



"2005" SEMINAR INFORMATION

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AUTOMATIC TRANSMISSION SERVICE GROUP

9200 South Dadeland Boulevard Suite 720

Miami, Florida 33156

WWW.ATSG.BIZ

(305) 670-4161

WWW.ATSGMIAMI.COM



"Out by Five in 2005" Seminar Information

Introduction

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WAYNE COLONNA
TECHNICAL CONSULTANT

PETER LUBAN
TECHNICAL CONSULTANT

JON GLATSTEIN
TECHNICAL CONSULTANT

GERALD CAMPBELL
TECHNICAL CONSULTANT

JERRY GOTT
TECHNICAL CONSULTANT

MIKE SOUZA
TECHNICAL CONSULTANT

DALE ENGLAND
TECHNICAL CONSULTANT

JIM DIAL
TECHNICAL CONSULTANT

ED KRUSE
TECHNICAL CONSULTANT

GREGORY LIPNICK
TECHNICAL CONSULTANT

DAVID CHALKER
TECHNICAL CONSULTANT

JOHN CACIA
TECHNICAL CONSULTANT

ROLAND ALVAREZ
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP
9200 S. DADELAND BLVD. SUITE 720
MIAMI, FLORIDA 33156
(305) 670-4161

Lubegard

Dacco



FORD 4R70W

CENTER GEAR CASE CHANGE

CHANGE: A service kit is now available, containing the Forward Sun Gear, the #5 bearing and sun gear shell as illustrated in Figure 1.

REASON: To eliminate the mismatch of these parts which would result in gear noise as well as damage to these and other internal transmission components due to dimensional differences.

PARTS AFFECTED:

- (1)The new Forward Sun Gear has an ID groove and blue dye stripe below the splined area and is 4.0”(101.6mm) long.
The previous Forward Sun Gear does not have an ID groove or a blue dye stripe and is also 4.0”(101.6mm) long.
- (2)The new #5 bearing is now a two piece design and is .205” (5.24mm) thick.
The previous one piece bearing is .177” (4.5mm) thick.
- (3)The new Sun Gear Shell has an ID groove at the base of the bowl and has an overall height of 4.02” (102.11mm).
The previous Sun Gear Shell does not have an ID groove and has an overall height of 4.13” (104.90mm).
All of the above measurements can be seen in Figure 2.

INTERCHANGEABILITY:

This service kit will back service all 4R70W transmissions from 1994 to 2003. It cannot be used in 2004 models due to the addition of a turbine speed sensor which created a different sun gear shell.

SERVICE INFORMATION:

1994 to 2003 Center Gear Case Service Package.....4L3Z-7D234-M

Schaffer

CENTER GEAR CASE CHANGE

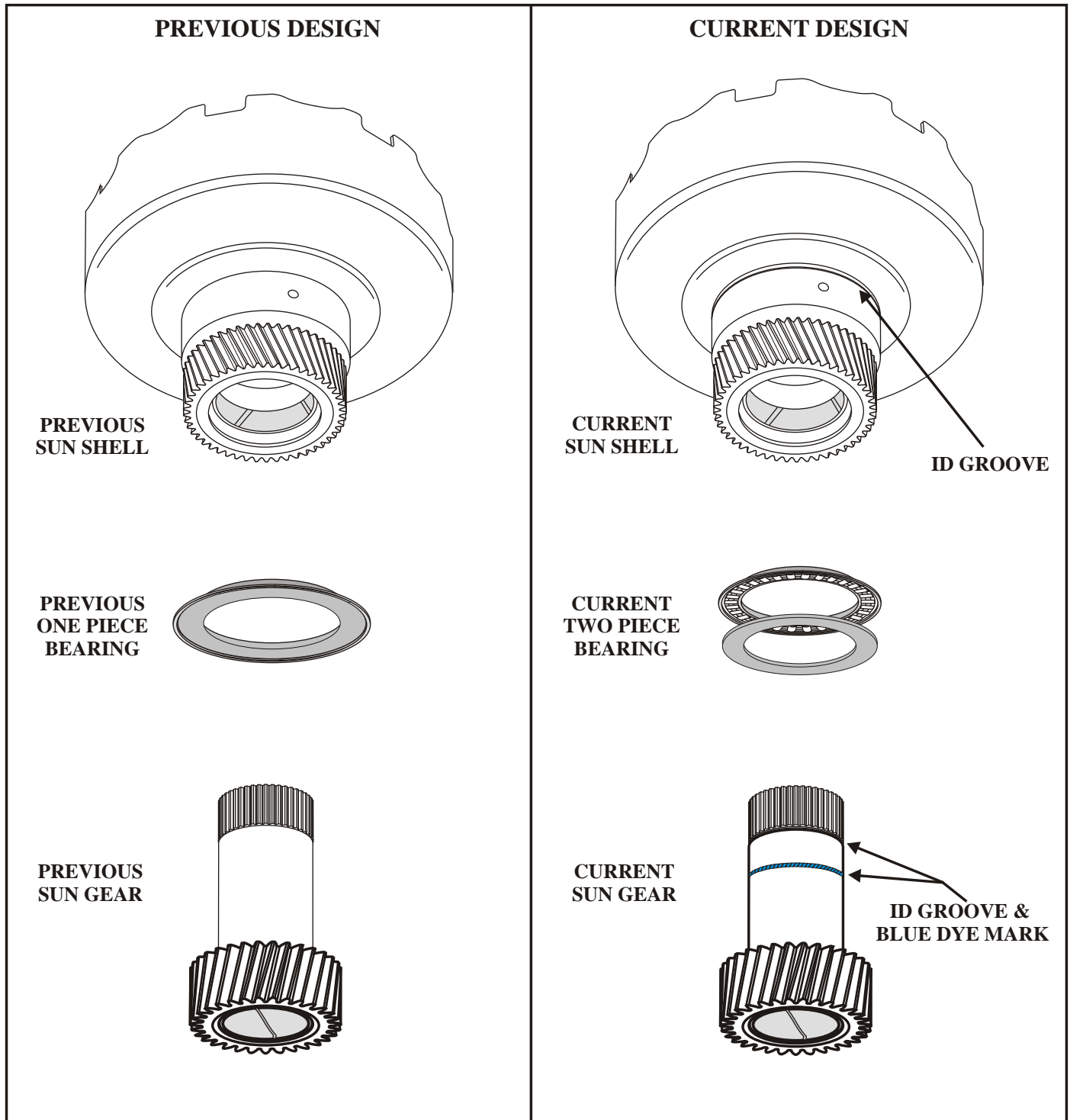


Figure 1

Sonnax

CENTER GEAR CASE CHANGE

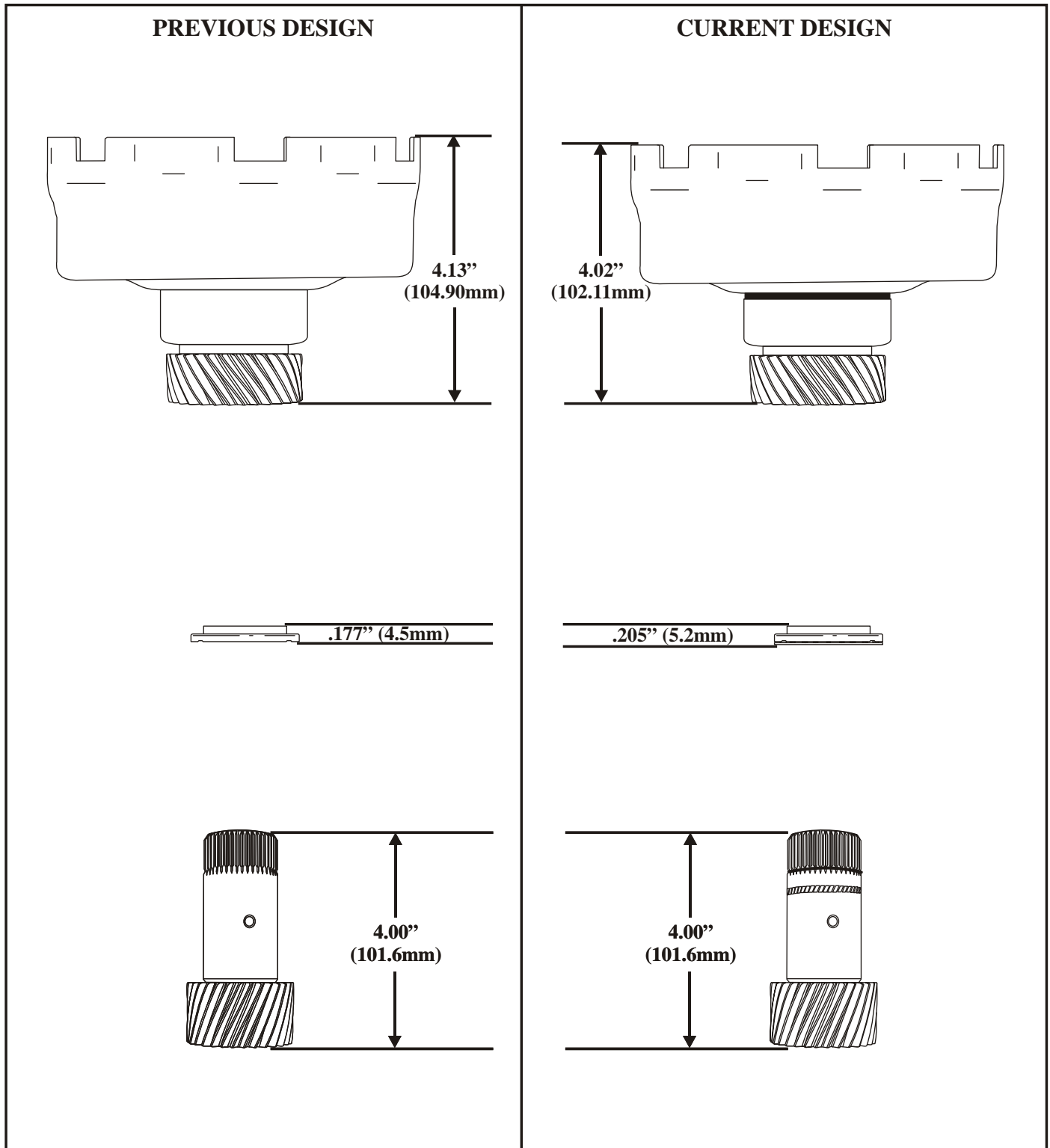


Figure 2

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FORD MOTOR COMPANY TRUCKS 1996 AND LATER

NO TORQUE CONVERTER CLUTCH APPLICATION AT LESS THAN 30 PERCENT THROTTLE

COMPLAINT: Some Ford Motor Company Trucks, 1996 and later, may exhibit a no Torque Converter Clutch application at less than 30 percent throttle. No Trouble Codes present.

CAUSE NO. 1: One cause for this condition may be that one or more of the vehicle brake light bulbs, including the High Mount brake light may be burned out, or have a damaged filament (See Figure 1). When this condition is present, the PCM will detect an open in the brake lamp circuit, and due to a pull-up resistor in the PCM, will output voltage from PCM terminal 92 to the brake on-off switch (See Figure 2). As a result, the Torque Converter Clutch will not be applied at less than 30 percent throttle.

CAUSE NO. 2: Recently there has been an increase in the popularity of replacing the stock incandescent brake lamp bulbs, with aftermarket LED lamp assemblies. Refer to Figures 3 and 4. The main advantages of switching to LED lamp assemblies is that there are no fragile filaments to burn out or break, which means that the LED lamp assemblies may possibly last for the entire life of the vehicle, and LED lamps consume much less energy than the stock incandescent bulbs. Due to the low power consumption, the PCM *may* view this reduced current draw as being a burned out bulb, resulting in a no Torque Converter Clutch apply at less than 30 percent throttle.

CORRECTION NO. 1:

Prior to any part replacement or modifications, it would be recommended to check for a 5 to 8 volt DC signal coming out of the PCM at terminal 92 using a volt meter set to read DC voltage. Voltage may also be checked at the Light Green wire located at the back of the Brake On-Off Switch. **Note:** *The example given is for a 1996 F-Series 7.3 Diesel.* This test will help to confirm that a circuit fault has been detected by the PCM. Refer to Figure 2. **Normal operation will be 0 volts DC, brake off, and 12 volts DC, brake on.**

Replace any burned out brake lamp bulbs, including the High Mount brake lamp bulb, as shown in Figure 1. It is also important to note, that a bad ground for the rear lamp assembly, has also been known to cause the identical symptom. Refer to Figure 5 for the rear lamp assemblies ground location.

CORRECTION NO. 2:

For those vehicles that have had the stock incandescent bulbs replaced with aftermarket LED bulb assemblies, it *may* be necessary to install a 6 ohm- 50 watt Load Resistor across the brake light power wire to simulate the load of the regular stock incandescent bulb (See Figure 6). **Note:** *One resistor is required for use on each LED bulb assembly.*

The 6 ohm, 50 watt Load Resistors are available from the suppliers of the LED bulb assemblies. Two examples are "superbrightleds.com" and "digikey.com". Cost of the resistor is approximately five dollars U.S.

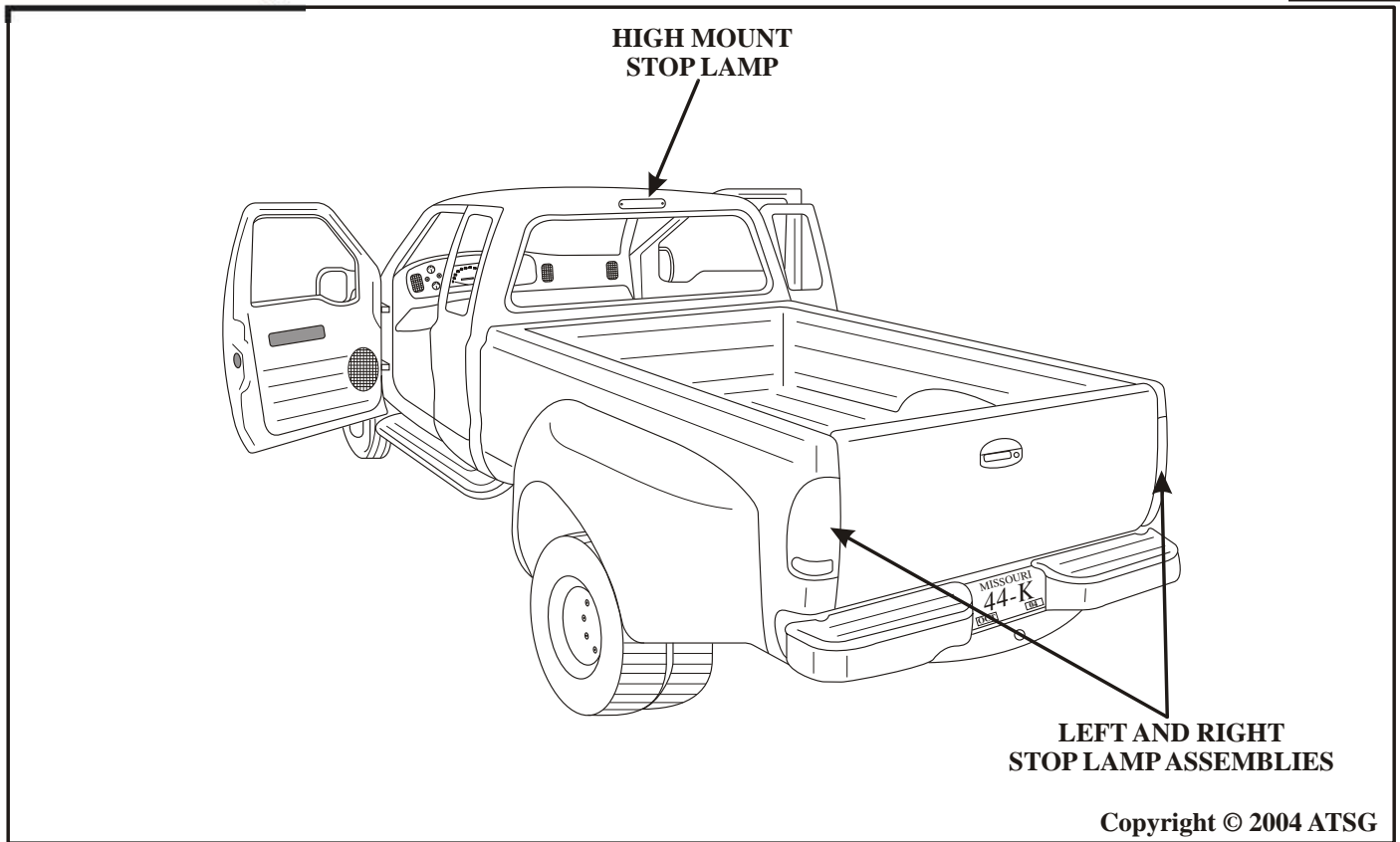


Figure 1

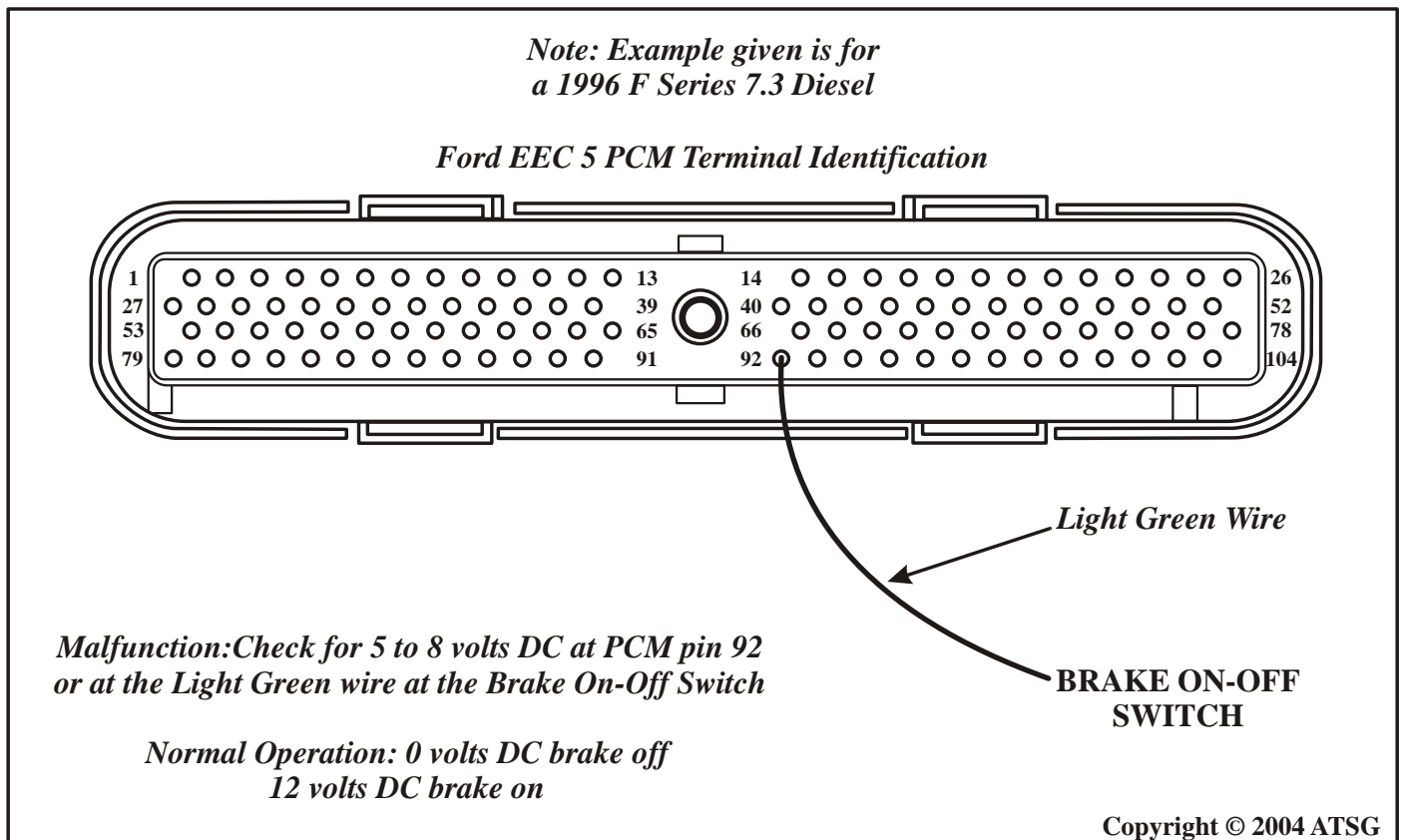
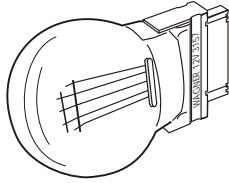


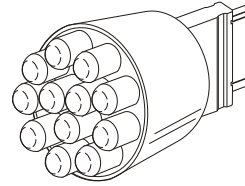
Figure 2



**FACTORY STYLE
INCANDESCENT BULB**

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Figure 3

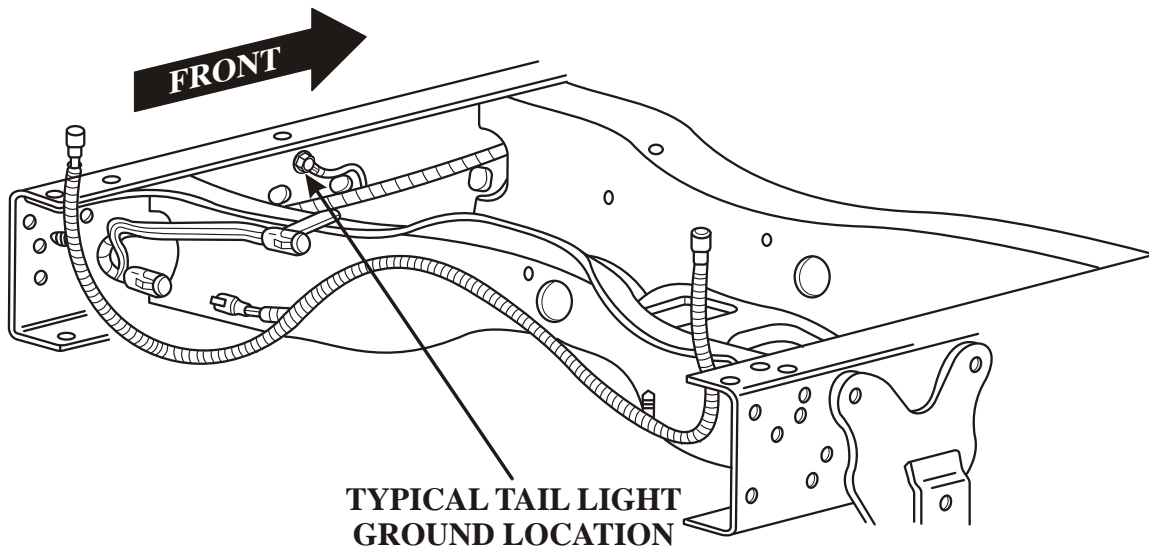


**AFTERMARKET
LED BULB**

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Figure 4

GROUND LOCATION

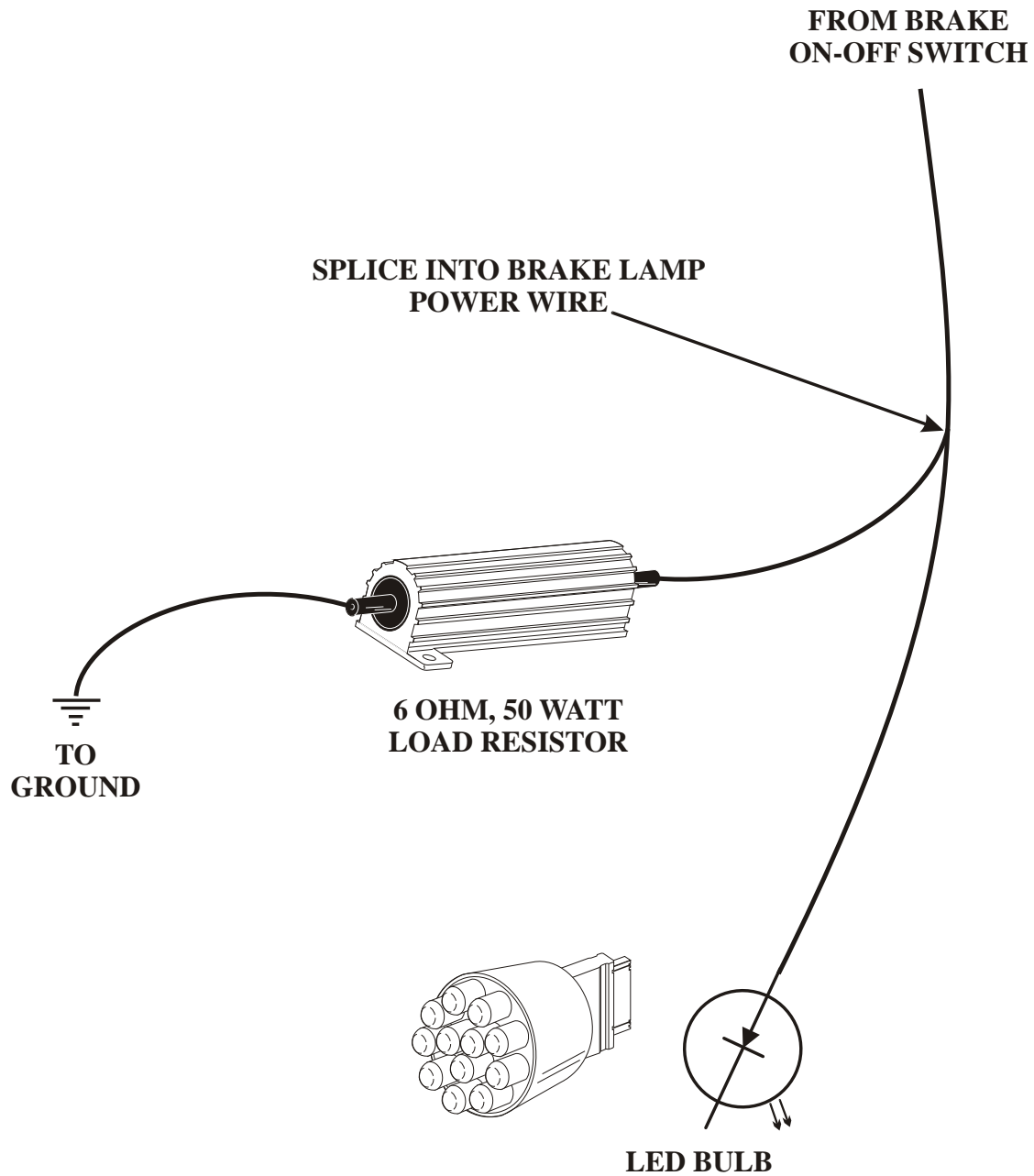


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Figure 5

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LOAD RESISTOR INSTALLATION



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Figure 6

FORD 5R110W "TorqShift" HARSH FORWARD ENGAGEMENT

COMPLAINT: After rebuild or repair, the vehicle exhibits a harsh forward engagement, or possibly a harsh engagement along with a soft mushy 1-2 shift.

CAUSE: The cause may be, the forward clutch orifice missing, or misplaced into the intermediate clutch feed instead of the forward clutch feed. (See Figure 1 and 2).

CORRECTION: Install the forward clutch feed passage, as shown in Figure 2. If the forward clutch orifice was missing, you will have harsh engagement into drive and the 1-2 shift will be OK. If you misplaced the forward clutch feed orifice into the intermediate clutch feed passage, you will have harsh engagement into drive along with a soft 1-2 shift.

Note: *The reason the forward clutch feed orifice is needed is, the forward clutch is the only clutch pack that is not fed with a PWM solenoid. The forward clutch feed oil comes straight from the manual valve.*

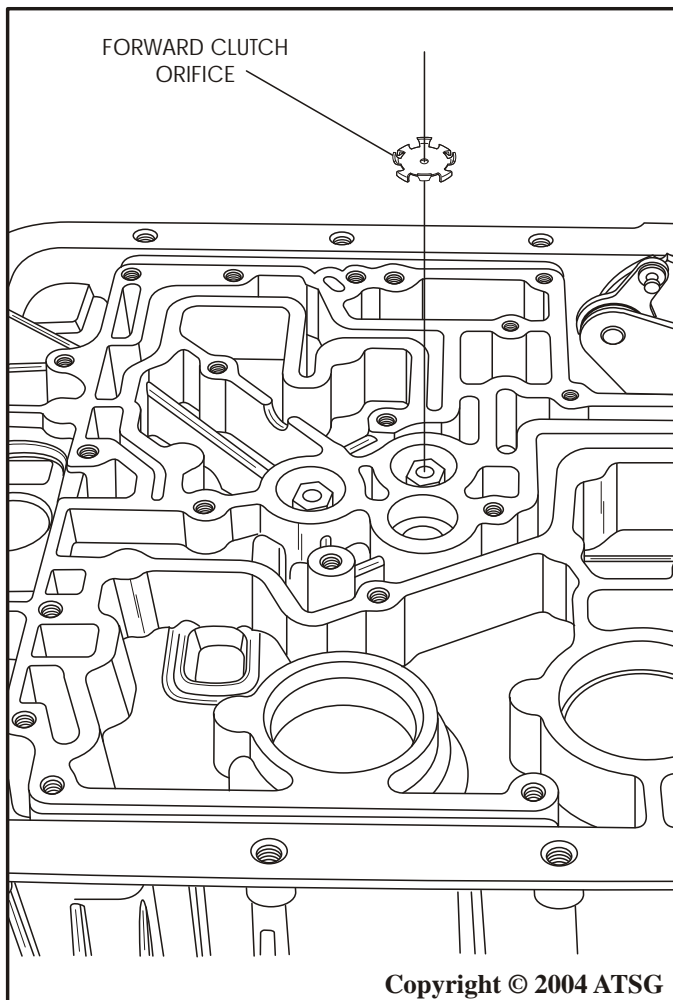


Figure 1

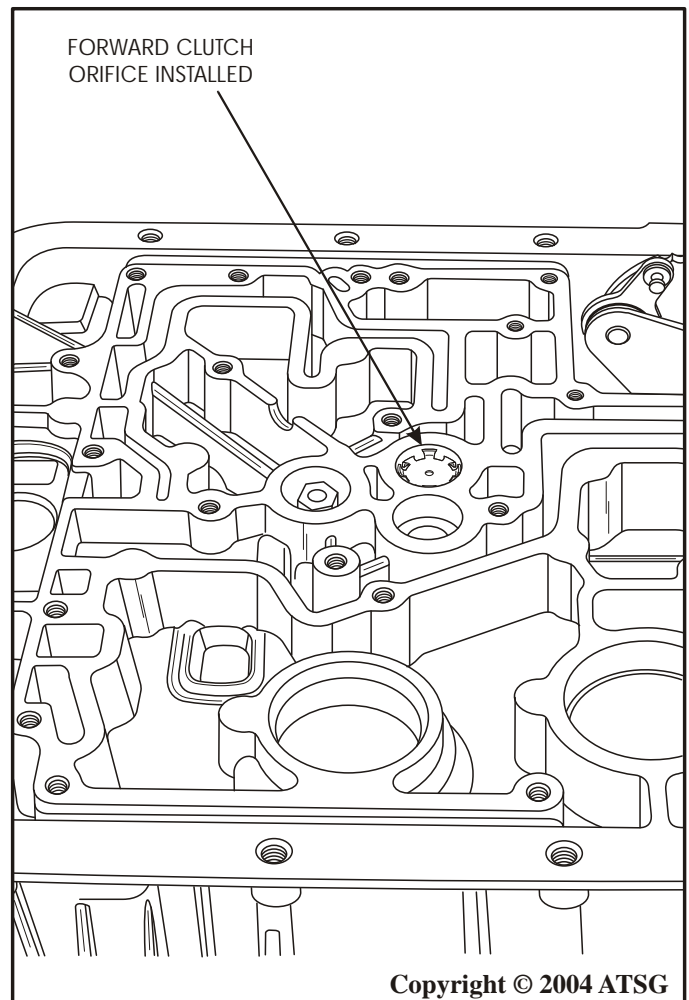


Figure 2



FORD 5R110W *Torqshift*
LOW DIODE FAILURE

CHANGE: The Low Diode assembly has been changed very early in the 2003 production year with a material change and very small dimensional changes. An exploded view of the low/reverse clutch parts is provided for you in Figure 1.

REASON: Much improved durability and reliability.

PARTS AFFECTED:

- (1) LOW DIODE ASSEMBLY - Received a material change on all pieces of the low diode assembly and a small "Dimple" was added to one tooth of the inner race for identification, as shown in Figure 2.

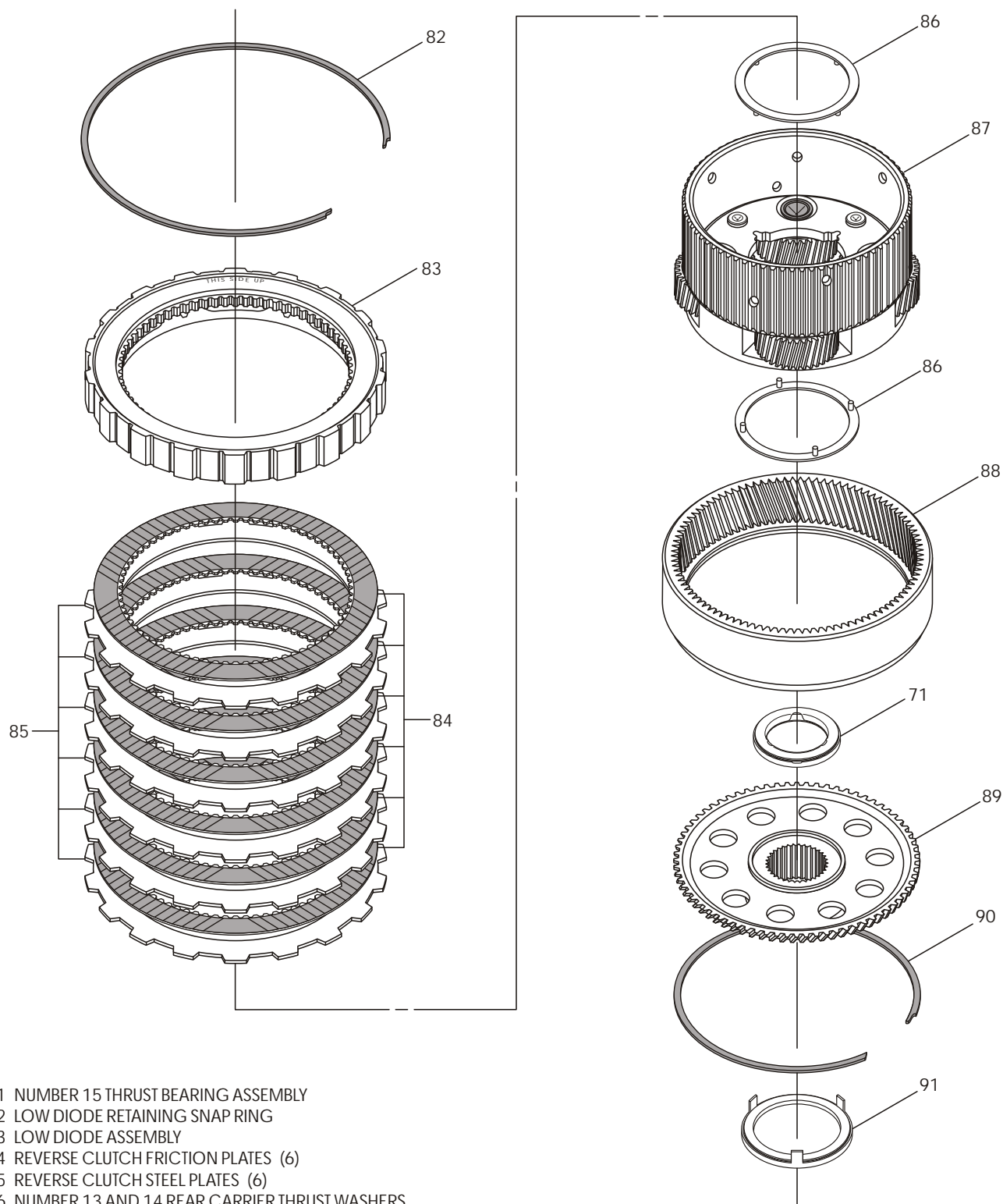
INTERCHANGEABILITY:

Will retro-fit back on all model years. Do not use a low diode that does not have the small identification "Dimple" on one tooth of the inner race, as shown in Figure 2.

SERVICE INFORMATION:

Low Diode Assembly (2nd Design) 3C3Z-7A089-AB

LOW/REVERSE CLUTCH PARTS EXPLODED VIEW

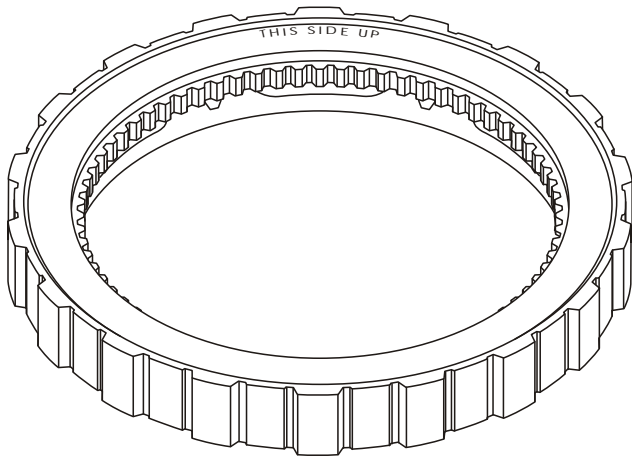


- 71 NUMBER 15 THRUST BEARING ASSEMBLY
- 82 LOW DIODE RETAINING SNAP RING
- 83 LOW DIODE ASSEMBLY
- 84 REVERSE CLUTCH FRICTION PLATES (6)
- 85 REVERSE CLUTCH STEEL PLATES (6)
- 86 NUMBER 13 AND 14 REAR CARRIER THRUST WASHERS
- 87 REAR PLANETARY CARRIER ASSEMBLY
- 88 REAR PLANETARY CARRIER INTERNAL RING GEAR
- 89 REAR PLANETARY CARRIER INTERNAL RING GEAR HUB
- 90 REAR PLANETARY CARRIER RING GEAR HUB SNAP RING
- 91 NUMBER 16 THRUST BEARING ASSEMBLY

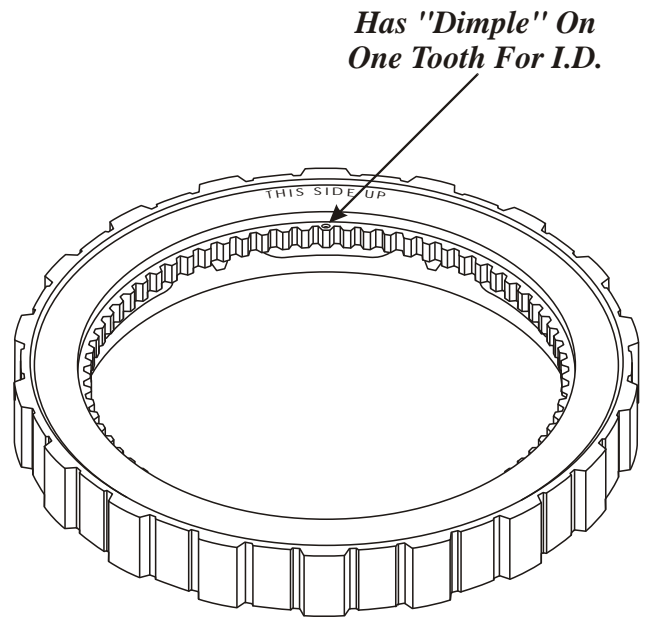
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Figure 1

1ST DESIGN LOW DIODE



2ND DESIGN LOW DIODE



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Figure 2

ATEC

FORD 5R110W "Torqshift"

INTERNAL HARNESS OR SOLENOID BODY SERVICE

If it becomes necessary to replace the internal wire harness and/or the entire solenoid body on a 5R110W Torqshift transmission, please be aware of the following:

1. You may have to install a new service harness, without pressure switch connectors, into a unit that has pressure switches in the solenoid body. (See Figure 1 for locations)
2. You may have to install a new service solenoid body, without pressure switches, into a unit that has the original internal harness with pressure switch connectors. (See Figure 1 for locations)

Note: *These are both acceptable repairs and will not affect the function or operation of the transmission. Use of the pressure switch input was dropped from the vehicle calibration before the 2003 model year went into production.*

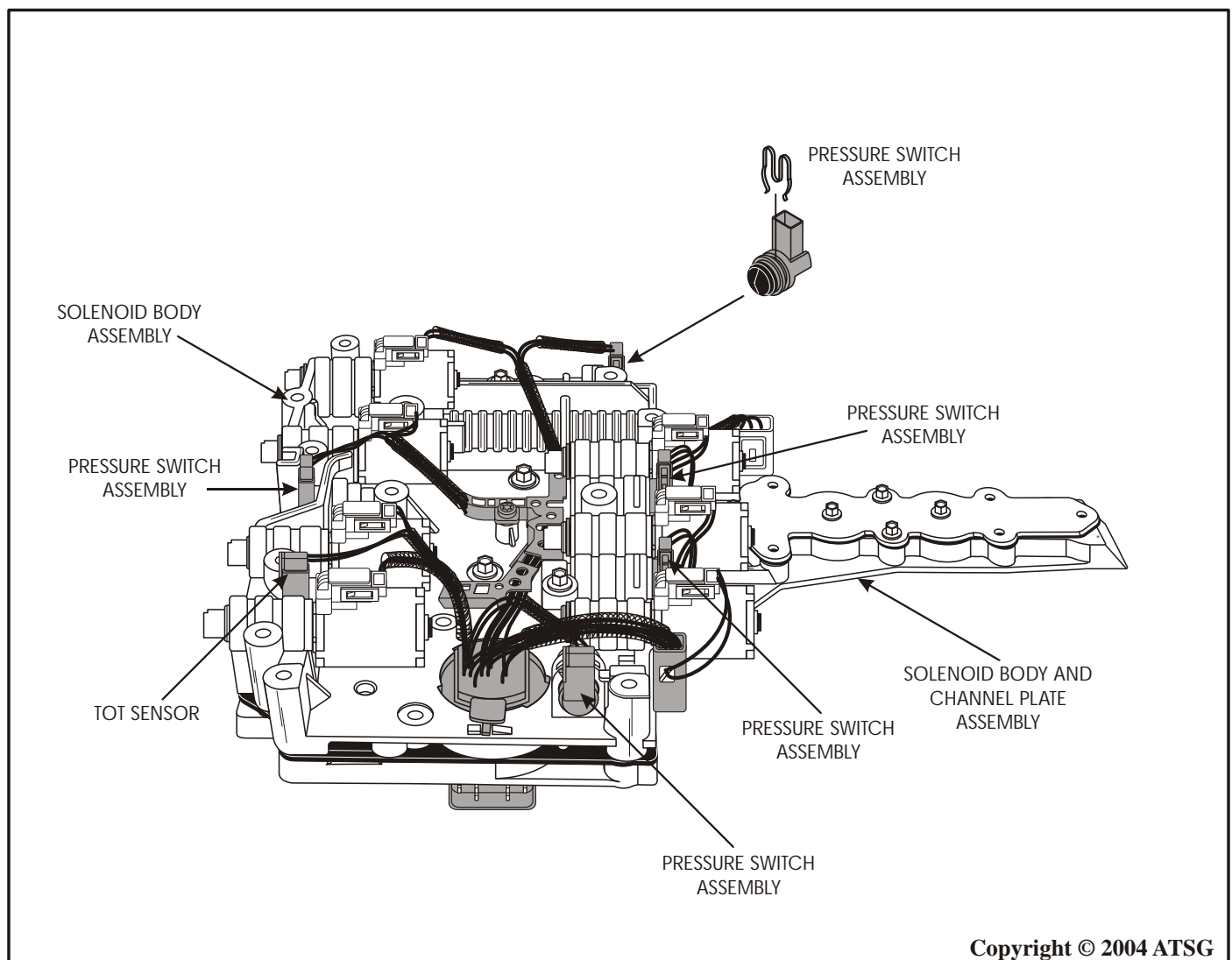


Figure 1

Superior



FORD 5R110W *Torqshift* NEW REAR PLANETARY AND INTERNAL RING GEAR

CHANGE: The rear planetary carrier assembly and rear ring gear hub have been changed for the 2005 production year because of pinion shaft movement in the carrier. Exploded view of all low/reverse clutch parts is provided for you in Figure 1.

REASON: Much improved durability and reliability.

PARTS AFFECTED:

- (1) REAR PLANETARY CARRIER ASSEMBLY - New carrier has a staking process change for the pinion pins to prevent them from "walking" out of the carrier assembly. There have also been some dimensional changes which helps us for identification. The overall height of the carrier has been reduced by .125" (1/8"), as shown in Figure 2. The carrier splines for the low/reverse frictions have also been shortened by .125" (1/8"), as shown in Figure 2.
- (2) REAR RING GEAR HUB - New design ring gear hub has the holes removed from the center, as shown in Figure 3.

INTERCHANGEABILITY:

The new design planetary carrier "Will" retro-fit back on all model years, and is required on any rebuild that has the previous design parts.

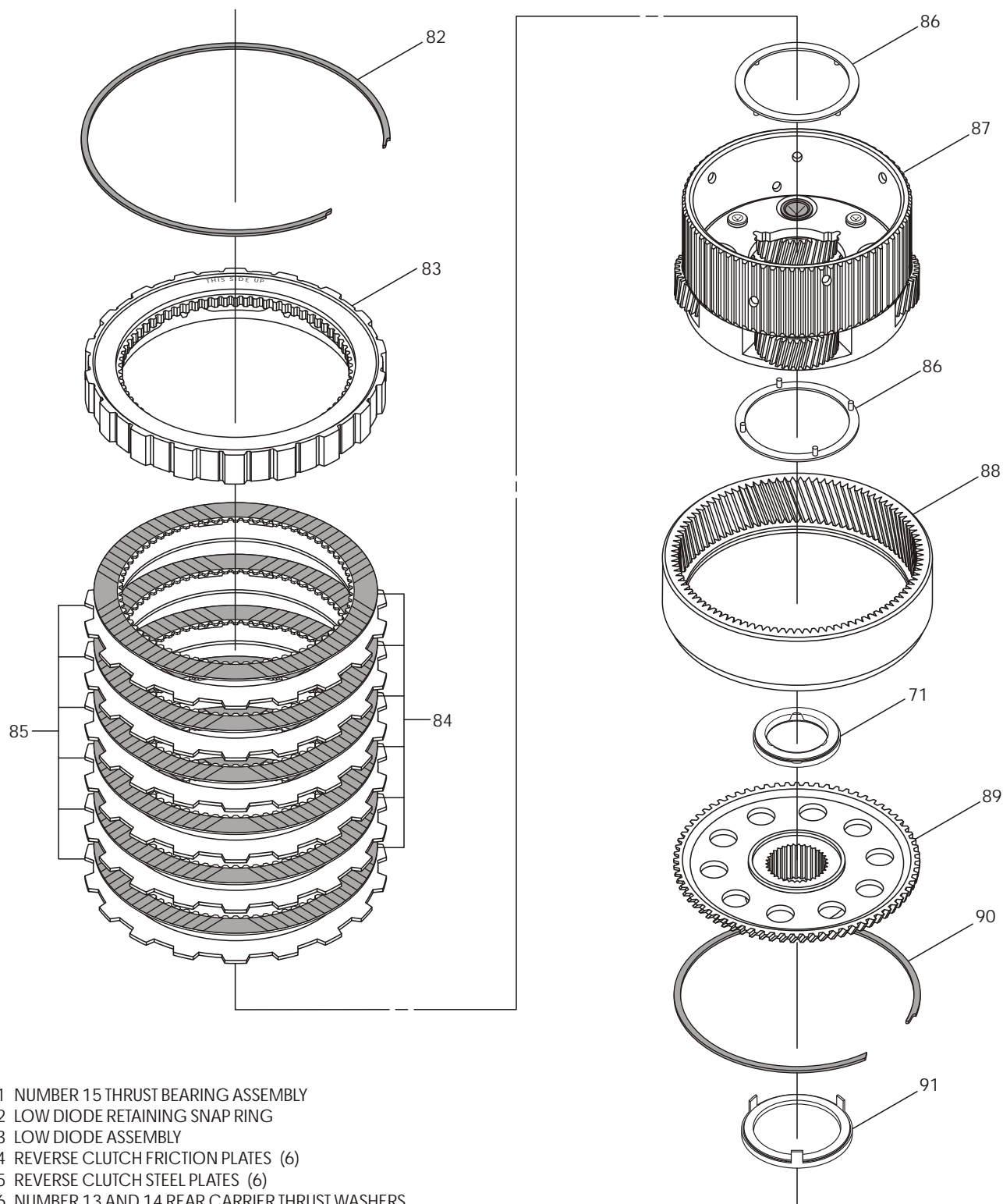
The new design ring gear hub will also retro-fit back on all model years, but the earlier design ring gear hub can be reused as long as it is not damaged. Reuse only with the new design carrier.

SERVICE INFORMATION:

Rear Planetary Carrier Assembly, (2nd Design)	5C3Z-7D006-AB
Rear Internal Ring Gear Hub, (2nd Design)	3C3Z-7D164-AA
Rear Planetary Carrier Thrust Washer, (2 Required)	3C3Z-7A166-A

*Special thanks to Don Wilgress from Festival
City Transmission in Stratford Ontario Canada*

LOW/REVERSE CLUTCH PARTS EXPLODED VIEW



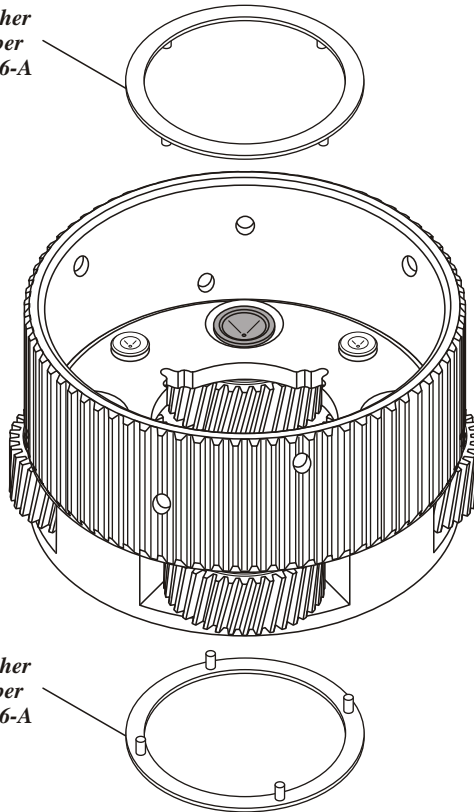
- 71 NUMBER 15 THRUST BEARING ASSEMBLY
- 82 LOW DIODE RETAINING SNAP RING
- 83 LOW DIODE ASSEMBLY
- 84 REVERSE CLUTCH FRICTION PLATES (6)
- 85 REVERSE CLUTCH STEEL PLATES (6)
- 86 NUMBER 13 AND 14 REAR CARRIER THRUST WASHERS
- 87 REAR PLANETARY CARRIER ASSEMBLY
- 88 REAR PLANETARY CARRIER INTERNAL RING GEAR
- 89 REAR PLANETARY CARRIER INTERNAL RING GEAR HUB
- 90 REAR PLANETARY CARRIER RING GEAR HUB SNAP RING
- 91 NUMBER 16 THRUST BEARING ASSEMBLY

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Figure 1

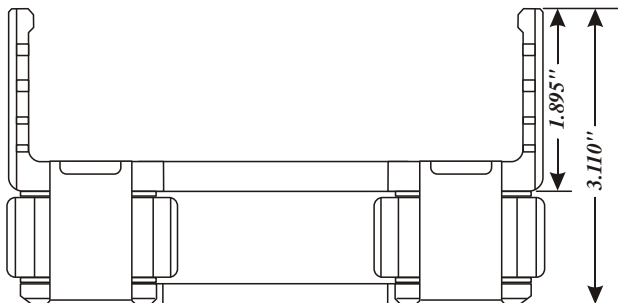
5R110W REAR PLANETARY CARRIER

Thrust Washer
Part Number
3C3Z-7A166-A



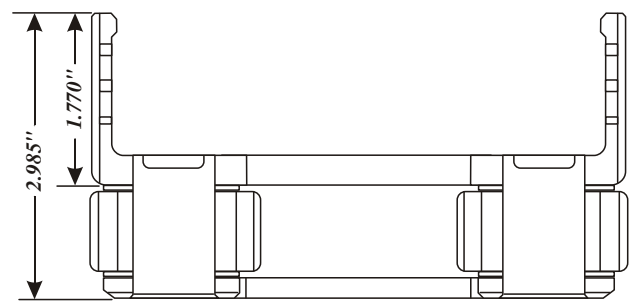
Thrust Washer
Part Number
3C3Z-7A166-A

"1ST DESIGN" REAR PLANETARY CARRIER



"DO NOT USE"

"2ND DESIGN" REAR PLANETARY CARRIER

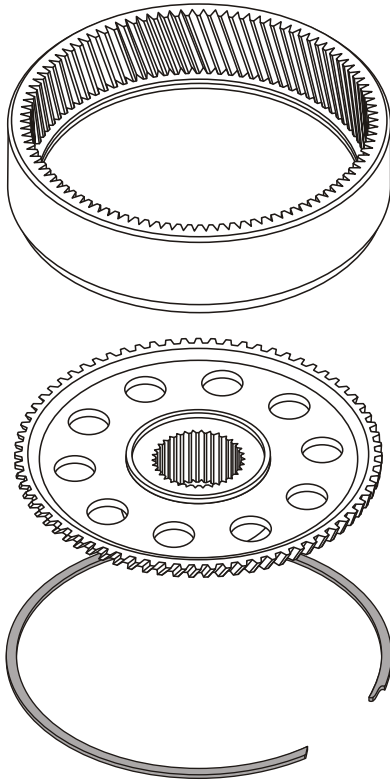


**PART NUMBER
5C3Z-7D006-AB**

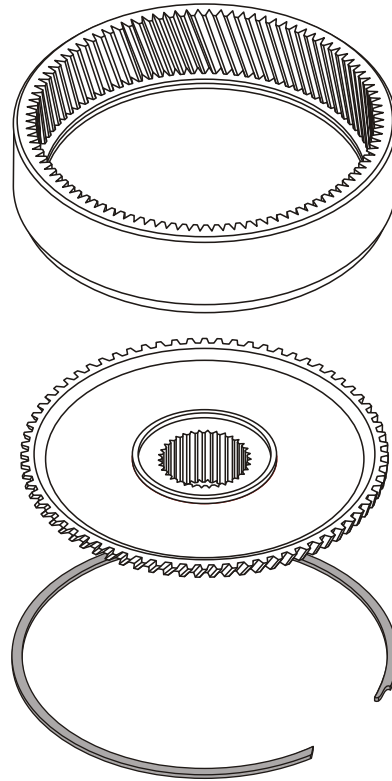
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Figure 2

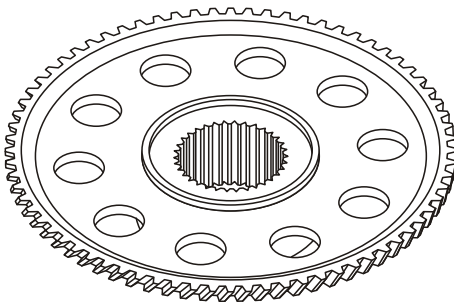
**"1ST DESIGN"
REAR RING GEAR HUB**



**"2ND DESIGN"
REAR RING GEAR HUB**

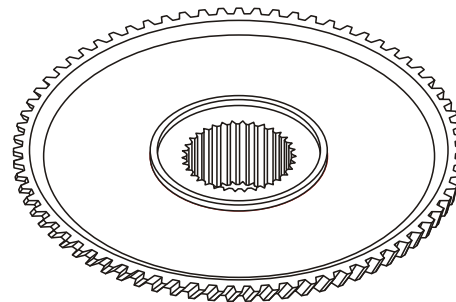


**"1ST DESIGN"
REAR RING GEAR HUB**



**"OK TO USE"
WITH NEW CARRIER**

**"2ND DESIGN"
REAR RING GEAR HUB**



**PART NUMBER
3C3Z-7D164-AA**

Figure 3

FORD AX4S OVERDRIVE BAND FAILURE

COMPLAINT: Vehicles equipped with the AX4S transaxle may exhibit premature Overdrive band failure.

CAUSE: The cause may be, a worn servo bore. The Overdrive servo is fed thru the center of the apply pin. Wear in the case, where the servo pin rides, may cause a pressure loss, creating the band failure. See Figure 1. *NOTE: ATSG has found that this is very common on 98&up models.*

CORRECTION: To correct this condition there are currently two options, replace the case or re-sleeve the case where the pin rides and install a bushing for a new sealing surface. *Northland transmission Inc. has a Re-boring kit available to repair the case bore, with a bushing, to fix the leak.*
Phone: 715-458-2617

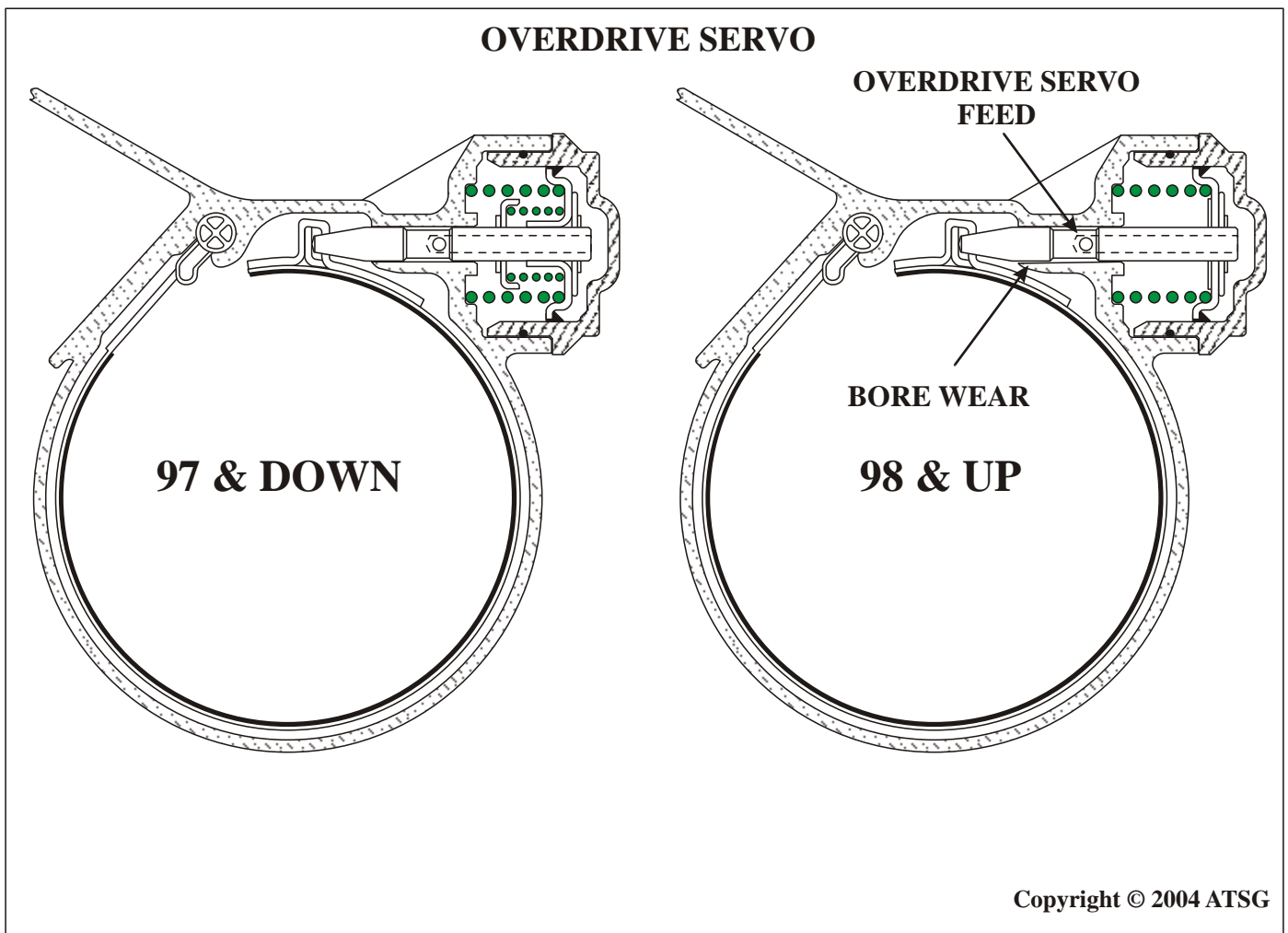


Figure 1



FORD WINDSTAR

CODE P0743, TCC SOLENOID ELECTRICAL CIRCUIT FAULT

COMPLAINT: A 1998 Ford Windstar comes into the shop with a code P0743 for a "TCC Solenoid Electrical Circuit Fault" stored as a hard code. The unusual part of this problem is that the code is stored as soon as the ignition is turned on.

CAUSE: Since all items relating to this type of situation had already been eliminated as the cause of the problem, the technician decided to consult wiring diagrams for this vehicle. Since the factory wiring diagrams were split into two categories, vehicles built before 9/8/97 and vehicles built after 9/8/97, both were compared. The "before 9/8/97" indicated that the TCC ground controlled terminal was at pin 82, (Refer to Figure 1). The "after 9/8/97" diagram indicated this circuit should be at terminal 54, (Refer to Figure 2). The technician decided to check the signal that was being sent on this circuit by the PCM. The Red/Lt Blue wire was located at terminal 82 in the PCM connector. There was battery voltage on the circuit at all times, usually meaning that the PCM did not deliver the ground signal. *The PCM connector location at pin 54 was molded shut!*

A call to the local Ford dealer parts person revealed a "Special Service Message" that is only available to Ford dealers that states as follows:

"THE TORQUE CONVERTER CLUTCH SOLENOID IN 1998 WINDSTARS BUILT FROM JANUARY 1, 1997 TO SEPTEMBER 8, 1997, WILL HAVE A RESISTANCE OF .98 TO 1.6 OHMS AND THE PCM TERMINAL LOCATION IS PIN 82.

THE TCC SOLENOID IN 1998½ WINDSTARS BUILT FROM SEPTEMBER 9, 1997 TO PRESENT WILL HAVE A RESISTANCE OF 13 TO 24 OHMS AND THE PCM TERMINAL LOCATION IS PIN 54.

1998½ MODEL YEAR DESIGNATION MAY BE IDENTIFIED BY THE LETTER "Z" IN THE 4TH DIGIT OF THE VEHICLE IDENTIFICATION NUMBER (VIN)".

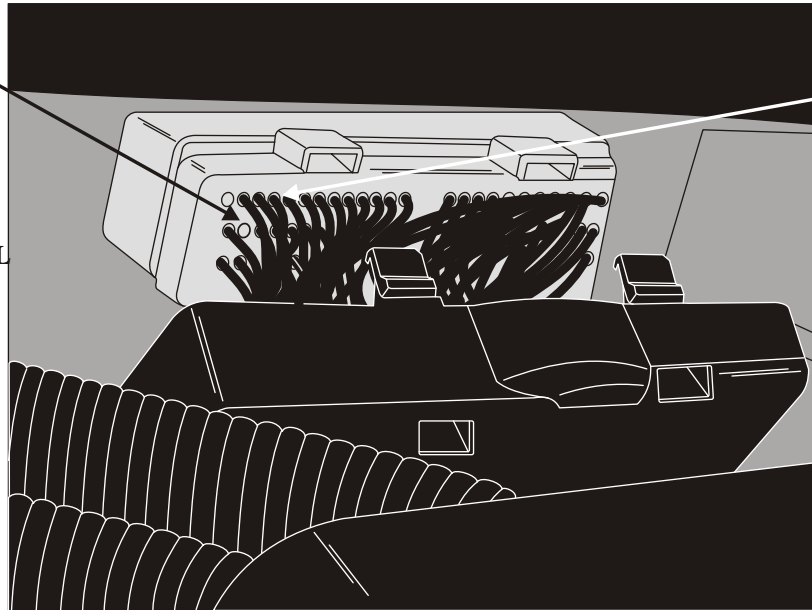
CORRECTION: This vehicle did have a "Z" as the 4th vin digit making it a 1998½ vehicle which means the active TCC solenoid ground circuit should be terminal 54, not 82. How this came about will remain a mystery. It would seem that someone working on this vehicle in the past went through the trouble of installing a 1998½ PCM with a 1998 wiring harness.

The fix was to drill the terminal 54 location open and move the TCC ground controlled wire from the pin 82 location to terminal 54.

Many thanks to Jim Brinkman of Brinkman's Transmission in Dayton, Ohio for sharing his experience with us in order to put this material together, and congratulations to Jim and Dan for a tough job well done.

WINDSTARS BUILT BEFORE 9/8/97

HAS THE WHITE CONNECTOR TCC SOLENOID AND WILL HAVE TERMINAL 54 MOLDED SHUT AND THIS PCM TERMINAL WILL BE NON-FUNCTIONAL

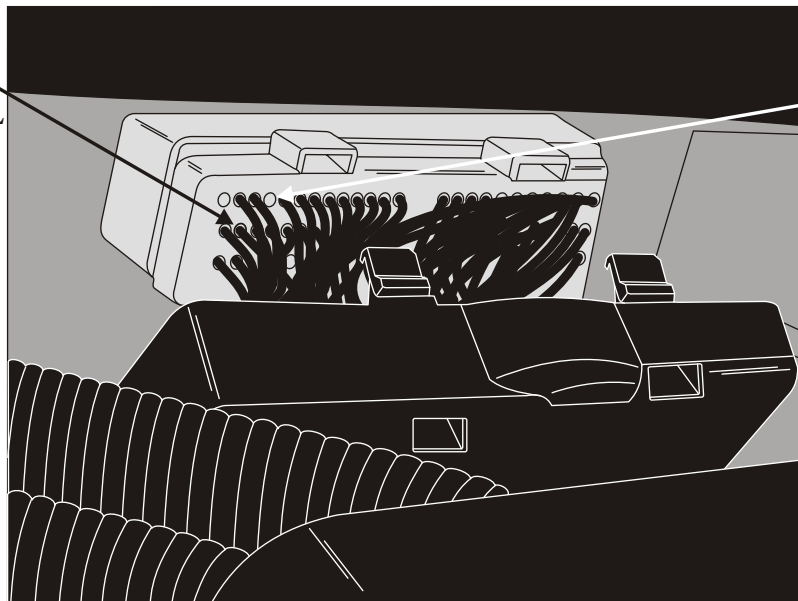


TERMINAL 82 WILL BE THE FUNCTIONAL TERMINAL FOR THE TCC GROUND CONTROLLED CIRCUIT

Figure 1

WINDSTARS BUILT AFTER 9/8/97

TERMINAL 54 WILL BE THE FUNCTIONAL TERMINAL FOR THE TCC GROUND CONTROLLED CIRCUIT



HAS THE BLUE CONNECTOR TCC SOLENOID AND WILL HAVE TERMINAL 82 MOLDED SHUT AND THIS PCM TERMINAL WILL BE NON-FUNCTIONAL

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Figure 2

FORD POWERTRAIN CONTROL MODULE

VEHICLE IDENTIFICATION BLOCK (VID)

COMPLAINT: On some 1999 and later Ford vehicles with gas engines only, after PCM replacement, either from the wrecking yard, the O.E. dealer, or a donor out of another similar vehicle, the speedometer is inaccurate or inoperative. In addition, the 4x4 lamp is illuminated and there are codes P1639 for "VID Block Not Programmed Or Is Corrupt" and P1635 for "Tire/Axle Out Of Acceptable Range".

These complaints can also arise after the instrument cluster is replaced.

CAUSE: Whenever the PCM or instrument cluster has been replaced in these vehicles, it is necessary to program the PCM with the correct Vehicle Identification (VID) Block.

A PCM from the wrecking yard or a donor vehicle may have the incorrect tire size and axle ratio information in it which will result in the above complaints.

A PCM obtained from the O.E. dealer will have none of this information in it, it must be flashed in at the time of installation.

CORRECTION: Currently this is an O. E. dealer process because the NGS scan tool or the WDS diagnostic station must be used. The tire size and axle ratio information is transferred from the original PCM to the replacement or this information is accessed from the Ford Motor Company "Professional Technician Society" website and downloaded from the "As-Built Database". This process becomes even more complicated if the vehicle is equipped with Ford's "PATs" anti-theft system.

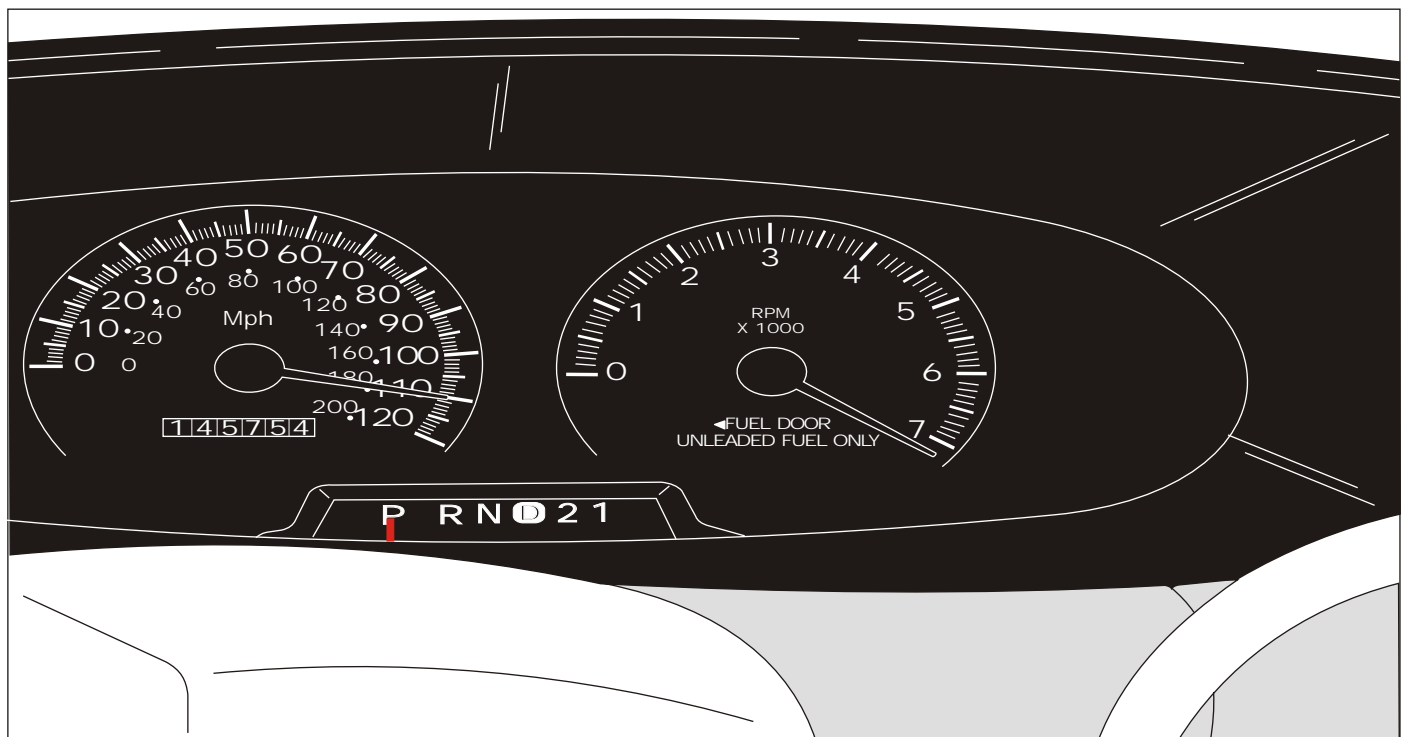


Figure 1

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A & Reds



FORD AX4N

VEHICLE SPEED SENSOR ELIMINATED

COMPLAINT: A 1995 to 2002 Lincoln Continental comes in with a complaint of erratic or no speedometer operation and the AX4N transmission is not shifting properly or, no upshift out of first gear. A scan of the PCM reveals any number of the following codes, P0500, P0501, P0503, P1500 or P1502 for no VSS or intermittent loss of VSS signal. The ABS warning lamp is also illuminated and the MIL lamp may also be on. A visual check of the VSS reveals that no VSS is located in either of the two locations it would normally be found! (Refer to Figure 1)
NOTE: This can also occur on 1996 to 1999 Taurus SHO with AX4N transmission.

CAUSE: These vehicles obtain the VSS signal from the Antilock Brake Control Module. This means that the raw signal the ABS Module is receiving comes from all four (4) Wheel Speed Sensors (WSS), Refer to Figure 2.

Systems using the gear driven or permanent magnet type of VSS, will have a wire at PCM terminal 58, with the ground circuit found at PCM terminal 33. Systems using the ABS Module to generate the VSS signal will not have a wire at PCM terminal 58 as shown in Figure 3. The VSS signal is sent from the ABS Module over the vehicles Multiplex Communication Network to the Speed Control Module (cruise control) and then to other modules that require a VSS signal as illustrated in the electrical schematic shown in Figure 4.

CORRECTION: The ABS Module will have to be scanned for wheel speed sensor codes in order to find the one, or more, wheel speed sensor(s) that are faulty. It would also help to view the ABS data to see if all four (4) wheel speeds are the same when driving in a straight line, (no turns).
Note: The reluctors at each wheel can become caked with mud or rust resulting in an erratic or no signal condition, be sure to check for this or any other condition that might cause a problem with the wheel speed sensor to reluctor relationship.

VEHICLE SPEED SENSOR ELIMINATED

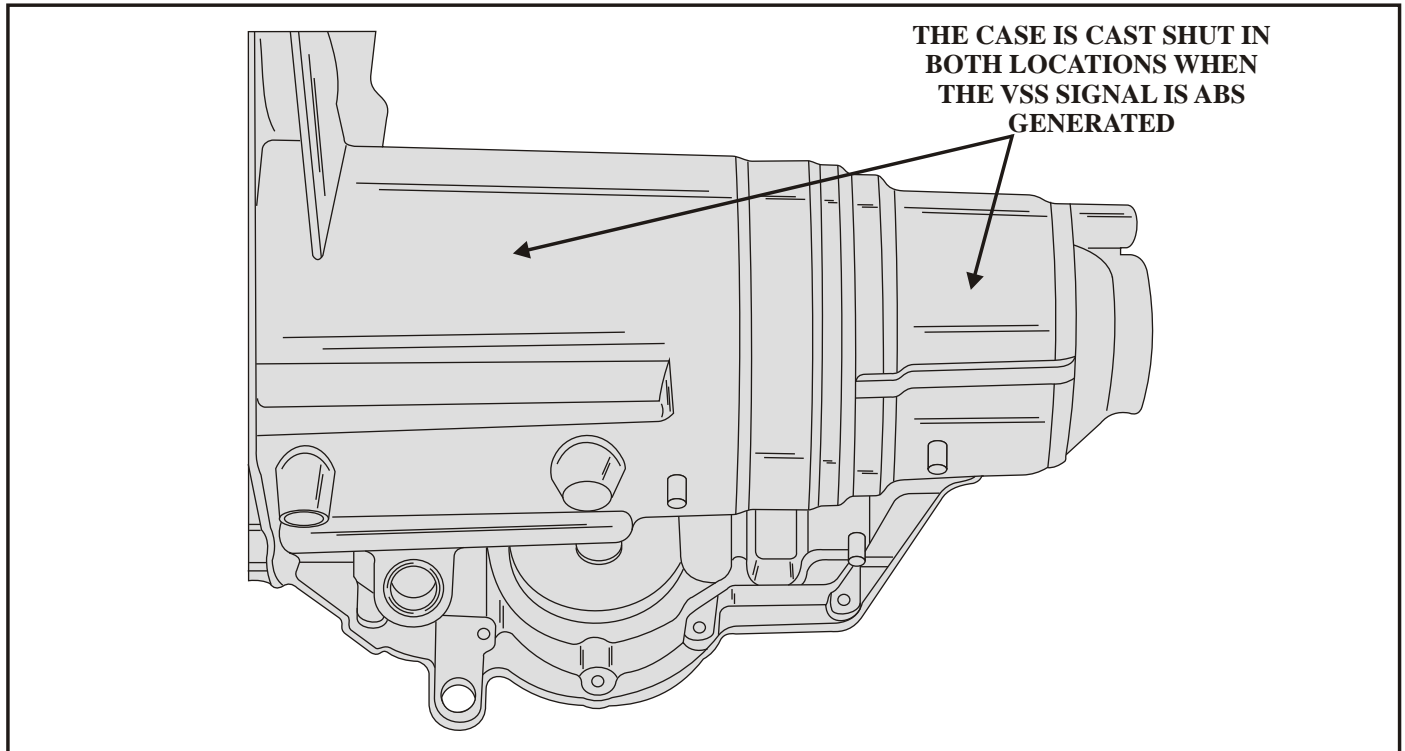


Figure 1

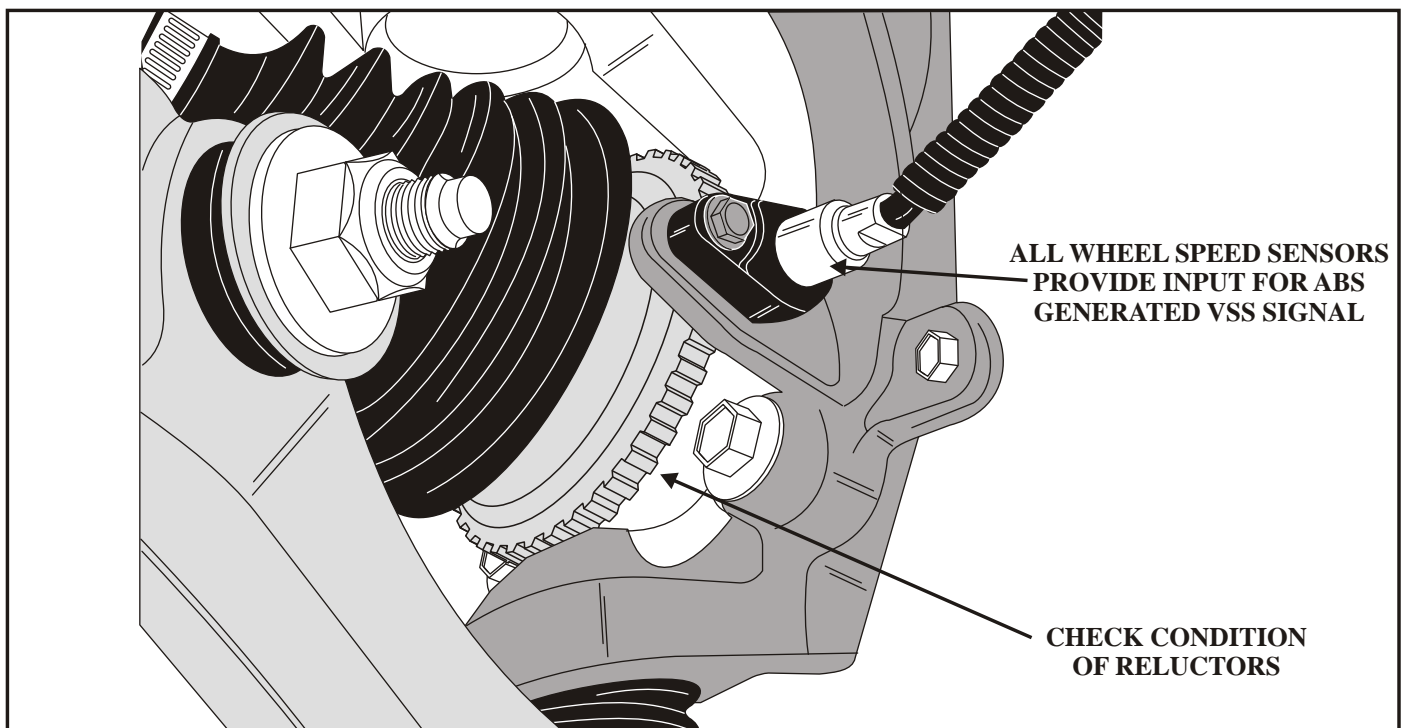


Figure 2

Transtec

VEHICLE SPEED SENSOR ELIMINATED

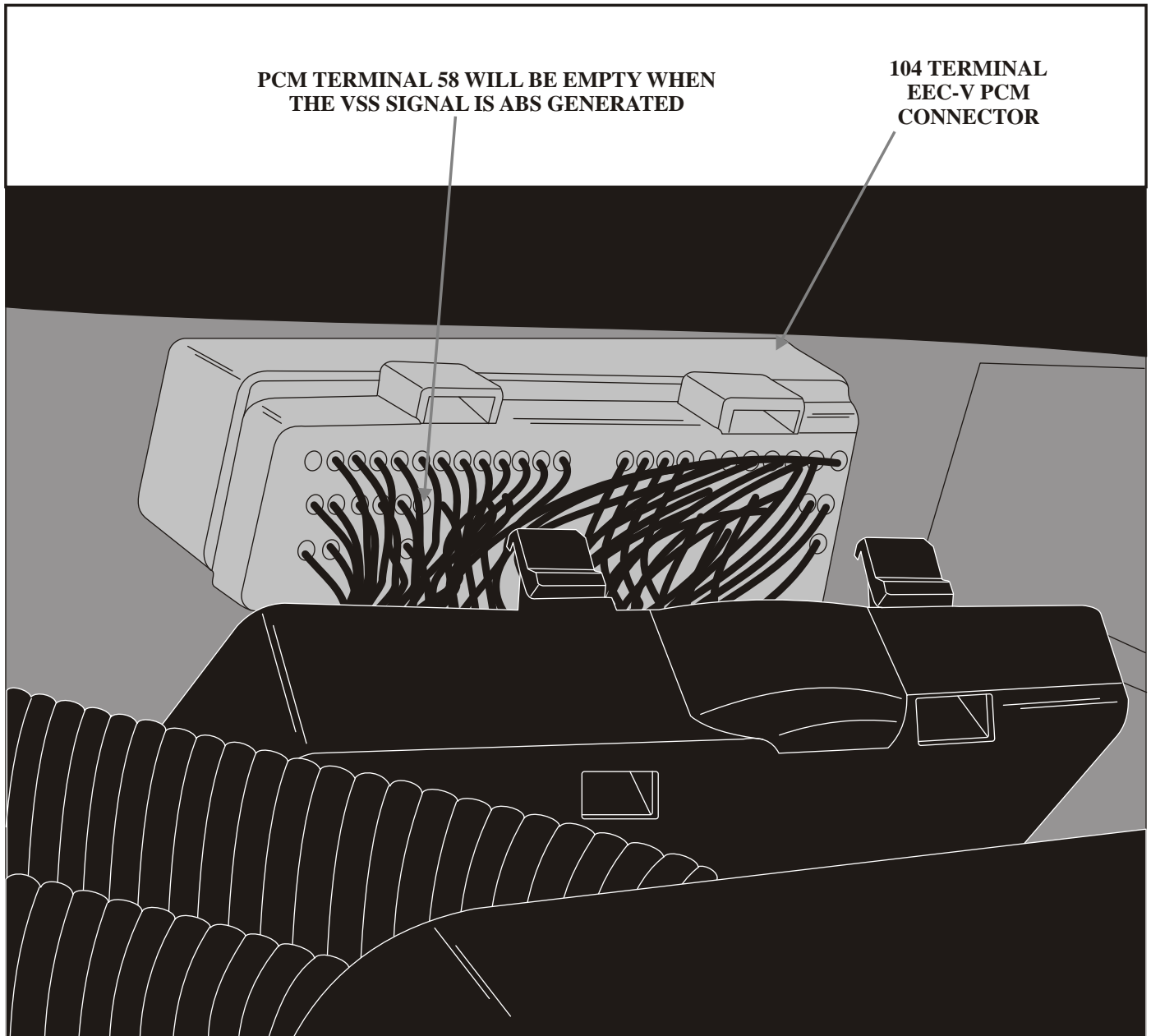
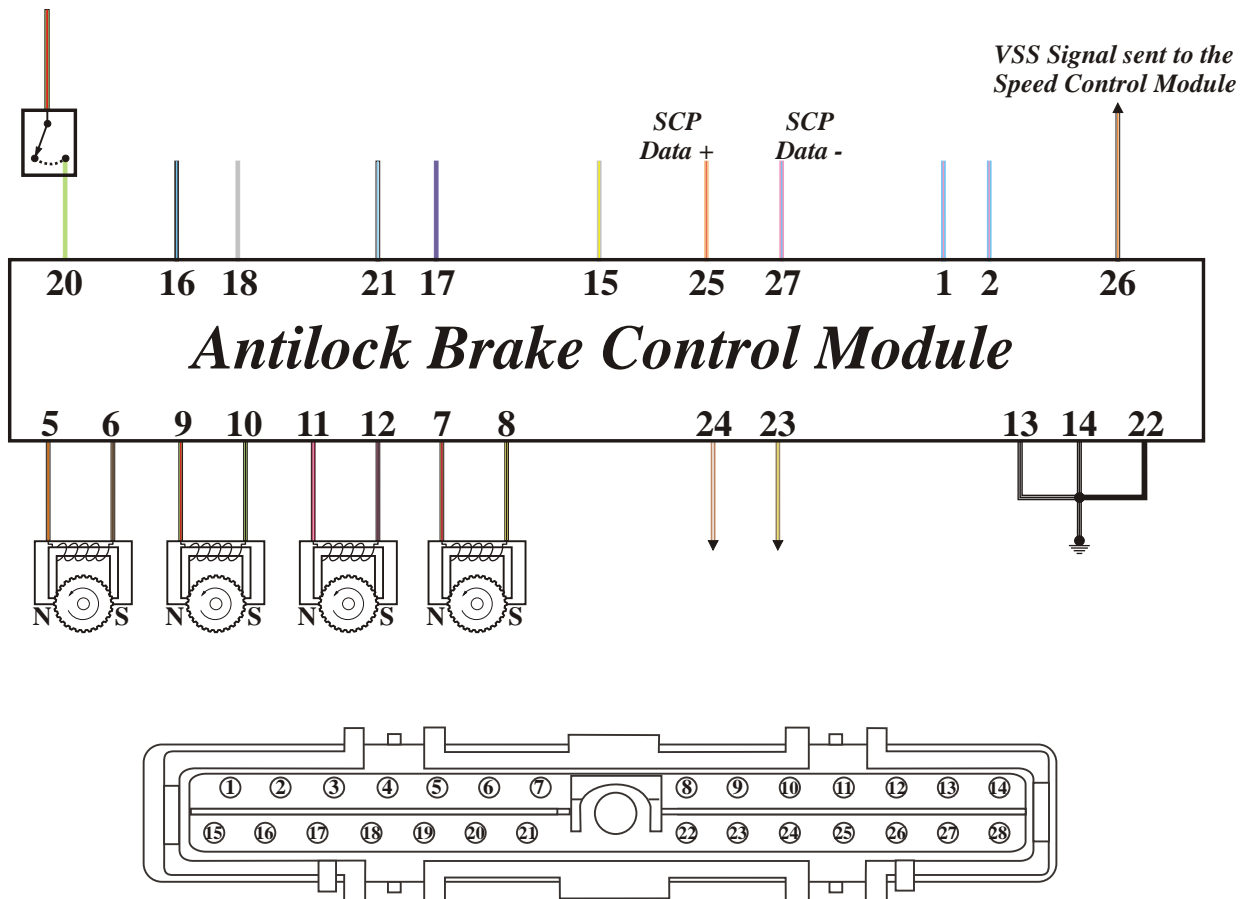


Figure 3

VEHICLE SPEED SENSOR ELIMINATED



1	Power (Hot at all times)	15	Accy Feed from ABS EVAC and Fill
2	Power (Hot at all times)	16	Traction Control ON/OFF Indicator to Module
3	Not used	17	Traction Control Active Indicator
4	Not used	18	Traction Control Feed to Module
5	LF Brake Sensor Input	19	Not used
6	LF Brake Sensor Input	20	Brake ON/OFF Switch (BOO)
7	RF Brake Sensor Input	21	Anti-Lock Warning Indicator
8	RF Brake Sensor Input	22	Ground
9	LR Brake Sensor Input	23	RR Buff Wheel Speed Output (To GPS
10	LR Brake Sensor Input	System)	
11	RR Brake Sensor Input	24	LR Buff Wheel Speed Output (To GPS
12	RR Brake Sensor Input	System)	
13	Ground	25	Data + (SCP Communication Network)
14	Ground	26	VSS Signal to Speed Control Module
		27	Data - (SCP Communication Network)
		28	Not Used

Figure 4

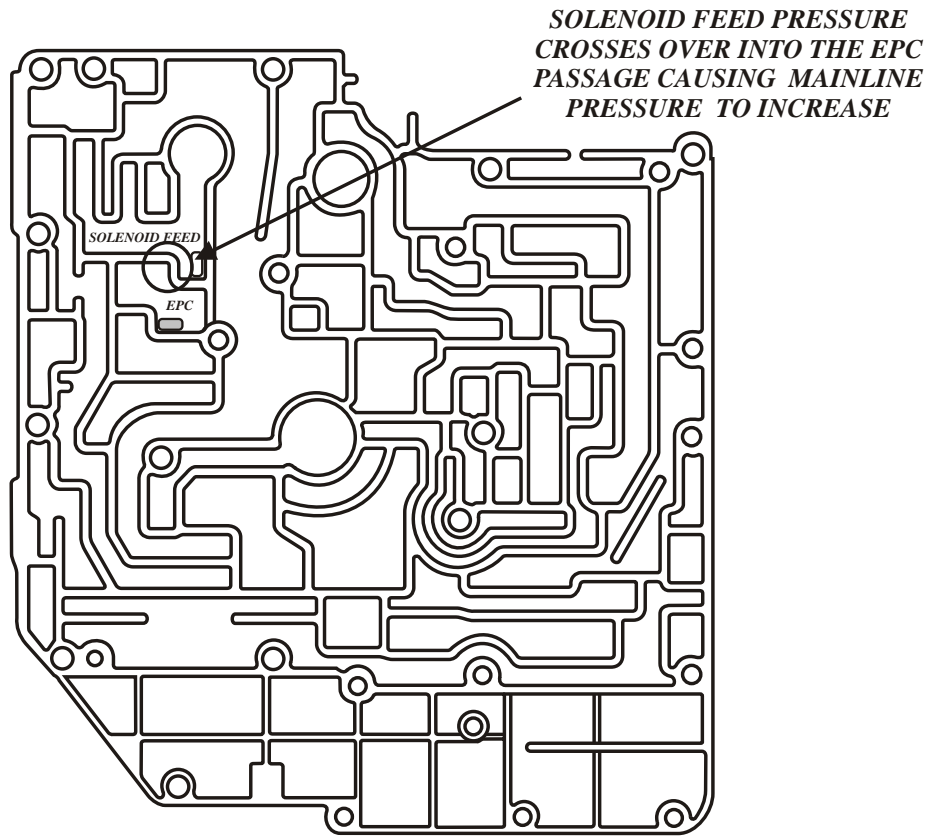


FORD AX4N

1994 - 1997 HARSH UPSHIFTS AND DOWNSHIFTS

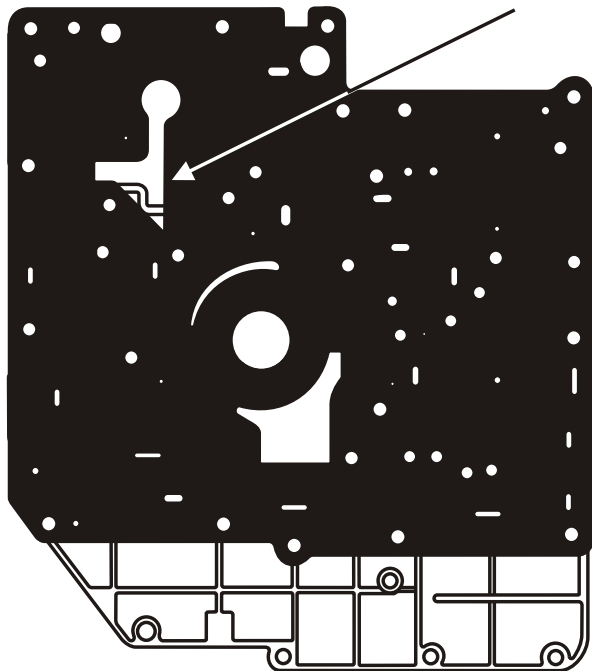
- COMPLAINT:** After overhaul, some Ford Motor Company vehicles 1994 - 1997 that are equipped with the AX4N Transaxle may exhibit a high Mainline and EPC pressure condition, along with *No* Trouble Codes.
- CAUSE:** One possible cause may be, that during the overhaul procedure the 1998 & up Pump Plate to Valve Body Gasket may have been installed on a 1994 - 1997 Valve Body. When this happens, an opening between the Solenoid Feed circuit and the EPC circuit will allow Solenoid Feed oil to go over a worm track and enter the EPC circuit at the end of the Pressure Failsafe Valve as shown in Figure 1. This additional oil entering the EPC circuit will increase the amount of pressure in the circuit causing increased movement of the Pressure Failsafe Valve, which allows an increase of EPC pressure to enter the TV Boost Valve assembly, thus increasing the Mainline pressure. See Figure 2 for a partial hydraulic schematic. *Note: Typically when the 1998 - up gasket is installed, the gauge reading has shown to be 100 - 110 psi. engine idling, and the shift selector in the OD position.*
- CORRECTION:** Ensure that the correct Pump Plate to Valve body gasket is being used. For reference, Figure 3 shows the 1994 - 1997 Pump Plate to Valve Body gasket and the 1994 - 1997 Valve Body casting. Figure 4 shows the 1998 and up Pump Plate to Valve body gasket and the 1998 and up Valve Body casting.

1994 - 1997 VALVE BODY

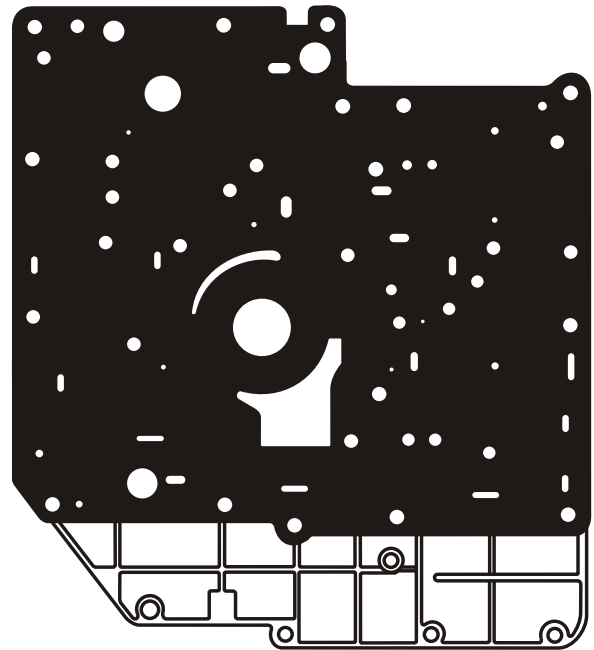


INCORRECT GASKET

1998 and up gasket on a 94-97 Valve body



CORRECT GASKET

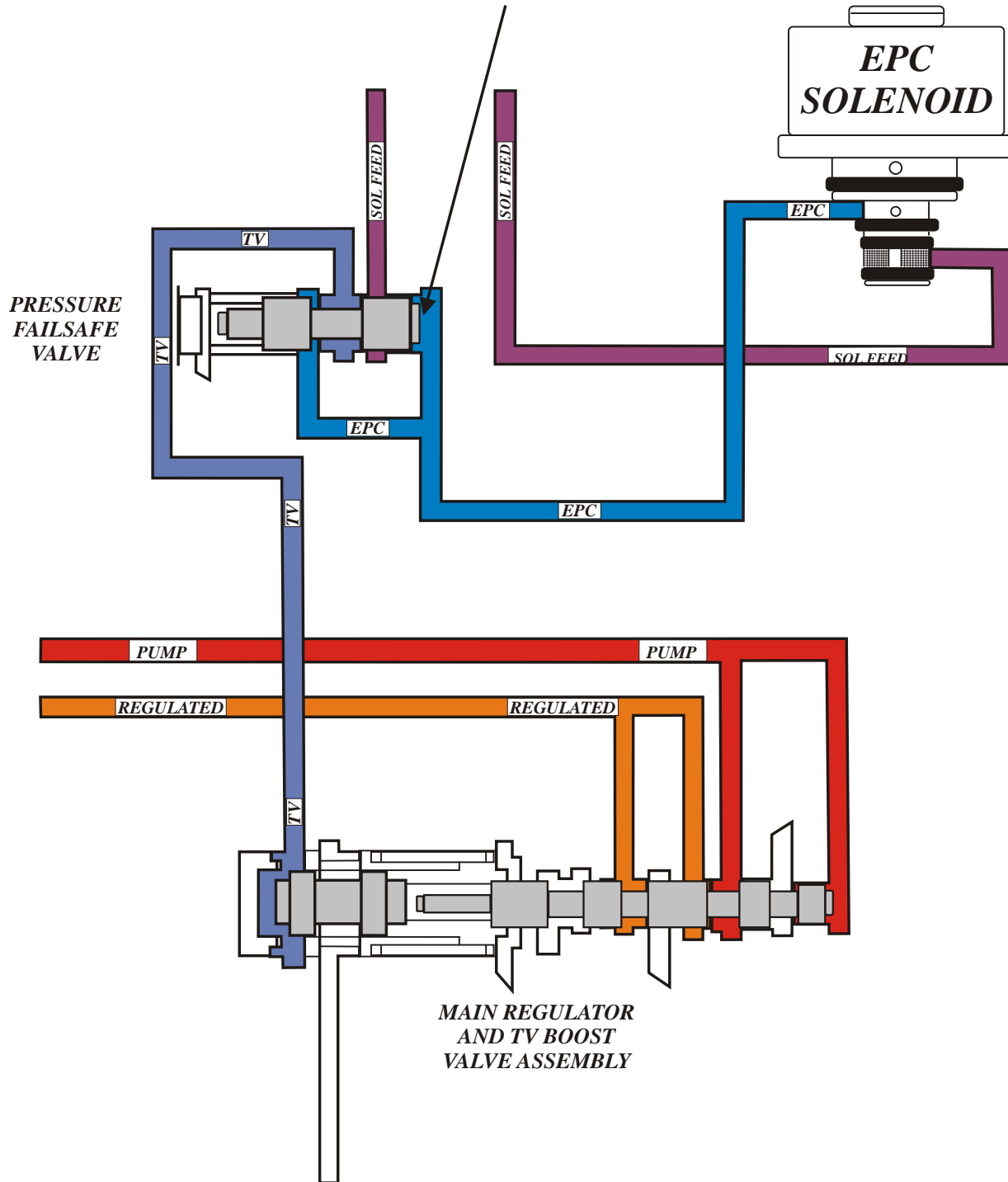


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Figure 1

PARTIAL HYDRAULIC SCHEMATIC

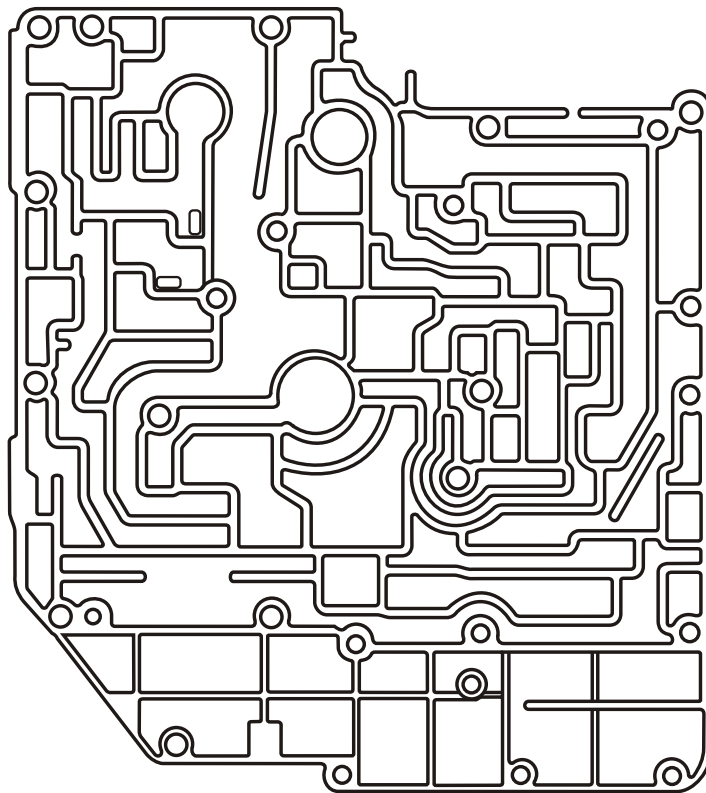
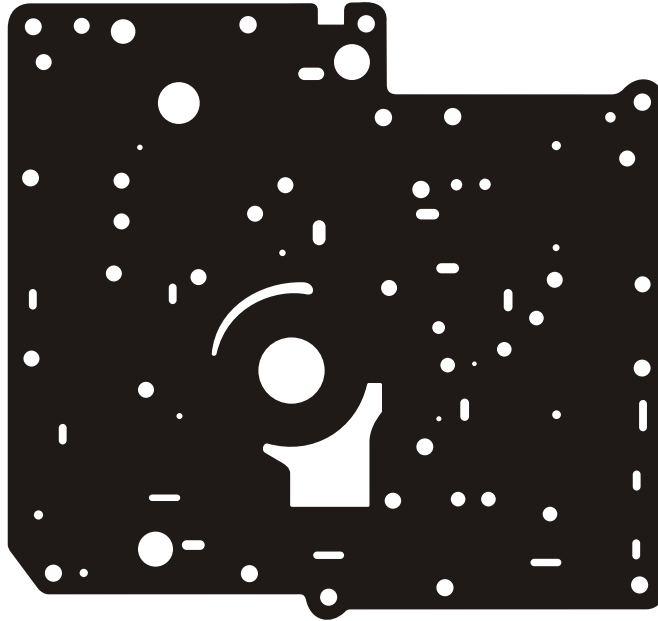
*SOLENOID FEED PRESSURE ACTS ON THIS
END OF THE PRESSURE FAILSAFE VALVE
CAUSING AN INCREASE OF TV PRESSURE*



Copyright © 2004 ATSG

Figure 2

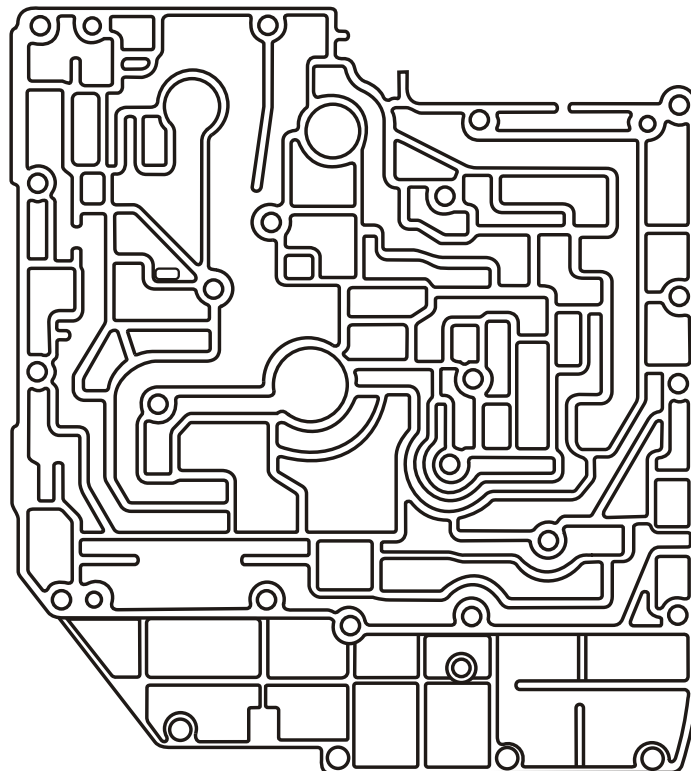
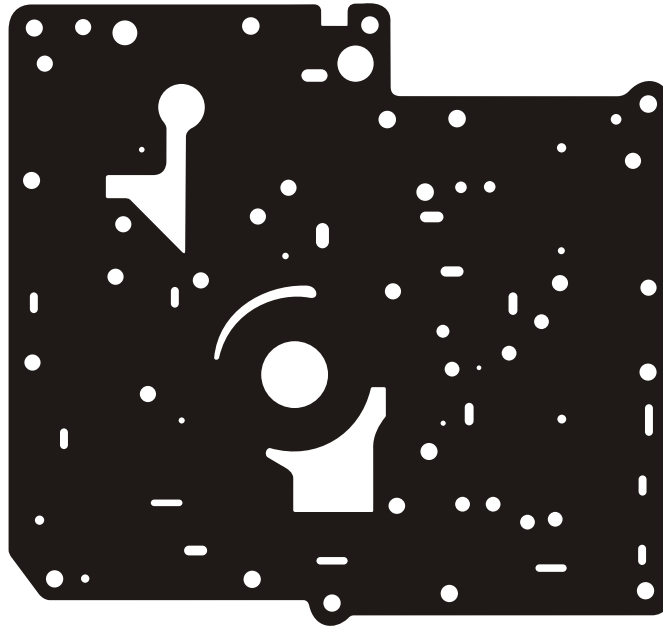
1994-1997 GASKET AND VALVE BODY



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Figure 3

1998 & UP GASKET AND VALVE BODY



Copyright © 2004 ATSG

Figure 4

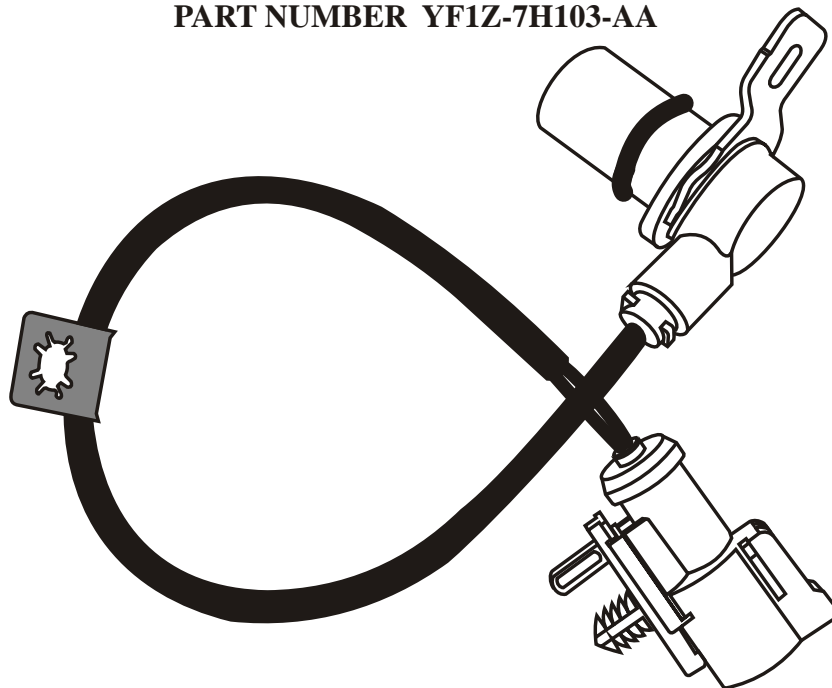
FORD MOTOR COMPANY AX4N 1999 - UP MOMENTARY NEUTRAL ON ACCELERATION SHIFT SELECTOR IN OD POSITION ONLY

COMPLAINT: Some 1999 and later Ford Motor Company vehicles equipped with the AX4N Transaxle may exhibit a condition that has been described as a neutral during the 1-2 upshift, or as a neutral during acceleration in first gear. This complaint does not occur if the shift selector is moved to the D position.

CAUSE: The cause may be that a faulty Vehicle Speed Sensor is causing this complaint. See Figure 1. It is a new design Vehicle Speed Sensor that is a Permanent Magnet Sensor that reads off the park gear. See figure 2. **Reason:** when the neutral feeling occurs it is a fault in the signal that is sent to the PCM, telling it that the vehicle speed has just increased from approximately 15 mph to approximately 35 to 40 mph. When this happens the trans is still in first gear, the PCM turns on Shift Solenoid 3 momentarily and then turns it back off again. At the time that Shift Solenoid 3 is on it allows the Forward Clutch Control Valve to move to a downshifted position, at which time the Forward Clutch exhausts causing the trans to slip into a neutral condition. Figure 3 shows Shift Solenoid 3 off, and the Forward Clutch applied. Figure 4 shows Shift Solenoid 3 on, and the Forward Clutch off.

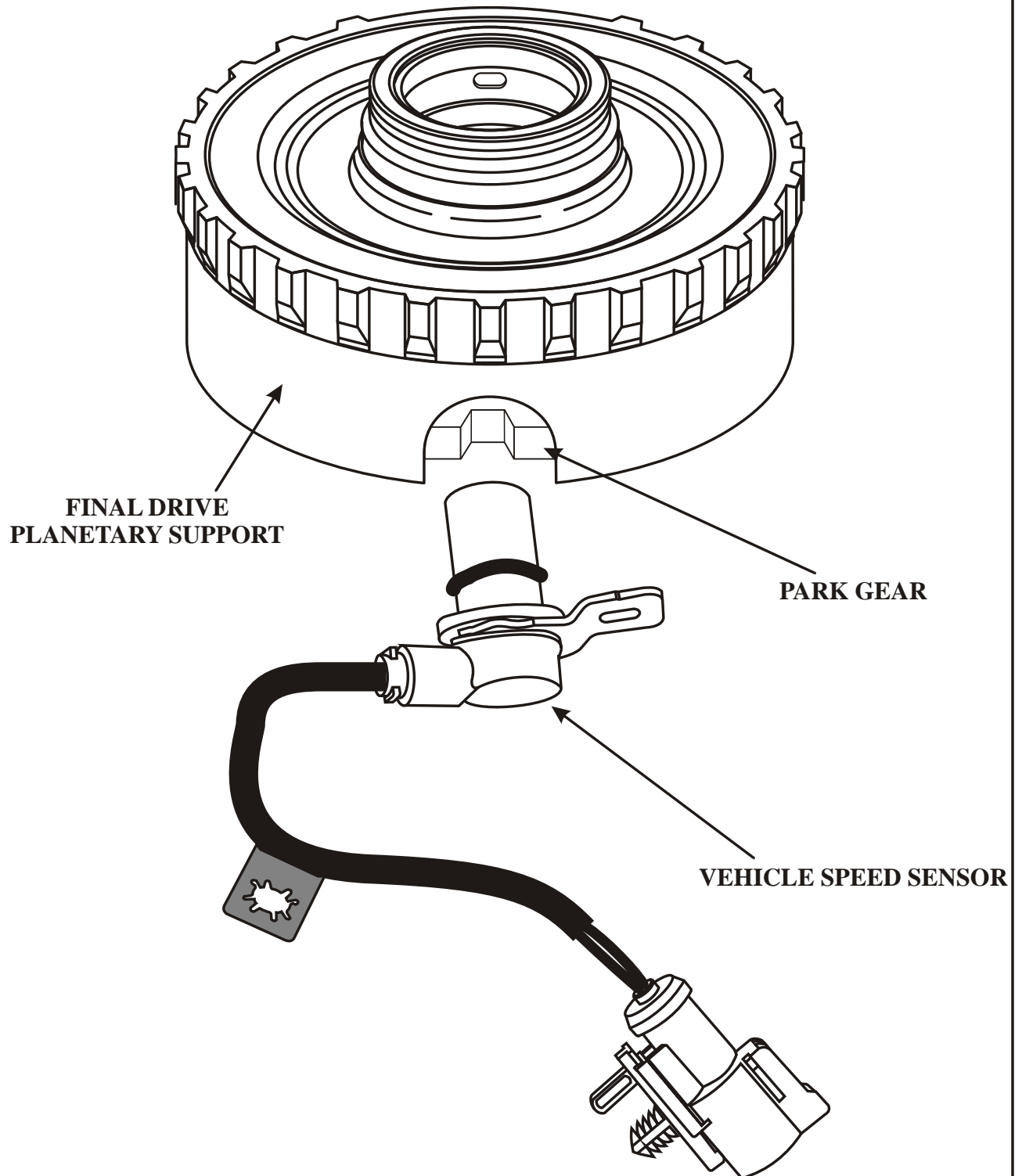
CORRECTION: Replace the Vehicle Speed Sensor with Ford Part Number YF1Z-7H103-AA

**AX4N VEHICLE SPEED SENSOR
PART NUMBER YF1Z-7H103-AA**



Copyright © 2004 ATSG

Figure 1
Automatic Transmission Service Group



Copyright © 2004 ATSG

Figure 2
Automatic Transmission Service Group

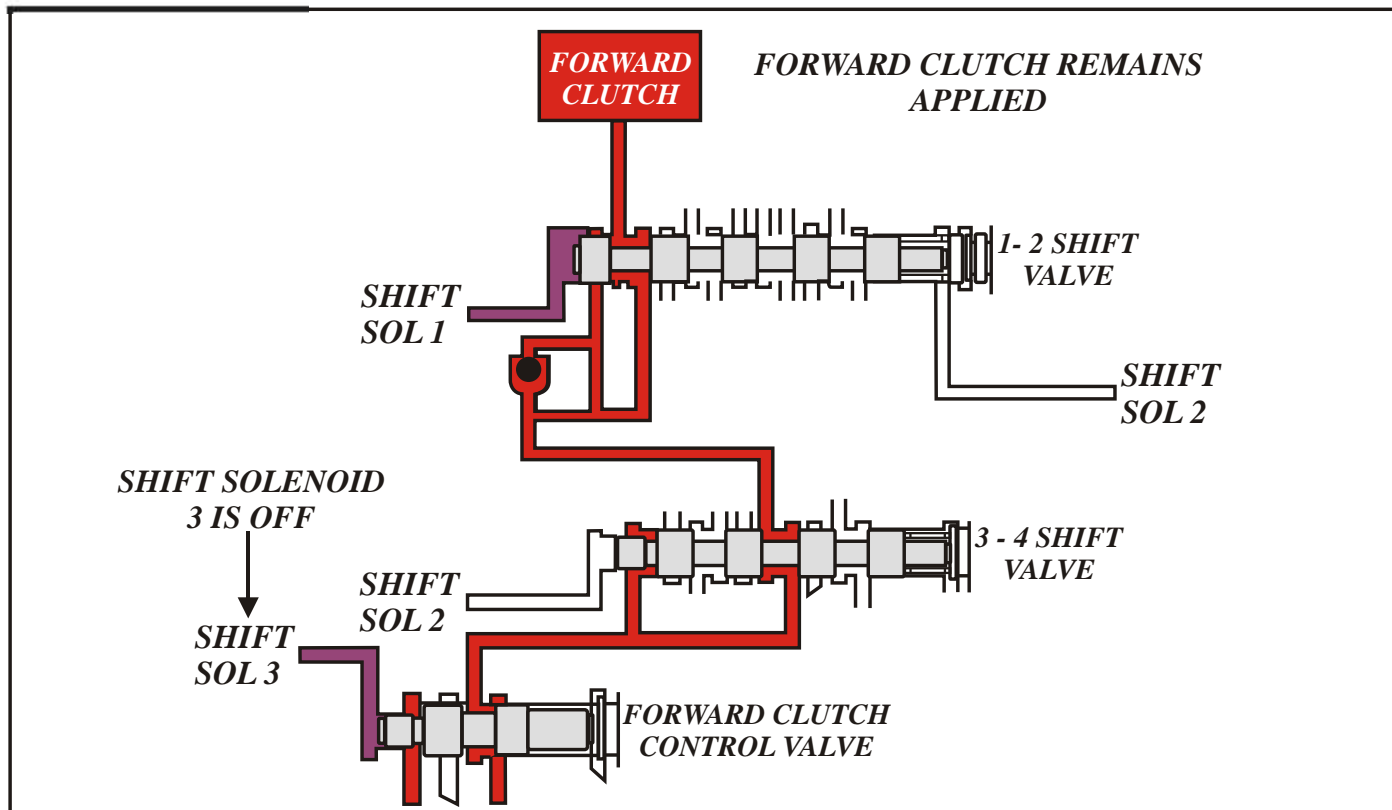
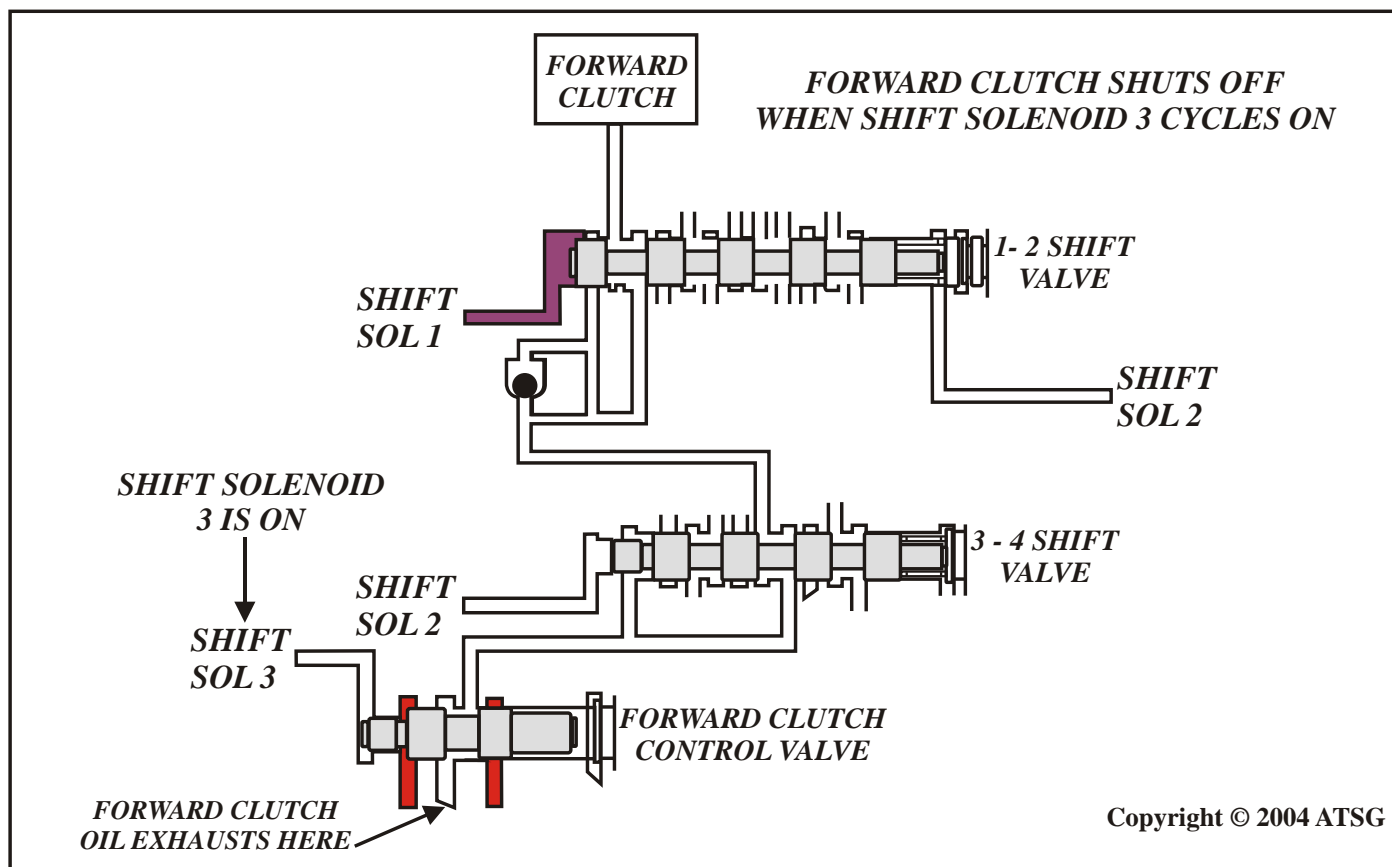


Figure 3



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Figure 4



FORD MOTOR COMPANY AX4N TRANSAXLE NO FOURTH OR NEUTRALS AT A STOP

COMPLAINT: Ford Motor Company vehicles equipped with the AX4N transaxle may exhibit a no fourth gear upshift, or a neutral condition at a stop. The neutral condition may affect First Gear or Reverse, or both.

CAUSE: **Cause number 1:** No upshift to fourth. One common cause for this condition is that the Forward Clutch Control Valve sticks in an upshifted position. Figure 1 shows the transaxle in 3rd gear with the shift selector in the OD position, with the Forward Clutch Control Valve sticking in an upshifted position. This will leave the Forward Clutch applied. With mainline pressure present at two locations of the 3-4 Shift Valve keeping the Forward Clutch applied, this will not allow the 3-4 Shift Valve to stroke, thus preventing the 3-4 shift from taking place. Figure 2 shows what takes place when the Forward Clutch Control Valve operates normally when the transaxle shifts to 3rd gear. You will notice that the valve has moved to the left, allowing the Forward Clutch pressure to exhaust, leaving the 3-4 Shift Valve free to stroke into an upshifted position when the PCM commands the shift to fourth gear.

Cause number 2: Neutrals at a stop after upshifting to either third or fourth gear with the shift selector in the OD position. The problem does not occur if the shift selector is left in the D position, or the OD Cancel Switch is depressed to show OD OFF (*Vehicles without an OD cancel switch has a shift quadrant of OD, D and L. With switch the quadrant is D, 2 and 1*). The most common cause for this condition is that the Forward Clutch Control Valve will be sticking in the downshifted position, blocking the path of the fluid pressure to the forward clutch. **Note: The Forward Clutch must be applied in order to have either First Gear or Reverse.** Figure 3 shows a normal Forward Clutch apply with the Forward Clutch Control Valve functioning properly. Figure 4 shows that the Forward Clutch Control Valve is stuck in the downshifted position, causing the Forward Clutch not to be applied.

Road test: Try this simple test to help you to determine if the Forward Clutch Control Valve is causing the transaxle to neutral at a stop. Drive the vehicle with the shift selector in the D range, or press the OD Cancel Switch so that it indicates OD OFF. If when road testing the vehicle this way, you find that the neutral condition at a stop does not occur, then it is very likely that the Forward Clutch Control Valve is sticking. The reason that this is helpful is that when OD is not selected, the PCM does not energize Shift Solenoid 3 during the upshift to 3rd. gear, which will leave the Forward Clutch Control Valve in the upshifted position, leaving the Forward Clutch applied. See figure 5.

CORRECTION: If it is found that the Forward Clutch Control Valve is sticking, cleaning up any debris, and checking the valve and the valve bore for any damage is recommended. If the valve retainer is bent or broken, it can be replaced with Ford Part Number F8DZ-7F194-AA. If the Forward Clutch Control Valve shows any signs of damage either on the valve nose or on the valve spools, it should be replaced. Sonnax has a replacement Forward Clutch Control Valve kit available. The TransGo AX4N Shift Kit also supplies a replacement Forward Clutch Control Valve.

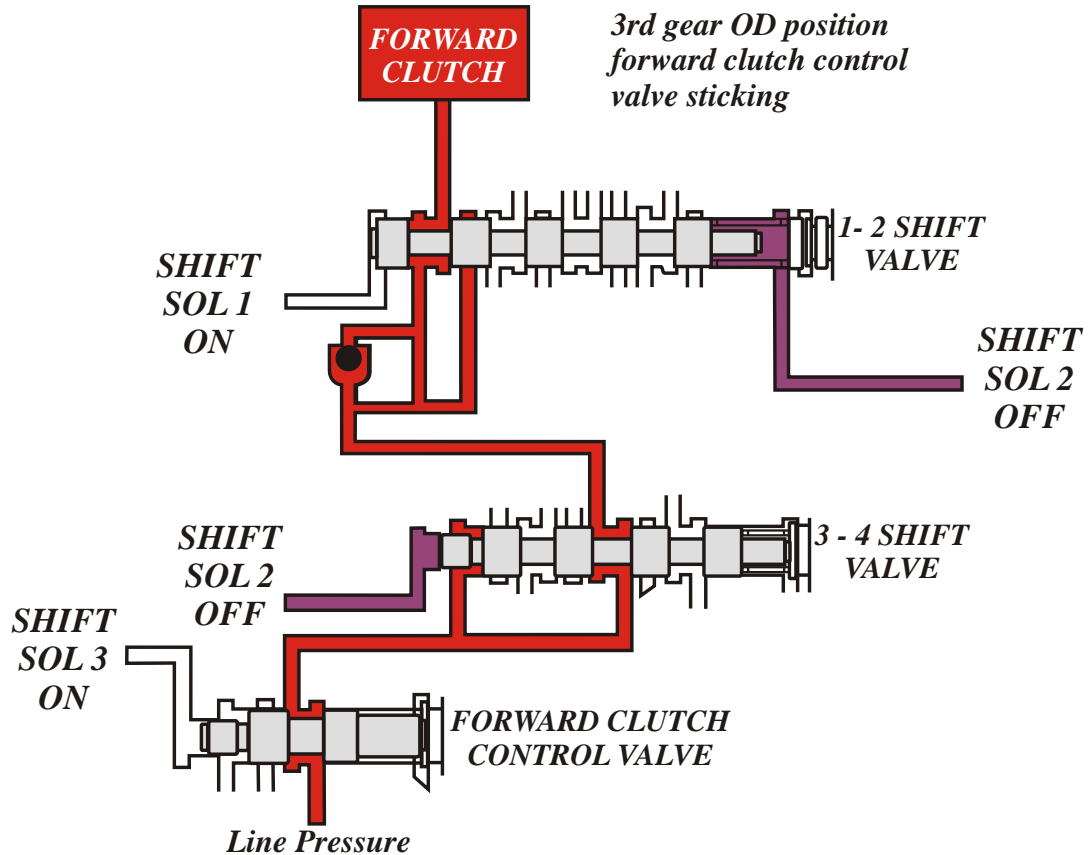
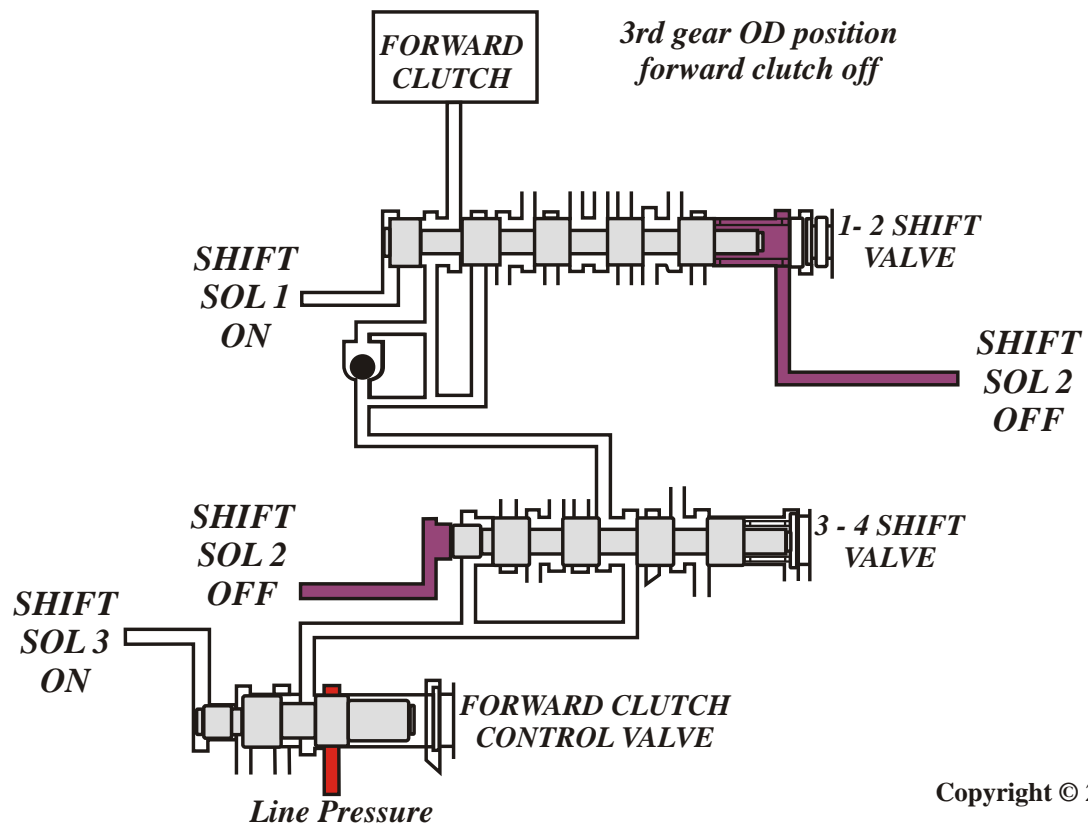


Figure 1



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Figure 2

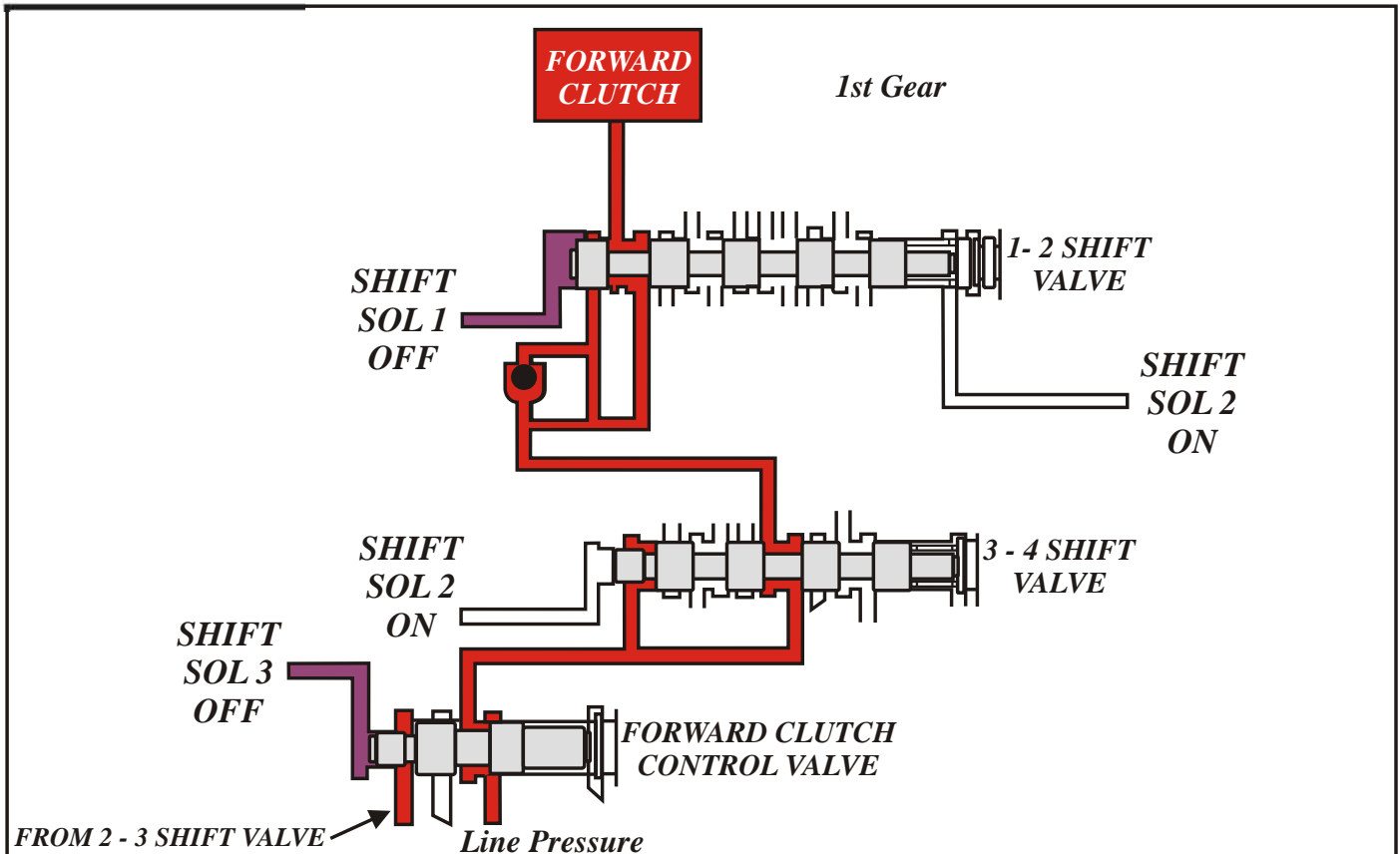
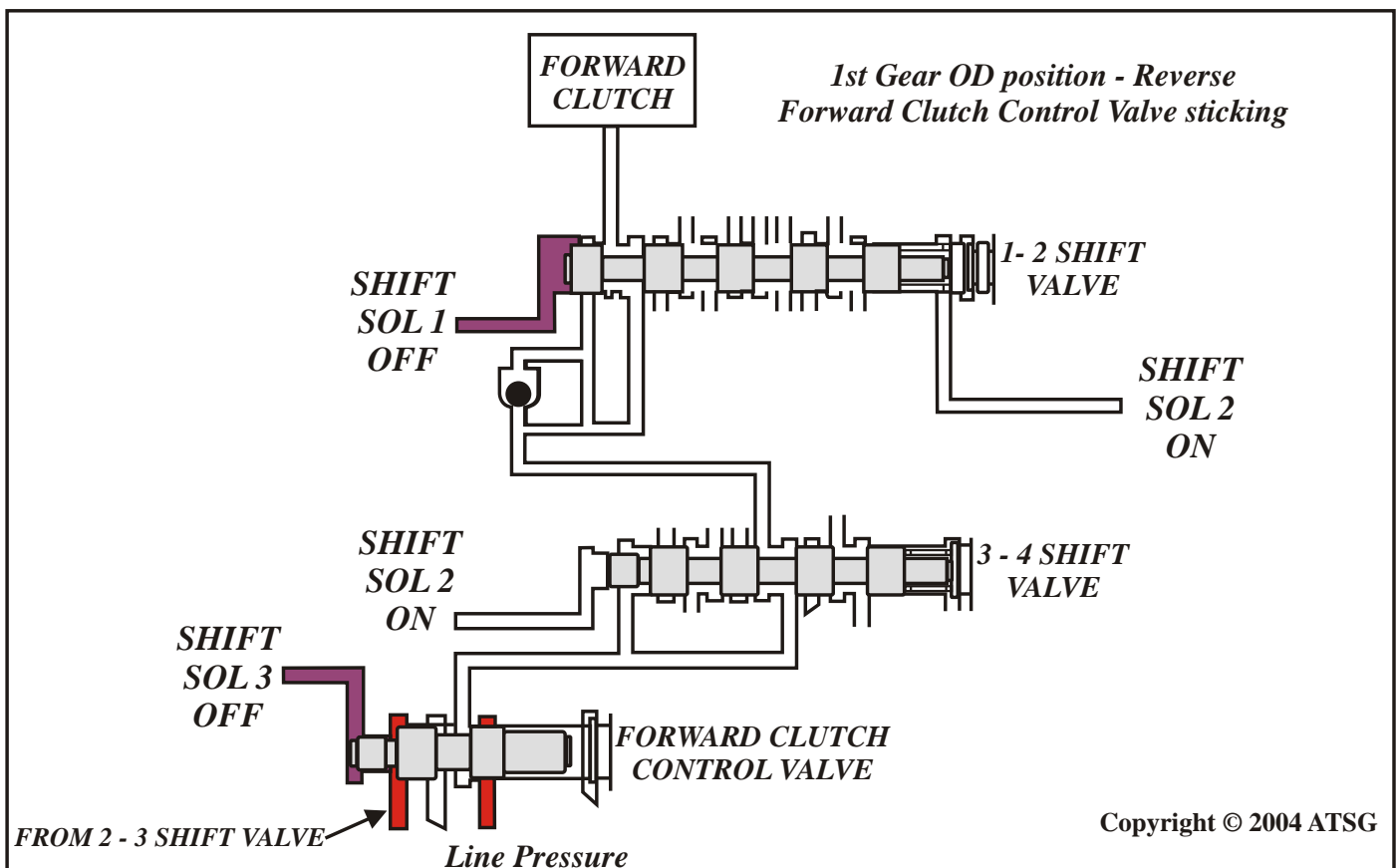


Figure 3



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Figure 4

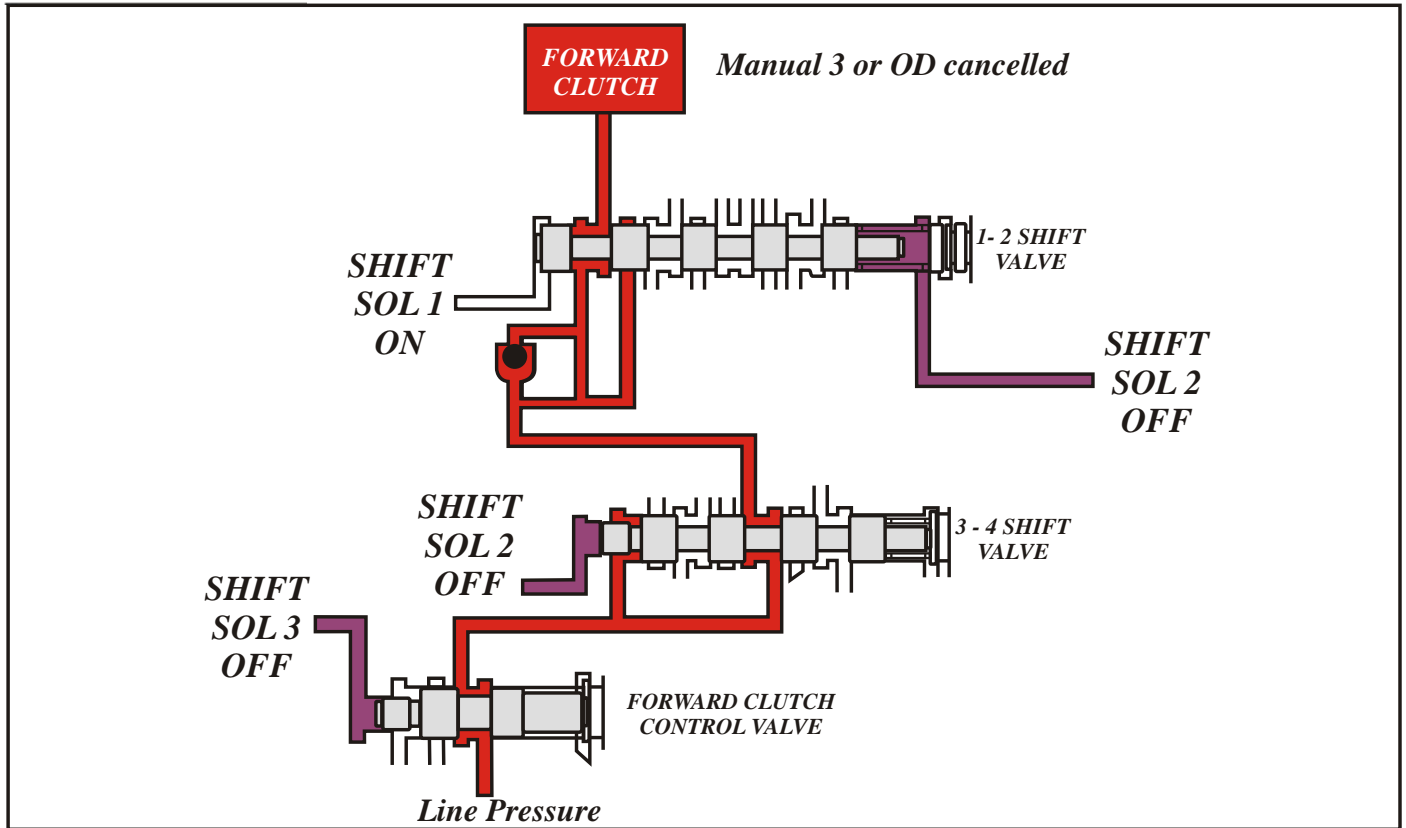


Figure 5

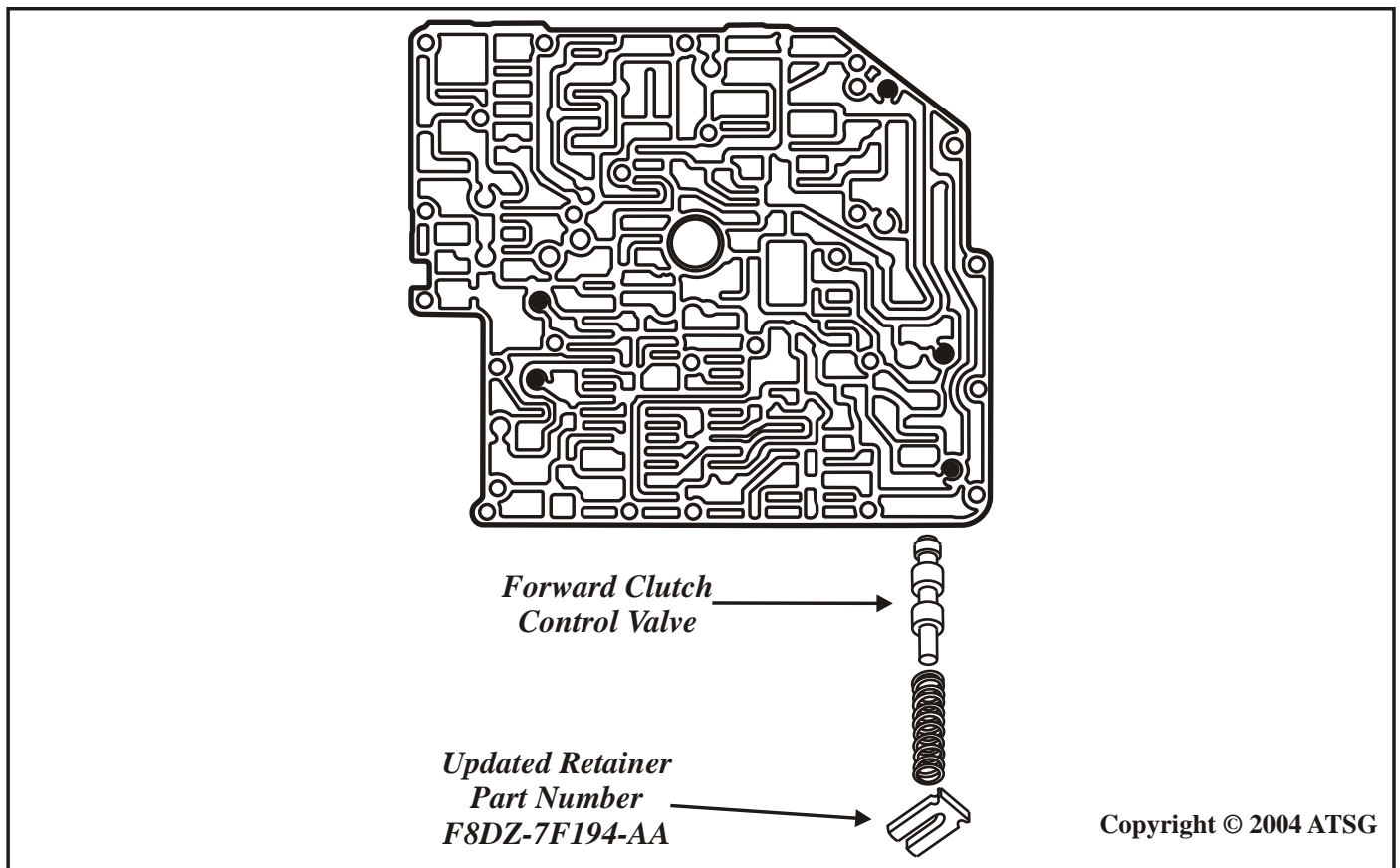


Figure 6

FORD ESCORT F4EAT NOISE FROM BELLHOUSING

COMPLAINT: Ford Escort with F4EAT transaxle exhibits a squealing type noise that is coming from the bell housing and converter area. This may be mis-diagnosed as a Torque Converter noise. After Torque Converter replacement, the noise remains.

CAUSE: This condition may be caused by a clogged PCV Pollution Control Valve. If the PCV valve won't allow air to be drawn through it, engine vacuum may become strong enough to pull in air through the rear main engine seal. If this occurs, a high pitched squealing noise may result from the vibration of the seal against the crank as air is pulled through the seal into the engine. See Figure 1.

CORRECTION: Replacing the PCV valve will correct this problem. See Figure 1.

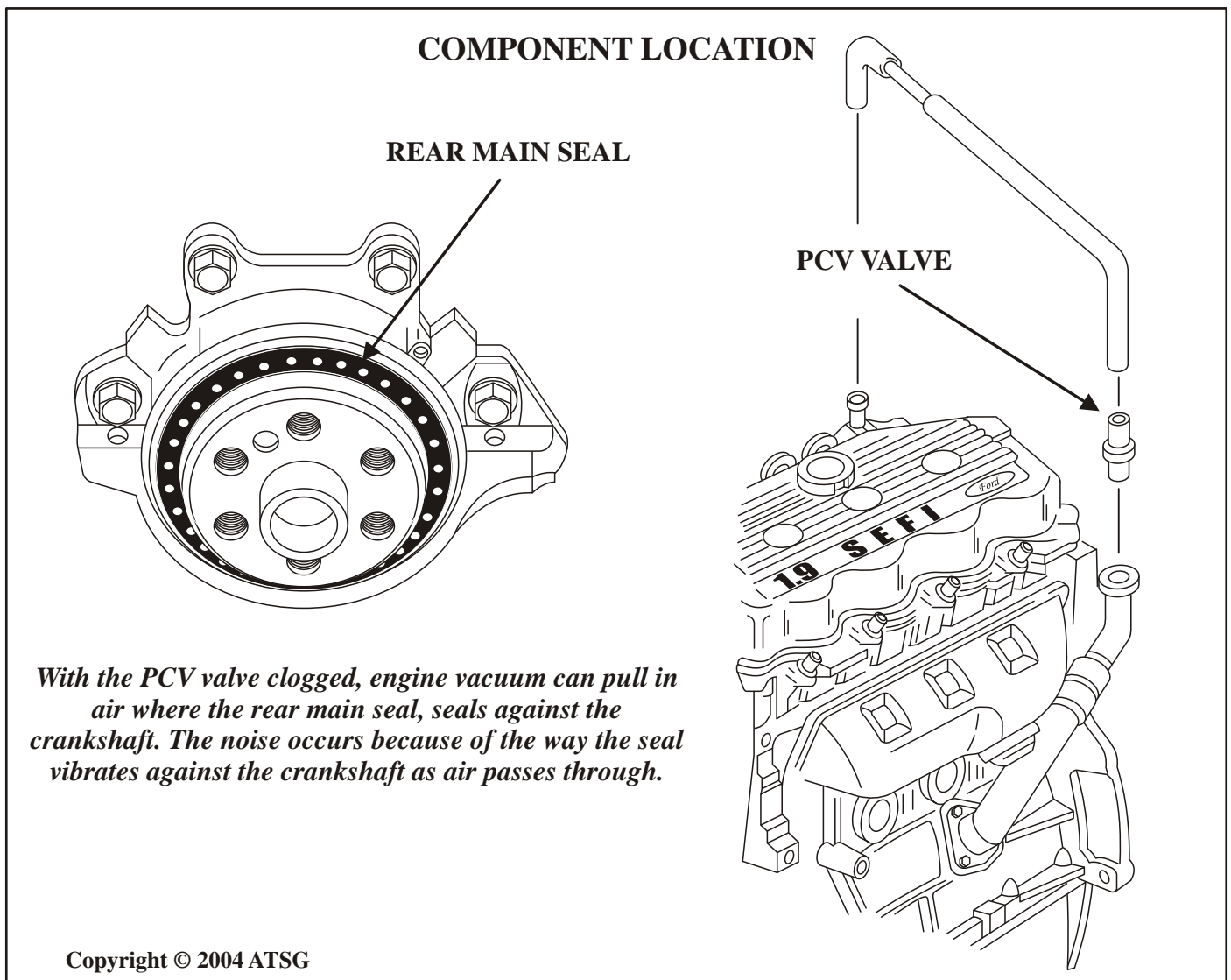


Figure 1



FORD 4F27E

GEAR RATIO CHANGE

CHANGE: Beginning with December 2000 production, the 4F27E transaxle received a final drive gear change. Tooth counts have changed which also changes gear ratios.

These current gear ratios replace the previous gear ratios. The vehicle's PCM must also receive a calibration update to accommodate these new gear ratios in order to avoid shift timing concerns.

Locate the Vehicle Certification Label (VCL), (Refer to Figure 1), in order to know which gear ratio the transaxle originally had.

An example of the VCL can be seen in Figure 2. The location of the axle code is shown as well as the previous and current axle codes and gear ratios. The previous gear ratios are no longer available.

REASON: Better engine performance.

PARTS AFFECTED:

- (1) The final drive input gear tooth count has changed from 87 to 59 teeth.
- (2) The transfer shaft input gear tooth count has changed from 83 teeth to 57 teeth. The final drive ring gear and its mating gear on the input transfer gear have *not* changed as shown in Figure 3.
- (3) A new PCM calibration was made available to accommodate the new gear ratio. An authorized PCM modification label (Refer to Figure 4) should be placed near the vehicle emission label.

INTERCHANGEABILITY:

The new final drive input and transfer shaft input gears or an exchange transaxle that contains the new gear sets can be used in any 2000 or 2001 vehicle with a previous gear ratio as long as the PCM upgrade calibration is installed.

SERVICE INFORMATION:

Transaxles that have a part number beginning with "X" (Ex: XS4P) contain the previous gear ratio. Transaxles that have a part number beginning with "1" (Ex: 1S4P) have been built with the new gear ratios.

Locate the transaxle ID tag on top of the transmission as shown in Figure 5. The part number will be found on the ID tag.

VEHICLE CERTIFICATION LABEL (VCL) LOCATION

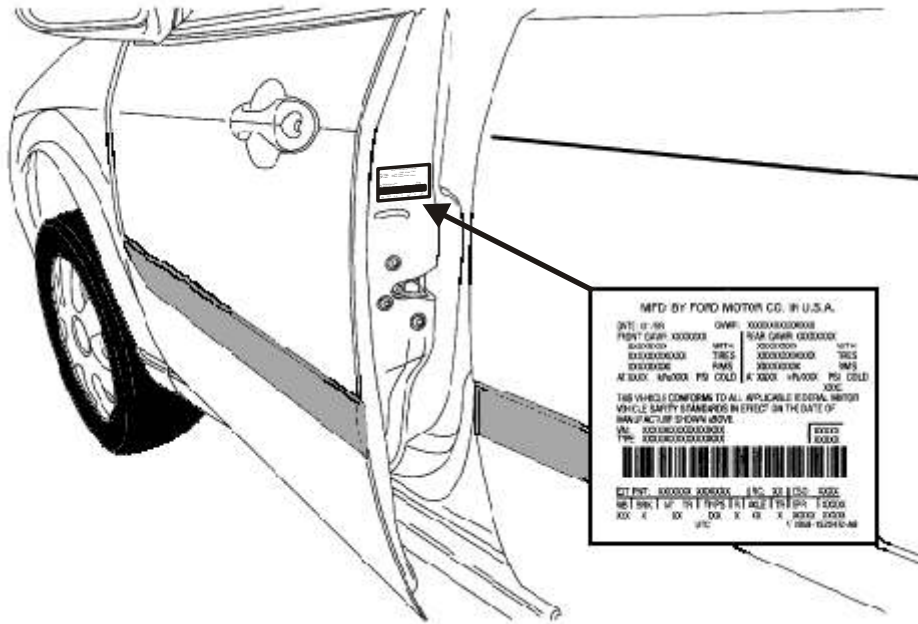



Figure 1

Typical Vehicle Certification Label

MFD BY FORD MOTOR CO IN USA							
DATE: 12/99				GVWR 4792LB 173KG			
FRONT GAWR		2491LB 1129KG		REAR GAWR		2324LB 1054KG	
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY, BUMPER AND THEFT PREVENTION STANDARDS IN							
VIN 1FAPP6235VH103589				F8169			
TYPE PASSENGER				RO114			
							
EXT PNT KM		RC: 71		DSO 2450			
BRK	IN TR	TP PS	R	AXLE	TR	SPR	
4	A2		H	NN	L	DOMM	

Axle Ratio Codes

NOTE: These are the two previous gear ratios used for North American applications with automatic transmission
 NN = 3.693 Automatic
 WW = 3.904 Automatic

NOTE: These are the two current gear ratios used for North American applications with automatic transmission
 *PP = 3.733 Automatic
 XX = 3.956 Automatic
 *Could also be JJ or ZZ

Figure 2

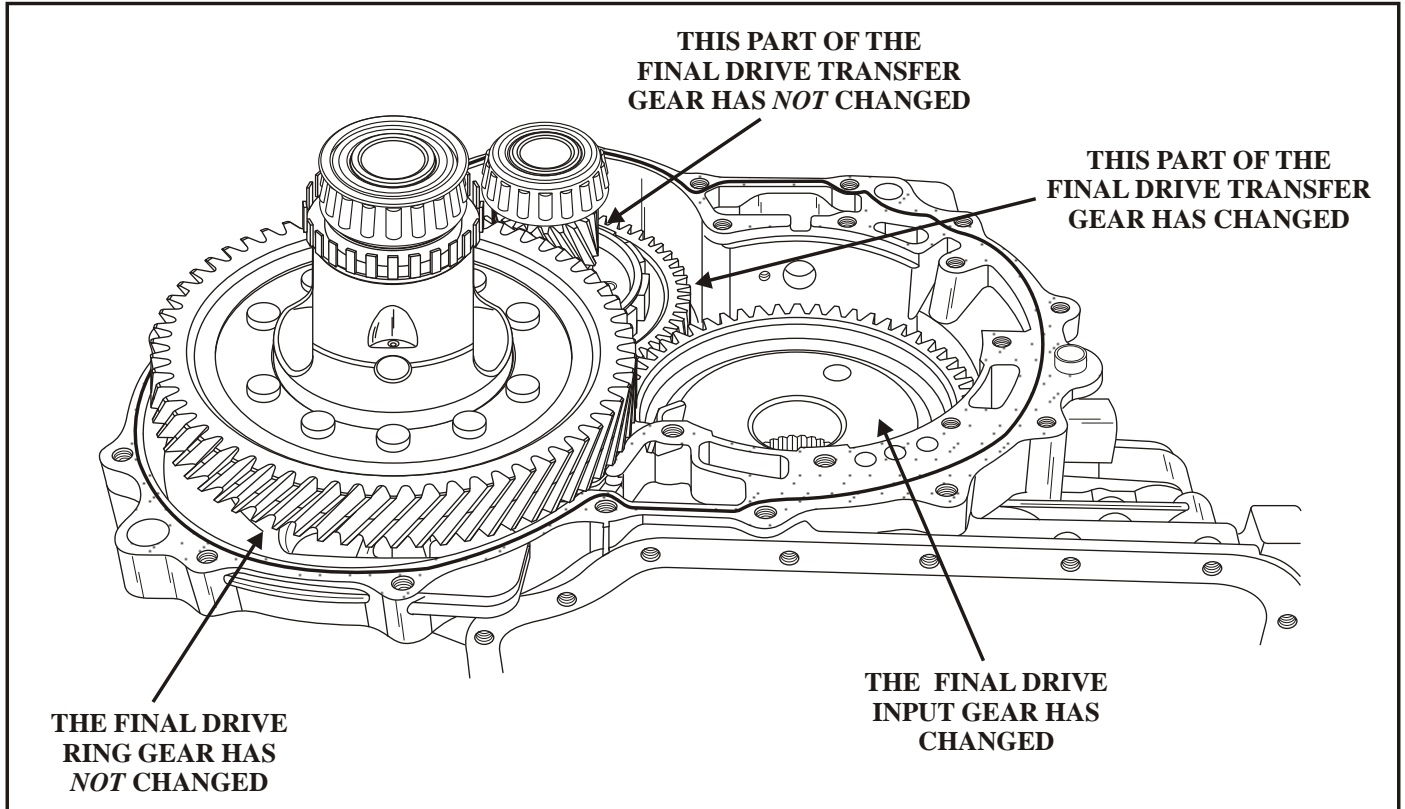


Figure 3


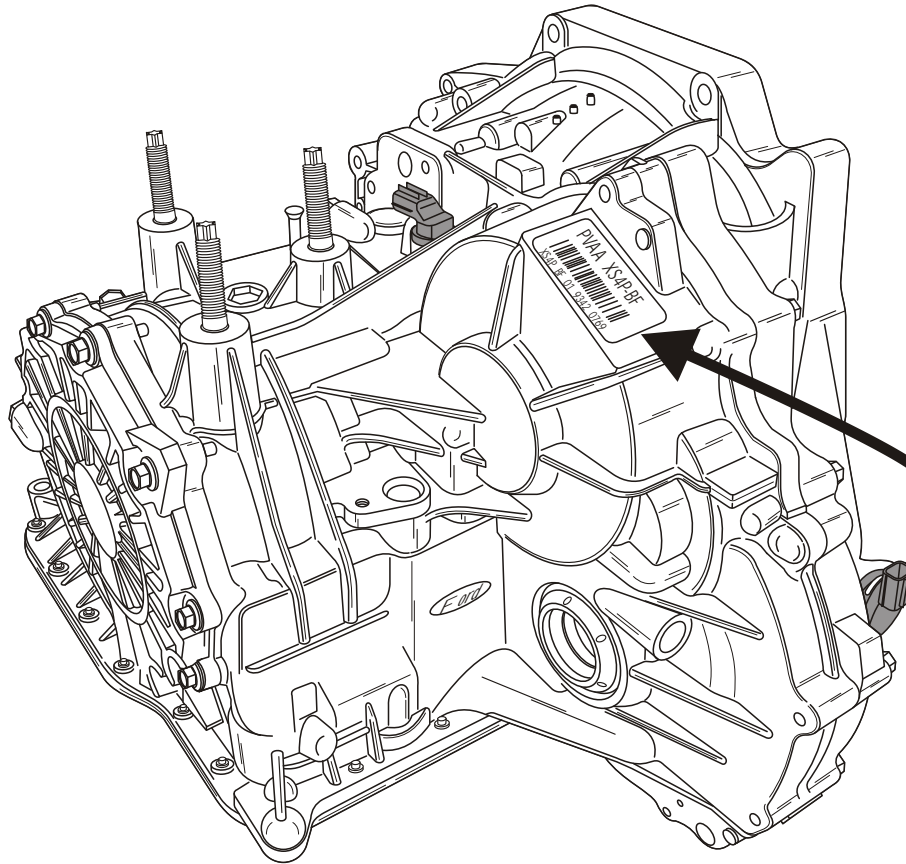
		<h3>AUTHORIZED MODIFICATIONS</h3>	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:			
Reprogrammed Powertrain Control Module (PCM) per TSB 01-25-4			
THESE MODIFICATIONS HAVE BEEN APPROVED, AS APPROPRIATE, BY EPA AND CARB			
DEALER NUMBER:		DATE:	
CHANGE AUTHORITY:			
FPS 8262 9/78		FORD MOTOR COMPANY	
PRINTED IN U.S.A.			

Figure 4

TRANSAXLE ID TAG LOCATION



*Typical Transaxle
I.D. Tag*

*1st Digit Of Suffix
Also Identifies Ratio
And Original Engine*

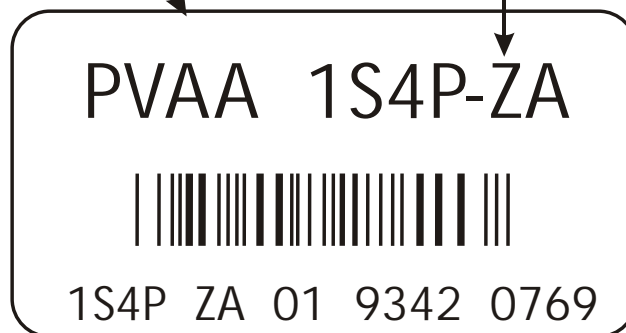


Figure 5



FORD 4F27E/MAZDA FN4A-EL

PRINCIPLES OF OPERATION

The 4F27E transmission uses (2) ON/OFF solenoids and (3) PWM solenoids to produce each of the shifts and converter clutch apply as the chart in figure 6 reveals. The EPC solenoid is used to control line pressure relative to engine torque. So far this sounds easy but from a strategy standpoint, it progressively moves towards a "different way of doing things" when compared to what we are accustomed to. Lets start off on familiar ground. Shift Solenoids A & B are the ON/OFF solenoids which when they are OFF, block fluid from stroking valves while the Pulse Width Modulated Solenoids, C, D & E are the opposite. When they are OFF they allow fluid to pass through the solenoid and stroke valves. OK, so far not so bad. Sounds a little like the 41TE/42LE transmission with their Normally Applied and Normally Vented PWM - ON/OFF solenoids.

The first departure from the "norm" if you will, is that shift solenoid B could be better understood as a Lock Up/TCC solenoid. To call this shift solenoid B made it difficult for me when I first looked at a solenoid application chart like the one in figure 1. I kept thinking it was a gear shift solenoid not a TCC shift solenoid. But now, having clarified the operation of shift solenoid B, it would be good to do a "simple" overview of the function of each of the other "shift" solenoids and by doing so, the solenoid application chart will make considerably more sense.

SSA

When this solenoid is in the ON position, it strokes the 3-4 shift valve which exhausts Forward Clutch and servo release pressure.

SSB

When this solenoid is in the ON position, it strokes the TCC Control Valve which exhaust the converter release pressure allowing for TCC apply.

PWM SSC

When this solenoid is in the OFF position, it provides Forward Clutch Apply Pressure

PWM SSD

When this solenoid is in the OFF position, it provides Servo Apply Pressure

PWM SSE

When this solenoid is in the OFF position, it provides Servo Release Pressure

With this simple overview of the function of each of the shift solenoids, along with the hydraulics provided for each of the shifts while the manual valve is in the D4 position (figures 2-8), a closer look will provide a more detailed understanding of "a different way of doing things."

Using the second gear TCC off hydraulic provided in figure 3, carefully look at the TCC Control Valve. Notice that forward clutch oil runs through the valve from the PWM SSC to the forward clutch. Also notice that line pressure is routed to and blocked by the TCC Control valve's land next to the spring. When this TCC Control Valve is stroked by SSB for lock up, TCC release oil becomes connected to the PWM SSC solenoid for a controlled TCC apply. At the same time, the forward clutch apply oil switched from being fed by the PWM SSC solenoid to the line pressure that was being blocked by the land next to the spring (See figure 4).



FORD 4F27E/MAZDA FN4A-EL

PRINCIPLES OF OPERATION

The PWM SSC not only controls forward clutch apply, it also controls converter clutch apply feel. Should this solenoid malfunction mechanically, we could have a harsh apply or delayed apply into forward and no TCC, or a slipping TCC concern. It is obvious that if SSB malfunctioned, we would experience TCC apply issues as well. And looking at the TCC Control Valve, in theory, should the valve or the valve bore develop excessive wear, combined with a lazy stroke of the valve, a forward clutch slip could occur at the time TCC is being applied in second or third gear.

Special Note: Mazda names the solenoids differently than Ford. The hydraulics shown in the following figures utilizes Ford's nomenclature. The chart below cross references Mazda solenoid identification to Ford's identification. Example: SSA in Ford's 4F27E material is equal to SSD in Mazda's FN4A-EL material.

OD POSITION		SHIFT & TCC SOLENOIDS					
GEAR SHIFTS	Mazda	SSD	SSE	PWM SSA	PWM SSB	PWM SSC	VFS EPC
	Ford	SSA	SSB	PWM SSC	PWM SSD	PWM SSE	VFS EPC
1st Gear		OFF	OFF	OFF	ON	ON	**
2nd Gear		OFF	OFF	OFF	OFF	ON	**
2nd Gear/TCC		OFF	ON	ON	OFF	ON	**
3rd Gear		OFF	OFF	OFF	OFF	OFF	**
3rd Gear/TCC		OFF	ON	ON	OFF	OFF	**
4th Gear		ON	OFF	ON	OFF	OFF	**
4th Gear/TCC		ON	ON	ON	OFF	OFF	**
**The Electronic Pressure Control Solenoid is in constant operation relative to throttle opening							

Figure 1

FORD 4F27E/MAZDA FN4A-EL

PRINCIPLES OF OPERATION

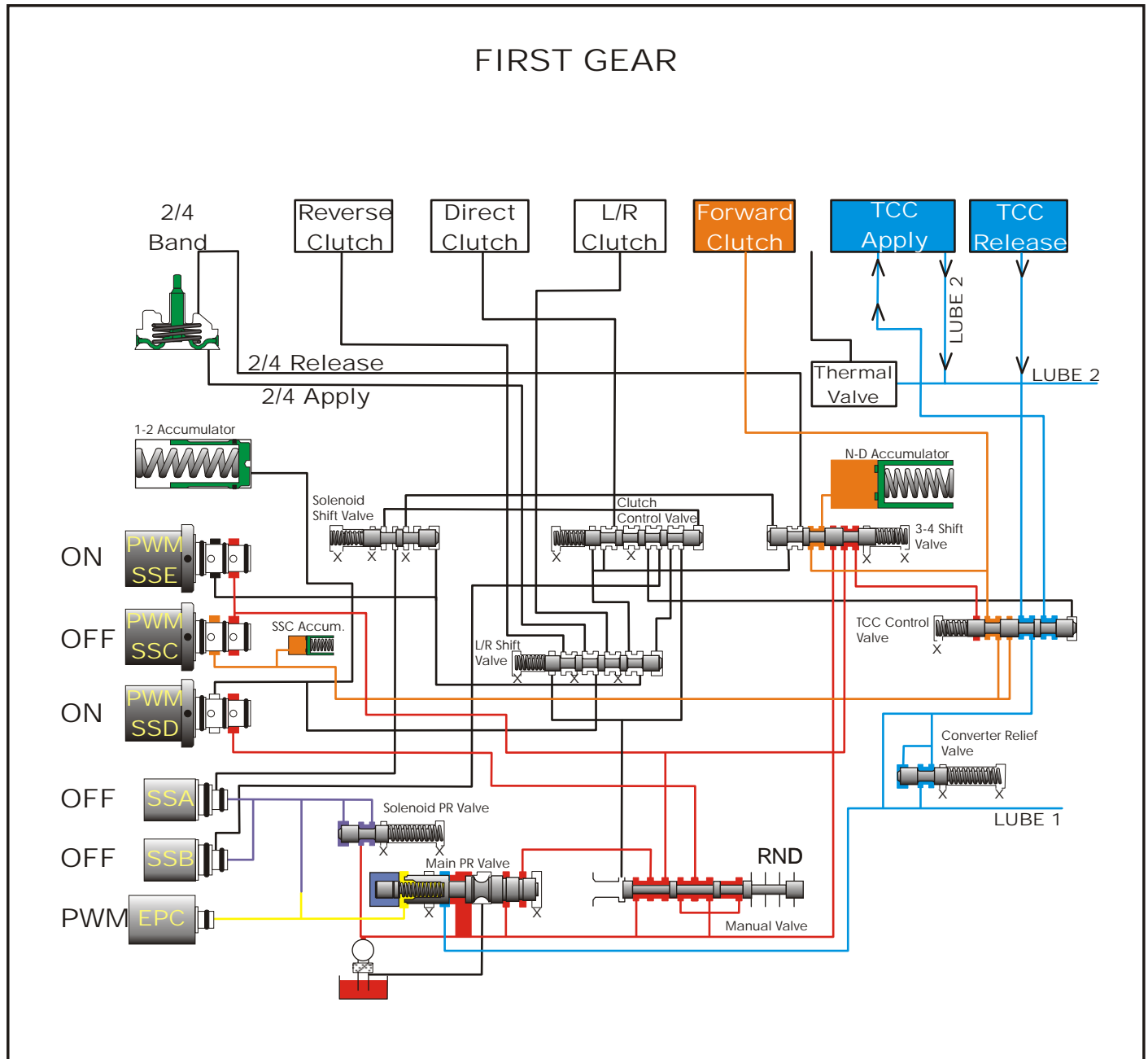


Figure 2

FORD 4F27E/MAZDA FN4A-EL

PRINCIPLES OF OPERATION

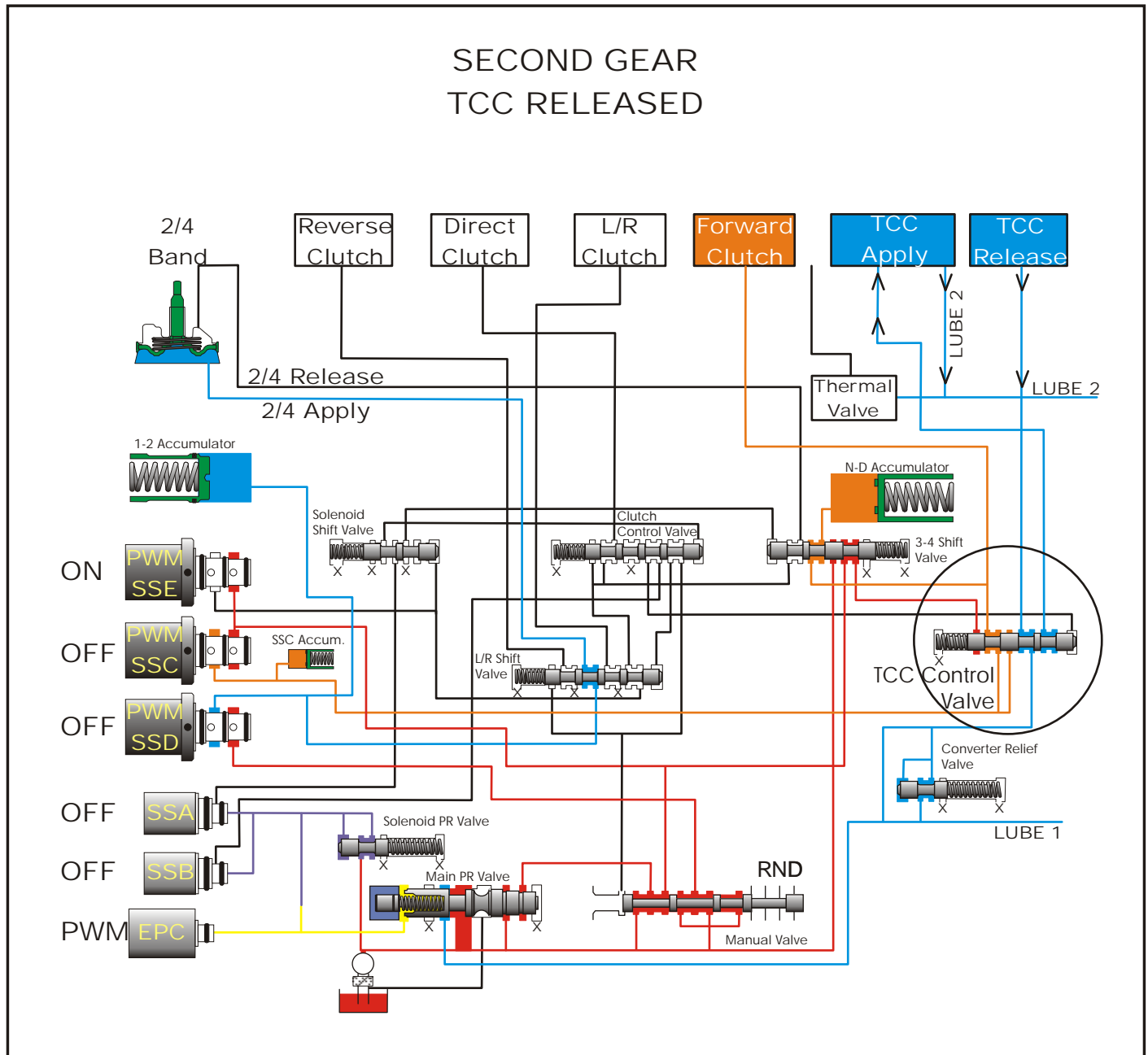


Figure 3

FORD 4F27E/MAZDA FN4A-EL

PRINCIPLES OF OPERATION

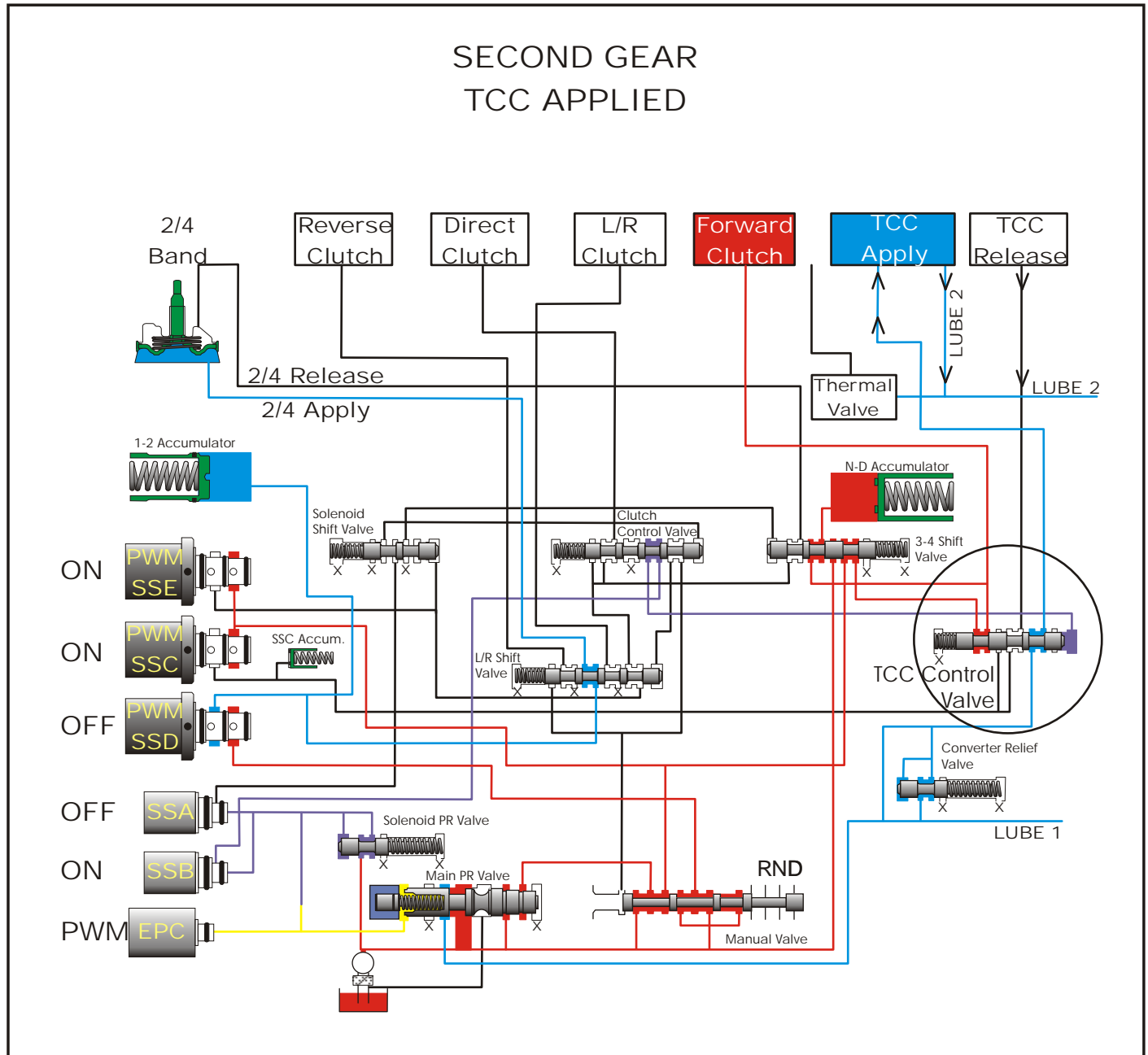


Figure 4

SPX

FORD 4F27E/MAZDA FN4A-EL

PRINCIPLES OF OPERATION

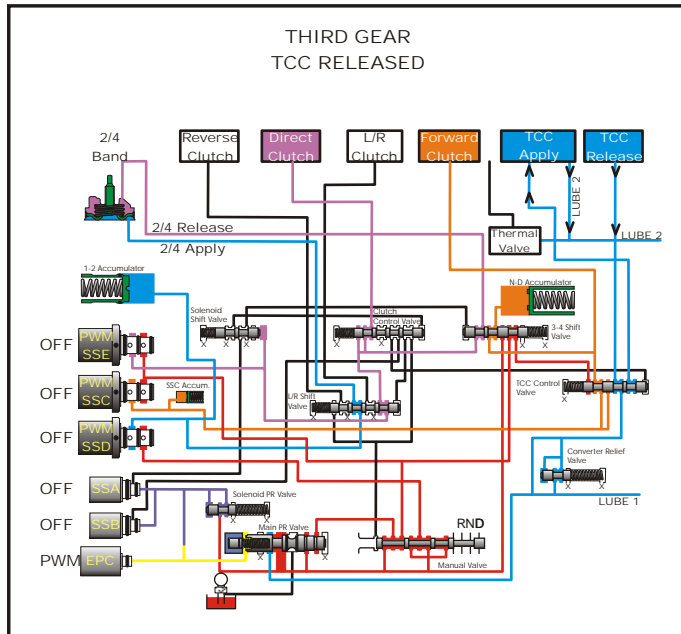


Figure 5

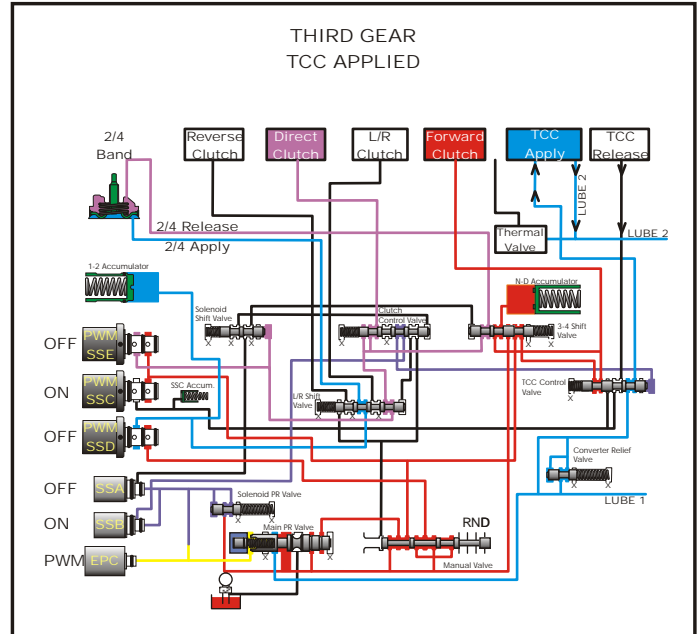


Figure 6

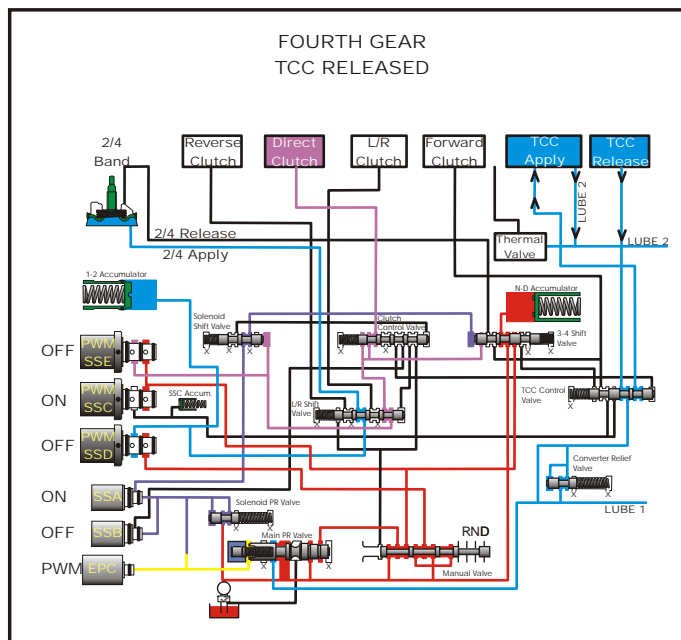


Figure 7

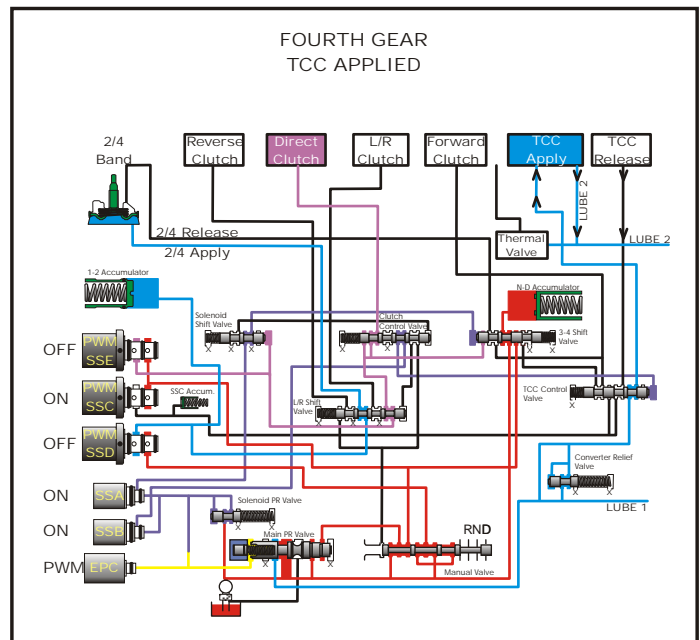


Figure 8

Precision

Rostra

Alto

AutoTrans Group

FORD 4F27E

NEUTRAL IN 4TH "HOT"

COMPLAINT: Vehicles equipped with the 4F27E transaxle may exhibit a neutral condition in 4th gear after the vehicle is "Hot."

CAUSE: The cause may be, the bonded solenoid gasket is leaking solenoid pressure feeding Shift Solenoid "A." This will cause the 3-4 shift valve not to stroke fully, creating neutral.

CORRECTION: Replace the bonded solenoid gasket as shown in Figure 1. Refer to Figure 2 for the location of the bonded gasket and Figure 3 for the remainder of the valve body assembly.

SERVICE INFORMATION:

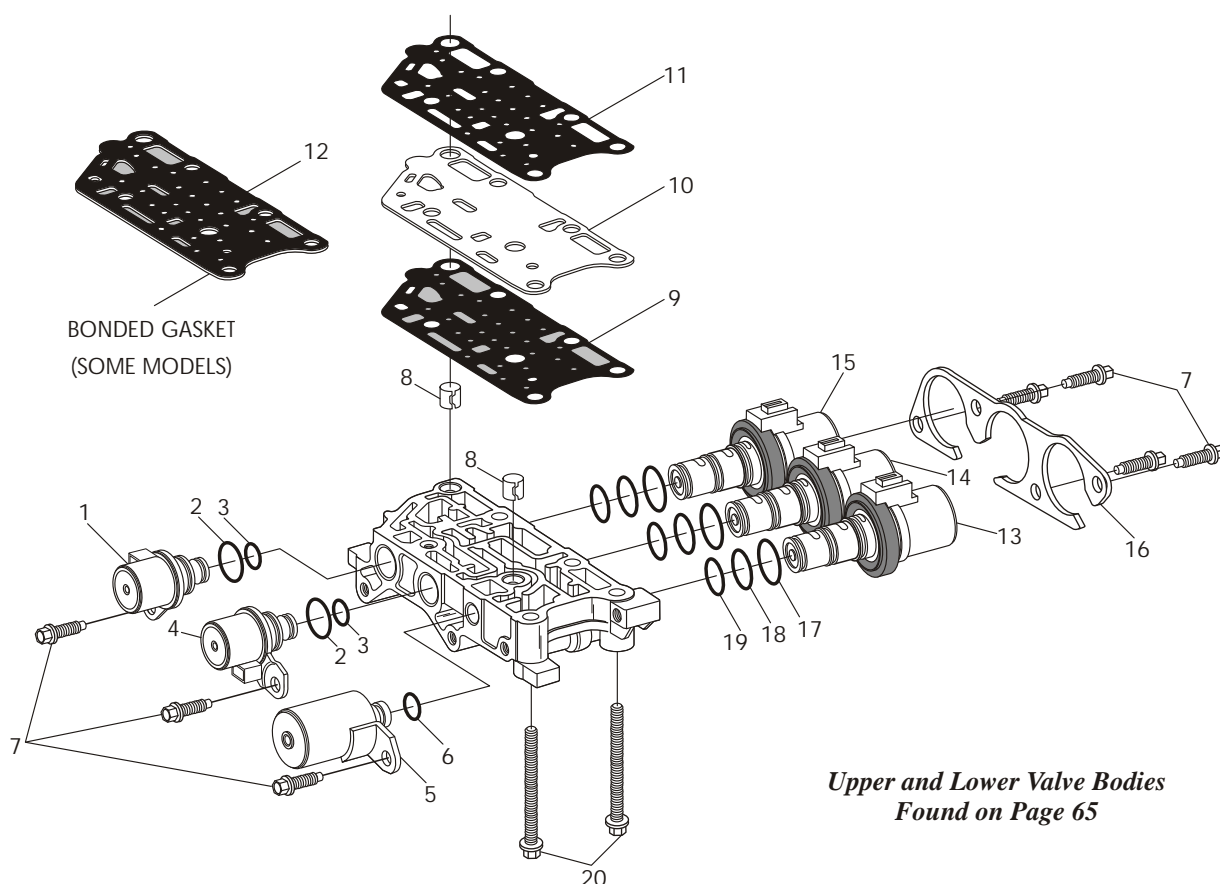
BONDED SOLENOID GASKET (Ford Part Number).....YS4Z-7Z490-AA

BONDED SOLENOID GASKET



Figure 1

SOLENOID BODY EXPLODED VIEW



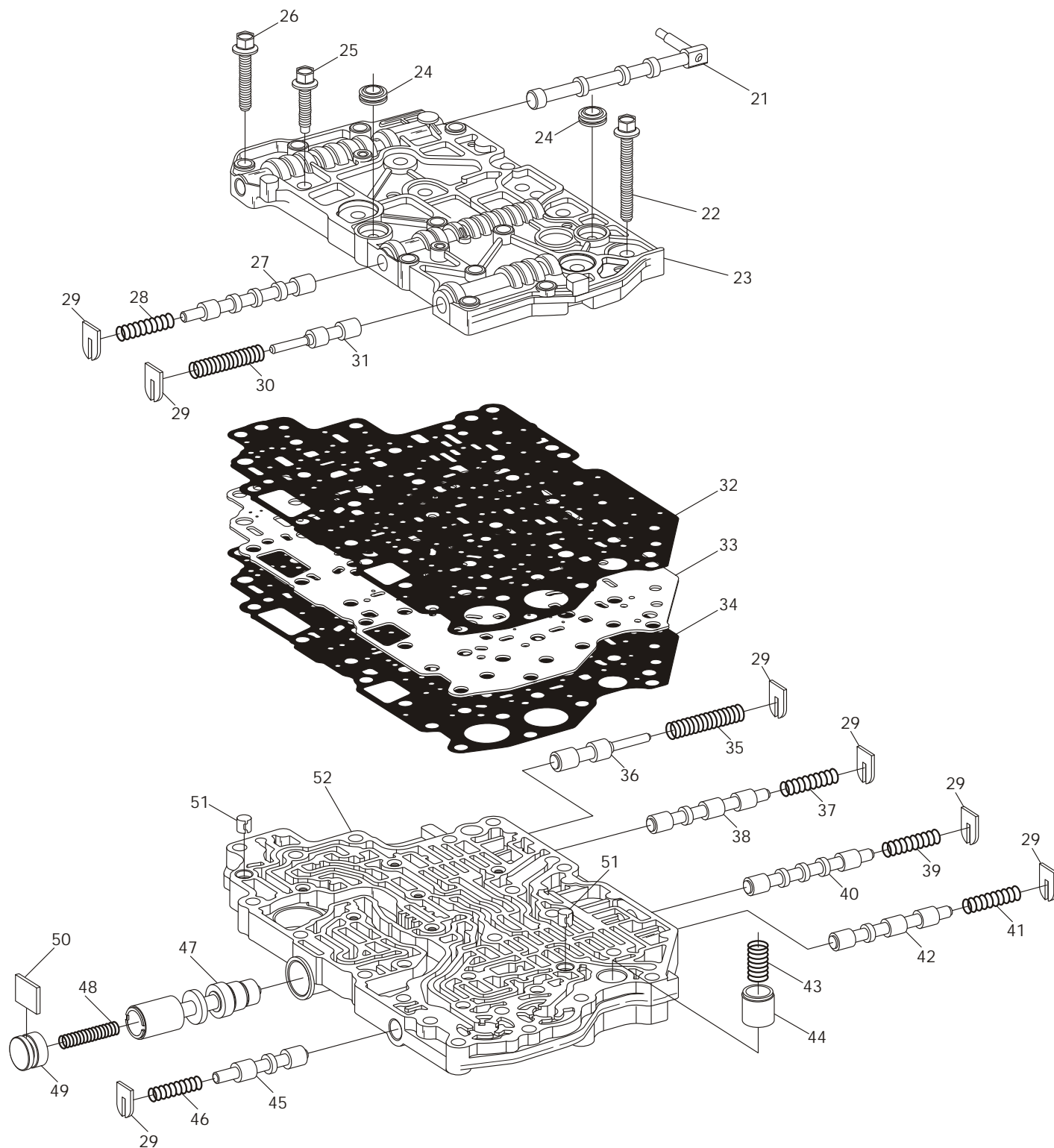
*Upper and Lower Valve Bodies
Found on Page 65*

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

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Figure 2

UPPER AND LOWER VALVE BODY EXPLODED VIEW



*Solenoid Body and
Legend Found in Figure 2*

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Figure 3



"2005" SEMINAR INFORMATION

SLIDE

66

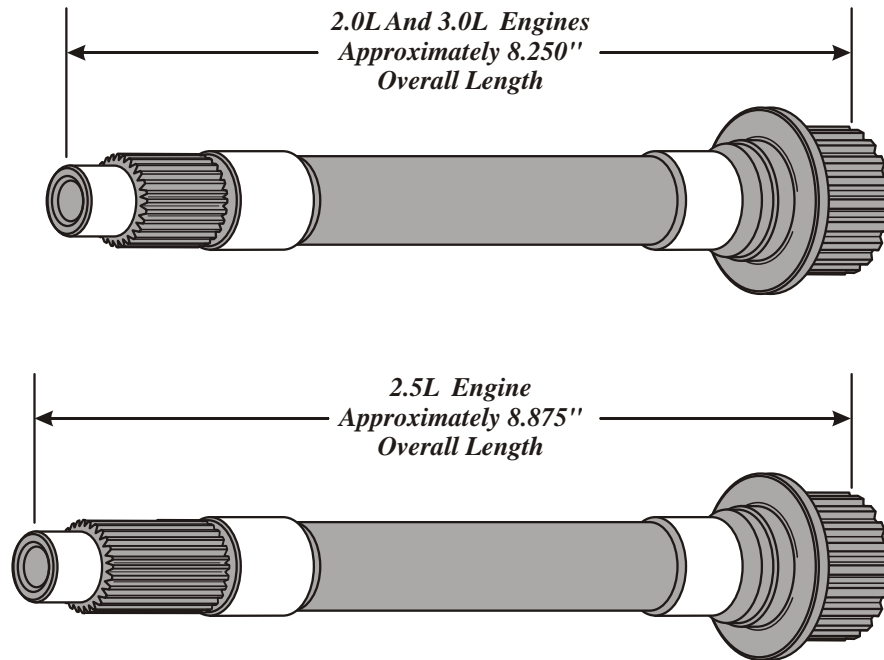
FORD CD4E

CODE P0741 STORED, AFTER REBUILD

- COMPLAINT:** Some vehicles equipped with the CD4E transaxle, after overhaul, may store trouble code P0741 in memory after the engine is up to operating temperature. You should also notice converter slippage when monitored on the scanner.
- CAUSE:** One cause may be, a mis-matched turbine shaft and torque converter that was mistakenly installed in the vehicle. The turbine shaft and oil pump drive shaft for the 2.0L and 3.0L engines are approximately 5/8" shorter than the turbine shaft and oil pump drive shaft for the 2.5L engine as shown in Figures 1 and 2. If the short turbine shaft is installed into the 2.5L and converter, the vehicle will exhibit the above concerns. Torque converter identification is provided for you in Figure 3, and as you can see in the height dimension chart, there is approximately 5/8" difference.
- CORRECTION:** Remove transaxle and ensure that the proper turbine shaft and oil pump drive shaft have been installed for the engine size that you have. Refer to Figure 1 to identify the turbine shaft, Figure 2 to identify oil pump drive shaft and Figure 3 for converter identification.

*Special thanks to
Bill at Roadmaster*

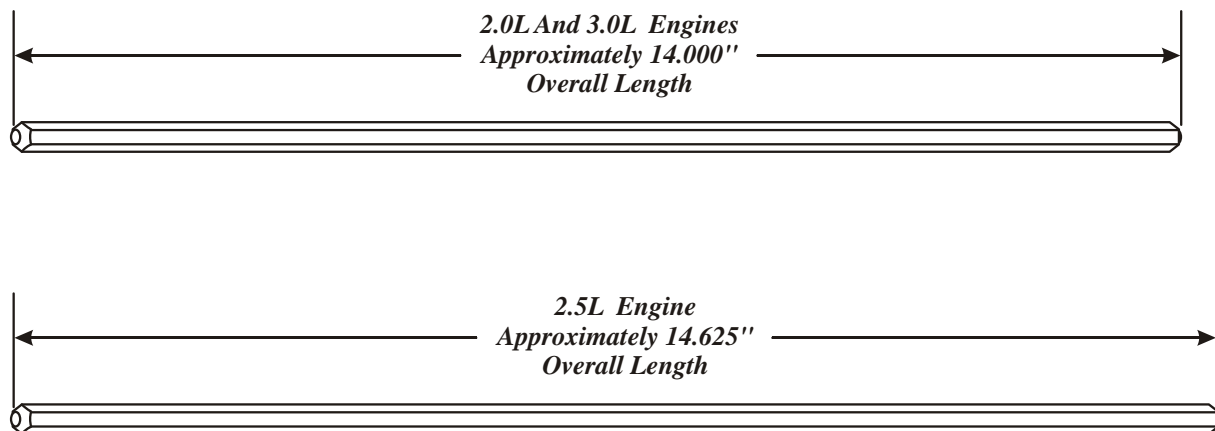
CD4E TURBINE SHAFT DIFFERENCES



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Figure 1

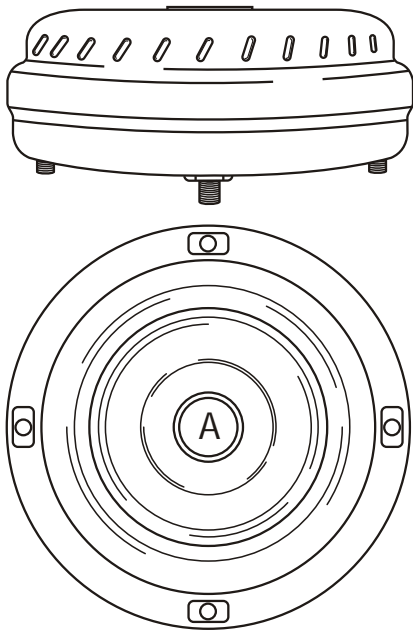
CD4E PUMP DRIVE SHAFT DIFFERENCES



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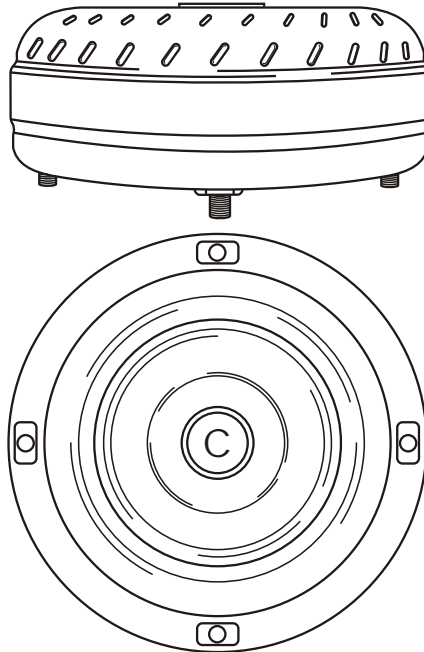
Figure 2

F-67



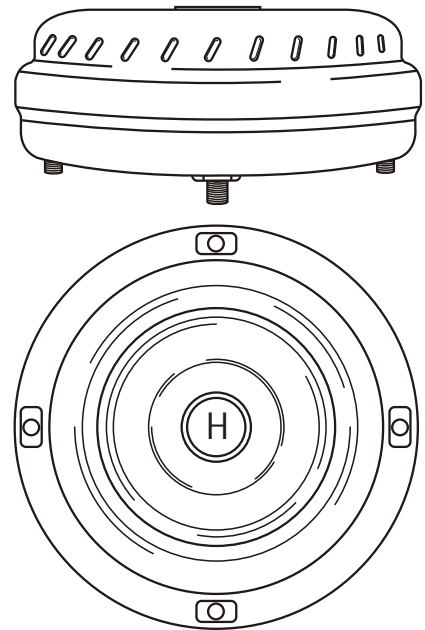
*This Converter "Requires"
The Short Turbine Shaft
And Pump Drive Shaft*

F-69



*This Converter "Requires"
The Long Turbine Shaft
And Pump Drive Shaft*

F-70



*This Converter "Requires"
The Short Turbine Shaft
And Pump Drive Shaft*

NOTE: THE PART NUMBERS LISTED ARE DACCO PART NUMBERS.

PART NUMBER	F-67	F-69	F-70
DIAMETER	10.50"	11"	10.875"
HEIGHT	3.710"	4.125"	3.710"
STAMP	A	C	H
MODEL	PROBE 626 MX6 CONTOUR MYSTIQUE	CONTOUR MYSTIQUE	TRIBUTE ESCAPE
ENGINE SIZE	2.0L	2.5L	3.0L

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Figure 3

CHRYSLER 46RE REOCCURRING P1740 OR P0740 WHEN HOT

COMPLAINT: Vehicles equipped with the 46RE may exhibit a reoccurring Diagnostic Trouble Code P1740 or P0740, Torque converter clutch or Overdrive solenoid performance, or Torque Converter slip, before or after overhaul.

CAUSE : The cause may be, that the mating surface, as shown in Figure 1, between the Pump Body and the Pump Stator is not flat, causing a loss of line pressure and Torque Converter apply pressure. Refer to Figure 2 for port identification of the Pump Body and Pump Stator.

CORRECTION: To verify that the stator surface is flat, Pressurex[®] Film may be used. This is a product from Sensor Products Inc., which uses microcapsules of a paint like substance that changes color intensity depending on pounds per square inch. The higher the psi., the brighter the color. To repair this condition, have the face of the stator machined so that it is flat.

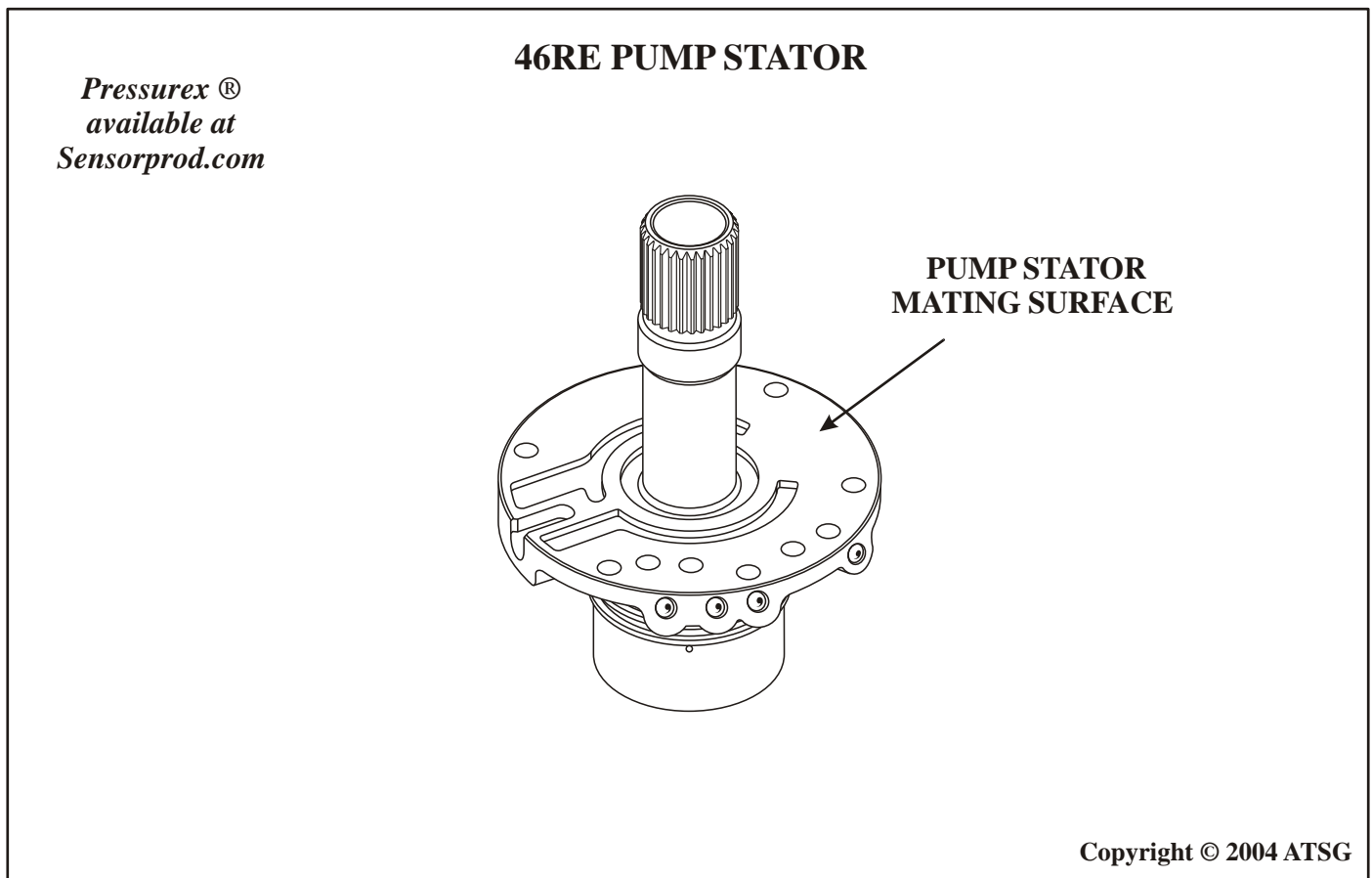
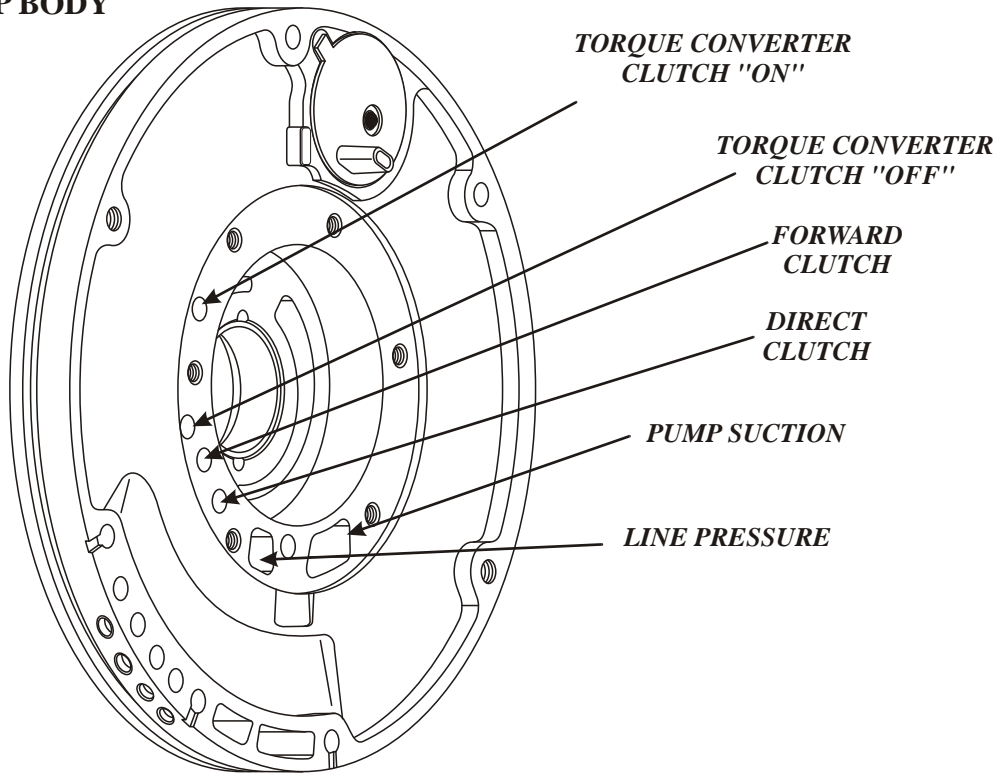


Figure 1

46RE PUMP BODY AND STATOR PASSAGE IDENTIFICATION

PUMP BODY



PUMP STATOR

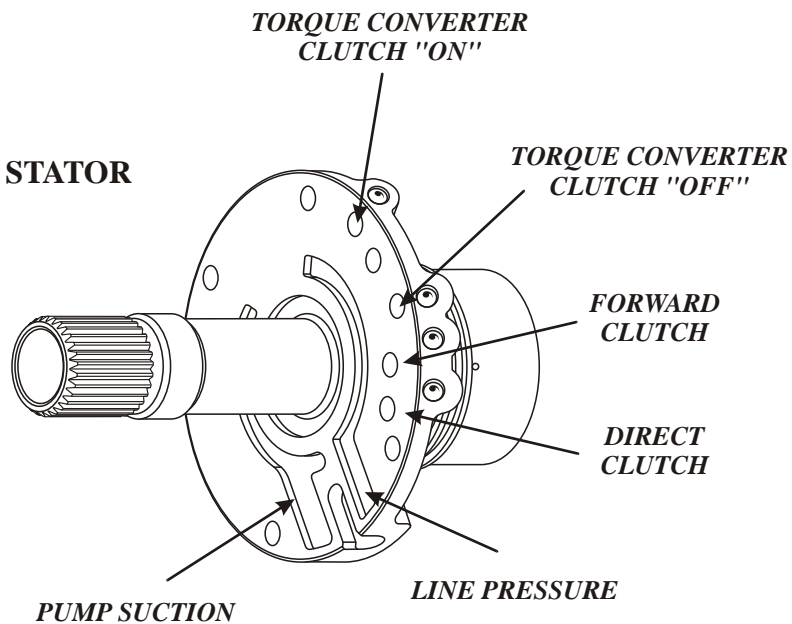


Figure 2

DODGE TRUCKS WITH GAS ENGINES & RE TRANSMISSIONS

3-4 SHIFT & TCC SHUTTLE

COMPLAINT: After overhaul, during the road test, between 34 and 43 mph (55 and 70 kph), the vehicle exhibited a 3-4, 4-3 shift shuttle. When the vehicle was driven between 43 and 56 mph (70 and 90 kph), TCC cycled in and out. *The computer signals for the 3-4 shift and TCC apply commanded what the transmission was doing, yet, loop status always remained closed throughout the cycling.* When the truck was driven at various speeds above 62 mph (100 kph), the vehicle would experience an occasional "fish bite" effect.

CAUSE: This 1999 Dodge 4x4 with 5.2L engine and 46RE transmission had 126,923 miles (204,264 kilometers) on the odometer. Worn spark plugs (See Figure 1) were the cause of the above mentioned complaints.

CORRECTION: A new set of Mopar spark plugs and an extensive test drive indicated that the problem was gone.

A special thanks to Dale Desveaux of Dale's Automotive Transmission in Napanee, Ontario, Canada for sharing his experience, and to his perseverance and determination to find the fix.

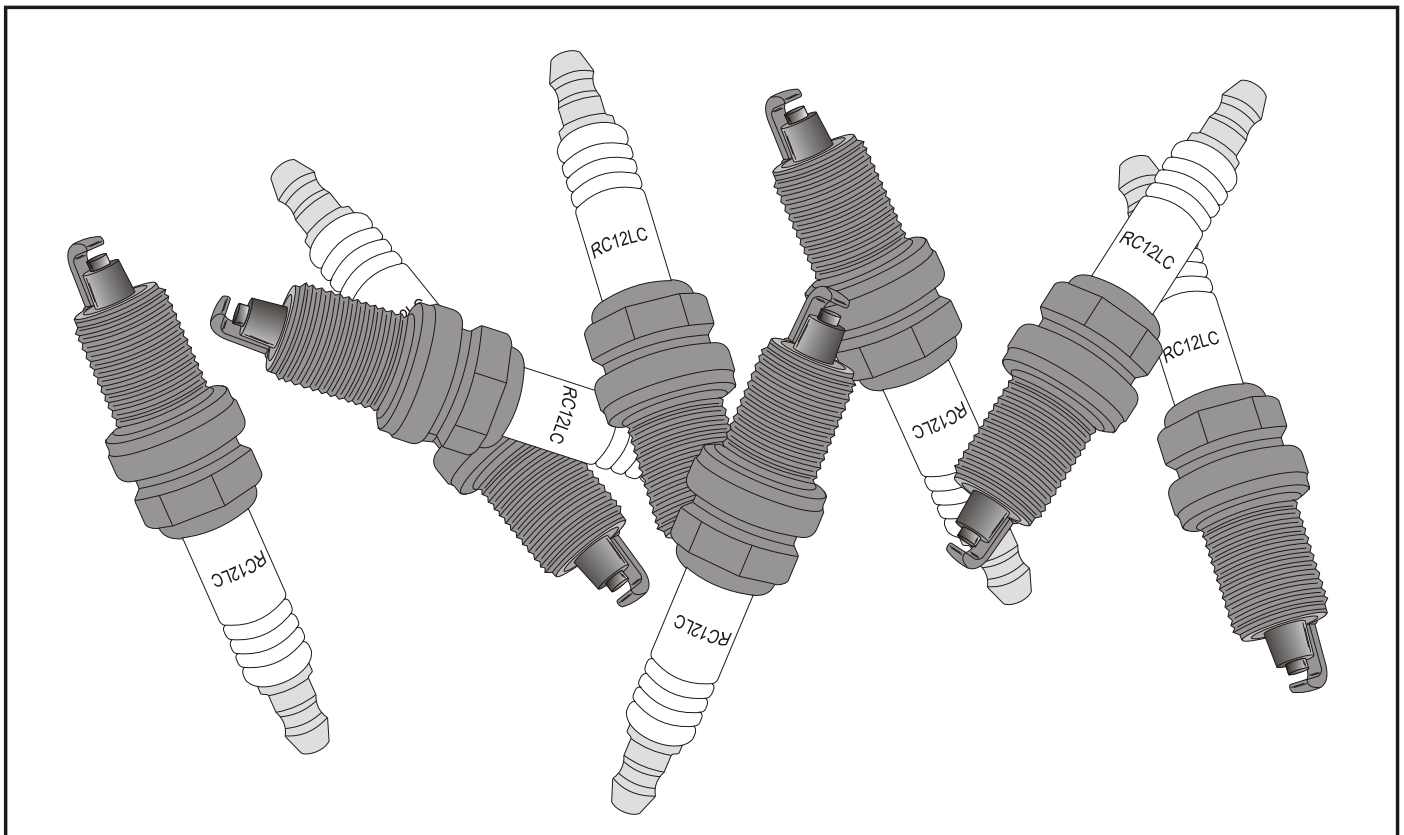


Figure 1



JEEP WITH 2.5 OR 4.0 LITER ENGINES & AW4 TRANSMISSION

TPS CODE P0123 WILL NOT CLEAR

COMPLAINT: A late model Jeep with a 2.5 or 4.0 liter engine and the AW4 transmission comes in with the "MIL" Lamp illuminated and a complaint of late shifts. A scan reveals a code P0123, "TPS Voltage High", is stored. The scan tools data list indicates that the TPS signal wire voltage is at 5.0 volts at closed throttle, and then ranges up to 11.5 volts. A backup check of the TPS signal wire (usually is a Orange/Dk Blue wire), shows 5.7 volts at closed throttle, with a similar rise in voltage as the throttle is opened. A check of the TPS 5 volt supply and ground circuit prove that both of these circuits are good.

A check of the TPS signal wire with the TPS disconnected shows the same 5.7 volts. The technician now begins an inspection of the wiring between the TPS and the PCM and TCM to no avail.

A replacement TPS does not cure the problem, neither does replacement of the PCM or TCM.

CAUSE: The Airbag Clockspring in the steering wheel hub has shorted to power! The horn button, Cruise Control Switch and the Airbag Clockspring are both located in the steering wheel hub. When the Clockspring shorts to the 12 volt HORN circuit which in turn shorts to the 5 volt CRUISE Control "Switch Sense" circuit, the TPS signal voltage is driven high and remains there as shown in Figure 1.

This is because the 5 volt reference voltage used by the Cruise "Switch Sense" circuit and the TPS are shared inside the PCM.

CORRECTION: Replace the Airbag Clockspring assembly. Once the Clockspring has been replaced, be sure to check the sensor 5volt reference voltage at the PCM to insure that circuit has not been damaged by the short to power. Also check the TPS signal range to insure the TPS has not been fried.

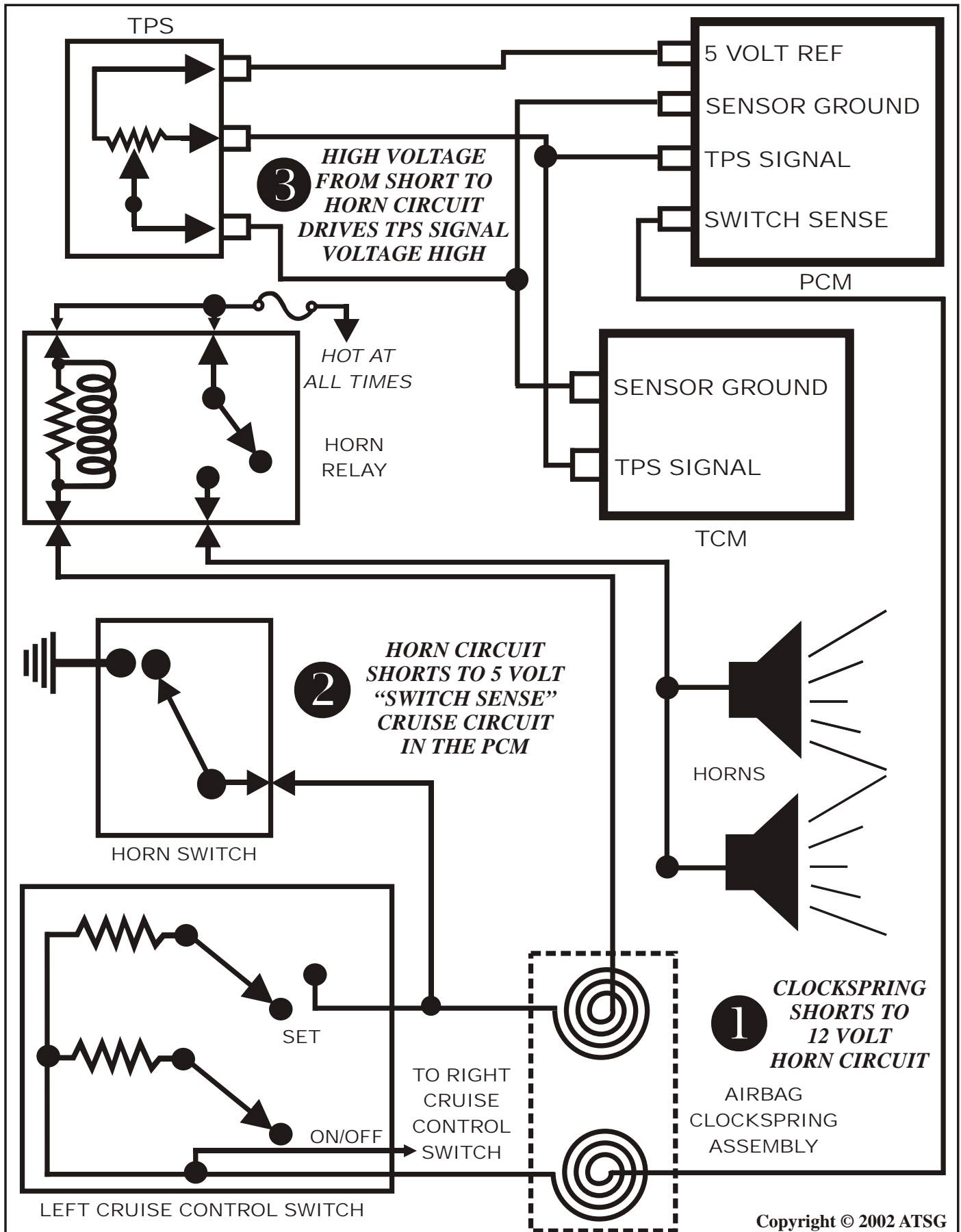


Figure 1
Automatic Transmission Service Group



DODGE TRUCKS & JEEP VEHICLES WITH RE UNITS STUCK IN THIRD GEAR

COMPLAINT: The vehicle is making third gear starts, a check of governor pressure reveals that governor pressure is at maximum. This problem may also be accompanied by a dead battery, charging system problems and possibly codes indicating a problem with the evap system. The scan tool may not communicate with various modules and the vehicle may or may not start. If communication is possible, no codes are stored.

CAUSE: The result of all these complaints is what A.T.S.G. will identify as an Engine Running Bus System, loss of power. Power for the "ERB" is provided by the PCM at terminal 25 of the C3 (Black) connector, (Refer to Figure 1) ***but only when the engine is running.*** This is usually labeled "Generator Source in most wiring diagrams because it actually is the source voltage for the generator's field winding. The "ERB" also supplies power to the Leak Detection Pump and to the Transmission Control Relay. The ground circuits for the generator as well as the leak detection pump are controlled by the PCM at PCM terminals 10 in the C2 (White) and terminal 10 in the C3 (Black) connector respectively. The Transmission Control Relay's PCM ground controlled circuit is PCM terminal 30 in the C2 (White) connector. This is the circuit that is shut down by the PCM when the transmission control system is in default, such as when a transmission related code is stored. ***The real cause of all these complaints is a faulty Crankshaft Position Sensor!***

CORRECTION: It seems that Chrysler/Jeep Computer strategy dictates that when the crank sensor signal is corrupt the PCM "Engine Running Bus" will not power up. Disconnect the crank sensor and see if these circuits power up, if they do, the crank sensor is faulty. It seems that when the crank sensor is disconnected the PCM will ignore it and use another sensor value as a back up signal. This sensor is a Hall Effect Sensor and when it shorts its 5 volt reference source it will cause the above mentioned complaints. It may even "pull down" the 5 volt reference voltage supply to the Governor Pressure Sensor or other sensors using the reference voltage supply as well. In many cases the sensor checks good with a voltmeter. Use a scope to see if the signal amplitude is adequate, in many cases it will not be. The next time one of these vehicles comes in with the transmission stuck in third gear check to see if the plus side of the Transmission Control Relay has power. If it does not, disconnect the crank sensor and check it again. ***Remember, the engine must be running.***

NOTE: In all wiring diagrams that were used for the information contained here within, the generator field winding is incorrectly identified. The positive and negative terminals are labeled backwards. Generator terminal 2, which leads to the generator source pin at the PCM is the positive terminal. Generator terminal 1, which leads to the generator field driver terminal at the PCM is the negative terminal as illustrated in Figure 1.

STUCK IN THIRD GEAR

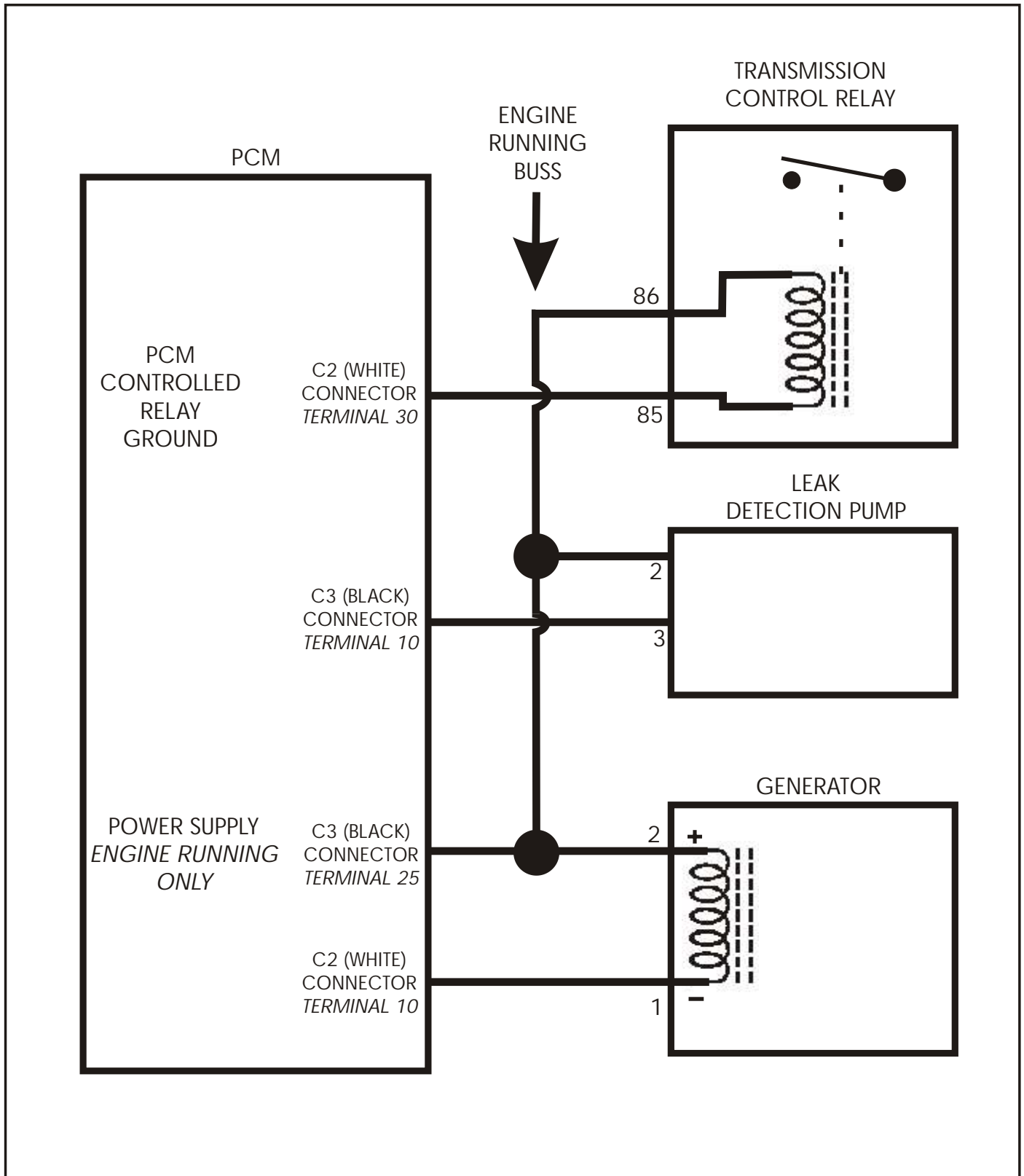


Figure 1



DODGE TRUCKS & VANS

LOCKUP SHUTTLE

COMPLAINT: The truck or van exhibits a lockup shuttle condition. The scan tool indicates that the signal remains steadily "ON".

- CAUSE:**
- (1) The throttle valve adjustment rod is a ball joint type. The socket and clips that hold the rod in place are plastic. As the plastic wears, the rod becomes sloppy resulting in the lockup shuttle condition.
 - (2) The throttle arm that the throttle position sensor mounts to has plastic bushings on the shaft of the throttle arm. These bushings wear and cause the throttle lever to wobble causing erratic TPS signal voltage, resulting in a lockup shuttle condition. The throttle arm blade also wears resulting in improper rotation of the TPS resulting in the same lockup shuttle condition, (Refer to Figure 1). The TPS cannot be adjusted when these items are worn.

CORRECTION:

- (1) Replace the throttle rod with the plastic sockets and clips with the all metal rod shown in Figure 2.
- (2) Replace the plastic bushings and the throttle arm if it is damaged.

SERVICE INFORMATION:

All Metal Throttle Rod.....5011959AB
Throttle Arm.....04863845
Throttle Arm Bushing.....04425053

A special thanks to Joe at Joe's Hamilton Garage in Mercerville, N.J. for sharing this information, faulty parts and part numbers, thanks a lot Joe.

LOCKUP SHUTTLE

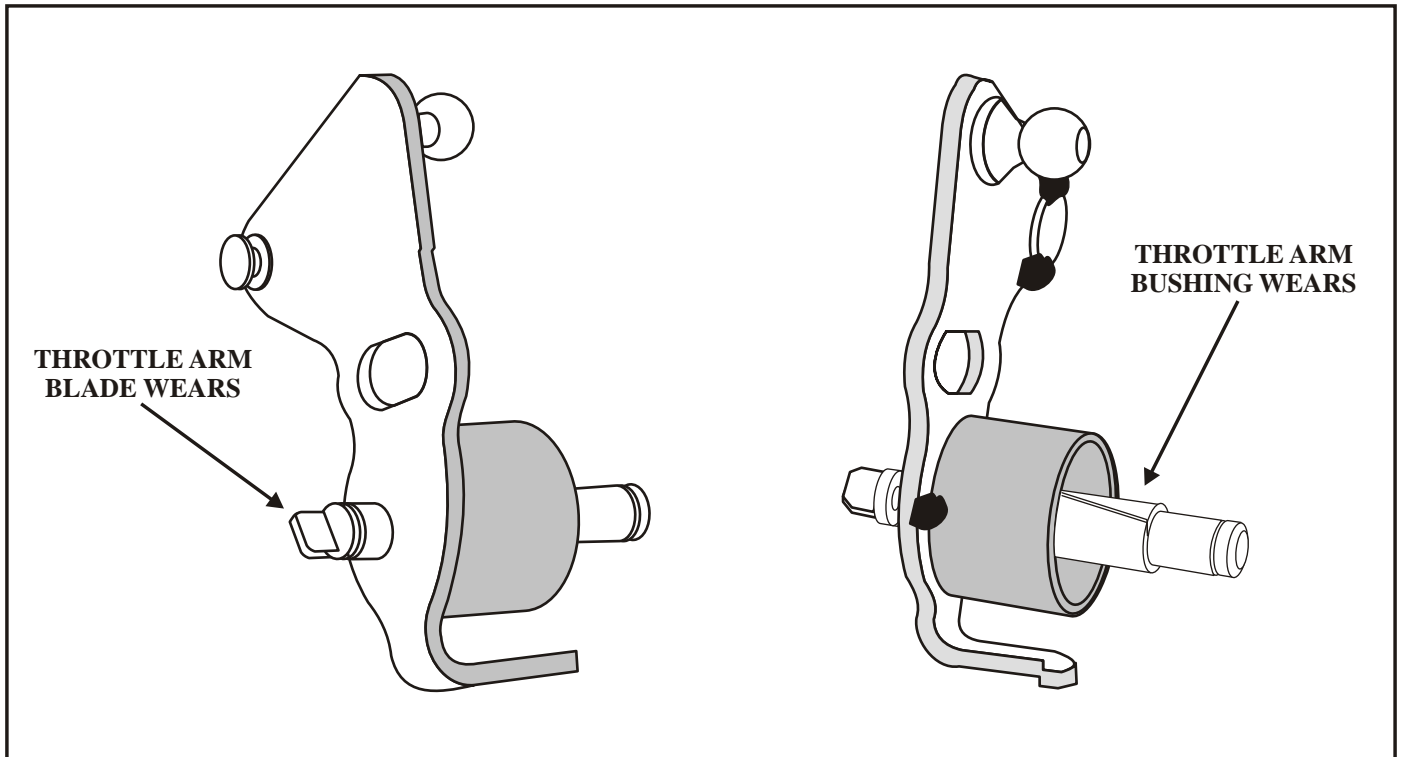


Figure 1

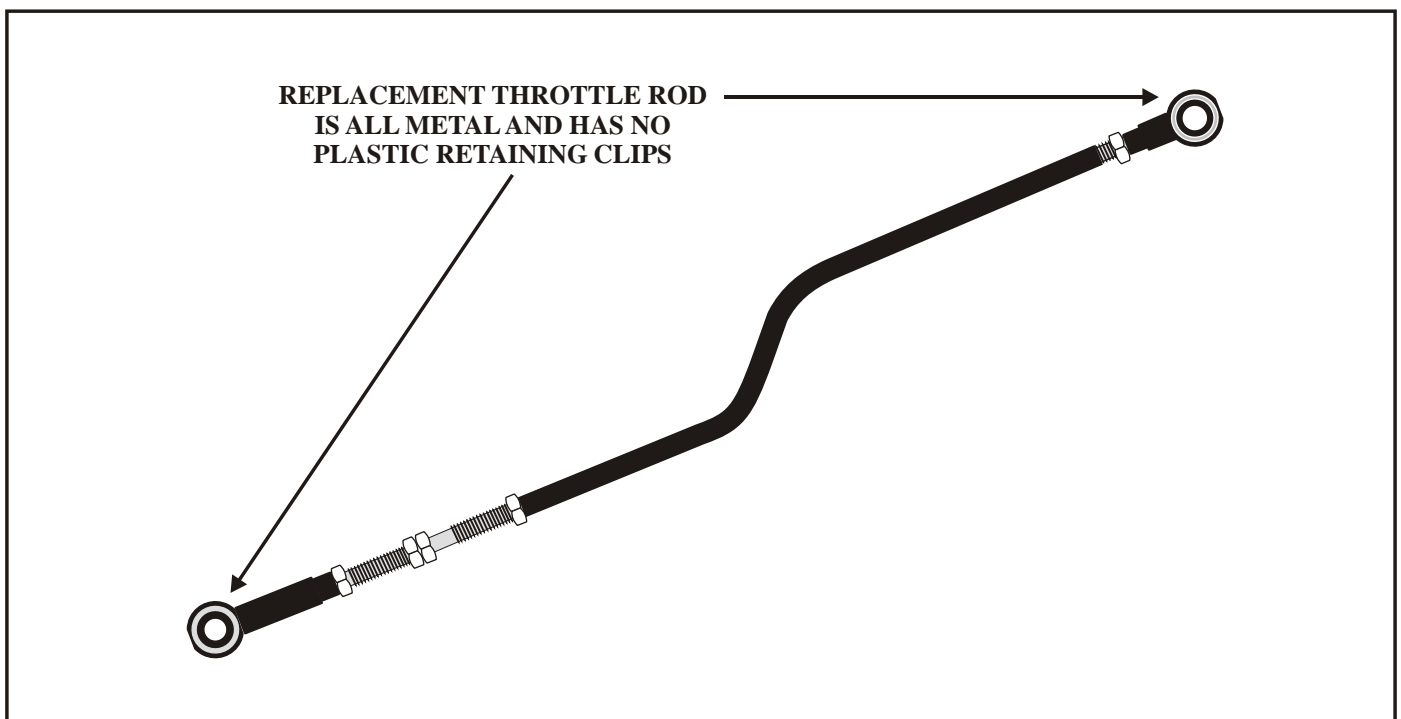


Figure 2

2000 & LATER DODGE TRUCKS & VANS

INTERNAL LINKAGE AND SAFETY NEUTRAL SWITCH CHANGES

COMPLAINT: After a valve body exchange, the vehicle does not start or the detent lever cannot clear the safety neutral switch.

CAUSE: The safety neutral switch and the valve body detent lever changed for the 2000 model year. The switch is longer and the detent lever dimensionally changed to accommodate the new switch. Figures 1 and 2 show the dimensional differences between the previous and current design detent levers. Figures 3 and 4 illustrate the correct and incorrect assembly using the short switch. Figure 5 shows the correct assembly using the long switch.

It is unnecessary to show the incorrect assembly of the long switch, as it will be impossible to install either the valve body assembly or the switch with that combination.

CORRECTION: The detent lever with the **red** plastic insert goes with the **long** safety neutral switch. The detent lever with the **turquoise** plastic insert goes with the **short** safety neutral switch.

A special thanks to Paul Tinges from Hardparts For Transmissions for sharing this information and for supplying the photos to make this bulletin possible.

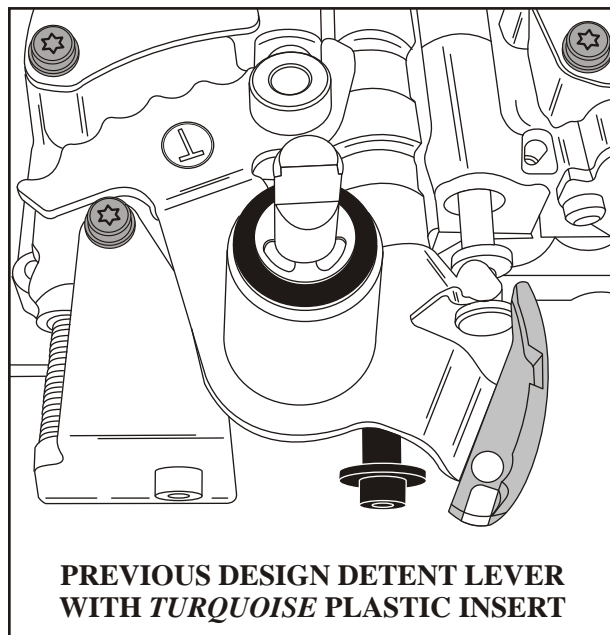


Figure 1

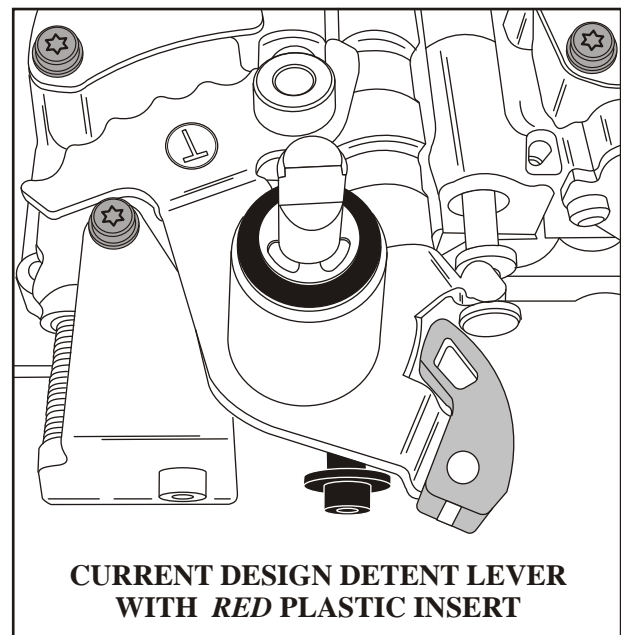


Figure 2

INTERNAL LINKAGE AND SAFETY NEUTRAL SWITCH CHANGES

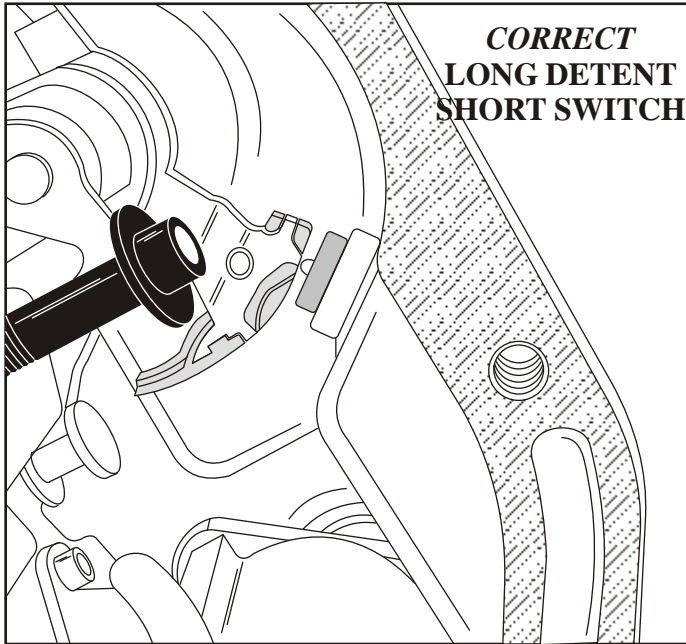


Figure 3

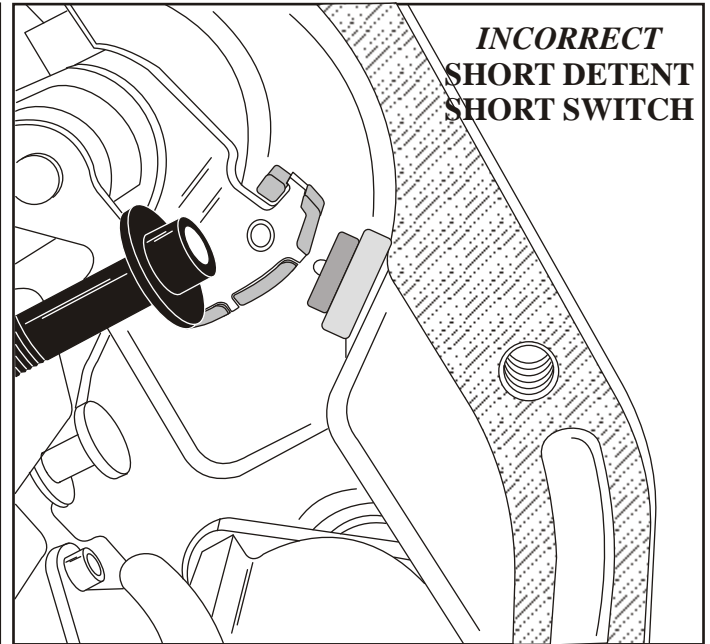


Figure 4

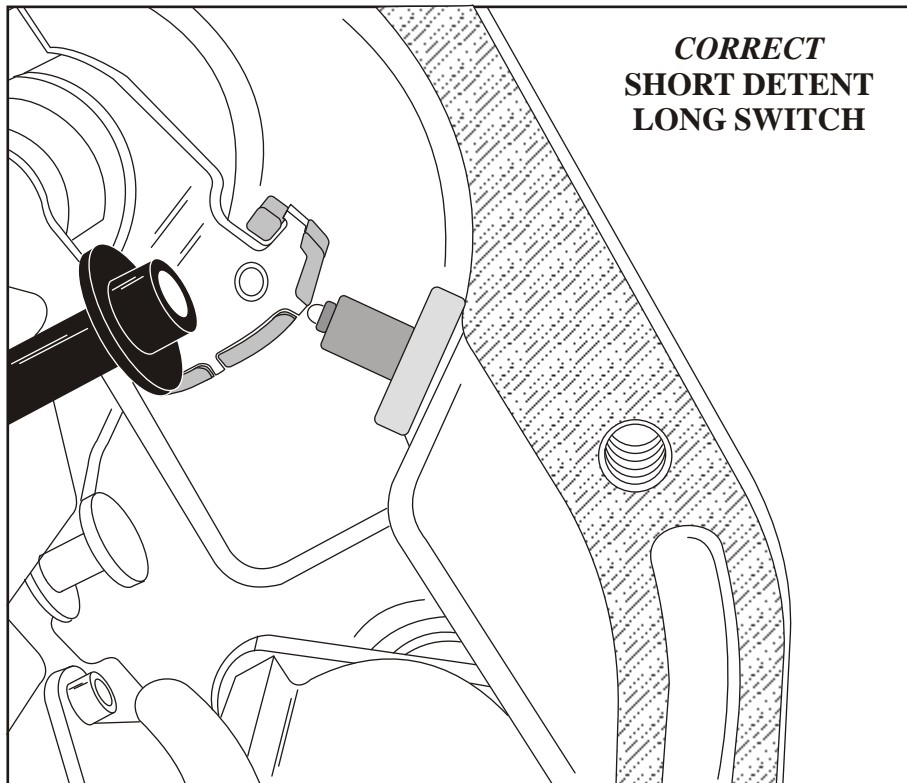


Figure 5



**CHRYSLER 45RFE
NO 3RD OR 4TH GEAR**

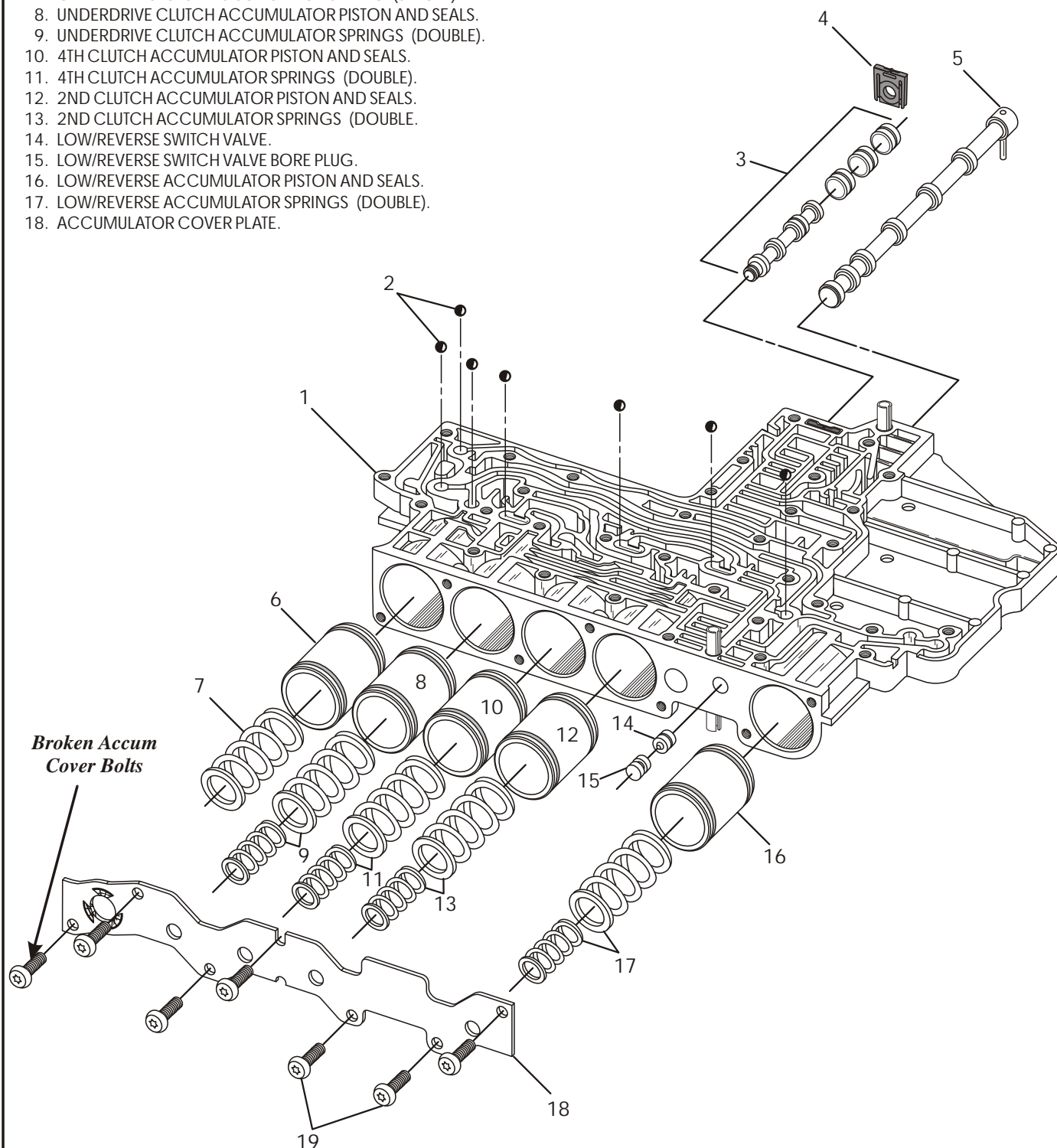
COMPLAINT: The vehicle exhibits a condition of no shift to 3rd or 4th gear. Vehicle has 1st and 2nd gear only.

CAUSE: The cause may be, broken accumulator cover bolts allowing the overdrive accumulator piston to come out far enough to exhaust all overdrive clutch feed oil. The overdrive clutch is applied in 3rd and 4th gears. Usually, the accumulator cover plate is also very badly bent and must be straightened, as it is not available from OEM individually. We suspect the accumulator bolts were not properly torqued to begin with.

CORRECTION: Straighten the accumulator cover plate and install new accumulator cover plate retaining bolts, as shown in Figure 1.
Special Note: When reinstalling the new bolts, use red Loctite® on the threads.

MAIN VALVE BODY EXPLODED VIEW

1. MAIN VALVE BODY CASTING.
2. 1/4" VITON CHECKBALLS (7 REQUIRED).
3. SOLENOID SWITCH VALVE LINE-UP
4. SOLENOID SWITCH VALVE LINE-UP PLASTIC RETAINING CLIP
5. MANUAL VALVE.
6. OVERDRIVE CLUTCH ACCUMULATOR PISTON AND SEALS.
7. OVERDRIVE CLUTCH ACCUMULATOR SPRING (SINGLE).
8. UNDERDRIVE CLUTCH ACCUMULATOR PISTON AND SEALS.
9. UNDERDRIVE CLUTCH ACCUMULATOR SPRINGS (DOUBLE).
10. 4TH CLUTCH ACCUMULATOR PISTON AND SEALS.
11. 4TH CLUTCH ACCUMULATOR SPRINGS (DOUBLE).
12. 2ND CLUTCH ACCUMULATOR PISTON AND SEALS.
13. 2ND CLUTCH ACCUMULATOR SPRINGS (DOUBLE).
14. LOW/REVERSE SWITCH VALVE.
15. LOW/REVERSE SWITCH VALVE BORE PLUG.
16. LOW/REVERSE ACCUMULATOR PISTON AND SEALS.
17. LOW/REVERSE ACCUMULATOR SPRINGS (DOUBLE).
18. ACCUMULATOR COVER PLATE.



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Figure 1



**DAIMLER/CHRYSLER 40TE, 41TE, 42LE, 42RLE,
45RFE & 545RFE
NEW BONDED PISTONS**

CHANGE: At the start of production for the 2004 model year the 40TE (new for 2004, light duty) 41TE, 42LE and the 42RLE transmissions are built using bonded molded rubber clutch pistons for the Low/Reverse and 2-4 clutch assemblies. In addition the Low/Reverse Accumulator Cover is of the bonded type. The Low/Reverse, 2-4, Underdrive and Overdrive accumulator pistons for the front drive models are also of the bonded type of piston which will also service the 45RFE and 545RFE rear drive transmissions.

REASON: Less expensive to manufacture.

PARTS AFFECTED:

- (1) The 2-4 piston has gone from aluminum, requiring individual lip seals or "D" rings to bonded molded rubber, (Refer to Figure 1). The 2-4 piston comes with the 2-4 retainer, but the retainer is unchanged.
- (2) The Low/Reverse piston has changed from the aluminum type requiring individual lip seals or "D" rings to the bonded molded rubber type, (Refer to Figure 2).
- (3) The Low/Reverse, 2-4, Underdrive and Overdrive accumulator pistons have changed from the aluminum and plastic type requiring individual seals to the bonded molded rubber type, (Refer to Figure 3).
- (4) The low/reverse accumulator cover has also changed from the aluminum type requiring and individual o-ring seal to the bonded molded rubber type.

INTERCHANGEABILITY:

All components listed above will back service any of the above mentioned transmissions.

SERVICE INFORMATION:

<i>Low/Reverse Bonded Piston for 40TE.....</i>	<i>4800235AA</i>
<i>Low/Reverse Bonded Piston for 41TE, 42LE and 42RLE.....</i>	<i>4800256AA</i>
<i>2-4 Bonded Piston for 40TE.....</i>	<i>4000234AA</i>
<i>2-4 Bonded Piston for 41TE, 42LE and 42RLE.....</i>	<i>4800257AA</i>
<i>Low/Reverse, 2-4 Underdrive and Overdrive Bonded Accumulator Pistons for 40TE, 41TE, 42LE, 42RLE, 45RFE and 545RFE.....</i>	<i>4446620AC</i>
<i>Low/Reverse Accumulator Cover for 40TE, 41TE and 42LE.....</i>	<i>4431617AB</i>

NEW BONDED PISTONS

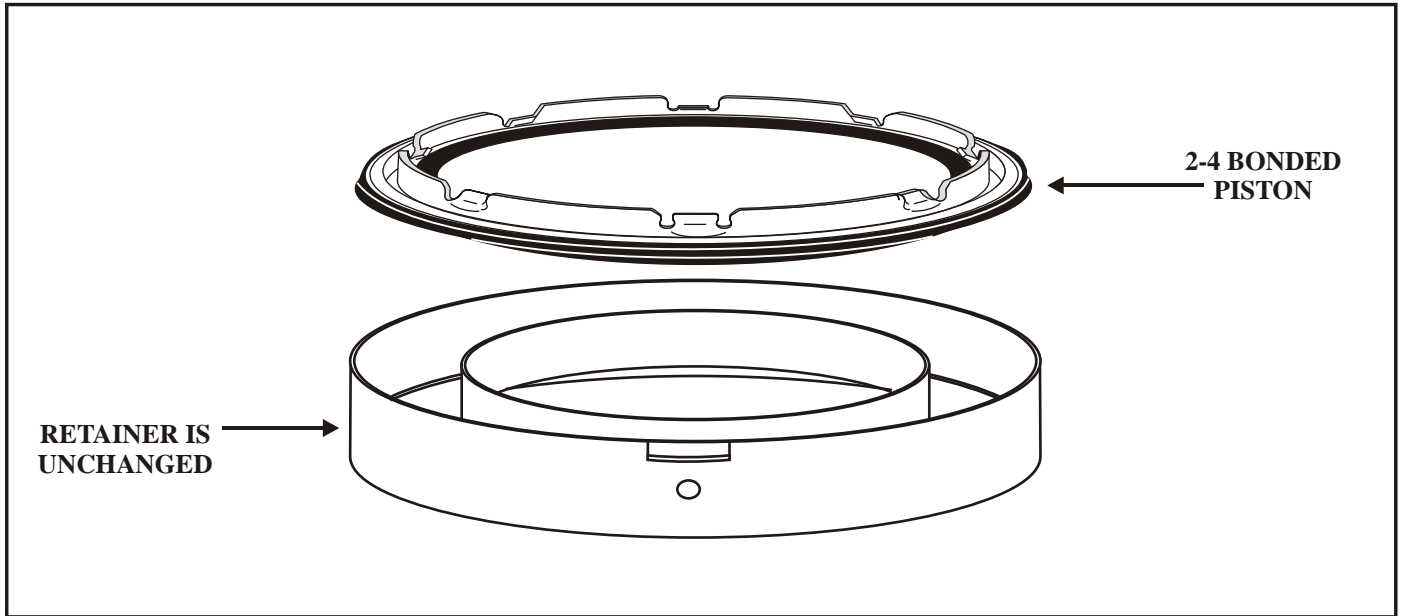


Figure 1

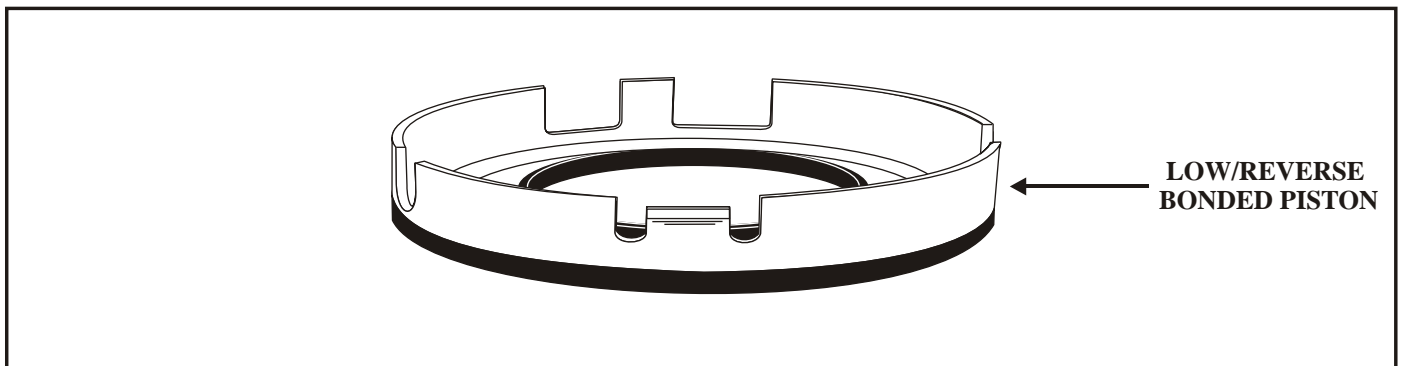


Figure 2

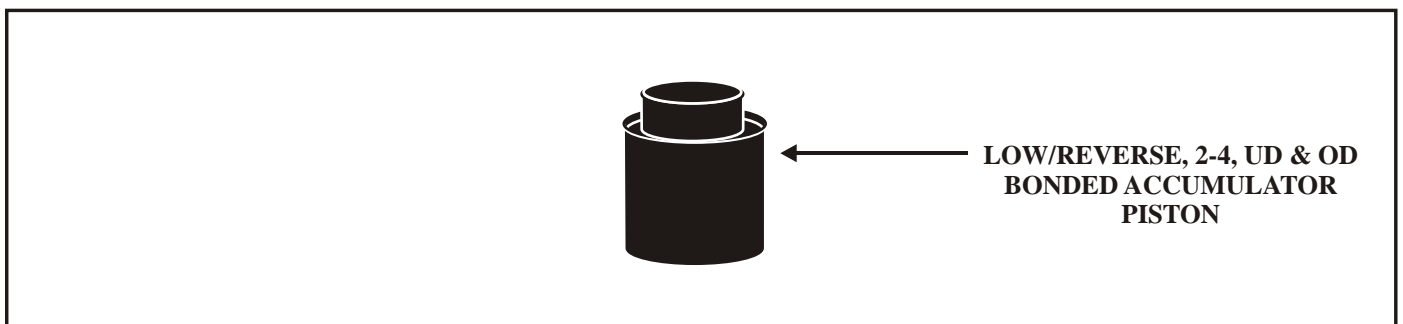


Figure 3



DAIMLER CHRYSLER 41TE/42LE

TRANSMISSION RANGE SENSOR CHANGE

CHANGE: As a running change during the 1999 model year, a newly designed Transmission Range Sensor, (Refer to Figure 1), was implemented for both the 41TE and 42LE transmissions. The connector part of the sensor changed from a pin type connector to a blade type connector. The chart in Figure 2 shows the "blade type" sensor applications.

PARTS AFFECTED:

- (1) The Transmission Range Sensor terminals changed to a blade type.
- (2) The TRS vehicle harness connector changed to accommodate the blade type TRS
- (3) The transmission case has changed in order to accommodate the new type TRS as it is larger in diameter and therefore requires a larger pass through opening in that area of the case.

INTERCHANGEABILITY:

None of the previous design components listed above will interchange with the current design parts.

However, there is available a "Jumper Harness" to allow using 1998 and earlier components with the 1999 and later 41TE and 42LE transmissions and vehicles due to the fact that there are no operational differences between the previous and current Transmission Range Sensors.

The chart in Figure 3 indicates the TRS terminal assignments for both the pin type and the blade type.

The chart in Figure 4 shows the correct range parameters of both TRS types when viewed in the data list on the scan tool.

NOTE: *The wire colors on the "Jumper Harness" may not match the TRS vehicle wire harness colors. DO NOT use wire color as a guide when installing the "Jumper Harness", use terminal location.*

SERVICE INFORMATION:

<i>41TE Pin Type TRS for 1998 and Earlier Vehicles.....</i>	<i>04659559AC</i>
<i>42LE Pin Type TRS for 1998 and Earlier Vehicles.....</i>	<i>04659492AC</i>
<i>41TE Blade Type TRS for 1999 and Later Vehicles.....</i>	<i>04659676AB</i>
<i>42LE Blade Type TRS for 1999 and Later Vehicles.....</i>	<i>004659677AB</i>
<i>41TE Jumper Harness Kit.....</i>	<i>05014473AA</i>
<i>42LE Jumper Harness Kit.....</i>	<i>05014474AA</i>

TRANSMISSION RANGE SENSOR CHANGE

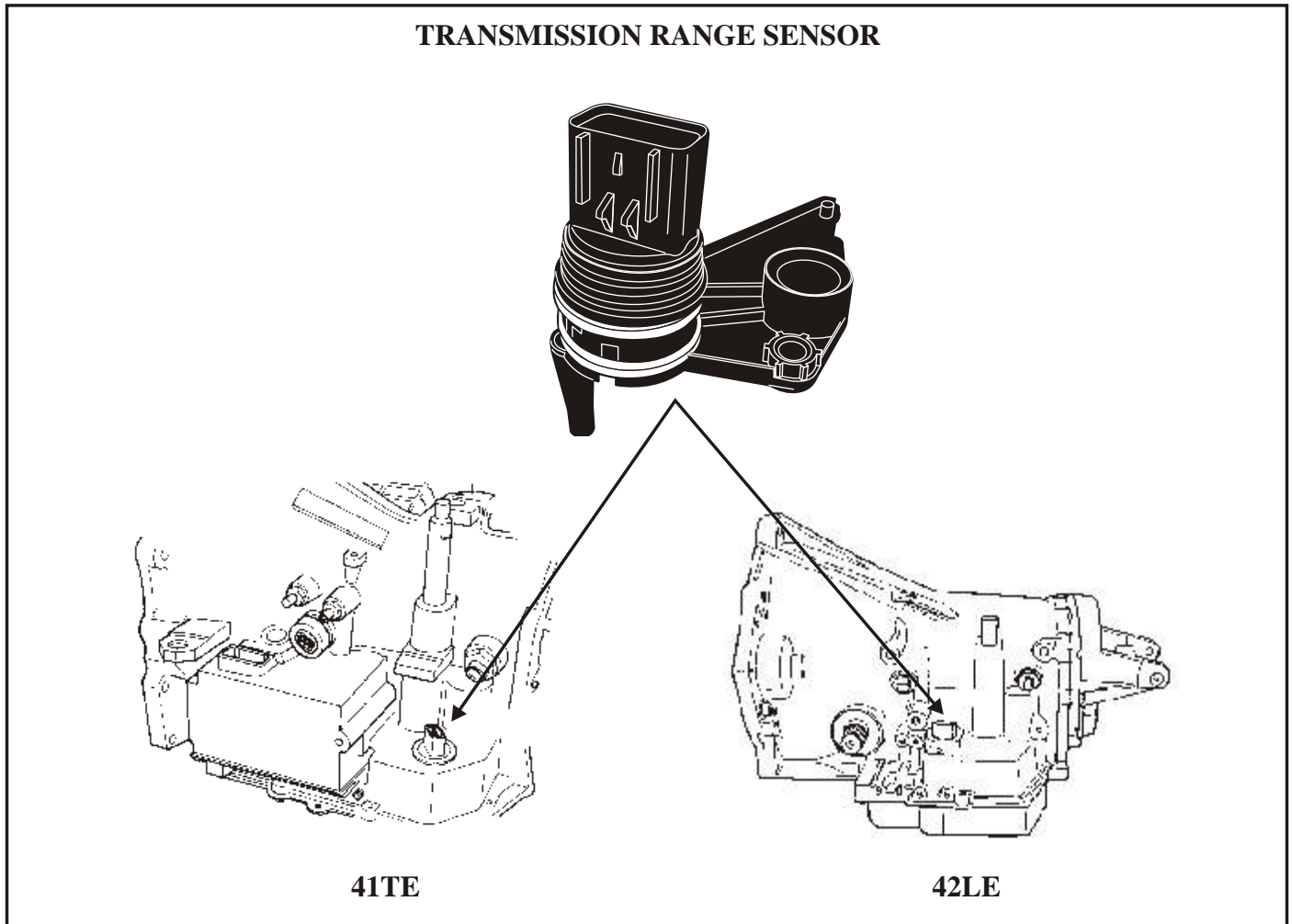


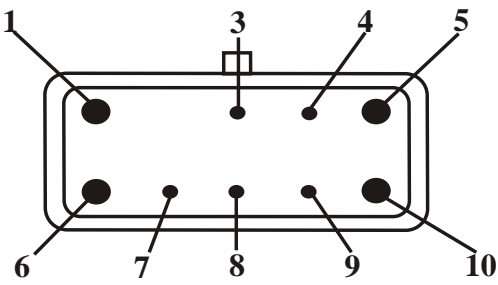
Figure 1

TRS APPLICATION CHART		
1999 MODEL TRS IMPLEMENTATION	ENGINE SIZE (LITERS)	TRANSAXLE BUILD DATE
NS / GS	3.0 / 3.3	9/25/98 OR LATER
NS / GS	2.4 / 3.8	9/28/98 OR LATER
NS / GS AWD	3.8	9/29/98 OR LATER
FJ / JA / JX	2.0 / 2.4 / 2.5	9/26/98 OR LATER
LH	2.7 / 3.2 / 3.5	9/21/98 OR LATER
PR	3.5	11/19/98 OR LATER

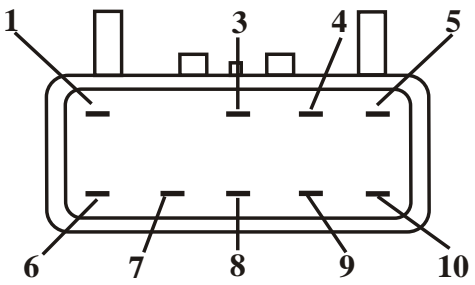
Figure 2

TRANSMISSION RANGE SENSOR CHANGE

TRS TERMINAL ASSIGNMENT	
TRS TERMINAL NUMBER	TRS TERMINAL FUNCTION
1	FUSED IGNITION SWITCH OUTPUT
2	NOT USED
3	SPEED SENSOR GROUND
4	TRANSMISSION TEMPERATURE SENSOR SIGNAL
5	PARK/NEUTRAL POSITION SWITCH SENSE
6	REVERSE LAMP SENSE
7	TRS T1 (C4) SENSE
8	TRS T3 (C3) SENSE
9	TRS T42 (C2) SENSE
10	TRS T41 (C1) SENSE



**PREVIOUS DESIGN
PIN TYPE**



**CURRENT DESIGN
BLADE TYPE**

Figure 3

RANGE		T42 (C2)	T41 (C1)	T3 (C3)	T1 (C4)
P	P	CL	CL	CL	OP
R	R	OP	CL	OP	OP
N	N	CL	CL	OP	CL
OD	D	OP	OP	OP	CL
3	2	OP	OP	CL	OP
1	1	OP	CL	CL	CL

OP = SWITCH IS OPEN
CL = SWITCH IS CLOSED

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Figure 4
Automatic Transmission Service Group



CHRYSLER DIAGNOSTIC CODES CODE P1717

- COMPLAINT:** Aftermarket scanners may retrieve Code P1717 with a late model Chrysler front wheel drive 41TE (A604) transmission that's in failsafe and defines the code as "No Communication with MIC" (mechanical instrument cluster).
- CAUSE:** The scanner inadvertently replaced P0760 (43) for an OD solenoid circuit error with the code P1717.
- CORRECTION:** Repair the OD solenoid circuit error.

The following is a listing of the majority of OBDII Chrysler transmission codes.

Chrysler Transmission Codes

P0120 Throttle Position Sensor Signal Circuit
P0122 Throttle Position Sensor/APPS Low
P0123 Throttle Position Sensor/APPS High
P0124 Throttle Position Sensor/APPS Intermittent
P0218 High Temperature Operation Activated
P0562 Low Battery Voltage
P0604 Internal TCM
P0605 Internal TCM
P0613 Internal TCM
P0700 Internal TCM (Ignore if present with other transmission fault codes)
P0705 Check Shifter Signal
P0706 Check Shifter Signal
P0711 Trans Temp Sensor, No Temp Rise After Start
P0712 Trans Temp Sensor Voltage Too Low
P0713 Trans Temp Sensor Voltage Too High
P0714 Transmission Temperature Sensor Intermittent
P0715 Input Speed Sensor Error
P0720 Output Speed Sensor Error
P0725 Engine Speed Sensor Circuit
P0731 Gear Ratio Error in 1st
P0732 Gear Ratio Error in 2nd
P0733 Gear Ratio Error in 3rd
P0734 Gear Ratio Error in 4th
P0735 Gear Ratio Error in 4th Prime
P0736 Gear Ratio Error in Reverse
P0740 Torque Converter Clutch, No RPM Drop @ Lockup
P0743 Torque Converter Clutch Solenoid/Trans Relay Circuits
P0748 Pressure Solenoid Control/Trans Relay Circuits
P0750 LR Solenoid Circuit
P0751 O/D Switch Pressed (Low) More Than 5 Minutes
P0753 Trans 3-4 Shift Solenoid/Trans Relay Circuits
P0755 2/4 Solenoid Circuit (41TE/42LE)
P0755 2C Solenoid Circuit (45RFE)



CHRYSLER DIAGNOSTIC CODES

P0760 OD Solenoid Circuit
P0765 UD Solenoid Circuit
P0770 4C Solenoid Circuit (45RFE)
P0783 3-4 Shift Solenoid, No RPM Drop @ Lockup
P0841 LR Pressure Switch Sense Circuit
P0845 2/4 Hydraulic Pressure Test Failure (41TE/42LE)
P0845 2C Hydraulic Pressure Test Failure (45RFE)
P0846 2/4 Pressure Switch Sense Circuit (41TE/42LE)
P0846 2C Pressure Switch Sense Circuit (45RFE)
P0867 Line Pressure Fault
P0868 Line Pressure Low
P0869 Line Pressure High
P0870 OD Hydraulic Pressure Test Failure
P0871 OD Pressure Switch Sense Circuit
P0875 UD Hydraulic Pressure Test Failure
P0876 UD Pressure Switch Sense Circuit
P0884 Power Up at Speed
P0888 Relay Output Always Off
P0890 Switched Battery
P0891 Transmission Relay Always On
P0897 Worn Out/Burnt Transaxle Fluid
P0932 Line Pressure Sensor Fault
P0944 Loss of Prime
P0951 Autostick Sensor Circuit
P0952 Autostick Input Circuit Low
P0987 4C Hydraulic Pressure Test Failure (45RFE)
P0988 4C Pressure Switch Sense Circuit (45RFE)
P0992 2-4/OD Hydraulic Pressure Test Failure
P1652 Serial Communication Link Malfunction
P1684 Battery Was Disconnected
P1687 No Communication with MIC
P1694 BUS Communication with Engine Module
P1714 Low Battery Voltage
P1715 Restricted Port In T3 Range
P1716 BUS Communication with Engine Module
P1717 No Communication with MIC
P1726 UD Hydraulic Pressure Switch Circuit
P1727 4C Hydraulic Pressure Switch Circuit (45RFE)
P1728 2C Hydraulic Pressure Switch Circuit (45RFE)
P1732 UD Pressure Switch Sense Circuit
P1733 4C Pressure Switch Sense Circuit (45RFE)
P1734 2C Pressure Switch Sense Circuit (45RFE)
P1735 Inadequate Element Volume 4C (45RFE)
P1736 Gear Ratio Error in 2nd Prime
P1738 High Temperature Logic Activated
P1739 Power Up at Speed
P1740 TCC O/D Solenoid Performanc
P1756 Gov. Press. not equal to target @ 15-20 PSI
P1757 Gov. Press. above 3 PSI in gear @ 0 MPH
P1762 Gov. Press. Sensor Offset Volts Too Low Or High
P1763 Governor Pressure Sensor Volts Too High
P1764 Governor Pressure Sensor Volts Too Low
P1765 Switched Battery (41TE/42LE)
P1765 Trans 12 Volt Supply Relay Control Circuit (42RE/46RE/47RE)
P1767 Relay Output Always On
P1768 Relay Output Always Off
P1770 Inadequate Element Volume LR
P1771 Inadequate Element Volume 2C (45RFE)
P1772 Inadequate Element Volume OD
P1773 Inadequate Element Volume UD
P1775 Solenoid Switch Valve Latched in TCC Position
P1776 Solenoid Switch Valve Latched in LR Position
P1781 OD Pressure Switch Sense Circuit
P1782 2-4 Pressure Switch Sense Circuit
P1784 L-R Pressure Switch Sense Circuit
P1787 OD Hydraulic Pressure Switch Circuit
P1788 2-4 Hydraulic Pressure Switch Circuit
P1789 2-4/OD Hydraulic Pressure Switch Circuit
P1790 Fault Immediately After Shift
P1791 Loss of Prime
P1792 Battery Was Disconnected
P1793 TRD Link Communication Error
P1794 Speed Sensor Ground Error
P1795 Internal Transmission Controller
P1796 Autostick Input Circuit
P1797 Manual Shift Overheat
P1798 Worn out / Burnt Transaxle Fluid
P1799 Calculated Oil Temp In Use
P1899 P/N Performance
P2700 Inadequate Element Volume LR
P2701 Inadequate Element Volume 2C (45RFE)
P2702 Inadequate Element Volume OD
P2703 Inadequate Element Volume UD
P2704 Inadequate Element Volume 4C (45RFE)
P2706 MS Solenoid Circuit (45RFE)

*Special thanks to Tod Chretien of TRNi for
the use of this code list from the website.*



DAIMLER/CHRYSLER

MODEL ID CODES

DAIMLER/CHRYSLER VEHICLE MODEL IDENTIFICATION		
MODEL YEAR	MODEL CODE	VEHICLE MODEL
1989 - 1995	AA	Spirit; Acclaim; Lebaron Sedan
1989 - 2003	AB	Ram Van/Wagon
1989 - 1993	AC	Dynasty; New Yorker; New Yorker Salon
1989 - 1993	AD	Ram Truck
1989 - 1994	AG	Daytona
1989	AH	Lancer; Lebaron GTS
1989 - 1995	AJ	Lebaron Coupe; Lebaron Convertible
1989 - 1990	AK	Aries/reliant
1989 - 1990	AL	Horizon/Omni
1989	AM	Diplomat; Gran Fury; New Yorker Fifth Avenue
1989 - 2004	AN	Dakota
1989 - 1994	AP	Shadow/Sundance
1990 - 1991	AQ	Maserati
1990 - 1993	AY	Imperial; New Yorker Fifth Avenue
1994 - 2002	BR/BE	Ram Pickup Truck
2004 - 2005	CS	Pacifica
1998 - 2003	DN	Durango
2002 - 2004	DR	Ram Pickup Truck
1995 - 2000	FJ	Sebring; Avenger; Talon
1996 - 2000	GS	Chrysler Voyager (International Market)
2004	HB	Durango
1995 - 2000	JA	Cirrus; Stratus; Breeze
2001 - 2004	JR	Sebring Sedan & Convertible; Stratus Sedan
1996 - 2000	JX	Sebring Convertible
2002 - 2004	KJ	Jeep Liberty
2002 - 2004	KJ	Jeep Cherokee (International Market)
1993 - 2004	LH	Concorde; Intrepid; Vision; LHS; New Yorker; 300M
2005	LX	Chrysler 300C; Dodge Magnum
1996 - 2000	NS	Town & Country; Voyager; Caravan
2002 - 2003	PG	Chrysler PT Cruiser (International Market)
1995 - 2004	PL	Neon
1997 - 2002	PR	Prowler
2000 - 2005	PT	PT Cruiser



DAIMLER/CHRYSLER

MODEL ID CODES

DAIMLER/CHRYSLER VEHICLE MODEL IDENTIFICATION		
MODEL YEAR	MODEL CODE	VEHICLE MODEL
2001 - 2005	RG	Chrysler Voyager (International Market)
2001 - 2005	RS	Town & Country; Caravan; Voyager
1993 - 2002	SR	Viper
2001 - 2004	ST	Sebring Coupe; Stratus Coupe
1997 - 2004	TJ	Jeep Wrangler
2003 - 2005	VA	Sprinter
1999 - 2004	WG	Jeep Grand Cherokee (International Market)
1999 - 2004	WJ	Jeep Grand Cherokee
2005	WH	Grand Cherokee (International Market)
2005	WK	Jeep Grand Cherokee
1989 - 1995	YJ	Jeep Wrangler
2003 - 2004	ZB	Viper
1996 - 1998	ZG	Grand Cherokee (International Market)
2004 - 2005	ZH	Crossfire
1994 - 1998	ZJ	Jeep Grand Cherokee; Grand Wagoneer

DAIMLER/CHRYSLER 722.6

TRANSMISSION/VEHICLE APPLICATION

The 722.6 transmission vehicle application has been expanded from Mercedes Benz only applications to include use in some Chrysler built vehicles.

Although this transmission is commonly referred to as the 722.6, it is also known as the W5AXXX, the last three digits change depending on torque capacity. Since the inclusion of Chrysler built vehicles, the transmission variations have increased significantly. Therefore the 722.6 transmissions from this point forward will be designated as the **NAG1**. The meaning of this designation is **New Automatic Gearbox, Generation 1**. The reason for this was to have a common transmission name for all the variations in order to prevent complexity in the Daimler/Chrysler operating systems. The chart in Figure 1 shows the Chrysler division designations and vehicle applications for the NAG 1 transmissions for North American and European consumption for up to and including the 2005 model year.

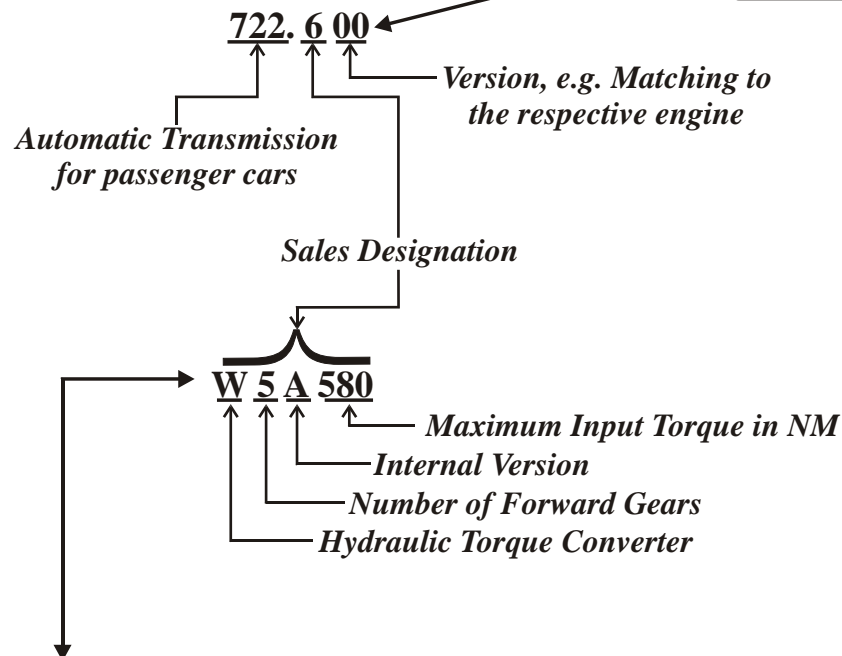
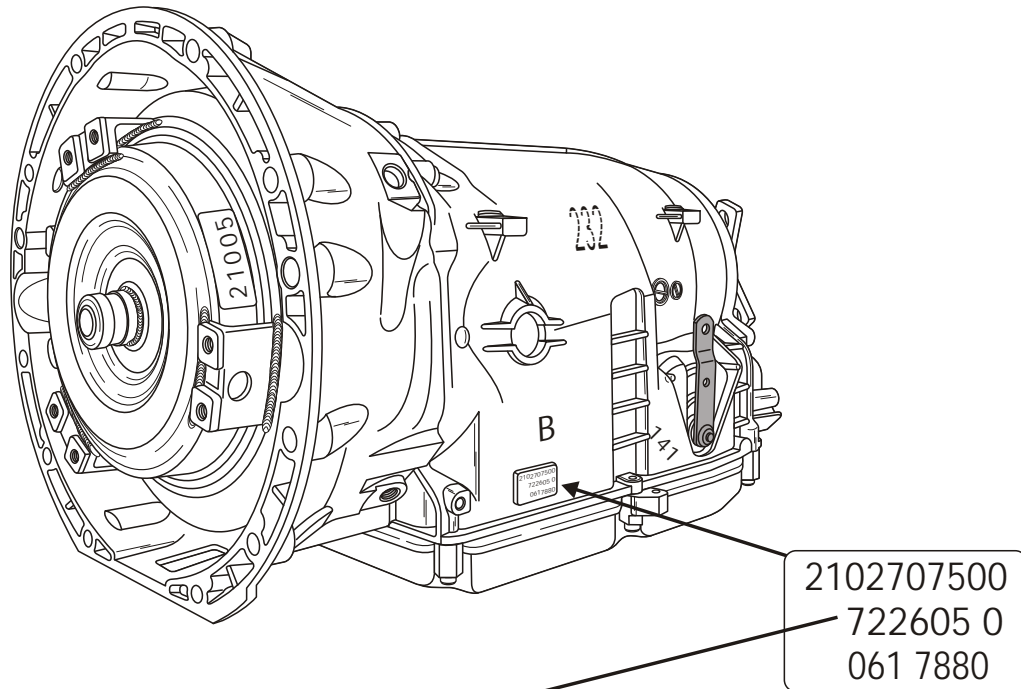
The previous transmission ID tag location and model designation definitions can be seen in Figure 2. The current ID tag location and transmission model designations can be seen in the illustration in Figure 3.

NAG 1 APPLICATION CHART				
MODEL YEAR	MARKET DESTINATION	VEHICLE MODEL	ENGINE FAMILY	TRANSMISSION DESIGNATION
2003	EUROPE	GRAND CHEROKEE	2.7L 5 CYL. DIESEL	W5J400
	UNITED STATES	DODGE SPRINTER	2.7L 5 CYL. DIESEL	W5A380
2004	UNITED STATES	DODGE SPRINTER	2.7L 5 CYL. DIESEL	W5A380
	U.S; CANADA; MEXICO; EUROPE	CHRYSLER CROSSFIRE	3.2L 6 CYL. GASOLINE	W5A330
2005	UNITED STATES	DODGE SPRINTER	2.7L 5 CYL. DIESEL	W5A380
	U.S; CANADA; MEXICO; EUROPE	CHRYSLER 300C DODGE MAGNUM	5.7L 8 CYL. GASOLINE	W5A580
	U.S; CANADA; MEXICO	JEEP GRAND CHEROKEE	3.7L 6 CYL. GASOLINE	W5A580
	EUROPE	JEEP GRAND CHEROKEE	3.7L 6 CYL. GAS	W5A580
			3.0L 6 CYL. DIESEL	W5J400
	U.S; CANADA; MEXICO; EUROPE	CHRYSLER CROSSFIRE	3.2L 6 CYL. GASOLINE	W5A330

Figure 1

TRANSMISSION/VEHICLE APPLICATION

PREVIOUS TRANSMISSION ID TAG LOCATION

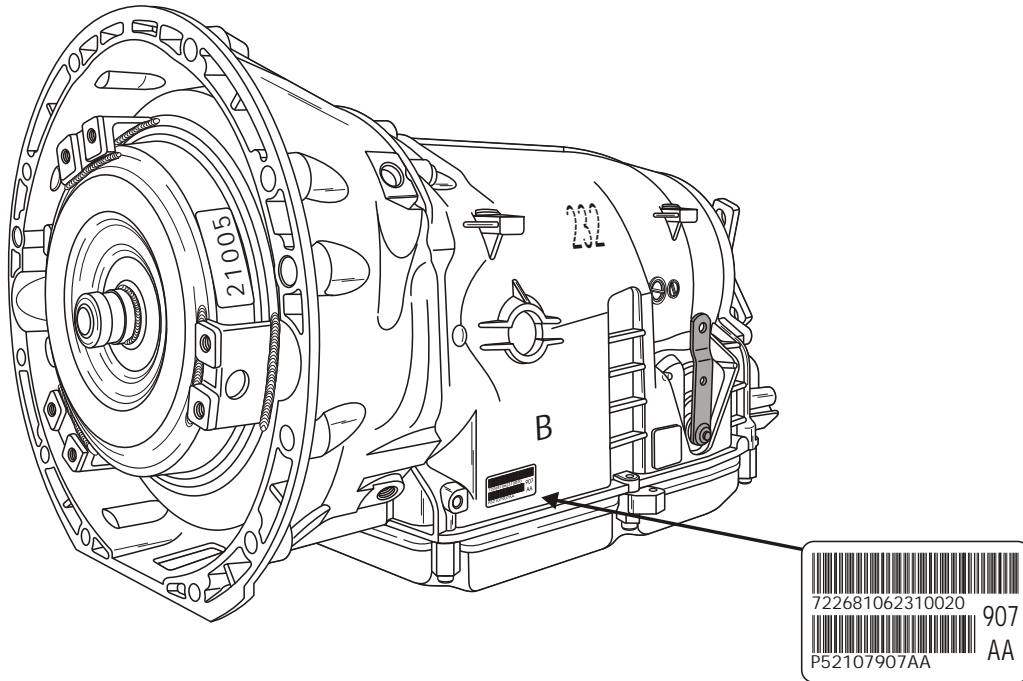


- W5A 580 = Passenger Cars with 8 and 12 cylinder engines
- W5A 400 = AAV (SUV) vehicles with 8 cylinder engines
- W5A 330 = Passenger cars with 4, 5 and 6 cylinder engines
- W5A 300 = AAV (SUV) vehicles with 6 cylinder engines
- W5A 280 = MB Vans - Vito, Sprinter and Vario

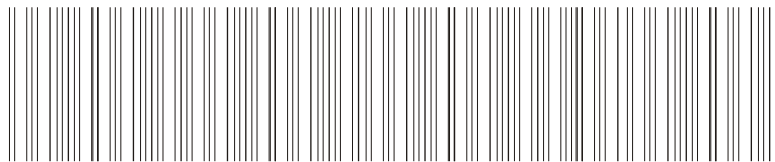
Figure 2

TRANSMISSION/VEHICLE APPLICATION

CURRENT TRANSMISSION ID TAG LOCATION



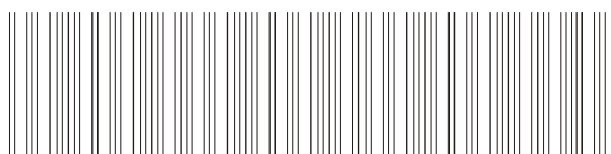
TRANSMISSION
MODEL ID
(722.681)



722681062310020

LAST THREE DIGITS OF
THE TRANSMISSION
PART NUMBER

907



P52107907AA

AA

TRANSMISSION
PART NUMBER

REVISION
LEVEL

Figure 3



DAIMLER/CHRYSLER VEHICLES WITH 722.6 TRANSMISSION

DIPSTICK USAGE

COMPLAINT: When the transmission requires a check of the fluid level, no dipstick is found in the filler tube, only a locking cap is found in the top of the filler tube.

CAUSE: Vehicles manufactured by Daimler/Chrysler and equipped with the 722.6 transmission do not come equipped with a dipstick with the exception of the Jeep Grand Cherokee which does come with a dipstick.

CORRECTION: The dipstick is considered a *tool* by the manufacturer and must be purchased separately. Currently, there are four (4) different dipsticks available depending on vehicle model. The conductor plate shown in figure 1 has a plastic funnel which provides a stop for the dipstick that is used in Mercedes built vehicles. This positions the end of the dipstick a few millimeters OFF the bottom of the pan. The dipstick used in Chrysler built vehicles bottoms out on the pan without deflection. The conductor plate in these applications has the plastic funnel eliminated as shown in figure 2. Three (3) of the four (4) dipsticks will have graduated markings every ten (10) millimeters, these are found in the Chrysler made vehicles. The dipstick for Mercedes Benz made vehicles does not have the ten (10) millimeter graduated markings, instead, it has preset fill level graduations. Figure 3 illustrates the fluid level check procedure for Mercedes Benz built vehicles *ONLY*. Fluid type and capacities can be found in the chart in Figure 4.

Use the part numbers for the correct dipstick/vehicle combination listed under "Service Information".

SERVICE INFORMATION:

<i>Dipstick for Mercedes Benz Vehicles.....</i>	<i>M/B #140 589 15 21 00</i>
<i>Dipstick for Sprinter & Crossfire.....</i>	<i>Miller Tool #8863A</i>
<i>Dipstick for Jeep Grand Cherokee.....</i>	<i>Miller Tool #8863B</i>
<i>Dipstick for Chrysler C & 300 Dodge Magnum.....</i>	<i>Miller Tool #9336</i>
<i>Dipstick for 2005 Grand Cherokee.....</i>	<i>Miller Tool #9336</i>

NOTE: Miller Tools is the tool supplier for Chrysler Division and can be contacted at www.miller.spx.com, or 1-800-801-5420.

DIPSTICK USAGE

MERCEDES BENZ CONDUCTOR PLATE

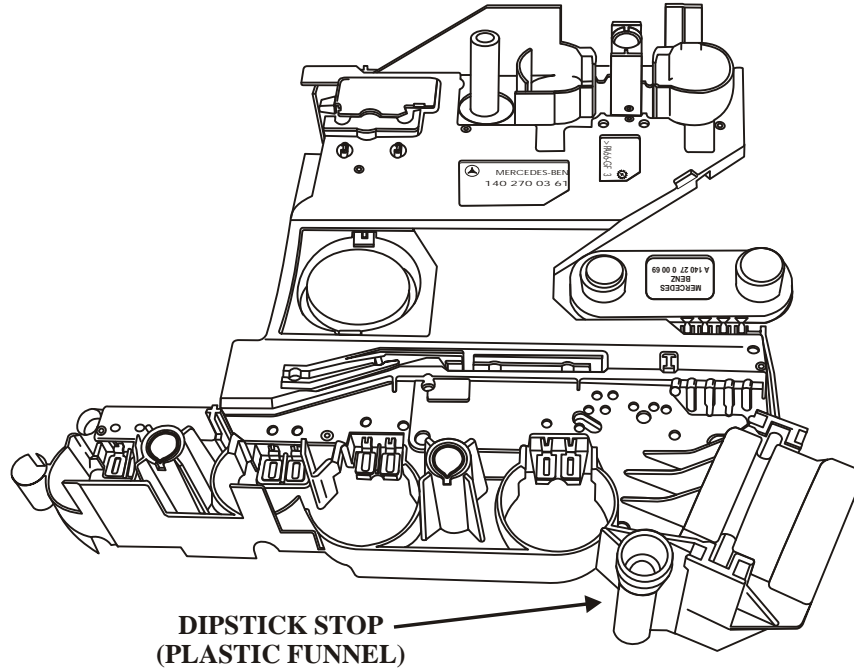


Figure 1

CHRYSLER CONDUCTOR PLATE

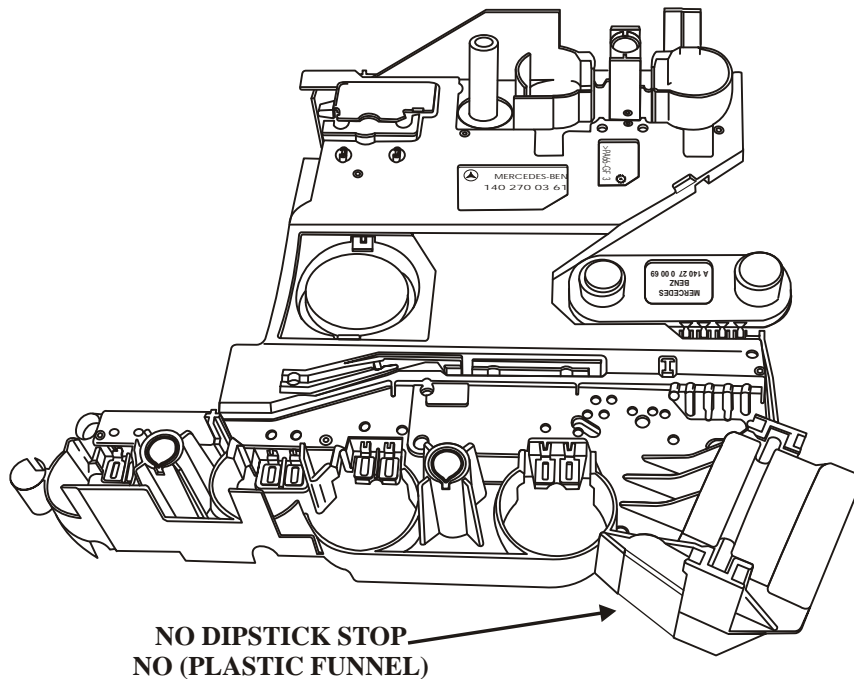


Figure 2

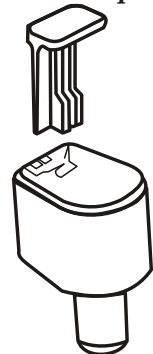
DIPSTICK USAGE

FLUID CHECKING PROCEDURE



**STEP 1: REMOVE
LOCK WITH
A SCREWDRIVER**

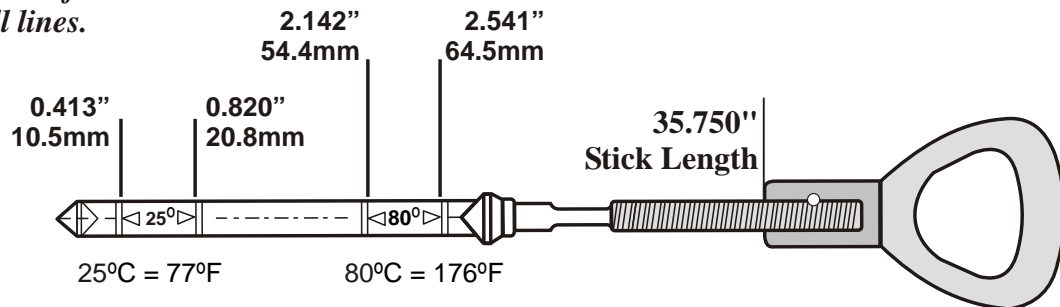
*Part # 05093746AA
for a new lock pin.*



**STEP 2:
REMOVE PLUG**



*Approximate measurements taken
from the bottom of the stick to the
individual fill lines.*



STEP 3: USE THIS TOOL TO CHECK FLUID LEVEL

Figure 3



AUTOMATIC TRANSMISSION FLUID USAGE

TRANSMISSION FLUID USAGE & CAPACITIES			
VEHICLE MODEL	FLUID TYPE	INITIAL FILL (LITERS)	DRY FILL (LITERS)
MERCEDES BENZ	Mercedes Benz Synthetic ATF (Shell 3403-M 115)	7.5	8.0 - 9.1
DODGE SPRINTER	Mercedes Benz Synthetic ATF (Shell 3403-M 115)	5.0	7.7
CHRYSLER CROSSFIRE	Mercedes Benz Synthetic ATF (Shell 3403-M 115)	5.0	8.0
CHRYSLER 300 C	Mercedes Benz Synthetic ATF (Shell 3403-M 115)	5.0	7.7
JEEP GRAND CHEROKEE	Mercedes Benz Synthetic ATF (Shell 3403-M 115)	5.0	7.7

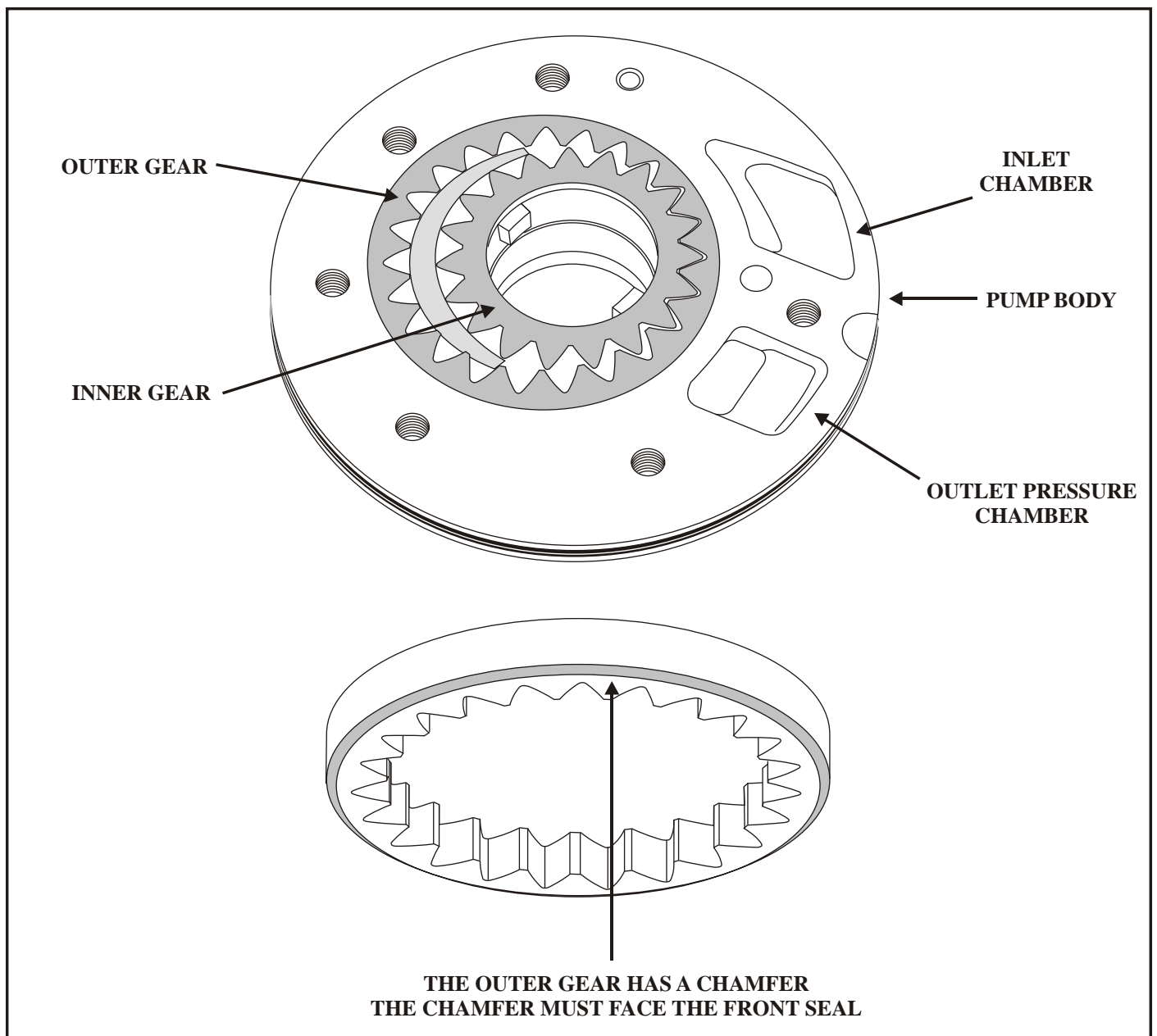
Figure 4

MERCEDES BENZ 722.6

PUMP SPECIFICATIONS

Average Thickness of Gears.....	12.77 mm (0.503 in.)
Average Depth of Gear Bore.....	12.817 mm (0.505 in.)
Average Inside Diameter of Gear Bore.....	87.0375 mm (3.427 in.)
Average Outside Diameter of External Gear.....	86.94 mm (3.423 in.)
Average Outside Diameter of Internal Gear.....	66.20 mm (2.606 in.)

NOTE: Any machined marks on the pump gears are not indicative of pump gear timing or orientation.





RE0F09A PRELIMINARY INFORMATION

The RE0F09A is Nissan's Continuous Variable Transaxle also known as the X-Tronic or the CVT3 transmission. This is a new-generation steel-belt CVT for use with engines up to the 3.5 liter class which has been fitted for use in their Murano crossover SUV vehicle starting back in November of 2002.

Viewing the unit in Figure 1, the following can be seen:

1. It utilizes a typical torque converter to input power from the engine into the transmission. This torque converter also contains a clutch for increased fuel economy.
2. There are several pressure taps available for diagnosing; a line pressure tap, a forward clutch tap, and taps for both the primary and secondary pulleys.
3. For cooling the transmission fluid, an external cooler independent from the radiator is used.
4. A 22 pin case connector
5. A vehicle Speed Sensor.

This CVT is controlled by a Transmission Control Module (TCM) which is located to the right side of the Engine Control Module (ECM) under the passenger side dash. Sensor and signal inputs to the TCM are:

1. Park Neutral Position Switch
2. Accelerator Pedal Position Signal
3. Closed Throttle Position Signal
4. Engine Speed Signal
5. CVT Fluid Temperature Sensor
6. Vehicle Speed Signal
7. Manual Mode Signal
8. Second Position Signal
9. Stop Lamp Switch Signal
10. Primary Speed Sensor
11. Secondary Speed Sensor
12. Primary Pressure Sensor
13. Secondary Pressure Sensor

From these Inputs, the TCM can control the following transmission operations:

1. Shift Control
2. Line Pressure Control
3. Primary Pressure Control
4. Secondary Pressure Control
5. Lock-up Control

The TCM performs these operations via the devices mounted on the valve body as seen in Figure 2:

1. Lock-Up Select Solenoid (LUSS)
2. Torque Converter Clutch Solenoid (TCCS)
3. Line Pressure Control Solenoid B - (LPCSB)
4. Line Pressure Control Solenoid A - (LPCSA)
5. Stepper Motor - A Ratio Control Motor (RCM)



"2005" SEMINAR INFORMATION VIDEO

100

Figure 3 shows where the Park/Neutral Position Switch and the Transmission Fluid Temperature Sensor is located. You will also notice a ROM assembly. This must stay with the transmission as it contains information specific to that transmission for it to operate at its optimum. A case passage identification is also provided in Figure 3.

Figures 4 and 5 provide valve body small parts location and identification as well as valve location and identification. NOTE: *The names of the valves have been assigned by ATSG as manufacturer information has not been made available at the time of this printing.*

Figure 6 identifies the Primary and Secondary pulleys location, the steel push belt by Van Doorne Transmissie now carried by BOSCH and the Ratio Control Motor follower. The steel belt is 30mm in width with each element being 1.8mm thick. Center distance is 240mm with an input torque rating of 350Nm or 258FtLbs from a 3.5L V6 engine. These belts do NOT stretch. What occurs is wear on the rocking or rolling edge of the element making the elements looser between themselves. Additionally the bands that hold them together may eventually begin to have stress cracks from being in a constant varying wrap angle. Should the belt begin to slip from a loss of holding pressure, the elements will damage the pulley face (sheave) and bits and pieces of the element will transpose themselves to the sheave face.

A Gerotor style pump is used in the RE0F09A as seen in Figure 7. This pump also utilizes a Volume Control Valve. Care must be taken when assembling the pump. It is very easy to place the pump gears in the body incorrectly. The upper left illustration in Figure 7 is correct while the upper right illustrates the incorrect assembly. Be sure that the converter ear pockets of the drive gear are facing you when you place the gears into the body.

Figure 8 provides the proper Reverse and Forward clutch cushion plate assembly. The Forward Clutch has two dished plates with the smaller inner ID facing each other while the Reverse clutch has one dished plate which sits at the bottom like a bowl.

Figure 9 provides a hydraulic schematic.

Figures 10 and 11 explain the operation of the solenoids.

Figure 12 provides information concerning the Ratio Control Motor (RCM) and Transducers.

Figure 13 gives data on the Park/Neutral Position Sensor and Transmission Fluid Temperature Sensor.

An overall wiring schematic and transmission case connector pin identification is provided in Figure 14.

Figures 15, 16 and 17 are a listing of Diagnostic Service Codes related to the TCM.

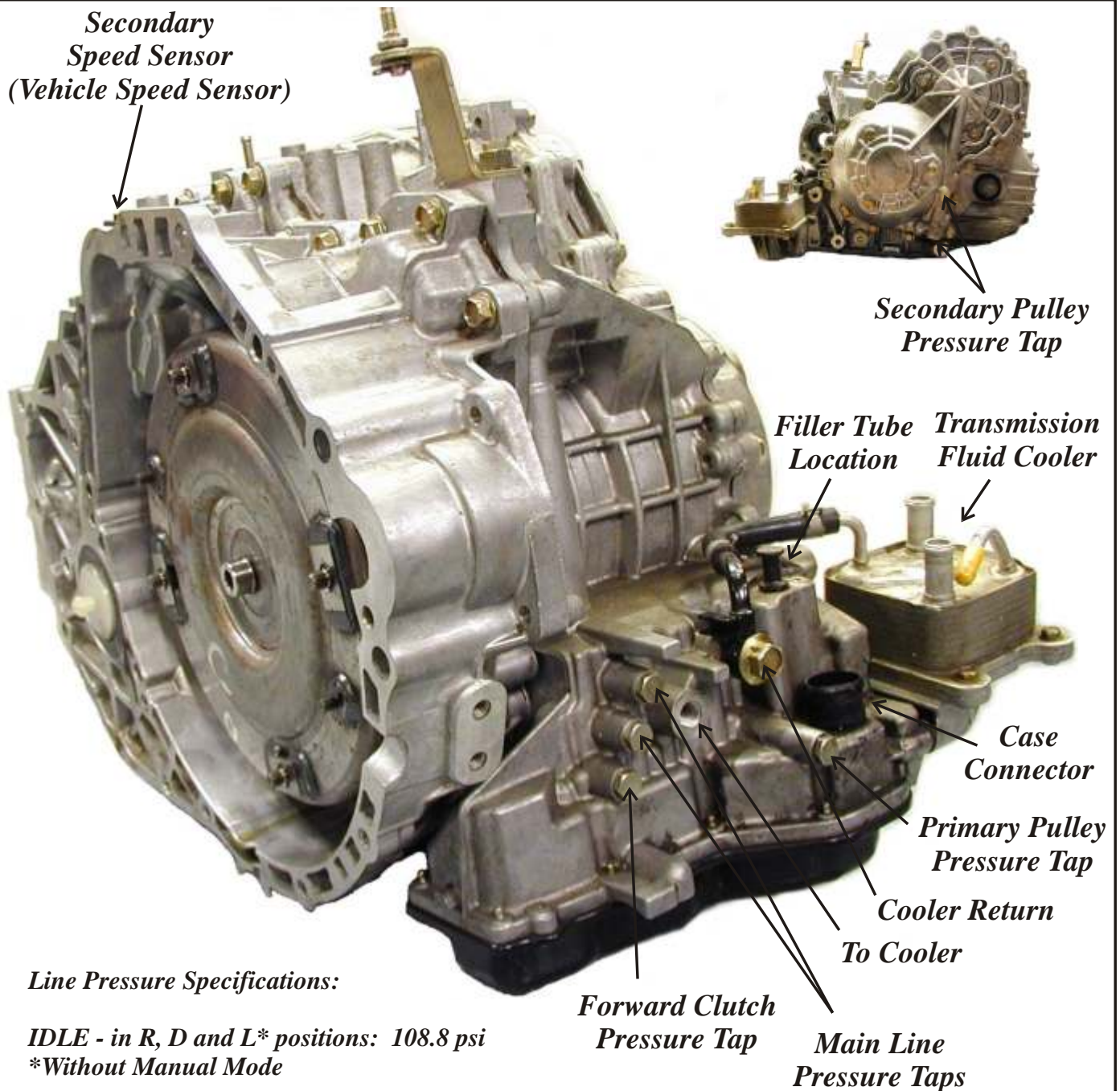
Fluid Information from Nissan Bulletin NTB02-114 Dated November 14th, 2002.

If the CVT/Xtronic transmission in the Murano (Z50) requires service, a new type of CVT transmission fluid MUST be used. The new fluid is CVT Fluid NS-2 as the internal parts used in this transmission REQUIRES the use of this fluid. Only Nissan CVT Fluid NS-2 is especially formulated to meet the exacting requirements of this new RE0F09A transmission. Use of any other transmission fluid, even Nissan's Matic D or J will cause deterioration in driveability and transmission durability.

Service Information:

CVT Fluid NS-2.....999MP-NS200P

RE0F09A
PRELIMINARY INFORMATION



Line Pressure Specifications:

IDLE - in R, D and L* positions: 108.8 psi
***Without Manual Mode**

STALL - in R, D and L* positions: 768.5 to 826.5 psi
***Without Manual Mode**

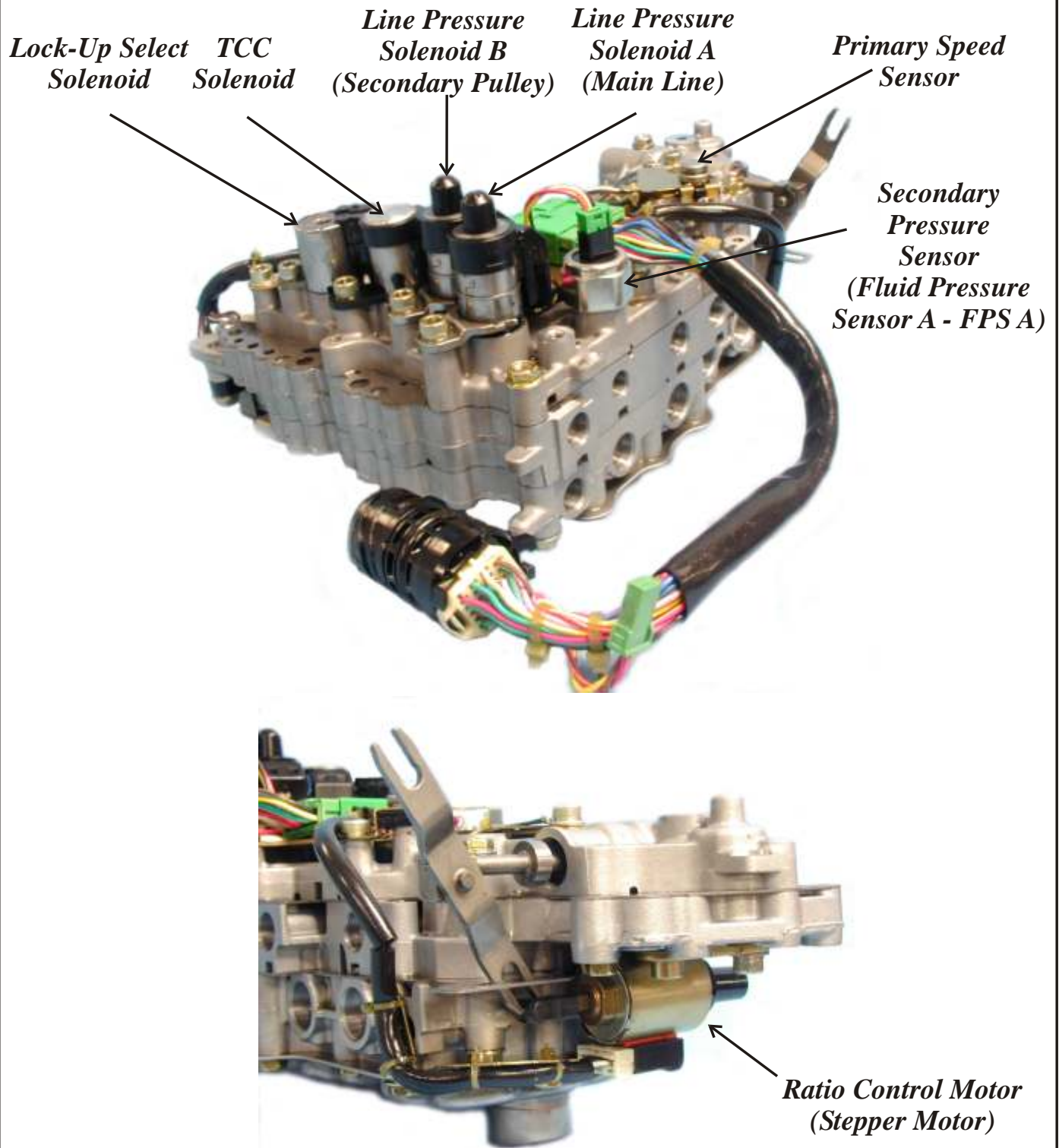
Forward Clutch and Primary Pulley Specifications are not available at the time of printing.

This Nissan CVT was provided by Phoenix Re-manufactured Transmission.

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Figure 1

RE0F09A
PRELIMINARY INFORMATION



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Figure 2

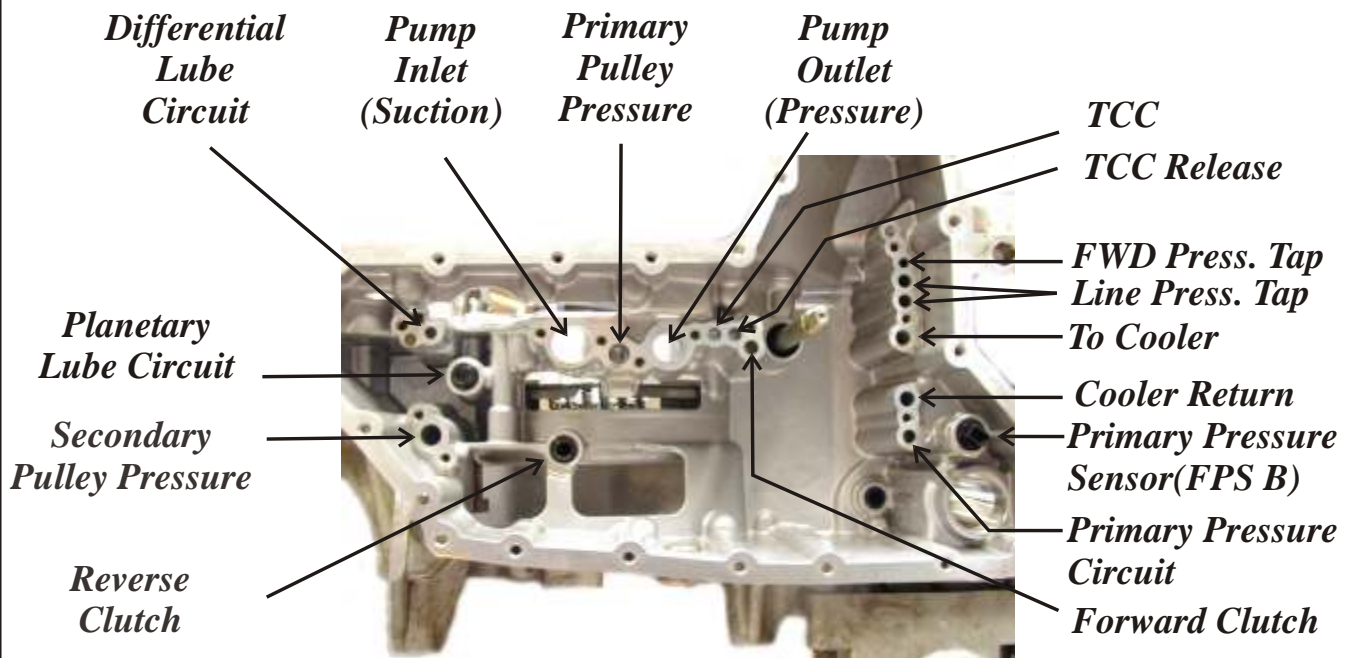
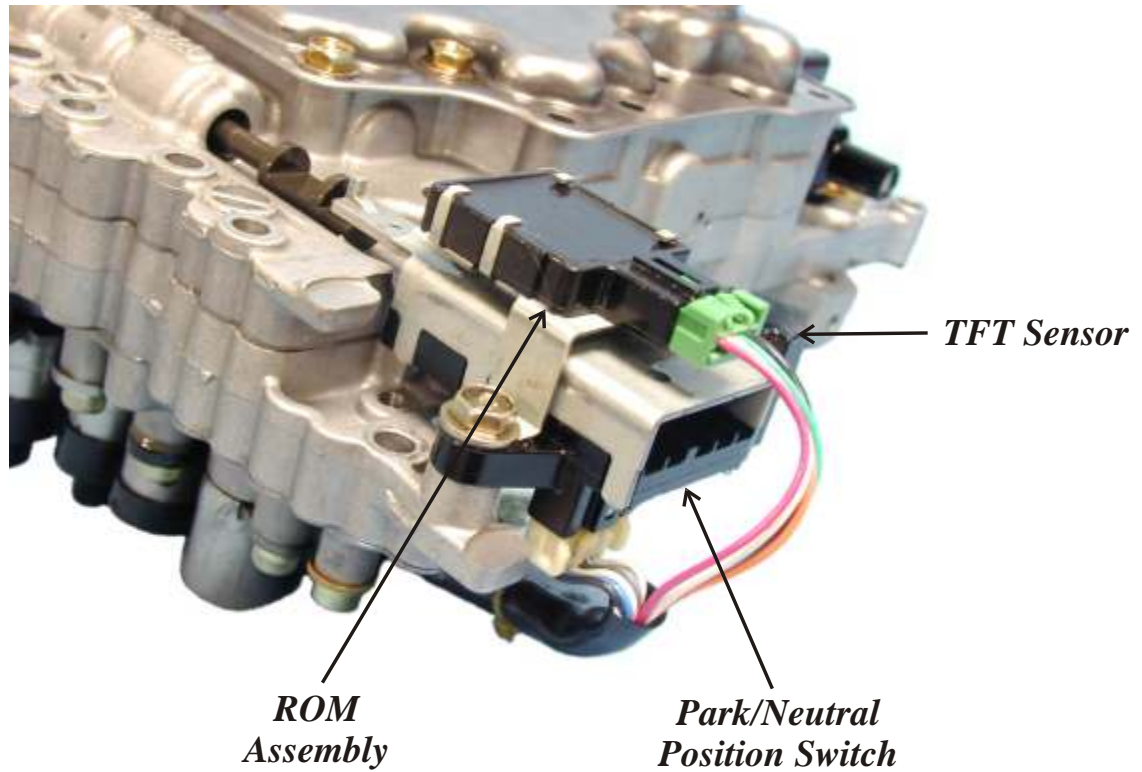
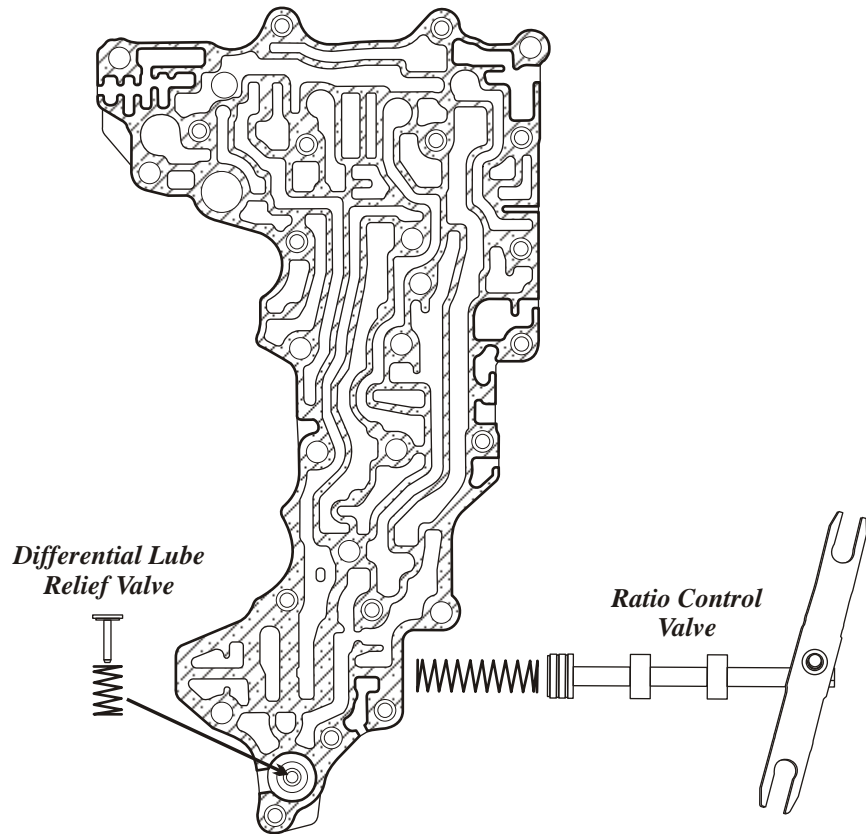
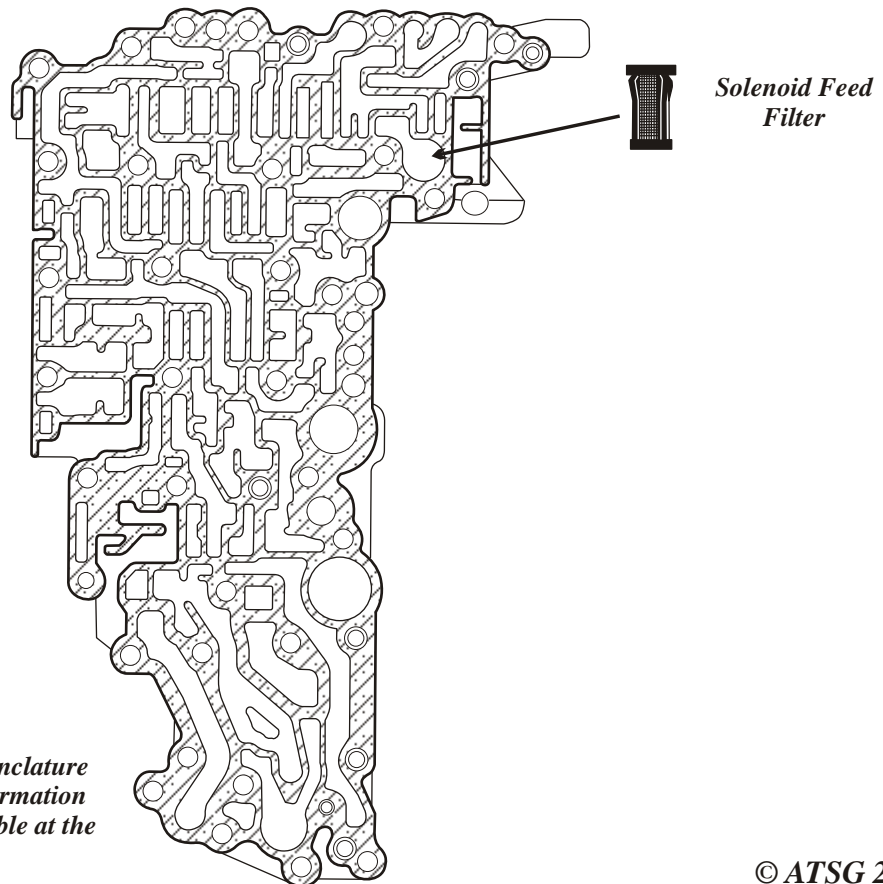


Figure 3
Automatic Transmission Service Group

Upper Valve Body



Center Valve Body Upper Side



NOTE: Small parts and valve nomenclature have been assigned by ATSG as information from the manufacturer is not available at the time of printing.

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Figure 4
Automatic Transmission Service Group

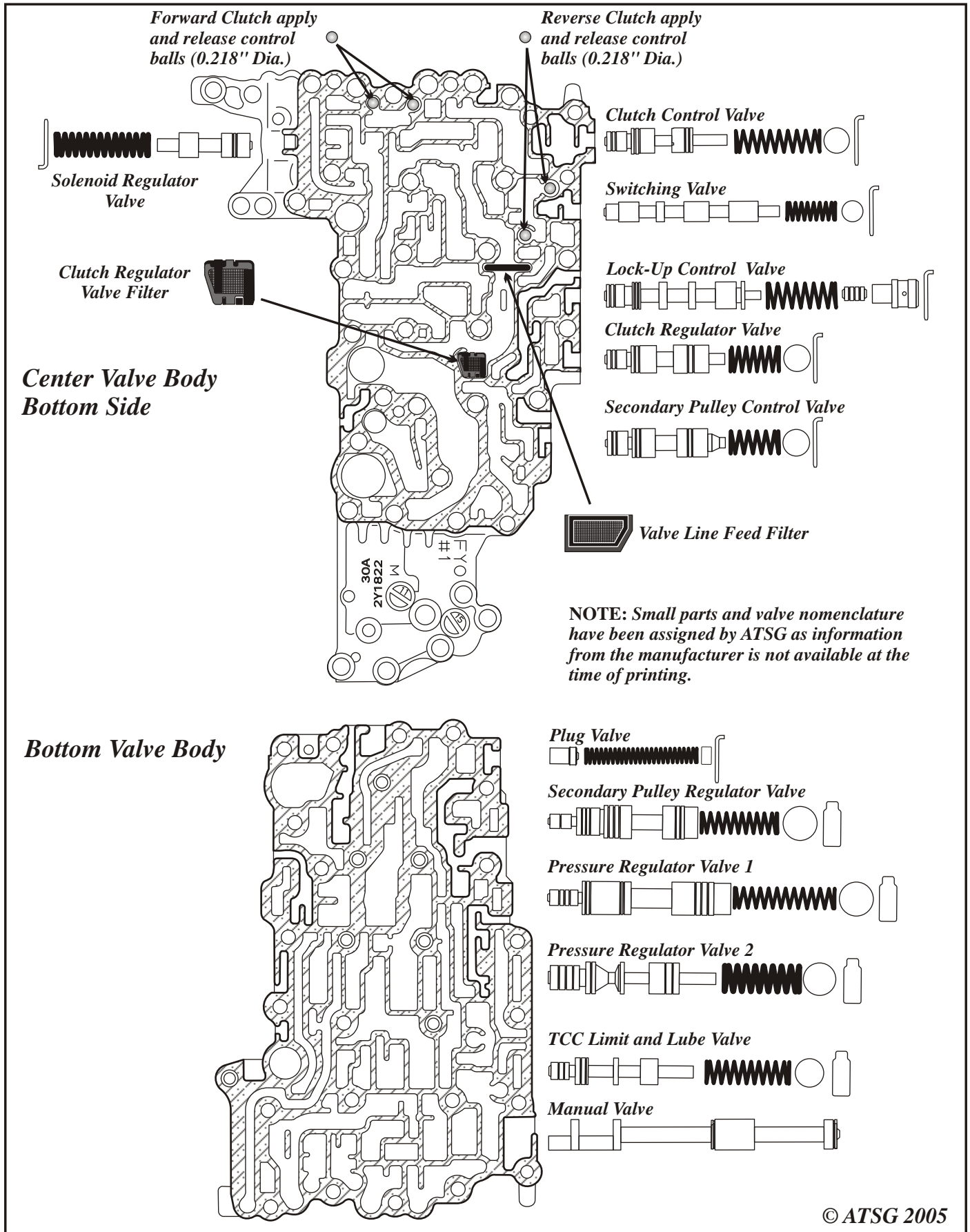


Figure 5
Automatic Transmission Service Group

RE0F09A
PRELIMINARY INFORMATION

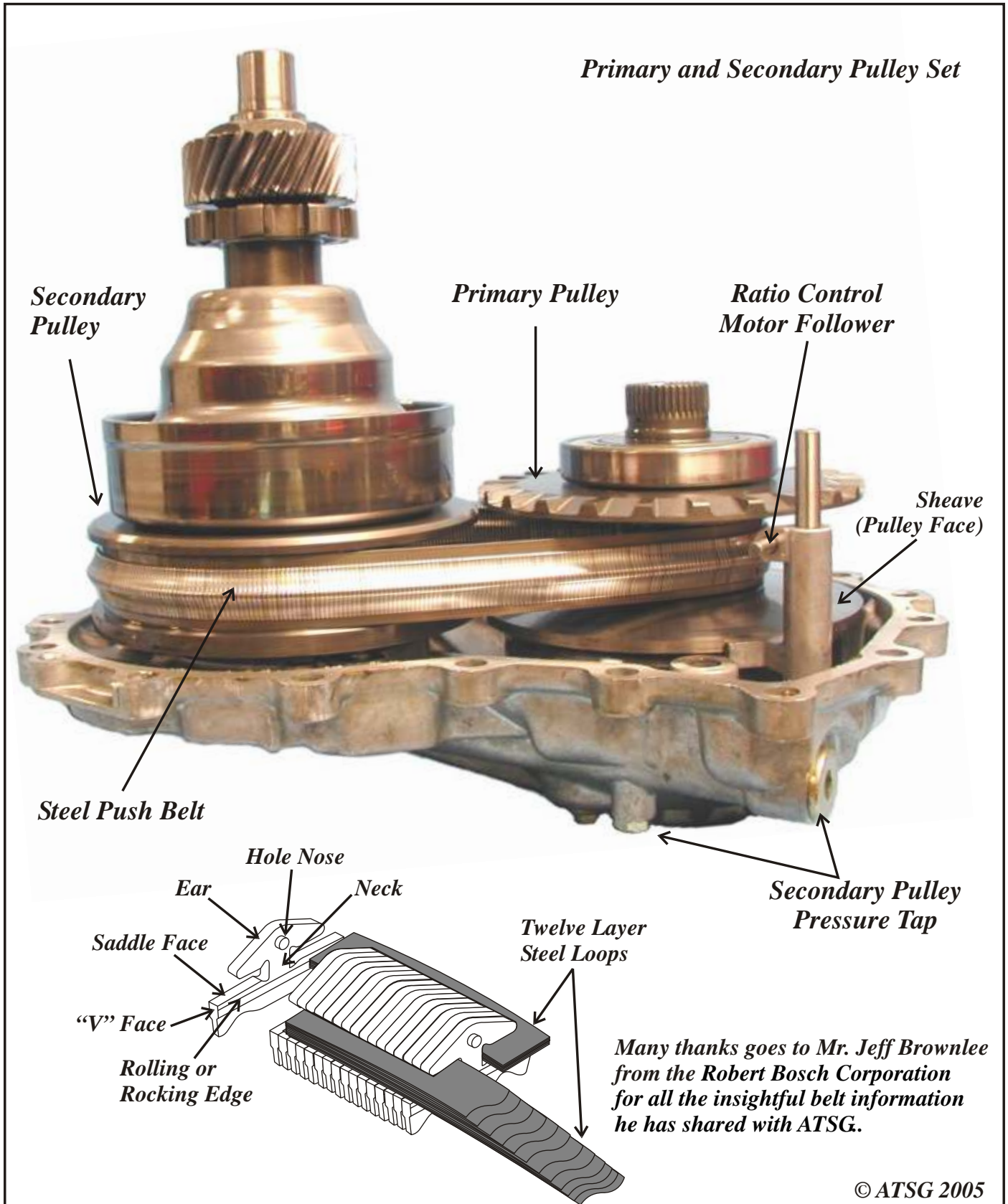
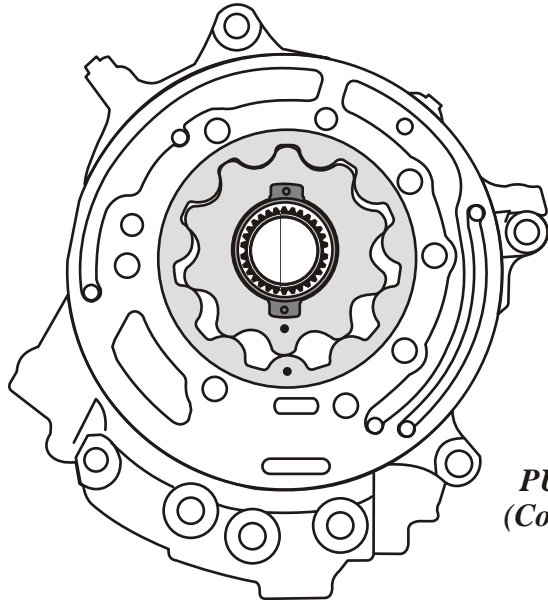


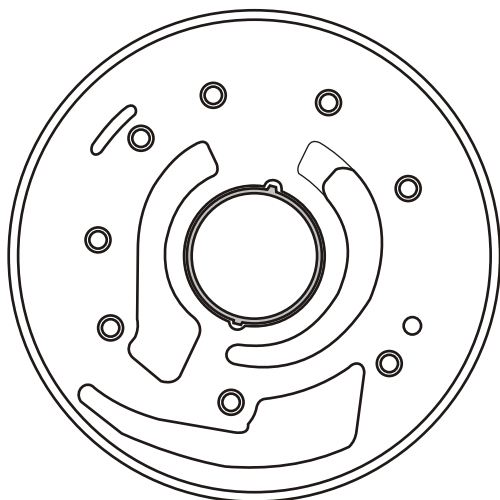
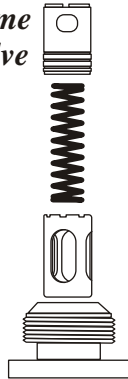
Figure 6
Automatic Transmission Service Group

RE0F09A PRELIMINARY INFORMATION

Correct Pump Gear Installation

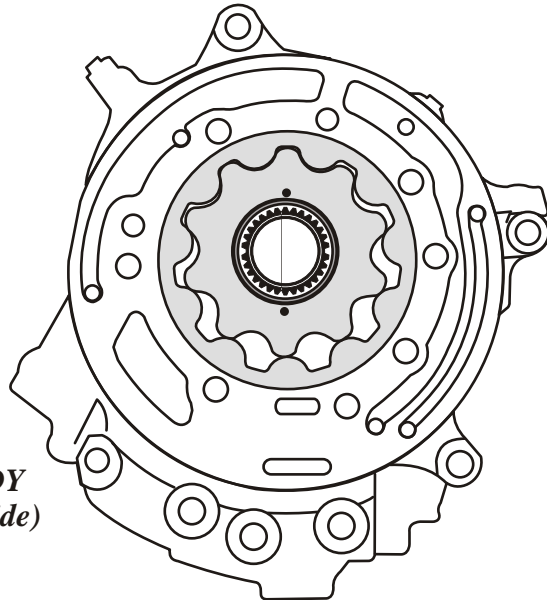


*Pump Volume
Control Valve*



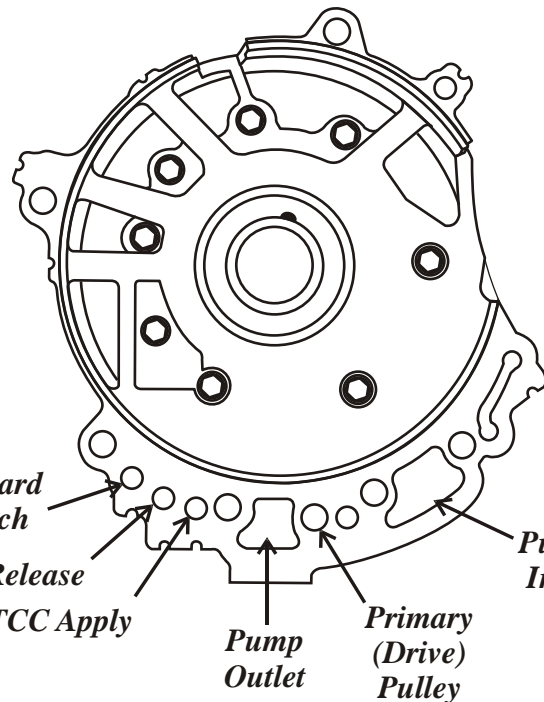
PUMP COVER

Incorrect Pump Gear Installation



**PUMP BODY
(Converter Side)**

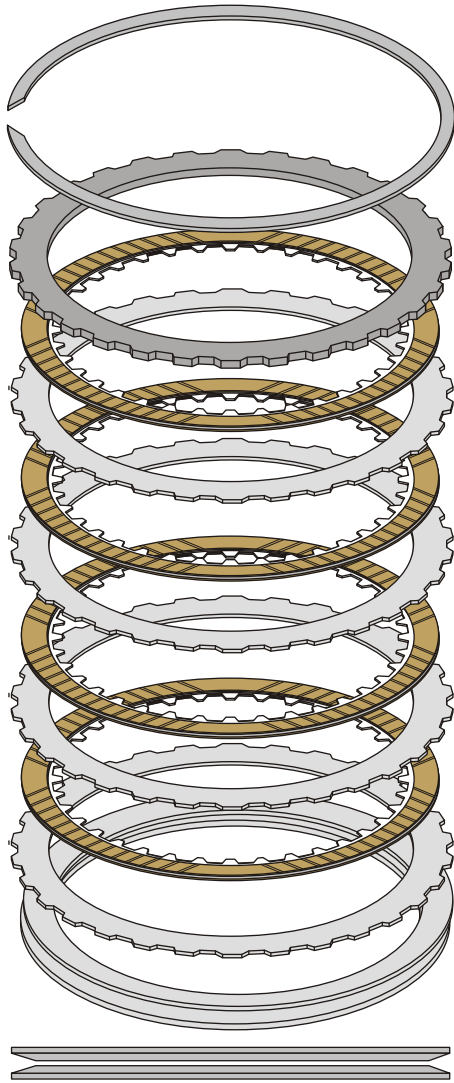
**PUMP BODY
(Transmission Side)**



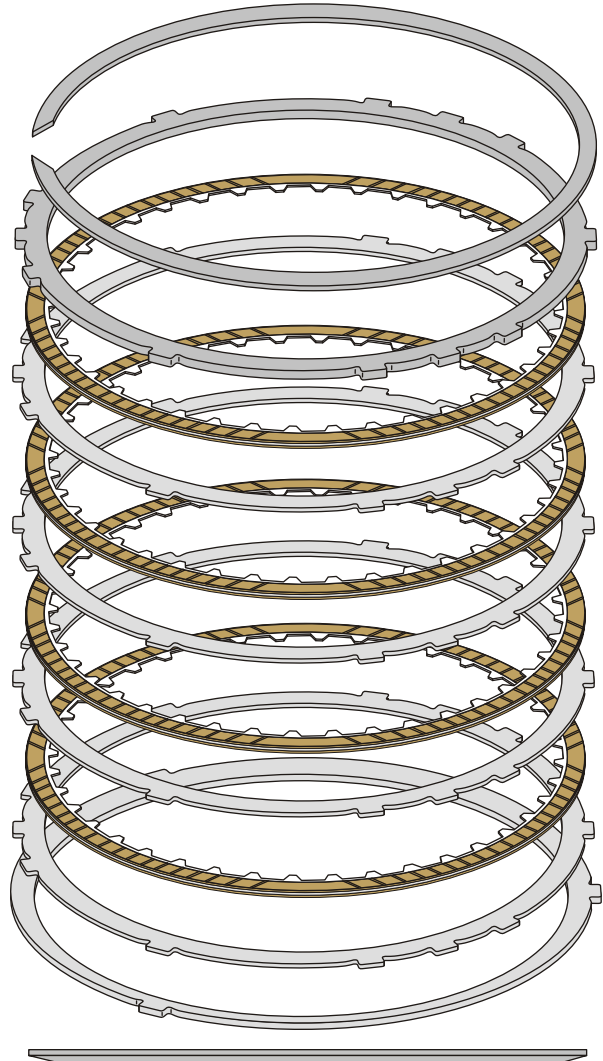
**Forward
Clutch**
TCC Release
TCC Apply
**Pump
Outlet**
**Primary
(Drive)
Pulley**
**Pump
Inlet**

RE0F09A
PRELIMINARY INFORMATION

Forward and Reverse Clutch Stack-Up



Forward Clutch with the small diameter of the double cushion plates facing each other.



Reverse Clutch with the small diameter of the single cushion plate facing towards the piston.

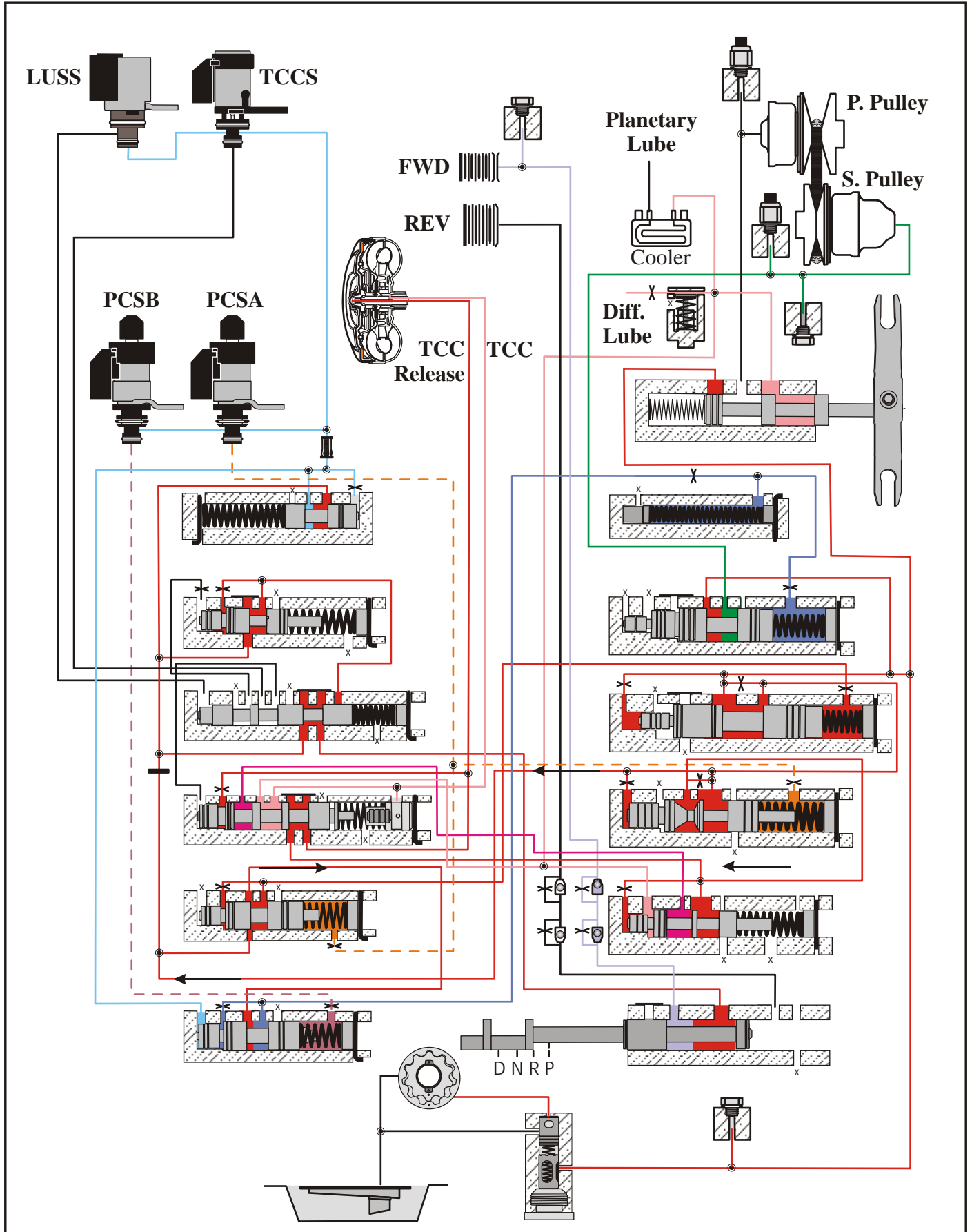


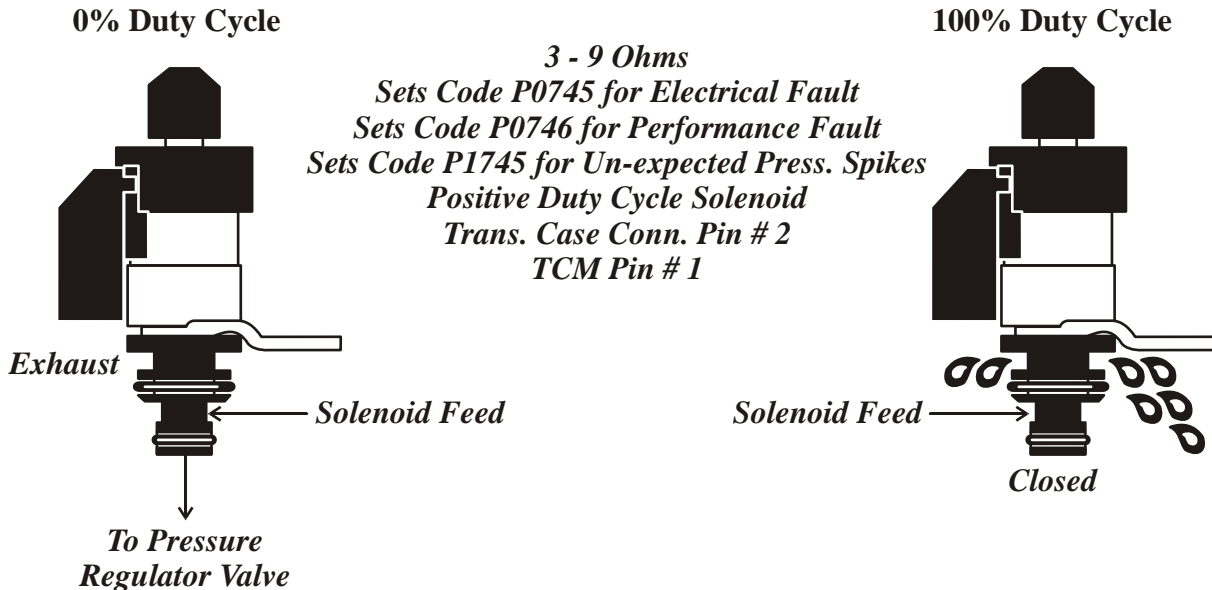
Figure 9
Automatic Transmission Service Group

RE0F09A

PRELIMINARY INFORMATION

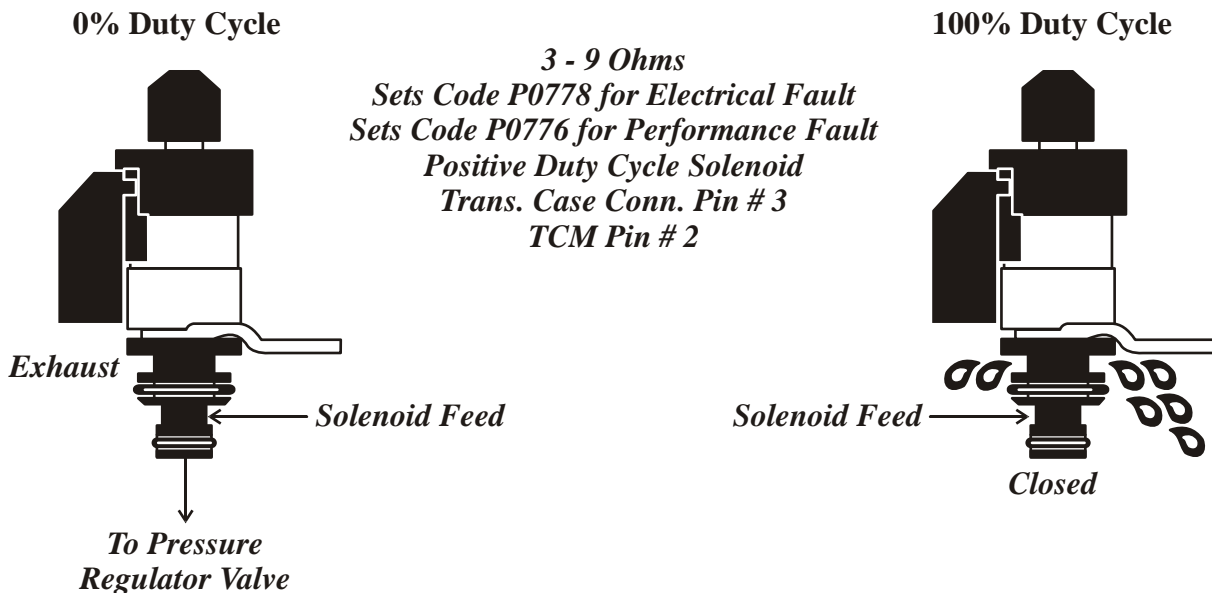
Pressure Control Solenoid A - PCSA (Line Pressure Control Solenoid)

Pressure Control Solenoid A regulates pump discharge pressure in relationship to engine load.



Pressure Control Solenoid B - PCSB (Secondary Pulley Pressure Control Solenoid)

Pressure Control Solenoid B regulates secondary (Driven) pulley pressure in relationship to engine load.

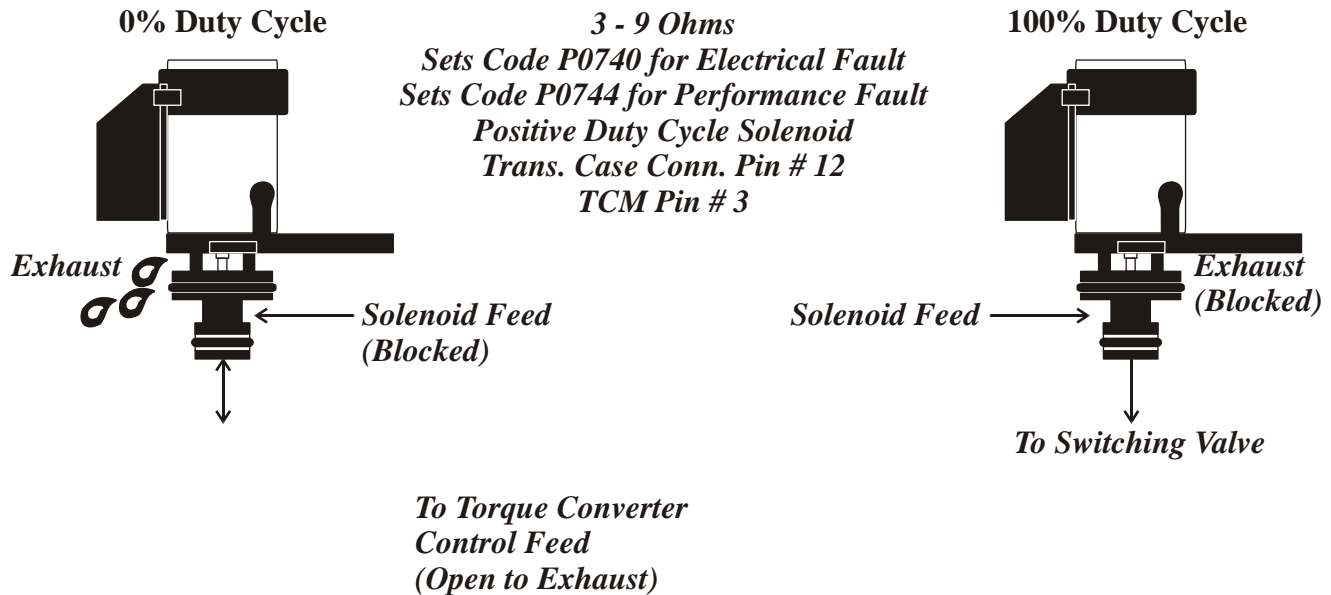


RE0F09A

PRELIMINARY INFORMATION

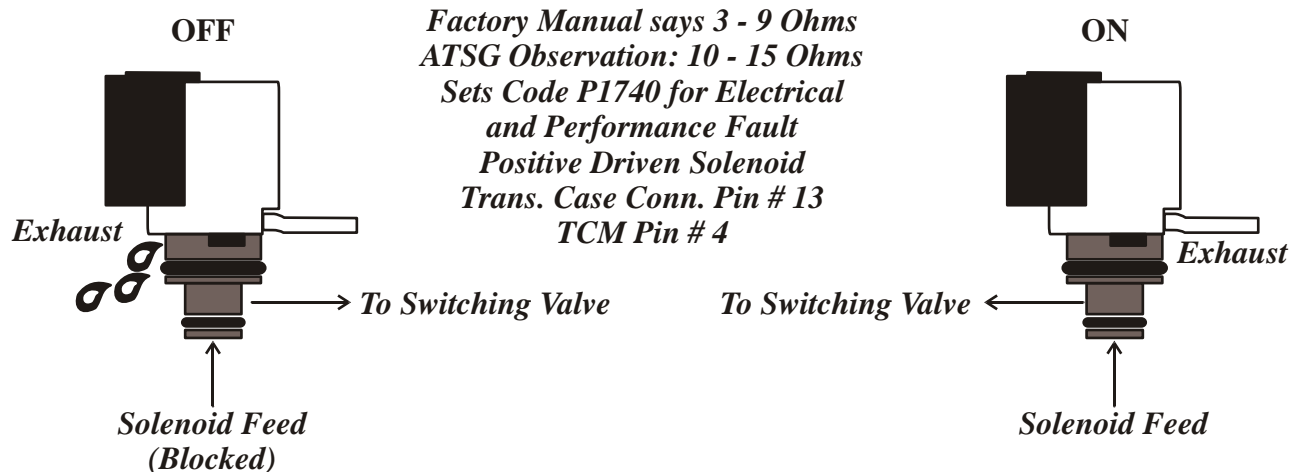
Torque Converter Clutch Solenoid - TCCS

The TCM commands the TCC Solenoid to apply the converter clutch when all requirements from the VSS, TPS and TFT are met.



Lock-Up Select Solenoid - LUSS

The Lock-Up Select Solenoid controls Forward, Reverse and Torque Converter Clutch engagement by directing the position of a Switching Valve in the valve body.



RE0F09A

PRELIMINARY INFORMATION

Stepper Motor - SM (Ratio Control Motor)

The Stepper Motor changes the step with turning 4 coils ON/OFF to control the flow of line pressure to the primary pulley controlling pulley ratio.

10-20 Ohms (Per Coil)

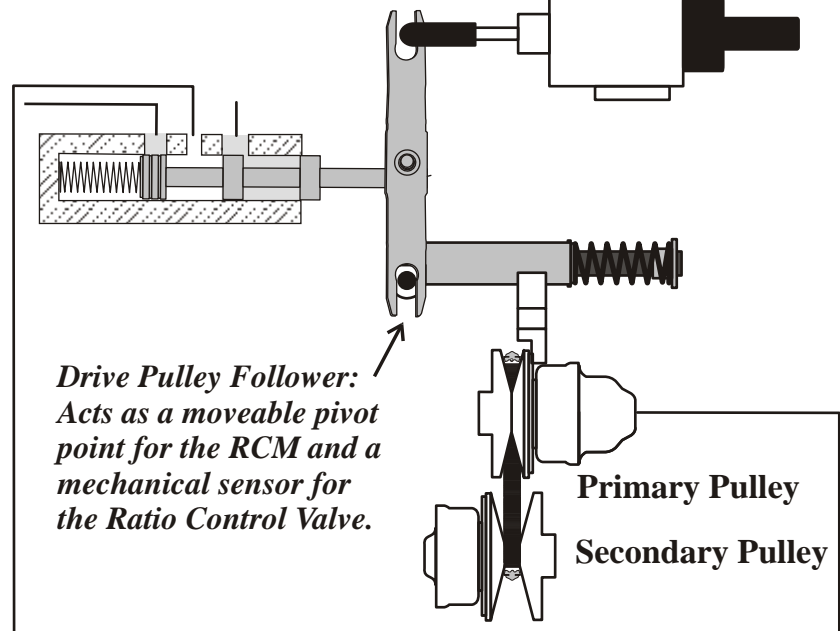
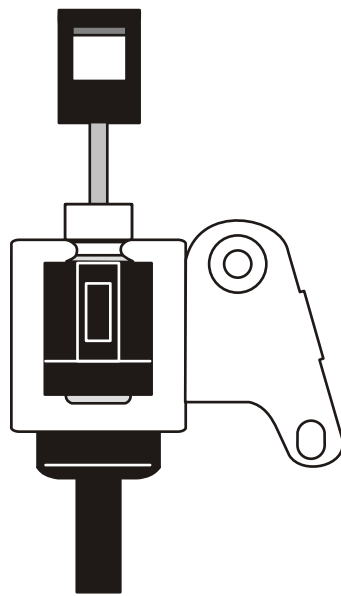
Sets Code P1777 for Electrical Fault

Sets Code P1778 for Performance Fault

Positive Driven Motor

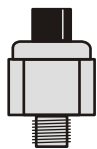
Trans. Case Conn. Pin #'s 6, 7, 8, 9

TCM Pin #'s 11, 12, 20, 21



Transmission Fluid Pressure Sensor A & B - TFPSA & B (Transducers)

These pressure sensors are typical transducers monitoring pressure. They are supplied with 5 volts and a ground from the TCM. The pressure sensor then provides a linear voltage signal to the TCM proportional to the pressure it senses. Pressure sensor A monitors the secondary (driven) pulley pressure while Pressure sensor B monitors main line pressure.



TFPSA Sets Code P0840 for Electrical Fault

P0841 sets when both sensors are out of sync

TFPSB Sets Code P0845 for Electrical Fault

TFPSA Sets Code P0868 when pressure is down

Trans. Case Conn. Pin #'s 19, 20, 22, 23, 25

TCM Pin #'s 37, 38, 41, 42, 46

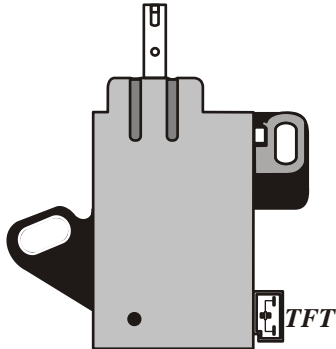
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RE0F09A

PRELIMINARY INFORMATION

Park/Neutral Position Sensor - PNP & Transmission Fluid Sensor - TFT

The Park/Neutral Sensor includes 4 position switches which the TCM judges the selector lever position by the combination of OFF/ON states of each switch. The TFT is a variable resistor which signals to the TCM approximate fluid temperature (68 F 1.8 - 2.0 Volts and at 176 F 0.6 - 1.0Volts).



*PNP Sets Code P0705 for
Implausible Combinations and for Electrical Fault
TFT Sets Code P0710 for
signal voltage excessively high or low*

PNP

Trans. Case Conn. Pin #'s 4, 5, 14, 14, 18

TCM Pin #'s 27, 32, 34, 35, 36

TFT

Trans. Case Conn. Pin #'s 17, 19

TCM Pin #'s 42, 47

5K Ohms @ 75 F

Shift Position	PNP Switch 1	PNP Switch 2	PNP Switch 3	PNP Switch 4
P	OFF	OFF	OFF	OFF
R	ON	OFF	OFF	ON
N	ON	ON	OFF	OFF
D-S*	ON	ON	ON	ON
L*	OFF	ON	ON	OFF

**:Without Manual Mode*

Note: Scanner may display the state of the PNP Switch # 3 only.

RE0F09A PRELIMINARY INFORMATION

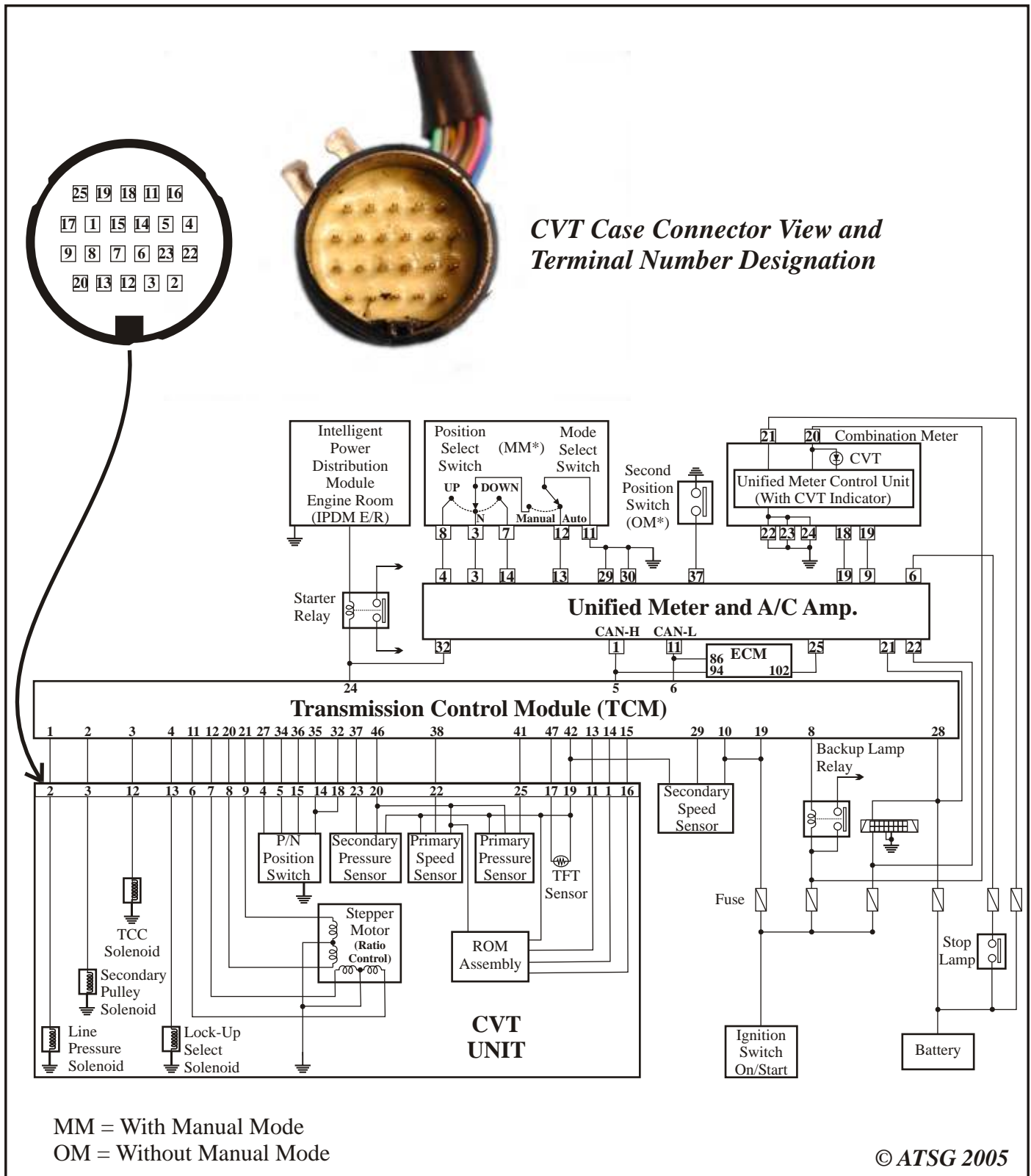


Figure 14



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RE0F09A PRELIMINARY INFORMATION

DTC	Scanner Display	Description
U100	CAN Communication Circuit	This code is produced when a malfunction is detected in CAN communications.
P0615	Starter Relay Circuit	If this signal is "ON" <u>other than</u> P or N, or if it is "OFF" in P or N, this is judged to be a malfunction.
P0703	Brake Switch Circuit	When the brake switch signal fails to switch between ON and OFF.
P0705	Park Neutral Position (PNP) Switch Circuit	PNP switch 1-4 signals input with impossible patten or, PNP switch 3 monitor terminal open or short circuit.
P0710	Transmission Fluid Temp. (TFT) Sensor Circuit	During running conditions the TFT Sensor signal voltage is excessively high or low.
P0715	Input Speed Sensor Circuit	No Input Speed Sensor signal due to an open/short circuit, or an unexpected signal is supplied while driving.
P0720	Vehicle Speed Sensor Circuit	No Vehicle Speed Sensor signal due to an open/short circuit or an unexpected signal is supplied while driving.
P0725	Engine Speed Signal	TCM does not receive the CAN communications signal from the ECM.
P0730	Belt Damage	Unexpected gear ratio detected.
P0740	TCC Solenoid Circuit	Excessive or insufficient current draw is detected due to an open or shorted circuit.
P0744	TCC Solenoid Electrical or Performance Fault	The TCM commands Converter Clutch apply and the engine RPM drop is insufficient. This could also include electrical failure, mechanical failure of the solenoid, related shift valve, the converter clutch and/or related parts.
P0745	Line Pressure Solenoid A Circuit Fault	Excessive or insufficient current draw is detected due to an open or shorted circuit or, the TCM detects as irregular by comparing target value with monitor value.
P0746	Line Pressure Solenoid A Performance Fault	Unexpected gear ratio was detected in the LOW side due to excessively low line pressure.
P0776	Line Pressure Solenoid B Performance Fault	Secondary pressure is too high or too low compared with the command value while driving.

Figure 15



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RE0F09A PRELIMINARY INFORMATION

DTC	Scanner Display	Description
P0778	Line Pressure Solenoid B Circuit Fault	Excessive or insufficient current draw is detected due to an open or shorted circuit or, the TCM detects as irregular by comparing target value with monitor value.
P0826	Manual Mode Switch	When an impossible pattern of switch signals is detected, a malfunction is detected.
P0840	Transmission Fluid Pressure Sensor A Circuit	Signal voltage of the transmission fluid pressure sensor A (secondary pressure) is too high or low while driving.
P0841	Transmission Pressure Sensor Function	Correlation between the values of fluid pressure sensor A (secondary pressure) and the transmission fluid pressure sensor B (primary pressure) is out of specification.
P0845	Transmission Fluid Pressure Sensor A Circuit	Signal voltage of the transmission fluid pressure sensor B (primary pressure) is too high or low while driving.
P0868	Secondary Pressure Down	Secondary pressure is too low compared with the command value while driving.
P1701	TCM Power Supply	When the power supply to the TCM is cut "OFF," for example; because the battery was disconnected or removed, and the self-diagnostics memory function stops. This may or may not be interpreted as a malfunction. If the battery was known to be disconnected, this message is not a malfunction. If the battery was NOT disconnected, this message may be interpreted as a malfunction.
P1705	Throttle Position Sensor	TCM does not receive the proper accelerator pedal position signal (input by CAN communication) from ECM.
P1722	Estimated Vehicle Speed Signal	CAN communication with the ABS actuator and the electrical unit (control unit) is malfunctioning or, there is a great difference between the vehicle speed signal from the ABS actuator and the electronic unit (control unit), and the vehicle speed sensor signal.
P1723	CVT Speed Sensor Function	A rotation sensor error is detected because the gear does not change in accordance with the positioning of the stepper motor.

Figure 16



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RE0F09A **PRELIMINARY INFORMATION**

DTC	Scanner Display	Description
P1726	Electronic Throttle Control	The electrically controlled throttle for the ECM is malfunctioning.
P1740	Lock-Up Solenoid Circuit	Excessive or insufficient current draw is detected due to an open or shorted circuit or, the TCM detects as irregular by comparing target value with monitor value.
P1745	Line Pressure Control	The TCM detects unexpected line pressure.
P1777	Stepper Motor Circuit	Each coil of the stepper motor is not energized properly due to an open or a short.
P1778	Stepper Motor Function	There is a great difference between the number of steps for the stepping motor and for the actual gear ratio.

Figure 17

A to Z Tools

Phoenix

Raybestos

RN Rebuilders

Techpack