



TIME OUT

INDEX

700-R4.....	3
440-T4.....	34
125C.....	42
180C.....	57
200C.....	58
325-4L.....	59
350C.....	61
C-4.....	63
C-6.....	67
AOD.....	70
ATX.....	71
A4LD.....	80
AXOD.....	83
A-413.....	86
HONDA.....	89
RE4R01A.....	101
ZF 4HP-18.....	102

AUTOMATIC TRANSMISSION SERVICE GROUP
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TIME OUT

INTRODUCTION

Due to the many requests for information on earlier units, we have put together some quick fixes on these older units. The information in this manual covers the C-4, 350, C-6, 180, and more. We have included information on early versions of the current units and a list of common complaints on Honda transmissions along with the fixes. The information on the GM video segment of the seminar is also included in this manual.

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

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THM 4L60 (700-R4) SOFT UPSHIFTS AND OTHER THINGS

COMPLAINT: Soft and/or mushy upshifts regardless of throttle position.

CAUSE: Not enough feed oil to the 2-4 band, and the 3-4 clutch pack.

CORRECTION: Drill the holes in the spacer plate, as shown in Figure 1, as follows:

HOLE "A", DRILL TO .110".

This will improve the 1-2 shift.

HOLE "B", DRILL TO .086".

This will improve the 2-3 shift. DO NOT drill any larger than .086" as a larger hole will create a flare on the 2-3 shift on some models.

HOLE "C", DRILL TO .055".

This will prevent the T.V. valve from hydraulically locking.

HOLE "D", DRILL TO .093".

This will help prevent the 3-4 clutches from burning. This hole was eliminated on the 1988 and later 5.7L models. If your spacer plate does not have this hole, use the gasket as a template and drill it to .093".

HOLE "E", MAKE SURE THIS HOLE IS NOT COVERED WITH YOUR GASKETS.

If this hole is covered by the gaskets, it will create the following:

- (1) Shifts 1-3 in drive, after initial upshift pattern. First set of upshifts are normal, and will be again, after setting awhile.
- (2) Delayed (5 Seconds) 4-2, or 3-2 kickdown.
- (3) Delayed (5 Seconds) manual downshift from D3 to D2. (Stays in 3rd)
- (4) Binds in reverse, after upshifting to 3rd gear. Normal operation after setting for a while.
- (5) Binds in manual Lo, after upshifting to 3rd gear. Normal operation after setting for a while.
- (6) Results in burnt 3-4 clutch plates. They are usually wiped out on the road test, as this is the exhaust hole for the 3-4 clutch.

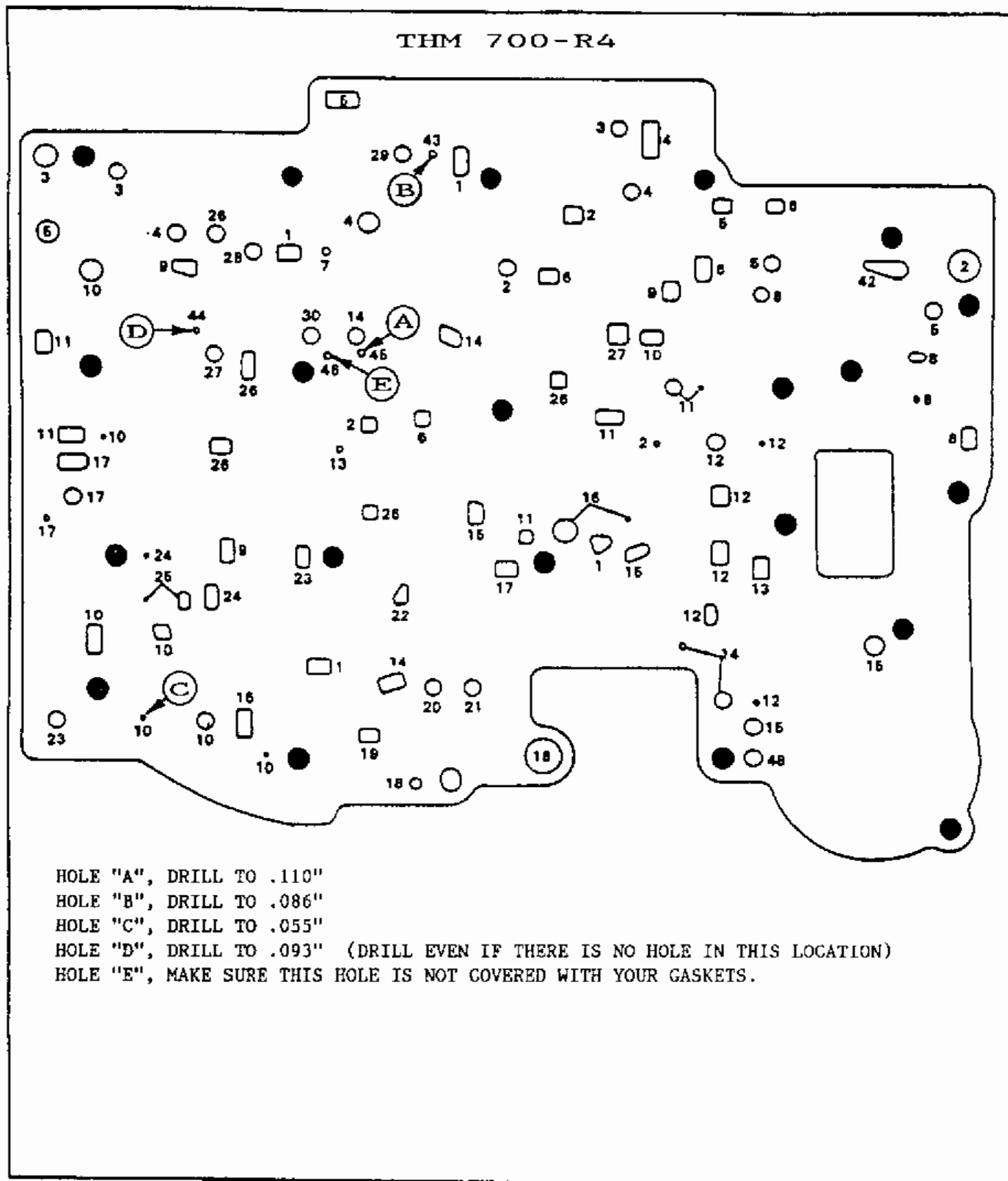


Figure 1
AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4L60 (700-R4) SHIFT PROBLEMS AND BURNT L/R CLUTCH

PROBLEM NUMBER 1.

Do not install a checkball in the location marked with an "X", as shown in Figure 3. The result will be, NO 2ND GEAR, as it blocks D4 oil from getting to the 1-2 shift valve.

PROBLEM NUMBER 2.

Do not install the number 9 checkball (Det/Lo) in the "Bathtub" in the case on any 1988 or later model (See Figure 3). This will create a tie-up on the 1-2 shift, and wipe out the Lo/Reverse Clutches and 2/4 Band.

PROBLEM NUMBER 3.

If you have very high and harsh upshifts, you can remove the number 10 checkball (T.V. Exhaust), and usually eliminate the problem (See Figure 3).

PROBLEM NUMBER 4.

Do not install the number 12 checkball on top of the orifice cup plug in the auxiliary valve body. It goes next to the orifice cup plug as shown in Figure 2. If you install it improperly, the checkball falls through the spacer plate into the D4 passage, and is forced into the governor screen blocking all of governor feed oil, and creates "No Upshift". It may also be an intermittent problem, as the checkball sometimes falls away from the screen allowing D4 oil to the governor (See Figure 3).

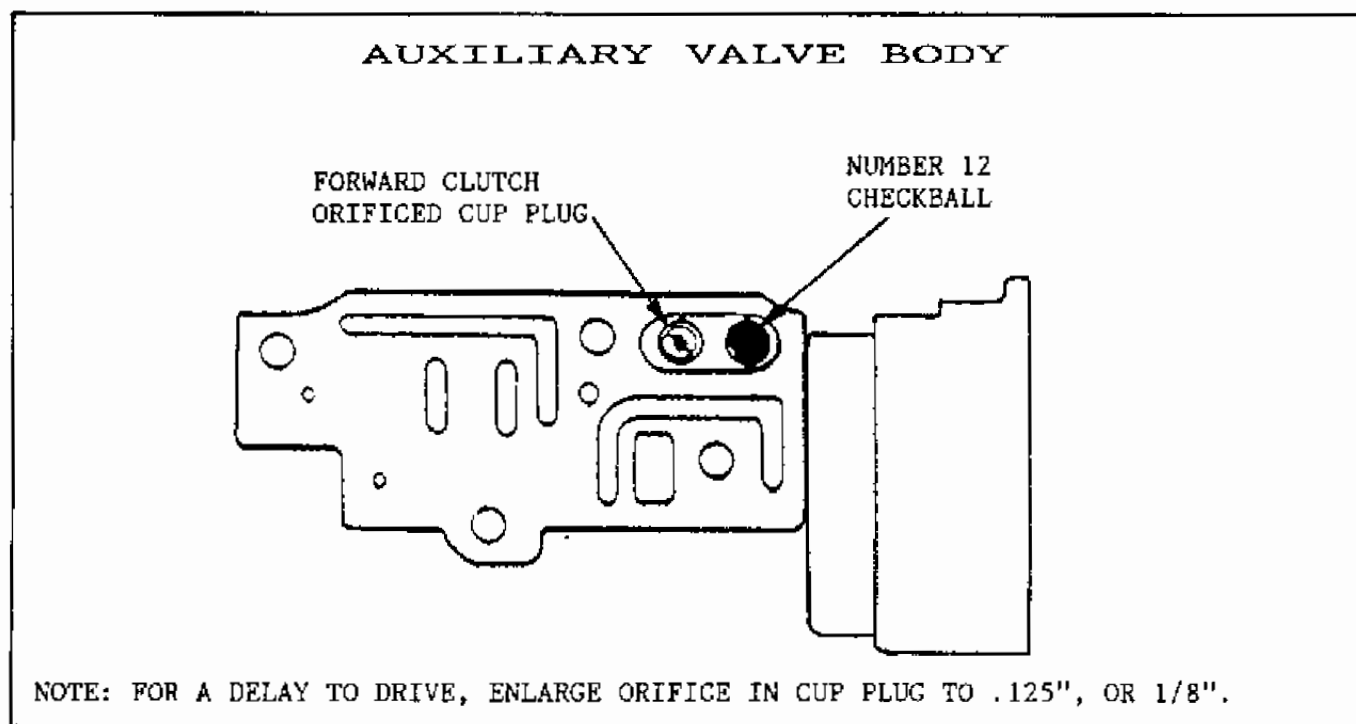
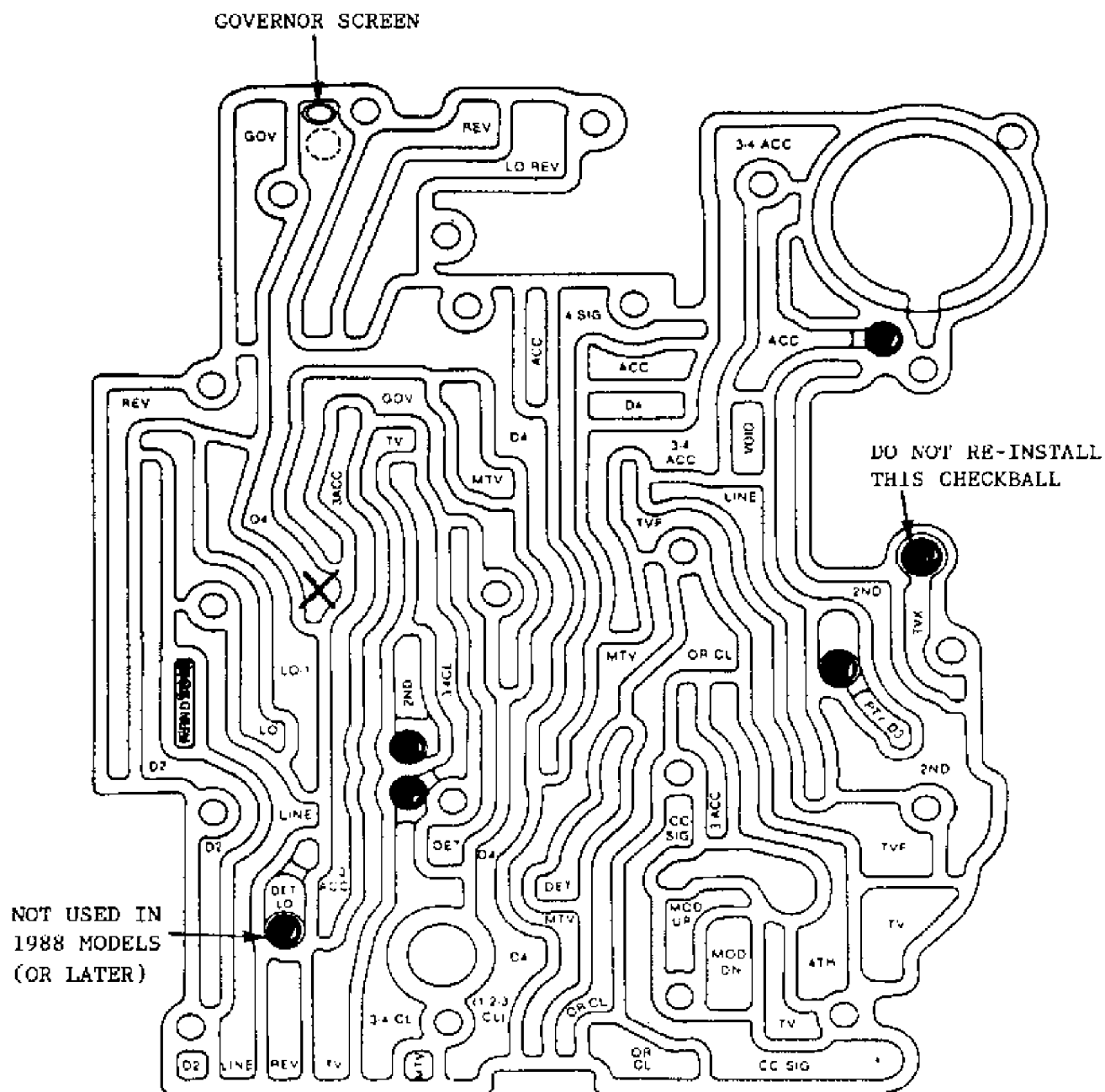


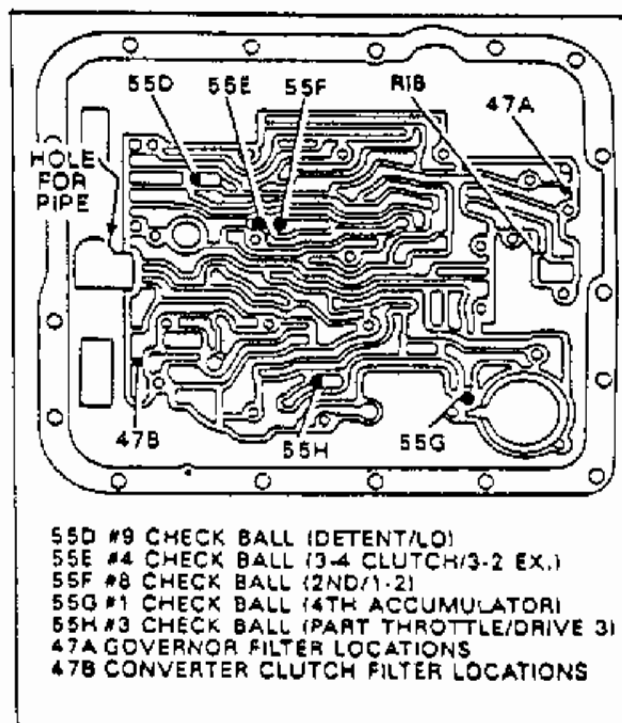
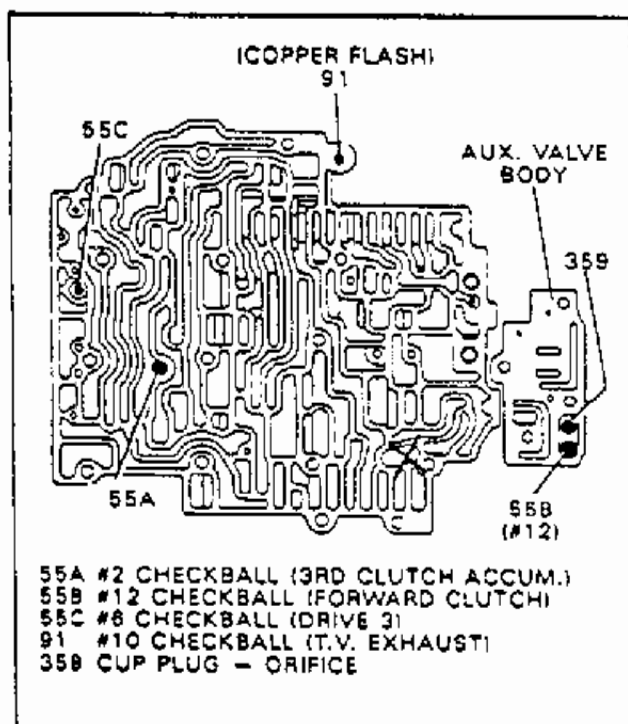
Figure 2



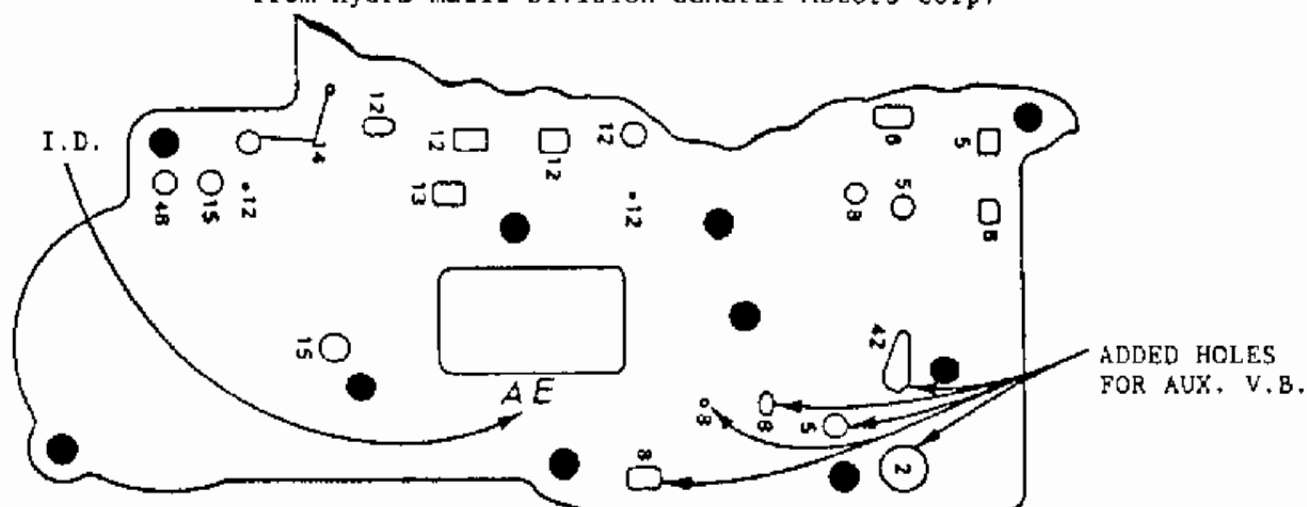
DO NOT INSTALL CHECKBALL IN LOCATION MARKED WITH AN "X" IN THE ILLUSTRATION ABOVE. IF YOU DO, THE RESULT WILL BE NO 2ND GEAR.

Figure 3

CHECKBALL LOCATIONS
1987 MODELS ONLY - WITH AUX. V.B.



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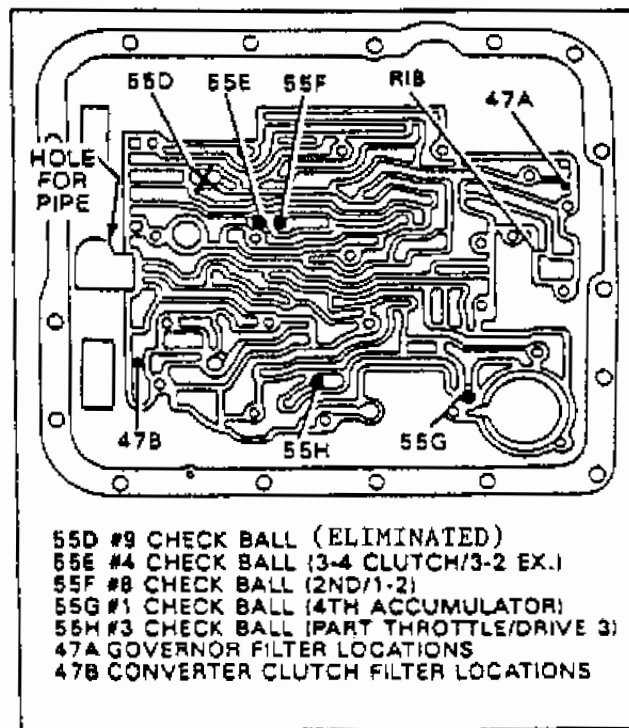
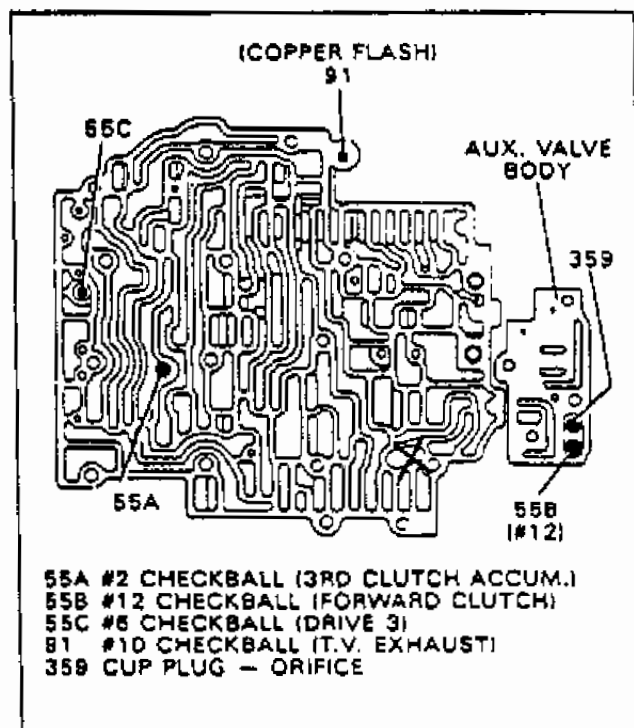
NOTE: DO NOT INSTALL CHECKBALL IN THE "BATHTUB" IN THE VALVE BODY ON ANY 1987 MODEL, WITH THE AUXILIARY VALVE BODY.

NOTE: 1987 MODEL SPACER PLATES ARE IDENTIFIED WITH A 2 LETTER CODE STAMPED INTO THE SPACER PLATE. THE FIRST LETTER WILL ALWAYS BE AN "A", AND WILL NOT INTERCHANGE WITH ANY OTHER MODELS.

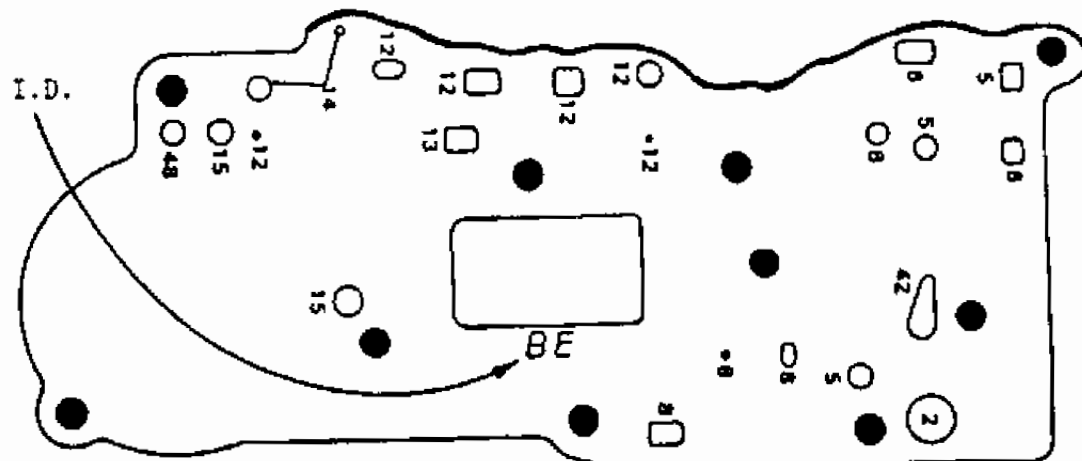
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Figure 4
AUTOMATIC TRANSMISSION SERVICE GROUP

CHECKBALL LOCATIONS
1988 MODELS ONLY - WITH AUX. V.B.



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NOTE: DO NOT INSTALL CHECKBALL IN THE "BATHTUB" IN THE VALVE BODY, NOR IN THE "BATHTUB" IN THE CASE, ON ANY 1988 MODELS. (SEE ABOVE ILLUSTRATIONS).

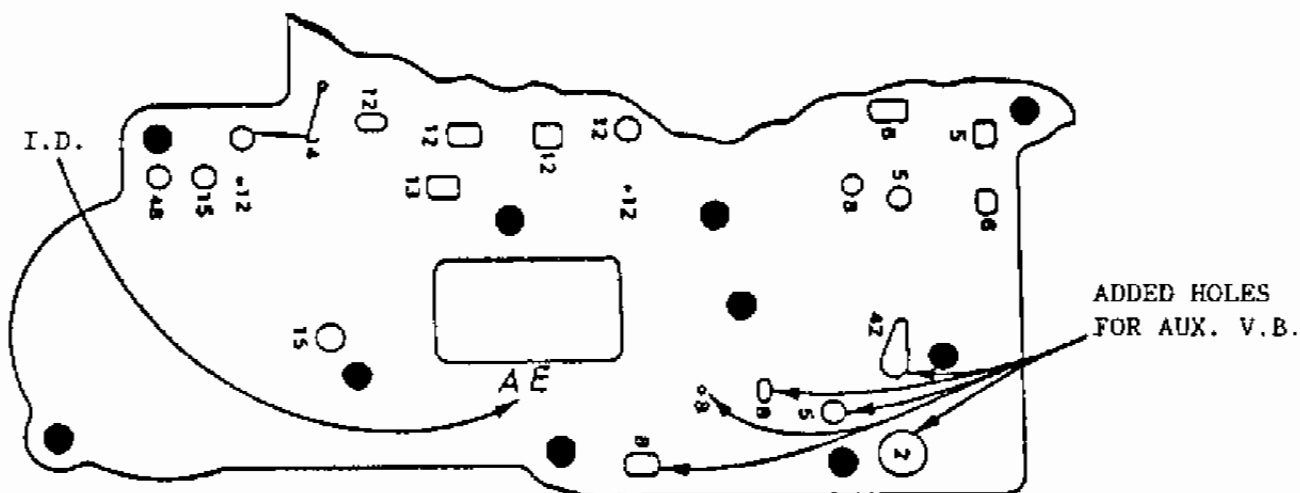
NOTE: 1988 MODEL SPACER PLATES ARE IDENTIFIED WITH A 2 LETTER CODE STAMPED INTO THE SPACER PLATE. THE FIRST LETTER WILL ALWAYS BE A "B", AND WILL NOT INTERCHANGE WITH PREVIOUS MODEL SPACER PLATES. (SEE ABOVE ILLUSTRATION).

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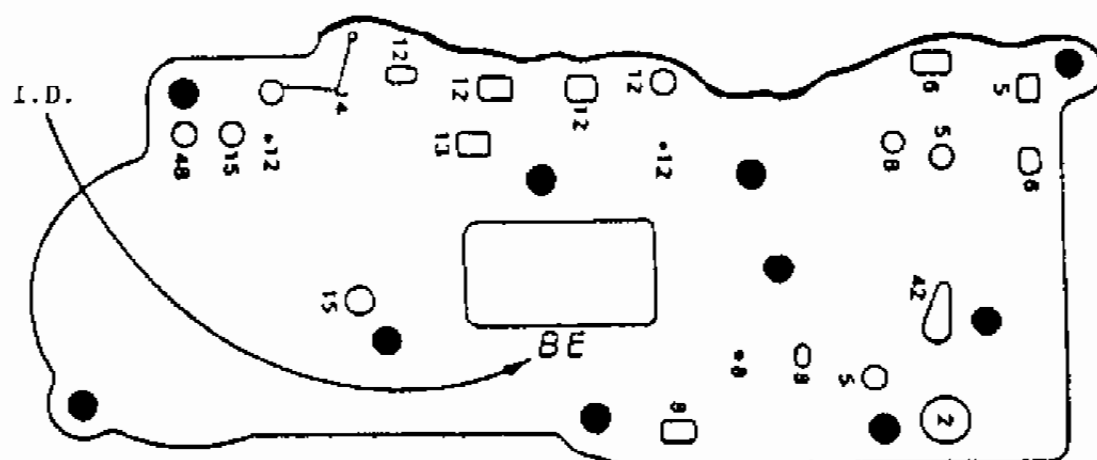
Figure 5
AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4L60 (700-R4)
SPACER PLATE IDENTIFICATION



NOTE: 1987 MODEL SPACER PLATES ARE IDENTIFIED WITH A 2 LETTER CODE STAMPED INTO THE SPACER PLATE. THE FIRST LETTER WILL ALWAYS BE AN "A", AND WILL NOT INTERCHANGE WITH ANY OTHER MODELS.

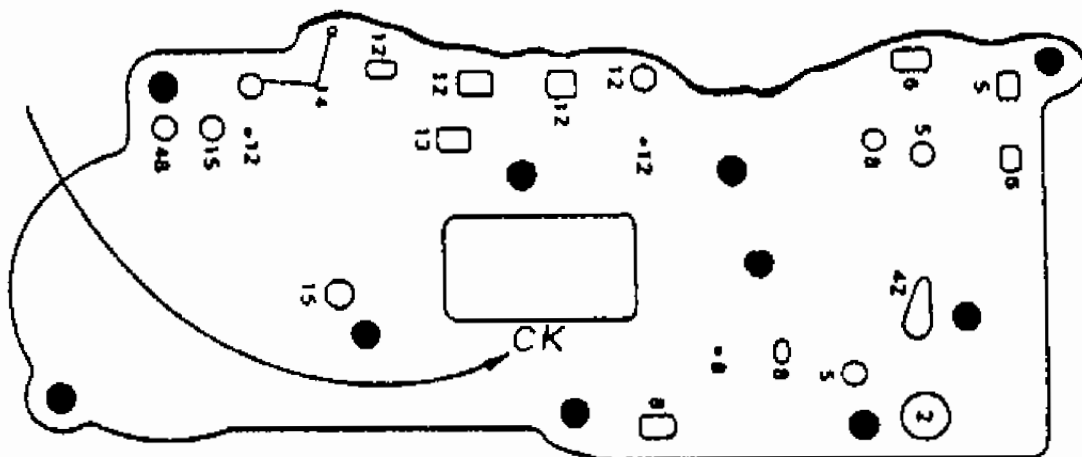
NOTE: DO NOT INSTALL CHECKBALL IN THE "BATHTUB" IN THE VALVE BODY ON ANY 1987 OR LATER MODEL, THAT HAS THE AUXILIARY VALVE BODY.



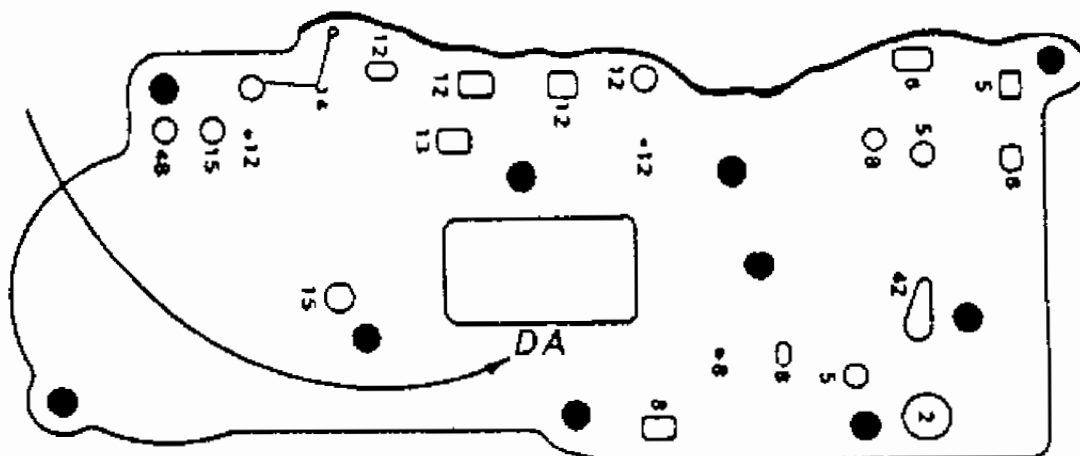
NOTE: 1988 MODEL SPACER PLATES ARE IDENTIFIED WITH A 2 LETTER CODE STAMPED INTO THE SPACER PLATE. THE FIRST LETTER WILL ALWAYS BE A "B", AS SHOWN ABOVE, AND WILL NOT INTERCHANGE WITH ANY PREVIOUS MODEL SPACER PLATES.

NOTE: DO NOT INSTALL CHECKBALL IN THE "BATHTUB" IN THE VALVE BODY, NOR IN THE "BATHTUB" IN THE CASE, ON ANY 1988 MODELS. (SEE FIGURE 5)

Figure 6



NOTE: BEGINNING IN 1989, THE FIRST LETTER WILL BE A "C" FOR ALL PASSENGER CAR SPACER PLATES, AND A "B" FOR ALL TRUCK SPACER PLATES. "B" SPACER PLATES, AND "C" SPACER PLATES WILL INTERCHANGE WITH NO FUNCTIONAL PROBLEMS, BUT OBVIOUSLY PASSENGER CARS ARE CALIBRATED DIFFERENT THAN TRUCKS, SO SHOULD NOT BE MIXED.



NOTE: BEGINNING IN 1990, WE HAVE THE FOLLOWING:

"B" SPACER PLATES, CALIBRATED AND FOUND IN TRUCKS.

"C" SPACER PLATES, CALIBRATED FOR AND FOUND IN PASSENGER CARS.

"D" SPACER PLATES, CALIBRATED FOR AND FOUND IN DIESELS.

Figure 7

THM 4L60 (700-R4) 3-4 CLUTCH DURABILITY

CHANGE: Load Release Springs are added to the 3-4 clutch pack on "F" and "Y" cars only (See Figure 8).

REASON: The load release springs were added to quicken the release of the 3-4 clutch pack on downshifts.

PARTS AFFECTED:

- (1) 3-4 Load Release Springs – Added on YDM, YMM, YWM, and YZM models only, and locates in five places around the 3-4 clutch pack (See Figure 8).
The 3-4 clutch pack now requires some special attention on the stack up. The wide tabs on the 3-4 steel plates were eliminated to make room for the load release springs (Figure 8). However, there is still "One" flat steel plate WITH the wide tabs required in the new 3-4 clutch pack. It goes on top of the stepped apply plate, and provides a "Seal" for the 3-4 load release springs (See Figure 8).

INTERCHANGEABILITY:

Should not be used on any models previous to 1988, nor on any 1988 model, other than models listed above.

SERVICE INFORMATION:

Plate, 3-4 Stepped Apply (1 Required)	8667423
Plate, 3-4 Steel, With Wide Tabs (1 Required)	8642173
Plate, 3-4 Steel, Without Wide Tabs (5 Required)	8663633
Plate, 3-4 Lined (6 Required)	8654145
Spring Assembly, 3-4 Load Release (5 Required)	8667424
Plate, 3-4 Backing Selective (Stamped "5")	8667535
Plate, 3-4 Backing Selective (Stamped "6")	8667536
Plate, 3-4 Backing Selective (Stamped "7")	8667537
Plate, 3-4 Backing Selective (Stamped "8")	8667538
Ring, Internal Snap (3-4 Clutch)	8663636
Gear, Input Internal (Longer Splines)	8663639

NOTE: THESE SPRINGS WERE ADDED TO ALL MODELS BEGINNING IN 1989, AND SHOULD BE ELIMINATED, ALONG WITH DRILLING THE NO. 44 HOLE IN THE SPACER PLATE AS SHOWN IN FIGURE 1. THESE MODIFICATIONS WILL IMPROVE THE 3-4 CLUTCH DURABILITY.

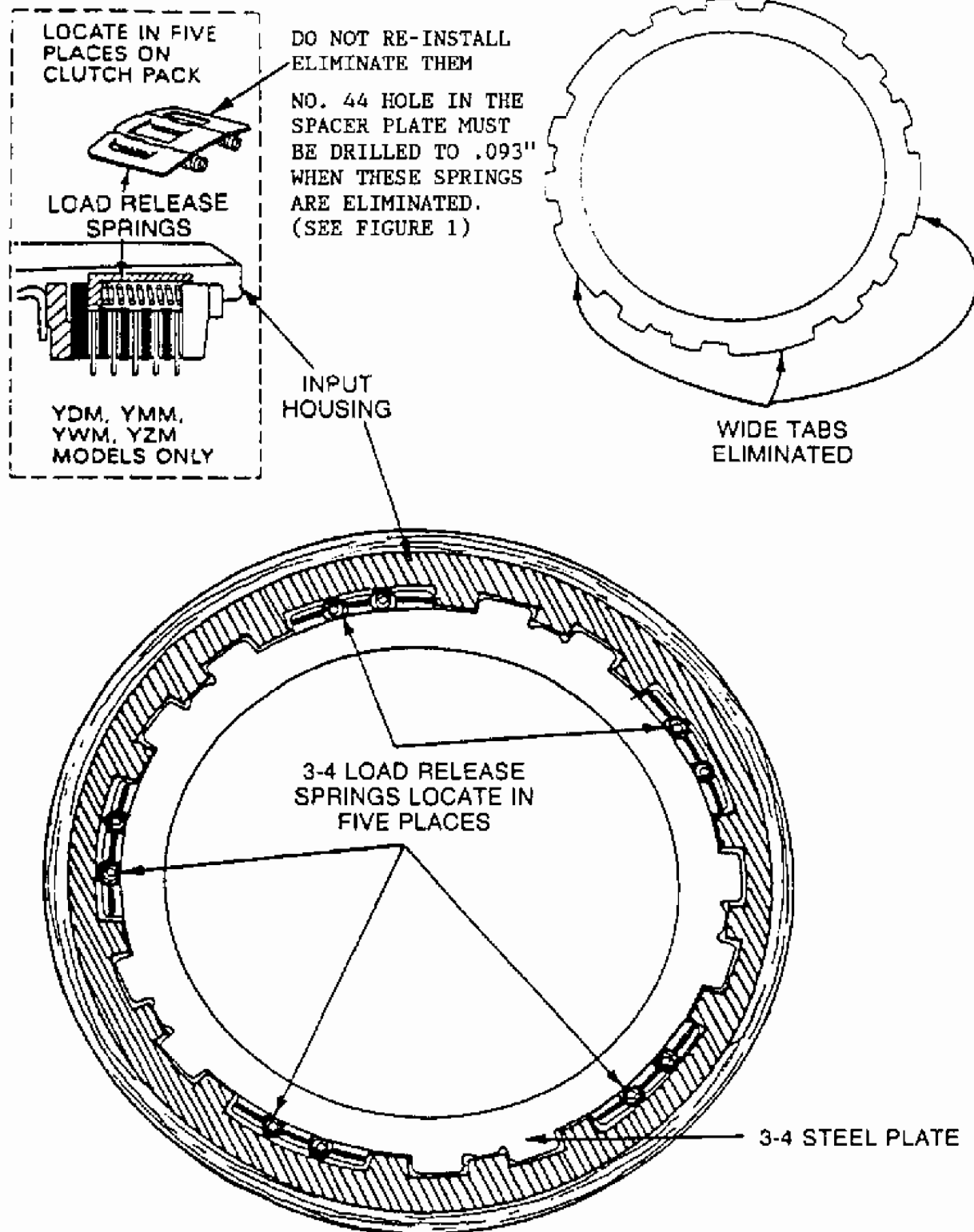


Figure 8

THM 4L60 (700-R4)**PREMATURE REVERSE INPUT CLUTCH FAILURE**

- COMPLAINT:** Premature failure of the reverse input clutches, on 1987 or later models only. These models have the new aluminum piston.
- CAUSE:** The cause may be the orifice hole in the new aluminum piston being larger than the feed hole in the reverse input housing. The original orifice hole was .116".
- CORRECTION:** This should be modified on ALL aluminum pistons to eliminate any repeat failures, and there are two methods.
- METHOD NO. 1.**
Plug the original hole from the back side of piston with an allen head set screw, flush or below. Retain the set screw with Loc-tite, (See Figure 9, Inset "A").
180 degrees from original hole you will find a hole started but not drilled through. Drill through here with a 1/16" drill bit, from the front side of piston. Turn the piston over and from the back side of piston, drill about half way through with a 1/8" drill bit (See Figure 9, Inset "B"). Please use a drill press for this operation to keep the holes straight.
- METHOD NO. 2.**
Install an orifice cup plug, OEM part number 8631146, into original hole from the back side of piston, and enlarge orifice to 1/16".

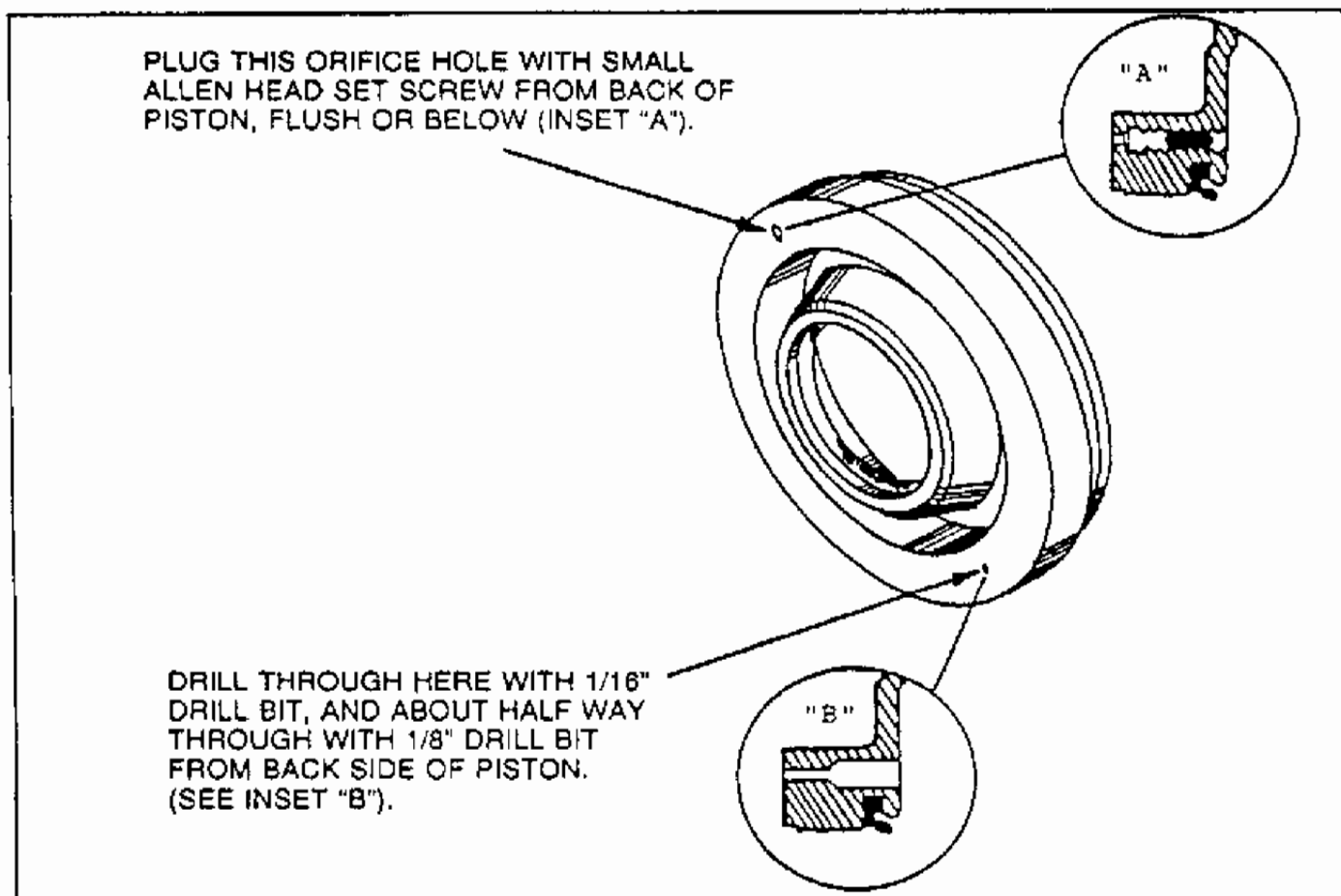


Figure 9

PUMP BODY AND COVER CHANGE

CHANGE: Oil Dam added to Pump Body and Pump Cover Assembly. Change occurred on June 28, 1984 (Julian Date 180).

REASON: To reduce pump fluid leaks.

PARTS AFFECTED:

- (1) Pump Body - Oil dam added to pump body casting. Refer to Figure 11 for identification of the casting changes and Figure 12 for the reference casting number locations.
- (2) Pump Cover - Oil dam added to pump cover casting. Refer to Figure 11 for identification to the casting changes and Figure 12 for the reference casting number locations.

INTERCHANGEABILITY:

- (1) The new design pump body (With Oil Dam) may be used with the previous design pump cover.
- (2) The new design pump cover (With Oil Dam) CANNOT be used with the previous design pump body, unless modifications are made. Loss of main line pressure will be the result.

SERVICE INFORMATION: (Modification of Pump Cover)

To use the new design pump cover (With Oil Dam), You must plug the hole marked "A" in Figure 11, and then it will be compatible with the previous design pump body. However if you are experiencing pump leakage between the pump halves you should use the "Dam Type" body and cover.

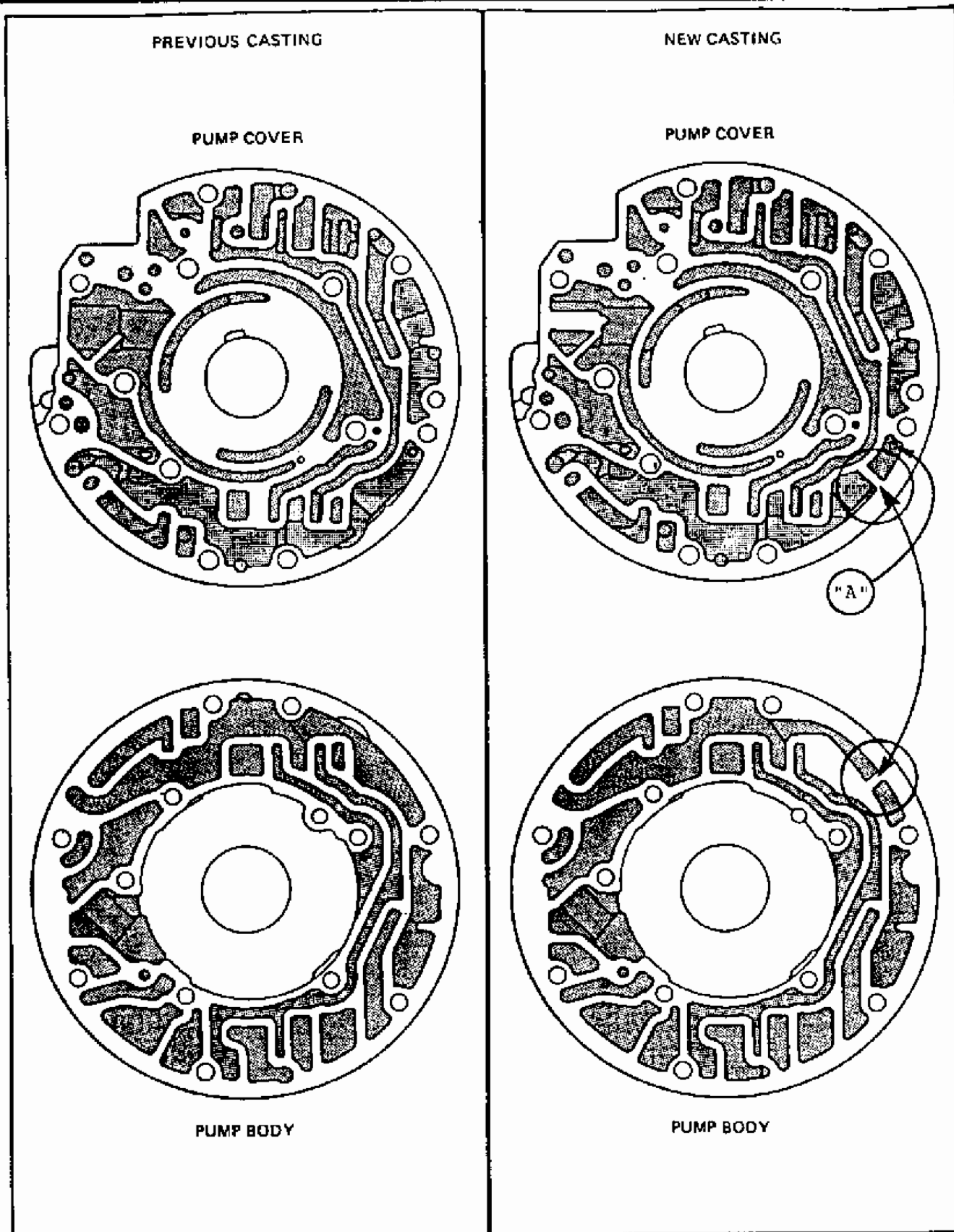


Figure 11

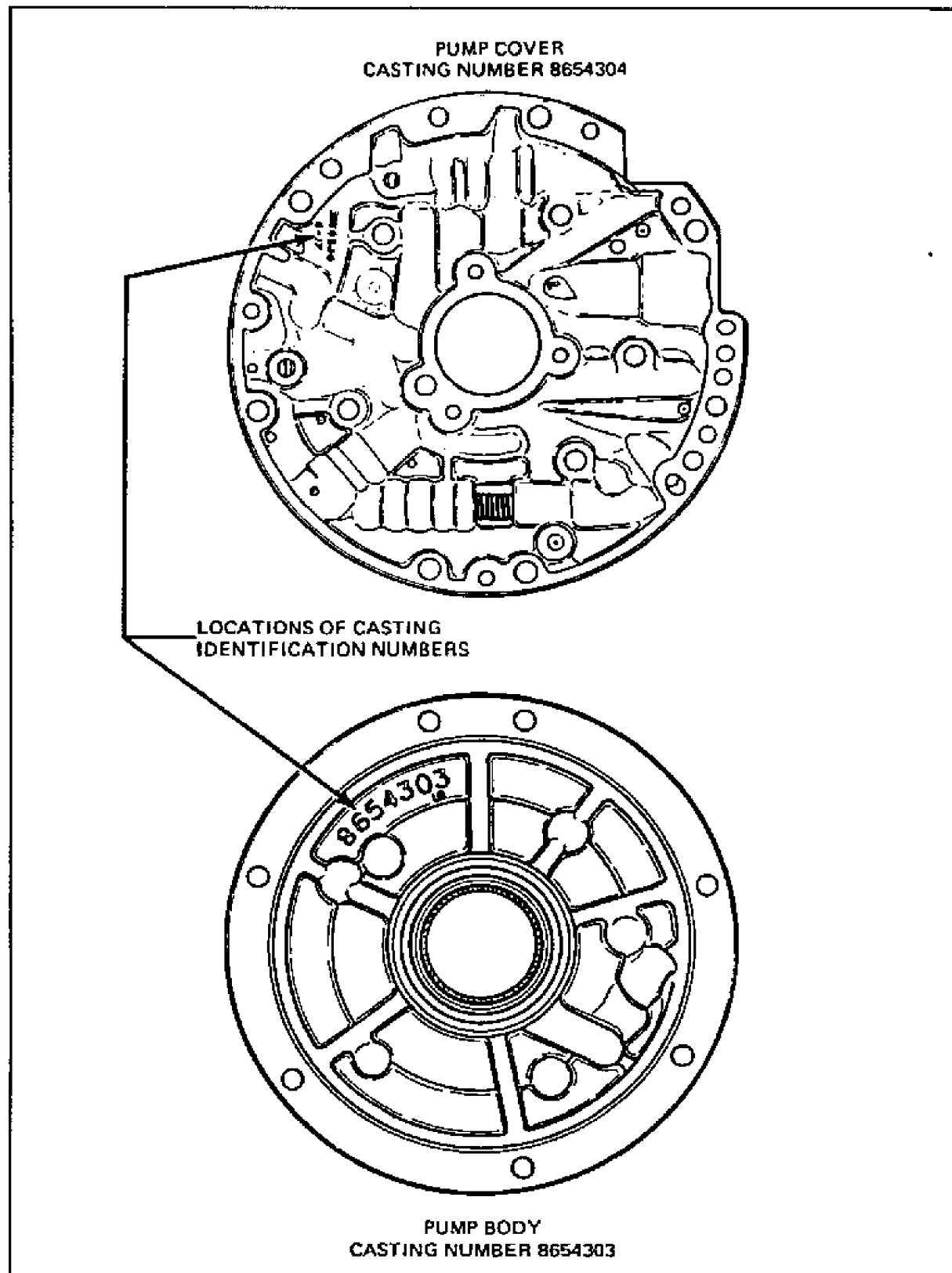


Figure 12

THM 700-R4 NO FOURTH GEAR

COMPLAINT: No 4th gear before and/or after overhaul.

CAUSE #1: The cup plug missing from the servo feed passage in the valve body shown in figure 13.

CAUSE #2: The 4th clutch pressure switch is leaking causing a loss of 4th signal oil to the 3-4 relay valve (See Figure 13).

CAUSE #3: The bleed orifice cup plug is missing from the case in the bottom of the 3-4 accumulator bore (See Figure 14).

CAUSE #4: The 3-4 relay valve may be installed backwards (See Figure 15).

CAUSE #5: The 4th apply piston seal in the servo may be missing or torn causing 4th apply oil to leak into the exhaust (See Figure 16).

CAUSE #6: The 4th oil apply passage in the servo apply pin may be blocked with foreign material (See Figure 16).

CAUSE #7: The 3-4 shift valve sleeve may be rotated to far against the roll pin (See Figure 17).

CAUSE #8: The governor may be defective, or the governor bore is worn, or the screen in the governor feed circuit may be restricted (See Figure 18).

CORRECTION #1: Install a cup plug in the bore as shown in figure 13.

CORRECTION #2: Screw the 4th clutch pressure switch into the end of your blow gun and pressurize the switch. If air comes out of the front of the switch, replace the switch with one that does not leak (See Figure 13).

CORRECTION #3: Replace the missing bleed orifice, part # 8628864 (See Figure 14).

CORRECTION #4: Install the 3-4 relay valve correctly as shown in figure 15.

CORRECTION #5: Repair or replace the sealing ring on the 4th apply piston in the servo (See Figure 16).

CORRECTION #6: Remove the foreign material that is blocking the 4th apply passage in the servo pin (See Figure 16).

CORRECTION #7: Rotate the 3-4 shift valve sleeve so that it does not rest up against one end of the roll pin (See Figure 17).

CORRECTION #8: Replace the governor, resleeve the bore if necessary, and remove the filter from the feed circuit if it has been installed (See Figure 18).

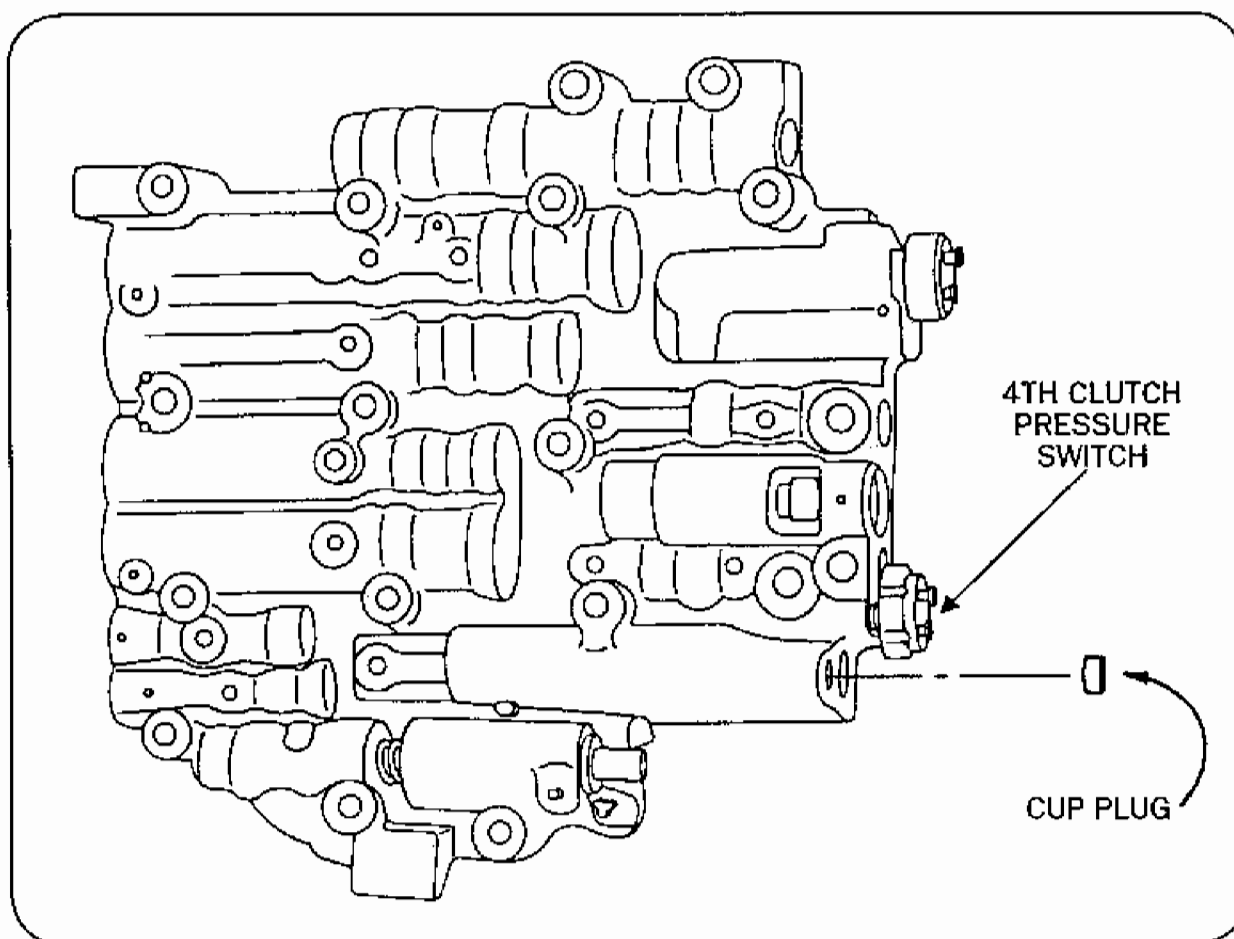


Figure 13

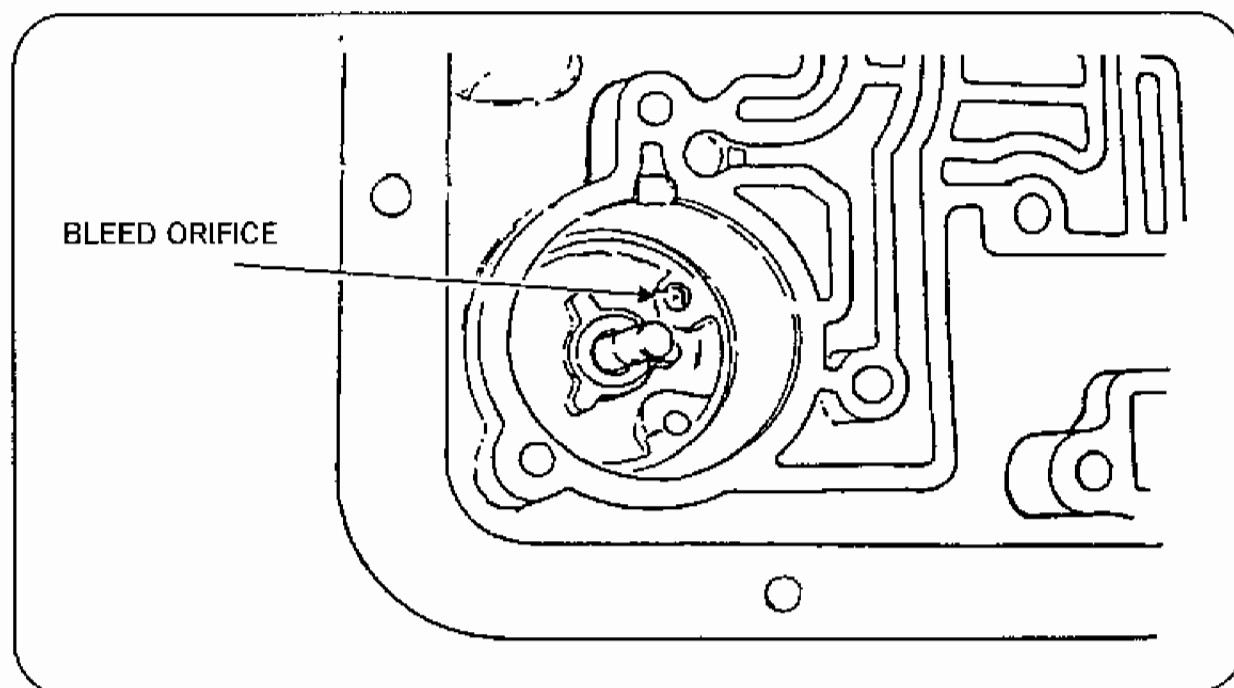


Figure 14

THM 700-R4 No Fourth Gear Continued

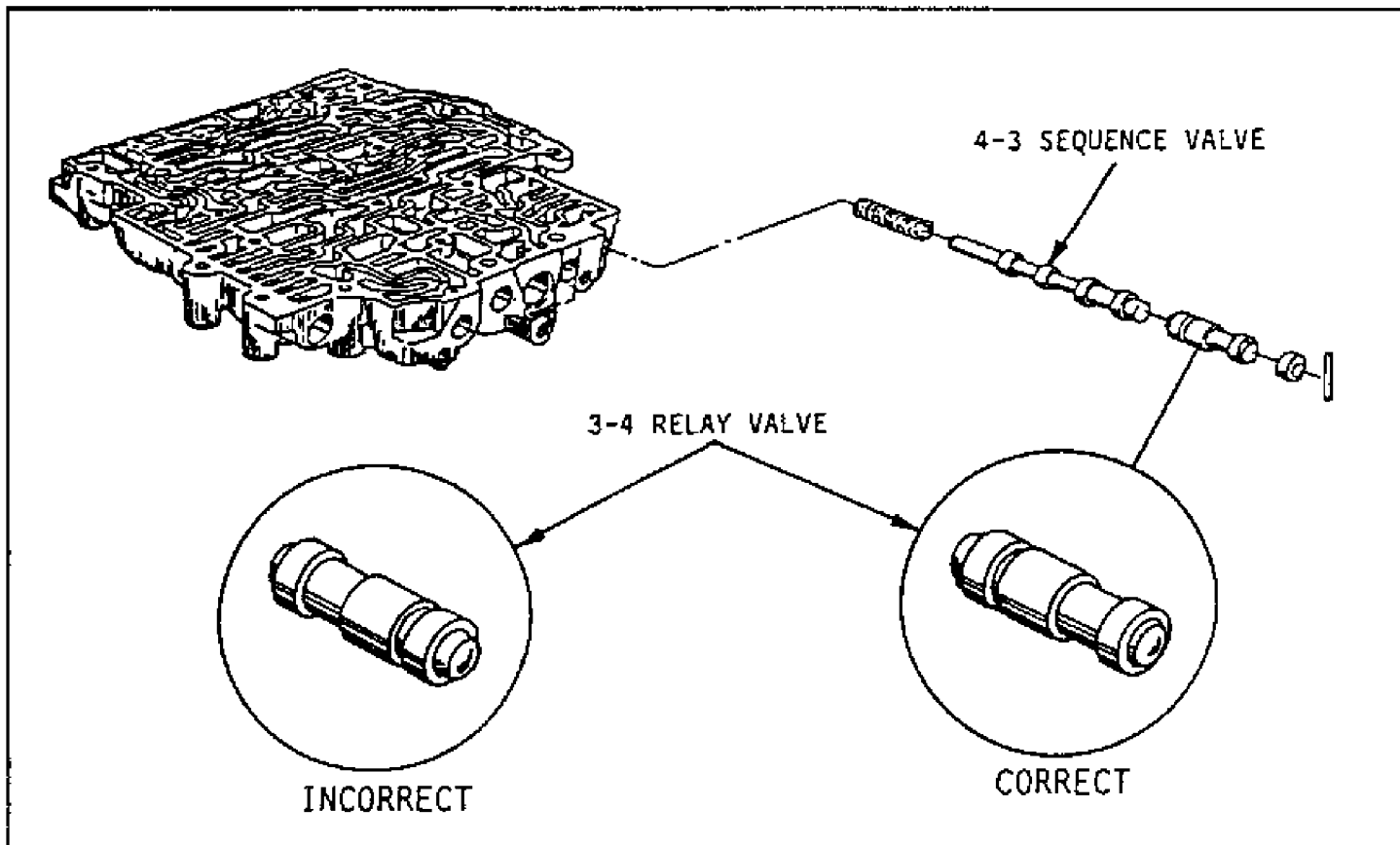


Figure 15

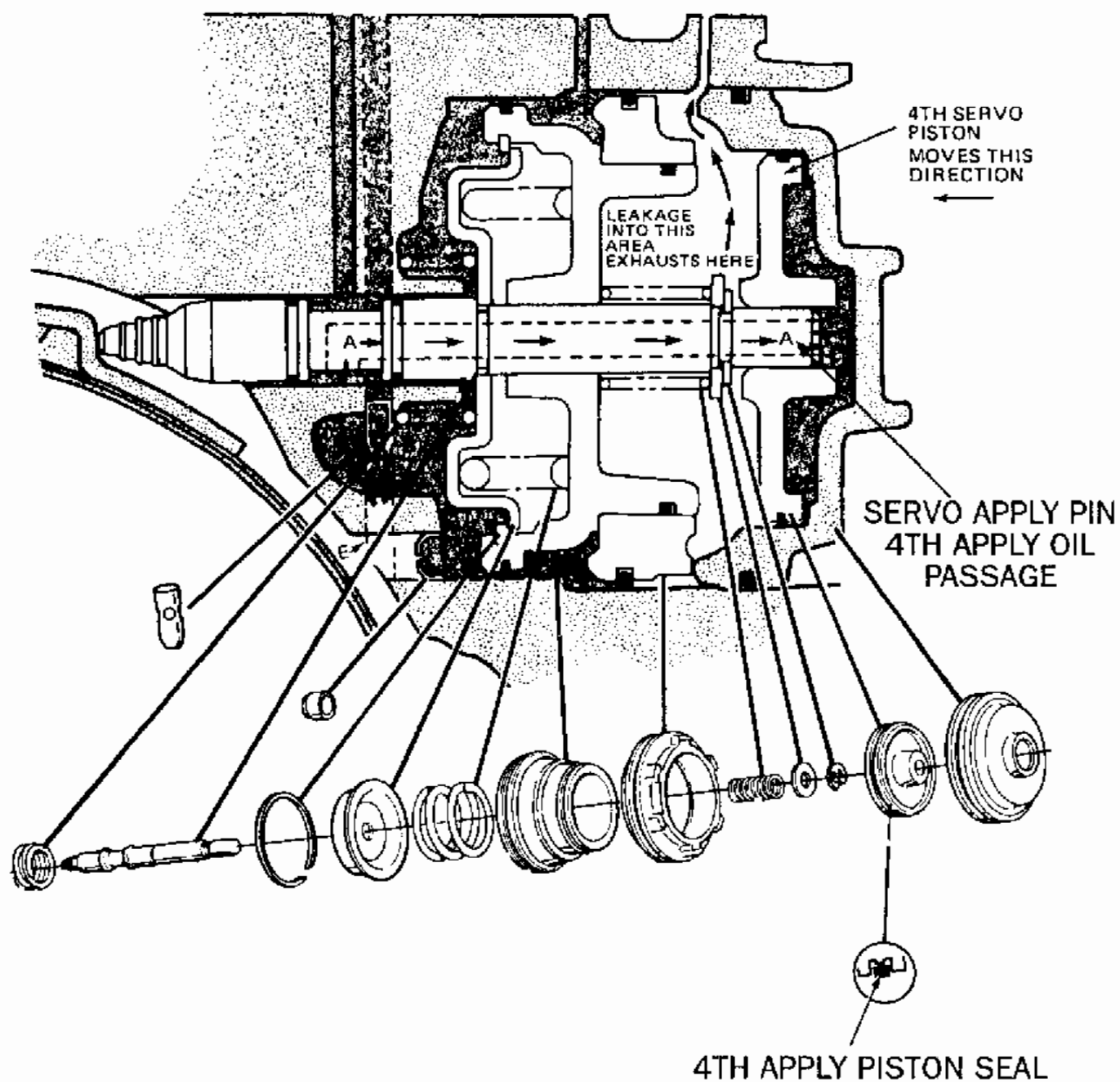


Figure 16

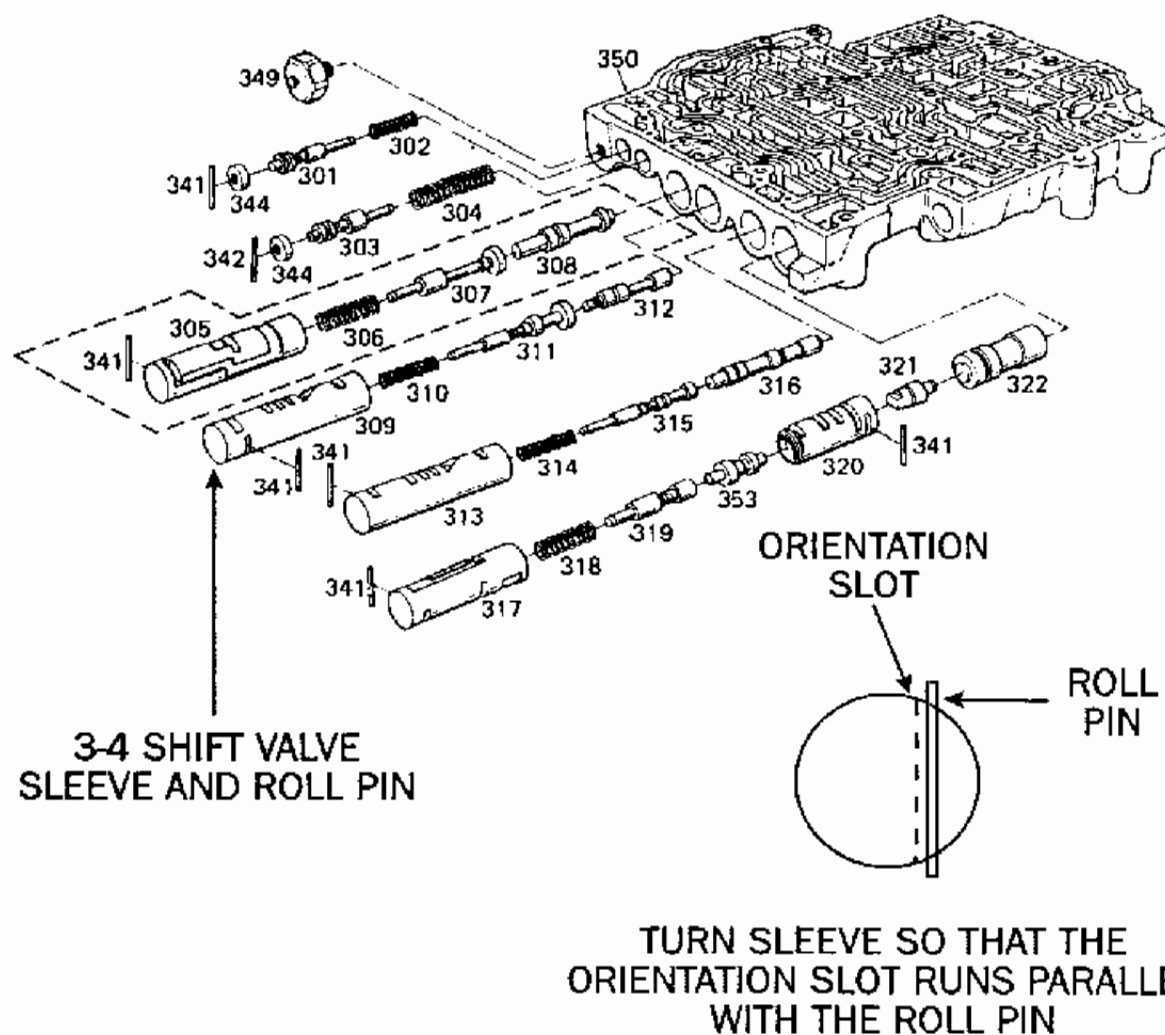


Figure 17

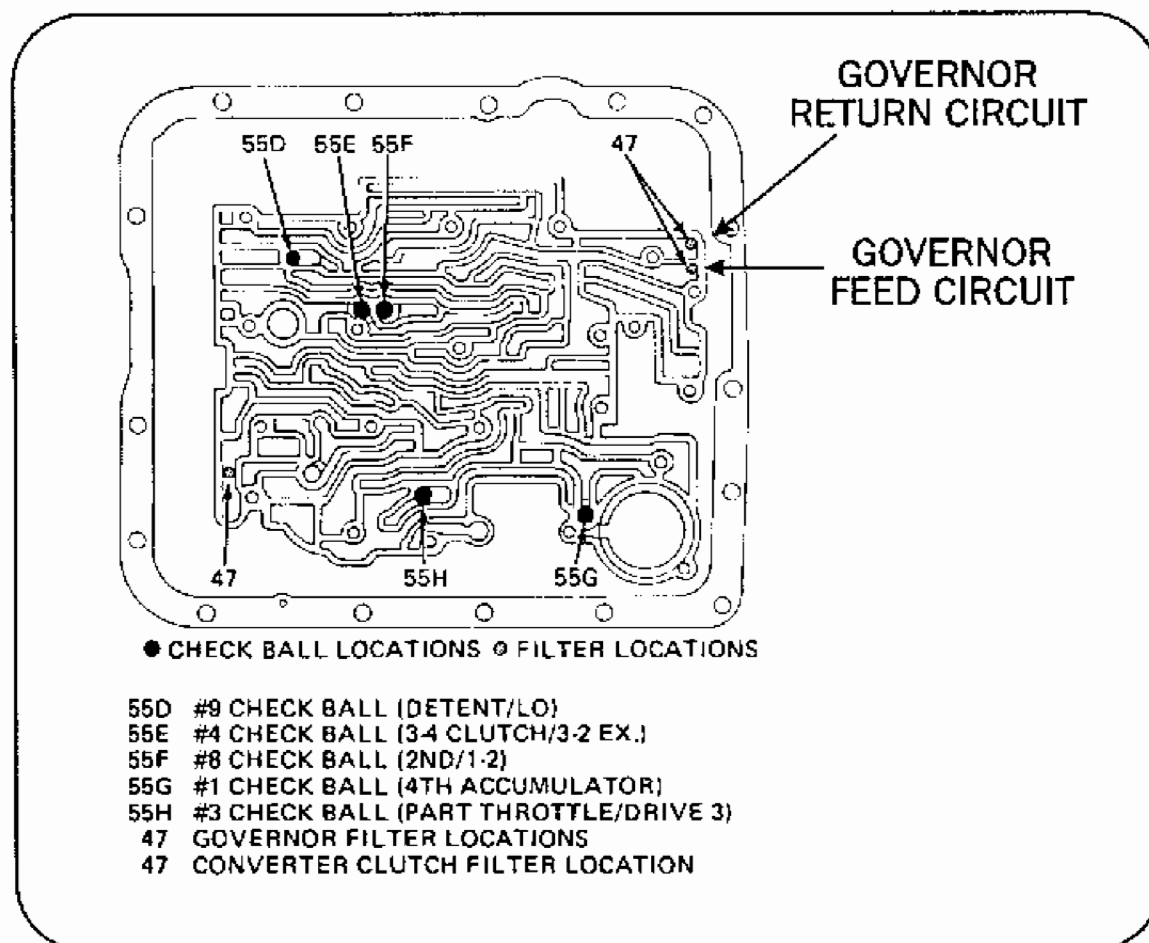


Figure 18

THM 4L60 (700-R4) REVERSE INPUT HOUSING AND CHECKBALL CHANGES FOR 1993

CHANGE: The Reverse Input Housing for ALL 1993 model THM 4L60 transmissions has the oil feed hole enlarged (Large Square Hole), from the previous .095" round feed hole (See Figure 19).

REASON: To make a "Common" Reverse Input Housing for both the THM 4L60 and the THM 4L60-E transmissions for the 1993 model year.

PARTS AFFECTED:

- (1) REVERSE INPUT HOUSING - Feed hole has been enlarged from .095" round hole to large square hole, and this is the ONLY identification as they both require the aluminum piston (See Figure 19).
- (2) VALVE BODY CASTING - Changed with the addition of checkball in location shown in Figure 20 (NOT IN BATHTUB). This checkball was added to orifice feed oil to the reverse input clutch (See Figure 20).
- (3) VALVE BODY SPACER PLATE - Orifice for the new checkball added in location shown in Figure 21, which is now the orifice for feed oil to the reverse input clutch. The 1993 spacer plate is identified with a two digit code stamped into the spacer plate as shown in Figure 21. However, the 1993 code letter can be prefixed with an "E", "G", or "H". Refer to the chart in Figure 22. Some 1992 spacer plates were also prefixed with an "E", so do compare the chart in Figure 22, with the chart in Figure 23, so as not to get the wrong spacer plate.
- (4) VALVE BODY GASKETS - Both gaskets now have a "Tear-Drop" hole at checkball and orifice location in spacer plate, instead of the round hole found in the previous gaskets (See Figure 24).
- (5) PUMP COVER SEALING RINGS - Will now be "Solid" Teflon seals for use with the new reverse input housing with the large square feed hole, and does require a new installation and re-sizing tool (See Figure 25).

INTERCHANGEABILITY:

- (1) REVERSE INPUT HOUSING - 1993 Reverse Input Housing CANNOT be used on any 1987 thru 1992 model transmission, but CAN be used to service any 1982 thru 1986 model transmission. Previous model Reverse Input Housings CANNOT be used on any 1993 models.
- (2) VALVE BODY CASTING - Can be used on previous models back thru 1998 models, as long as checkball is not installed in the new pocket. Previous model valve body CANNOT be used on any 1993 model, as there is no dam to retain new checkball in the proper location.
- (3) VALVE BODY SPACER PLATE - Not recommended to be used on any previous models, and 1992 plates WILL NOT work on 1993 models.
- (4) VALVE BODY GASKETS - New gaskets can be used on previous models back thru 1987. The previous gaskets CANNOT be used on any 1993 models, as they will block the reverse input clutch feed orifice in the spacer plate.
- (5) PUMP COVER SEALING RINGS - Will retro-fit back on ALL previous models, but will require installation and re-sizing tools J-39855-1, J-39855-2, and re-sizer J-39855-3.

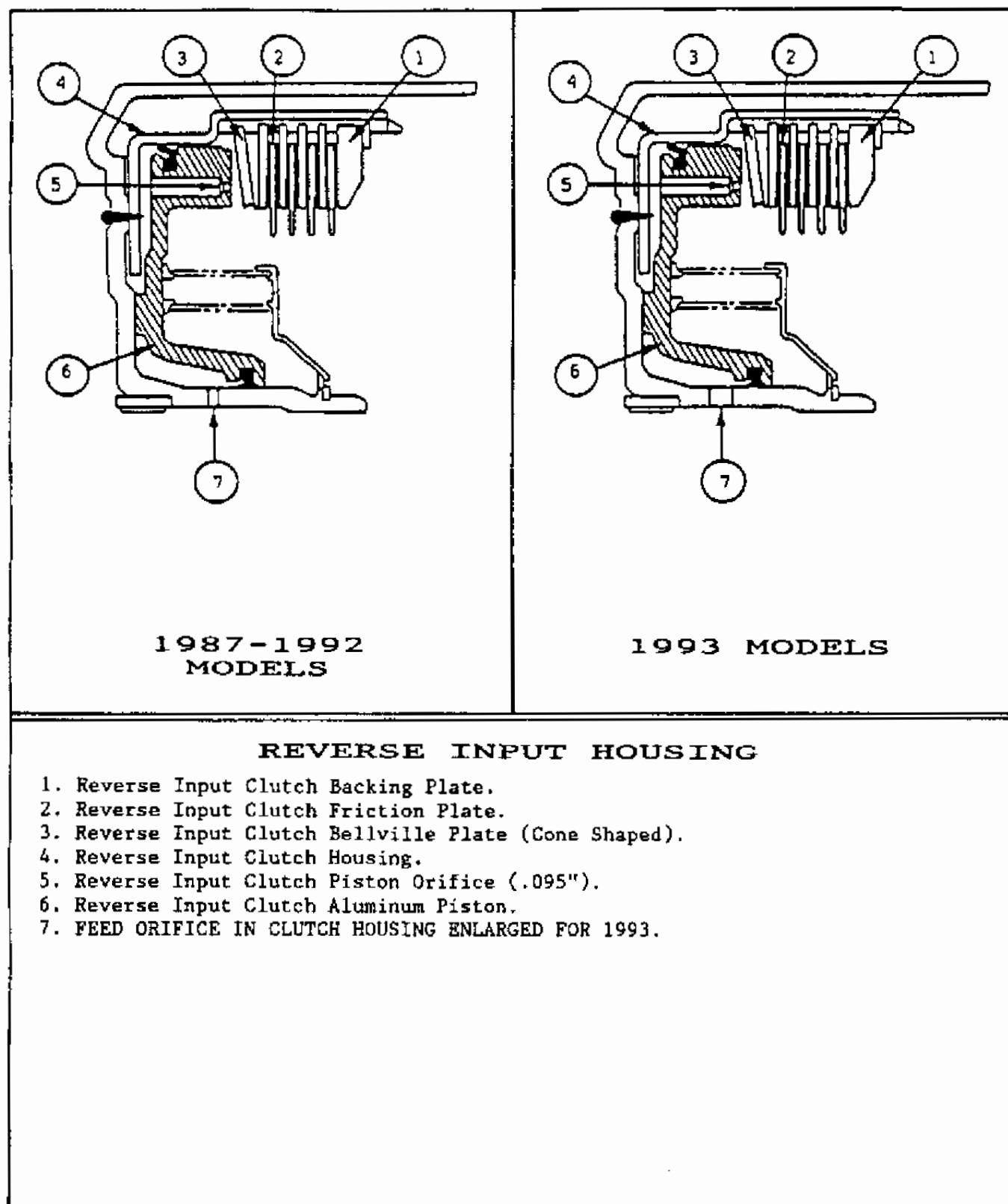
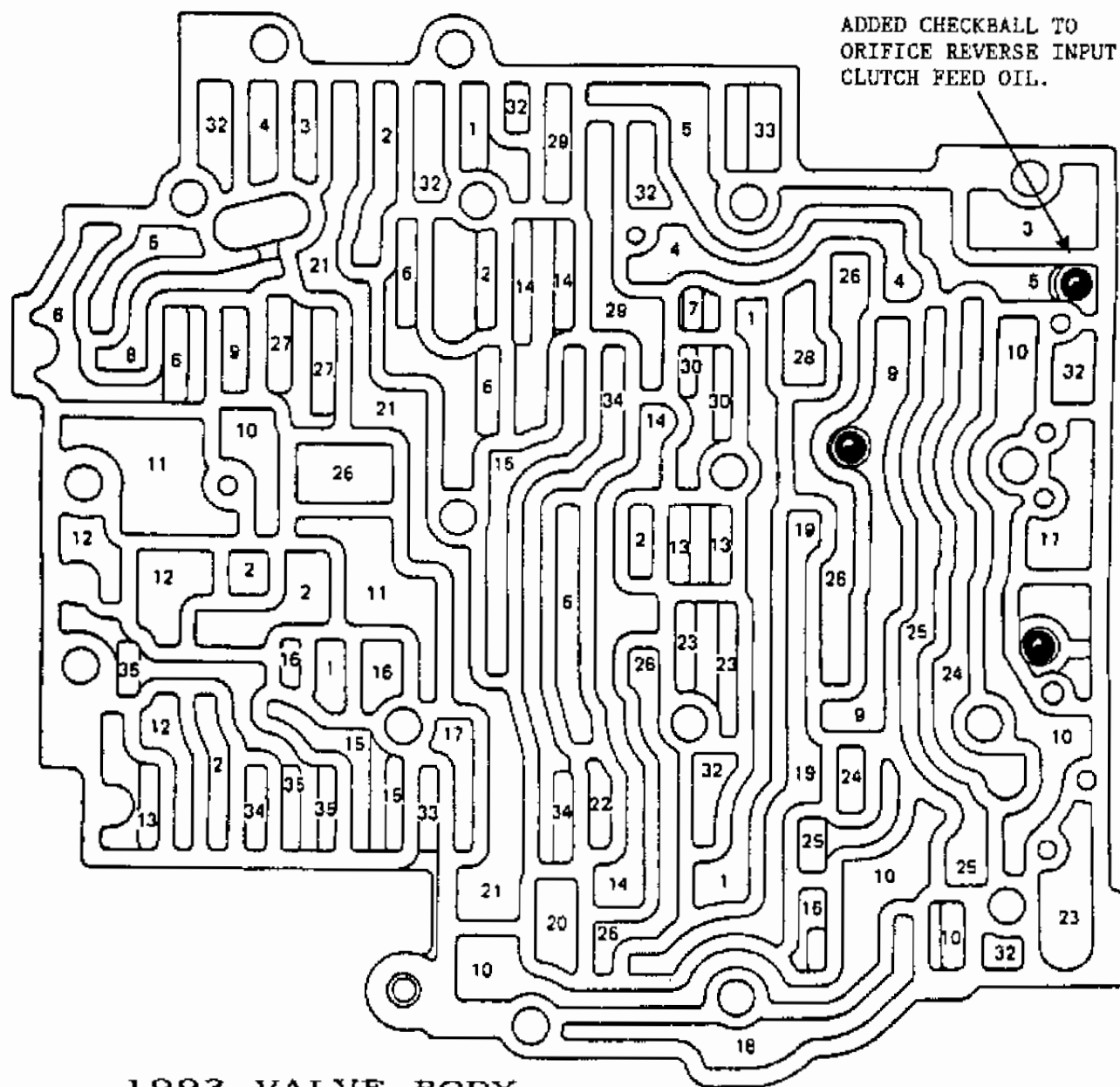


Figure 19



1993 VALVE BODY

ILL. NO.	DESCRIPTION	ILL. NO.	DESCRIPTION	ILL. NO.	DESCRIPTION
1	LINE	13	4TH SIGNAL	25	MOD. DOWN
2	D4	14	2ND CLUTCH	26	DETENT
3	D2	15	3-4 ACCUMULATOR	27	3-4 CLUTCH
4	LO	16	T.V.F.	28	DETENT/LO
5	REVERSE	17	OVERRUN CLUTCH	29	RND4-3
6	GOVERNOR	18	T.V. EX.	30	3RD CLUTCH
7	LO-1	19	D3/PART THROTTLE	31	IDENTIFICATION
8	LO/REVERSE	20	PART THROTTLE	32	VOID
9	3RD ACCUMULATOR	21	D3	33	EXHAUST
10	T.V.	22	4TH CLUTCH	34	SF
11	M.T.V.	23	C.C. SIG.	35	4-3
12	ACCUMULATOR	24	MOD. UP		

Figure 20

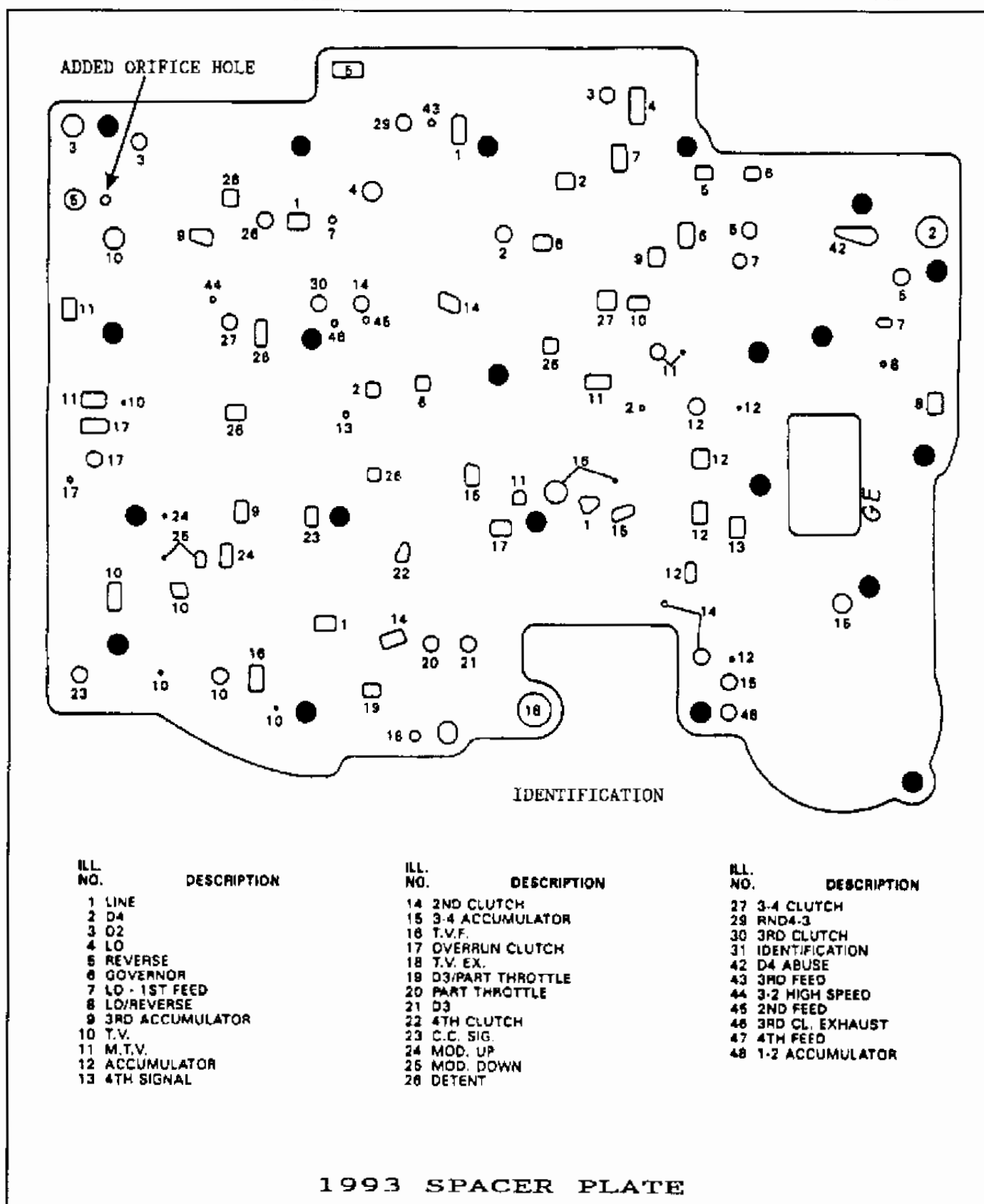


Figure 21

1993 SPACER PLATE CHART (ALL MODELS)

PART NO.	8681262	8681263	8681264	8681265	8681266	8681267
I.D. CODE	EP	ES	ET	EU	EV	EW
FITS THESE MODELS	AAM	BWM	ADM AFM	FAM FDM	HBM	HDM
PART NO.	8681268	8681269	8681270			
I.D. CODE	EX	EY	EZ			
FITS THESE MODELS	PFM	YMM	HJM			
PART NO.	8681271	8681272	8681273	8681274	8681275	8681276
I.D. CODE	GA	GB	GC	GD	GE	GG
FITS THESE MODELS	HLM	YAM YCM	YDM	BAM	BBM BHM	BCM
PART NO.	8681277	8681278	8681280	8681285	8681289	8681259
I.D. CODE	GH	GJ	GL	GS	GW	GX
FITS THESE MODELS	BPM	SAM	CPM	LHM	SFM	BRM
PART NO.	8684466					
I.D. CODE	HA					
FITS THESE MODELS	ASM					

Figure 22

1991-1992 SPACER PLATE CHART (PREFIX "E" ONLY)

PART NO. I.D. CODE	8680144 EA	8680371 EB	8680678 EC	8680677 ED	8680502 EE	8680503 EG
FITS THESE MODELS	1CNM 1CYM 1KWM 1RCM 1RDM 2CJM 2CEM 2KJM 2WCM	1AMM 1APM	YAM YCM	YDM	BAM	BWM
PART NO. I.D. CODE	8680770 EH	8680828 EJ	8681061 EK			
FITS THESE MODELS	ADM AKM	MMM MSM	CPM			

Figure 23

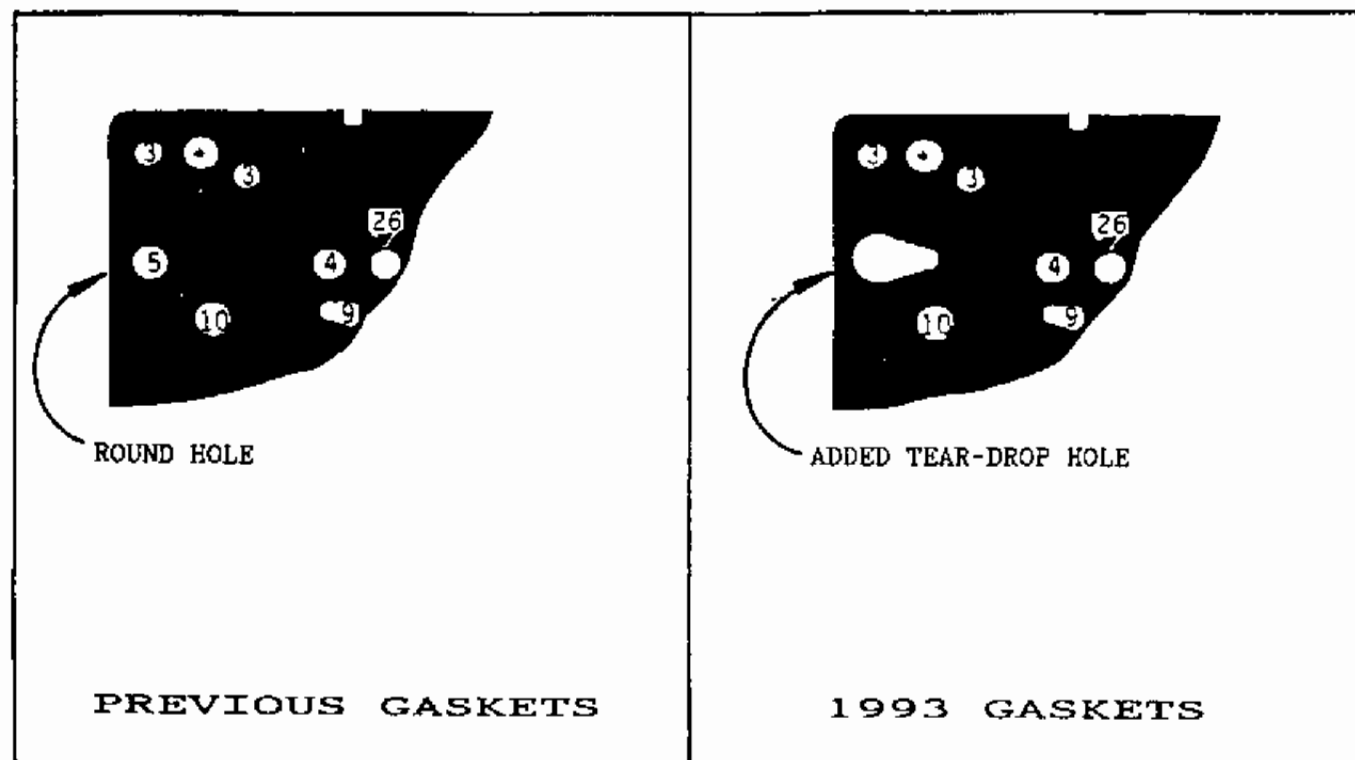


Figure 24

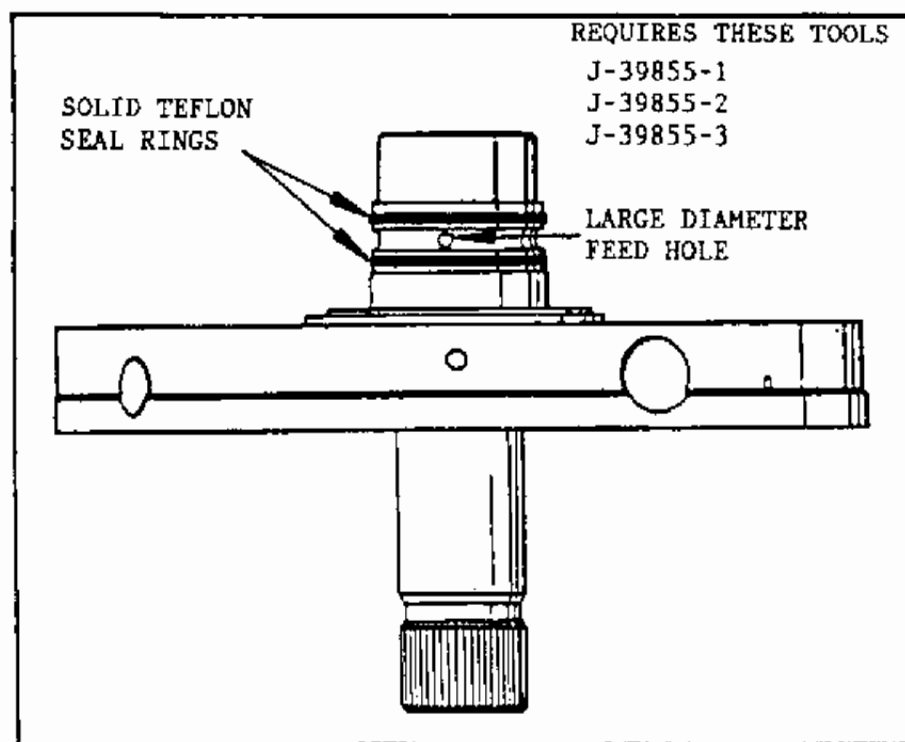


Figure 25

THM 4L60 (700-R4) REVISED ACCUMULATOR ASSEMBLY FOR SOME 1993 MODELS

Beginning with the Start of Production for 1993, SOME MODELS of the THM 4L60 (700-R4) transmissions were built with a new calibration that eliminates the 3-4 accumulator spring, and INVERTS the 1-2 accumulator piston and spring (See Figure 26).

The models affected are as follows:

3AAM, 3ADM, 3AFM, 3ASM, 3BBM, 3BCM, 3BHM, 3BRM, 3BWM.

1. This affects ALL vehicles equipped with the 5.0L engine, and 5.7L in the "B" Car, EXCEPT 5.7L POLICE CAR.

"B" Car = Chevrolet Caprice, Chevrolet Classic, Chevrolet Wagon,
Buick Roadmaster Sedan, Buick Roadmaster Wagon.

2. This affects ALL Cadillac vehicles equipped with the THM 4L60 (700-R4).

We have also provided you with the accumulator spring color code chart for ALL 1993 models of the THM 4L60 (700-R4) transmission (See Figure 27).

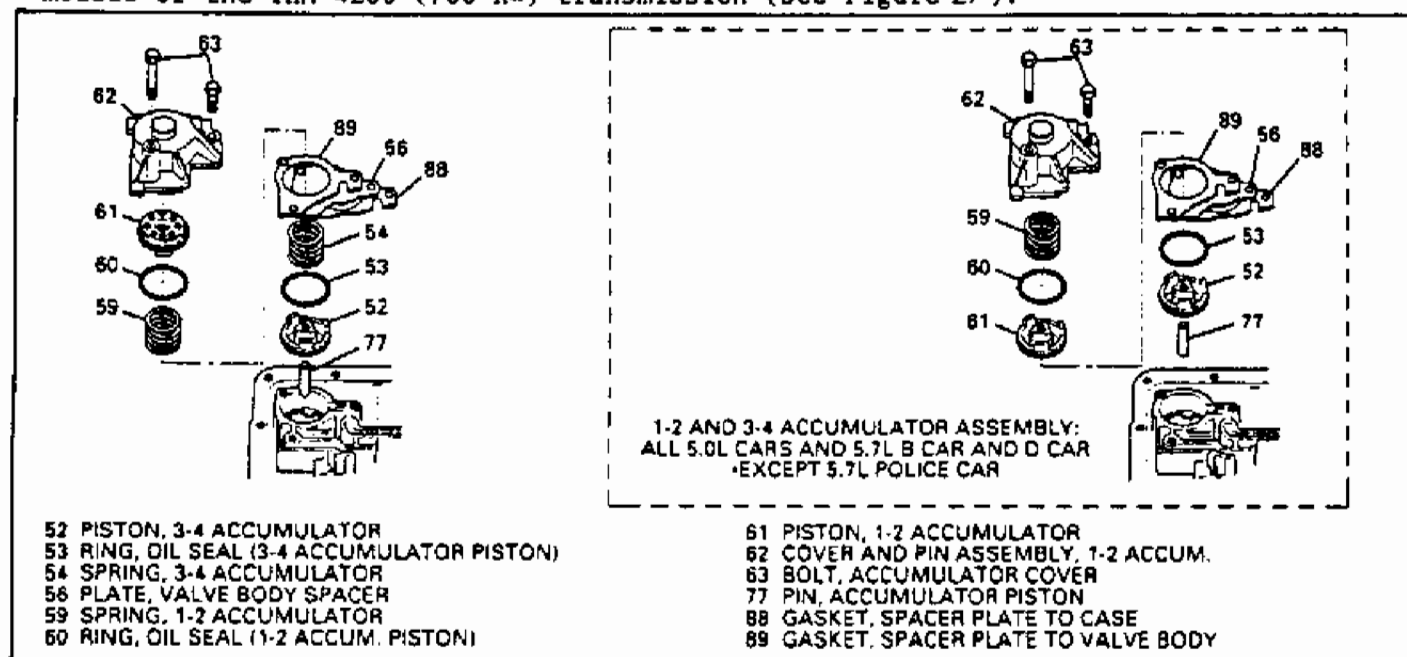


Figure 26

1993 MODELS	BCM, BWM	AAM, ADM, AFM, ASM, BBM, BHM, BRM	SAM	SFM	HBM, HLM	HJM	HDM	YAM, YCM, YDM, FFM, FMM	FAM, FOM	BFM, LHM	BAM, CPM
1-2 ACCUMULATOR SPRING COLOR	DARK GREEN	YELLOW	YELLOW	NO PAINT	DARK GREEN	VIOLET	DARK GREEN	YELLOW	YELLOW	NO PAINT	NO PAINT
3-4 ACCUMULATOR SPRING COLOR	NOT USED	NOT USED	RED	DARK GREEN	YELLOW	YELLOW	VIOLET	NO PAINT	VIOLET	NO PAINT	VIOLET

Figure 27

THM 4L60 (700-R4) CHECKBALL LOCATIONS - ALL MODELS

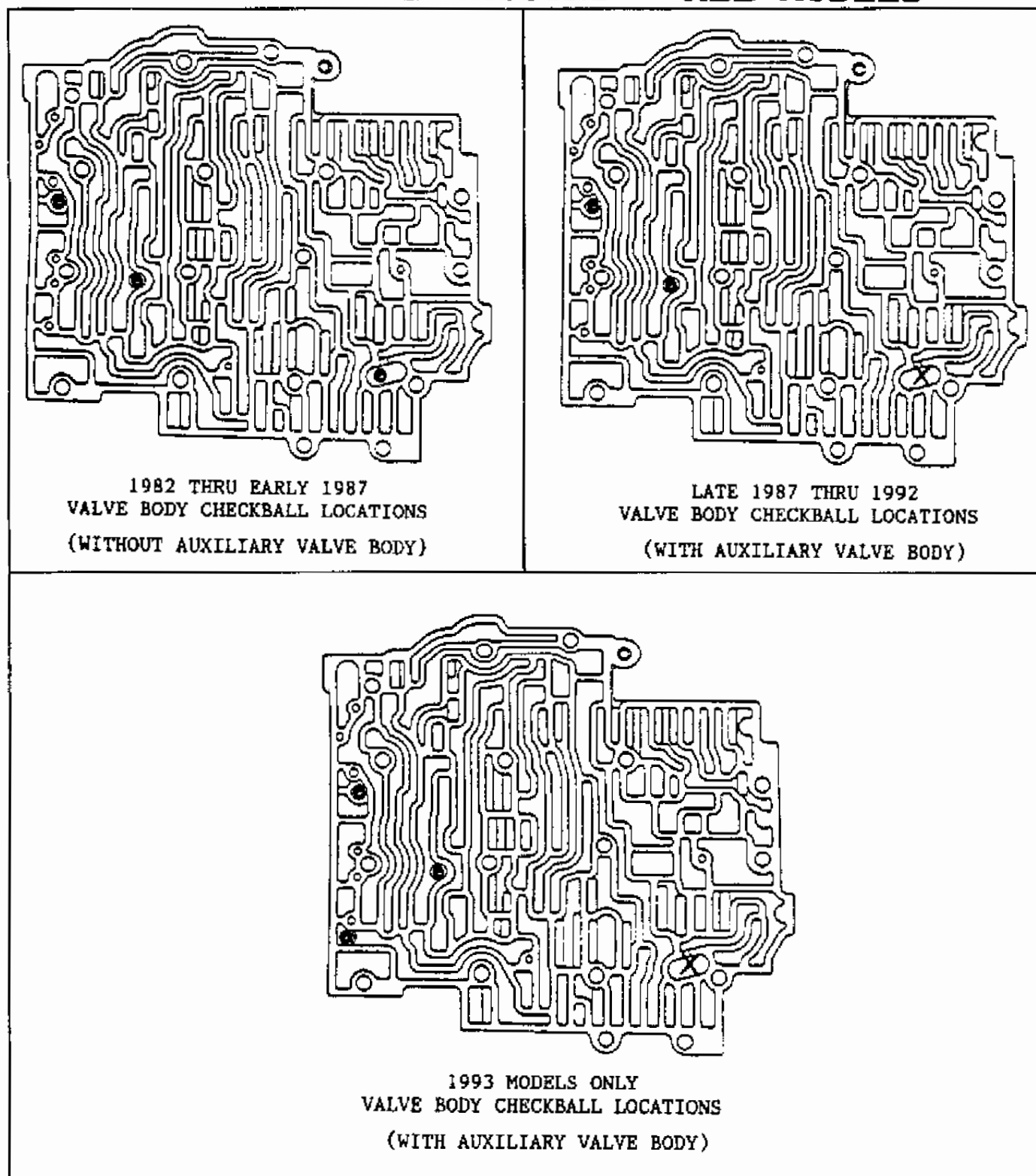


Figure 28

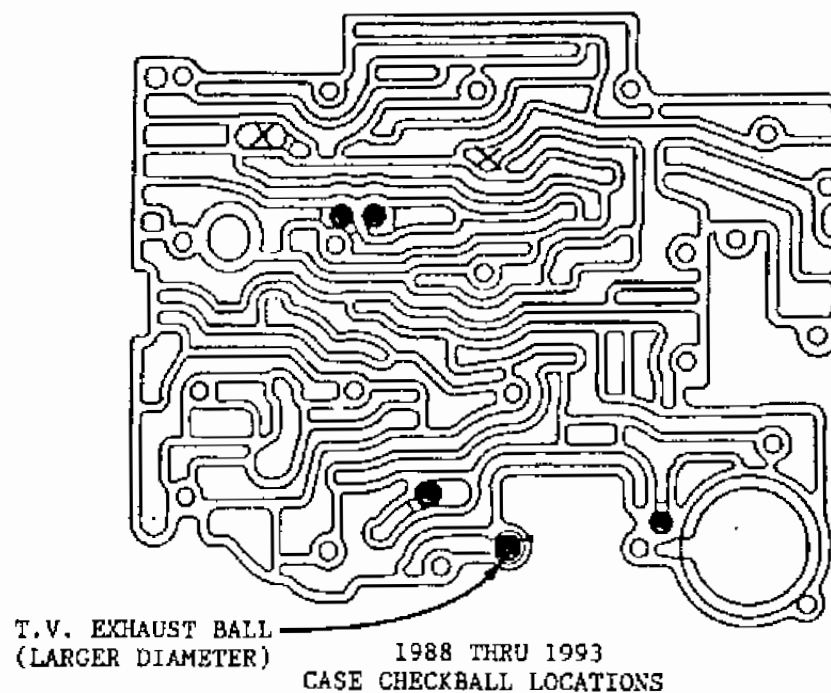
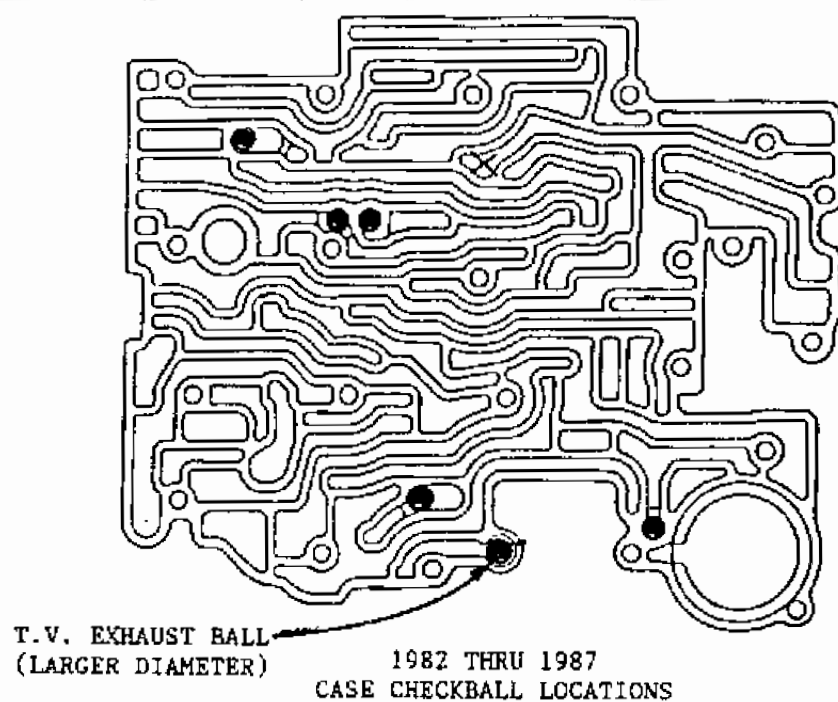


Figure 29

4T60 / 4T60E

BLOWN CHANNEL PLATE GASKETS

COMPLAINT: Channel plate gaskets upper and/or lower blown after rebuild.

CAUSE: No. 1 Using gaskets that do not have ribs manufactured into the gasket.

No. 2 Improper torque on channel plate bolts and valve body bolts.

No. 3 Out of flat mating surfaces

CORRECTION: No. 1 Use ribbed gaskets.

No. 2 Torque all bolts to proper specifications.

No. 3 Check all surfaces and replace where necessary.

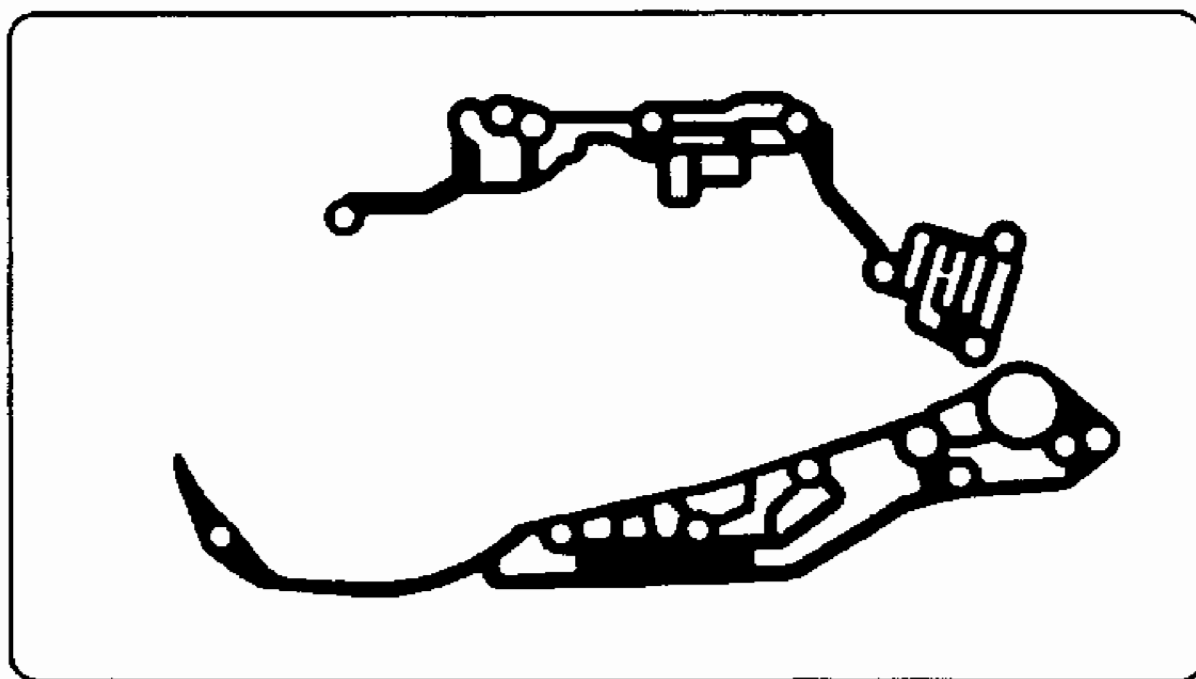


Figure 30

THM 440-T4 (4T60) NEW 1-2 BAND ASSEMBLY

CHANGE: A new style 1-2 Band Assembly (See Figure 31) went into production beginning on January 16, 1990 (Julian Date 016) in all THM 440-T4 transaxles.

REASON: To eliminate the possibility of a intermittent "No Drive" condition.

PARTS AFFECTED:

- (1) 1-2 BAND ASSEMBLY - The target area on the new 1-2 band, where the band apply pin engages, has been made wider and has "Wings" added to prevent the pin from ever missing the "Target" area (See Figure31).
- (2) 1-2 BAND STOP ASSEMBLY - The 1-2 Band Stop has been eliminated as it is no longer needed (See Figure32).

INTERCHANGEABILITY:

The new style 1-2 Band Assembly can be used to service ALL past models, but the 1-2 Band Stop MUST be removed and discarded (See Figure32).

If the new 1-2 Band Assembly is used in a case with a 1-2 Band Stop, interference may result and band durability may be affected.

SERVICE INFORMATION:

1-2 BAND ASSEMBLY (New Style)..... 8668984

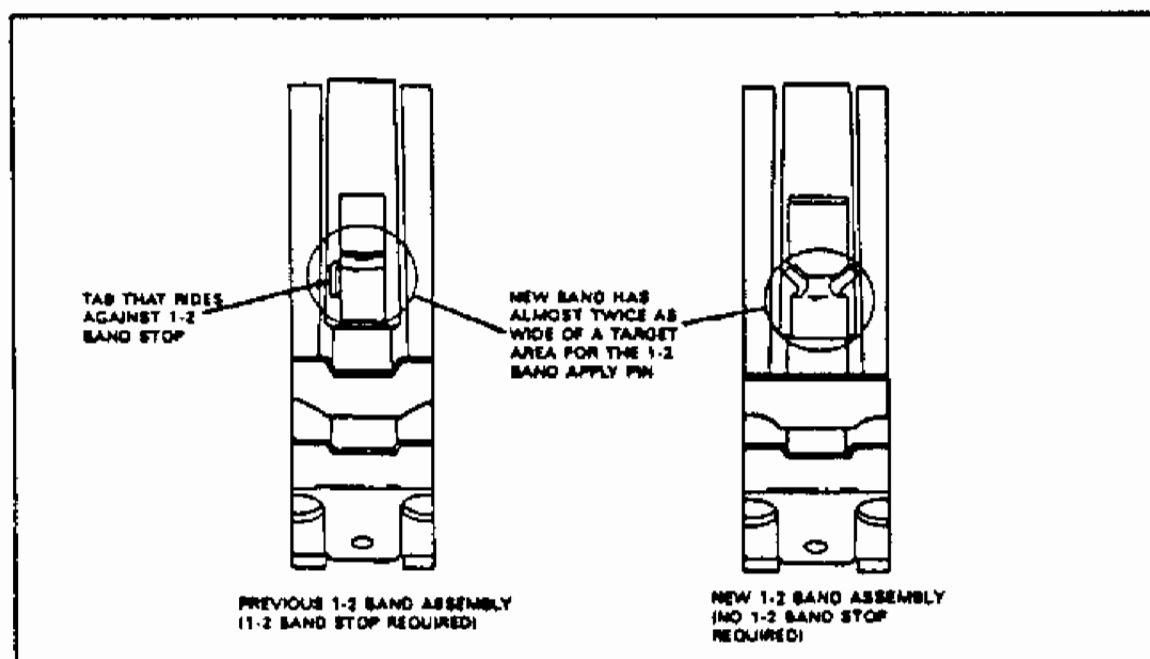


Figure 31

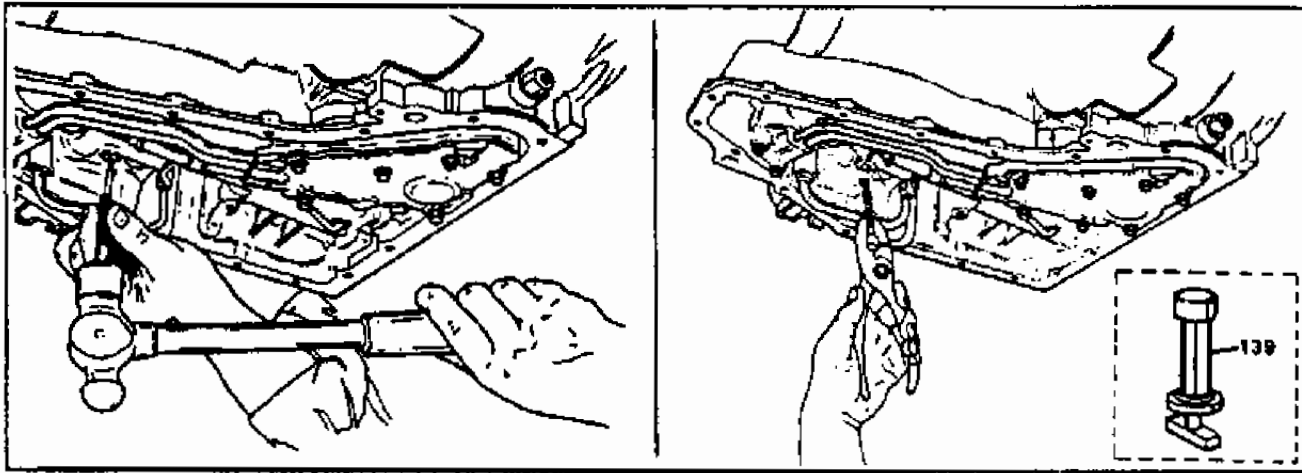


Figure 32

THM 440-T4 (4T60)**NEW REVERSE BAND ASSEMBLY**

CHANGE: A 4th design Reverse Band Assembly is now in production on all THM 440-T4 transaxles.

REASON: To help eliminate a harsh reverse apply condition.

PARTS AFFECTED:

- (1) **REVERSE BAND ASSEMBLY** - The lining on the reverse band has once again been changed, and can be identified by the "Paper" lining on the band itself (See Figure 33).

INTERCHANGEABILITY:

It will retro-fit back to all previous models and is highly recommended, to help eliminate a harsh reverse apply condition.

SERVICE INFORMATION:

Reverse Band Assembly (4th Design)..... 8675152

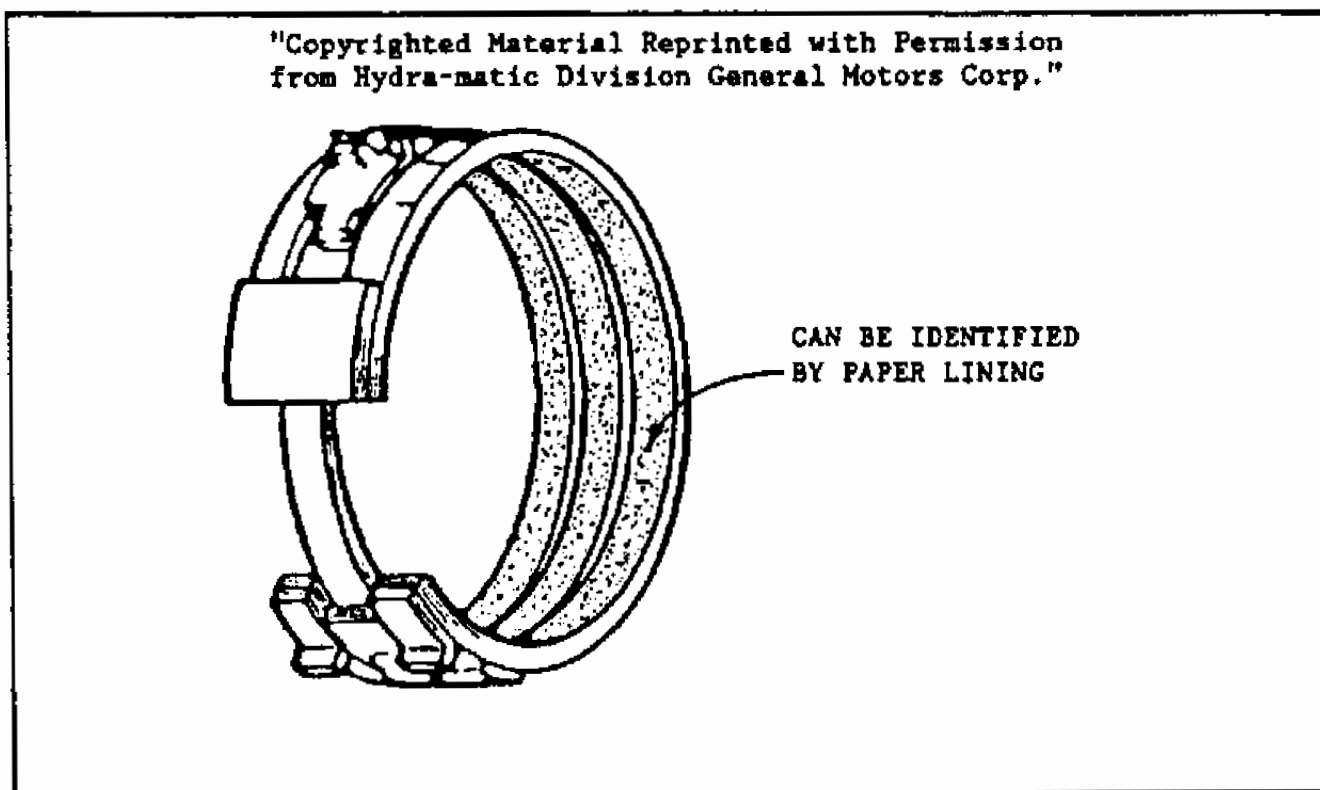


Figure 33

THM 440-T4 (4T60) INPUT CLUTCH ACCUMULATOR ELIMINATED

CHANGE: The Input Clutch Accumulator has been eliminated from the channel plate (See Figure 34).

REASON: A "Wave" plate was added to the Input Clutch Pack.

PARTS AFFECTED:

- (1) CHANNEL PLATE - The input clutch accumulator piston, piston pin, and accumulator spring have been eliminated from the channel plate, which of course changes the channel plate casting (See Figure 34).
- (2) INPUT HOUSING - Top snap ring groove moves .060" closer to the top of the input housing, to accomodate the added wave plate (See Figure 35).
- (3) INPUT CLUTCH STEEL PLATES - The steel plates are .027" thinner to help accomodate the added wave plate (See Figure 36). The new steel plates are .049" thick, and the old steel plates are .076" thick (Figure 36).
- (4) INPUT CLUTCH "STACK-UP" - The input clutch stack has also been revised to accomodate the new changes. Refer to Figure 36 for proper assembly of the new input clutches.

NOTE: BOTH PRESSURE PLATES AND FOUR LINED PLATES REMAIN THE SAME
AS PREVIOUS MODELS WITH NO DIMENSIONAL CHANGES.

INTERCHANGEABILITY:

NOT RECOMMENDED TO INTERCHANGE WITH PREVIOUS MODELS.

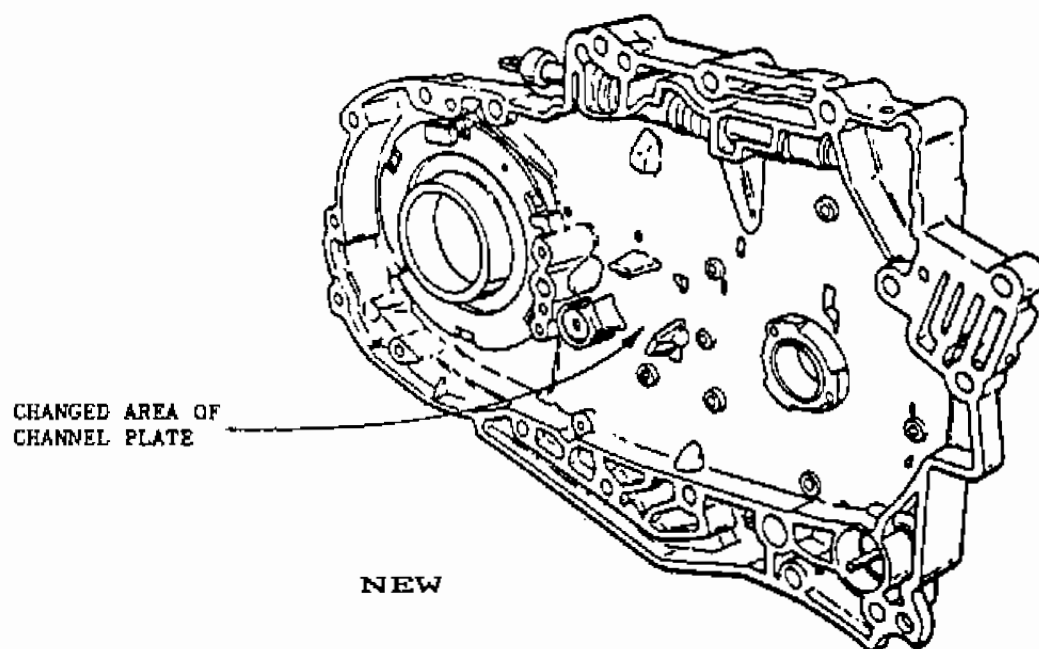
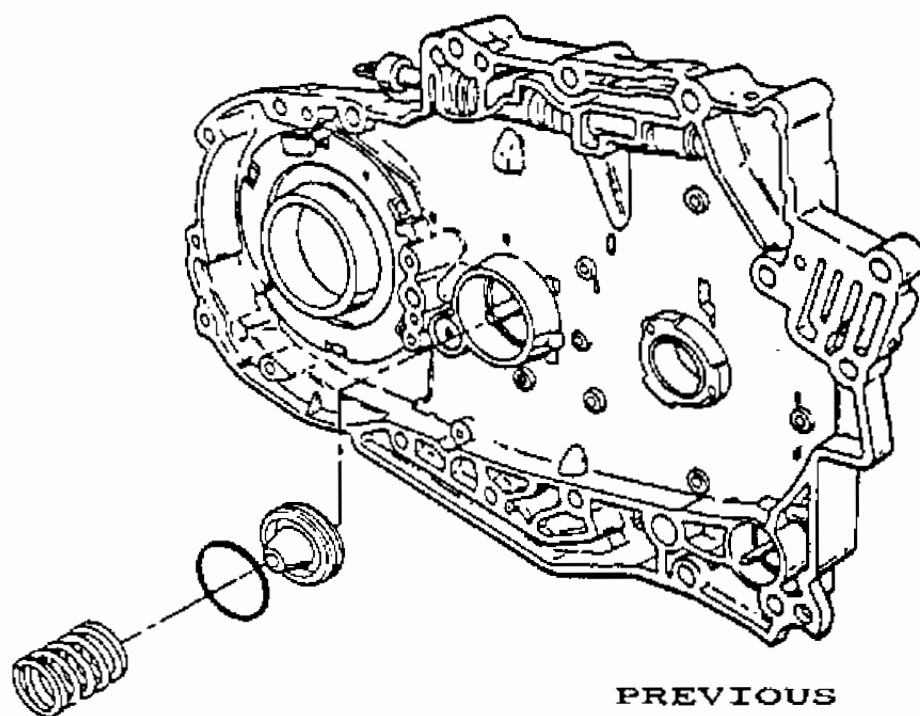


Figure 34

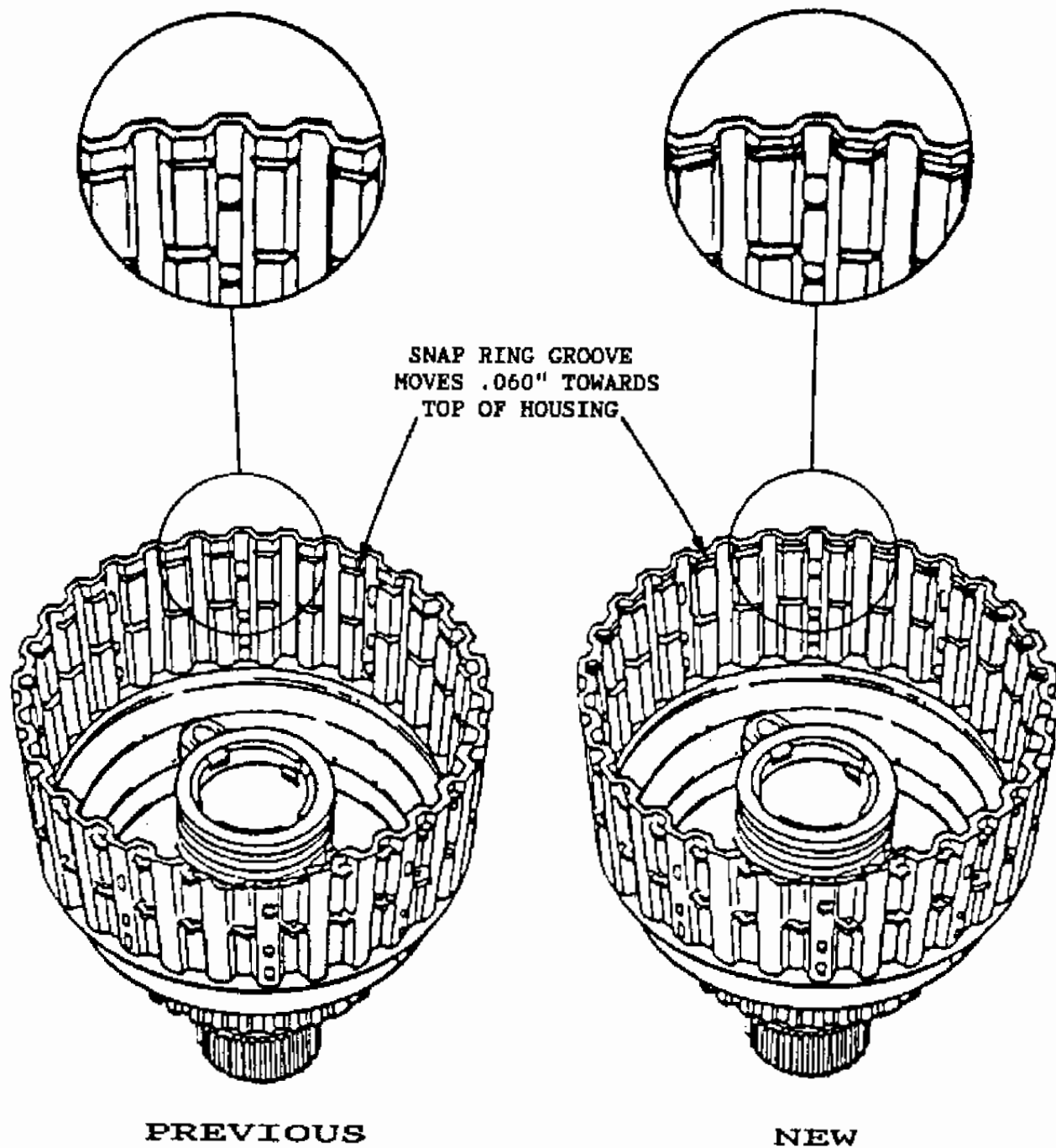


Figure 35

BOTH PRESSURE PLATES AND THE FOUR LINED PLATES
REMAIN THE SAME WITH NO DIMENSIONAL CHANGES.

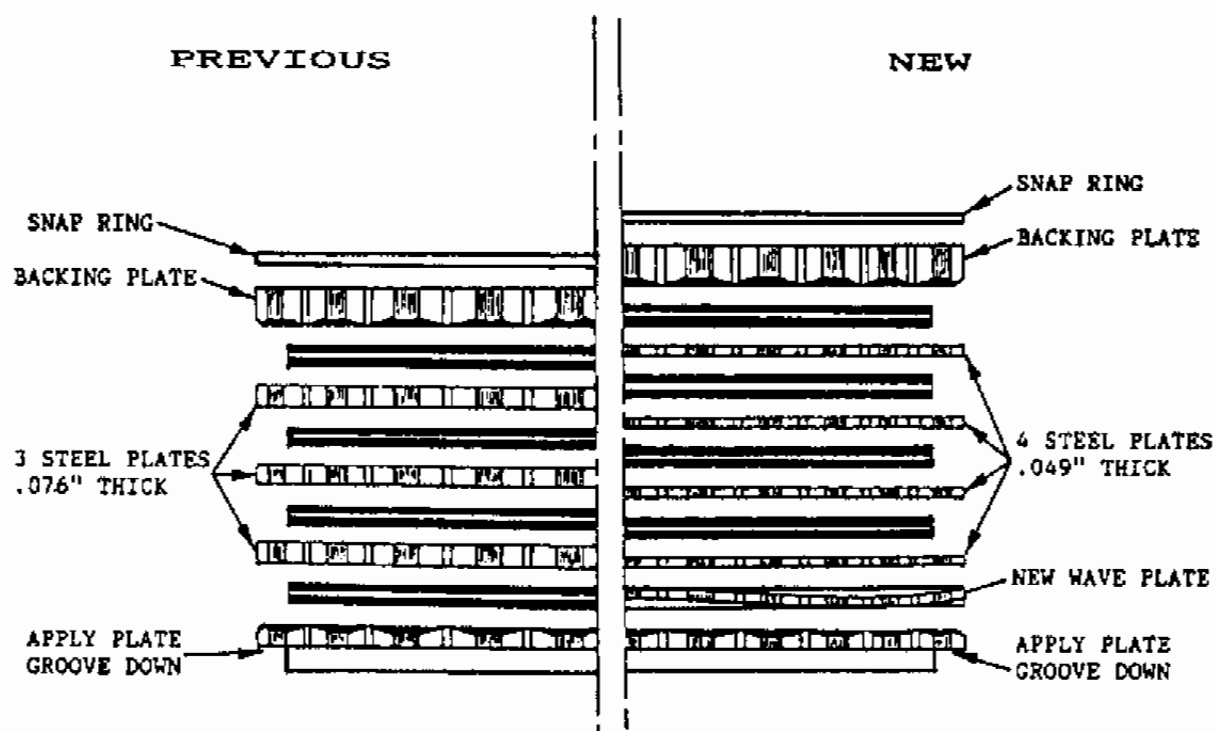


Figure36

**THM 3T40 (125C)
NO REVERSE AND/OR PREMATURE
LOW/REVERSE CLUTCH FAILURE**

- COMPLAINT:** A no reverse condition and/or low/reverse clutches badly burnt at a very low mileage.
- CAUSE:** The cause may be the Low/Reverse fluid not completely exhausting, so that the Low/Reverse clutch remains partially applied while moving in all forward gears. All reverse fluid must exhaust through the thermo element, located in the manual valve, on a reverse to drive garage shift.
- CORRECTION:** Remove and discard the thermo-element and the retaining clip, located inside the manual valve, on all vehicles so equipped (See Figure 37). This should be done as standard procedure during ALL rebuilds.

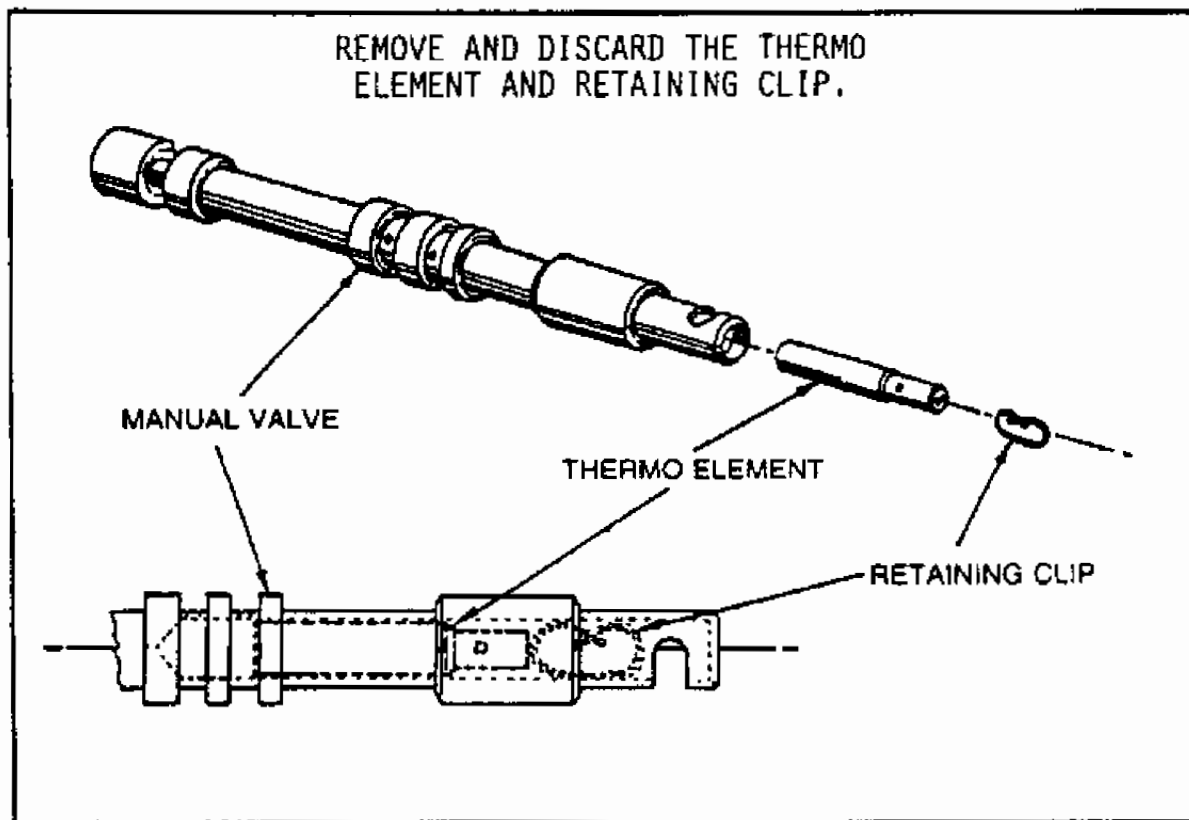


Figure 37

**THM 3T40 (125C)
NEW LOW/REVERSE CLUTCH RETURN
SPRING AND SPIRAL RETAINING RING**

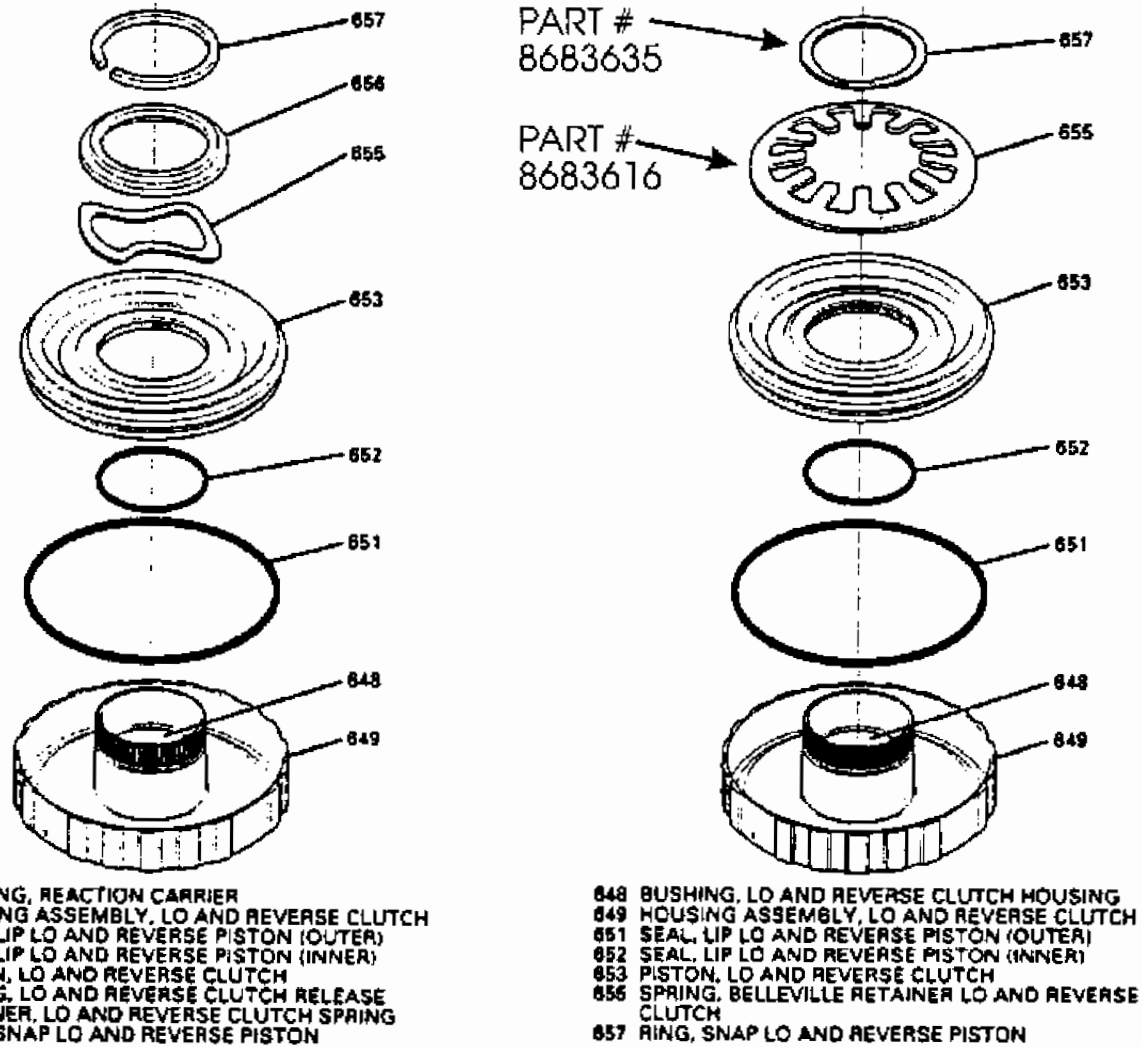
CHANGE: Beginning in 1993 models, there is a new "Belleville" return spring and spiral retaining ring found in the low/reverse clutch housing.
(See Figure38).

REASON: The current return spring rate may not be great enough to keep the piston from partially applying while in drive range.

PARTS AFFECTED:

- (1) LOW/REVERSE RETURN SPRING - Changed to the "Belleville" design instead of the previous "Wave" design, and the spring retainer is eliminated.
(See Figure38).
- (2) LOW/REVERSE RETAINING RING - Changed to a spiral retaining ring instead of the previous snap ring (See Figure38).

NOTE: NO CHANGES WERE MADE TO THE HOUSING OR PISTON.



PREVIOUS DESIGN

NEW DESIGN

Figure 38

THM 125C (3T40) REVISED WIRING DIAGRAMS

This bulletin covers revised wiring diagram information, and eight 1990 models that were added after the printing of the 1990 service manuals.
Refer to this bulletin whenever service to any 1990 wiring assembly is necessary.

REFER TO FIGURES 39 THRU 45 FOR WIRING DIAGRAMS

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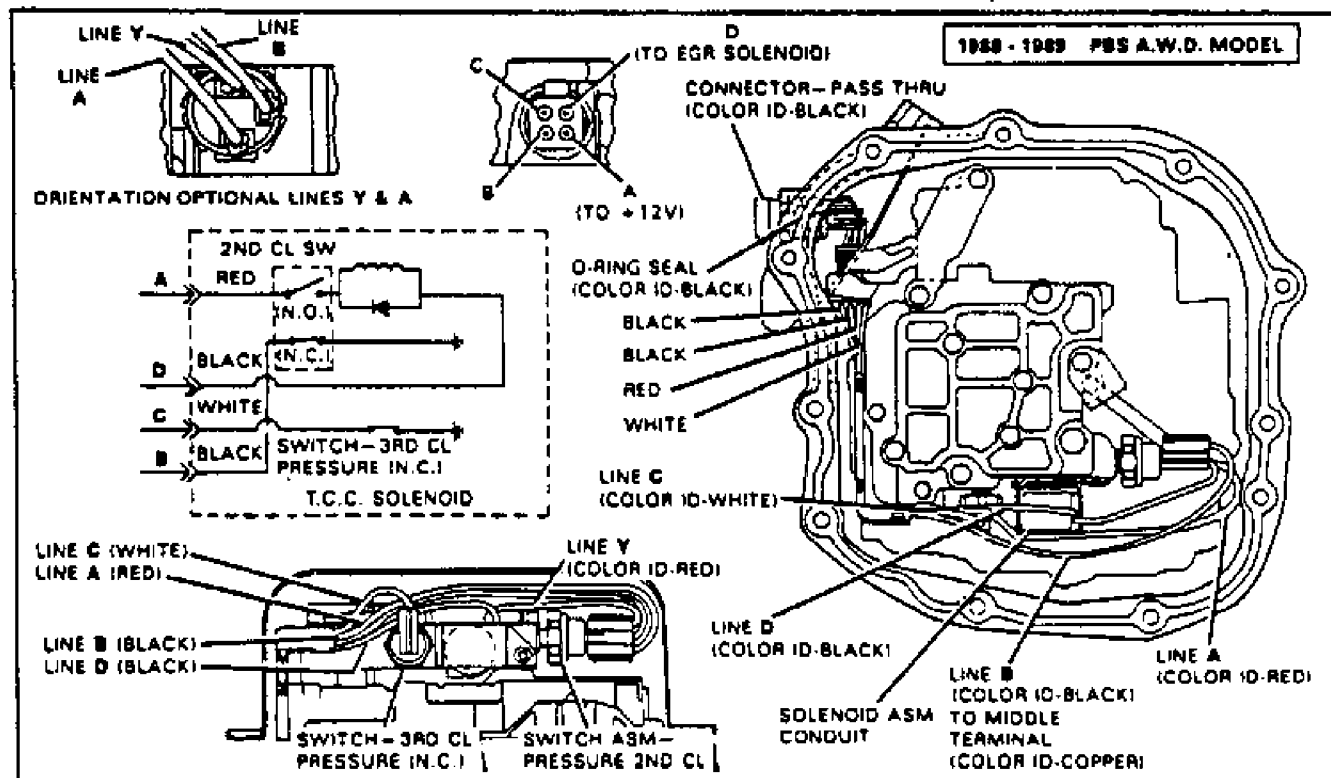


Figure 39

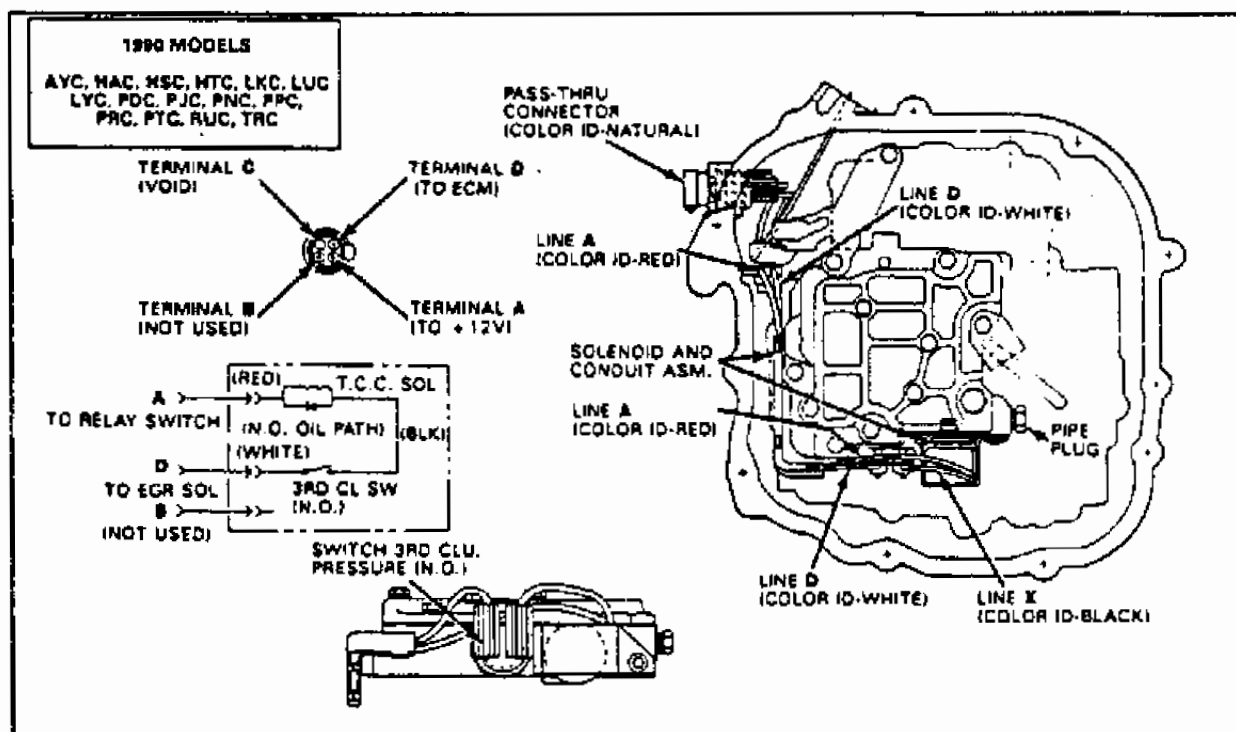


Figure 40

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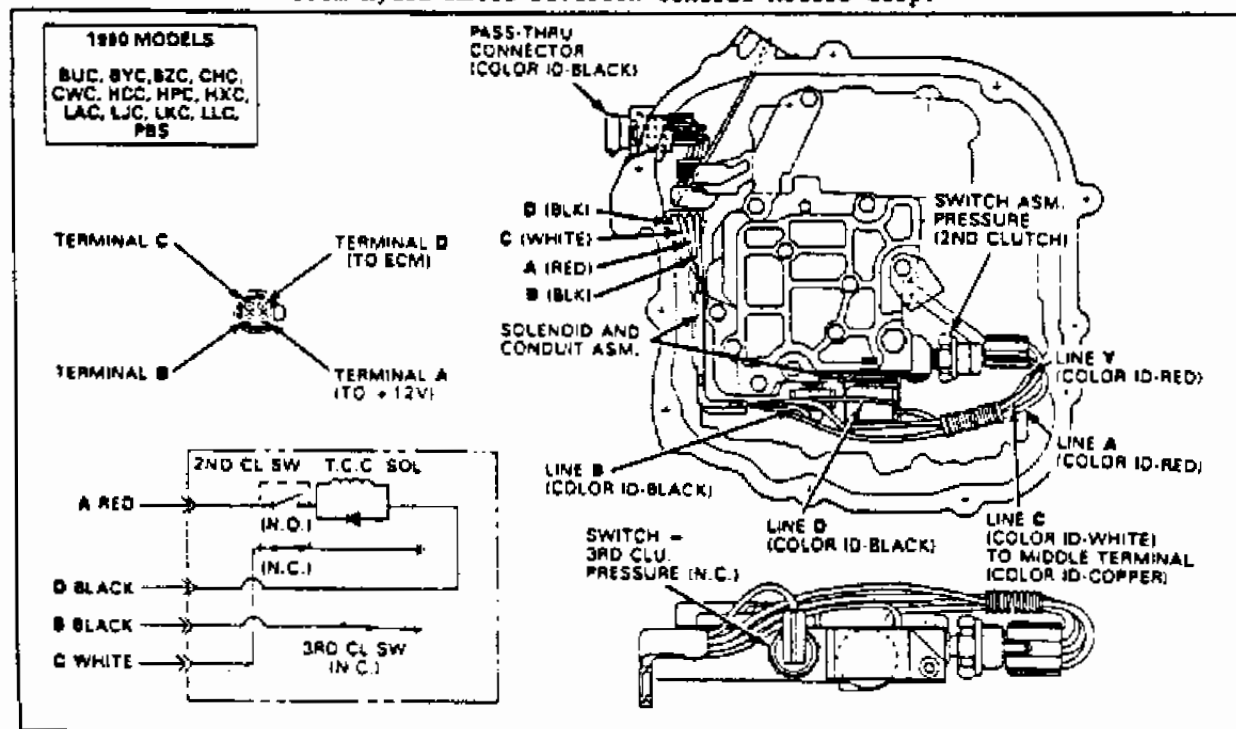


Figure 41

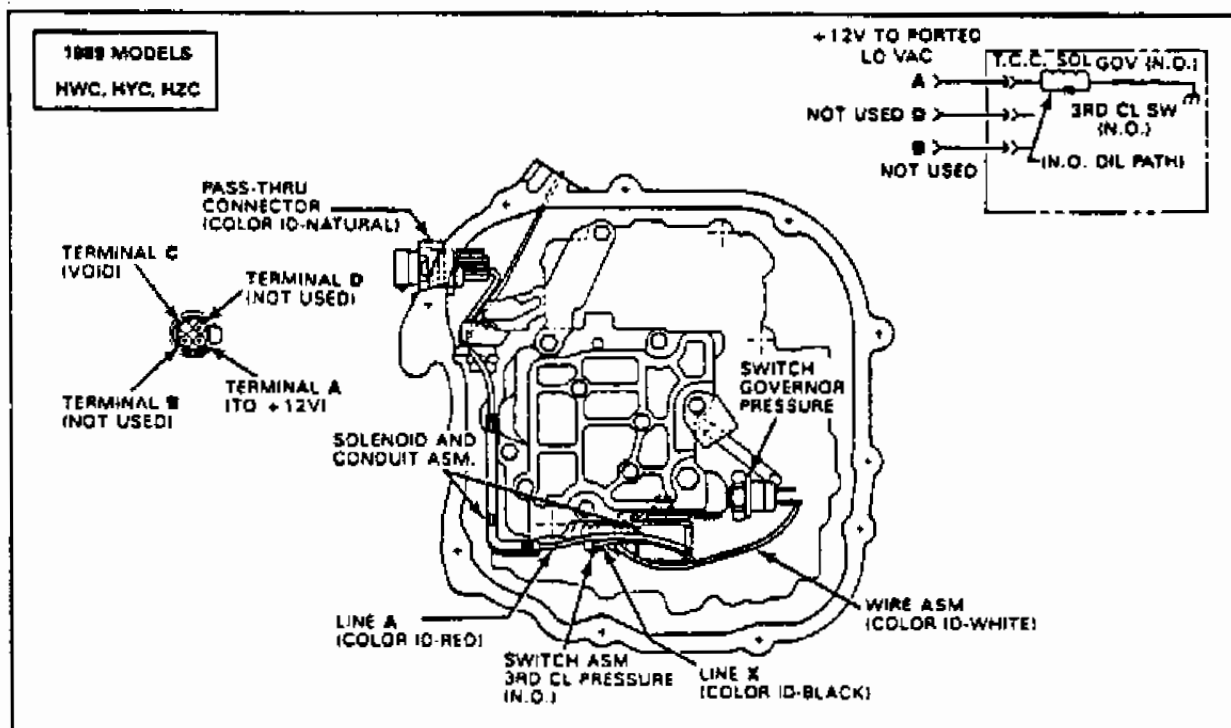


Figure 42

"Copyrighted Material Reprinted with Permission
from Hydra-matic Division General Motors Corp."

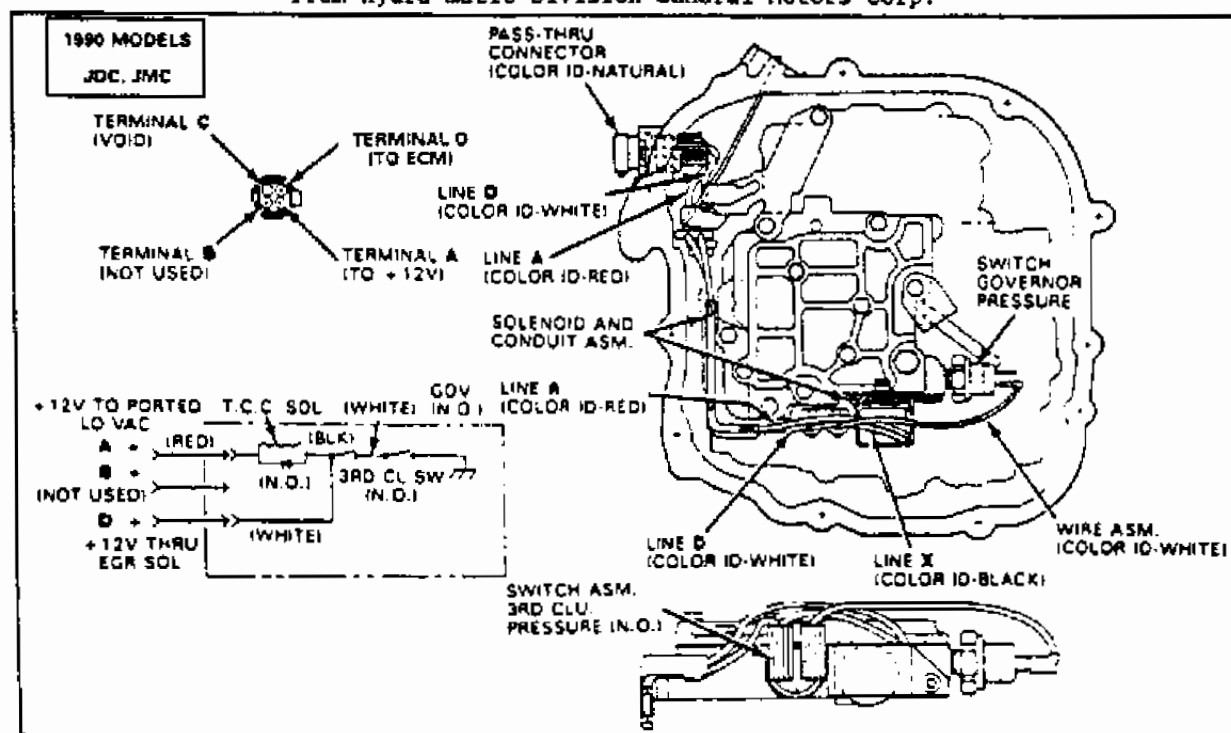


Figure 43

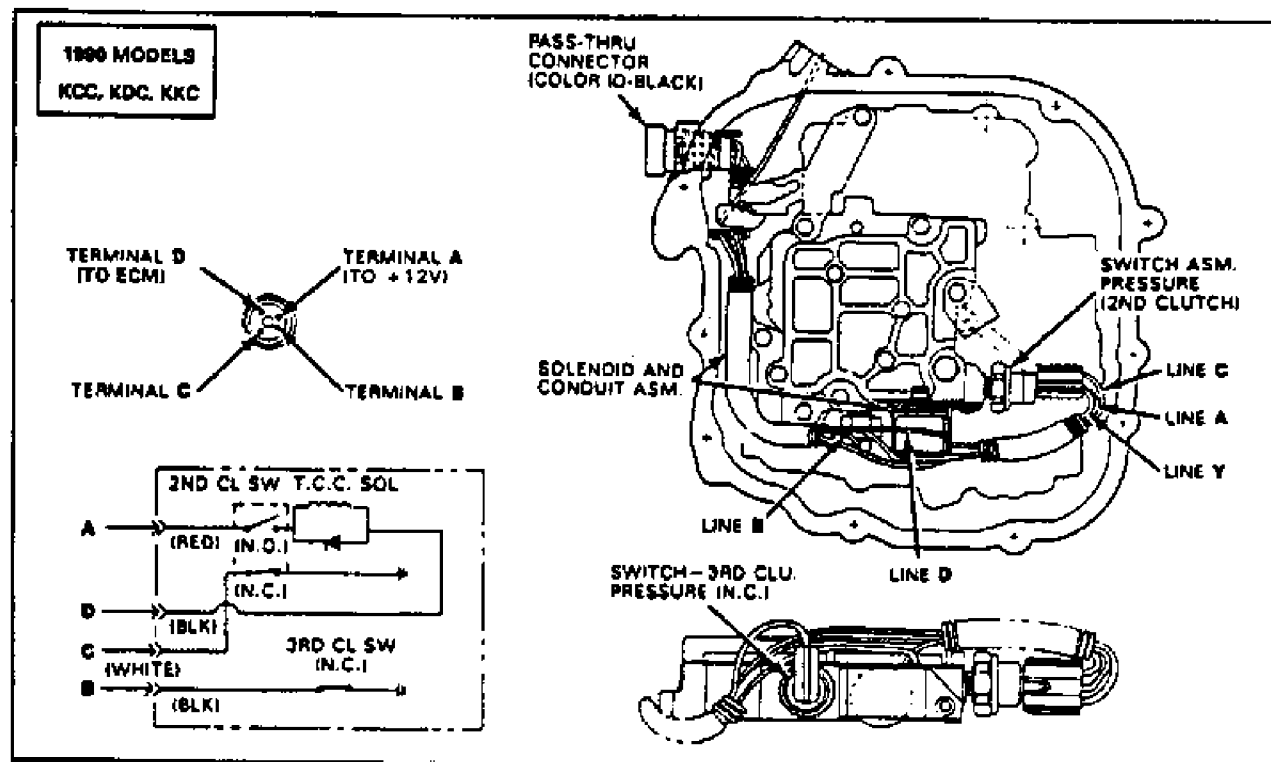


Figure 44

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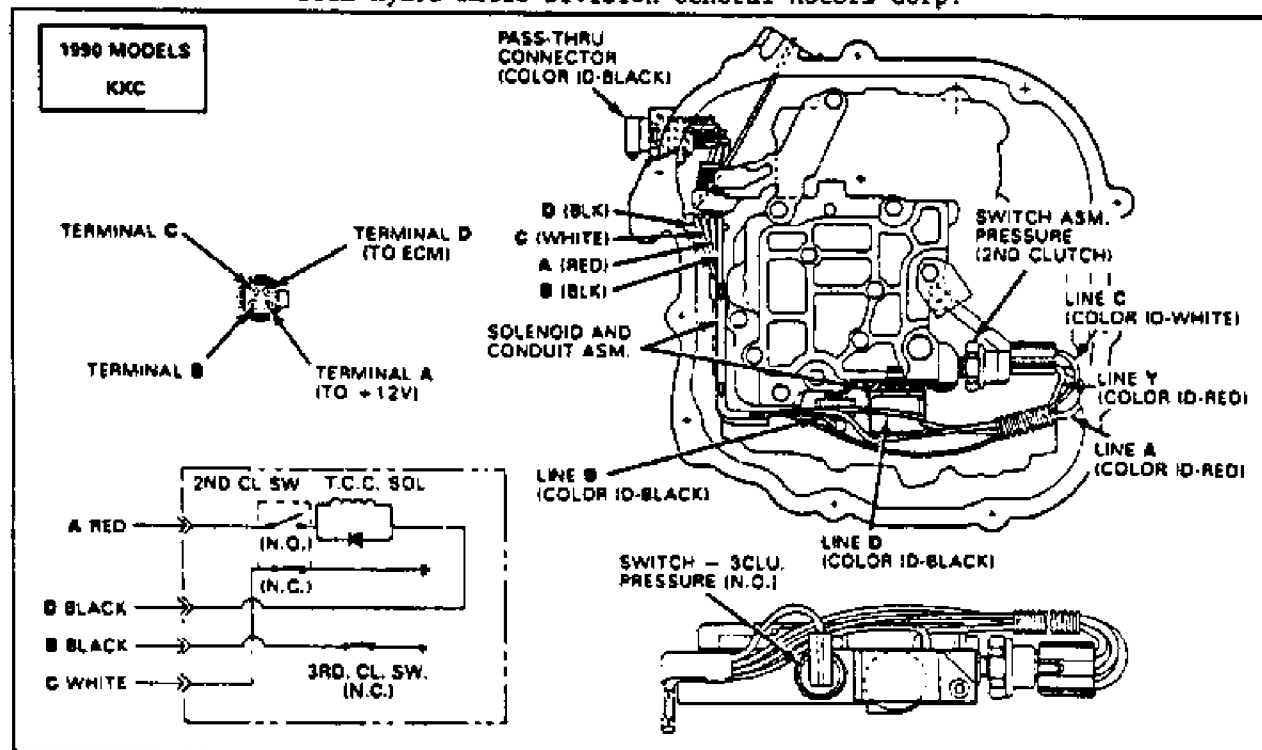


Figure 45

THM 3T40 (125C)**1988, 1989, 1990 SWITCH IDENTIFICATION****2ND CLUTCH SWITCH**

Beginning in 1988, with the introduction of the "Quad Four" engine, there was a 2nd clutch switch installed in the auxiliary valve body, located where we are used to seeing the governor switch. This required valve body and auxiliary valve body oil passage modifications that are unique to these models.

The models affected are as follows:

1988 = 8KDC

1989 = 9KCC, 9KDC, 9KRC, 9BUC, 9BYC, 9BZC

1990 = 0KDC, 0KCC, 0KXC, 0BUC, 0BYC, 0BZC, 0CHC, 0LAC, 0LJC, 0LKC, 0LLC

All of the above models use the 2nd clutch switch in the model years indicated.

The 2nd clutch switch, OEM part number 8664388, is actually two switches incorporated inside of one casing (See Figure 47). The 2nd clutch switch has three terminals, 2 "Silver" colored, and 1 "Copper" colored. The 2 silver colored terminals is a "Normally Open" switch and relays 12V signal to the TCC solenoid. The 1 copper colored terminal is a "Normally Closed" switch, that is completed to ground (See Figure 47).

This requires that the wires be connected properly, as the wires and connectors are separate.

1. Red wire with red connector, goes to - either "Silver" terminal.
2. Red wire with red connector, goes to - either "Silver" terminal.
3. Blue wire with blue connector, goes to - "Copper" colored terminal.

NOTE: IF THE WIRES ARE CONNECTED IMPROPERLY:

- (1) MAY CREATE A NO LOCK-UP CONDITION.
- (2) MAY SEND 12V SIGNAL TO ECM, WHICH MAY DESTROY THE ECM.
- (3) MAY BLOW A FUSE THE INSTANT THE KEY IS TURNED ON.

CASE CONNECTOR

Beginning in 1988, with the introduction of the "Quad Four" engine, there was a round case connector introduced that is unique to 1988 and 1989 models. On the 1990 models they went back to the square, black, 4 terminal case connector.

Use the chart provided in Figure 46 to determine which case connector to use, and Figure 49 for identification of the case connectors.

3RD CLUTCH SWITCHES

Beginning in 1988, with the introduction of the "Quad Four" engine, there were four (4) different 3rd clutch switches used depending on model, and they WILL NOT interchange.

- (1) 3rd Clutch Switch, OEM part number 8643710, is a "Normally Open", 2 terminal switch (See "A" in Figure 48).
- (2) 3rd Clutch Switch, OEM part number 8664387, is a "Normally Open", single terminal switch, identified by silver case and silver front. (See "B" in Figure 48).
- (3) 3rd Clutch Switch, OEM part number 8665355, is a "Normally Closed", single terminal switch, identified by olive drab case and black front. (See "C" in Figure 48).
- (4) 3rd Clutch Switch, OEM part number 8666603, is a "Normally Closed", single terminal switch, with "Push-in" base and mounting bracket. (See "D" in Figure 48).

Notice that switch "B" and "C" are single terminal switches, that screw in to the auxiliary valve body. However, switch "B" is "Normally Open", and switch "C" is "Normally Closed", and they will not interchange.

Switch "B" was used in only two model years, 1988 and 1989, in 1990 they went back to the "Normally Closed" switch "C".

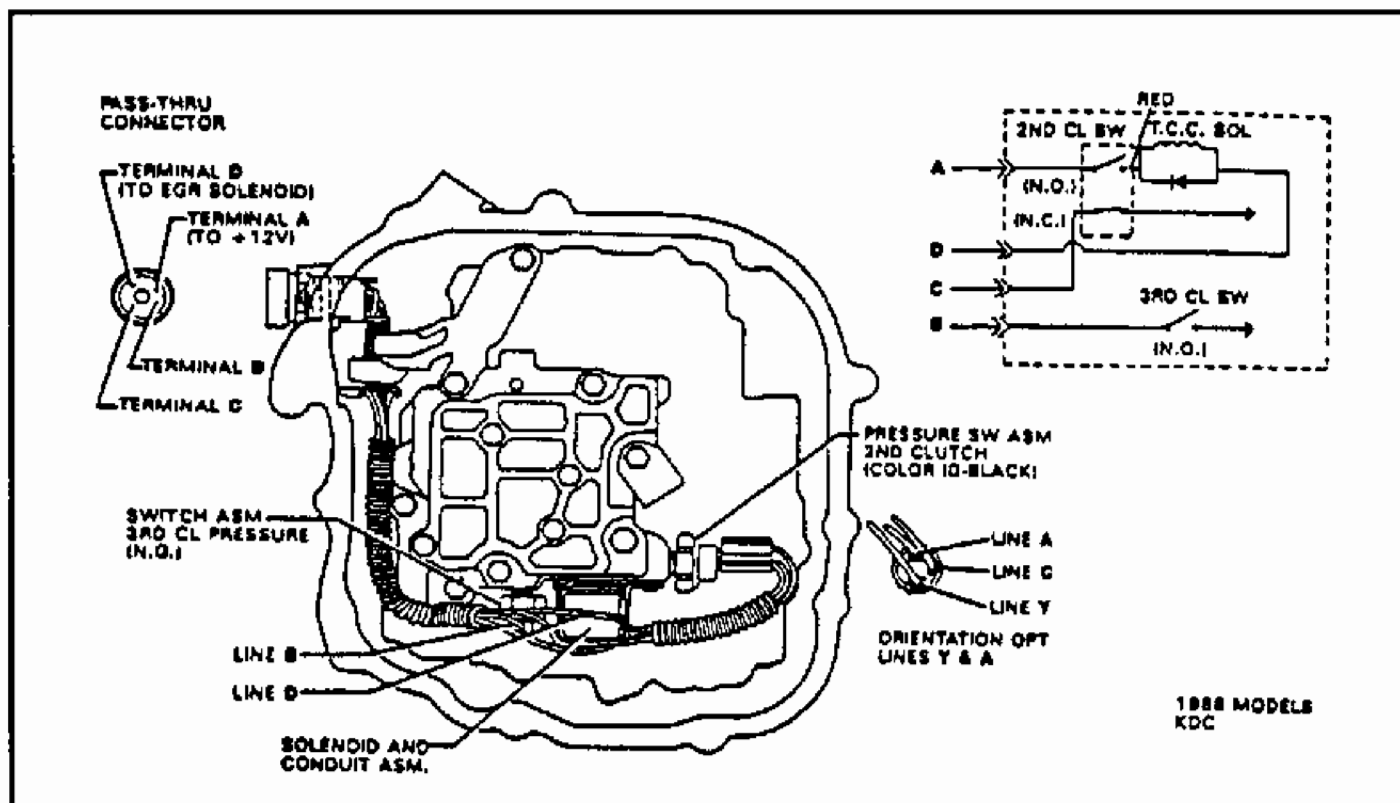
Use the chart provided in Figure 46 to determine which 3rd clutch switch to use, and Figure 48 to identify the 3rd clutch switches.

1988 MODELS				
MODELS	2ND CLUTCH SWITCH	3RD CLUTCH SWITCH	SOLENOID	CASE CONNECTOR
8BHC, 8BJC, 8CBC, 8CJC, 8CMC, 8CPC, 8CRC, 8CTC, 8CUC, 8LSC, 8PDC, 8PKC, 8PMC, 8PNC, 8POC, 8PPC, 8PRC, 8PSC, 8PTC, 8PUC, 8PZC, 8TNC, 8TRC,	NONE	8643710	8652379	8634383
8KDC,	8664388	8664387	8665016	8665015

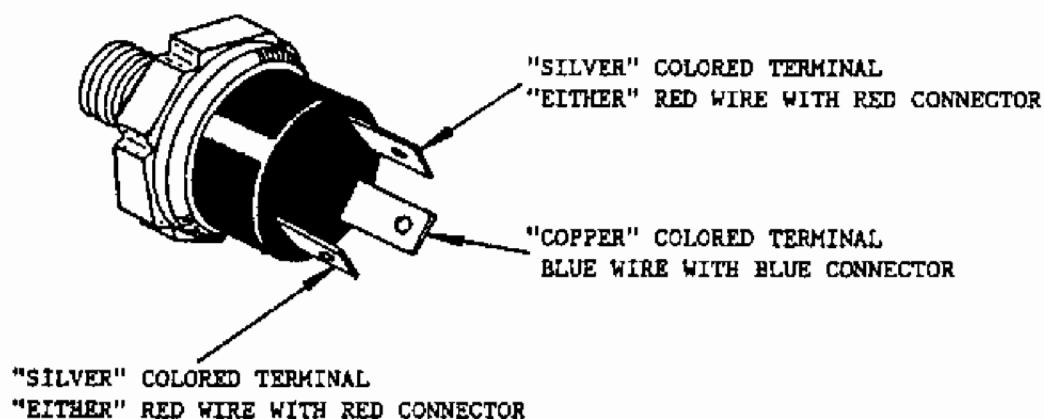
1989 MODELS				
MODELS	2ND CLUTCH SWITCH	3RD CLUTCH SWITCH	SOLENOID	CASE CONNECTOR
9CBC, 9CJC, 9CRC, 9CTC, 9CUC, 9PDC, 9PMC, 9PNC, 9PPC, 9PRC, 9PTC, 9RTC, 9RUC, 9TRC,	NONE	8643710	8652379	8634383
9KCC, 9KDC, 9KRC,	8664388	8664387	8665016	8665015
9BUC, 9BYC, 9BZC,	8664388	8665355	8665465	8662395

1990 MODELS				
MODELS	2ND CLUTCH SWITCH	3RD CLUTCH SWITCH	SOLENOID	CASE CONNECTOR
0AYC, 0HSC, 0LUC, 0LYC, 0PDC, 0PJC, 0PNC, 0PPC, 0PRC, 0PTC, 0RUC, 0TRC,	NONE	8634710	8652379	8634383
0CHC, 0KDC, 0KKC, 0KXC, 0LAC, 0LJC, 0LKC, 0LLC,	8664388	8665355	8665465	8662395
0BUC, 0BYC, 0BXC,	8664388	8666603	8665465	8662395

Figure 46



2ND CLUTCH SWITCH



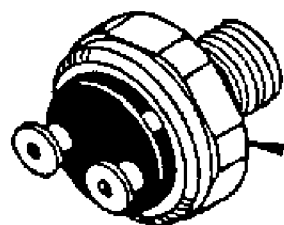
NOTE: IF THE WIRES ARE CONNECTED IMPROPERLY:

- (1) MAY CREATE A NO LOCK-UP CONDITION.
- (2) MAY SEND 12V SIGNAL TO ECM, WHICH MAY DESTROY THE ECM.
- (3) MAY BLOW A FUSE THE INSTANT THE KEY IS TURNED ON.

Figure 47

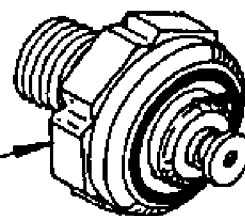
3RD CLUTCH SWITCHES

SWITCH "A"



"NORMALLY OPEN", TWO TERMINAL
OEM PART NUMBER 8643710

SWITCH "B"

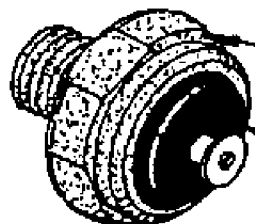


SILVER
FRONT

SILVER CASE

"NORMALLY OPEN", SINGLE TERMINAL
OEM PART NUMBER 8664387

SWITCH "C"

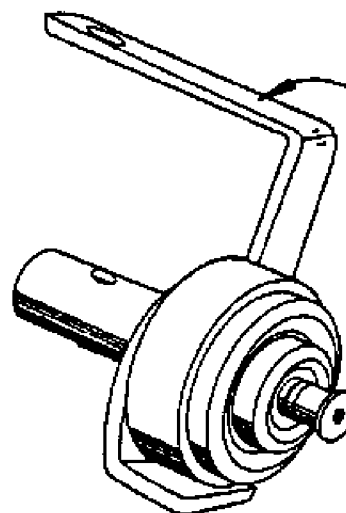


OLIVE DRAB
COLOR CASE

BLACK
FRONT

"NORMALLY CLOSED", SINGLE TERMINAL
OEM PART NUMBER 8665355

SWITCH "D"

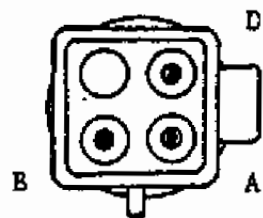


MOUNTING
BRACKET

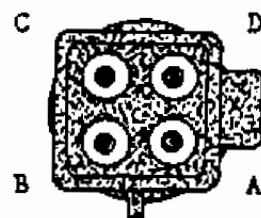
"NORMALLY CLOSED", SINGLE TERMINAL
OEM PART NUMBER 8666603

Figure 48

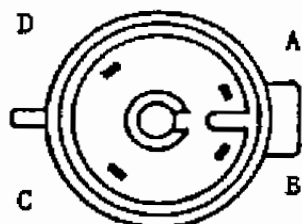
CASE CONNECTORS



SQUARE, NATURAL COLOR
THREE TERMINAL
OEM PART NO. 8634383



SQUARE, BLACK COLOR
FOUR TERMINAL
OEM PART NO. 8662395



ROUND, NATURAL COLOR
FOUR TERMINAL
OEM PART NO. 8665015

Figure 49

THM 125-C 2ND GEAR STARTS

COMPLAINT: 2nd gear starts occasionally, especially cold. If pulled into 1st manually, it downshifts to 1st and then the upshifts seem normal.

CAUSE: If the valve body and the auxillary valve body are not mismatched, the problem may be a poor compression of the valve body gaskets. This will send too much oil to the governor.

CORRECTION: Re-torque All of the 6 mm. valve body bolts to 8 Ft Lbs. and All of the 8 mm. valve body bolts to 18 Ft. Lbs. If 2nd gear starts are still a problem, remove the spring from the "primary"(Large) weight of the governor and discard it. (See Figure 1)

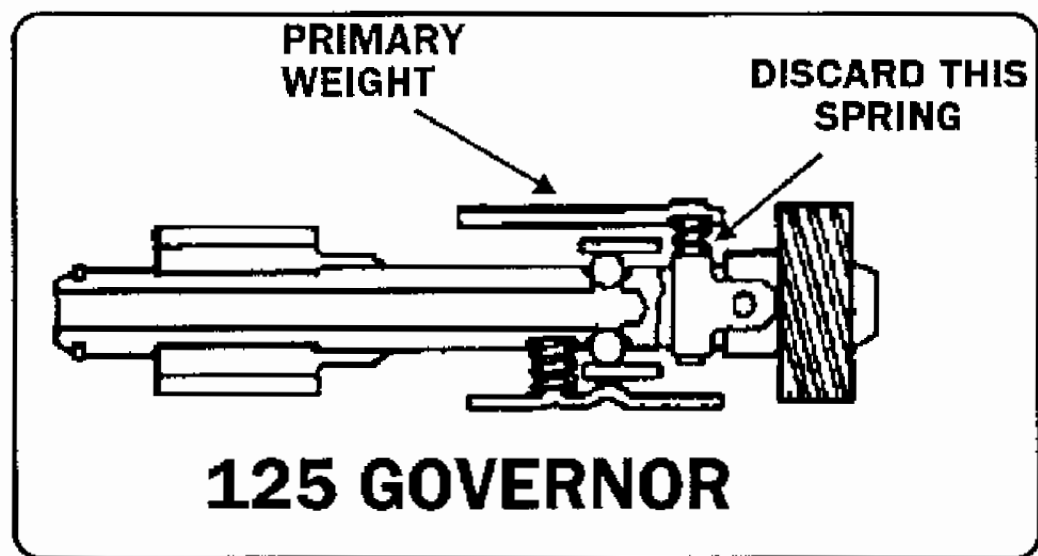


Figure 1.

THM 125-C LATE UPSHIFTS

COMPLAINT: Very late upshifts and throttle cable has little or no effect on shift timing. Line pressure is high and uncontrollable.

CAUSE: The TV exhaust lifter on the top of the valve body may be partially seating (See Figure 1). If this occurs, orificed TV oil will not bleed off and the TV pressure will rise to maximum.

CORRECTION: Remove the valve body and drill down through "BOTH" the plug and the TV lifter (See Figure 2) with a 1/16 inch drill bit. This will relieve any pressure that is trapped by the lifter.

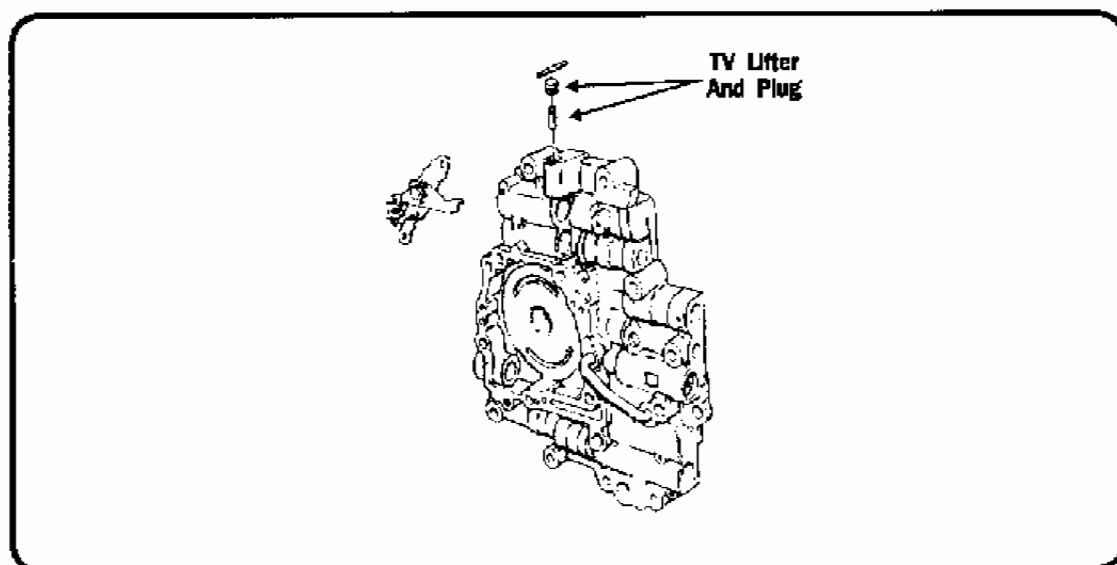


Figure 1.

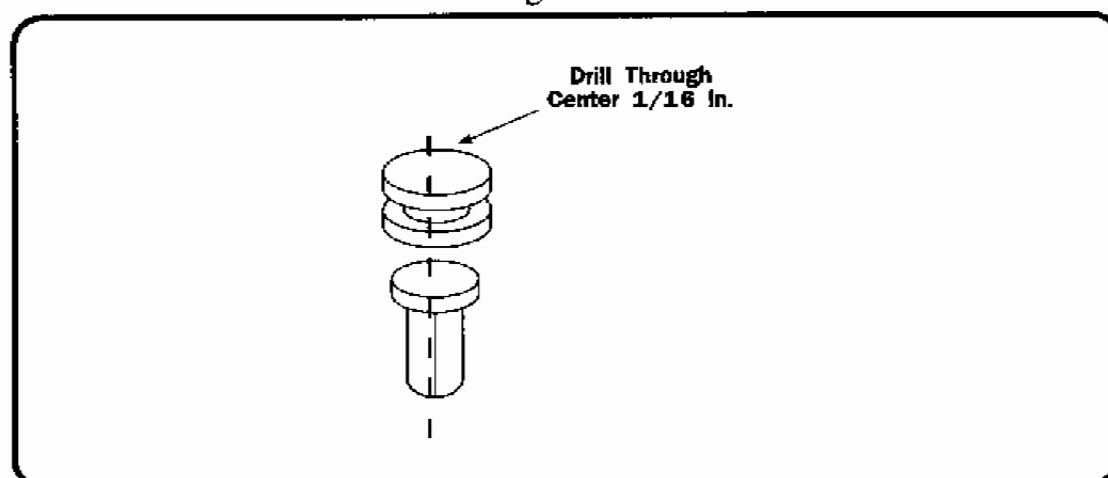


Figure 2.

THM 180-C NEUTRALS ON COASTDOWN

COMPLAINT: When coming to a stop, the transmission seems to go to neutral and then slams back into gear as you try to accelerate.

CAUSE: If the fluid level is okay, the cause may be that the spring under the servo is so strong that the band cannot reapply at minimum pressure.

CORRECTION: Carefully remove the servo cover, piston, and spring. See **Figure 1**. Remove the strong servo release spring and replace it with a weaker one. See **Figure 2**. The overall length of the factory spring is about 2.48 inches, the outer spring diameter is about 1.87 inches, and the spring coil thickness is about .25 inches.

USE CAUTION: Servo Is Under High Spring Tension

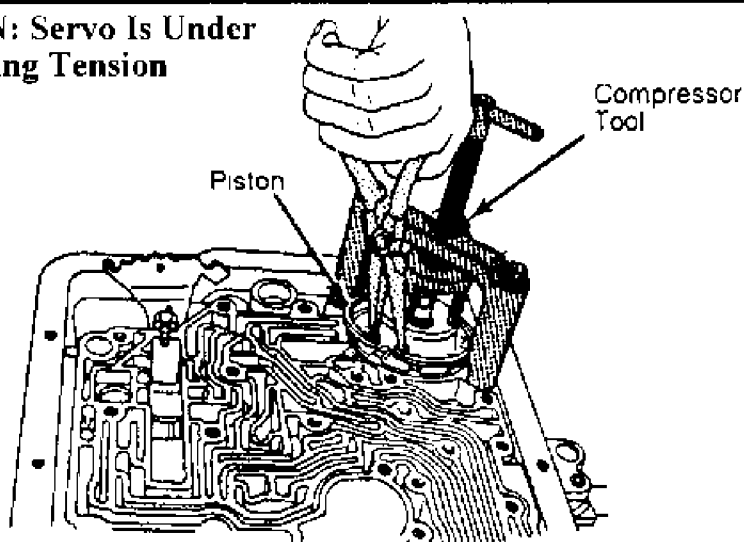


Figure 1.

Servo Piston Spring.
Replace With A
Weaker Spring

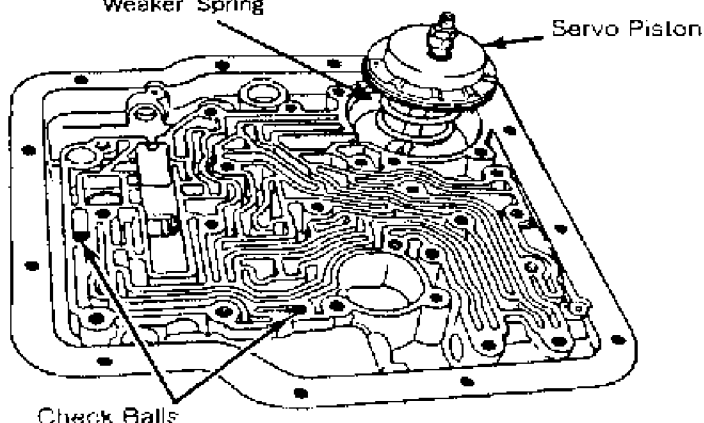


Figure 2.

THM 200, 200-4R, 325, 325-4L, AND 700-R4

LATE UPSHIFTS

- COMPLAINT:** Very late upshifts which cannot be changed by adjusting the TV cable. If a pressure test is performed, all pressures will be high.
- CAUSE:** The TV exhaust lifter on the Throttle valve linkage may not be keeping the TV exhaust ball (See Figure 1) off of its seat. This ball will cause high line pressure and late shifts if it is permitted to block the metered exhaust passage in the valve body.
- CORRECTION:** Remove the valve body and spacer plate and discard the TV exhaust ball. During an overhaul do not reinstall this ball in the case.

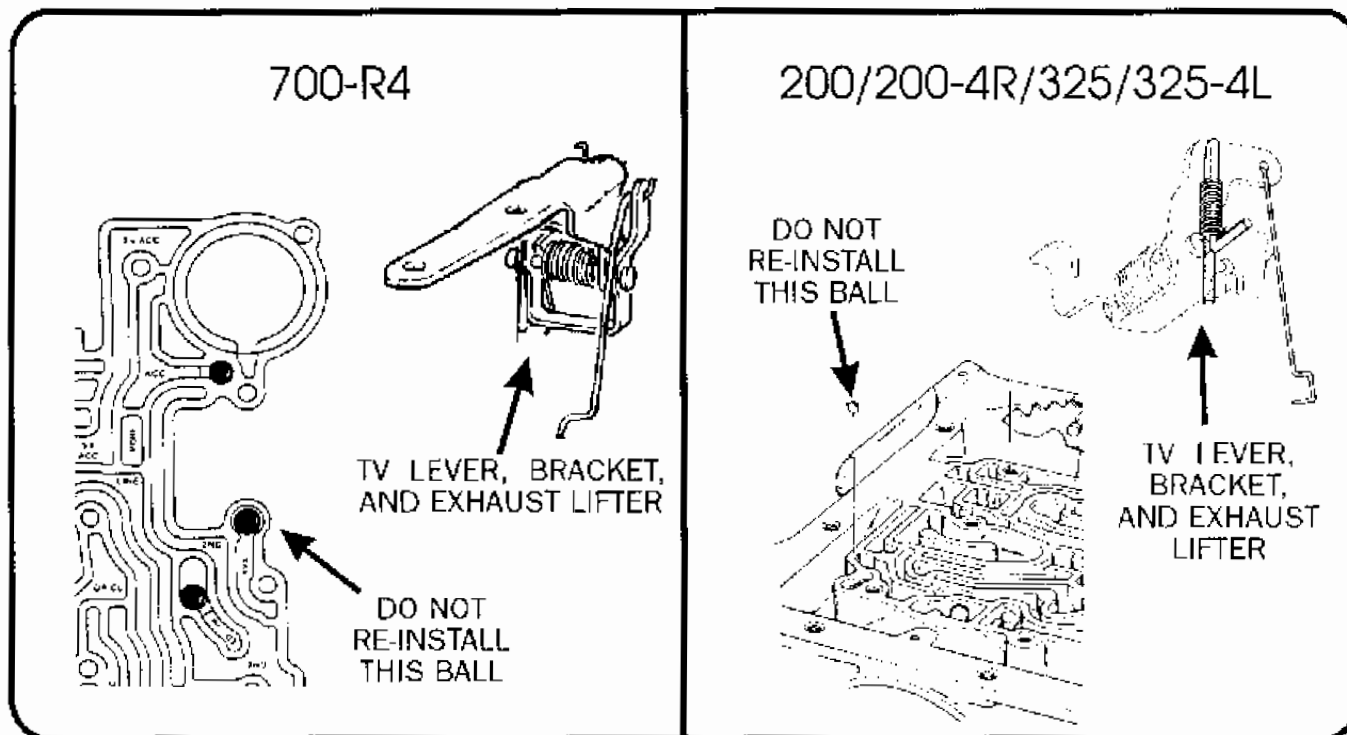


Figure 1

THM 325-4L O.D. RING GEAR BROKEN

COMPLAINT: After an overhaul, a 325-4L transmission returns with the overdrive ring gear broken. There may be no apparent cause as these parts may have checked out as good during the overhaul, and everything else looks okay.

CAUSE: The cause may be that the overdrive clutch housing is not centered on the case cover. When the overdrive clutch housing is not centered, excessive side force is applied to the drive sprocket by the overdrive carrier. This jams the carrier gear into the ring gear causing the explosion.

CORRECTION: During reassembly, DO NOT TIGHTEN the 4th clutch housing bolts (See Figure 1) before installing the overdrive carrier. Install the overdrive carrier, the thrust bearing, selective thrust washer, and snap ring first. (See Figure 2.) This will help center the 4th clutch housing on the case cover. After the carrier is installed, torque the 4th clutch bolts to 18Ft.-Lbs.

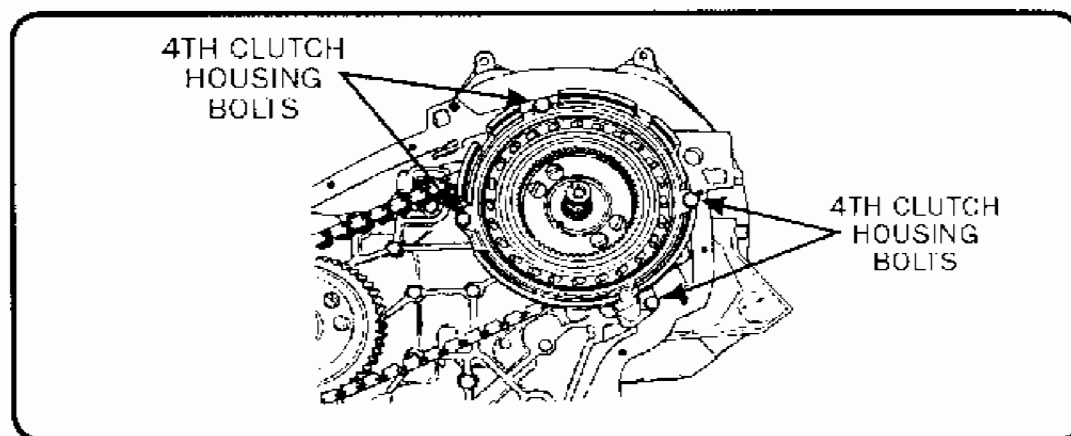


Figure 1.

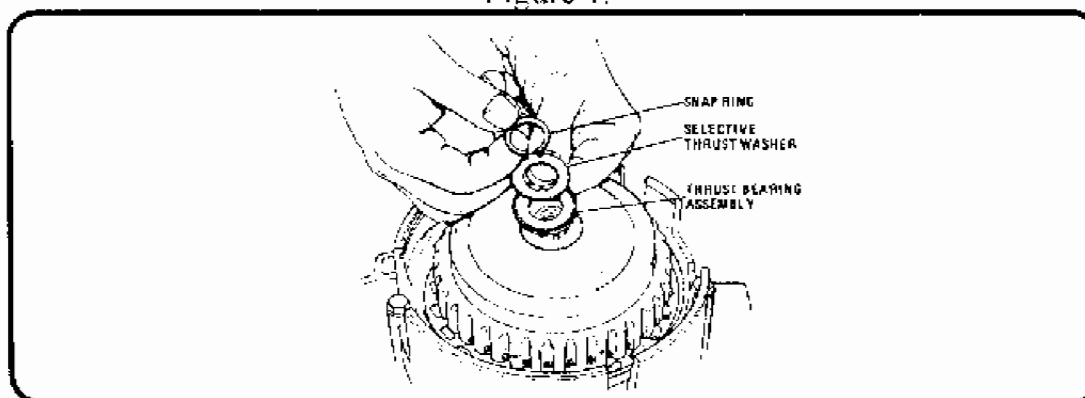


Figure 2.

THM325-4L OVERDRIVE FAILURE

COMPLAINT: Overdrive Carrier, sun gear, and roller clutch burnt up and/or broken into pieces.

CAUSE: Loss of lube oil to the overdrive carrier area. If the solid teflon sealing ring located on the rear of the sprocket support is damaged or missing, **See Figure 1.** lube oil will not be able to get to the overdrive carrier. Also if the steel sleeve in the drive sprocket support has moved toward the overdrive carrier, lube oil will be blocked to the overdrive carrier resulting in destroyed gears. If the turbine shaft teflon rings are damaged or have worn grooves in the sprocket support, lube oil will be lost. **See Figure 2.**

CORRECTION: Check the seal on the turbine shaft to make sure that it fits properly into sprocket support sleeve, and that the sleeve is not grooved. Carefully check the sprocket support where the steel sleeve is pressed in at the rear. If there is evidence that the sleeve may have moved, then the sprocket support should be replaced. Next, check the solid teflon ring on the rear of the sprocket support for wear or damage. Replace as necessary. It is a good idea to blow air through all of the passages shown in **Figure 1** to assure that there are no restrictions.

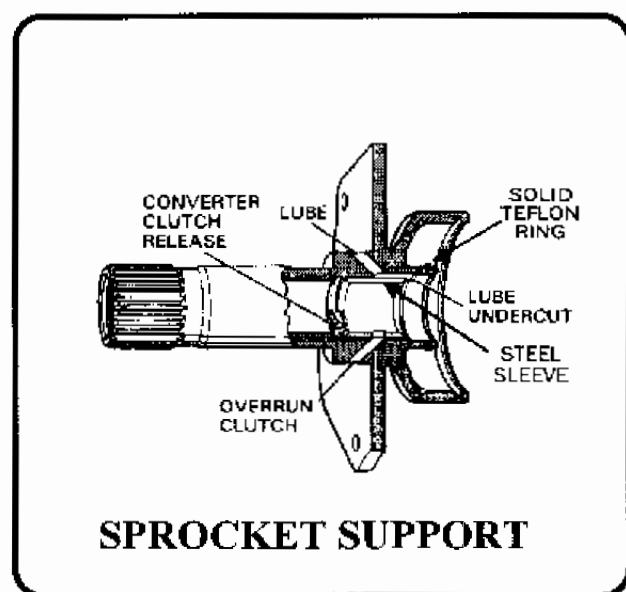


Figure 1.

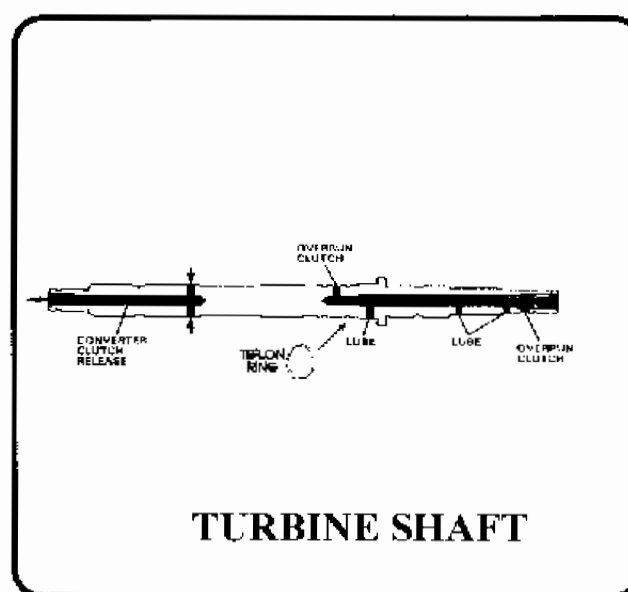
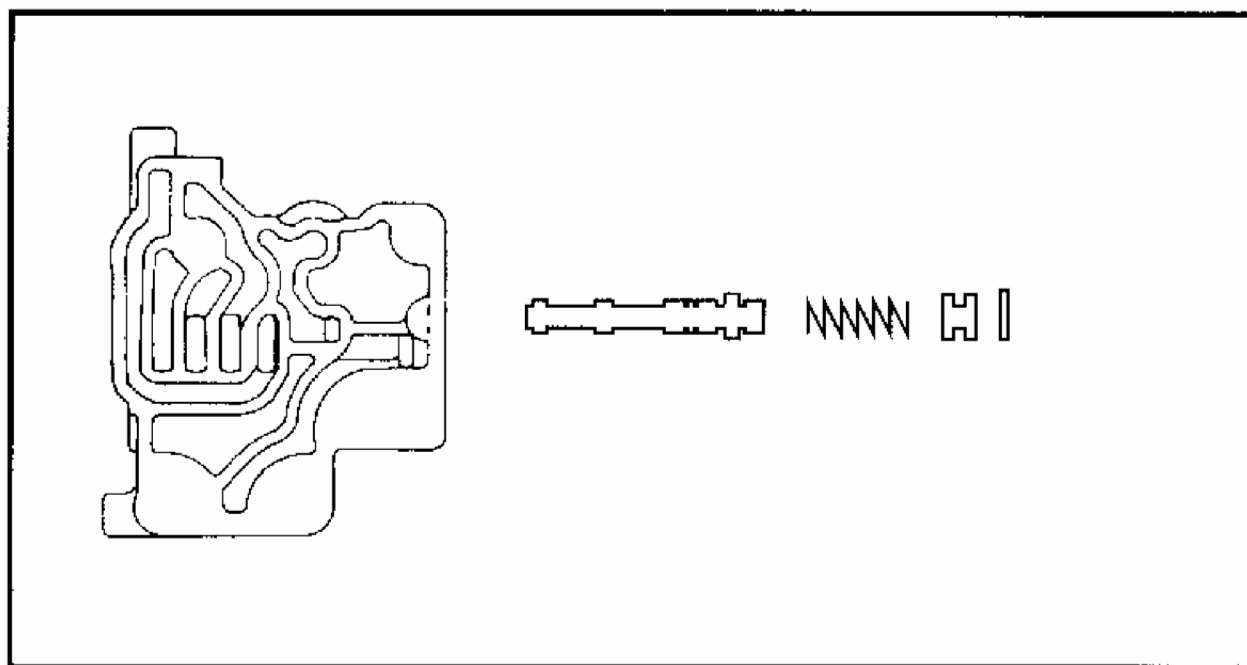
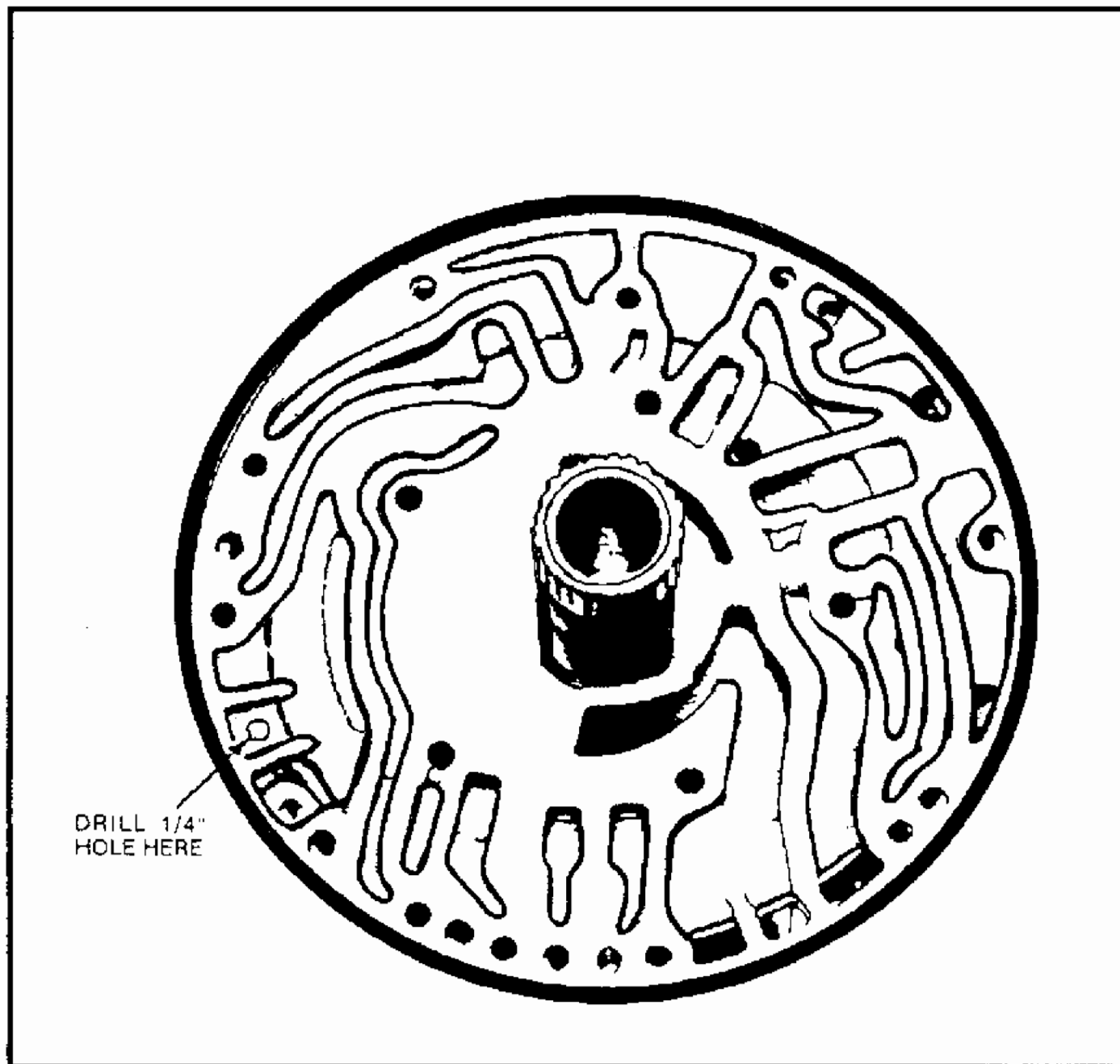


Figure 2.

THM 350C CONVERTING TO NON LOCK-UP

- (1) INSTALL COMPLETE NON LOCK-UP PUMP.
DO NOT INTER-MIX PUMP HALVES.
- (2) DRILL 1/4" HOLE IN DRAINBACK AREA,
AS SHOWN IN FIGURE
- (3) INSTALL ORIGINAL LOCK-UP VALVE BODY
AND SPACER PLATE.
- (4) REMOVE ROLL PIN AND BORE PLUG AND
SPRING FROM AUXILIARY VALVE BODY,
AS SHOWN IN FIGURE
- (5) INSTALL PIECE OF RUBBER HOSE IN
PLACE OF SPRING AND INSTALL BORE
PLUG AND PIN. SEE FIGURE
- (6) INSTALL NON LOCK-UP CONVERTER.
- (7) MAKE A SOLID GASKET AND INSTALL
UNDER THE SOLENOID.
- (8) LEAVE THE NUMBER 5 CHECKBALL OUT
OF THE CASE (FRONT OF CASE).





FORD C-4 AND C-5 SENSITIVE DOWNSHIFTS

COMPLAINT: Very sensitive downshifts from 3rd to 2nd at lower vehicle speeds, usually under 30 MPH. Upshifts seem okay as long as the throttle pressure remains constant.

CAUSE: If the modulator and pin are correct, and the kickdown linkage properly adjusted, the problem may be that the throttle pressure boost valve is overreacting to throttle changes.

CORRECTION: Remove the throttle pressure boost valve and spring and install a 1/4 inch check ball into the bore before reinstalling the spring and valve. **See Figure 1.** This will eliminate part throttle 3-2 downshifts, but will not affect normal upshifts or full detent downshifts.

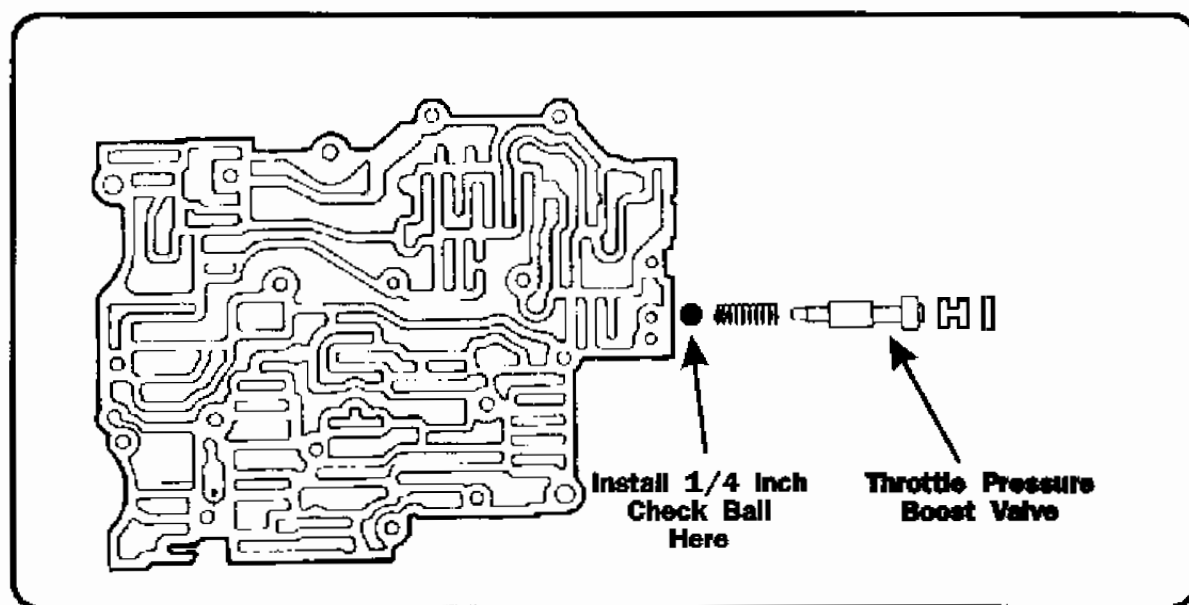
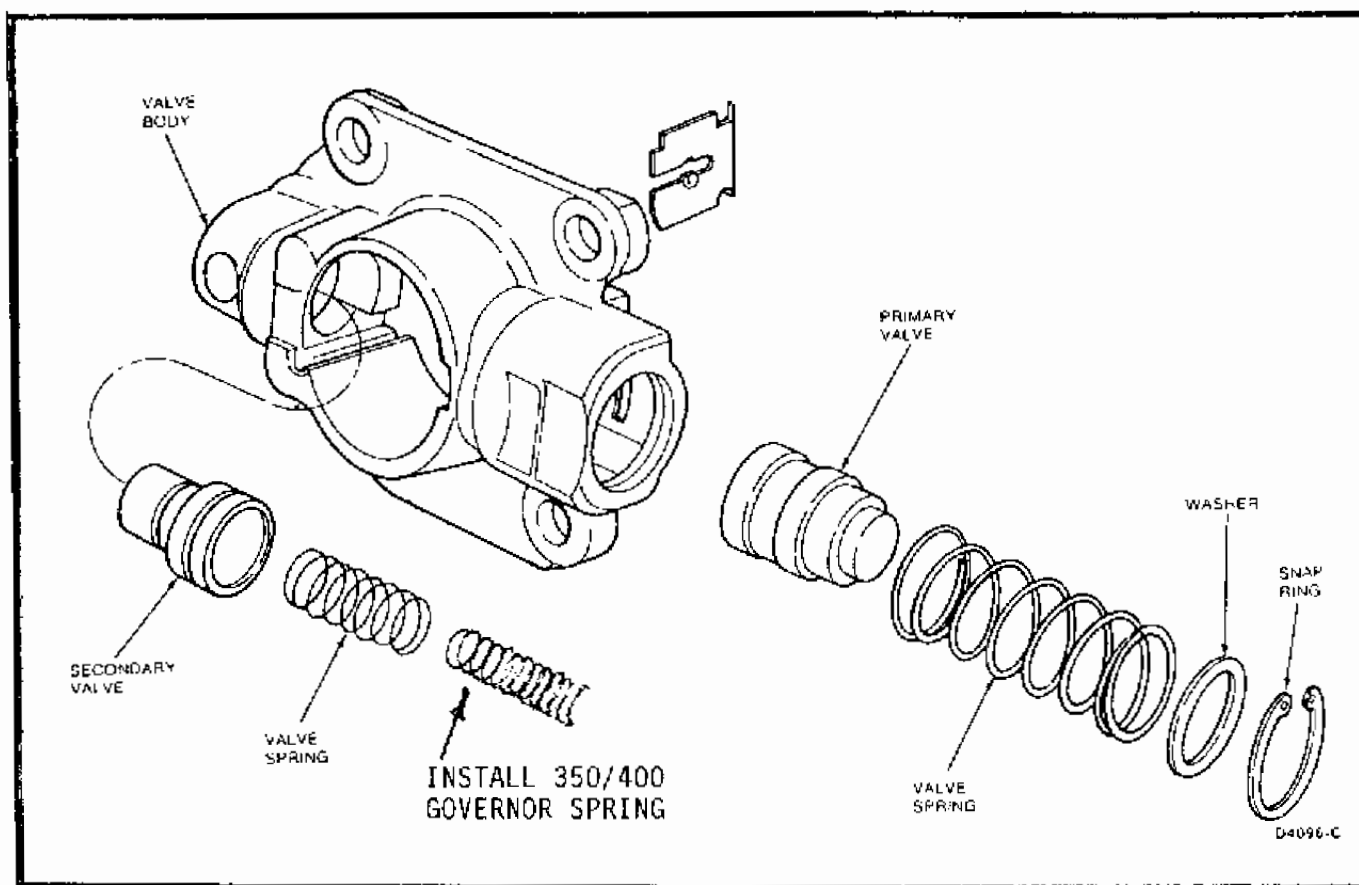


Figure 1.

C-4 Late Upshift

- COMPLAINT:** Late 1-2 and 2-3 shift* Equal spacing of the shifts.
- CAUSE:** Mis-match of the valve body with the governor and the diameter of the intermediate servo. Low vacuum
- CORRECTION:** If the vacuum to the modulator is correct and the right modulator has been installed. Then re-calibrate the G-2 secondary governor valve, by installing a governor spring from a Thm 400 (orange spring) or a 350 valve body kit yellow governor spring inside the existing secondary governor spring Figure 1.

* late shifts is defined as 1-2 shift at 20-25 mph and 2-3 shift at 35-40 mph at minimal throttle.



FORD C-5 1-3 Shift

Some C-5 automatic transmissions, built prior to September 10, 1981 (transmission build date code -J10) may exhibit shift concerns caused by irregularities in the D2 valve. (Figure 14). This condition results in a 1-3 shift or second gear starts, at all throttle openings, the condition may go away as the transmission warms up to normal operating temperatures and may return as the transmission cools down.

Similar concerns, i.e., delayed shifts, no 1-2 upshift, second gear starts or 1-3 shifts may be also caused by chips, burrs in either the governor assembly or the main control. Service using the following procedures:

1. First determine whether there are metal particles or other material (such as clutch material, etc.) in the transmission fluid. If the fluid is found to have metal particles or materials, clean and service the transmission in the usual manner.
2. If the above fluid condition is not evident, road test the vehicle to determine if line pressure cutback is occurring. Attach a pressure gauge to the line pressure port of the case (Figure 15). Cutback should occur between 10 mph and 16 mph. If line pressure cutback is not observed, then the governor is not operating properly.

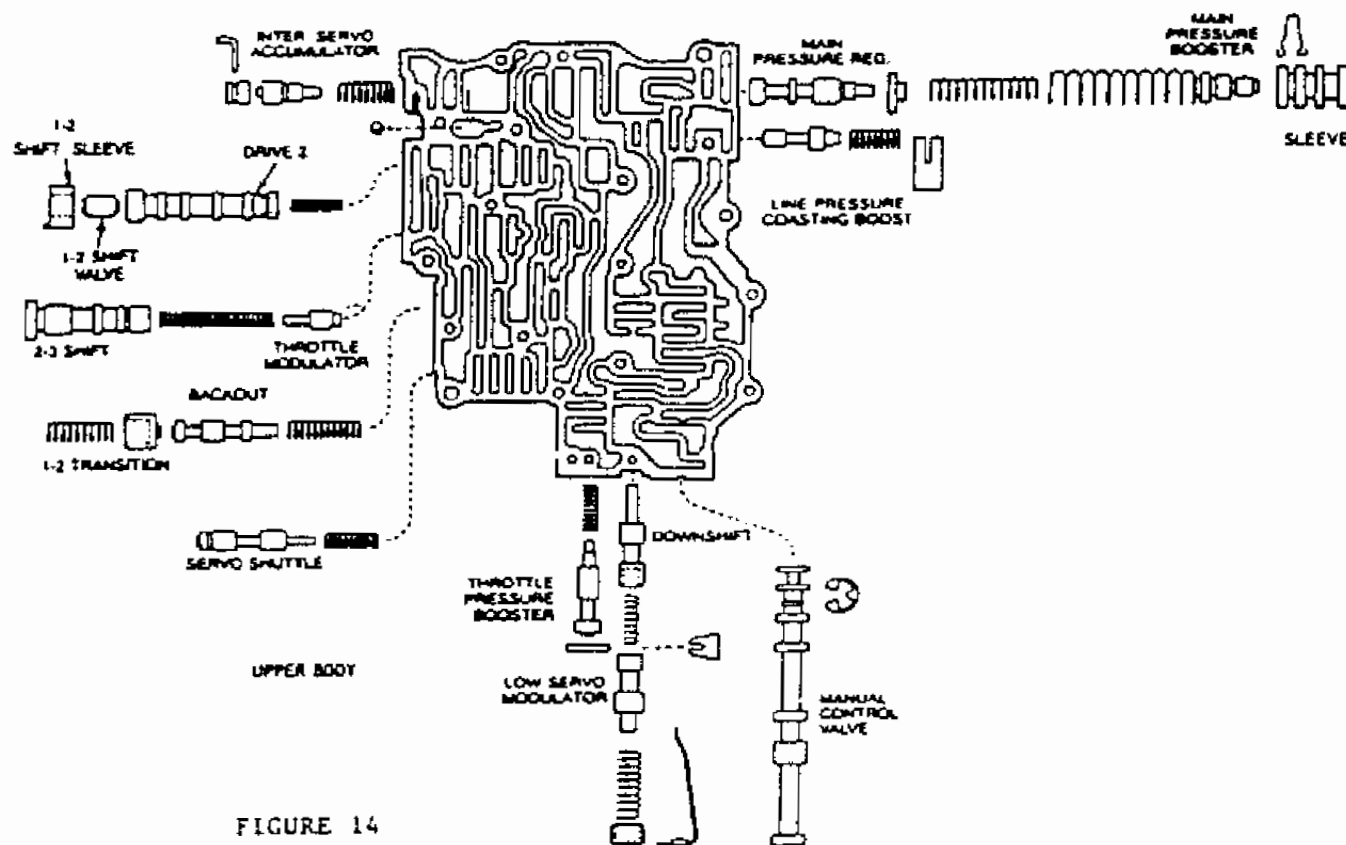


FIGURE 14

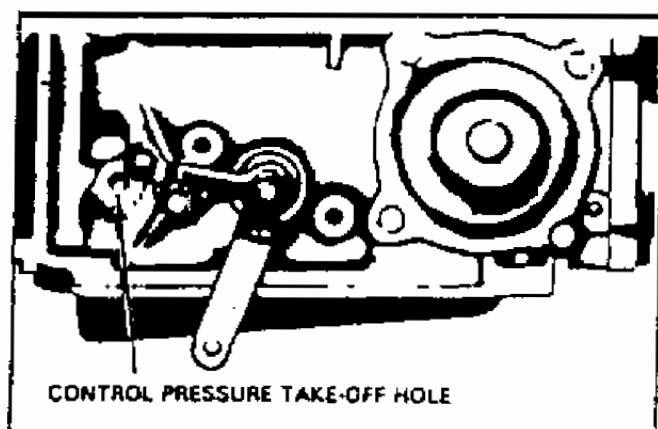


Figure 15

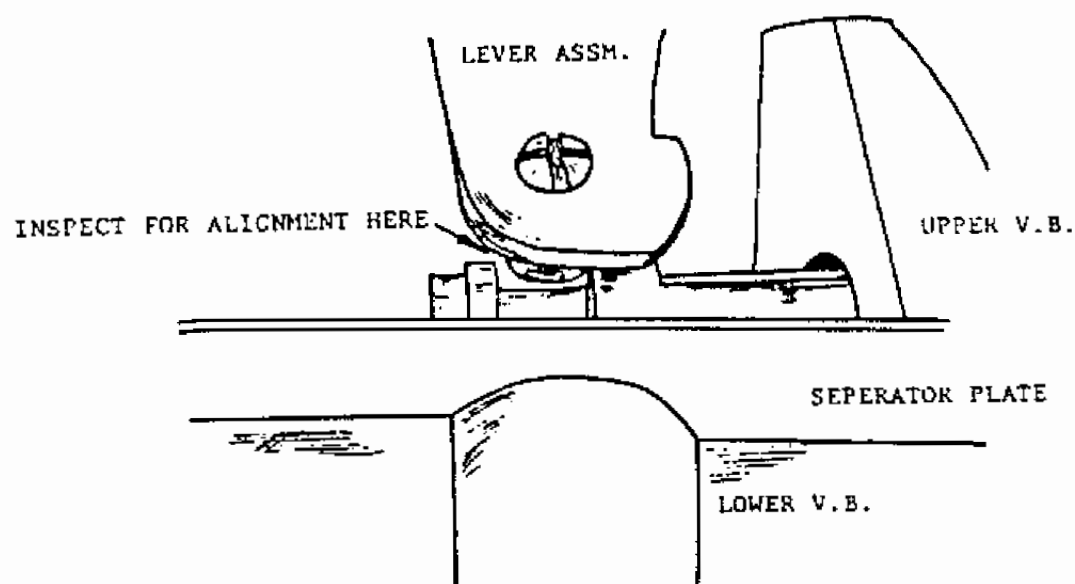
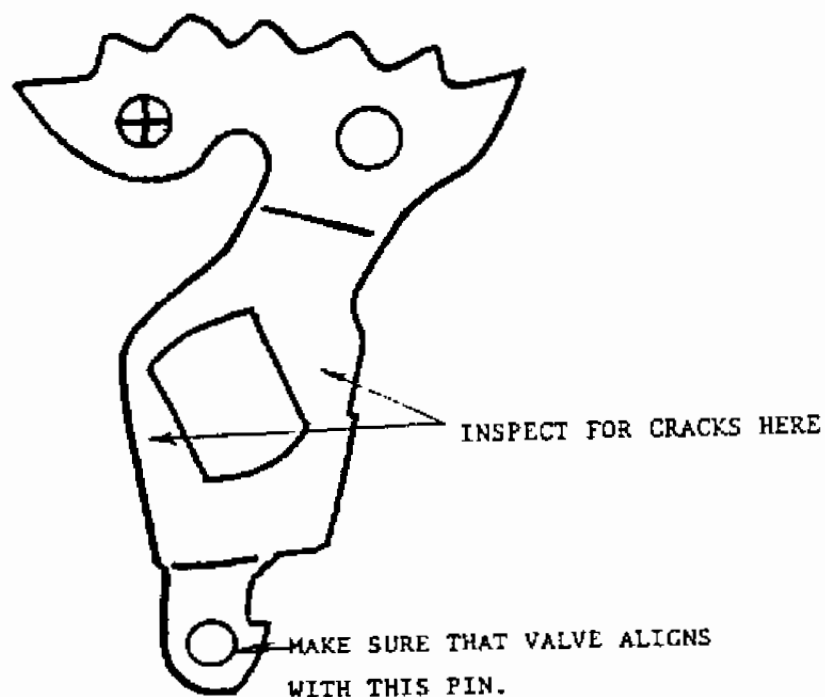
3. If line pressure cutback is observed, then the governor is operating properly and the main control is the probable source. Remove the main control and inspect the D2 valve and valve bore for observable causes (i.e., chips or burrs). If no obvious cause is observed, then D2 valve bore irregularity is the probable cause and the main control must be replaced.

C-6

PROBLEM : Any complaint of delayed engagement drive or reverse, any unexplained burn out or any shift related complaint.

CAUSE : The cause can be a bent or cracked internatl detent lever.

CORRECTION : The way to check the alignment is to use an old style C-6 valve body that has the detent in the valve body. On that assembly, place the manual valve in drive position. With the detent lever in the case set in drive set the old style valve body on the transmission, and check that the manual valve lines up with the pin in the detent valve. If the valve and pin do not align, replace the linkage. Inspect all linkage parts for cracking and bending.



FORD C-6
DELAY FORWARD AND/OR
PREMATURE FORWARD CLUTCH FAILURE

COMPLAINT: Abnormal delay when the selector lever is placed into the drive position, and reverse is normal, or premature failure of the forward clutch pack.

CAUSE: The cause may be the forward clutch piston inner "O" ring seal, that has become hard or cracked from heat. The OEM "O" ring seal for this location is made of a "Nitrile" material.

CORRECTION: Install a THM 440-T4 servo cover "O" ring seal in the forward clutch housing as it is exactly the same deminsion. This "O" ring seal is made of a "Viton" material and will withstand much more heat without becoming brittle or breaking down (See Figure 1).

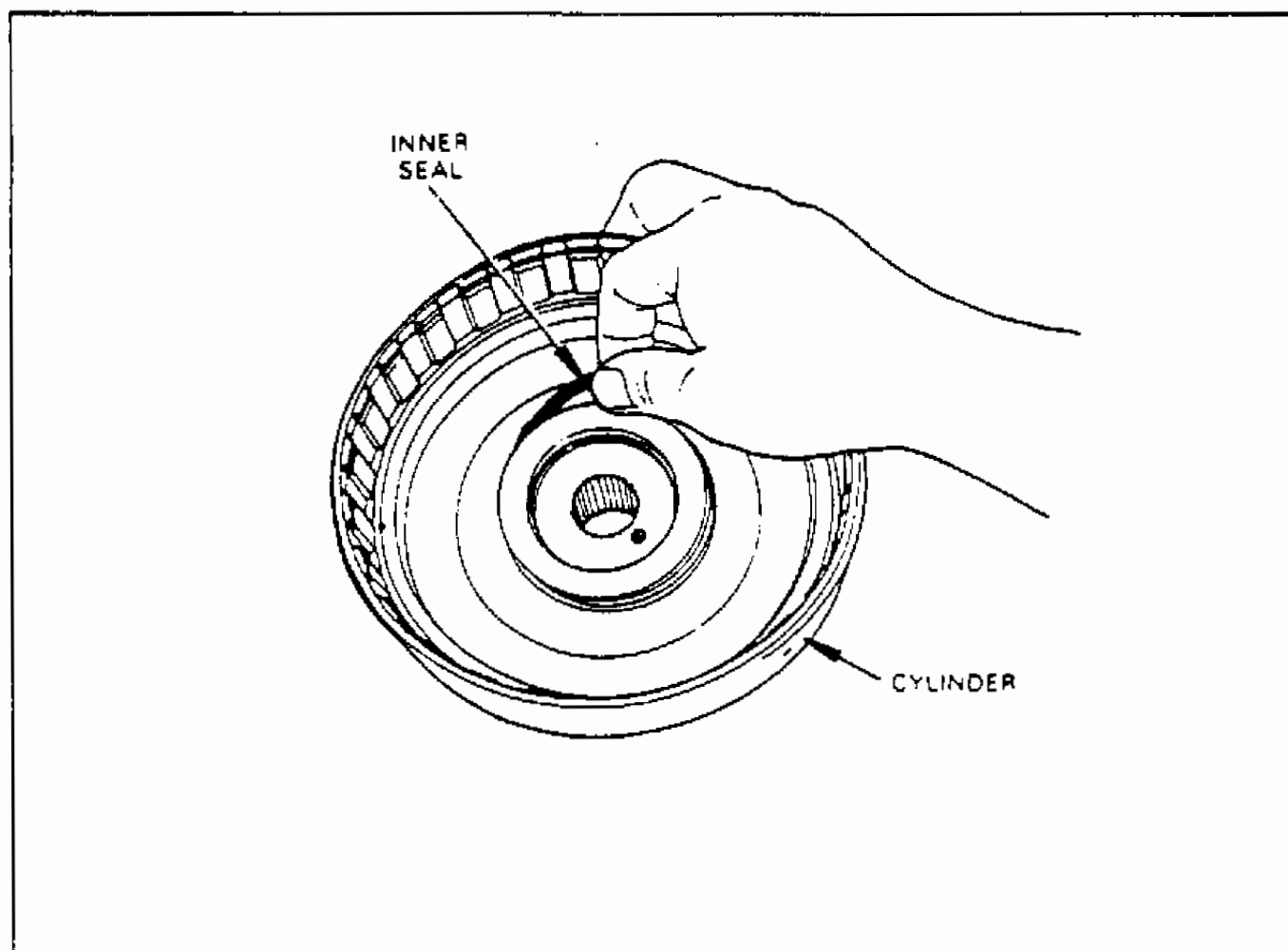


Figure 1

FORD AOD SNAP RING RELACEMENT

COMPLAINT: The intermediate roller clutch outer race retainer snap ring pops off and the roller clutch fails. **See Figure 1.**

CAUSE: During a forced 4-2 downshift, the forward clutch may not reapply fast enough. An overspeed condition of the reverse drum will occur causing the snap ring and retainer to blow off of the drum.

CORRECTION: Replace the roller clutch and install an "acquired" spiral snap ring. The spiral snap ring from a 125 or 440-T4 final drive (See Figure 2), will usually work fine. On some reverse drums it may be necessary to file the snap ring groove slightly.

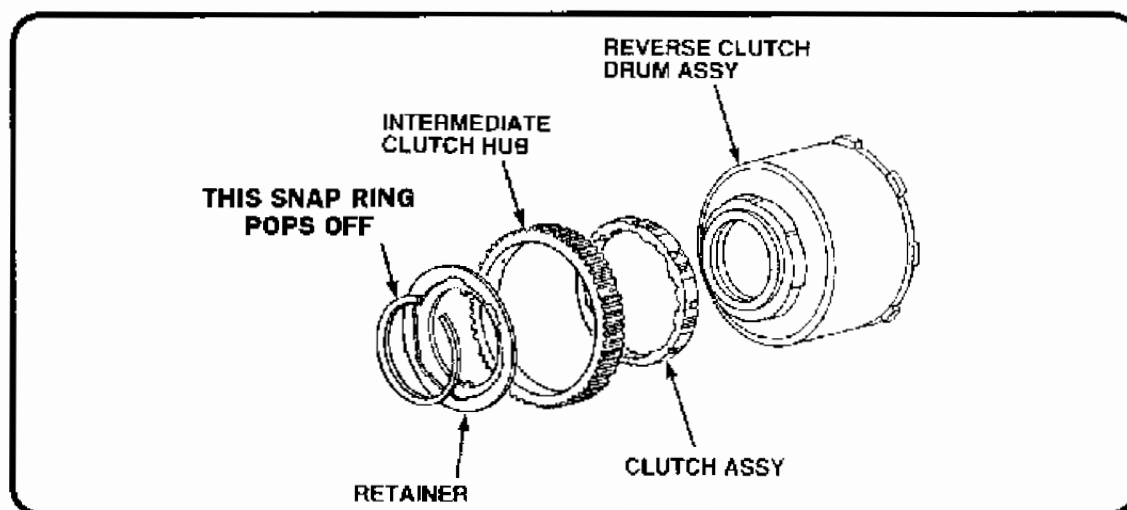


Figure 1.

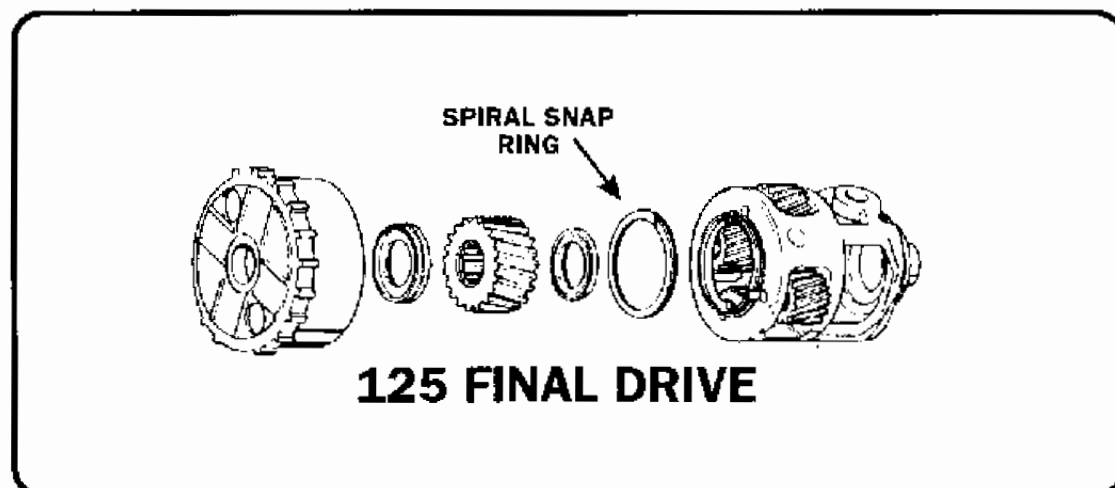


Figure 2.

FORD - ATX (TEMPO & TOPAZ) LOW SPEED 3-2 SHUDDER

COMPLAINT: A low speed shudder and/or boom while driving in third gear.

CAUSE: The cause may be shift point variances in the 2-3 upshift and the 3-2 downshift pattern.

CORRECTION: Install a new design main control service kit, OEM part number E6FZ-7A230-A, that revises the part throttle 2-3 upshift and 3-2 downshift pattern. Refer to the following procedure.

1. Remove and discard the 3-2 control valve plug and retainer. (See Figure 1)
2. Install the new 3-2 control valve, control valve spring, and flat plate retainer from the main control service kit. (See Figure 1).
3. Replace the 2-3 shift valve spring with the two spring "Nested" assembly from the main control service kit (See Figure 1).

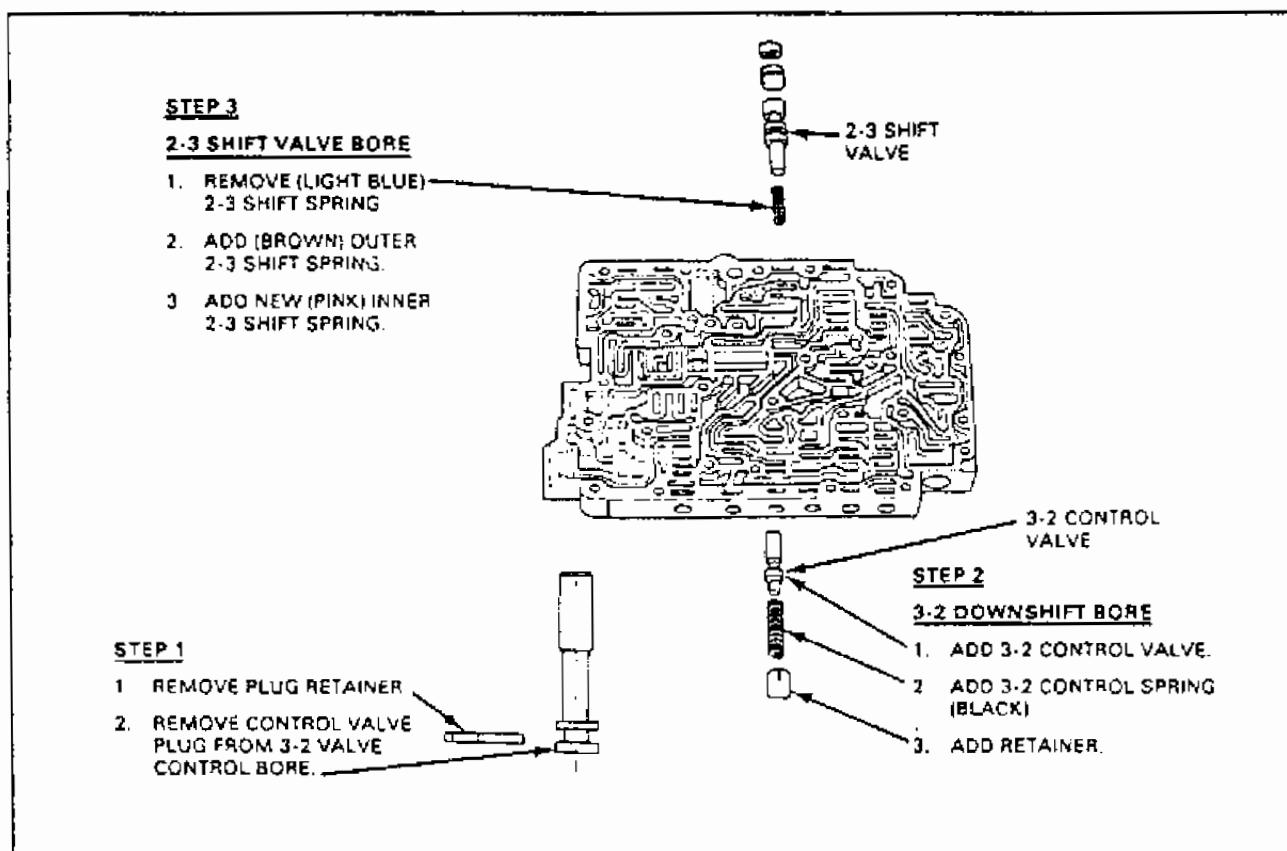


Figure 1

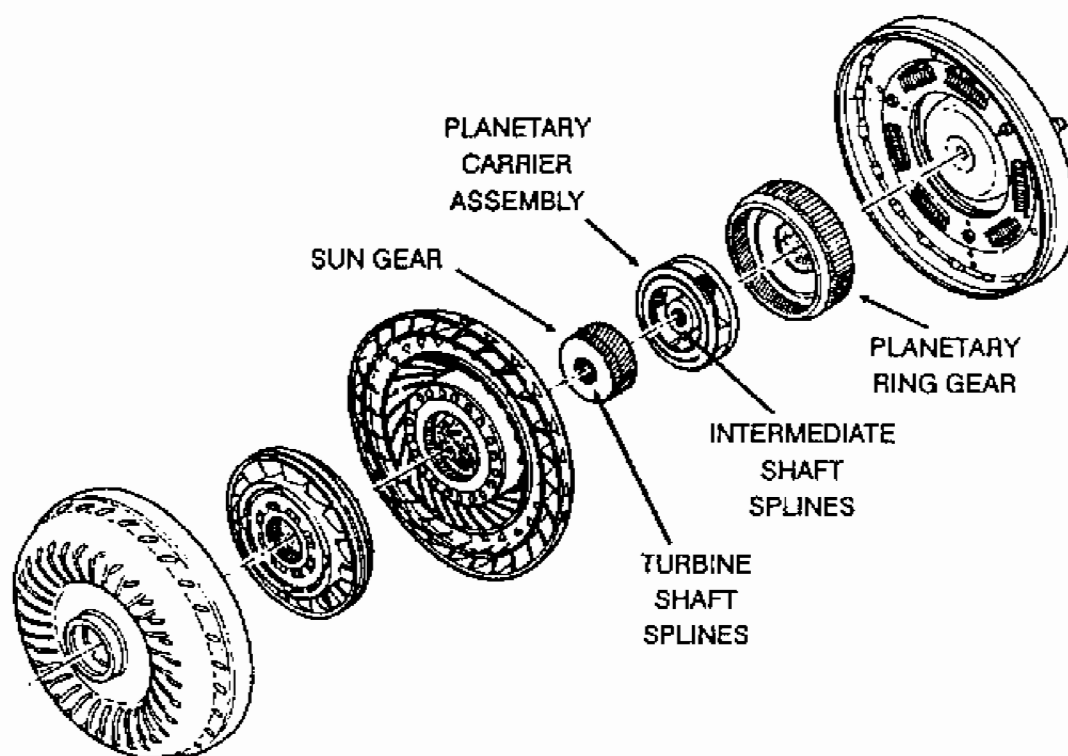
FORD ATX

NO UP-SHIFT

COMPLAINT: Transmission does not shift to second or third gear.
Valve body and governor good.

CAUSE: Splines for the intermediate shaft in the converter are stripped, or bad gear set in converter, preventing torque transfer to the intermediate drum.

CORRECTION: Replace the torque converter.



TRANSAXLE—ATX (FLUID LINK CONVERTER)—DIRECT CLUTCH CYLINDER AND INTERMEDIATE CLUTCH BEARING ASSEMBLY—SERVICE TIPS

ISSUE: A new direct clutch assembly is currently in production which does not require a direct clutch bearing, Figure 1. For service, the only available direct clutch cylinder will be the cylinder which requires a bearing assembly.

CAUTION: FAILURE TO USE THE BEARING ASSEMBLY WITH THE MACHINED CYLINDER (E4FZ-7F283-B) WILL RESULT IN DAMAGE TO THE INTERMEDIATE CLUTCH ASSEMBLY.

ACTION: If direct clutch cylinder replacement is required, it must be replaced with a clutch cylinder assembly and bearing assembly.

NOTE: THE BEARING (E1FZ-7F373-A) WILL ALSO REMAIN AVAILABLE FOR SEPARATE PURCHASE.

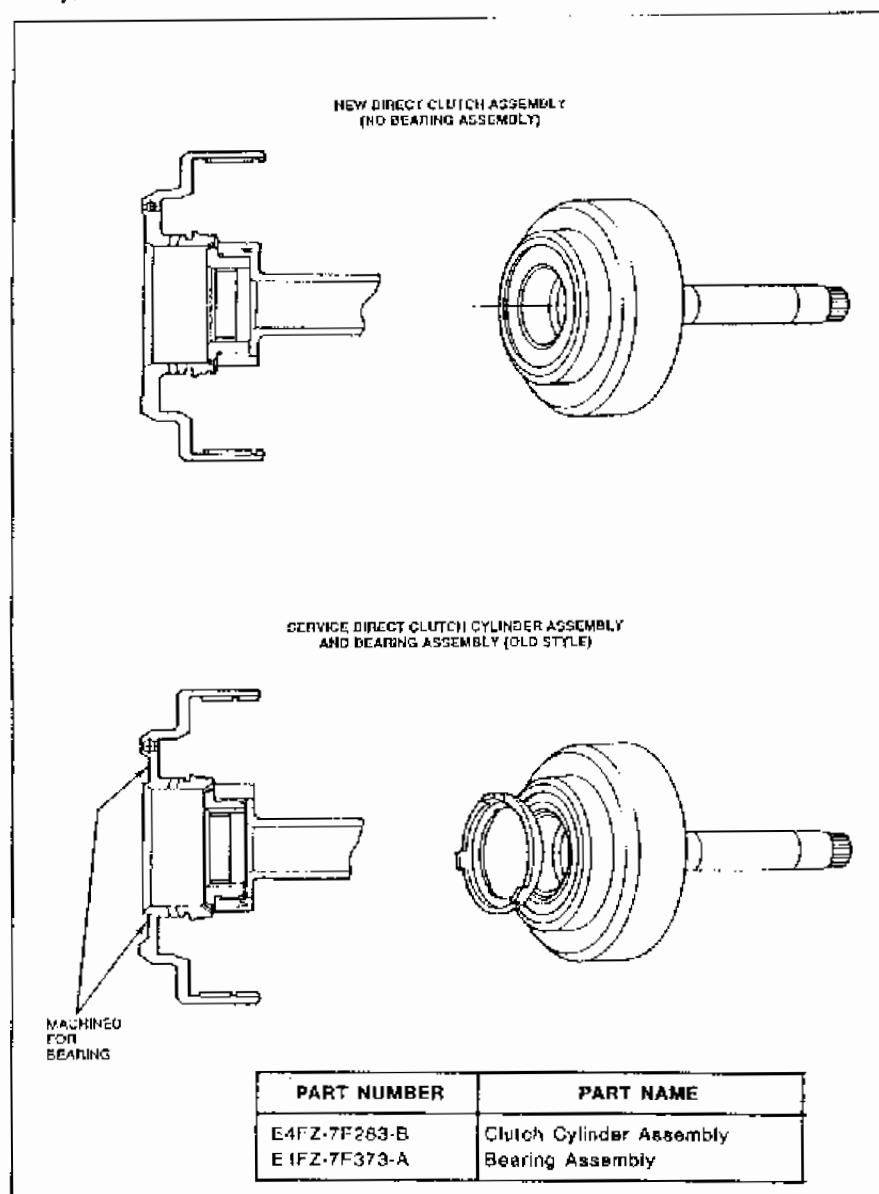


Figure 1

FORD - ATX VALVE BODY CHECKBALL LOCATIONS

THERE ARE THREE DIFFERENT VALVE BODIES USED ON THE FORD ATX TRANSAXLES, AND THEY HAVE THREE DIFFERENT CHECKBALL LOCATIONS, DEPENDING ON THE VEHICLE MODEL AND THE "TYPE" OF TORQUE CONVERTER THAT IS USED. ALL THREE DESIGN LEVELS ARE LISTED BELOW.

GEAR TYPE CONVERTER

These valve bodies require five (5) checkballs placed in the locations shown in Figure 1, and is for following vehicles:

ESCORT/LYNX 1981-1990
TEMPO/TOPAZ 1984-1986

CENTRIFUGAL LOCKING CONVERTER (CLC)

These valve bodies require six (6) checkballs placed in the locations shown in Figure 2, and is for following vehicles:

TAURUS/SABLE 1986-1987 (SEE NOTE 1)

FLUID LOCKING CONVERTER (FLC)

These valve bodies require seven (7) checkballs placed in the locations shown in Figure 3, and is for following vehicles:

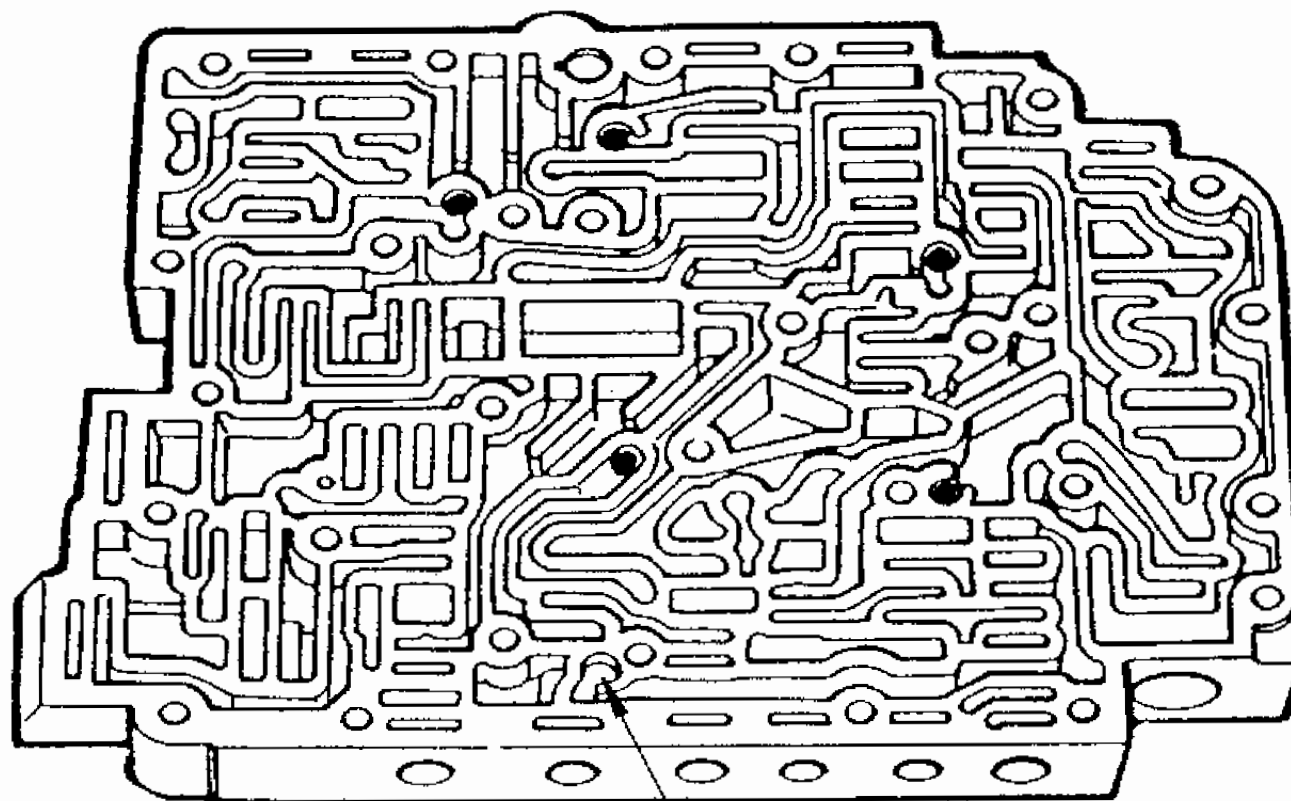
TEMPO/TOPAZ 1987-1992 (SEE NOTE 2)
TAURUS/SABLE 1988-1990

NOTES:

1. YOU CAN SERVICE THE 1987 ATX/CLC WITH A 1988 MAIN CONTROL ONLY IF YOU USE AN FLC CONVERTER.
2. YOU CANNOT USE A 1987 TEMPO/TOPAZ MAIN CONTROL IN A 1987 TAURUS/SABLE WITH THE CLC TRANSAXLE.

FORD - ATX
VALVE BODY CHECKBALL LOCATIONS

GEAR TYPE CONVERTER
REQUIRES 5 CHECKBALLS



NO CHECKBALL HERE.

Figure 1

FORD - ATX
VALVE BODY CHECKBALL LOCATIONS

"CLC" TYPE CONVERTER
REQUIRES 6 CHECKBALLS

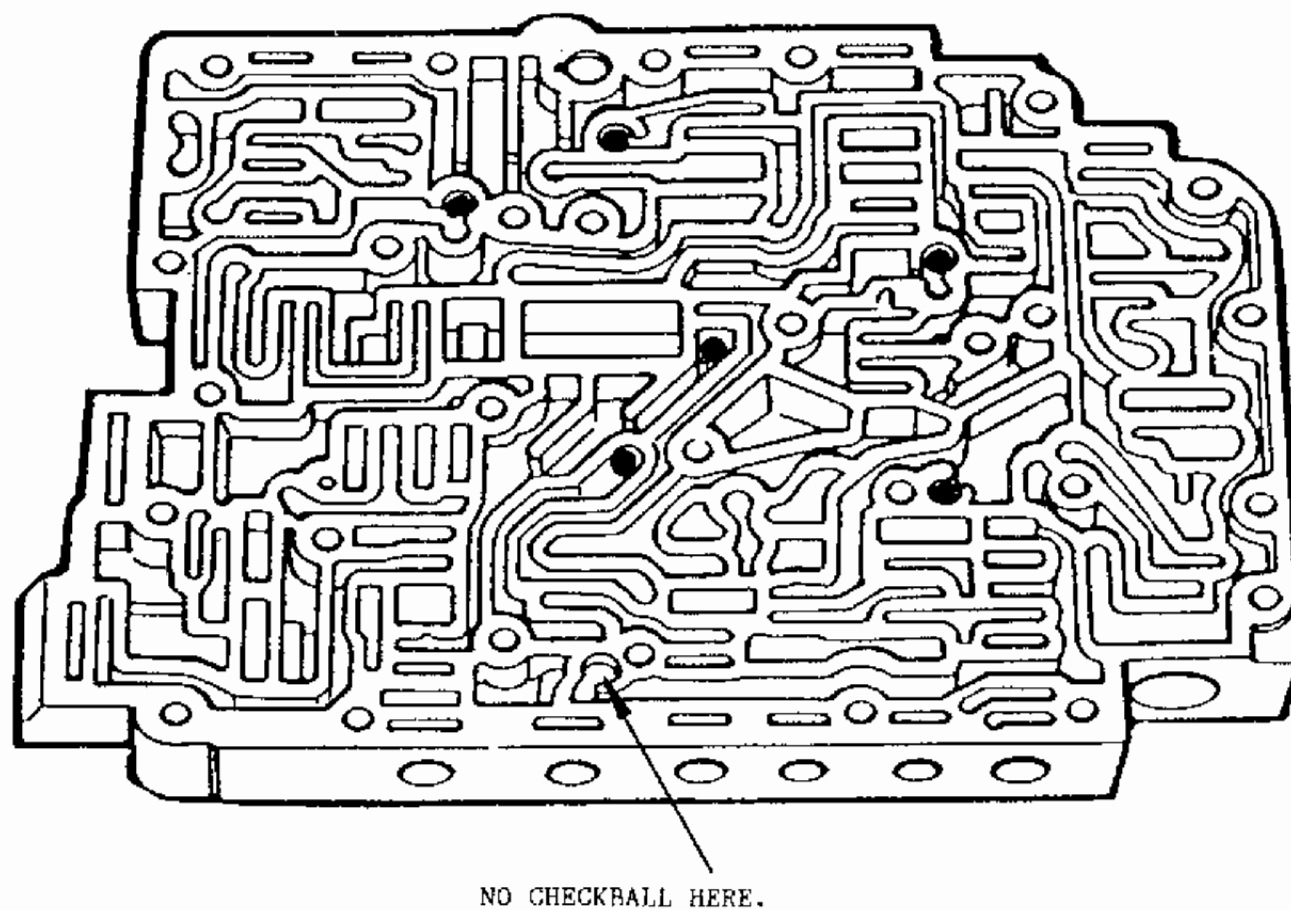


Figure 2

FORD - ATX
VALVE BODY CHECKBALL LOCATIONS

"FLC" TYPE CONVERTER
REQUIRES 7 CHECKBALLS

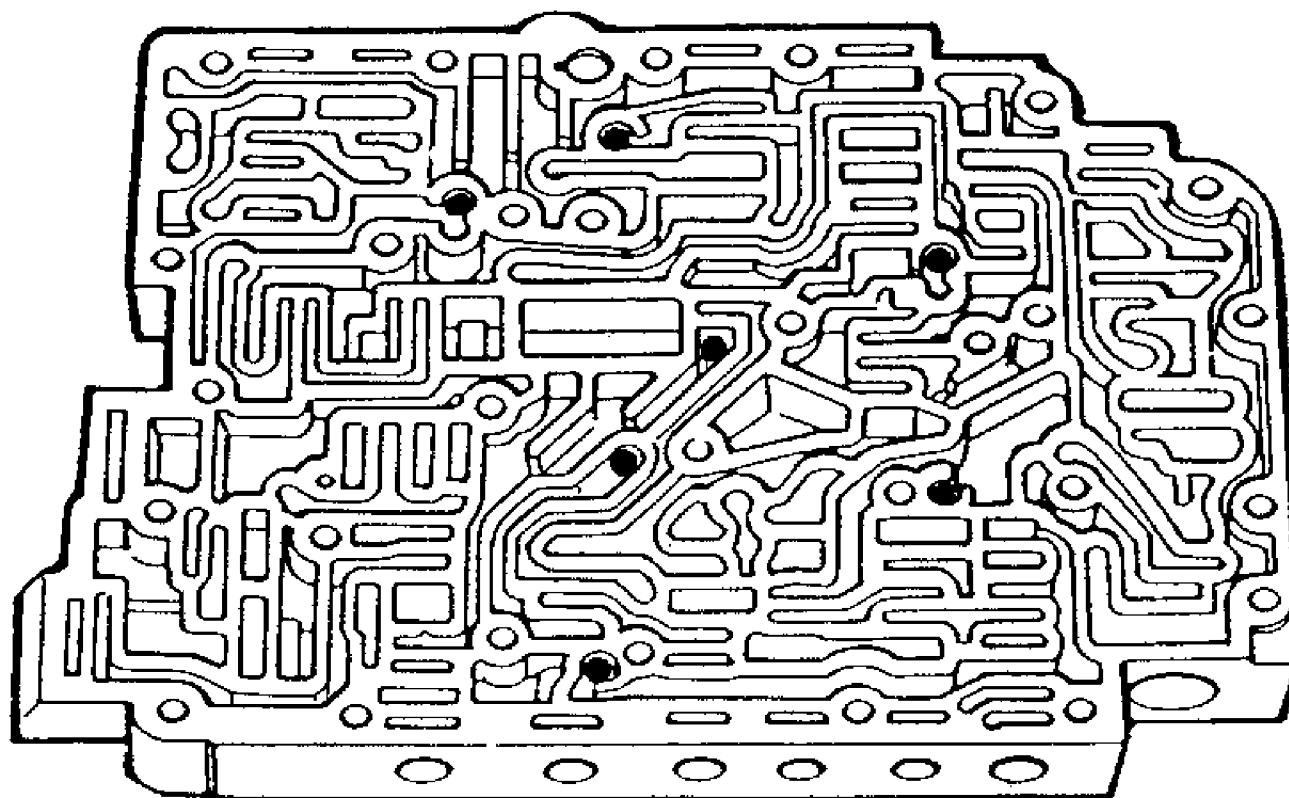


Figure 3

ATX HARSH 2/3 UPSHIFT MAIN CONTROL CHECK BALL LOCATIONS

The number of main control check balls and their locations for the ATX transaxle as published in the 1989 Tempo/Topaz-Escort Car Shop Manual, Section 17-25-82 is incorrect. The correct number of main control check balls for the 1.9L ATX transaxle is seven (7) not six (6). Failure to install the seventh check ball will cause a harsh 2-3 upshift.

ACTION: When servicing the ATX transaxle main control make sure that all seven (7) check balls are installed. Refer to Figure 1 for the correct location of the main control check balls.

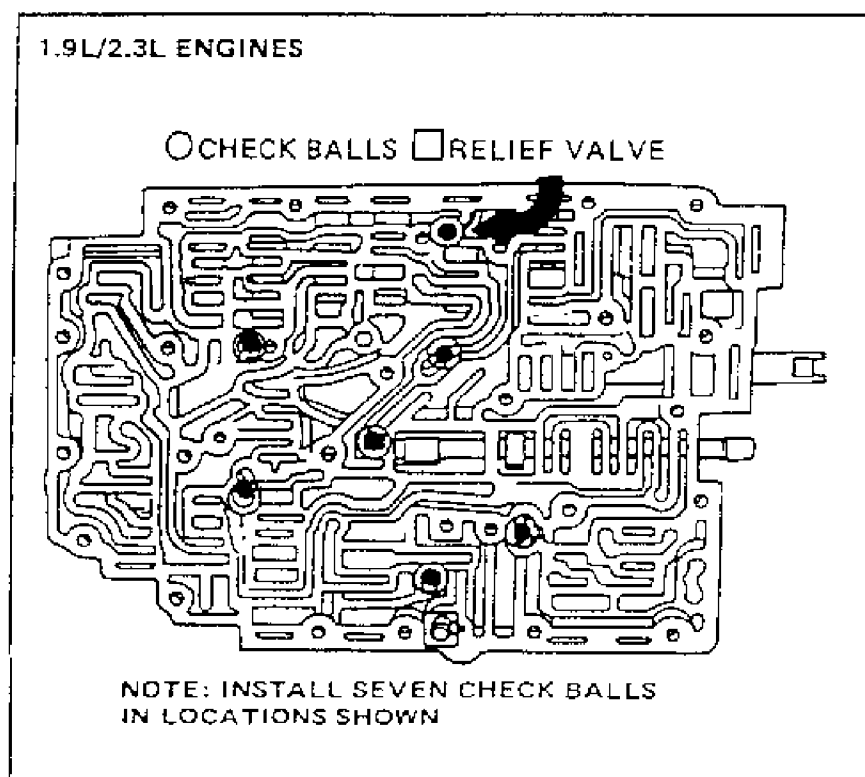


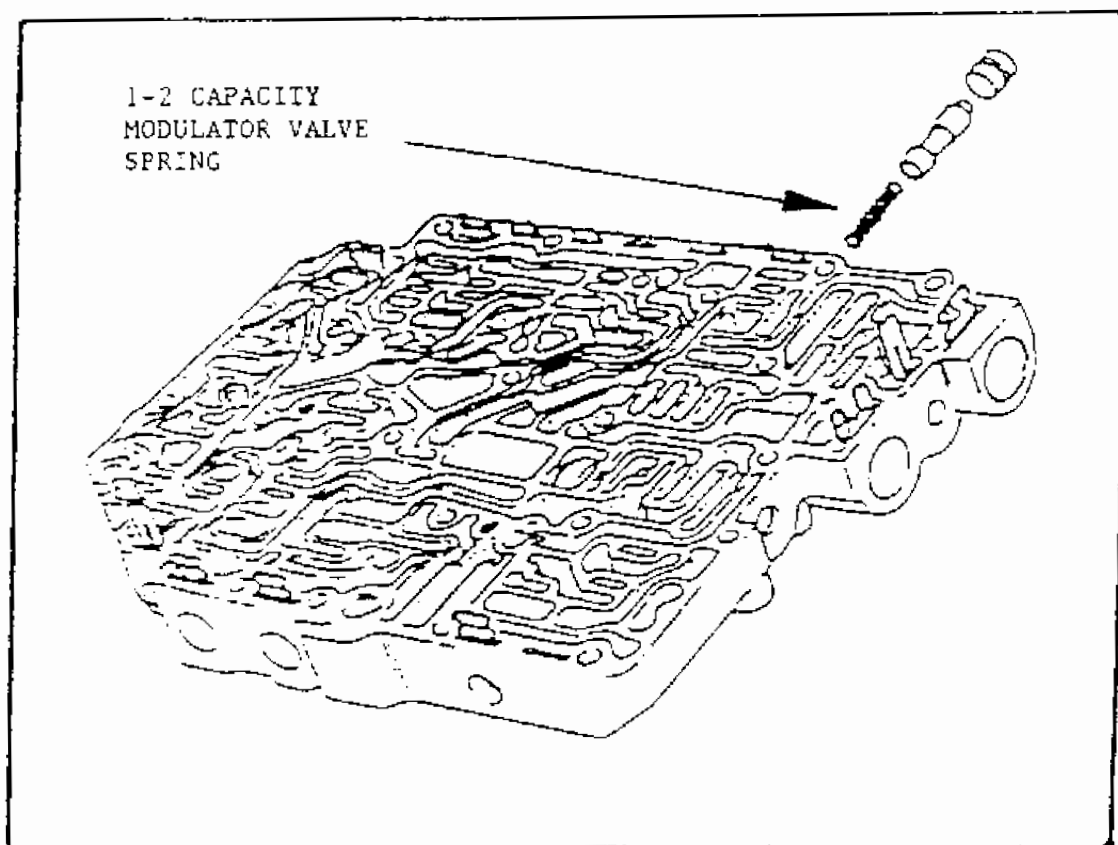
Figure 1

ATX - HARSH OR SOFT 1-2

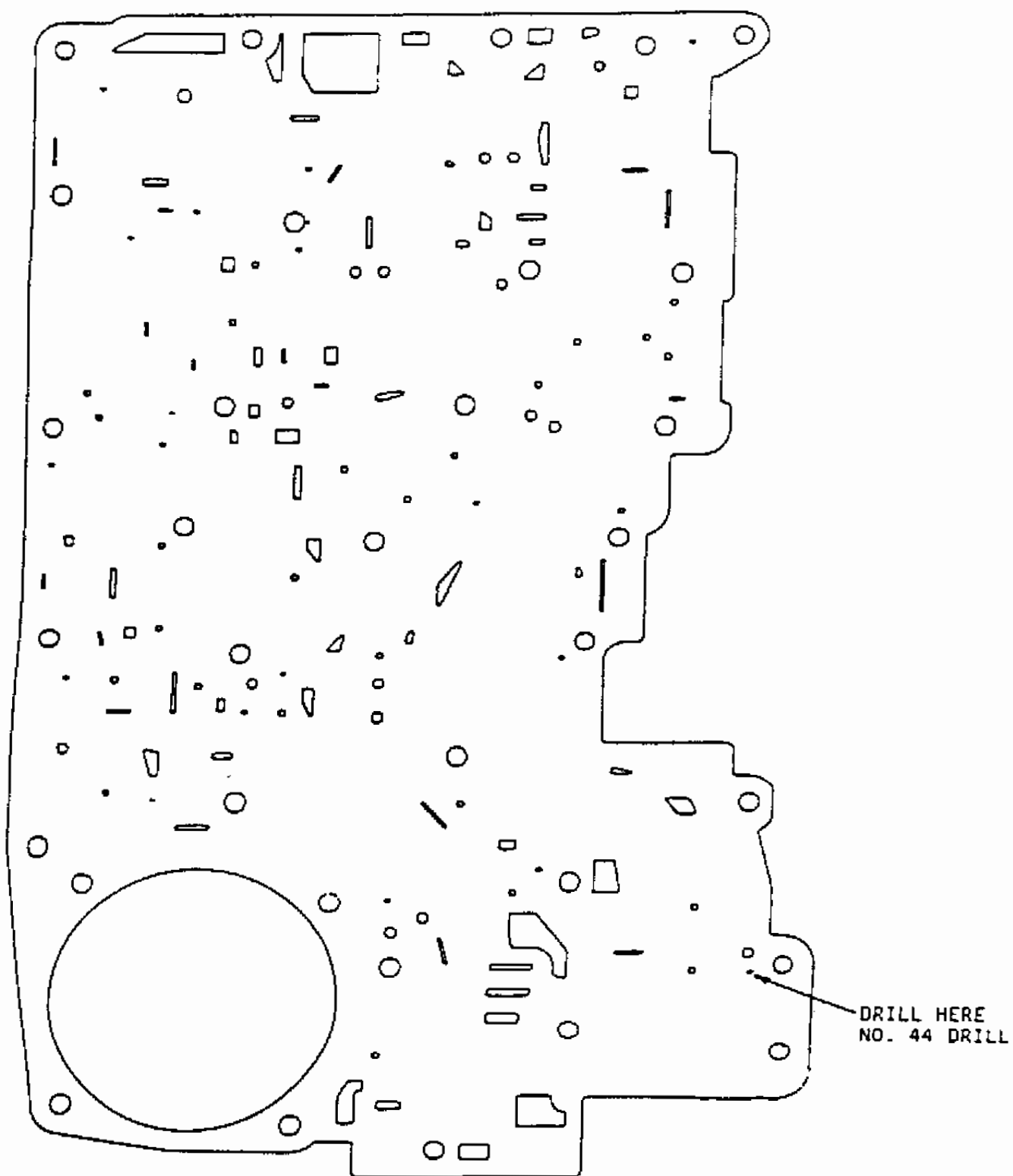
COMPLAINT: #1 - Soft 1-2 shift
#2 - Harsh 1-2 shift

CAUSE: 1-2 capacity modulator valve spring calibration

CORRECTION: Complaint #1 - Replace 1-2 capacity modulator valve spring with stronger spring.
Complaint #2 - Replace 1-2 capacity modulator valve spring with weaker spring.



A4LD DELAYED REVERSE



FORD A4LD**DIRECT CLUTCH FAILURE**

COMPLAINT: Premature failure of the direct clutch pack.

CAUSE: Inspect for the following;

- * Rear end play out of specification. Select #4 thrust washer that will obtain an end play of close to .012". DO NOT go under .012".
- * Nicked or cut center support viton (Rubber) seals. DO NOT use steel or teflon seals in this location.
- * Direct clutch piston check ball leaking.
- * Shift Cable - High resistance to movement.
- * Shift Bezel - High resistance to movement.
- * Manual valve out of position.

CORRECTION: There is now a new design manual valve available for service, and can be identified by a groove on the valve stem just behind the manual valve link hole (See Figure 1).
The 2nd design manual valve has a thinner land on it, as shown in Figure 1, and went into production vehicles in January, 1988.

SERVICE INFORMATION:

Manual Valve (2nd Design)..... E8TZ-7C389-A

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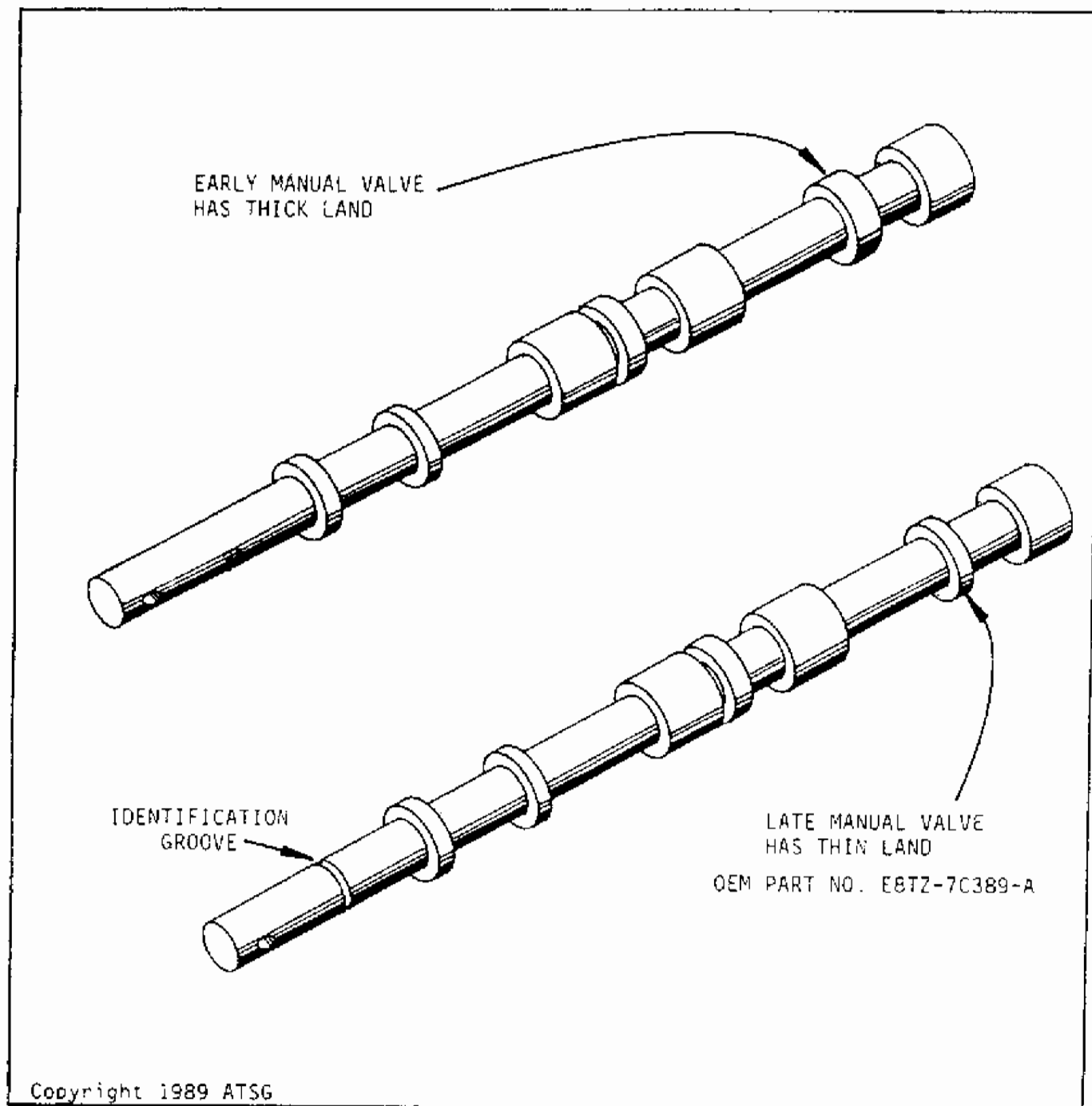


Figure 1

AXOD - FLARE ON 2-3 SHIFT

COMPLAINT: Flare or slip on 2-3 shift, or premature failure of direct clutches.

CAUSE: The cause may be a cracked direct clutch piston. For procedure to check the piston, see Figure 1.

CORRECTION: Replace the direct clutch piston.

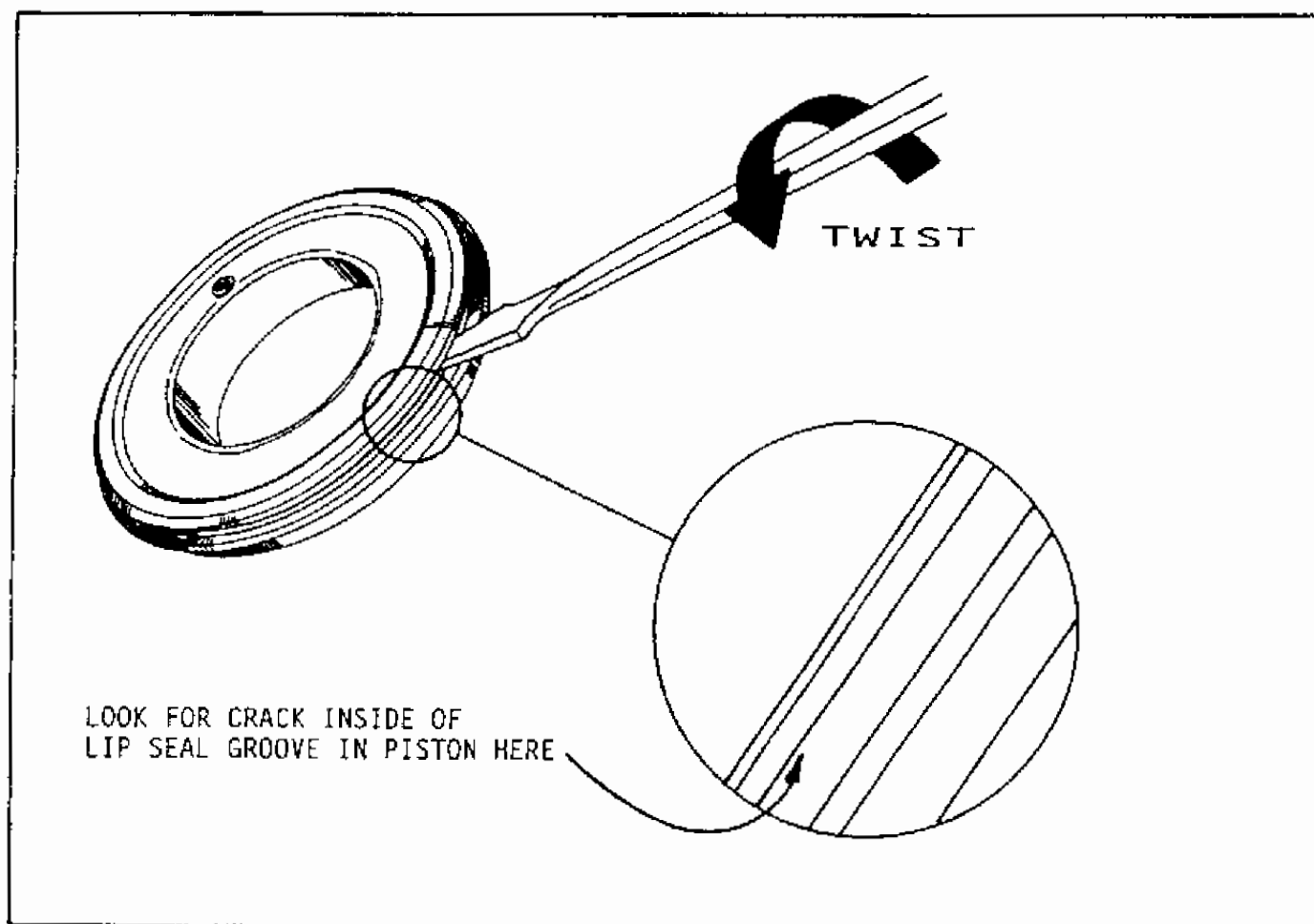


Figure 1

FORD - AXOD

NO 3-4 SHIFT

COMPLAINT: An extended 3-4 shift with possible direct clutch failure or a NO 3-4 shift condition.

CAUSE: This condition may be caused by a partially or fully blocked oil flow of the direct clutch piston check ball.

CORRECTION: Special care must be taken during the overhaul operation when re-assembling the direct clutch return spring over the direct clutch piston. Make sure that the notch in the spring bottom retainer (See Figure 1) is positioned properly over the check ball so it will not block or restrict oil flow of the piston check ball assembly. Refer to Figure 1.

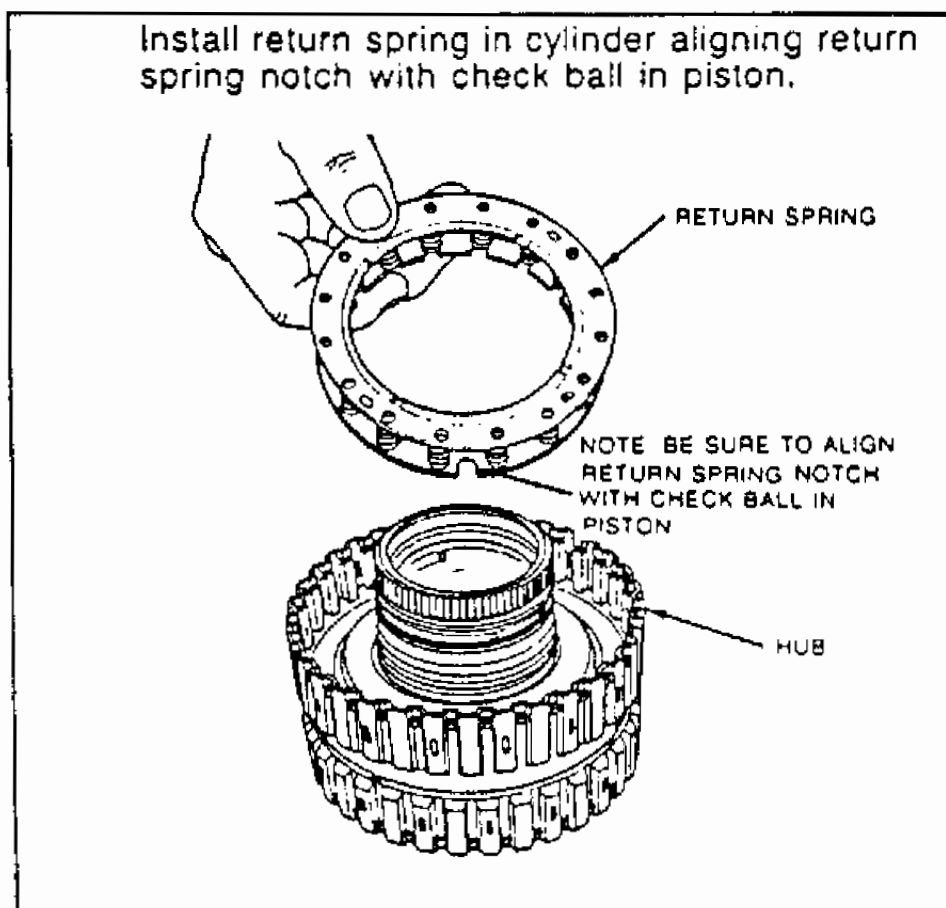


Figure 1

FORD AXOD HARSH COAST DOWNSHIFT

- COMPLAINT: Harsh downshift when coasting to a stop at closed throttle.
- CAUSE: Insufficient travel of the 1-2 piston against the cushion spring.
- CORRECTION: Remove $1/16"$ to $3/32"$ from the boss on the inside of the 1-2 servo piston as shown in Figure 1. We have shaded the area to be machined.

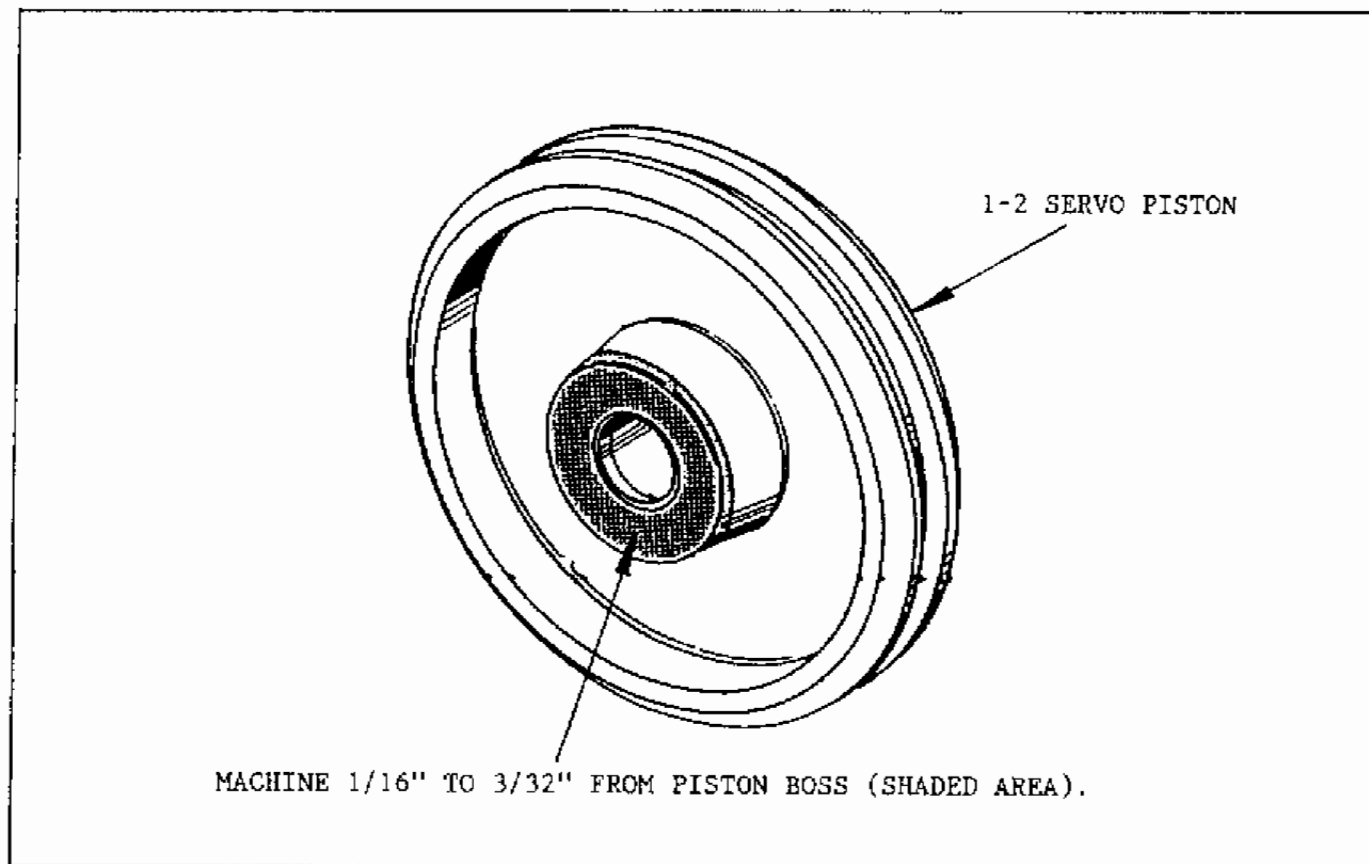


Figure 1

CHRYSLER A404-413-670

SECOND GEAR STARTS

- COMPLAINT: 2nd GEAR STARTS AFTER OVERHAUL.
- CAUSE: IF ALL OTHER POSSIBILITIES HAVE BEEN ELIMINATED, THE CAUSE MAY BE CROSS LEAKS CAUSING GOVERNOR PRESSURE AT A STAND STILL.
- CORRECTION: CAREFULLY GRIND 3 SMALL FLATS ON THE SECOND LAND OF THE FREE FLOATING GOVERNOR VALVE (WITHOUT SPRING) TO PROVIDE AN EXHAUST. SEE FIGURE 1.

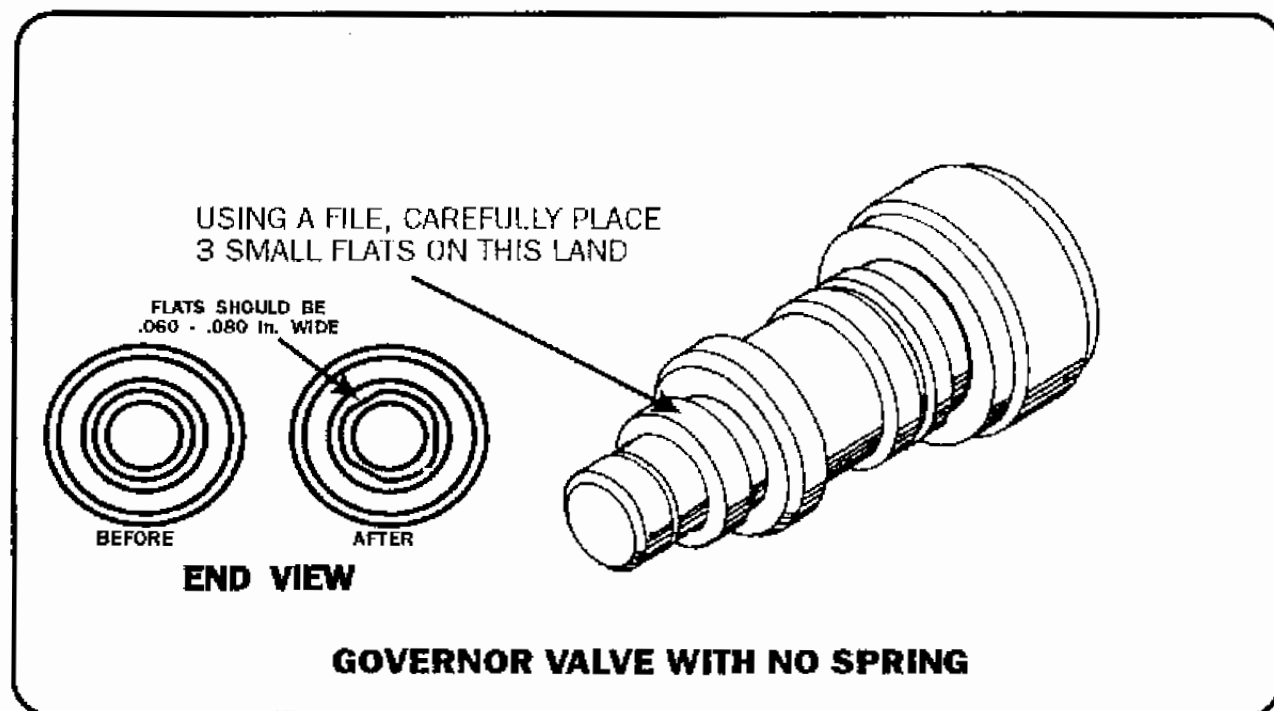


FIGURE 1

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 1).

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 2).
3. Remove the park sprag rod from the transaxle assembly and inspect the bullet end of the rod (Figure 1). 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.

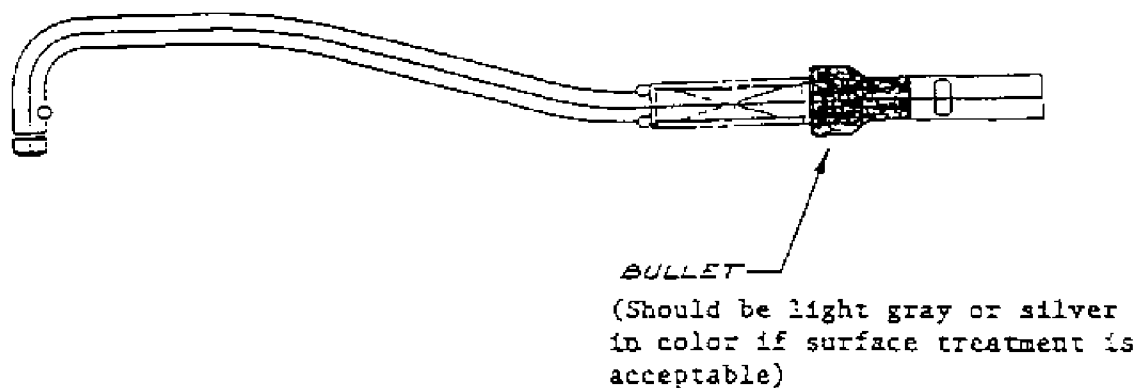


Figure 1

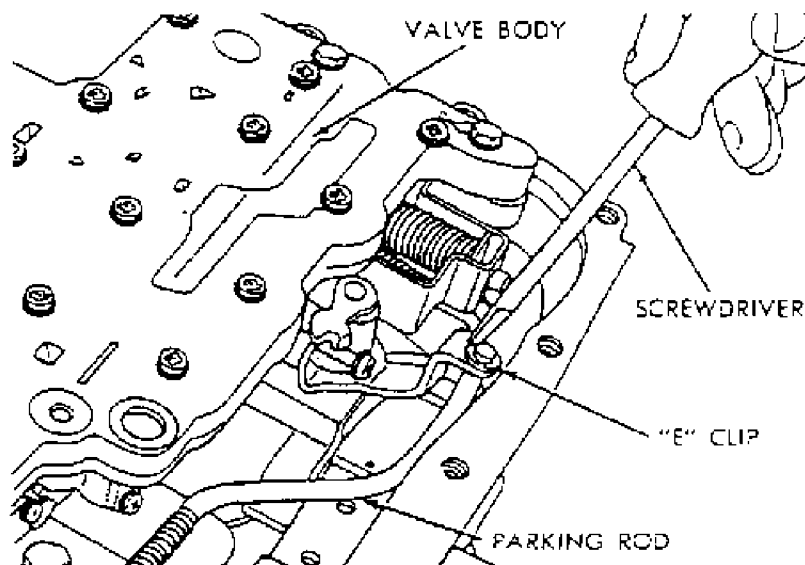


Figure 2

HONDA - ACURA 3 & 4 SPEED ALL T.V. CABLE CONTROLLED TRANSAXLES

COMPLAINT: Slipping, shudders, hard up or down shifts and trans failure

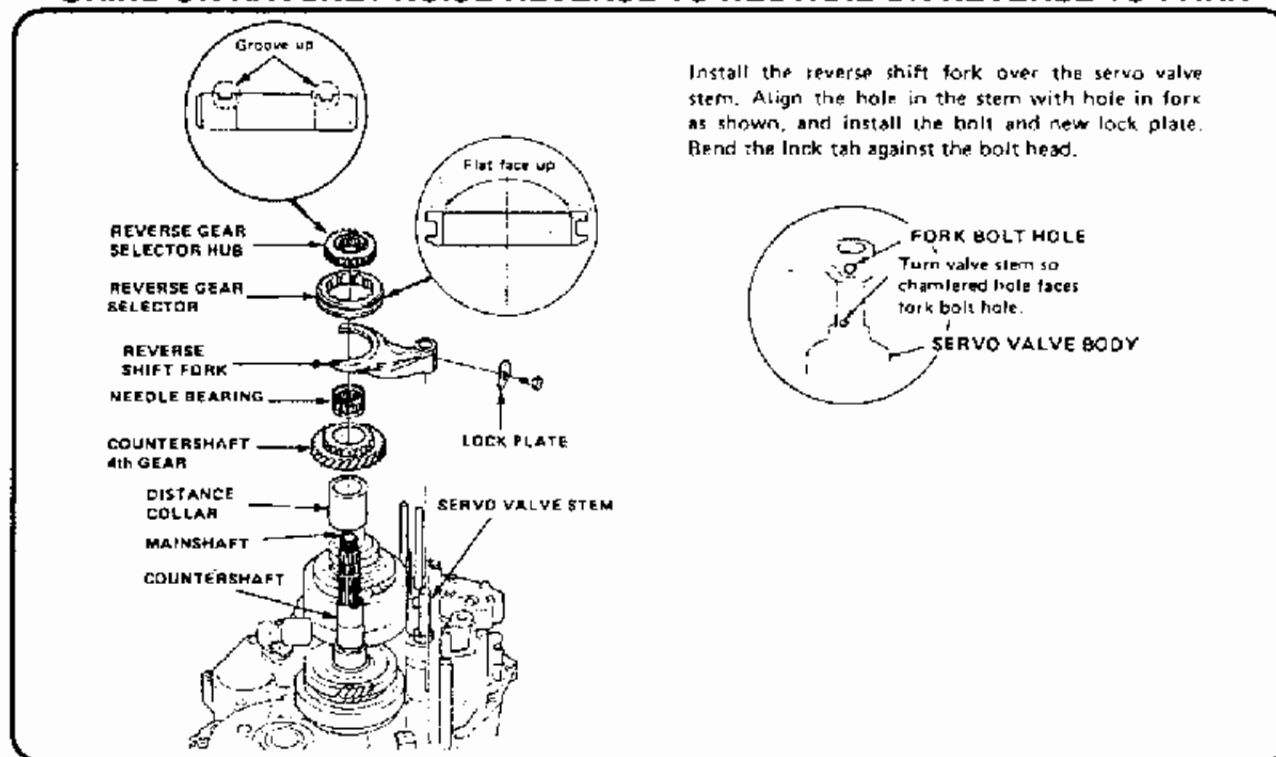
CAUSE: Improper T.V. cable timing.

CORRECTION: The #1 cause of transaxle problems can be corrected by properly adjusting the T.V. cable with a pressure gauge. Adjust the T.V. cable using the following procedure.

- Step 1 Connect a pressure gauge to the T.V.B. pressure tap (check service manual exact model location).
- Step 2 Warm up engine, it must be off of high idle.
- Step 3 Apply the brake and place the vehicle into D4 or S4.
- Step 4 From the drivers seat check the pressure gauge. At idle the gauge should read 0 psi, if the gauge reads more than 0 adjust the locking nut as necessary to read 0 psi.
- Step 5 With the breaks applied, gently press the accelerator untill you hear the slightest engine rpm change. At that moment the needle of the gauge must start to rise, if you don't get a pressure rise at that moment adjust as necessary.
- Step 6 Press the accelerator quickly to the floor, The pressure should rise to 100 psi then to 250 psi.

HONDA F4 - AS

GRIND OR RATCHET NOISE REVERSE TO NEUTRAL OR REVERSE TO PARK



STEP 1.

WITH THE ENGINE AT OPERATING TEMPERATURE, CHECK THAT ENGINE IDLE SPEED IS NOT ABOVE SPECIFICATIONS IN REVERSE, IF NECESSARY HAVE IT ADJUSTED BY A FUEL SYSTEM SPECIALIST.

STEP 2.

CHECK THE ENGINE IDLE SPEED, IT SHOULD NOT INCREASE MORE THAN 350 RPM WHEN SHIFTING FROM REVERSE TO NEUTRAL OR PARK, IF SO HAVE FUEL SYSTEM INSPECTED BY A FUEL SYSTEM SPECIALIST.

STEP 3.

TRY DEXRON II E FLUID.

STEP 4.

INSPECT MANUAL SHAFT LEVER BOLT FOR TIGHTNESS AND FOR A WORN LEVER WHICH CANNOT HOLD A POSITION WITH THE BOLT TIGHT.

STEP 5.

CHECK SHIFTER CABLE ADJUSTMENT AT SHIFTER INSIDE VEHICLE.

STEP 6.

4TH CLUTCH STEEL PLATES MAY BIND IN THE 4TH CLUTCH DRUM, INSPECT THE 4TH CLUTCH STEEL PLATES FOR DAMAGE. INSPECT 4TH CLUTCH DRUM FOR GROOVING OR DAMAGE IN THE AREA THE STEEL PLATES SPLINE INTO.

AUTOMATIC TRANSMISSION SERVICE GROUP

STEP 7.

4TH CLUTCH FRICTION PLATES MAY BIND ON THE MAINSHAFT 4TH GEAR SPLINES, INSPECT FRICTION PLATES FOR SMOOTH MOVEMENT OVER SPLINES. INSPECT MAINSHAFT 4TH GEAR IN THE AREA THE FRICTION PLATES SPLINES INTO FOR GROOVING OR DAMAGE.

STEP 8.

CHECK FOR A BROKEN SPRING WASHER JAMED UNDER THE BOTTOM STEEL PLATE IN THE 4TH CLUTCH DRUM.

STEP 9.

LIGHTLY SAND STEEL PLATES WITH 240 TO 320 GRIT SANDPAPER. DO NOT BUFF OR BEAD BLAST PLATES.

STEP 10.

USE A GOOD OEM QUALITY FRICTION PLATE.

STEP 11.

SET CLUTCH PACK CLEARANCE WITH PRE-SOAKED FRICTION PLATES TO .032 INCH.

STEP 12.

REPLACE COUNTERSHAFT 4TH GEAR AND REVERSE GEAR SELECTOR. BE SURE TO INSTALL REVERSE GEAR SELECTOR WITH FLAT SIDE UP TO THE REVERSE GEAR. INSPECT REVERSE SHIFT FORK FOR WEAR.

STEP 13.

SET MAINSHAFT END CLEARANCE TO .006 INCH BY SELECTING THE CORRECT SELECTIVE WASHER BETWEEN 2ND AND 3RD GEAR. IF THE MAINSHAFT IS NOT COMPLETELY ASSEMBLED WITH THE NUT TORQUED TO 70 FOOT POUNDS WHILE MEASURING THE CLEARANCE, A SERIOUS MEASURING ERROR MAY OCCUR.

STEP 14.

IF COUNTERSHAFT END CLEARANCE IS GREATER THAN .006 INCH, THE COUNTERSHAFT 4TH GEAR MAY TURN TOO FREELY. SET COUNTERSHAFT END CLEARANCE BETWEEN .003 -.006 INCH BY SELECTING THE CORRECT SELECTIVE SPACER COLLAR BETWEEN 2ND GEAR AND 4TH GEAR. IF THE COUNTERSHAFT IS NOT COMPLETELY ASSEMBLED WITH THE NUT TORQUED TO 80 FOOT POUNDS FOR A 30MM SOCKET SIZE NUT, OR 102 FOOT POUNDS FOR A 34MM SOCKET SIZE NUT WHILE MEASURING THE CLEARANCE, A SERIOUS MEASURING ERROR MAY OCCUR.

STEP 15.

CUT SERVO RETURN SPRING TO MAKE IT A TOTAL LENGTH OF 1.200 INCH.

STEP 16.

CHECK FOR A TORQUE CONVERTER WITH A DRAGING CLUTCH.

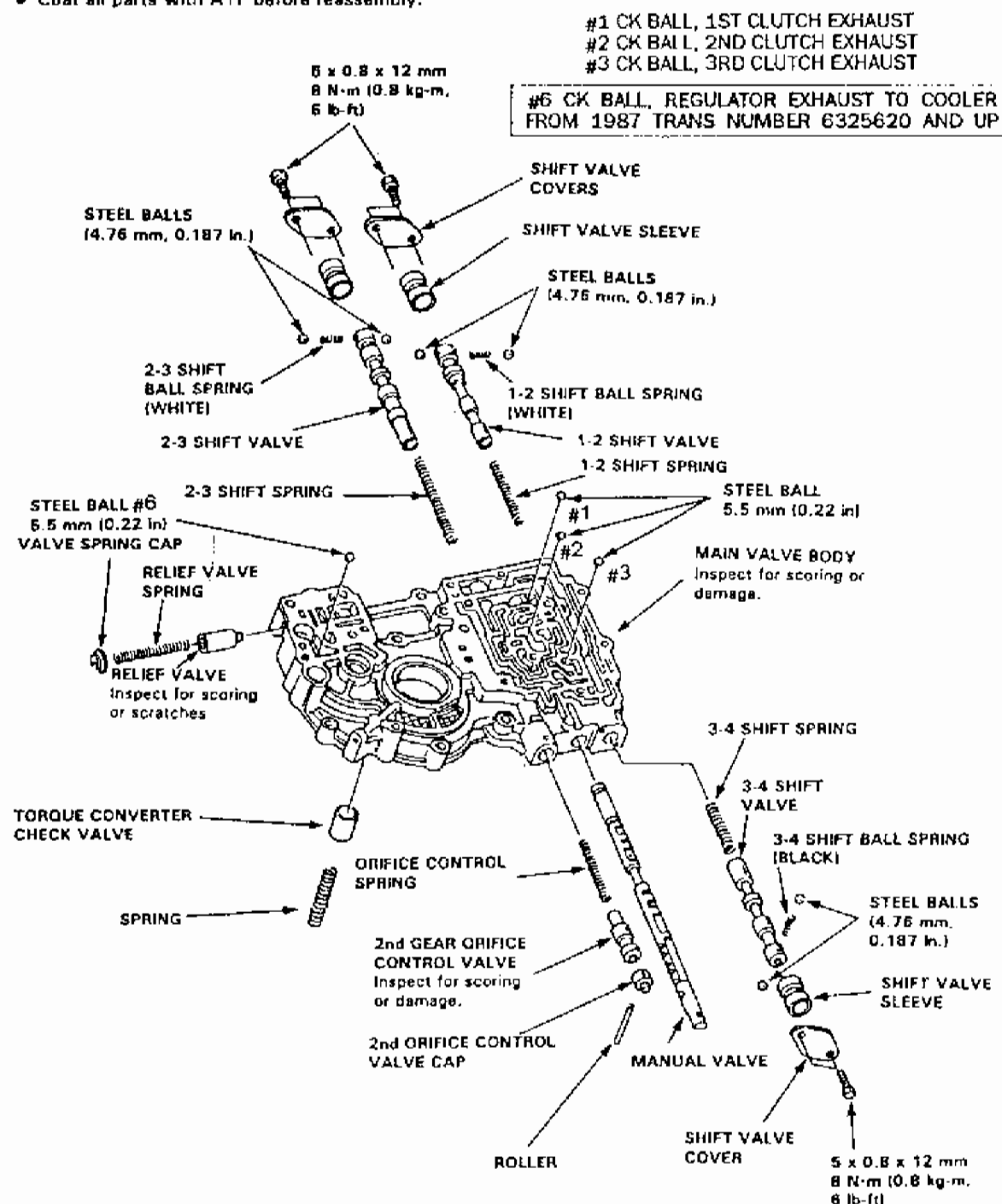
MAIN VALVE BODY

F4

Disassembly/Inspection/Reassembly

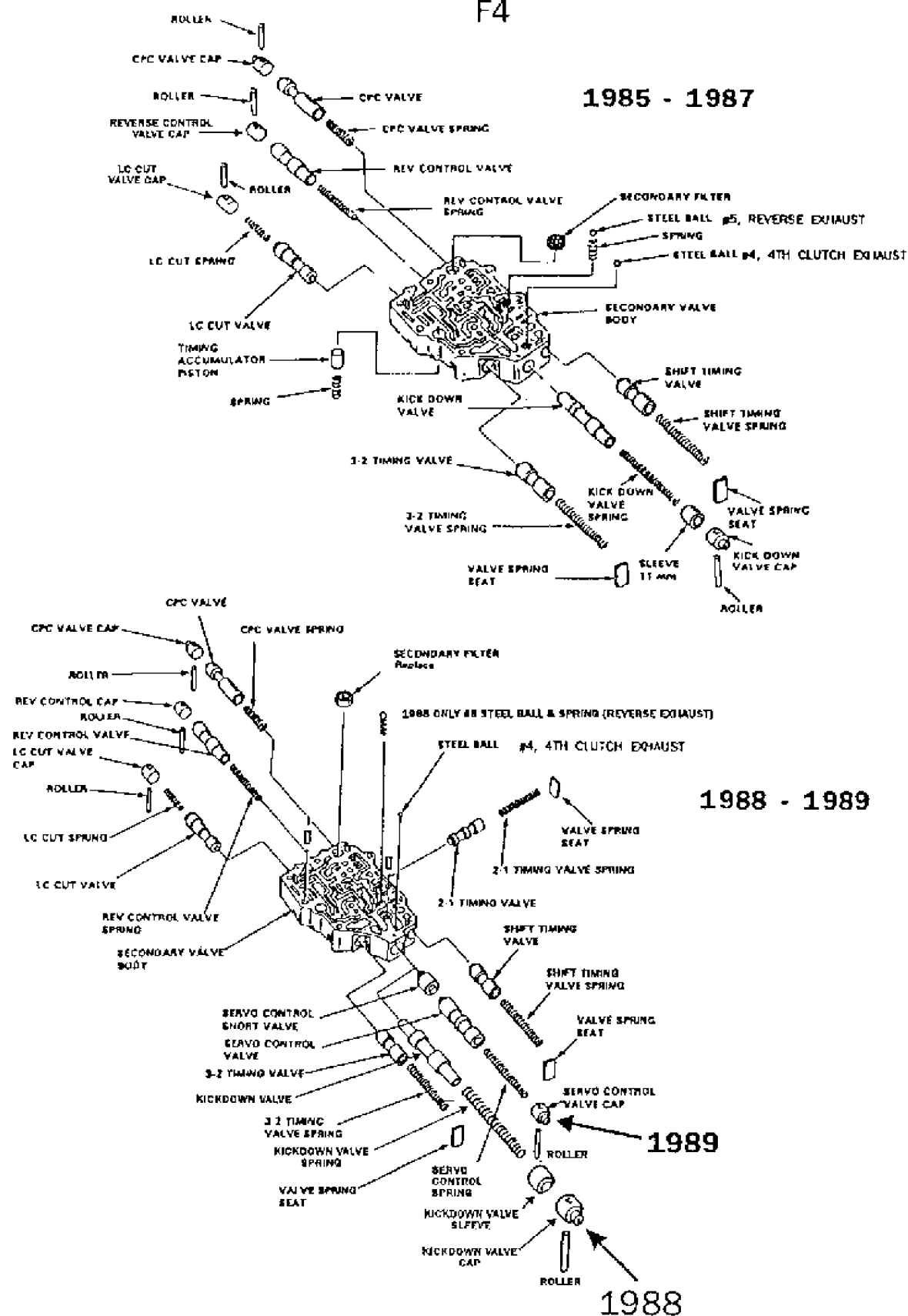
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement.
- Coat all parts with ATF before reassembly.



F4

1985 - 1987



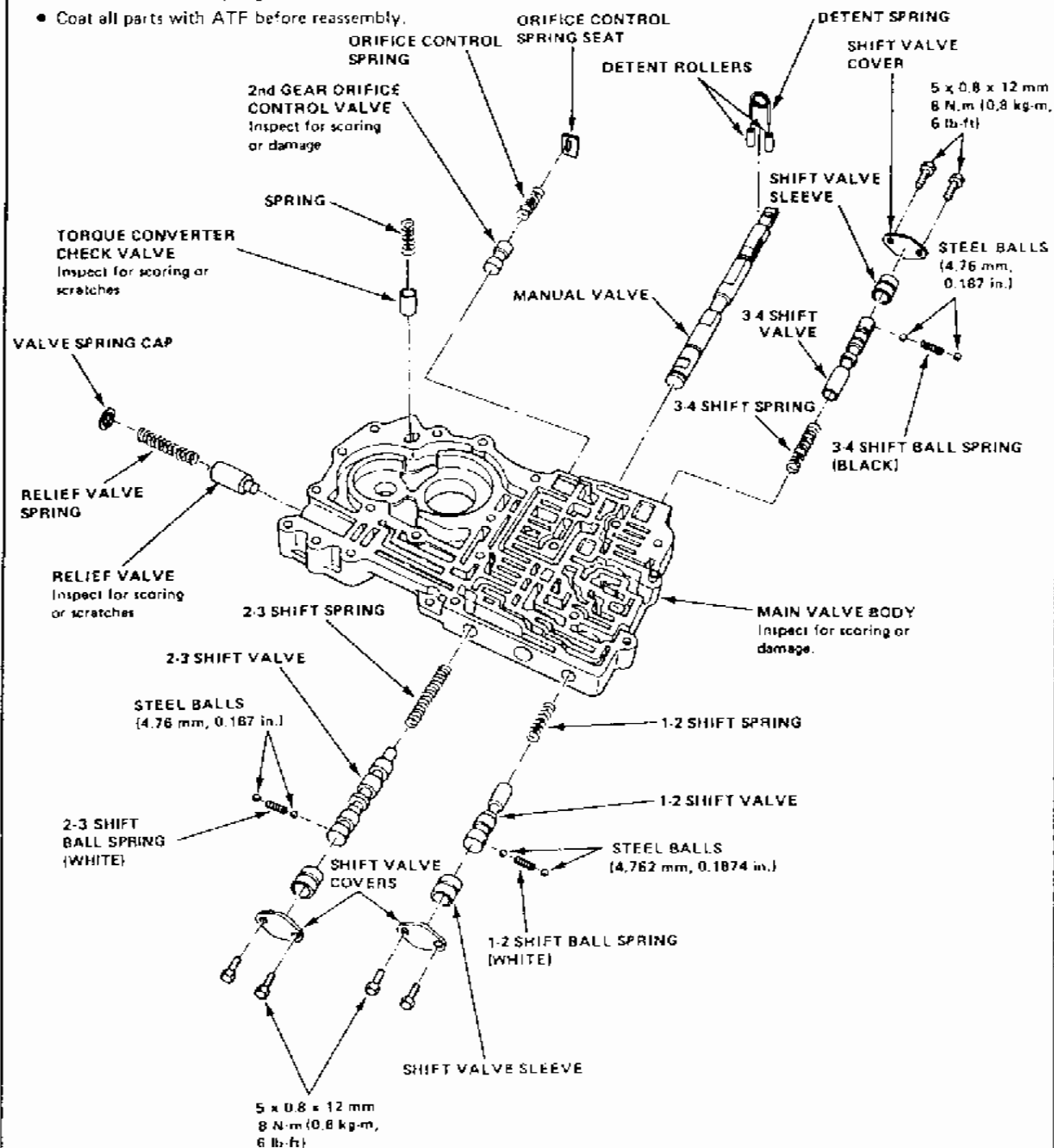
Main Valve Body

AS

Disassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.



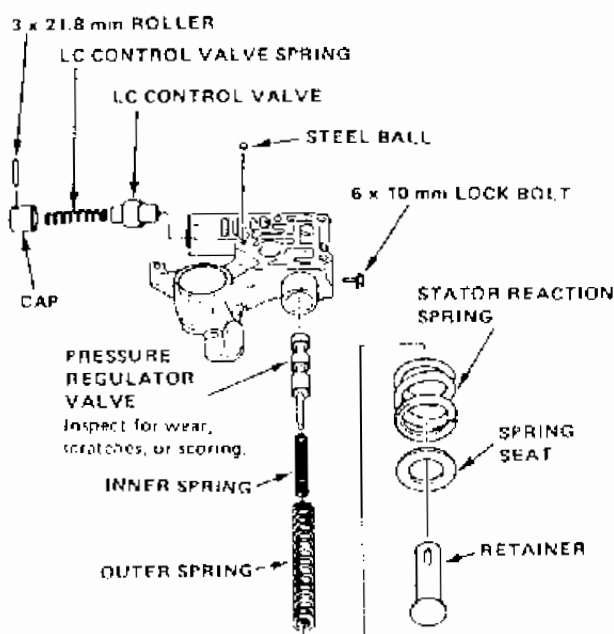
AS

Disassembly/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as assembly if any parts are worn or damaged.
- Check all valves for free movement, if any fail to slide freely, see Valve Body Repair on page 15-94.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.

1. Hold the retainer in place while removing the lock bolt. Once the bolt is removed, release the retainer slowly.
2. Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.

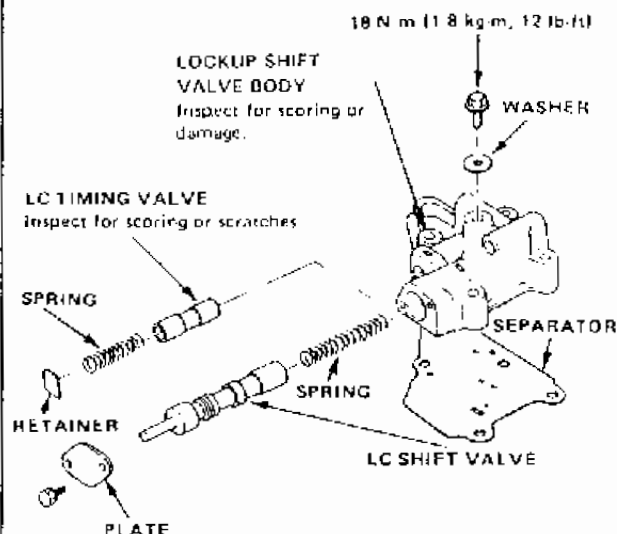


3. Install the pressure regulator valve, and the inner and outer springs.

Disassembly/Inspection

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner.
- Replace valve body as assembly if any parts are worn or damaged.
- Check all valves for free movement, if any fail to slide freely, see Valve Body Repair on page 15-94.
- See Section 3 for spring specifications.
- Coat all parts with ATF before reassembly.



ACURA HONDA TIPS**F4 AS**

1. RATCHET OR GRIND FROM REVERSE TO NEUTRAL OR PARK-----USE AN OEM QUALITY FRICTION PLATE AND SAND THE STEELS FOR 4TH CLUTCH , USE .010 TO .012 INCH CLEARANCE PER FRICTION
2. WRONG GEAR STARTS,NO SHIFT,NO SHIFT COLD, NO 3RD,NO 4TH,LATE 4TH-----GOVERNOR OR TV A VALVES STUCK,GOVERNOR OUTER SNAP RING NOT SEATED
3. WHERE DO THE CHECK BALLS GO---SEE ILLUSTRATION
4. HUNTING OR BIND UP IN 4TH-----CRACKED 2-4 DRUM
5. REVERSE BINDUP----NOT ENOUGH CLEARANCE ON SHAFTS OR 1ST CLUTCH OR BOTTOM FRICTION IN 1ST CLUTCH NOT ENGAGED JAMMING CLUTCH ON.
6. NO MOVE IN D4 AND D3, OK IN MANUAL 2ND-----ORING IN END COVER, INSTALL ORING INTO COVER, NOT ON TO RETAINER THEN INTO END COVER
7. COOLER RETURN LINE LOCATION-----TO THE REAR, OVER THE FINAL DRIVE
8. 4TH SLIPS OR CHATTERS-----TV ADJUSTMENT,TUBE IN END COVER LEAKING,WORN MAINSHAFT BUSHINGS, CRACKED 2-4 DRUM
9. TCC HUNTING-----CLIP ONE COIL FROM LC CUT VALVE SPRING
10. SLIPS ALL SHIFTS,SLIPS F&R,NO MOVE-----FILTER, PRESSURE REGULATOR VALVE
11. GENERAL ASSEMBLY-----FLAT SIDE UP ON REVERSE SELECTOR
12. REVERSE HARSH-----USE HONDA FLUID,4TH CLUTCH STEEL PLATE NEXT TO CUSHION HAS GROOVE ,USE OEM QUALITY FRICTIONS,1ST AND 4TH CUSHION PLATE MIXED UP,4TH ACCUMULATOR STUCK
13. GENERAL INFORMATION--ALWAYS USE GOLD COLOR FINAL DRIVE DIFFERENTIAL PIN, WAVY MAIN FILTER, AND IN LINE FILTER
14. NOISES-----CHANGE FINAL DRIVE, COUNTERSHAFT, AND GOVERNOR GEAR TOGETHER
15. COAST DOWN SHIFTS HARSH-----SET TV PRESSURE, HONDA FLUID, STUCK TV B, SET 2ND CLUTCH TO .028
16. 4TH NEUTRALS,OR GRINDS ON SHIFT-----REVERSE SELECTOR AND

AUTOMATIC TRANSMISSION SERVICE GROUP

COUNTER SHAFT 4TH GEAR SYCRO TEETH BADLY WORN

17. NO PARK AND OR RATCHETS-----PAWL RETURN SPRING IN WRONG HOLE, SHOULD BE THE UPPER HOLE
18. NO REVERSE-----GOVERNOR, REVERSE CONTROL VALVE STUCK
19. REPEAT FAILURE OF 2ND GEAR NEEDLE BEARING-----END CLEARANCE TOO TIGHT, MAINSHAFT OIL HOLE BLOCKED
20. HONDA AS ONLY, 4TH SLIPS, FLARES, AND/OR SLIPS REVERSE-----LC CUT VALVE SPRING RETAINER OUT OF POSITION NOT ALLOWING COVER PLATE TO FIT
21. NO MOVE HOT-----FILTER BLOCKED
22. LOUD SINGLE CLICK FROM PARK TO REVERSE OR DRIVE OR CLICK AS WHEEL ROTATES-----DIFERENTIAL PIN WORN, ALWAYS INSTALL NEW GOLD COLOR PIN
23. NO UPSHIFT-----CLUTCH PRESSURE CONTROL VALVE INSTALLED BACKWARDS
24. 4TH FLARE-----USE STRONGER SPRING ON THE 3RD ORFICE CONTROL VALVE
25. NO 2ND, MANUAL OR AUTOMATIC-----INNER SEAL ON 2ND PISTON POOR FIT
26. DELAY FORWARD-----MAINSHAFT NUT LOOSE
27. 3RD SKIPPED-----PASSAGE IN COUNTERSHAFT BLOCKED
28. GRINDS INTO REVERSE-----PUMP, PR VALVE, FILTER
29. NO 4TH HOT-----GOVERNOR SHAFT WORN BADLY
30. NO MOVE IN D4, D3 OR SKIPS 3RD OR NEUTRALS ON 4TH AND NO REVERSE-----AN EXTRA 2ND PISTON WITH A LARGE INSIDE DIAMETER WAS USED BY MISTAKE, SPECIFIC SYMPTOMS ARE DETERMINED BY WHAT DRUM THE PISTON WAS INSTALLED INTO

L5 PL5X

31. WRONG GEAR STARTS, NO KICK DOWN, SKIPS 2ND, ALL SHIFTS EARLY, STACK SHIFTS AT WOT, SKIPS 3RD,-----REPLACE SHIFT SOLONIDS (LOWER SOLONIDS)

32. ASSEMBLY-----ALWAYS USE GOLD COLOR PIN IN DIFFERENTIAL, VALVE BODY, SPRAG ROTATION
33. 2ND CHATTERS OR HARSH-----ADJUST TV PSI, SEE PROCEDURE, HONDA OIL, USE OEM QUALITY FRICTION PLATES, SAND STEEL PLATES, CUSHION UPSIDE DOWN
34. GENERAL-----USE HONDA OIL, USE TV PRESSURE ADJUSTMENT PROCEDURE
35. RATCHET OR GRINDS FROM REVERSE TO NEUTRAL OR PARK-----, O45 CLUTCH PACK CLEARANCE IN 4TH CLUTCH, SAND STEELS, USE OEM QUALITY FRICTIONS, USE NEW REVERSE SELECTOR AND COUNTERSHAFT 4TH GEAR
36. NO REVERSE-----NO TEETH LEFT ON REVERSE SELECTOR, ALWAYS REPLACE REVERSE SELECTOR, COUNTERSHAFT 4TH GEAR AND REVERSE GEAR AS NECESSARY, STUCK SERVO CONTROL VALVE
37. 4-3, 4-2, 3-2 DOWN SHIFTS ON IT'S OWN WHEN HOT-----ROUND SCREENS BLOCKED
38. LEAKS AT FRONT SEAL----- SEAL DRIVEN IN TOO FAR, SHOULD BE FLUSH, INCORRECT CONVERTER
39. TCC SHUDDER-----TORQUE CONVERTER
40. 2ND SHUDDER-----SNAP RING BLOWN OFF OF 2-4 DRUM-----PRESSURE REGULATOR STUCK, POOR DRUM
41. TCC ON TOP OF 2ND----- TOO MUCH TVPSI , BACK OFF CABLE
42. NO MOVE HOT-----BLOCKED FILTER, TCC CLUTCH BAD

G4

43. NO REVERSE NO 4TH-----FORK BROKEN
44. NOISE WITH VEHICLE SPEED-----SHIM ON WRONG SIDE OF RING GEAR, RUBBING ON BOTTOM OF 3RD DRUM
45. 3RD FLARE-----USE OEM QUALITY FRICTION PLATES AND SAND STEEL PLATES

K4

46. WRONG GEAR STARTS, NO KICKDOWN, SKIPS 2ND, ALL SHIFTS EARLY, STACK SHIFTS AT WOT, SKIPS 3RD-----REPLACE SHIFT SOLENOIDS INSIDE CASE



- 47. UPSHIFTS AT THE SAME SPEED FROM IDLE TO WOT -----THROTTLE
ANGLE SENSOR DISCONNECTED
- 48. CODE 9----SPEED SENSOR WIRES DISCONNECTED OR PULLED OUT ON
WIRE HARNESS SIDE OF CONNECTOR ,HAPPENS ON R&R
- 49. CODE 2 AND NO TCC-----BAD CONNECTION ON TCC SOLONIDS

APX4

- 50. GRINDS GOING INTO PARK OR REVERSE, INTO DRIVE IS OK-----REVERSE
SELECTOR IS UPSIDE DOWN

ACURA COMPUTER CONTROLLED 4 SPEED ERRATIC 4-2 DOWNSHIFTS

COMPLAINT: *Good up shifts to fourth gear but drops to second gear unexpectedly.*

CAUSE: *Filter located in main portion of valve body damaged or restricted with foreign material causing pressure loss to the shift solenoids.*

CORRECTION: *Clean or replace filter (see figure 1).*

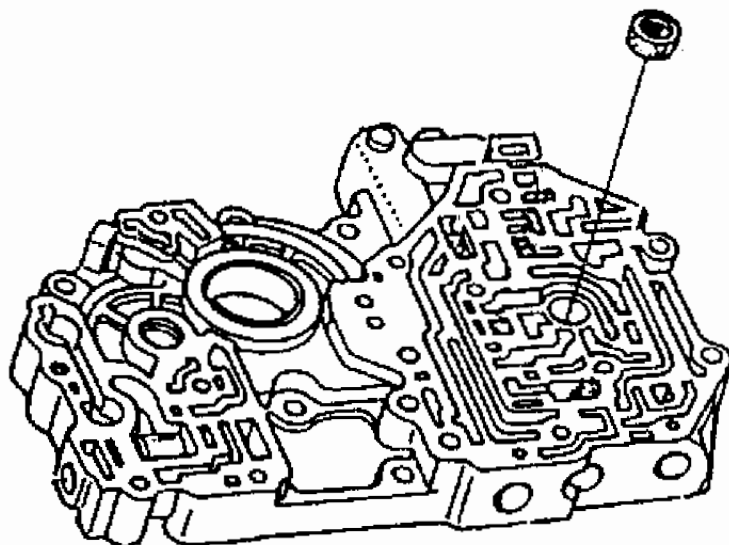
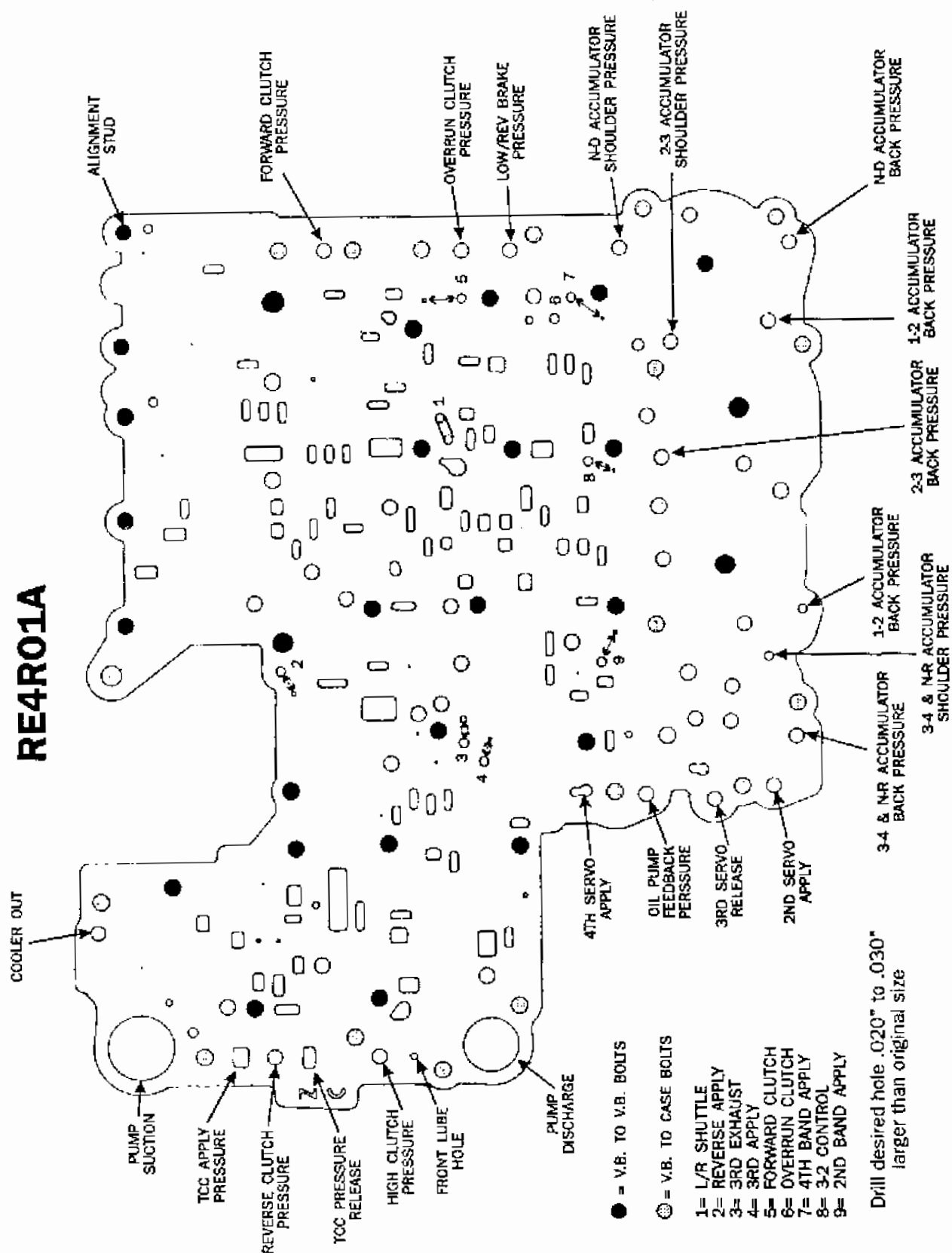


Figure 1

Nissan RE4R01A



ZF-4HP-18

2ND GEAR STARTS

COMPLAINT: Transmission starts in 2nd gear and binds up in manual low after overhaul.

CAUSE: The diaphragm return spring in the C clutch (Intermediate Clutch), may be mis-positioned causing the C clutch to remain applied mechanically.

CORRECTION: Assemble the C clutch pack with a steel plate going first onto the pump where the C clutch piston is located (See Figure 1). Then the diaphragm return spring which sits down onto the steel plate with the bevel up (like a bowl) as shown in figure 2. Once the diaphragm return spring is installed, the rest of the clutch pack can be installed starting with a lined plate.

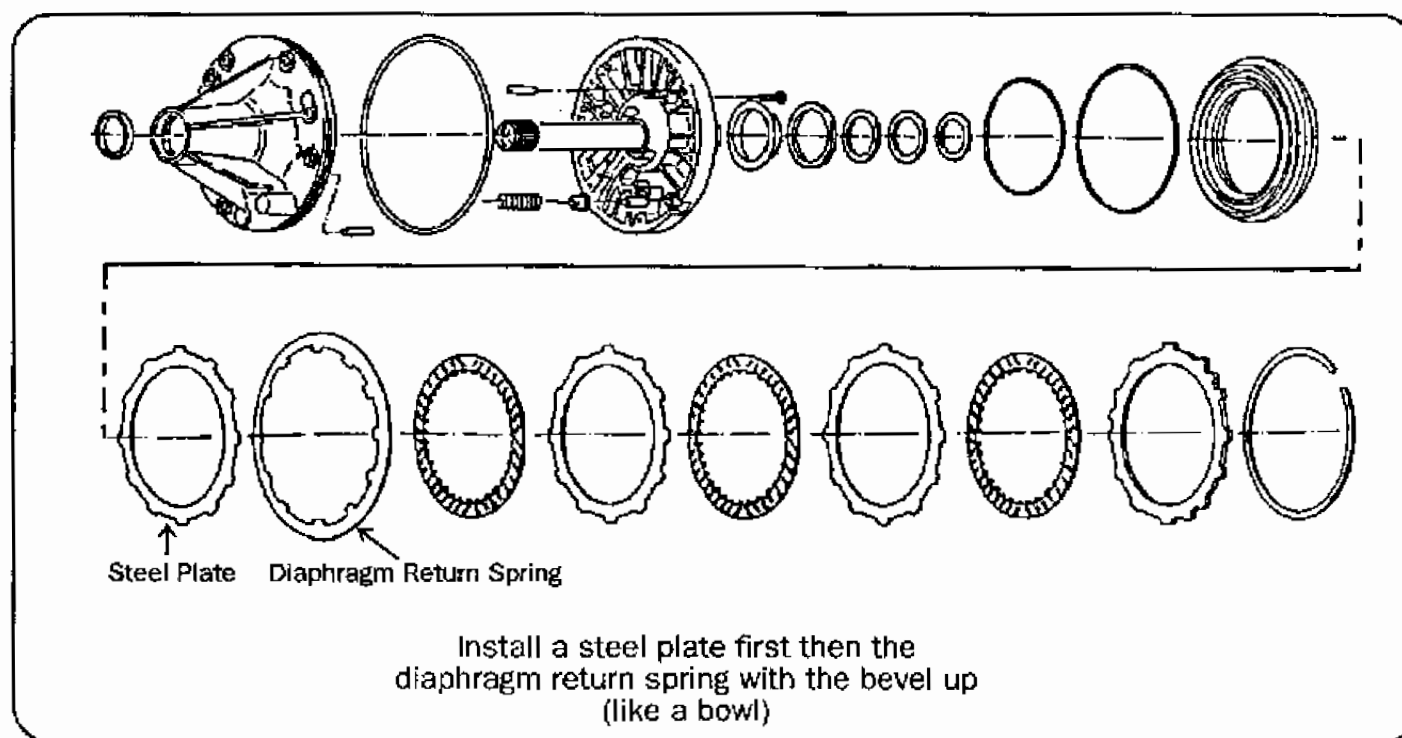


Figure 1

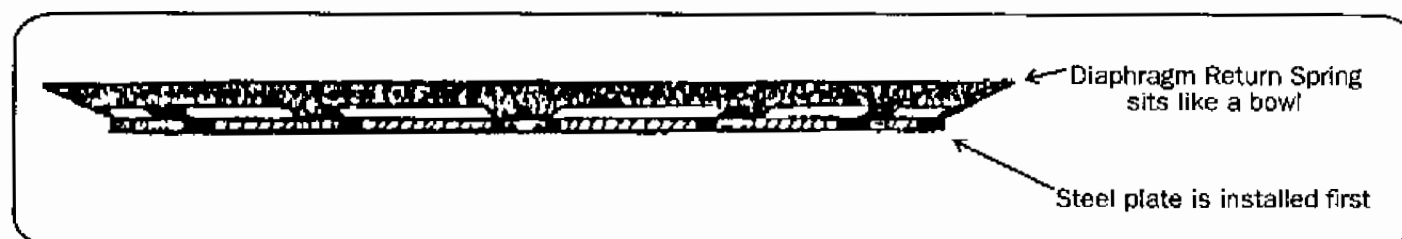
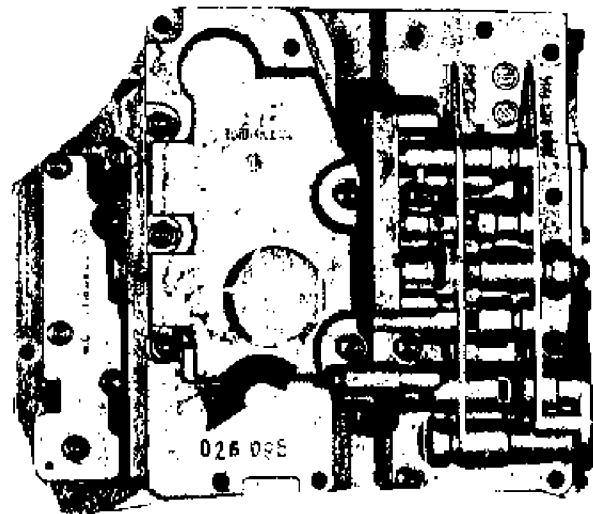


Figure 2

ZF4HP18

HARSH 4-3 COASTDOWN

- COMPLAINT:** After an overhaul, a harsh downshift from fourth gear to third is experienced. This condition usually occurs with closed throttle while the vehicle is coasting down after being in fourth gear.
- CAUSE:** Because the Forward (A) clutch must be re-applied on the 4-3 downshift, the cause may be that the Forward clutch accumulator orifice may be too large or new clutch material differences may affect the rate of clutch application, causing a harsh feel.
- CORRECTION:** The Forward (A) clutch accumulator orifice has been reduced in later valve bodies. To determine the update level of the valve body, refer to the first three numbers stamped on the filter cover. **See Figure 1.** If the valve body is the early style with either the 026 or 032 filter cover, check the valve body orifice (A) and reduce it as necessary to .047 in. **See Figure 2.** If this does not correct the problem, or if the valve body filter cover is 052, 068, or higher, then it will be necessary to install a lighter spring into the Forward (A) clutch accumulator. The pressure regulator spring from a 350 valve body will fit nicely and soften the clutch as it reapplies during a coast downshift. **See Figure 3** for the location of the Forward (A) clutch accumulator.



See arrow on cover to locate identification numbers.
Production numbers beginning with 026 or 132 are early model.
Production numbers beginning with 052, 068, or higher are late model.

Figure 1.

HARSH 4-3 COASTDOWN CONTINUED

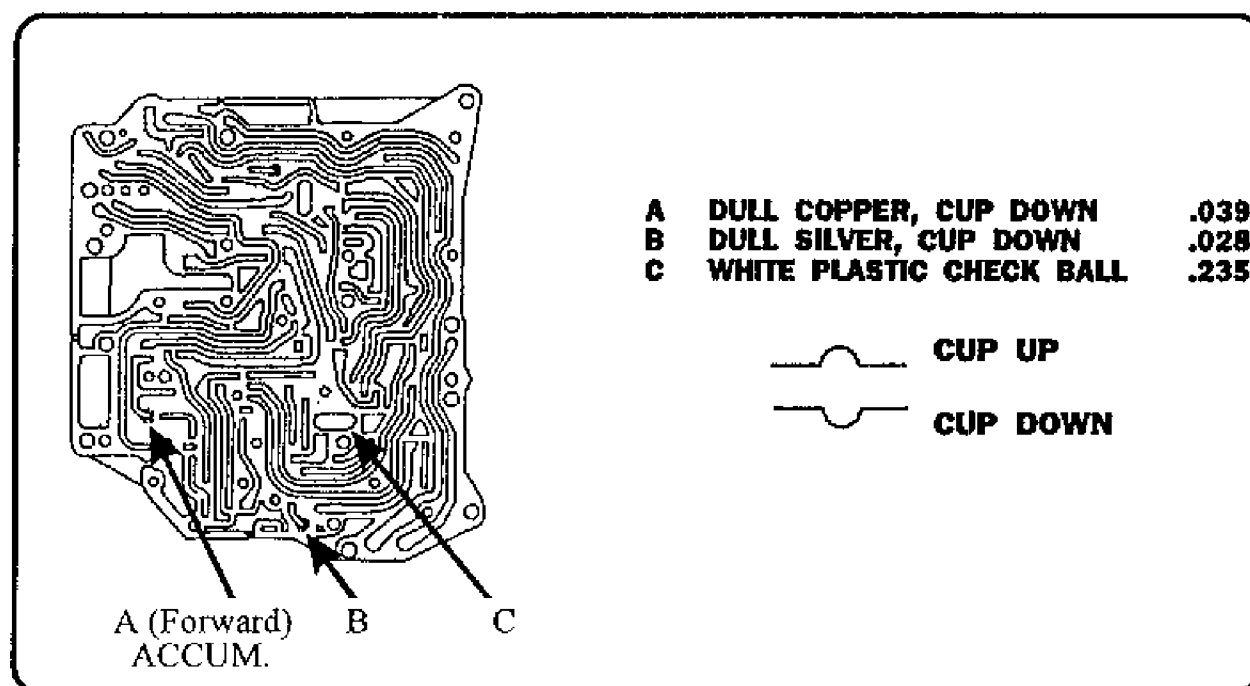


Figure 2.

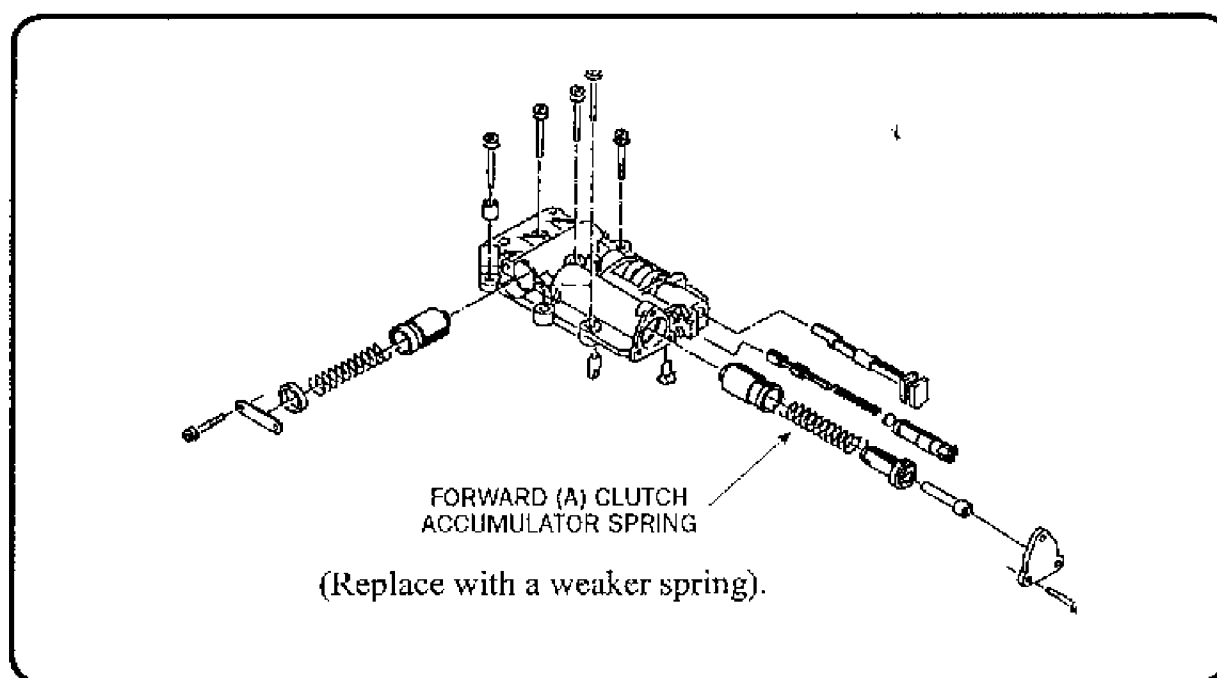


Figure 3.