



1997 SEMINAR INFORMATION

"THE RIGHT DIRECTION FOR '97"

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MIAMI, FL 33156
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"THE RIGHT DIRECTION FOR '97"

INTRODUCTION

In this second manual on "THE RIGHT DIRECTION IN '97" seminar, we continue with the General Motors portion of the seminar. The manual goes on to cover the great information on Ford's CD4E, AXODE, E4OD and AODE transmissions. Electrical tips and factory updates as well as complaint, cause and correction information fill this manual to give the technician "The Right Direction in 97".

We thank both General Motors and Ford Motor Company for the illustrations and information that made this booklet possible.

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

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**THM 4L60-E
ACCUMULATOR PISTON WEAR**

COMPLAINT: When the accumulator piston wears with an "Egg-Shaped" hole where the accumulator piston strokes, it can create a delayed engagement to drive, slipping condition in forward gears, slipping 1-2 shift, slipping 3-4 shift, depending on which accumulator piston is worn, and how bad it is worn.

CAUSE: The cause may be, a worn accumulator piston pin bore (See Figure 1).

CORRECTION: Replace the accumulator piston with the proper part number from "Service Information" as shown below.

SERVICE INFORMATION:

1-2 Accumulator Piston (Package of 2)	8684429
3-4 Accumulator Piston (Package of 2)	8682096
Forward Clutch Accumulator Piston	8679738

Service Note:

The THM 4L60-E, 3-4 accumulator piston is same as 700-R4.

The THM 4L60-E, 1-2 accumulator piston has a smaller pin diameter.

The THM 4L60-E, forward accumulator piston is a smaller outside diameter.

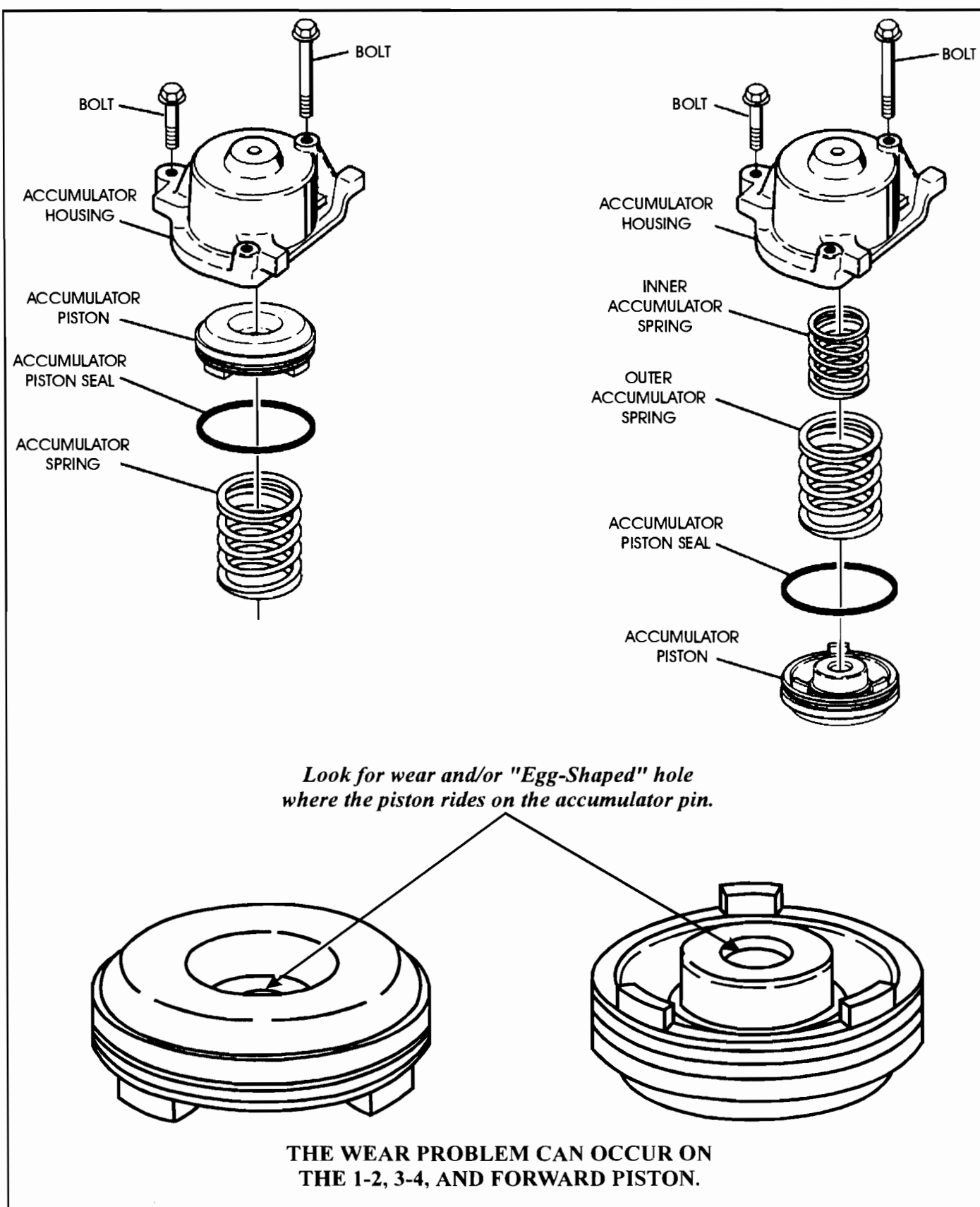


Figure 1



**THM 4L60-E
NEW DESIGN PUMP ROTOR
AND SLIDE FOR 1997 MODELS**

CHANGE: Beginning at the start of production for all 1997 models, there was a new design 13 vane pump rotor and new design pump slide installed in all THM 4L60-E transmissions (See Figure 1).

REASON: To help eliminate "Pump Whine" and pressure regulator valve buzzing noises.

PARTS AFFECTED:

- (1) OIL PUMP ROTOR - Now has 13 vanes in the pump rotor instead of the previous 10 vanes, as shown in Figure 1.
- (2) OIL PUMP SLIDE - Now has longer porting slots on the face of the slide (See Figure 1).
- (3) ROTOR GUIDE - Now has 13 slots in the rotor guide to accommodate the added vanes.
- (4) OIL PUMP COVER - Now has different configuration on the porting slots in the pump cover to accommodate the changes in the pump slide (See Figure 2). The 13 vane pump cover can be easily identified with "13 V" cast into the back side in the location shown in Figure 3.
- (5) VANE RINGS - Material change to increase vane ring durability.

INTERCHANGEABILITY:

None of the parts listed above will retro-fit back on previous models, unless all are used as a package, and even then will only fit back to 1995. This is not recommended.

SERVICE INFORMATION:

13 Vane Rotor (17.955mm)	24205400
13 Vane Rotor (17.968mm)	24205401
13 Vane Rotor (17.981mm)	24205402
13 Vane Rotor (17.994mm)	24205403
13 Vane Rotor (18.007mm)	24205404
97 Pump Slide (17.955mm)	24205405
97 Pump Slide (17.968mm)	24205406
97 Pump Slide (17.981mm)	24205407
97 Pump Slide (17.994mm)	24205408
97 Pump Slide (18.007mm)	24205409
Plastic Rotor Guide (13 Vane)	24205410
Oil Pump Vanes (13 Required)	8631280
Pump Vane Rings (13 Vane)	24201144

**13 VANE PUMP ROTOR AND SLIDE
FOR 1997 MODELS**

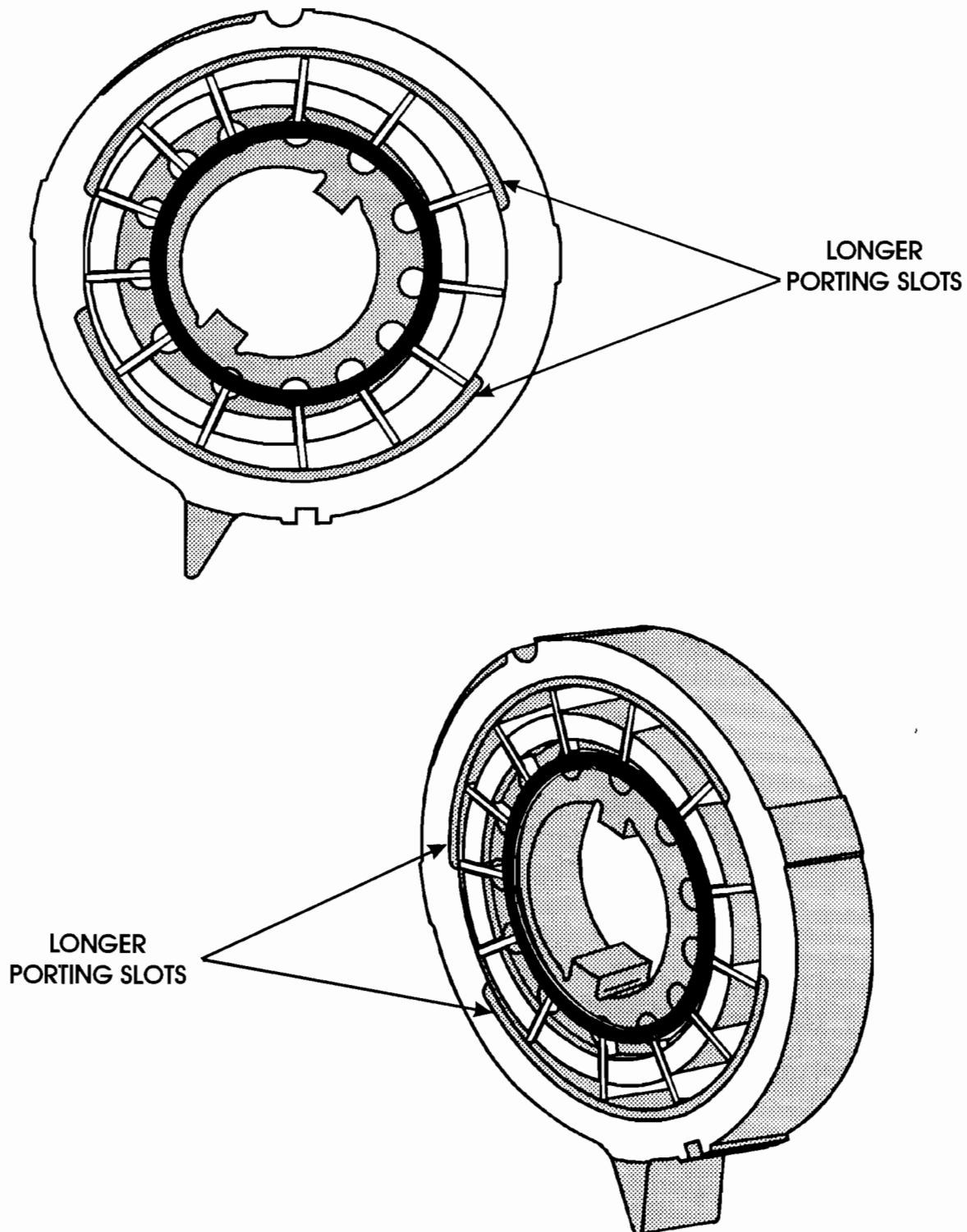
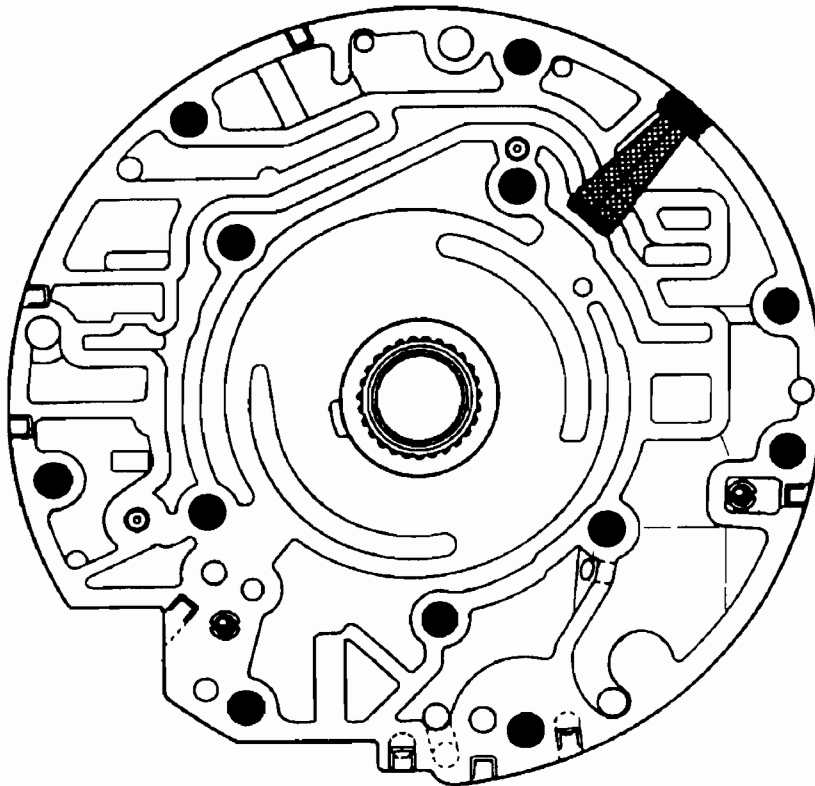


Figure 1

95-96 "PWM" PUMP COVER



1997 "13 V" PUMP COVER

"PORTING SLOTS"
ARE DIFFERENT THAN
PREVIOUS MODELS

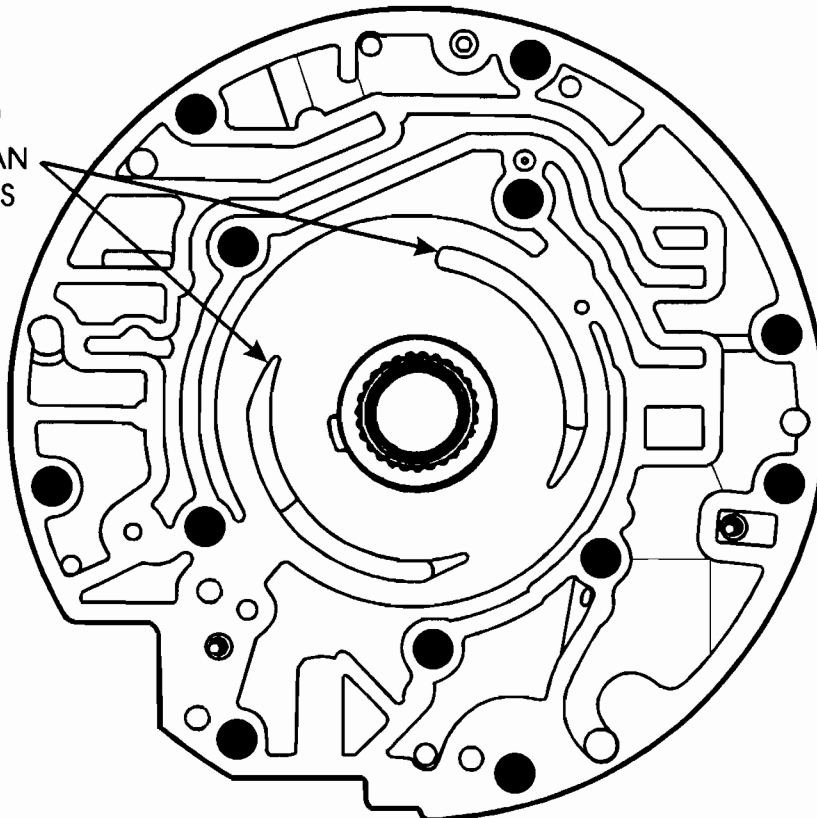
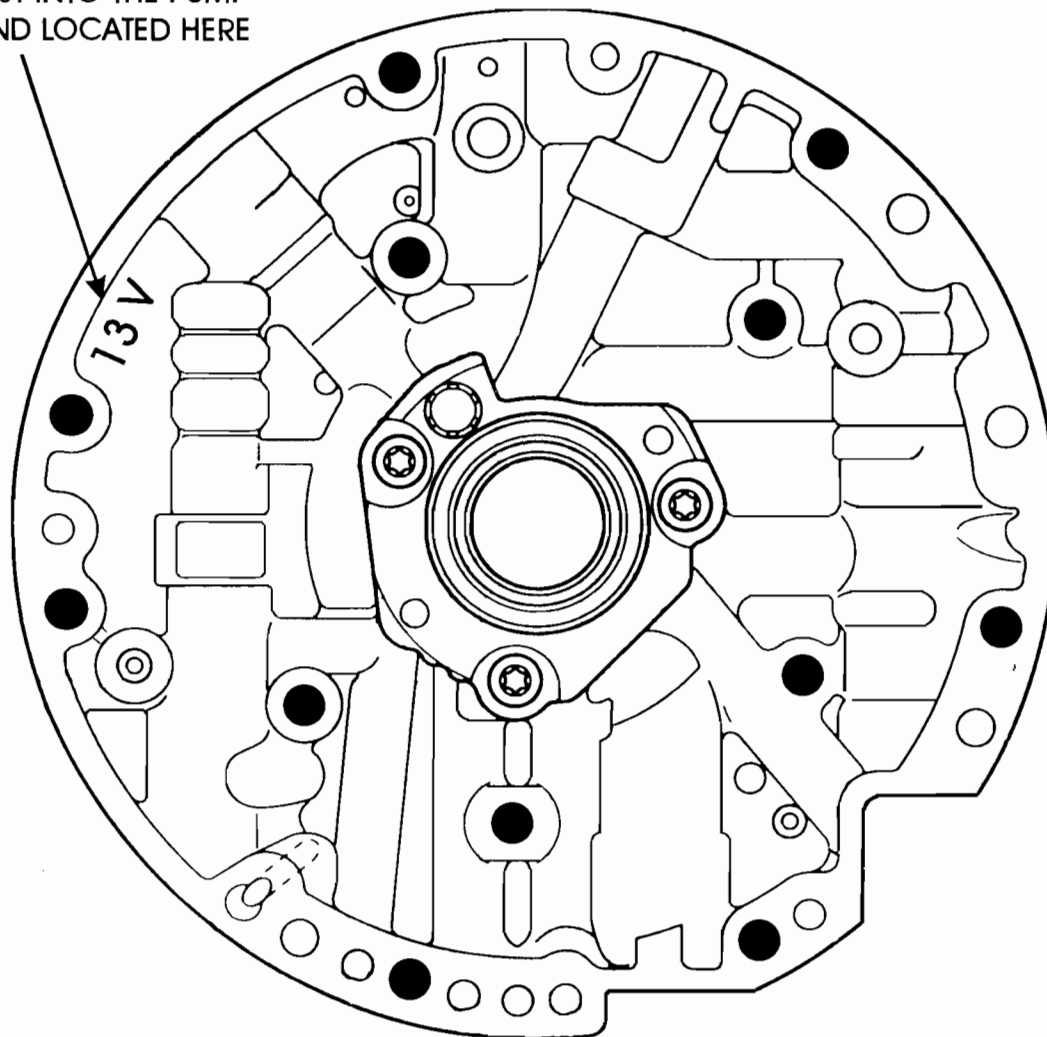


Figure 2
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**1997 13-VANE PUMP COVER
IDENTIFICATION**

"13 V" CAST INTO THE PUMP
COVER AND LOCATED HERE



***THIS PUMP COVER WILL NOT INTERCHANGE WITH PREVIOUS MODELS.
IT MUST BE USED WITH THE 13 VANE ROTOR AND SLIDE.***

Figure 3



1997 SEMINAR INFORMATION

SLIDE

10

THM 4L60-E PUMP INTERCHANGE

1993 -1994 MODELS:

Pump Body - All models use the 10 Vane rotor and slide assembly, and this Pump Body has the same casting and worm track configuration as the 1985-1993 models of the 700-R4 transmission. Refer to Figure 3.

Pump Cover - All models of the 4L60-E have a larger diameter filter seal bore, as shown in Figure 1 and is the easiest way to distinguish the 93-94 4L60-E Pump Cover from the 700-R4 version. The 93-94 4L60-E worm track configuration is shown in Figure 5.

1995 -1996 MODELS:

Pump Body - All models use the 10 Vane rotor and slide assembly, but this Pump Body has a different casting and worm track configuration than the 93-94 model Pump Body and **will not** interchange. The 95-96 Pump Body is easily identified with "PWM" cast into the front side, as shown in Figure 4. The "Bolt-On" bell housing was also introduced in 1996, which required the added "Flange" to center the bell housing. Refer to Figure 4.

Pump Cover - Has a different casting and worm track configuration than the 93-94 model Pump Cover and **will not** interchange. The 95-96 Pump Cover is easily identified with "PWM" cast into the back side in the location shown in Figure 6.

1997 MODELS:

Pump Body - Has the same worm track configuration as the 95-96 "PWM" Pump Body, but a 13 Vane rotor and slide assembly was introduced, as shown in Figure 7. The 13 Vane slide has longer "Porting Slots" as shown in Figure 7. The "PWM" is still cast into the front side of the Pump Body. Refer to Figure 7.

Pump Cover - Has the same worm track configuration as the 95-96 "PWM" Pump Cover, but the "Porting Slots" are a different configuration than the 95-96 Pump Cover, to accommodate the changes in the 13 Vane rotor and slide. Refer to Figure 8. The 13 Vane Pump Cover is easily identified with "13 V" cast into the back side of the Pump Cover in the location shown in Figure 8.

INTERCHANGEABILITY:

Refer to the interchange chart shown in Figure 2.

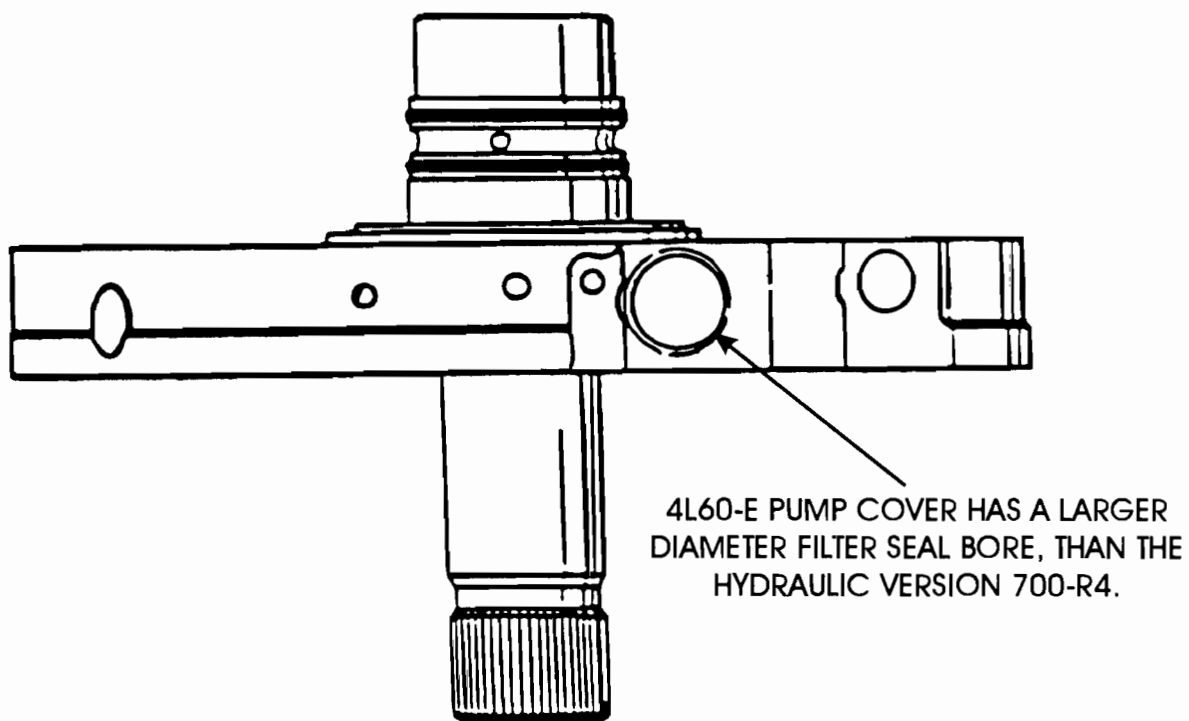


Figure 1

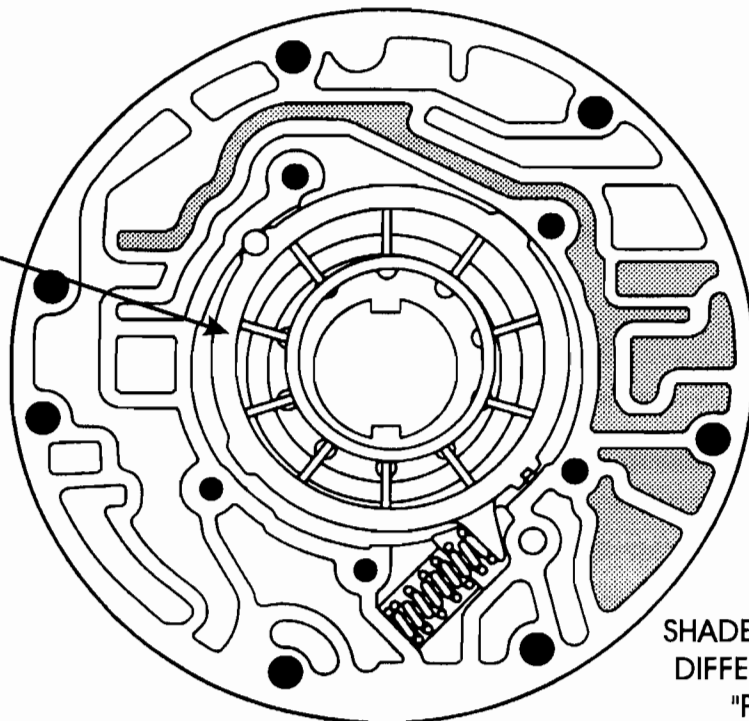
THM 4L60-E INTERCHANGE CHART

	93-94 COVER (Fig. 5)	95-96 COVER (Fig. 6)	13 VANE COVER (Fig. 8)
93-94 BODY (Fig. 3)	YES	NO	NO
95-96 BODY (Fig. 4)	NO	YES	NO
13 VANE BODY (Fig. 7)	NO	NO	YES
85-93 700-R4 BODY (10 V)	YES	NO	NO

Figure 2

1993-1994 THM 4L60-E
PUMP BODY
(Worm Track Side)

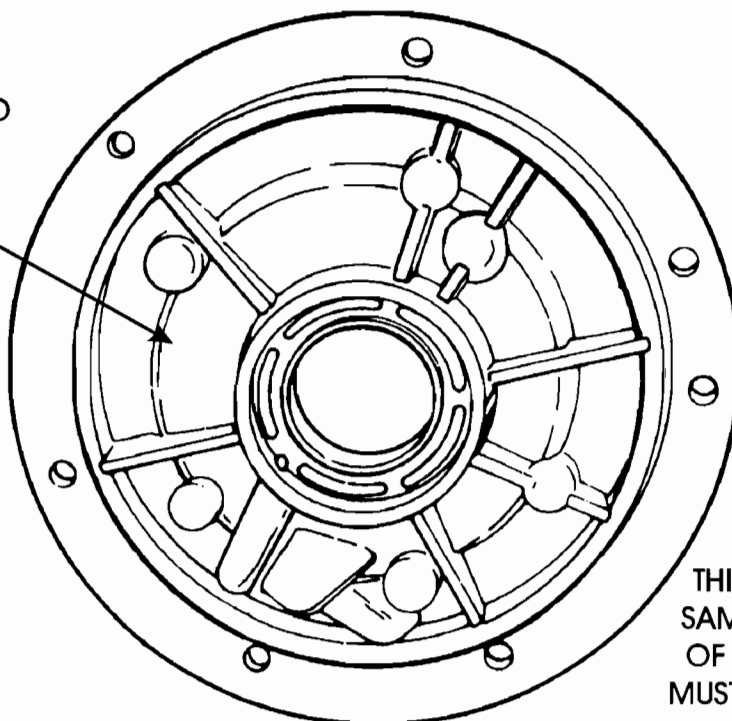
10 VANE
ROTOR AND SLIDE



SHADED WORM TRACKS ARE
DIFFERENT THAN THE 95-96
"PWM" PUMP BODY

1993-1994 THM 4L60-E
PUMP BODY
(Front Side)

NO "PWM" CAST INTO
THE PUMP BODY



THIS PUMP BODY IS THE
SAME AS 85-93 MODELS
OF THE THM 700-R4 BUT
MUST USE 10 VANE ROTOR

Figure 3

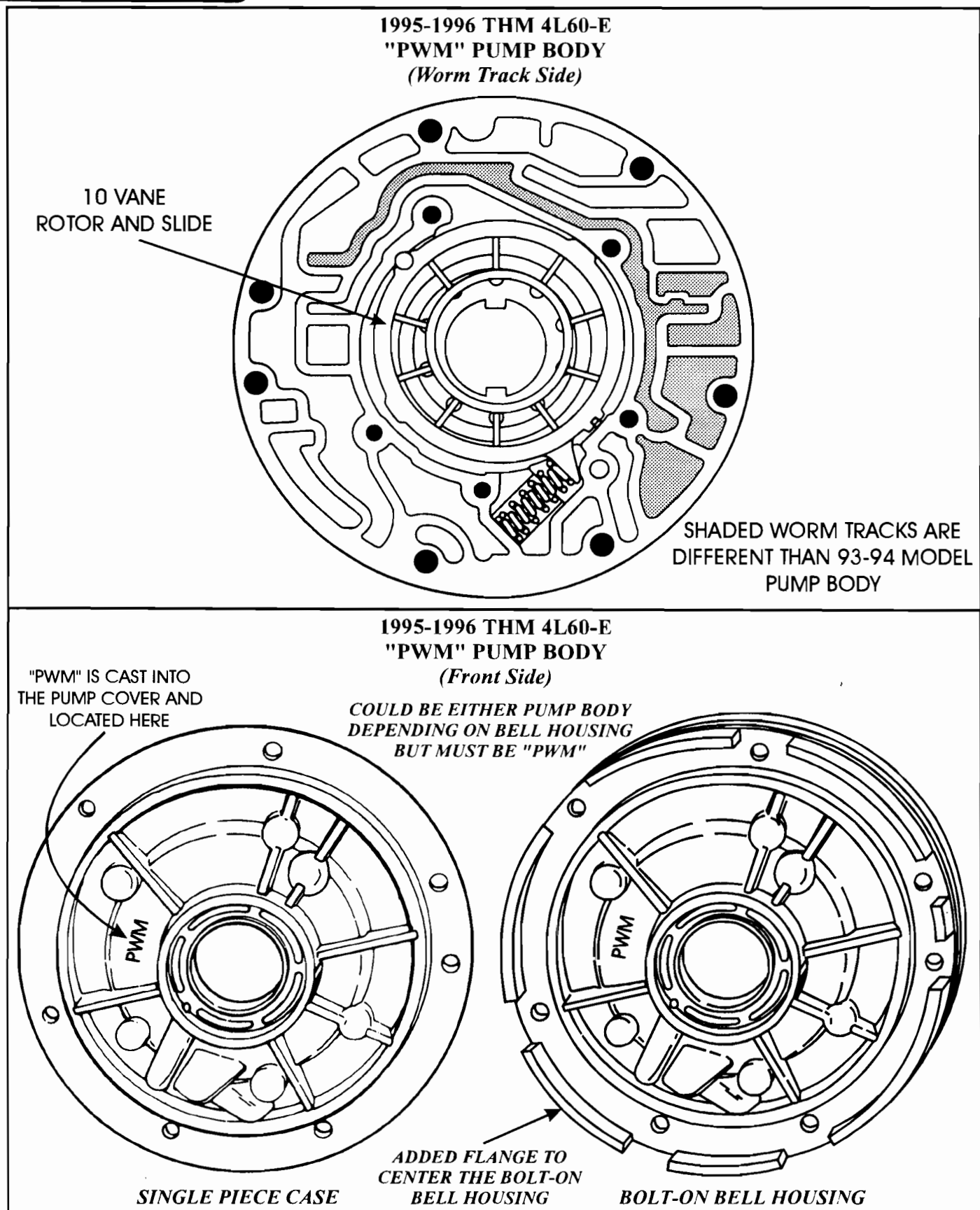
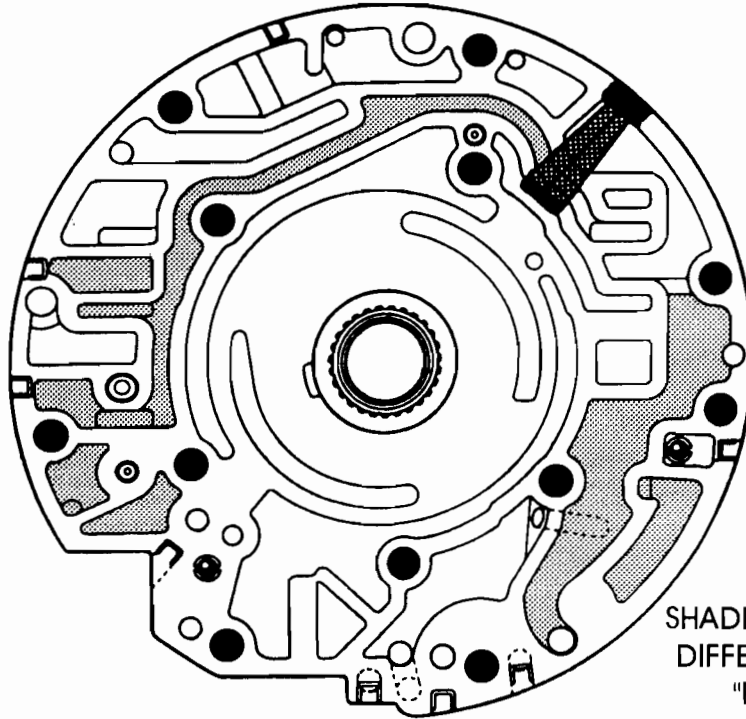


Figure 4

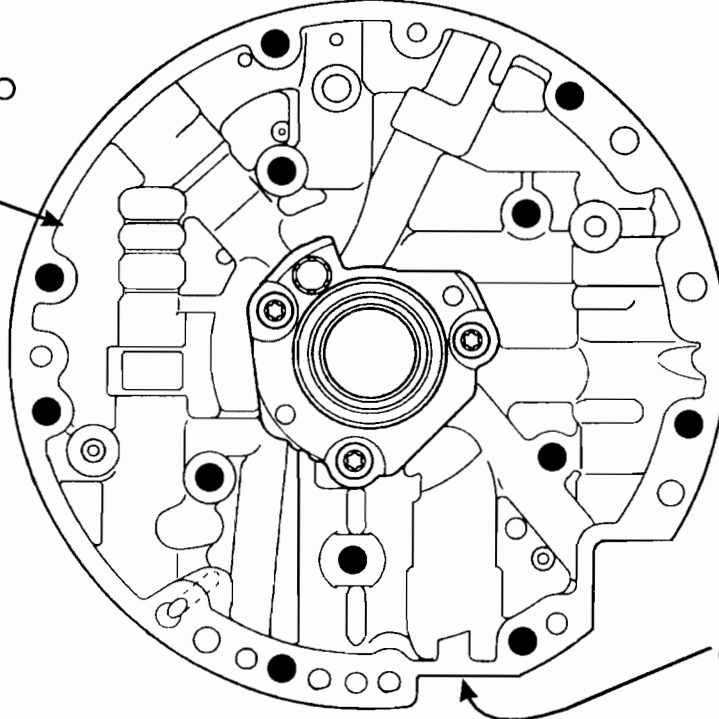
1993-1994 THM 4L60-E
PUMP COVER
(Worm Track Side)



SHADED WORM TRACKS ARE
DIFFERENT THAN THE 95-96
"PWM" PUMP BODY

1993-1994 THM 4L60-E
PUMP COVER
(Back Side)

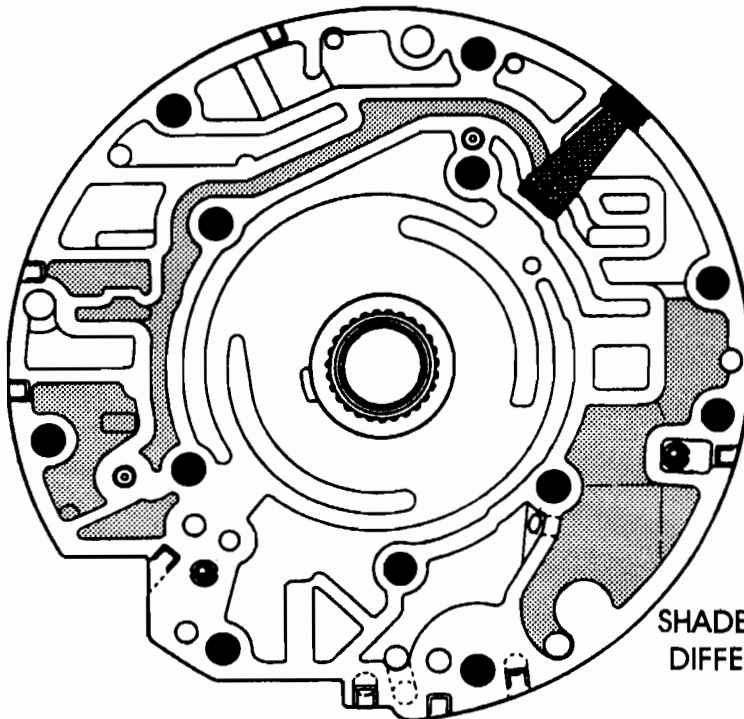
NO "PWM" CAST INTO
THE PUMP COVER



FILTER SEAL BORE
DIAMETER IS LARGER
ON "ALL" THM 4L60-E
PUMP COVERS

Figure 5

1995-1996 THM 4L60-E
"PWM" PUMP COVER
(Worm Track Side)



SHADED WORM TRACKS ARE
DIFFERENT THAN THE 93-94
PUMP BODY

1995-1996 THM 4L60-E
"PWM" PUMP COVER
(Back Side)

"PWM" IS CAST INTO
THE PUMP COVER FOR
IDENTIFICATION AND
LOCATED HERE

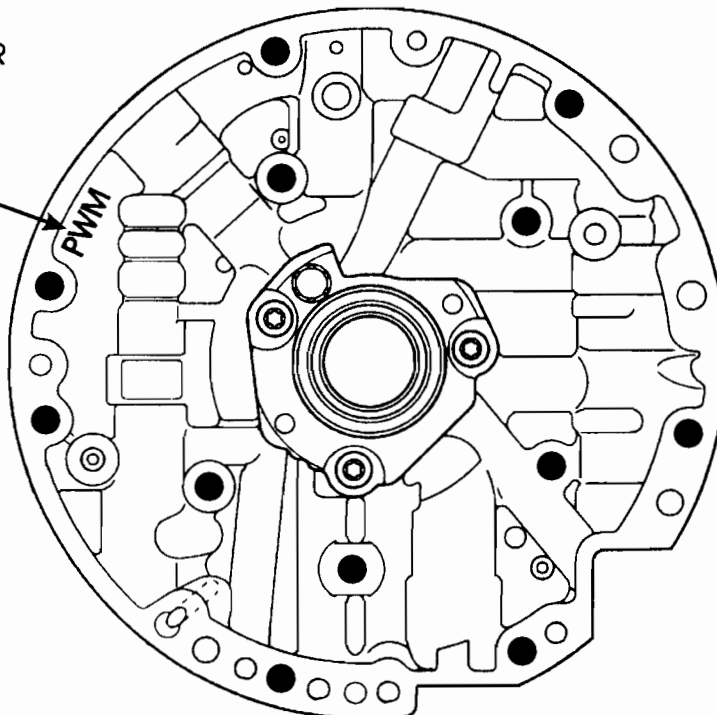


Figure 6

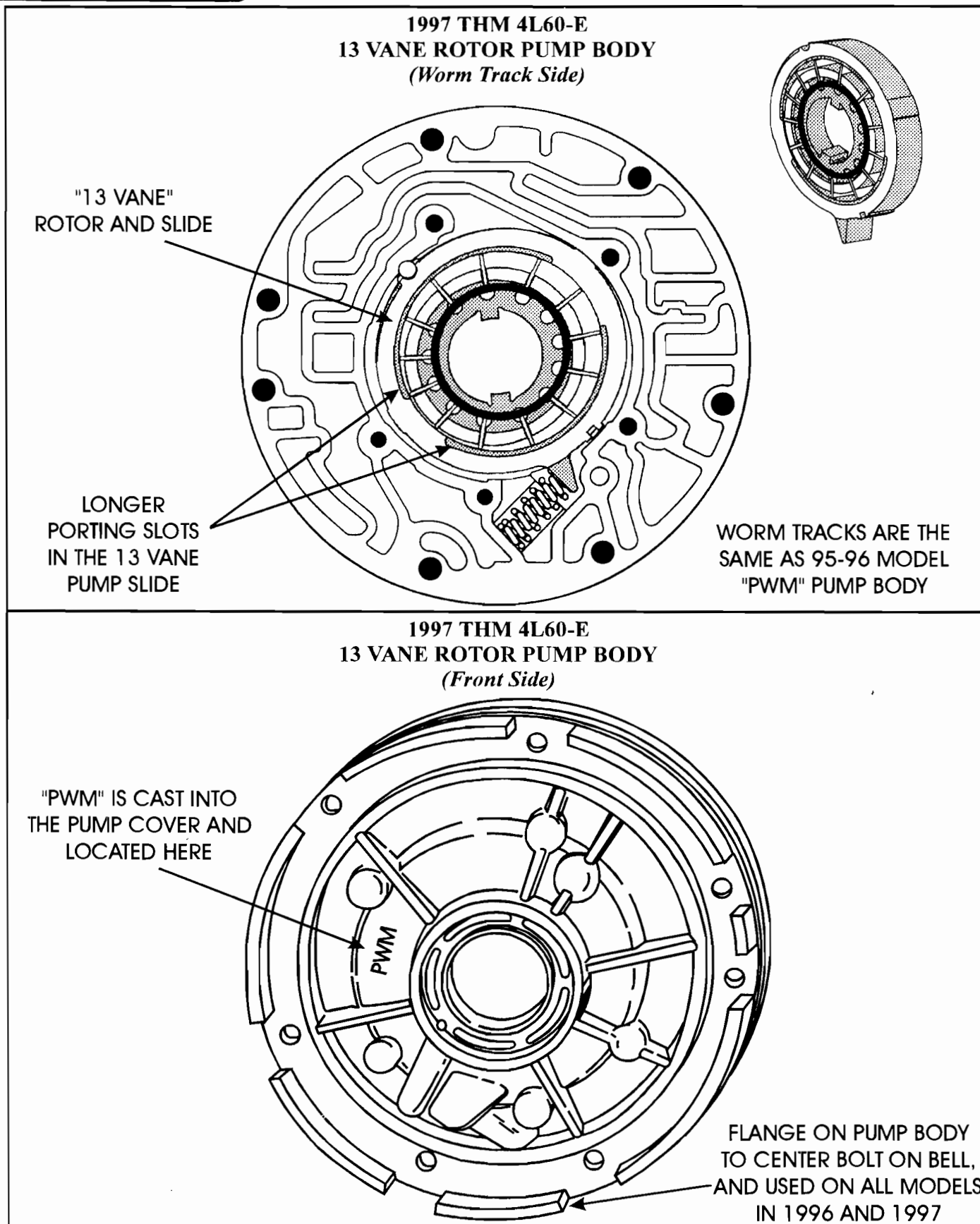
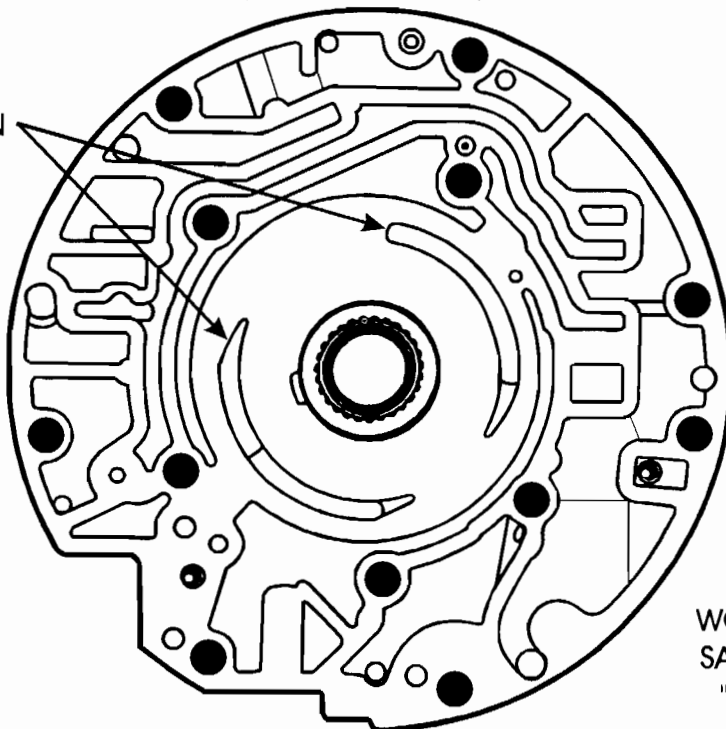


Figure 7

1997 13 VANE ROTOR
"PWM" PUMP COVER
(Worm Track Side)

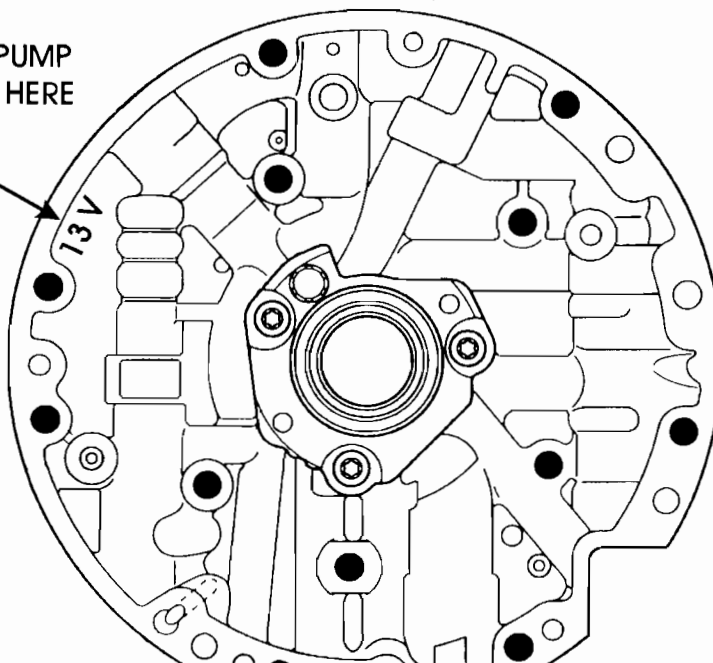
"PORTING SLOTS"
ARE DIFFERENT THAN
PREVIOUS MODELS



WORM TRACKS ARE THE
SAME AS 95-96 MODEL
"PWM" PUMP COVER

1997 13 VANE ROTOR
"PWM" PUMP COVER
(Back Side)

"13 V" CAST INTO THE PUMP
COVER AND LOCATED HERE

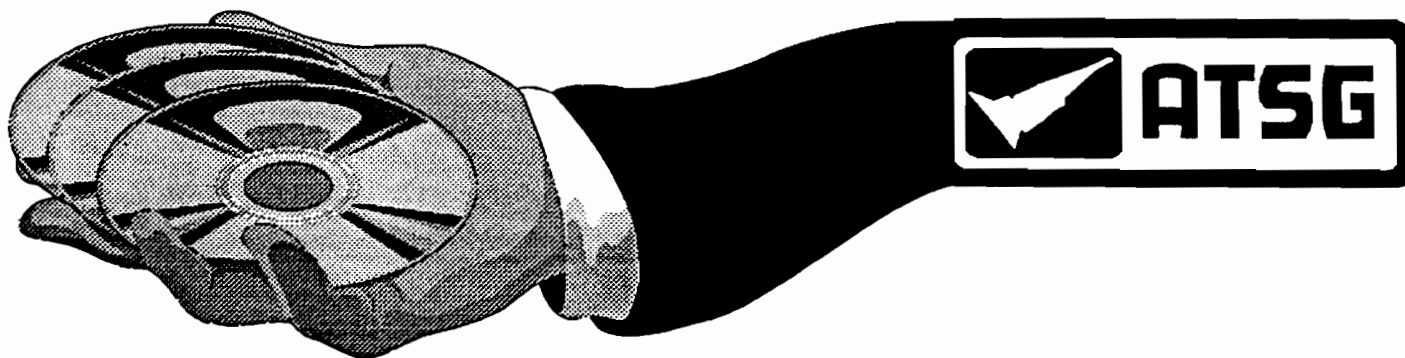


**THIS PUMP COVER WILL NOT INTERCHANGE WITH PREVIOUS MODELS.
IT MUST BE USED WITH THE 13 VANE ROTOR AND SLIDE.**

Figure 8

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THM 4L60-E SPACER PLATE IDENTIFICATION

Refer to Figure 2 for 1993 4L60-E spacer plate identification.
Refer to Figure 3 for 1994 4L60-E spacer plate identification.
Refer to Figure 4 for 1995 4L60-E spacer plate identification.
Refer to Figure 5 for 1996 4L60-E spacer plate identification.

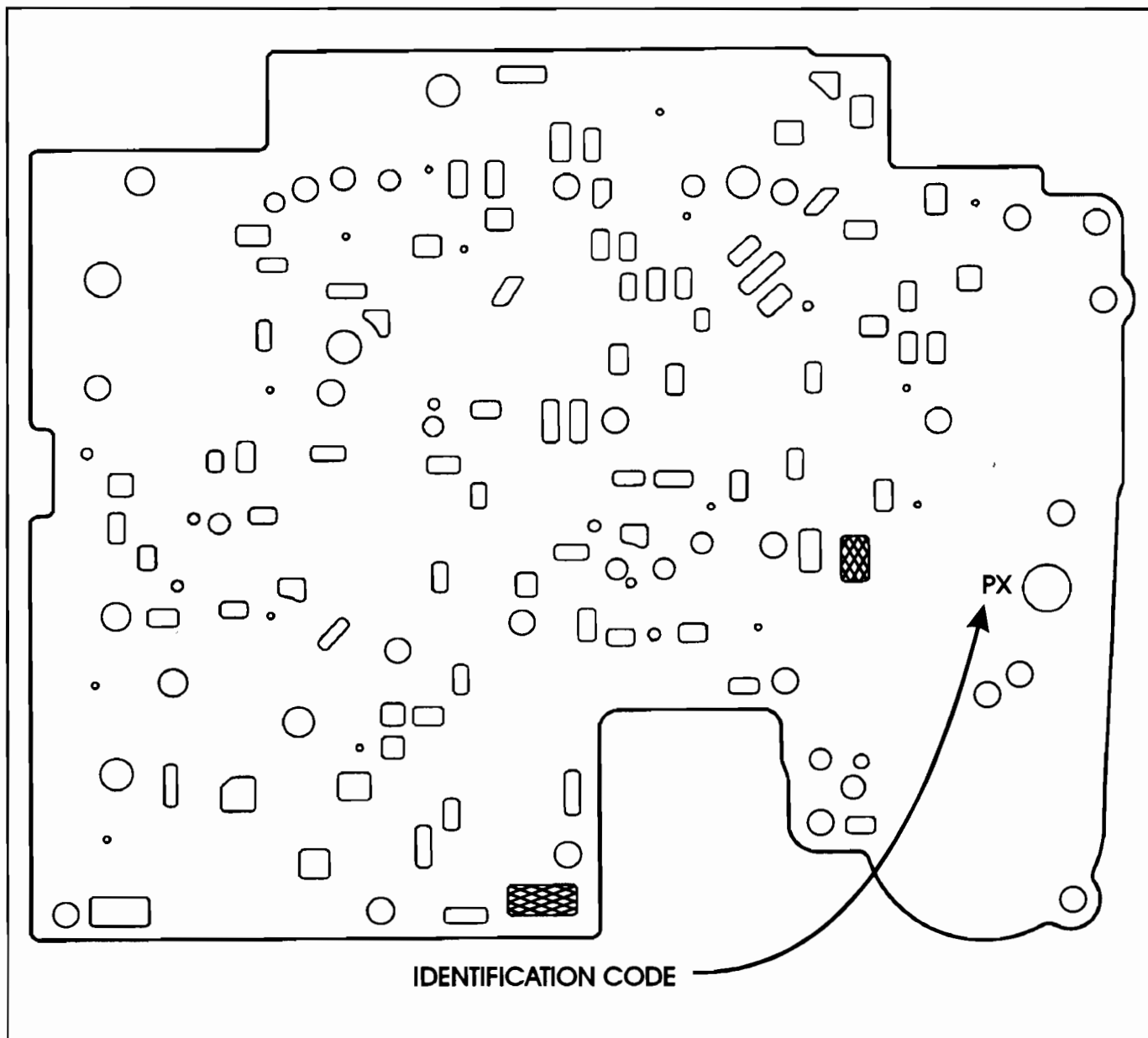


Figure 1



1993 THM 4L60-E SPACER PLATE CHART						
PART NO.	8684122	8684123	8684124	8684125	8684126	
I.D. CODE	JV	JW	JX	JY	JZ	
FITS THESE MODELS	MJD MND MSD TAD TBD MDD	SHD TLD CAD CBD KAD TWD	CCD CFD KBD	CJD CHD KCD	CKD CLD KDD	

Figure 2

1994 THM 4L60-E SPACER PLATE CHART						
PART NO.	8686011	8686012	8686013	8686037	8686038	8686039
I.D. CODE	KO	KP	KS	KT	KU	KV
FITS THESE MODELS	BBD	BWD	FDD SFD	FFD YDD	HBD	HDD
PART NO.	8686040	8686041	8686042	8686043	8686044	8686045
I.D. CODE	KW	KX	KY	KZ	LA	LB
FITS THESE MODELS	SHD TLD MJD CAD CBD KAD MND TWD	MSD TAD TBD MDD	SAD	CCD CFD KBD	CHD CJD KCD CPD	CMD CUD KPD
PART NO.	24200361	24200608	24200609			
I.D. CODE	LC	LD	LE			
FITS THESE MODELS	BFD	AHD	BCD			

Figure 3



1997 SEMINAR INFORMATION
SLIDE

21

1995 THM 4L60-E SPACER PLATE CHART						
PART NO.	24201484	24201485	24201486	24201487	24201488	24201489
I.D. CODE	MP	MS	MT	MU	MV	MW
FITS THESE MODELS	STD	SHD TLD CAD CBD KHD CRD CSD	TAD TBD TYD TZD	CCD CDD CHD CJD CLD CND CWD KTD KWD LHD	CKD CMD KMD LUD	MSD MDD
PART NO.	24201490	24201491	24201492	24201493	24201494	24202313
I.D. CODE	MX	MY	MZ	NA	NB	NC
FITS THESE MODELS	BBD BCD	BWD	AHD	BFD	FFD YDD	HBD
PART NO.	24202314	24202813	24203084	24203918		
I.D. CODE	ND	NE	NG	NH		
FITS THESE MODELS	HDD HCD	FCD	HSD	FDD		

Figure 4



1996 THM 4L60-E SPACER PLATE CHART						
PART NO.	24203222	24204438	24203283	24203947	24203948	24203949
I.D. CODE	PA	PC	PG	PL	PM	PN
FITS THESE MODELS	SAD	CCD CFD KBD WBD	HDD HCD	BBD	BCD	BWD
PART NO.	24203950	24203951	24203952	24203953	24203946	24204435
I.D. CODE	PP	PS	PT	PU	PW	PX
FITS THESE MODELS	AHD	FBD FCD	BFD BKD	FFD YDD	CPD	SHD TLD MSD TAD TBD MDD
PART NO.	24204438	24207492	24205978	24205979		
I.D. CODE	PY	PZ	SC	SD		
FITS THESE MODELS	CAD CBD KAD	CHD CJD KCD WHD	HBD	HSD		

Figure 5



THM 4L60-E INTERNAL WIRE HARNESS IDENTIFICATION

1993 Models Only - Has a **"Single"** guide rail on the side of the wire harness connector that connects to the Pressure Switch Assembly, and the harness connector is **Red** in color, as shown in Figure 24.

1994 Models Only - Has **"Two"** guide rails on the top of the wire harness connector that connects to the Pressure Switch Assembly, and the harness connector is **White** in color, as shown in Figure 25.

1995 Models Only - Has an added **"TCC/PWM Solenoid"** on the valve body which requires an added connector to the internal wire harness assembly. Both the added TCC/PWM Solenoid and the 3-2 PWM Solenoid are the same part number and their harness connectors are **Blue** in color as shown in Figure 26. 1995 Models use the White harness connector for the Pressure Switch Assembly, as shown in Figure 26.

1996 Models Only - The **"3-2/PWM" Downshift Solenoid** was changed to an **"On-Off" 3-2 Downshift Solenoid**, which changes the solenoid's part number, and the connector for the new design solenoid. The TCC/PWM Solenoid internal harness connector remains **Blue** in color, with the "Fat" tab on the left side as shown in Figure 4. The new design 3-2 "On-Off" Downshift Solenoid harness connector is **Gray** in color, with the "Fat" tab on the right side as shown in Figure 27.

SERVICE INFORMATION:

Internal Wire Harness (1993 Only)	12121299
Internal Wire Harness (1994 Only)	12143279
Internal Wire Harness (1995 Only)	12163009
Internal Wire Harness (1996 Only)	12163408
Pressure Switch Assembly (1993 Only)	8678450
Pressure Switch Assembly (94-96 Only)	8686147
3-2 "PWM Solenoid (93-95 Only)	8683187
3-2 "On-Off" Solenoid (1996 Only)	24203267
Shift Solenoid "A" and "B" (All Models)	10478120
TCC/PWM Solenoid (95-96 Only)	8683187
EPC Solenoid (1993 Only)	8683434
EPC Solenoid (94-96 Only)	24203101
Output Shaft Speed Sensor (93-95 Only)	8673299
Output Shaft Speed Sensor (1996 Models - "Except Corvette")	10456194
Output Shaft Speed Sensor (1996 Corvette)	8673299

WIRE HARNESS AND CONNECTORS FOR 1993 MODELS ONLY
INTERNAL WIRE HARNESS PART NUMBER 12121299

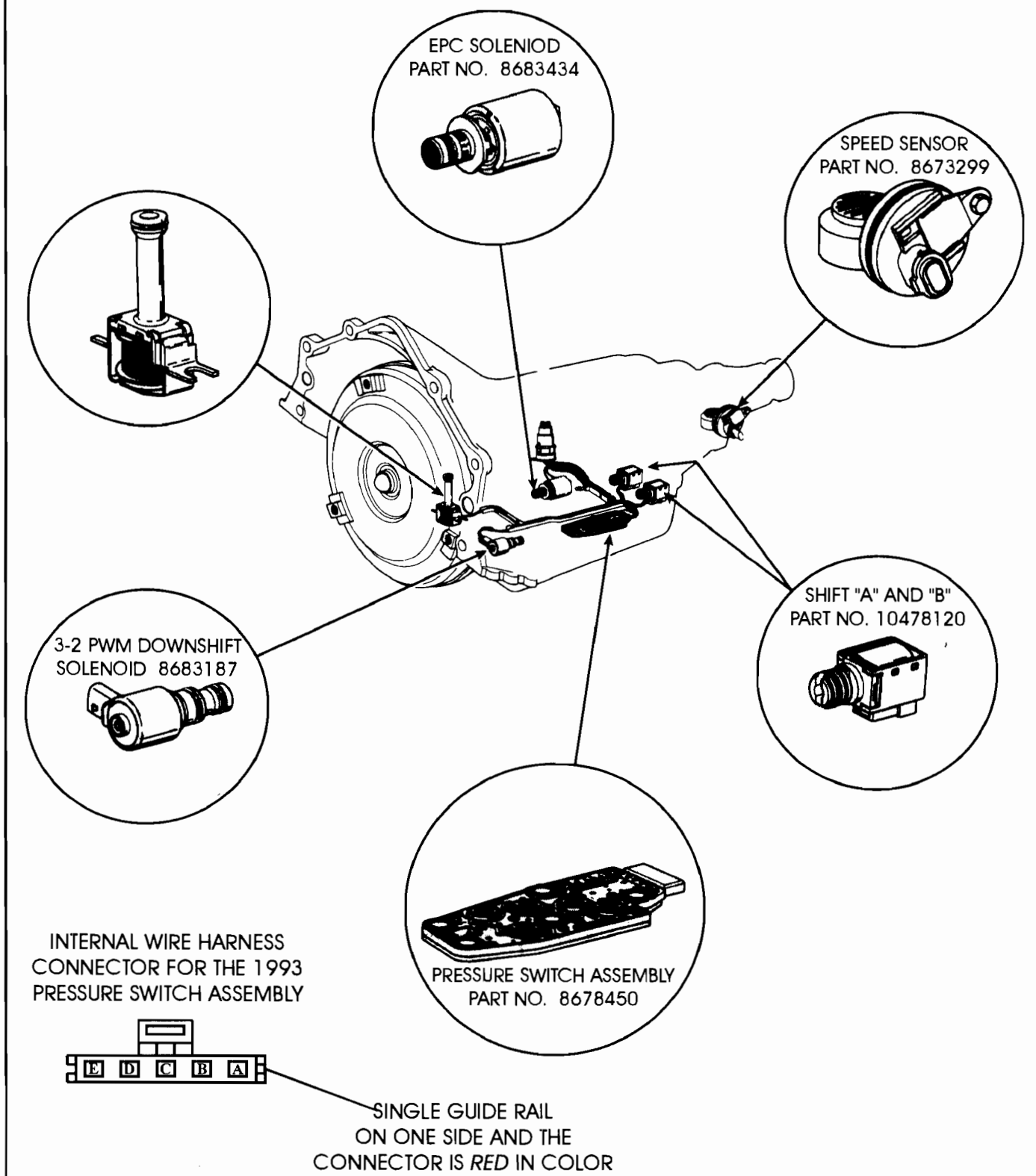


Figure 24

WIRE HARNESS AND CONNECTORS FOR 1994 MODELS ONLY
INTERNAL WIRE HARNESS PART NUMBER 12143279

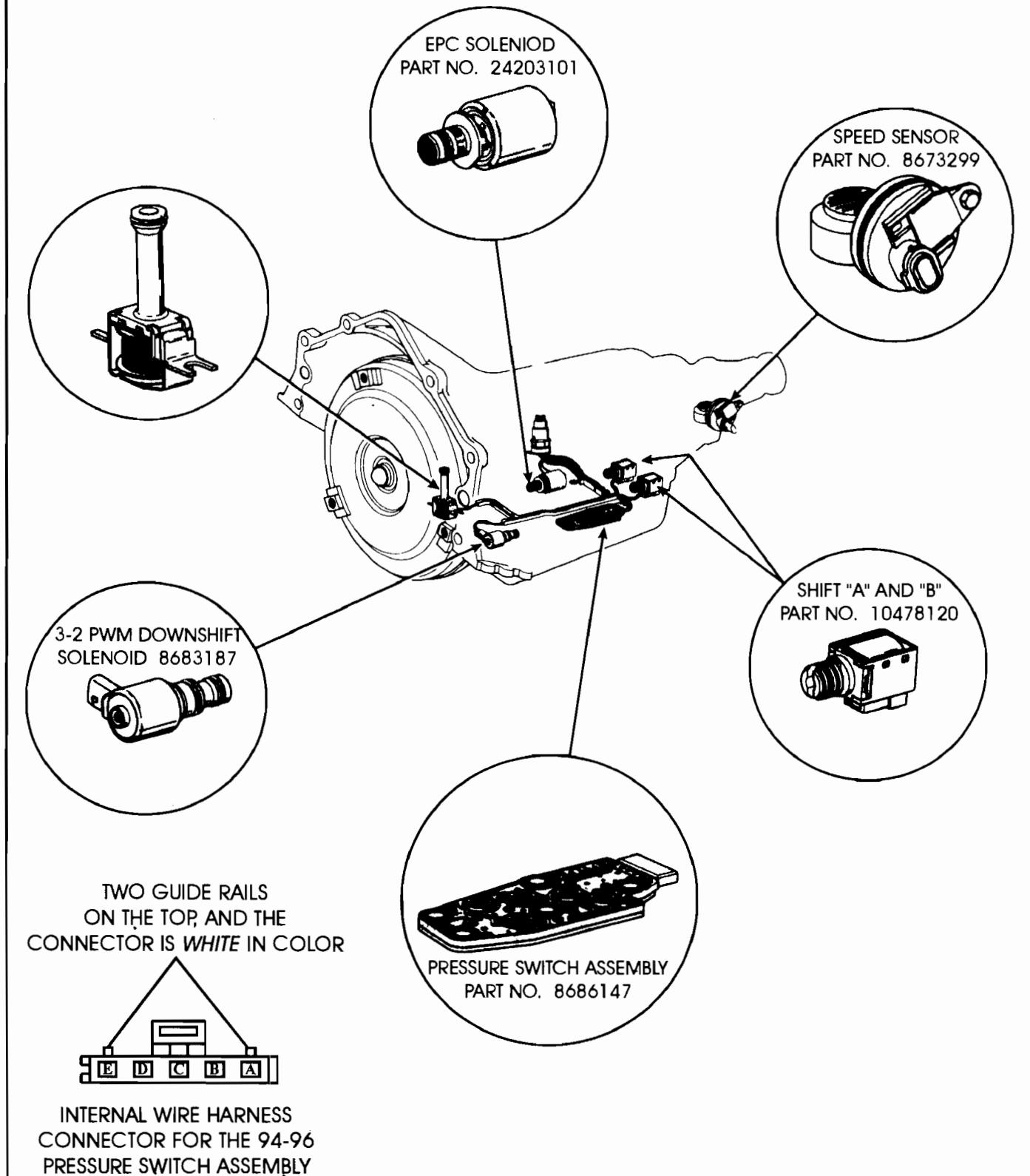


Figure 25

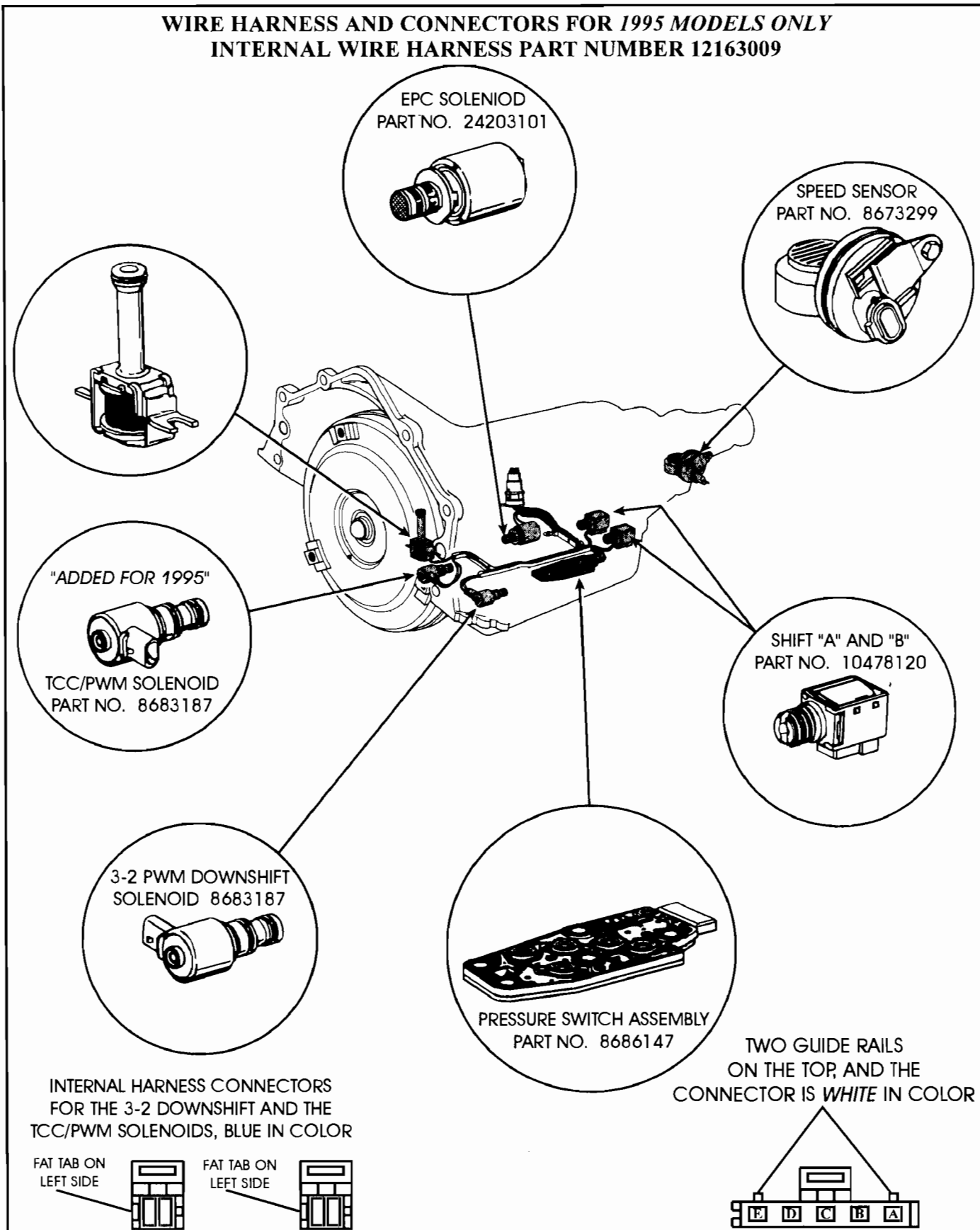


Figure 26
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WIRE HARNESS AND CONNECTORS FOR 1996 MODELS ONLY
INTERNAL WIRE HARNESS PART NUMBER 12163408

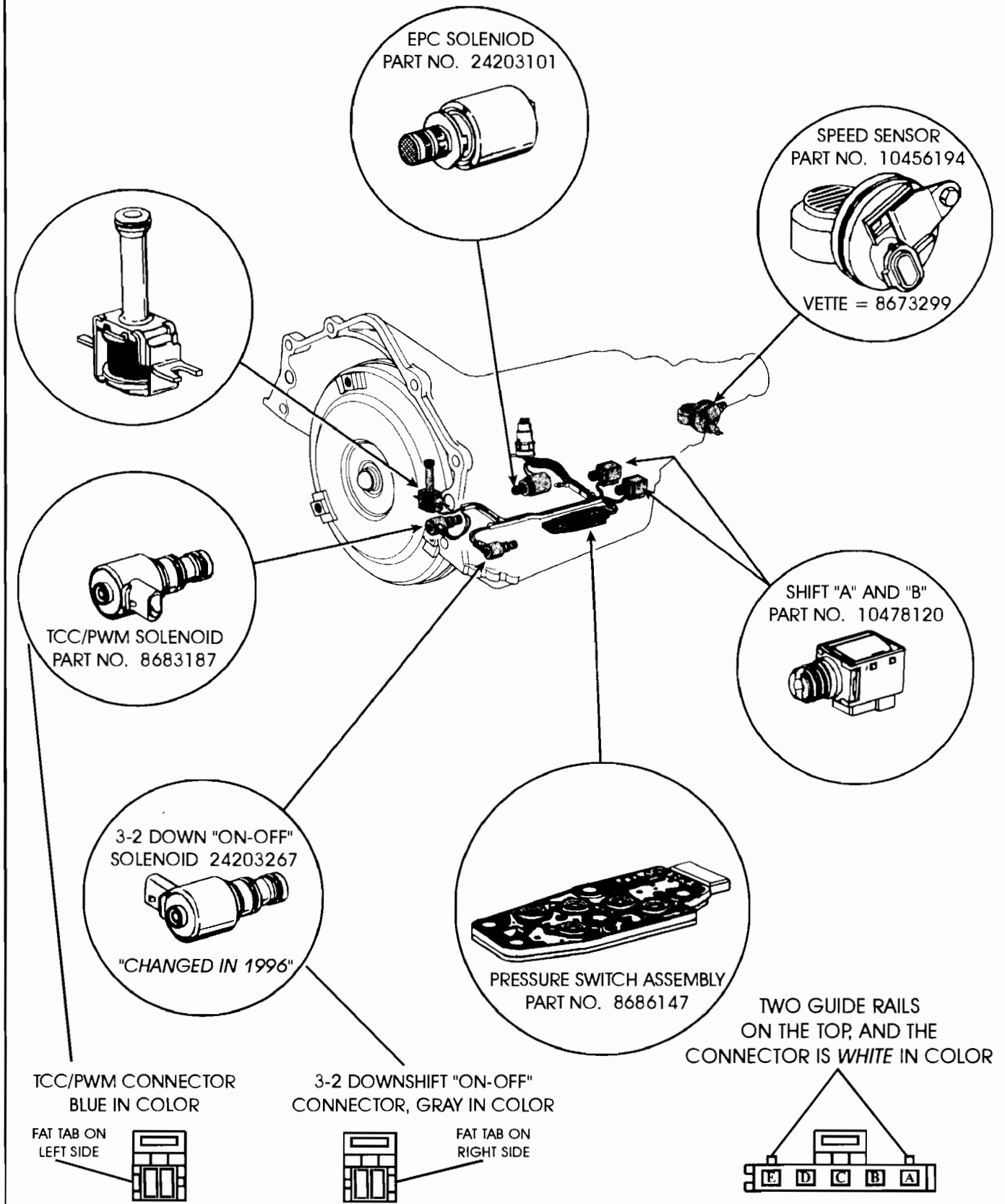
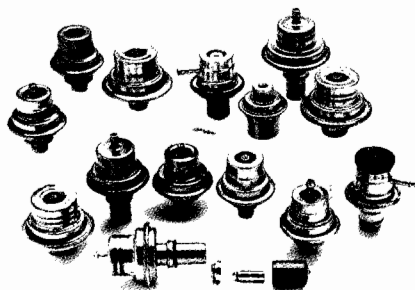


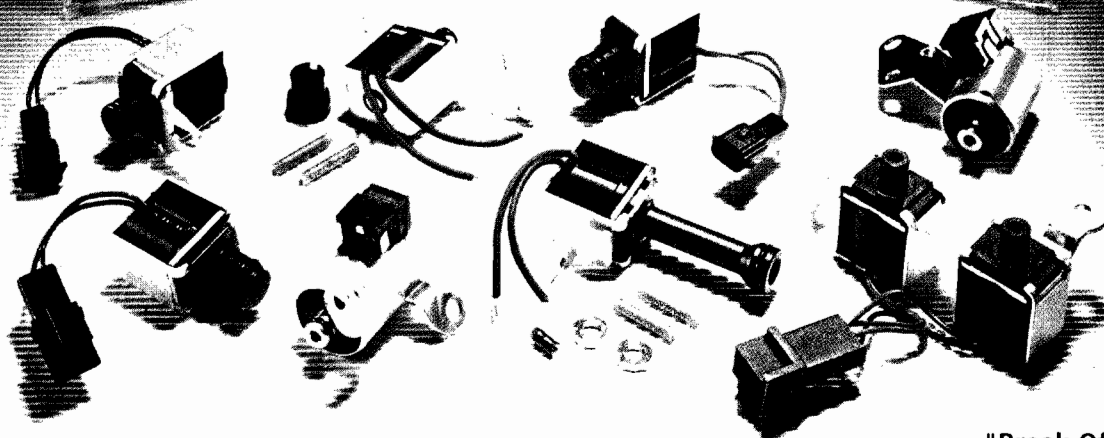
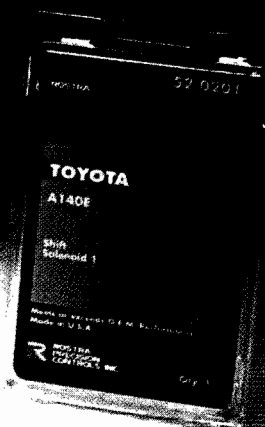
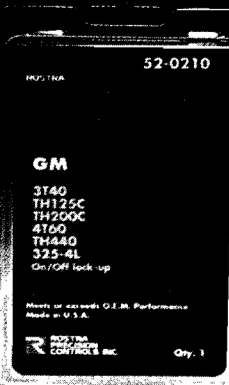
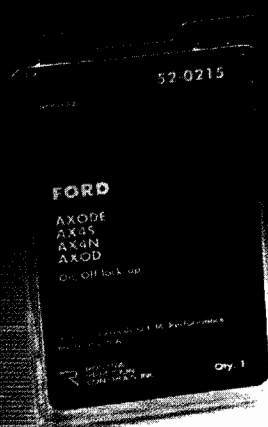
Figure 27



ROSTRA PRECISION CONTROLS

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Rostra, the quality line manufacturer of O.E.M. and After Market Products for over 40 years introduces a new patent pending, innovative line of Transmission Solenoids which meets or exceeds O.E.M. performance. They come with easy to install "Break-off" Tab Mounting Brackets and "Custom" Plug-in Connectors, where applicable, for exact fit. Rostra Solenoids are produced with "Anti-stick" design to operate in the most severe conditions. Each unit is 100% tested and manufactured in QS9000 Environment. Be sure to ask your distributor for Rostra by name. Don't settle for anything less.



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4L80E WIRING UPDATE

COMPLAINT: The technician does not know which of the new wires should be spliced to which of the original wires.

CAUSE: Vehicles that were built from the 1991 model year to May 24, 1993 have a different wiring arrangement as well as different wiring colors than vehicles built from May 25, 1993 and up which could make matching up the correct wires difficult. This is illustrated in Figures 1 and 2.
Vehicles built from May 25, 1993 can also utilize the wiring update kit. On those vehicles it would be a simple matter of matching wire color to wire color since those vehicles have the same wiring arrangement and color.
The external transmission harness connector has prematurely been completely severed which has resulted in an extra **PINK/BLACK** wire left over and/or not being able to determine which new wire should be spliced to which original wire and the enclosed instructions in the update wiring kit are illegible.

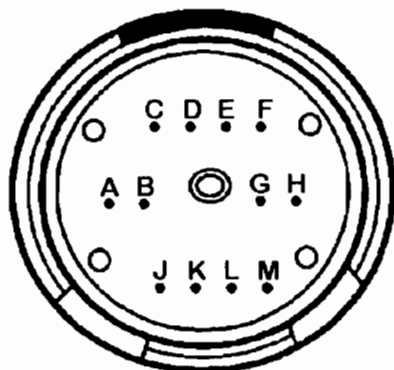
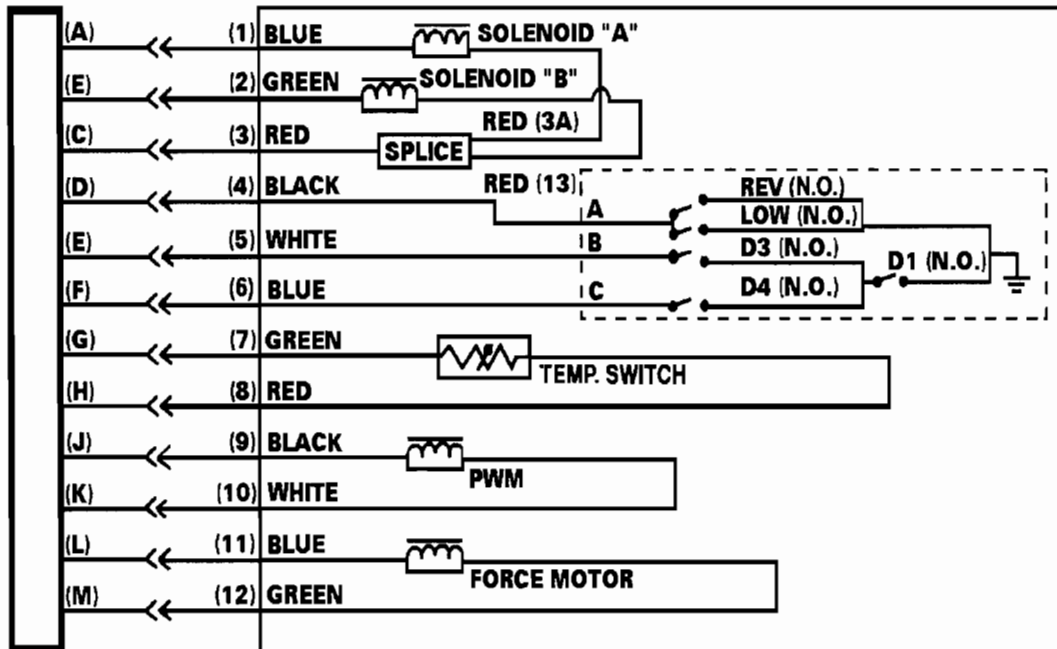
CORRECTION: The **FIRST** step is to identify the wire at **PIN "K"** in the original connector which is **PINK/BLACK**. Cut that wire and tape it back in the harness as illustrated in Figure 3, it is **NOT USED**.
Then cut and splice one wire at a time until all wires are connected using the wire color code chart Figure 2 as a guide.

NOTE: It is a good practice to stagger the splices in order to avoid a large bundle which could be difficult to keep out of harm's way as shown in Figure 4.

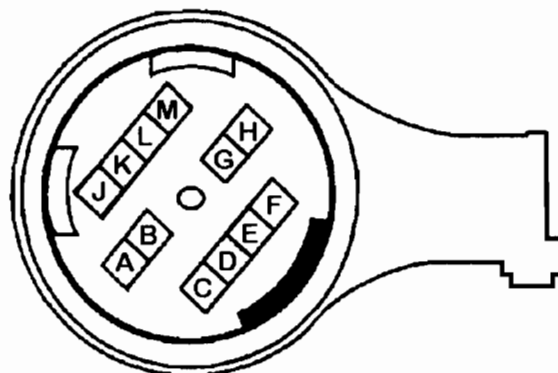
SERVICE INFORMATION:
Update Wiring Kit.....24200161

4L80E WIRING UPDATE

EARLY WIRING AND CASE CONNECTOR



TRANSMISSION
CASE CONNECTOR

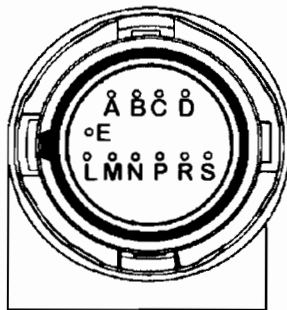
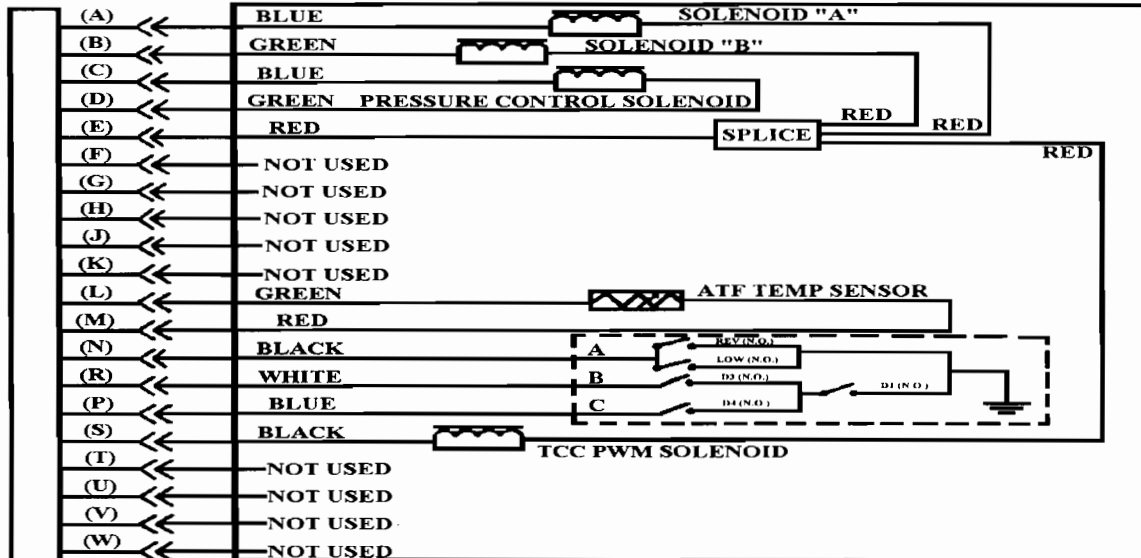


VEHICLE
HARNESS CONNECTOR

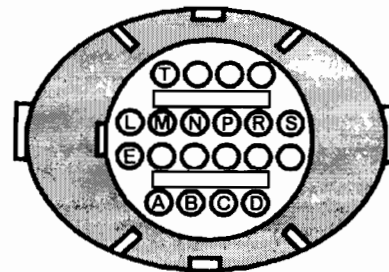
Figure 1

4L80E WIRING UPDATE

LATE WIRING AND CASE CONNECTOR



TRANSMISSION
CASE CONNECTOR



VEHICLE
HARNESS CONNECTOR

MODEL REFERENCE CHART FOR 4L80E EXTERNAL WIRING

NEW CAVITY	OLD CAVITY	NEW WIRE COLOR	"G" SERIES WIRE COLOR	"C" & "K" SERIES WIRE COLOR	"P" SERIES WIRE COLOR	"R" & "V" (1991) WIRE COLOR
A	A	LT GREEN	LT GREEN	LT GREEN	LT GREEN	LT GREEN
B	B	YELLOW	YEL/BLK	YELLOW/BLACK	YEL/BLK	YEL/BLK
C	L	ORANGE	RED/BLK	RED/BLACK	RED/BLK	RED/BLK
D	M	LT BLUE	LT BLUE/WHT	LT BLUE/WHT	LT BLUE/WHT	LT BLUE/WHT
E	C	PINK	PINK or PINK/BLK	PINK or PINK/BLK	PINK or PINK/BLK	PINK or PINK/BLK
L	G	DK GREEN	BLK/YEL	BLK/YEL	BLK/YEL	BLK/YEL
M	H	PURPLE	PURPLE or BLK	PURPLE or BLK	PURPLE or BLK	PURPLE or BLK
N	D	GRAY	PINK	PINK	PINK	PINK
P	F	RED	RED	RED	RED	RED
R	E	DK BLUE	DK BLUE	DK BLUE	DK BLUE	DK BLUE
S	J	WHITE	DK BLUE	TAN/BLK or DK BLUE	TAN/BLK	TAN/BLK
	K	DO NOT USE ON NEW CONNECTOR - TAPE BACK TO HARNESS				

*SOME "P" COMMERCIAL CHASSIS MODELS, THE ORIGINAL WIRE COLOR IS **BROWN**

Figure 2

4L80E WIRING UPDATE

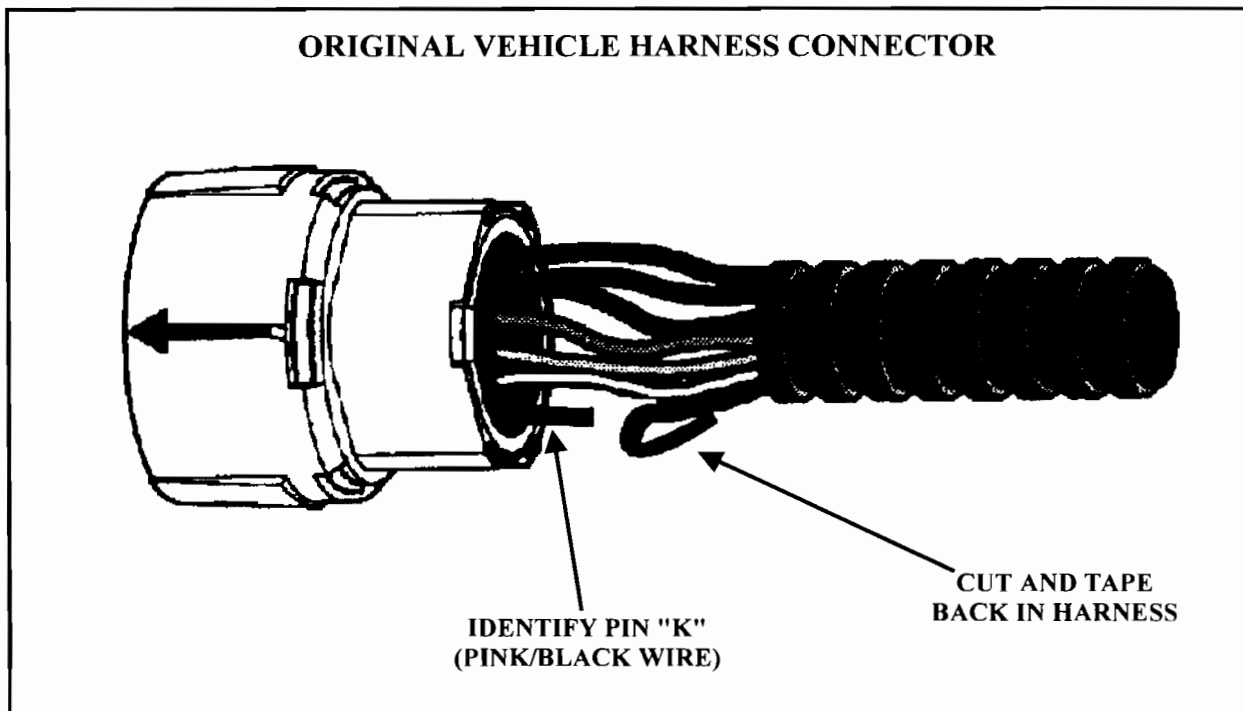


Figure 3

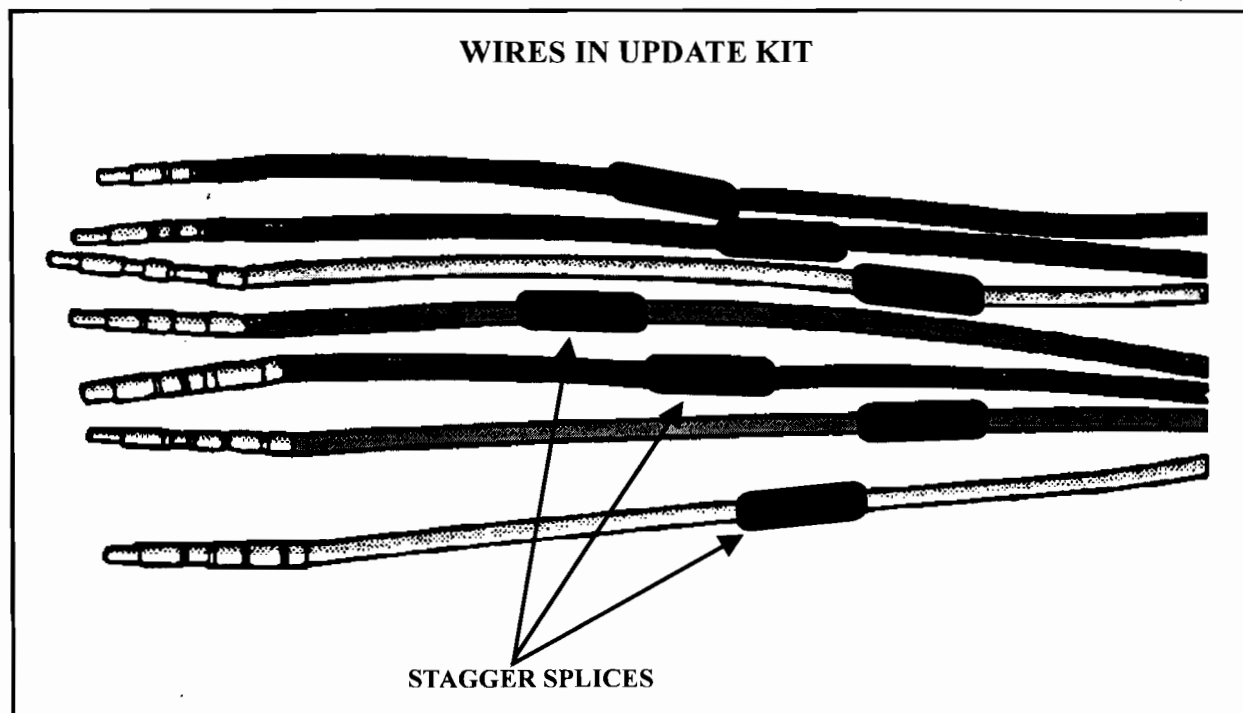


Figure 4

THM 4L80-E
LOSS OF REVERSE WHEN HOT

COMPLAINT: Vehicle has a good reverse until the transmission reaches full operating temperature, primarily after sustained highway speeds, and then displays no reverse.

CAUSE: The cause has been traced to the use of short lip seals on the direct clutch piston, causing the direct clutch not to apply when reverse is selected.

CORRECTION: Install **LONG** lip seals on the direct clutch piston when reconditioning the transmission, as shown in Figure 1. Also be sure to replace the solid Teflon sealing rings on the center support with **White or Tan rings with Red and/or Green speckles** (See Figure 2). Always replace the center support feed bolt with a **new** one every time it is removed, and ensure that the center support is **Fully** drawn up against the case surface (See Figure 3).
Special Note: The new center support bolt allows one time reuse/reassembly of the center support by achieving the same level of thread interference as the production assembly. Torque for the service bolt is 37 ft.lbs., and the run-in torque will be about half of this value.

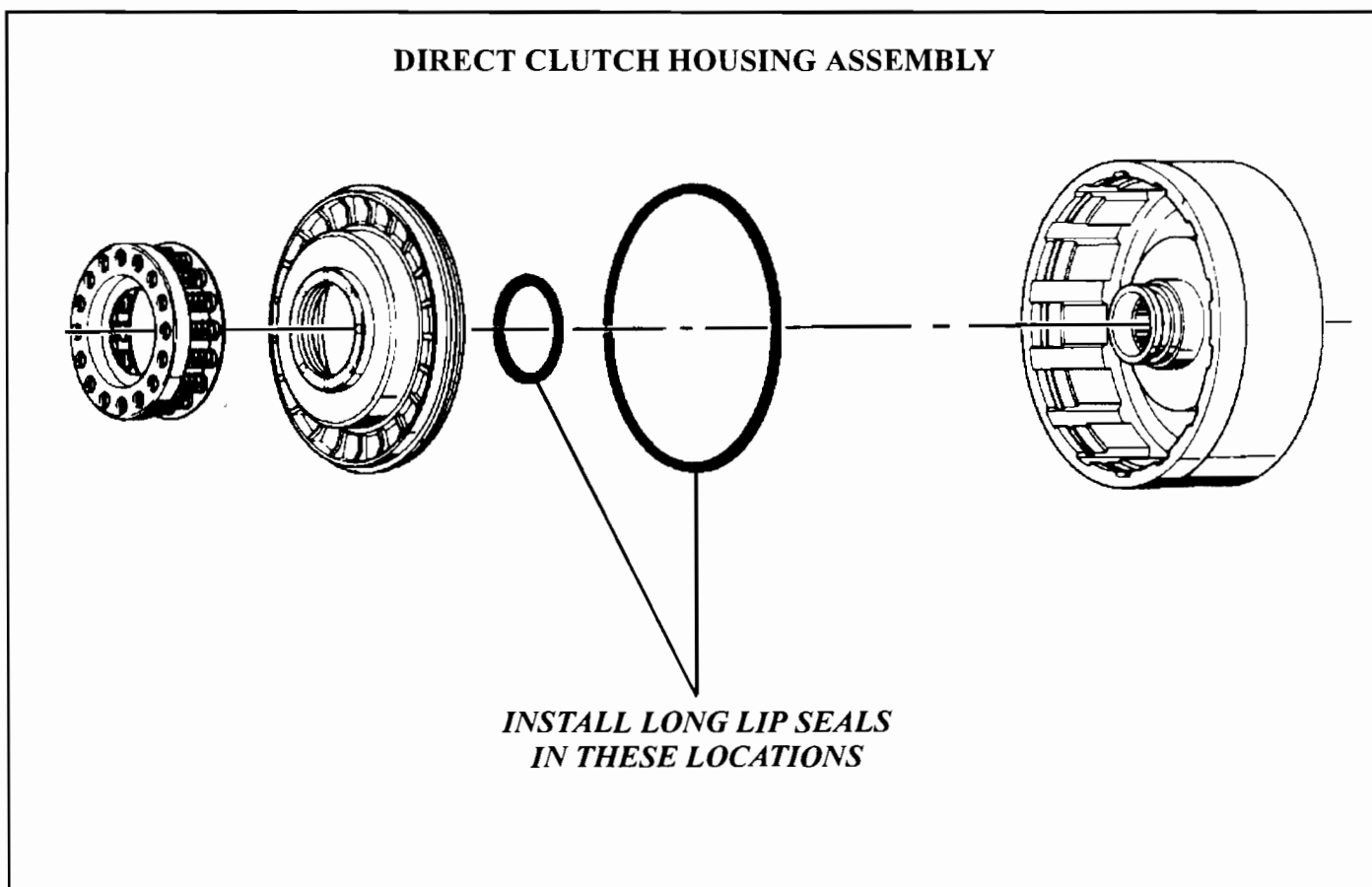
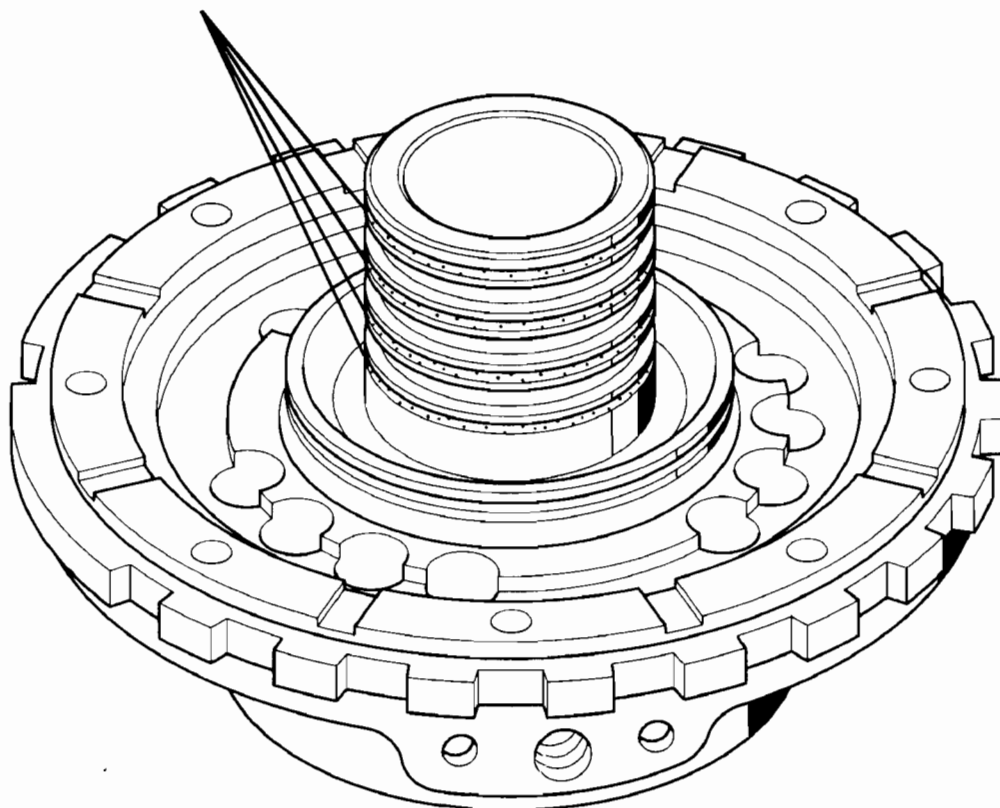


Figure 1

CENTER SUPPORT ASSEMBLY

**CENTER SUPPORT SEALING RINGS MUST BE
"WHITE OR TAN WITH RED AND/OR GREEN SPECKLES"**



**THE WHITE WITH RED SPECKLE SEALING RINGS HAVE
A HIGHER GLASS CONTENT TO REDUCE SHRINKAGE.**

Figure 2

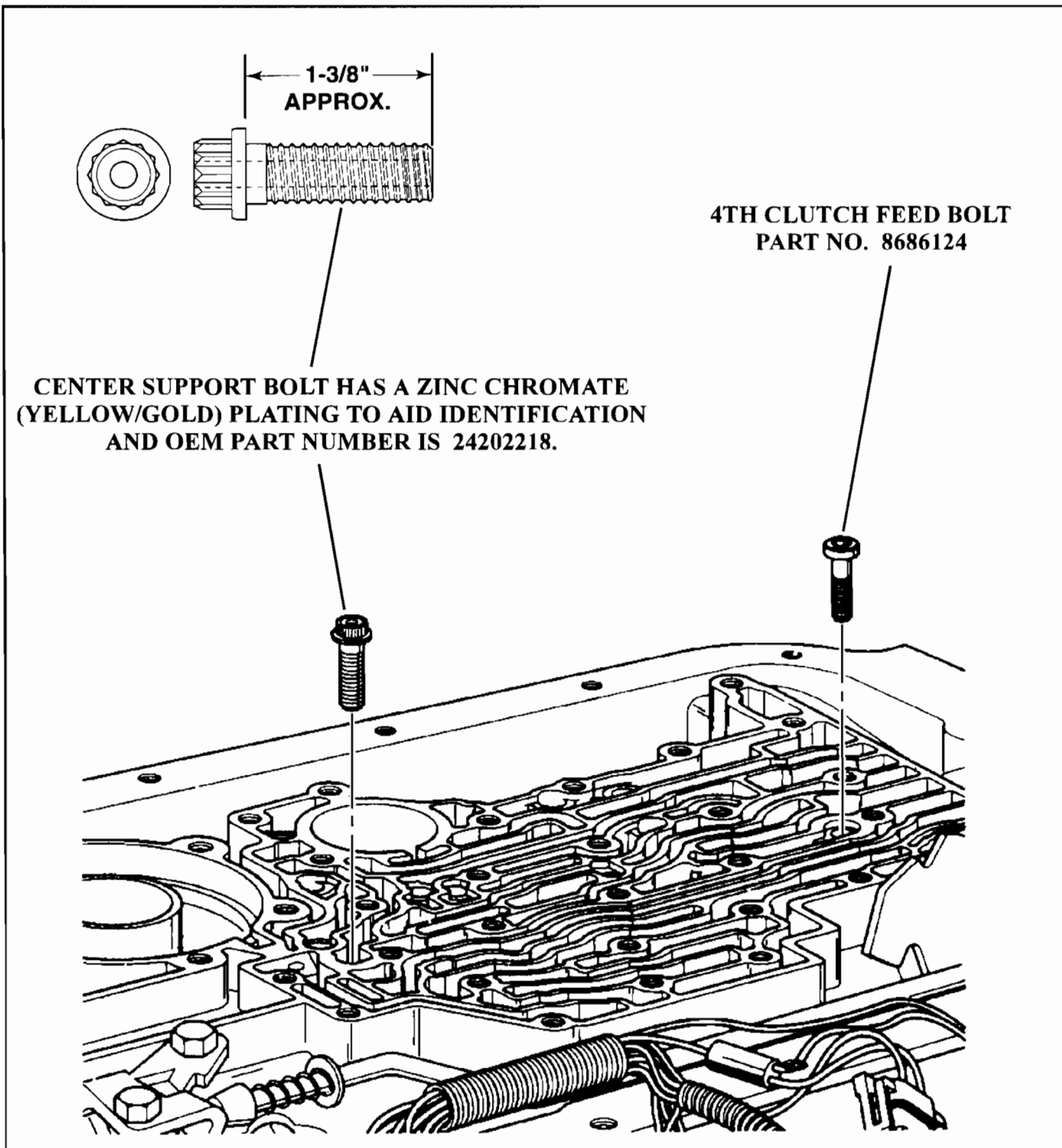


Figure 3

**THM 4L80-E/4L80-EHD
SPEED SENSOR HARNESS REPAIR KIT**

There is now available from General Motors, a new Speed Sensor Harness Repair Kit, available under OEM part number 12101899, to fit all THM 4L80-E/4L80-EHD transmissions (See Figure 1).

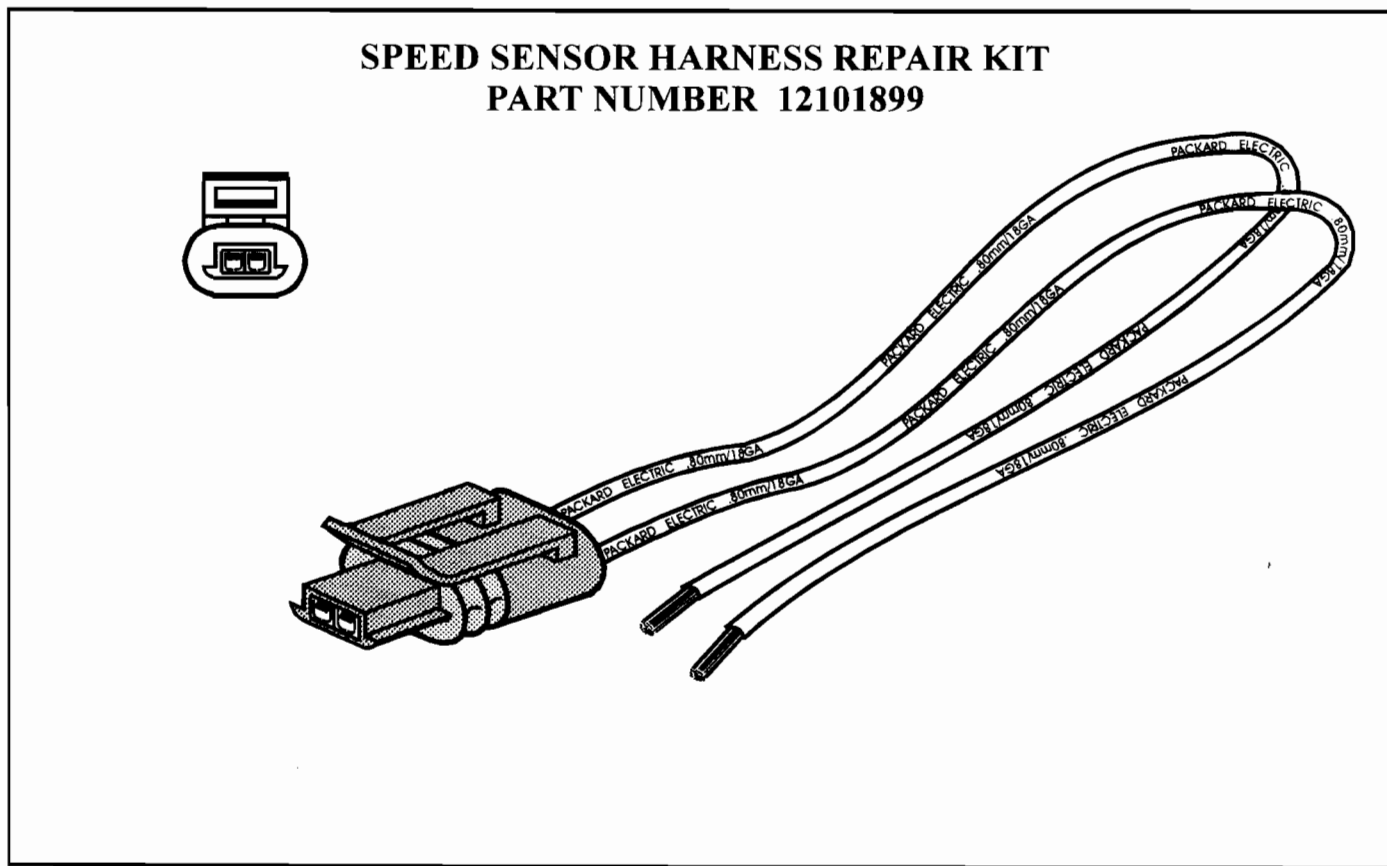


Figure 1

THM 4L80-E/4L80-EHD NEW SHIFT SOLENOID ASSEMBLIES

CHANGE: Beginning in the middle of 1996 model year, as a running change, all THM 4L80-E/4L80-EHD transmissions were built with revised shift solenoids once again.

REASON: Revised internal seal material and coil windings for increased durability.

PARTS AFFECTED:

- (1) SHIFT SOLENOID "A" - Revised internal seal material, and is now TAN in color, instead of the previous Purple (See Figure 1).
- (2) SHIFT SOLENOID "B" - Reveised internal seal material, and is now BLACK in color, instead of the previous Tan (See Figure 1).

INTERCHANGEABILITY:

The new design Shift Solenoids will retro-fit back on *all* previous models.

SERVICE INFORMATION:

Shift Solenoid "A" (TAN)	10478125
Shift Solenoid "B" (BLACK)	10478126

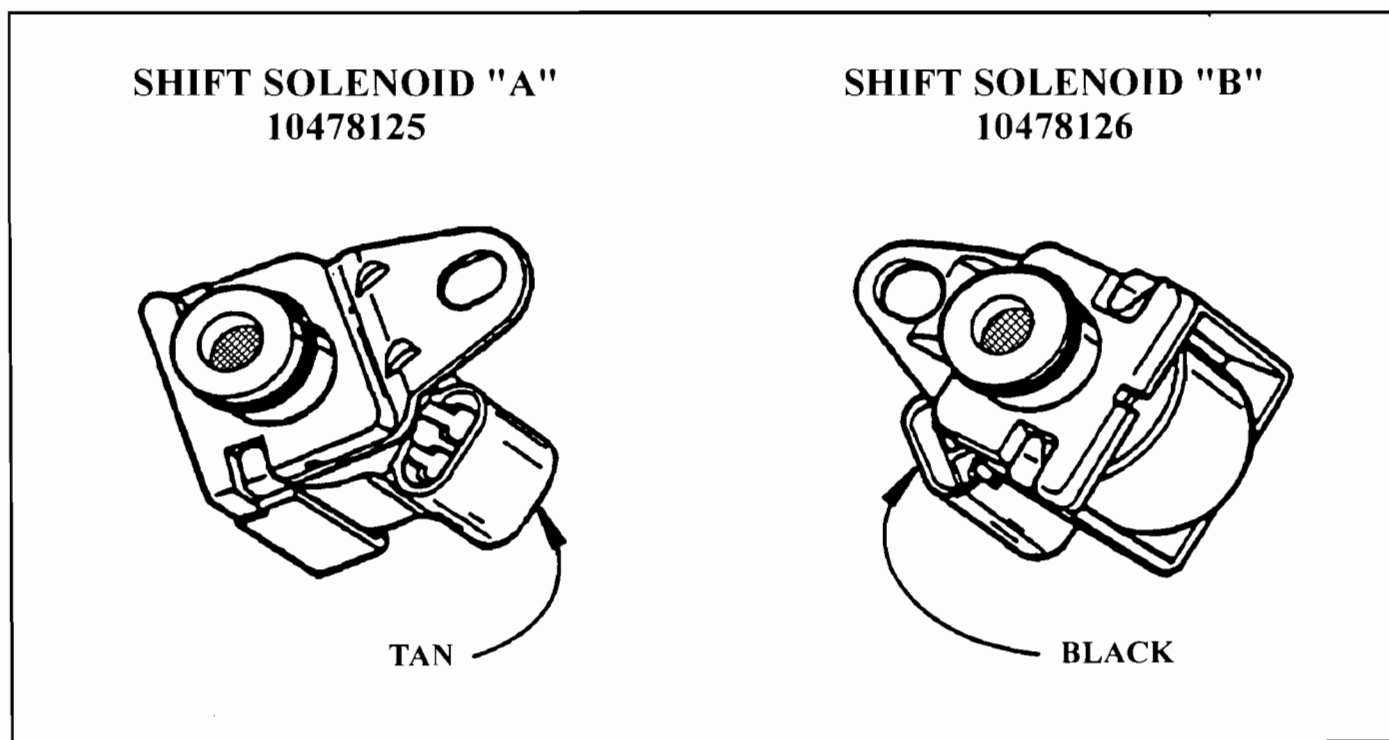


Figure 1



**THM 4L80-E/4L80-EHD
REAR LUBE SEAL AND
ORIFICE LOCATION**

ATSG receives many phone calls wanting to know the location of the Orificed Cup Plug Lube Seal for the THM 4L80-E transmission. We have shown the location of this orificed cup plug and seal assembly in Figure 1. Lube oil is fed through this orificed cup plug and into a passage in the extension housing that leads to the extension housing bushing, to lubricate the bushing.

Since four wheel drive models do not have an extension housing bushing to lubricate, there will be a solid cup plug in this location on all four wheel drive models. Extra caution must be used if you happen to be changing the transmission case. If a four wheel drive case (***Solid Plug***) were to be installed with a two wheel drive output shaft and extension housing, the bushing would be gone in a very short period of time.

***Always inspect and replace the Orificed Cup Plug Lube Seal
on 2WD trucks as shown in Figure 1.***

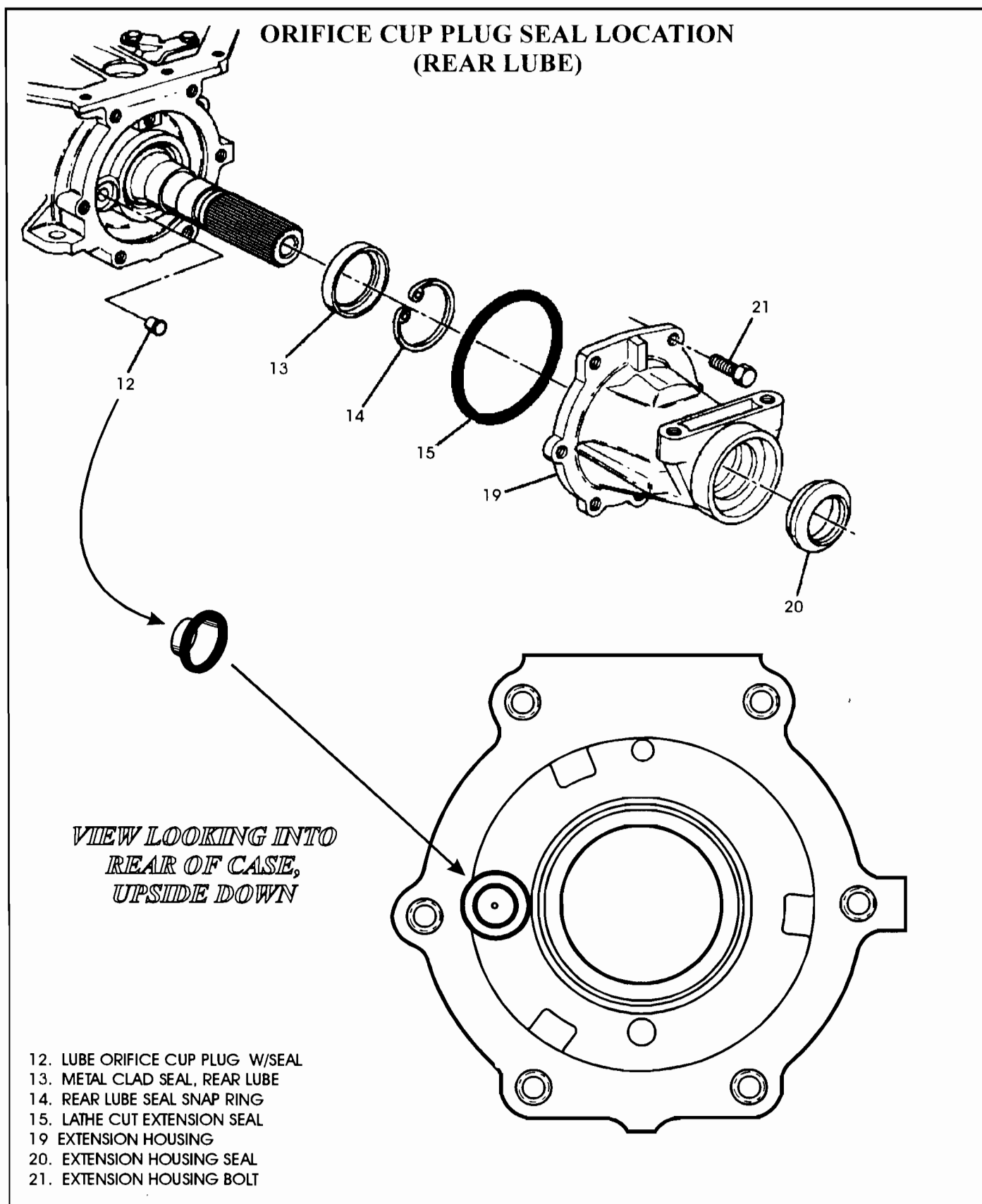


Figure 1

THM 4L80-E/4L80-EHD VENT SHIELD LOCATION

CHANGE: Beginning at start of production for all 1994 model THM 4L80-E/4L80-EHD transmissions, there was a Vent Shield added to the back side of the pump cover, and retained by a pump cover to pump body retaining bolt as shown in Figure 1.

REASON: To eliminate fluid from exhausting from the transmission air vent.

PARTS AFFECTED:

(1) VENT SHIELD - Added to the oil pump assembly in model year 1994 (See Figure 1).

INTERCHANGEABILITY:

The Vent Shield will retro-fit back to all previous models

SERVICE INFORMATION:

Vent Shield, Oil Pump 24200357

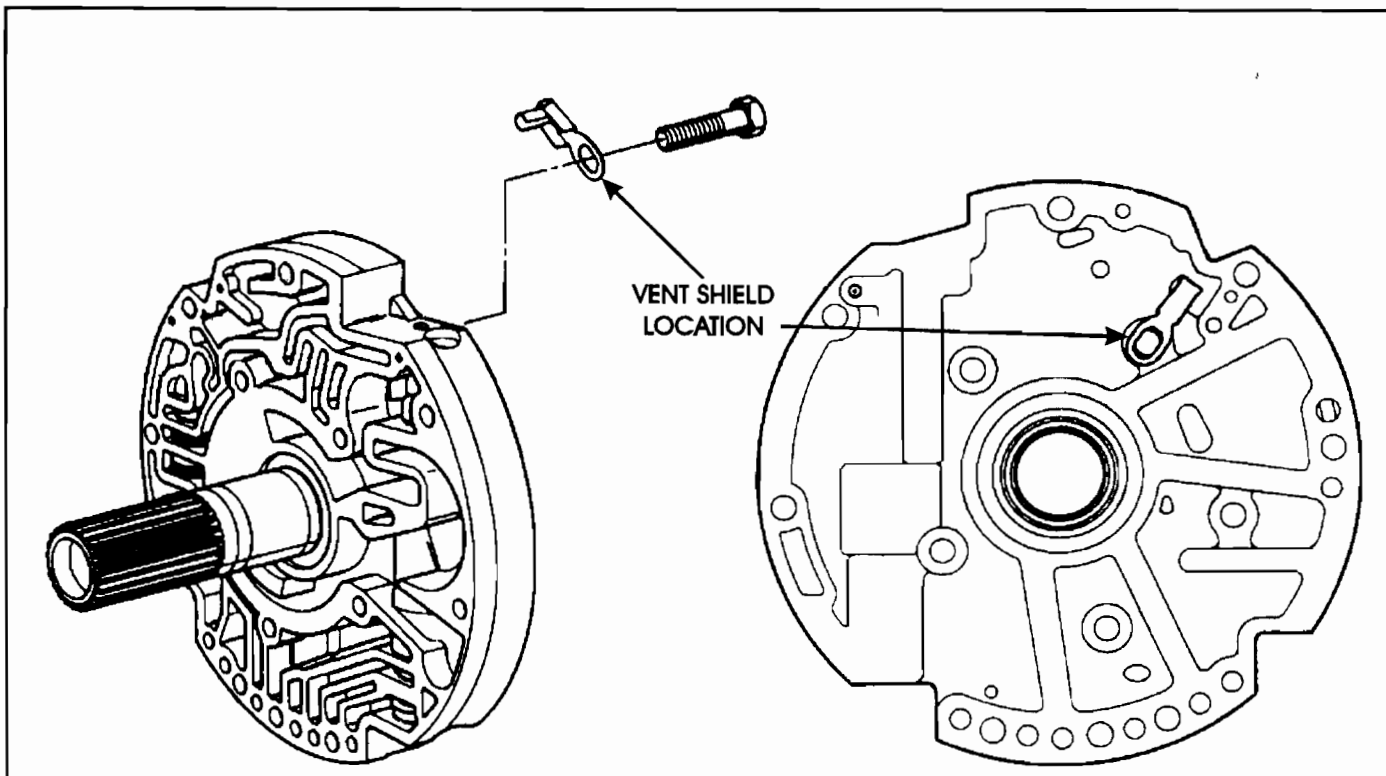


Figure 1

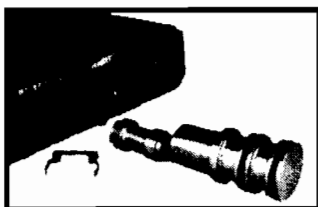
TASC Force Approved!

The TASC Force is a group of recognized industry technical specialists, transmission rebuilders & Sonnax Industry, Inc. technicians.

AXOD & AXOD-E

96201-01K

AXOD & AXOD-E Manual Control Valve



Typical Symptoms

- 1-2 & 2-3 Upshift Flairs
- 2-1 Downshift Clunk
- Non-Adjustable Throttle PSI
- High Pressure • Harsh Reverse
- Clutch or Band Failure

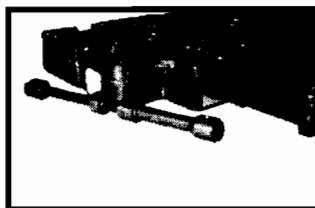
Caused By

Wear on the inside diameter of the boost sleeve & leakage past the valve body

The boost valve and sleeve in this direct replacement kit have been specially coated to eliminate excessive wear. The two o-rings provide additional protection against leakage through the valve body.

96201-05

AXOD & AXOD-E Manual Control Valve



Typical Symptoms

- Delayed Forward Engagement
- Burned Forward Clutch
- Forward Clutch Line Pressure Low by 10-15 PSI

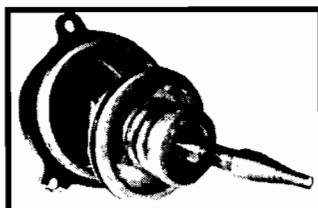
Caused By

A worn manual valve bore, allowing oil leakage

This direct replacement part has a special hard coat finish designed to withstand excessive wear and provide extra lubrication. The three spool diameters have been lengthened and have partial flats to aid in exhausting residual oil pressure.

96995-0

AXOD & AXOD-E Intermediate Servo Spring



Typical Symptoms

- Delayed Forward Engagement
- 2-3 Shift Flair

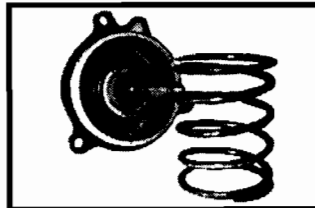
Caused By

Servo piston bore wear, allowing oil leakage

This direct replacement servo piston restores the bore / pilot hydraulic seal integrity.

96995-0

AXOD & AXOD-E Intermediate Servo Spring



Typical Symptoms

- Delayed Forward Engagement
- Downshift "Clunk"

Caused By

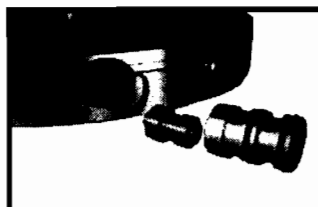
Springs with inaccurate spring rates

This direct replacement spring is longer and has a lighter spring rate than the OEM spring, thus eliminating delayed forward engagement. It is also stiffer than the common replacement spring, eliminating the downshift "clunk".

E4OD

36424-01K

E4OD Pressure Regulator Boost Valve & Sleeve Kit



Typical Symptoms

- Poor Reverse Boost
- Soft Shifts

Caused By

Wear on the inside diameter of the boost sleeve and leakage past the pump body

This direct replacement kit, much like the 96201-01K, has a special coat on the valve and sleeve to eliminate excessive wear. The o-rings provide additional protection against leakage through the pump body.

THM 400 / 4L80E

34006-SP

THM400 / 4L80E "No-Walk-Out" Case Bushing



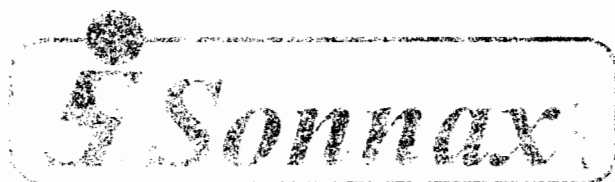
Typical Symptoms

- "Walk-Out" of OEM Case Bushing
- Output Shaft Wobble

Caused By

Spinning of original bushing in bore allowing dislocation

This direct replacement bushing is manufactured from high quality leaded bronze. It has a flange on the transmission case side that prevents it from being pushed completely through the bore.



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These products were designed, tested and approved by the TASC Force* (Technical Automotive Specialties Committee) in association with Accurate Transmissions, Mundelein, Illinois and Deltrans, Inc., Newark, Delaware.

* The TASC Force is a group of recognized industry technical specialists, transmission rebuilders & Sonnax technicians. We accept and encourage product development suggestions. Contact your Sonnax sales person with your ideas.

THM 4T60-E NEW REVERSE REACTION DRUM FOR 1997 MODELS

CHANGE: Beginning at the start of Production for 1997 models, all THM 4T60-E transaxles were built with a new design Reverse Reaction Drum, as shown in Figure 1.

REASON: Greatly increased durability of the Reverse Reaction Drum.

PARTS AFFECTED:

- (1) REVERSE REACTION DRUM - New design has been through a hardening process and can be identified by its blackened color, as shown in Figure 1.

INTERCHANGEABILITY:

The new design Reverse Reaction Drum *will* retro-fit back on *all* previous models of the THM 4T60-E transaxles.

SERVICE INFORMATION:

Reverse Reaction Drum (New Hardened Design) 24202422

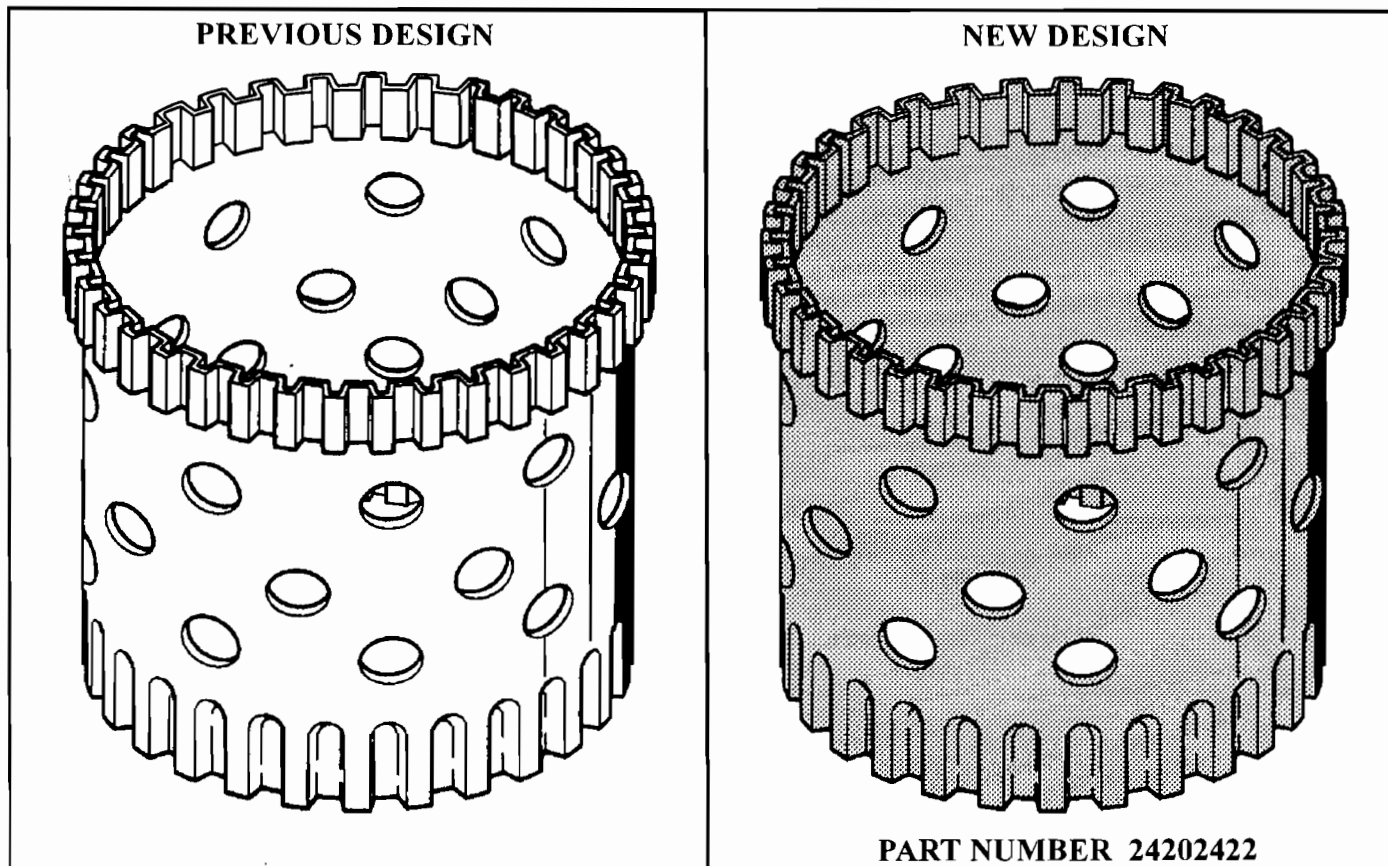


Figure 1



THM 4T60-E
TRANSMISSION IDENTIFICATION
BY MODEL NUMBER AND RATIO

This bulletin has been prepared to help you identify 4T60-E transmissions by model number so that you get the right sprocket ratio, final drive ratio, and speed sensor rotor tooth count back into the proper vehicle. The first column gives you the broadcast code off of the I.D. tag, the second column gives you the engine size and vehicle that it came out of, the third column refers you to a Figure number that will show you the wiring harness and the part number to purchase the wiring harness if necessary, the fourth column gives you the final drive ratio/speed sensor rotor tooth count, the fifth column gives you the drive/driven sprocket tooth count, the sixth column gives you the stall speed of the torque converter, and the last column tells you which structural side cover is required in that particular model, if it requires one. If no structural side cover is indicated in the last column, it requires the familiar tin side cover.

For 1991 Model vehicles, refer to Figure 1.
For 1992 Model vehicles, refer to Figure 2.
For 1993 Model vehicles, refer to Figure 3.
For 1994 Model vehicles, refer to Figure 4.
For 1995 Model vehicles, refer to Figure 5.
For 1996 Model vehicles, refer to Figure 6.

1992 THM 4T60-E MODELS						
TRANSAXLE MODEL CODE	DESCRIPTION	WIRE HARNESS	FINAL DRIVE RATIO/ROTOR	SPROCKETS DRIVE/DRIVEN	STALL SPEED	STRUCTURAL SIDE COVER
2AVW, 2A5W	4.9L CADILLAC C - BODY (EXPORT)	Figure 12	3.06/30	37/33	1825	
2AMW, 2A2W	4.9L CADILLAC E/K - BODY	Figure 12	3.33/31	37/33	1825	
2ABW, 2A1W	4.9L CADILLAC C - BODY	Figure 9	3.06/30	37/33	1825	
2ANW, 2A3W	4.9L CADILLAC C - BODY	Figure 9	3.33/30	37/33	1825	
2APW, 2A4W	4.9L CADILLAC E/K - BODY (EXPORT)	Figure 12	3.33/31	37/33	1825	
2AWW, 2A6W	4.9L CADILLAC C - BODY (EXPORT)	Figure 12	3.33/30	37/33	1825	
2AZW, 2A8W	4.9L CADILLAC C - BODY (LIMO)	Figure 12	3.06/32	37/33	1825	
2AYW, 2A7W	4.9L CADILLAC E/K - BODY	Figure 12	3.33/31	35/35	1825	
2BTW, 2B1W	3.8L C - BODY	Figure 12	3.33/31	37/33	1897	
2BYW, 2B2W	3800 C/H - BODY SSE	Figure 12	3.06/31	35/35	1897	
2CLW, 2C1W	3800 C/H - BODY	Figure 9	2.84/30	35/35	1420	
2CSW, 2C2W	3800 C/H - BODY	Figure 9	3.06/30	35/35	1897	
2CTW, 2C3W	3800 C/H - BODY SSE	Figure 9	3.06/31	35/35	1897	
2CWW, 2C4W	3.4L W - BODY (NON PWM)	Figure 7	3.06/30	33/37	2095	
2CXW, 2C5W	3800 C - BODY	Figure 9	3.33/31	37/33	1897	
2CZW, 2C6W	3.8L H - BODY SSE/SSE	Figure 9	3.33/31	37/33	1897	
2PHW, 2P1W	3.8L H - BODY SSE	Figure 12	3.33/31	37/33	1897	
2WAW, 2W1W	3800 C/H - BODY & GM200 (U - BODY)	Figure 12	3.06/31	35/35	1897	
2YLW, 2Y1W	3800 C/H - BODY	Figure 12	2.84/31	35/35	1420	
2YMW, 2Y2W	3800 C/H - BODY	Figure 12	2.84/30	35/35	1420	
2YZW, 2Y4W	3800 C/H - BODY	Figure 12	3.06/30	35/35	1897	
2YPW	3800 BUICK GM-33 BODY	Figure 12	3.33/30	35/35	1897	

Figure 2



1997 SEMINAR INFORMATION

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1993 THM 4T60-E MODELS						
TRANSAXLE MODEL CODE	DESCRIPTION	WIRE HARNESS	FINAL DRIVE RATIO/ROTOR	SPROCKETS DRIVE/DRIVEN	STALL SPEED	STRUCTURAL SIDE COVER
3ABW	4.9L CADILLAC C - BODY	Figure 9	306/30	37/33	1825	
3AMW	4.9L CADILLAC E/K - BODY	Figure 12	333/31	37/33	1825	
3ANW	4.9L CADILLAC C - BODY	Figure 9	333/30	37/33	1825	
3APW	4.9L CADILLAC E/K - BODY (EXPORT)	Figure 12	333/31	37/33	1825	
3AVW	4.9L CADILLAC C - BODY	Figure 12	306/30	37/33	1825	
3AWW	4.9L CADILLAC C - BODY (EXPORT)	Figure 9	333/30	37/33	1825	
3AZW	4.9L CADILLAC C - BODY (LIMO)	Figure 12	306/32	37/33	1825	
3BTW	3800 C - BODY	Figure 12	333/31	37/33	1897	
3BYW	3800 H - BODY	Figure 12	306/31	35/35	1897	
3CLW	3800 C/H - BODY	Figure 9	284/30	35/35	1420	
3CSW	3800 C/H - BODY (EXPORT)	Figure 9	333/30	35/35	1897	
3CTW	3800 H - BODY SSE	Figure 9	306/31	35/35	1897	
3CXW	3800 C - BODY	Figure 9	306/31	37/33	1897	
3CZW	3800 H - BODY SSE/SSE	Figure 9	333/31	37/33	1897	
3PHW	3800 H - BODY SSE	Figure 12	333/31	37/33	1897	
3WAW	3800 C/H - BODY & GM200 (U - BODY)	Figure 12	306/31	35/35	1897	
3YMW	3800 C/H - BODY	Figure 12	284/30	35/35	1420	
3YZW	3800 C/H - BODY (EXPORT)	Figure 12	306/30	35/35	1897	
3CWW	3.4L W - BODY (NON PWM)	Figure 7	306/30	33/37	2095	
3CMW	3.1L W - BODY (NON PWM)	Figure 7	333/30	35/35	2060	
3YLW	3800 H - BODY	Figure 9	284/31	35/35	1420	
3YRW	3800 E - BODY	Figure 12	306/30	35/35	1897	
3BHW	3.1L W - BODY	Figure 10	333/30	35/35	2095	YES/4 BOLT

Figure 3



1994 THM 4T60-E MODELS						
TRANSAXLE MODEL CODE	DESCRIPTION	WIRE HARNESS	FINAL DRIVE RATIO/ROTOR	SPROCKETS DRIVE/DRIVEN	STALL SPEED	STRUCTURAL SIDE COVER
4ATW	4.9L CADILLAC K - BODY	Figure 11	306/31	37/33	1825	
4CLW	2.3L QUAD-4 N - BODY	Figure 13	306/29	33/37	2095	YES/6 BOLT
4PHW	2.3L QUAD-4 N - BODY	Figure 13	333/29	33/37	2363	YES/6 BOLT
4AFW	3.1L W - BODY	Figure 10	333/30	35/35	2095	YES/4 BOLT
4AJW	3.1L A - BODY (EXPORT)	Figure 10	333/29	37/33	1630	
4CMW	3.1L W - BODY (NON PWM)	Figure 8	333/30	35/35	2060	
4PAW	3.1L A - BODY	Figure 10	333/29	37/33	1630	
4WSW	3.1L L/N - BODY	Figure 10	333/29	37/33	1630	YES/6 BOLT
4PBW	3.4L W - BODY	Figure 10	306/30	33/37	2060	YES/4 BOLT
4BLW	3800 W - BODY	Figure 10	306/31	35/35	1897	YES/4 BOLT
4KUW	3800 U - BODY	Figure 10	306/31	35/35	1897	
4KHW	3800 SUPERCHARGED H - BODY	Figure 10	333/31	37/33	1897	
4PFW	3800 H - BODY	Figure 10	306/31	35/35	1897	
4WAW	3800 C/H - BODY	Figure 10	306/31	35/35	1897	
4YCW	3800 SUPERCHARGED C/H - BODY	Figure 10	333/31	37/33	1897	
4YMW	3800 H - BODY	Figure 10	284/30	35/35	1420	
4YZW	3800 H - BODY	Figure 10	306/30	35/35	1897	
4CWW	3.4L W - BODY	Figure 10	306/30	33/37	2095	YES/4 BOLT
4PMW	3800 U - BODY (EXPORT)	Figure 10	306/30	35/35	1897	

Figure 4



1997 SEMINAR INFORMATION
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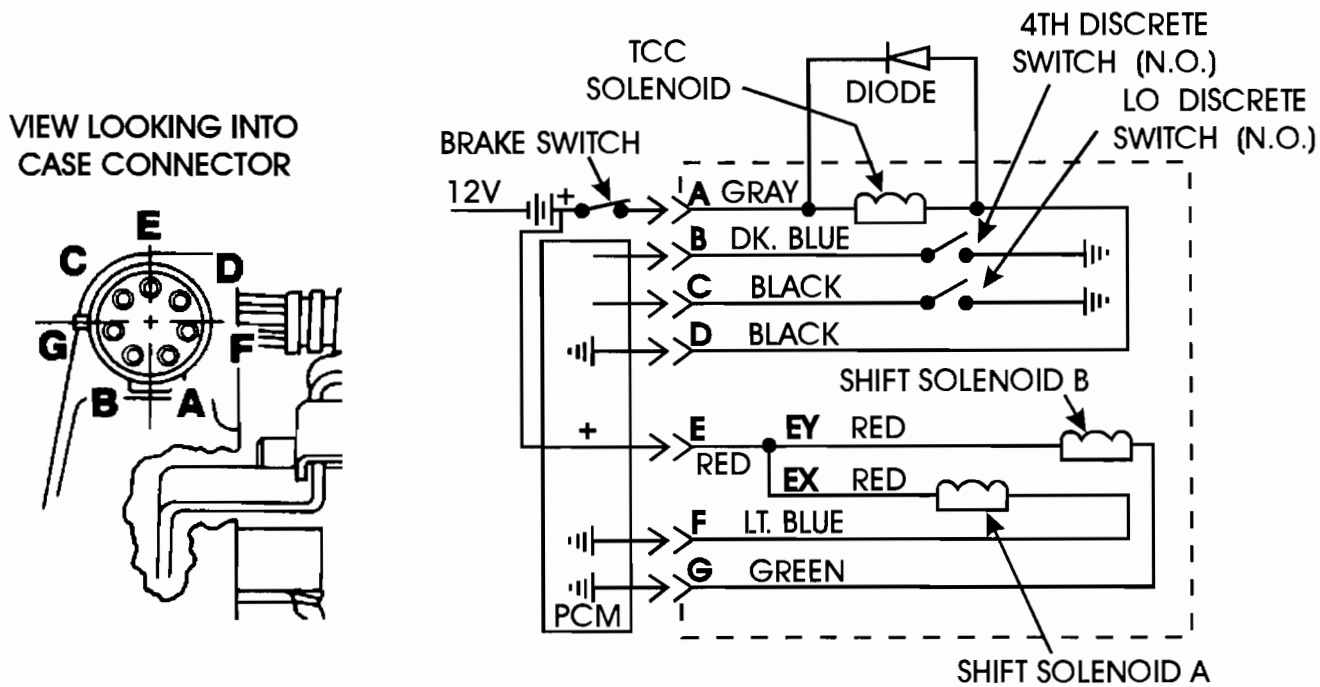
1995 THM 4T60-E MODELS						
TRANSAXLE MODEL CODE	DESCRIPTION	WIRE HARNESS	FINAL DRIVE RATIO/ROTOR	SPROCKETS DRIVE/DRIVEN	STALL SPEED	STRUCTURAL SIDE COVER
5ATW	4.9L CADILLAC K - BODY	Figure 11	306/31	37/33	1825	
5PCW	2.3L QUAD 4 N - BODY	Figure 13	* 329/29	33/37	2363	YES/6 BOLT
5AFW	3.1L W - BODY	Figure 10	333/30	35/35	2095	YES/4 BOLT
5AJW	3.1L A - BODY (EXPORT)	Figure 10	333/29	37/33	1630	
5PAW	3.1L A - BODY	Figure 10	333/29	37/33	1630	
5WFW	3.1L L/N - BODY	Figure 10	* 329/29	37/33	1630	YES/6 BOLT
5PBW	3.4L W - BODY	Figure 10	306/30	33/37	2060	YES/4 BOLT
5BLW	3800 W - BODY	Figure 10	306/31	35/35	1897	YES/4 BOLT
5CAW	3800 G - BODY	Figure 10	* 305/31	35/35	1897	YES/6 BOLT
5BFW	3800 SUPERCHARGED G - BODY	Figure 10	* 329/31	37/33	1897	YES/6 BOLT
5KUW	3800 U - BODY	Figure 10	306/31	35/35	1897	
5PMW	3800 U - BODY (EXPORT)	Figure 10	306/30	35/35	1897	
5ACW	3800 C/H - BODY	Figure 10	306/30	35/35	1897	
5ASW	3800 C/H - BODY	Figure 10	284/30	35/35	1420	
5YZW	3800 H - BODY	Figure 10	306/30	35/35	1897	
5BXW	3800 H - BODY	Figure 10	306/31	35/35	1897	
5BKW	3800 H - BODY	Figure 10	306/31	35/35	1897	
5YMW	3800 H - BODY	Figure 10	284/30	35/35	1420	
5YDW	3800 SUPERCHARGED C/H - BODY	Figure 10	333/31	37/33	1897	
5YNW	3800 SUPERCHARGED H - BODY	Figure 10	333/31	37/33	1897	
3.05 AND 3.29 RATIOS ARE "FINE PITCH" FINAL DRIVES. SUN GEARS, INTERNAL RING GEARS AND PINION GEARS ARE NOT INTERCHANGEABLE WITH OTHER FINAL DRIVES.						

Figure 5

1996 THM 4T60-E MODELS						
TRANSAXLE MODEL CODE	DESCRIPTION	WIRE HARNESS	FINAL DRIVE RATIO/ROTOR	SPROCKETS DRIVE/DRIVEN	STALL SPEED	STRUCTURAL SIDE COVER
6CUW	2.4L N - BODY	Figure 13	* 305/30	33/37	2363	YES/6 BOLT
6AFW	3.1L W - BODY	Figure 10	333/30	35/35	2095	YES/4 BOLT
6AJW	3.1L A - BODY (EXPORT)	Figure 10	333/30	37/33	1630	
6PAW	3.1L A - BODY	Figure 10	333/30	37/33	1630	
6WFW	3.1L L - BODY	Figure 10	* 329/30	37/33	1630	YES/6 BOLT
6BSW	3.1L N - BODY	Figure 10	* 329/30	37/33	1630	YES/6 BOLT
6PBW	3.4L W - BODY	Figure 10	306/30	33/37	2060	YES/4 BOLT
6PKW	3.4L U - VAN	Figure 10	* 329/30	35/35	1897	
6CAW	3800 G - BODY	Figure 10	* 305/30	35/35	1897	YES/6 BOLT
6HBW	3800 W - BODY	Figure 10	306/30	35/35	1897	YES/4 BOLT
6ACW	3800 C/H - BODY	Figure 10	306/30	35/35	1897	
6ASW	3800 C/H - BODY	Figure 10	284/30	35/35	1420	
6BXW	3800 H - BODY	Figure 10	306/30	35/35	1897	
6YLW	3800 SUPERCHARGED C/H - BODY (H.D.)	Figure 10	* 329/30	37/33	1897	
6YRW	3800 SUPERCHARGED H - BODY (H.D.)	Figure 10	* 329/30	37/33	1897	
6CTW	3800 SUPERCHARGED G - BODY (H.D.)	Figure 10	* 329/30	37/33	1897	YES/6 BOLT

3.05 AND 3.29 RATIOS ARE "FINE PITCH" FINAL DRIVES. SUN GEARS, INTERNAL RING GEARS AND PINION GEARS ARE NOT INTERCHANGEABLE WITH OTHER FINAL DRIVES.

91-93 PRESSURE SWITCH MODELS



WIRING HARNESS PART NUMBER FOR
THIS MODEL IS 12082981 OR 12121131

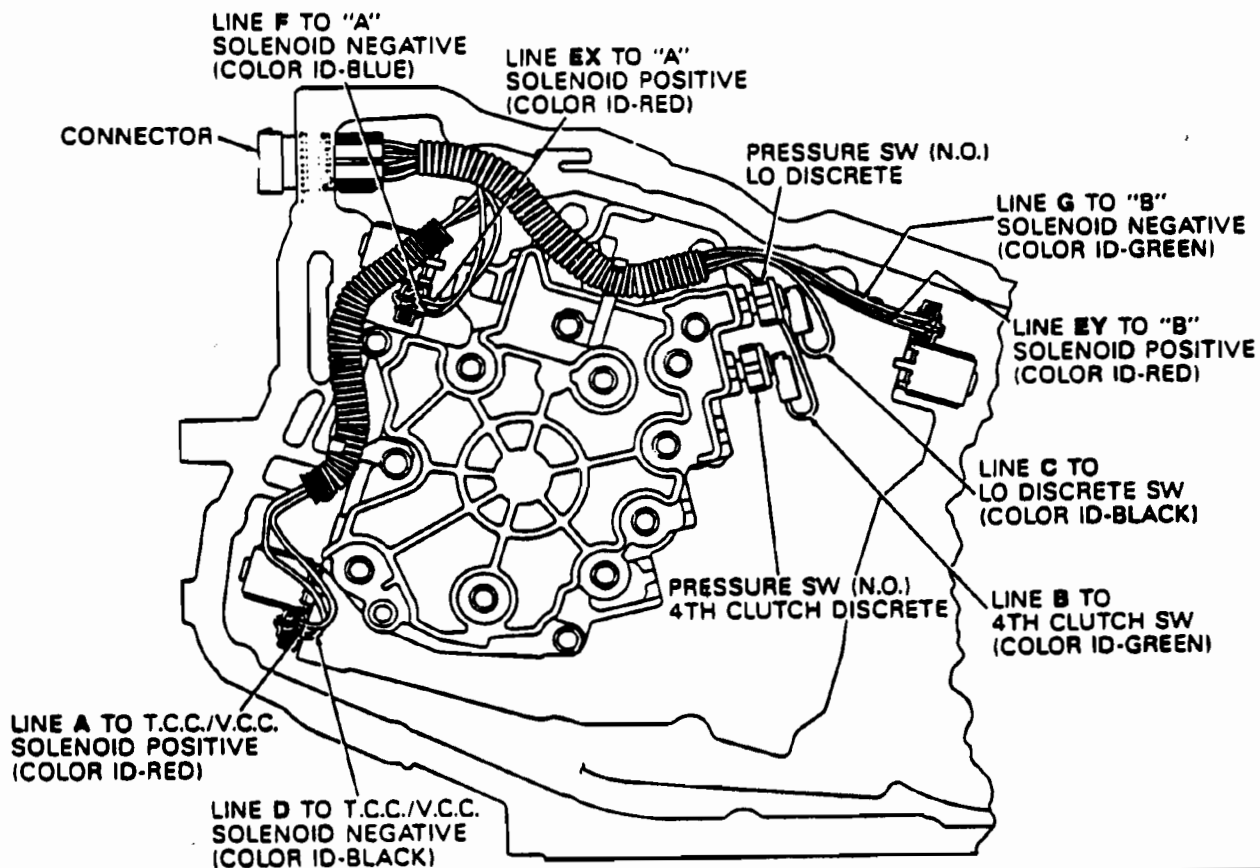
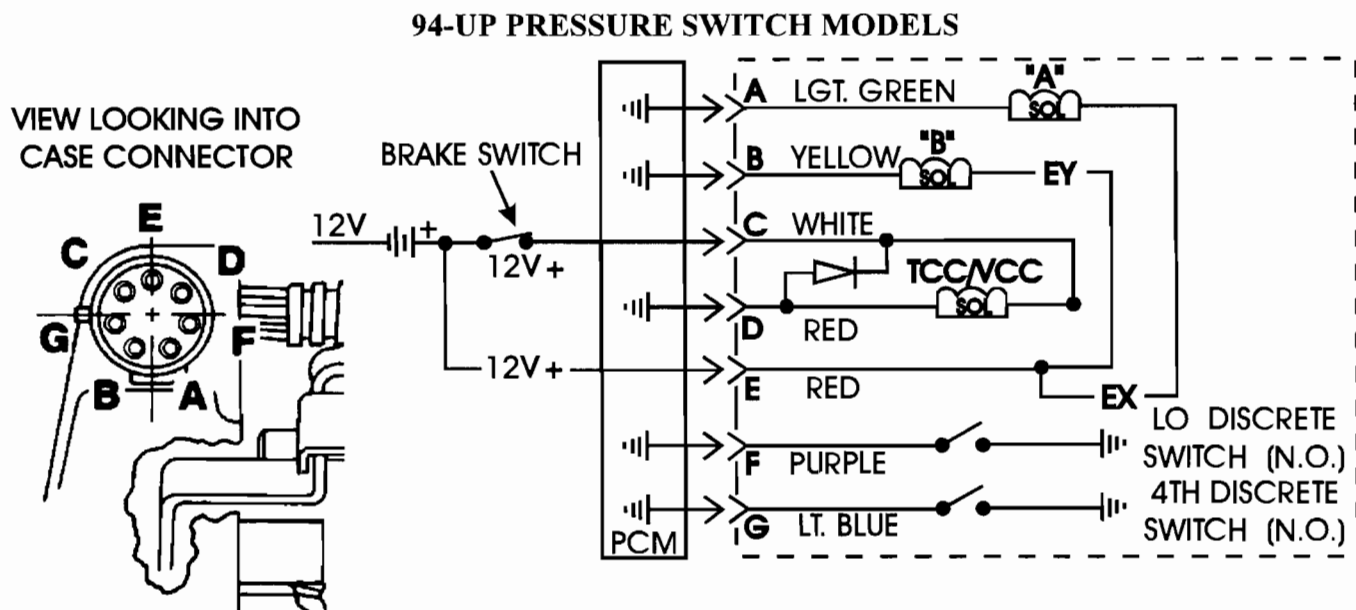


Figure 7



*WIRING HARNESS PART NUMBER FOR
THIS MODEL IS 12143596*

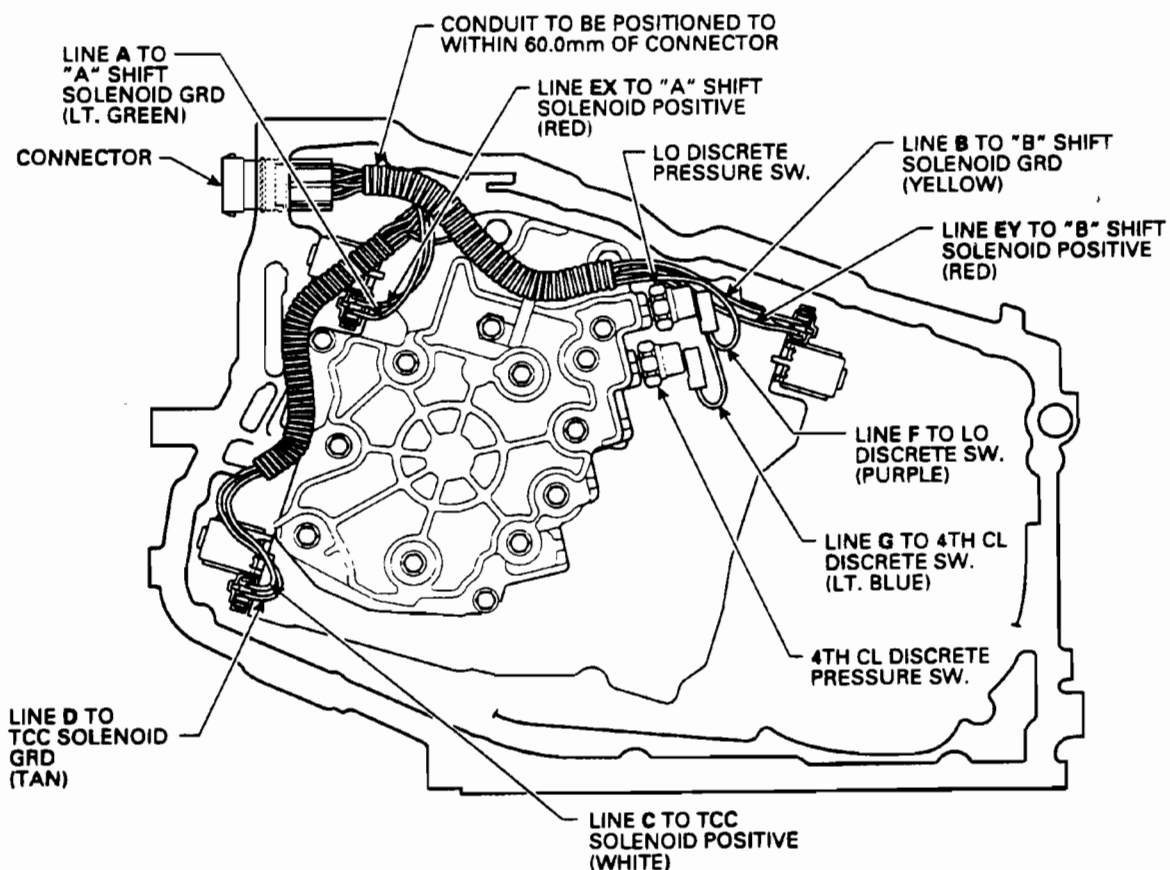
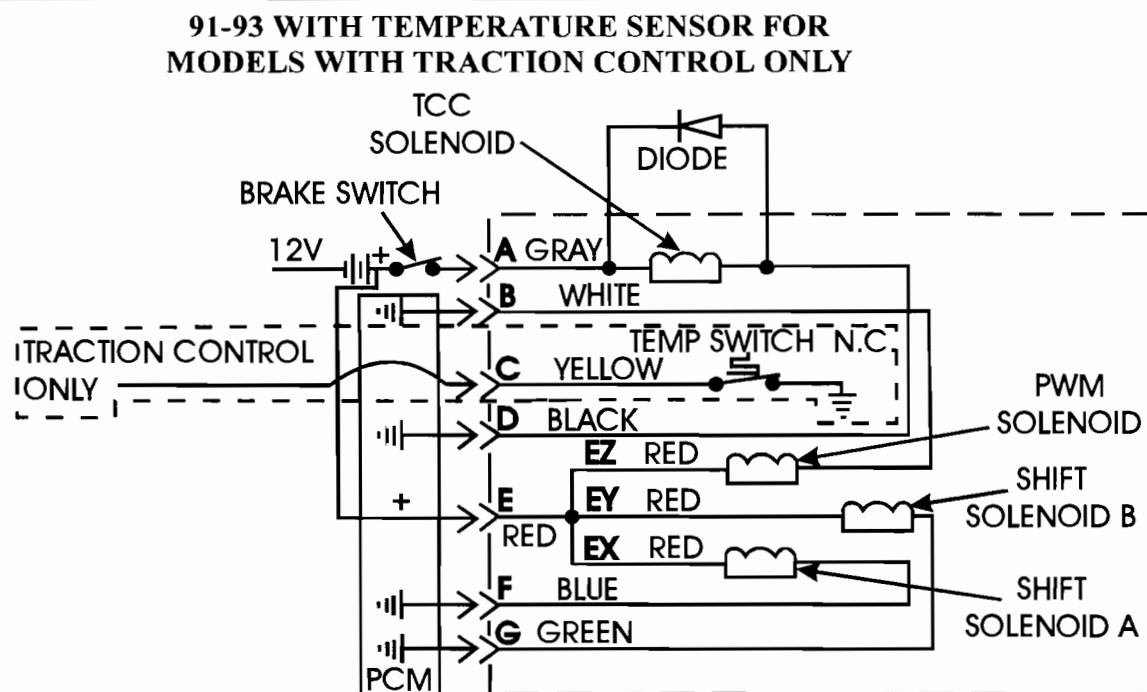


Figure 8



WIRING HARNESS PART NUMBER FOR THIS MODEL IS 12109436

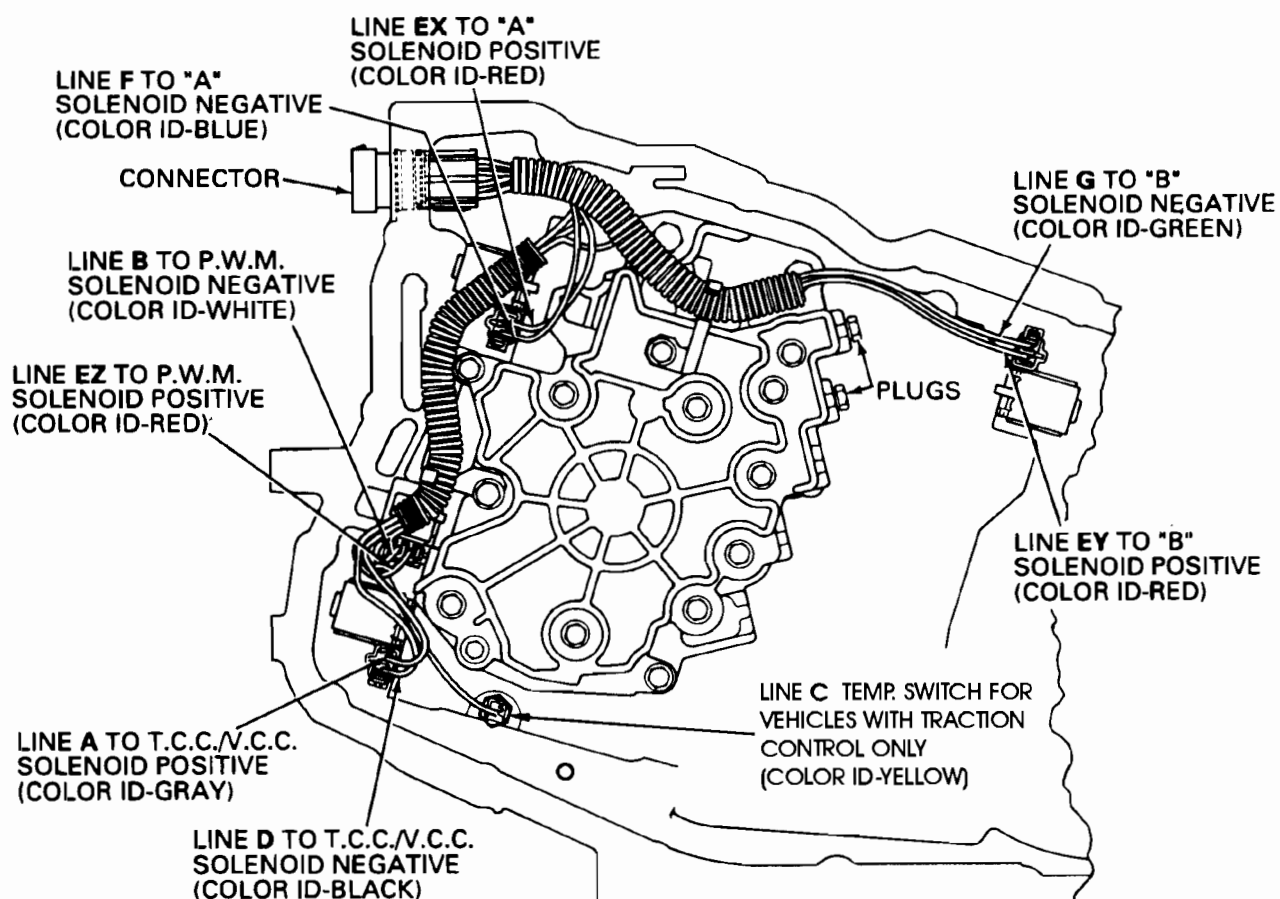
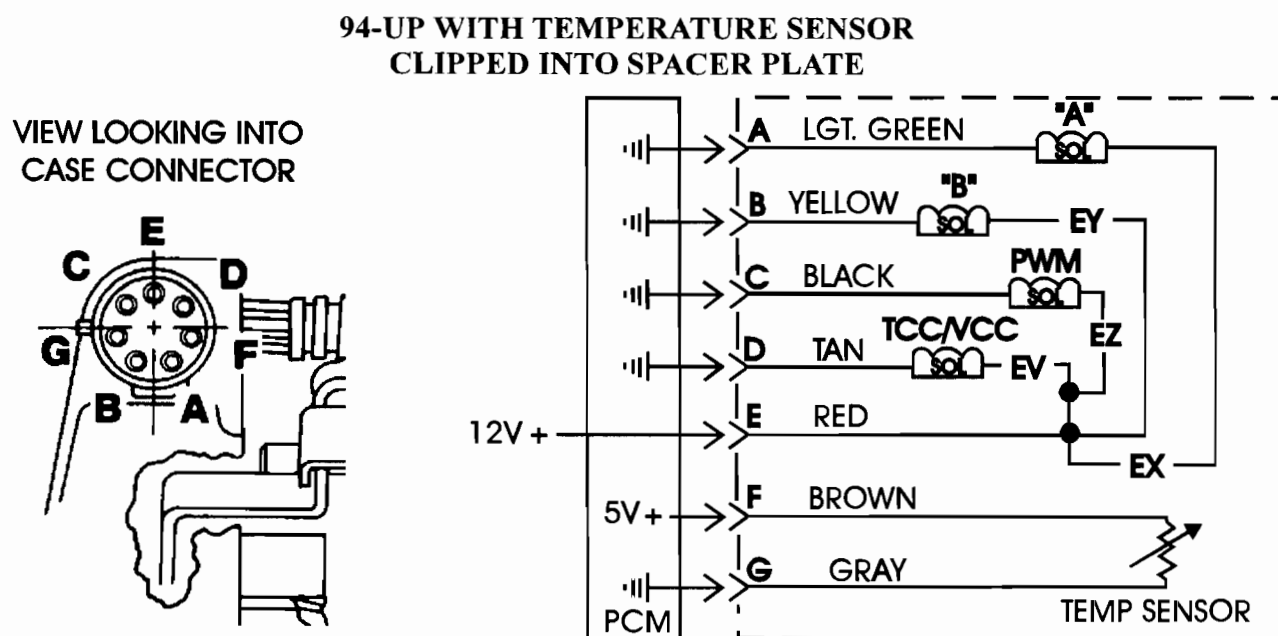


Figure 9



**WIRING HARNESS PART NUMBER FOR
THIS MODEL IS 12143000 OR 12163484**

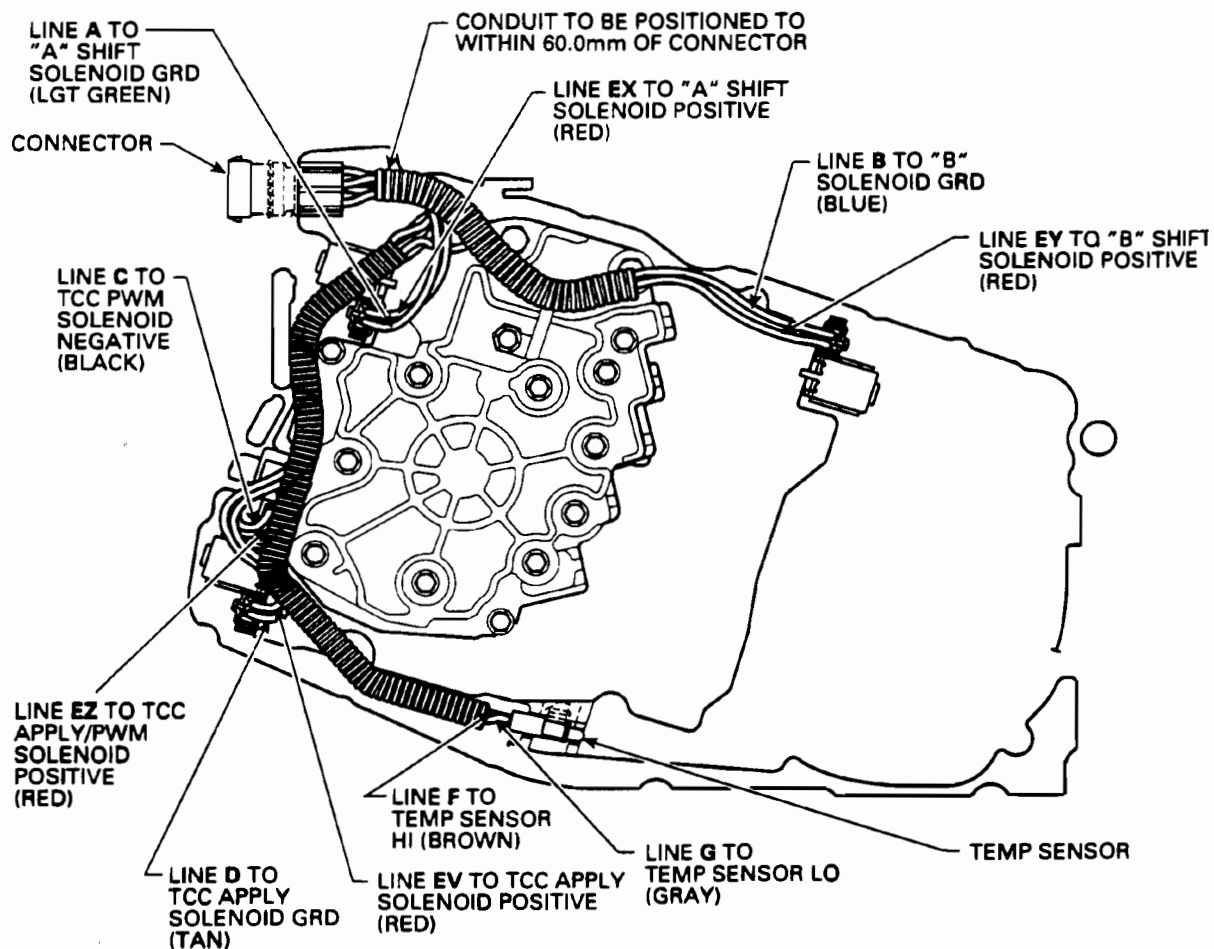
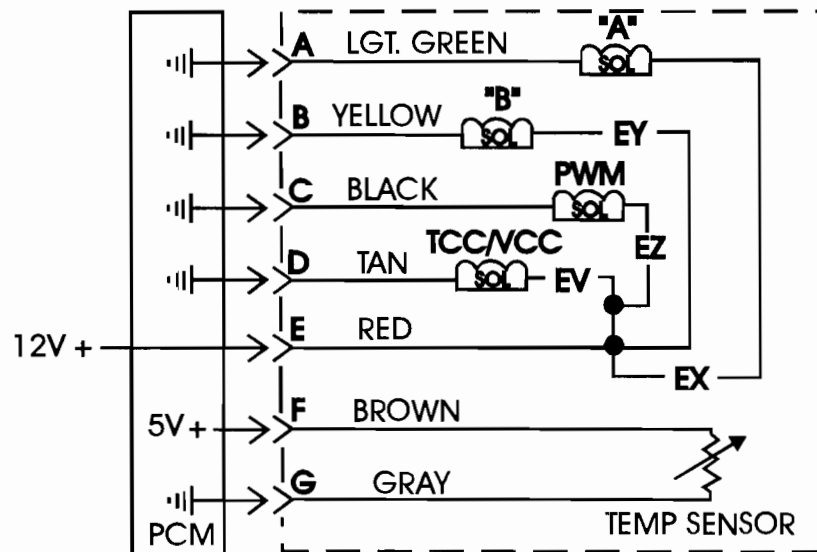
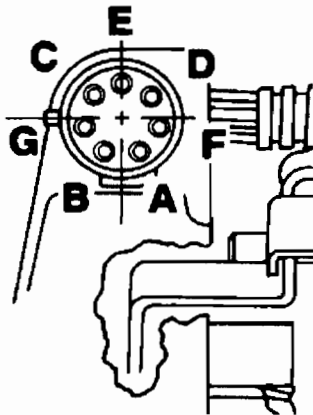


Figure 10

94-UP WITH TEMPERATURE SENSOR
INSTALLED INTO CHANNEL PLATE

VIEW LOOKING INTO
CASE CONNECTOR



WIRING HARNESS PART NUMBER FOR
THIS MODEL IS 12143082

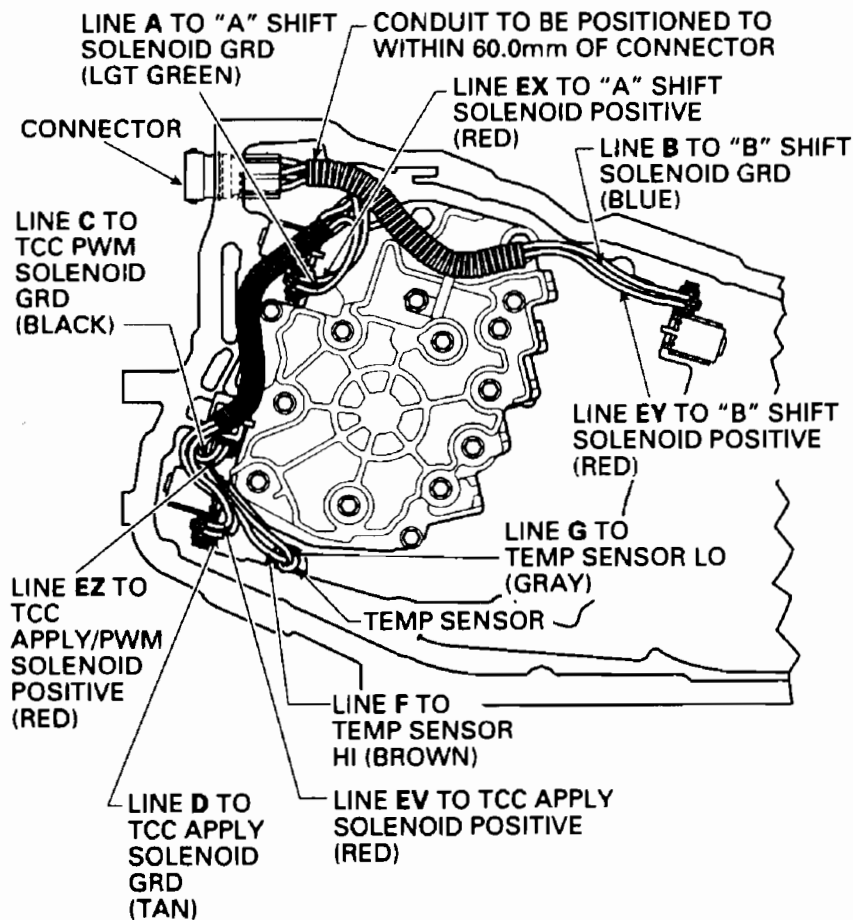


Figure 11

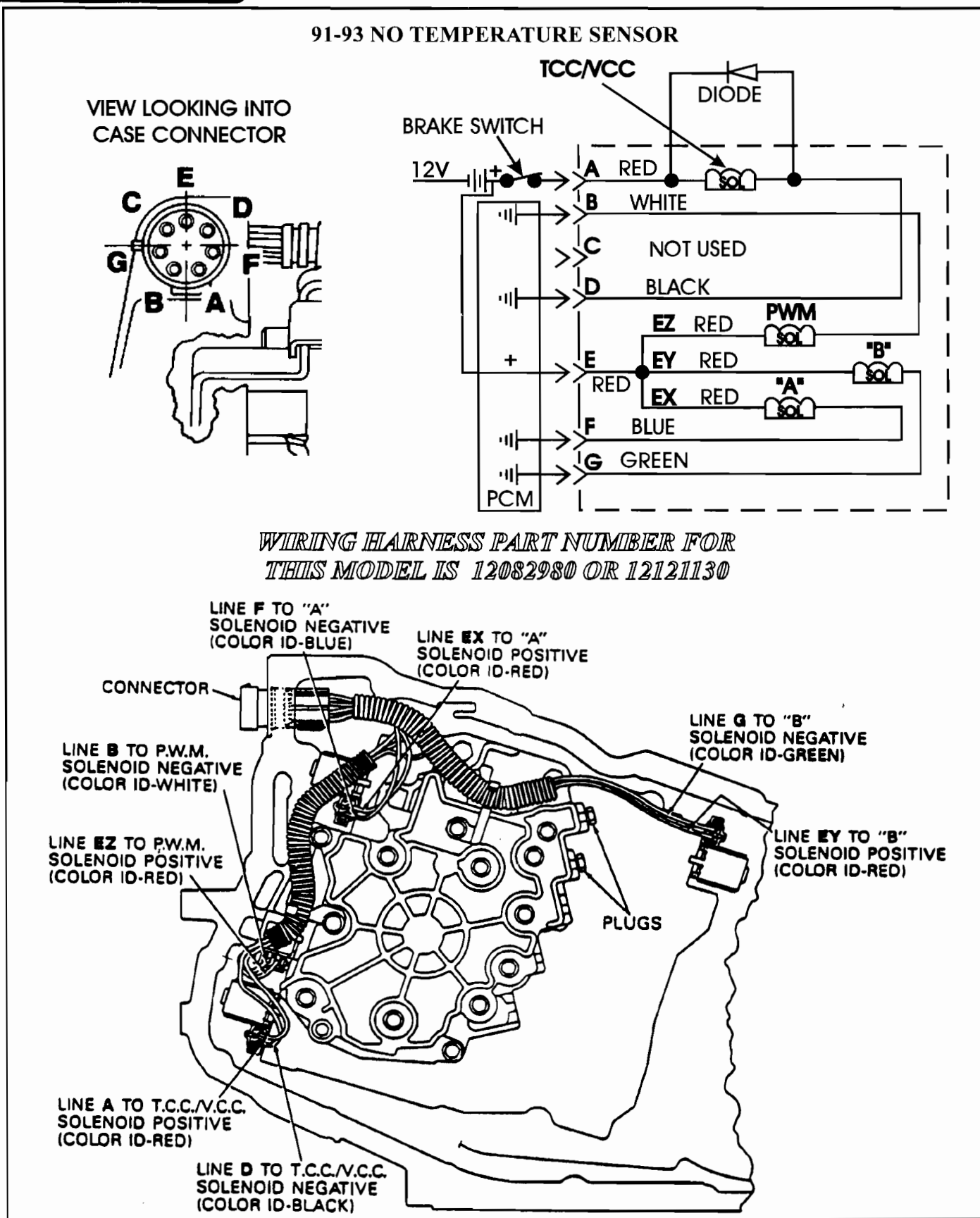


Figure 12

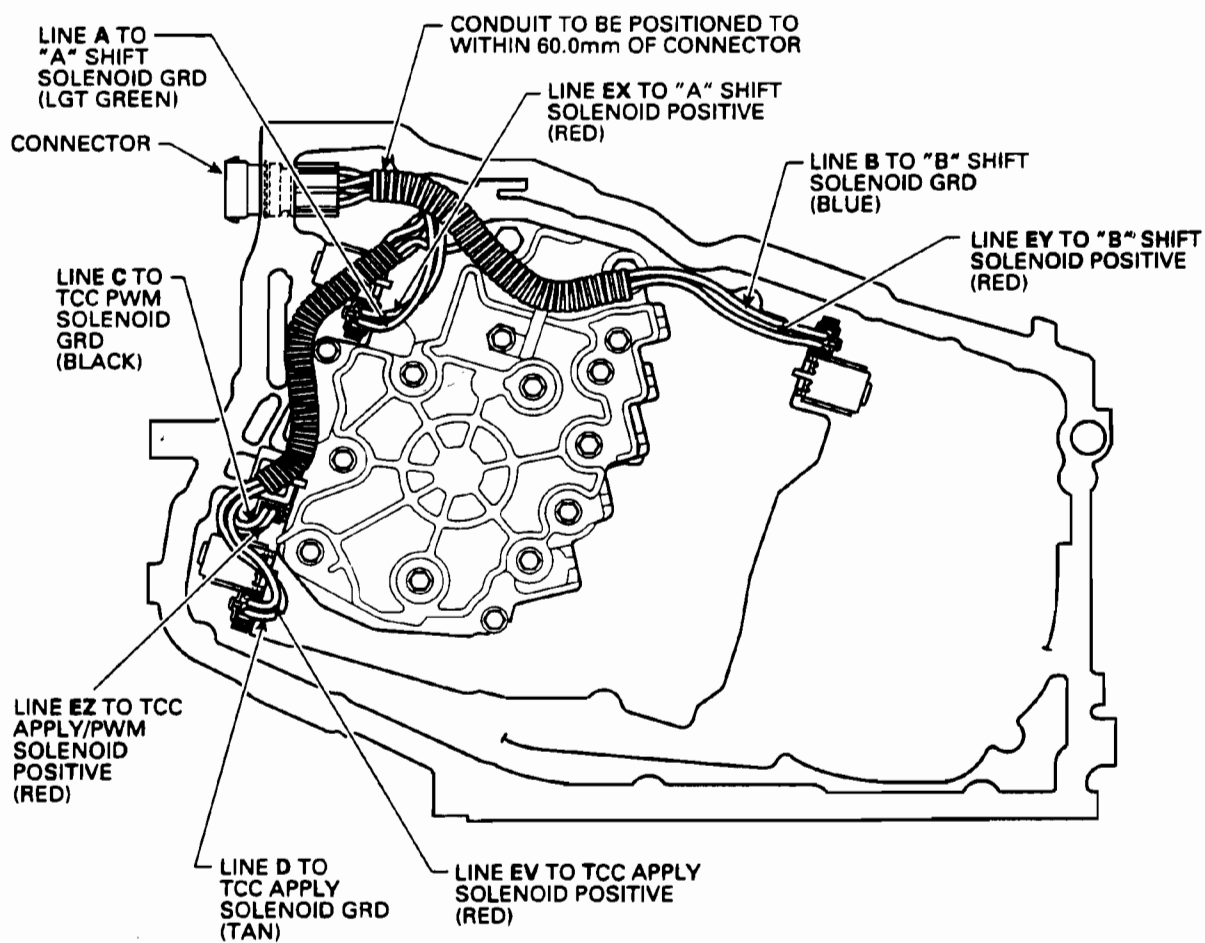
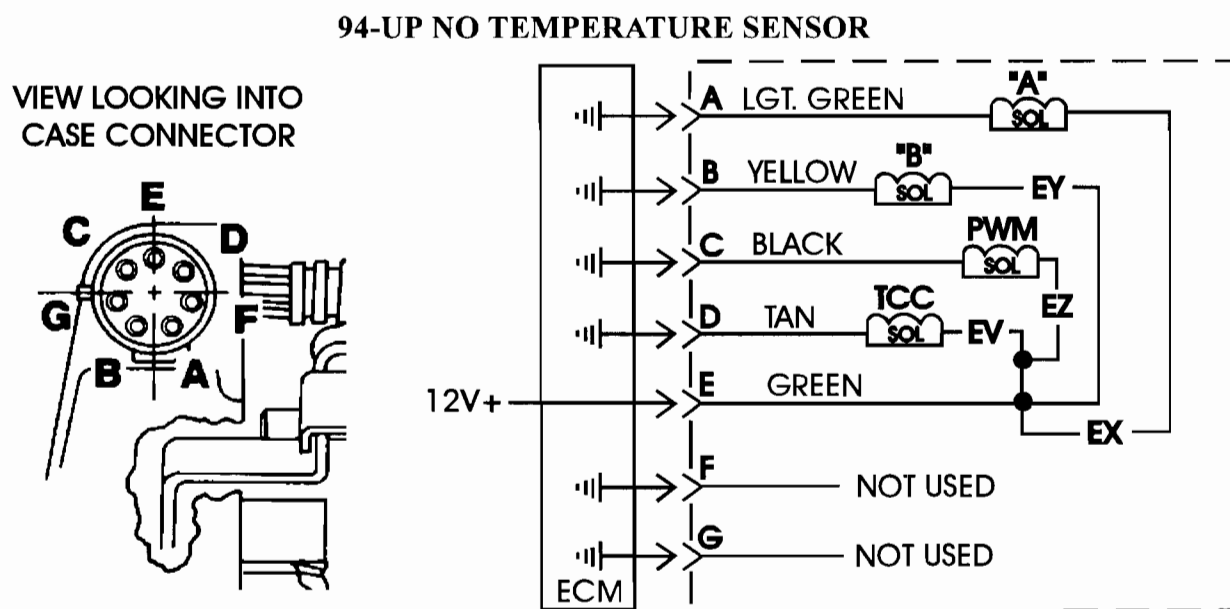


Figure 13

TCRS™

10 Years of business - Thank you for your support.

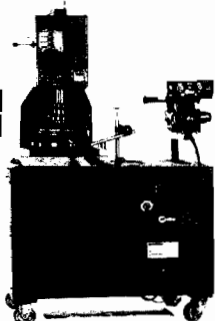
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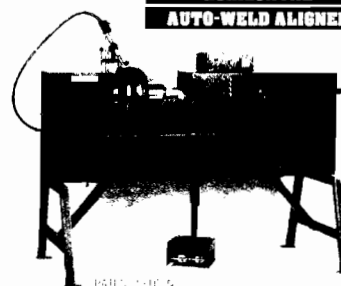


TCRS robotic 2001 "Auto Tack System"™
Automatically indexes and fully tacks the converter in seconds. Upon completion of the last tack it makes a complete 360 weld and automatically shuts off!

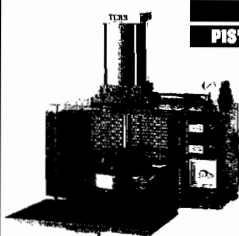
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- Qualified trained personnel
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- Air hold down no bolting necessary
- Air collet system no chuck keys
- All pilots and hub bushings included
- Complete hubbing system to install new finished hubs on any impeller
- Bond build-up saves critical cores
- Welds on ring gears
- Delta weld 300
- Tweeko Turn Gim
- Concentricity, perpendicularity and parallelism

HORIZONTAL AUTO-WELD ALIGNER



PB-2002 PISTON BONDER



- Easy as 1-2-3
- Bonds a piston every 5 min
- Adjustable heat & timer controls

- Aluminum bonder dies provide even heat distribution
- Compact & efficient
- No wait-no freight • Pat # 5 141 586
- Comes with 20 die sets Am. & Foreign

TCRS is proud to announce another first!!! The new Hub Master™ Auto-Tack-Auto-Weld machine. The HM-2000 (PATENT PENDING). The Hub Master™ machine is designed for the production builder or for anyone looking for an easy, fast, accurate, precision means of hub to impeller alignment.



THE HUB MASTER™ AUTO-WELD "AUTO-TACK"



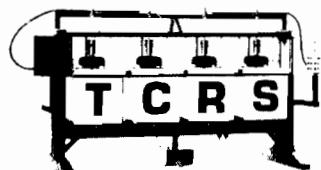
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NEW FROM HOFMANN - the name in balancing equipment throughout the world. (German engineering since 1920).
• Components supplied by Hofmann and produced by TCRS in our manufacturing facilities.
• Balance in 4 seconds. No bolting necessary. Find or Dr. Balance - Computer to it's easy, pad for entering torque converter turn.

NEW

- NEW TCRS BALANCER TOOLING
- TCRS Collet locking system - both inter-changeable to spare hardened, precision ground radius shafts - American Tooling (Foreign Tooling Optional)

AWA-400 - NEW



Supertanker Air Test Stand

- Operator friendly and Safe
- Test 4 or 1 at a time
- Air operated sealing device
- Reservoirs are independent
- Easy to clean

NEW



NOW AVAILABLE
WASTE OIL FIRED

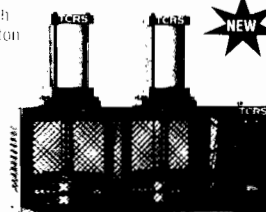
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The TCRS MULTI-PURPOSE Pass Through Conveyor Washer is designed to clean efficiently any kind of part - whether it's a TRANSMISSION CASE, HARD PART or TORQUE CONVERTER

NEW

PB-2004 - NEW Piston Bonder

- Easy as 1-2-3
- Bond 1 or 2 at a time with the same or different piston Avg. 5 min
- Adjustable heat & timer controls
- Aluminum bonder dies provides even heat distribution
- Comes with 20 die applications
- American & Foreign



NEW

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TCRS SPECIAL APPLICATION LATHE
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WASHER
SUPERTANKER AIR TEST STAND
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PRODUCTION REBUILDER
HORIZONTAL AUTO WELD ALIGNER
HUB MASTER
CONVEYOR WASHER - ELECTRICAL
OR WASTE OIL FIRED
DOUBLE PISTON BONDER
SUPERTANKER AIR TEST STAND
(1 TO 4 UNITS AT A TIME)

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HEIGHT GAGE
TCRS BUSHING DRIVER SET
BELT SANDER
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SATURN

1995 ACTUATOR QUICK CHECK PROCEDURE

1995 Saturns equipped with MP6 or MP7 transaxles require a different actuator quick check procedure than is required on 1994 and earlier models.

1994 and earlier models, utilized a master enable relay to power the actuators when the ignition was turned on and terminals "A" and "B" in the diagnostic connector were bridged as shown in Figure 1. The gearshift lever was then moved to the position that would energize that particular actuator and the audible buzz could then be heard which is illustrated in the chart in Figure 2.

1995 Saturns receive actuator power through the fuel pump relay, which is only powered up for **5 SECONDS** when the ignition key is turned to the **RUN** position which is not a long enough time period to run the actuator test. After the 5 second period has elapsed, the actuators receive **NO** power.

After the engine is running the fuel pump relay is once again powered up, but, with the engine running it is difficult to hear the actuators.

In order to keep the the fuel pump relay energized for a longer period of time, a jumper wire must be connected between the body fuse and the fuel pump relay circuit as shown in Figure 3. The body fuse and the fuel pump relay are located in the instrument panel junction box behind the center of the dash.

The actuator audible quick test procedure is as follows:

- 1.REMOVE THE #15 10 AMP BODY FUSE.
- 2.CONNECT THE JUMPER LEAD TO THE FUEL PUMP PROBE HOLE AND THE B+ TERMINAL OF THE BODY FUSE.
- 3.JUMP THE "A" & "B" TERMINALS IN THE DIAGNOSTIC CONNECTOR.
- 4.TURN IGNITION KEY TO "ON" AND MOVE GEARSHIFT LEVER TO THE DESIRED POSITION.

NOTE: The way to identify the need to use the 1995 procedure is to check the underhood fuse box to see if there is a Transaxle Master Enable Relay located there. If it does **NOT** have this relay, then the 1995 procedure must be used.

SATURN
1995 ACTUATOR QUICK CHECK PROCEDURE

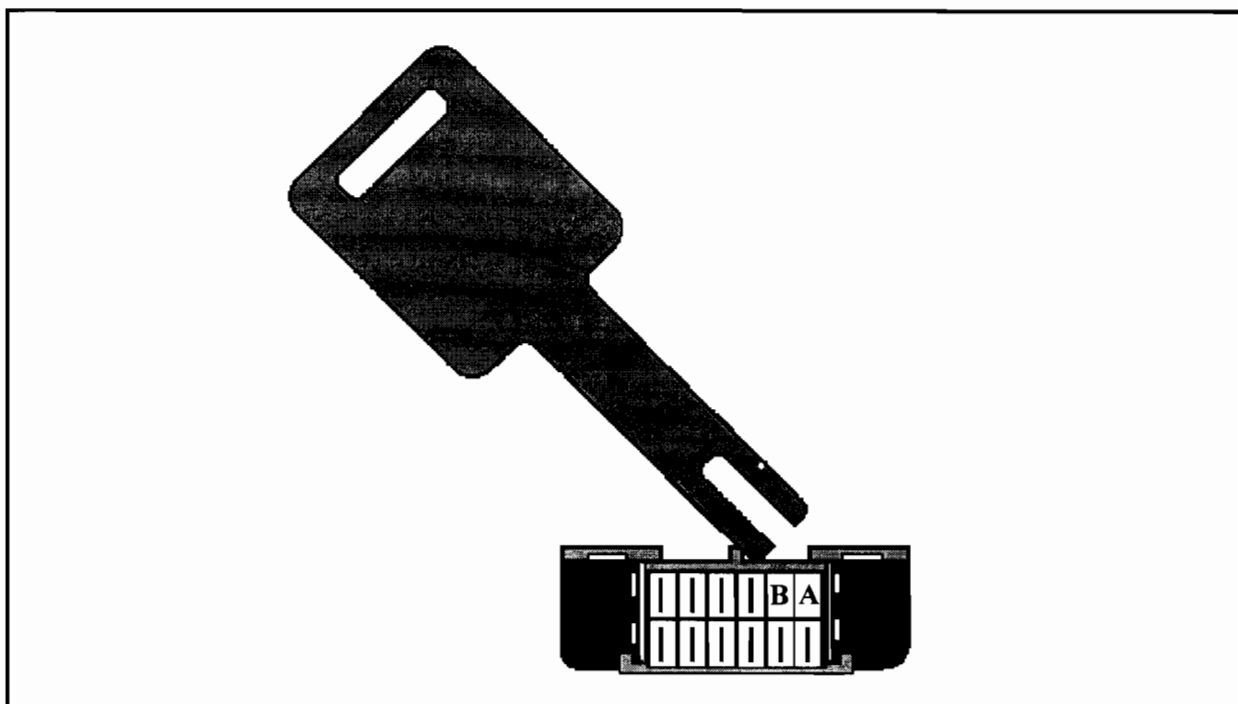


Figure 1

GEAR SELECTION	ACTUATOR
2	2nd Actuator
3	3rd Actuator
D	4th Actuator
R	TCC Actuator
N	Line Actuator

Figure 2

SATURN

1995 ACTUATOR QUICK CHECK PROCEDURE

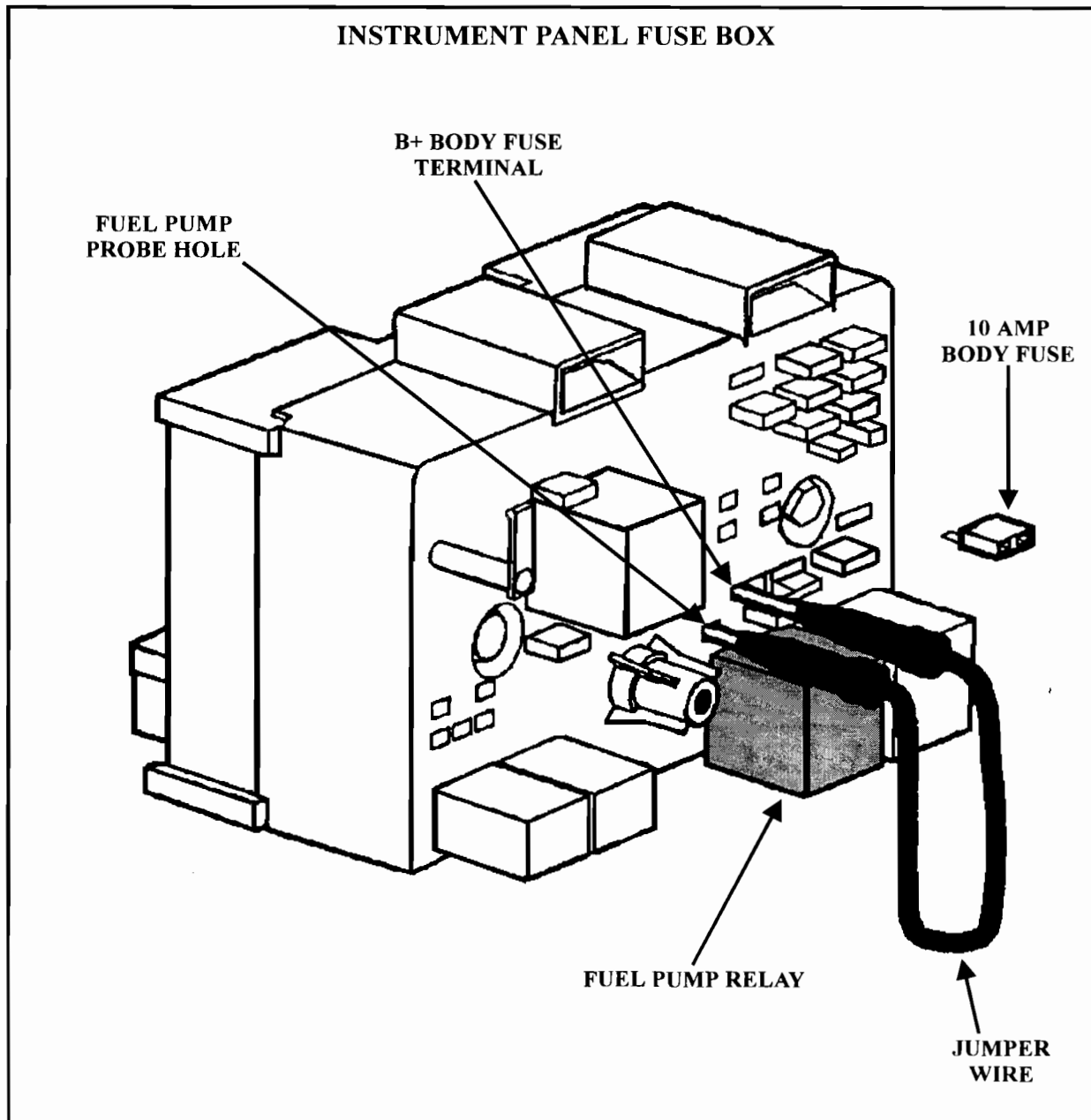


Figure 3

Fix it right the first time - on time!

Powertrain Division of Ford Motor Company is offering the following service publications as a means to improve your diagnostic and repair capability, reduce service time, and minimize "come backs".

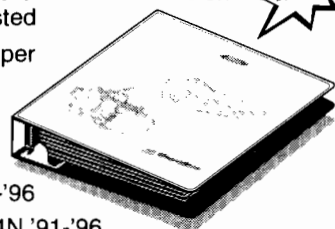
These materials are well illustrated, contain detailed specifications and are written specifically for service technicians.

Many publications are new. Watch for the



SERVICE BULLETINS FOR AUTOMATIC TRANSMISSIONS

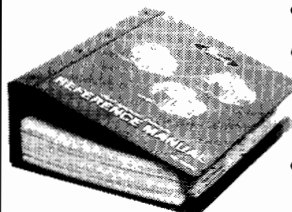
- Listed by model, year and symptom.
- Contains official Ford Service Bulletins on the transmissions listed
- Printed on heavy paper
- 400 pages
- Covers: Years
 - A4LD '89-'96
 - AODE/4R70W '92-'96
 - AXODE/AX4S/AX4N '91-'96
 - C6 '89-'96
 - CD4E '94-'96
 - E4OD '89-'96
 - 4EAT '89-'96
 - 4F20E '93-'96



**ORDER
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- Single post style binder
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 - Types G-F - FG
 - Years 91-95
- 119 color hydraulic fluid circuits
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**ORDER
 ITEM #18**

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3 TAPE KIT ORDER ITEM #15

Electronic Transmission Diagnostic Video - a two part, 50 minute video that discusses the Ford electronic systems and the electronic tools to diagnose the system. Part one uses an animated character "ZAP" to show how the Ford EEC IV and V systems control the transmission. Part two shows the advanced diagnostic tools needed to properly diagnose and repair electronically controlled transmissions.



Diagnosis and Service Tips Video - produced in 1993 is 55 minutes long. The tape covers diagnosis using the transmission tester tool and factory approved routines through-out the video. Special emphasis is placed on the AXODE transmission.

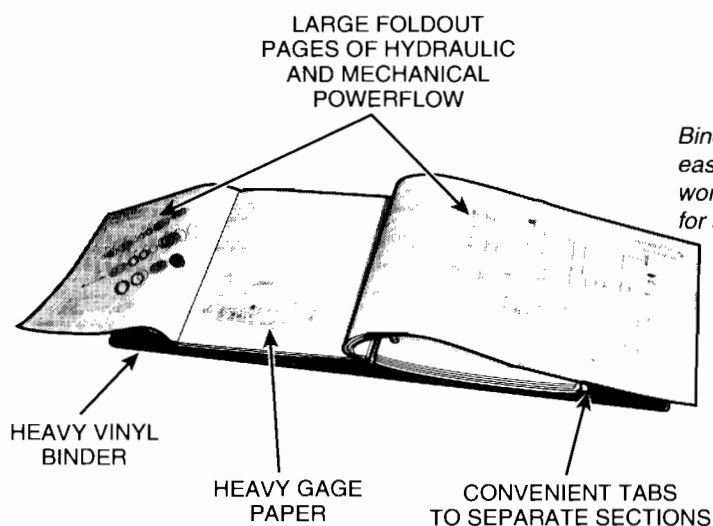
E4OD Video - produced in 1992 is 56 minutes long and divided into two parts. The first part covers diagnosis of the electronics that control the E4OD and product updates. Part two includes disassembly and reassembly, highlighting all areas that require special attention to ensure a "fix it right the first time" repair.

The Kit Consists of 3 Videos and 3 Laminated Cards.

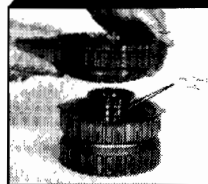
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Sections For:

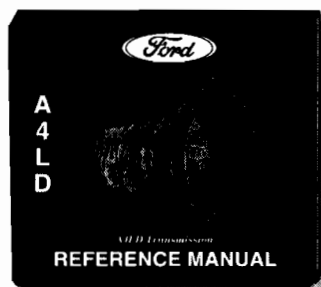
- Disassembly
- Theory
- Diagnosis
- Tools
- Hydraulic Fluid Circuits



*Binders stand up for
ease of using on the
work bench or lay flat
for study.*

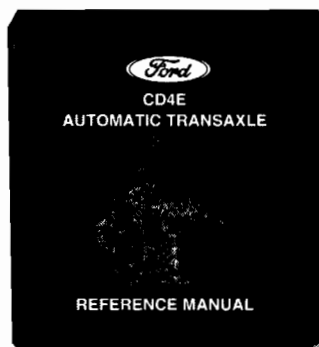


*Disassembly/Reassembly
sections use real
photographs.*



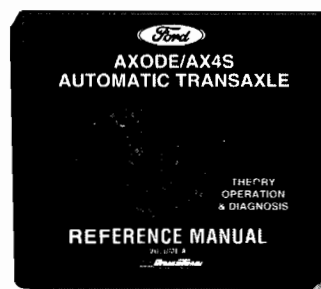
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- 453 total pages

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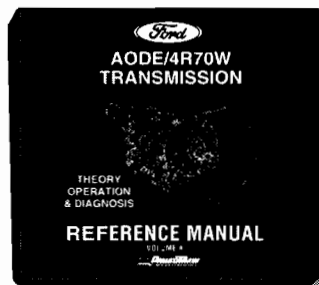
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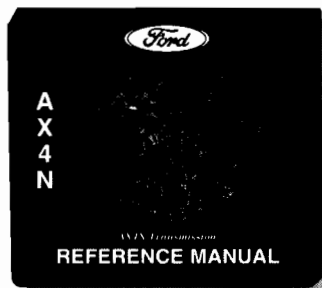
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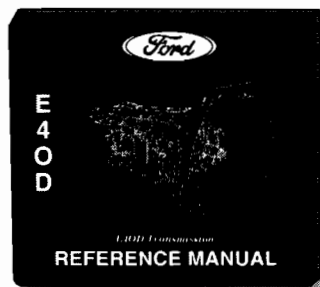
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ONE EACH OF THE ITEMS ABOVE - ORDER ITEM #16

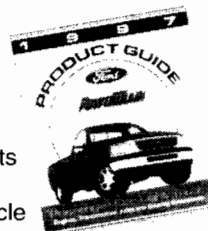
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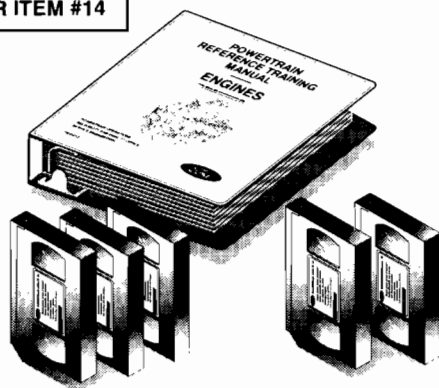
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You will receive:

A ring binder with 6 books – 5 Video Tapes and an assortment of booklets and other repair information enhancements.
24 Total Items.

• Leak and Noise Set

The Leak and Noise set contains a 60 minute video on Leak and Noise Diagnosis. Two companion booklets, each 36 pages, describe in more detail the steps outlined in the video. Two laminated quick reference cards are also included.

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- Engine Gasket / Surface Preparation
- Engine Basic Electrical
- Leak Diagnosis
- Engine/Transmission Exchange Program
- Axle Bearing & Seal Service
- Transmission Updates

• Fuel Delivery Set

The fuel system set contains a 48 minute video that walks the technician thru diagnosis and service of fuel injectors and throttle bodies. A 76 page companion book provides the technician with additional information. Also included are a wall chart indicating serviceability by year and model, and a ready reference card and sticker.

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Ford ICBA forms with authorization signatures should be sent to: Ford Powertrain Box 28
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9	CD4E Reference Manual Binder - - - PTB 306	69.95		35.00		
11	A4LD Reference Manual Binder - - - PTB 304	59.95		30.00		
12	AX4N Reference Manual Binder - - - PTB 407	69.95		35.00		
13	Powertrain Product Guides (see page 1) - - - POB 701	5.00		2.50		
14	Engine - Information Kit - - - PEO 214B (see page 1)	49.95		25.00		
15	Transmission Information Kit - - - PTK 418 (see page 3)	29.95		15.00		
16	Master Kit of the 6 Binders (Listed in Bold Type) E4OD, AODE/4R70W, AXODE/AX4S, CD4E, A4LD and AX4N	299.95		180.00		
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19	Comprehensive TSB - - - PTB 609	69.95		35.00		
20	AODE/4R70W Reference Manual Binder - - - PTB 606	69.95		35.00		
21	AXODE/AX4S Reference Manual Binder - - - PTB 605	69.95		35.00		

Total

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TRANSMISSION RANGE SENSOR CHECK ALL EEC-V MODELS

Beginning in the production year of 1995, Ford introduced its 5th generation Electronic Engine Control system called the EEC-V Processor. By production year 1996, all Ford manufactured vehicles are equipped with this new 104 pin EEC-V processor. Since all late model Ford vehicles are equipped with this new processor, pin checks at the computer has obviously changed since the previous EEC-IV processor had only 60 pins in it. The following information provides different checks that can be made at the processor beginning with the Transmission Range Sensor (Manual Lever Position Sensor).

Figure 1 below is a typical wiring diagram of a Transmission Range Sensor used in all Ford applications for the exception of Escort and Tracer vehicles. Pin # 64 is the power supply to the sensor while pin # 91 is the voltage return circuit going back to the computer. Notice how there are resistors between each range. This is known as step down resistors and changes the amount of voltage that goes back to the processor. It is the amount of return voltage that the processor uses to determine the manual lever position chosen by the driver.

The minimum and maximum return voltage that the processor uses to determine which gear selection has been chosen, can be easily checked at the processor with a DVOM. This simple check can determine proper operation of the Transmission Range Sensor as well as the integrity of its electrical circuit. To make this check, place the negative meter lead to a good known ground and carefully back probe the # 91 wire as shown in Figure 2. With the ignition on, move the selector lever through out each gear range and compare the voltage reading to that which is shown in the Figure 3 chart for proper operation.

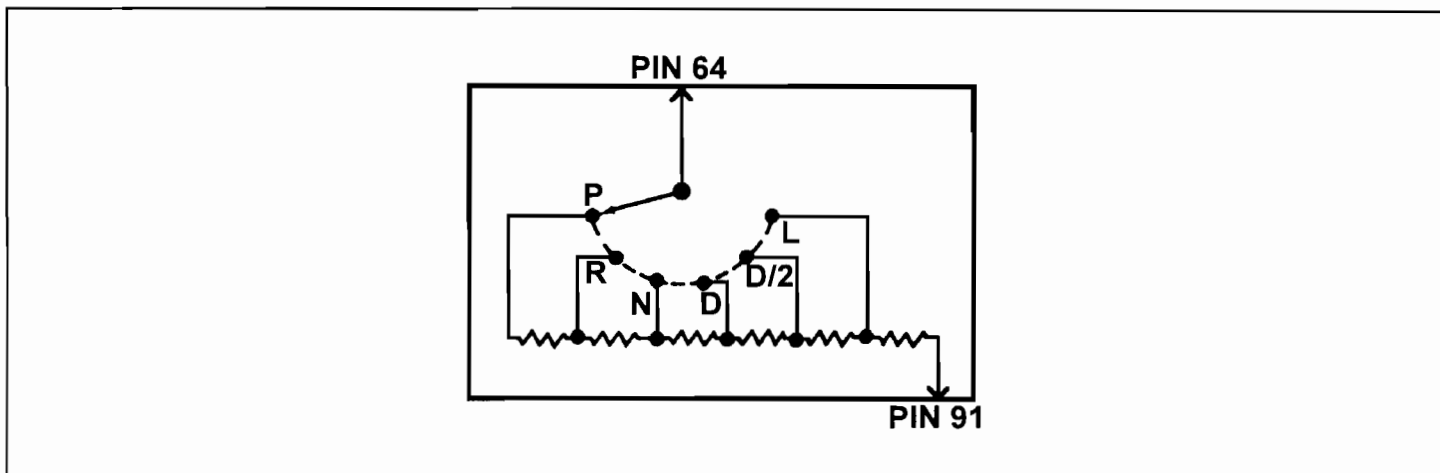


Figure 1

WIRE SIDE VIEW OF THE EEC-V CONNECTOR

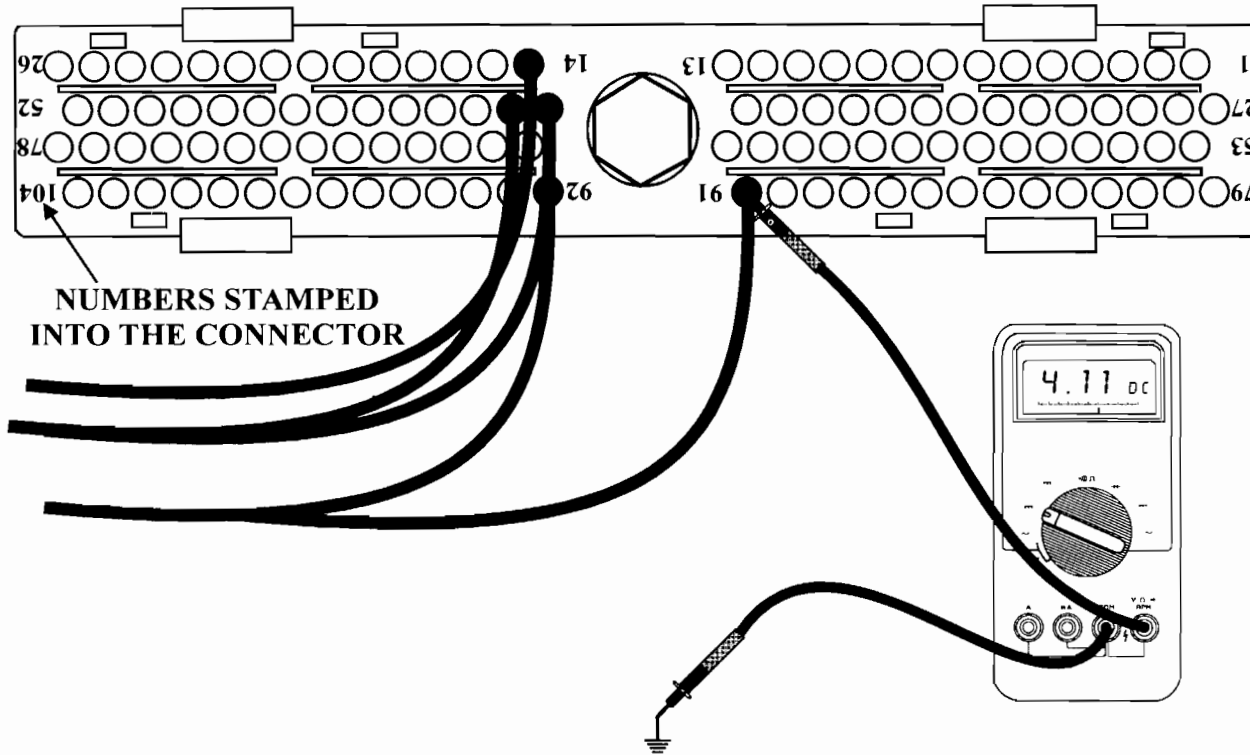


Figure 2

TRANSMISSION RANGE POSITION	VOLTAGE	
	MINIMUM	MAXIMUM
PARK	3.97	4.85
REVERSE	3.24	3.96
NEUTRAL	2.55	3.11
OVERDRIVE	1.88	2.30
DRIVE/SECOND	1.23	1.51
FIRST	0.61	0.75

Figure 3

THROTTLE POSITION SENSOR CHECK ALL EEC-V MODELS

Checking the TPS voltage at the EEC-V processor can be done easily with the use of a DVOM. . Place the negative lead to a good known ground and carefully back probe wire # 89 with the positive meter lead (See Figure 1). With the key on and engine off, step into the throttle and watch the voltage increase in proportion to throttle opening. Compare the voltage to that which is shown in the chart Figure 2 has a chart indicating the proper voltage increase proportional to throttle opening. Typically, 0.5 volts is at closed throttle and increases proportionally with throttle opening to approximately 4.50 volts at wide open throttle. The computer sends a constant 5 volts to the TPS from pin # 90. The ground wire from the TPS goes to pin # 91 at the computer (See Figure 3). These two wires can be easily checked as well. Obviously wire # 90 should have approximately 5 volts on it at all times while wire # 91 should always have less than 0.1 volts on it.

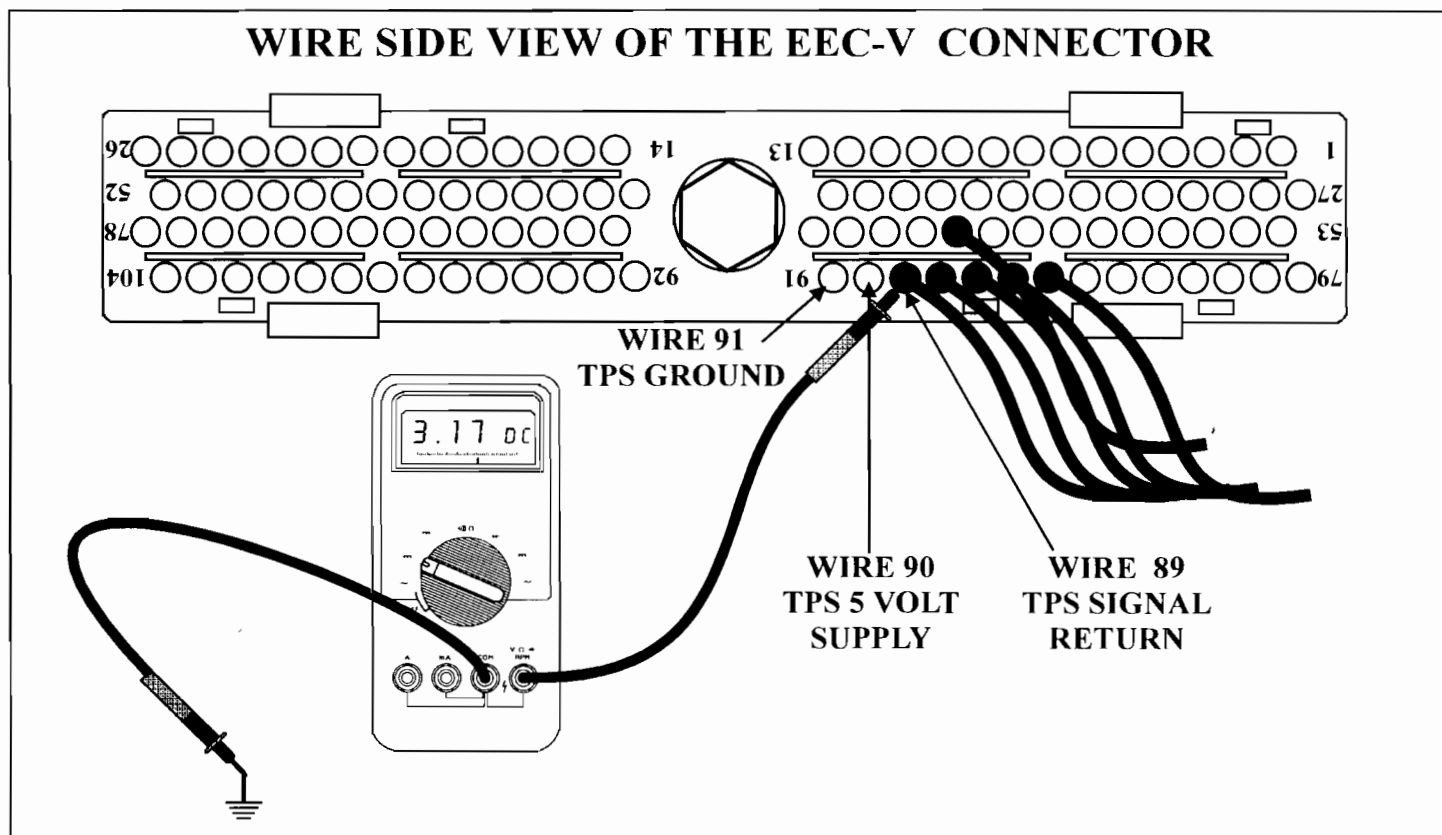


Figure 1

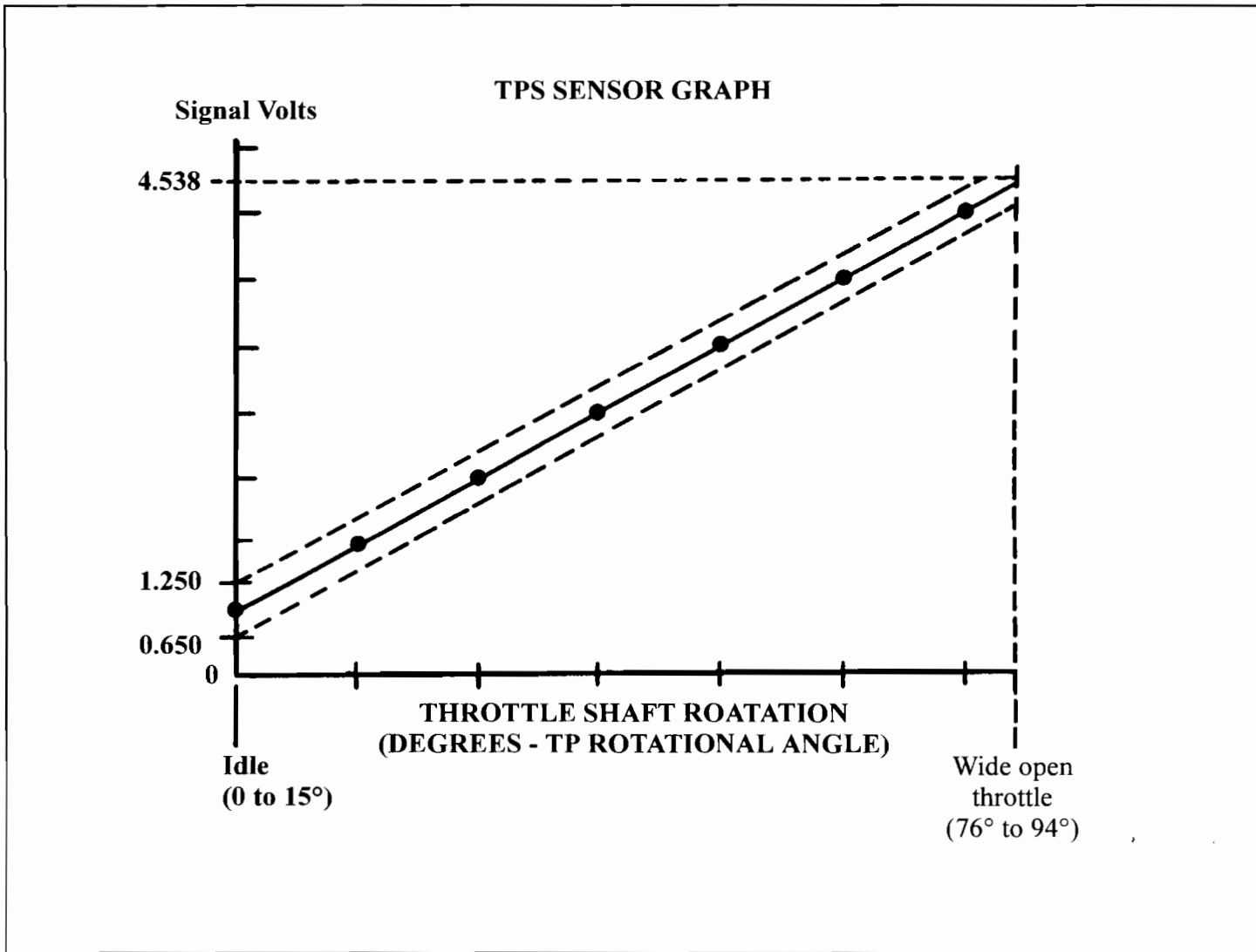


Figure 2

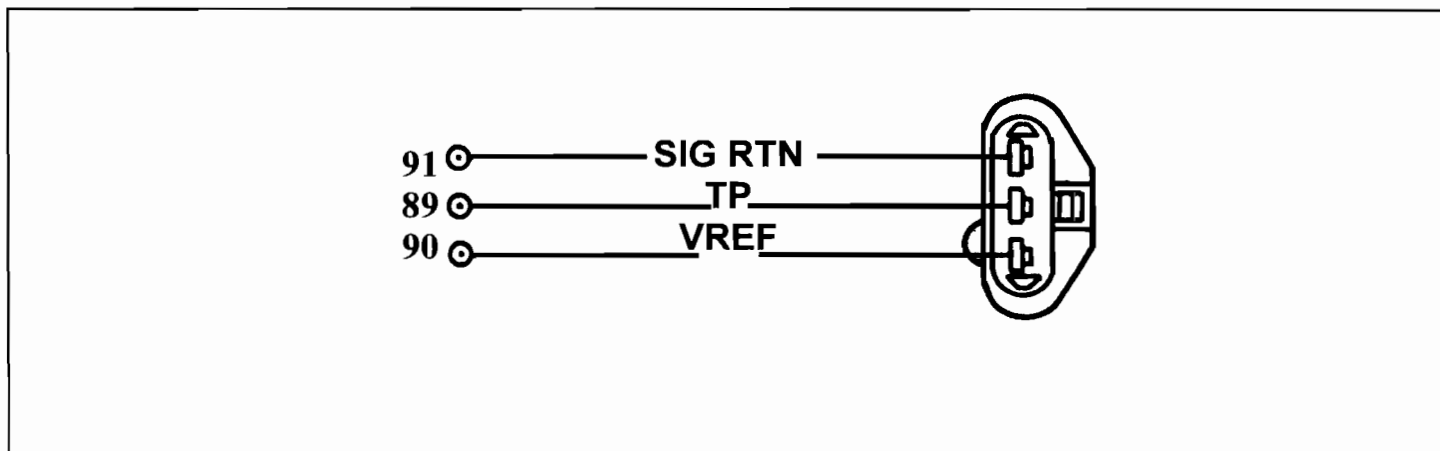


Figure 3

TRANSMISSION FLUID TEMPERATURE SENSOR CHECK ALL EEC-V MODELS

Checking the TFT sensor voltage at the EEC-V processor can be done easily with the use of a DVOM. Carefully back probe wire # 91 with the negative meter lead and carefully back probe the # 37 wire with the positive meter lead (See Figure 1). With the key on and engine off, compare the voltage value observed with the chart shown in Figure 2 and 3 to determine the temperature of the transmission fluid.

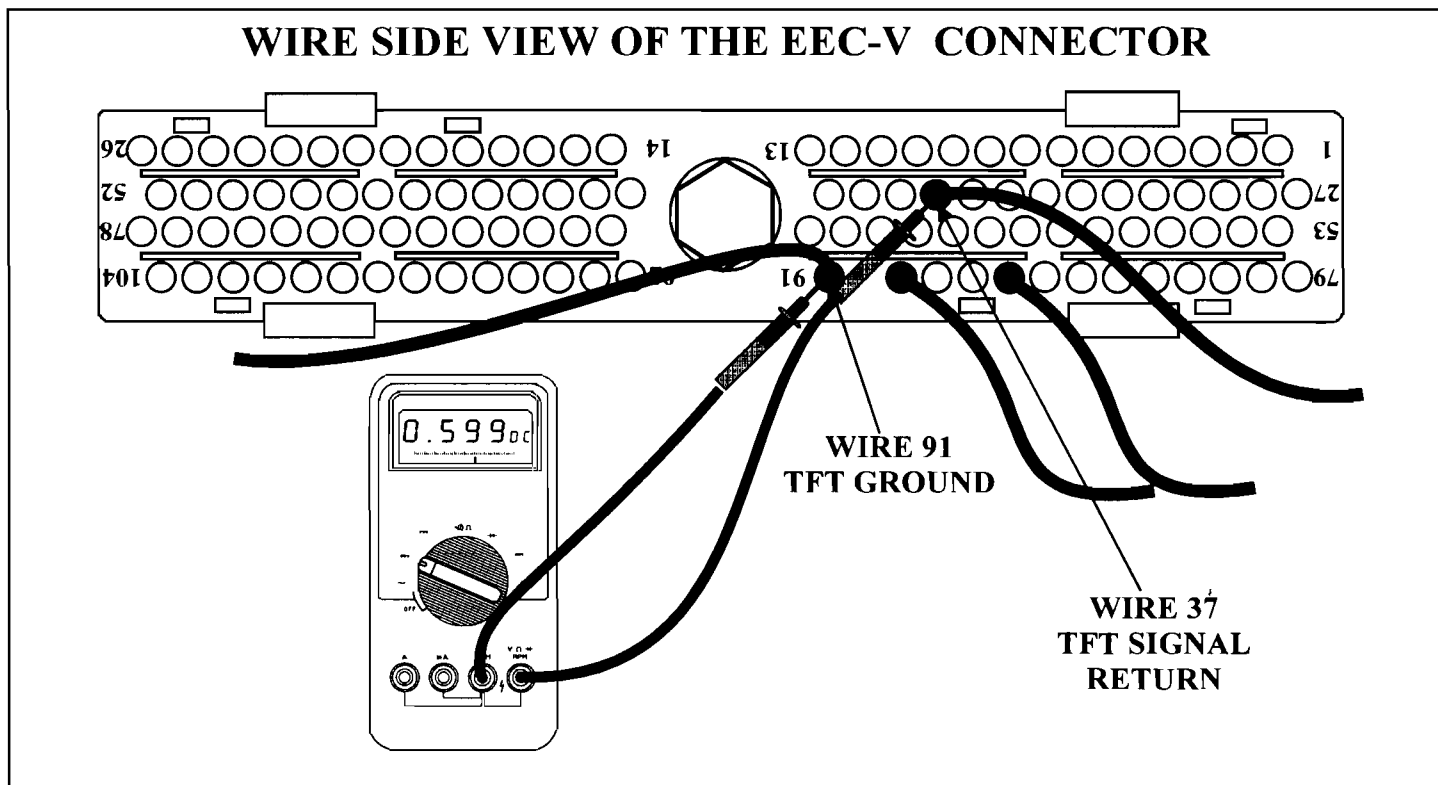
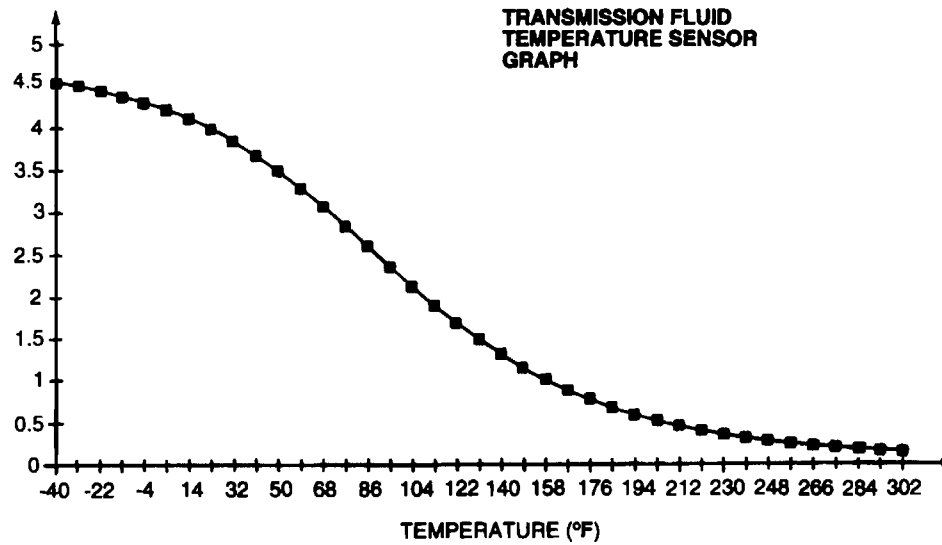


Figure 1

TFT Sensor Graph



Temperature		TFT Sensor Values	
°C	°F	Volts (V)	Resistance (K ohms)
-40	-40	4.541	965.808
-35	-31	4.509	700.178
-30	-22	4.467	513.019
-25	-13	4.413	379.674
-20	-4	4.345	283.664
-15	5	4.259	213.842
-10	14	4.155	162.584
-5	23	4.03	124.614
0	32	3.882	96.255
5	41	3.714	75.201
10	50	3.525	59.175
15	59	3.318	46.883
20	68	3.095	37.387
25	77	2.862	30
30	86	2.623	24.215
35	95	2.383	19.657
40	104	2.149	16.043
45	113	1.923	13.161
50	122	1.71	10.85
55	131	1.513	8.99
60	140	1.333	7.487

(Continued)

Figure 2



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Temperature		TFT Sensor Values	
°C	°F	Volts (V)	Resistance (K ohms)
65	149	1.17	6.265
70	158	1.025	5.268
75	167	0.897	4.45
80	176	0.784	3.775
85	185	0.685	3.215
90	194	0.599	2.75
95	203	0.523	2.361
100	212	0.458	2.034
105	221	0.401	1.758
110	230	0.352	1.523
115	239	0.309	1.324
120	248	0.272	1.155
125	257	0.239	1.01
130	266	0.212	0.8866
135	275	0.187	0.7805
140	284	0.166	0.6891
145	293	0.148	0.6101
150	302	0.132	0.5417

Figure 3

NOTE: Resistance check of the Temperature Sensor would require unplugging the Processor and goin across terminals 91 and 37 with an ohm meter.

FORD 5R55E GENERAL DESCRIPTION

The 5R55E automatic (rear wheel drive) transmission is for five-speed units with electronic shift controls.

The 5R55E transmission is used with 4.0L engine applications.

These transmissions feature a four-element torque converter including TCC (Torque Converter Clutch).

The geartrain includes:

- Three compound planetary gearsets
- Three bands
- Three multi-plate clutches
- Two one-way clutches

The hydraulic functions are directed by electronic solenoids to control:

- Engagement feel
- Shift feel
- Shift scheduling
- Modulated TCC applications
- Timing of the 4-3 T.D. and K.D. shifts
- Engine braking (with O/D cancelled) utilizing the Coast Clutch
- Manual 1st timing

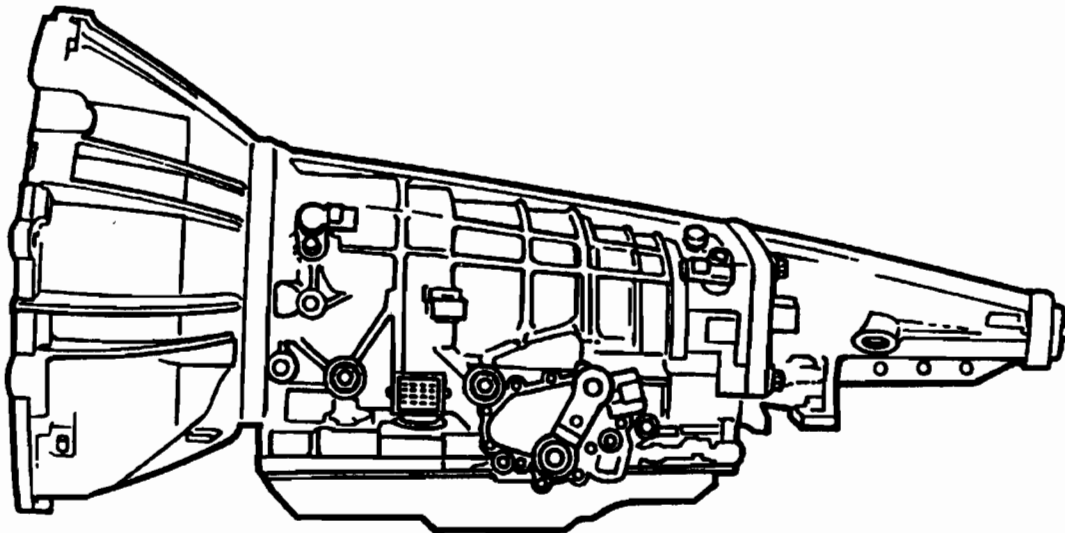


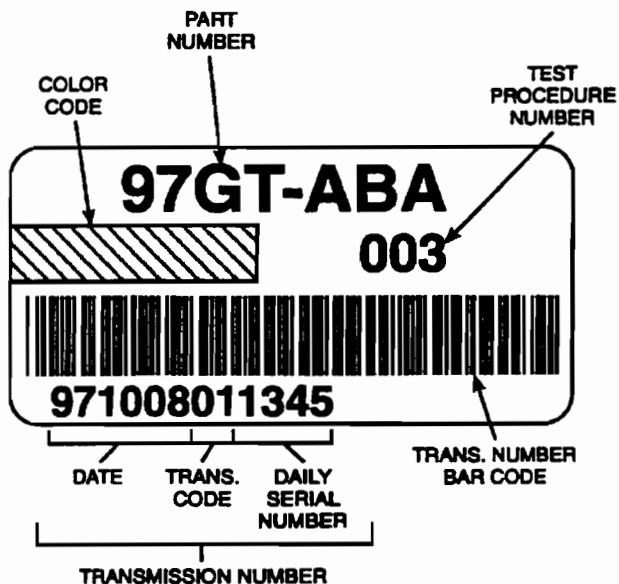
Figure 1

FORD 5R55E IDENTIFICATION TAGS

IDENTIFICATION TAGS

Models are identified by a service identification tag affixed to the assembly. Typical service identification tags are shown below.

Assembly Plant Bar Code I.D. Label Located on Fluid Pan



Located Under Extension Housing Bolt

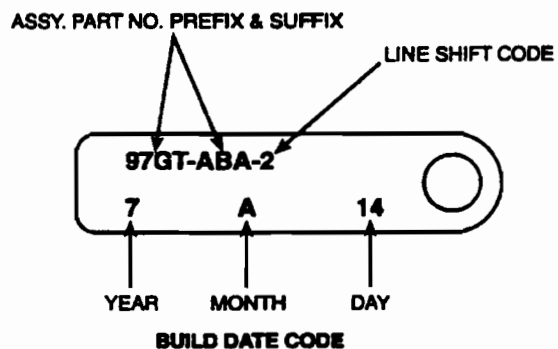


Figure 2

Automatic Transmission Service Group

TRANSMISSION RANGE SELECTOR AND SHIFT PATTERNS

The 5R55E transmission range selector lever has six positions: P, R, N, **D**, 2, 1. The driver selects the required gear position by moving the selector lever to the various positions. Interlocking cables and linkages connect the selector lever to the transmission. This allows the selector lever to move internal linkages and the manual control valve, which signals the driver demand.

Park

No powerflow is transferred through the transmission in PARK. The manual lever shaft, which is connected to a park rod, presses the parking pawl into the park gear on the output shaft. This locks the output shaft and prevents the vehicle from rolling. However, for safety reasons, the parking brake should be applied whenever the vehicle is parked.

While the engine can be started in either P or N position, the ignition key can only be removed in PARK.

Reverse

Reverse gear allows the vehicle to be operated in a rearward direction, at a reduced gear ratio.

Neutral

As in PARK, there is no power transferred through the transmission. However, the final drive is not locked by the parking pawl, so the wheels are free to rotate. The vehicle may be started in the N position, but the ignition key cannot be removed.

Overdrive

In the **D** position, the transmission will upshift or downshift 1-2-3-4-5 automatically. When overdrive has been cancelled by depressing the Transmission Control Switch (TCS) and activating Transmission Control Indicator Lamp (TCIL), the transmission will not upshift to 5th gear and engine braking is provided.

2nd Position

Selection of the 2 position provides a 3rd gear hold position from a manual upshift or downshift. When the 2 position is selected from a stop, the transmission will start in 3rd gear. This allows for maximum traction on slippery surfaces. Engine braking is provided in the 2 position when the Transmission Control Switch (TCS) is on or off.

1st Position

The 1 position provides a 1st gear hold after an automatic or manual downshift. The transmission is prevented from downshifting above a specific speed (approximately 48 km/h [30 mph]) to protect the powertrain from overspeeding. Engine braking is provided in the manual 1 position when the Transmission Control Switch (TCS) or (TCIL) is on or off.

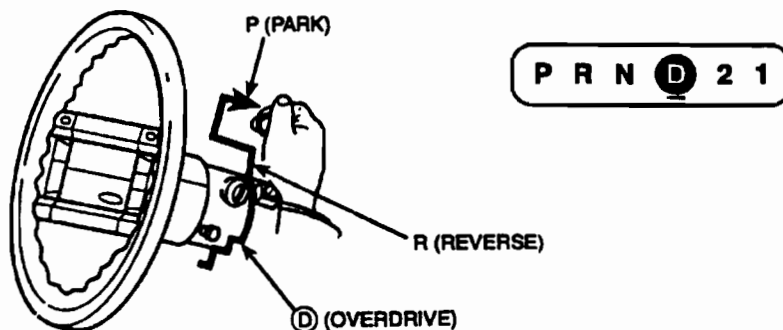


Figure 3

BRAKE SHIFT INTERLOCK SYSTEM

The Brake Shift Interlock System prevents the transmission range selector lever from being shifted out of PARK position unless the ignition key is in the ON position and the brake pedal is depressed. The brake shift consists of an electrical solenoid mounted at the base of the steering column. If ignition key is in the RUN position, the solenoid continually runs unless the brake is depressed.

If the brake circuit fuse is blown or the solenoid has internally shorted, the vehicle will not shift from the PARK position even if the ignition is on and the brake pedal is depressed. The interlock can be temporarily overridden by the following:

1. Apply parking brake.
2. Remove the ignition key.
3. Insert the ignition key and rotate one position clockwise (ignition off).
4. Shift the selector lever to neutral.

NOTE: If the vehicle is shifted into PARK, the above procedure must be repeated.

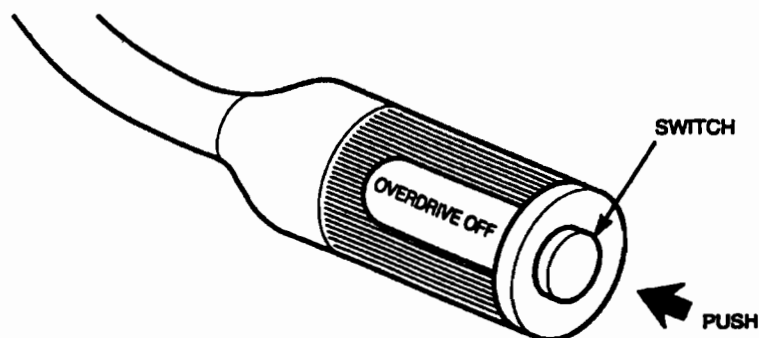
5. Start the vehicle.

Transmission Control Switch (TCS)

The Transmission Control Switch (TCS) is a driver-controlled momentary contact switch mounted on the end of the transmission range selector lever. When the TCS is activated (TCIL on), 5th gear operation (overdrive) is cancelled.

Transmission Control Indicator Lamp (TCIL)

The Transmission Control Indicator Lamp (TCIL) is located on the instrument panel or on the end of the transmission range selector lever (model dependant) and is a visual cue to let the driver know that the TCS has been depressed and 5th gear has been cancelled (TCS on/TCIL activated). The TCIL will flash if the Powertrain Control Module (PCM) detects a concern in certain transmission-related sensors or solenoids.



TRANSMISSION CONTROL SWITCH
(LOCATED ON THE END OF THE TRANSMISSION RANGE SELECTOR LEVER)

Figure 4

TORQUE CONVERTER

The 5R55E uses a four-element torque converter. The converter contains the standard internal components (turbine, impeller, and stator) for transfer of power and multiplication of torque. It also utilizes a disc-type Torque Converter Clutch (TCC) for maximum fuel economy.

When applied, the TCC provides a mechanical link between the converter turbine and the engine, allowing for a direct mechanical power transfer from the engine to the transmission. The converter clutch pressure plate is applied and released by fluid pressure, which is controlled by the Powertrain Control Module (PCM). The PCM controls the torque converter clutch using a pulse-width modulated TCC solenoid. The torque converter damper is functional full time for improved NVH.

Filter

All fluid drawn from the pan passes through the filter. The filter and its accompanying seals are part of the fluid path to the fluid pump.

The filter also has a bypass section. This allows the fluid, which is vented at the main regulator valve, to be recirculated to the pump without passing through the filtering element.

Pump

The pump provides the fluid pressure required to charge the torque converter, main control assembly, transmission cooling system, lubrication system and apply devices.

The 5R55E has a positive displacement gear and crescent-type pump which is driven by the torque converter hub.

Main Control Assembly

The main control assembly and related components are part of the pressure side of the 5R55E hydraulic system. The main control assembly consists of the solenoids, the valve body assembly and the separator plate.

All valves inside the main control assembly are anodized aluminum. This means they cannot be sanded, filed or dressed in any way that may damage the valves' surface. If the valves have any scratches, burns or nicks that prevent free movement, the main control assembly must be replaced.

ELECTRONICS

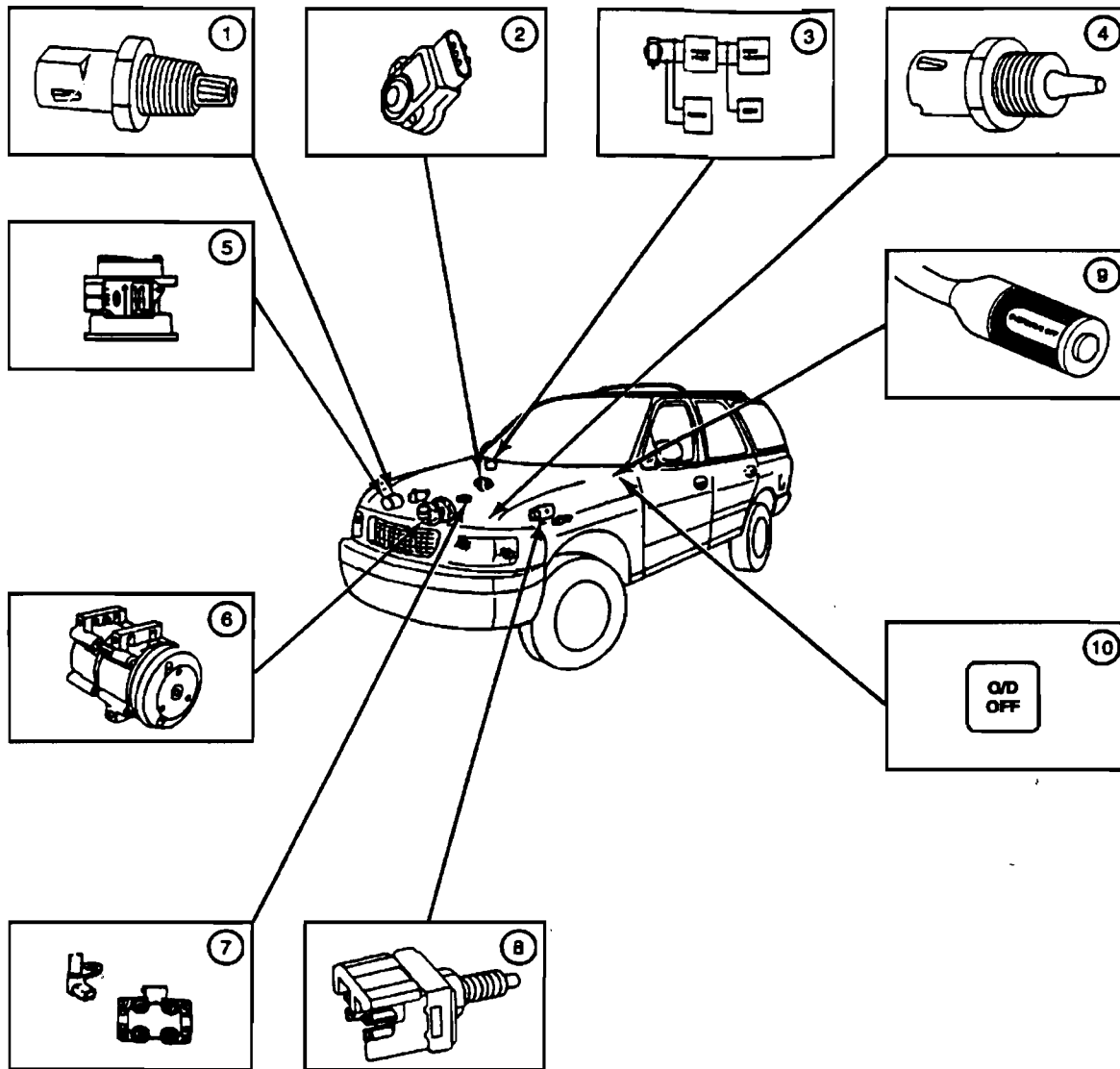
Shift scheduling, timing and feel (line pressure), as well as Torque Converter Clutch (TCC) operation in the 5R55E are controlled electronically by the Powertrain Control Module (PCM).

Input signals from various engine sensors (refer to Figures 6 and 7) give the PCM information about the engine's operating state. Other inputs are based on driver demands, such as the accelerator pedal position, which is monitored by the PCM using the Throttle Position (TP) sensor. Inputs are also supplied by the transmission itself. The Turbine Shaft Speed (TSS) sensor, the Output Shaft Speed (OSS) sensor, the Overdrive Drum Speed (ODS) sensor and the Transmission Fluid Temperature (TFT) sensor supply information to the PCM.

Using these input signals, the PCM can determine when the time and conditions are right for a shift or TCC application. The PCM also determines the line pressure needed to optimize shift feel. To accomplish this, the PCM controls six solenoids (outputs): four on/off for upshifts, downshifts and coast clutch application, one for pulse-width modulated control of the torque converter clutch and one VFS for electronic line pressure control.

Figure 5

VEHICLE SENSORS



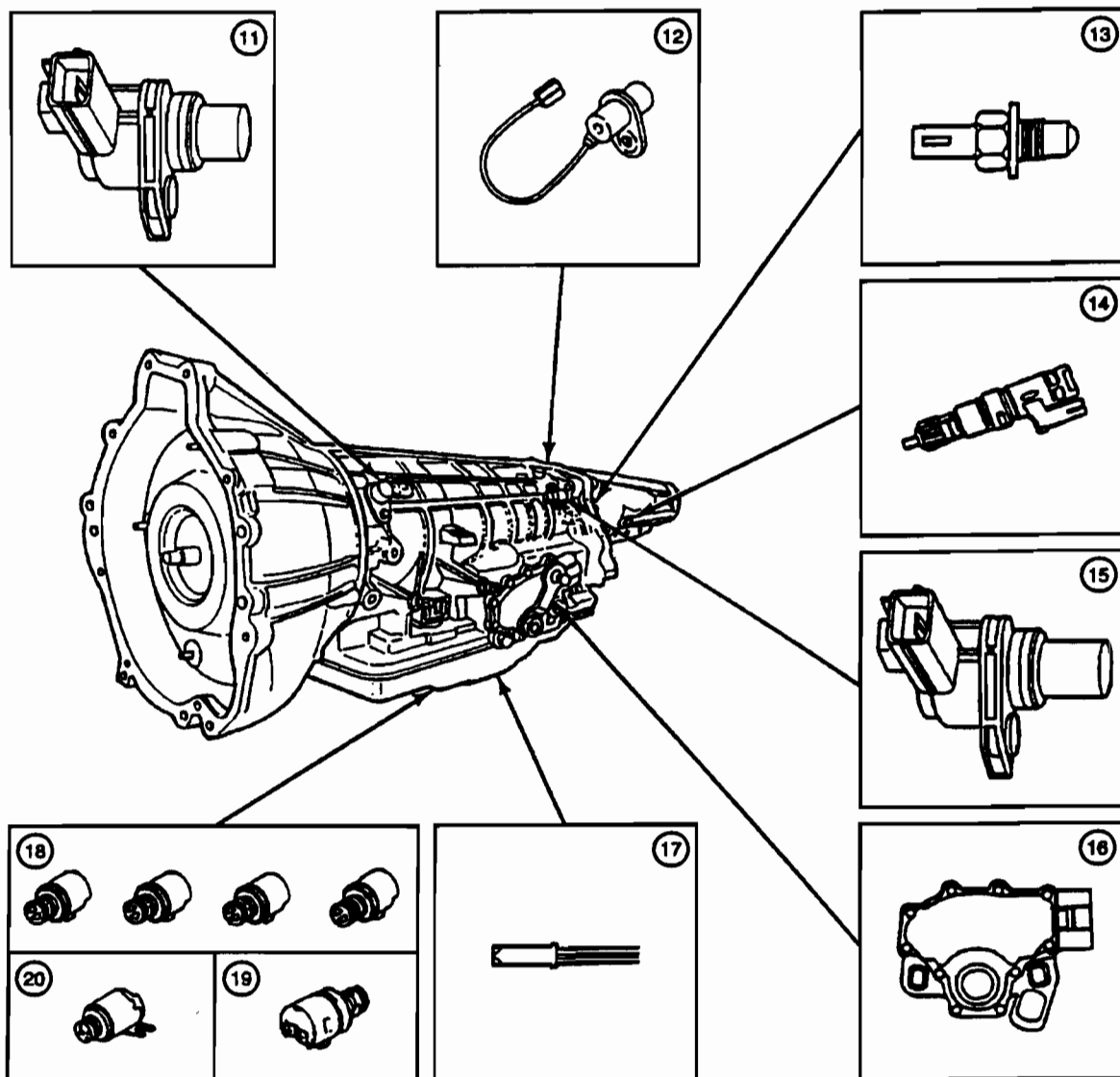
Item	Part Number	Description
1	-12A897-	Intake Air Temperature (IAT) Sensor
2	-9B989-	Throttle Position (TP) Sensor
3	—	Programmable Speedometer/Odometer Module (PSOM)
4	-12A648-	Engine Coolant Temperature (ECT) Sensor
5	-12B579-	Mass Air Flow (MAF) Sensor

(Continued)

Item	Part Number	Description
6	-2884-	Air Conditioning (A/C) Clutch
7	-12029-	Electronic Ignition
8	-13480-	Brake ON/OFF (BOO) Switch
9	-7G550-	Transmission Control Switch (TCS)
10	—	Transmission Control Indicator Lamp (TCIL)

Figure 6

TRANSMISSION SENSORS



Item	Part Number	Description
11	-7M183-	Overdrive Drum Speed (ODS) Sensor
12	-7M101-	Turbine Shaft Speed (TSS) Sensor
13	—	4X4 Low (4x4L) Switch
14	-9E731-	Vehicle Speed Sensor (VSS)
15	-7H103-	Output Shaft Speed (OSS) Sensor
16	-7F293-	Digital Transmission Range (DTR) Sensor

Item	Part Number	Description
17	—	Transmission Fluid Temperature (TFT) Sensor (part of -7Z409- Harness)
18	-7G484-	Shift Solenoids 1, 2, 3, 4 (SS1, SS2, SS3, SS4)
19	-7G383-	Electronic Pressure Control (EPC) Solenoid
20	-7G136-	Torque Converter Clutch (TCC) Solenoid

(Continued)

Figure 7



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BAND APPLICATION CHART GEARTRAIN and APPLY COMPONENTS

Power is transmitted from the torque converter to the (simple) planetary gearsets through the input shaft.

By holding and driving certain members of the gearsets, five forward ratios and one reverse ratio are obtained and transmitted to the output shaft and differential.

The ratios are:

- 1st — 2.47
- 2nd — 1.86
- 3rd — 1.47
- 4th — 1.00
- 5th — 0.75

APPLY COMPONENTS

These are the following apply components in the 5R55E:

- Front band
- Intermediate band
- Reverse band
- Direct clutch
- Forward clutch
- Overdrive one-way clutch
- Low one-way clutch
- Coast clutch

Figure 8

	FRONT BAND	INTERMEDIATE BAND	LOW/REVERSE BAND	FORWARD CLUTCH	DIRECT CLUTCH	COAST CLUTCH	FRONT ONE-WAY CLUTCH		REAR ONE-WAY CLUTCH		SHIFT SOLENOID 1 (SS1)	SHIFT SOLENOID 2 (SS2)	SHIFT SOLENOID 3 (SS3)	SHIFT SOLENOID 4 (SS4)	ENGINE BRAKING	TCIL
PARK											ON	OFF	OFF	OFF	NE	NE
REVERSE			A		A		H	OR			ON	OFF	OFF	OFF	NO	NE
NEUTRAL											ON	OFF	OFF	OFF	NE	NE
1ST				A			H	OR	H	OR	ON	OFF	OFF	OFF	NO	OFF
1ST*				A			H	OR	H	OR	ON	OFF	OFF	OFF	NO	ON
2ND	A			A			OR	OR	H	OR	ON	OFF	ON	OFF	NO	OFF
2ND*	A			A			OR	OR	H	OR	ON	OFF	ON	OFF	NO	ON
3RD		A		A			H	OR	OR	OR	ON	ON	OFF	OFF	NO	OFF
3RD*		A		A			H	OR	OR	OR	ON	ON	OFF	OFF	NO	ON
4TH				A	A		H	OR	OR	OP	OFF	OFF	OFF	OFF	NO	OFF
4TH*				A	A	A	H	OR	OR	OR	OFF	OFF	OFF	ON	YES	ON
5TH	A			A	A		OR	OR	OR	OR	OFF	OFF	ON	OFF	YES	OFF
MAN. 1ST			A	A		A	H	OR	OR	OR	ON	OFF	OFF	ON	YES	NE
MAN. 2ND		A		A		A	H	OR	OR	OR	ON	ON	OFF	ON	YES	NE

A = APPLIED H = HOLD OR = OVERRUNNING * = OVERDRIVE CANCELLED NE = NO EFFECT

Figure 9



FORD E4OD
TIE-UP IN MANUAL 1ST, AFTER REBUILD

COMPLAINT: After you have the transmission rebuilt, the vehicle exhibits a "Tie-Up" condition when the manual shift lever is placed into the Manual 1st position.

CAUSE: The cause may be, the valve body gaskets reversed.

CORRECTION: Install the valve body gaskets in their proper positions. The gasket with the "Tail" is the gasket that goes between the spacer plate and the case. The gasket without the "Tail" is the gasket that goes between the spacer plate and the valve body. Refer to Figures 1 thru 3 for the proper gaskets. When the valve body gaskets have been compressed with installation and torquing procedure, always replace them with new ones. We have provided you with the part numbers and identification for all three versions of the E4OD valve body gaskets, depending on the year of the unit you are working on. Refer to Figure 1 for the 1989 model year, Figure 2 for the 90-95 models, and Figure 3 for 96-up models.

1989 ONLY VALVE BODY GASKETS



Figure 1
Automatic Transmission Service Group

1990-1995 ONLY VALVE BODY GASKETS

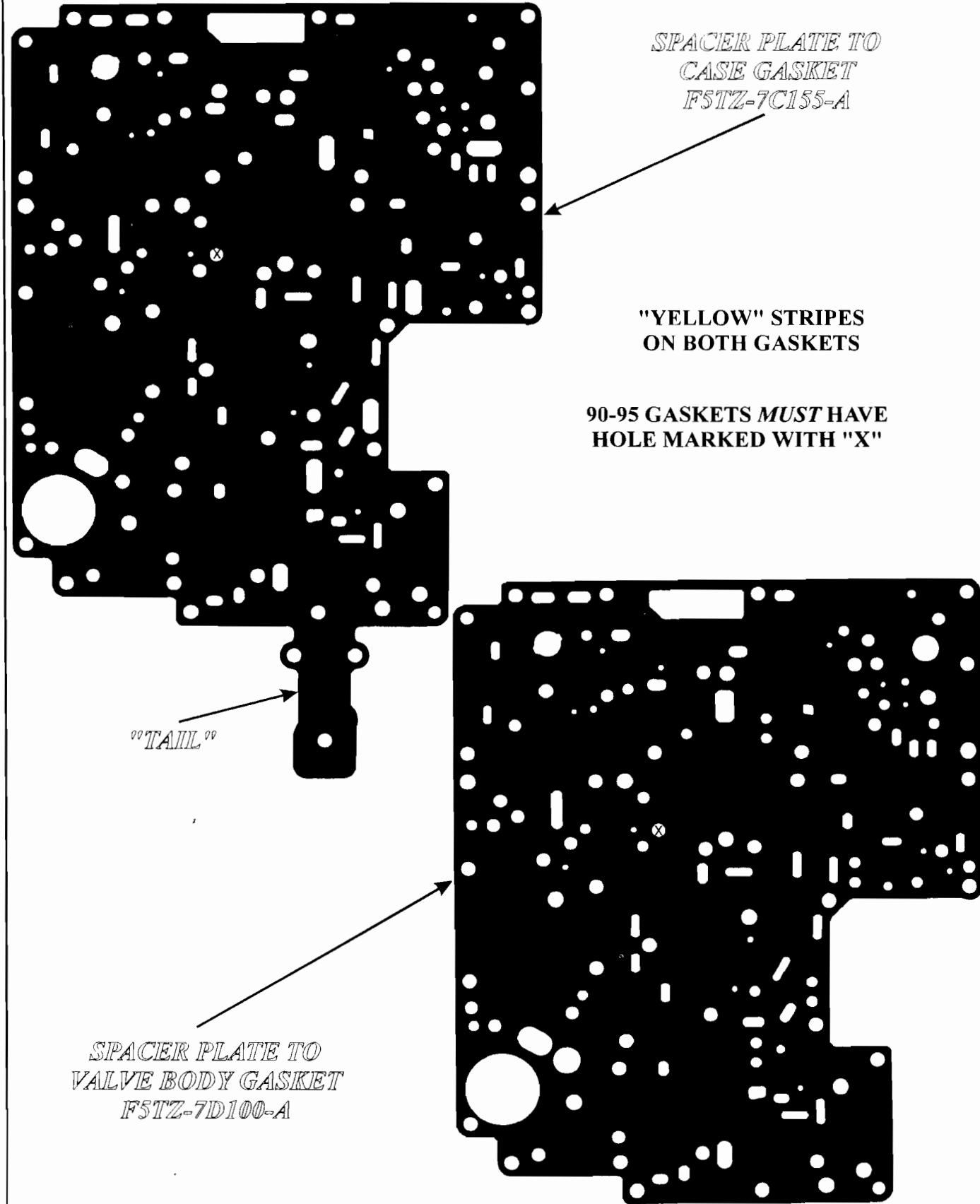


Figure 2
Automatic Transmission Service Group

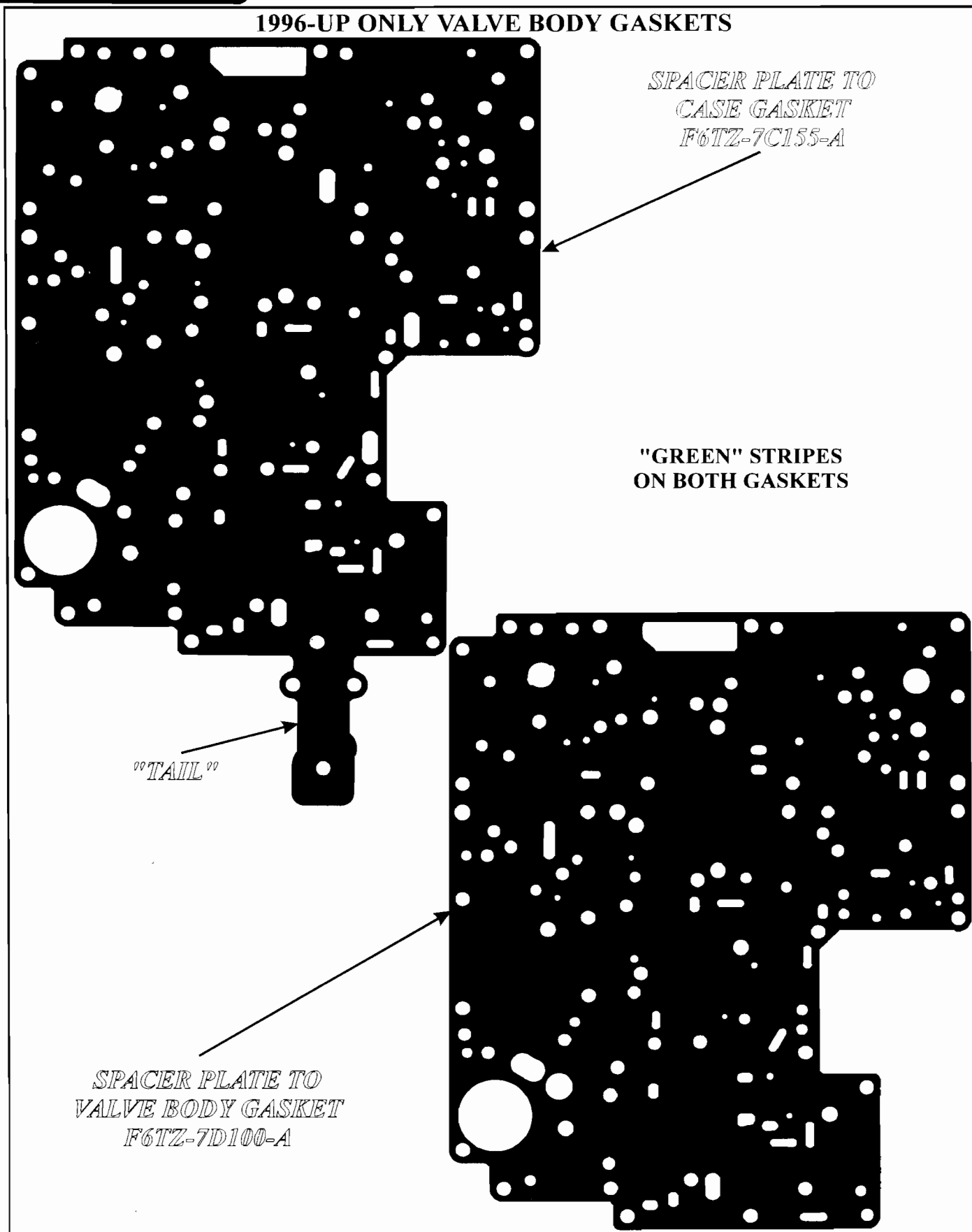


Figure 3
Automatic Transmission Service Group



**FORD E4OD
NEW DESIGN SOLENOID PACK FOR 1995
VEHICLE HARNESS WILL NOT CONNECT
TO A NEW SOLENOID PACK**

CHANGE: Beginning at the start of production for 1995, all models of the E4OD transmission were produced using a new design solenoid pack, that will not interchange with previous models.

REASON: New design vehicle harness connector with grommet installed, to eliminate contamination from water and road debris, that may cause corrosion.

PARTS AFFECTED:

- (1) **SOLENOID PACK** - New design solenoid assembly case connector to accommodate the new design vehicle harness connector. Refer to Figure 1 for identification of the previous design and the new design solenoid assemblies.

NOTE: The plastic sleeve incorporated in the previous design solenoid pack has been eliminated on the new design solenoid pack (See Figures 1 and 2). This plastic sleeve will sometimes remain on the vehicle harness connector when it is disconnected. If a new solenoid pack is installed (which includes sleeve), it will be impossible to reconnect the vehicle harness to the solenoid pack until the old sleeve is removed from vehicle harness connector. Refer to Figure 2.

INTERCHANGEABILITY:

The previous design solenoid assembly will fit *only* 1989-1994 model vehicles, and the new design solenoid assembly will fit *only* 1995-UP models.

They will not interchange because in 1995 models the diodes for the solenoids were moved out of the solenoid pack and placed into the PCM (See Figure 3).

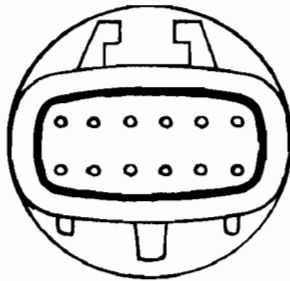
**IF A 1995 SOLENOID PACK IS USED ON 1989-1994 MODEL,
YOU WILL HAVE NO DIODE PROTECTION!**

SERVICE INFORMATION:

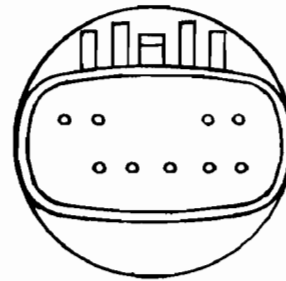
Solenoid Assembly, 1989-1994 Models Only	E9TZ-7G391-A
Solenoid Assembly, 1995-UP Models Only	F5TZ-7G391-A

E4OD SOLENOID PACK DIFFERENCES

PREVIOUS DESIGN
1989-1994 MODELS



NEW DESIGN
1995-UP MODELS



VIEW LOOKING INTO SOLENOID CASE CONNECTOR

THERE IS NO SLEEVE ON 1995 SOLENOID PACK

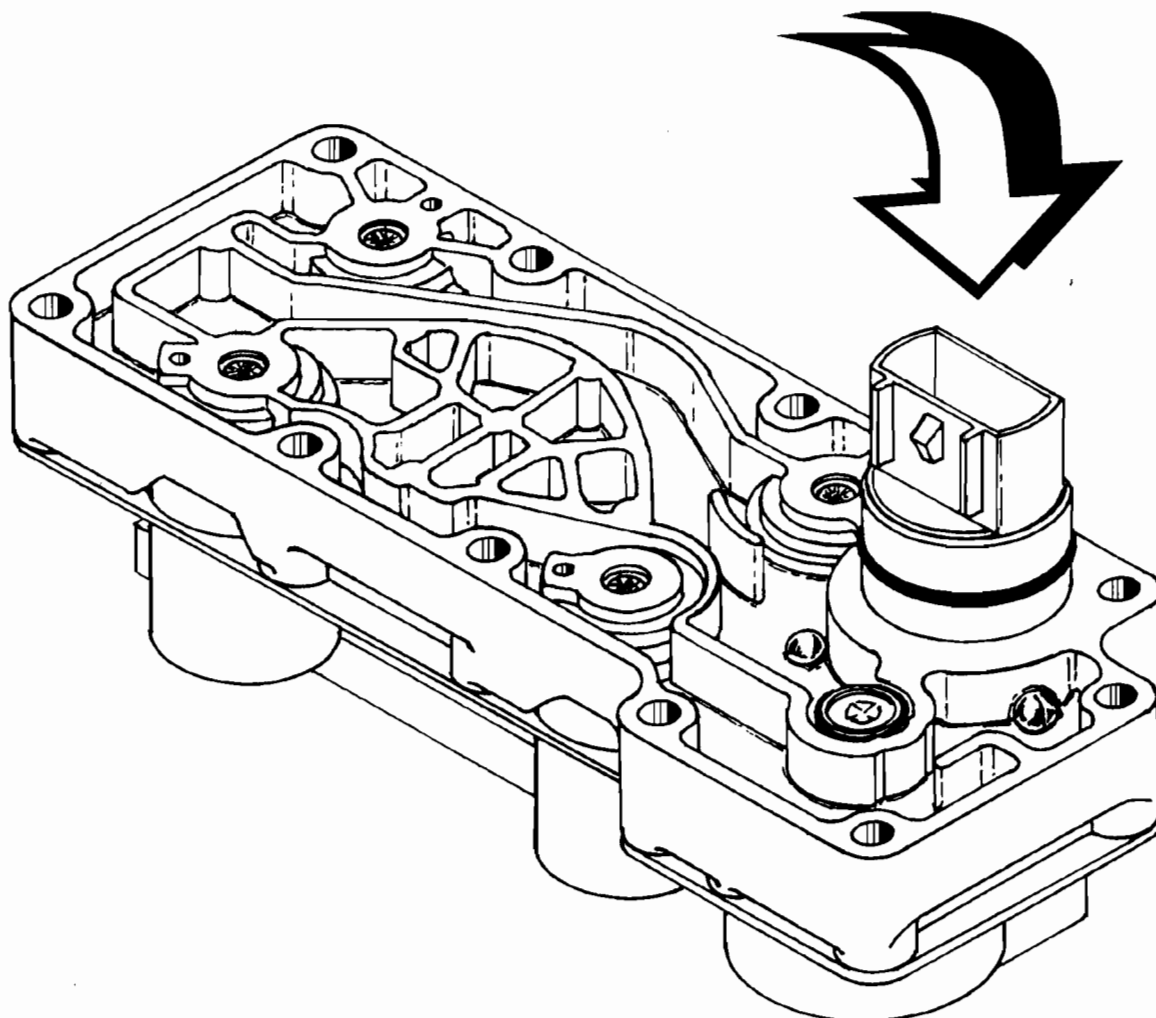


Figure 1

1989-1994 SOLENOID PACK

**PLASTIC SLEEVE SOMETIMES REMAINS
ON THE VEHICLE HARNESS AND MAKES
IT IMPOSSIBLE TO CONNECT TO A NEW
SOLENOID PACK**

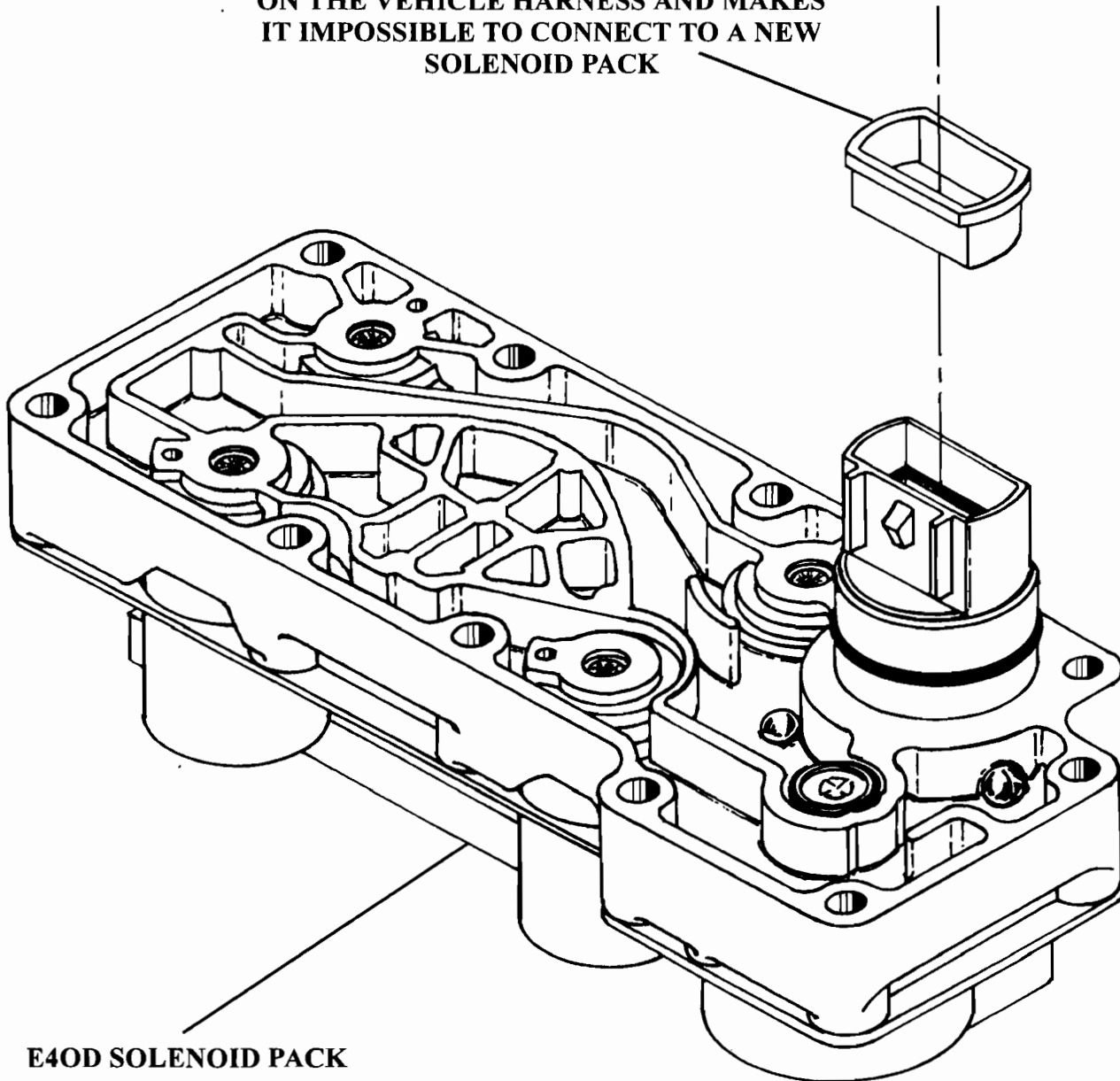


Figure 2

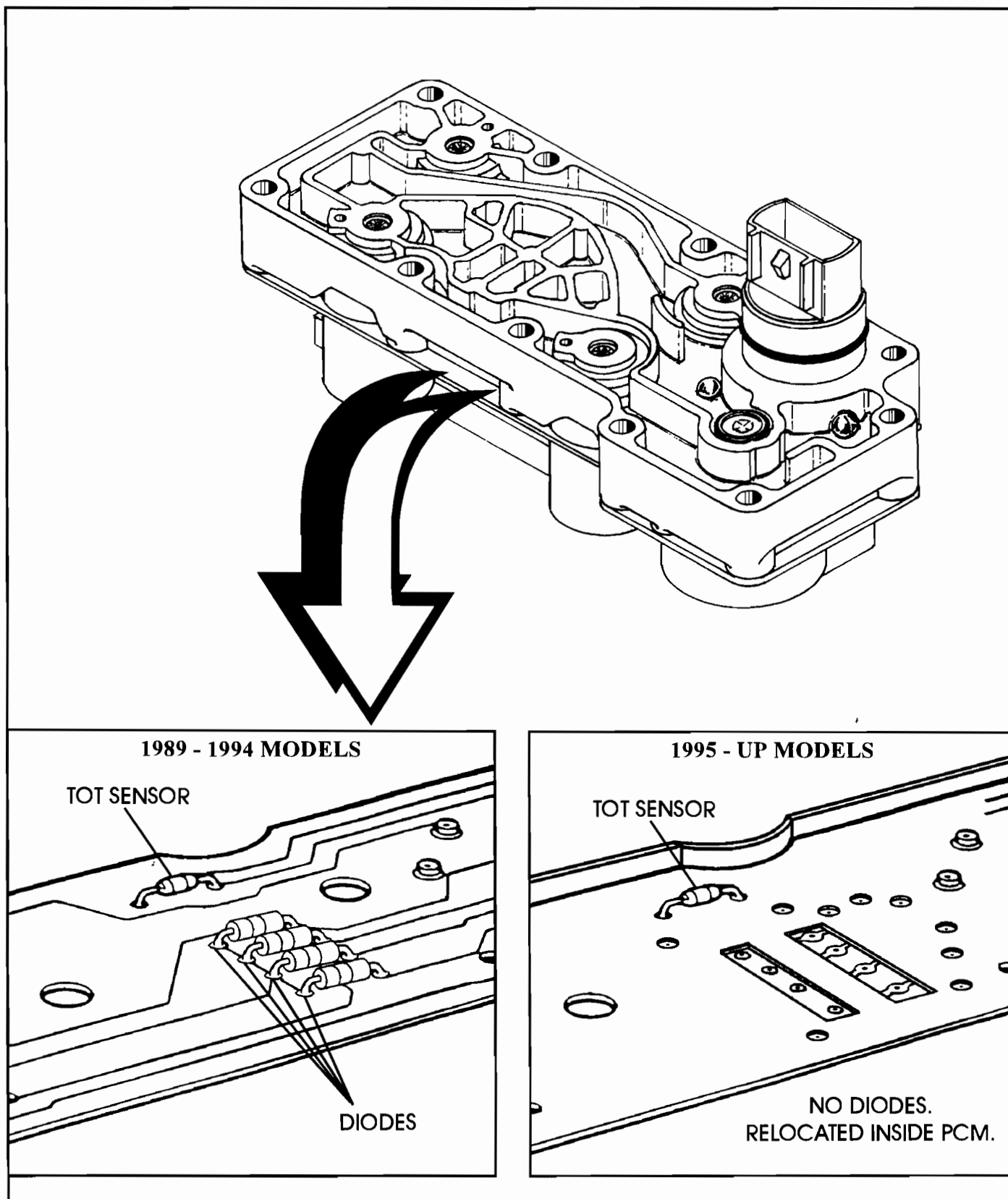


Figure 3



**FORD E4OD
NEW DESIGN FRONT PUMP
FOR 1995 MODELS**

CHANGE: Beginning at the Start Of Production for all 1995 model E4OD transmissions, Ford Motor Co. introduced an increased displacement Front Pump Assembly, 1.70 cu in/rev, versus 1.50 cu in/rev for previous models.

REASON: To provide additional flow for more robust converter clutch functions and additional lube flow, both of which will greatly increase transmission durability.

PARTS AFFECTED:

- (1) **FRONT PUMP BODY** - Gerotor bore has an increased diameter to accommodate the new design level outer gerotor. Previous outer gerotor diameter was 3.950" and the new design level outer gerotor diameter is 4.083". Refer to Figures 1 and 2. Also, the two holes in the suction cavity were increased from .312" to .400", as shown in Figures 1 and 2. Another way to identify the new pump body is with the "Rough Forging Number" F5TP-7A105-AA, and is found on the front seal side of the pump body. All of the oil passages in the new design Front Pump Body remained the same as previous years and are identified in Figure 4.
- (2) **OUTER GEROTOR** - The lobes on the Outer Gerotor changed from the previous 11 lobes to 10 lobes on the new design, to accommodate the changes on the inner gerotor. The diameter of the Outer Gerotor also changed from 3.950" to 4.083". Refer to Figures 1 and 2. The changes on both the inner and outer gerotor increased the cavity between the gerotors for increased pump volume, as shown in Figure 3.
- (3) **INNER GEROTOR** - The lobes on the Inner Gerotor changed from the previous 10 lobes to 9 lobes on the new design, to accommodate the changes on the outer gerotor. Refer to Figures 1 and 2. The changes on both the inner and outer gerotor increased the cavity between the gerotors for increased pump volume, as shown in Figure 3.
- (4) **FRONT PUMP COVER** - Received casting changes with added ribs in strategic places to increase torque retention when the two halves are torqued properly. The Pump Body to Pump Cover bolts should be torqued to 18-23 ft.lbs, with the alignment ring in place. The easiest way to identify the new design level Pump Cover is with the "Rough Forging Number" F5TP-7B324-AA, and is located on the back side of the Pump Cover. All of the oil passages in the new design Pump Cover remained the same as previous years and are identified in Figure 5. Internal pump cover passages are identified in Figure 6.

INTERCHANGEABILITY:

- (1) The new design level Front Pump Assembly will retro-fit back to all previous models, when used as an assembly, and is recommended for all rebuilds. The new design Front Pump Assembly is available under OEM part number F5TZ-7A103-A.
- (2) *The new design level and previous design level gerotors will not interchange in any way.*

SERVICE INFORMATION:

Front Pump Assembly (New 1995 Design) F5TZ-7A103-A

**1989-1994 PUMP BODY AND GEARS
ROUGH FORGING NO. E9TP-7A105-BA
(PREVIOUS DESIGN)**

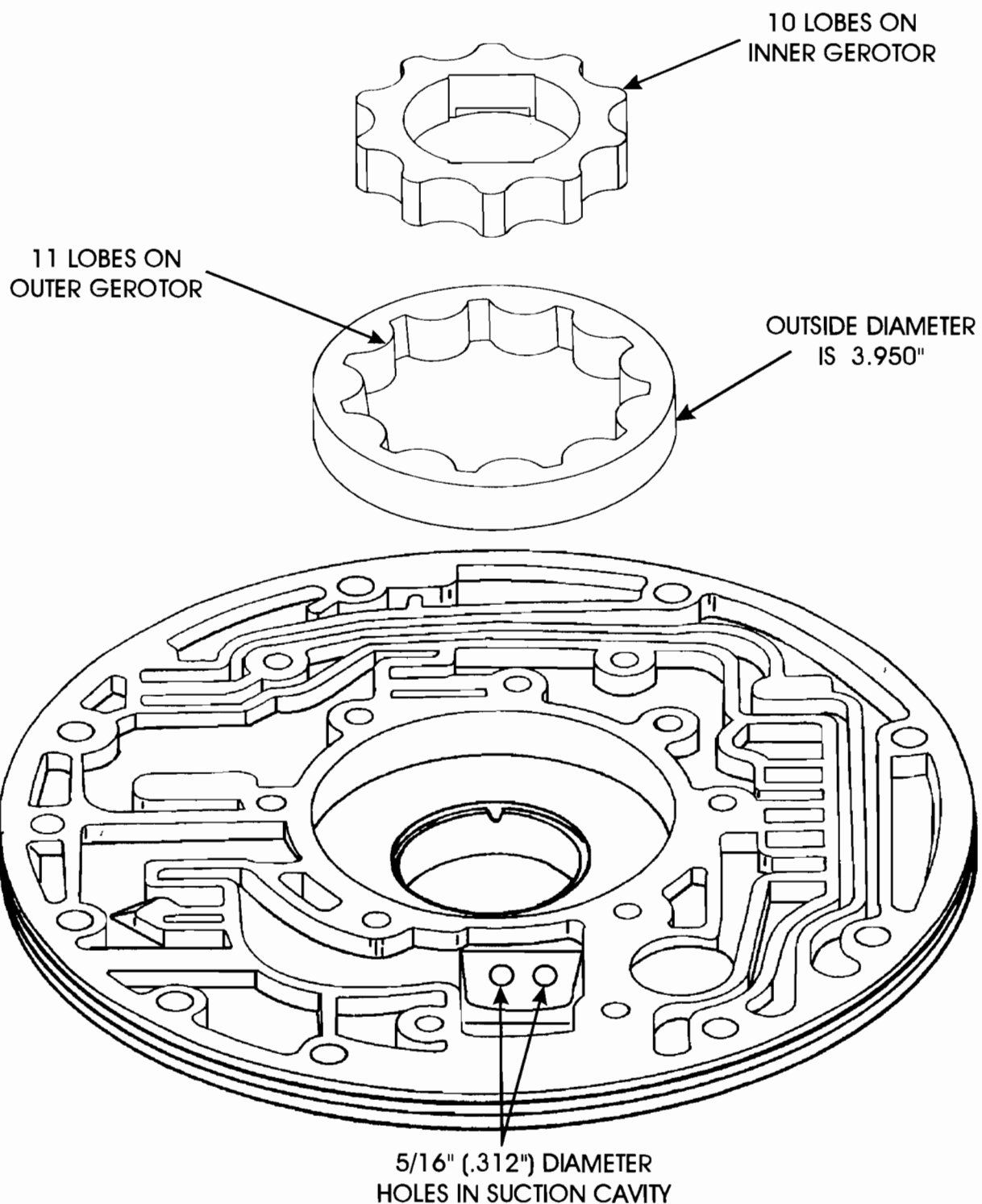


Figure 1

**1989-1994 PUMP BODY AND GEARS
ROUGH FORGING NO. F5TP-7A105-AA
(NEW DESIGN)**

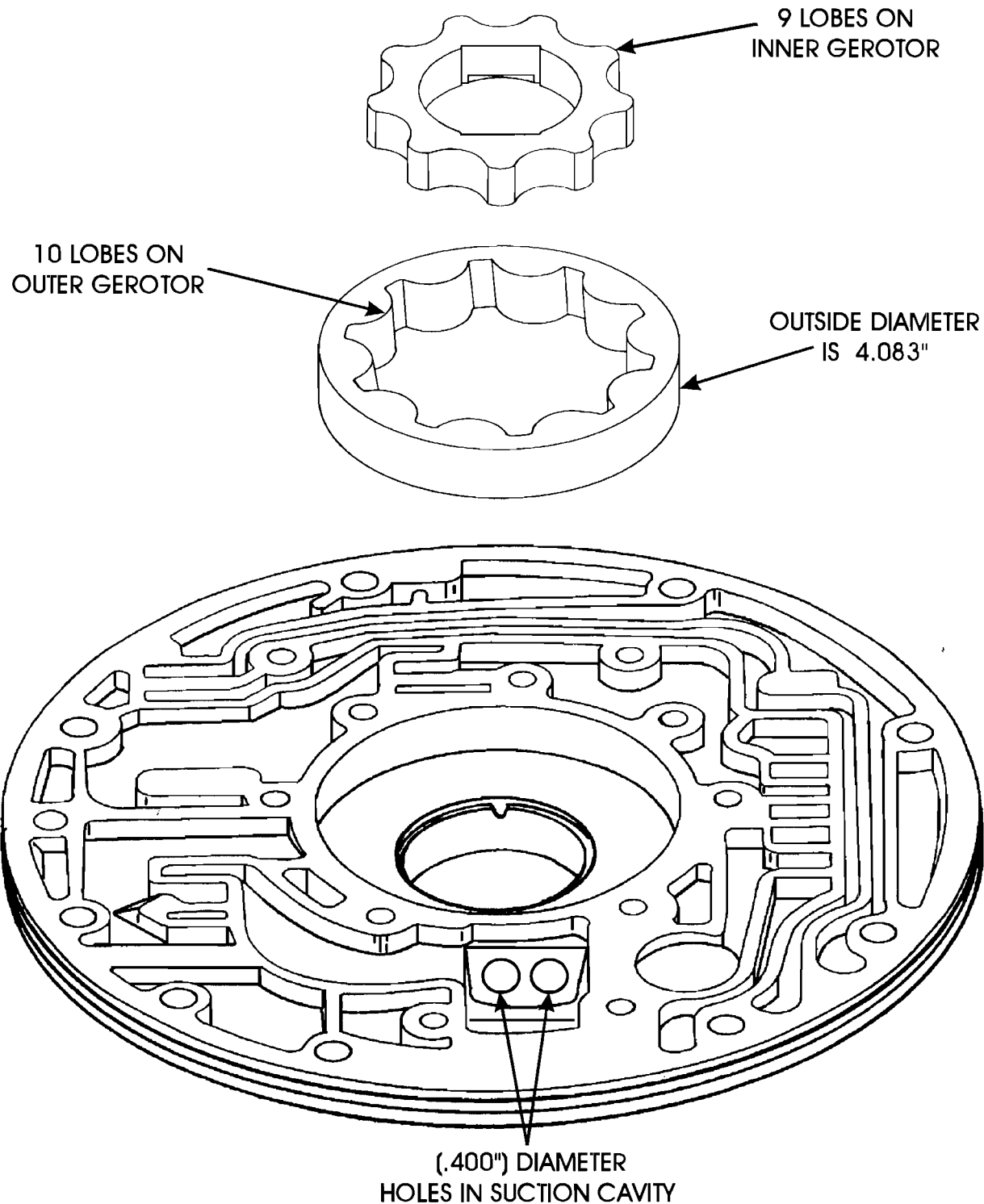


Figure 2

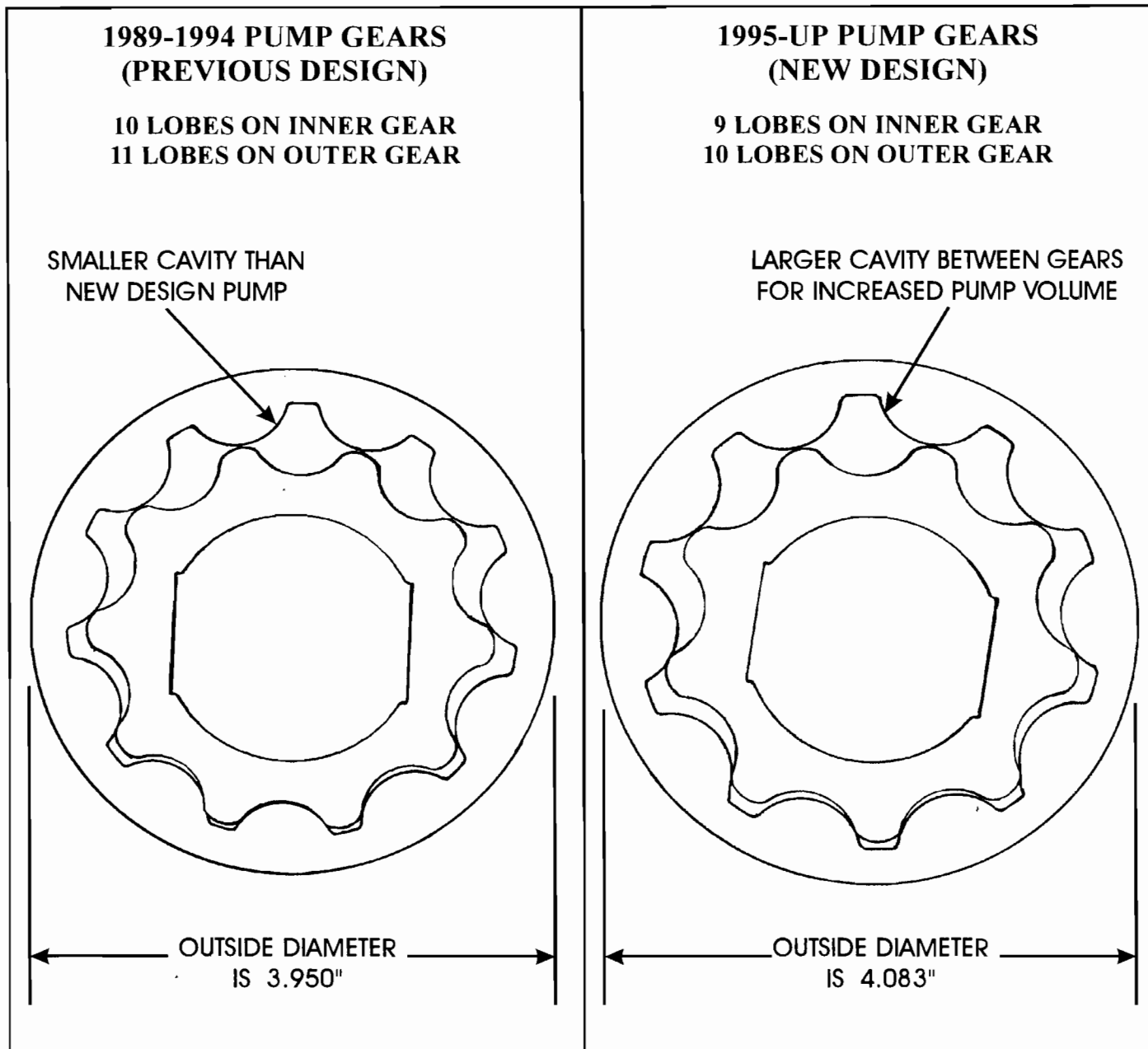
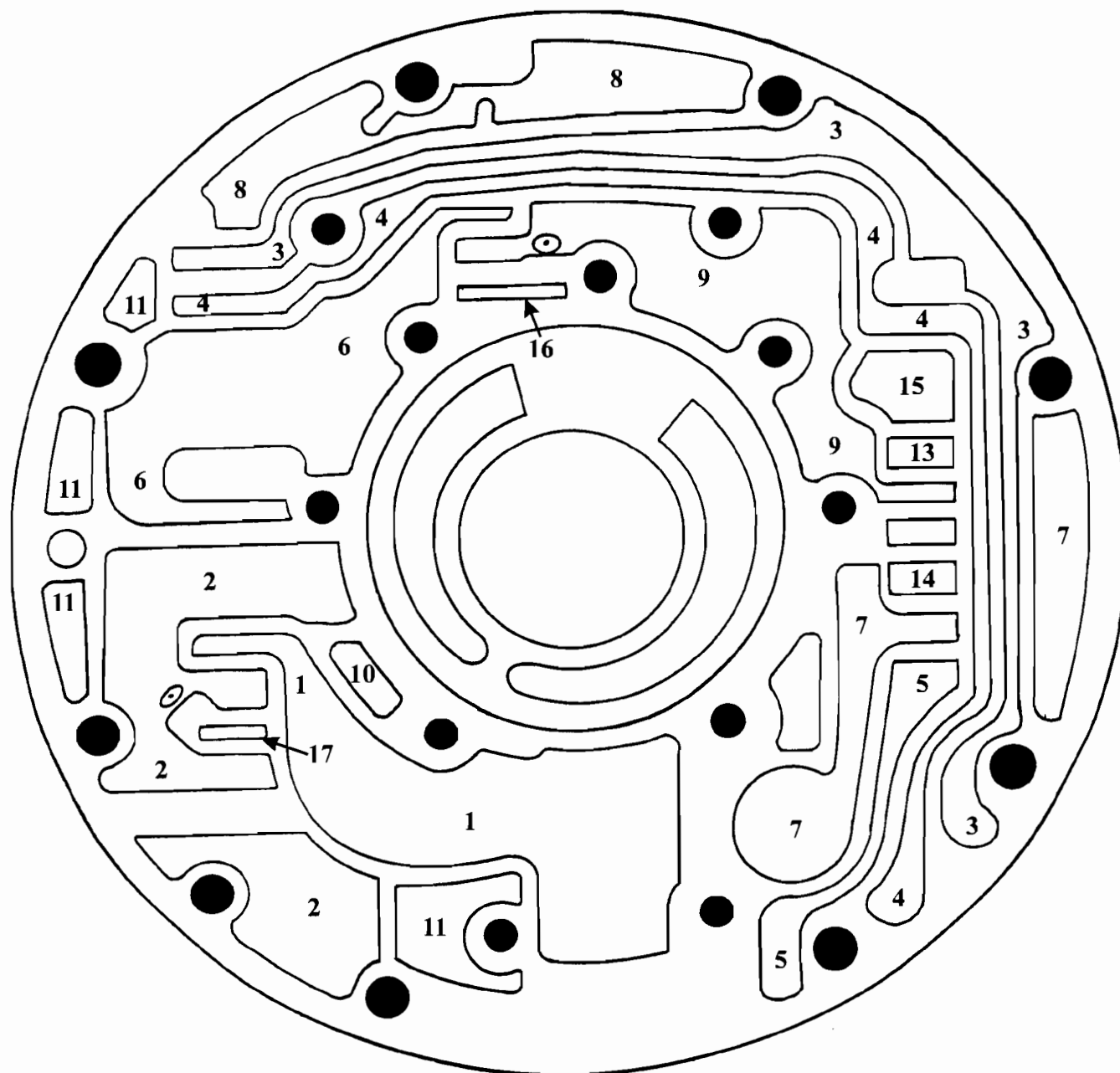


Figure 3

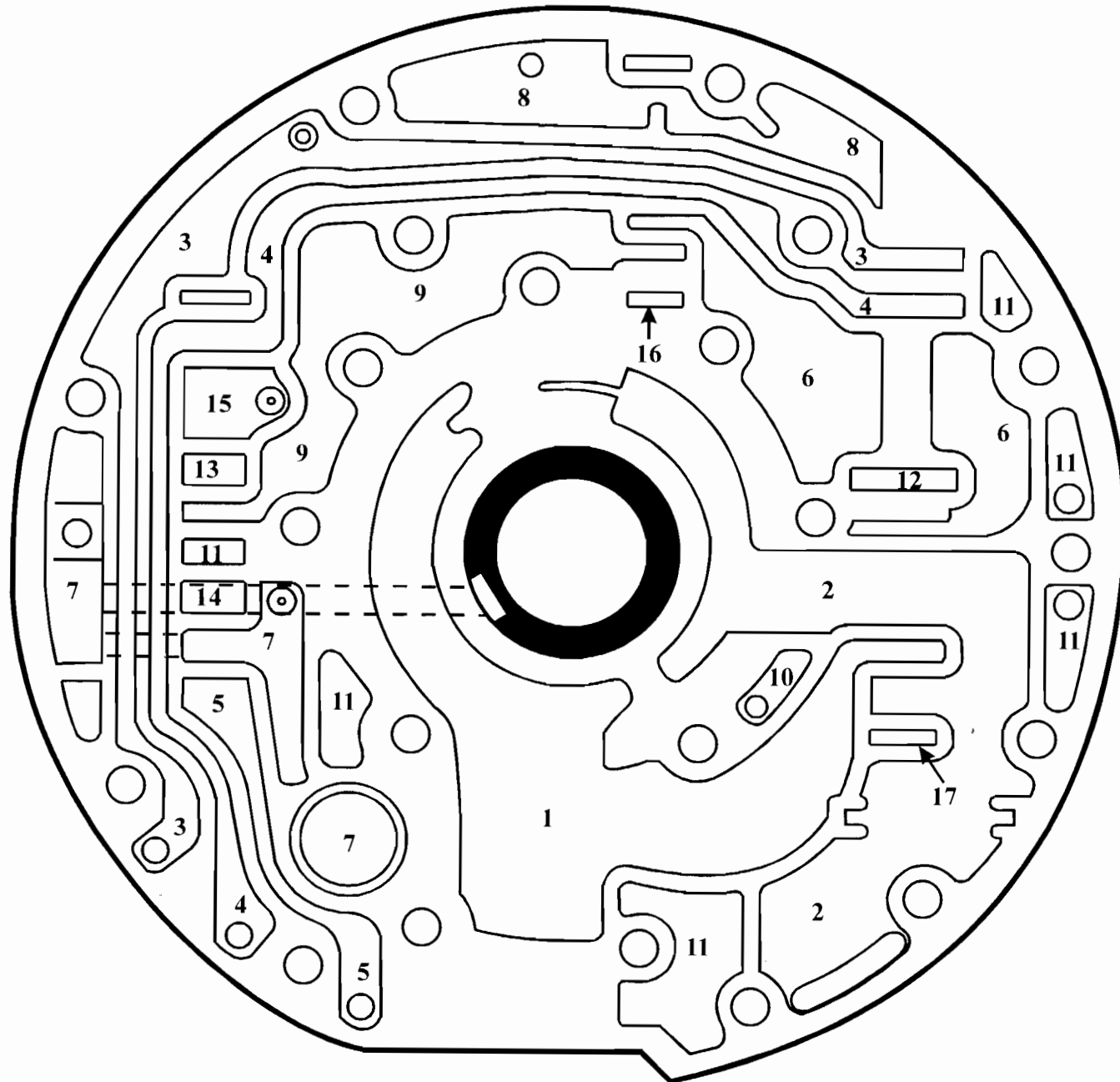
**E4OD PUMP BODY
OIL PASSAGE IDENTIFICATION**



- | | |
|---------------------------------|---------------------------------|
| 1. PUMP SUCTION | 10. PUMP SEAL DRAIN |
| 2. LINE PRESSURE | 11. VOID |
| 3. EPC BOOST | 12. EXHAUST |
| 4. MANUAL 1ST AND REVERSE BOOST | 13. CONVERTER RELEASE |
| 5. CONVERTER CLUTCH SIGNAL | 14. CONVERTER APPLY |
| 6. CONVERTER FEED | 15. RELEASE OIL EXHAUST |
| 7. TO COOLER | 16. TCC REGULATOR VALVE BALANCE |
| 8. VENT | 17. P.R. VALVE BALANCE |
| 9. REGULATED CONVERTER FEED | |

Figure 4

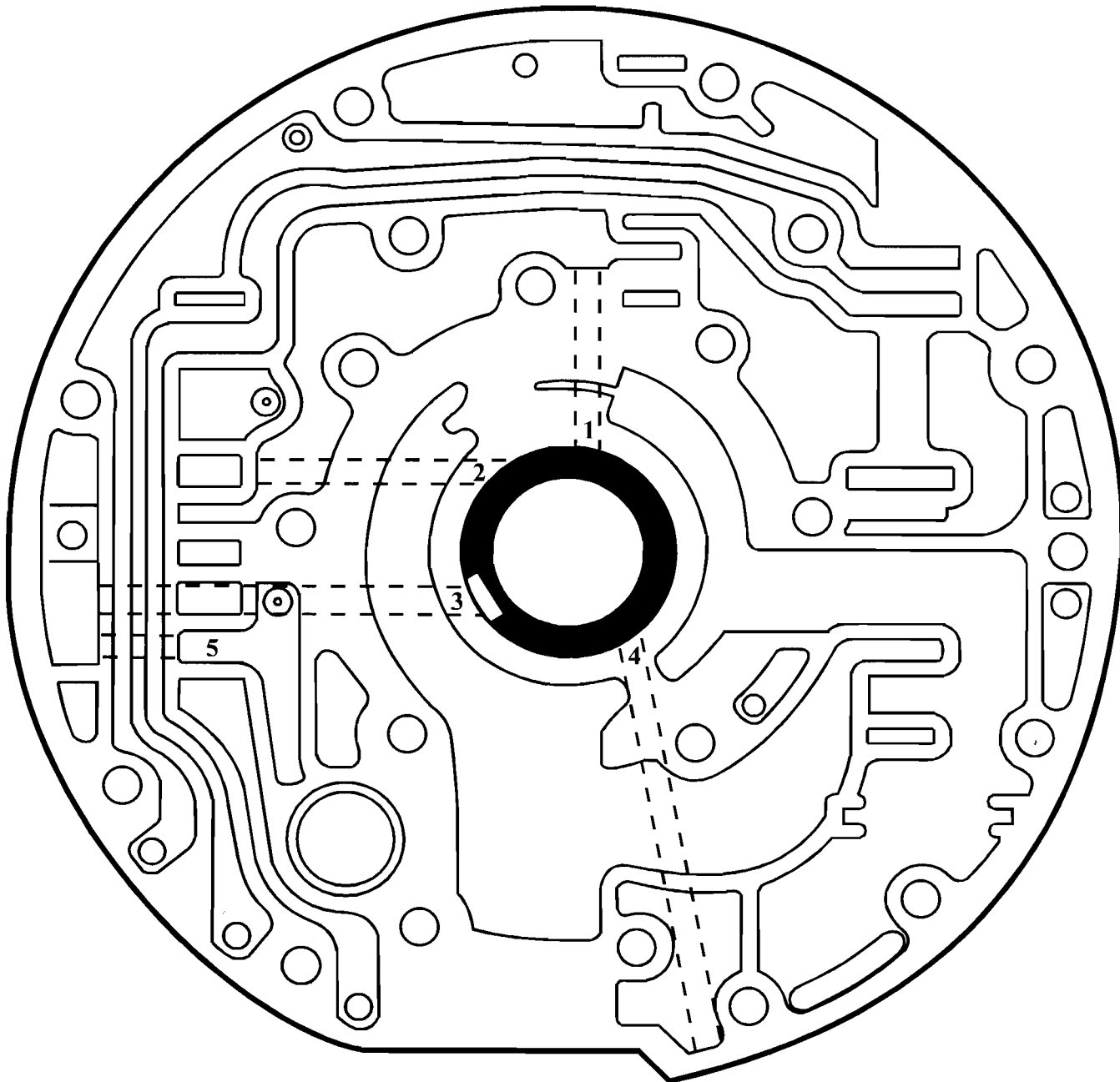
**E4OD PUMP COVER
OIL PASSAGE IDENTIFICATION**



- | | |
|---------------------------------|---------------------------------|
| 1. PUMP SUCTION | 10. PUMP SEAL DRAIN |
| 2. LINE PRESSURE | 11. VOID |
| 3. EPC BOOST | 12. EXHAUST |
| 4. MANUAL 1ST AND REVERSE BOOST | 13. CONVERTER RELEASE |
| 5. CONVERTER CLUTCH SIGNAL | 14. CONVERTER APPLY |
| 6. CONVERTER FEED | 15. RELEASE OIL EXHAUST |
| 7. TO COOLER | 16. TCC REGULATOR VALVE BALANCE |
| 8. VENT | 17. P.R. VALVE BALANCE |
| 9. REGULATED CONVERTER FEED | |

Figure 5

**E4OD PUMP COVER INTERNAL
PASSAGE IDENTIFICATION**



- 1. FRONT LUBE SUPPLY
- 2. CONVERTER RELEASE
- 3. CONVERTER APPLY
- 4. COAST CLUTCH FEED
- 5. TO COOLER

Figure 6



FORD E4OD
NO FLOW TO COOLER,
AFTER REBUILD

COMPLAINT: After rebuild, your E4OD transmission is returned with premature planetary failure due to a lack of lubrication, *or* if you checked lube flow before delivery, you find zero lube flow, and zero flow from the front "To Cooler" fitting.

CAUSE: The cause may be, mis-match of stator shaft and pump cover creating a *totally blocked* "To Cooler" passage in the pump cover.

CORRECTION: Install the proper stator shaft into the proper pump cover. The differences are as follows:

- (1) **89-94 MODELS** - Have a relief (Notch) cut into the *pump cover* on the inside diameter, where the stator shaft presses into the cover, creating a passage for converter apply oil to get into the "To Cooler" passage in the pump cover. Refer to Figure 1.
- (2) **95-96 MODELS** - The relief (Notch) cut in the pump cover was eliminated from the cover, and the relief (Notch) cut was added to the *stator shaft* (See Figure 2).
- (3) If for any reason, it becomes necessary to install a different stator shaft into your pump cover, you *must* ensure that you are installing compatible parts.

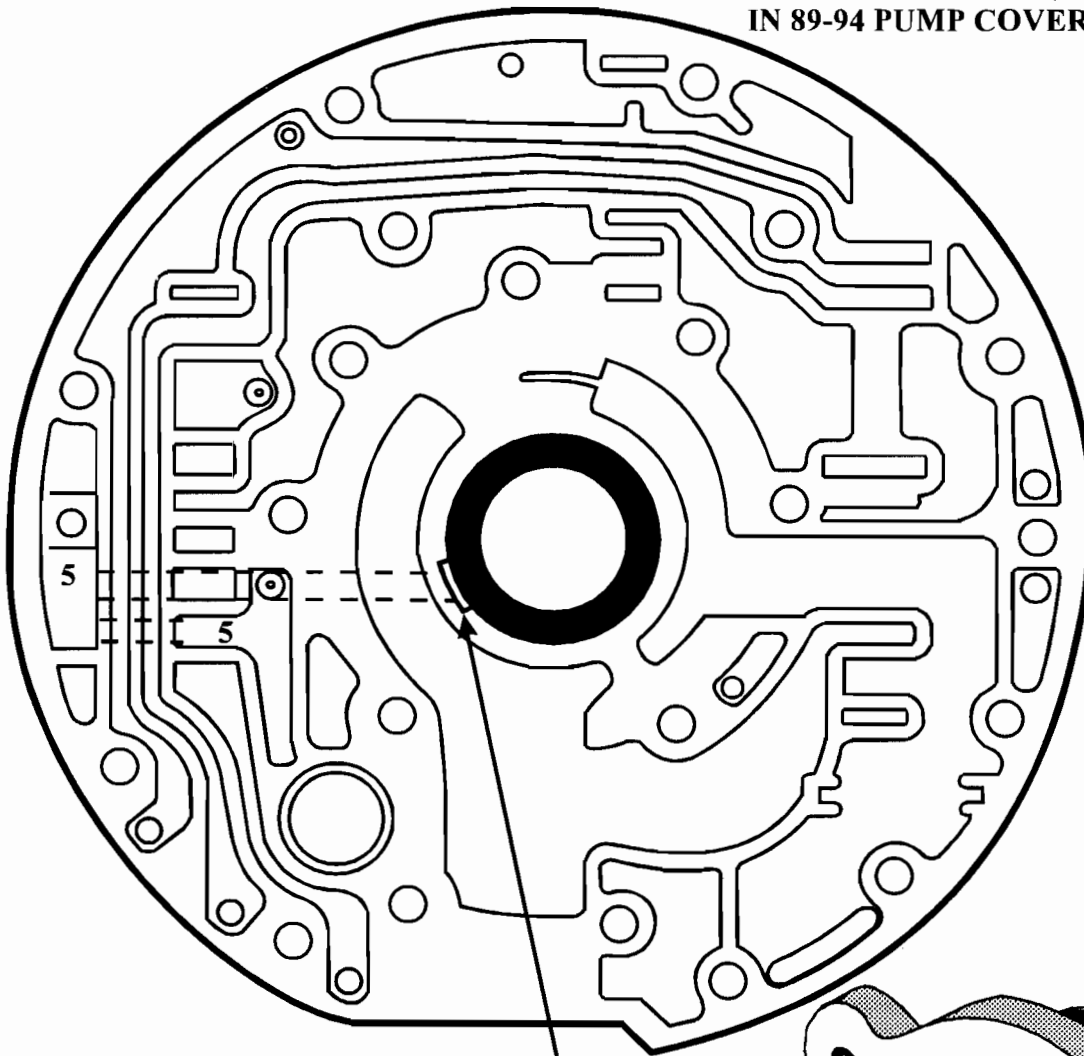
89-94 Model pump cover *with notch*, **MUST** be used with the stator shaft *without notch*. Refer to Figure 1.

95-96 Model pump cover *without notch*, **MUST** be used with the stator shaft *with notch*. Refer to Figure 2.

If you install a 89-94 stator shaft *without notch*, into a 95-96 pump cover *without notch* -- You will create a *totally blocked "To Cooler" passage* in the pump cover. Refer to Figure 3.

CORRECT ASSEMBLY

89-94 PUMP STATOR (WITHOUT NOTCH)
IN 89-94 PUMP COVER (WITH NOTCH)



NOTCH IN PUMP COVER,
NO NOTCH IN STATOR SHAFT

5. "TO COOLER" PASSAGE

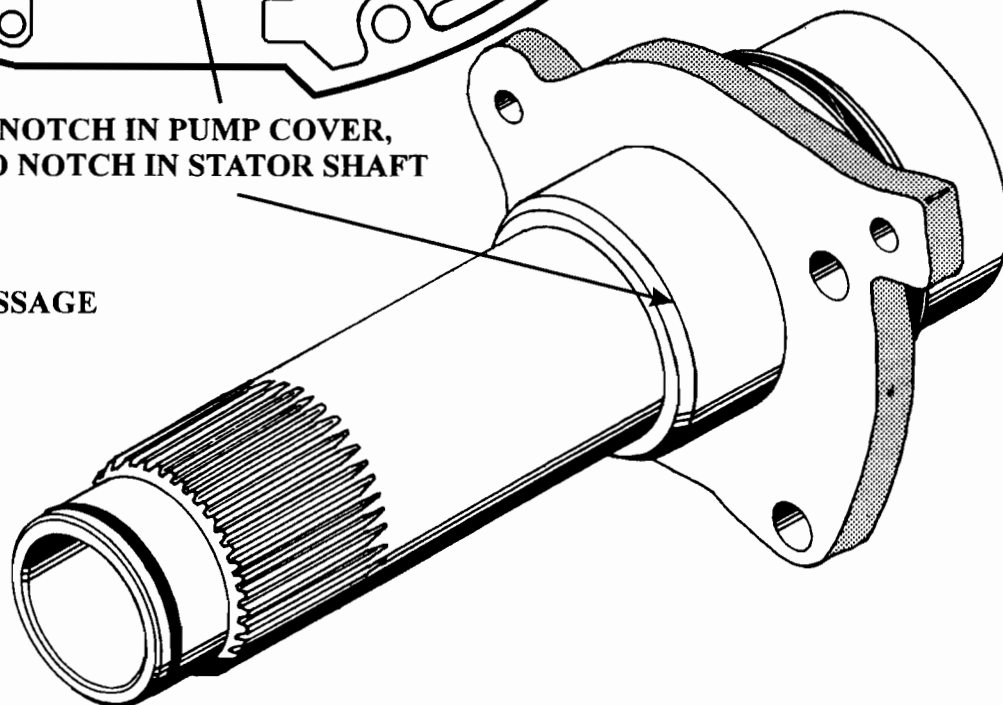


Figure 1

CORRECT ASSEMBLY

95-96 PUMP STATOR (WITH NOTCH)
IN 95-96 PUMP COVER (WITHOUT NOTCH)

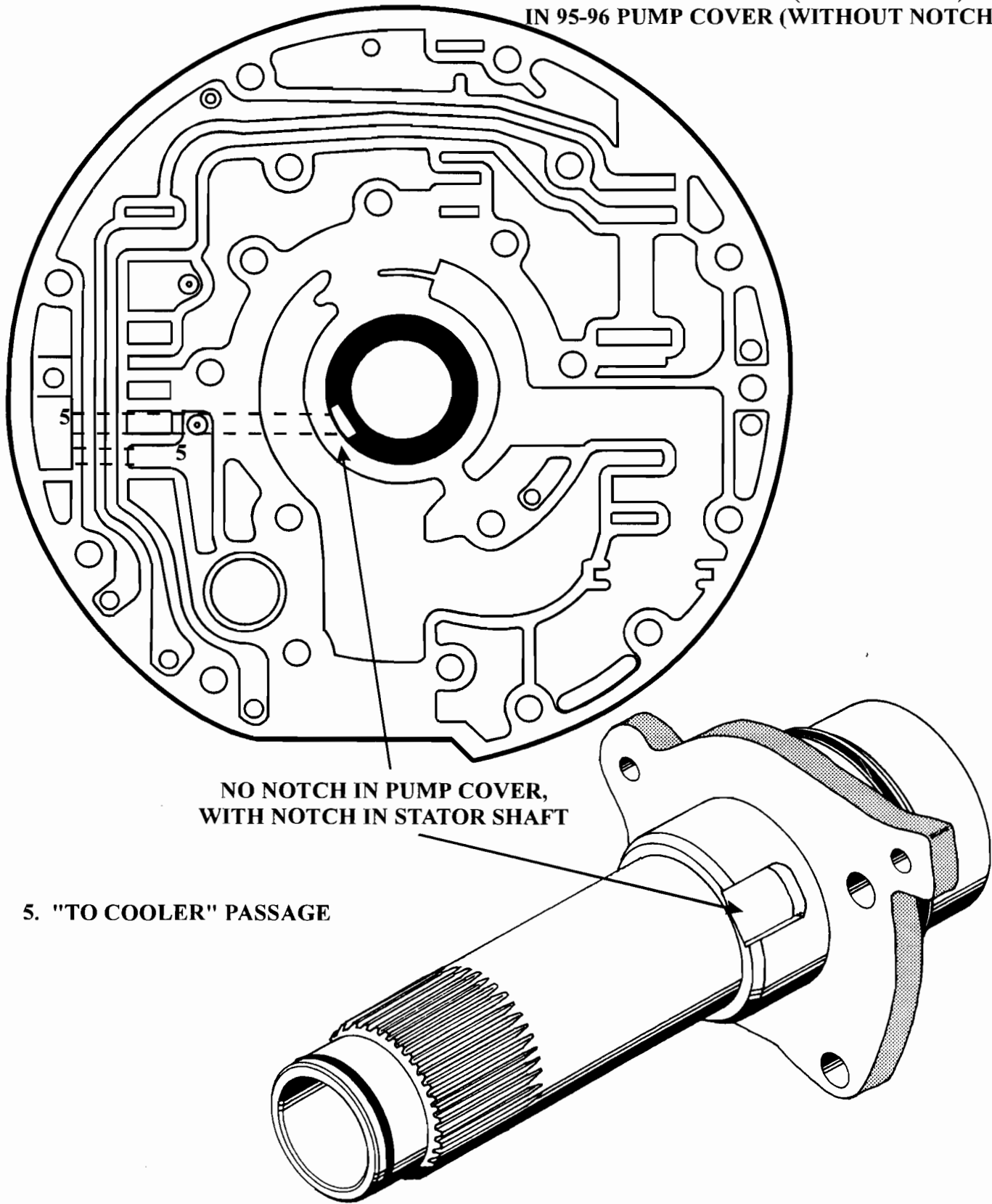
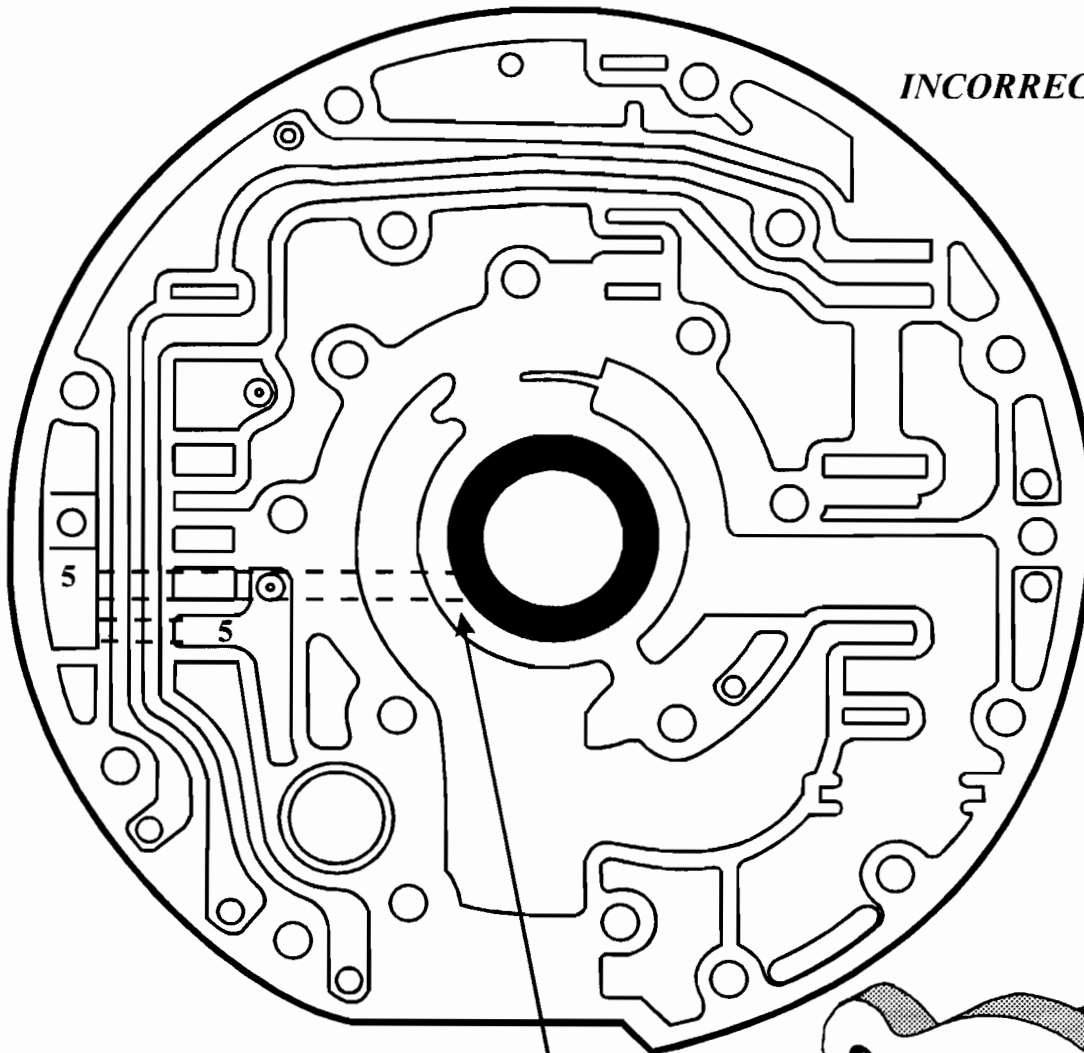


Figure 2

89-94 PUMP STATOR (WITHOUT NOTCH), IN 95-96 PUMP COVER (WITHOUT NOTCH)
RESULTING IN A *TOTALLY BLOCKED* "TO COOLER" PASSAGE.

INCORRECT ASSEMBLY



NO NOTCH IN EITHER
STATOR SHAFT OR PUMP COVER

5. "TO COOLER" PASSAGE

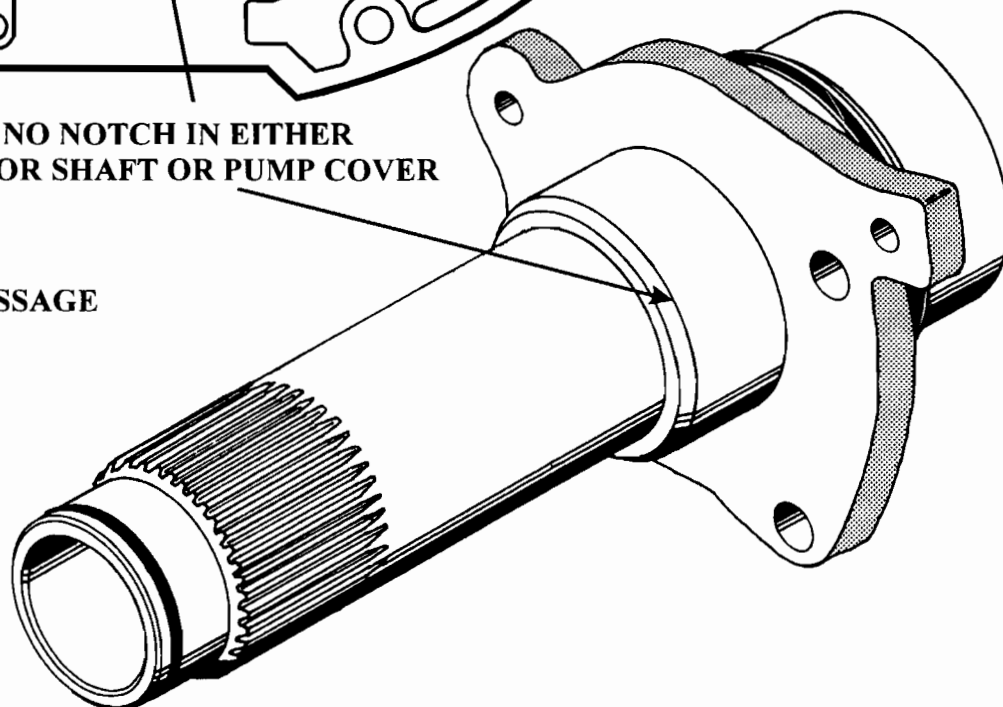
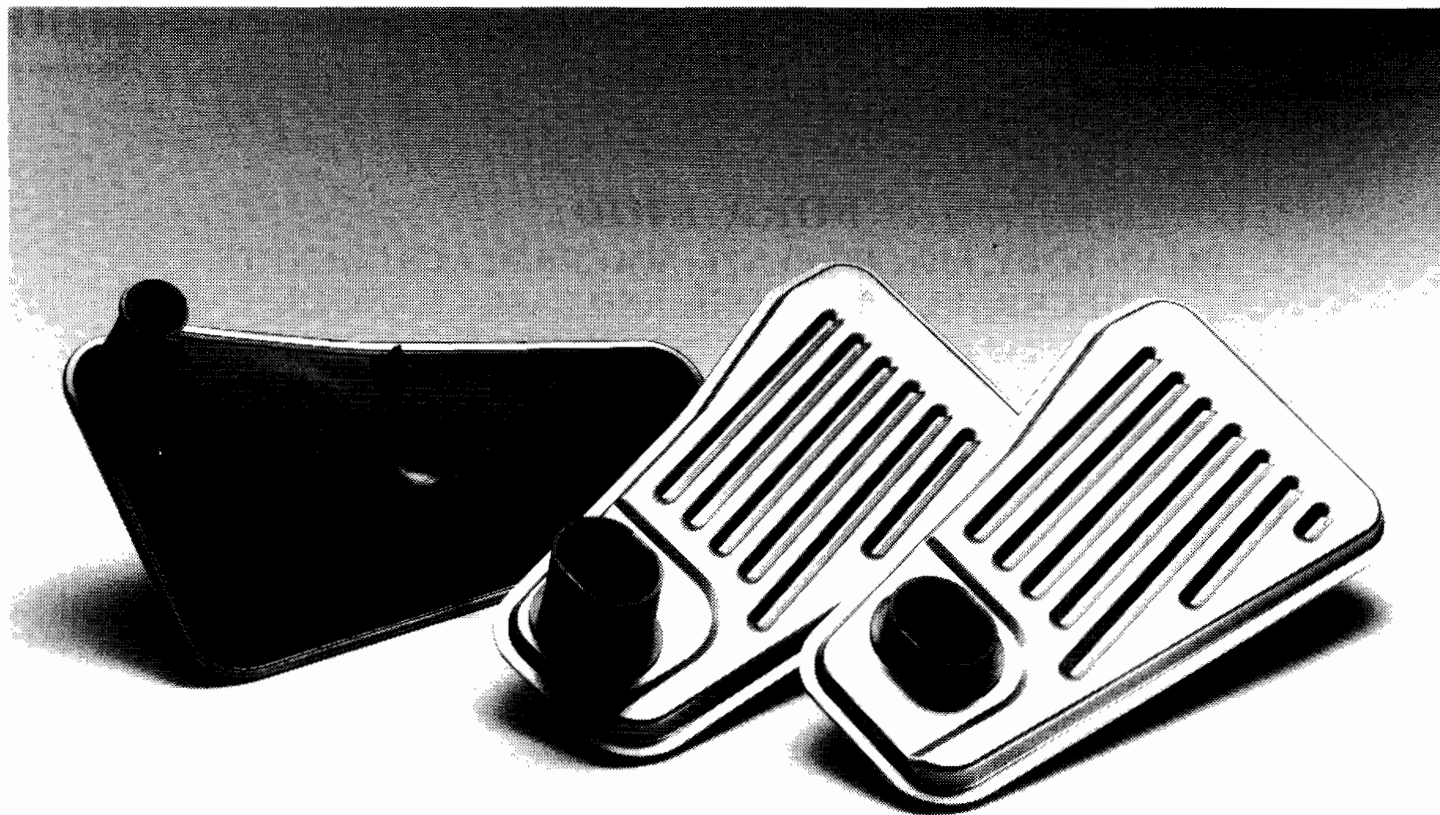


Figure 3



E40D. The E40D automatic transmission filter from Filtran. No other E40D transmission filter can offer the proven sealed seam, zero leak technology that locks the filter media in place to eliminate leaks, fluid bypass

and contamination. And no other E40D filter features Filtran's proprietary depth filtration media, developed and tested for cleaner and more efficient fluid flow.

The Filtran E40D filter also offers a permanent ethylene


Sealed seam security.

acrylate multi-lip outlet tube seal to prevent external air leaks, cavitation, and pressure loss. Plus, a composite material design that's engineered for durability and improved efficiency to provide proper filtration even in cold flow conditions.

No other E40D automatic transmission filter can deliver this kind of performance. So the next time you service a Ford E40D transmission, install the only filter that's sealed for security — the automatic transmission filter from Filtran.

FILTRAN

A division of SPX Corporation

 Look for this Mark of Quality on every transmission filter you install.



FORD E4OD
VALVE BODY, SPACER PLATE, SPACER PLATE GASKETS,
CHECKBALL LOCATIONS, AND CASE CHANGES,
FOR THE 1996 MODEL YEAR

CHANGE: Beginning in mid-1989 Ford Motor Co. changed the checkball locations in the case, and in 1990 changed the case checkball locations again. Beginning in 1996, both the valve body and case checkball locations change once again. These changes have created confusion in the field.

REASON: Pleaseability, Reliability, and Durability concerns.

PARTS AFFECTED:

- (1) **VALVE BODY CHECKBALL LOCATIONS** - Have remained the same for 1989 thru 1995 model years, with TWO 5/16" rubber checkballs, and their locations are shown in Figure 1. Beginning in the 1996 model year there are **FIVE** checkballs in the main valve body and their locations are shown in Figure 2. Notice that there are two 5/16" rubber balls and three 1/4" rubber balls. The 1/4" rubber balls are green in color (See Figure 2).
- (2) **CASE CHECKBALL LOCATIONS** - Have now changed *three times* since the introduction in 1989, as listed below.
 - Early 1989 Models** - Requires **Fourteen** 5/16" checkballs in the case, in the locations shown in Figure 3, and uses a 1/4" steel ball for the EPC blow-off, and location shown in Figure 3.
 - Late 1989 Models** - Requires **Ten** 5/16" rubber checkballs, and **One** 5/16" diameter steel checkball, for a total of **Eleven**, in the locations shown in Figure 4, and uses a 1/4" steel ball for the EPC blow-off, and the location is shown in Figure 4.
 - All 1990-1995 Models** - Requires **Nine** 5/16" rubber checkballs in the case, in the locations shown in Figure 5, and uses a 1/4" steel ball for the EPC blow-off, and the location is shown in Figure 5. Beginning in 1991 there is an added Intermediate Accumulator Regulator Filter Assembly, and the location in the case is shown in Figure 5.
 - All 1996-UP Models** - Requires **Eight** 5/16" rubber checkballs in the case, in the locations shown in Figure 6, and uses a 1/4" steel ball for the EPC blow-off, and the location is shown in Figure 6.
- (3) **SPACER PLATE GASKETS** - Have changed twice since the introduction in 1989.
 - 1989 Models Only** - Require the Spacer Plate Gaskets with solenoid feed hole (Marked X) in the location shown in Figure 8, and the gaskets have **No I.D.** stripes on either gasket.
 - 90-95 Models Only** - Require the Spacer Plate Gaskets with solenoid feed hole (Marked X) in the location shown in Figure 9, and both gaskets have **Yellow I.D.** stripes
 - 96-UP Models Only** - Require the Spacer Plate Gaskets with **Green I.D.** stripes on both gaskets. These gaskets have a multitude of hole location differences, as shown in Figure 10.

Continued on next Page.



1997 SEMINAR INFORMATION

SLIDE

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- (4) **MAIN VALVE BODY SPACER PLATE**- Has changed twice since the introduction in 1989.
1989 Models Only - Requires the Spacer Plate with the solenoid feed hole in the location shown in Figure 11, and has two "Square" notches for identification

90-95 Models Only - Requires the Spacer Plate with the solenoid feed hole in the location shown in Figure 12, and has two "Half Moon" notches for identification. Note; Some models have two "V" notches with one "Half Moon" notch between them for identification.

1996-UP Models Only - Requires the Spacer Plate with the three "V" notches for identification as shown in Figure 13, and has a multitude of hole location changes.

- (5) **MAIN VALVE BODY** - Has changed twice since the introduction in 1989 as listed below.
1989 Models Only - Can be identified by the differences in the worm track area at the 1-2 shift valve, as shown inside the circles in Figure 14. The best, and most accurate method to identify the valve body, is the rough forging number cast into the valve body in the location shown in Figures 1 and 2.

90-95 Models Only - Can be identified by the differences in the worm track area at the 1-2 shift valve, as shown inside the circles in Figure 14. The best, and most accurate method to identify the valve body, is the rough forging number cast into the valve body in the location shown in Figures 1 and 2.

1996-UP Models Only - Has a multitude of worm track location differences from the previous models, as shown in Figure 15. The best and most accurate method to identify the valve body, is the rough forging number cast into the valve body in location shown in Figures 1 and 2.

- (6) **LOWER VALVE BODY SPACER PLATE** - Can be identified by the diameter of the feed hole in the location shown in Figure 16. For 1989 models the hole diameter is .312", and for 90-95 models the hole diameter is .055".
The 1996-Up models have three small holes in this location, as shown in Figure 16, and a multitude of hole location differences to accommodate the added valve body checkballs.

- (7) **LOWER VALVE BODY** - The engagement control valve retaining clip on 1989 models, was replaced by a bore plug and new design clip on the 90-95 models, which also changed the worm track configuration in that area, as shown inside the circles in Figure 17.
The 1996-Up models have a multitude of worm track location differences than the previous models, to accommodate the added valve body checkballs, as shown in Figure 17. The best, and most accurate method of identification is the rough forging number cast into the lower valve body using the formula in Figures 1 and 2.

Continued on next Page.



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INTERCHANGEABILITY:

- (1) The 1989 Main Spacer Plate **MUST** be used on 1989 case, with 1989 checkball locations, 1989 valve body gaskets (No Stripe), and 1989 Main Valve Body.
- (2) The 1989 Main Valve Body can be used on 90-95 models, but the 90-95 Main Valve Body **MUST** be used on 90-95 models.
- (3) The Lower Valve Body and spacer plates should also be kept together, large (.312") hole with 1989 models, and small (.055") hole with 90-95 models.
- (4) None of the 1996 design level parts will interchange with previous models.

SERVICE INFORMATION:

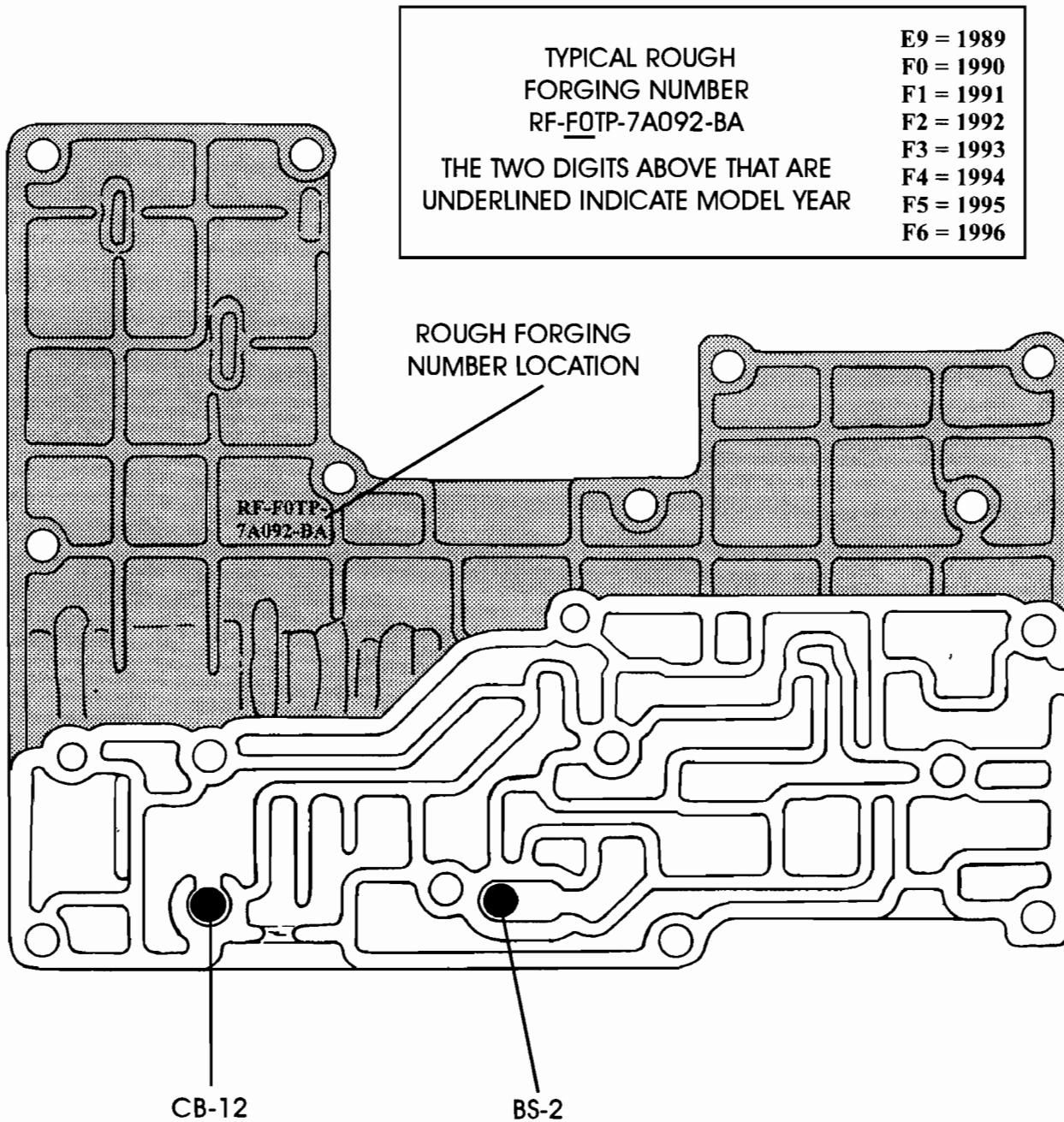
Main Valve Body Spacer Plate (1989 Models)	E9TZ-7A008-A
Main Valve Body Spacer Plate (90-95 Models)	F5TZ-7A008-A
Main Valve Body Spacer Plate (1996 Models)	F6TZ-7A008-B
Spacer Plate to Case Gasket (1989 Models)	E9TZ-7C155-A
Spacer Plate to Case Gasket (90-95 Models)	F5TZ-7C155-A
Spacer Plate to Case Gasket (1996 Models)	F6TZ-7C155-A
Valve Body to Spacer Plate Gasket (1989 Models)	E9TZ-7D100-A
Valve Body to Spacer Plate Gasket (90-95 Models)	F5TZ-7D100-A
Valve Body to Spacer Plate Gasket (1996 Models)	F6TZ-7D100-A
Intermediate Accumulator Regulator Filter Assembly (91-96 Models)	F1TZ-7H194-A
EPC Blow-Off Spring (All Models)	E9TZ-7D017-A

SPECIAL NOTE:

Some 1995 models were built with 1996 production valve body, spacer plate, and valve body gaskets. Be very careful to identify the parts on any 1995 model properly.

FORD E4OD

1989-1995 VALVE BODY CHECKBALL LOCATIONS
TWO 5/16" RUBBER BALLS - ALL MODELS



SPECIAL NOTE:

Some 1995 models were built with 1996 production valve body, spacer plate, and valve body gaskets. Be very careful to identify the parts on any 1995 model properly.

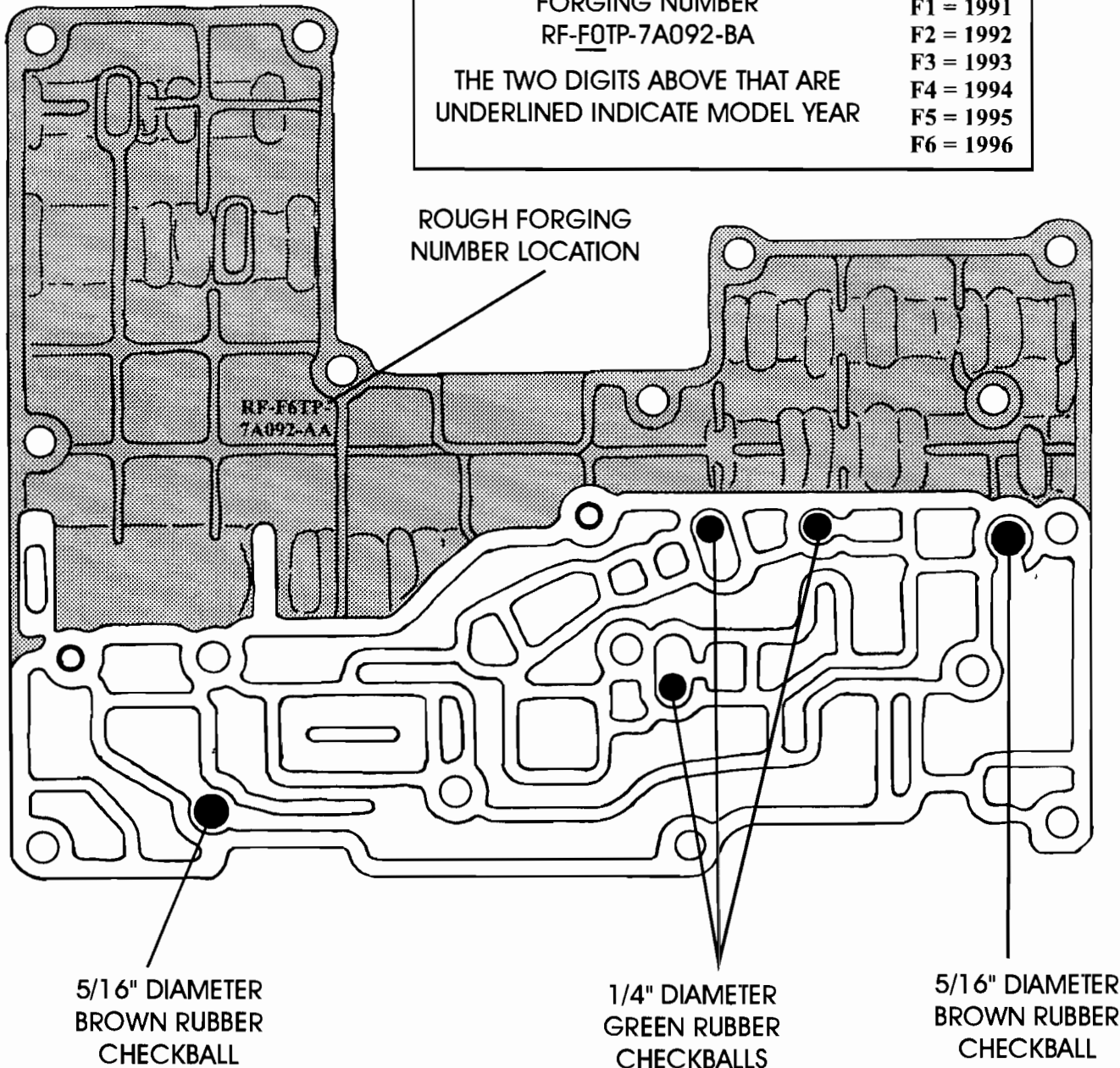
Figure 1

**1996 VALVE BODY CHECKBALL LOCATIONS
REQUIRES THREE 1/4" RUBBER BALLS,
AND TWO 5/16" RUBBER BALLS**

TYPICAL ROUGH
FORGING NUMBER
RF-F0TP-7A092-BA

THE TWO DIGITS ABOVE THAT ARE
UNDERLINED INDICATE MODEL YEAR

E9 = 1989
F0 = 1990
F1 = 1991
F2 = 1992
F3 = 1993
F4 = 1994
F5 = 1995
F6 = 1996



SPECIAL NOTE:

Some 1995 models were built with 1996 production valve body, spacer plate, and valve body gaskets. Be very careful to identify the parts on any 1995 model properly.

Figure 2

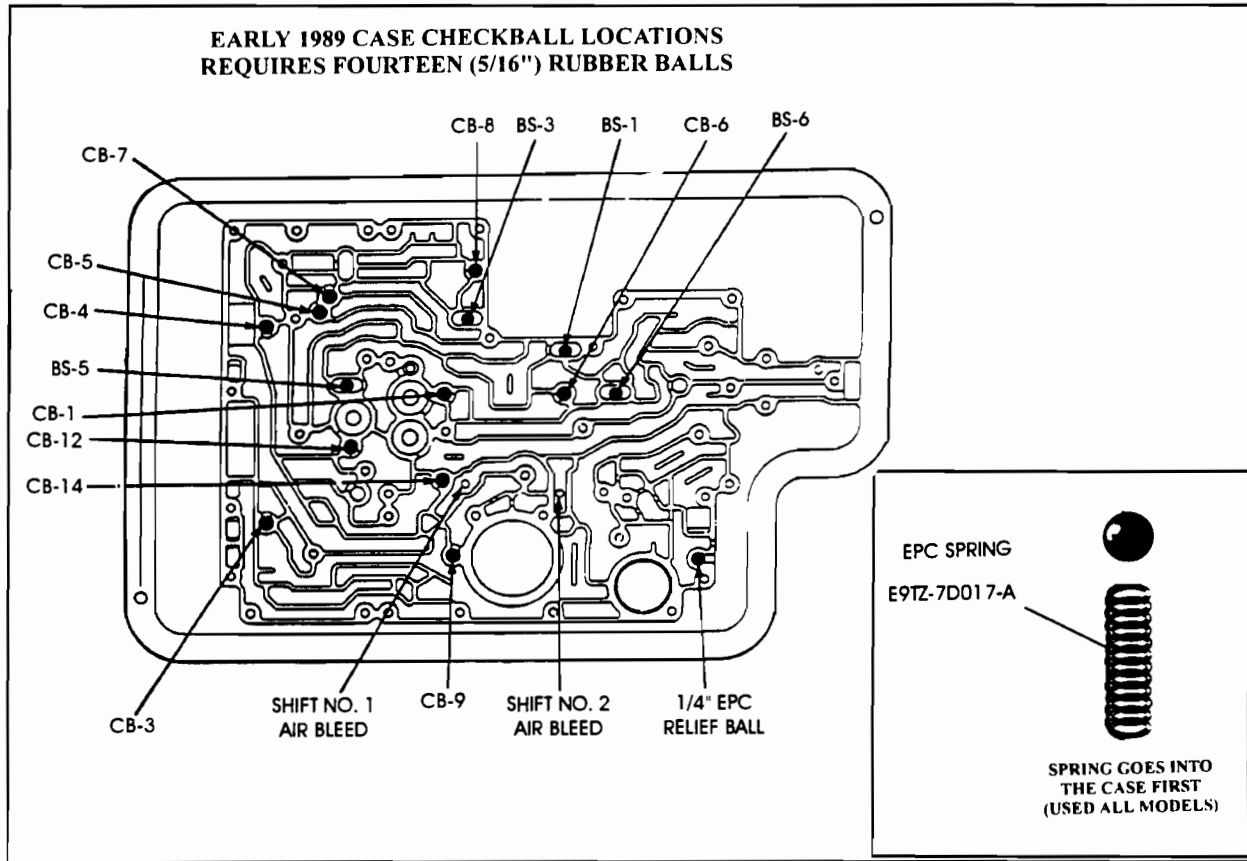


Figure 3

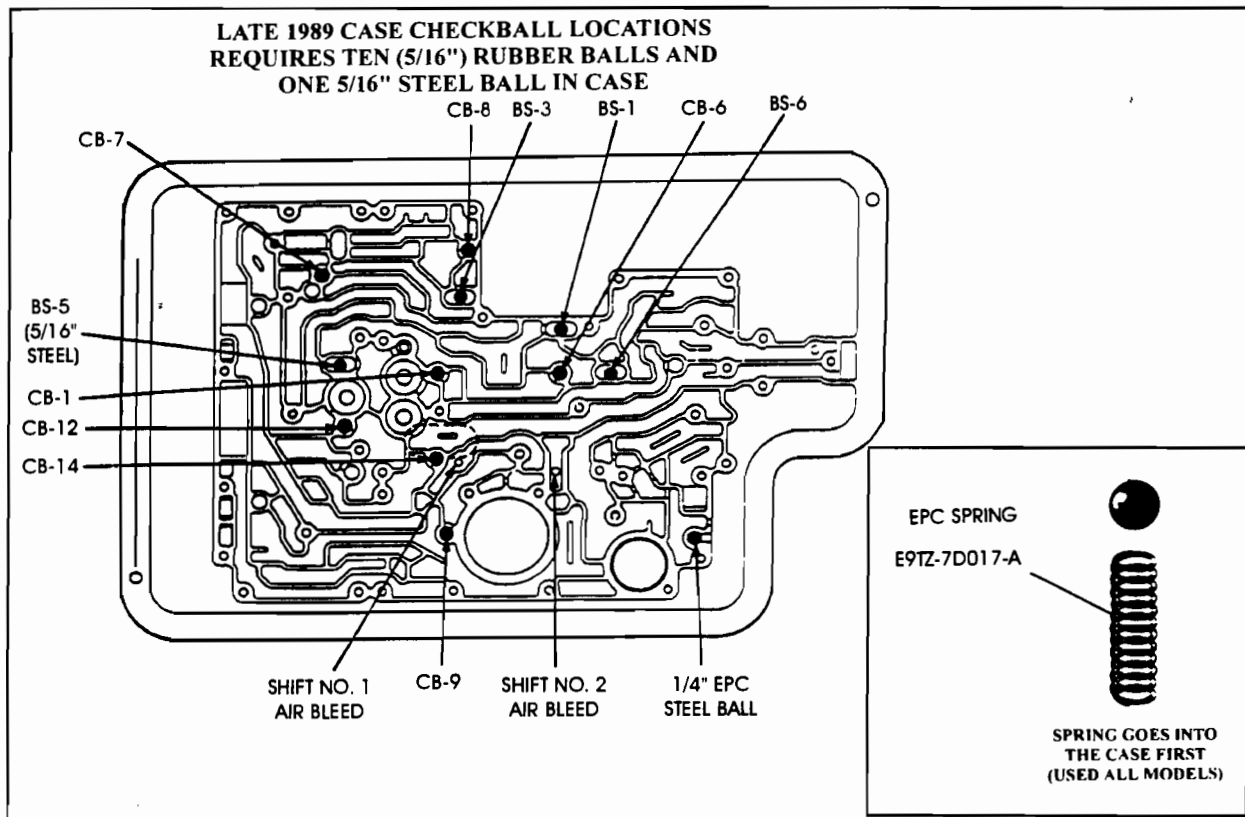


Figure 4

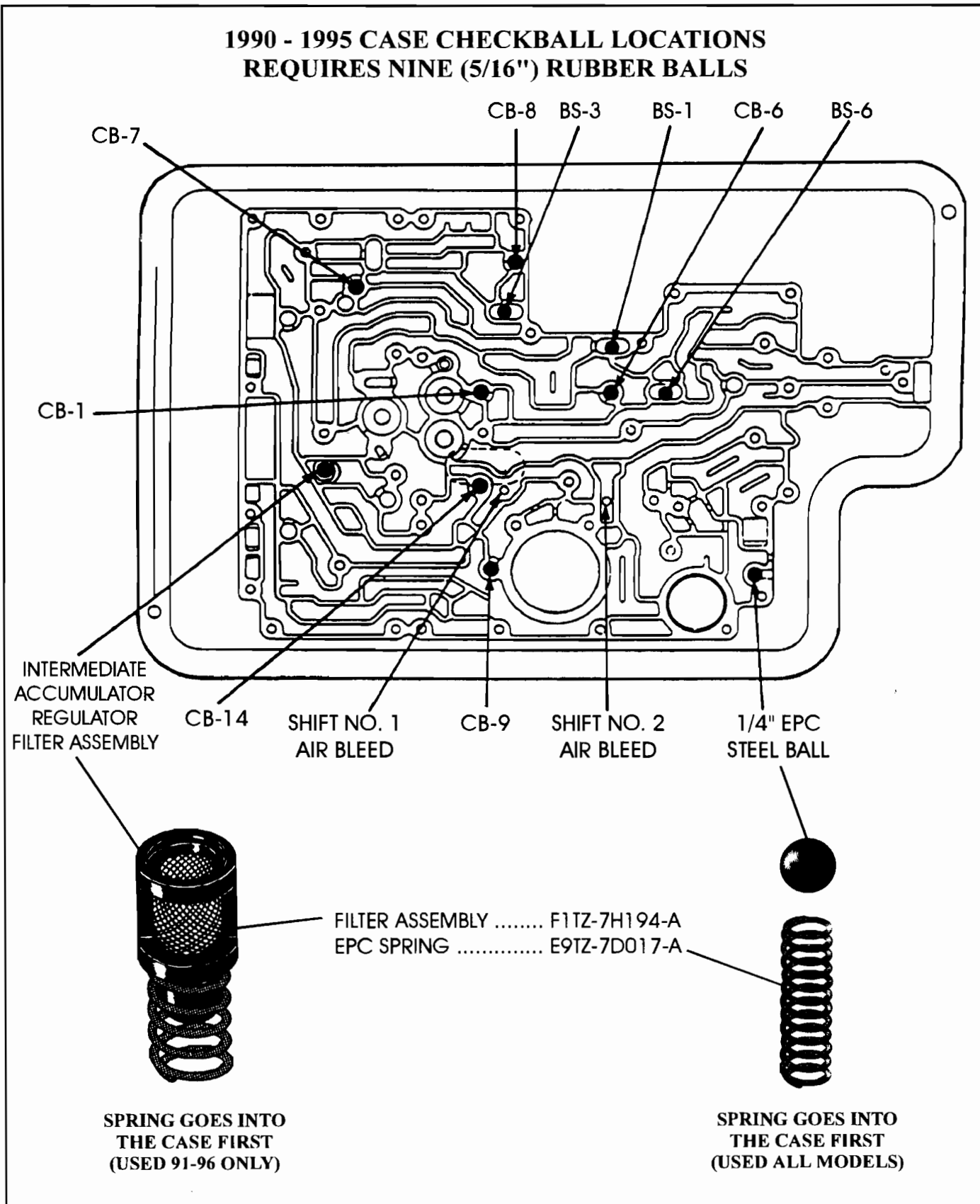


Figure 5

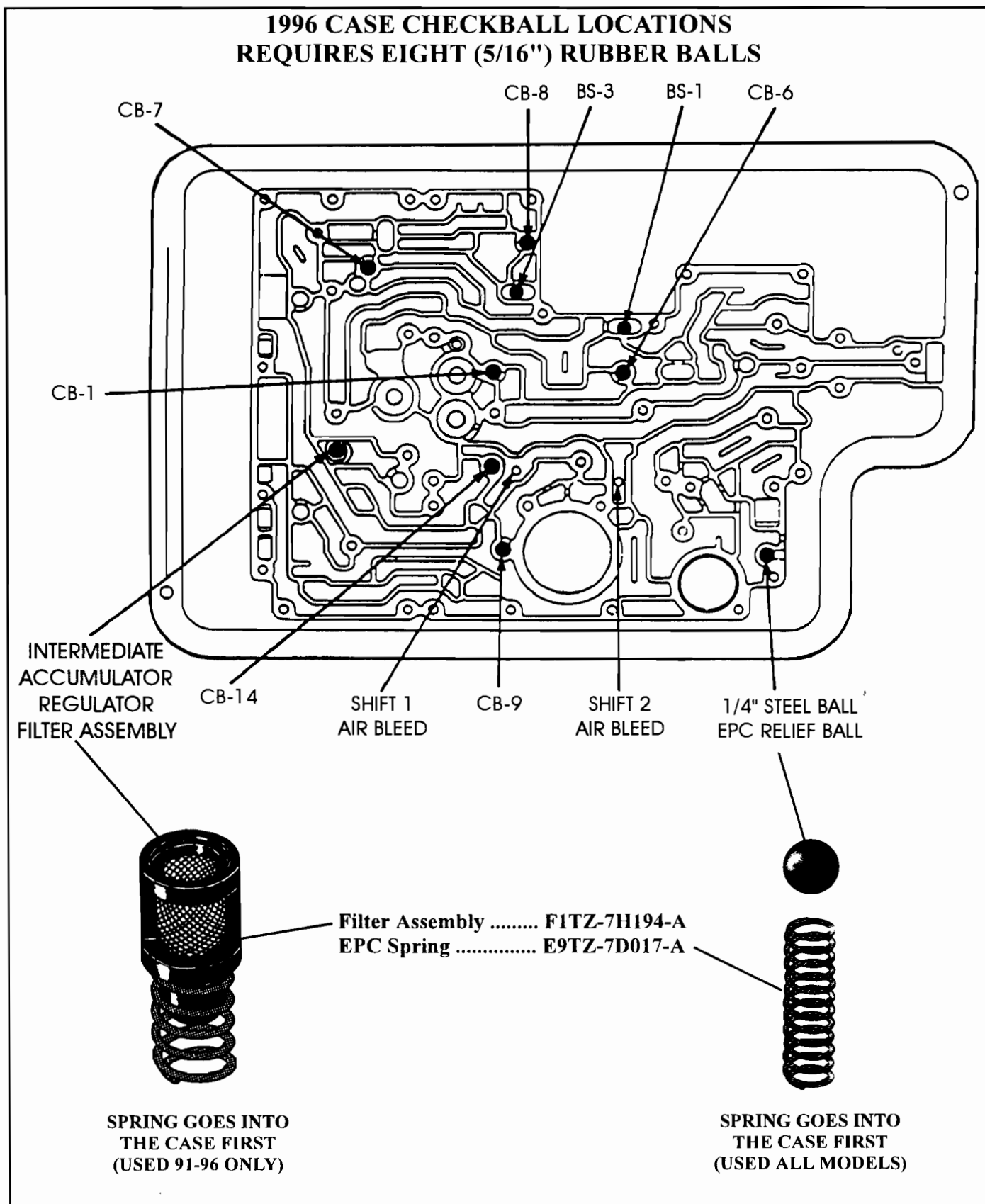
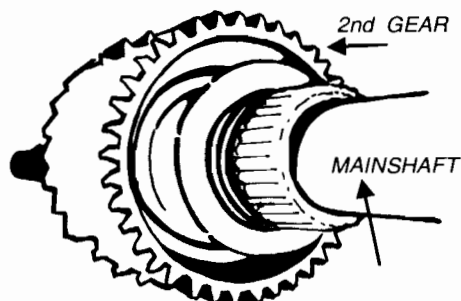


Figure 6

NEW PRODUCTS FROM OTS

Bronze Thrust Washer

OTS 88406AW



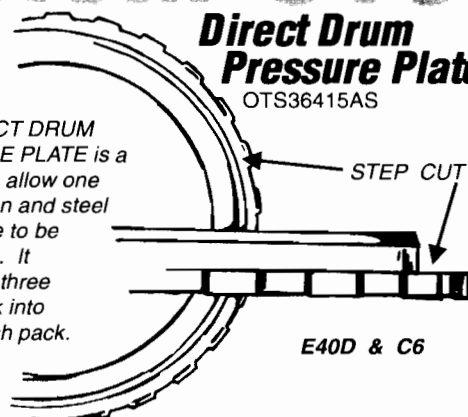
On Honda 4 speed transmissions, the mainshaft 2nd gear wears severely from the 2nd clutch needle roller bearing. This bearing also needs frequent replacement due to wear.

Replace the needle bearing with OTS 88406AW. This high quality BRONZE THRUST WASHER is designed to withstand the wear and axial thrust load of the mainshaft 2nd gear assembly.

Direct Drum Pressure Plate

OTS36415AS

This DIRECT DRUM PRESSURE PLATE is a step cut, to allow one extra friction and steel clutch plate to be assembled. It converts a three clutch pack into a four clutch pack.



Specialty Bushings

T1599

T5698

T9699

Accumulator Piston Repair Tool TH700

A4LD Roller Clutch Race Removing Tool

AXOD Case Cover Repair Tool

77099

56437

96030

36007EX

Accumulator Piston Sleeve TH700

A4LD Rear Case Washer 90-on 4.OL

AXOD Case Cover Repair Sleeve

E40D Rear Case Bushing 1-Piece

RB1

RB2

RB3

RB4

Nissan 5 Speed Ext. Housing Bushing

TOYO KOYGO 5 Speed Ext. Housing Bushing

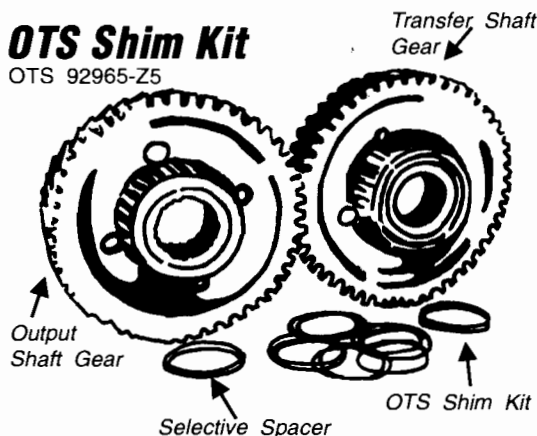
Housing Bushing

Suzuki 5 Speed Ext. Housing Bushing

Ranger 5 Speed Ext. Housing Bushing

OTS Shim Kit

OTS 92965-Z5



It is difficult to set the output shaft gear preload and transfer shaft gear endplay. Rebuilders often go through many shim kits to get the useful size. The shim thickness must be adjusted when any of the following components are replaced: case, carrier, carrier bearings, extension housing or bearing cups.

OTS SHIM KITS contains 10 shims that are .005 thick. These may be used in conjunction with leftover selective spacers to set the correct preload or endplay.

Oklahoma City Location:

927 N.W. First Street
(405) 236-4391

(800) 288-3668

FAX #: (405) 236-1176

Tulsa Location:

1510 E. Third St.
(918) 584-7444

(800) 369-7444

FAX #: (918) 584-1208

Denver Location:

3300 East 43rd Ave.
(303) 296-2500

(800) 962-9652

FAX #: (303) 296-2561

ots

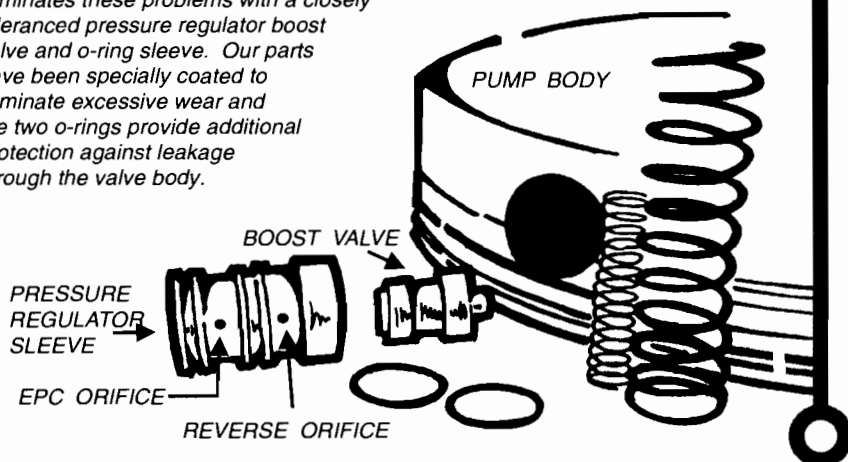
AUTOMOTIVE PRODUCTS

OTS Replacement Assemble

OTS 36424-01K

Vehicles with an E40D transmission frequently have problems with poor line rise and/or soft shifts.

The OTS REPLACEMENT ASSEMBLY 35424-01K eliminates these problems with a closely toleranced pressure regulator boost valve and o-ring sleeve. Our parts have been specially coated to eliminate excessive wear and the two o-rings provide additional protection against leakage through the valve body.





SLIDE

	USAGE CHART		
	EARLY 89	LATE 89	90 - 95
CB-1: Feeds reverse flow through 4-3-2 shift timing valve.	X (CASE)	X (CASE)	X (CASE)
CB-3: Bypasses intermediate accumulator plunger feed orifice during 2-1.	X (CASE)		
CB-4: Bypasses overdrive accumulator plunger feed orifice during 4-3.	X (CASE)		
CB-5: Bypasses direct accumulator plunger feed orifice during 3-2.	X (CASE)		
CB-6: Forces direct clutch to exhaust through orifice during 3-2 downshift.	X (CASE)	X (CASE)	X (CASE)
CB-7: Forces overdrive clutch to exhaust through an orifice during 4-3 downshift.	X (CASE)	X (CASE)	X (CASE)
CB-8: Forces coast clutch feed oil through orifice for 4-3 downshift and manual 1 or 2 pull-ins while allowing free exhaust.	X (CASE)	X (CASE)	X (CASE)
CB-9: Forces band servo apply pressure through an orifice while bypassing the orifice on exhaust.	X (CASE)	X (CASE)	X (CASE)
CB-12: Facilitates fast exhaust of direct clutch when coming out of reverse.	X (CASE)	X (CASE)	
CB-13: Forces forward engagement pressure through orifice while allowing free exhaust.	X (V.B.)	X (V.B.)	X (V.B.)
CB-14: Forces intermediate clutch to exhaust through orifice during 2-1 downshift.	X (CASE)	X (CASE)	X (CASE)
BS-1: Separates manual 2 flow and reverse flow to the 4-3-2 timing valve and the coast clutch shift valve.	X (CASE)	X (CASE)	X (CASE)
BS-2: Separates manual 2 flow and solenoid 2 flow into the 1-2 manual transition valve which supplies flow to prevent 1-2 shift valve from shifting.	X (V.B.)	X (V.B.)	X (V.B.)
BS-3: Separates solenoid 4 flow from either the Man. 2 flow or the reverse flow which shifts the coast clutch shift valve.	X (CASE)	X (CASE)	X (CASE)
BS-5: Separates reverse flow and direct accumulator flow into the direct clutch.	X (CASE)	X (CASE)	
BS-6: Separates two and reverse flow at low reverse modulator valve.	X (CASE)	X (CASE)	X (CASE) ELIM. 1996

Figure 7

1989 ONLY VALVE BODY GASKETS

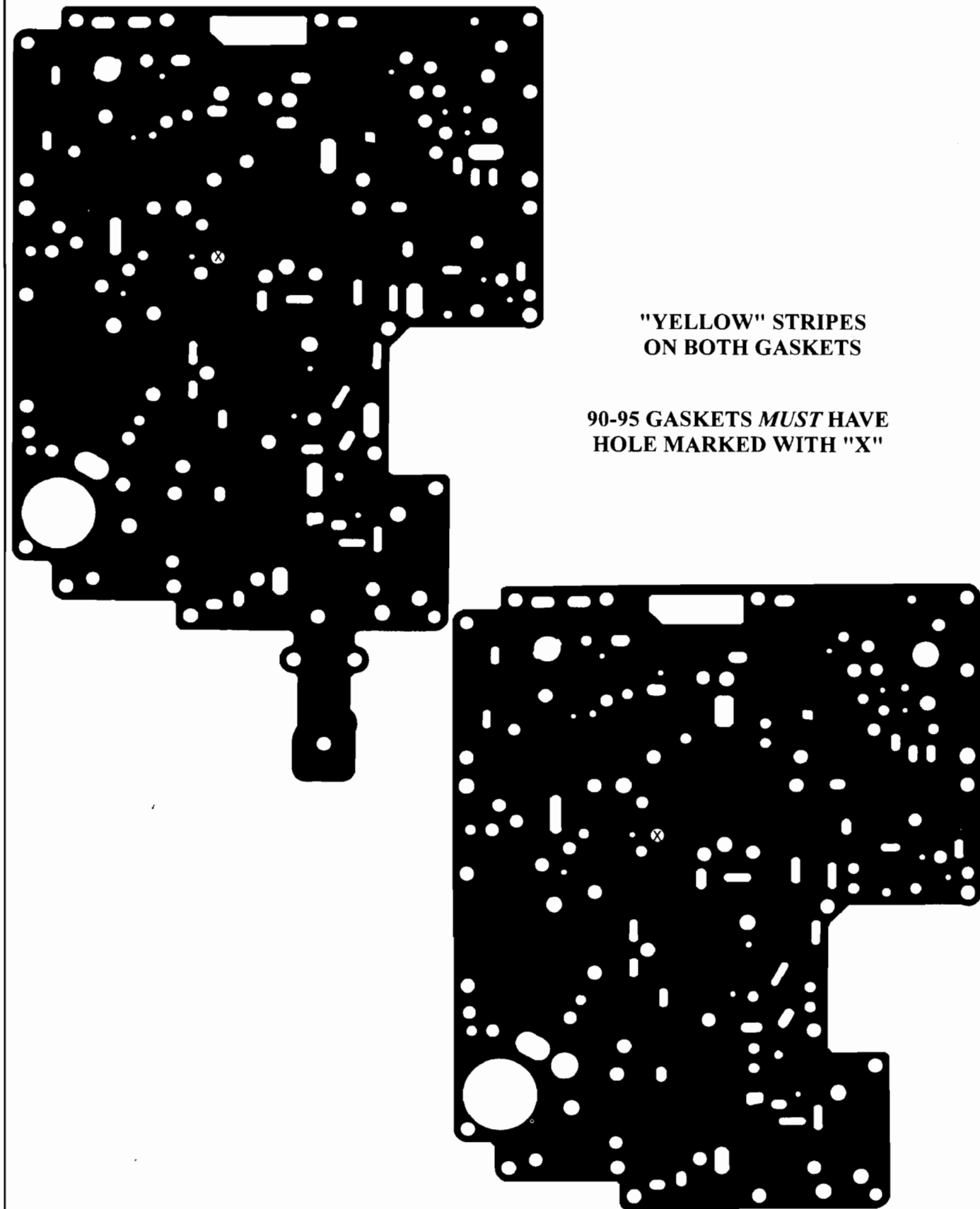
**"NO" STRIPES ON
EITHER GASKET**

**1989 GASKETS *MUST* HAVE
HOLE MARKED WITH "X"**



Figure 8
Automatic Transmission Service Group

1990-1995 ONLY VALVE BODY GASKETS



"YELLOW" STRIPES
ON BOTH GASKETS

90-95 GASKETS *MUST* HAVE
HOLE MARKED WITH "X"

Figure 9
Automatic Transmission Service Group

1996-UP ONLY VALVE BODY GASKETS

"GREEN" STRIPES
ON BOTH GASKETS



Figure 10
Automatic Transmission Service Group

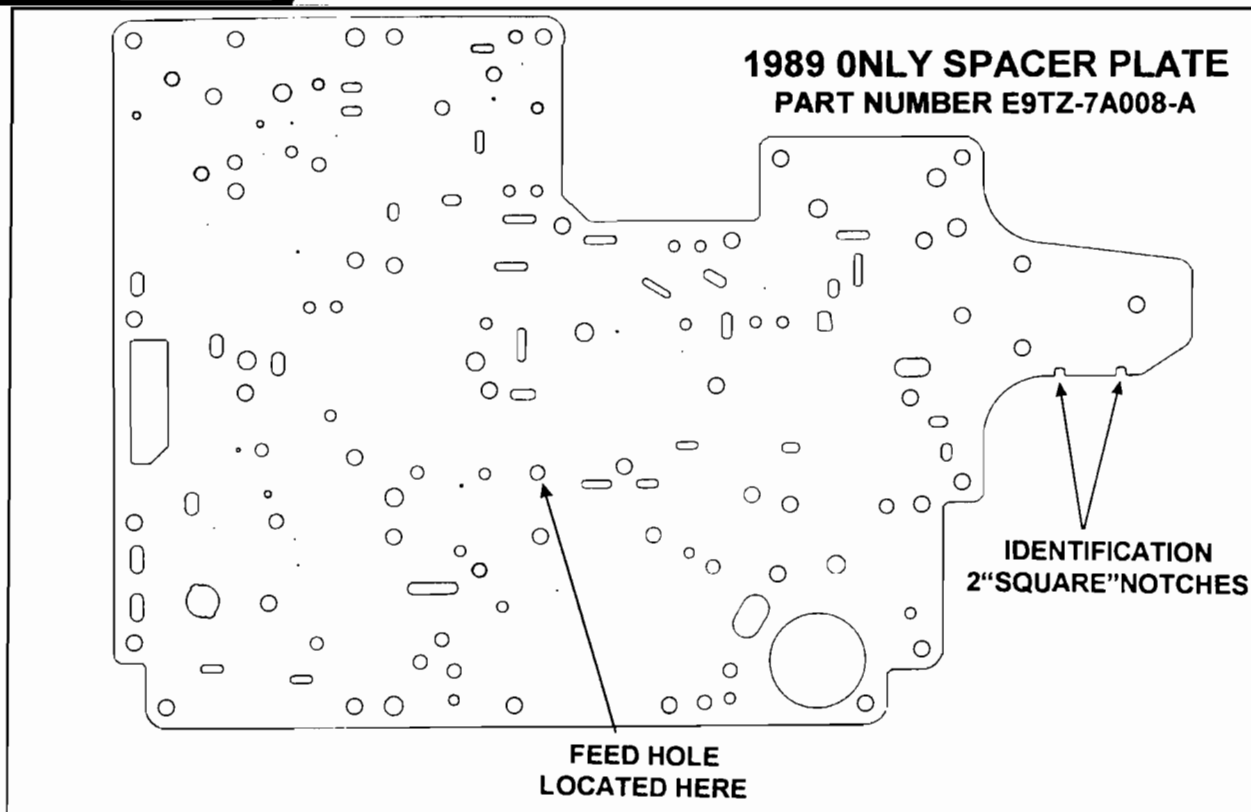


Figure 11

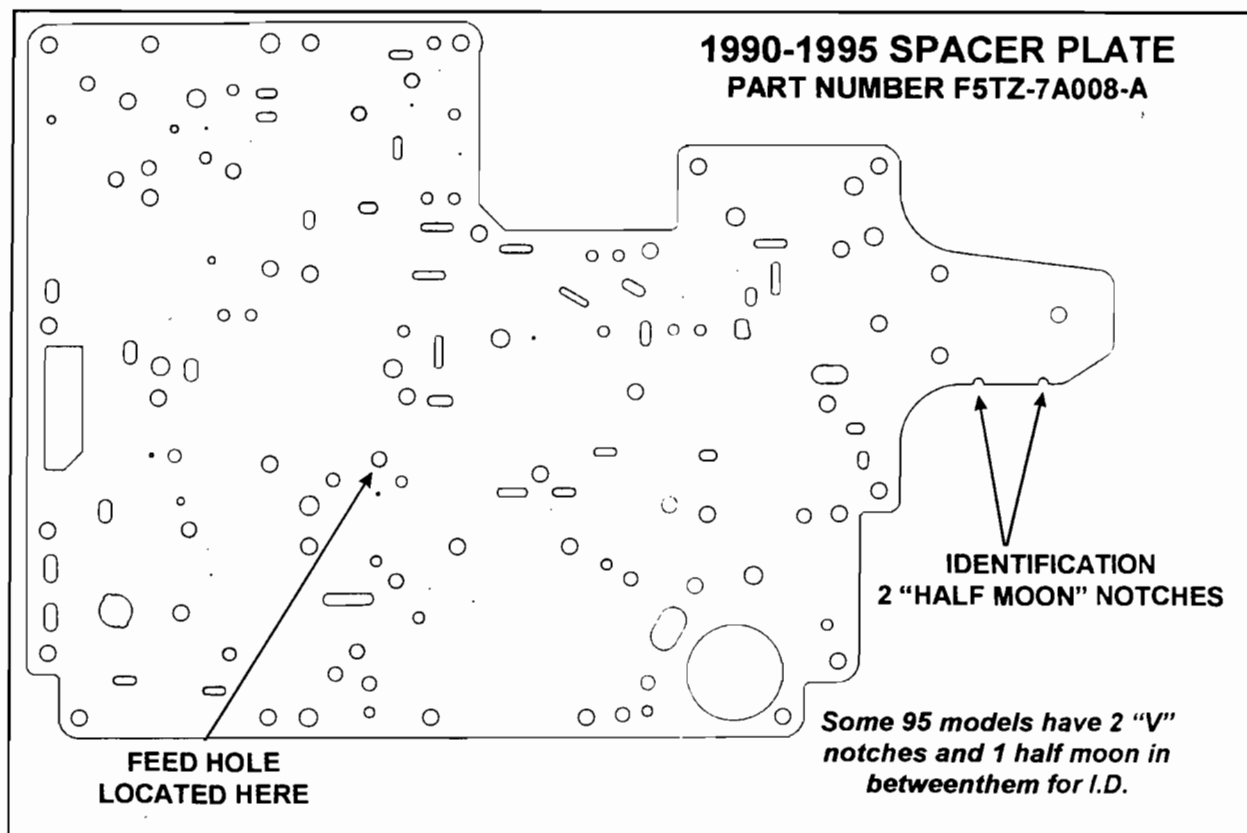


Figure 12



**1996-UP ONLY SPACER PLATE
PART NUMBER F6TZ-7A008-B**

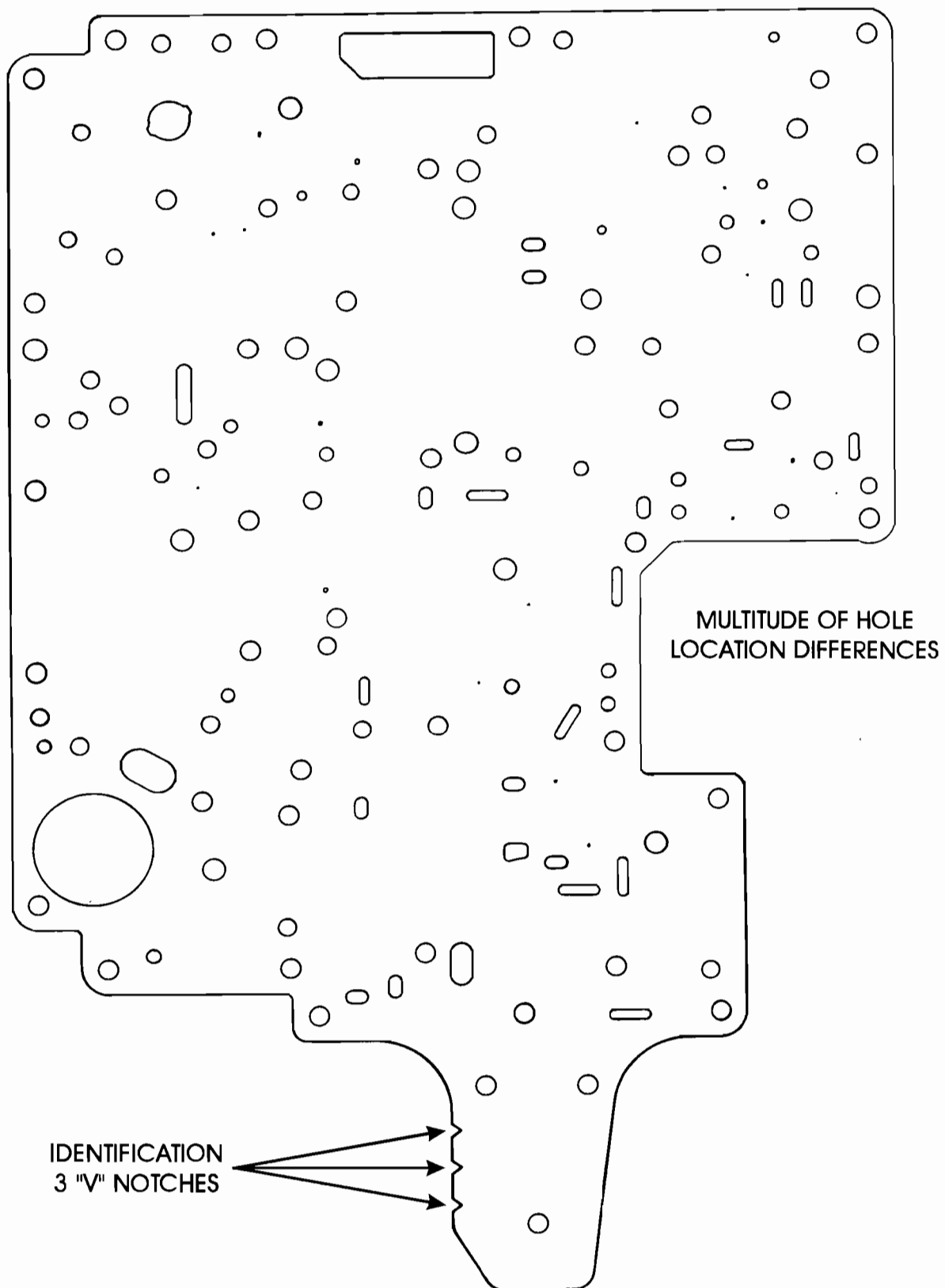


Figure 13

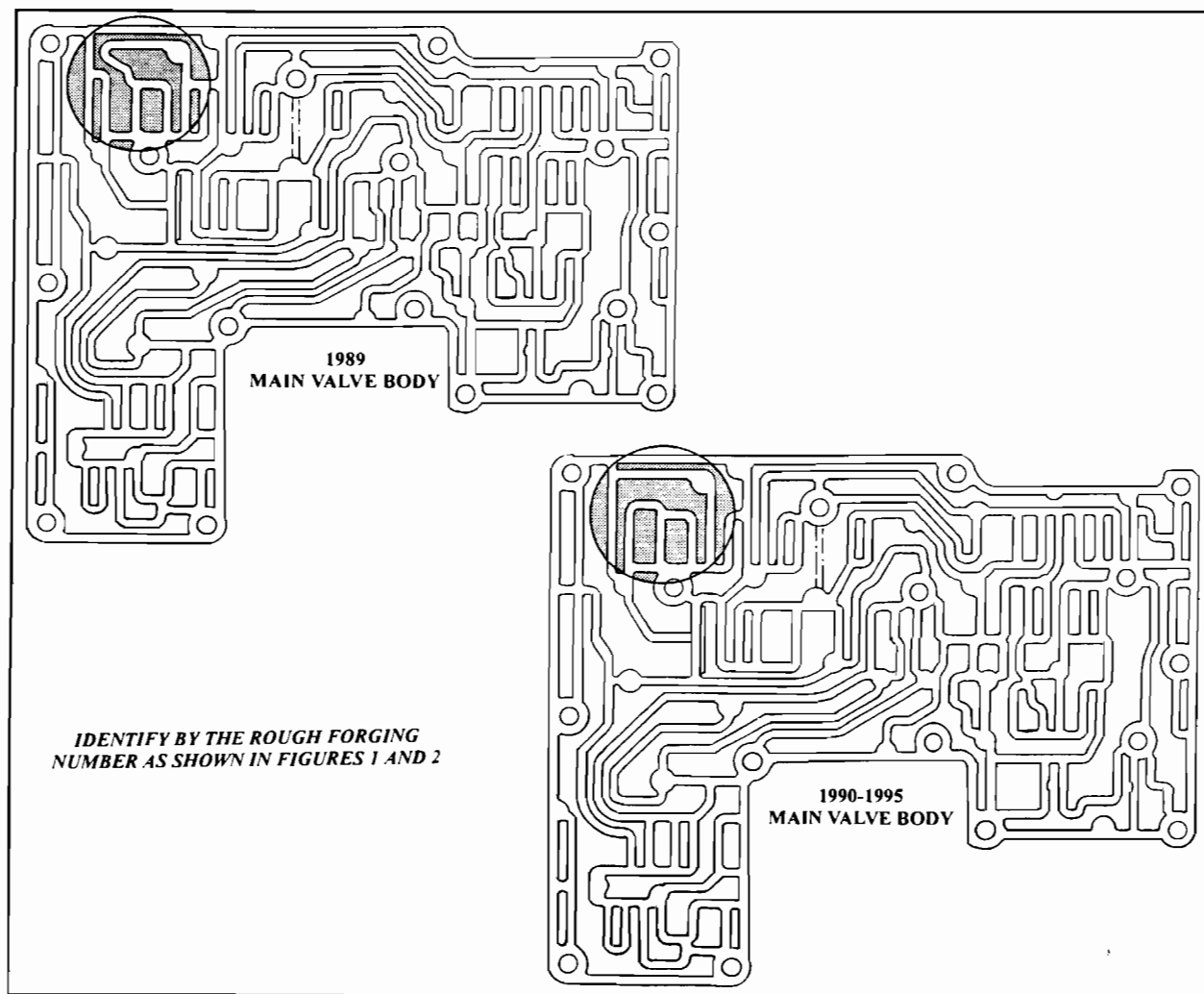


Figure 14

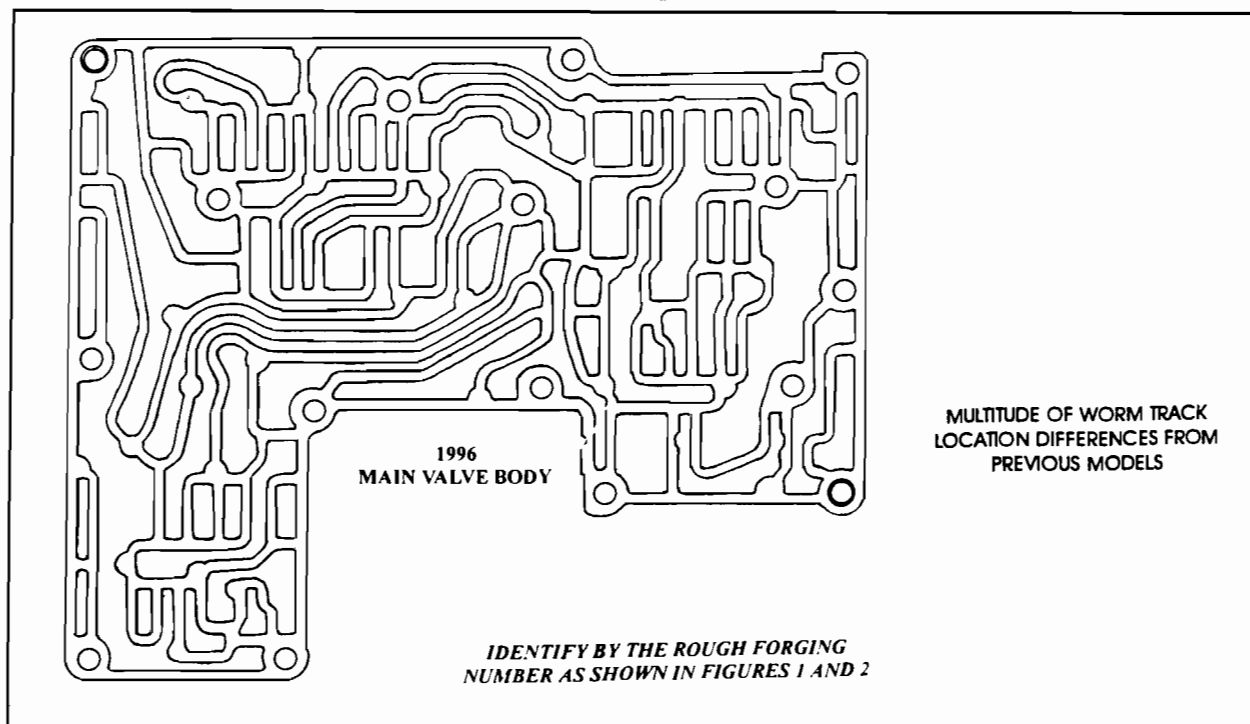


Figure 15

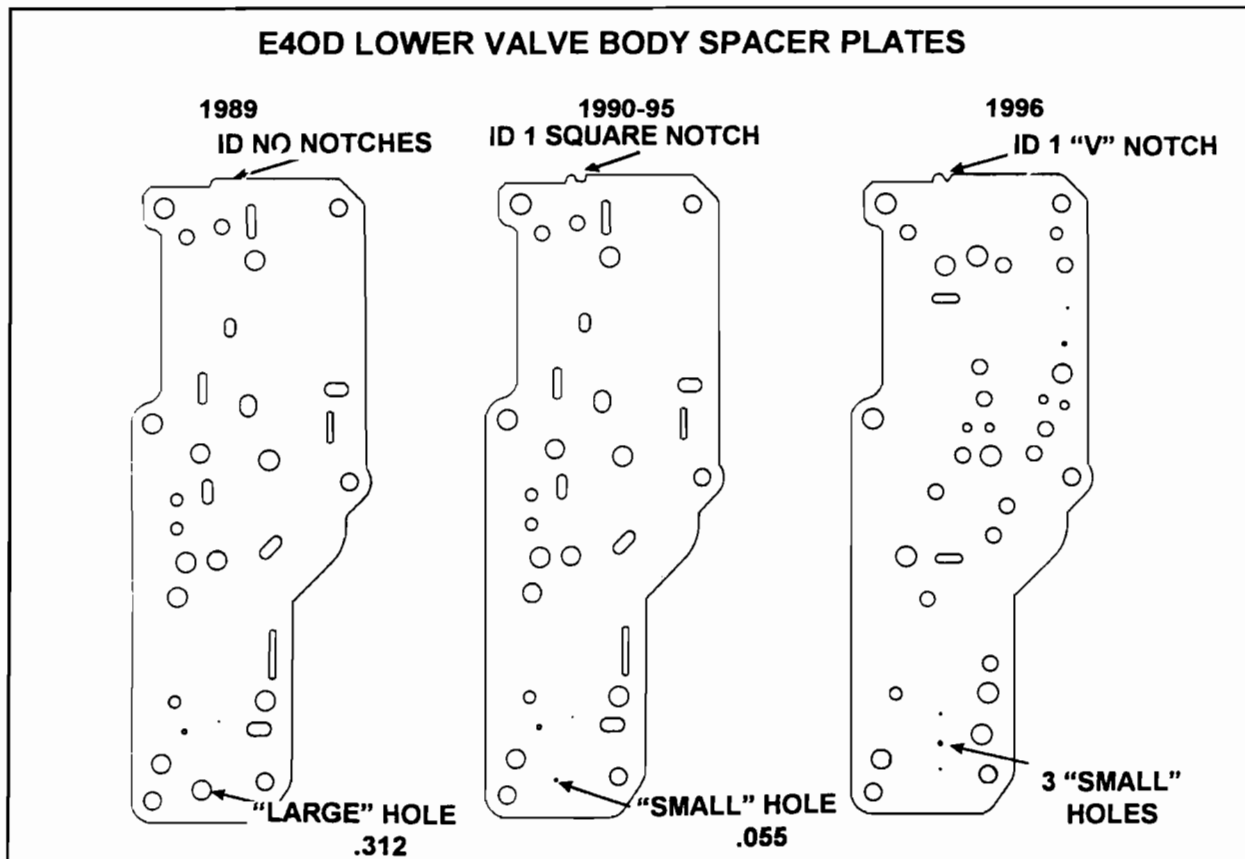


Figure 16

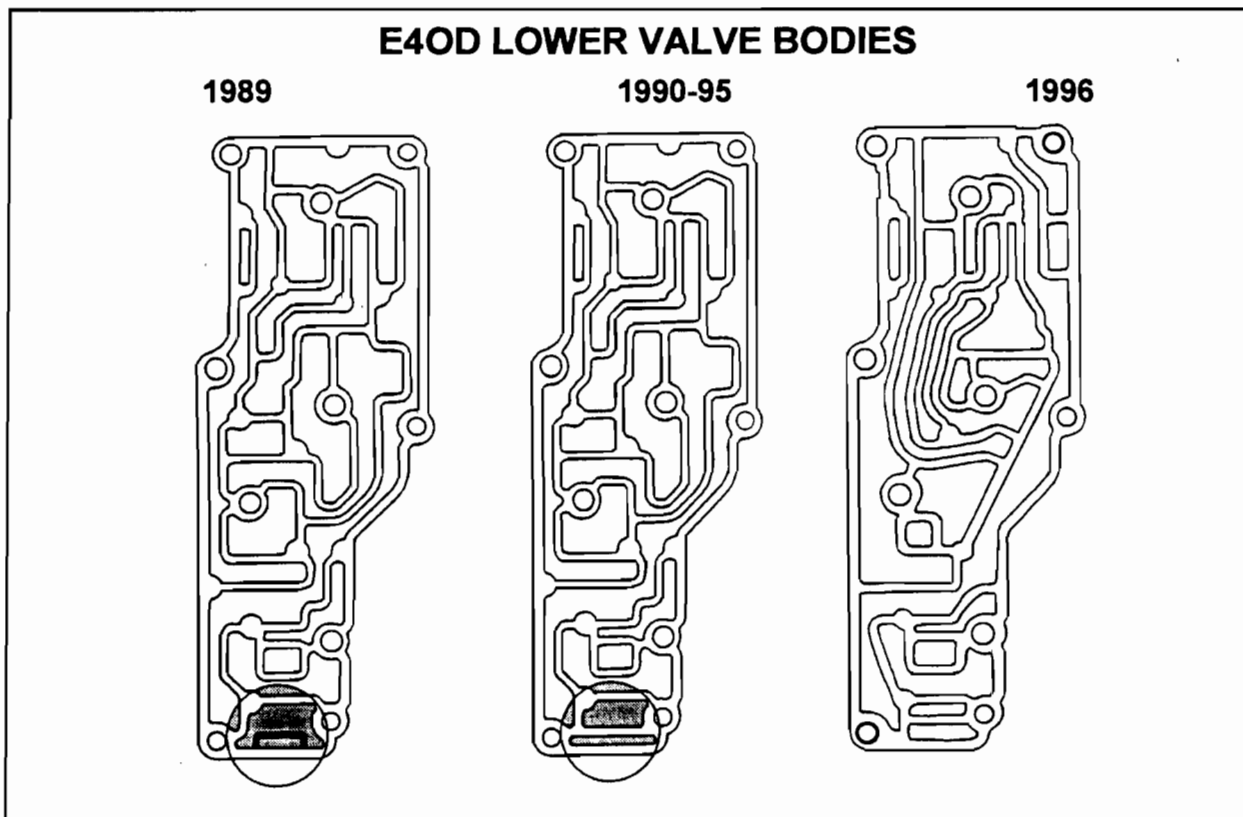


Figure 17



**FORD E4OD
REVERSE CLUTCH LIP SEALS
FOR 1996 MODELS**

CHANGE: Beginning at the Start Of Production for all 1996 models equipped with the E4OD transmission, Ford Motor Company installed "Lip" seals on the reverse clutch piston and added a cushion (Wave) plate to the reverse clutch pack.

REASON: To address reverse engagement concerns.

PARTS AFFECTED:

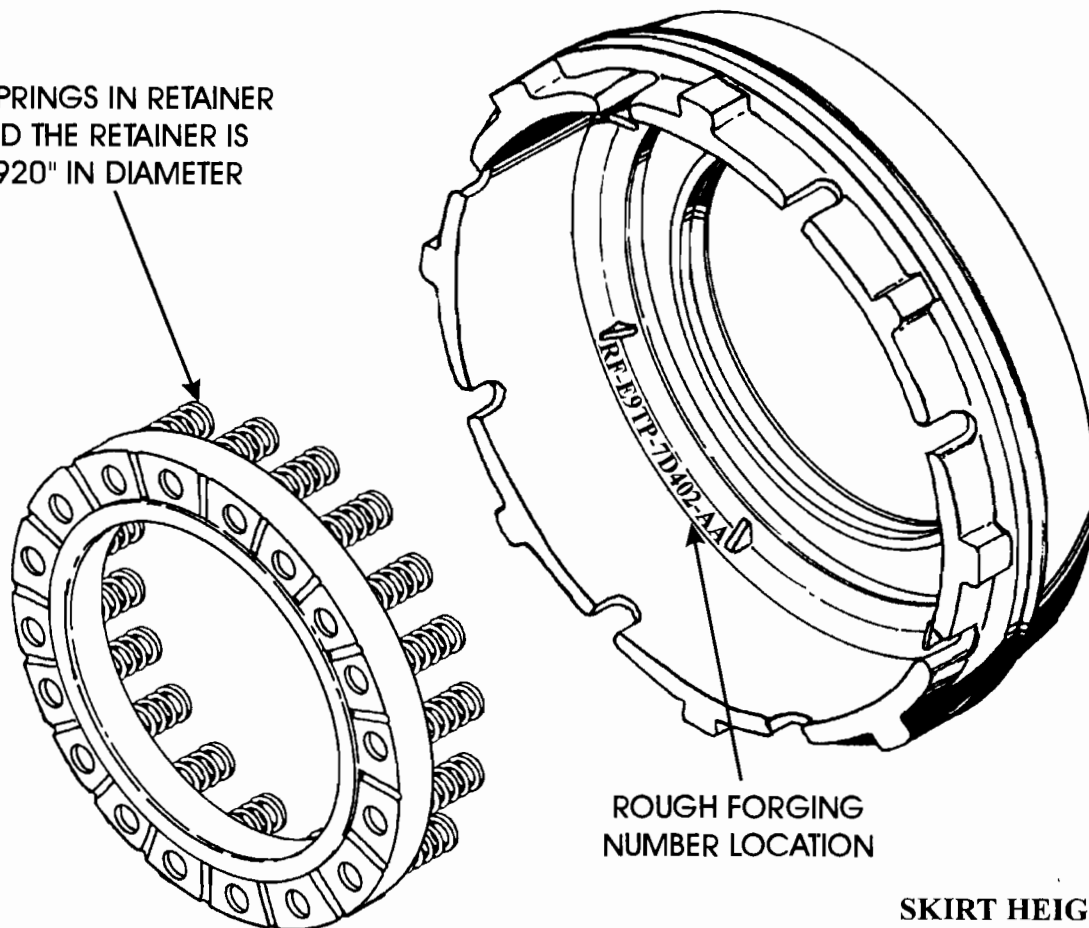
- (1) **REVERSE CLUTCH PISTON SEALS** - Change from the previous "Square" cut seals to the new design "Lip" seals, for increased sealing ability. Refer to Figures 1, 2 and 3.
- (2) **REVERSE PISTON** - Seal grooves in the piston are machined differently to accommodate the new design lip seals. The reverse piston skirt is also .140" shorter than the previous piston, to accommodate the added cushion (Wave) plate in the reverse clutch pack. This will obviously also affect the overall height of the piston. Refer to Figures 1, 2 and 3.
The pistons can be identified by the "Rough Forging" number, as shown in Figures 1 and 2.
Rough Forging Number RF-E9TP-7D402-AA = 89-95 Model (Square Cut Seals)
Rough Forging Number RF-F6TP-7D402-AA = 1996 Model (Lip Seals)
- (3) **REVERSE PISTON SPRING RETAINER** - New design level spring retainer has 23 return springs in the retainer, instead of the previous 18 return springs. The new design level 23 spring retainer is also approximately 1/4" larger in diameter, 5.200" as opposed to the previous 4.920", which will allow a better cushion. Refer to Figures 1 and 2.
- (4) **CUSHION (WAVE) PLATE** - Added to the reverse clutch pack to cushion the reverse clutch apply, as shown in Figure 3. The new cushion plate when it is not compressed, is .140" in height and the nominal thickness is .080".

SERVICE INFORMATION:

Reverse Clutch Piston (New Design)	F6TZ-7D402-A
Reverse Piston Outer Lip Seal (Package of 3)	F6TZ-7D403-A
Reverse Piston Inner Lip Seal (Package of 3)	F6TZ-7D404-A
Reverse Piston Return Spring Assembly (New Design)	F6TZ-7D406-A
Reverse Clutch Cushion Spring	F6TZ-7D085-A

1989-1995 MODEL REVERSE CLUTCH
PISTON AND SPRING RETAINER

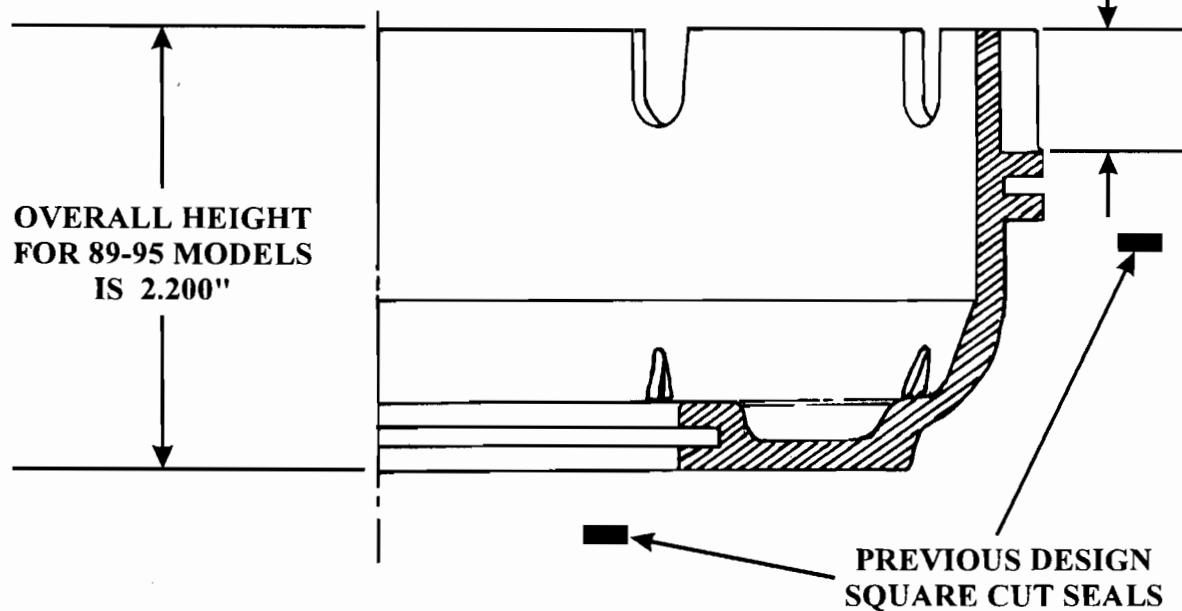
18 SPRINGS IN RETAINER
AND THE RETAINER IS
4.920" IN DIAMETER



ROUGH FORGING
NUMBER LOCATION

SKIRT HEIGHT
IS APPROX .640"

OVERALL HEIGHT
FOR 89-95 MODELS
IS 2.200"

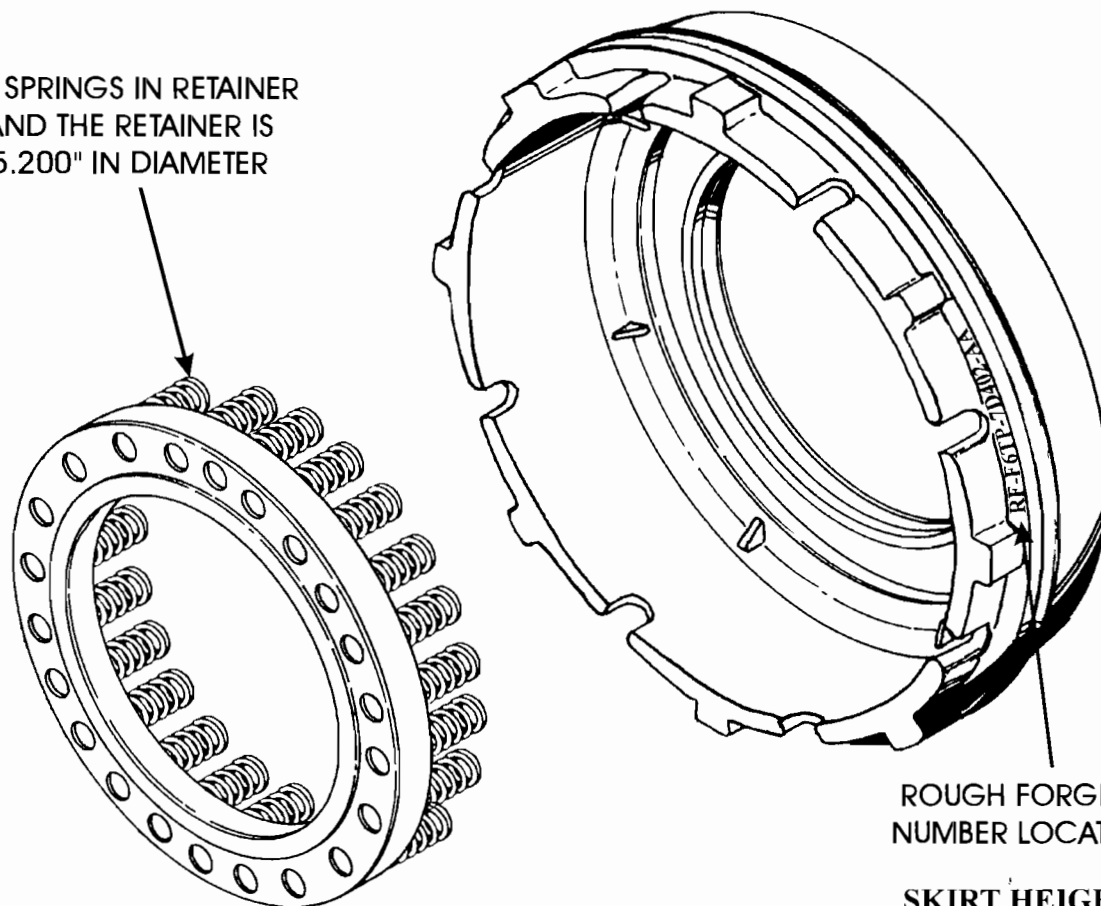


PREVIOUS DESIGN
SQUARE CUT SEALS

Figure 1

**1996 MODEL REVERSE CLUTCH
PISTON AND SPRING RETAINER**

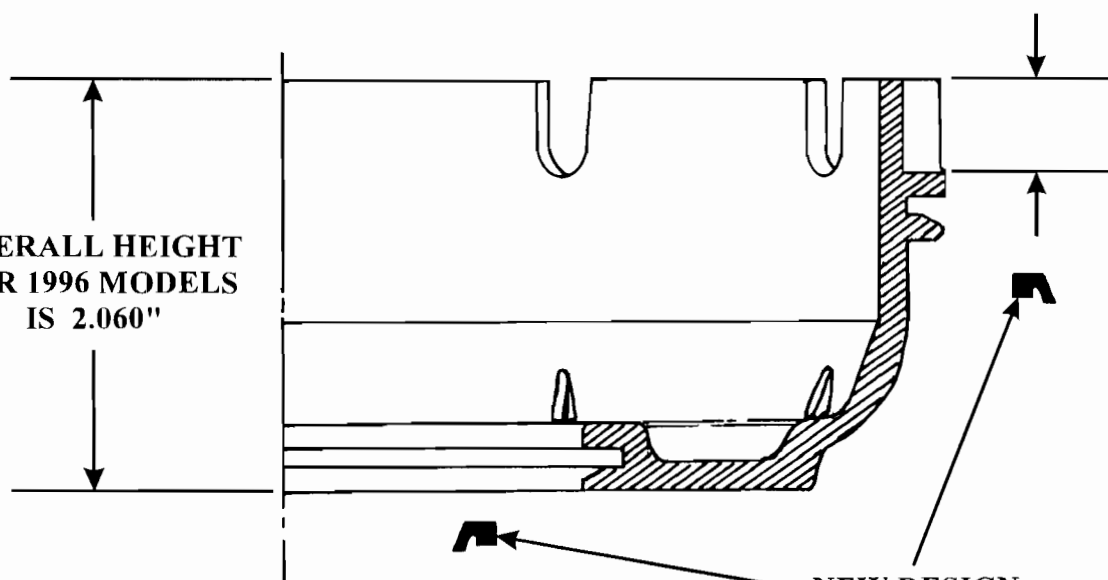
23 SPRINGS IN RETAINER
AND THE RETAINER IS
5.200" IN DIAMETER



ROUGH FORGING
NUMBER LOCATION

SKIRT HEIGHT
IS APPROX .500"

OVERALL HEIGHT
FOR 1996 MODELS
IS 2.060"



NEW DESIGN
"LIP" SEALS

Figure 2

**89-95 MODEL
REVERSE CLUTCH STACK**

NOTE: THE NUMBER OF REVERSE CLUTCH PLATES FOR THE REVERSE CLUTCH IS MODEL DEPENDENT

**1996 MODEL
REVERSE CLUTCH STACK**

NOTE: THE NUMBER OF REVERSE CLUTCH PLATES FOR THE REVERSE CLUTCH IS MODEL DEPENDENT

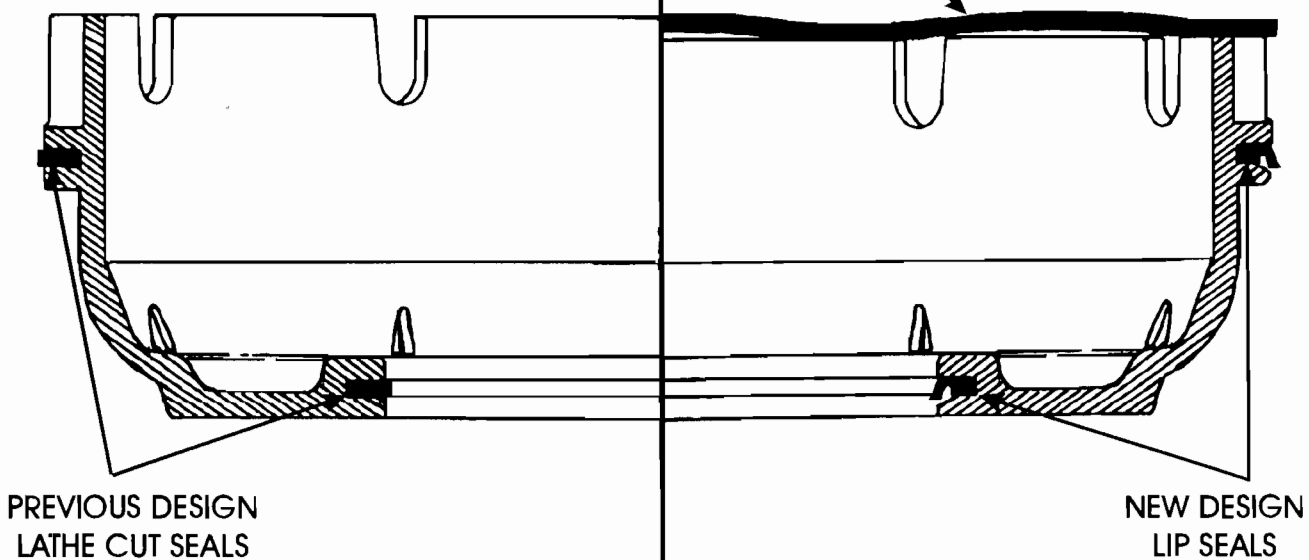
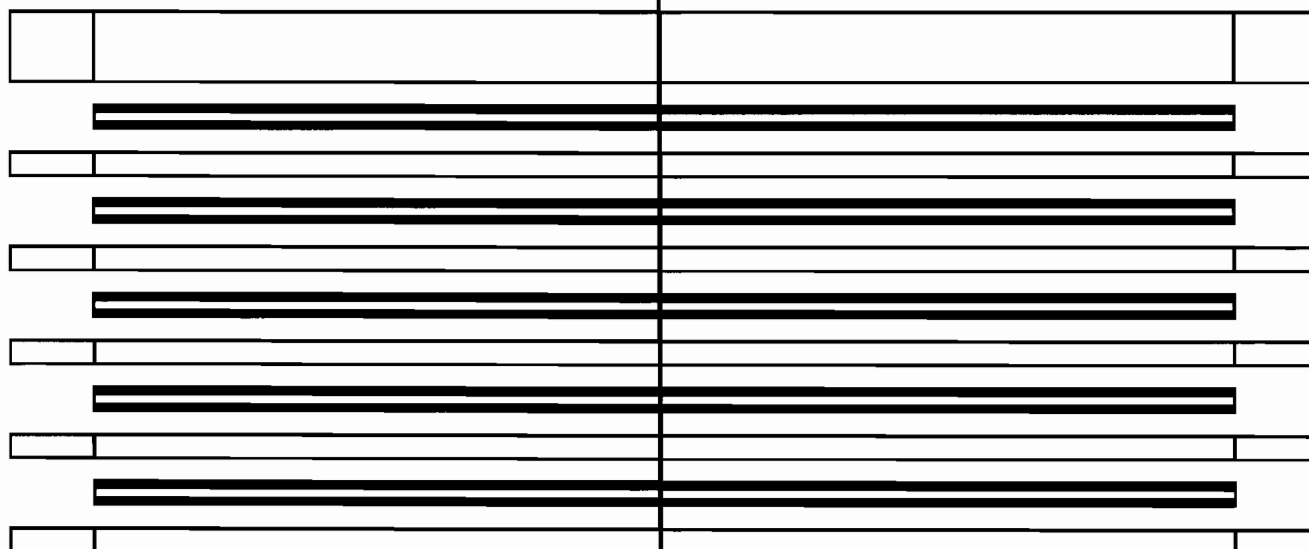


Figure 3