INDEX

AUTOMATIC TRANSMISSION SERVICE GROUP

SEMINARS '88

TECHNICAL INFORMATION PACKAGE

Space age technology has fully arrived in the automotive industry. Currently most vehicles carry one on board computer. Within the next year some vehicles will have as many as six computers on board. Controlling, engine management, vehicle suspension, Interior air-temperature, Brakes, TRANSMISSION, vehicle location via satellite communication.

The seminars continue on updating computer diagnosing information along with basic transmission diagnosing. We feel it is important to you and the people that work with you in the shop to come up with a common method of diagnosing. We have a chapter in this manual that covers just that.

A thought: It might be helpful to arrange transmission problems as follows:

COMPLAINT .....or problem
CAUSE .....the part or condition creating the problem
CORRECTION ... what is needed to be done to fix the problem

Keep in mind you have the need to be able to diagnose whether the transmission problem is ELECTRICAL — HYDRAULIC — MECHANICAL if it is not the computer . . . again we welcome you.

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Torque Converter Identification

GENERAL MOTORS-FORD
TORQUE CONVERTER IDENTIFICATION

TORQUE CONVERTERS

With the many different stall speed converters that are available on late model GM and Ford vehicles it is important to be able to find a way to identify them.

By examining the embossing or hatch marks on the converter shell you can determine whether the converter is a low or high stall unit.

In Figure 1, we have shown the different angles of the embossing. The direction of the embossing will determine whether it is a high or low stall unit. In Figure 1, the converters illustrated on the left are the high stall units and the ones on the right are the low stall units.

It should become a common practice when exchanging a converter, to match the embossing angles with the unit removed from the vehicle with the one to be installed.

Although stall speeds can vary even though the embossing looks the same outwardly, the stator in the converter and the number of blades will effect stall speed. However, the difference may be 100 to 200 rpm difference which will not have a marked effect on transmission operation.

Another check that should be made on the late model vehicles is a stall test using a tach or a computer scanner and if the vehicle is driveable, this stall test prior to transmission removal will display converter stall speed-application.

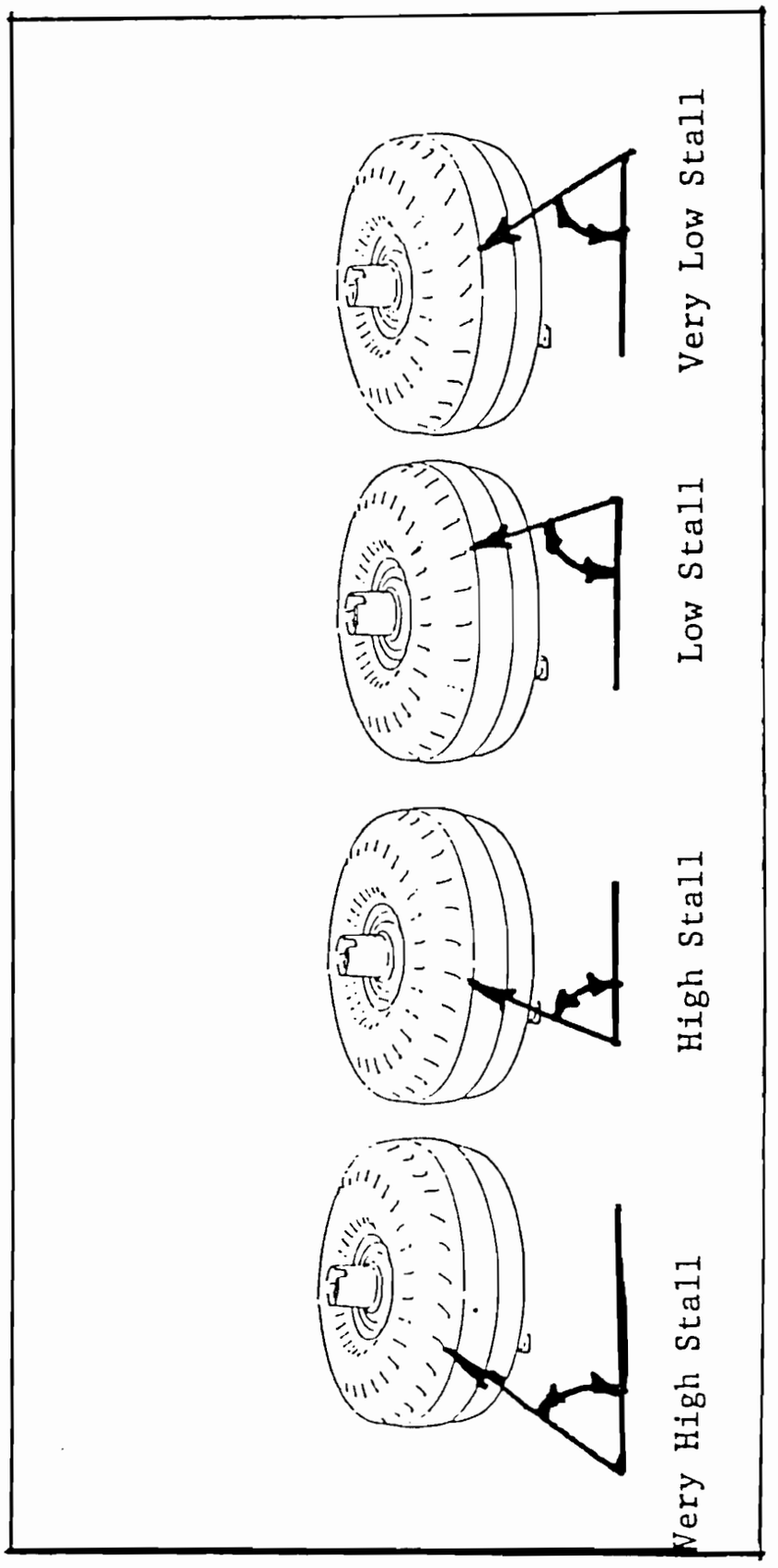


Figure 1

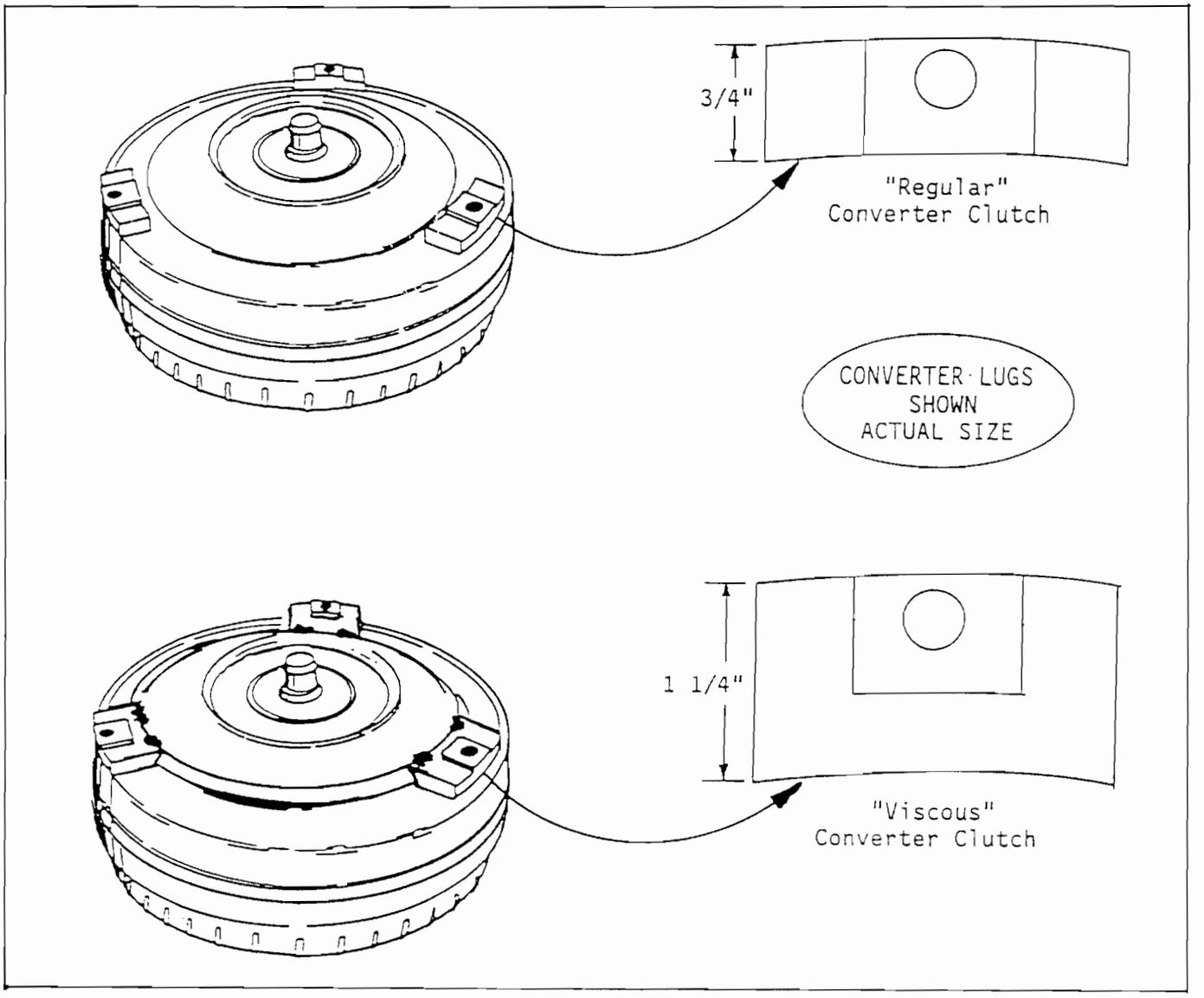


Figure 60

CONVERTER IDENTIFICATION

Identification of the "VISCOUS" converter from the "REGULAR" converter, can be done very easily externally. Notice the difference in the size of the converter drive lugs (see Figure 60). The profile of the converter covers are also different, but takes a closer look to detect, than do the drive lugs.

GM POPPET VALVE CONVERTERS

APPLICATION:

STATIC CLOSED: Diesel engine vehicles with 200C, 325-4L, 350C, 200-4R, 125C (except THM 700-R4)

STATIC OPEN: Cadillac gas: 200-4R - AA AP
325-4L - OF OM

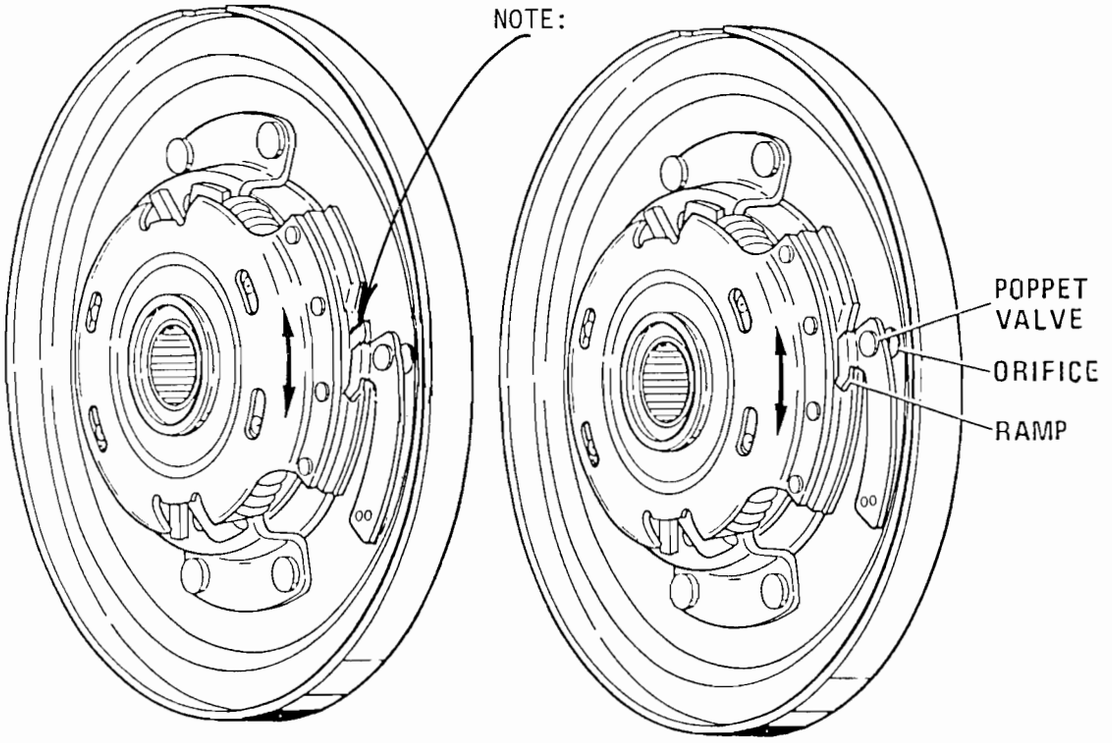


Figure 1

NOTE: In Figure 1, the static open clutch assembly, you can see the poppet valve is set on the ramp in the open position.

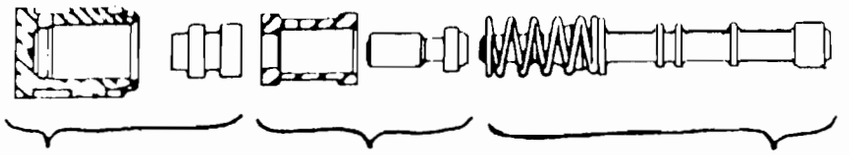
Valve Line-up

THM 125,200-4R,700-R4

The pressure regulator line-ups on the THM 125, 200-4R and 700-R-4 transmission can be misassembled in a couple different ways. To be sure of the proper sequence, refer to the picture below. The actual parts are not interchangable between transmissions.

On the second page shows the two ways of misassembling the line-up. The possible problem vary, but most of all you will get slipping in drive or reverse.

Just a reminder, the pin that holds the 125 line-up in position has been found to wear, allowing the T.V. boost valve to back out of the bore. It is recommended that you replace that pin with a solid one.

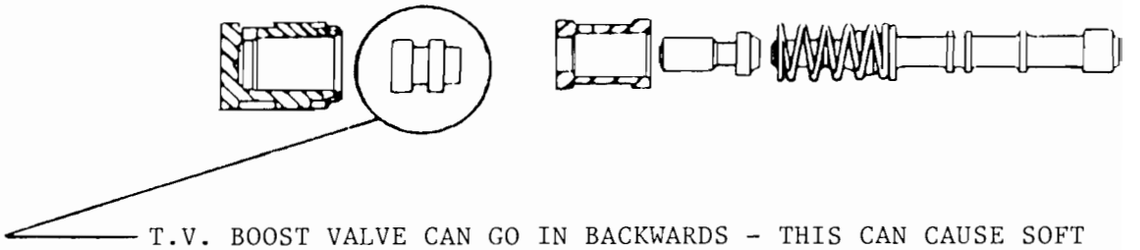


T.V. BOOST VALVE AND BUSHING

REVERSE BOOST VALVE AND BUSHING

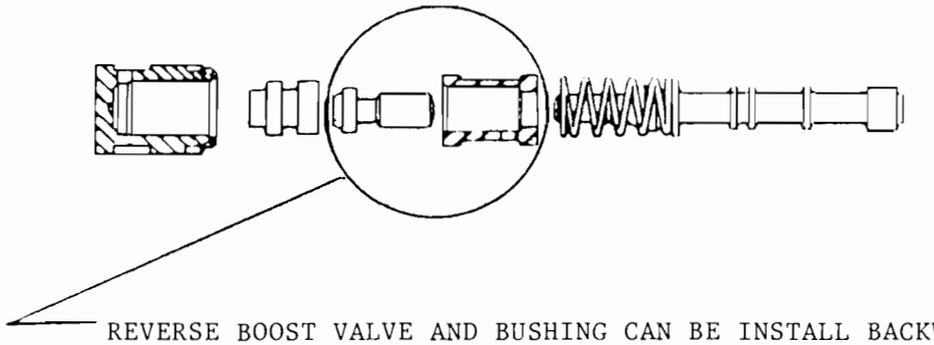
PRESSURE REGULATOR VALVE AND SPRING

CORRECT



T.V. BOOST VALVE CAN GO IN BACKWARDS - THIS CAN CAUSE SOFT 2-3 SHIFTS, AND LOW LINE PRESSURE

INCORRECT



REVERSE BOOST VALVE AND BUSHING CAN BE INSTALL BACKWARDS- THIS CAN CAUSE SLIPPING IN REVERSE AND ERATIC SHIFT FEEL

INCORRECT

1984 THM 125C PARTS CHANGES

For 1984 the THM 125C has 5 L&R friction plates that are .010" thicker, and 5 L&R steel plates that are .010" thicker, for a total of .100". They had to make room for that extra .100" in the L&R clutch pack. They accomplished this by moving the final drive ring gear spacer snap ring .050" closer to the final drive and of course this requires a thiner ring gear spacer (See Figure 1). The 1983 ring gear spacer measures 1.344" and can be identified by no notch in the tab. The 1984 ring gear spacer measures 1.294" and can be identified by a "V" notch in the tab (See Figure 2).

The other .050" was handled by making the L&R piston .050" thinner. The 1983 piston measures .535" (total height) and is identified by a "round" hole in the lip seal retainer on the back of the piston. The 1984 piston measures .485" (total height) and is identified by a "square" hole in the lip seal retainer on the back of the piston (See Figure 3). Needless to say these parts cannot be interchanged.

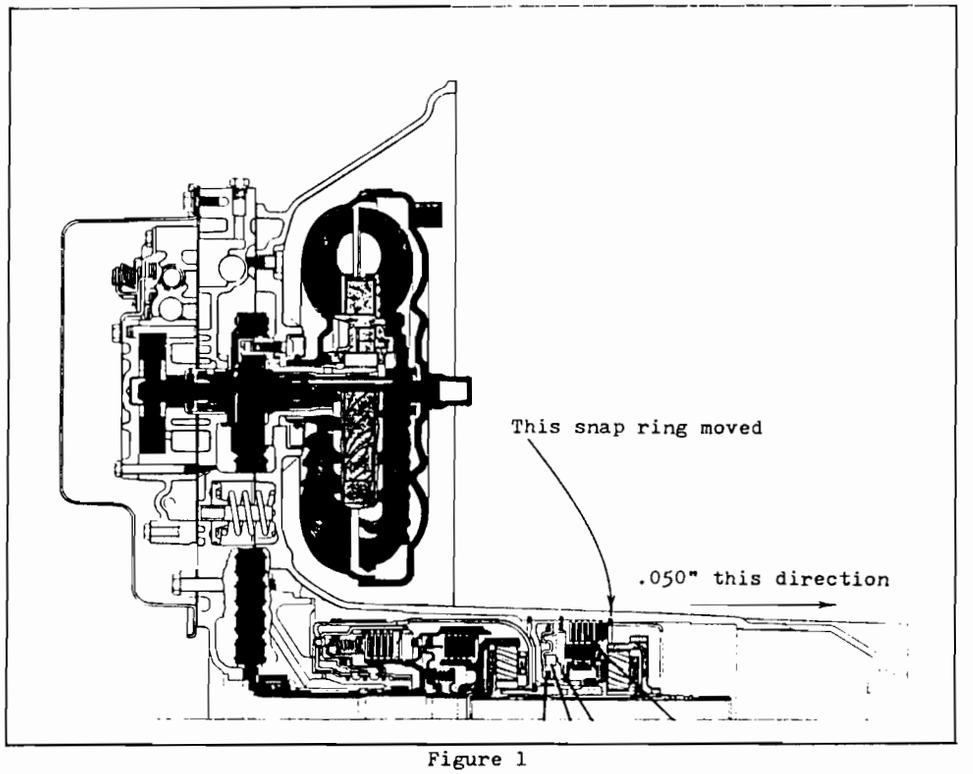


Figure 1

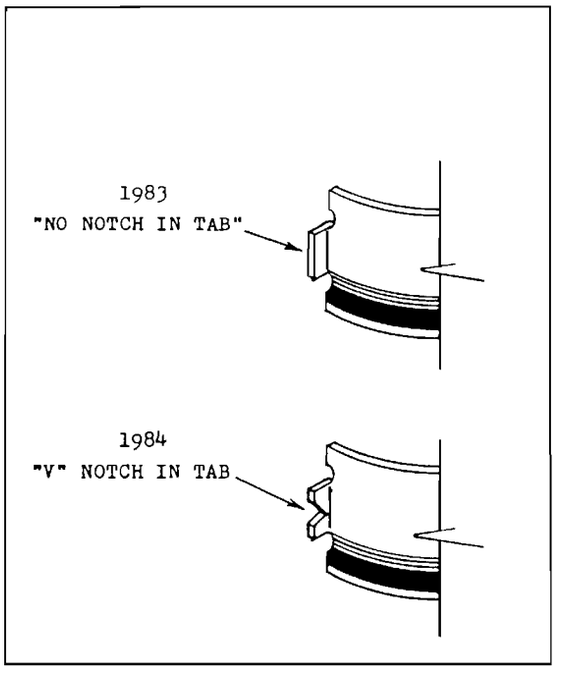


Figure 2

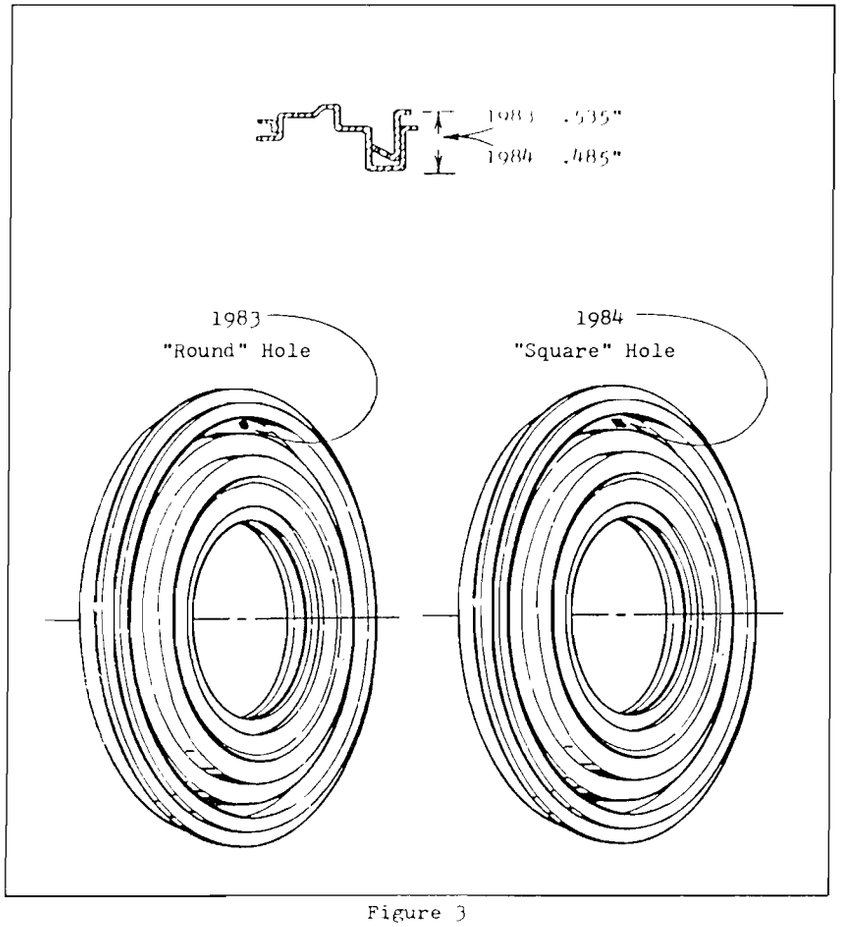
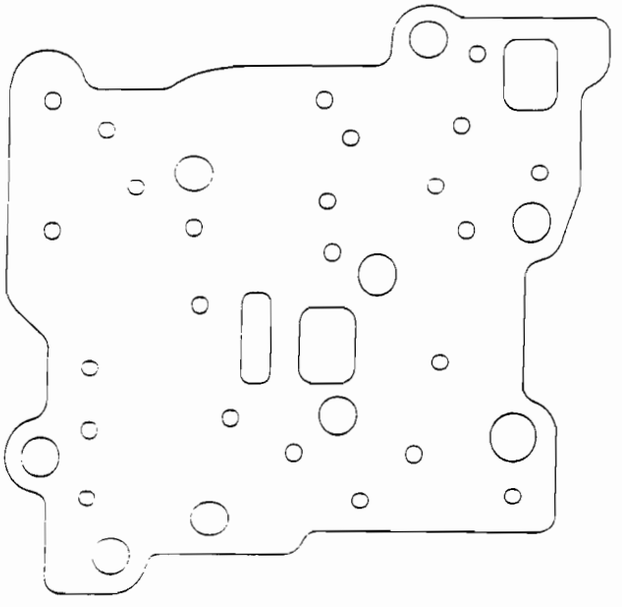


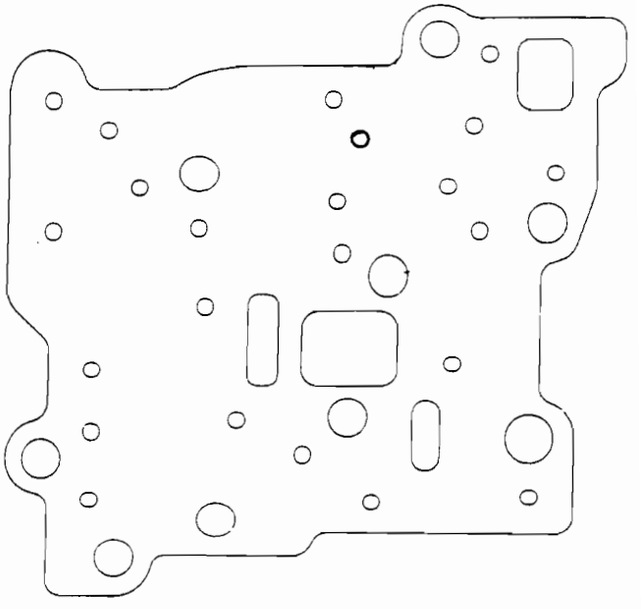
Figure 3

THM 125C GASKET CHANGE

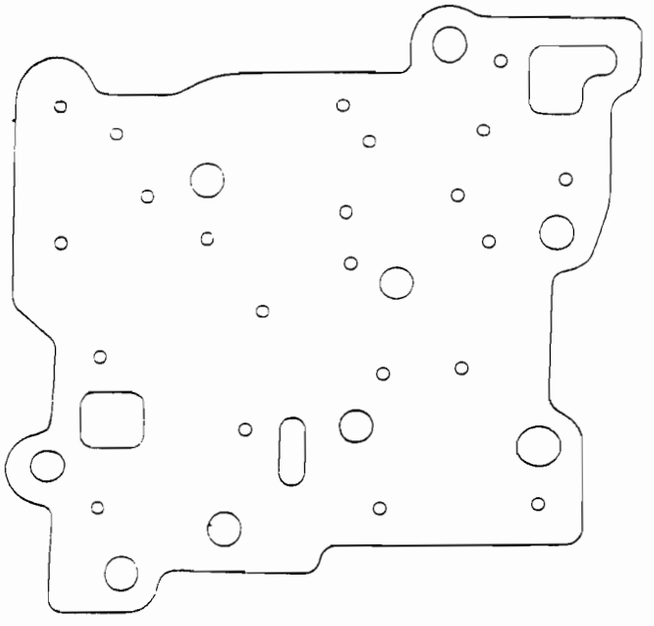
NOTE: GASKETS DO NOT RETROFIT, MISMATCH CAN CAUSE NO TCC ENGAGEMENT OR NO TCC RELEASE.



1982-83



1984-86



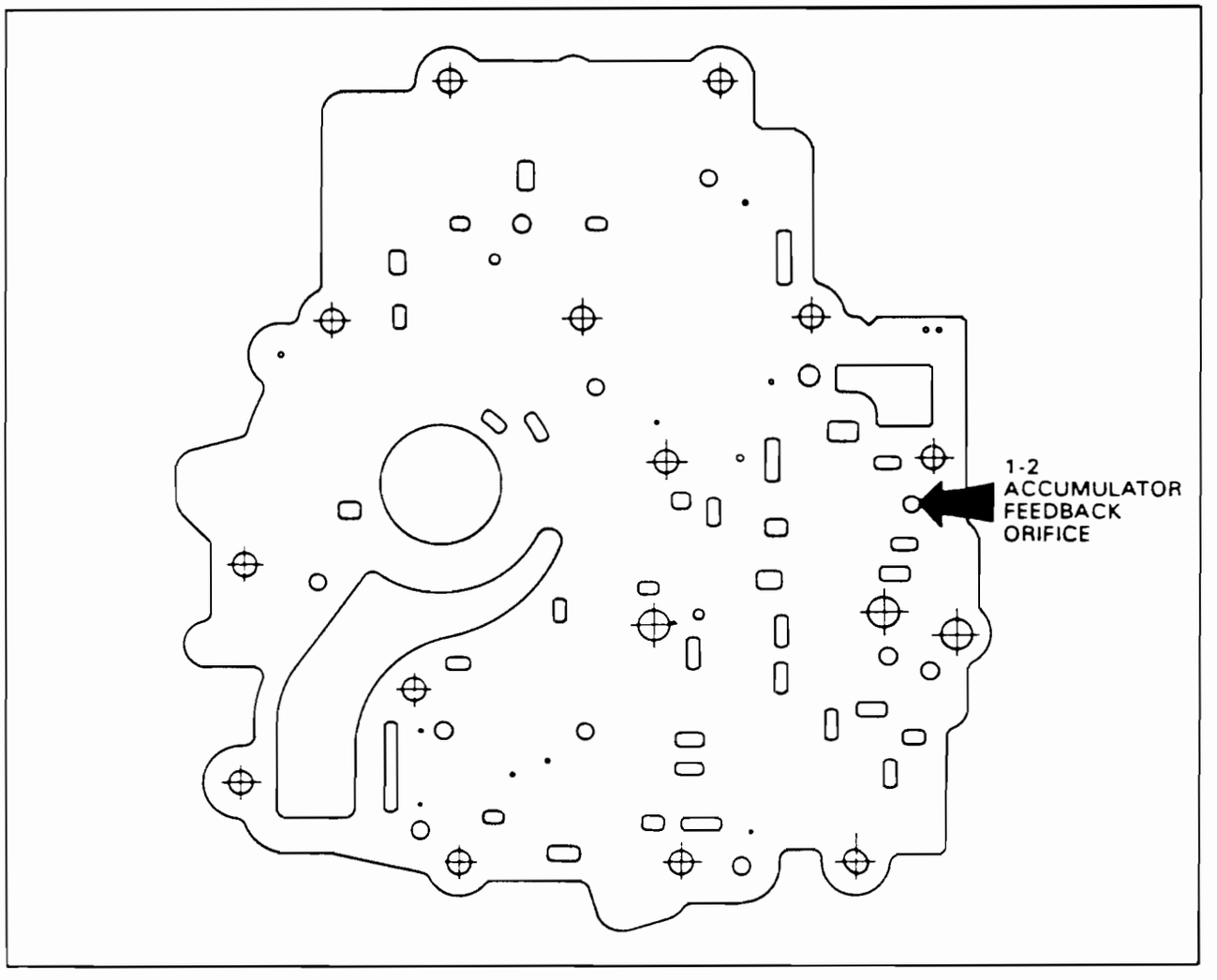
1987

THM 125C

COMPLAINT: Harsh 1-2 shift encountered on 1985-86 Thm 125C transmissions

CAUSE: Too small an orifice in separator plate (.040) 1-2 ACCUMULATOR FEED BACK ORIFICE.

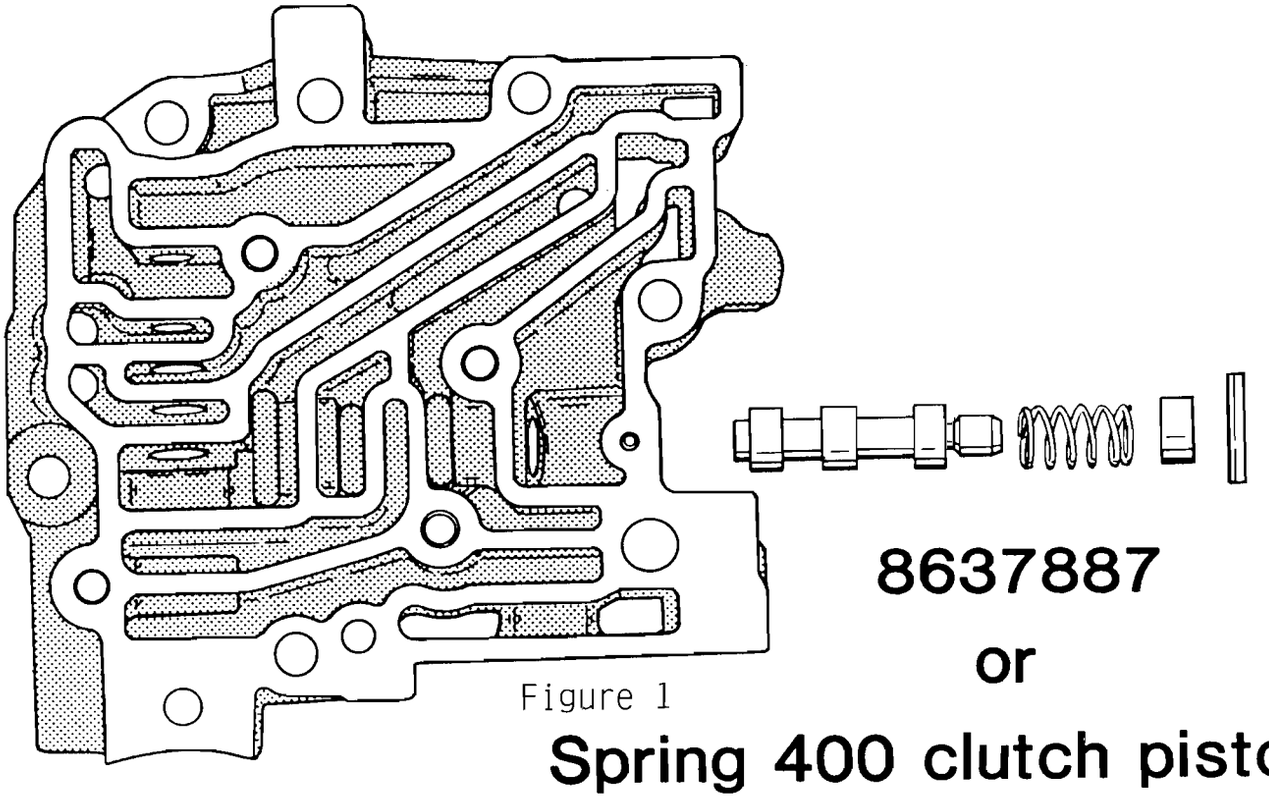
CORRECTION: Drill orifice to (.125) or replace with part number 8660581



Thm 125C TCC Shudder

COMPLAINT:CONVERTER CLUTCH SHUDDER

CAUSE; One cause can be low converter regulator charge pressure. Figure 1. Another cause can be slow drain of converter oil in front of clutch piston.



8637887

or

Spring 400 clutch piston

Figure 1

CORRECTION: Install stronger regulator valve spring 8637887 or use a spring from a Thm 400 foward or direct clutch retainer
Figure 2 Drill converter exhaust hole in separator plate to .080

THM 125C

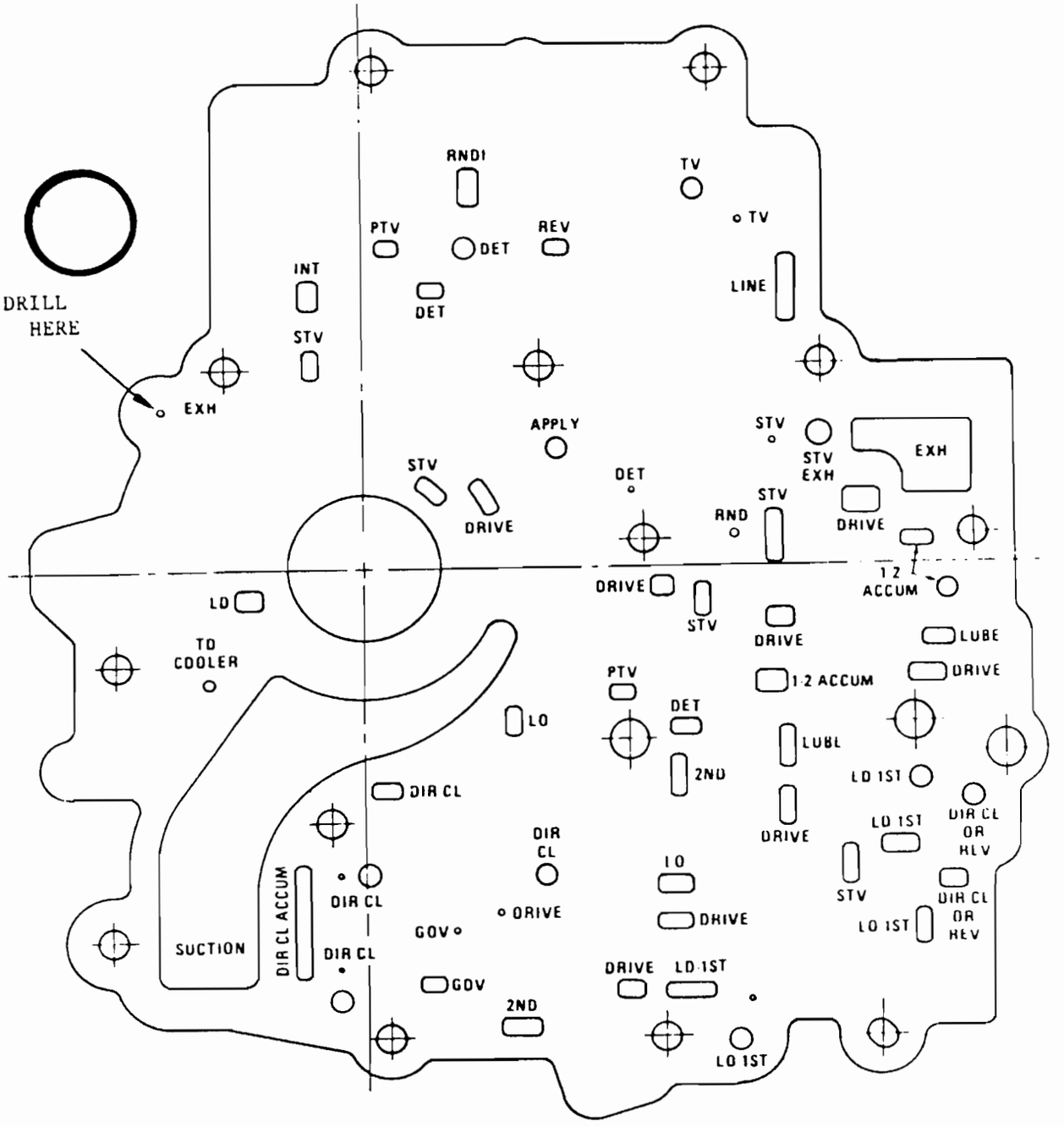


Figure 2

1987 - THM 200C
"FEED/BLEED" SYSTEM

1987 THM 200C transmissions are being built with a new design "feed/bleed" system for the forward clutch. This system gives more cushioning during forward clutch apply and can be used on certain past models to reduce a harsh park/neutral to drive engagement feel.

DATE OF PRODUCTION CHANGE: (Figures 1 and 2)

August 4, 1986 (Julian Date 216). These changes were introduced for all THM 200C models:

Forward clutch assembly, minus check ball in housing (619)
Forward clutch piston assembly (623)
Additional waved plate (627)
Front internal gear (636)

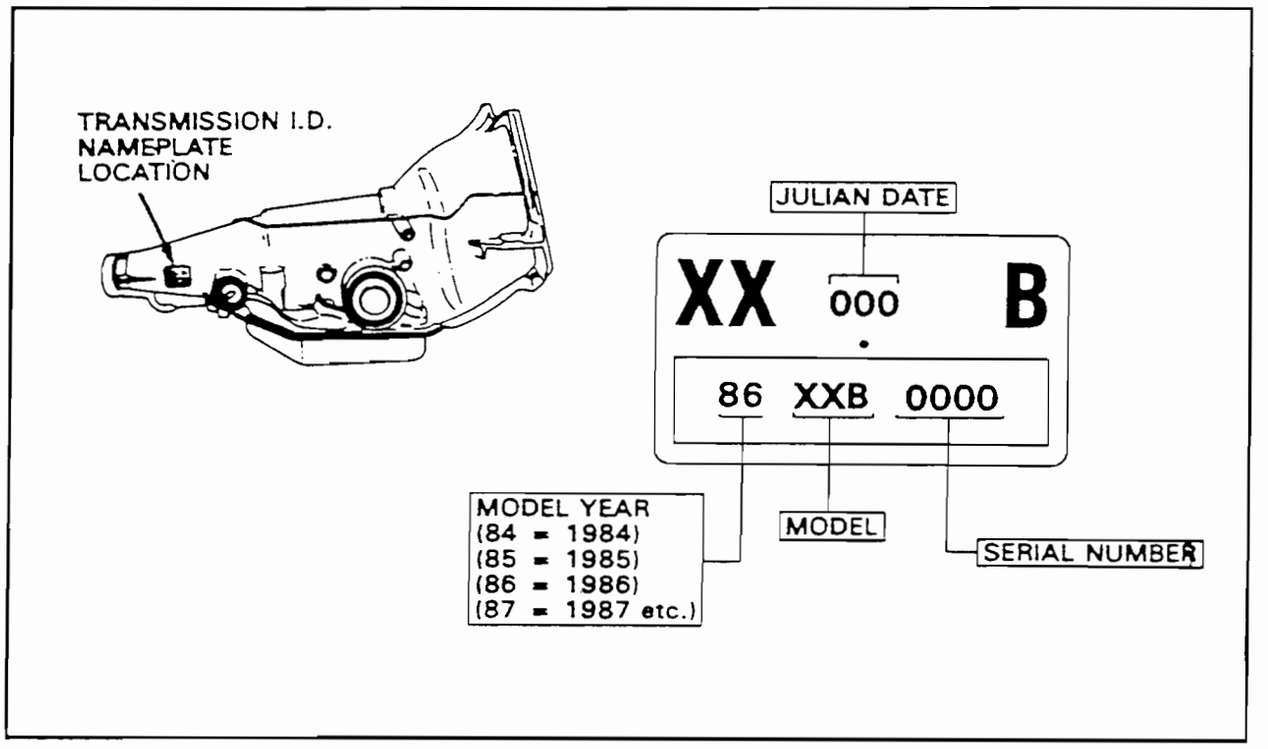
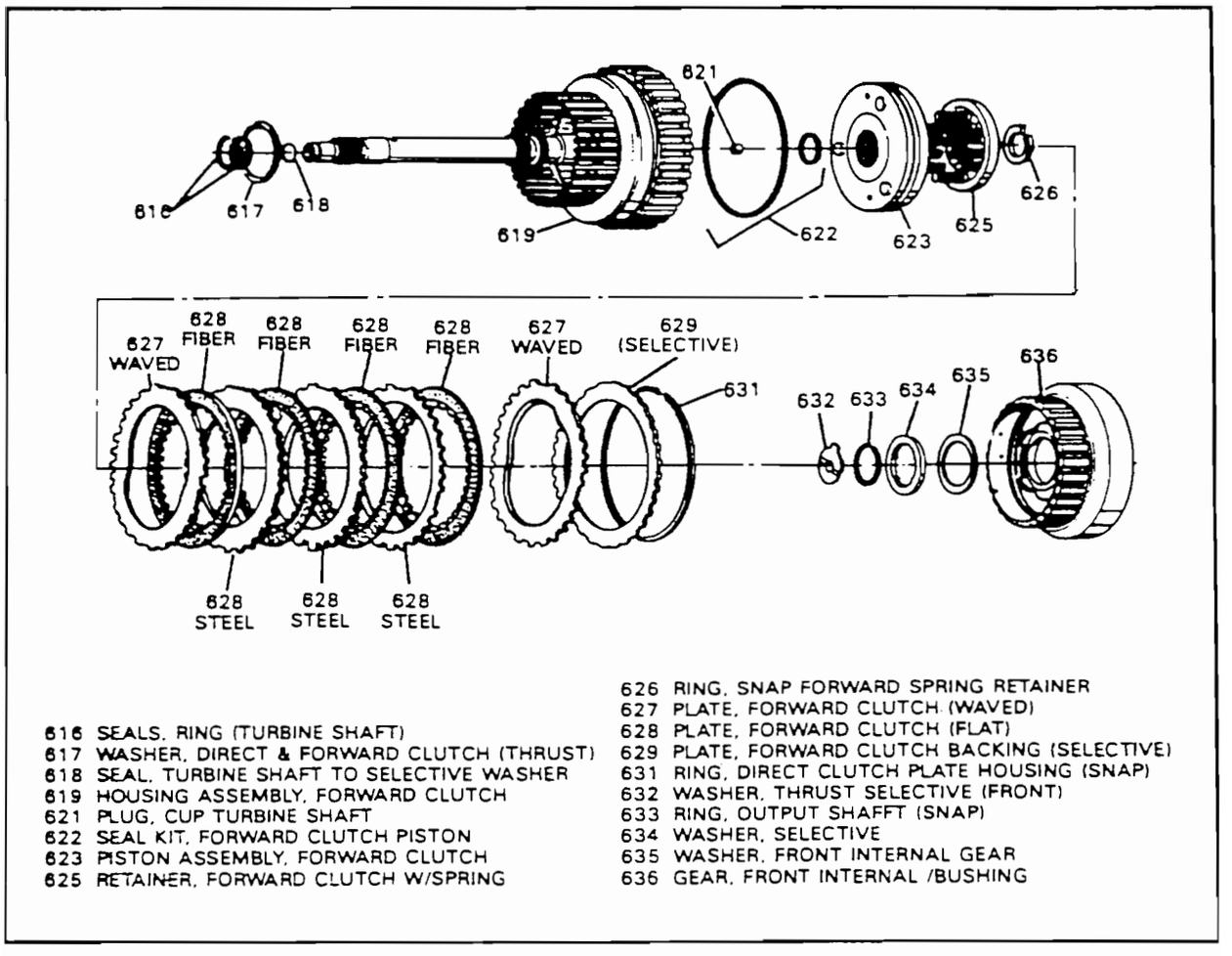


Figure 1 - THM 200C Transmission Nameplate



616 SEALS, RING (TURBINE SHAFT)
617 WASHER, DIRECT & FORWARD CLUTCH (THRUST)
618 SEAL, TURBINE SHAFT TO SELECTIVE WASHER
619 HOUSING ASSEMBLY, FORWARD CLUTCH
621 PLUG, CUP TURBINE SHAFT
622 SEAL KIT, FORWARD CLUTCH PISTON
623 PISTON ASSEMBLY, FORWARD CLUTCH
625 RETAINER, FORWARD CLUTCH W/SPRING
626 RING, SNAP FORWARD SPRING RETAINER
627 PLATE, FORWARD CLUTCH (WAVED)
628 PLATE, FORWARD CLUTCH (FLAT)
629 PLATE, FORWARD CLUTCH BACKING (SELECTIVE)
631 RING, DIRECT CLUTCH PLATE HOUSING (SNAP)
632 WASHER, THRUST SELECTIVE (FRONT)
633 RING, OUTPUT SHAFFT (SNAP)
634 WASHER, SELECTIVE
635 WASHER, FRONT INTERNAL GEAR
636 GEAR, FRONT INTERNAL /BUSHING

Figure 2

SERVICE ACTION:

1984-87 models built before August 4, 1986 (Julian Date 216):

If a vehicle equipped with a THM 200C transmission listed in service parts information has a harsh park/neutral to drive engagement, install the neutral drive shift package.

1987 models built on or after August 4, 1986 (Julian Date 216):

Models built after implementation of the feed/bleed system can be serviced with individual parts.

IMPORTANT: When servicing the forward clutch, select the correct backing plate (629). Backing plate selection affects piston travel, shift feel and clutch durability.

Backing Plate Selection (Clutch Fully Assembled):

Apply an evenly distributed load in the direction indicated in Figure 3 to remove slack from the clutch assembly. Use 9 kg (20 lbs.) of pressure against the backing plate — excessive pressure will cause an inaccurate measurement. With the clutch assembly compressed, use a feeler gauge to measure the distance between the backing plate and snap ring. Correct backing plate travel is 0.7 mm – 1.5 mm (0.028" – 0.059").

1984-87 models (excluding 1984-85 CZ,JY which are not used by Oldsmobile) built before August 4, 1986 (Julian Date 216):

Part Number	Description
8638957	Neutral drive shift package (contains forward clutch assembly complete, front internal gear and thrust washer)

1987 models built on or after August 4, 1986 (Julian Date 216):

8648720	Forward clutch assembly, complete
8638956	Forward clutch housing package
8648721	Forward clutch piston
8657267	Backing plate, selective—identification 7 (Figure 4)
8657266	Backing plate, selective—identification 6 (Figure 4)
8657618	Backing plate, selective—identification X (Figure 4)
8657265	Backing plate, selective—identification 5 (Figure 4)
8657264	Backing plate, selective—identification 4 (Figure 4)
8639947	Front internal gear and thrust washer package

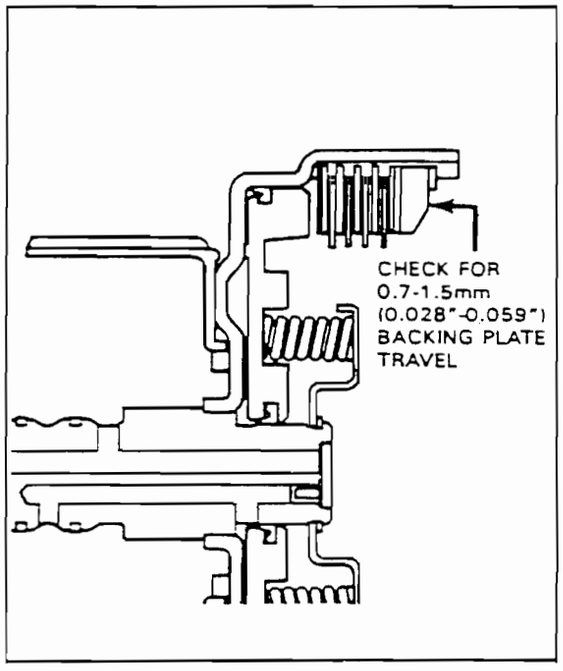


Figure 3

FORWARD CLUTCH BACKING PLATE SELECTION	
ALL MODELS	
BACKING PLATE TRAVEL = 0.7mm - 1.5mm (0.028" - 0.059")	
PLATE THICKNESS	IDENTIFICATION
3.70mm - 4.15mm (.146" - .163")	7
4.25mm - 4.70mm (.167" - .185")	6
4.80mm - 5.25mm (.189" - .207")	X
5.35mm - 5.80mm (.211" - .228")	5
5.90mm - 6.35mm (.232" - .250")	4

Figure 4

Service Notes:

1. Earlier design front internal gears (Service Package Number 8630909) cannot be used with THM 200C models built after August 4, 1986 (Julian Date 216).

Thm 200C-200 4R 325-325 4L

COMPLAINT: No Reverse no upshifts, low gear only.

CAUSE: Stripped splines on the sun gear shell as shown in Figure 1.

CORRECTION: Replace the sun gear shell. If the vehicle is used in heavy duty operation (police-taxi) a new hardened shell is available. It is a flat black in color.

Part number **8648360**

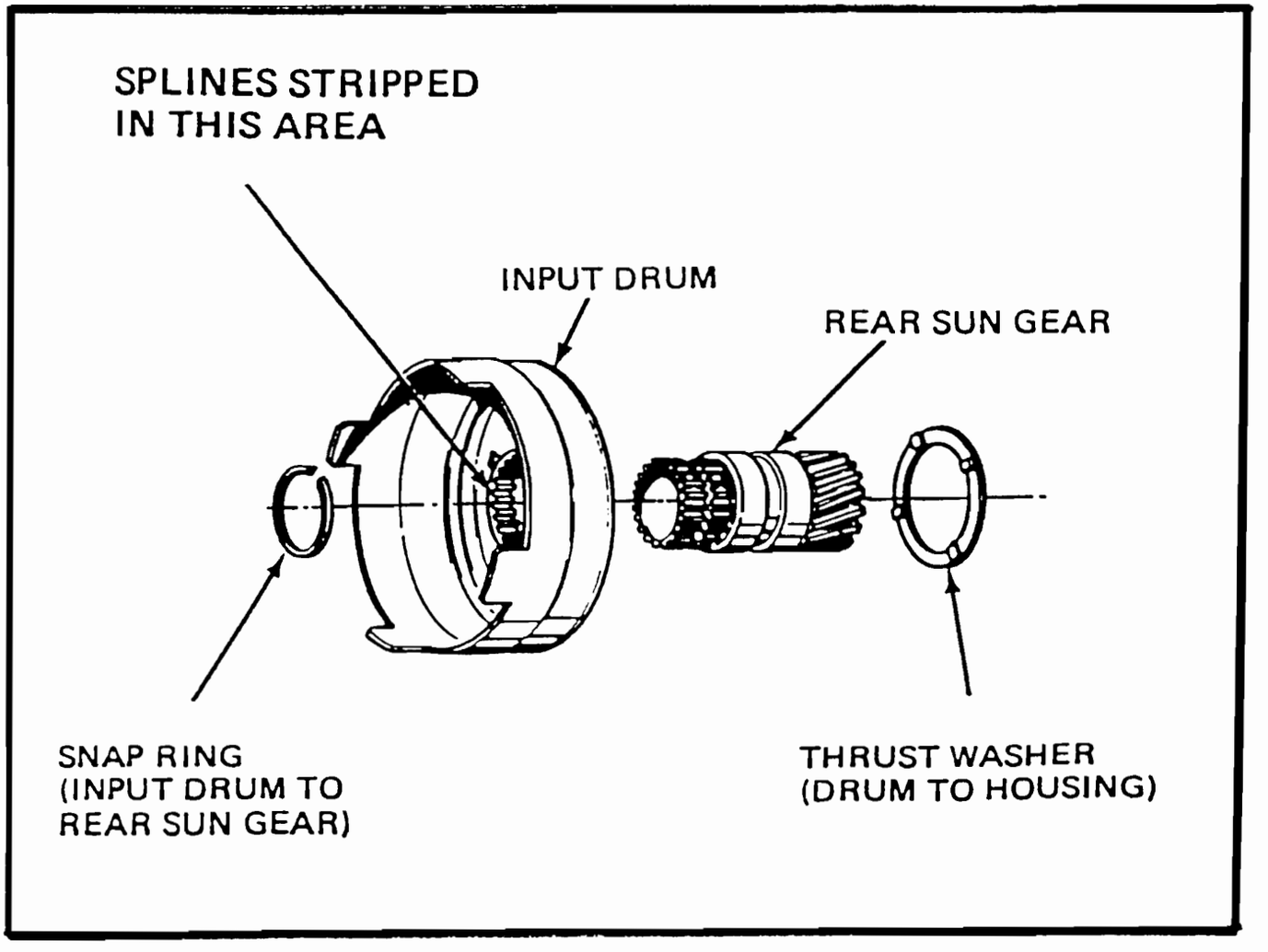


Figure 1

THM 200C

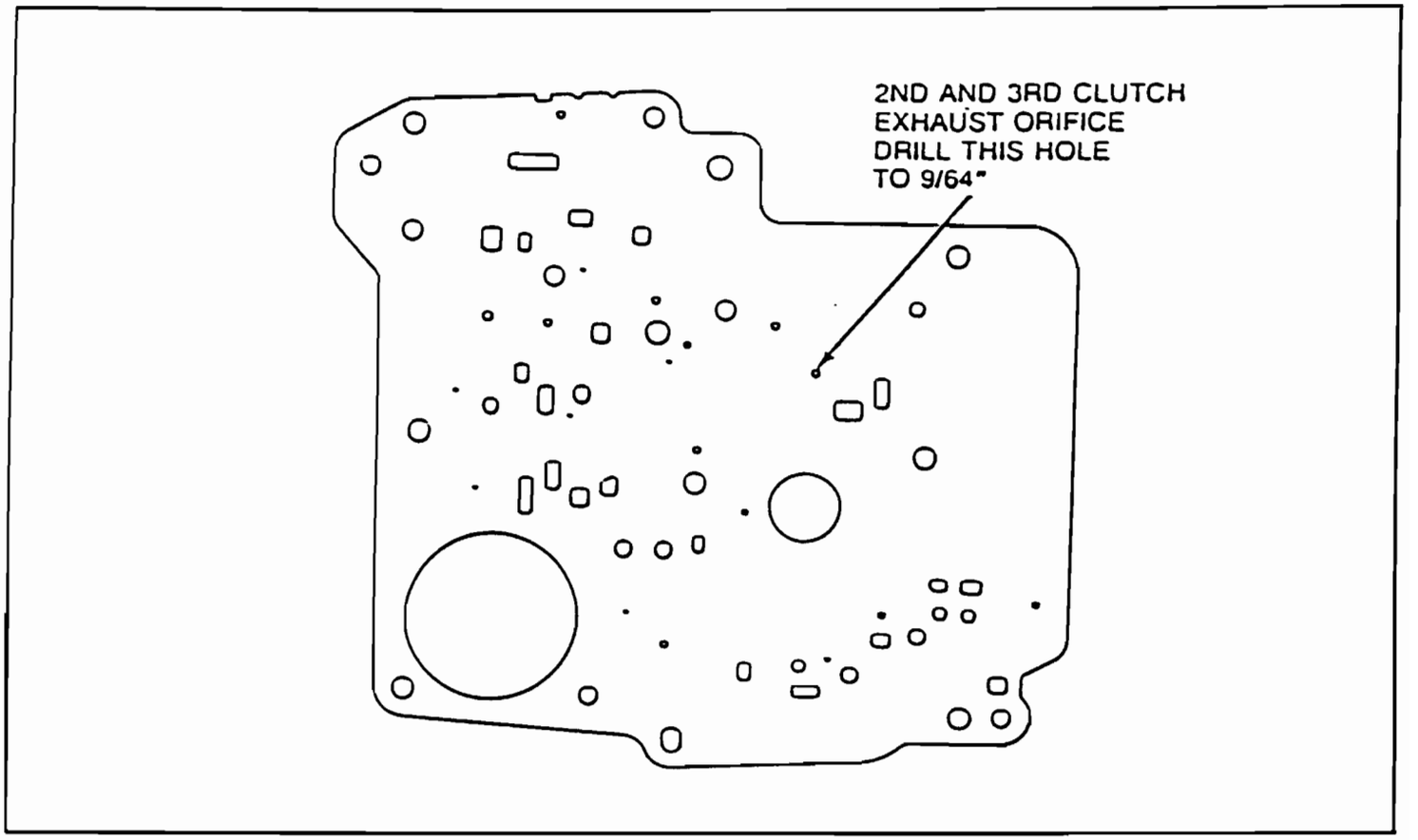


FIGURE 2 TYPICAL 200C SPACER PLATE

On any 1984 and early 1985 THM 200C built prior to Julian date 268, remove the valve body spacer plate. Drill the 2nd and 3rd clutch exhaust orifice out to 3.57 mm (9/64") (Figure 2). Using a 6.3 mm drill bit, hand chamfer both sides of the hole, slightly, to remove burrs and rough edges.

In some cases the above "on car" procedure may not repair this condition; it will then be necessary to perform the following procedure:

1. Replace the rear internal gear and output shaft with part number 8633910. This service package will have the rear internal gear pressed onto the output shaft.

NOTICE: *The OI, OR and OU THM 200C models already have the press fit rear internal gear and output shaft and does not require replacement.*

2. Upon reassembly of the transmission, reduce the transmission Output Shaft rear end play to .10mm - .38mm (.004 - .015 inches) by using a thicker selective washer, if required.

NOTICE: *Do not let rear end play get lower than .004 inches. Transmission damage may result.*

Thm 200C DownShift Clunk

Complaint:

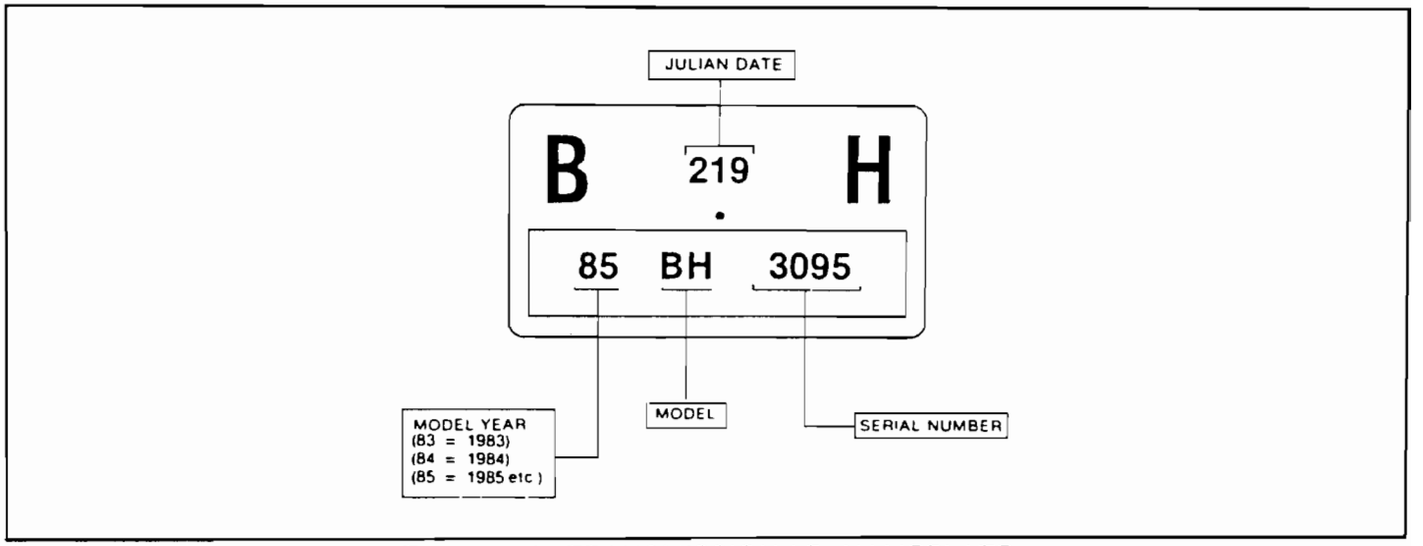
On a 1984 or 1985 200C Built prior to september 25 1985 (see juilian date on ID tag) Of a down shift clunk on the 2-1 downshift. 1984-1986 Delta 88 Cutlass Supreme

If the condition still exists after the modification of the separator plate. Which comprised of drilling the 2nd and 3rd clutch orifice (9/64")then....

CORRECTION:

Check engine idle speed and set to specs, Check differential for excessive backlash. On 1984 or 1985 "BH" Models remove the primary spring from the governor figure 2.

Or on V-6 engine equipped vehicles built prior to January10 1986, it maybe necessary to replace the rear internal gear and output shaft with anew pressed on type, figure 3.



THM 200-C TRANSMISSION I.D. NAMEPLATE

Figure 1

AUTOMATIC TRANSMISSION SERVICE GROUP

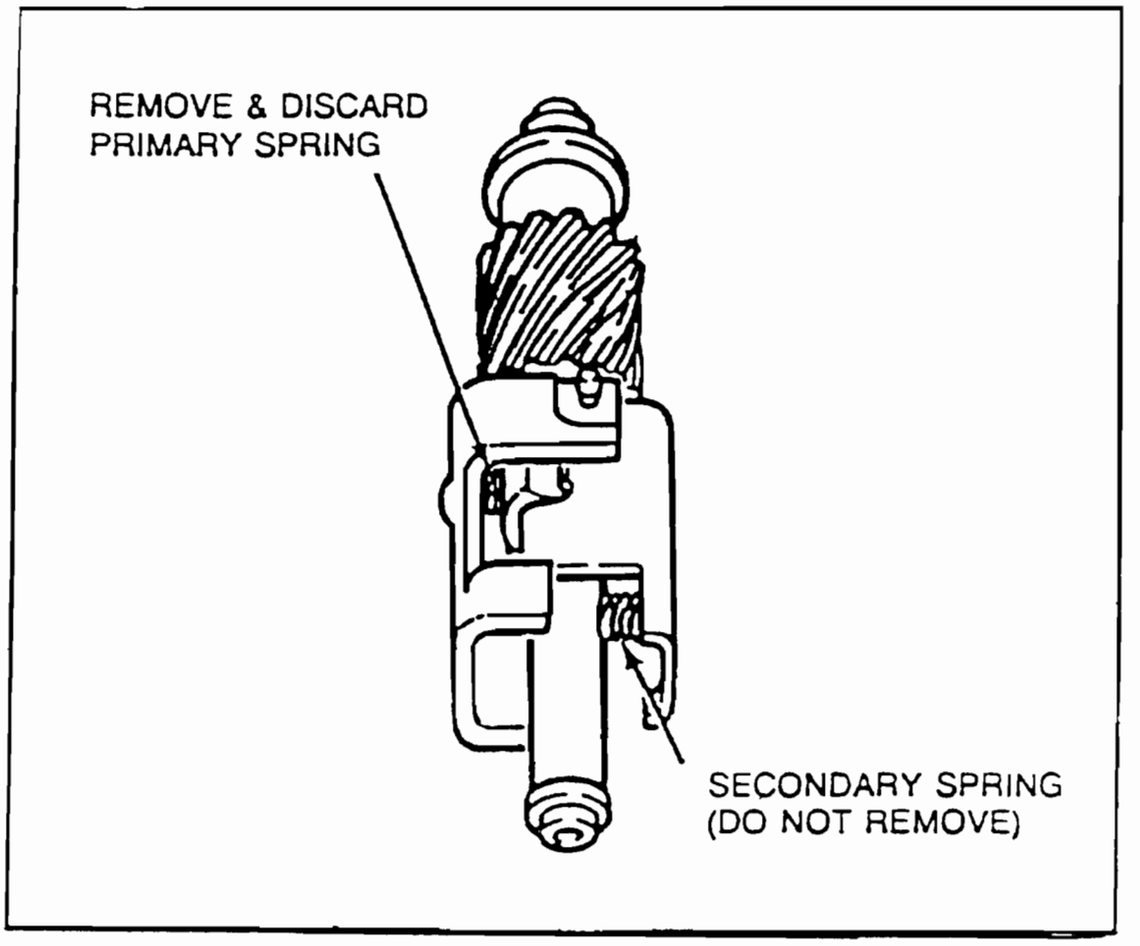


Figure 2

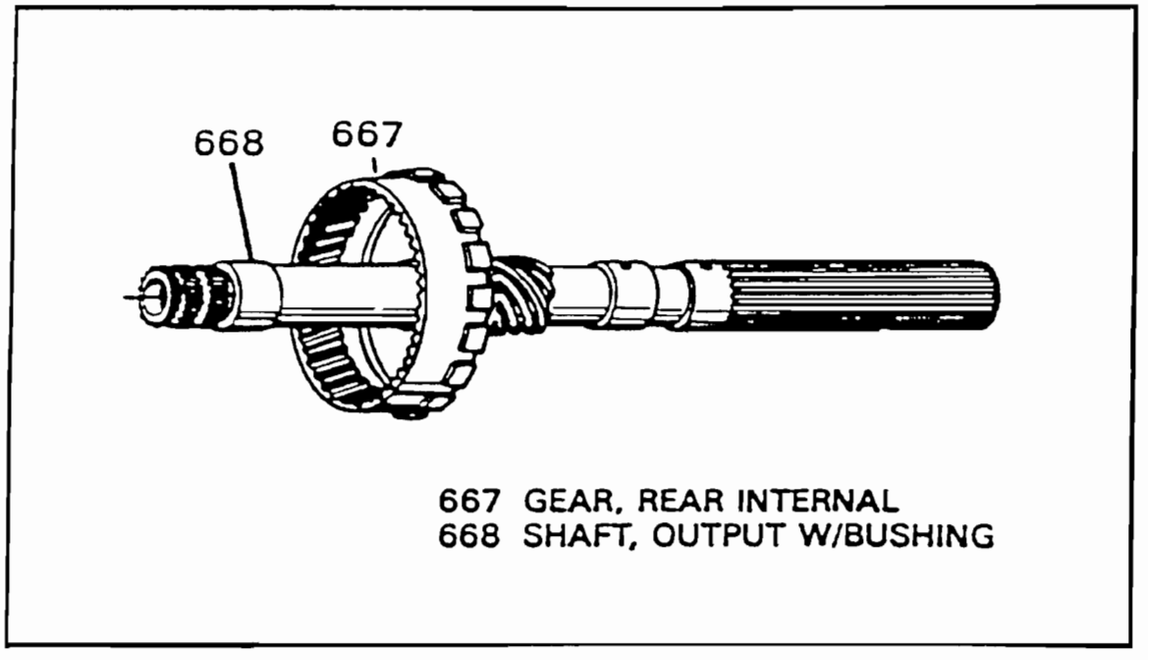
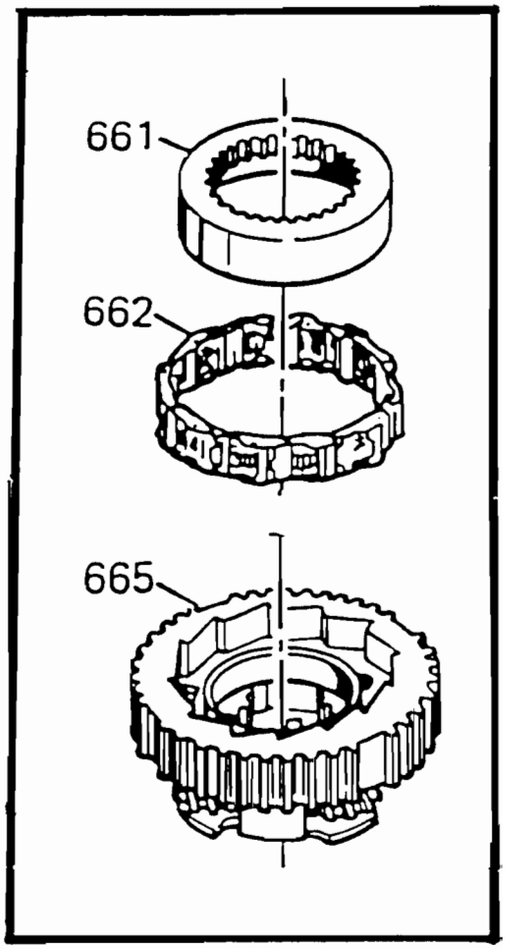


Figure 3

THM 200 200C No Drive in DRIVE

COMPLAINT :

COLD WEATHER CONDITION VEHICLE WILL NOT DRIVE IN DRIVE OR INTERMEDIATE] RANGE. HOWEVER IT WILL MOVE IN LOW OR REVERSE. MAKE SURE IF YOU HAVE THIS PROBLEM ALWAYS CHECK INTERMED-IATE RANGE.



CAUSE :

THE CAUSE MAYBE A WORN OUT ROLLER CLUTCH. SOMETIMES THE SPRINGS BAN BE WEAK, BENT OR BROKEN.

CORRECTION :

INSTALL A NEW ROLLER CLUTCH ASSEMBLY ITEM 662 IN ILLUSTRATION

THM 440 T4

PUMP BODY CHANGES

1985	Identification:	Has slot in pump body (See Figure 5).
	Interchangeability:	The 1985 pump body will not work on 1985 1/2 up valve body unless spacer plate is used to eliminate slot. If used without the spacer plate result will be tie-up when transaxle shifts to 4th gear.
1985 1/2	Identification:	Slot in pump body was eliminated (See Figure 5).
	Reason:	Addition of 3-2 TV bias valve in valve body and complete revision of hydraulic circuit for improved 3-2 downshift.
	Interchangeability:	Will interchange on 85 1/2 and 1986 models only.
1986	Identification:	No way to identify from 1985 1/2. Pump pocket depth was made shallower by .0001" which created 5 new slide sizes unique to the 1986 pump. See chart on page 6.
Reason:		Improved pump capacity.
Interchangeability:		Will interchange with 85 1/2 only, as long as proper slide selection is made to correspond with depth of pump pocket.
1987	Identification:	Hole eliminated in pump body (See Fig. 5).
	Reason:	Improved 3-2 downshift. Modulator oil was fed thru the hole in pump body to stroke the 3-2 coastdown valve. Improved 3-2 downshift could be obtained by using servo release oil to stroke the valve, so hole was eliminated and the 3-2 maneuver pipe was added to carry servo release oil to the 3-2 coastdown valve in pump body (See Figure 6). This also made a change in the pump cover necessary with an additional hole and seal to accept the 3-2 maneuver pipe.
	Interchangeability:	Will retro fit back to 85 1/2, and is recommended. The 3-2 maneuver pipe must be used with it. Not interchangeable unless 3-2 maneuver pipe is used.

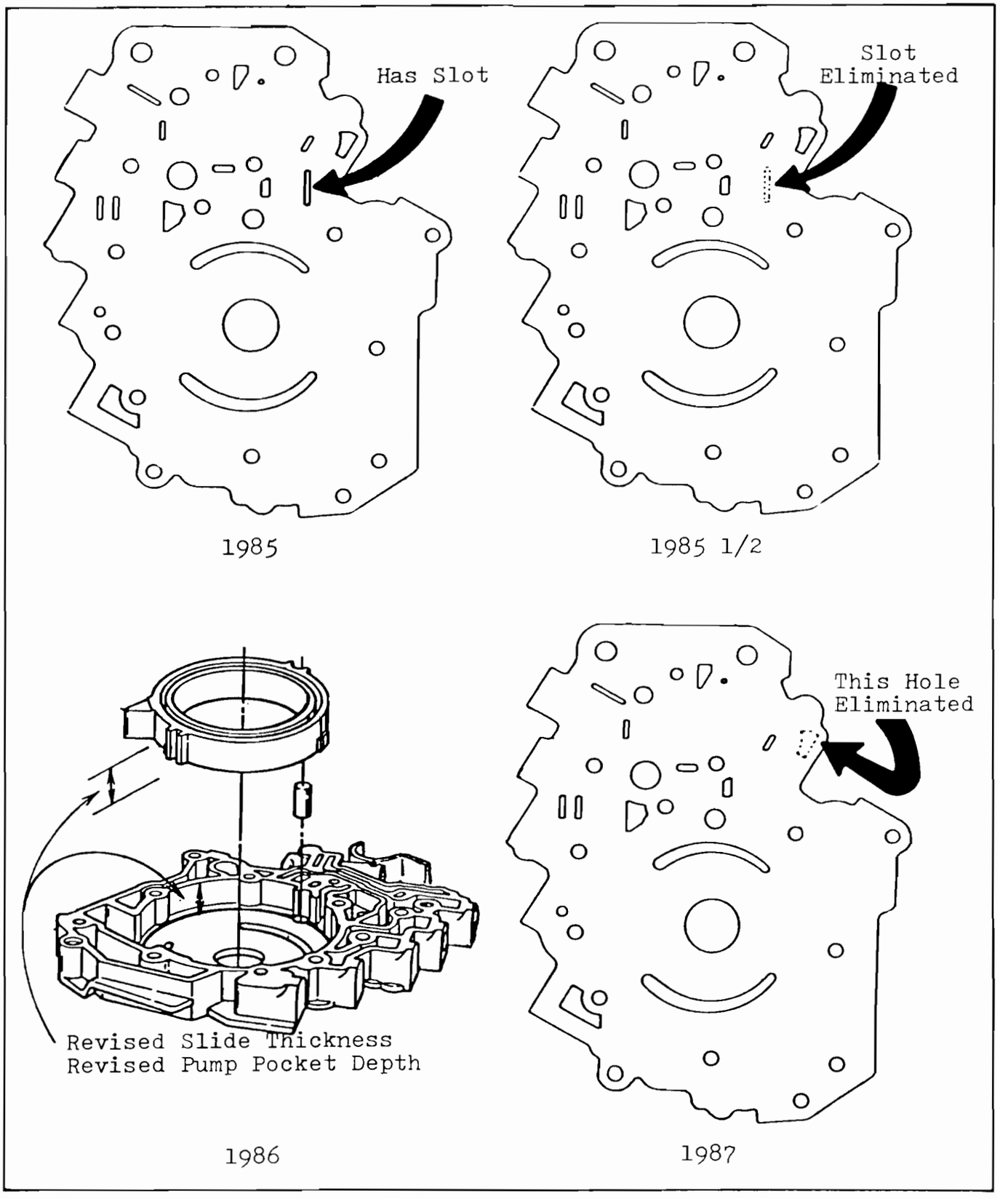

Has Slot
1985
Slot
Eliminated
1985 1/2
Revised Slide Thickness
Revised Pump Pocket Depth
1986
This Hole
Eliminated
1987

Figure 5

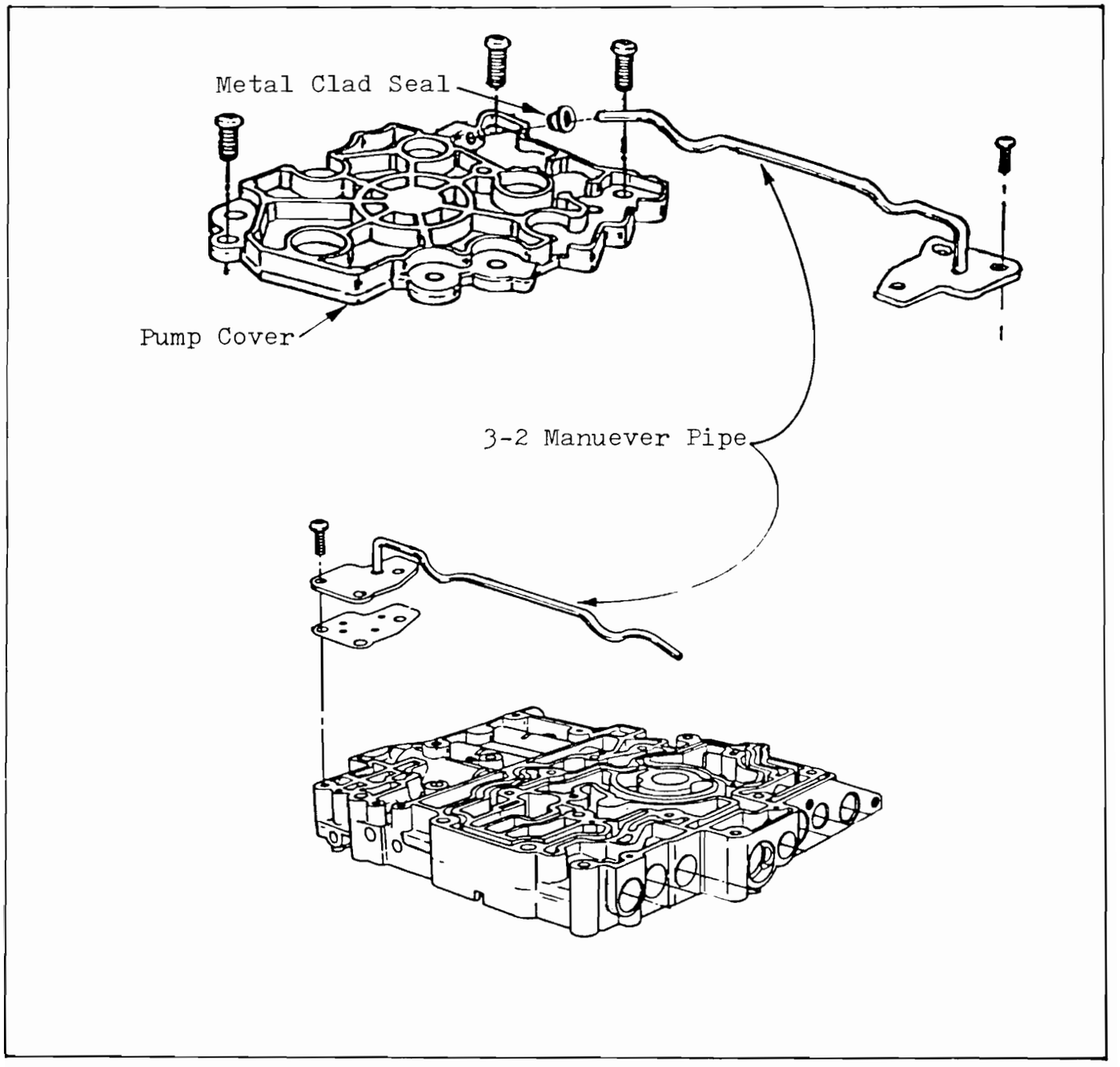


Figure 6

THM 440-T4

COMPLAINT: Premature Lock-up, - Sometimes described as No Lock-up.

CAUSE: The cause may be a missing TCC screen and orifice (See Figure 1). If the TCC screen and orifice are left out of the 440-T4, the converter clutch will apply on the 1-2 shift, because of the solenoids inability to exhaust TCC signal oil there by stroking the lock-up valve. The TCC screen and orifice must be in place, as well as the "O" ring (See Figure 1).

CORRECTION: Install the TCC screen and "O" ring into spacer plate in location shown in Figure 1. First install "O" ring on TCC screen and then "Snap" into place in spacer plate. OEM Part No's as follows; TCC Screen-----8658060 "O" Ring, TCC Screen-----8658109

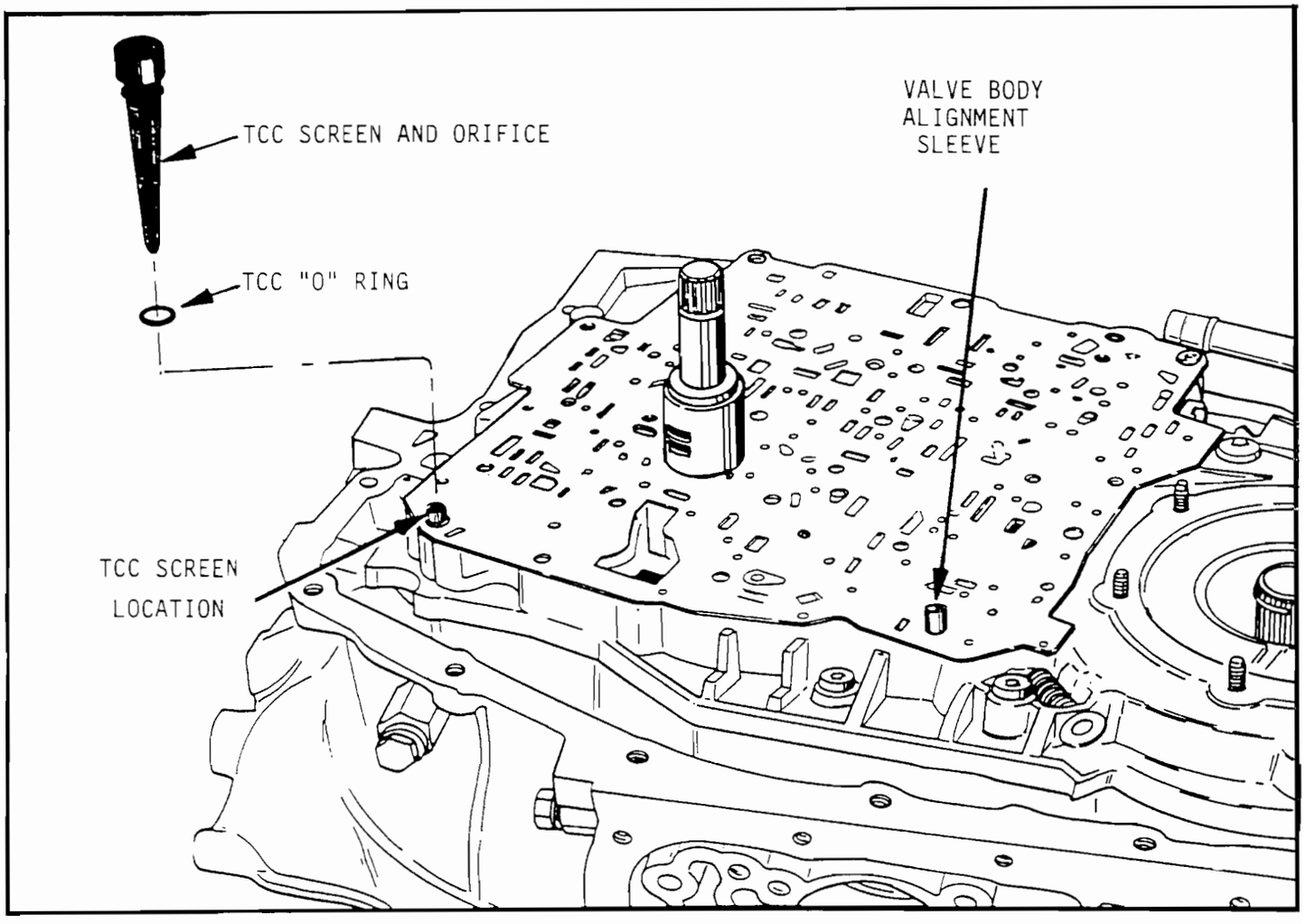


Figure 1

THM 440-T4

START OUT IN 2ND GEAR INSTEAD OF 1ST

A 1984-87 vehicle equipped with a THM 440-T4 (Figure 1) may start out in 2nd gear instead of 1st gear. This condition could occur intermittently or all the time.

SERVICE ACTION:

High line pressure could be a cause by holding too much governor pressure and not allowing the 1-2 shift valve to downshift. Check line pressure and governor pressure. Governor pressure should be below 3.0 PSI at 0 mph.

If governor pressure is okay, the 1-2 shift valve (331) may be stuck in the upshifted position. Remove the control valve assembly and check for a sticking 1-2 shift valve (331), 1-2 throttle valve (332), or the 1-2 throttle valve spring (333) caused by the 1-2 throttle valve bushing retainer (390) pushed in too far. The retainer should be installed flush with the machined surface of the valve body. (Figure 2)

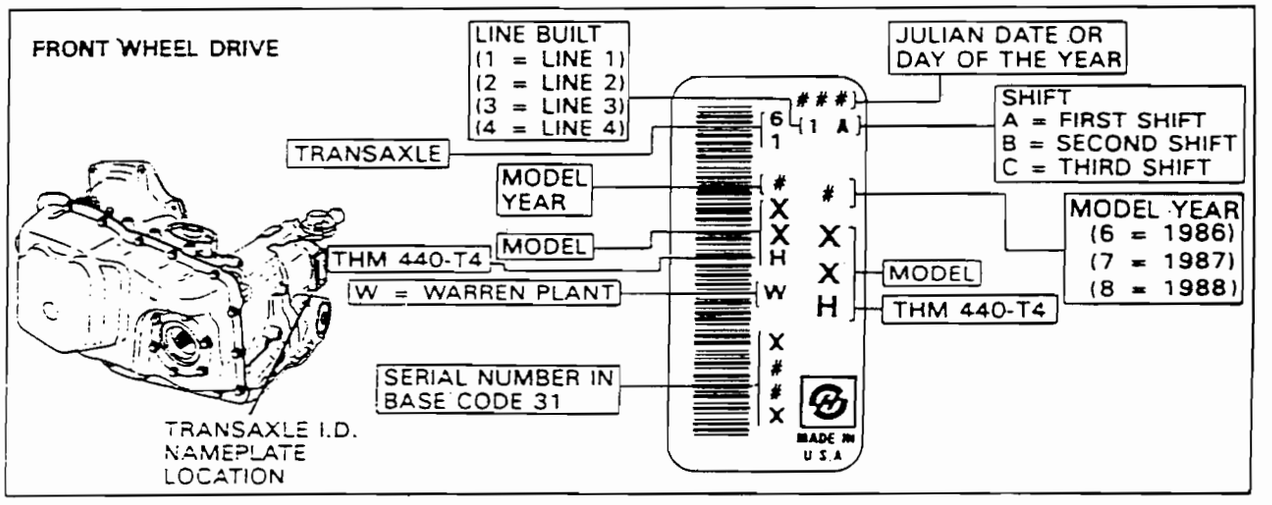


Figure 1 - THM 440-T4 Transaxle Identification Information

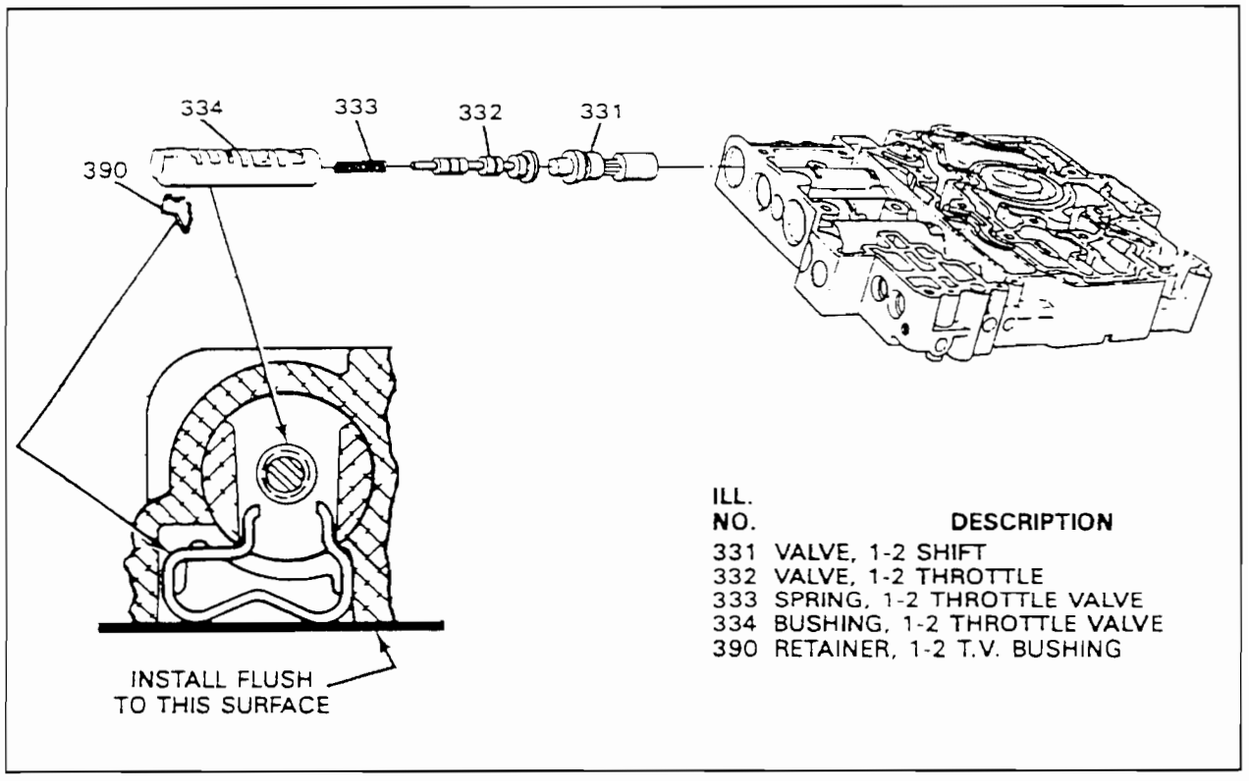

334
333
332
331
390
INSTALL FLUSH
TO THIS SURFACE
ILL.
NO. DESCRIPTION
331 VALVE, 1-2 SHIFT
332 VALVE, 1-2 THROTTLE
333 SPRING, 1-2 THROTTLE VALVE
334 BUSHING, 1-2 THROTTLE VALVE
390 RETAINER, 1-2 T.V. BUSHING

Figure 2

THM 440 T4

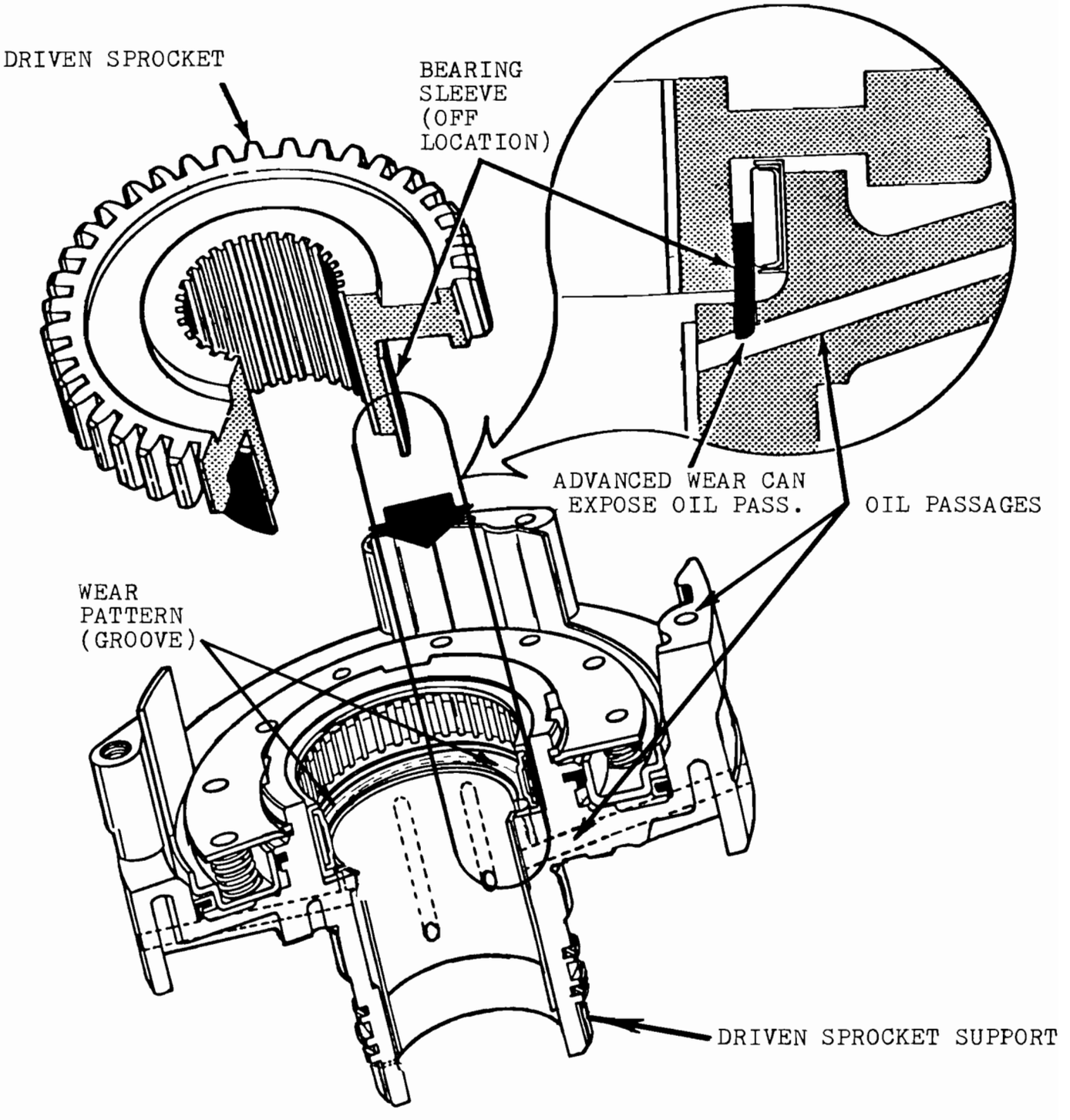
DRIVEN SPROCKET BEARING SLEEVE

When diagnosing a THM 440-T4 transaxle for slipping shifts, or erratic shifts, check the driven sprocket support for wear as shown in illustration.

This wear pattern, if present, is caused by the bearing sleeve on the outside hub of the driven sprocket moving and wearing into the driven sprocket support. As this wear condition reaches an advanced state the oil feed psssages in the driven sprocket support could be exposed, allowing an oil pressure cross leak.

The bearing sleeve on the driven sprocket may, after causing the described wear pattern (Groove), move back on to the driven sprocket and appear to be normal. If this condition is suspected, be certain to check the driven sprocket support for the wear pattern as shown in illustration.

If the above condition exists, replace the driven sprocket, driven sprocket support and any other affected parts. Be certain to check all four clutch packs in the transaxle as they are all fed through oil passages in the driven sprocket support. Repair or replace as necessary.

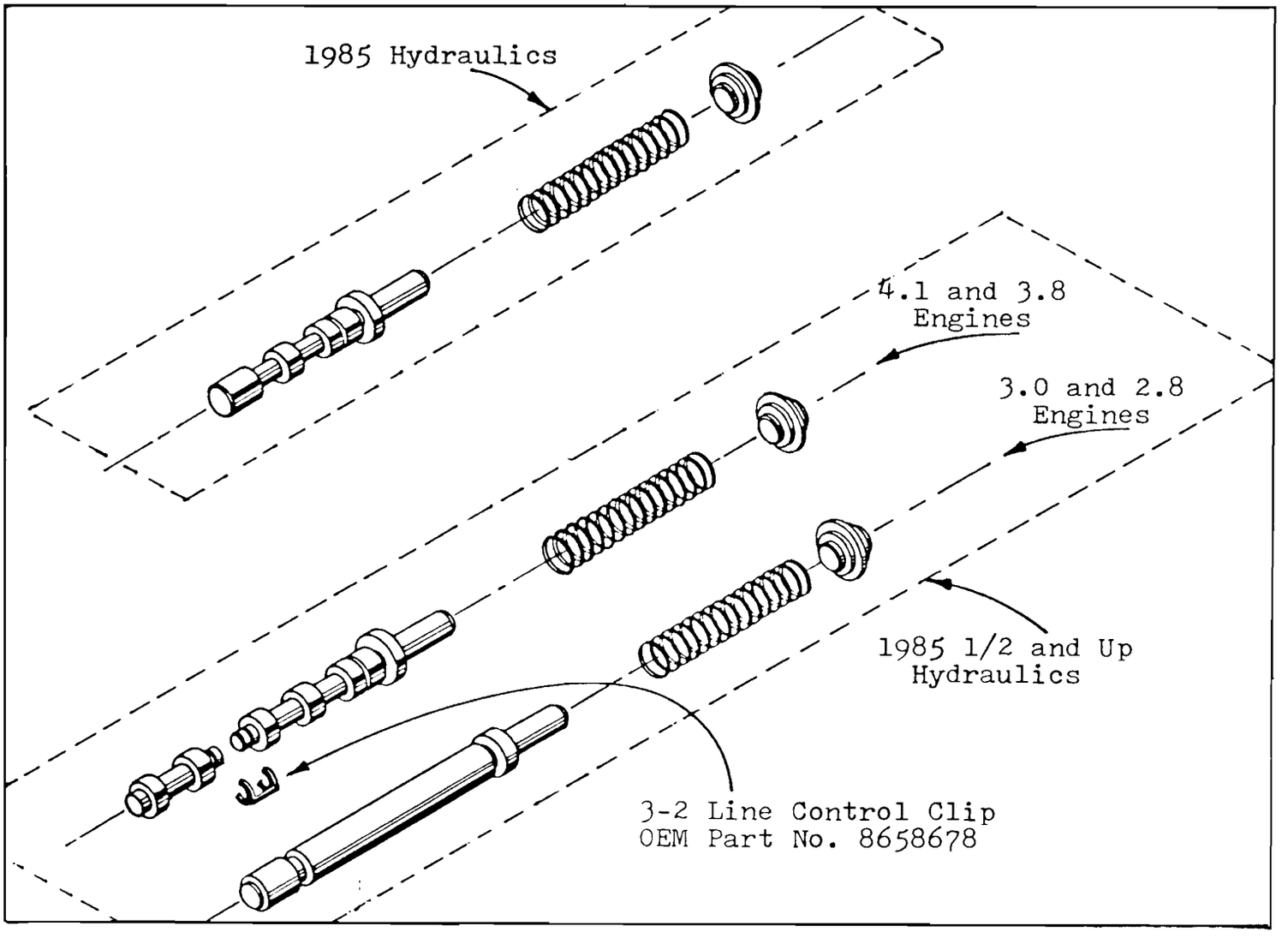

DRIVEN SPROCKET
BEARING SLEEVE (OFF LOCATION)
ADVANCED WEAR CAN EXPOSE OIL PASS.
OIL PASSAGES
WEAR PATTERN (GROOVE)
DRIVEN SPROCKET SUPPORT

THM 440-T4 SPACER PLATE

Great care should be exercised when cleaning the spacer plate on any THM 440-T4, so as not to damage the thermo element that is attached to it. The spacer plates are not as interchangeable as the transmissions we have known in the past, so "Builder Beware".

The main reason, besides calibration, is the 3-2 Line Control Valve located in the channel plate directly under the spacer plate. There are currently three different line-ups on this valve (Shown Below), and this affects the number of holes that are punched into a particular model spacer plate.

The spacer plates can be identified by a three digit number that is stamped into the plate. This number is the last three numbers of the OEM part number. There are currently about 70 different spacer plates.



THM 440-T4
MODULATOR AND MODULATOR VALVE CHANGE

Some THM 440-T4 transaxle models may exhibit harsh upshifts when operated at high altitudes. This condition may be caused by excessive line pressure resulting from insufficient engine vacuum.

A new vacuum modulator assembly, and a new modulator valve have been released for service in a package (OEM Part No. 8646956) for the harsh upshift condition. The dimensions of the new vacuum modulator and the new modulator valve have changed drastically. If the previous style vacuum modulator was to be installed with the latest modulator valve, damage to the transaxle could occur as a result of low line pressure.

Refer to Figure 1 for the previous vacuum modulator and modulator valve, and Figure 2 for the latest vacuum modulator and modulator valve.

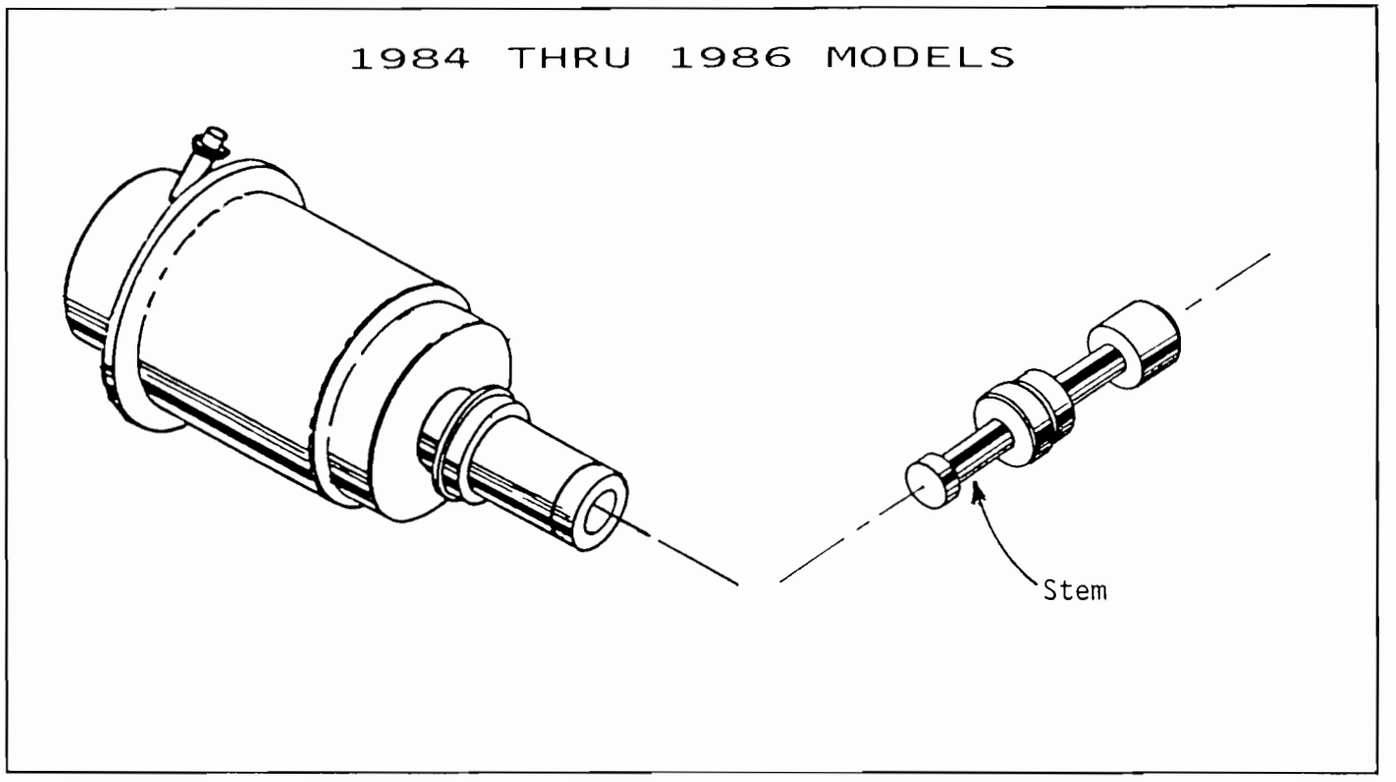


Figure 1

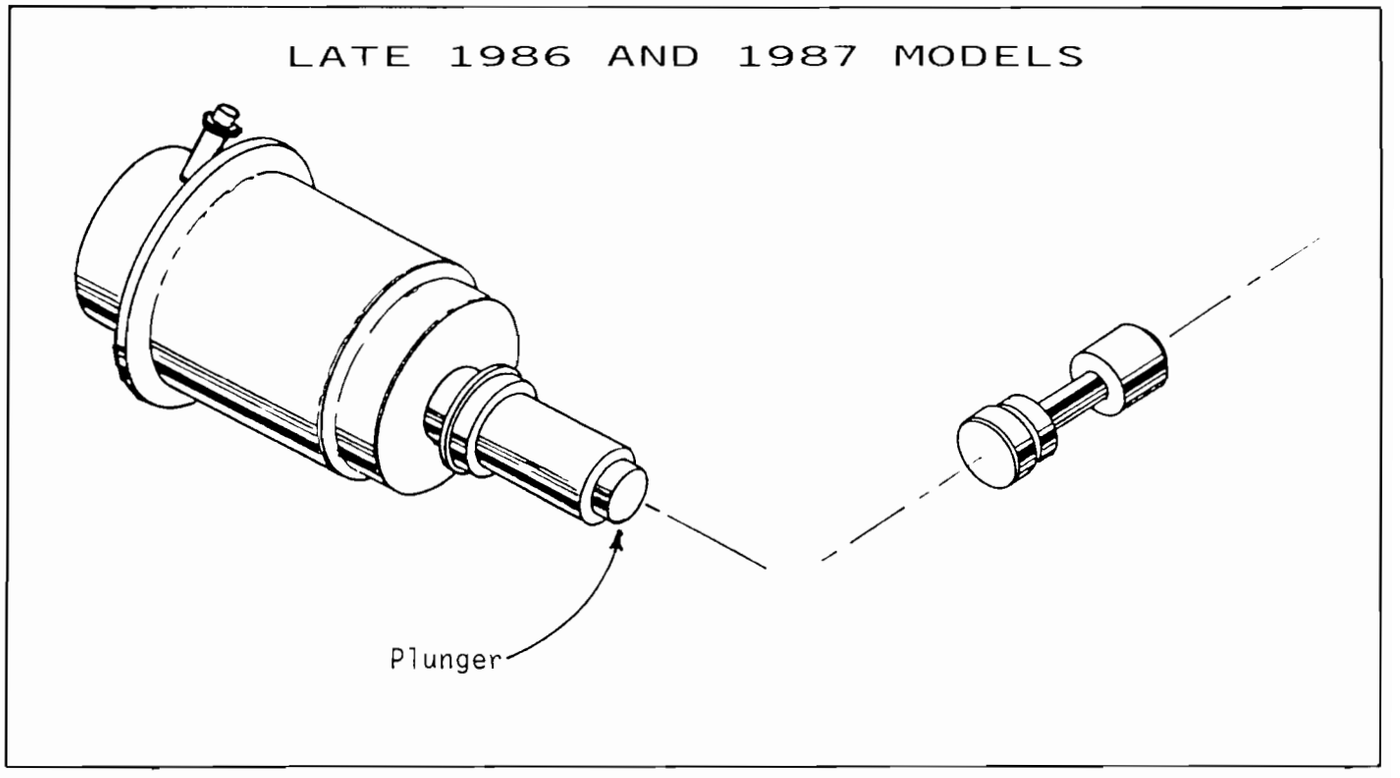
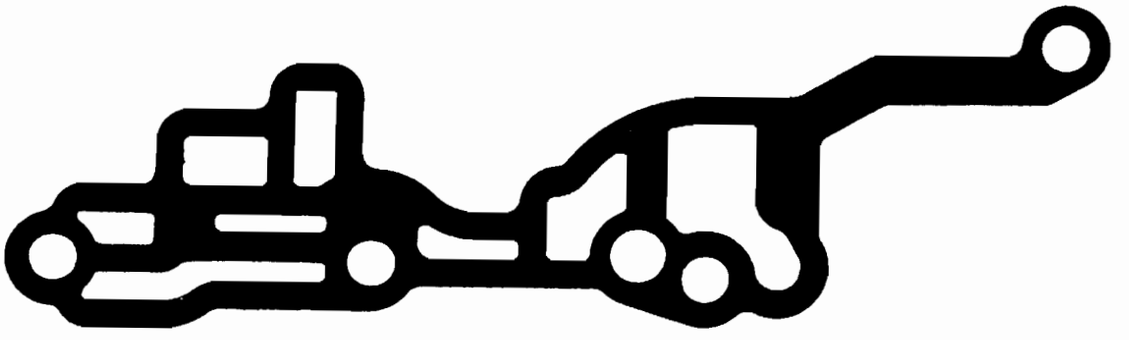


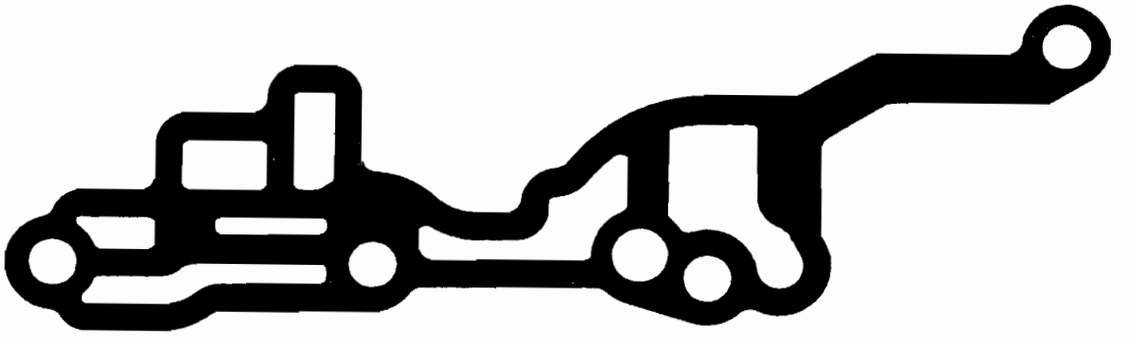
Figure 2

ATSG Technical Service Information

THM 440-T4
CASE COVER GASKET CHANGE



"Early" - 1984 and 1985 Hydraulics



"Late" - 1985½ and 1986 Hydraulics

NOTE: Early gasket will fit the late model units, but late will not fit early.

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 440-T4

TCC SHUDDER FIX

When all internal possibilitys for TCC shudder have been exhausted, and TCC shudder is still present, here is something that can be done that will usually eliminate it.

Install a C-4 Viton check ball, behind the TCC regulator valve in the valve body (See Figure 25). This will raise converter apply pressure Approx. 20 PSI, and provide a positive application of the converter clutch.

One caution, about half of the many different 440-T4 models do not use a spring behind the TCC regulator valve. If you encounter one of these, you will also have to install the spring, so that the check ball will stay centered in the bore (See Figure 25)

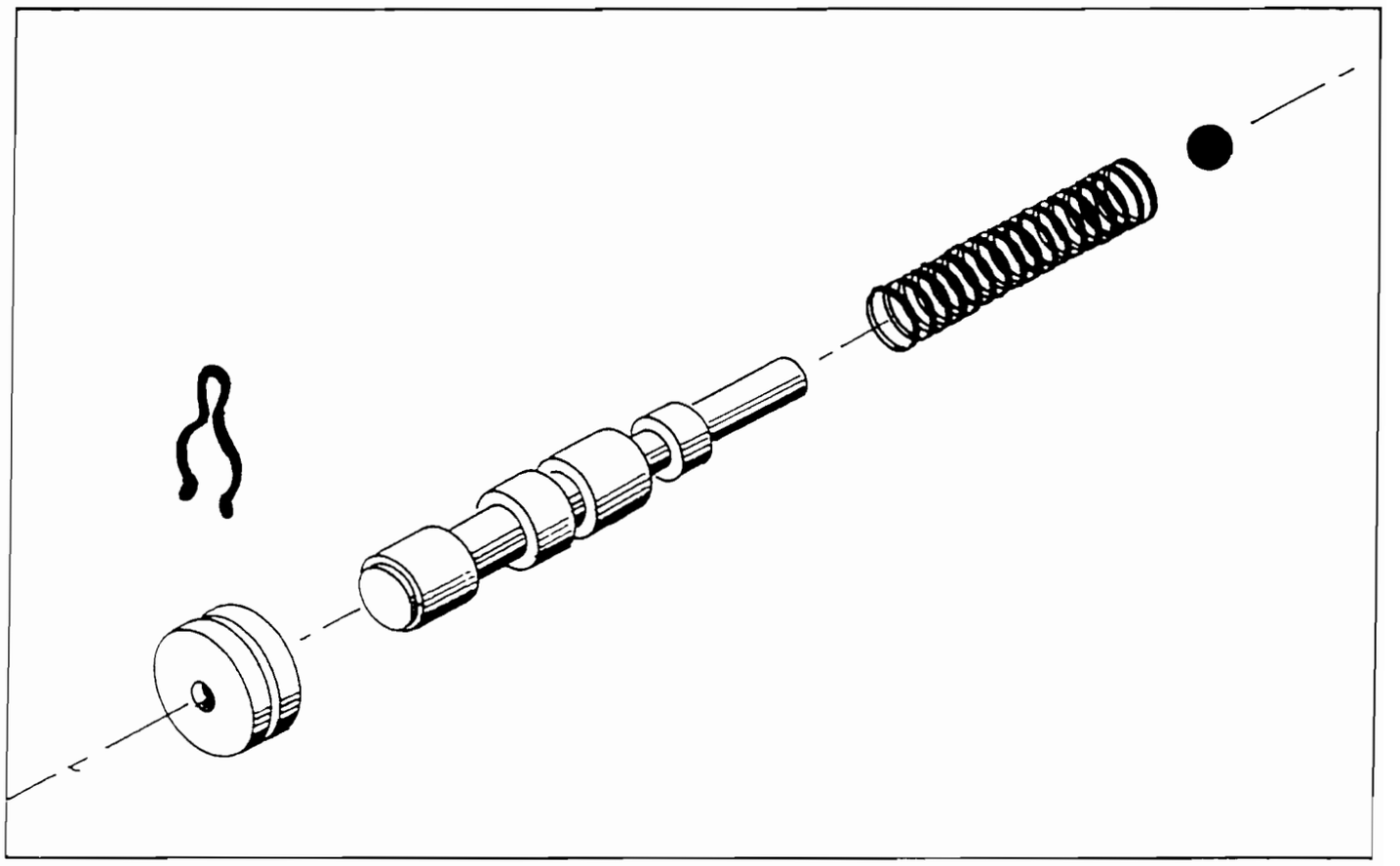
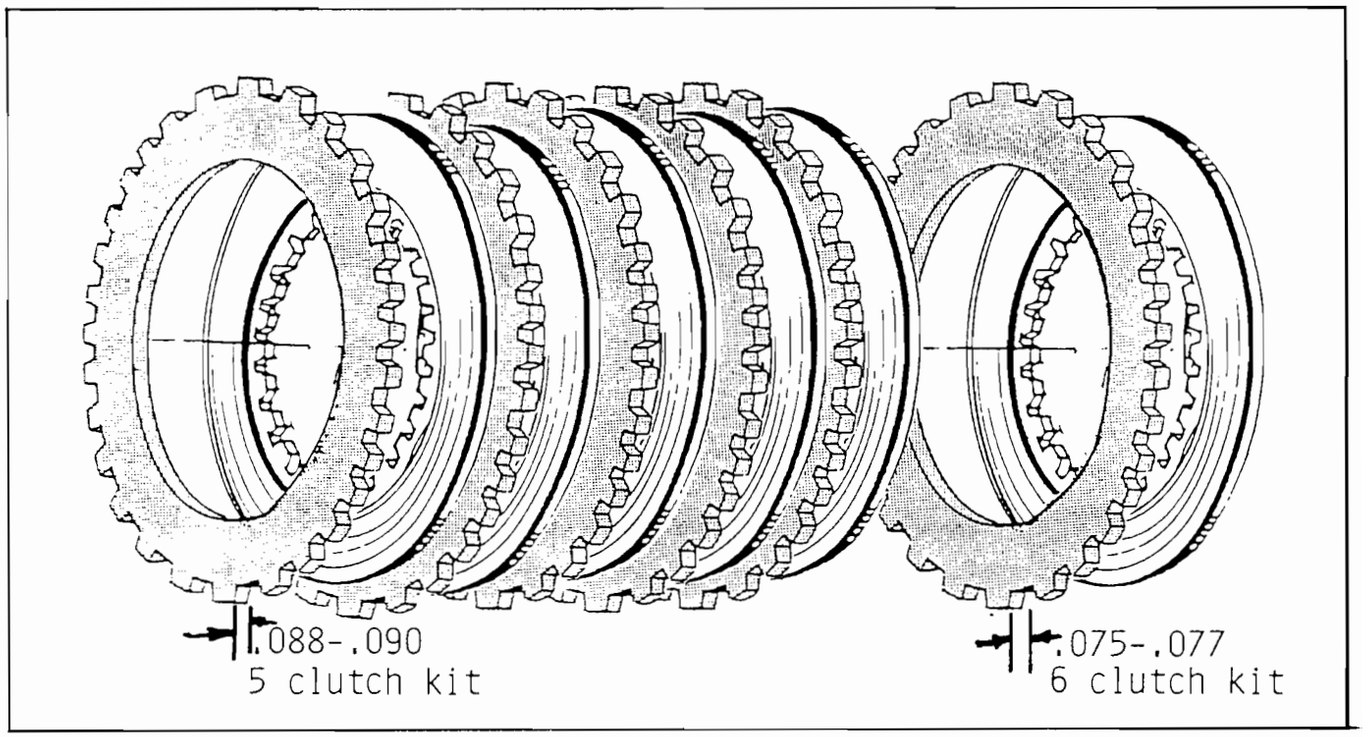


Figure 25

THM 440 T4 1-2 Slide Shudder

Complaint of a 1-2 slide shudder on THM 440 T4 1984-87. Can be caused by clutch lining compatability of lined plates. This can also be a problem encountered with SRTA or factory rebuilt units. To correct this problem Install kit number 8662913 for 1984 thru 1986 which comes with 5 lined plates and 5 steel (koline) plates. the koline plates in this kit are .088-.090 thick. For the 1987 units use kit number 8662914 comes with 6 lined plates and 6 steel (koline) plates. The koline plates in this kit are .075-.077 thick.

8662913 (5) Clutch Kit 1984-86



8662914 (6) Clutch Kit 1987

AUTOMATIC TRANSMISSION SERVICE GROUP

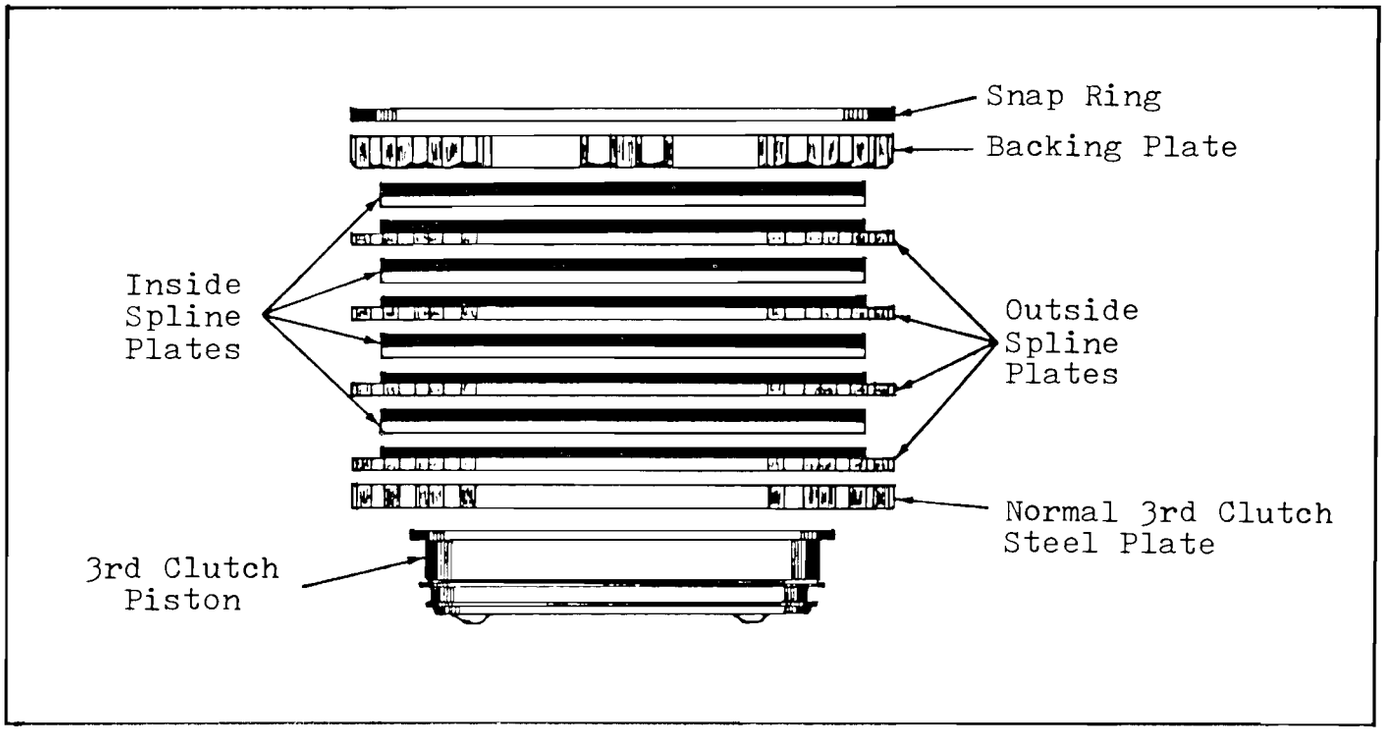
THM 440-T4 THIRD CLUTCH CHANGES

Beginning with the model year 1986, the factory started installing single sided clutch plates in the 3rd clutch on all models of the THM 440-T4. There were only two models that used single sided plates in 1985. The single sided 3rd clutch plates require a unique assembly procedure.

The single sided 3rd clutch plates will retro fit backwards and are recommended, as long as proper assembly procedures are used. The proper assembly procedures for the 3rd clutch pack on models 5CP, 5CM, and all 1986 up 440-T4 transaxles is shown in the figure below.

The 3rd clutch pack on the models mentioned above have single sided clutch plates, or clutch plates with lining on one side only. Notice that the outside spline plates, or what we normally refer to as "Steel" plates, also have lining on one side only. Notice also that the clutch pack is started with a normal 3rd clutch steel plate, and is followed with an outside spline plate with the "Lining UP". Steel against steel will not be a problem as long as they are both outside spline plates, because they cannot counter rotate against one another. Obviously if you followed the normal steel plate with an inside spline plate you would have steel counter rotating against steel, and damage to the clutch pack would result.

They must be assembled as shown, and you must start with a normal 3rd clutch steel plate to obtain proper clutch clearance.



440-T4
SLIPPING OR NO 1-2 SHIFT

A soft, slipping or no 1-2 shift condition may result if the two cast iron seals between the driven sprocket support and 2nd clutch housing bind to the driven sprocket support and wear into the 2nd clutch housing.

DATE OF PRODUCTION CHANGE: (Figure 1)

Start of production for all 1987 THM 440-T4 transaxle models.

SERVICE ACTION: (Figure 2)

Inspect the cast iron oil seal rings (607) for wear (indicated by a shiny surface on the O.D.) and the 2nd clutch housing (611) for wear (grooves caused by the seal rings). The driven sprocket support may not appear affected, but must be replaced if these wear conditions are present.

For all 1984 through 1986 model year THM 440-T4 transaxles, it is recommended that the new Vespel (TM) oil seal rings, 4-lobe ring seals and driven sprocket support be installed with other parts that indicate wear (such as the 2nd clutch housing).

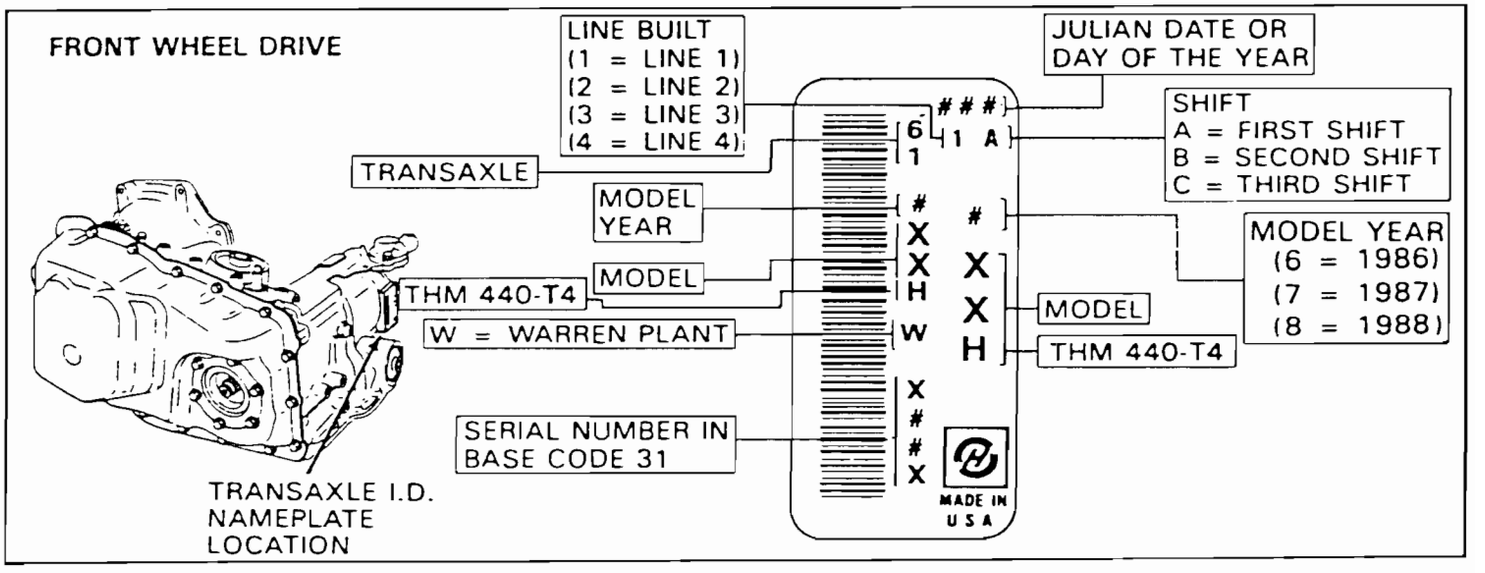


Figure 1 - THM 440-T4 Transaxle Identification Information

Due to changes in the driven sprocket support for 1987, the new Vespel (TM) oil seal rings and 4-lobe ring seals are not interchangeable with the cast iron oil seal rings on models built prior to 1987 Start Of Production (SOP). Changes made to the driven sprocket support include deeper seal ring grooves and "cutouts" to accommodate the ring tangs which prevent the Vespel (TM) oil seal rings from rotating (refer to Figure 3).

The new Vespel (TM) oil seal rings, 4-lobe ring seals and driven sprocket support are included in the following service package assembly and services all model years:

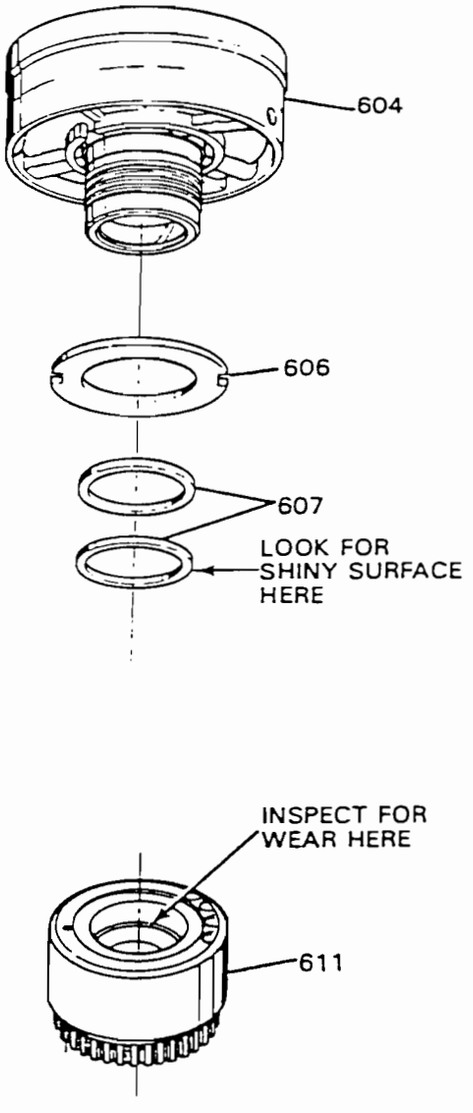
MODEL YEARS	PART NUMBER	DESCRIPTION
1984 - 1987	8662523	Driven Sprocket Support Assembly Complete

Refer to the appropriate parts catalog for other part numbers (such as 2nd clutch housing) for the appropriate year and model transaxle being serviced.

SERVICE NOTES; (Figure 3, Item 697)

IMPORTANT: When installing a 4-lobe ring seal, make sure that it is not rolled or twisted. Lubricate the vespel rings with transaxle fluid or petroleum jelly for easier installation into the 2nd clutch housing.

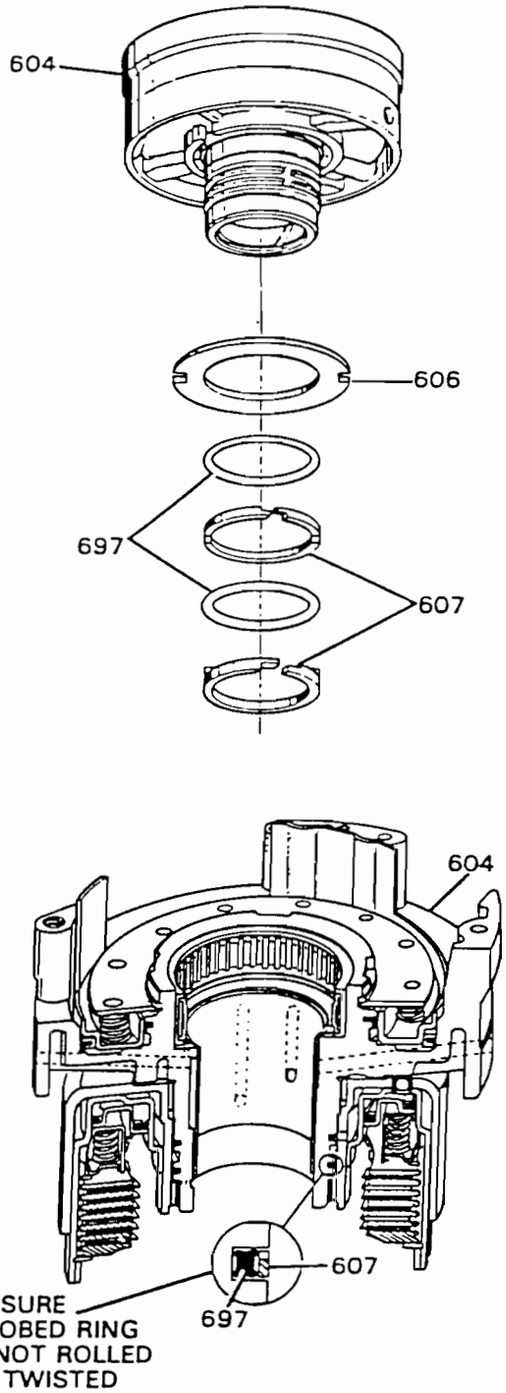
PAST DESIGN



604 SUPPORT, DRIVEN SPROCKET
606 WASHER, THRUST (SUPPORT/2ND CLUTCH)
607 SEAL, CAST IRON RING (SUPPORT/2ND CLUTCH)
611 HOUSING, 2ND CLUTCH

Figure 2

NEW DESIGN



604 SUPPORT, DRIVEN SPROCKET
606 WASHER, THRUST (SUPPORT/2ND CLUTCH)
607 RING, VESPEL (SUPPORT/2ND CLUTCH)
697 SEAL, 4-LOBED (SUPPORT/2ND CLUTCH)

Figure 3

THM 440-T4
VALVE BODY GASKET IDENTIFICATION

1985 and 1985 1/2 model valve body and channel plate gaskets "ARE NOT" interchangeable.

Ink stamped on each gasket is a 3 digit Identification Number, in the location shown in Figure 1.

Refer to the chart in Figure 2 for proper application.

Refer to Figure 3 to identify transaxle model.

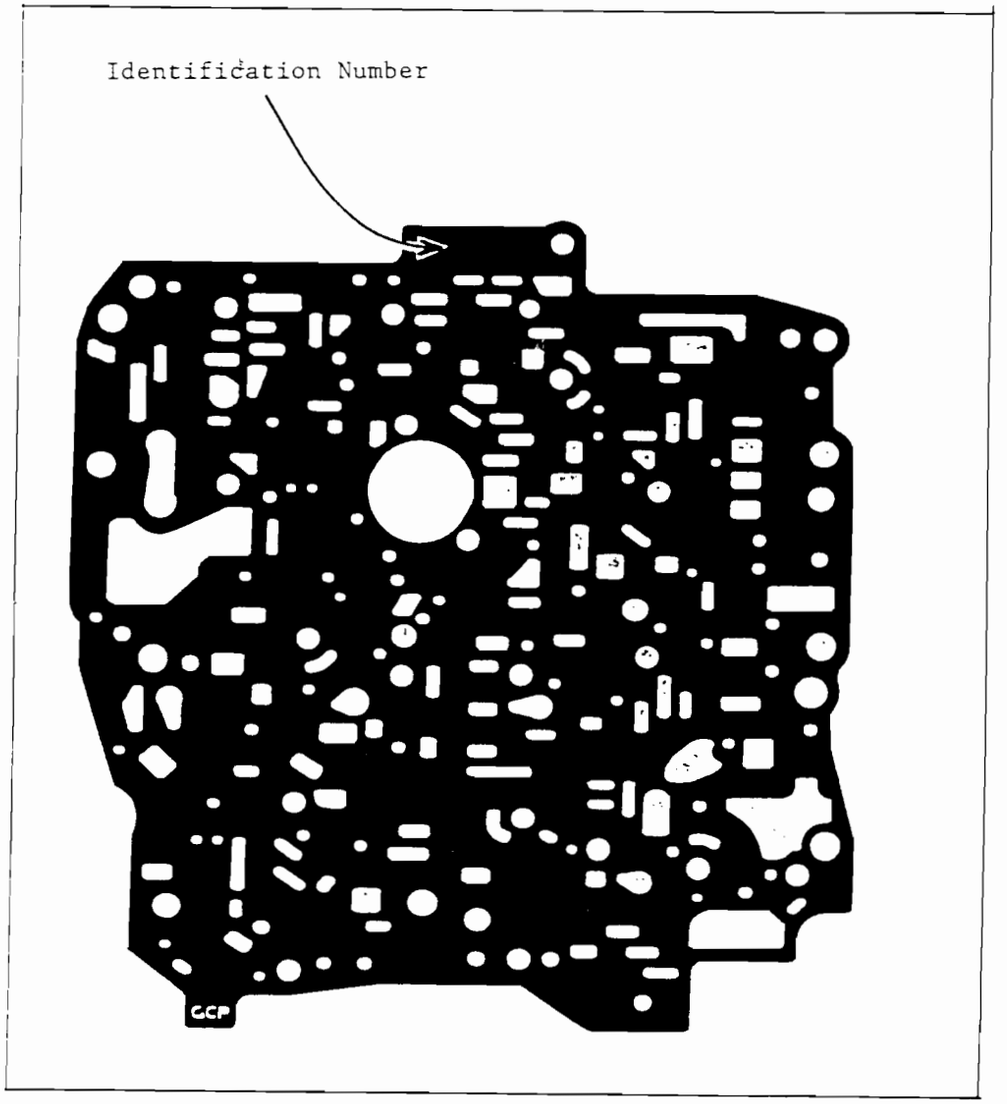


Figure 1

	1985 MODELS ONLY	1985 1/2 AND UP MODELS ONLY
(GVB) Valve Body to Spacer Plate	712	812, 882, or 848
(GCP) Channel Plate to Spacer Plate	713	813

Figure 2

1985 MODELS	1985 1/2 MODELS
5AY, 5BA, 5BC 5BN, 5BS, 5BU 5BX, 5CP, 5CW 5HA, 5HT, 5OB 5OY	5AF, 5AM, 5AR 5BR, 5BV, 5BW 5CM, 5CN, 5HJ

Figure 3

440-T4
ENGINE FLARE/PUMP WHINE/ TRANSAXLE SLIP

Engine flare, pump whine or transaxle slip during vehicle turns may be caused by low fluid level or the fluid filter.

Date of Production Change:

Starting April 6, 1987 (Julian Date 096), all THM 440-T4 transaxles were built using a filter with a new inlet and baffle design.

Service Action:

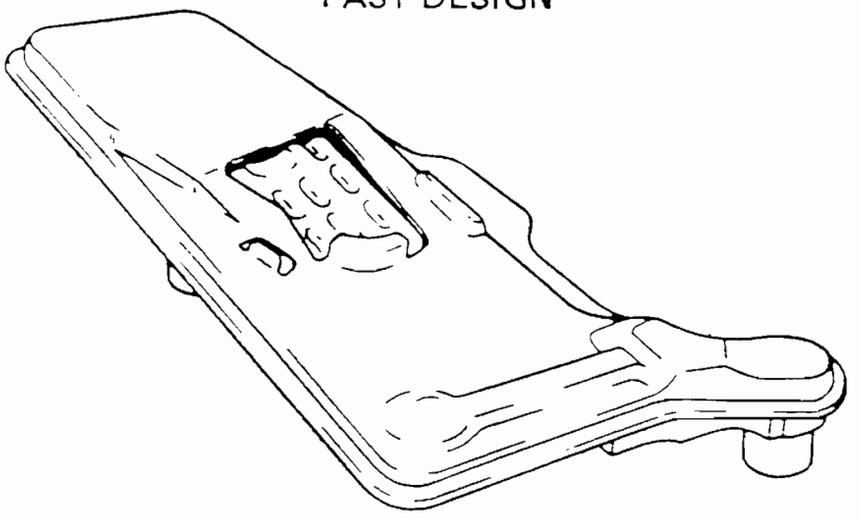
Check for proper fluid level and correct as necessary. If the flare or whine still occurs remove the bottom pan and replace the filter and seal with a new filter (Figure 1) and seal package listed below in "Service Parts Information".

Service Parts Information:

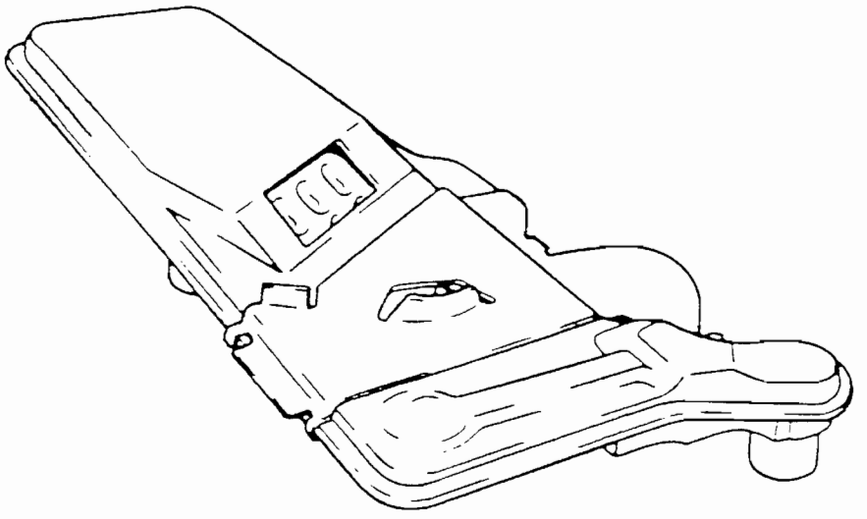
Current GMSPO stock of service package number 8646902 (filter and seal package) contains the following items:

— Oil pan gasket
— New fluid filter assembly (Figure 1)
— Filter intake pipe to case seal

PAST DESIGN



NEW DESIGN



THM 700-R4

To update pump assemblies used on all THM 700-R4 transmissions, install an inner slide spring (243), an outer slide spring (209) and new nodular iron vane rings (212). Refer to items (243), (209) and (212) in Figure 1.

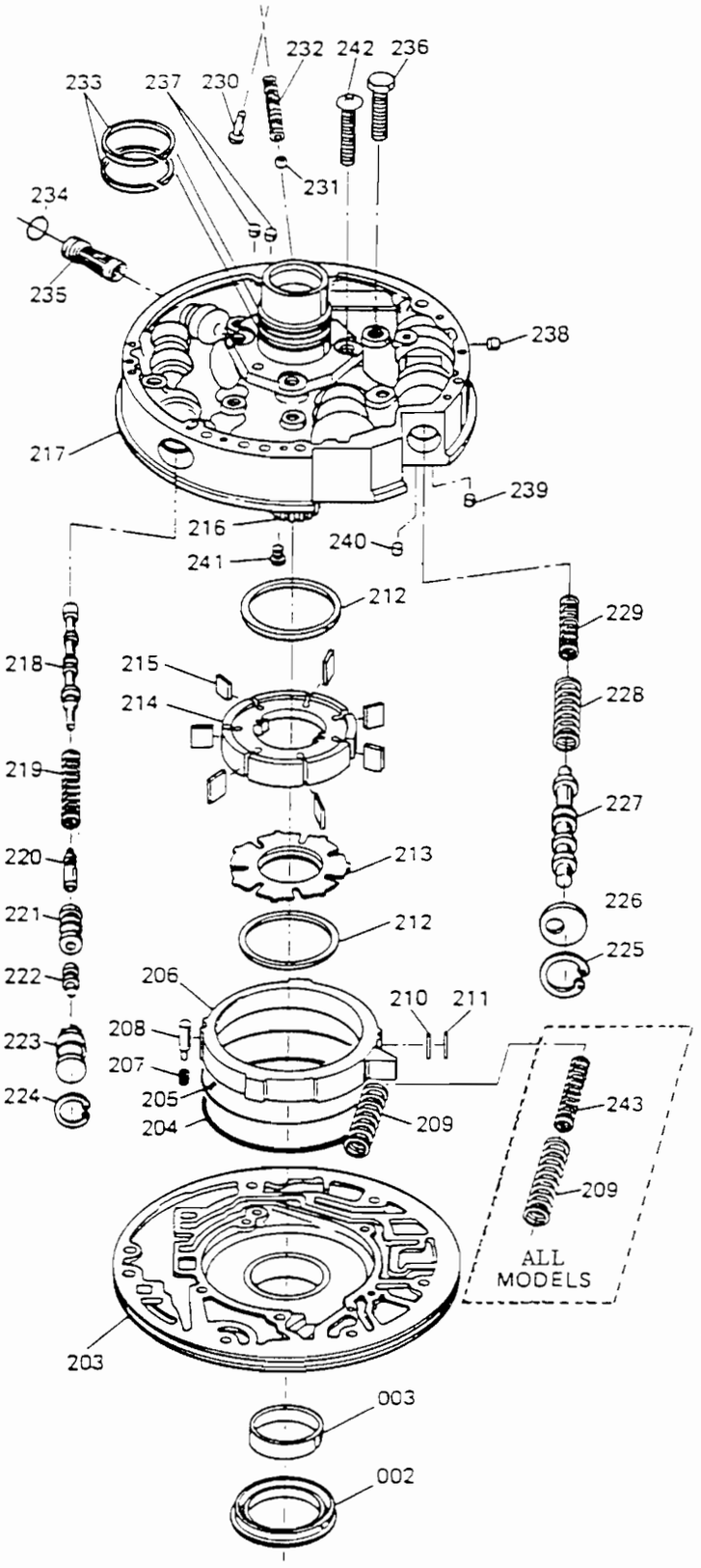
The inner and outer pump slide springs will improve pump capacity, and the new design vane rings will reduce the possibility of vane ring distress.

The inner and outer pump slide springs are recommended for any 1982 through 1987 THM 700-R4 transmissions, as are the new design nodular iron vane rings.

Following are the OEM part numbers:

Inner Pump Slide Spring	8639562
Outer Pump Slide Spring	8639563
Nodular Iron Vane Rings	8657692 (2 required)

Use service procedures contained in the appropriate ATSG Techtran Manual and the illustration provided in Figure 1.

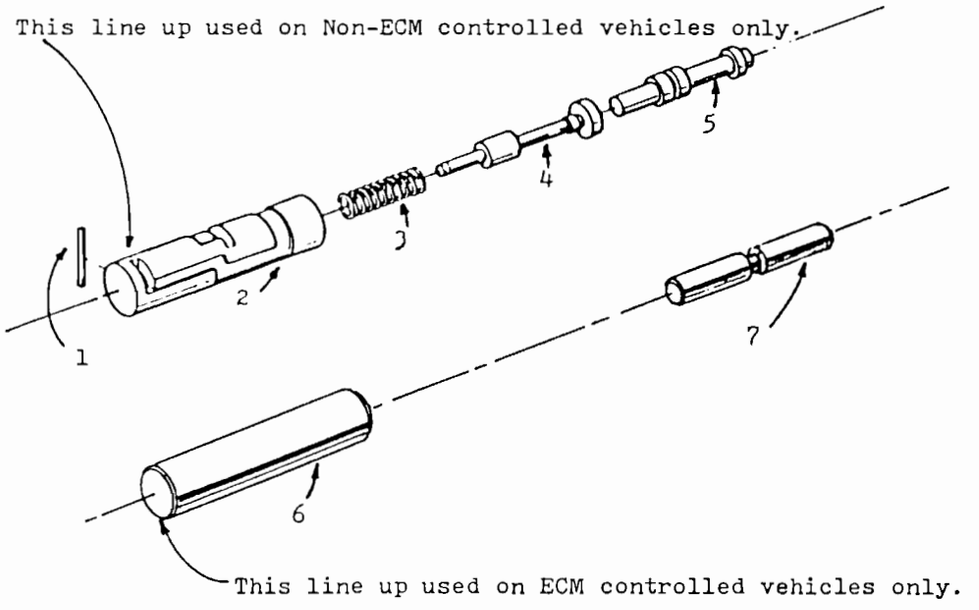


ILL. NO.	DESCRIPTION
002	SEAL ASSEMBLY, OIL
003	BUSHING, PUMP BODY
203	BODY, PUMP
204	RING, OIL SEAL (SLIDE TO WEAR PLATE)
205	SEAL, "O" RING (SLIDE SEAL BACK-UP)
206	SLIDE, PUMP
207	SPRING, PIVOT PIN
208	PIN, PIVOT SLIDE
209	SPRING, PUMP SLIDE (OUTER)
210	SUPPORT, PUMP SLIDE SEAL
211	SEAL, PUMP SLIDE
212	RING, PUMP VANE
213	GUIDE, ROTOR
214	ROTOR, OIL PUMP
215	VANE, PUMP
216	SHAFT, STATOR
217	COVER, PUMP
218	VALVE, PRESSURE REGULATOR
219	SPRING, PRESSURE REGULATOR VALVE
220	VALVE, REVERSE BOOST
221	SLEEVE, REVERSE BOOST VALVE
222	VALVE, T.V. BOOST
223	BUSHING, T.V. BOOST
224	RING, OIL PUMP REVERSE BOOST VALVE RETAINING
225	RING, OIL PUMP CONVERTER CLUTCH VALVE RETAINING
226	VALVE, STOP
227	VALVE, CONVERTER CLUTCH
228	SPRING, CONVERTER CLUTCH VALVE (OUTER)
229	SPRING, CONVERTER CLUTCH VALVE (INNER)
230	RIVET, PRESSURE RELIEF BOLT
231	BALL, PRESSURE RELIEF
232	SPRING, PRESSURE RELIEF
233	RING, OIL SEAL (STATOR SHAFT)
234	SEAL, OIL PUMP COVER SCREEN
235	SCREEN, OIL PUMP COVER
236	BOLT, M8 x 1.25 x 40 (COVER TO BODY)
237	PLUG, OIL PUMP AIR BLEED
238	PLUG, OIL PUMP COVER
239	PLUG, OIL PUMP COOLER FEED
240	PLUG, OIL PUMP CONVERTER CLUTCH SIGNAL
241	RETAINER & BALL ASSEMBLY, PUMP COVER
242	SCREW, STATOR SHAFT (M6 x 1 x 16.0)
243	SPRING, PUMP SLIDE (INNER)

THM 700-R4
8642970 KIT IN THE ECM CONTROLLED MODELS

We all know that the factory installed an aluminum plug in the valve body, where the converter clutch T.V. sleeve normally goes. This was to block off the oil channels since TCC was no longer controlled by oil pressure, but controlled instead by the ECM. What some of us do not know, is that they installed "TWO" aluminum plugs. One to replace the converter clutch T.V. sleeve, and one to replace the converter clutch shift valve (See Figure 1). You will have to remove "TWO" aluminum plugs from the valve body and in addition you will have to come up with a converter clutch shift valve from an old valve body, as it is not available from OEM sources.

With both aluminum plugs removed, install the "Aquired" converter clutch shift valve first and then your 8642970 kit. Be sure to clip one coil off of the spring that comes in the kit.



1. Retaining pin
2. Converter Clutch T.V. Sleeve
3. Converter Clutch T.V. Spring
4. Converter Clutch T.V. Valve
5. Converter Clutch Shift Valve
6. Aluminum Plug(ECM Controlled Only)
7. Aluminum Plug(ECM Controlled Only)

Figure 1

THM 700-R4

COMPLAINT: Harsh downshift clunk with selector in D3 only.

CAUSE: The cause could be the 2nd apply piston.

CORRECTION: Modify the 2nd apply piston by machining the inner hub and remove .125" (See Figure 1).

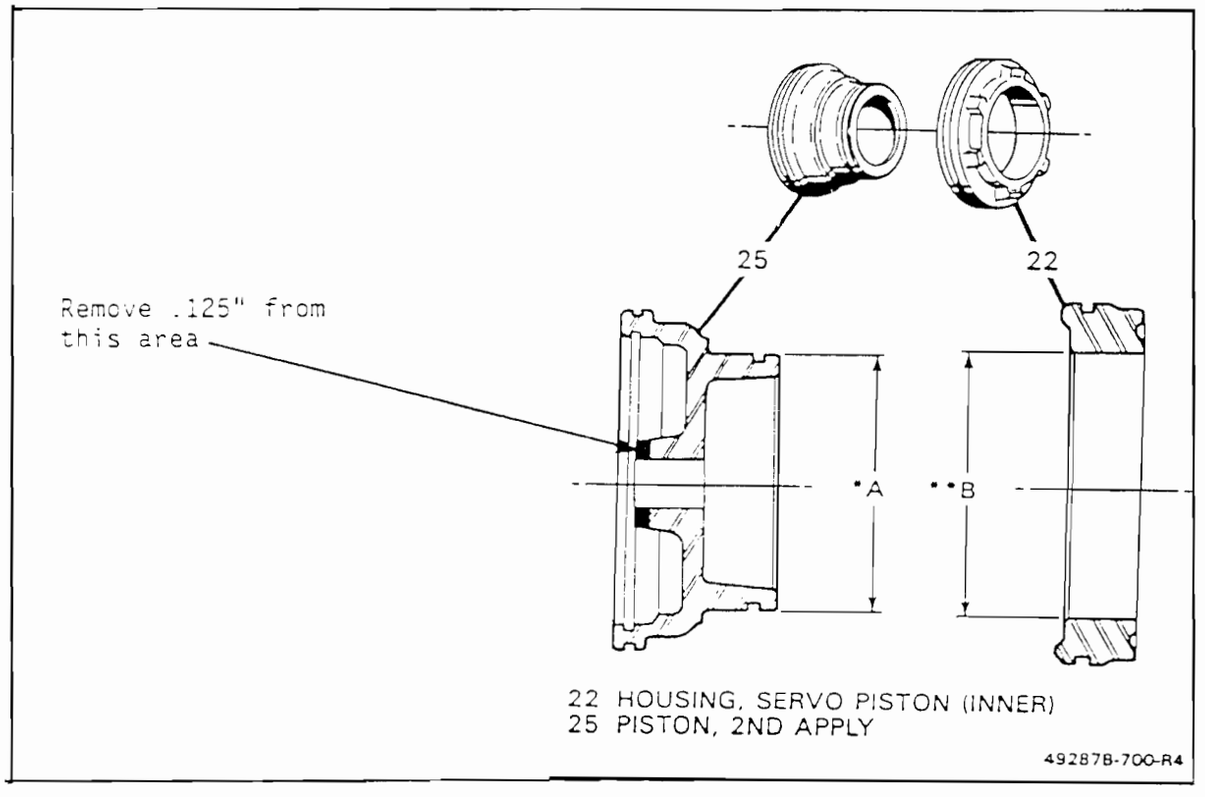


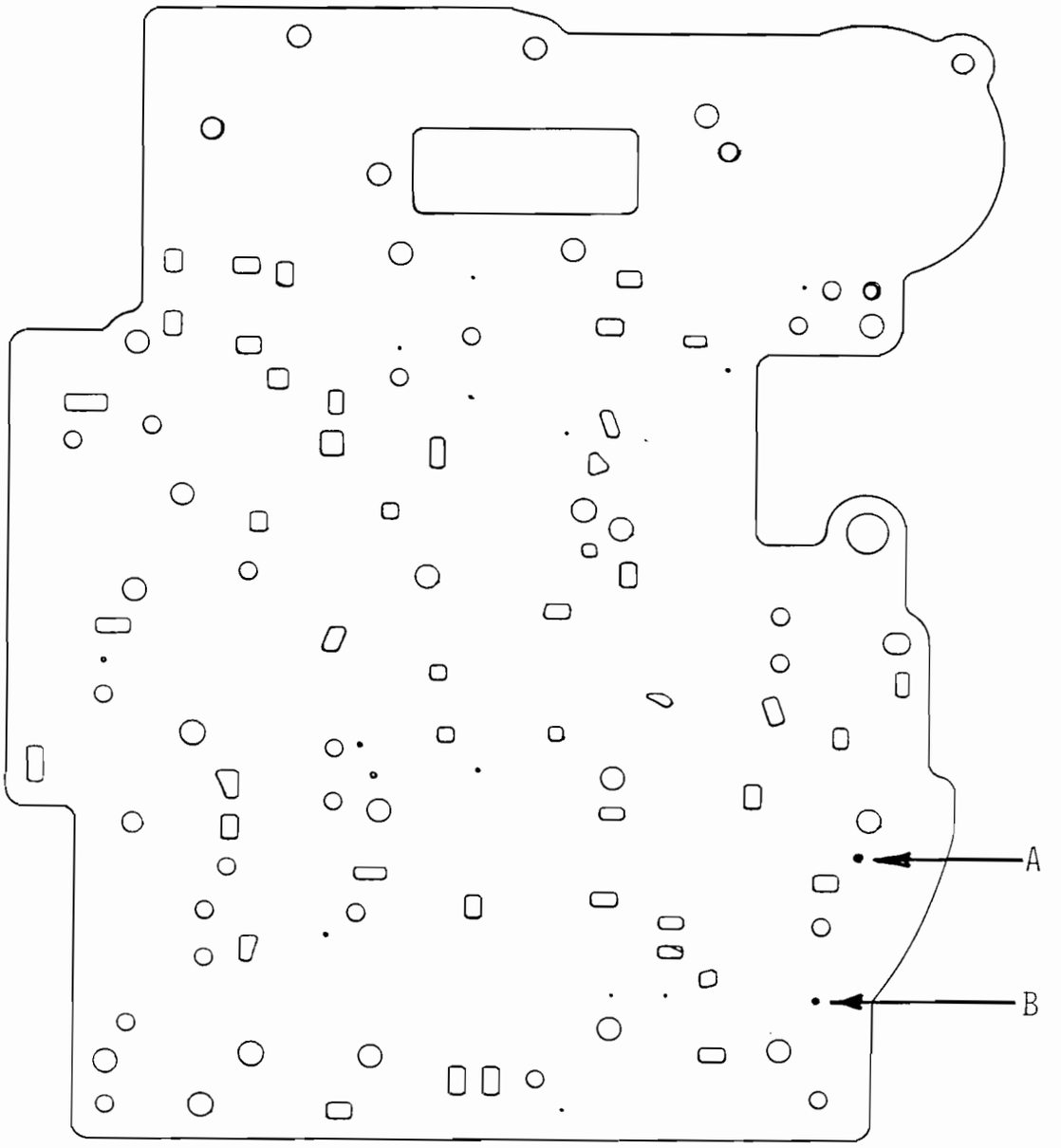
Figure 1

AUTOMATIC TRANSMISSION SERVICE GROUP

Thm 700 R4 Hanging TV Valve

A-IS THE TV FEED HOLE IF YOUR PLATE DOES NOT HAVE THIS HOLE (1982 MODELS) DRILL TO .040.

B-THIS IS THE TV BALANCE HOLE. SAME FUNCTION AS ON THE 200-200C-200 4R. DRILL OUT TO .062 TO ELIMINATE STICKING OR HANGING TV VALVE.



THM 700-R4
NO FOURTH GEAR

COMPLAINT: No 4th gear; 2nd and 4th pressure lower than line pressure.

CAUSE: The cause could be the bleed orifice cup plug missing from the case in the bottom of the 3-4 accumulator bore (see Figure 1).

CORRECTION: Install bleed orifice cup plug, OEM Part Number 8628864.

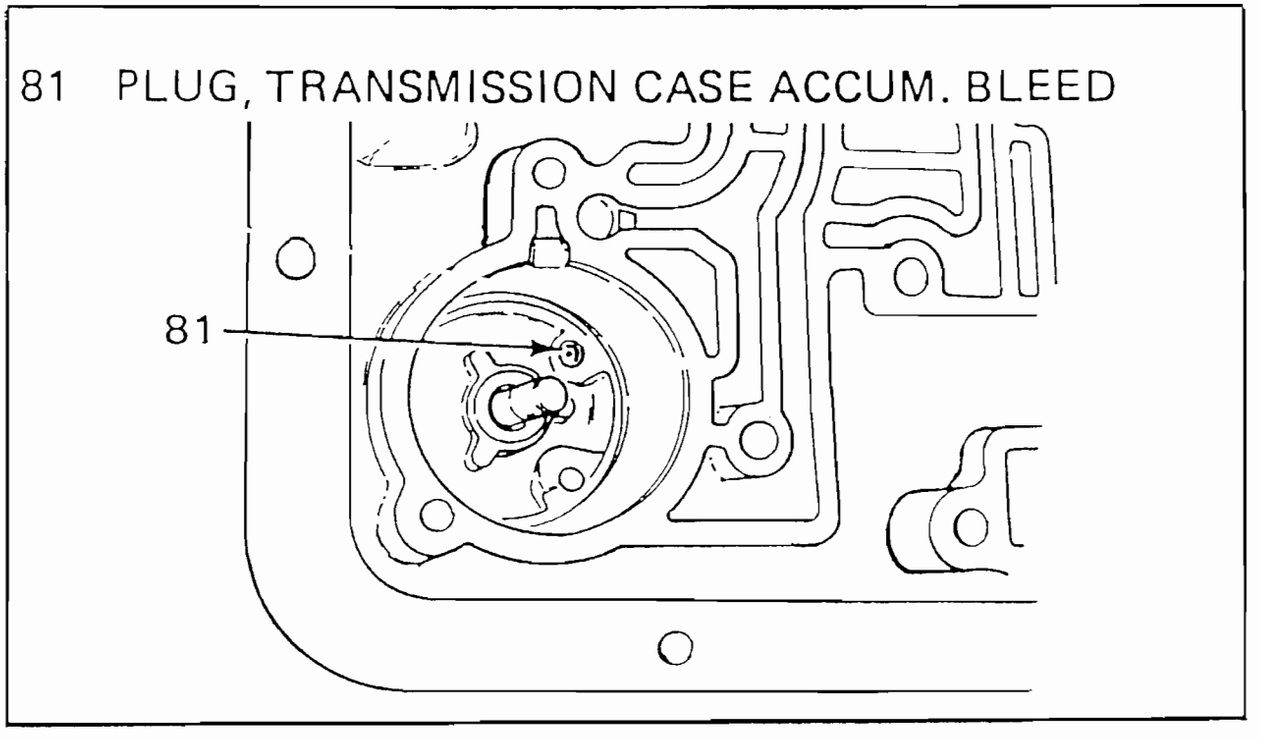


Figure 1

THM 700-R4 NEW DESIGN SPRAG

Beginning July 17, 1986, a new Forward Sprag Assembly went into production to increase the torque carrying capacity of the forward sprag for the 1987 model THM 700-R4 transmissions.

There are two additional sprag elements (This increased elements from 26 to 28), and revised diameters on the inner and outer races, along with solid steel end bearings (See Figure 1 for comparison).

The new design forward sprag and associated parts are not interchangeable with the old parts.

The new design sprag will retro fit all the way back to 1982 models by replacing the entire assembly, OEM Part Number 8657928, and is highly recommended.

When the new design sprag is used, the wear plate and the black plastic input carrier thrust washer are eliminated (See Inset Fig. 1). The wear plate (640) is eliminated to make room for the solid steel end bearings, and the long lip of the retainer on the sprag inner race takes the place of the input carrier thrust washer (660). See Figure 1.

Use of the input carrier thrust washer (660) with the new design sprag assembly will cause a misbuild (Correct end clearance cannot be obtained).

1987 New Design Forward Sprag Assembly ---------- 8657928

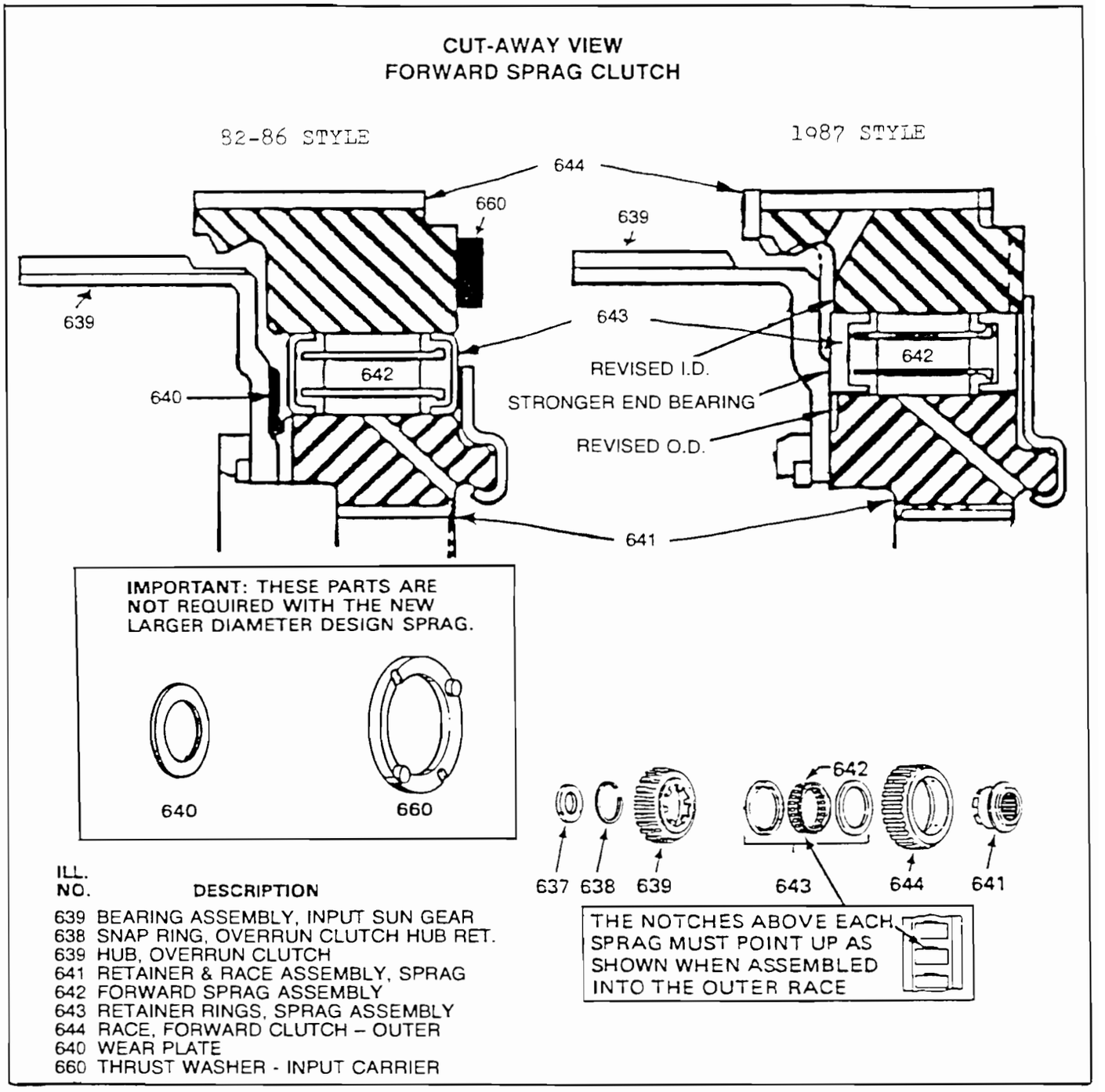

CUT-AWAY VIEW
FORWARD SPRAG CLUTCH
82-86 STYLE
1987 STYLE
644
660
639
639
643
642
642
REVISED I.D.
640
STRONGER END BEARING
REVISED O.D.
641
IMPORTANT: THESE PARTS ARE NOT REQUIRED WITH THE NEW LARGER DIAMETER DESIGN SPRAG.
640
660
642
637 638 639
643
644
641
THE NOTCHES ABOVE EACH SPRAG MUST POINT UP AS SHOWN WHEN ASSEMBLED INTO THE OUTER RACE
ILL. NO. DESCRIPTION
639 BEARING ASSEMBLY, INPUT SUN GEAR
638 SNAP RING, OVERRUN CLUTCH HUB RET.
639 HUB, OVERRUN CLUTCH
641 RETAINER & RACE ASSEMBLY, SPRAG
642 FORWARD SPRAG ASSEMBLY
643 RETAINER RINGS, SPRAG ASSEMBLY
644 RACE, FORWARD CLUTCH – OUTER
640 WEAR PLATE
660 THRUST WASHER - INPUT CARRIER

Figure 1

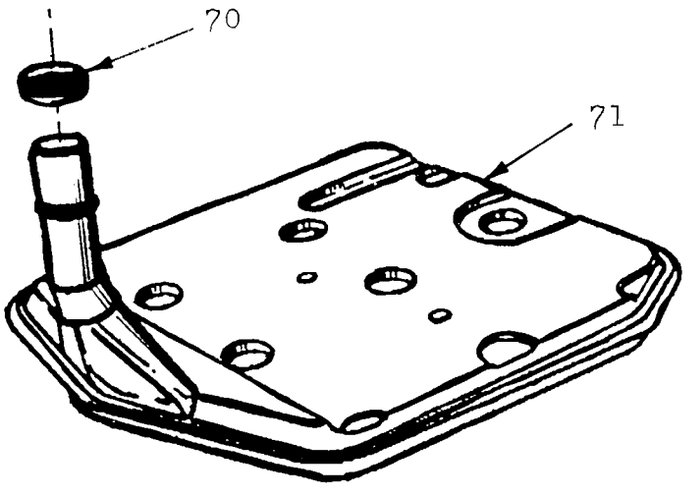
THM 700-R4 NEW FILTER

There is now available a new design filter and filter seal assembly for all THM 700-R4 transmissions.

The filter is now bottom suction instead of top suction, and the new seal can best be described as two "O" Rings moulded together. (See Figure Below).

When replacing the previous design filter with the new design filter, discard the spring clip that was used to hold the previous design filter against the transmission oil pan.

Following are the OEM Part Numbers;
Seal Assy, Filter ---------- 8657767
Filter, Seal, and Gasket (Service Package) --- 8657926

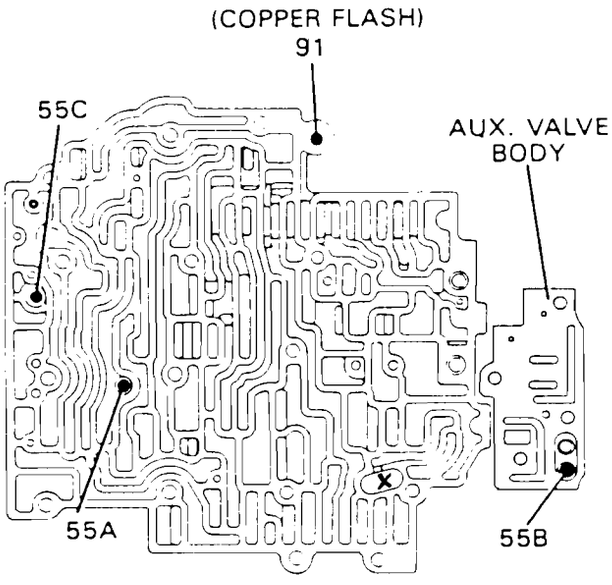


70 Seal Assy, Filter
71 Filter Assy, Transmission Oil

THM 700-R4 CHECK BALL LOCATION

The number 5 check ball has been removed from the bath tub in the valve body, and relocated in the auxiliary valve body on all 1987 model THM 700-R4 transmissions.

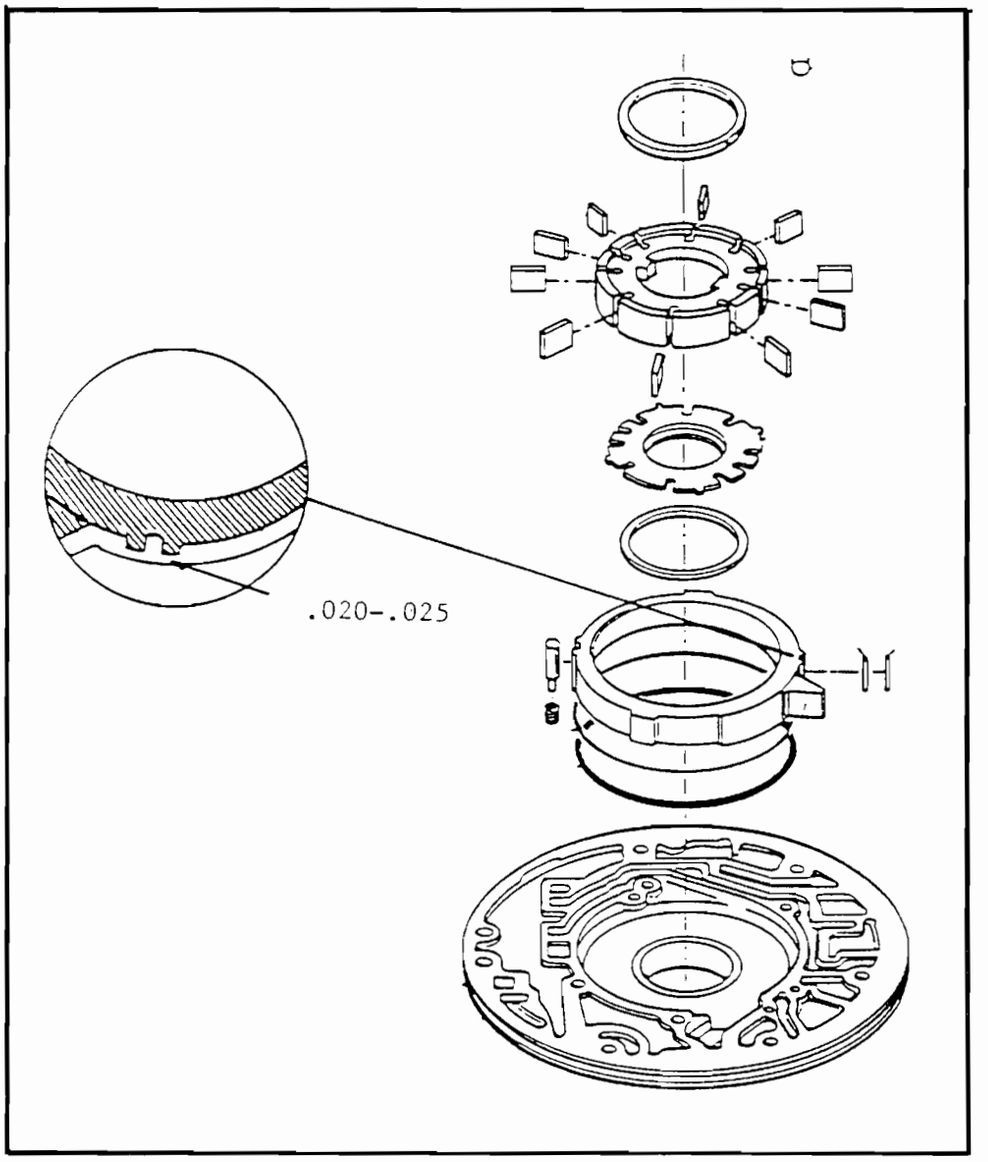
NOTE: If this check ball is installed in the old position when the auxiliary valve body is used, the low and reverse clutch pack will burn in approximately 15 minutes of normal operation. See figures below.



55A #2 CHECKBALL (3RD CLUTCH ACCUM.)
55B #5 CHECKBALL (FORWARD CLUTCH)
55C #6 CHECKBALL (DRIVE 3)
91 #10 CHECKBALL (T.V. EXHAUST)

THM 700-R4 PUMP CHANGE

The ten vane rotor and slide can be used in an oil pump body which originally had seven vanes. However, be sure to check for clearance between the slide and the slide pocket where the slide seal and support go. The normal clearance is approximately .025". If the clearance gets much closer than .020" you may run into oil pressure problems. See inset in figure below.

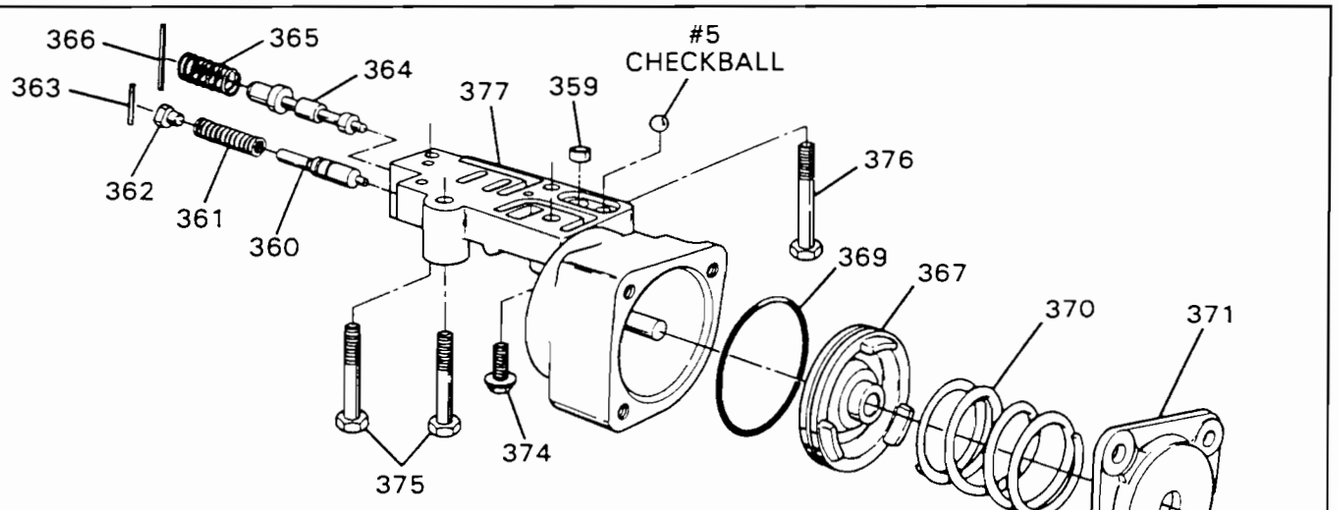


1987 THM 700-R4

COMPLAINT: Premature forward clutch failure on 1987 THM 700-R4 with auxilary valve body.

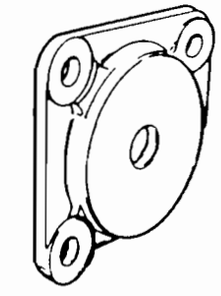
CAUSE: The cause could be the forward clutch accumulator pin in the auxilary valve body moving out thru the hole in the center of the 1st design accumulator cover, and creating a loss of forward clutch oil. The original press fit of the pin was not sufficient to retain the pin in the auxilary valve body casting.

CORRECTION: If you have the 1st design cover, braze shut the hole in the center of the cover and drill a 3/16" hole off center. (See Figure 1). The 2nd design cover with the oblong hole in the center is OK to use as is. If the pin has moved out the back side of the auxilary valve body, a simple "staking" process will prevent it from moving that direction again. The 2nd design auxilary valve body casting has a step machined in that area to prevent the pin from moving.

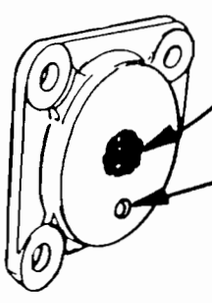


359 PLUG, CUP (ORIFICE)
360 VALVE, ABUSE
361 SPRING, ABUSE VALVE
362 STOP, ABUSE VALVE
363 PIN, SPRING
364 VALVE, LO OVERRUN CLUTCH
365 SPRING, LO OVERRUN CLUTCH VALVE
366 PIN, SPRING VALVE RETAINING
367 PISTON, ACCUMULATOR
369 RING, OIL SEAL ACCUMULATOR PISTON
370 SPRING, ACCUMULATOR PISTON
371 COVER, AUXILIARY ACCUMULATOR VALVE
373 BOLT, SPEC. HEX WASHER HEAD (M6 X 1 X 24)
374 BOLT, SPEC. HEX WASHER HEAD (M6 X 1 X 16)
375 BOLT, HEX HEAD (M6 X 1 X 40)
376 BOLT, HEX HEAD (M6 X 1 X 45)
377 AUXILIARY ACCUM. VALVE BODY ASM.

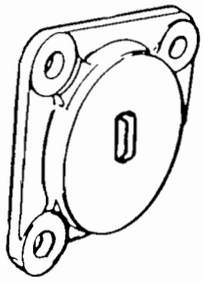
Figure 1



"1st Design"
(Do Not Use)



"1st Design Modified"
(OK To Use)

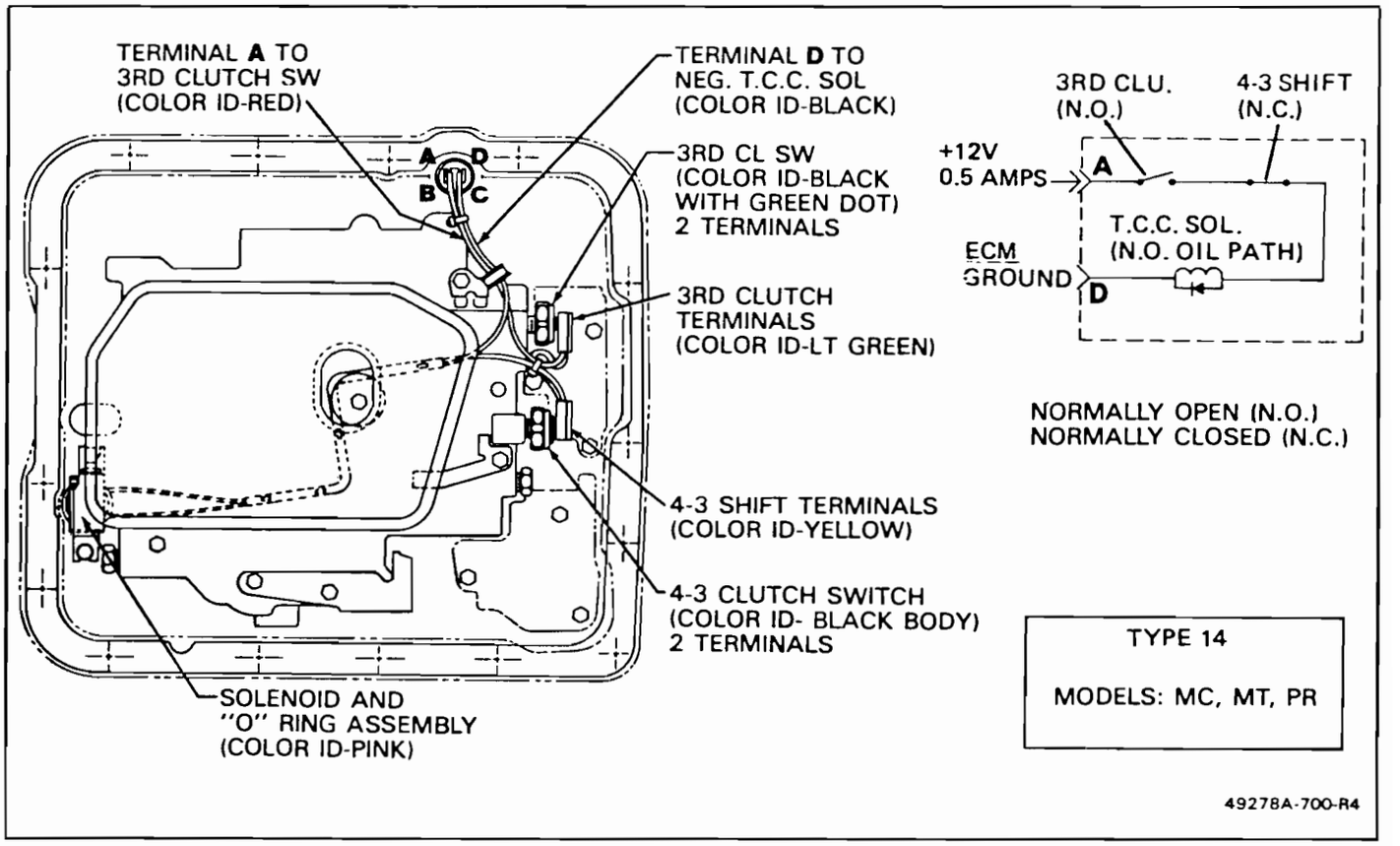


"2nd Design"
(OK To Use)

Figure 2

THM 700-R4 WIRING DIAGRAM

This is the wiring diagram for the THM 700-R4 transmission that first appeared in 1985. The number designation is Type 14, and you can identify it by the color of the insulator on the solonoid (Color ID Pink).



1987 THM 700-R4

Beginning July 17, 1986, Julian Date 198, for 1987 THM 700-R4 transmissions, a new solenoid and wiring harness (Type 15) went into production, along with a new temperature switch and bracket assembly (See Figure 1).

The new temperature switch is designed to prevent the transmission from overheating by applying the torque converter clutch (TCC) under certain conditions. With the gear selector in "D" and the transmission operating in fourth gear, the temperature switch is normally open. If the transmission is operating in fourth gear without TCC apply and the fluid temperature reaches 275°F the switch closes. When the switch is closed, the torque converter clutch is applied to allow the fluid to cool to 246°F, at which time the switch opens and normal TCC operation resumes.

The new temperature switch is mounted on the control valve assembly by an existing bolt and can be serviced by removing the oil pan.

Models affected are as follows; FAM, MAM, MDM, MFM, MKM, MLM, MMM, MRM, MVM, MWM, MXM, MZM, TJM, TKM, TVM, TXM,

Vehicles affected are as follows;

M-Van with: 4.3L Engine
G-Van with: 4.3L, 5.0L, 5.7L Engine
R, V, C and K Truck with: 4.3L, 5.0L, 5.7L Engine

Temperature Switch (1987 Models)---------- 8654421
Solenoid Assy. (1987 Models-Type 15)------- 8654415

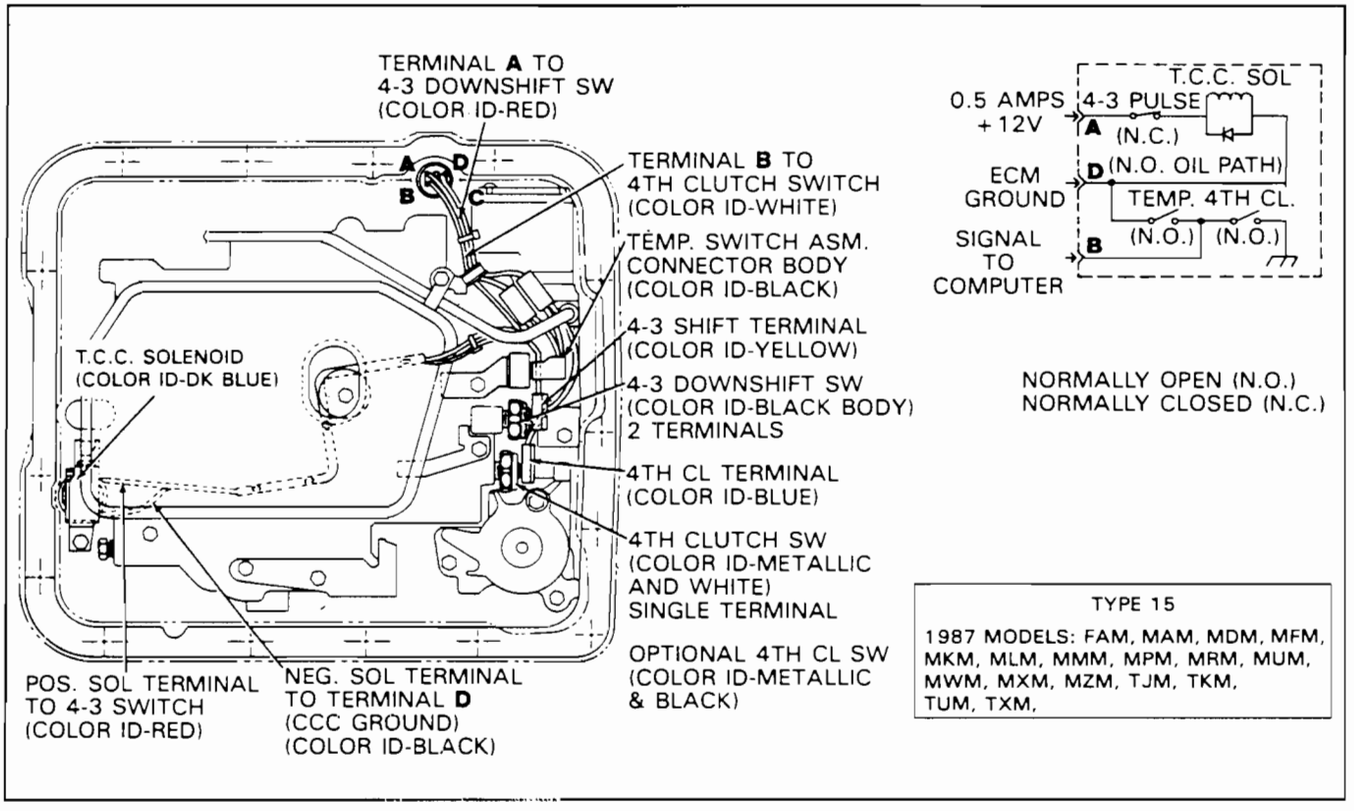


Figure 1

C-3 FRONT SEAL POP OUT

COMPLAINT: C-3 front seal pops out after overhaul or seal replacement.

CAUSE: One cause can be the use of an A4LD front seal used in place of the C-3 front seal. See Figure 1 B (A4LD seal). Note that the lip of the seal protrudes past the metal base of the seal housing. When the seal is installed, the rubber portion of the seal restricts the drain passage behind the seal. In Figure 1 A (C-3 seal), the seal lip is below the metal base of the seal.

CORRECTION: Install a C-3 front seal (D4ZZ-7A248A) in C-3 transmissions.

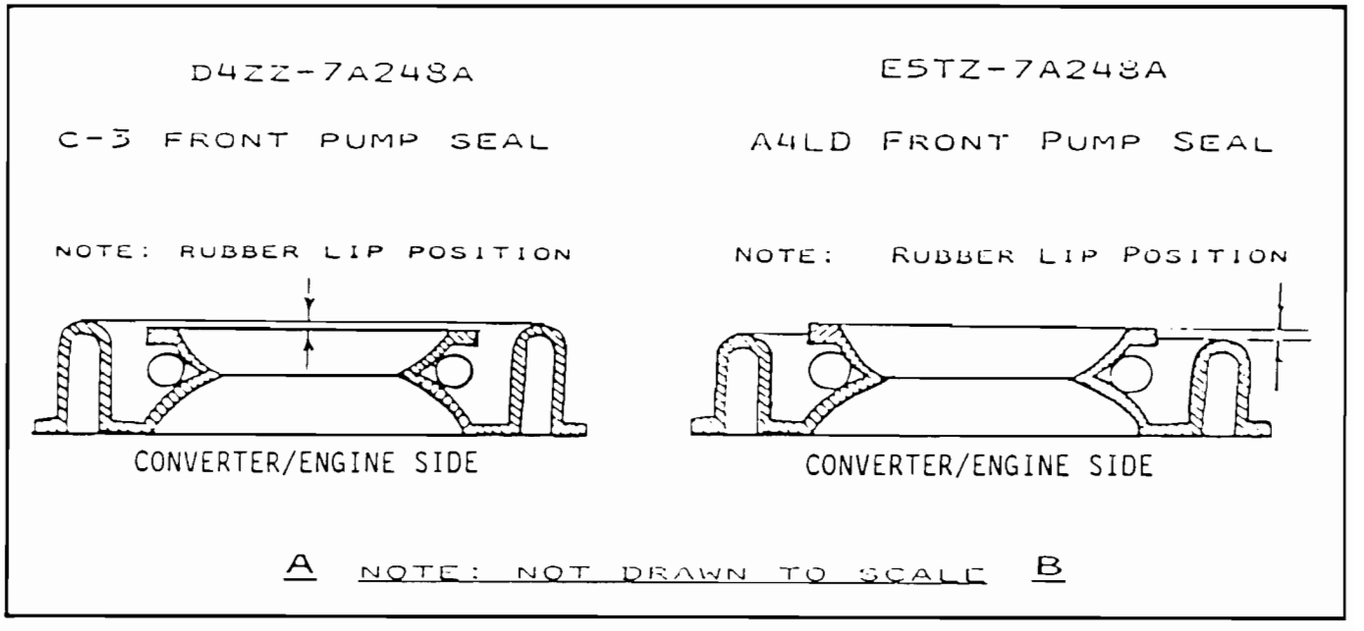


Figure 1

FORD C-4

On the Ford C-4 transmission, you may get a complaint of sensitive part throttle downshifts, which means that when you are driving in third gear and you barely touch the throttle, the unit will downshift to second gear.

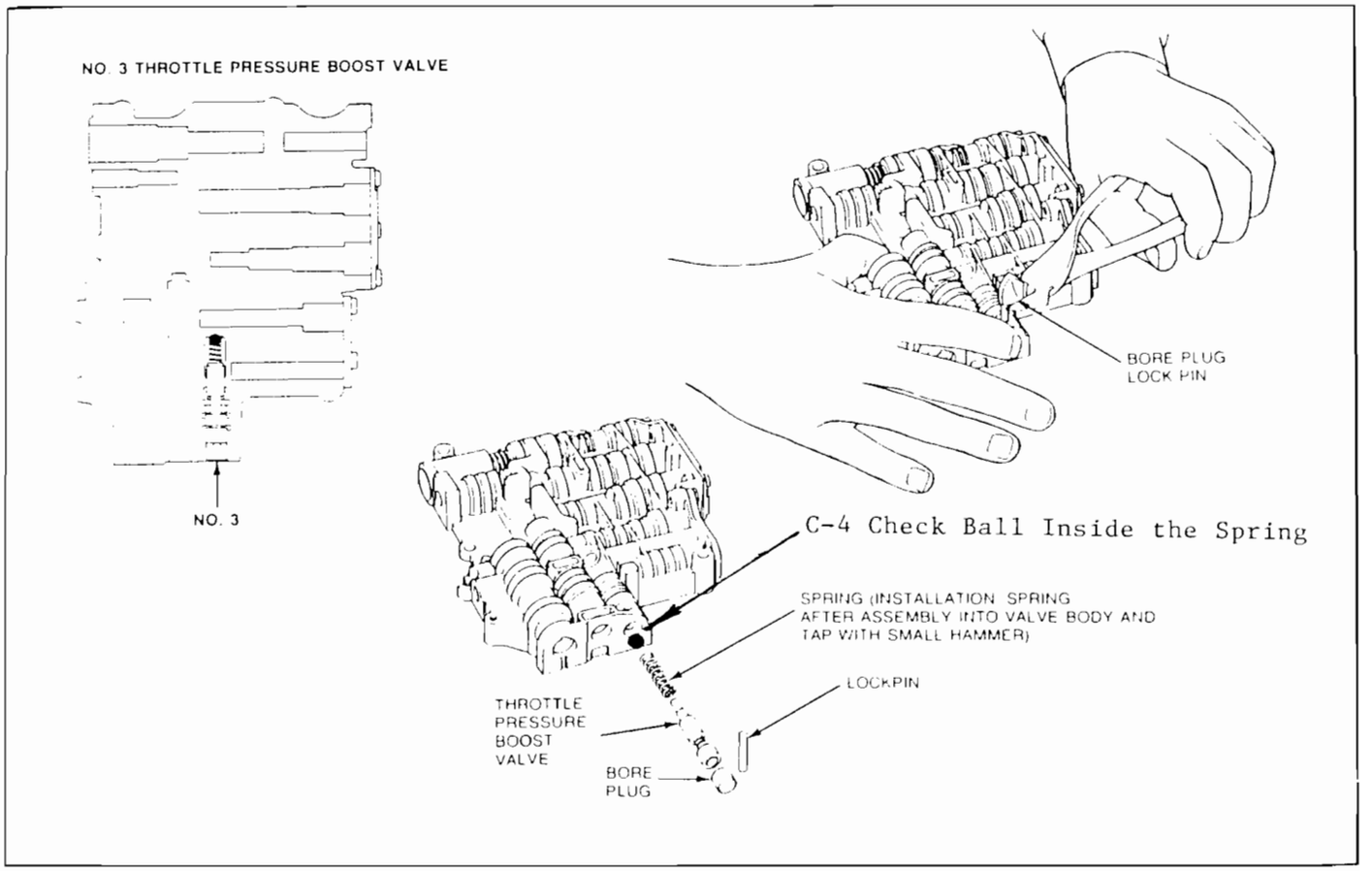
To correct this, the following should be done:

1) Make sure the proper modulator is installed for that vehicle

2) Make sure the modulator pin is the correct length

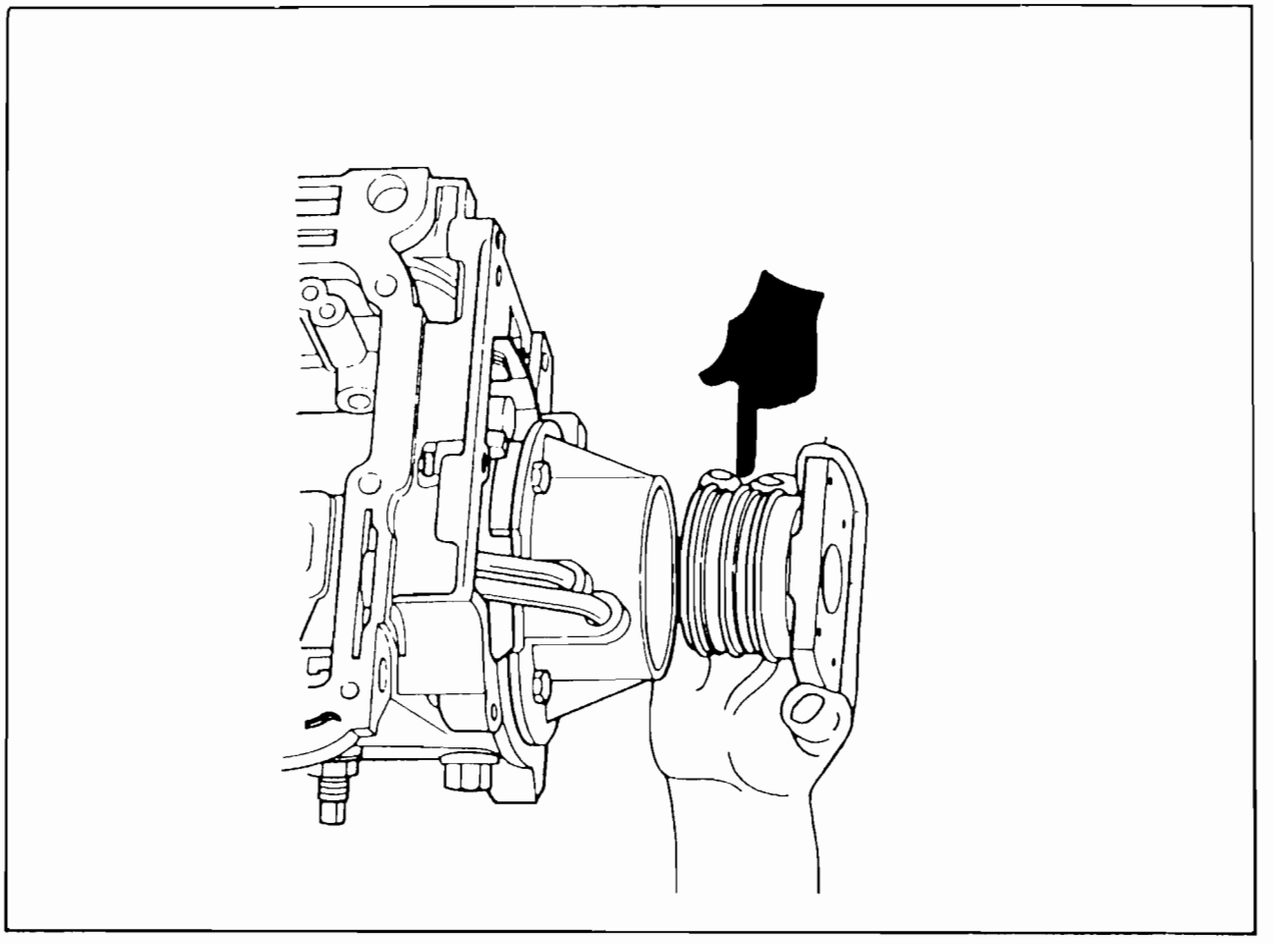
3) Check the downshift linkage and make sure it is correct.

If you know that all of the above are correct, you can block the throttle booster valve by using a C-4 check ball inside the spring as shown below.



C-4 / C-5
DELAYED ENGAGMENT

A complaint of delayed engagement in Forward or reverse on C-4 or C-5 transmissions that have just been overhauled, can be caused by a gap in the butt rings used on the governor support. Some replacement rings in overhaul kits have a .012 ring gap. So be sure to check the rings in the case support. There should be no gap greater than .001 to .002.



C-4 Harsh Reverse

FORD

1981 FAIRMONT/GRANADA/MUSTANG EQUIPPED WITH 3.3L AND C-4 (PEN) MODEL TRANSMISSIONS

LINCOLN-MERCURY

1981 ZEPHYR/COUGAR/CAPRI EQUIPPED WITH 3.3L AND C-4 (PEN) MODEL TRANSMISSIONS

A harsh neutral to reverse idle engagement may be encountered on the above 1981 3.3L passenger car applications equipped with a C-4 (PEN) model transmission. To service this concern, check the model identification tag on the transmission to verify that it is a PEN model C-4 transmission. If it is a PEN model, verify that the idle speed is set to specifications, if the concern persists, the following are instructions to rework the main control valve body assembly and the low-reverse servo piston assembly:

NOTE: This rework may cause a slight delay in reverse engagement.

1. Remove the low-reverse servo assembly as outlined in the 1981 Car Shop Manual, low-reverse servo procedure, Section 17-05-9, Steps 1 thru 4. Mustang and Capri vehicle applications require lowering the transmission to remove the low-reverse servo. To lower the transmission, remove the engine support-to-crossmember nuts, loosen the right-hand crossmember nut, remove the left hand crossmember bolt and nut, and then swing the crossmember to the right side. The transmission can be lowered with a jack sufficiently to gain access to the low-reverse servo cover.
2. After removing the low-reverse servo piston, drill a .031 ± .002" (#68 Drill) diameter hole through the piston top surface. This can be facilitated by inserting the servo in a vise. Allow the top of the servo to be supported by the vise not clamped in the jaws. Clean the metal shavings from the drilled hole and from the piston (Figures 16 and 17).
3. Reinstall the piston into the case as outlined in the low-reverse servo shop manual procedure. Follow steps 5 thru 7. No special orientation of the hole is necessary when installing the servo assembly into the case.
4. Adjust the low-reverse band as outlined in the shop manual procedure.

Step II Main Control Valve Body Assembly Modification

1. Remove the main control valve body assembly from the transmission as outlined in the 1981 Car Shop Manual Section 17-05-8, Steps 1 thru 6.
2. Remove the seperator plate from the main control valve body according to the disassembly procedure in Section 17-05-23, Steps 1 and 2, be careful not to lose the upper valve body shuttle valve and check

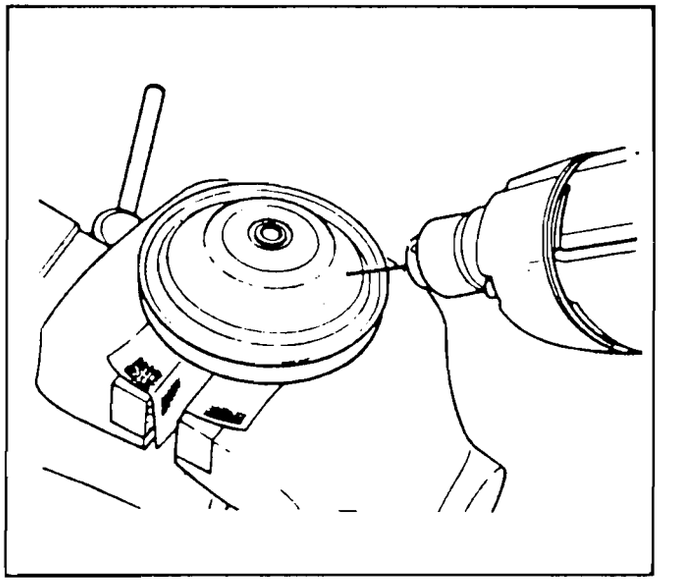


Figure 16

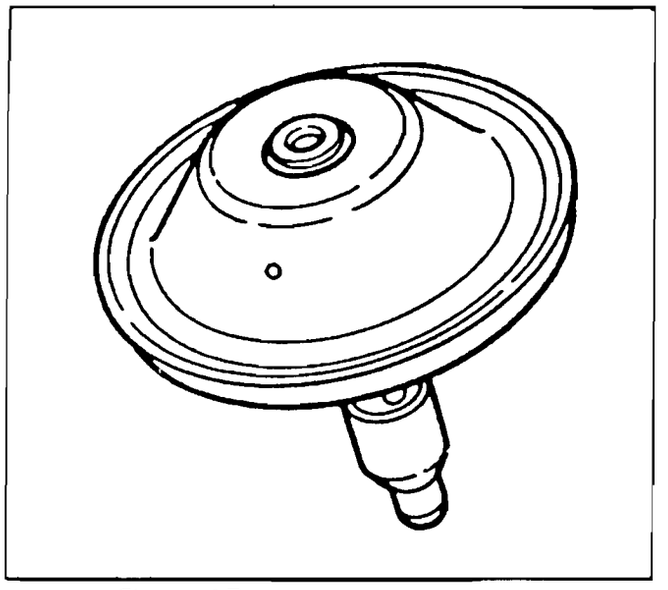


Figure 17

valve when seperating the upper and lower valve bodies.

3. Rework the seperator plate as follows: Place the seperator plate on a hard flat surface such as a steel block, Using a steel ball approximately 1/4" diameter, rework hole #76 (Figure 18) by placing the ball in the hole and striking the ball with a hammer until the hole is reduced to a diameter of slightly less than .040 where a #60 drill will not quite pass through the hole. Then size the hole to .040 by drilling with a #60 drill. Clean-up metal burrs from the hole after the operation. (Figure 19).

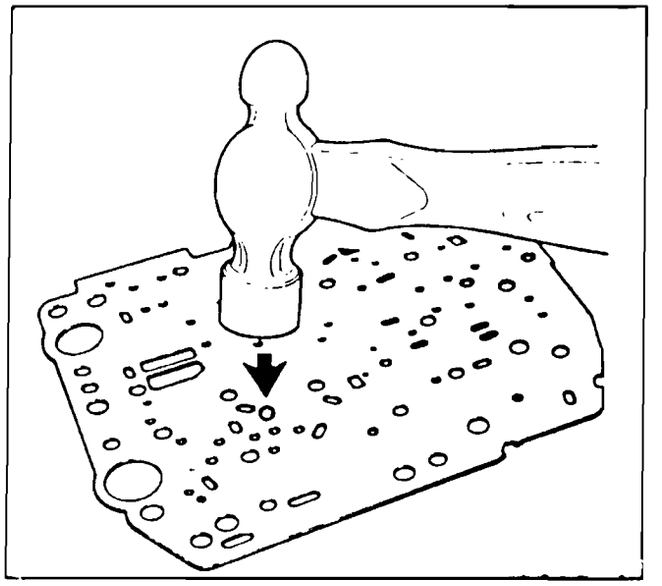


Figure 18

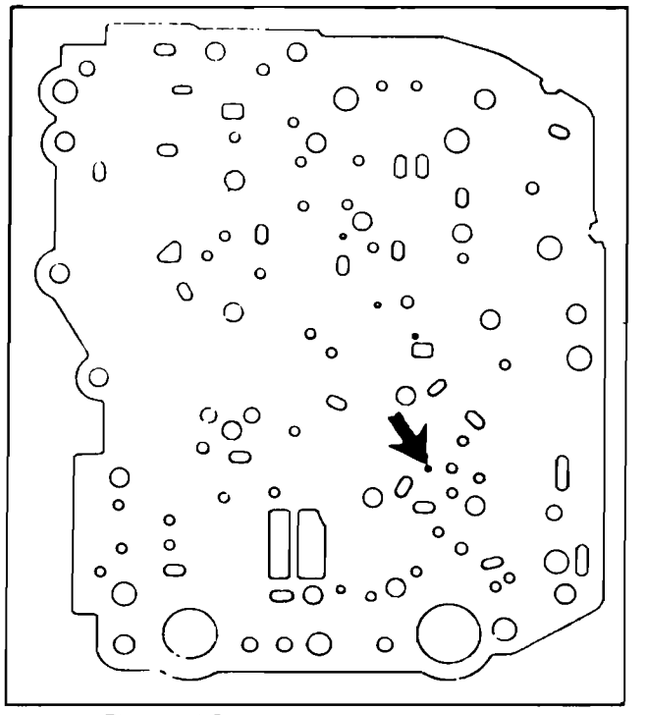


Figure 19

TRANSMISSION — AUTOMATIC — AOD — NO FORWARD DRIVE AFTER COAST DOWN FROM FOURTH GEAR

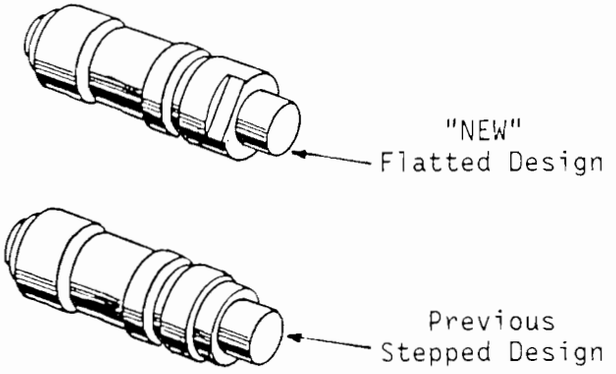
FORD
1983-1985 FORD, THUNDERBIRD, LTD, MUSTANG

LINCOLN-MERCURY
1983-85 MERCURY, COUGAR, MARQUIS, CAPRI, LINCOLN, MARK, CONTINENTAL

LIGHT TRUCK
1983-85 E & F SERIES

Some AOD-equipped vehicles with transmissions built between March, 1983 and April 19, 1985 may exhibit a no forward drive condition after coast down from fourth gear. This condition may occur if a small particle of contamination causes the 3-4 shift valve to stick in the forward clutch exhaust position.

To service this condition, install a new 3-4 shift valve that has a design with flats on the valve. This will allow contamination to pass and be trapped in the main control filter assembly. The new valve was incorporated in production April 19, 1985. Refer to Figure 1 for visual differences between 3-4 shift valve design levels.



PART NUMBER	PART NAME
E5AZ-7F259-A	3-4 Shift Valve

Figure 1

TRANSMISSION — AUTOMATIC — AOD — MAIN CONTROL VALVE BODY GASKETS

FORD
1980-86 FORD, THUNDERBIRD, LTD, MUSTANG

LINCOLN-MERCURY
1980-83 MARK VI; 1980-86 MERCURY, COUGAR, MARQUIS, CAPRI, LINCOLN, CONTINENTAL; 1984-86 MARK VII

LIGHT TRUCK
1981-86 E-SERIES, F-SERIES, BRONCO

New upper and lower main control valve body gaskets have been released for service. The new gasket has an additional slot, which reduces the chance for contamination of the 3-4 shift valve (refer to Figures 11 and 12). The new gaskets can be used on all AOD main control valve bodies produced for the 1980-86 model years.

Old upper and lower main control valve body gaskets (E0AZ-7D100-B and E0AZ-7C155-A) may still be used on certain applications. To identify the correct application, the middle letter of the main control valve body's three-letter I.D. code is necessary. Refer to the following service usage chart for the correct gasket applications.

SERVICE USAGE CHART FOR AOD MAIN CONTROL VALVE BODY GASKETS

AOD Valve Body I.D. Codes (Middle Letter)	Old Gaskets E0AZ-7D100-B E0AZ-7C155-A	New Gaskets E6AZ-7D100-A E6AZ-7C155-A
A, B, C, D, E T, U, V, W, X, Y, Z	Acceptable	Acceptable
All other than above (For example: main controls with middle letter I.D. code F, G, H, Q, R, S)	Must **NOT** Use	Must Use

(Continued on next page)

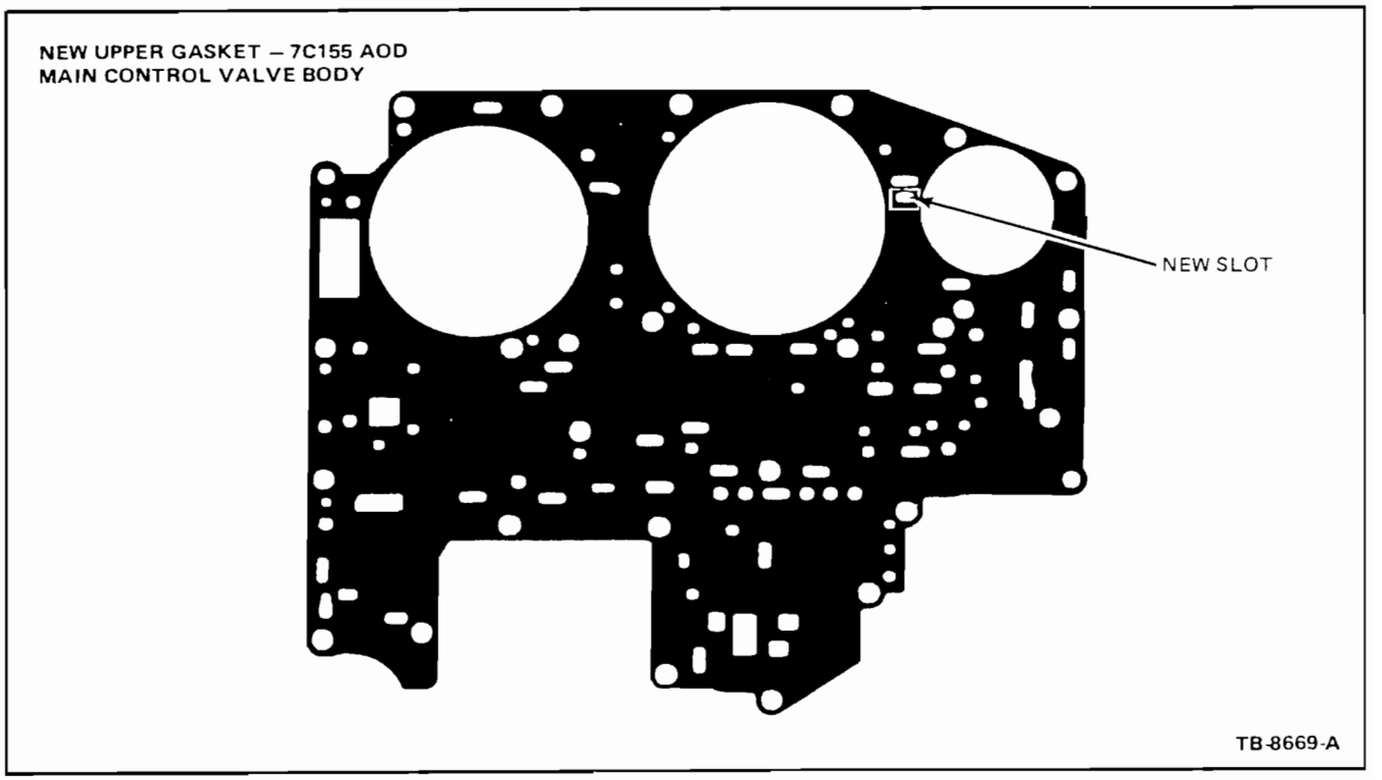


Figure 11

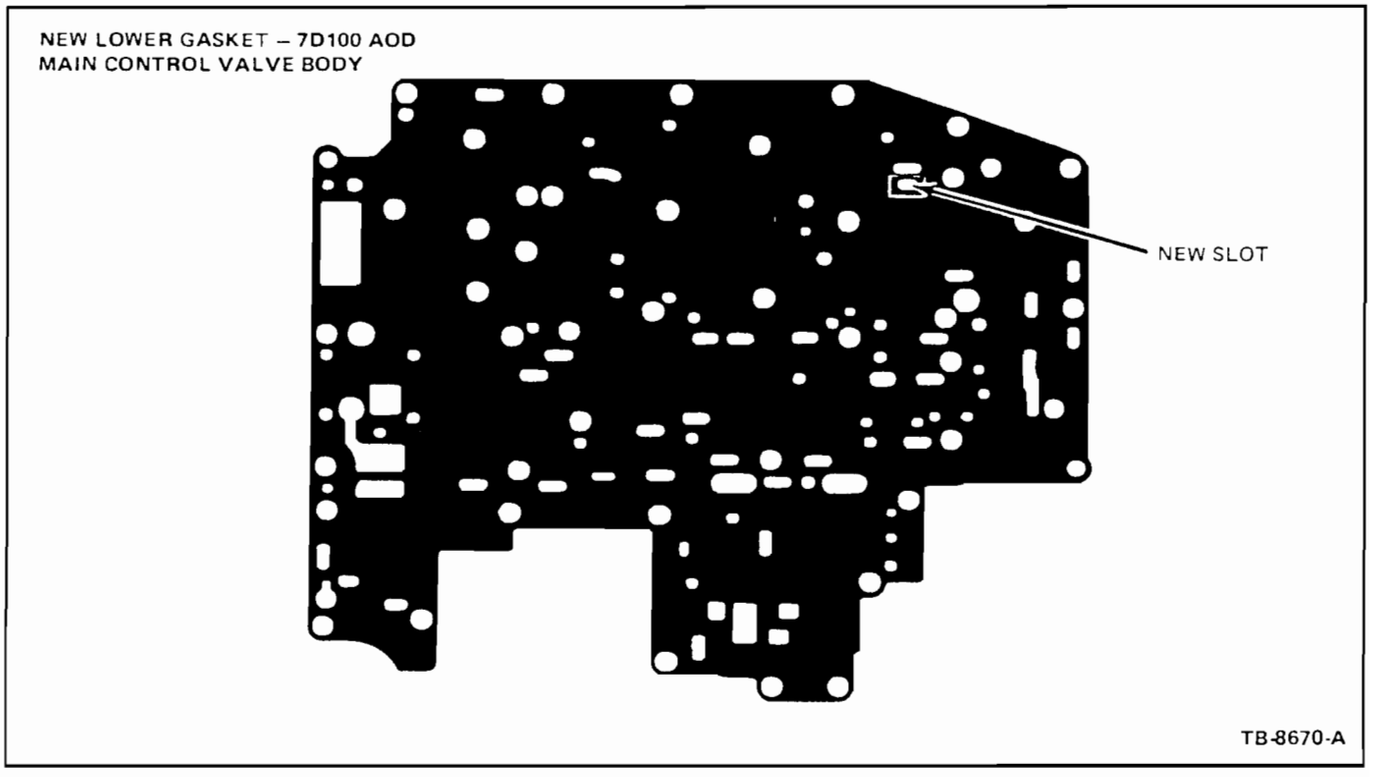


Figure 12

AOD Lube Oil

FORD
1984-85 FORD, THUNDERBIRD, MUSTANG, LTD

LINCOLN-MERCURY
1984-85 MERCURY, COUGAR, CAPRI, MARQUIS, LINCOLN, MARK VII, CONTINENTAL

LIGHT TRUCK
1984-85 E & F SERIES, BRONCO

Contamination blocking the converter drainback valve could prevent proper lubrication and result in overheating and malfunction of various transmission components. Any overheating will be indicated by heat stained blue surfaces on the forward sun gear, reverse sun gear and drive shell and the planetary assembly. Refer to Figure 9.

When overhauling a low mileage AOD transmission with evidence of overheating, inspect the converter drainback cross hole passage in the pump stator support for contamination, or a spring compressed solid which would indicate a stuck open check ball. (See Figure 8, Hole No. 13.)

NOTE. **A low mileage vehicle is considered to have approximately 5,000 miles or less on the odometer.**

The converter drainback valve in Hole No. 12 of the pump stator support consists of a spring and a ball with an aluminum ball plug pressed in the passage. If contamination can be seen in the exposed cross hole passage area or if the spring is compressed solid which would indicate a stuck open check ball (can be seen when the stator support is turned over — refer to Figure 8, Hole No. 13), then follow the procedure included here for removal and cleaning of the converter drainback valve. In addition, the converter will have to be replaced.

Converter Drainback Check Valve Removal and Cleaning Procedure

1. To remove the drainback valve (check ball and spring) in Hole No. 12, remove the aluminum ball plug. This can be done by using a suitable punch inserted into the cross Hole No. 13. (See Figure 8.) Discard the aluminum ball plug and the spring. The check ball must be retained for reinstallation.

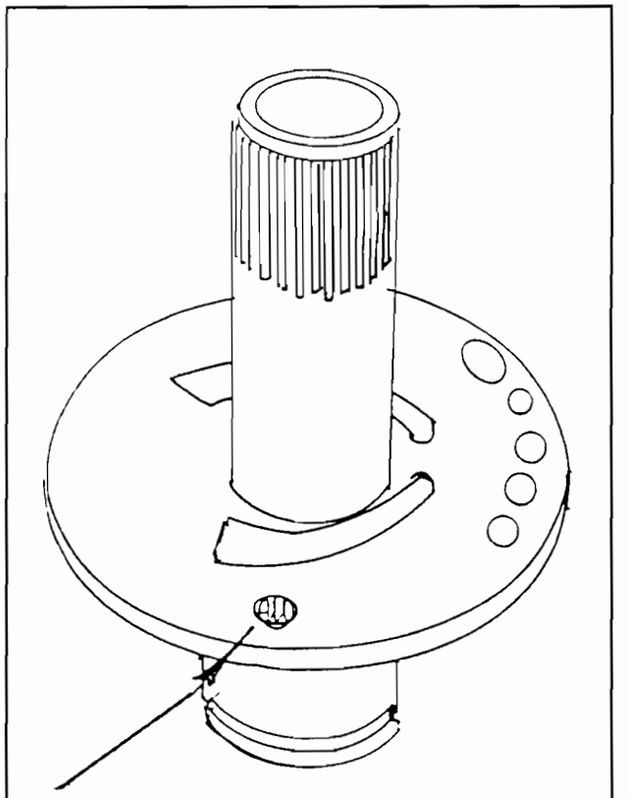


Figure 8 — Article No. 85-11-9

2. Flush and clean the passage.
3. Install the check ball and a new spring. Press in flush a new aluminum ball plug as indicated in Figure 10.
4. Reassemble the pump body and stator support assembly according to the procedure in the appropriate model year Shop Manual.
5. Install a new torque converter.

General Transmission Instructions (Typically done during any transmission overhaul)

1. Overhaul the transmission making sure to inspect all hardware for evidence of overheating. Replace parts as necessary. Follow the inspection procedure in Section 17-01 of the Shop Manual.

Continued on next page

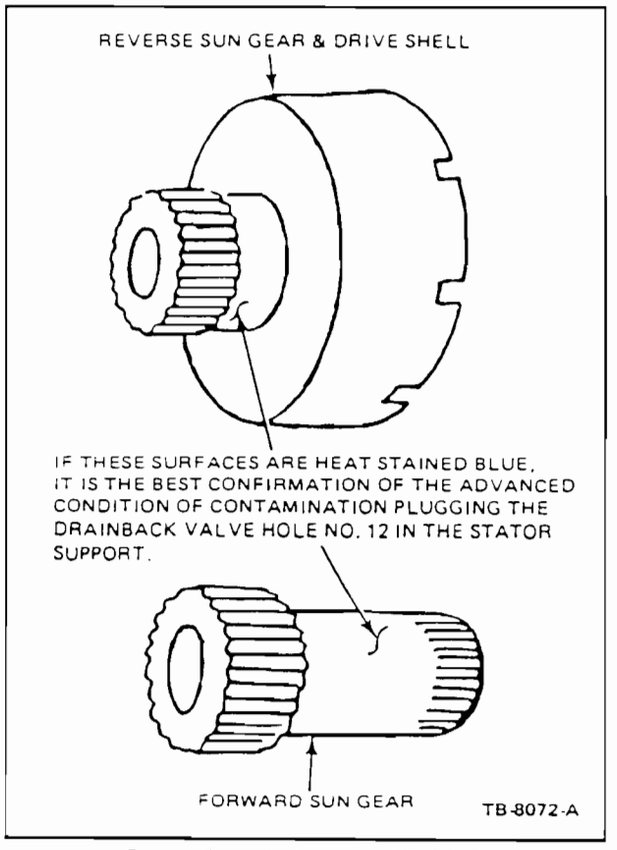


Figure 9 — Article No. 85-11-9

2. Before reassembly, thoroughly clean all transmission components including the check balls in the forward clutch cylinder, the reverse clutch piston, and the direct clutch piston. Follow the cleaning procedure in Section 17-01 of the Shop Manual.
3. The cooler lines, the intake cooler and the auxiliary cooler (if equipped) should be thoroughly FLUSHED out before reinstalling the transmission.

PART NUMBER	PART NAME
E5AZ-7A205-A	Spring & Ball — Kit

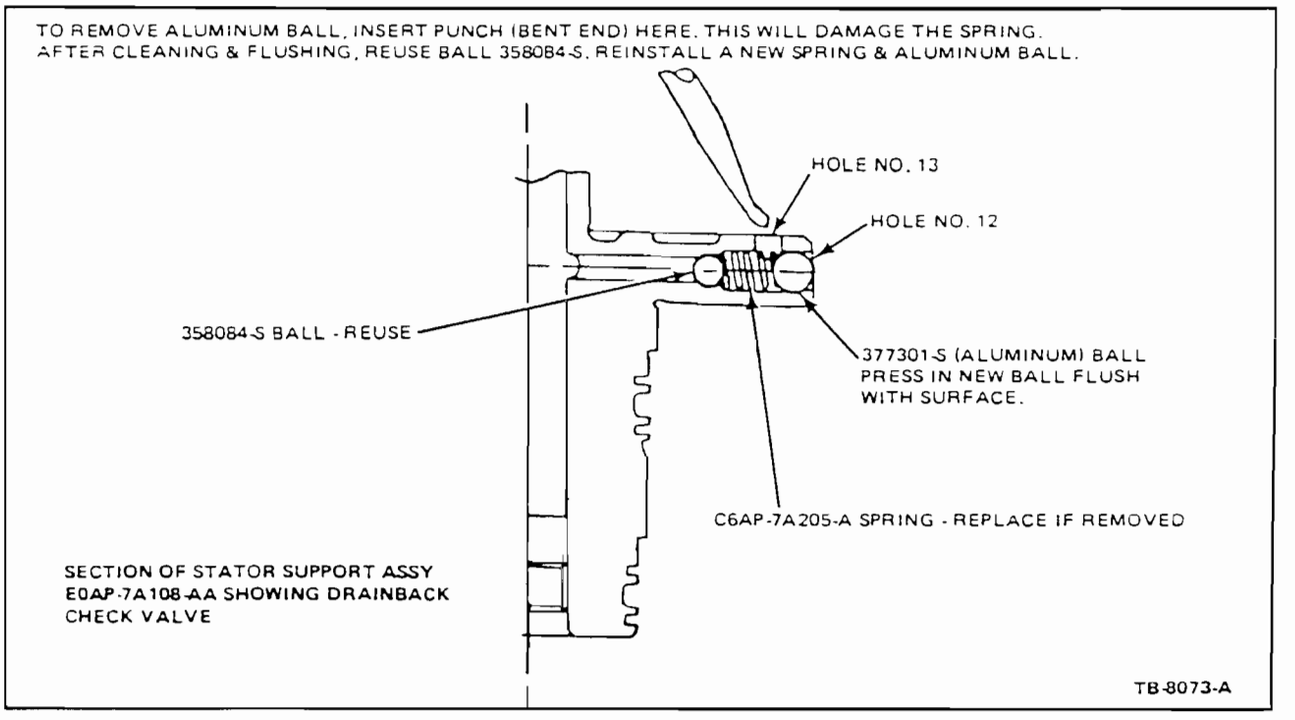


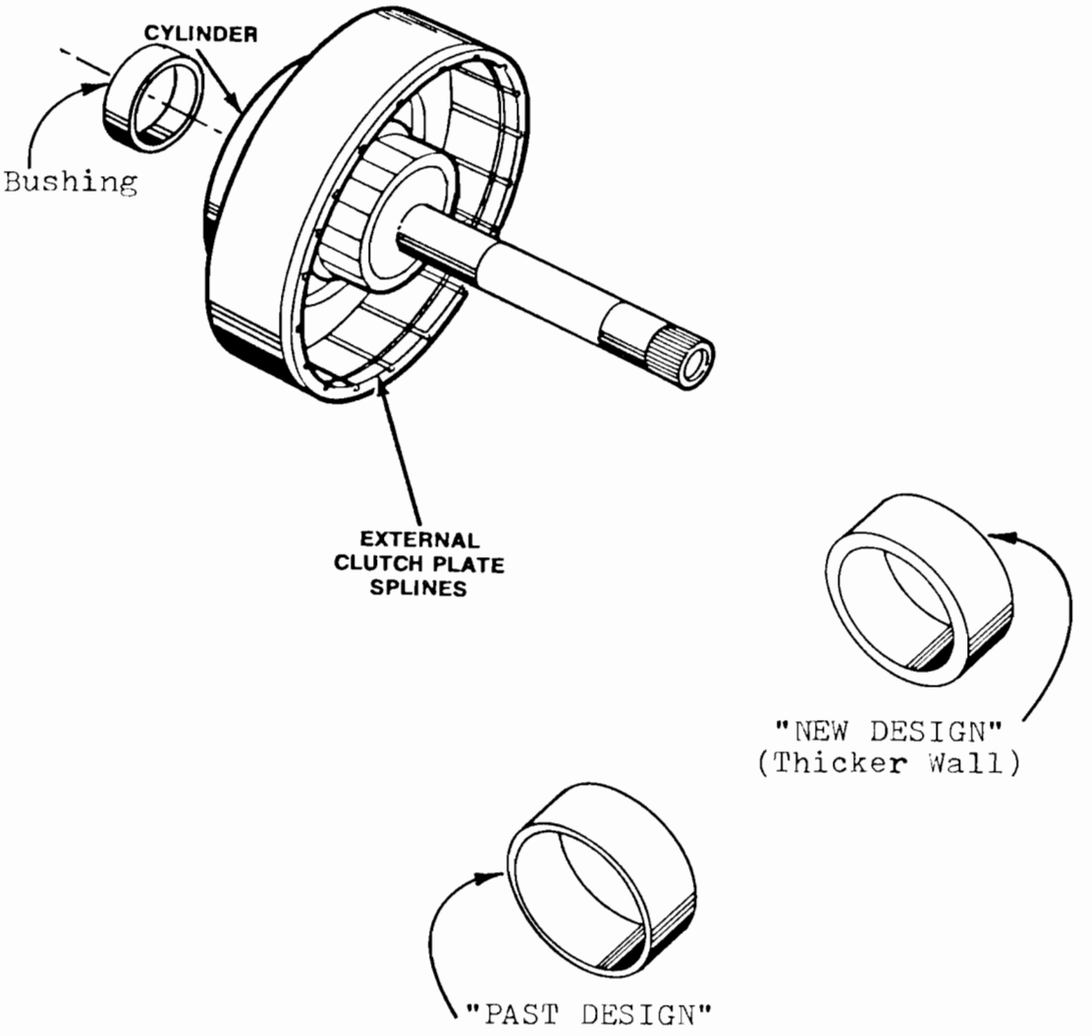
Figure 10 — Article No. 85-11-9

FORD ATX 2-3 SLIP

There is now available an aftermarket bushing for the direct drum on the ATX (Location shown below), that has a thicker wall thickness (See Below), and provides a closer tolerance where the direct drum sets on the intermediate drum.

This provides a much better support for the direct clutch sealing rings and a much improved 2-3 shift.

The new bushing is available under Aftermarket part No. 57010E.

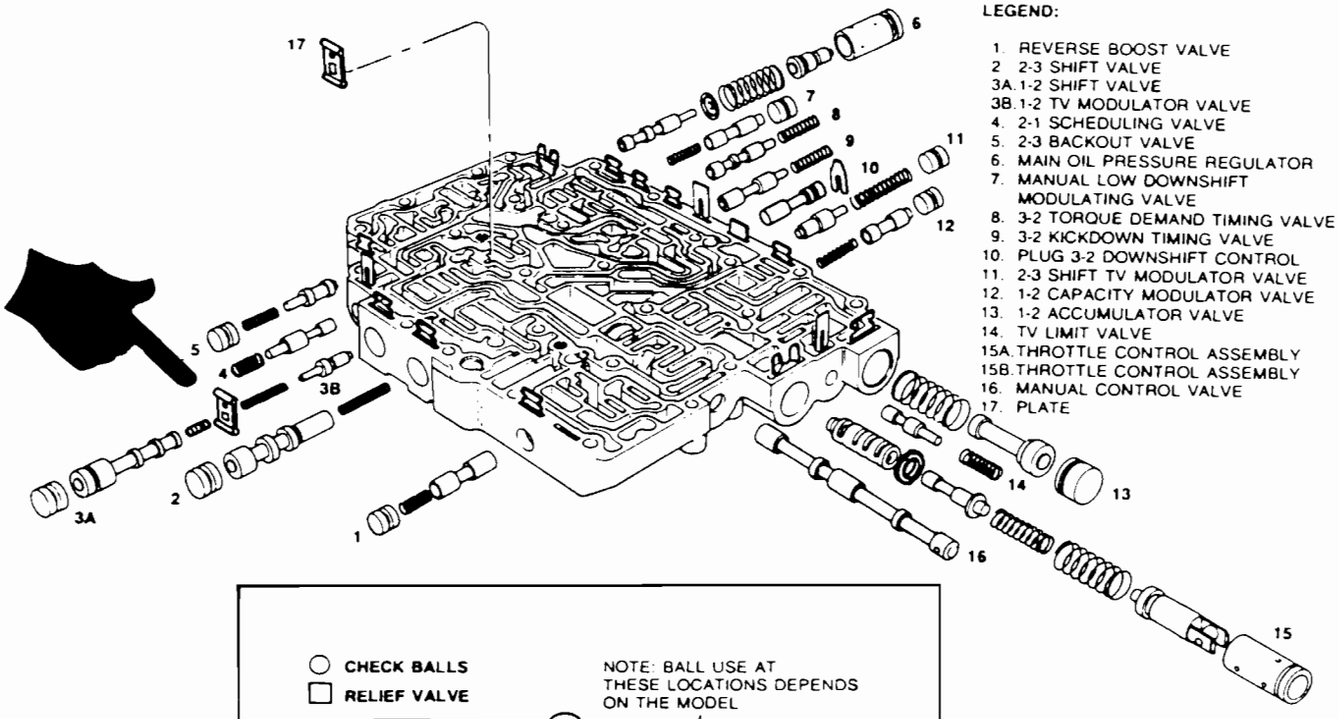


FLC-ATX

SECOND GEAR STARTS - This can be caused by a mis-positioned retainer clip (17) in the 1-2 valve line-up

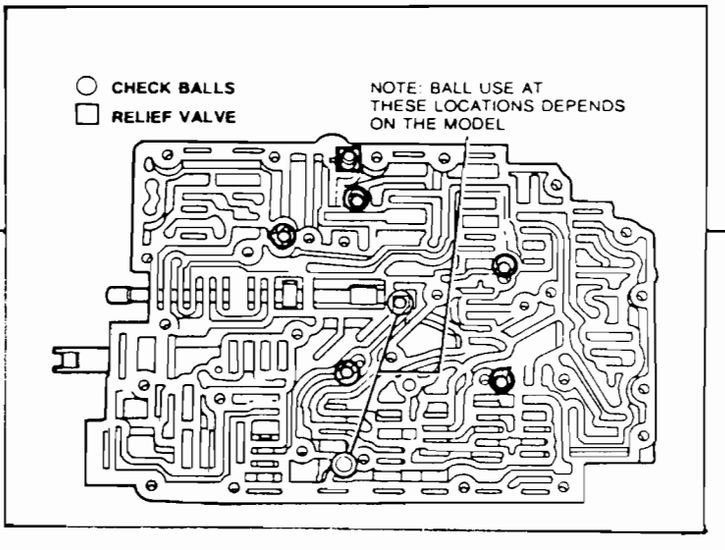
The following illustration shows the position and components for each of the valve assemblies in the valve body.

NOTE: Do not turn the throttle valve adjusting screw. The adjustment is set during manufacture and must not be altered.



LEGEND:

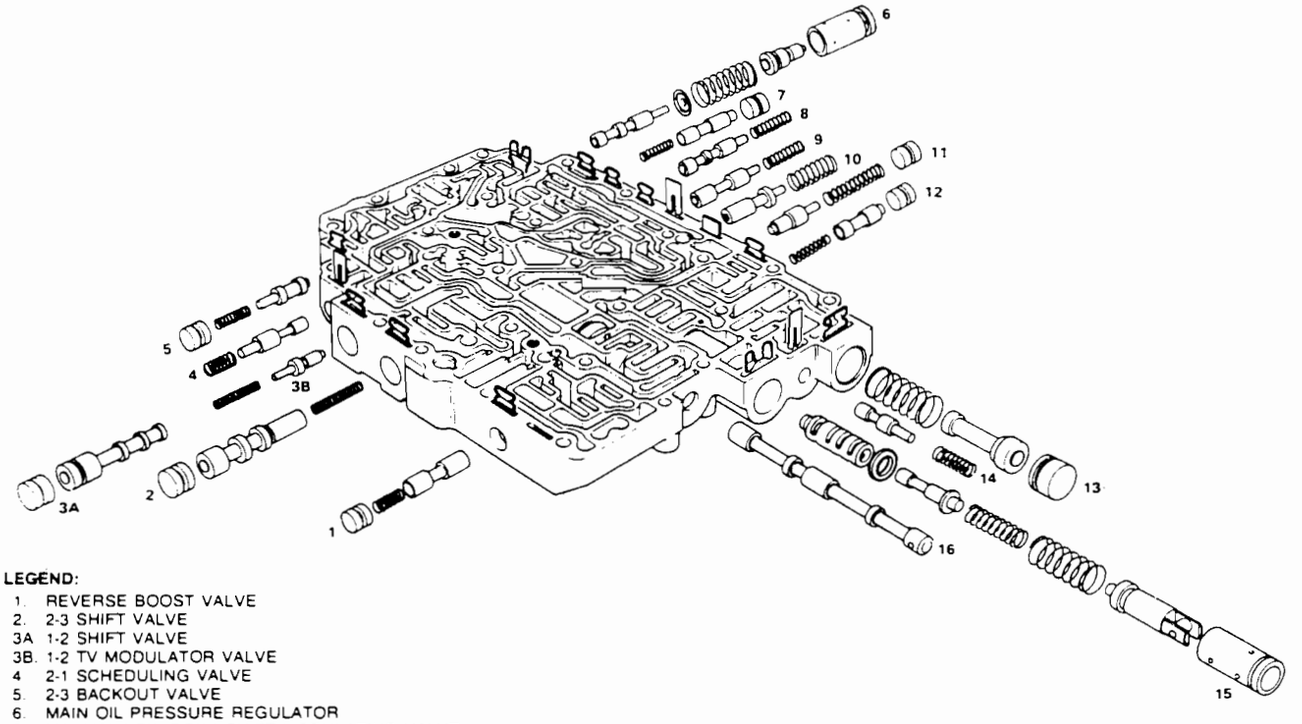
1. REVERSE BOOST VALVE
2. 2-3 SHIFT VALVE
3A. 1-2 SHIFT VALVE
3B. 1-2 TV MODULATOR VALVE
4. 2-1 SCHEDULING VALVE
5. 2-3 BACKOUT VALVE
6. MAIN OIL PRESSURE REGULATOR
7. MANUAL LOW DOWNSHIFT MODULATING VALVE
8. 3-2 TORQUE DEMAND TIMING VALVE
9. 3-2 KICKDOWN TIMING VALVE
10. PLUG 3-2 DOWNSHIFT CONTROL
11. 2-3 SHIFT TV MODULATOR VALVE
12. 1-2 CAPACITY MODULATOR VALVE
13. 1-2 ACCUMULATOR VALVE
14. TV LIMIT VALVE
15A. THROTTLE CONTROL ASSEMBLY
15B. THROTTLE CONTROL ASSEMBLY
16. MANUAL CONTROL VALVE
17. PLATE



CLC-ATX

The following illustration shows the position and components for each of the valve assemblies in the valve body.

NOTE: Do not turn the throttle valve adjusting screw. The adjustment is set during manufacture and must not be altered.



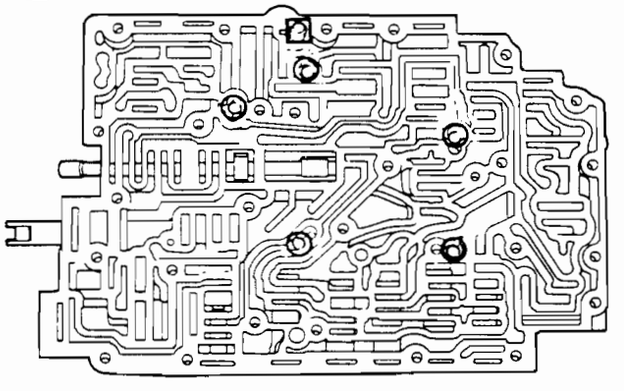
LEGEND:

1. REVERSE BOOST VALVE
2. 2-3 SHIFT VALVE
3A. 1-2 SHIFT VALVE
3B. 1-2 TV MODULATOR VALVE
4. 2-1 SCHEDULING VALVE
5. 2-3 BACKOUT VALVE
6. MAIN OIL PRESSURE REGULATOR
7. MANUAL LOW DOWNSHIFT MODULATING VALVE
8. 3-2 TORQUE DEMAND TIMING VALVE
9. 3-2 KICKDOWN TIMING VALVE
10. 3-2 CONTROL VALVE
11. 2-3 SHIFT TV MODULATOR VALVE
12. 1-2 CAPACITY MODULATOR VALVE
13. 1-2 ACCUMULATOR VALVE
14. TV LIMIT VALVE
15A. THROTTLE CONTROL ASSEMBLY
15B. THROTTLE CONTROL ASSEMBLY
16. MANUAL CONTROL VALVE

Install check balls and relief valve.

○ CHECK BALLS

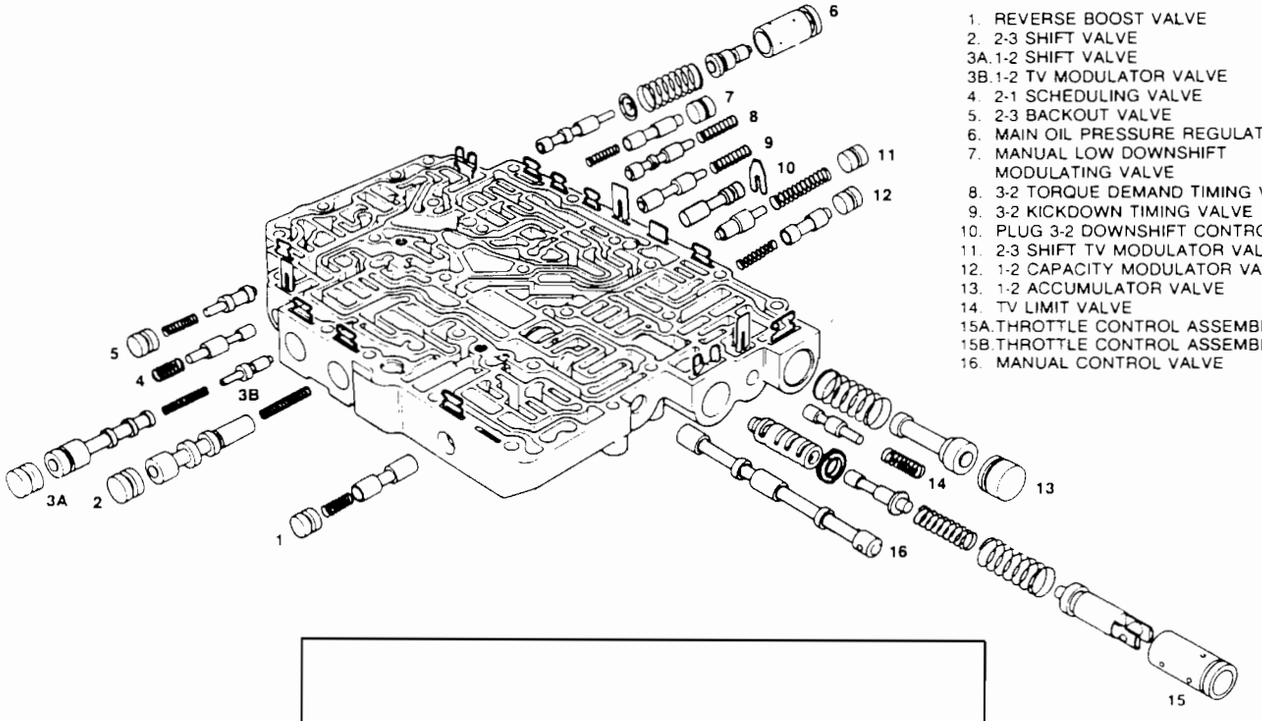
□ RELIEF VALVE



ATX

The following illustration shows the position and components for each of the valve assemblies in the valve body.

NOTE: Do not turn the throttle valve adjusting screw. The adjustment is set during manufacture and must not be altered.

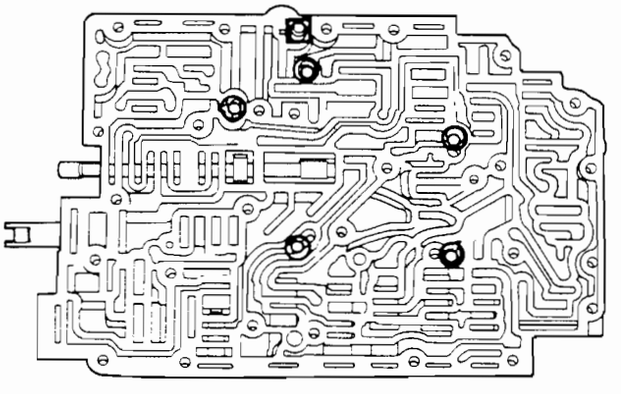


LEGEND:

1. REVERSE BOOST VALVE
2. 2-3 SHIFT VALVE
3A. 1-2 SHIFT VALVE
3B. 1-2 TV MODULATOR VALVE
4. 2-1 SCHEDULING VALVE
5. 2-3 BACKOUT VALVE
6. MAIN OIL PRESSURE REGULATOR
7. MANUAL LOW DOWNSHIFT MODULATING VALVE
8. 3-2 TORQUE DEMAND TIMING VALVE
9. 3-2 KICKDOWN TIMING VALVE
10. PLUG 3-2 DOWNSHIFT CONTROL
11. 2-3 SHIFT TV MODULATOR VALVE
12. 1-2 CAPACITY MODULATOR VALVE
13. 1-2 ACCUMULATOR VALVE
14. TV LIMIT VALVE
15A. THROTTLE CONTROL ASSEMBLY
15B. THROTTLE CONTROL ASSEMBLY
16. MANUAL CONTROL VALVE

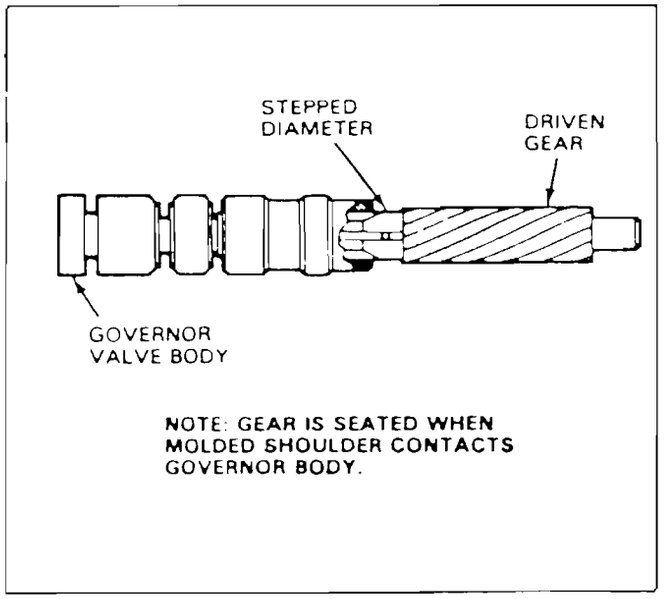
Install check balls and relief valve.

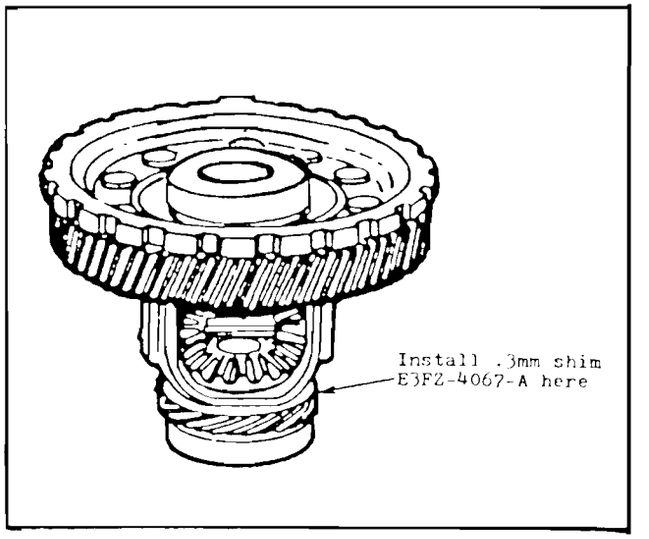
○ CHECK BALLS
□ RELIEF VALVE



ATX - SPEEDOMETER DRIVE/DRIVEN AND GOVERNOR GEAR DAMAGE WITH BALL BEARING DIFFERENTIAL

Loss of speedometer, speed control, and/or transaxle governor operation or function may be caused from the speedometer drive gear wearing against the differential housing causing gear wear and looseness. This condition will cause speedometer driven gear wear, and a "Hourglass" wear pattern of the governor gear. To service this condition replace the speedometer drive gear on the differential housing (OEM Part No E3FZ-17285-B). Prior to installing the drive gear, install a .3mm shim (E3FZ-4067-A) between the differential and the speedometer drive gear to eliminate repeat repairs. Replace speedometer driven gear and governor gear as required. Refer to ATSG Techtran Manual, Page 92, for differential removal without removing entire transaxle.





PART NUMBER	PART NAME
E3FZ-17285-B	Speedometer Drive Gear
E3FZ-4067-A	Shim
E2FZ 7F419-A	ATX Governor Drive Gear

CONVERTER REBUILDERS
1987-88 FORD ATX FLC

1987-88 Tempo Topaz only use a converter adapter sleeve, Part Number E7FZ-7A878-A. This sleeve has two internal splines and one external spline. (See Figure 1) Since this is a slip on adapter, it can stay engaged in the torque converter turbine hub upon removal of the converter from the transmission. If this adapter IS NOT reinstalled on the transmission (turbine and intermediate shafts), a NO DRIVE CONDITION WILL BE THE COMPLAINT AFTER INSTALLATION. (See Figure 2)

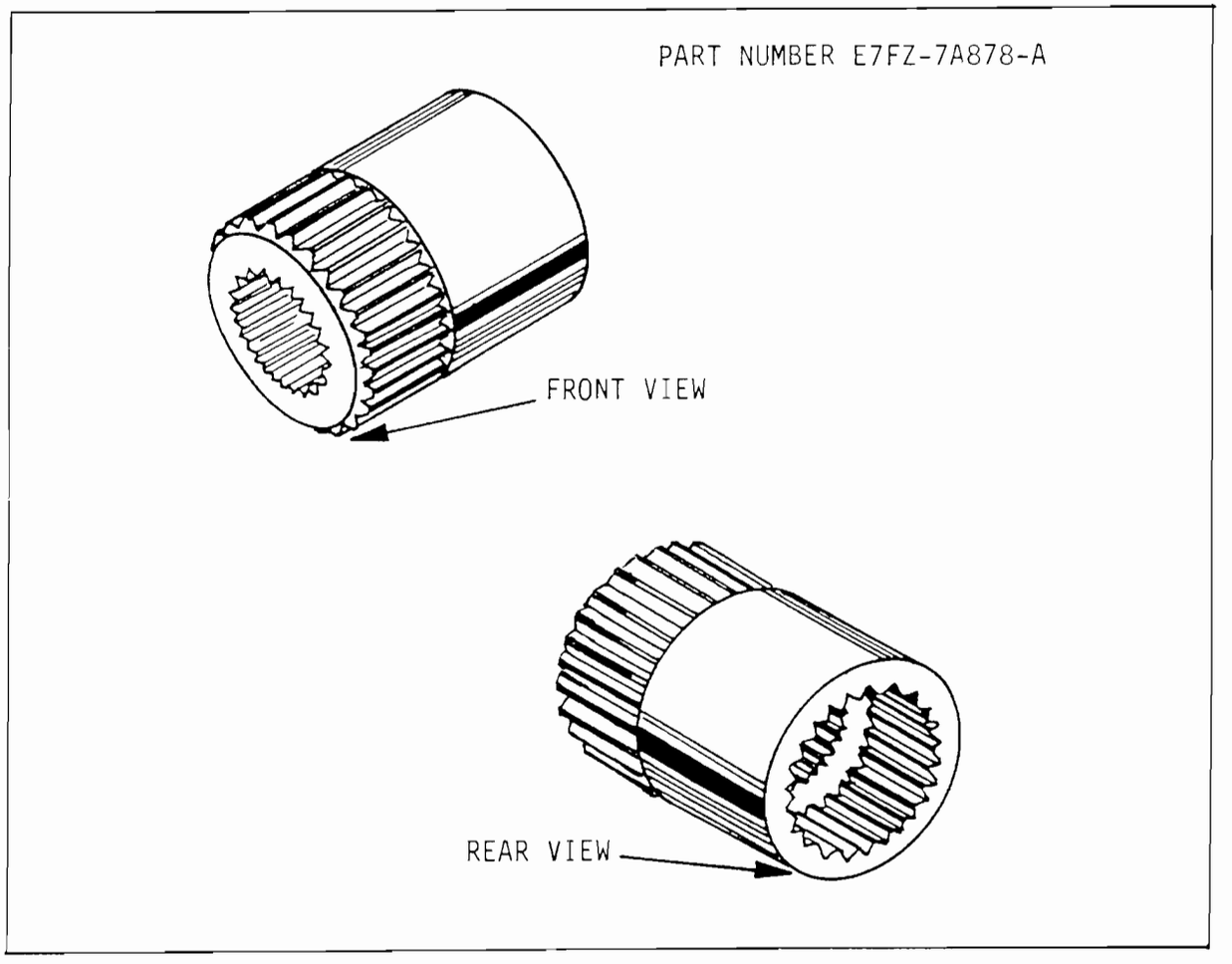


Figure 1

Remove Converter Turbine Sleeve.

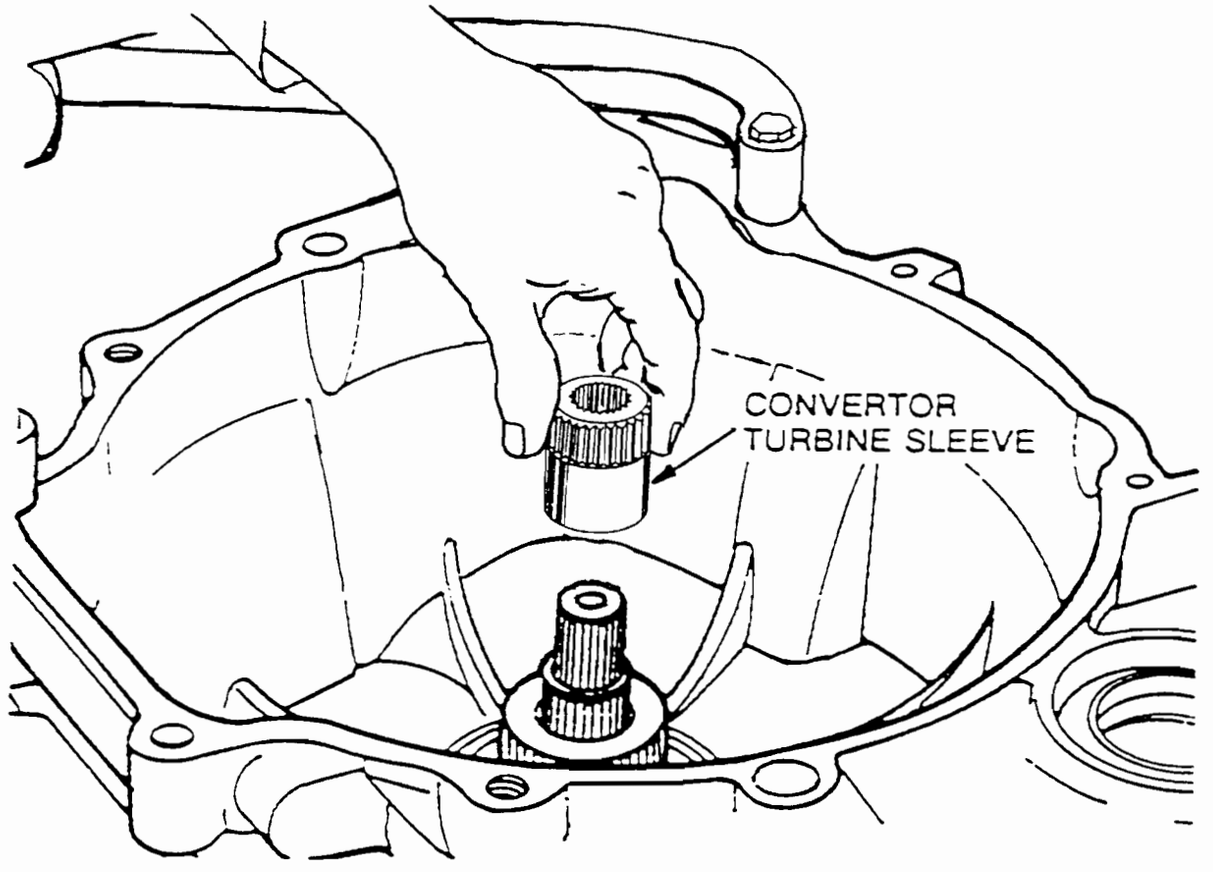


Figure 2

ATX

TRANSMISSION – AUTOMATIC TRANSAXLE – SENSITIVE 3-2 DOWNSHIFT, 3-2, 2-3 "HUNTING"

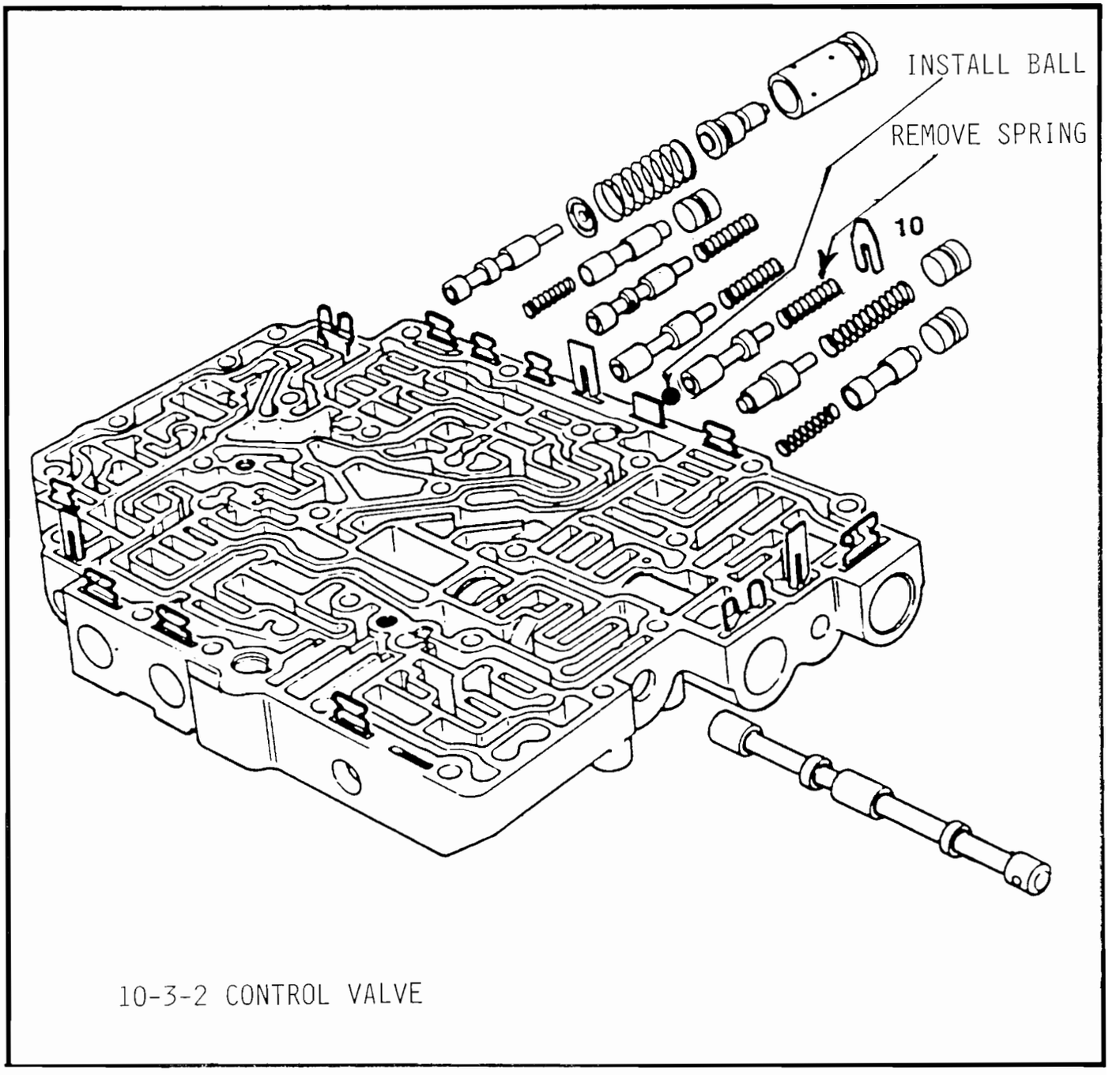
This article revises, supersedes and cancels the service procedure in TSB 83-19-11 for customer concerns of 3-2 torque demand sensitivity and 3-2, 2-3 shift "hunting".

Main control assembly (7A100) removal, disassembly/assembly, as well as location of 3-2 Control Valve with procedural steps for the removal of the individual valve components are described in Section 17-25 of the Tempo/Topaz Car Shop Manual.

Revised assembly of the 3-2 control valve is as follows:

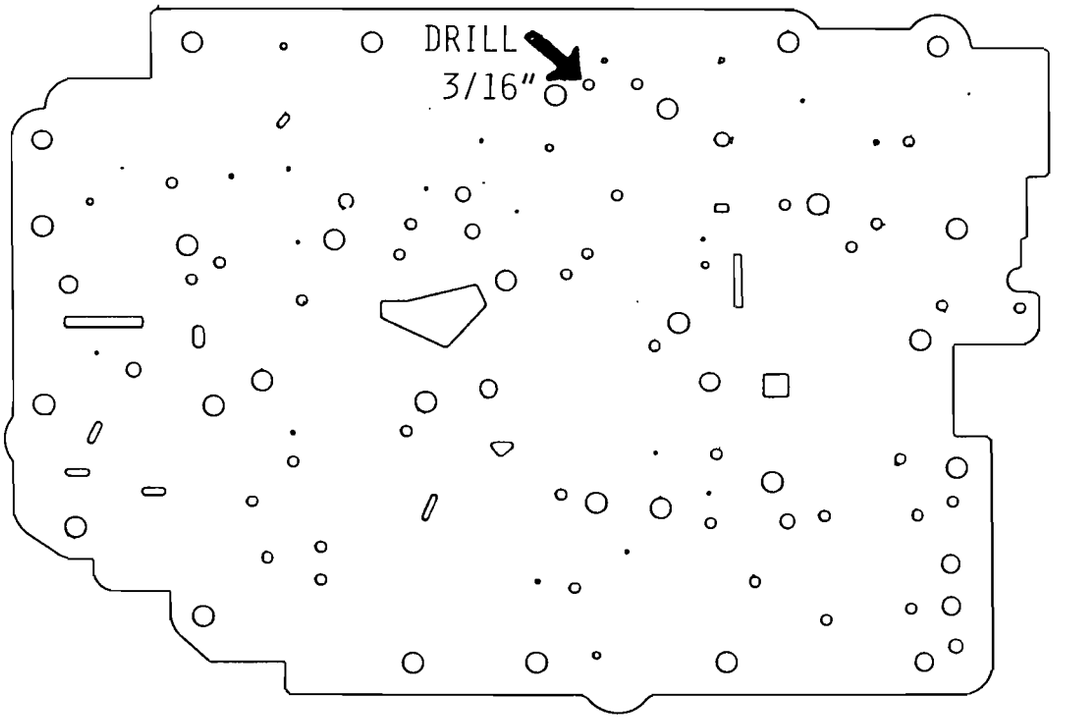
1. Remove main control assembly and disassemble.
2. Locate and remove 3-2 control valve components (Ref: Car Shop Manual, Section 17-25, Page 92).
3. Discard spring (Yellow or Purple).
4. Install check ball E0AZ-7E195-B at bottom of bore.
5. Replace 3-2 control valve with main control (DO NOT INSTALL SPRING) and install retainer.
6. Assemble and install main control assembly.

PART NUMBER	PART NAME
E0AZ-7E195 B	Check Ball



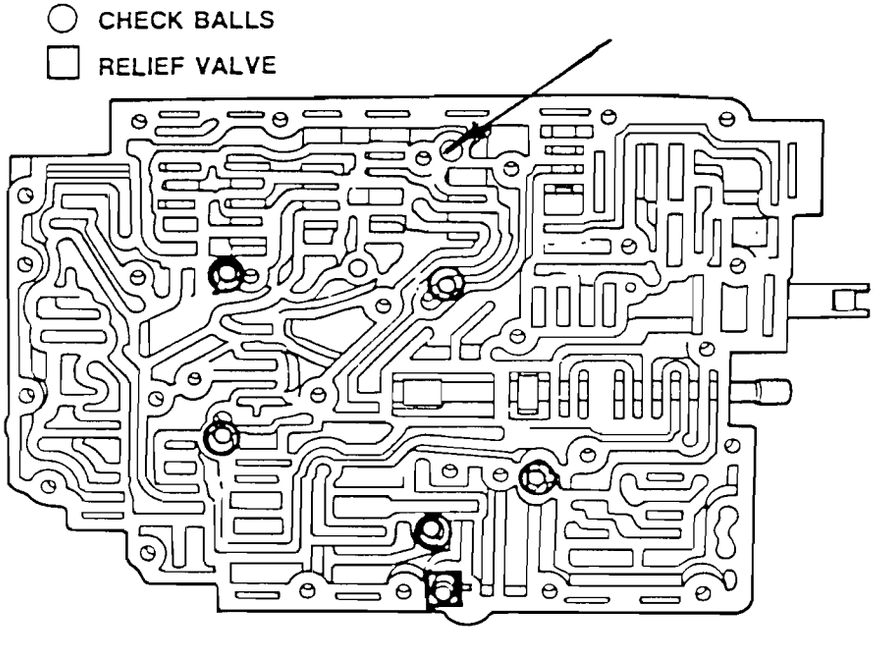
10-3-2 CONTROL VALVE

ATX



Assembly

check balls and relief valve.



TRANSMISSION — A4LD — 2.3L, 2.9L, 3.0L — ENGINE RPM INCREASES ON DOWNSHIFT — TRANSMISSIONS BUILT BETWEEN 07/30/86 AND 10/01/86

FORD 1987 MUSTANG

LIGHT TRUCK 1986-87 RANGER, BRONCO II, AEROSTAR

ISSUE: An increase of approximately 1000 engine RPM when downshifting to 2nd gear in Drive or Overdrive during a 3-2 or 4-2 downshift may be caused by a mispositioned channel in the #214 (3-2 kickdown timing valve) bore of the main control casting (see Figure 29). This condition usually occurs within a narrow 3 mph/5 km/h range at a normal speed of 38 mph/61 km/h depending upon axle ratio and tire size.

ACTION: To correct this, install a new service valve, E7TZ-7D054-A, using the following service procedure.

- Locate bore #214 using the appropriate Shop Manual.
- Remove separator plate, gasket, retainer, spring and valve from bore #214. Discard the original valve, but save the other parts for reassembly.
- Install new service valve, E7TZ-7D054-A, and reinstall spring, retainer, gasket and separator plate.
- Reinstall main control using the appropriate Shop Manual.

NOTE: **If the main control does not match the qualifying identification, the above repair must not be made even if a similar concern is reported. Additional concerns may occur if this repair is made to other than qualifying transmissions.**

1. Confirm that increase in engine RPM occurs on downshift by road testing the vehicle.
2. If the transmission build date falls within the July 30-October 1, 1986 time period, remove oil pan to determine casting supplier code, casting date and cavity number (Figure 29).
3. If the main control has the matching identification specified in Figure 29 (Supplier Code 1-7010-D, Cavity No. 1, Build Date 30th Week '86 through 39th Week '86 and Part No. P86GT-7A101-AAR), remove main control using the procedure in Section 17 of the appropriate Shop Manual and repair as follows:
4. Drive vehicle to determine if repair has corrected the concern.

PART NUMBER	PART NAME
E7TZ-7D054-A	Service Valve

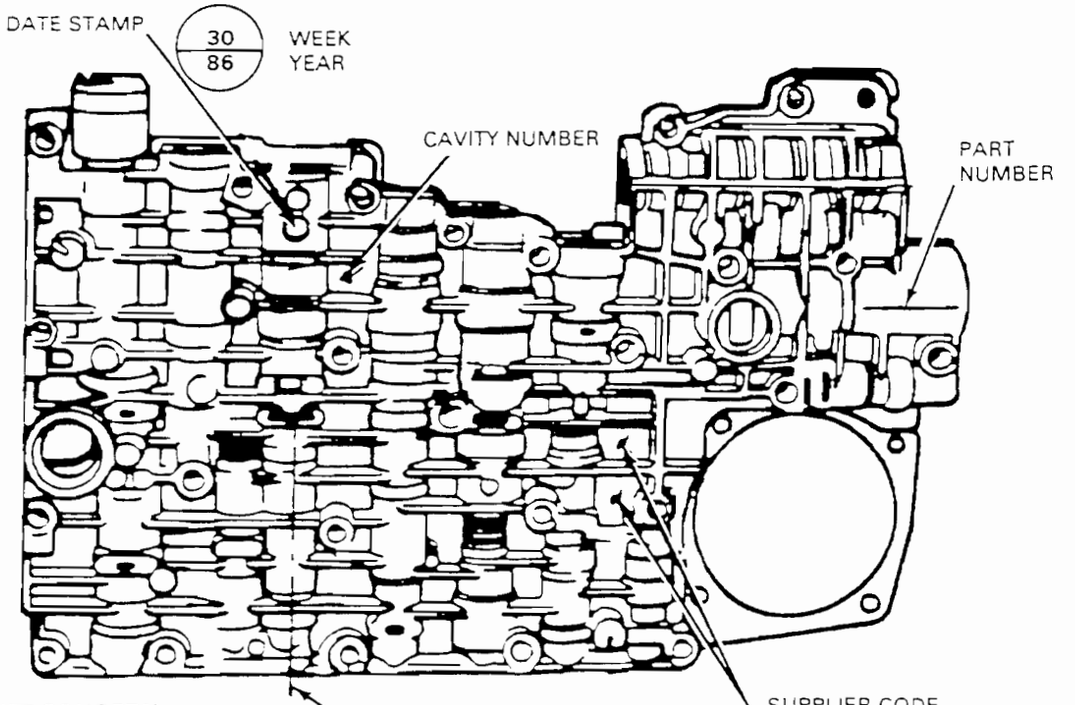

DATE STAMP
30
86
WEEK
YEAR
CAVITY NUMBER
PART
NUMBER
SUPPLIER CODE
BORE 214
3-2 DOWNSHIFT CONCERN
• SUPPLIER CODE: 1-7010-D
• CAVITY NUMBER: 1
• DATE: 30/86 THRU 39/86
• PART NUMBER: P86GT-7A101-AAR

Figure 29

FORD

TRANSMISSION — AUTOMATIC — A4LD — ENGINE STALLS WHEN SHIFTING INTO FORWARD OR REVERSE

A4LD

LIGHT TRUCK
1985 RANGER, BRONCO II

An engine stall condition may be experienced in the subject vehicles equipped with A4LD automatic overdrive transmissions. This condition occurs after engine start up and when shifting the transmission into any forward gear or reverse.

A possible cause of this condition is a broken converter clutch shuttle valve spring. This will allow the shuttle valve to remain in the bottom on its bore thereby continuously applying the piston plate clutch in the torque converter. This provides a mechanical connection between the engine and wheels thus resulting in engine stall when the transmission is engaged.

Prior to taking any action, verify that engine speeds are set to specification as shown on the Engine Emission Decal.

Disassemble the valve body from the transmission assembly and remove the separator plate. Follow the valve body removal procedure in Section 17-08 of the 1985 Ranger/Bronco II Shop Manual.

Refer to the valve body identification illustration in Section 17-08 of the Shop Manual or Figure 21, for the shuttle valve bore location (bore reference number 200). Locate the converter clutch shuttle valve spring. See Figure 21.

Remove the retainer plate, override solenoid, plug, valve and spring. Remove any foreign material from the bore. Do not dislodge the shuttle balls.

Install a new shuttle valve spring (part number E5TZ-7L490-A, color code dark green). Reinstall the other components in reverse order. Make sure the shuttle valve moves freely.

Install the separator plate and assemble the valve body into the transmission assembly per the procedure in Section 17-08 of the Shop Manual.

PART NUMBER	PART NAME
E5TZ-7L490-A	Spring — Shuttle Valve

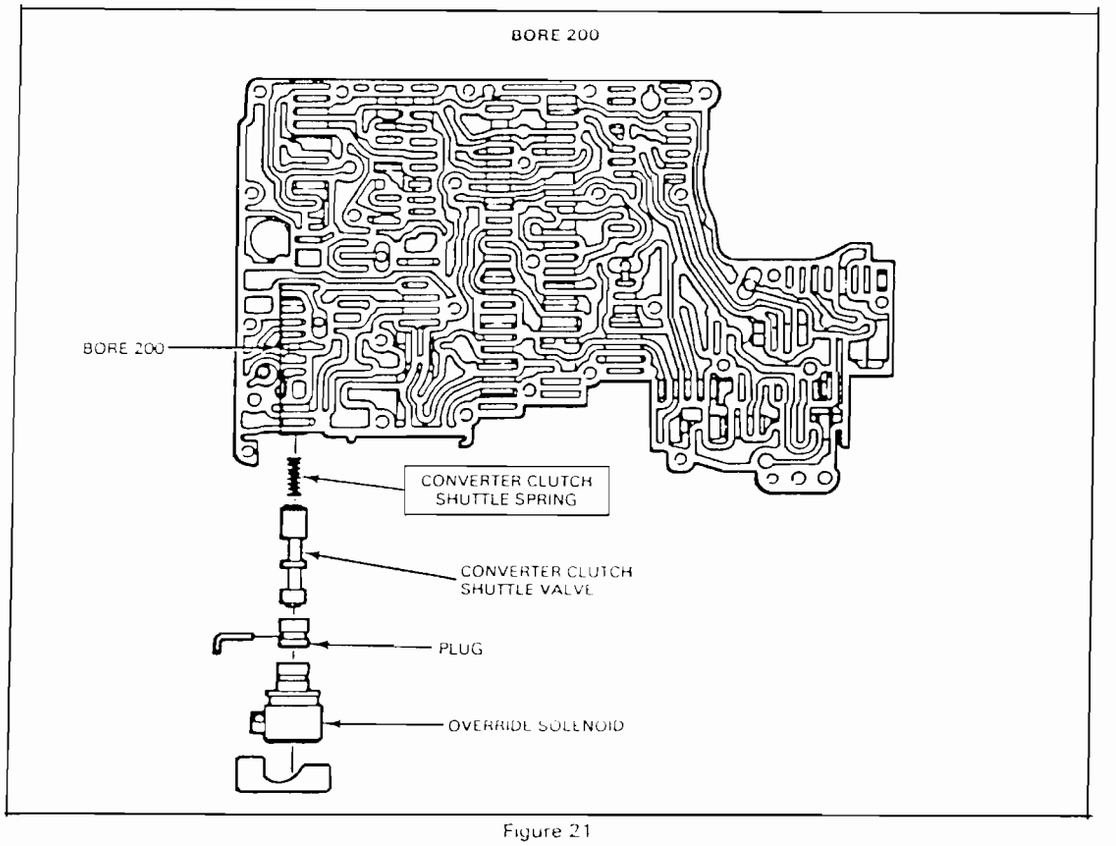
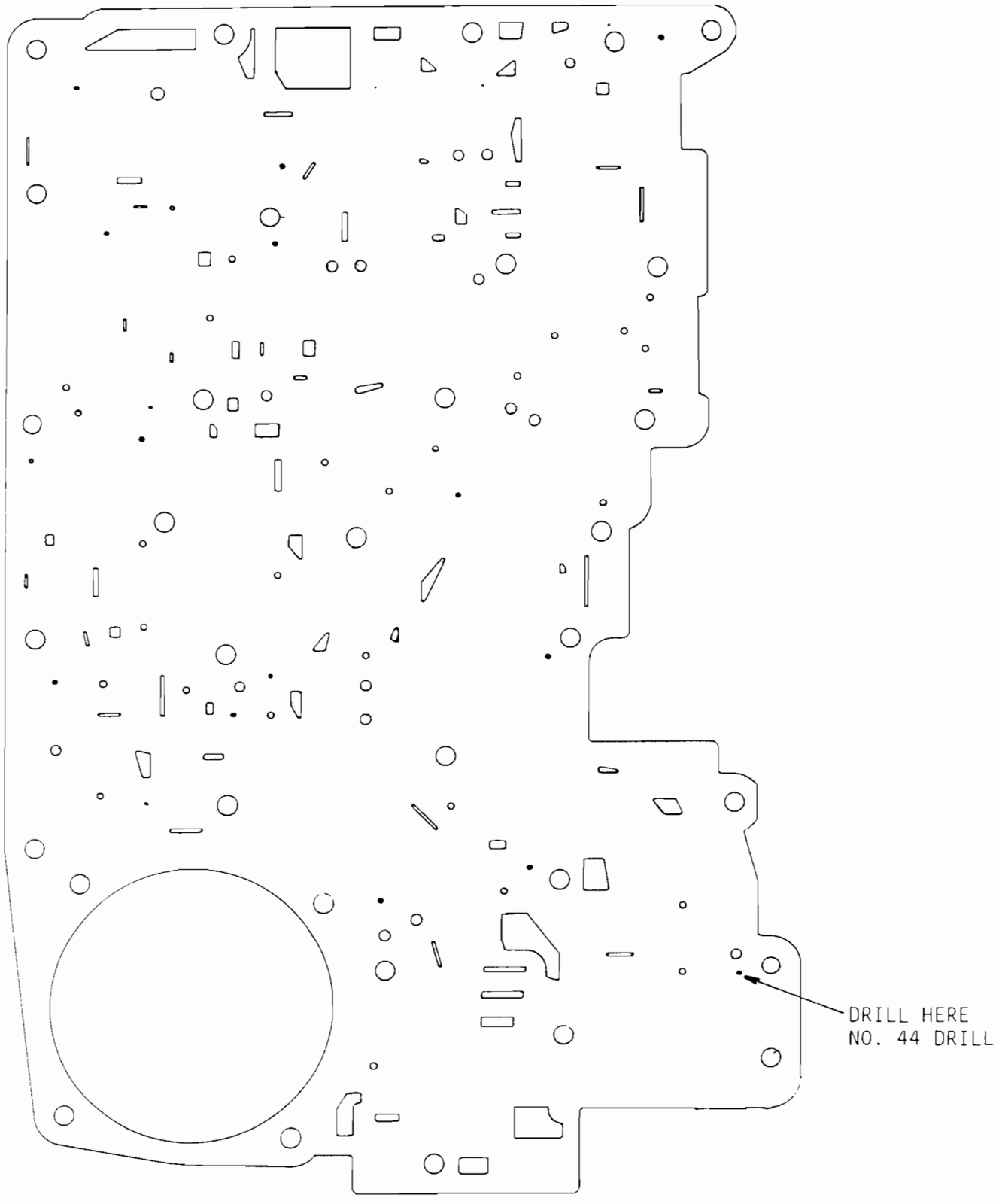
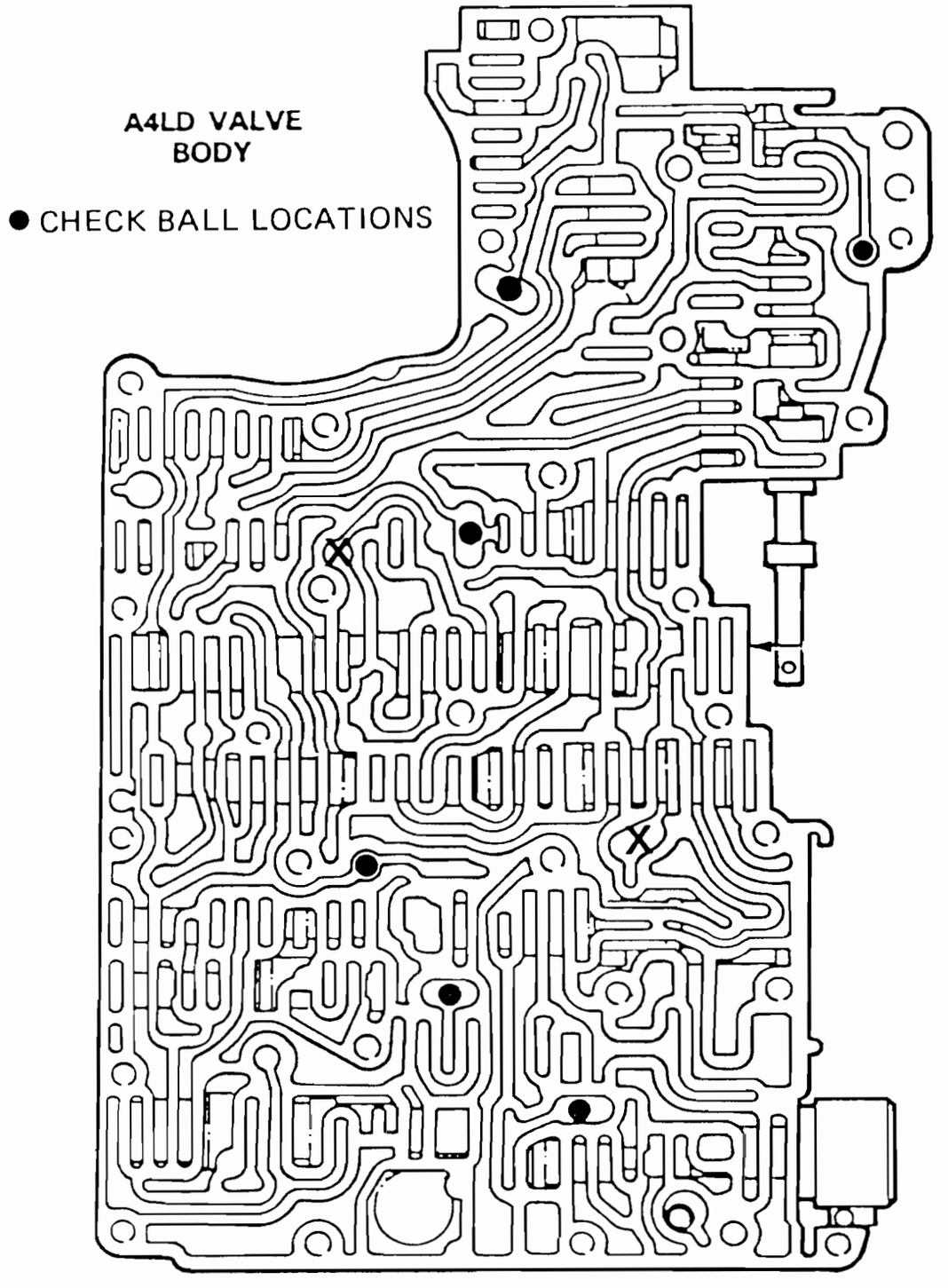


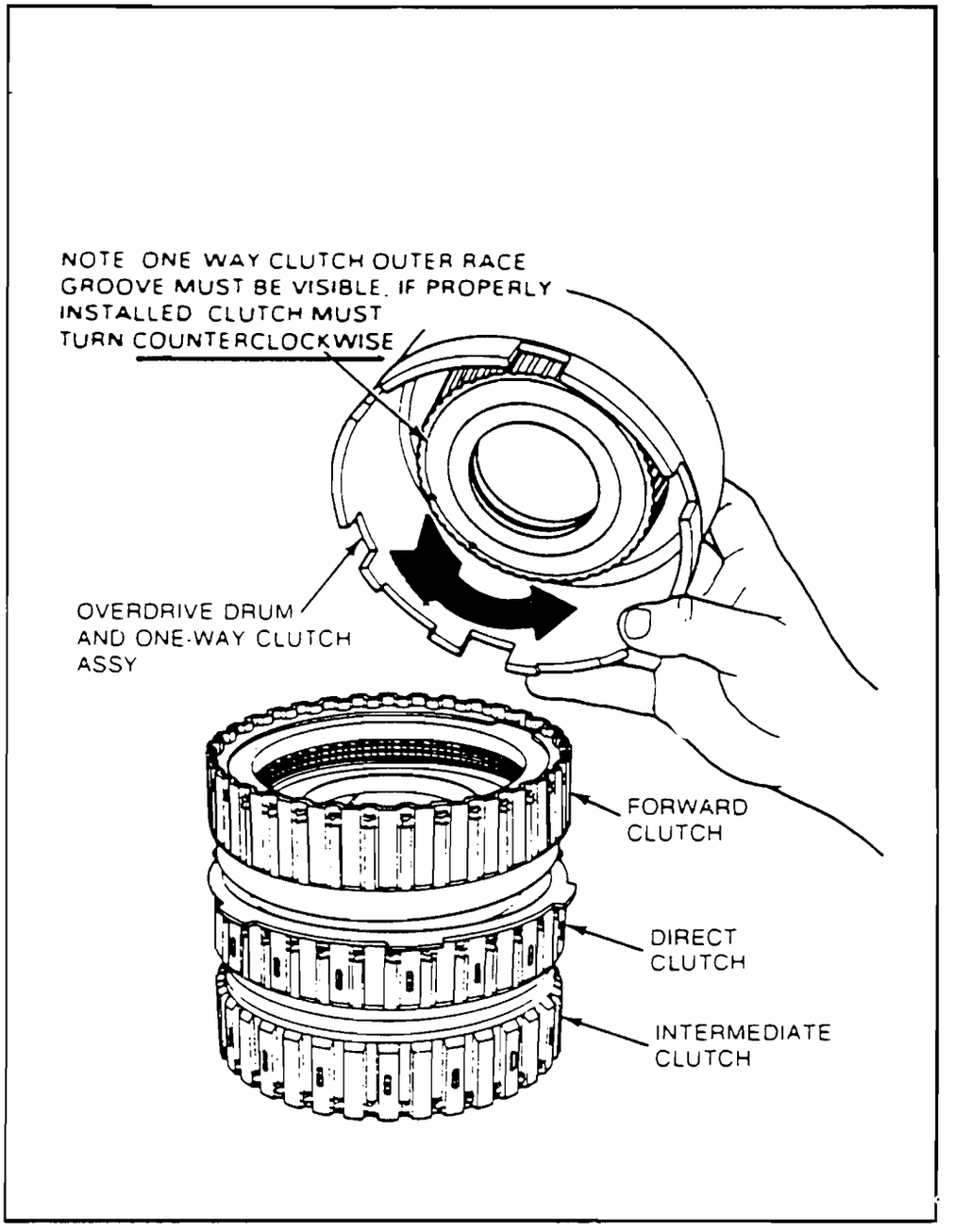
Figure 21

A4LD - DELAYED REVERSE




A4LD VALVE
BODY
● CHECK BALL LOCATIONS

AXOD


NOTE ONE WAY CLUTCH OUTER RACE GROOVE MUST BE VISIBLE. IF PROPERLY INSTALLED CLUTCH MUST TURN COUNTERCLOCKWISE
OVERDRIVE DRUM AND ONE-WAY CLUTCH ASSY
FORWARD CLUTCH
DIRECT CLUTCH
INTERMEDIATE CLUTCH

Ford AXOD

TRANSMISSION – AUTOMATIC — AXOD — MAIN CONTROL ASSEMBLY — LOOSE VALVE RETAINER CLIPS — VEHICLES BUILT PRIOR TO 4/18/86

FORD
1986 TAURUS

LINCOLN-MERCURY
1986 SABLE

Loss of transmission forward engagement and/or a no downshift condition may be caused by the valve plug retaining clips coming loose and allowing the valves to move out of position. For complaints of this type, use the following procedure to install new valve plug retainers in the nine locations shown in Figure 18.

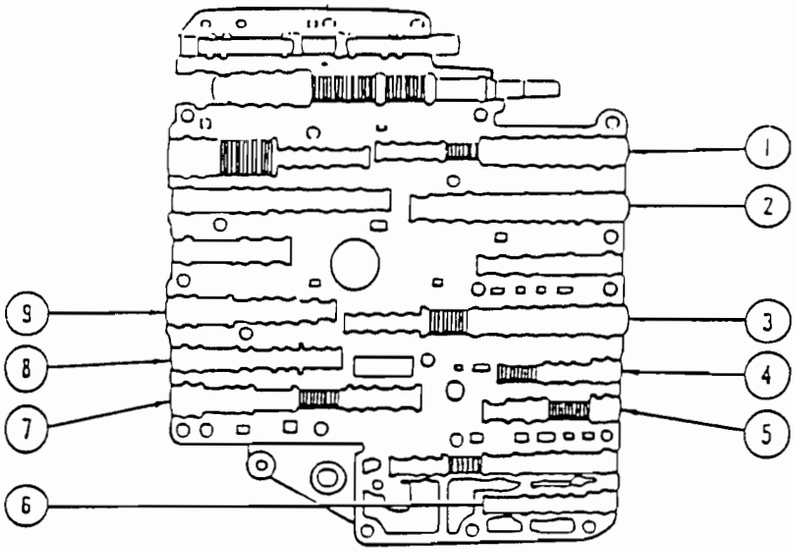
NOTE: Whenever the main control valve assembly is removed for service, check to make sure new valve plug retainers have been installed. If not, install the valve plug retainers at this time.

1. Remove the two Torx® bolts retaining the separator plate.
2. Remove separator plate and gasket.

   NOTE: Check balls may fall out from excessive valve body movement. Refer to Taurus/Sable Shop Manual, Section 17-15-94 for proper location.

3. Place a thumb against the valve plug to maintain bore alignment.
4. Using a pic, pry the retainer off the plug and push on the new retainer. Repeat for all nine retainers.
5. Verify check ball locations.
6. Install separator plate and install a new gasket.
7. Install separator plate guide pins, T86P-70100-A or equivalent. (Refer to Taurus/Sable Shop Manual, Section 17-15-96 for guide pin locations).
8. Install Torx® bolts and tighten to 9-12 Nm (7-9 lbs.-ft.).

PART NUMBER	PART NAME
E6DZ-7G007-A	Valve Plug Retainer



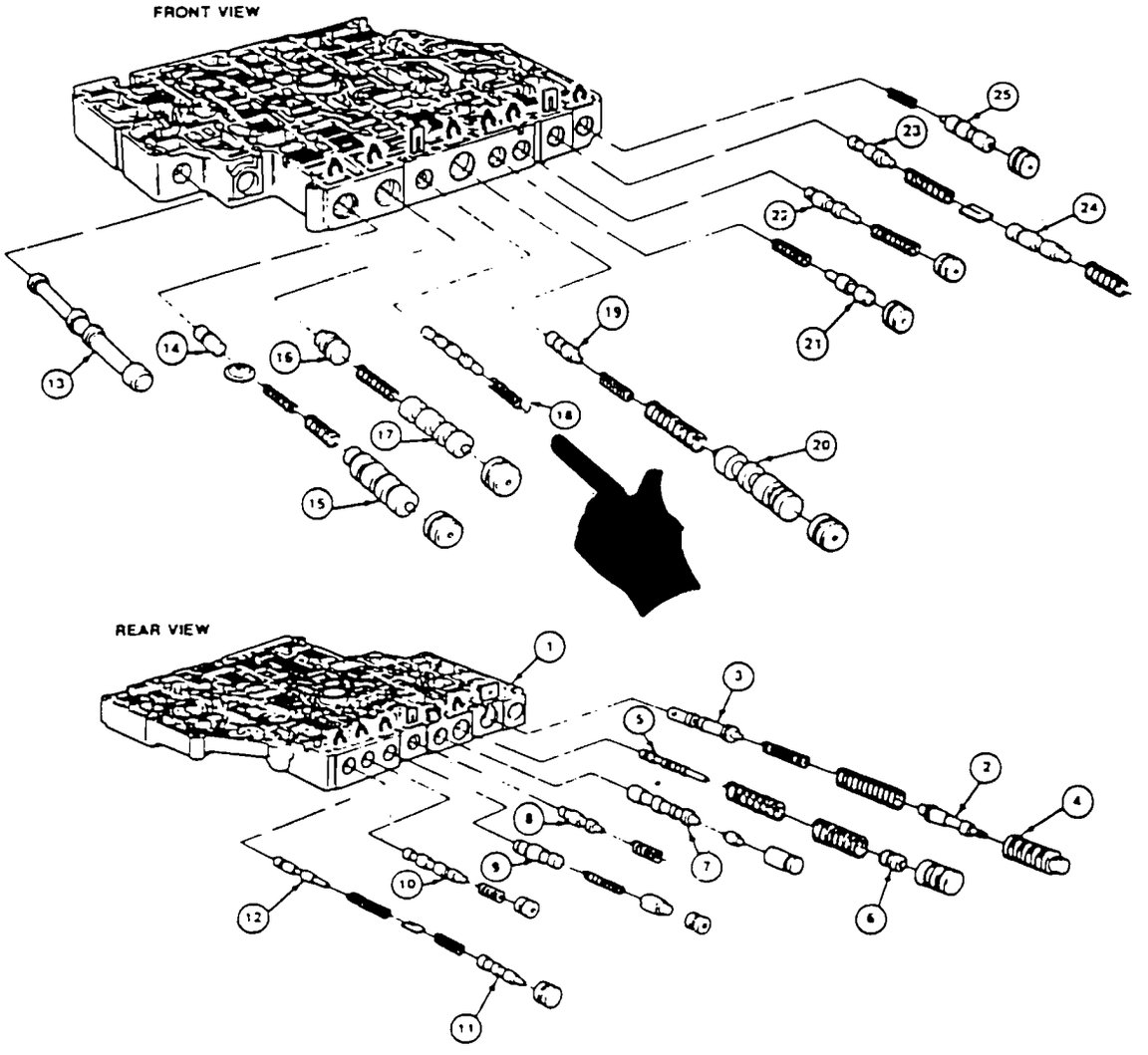
VALVE IDENTIFICATION

1. 2-3 SHIFT VALVE
2. 1-2 SHIFT VALVE
3. 3-4 SHIFT VALVE
4. 2-4 INHIBIT VALVE
5. 3-2 CONTROL VALVE
6. 2-3 SERVO REGULATOR VALVE
7. TV/LINE MODULATOR VALVE
8. BACKOUT VALVE
9. ACCUMULATOR REGULATOR VALVE


EARLY


LATE

AXOD



1	MANUAL VALVE	14	TV LINE MODULATOR VALVE
2 & 3	2-3 SHIFT AND 2-3 TV MODULATOR VALVES	15	4-3 SCHEDULING VALVE
4 & 5	1-2 SHIFT AND 1-2 THROTTLE DELAY VALVES	16	BACKOUT VALVE
6	2-1 SCHEDULING VALVE	17	ACCUMULATOR REGULATOR
7 & 8	3-4 SHIFT AND 3-4 TV MODULATOR VALVES	18	CONVERTER REGULATOR VALVE
9	2-4 INHIBIT VALVE	19	CONVERTER CLUTCH CONTROL VALVE
10	3-2 CONTROL VALVE	20	MAIN REGULATOR BOOST VALVE
11	TV LIMIT VALVE	21	MAIN REGULATOR VALVE
12	N-D ENGAGEMENT VALVE	22	THROTTLE VALVE (TV)
13	2-3 SERVO REGULATOR VALVE	23	THROTTLE PLUNGER

AXOD CHECK BALL LOCATIONS

Valve Body Ball Checks

The following information describes the function of the valve body ball checks. The location of the different ball checks is shown in figure 1.

Ball Checks:

B1: Forces reverse clutch feed oil through the A orifice and thermal element while allowing the clutch to exhaust without restriction.

B2: Separates reverse clutch and forward clutch circuits feeding the forward clutch.

B3: Separates manual low relief and TVLM passages to the main regulator boost valve.

B4: Separates manual low relief and direct clutch circuits to the direct clutch.

B5: Connects low/intermediate servo release and direct clutch passages during pressurization of these circuits while forcing low/intermediate servo release to be exhausted through the L orifice and the 3-2 control valve.

B6: (2 required) Forces forward clutch feed oil through the K orifice for the 4-3 downshift while bypassing the orifice for a drive engagement.

B7: Allows forward clutch to exhaust freely on the 3-4 upshift but forces forward clutch apply through the K orifice for the 4-3 downshift.

B8: Separates low and kickdown circuits to the 2-3 shift valve.

B9: Forces the direct clutch to exhaust through the M orifice on a 3-2 downshift while bypassing the orifice for the 3-1 downshift.

B10: Exhausts low/intermediate servo apply directly through the manual valve on a drive-neutral or a drive-reverse engagement, bypassing the B orifice.

B11: Not used.

B12: Not used.

B13: Forces direct clutch feed through the E and F orifices bypassing the M orifice.

B14: Forces overdrive servo apply feed through the H and G orifices while bypassing the orifices for exhaust.

B15: Applies forward clutch through the PP orifice as well as the K orifice for a manual 3 pull in.

B16: Separates the low and backout circuits to the backout valve.

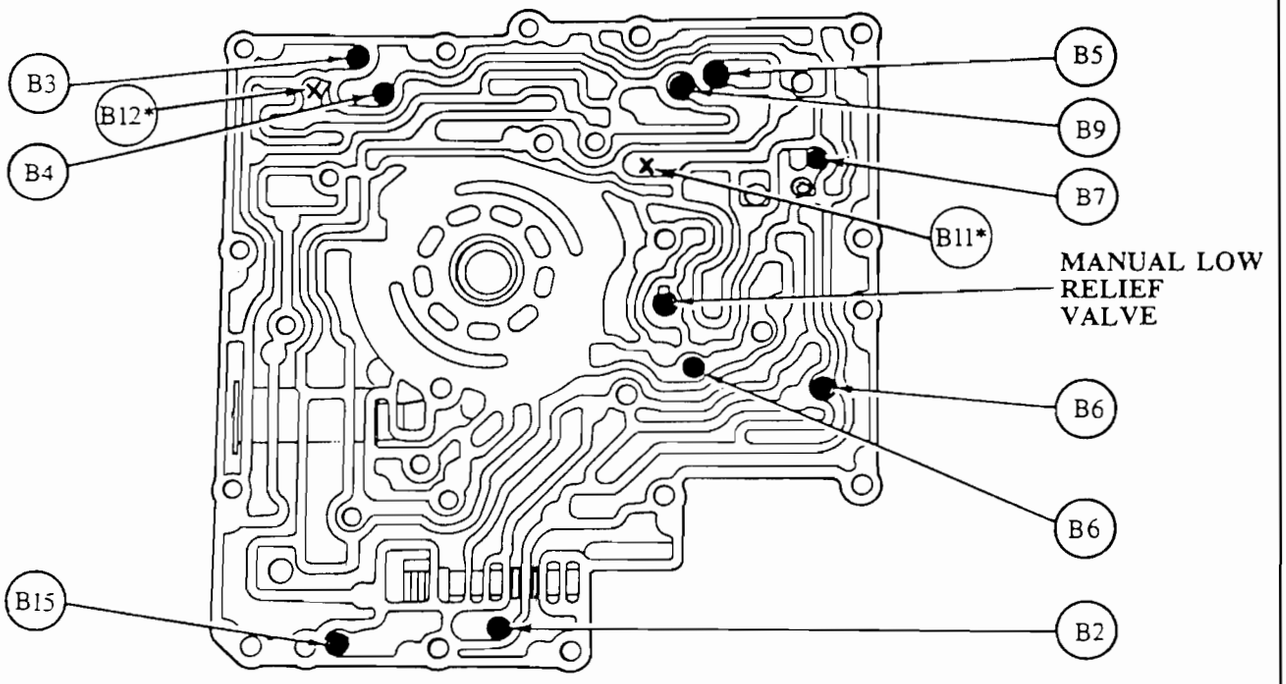
B17: Not used.

B18: Feeds the N-D accumulator through the RR and SS orifices in parallel and exhausts N-D accumulator through the RR and SS orifices in series.

Relief and Drainback Valves

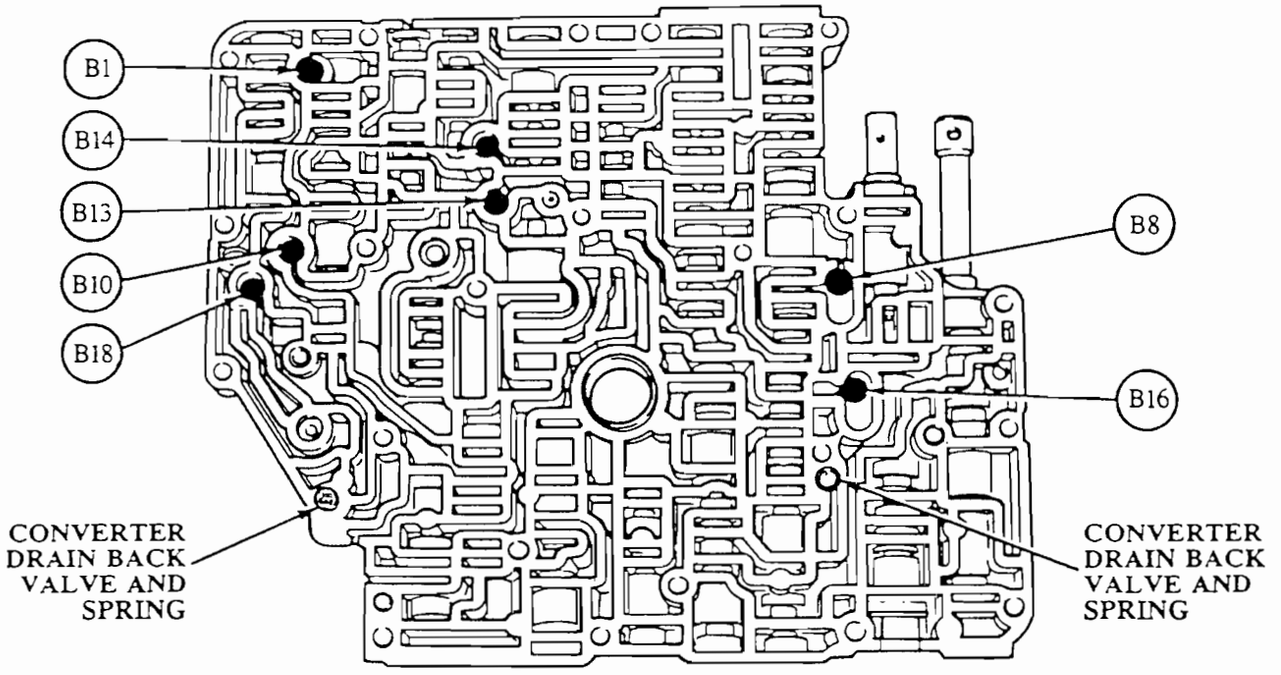
MANUAL LOW RELIEF — Controls direct clutch pressure to 55 psi during a manual low pull-in. Also acts to boost line pressure at low TV pressure during the manual low pull-in.

CONVERTER DRAINBACK — Prevents the converter from draining when the vehicle is not running.



OIL PUMP

*Do not install ball check



VALVE BODY

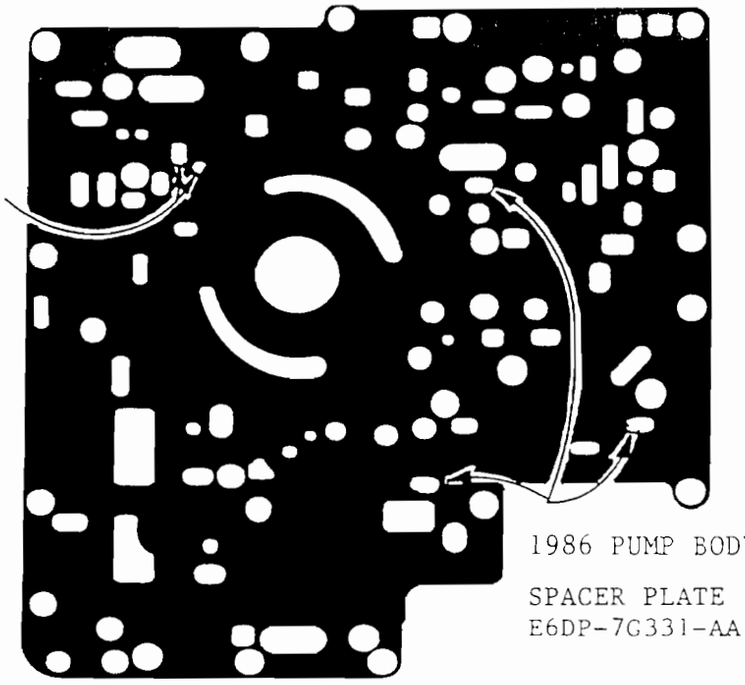
Figure 1

Gasket Change FORD AXOD

The pump to plate and the plate to valve body gaskets have been changed in 1987. The valve body to plate and the plate to chain cover have also been changed for 1987. The changes are illustrated in this bulletin.

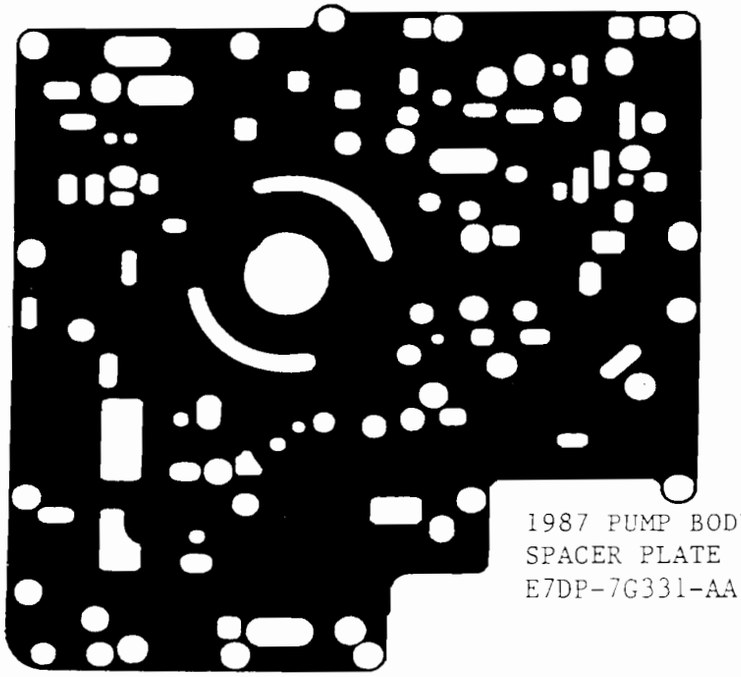
IMPORTANT- THE 1986 GASKETS WILL NOT FIT THE 1987 UNITS. NOR WILL THE 1987 GASKETS FIT THE 1986 UNITS.

A MIS-MATCH OF THESE GASKETS CAN CAUSE A SLIP, A DELAYED ENGAGEMENT OR A 1-2 SLIDE BUMP.

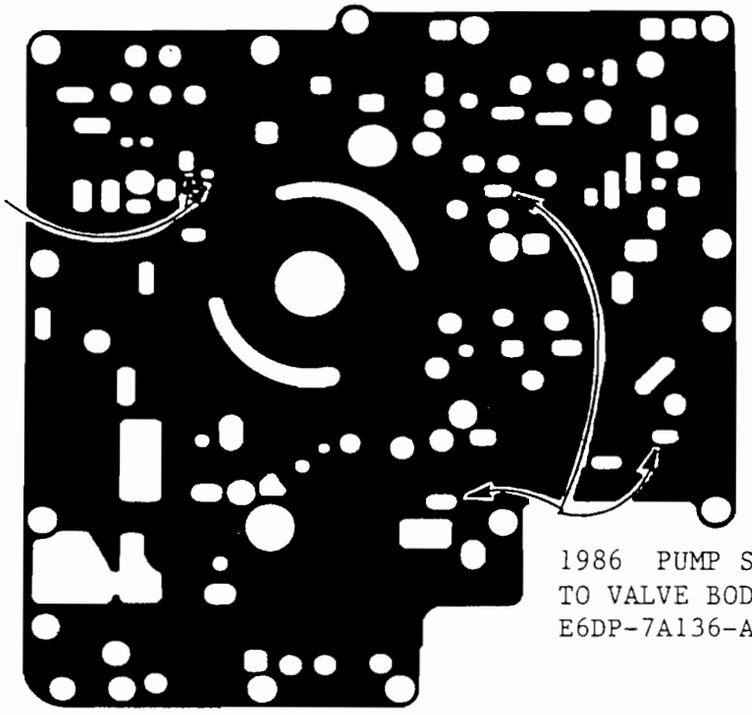


1986 PUMP BODY TO SPACER PLATE
E6DP-7G331-AA

NOTE; 5 HOLES HAVE BEEN ELIMINATED IN THE 1987 GASKET

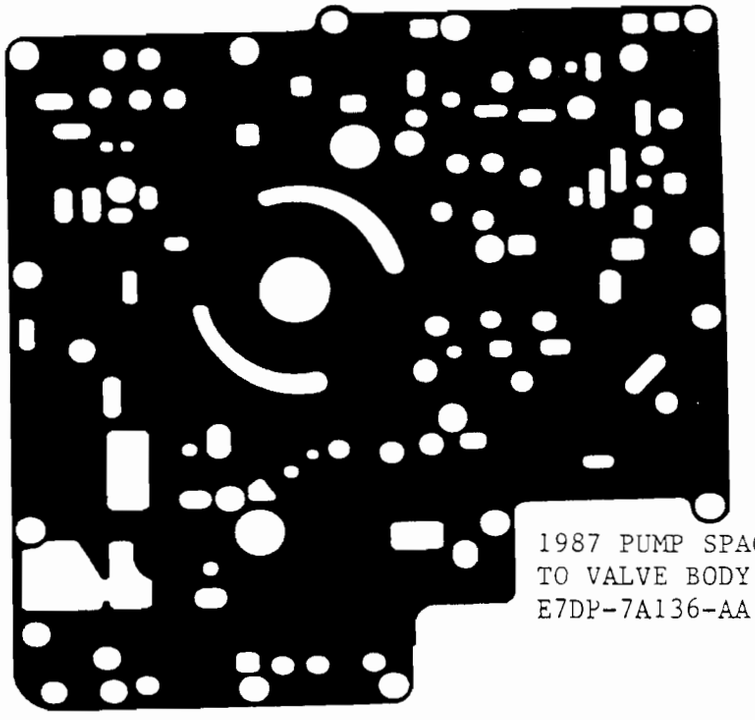


1987 PUMP BODY TO SPACER PLATE
E7DP-7G331-AA

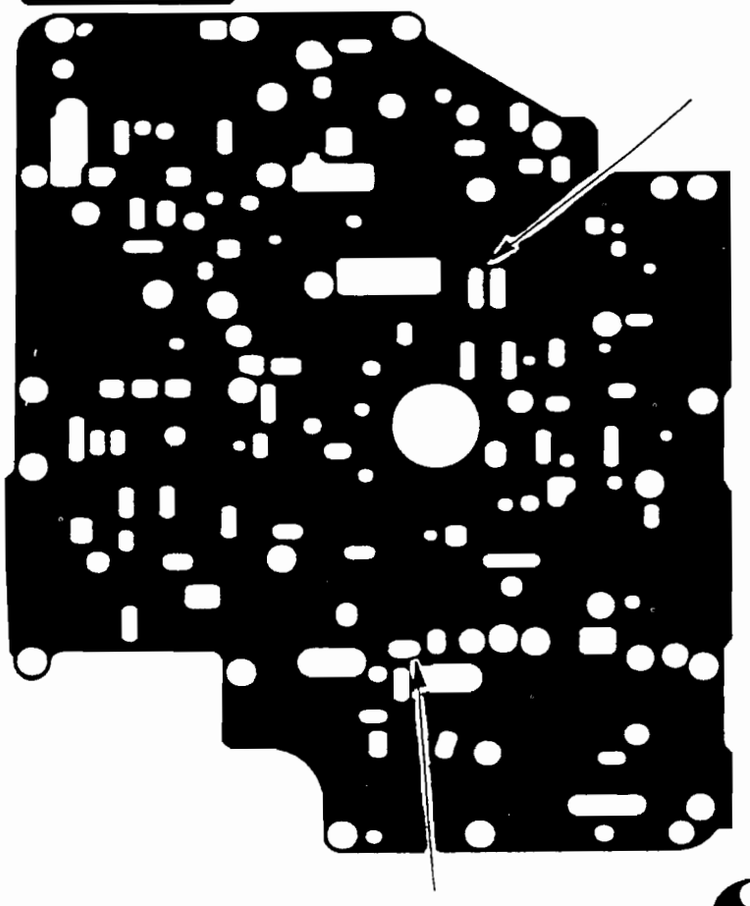


1986 PUMP SPACER PLATE
TO VALVE BODY
E6DP-7A136-AA

NOTE: 5 HOLES HAVE BEEN ELIMINATED IN THE 1987 GASKET



1987 PUMP SPACER PLATE
TO VALVE BODY
E7DP-7A136-AA

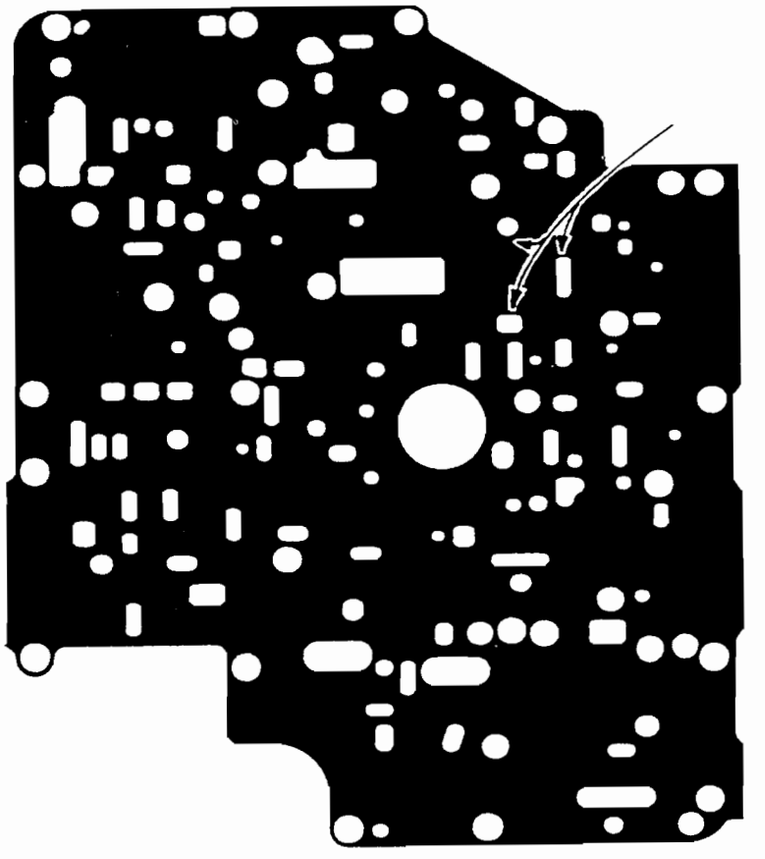


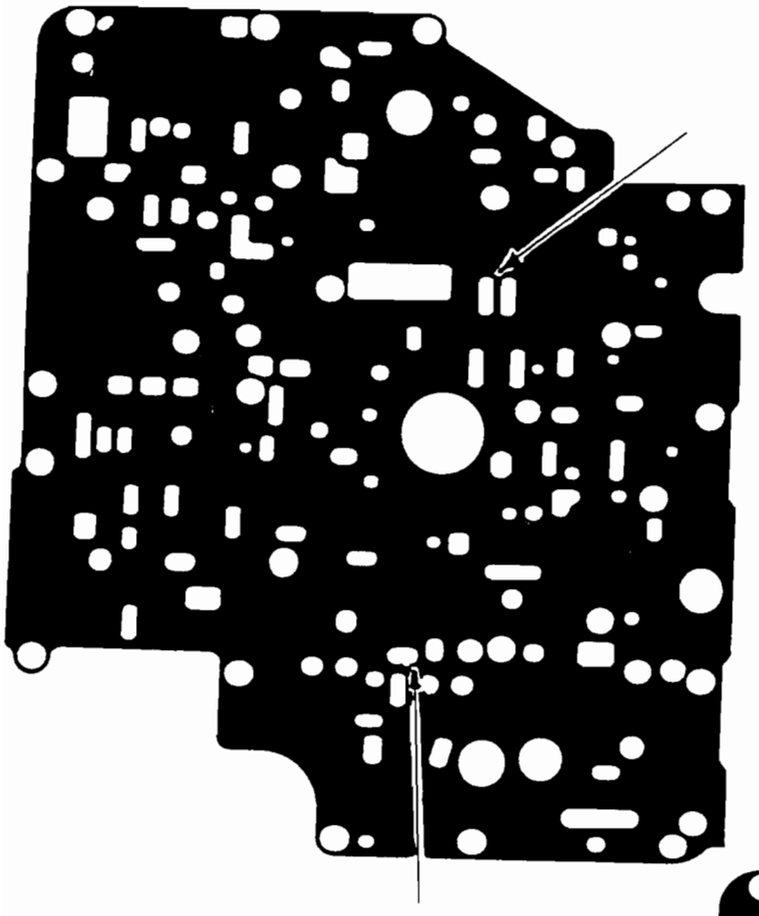
1986 VALVE BODY TO SPACER PLATE GASKET E6DP-7D100-AA

NOTE: THESE THREE SLOTS ELIMINATED IN THE 1987 GASKET

1987 VALVE BODY TO SPACER PLATE GASKET E7DP-7D100-AA

NOTE: THESE THREE HOLES ADDED TO THE 1987 GASKET



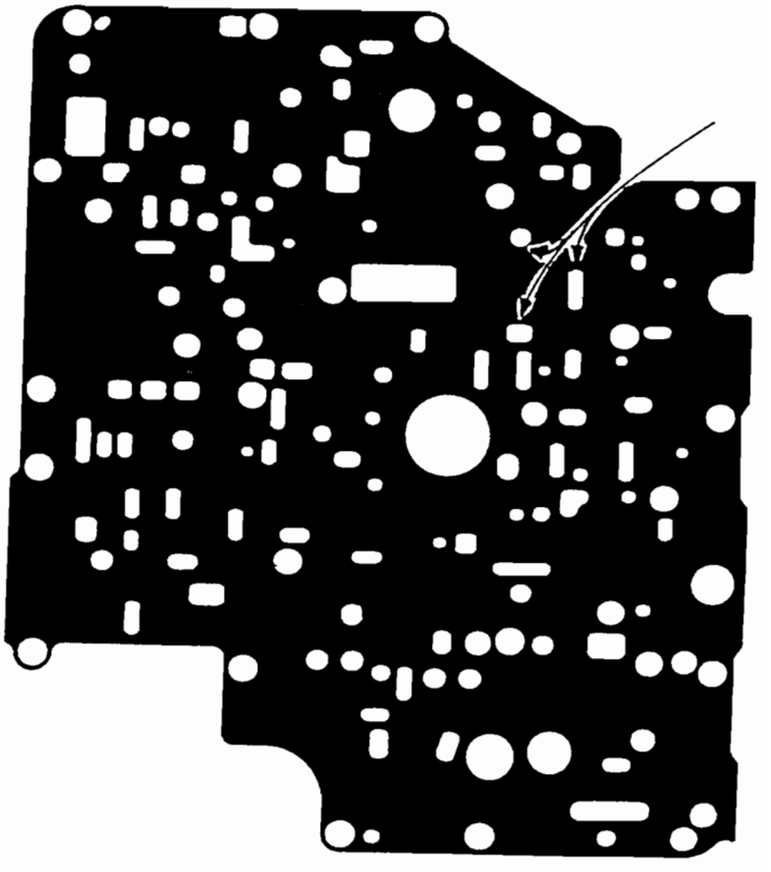


1986 SPACER PLATE TO
CHAIN COVER E6DP-7C155-AA

NOTE: THESE THREE SLOTS
ELIMINATED IN 1987 GASKETS

1987 SPACER PLATE TO
CHAIN COVER E7DP-7C155-AA

NOTE: THESE THREE HOLES
ADDED TO THE 1987 GASKET



TORQUEFLITE A-413 / A-470

SYMPTOM/CONDITION

Customer concern of high effort to shift out of park position, particularly when vehicle is parked on a steep grade.

DIAGNOSIS

Inspect shift cable and linkage for proper routing and adjustment. If routing and adjustment are proper, the condition may be due to improper surface finish of the bullet end of the park sprag rod (Figure 3).

NOTE: Only transaxles built between 12-2-81 and 7-12-82 with serial numbers 7432-XXXX to 7654-XXXX are suspect for this condition.

PARTS REQUIRED

1 - Park Rod Assembly PN 4207130

REPAIR PROCEDURE

1. Remove the transaxle oil pan.

2. Remove the "E" clip retaining the park sprag rod to the valve body (Figure 4).

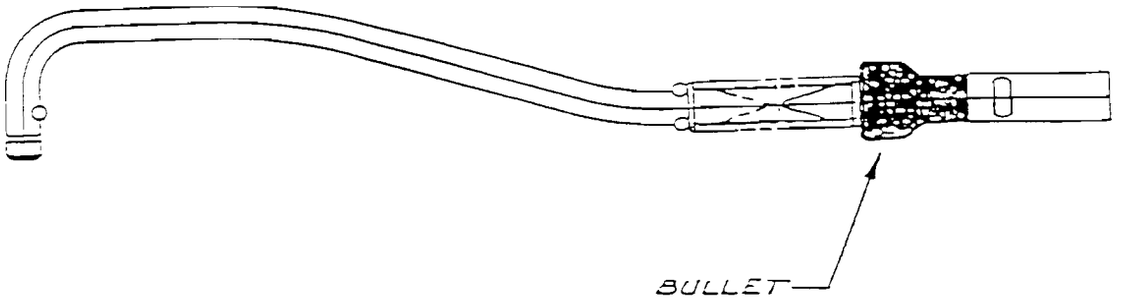
3. Remove the park sprag rod from the transaxle assembly and inspect the bullet end of the rod. If the bullet end surface is dark blue or black, replace the park rod assembly with PN 4207130 containing a bullet that is silver or light gray in color.

4. Reinstall "E" clip, install the transaxle oil pan, and refill with automatic transmission fluid.

NOTE: The manual shift lever (at the transmission) may have been bent if the vehicle operator has attempted to force a transmission with an improperly finished rod out of the park position. Therefore, after replacing the park sprag rod, check the shift lever and replace if lever is bent.

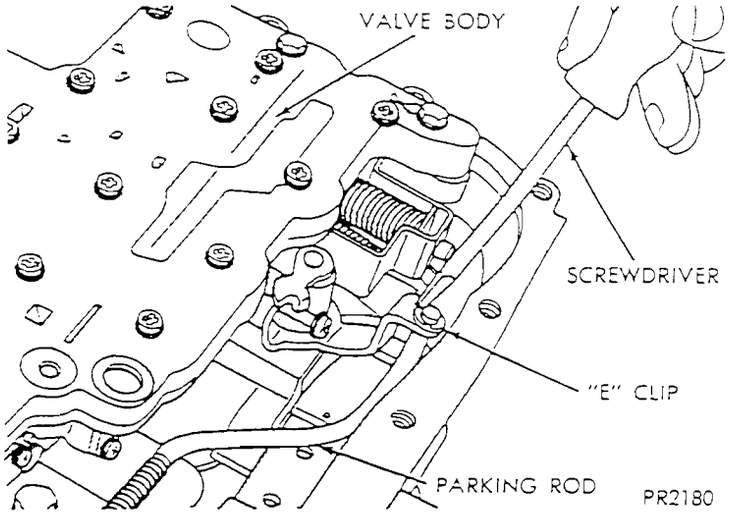
5. Check linkage adjustment and road test to verify operation.

FWD PARK SPRAG ROD ASSEMBLY



(Should be light gray or silver in color if surface treatment is acceptable)

Figure 3



Remove or Install Parking Rod "E" Clip

Figure 4