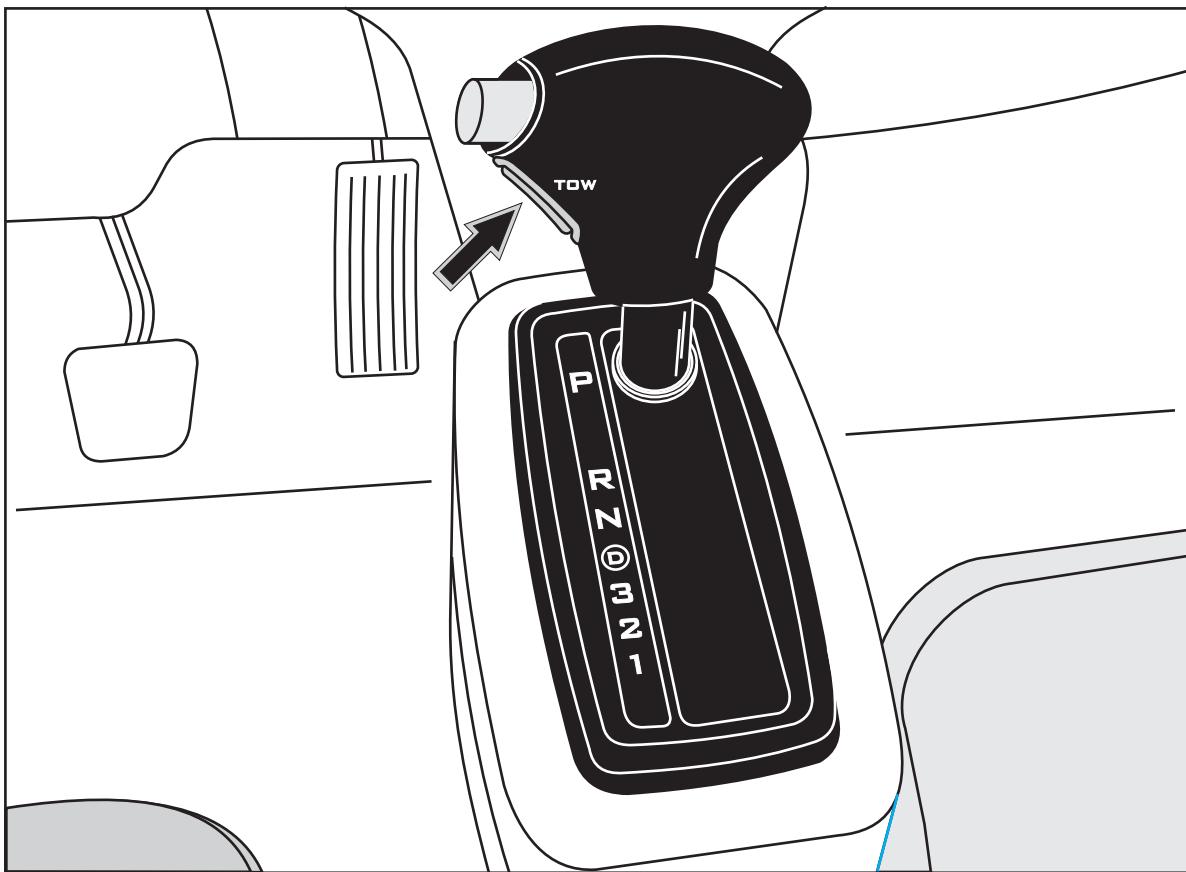
STEP 4: Place shift selector in *R* position and push the *TOW/Haul* switch once.

STEP 5: Place shift selector in *P* position and push the *TOW/Haul* switch once.



The Check Trans Trans Temp and Tow/Haul will flash three times to indicate diagnostic mode has been cleared.

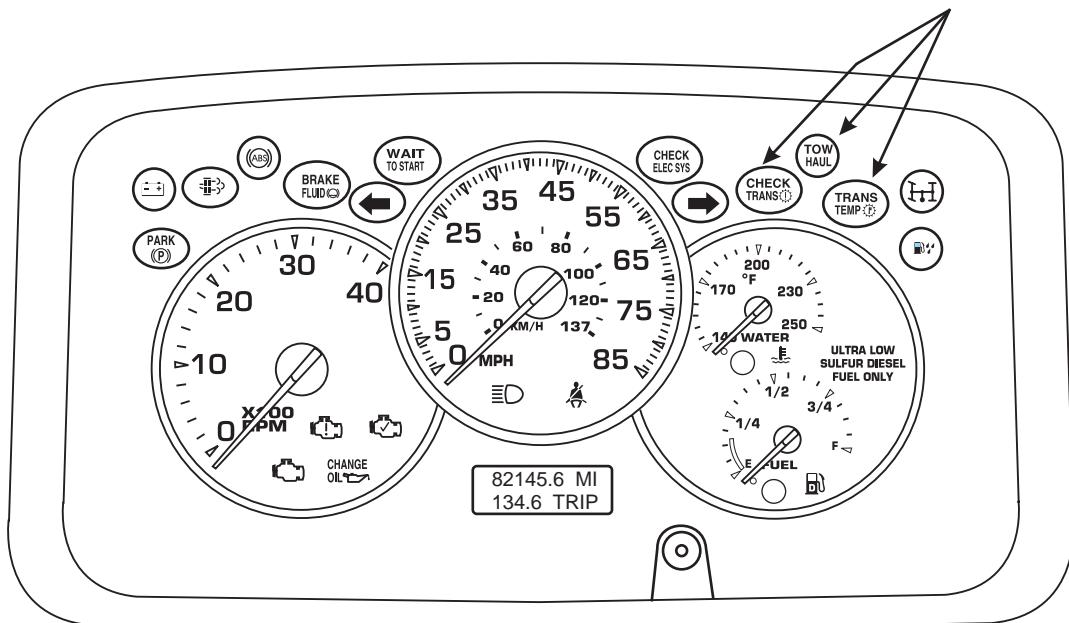
TOW HAUL SWITCH LOCATION



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Figure 1

INDICATOR LAMP LOCATIONS



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Figure 2
Automatic Transmission Service Group

<i>5R110W Diagnostic Trouble Code Chart</i>			
<i>Flash DTC</i>	<i>OBDII DTC</i>	<i>Diagnostic Code Description/Symptom</i>	<i>Diagnostic Trouble Code Description</i>
113 114	P0706 P0707	<i>Transmission Range (TR-P) Sensor</i>	Transmission Range sensor signal out of range or duty cycle is below threshold, sensor/circuit elect. malfunction.
115	P0708	<i>Transmission Range (TR-P) Sensor</i>	Transmission Range sensor signal duty cycle is above threshold, sensor/circuit elect. malfunction.
412 413	P1702 P1705	<i>Transmission Range (TR-P) Sensor</i>	Transmission Range sensor circuit failure, or KOEO or KOER not run in P or N positions.
122	P0711	<i>Trans Fluid Temp (TFT) Sensor</i>	PCM has detected no TFT change during operation. Stuck at some normal reading.
123 121	P0712 P0710	<i>Trans Fluid Temp (TFT) Sensor</i>	Voltage drop across TFT sensor exceeds scale set for temperature of 315°F.
124 121	P0713 P0710	<i>Trans Fluid Temp (TFT) Sensor</i>	Voltage drop across TFT sensor exceeds scale set for temperature of minus 40°F.
414	P1711	<i>Trans Fluid Temp (TFT) Sensor</i>	Transmission not operating at normal temperature during On-Board diagnostics.
423	P1783	<i>Trans Fluid Temp (TFT) Sensor</i>	Transmission over temp condition indicated.
125	P0715	<i>Turbine Shaft Speed (TSS) Sensor</i>	PCM detected a loss of TSS signal during normal operation.
131	P0717	<i>Turbine Shaft Speed (TSS) Sensor</i>	PCM has not detected a TSS signal.
132	P0718	<i>Turbine Shaft Speed (TSS) Sensor</i>	PCM has detected a noisy TSS signal.
133	P0720	<i>Output Shaft Speed (OSS) Sensor</i>	PCM detected a loss of OSS signal during normal operation.
134	P0721	<i>Output Shaft Speed (OSS) Sensor</i>	PCM has detected a noisy OSS signal.
136	P0722	<i>Output Shaft Speed (OSS) Sensor</i>	PCM has detected no OSS signal.
141	P0730	<i>Clutch Control Solenoid or Internal Problem</i>	PCM has detected a gear ratio error.
142	P0740	<i>TCC Solenoid</i>	TCC Solenoid, Electrical, Open Circuit.
143	P0741	<i>TCC Solenoid</i>	TCC slippage detected during engagement. Mechanical or Hydraulic concern.

<i>5R110W Diagnostic Trouble Code Chart</i>			
<i>Flash DTC</i>	<i>OBDII DTC</i>	<i>Diagnostic Code Description/Symptom</i>	<i>Diagnostic Trouble Code Description</i>
144	P0742	<i>TCC Solenoid</i>	TCC Solenoid circuit, shorted to ground.
145	P0743	<i>TCC Solenoid</i>	TCC Solenoid circuit failure.
151	P0744	<i>TCC Solenoid</i>	TCC Solenoid circuit, shorted to power.
421	P1744	<i>TCC Solenoid</i>	TCC slippage detected during engagement. Mechanical or Hydraulic concern.
152	P0748	<i>Line Pressure Control (PC-A) Solenoid</i>	PC-A Solenoid circuit failure.
314	P0960	<i>Line Pressure Control (PC-A) Solenoid</i>	PC-A Solenoid circuit open failure.
315	P0962	<i>Line Pressure Control (PC-A) Solenoid</i>	PC-A Solenoid circuit, shorted to ground.
321	P0963	<i>Line Pressure Control (PC-A) Solenoid</i>	PC-A Solenoid circuit, shorted to power.
153	P0750	<i>SSPC-A Solenoid (Coast Clutch)</i>	SSPC-A Solenoid circuit open failure.
154	P0751	<i>SSPC-A Solenoid (Coast Clutch)</i>	SSPC-A Solenoid circuit, or solenoid failure OFF.
155	P0752	<i>SSPC-A Solenoid (Coast Clutch)</i>	SSPC-A Solenoid circuit, or solenoid failure ON.
211	P0753	<i>SSPC-A Solenoid (Coast Clutch)</i>	SSPC-A Solenoid circuit failure.
323	P0973	<i>SSPC-A Solenoid (Coast Clutch)</i>	SSPC-A Solenoid circuit, shorted to ground.
324	P0974	<i>SSPC-A Solenoid (Coast Clutch)</i>	SSPC-A Solenoid circuit, shorted to power.
212	P0755	<i>SSPC-B Solenoid (Overdrive Clutch)</i>	SSPC-B Solenoid circuit open failure.
213	P0756	<i>SSPC-B Solenoid (Overdrive Clutch)</i>	SSPC-B Solenoid circuit, or solenoid failure OFF.
214	P0757	<i>SSPC-B Solenoid (Overdrive Clutch)</i>	SSPC-B Solenoid circuit, or solenoid failure ON.

5R110W Diagnostic Trouble Code Chart			
<i>Flash DTC</i>	<i>OBDII DTC</i>	<i>Diagnostic Code Description/Symptom</i>	<i>Diagnostic Trouble Code Description</i>
215	P0758	<i>SSPC-B Solenoid (Overdrive Clutch)</i>	SSPC-B Solenoid circuit failure.
331	P0976	<i>SSPC-B Solenoid (Overdrive Clutch)</i>	SSPC-B Solenoid, or shorted to ground.
332	P0977	<i>SSPC-B Solenoid (Overdrive Clutch)</i>	SSPC-B Solenoid, or shorted to power.
221	P0760	<i>SSPC-C Solenoid (Intermediate Clutch)</i>	SSPC-C Solenoid circuit open failure.
222	P0761	<i>SSPC-C Solenoid (Intermediate Clutch)</i>	SSPC-C Solenoid circuit, or solenoid failure OFF.
223	P0762	<i>SSPC-C Solenoid (Intermediate Clutch)</i>	SSPC-C Solenoid circuit, or solenoid failure ON.
224	P0763	<i>SSPC-C Solenoid (Intermediate Clutch)</i>	SSPC-C Solenoid circuit, electrical circuit.
334	P0979	<i>SSPC-C Solenoid (Intermediate Clutch)</i>	SSPC-C Solenoid, or circuit shorted to ground.
336	P0980	<i>SSPC-C Solenoid (Intermediate Clutch)</i>	SSPC-C Solenoid, or circuit shorted to power.
225	P0765	<i>SSPC-D Solenoid (Direct Clutch)</i>	SSPC-D Solenoid circuit open failure.
231	P0766	<i>SSPC-D Solenoid (Direct Clutch)</i>	SSPC-D Solenoid circuit, or solenoid failure OFF.
232	P0767	<i>SSPC-D Solenoid (Direct Clutch)</i>	SSPC-D Solenoid circuit, or solenoid failure ON.
233	P0768	<i>SSPC-D Solenoid (Direct Clutch)</i>	SSPC-D Solenoid electrical circuit.
342	P0982	<i>SSPC-D Solenoid (Direct Clutch)</i>	SSPC-D Solenoid, or circuit shorted to ground.
343	P0983	<i>SSPC-D Solenoid (Direct Clutch)</i>	SSPC-D Solenoid, or circuit shorted to power.



5R110W Diagnostic Trouble Code Chart			
<i>Flash DTC</i>	<i>OBDII DTC</i>	<i>Diagnostic Code Description/Symptom</i>	<i>Diagnostic Trouble Code Description</i>
345	P0985	<i>SSPC-E Solenoid (Low/Reverse Clutch)</i>	SSPC-E Solenoid, or circuit shorted to ground.
351	P0986	<i>SSPC-E Solenoid (Low/Reverse Clutch)</i>	SSPC-E Solenoid, or circuit shorted to power.
243	P0791	<i>Intermediate Shaft Speed Sensor (ISS)</i>	Insufficient input from ISS.
244	P0793	<i>Intermediate Shaft Speed Sensor (ISS)</i>	No input from ISS.
245	P0794	<i>Intermediate Shaft Speed Sensor (ISS)</i>	ISS signal intermittent.
422	P1780	<i>Transmission Control Switch (TCS)</i>	Transmission Control Switch voltage incorrect.
435	U0100	<i>Transmission Control Module (CAN) Control Area Network</i>	Transmission Control Module loss of Communication with the Engine Control Module thru Control Area Network.

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B&W



FORD 5R110W

EXTREME COLD WEATHER RELATED LOW DIODE FAILURE

COMPLAINT: Some, 2008-09 Ford E-Series, F-Super Duty and LCF vehicles , built with *No* external in-line filter and equipped with the 5R110W, may exhibit premature Low Diode Failure, due to operation in -35° F temperature.

CAUSE: The cause may be, that the cold temperature has caused the fluid to be restricted in the cooler, and without the external in-line filter, which has a bypass built in as shown in Figure 1, the *To cooler* pressure may build up and cause the Bypass Valve to stroke cutting off lube feed to the Front, Center and Rear lube circuits, creating Low Diode failure from lack of lubrication. See Figure 2 for valve identification for the pump cover. Also see Figures 3-5 which explains the function of the Bypass Valve and how its position with a restricted cooler will cut off Lube.

CORRECTION: To correct this condition, replace the pump assembly with the pump listed in service information. This new design pump has a connection that was made between the To Cooler passage and the Lube passage as shown in Figure 5. Refer to Figures 5 and 6 for Identification of this Pump, by the Rough Forging number listed. The RF number listed by Ford is only on the Pump body as shown in Figure 6. It may be necessary to split the pump and look for the notch to verify application, especially if the Pump Body has been changed. Note: This pump assembly is for versions that do *Not* use the external filter.

SERVICE INFORMATION:

PUMP ASSEMBLY (Ford part #).....9C3Z-7A103-B

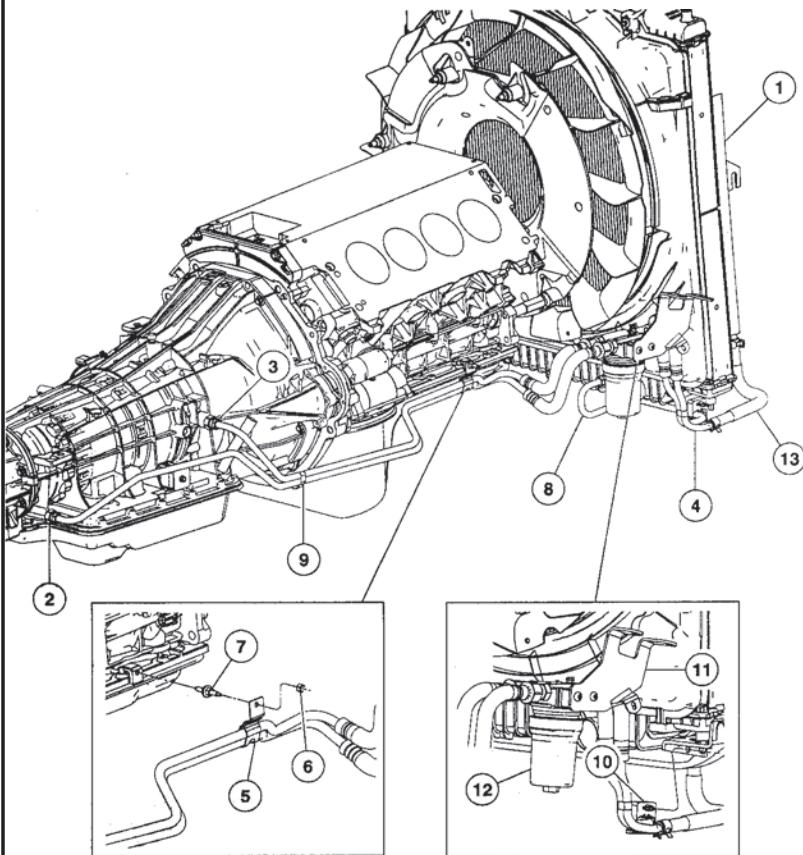
Note: This pump assembly is for versions that do Not use the external filter.

PUMP ASSEMBLY (Ford part #).....9C3Z-7A103-A

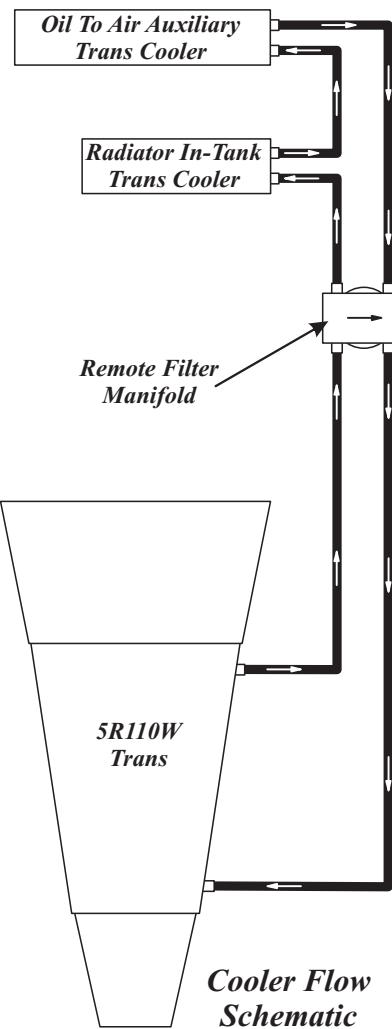
Note: This pump assembly is for versions that Use the external filter. It will retro-fit back to 2003 models.



REMOTE TRANSMISSION FILTER IN COOLER LINES



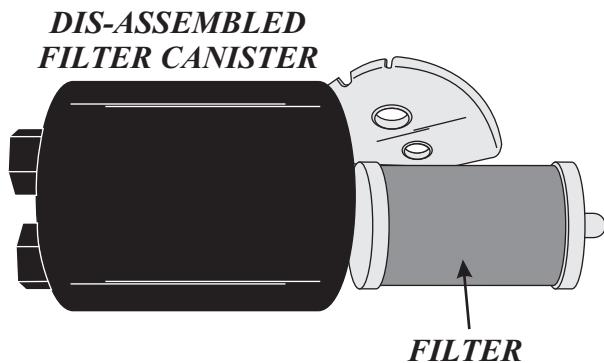
- 1 OIL TO AIR TRANSMISSION FLUID AUXILIARY COOLER
- 2 REAR "FROM COOLER" LINE CASE FITTING
- 3 FRONT "TO COOLER" LINE CASE FITTING
- 4 REMOTE FILTER "OUT" LINE
- 5 COOLER LINE BRACKET
- 6 NUT
- 7 STUD
- 8 RADIATOR COOLER "IN" LINE
- 9 COOLER LINE "C" CLIP
- 10 COOLER LINE CLIP
- 11 REMOTE FILTER MANIFOLD BRACKET
- 12 REMOTE TRANSMISSION FLUID FILTER
- 13 HOSE ASSEMBLY



CAUTION: The transmission cooler lines must be disconnected prior to flushing out the cooler lines. Do Not attempt to flush the remote filter housing because of the internal orifice.

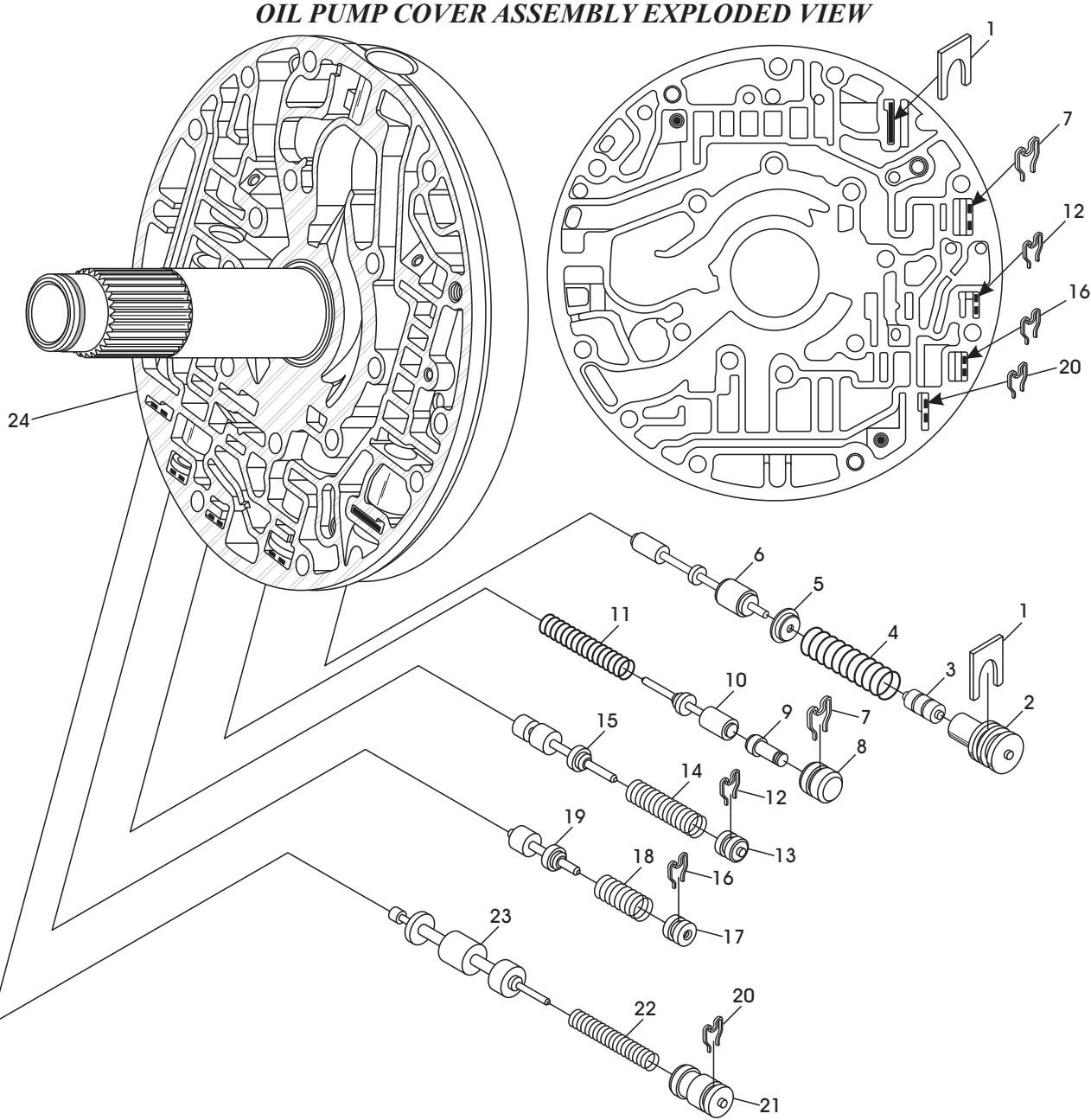
REMOTE FILTER CLOSE-UP

ASSEMBLED FILTER CANISTER



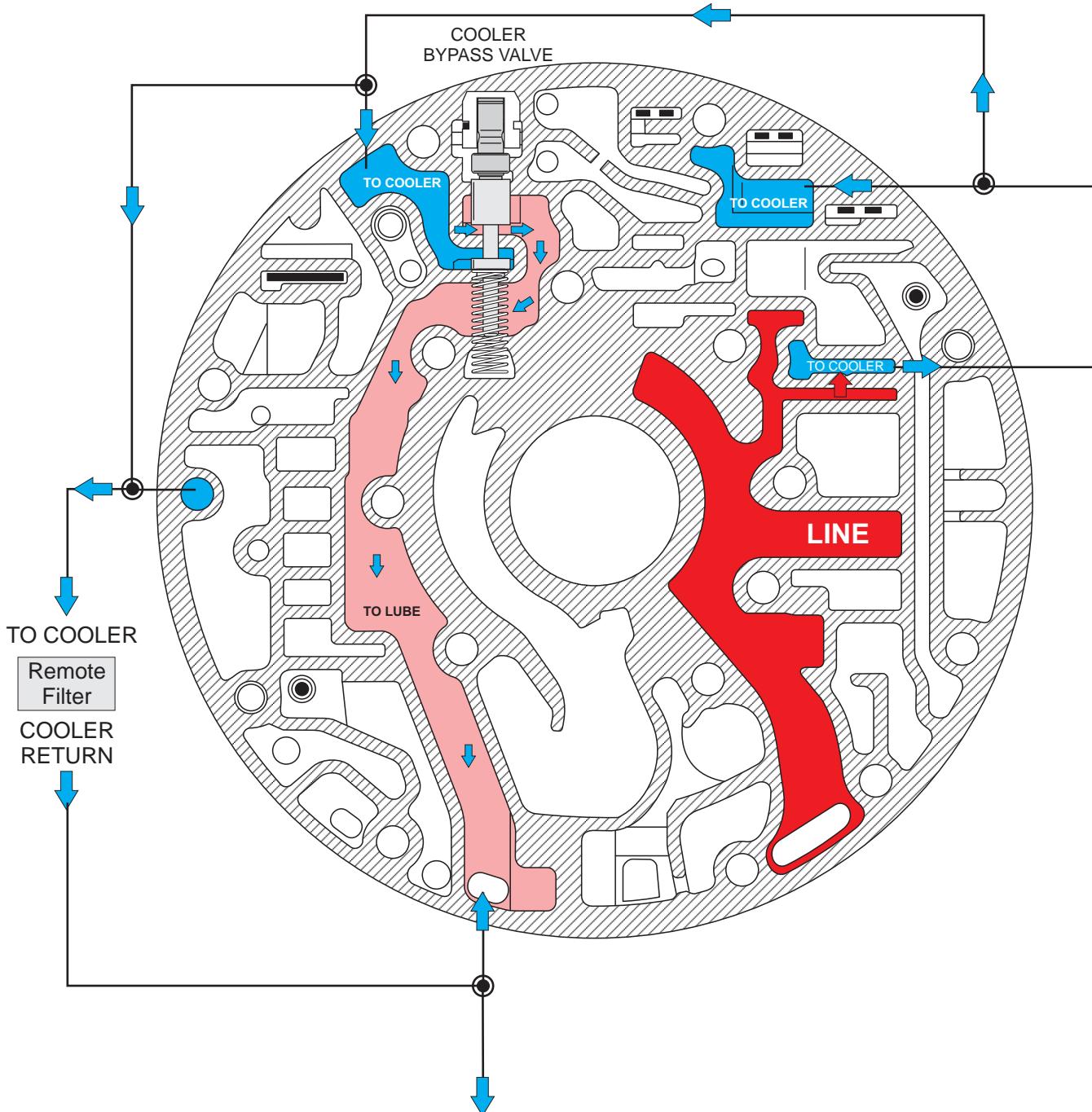
DIS-ASSEMBLED FILTER CANISTER

Figure 1



- 1 CONVERTER CLUTCH CONTROL VALVE BORE PLUG RETAINER.
- 2 CONVERTER CLUTCH CONTROL VALVE SLEEVE.
- 3 CONVERTER CLUTCH CONTROL VALVE PLUG.
- 4 CONVERTER CLUTCH CONTROL VALVE SPRING.
- 5 CONVERTER CLUTCH CONTROL VALVE SPRING SEAT.
- 6 CONVERTER CLUTCH CONTROL VALVE.
- 7 COOLER BYPASS VALVE BORE PLUG RETAINER (ORANGE I.D.).
- 8 COOLER BYPASS VALVE BORE PLUG.
- 9 THERMOSTATIC VALVE ASSEMBLY.
- 10 COOLER BYPASS VALVE.
- 11 COOLER BYPASS VALVE SPRING.
- 12 CONVERTER PRESSURE LIMIT VALVE BORE PLUG RETAINER.

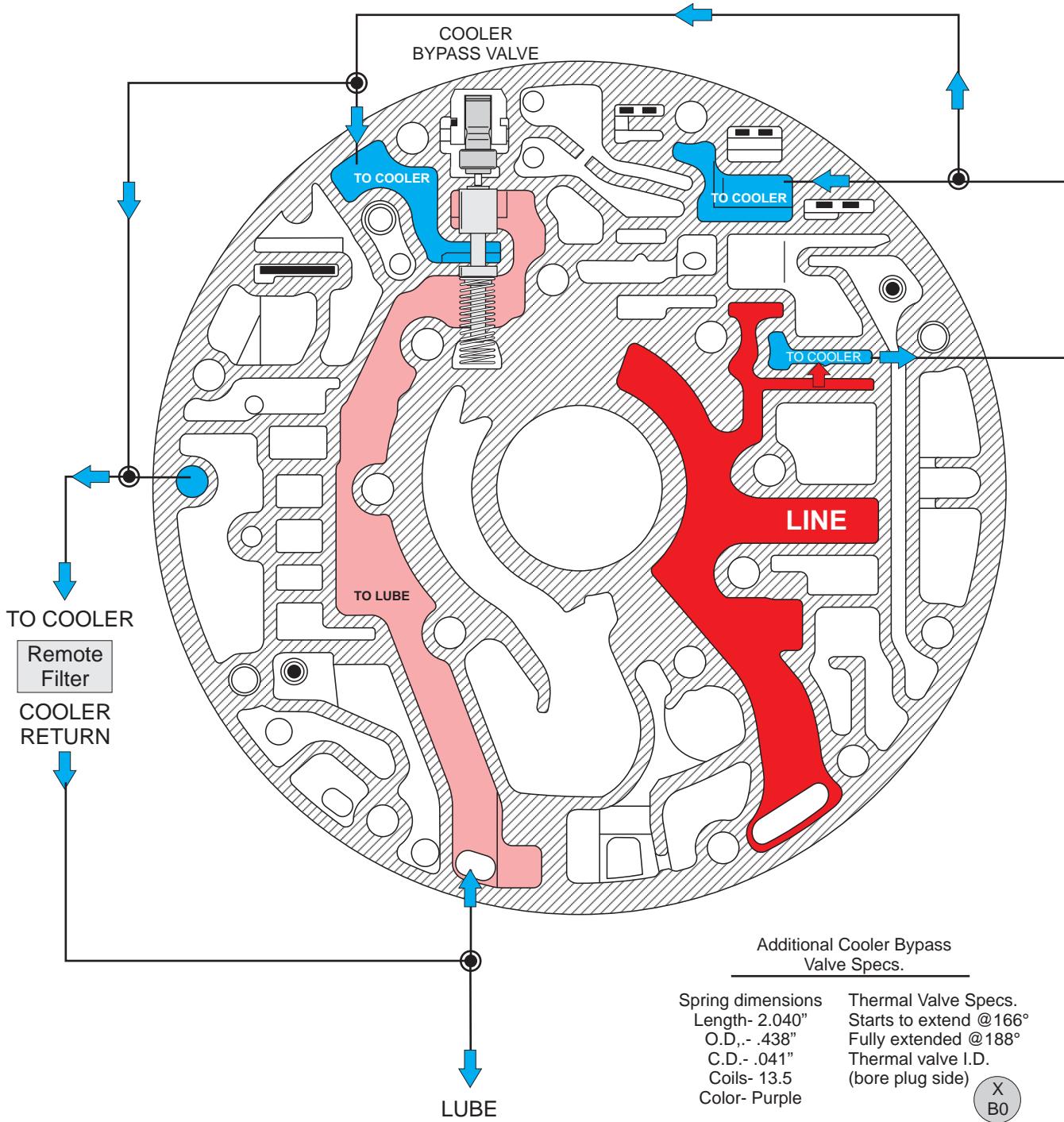
- 13 CONVERTER PRESSURE LIMIT VALVE BORE PLUG.
- 14 CONVERTER PRESSURE LIMIT VALVE SPRING.
- 15 CONVERTER PRESSURE LIMIT VALVE.
- 16 CONVERTER ANTI-DRAIN BACK VALVE BORE PLUG RETAINER.
- 17 CONVERTER ANTI-DRAIN BACK VALVE BORE PLUG.
- 18 CONVERTER ANTI-DRAIN BACK VALVE SPRING.
- 19 CONVERTER ANTI-DRAIN BACK VALVE.
- 20 MAIN REGULATOR VALVE BORE PLUG RETAINER.
- 21 MAIN REGULATOR VALVE BORE PLUG.
- 22 MAIN REGULATOR VALVE SPRING.
- 23 MAIN REGULATOR VALVE.
- 24 OIL PUMP COVER ASSEMBLY.

PREVIOUS DESIGN COOLER BYPASS OPERATION "COLD MODE"

Summary: When Transmission fluid temperature is Cold, "To Cooler" pressure flows thru the Cooler Bypass Valve into the Front, Center and Rear Lube circuits, as well as the Coolers and remote filter.

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Figure 3
Automatic Transmission Service Group

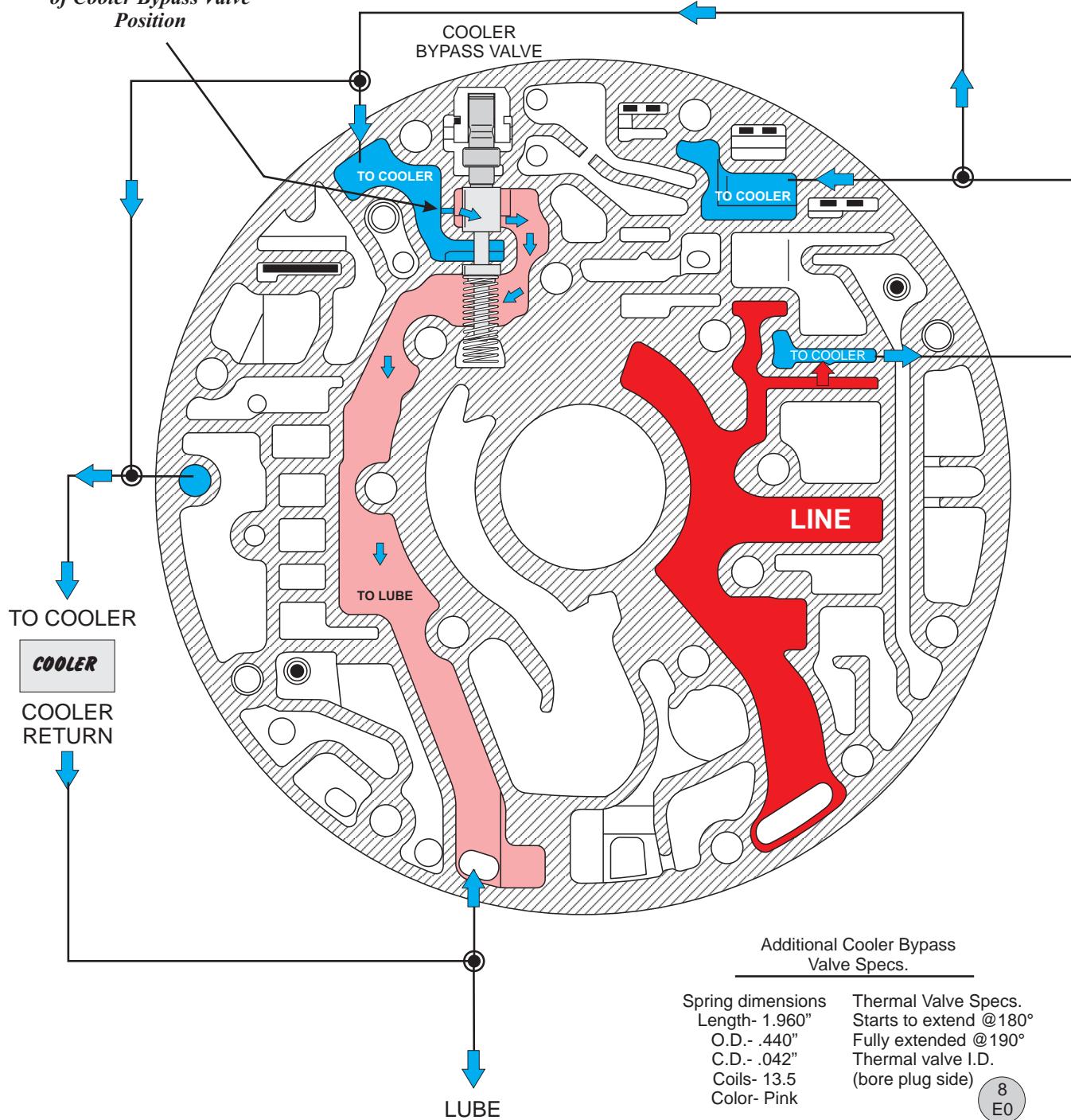
PREVIOUS DESIGN COOLER BYPASS OPERATION "HOT MODE"


Summary: When Transmission fluid temperature is Hot, "To Cooler" pressure flows thru the Coolers and remote filter before it enters into the Front, Center and Rear Lube circuits.

NEW DESIGN COOLER BYPASS OPERATION "HOT MODE"

*Passage cut thru
worm track connecting
the two circuits regardless
of Cooler Bypass Valve
Position*

Width Dimension .078"
Depth Dimension .050"



Summary: When Transmission fluid temperature is Cold or Hot, "To Cooler" pressure flows around the Cooler Bypass Valve into the Front, Center and Rear Lube circuits, as well as the Coolers. The To Cooler and Lube Circuits are connected thru a notch in the worm track.

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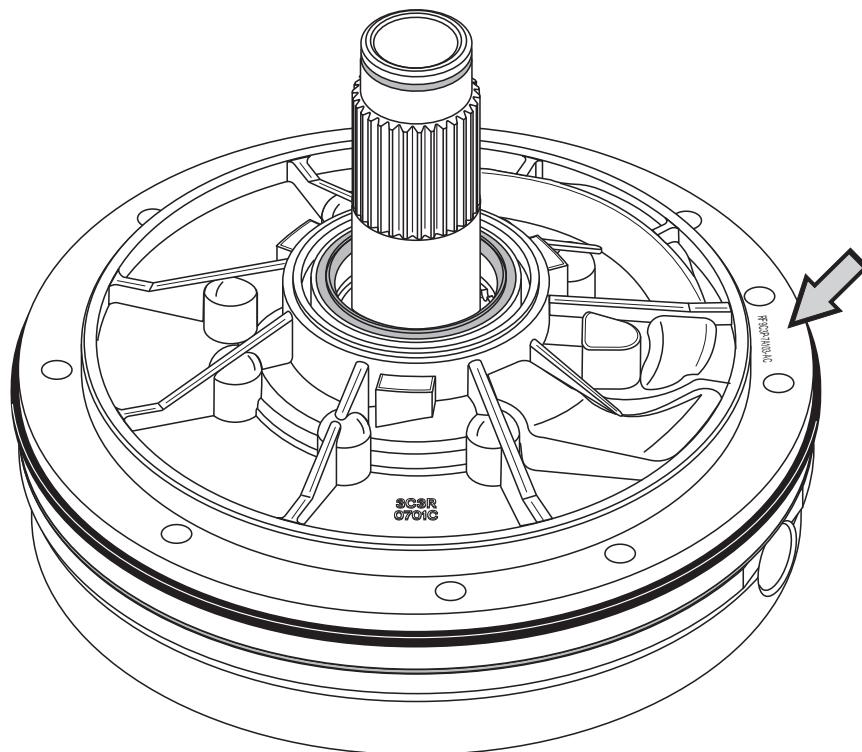
Figure 5

Automatic Transmission Service Group

PUMP CASTING NUMBER LOCATION

**05 Models
With External
Filter** NO RF NUMBER ON BODY

**08-09 Models
Without External
Filter** RF NUMBER
RF9C3P-7A103-AC



Note: Rough Forging numbers provided by Ford are only on the Pump Body. It may be necessary to dis-assemble the pump to look for the notch as shown in Figure 5 to verify application, in case the Pump body has been changed.



FORD 5R110W SOLENOID FAILURE

COMPLAINT: A Ford truck equipped with a 5R110W transmission may come into the shop storing codes P2700, P2701, P2702, P2703 or P2704 which indicate that one or more the shift friction apply elements are taking too long to apply to zero clearance. In this instance code P2702 was stored with a scan tool definition of "Transmission Friction Element C Apply Time Range/Performance".

The vehicle also exhibited complaints of a delay into drive and a 1-2 flared shift, the transmission was in limp mode and the Tow/Haul Lamp was flashing.

CAUSE: The intermediate clutch solenoid was mechanically faulty resulting in the TCM not seeing the correct third gear ratio when second gear was commanded.

CORRECTION: Replace the intermediate clutch solenoid.

SUMMARY: It should become standard rebuild procedure to check for fit and tightness of the solenoid stem to body because the stem is just crimped into the solenoid body as seen in Figure 1. The solenoid may look good but may require little pull effort to separate the stem from the body. Solenoid identification can be seen in Figure 2.

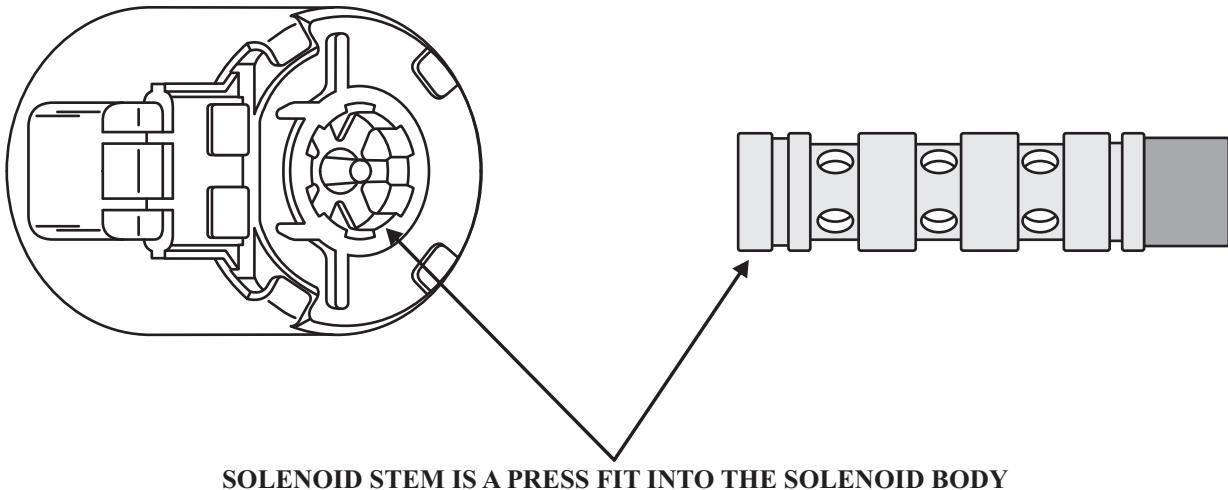
If this fault should happen to the line pressure control solenoid, slipping and gear ratio codes may be stored. If this should happen to the TCC solenoid, converter clutch slippage may occur possibly storing a P1744 or P0741 code.

SERVICE INFORMATION:

<i>Line Pressure Control Solenoid.....</i>	<i>4C3Z-7G383-AA</i>
<i>Direct/Coast Clutch Solenoids.....</i>	<i>3C3Z-7J136-AA</i>
<i>L/R, Intermediate, Overdrive & TCC Solenoids.....</i>	<i>3C3Z-7J136-BA</i>

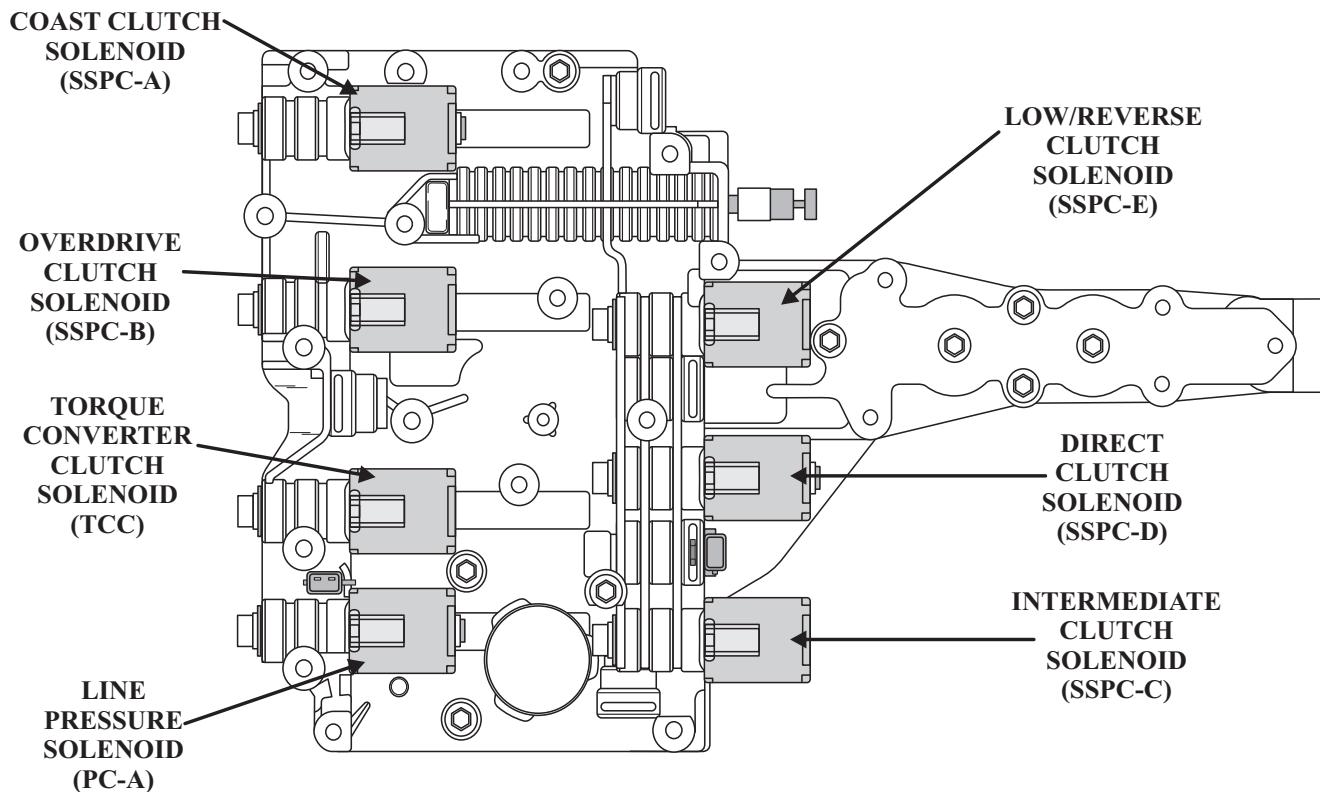
Many thanks to John Finch and the crew at John Finch Auto Repair in Independence, LA.

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FORD 5R110W SOLENOID FAILURE


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Figure 1



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Figure 2

FORD 5R110W

NEW DESIGN PAN AND SUMP FILTER

CHANGE: 2008 and UP Ford/International vehicles equipped with the 5R110W, now have a redesigned "High Efficiency" Sump filter and pan.

REASON: Better filtration of the transmission fluid. This helps prevent Solenoid mechanical problems and the gear ratio errors related to them.

PARTS AFFECTED:

SUMP FILTER: Refer to Figure 1 for a view of the previous and new style filter. The High Efficiency filter now uses an accordion style pleated media and also has a built in bypass in case of restriction. See Figure 2 for a cut-away of this filter.

PAN: The Pan was redesigned to accommodate the changes in High Efficiency filter. Refer to Figure 3 for a view of the previous design filter and pan. Refer to Figure 4 for a view of the new High Efficiency filter and pan.

INTERCHANGEABILITY:

The new design parts will retro-fit to previous versions as a set.

SERVICE INFORMATION:

HIGH EFFICIENCY FILTER (Ford part #).....	8C3Z-7A098-D
PAN (Ford part #).....	8C3Z-7A194-B

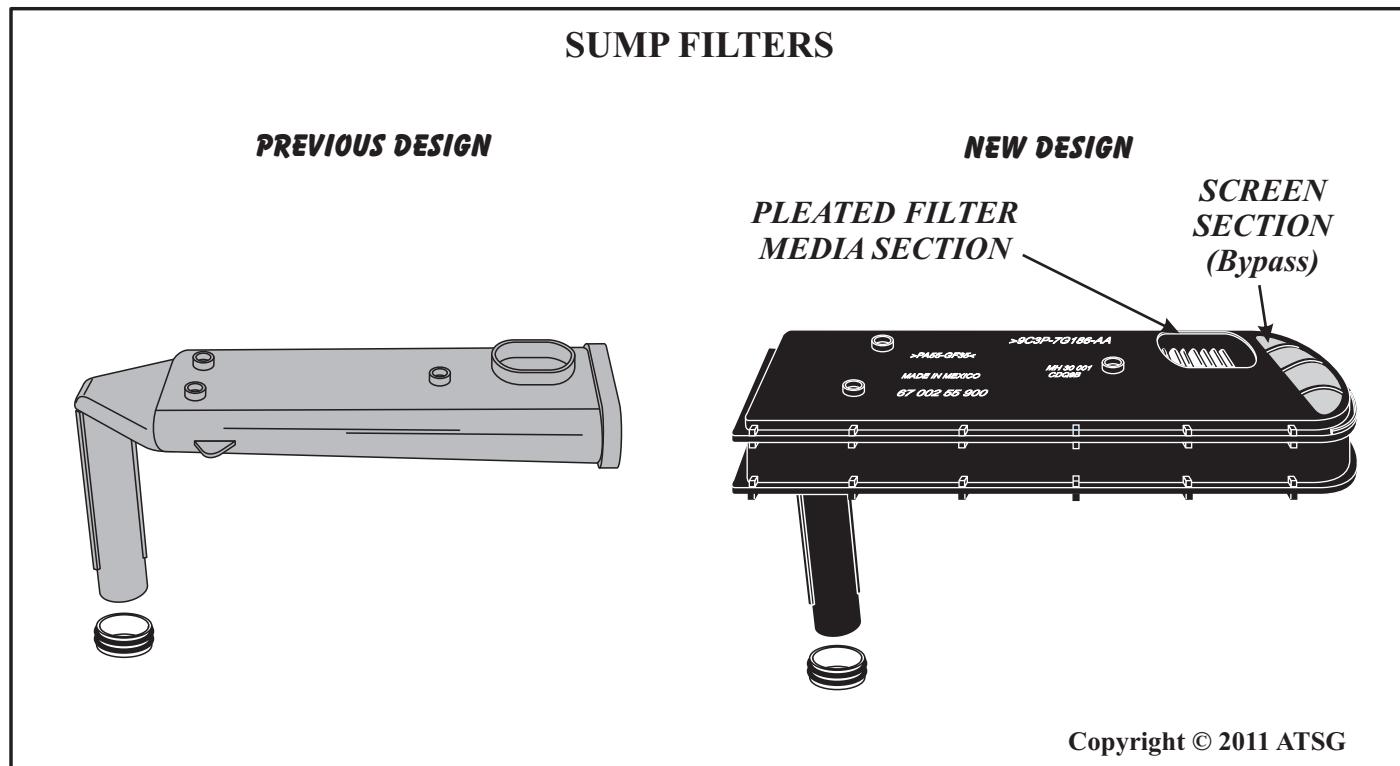
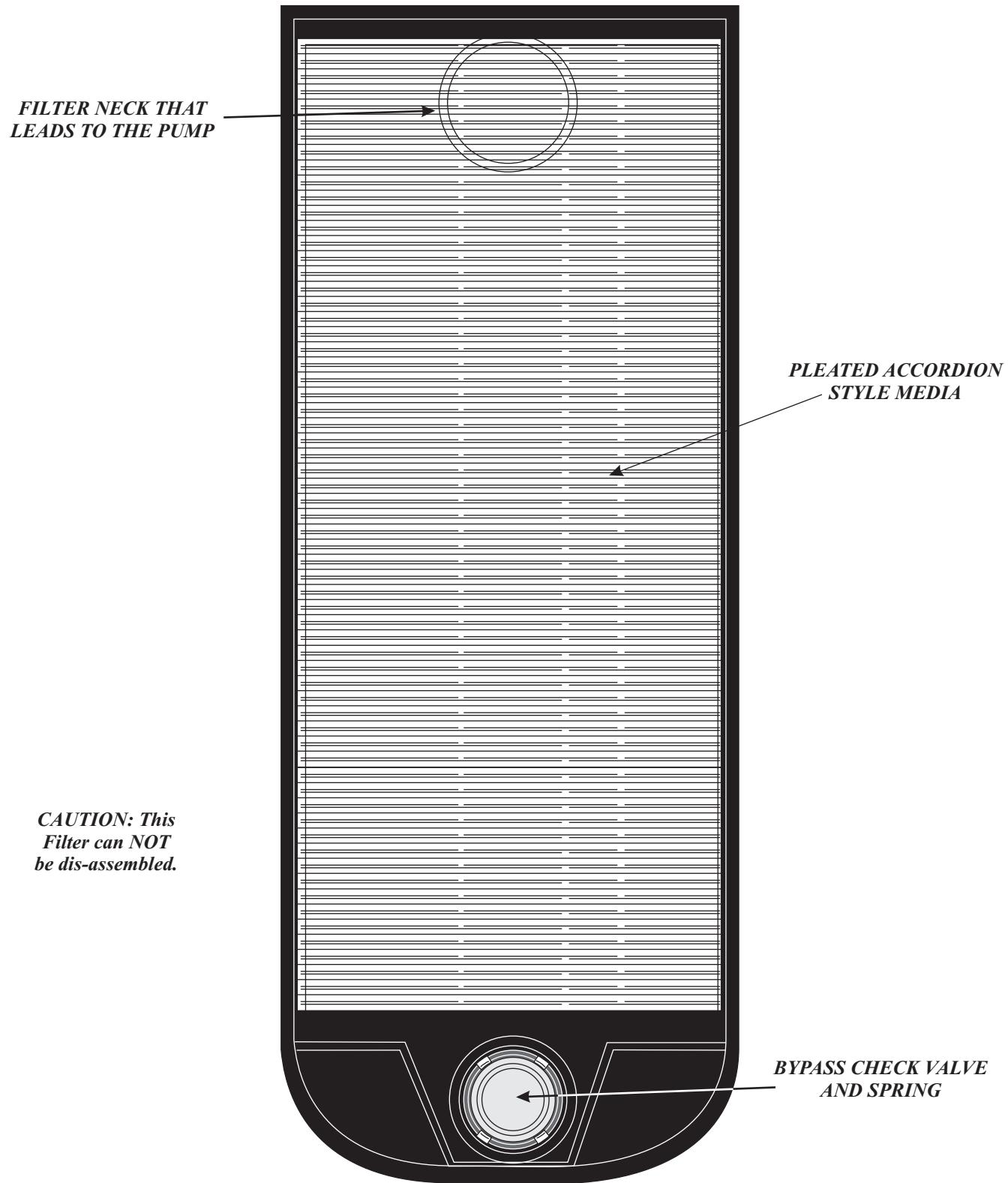


Figure 1

G-COR Automotive - 84

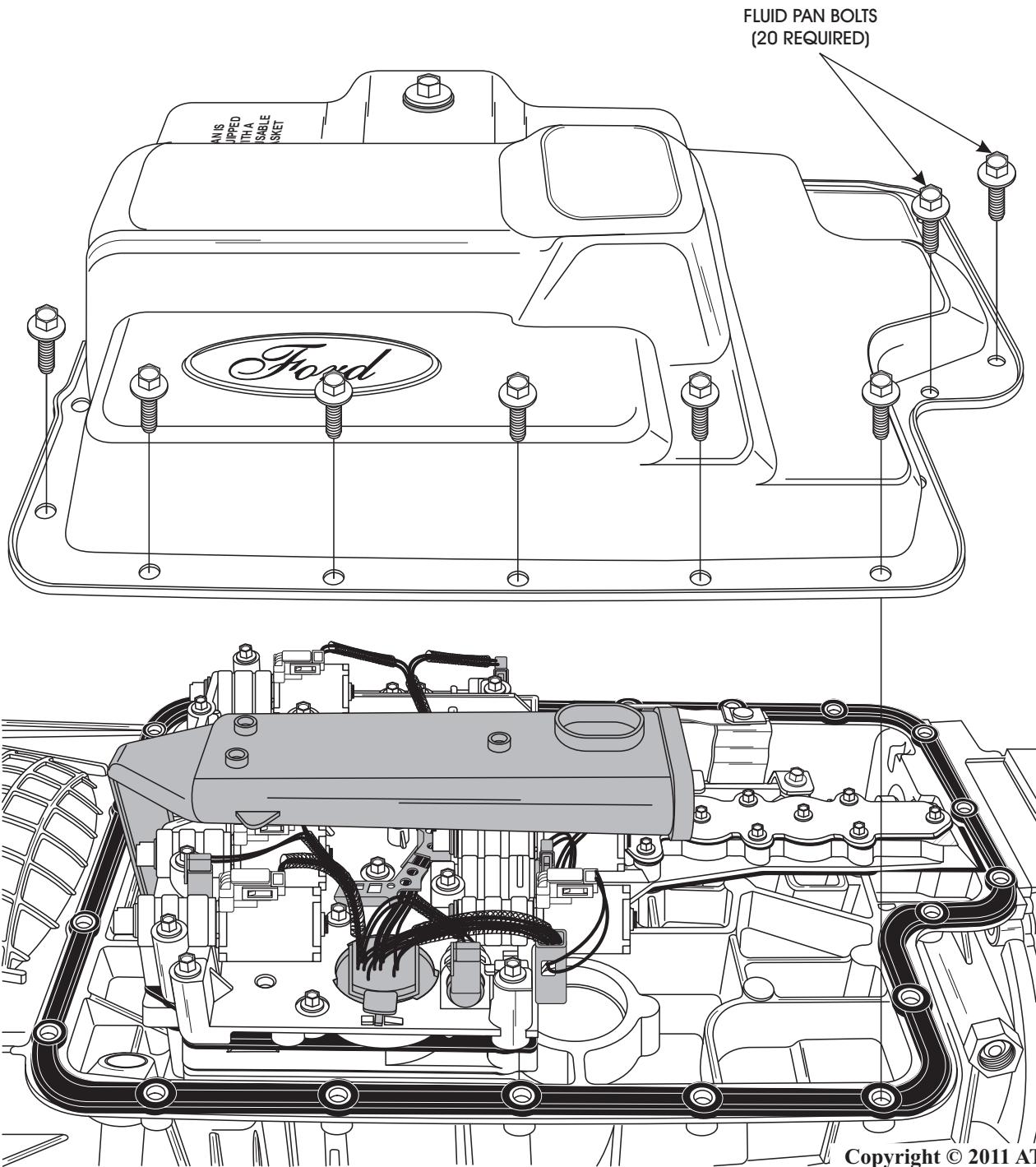
HIGH EFFICIENCY FILTER CROSS SECTION



Note: Pump Suction will unseat the Bypass Check Valve, sucking oil thru the Screened Section on the bottom of the filter, if the pleated media is restricted. Copyright © 2011 ATSG

Figure 2
Automatic Transmission Service Group

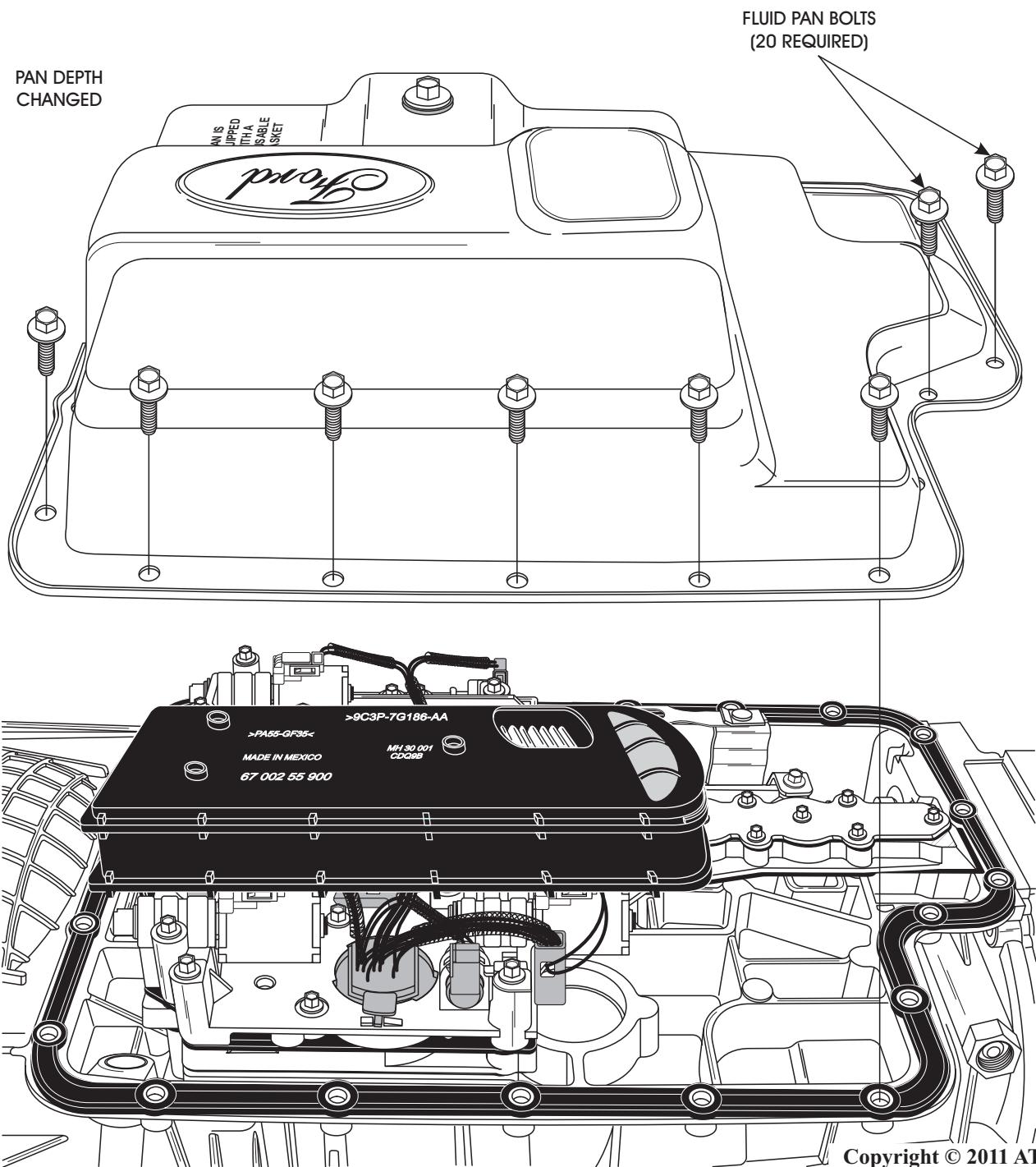
PREVIOUS DESIGN PAN AND SUMP FILTER



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Figure 3
Automatic Transmission Service Group

NEW DESIGN PAN AND SUMP FILTER



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Figure 4
Automatic Transmission Service Group

FORD 5R55W/S 4X4**METALLIC CLANK ON ENGAGEMENTS**

COMPLAINT: Ford 4X4 models equipped with the 5R55W/S transmission may exhibit a complaint of a clank or metallic noise during engagement into any forward or reverse range. This noise is typically perceived as a differential or transfer case problem.

CAUSE: The cause may be, that condensation has built up in the area between the output shaft splines and the transfer case input splines, which has caused the splines on the output shaft to rust resulting in deterioration of the spline. This causes clearance between these two items which creates the metallic noise during engagements.

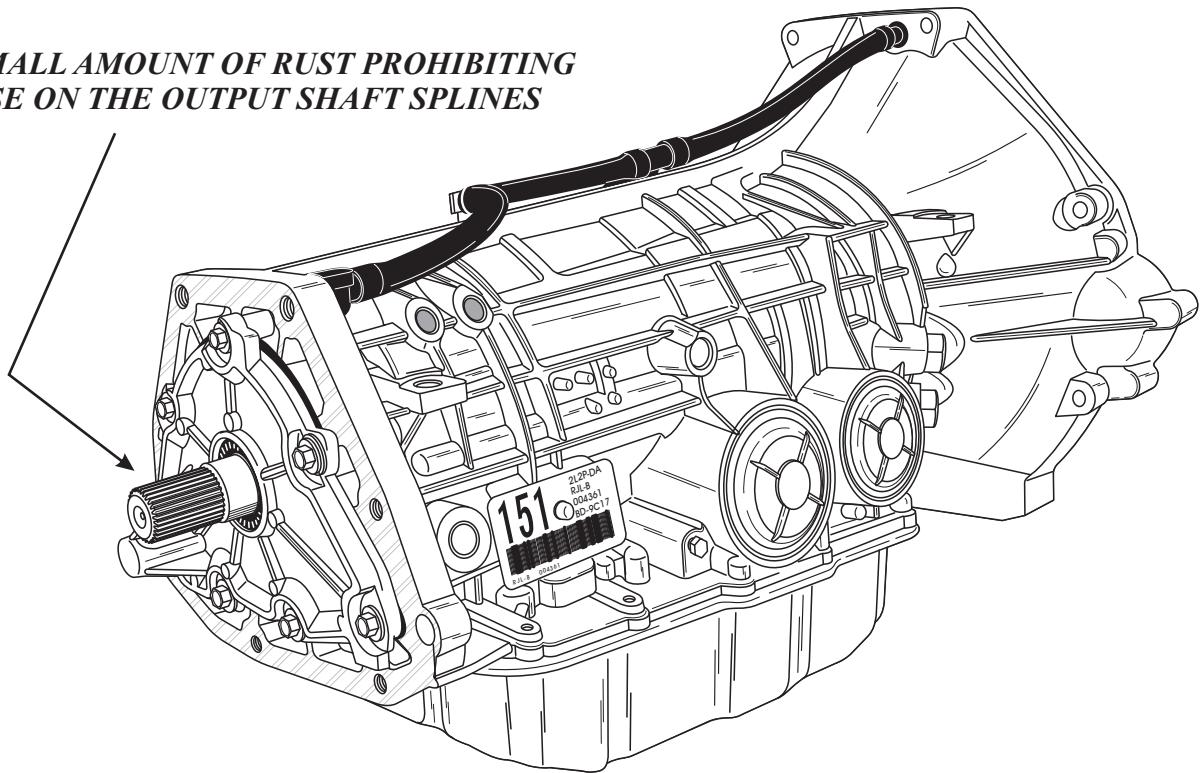
CORRECTION: To correct this condition, the transfer case will have to be removed so the splined area on the output shaft can be inspected, as shown in Figure 1. If there is rust built up in this area, the output shaft in the transmission will have to be replaced. After replacement, it is highly recommended to use a small amount of synthetic grease that is a rust inhibitor to coat the splines, so this problem does not happen again.

SERVICE INFORMATION:

There are numerous types of synthetic rust prohibiting grease products available. There are two common ones that are used, the first is the high temp urea grease available from your local Honda/Acura dealer, or you can use a high temp brake and caliper grease, available from your local auto parts store.

OUTPUT SHAFT SPLINES

USE A SMALL AMOUNT OF RUST PROHIBITING GREASE ON THE OUTPUT SHAFT SPLINES



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Figure 1

FORD 4R75E TRANSMISSION OVERHEATS

COMPLAINT: A late model Ford Crown Victoria (usually a police vehicle) comes into the shop with the transmission slipping. Upon disassembly it is obvious that the transmission was overheated. Once the transmission is installed , and the vehicle is road tested, the technician notices that the transmission temperature is rising above a normal operating level. The vehicle is brought back into the shop and cooler flow is checked only to find out that the flow rate is far to great. The flow rate was one gallon in 15 seconds instead of the normal quart in 20 second standard. At this time the technician realizes that the transmission fluid is bypassing the cooler and not giving off it's heat resulting in a transmission operating temperature of about 270 degrees.

CAUSE: These as well as some other Ford vehicles use a unique transmission cooler, it is integrated with the A/C condenser as one unit. Located at the lower driver side corner of the ATF cooler where the cooler lines enter, Figure 1, is a Thermal Bypass Valve, Figure 2. These valves are allowing oil to bypass the cooler even though transmission is fully warmed up resulting in the above mentioned complaint.

CORRECTION: In some instances the municipality will not stand the cost of a replacement ATF cooler/A/C condenser. The thermal bypass valve can be rendered inoperative which will allow fluid to circulate through the cooler at all times.

NOTE: *This may not be a good option in colder climates due to the possibility of fluid jelling.*

To perform the bypass valve modification seen in Figure 3, remove the bypass valve assembly from the cooler. Using round aluminum stock .865" in length and at least .739" in diameter. Machine a locating dowel pin in one end .382: in diameter and about .135" in length. Next machine a .337" length of the aluminum stock to .739" in diameter. Next, machine a .428" length of the remaining aluminum stock to .700" in diameter. Insert the machined aluminum plug with the .700" end into the bypass valve housing, then install the inner heavy spring next followed by the inner plug and retaining snap ring, Figure 4.

After this modification is completed transmission operating temperature was at 175 degrees regardless of run time and accessory usage.

A very large thank you to Daryl Keels at Econo Transmissions in Wilmington, N.C for sharing his fix with the industry and providing the photos.

FORD 4R75E TRANSMISSION OVERHEATS

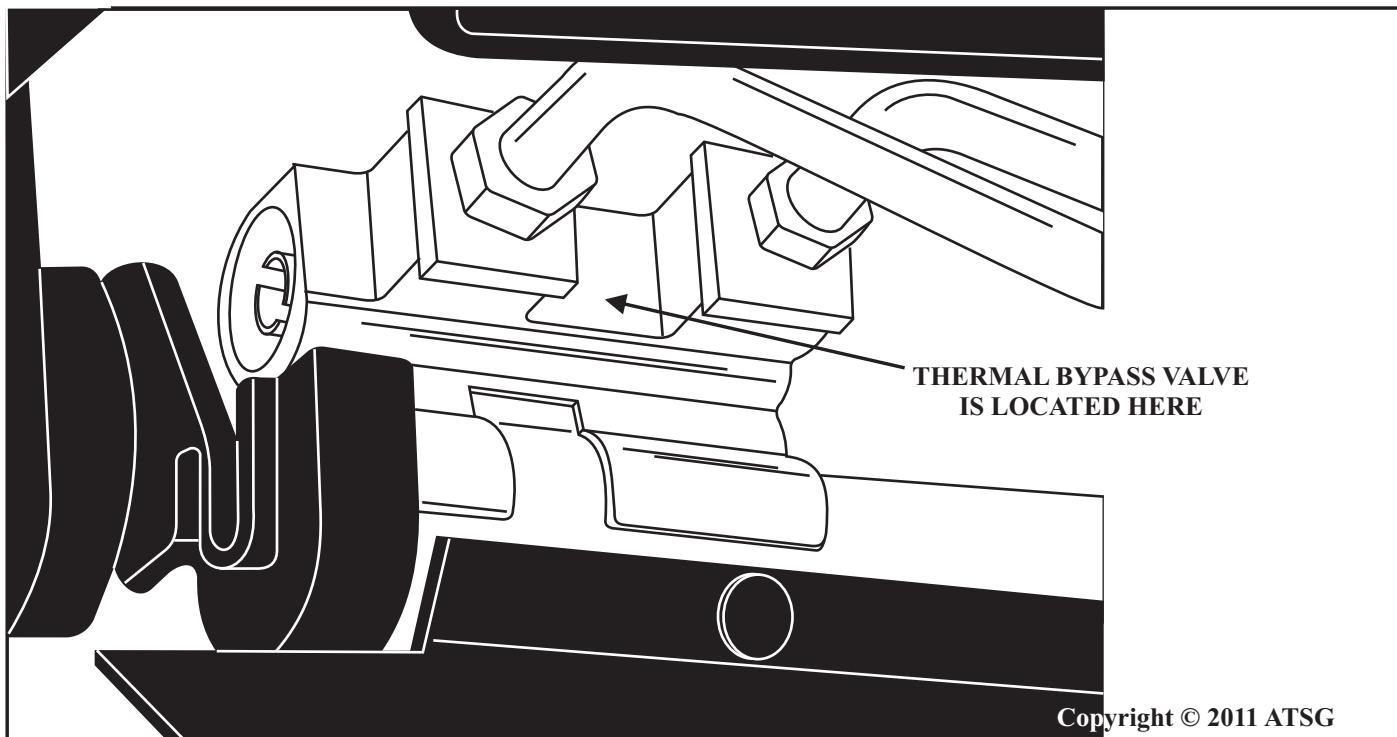


Figure 1

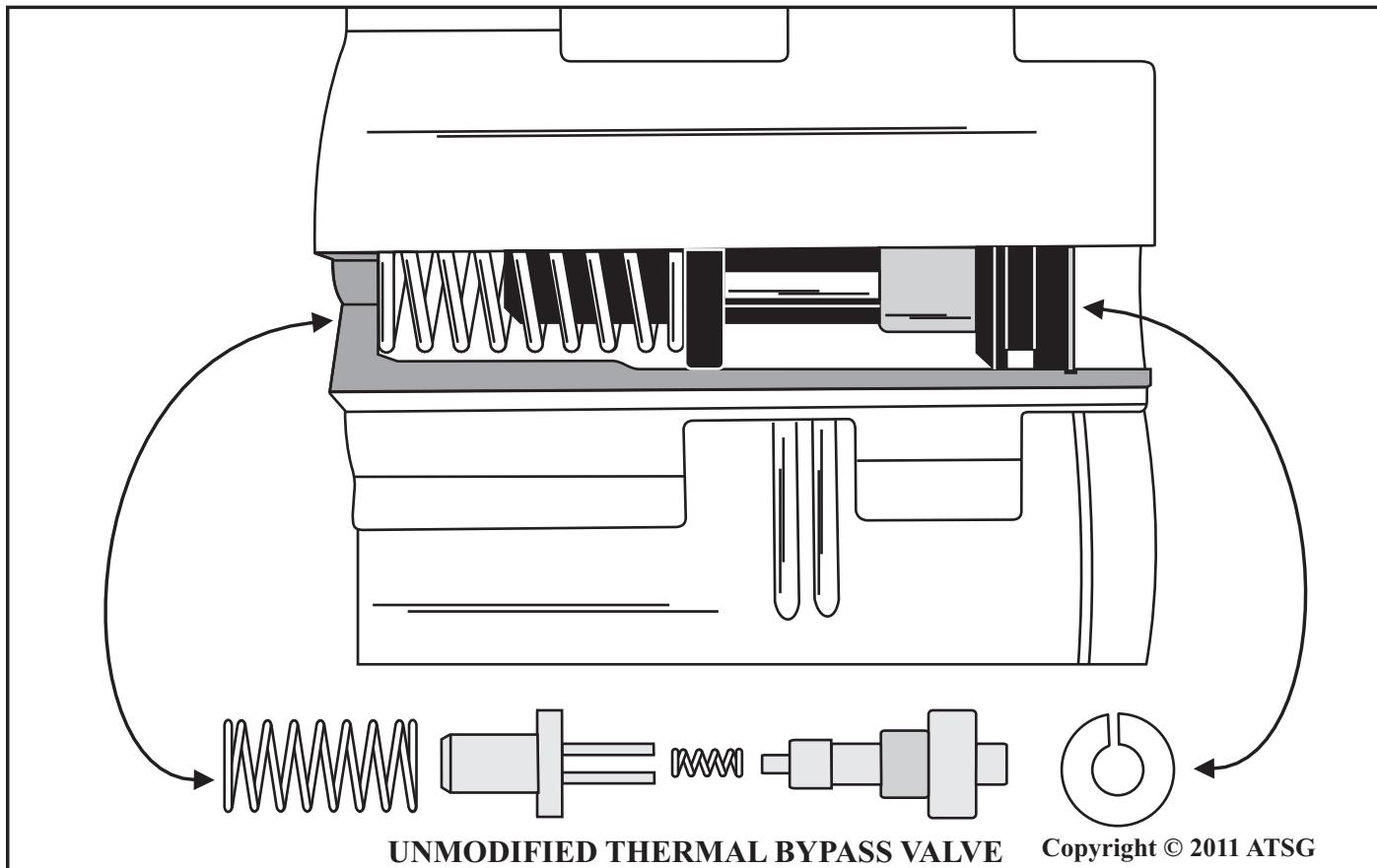


Figure 2

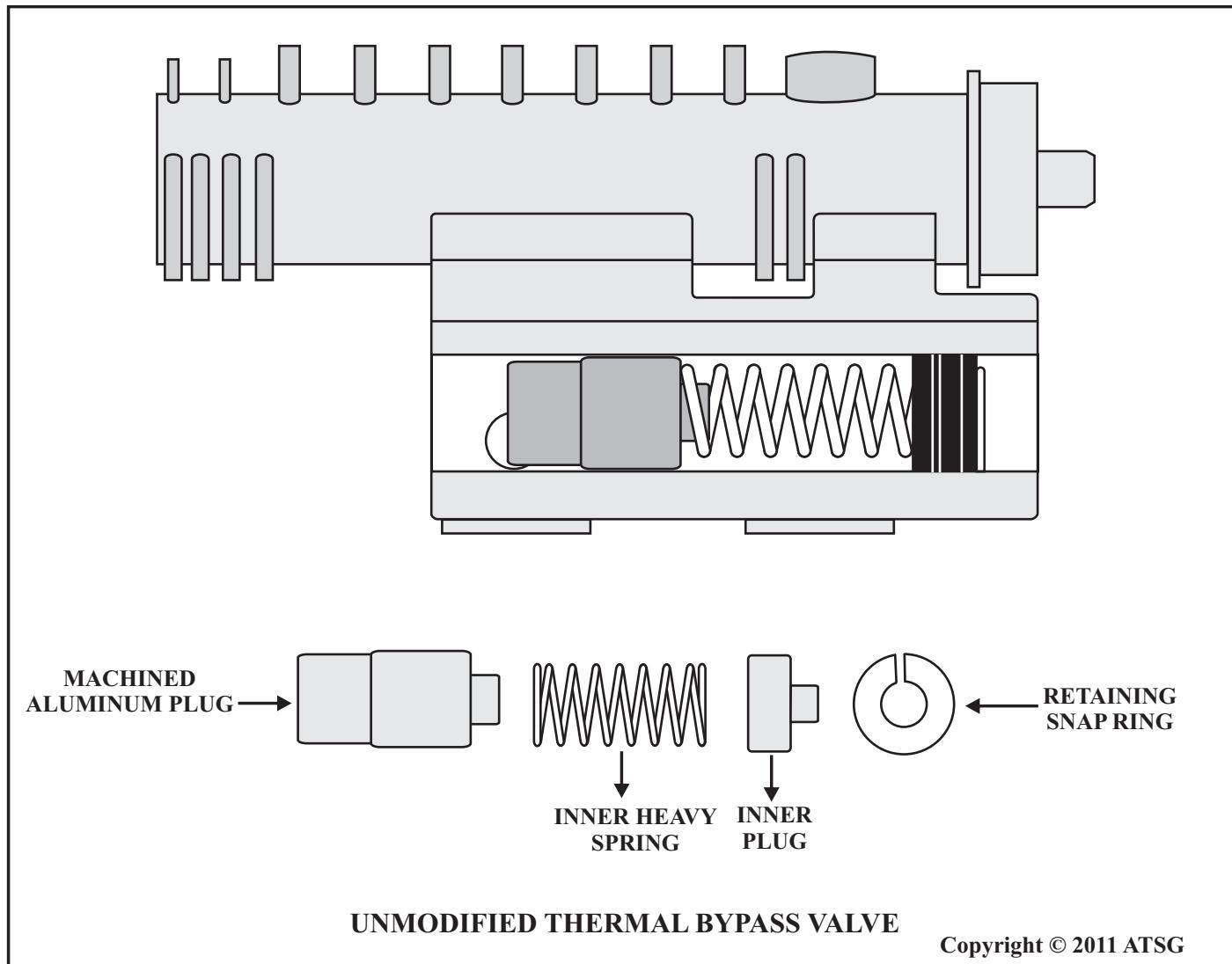
FORD 4R75E TRANSMISSION OVERHEATS


Figure 3

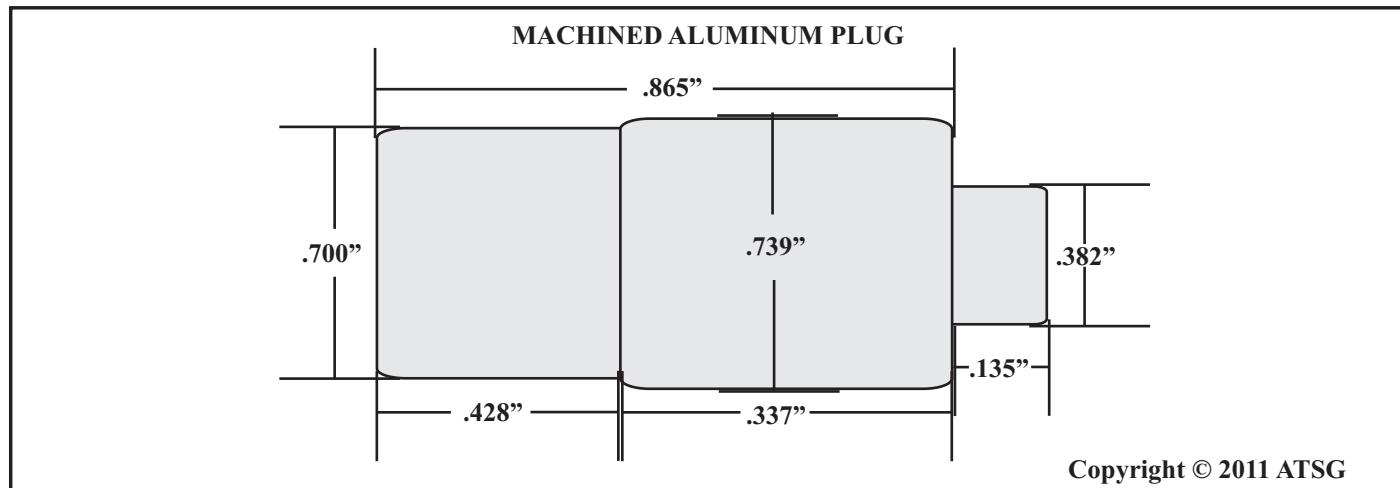


Figure 4

FORD 4R75E

ERRATIC OPERATION WITH VARIOUS CODES

COMPLAINT: A 2009 or later Ford vehicle equipped with the 4R75E has a complaint of improper gear selection, erratic converter clutch operation or improper shift feel. A variety of diagnostic trouble codes are stored including P0712, P0740, P0743, P0748, P0750, P0753, P0755, P0758, P0962 or P0963. Depending on vehicle model as to which circuits a shorted, those circuit fuses, located in the battery junction box, may also be blown. As a result of the blown fuse, the transmission could be stuck in a higher gear and engine driveability problems will be present.

CAUSE: The Ford line of 4R75E equipped vehicles has returned to soft internal wiring as of the 2009 model year allowing the internal harness to be routed incorrectly causing it to chafe on a valve body bolt as seen in Figure 1.

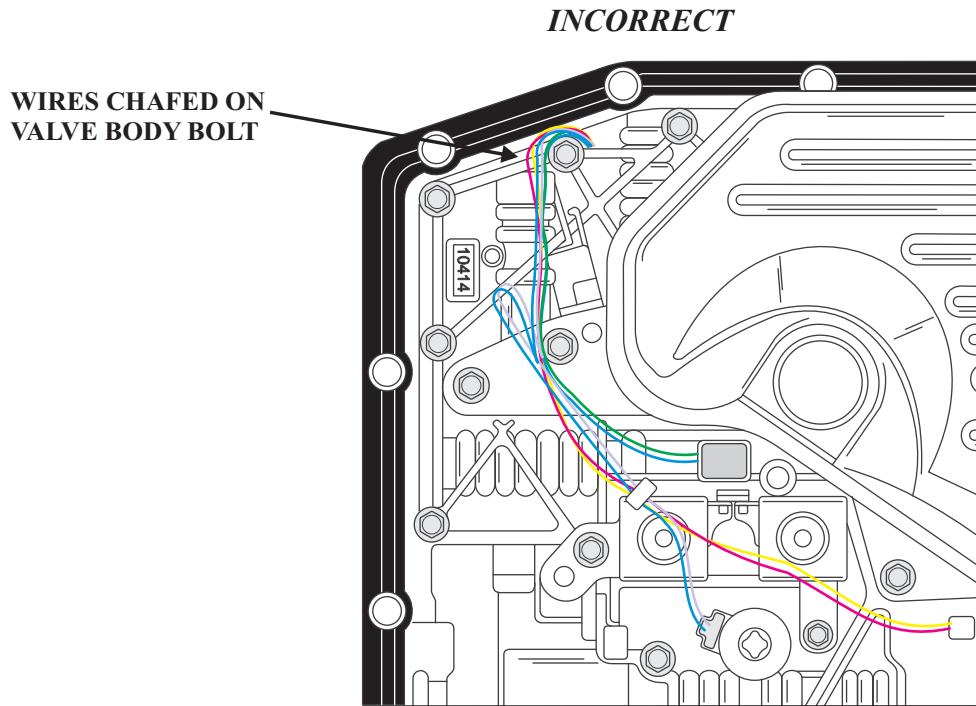
CORRECTION: Route the internal wiring as shown in Figure 2.

NOTE: *This problem could occur on vehicles that have left the factory if those vehicles were built before 12/1/2008.*

SERVICE INFORMATION:

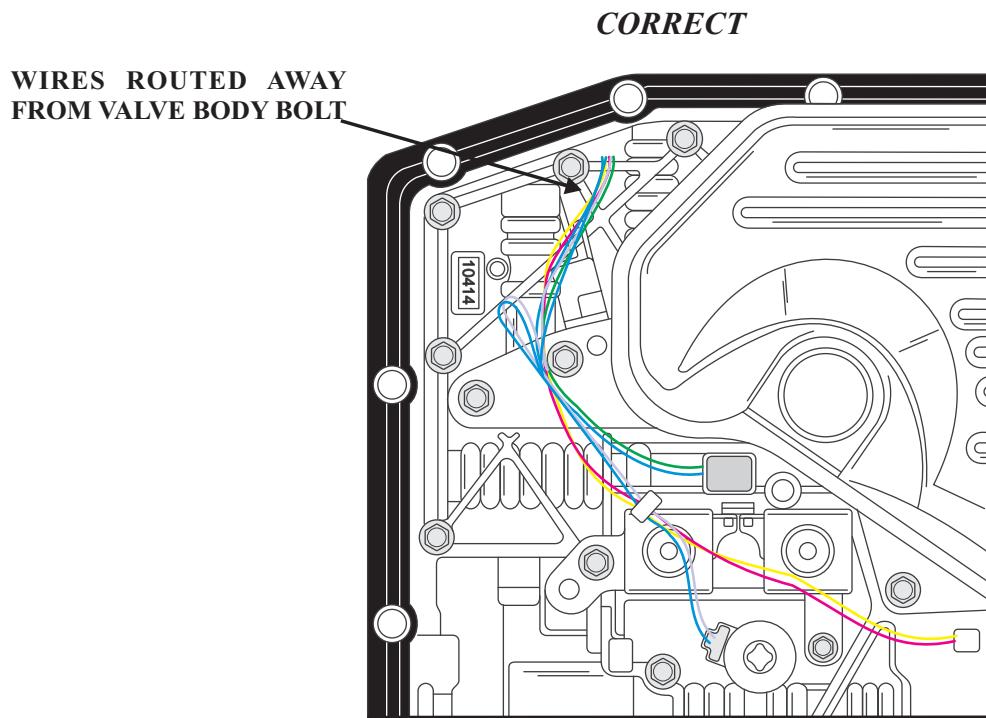
2009 & Later 4R75E Internal Wire Harness.....9L3Z-7G276-A

Many thanks to Darryl Keels of Econo Transmissions in Wilmington, N.C. for supplying ATSG with the necessary photos.

FORD 4R75E ERRATIC OPERATION

Copyright © 2011 ATSG

Figure 1



Copyright © 2011 ATSG

Figure 2



FORD 4R75E

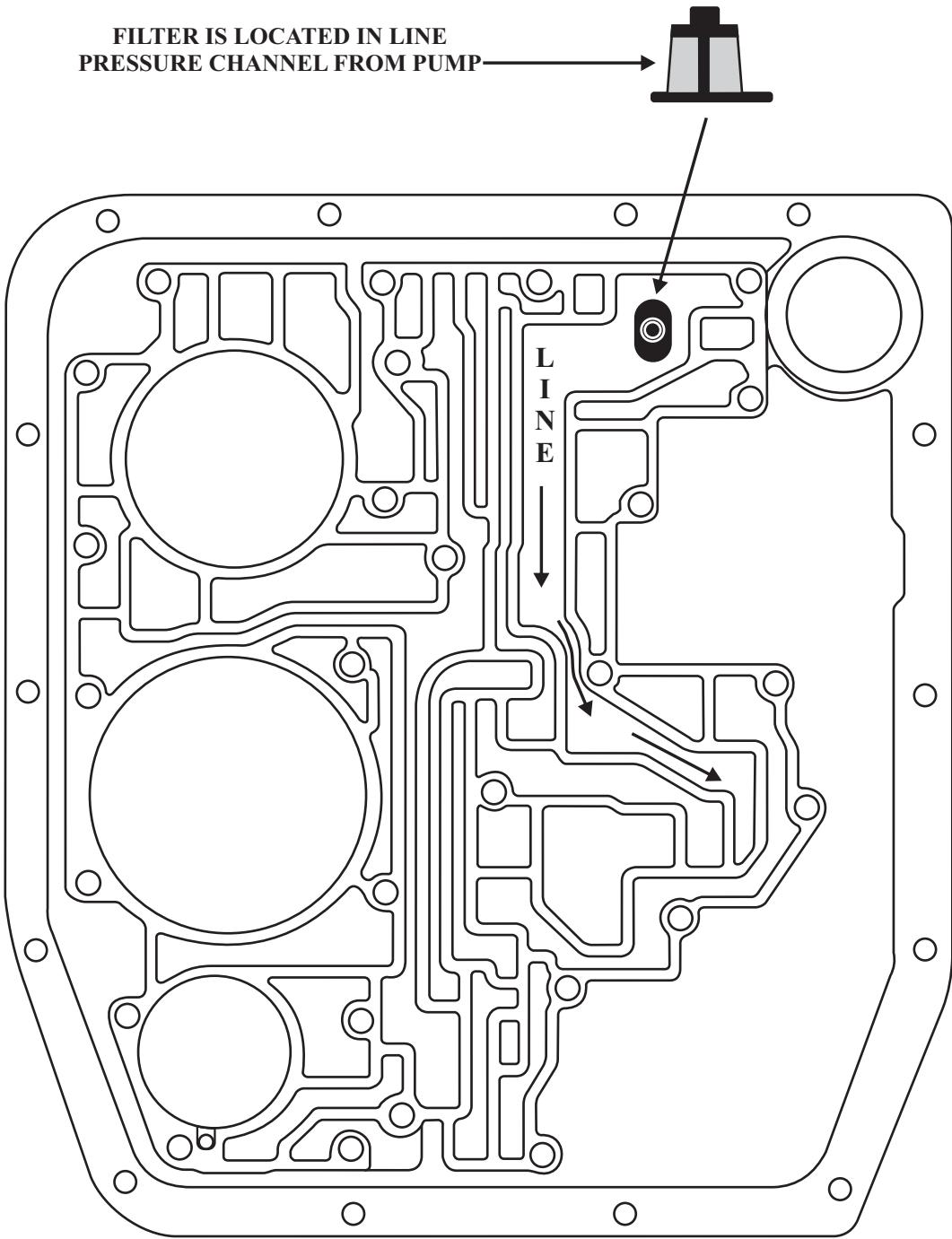
CASE FILTER

COMPLAINT: When the valve body is removed from a late model 4R75E, a filter screen is found in an oil channel next to the 1-2 accumulator. When the technician examines the overhaul kit the screen is not found and any attempts to obtain it from the Ford dealer is unsuccessful.

CAUSE: Currently, this screen is an assembly line item only and is not available. This screen is placed in the line pressure channel from the pump to the area of the EPC Solenoid and is meant to keep debris out of that circuit.

CORRECTION: Reuse the screen if possible. Aftermarket kit makers are aware of this and will probably have this screen in future overhaul kits.

4R75E CASE FILTER



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Figure 1

FORD AX4S/AX4N/4F50N

TURBINE SPEED SENSOR DIFFERENCES

COMPLAINT: After installation of the transmission shortly after the vehicle is started, the MIL is illuminated and code retrieval produces codes P0715, P0717 or P0718.

CAUSE: The incorrect combination of Turbine Speed Sensor and driven sprocket was used.

CORRECTION: The AX4S and AX4N/4F50N use two different turbine speed sensors of different lengths, (Refer to Figure 1). The driven sprockets for both are the same but the TSS reluctor is pressed into the sprocket at two different depths as seen in Figure 2. The correct air gap between the TSS and the reluctor is .120". If an AX4S TSS is used with an AX4N/4F50N driven sprocket, the reluctor will make contact with the TSS and destroy it. If a AX4N/4F50N TSS is used with a AX4S drive sprocket, the air gap will be too great.

In order to insure the correct combination of parts is used, put the channel plate in place and measure the depth of the TSS hole to the reluctor as shown in Figure 3. If the measurement is .687" to .709" an AX4N/4F50N TSS must be used. If the measurement is .759" to .772" an AX4S TSS must be used.

NOTE: If a 4F50N has the wrong driven sprocket installed, an AX4S/N TSS connector can be spliced in to avoid transmission removal.

<i>AX4S Turbine Speed Sensor.....</i>	<i>F1DZ-7M101-A</i>
<i>AX4S TSS Connector.....</i>	<i>3U2Z-14S411-VBA</i>
<i>AX4N/4F50N Turbine Speed Sensor.....</i>	<i>F5DZ-7M101-A</i>

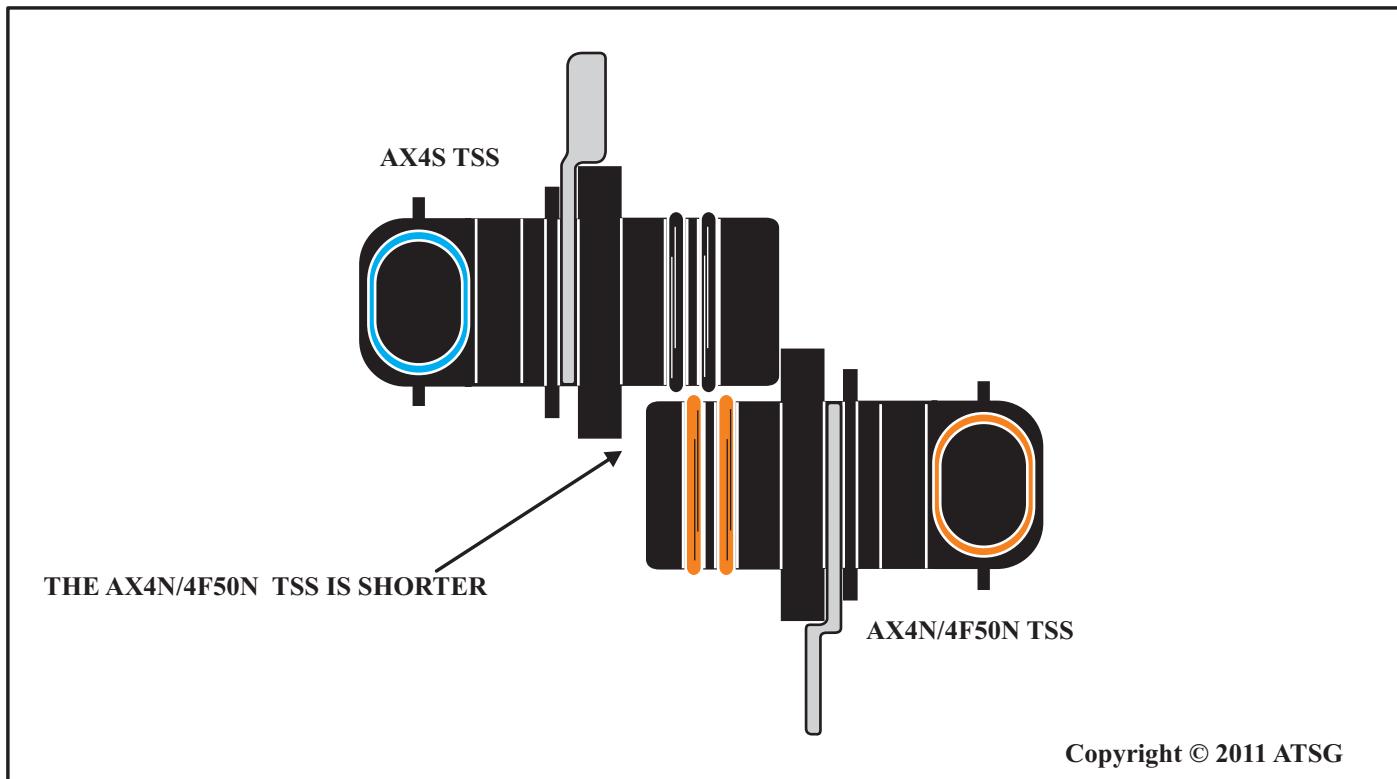
TURBINE SPEED SENSOR DIFFERENCES


Figure 1

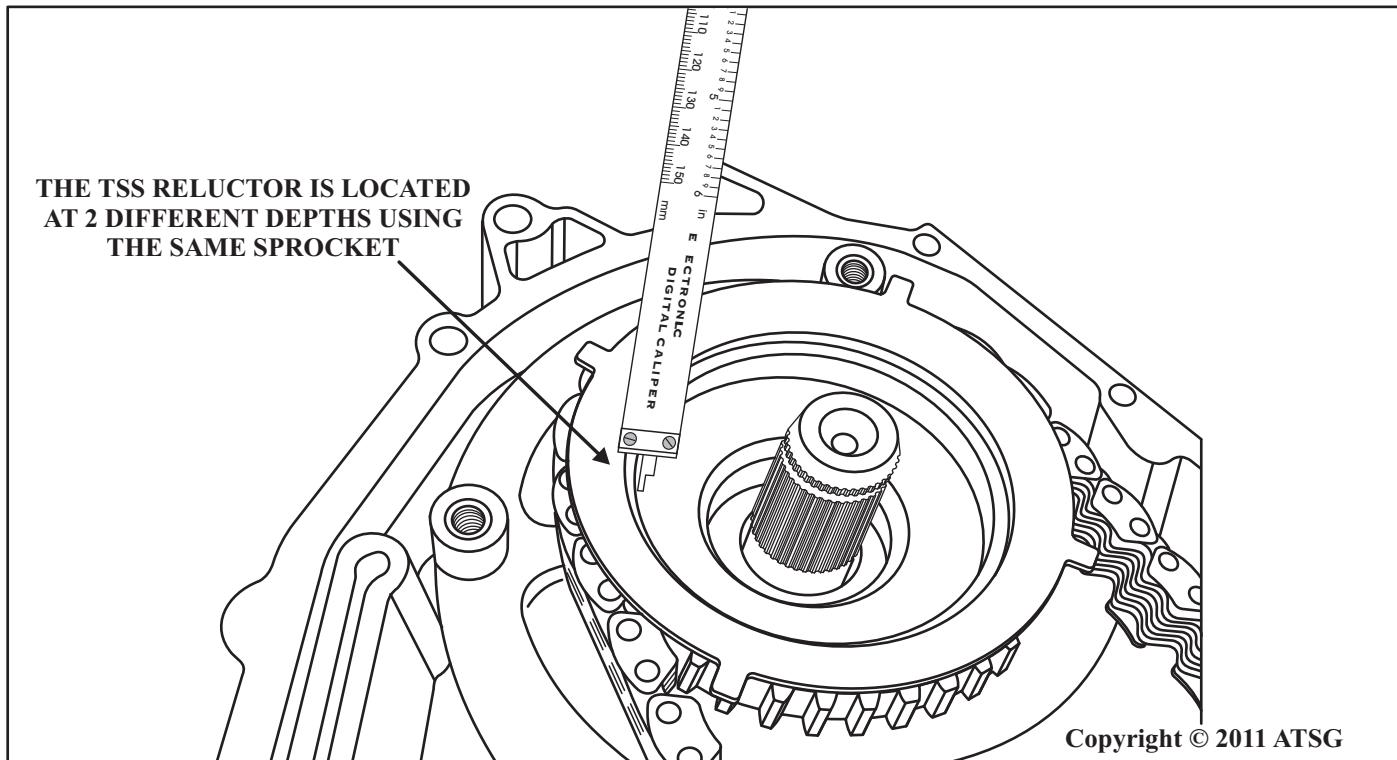


Figure 2

TURBINE SPEED SENSOR DIFFERENCES

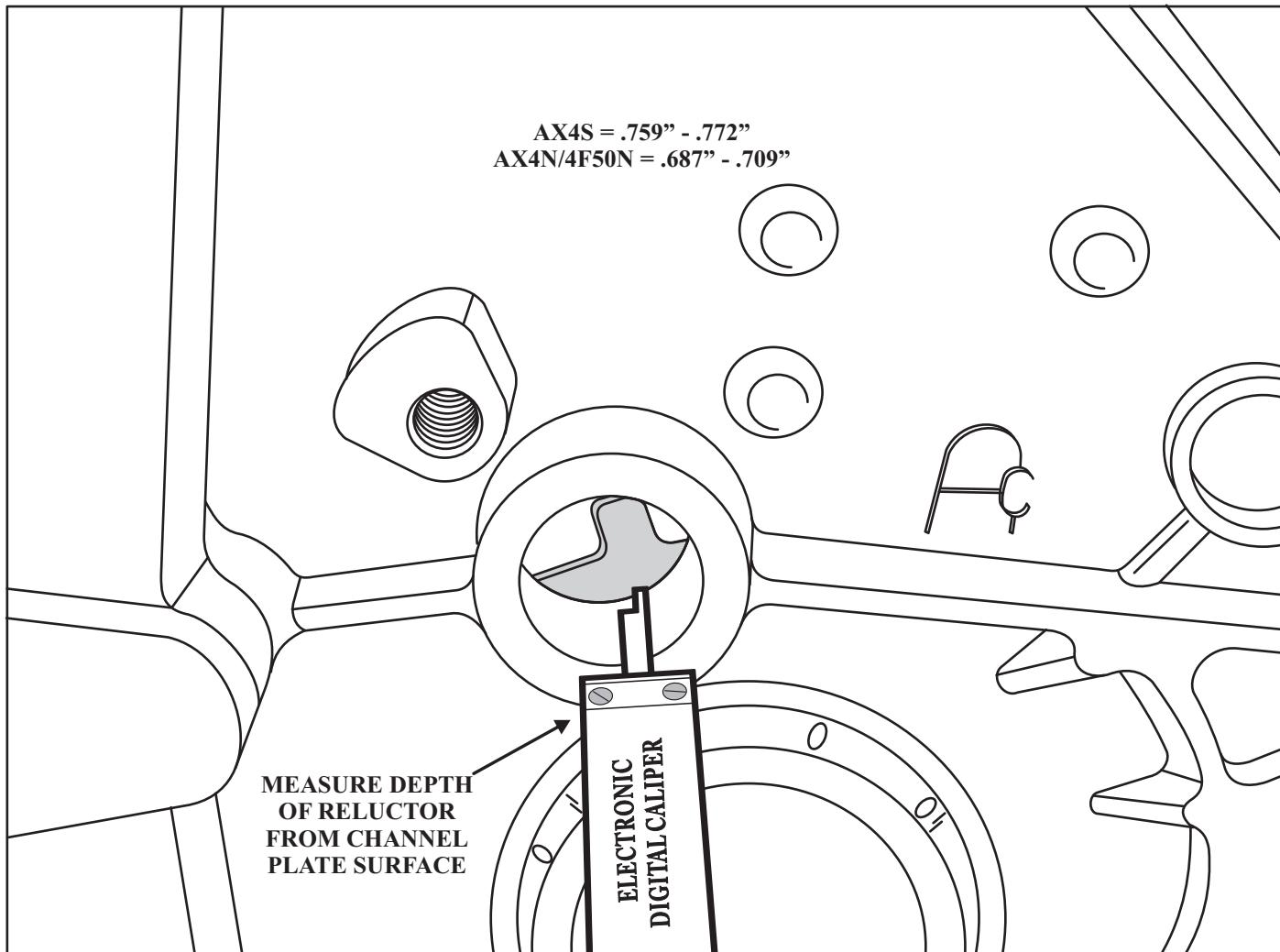


Figure 3



FORD 4F27E/MAZDA FN4AEL

3-NEUTRAL SHIFT

COMPLAINT: The transmission shifts from third gear to neutral even though solenoid command is correct.

CAUSE #1: A piece of rubber like material has lodged itself in a hole in the spacer plate which blocks Solenoid "E" feed oil, see Figure 1.

A hydraulic schematic of third gear in Figure 2 shows how solenoid pressure from SSE is used to release the band servo, apply the direct clutch and stroke the Solenoid Shift Valve in preparation of a 3-4 shift.

The hydraulic schematic in Figure 3 is of a normal 3-4 shift where the forward clutch is released and servo release pressure is exhausted allowing pressure to apply the band.

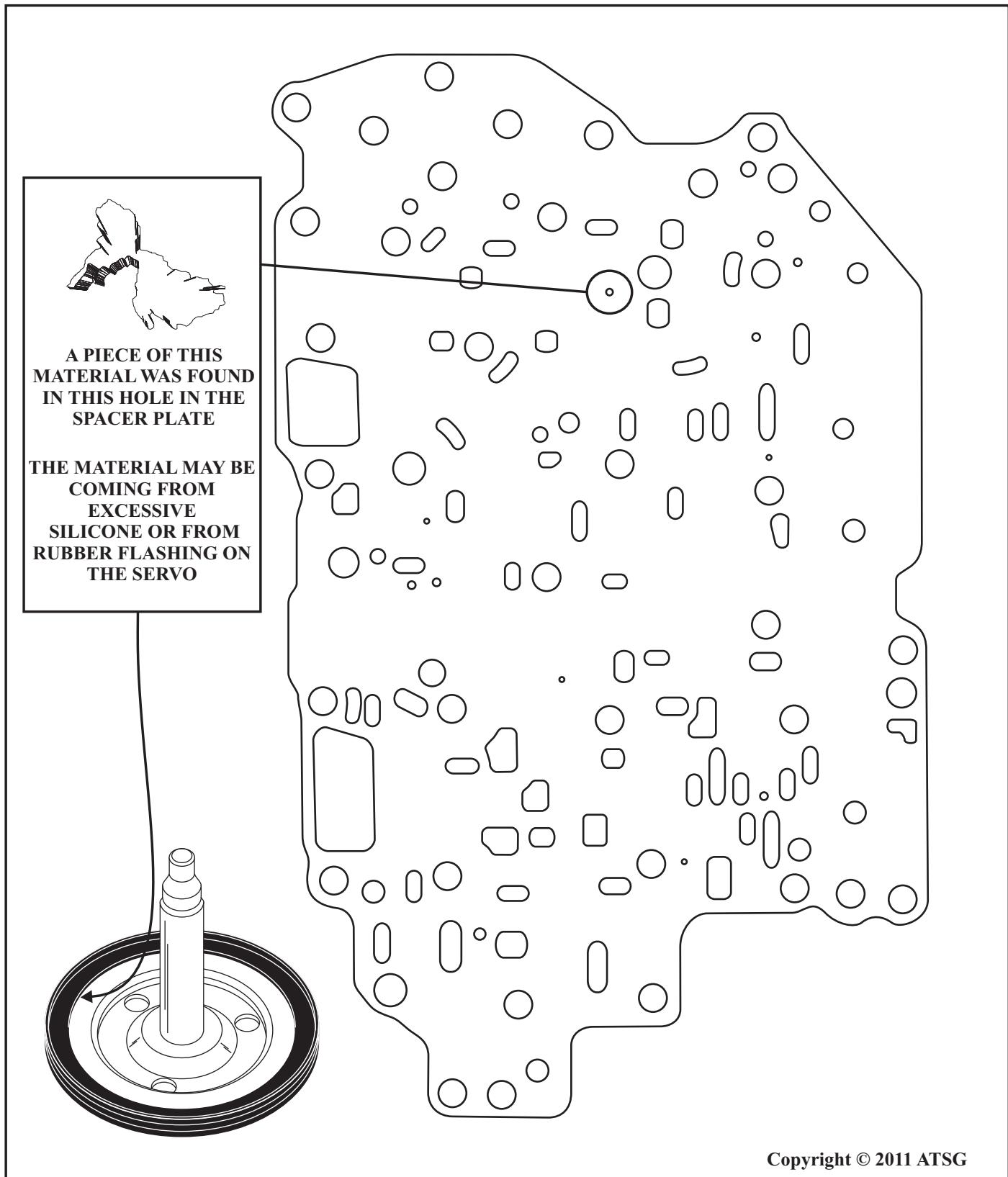
The hydraulic schematic in Figure 4 shows what occurs during a 3-4 shift when foreign debris has closed off SSE pressure from stroking the Solenoid Shift Valve. Pressure from SSA will now stroke the Clutch Control Valve rather than the 3-4 Shift Valve which exhausts direct clutch oil and releases the band. This action puts the transmission in neutral as no clutch elements are applied.

CAUSE #2: The valve body gasket has been sucked into a channel of the valve body, Figure 5.

CORRECTION #1: Replace all rubber parts during overhaul and thoroughly clean all debris from transmission, torque converter and cooler. Make certain all spacer plate orifices are clear.

CORRECTION #2: Flat sand valve body surfaces, replace gaskets and torque all valve body bolts to 80 in. lb. (9 Nm) and torque all valve body to case bolts to 89 in.lb (10Nm).

4F27E 3-NEUTRAL SHIFT



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Figure 1

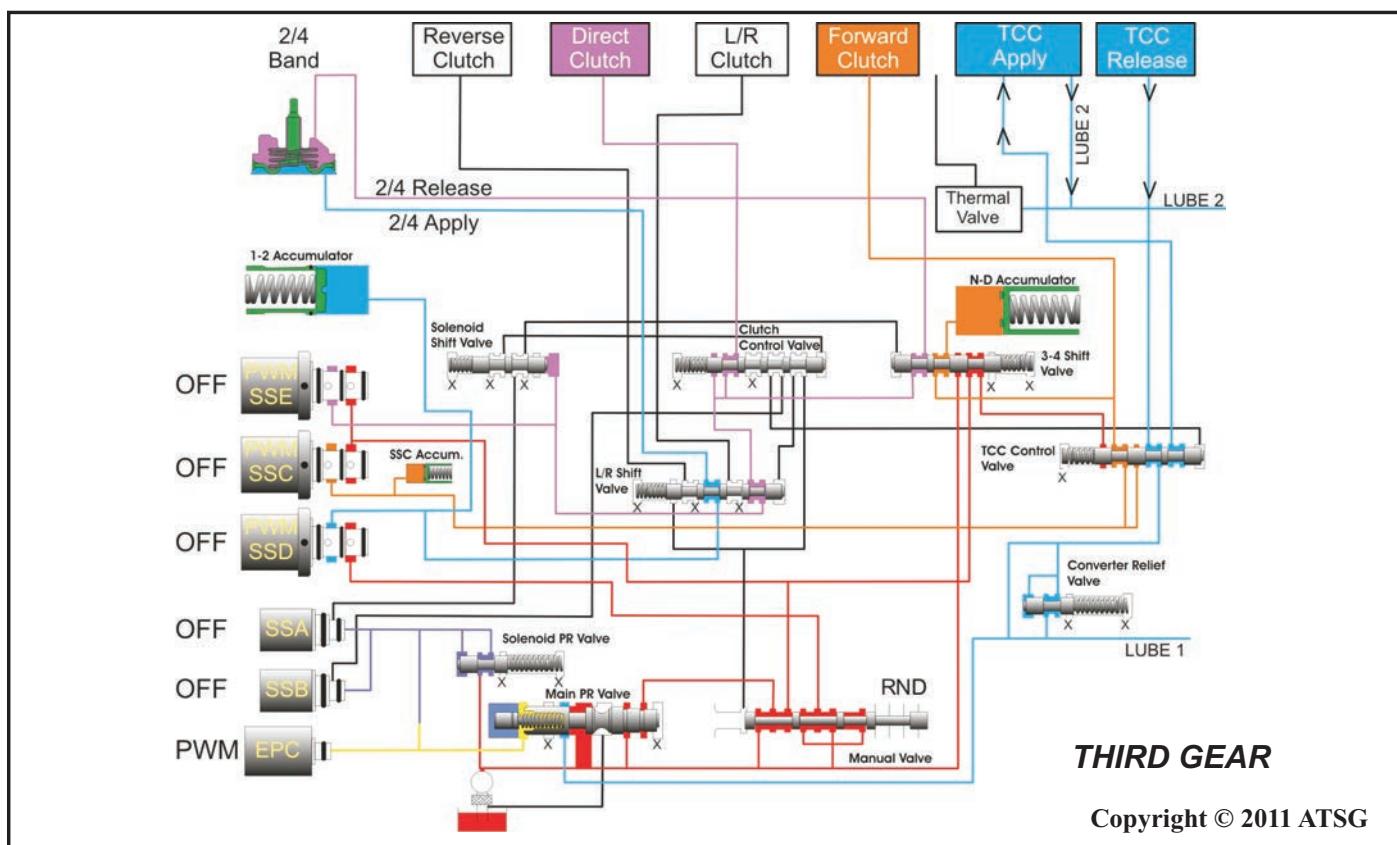
4F27E 3-NEUTRAL SHIFT


Figure 2

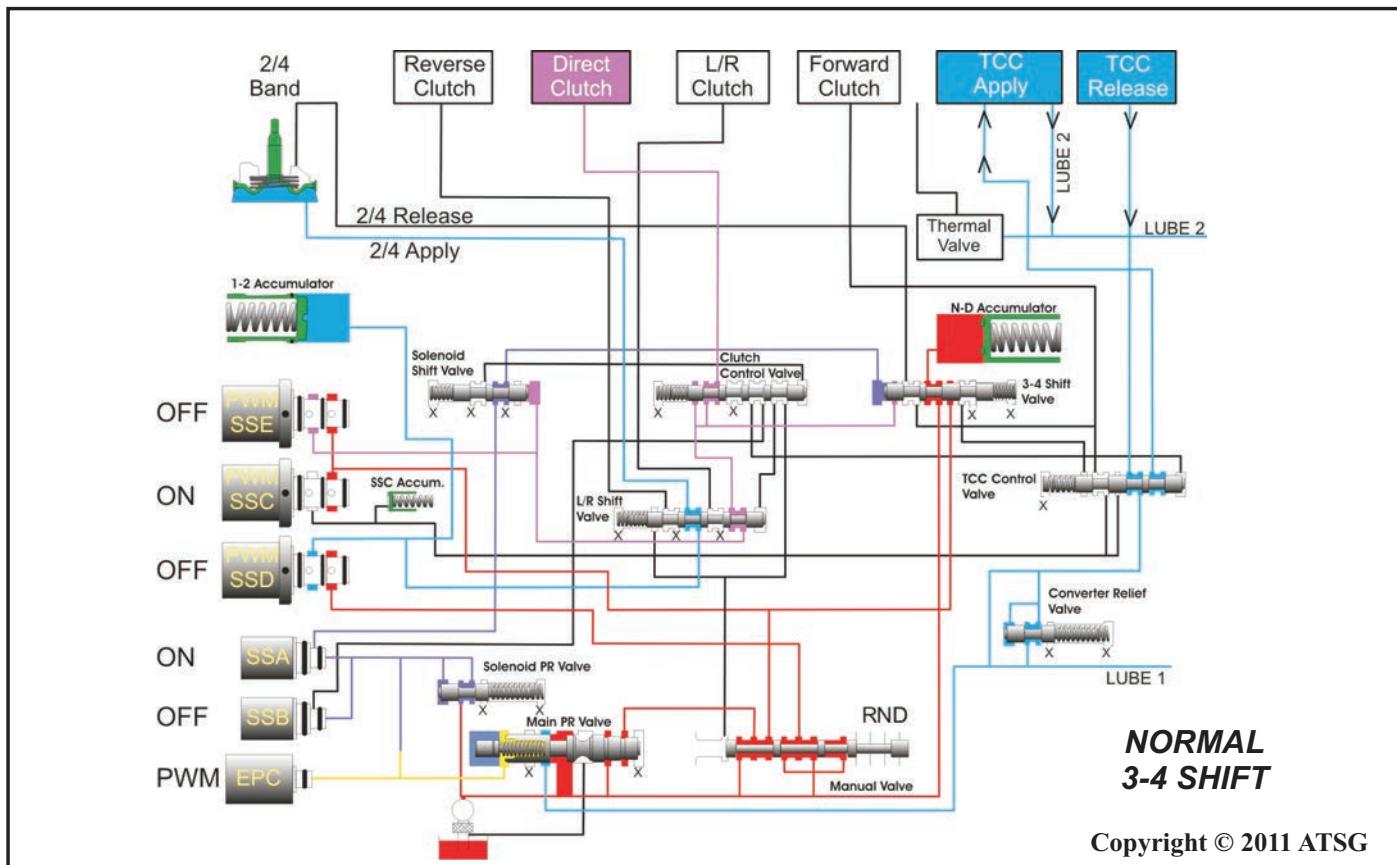
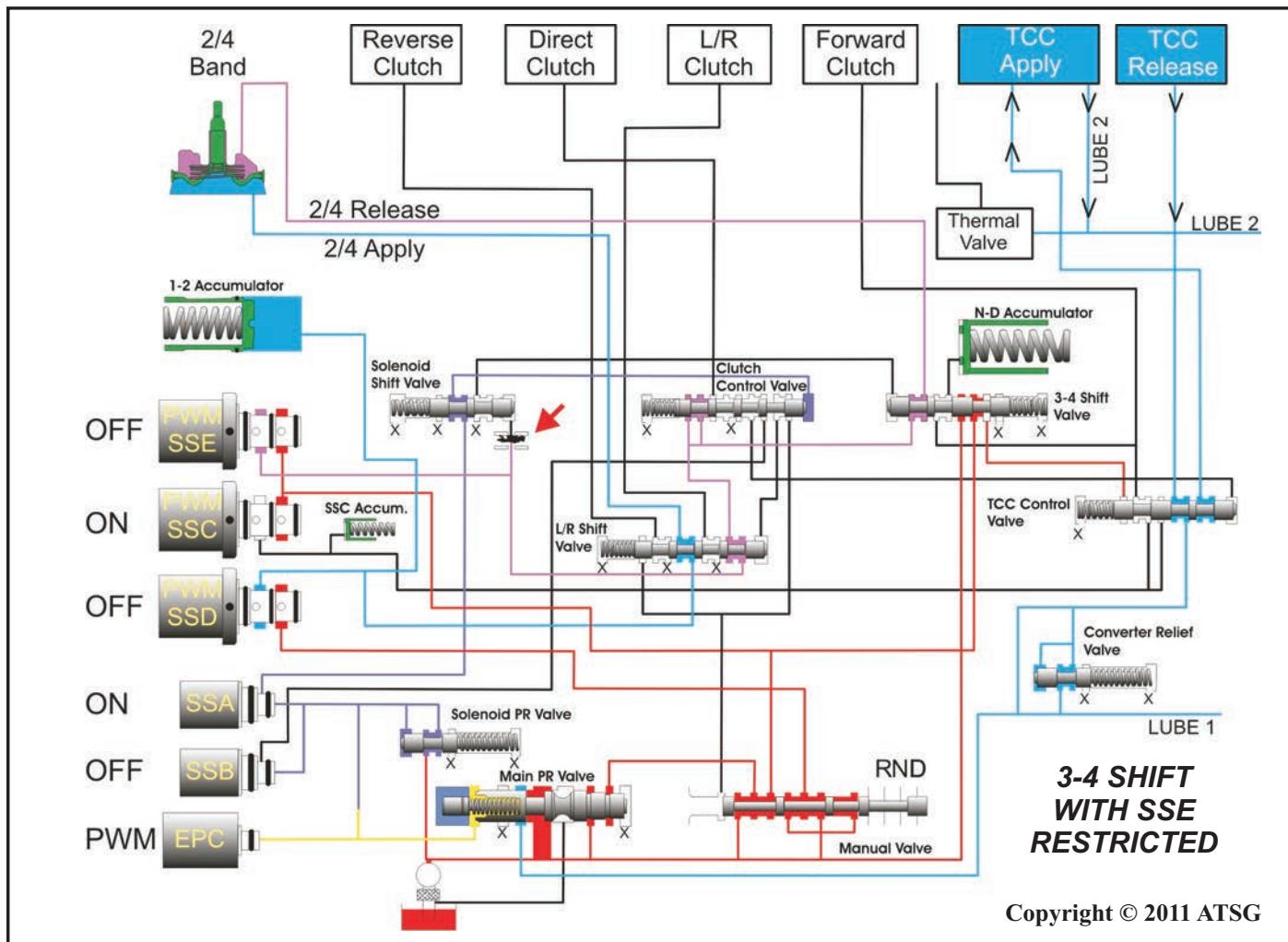
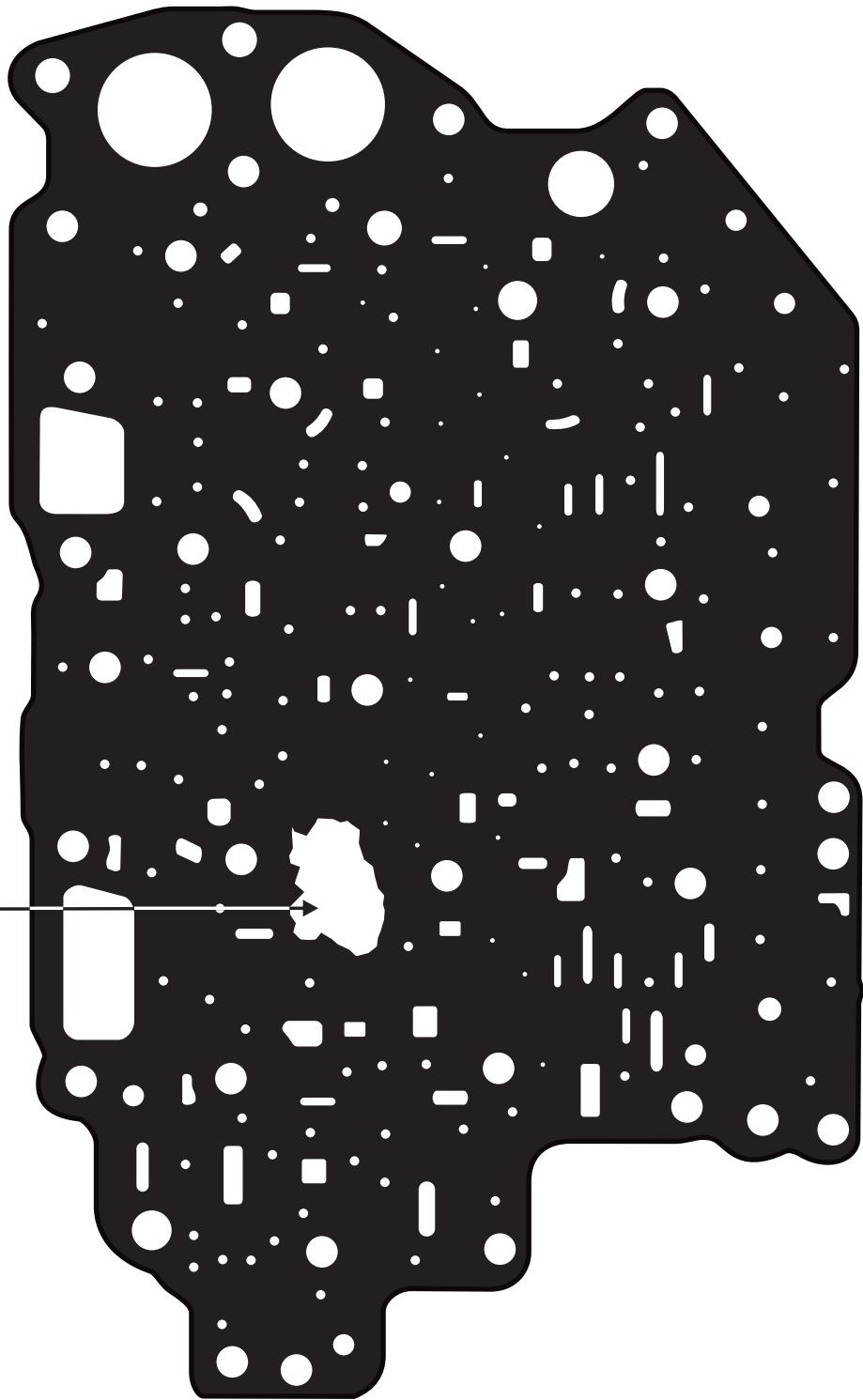


Figure 3
Automatic Transmission Service Group

4F27E 3-NEUTRAL SHIFT

Figure 4

4F27E 3-NEUTRAL



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Figure 5

**FORD 4F27E - FNR5
MAZDA FN4A-EL - FS5A-EL
SUMP FILTER & PAN COMPATIBILITY**

COMPLAINT: After transmission work has been performed, the vehicle has a slipping condition when making turns.

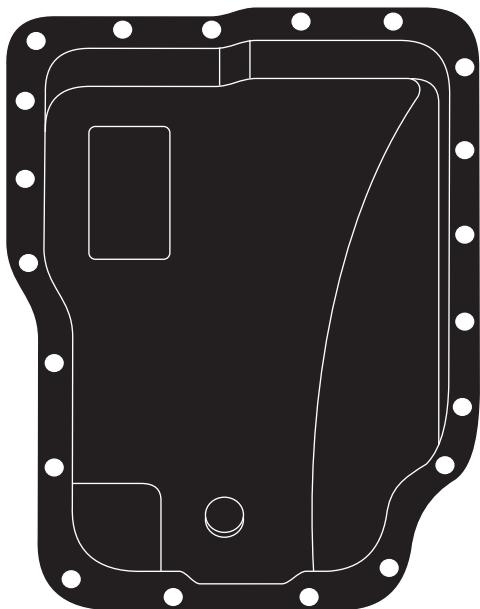
CAUSE: The incorrect pan and filter combination was used.

CORRECTION: The 4F27E/FN4A-EL sump pan and filter are different from the FNR5/FS5A-EL pan and filter. The 4F27E/FN4A-EL pan that is seen in Figure 1 is the shallow pan and has no drain plug. The sump filter that is compatible with this pan is also seen in Figure 2 and has the short pickup spout.

The FNR5/FS5A-EL pan that is seen in Figure 2 is the deep pan and has a drain plug. The sump filter that is compatible with this pan is also seen in Figure 2 and has the long pickup spout. This pan also has brackets in the bottom. The pickup tube on both filters are the same making it easy to switch them.

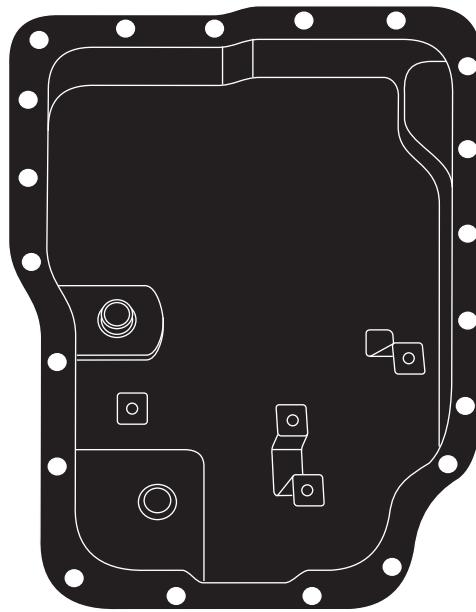
SUMP FILTER & PAN COMPATIBILITY

4F27E - - FN4A-EL



SHALLOW PAN, NO DRAIN PLUG, NO BRACKETS

FNR5 - FS5A-EL

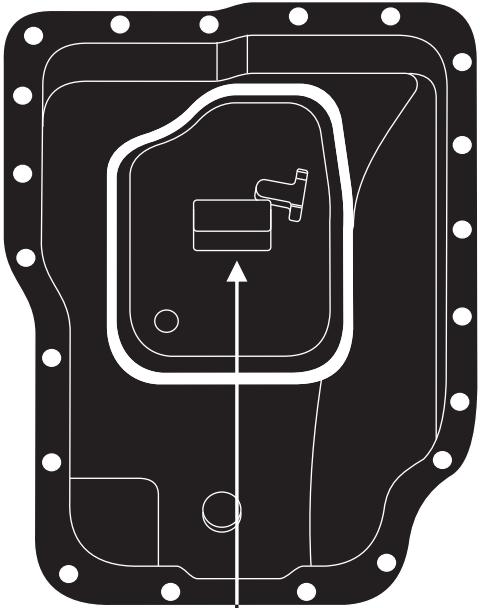


DEEP PAN, HAS DRAIN PLUG, HAS BRACKETS

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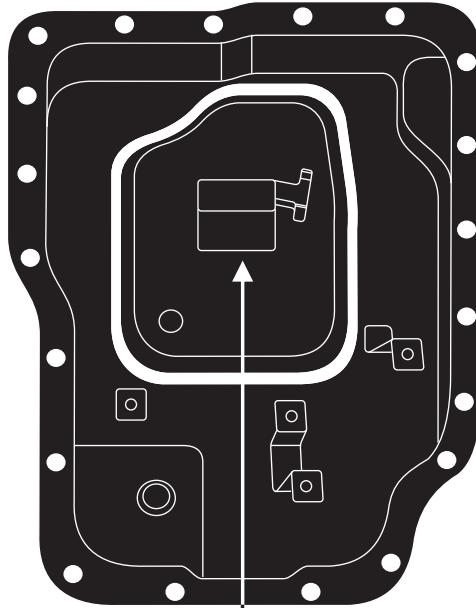
Figure 1

4F27E - - FN4A-EL



SHORT FILTER PICKUP SNOUT

FNR5 - FS5A-EL



LONG FILTER PICKUP SNOUT

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Figure 2

**FORD/MAZDA
FNR5/5NR5
HARSH SHIFTS AND OR DOWNSHIFTS**

COMPLAINT: Ford/Mazda vehicles equipped with the FNR5/5NR5 transmission may exhibit a complaint of harsh upshifts and or downshifts especially hot.

CAUSE: The cause may be, that the bore where the Pressure Regulator Valve is located is worn, causing high pressure or pressure instability.

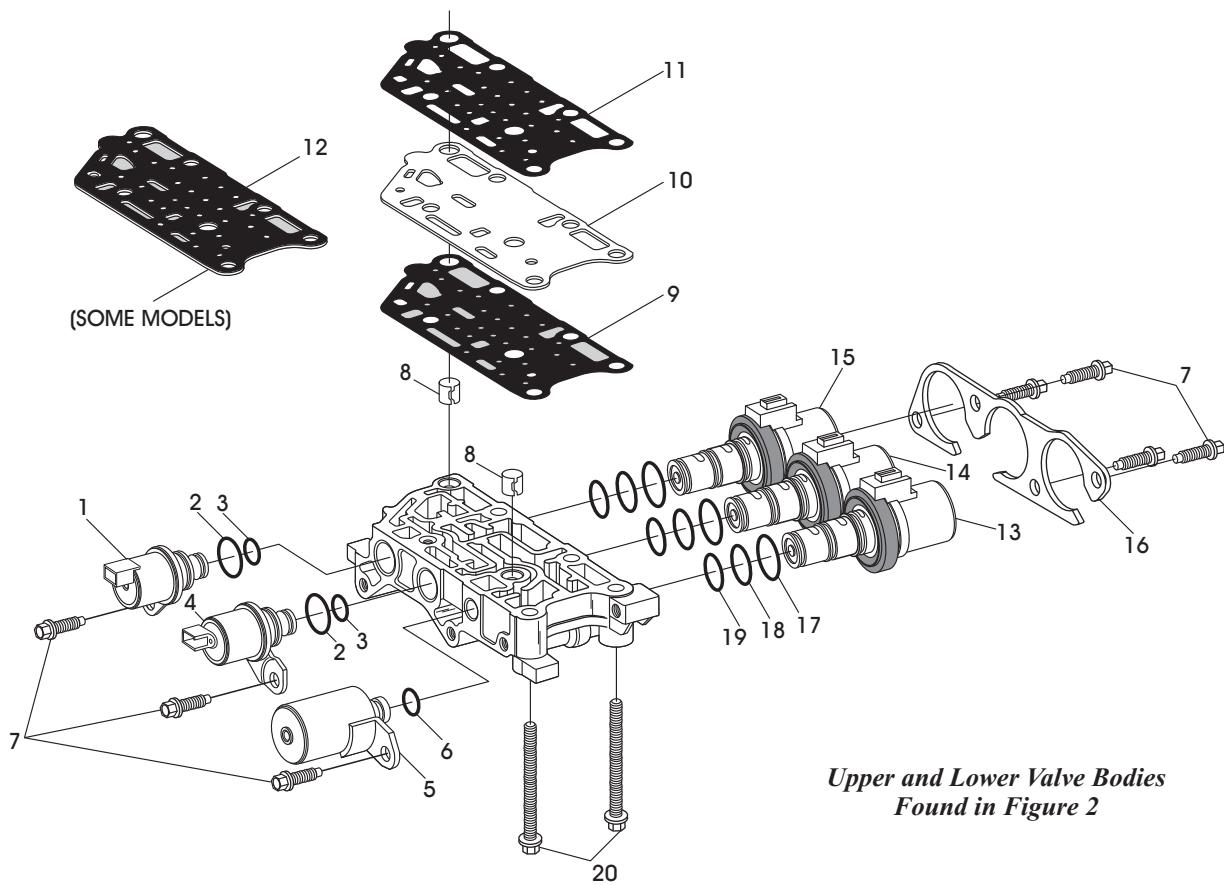
CORRECTION: To correct this condition, dis-assemble the Valve body and inspect the bore where the Pressure Regulator Valve is located, See Figure 2 . If the bore is worn, it will need to be reamed and a new pressure regulator valve will need to be installed. Note:Sonnax has a reamer and oversized Pressure Regulator Valve for the 4F27E that is exactly the same as the FNR5. Note: this is a very delicate process, the reamer must be used with the holding fixture and the valve body halves must be flat sanded.

SERVICE INFORMATION:

ATSG has provided information on the tear down and assembly, of the Main Valve Body in Figures 1 and 2, on the FNR5, as this information is not readily available, and most importantly the solenoid names have changed. Figures 3 and 4 show the Secondary Valve Body exploded view. Figure 5 shows a view of the internal wiring harness with internal wire and connector colors. Figure 5 also refers to the C134 Connector that has caused problems with trouble codes related to water intrusion, see special note. Figure 6 shows a ohm test chart for the Solenoids on the Main valve body.

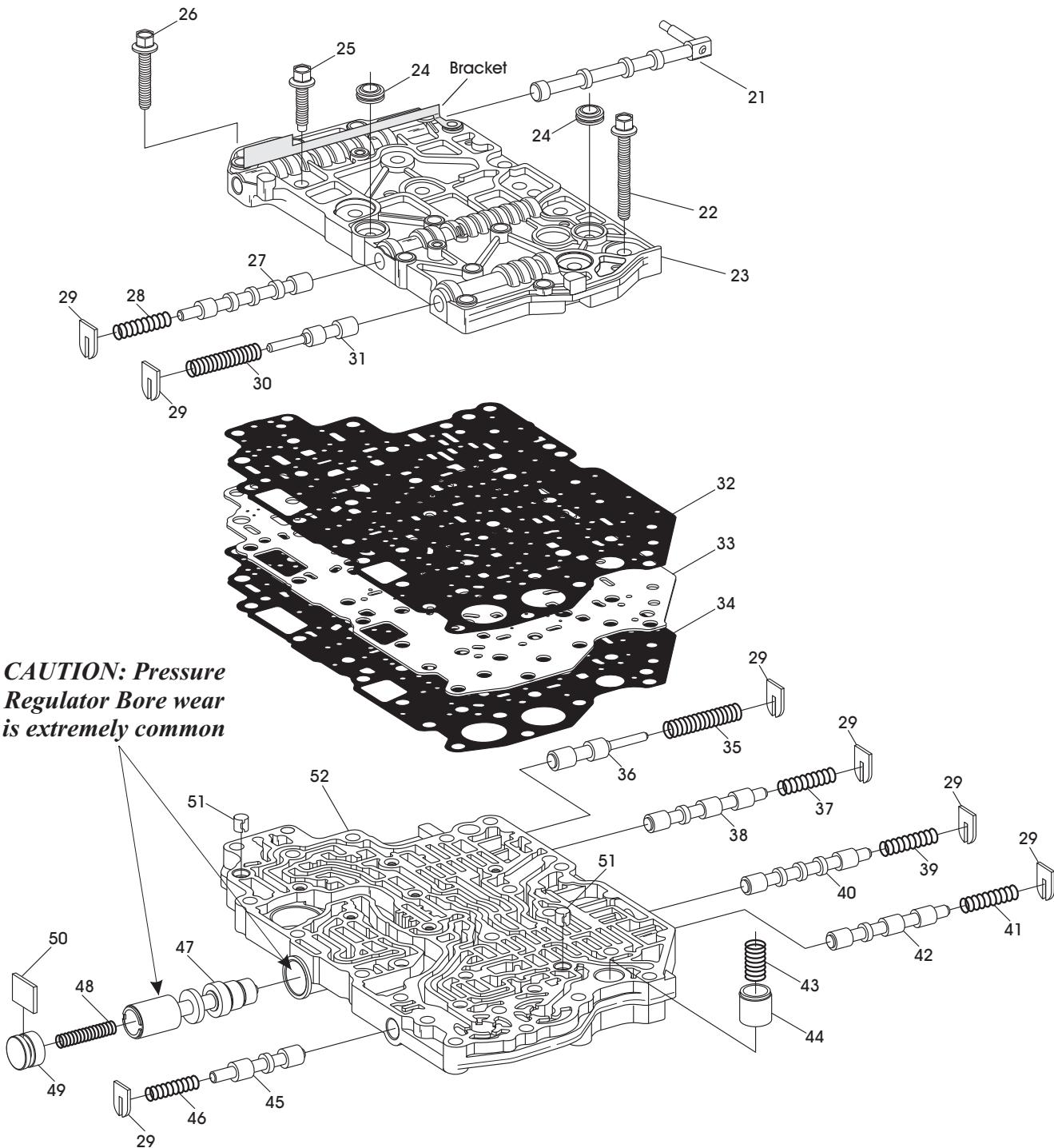
*Special Thanks to
Jeff Parlee VBX
Chuck @ Transmissions
Unlimited, MI*

MAIN SOLENOID BODY EXPLODED VIEW



- 1 ON-OFF SHIFT SOLENOID "D"
- 2 SHIFT SOLENOID "D" AND "E" LARGE "O" RING SEAL
- 3 SHIFT SOLENOID "D" AND "E" SMALL "O" RING SEAL
- 4 ON-OFF SHIFT SOLENOID "E"
- 5 PRESSURE CONTROL (EPC) SOLENOID "A"
- 6 EPC SOLENOID "O" RING SEAL
- 7 SOLENOID RETAINING BOLTS (7 REQUIRED)
- 8 SOLENOID BODY TO LOWER V. B. ALIGNMENT DOWELS (2 REQ)
- 9 SOLENOID BODY TO SPACER PLATE GASKET, WITH SCREENS
- 10 SOLENOID BODY SPACER PLATE
- 11 SOLENOID BODY SPACER PLATE TO LOWER V. B. GASKET
- 12 SPACER PLATE WITH MOLDED GASKETS (SOME MODELS)
- 13 DUTY SOLENOID "A"
- 14 DUTY SOLENOID "C"
- 15 DUTY SOLENOID "B"
- 16 DUTY SOLENOID RETAINING PLATE
- 17 DUTY SOLENOID LARGE "O" RING SEAL (3 REQUIRED)
- 18 DUTY SOLENOID MEDIUM "O" RING SEAL (3 REQUIRED)
- 19 DUTY 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 (MAZDA REFERS TO IT AS "BYPASS")
- 41 3-4 SHIFT VALVE SPRING
- 42 3-4 SHIFT VALVE
- 43 DUTY SOLENOID "A" ACCUMULATOR SPRING
- 44 DUTY SOLENOID "A" 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

MAIN UPPER AND LOWER VALVE BODY EXPLODED VIEW

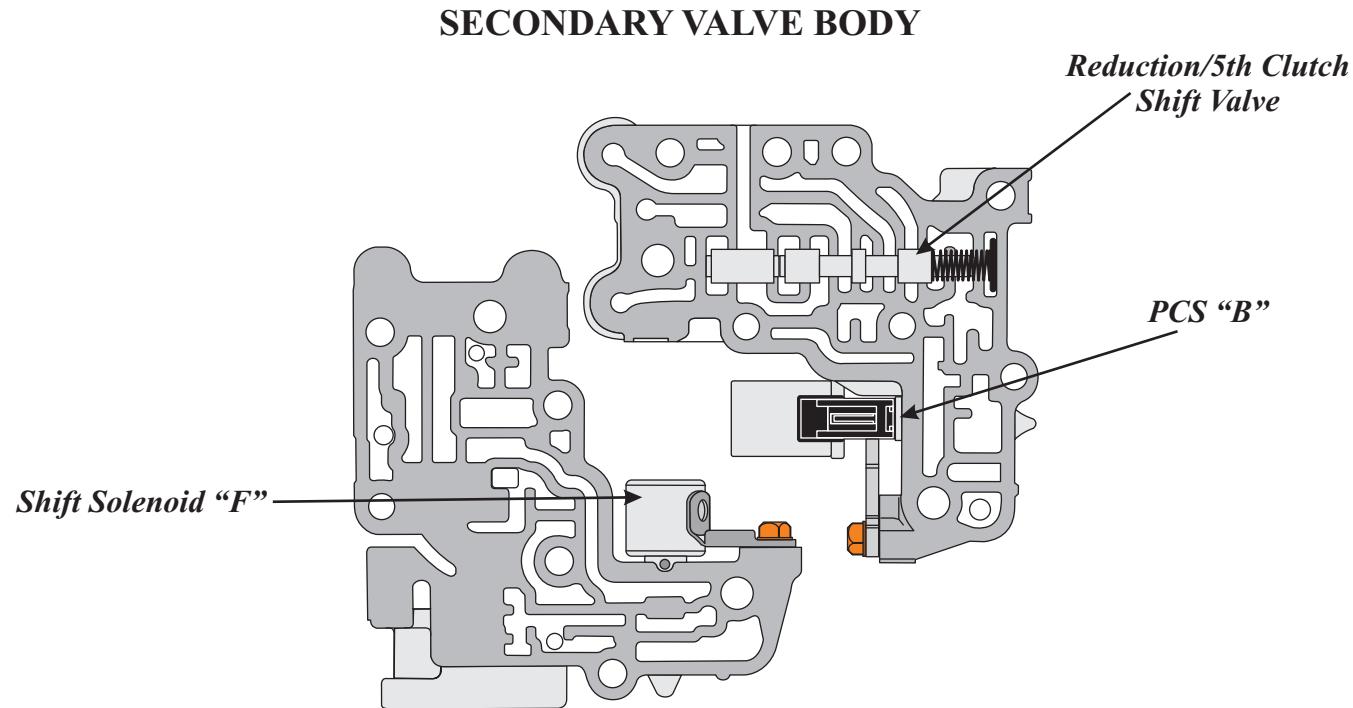


Solenoid Body and
Legend Found in Figure 1

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Figure 2

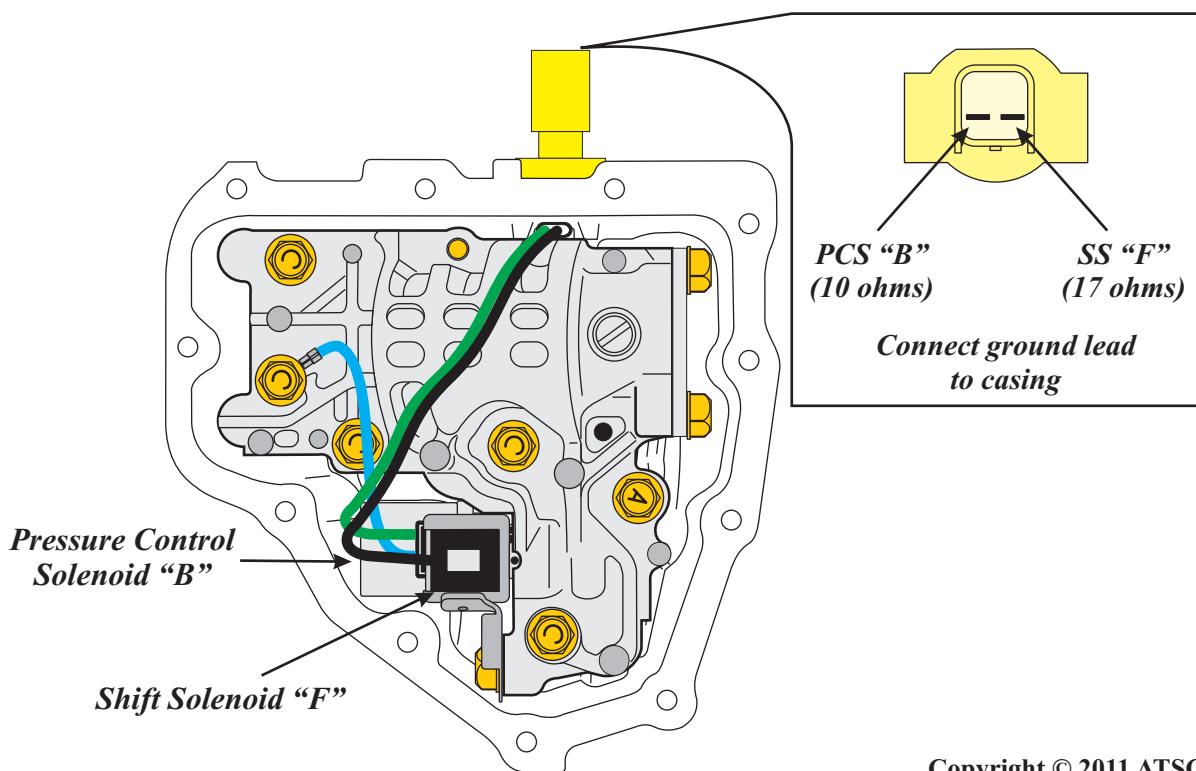
Automatic Transmission Service Group



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Figure 3

SECONDARY VALVE BODY SOLENOID LOCATION

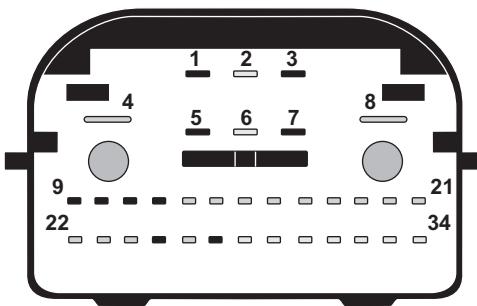


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Figure 4
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TRANSAXLE ELECTRICAL COMPONENT WIRE SCHEMATIC

C134 Connector



Note: This connector is located in front of the battery tray, and has had a history of water intrusion resulting in gear ratio errors and solenoid circuit faults.

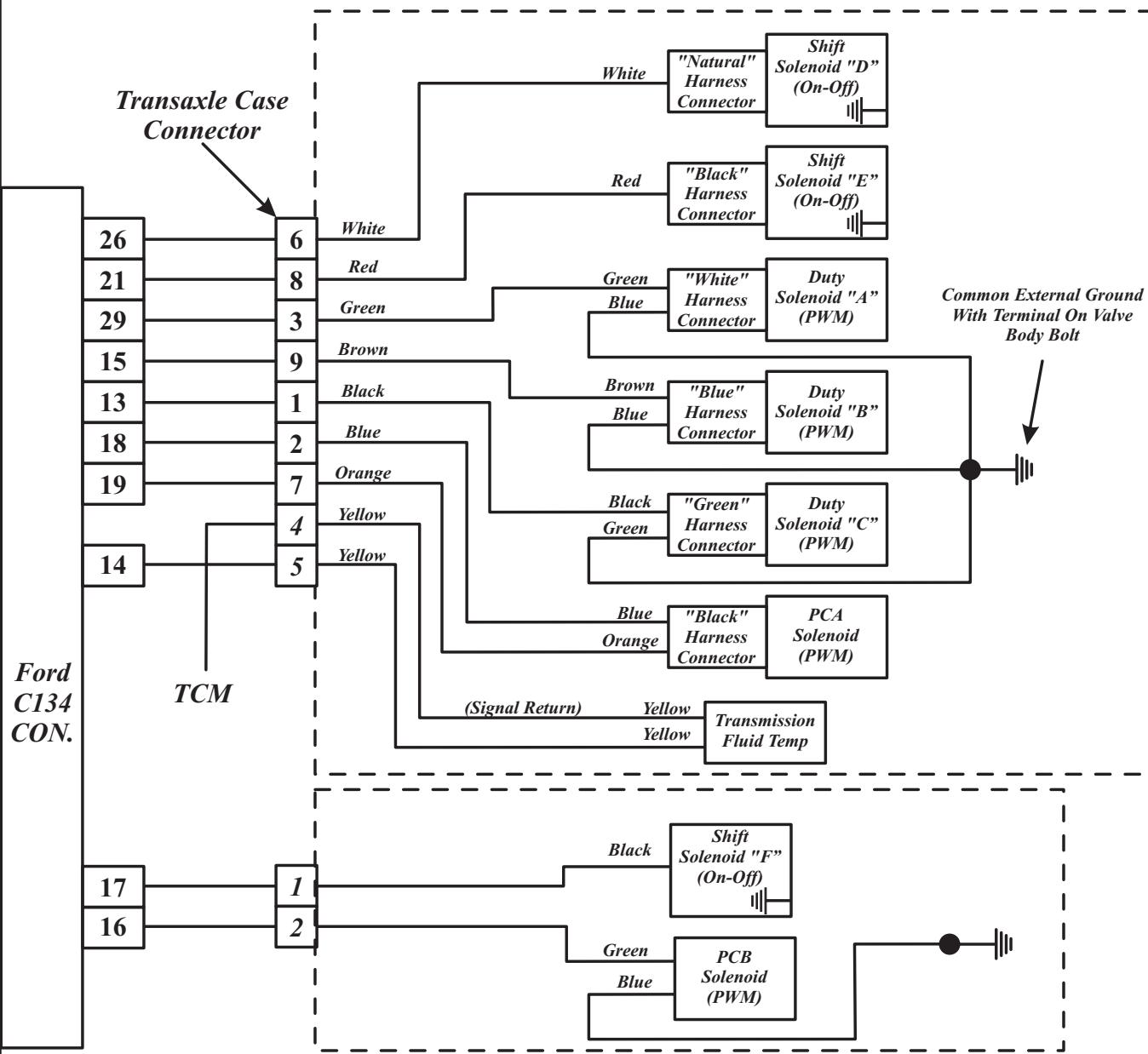
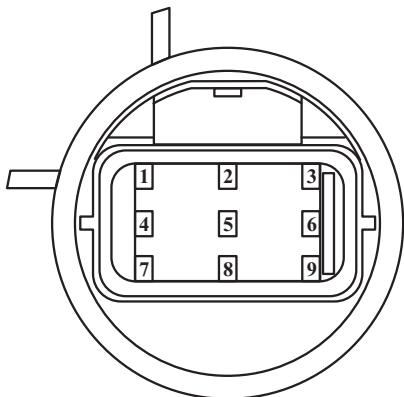
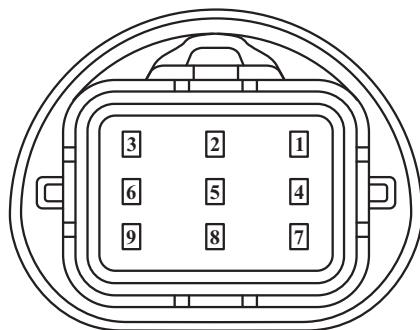


Figure 5
Automatic Transmission Service Group

SOLENOID AND TRANSAXLE FLUID TEMP RESISTANCE CHART


*Transaxle Case Connector
(Face View)*



*Vehicle Harness Connector
(Face View)*

INTERNAL TRANSAXLE COMPONENTS RESISTANCE CHART

<i>Terminals</i>	<i>Transaxle Component</i>	<i>Ohms Resistance At 20°C (70°F)</i>
6 and Gnd.	Shift Solenoid "D" (On-Off)	10.9 - 26.2
8 and Gnd.	Shift Solenoid "E" (On-Off)	10.9 - 26.2
3 and Gnd.	Duty Solenoid "A" (PWM)	1.0 - 4.2
9 and Gnd.	Duty Solenoid "B" (PWM)	1.0 - 4.2
1 and Gnd.	Duty Solenoid "C" (PWM)	1.0 - 4.2
2 and 7	Pressure Control Solenoid "A" (PWM)	2.4 - 7.3

NOTE: Gnd. = Ground Ohm Meter to the Case

Transaxle Temperature Sensor Resistance Chart Terminals 4 and 5

0°C (32°F) = 83.2k - 107k Ohms

20°C (70°F) = 33.5k - 41.2k Ohms

40°C (104°F) = 14.6k - 17.6k Ohms

60°C (140°F) = 7.08k - 8.01k Ohms

80°C (176°F) = 3.61k - 4.06k Ohms

100°C (212°F) = 1.96k - 2.20k Ohms

120°C (248°F) = 1.13k - 1.25k Ohms

130°C (266°F) = 0.87k - 0.96k Ohms

FORD/MAZDA FNR5/5NR5

SHORT 3-4 BIND-UP SHIFT

COMPLAINT: Ford/Mazda vehicles equipped with the FNR5/5NR5 transmission may exhibit a complaint of a short bind-up during the 3-4 upshift.

CAUSE: The cause may be that during overhaul of the transmission, the clearance in the Forward drum was adjusted too tight. Refer to Figure 1 in the application chart and note that during the 3-4 upshift the Forward Clutch is turned Off. If the clearance is too tight in this clutch there will be a short momentary bind-up. The PCM is monitoring the Forward Clutch pressure switch's opening and closing to help adjust the Forward Clutch adaptives, shown in Figure 2. It can not change the adaptives enough for a Forward Clutch Pack that is stacked too tight.

CORRECTION: To correct this condition, refer to Figure 3 for a breakdown of the Forward Clutch and Figure 4 for a clearance check for the Forward Clutch and be sure that the minimum clearance is no less than .059." Note: There are selective snap rings listed in the chart in Figure 4 that are for the 4F27E that are the same for the FNR5.

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

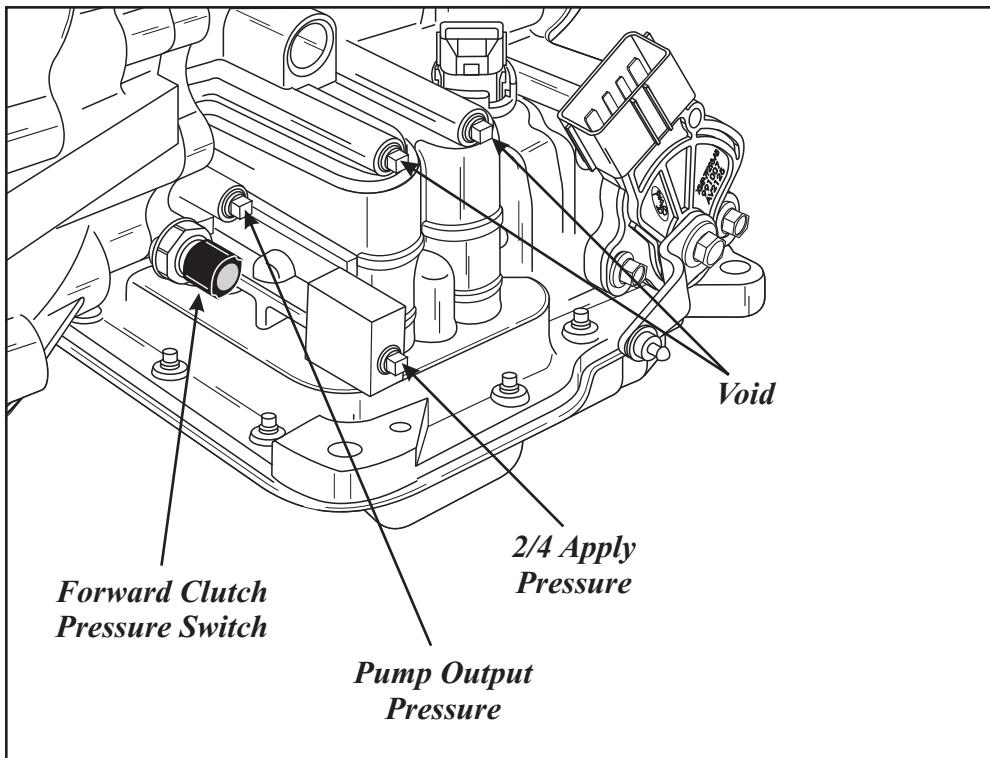
NOTE: Failsafe on this unit is 3rd gear in all forward ranges.

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

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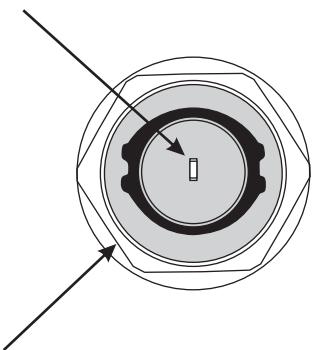
Figure 1

FORWARD CLUTCH PRESSURE SWITCH LOCATION

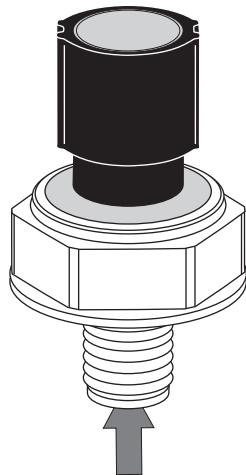


FORWARD CLUTCH PRESSURE SWITCH OPERATION

Connect Positive lead here
(Single terminal)



Connect Negative lead here
(Casing of the switch)



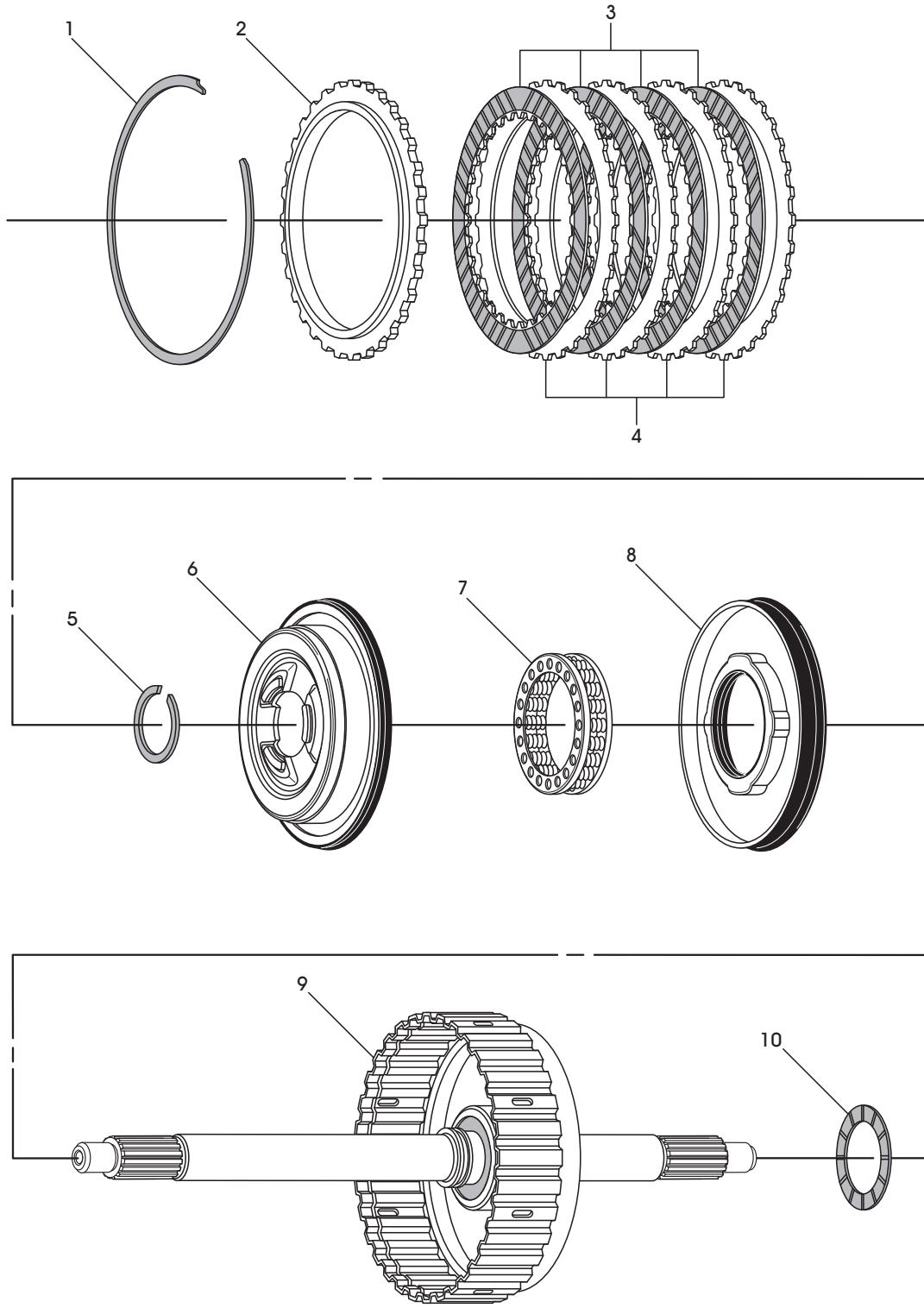
Apply air pressure here

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.

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Figure 2

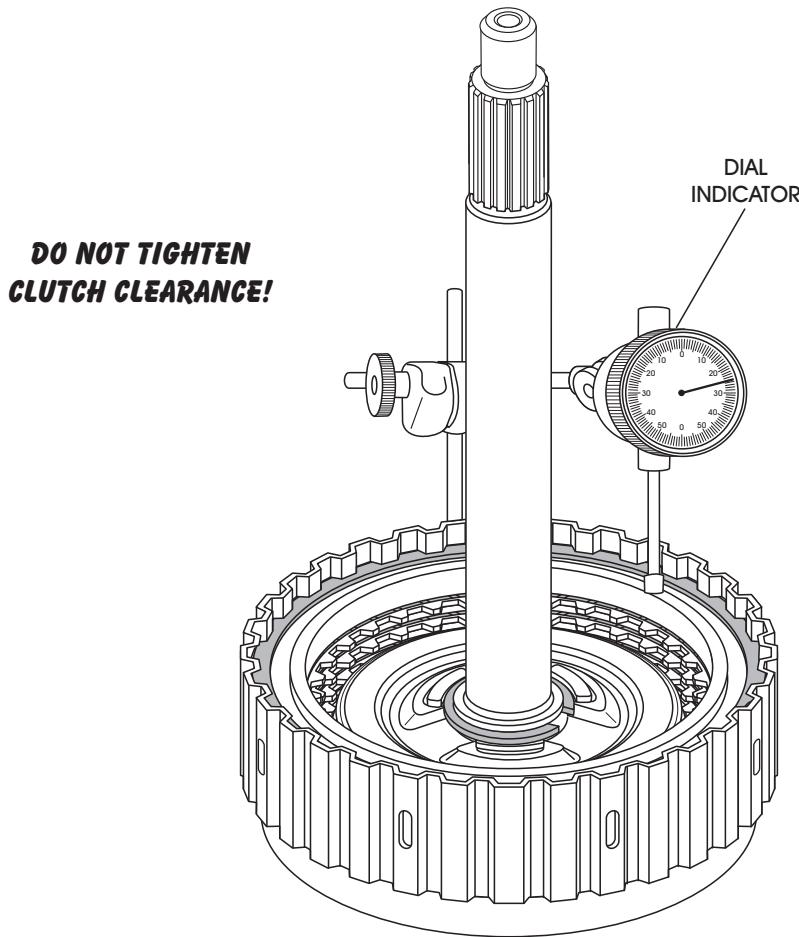
FORWARD CLUTCH EXPLODED VIEW



1. FORWARD CLUTCH BACKING PLATE SNAP RING (SELECTIVE).
2. FORWARD CLUTCH BACKING PLATE.
3. FORWARD CLUTCH FRICTION PLATES (4).
4. FORWARD CLUTCH STEEL PLATES (4).
5. RETURN SPRING RETAINER/BALANCE PISTON SNAP RING.
6. RETURN SPRING RETAINER/BALANCE PISTON.
7. FORWARD CLUTCH PISTON RETURN SPRING ASSEMBLY.

8. FORWARD CLUTCH APPLY PISTON.
9. FORWARD CLUTCH HOUSING ASSEMBLY.
10. FORWARD CLUTCH HOUSING TO STATOR THRUST WASHER.

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



4F27E/FNR5 Selective Snap Ring Thickness Available

<i>1.15 - 1.25 mm (.045" - .049")</i>	<i>.....XS4Z-7D483-CA</i>
<i>1.35 - 1.45 mm (.053" - .057")</i>	<i>.....XS4Z-7D483-CB</i>
<i>1.55 - 1.65 mm (.061" - .065")</i>	<i>.....XS4Z-7D483-CC</i>
<i>1.75 - 1.85 mm (.069" - .073")</i>	<i>.....XS4Z-7D483-CD</i>
<i>1.95 - 2.05 mm (.077" - .081")</i>	<i>.....XS4Z-7D483-CE</i>
<i>2.15 - 2.25 mm (.085" - .089")</i>	<i>.....XS4Z-7D483-CF</i>

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Figure 4

Wesco - 117



FORD 6F50 NO REVERSE, 3RD OR 5TH GEARS

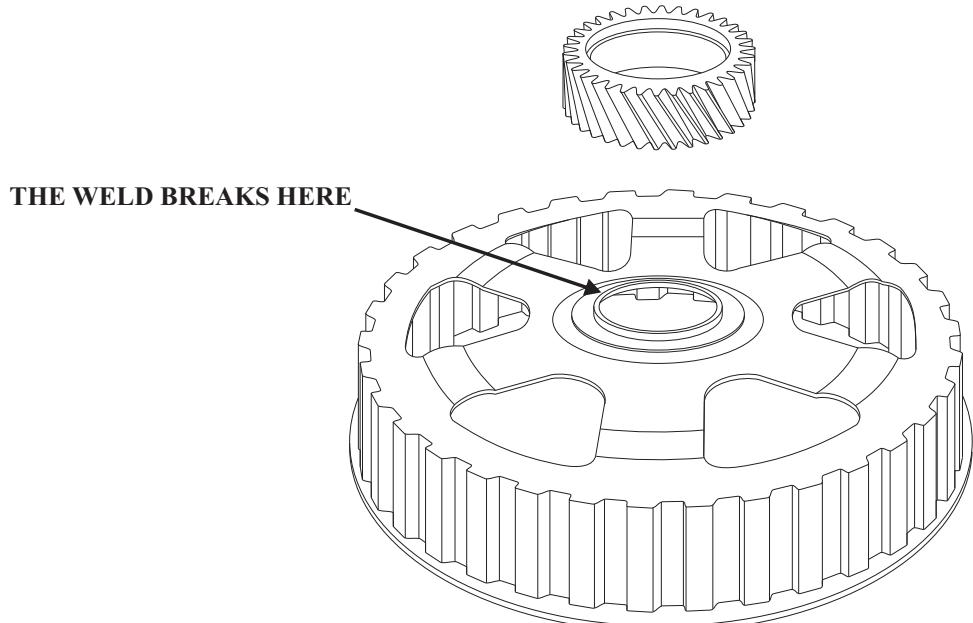
COMPLAINT: A vehicle is towed to the shop with a complaint of no reverse, third or fifth gears and the MIL is illuminated. Code retrieval produces codes P0733 for a gear ratio error in third gear, P0735 for a gear ratio error in fifth gear and a P0756 for Shift Solenoid "B" Stuck Off.

CAUSE: The weld holding the sun gear to the shell has broken as seen in Figure 1.

CORRECTION: Replace the sun gear shell with the updated assembly, Figure 2, using the part number provided under "Service Information", the number three thrust bearing will be packaged with the sun gear shell.

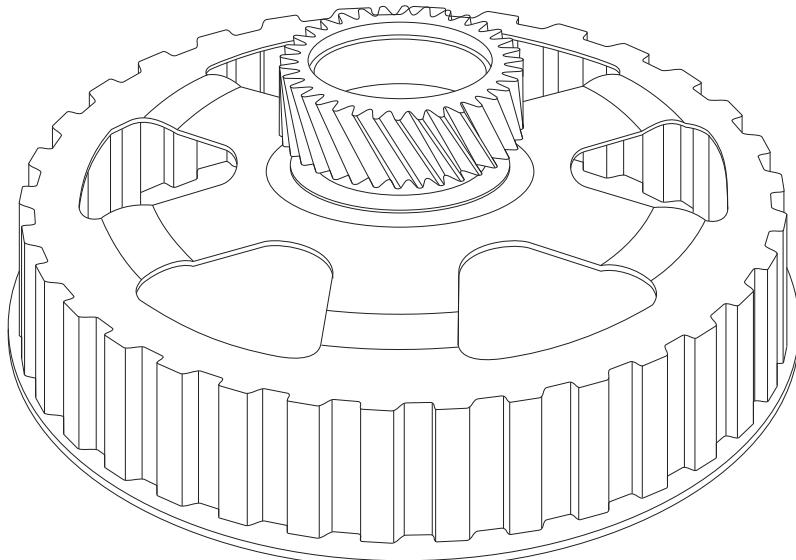
SERVICE INFORMATION:

Sun Gear Shell Assembly & #3 Thrust Bearing..... 7T4Z-7A019-A

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Figure 1

REVISED SUN SHELL & #3 BEARING ASSEMBLY

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Figure 2

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Transtec - IBC

Smart Blend BC