"2001" SEMINAR INFORMATION
"PRACTICAL TECH"

INDEX
FORD & CHRYSLER

ADVERTISER'S

AUTOMATIC TRANSMISSION SERVICE GROUP
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INTRODUCTION

The General Motors and Ford information in the first manual is only a preview of the great tech the day has in store. As we continue with Ford, you will see that the easy to follow Complaint, Cause, Correction format presents "Fixes That Work" for the 2001 year and beyond. After the Ford presentation is the Chrysler section containing a very detailed look at the 42RE. It helps to belong to a tech service, but belong to a tech service that helps...ATSG!

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

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FORD AODE / 4R70W SHUDDERS

(Another Use For LUBEGARD® Highly Friction Modified ATF Supplement)

ISSUE: In the Ford AODE and 4R70W, a shudder or vibration may occur under light-to-moderate acceleration above 35 mph in third or fourth gear, or during a 3-4 upshift or a 4-3 downshift. This condition may be caused by the converter clutch. The condition normally is noticed on vehicles with 20,000 or more miles when the torque-converter clutch engages or disengages and the vehicle is under light load.

ACTION: It has been found that by changing the vehicles transmission fluid and adding the **LUBEGARD® Highly Friction Modified ATF Supplement** you can **ELIMINATE** the problem. The vehicle may have to be driven up to 100 miles for the condition to be corrected.

FORD/MAZDA CD4E

PERSISTENT GEAR RATIO ERROR OR TCC SLIP CODES

COMPLAINT: After Turbine Speed Sensor (TSS) replacement, TCC slip codes 628 or P1744 maybe stored. Gear ratio error codes 645, 646, 647, 648, PO731, PO732, PO733 or PO734 may also be stored. After clearing these codes, they immediately return during the road test. No matter what parts are replaced, or what procedure is followed, these codes keep returning.

CAUSE: ***The cause, believe it or not, is the replacement Turbine Speed Sensor***. The replacement TSS was redesigned and has an enclosed pickup as seen in figure 1. The previous design TSS has an exposed pickup also seen in figure 1.
It seems, when the pickup was enclosed, the air gap between the TSS and the reverse clutch hub was increased. When the signal was checked and compared to the previous sensor signal, the new sensor signal exhibited a voltage difference but, when checked with an oscilloscope the previous sensor puts out a wider pattern than the current design sensor which means, the computer has more time to read the signal with the previous design sensor.
In other words, with the current design turbine sensor, the computer does not have enough time to read the signal and may miss alternate signal pulses which causes the above complaint.

CORRECTION: Do not use the current design Turbine Speed Sensor until further notice, use only the previous design sensor, both of which are shown in figure 1.

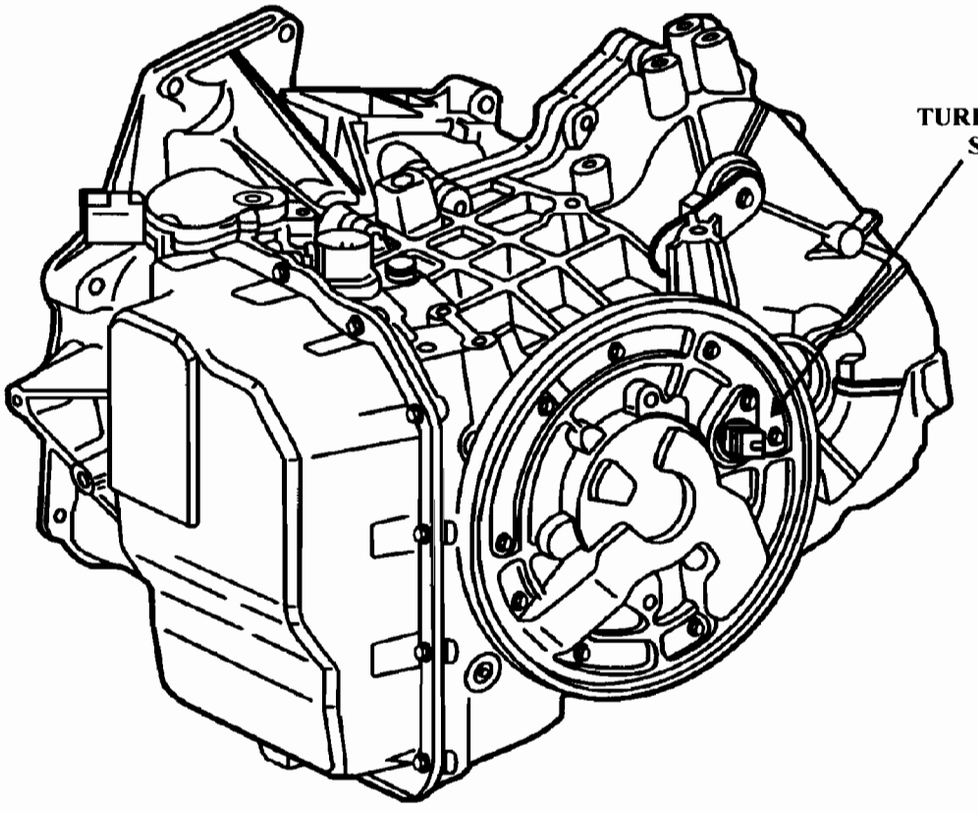
SERVICE INFORMATION:

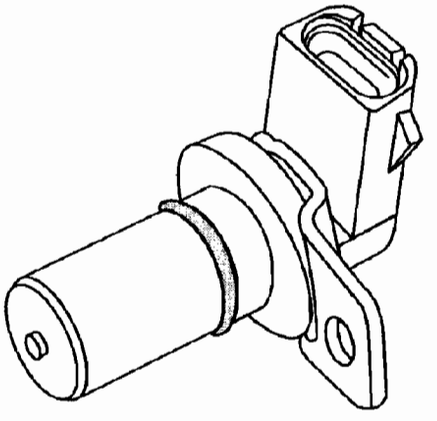
Previous Design Turbine Speed Sensor*.....*F3RZ-7M101-A
Current Design Turbine Speed Sensor*.....*FORD...XS7Z-7M101-KA
Current Design Turbine Speed Sensor*.....*MAZDA.....FW60-21-550

Many thanks to Bill Kleckner, Technical Director, Ameraparts International, East Point, GA.

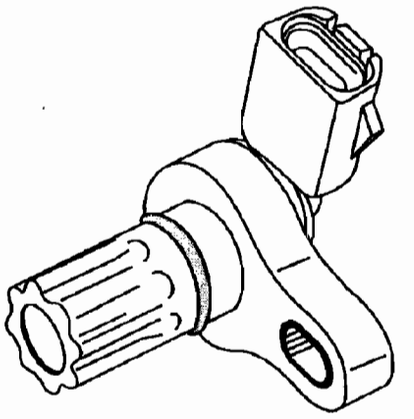
FORD/MAZDA CD4E

PERSISTENT GEAR RATIO ERROR OR TCC SLIP CODES





PREVIOUS DESIGN
589 OHMS
F3RZ-7M101-A



CURRENT DESIGN
787 OHMS
FORD PART # ...XS7Z-7M101-KA
MAZDA PART #...FW60-21-550

Figure 1

FORD CD4E/MAZDA LA4A-EL
FRONT SEAL BLOW-OUT OR CONSTANT LEAK

COMPLAINT: Vehicles equipped with CD4E/LA4A-EL transmissions may exhibit repeated front seal "blow-out" or constant front seal leak.

CAUSE: The cause may be, an undersized drain back passage in the bellhousing.

CORRECTION: Follow the steps listed below to correct this condition,

1. Remove the Stator from the front of the bellhousing. Remove the area highlighted in grey, as shown in Figure 1, with a bench grinder .

Note: Heating the bellhousing up in a parts washer will ease Stator removal.

2. With a 3/16" or 13/64" drill bit, drill at an angle through the area shown in Figure 2.
3. Refer to Figure 3 to see the modified drain back passage from the front side of the bellhousing.
4. Apply Loctite ® to the front seal before installing it into the bellhousing as shown in Figure 1.

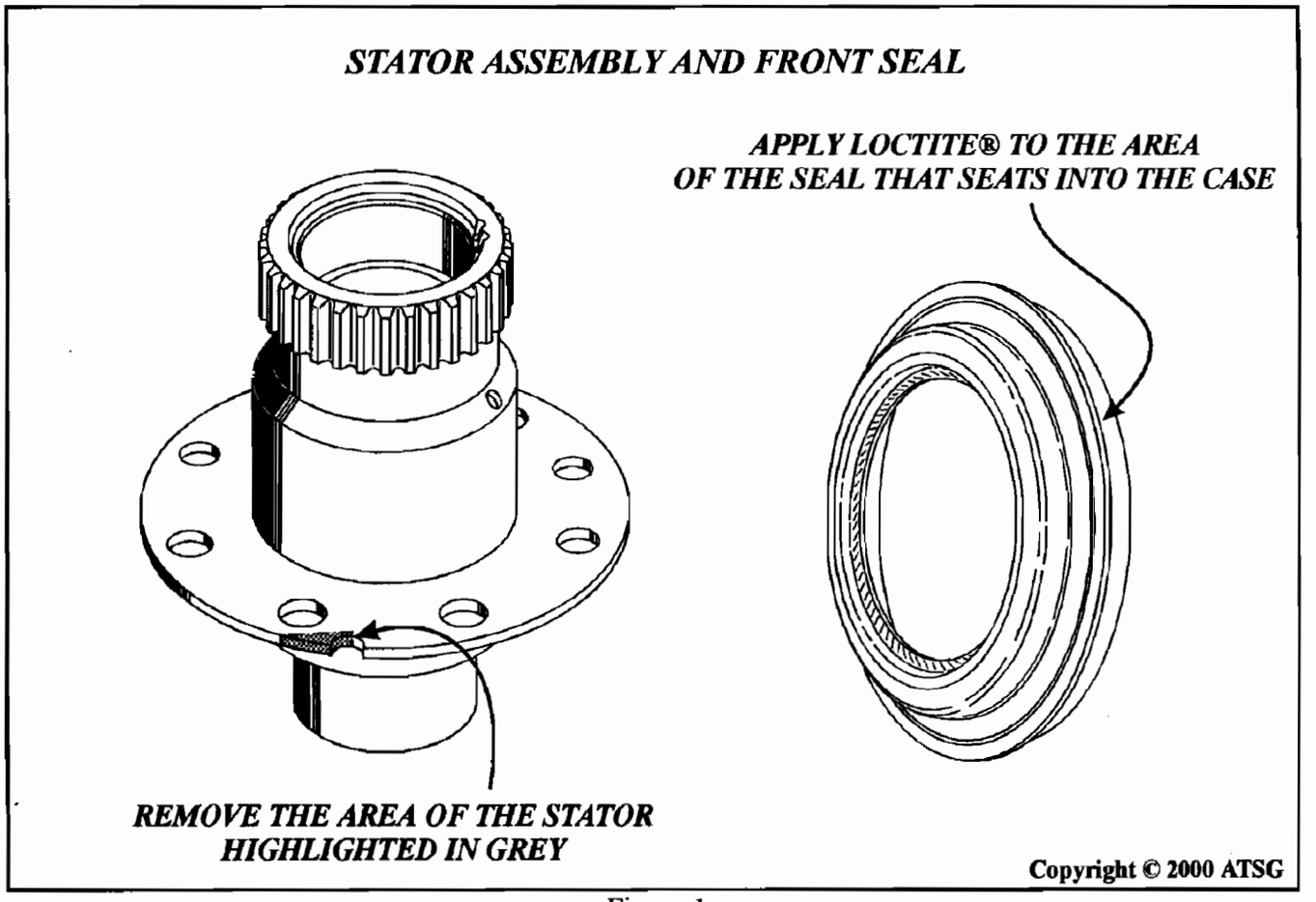


Figure 1

BELL HOUSING REAR VIEW

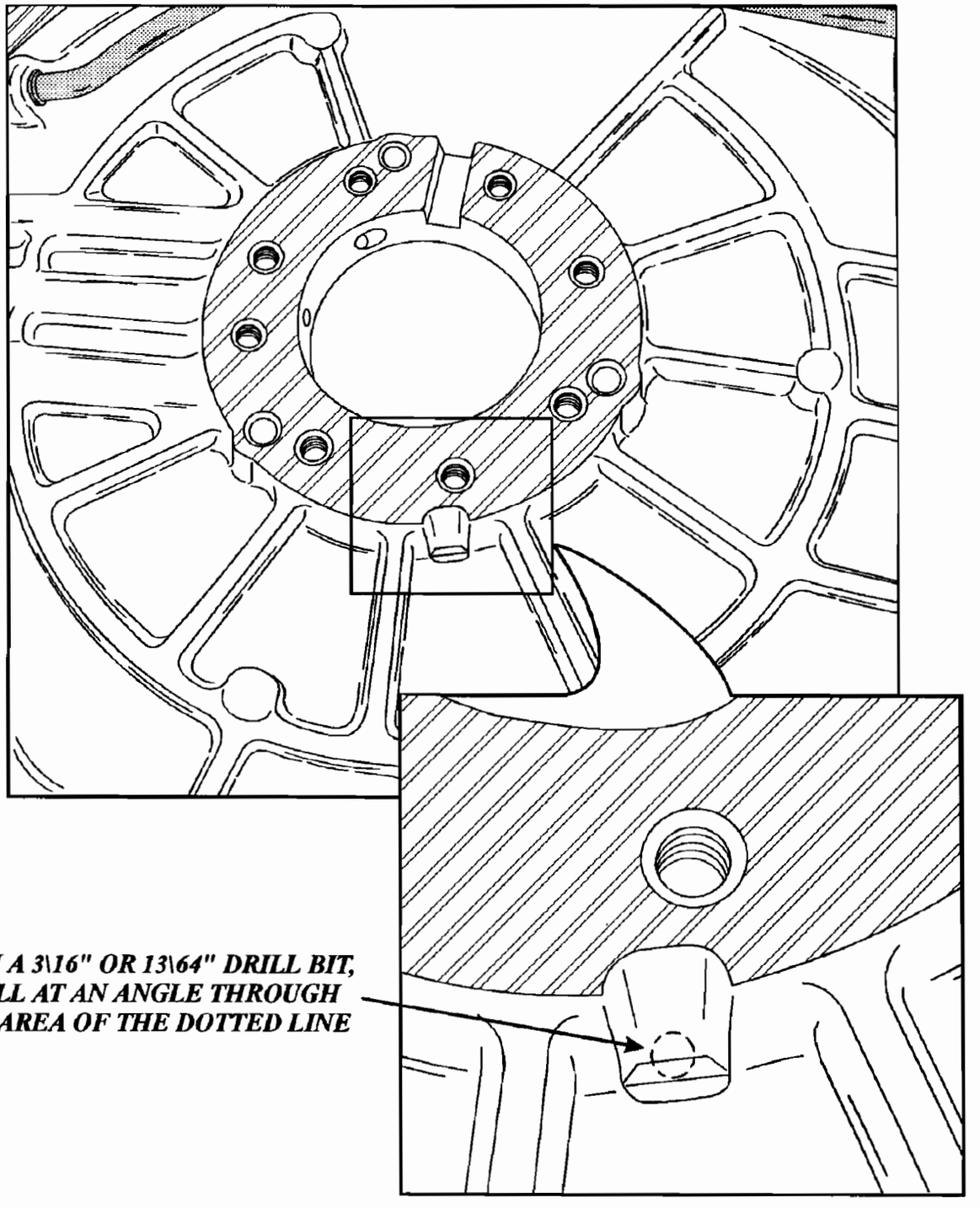


Figure 2

BELL HOUSING FRONT VIEW

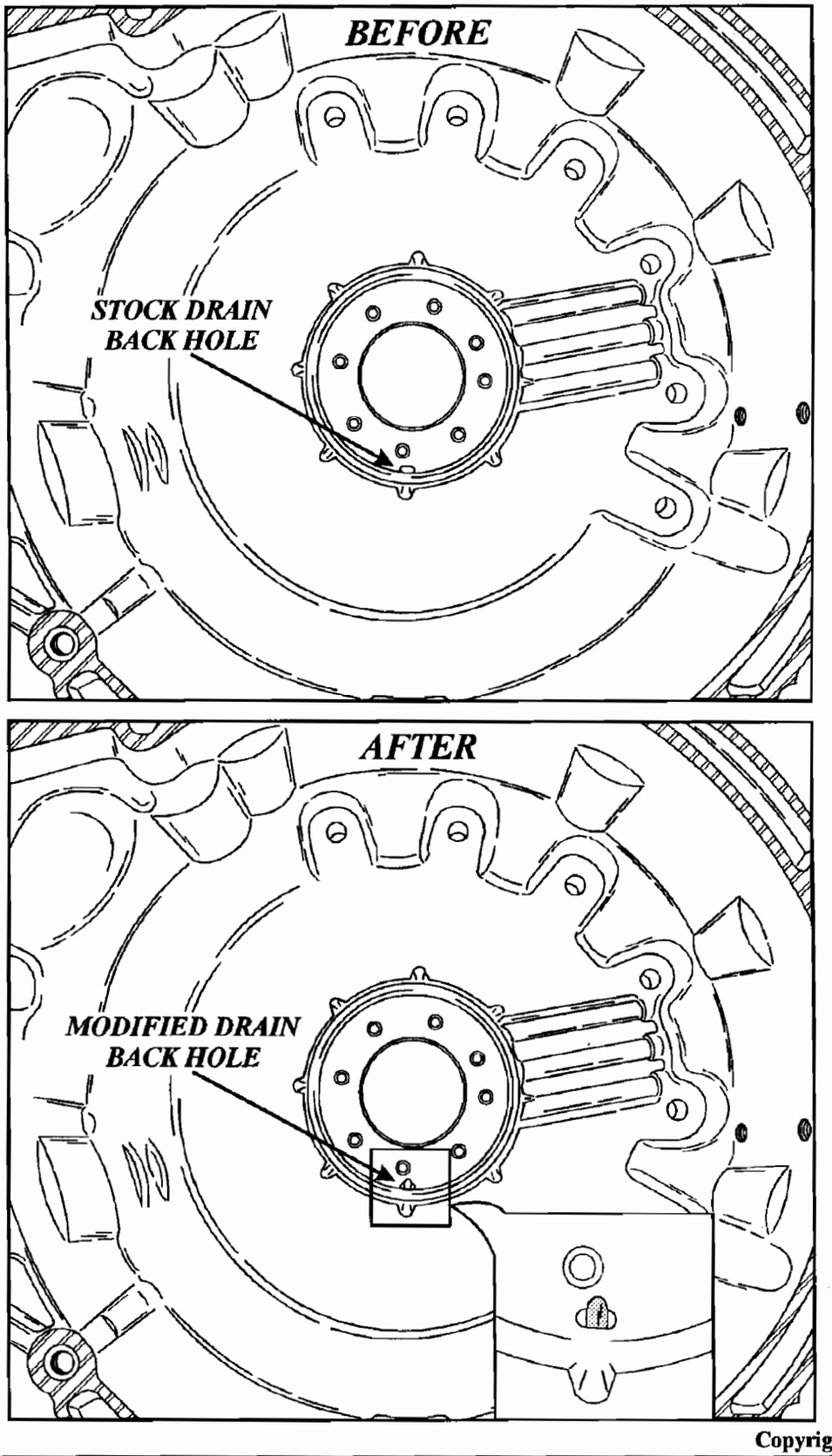


Figure 3

OE Approved Transmission Bands...

Raybestos uses only high quality friction material specially formulated for each application.

High energy Kevlar® bands are available!

All Raybestos flex bands are made with quality spring steel that gives quick apply and release.

All bands are manufactured to precise dimensional tolerances.

Hold & Release the Power with Raybestos Bands!

Transmission friction bands have been around as long as the Ford Model T, where a simple foot pedal was used to mechanically apply a band to change gears. However, transmission bands did not become widely used until the post WW II era in such transmissions as the GM Powerglide, the Ford FMX, or even the old Iron Hydramatic.

Although the basic concept of how the transmission band functions is still relatively simple, Raybestos continually strives to provide the OEM and aftermarket with improved transmission product designs and materials.

In both OE and aftermarket transmission bands, Raybestos uses OE approved materials to produce bands with extreme driving pleasability and durability. Precise dimensional tolerances of Raybestos transmission bands insure easy installation with no fuss and minimal adjustments needed.

With more than 100 years in the automotive industry, you get *"made in the U.S.A."* quality products from Raybestos. Insist on Raybestos transmission parts . . .

They are performance proven!

Raybestos®
AFTERMARKET PRODUCTS COMPANY

FORD CD4E

PREMATURE BUSHING FAILURE AND/OR NO FORWARD OR REVERSE

COMPLAINT: Before or after overhaul, vehicles equipped with CD4E transaxles may exhibit premature Reverse Input Clutch Housing bushing failure, repeated Forward Clutch snap ring groove blow out or breakage of the Low Reverse Clutch snap ring lugs located in the case.

CAUSE: The cause may be,

(1) ***Reverse Input Clutch bushing failure:***

A. Mis-alignment of the Reverse Input Clutch Hub to the Forward/Coast/Direct drum splines, as shown in Figure 1. When this mis-alignment occurs the lube holes in the drum and the slots in the hub are not lined up causing a loss of lube to the bushing.

B. Poor connections of ground straps causing Electralisis through bushings. ***NOTE: Adding an extra ground strap from the firewall to the bellhousing or the starter area of the transmission is always a good practice for extra insurance.***

C. A mis-aligned pump cover to pump body causing the drum to be off center.

D. A worn Pressure Regulator Bore in the valve body, as shown in Figure 3, causing line pressure to be over the maximum amount which in turn causes convertor charge and cooler pressure to be minimal.

E. A worn Bypass Clutch Control Valve sleeve, as shown in Figure 4, causing a loss of convertor regulator valve oil feeding front and differential lube.

(2) ***Forward Clutch Snap ring or Low Reverse Clutch snap ring lug blow-out:***

A. A worn Pressure Regulator Bore in the valve body, as shown in Figure 3, causing line pressure to be in excess of 500psi. which in turn breaks parts!

CORRECTION: To correct these conditions, follow the steps listed below:

(1) ***Reverse Input Clutch bushing failure:***

A. Refer to Figure 1 for the correct alignment of the Reverse Input Clutch Hub and Forward/Coast/Direct drum splines.

B. Check and clean main ground cables from the battery to the engine block. Add an extra ground strap from the firewall to the bellhousing of the transmission.

C. Align the pump cover, plate and pump body with pump alignment pins to ensure perfect alignment. The Ford pins are part no. T94P-77000-P or use 2 E40D valve body to case alignment studs as shown in Figure 2.

D. Refer to Figures 5 and 6 to check for bore wear. Remove the Pressure Regulator valve and inspect it for wear which normally shows up as brown lines. Re-install the Pressure Regulator valve back into its bore and check for wobble from side to side. Fill the cavity shown in Figure 6 with ATF. Place a suitable block over the passage shown in Figure 6 and torque the hold down bolt too 8ft. lbs. Apply 70psi. of air pressure to the hole in the block so the cavity is full and ensure there is no leakage between the block and the valve body. There should be no leakage between the first land of the Pressure Regulator Valve and the wall shown in Figure 6 for approximately 25-30 seconds. A new valve body will hold air pressure for 45-50 seconds. If the valve body in question leaks at 25 seconds or less, the bore is worn and the valve body will require replacement or Sonnax part no. 73840-RK regulating valve kit installed. ***Note: requires reamer Sonnax part no. 73840-RTL.***

CORRECTION: (Cont'd)

E. Remove and inspect the Bypass Clutch Control Valve Sleeve as shown in Figure 5. If the sleeve is worn the valve body will require replacement as the sleeve is not available from Ford seperately, or Sonnax Part no. 73840-BK Bypass Clutch Control Valve Kit installed to renew the sleeve and valve bore. ***Note: Requires Sonnax 73840-BTL reamer.***

(2) ***Forward Clutch Snap ring or Low Reverse Clutch snap ring lug blow-out:***

A. Refer to Figures 5 and 6 to check for bore wear. Remove the Pressure Regulator valve and inspect it for wear which normally shows up as brown lines. Re-install the Pressure Regulator valve back into its bore and check for wobble from side to side. Fill the cavity shown in Figure 6 with ATF. Place a suitable block over the passage shown in Figure 6 and torque the hold down bolt too 8ft. lbs. Apply 70psi. of air pressure to the hole in the block so the cavity is full and ensure there is no leakage between the block and the valve body. There should be no leakage between the first land of the Pressure Regulator Valve and the wall shown in Figure 6 for approximately 25-30 seconds. A new valve body will hold air pressure for 45-50 seconds. If the valve body in question leaks at 25 seconds or less, the bore is worn and the valve body will require replacement or Sonnax part no. 73840-RK regulating valve kit installed. ***Note: requires reamer Sonnax part no. 73840-RTL.***

REVERSE INPUT CLUTCH HUB ALIGNMENT

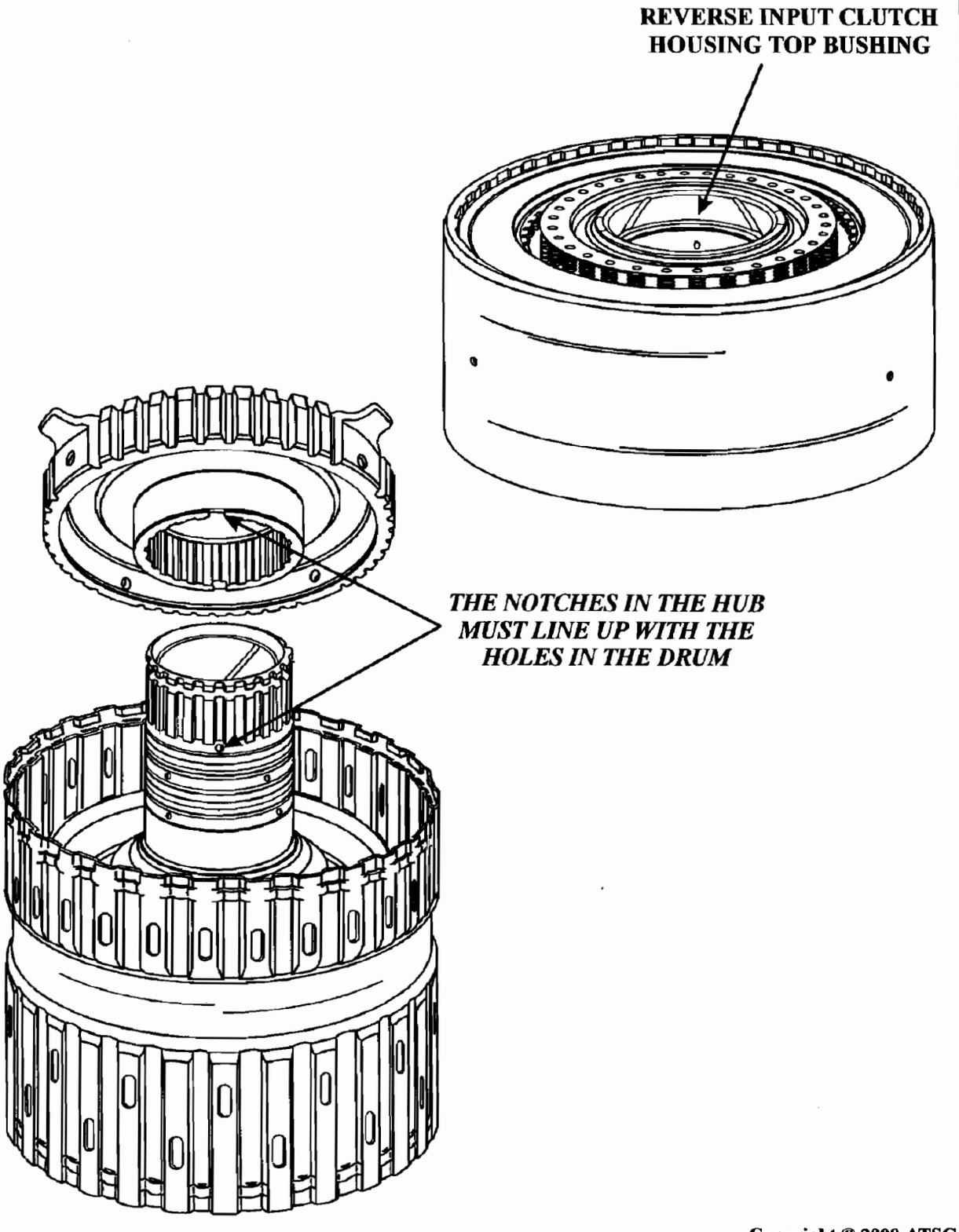
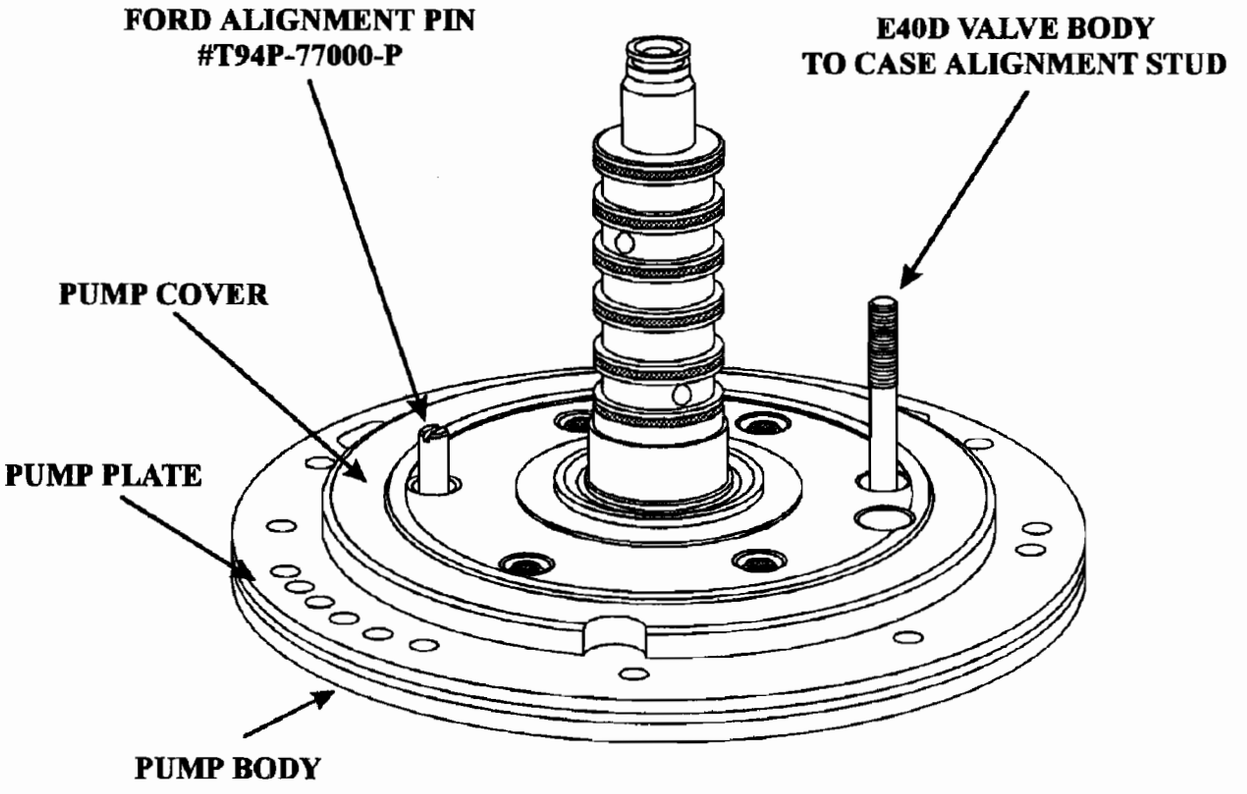


Figure 1

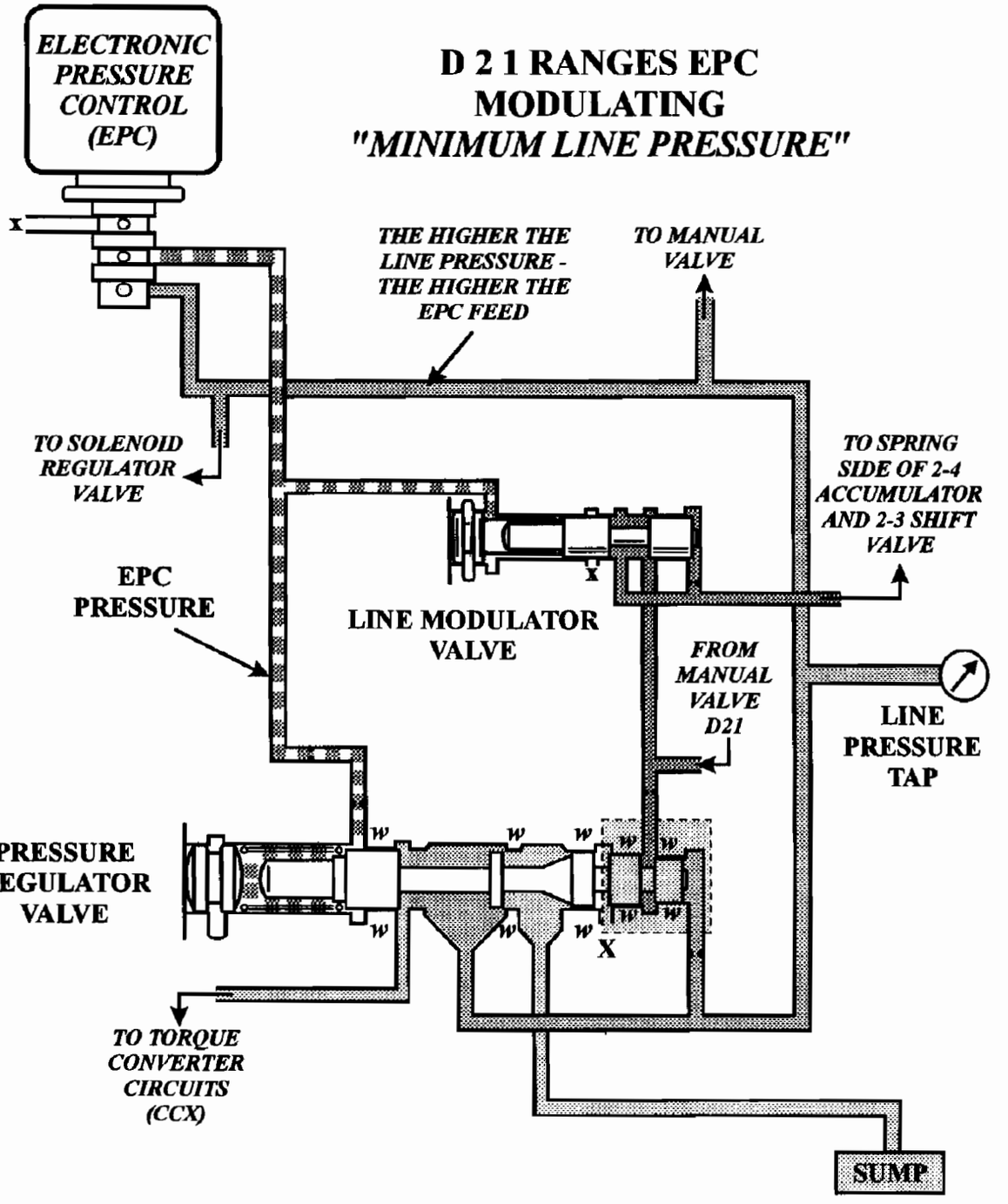
PUMP ALIGNMENT



TORQUE PUMP BOLTS TO 10ft. lbs.

Figure 2

CD4E PRESSURE REGULATOR CIRCUIT *(PARTIAL)*

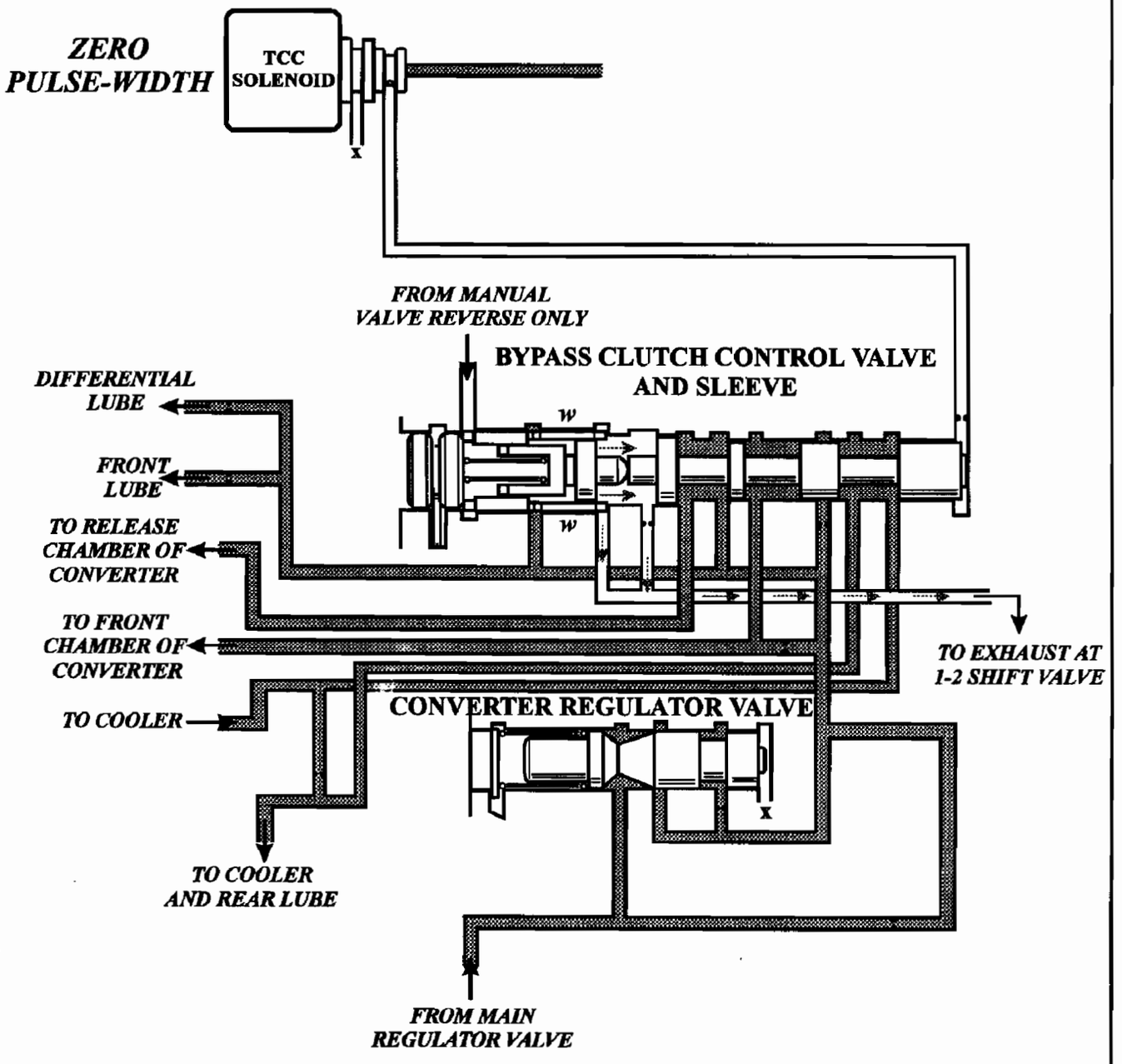


w = Wear areas in the valve body bore

Wear in the area highligted with the dotted line will create a loss of balance feed oil resulting in extremely High Line Pressure. Without balance feed, reducing line pressure, it will take very little EPC pressure to create 400-500 psi.

Figure 3

TORQUE CONVERTER CLUTCH "OFF" CIRCUIT *(PARTIAL)*



w = Wear areas in the sleeve bore

Wear in the areas of the sleeve can cause a loss of convertor regulator oil feeding front and differential lube

Figure 4

CD4E VALVE BODY

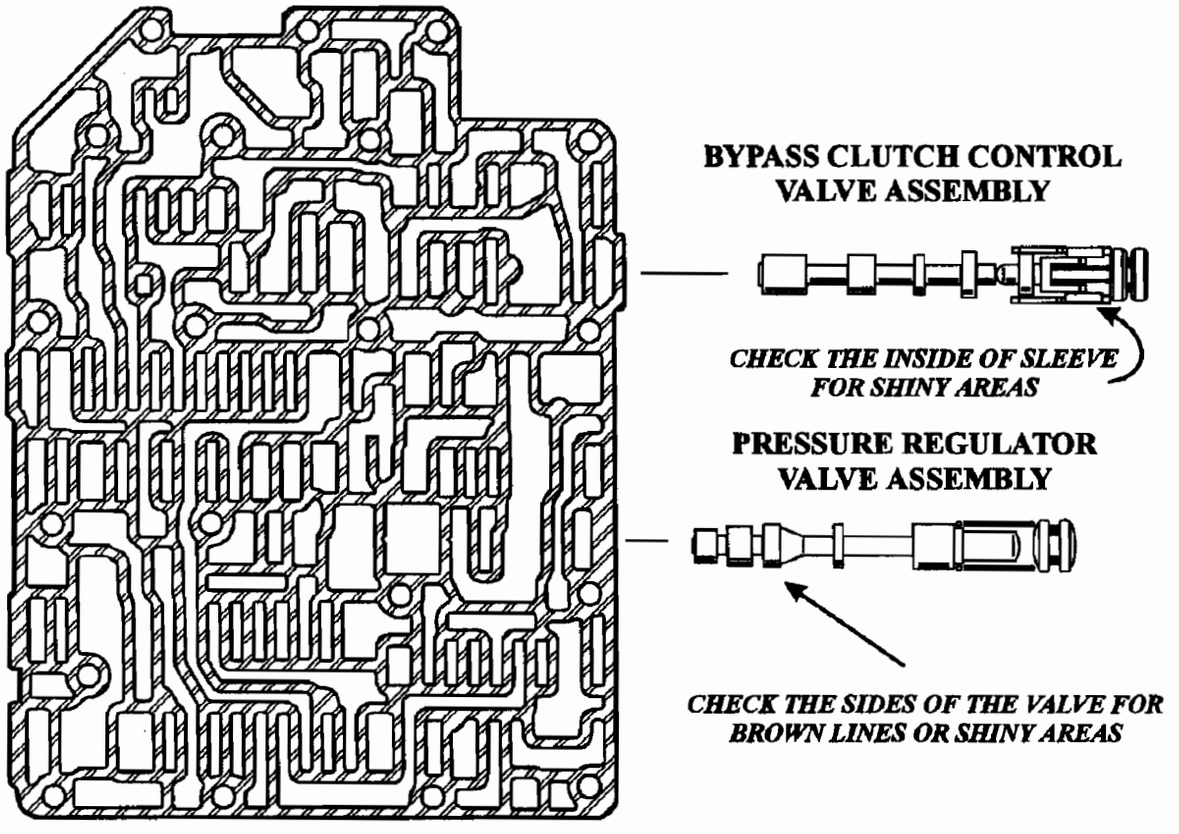
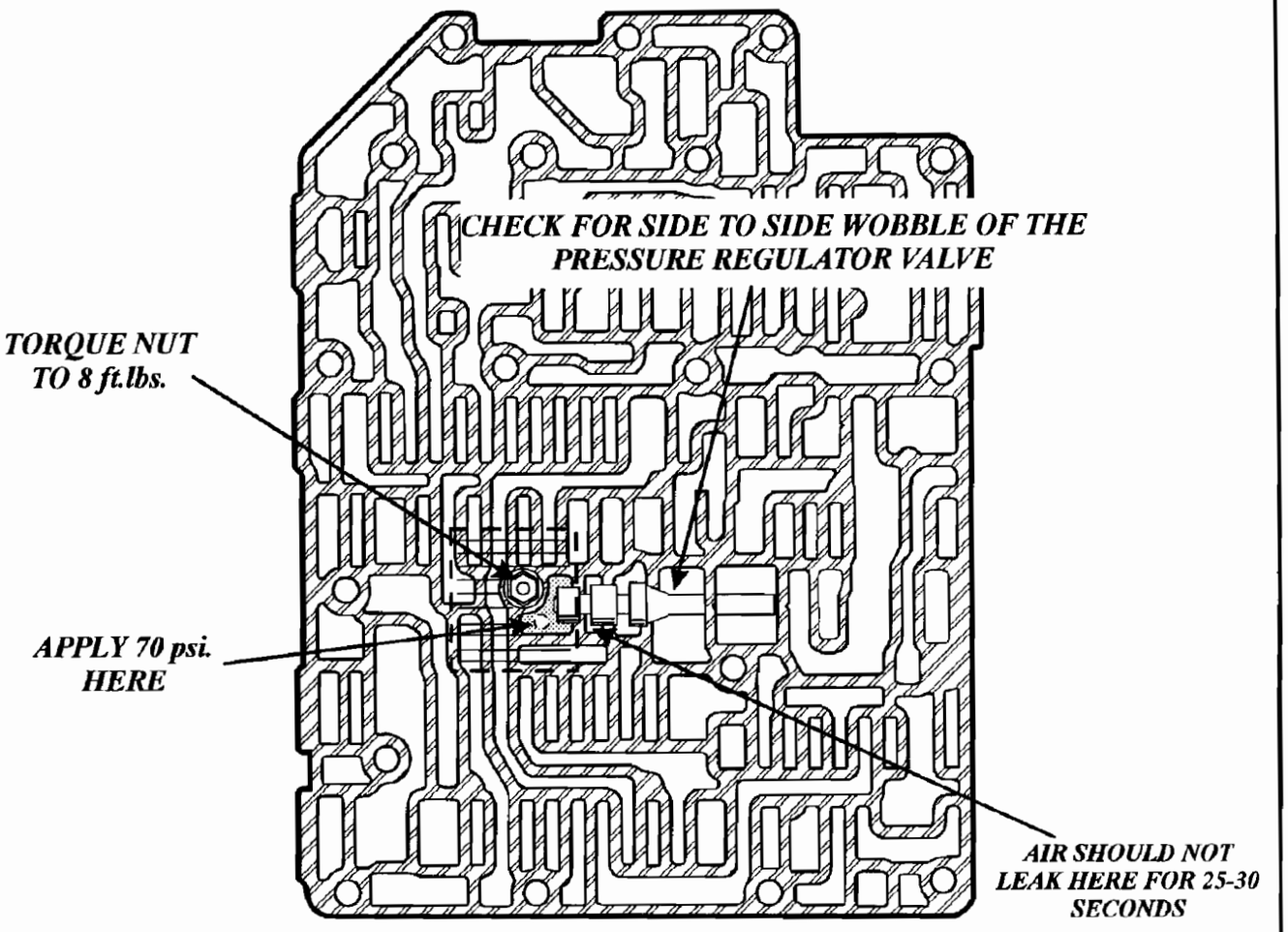


Figure 5

CD4E VALVE BODY



FILL THE AREA HIGHLITED IN GREY WITH ATF AND COVER WITH A SUITABLE PLATE AS OUTLINED WITH THE DOTTED LINE

APPLY 70 psi. OF AIR PRESSURE TO THE DOTTED HOLE IN THE PLATE. THE VALVE BODY BORE SHOULD HOLD THIS AIR PRESSURE FOR APPROXIMATELY 25-30 SECONDS OR THE BORE IS WORN.

Figure 6

FORD AXODE/AX4S/AX4N

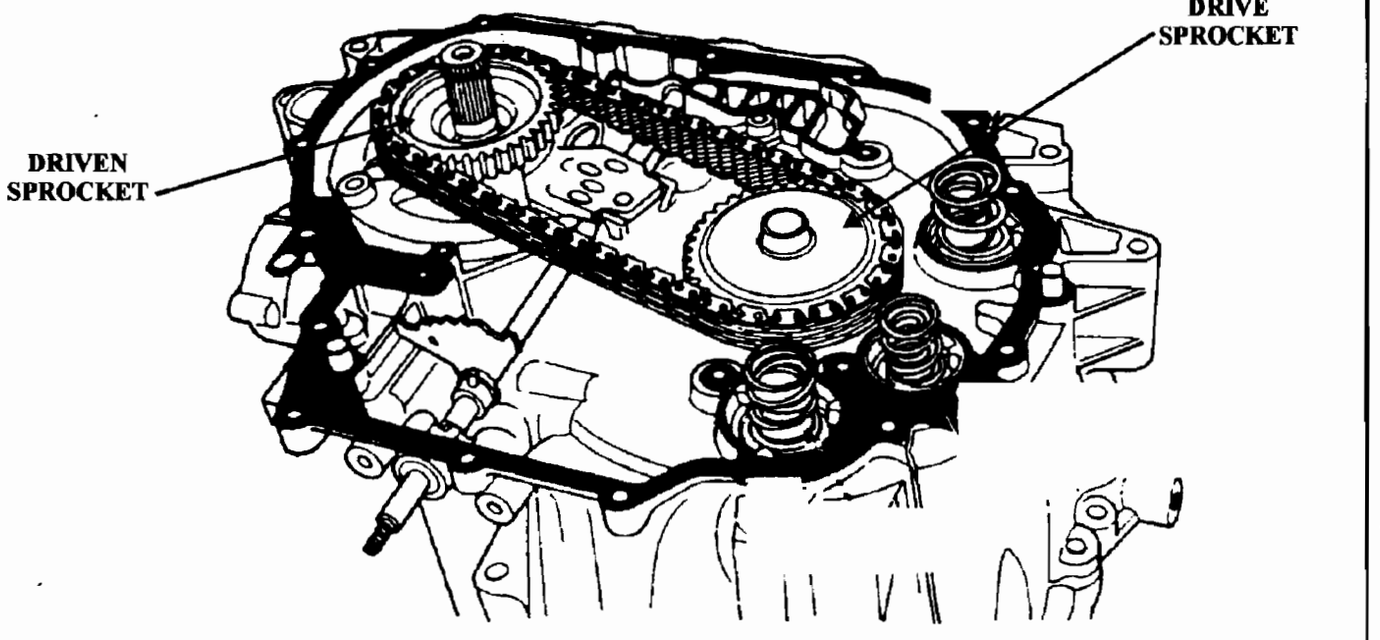
GEAR RATIO ERRORS

COMPLAINT: After overhaul, during the road test, the Malfunction Indicator Lamp (MIL) begins to flash and the system faults to Failure Mode Effects Management (FMEM). When code retrieval is completed, code 628 for TCC slippage, code PO741 for TCC Stuck Off or code P1744 for a TCC Performance fault may be stored. After diagnosis of the TCC system is performed, no faults are found. When these codes are cleared, they return on the next road test.

CAUSE: These complaints can be caused by installing the incorrect drive and/or driven sprockets (Refer to Figure 1) or by installing an exchange unit that has the incorrect sprocket tooth count. It is the sprocket tooth count that determines the target gear ratio that the PCM should see. Because the PCM is comparing the engine rpm signal to turbine speed sensor (TSS), the PCM assumes the converter clutch is slipping and stores the above codes due to an incorrect gear ratio caused by the incorrect sprocket tooth count.

CORRECTION: Use the charts in figures 2 and 3 to insure that the sprocket tooth count matches the vehicle application. It is also a good practice to tag exchange units so that the sprocket tooth count is known to insure that the correct transmission for that vehicle is installed.

NOTE: To help diagnose this problem, raise the front wheels off the ground and see if these codes reset with no load on the vehicle. If they do reset, the chances are that it is a gear ratio error and NOT converter clutch slip.



Many thanks to Diana of Cotton's Transmission, La Grange, GA.

Figure 1

FORD AXODE/AX4S/AX4N

GEAR RATIO ERRORS

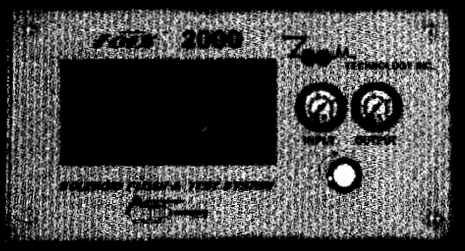
AXODE/AX4S TRANSAXLE SPROCKET TO VEHICLE APPLICATION CHART		
YEAR / ENGINE / MODEL	**DRIVE SPROCKET**	**DRIVEN SPROCKET**
1991-99 / 3.0 / Taurus/Sable	37 Teeth	36 Teeth
1991-95 / 3.8 / Taurus/Sable Police	37 Teeth	36 Teeth
1991-94 / 3.8 / Lincoln Continental	37 Teeth	36 Teeth
1995 / 3.8 / Windstar	37 Teeth	36 Teeth
1991-99 / 3.8 / Taurus/Sable	38 Teeth	35 Teeth
1993-95 / 3.2 / Taurus SHO	35 Teeth	38 Teeth
1995-99 / 3.0 / Windstar	34 Teeth	39 Teeth
1996-99 / 3.8 / Windstar	38 Teeth	39 Teeth
1996 / 3.4 / Taurus SHO	35 Teeth	38 Teeth
1996-00 / 3.0 DOHC / Taurus/Sable	35 Teeth	38 Teeth
2000 / 3.0 / Taurus/Sable	35 Teeth	38 Teeth

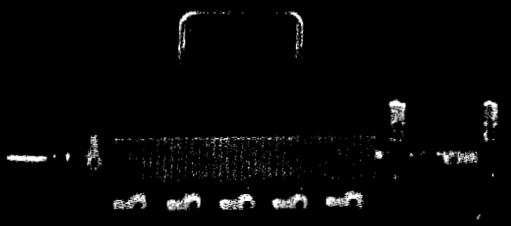
Figure 2

AX4N TRANSAXLE SPROCKET TO VEHICLE APPLICATION CHART		
YEAR / ENGINE / MODEL	**DRIVE SPROCKET**	**DRIVEN SPROCKET**
1996-97 / 3.0 DOHC / Taurus/Sable	35 Teeth	38 Teeth
1996-97 / 3.0 / Taurus/Sable	35 Teeth	38 Teeth
1996-99 / 3.4 / Taurus SHO	35 Teeth	38 Teeth
1998-99 / 3.0 DOHC / Taurus/Sable	35 Teeth	38 Teeth
1998-99 / 3.0 / Taurus/Sable	35 Teeth	38 Teeth
1995-00 / 3.8 / Lincoln Continental	35 Teeth	38 Teeth
1995 / 3.0 & 3.8 / Taurus/Sable	37 Teeth	38 Teeth
1995-98 / 4.6 / Lincoln Continental	38 Teeth	36 Teeth

Figure 3

You can be sure of your solenoid!





CHECK OUT OUR UNIQUE FEATURES:

6 CHANNEL MANIFOLD - Fast and flexible solenoid adapter set-up. **Handles individual solenoids as well as solenoid packs!**

SOLENOID ADAPTERS - A complete line of specific solenoid adapters and solenoid pack plates are available. **The Sol-X™ handles all your solenoid testing needs.**

PRESSURE GAUGES - Input and output oil pressure can be accurately set and measured for proper solenoid testing.

FLOW - TEMPERATURE - Oil flow and oil temperature can be digitally measured. **Helps you sort out bad solenoids quickly.**

OIL HEATER - Optional heated oil allows you to take advantage of the natural detergency of transmission fluid when it is hot as well as simulate normal operating conditions of the solenoid! **Give your solenoids a royal flush!**

SOLENOID DEMAGNETIZER - The optional solenoid demagnetizer lets you quickly demagnetize the solenoid and any metal material within it prior to flushing and testing.

MULTIMODE CONTROLLER - The Sol-X™ controller has 4 separate modes of operation:

MANUAL mode provides you with manual control of the solenoid on-off cycle.

CYCLE 1 mode provides a fast on off exercising of the solenoid.

CYCLE 2 mode provides an aggressive continuous flush cycling of the solenoid being tested.

FLUSH mode combines the features of the **CYCLE 2** mode with a built in Timer!! Walk away and come back when the **"TIMER FINISHED ALARM"** sounds. It's as simple as popping corn in a microwave oven.

MULTIMETER - The Sol-X™ multimeter allows you to continuously electrically evaluate the solenoid being tested. **Find opens, shorts and intermittents fast!**

SOLENOID DRIVE - Eight separate driver channels are provided to allow continuity checks of solenoid packs and harnessed solenoids.

SOLENOID POWER - Solenoid drives can be set up to operate either connected to ground or connected to common positive.

ON/OFF DUTY - Complete duty cycling controls are provided to allow either simple ON/OFF testing or PULSE WIDTH MODULATION (PWM) testing. Pulse width duties are set digitally to within 1% and are very stable and repeatable. **Repeatability means profit!**

FREQUENCY - You can select from 5 available operating frequencies for testing PWM solenoids.

SIZE - Bench top design is approximately 24"H x 22"W x 23"D. Operates from standard shop power.

ZOOM TECHNOLOGY, INC.

1003 Industrial Drive • West Berlin, NJ 08091

1.856.767.8840 • Toll Free: 1.800.322.0806

Fax: 1.856.767.8839 • www.zoom-tech.com

Patents #4809544, #4998437. Other US & Foreign Patents Pending.

Answermatic Division

FORD AX4N
VALVE BODY CHANGES FOR 1998 MODELS

CHANGE: Beginning at the start of 1998 production, all AX4N transaxles recieved a revised design level valve body, pump body, and both spacer plates.

REASON: Increased durability and reliability.

PARTS AFFECTED:

(1) VALVE BODY - The Valve body casting changed around the line modulator valve, the 2-3 capacity modulator valve, and an extra bolt was added to retain the spacer plate as shown in Figure 1. The Line Modulator valve was also changed from the previous two piece design to a one piece valve assembly, as shown in Figure 1. Identification for the new Valve Body is the Rough Forging number XF1P-7A092-BA.

(2) VALVE BODY SPACER PLATE - The valve body spacer plate and gaskets had an extra hole added to them for the additional retaining bolt, as shown in Figure 2.

(3) PUMP BODY - The Pump body had numerous casting changes as well as a new location for the pump spacer plate lower retaining bolt, as shown in Figure 3. Identification for the new Pump Casting is the rough forging number of RF-F8DP-7B324-AA.

(4) PUMP SPACER PLATE - The pump spacer plate and gaskets had the previous lower retaining bolt hole eliminated, as shown in Figure 4, as well as new hole location added for the retaining bolt that moved.

INTERCHANGEABILITY:

None of the parts listed above will interchange with the previous design level parts, however, when all parts above are used as a service package, we see no reason that they will not retro-fit back on all previous models.

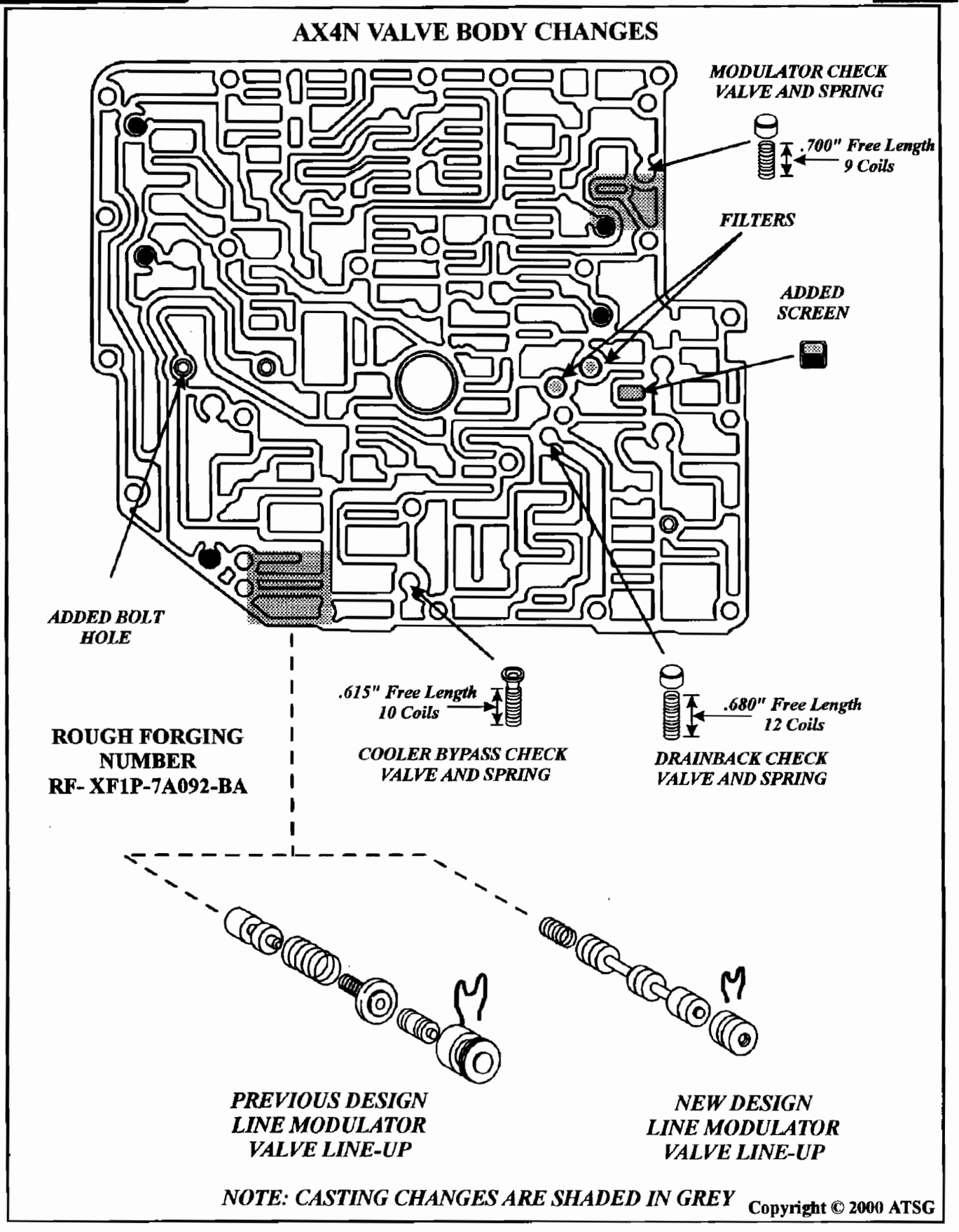

AX4N VALVE BODY CHANGES
MODULATOR CHECK VALVE AND SPRING
.700" Free Length
9 Coils
FILTERS
ADDED SCREEN
ADDED BOLT HOLE
.615" Free Length
10 Coils
COOLER BYPASS CHECK VALVE AND SPRING
.680" Free Length
12 Coils
DRAINBACK CHECK VALVE AND SPRING
ROUGH FORGING NUMBER
RF- XF1P-7A092-BA
PREVIOUS DESIGN LINE MODULATOR VALVE LINE-UP
NEW DESIGN LINE MODULATOR VALVE LINE-UP
NOTE: CASTING CHANGES ARE SHADED IN GREY
Copyright © 2000 ATSG

Figure 1

MAIN VALVE BODY SPACER PLATE AND GASKETS

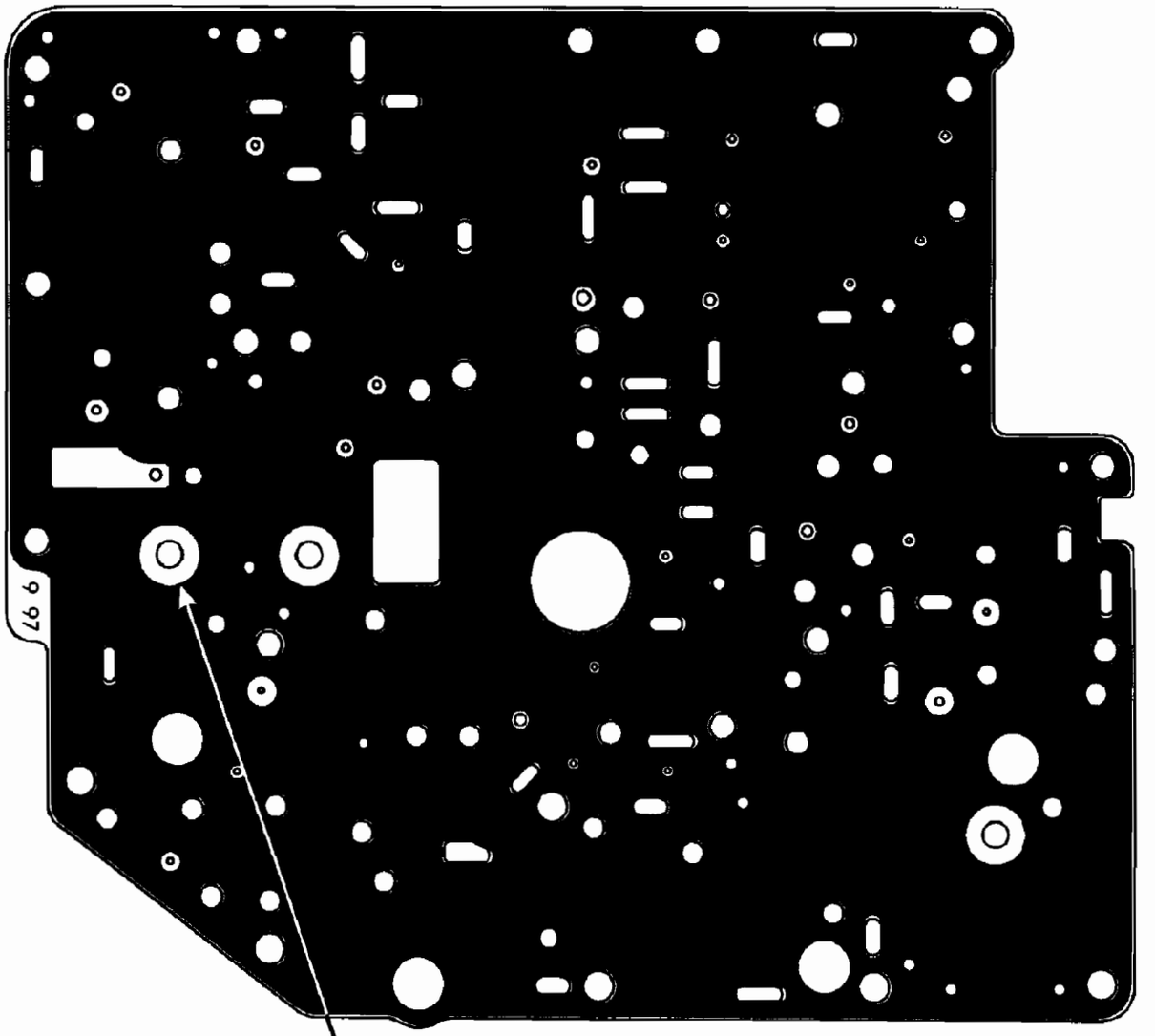
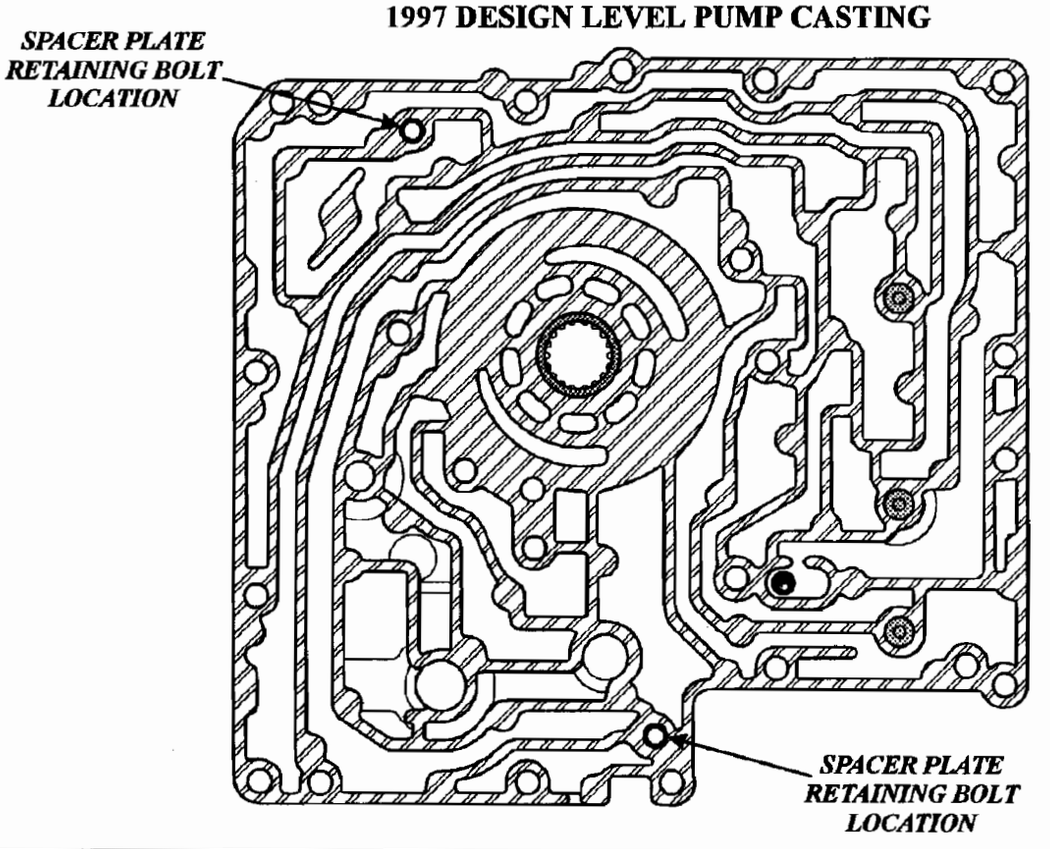


Figure 2

1997 DESIGN LEVEL PUMP CASTING



1998-UP DESIGN LEVEL PUMP CASTING

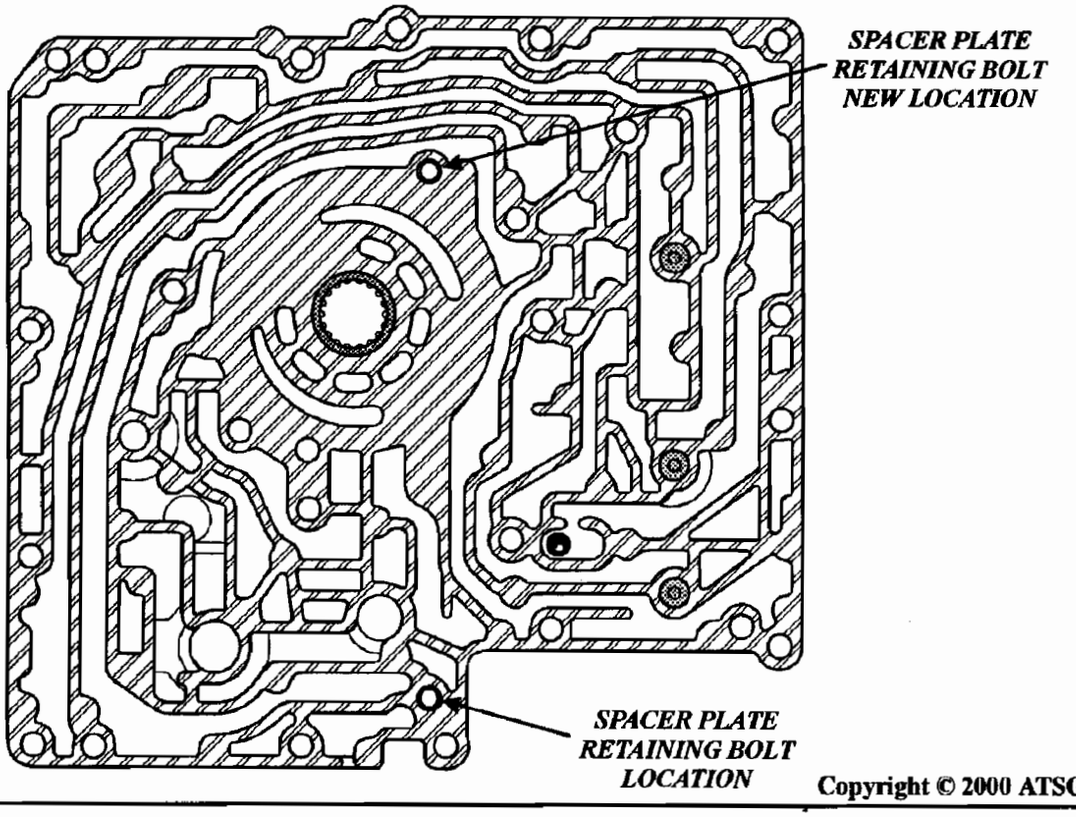


Figure 3

PUMP SPACER PLATE AND GASKET CHANGE

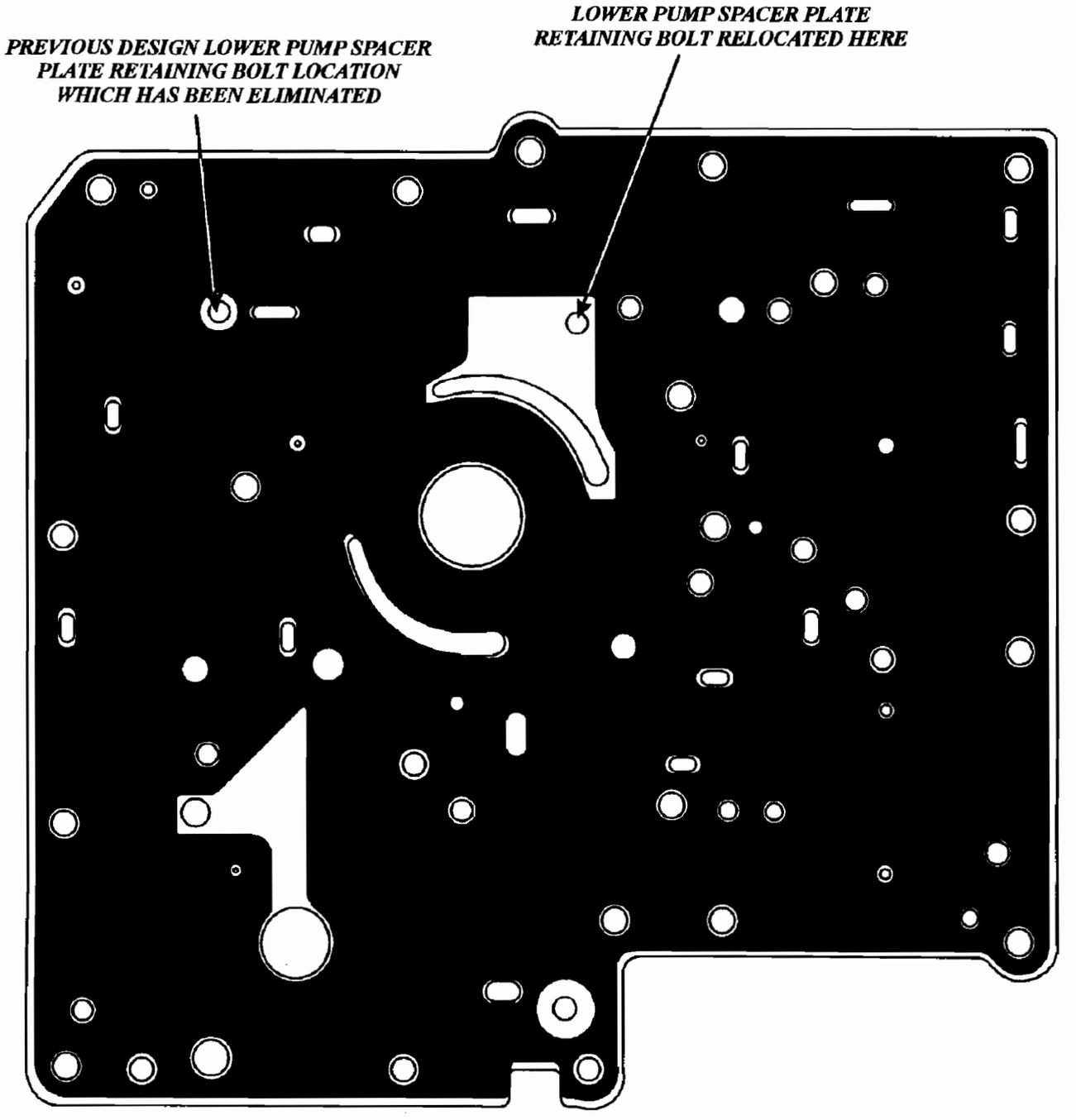


Figure 4

FORD E40D
NO UPSHIFT, COMPUTER COMMANDS OK

COMPLAINT: Some 1996 and later Ford Motor Company vehicles that are equipped with the E4OD Transmission, before or after overhaul may exhibit a no upshift condition with the shift selector in Drive.

CAUSE: After determining that the PCM is commanding the transmission to make the upshifts, the cause may be that the BS2 Checkball, located in the Main Valve Body is missing. See Figure 1.

CORRECTION: Install the ¼ in. Green Rubber Checkball in the location as shown in Figure 1.

SERVICE INFORMATION:

Green ¼ in. Checkball.....F6TZ-7E195BB

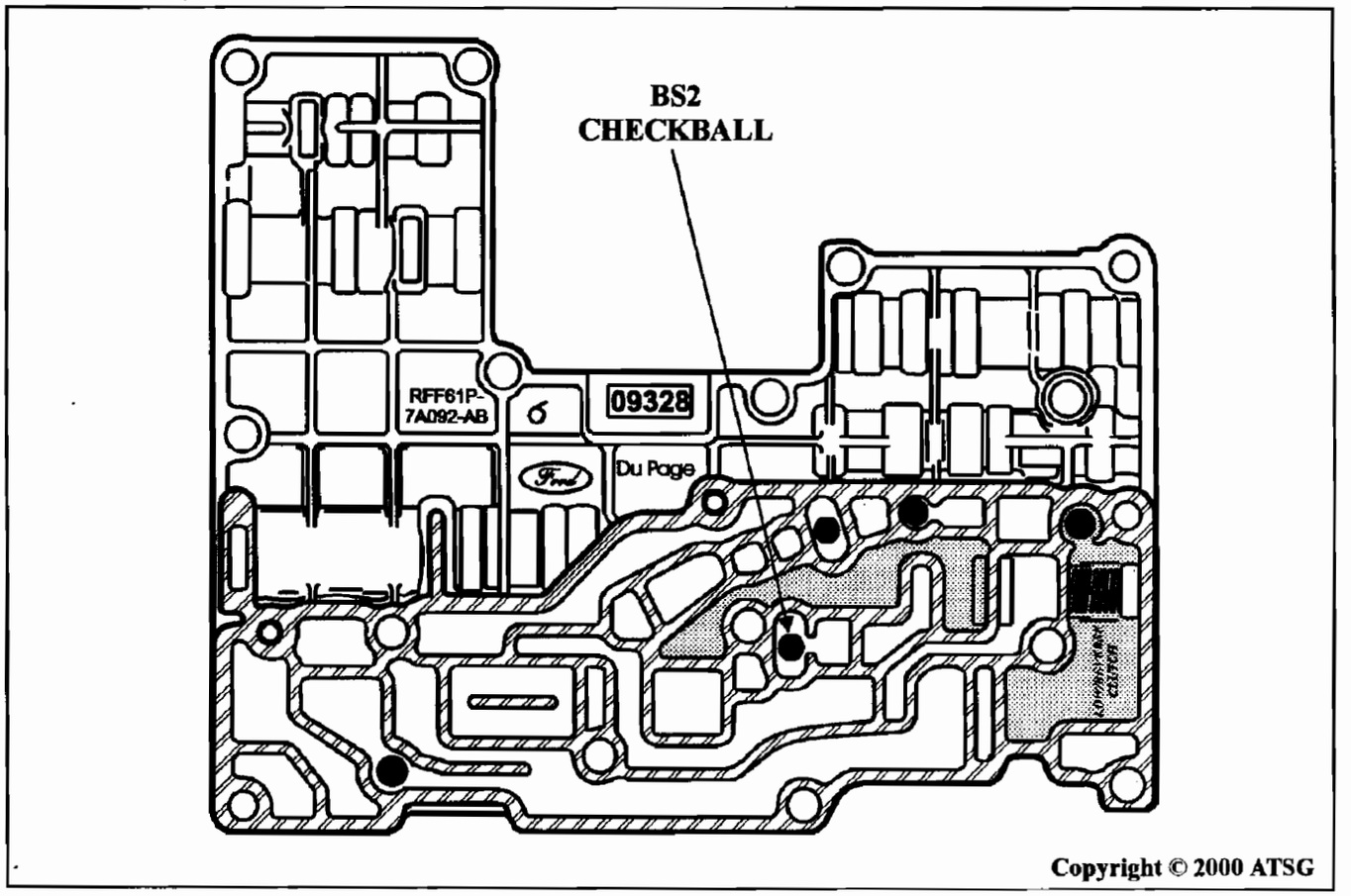


Figure 1

FORD AODE/4R70W

OIL VENTING OUT OF FILLER TUBE

COMPLAINT: After installation of the overhauled transmission, as oil is being pumped into the filler tube, it becomes difficult for the transmission to accept oil. As the transmission warms, oil begins venting from the filler tube. This problem was NOT an original complaint. A front seal leak may also develop.

CAUSE: Located in the transmission case vent is a conical filter screen as shown in figure 1. During the time the case was in the cleaning machine, cleaning soap residue or other contaminates became lodged in the screen thereby restricting the screen located in the vent resulting in the above complaints.

CORRECTION: When air blowing the case after it comes out of the "cooker", be sure to blow air into the vent to insure that the vent is clear, if it is not clear, either remove the screen or replace the vent assembly. It is recommended that the screen in the vent always be removed.

Many thanks to Ed Lee from Deltrans, Inc., Newark, DE.

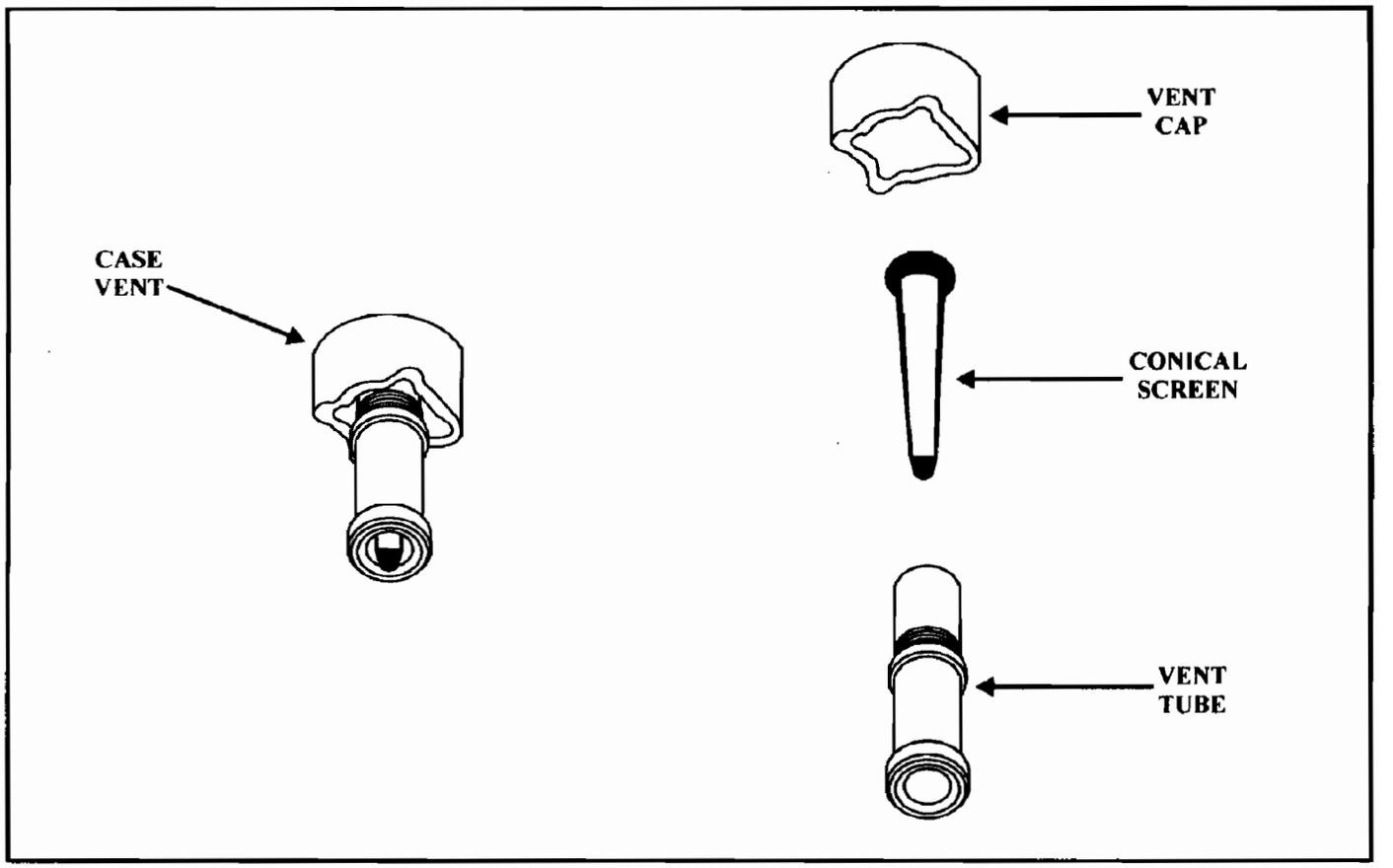


Figure 1

FORD AODE/4R70W

GEAR RATIO ERROR

COMPLAINT: After overhaul or after an exchange transmission has been installed, during the road test, shortly after TCC application as full duty cycle is attained, the TCC ground signal is lost. Code 628 for TCC slippage, Code PO741 for TCC Stuck OFF or Code P1744 for a TCC Performance Fault may be stored. After clearing these codes and road test, the same complaint occurs. After a thorough system diagnostic check, no faults are found.

CAUSE: A 4R70W transmission was installed at another repair facility before arriving at the current repair facility. ***This vehicles original equipment transmission was an AODE.*** The gear ratio created by the 4R70W gear train was NOT the target gear ratio that the PCM should see with an AODE gear train. Shortly after TCC application, the PCM realized that the gear ratio was incorrect at which time the PCM canceled the TCC ground signal and a code was stored. The AODE and 4R70W gear ratios are as follows:

AODE	4R70W
1ST GEAR.....2:40	1ST GEAR.....2:84
2ND GEAR.....1:47	2ND GEAR.....1:55
3RD GEAR.....1:00	3RD GEAR.....1:00
4TH GEAR.....0:67	4TH GEAR.....0:70

CORRECTION: If these symptoms are suspected as being the cause of your complaint, check the Vehicle Certification Label (VCL) located on the driver side door jamb as shown in figure 1. Locate the transmission code indicated by **"TR"** at the bottom of the VCL.
Code "P" indicates the vehicles original equipment transmission was an AODE.
Code "U" indicates the vehicles original equipment transmission was a 4R70W.

Many thanks to Alvin Beverly, Harrell & Beverly Transmissions, Sanford, Florida

VEHICLE CERTIFICATION LABEL (VCL)

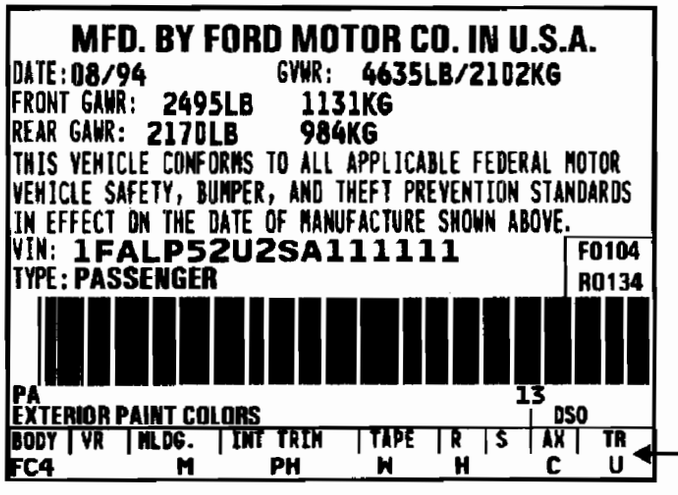


Figure 1

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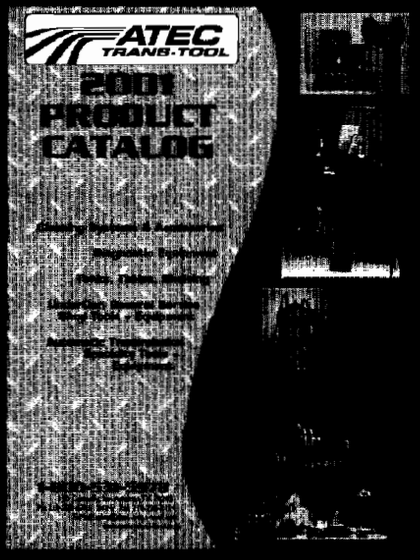
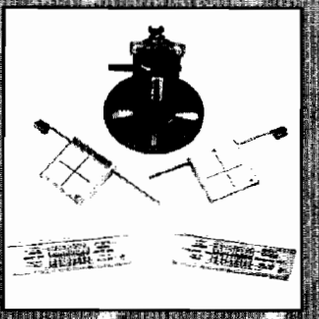
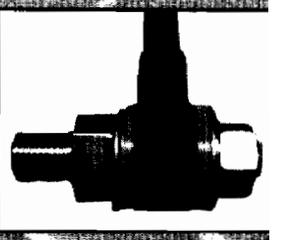
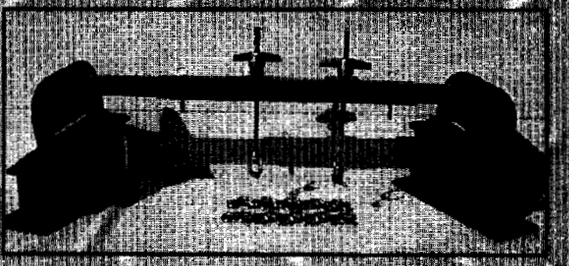


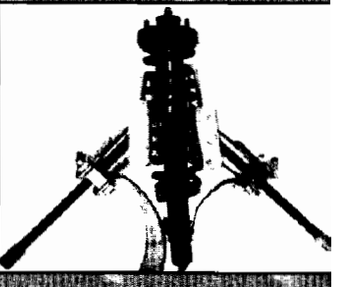




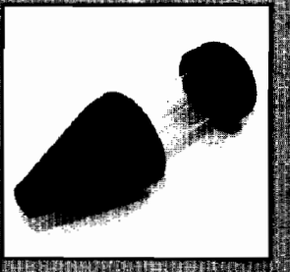
NEW PRODUCT CATEGORIES



HUNDREDS OF NEW PRODUCTS



NEW UNDER CAR TOOL & EQUIPMENT SECTION



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FORD 4R44E / 4R55E
ERRATIC OR NO LINE PRESSURE RISE

COMPLAINT: Vehicles equipped with 4R44E / 4R55E may exhibit a slipping condition, along with erratic or no line pressure rise.

CAUSE: The cause may be the EPC solenoid has blown out of the valve body due to a broken solenoid retainer holding in the EPC solenoid.

CORRECTION: Replace the early style solenoid retainer with the new design retainer as shown in figures 1 & 2.

SERVICE INFORMATION:

NEW DESIGN SOLENOID RETAINER.....XL2Z-7L491-AA

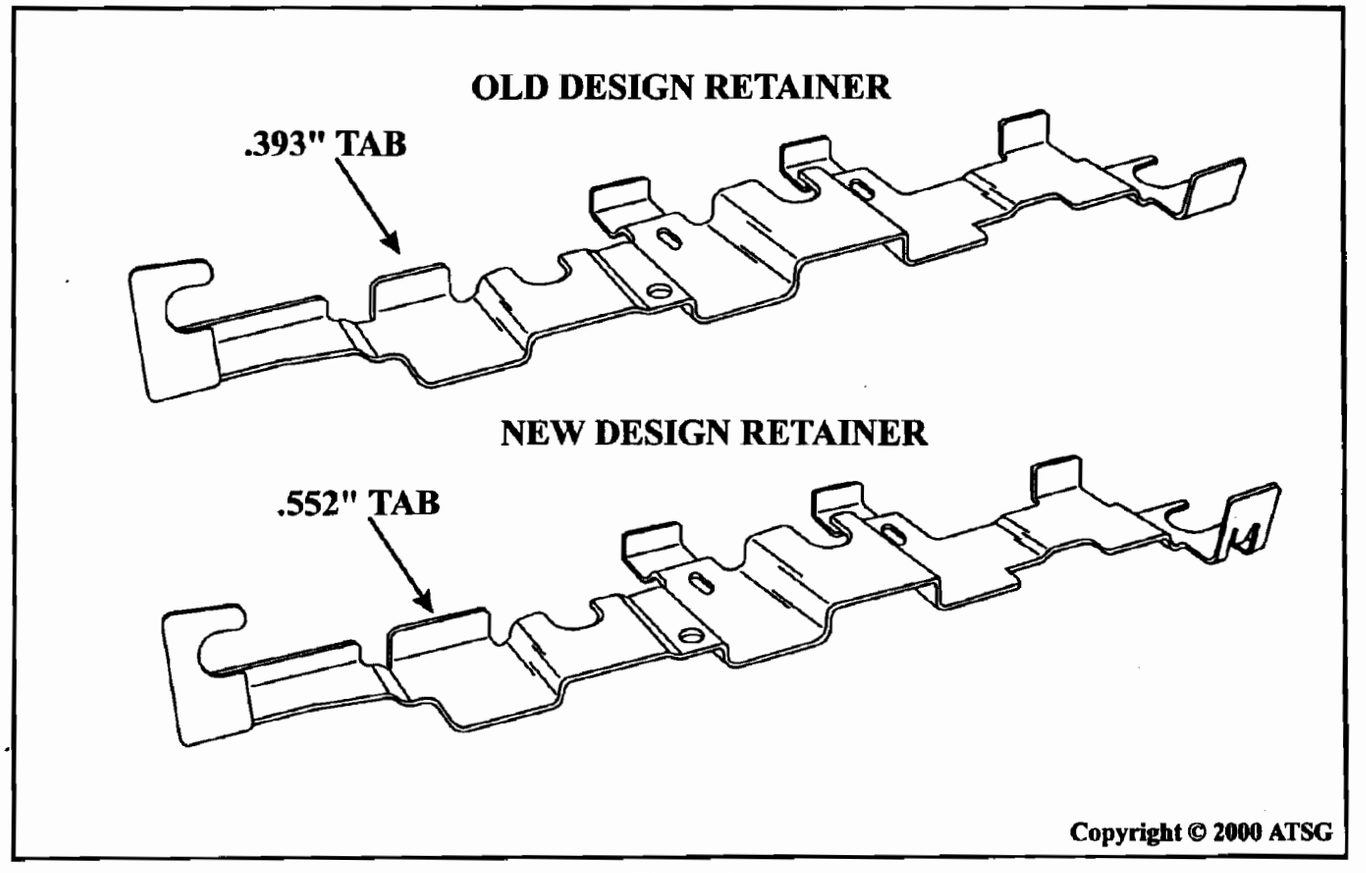

Figure 1

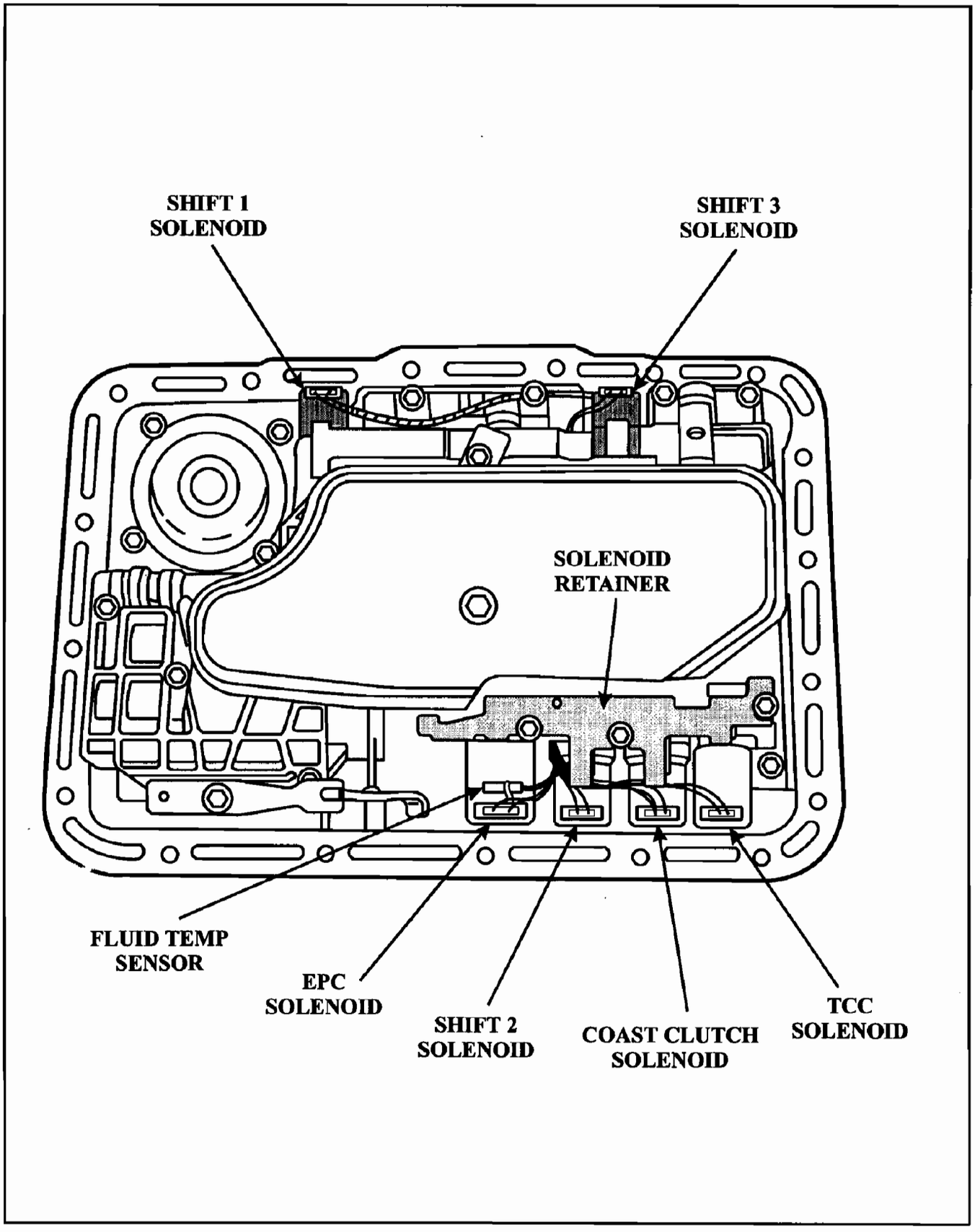
SHIFT 1
SOLENOID
SHIFT 3
SOLENOID
SOLENOID
RETAINER
FLUID TEMP
SENSOR
EPC
SOLENOID
SHIFT 2
SOLENOID
COAST CLUTCH
SOLENOID
TCC
SOLENOID

Figure 2

FORD 4R44E/4R55E/5R55E

SLIPPING AND/OR NO LOCKUP AND DTC 628 OR PO741

COMPLAINT: After overhaul vehicles equipped with 4R44E/4R55E/5R55E may exhibit a slipping or no lockup condition, along with a Diagnostic Trouble Code 628 or PO741 stored in memory.

CAUSE:

(1) The incorrect "Scarf Cut" sealing ring was installed on the pump stator (Refer to Figure 1).

(2) An A4LD inner pump gear used in a 4R44E/4R55E pump body as shown in Figure 2.

(3) The "O" ring inside the 4R44E/4R55E inner pump gear may be missing or damaged.

CORRECTION:

(1) Replace the early style "Scarf Cut" sealing ring with the new design "Butt Cut" sealing ring, as shown in Figure 1.

(2) Ensure that the inner pump gear is a 4R44E/4R55E gear, as shown in Figure 2.

(3) During rebuild make sure the "O" ring on the inside diameter of the inner pump gear is replaced and use care not to damage the "O" ring when installing the converter.

SERVICE INFORMATION:

TCC Butt Cut Sealing Ring..... F77Z-7L323-AA

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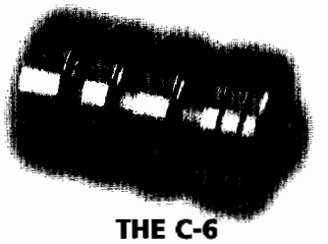
Part # K021

THE E40D
STEEL SERIES REPLACEMENT
BOOST VALVE & SLEEVE
Part #K024

THE AOD-E
STEEL SERIES REPLACEMENT
BOOST VALVE & SLEEVE
Part #K026



THE C-6
STEEL SERIES REPLACEMENT
BOOST VALVE & SLEEVE
Part # K028

THE AXOD
STEEL SERIES REPLACEMENT
BOOST VALVE & SLEEVE
Part# K009, Also For AXOD-E, AX4S & AX4N

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- Able to pull down to manual low at a higher road speed
- Creates greater line pressure in manual low and 2nd

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FORD 4R44E/4R55E/5R55E
STATOR SEALING RING IDENTIFICATION

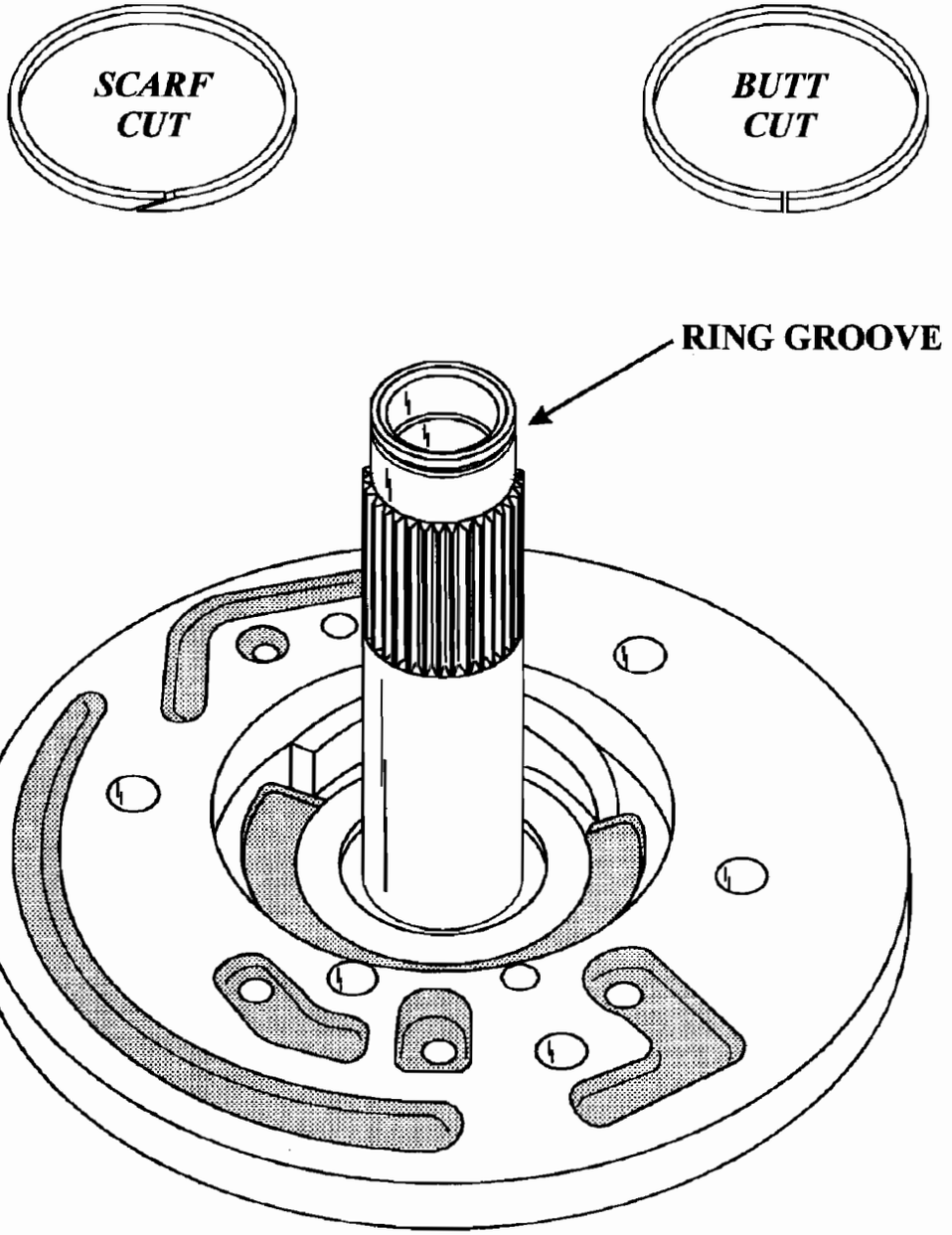


Figure 1

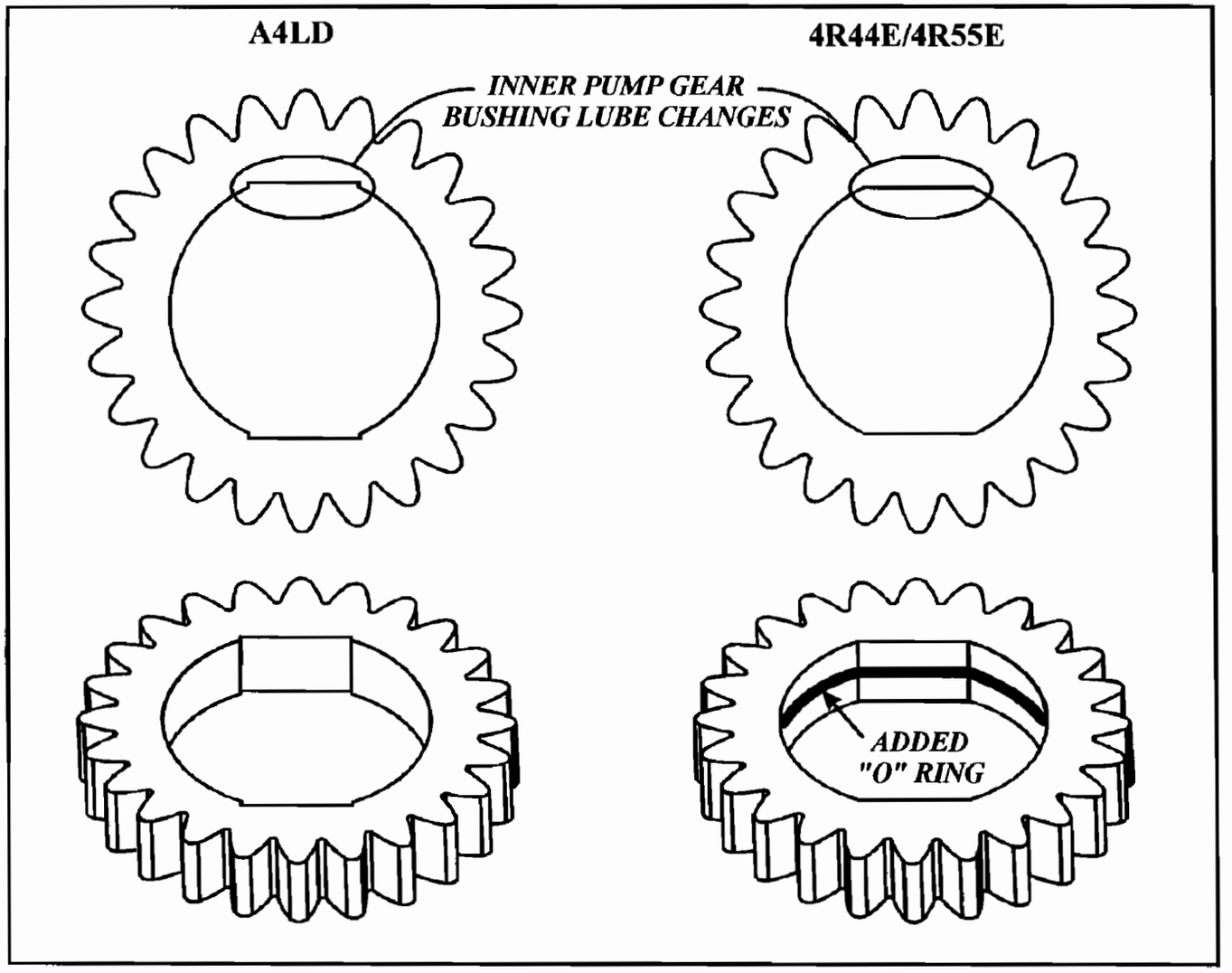


Figure 2

FORD 5R44E/5R55E

INTERMEDIATE SHAFT SENSOR ADDED AND NEW TRANSMISSION FOR 2001

CHANGE: Beginning at the start of production for 2001, Ford Motor Co. has implemented a new model transmission with the designation 5R44E, which is a five speed transmission that replaces the previous design 4R44E unit. This new 5R44E model transmission, as well as the 5R55E transmission, has an added Intermediate Shaft Speed (ISS) sensor (See Figure 1). There was also changes to the PCM strategy that now includes Shift Adaptive Pressure Control Strategy. The new 5R44E transmission will be found in 2001 Rangers with 2.3L and 3.0L engines, and the new design 5R55E transmission will be found in Ranger, Explorer with 4.0L engines.

REASON: New transmission added to commonize transmission models, and new Intermediate Shaft Speed (ISS) sensor added for the new PCM Shift Adaptive Pressure Control Strategy.

PARTS AFFECTED:

(1) TRANSMISSION CASE - New transmission case casting and machining to accommodate the added Intermediate Shaft Sensor (ISS), as shown in Figure 1.

(2) INTERMEDIATE SHAFT SPEED SENSOR - Additional information for the PCM to determine various incremental pressure changes needed to minimize the difference between the actual and ideal shift times for Shift Adaptive Pressure Control Strategy.

(3) SUN SHELL - Now manufactured with windows and used to trigger the added Intermediate Shaft Speed (ISS) sensor, as shown in Figure 2.

(4) POWERTRAIN CONTROL MODULE - Operational changes that includes Shift Adaptive Electronic Pressure Control Strategy.

Shift Adaptive Electronic Pressure Control Strategy

This strategy allows for improved control over the transmission shift events. Based on various input signals, the strategy calculates an actual shift time and compares it to an ideal shift time. Once the vehicle is up to operating temperture, incremental pressure changes are made to minimize the difference between actual and ideal shift times. Over time the adaptive learning process will fully update Keep Alive Memory (KAM). The more varied the driving habits the longer the update will take. However, the adaptive learning process will also be more complete. Adaptive pressure control strategy is capable of adapting upshifts, closed throttle downshifts and garage shifts.

If for any reason the vehicle loses power to the Keep Alive Memory (KAM), the transmission will return to its pre-set level. Reasons for this happening are battery disconnected or fully discharged, PCM disconnected while the battery is still connected, or updated calibration programmed into the PCM.

INTERCHANGEABILITY:

None of the parts listed above are interchangeable with the previous design level parts. For diagnosis of Intermediate Shaft Speed sensor, refer to Figure 3.

NEW CASE AND SPEED SENSOR

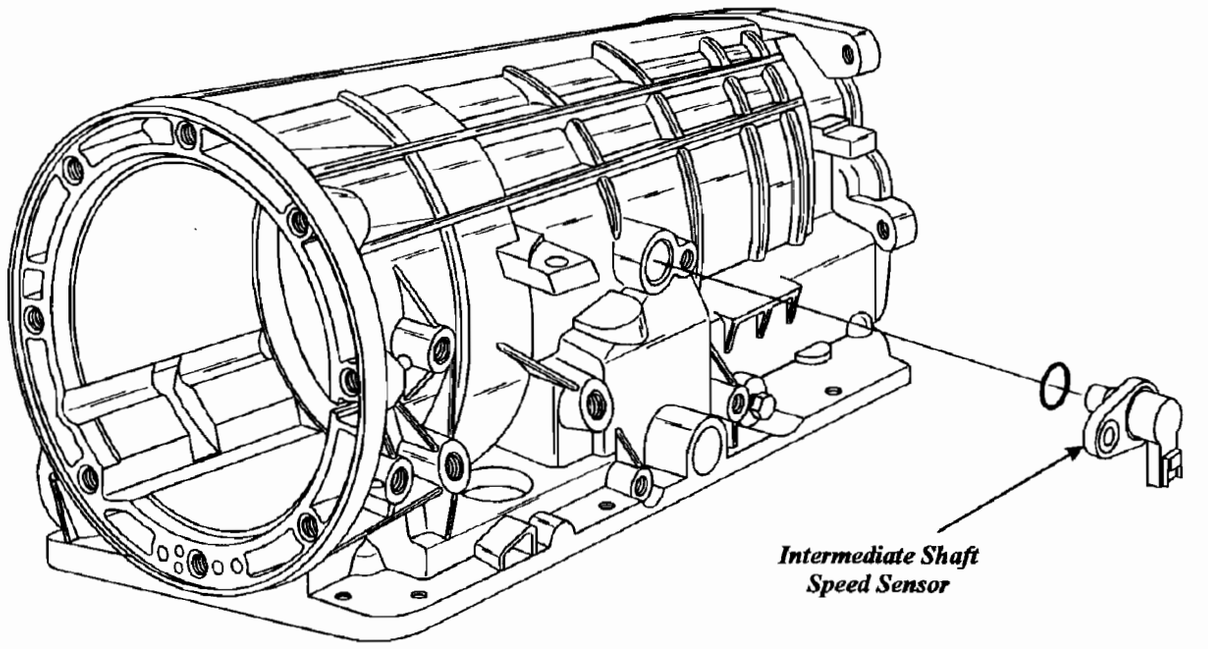


Figure 1

NEW SUN GEAR SHELL

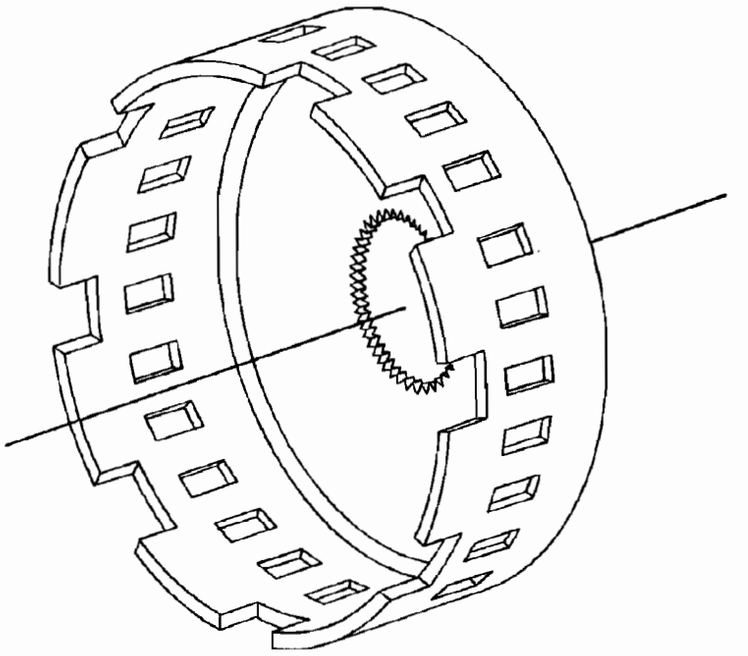


Figure 2

5R44E/5R55E ADDED DIAGNOSTICS AND TROUBLE CODE CHART

DTC	DESCRIPTION	SYMPTOM	POSSIBLE CAUSES
P0791	ISS Sensor Failure (Signal Loss)	Harsh 2-3 Shifts	ISS Sensor or Wiring
P0794	ISS Sensor Signal Intermittent	Harsh 2-3 Shifts	ISS Sensor or Wiring
P1636	SSx ISIG Communication Error	None	Replace PCM

Intermediate Shaft Speed Sensor
325-485 Ohms Resistance @ 20°C (70°F)

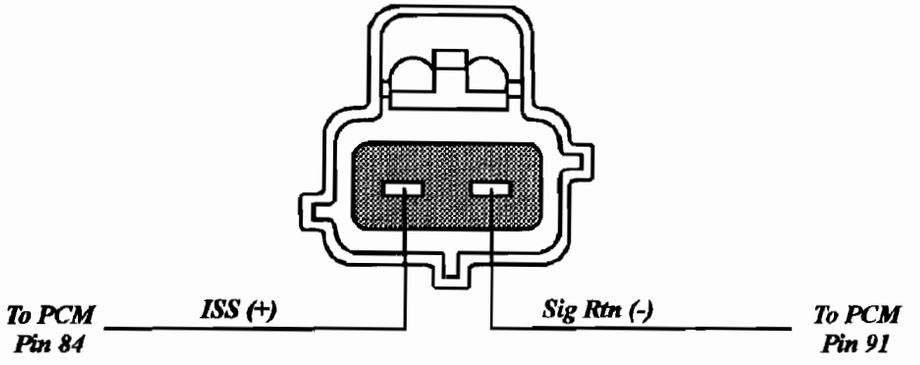


Figure 3

FORD 5R55E

BINDS IN REVERSE AND 3RD AND/OR WRONG GEAR STARTS

COMPLAINT: Vehicles equipped with the 5R55E transmission may exhibit a bind-up in reverse and third gear, and/or wrong gear starts.

CAUSE: One cause may be the inner race for the center support caged needle bearing has developed a crack allowing the forward and direct clutches to be applied at the same time as shown in Figure 1.

CORRECTION: Air pressure check the forward and direct clutches thru the center support, as shown in Figure 3, and ensure air does not mix between the two separate circuits. If the air check does not pass, inspect the inner race for a crack, as shown in Figures 1 and 2. If a crack is found replace the center support.

NOTE: REMOVING THE CAGED NEEDLE BEARING WILL DESTROY THE CENTER SUPPORT!

SERVICE INFORMATION:

Center Support With Bearing XW4Z-7A130-DA

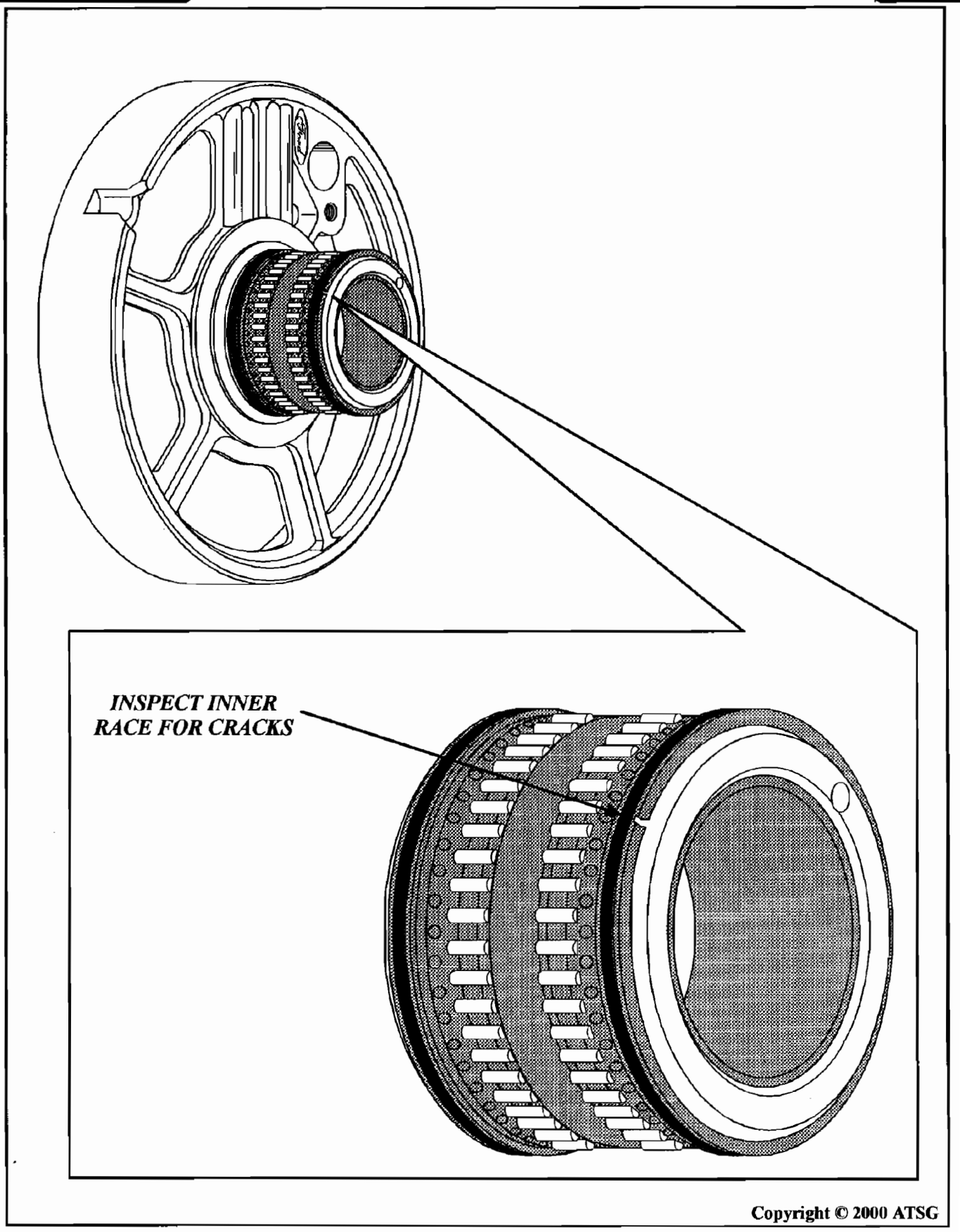


Figure 1

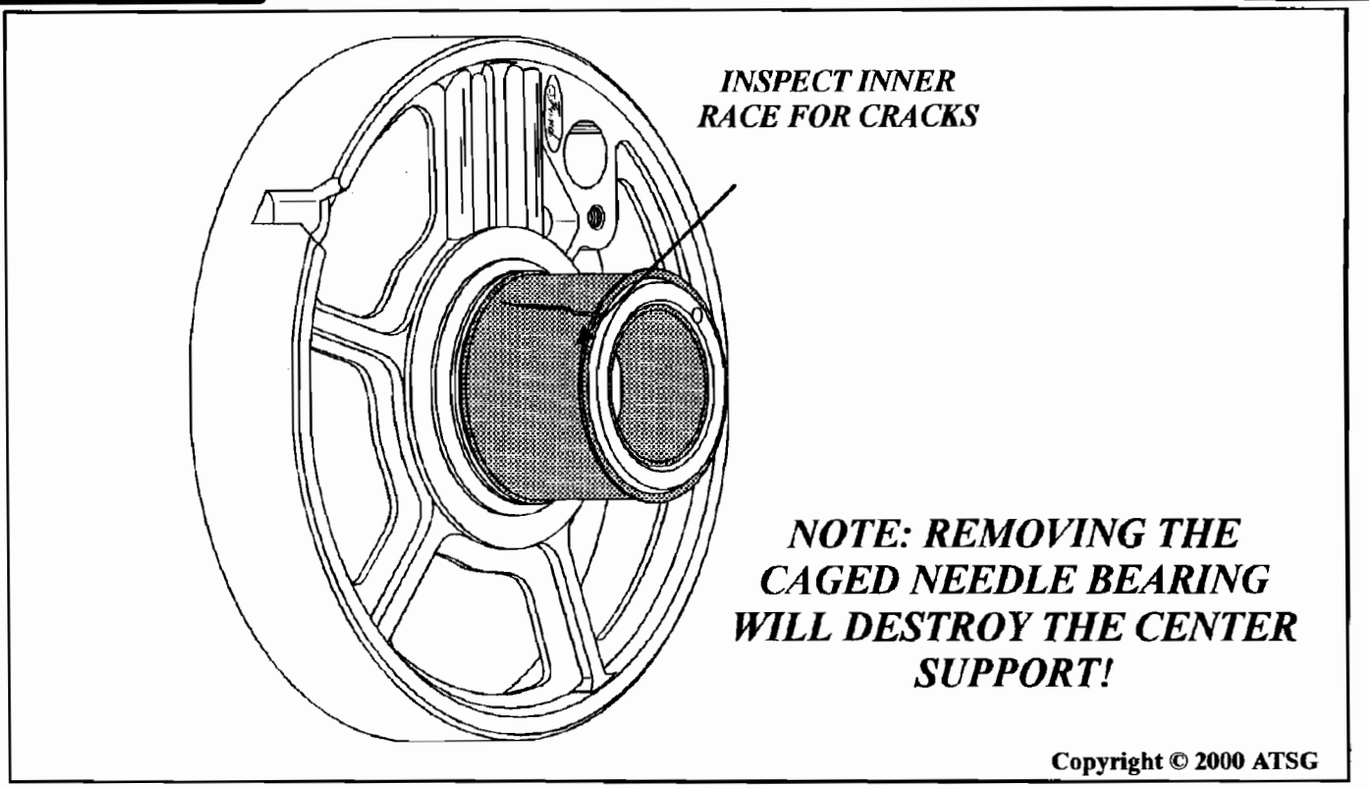


Figure 2

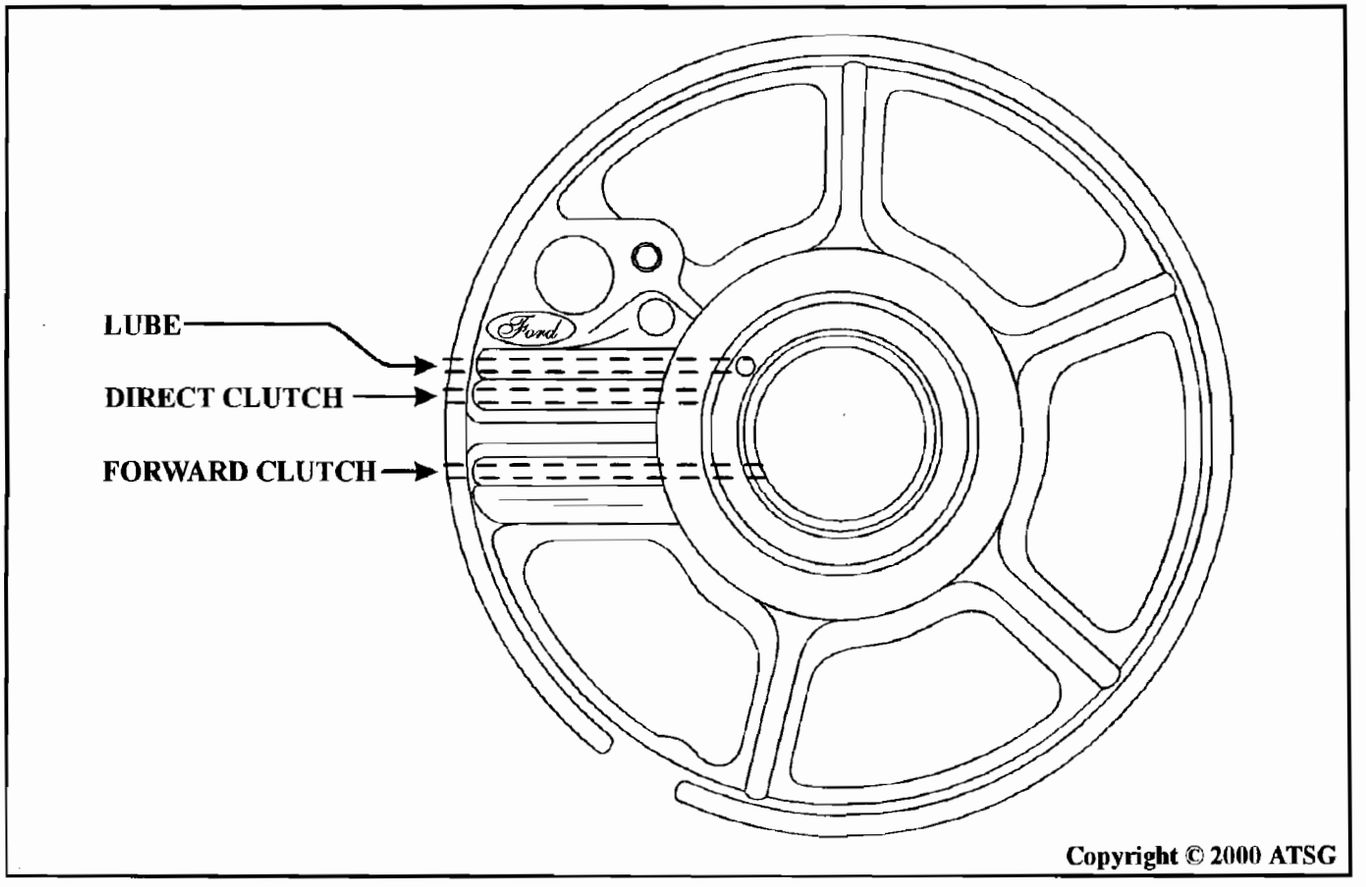
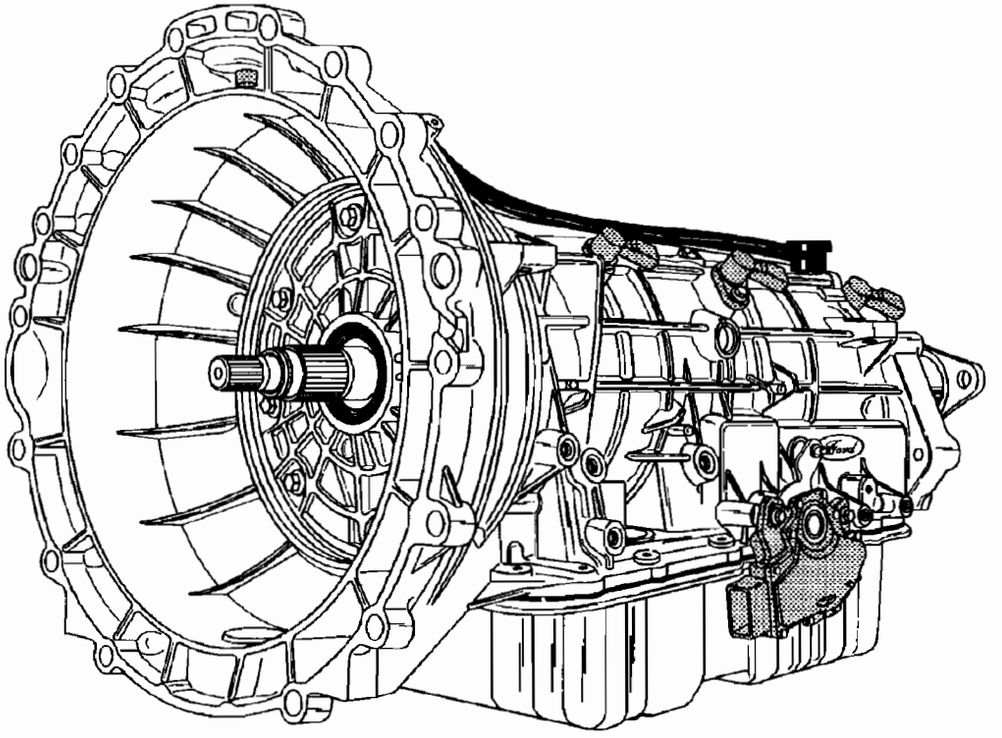
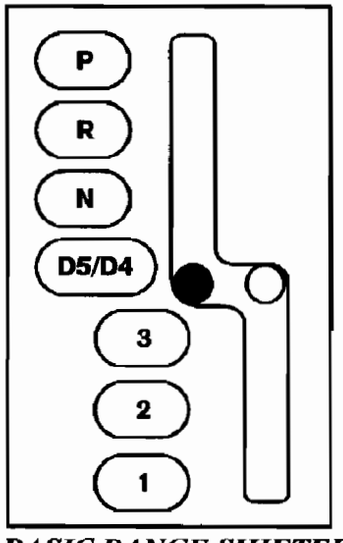


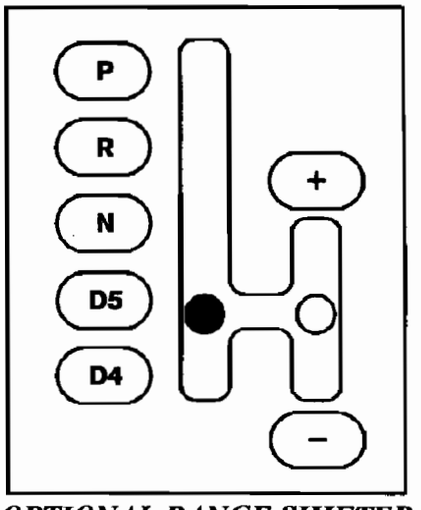
Figure 3

PRELIMINARY INFORMATION





BASIC RANGE SHIFTER



OPTIONAL RANGE SHIFTER

Figure 1

FORD 5R55N COMPONENT APPLICATION CHART											
RANGE	FWD CLUT	INT [1] CLUT	DIR CLUT	COAST CLUT	O/D BAND	INT [2] BAND	L/R BAND	O/D SPRAG	INT [3] SPRAG	LOW SPRAG	RATIO
Park											
Reverse			ON	ON			ON				3.07
Neutral											
"D5"-1st Gear	ON							HOLD		HOLD	3.25
"D5"-2nd Gear	ON				ON					HOLD	2.44
"D5"-3rd Gear	ON	ON						HOLD	HOLD		1.55
"D5"-4th Gear	ON	ON	ON					HOLD			1.00
"D5"-5th Gear	ON	ON	ON		ON						0.75
"D4"-1st Gear	ON			ON				HOLD		HOLD	3.25
"D4"-2nd Gear	ON				ON					HOLD	2.44
"D4"-3rd Gear	ON	ON		ON				HOLD	HOLD		1.55
"D4"-4th Gear	ON	ON	ON	ON				HOLD			1.00
"3"-1st Gear	ON			ON				HOLD		HOLD	3.25
"3"-2nd Gear	ON				ON					HOLD	2.44
"3"-3rd Gear	ON	ON		ON		ON		HOLD	HOLD		1.55
"2"-2nd Hold *	ON				ON		ON			HOLD	2.44
"1"-1st Hold	ON			ON			ON			HOLD	3.25

* Manual "2" is 2nd starts and hold.
** Manual "1" is provides 1st gear operation only.

1 - Ford named the new clutch Intermediate Clutch, actually active in 3rd gear.
2 - Intermediate Band is now ON only in Manual 3rd gear.
3 - Ford named the new sprag Intermediate Sprag, actually active in 3rd gear.

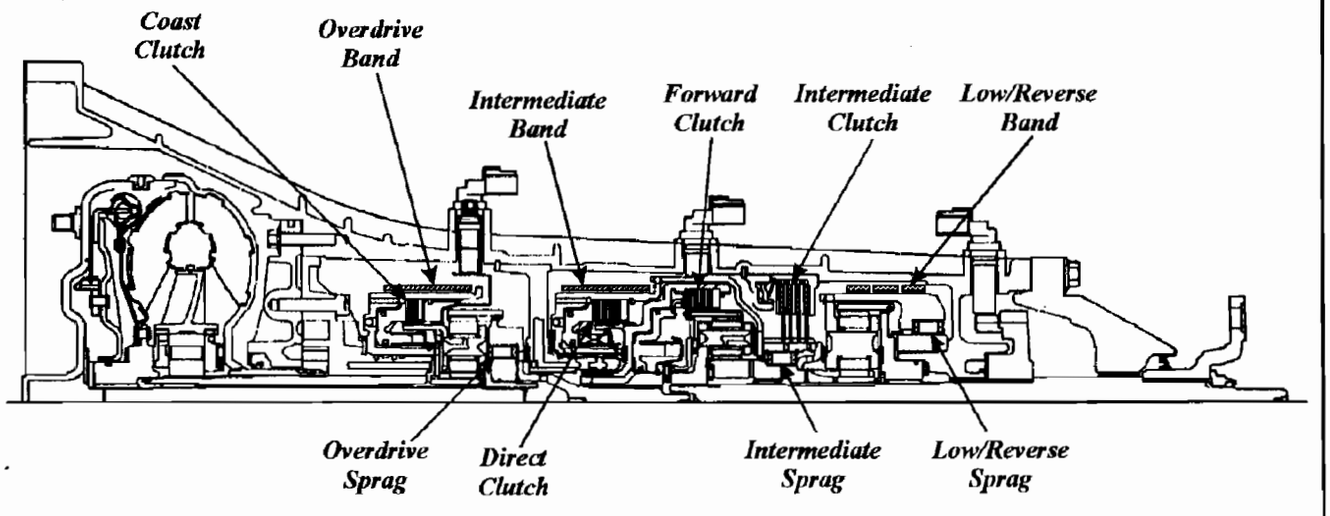


Figure 2

FORD 5R55N SOLENOID APPLY CHART

Range And Gear Commanded	Shift Sol. "A"	Shift Sol. "B"	Shift Sol. "C"	Shift Sol. "D"	Pres Cont Sol. "A"	Pres Cont Sol. "B"	Pres Cont Sol. "C"	TCC Solenoid
Park/Neutral	ON			ON	"L"	"C"	"L"	
Reverse	ON			ON	"L"	"H"	"H"	
D5 - 1st Gear	ON			ON	"C"	"L"	"L"	
D5 - 2nd Gear	ON		ON	ON	"L"	"C"	"L"	
D5 - 3rd Gear	ON	ON		ON	"C"	"L"	"L"	**
D5 - 4th Gear				ON	"C"	"L"	"H"	**
D5 - 5th Gear			ON	ON	"C"	"C"	"H"	**
D4 - 1st Gear	ON			ON	"C"	"L"	"L"	
D4 - 2nd Gear	ON		ON	ON	"L"	"C"	"L"	
D4 - 3rd Gear	ON	ON		ON	"C"	"L"	"L"	**
D4 - 4th Gear					"C"	"C"	"H"	**
"3" - 3rd Gear	ON	ON			"C"	"C"	"L"	
"2" - 2nd Gear (Hold)	ON		ON		"C"	"C"	"L"	
"1" - 1st Gear (Hold)	ON				"C"	"C"	"L"	

"L" = Low Line Pressure
"C" = Control Line Pressure
"H" = High Line Pressure
** = TCC On is dependent on vehicle speed and throttle position

CASE CONNECTOR PIN IDENTIFICATION AND RESISTANCE CHARTS

Solenoid Resistance Chart		
Component	Connector Terminals	Resistance In Ohms
Shift Solenoid "A"	3 And 16	16-45
Shift Solenoid "B"	3 And 15	16-45
Shift Solenoid "C"	3 And 6	16-45
Shift Solenoid "D"	3 And 5	16-45
Pressure Control Solenoid "A"	3 And 1	3.3-7.5
Pressure Control Solenoid "B"	3 And 4	3.3-7.5
Pressure Control Solenoid "C"	3 And 11	3.3-7.5
TCC Solenoid	3 And 14	9-16
Reverse Pressure Switch	12 And 13	Open/Closed
TOT Sensor	2 And 12	See Chart

TOT Sensor Resistance Chart
0°F-31°F = 284k - 100k Ohms
32°F-68°F = 100k - 37k Ohms
69°F-104°F = 37k - 16k Ohms
105°F-158°F = 16k - 5k Ohms
159°F-194°F = 5k - 2.7k Ohms
195°F-230°F = 2.7k - 1.5k Ohms
231°F-266°F = 1.5k - 0.8k Ohms
267°F-302°F = 0.8k - 0.54k Ohms

Refer To Figure 4 For Case Connector Pin Identification

Figure 3

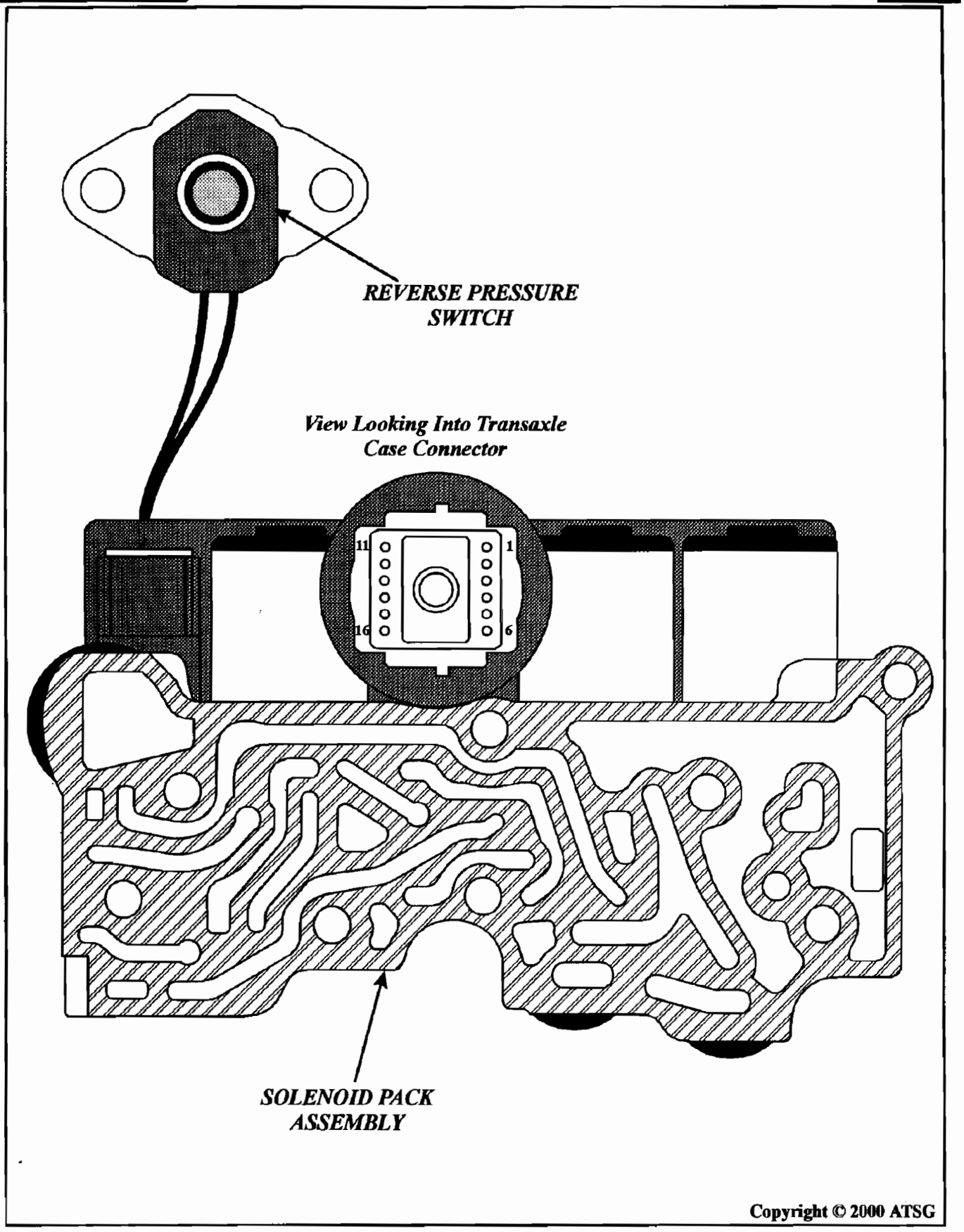

REVERSE PRESSURE SWITCH
View Looking Into Transaxle Case Connector
11
1
16
6
SOLENOID PACK ASSEMBLY
Copyright © 2000 ATSG

Figure 4

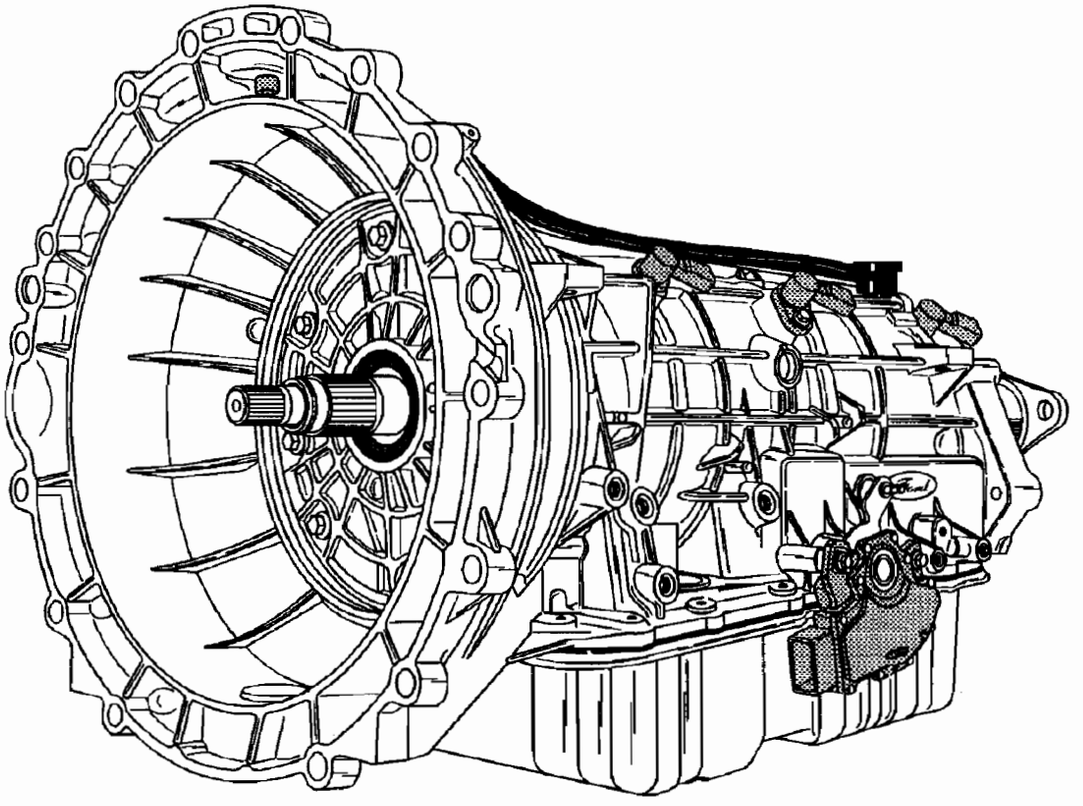
FORD 5R55N

CHECKING FLUID LEVEL

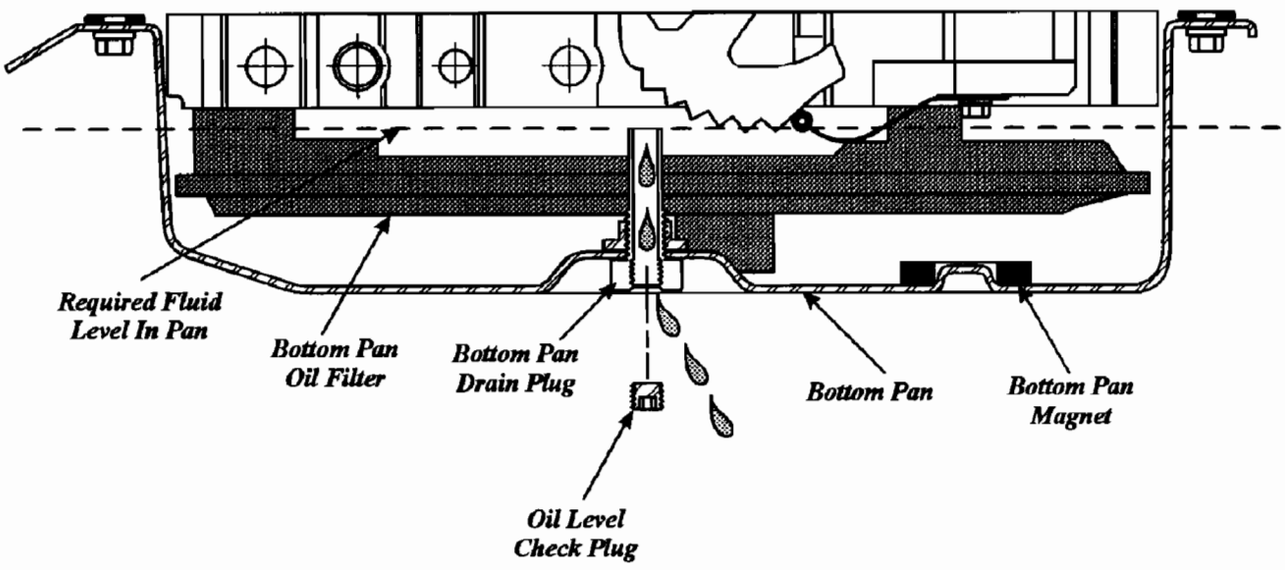
Checking the fluid level on any vehicle equipped with Ford Motor Companys new 5R55N transmission may become confusing to some technicians. There is a plug in the extension housing, as shown in Figure 1, that would lead one to believe that this is where you check the fluid level, since some of the other manufacturers are currently checking fluid level in this manner, and it refers to the correct temperature to check the fluid right on the extension housing.

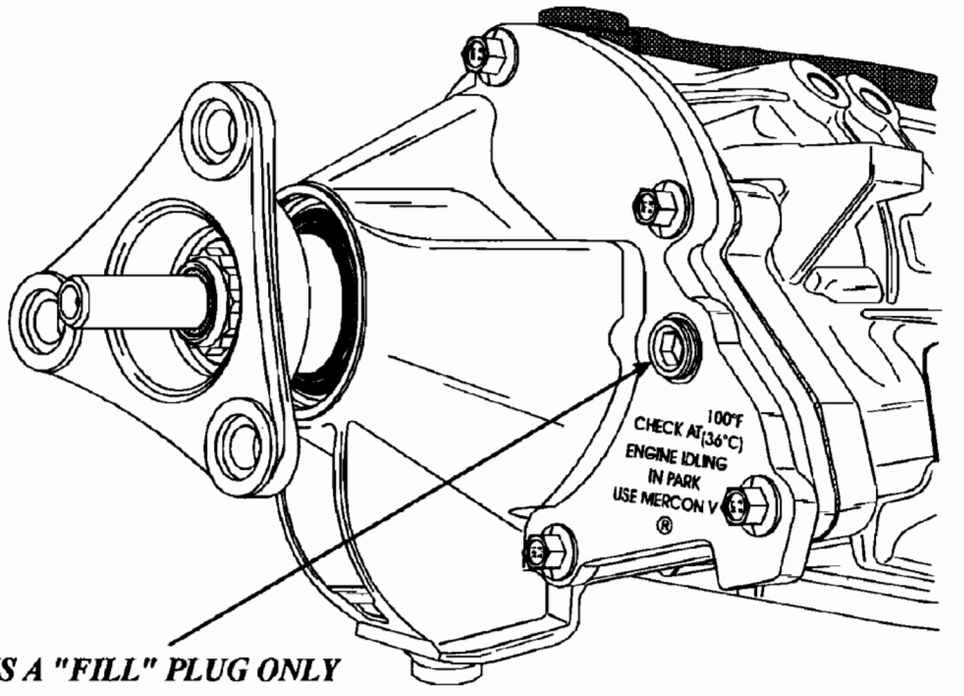
However, this is a ***"Fill" plug only*** on the new 5R55N transmission from Ford Motor Company, which is currently found in the 2000 Lincoln LS and some Jaguars. To ***"Check"*** for the correct fluid level, you must remove the check plug, which is located in the center of the bottom pan drain plug, and is removed with an allen wrench, as shown in Figure 1, while holding the drain plug with the proper size wrench so as not to loosen the drain plug.

We have provided you with a cut-away drawing of the bottom oil pan and the drain plug so that you will understand how this system works. Notice that the drain plug actually has a "stem" made on it that extends some distance up into the bottom pan, which is our way to establish the proper fluid level in the transmission. By removing the "Check" plug from the "Drain" plug, the fluid should just trickle over the stem and out through the center of the drain plug, as shown in Figure 1. The "Fill" plug in the extension housing is your only way to replace fluid in the transmission.



CHECKING FLUID LEVEL





THIS IS A "FILL" PLUG ONLY

FORD 5R55N
NEW DESIGN PAN GASKET

CHANGE: Ford Motor Company has implemented a new design pan gasket as a running change during the first few months of production, with a "Tab" added to the gasket, as shown in Figure 1.

REASON: To prevent the roll pin that retains the manual shift lever from falling out.

PARTS AFFECTED:

(1) PAN GASKET - This gasket is the same design as the AX4S/AX4N, with a plastic core and molded rubber sealing surface. Revision was made to the plastic core with the addition of the "Tab", as shown in Figure 1.

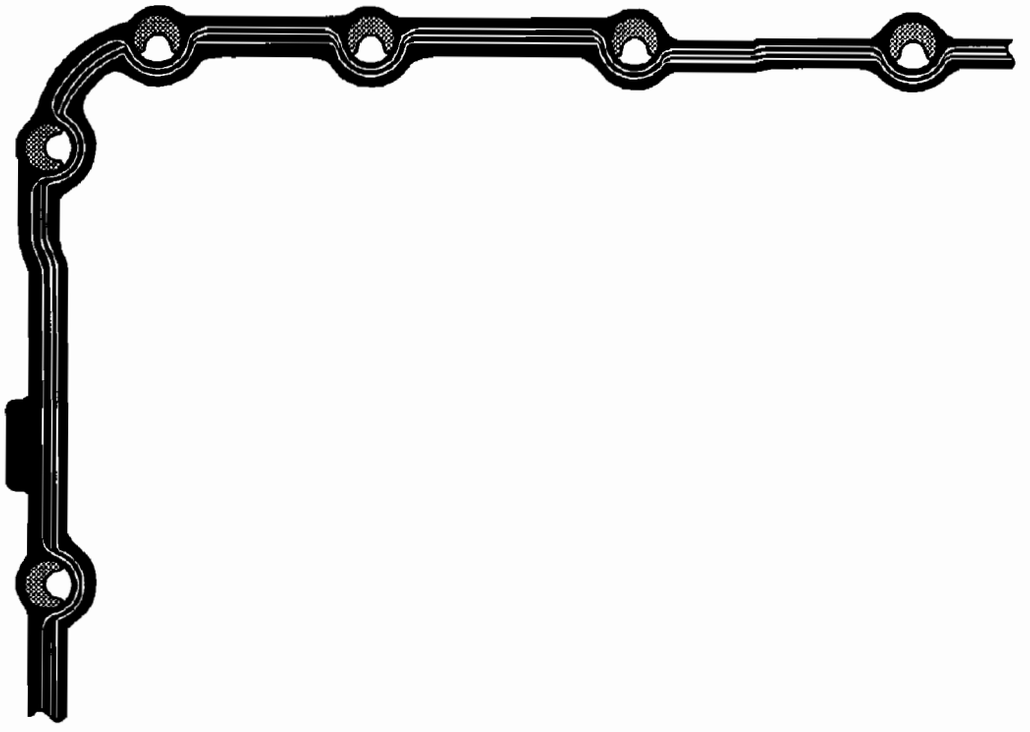
INTERCHANGEABILITY:

The new design pan gasket should be used on all models of the Ford 5R55N transmission. Failure to use the pan gasket with the added "Tab", may result in loss of vehicle control and/or gear selection, including Park.

SERVICE INFORMATION:

Pan Gasket (New Design) XW4Z-7A191-CA

FORD 5R55N PREVIOUS DESIGN PAN GASKET
(NOT RECOMMENDED FOR USE)



FORD 5R55N CURRENT DESIGN PAN GASKET
PART NUMBER XW4Z-7A191-CA

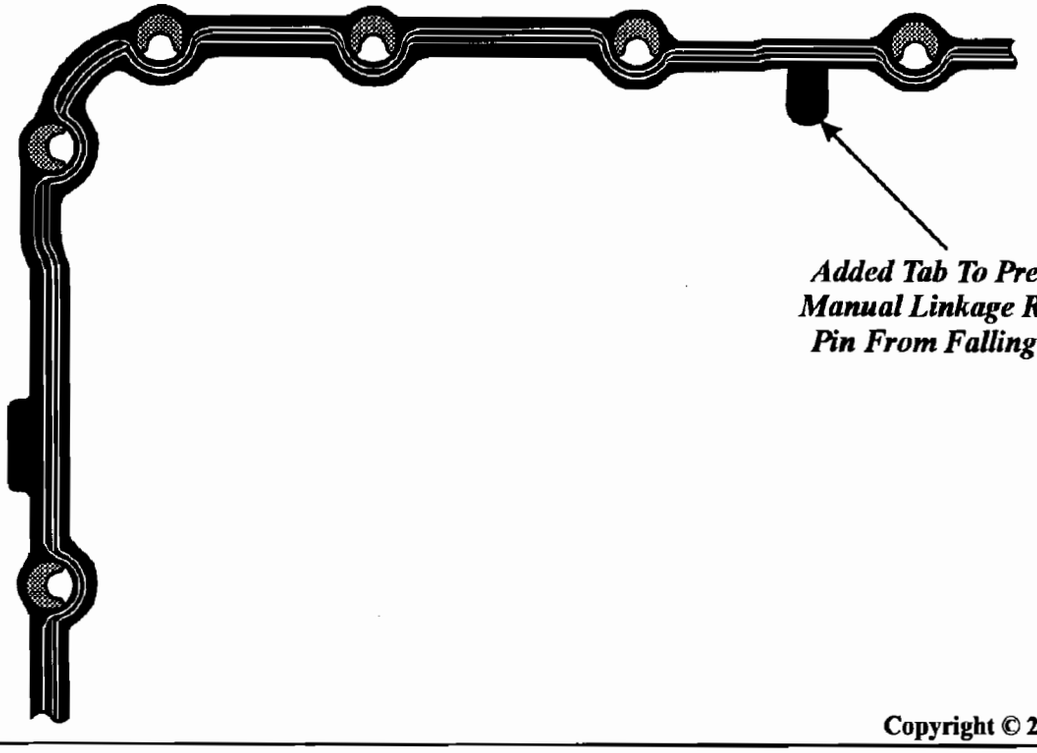
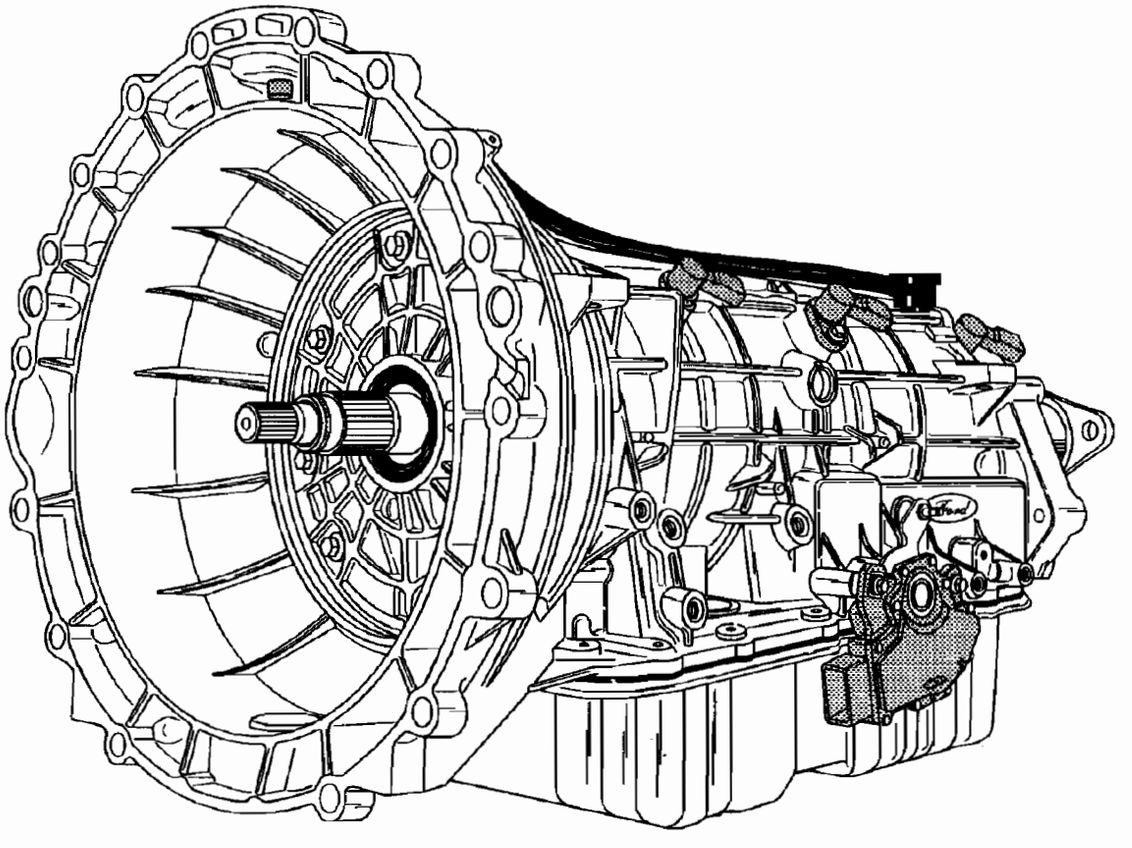


Figure 1

FORD 5R55N
LOW SPRAG ASSEMBLY

There are some different procedures that need to be addressed on the assembly of the Low Sprag on the new 5R55N transmission from Ford Motor Company. Some of these procedures are enough different that some mis-assemblies could easily occur if the technician did not refer to the manual. ATSG will have an assembly/disassembly manual available very soon.

1. The reverse drum to sprag inner race caged needle bearing must be installed into the reverse drum first, as shown in Figure 3. The Low Sprag Assembly is very difficult to remove if this bearing is forgotten.
2. The Low Sprag Assembly ***must*** be installed into the reverse drum with the locking tabs facing down as shown in Figure 3. It is very easy to install in the other direction, but reverse drum will freewheel in the wrong direction.
3. We have also provided you with illustrations of the gear train in Figures 1 and 2, to assist you in the assembly process, in case you encounter one of these units before you have a manual. ATSG will have a manual available very soon.



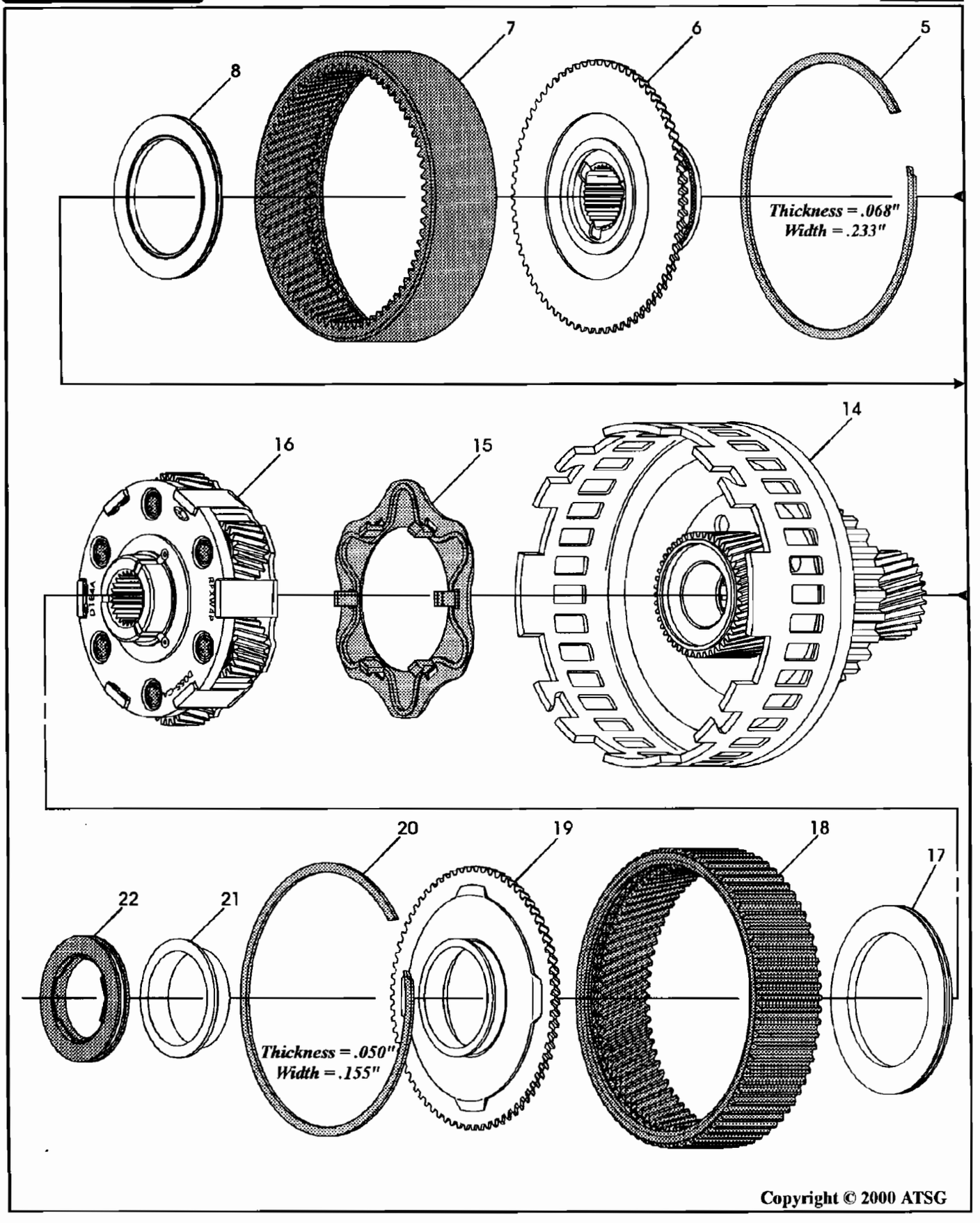

8
7
6
5
Thickness = .068"
Width = .233"
16
15
14
20
19
18
17
22
21
Thickness = .050"
Width = .155"
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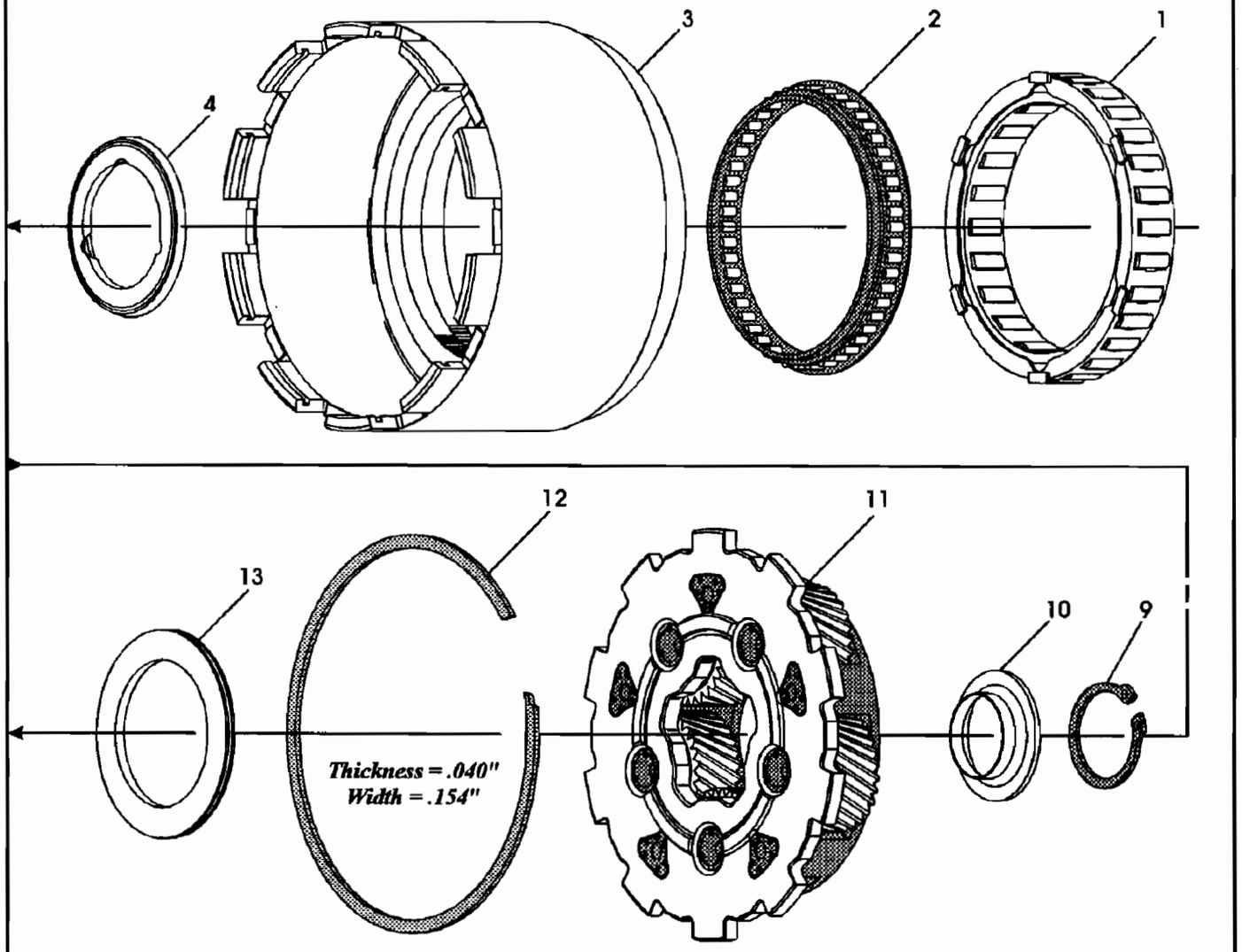
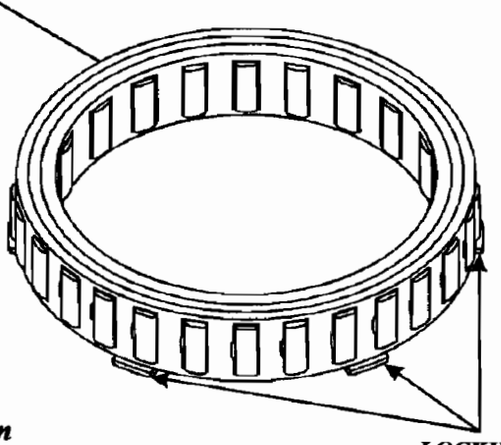
Figure 1



1. LOW SPRAG ASSEMBLY.
2. REVERSE DRUM TO INNER RACE CAGED NEEDLE BEARING.
3. REVERSE DRUM ASSEMBLY.
4. REAR RING GEAR HUB THRUST BEARING.
5. REAR RING GEAR HUB RETAINING RING.
6. REAR INTERNAL RING GEAR HUB.
7. REAR INTERNAL RING GEAR.
8. REAR PLANETARY CARRIER THRUST BEARING.
9. OUTPUT SHAFT RETAINING RING.
10. OUTPUT SHAFT LUBRICATION SLEEVE.
11. REAR PLANETARY CARRIER ASSEMBLY.
12. REAR CARRIER TO REVERSE DRUM RETAINING SNAP RING.
13. REAR PLANETARY CARRIER THRUST BEARING.
14. SUN SHELL AND SUN GEAR ASSEMBLY.
15. INPUT CARRIER TO SUN SHELL THRUST WASHER.
16. INPUT CARRIER ASSEMBLY.
17. INPUT CARRIER THRUST BEARING.
18. INPUT INTERNAL RING GEAR.
19. INPUT INTERNAL RING GEAR HUB.
20. INPUT INTERNAL RING GEAR HUB RETAINING SNAP RING.
21. NUMBER 6 THRUST WASHER
22. INPUT INTERNAL RING GEAR HUB THRUST BEARING.

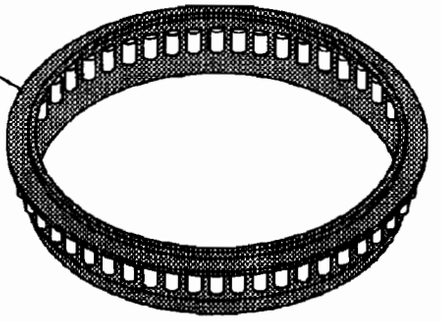
Figure 2

Second, ensure that sprag assembly is installed with the "Tabs" facing down as shown here. It is very easy to install in opposite direction, but you won't like it.



LOCKING TABS

First, ensure that this caged needle bearing has been installed in direction shown, before sprag assembly is installed, as sprag assembly is difficult to remove.



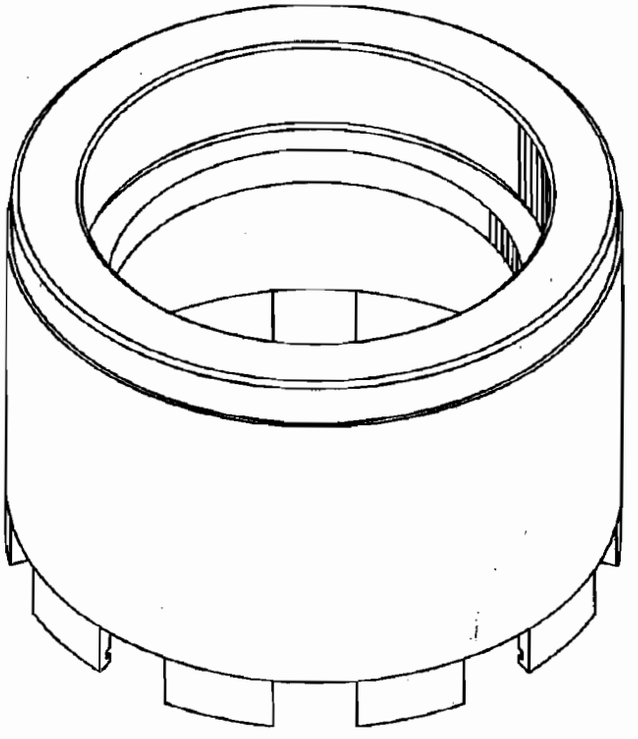
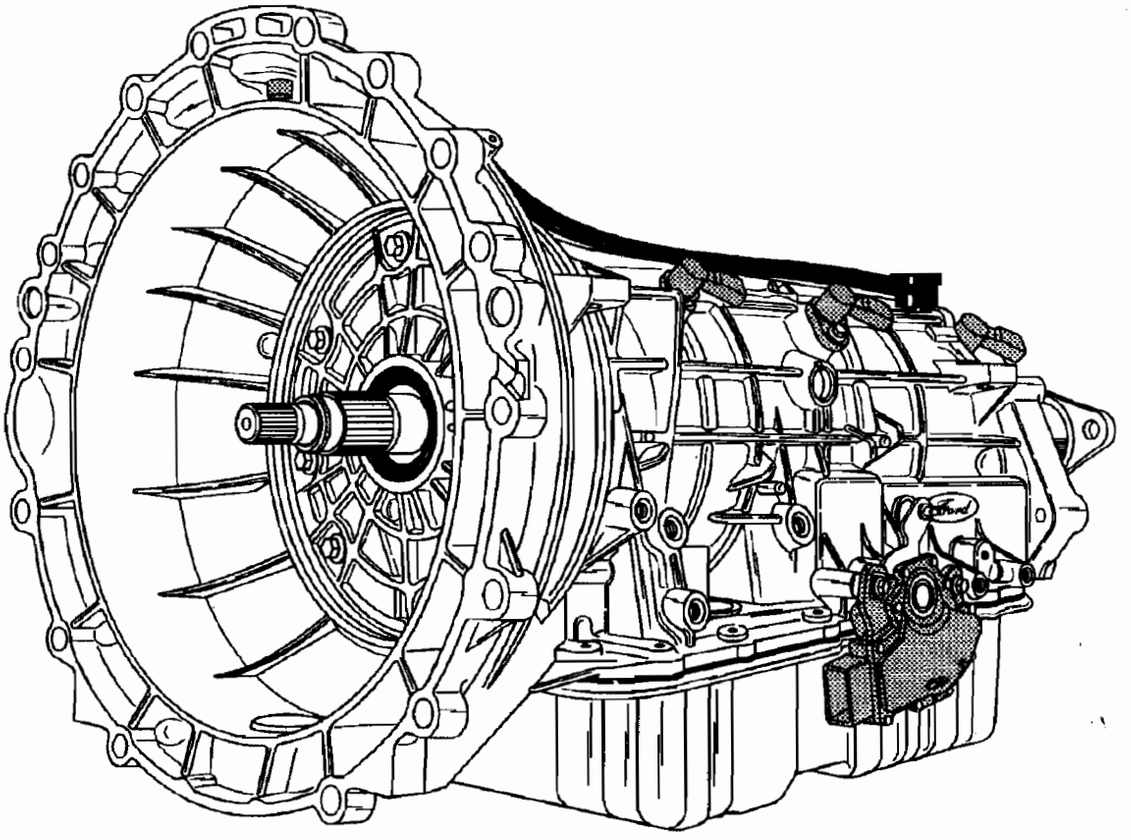


Figure 3

FORD 5R55N
FRONT PUMP ASSEMBLY

There are some different procedures that need to be addressed on the assembly of the Front Pump on the new 5R55N transmission from Ford Motor Company. Some of these procedures are enough different that some mis-assemblies could easily occur if the technician did not refer to the manual. ATSG will have an assembly/disassembly manual available very soon.

1. The Inner and Outer Pump Gears ***must*** be placed into the pump body with the identification marks facing ***down,*** as shown in Figure 1. If they are placed in the opposite direction, the Inner Gear "O" ring will be in the wrong position, and the torque converter will be very difficult if not impossible to install.
2. There is a Line Pressure Limit Valve Assembly in this pump body that is not found in most other transmissions, and is installed in the direction shown in Figure 2.
3. The Pump Alignment Tool is mandatory with this transmission and is the same one that is used on the A4LD, 4R55E/4R55E, and 5R55E transmissions, as shown in Figure 4. Pump alignment pins are also necessary for this transmission.
4. There is also an inner gear "O" ring seating tool, as shown in Figure 5, to ensure that the "O" ring is fully seated inthe groove in the inner gear.



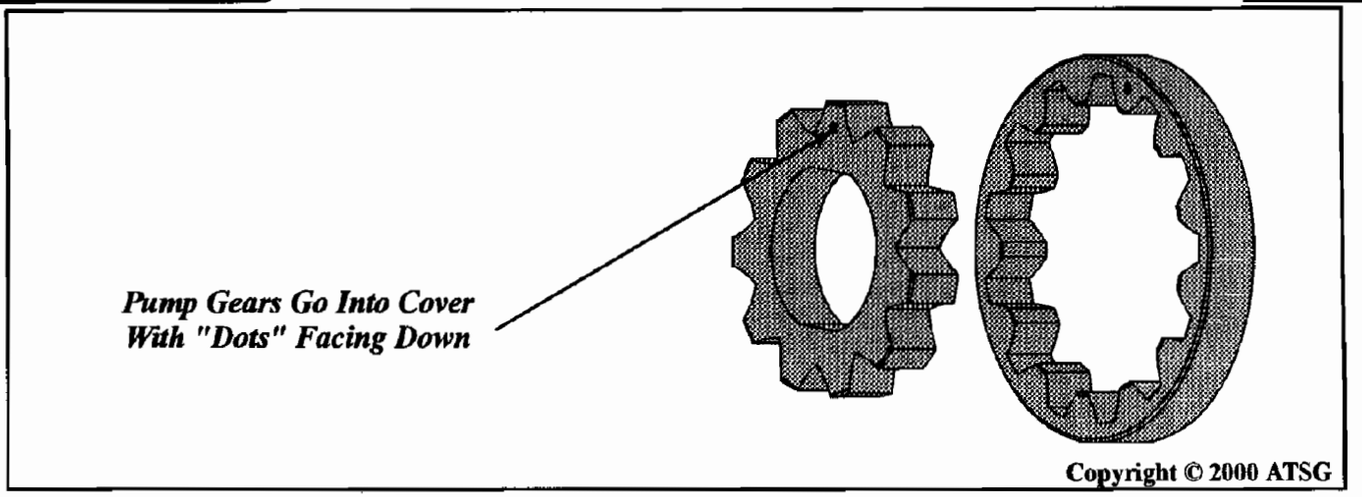


Figure 1

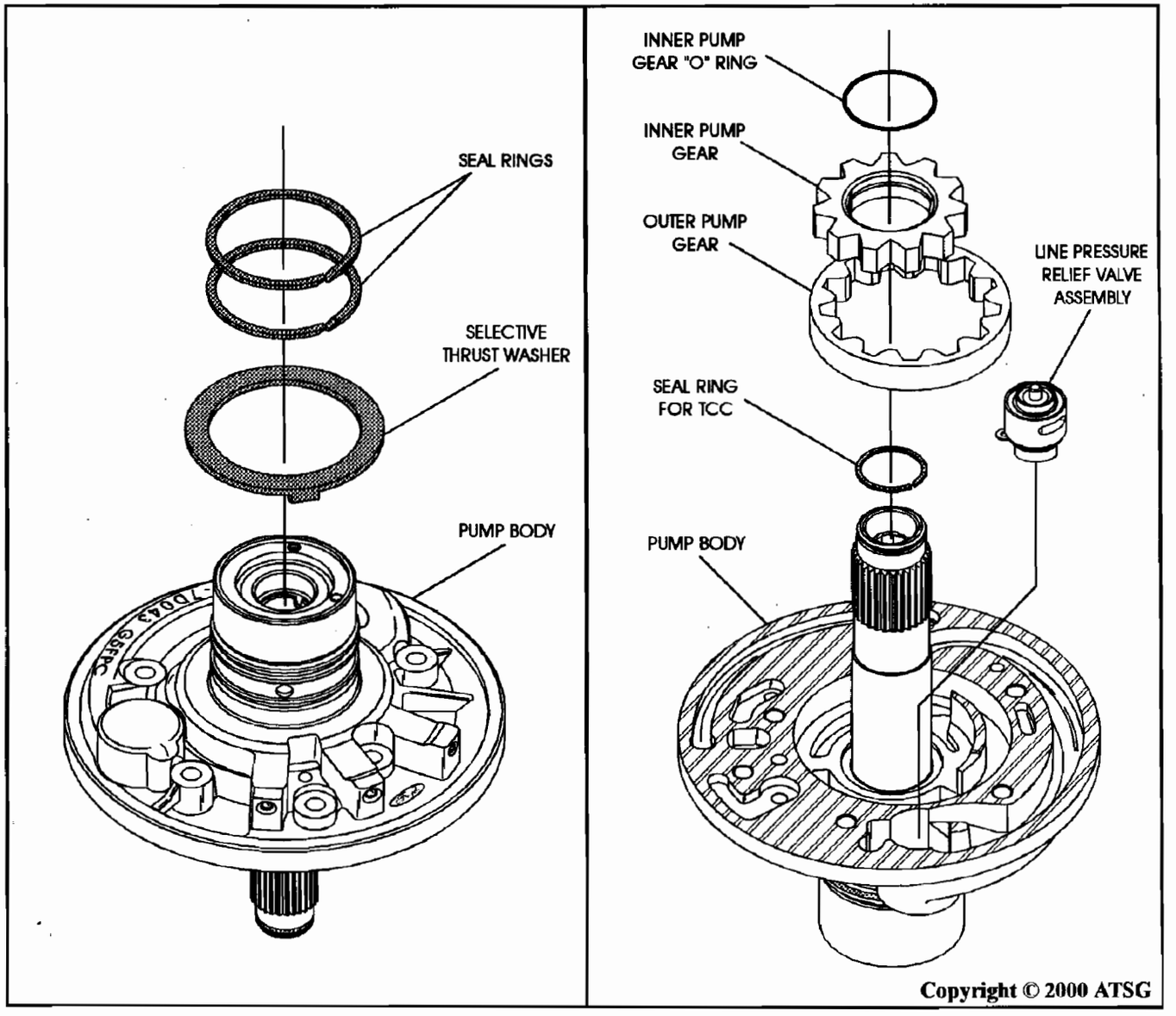


Figure 2

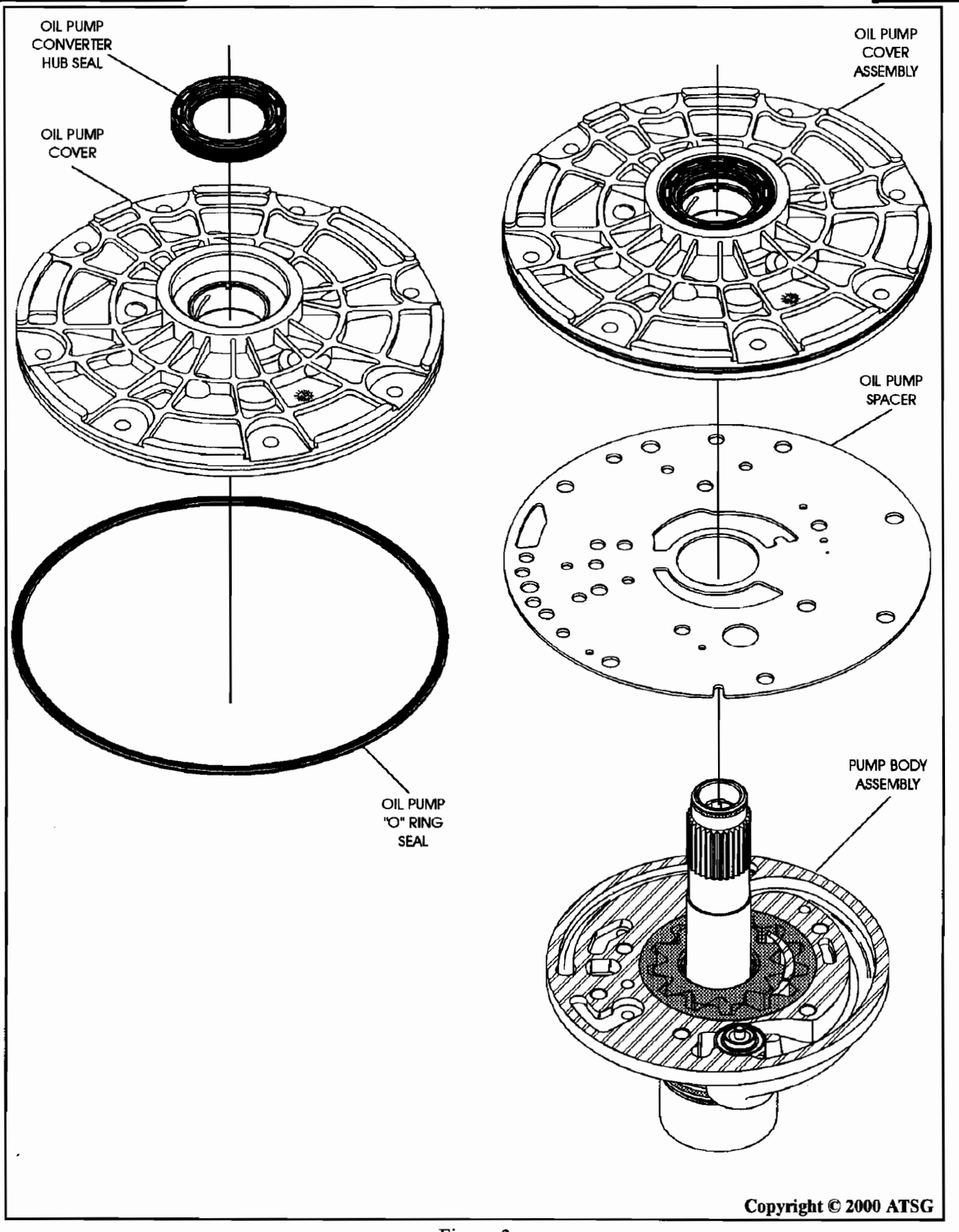

OIL PUMP CONVERTER HUB SEAL
OIL PUMP COVER
OIL PUMP "O" RING SEAL
OIL PUMP COVER ASSEMBLY
OIL PUMP SPACER
PUMP BODY ASSEMBLY
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Figure 3

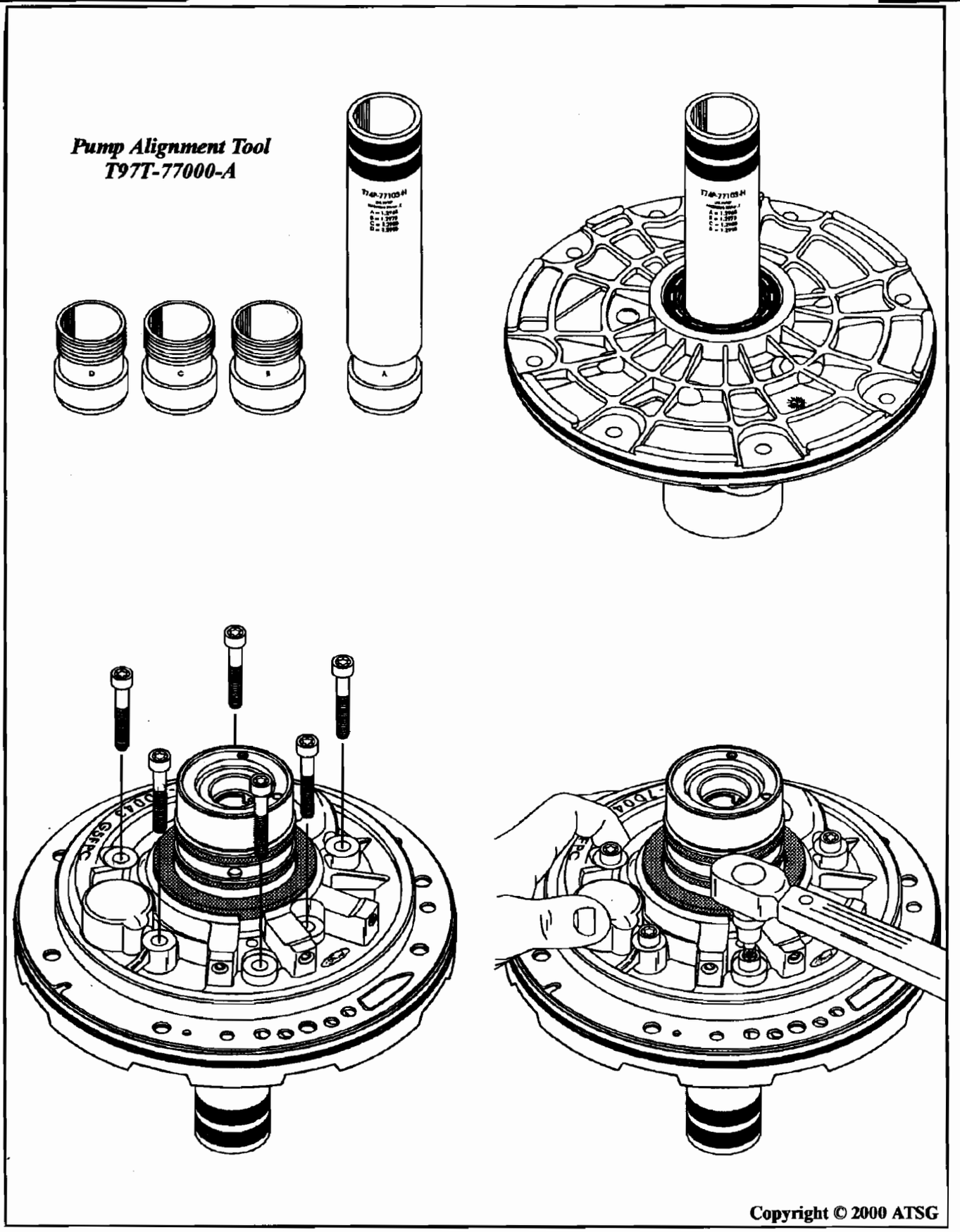


Figure 4

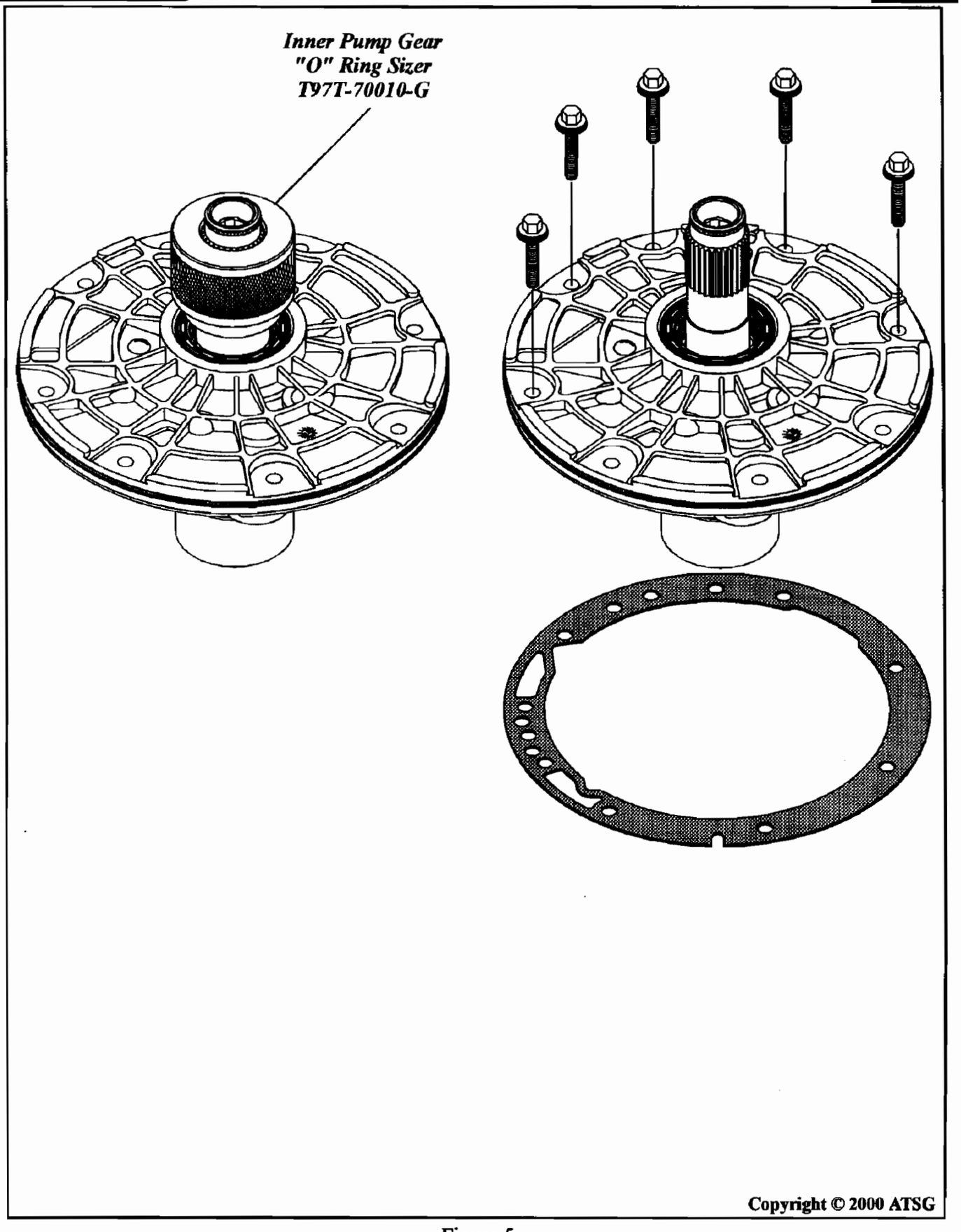
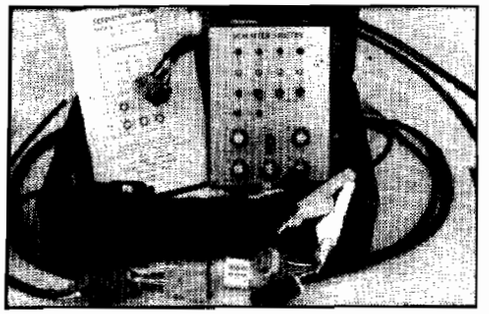


Figure 5

NEED HELP WITH DIAGNOSTICS?



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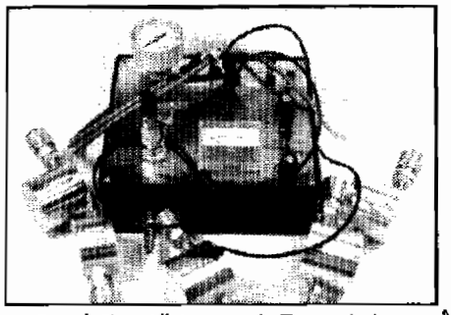

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(All items in package also available separately)

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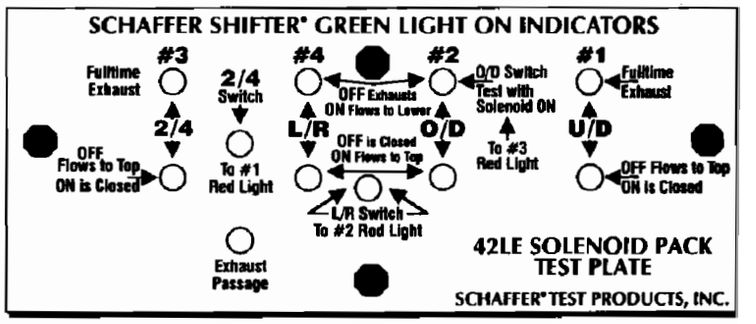
- A604 - Solenoid Pack Test Plate
- 42LE - Solenoid Pack Test Plate
- CD4E - Solenoid Pack Test Plate
- KM EPC & L/U Manifold
- 42RE Governor Pressure Solenoid Manifold
- 4L60E & 4T80E PWM Solenoid Manifold
- 4R44/55E & 5R - EPC Solenoid Manifold
- 4R44/55E & 5R - Shift Solenoid Manifold

A4LD TEST SPOOL

42LE SOLENOID PACK TEST PLATE



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allows testing during operation - ***set of 2***

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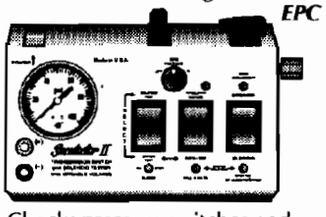
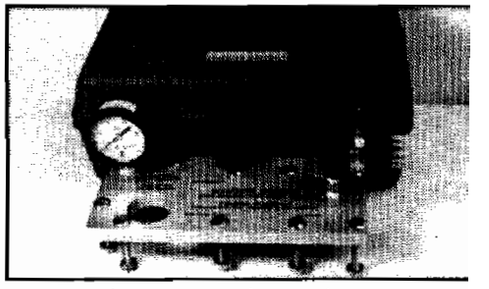
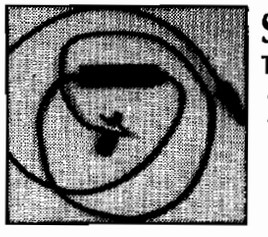


Checks pressure switches and simple solenoids under simulated operating conditions.

E40D SOLENOID PACK BENCH TEST MANIFOLD



- Mounted pressure regulator and gauge.
- Individual passages to identify which solenoid i being tested.
- EPC valve check by cycling the solenoid throug the operating ranges.



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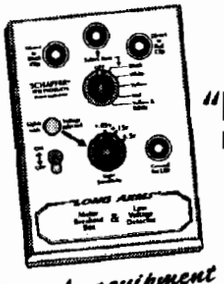

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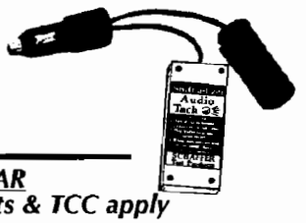

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FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

At the start of production for the 1998 model year the Ford Escort and Mercury Tracer received a modified version of the F-4EAT transaxle designated the F4E-III. This is a four speed unit with converter clutch and is a full electronically controlled transmission.

The F-4EAT transaxle in 1997 and previous models utilized a throttle cable to control shift feel. The F4E-III utilizes an EPC solenoid which resulted in valve body differences concerning valve line-ups and checkball and small part locations.

The F4E-III valve line-ups and checkball small part locations begin as follows:

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

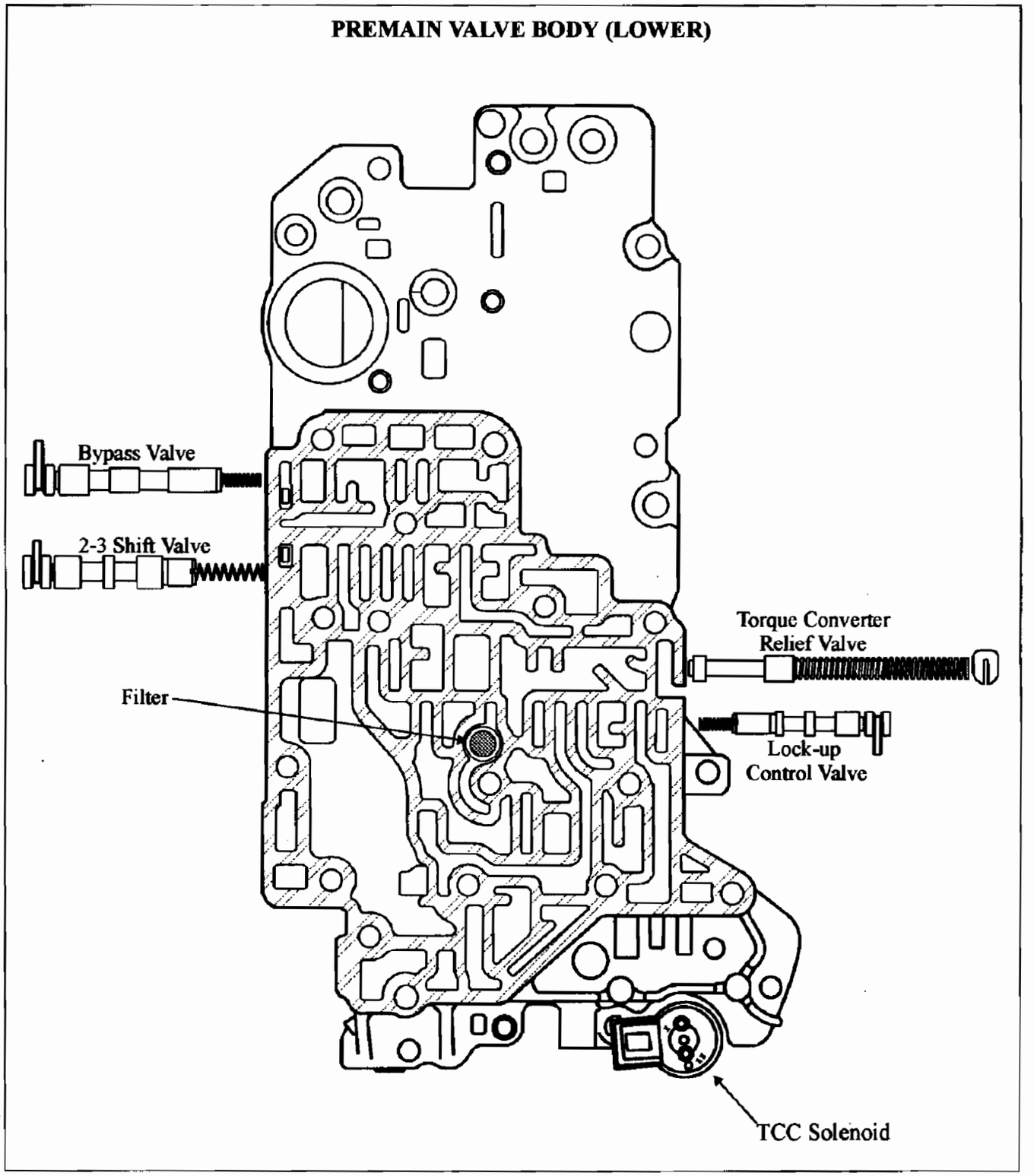

Figure 1

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

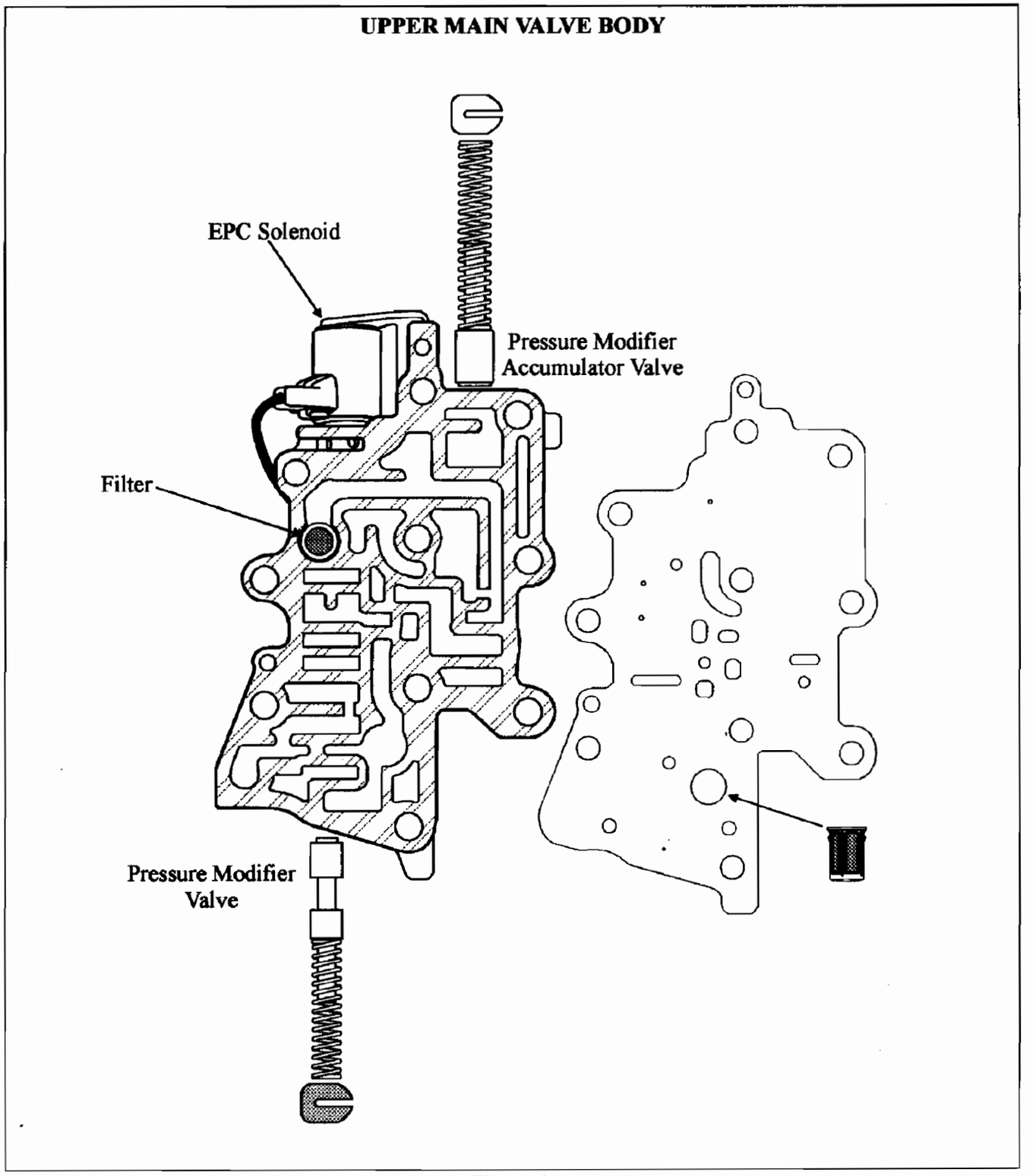

Figure 3

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

PREMAIN VALVE BODY (UPPER)

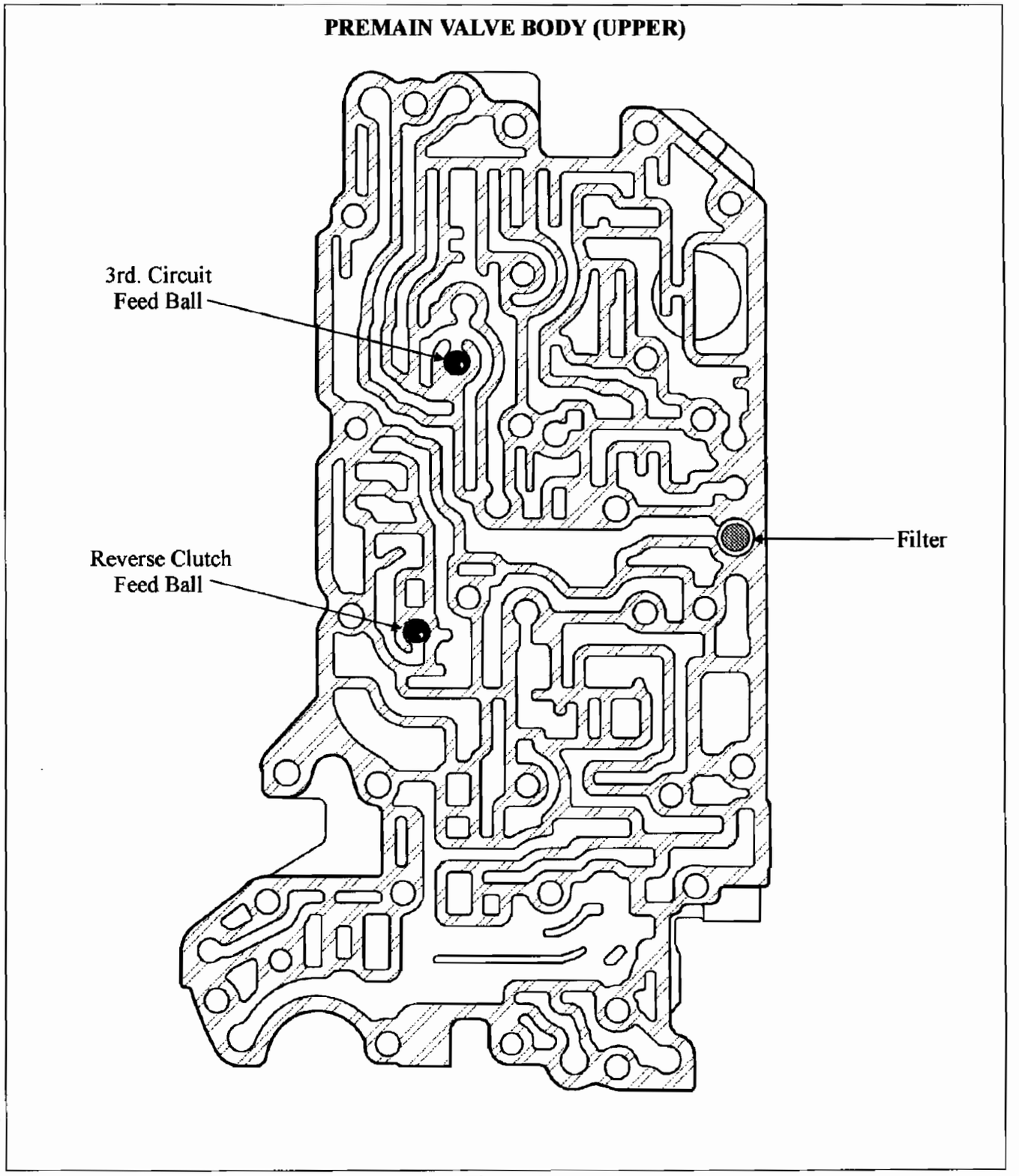

Figure 4

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

PREMAIN VALVE BODY SEPARATOR PLATE

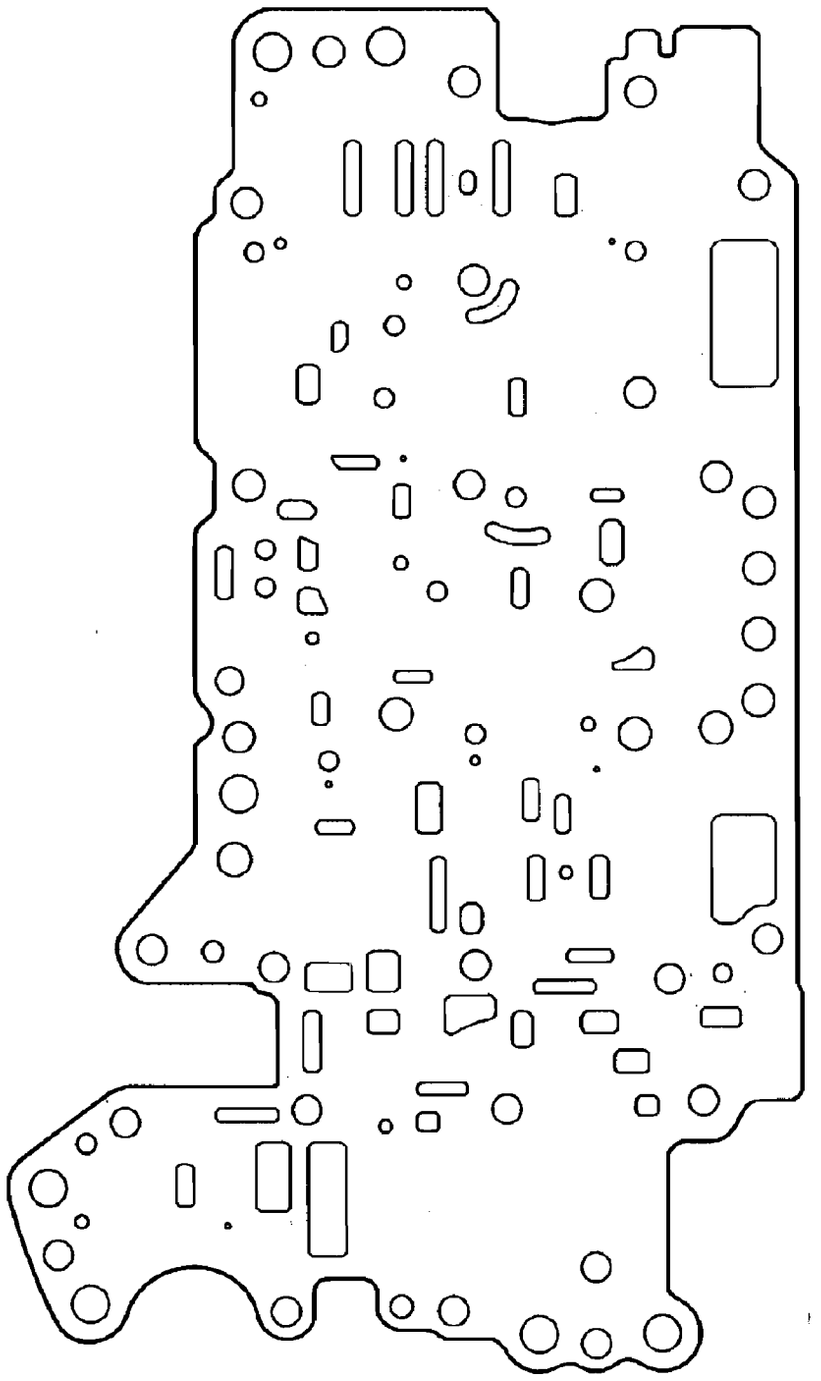

Figure 5

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

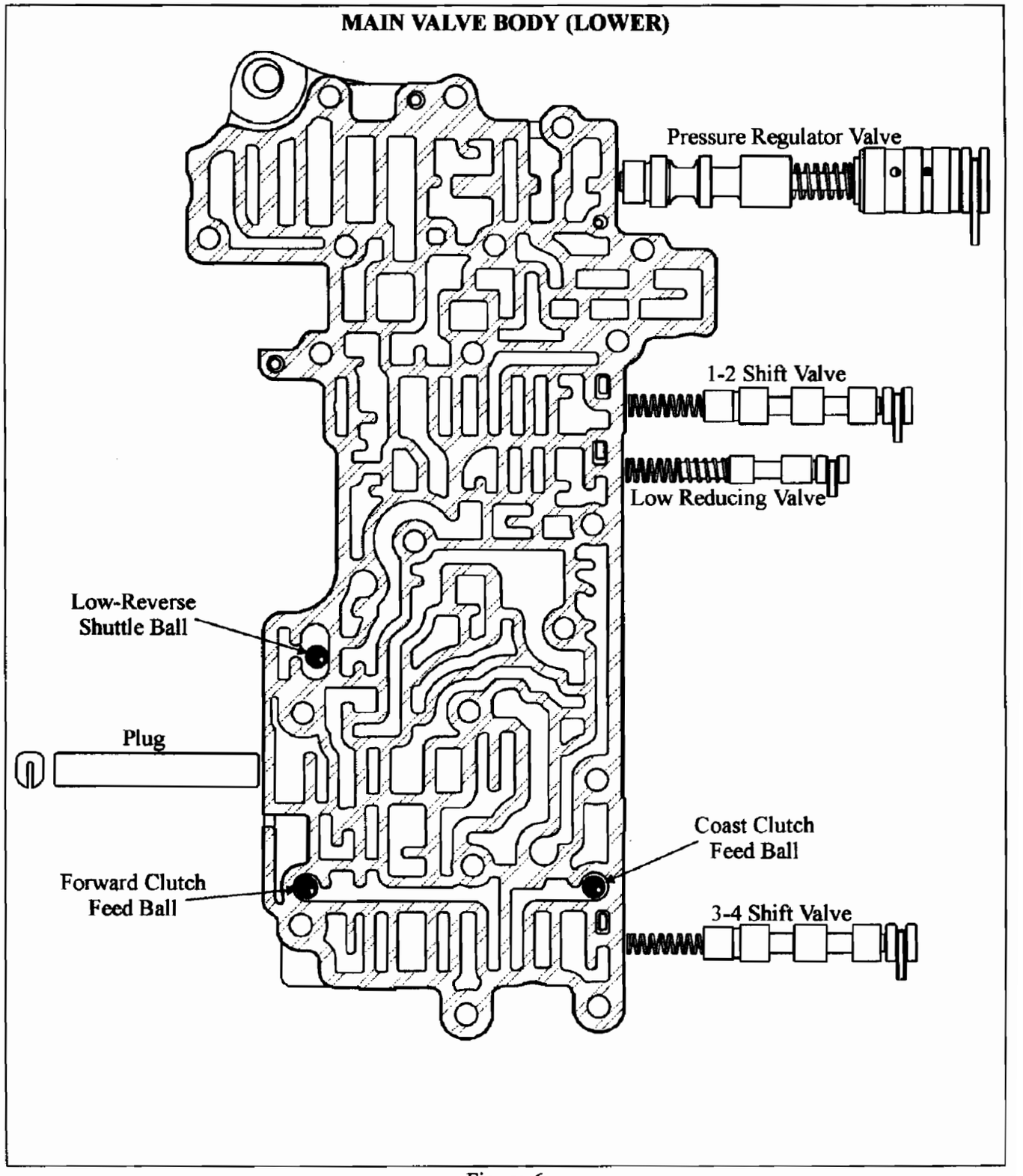

Figure 6

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

MAIN VALVE BODY (UPPER)

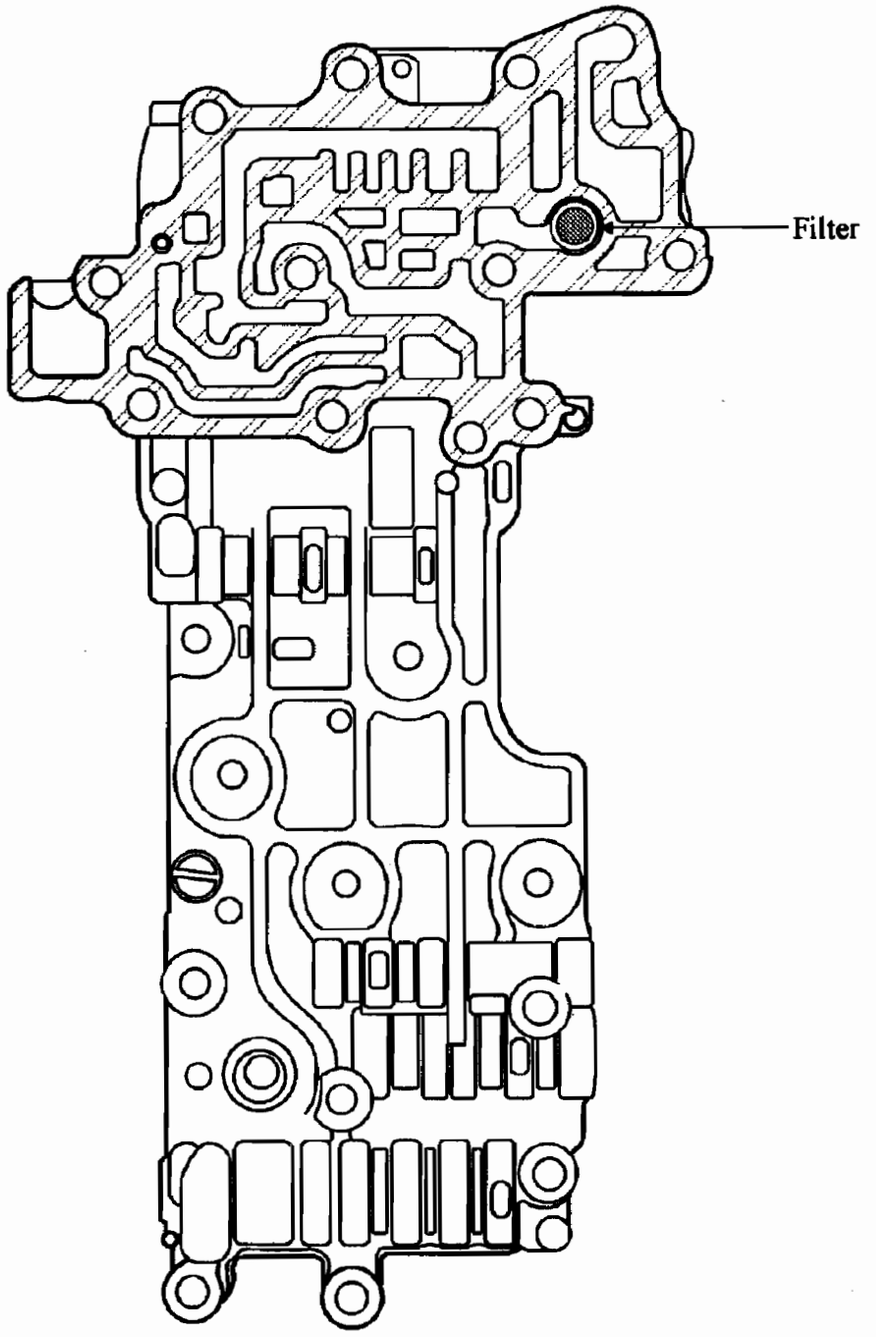

Figure 7

FORD ESCORT/TRACER

1998 & LATER WITH F4E-III TRANSAXLE

LOWER VALVE BODY

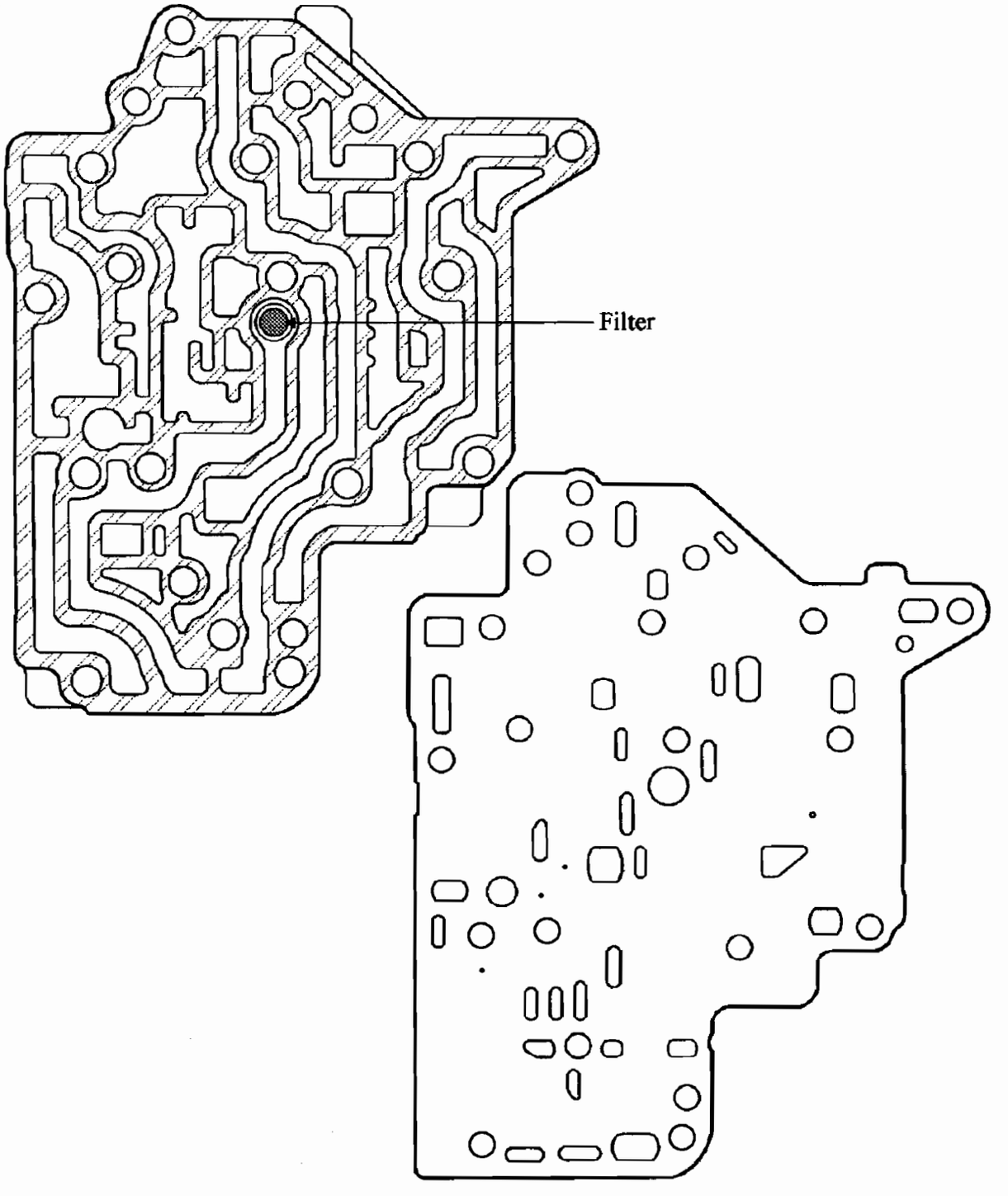

Figure 2

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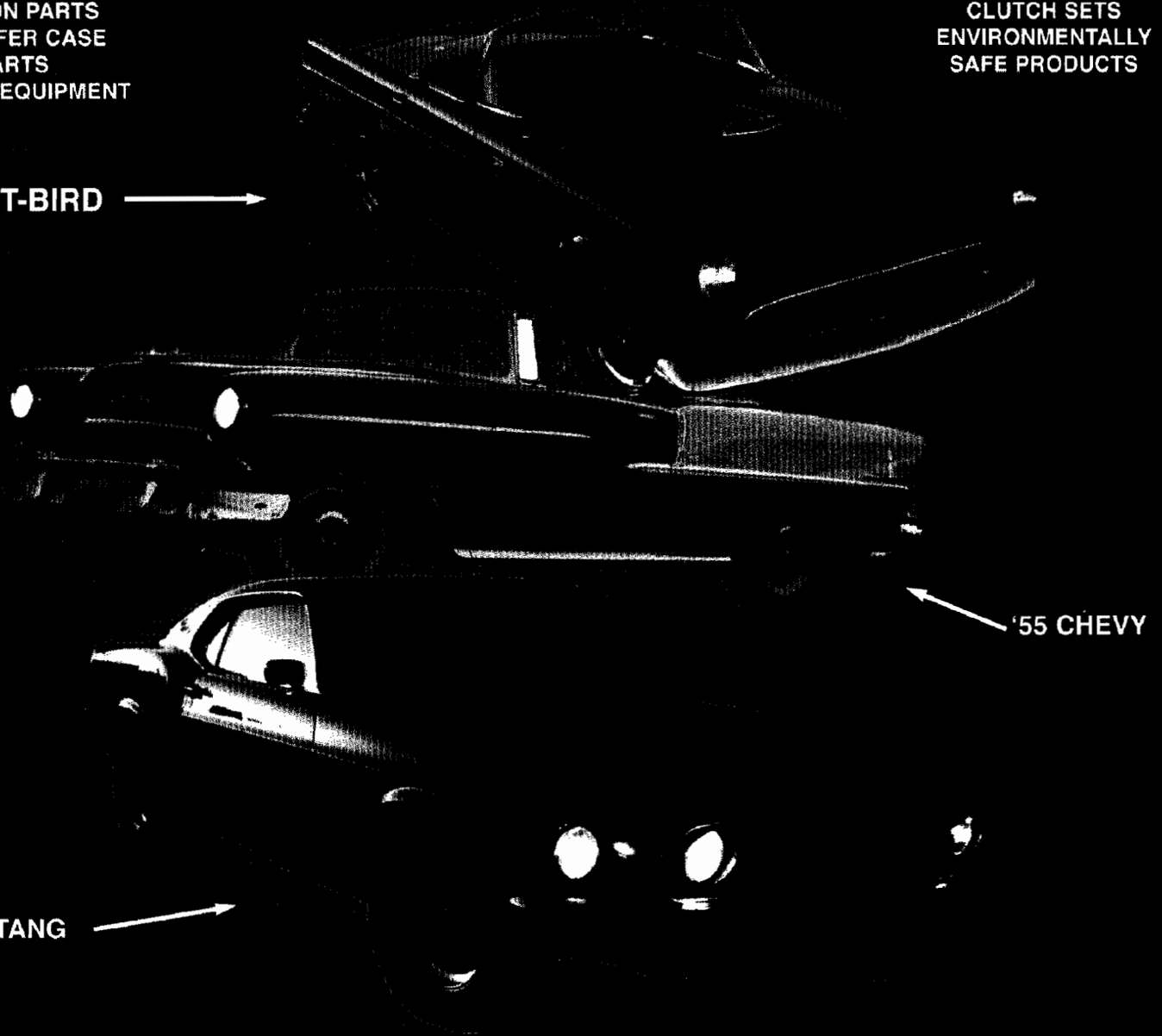

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MERCURY VILLAGER/NISSAN QUEST

GEAR RATIO ERROR

COMPLAINT: A 1996-97 Mercury Villager or Nissan Quest with the 4F20E or RE4F04A transaxle come in with the MIL Lamp on and possible codes PO120 for a TPS fault, or a PO510 for an Idle Switch fault, and/or Gear Ratio Error codes PO731, PO732 or PO733 stored, yet NO driveability or transmission concerns are present.
What is observed during the road test is, the MIL Lamp illuminates during coast down from 40mph (64km/h).

CAUSE: The cause is a malfunctioning Throttle Position Sensor. When coasting down from a vehicle speed of 40mph (68km/h) or higher, the Idle Switch is indicating closed throttle.
The Transmission Control Module (TCM) senses higher than idle TPS voltage as well as a decrease in vehicle speed and engine rpm which will cause one or more of the above mentioned codes to be stored.

NOTE: Uniquely, any of these stored codes are retrieved from the ECM only, the TCM has no codes stored.

CORRECTION: Diagnose the Idle Switch circuits as illustrated in figure 1 and replace the TPS if the Idle Switch is faulty.

SERVICE INFORMATION:
Throttle Position Sensor*.....*F6XZ-9B989-BA

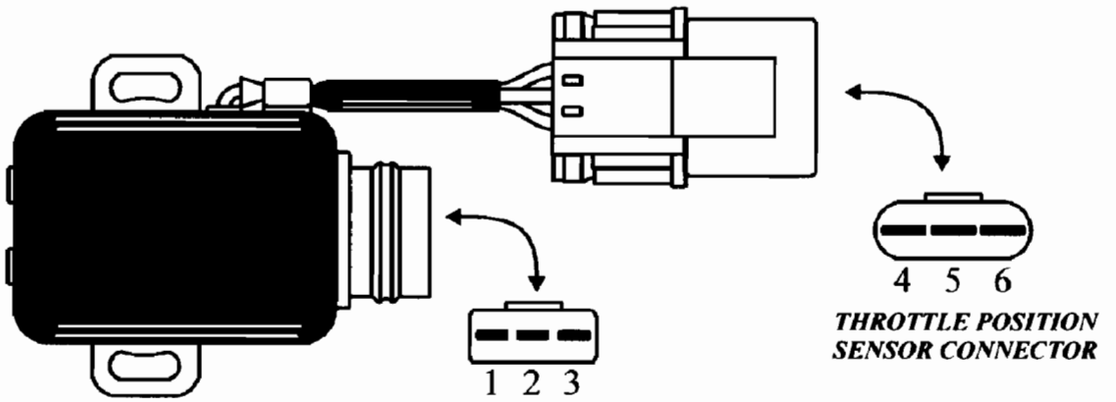
TSB INFORMATION:
Refer to Ford TSB 98-18-4

Many thanks to Dominick Tietrantonio from AC Transmission, Addison, IL.

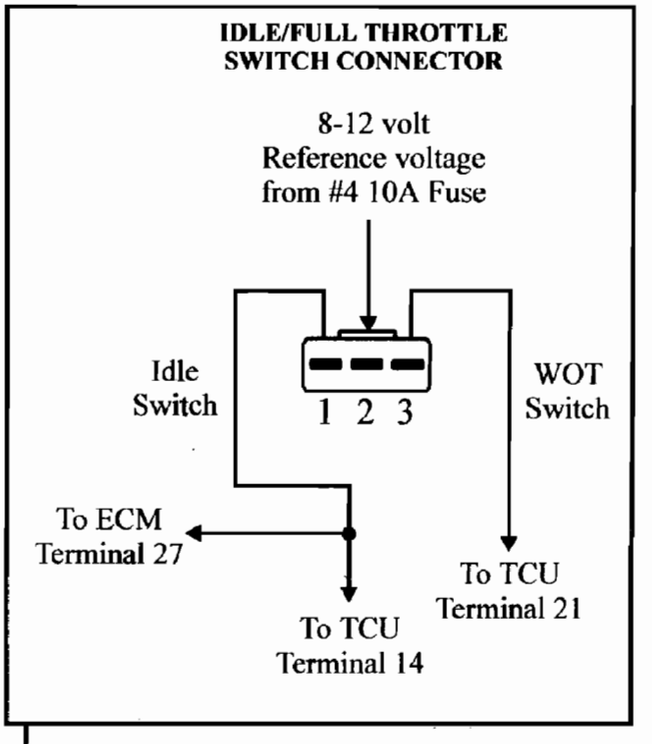
MERCURY VILLAGER/NISSAN QUEST

GEAR RATIO ERROR

THROTTLE POSITION SENSOR AND IDLE/FULL THROTTLE SWITCH CHECK



Terminal 1	Idle switch voltage 8-12 volts at idle 0 volts off idle
Terminal 2	Throttle switch reference voltage 8-12 volts
Terminal 3	Full throttle switch 8-12 volts at WOT 0 volts off WOT
Terminal 4	Throttle position sensor reference voltage 5 volts
Terminal 5	Throttle position sensor signal return voltage varies .3 volts to 5 volts
Terminal 6	Throttle position sensor signal ground less than .1 volts



TRANSMISSION CONTROL UNIT CONNECTOR-VIEW FROM HARNESS SIDE

Figure 1

CHRYSLER A518 SERIES
NO OR LATE THIRD GEAR

COMPLAINT: 1989 and later A518's, 46RE and 47RE units may exhibit a late or no shift into third under various temperature conditions. This complaint may also be accompanied with a delayed engagement into reverse when hot.

CAUSE: Some direct clutch drums had the inner seal groove cut to deep. This allows for the inner seal to be swallowed up into the groove causing poor retention of fluid (See Figure 1). Another possibility is the outer lip seal being worn due to a poor finish of the drum, in the contact area of the outer lip seal.

CORRECTION: Replace the inner lip seal with a larger radial base. Aftermarket sources such as TransTec/Freudenberg-NOK and Precision International produce a wider base seal to accommodate the deeper groove. Also Shift Technology Products packages an inner lip seal in their K500-618 kit. Replace the outer lip seal, after polishing the drum surface, in the contact area of the outer lip seal.
There have also been reports of the same complaint with the inner lip seals on A500 and 42RE style units. In these cases, a lip seal from a 200-4R servo has worked very well in this location.

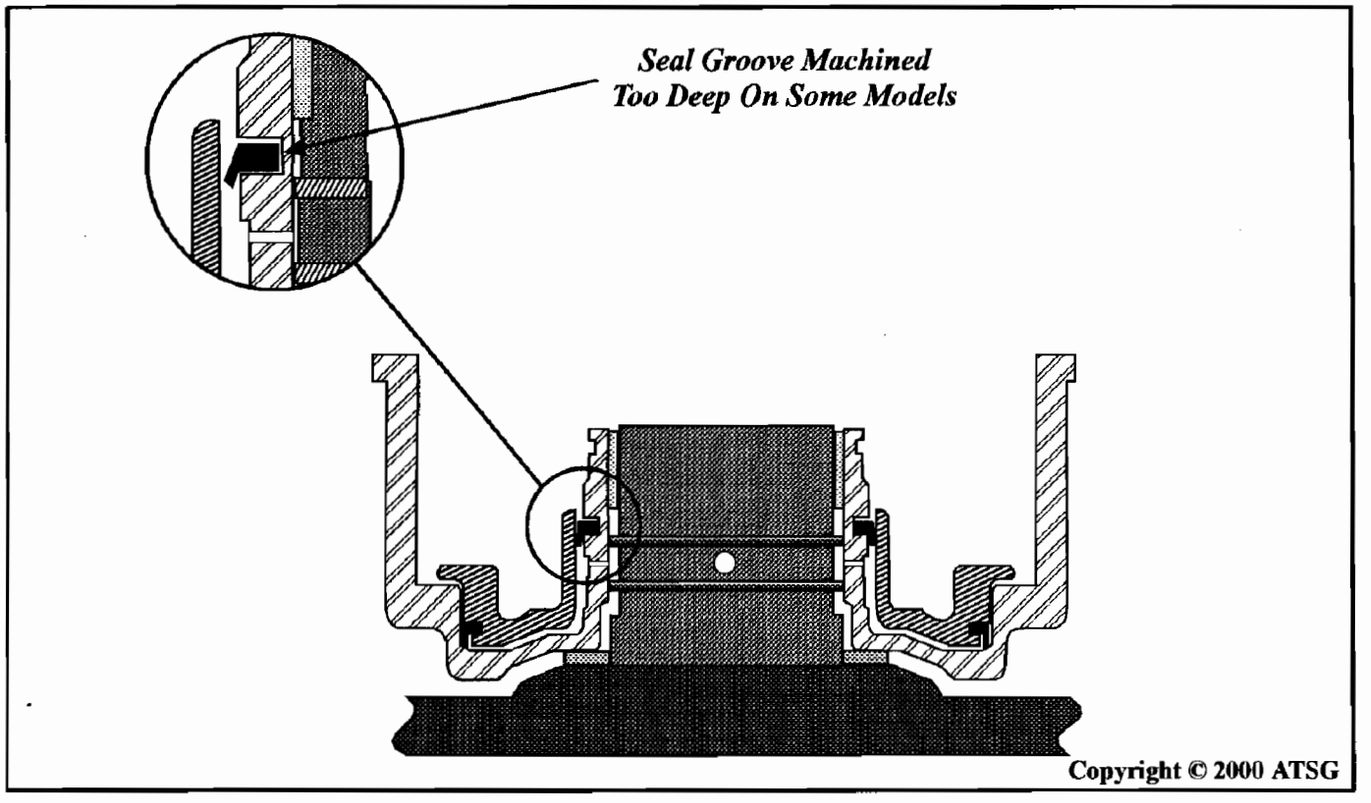


Figure 1

CHRYSLER A500 (42RE) SERIES

NEW DESIGN REAR (DIRECT) CLUTCH HOUSING

CHANGE: Chrysler Corporation re-designed the Rear (Direct) Clutch Housing on the A500 (42RE) transmission, during the 98-99 model years, on some models only. This clutch is applied in 3rd gear and reverse. Refer to Figure 1 for cut-away illustrations of both previous and current design housings.

REASON: Greatly improved application of the Rear (Direct) Clutch and improved durability.

PARTS AFFECTED:

(1) REAR (DIRECT) CLUTCH HOUSING - Now manufactured with the outer lip seal groove in the clutch housing instead of the clutch piston. Also the addition of another bushing in the clutch housing to support the clutch housing when installed on the pump cover, and the addition of "V" shaped grooves where the steel plates and pressure plate ride in drum, as shown in Figure 2.

(2) REAR (DIRECT) CLUTCH OUTER SEAL - Now an inside lip design, to accommodate the changes in the clutch housing, as shown in Figure 2.

(3) REAR (DIRECT) CLUTCH PISTON - Now manufactured ***without*** the seal groove in the piston to accommodate the new seal in the housing, as shown in Figure 2.

(4) REAR (DIRECT) CLUTCH PRESSURE PLATE - Now manufactured with two of the locating tabs missing, and must be oriented properly to fit into the clutch housing because of the added "V" shaped grooves, as shown in Figure 3.

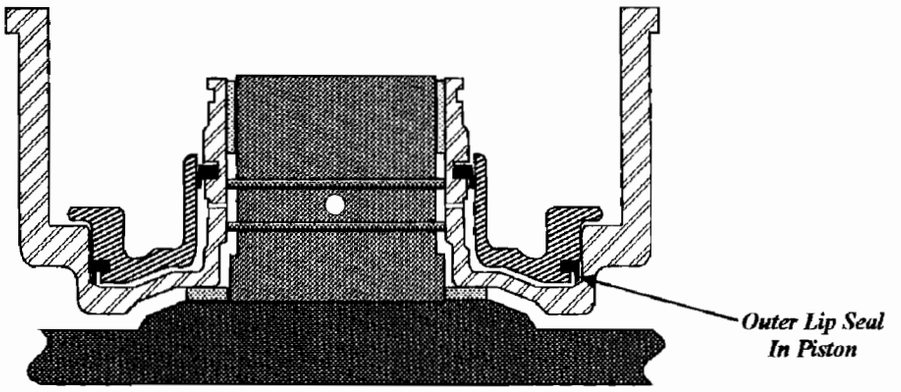
INTERCHANGEABILITY:

None of the parts listed above will interchange with any of the previous design parts, but when using the parts listed above as a package, will retro-fit back to all models of the Chrysler A500 (42RE) transmissions.

SERVICE INFORMATION:

Rear (Direct) Clutch Housing (New Design)	4531285AB
Rear (Direct) Clutch Outer Lip Seal (New Design)	4058487AB
Rear (Direct) Clutch Inner Lip Seal (New Design)	2852925AA
Rear (Direct) Clutch Piston (New Design)	4617154AB
Rear (Direct) Clutch Pressure Plate (New Design)	4617176AB

***"PREVIOUS"* DESIGN LEVEL**



***"CURRENT"* DESIGN LEVEL**

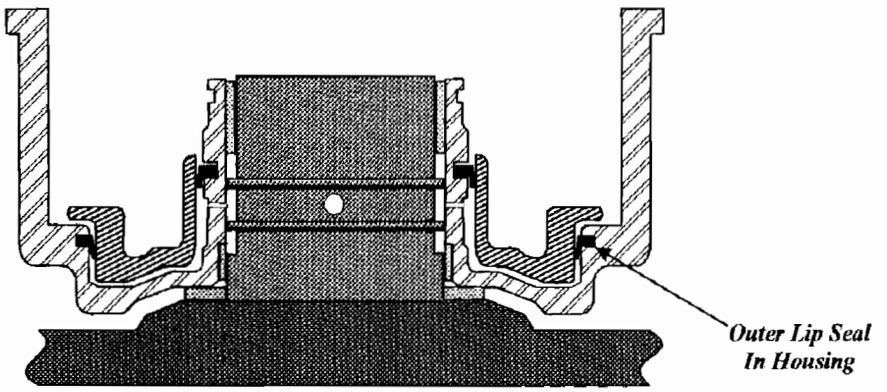
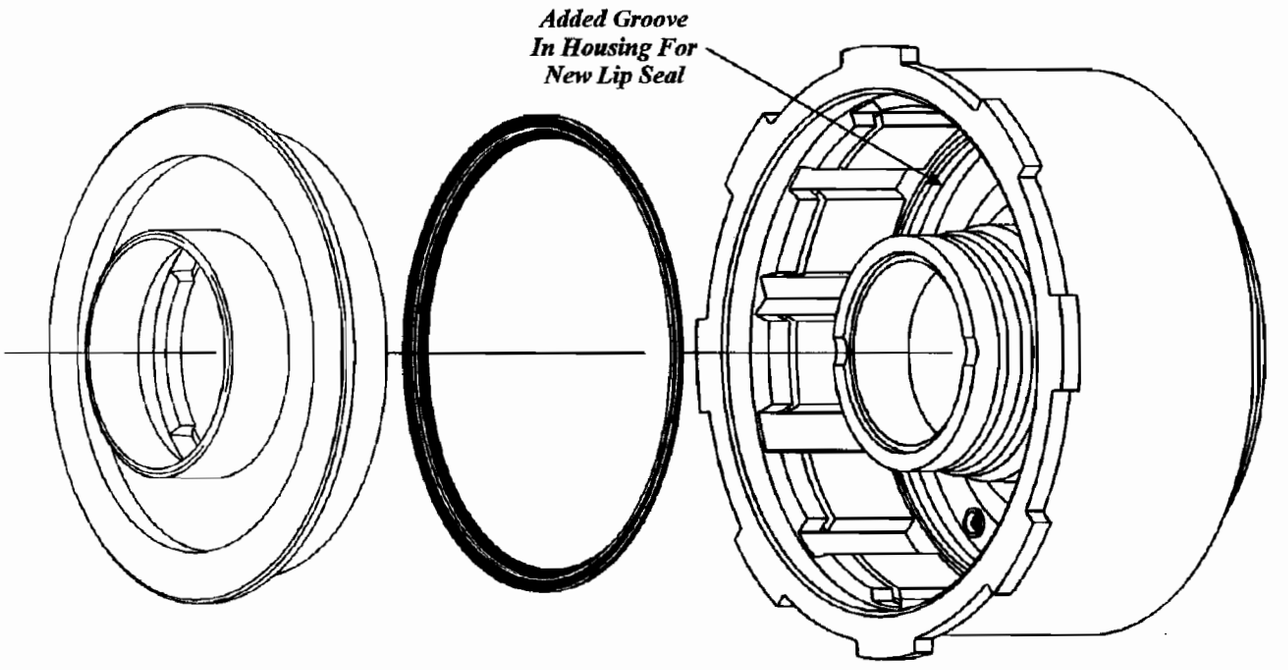


Figure 1

CURRENT DESIGN LEVEL "REAR" VIEW



CURRENT DESIGN LEVEL "FRONT" VIEW

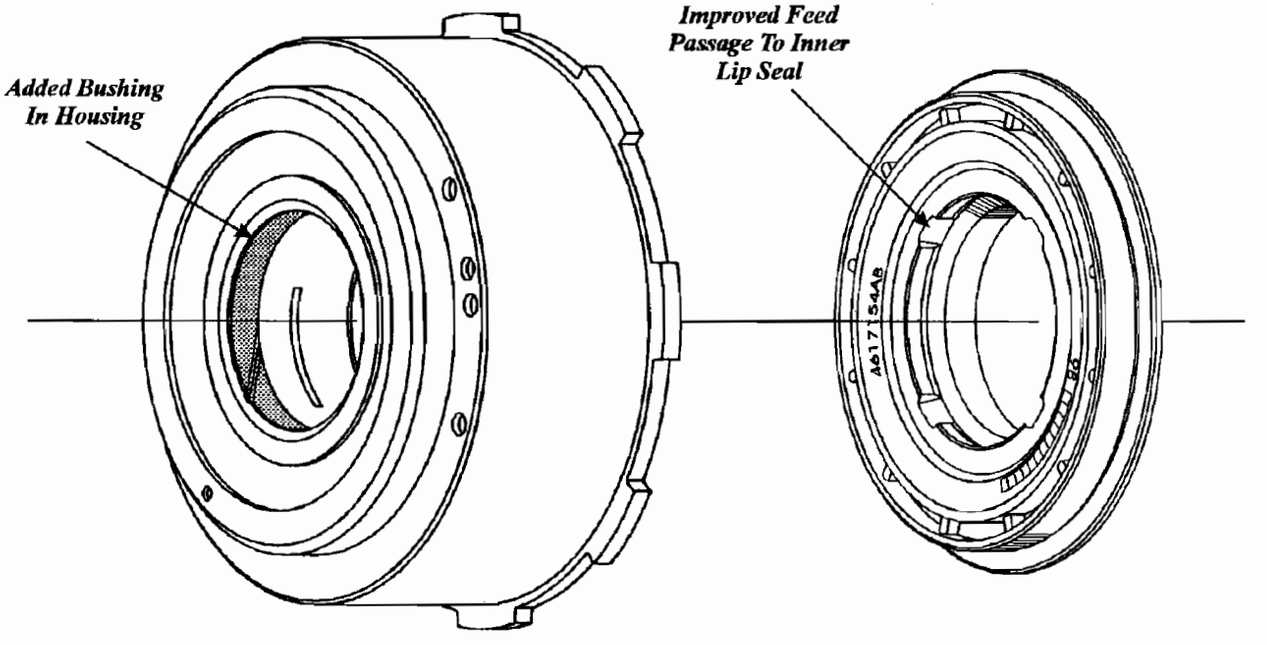
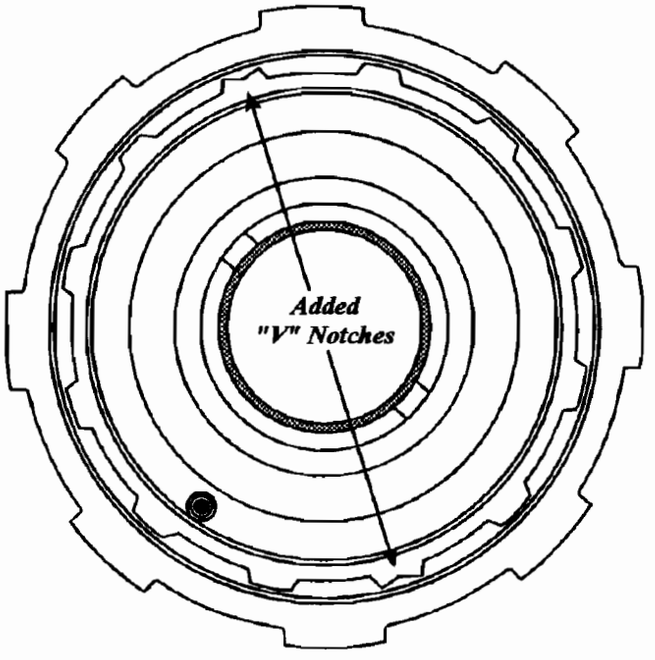
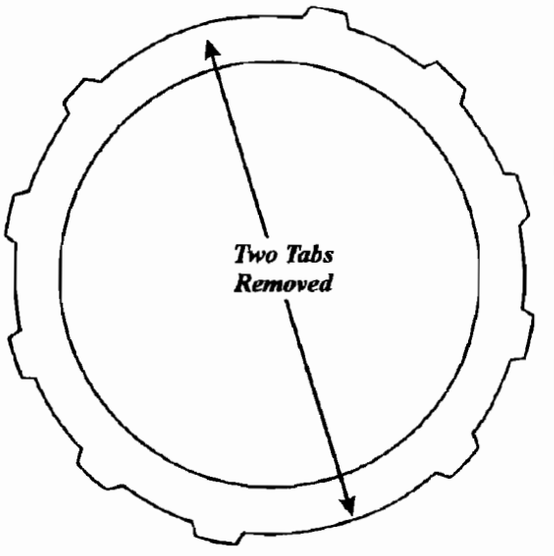


Figure 2



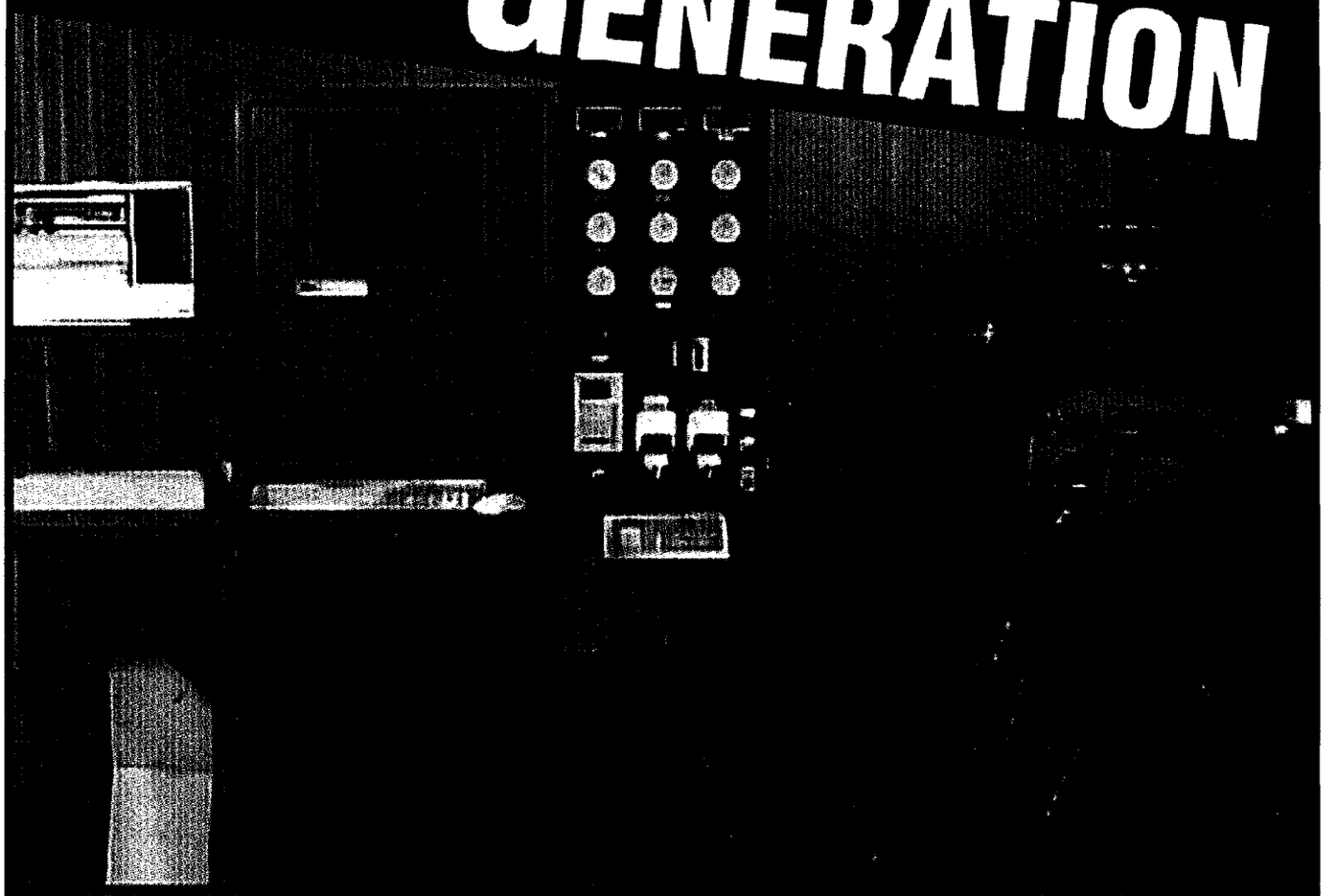
DIRECT CLUTCH HOUSING



PRESSURE PLATE

Figure 3

THE NEW GENERATION



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42LE/A606

CHRONIC SOLENOID BODY CODES, and/or SPEED SENSOR, TRS or TOT SENSOR CODES

COMPLAINT: Chronic or intermittent solenoid, pressure switch, Transmissions Range Sensor, Speed Sensor and/or TOT sensor codes occur even after sensor, solenoid body and/or TCM replacement. Individual wires have been checked and verified for continuity and still one or more codes persists.

CAUSE: The 42LE/A606 transaxle has an independent wiring harness for the solenoid body and transmission range sensor as seen in Figure 1. The opposite end of the wiring harness which plugs into the main wiring harness is bracketed among a gang of connectors located in the engine compartment near the right side passenger shock tower (See Figure 2). It has been noted on several occasions that the insulation in the wiring coming from the transmission into the back of the connector experiences premature deterioration (See Figure 3). This deterioration allows individual wires to make contact one with another producing the chronic codes.

CORRECTION: The upper right hand 8 way connector as seen in Figures 2 and 3 is the connector containing all the solenoid and pressure switch ground wires. The lower 12 pin connector contains the Transmission Range Sensor, Speed Sensors and TOT sensor wires. Carefully remove the protective conduit or electrical tape from behind the connector exposing the wires for inspection. Repair as necessary.

Figure 4 is an illustration of this 8 way connector containing the solenoid and pressure switch ground wires. Resistance checks can be made with an OHM Meter of both the solenoids and the pressure switch resistors using the accompanying chart.

TIP: There should not be any resistance of any amount between any combination of wires from this connector with the solenoid body unplugged. This test will check for shorted wires within the harness. Should resistance of any amount be seen, there is still a problem within the harness.

Figure 5 provides additional information such as wire colors for the 8 way connector as well as the 12 way connector. The 12 way connector contains wiring for both the RPM sensors, transmission range sensor and temperature sensor. Wiring problems in this connector has also been known to occur. The same tip can be applied here as there should not be any resistance of any amount between any combination of wires from this connector with the transmission range sensor and RPM sensors unplugged. This will check for shorted wires within the harness. Should resistance of any amount be seen, there is a short within the harness that will need to be repaired.

SERVICE INFORMATION:

Wire Harness.....4760058

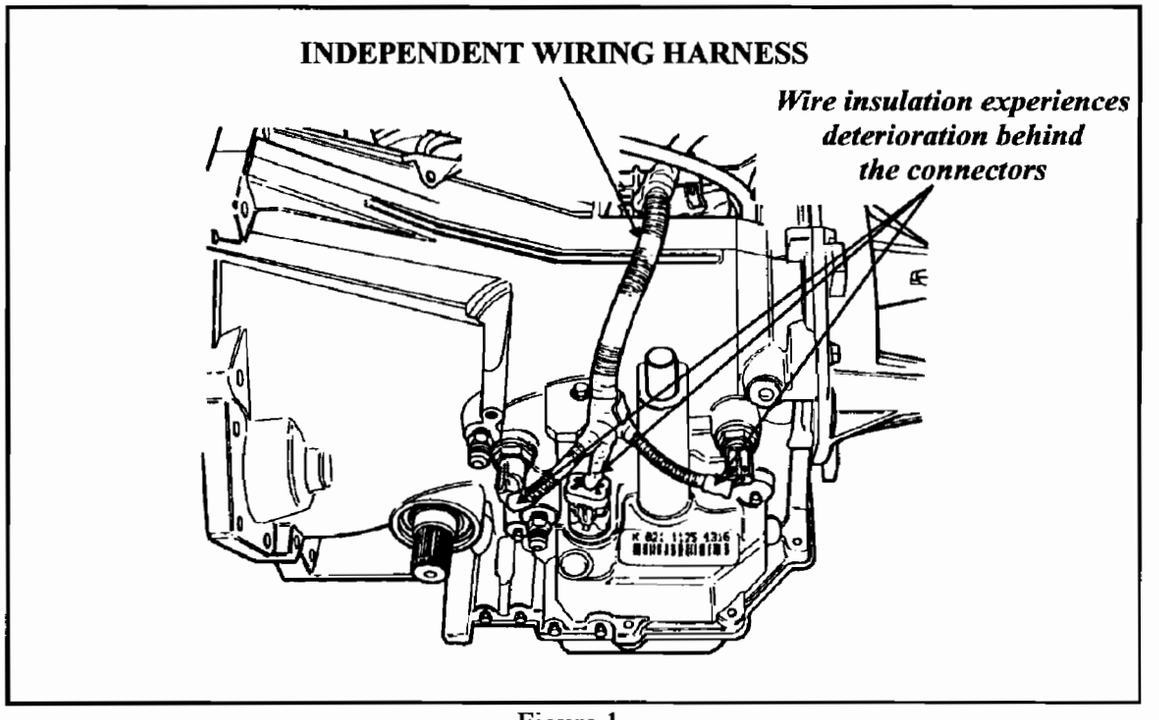


Figure 1

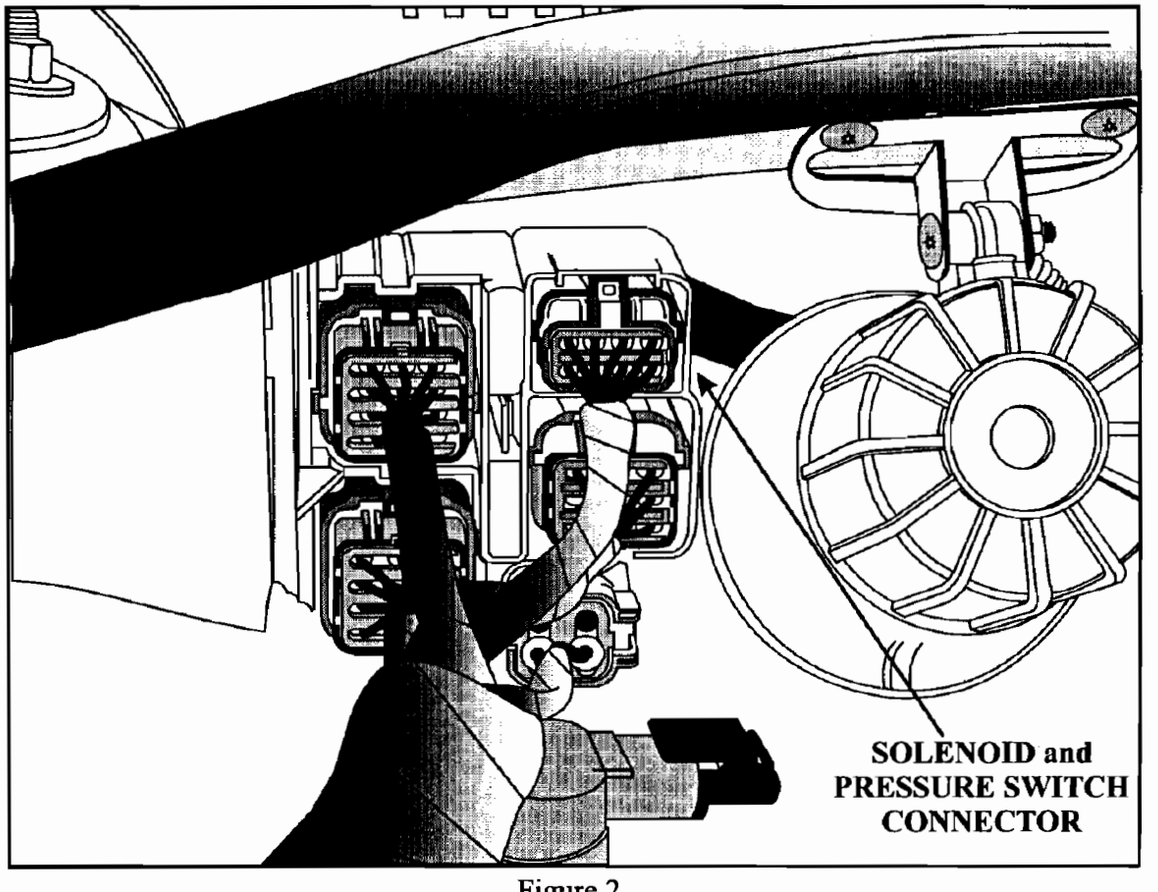


Figure 2

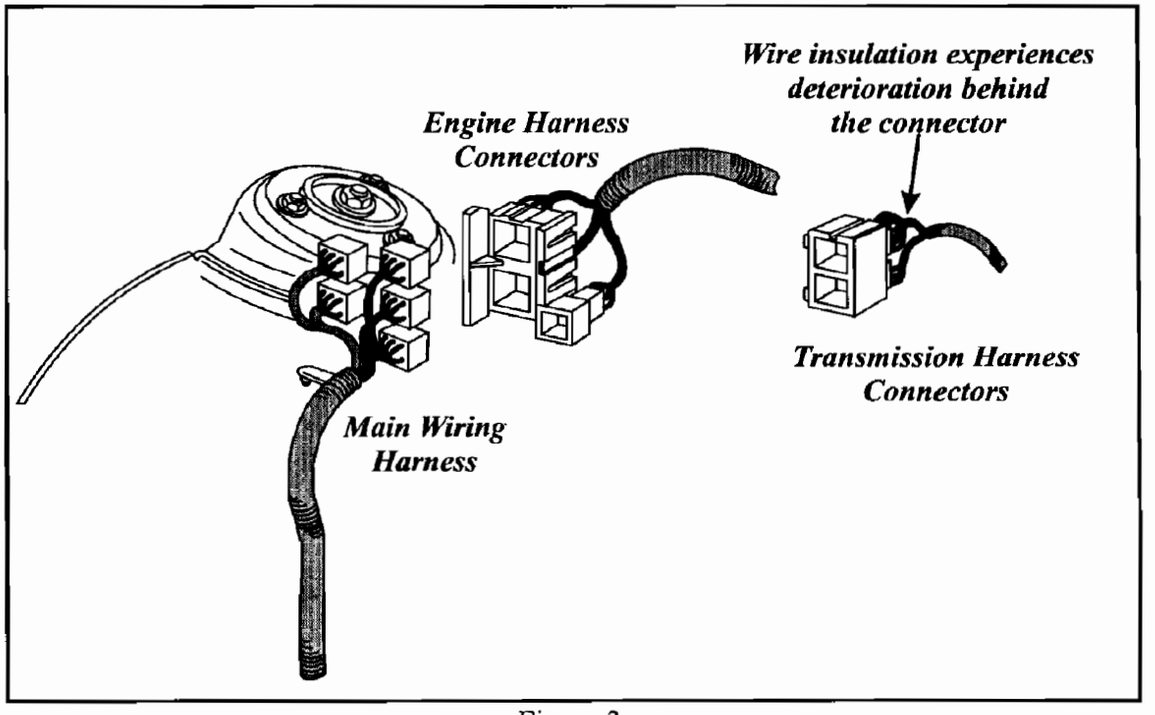
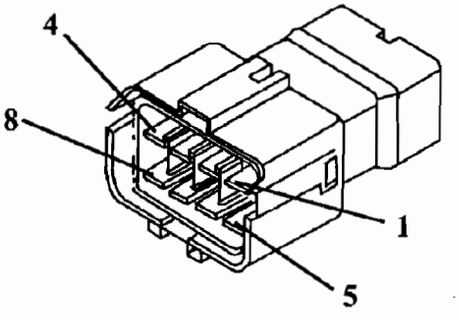


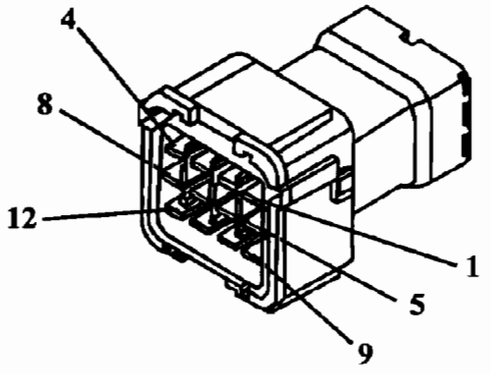
Figure 3



TEST	POSITIVE LEAD	NEGATIVE LEAD	RESISTANCE
L/R SOLENOID		8	1.5-2.0 OHMS
2-4 SOLENOID		2	1.5-2.0 OHMS
UD SOLENOID		3	1.5-2.0 OHMS
OD SOLENOID	7	1	1.5-2.0 OHMS
L/R PRESS. SW.		4	270-330 OHMS
2-4 PRESS. SW.		5	270-330 OHMS
OD PRESS. SW.		6	270-330 OHMS

Figure 4

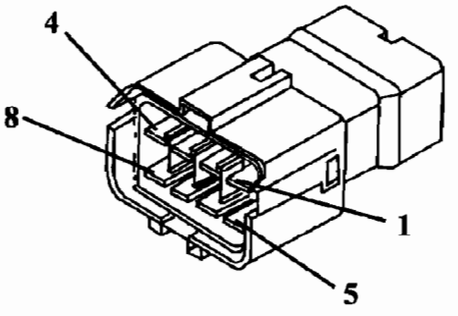
12 PIN CONNECTOR (TRANSMISSION SIDE)



CAVITY	COLOR	FUNCTION
1	RD/BK	INPUT SPEED SENSOR SIGNAL
2	DB/BK	SPEED SENSOR GROUND
3	LG/WT	OUTPUT SPEED SENSOR SIGNAL
4	BR/YL	TRS-T1 SENSE
5	VT/WT	TRS-T2 SENSE
6	VT	TRS-T3 SENSE
7	LG/BK	TRS-T4 SENSE
8	VT *	TRANS TEMP. SENSOR SIGNAL
9	DG/OR *	AUTOMATIC SHUT DOWN RELAY
10	VT/BK	REVERSE LAMP SENSE
11	WT	FUSED IGNITION SWITCH OUTPUT
12	BK/LG	FUSED IGNITION SWITCH OUTPUT

* 1996-97 LH

8 PIN CONNECTOR (TRANSMISSION SIDE)



CAVITY	COLOR	FUNCTION
1	BR	O.D. SOLENOID
2	WT	2-4 SOLENOID
3	PK	U.D. SOLENOID
4	DG	L-R PRESSURE SWITCH
5	YL/BK	2-4 PRESSURE SWITCH
6	OR/BK	O.D. PRESSURE SWITCH
7	RD	TRANS CONTROL RELAY OUTPUT
8	LB	L-R SOLENOID

Figure 5

CHRYSLER A604
NEW SOLENOID PACK

CHANGE: A new design Solenoid Pack has been introduced as a running change in the 1999 model year for ***all*** 41TE (A604) transaxles, as shown in Figure 1. This new design Solenoid Pack, available under OEM part number 5015646AB, will also be used for service, as the previous design solenoid pack is no longer available from Chrysler.

REASON: Greatly reduced operational noise by using internal solenoids with the needles and seats incorporated inside the solenoids. The "Buzzing" noise normally associated with this unit is gone.

PARTS AFFECTED:

(1) SOLENOID PACK - Totally re-designed casting with changes in the worm track area and is illustrated in Figure 2. The new design Solenoid Pack, available under OEM part number 5015646AB, is now the only one available for service.

(2) SOLENOID GASKET - Changed to accomodate the changes in the new design solenoid pack, as shown in Figure 3.

(3) SOLENOID SPACER PLATE - Eliminated, with the new design solenoid pack. Refer to Figure 4 for illustrations.

(4) SOLENOID SOUND COVER - Eliminated with the new design solenoid pack, as it is no longer needed to dampen the "Buzzing" noise.

SERVICE INFORMATION:

Solenoid Pack (New Design)	5015646AB
Solenoid Gasket (New Design)	4659982

INTERCHANGEABILITY:

The new design Solenoid Pack and gasket will retro-fit back on ***all models*** of the 41TE (A604) transaxle, by following the installation instructions listed below;

1. Remove and discard the previous design solenoid pack, spacer plate, both gaskets, and the sound cover.
2. Install the new design Solenoid Pack with the new design gasket, and torque the three retaining bolts to 105 in.lb.
   Special Note: Most early cases will require that you either press the rear roll pin in so that it is flush with the body, or remove it, as shown in Figure 1, so that new Solenoid Body will bolt down flush with the case surface.

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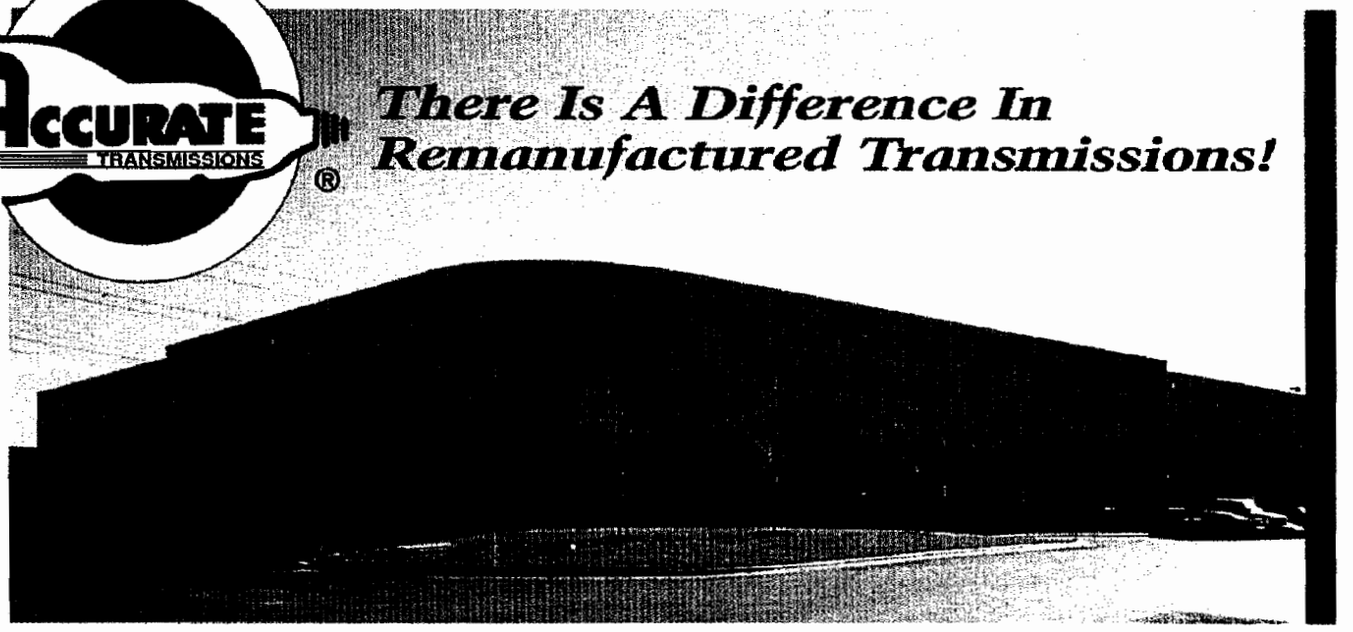

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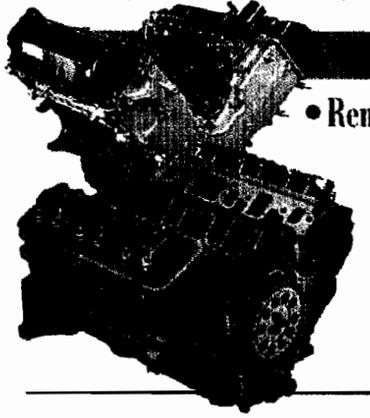

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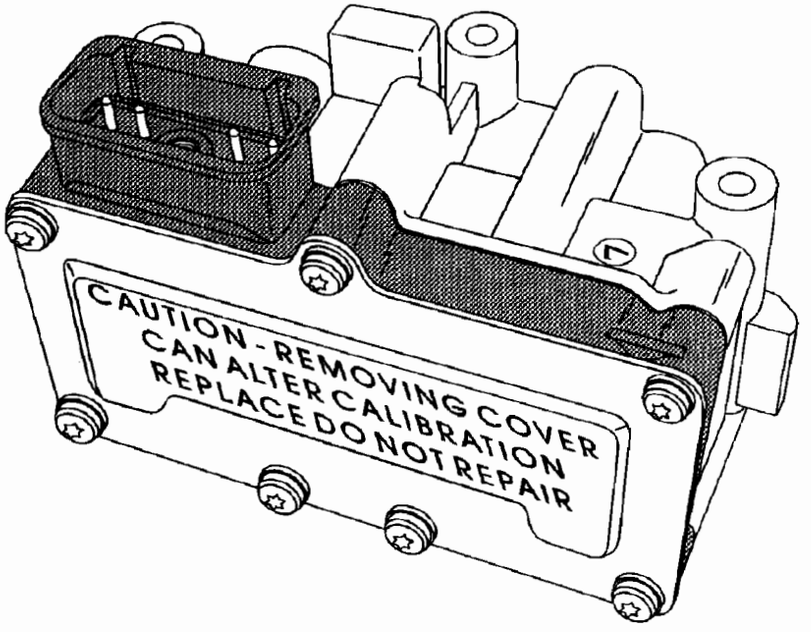
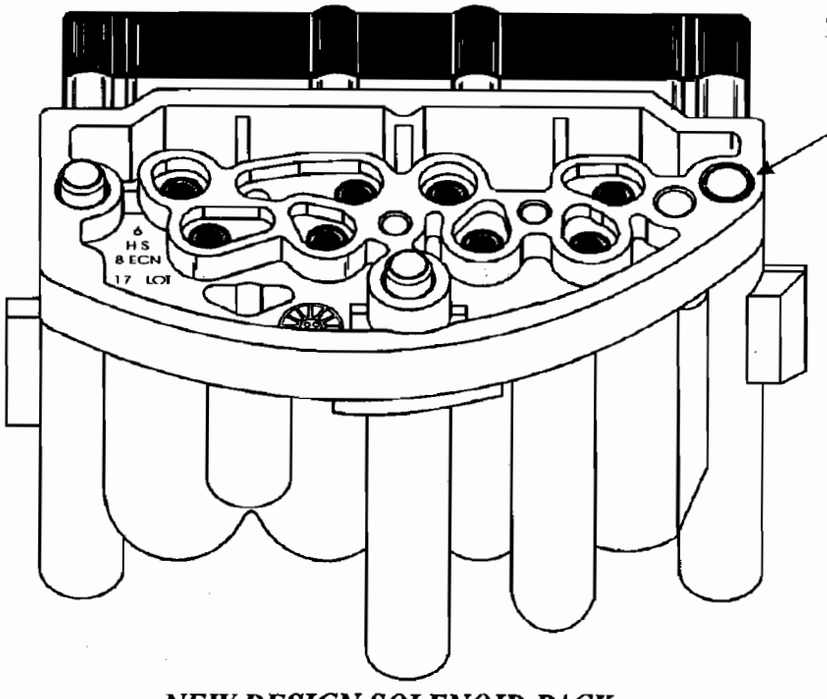
NEW DESIGN SOLENOID PACK



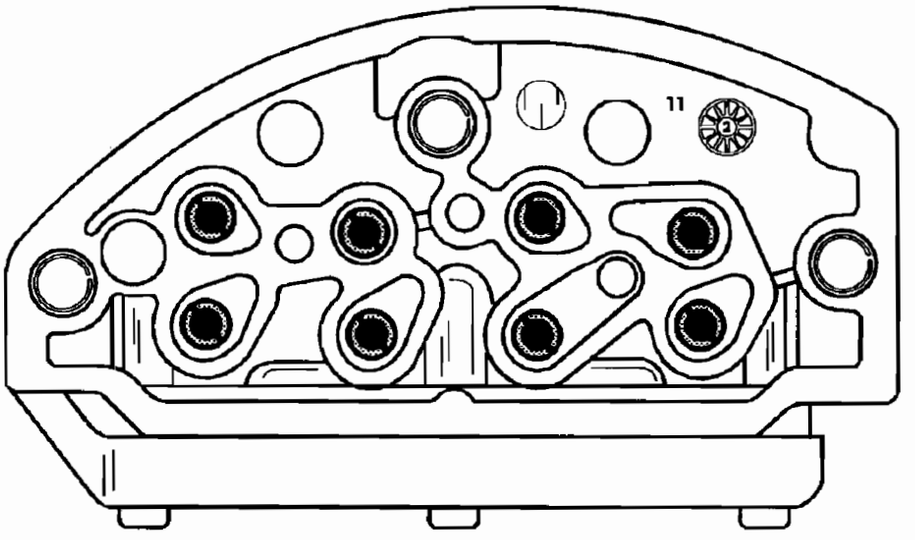


This Roll Pin Must Be Pressed Down Flush Or Removed

NEW DESIGN SOLENOID PACK (BOTTOM VIEW)

Figure 1

Early Solenoid Pack
(Bottom View)



Late Solenoid Pack
(Bottom View)

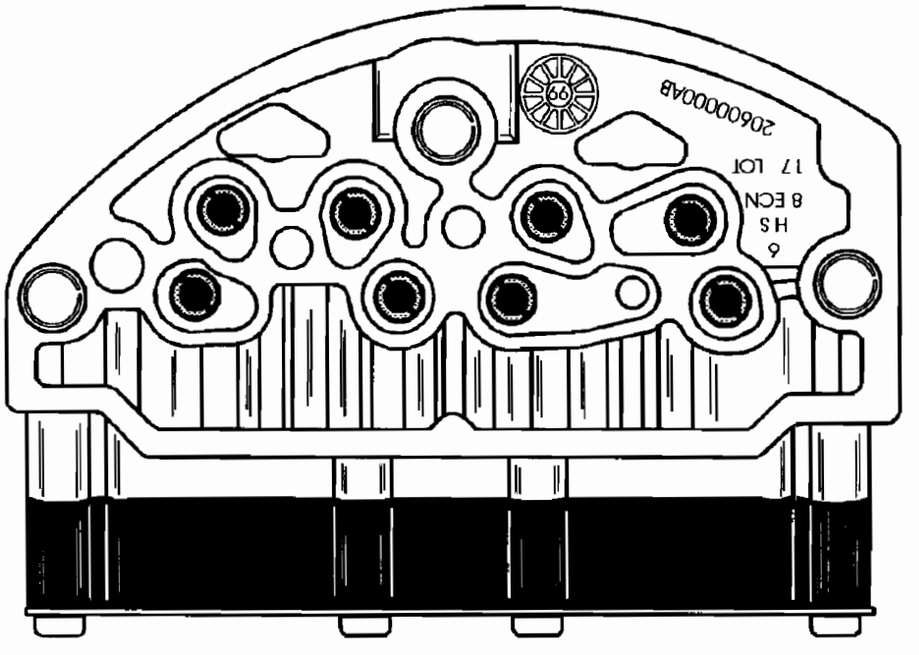
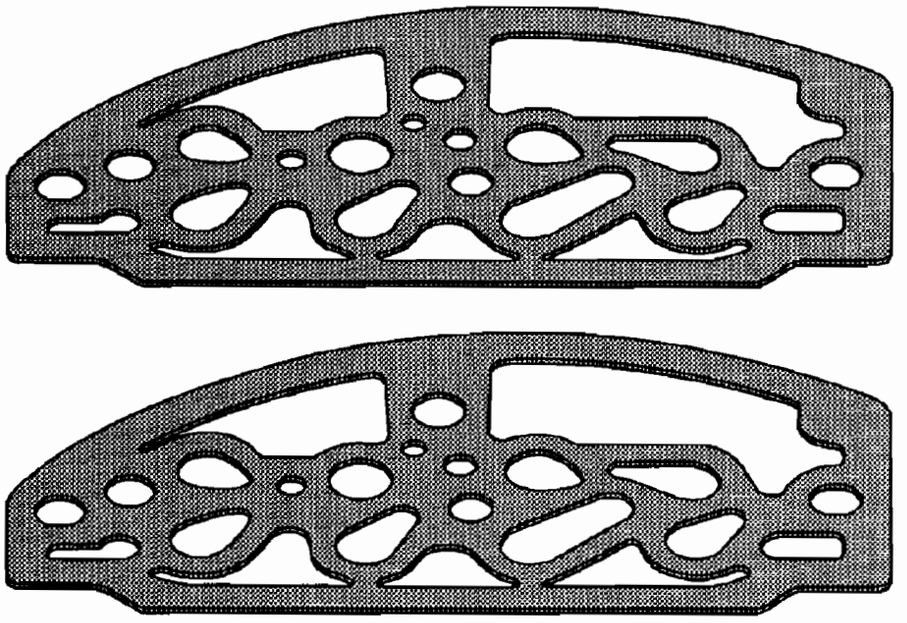


Figure 2

Early Solenoid Gaskets



Late Solenoid Gasket

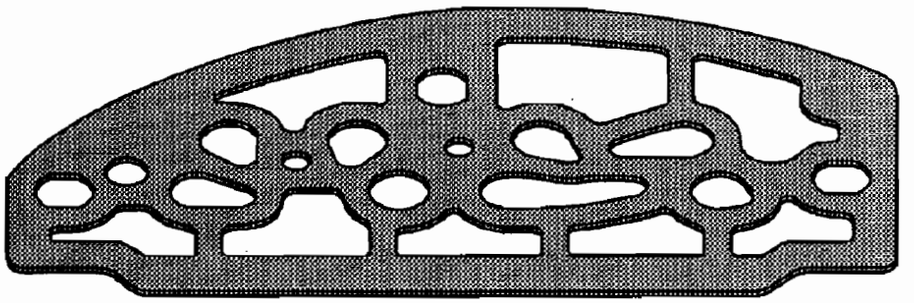
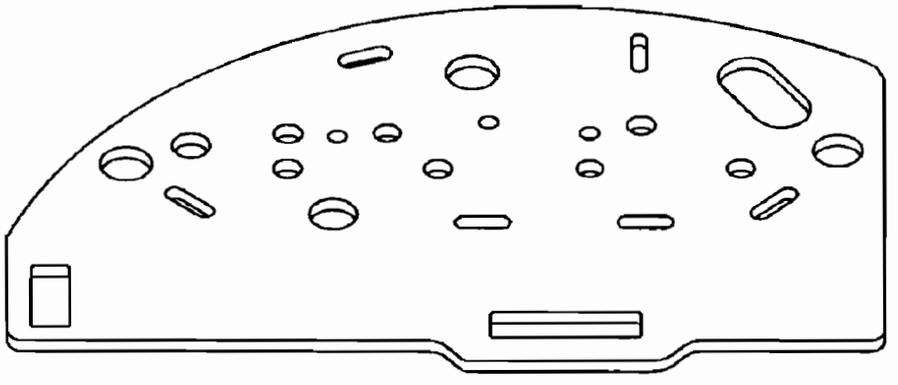


Figure 3

Early Solenoid Spacer Plate



Late Solenoid Spacer Plate

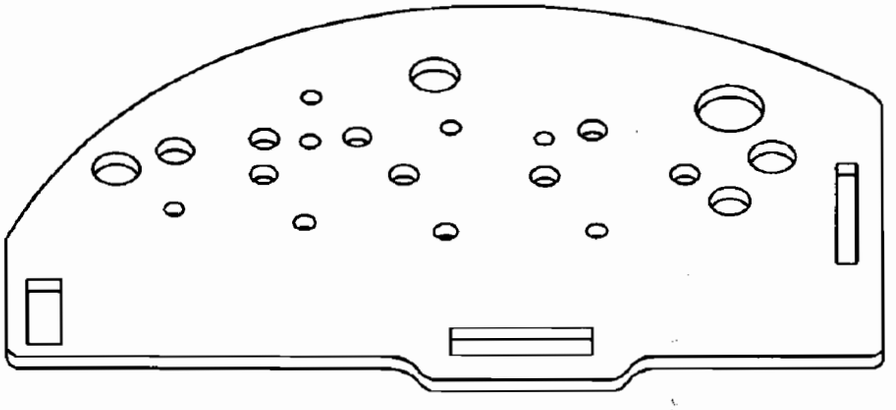
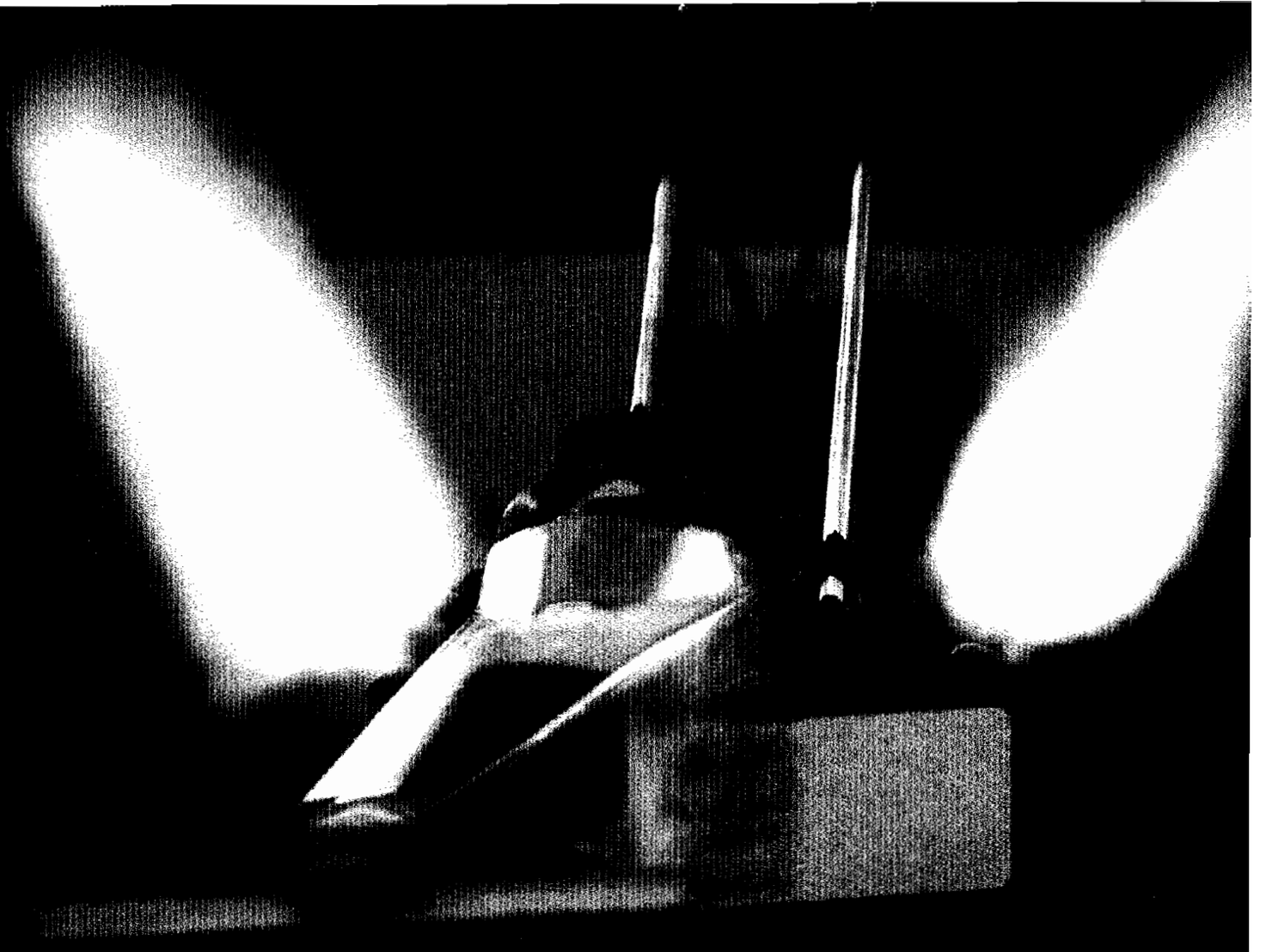


Figure 4



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CHRYSLER A518/A618
DRIVESHAFT YOKE DOES NOT FIT OUTPUT SHAFT

COMPLAINT: After rebuild and installation of the transmission into the vehicle, your R&R person comes to you and tells you that the driveshaft will not go into the transmission.

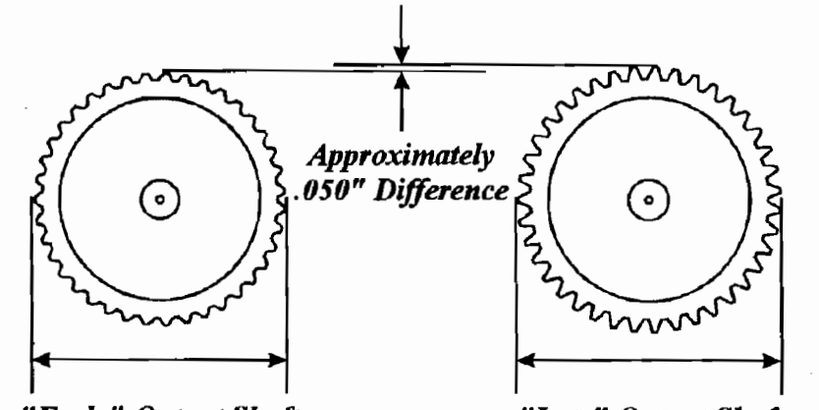
CAUSE: ***Late*** output shaft in the transmission with ***early*** driveshaft yoke in vehicle.
Explanation: Chrysler Corporation changed the outside diameter of the output shaft in the spline area, which increased the contact area of the yoke splines for improved durability, and of course the yoke changed at the same time to accommodate the output shaft change, as shown in Figure 1.

CORRECTION: There are two ways to correct this concern. If it is after installation, the easiest way to correct this is to purchase and install the late driveshaft yoke, available under OEM part number 4384437, as it will fit both early and late output shafts.
The only other option is to make yourself a Go-No Go gauge to fit the early output shaft diameter, and remove approximately .050" from the outside diameter of the spline area, if the Go-No Go gauge will not go over your output shaft, and do this before the output shaft is installed into the transmission. This will ensure that the driveshaft yoke will go on the output shaft as you have now made it an early shaft, which either driveshaft yoke will fit.

SERVICE INFORMATION:

Driveshaft Yoke (Late Design) 4384437

OUTPUT SHAFT DIFFERENCES



"Early" Output Shaft Diameter Approximately 1.290"

"Late" Output Shaft Diameter Approximately 1.340"

"LATE" DRIVESHAFT YOKE PART NUMBER 4384437 FITS BOTH EARLY AND LATE SHAFTS

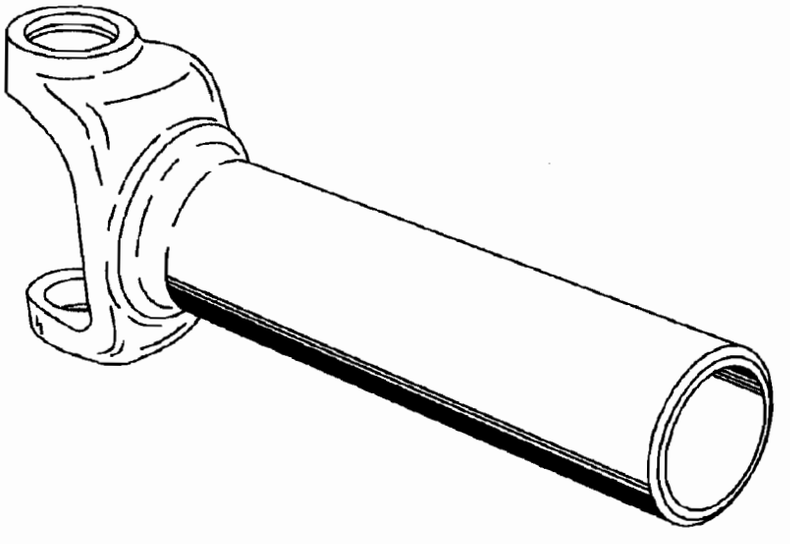


Figure 1

CHRYSLER A500/A518

LATE OR NO UPSHIFTS, OR NO UPSHIFT AFTER KICKDOWN

COMPLAINT: Any vehicle equipped with a A500/518 transmission may exhibit a complaint of late, or no upshifts, or no upshift after passing gear.

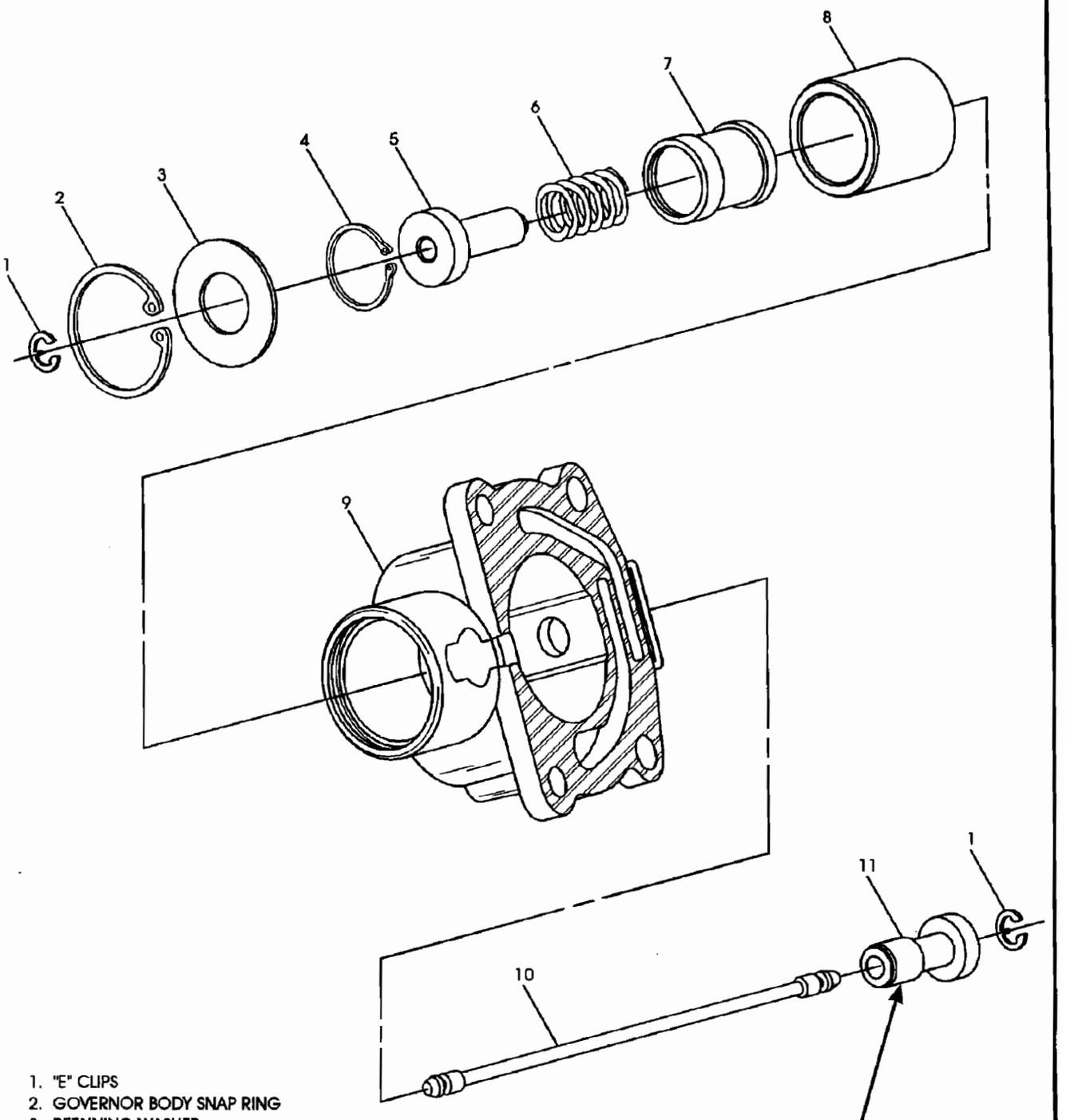
CAUSE: One cause may be a worn governor valve in the governor assembly, not allowing governor pressure to increase properly. Refer to Figure 1 for identification of the governor valve.

CORRECTION: Replace the governor valve, as shown in Figure 1.

SERVICE INFORMATION:

Governor Valve 4617064

EXPLODED VIEW OF THE 3 STAGE GOVERNOR



1. "E" CLIPS
2. GOVERNOR BODY SNAP RING
3. RETAINING WASHER
4. INTERMEDIATE WEIGHT SNAP RING
5. INNER WEIGHT
6. GOVERNOR SPRING
7. INTERMEDIATE WEIGHT
8. OUTER WEIGHT
9. GOVERNOR BODY
10. GOVERNOR VALVE SHAFT
11. GOVERNOR VALVE

Figure 1

CHRYSLER A500, A518, A618 SERIES

OVERDRIVE CLUTCH AND OD/DIRECT CLUTCH IDENTIFICATION AND USAGE BY MODEL

Overdrive Clutch Identification And Proper Assembly

Refer to Figure 1 for the proper assembly procedure and identification of the Overdrive Clutch components for all models. Notice that the first design clutch stack is not recommended, and there are two snap rings that go in first, one being flat and one being waved.

OD/Direct Clutch Identification And Proper Assembly

It is very easy to incorrectly assemble the Overdrive Direct Clutch pack. There are two different thickness of the steel plates and two different thickness of the pressure plates used in the OD/Direct clutch pack. Not being aware of the differences will allow you to mis-assemble this clutch pack. Follow the steps below and refer to Figures 2, 3, and 4, to correctly identify which design level you are working with, and properly assemble this critical drum. If a mis-assembly occurs here it will create no reverse or bind-up on 3-4 shift.

Step No. 1 - Identify which design level pressure plate that you are using by measuring the thickness of the "Lug Area". The 1st design level pressure plate will measure approximately .215" in thickness and the 2nd design level pressure plate will measure approximately .085" in thickness, as shown in Figure 2.

Step No. 2 - Identify which design level steel plates that you are using by measuring the thickness. The 1st design level steel plates will measure approximately .070" in thickness and the 2nd design level steel plates will measure approximately .055" in thickness, as shown in Figure 2.

Step No. 3 - If all First Design steels and pressure plate are being used, refer to the chart in Figure 3 to identify the OD Direct clutch housing that you have, as well as the number of steel plates and lined plates for that housing.

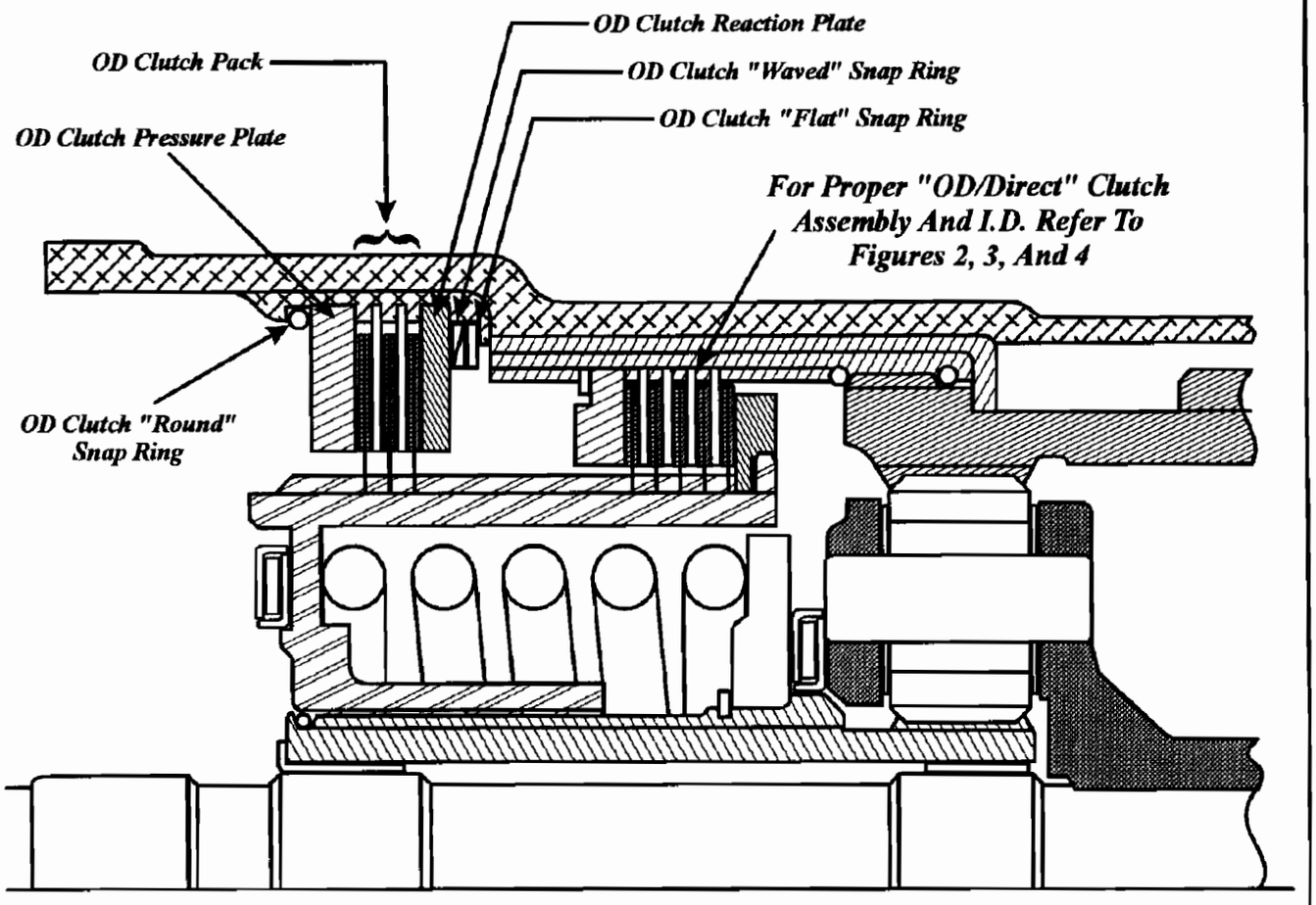
If all Second Design steels and pressure plate are being used, refer to the chart in Figure 4 to identify the OD Direct clutch housing that you have, as well as the number of steel plates and lined plates for that housing.

SPECIAL NOTE: "Always" use the special tools and procedures to measure and determine the correct thickness Overdrive Piston Shim that your set-up requires. An incorrect shim selection may also cause, no reverse or tie-up on 3-4 shift.

SERVICE INFORMATION:

OD/Direct Pressure Plate (1st Design .215" Thick)	4461031
OD/Direct Steel Plate (1st Design .070" Thick)	4461054
OD/Direct Pressure Plate (2nd Design .085" Thick)	4461183
OD/Direct Steel Plate (2nd Design .055" Thick)	4864053

PROPER OVERDRIVE CLUTCH ASSEMBLY AND USAGE



OVERDRIVE CLUTCH USAGE CHART

Illustration Number	MODEL	REACTION PLATE	STEEL PLATES	FRICTION PLATES	PRESSURE PLATE
1	A500, Early Version	Thick-.376"	1	2	Thick-.376"
2	A500, Later Version	Thin-.215"	2	3	Thick-.376"
3	A518, Except Diesel Engine	Thin-.215"	3	4	Thin-.215"
4	A518, With Diesel Engine	Thin-.215"	5	5	None **
4	A618, All Models	Thin-.215"	5	5	None **

** Normal Steel Plate Serves As Pressure Plate

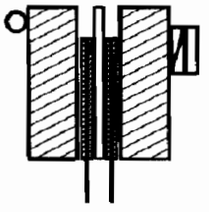
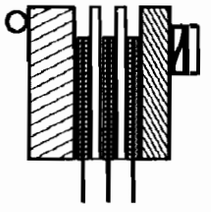
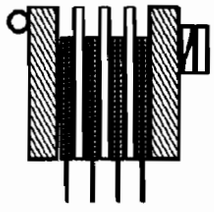
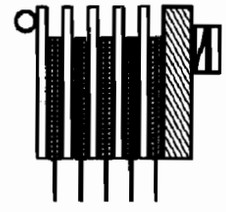
Illustration No. 1	Illustration No. 2	Illustration No. 3	Illustration No. 4
			
"Not Recommended"			

Figure 1

CHRYSLER A500 AND A518 SERIES TRANSMISSIONS
OD/DIRECT CLUTCH I.D. AND USAGE

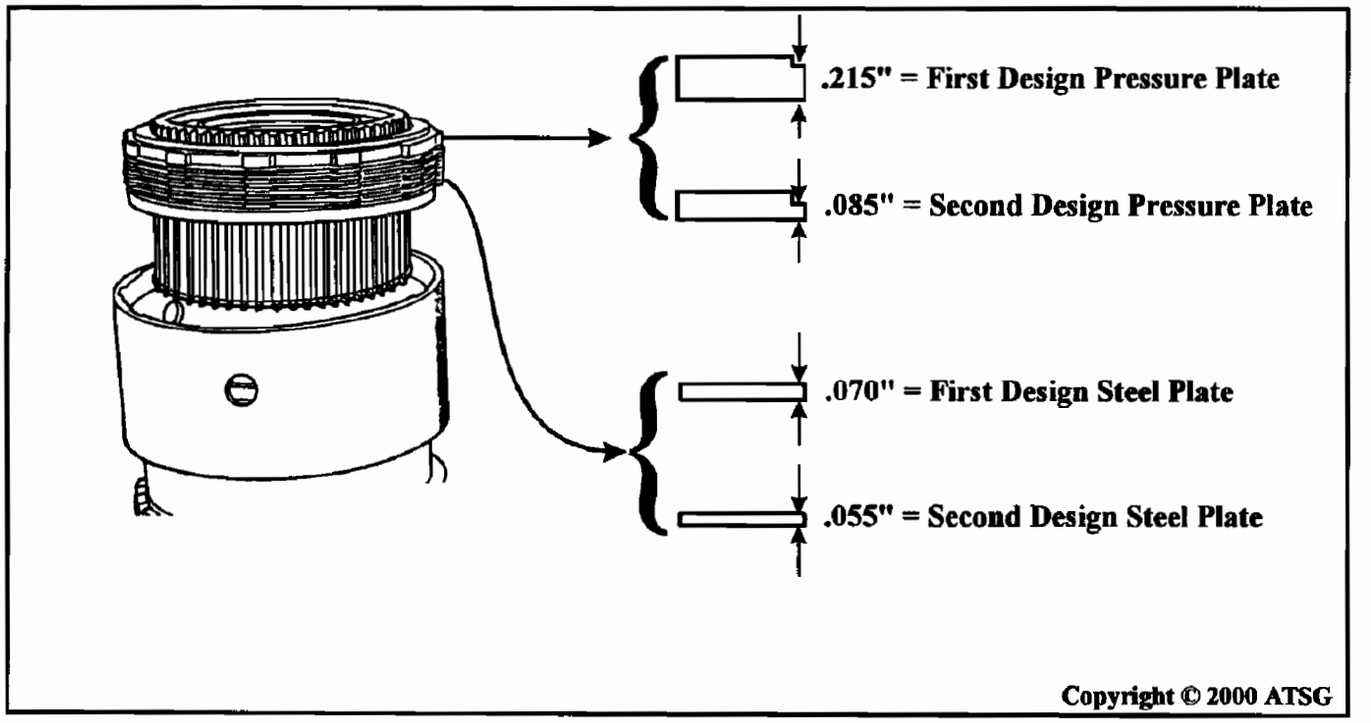


Figure 2

CHRYSLER A500 AND A518 SERIES TRANSMISSIONS
OD/DIRECT CLUTCH I.D. AND USAGE

There are currently four different Overdrive/Direct clutch housings dependent on the engine size and the transmission model you are working on. If it becomes necessary to replace the drum, measure the distance between the top of snap ring groove and the top of the housing, as shown below, and use the chart below to determine the amount of friction plates and steel plates for the model you are working on. Choosing the wrong amount may create a tie-up on the 3-4 shift, or a no reverse condition. ***The number of lined and steel plates in this chart, are based upon FIRST DESIGN PARTS.***

TRANSMISSION	LINED	STEEL	MEASUREMENT
A500 (40RH) 3.9L	5	4	.485"
A500 (42RH) 5.2L	6	5	.350"
A518/A618	8	7	.100"

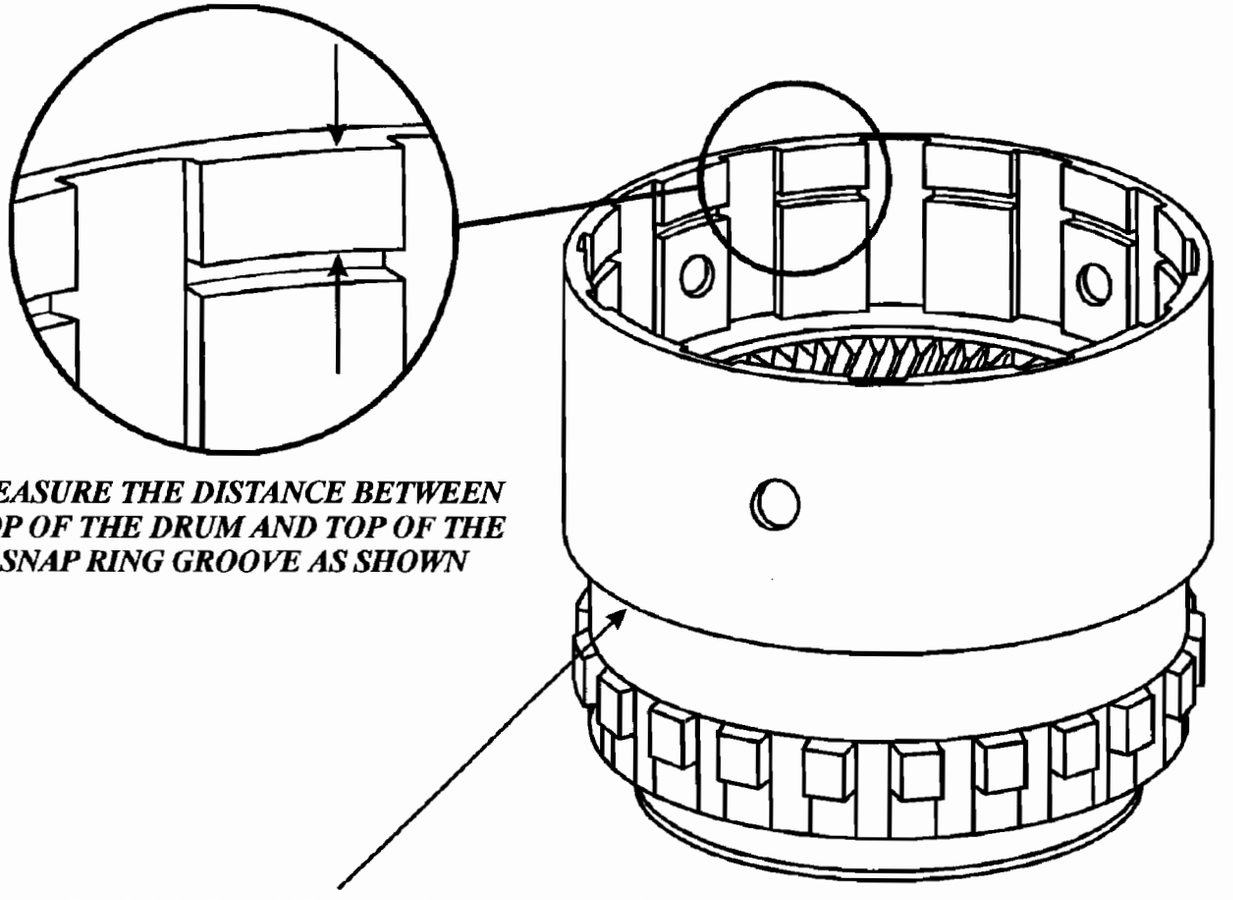


Figure 3

CHRYSLER A500 AND A518 SERIES TRANSMISSIONS
OD/DIRECT CLUTCH I.D. AND USAGE

There are currently four different Overdrive/Direct clutch housings dependent on the engine size and the transmission model you are working on. If it becomes necessary to replace the drum, measure the distance between the top of snap ring groove and the top of the housing, as shown below, and use the chart below to determine the amount of friction plates and steel plates for the model you are working on. Choosing the wrong amount may create a tie-up on the 3-4 shift, or a no reverse condition. ***The number of lined and steel plates in this chart, are based upon SECOND DESIGN PARTS.***

TRANSMISSION	LINED	STEEL	MEASUREMENT
A500 (40RH) 3.9L	6	5	.485"
A500 (42RH) 5.2L	8	7	.350"
A518/A618	10	9	.100"

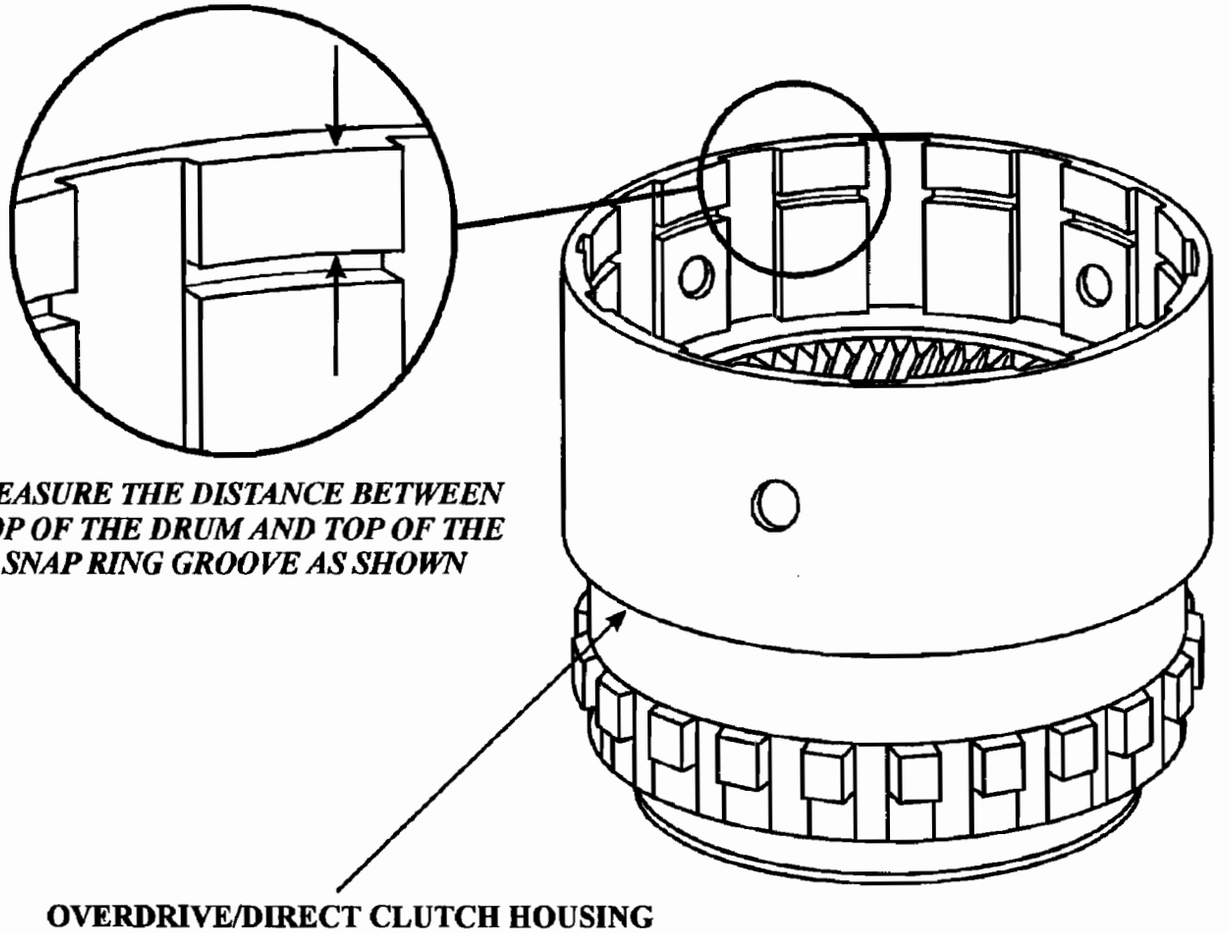


Figure 4

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION

PRELIMINARY INFORMATION:

Chrysler's Rear wheel drive Electronic series transmissions are unlike any other transmission found on the road today. And for this reason, diagnosing shift complaints and/or solenoid codes becomes entirely unique. Although proper diagnostics begins with an understanding of the solenoid and sensor's principles of operation, there also needs to be an understanding between the TCM and the OBD II computer systems. And to add just another twist, there is a notable difference between gas and diesel governor pressure strategy. Not knowing these important factors has caused confusion for the technician resulting in mis-diagnosis and much time wasted trying to repair a troublesome transmission.

To assist the technician in effectively diagnosing the majority of problems associated with this system, it is imperative that the following be read and assimilated.

GOVERNOR SOLENOID:

The purpose of the governor solenoid is to produce governor pressure which in gas vehicles rises proportional to road speed. For example: at 20 mph there should be approximately 20 psi of governor pressure and at 30 mph there should be approximately 30 psi and so on. ***With diesel vehicles, this is not so.*** At approximately 20 mph governor pressure begins to double road speed. So when 20 mph is reached there will be approximately 40 psi and at 30 mph there will be approximately 60 psi of governor pressure. The purpose of this strategy is to prevent 4-2 or 3-2 kick downs which would result in high engine revolutions. Problems may arise here if gas and diesel valve bodies are improperly interchanged. A quick 1-2 and 2-3 shifts may occur if a gas valve body is used in a diesel vehicle while a late 1-2 and 2-3 shift may occur with a diesel valve body in a gas vehicle.

Another point to remember is that the governor pressure control solenoid is no different than a typical line pressure control solenoid in that when it is unplugged, high pressure occurs. Therefor, whenever the case connector on any RE unit is unplugged, governor pressure should reach approximately 60 psi at idle ***with the selector lever in DRIVE.*** If pressure stays low with the connector unplugged, there is an internal transmission problem. The possibilities could be a defective governor solenoid, the screen on the solenoid inlet port is clogged, the overdrive piston support to case gasket is damaged or installed improperly, or an A500/518 overdrive piston support was improperly installed. This solenoid measures approximately 3 to 5 ohms in resistance as with any typical pressure control solenoid.

If and when a scanner will provide data stream information, the governor solenoid is displayed as being: "Desired Governor Pressure" as the solenoid is being controlled by the computer based various inputs such as VSS, TPS, ECT and TFT (See Figure 1). ***NOTE: The selector lever must be placed in Drive before the scanner will provide governor pressure data.***

Throughout all years terminal functions at the transmission case connector has remained the same. It can be observed in Figure 2 that system voltage is supplied to all three solenoids on the valve body. The governor pressure sensor, the OD solenoid and the TCC solenoid. Terminal 5 is the ground wire used by the TCM or PCM to control the governor pressure control solenoid. One amp of current produces zero psi of governor pressure while zero amps sets maximum governor pressure.

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

GOVERNOR SENSOR/TRANSDUCER:

The greatest misconception of the governor sensor (Transducer) is that it is controlled by the computer (Module). The computer does not control the sensor in any way other than supplying it with a 5 volt source. The function of the sensor is to provide information TO the computer as to what the output pressure of the governor solenoid is, i.e. governor pressure. This information can be viewed through the scanner as "Actual PSI" (See Figure 1). This tends to be misleading since it is possible to have a sensor fail providing erroneous data to the scanner. It is to the technicians advantage to verify actual governor pressure with a pressure gauge. ***NOTE: The selector lever must be placed in Drive before the scanner will provide governor sensor data.***

The illustration in Figure 2 shows that terminal 2 in the case connector is the 5 volt supply to the sensor from the computer. Terminal 3 is the transducer's ground wire and terminal 4 is the wire in which the sensor sends an analog linear electrical signal to the computer that is related to governor pressure. The average typical linear voltage range which the sensor sends to the computer is approximately 0.5 volts @ zero psi of governor pressure to 3.0 volts @ 60 psi of governor pressure. It is this linear voltage that the computer reads and compares to a memorized table within itself to determine governor pressure state. This information is used to tailor the control of the governor solenoid for both up shift and down shift operations.

This governor sensor was originally a three wire sensor. In production year 1996 it underwent a change where the externally mounted TFT sensor on the OD and TCC solenoid bracket was incorporated into the sensor making it a 4 wire sensor (See Figure 3). This in no way changed any of the case connector pin functions (Figure 2).

THE OVERDRIVE SOLENOID:

As previously stated, the governor pressure control solenoid is responsible to produce governor pressure proportional to road speed. This governor pressure is used to make the 1 to 2 and the 2 to 3 up shift in opposition to typical throttle pressure. The 3 to 4 up shift however ***is not*** directly influenced by governor pressure rather, it is controlled by the Overdrive solenoid.

The OD solenoid is fed with 3rd gear oil which when the OD solenoid becomes energized, third gear oil is used to stroke the 3-4 shift valve to make the 3-4 up shift. If there is a loss of governor pressure to the place where 3rd gear oils is lost, the OD solenoid becomes ineffective and a shift into a lower gear will occur and may be described as neutralizing. The Overdrive solenoid is supplied system voltage through terminal # 1 and controlled on the ground side by the computer through the # 6 terminal in the case connector (See Figure 2).

THE TCC SOLENOID:

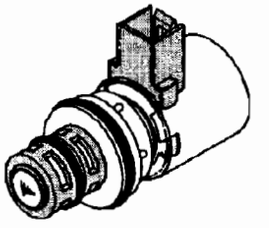
The TCC solenoid is supplied with 2nd gear oil as stroking pressure for the converter clutch switch valve. The solenoid is supplied with system voltage through terminal # 1 and is controlled on the ground side by the computer through the # 7 terminal in the case connector (See Figure 2).

THE ELECTRONIC GOVERNOR SYSTEM AND SCANNER NOMENCLATURE

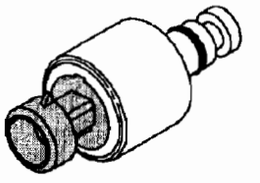
Governor Solenoid

SCANNER NOMENCLATURE:

DESIRED PSI
This is the command the computer is giving to the solenoid



ACTUAL PSI
Governor pressure converted to an analog linear voltage signal received by the computer from the transducer



Governor Sensor/Transducer

Figure 1

CASE CONNECTOR PIN FUNCTIONS

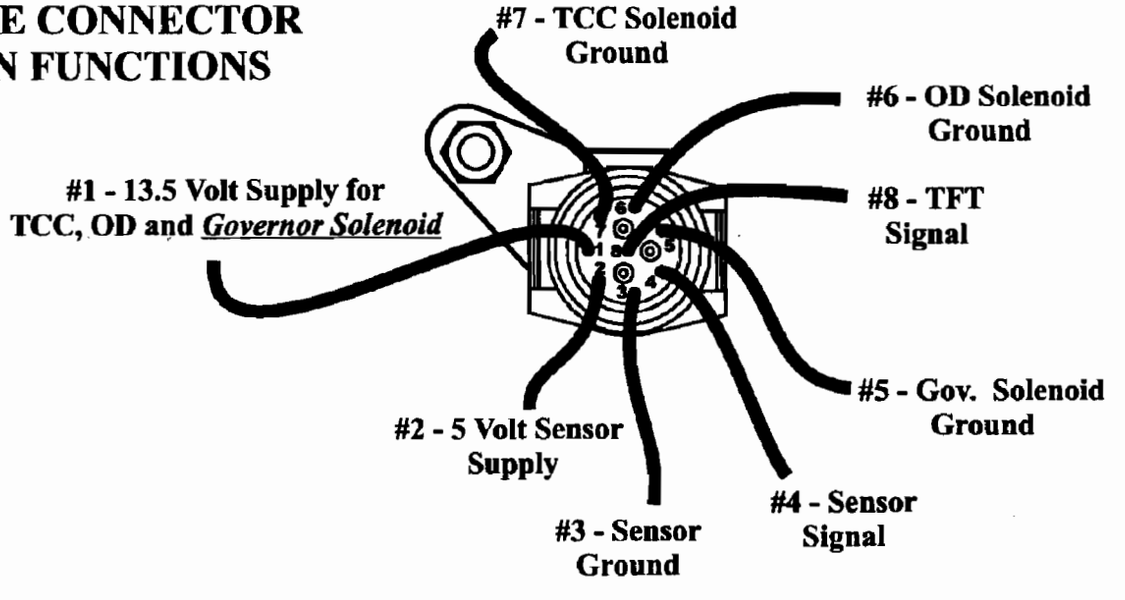
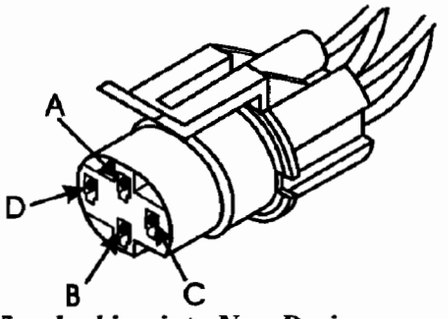


Figure 2

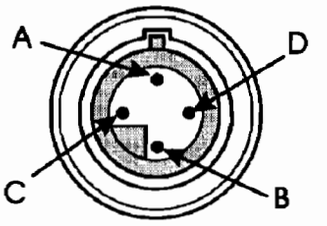
NEW DESIGN GOVERNOR PRESSURE SENSOR WITH "TFT" INCORPORATED INSIDE THE SENSOR



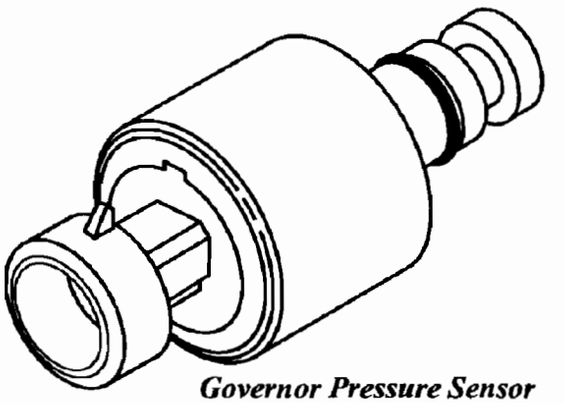
View looking into New Design Governor Pressure Sensor Connector

Pin Number	All Models
A	RED
B	WHITE
C	BLACK
D	GREEN

PIN	FUNCTION
A	5-Volt supply to sensor from PCM
B	Governor Pressure Sensor Signal to PCM
C	Transmission Fluid Temperature Signal to PCM
D	Governor Pressure Sensor Ground

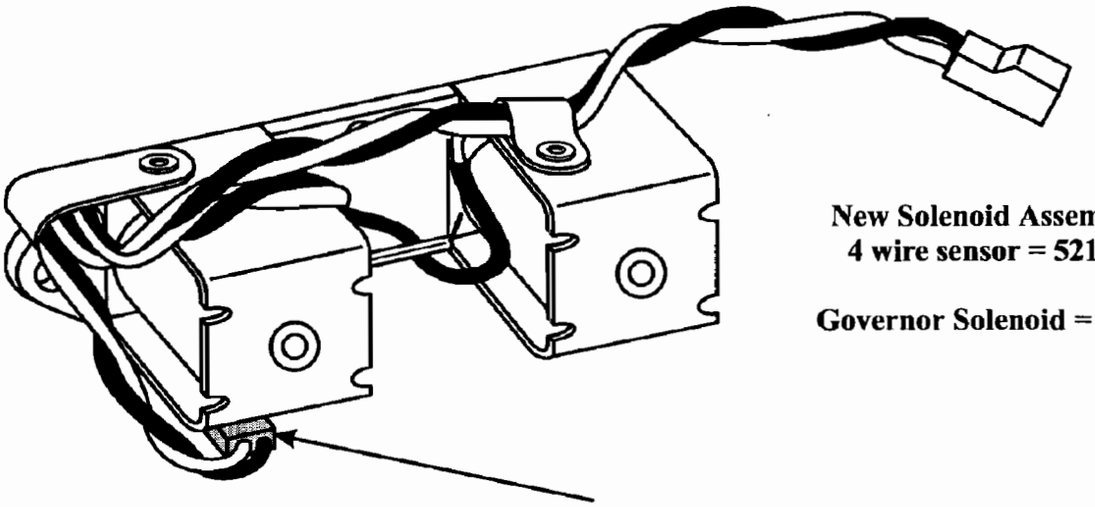


View looking into the Governor Pressure Sensor



Governor Pressure Sensor
3 wire = 56027562
4 wire = 56027720

PREVIOUS DESIGN "TFT" SENSOR LOCATION



New Solenoid Assembly for 4 wire sensor = 52118500

Governor Solenoid = 4617210

Transmission Fluid Temperature Sensor

Figure 3

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

THE TCM:

1993½-1995 RE series transmissions have a dedicated computer to control all solenoid operations and it is called the "Transmission Control Module" (TCM). This module is located under the left side of the dash as seen in Figure 4. The TCM provides system voltage to all three solenoids out of terminal D-16 to terminal 1 at the transmission connector (See Figure 5). The TCM monitors its operating system and if an error is detected a diagnostic trouble code is produced. The module then enters a "default mode" by cutting the voltage to pin 1 placing the vehicle into third gear. Codes are accessible over the SCI lines in the # 2 Data Link Connector with the use of a scanner. If incorrect information is entered into the scanner codes may unretrievable. One such common mistake is entering Cherokee when Grand Cherokee should have been be entered. The #2 DLC is black in color and its location is illustrated in Figure 4. If a scanner is not available, the Overdrive Off Lamp can be used to flash out the DTC's using the following procedure:

A. Turn ignition key on and off three times. Then, leave overdrive OFF switch in normal overdrive ON position.
B. Immediately begin counting the number of flashes displayed by overdrive OFF switch indicator lamp.
C. A code 55 identifies *end of flash code transmission.*

The fault code description are as follows:

11 Engine RPM input
12 Output shaft sensor input
13 Vehicle speed input
14 Governor pressure sensor input
15 Throttle position sensor input
16 Transmission fluid temperature input
17 Overdrive override (control) switch input
18 System voltage
19 Internal fault in modem
21 Governor pressure solenoid output
22 Overdrive solenoid output
23 Converter clutch solenoid output
24 Overdrive override (control switch) lamp output
25 Internal fault in modem
26 Governor pressure sensor offset drift
55 End of code transmission

THE PCM:

In 1996, a major change took place with the implementation of the Federally Regulated OBD II system. The TCM has been incorporated into the Engine Controller and it is called the "Powertrain Control Module" (PCM) (See Figure 6). This PCM is located in the engine compartment in one or two places as seen in Figure7.

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

THE PCM *continued*:

Code retrieval can be performed by cycling the ignition 3 times as previously explained with non-OBDII TCM vehicles. However, the codes obtained in this manner with OBDII PCM vehicles are vague and for the most part useless. Codes that are useful can only be achieved with the operation of a scanner through the Data Link Connector (DLC) located below the knee bolster to the left of the steering column.

The fault code description are as follows:

Scan Tool Display	*Generic Scan Tool Code*
3-4 shift sol, no rpm drop @ 3-4 shift	P0783
Gov press above 3 psi in gear with 0 mph	P1757
Gov press not equal to target @ 15-20 psi	P1756
Gov press sen offset volts too low or high	P1762
Governor pressure sensor volts too hi	P1763
Governor pressure sensor volts tool low	P1764
Governor pressure solenoid/trans relay ckts	P0748
O/D switch pressed (Lo) more than 5 min	P1751
P/N switch stuck in park or in gear	P0600
Torque converter clutch, no rpm drop at lockup	P1765
Torque converter clutch solenoid/trans relay ckts	P1780
Trans 12 volt supply relay control circuit	P1765
Trans 3-4 solenoid/trans relay circuits	P0753
Trans temp sensor voltage too high	P0713
Trans temp sensor voltage too low	P0712
Trans temp sensor, no temp rise after start	P0711

THE RELAY:

One very notable difference is that the system voltage supplied to pin 1 at the case connector is no longer directly fed from the computer as with the TCM. Battery or system voltage is now supplied via a Transmission Control Relay (TCR) (See Figures 6 and 8). All relay locations are displayed in Figure 9. The function of the TCR is the same as the EATX relay found in Chrysler's A604 and A606 transaxles in that it cuts voltage to the solenoids after the PCM has determined that a system fault occurred. This action places the transmission into a 3rd gear only default mode.

Although the function of the EATX relay is the same as the TCR, the operation of it is slightly different. The EATX relay is excited by the TCM via a voltage wire from terminal 15. The TCR however is controlled by the PCM via a ground wire from terminal 30 in the white # 2 or B connector as seen in Figures 6 and 8. Cavity identifications are provided for each terminal of the TCR connector in Figure 9. Since the PCM and the TCR are located in the engine compartment, solenoid resistance can be easily performed from their connectors as seen and explained in Figure 10.

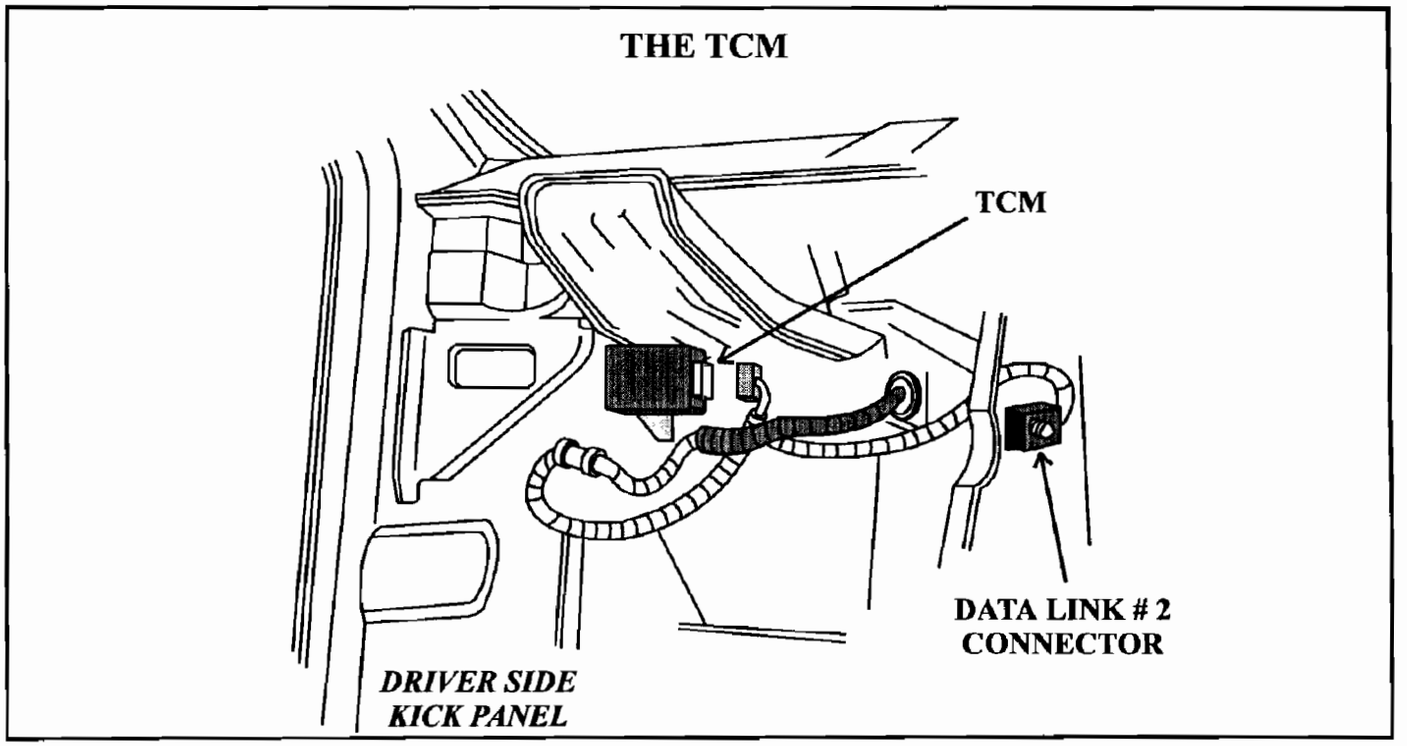


Figure 4

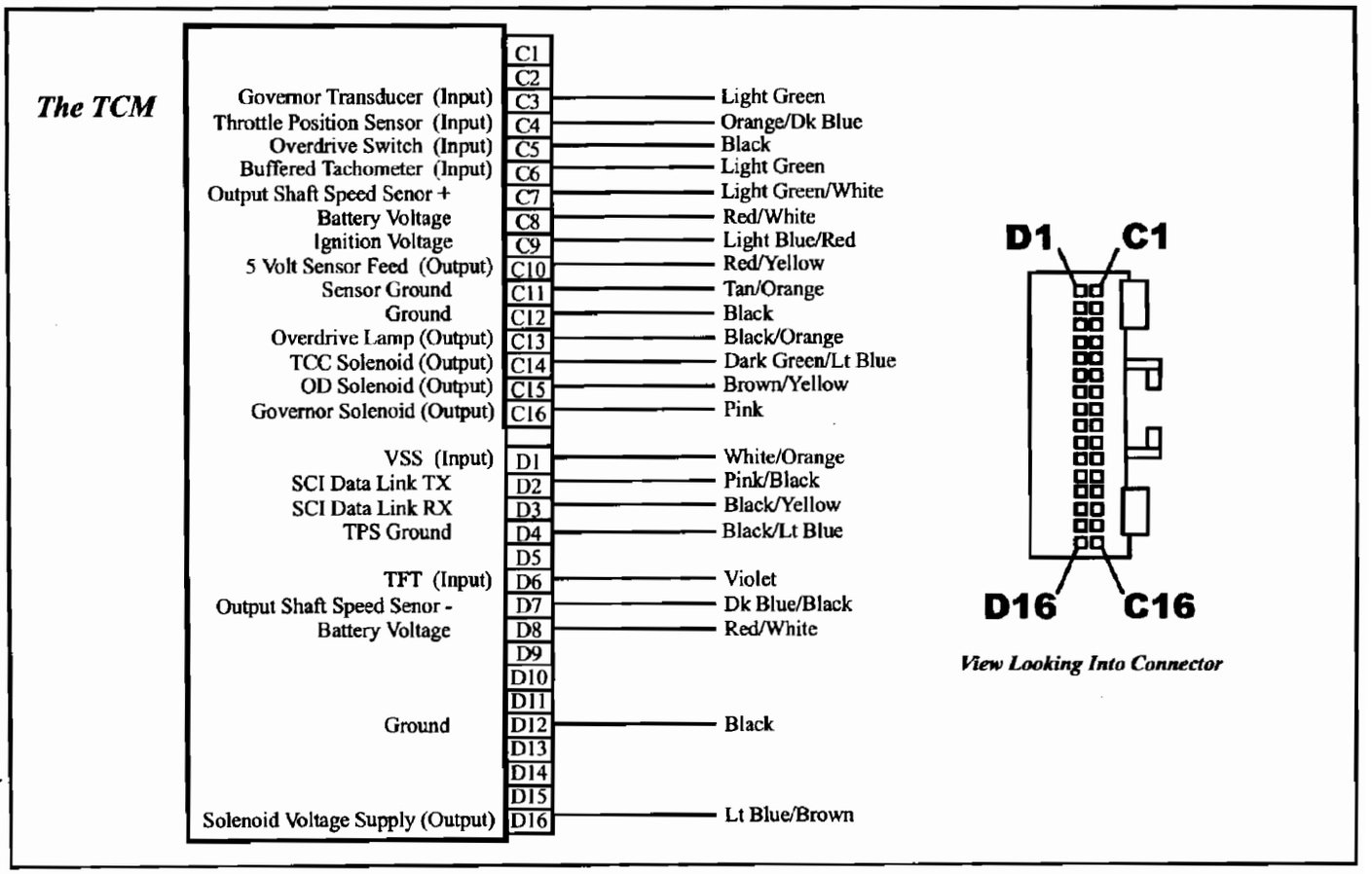


Figure 5

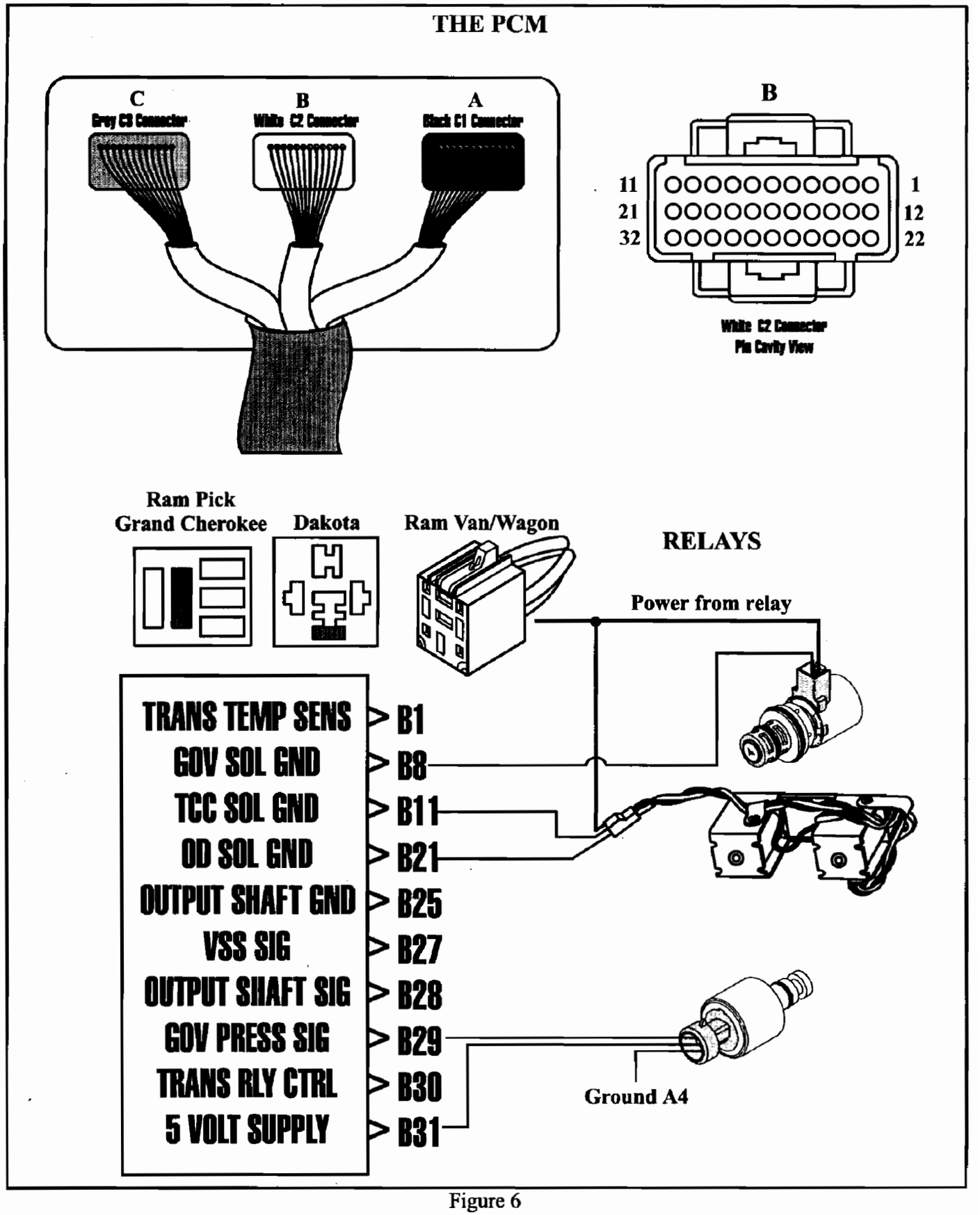
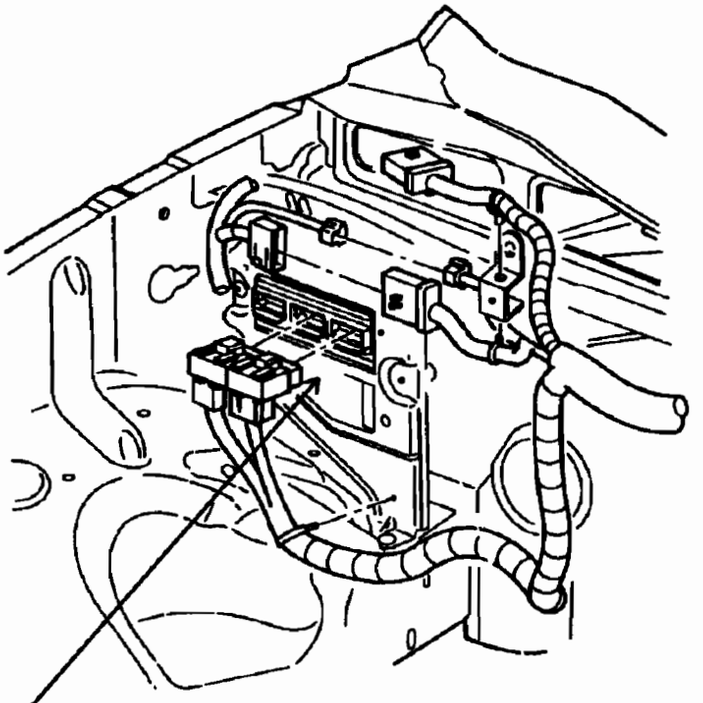

THE PCM
C
Grey C3 Connector
B
White C2 Connector
A
Black C1 Connector
B
11
21
32
1
12
22
White C2 Connector
Pin Cavity View
Ram Pick
Grand Cherokee
Dakota
Ram Van/Wagon
RELAYS
Power from relay
TRANS TEMP SENS B1
GOV SOL GND B8
TCC SOL GND B11
OD SOL GND B21
OUTPUT SHAFT GND B25
VSS SIG B27
OUTPUT SHAFT SIG B28
GOV PRESS SIG B29
TRANS RLY CTRL B30
5 VOLT SUPPLY B31
Ground A4

Figure 6

POWERTRAIN CONTROL MODULE LOCATION



PCM location differ between Dakotas and Jeeps

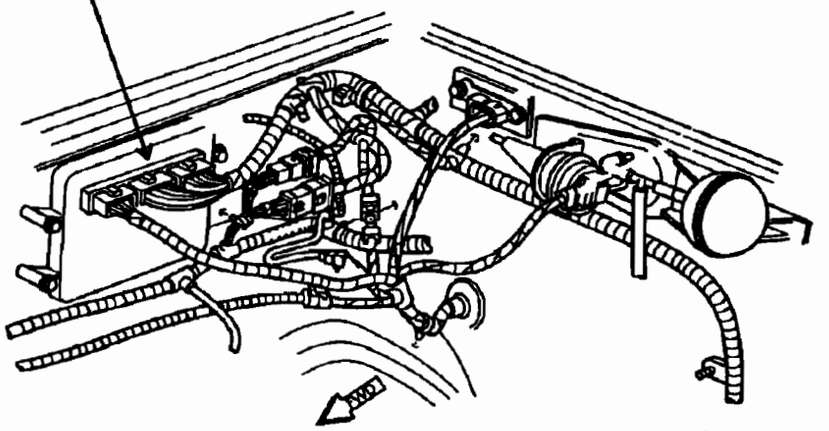


Figure 7

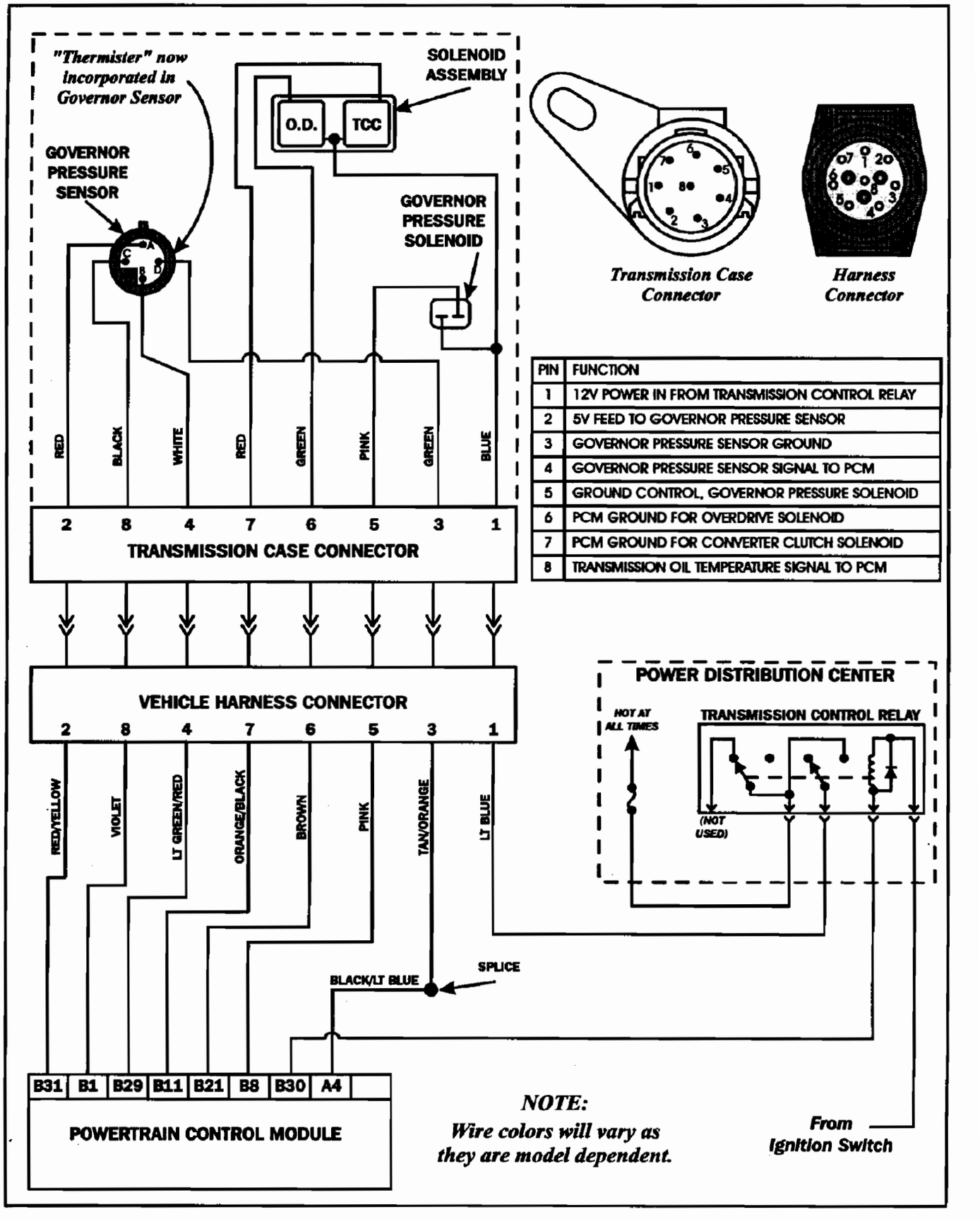
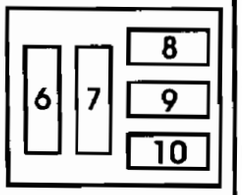

"Thermister" now incorporated in Governor Sensor
SOLENOID ASSEMBLY
O.D.
TCC
GOVERNOR PRESSURE SENSOR
GOVERNOR PRESSURE SOLENOID
RED
BLACK
WHITE
RED
GREEN
PINK
GREEN
BLUE
2 8 4 7 6 5 3 1
TRANSMISSION CASE CONNECTOR
Transmission Case Connector
Harness Connector
PIN FUNCTION
1 12V POWER IN FROM TRANSMISSION CONTROL RELAY
2 5V FEED TO GOVERNOR PRESSURE SENSOR
3 GOVERNOR PRESSURE SENSOR GROUND
4 GOVERNOR PRESSURE SENSOR SIGNAL TO PCM
5 GROUND CONTROL, GOVERNOR PRESSURE SOLENOID
6 PCM GROUND FOR OVERDRIVE SOLENOID
7 PCM GROUND FOR CONVERTER CLUTCH SOLENOID
8 TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM
VEHICLE HARNESS CONNECTOR
2 8 4 7 6 5 3 1
POWER DISTRIBUTION CENTER
HOT AT ALL TIMES
TRANSMISSION CONTROL RELAY
(NOT USED)
RED/YELLOW
VIOLET
LT GREEN/RED
ORANGE/BLACK
BROWN
PINK
TAN/ORANGE
LT BLUE
SPLICE
BLACK/LT BLUE
B31 B1 B29 B11 B21 B8 B30 A4
POWERTRAIN CONTROL MODULE
NOTE:
Wire colors will vary as they are model dependent.
From Ignition Switch

Figure 8

Relay Location Sheet

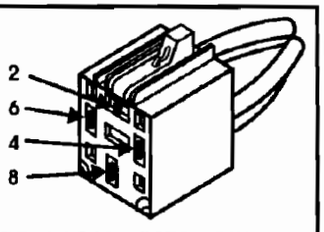
Pin Number	Model "BR" Ram Pick-up	Model "ZJ" Grand Cherokee
6	RED/WHT	LT GREEN
7	RED	LT BLUE
8	PINK	BRN/ORG
10	LTG/BLK	RED/ORG



TRANSMISSION CONTROL RELAY CONNECTOR PIN I.D. FOR "BR" AND "ZJ" MODELS

PIN	FUNCTION
6	Fused Battery Voltage
7	Transmission Control Relay Output (12V to Transmission)
8	Transmission Relay Control (Gmd Signal from PCM)
10	Fused Ignition Switch (12V to Relay from Ign. Switch)

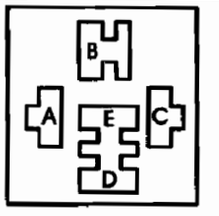
Pin Number	Model "AB" Ram Van, Wagons and Jeeps
2	LIGHT BLUE
4	LT GREEN/BLACK
6	VIOLET/LT BLUE
8	RED/WHT



TRANSMISSION CONTROL RELAY CONNECTOR PIN I.D. FOR "AB" MODELS

PIN	FUNCTION
2	Transmission Control Relay Output (12V to Transmission)
4	Fused Ignition Switch (12V to Relay from Ign. Switch)
6	Transmission Relay Control (Gmd Signal from PCM)
8	Fused Battery Voltage

Pin Number	Model "AN" Dakota Pick-up
A	DK BLUE
B	PNK/DKB
C	DKB/WHT
D	LT GREEN



TRANSMISSION CONTROL RELAY CONNECTOR PIN I.D. FOR "AN" MODELS

PIN	FUNCTION
A	Fused Ignition Switch (12V to Relay from Ign. Switch)
B	Fused Battery Voltage
C	Transmission Relay Control (Gmd Signal from PCM)
D	Transmission Control Relay Output (12V to Transmission)

TRANSMISSION CONTROL RELAY LOCATIONS

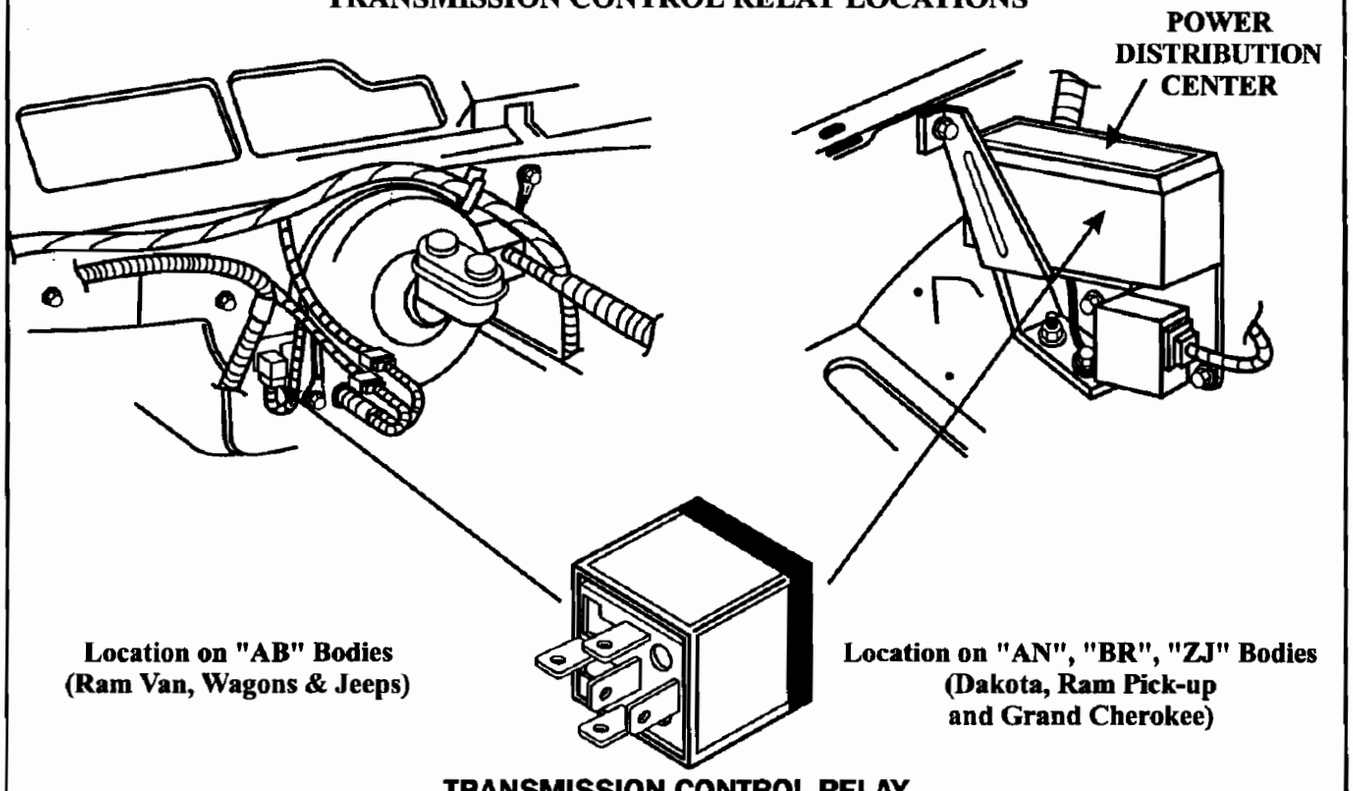


Figure 9

SOLENOID RESISTANCE THROUGH RELAY AND PCM CONNECTOR

With the introduction of the On Board Diagnostic Systems Version 2 (OBD II) in 1996, Chrysler eliminated the previously used TCM (Transmission Control Module) and incorporated it into the engine computer called the PCM (Power Train Control Module). This system is also known as the JTEC (pronounced like Jay Tech) which stands for Jeep Truck Electronic Control. Resistance checks on the Torque Converter Clutch, Governor and Overdrive solenoids may be easily performed between the PCM connector and Transmission Relay connector with a DVOM in the following manner:

1. Locate the PCM as seen in Figure 7.
   A) Dakota - In the engine compartment on the right inner fender panel.
   B) Ram Pick Up - In the engine compartment on the right side of dash panel.
   C) Ram Van/Wagon - Center of firewall
   D) Jeep Grand Cherokee - On right rear of engine compartment
2. Locate the Transmission Control Relay as seen in Figure 9.
3. Unplug the Transmission Control Relay and place the positive meter lead of a DVOM set to ohms into the Trans Control Relay Output terminal as seen in Figure 10 below.
4. The PCM has three 32 pin connectors, black, grey and white. Unplug the middle connector which is the white connector. With the negative lead resistance checks on the Torque Converter Clutch, Governor and Overdrive solenoids may be checked at terminals 8, 11 and 21 individually as seen in Figure 10 below. Both the TCC and OD solenoids should measure between 25 and 40 ohms. The Governor Pressure Solenoid should measure between 3 to 5 ohms.

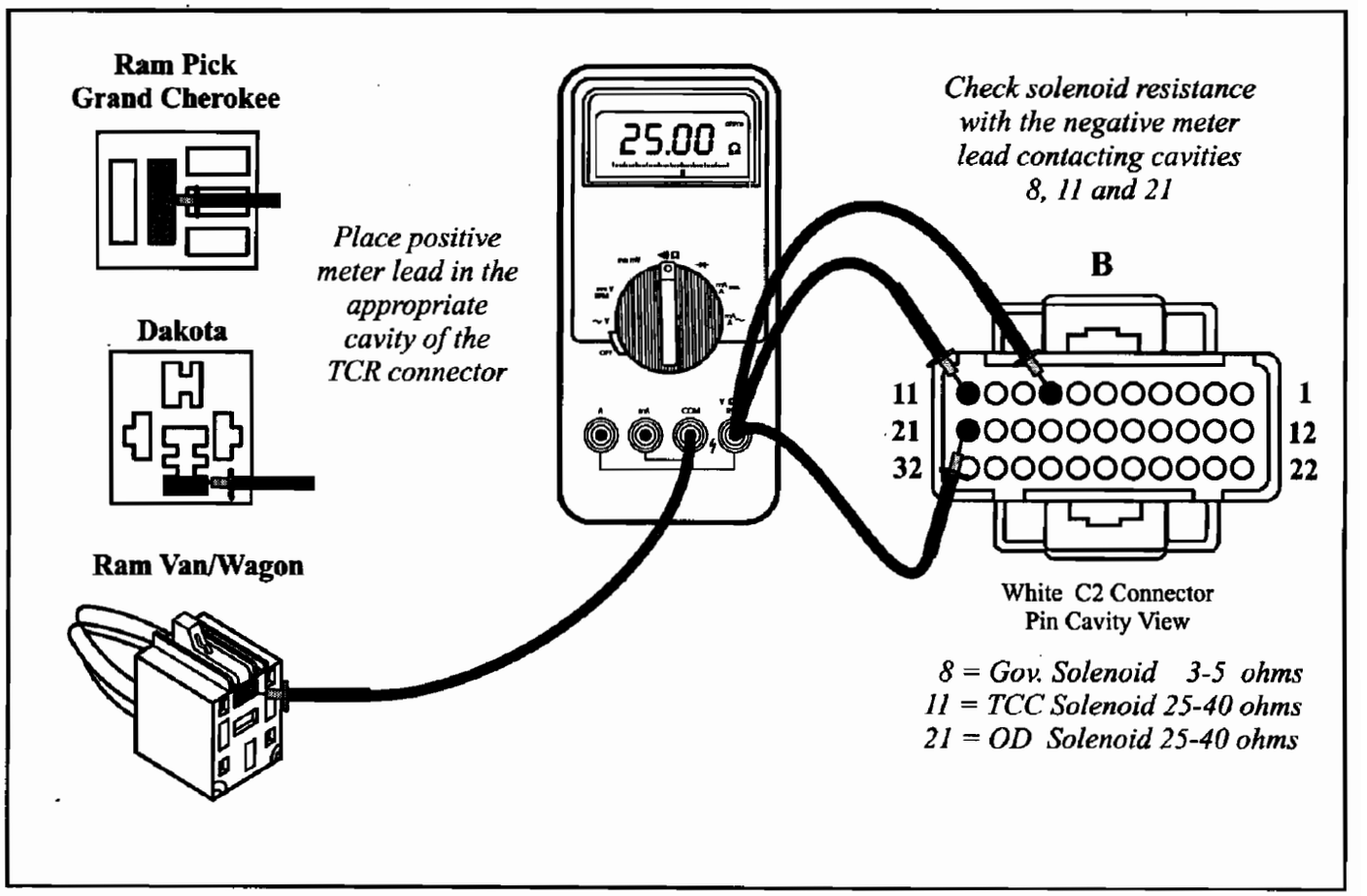


Figure 10

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

CHECKING THE SYSTEM:

DIAGNOSTIC TIPS: Data stream information from the scanner is useful for identifying problems with the vehicle speed sensor, output shaft speed sensor, throttle position sensor, engine coolant temperature sensor, transmission fluid temperature sensor, oxygen sensor, the P/N switch , air conditioning and cruise control operation. All of which should be viewed and considered when diagnosing drive ability complaints. Governor pressure and solenoid operation may also be viewed through the scanner as explained in Figure 1. This can be helpful but it is important that the technician realize that the governor pressure solenoid and transducer information viewed through the scanner can be misleading as they may fail mechanically providing false data to the computer. During the initial road test it is good to first observe all the information the scanner provides including codes. Many times the problem can be spotted quickly and resolved easily. Should this not happen, the next step would be to place an actual gauge on the governor pressure tap as seen in Figure 11 and compare gauged pressure to the scanner pressure. From this comparison the validity of governor pressure information received via the scanner can be confirmed. Should gauged governor pressure be different than the actual psi observed on the scanner, the transducer is defective or there is a wiring problem from the transducer to the TCM or PCM. If gauged pressure and scanner psi match, the transducer is working. If there is a problem with the governor pressure not increasing, the governor solenoid may be defective, the governor circuit inside the transmission has a leak, or there is an electrical problem. To quickly identify which it may be, unplug the transmission case connector. If governor pressure increases to approximately 60 psi, there is an external electrical problem. If governor pressure stays low, there is an internal transmission problem.

As previously stated, governor pressure should increase proportional to road speed for the exception of Diesel applications. The computer controls this pressure on the ground side of the governor solenoid which is the # 5 wire in the case connector. The governor transducer (sensor) sends a linear voltage back to the computer through # 4 wire in the case connector. A comparison chart is provided in Figure 12 as to the approximate voltage seen in relation to governor pressure. The chart in Figure 12 will be needed for comparison against system problems revealed in Figures 15 to 18. As an aid to diagnosing, these figures provides examples of different drive ability complaints experienced with 42RE. It puts together how to look at all the information provided by the scanner, volt meter and pressure gauge. These examples sheets may be considered a library source of information which can be used for comparison purposes.

FIGURE 13: ***The Governor Solenoid...***

Figure 13 is an example of monitoring the governor pressure with the use of Snap-On's pressure transducer connected to Snap-On's Vantage digital graphing multi meter. The multi meter is set up in a dual screen mode making it available to monitor both pressure and voltage. The voltage being monitored is the ground side of the solenoid which is wire # 5 in the case connector. If a Vantage multi meter is not available, a typical pressure gauge can be used on the governor tap and a voltmeter probed into wire # 5 with the positive lead and the negative placed to ground.

Note that governor pressure increases proportional to the voltage on the ground side of the governor solenoid. It is important to keep in mind two things, 1. The computer controls the governor solenoid and 2. The voltage seen on the ground wire for the governor solenoid is voltage NOT being used. The solenoid is supplied with system voltage through wire #1 in the case connector. System voltage could be

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

FIGURE 13: ***The governor solenoid continued...***

approximately 13 to 13.5 volts. This system voltage goes through the coil in the solenoid and out through the #5 ground wire to the TCM or PCM. Figure 13 shows that when the vehicle is not moving and governor pressure is at 0 psi, approximately 8.5 of unused volts is seen. Since this solenoid is being supplied with approximately 13.5 volts and 8.5 unused volts are observed on the # 5 ground wire, it means that the computer is using 5 volts to fully energize the governor solenoid producing 0 psi. As the vehicle speed increases, the computer slowly begins to turn the solenoid off explaining the observance of increased voltage as the voltage seen is the voltage not being used. When a maximum of 60 to 70 psi is seen in the governor circuit, system voltage will be seen on the # 5 ground wire as the solenoid at this point is completely turned off.
The governor solenoid only controls the 1-2 and 2-3 shifts as well as their respective downshifts. The 3-4 shift is controlled by the OD solenoid which is supplied with third gear oil. Should the PCM (96 and later) place the vehicle into fail safe, voltage is cut from wire # 1. This action is the same as unplugging the case connector. The result is third gear only.

FIGURE 14: ***The Governor Sensor...***

Figure 14 is an example of a good working governor transducer. The sensor (Transducer) is a device sending information to the computer as to the approximate pressure inside the governor circuit produced by the governor solenoid. When 0 psi exists in the circuit the transducer sends approximately 0.5 volts to the TCM or PCM through wire # 4 from the case connector. As governor pressure increases, this pressure presses on the tip of the sensor causing the voltage to increase proportional to the pressure increasing. When a maximum of 60 to 70 psi is reached in the governor circuit, the transducer sends approximately 3 volts back to the TCM or PCM.

FIGURE 15: ***Second gear start...***

Figure 15 is an example of what would be observed with a 2nd gear start complaint due to a defective governor pressure sensor (Transducer). To make this diagnosis, what should be noticed is that the pressure gauge indicates 10 to 12 psi at 0 miles per hour. This amount of governor pressure will keep the 1-2 shift valve stroked in an up shifted 2nd gear position. Comparing this chart to the one seen in Figure 12, it is noticed in Figure 15 that with 10 pounds of governor pressure the sensor is sending to the computer a 0.66 volt reading. This indicates to the computer that their is 0 psi in the circuit when actually there is 10. At 10 pounds of pressure, approximately 0.9 volts should be observed as seen in Figure 12. With the computer thinking that it controlled the governor solenoid to produce 0 psi due to faulty data produced by the sensor, it did not attempt to energize the solenoid any further. Changing the sensor will solve this complaint.

FIGURE 16: ***Second gear start...***

Figure 16 is an example of what would be observed with a second gear start due to a stuck 1-2 shift valve. Notice that there is 0 psi of governor pressure and the sensor indicates the same in voltage (0.66). The only way a second gear start could be possible is a 1-2 shift valve stuck in a stroked position.

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

FIGURE 17: No up shift...

Figure 17 is an example of what would be observed in a no up shift situation due to a leak in the governor circuit or a clogged inlet port to the governor solenoid. Notice that the computer is trying to raise governor pressure by turning the solenoid off. The pressure gauge indicates 0 psi in the governor circuit and it never rises. The governor sensor remains at a 0.66 voltage indicating to the computer that governor pressure is not rising which means the senor is working properly. By 30 mph the computer has turned off the governor solenoid as indicated by the full system voltage observed on the ground wire (#5). A leak in the governor circuit or a clogged inlet port to the governor solenoid can then be concluded.

FIGURE 18: ***Third gear start...***

Figure 18 is an example of a third gear start problem due to a mechanically failed governor solenoid. Notice how governor pressure is at a full 60 psi. The governor sensor is sending a 2.95 volt reading which tells the computer that governor pressure is at 60 psi. The computer then begins to increase current draw on the governor solenoid to try to bring down governor pressure. Notice how the voltage is dropping on the # 5 wire. Remember, the voltage seen on the # 5 wire is voltage not being used. The lowest voltage reading observed is 6.3 volts. If you subtract that from 13.5 volts, the computer used as much as 7.2 volts in an attempt to bring down governor pressure based on the information it was receiving from the sensor. With the pressure gauge verifying that governor pressure was high as well as having a third gear start problem, a mechanically failed governor solenoid would be the logical reason for this complaint. It just so happened that this example was taken from a vehicle where the magnet that was in the pan was improperly placed onto the solenoid. The magnet kept the solenoid in a fully applied position causing full governor pressure to remain in the circuit. Another point is that this was a pre 96 vehicle making it a TCM version. Notice that after the computer used as much as 7.2 volts in an attempt to bring down governor pressure it suddenly went to 13.8 volts. This action means the computer had decided to shut the solenoid off going into a failsafe mode. If this was a 96 and later vehicle, the relay would have been turned off cutting the supply voltage to wire # 1 and wire # 5 would have gone to 0 volts.

FIGURE 19: ***Work Sheet...***

Figure 19 can be used as a work sheet when diagnosing a troublesome unit. Fill in all the data and compare the chart to the one seen in Figure 12 and make your diagnosis.

42-47RE TRANSMISSIONS
DIAGNOSTIC INFORMATION *continued*

Use either a transducer from Snap-On with their Vantage OR use a typical pressure gauge on the governor tap

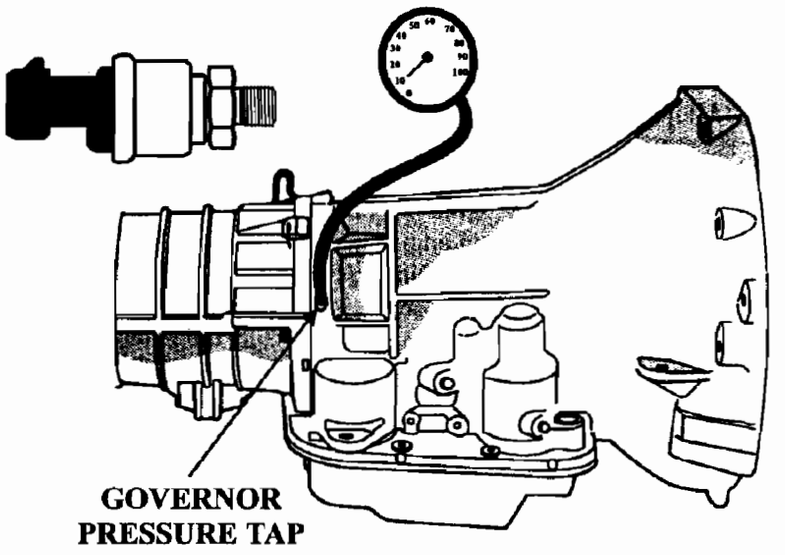


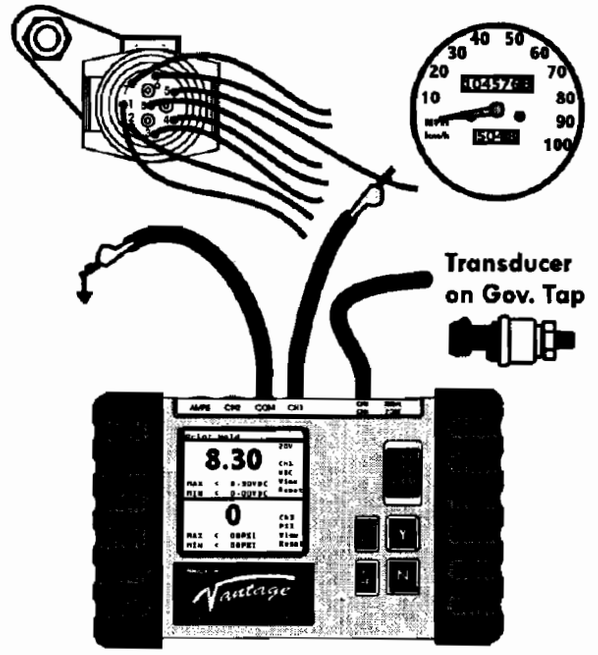
Figure 11

MPH	0	10	20	30	40	50	60
GOVERNOR PSI - GAS	0	10	20	30	40	50	60
GOVERNOR PSI - DIESEL	*0*	*8*	*38*	*60*	*65*	*68*	*70*
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.90	1.10	1.45	1.80	2.15	2.95
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.60	9.45	9.80	10.30	10.80	13.80

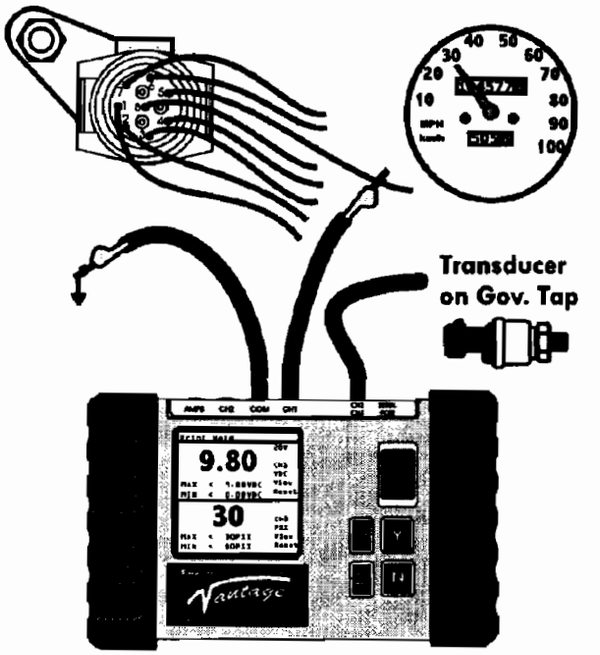
Figure 12

42-47RE TRANSMISSIONS

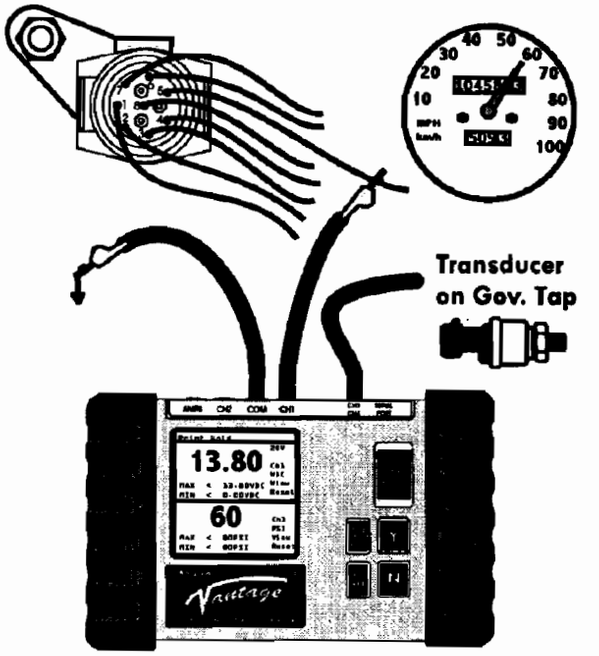
DIAGNOSTIC INFORMATION *continued*



MPH	0	10	20	30	40	50	60
GOVERNOR PSI - *Gas*	0	10	20	30	40	50	60
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.60	9.45	9.80	10.30	10.80	13.80



MPH	0	10	20	30	40	50	60
GOVERNOR PSI - *Gas*	0	10	20	30	40	50	60
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.60	9.45	9.80	10.30	10.80	13.80

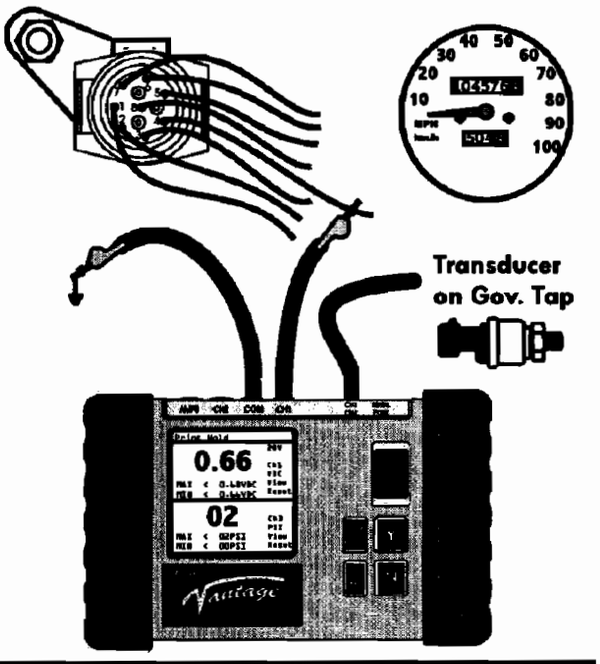


MPH	0	10	20	30	40	50	60
GOVERNOR PSI - *Gas*	0	10	20	30	40	50	60
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.60	9.45	9.80	10.30	10.80	13.80

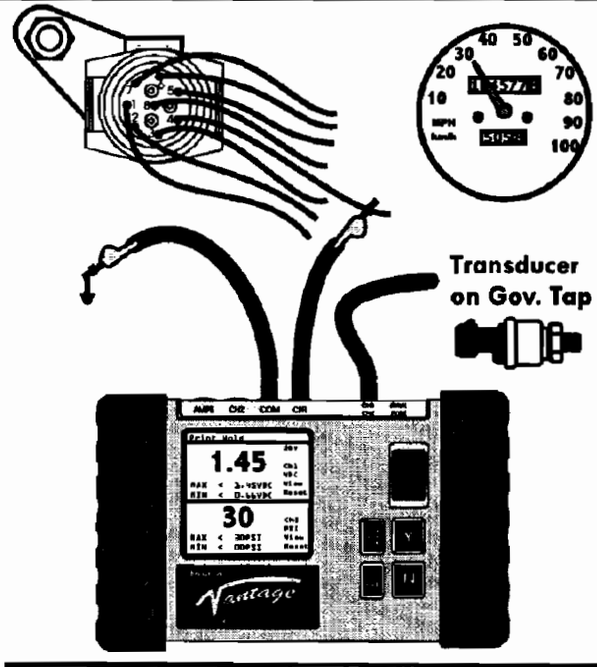
Figure 13

42-47RE TRANSMISSIONS

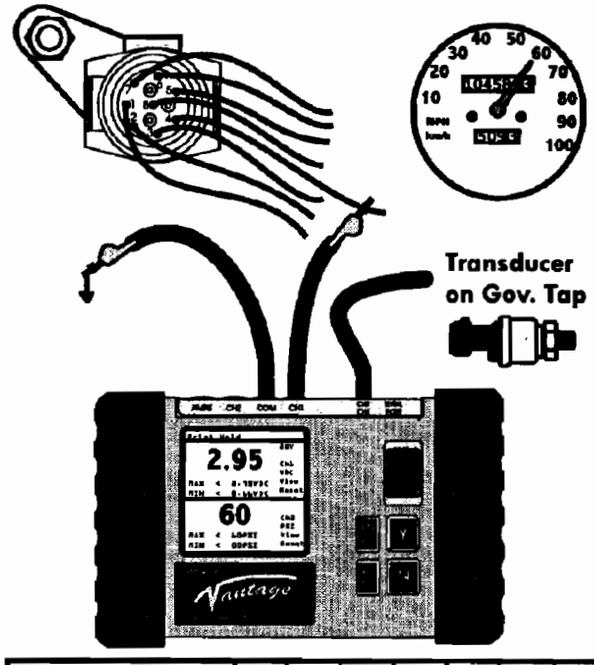
DIAGNOSTIC INFORMATION *continued*



MPH	0	10	20	30	40	50	60
GOVERNOR PSI - *Gas*	0	10	20	30	40	50	60
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.90	1.10	1.45	1.80	2.15	2.95



MPH	0	10	20	30	40	50	60
GOVERNOR PSI - *Gas*	0	10	20	30	40	50	60
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.90	1.10	1.45	1.80	2.15	2.95



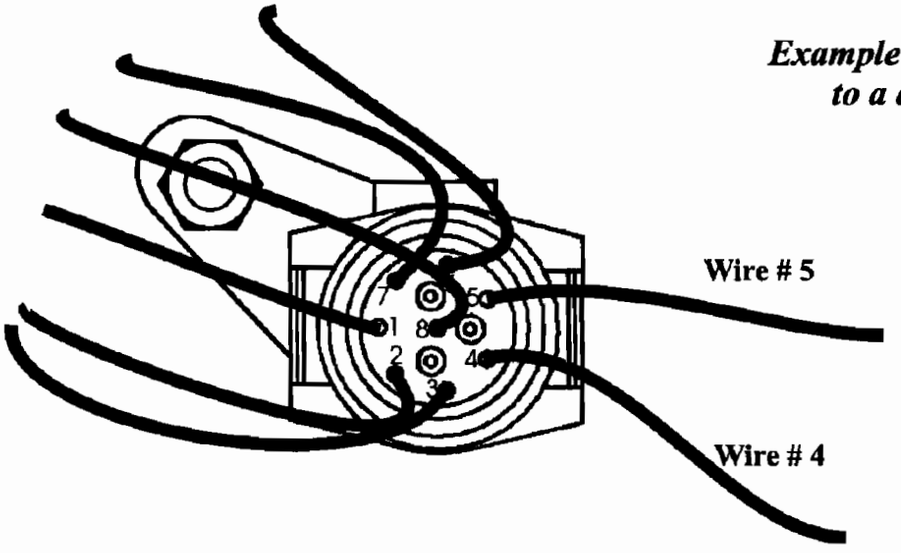
MPH	0	10	20	30	40	50	60
GOVERNOR PSI - *Gas*	0	10	20	30	40	50	60
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.90	1.10	1.45	1.80	2.15	2.95

Figure 14

Automatic Transmission Service Group

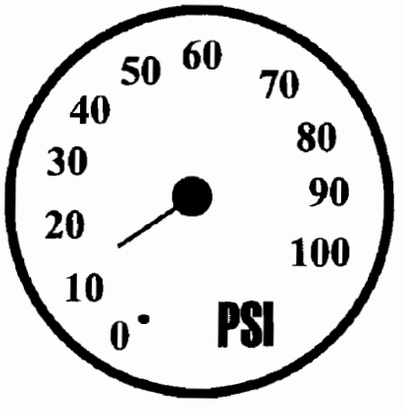
42-47RE TRANSMISSIONS

DIAGNOSTIC INFORMATION *continued*



Example of a 2nd Gear Start due to a defective transducer

MPH	0	10	20	30	40	50	60
GOVERNOR PSI	10	10	20	30	40	50	60
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.66	1.10	1.45	1.80	2.15	2.95
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.60	8.60	9.45	9.80	10.30	10.80	13.80



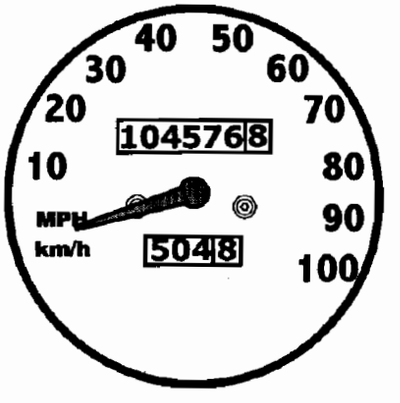
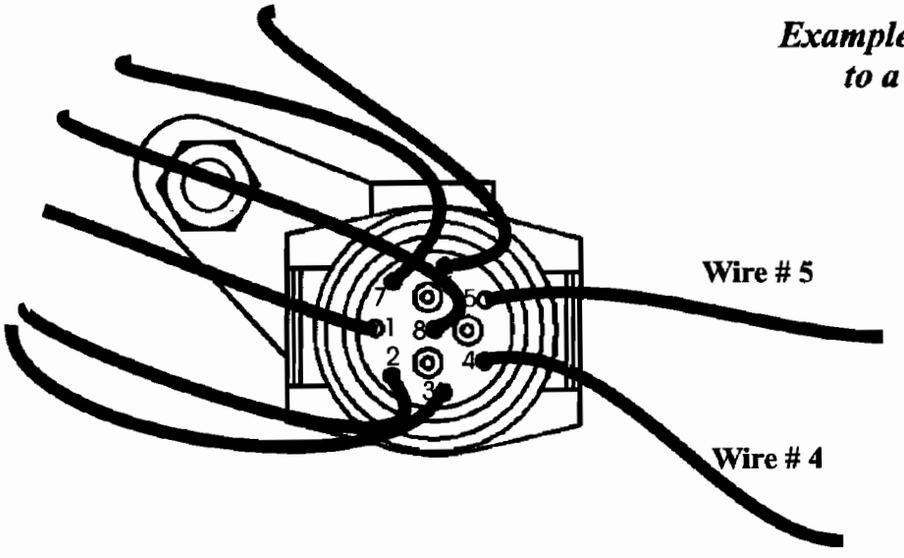


Figure 15

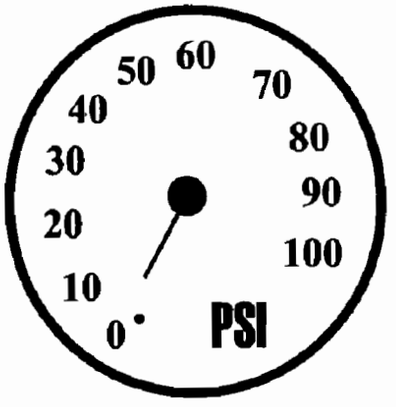
42-47RE TRANSMISSIONS

DIAGNOSTIC INFORMATION *continued*

Example of a 2nd Gear Start due to a stuck 1-2 shift valve



MPH	0	10	20	30	40	50	60
GOVERNOR PSI	0	10	20	30	40	50	60
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.90	1.10	1.45	1.80	2.15	2.95
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.60	9.45	9.80	10.30	10.80	13.80



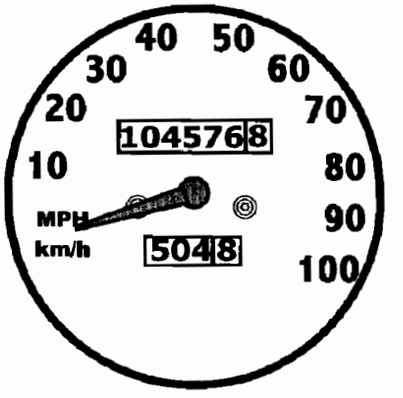
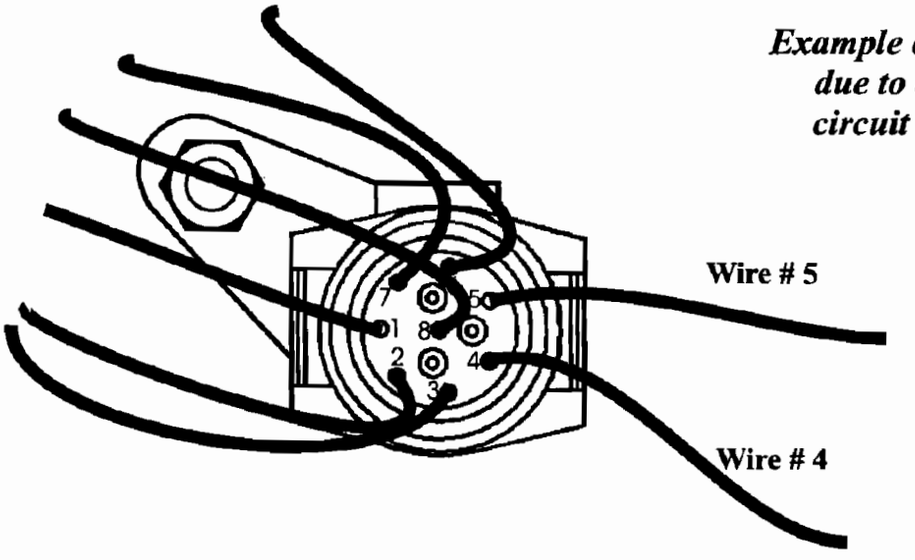


Figure 16

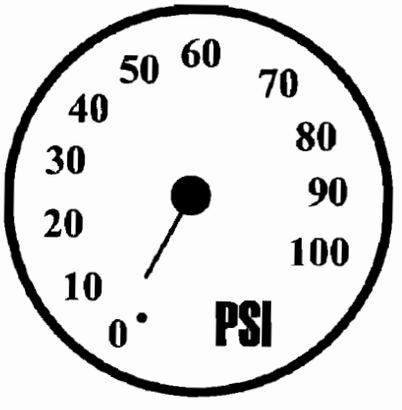
42-47RE TRANSMISSIONS

DIAGNOSTIC INFORMATION *continued*



Example of a no up shift condition due to a leak in the governor circuit or a clogged inlet port to the solenoid

MPH	0	10	20	30	30	30	30
GOVERNOR PSI	0	0	0	0	0	0	0
WIRE # 4 SENSOR SIGNAL VOLTAGE	.66	.66	.66	.66	.66	.66	.66
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.60	9.45	9.80	10.30	10.80	13.80



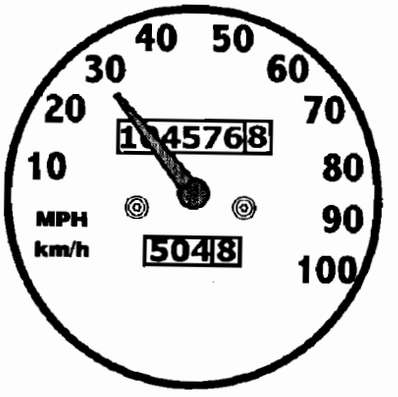
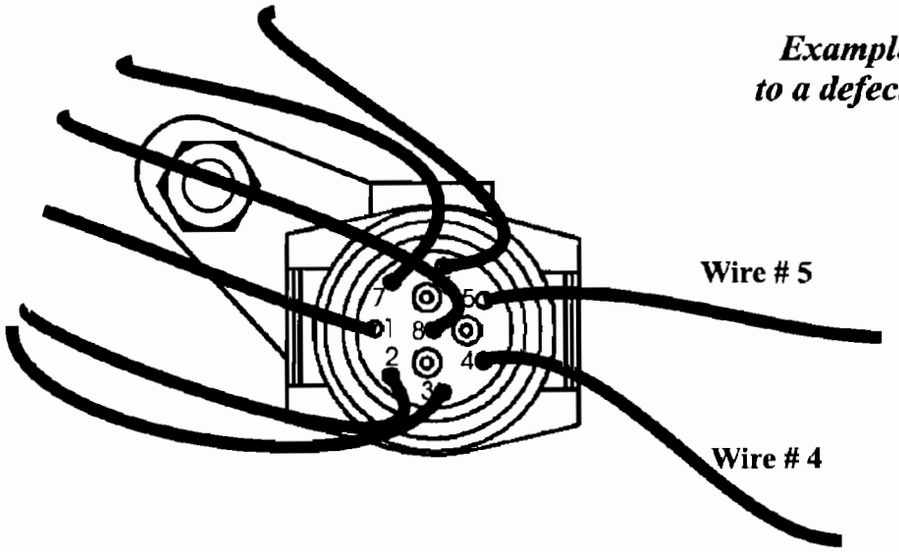


Figure 17

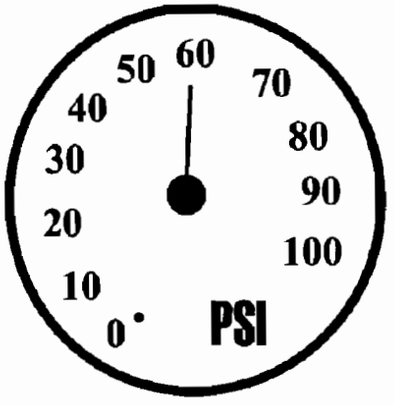
42-47RE TRANSMISSIONS

DIAGNOSTIC INFORMATION *continued*



Example of a 3rd Gear Start due to a defective solenoid mechanically

MPH	0	0	0	0	0	0	0
GOVERNOR PSI	60	60	60	60	60	60	60
WIRE # 4 SENSOR SIGNAL VOLTAGE	2.95	2.95	2.95	2.95	2.95	2.95	2 95
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE	8.30	8.00	7.45	6.80	6.30	13.80	13.80



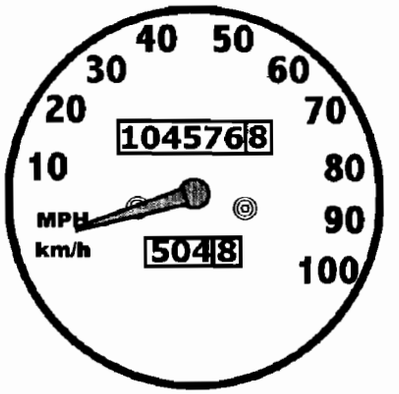
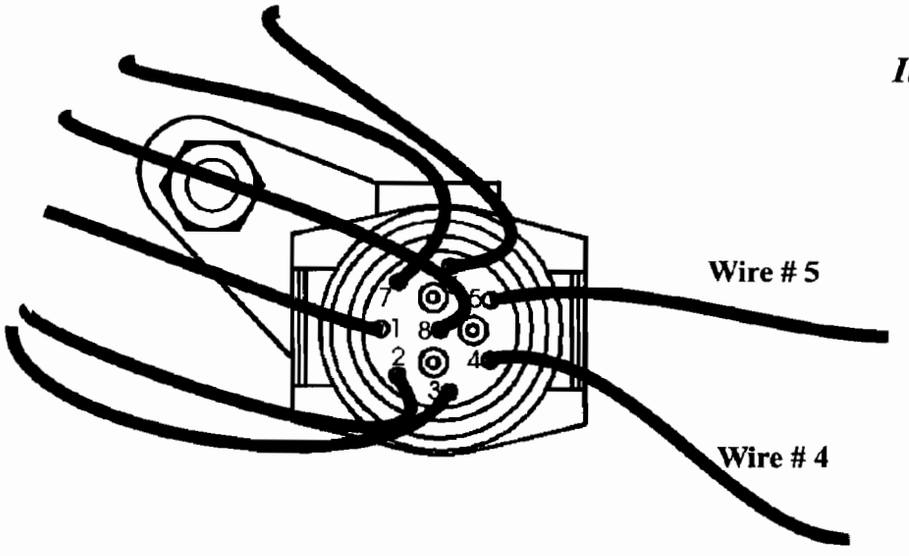


Figure 18

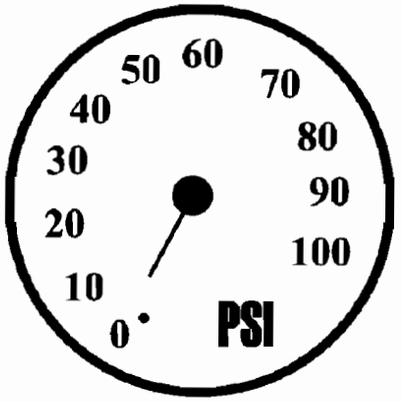
42-47RE TRANSMISSIONS

DIAGNOSTIC INFORMATION *continued*

In Shop Work Sheet



MPH							
GOVERNOR PSI							
WIRE # 4 SENSOR SIGNAL VOLTAGE							
WIRE # 5 SOLENOID GROUND WIRE VOLTAGE							



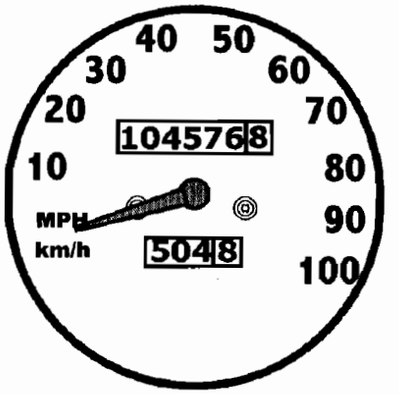


Figure 19