1996 SEMINAR INFORMATION

"THE BEST FIX IN '96"

INDEX

FORD

CHRYSLER

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

OEM's use

- Softens harsh shifts with no loss of lock-up time
- Eliminates objectionable noises during shifts
- Optimizes overall transmission performance
- Prevents lock-up torque converter shudder
- Inhibits oxidation and overheating
- Eliminates hung-up governors
- Prevents clutch chatter
- Increases fluid life
- Keeps valves free
- **OEM endorsed**

shouldn't you?

SAAB

Parts & Service Information

CATEGORY	
Transmission	
SECTION	PAGE
4	14
ISSUE	CODE
06/93–0352	442

Subject: Automatic Transmission Upshift Noise

Application: 9000 Models with ZF Automatic Transmission

Some complaints have been received from owners of 9000 cars equipped with the ZF 4HP18 automatic transmission of a noise that occurs at the 2 - 3 upshift point. The noise may be described as a "squawk" or "moan" that usually occurs under light throttle pressure. A transmission fluid additive has been tested and approved for use as a service solution to address these complaints.

Before this fluid supplement can be added, the condition of the transmission fluid must be checked. If there are any indications of either burned or contaminated fluid, this may be the actual cause of the noise. In this case, addition of the fluid supplement will not cure the complaint.

It should be noted that the specific noise described in this PSI does not indicate any mechanical failure, or impending failure. It may, however, be an irritant to the car owner and should be addressed.

Cars Affected:

9000 models with ZF automatic transmission.

Parts:

LUBEGARD ATF SUPPLEMENT, 10 fl.oz. (296ml) bottle (5.0 fl.oz. (150ml) required per car).

NOTE

LUBEGARD ATF SUPPLEMENT can be obtained through any of the distributors listed on the following pages. Minimum order quantities and prices may vary.

Action:

1. Evaluate the condition of the transmission fluid. If coolant or other contaminants are found in the fluid, do not add this supplement. The source of the contamination must be determined and rectified.
2. Add 5.0 fl.oz. (150ml) of LUBEGARD to the transmission fluid. Check the fluid level and top off with Dexron II if necessary.
3. Road test the vehicle to ensure that no other transmission related problems exist.
4. Return the vehicle to the owner and counsel them on the following:

   The vehicle should be driven under their normal driving conditions to allow the LUBEGARD to circulate throughout the transmission.

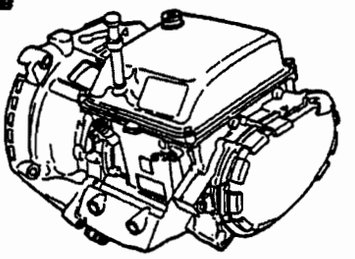
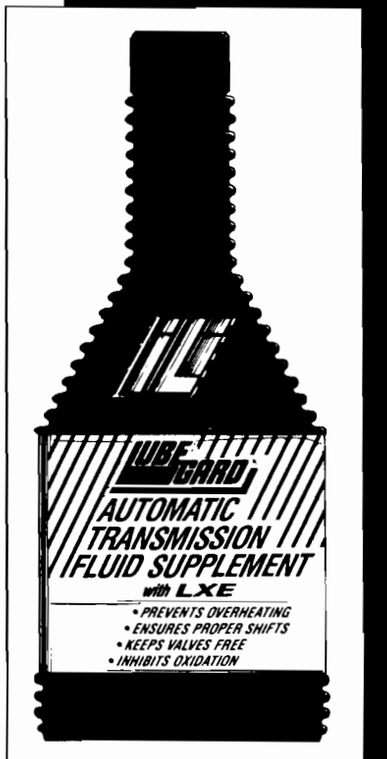


Figure 1. LUBEGARD ATF SUPPLEMENT



FILE	CIRCULATE			

INTERNATIONAL LUBRICANTS INC.
SEATTLE, WA 98108
(206) 762-5343
1-800-333-LUBE (5823)

1996 SEMINAR INFORMATION

1

"THE BEST FIX IN '96"

INTRODUCTION

In this third manual on "THE BEST FIX IN '96" seminar, we continue with FORD's E4OD, AX4S/AXODE, AODE/4R70W and the A4LD transmission. Updates and parts changes, problems and fixes for FORD transmissions fills this book with valuable information. This manual concludes with Chrysler's A604 transaxle. Scanner communication problems, CVI's out of range and EATX relay problems are solved in the concluding portion of this years manual and seminar.

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GREGORY LIPNICK
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JERRY GOTT
TECHNICAL CONSULTANT

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TECHNICAL CONSULTANT

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FORD E4OD
4TH GEAR STARTS IN OD POSITION
MANUAL SHIFTS OK

COMPLAINT: After rebuild, the vehicle exhibits a 4th gear start with the selector lever in the OD position, but when manual shifted through the gears all is OK.

CAUSE: The cause may be, a 1990 Main Valve Body installed onto 1989 spacer plate, 89 gaskets, and 89 checkball locations. This will block solenoid feed oil to the 1-2 shift valve. Since shift solenoid 2 is OFF electronically, and shift solenoid 1 is OFF hydraulically (Feed Oil Blocked), the transmission will be in 4th gear.

CORRECTION: Install 1989 Main Valve Body with the 89 spacer plate, 89 gaskets, and 89 checkball locations. The 1989 Main Valve Body will also work on 1990 spacer plate and gaskets. The worm tracks are different in 89 valve body but will not block solenoid feed oil to the 1-2 shift valve.

PARTS IDENTIFICATION:

(1) MAIN VALVE BODY SPACER PLATE - Can be positively identified by the solenoid feed hole location, as shown in Figures 10 and 11. Can also be identified by the shape of the I.D. notches in the spacer plate, as shown in Figures 10 and 11.

(2) VALVE BODY GASKETS - ***Must*** have solenoid feed hole locations in the gaskets that match the solenoid feed hole locations in the spacer plate, as shown in Figures 10 and 11.

(3) MAIN VALVE BODY - Can be identified by the differences in the worm track area at the 1-2 shift valve, as shown inside the circles in Figure 12. Can also be identified by the rough forging number cast into the valve body in the location shown in Figure 13.
RF-***E9***TP-7A092 = 1989 Model
RF-***F0***TP-7A092 = 1990 Model

(4) LOWER VALVE BODY SPACER PLATE - Can be identified by the diameter of the feed hole in the location shown in Figure 14. For 1989 models the hole diameter is .312", and for 1990 models the hole diameter is .055". They can also be identified by the I.D. notches in the spacer plate. 1989 plate has no notch and 1990 plate has one notch, as shown in Figure 14.

(5) LOWER VALVE BODY - The engagement control valve retaining clip on 1989 models, was replaced by bore plug and new design clip on the 1990 model, which also changed the worm track configuration in that area, as shown inside the circles in Figure 15. The lower valve body can also be identified by the rough forging number cast in valve body.
RF-***E9***TP-7A101 = 1989 Model
RF-***F0***TP-7A101 = 1990 Model

Continued on next Page.

INTERCHANGEABILITY:

(1) The 1989 main spacer plate must be used on 1989 case, with 1989 checkball locations, 1989 valve body gaskets, and 1989 Main Valve Body.

(2) The 1989 Main Valve Body can be used on later models, but the 1990 Main Valve Body ***MUST*** be used on 90-UP models.

(3) The Lower Valve Body and spacer plates should also be kept together, large (.312") hole with 1989 model, and small (.055") hole with 1990 models.

SERVICE INFORMATION:

Main Valve Body Spacer Plate (1989 Models) E9TZ-7A008-A
Main Valve Body Spacer Plate (90-UP Models) F0TZ-7A008-A

1989 SPACER PLATE

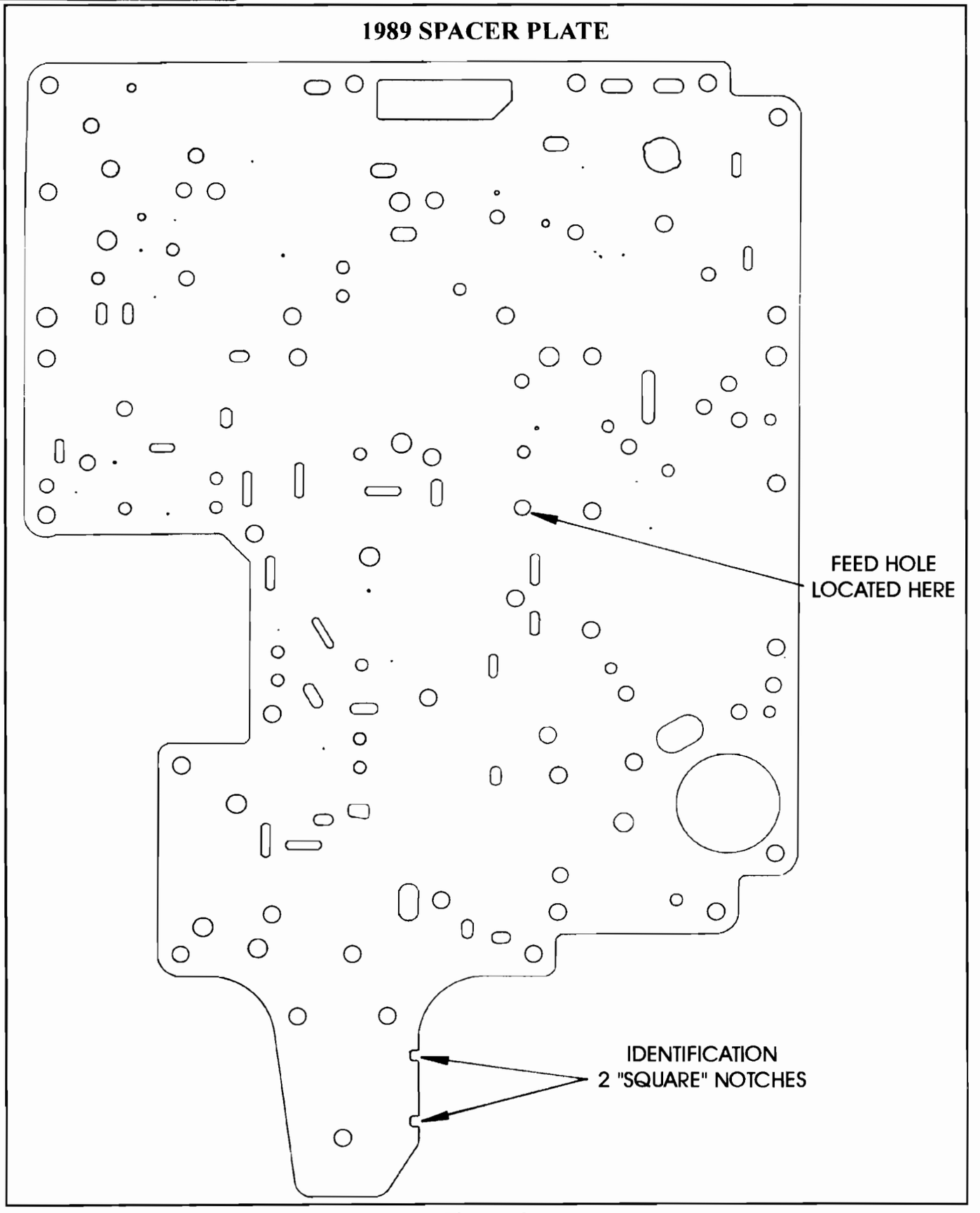


Figure 10

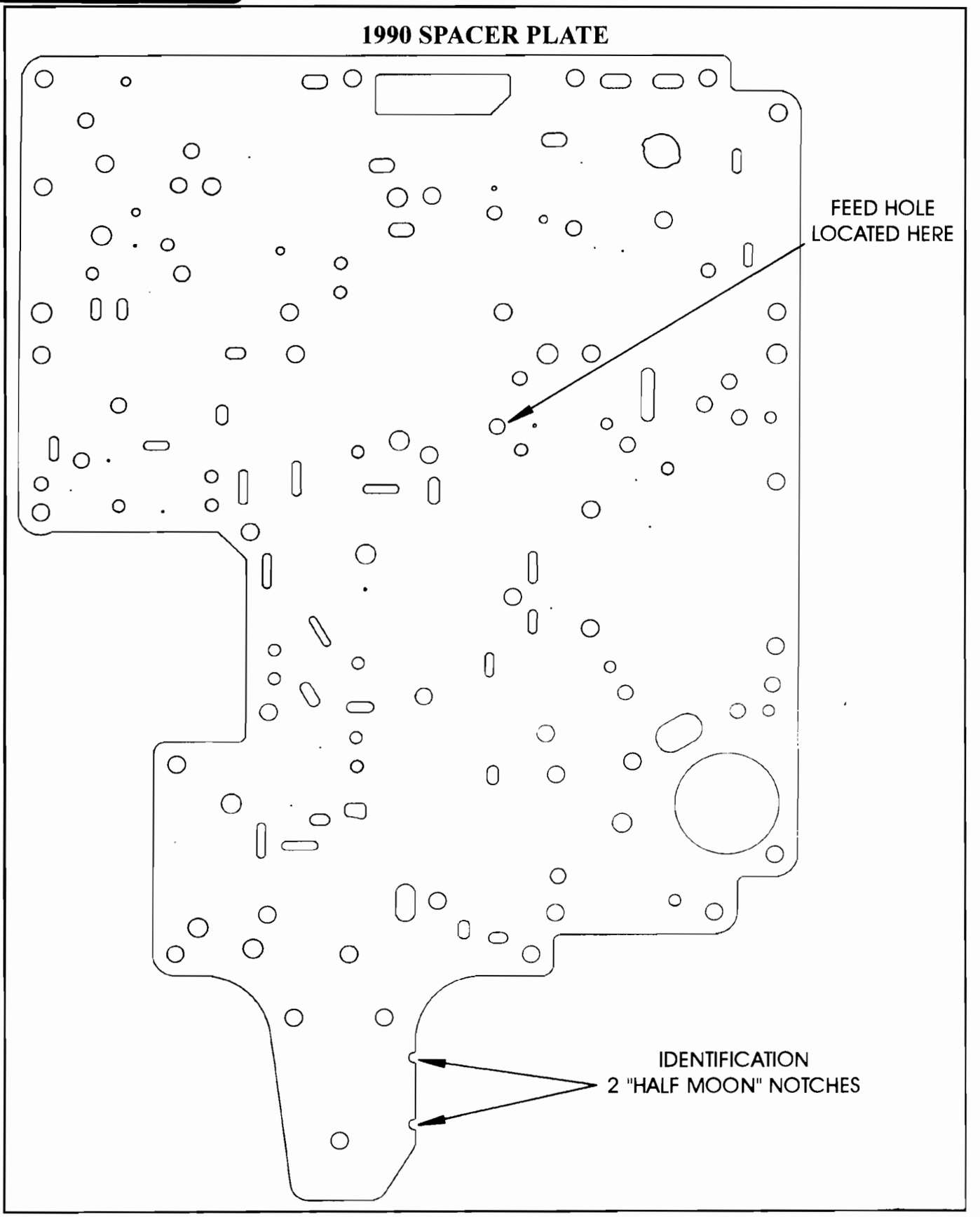

1990 SPACER PLATE
FEED HOLE
LOCATED HERE
IDENTIFICATION
2 "HALF MOON" NOTCHES

Figure 11

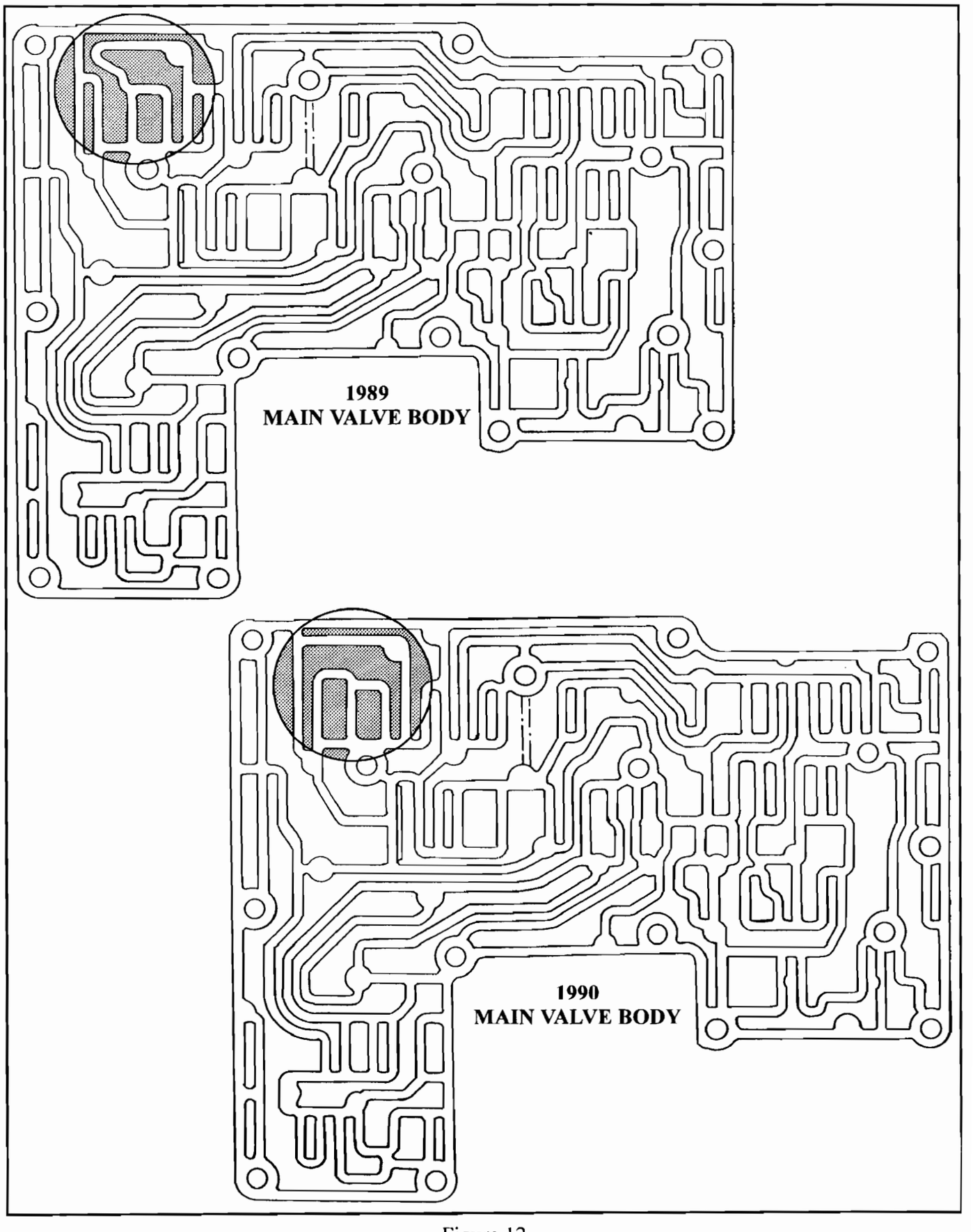


Figure 12

MAIN VALVE BODY

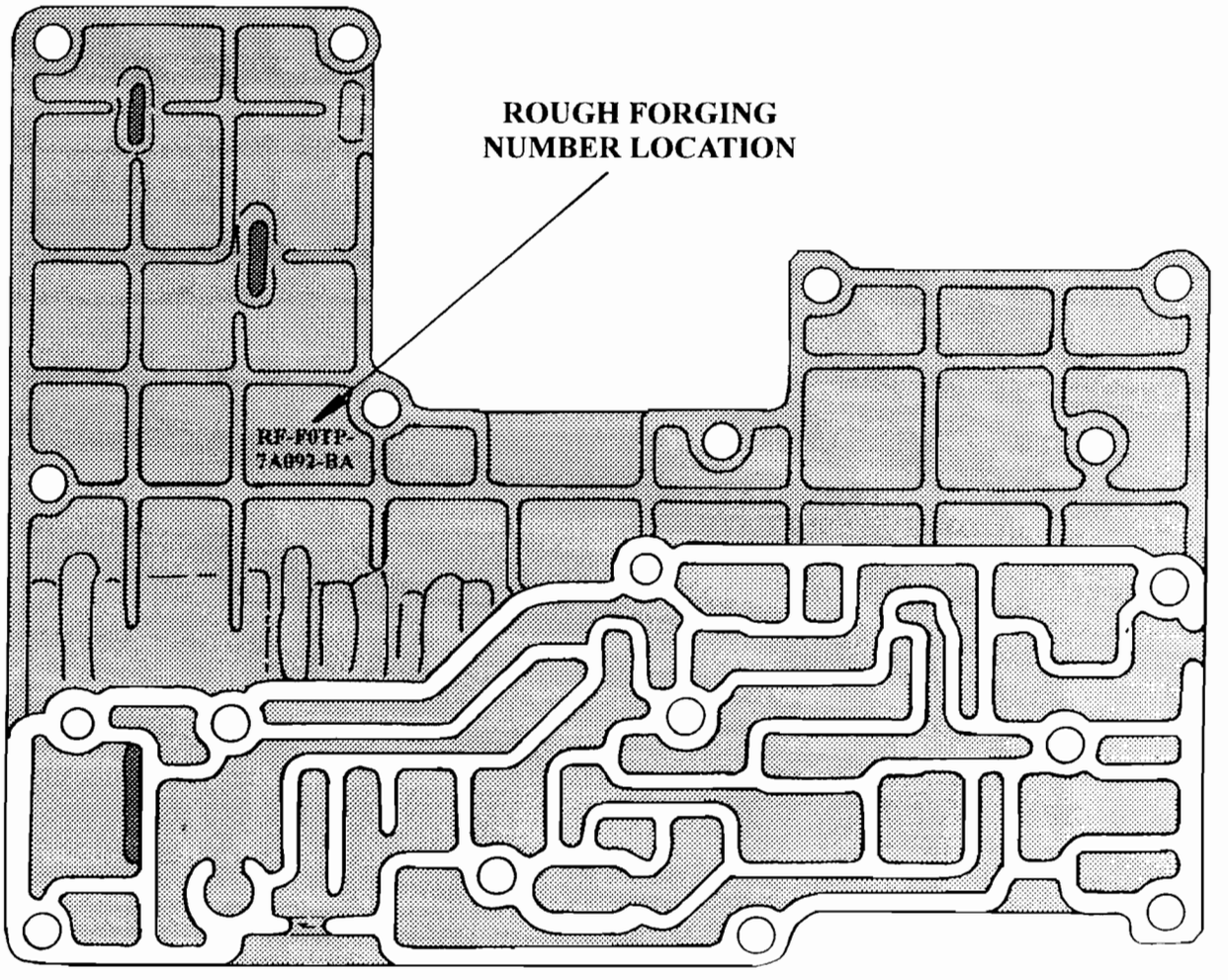


Figure 13

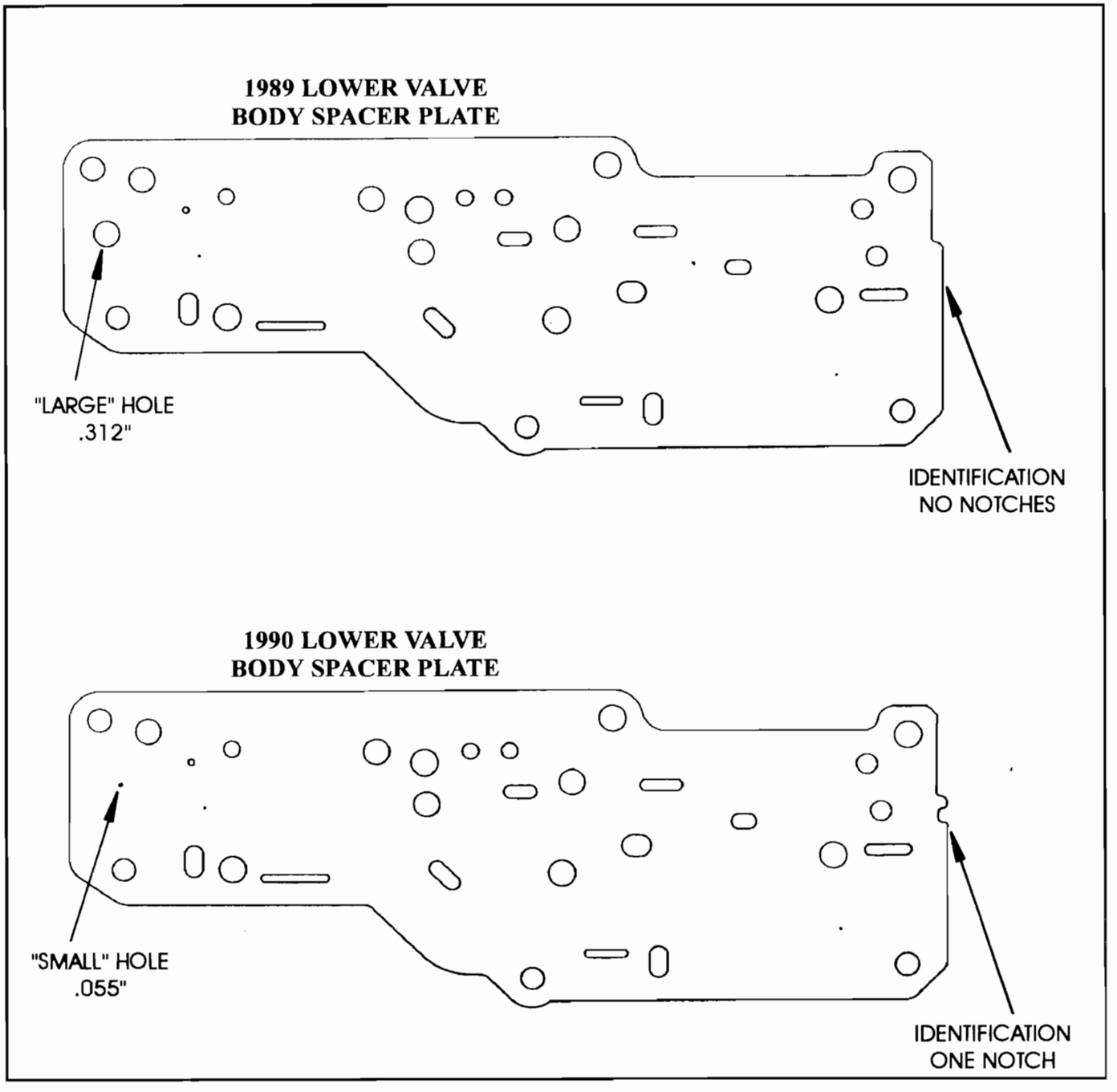
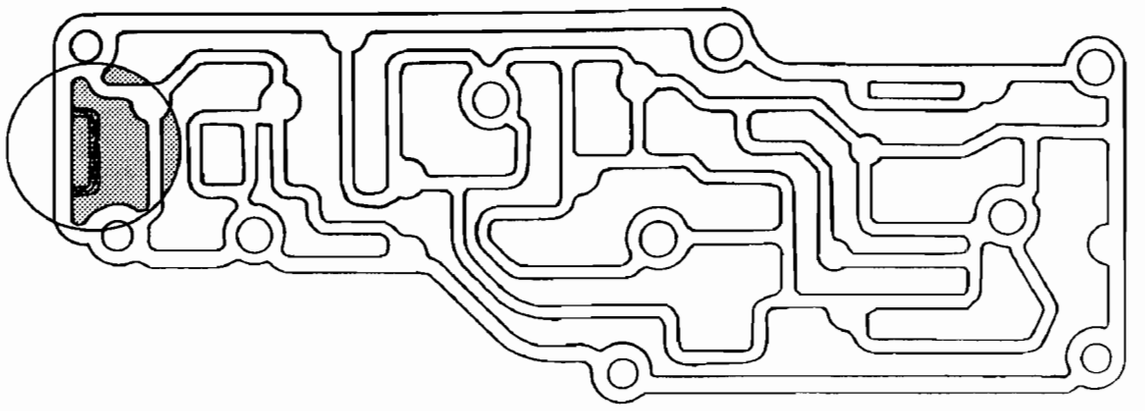

1989 LOWER VALVE
BODY SPACER PLATE
"LARGE" HOLE
.312"
IDENTIFICATION
NO NOTCHES
1990 LOWER VALVE
BODY SPACER PLATE
"SMALL" HOLE
.055"
IDENTIFICATION
ONE NOTCH

Figure 14

1989 LOWER VALVE BODY



1990 LOWER VALVE BODY

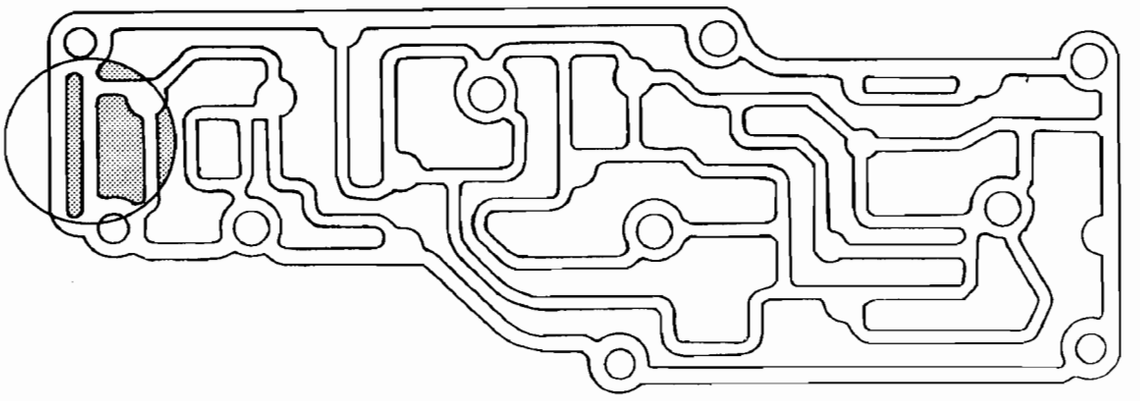


Figure 15

1989 E4OD CASE IDENTIFICATION

SHADED AREAS ARE DIFFERENT THAN 1990 MODEL

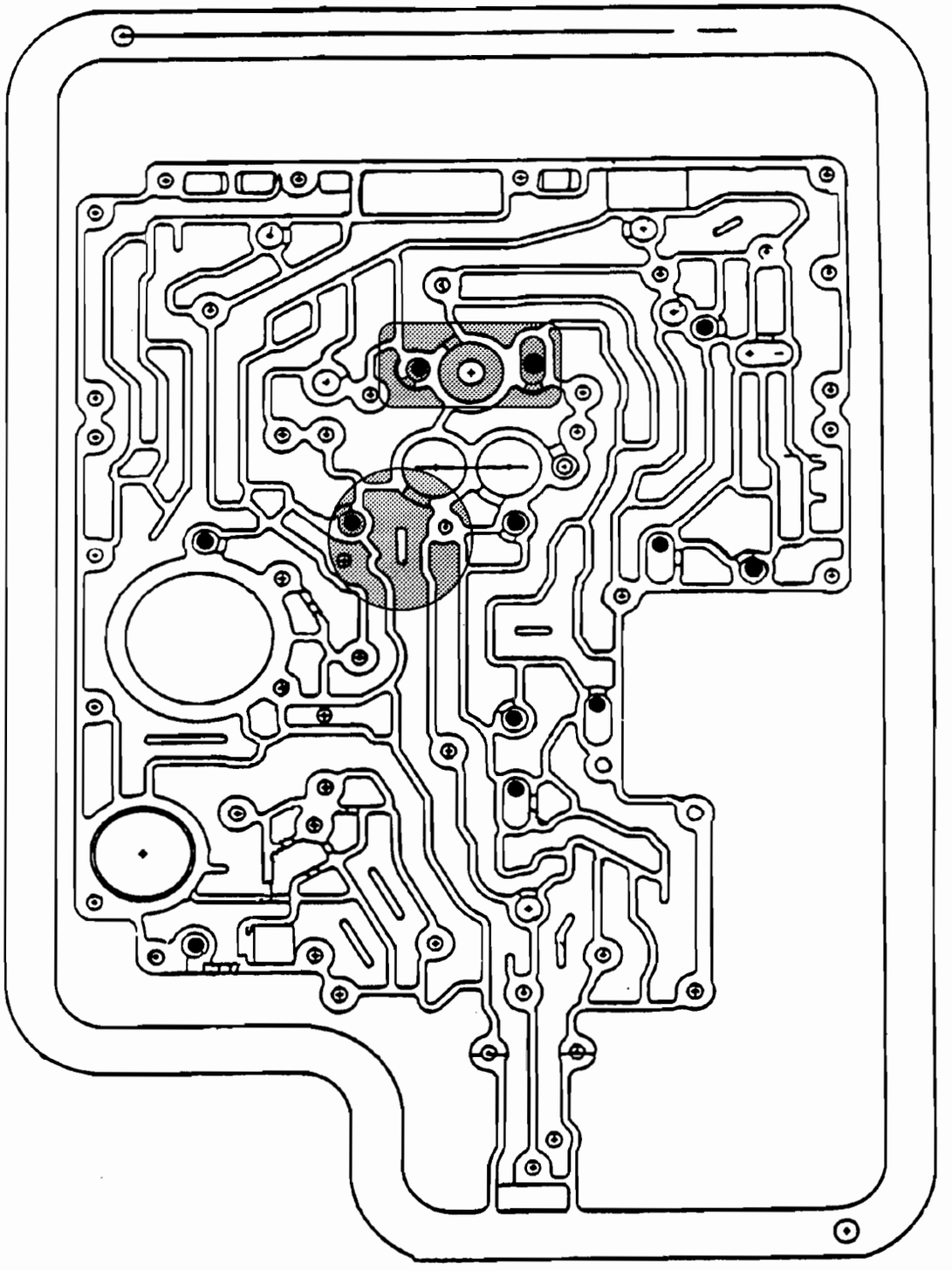


Figure 16

1990 E4OD CASE IDENTIFICATION

SHADED AREAS ARE DIFFERENT THAN 1989 MODEL

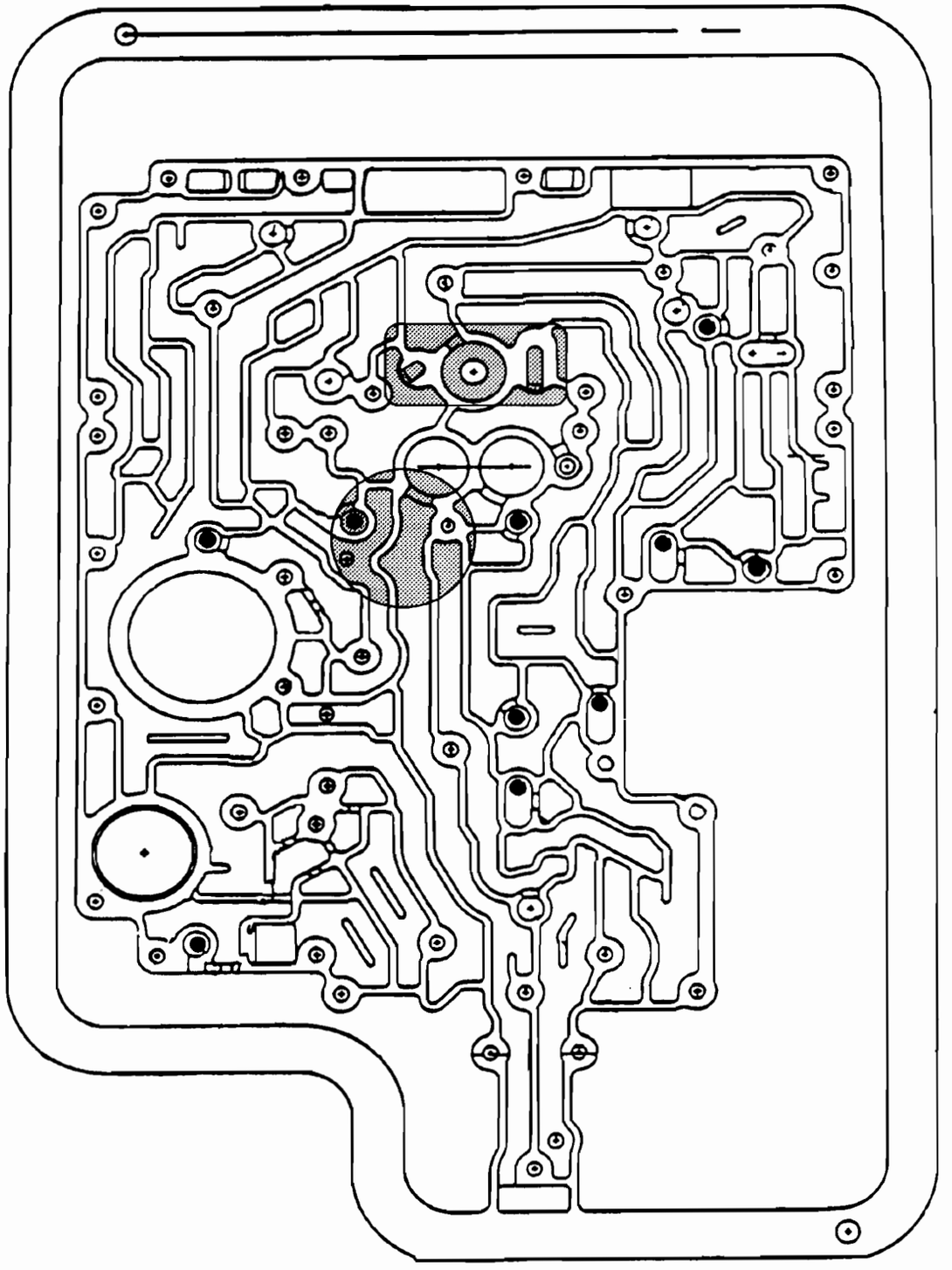


Figure 17

FORD E4OD

REVISED DIRECT CLUTCH HOUSING FOR 1995 MODELS

CHANGE: Beginning at the start of production for the 1995 model year, all E4OD transmissions were built with a revised Direct Clutch Housing (Intermediate Brake Drum) as shown in Figure 18.

REASON: Calibration concerns and changes for the 1995 model year.

PARTS AFFECTED:

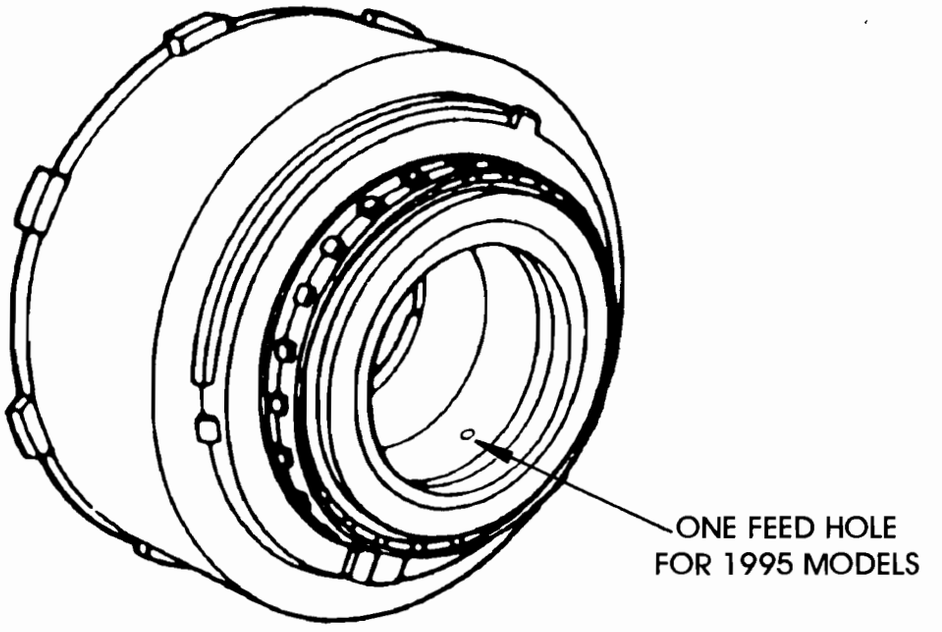
(1) DIRECT CLUTCH HOUSING - 1995 models now have only ***one*** direct clutch apply pressure feed hole, instead of the ***two*** feed holes found in previous models (See Figure 18).

INTERCHANGEABILITY:

Usage of the revised 1995 Direct Clutch Housing with one feed hole, into any of the previous model units, may result in 2-3 shift concerns and/or reverse engagement concerns.

SERVICE INFORMATION:

89-94 Direct Clutch Housing (2 Feed Holes - 3/4 Clutch)	E9TZ-7D044-A
1995 Direct Clutch Housing (1 Feed Hole - 3/4 Clutch)	F5TZ-7D044-A
1995 Direct Clutch Housing (1 Feed Hole - 5 Clutch)	F5TZ-7D044-B



1995 DIRECT CLUTCH HOUSING

Figure 18

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 19 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 19 and 20). 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 imposible to reconnect the vehicle harness to the solenoid pack until the old sleeve is removed from vehicle harness connector. Refer to Figure 20.

INTERCHANGEABILITY:

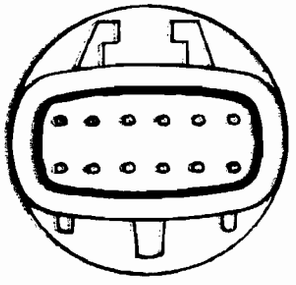
The previous design solenoid assembly will fit ***only*** 1989-1994 model vehicles, and the new design solenoid assembly will fit ***only*** 1995-UP models. ***They will not interchange!***

SERVICE INFORMATION:

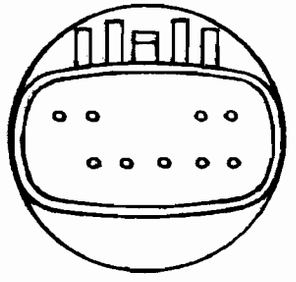
Solenoid Assembly, 1989-1994 Models Only	E9TZ-7G391-A
Solenoid Assembly, 1995-UP Models Only	F5TZ-7G391-A

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

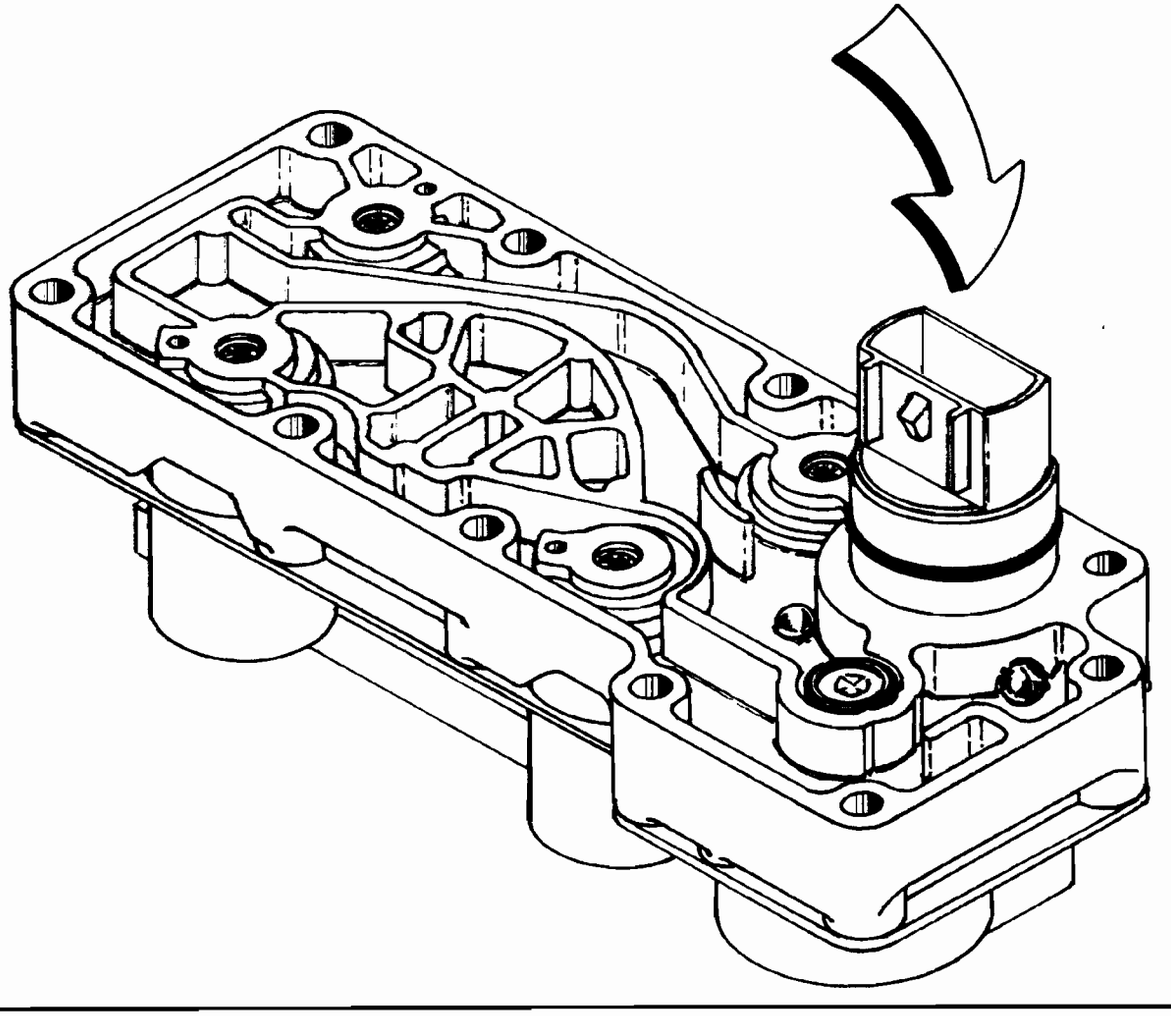


Figure 19

1989-1994 SOLENOID PACK

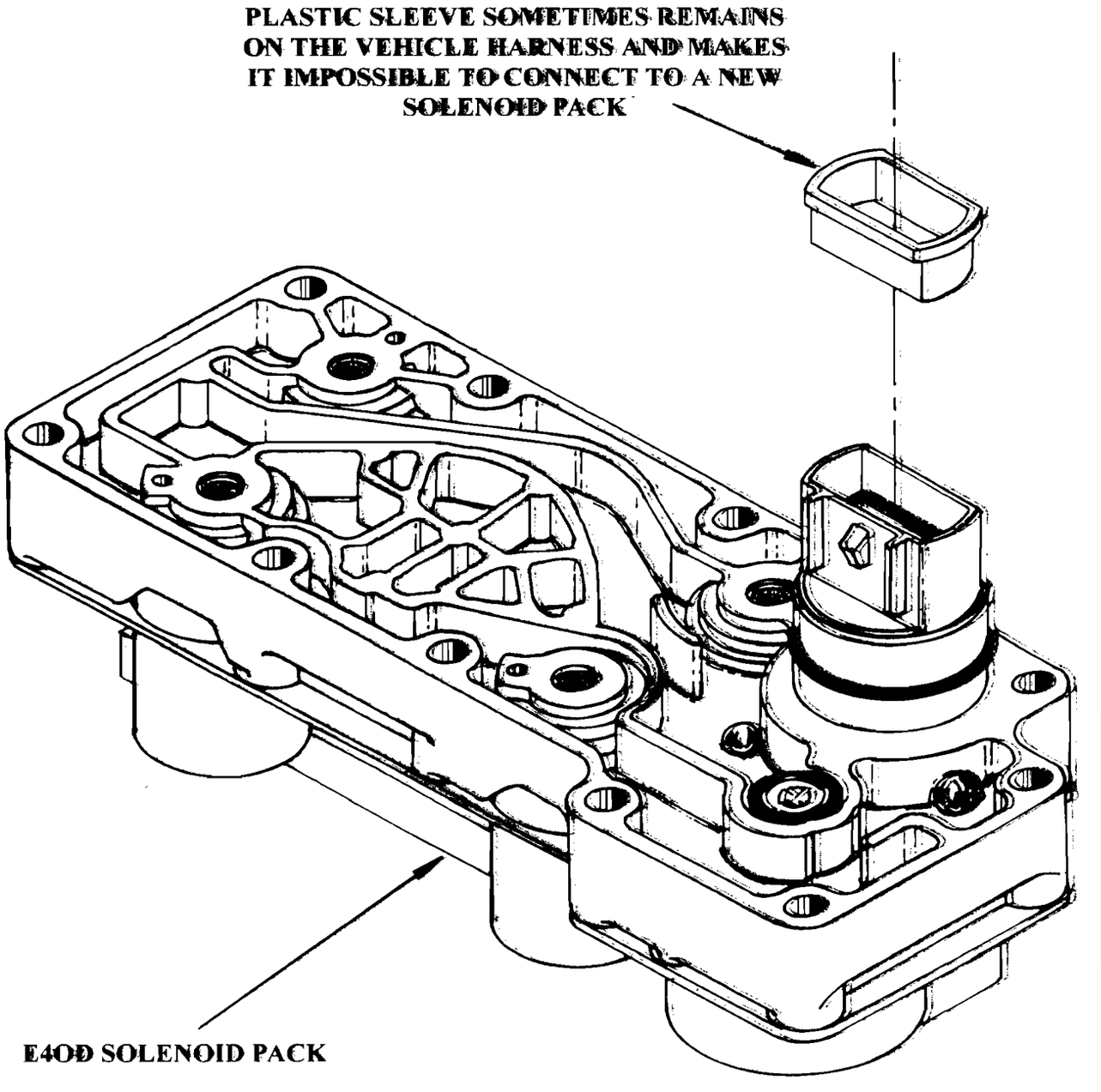


Figure 20

FORD E4OD

NEW OVERDRIVE ROLLER CLUTCH KIT TO REPLACE OVERDRIVE SPRAG ASSEMBLY

Beginning on August 11, 1994, ***all*** 1995 model E4OD transmissions were produced with a new design "Overdrive Roller Clutch", instead of the previous "Overdrive Sprag Assembly".
The previous design Overdrive Sprag (E9TZ-7A089-A) ***is no longer available.*** The previous part number will now supercede to one of the part numbers listed below under "Service Information", as there is one number for F-Super Duty and Motorhomes and another number for all others. The new design "Overdrive Roller Clutch Service Kit" will retro-fit back on ***all*** previous models (See Figure 21).
However, ATSG recommends that the "Overdrive Roller Clutch Kit" be installed on all previous models, ***only if you have also installed the "Ball Bearing Center Support Kit"***, available under OEM part number F4TZ-7A130-B. Refer to ATSG bulletin No. 95-05 for the Ball Bearing Center Support information and dimensions.

Use the following procedure to assemble and install the new design "Overdrive Roller Clutch Kit", as it comes in pieces, and does not include any installation instructions in the kit.

(1) Place the new inner cam on a flat work surface with the "Undercut" on the inside diameter facing ***up***, as shown in Figure 22.
(2) Install the overdrive roller clutch assembly over the inner cam, ***with the 9 locking tabs on the inner diameter facing down, and the three upper locking tabs facing up***, as shown in Figure 22.
(3) Push the overdrive roller clutch assembly all the way down, as shown in Figure 23.
(4) Install the snap ring into the groove in the outer race, as shown in Figure 24.
(5) Install the outer race assembly over the overdrive roller clutch, by holding the inner cam and rotating the outer race in a clockwise direction, until fully seated, as shown in Figure 25.

NOTE: With the outer race snap ring facing up, and the inner cam "undercut" facing up, the inner cam should freewheel in a counter-clockwise direction and lock clockwise, while holding the outer race. Refer to Figure 25.

(6) Install the completed Overdrive Roller Clutch Assembly into the overdrive ring gear, with the snap ring and the inner cam undercut, ***facing up***, and install the outer race to ring gear snap ring, as shown in Figure 26.

SERVICE INFORMATION:

Overdrive Roller Clutch Service Kit, (All Except Super Duty and Motorhome) F5TZ-7A089-A
Overdrive Roller Clutch Service Kit, (7.5L F-Super Duty and Motorhome) F4TZ-7A089-A

OVERDRIVE ROLLER CLUTCH ASSEMBLY
PART NUMBER F5TZ-7A089-A

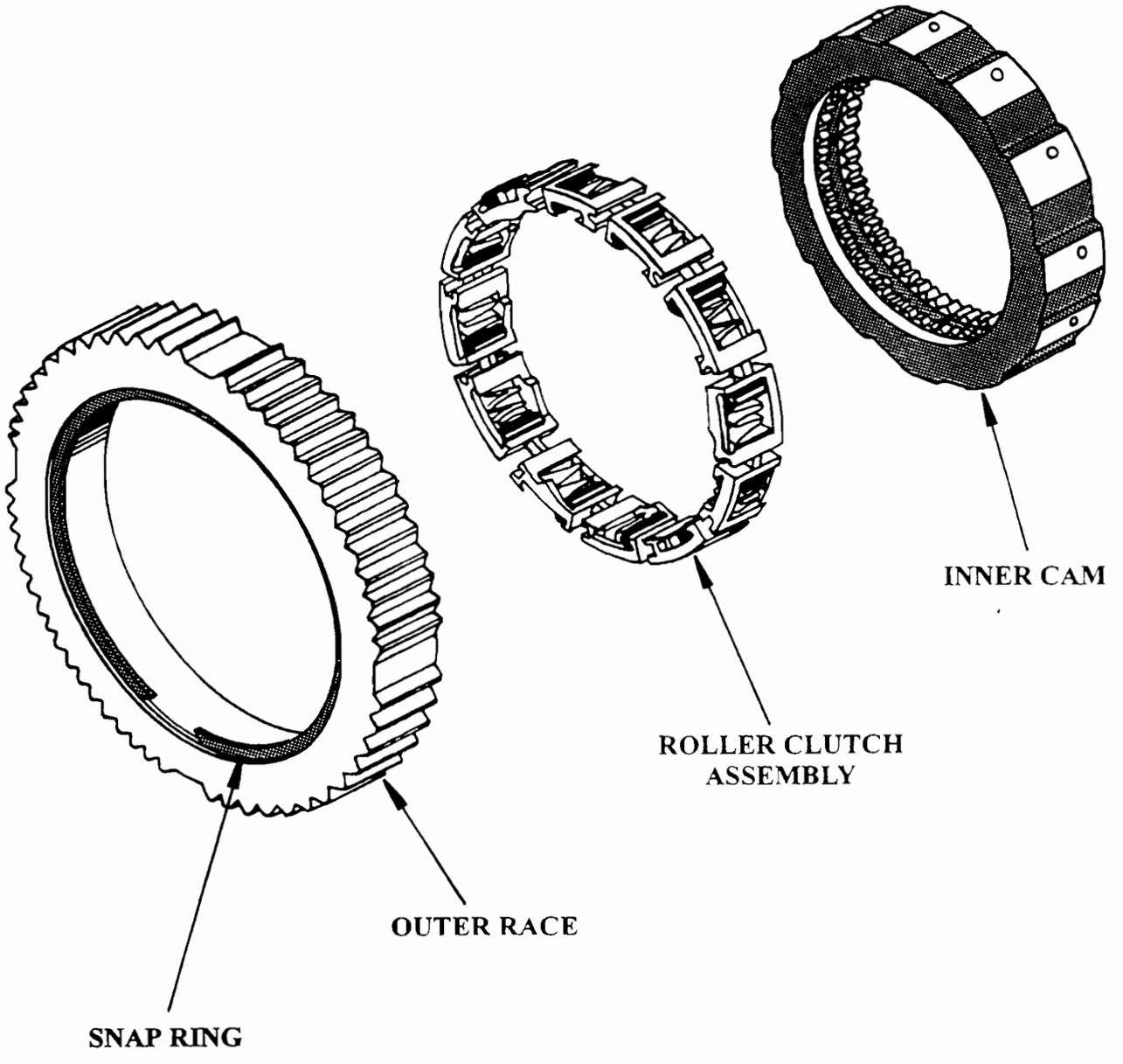


Figure 21

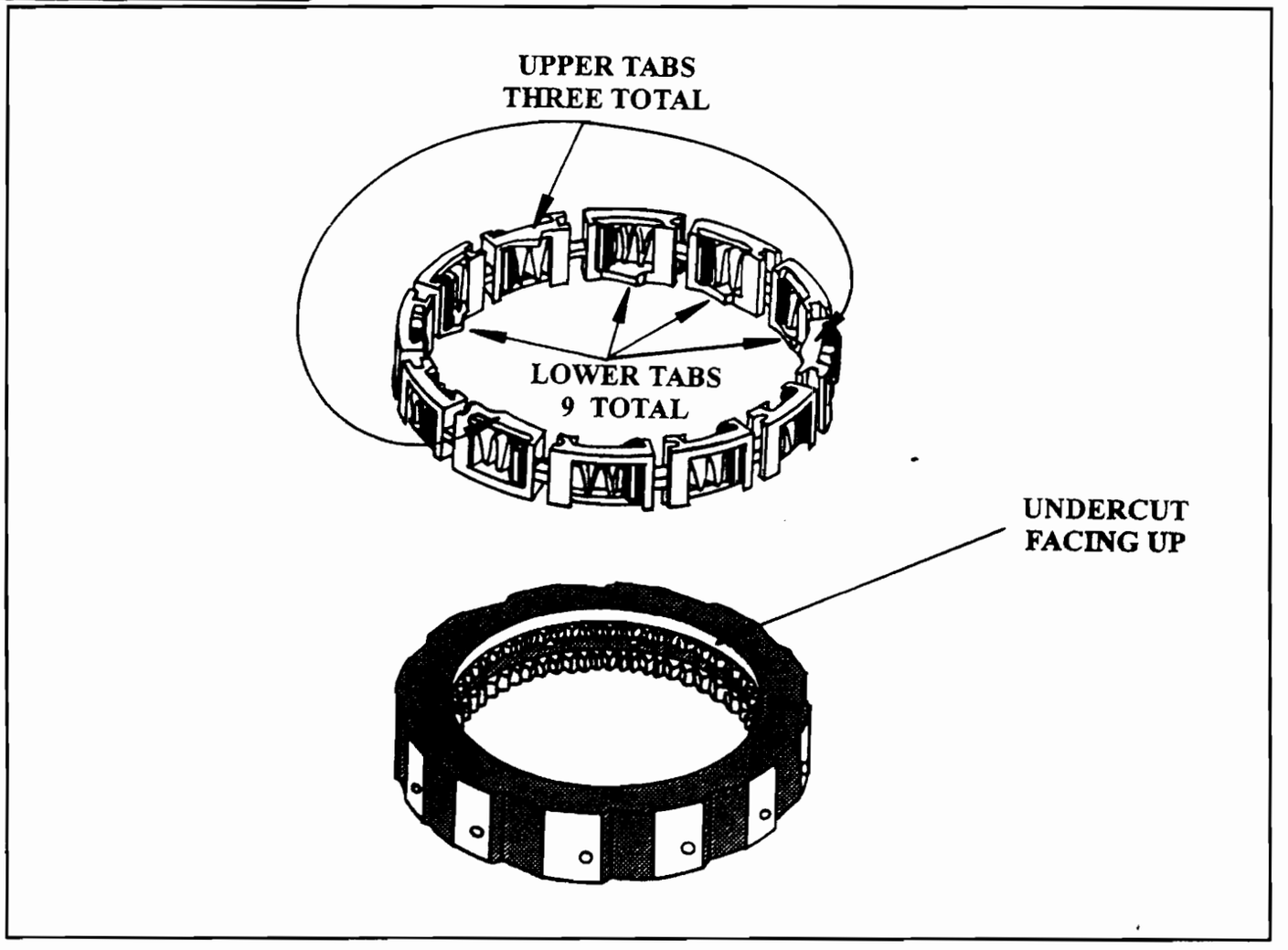


Figure 22

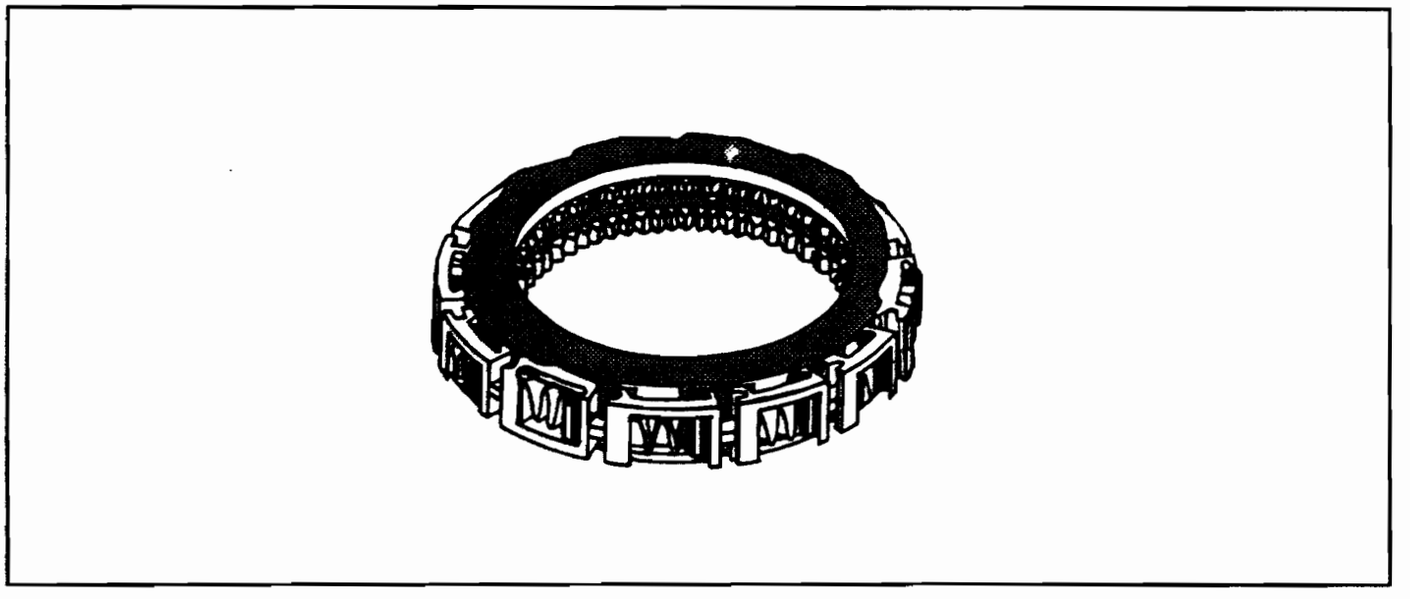


Figure 23

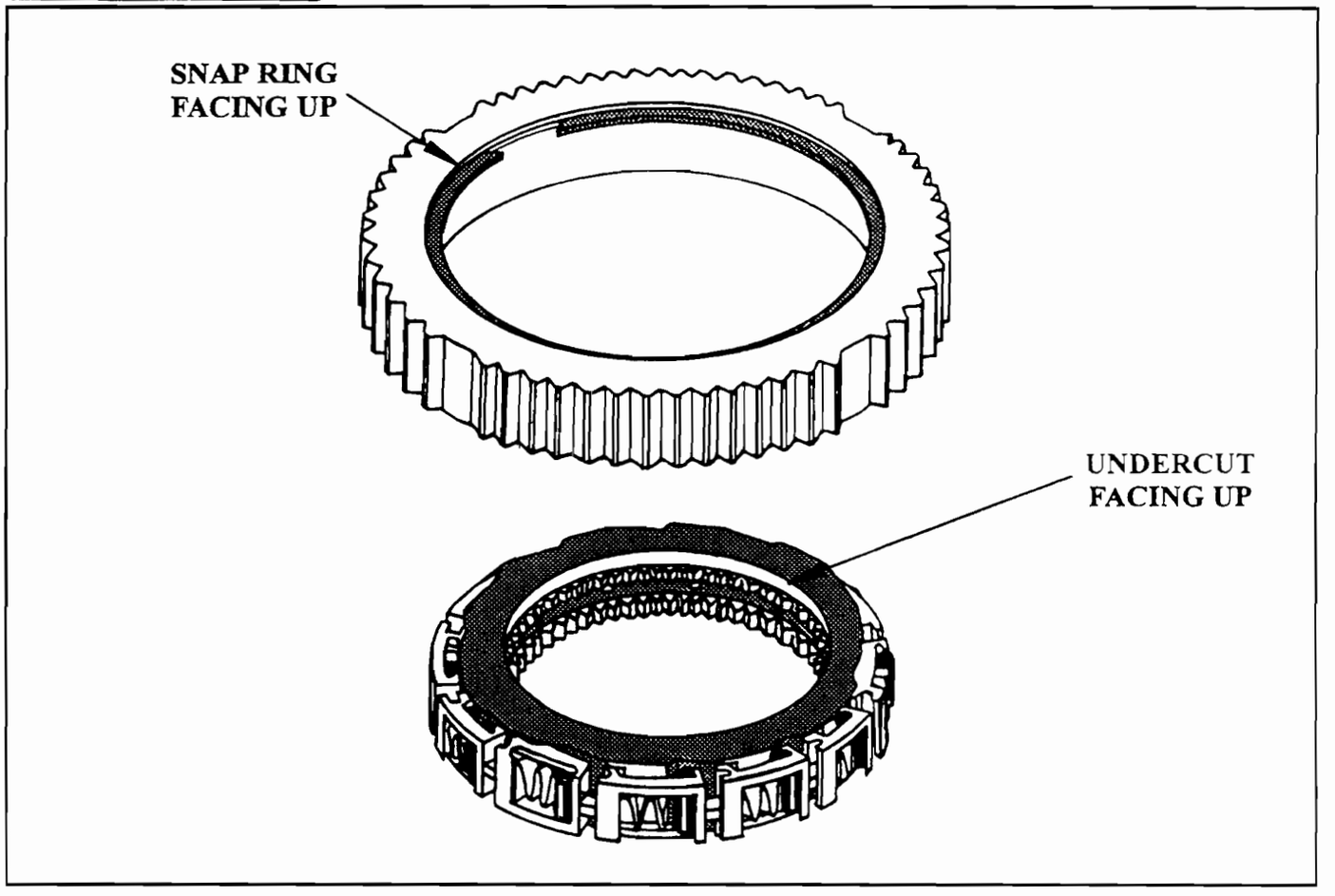


Figure 24

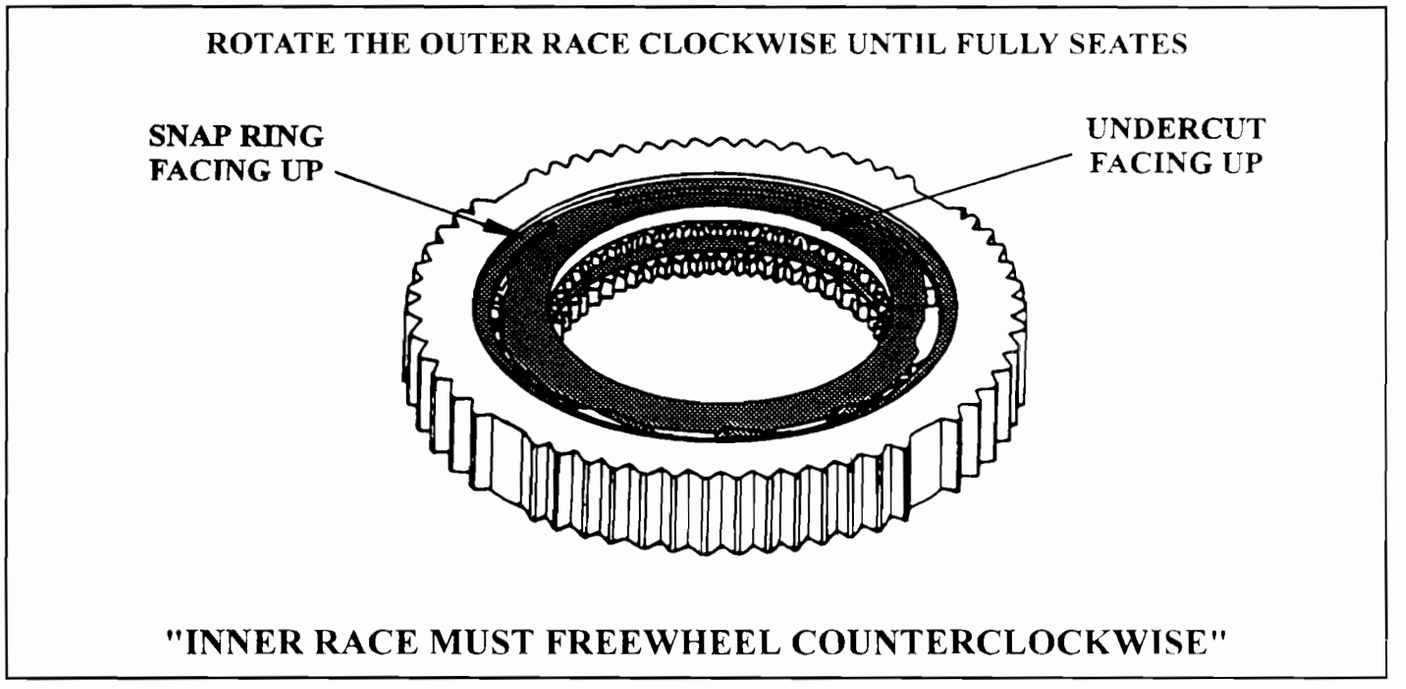
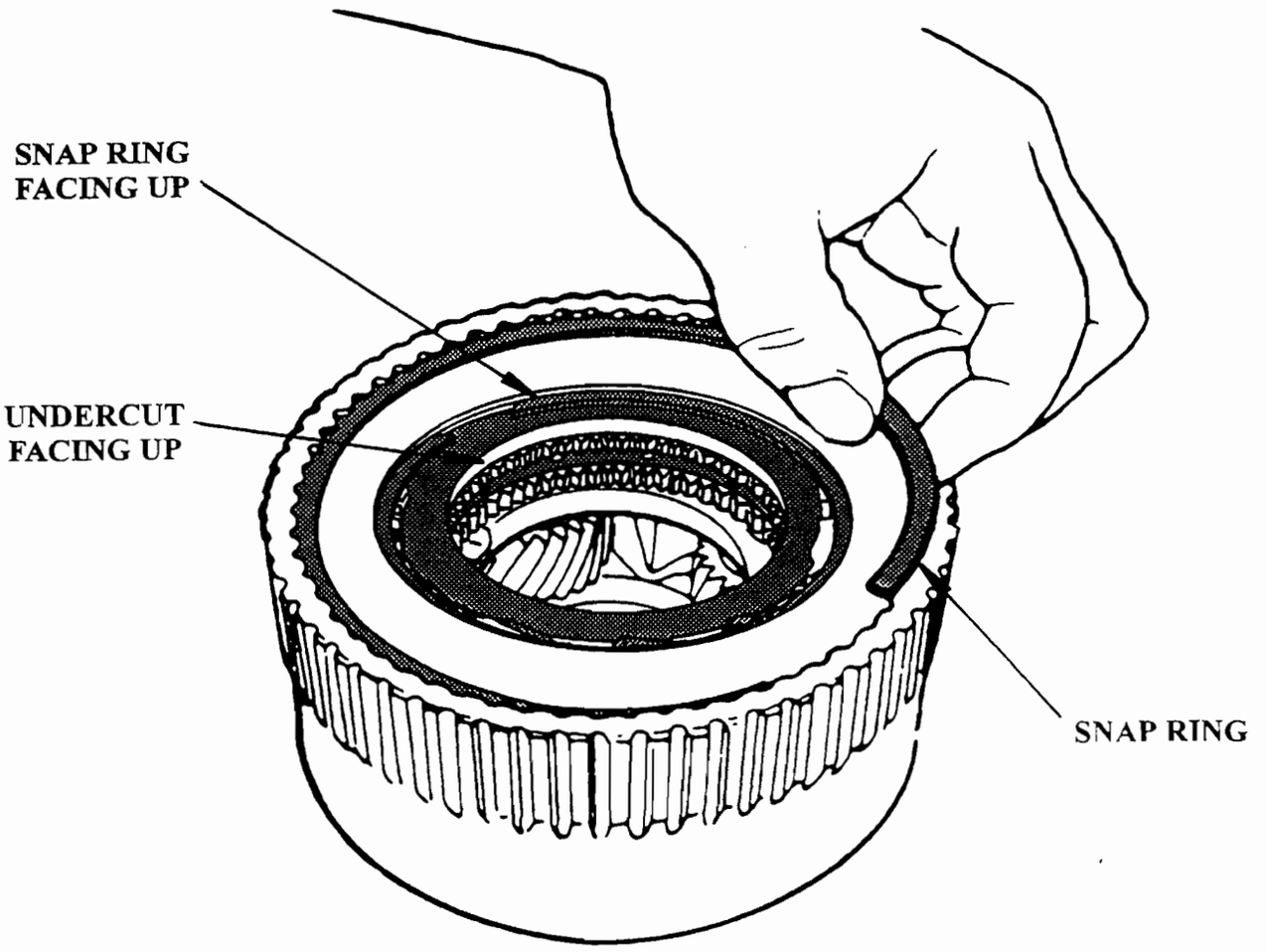


Figure 25



"INNER RACE MUST FREEWHEEL COUNTERCLOCKWISE"

Figure 26

FORD E4OD

CHECKBALL LOCATIONS, EARLY 89 THRU 96
ACCUMULATOR FILTER ASSEMBLY LOCATION

EARLY 1989 MODELS

Valve Body checkball locations are shown in Figure 27 below.
This model uses 14 rubber checkballs in the case, and the EPC Relief Ball and Spring, as shown in Figure 28.

LATE 1989 MODELS

Valve Body checkball locations are shown in Figure 27 below.
This model uses 10 rubber checkballs, and one 5/16" steel checkball in the case, and the EPC Relief Ball and Spring, as shown in Figure 29.

1990-1996 MODELS

Valve Body checkball locations are shown in Figure 27 below.
These models use 9 rubber checkballs in the case, and the EPC Relief Ball and Spring, as shown in Figure 30.
1991-1996 models also use an Intermediate Accumulator Regulator Filter Assembly in the case, and is located in the case in the position shown in Figure 30.

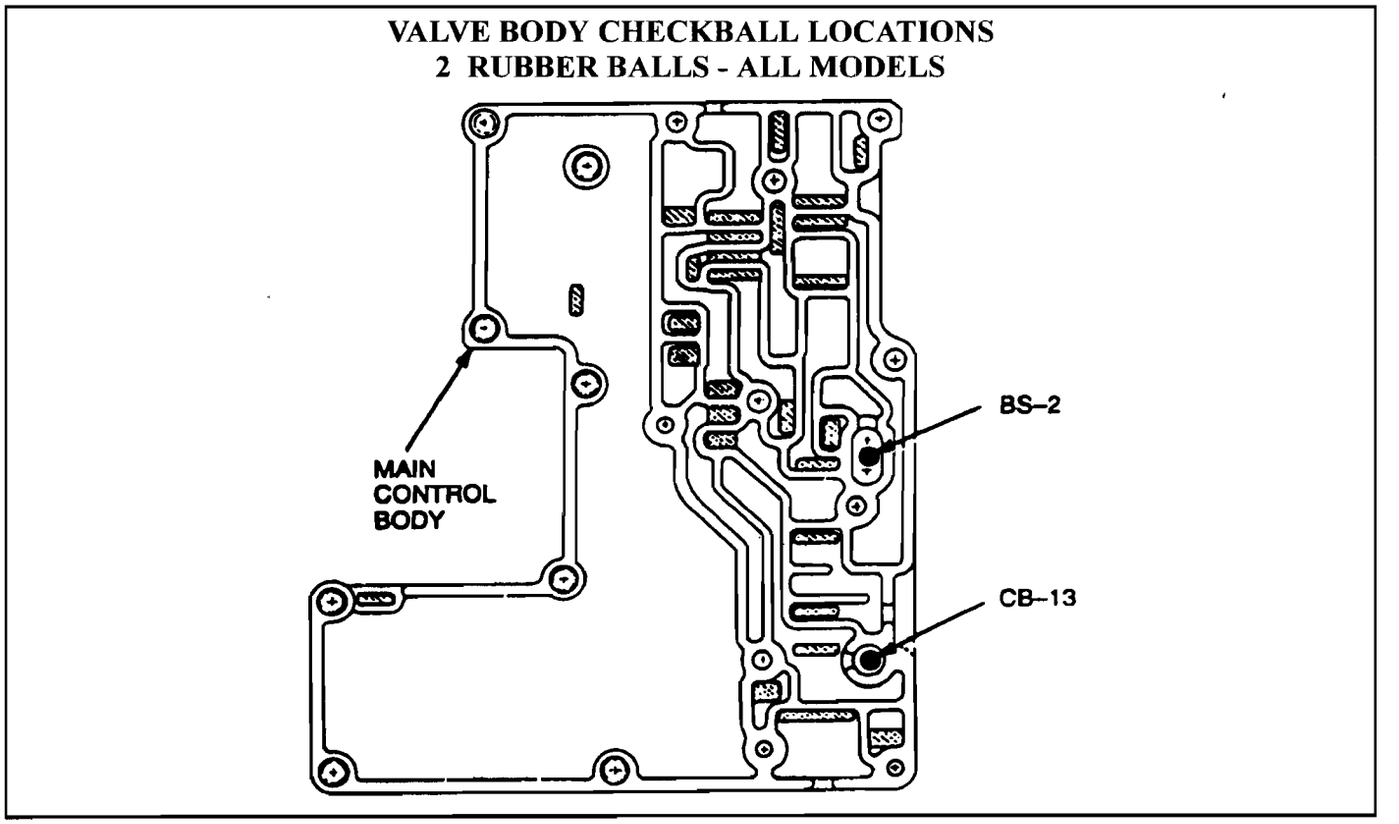
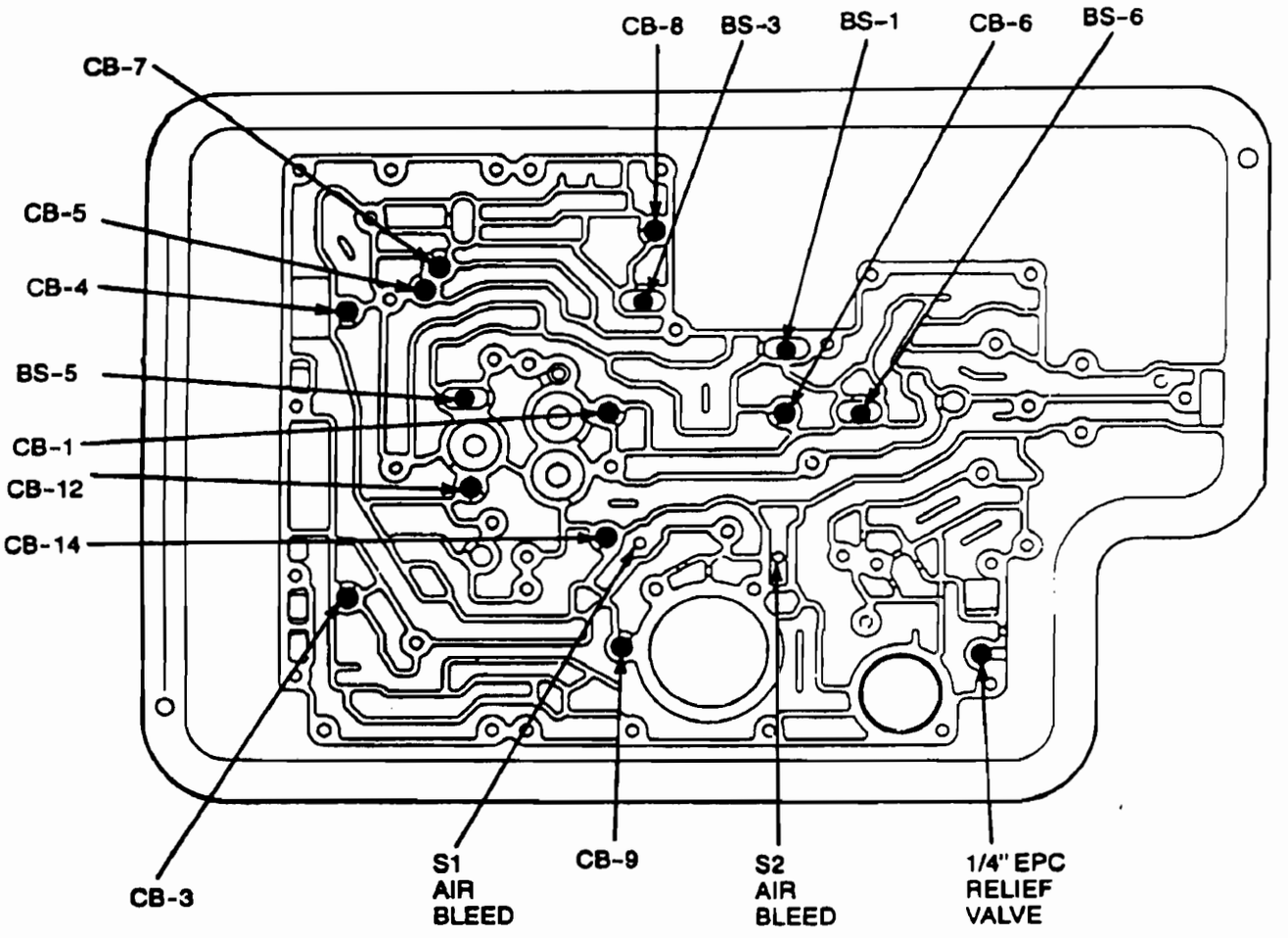


Figure 27

EARLY 1989 CHECKBALL LOCATIONS
14 RUBBER BALLS IN CASE

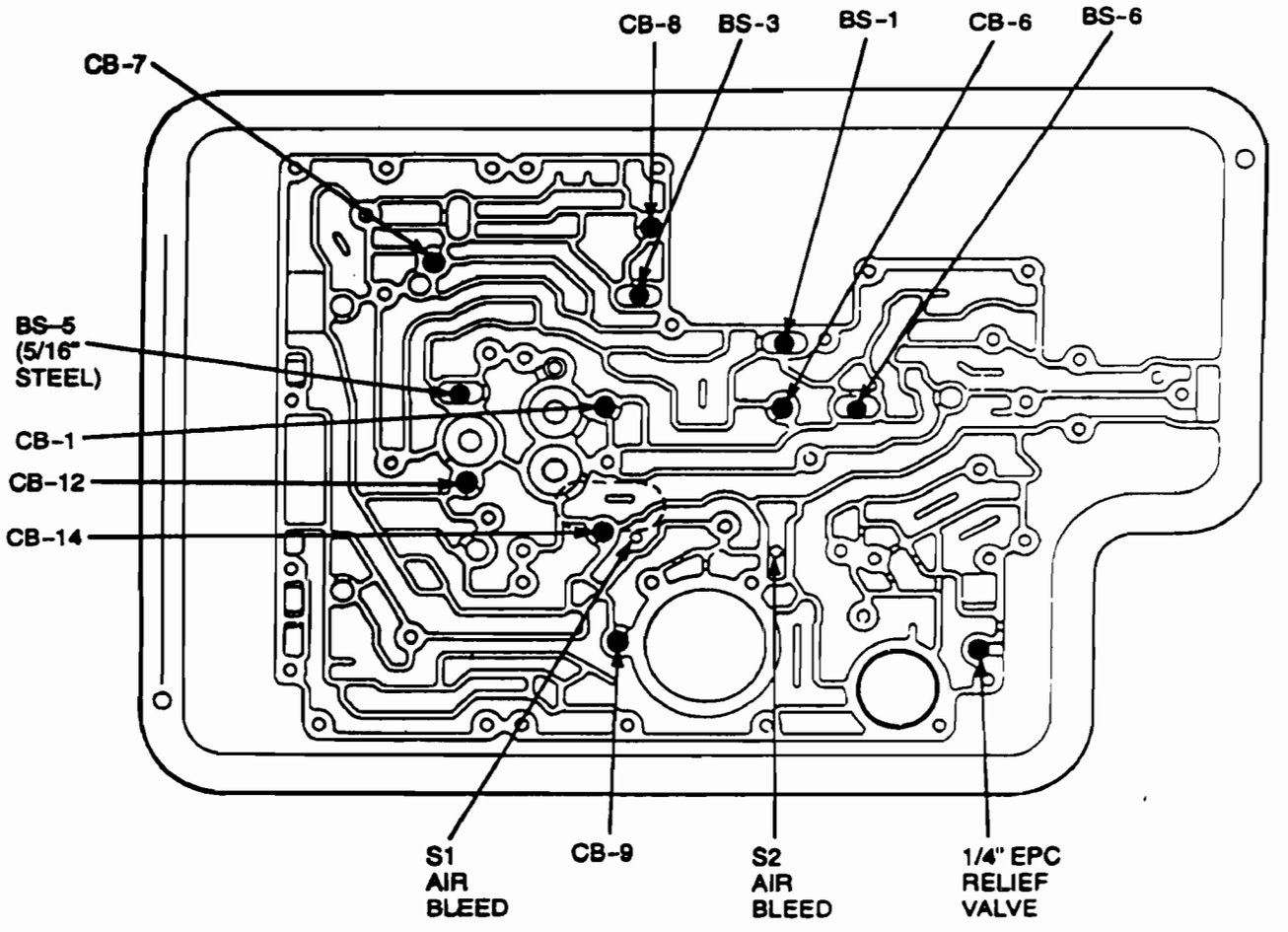


EPC Spring E9TZ-7D017-A

SPRING GOES INTO THE CASE FIRST (USED ALL MODELS)

Figure 28

LATE 1989 CHECKBALL LOCATIONS REQUIRES 10 RUBBER BALLS AND ONE 5/16" STEEL BALL IN CASE

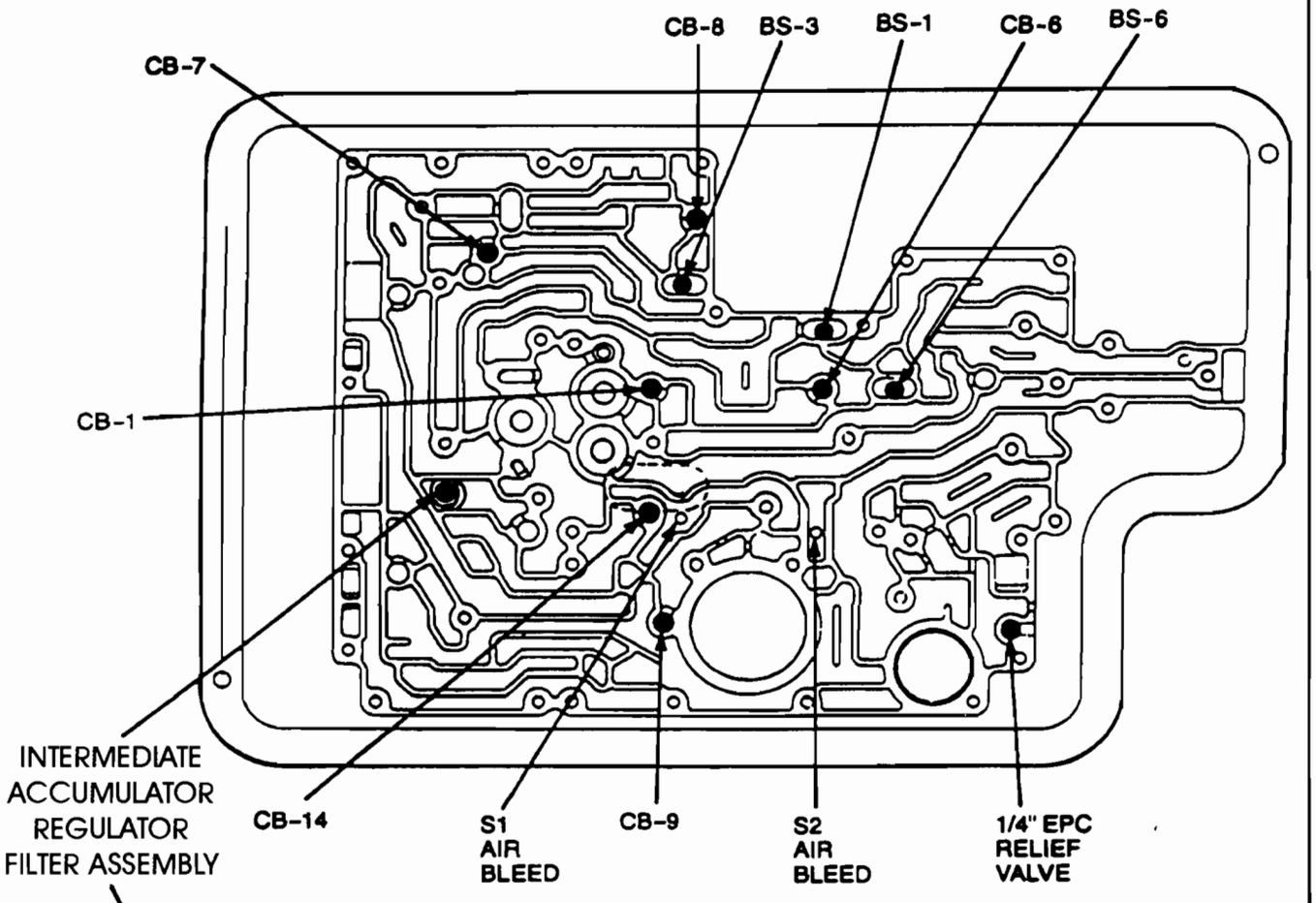


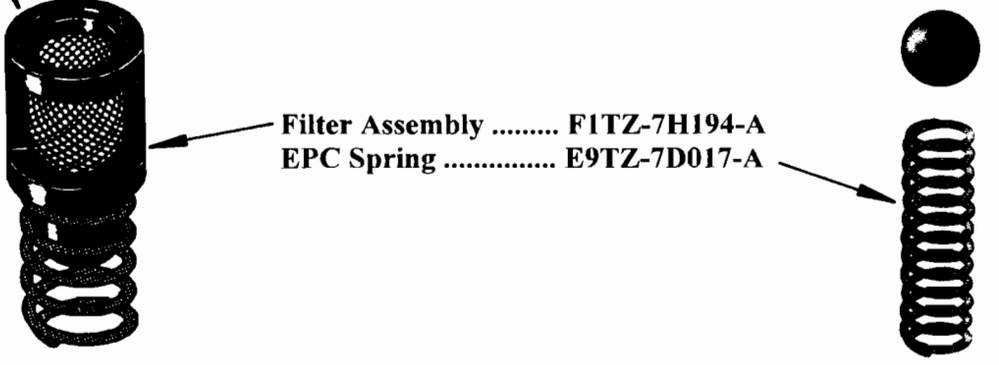
EPC Spring E9TZ-7D017-A

SPRING GOES INTO THE CASE FIRST (USED ALL MODELS)

Figure 29

1990-1996 CHECKBALL LOCATIONS
9 RUBBER BALLS IN CASE





Filter Assembly F1TZ-7H194-A
EPC Spring E9TZ-7D017-A

SPRING GOES INTO THE CASE FIRST (USED 91-96 ONLY)

SPRING GOES INTO THE CASE FIRST (USED ALL MODELS)

Figure 30

Automatic Transmission Service Group

FORD E4OD

REPEATED CODE 62 ON AMBULANCE, WITH HARSH SHIFTS AND O.D. CANCEL LIGHT FLASHING

COMPLAINT: An ambulance equipped with an E4OD transmission continues to store trouble code 62, even after disconnecting the battery for a minimum of 30 minutes, and then allowing the computer to relearn a 1 to 1 gear ratio.

CAUSE: The cause may be, the computer losing Keep Alive Power (KAPW). Most ambulance manufacturers build the vehicles with a master power shutoff switch. When the drivers park the vehicle for any extended period of time, they turn the master switch to the "OFF" position. When the master switch is turned off, Keep Alive Power (KAPW) is lost to the TECA controller, and it goes brain dead. This allows the computer to ***forget*** what 1 to 1 ratio is, and it must be relearned before driving again, otherwise trouble code 62 may be set again.

CORRECTION: Start the vehicle, cancel overdrive, and drive the vehicle for approximately 3 miles at a speed of 45-55 MPH. After 3 miles cycle the overdrive cancel button to go into 4th gear and return to the shop. Before turning the master switch off, run a new wire with a 10 amp inline fuse from the battery positive terminal and splice into terminal No. 1 at the TECA controller, as shown in Figure 31. This will eliminate KAPW from being lost when the master power shutoff switch is turned off, and the problem should be resolved.

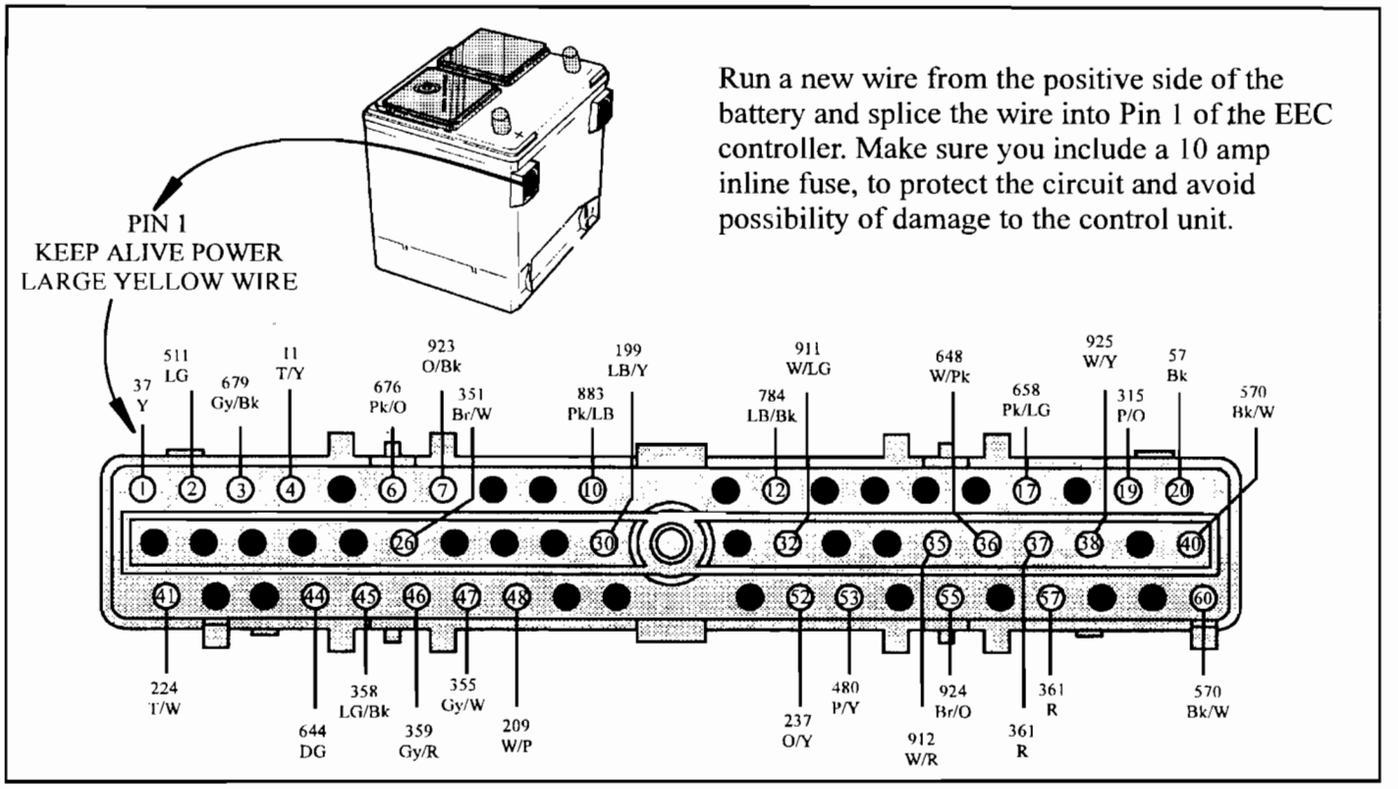


Figure 31

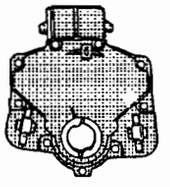
FORD E4OD

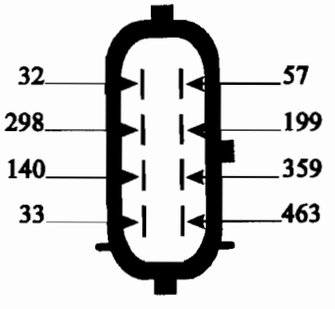
TESTING MANUAL LEVER POSITION SENSOR CIRCUITS ON F150-F350, F-SUPER DUTY, BRONCO VEHICLES

1991 MODELS

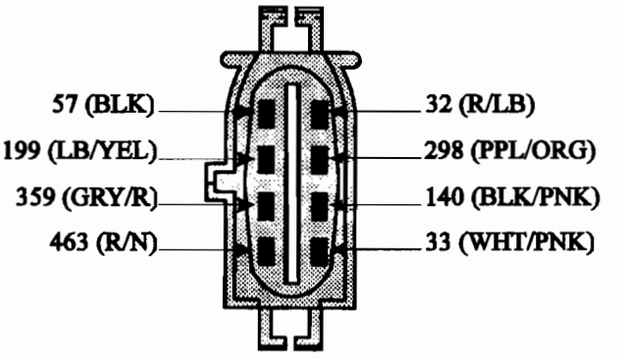
TO TEST	CONNECT OHMMETER TO TERMINALS	MOVE SWITCH TO THESE POSITIONS	A GOOD SWITCH WILL INDICATE
TRANSMISSION CIRCUITS	359 AND 199	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	3770-4607 OHMS 1304-1593 OHMS 660-807 OHMS 361-442 OHMS 190-232 OHMS 78-95 OHMS
BACKUP LAMP CIRCUIT	298 AND 140	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	OPEN CIRCUIT CLOSED CIRCUIT OPEN CIRCUIT OPEN CIRCUIT OPEN CIRCUIT OPEN CIRCUIT
STARTER RELAY CIRCUIT	33 AND 32	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	CLOSED CIRCUIT OPEN CIRCUIT CLOSED CIRCUIT OPEN CIRCUIT OPEN CIRCUIT OPEN CIRCUIT
ALL WHEEL DRIVE CIRCUIT	463 AND 57	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	CLOSED CIRCUIT OPEN CIRCUIT CLOSED CIRCUIT OPEN CIRCUIT OPEN CIRCUIT OPEN CIRCUIT

SENSOR VIEW





VEHICLE HARNESS VIEW TERMINAL SIDE



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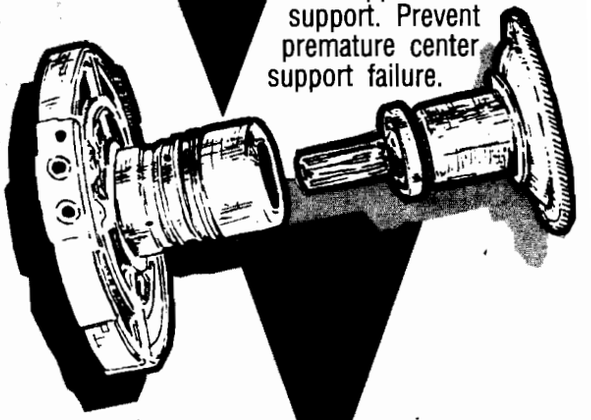

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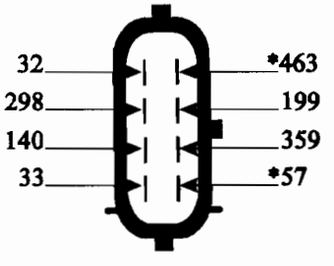
FORD E4OD

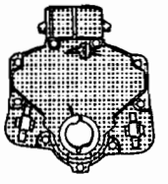
TESTING MANUAL LEVER POSITION SENSOR CIRCUITS ON F150-F350, F-SUPER DUTY, BRONCO VEHICLES

1993 MODELS

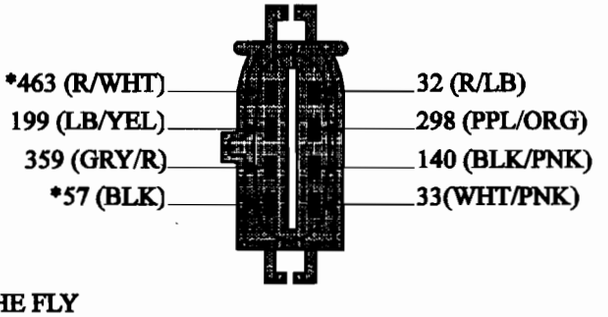
TO TEST	CONNECT OHMMETER TO TERMINALS	MOVE SWITCH TO THESE POSITIONS	A GOOD SWITCH WILL INDICATE
TRANSMISSION CIRCUITS	359 AND 199	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	3770-4607 OHMS 1304-1593 OHMS 660-807 OHMS 361-442 OHMS 190-232 OHMS 78-95 OHMS
BACKUP LAMP CIRCUIT	298 AND 140	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	GREATER THAN 1OOK OHMS LESS THAN 5.0 OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS
STARTER RELAY CIRCUIT	33 AND 32	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	LESS THAN 5.0 OHMS GREATER THAN 100K OHMS LESS THAN 5.0 OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS
4X4 SHIFT ON THE FLY CIRCUIT	463 AND 57	PARK REVERSE NEUTRAL DRIVE SECOND(2) MANUAL LOW(1)	OPEN CIRCUIT OPEN CIRCUIT CLOSED CIRCUIT OPEN CIRCUIT OPEN CIRCUIT OPEN CIRCUIT

SENSOR VIEW





VEHICLE HARNESS VIEW TERMINAL SIDE



*4X4 SHIFT ON THE FLY

FORD AX4S/AXODE

HARSH SHIFTS, CLICKING NOISE, TIE-UP ON SHIFTS

1993-UP AFTER REBUILD

COMPLAINT: ***After rebuild,*** harsh shifts (High Line) and/or a "Clicking" or cyling noise may be heard from the side cover area, that is usually accompanied by an ON/OFF bind-up sensation that coincides with the "Clicking" noise. These symptoms may be accompanied with Diagnostic Trouble Code (DTC) 652 (MCCC Shorted or Open Circuit), DTC 624 (EPC Circuit Failure), and/or one Shift Solenoid DTC 621, 622, or 624.

CAUSE: The cause may be, solenoid wire connectors installed on the wrong solenoids.

CORRECTION: Connect the internal wiring harness connectors to their proper solenoids, using the wire colors, as shown in Figure 1 and 2. Proper connection of solenoids can also be verified externally through the case connector using the Ohms chart in Figure 2.
NOTE: The internal wire harness normally is secured by wire-ties which would prevent improper connection of solenoids, however, not all wire harnesses have the wire ties necessary to prevent this problem and the chart must be used.

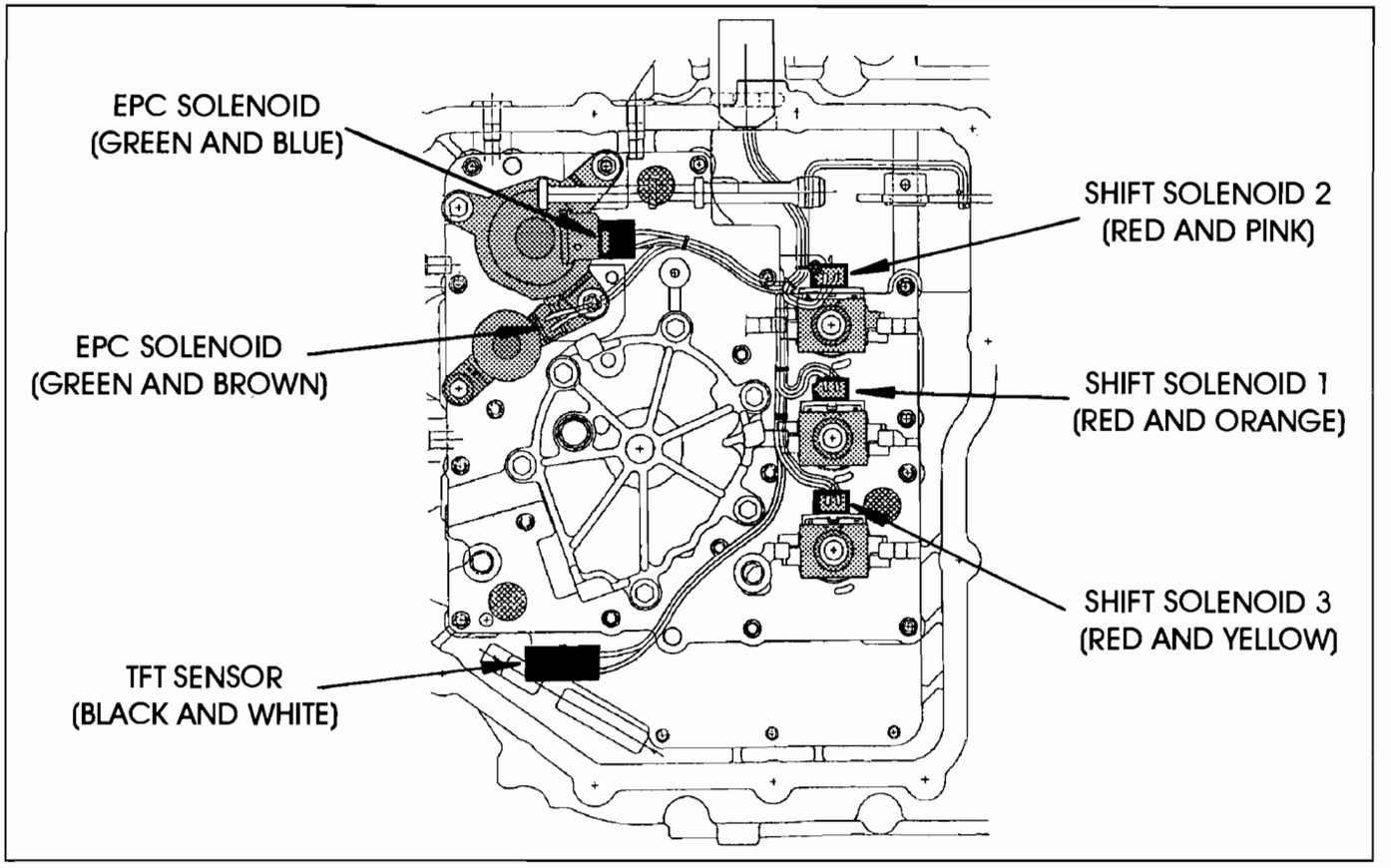


Figure 1

SHIFT SOLENOID RESISTANCE CHART
AND TFT SENSOR RESISTANCE CHART
FOR BOTH AX4S AND AX4N

SOLENOID	SOLENOID RESISTANCE (OHMS)
SS1	15 - 25
SS2	15 - 25
SS3	15 - 25
LUS	21 - 36
MLUS	.98 - 1.6
EPC	3.23 - 5.50
TSS	100 - 200

°C	°F	TFT SENSOR (OHMS)
0-20	32-58	100k - 37k
21-40	59-104	37k - 16k
41-70	105-158	16k - 5k
71-90	159-194	5k - 2.7k
91-110	195-230	2.7k - 1.5k
111-130	231-266	1.5k - 0.8k
131-150	267-302	0.8k - 0.5k

93-96 AX4S AND ALL AX4N

1. EPC GROUND (BLUE)
2. EPC/MCCC POWER (GREEN)
3. SS3 GROUND (YELLOW)
4. MCCC GROUND (BROWN)
5. SHIFT SOLENOID POWER (RED)
6. SS1 GROUND (ORANGE)
7. TFT (BLACK)
8. SS2 GROUND (PINK)
9. TOT RETURN (WHITE)

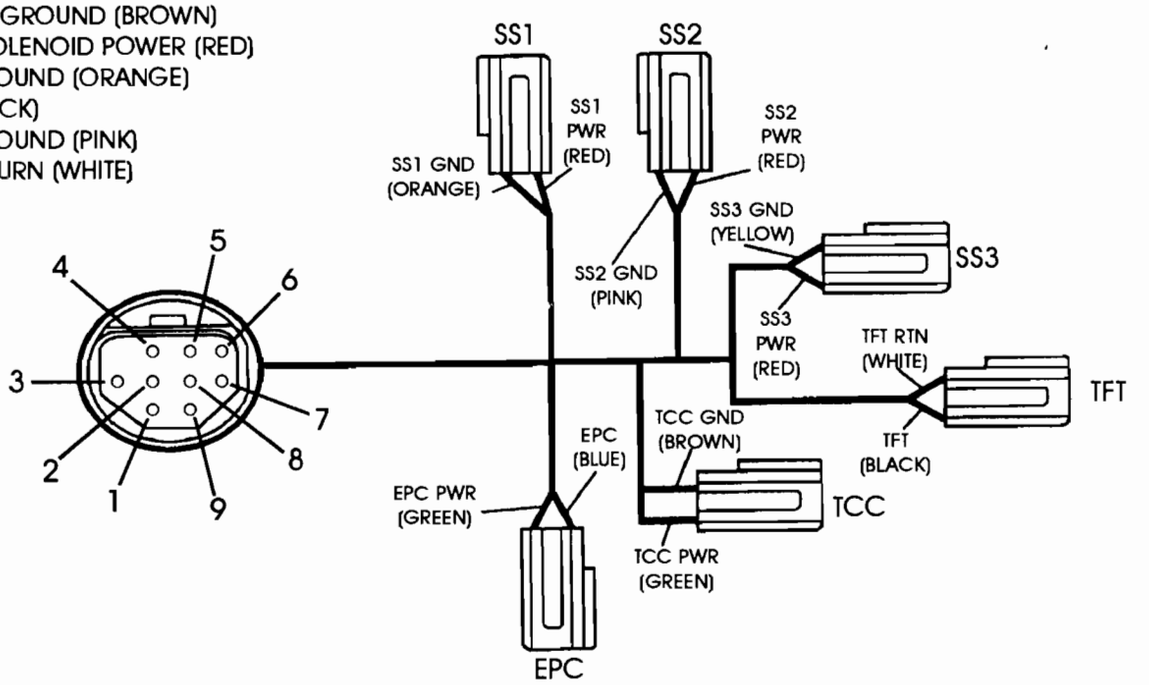


Figure 2

FORD AX4S/AXODE
PRESSURE CONTROL PROBLEM DIAGNOSIS

To accurately diagnos and repair pressure control problems, it first must be determined whether the problem is a malfunction that is inside the transaxle, or outside the transaxle. The pressure problems that we usually need to address and repair are high line, low line, and/or inadequate line rise, and fluctuations as seen on a pressure gauge while driving. One of the tools that can be used to determine inside transaxle or outside the transaxle, is the "Schaffer Shifter". However, a current draw test in the EPC circuit can also be performed, while monitering the pressure changes on a 0-400 lb. pressure gauge.

NOTE: It is very important to perform this test with a 0-400 lb (or higher) gauge because this transaxle is capable of producing over 400 PSI of line pressure, which could burst a gauge of a lower rating, and possibly cause injury.

A current draw test in the EPC circuit will also require the use of a Digital Volt-Ohm Meter, that is capable of reading Amps or Milliamps. When performing this teat you will be looking at amperage changes in relation to pressure changes, as seen on the pressure gauge. With a normally functioning EPC circuit, you will see about ***150 PSI*** on the pressure gauge while in Park, ***on the initial start up***, which is part of the computer strategy, ***and is normal.*** After the vehicle is warmed up and/or is put into gear the idle pressure will drop immediately to between 48 and 77 PSI. As the throttle is opened, the amperage should begin to drop, and the pressure should begin to rise.

To begin the EPC circuit current draw test, the EPC ground wire that runs from the computer to the transaxle case connector must be located, and the external wire color will be White with a Yellow tracer on both versions, as shown in Figure 3. On 1991-1992 model vehicles the wire will be found in the top case connector and comes from pin number 38 on the computer. On 1993-UP vehicles there is only one case connector and the wire still comes from pin number 38 on the computer. Refer to Figure 3.

Connect the 0-400 lb. pressure gauge to the mainline pressure tap, as shown in Figure 4. Cut the White wire with the Yellow tracer and hook the DVOM, ***in series,*** so that current flows ***through*** the DVOM, as shown in Figure 5. Start the engine and let it warm up until the pressure stabilizes between 48-77 PSI. The amperage reading at idle should be approximately 1 Amp. As the throttle is opened, amperage should begin to drop, and pressure should begin to rise. Refer to the chart in Figure 6.

If the amperage drops, but no pressure rise, the problem is inside the transaxle.

Problems on the inside of the transaxle will include, EPC Solenoid failure or trash in the solenoid, boost valve and/or sleeve damaged, pressure regulator valve damaged and/or sticking, blockage from gasket material (early models), pump damage and/or pump slide sticking.

If the amperage does not drop, and the pressure does not rise, the problem is outside the transaxle.

The inputs that are used by the computer to determine pressure changes will now have to be checked. These inputs include, Throttle Position Sensor, Mass Airflow Sensor, Power Steering Pressure Switch, Turbine Shaft Speed Sensor, Vehicle Speed Sensor. Bad harness connections and wiring damage must also be thoroughly checked and verified. After ***all*** sensors, connections and wiring have passed inspections and tested OK, the computer may have to be replaced.

When pressures are seen to be fluctuating on the gauge, but the amperage readings are steady, then the problems are on the inside if the transaxle.

If the pressures are seen to be fluctuating on the gauge, and the amperage readings are also fluctuating, then the problems are on the outside of the transaxle and are electrical.

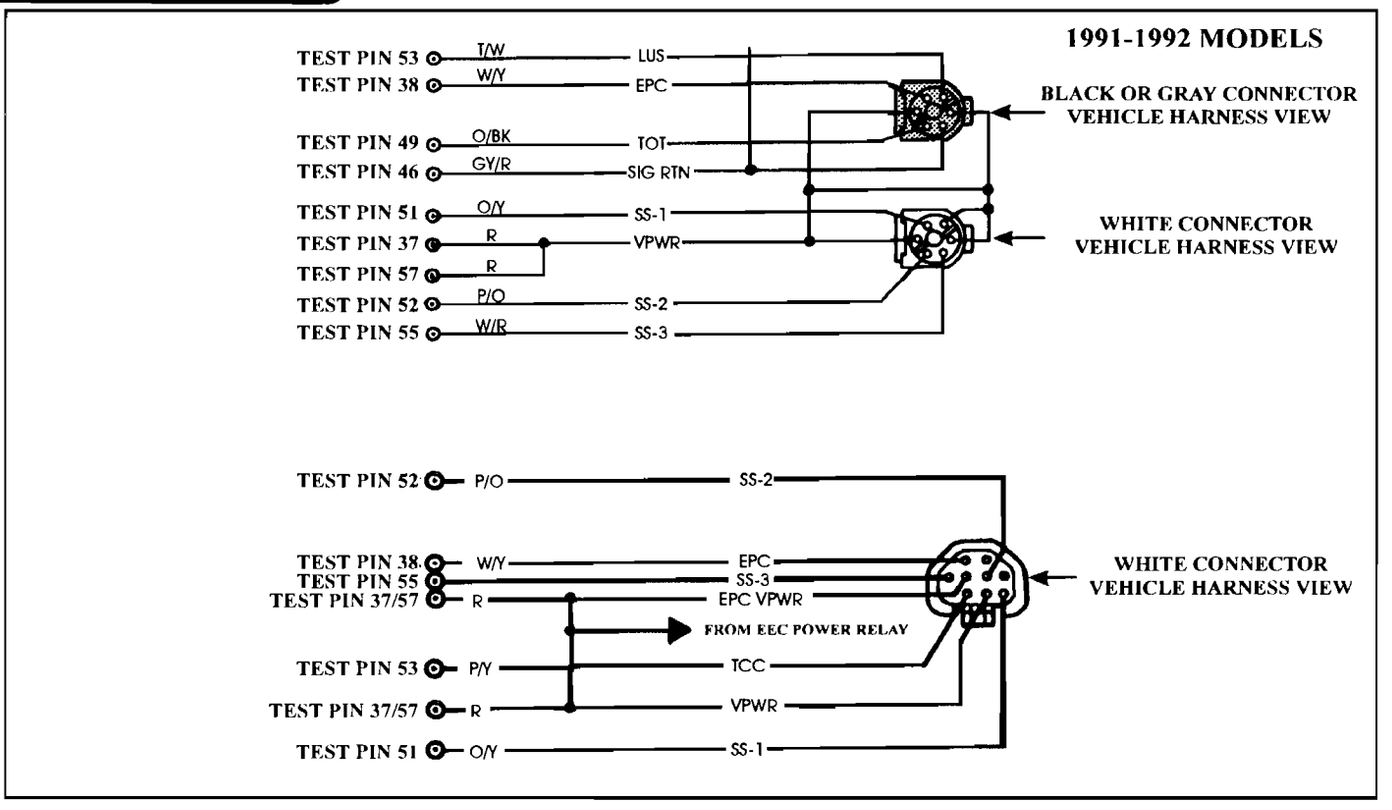


Figure 3

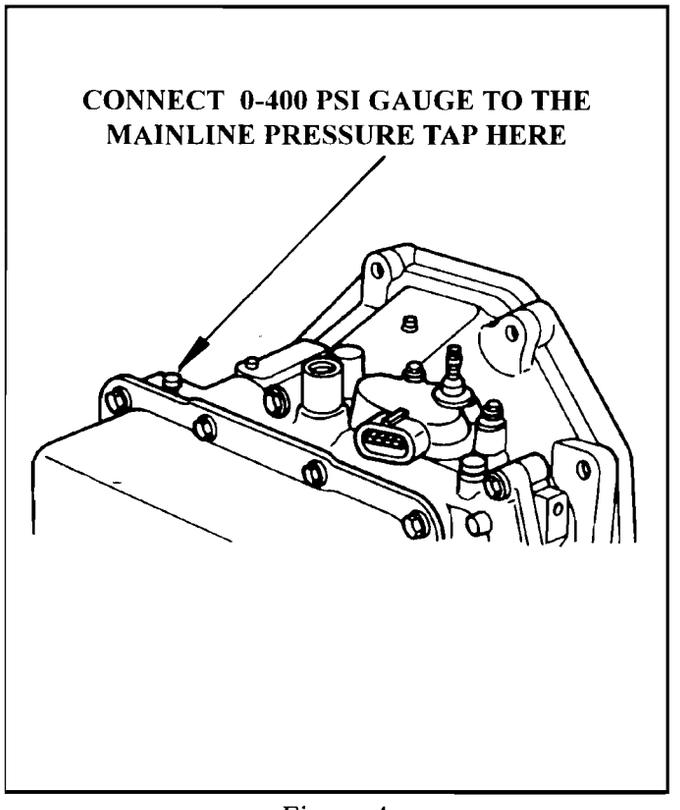


Figure 4

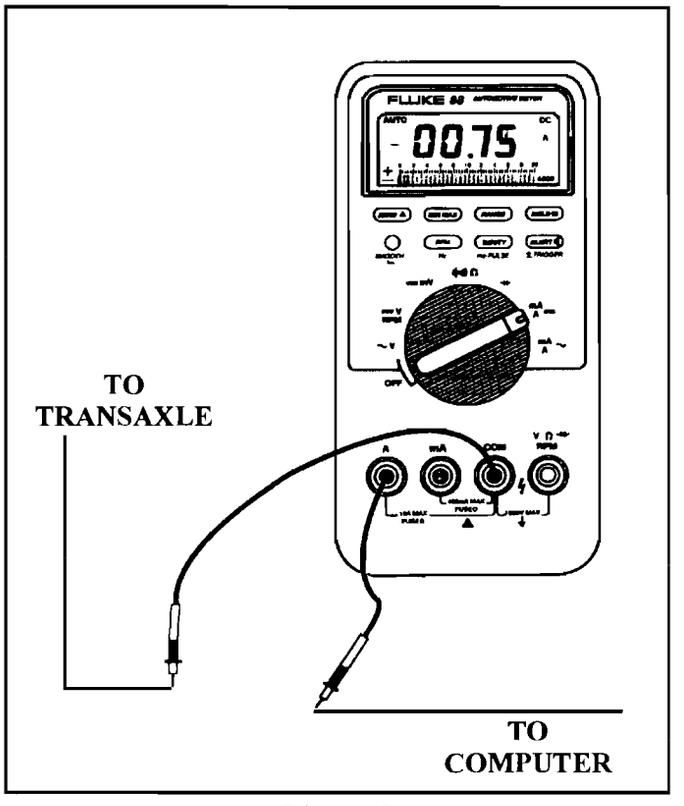


Figure 5

AX4S/AXODE PRESSURE CHART

EPC AMPS	1.0	.90	.75	.70	.60	.50	.35		
EPC PSI	20	30	40	50	60	70	80	*	*
P	75	---	---	---	---	---	---	*	*
R	90	145	175	200	225	275	310	*	*
N	75	---	---	---	---	---	---	*	*
OD	75	100	125	145	165	180	210	*	*
D	75	100	125	145	165	180	210	*	*
L	80	100	125	155	175	190	220	*	*

MAINLINE PRESSURES SHOULD NOT EXCEED THE MAXIMUMS AS SHOWN ABOVE

This chart is based on EPC Amps and Mainline Pressure. EPC pressure readings have also been shown for convience.

During driving conditions, pressures will show a momentary cut-back during the upshifts, *and this is normal.*

Figure 6

FORD AX4S/AXODE

DELAYED ENGAGEMENTS, HARSH SHIFTS, DELAYED UPSHIFTS, DTC 639 STORED

COMPLAINT: Some vehicles may exhibit an increased engine RPM when the selector lever is placed into Drive and/or Reverse, harsh upshifts and/or downshifts, delayed upshifts with a slide bump feel at the end of the shift. Some vehicles may also store Diagnostic Trouble Code (DTC) 639, which is a Turbine Speed Sensor problem.

CAUSE: The cause may be, a defective Turbine Speed Sensor.

CORRECTION: The Turbine Speed Sensor is located on the chain cover, near the left axle seal, as shown in Figure 7. To test the TSS, disconnect the sensor harness connector, and place the leads of a DVOM across the two sensor pins. A good sensor should read 80 - 200 ohms resistance (See Figure 7). If the readings are not within the acceptable range, replace the Turbine Speed Sensor with OEM part number F1DZ-7M101-A.

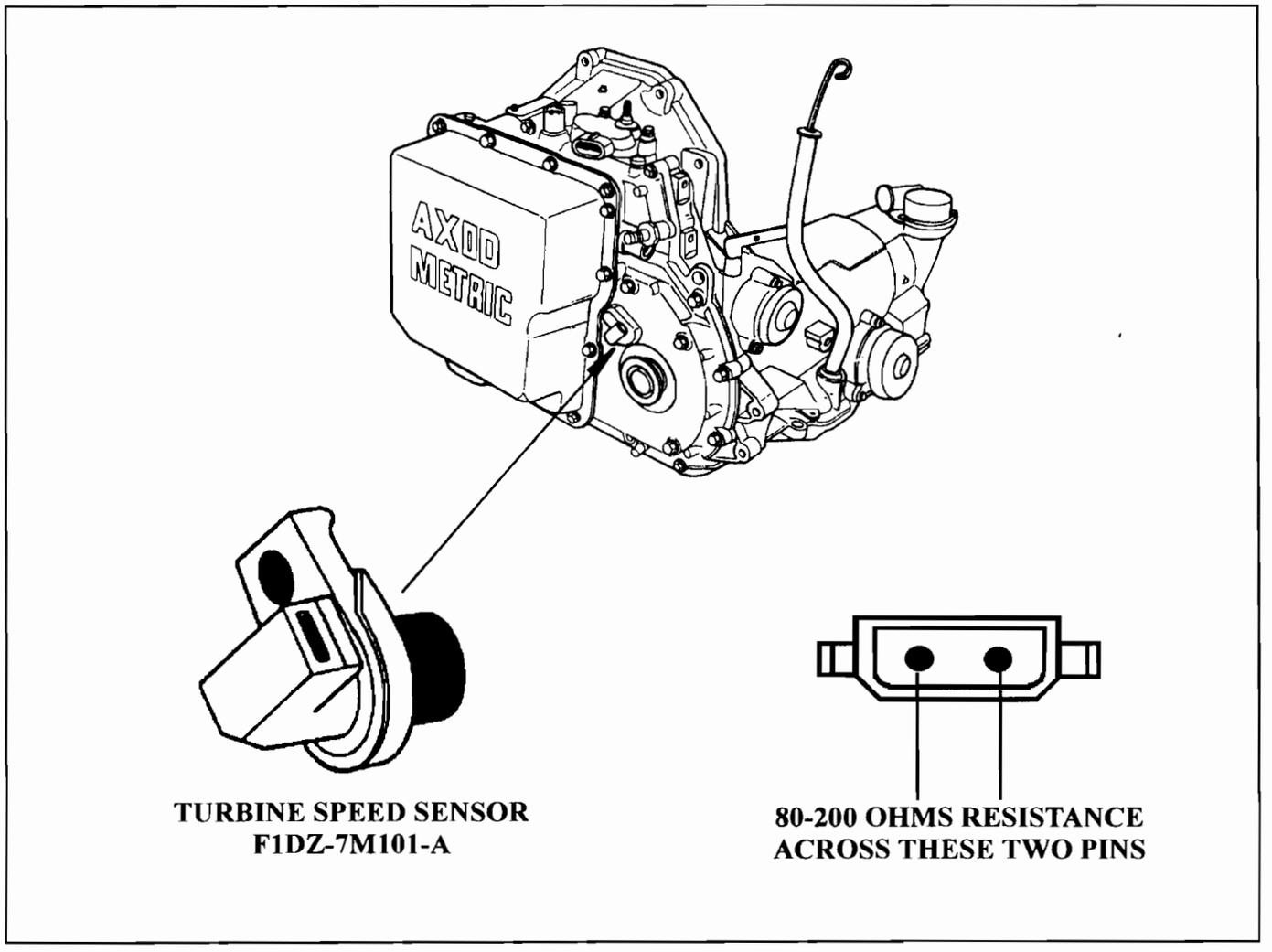


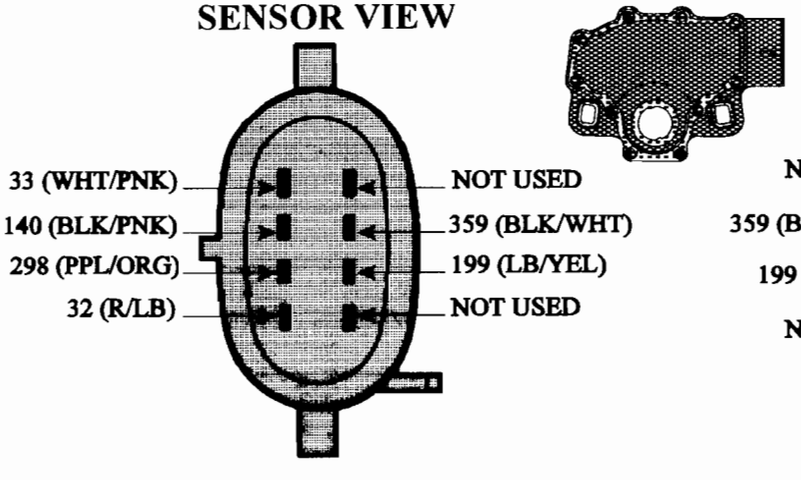
Figure 7

FORD AXODE

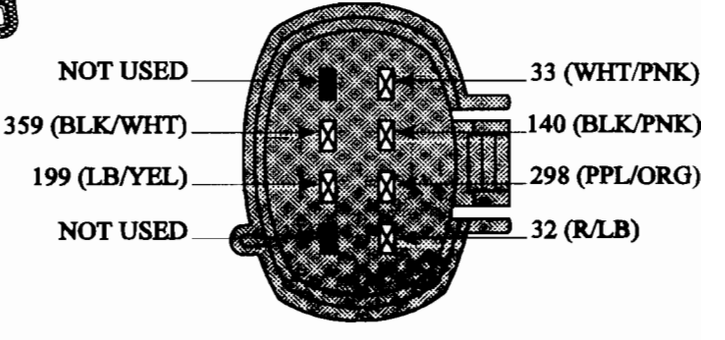
TESTING MANUAL LEVER POSITION SENSOR CIRCUITS ON FORD WINDSTAR VANS
1995 MODELS

TO TEST	CONNECT OHMMETER TO TERMINALS	MOVE SWITCH TO THESE POSITIONS	A GOOD SWITCH WILL INDICATE
TRANSMISSION CIRCUITS	359 AND 199	PARK	3770-4607 OHMS
		REVERSE	1304-1593 OHMS
		NEUTRAL	660-807 OHMS
		OVERDRIVE	361-442 OHMS
		SECOND(2)	190-232 OHMS
		MANUAL LOW(1)	78-95 OHMS
BACKUP LAMP CIRCUIT	298 AND 140	PARK	LESS THAN 5.0 OHMS
		REVERSE	GREATER THAN 100K OHMS
		NEUTRAL	LESS THAN 5.0 OHMS
		OVERDRIVE	GREATER THAN 100K OHMS
		SECOND(2)	GREATER THAN 100K OHMS
		MANUAL LOW(1)	GREATER THAN 100K OHMS
STARTER RELAY CIRCUIT	33 AND 32	PARK	GREATER THAN 100K OHMS
		REVERSE	LESS THAN 5.0 OHMS
		NEUTRAL	GREATER THAN 100K OHMS
		OVERDRIVE	GREATER THAN 100K OHMS
		SECOND(2)	GREATER THAN 100K OHMS
		MANUAL LOW(1)	GREATER THAN 100K OHMS

SENSOR VIEW



VEHICLE HARNESS VIEW TERMINAL SIDE



FORD AX4S/AXODE

PREMATURE FAILURE OF PLANETARY GEARSET

COMPLAINT: Some vehicles may exhibit premature planetary gearset failure, before and/or after rebuild. There are several things that can be done to prevent this type of failure.

CAUSE: Lack of lubrication to the planetary gearset.

CORRECTION, STEP 1:

Always install the latest design Rear Lube Cross-Over Tube F3DZ-7G084-A, which uses a new design Rear Lube Tube Seal F3DZ-7G085-A, and requires the new design Rear Planetary Support F3DZ-7A130-A. Refer to Figures 8 and 9. The new design parts listed above may be used on any 1991-1992 AXODE transaxle, however, ***all three pieces must be used together.***

STEP 2:

Install the AX4S/AXODE Lube Dam, manufactured by Shift Technology Products, that retains more oil on the planetary gearset, as shown in Figure 10.

STEP 3:

Drill a .065" hole through the Valve Body wall, to connect line pressure passage to the lube oil passage, as shown in Figure 11. This will ensure lube oil to the transaxle even at extremely high line pressures.

STEP 4:

Drill the hole in the valve body spacer plate, as shown in Figure 12, out to .078" to increase lube oil flow.

STEP 5:

Perform final drive end play measurement with dial indicator, as shown in Figure 13, and set final drive end play to .004"-.016". Most manuals give a wider specification than this but Ford Motor Company changed it some time ago, to improve gearset durability. If not within .004" - .016", change the selective thrust washer to obtain desired specification.

SERVICE INFORMATION:

Rear Lube Cross-Over Tube (New Design)	F3DZ-7G084-A
Rear Planetary Support (New Design-Includes Seal)	F3DZ-7A130-A
Rear Lube Tube Seal (New Design-3 Per Pkg)	F3DZ-7G085-A
Differential/Speedo Lube Tube (Existing Design)	F2DZ-7G086-A

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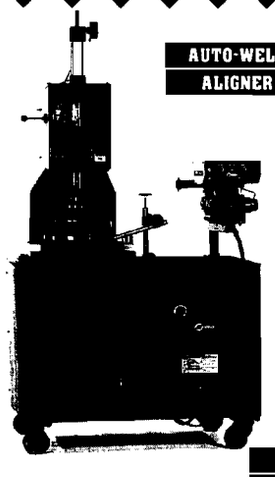

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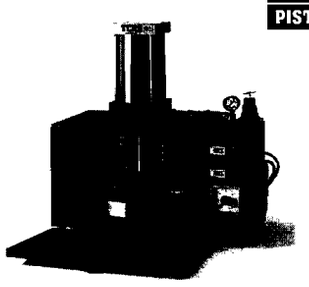

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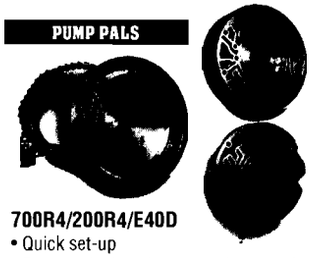

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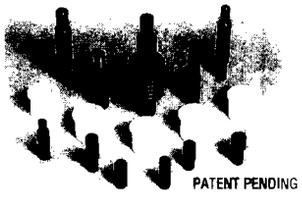

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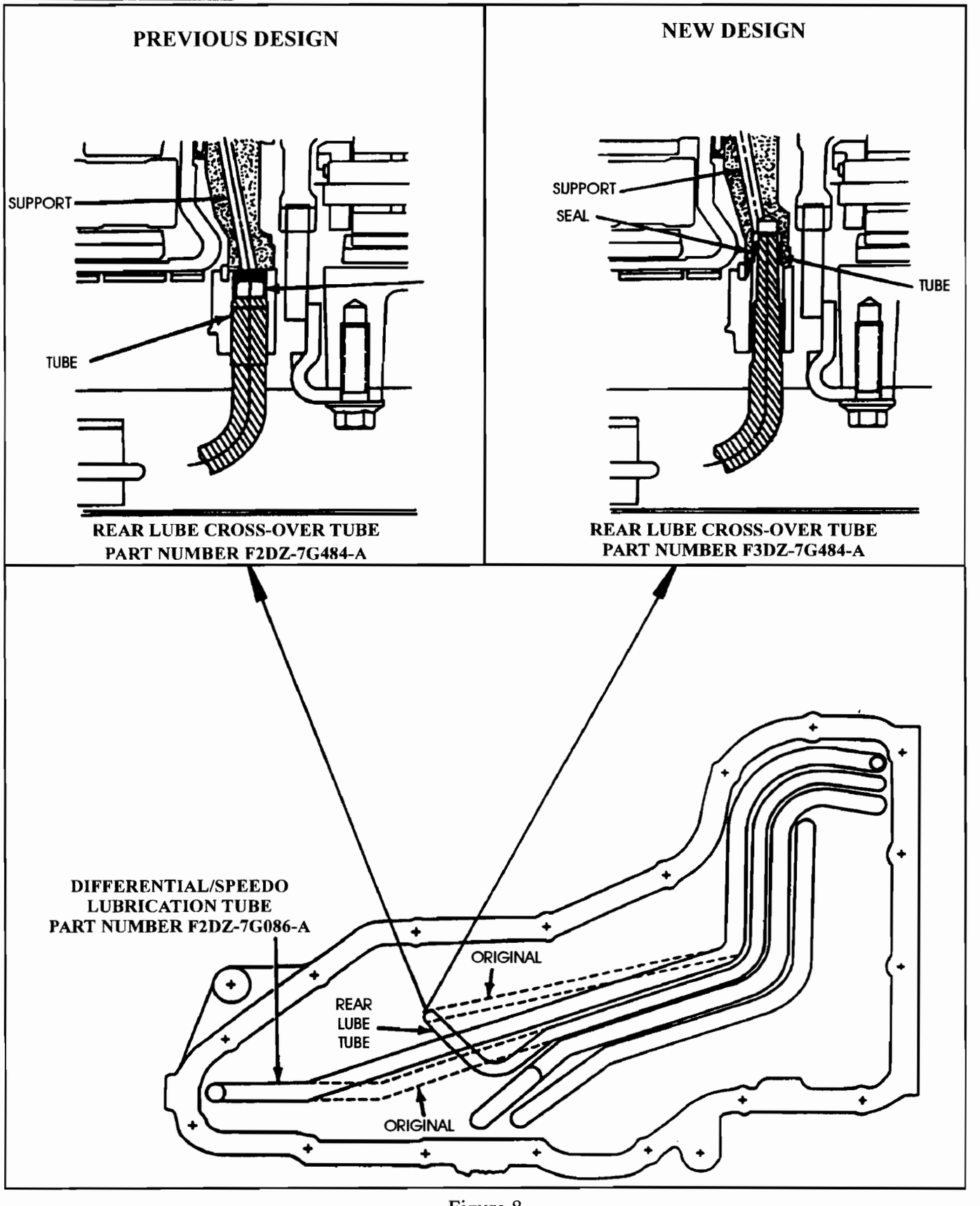
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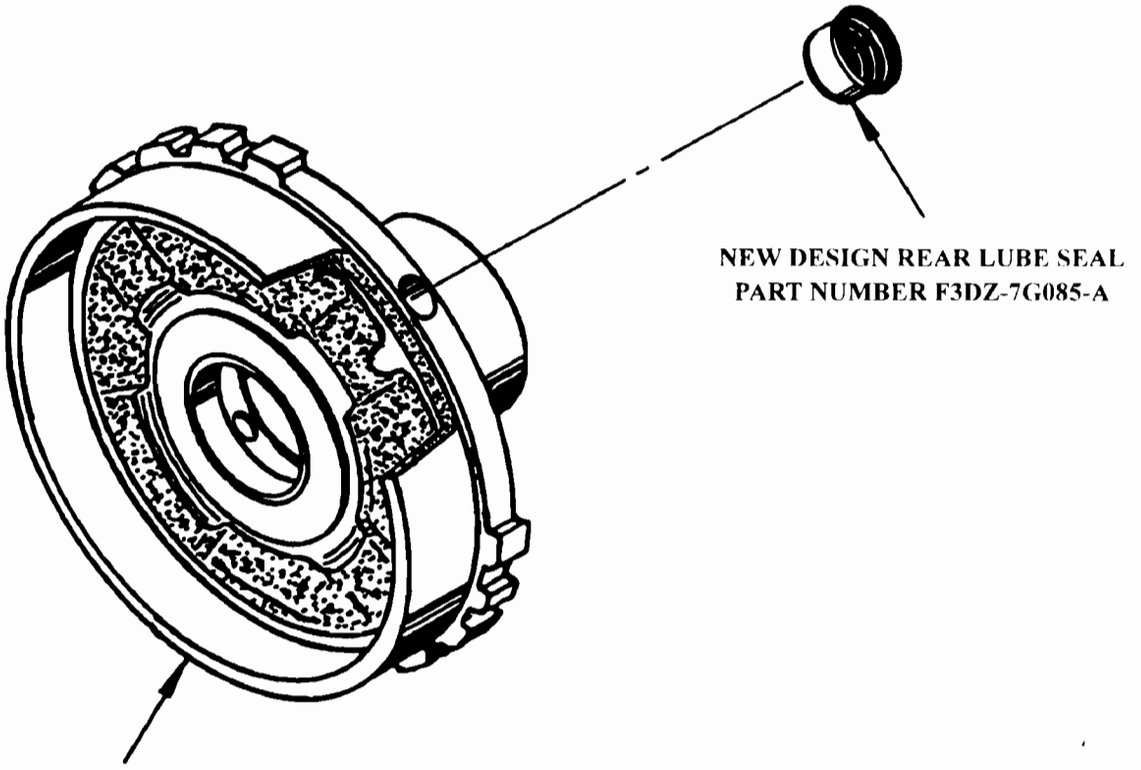
SEAL
TUBE
REAR LUBE CROSS-OVER TUBE
PART NUMBER F2DZ-7G484-A
REAR LUBE CROSS-OVER TUBE
PART NUMBER F3DZ-7G484-A
DIFFERENTIAL/SPEEDO
LUBRICATION TUBE
PART NUMBER F2DZ-7G086-A
ORIGINAL
REAR
LUBE
TUBE
ORIGINAL

Figure 8

NEW DESIGN REAR PLANETARY SUPPORT AND REAR LUBE SEAL



NEW DESIGN REAR LUBE SEAL
PART NUMBER F3DZ-7G085-A

NEW DESIGN REAR PLANETARY SUPPORT
PART NUMBER F3DZ-7A130-A (INCLUDES SEAL

Figure 9

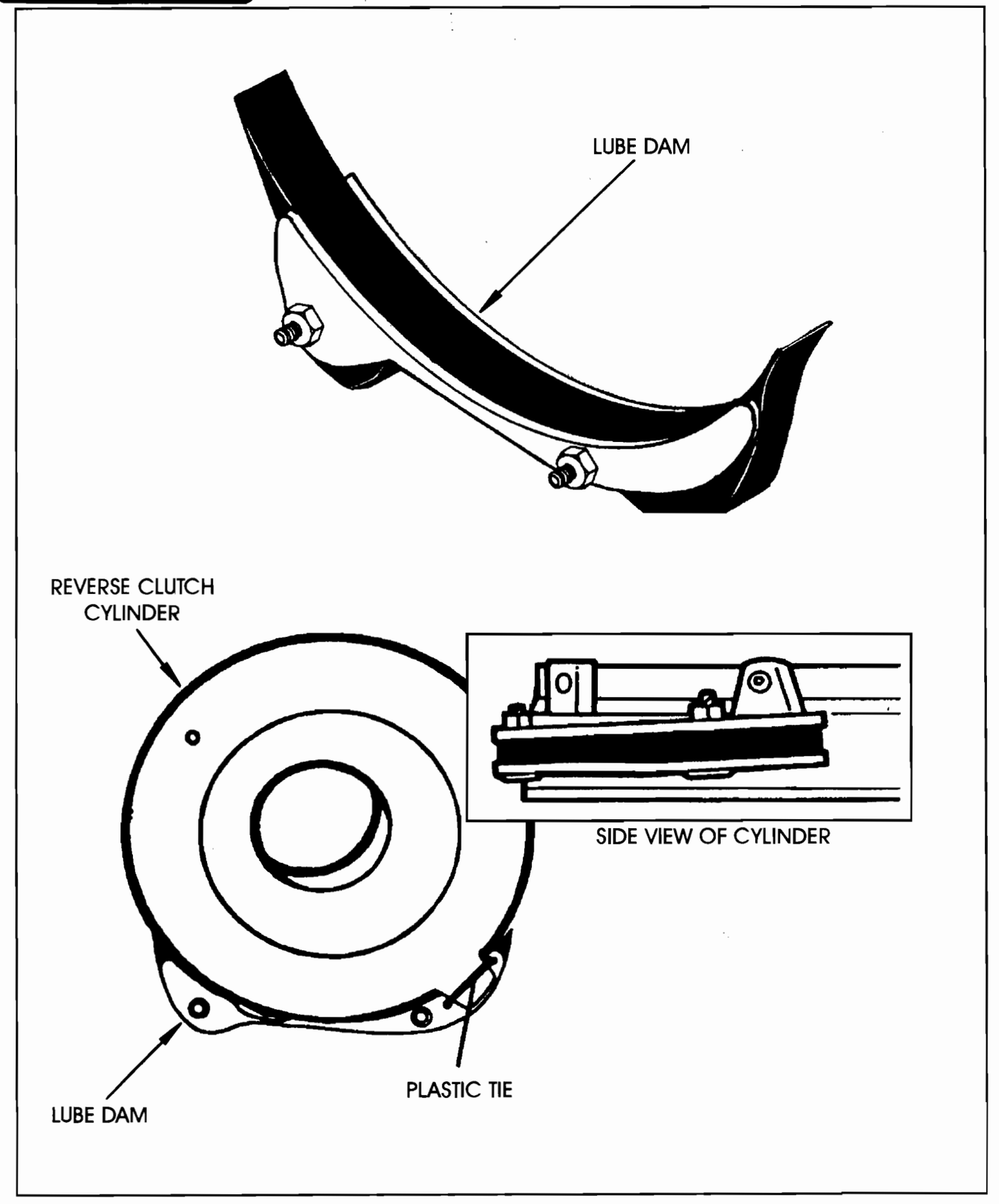

LUBE DAM
REVERSE CLUTCH CYLINDER
SIDE VIEW OF CYLINDER
PLASTIC TIE
LUBE DAM

Figure 10

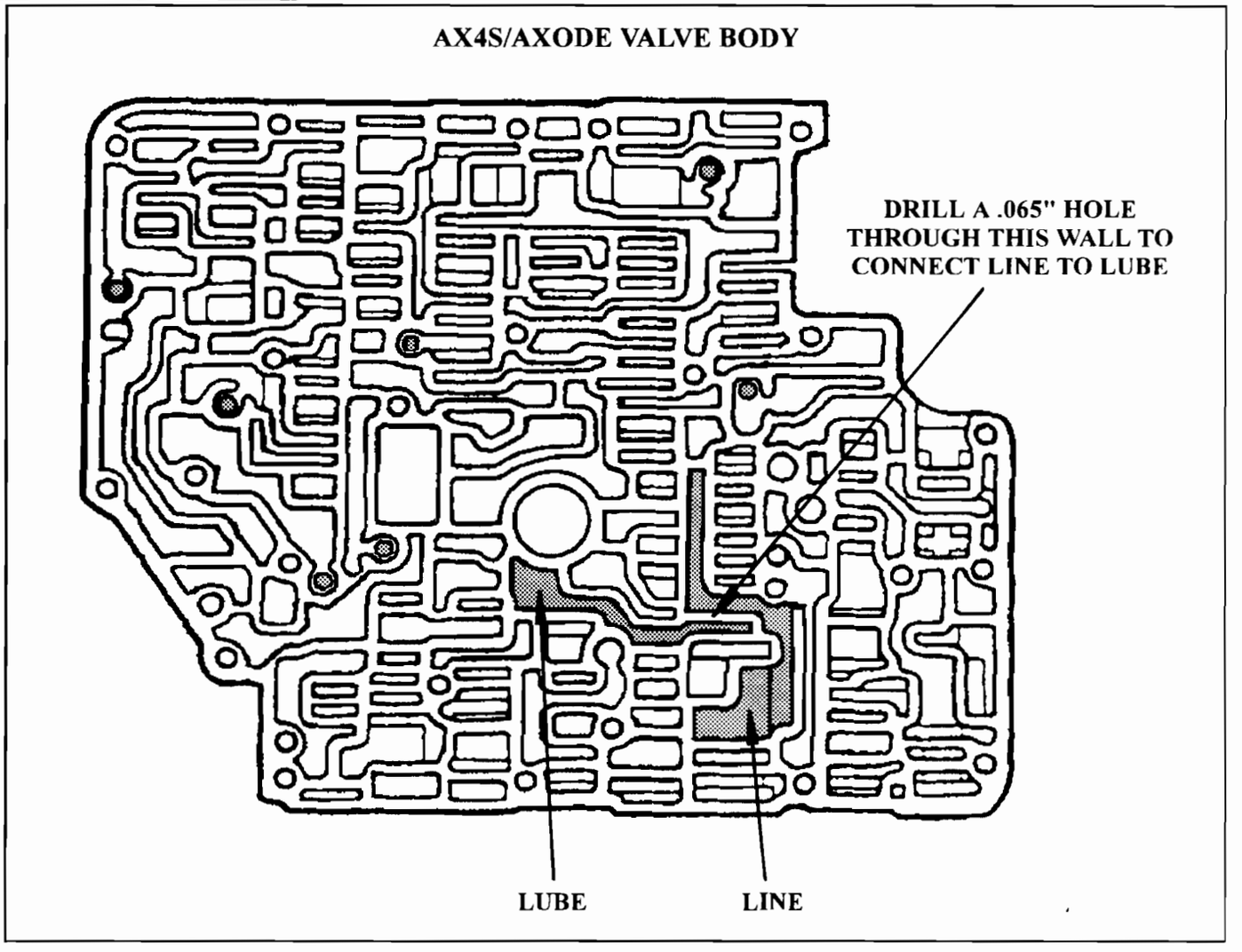

AX4S/AXODE VALVE BODY
DRILL A .065" HOLE
THROUGH THIS WALL TO
CONNECT LINE TO LUBE
LUBE
LINE

Figure 11

AX4S/AXODE SPACER PLATE

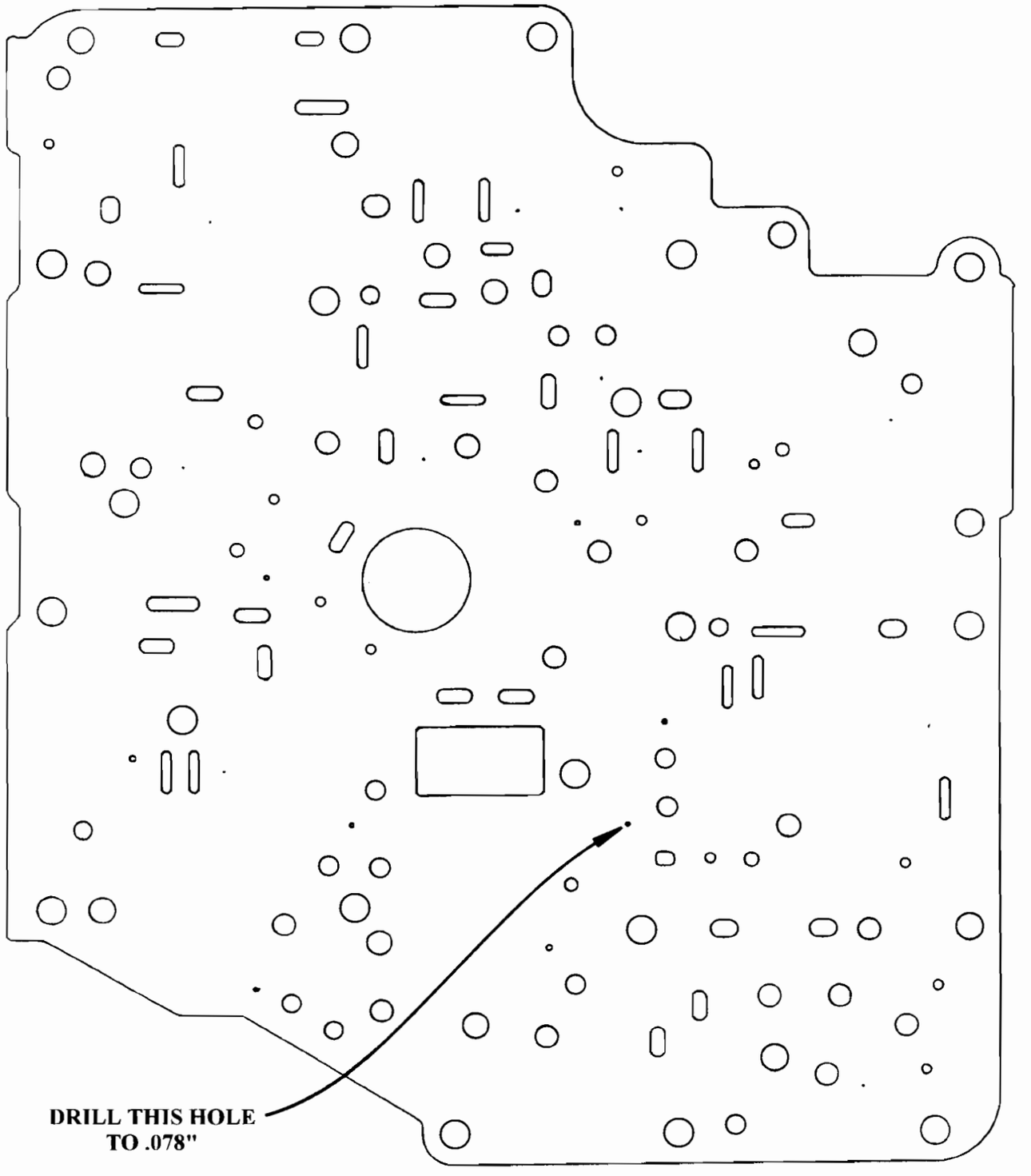
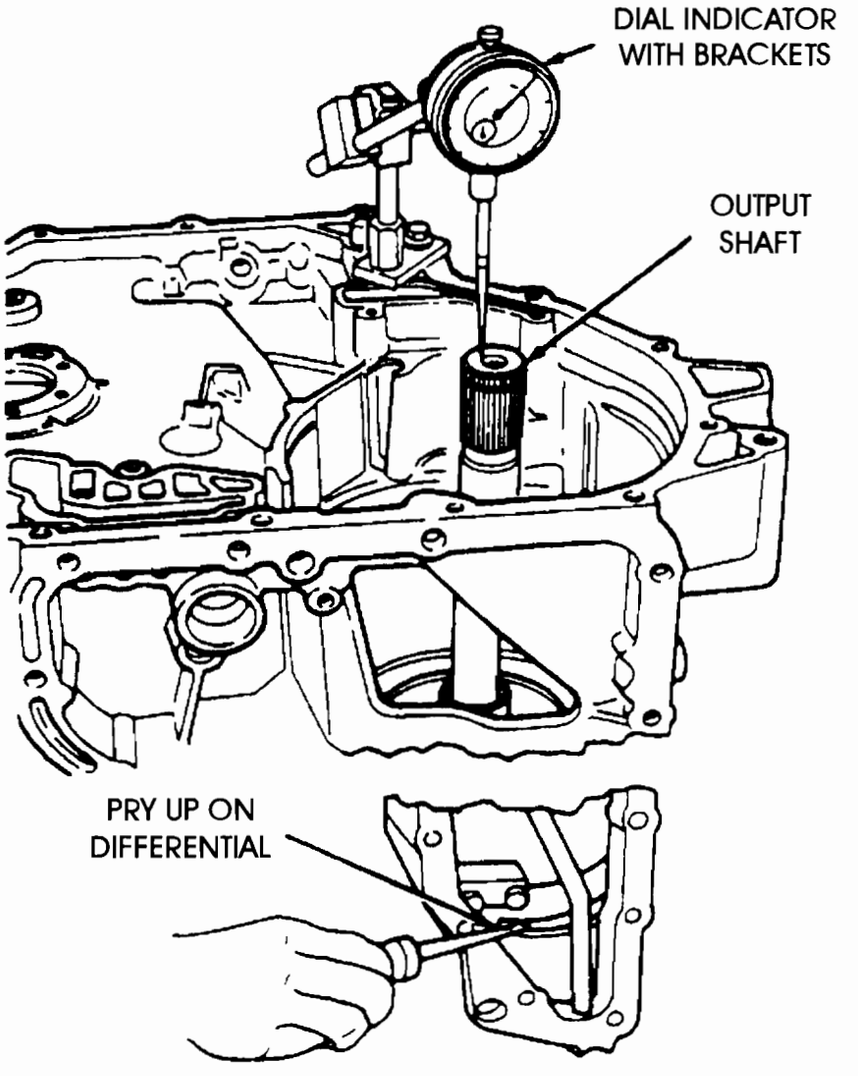


Figure 12

FINAL DRIVE END PLAY MEASUREMENT



FINAL DRIVE END PLAY SHOULD BE .004" MINIMUM TO .016" MAXIMUM.

Figure 13

FORD AXOD-E (AX4S)
CONVERTER CLUTCH SHUDDER
NEW 25 SPLINE TURBINE SHAFT

COMPLAINT: After rebuild, some vehicles equipped with the AXOD-E transaxle may display a torque converter clutch apply shudder, and/or a shudder as the accelerator is pressed without allowing a downshift (Crowd Shudder).
Beginning December 20, 1993, the AXOD-E (AX4S) transaxle was built with a 25 tooth turbine shaft instead of a 23 tooth turbine shaft. The 25 tooth turbine shaft ***requires*** a larger diameter "O" ring seal that does not come in all gasket and seal packages.

CAUSE: The cause may be, the wrong size "O" ring seal (23 Spline) installed onto a 25 spline turbine shaft (See Figure 14).

CORRECTION: If service is required on a transaxle containing the 25 tooth turbine shaft, install the turbine shaft "O" ring with the larger diameter, available under OEM part number F0TZ-6749-B. The turbine shafts can be easily identified by measuring the shaft diameter directly behind the "O" ring location (See Figure 14).
The 23 spline turbine shaft diameter is 1.010", as shown in Figure 14.
The 25 spline turbine shaft diameter is 1.065", as shown in Figure 14.
The drive sprocket support bushing inside diameter did not change, and both turbine shafts will work in the sprocket support. Just make certain that you have the turbine shaft and torque converter matched, and the proper "O" ring installed.

SPECIAL NOTE: We have provided you a chart in Figure 15 to identify your torque converters for the 23 spline and 25 spline versions, as the I.D. numbers have changed and we have provided you with both numbers.

SERVICE INFORMATION:

Turbine Shaft (23 Spline)	E6DZ-7F213-A
Turbine Shaft (25 Spline)	F4DZ-7F213-A
Turbine Shaft "O" Ring (23 Spline)	87022-S94
Turbine Shaft "O" Ring (25 Spline)	F0TZ-6749-B

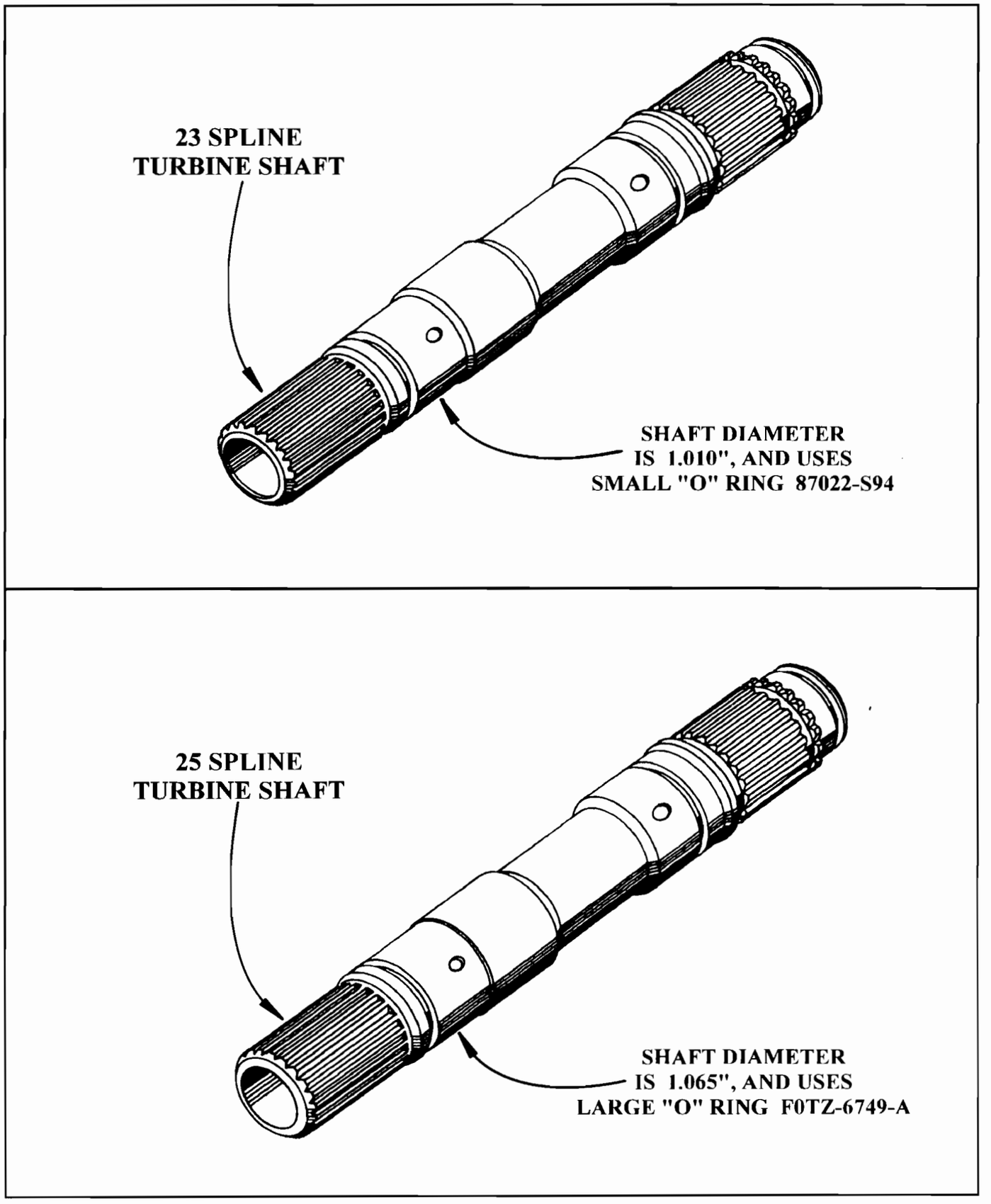
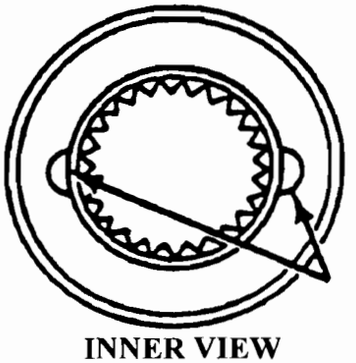


Figure 14
Automatic Transmission Service Group

TORQUE CONVERTER IDENTIFICATION CODE CHART			
OLD I.D. NO.	APPLICATION	NEW I.D. NO.	PART NUMBER
1	1986-1990 3.0L TAURUS/SABLE	34	E6SP-7902-CA
3	1987 3.8L TAURUS/SABLE & CONTINENTAL	46	E7DP-7902-AA
4	1988 3.8L TAURUS/SABLE & CONTINENTAL	46	E7DP-7902-BA
12	1989-1990 3.8L TAURUS/SABLE & CONTINENTAL	47	E9DP-7902-AA
6	1991 3.0L TAURUS/SABLE	53	F1DP-7902-BA
7	1991 3.8L TARUS/SABLE AND POLICE	35	F1DP-7902-CA
11	1991 3.8L CONTINENTAL	48	F1DP-7902-FA
10	1992-1993 3.0L TAURUS/SABLE	37	F2DP-7902-BA
15	1992-1993 3.8L TAURUS/SABLE	38	F2DP-7902-DA
17	1992-1993 3.8L POLICE	40	F2DP-7902-EA
14	1992-1993 3.8L CONTINENTAL	43	F2DP-7902-CA
18	1993-1994 3.2L TAURUS SHO (23 SPLINE)	36	F3DP-7902-BA
19	1994 3.0L TAURUS/SABLE (25 SPLINE)	45	F4DP-7902-AA
24	1994 3.0L TAURUS/SABLE (23 SPLINE)	37	F4DP-7902-BA
29	1994-1995 3.8L TAURUS/SABLE (25 SPLINE)	39	F4DP-7902-CB
25	1994 3.8L TAURUS/SABLE (23 SPLINE)	38	F4DP-7902-CA
26	1994 3.8L CONTINENTAL (23 SPLINE)	43	F4OP-7902-AA
30	1994-1995 3.8L WINDSTAR & 94 CONTINENTAL (25 SPLINE)	44	F4OP-7902-AB
31	1994 3.8L POLICE (25 SPLINE)	41	F4DP-7902-DB
27	1994 3.8L POLICE (23 SPLINE)	40	F4DP-7902-DA
28	1994-1995 3.2L TAURUS SHO (25 SPLINE)	42	F4DP-7902-EA
32	1995 3.0L TAURUS/SABLE & WINDSTAR (25 SPLINE)	45	F6DP-7902-BA
N/A	1995 4.6L CONTINENTAL (25 SPLINE)	20	F5OP-7902-AA



INNER VIEW OF CONVERTER HUB OPENING

TWO "NOTCHES" 180 DEGREES APART INDICATE A 25 SPLINE TURBINE HUB

Figure 15

FORD AXOD & AXODE

ERRATIC UPSHIFTS AND DOWNSHIFTS
ERRATIC LINE PRESSURES
PREMATURE CLUTCH/BAND FAILURE

COMPLAINT: Some vehicles equipped with the AXOD or the AXODE transmission may exhibit a flair 1-2 or 2-3 upshift, 2-1 downshift clunk, non-adjustable throttle pressure, high line pressure, harsh reverse (300 PSI) and clutch and/or band failure from poor line rise.

CAUSE: The cause may be, the boost valve wearing the inside diameter of the boost sleeve. When this occurs, oil that enters the T.V. orifice leaks past the boost valve and exhausts through the reverse orifice. The outside diameter of the boost sleeve also allows some leakage through the valve body (See Figure 16).

CORRECTION: The Sonnax replacement assembly is designed to help eliminate the problems listed above, and is available under Sonnax part number 96201-01K from your transmission parts supplier. The new parts are specially coated to eliminate excessive wear and the two "O" rings provide additional protection against leakage through the valve body, as shown in Figure 16.

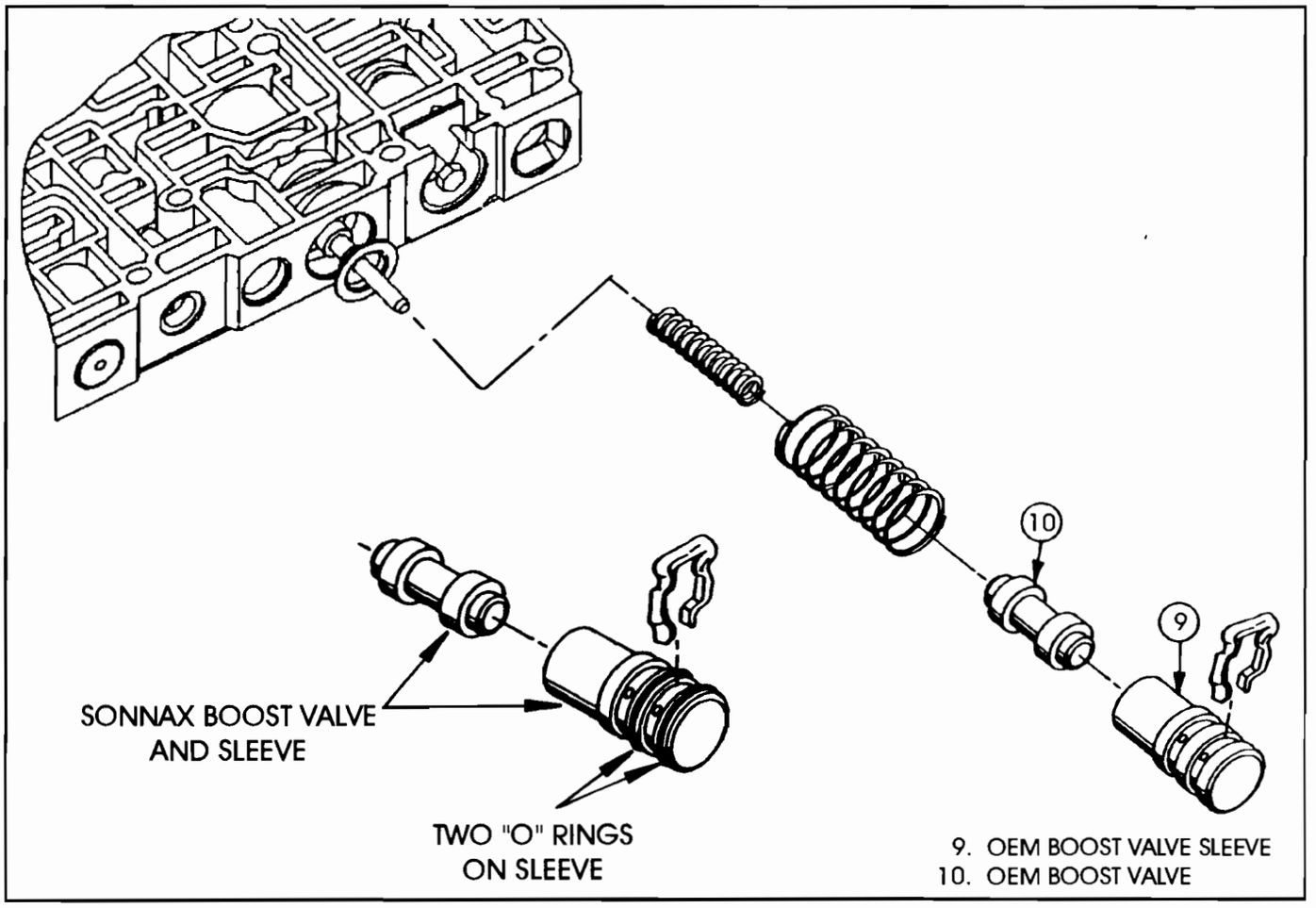


Figure 16

FORD AX4N

REAR PLANETARY SUPPORT SELECTIVE SNAP RING IDENTIFICATION

The AX4N transaxle is ***similar*** to the AXOD-E and found in ***some*** 1994-1995 Taurus and Sable, and found in ***all*** 1995 Lincoln Contintal. The rear planetary support in this unit is retained with a ***selective*** beveled snap ring. The configuration of the end of the snap ring identifies the difference in thickness between the five selective snap rings (See Figure 17).

Service snap rings (Ordered thru Parts Dept.), have a different "Notch" profile, and a different configuration than the originals, on the end of the snap ring to identify the five different selective thickness snap rings as shown in Figure 18.

IF TRANSAXLE TEARDOWN IS NECESSARY:

1. Inspect for "Notches" on the beveled snap ring (See Figure 17). If notches are present, use retaining pliers (T95P-77001-AH) to remove and install the selective beveled snap ring.
2. If notches ***are not*** present, (Not all units have them), the beveled snap ring will be much more difficult to remove, and must be done carefully using a screwdriver.
3. After removal, identify the style beveled snap ring using Figure 17 and record the selective thickness of the beveled snap ring, and then discard the original beveled snap ring.
4. Inspect the transaxle case and rear planetary support for possible damage caused by removing beveled snap ring with a screwdriver.
5. Obtain a new ***service part*** beveled snap ring, with notches (See Figure 18), with the same thickness as the original beveled snap ring, and install the new snap ring using the retaining ring pliers.
6. Perform end clearance check for the rear planetary support using the service manual. If it is not within specification, replace the selective beveled snap ring to obtain proper clearance.

SERVICE INFORMATION:

Beveled Retaining Ring, 1.79mm (.070") Thick	F5DZ-7D483-A
Beveled Retaining Ring, 1.73mm (.068") Thick	F5DZ-7D483-B
Beveled Retaining Ring, 1.67mm (.065") Thick	F5DZ-7D483-C
Beveled Retaining Ring, 1.61mm (.063") Thick	F5DZ-7D483-D
Beveled Retaining Ring, 1.55mm (.061") Thick	F5DZ-7D483-E

AX4N *ORIGINAL* SELECTIVE BEVELED SNAP RING IDENTIFICATION AND THICKNESS

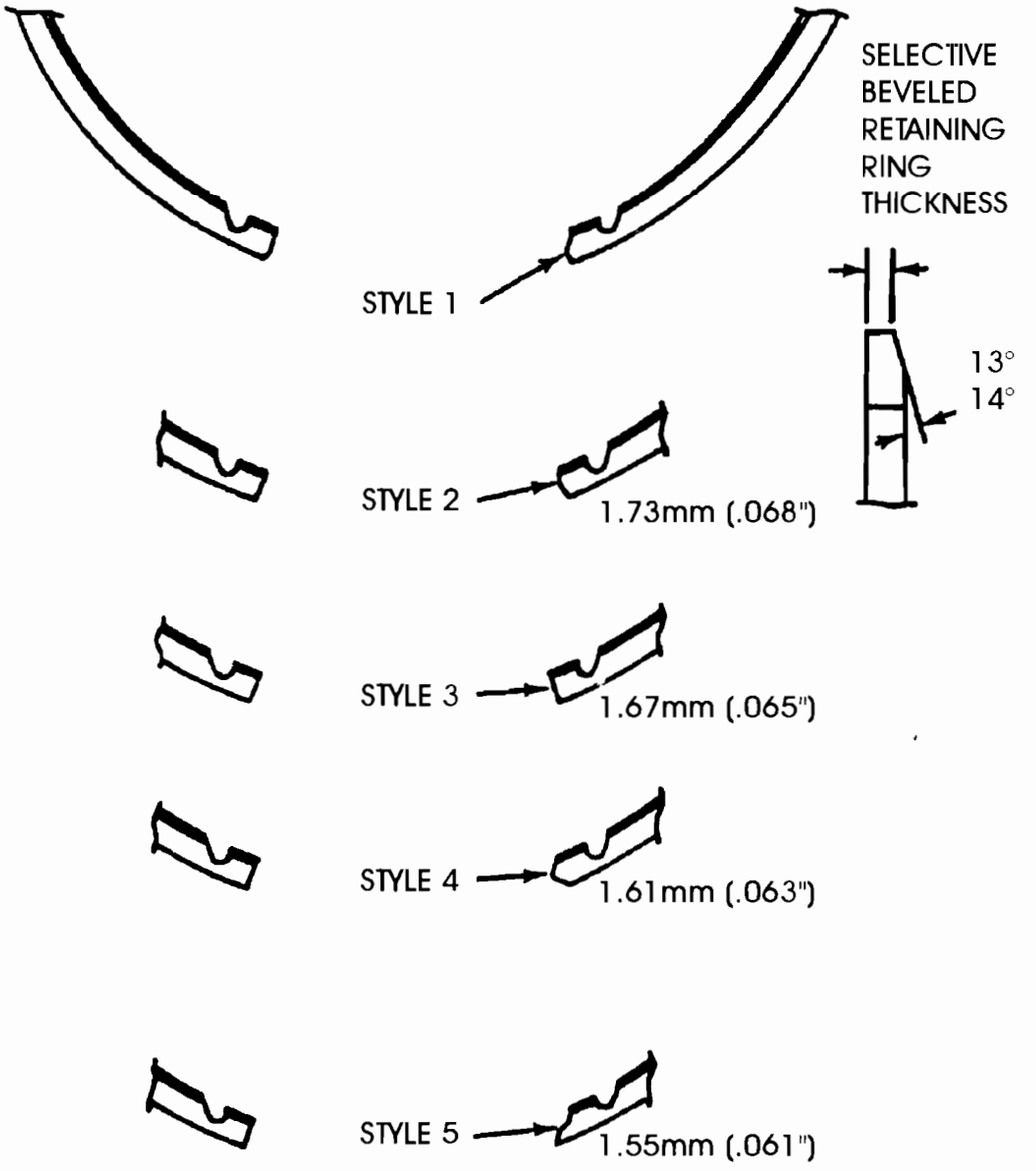


Figure 17

AX4N *SERVICE* SELECTIVE BEVELED SNAP RING IDENTIFICATION AND THICKNESS

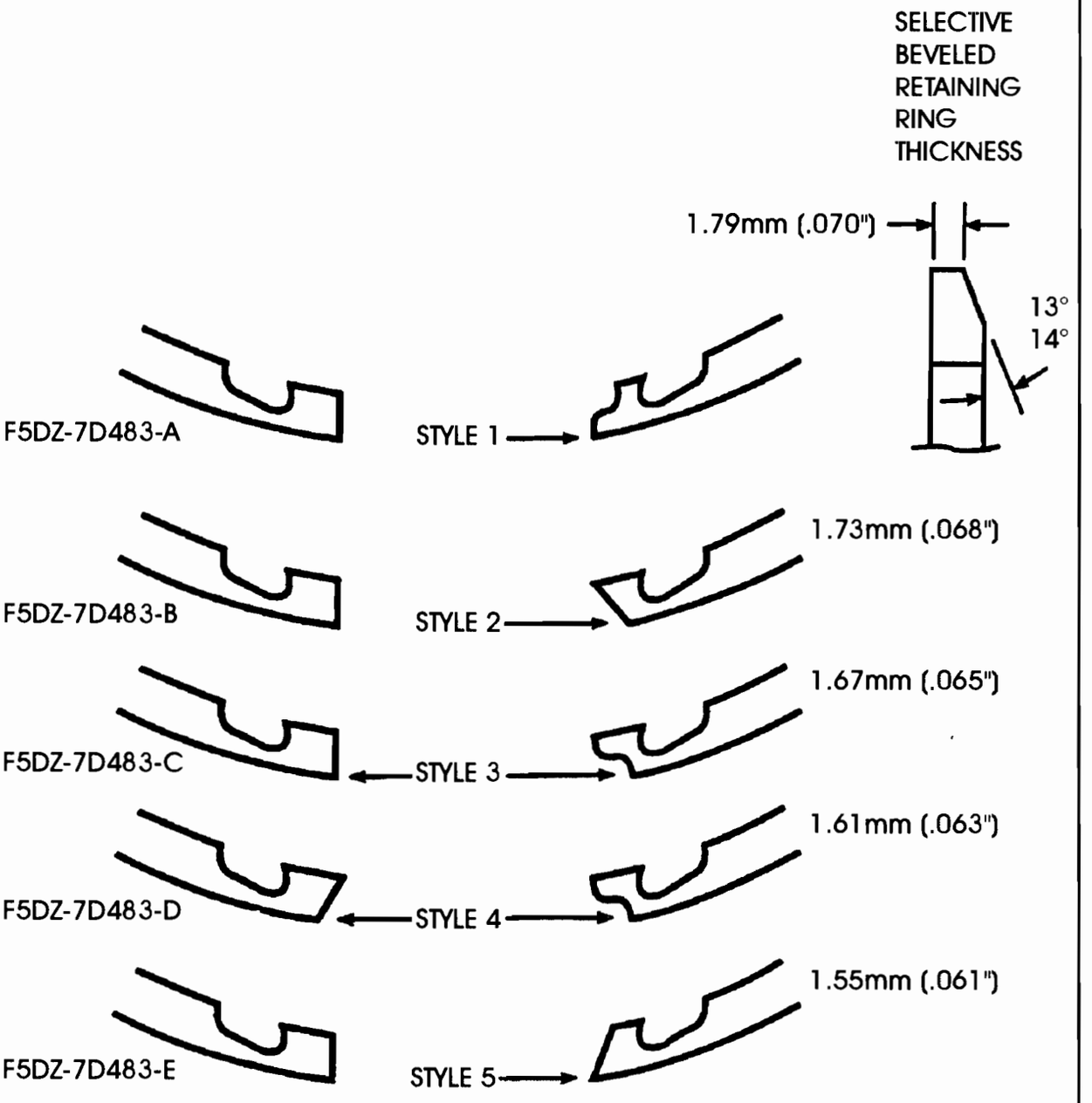


Figure 18

FORD AXOD
HYDRAULICALLY LOCKED T.V. PLUNGER

COMPLAINT: With the engine running, you cannot pull out on the T.V. cable. The accelerator pedal becomes stiff, and difficult to depress. The vehicle will exhibit extremely late and/or no upshifts.

CAUSE: The cause may be one of the following:

1. ***The T.V. Cable not adjusted properly.***
2. ***The T.V. Valve in the valve body stuck.***
3. ***The T.V. Limit Valve in the valve body stuck.***
4. ***The T.V./Line Modulator Valve in the valve body stuck or installed backwards.***
5. ***The B3 Checkball located in the pump is missing, leaking, or off location.***

CORRECTION: Proceed as follows:

1. Install a 0-100 lb. pressure gauge into the T.V. pressure port, which is located on the side of transaxle as shown in Figure 19, and set the T.V. cable so that T.V. pressure reading is between 12-16 PSI.
2. Check the T.V. Valve in the valve body to ensure it is not stuck (See Figure 20).
3. Check the T.V. Limit Valve in the valve body to ensure it is not stuck, and location is shown in Figure 20.
4. Check the T.V./Line Modulator Valve in the valve body to ensure it is not stuck and is installed in the proper direction, as shown in Figure 20.
5. Ensure that the B3 Checkball located in the pump is in the proper location, as shown in Figure 21, and is the proper diameter.

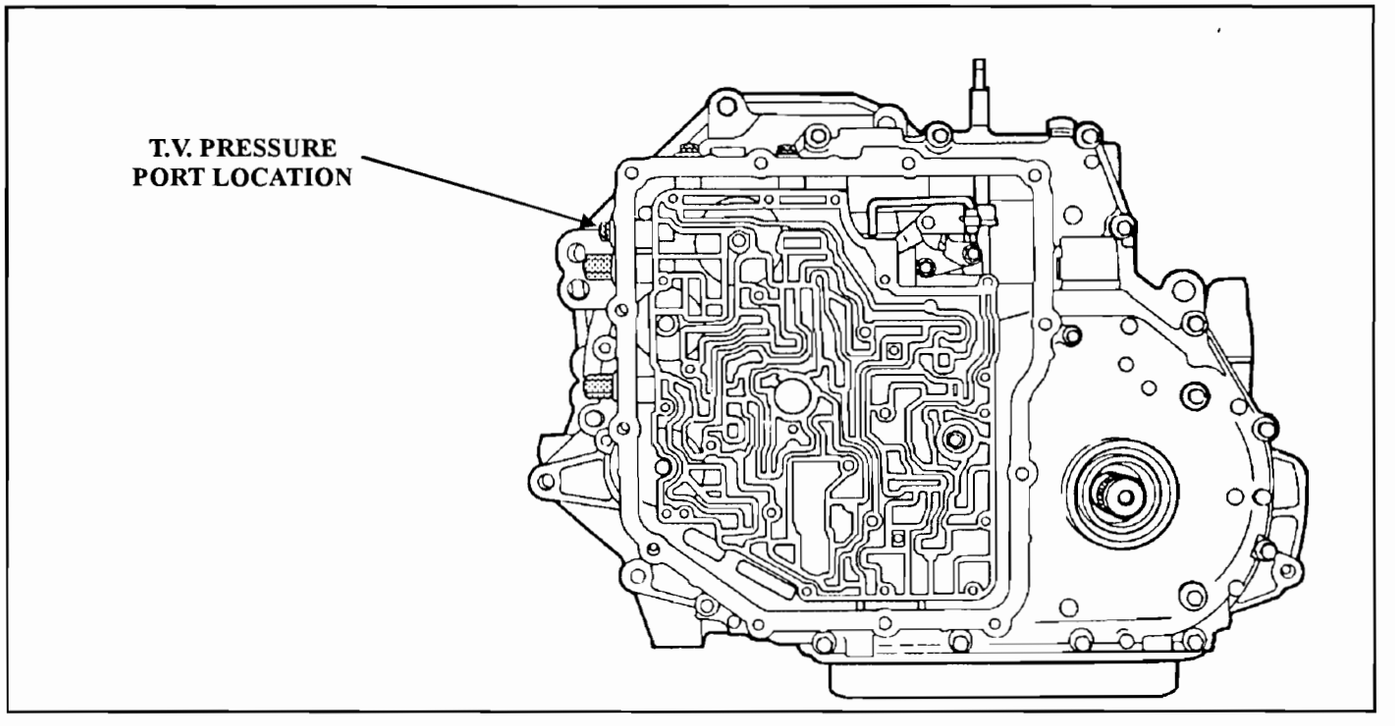
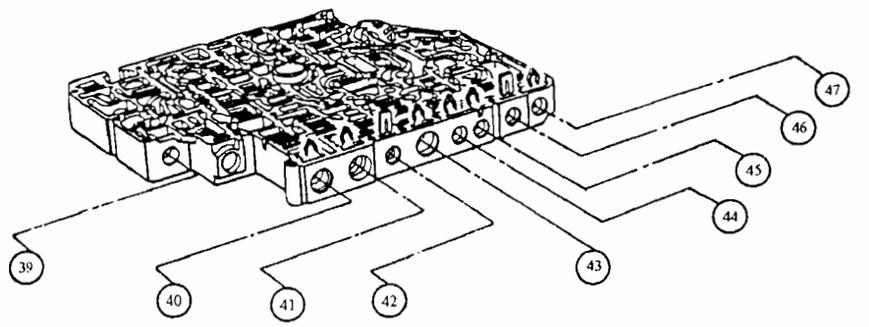
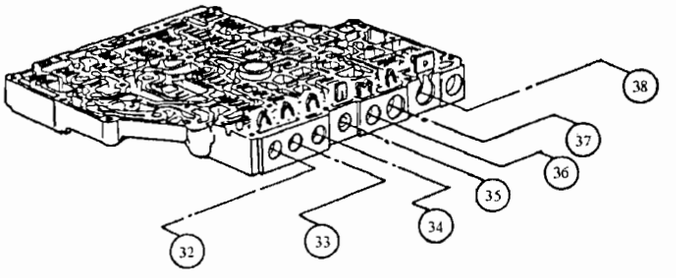
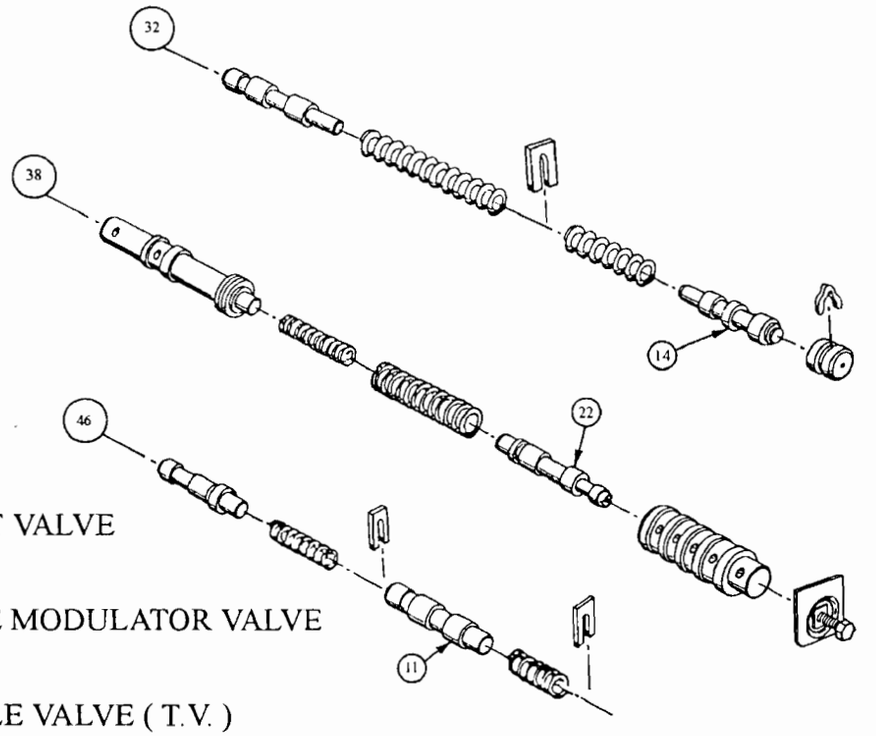


Figure 19







11. T.V. LIMIT VALVE

14. T.V. / LINE MODULATOR VALVE

22. THROTTLE VALVE (T.V.)

Figure 20

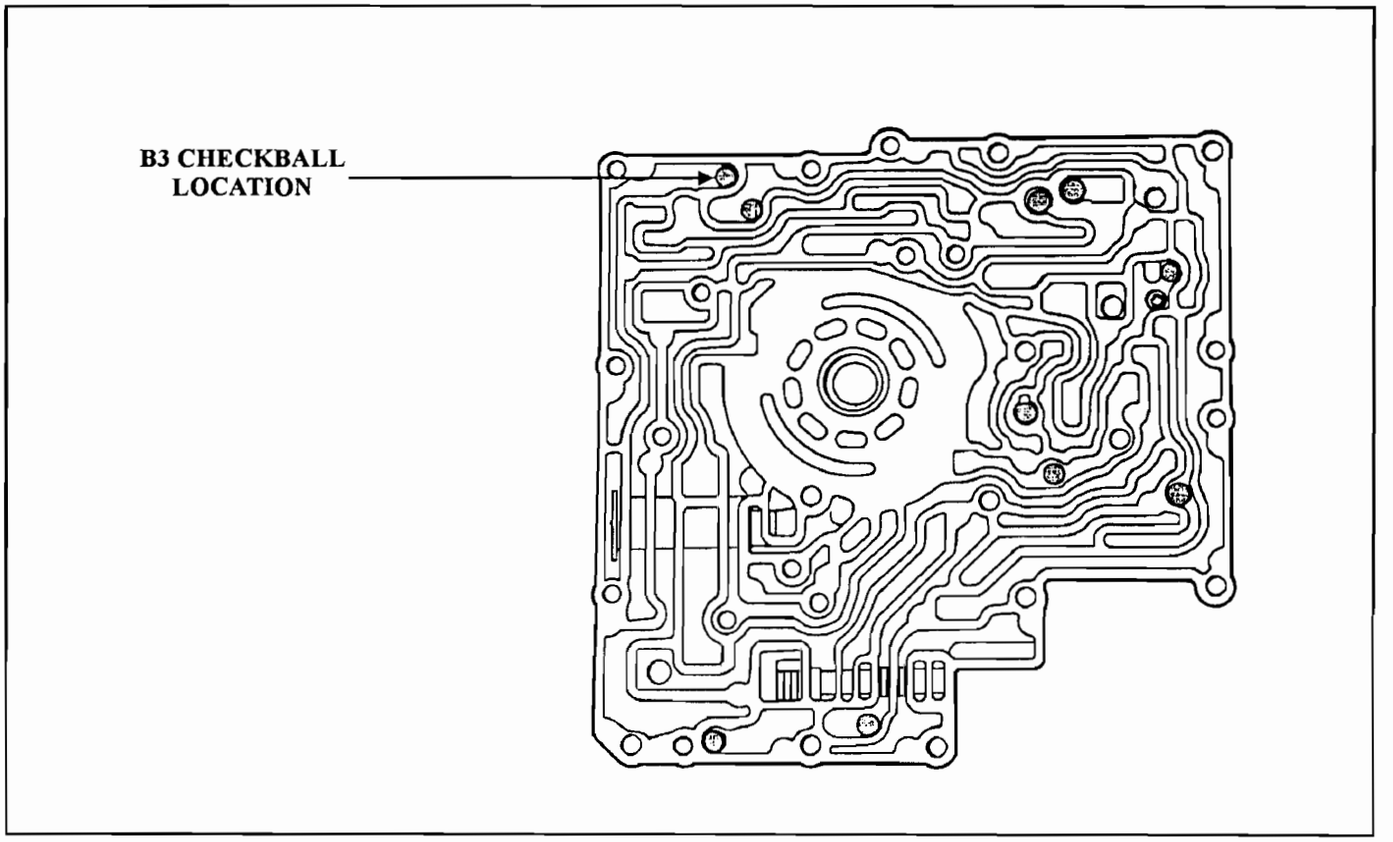


Figure 21

FORD AXOD/AXODE

NO MOVEMENT OR NO CONVERTER CLUTCH

COMPLAINT: Before and/or after rebuild, the vehicle exhibits one of the following:

1. ***"No Movement" in forward or reverse.***
2. ***"No Converter Clutch" apply at any speed.***

CAUSE: The cause may be, one of the following:

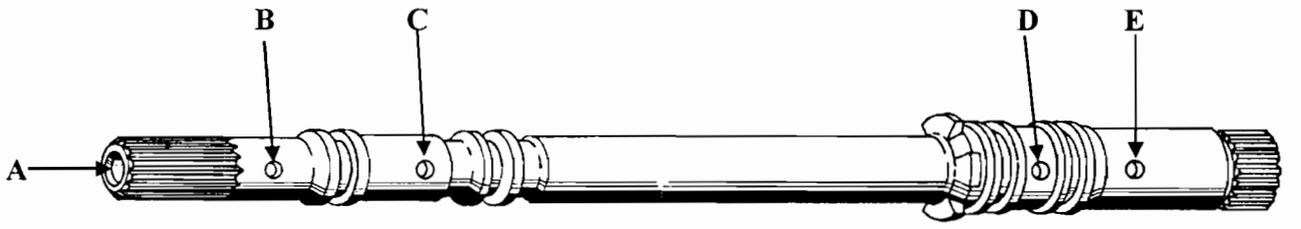
1. ***The converter feed passage in the Oil Pump Drive Shaft blocked with debris or was not machined properly to allow converter feed oil to enter the converter.***
2. ***The Oil Pump Drive Shaft leaking or not machined properly, allowing converter feed passage and converter release passage to be connected.***

CORRECTION: Refer to Figure 22 to ***check*** the Oil Pump Drive Shaft, and clean or replace as necessary.
NOTE: We have seen some replacement shafts, both reman and new that were leaking between the converter apply and release passages.

SERVICE INFORMATION:

Oil Pump Drive Shaft (AXOD/AXODE) E6DZ-7B328-A

OIL PUMP DRIVE SHAFT



NOTE: THERE ARE ADJOINING HOLES ON THE OPPOSITE SIDE OF THE OIL PUMP DRIVE SHAFT THAT ARE NOT ILLUSTRATED.

APPLY AIR PRESSURE INTO HOLE "D" AND ENSURE THAT AIR PRESSURE ESCAPES THROUGH HOLE "C" ONLY.

APPLY AIR PRESSURE INTO HOLE "A" AND ENSURE THAT AIR PRESSURE ESCAPES THROUGH HOLES "B"&"E" ONLY.

Figure 22

FORD AOD-E/4R70W

GEAR TRAIN DIFFERENCES AND IDENTIFICATION

The Ford AOD-E which was introduced in 1992, and the Ford 4R70W which was introduced in 1993, look identical from the external appearances of the transmission, but have different gear ratios as shown in the chart below. This means that the gear train components have different tooth counts and look very similar when compared, but ***will not interchange***. Use this bulletin to identify the gear train components to ensure proper build content.

AOD-E	**4R70W**
1ST = 2.40 Ratio	1ST = 2.84 Ratio
2ND = 1.47 Ratio	2ND = 1.55 Ratio
3RD = 1.00 Ratio	3RD = 1.00 Ratio
4TH = 0.67 Ratio	4TH = 0.70 Ratio
REV = 2.00 Ratio	REV = 2.32 Ratio

OUTPUT SHAFT RING GEAR SUPPORT

There is a different profile on the supports and each support ***requires*** a different style rear case bearing, as shown in Figure 1. The AOD-E transmission ***requires*** a two piece open (needles exposed) rear case bearing that is approximately .113" thick (See Figure 1). The 4R70W transmission ***requires*** a three piece closed (needles not exposed) rear case bearing that is approximately .144" thick (See Figure 1).

OUTPUT SHAFT RING GEAR

The AOD-E has 72 teeth on the Output Shaft Ring Gear, and the direct drum ***will not*** pass through the front side of the ring gear (See Figure 2).
The 4R70W has 88 teeth on the Output Shaft Ring Gear, and the direct drum ***will*** pass through the front side of the ring gear (See Figure 2).

PLANETARY CARRIER ASSEMBLY

The AOD-E has 18 teeth on both the long, and the short pinions, and the thrust plate retaining pins are ***flush*** with the retaining plate (See Figure 3).
The 4R70W has 25 teeth on the long pinions, 24 teeth on the short pinions, and the thrust plate retaining pins are ***recessed*** (See Figure 3).

REVERSE SUN GEAR AND SUN GEAR SHELL

The AOD-E has 36 teeth on the Reverse Sun Gear Shell and the outside diameter of the gear is approximately 2.600" (See Figure 4).
The 4R70W has 38 teeth on the Reverse Sun Gear Shell and the outside diameter of the gear is approximately 2.438" (See Figure 4).

Continued on next Page.

FORWARD CLUTCH SUN GEAR

The AOD-E has 30 teeth on the sun gear and the outside diameter of the gear is approximately 2.225", as shown in Figure 4.
The 4R70W has 31 teeth on the sun gear and the outside diameter of the gear is approximately 2.062", as shown in Figure 4.

OUTPUT SHAFT

The output shaft on the AOD-E transmission is approximately one inch longer than the 4R70W output shaft.

PART NUMBER INFORMATION

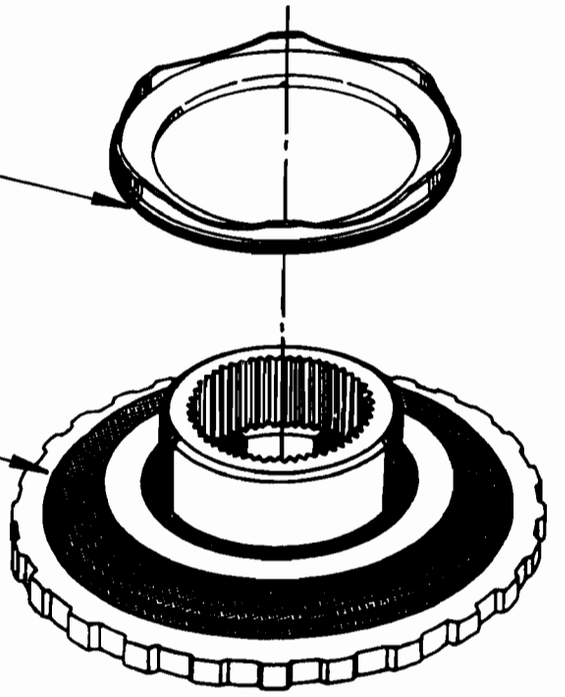
	AOD-E	4R70W
Output Shaft Hub (Support)	F4AZ-7D164-A	F3LY-7D164-B
Rear Case Bearing (Number 9)	E0AZ-2F242-A	F3LY-7F242-A
Output Shaft Ring Gear	F4AZ-7A153-A	F3LY-7A233-A
Planetary Carrier Assembly	F2AZ-7A398-A	F3LY-7A398-A
Forward Clutch Sun Gear	E0AZ-7A399-A	F3LY-7A399-A
Reverse Sun Gear and Shell Assembly	F4AZ-7A019-A	F4SZ-7A019-A

FORD AOD-E
OUTPUT SHAFT RING GEAR SUPPORT AND REAR CASE BEARING IDENTIFICATION

**TWO PIECE (OPEN)
REAR CASE BEARING
APPROX .113" THICK
PART NO. E0AZ-7F242-A**

**DIFFERENT PROFILE ON SUPPORT
AND WILL NOT INTERCHANGE
WITH THE 4R70W**

**RING GEAR SUPPORT PART NO.
FOR THE A0D-E: = F4AZ-7D164-A**



FORD 4R70W
OUTPUT SHAFT RING GEAR SUPPORT AND REAR CASE BEARING IDENTIFICATION

**THREE PIECE (CLOSED)
REAR CASE BEARING
APPROX .144" THICK
PART NO. F3LY-7F242-A**

**DIFFERENT PROFILE ON SUPPORT
AND WILL NOT INTERCHANGE
WITH THE AOD-E**

**RING GEAR SUPPORT PART NO.
FOR THE 4R70W: = F3LY-7D164-B**

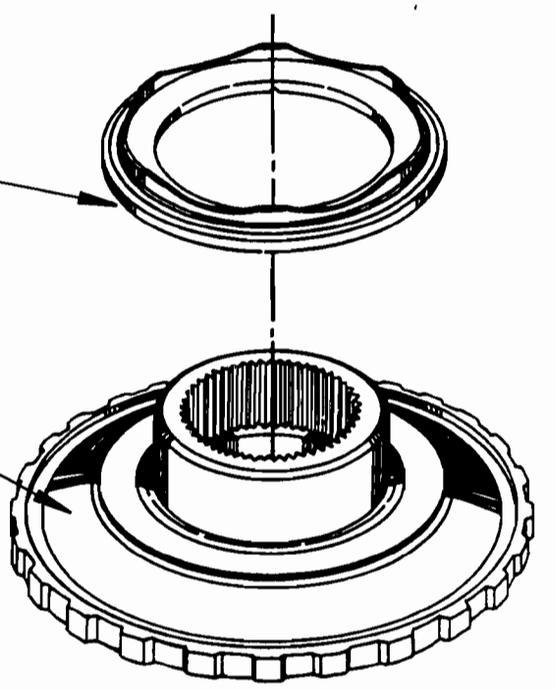
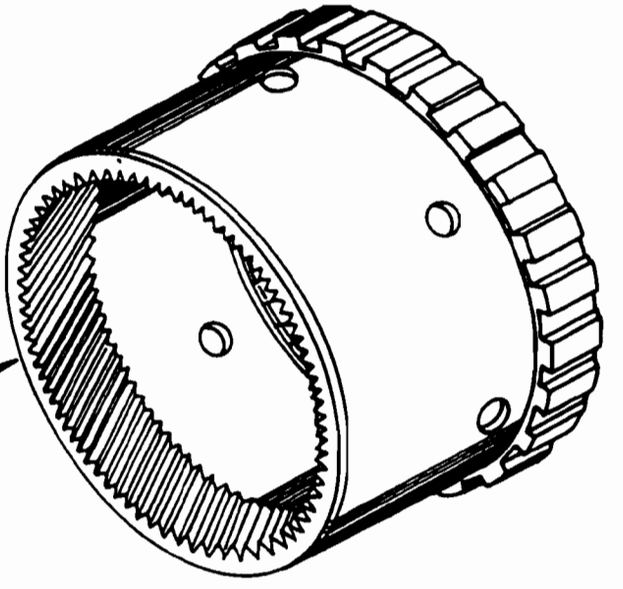


Figure 1

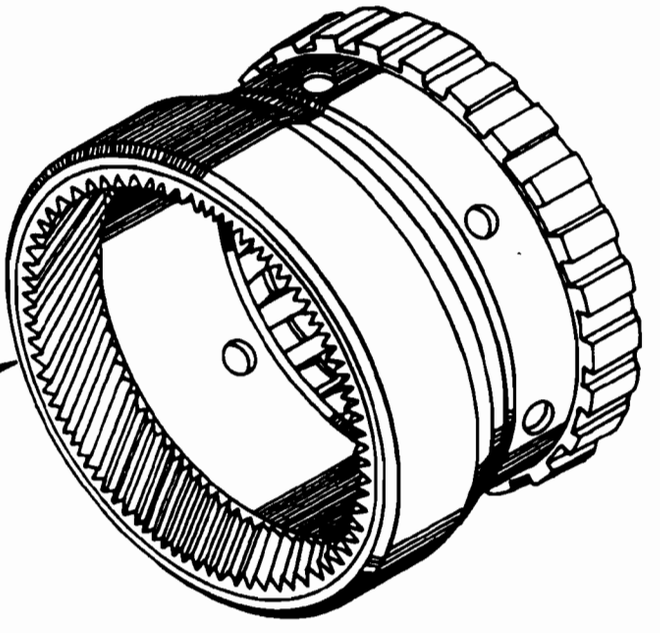
FORD AOD-E
OUTPUT SHAFT RING GEAR
PART NO. F4AZ-7A153-A



72 TEETH, AND THE RING GEAR IS SMALLER IN DIAMETER THAN THE 4R70W RING GEAR

DIRECT CLUTCH HOUSING CANNOT BE REMOVED THROUGH FRONT

FORD 4R70W
OUTPUT SHAFT RING GEAR
PART NO. F3LY-7A233-A

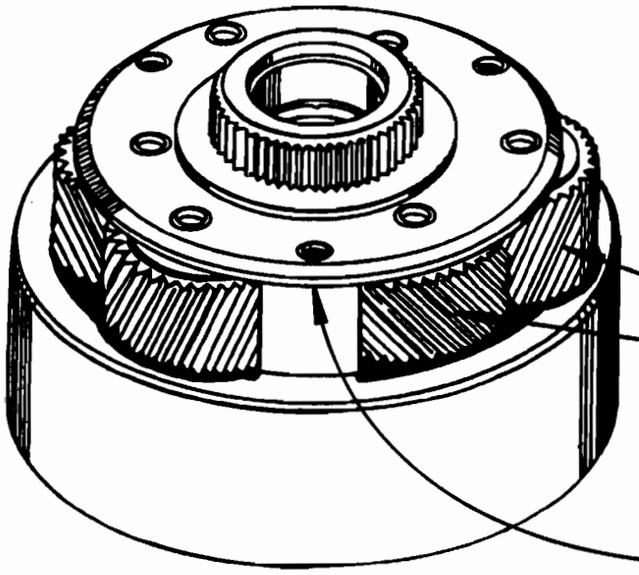


88 TEETH, AND THE RING GEAR IS LARGER DIAMETER THAN THE AOD-E RING GEAR

DIRECT CLUTCH HOUSING CAN BE REMOVED THROUGH FRONT

Figure 2

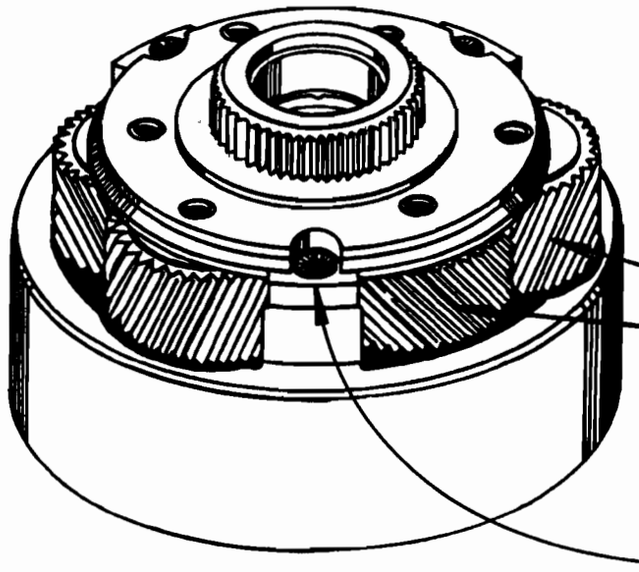
FORD AOD-E
PLANETARY CARRIER ASSEMBLY
PART NO. F2AZ-7A398-A



LONG PINIONS : 18 TEETH
SHORT PINIONS: 18 TEETH

THRUST PLATE RETAINING PINS ARE FLUSH WITH PLATE

FORD 4R70W
PLANETARY CARRIER ASSEMBLY
PART NO. F3LY-7A398-A

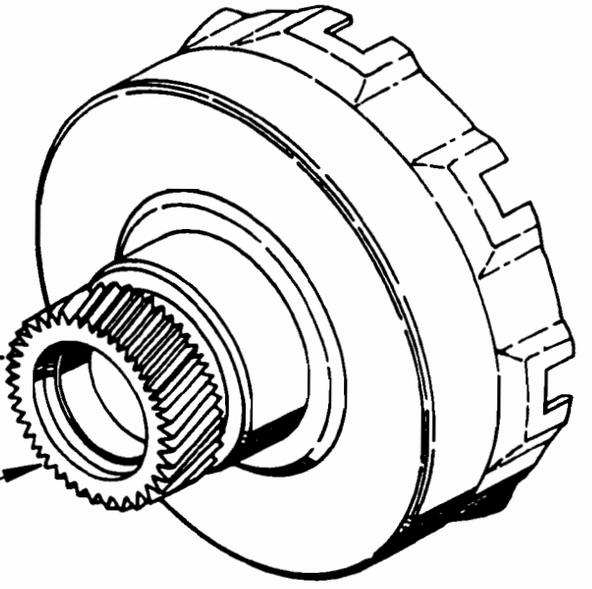


LONG PINIONS: 25 TEETH
SHORT PINIONS: 24 TEETH

THRUST PLATE RETAINING PINS ARE RECESSED ON PLATE

Figure 3

REVERSE SUN GEAR AND SUN GEAR SHELL IDENTIFICATION

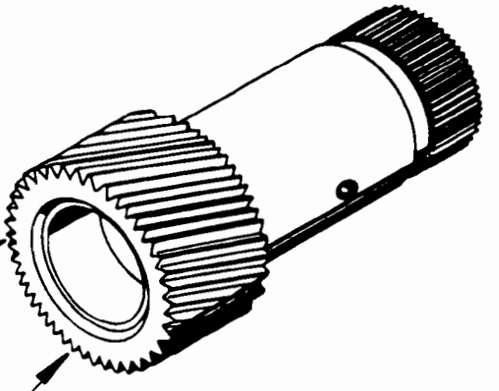


AOD-E: = 36 TEETH ON SUN GEAR
4R70W: = 38 TEETH ON SUN GEAR

AOD-E: = 2.600" OUTSIDE GEAR DIAMETER
4R70W: = 2.438" OUTSIDE GEAR DIAMETER

AOD-E: = PART NO. F4AZ-7A019-A
4R70W: = PART NO. F4SZ-7A019-A

FORWARD CLUTCH SUN GEAR IDENTIFICATION



AOD-E: = 30 TEETH ON SUN GEAR
4R70W: = 31 TEETH ON SUN GEAR

AOD-E: = 2.225" OUTSIDE GEAR DIAMETER
4R70W: = 2.062" OUTSIDE GEAR DIAMETER

AOD-E: = PART NO. E0AZ-7A399-A
4R70W: = PART NO. F3LY-7A399-A

Figure 4

FORD 4R70W

3-NEUTRAL SHIFT AND FORWARD CLUTCHES BURNT

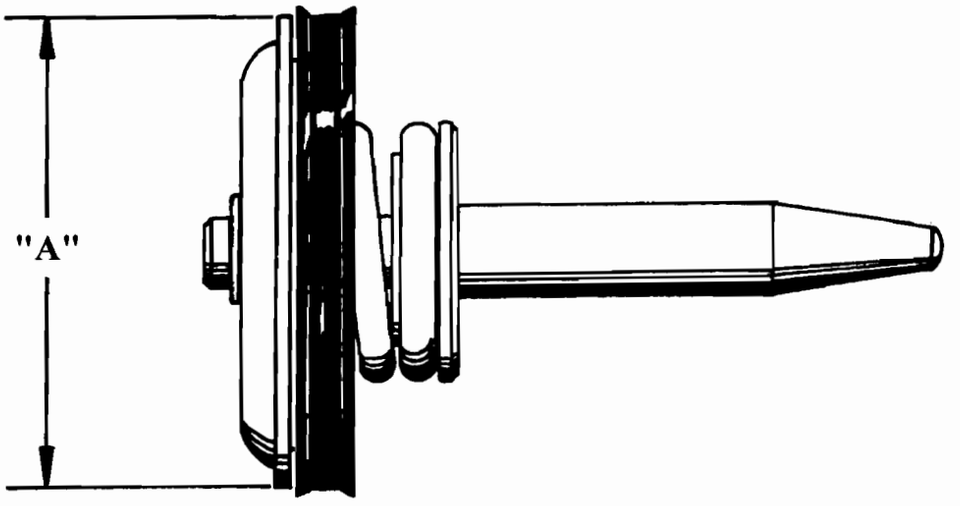
COMPLAINT: After overhaul, the 4R70W transmission displays a 3-neutral upshift, and upon disassembly you find the forward clutches burnt.

CAUSE: The cause may be a mis-assembled Overdrive Servo Assembly, with the "Rubber Coated Sleeve" omitted. The 4R70W transmission is calabrated with a smaller diameter overdrive servo piston than is the AOD-E transmission. To retain a common case between the two transmissions, an additional "Rubber Coated Sleeve" is required on the 4R70W Overdrive Servo Assembly, as shown in Figure 6.

CORRECTION: Install the "Rubber Coated Sleeve" in the Overdrive Servo Assembly, as shown in Figure 6. If your rubber coated sleeve is missing or lost, you ***MUST*** buy the complete Overdrive Servo Assembly, available under OEM part number F3LY-7H188-A. It is not available individually.
Overdrive servo piston dimensions are shown in Figure 5, to identify the two different overdrive pistons.

SERVICE INFORMATION:

4R70W Overdrive Servo Assembly (Includes Sleeve) F3LY-7H188-A
AOD-E Overdrive Servo Assembly F2VY-7H188-A



DIMENSION "A" = 2.470" (4R70W PISTON)
DIMENSION "A" = 2.680" (AOD-E PISTON)

Figure 5

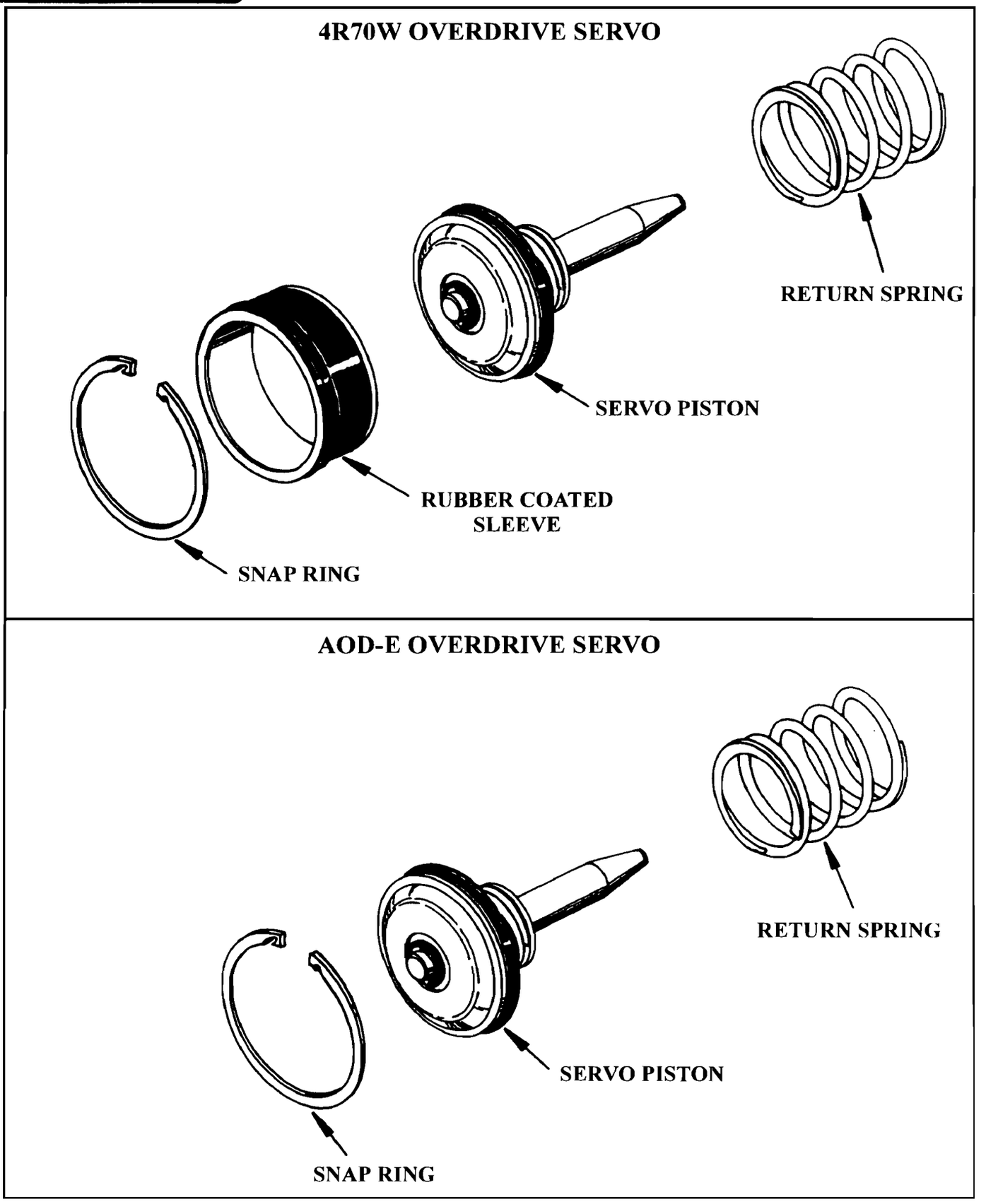

4R70W OVERDRIVE SERVO
RETURN SPRING
SERVO PISTON
RUBBER COATED SLEEVE
SNAP RING
AOD-E OVERDRIVE SERVO
RETURN SPRING
SERVO PISTON
SNAP RING

Figure 6

FORD AODE/4R70W
VALVE BODY AND SPACER PLATE IDENTIFICATION

Beginning at the start of production for 1993 model vehicles, that were equipped with the AODE/4R70W transmission, Ford Motor Company added an Overdrive Cancel Switch to cancel 4th gear (Overdrive), when the selector is in the "OD" position. On the previous 1992 models you must move the selector lever into the "D" position to cancel 4th gear operation.

Both the 1992 and 1993 shift selectors have six detent positions, ***but their functions are different,*** as shown in Figure 7. On 1993 models the "2" position replaces the "D" position, and now provides second gear start and hold. This position can be selected when starting on slippery roads for improved traction, or engine braking.

This changed the valve body and spacer plate between 92 and 93 models, ***and they will not interchange.*** If a 1993 valve body and spacer plate are installed onto a 1992 model vahicle, you will have 2nd gear only with the selector lever in the "D" position.

If a 1992 valve body and spacer plate are installed onto a 1993 model vehicle, you will have a 1-2-3 upshift when the selector is in the "2" position, and the overdrive cancel switch will be inefective.

Refer to Figure 8 for 1992 model valve body and spacer plate identification.
Refer to Figure 9 for 1993 model valve body and spacer plate identification.
Refer to Figure 10 for Transmission Control Switch (TCS) and Transmission Control Indicator Lamp (TCIL) locations for the various 1993 model vehicles equipped with the AODE/4R70W transmission.

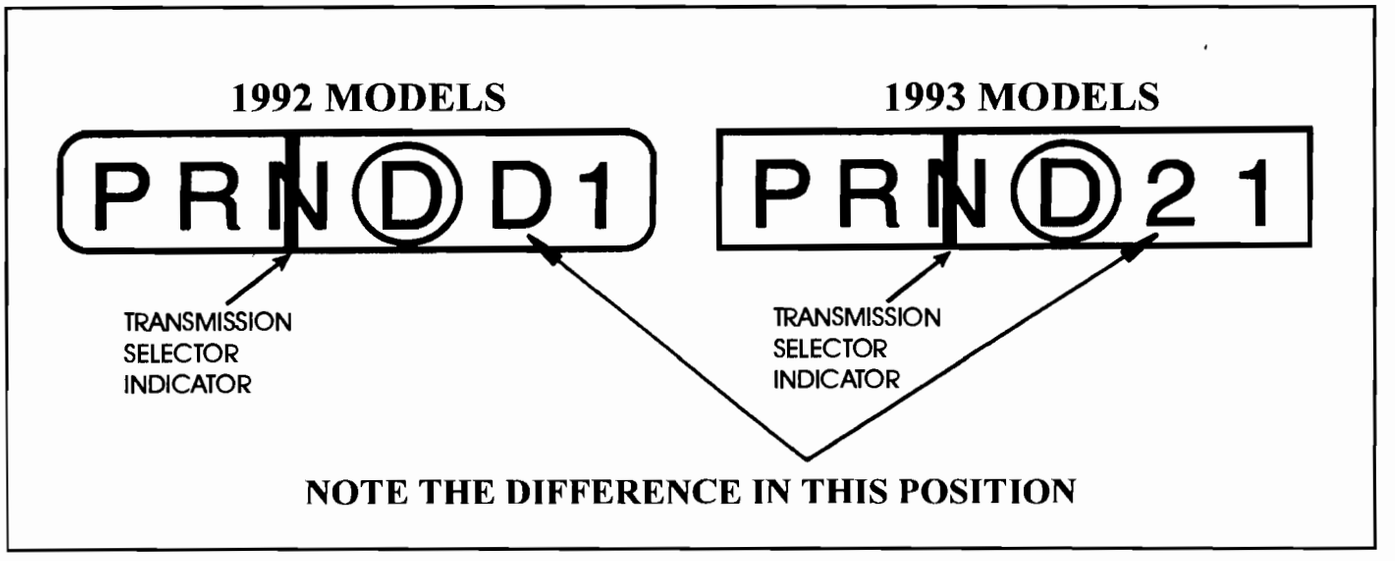


Figure 7

1992 VALVE BODY AND SPACER PLATE

Manual Selector Indicator with OD-D-1, has a 1/8" wide passage in the valve body by the manual valve, and the spacer plate has two (2) additional holes above the manual valve location, as shown below.

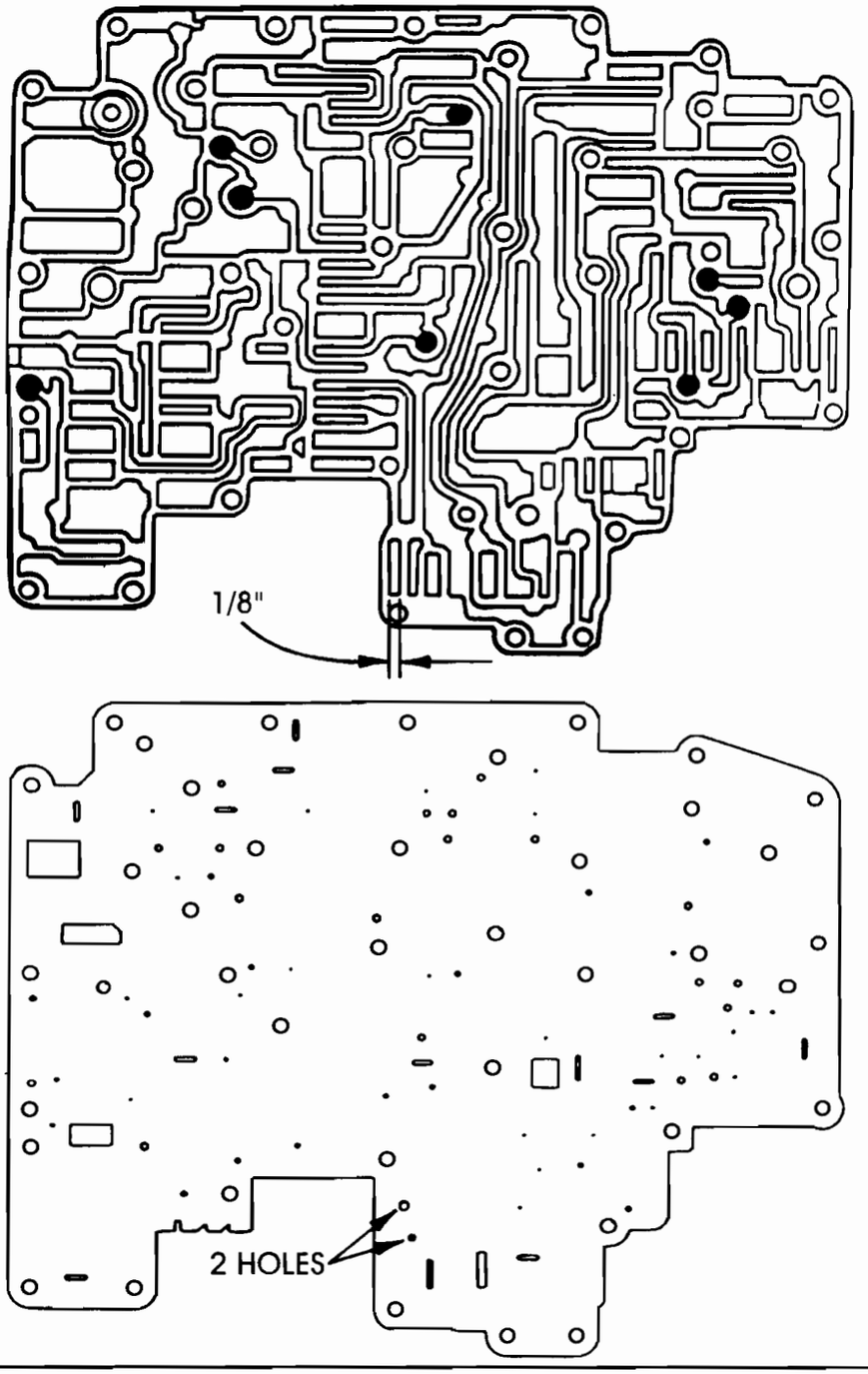


Figure 8

1993 VALVE BODY AND SPACER PLATE

Manual Selector Indicator with OD-2-1, and the Overdrive Cancel Switch, has a 3/8" wide passage in the valve body by the manual valve, and the spacer plate DOES NOT have the two holes above the manual valve location.

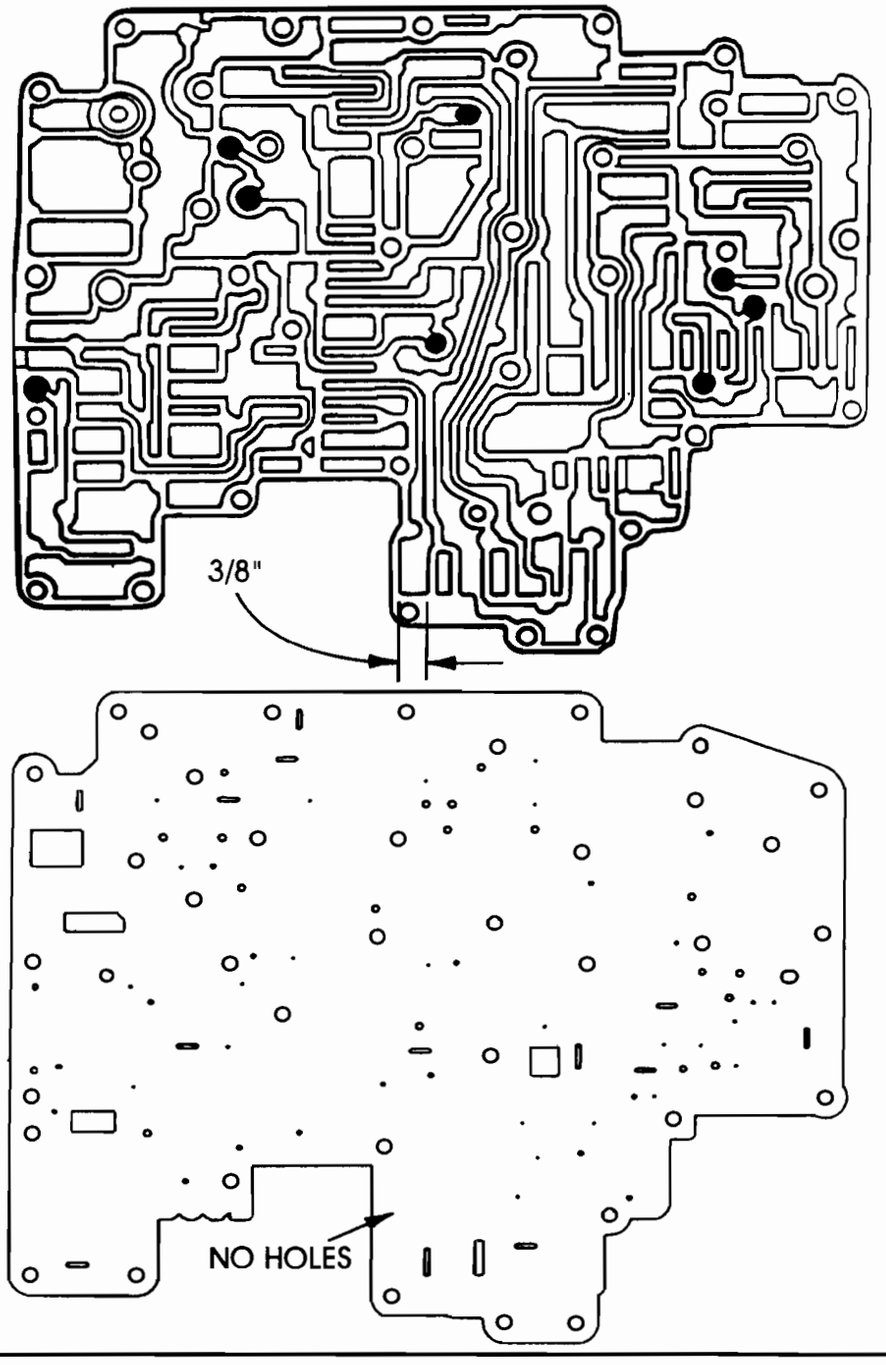
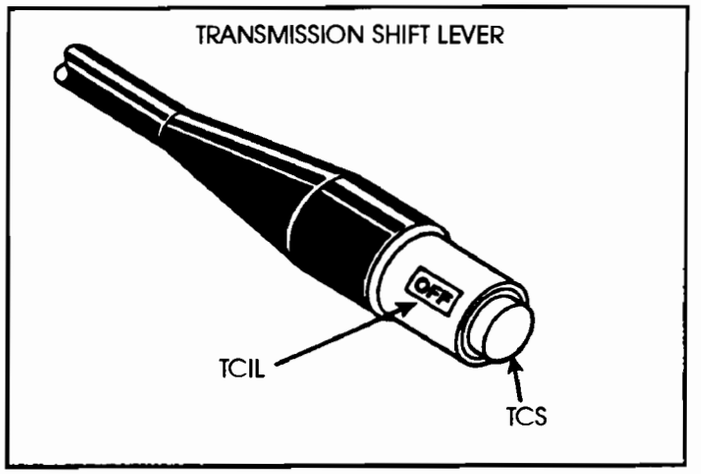
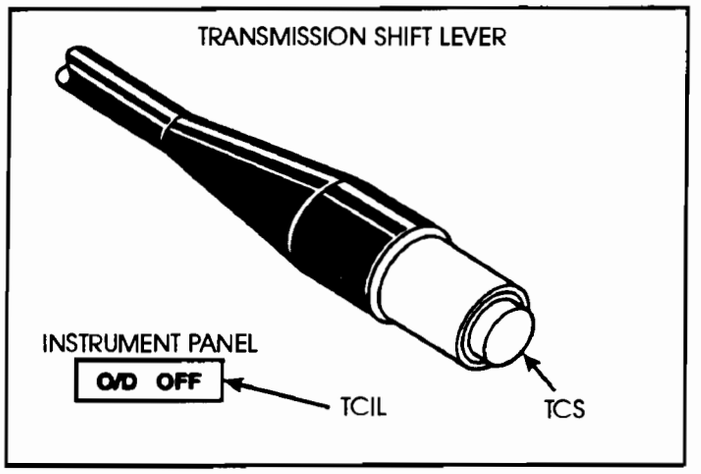


Figure 9

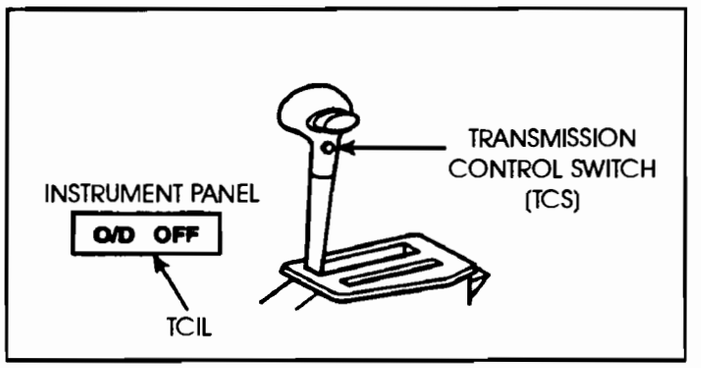
TRANSMISSION CONTROL SWITCH AND TRANSMISSION CONTROL INDICATOR LAMP LOCATIONS AND APPLICATIONS



4R70W - F SERIES TRUCKS
E SERIES VANS



AODE - LINCOLN TOWN CAR
CROWN VICTORIA
GRAND MARQUIS



4R70W - LINCOLN MARK VIII

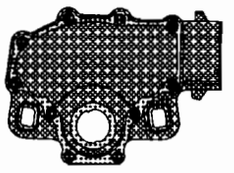
Figure 10

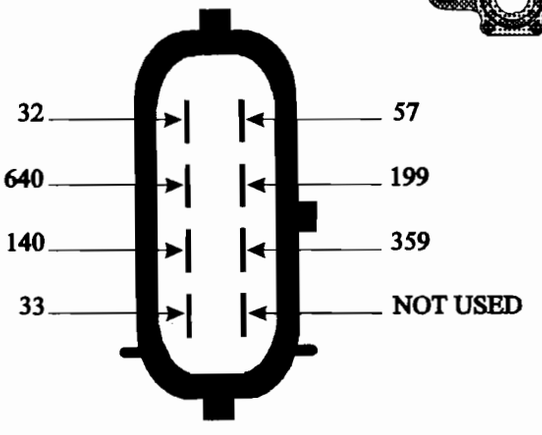
FORD AODE

TESTING MANUAL LEVER POSITION SENSOR
LINCOLN TOWN CAR
1992 MODEL

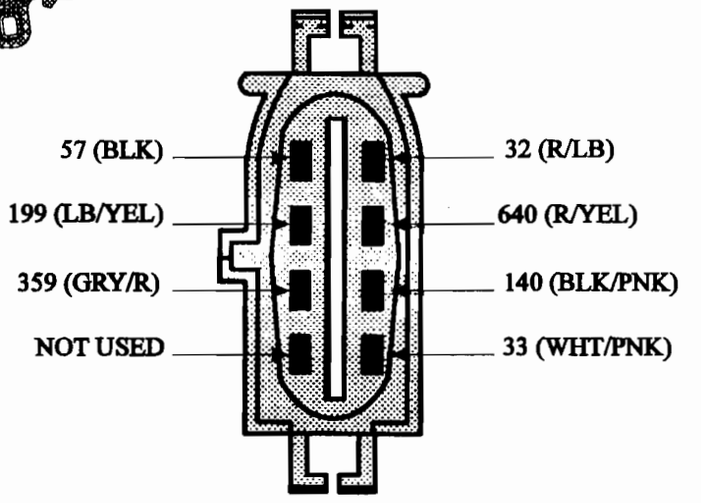
TO TEST	CONNECT OHMMETER TO TERMINALS	MOVE SWITCH TO THESE POSITIONS	A GOOD SWITCH WILL INDICATE
TRANSMISSION CIRCUITS	359 AND 199	PARK REVERSE NEUTRAL OVERDRIVE SECOND(2) MANUAL LOW(1)	3770-4607 OHMS 1304-1593 OHMS 660-807 OHMS 361-442 OHMS 190-232 OHMS 78-95 OHMS
BACKUP LAMP CIRCUIT	640 AND 140	PARK REVERSE NEUTRAL OVERDRIVE SECOND(2) MANUAL LOW(1)	OPEN CIRCUIT CLOSED CIRCUIT OPEN CIRCUIT OPEN CURCUIT OPEN CIRCUIT OPEN CIRCUIT
STARTER RELAY CIRCUIT	32 AND 33	PARK REVERSE NEUTRAL OVERDRIVE SECOND(2) MANUAL LOW(1)	CLOSED CIRCUIT OPEN CIRCUIT CLOSED CIRCUIT OPEN CIRCUIT OPEN CIRCUIT OPEN CIRCUIT

SENSOR VIEW





VEHICLE HARNESS VIEW
TERMINAL SIDE

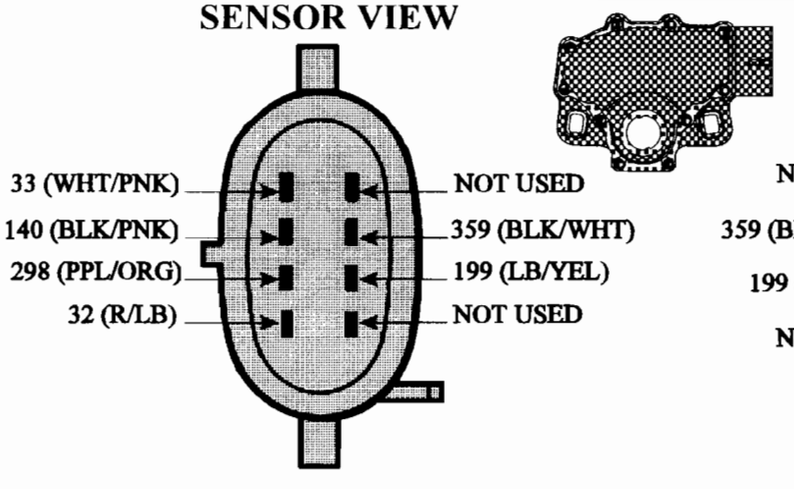


FORD AODE

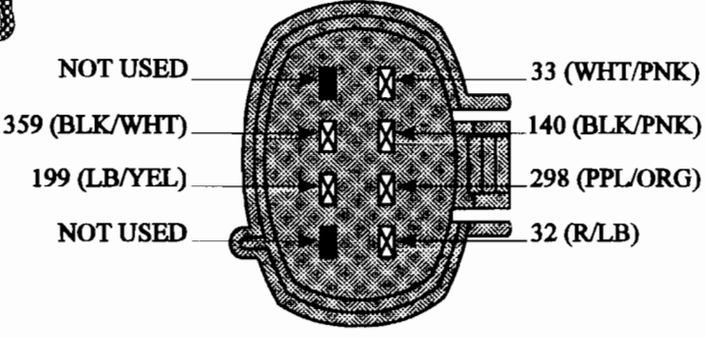
TESTING MANUAL LEVER POSITION SENSOR
CROWN VICTORIA, GRAND MARQUIS, LINCOLN TOWN CAR
1993 MODELS

TO TEST	CONNECT OHMMETER TO TERMINALS	MOVE SWITCH TO THESE POSITIONS	A GOOD SWITCH WILL INDICATE
TRANSMISSION CIRCUITS	359 AND 199	PARK REVERSE NEUTRAL OVERDRIVE SECOND(2) MANUAL LOW(1)	3770-4607 OHMS 1304-1593 OHMS 660-807 OHMS 361-442 OHMS 190-232 OHMS 78-95 OHMS
BACKUP LAMP CIRCUIT	298 AND 140	PARK REVERSE NEUTRAL OVERDRIVE SECOND(2) MANUAL LOW(1)	LESS THAN 5.0 OHMS GREATER THAN 100K OHMS LESS THAN 5.0 OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS
STARTER RELAY CIRCUIT	33 AND 32	PARK REVERSE NEUTRAL OVERDRIVE SECOND(2) MANUAL LOW(1)	GREATER THAN 100K OHMS LESS THAN 5.0 OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS GREATER THAN 100K OHMS

SENSOR VIEW



VEHICLE HARNESS VIEW
TERMINAL SIDE



FORD A4LD

OVERRUN CLUTCH RETURN SPRINGS AND RETAINER DESTROYED

COMPLAINT: Before and/or after rebuild, the overrun clutch springs and the overrun clutch spring retainer are destroyed, from what appears to be a ***"twisting"*** motion.

CAUSE: The cause may be:

1. Poorly supported overdrive planetary carrier, allowing the inside diameter of the hub on the overdrive carrier to come in contact with, and turn in a ***"twisting"*** motion, the overrun clutch spring retainer. This will destroy the retainer and the return springs in a very short period of time (See Figure 1).

   NOTE: The dimension, or clearance between the outside diameter of the overrun clutch spring retainer, and the inside diameter of the overdrive carrier hub is extremely critical (See Figure 1).

2. Bent and/or improperly installed overrun clutch spring retainer will also drastically affect the clearance between the retainer and the carrier hub. If the retainer is bent even slightly while removing the snap ring, it should be replaced with a new one.

CORRECTION: A. Inspect and replace the following, as necessary:

1. Turbine shaft bushings in the pump stator for wear and/or damage.
2. Turbine shaft splines (Overdrive Carrier End) for wear and/or damage.
3. Turbine shaft splines in the overdrive carrier, for wear and/or damage.
4. Bushing in the front end of the output shaft for wear and/or damage. This bushing supports the forward clutch drum, and the overdrive center shaft. Replace bushing on ***all*** units during rebuild (See Figure 2).
   NOTE: In later applications a caged needle bearing is used in this location. Inspect and replace as necessary (See Figure 2).
5. Overrun clutch housing bushing for wear and/or damage (See Figure 3).

B. Ensure that the overrun clutch spring retainer is supported evenly, using an outer pump gear when compressing the return springs to avoid ***any*** distortion. ***This is critical, and is easily distorted with any uneven pressure.***

SERVICE INFORMATION:

Overrun Clutch Spring Retainer E5TZ-7A527-A

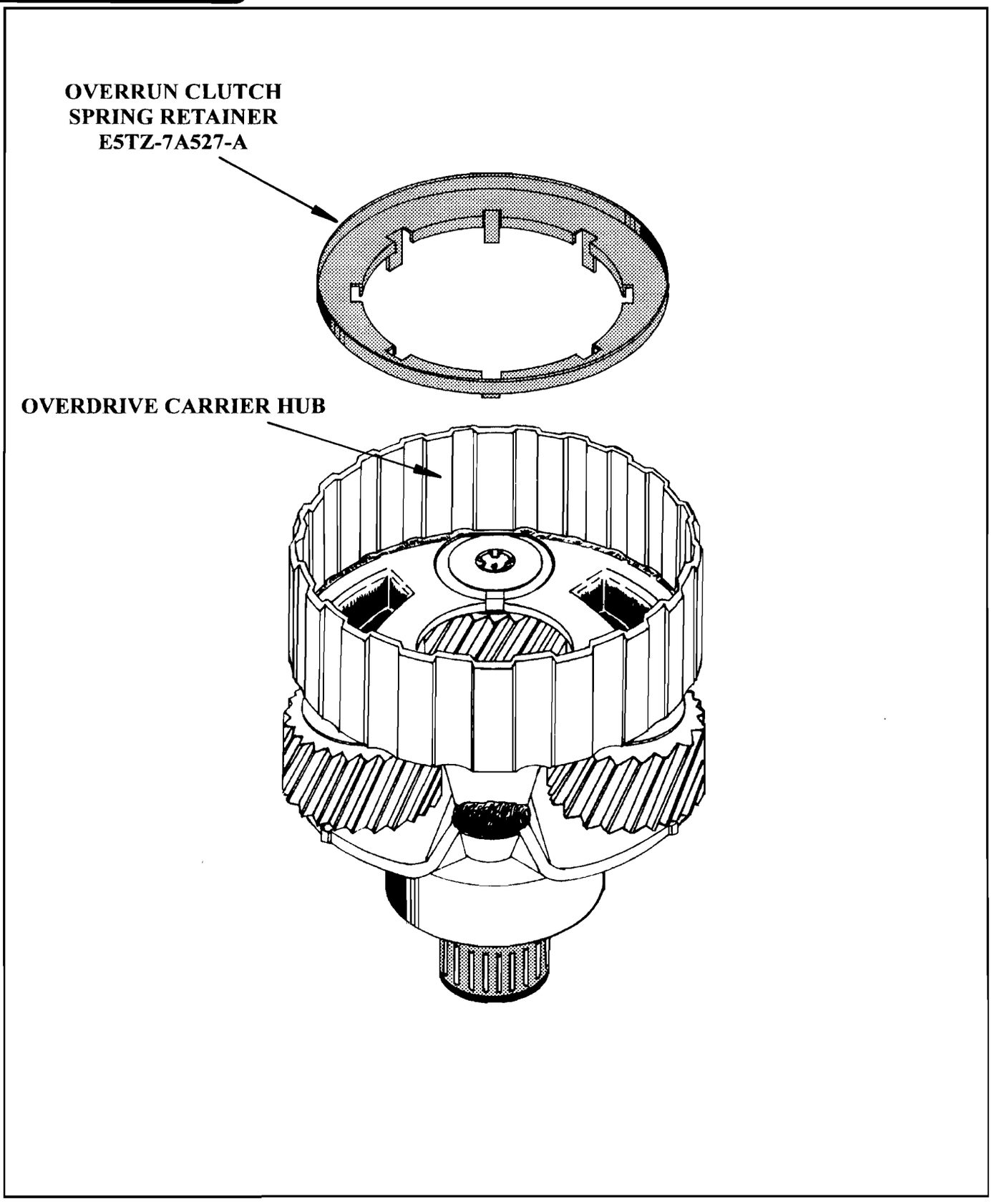

OVERRUN CLUTCH
SPRING RETAINER
E5TZ-7A527-A
OVERDRIVE CARRIER HUB

Figure 1

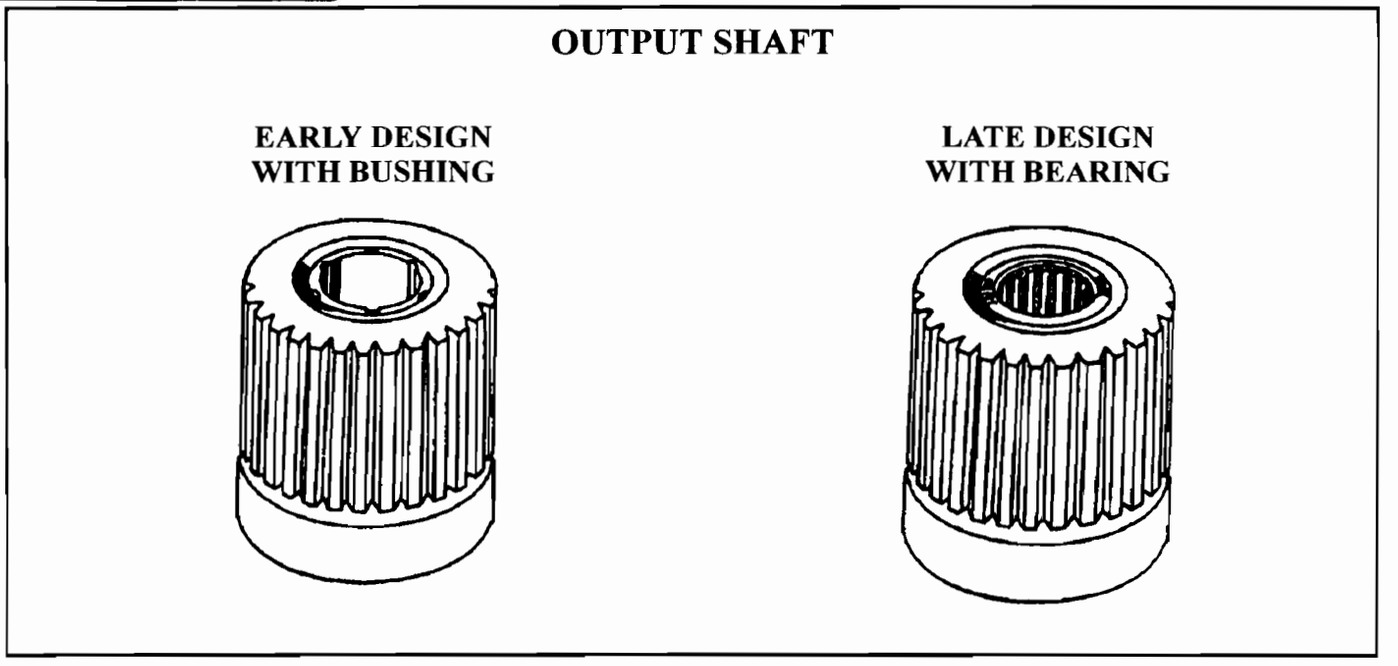


Figure 2

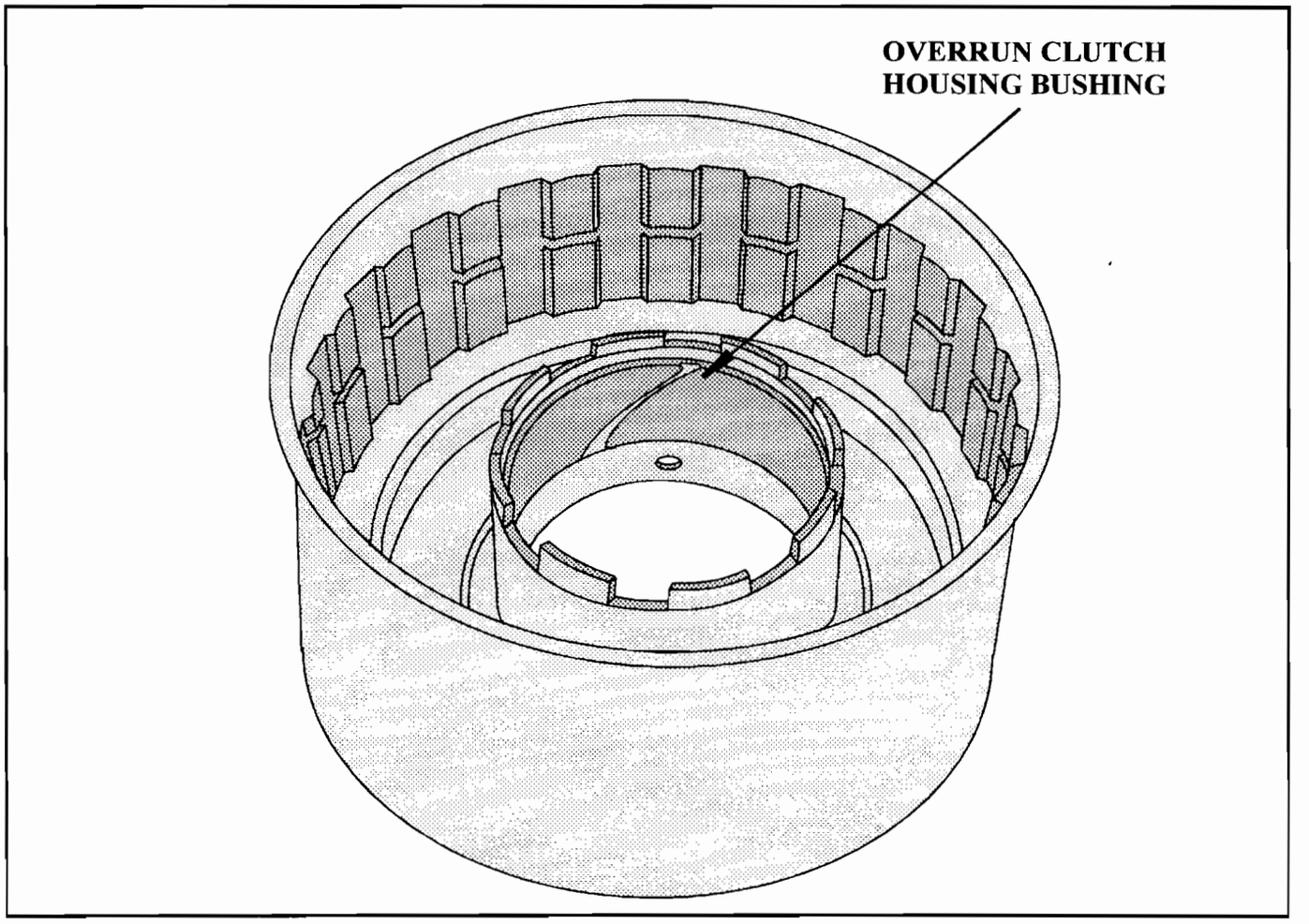


Figure 3

FORD A4LD
"TIE-UP" IN THE PARK POSITION

COMPLAINT: After rebuild, your A4LD transmission exhibits a "Tie-Up" condition, when the selector lever is placed into the Park position.

CAUSE: The cause may be, an improperly adjusted manual valve. The .075" "Puck" supplied in some gasket sets and in some valve body kits, ***will not work on all models.*** On ***some*** valve bodies, using the "Puck" to adjust the manual valve, will allow the manual valve to move past the Park position and apply the forward clutch.

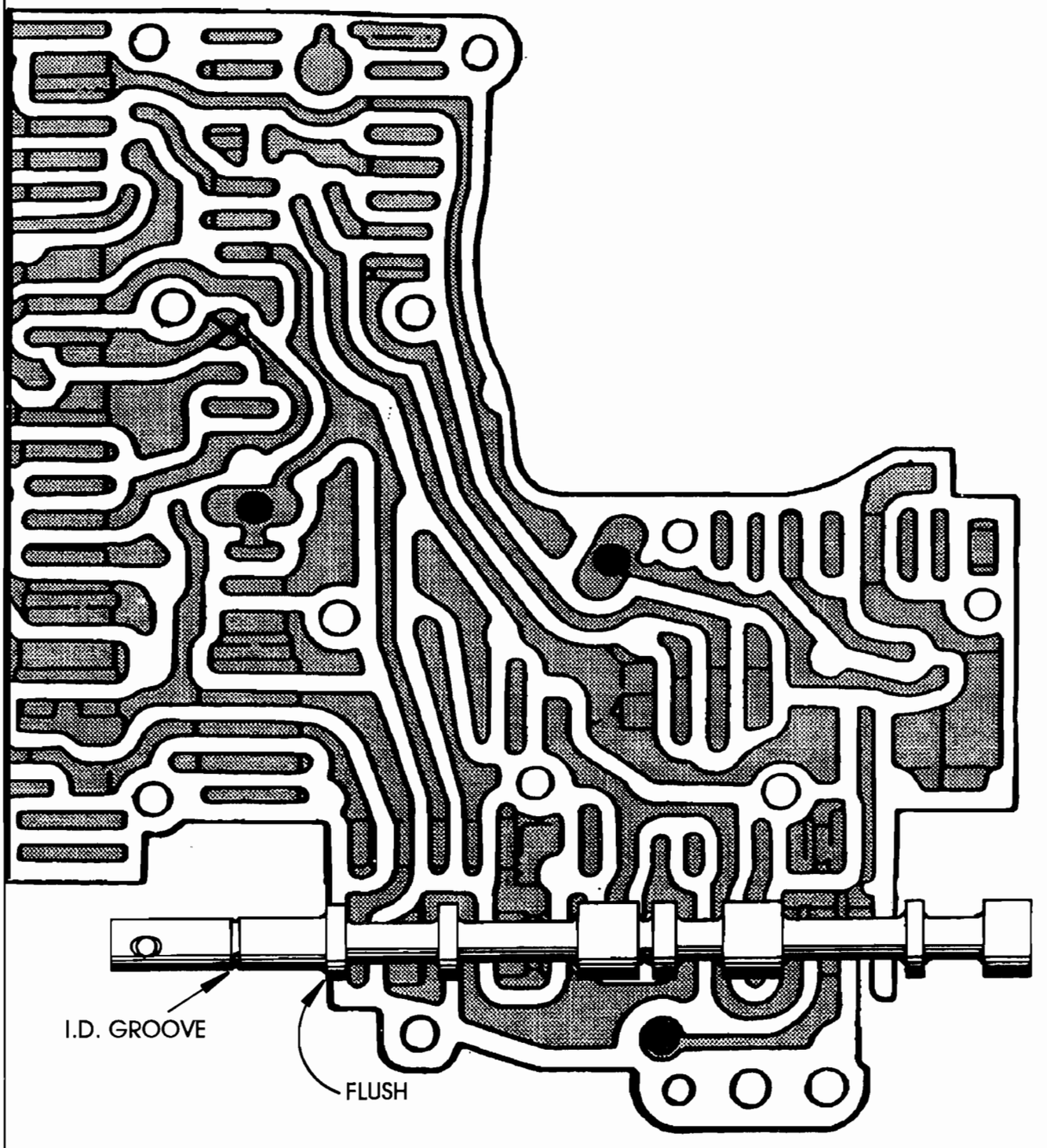
CORRECTION: Check the manual valve adjustment as follows:

1. Measure the link hole in the manual valve to ensure that it is .157" in diameter, and has not elongated due to wear. It is also recommended to use the latest design valve from Ford Motor Company, with the I.D. groove near the link hole, and available under OEM part number E8TZ-7C389-A (See Figure 4).
2. With the valve body installed on the transmission, place the manual lever into the "D2" position.
3. With the manual lever in the "D2" position, the 1st land on the manual valve should be flush with the valve body casting, as shown in Figure 4. However, approximately .010" below flush to .020" above flush with the valve body casting is acceptable.
4. Bend the manual valve link as necessary to achieve the dimensions listed above.

SERVICE INFORMATION:

Manual Valve (Latest Design) E8TZ-7C389-A

A4LD MANUAL VALVE ADJUSTMENT



WITH THE MANUAL LEVER IN THE "D2" POSITION, THE FIRST LAND ON THE MANUAL VALVE SHOULD BE FLUSH WITH THE VALVE BODY CASTING, AS SHOWN ABOVE.

Figure 4

FORD A4LD

VALVE BODY AND SPACER PLATE IDENTIFICATION

COMPLAINT: There have been many minor changes in several of the valve trains in the valve bodies on the A4LD transmission over the years, which also affects the compatability of the spacer plate for the valve body you are using. Mis-matching these parts will create a wide variety of different complaints, depending on how they have been mis-matched.

CAUSE: Mis-matching of the valve body and spacer plates. Not all will interchange.

CORRECTION: **BORE 211, *1ST DESIGN:* (1-2 TRANSITION VALVE)**

This bore contains the 1-2 Transition Valve and is located as shown in Figure 5. Notice the location of the No. 2 retainer in the valve body is also shown in Figure 5. Figure 6 shows the "Large Hole" spacer plate that is ***required*** on the valve body with the 1st design bore 211. Figure 6 also identifies the holes that were eliminated on the 2-solenoid valve bodies.

BORE 211, *2ND DESIGN:* (1-2 TRANSITION VALVE)

The 2nd design valve train has eliminated two springs and incorporated two spool valves into one, as shown in Figure 7. Figure 8 shows the "Small Hole" spacer plate that is ***required*** with the 2nd design line-up in bore 211.

NOTE: The 1st design bore 211 parts are not compatable with the 2nd design valve body casting, because the orifice control valve and the 1st design valve body bore are smaller in diameter.

BORE 207, *1ST DESIGN:* ("WITHOUT" REVERSE ENGAGEMENT VALVE)

Figure 9 shows the correct line-up for this bore, and the No. 2 retainer location in the valve body casting. Figure 10 shows the "Slot" in the spacer plate that is ***required*** for the 1st design bore 207, "Without" reverse engagement valve.

BORE 207, *2ND DESIGN:* ("WITH" REVERSE ENGAGEMENT VALVE)

This is when the reverse engagement control valve was added to bore 207, as shown in Figure 11, and also shows the location of the No. 2 retainer in the valve body casting and the direction of the bore plugs. Figure 12 shows the "3 Hole" spacer plate that is ***required*** on valve bodies containing the reverse engagement control valve.

NOTE: Valve body castings are also different in the worm track area, when it comes to bore 207. Compare the inset in Figure 9 to the inset in Figure 11, and you will see the difference in the passages, which will not allow you to install reverse engagement valve into a 1st design valve body casting.

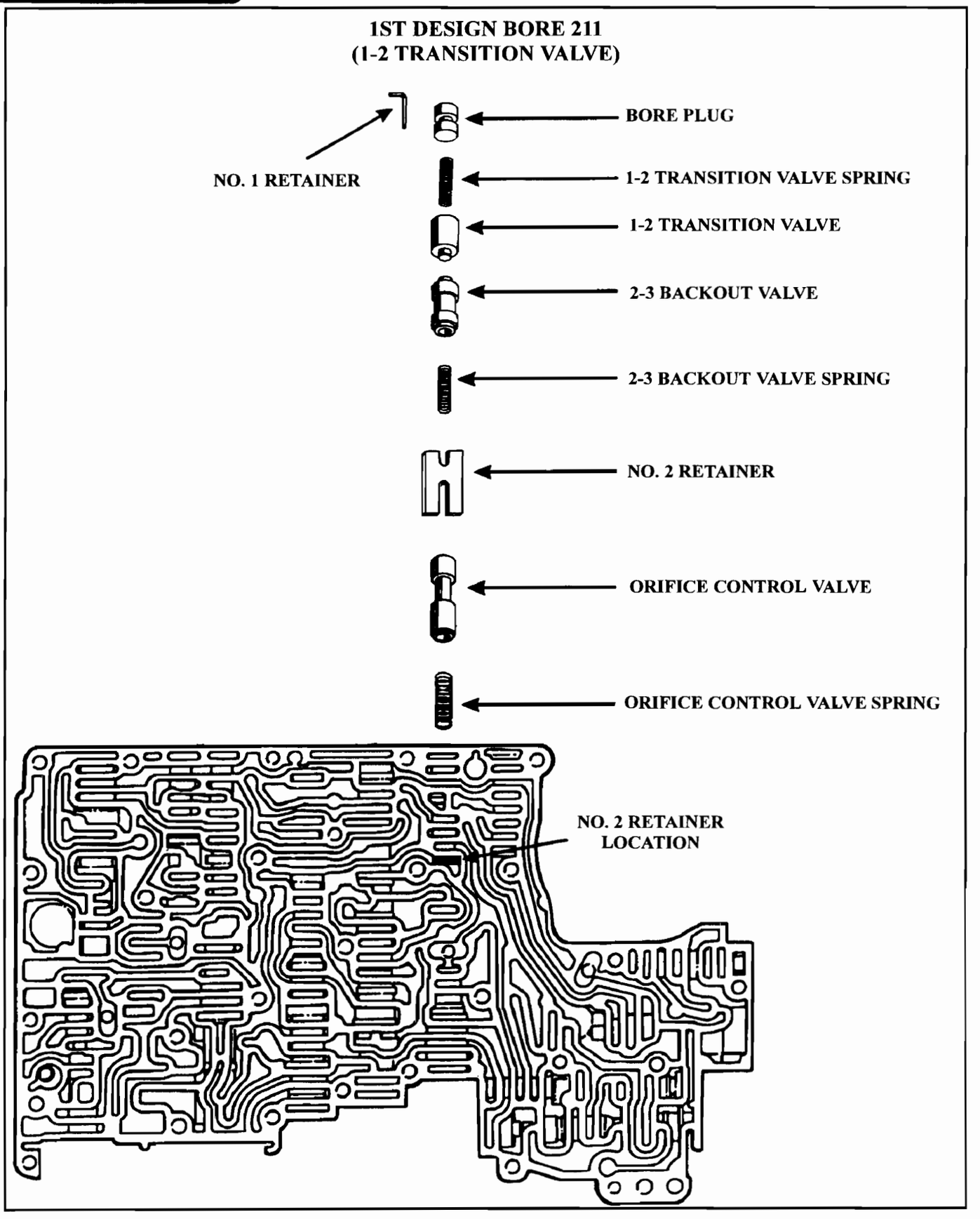


Figure 5

Automatic Transmission Service Group

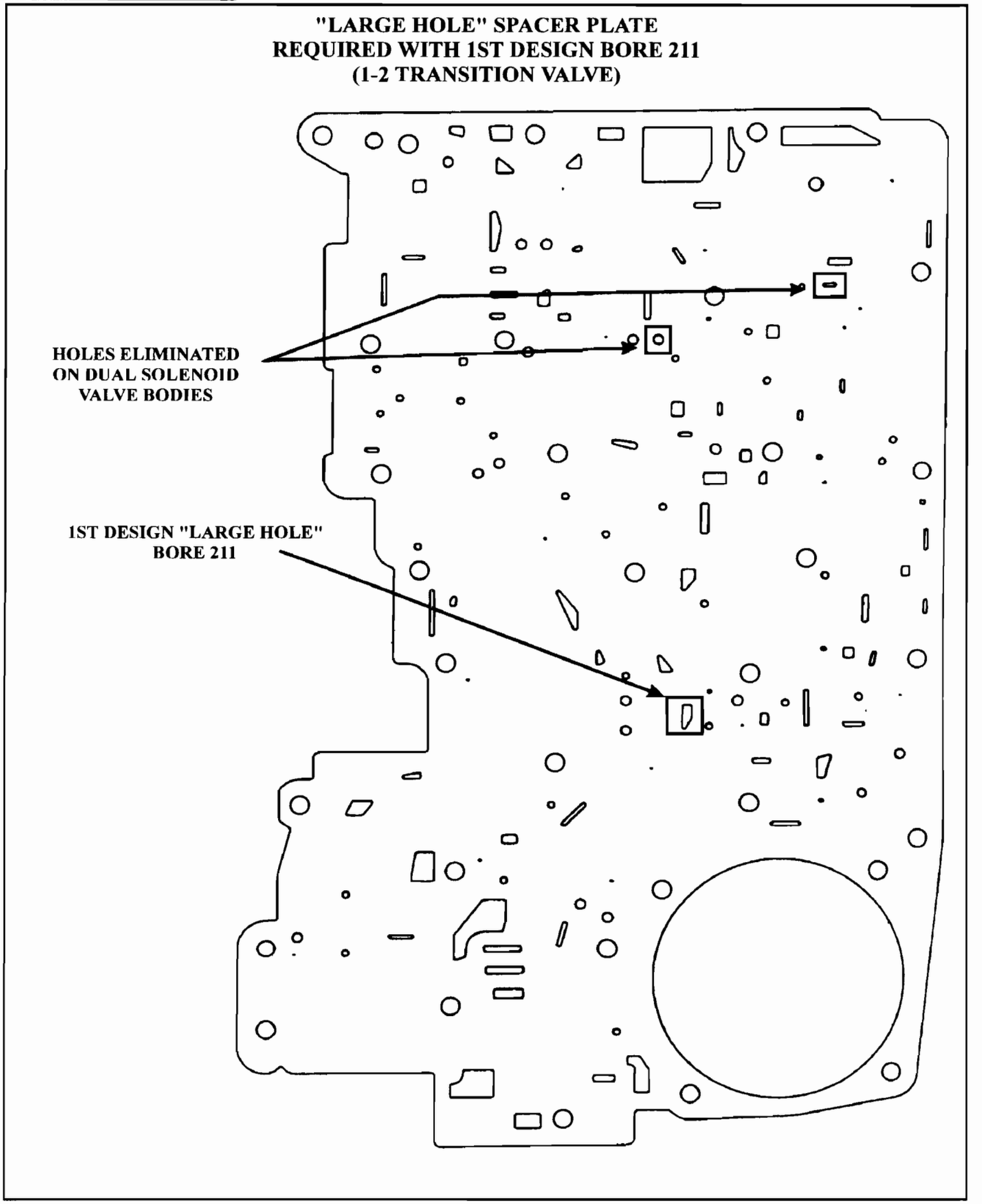
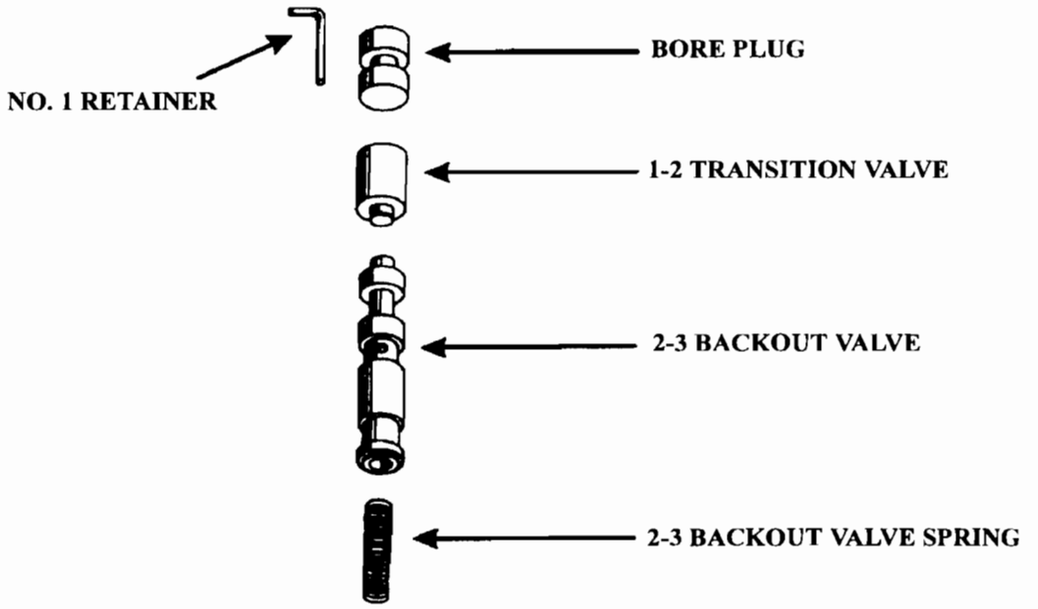


Figure 6

Automatic Transmission Service Group

2ND DESIGN BORE 211
(1-2 TRANSITION VALVE)



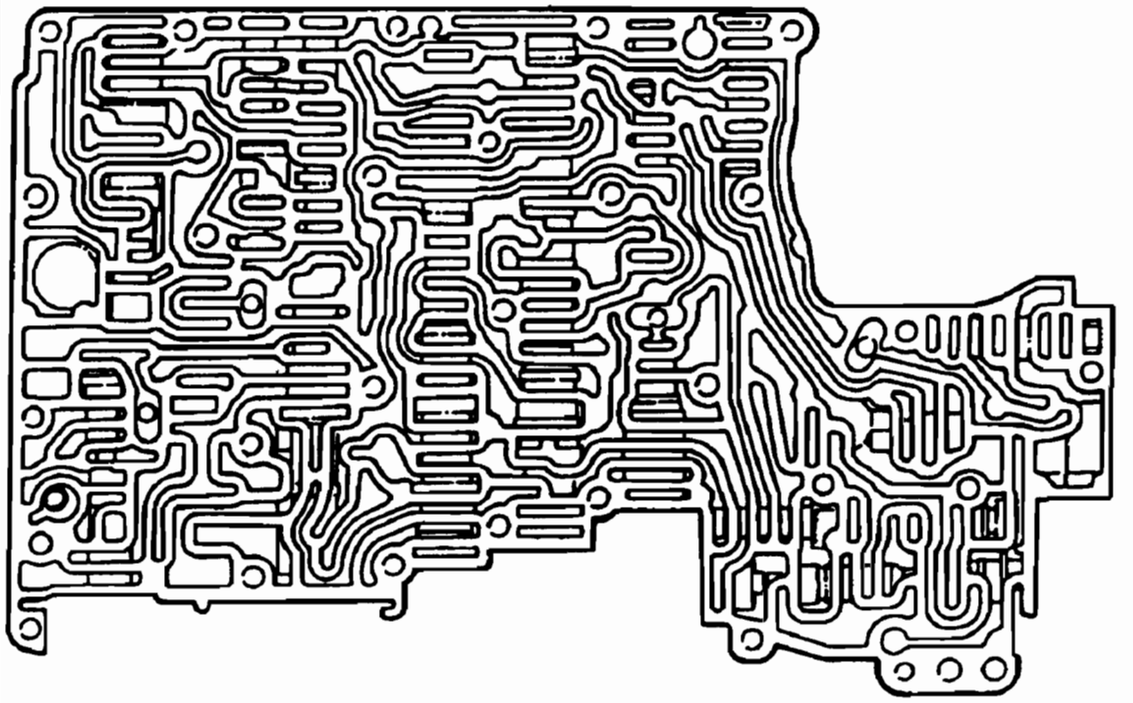


Figure 7

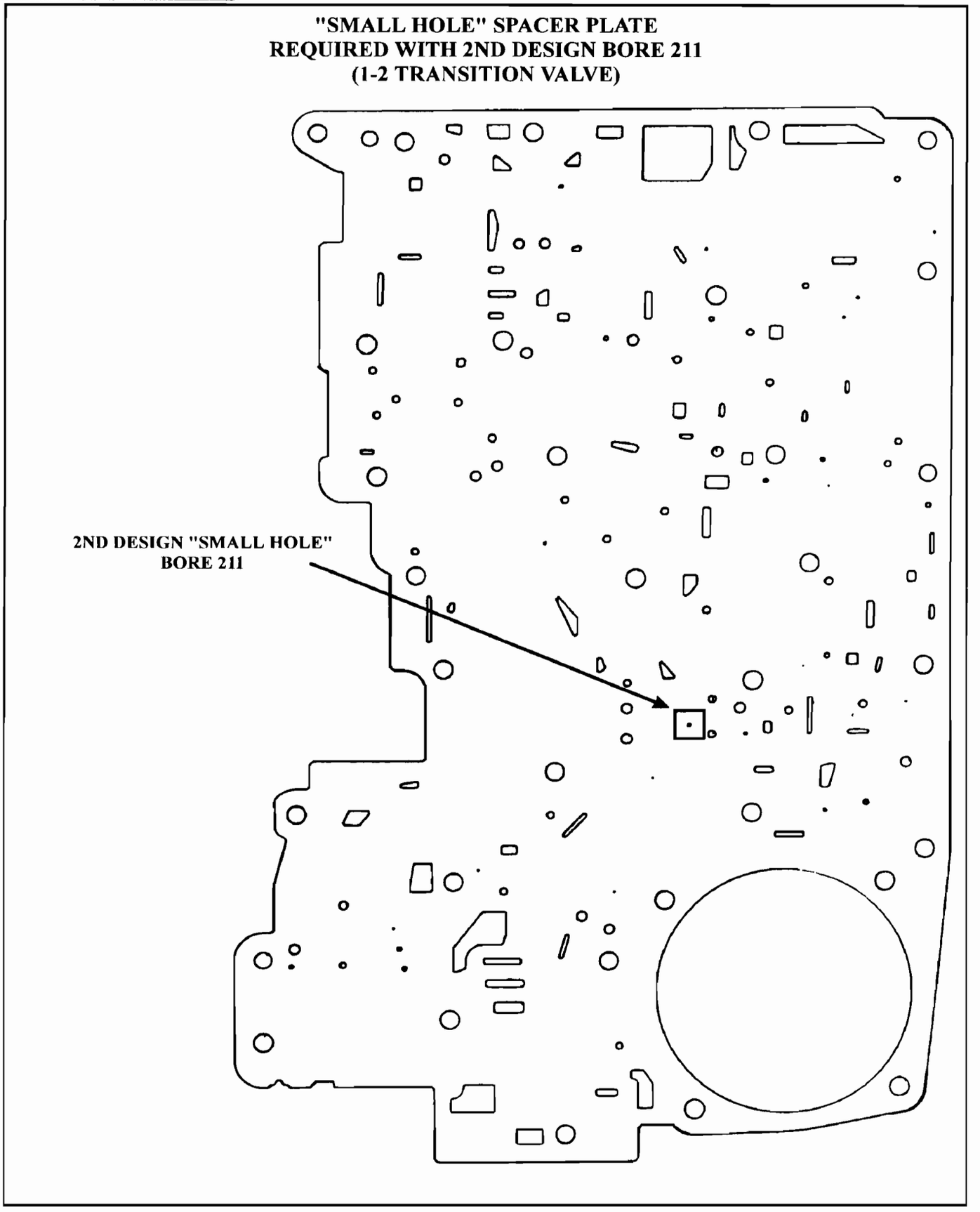

"SMALL HOLE" SPACER PLATE
REQUIRED WITH 2ND DESIGN BORE 211
(1-2 TRANSITION VALVE)
2ND DESIGN "SMALL HOLE"
BORE 211

Figure 8

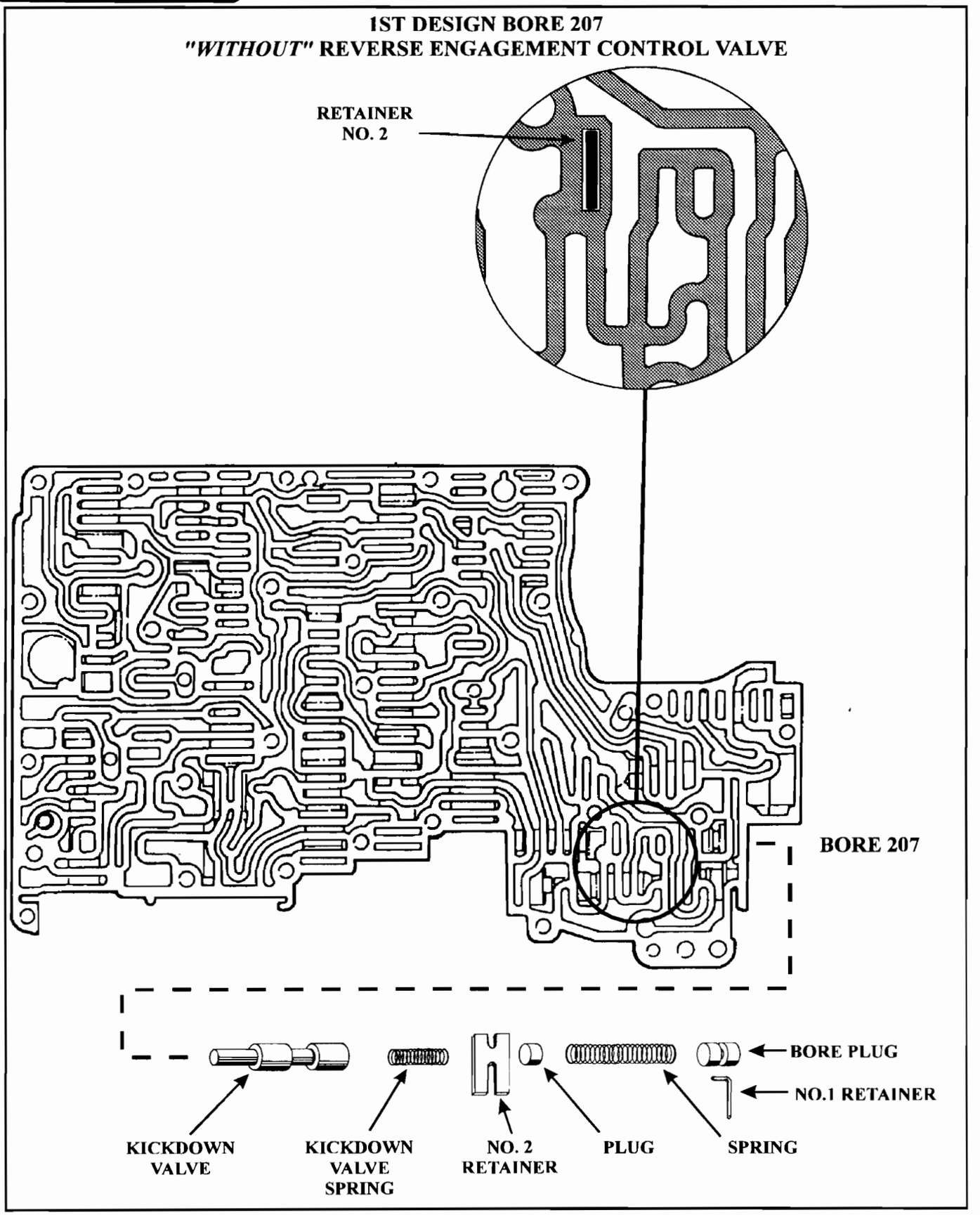


Figure 9

Automatic Transmission Service Group

"SLOT" IN SPACER PLATE
REQUIRED WITH 1ST DESIGN BORE 207
***"WITHOUT"* REVERSE ENGAGEMENT CONTROL VALVE**

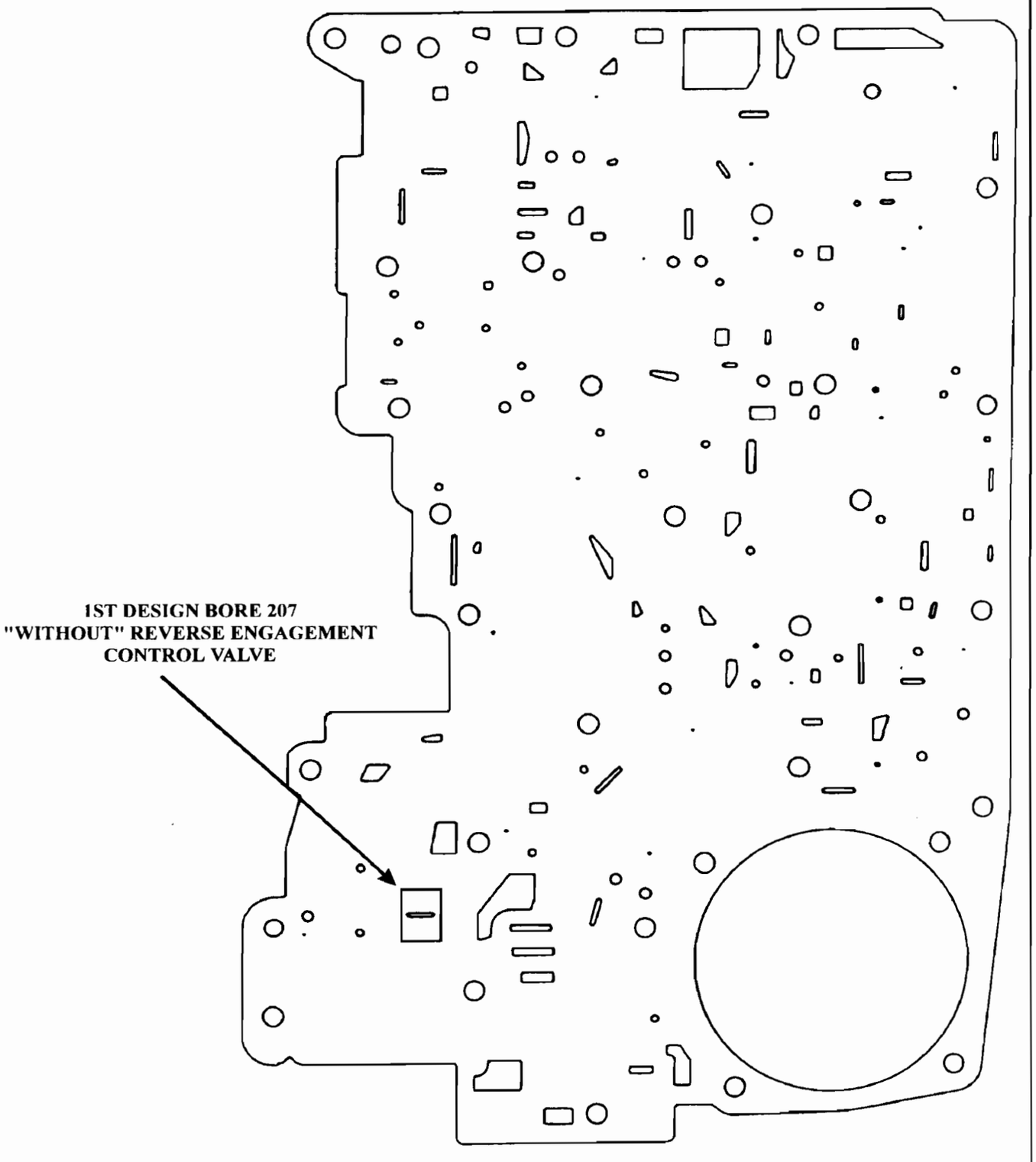


Figure 10

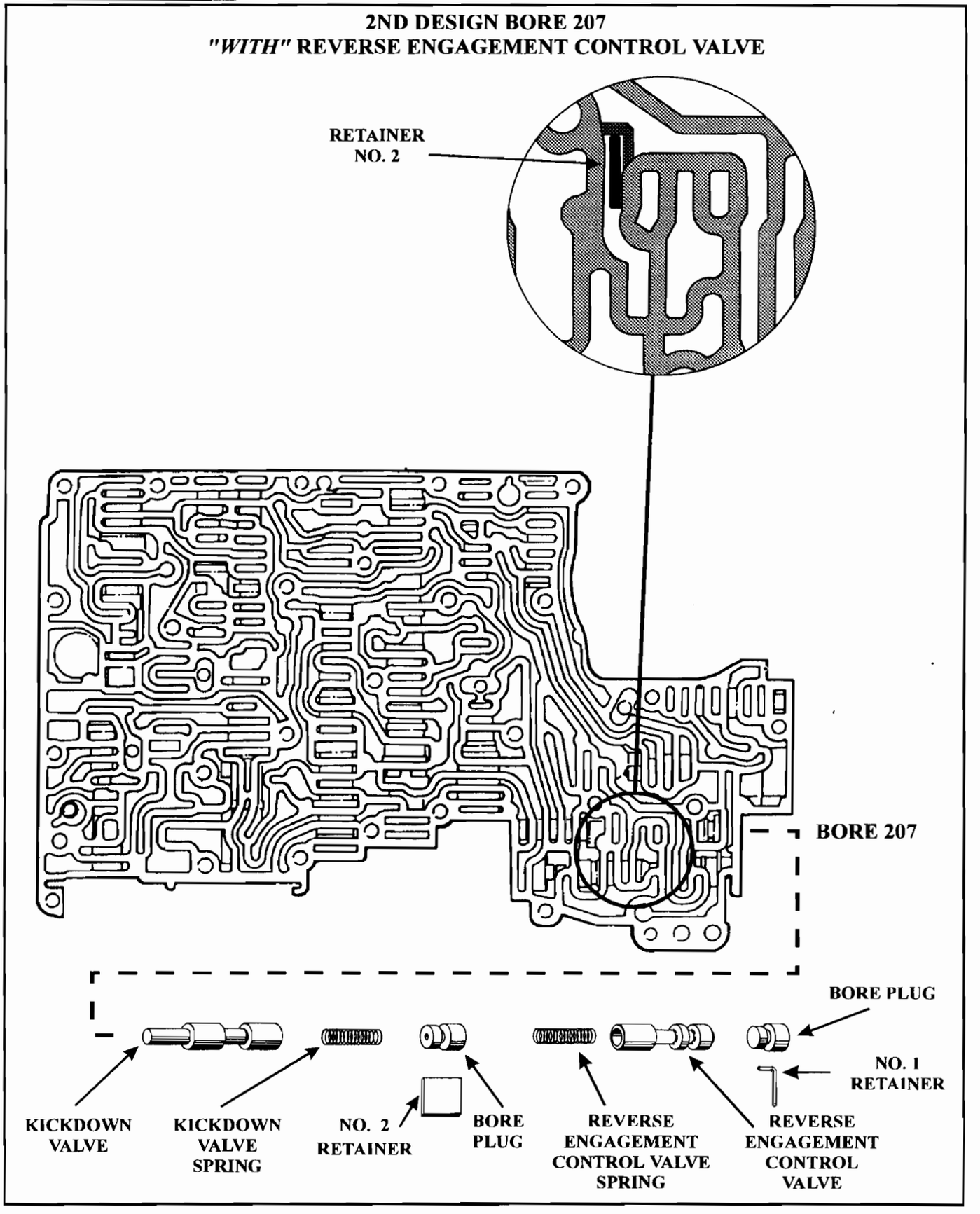


Figure 11

Automatic Transmission Service Group

"3 HOLE" SPACER PLATE
REQUIRED WITH 2ND DESIGN BORE 207
***"WITH"* REVERSE ENGAGEMENT CONTROL VALVE**

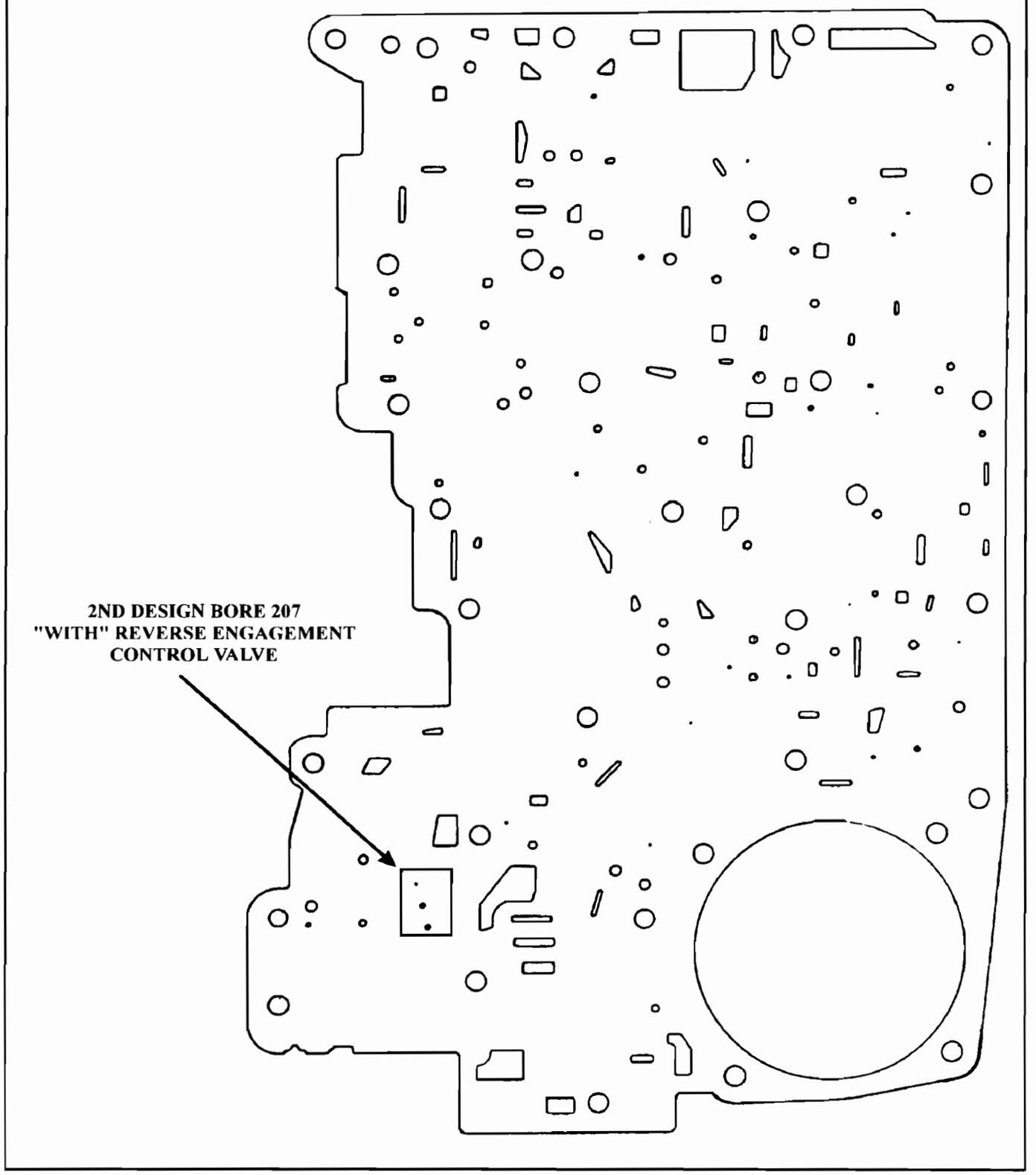


Figure 12

FORD A4LD

SUN GEAR, SUN GEAR SHELL, DIRECT CLUTCH DRUM, FORWARD CLUTCH DRUM, AND CENTER SUPPORT CHANGES

CHANGE: Beginning in model year 1990, and continuing through the 1993 model year on 4.0L models, many running changes have occured to all of the parts listed above. These changes have created confusion in the aftermarket, and they do affect the interchangeability of all of the parts listed above.

REASON: Improved transmission lubrication, improved durability, and improved assembly line process.

PARTS AFFECTED:

(1) SUN GEAR - Both bushings, inside the sun gear, were eliminated to allow full lubrication flow to the front planetary (See Figure 13).

(2) SUN GEAR SHELL - "Snap Shell" was introduced in 1993 4.0L engine models, and has two retaining tabs stamped into the sides 180° apart, as shown in Figure 14. These tabs are used to retain the new direct drum in the sun gear shell.

(3) DIRECT CLUTCH DRUM - The "Lug" area where the direct clutch drum engages the sun gear shell, was machined approximately .200" thinner, and a .050" deep groove was machined into the drum to accommodate the added retaining tabs on the "Snap Shell" (See Figure 15). This now allows the sun shell and the direct drum to "Snap" together for easier assembly (See Figure 16). This change also allows the elimination of the number 4 thrust washer, located between the direct clutch drum and the center support.

(4) CENTER SUPPORT - When the "Snap Shell" was introduced in 1993, the number 3 thrust washer was eliminated (See Figure 17), and number 3 thrust bearing was added, as shown in Figure 18. The addition of the number 3 thrust bearing required machining the surface deeper to accommodate the bearings added thickness (See Figure 18).
The new design center support also has a machined recess at the base of the sealing ring hub to accommodate the newly added number 5 thrust bearing (See Figure 20). Remember, the number 4 thrust washer was eliminated when this change occured (See Figure 19).
There are four easy steps to identify the new design center support:

1. Machined recess for added number 3 thrust bearing (See Figure 18).
2. Machined recess for added number 5 thrust bearing (See Figure 20).
3. Machined hole for turbine speed sensor getting ready for 4R55E (See Figures 18 and 20).
   NOTE: Some new design center supports are cast for, but no hole has been machined.
4. Casting number on new design center support is 92GT-7L328-AA.

(5) FORWARD CLUTCH DRUM - Was machined at the base of the sealing ring hub to eliminate the chamfer, and provide a flat surface to accommodate the added number 5 thrust bearing, as shown in Figure 21.

Continued on next Page

INTERCHANGEABILITY:

(1) The new design sun gear ***WITHOUT*** bushings ***WILL*** retro-fit back to all previous models. (See Figure 13).

(2) The previous design sun gear ***WITH*** the bushings ***CANNOT*** be used forward into the 4.0L engine models (See Figure 13).

(3) The new design "Snap Shell" ***must be used only*** with the direct clutch drum that is machined to accept the retaining tabs (See Figure 15).

(4) The direct clutch drum ***WITH*** the machined groove for the "Snap Shell" ***WILL*** retro-fit back to ***ALL*** previous models (See Figure 15).

(5) The new design level center support ***CANNOT*** be used in ***ANY*** previous models, unless updated with ***ALL*** of the parts listed above (See Figures 18 and 20).

(6) The previous design center support ***CANNOT*** be used forward into ***ANY*** model that is using the "Snap Shell" (See Figure 17).

(7) The new design forward clutch drum ***WILL*** retro-fit back on ***ALL*** previous models. (See Figure 21).

(8) The previous design forward clutch drum ***CANNOT*** be used in 1993 and later models, as the chamfered area at the base of the hub will not let the number 5 bearing seat properly. (See Figure 21).

SERVICE INFORMATION:

Sun Gear Shell ("Snap" Type - Includes Sun Gear)	F3TZ-7D064-A
Direct Clutch Drum (For "Snap Shell")	F0TZ-7D044-A
Forward Clutch Drum (Late Design)	F0TZ-7A360-B
Center Support (Late Design - Includes No. 5 Bearing)	F3TZ-7A130-A
Number 5 Thrust Bearing	F3TZ-7D234-A
Number 3 Thrust Bearing	F3TZ-7L326-A

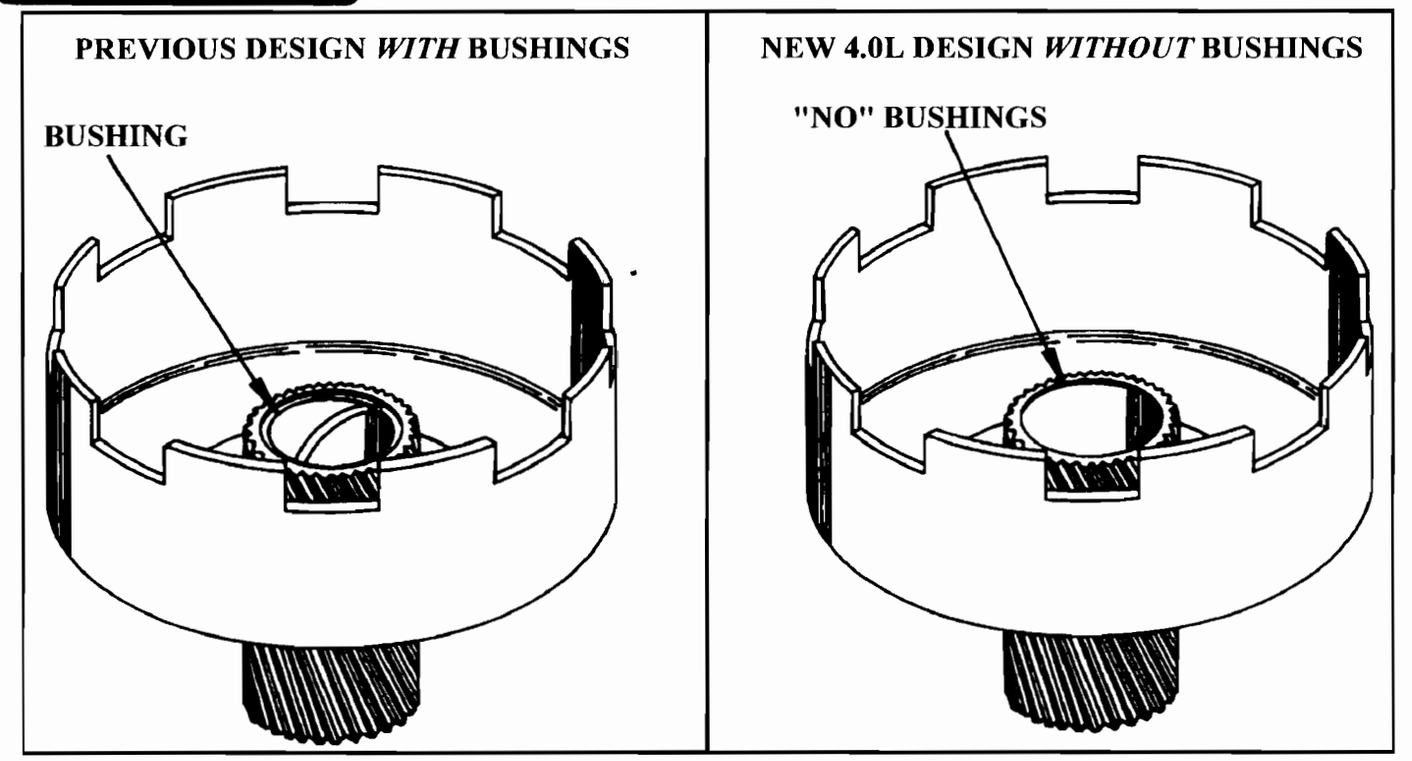


Figure 13

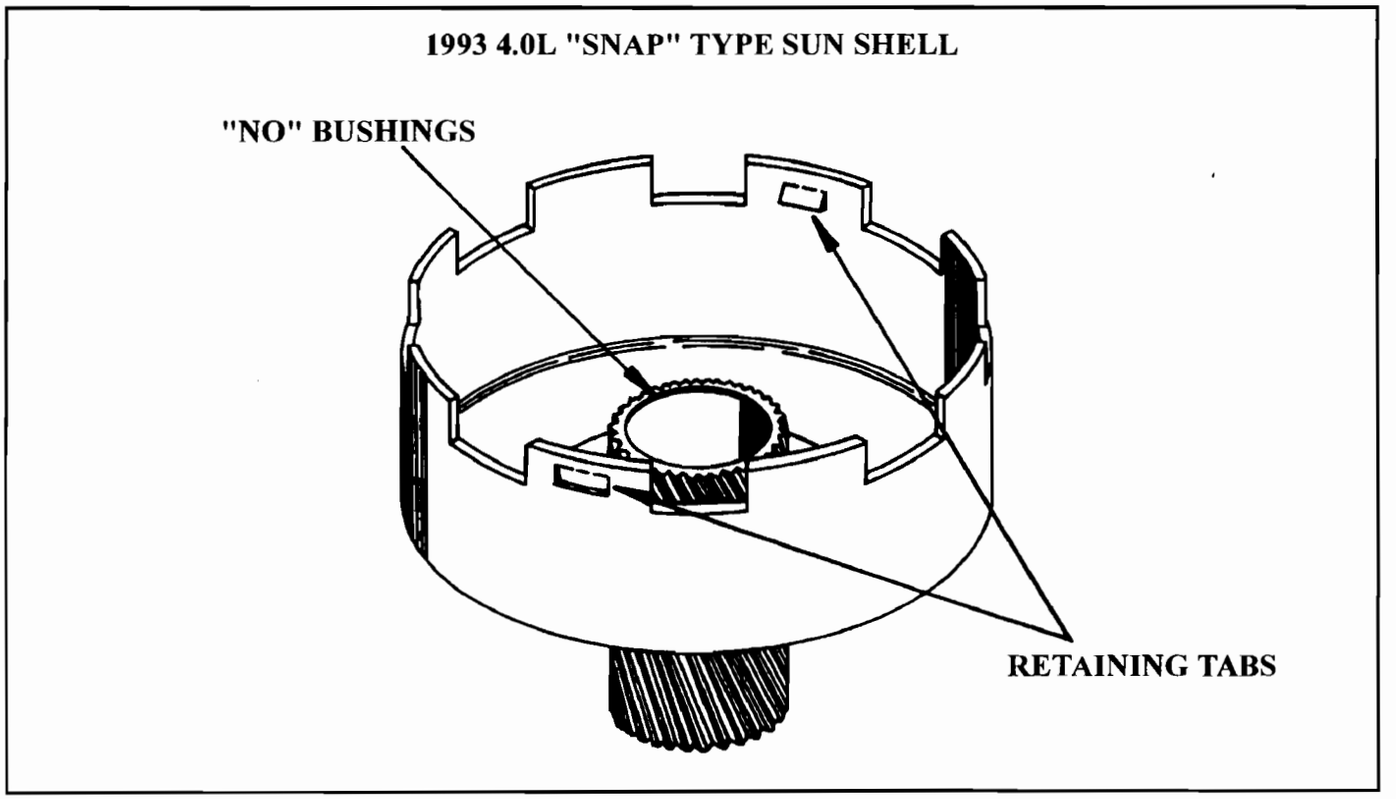


Figure 14

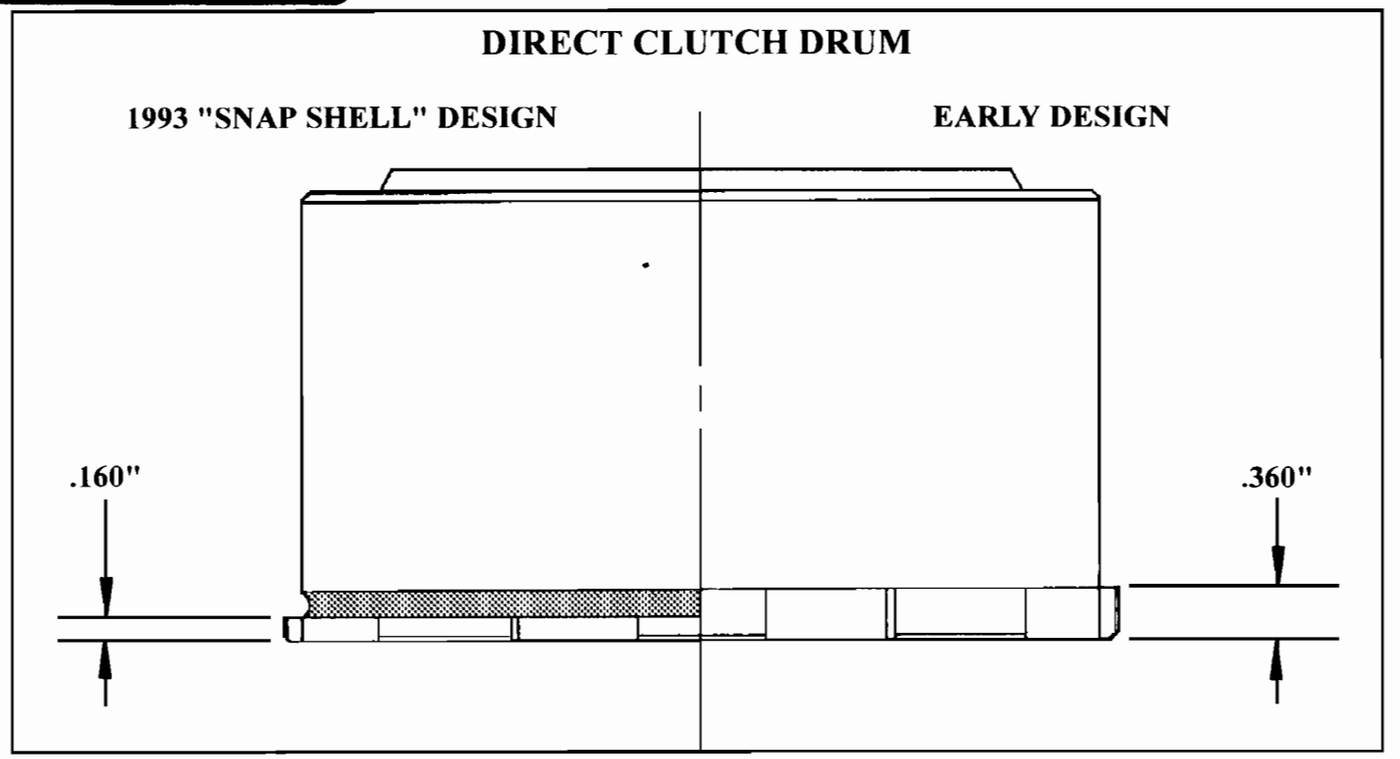


Figure 15

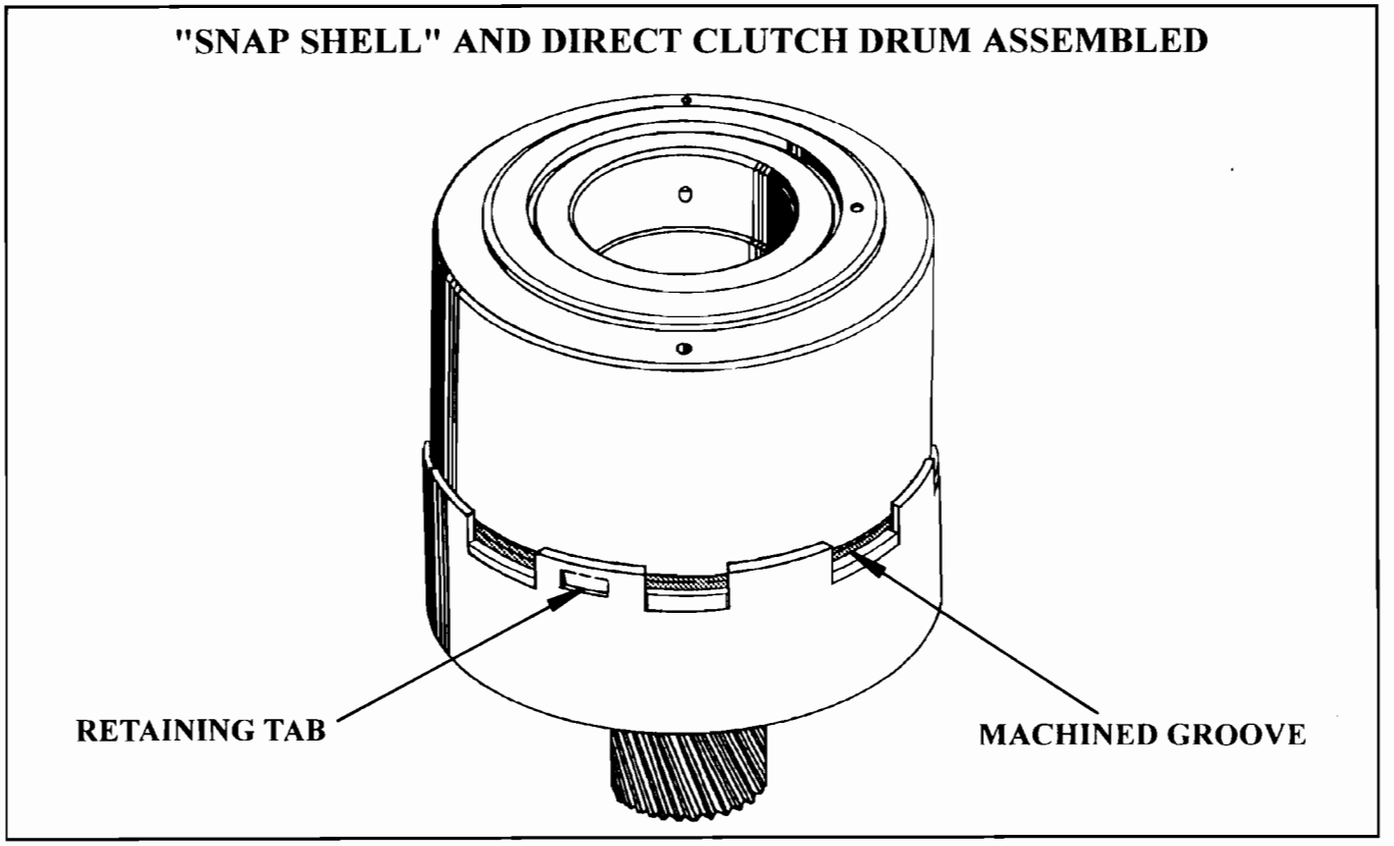


Figure 16

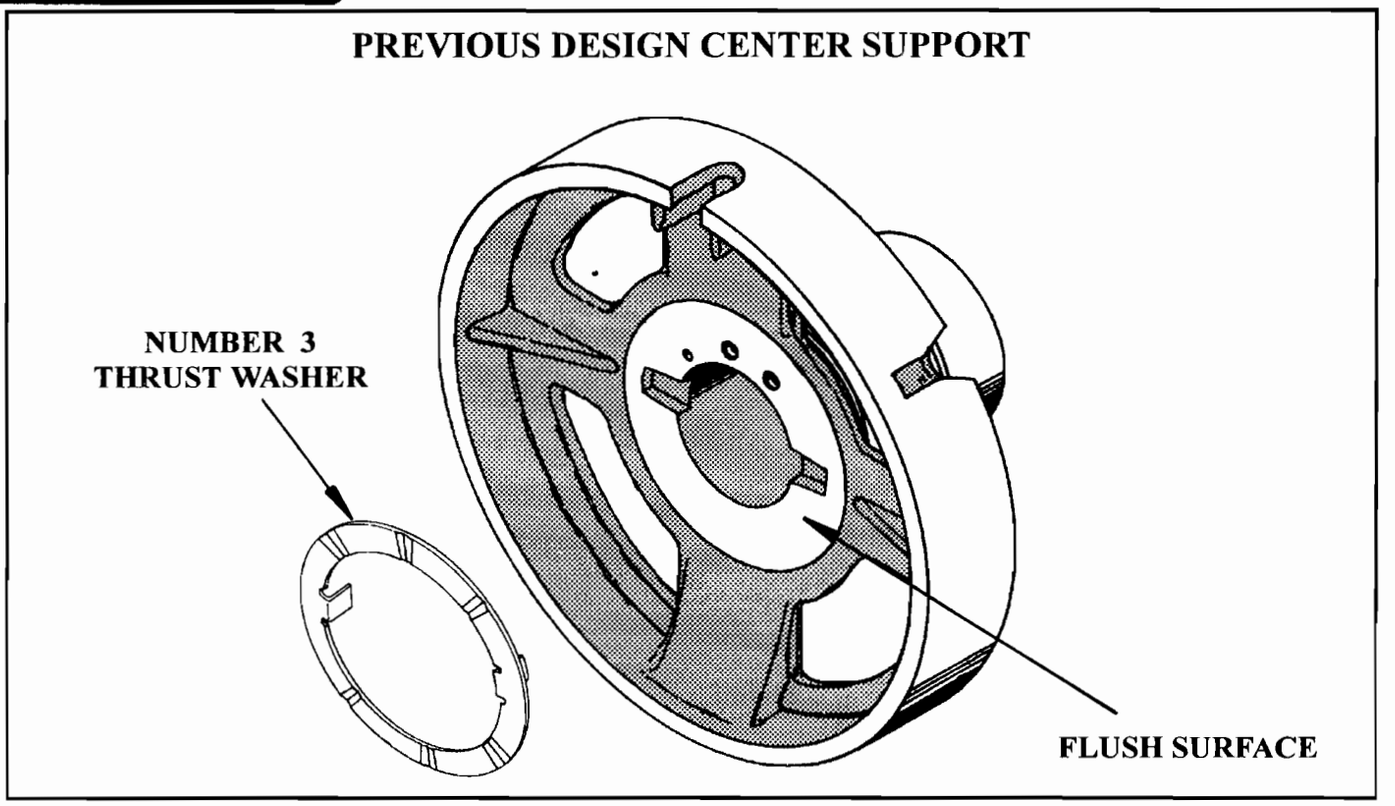


Figure 17

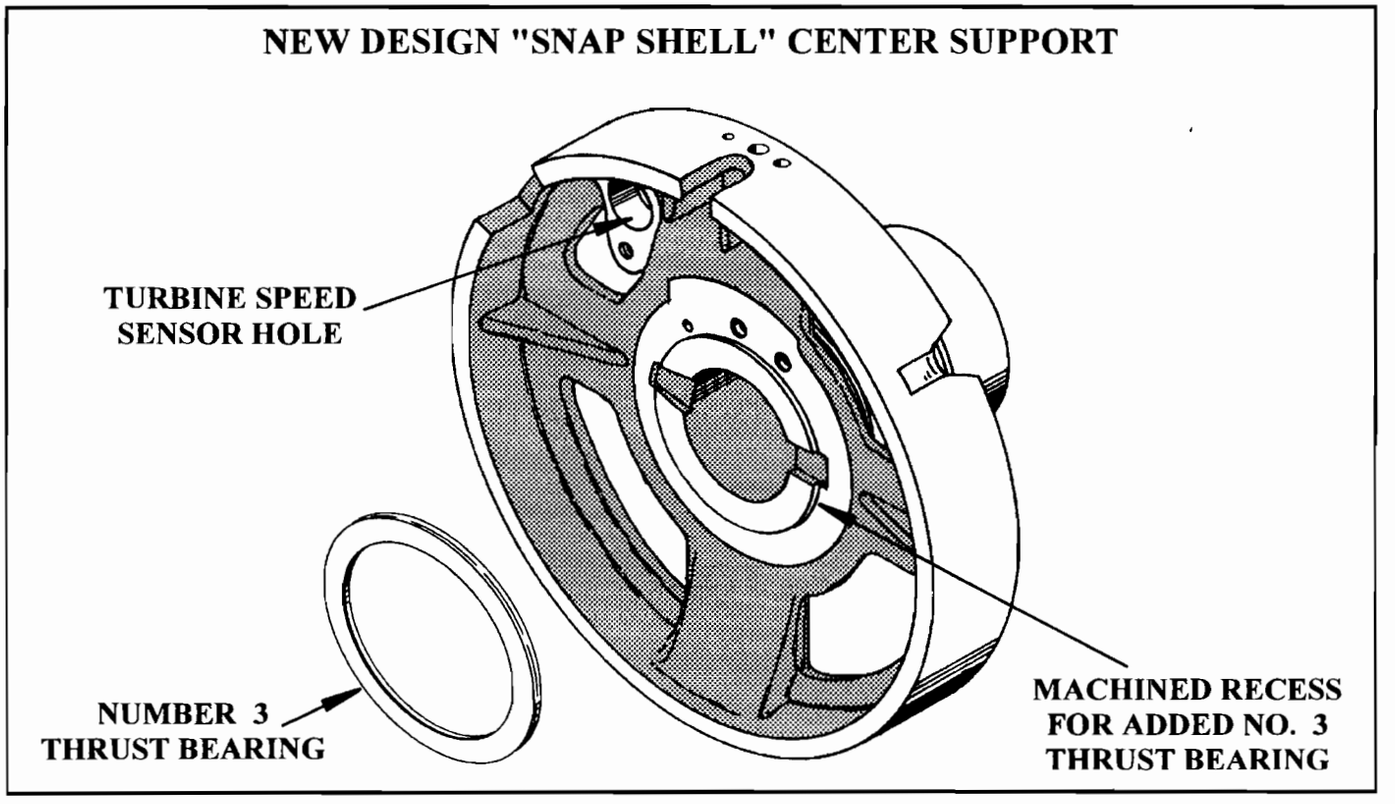


Figure 18

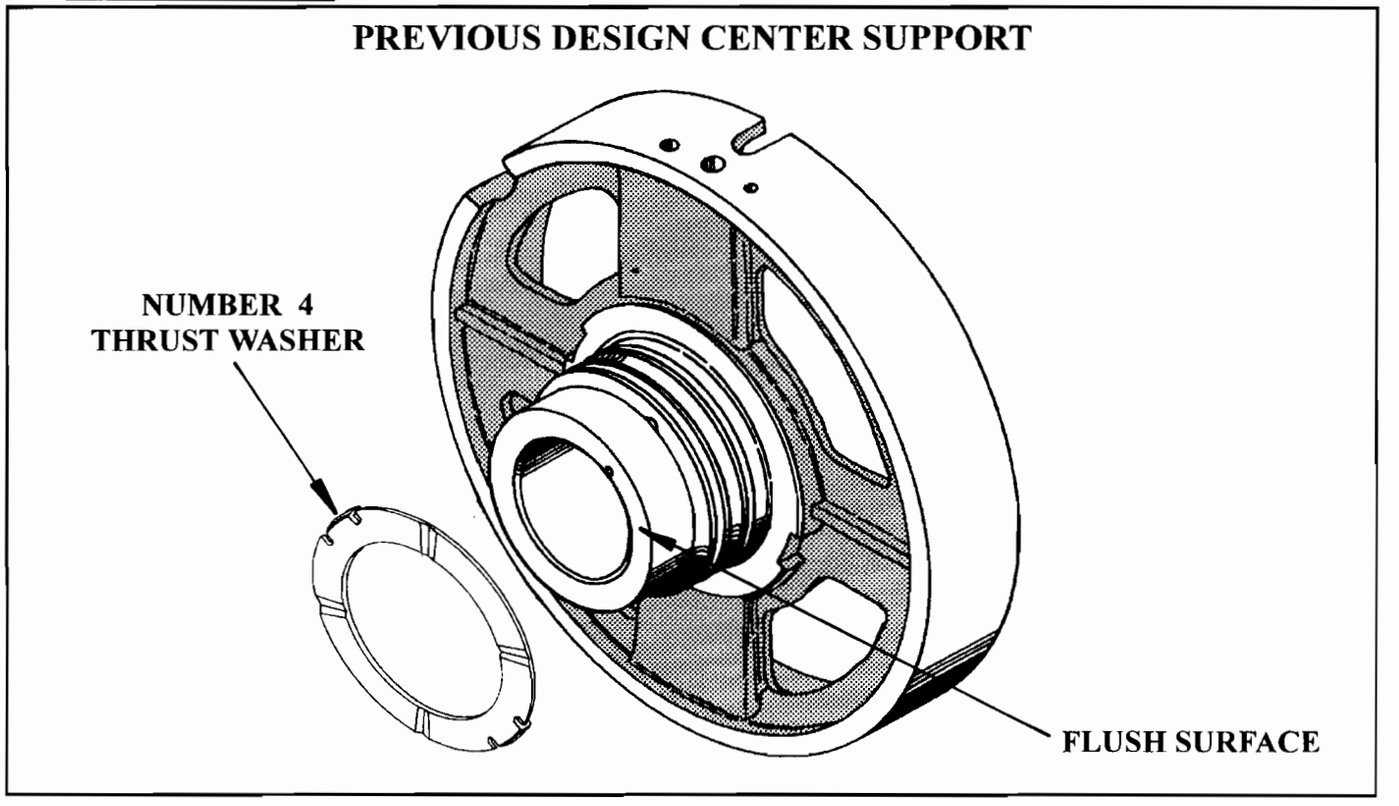


Figure 19

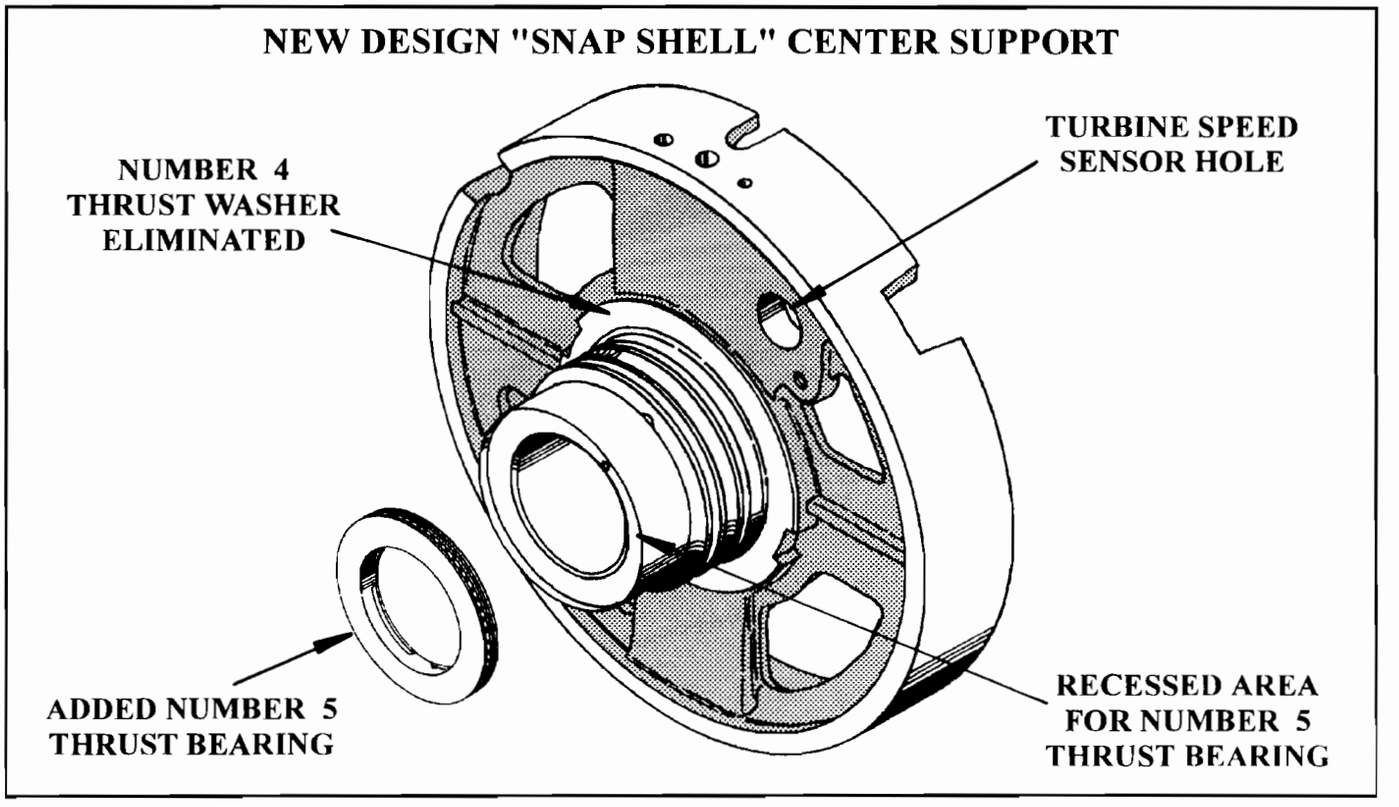


Figure 20

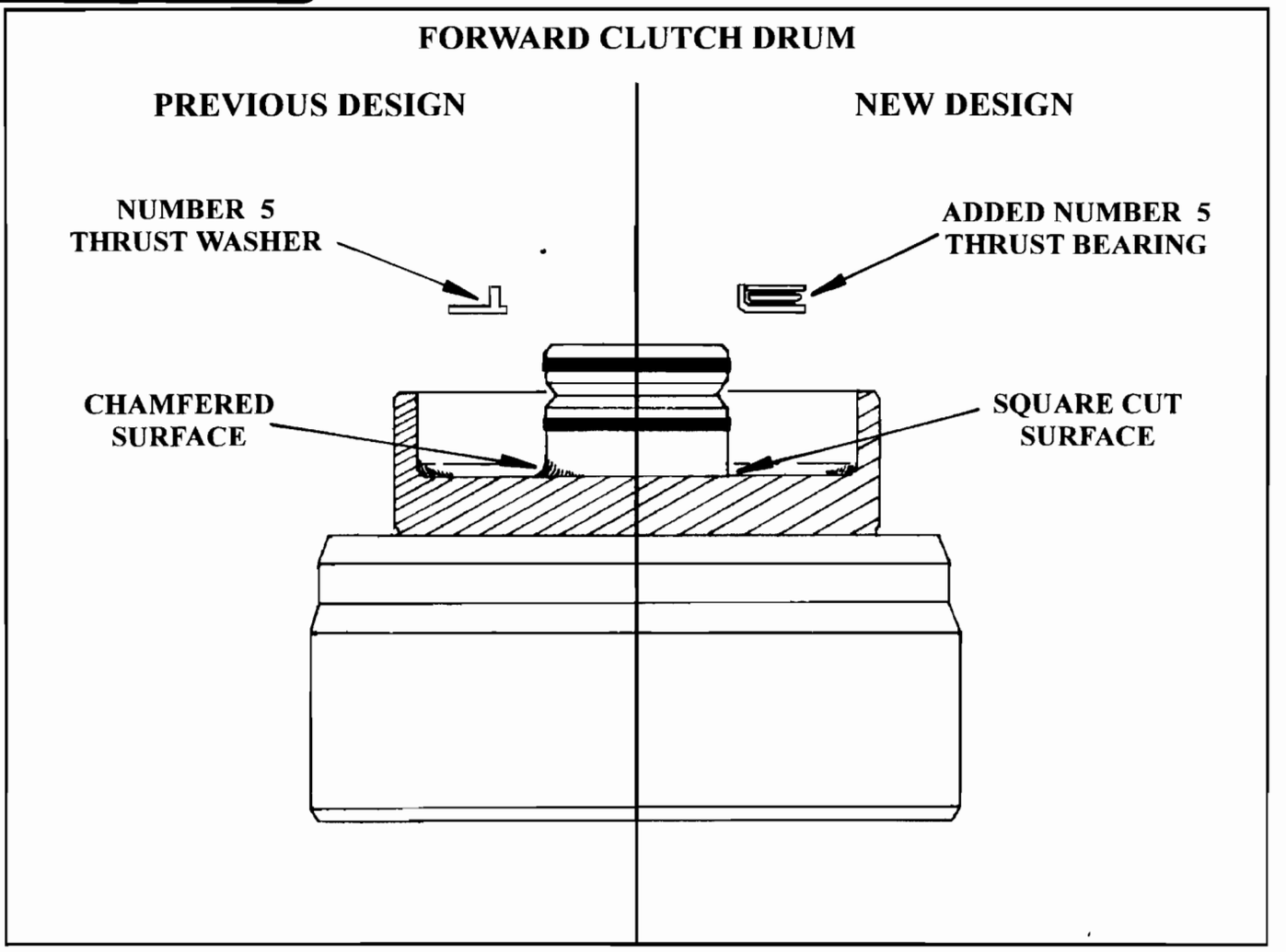

FORWARD CLUTCH DRUM
PREVIOUS DESIGN
NEW DESIGN
NUMBER 5
THRUST WASHER
ADDED NUMBER 5
THRUST BEARING
CHAMFERED
SURFACE
SQUARE CUT
SURFACE

Figure 21

FORD A4LD

FRONT PLANETARY GEARSET CHANGES

CHANGE: Sometime in model year 1987, the 1st design ***3 pinion aluminum*** front planetary carrier was replaced with a revised ***4 pinion steel*** front planetary carrier (See Figures 22 and 24).
In model year 1990, on 4.0L engine models only, the steel front planetary carrier was once again revised to a ***6 pinion steel*** carrier (See Figures 22 and 24). These changes have affected many of the related parts and created confusion for many rebuilders.

REASON: Greater torque carrying capacity because of increased horsepower demands

PARTS AFFECTED:

(1) FRONT PLANETARY CARRIER - The 1st design ***3 pinion aluminum*** carrier was eliminated and replaced with a revised ***4 pinion steel*** carrier. The snap ring groove and the snap ring that previously retained the carrier into the ring gear were eliminated (See Figure 22).
In 1990 the steel carrier was once again upgraded with a ***6 pinion steel*** carrier, for 4.0L engine models only. The 6 pinion steel carrier was also shortened in overall height, by approximately .125", to accommodate a new design number 6 (3 piece) thrust bearing (See Figures 22 & 24).
NOTE: The 1st design 3 pinion aluminum and 2nd design 4 pinion steel front carriers are no longer serviced by Ford Motor Co. They are now upgraded to the latest 3rd design 6 pinion steel front planetary system, which comes as a service package and includes all necessary hubs and washers to make it compatable.

(2) FORWARD RING GEAR HUB - The 1st Design forward ring gear hub uses a number 7 thrust washer as shown in Figure 24. On the 2nd Design ring gear hub, a recess was machined to accommodate an added number 7 thrust bearing, that replaced the number 7 thrust washer. Refer to Figures 23 and 24. Both 1st and 2nd design ring gear hubs inside diameter measure 1.500", as shown in Figure 23.
On the 3rd Design ring gear hub the inside diameter was machined approximately .080" larger to accommodate a new design number 6 "Top Hat" thrust washer (See Figure 24). The inside diameter on the 3rd Design ring gear hub measures 1.580", as shown in Figure 23.

(3) NUMBER 6 THRUST WASHER - Was changed from a 3 tab thrust washer to a "Top Hat" design thrust washer in 1987 (See Figure 24). This change is what required the larger inside diameter on the ring gear hub.
Beginning in 1990, on 4.0L engine models, the number 6 "Top Hat" thrust washer was replaced with a new number 6 (3 piece) thrust bearing, as shown in Figure 24. Notice also the added washer (7D090), that must be used with the 3 piece bearing design (See Figure 24). This is what required the carrier to be machined shorter. The 3 piece thrust bearing has now been changed to a normal "Torrington" (Snap Together) type bearing, and replaces the 3 piece design, without any other changes.

(4) NUMBER 7 THRUST WASHER - Sometime in 1986, the number 7 thrust washer was eliminated, and replaced with a number 7 thrust bearing as shown in Figure 24. This change required the machined recess in the ring gear hub, to make room for the thrust bearing, as shown in Figure 23. The number 7 thrust bearing is still used through current production (See Figure 24).

Continued on next Page

INTERCHANGEABILITY:

(1) The ***1st Design 3 pinion aluminum*** front planetary carrier system, as shown in Figure 24, is recommended for nothing larger than 2.3L engine models. The 1st Design 3 pinion aluminum front planetary carrier is no longer serviced by Ford Motor Co. It now upgrades to the latest 3rd Design 6 pinion steel front planetary carrier system, which comes as a service package and includes all necessary hubs and washers to make it compatable, and is available under OEM part number F0TZ-7A398-E.

(2) The ***2nd Design 4 pinion steel*** front planetary carrier system, as shown in Figure 24, with the 1.580" inside diameter ring gear hub, the number 7 thrust bearing, the number 6 "Top Hat" thrust washer ***WILL*** retro-fit back on all models, ***except*** 4.0L engine models, but all parts listed above must be used as an assembly (See Figure 24). The 2nd Design 4 pinion steel front planetary carrier is no longer serviced by Ford Motor Co. It now upgrades to the latest 3rd Design 6 pinion steel front planetary carrier system, which comes as a service package and includes all necessary hubs and washers to make it compatable, and is available under OEM part number F0TZ-7A398-E.

(3) The ***3rd Design 6 pinion steel*** 4.0L engine front planetary system, as shown in Figure 24, with the 1.580" inside diameter ring gear hub, the number 7 thrust bearing, number 6 (3 piece) thrust bearing, and bushing (7D090) ***WILL*** retro-fit back on all previous models, but the parts listed above ***are mandatory on all 4.0L engine models*** (See Figure 24).

SERVICE INFORMATION:

3 Piece Thrust Bearing, 6 Pinion Steel Front Carrier F3TZ-7D234-A
Washer (7D090), 6 Pinion Steel Front Carrier F0TZ-7D090-A
Service Package, 6 Pinion Steel Front Carrier
(Includes the following:)
Front Planetary Assembly (7A398)
Number 7 Thrust Bearing (7F374)
Front Ring Gear Hub, 3rd Design (7B067)
Forward Clutch Thrust Washer (7D090)
3 Piece Thrust Bearing Assembly (7D234) F0TZ-7A398-E

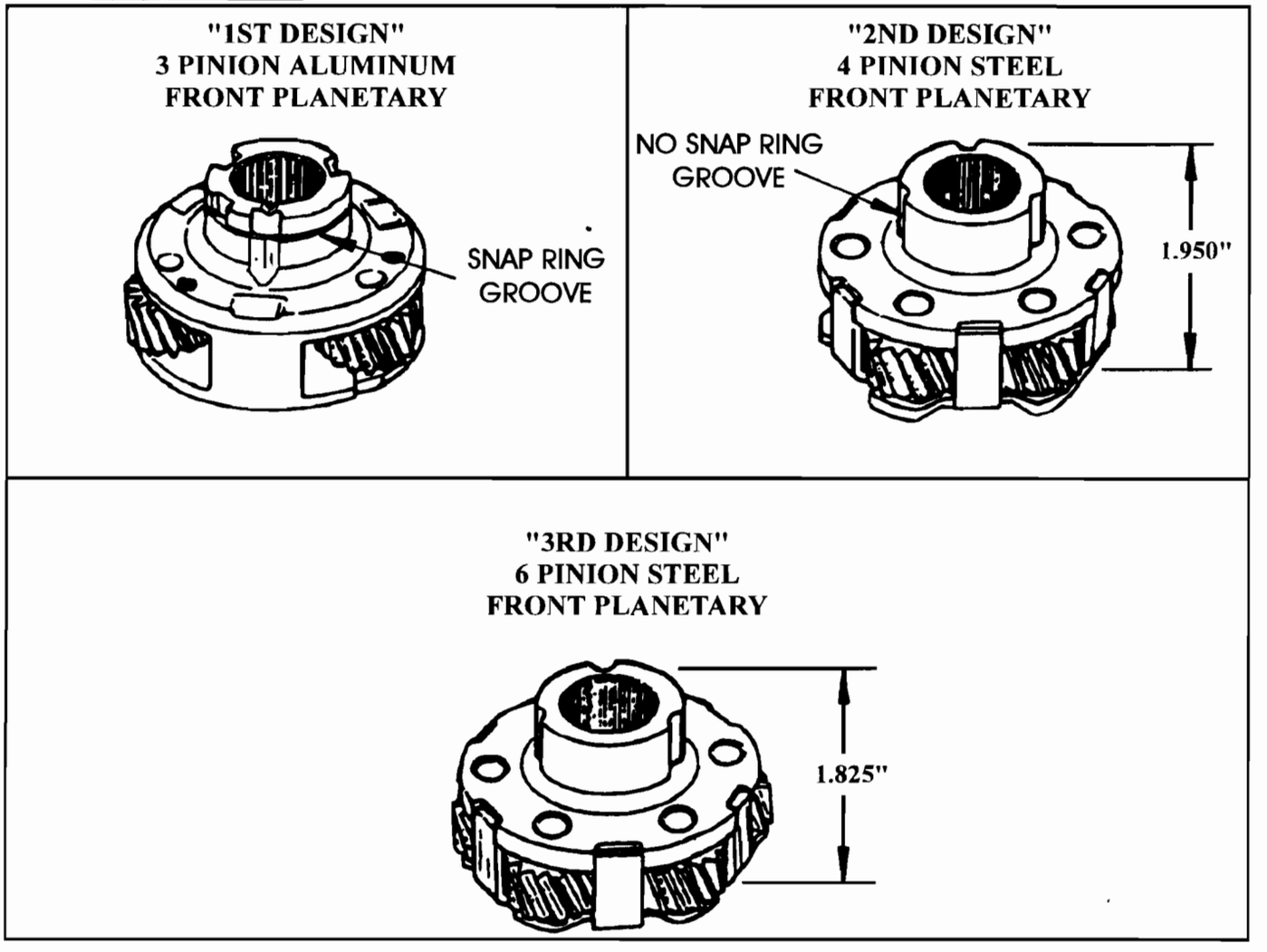
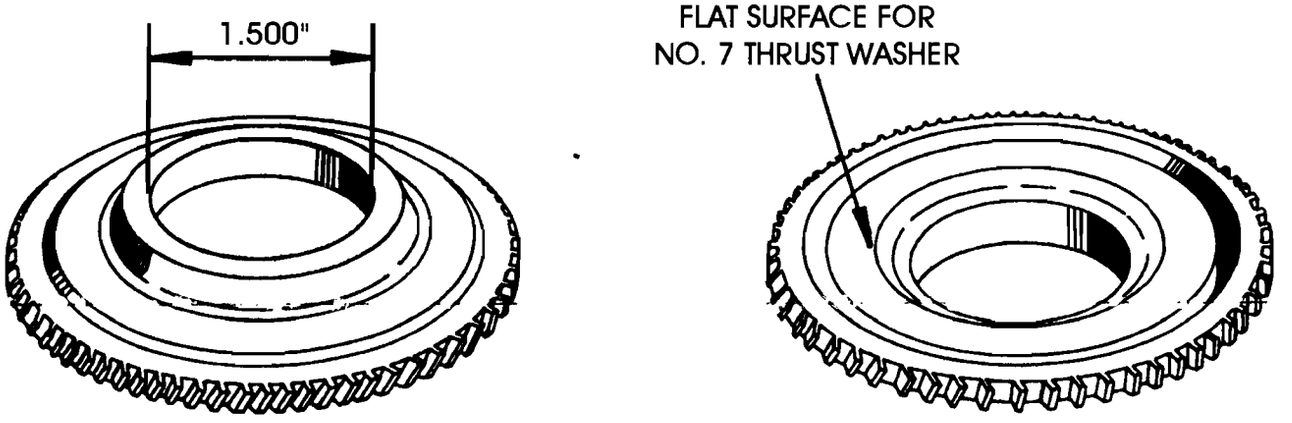
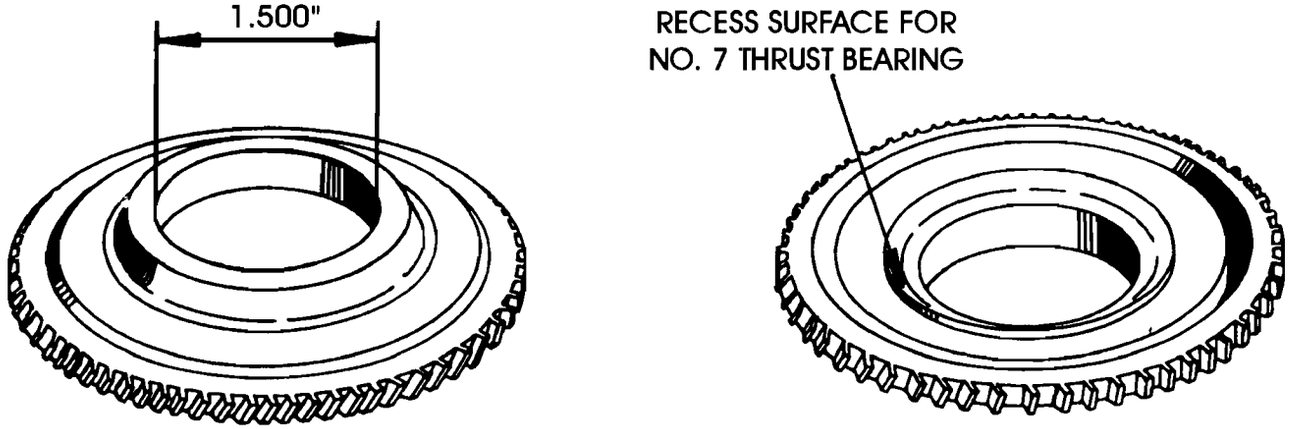

"1ST DESIGN"
3 PINION ALUMINUM
FRONT PLANETARY
SNAP RING
GROOVE
"2ND DESIGN"
4 PINION STEEL
FRONT PLANETARY
NO SNAP RING
GROOVE
1.950"
"3RD DESIGN"
6 PINION STEEL
FRONT PLANETARY
1.825"

Figure 22

"1ST DESIGN"
FORWARD RING GEAR HUB



"2ND DESIGN"
FORWARD RING GEAR HUB



"3RD DESIGN"
FORWARD RING GEAR HUB

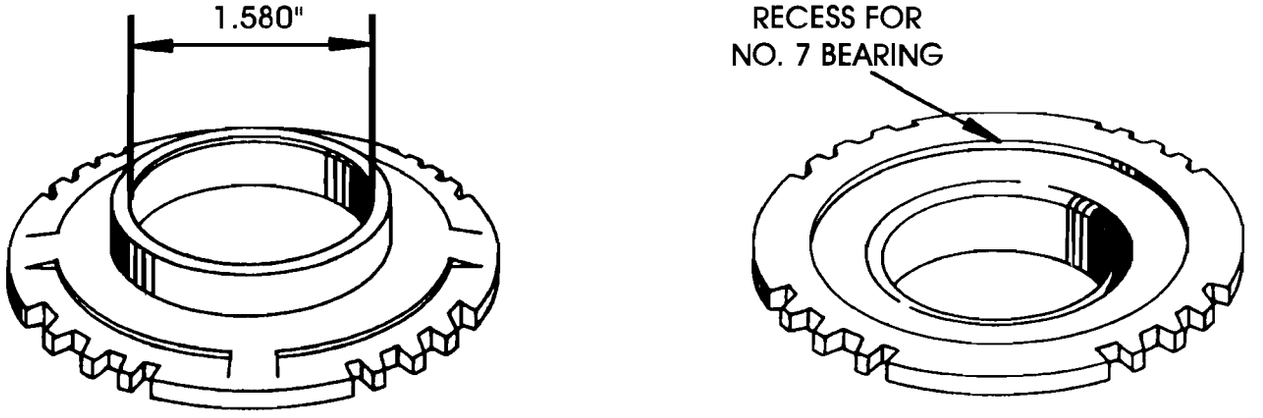
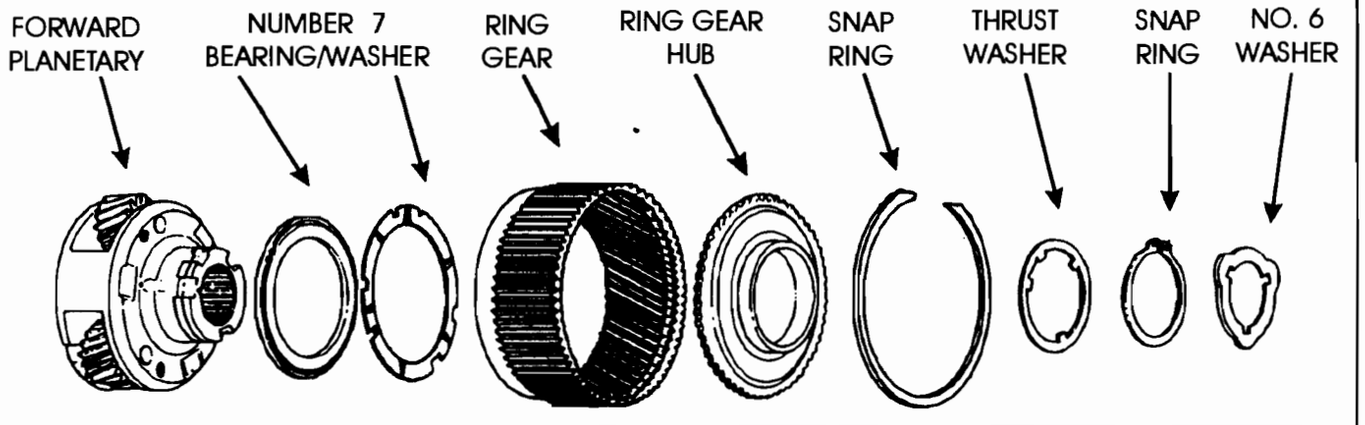
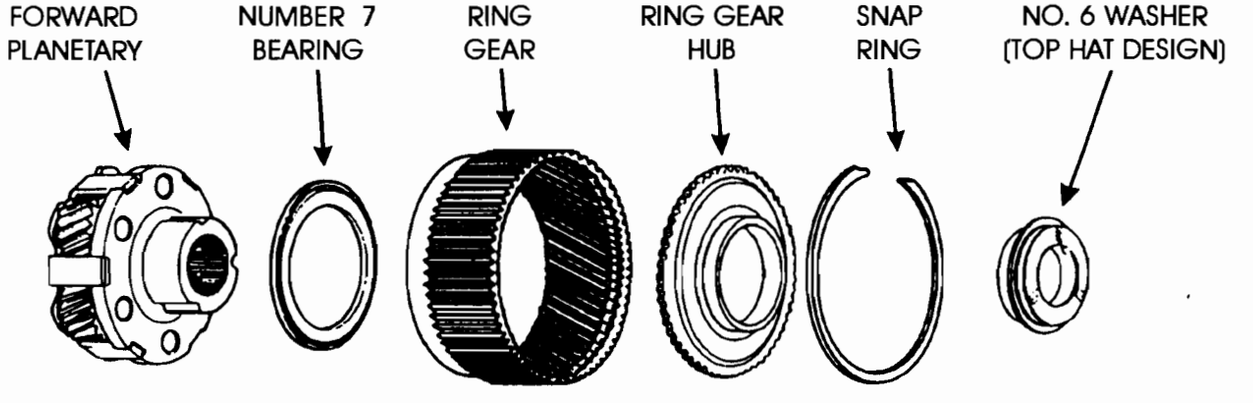


Figure 23

"1ST DESIGN" *3PINION ALUMINUM* FRONT CARRIER PARTS



"2ND DESIGN" *4 PINION STEEL* FRONT CARRIER PARTS



"3RD DESIGN" *6 PINION STEEL* FRONT CARRIER PARTS

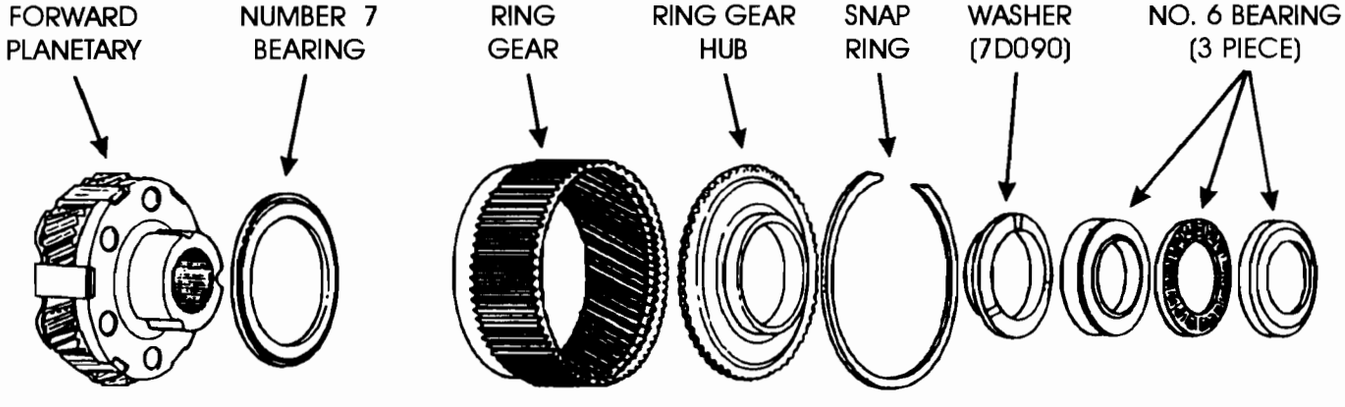


Figure 24

Automatic Transmission Service Group

FORD A4LD
REAR PLANETARY CARRIER AND LUBE CIRCUIT CHANGES

CHANGE: Sometime in model year 1987, the 1st design ***3 pinion aluminum*** rear planetary carrier was replaced with a 2nd design ***4 pinion steel*** rear planetary carrier (See Figure 26).
In model year 1990, on 4.0L engine models only, the 4 pinion steel carrier was once again revised to a ***6 pinion steel*** rear planetary carrier (See Figure 26). Included in this change were changes in the internal lubrication circuit. These changes have affected many of the related parts and created confusion for many rebuilders.

REASON: Greater torque carrying capacity to meet increased horsepower demands.

PARTS AFFECTED:

(1) REAR PLANETARY CARRIER - The 1st design ***3 pinion aluminum*** rear carrier was eliminated and replaced with a 2nd design ***4 pinion steel*** rear carrier, as shown in Figure 26. Both 1st and 2nd design rear carriers have 10 lugs ahere it lugs into the reverse drum, as shown in Figure 26. The 1st design 3 pinion aluminum rear carrier is no longer serviced by Ford Motor Co, and automatically supercedes to the 4 pinion steel carrier. It is available as a service package under OEM part number E7SZ-7D006-C, which includes the number 8 and number 9 thrust washers, to make it compatable.
Beginning in1990, on 4.0L engine models only, Ford introduced a 3rd design ***6 pinion steel*** rear carrier, which has multiple lugs where it lugs into the reverse drum (See Figure 26).

(2) REVERSE DRUM - The 1st design Reverse Drum contains the ***low roller clutch*** and has the "Castles" on the front of the drum to accept the 10 lug, 4 pinion steel rear carrier, as shown in Figure 27.
The 2nd design Reverse Drum contains the ***low sprag clutch*** and is machined to accept the multiple lug, 6 pinion steel rear carrier for the 4.0L models, as shown in Figure 27.

(3) REAR RING GEAR HUB - The 1st design Rear Ring Gear Hub is identified with a "Stepped" washer surface as shown in Figure 28, and uses the 1st design number 9 thrust washer as shown in Figure 26.
The 2nd design Rear Ring Gear Hub is identified with a "Flat" washer surface as shown in Figure 28, to accommodate the new 2nd design number 9 thrust washer (See Figure 26).
The 3rd design Rear Ring Gear Hub is identified with a machined recess to accommodate the added oil sleeve and the thicker output shaft snap ring, and you can also see the added lube grooves in the spline area to accommodate the internal lube flow changes (See Figure 28).
The 2nd and 3rd design Rear Ring Gear Hub also has step removed out next to the ring gear teeth, to accommodate larger diameter of the 2nd design number 9 thrust washer, as shown in Figure 28..

(4) NUMBER 8 THRUST WASHER - Thrust washer tab locations and design changed, to accommodate the 2nd design 4 pinion steel rear carrier, as shown in Figure 26.
The 2nd design number 8 thrust washer was carried forward, and used also on the 6 pinion steel rear carrier for the 4.0L engine models, as shown in Figure 26.

Continued on next Page

PARTS AFFECTED: (Cont'd)

(5) NUMBER 9 THRUST WASHER - Thrust washer tab locations, and thrust washer surface area changed, to accommodate the 2nd design 4 pinion steel rear planetary carrier (See Figure 26). The 2nd design number 9 thrust washer was carried forward, and used also on the 6 pinion steel rear carrier for the 4.0L engine models (See Figure 26).

(6) NUMBER 10 THRUST WASHER - Recieved a change in outside diameter, as shown in Figure 28, and is now used to retain the low sprag end bearing on 4.0L engine models. Refer to the cutaway illustrations in Figure 30.
The outside diameter on the number 10 thrust washer for the 4 pinion carrier is 2.275", and the outside diameter on the number 10 thrust washer for the 6 pinion carrier is 3.205", as shown in Figure 28.

(7) OIL SLEEVE - An added oil delivery sleeve, or lubrication guide, was added to the output shaft rear ring gear hub, to direct lube oil from the added grooves in the hub, through the sun gear to the front planetary gear set (See Figures 25 and 28).

(8) OUTPUT SHAFT - The Output Shaft was revised in three areas:
- 0 The front output shaft bushing was replaced with a caged needle bearing, and if necessary can be purchased from local bearing house under number INA 1010 (See Figure 29).
- 0 The output shaft snap ring groove was machined approximately .030" wider to make room for a revised thickness snap ring (See Figure 29). The new snap ring thickness is .o77", as shown in Figure 29.
- 0 The lube holes in the 1st design output shaft were eliminated entirely, to accommodate the revisions in the lube circuit on the 4.0L engine models (See Figure 29).

(9) OUTPUT SHAFT SNAP RING - The snap ring that retains the rear ring gear and hub onto the output shaft on 4.0L models was increased in thickness, and now measures .077" thick. On all other applications the snap ring measures .046" thick (See Figure 29).

(10) REVERSE DRUM SNAP RING - The snap ring that retains the 10 lug (4 Pinion) rear carrier in the Reverse Drum was eliminated on the "Multiple Lug" (6 Pinion) rear carrier for the 4.0L engine models (See Figure 30).

INTERCHANGEABILITY:

(1) 1ST DESIGN, 3 PINION ALUMINUM, REAR CARRIER - ***Not recommended for use in any A4LD,*** however if it is used, it must be used with all 1st design parts listed above.

(2) 2ND DESIGN, 4 PINION STEEL, REAR CARRIER - Recommended for all 2.3L, 2.8L, 2.9L, 3.0L engines, and ***mandatory*** for all 2.3L Turbo models. Must be used with all 2nd design parts listed above, except output shaft which must be 1st design.

(3) 3RD DESIGN, 6 PINION STEEL, REAR CARRIER - ***Mandatory for all 4.0L models,*** and must be used with all 3rd design parts listed above, and the 2nd design output shaft.

SERVICE INFORMATION:

Number 8 Thrust Washer (1st Design)	D4ZZ-7A166-A
Number 8 Thrust Washer (2nd Design)	F0TZ-7A166-A
Number 9 Thrust Washer (1st Design)	D4ZZ-7A166-A
Number 9 Thrust Washer (2nd Design)	F0TZ-7A166-B
Number 10 Thrust Washer (1st Design)	D4ZZ-7D422-B
Number 10 Thrust Washer (2nd Design)	F0TZ-7D422-A
Oil Sleeve, Output Shaft (4.0L Engine)	F0TZ-7B176-A
Snap Ring, Output Shaft (.046" Thick)	E661125-S
Snap Ring, Output Shaft (.077" Thick)	E860527-S
Rear Carrier, 4 Pinion Steel (Includes No. 8 & No. 9 Washers)	E7SZ-7D006-C
Rear Ring Gear Hub, (4 Pinion Steel)	E7SZ-7D164-A
Rear Carrier, 6 Pinion Steel (4.0L Engine)	F0TZ-7D006-A
Rear Ring Gear Hub, (6 Pinion Steel)	F0TZ-7D164-C

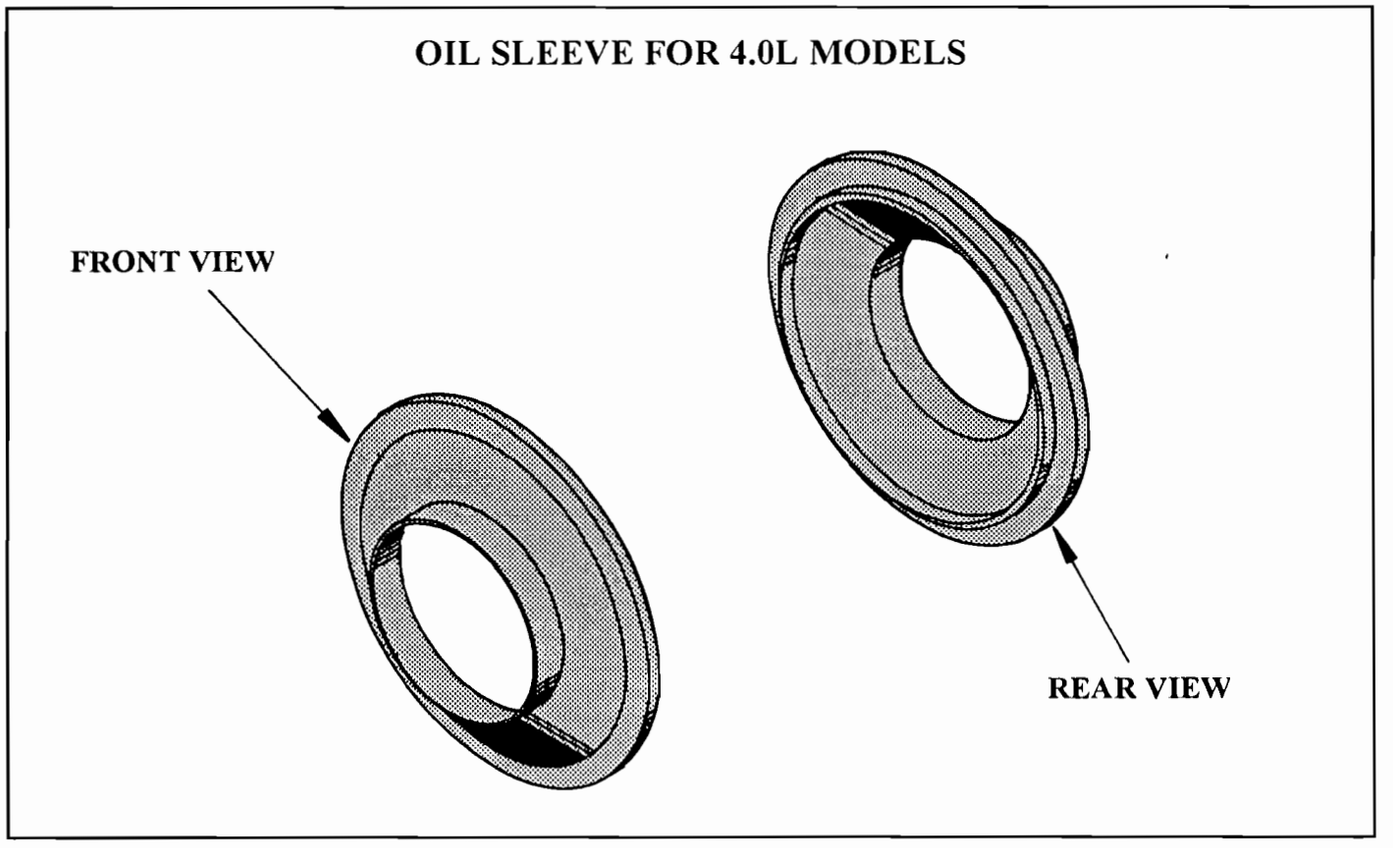
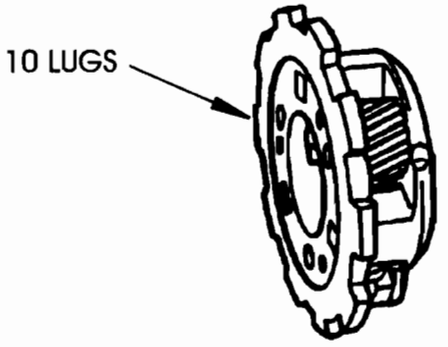
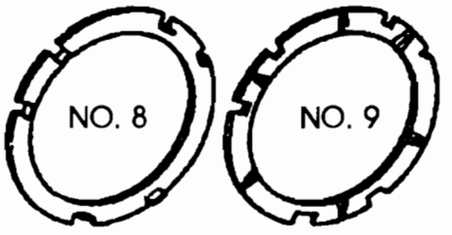


Figure 25

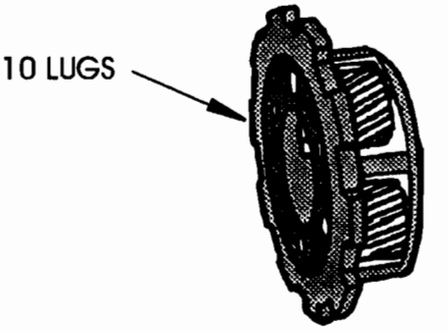
"1ST DESIGN"
3 PINION ALUMINUM
REAR PLANETARY CARRIER



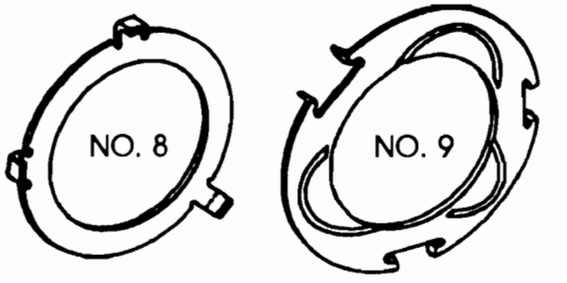
"1ST DESIGN" THRUST WASHERS



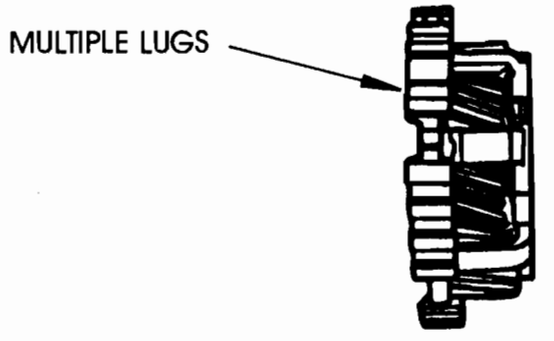
"2ND DESIGN"
4 PINION STEEL
REAR PLANETARY CARRIER



"2ND DESIGN" THRUST WASHERS



"3RD DESIGN"
6 PINION STEEL (4.0L)
REAR PLANETARY CARRIER



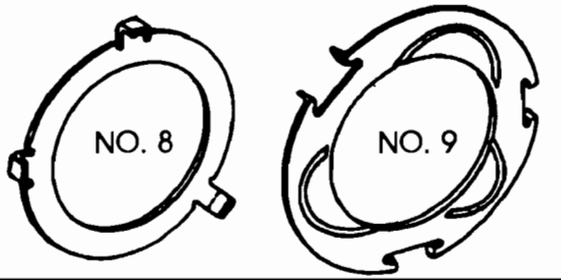
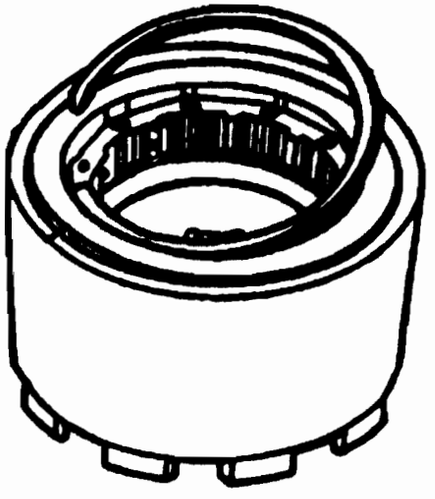
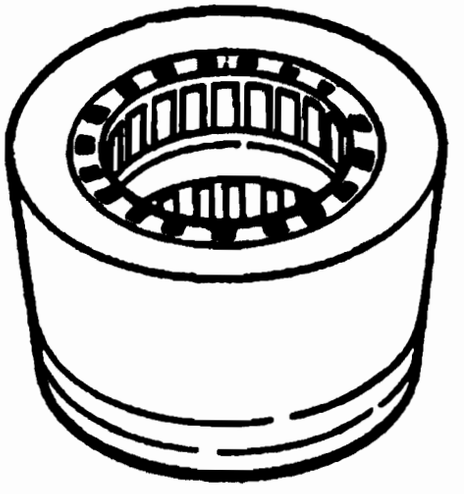


Figure 26

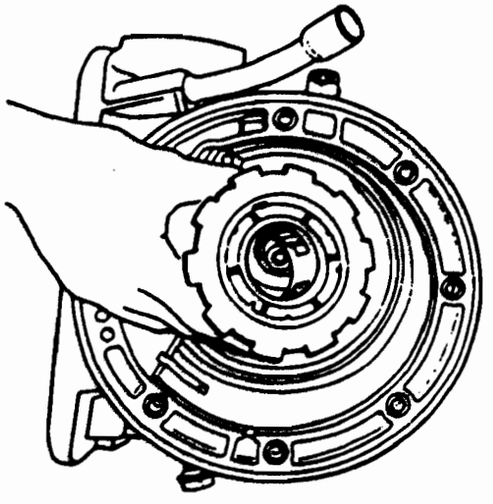
"1ST DESIGN"
REVERSE DRUM
WITH ROLLER CLUTCH



"2ND DESIGN"
REVERSE DRUM
WITH SPRAG



REQUIRES THE "2ND DESIGN"
10 LUG REAR CARRIER



REQUIRES THE "3RD DESIGN"
MULTIPLE LUG REAR CARRIER

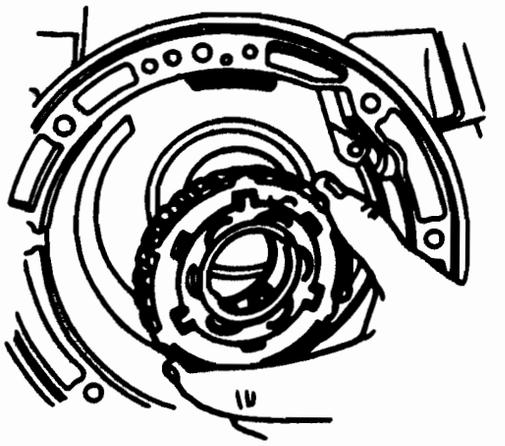


Figure 27

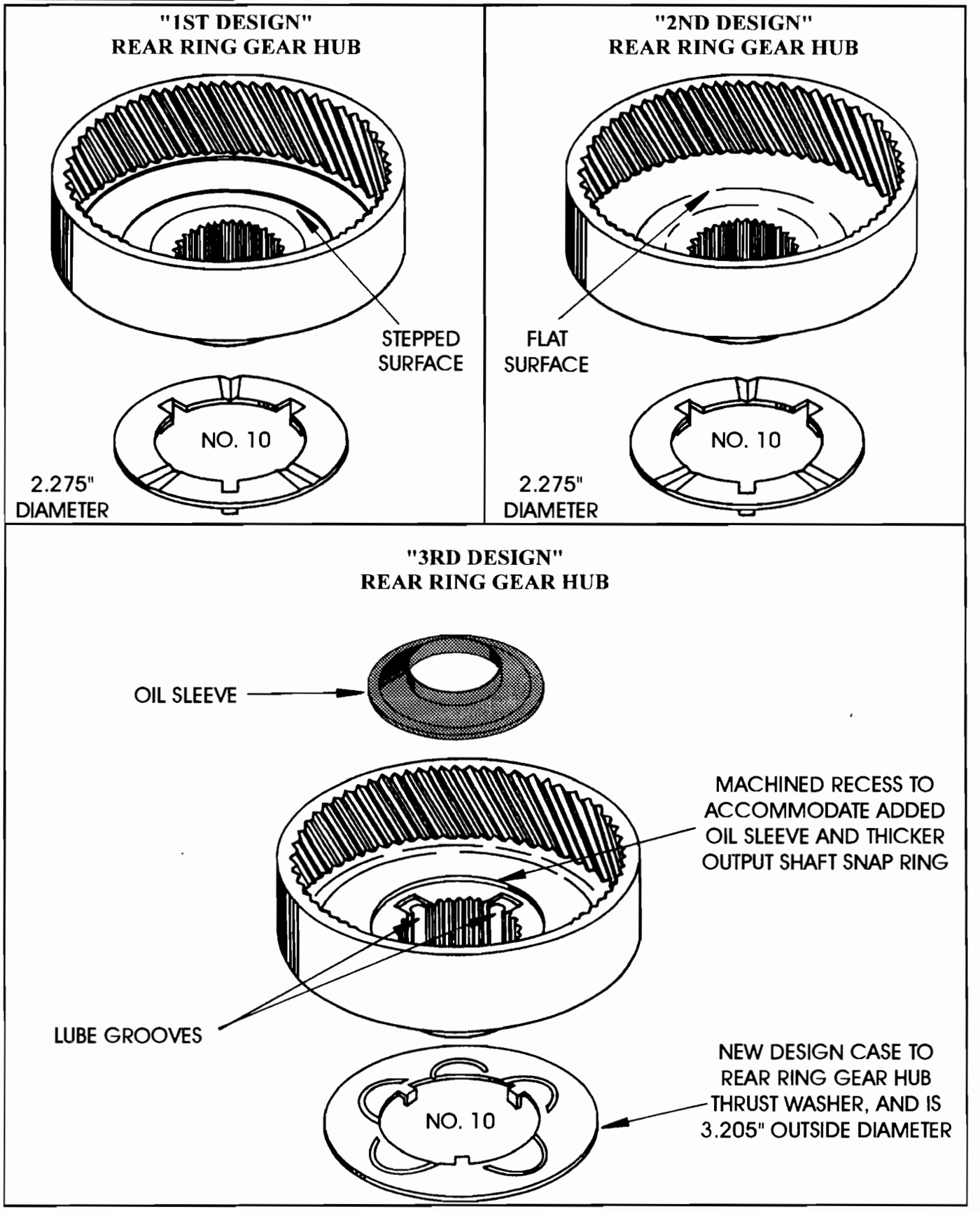


Figure 28

Automatic Transmission Service Group

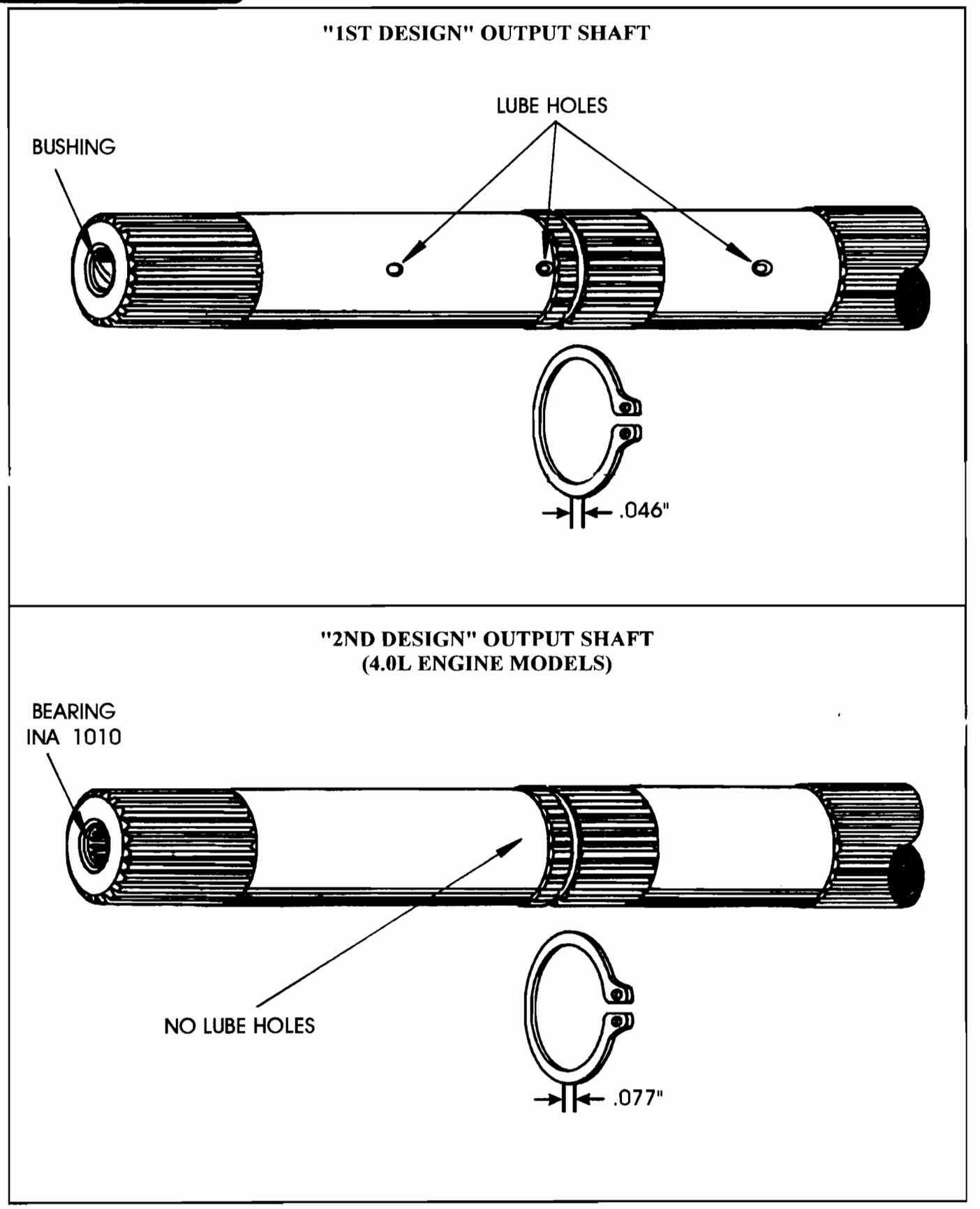
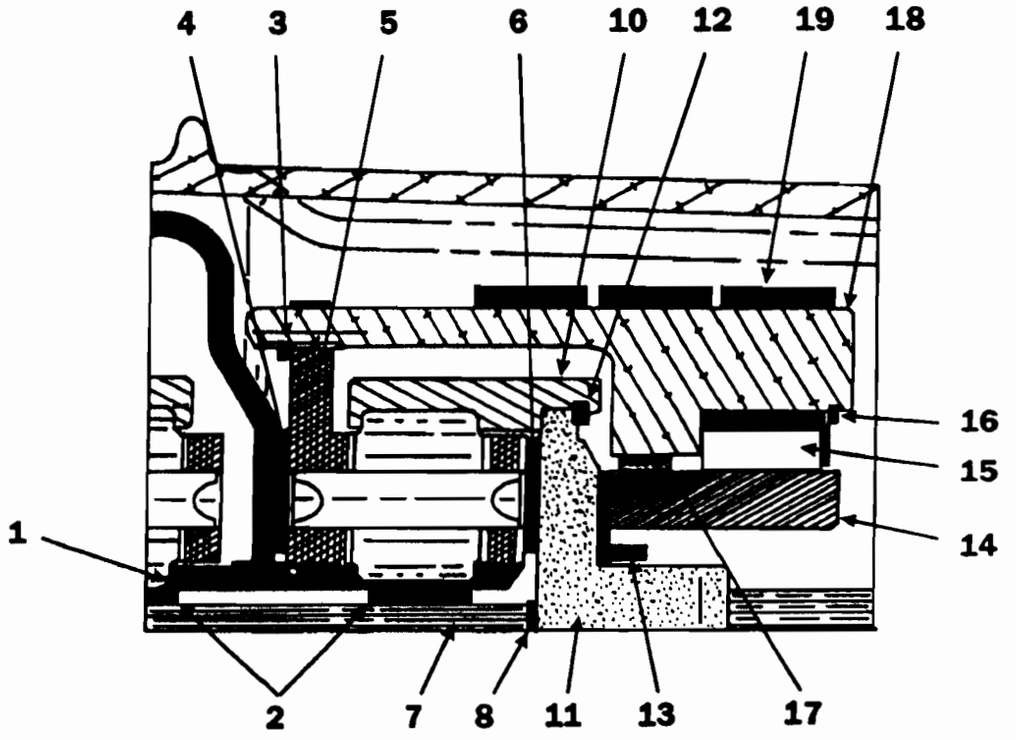


Figure 29
Automatic Transmission Service Group

EARLY LOW ROLLER CLUTCH ASSEMBLY



LATE (4.0L) LOW SPRAG ASSEMBLY

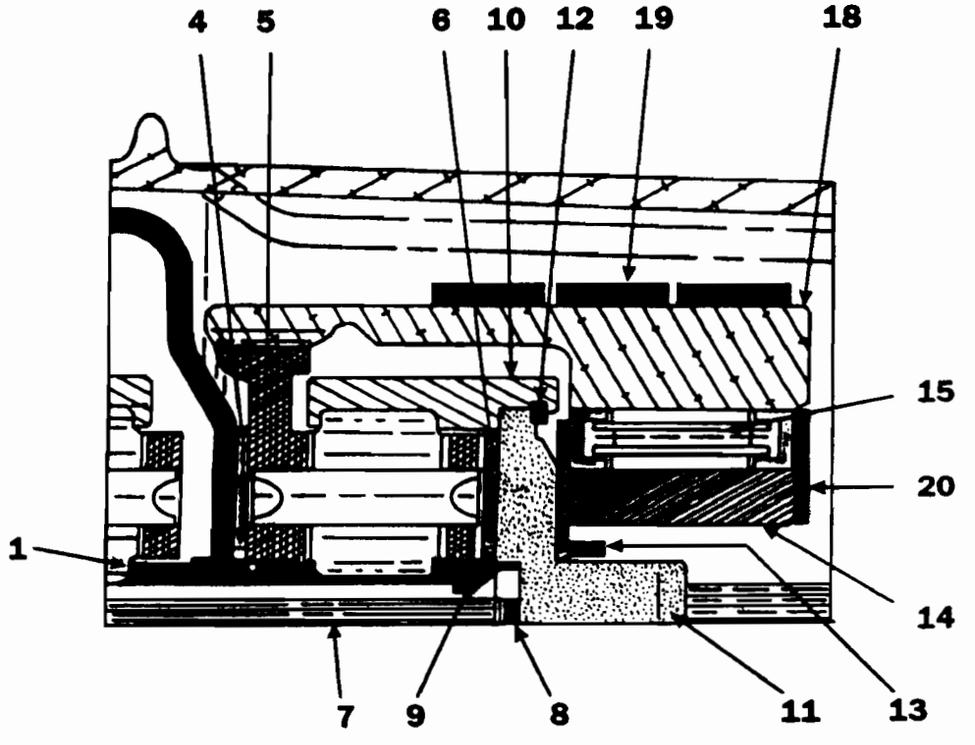


Figure 30

Automatic Transmission Service Group

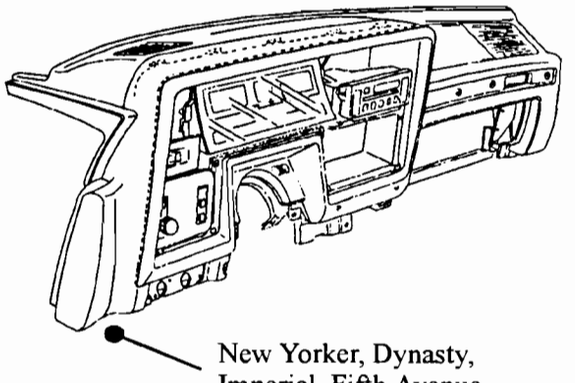
1. SUN GEAR.
2. SUN GEAR BUSHING.
3. REVERSE DRUM RETAINING SNAP RING.
4. NUMBER 8 THRUST WASHER.
5. REAR PLANETARY CARRIER.
6. NUMBER 9 THRUST WASHER.
7. OUTPUT SHAFT.
8. OUTPUT SHAFT TO REAR RING GEAR HUB RETAINING SNAP RING (.046" OR .077").
9. OIL SLEEVE, OUTPUT SHAFT (LUBE GUIDE).
10. REAR PLANETARY RING GEAR.
11. REAR RING GEAR HUB.
12. REAR RING GEAR TO RING GEAR HUB RETAINING SNAP RING.
13. NUMBER 10 THRUST WASHER.
14. LOW ROLLER / LOW SPRAG CLUTCH INNER RACE ASSEMBLY.
15. LOW ROLLER / LOW SPRAG ASSEMBLY.
16. LOW ROLLER CLUTCH TO REVERSE DRUM RETAINING SNAP RING.
17. REVERSE DRUM BUSHING.
18. REVERSE DRUM.
19. LOW / REVERSE BAND ASSEMBLY.
20. NUMBER 15 THRUST WASHER. (PART OF CASE)

Figure 30 Legend

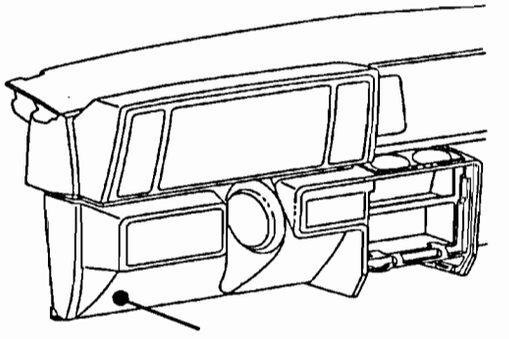
What to do if?

Your scanner says "NO COMMUNICATION"

1. Be sure that you are attached to the diagnostic connector located under the dash and not under the hood (See Figure 1).
2. Verify that you have chosen the CCD mode and not the Engine selection. With Snap-On, when choosing the CCD mode, be sure that you choose CCD SYSTEMS and not DEMO; CCD SYSTEMS. Also, be sure the correct cartridge is being used.
3. Check the battery and charging system for proper voltage and repair if necessary
4. Check terminal 2 in the CCD connector (See Figure 2) for battery voltage by placing the positive meter lead to the terminal and the negative lead to a good known ground. If 0 volts is seen, check fuses. Depending on model and year, it could be fuse 2, 7, 11, 13, 15 or 23. If battery voltage is present, check the ground wire by placing the negative meter lead to terminal 6 and the positive lead to the negative post of the battery (See Figure 2). There should be 0.1 volt or less. If a higher voltage value is seen, clean or repair the ground wire.



New Yorker, Dynasty,
Imperial, Fifth Avenue



Spirit, Acclaim, Lebaron, Daytona, Shadow,
Sundance, Caravan, Voyager

Figure 1

1....Data In (Vehicle with ABS)

2....Battery (12V)

3....Serial Data Bus (-) (2.5 V)

4....Serial Data Bus (+) (2.5 V)

5....Data Out (Vehicle with ABS)

6....Ground (0.1 V or less)

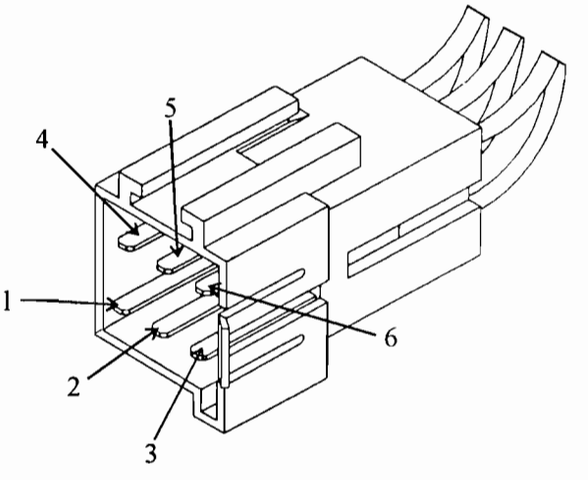


Figure 2

What to do if?

Your scanner says "NO MODULES RESPONDING"

1. Check for battery voltage on the J11 circuit at pin 56 which is in the 60 way connector that plugs into the EATX controller (See Figure 3). If battery voltage is not seen, a fuse or a fusible link may be blown (See Figure 4) . Fusible links are color coded and can usually be found below and between the battery and driver side spring tower (See Figure 5). Refer to Figure 6 for fusible link color or fuse number.

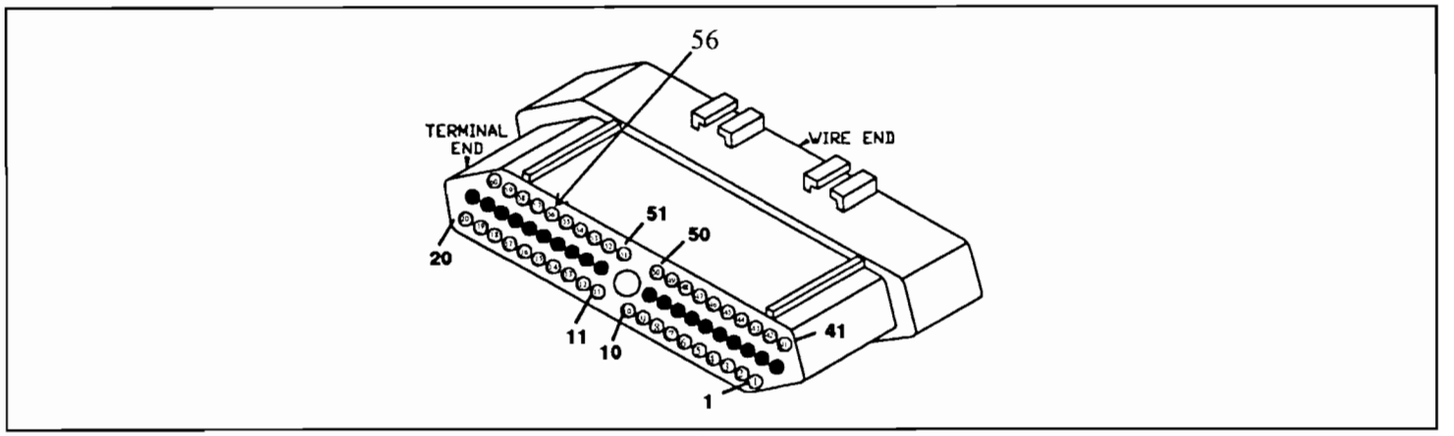


Figure 3

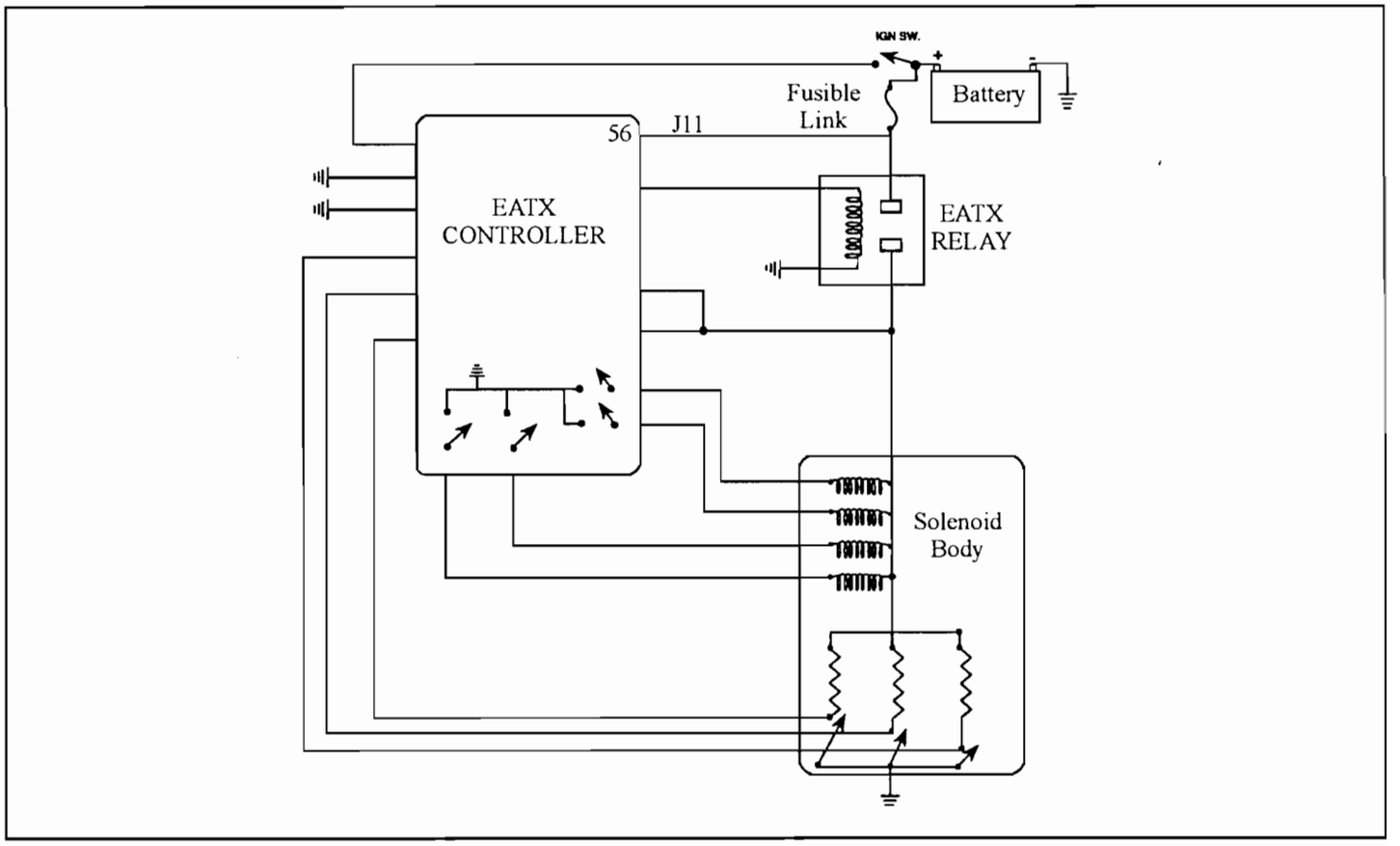
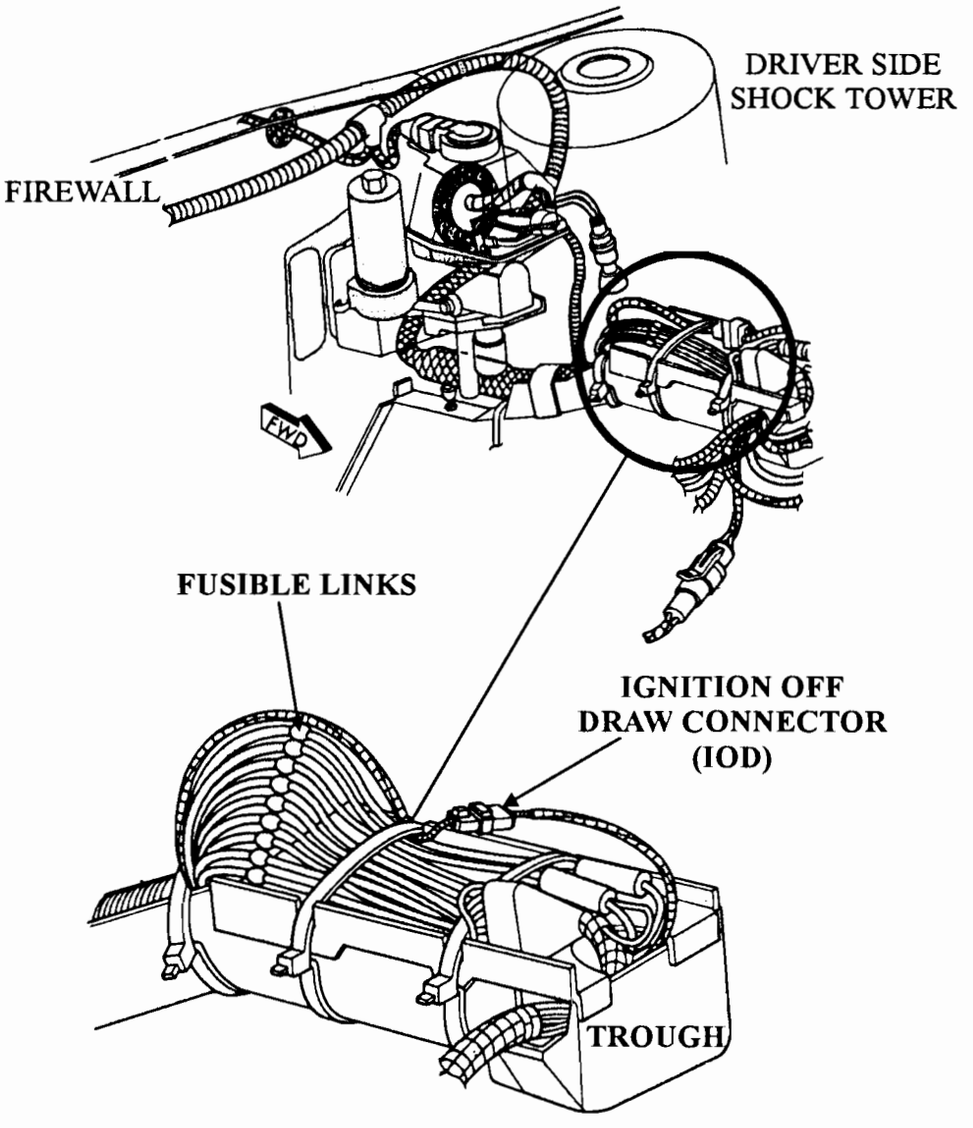


Figure 4

What to do if?

Your scanner says "NO MODULES RESPONDING" continued



Typical view of both fusible link and IOD connector location. Not all vehicles have an IOD connector or a trough that the fusible links sit into. All fusible links are located behind and below the battery tray towards the driver side shock tower.

Figure 5

What to do if?

Your scanner says "NO MODULES RESPONDING" continued

1989

Acclaim, Dynasty, New Yorker and Spirit.....White Fusible Link
Caravan, Mini Ram Van & Voyager.....Orange Fusible Link

1990

Acclaim and Spirit.....(IOD) - Orange Fusible Link
Daytona.....(IOD) - Orange & or White Fusible Link
Dynasty, 5th Avenue, Imperial and New Yorker.....(PDC) - Fuse J
Lebaron Convertable and Coupe.....Orange & or White Fusible Link
Caravan, Mini Ram Van & Voyager.....Battery Feed comes from Pin # 3 out of the SMEC

1991

Acdaim, Lebaron Sedan and Spirit.....White Fusible Link
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 54
Dynasty, 5th Avenue, Imperial, New Yorker.....(PDC) - Fuse J
Caravan, Town & Country & Voyager.....(FB) - Fuse # 54

1992

Acclaim, Lebaron Sedan and Spirit.....White Fusible Link
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 46
Dynasty, 5th Avenue, Imperial, New Yorker.....(PDC) - Fuse J
Caravan, Town & Country & Voyager.....(IOD) - Gray Fusible Link

1993

Acclaim, Lebaron Sedan and Spirit.....Orange Fusible Link
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 55
Dynasty, 5th Avenue, Imperial, New Yorker.....(PDC) - 30 Amp Fuse (Fuel Pump Trans)
Shadow & Sundance.....White Fusible Link
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager.....Gray Fusible Link

1994

Acclaim, Lebaron Sedan and Spirit.....White Fusible Link
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 55
Shadow & Sundance.....White Fusible Link
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager.....(FB) - Fuse # 15

IOD = Ignition Off Draw Connector PDC = Power Distribution Center FB = Fuse Block

Figure 6

What to do if?

Your scanner says "BUS IS INACTIVE or BUS FAILURE"

1. Check terminals 3 and 4 in the diagnostic connector individually (See Figure 7). They should each have approximately 2.52 volts. The check should be made with the key on and engine off. If the voltage value is greater than 2.8 or less than 2.2, there is either a failed controller, or shorted to ground or shorted to power or open and or bad grounds in the BUS wires. If the voltage is acceptable, go to step 2.
2. The majority of vehicles are equipped with both a body controller and an EATX controller. Most BUS inactive or failure problems can be attributed to one of these controllers going bad. Vehicles NOT equipped with a body computer are, all Spirit and Acclaim vehicles, all 1989 and 1990 Vans and some Lebarons. In these cases, the EATX controller would be suspect. On vehicles equipped with both a body controller and an EATX controller, go to step 3.
3. Unplug the transaxle controller (The transaxle controller is located inside the passenger side fender behind the headlight on all passenger cars. On all vans, they are mounted onto the firewall on the passenger side of the vehicle). Attach the scanner to the diagnostic connector and re-enter the diagnostic mode. If the scanner begins to show other modules that are on the BUS system, or the scanner now reads "No Modules Responding", the transaxle controller is bad.
4. If the problem of "BUS IS INACTIVE" persists, plug the transaxle controller back in and unplug the Body Controller. This controller is usually found behind the passenger side kick panel. Repeat the same steps as described with the transaxle controller in step 3. If the scanner begins to show other modules on the BUS system, or the scanner now reads "No Modules Responding", replace the body controller.
5. If the "BUS IS INACTIVE" still continues to be a problem, there may be another controller on the BUS system causing the problem. This would require locating each controller or controllers your vehicle may be equipped with and unplug one unit at a time until you get a response on the BUS system. Replace the controller which when it was unplugged allowed the "BUS IS INACTIVE or FAILURE" to be eliminated from the scanner screen.

1....Data In (Vehicle with ABS)

2....Battery (12V)

3....Serial Data Bus (-) (2.5 V)

4....Serial Data Bus (+) (2.5 V)

5....Data Out (Vehicle with ABS)

6....Ground (0.1 V or less)

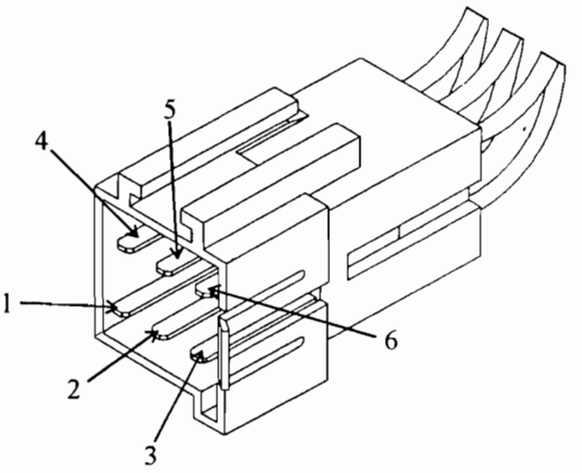


Figure 7

CHRYSLER A604
CVI
Clutch Volume Index

What is CVI: Clutch Volume Index is a calculated numerical value to indicate how much volume of transmission fluid was needed to apply a friction element without stroking the accumulator piston. The L/R, 2/4, OD and UD clutch elements are continuously monitored and learned for adaptive controls. As the friction material wears, the volume of fluid needed to apply the element increases. The following numerical values are Chrysler's suggested acceptable tolerances for A-604 clutch volumes:

L/R: 35 to 83	2/4: 20 to 77
OD: 75 to 150	UD: 24 to 70

If the battery has been disconnected, some models will loose the learned CVI values. In such cases, the EATX Controller will go to a default setting until the new CVI values are learned. The default settings used are:

L/R: 64	2/4: 48
OD: 89	UD: 45

Late model vehicles as well as updated controllers will remember the learned CVI values even if the battery has been disconnected. These controllers will also allow you to utilize a QUICK LEARN feature through a scan tool to update new CVI values after an overhaul. Earlier transaxle controllers require what is called an "Upshift Learn Procedure" otherwise known as the "Dumb Method". This means that you have to first bring the vehicle up to operating temperature before road testing. During this road test, you must maintain constant throttle opening during the shifts and do not move the accelerator pedal during these shifts. Make 15 to 20 1-2, 2-3 and 3-4 upshifts. Accelerate from a stop each time to approximately 45 mph at an approximate throttle angle of 20-25 degrees. Next, perform what is called the "Kickdown Learn Procedure" by making 5 to 8 wide open throttle kickdowns to first gear from speeds below 25 mph. With vehicle speeds greater than 25 mph, make 5 to 8 part throttle to wide open throttle kickdowns to either 3rd or 2nd gear. The clutch volumes will update during the following shift sequence:

The L/R clutch volume updates during a 2-1 or 3-1 downshift.
The 2/4 clutch volume updates during a 1-2 upshift.
The OD clutch volume updates during a 2-3 upshift.
The UD clutch volume updates during a 4-3 or 4-2 downshift.

1991 and up vehicles or newly replaced updated controllers will provide the following codes in regard to inadequate clutch volume:

Code 60 Inadequate LR Element Volume
Code 61 Inadequate 24 Element Volume
Code 62 Inadequate OD Element Volume
Code 63 Inadequate UD Element Volume

Clutch Volume Index's are best used in a diagnostic procedure when there are shift problems associated with the transaxle. If the transaxle does not exhibit any shift concerns, a below minimum or above maximum Clutch Volume Index's does not indicate transaxle removal. At best, it may be a warning sign of future concerns. In other words, if out of range CVI values do not interfere with the quality of the shift, transaxle removal may be a premature diagnosis. However, when diagnosing excessive CVI values in relationship to flared shifts, keep in mind that they are usually due to excessive clutch pack clearance, leaks or broken snap rings. If inadequate clutch volumes exist and a code has been set, the transaxle may be accompanied with harsh shifts. There are several possibilities as to the cause of inadequate or below minimum CVI's. Too tight of a

clutch pack or a broken snap ring jamming the clutch pack would be the obvious possibilities. The not so obvious would be cross leaks. For example, in figure 8 a view of both the early and late stators are shown. The earlier 3 ring stator would allow UD clutch oil to cross over into the OD clutch circuit in first and second gears. This would keep the OD clutch circuit partially charged with oil. The result would be low OD clutch volume readings since not much oil was required to put the OD clutches on during a 2-3 shift. This was usually accompanied with a low clutch volume reading in the UD clutch circuit as well. The reason for this is that when the transaxle made a shift into fourth gear, OD clutch oil would now cross over the ring and keep the UD clutch circuit partially charged with pressure. When the transaxle would make a 4-3 or a 4-2 downshift, not much volume of oil was required to put the UD clutch back on. This obviously was the reason why Chrysler redesigned the stator to 4 rings adding an exhaust between the two circuits.

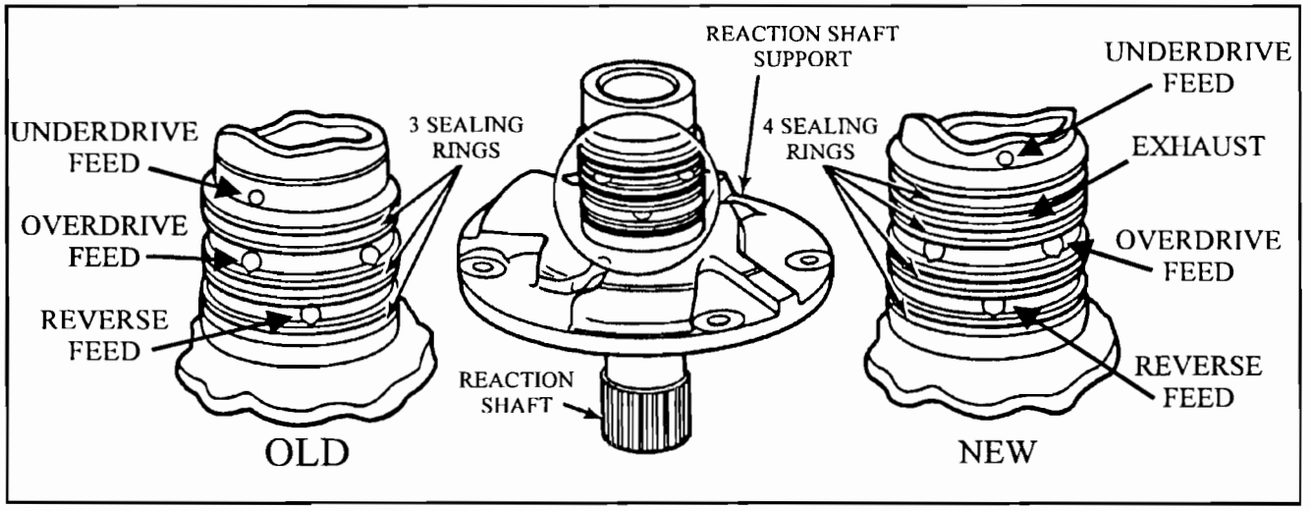


Figure 8

A low clutch volume reading in just the OD clutch circuit has been commonly caused by a defective O ring on the # 5 check ball capsule in the transfer plate as shown in figure 9. This blocks controlled line pressure from entering the OD clutch circuit. If the O ring or the capsule itself fails to hold back this pressure, the low OD clutch volume reading will vary depending upon the severity of the leak. If the leak is slight, most of the oil will exhaust past the OD solenoid and the OD clutch volume may appear to be normal. As the leak gets worse, the OD solenoid is flooded and the OD circuit becomes charged with oil causing below minimum CVI.

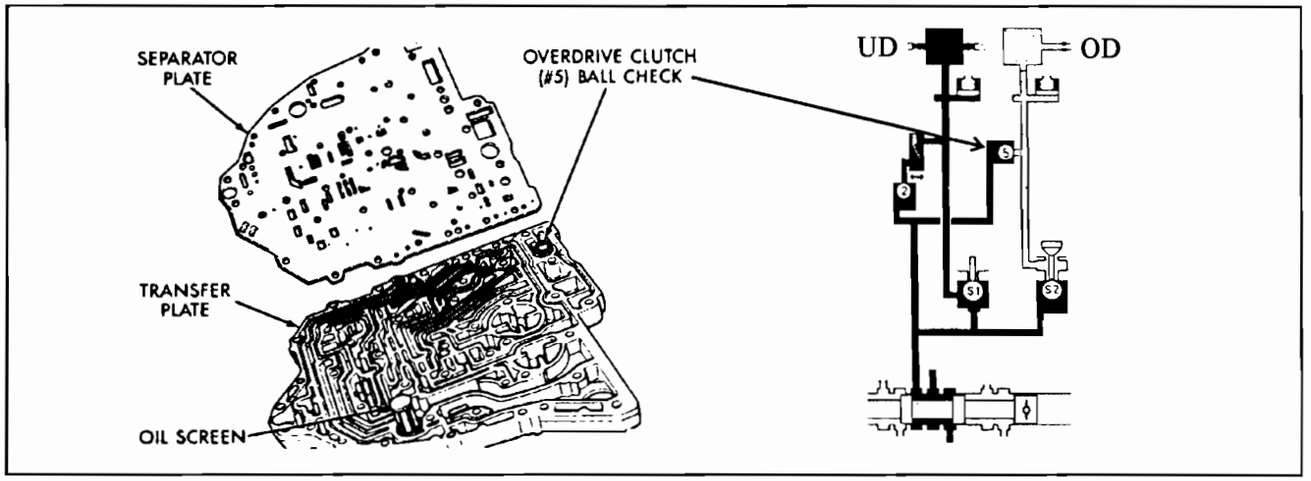


Figure 9

Another cause of low CVI that is often overlooked is high line pressure. There are three predetermined line pressure settings in an A604 transaxle. First and second gears have 120 to 145 psi. Third and fourth have 75 to 95 psi, while reverse is calibrated to have 175 to 235 psi. The controller for the transaxle has no way of knowing or checking what the actual line pressure is in the transaxle. Therefore, the controller controls the solenoid pulse rate based on these predetermined line pressure settings. If a mechanical problem occurs in the valve body causing high line pressure, the controller will be pulsing a clutch on through a solenoid based on a lower value pressure. With line pressure being much higher than what the controller thinks it is, a higher volume of oil is allowed to pass through the solenoid which results in a below minimum CVI reading. One common cause for this is either a worn sleeve in the pressure regulator valve system or a stuck pressure regulator valve (See Figure 10). These sleeves are available separately through TransGo.

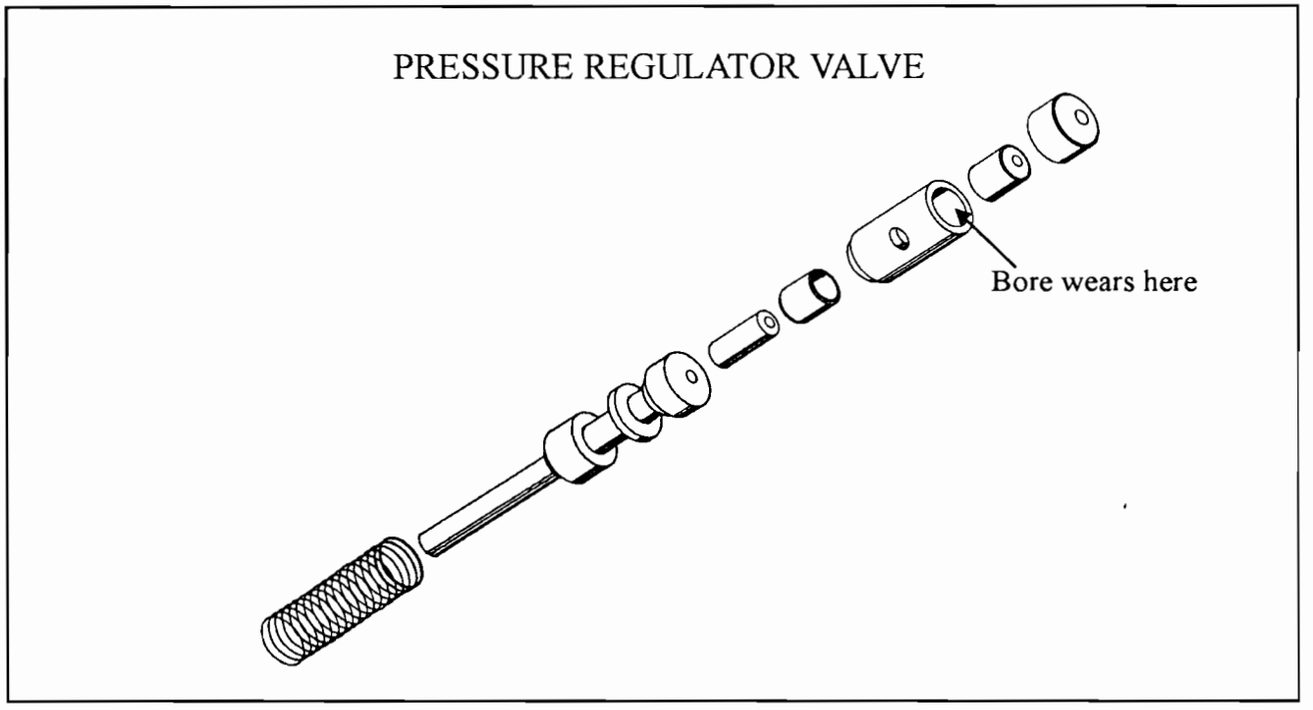


Figure 10

Both cross leaks and high line pressure problems causing the below minimum CVI values can be easily checked with a pressure gauge. For example, if you have a below minimum CVI value in the OD clutch circuit, attach a pressure gauge on the OD clutch tap. There should NOT be any pressure in that port in first and second gear. If there is, you have a cross leak. At the same time, when you shift into third and fourth, your OD clutch pressure should be 75 to 95 psi. If you have 110 psi or higher, you have a high line pressure problem most likely caused by a worn sleeve in the pressure regulator valve.

If clutch clearances are good, snap rings are not broken, line pressures are to spec and there is not a possibility of a cross leak and you are still being plagued with below minimum CVI values in either the L/R, 2/4 or OD circuit, change the solenoid body. The pressure switches inside the solenoid body may have week springs sending false signals to the controller. There is an aftermarket solenoid body repair kit available with these springs in it if you would like to rebuild one on your own. Ask your supplier for a solenoid body repair kit by Precision International.

A604

2ND GEAR STARTS AND NO UPSHIFT, EVEN AFTER IGNITION CYCLE

COMPLAINT: 2nd gear starts and no up shifts occur even after an ignition cycle. A code 15 may be accompanied with this complaint.

CAUSE: The cause may be a loss of voltage supply to pin number 4 at the solenoid body which is controlled by the EATX relay. The EATX relay (Electronic Automatic Transaxle) is operated by the controller. Its purpose is to provide battery voltage to the solenoids and switches. When the controller receives an ignition run signal from the ignition switch, it will first perform a number of circuit checks and a EATX relay check. The controller will initialize and activate the EATX relay if no circuit problems are found. One side of the EATX relay coil is grounded and the controller applies battery voltage to the opposite side. This power comes from the controllers direct battery supply circuit. When the EATX relay contacts close, battery voltage is supplied to pin number 4 at the solenoid body and pins 16 & 17 on the controller. This is referred to as switched battery voltage (See Figure 11). The controller uses pins 16 & 17 to monitor the relay function and applied voltage. If the contacts in the EATX relay cannot close, switched battery voltage cannot be supplied to pin number 4 at the solenoid body or pins 16 & 17 at the controller causing the 2nd gear starts and no up shifts even after an ignition cycle. Fault code 15 may be accompanied with this fault which means EATX relay off.

CORRECTION: **NEW YORKER, DYNASTY, IMPERIAL and FIFTH AVENUE ONLY.**

(1) Locate the EATX relay in the Power Distribution Center as shown in Figure 12.

(2) With the ignition OFF, remove the relay and refer to figure 13 for cavity identification.

(3) Reinstall the EATX relay into the cavity so that pins make contact with the cavity terminals, leaving room to back probe relay pin. *NOTE: FOLLOWING TEST CANNOT BE MADE WITH RELAY REMOVED.*

(4) Using a Volt Meter set to DC volts, place the positive lead onto terminal B and the negative lead on the ground post of the battery. Battery voltage should be seen here with the ignition switch either on or off. If no voltage appears, inspect and repair the wiring for an open or a blown fusible link. If there is battery voltage, go to step 5.

(5) Using an OHM meter, place the positive lead onto terminal C and the negative lead to a good ground and check for continuity. If there is continuity, go to step 6. If there is no continuity, the wire coming out of cavity C has a bad ground. Repair the ground wire coming out of cavity C and repeat this check to insure that you have good continuity.

(6) Using a volt meter set to DC volts, place the positive lead onto terminal A and the negative lead onto the ground post of the battery. Once the meter is hooked up, cycle the ignition. If battery voltage appears for approximately 3 seconds and goes out continue to step 7. If battery voltage does not appear, check for continuity between cavity A at the relay and terminal 15 at the controller (See figure 14 for terminal location at the controller). If there is continuity, go to step 7. If there is no continuity, the wire from terminal 15 at the controller to cavity A at the relay has an open. Repair the wire and repeat this step to insure that you have continuity across this wire.

(7) Using an OHM meter, check continuity from terminal D at the EATX relay (Red Wire). to terminal 16 and then 17 at the transaxle's 60 way connector (See Figure 14). If there is no continuity, repair the break (open) in the wire. If continuity is seen from both terminal D to terminal 16 and then 17, go to step 8

CONTINUED ON NEXT PAGE

A604 Continued

(8) Using a volt meter set to DC volts, place the positive lead onto terminal A and the negative onto terminal C. Battery voltage should be seen here with ignition switch on. If battery voltage is not seen, replace the controller. If battery voltage is seen, go to step 8.

(9) Using a volt meter set to DC volts, place the positive lead onto terminal D and the negative lead on the ground post of the battery. Battery voltage should be seen here with ignition switch on. If battery voltage is not seen, replace the EATX relay. If battery voltage is seen, go to step 9.

(10) Using an OHM meter, check for continuity between cavity D at the relay and terminal 4 at the solenoid body connector. See figure 15 for solenoid connector terminal identification. If there is no continuity, the wire from cavity D at the relay to terminal 4 in the solenoid connector has an open. Repair the wire and repeat this check to insure that you have continuity across this wire.

CORRECTION: SPIRIT, ACCLAIM, LEBARON, DAYTONA, SHADOW, SUNDANCE, CARAVAN and VOYAGER ONLY

(1) Locate the EATX relay location by using figure 16 and refer to figure 17 for cavity identification.

(2) Carefully bend the EATX relay bracket to gain access to back probe the connector. ***NOTE:*** FOLLOWING TEST CANNOT BE MADE WITH CONNECTOR REMOVED.

(3) Using a volt meter set to DC volts, take the positive lead and carefully back probe the D terminal (Red with white stripe wire). Place the negative lead onto the ground post of the battery. Battery voltage should be seen here with ignition switch either on or off. If no voltage appears, inspect and repair the wiring for an open or a blown fusible link. If there is battery voltage, go to step 4.

(4) Using an OHM meter, take the positive lead and carefully back probe the A terminal (Black with red stripe wire) and put the negative lead to a good ground. If you have good continuity, go to step 5. If there is no continuity, the wire coming out of terminal A has a bad ground. Repair the ground wire coming out of terminal A and repeat this check to insure that you have good continuity.

(5) Using a volt meter set to DC volts, take the positive lead and carefully back probe the C terminal (Light green wire) and place the negative lead onto the ground post of the battery. Once the meter is hooked up, cycle the ignition. If battery voltage appears for approximately 3 seconds and goes out continue to step 6. If battery voltage does not appear, check for continuity between cavity C at the relay and terminal 15 at the controller (See figure 14 for terminal location at the controller). If there is continuity, go to step 6. If there is no continuity, the wire from terminal 15 at the controller to cavity C at the relay has an open. Repair the wire and repeat this step to insure that you have continuity across this wire.

(6) Using an OHM meter, check continuity from terminal B at the EATX relay (Red Wire), to terminal 16 and then 17 at the transaxle's 60 way connector (See Figure 14). If there is no continuity, repair the break (open) in the wire. If continuity is seen from both terminal B to terminal 16 and then 17, go to step 7.

(7) Using a volt meter set to DC volts, take the positive lead and carefully back probe terminal C (Light green wire). Take the negative lead and carefully back probe terminal A (Black with red stripe wire). Battery voltage should be seen here with ignition switch on. If battery voltage is not seen, replace the controller. If battery voltage is seen, go to step 8.

CONTINUED ON NEXT PAGE

A604 Continued

(8) Using a volt meter set to DC volts, take the positive lead and carefully back probe terminal B (Red wire). Place the negative lead onto the ground post of the battery. Battery voltage should be seen here with the ignition switch on. If battery voltage is not seen, replace the EATX relay. If battery voltage is seen, go to step 9.

(9) Using an OHM meter, check for continuity between terminal B (Red) at the relay and terminal 4 at the solenoid body connector. See figure 5 for solenoid connector terminal identification. If there is no continuity, the wire from terminal B (Red wire) at the relay to terminal 4 at the solenoid connector has an open. Repair the wire and repeat this check to insure that you have continuity across this wire.

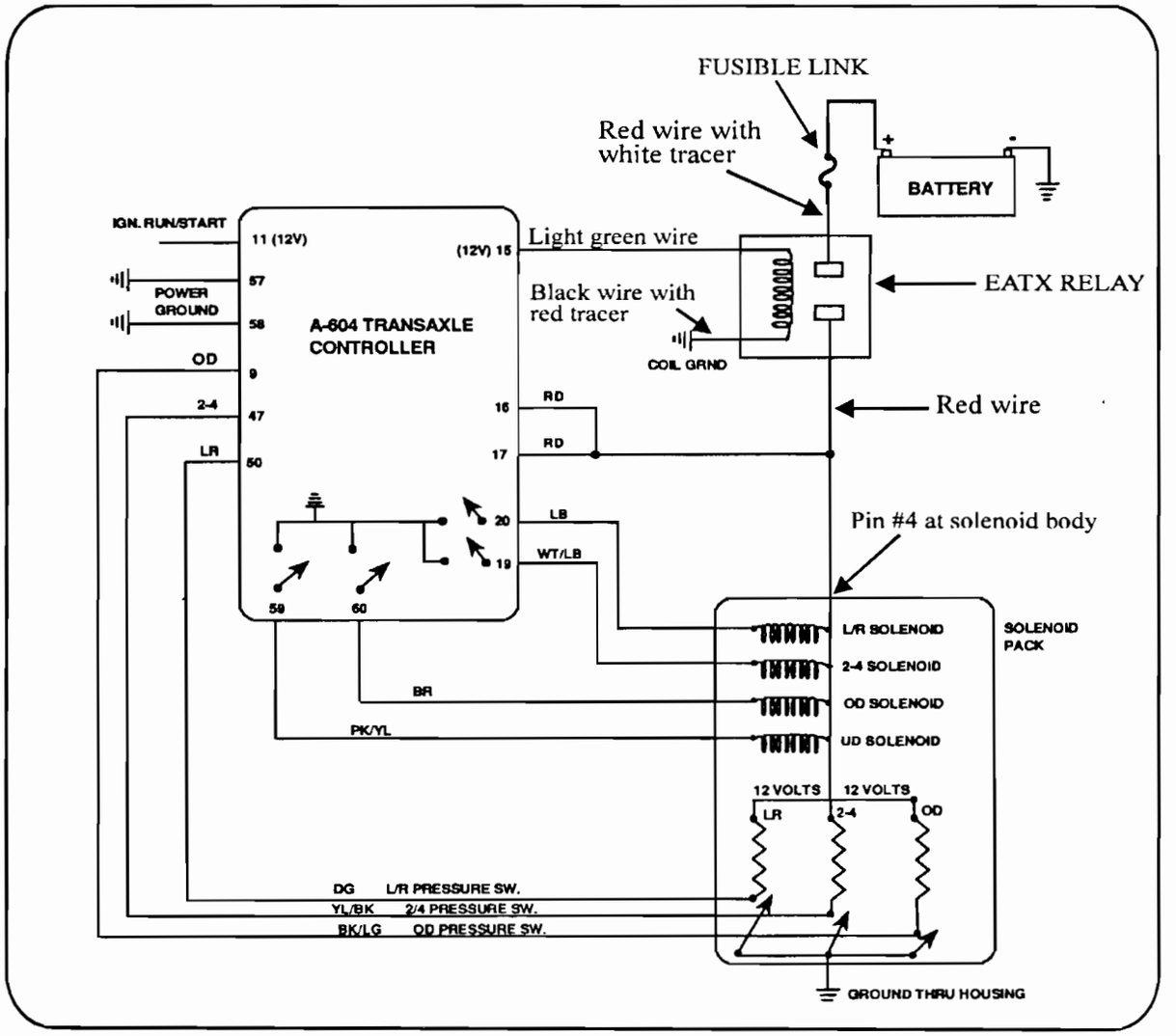


Figure 11

EATX RELAY LOCATION FOR NEW YORKER, DYNASTY, IMPERIAL AND FIFTH AVENUE.

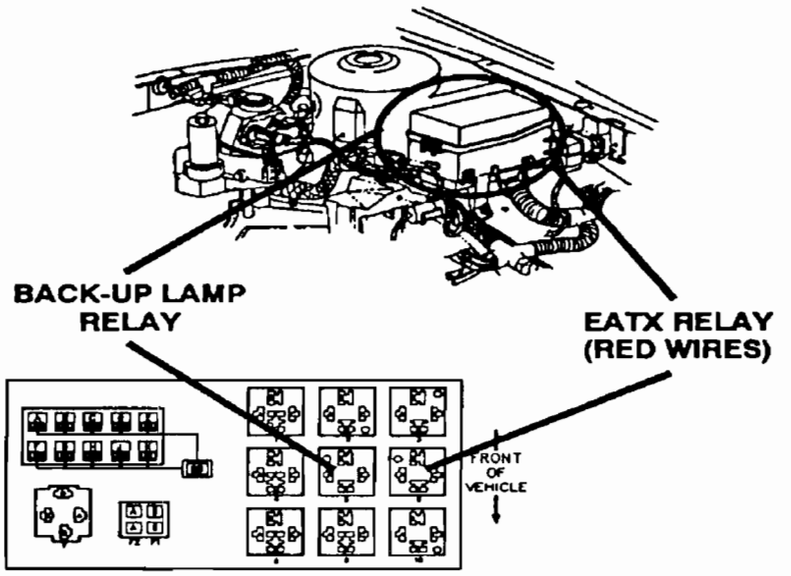


Figure 12

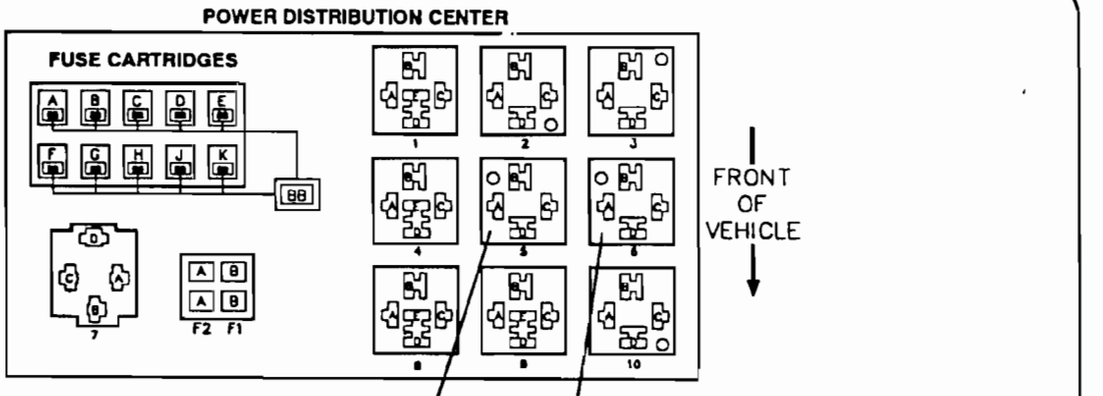
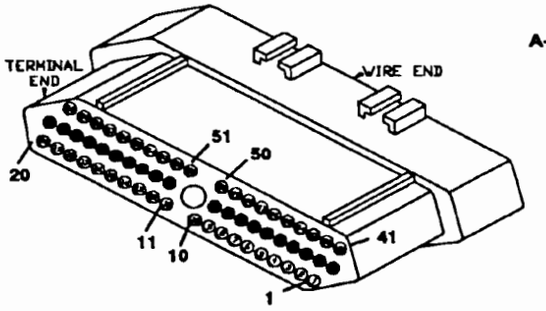


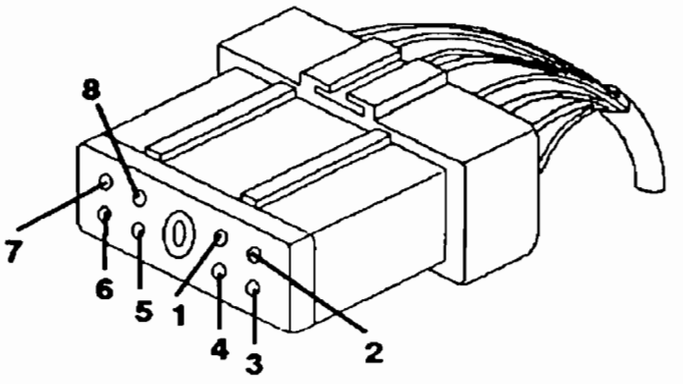
Figure 13



CAV..	CIRCUIT.....	FUNCTION
1	T01 18LG/*.....	PRNDL (RL2)
2	T02 18TN/BK	Back-up Lamp Relay, Coil Driver (RL3)
3	T03 14VT	Neutral Start Switch (RL1)
4	D02 20PK/BK	Bus (-)
5	D01 20WT/BK	Bus Bias (A Body Only)
6	T44 18TN/YL	(2.5L Turbo Only)
7	.....	Not Used
8	A41 14YL	Crank Signal
9	T09 18OR/BK.....	OD Pressure Switch
10	.....	Not Used
11	A21 14DB.....	Ignition (+)
12	K22 18OR/DB.....	Throttle Position Sensor
13	T13 18DB/BK	Speed Sensor Ground
14	T14 18LG/WT.....	Output Speed Sensor
15	T15 18LG	EATX Relay Coil (Power)
16	T16 16RD.....	EATX Relay Output
17	T16 16RD.....	EATX Relay Output
18	.....	Not Used
19	T19 18WT	2-4 Solenoid Driver
20	T20 18LB	L/R Solenoid Driver
21-40	.....	Not Used
41	T41 20BR/YL	Neutral Start (NS1)
42	T42 18VT/*.....	PRNDL (NS2)
43	D01 20VT/BR	Bus (+)
44	D02 20WT/BK	Bus Bias (A Body Only)
45	K24 18GY/BK.....	Engine Speed Signal
46	.....	Not Used
47	T47 18YL/BK	2-4 Pressure Switch
48	.....	Not Used
49	.....	Not Used
50	T50 18DG.....	LR Pressure Switch
51	K04 18BK/LB	T.P.S. Ground
52	T52 18RD/BK.....	Turbine Speed Sensor
53	Z14 18BK/YL	Signal Ground
54	Z14 18BK/YL	Signal Ground
55	.....	Not Used
56	A14 16RD/*	Battery Feed
57	Z13 18BK/RD	Power Ground
58	Z13 18BK/RD	Power Ground
59	T59 18PK.....	UD Solenoid Driver
60	T60 18BR.....	OD Solenoid Driver

Figure 14

SOLENOID CONNECTOR TERMINAL IDENTIFICATION

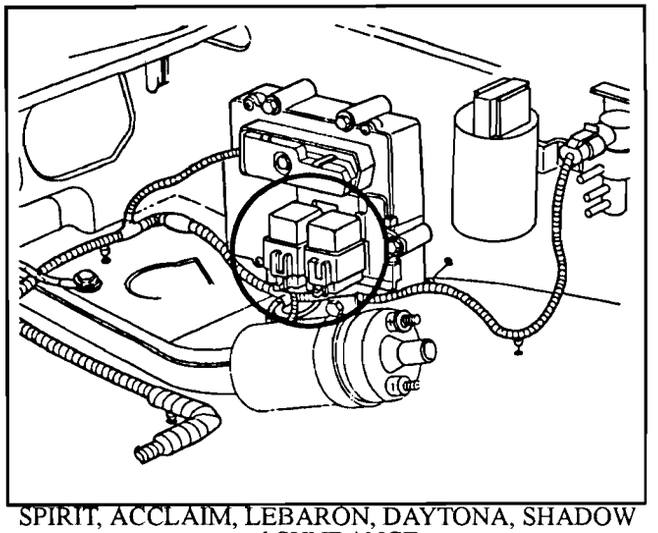


TRANSMISSION SOLENOID PACK CONNECTOR

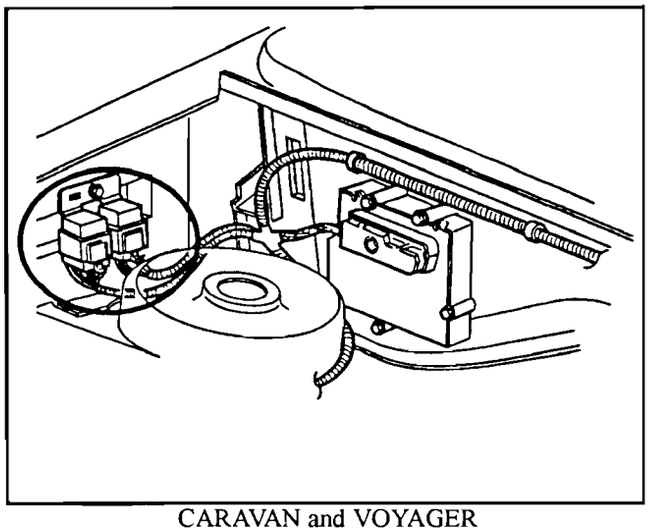
CAV	CIRCUIT	FUNCTION
1	T47 18YL/BK	2-4 Pressure Switch
2	T50 18DG	L/R Pressure Switch
3	T9 18OR/BK	OD Pressure Switch
4	T16 18RD	Relay Output
5	T59 18PK.....	UD Solenoid Driver
6	T60 18BR	OD Solenoid Driver
7	T20 18LB	L/R Solenoid Driver
8	T19 18WT	2-4 Solenoid Driver

Figure 15

EATX RELAY LOCATION FOR SPIRIT, ACCLAIM, LEBARON, DAYTONA, SHADOW, SUNDANCE, CARAVAN and VOYAGER.

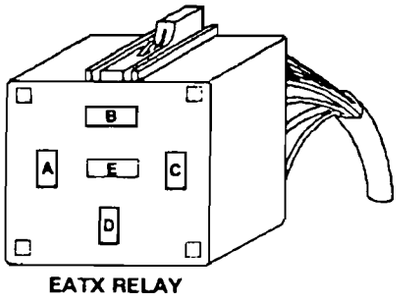


SPIRIT, ACCLAIM, LEBARON, DAYTONA, SHADOW and SUNDANCE.



CARAVAN and VOYAGER

Figure 16



EATX RELAY

CAV	CIRCUIT	FUNCTION
A	Z13 18BK/RD	Ground
B	T16 18RD	Relay Output
C	T15 18LG	Relay Coil Power
D	A14 18RD/WT	Battery 12V
E		Not Used

Figure 17