



TRANSMISSION SEMINAR 1991

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TRANSMISSION SEMINAR

1991

This years seminar brings the latest information on transmission changes and complaints to you the field technicians in both a video and slide format along with this printed back-up material to help you in the shop. We cover the most often asked questions from the ATSG "hotline" on the 4L60 (700-R4), 4T60 (440-T4), and 3T40 (125-C) . This information will help you when the same type problems arise on the vehicles coming into your shop.

The 1991 model year has seen introduction of several new fully electronic controlled transmissions. In the transaxle catagory is the 4T60-E, which will eventually replace the 440-T4, with a 4T80-E and a 4T40-E waiting in the wings. For the rear drive vehicles, the 4L80-E (400 Overdrive), has been released, and the 4L60-E (700 Electronic Control), due to be released in 1992.

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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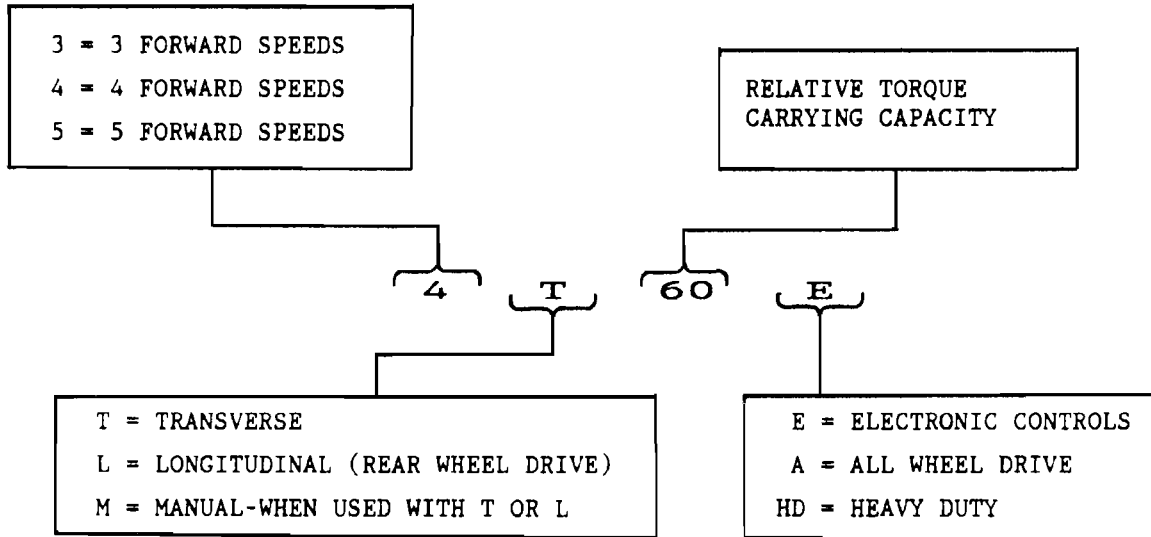
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Technical Service Information

NEW DESIGNATION SYSTEM FOR HYDRA-MATIC PRODUCTS



AUTOMATIC PRODUCTS

PREVIOUS
DESIGNATION
THM 180/180C
THM R1
THM A-1
THM 125/125C
THM 700-R4
NONE
THM 440-T4
THM F-31
THM 400
THM 475
THM R-2
NONE

NEW
DESIGNATION
HYDRA-MATIC 3L30
HYDRA-MATIC 4L30-E
HYDRA-MATIC 3T40-A
HYDRA-MATIC 3T40
HYDRA-MATIC 4L60
HYDRA-MATIC 4L60-E
HYDRA-MATIC 4T60
HYDRA-MATIC 4T60-E
HYDRA-MATIC 3L80
HYDRA-MATIC 3L80-HD
HYDRA-MATIC 4L80-E
HYDRA-MATIC 4T80-E

MANUAL PRODUCTS

HM-290
HM-282

HYDRA-MATIC 5LM60
HYDRA-MATIC 5TM40

AUTOMATIC TRANSMISSION SERVICE GROUP



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.

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 700-R4

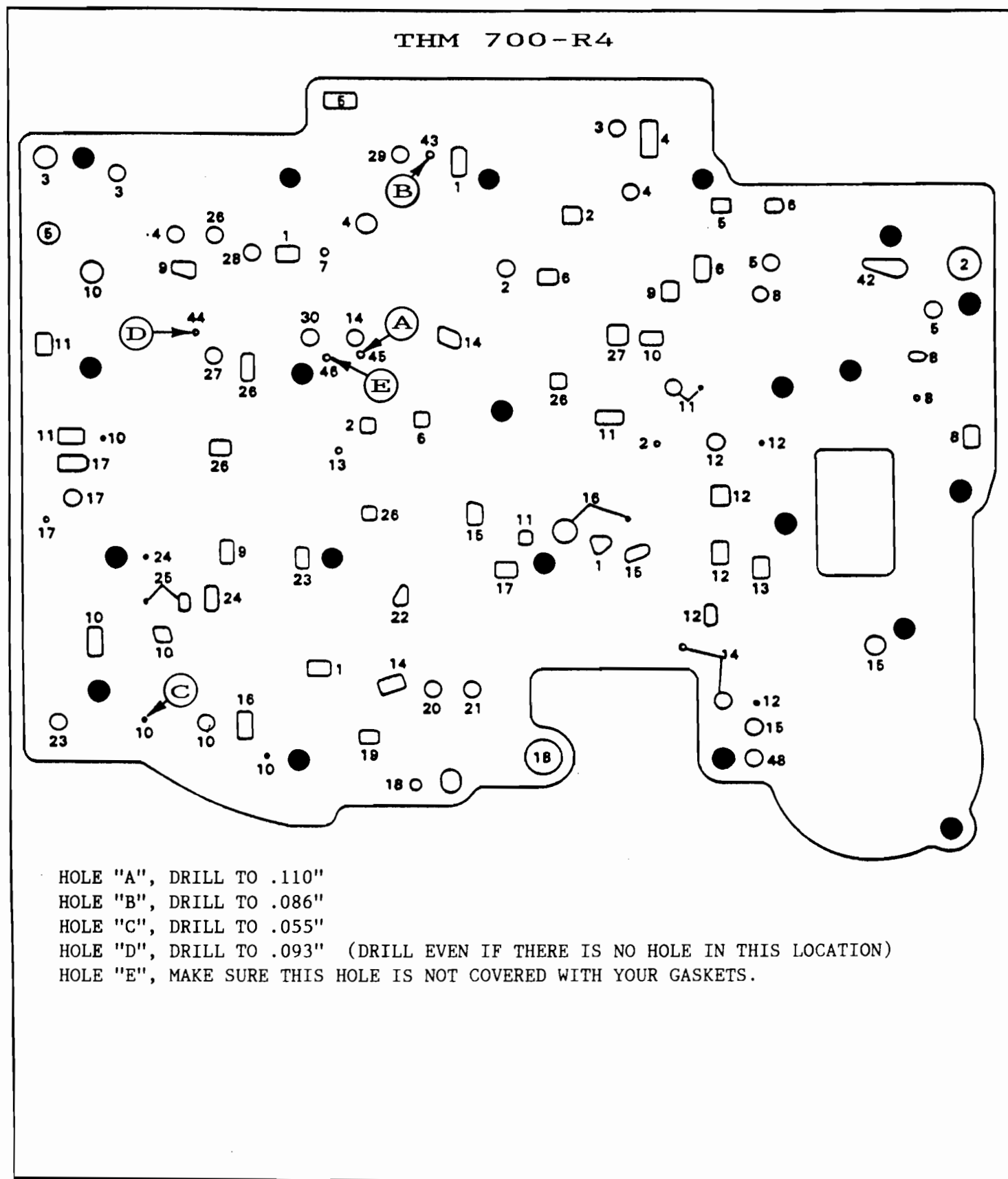


Figure 1



Technical Service Information

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).

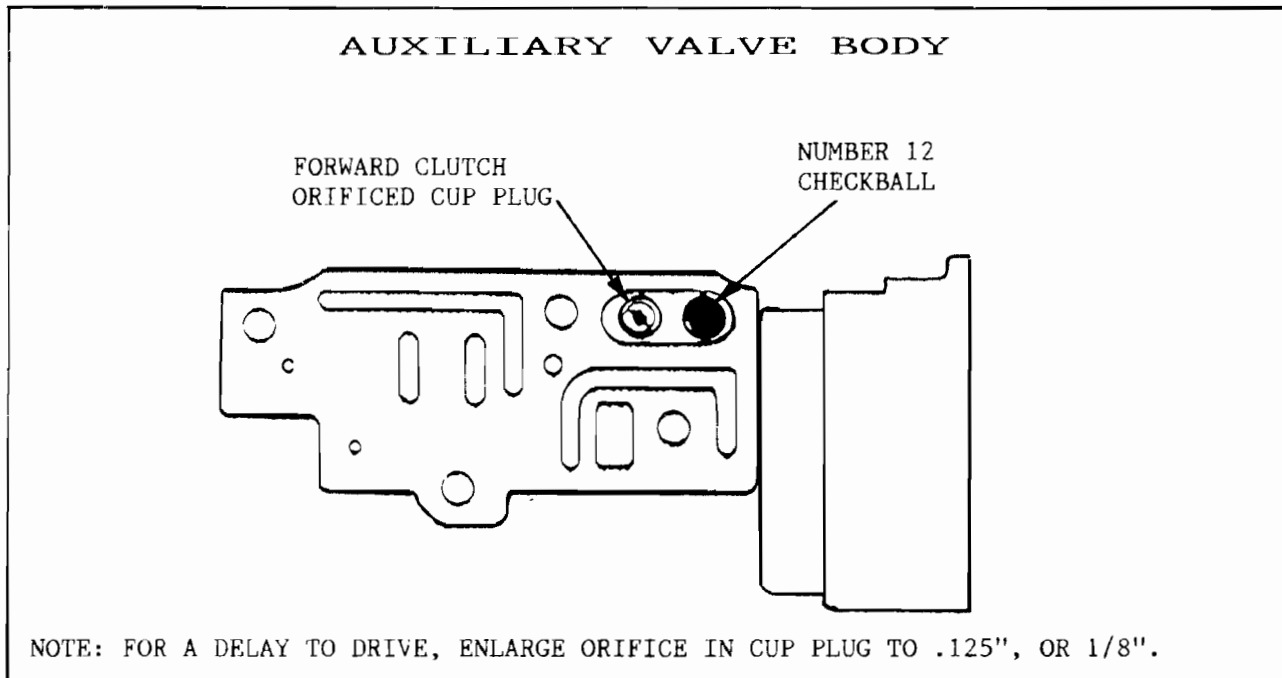


Figure 2

AUTOMATIC TRANSMISSION SERVICE GROUP

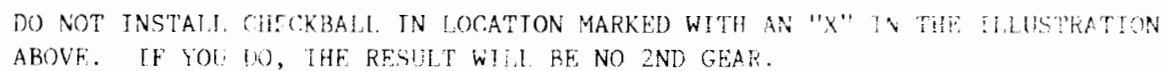
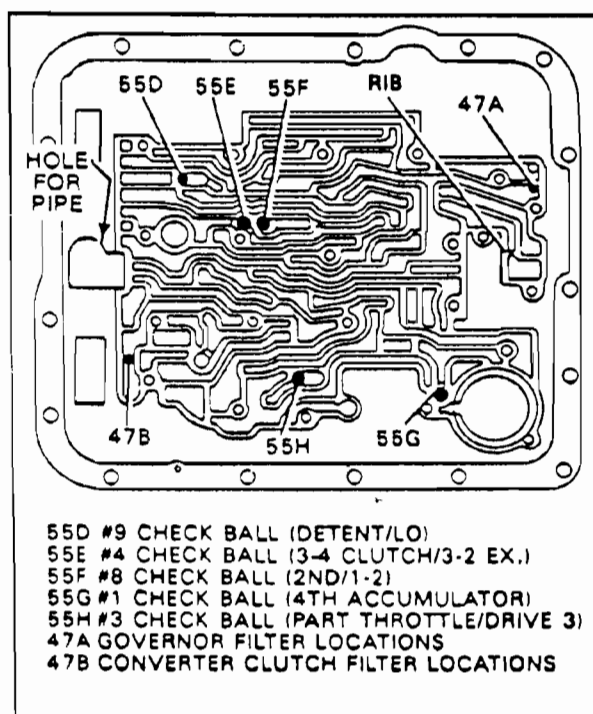
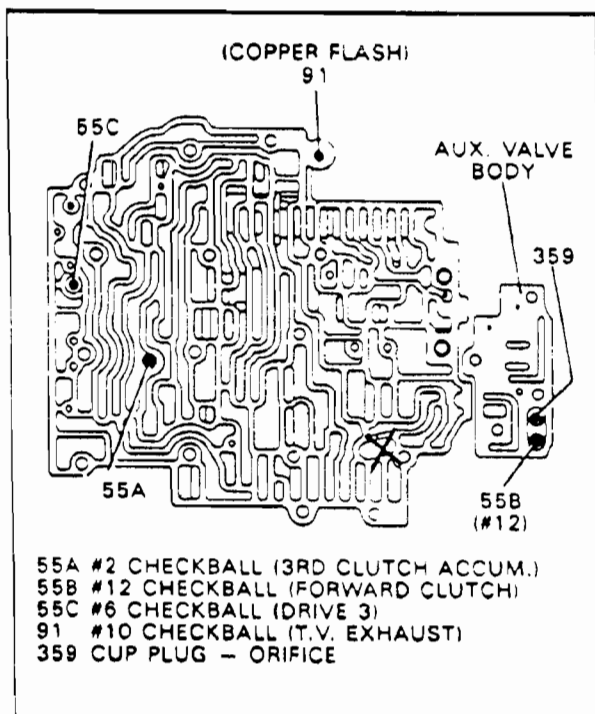
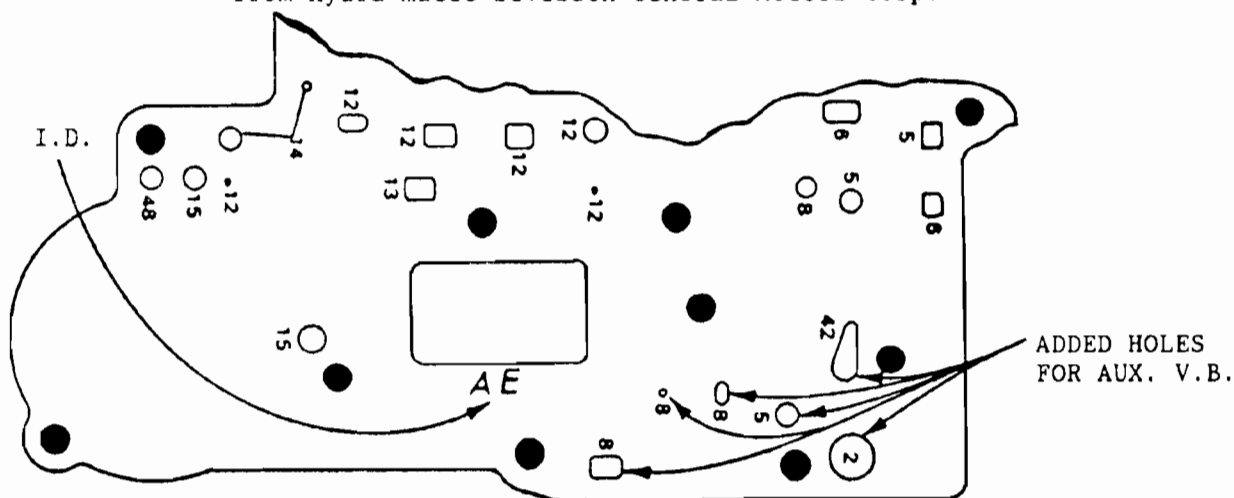


Figure 3

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.

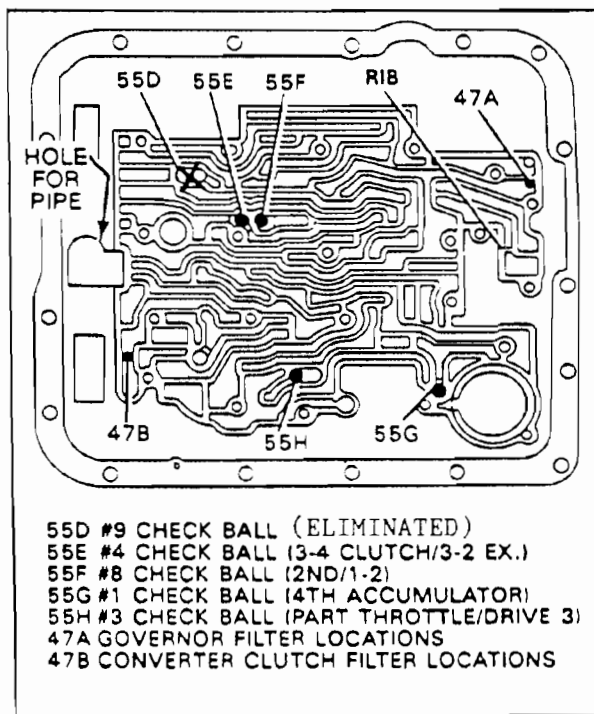
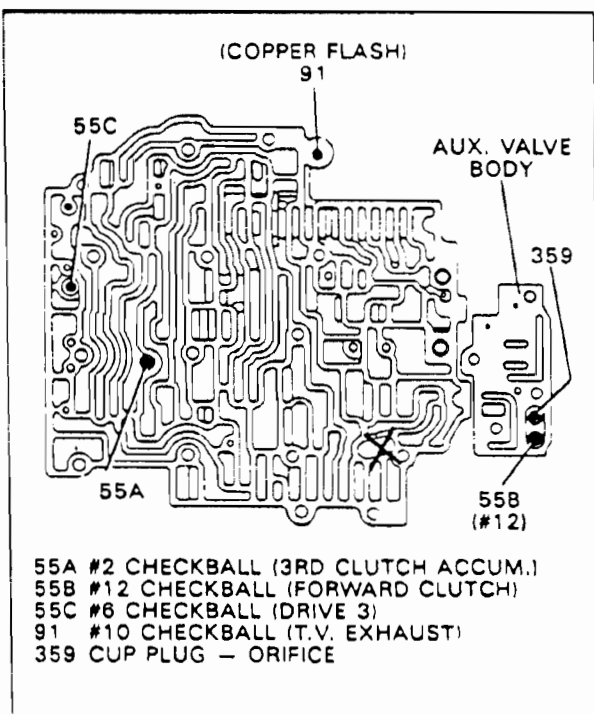
NOTE: 1987 MODEL SPACER PLATES ARE IDENTIFIED WITH A 2 LETTER CODE STAMPED INTO THE SPACER PLATE. THE FIRST LETTER WILL ALWAYS BE AN "A", AND WILL NOT INTERCHANGE WITH ANY OTHER MODELS.

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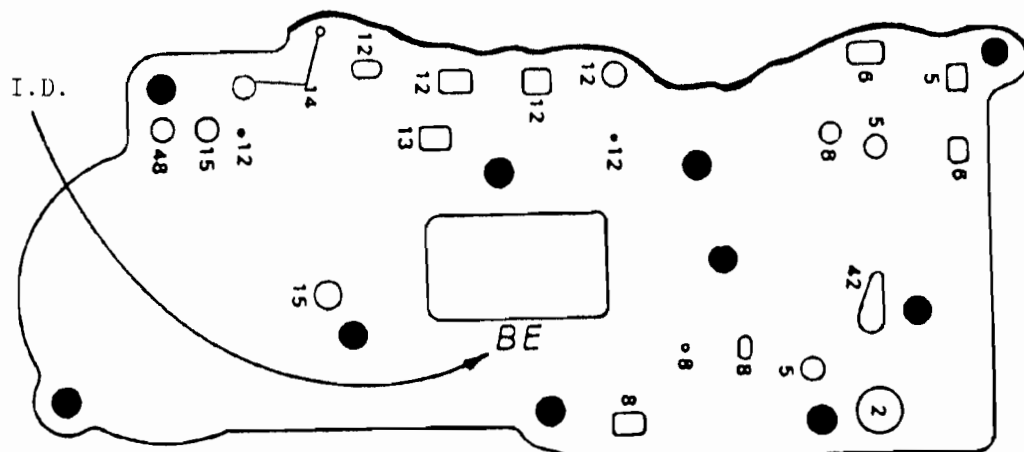
Figure 4

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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).

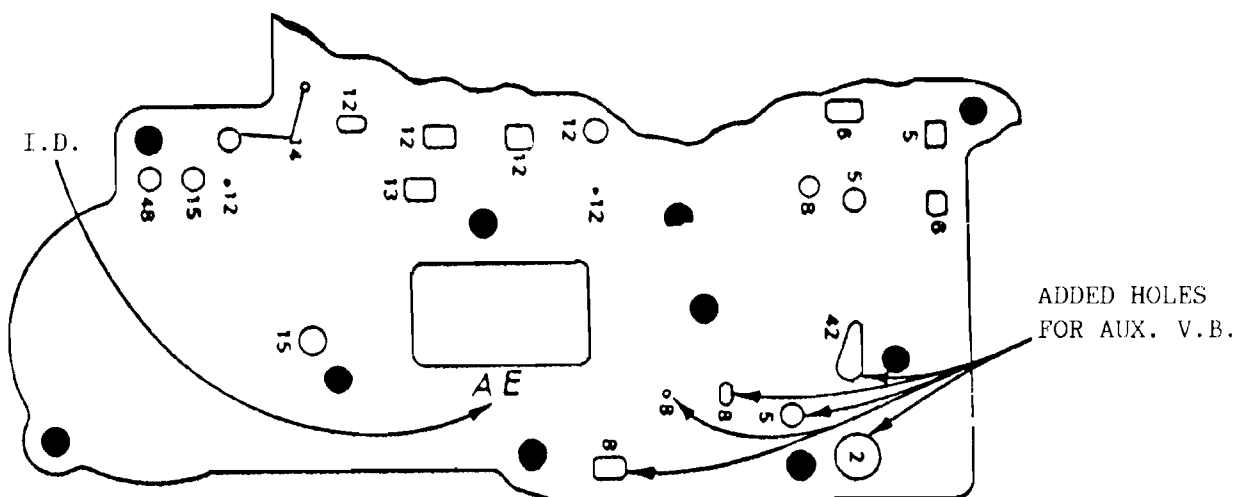
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Figure 5

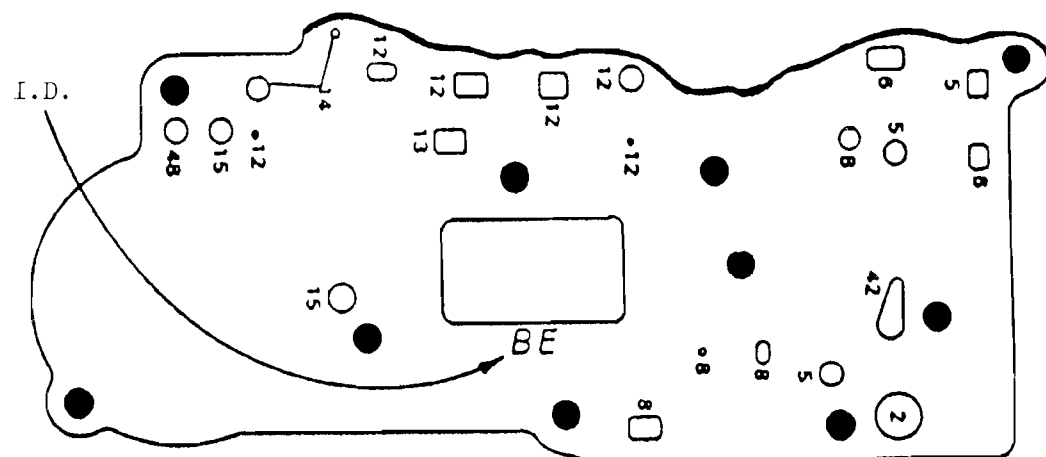
AUTOMATIC TRANSMISSION SERVICE GROUP

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.

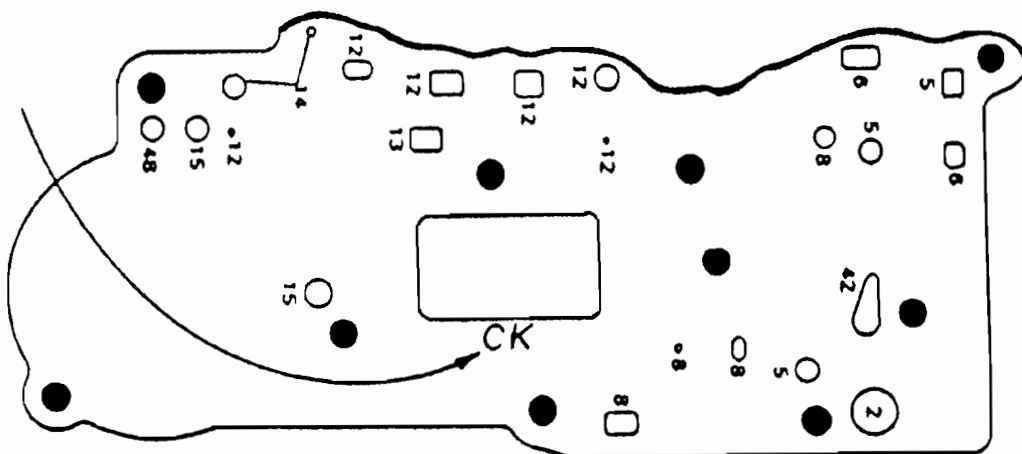


NOTE: 1988 MODEL SPACER PLATES ARE IDENTIFIED WITH A 2 LETTER CODE STAMPED INTO THE SPACER PLATE. THE FIRST LETTER WILL ALWAYS BE A "B", AS SHOWN ABOVE, AND WILL NOT INTERCHANGE WITH ANY PREVIOUS MODEL SPACER PLATES.

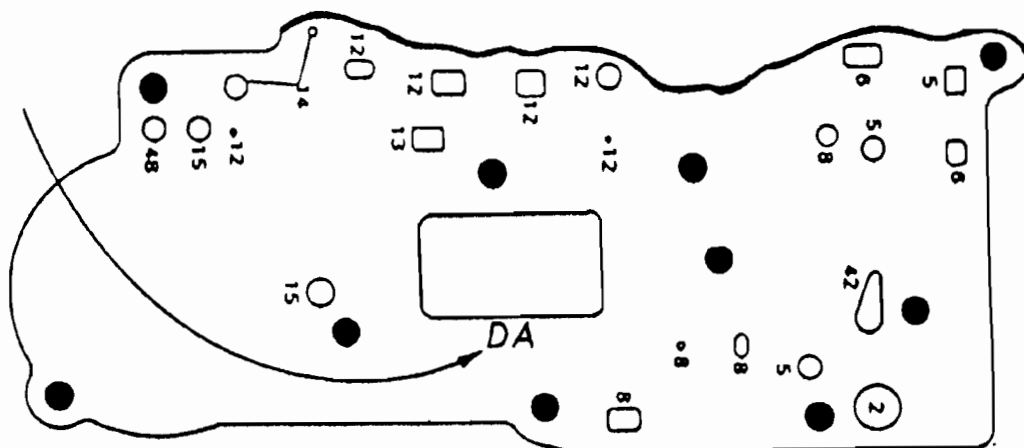
NOTE: DO NOT INSTALL CHECKBALL IN THE "BATHTUB" IN THE VALVE BODY, NOR IN THE "BATHTUB" IN THE CASE, ON ANY 1988 MODELS. (SEE FIGURE 5)

Figure 6

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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

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Technical Service Information

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 "Seat" 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.

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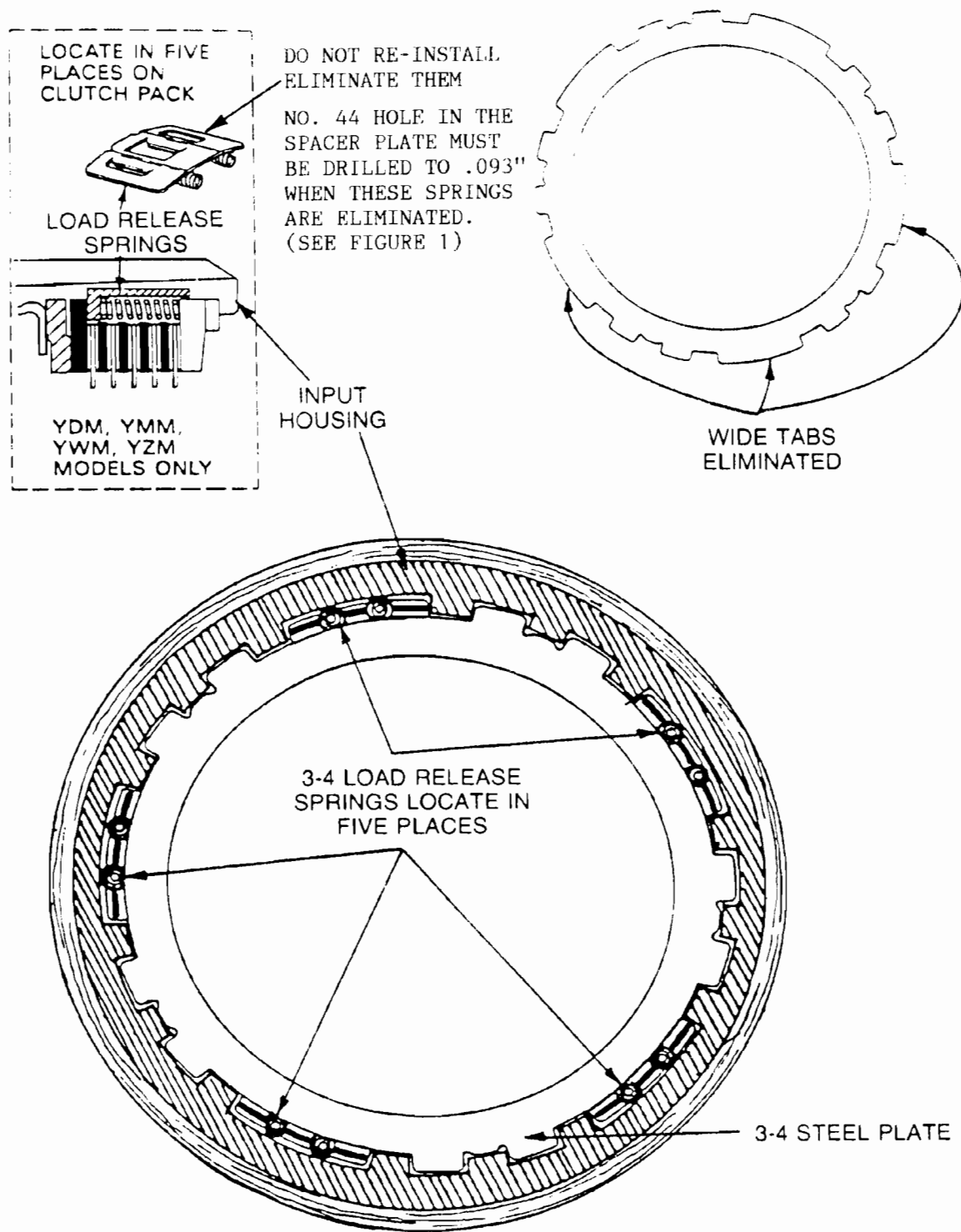


Figure 8



THM 700-R4 (4L60)

NEW LOW/REVERSE CLUTCH SUPPORT AND SELECTIVE PLATE DIMENSIONS

Beginning on November 1, 1989 (Julian Date 305) on all 1990 model THM 700-R4 transmissions, a new Low/Reverse Clutch Support went into production, that was made thicker. The "ONLY" way to identify the new low/reverse clutch support is to measure its thickness with a micrometer (See Figure 9).

This change also effects the thickness of the selective plates for the Low/Reverse clutch pack. The selective plates have decreased in thickness and "WILL NOT" interchange with the previous plates. Refer to the chart in Figure 10 for identification and dimensions.

To choose the proper selective plate for the low/reverse clutch pack, stack the entire clutch pack on a flat work table. With the selective plate installed, the overall height at dimension "D" should be 1.201"-1.236" (31.40mm-30.51mm). Refer to Figure 11. In most cases, the new low/reverse clutch support will only require a fifth reaction plate instead of a selective plate.

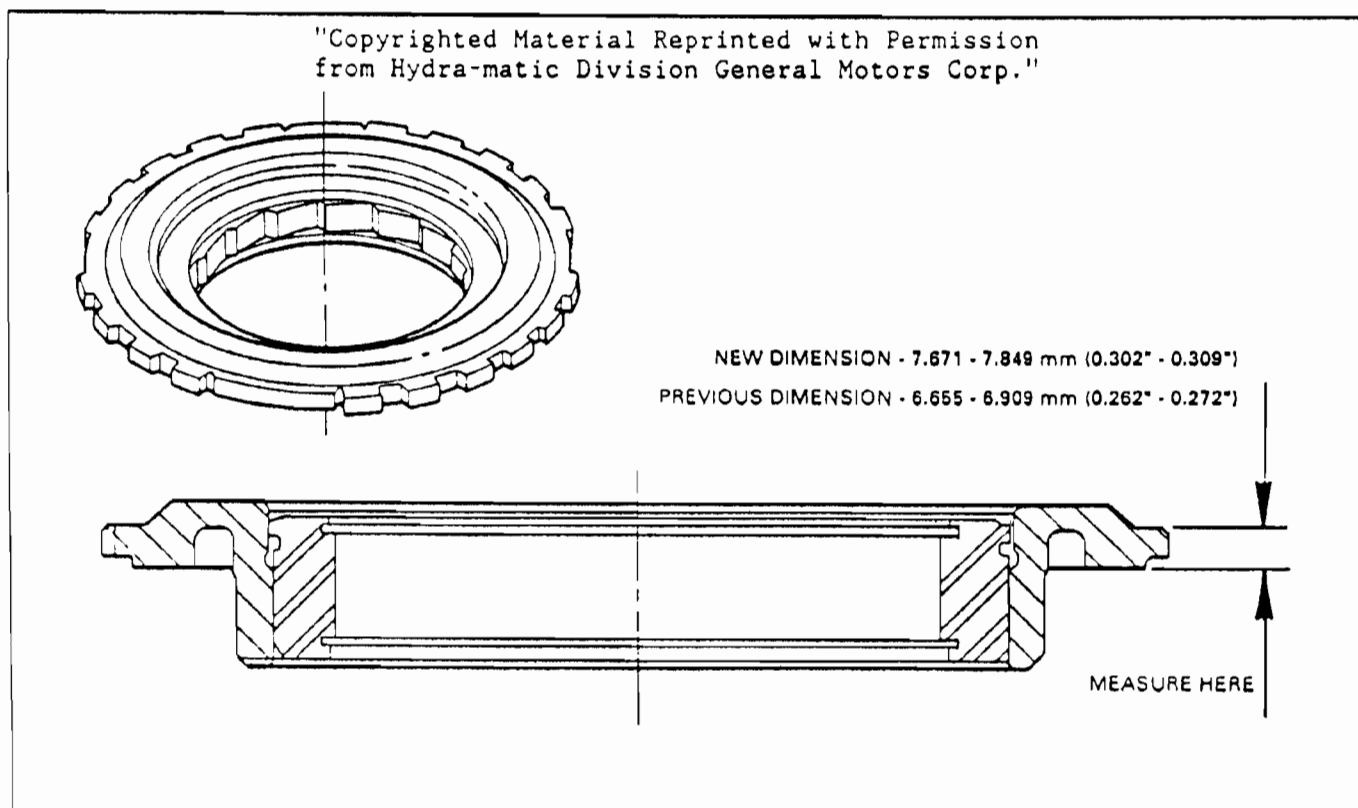


Figure 9

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PREVIOUS LOW/REVERSE SELECTIVE PLATES

<u>PART NAME</u>	<u>DIMENSION</u>	<u>IDENTIFICATION</u>	<u>PART NO.</u>
Reaction Plate	.066"-.073"	NONE	6261120
Selective Plate	.094"-.101"	Stamped "4"	8667584
Selective Plate	.122"-.129"	Stamped "5"	8667585

NEW LOW/REVERSE SELECTIVE PLATES

<u>PART NAME</u>	<u>DIMENSION</u>	<u>IDENTIFICATION</u>	<u>PART NO.</u>
Selective Plate	.046"-.052"	Stamped "8"	8673548
Reaction Plate	.066"-.073"	NONE	6261120
Selective Plate	.086"-.092"	Stamped "9"	8673549

NOTE: In most cases, the new low/reverse clutch support will only require a fifth reaction plate instead of a selective plate.

Figure 10

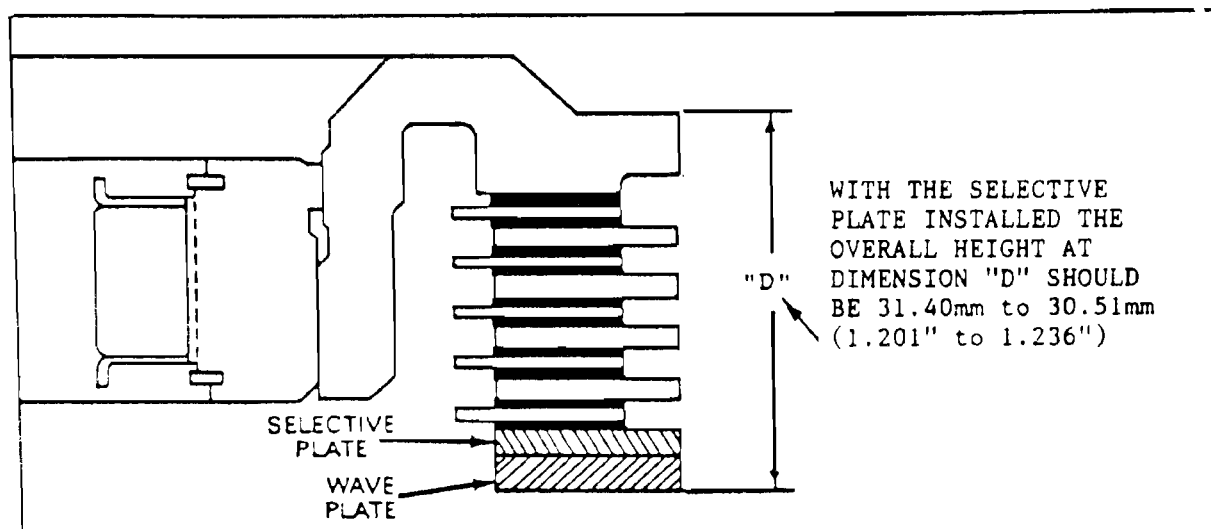


Figure 11



Technical Service Information

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 12, 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 12, 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".

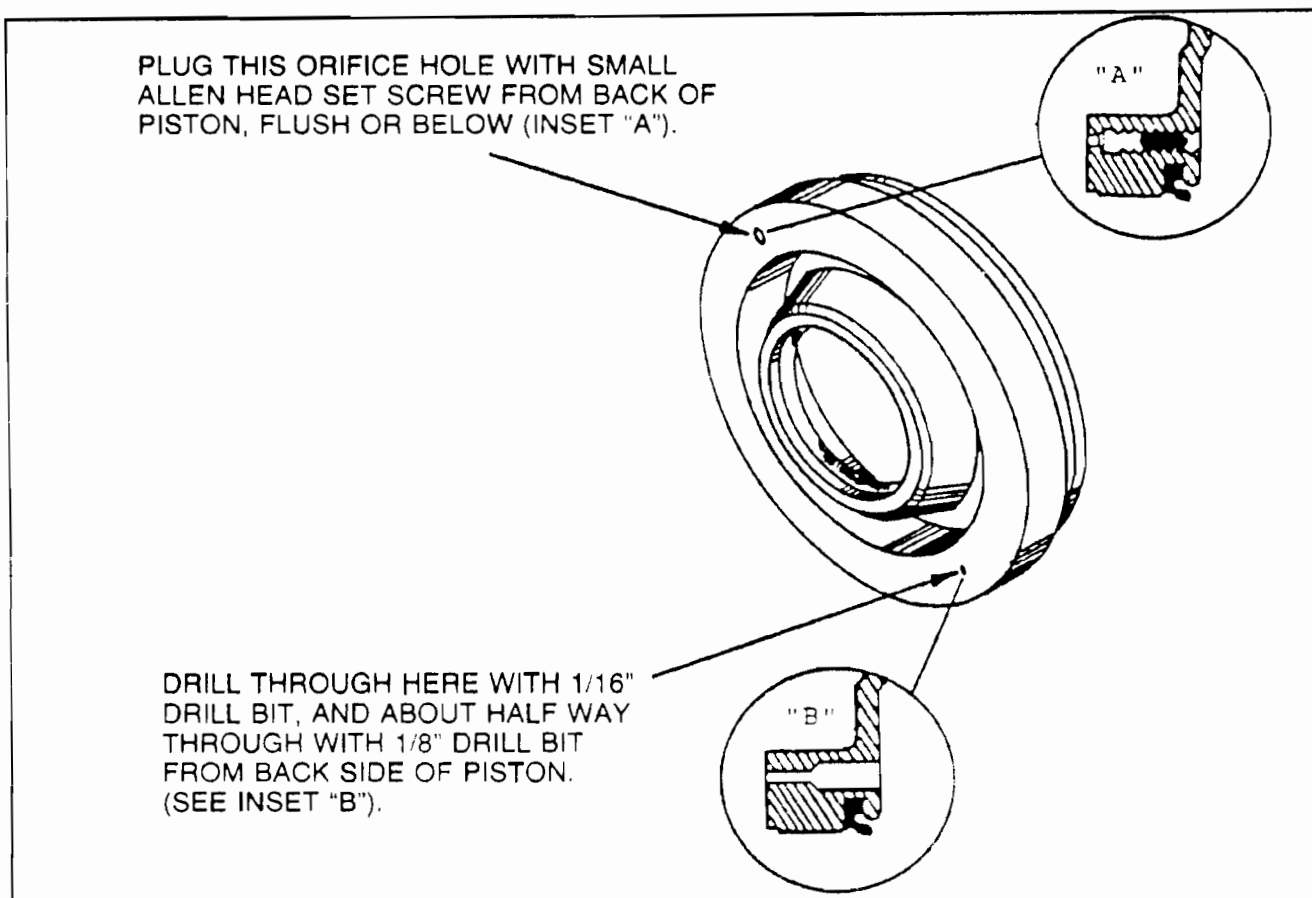


Figure 12

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THM 4L60 (700-R4)

DELAYED ENGAGEMENT TO REVERSE

COMPLAINT: Delayed engagement when selector lever is placed in reverse, on 1987 or later models ONLY.

CAUSE: The cause may be, lack of feed oil to the Lo/Reverse clutch pack.

CORRECTION: Remove the BALL ONLY from the capsule at the rear of the case in the Lo/Reverse feed passage (See Figure 13). Leave the capsule in place in the case. Remove the ball only.

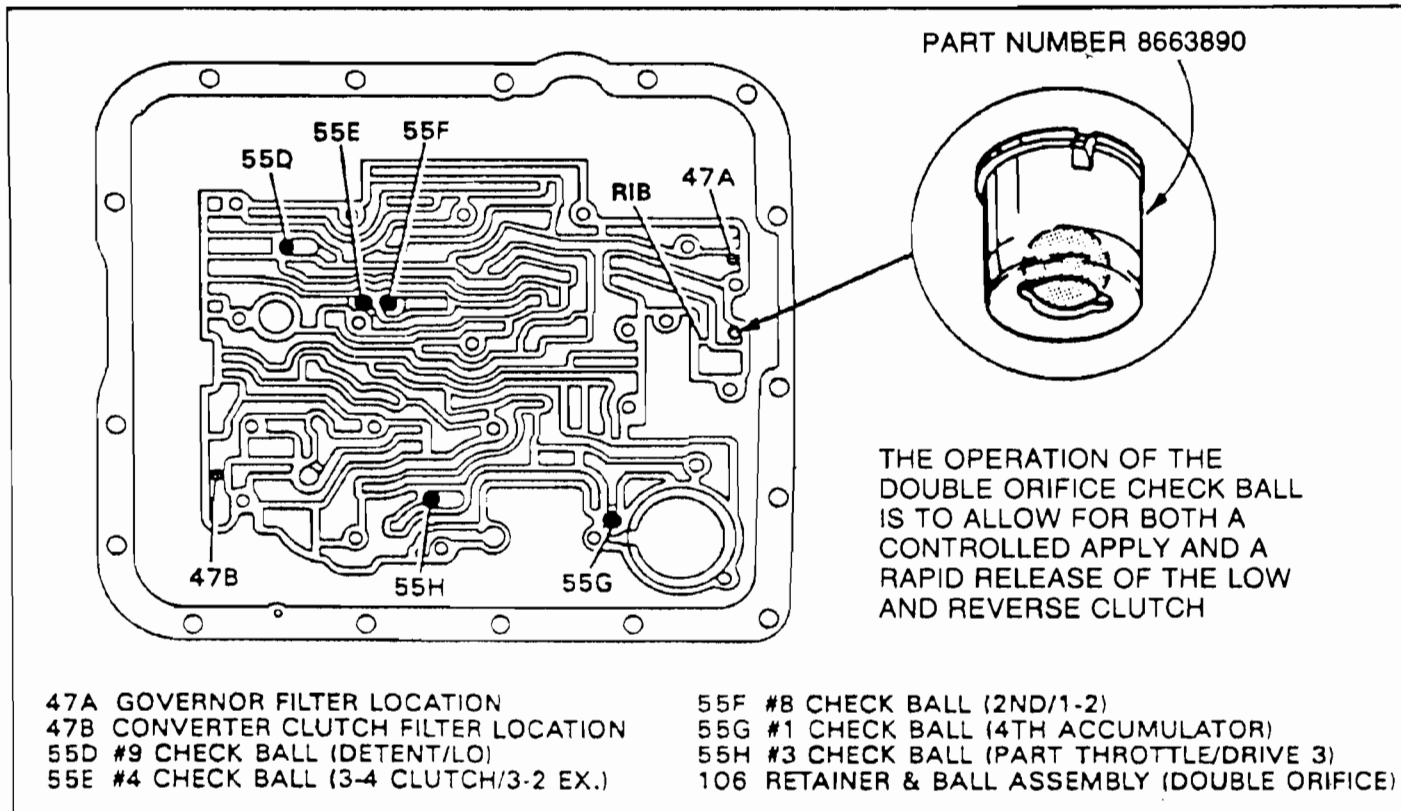


Figure 13



Technical Service Information

THM 4L60 (700-R4) 3-2 COASTDOWN "CLUNK" IN D3 ONLY

COMPLAINT: Severe "Clunk" on a coastdown 3-2 shift, in the D3 range only. The noise is more noticeable if the vehicle is heavily loaded or towing a trailer.

CAUSE: Not enough travel for the 2/4 servo cushion spring.

CORRECTION: Remove .100" to .125" from the inner hub of the 2nd apply servo piston as shown in Figure 14, and replace the servo cushion spring with OEM Part Number 8642539.

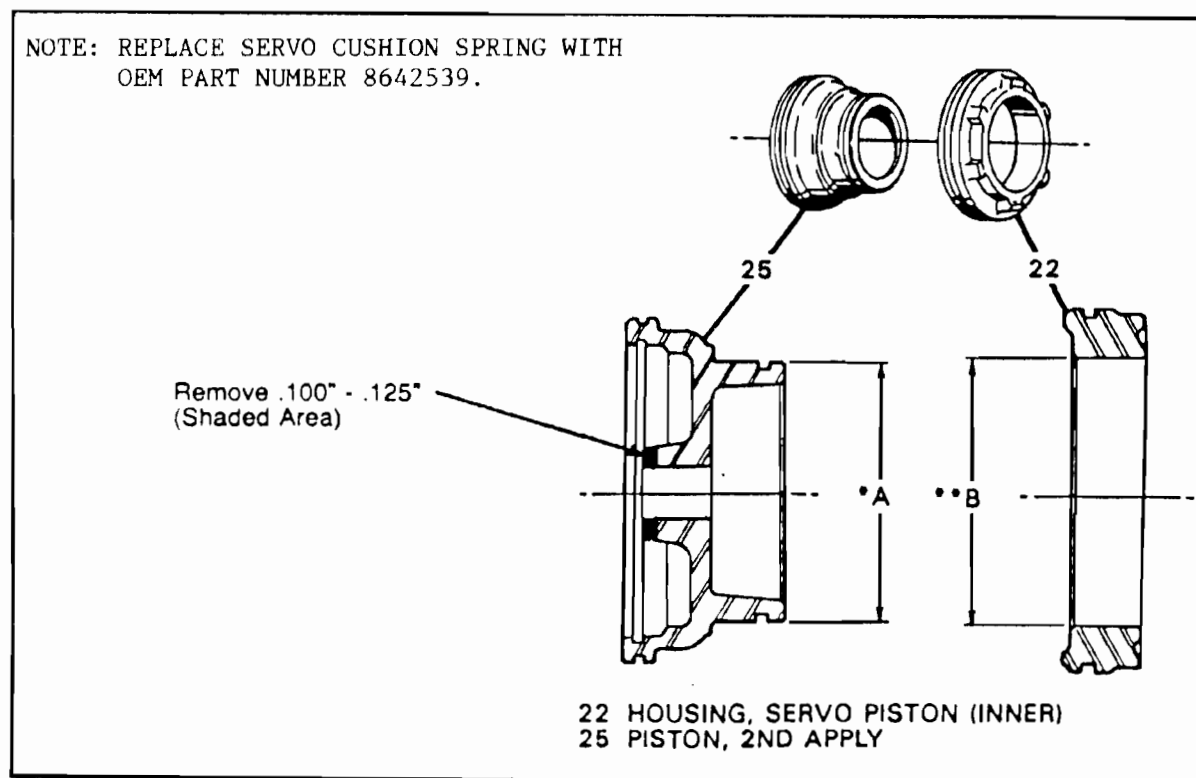


Figure 14

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 4L60 (700-R4) FREQUENTLY REQUESTED PART NUMBERS

1-2 ACCUMULATOR VALVE SPRING (HARSH 1-2 SHIFT)	8647974
3RD ACCUMULATOR BALL CAPSULE (SERVO)	8634400
PRESSURE REGULATOR VALVE (CROSS DRILLED)	8637546
LATE REACTION CARRIER (WITH OIL DEFLECTOR)	8654200
REACTION RING GEAR SUPPORT (FOR OIL DEFLECTOR)	8654197
REACTION RING GEAR (LATE STYLE)	8667055
T.C.C. THROTTLE VALVE KIT	8642970
28 ELEMENT SPRAG ASSEMBLY	8657928
INNER PUMP SLIDE SPRING	8639562
OUTER PUMP SLIDE SPRING	8639563
FORWARD CLUTCH ACCUMULATOR COVER (LATE STYLE)	8673043
ORIFICE CUP PLUG (FOR REVERSE INPUT PISTON MODIFICATION)	8631146
BALL CAPSULE (FOR LO/REVERSE FEED PASSAGE)	8663890
2/4 SERVO CUSHION SPRING (3-2 DOWNSHIFT CLUNK IN D3)	8642539

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 440-T4 (4T60) CONVERTER CLUTCH SHUDDER

COMPLAINT: Converter clutch shudder on any THM 440-T4.

CAUSE: The cause may be, not enough converter apply pressure, as the factory has it calibrated at 45 PSI.

CORRECTION: There is now available from the aftermarket suppliers a spring for the converter clutch regulator valve that will raise the apply pressure from 45 PSI to 61 PSI, and will eliminate converter clutch shudder (See Figure 15).

The new spring is available under part number SGSF-440.

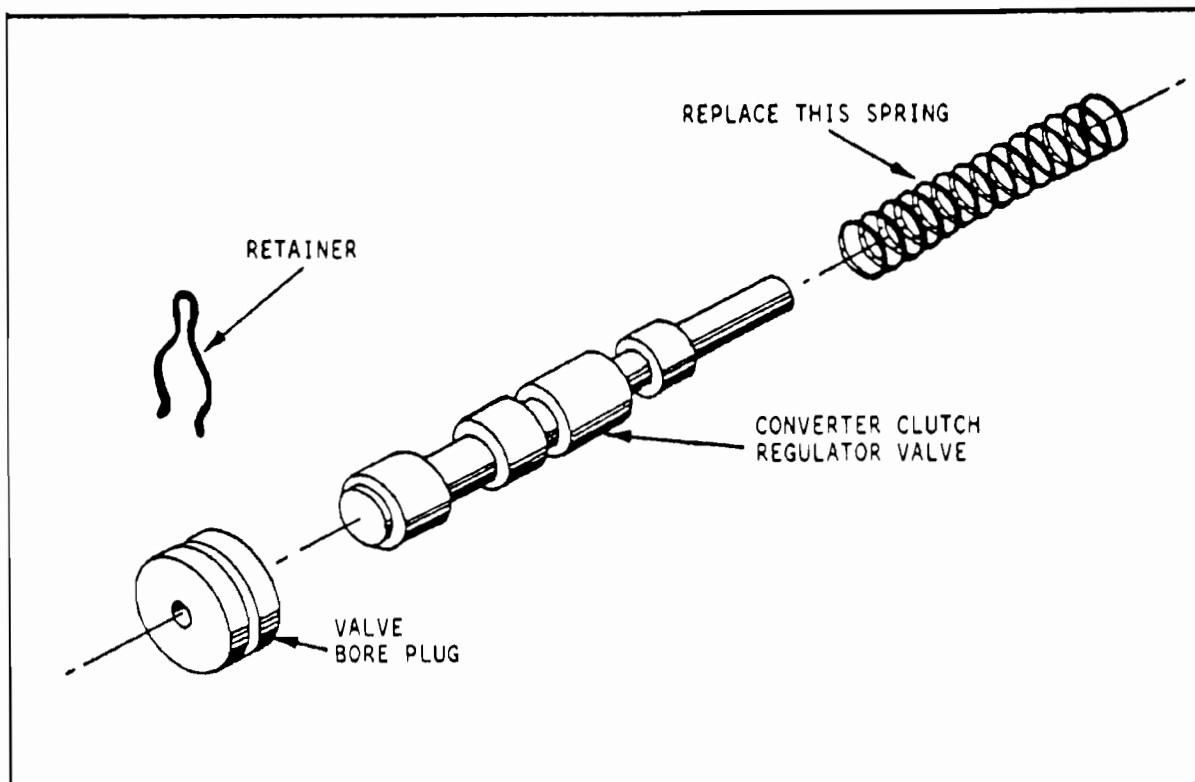


Figure 15

AUTOMATIC TRANSMISSION SERVICE GROUP



THM 440-T4 (4T60)

EARLY UPSHIFTS AND NO PASSING GEAR

COMPLAINT: Early upshift pattern (Regardless of Throttle Position), and no forced (Part or Full Throttle) downshifts.

CAUSE: The cause may be, a loss of T.V. pressure due to a mis-matched spacer plate and T.C.C. Regulator Valve.

There are two totally different types of converter regulator valve systems.

(1) T.V. CONTROLLED T.C.C. REGULATOR VALVE - On this system lands one, two, and three are all the same diameter, and requires a spacer plate WITH a T.V. hole as shown in Figure 16.

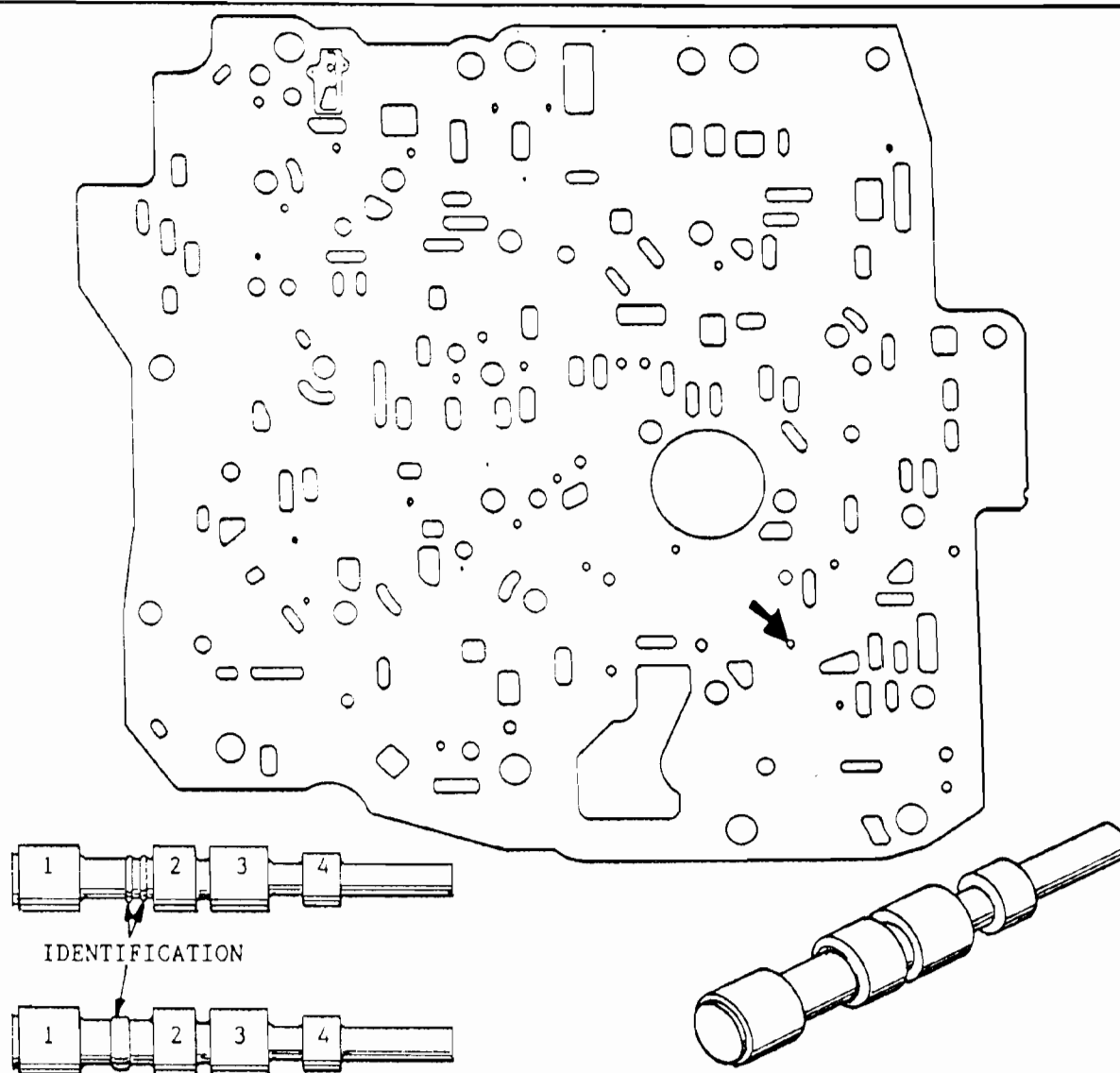
There are currently two different styles of the T.V. controlled converter regulator valve as shown in Figure 16. The 1st design is identified by "2 Narrow Rings", and the 2nd design is identified by a "Wide Band". The 2nd design valve improves T.C.C. apply feel because land No. 2 is .018" longer than the 1st design. Refer to Figure 16 to compare the length.

(2) NON T.V. CONTROLLED CONVERTER REGULATOR VALVE - On this system lands one and two are the same size, but land three is .052" smaller in diameter (See Figure 17). This system requires a spacer plate WITHOUT a T.V. hole by arrow, as shown in Figure 17.

If the non T.V. controlled converter regulator valve is mis-matched with a spacer plate "WITH" the T.V. hole, all T.V. pressure will be exhausted and early upshifts and no kickdown will be the result.

CORRECTION: Install spacer plate and T.C.C. regulator valve that are compatible with one another. Refer to Figures 16 and 17.

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I.D.		LAND 1	LAND 2	LAND 3	LAND 4
2 RINGS (NARROW)	Diameter	.387"	.387"	.387"	.315"
	Length	.335"	.222"	.333"	.197"
WIDE BAND	Diameter	.387"	.387"	.387"	.315"
	Length	.335"	.240"	.333"	.197"

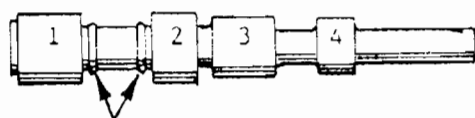
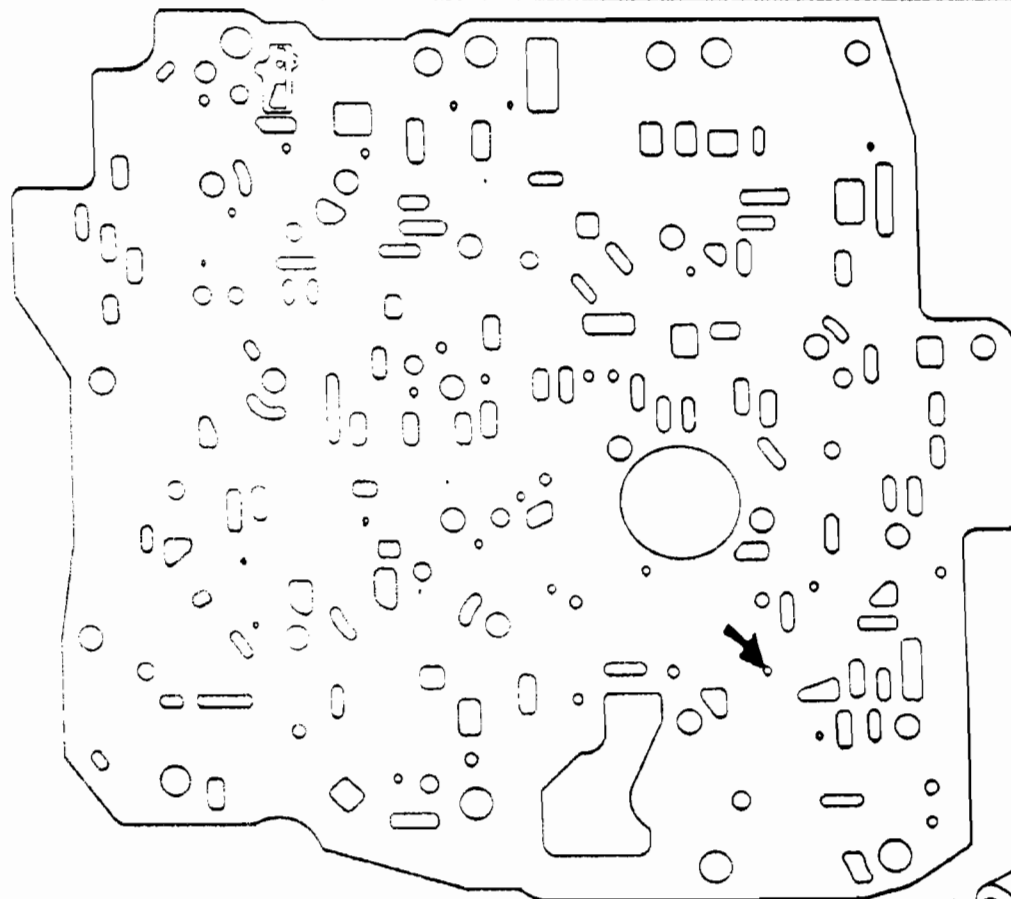
THIS TYPE OF CONVERTER CLUTCH REGULATOR VALVE REQUIRES
SPACER PLATE WITH HOLE SHOWN BY ARROW ABOVE.

NOTE: LAND 3 IS THE SAME SIZE AS LAND 1 AND LAND 2.

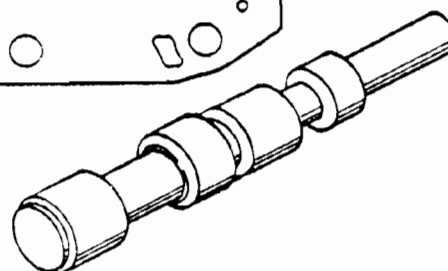
T.V. CONTROLLED T.C.C. REGULATOR VALVE

Figure 16

AUTOMATIC TRANSMISSION SERVICE GROUP



IDENTIFICATION



I.D.		LAND 1	LAND 2	LAND 3	LAND 4
2 RINGS	Diameter	.387"	.387"	.335"	.315"
(WIDE)	Length	.335"	.222"	.333"	.197"

THIS TYPE OF CONVERTER CLUTCH REGULATOR VALVE REQUIRES
SPACER PLATE WITHOUT HOLE SHOWN BY ARROW ABOVE.

NOTE: LAND 3 IS SMALLER THAN LAND 1 AND LAND 2.

NON T.V. CONTROLLED REGULATOR VALVE

Figure 17

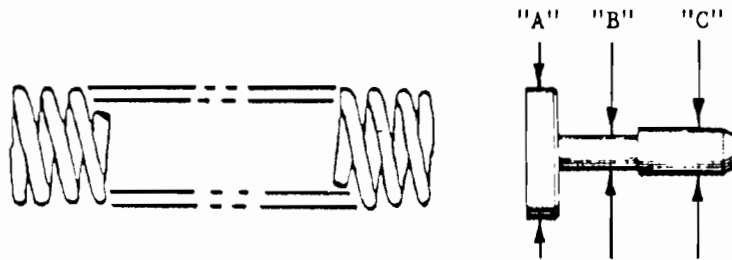
AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 440-T4 (4T60) 2ND CLUTCH DURABILITY

- COMPLAINT:** 2nd clutch pack with a very short life span, usually associated with a 1-2 slip, or a 1-2 slide bump.
- CAUSE:** The cause may be a lack of line pressure rise to sufficiently apply the second clutch pack. We also recommend OEM "Koline" steel plates in this pack, and "Vespel" sealing rings on the driven sprocket support.
- CORRECTION:** Shorten the modulator boost valve spring by $1/4"$, or approximately 1 to $1\frac{1}{4}$ coils. The modulator boost valve spring is located in the pressure regulator line up, which is directly next to the T.V. plunger in the valve body (See Figure 18). This will allow line pressure to rise at less of a throttle opening and greatly increase 2nd clutch durability. This modification should be done on "ALL" THM 440-T4 transaxles during the rebuilding process.
- SPECIAL NOTE:** There are currently 3 different diameters of modulator boost valves, and 3 different spring calibrations (See Below). This equation will work on all 3 calibrations.



	SPRING COLOR	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"
CALIBRATION NO. 1	BLUE	.568"	.170"	.200"
CALIBRATION NO. 2	GREEN	.568"	.166"	.276"
CALIBRATION NO. 3	ORG/YELLOW	.547"	.168"	.200"

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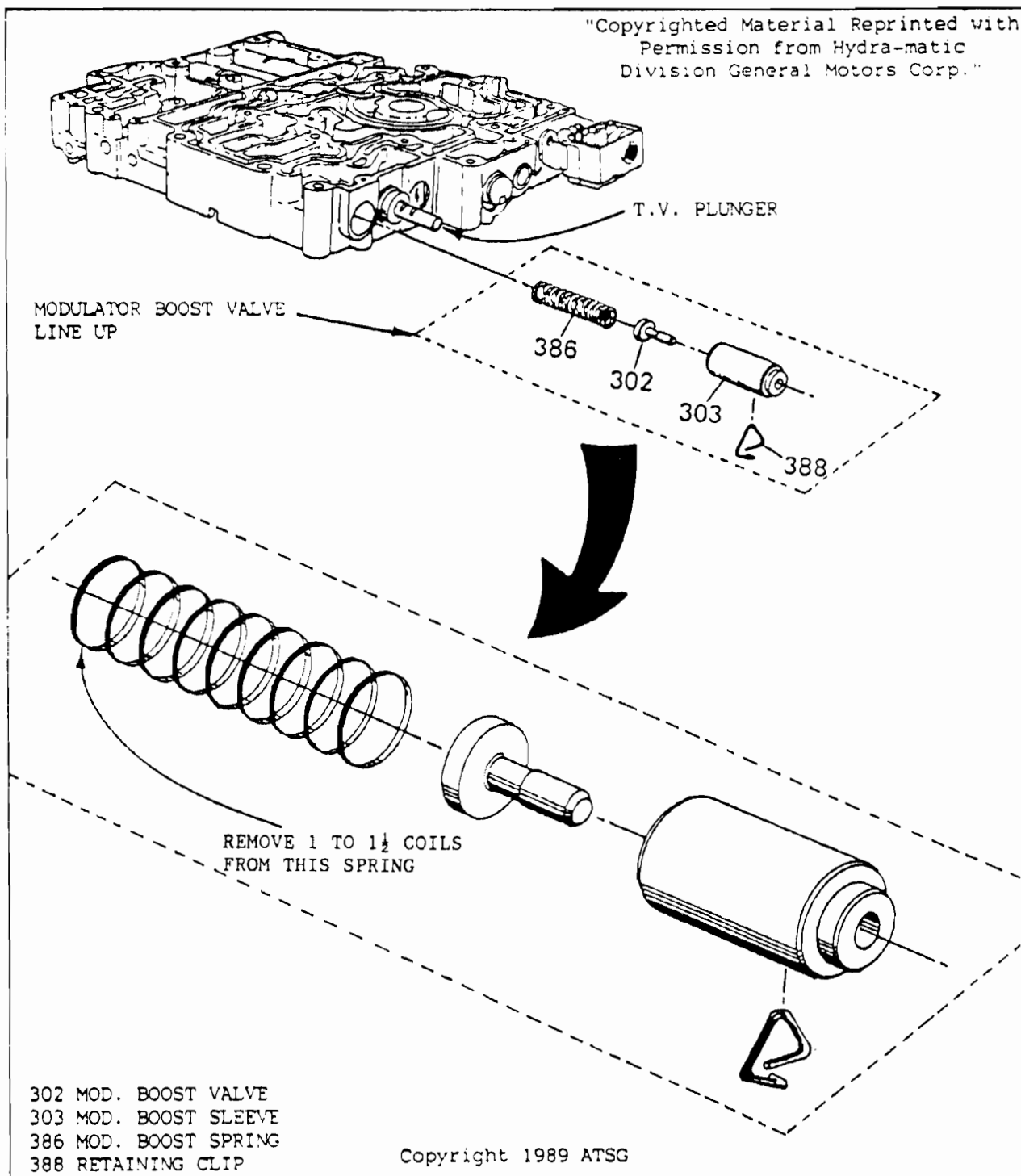


Figure 18

Notes



THM 440-T4 (4T60) HARSH 3-2 DOWNSHIFT

COMPLAINT: Harsh 3-2 part throttle, and/or full throttle downshifts.

CAUSE: Improper timing for release of the third clutch and re-application of the 1-2 band.

CORRECTION: Install a new 3-2 Control Valve Spring, now available in a service package from OEM. See "Service Information" on pages 28 and 29 for proper OEM part numbers. Refer to Figure 19 for proper installation.

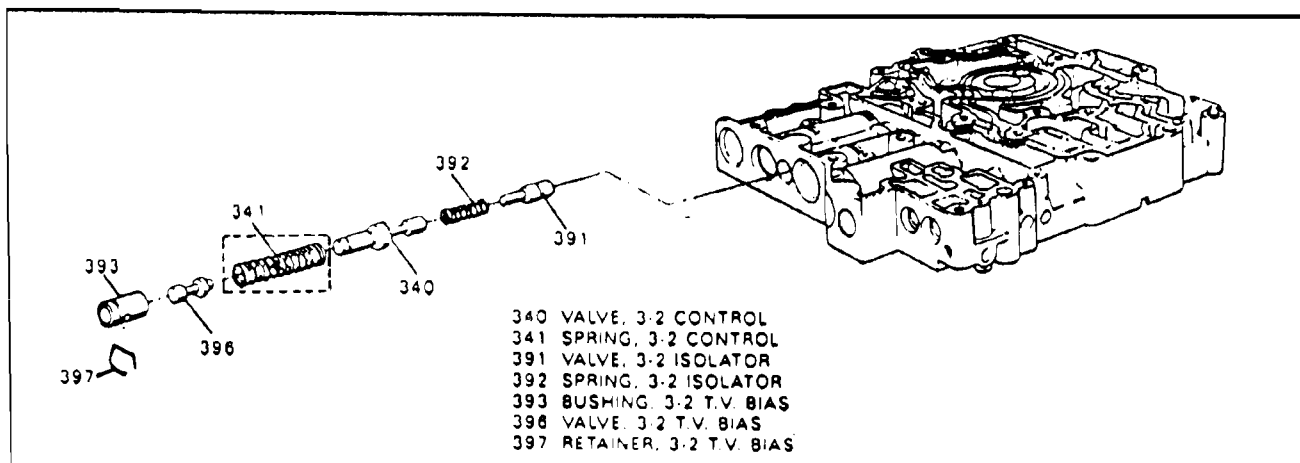


Figure 19



Technical Service Information

SERVICE INFORMATION:

HIGH ALTITUDE ONLY;

SAC, 5AY, 5BW	8646981
5BR, 5CP, 5CW	8646993
5BX	8646979
5BV	8646994
5CN, 5CN	8646983

6AAH, 6AMH, 6AFH, 6APH, 6ASH,	
6AYH, 6BBH, 6BHH, 6FBH	8646982
6ACH, 6AWH	8646981
6BAH	8646980
6BCH, 6BDH, 6BMH, 6BZH, 6FCH, 6FZH	8646979
6BLH, 6BTH, 6BYH	8646992
6CMH, 6CNH, 6CFH	8646983
6FTH, 6FYH	8646993

7FBH, 7FKH	8646982
7FCH, 7FZH	8646979
7FJH, 7FNH, 7FRH, 7FTH	8646993

8BJH, 8BRH, 8BTH, 8BYH, 8FJH	8646993
8BKH, 8FBH	8646982
8FCH	8646979

9AAH, 9ABH, 9AFH, 9ANH, 9ATH, 9AJH	8646953
9ACH, 9ADH, 9AHH	8675936
9BAH, 9BDH, 9BJH, 9BWH	8646982
9BFH, 9BMH	8646993
9BHH, 9PAH, 9WBH, 9WCH	8646981
9BPH, 9WRH	8646980
9CDH, 9CLH, 9CPH, 9CYH, 9CZH	8646994
9PBH, 9WLH, 9WKH	8662932
9WUH, 9WZH, 9VYH	8646993
9YAH, 9YBH, 9YJH, 9YCH, 9YFH	8646982

0AAH, 0ABH, 0AFH, 0ANH, 0ATH	8646980
0AJH	8662932
0LMH, 0LNH	8646993
0BAH, 0BDH, 0BWH, 0BJH	8646982
0BHH	8646981
0BFH	8646980
0BPH	8662932
0FAH	8646979
0YKH, 0YLH	8646993
0CHH, 0CJH	8646982

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

SERVICE INFORMATION: (Cont'd)

LOW ALTITUDE ONLY;

6FCH, 6FZH	8662932
6FBH	8646993
6CFH, 6CMH, 6CNH	8646994
6BHH	8646982
6BBH	8646981
6BCH, 6BDH, 6BMH, 6BZH	8662907
6BAH, 6BLH, 6BTH, 6BYH, 6FTH, 6FYH	8646979
=====	
7FCH, 7FZH	8662932
7FBH, 7FKH	8646993
7FJH, 7FNH, 7FRH, 7FTH	8646979
=====	
8FCH	8662932
8BRH	8646980
8FBH, 8BKH	8646993
8BJH, 8BTH, 8BYH, 8FJH	8646979
=====	
9AAH, 9ABH, 9AFH, 9AJH, 9ANH, 9ATH	8646953
9ACH, 9ADH, 9AHH	8675936
9BAH, 9BDH, 9BJH, 9BWH, 9YAH,	
9YBH, 9YJH, 9YFH, 9YCH	8646981
9BCH, 9BHH, 9WBH, 9PAH	8646993
9BFH, 9BMH, 9WUH, 9WZH, 9VYH	8646980
9BPH, 9WRH	8662932
9WTH	8646953
=====	
0AAH, 0ABH, 0AFH, 0ANH, 0ATH	8646980
0AJH	8662932
0LMH, 0LNH	8675963
0BFH	8646979
0BAH, 0BDH, 0BJH, 0BWH	8646993
0BHH	8646980
0BPH	8675962
0PAH	8662907
0YKH, 0YLH	8646979
0CHH, 0CJH	8646981
=====	

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 440-T4 (4L60)

BROKEN T.V. PLUNGER

The T.V. Plunger and Bushing Assembly are now available from OEM in a service package, so that buying a valve body is no longer necessary when the TV plunger is broken or cracked (See Figure 20). Refer to the following OEM part numbers as it IS a model sensitive part.

<u>YEAR</u>	<u>TRANSAXLE MODELS</u>	<u>PART NO.</u>
1984	4BC	8649730
=====		
1985	5OB, 5OY	8649317
	5BA, 5BC, 5BR, 5BW, 5BX	8649730
	5CM, 5CP	8646435
	5AF, 5AM	8649641
=====		
1986	6AAH, 6ACH, 6ADH, 6AFH, 6AMH, 6ANH, 6APH, 6ARH, 6ASH, 6ATH, 6AWH, 6AYH	8649641
	6BAH, 6BBH, 6BCH, 6BDH, 6BLH, 6BMH, 6BSH, 6BTH, 6BYH	8658704
	6BHH, 6BZH	8649730
	6CFH, 6CMH	8646435
=====		
1987	7ACH, 7ADH, 7AHH, 7ALH, 7ARH, 7HAH, 7HCH	8649641
	7CAH, 7CBH	8646435
	7FBH, 7FCH, 7FJH, 7FKH, 7FLH, 7FNH, 7FRH, 7FSH, 7FTH, 7FUH, 7FZH	8658704
=====		
1988	8AAH, 8ABH, 8AFH, 8AJH, 8ANH, 8ATH	8649641
	8BJH, 8BKH, 8BRH, 8BTH, 8BYH, 8FBH, 8FCH, 8FJH, 8FSH, 8VXH	8658704
	8CFH, 8CMH, 8CRH, 8CTH, 8CWH, 8CXH	8646435
=====		
1989	9AAH, 9ABH, 9ACH, 9ADH, 9AFH, 9AHH, 9AJH, 9ANH, 9ATH	8649641
	9BAH, 9BDH, 9BFH, 9BHH, 9BJH, 9BMH, 9BPH, 9PAH, 9PBH, 9VXH, 9VYH, 9WBH, 9WCH, 9WKH, 9WLH, 9WRH, 9WTH, 9WUH, 9WZH,	8658704
	9CDH, 9CLH, 9CPH, 9CYH, 9CZH, 9YAH, 9YBH, 9YCH, 9YFH, 9YJH	8646435
=====		
1990	0AAH, 0ABH, 0AFH, 0AJH, 0ANH, 0ATH	8649641
	0BAH, 0BDH, 0BFH, 0BHH, 0BJH, 0BMH, 0BPH, 0BWH, 0PAH	8658704
	0CHH, 0CJH, 0LAH, 0LMH, 0LNH, 0YKH, 0YLH	8646435
=====		

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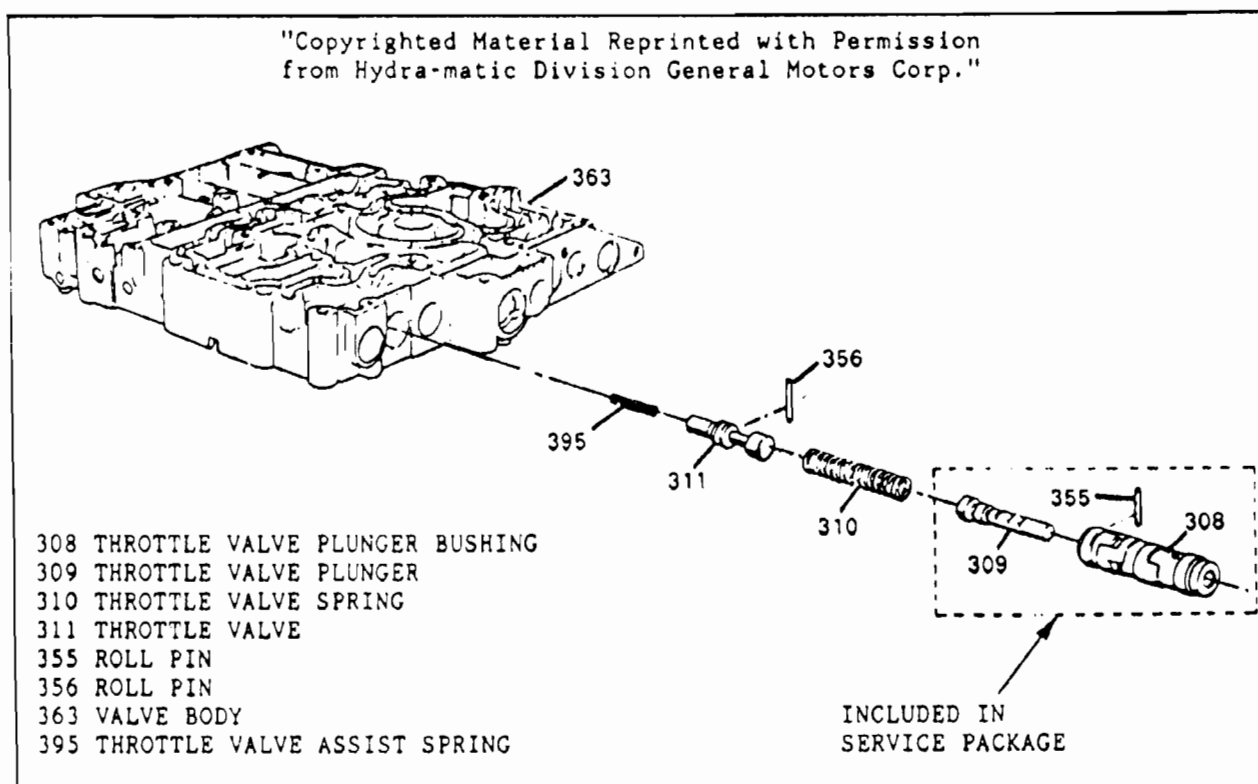


Figure 20

AUTOMATIC TRANSMISSION SERVICE GROUP



THM 440-T4 (4T60)

BURNT AND/OR WELDED FOURTH CLUTCH

COMPLAINT: On 1989 and 1990 models only, the fourth clutch lined and steel plates burnt to the point that it has melted the channel plate in the fourth clutch area.

POSSIBLE DRIVER COMPLAINTS:

- (1) Tie-up when transaxle shifts to 4th gear.
- (2) Will not move in drive and/or reverse (Due to 4th clutch welded to Channel Plate), but can be pushed with engine off.
- (3) Leak from the left axle area (Doughnut Gasket burnt from Heat).

CAUSE: The cause may be the manual valve being positioned between the neutral and D4 position, which would allow the input clutch to be applied in 4th gear.

This was created by a change in the channel plate porting, in the manual valve area. The questionable channel plate can be identified by the casting number "8668423", with engineering update level "E". Refer to Figure 21 for locations. Casting number "8668423" with engineering update levels "A", "B", "C", and "D" are OK to use.

DO NOT USE CASTING NO. "8668423" WITH ENGINEERING UPDATE LEVEL OF "E" OR HIGHER - REFER TO FIGURE 21 FOR LOCATIONS OF BOTH.

CORRECTION: Install an earlier model channel plate that does not have the questionable casting number 8668423, as long as it is 85 1/2 or later channel plate.

There is also a new service package available from OEM, to address this condition. The new service package contains the following:

- (1) **NEW CHANNEL PLATE** - Will have porting changes for the new manual valve and new inside detent lever. The porting changes will help ensure that the 2 ports will never be opened at once to cause burnt 4th clutch assembly. The bore for the new manual valve will be reduced by .010" to accommodate the new manual valve. This will make the previous and new parts non-interchangeable (See Figures 22 and 23).
- (2) **NEW MANUAL VALVE** - Will have changes to the valve lands and reduced .010" in diameter for the new porting changes in channel plate. The previous and new manual valves are not interchangeable. The new manual valve can be identified by a ring between the first two lands as shown in Figure 23.
- (3) **NEW INSIDE DETENT LEVER** - Will have the manual link hole location changed to provide a different "Throw" of the manual valve, and the hole is now round instead of "Keyhole" shaped. Since the "W" car detent lever is different than all others, it will have square identification hole punched in it. The previous and new inside detent levers will not interchange. Refer to Figure 24 for I.D.

AUTOMATIC TRANSMISSION SERVICE GROUP

SERVICE INFORMATION:

Channel Plate Assembly, 1989-1990 AAH, ABH, ACH, ADH, AFH,
 AHH, AJH, ANH, ATH8668993

Channel Plate Assembly, 1989-1990 CLH, CPH, CZH, LMH, LNH,
 YBH, YCH, YJH8668994

Channel Plate Assembly, 1989-1990 BAH, BDH, BFH, BHH, BJH,
 BPH, BWH, PAH, PBH, VXH,
 VYH, WBH, WCH, WLH, WRH,
 WTH, WUH, WZH8668995

Channel Plate Assembly, 1989-1990 CDH, CHH, CJH, CYH, YAH,
 YFH, YLH, YKH8668996

Channel Plate Assembly, 1990 LAH, YRH8668997

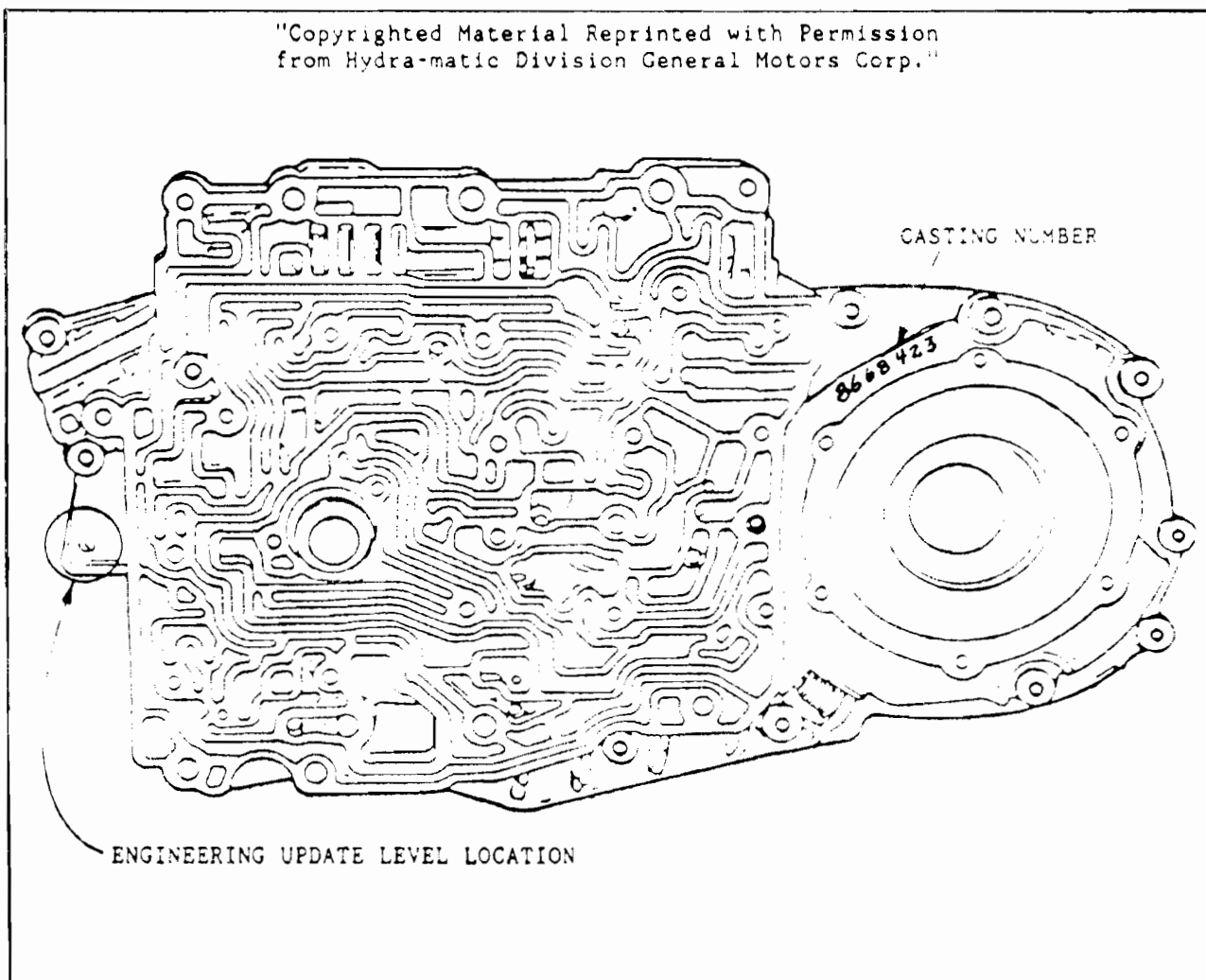


Figure 21

AUTOMATIC TRANSMISSION SERVICE GROUP

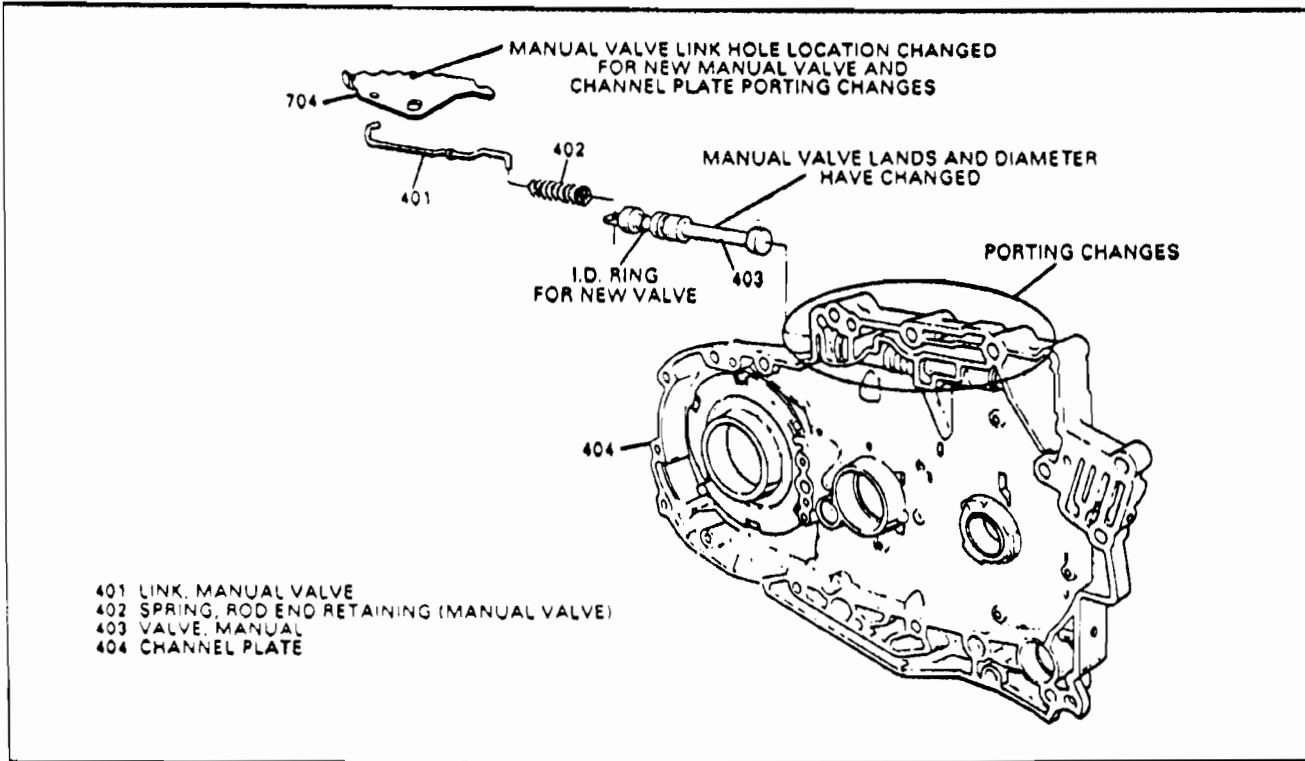


Figure 22

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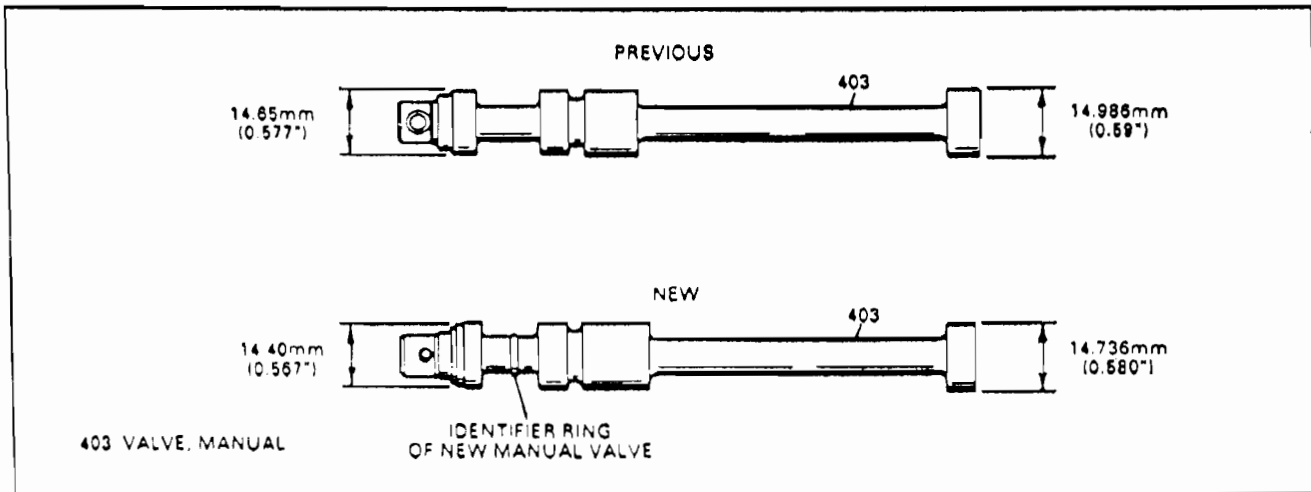


Figure 23

AUTOMATIC TRANSMISSION SERVICE GROUP

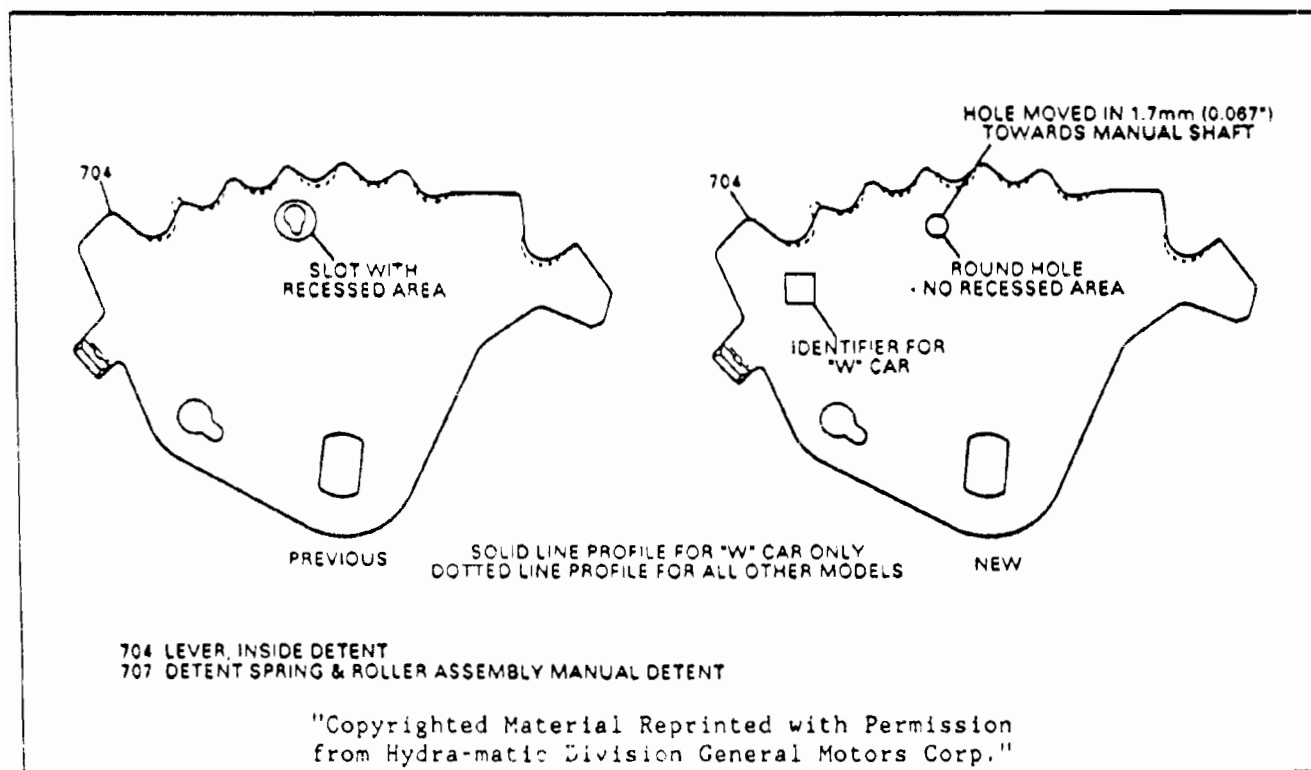


Figure 24



THM 440-T4 (4T60)

CHANGE ON 3RD CLUTCH PLATES

CHANGE: A change of the fiber material on the 3rd clutch plates requires that all 1989 and 1990 model THM 440-T4 transaxle models built after March 17, 1989 (Julian Date 076) have "New Calibrations" and new two letter model codes.

REASON: Change of factory supplier.

PARTS AFFECTED:

- (1) 3RD CLUTCH PLATES - Change of Fiber Material on the 3rd clutch plates, and can be identified by four (4) black stripes and/or "Notch" cut in one of the teeth, and/or NO identification (See Figure 25).
- (2) NEW MODEL CODES - Were assigned when the fiber material changed on the 3rd clutch plates (See Figure 26).
- (3) SPACER PLATE - Was changed on some models. To identify the new spacer plate, see Figure 27.
- (4) VALVE BODY CALIBRATION - As Follows: (Refer to Figure 28).
 - A. 2-3 accumulator valve spring (Most Models).
 - B. 3-2 control valve spring (All Models).
 - C. 1-2 accumulator valve spring (CPH Models Only).

NOTE: The updated valve body assembly will have an update level "Laser Etched" into the casting by the servo pipes. Refer to Figure 27 for the identification numbers.
- (5) 1-2 SERVO CUSHION SPRING - New 1-2 servo cushion spring can be identified by light blue and orange paint (See Figure 29).
- (6) 1-2 ACCUMULATOR SPRING - New calibration on CPH model only (See Figure 30).

INTERCHANGEABILITY:

The new 3rd clutch fiber plates (Black Stripe) WILL NOT service previous models, UNLESS, a "Calibration Update Kit" is installed at the same time. When the new 3rd clutch plates and Calibration Update Kit are installed, a new model tag must be installed with adhesive, that reflects the "New" model code. This is supplied in the Calibration Update Kit. Refer to Figure 31 for location of tag.

NOTE: THE FOLLOWING CONDITIONS COULD OCCUR IF PARTS ARE MIXED.

- (1) Harsh shifts and possibly a tie-up condition (Worse at Altitudes) on 2-3 and 3-2 shifts if the PREVIOUS 3rd clutch plates are installed into a transaxle built after March 17, 1989 (New Model Codes).
- (2) A slide-bump on 2-3 and 3-2 shifts if the NEW 3rd clutch plates (Black Stripe) are installed into a transaxle built before March 17, 1989 (Old Model Codes) without installing one of the "Calibration Update Kits". Refer to Page 37 of this booklet for OEM part numbers under Service Information.

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Technical Service Information

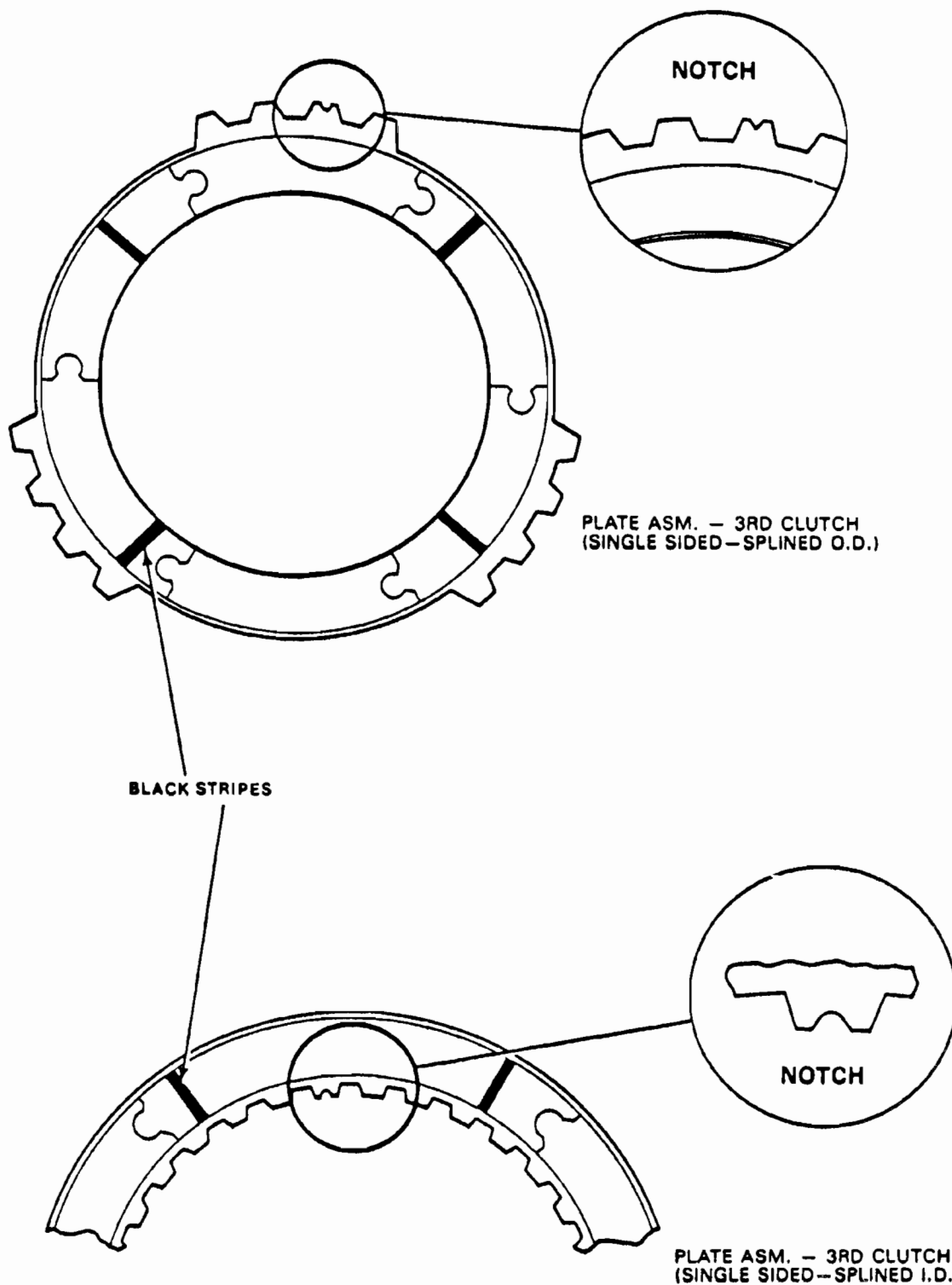
SERVICE INFORMATION:

<u>DESCRIPTION</u>	<u>MODELS</u>	<u>PART NO.</u>
1989 Calibration Update Kit	9AAH, 9ABH, 9AFH	8675936
1989 Calibration Update Kit	9BAH, 9BDH	8675937
1989 Calibration Update Kit	9BFH, 9BMH	8675938
1989 Calibration Update Kit	9BHH,	8675939
1989 Calibration Update Kit	9BJH,	8675940
1989 Calibration Update Kit	9BPH,	8675941
1989 Calibration Update Kit	9BWH, 9VXH	8675942
1989 Calibration Update Kit	9CDH, 9CLH, 9CZH	8675943
1989 Calibration Update Kit	9PAH	8675945
1989 Calibration Update Kit	9CPH, 9CYH	8675946
1989 Calibration Update Kit	0CHH	8675947
1989 Calibration Update Kit	0CJH	8675948

3RD CLUTCH PACK PART NUMBERS

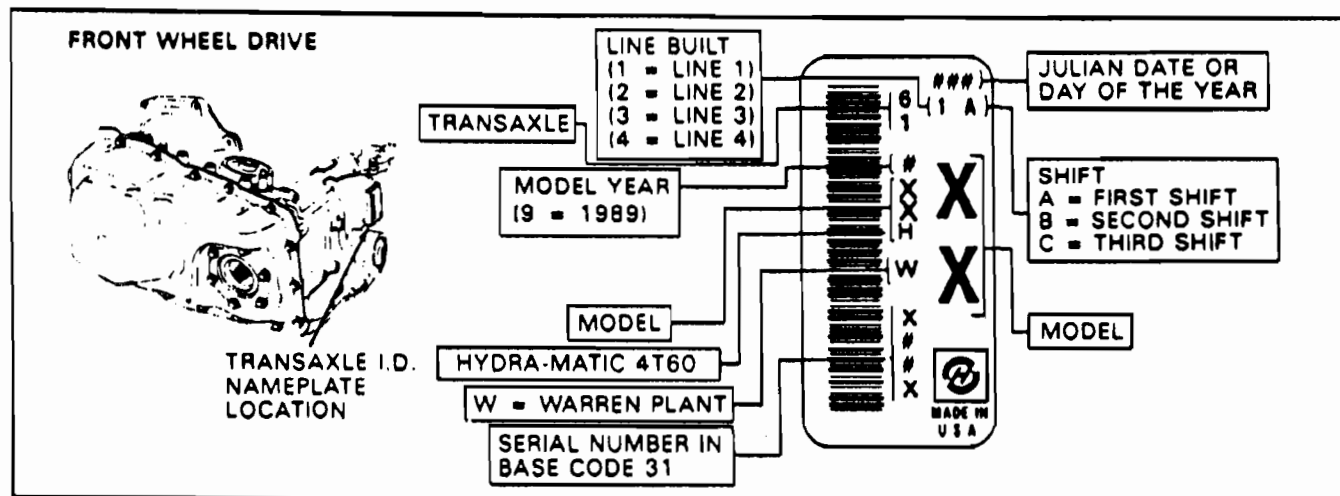
1984-1988	3RD CLUTCH PACK	8646938
	CONTAINS THE FOLLOWING:	
	4 Single Sided Inside Spline Plates (Green Stripes)	
	4 Single Sided Outside Spline Plate (Green Stripes)	
	1 Normal Steel Plate	
1989-1990	3RD CLUTCH PACK	8662954
	CONTAINS THE FOLLOWING:	
	5 Single Sided Inside Spline Plates (No Stripes)	
	5 Single Sided Outside Spline Plates (No Stripes)	
	1 Wave Plate	
1989-1990	3RD CLUTCH PACK	8662990
	CONTAINS THE FOLLOWING:	
	5 Single Sided Inside Spline Plates (Black Stripes)	
	5 Single Sided Outside Spline Plates (Black Stripes)	
	1 Wave Plate	
	REQUIRES CALIBRATION UPDATE KIT, IF USED IN PREVIOUS MODELS.	

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Figure 25
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OLD MODEL	NEW MODEL	CODES	CODE INFORMATION
AAH	ACH		<p>(*) = NO CHANGES (NO NEW 3RD CLUTCH PLATES)</p> <p>(O) = EARLY 1990 MODEL</p> <p>NOTE: IF THE MODEL CODES CHANGED THEN THE 3RD CLUTCH PLATE ASSEMBLY AND CALIBRATIONS DID ALSO.</p>
ABH	ADH		
AFH	AHH		
(AJH)	(AJH)	(*)	
(ANH)	(ANH)	(*)	
(ATH)	(ATH)	(*)	
(OLAH)	(OLAH)	(*) (O)	
(OLCH)	(OLCH)	(*)	
PAH	PBH		
VXH	VYH		
BAH	WBH		
BDH	WCH		
BFH	WLH		
BMH	WKH		
BHH	WRH		
BJH	WZH		
BPH	WTH		
BWH	WUH		
CDH	YAH		
CLH	YBH		
CPH	YCH		
CYH	YFH		
CZH	YJH		
OCHH	OYKH	(O)	
OCJH	OYLH	(O)	

Figure 26

AUTOMATIC TRANSMISSION SERVICE GROUP

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MODELS	VALVE BODY I.D.	MODELS	SPACER PLATE LAST FOUR NUMBERS
AJH	8S-1	AJH	8394
ACH, ADH, AHH	9A-3	ACH, ADH, AHH	5213
ANH, ATH	9B-2	ANH, ATH	8415
WBH, WCH	9D-2	WBH, WCH	5103
WLH, WKH	9E-3	WLH, WKH	5091
WRH	9G-3	WRH	5091
WZH, WUH	9H-3	WZH	5099
		WUH	5097
WTH	9J-3	WTH	5091
YAH, YBH, YJH	9M-2	YAH, YBH, YJH	5089
YCH	9P-2	YCH	5093
PBH	9U-2	PBH	5101
OYKH	OY-1	OYKH	5201
OYLH	OW-1	OYLH	5203
OLAH	OZ-1	OLAH	8874
YFH	9C-0	YFH	8273
The last number of the valve body I.D. can be the same as indicated or higher. The higher number means that it was updated.			

Figure 27

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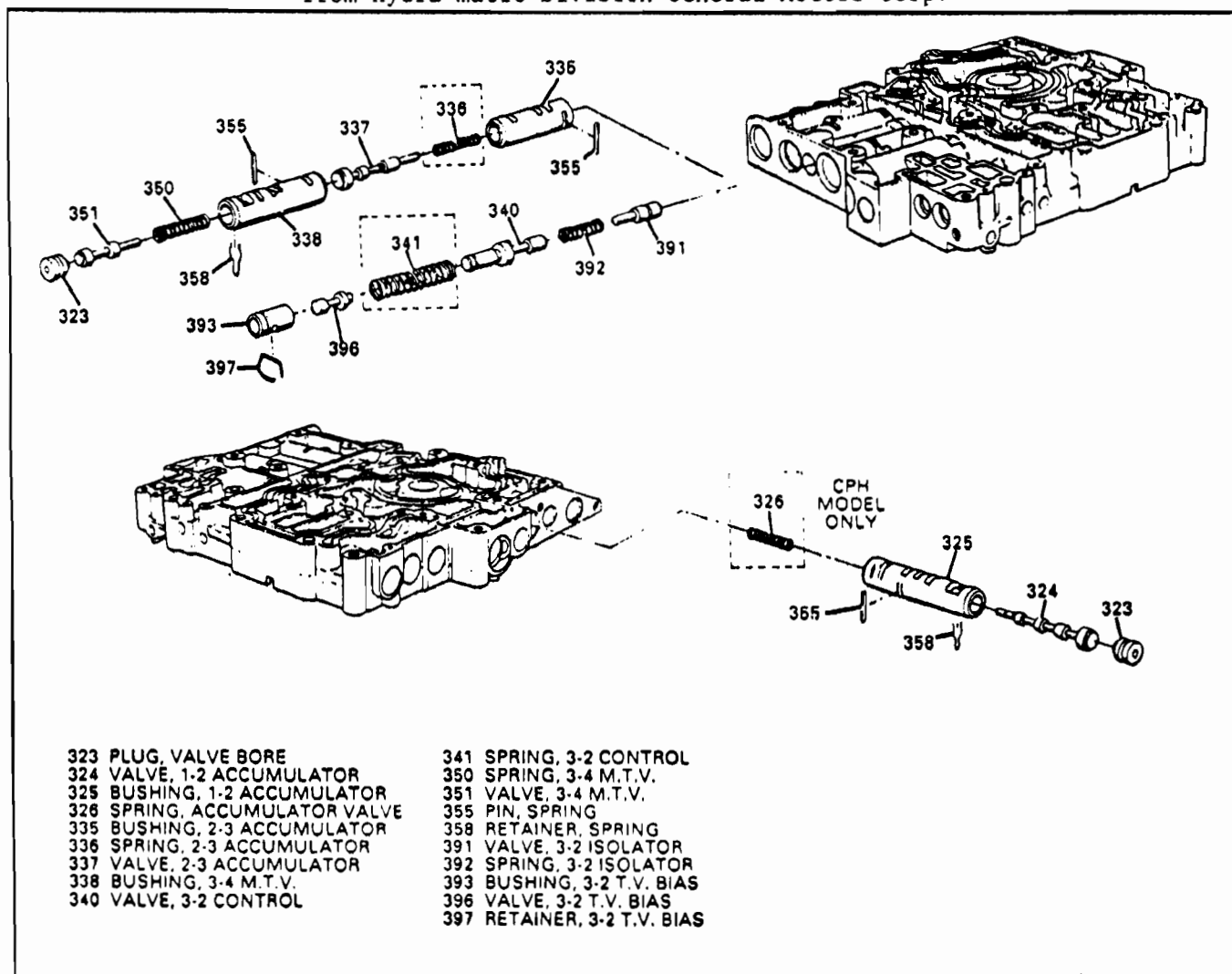


Figure 28

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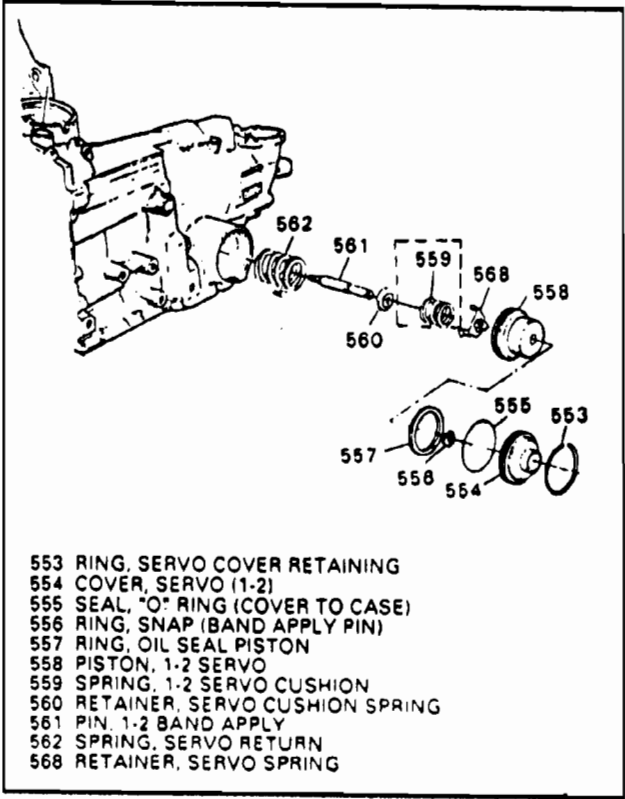


Figure 29

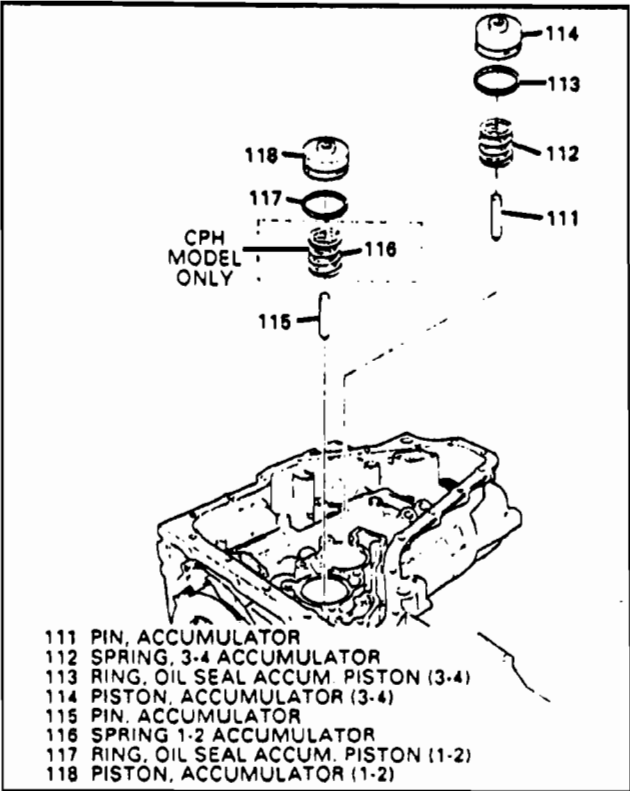


Figure 30

FRONT WHEEL DRIVE

TRANSAXLE I.D. NAMEPLATE LOCATION

JULIAN DATE

CLEAN AREA/PLACE NEW ADHESIVE MODEL TAG HERE

SHOWN	CHANGE TO	SHOWN	CHANGE TO
AAH	ACH	CLH	YBH
ABH	ADH	CPH	YCH
AFH	AHH	CYH	YFH
PAH	PBH	CZH	YJH
VXH	VYH	CHH	YKH
BAH	WBH	CJH	YLH
BDH	WCH		
BFH	WLH		
BMH	WKH		
BHH	WRH		
BJH	WZH		
BPH	WTH		
BWH	WUH		
CDH	YAH		

Figure 31



THM 440-T4 (4T60)

NEW "TWO PLATE" 4TH CLUTCH (SOME MODELS ONLY)

CHANGE: A new "Two Plate" 4th clutch assembly was used to replace the Single Plate 4th clutch assembly for SOME MODELS ONLY on the 1990 THM 440-T4 transaxles (See Figure 33).

REASON: Higher torque engine applications (Some Models Only).

PARTS AFFECTED:

- (1) 4TH CLUTCH LINED PLATES - Were made thinner by .020" than the previous lined plate, and can be identified by the four WHITE stripes, while the single plate lined plate has four GREEN stripes (See Figure 32). The Single Plate 4th Clutch is .090" thick, and the new "Two Plate" 4th Clutch plates are .070" thick.
- (2) 4TH CLUTCH STEEL PLATES - Were made thinner by .004" than the previous plates, and can be identified by a "Notch" cut into one of the tabs (See Figure 32). The single plate 4th clutch steels are .078" thick, and the new "Two Plate" steels are .074" thick.
- (3) 4TH CLUTCH APPLY PLATE - Was machined thinner than the previous apply plate, and the step was removed. Refer to Figure 32.

INTERCHANGEABILITY:

Will not interchange without calibration changes. May create harsh shifts if the Two Plate type is installed where the Single type was, or soft shift if the Single type is installed where the Two Plate type belongs.

SERVICE INFORMATION:

4th Clutch Lined Plates (Two Plate Type)	18017246
4th Clutch Steel Plates (Two Plate Type)	8661006
4th Clutch Apply Plate (Two Plate Type)	8661004

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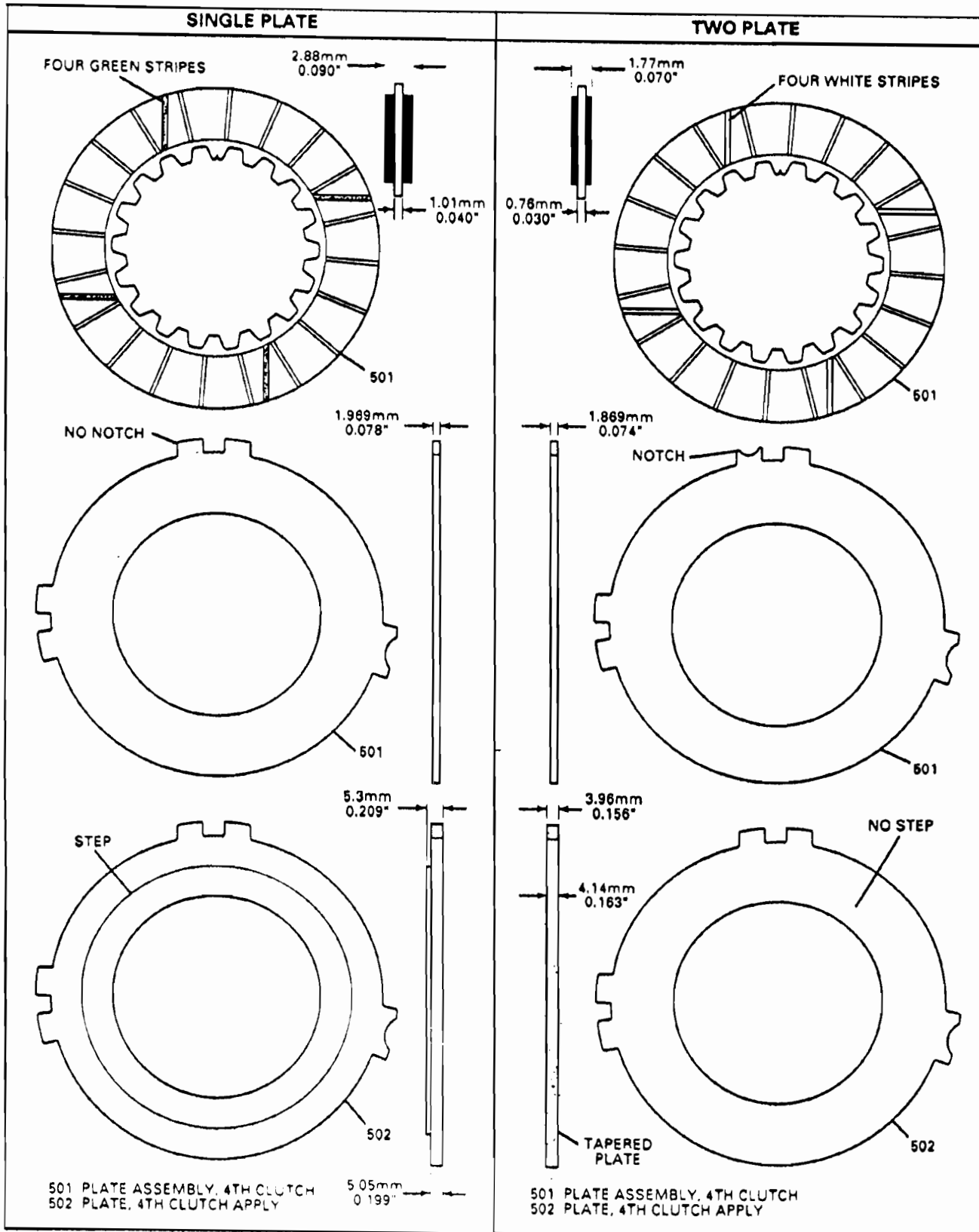


Figure 32
AUTOMATIC TRANSMISSION SERVICE GROUP

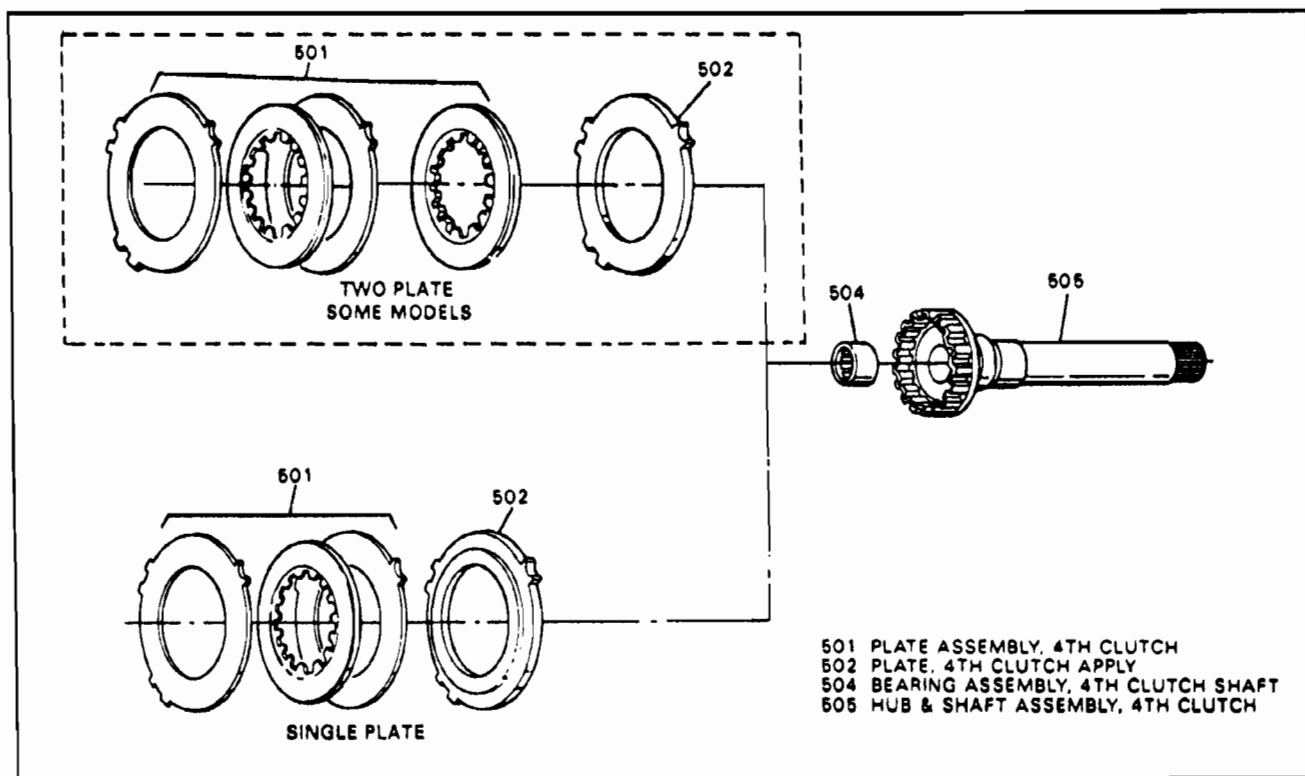


Figure 33

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 440-T4 (4T60) CHECKING TRANSAXLE END PLAY

Following is an easy procedure to use for checking end play on the THM 440-T4 transaxle, using only a straight edge and a feeler gage.

- (1) Remove all final drive end play with the loading fixture tools, or a large screwdriver through the hole in the case.
- (2) Install selective washer and the bearing on the input housing.
- (3) Install driven sprocket support into the case using the two long pump bolts as tools.
- (4) Measure with feeler gage and straight edge, the distance between the driven sprocket support and the case (See Figure 34).
NOTE: THE DRIVEN SPROCKET SUPPORT MUST "ALWAYS" BE BELOW THE CASE SURFACE.
- (5) Measurement should be, MINIMUM .006" and MAXIMUM .012".
- (6) Change selective washer as necessary to obtain the desired end play.

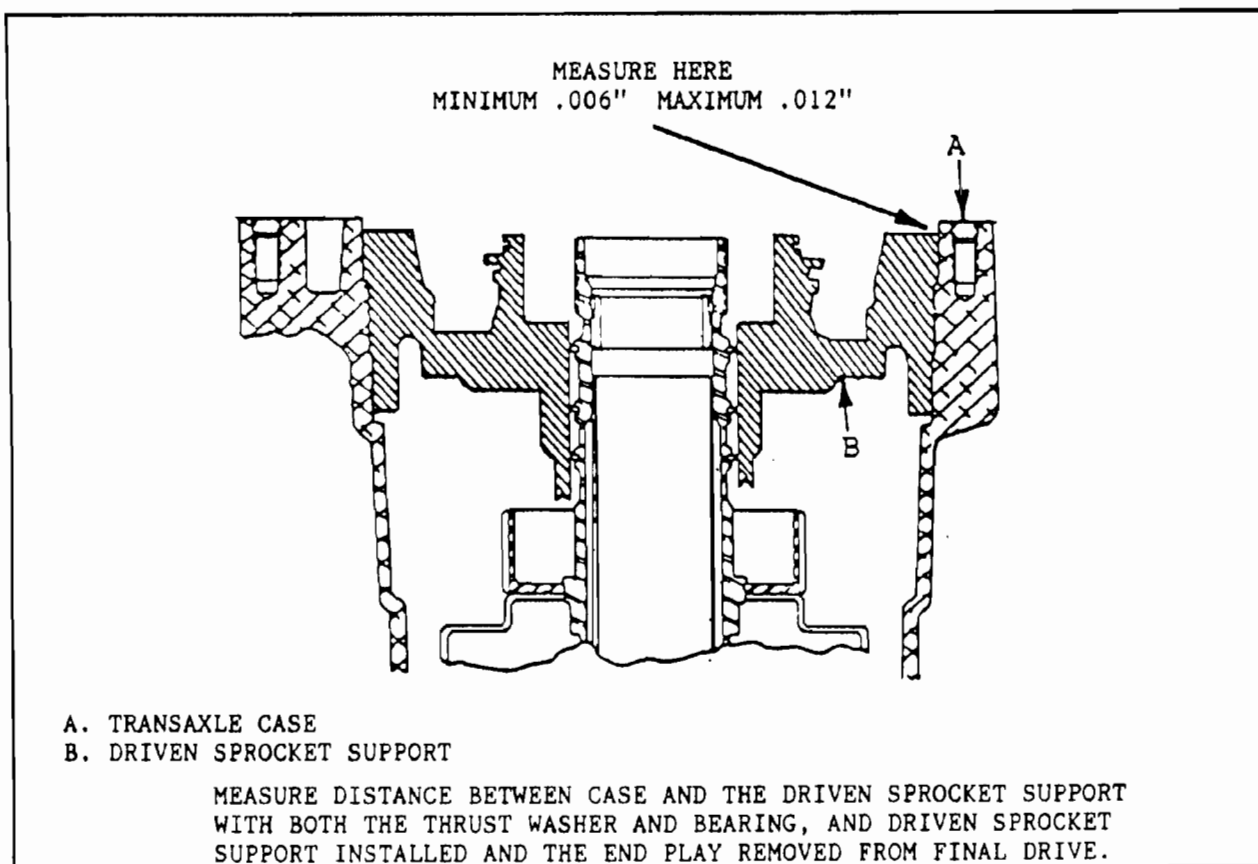


Figure 34

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 440-T4 (4T60) 1990 CHANGE

CHANGE: A new Driven Sprocket Support and Chain Scoop is now used in production on all 1990 vehicles equipped with a THM 440-T4 (4T60) transaxle. (See Figure 35).

REASON: This now makes a common casting for both the THM 440-T4 (4T60), and the new THM F-31 (4T60-E) that is scheduled for the spring of 1990.

PARTS AFFECTED:

- (1) **DRIVEN SPROCKET SUPPORT** - The new design sprocket support has an increased width of one leg on the support (See Figure 35). The wider leg on the new support will accommodate a new lube feed passage for the new THM F-31 (4T60-E) transaxle. Lube feed for the THM F-31 (4T60-E) will be thru the channel plate, instead of the pipe from the accumulator cover as on the THM 440-T4 (4T60) (See Figure 36).
- (2) **CHAIN SCOOP** - The new sprocket support requires the chainscoop, both black and white, to be about 1/3 the length of the previous chain scoop. (See Figure 35).

INTERCHANGEABILITY:

The new driven sprocket support will service all past models, but the new length (Short) chain scoop must be used with it. The previous (Long) chain scoop will not fit, but can be cut to fit the new support. Lay the previous chain scoop on the actual size drawing in Figure 37 and cut straight down, as indicated, with a hack saw. Smooth off the rough cut edge with sandpaper. The new length (Short) chain scoop must be used ONLY with the new design driven sprocket support.

SERVICE INFORMATION:

The service part number did not change from the previous to the new driven sprocket support. Either design may be available until the previous design stock is depleted, and then the new design support will be the only one available.

Driven Sprocket Support Assembly..... 8668385
White Chain Scoop (New Short Design, 35-35 Sprocket Ratio).... 8668613
Black Chain Scoop (New Short Design, 37-33 Sprocket Ratio).... 8651622

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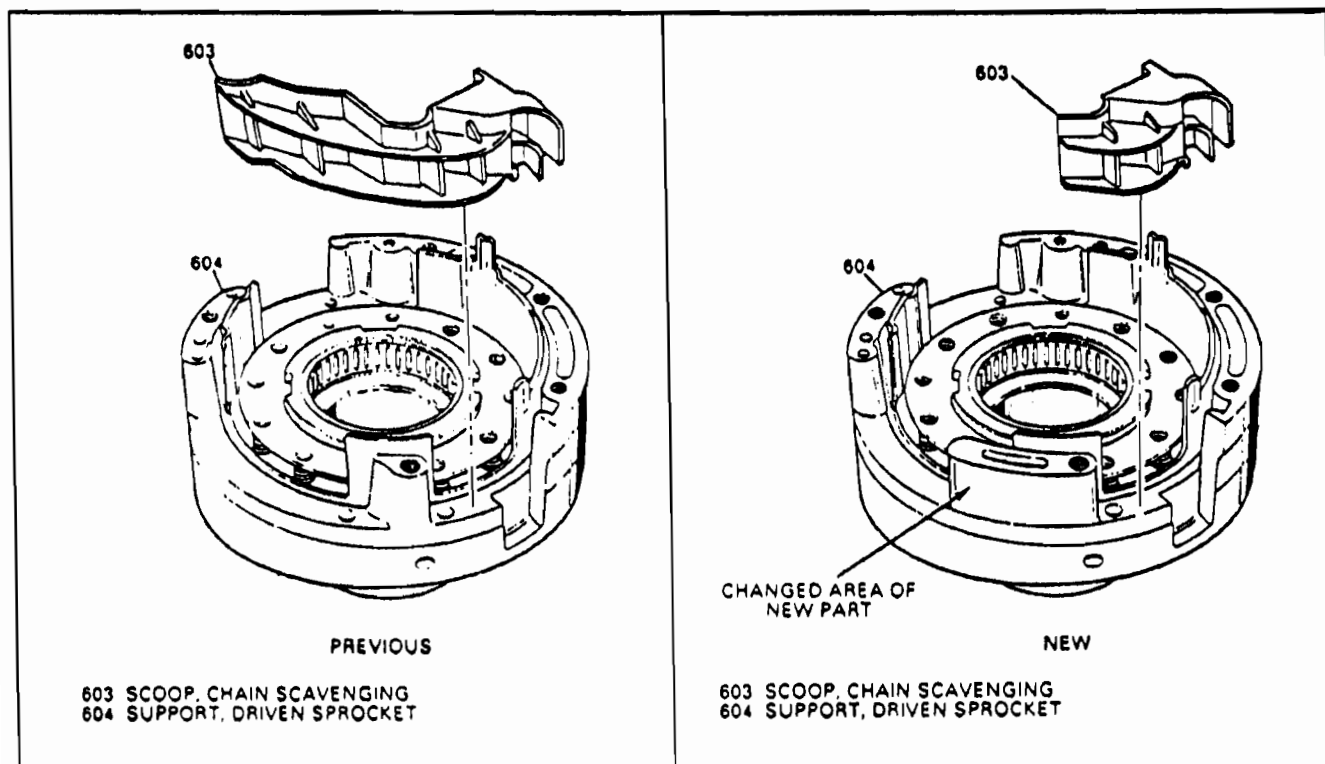


Figure 35

AUTOMATIC TRANSMISSION SERVICE GROUP

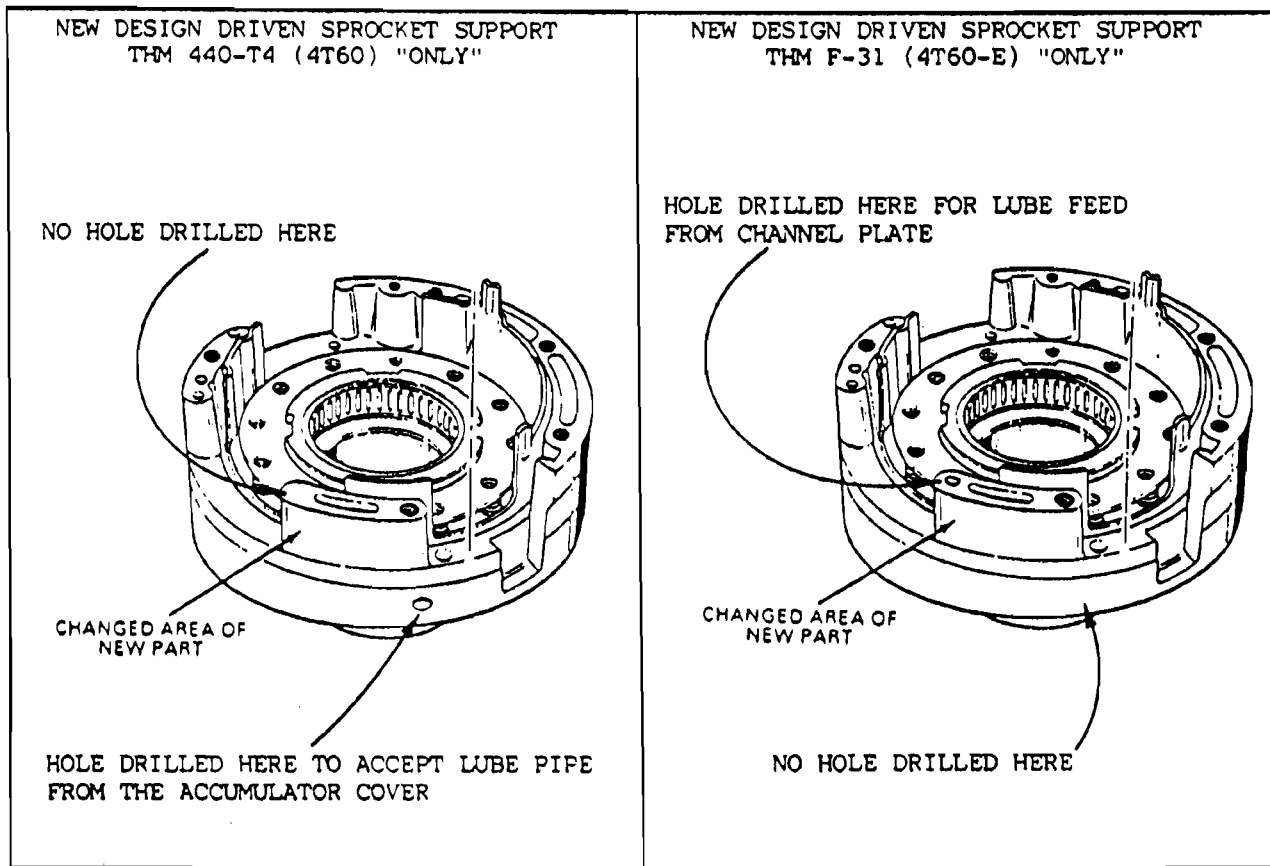


Figure 36

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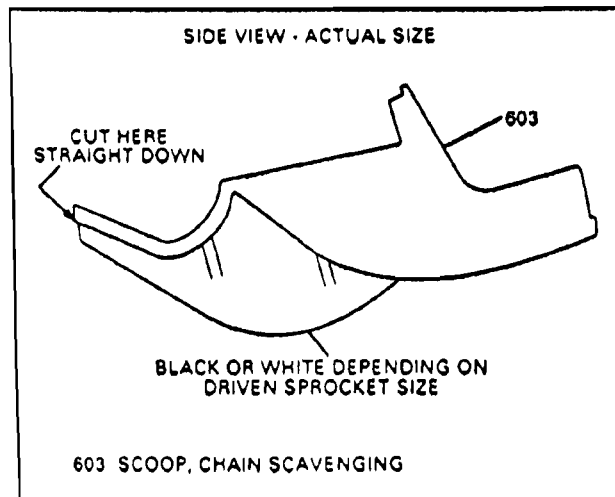


Figure 37

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 440-T4 (4T60)

1990 CHANGE

CHANGE: Entirely new parking lock and actuator system.

REASON: To expand model usage that would include vehicles with a heavier Gross Vehicle Weight (GVW).

PARTS AFFECTED:

- (1) TRANSAXLE CASE - Bore diameter for the actuator guide has been increased by .026", to accomodate the new actuator guide (See Figure 38).
- (2) ACTUATOR GUIDE - Outside diameter has been increased by .026" for the increased diameter of the "Bullet" on the parking rod. The plunger assembly and spring have been eliminated. The slot in the actuator guide has also been eliminated (See Figure 39).
- (3) ACTUATOR GUIDE "O" RING - The "O" ring is now a larger diameter to seal the larger diameter actuator guide (See Figure 39).
- (4) PARKING ACTUATOR ROD - The "Bullet" on the park rod is now .070" larger in diameter, and the length increased by .543" (See Figure 40).
- (5) PARKING PAWL - The parking pawl lock-out pin has been eliminated, and the dimension (Width) of the parking pawl was reduced by .039" (See Figure 41).

NOTE: Parking Pawl is an integral part of Final Drive Ring Gear.

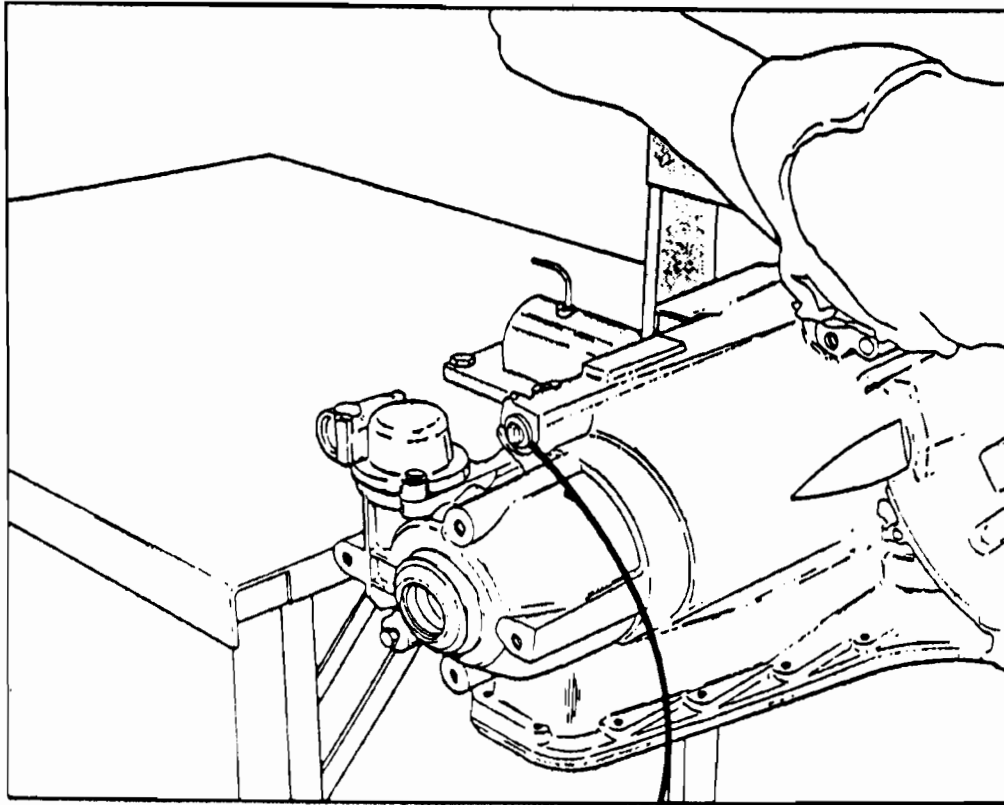
INTERCHANGEABILITY:

THE NEW PARK LOCK SYSTEM PARTS "CANNOT" BE USED TO SERVICE PAST MODELS UNLESS ALL THE COMPONENTS ARE REPLACED, INCLUDING THE TRANSAXLE CASE.

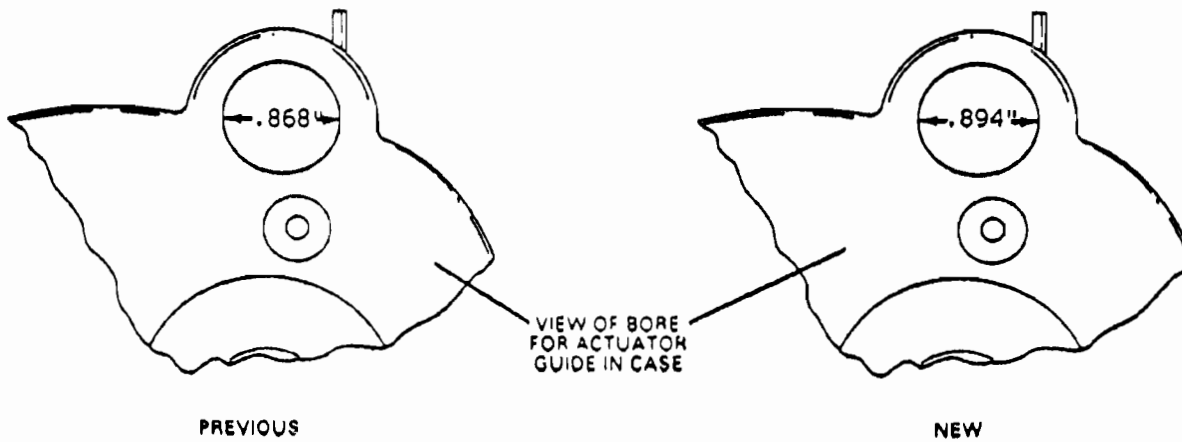
SERVICE INFORMATION:

1990 Transaxle Case (All Except OLAH).....	8668985
1990 Transaxle Case (Model OLAH).....	8668986
1990 Actuator Assembly (All).....	8675325
1990 Park Rod Assembly (All).....	8675335
1990 Final Drive Ring Gear Assembly (All).....	8675330

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TRANSAXLE CASE ACTUATOR BORE



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Figure 38

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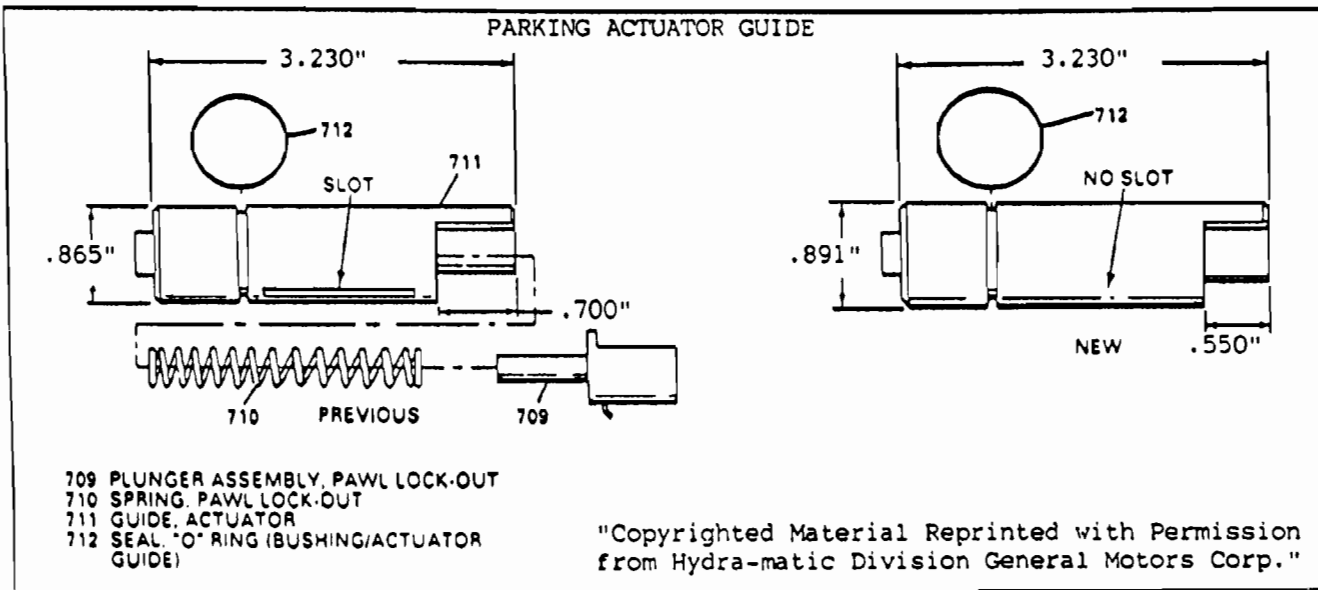


Figure 39

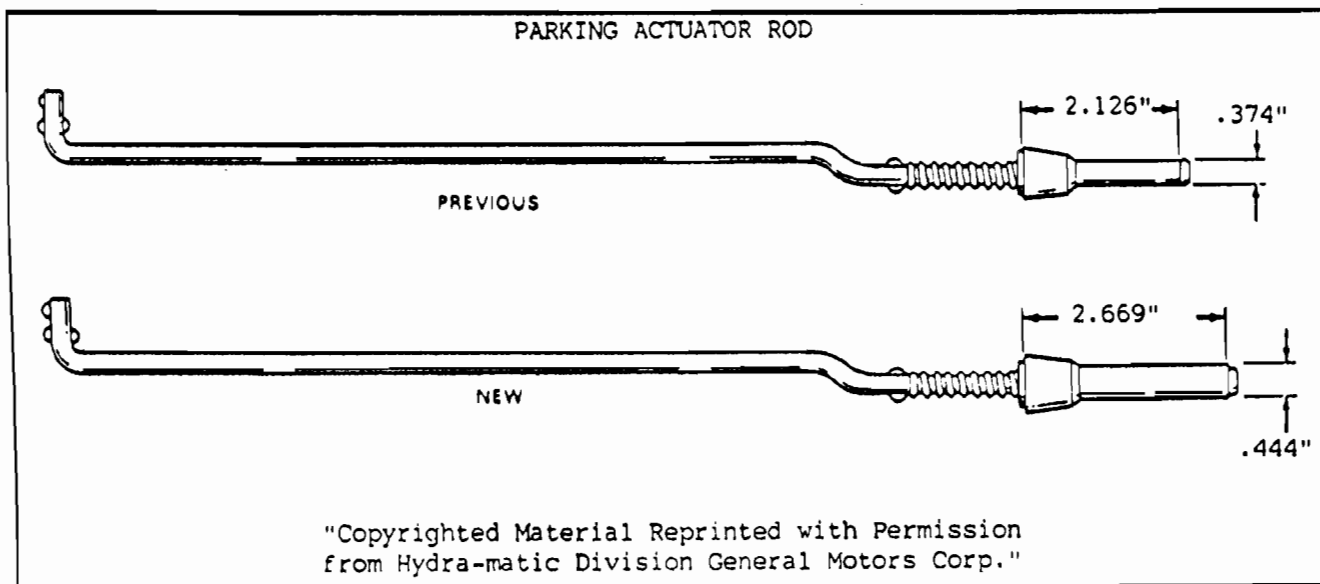


Figure 40

AUTOMATIC TRANSMISSION SERVICE GROUP

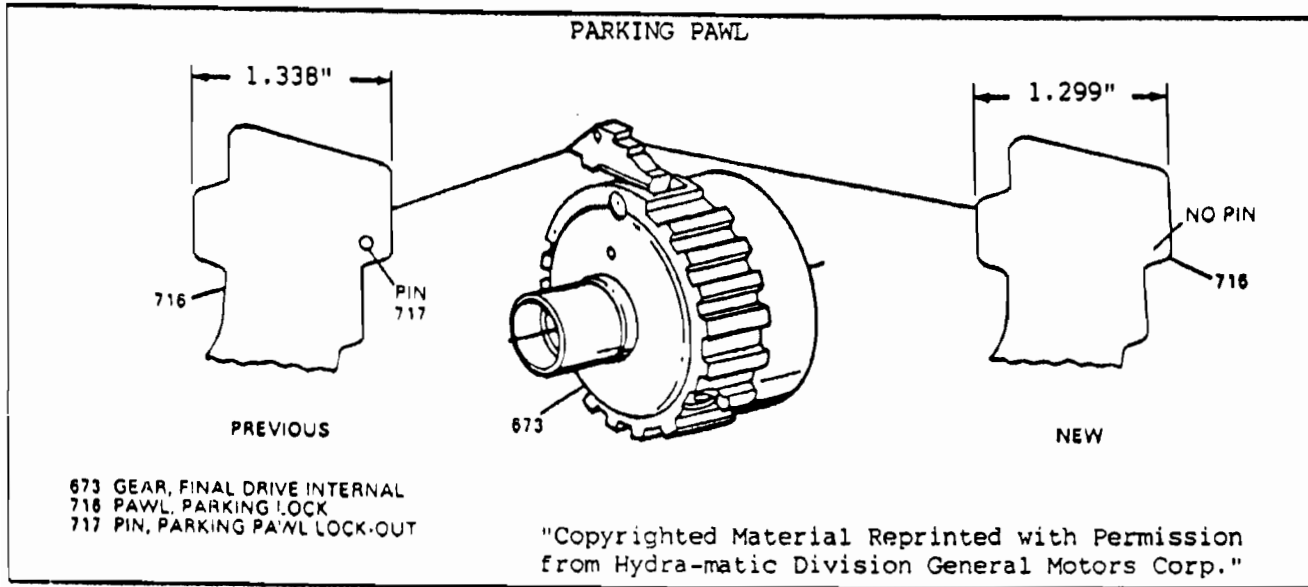


Figure 41



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

CHANGE: A new style 1-2 Band Assembly (See Figure 26) 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 Figure 42).
- (2) 1-2 BAND STOP ASSEMBLY - The 1-2 Band Stop has been eliminated as it is no longer needed (See Figure 43).

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 Figure 43).

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

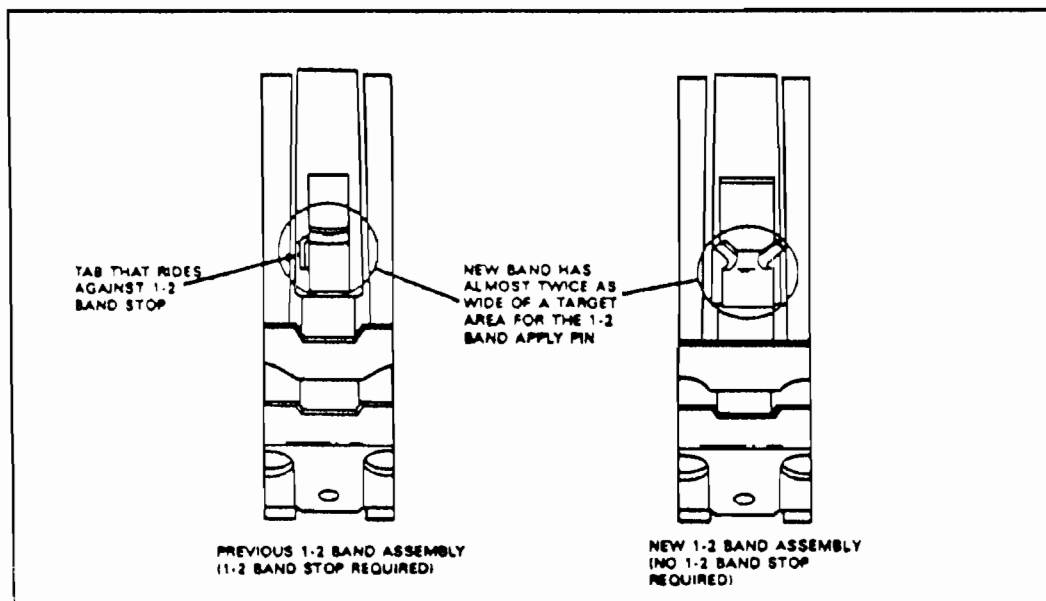


Figure 42

AUTOMATIC TRANSMISSION SERVICE GROUP

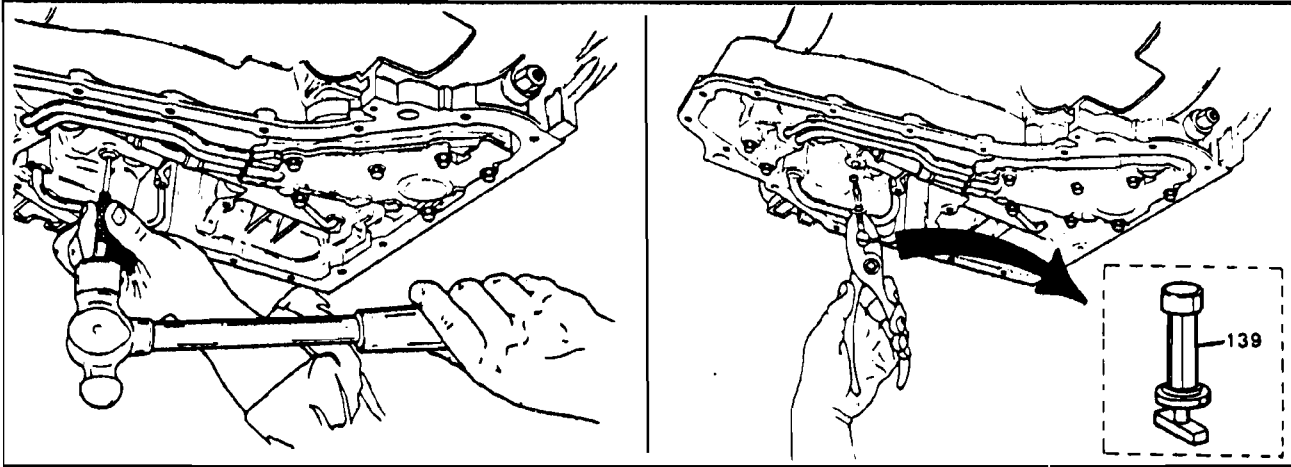


Figure 43



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 44).

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

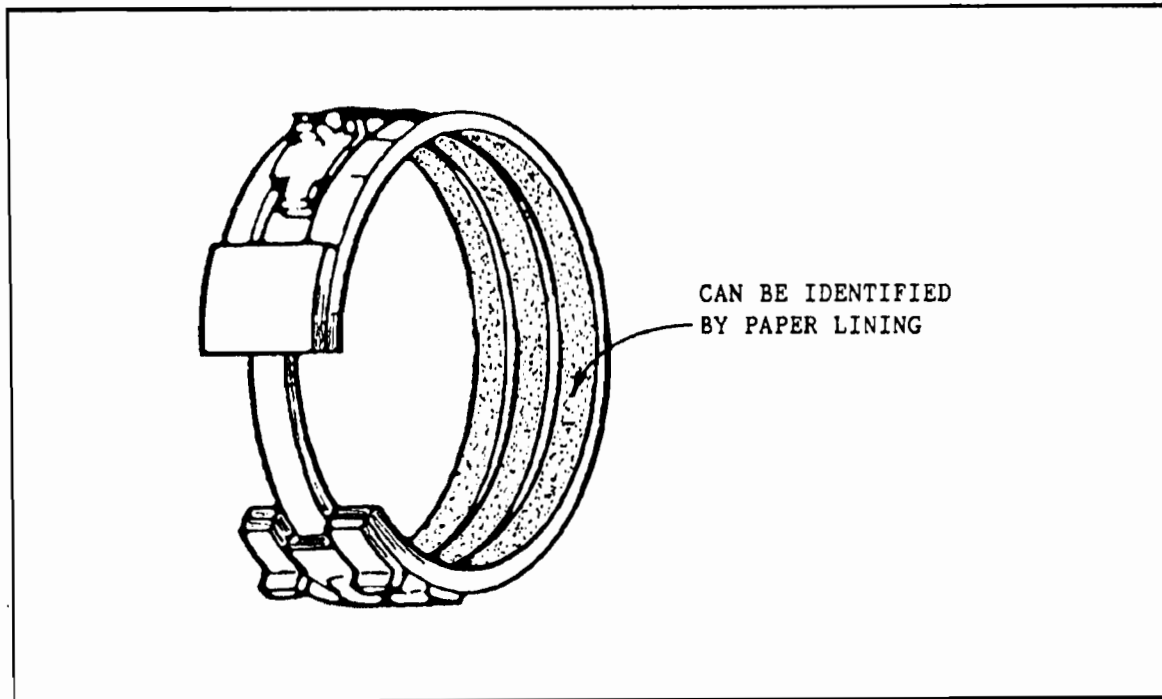
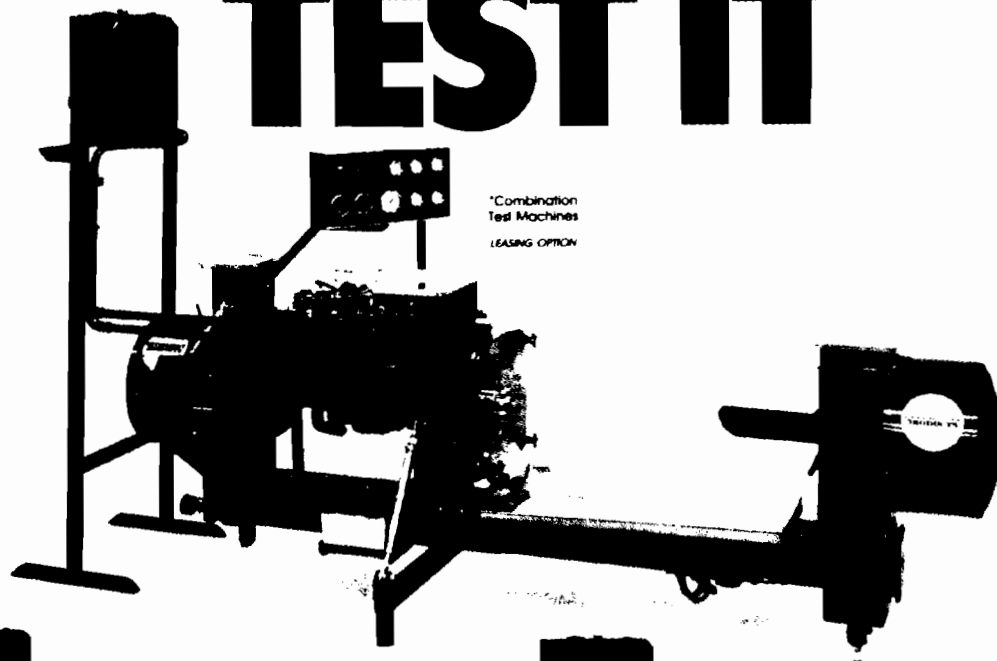


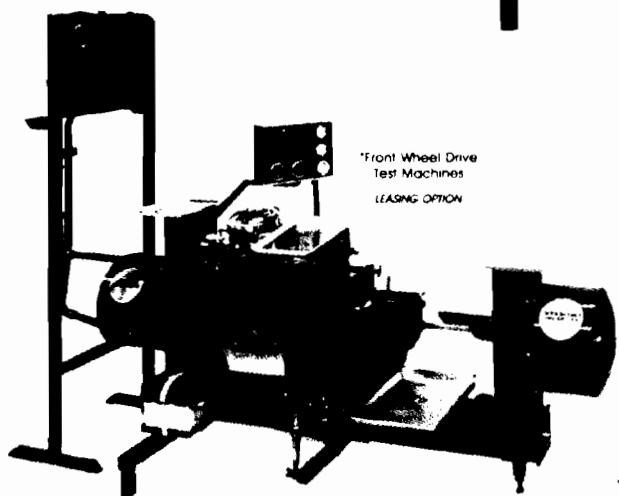
Figure 44

AUTOMATIC TRANSMISSION SERVICE GROUP

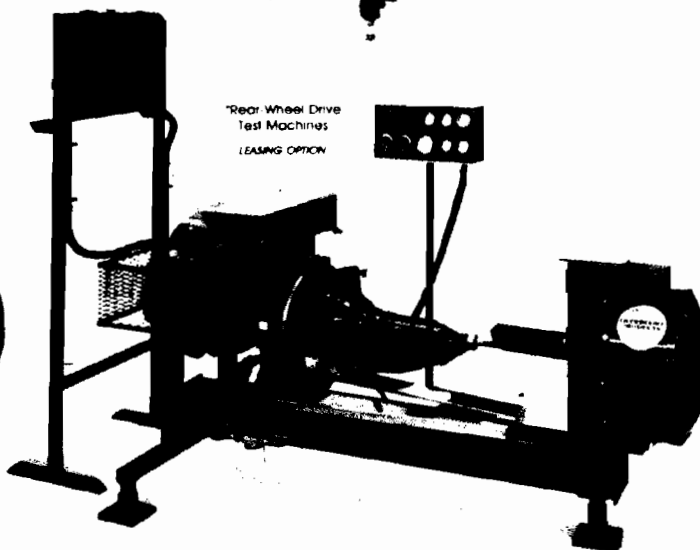
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THM 440-T4 (4T60)

NEW OUTPUT SHAFT/BEARING & 3RD ROLLER CLUTCH

CHANGE: There is now a new Output Shaft/Bearing Assembly, and a new style 3rd Roller Clutch Assembly (See Figure 29 and 30). Beginning on December 11, 1989 (Julian Date 345) all 1990 model 440-T4 transaxles were built with the new 3rd Roller Clutch Assembly, and the new Output Shaft/Bearing Assembly went into production on January 25, 1990 (Julian Date 025).

REASON: Improved lube oil flow to 3rd roller clutch and input sprag.

PARTS AFFECTED:

- (1) **OUTPUT SHAFT/BEARING** - The new bearing has a single row of needle bearings instead of a double row, and the output shaft is machined different to accommodate the new bearing (See Figure 45). This change will improve lube oil flow to the 3rd roller clutch and input sprag.
- (2) **3RD ROLLER CLUTCH ASSEMBLY** - The new 3rd roller clutch outer race has four (4) less lube holes than previous models. The four lube holes are in line with the very end of the rollers (See Figure 46). Elimination of these holes helps keep the rollers from "Skewing" (Running at an Angle), thus generating less heat.

INTERCHANGEABILITY:

The new Output Shaft/Bearing Assembly will retro-fit back to 1988 models only, because the longer output shaft was required for the up-dated final drive assembly that had the larger side gears.

IT WILL NOT FIT INTO 84-87 MODEL TRANSAXLES.

The new 3rd Roller Clutch Assembly will service all 1989 models that are equipped with the input housing thrust bearing assembly (Page 60).

IT WILL NOT FIT TRANSAXLES WITH THE "TOP HAT" THRUST WASHER.

SERVICE INFORMATION:

Output Shaft and Bearing Assembly (New Style).....	8668990
Needle Bearing Only (New Style).....	8675032
3rd Roller Clutch Assembly (New Style).....	8677016

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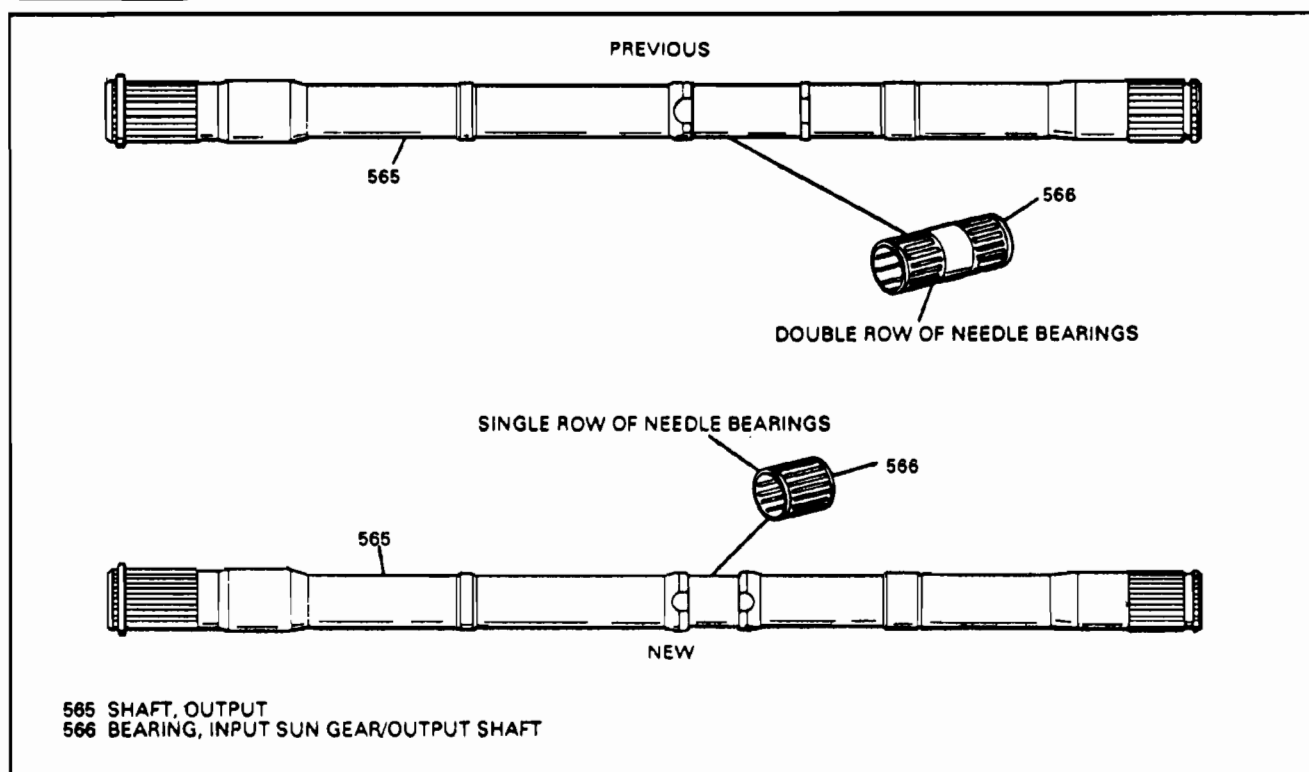


Figure 45

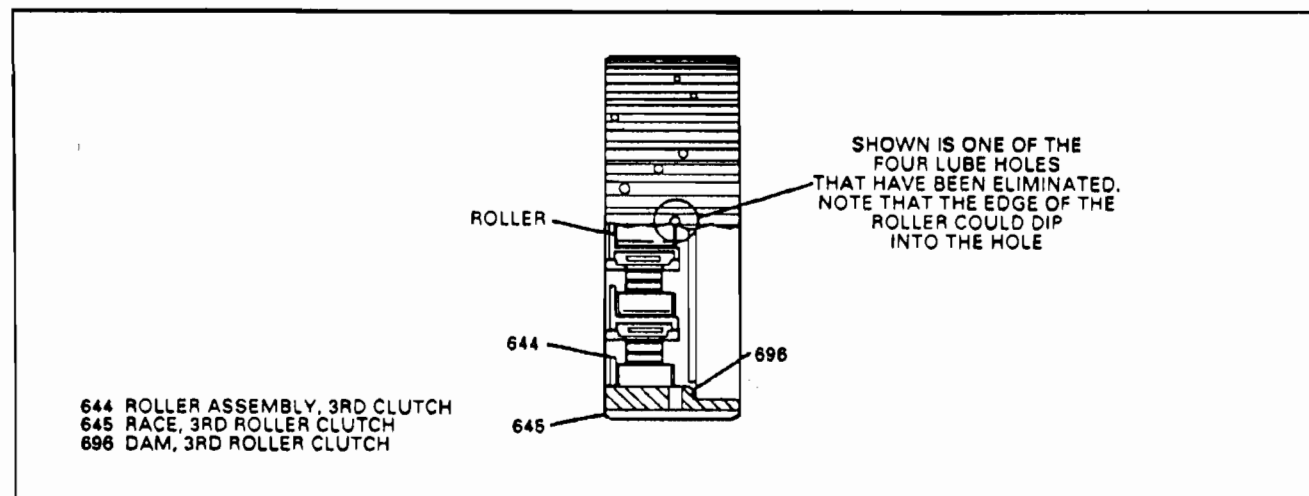


Figure 46



Technical Service Information

THM 440-T4 (4T60) BEARING REPLACES "TOP HAT" WASHER

CHANGE: A new Thrust Bearing Assembly replaces the "Top Hat" Thrust Washer and Lock-up Sleeve in the input housing (See Figure 47) The new bearing and related parts went into production on all 1989 models on November 28, 1988 (Julian Date 333).

REASON: To minimize friction and the potential of excess heat that would melt the plastic in the 3rd roller clutch assembly.

PARTS AFFECTED:

- (1) INPUT HOUSING - Surface on the input housing where the new bearing assembly rides, has been reduced by .035" to accomodate the increased thickness of the new bearing (See Figure 48).
- (2) "TOP HAT" THRUST WASHER - Eliminated (See Figure 48).
- (3) LOCK UP SLEEVE - The lock-up sleeve is no longer needed and has been eliminated (See Figure 48).
- (4) 3RD ROLLER CLUTCH LUBE DAM - The inside diameter has been increased by .256" to accomodate the larger diameter new bearing, and the lip on the lube dam eliminated for increased lube oil flow to the 3rd roller assembly (See Figure 49).
- (5) 3RD ROLLER CLUTCH INNER RACE - Has been machined .040" thinner to accomodate the increased thickness of the new bearing assembly (See Figure 49).

INTERCHANGEABILITY:

Will retro-fit back to all previous models, as long as, all parts affected are used. You "Cannot" mix parts in this location as you will not be able to obtain proper end play.

You can purchase the new Thrust Bearing Assembly and the new design 3rd Roller Clutch Complete, and have .030" machined from your input housing, to retro back to all models. Make sure you check end play. This will save the cost of buying a new input housing.

SERVICE INFORMATION:

Thrust Bearing Assembly (New Design).....	8668422
3rd Roller Clutch Complete (New Design).....	8677016
Service Package (Fits 84-88).....	8662975
Service Package (Fits 1989).....	8662970

Service Packages Contain the Following;

1. New design Input Housing.
2. New design Thrust Bearing Assembly.
3. New design 3rd Roller Clutch Complete.
4. Instruction Sheet.

AUTOMATIC TRANSMISSION SERVICE GROUP

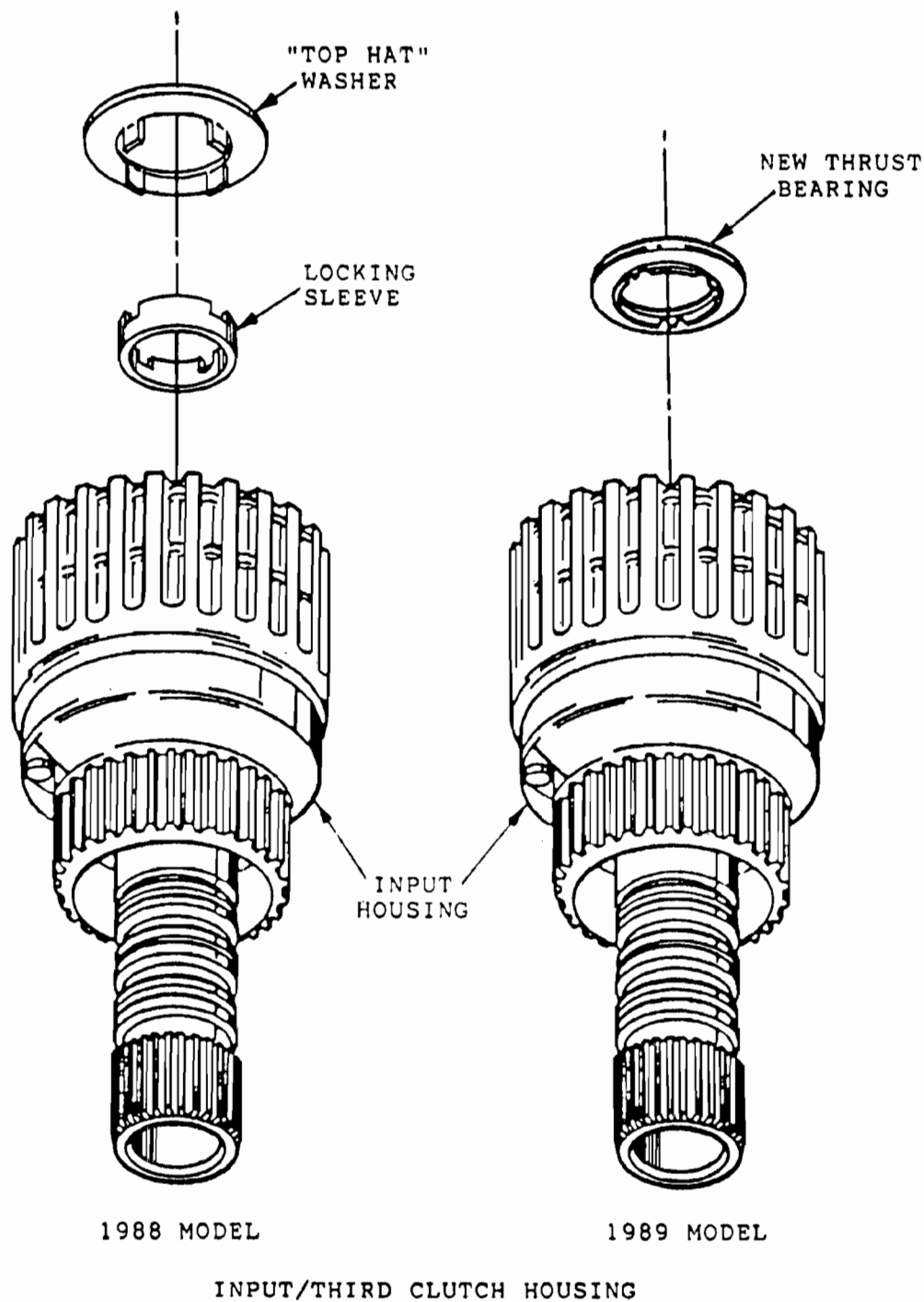


Figure 47

AUTOMATIC TRANSMISSION SERVICE GROUP

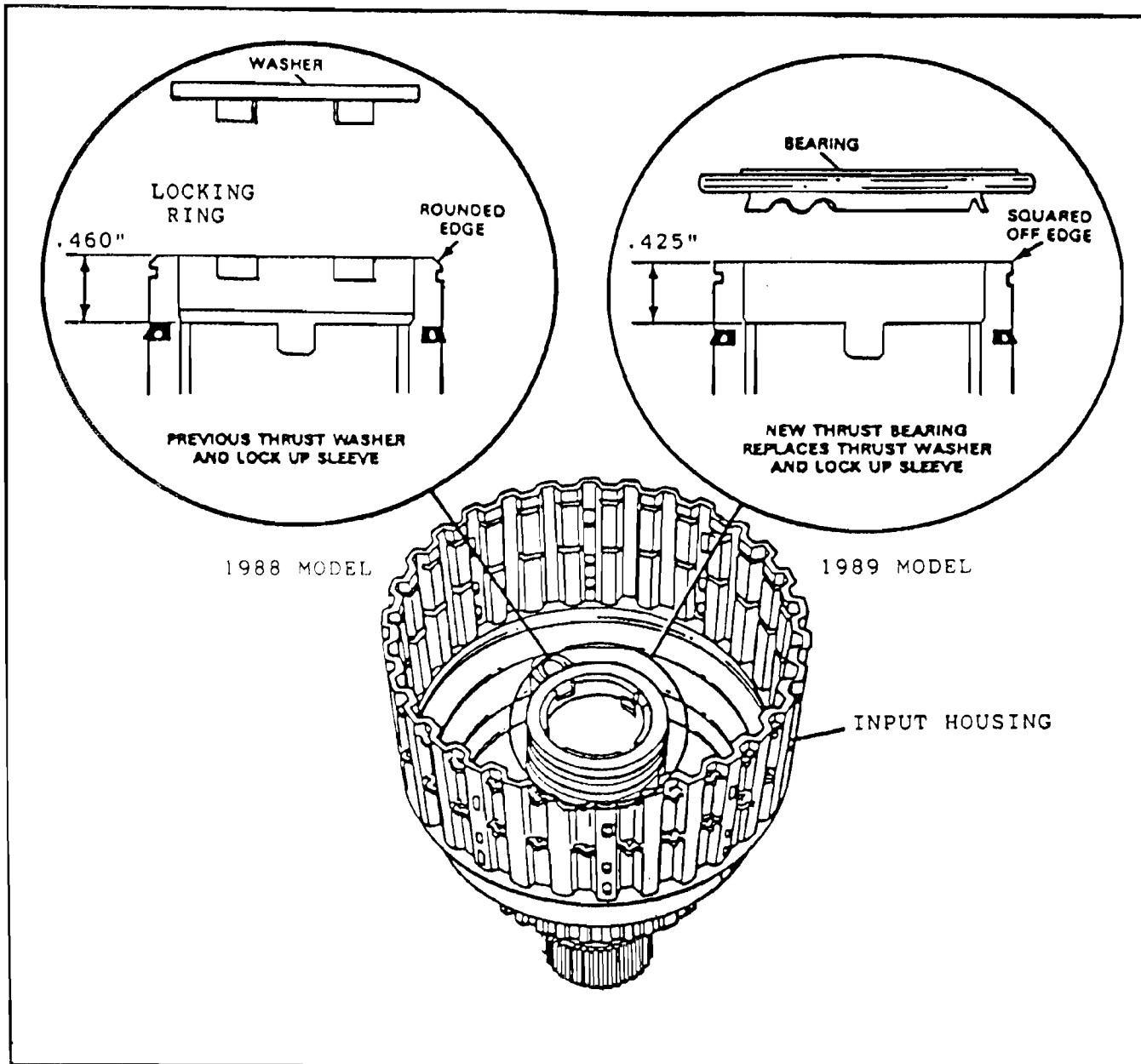


Figure 48

AUTOMATIC TRANSMISSION SERVICE GROUP

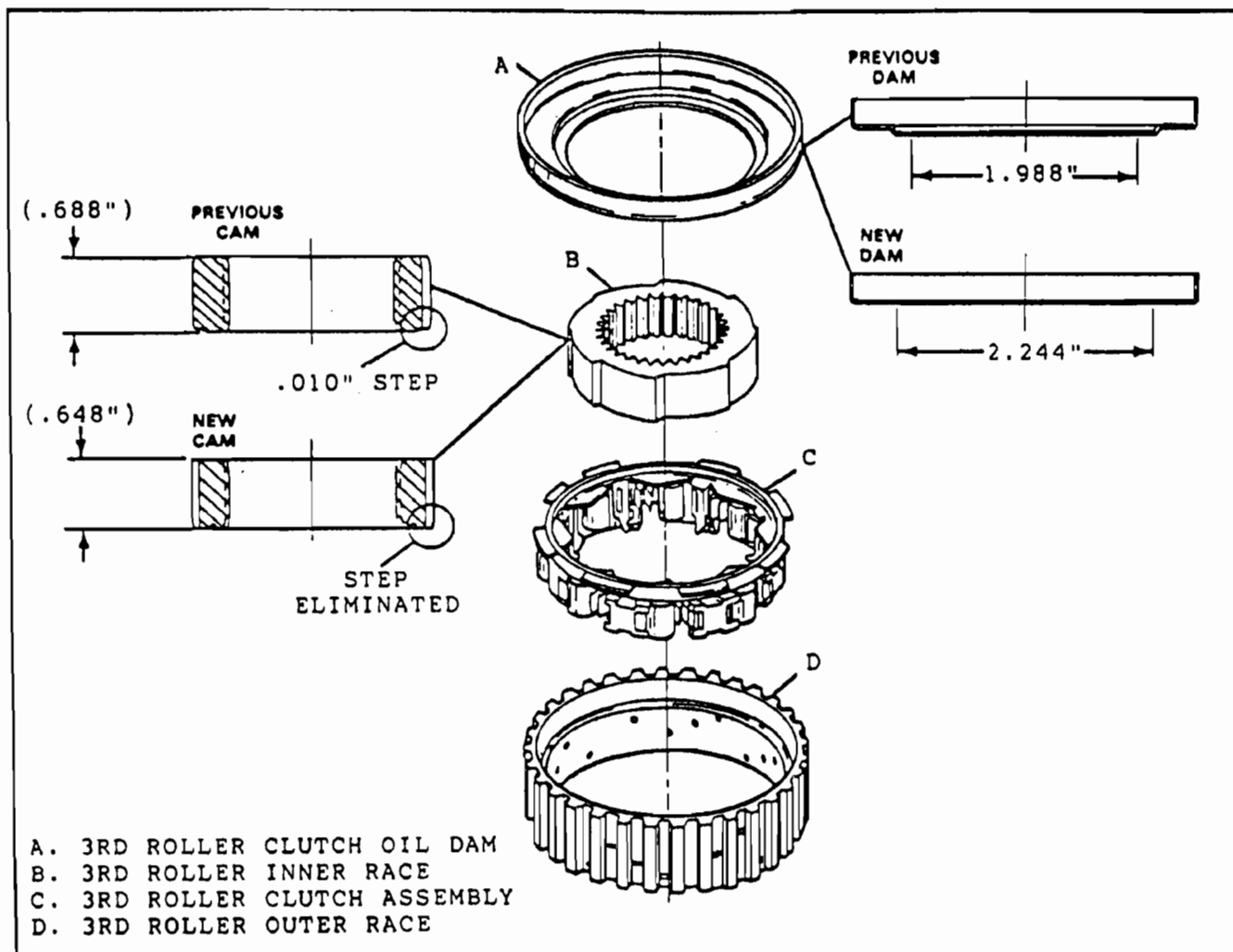


Figure 49

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

CHANGE: The Input Clutch Accumulator has been eliminated from the channel plate (See Figure 50).

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 also changes the casting (See Figure 50).
- (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 51).
- (3) INPUT CLUTCH STEEL PLATES - The steel plates are .027" thinner to accomodate the added wave plate (See Figure 52). The new steel plates are .049" thick, and the old steel plates are .076" thick.
- (4) INPUT CLUTCH "STACK" - The input clutch stack has been revised to accomodate the new changes. Refer to Figure 52 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.

NEW WAVED PLATE - - - - -	8675257
.049" STEEL PLATES - - - - -	8651446

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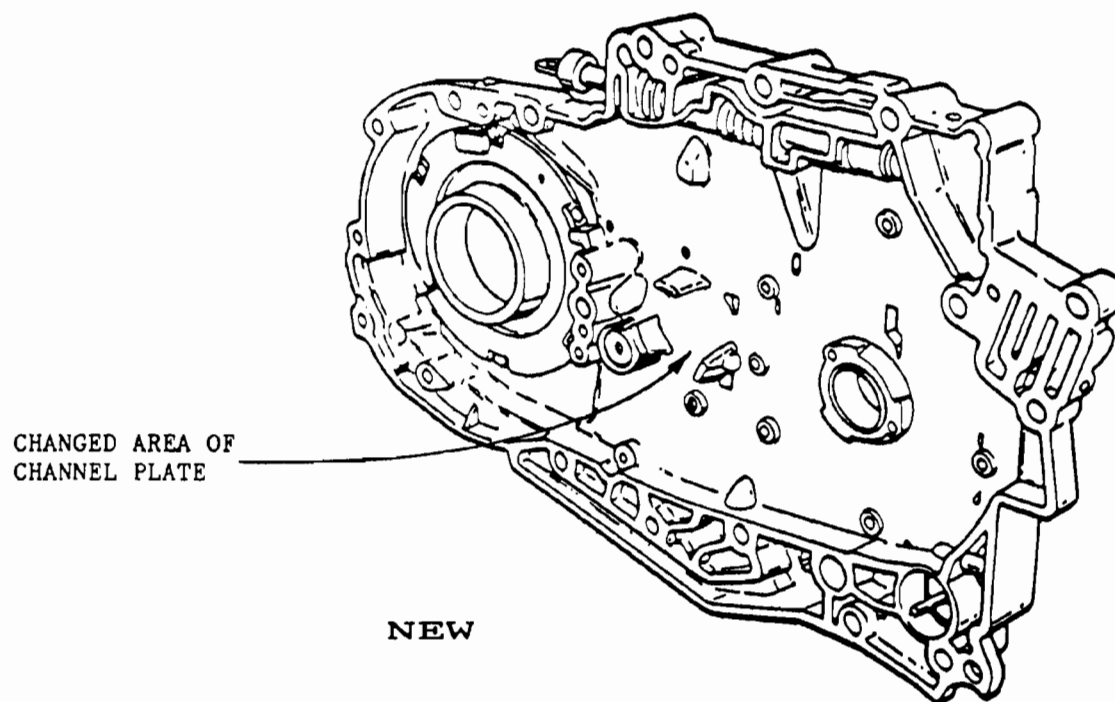
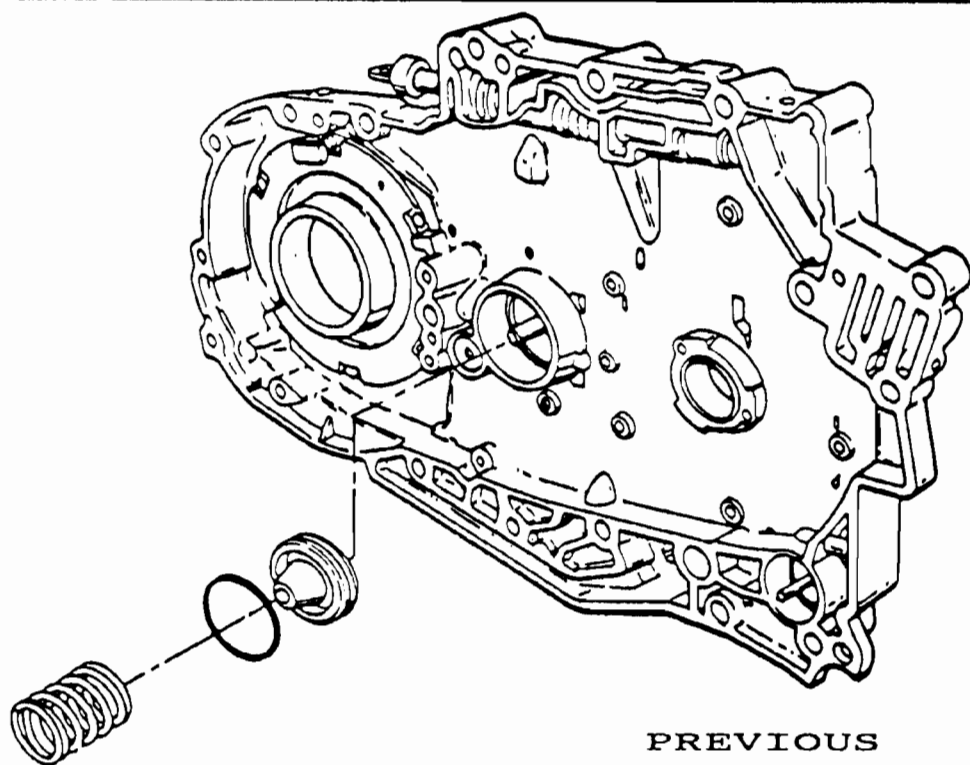


Figure 50

AUTOMATIC TRANSMISSION SERVICE GROUP

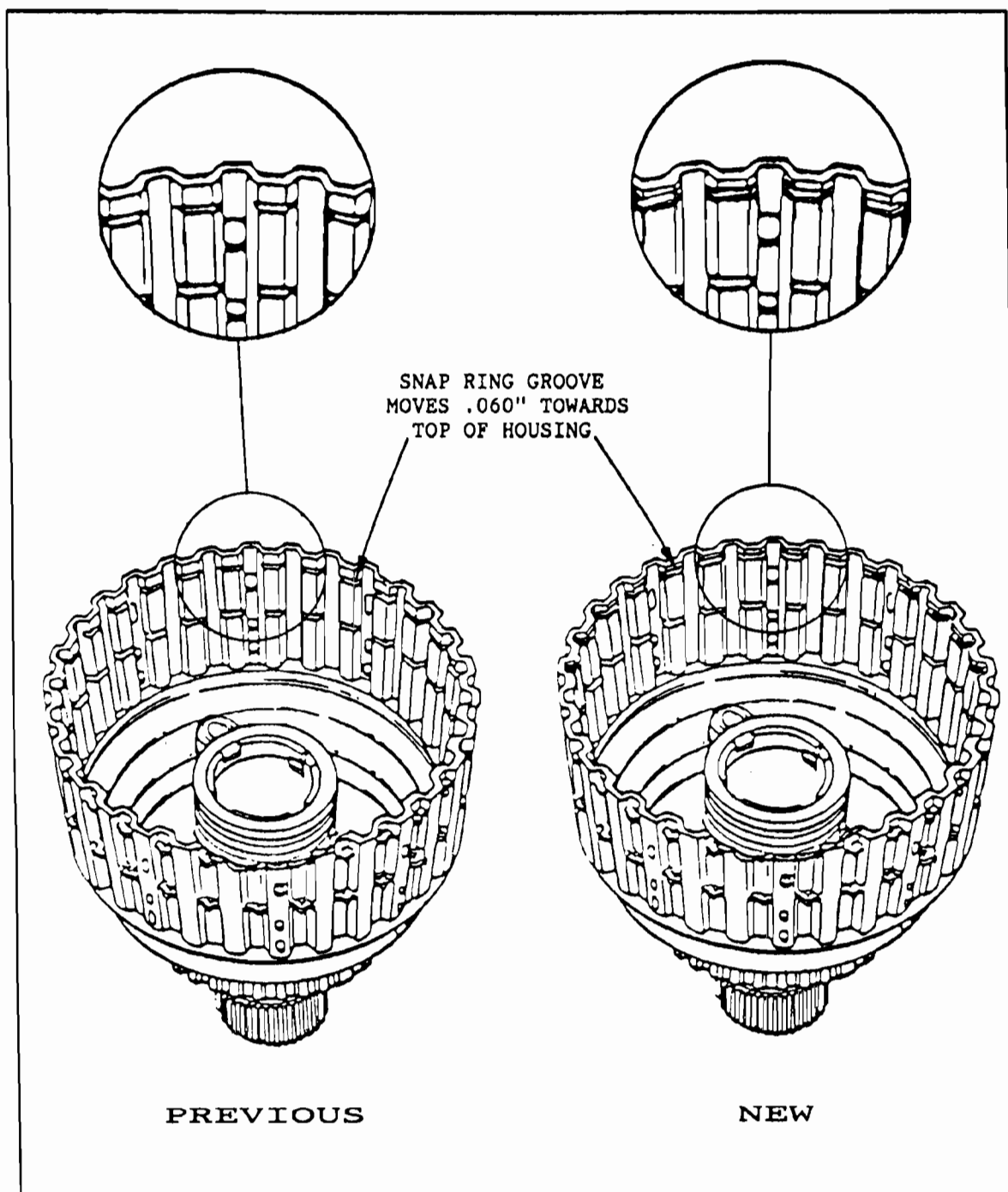


Figure 51

AUTOMATIC TRANSMISSION SERVICE GROUP

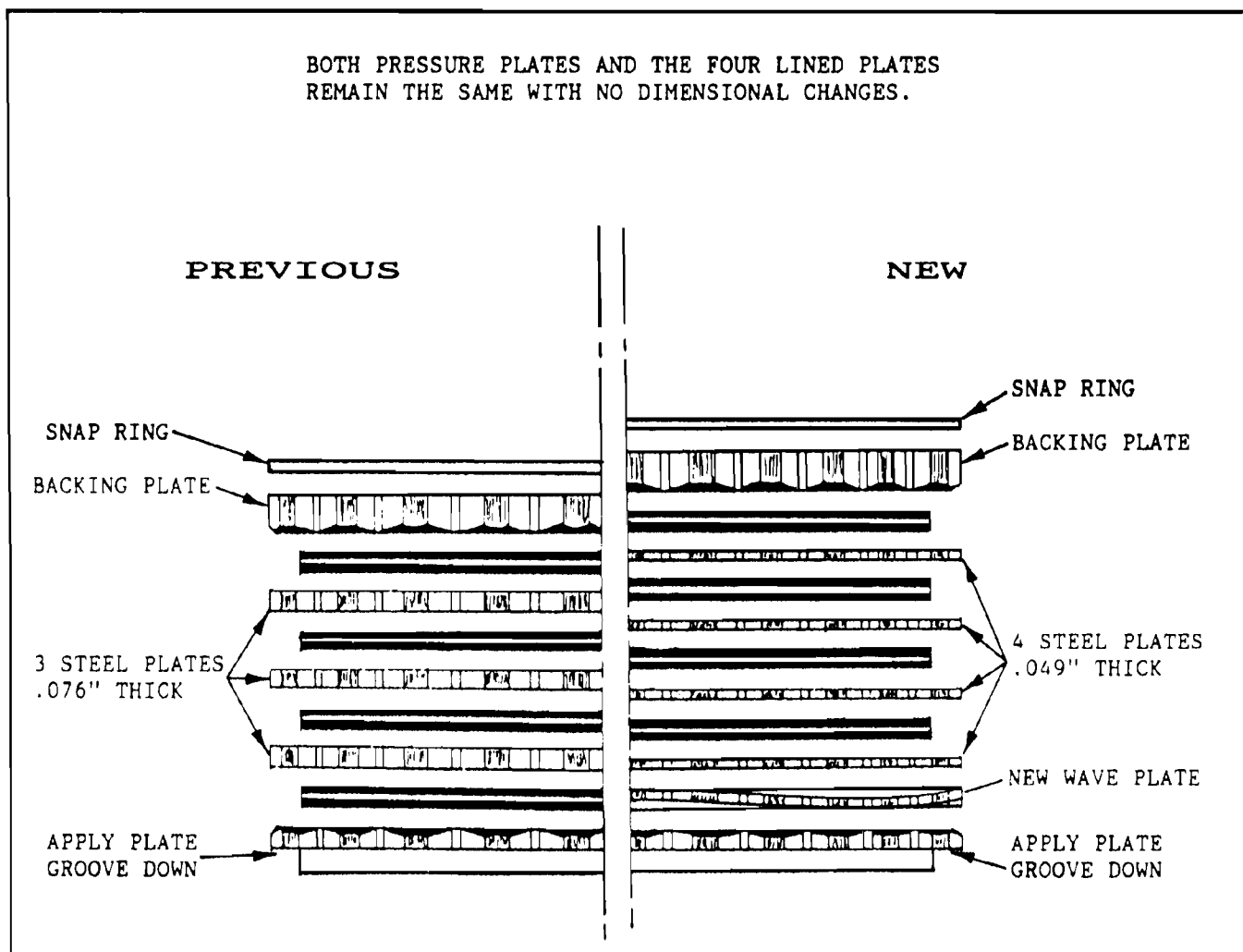


Figure 52

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Technical Service Information

THM 4T60 (440-T4) NEW 2ND CLUTCH HOUSING

CHANGE: There has been a new model 4T60 (440-T4) introduced for the 1991 "W" car, 1WWH, that has a new 2nd clutch housing with a new "Moulded" 2nd clutch piston and seal assembly.

REASON: Improved 2nd clutch durability.

PARTS AFFECTED:

- (1) 2ND CLUTCH HOUSING - Snap ring grooves moved and revised clutch stack up, along with dimensional changes on the center journal area so as to accomodate the new moulded piston and seal assembly (See Figure 53).
- (2) 2ND CLUTCH PISTON - Now has moulded seal assembly on the piston (See Figure 53).
- (3) APPLY RING AND RETURN SPRING ASSEMBLY - Revised dimensions to accomodate the new moulded piston assembly, and the revised clutch stack-up. (See Figure 53).
- (4) REVISED CLUTCH STACK - Includes a new "Apply" plate in the stack-up and one less "Koline" steel plate (See Figures 53 and 55).

INTERCHANGEABILITY:

WILL NOT interchange with previous models because the new 2nd clutch assembly requires a different calibration (Valve Body and Spacer Plate).

SERVICE INFORMATION:

2nd Clutch Housing and Bushing Assembly	8651919
Moulded 2nd Clutch Piston Assembly	8676387-8678494
Apply Ring and Return Spring Assembly	8675319
Tapered Apply Plate	8675227
Spacer Plate Assembly (Model 1WWH)	8677626
Valve Body Assembly (Model 1WWH)	8677629

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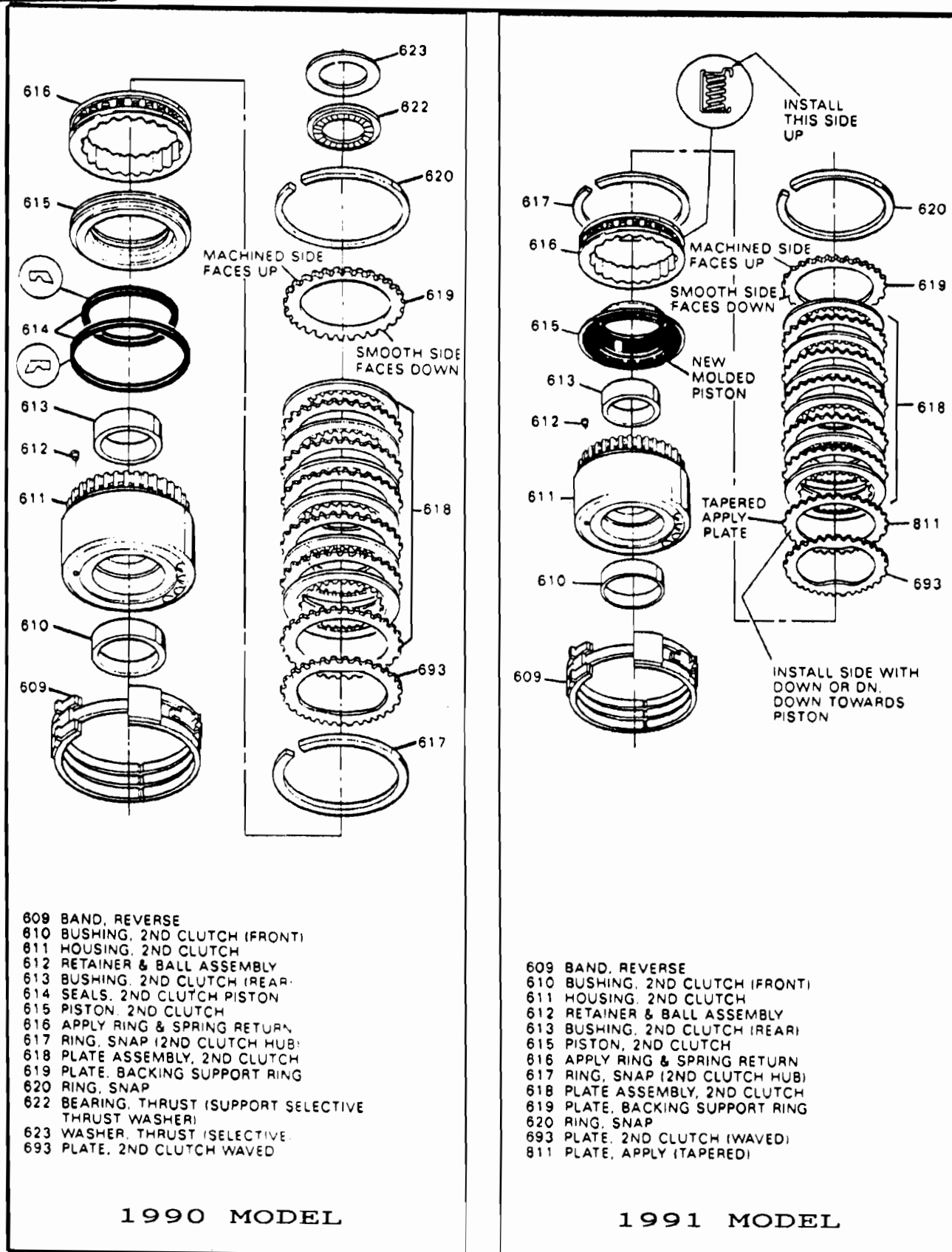


Figure 53

Technical Service Information

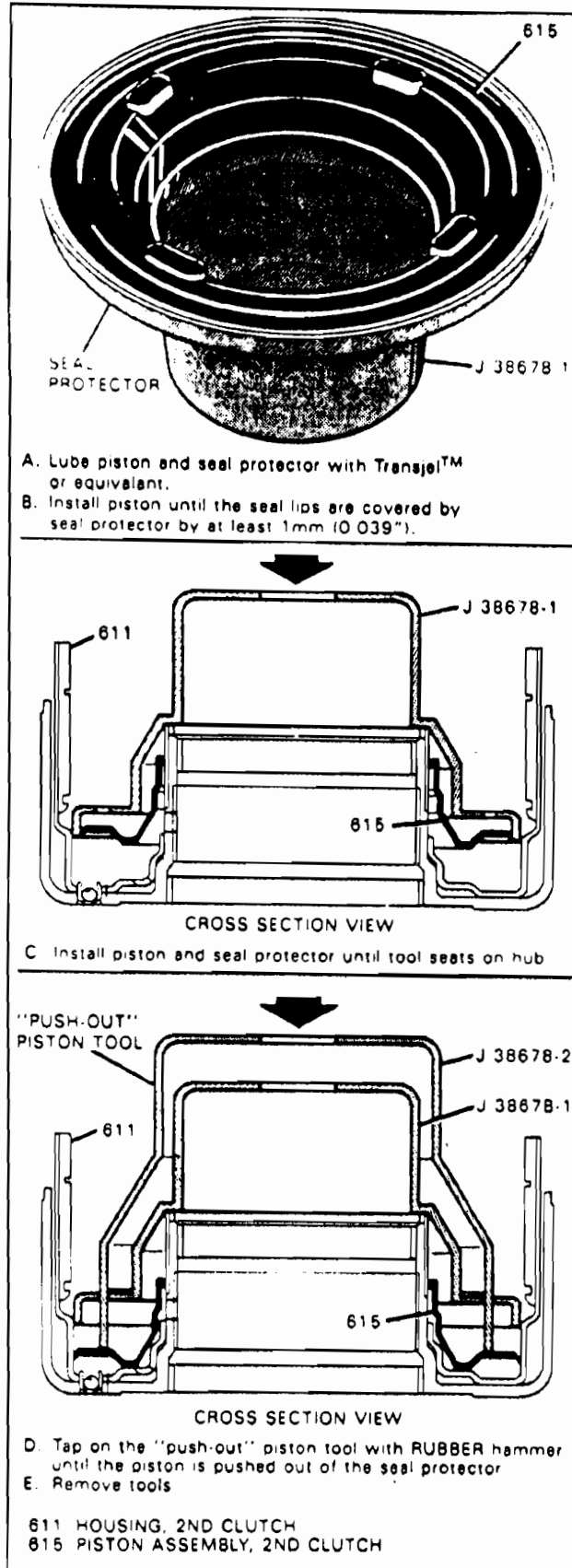


Figure 54

AUTOMATIC TRANSMISSION SERVICE GROUP

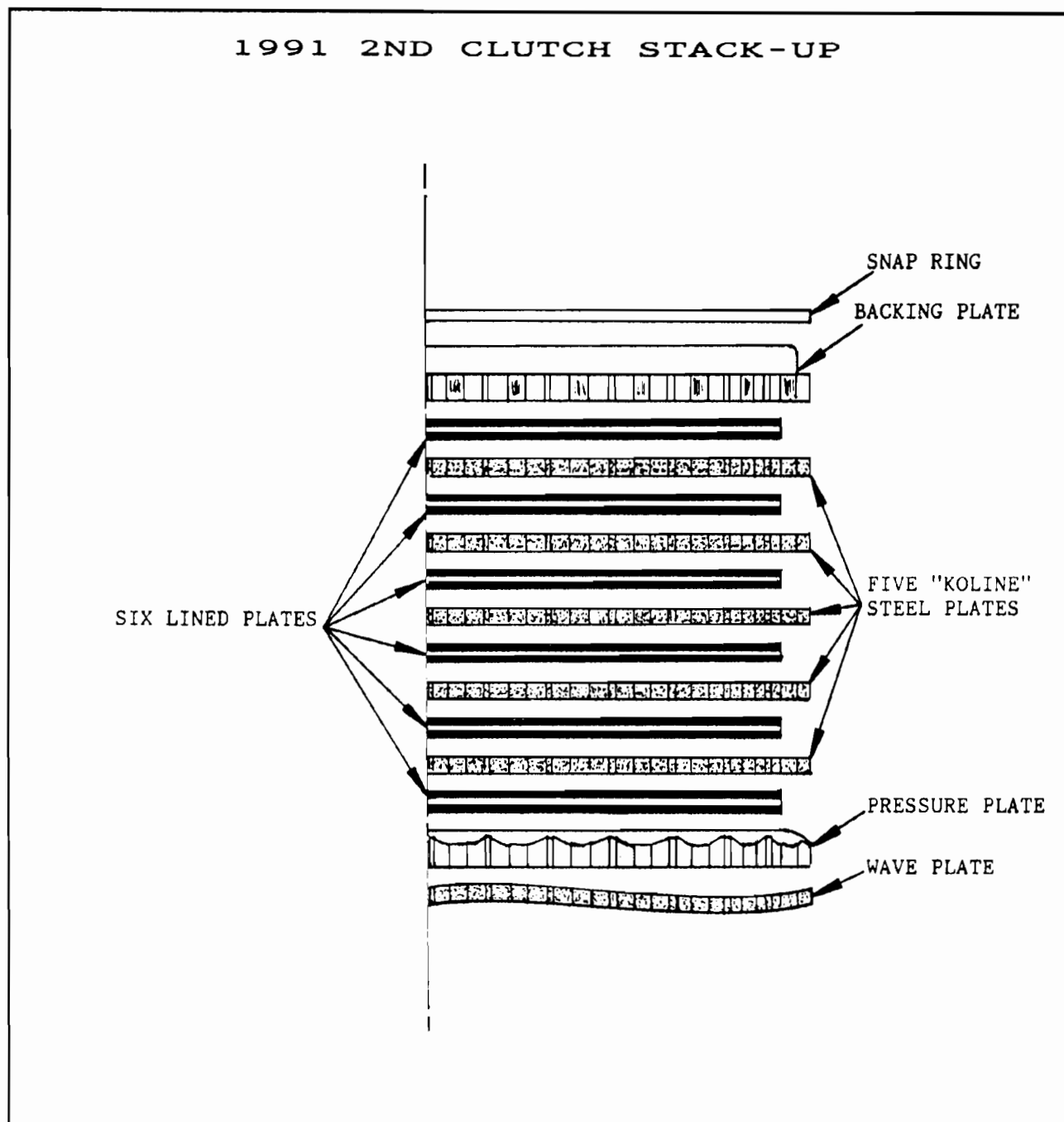


Figure 55



Technical Service Information

THM 4T60 (440-T4)

NEW 1-2 AND REVERSE BANDS NO SELECTIVE BAND APPLY PINS REQUIRED

CHANGE: Beginning July 2, 1990 (Julian Date 183) all 1991 THM 4T60 (440-T4) transaxles will be built with the new 1-2 and reverse bands, that require no selective apply pins.

REASON: Ease of assembly, because of the elimination of the process for the measurement for the selective pins.

PARTS AFFECTED:

- (1) 1-2 BAND ASSEMBLY - A new manufacturing process machines the area where the case anchor pins contact the band (See Figure 56). With this new process, all of the 1-2 bands are the same size, and the selective band apply pins are eliminated.
NOTE: THE 1-2 BAND STOP LOCATED IN THE BARREL OF THE CASE (ON MODELS SO EQUIPPED) MUST BE REMOVED AND DISCARDED WHEN USING THE NEW BAND.
- (2) REVERSE BAND ASSEMBLY - A new manufacturing process machines the area where the case anchor pins contact the band (See Figure 57). With this new process, all of the reverse bands are the same size, and selective band apply pins are eliminated. The new reverse band also has the new friction material to help decrease reverse engagement concerns.
- (3) SELECTIVE BAND PINS - Eliminated, there is now only ONE size band apply pin required for the 1-2 band, and only ONE size band apply pin required for the reverse band (See Figures 56 and 57).

INTERCHANGEABILITY:

The new 1-2 band assembly will retro-fit back to all previous models, with the proper band apply pin installed (See Figure 56).

NOTE: THE 1-2 BAND STOP LOCATED IN THE BARREL OF THE CASE (ON MODELS SO EQUIPPED) MUST BE REMOVED AND DISCARDED WHEN USING THE NEW BAND.

The new reverse band assembly will retro-fit back to all previous models, with the proper band apply pin (See Figure 57), and it also has the new friction material to help decrease reverse engagement concerns.

SERVICE INFORMATION:

1-2 Band Assembly (Non-selective Style)	8675987
1-2 Band Apply Pin (Non-selective Style)	8656540
Reverse Band Assembly (Non-selective Style)	8675986
Reverse Band Apply Pin (Non-selective Style)	8656543

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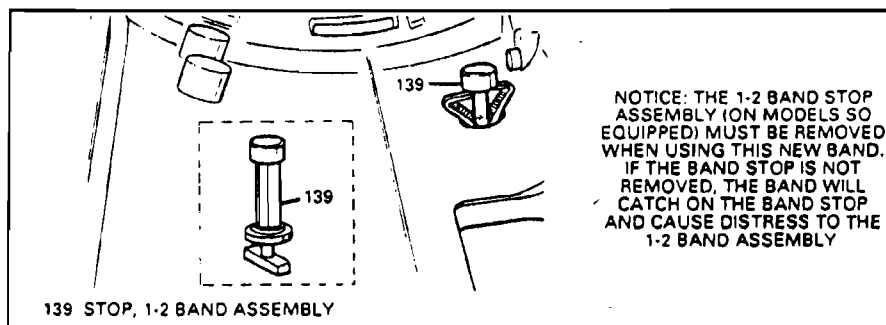
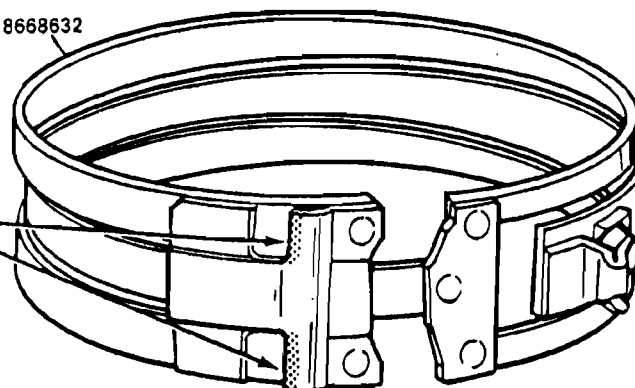
1-2 BAND ASSEMBLY

IDENTIFIER FOR NEW BAND
IS MACHINING IN THE AREA
WHERE THE TWO 1-2 BAND ANCHOR PINS
CONTACT THE BAND

AREA WILL BE BRIGHT BARE METAL

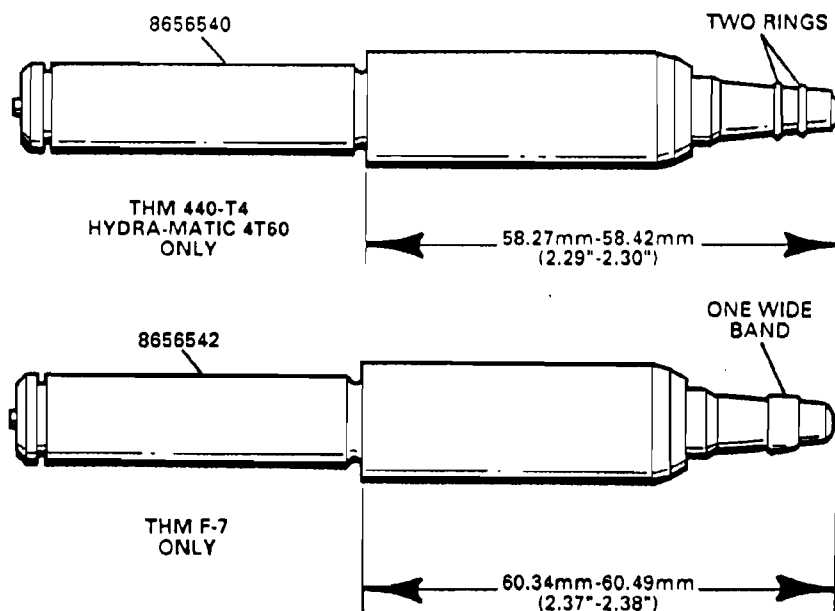
THE MACHINING
MAKES ALL THE BANDS
THE SAME SIZE
NO SELECTIVE PINS
REQUIRED

8668632



NOTICE: THE 1-2 BAND STOP
ASSEMBLY (ON MODELS SO
EQUIPPED) MUST BE REMOVED
WHEN USING THIS NEW BAND.
IF THE BAND STOP IS NOT
REMOVED, THE BAND WILL
CATCH ON THE BAND STOP
AND CAUSE DISTRESS TO THE
1-2 BAND ASSEMBLY

USE ONE OF THE FOLLOWING BAND APPLY PINS
WITH THE NEW BAND
DEPENDENT ON
TRANSAXLE

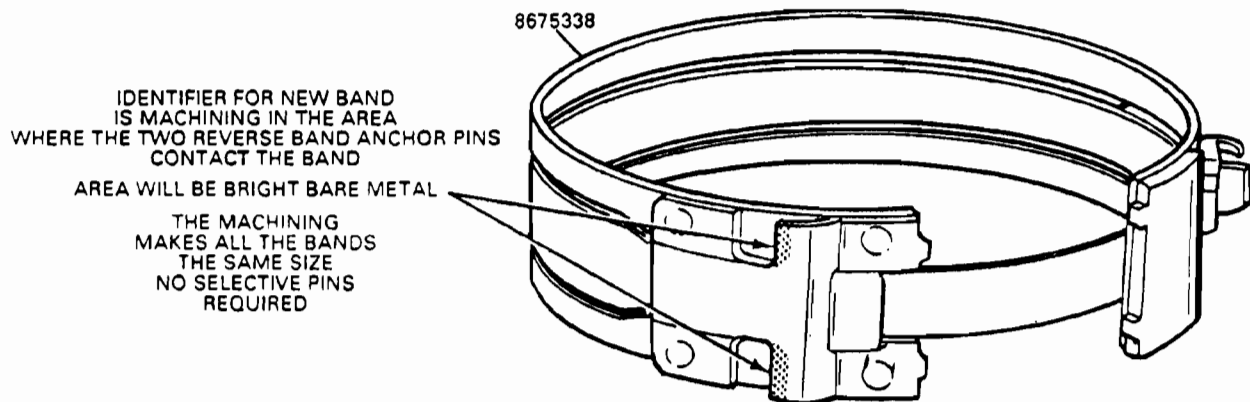


IMPORTANT:
THE BAND APPLY PINS SHOWN ABOVE
WILL BE THE ONLY PINS
THAT WILL BE REQUIRED
FOR THE ENTIRE NORMAL SERVICE LIFE
OF THE BAND

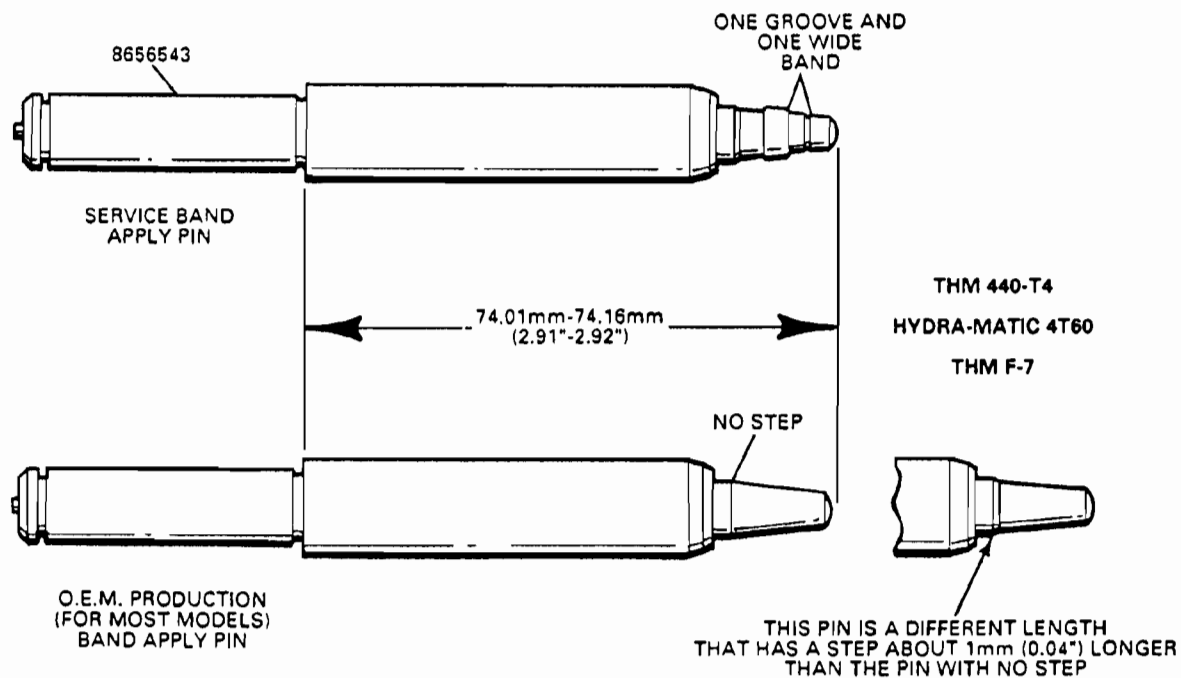
Figure 56

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REVERSE BAND ASSEMBLY



USE ONE OF THE FOLLOWING BAND APPLY PINS WITH THE NEW BAND



IMPORTANT:
THE BAND APPLY PINS SHOWN ABOVE
WILL BE THE ONLY PINS
THAT WILL BE REQUIRED
FOR THE ENTIRE NORMAL SERVICE LIFE
OF THE BAND

Figure 57

AUTOMATIC TRANSMISSION SERVICE GROUP



THM 4T60-E

PRELIMINARY INFORMATION

The THM 4T60-E is a fully automatic, electronic controlled, four speed front wheel drive transaxle. The 4T60-E was first introduced for the 1991 model year, and is currently found in Cadillac Eldorado, Seville, Deville, Limosines. Also found in Buick Riviera, Park Avenue, Electra, and Reatta - Oldsmobile Toronado, Olds "98" - and will be introduced into Chevrolet "W" cars in mid 1991. It will eventually replace all 4T60 (440-T4) transaxles, with complete changeover expected by 1993.

The 4T60-E operation is very similar to the 4T60 (440-T4) operation, with a few minor changes. The 4T60-E has added a 1-2 roller clutch that holds in 1st and 2nd gears, and a 2-1 manual band that is applied in manual D2 and Lo-1st ranges only. The new roller clutch allows the Forward Band (Formerly 1-2 Band) to remain applied in all forward gears. This change eliminates all of the timing problems that were encountered on the 3-2 downshift in the 4T60 (440-T4). The 4T60-E transaxle has a very smooth forced 3-2 downshift. The 2-1 manual band is applied in the D2 and Lo-1st ranges to prevent the 1-2 roller clutch from over-running, and thus provides engine braking in these ranges. Refer to the power flow chart in Figure 58. With the exception of these changes, the mechanical operation is identical to the 4T60 (440-T4) transaxle, so don't let this unit scare you because of the electronic controls.

The 4T60-E transaxle incorporates electronic controls that use the Powertrain Control Module (PCM) to command shift points, and Torque Converter Clutch (TCC) apply and release. Electrical signals from the Vehicle Speed Sensor (VSS) (The Governor is Eliminated), Throttle Position Sensor (TPS) (TV Cable is Eliminated), Coolant Temperature Sensor (CTS), Vacuum Sensor (VS), Park/Neutral Indicator Switch, and Engine Speed Sensor (RPM) are sent to the PCM. Refer to Figure 61 for location of the various sensors. The PCM uses this information to determine the precise moment to energize or de-energize shift solenoid "A" and shift solenoid "B", located inside the transaxle on the valve body (Figure 61), to shift the transaxle into the appropriate gear. Refer to Figure 58 for shift solenoid ON and OFF pattern. The PCM also determines apply or release of the converter clutch, by controlling the TCC solenoid. This type of control provides consistent and precise shift points that is based on the operating characteristics of the vehicle. Shift Solenoid "A", Shift Solenoid "B", and the TCC Solenoid are all "Normally Open" solenoids, and close off the exhaust when energized. All three are exactly alike and will interchange with one another. These three solenoids no longer have the diode incorporated inside the solenoid. The diodes for the two shift solenoids are located inside the PCM, and the diode for the TCC solenoid is located inside the transaxle wiring harness (See Figure 62). The diodes protect the PCM from voltage spikes.

If the PCM detects a trouble code, the PCM will force the transaxle into 3rd gear (Failsafe) for Chevrolet, Pontiac, Oldsmobile, and Buick models, and 2nd gear for all Cadillac models. Cadillac models go to failsafe 2nd gear to protect the Viscous Converter Clutch (VCC) from overheating and causing damage.

If for any reason the entire electronic control system to the transaxle becomes disabled (Example: Unplugged or Blown Fuse), both shift solenoids will be OFF and the transaxle will be in failsafe 3rd gear on "ALL" models including Cadillac. This operating state of the shift solenoids permits the transaxle to operate in

AUTOMATIC TRANSMISSION SERVICE GROUP



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3rd gear only, providing the selector lever is in the Overdrive or D3 range. However, if the selector lever is moved to the D2 Manual Second Range (With Solenoids Disabled) the 2-3 shift valve is "Hydraulically" forced to move, and the transaxle can now operate in the selected gear range regardless of solenoid state.

In Manual 1st gear however, the gear selection is completely electronic for safety and durability reasons. This means that the PCM must electronically command the shift solenoids to be in first gear state in order for Manual 1st gear operation to be achieved.

Notice also that there is a fourth solenoid on the valve body called a Pulse Width Modulated (PWM) Solenoid (See Figure 61). The PWM solenoid receives a ground signal from the Powertrain Control Module (PCM). This ground signal is pulse width modulated (Variable), depending on throttle opening (TPS), and controls the amount of line pressure sent to the back side of the TCC Regulator Valve and thus control converter clutch apply "Feel". This provides for accurate control of the actual value of regulated converter apply pressure. For failure mode considerations the PWM is normally open. This means that when the PWM solenoid is OFF (No Voltage), the PWM supply port is open to the PWM output port. This results in a maximum TCC apply pressure when the PWM is OFF. In the unlikely event that the PWM has failed, or is disconnected, and the TCC enable solenoid is still operated, the TCC/VCC will be applied with maximum pressure.

The Pulse Width Modulated (PWM) Solenoid "WILL NOT" be used on Chevrolet engine models (See Figure 60), so they will use the normal TCC accumulator system that is in the current 4T60 (440-T4). Currently, Chevrolet engine models are the only ones scheduled to use the old TCC accumulator system. All other models will use the PWM solenoid system. We have also included wiring schematics for the two different systems. See Figure 59 for Buick and Cadillac models, and Figure 60 for the Chevrolet models. Notice also that the Chevrolet models have a fourth gear switch, and a Lo discrete switch on the pump that the other models do not use.

The hydraulic controls have been greatly simplified in the 4T60-E, as the total number of valves have been reduced from 28 to 14. This was accomplished through the elimination of "Several" valve line-ups to control the very sensitive 2-3/3-2 band to clutch sequencing, as this is now controlled with the new 1-2 roller clutch. With the elimination of the complete governor system, and the complete T.V. system, the valve body complexity was further reduced. There was a 2-3 accumulator added to the hydraulic system. We no longer have a 1-2 servo to release on the 2-3 shift, and this was used as a 2-3 accumulator in the 4T60 (440-T4).

Line pressure is still controlled with a vacuum modulator (Old Reliable), but changes are already in the making, as the 4T60-E is scheduled to get an electronic controlled pressure system, with the addition of a "Force Motor" (Pressure Control Solenoid) sometime in 1992.

Everything considered, it looks like we may finally have a "World Class" transaxle on our hands.



Technical Service Information

4T60-E (F-31) POWER FLOW CHART

	INPUT CLUTCH	SECOND CLUTCH	THIRD CLUTCH	FOURTH CLUTCH	FORWARD BAND	D-2 BAND	REVERSE BAND	INPUT SPRAG	1-2 ROLLER	3RD ROLLER
PARK	*							*		
D4/1ST	ON				ON			HOLD	HOLD	
D4/2ND	ON	ON			ON			O/R	HOLD	
D4/3RD		ON	ON		ON				O/R	HOLD
D4/4TH		ON	ON	ON	ON					O/R
D3/1ST	ON				ON			HOLD	HOLD	
D3/2ND	ON	ON			ON			O/R	HOLD	
D3/3RD	ON	ON	ON		ON				O/R	HOLD
D2/1ST	ON				ON	ON		HOLD	HOLD	
D2/2ND	ON	ON			ON	ON		O/R	HOLD	
LO/1ST	ON		ON		ON	ON		HOLD	HOLD	HOLD
REVERSE	ON						ON	HOLD		

* APPLIED BUT NOT EFFECTIVE

4T60-E (F-31) SOLENOID PATTERN

SHIFT SOLENOID

"A"

SHIFT SOLENOID

"B"

1ST GEAR

ON

ON

2ND GEAR

OFF

ON

3RD GEAR

OFF

OFF

4TH GEAR

ON

OFF

TCC APPLY SOLENOID

THIS SOLENOID CONTROLS THE POSITION OF THE
CONVERTER CLUTCH APPLY VALVE

TCC PWM SOLENOID

THIS SOLENOID CONTROLS
CONVERTER CLUTCH APPLY FEEL

Figure 58

AUTOMATIC TRANSMISSION SERVICE GROUP

**4T60-E BUICK
AND CADILLAC**

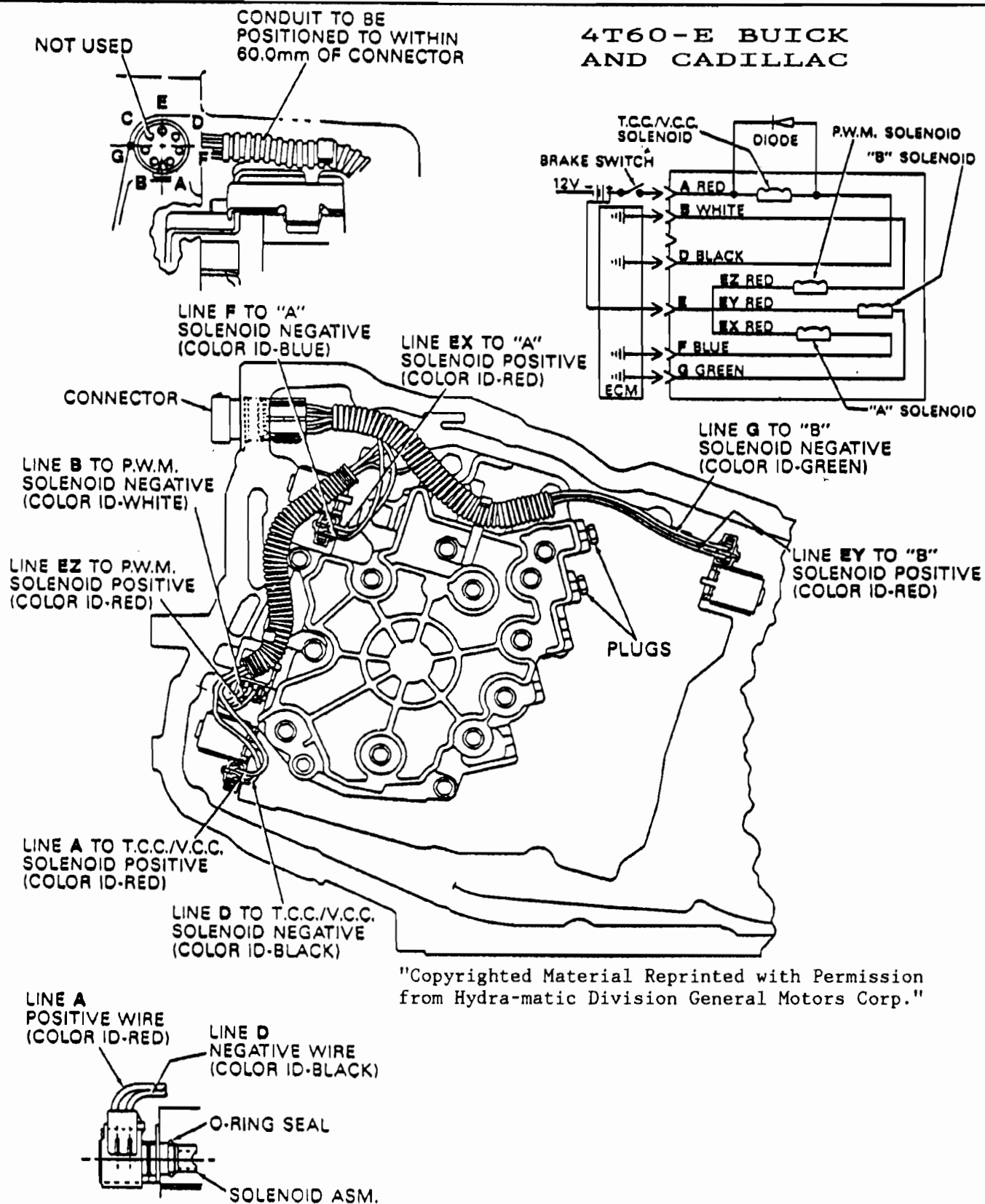


Figure 59

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4T60-E CHEVROLET

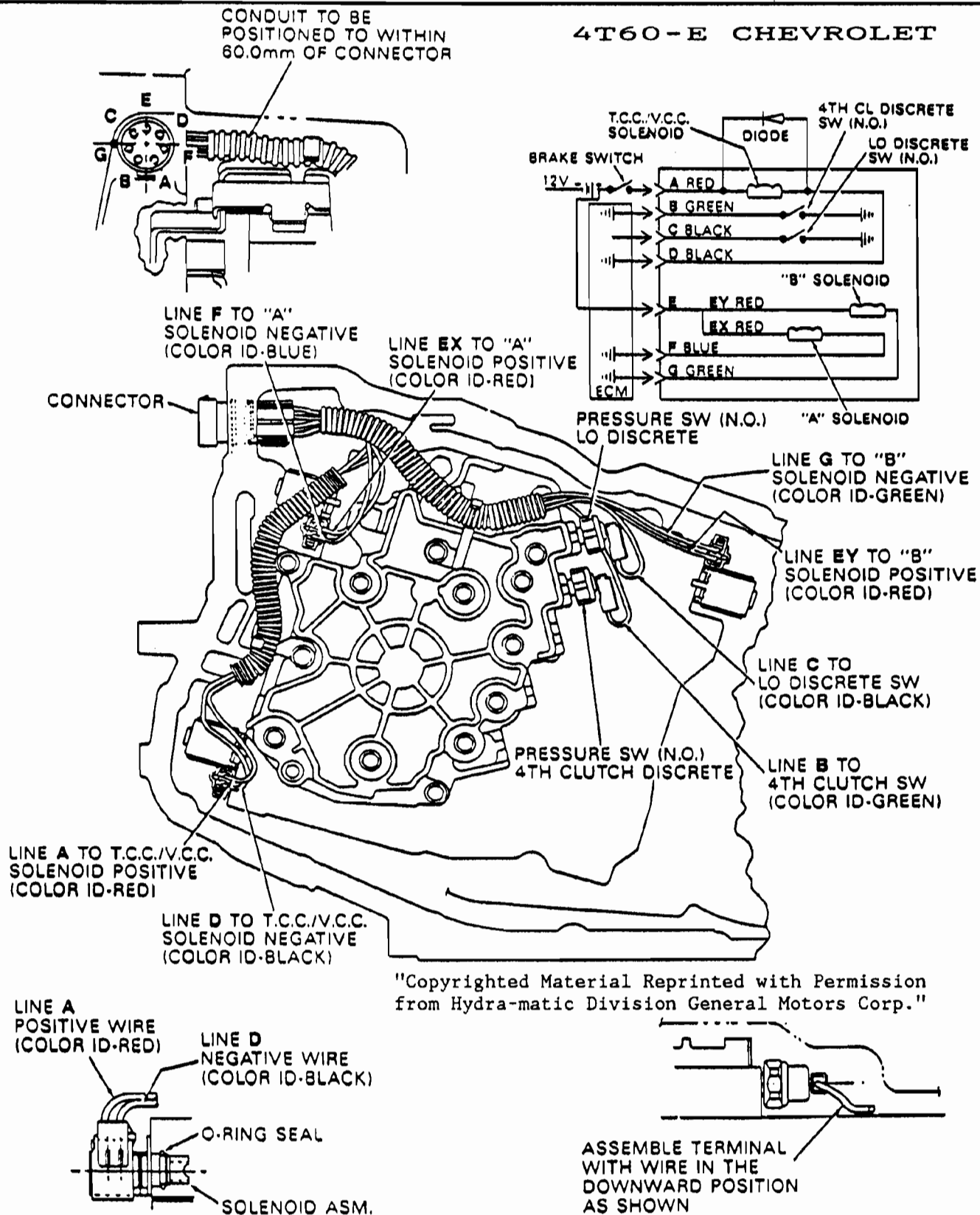


Figure 60

AUTOMATIC TRANSMISSION SERVICE GROUP

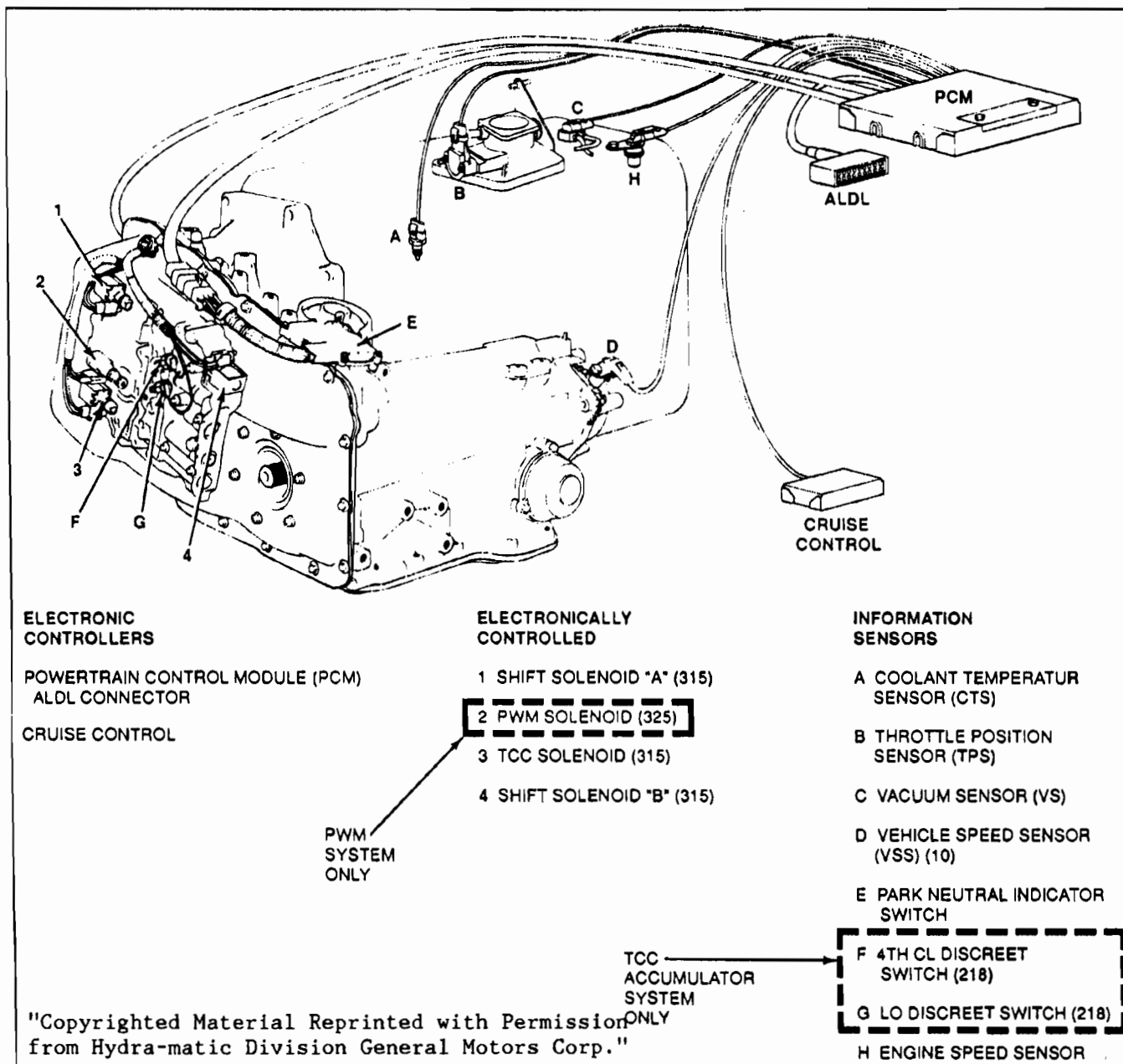


Figure 61

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

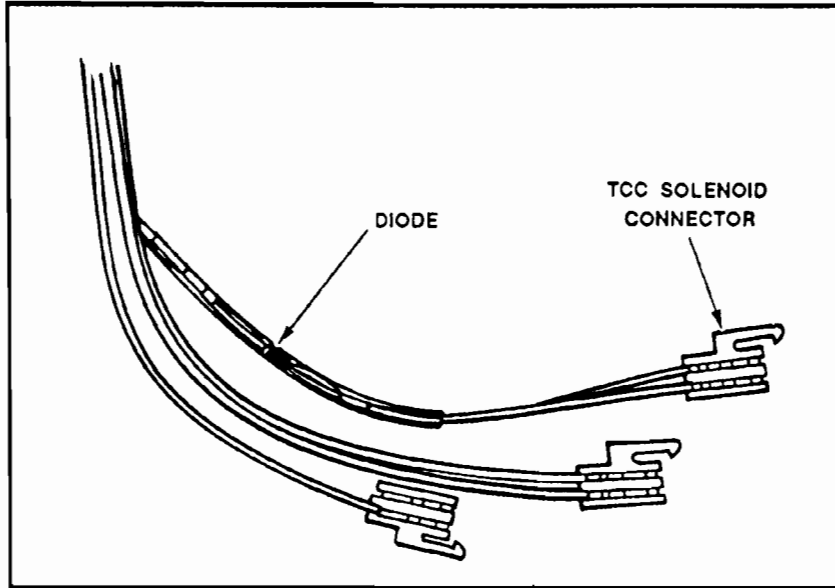


Figure 62



ALL GENERAL MOTORS VEHICLES RAISE CONVERTER CLUTCH APPLY SPEED

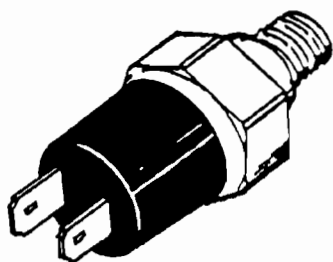
COMPLAINT: Torque Converter Clutch applies at too low vehicle speed, on computer controlled vehicles only.

CAUSE: Computer Calibration.

CORRECTION: There is now available from most aftermarket sources, a two prong, normally open (NO) switch, that completes from terminal to terminal when it closes, and it closes at 40-45 PSI (See Figure 63).

This switch when installed in the governor pressure port, in series with the "D" wire (Computer Ground Signal), will raise the lock-up speed to approximately 45 MPH, and you will still have capability to release TCC with the throttle position sensor.

We have shown it here in a I25C (See Figure 64), both internal and external application, but it can be used in any G.M. vehicle that gives you access to governor pressure.



CHECK WITH YOUR SUPPLIER
FOR THEIR PART NUMBER.

Figure 63

NOTE: W
OF
A
P

TO
TERMINAL
"A"

TO
TERMINAL
"D"

NOTE: WILL WORK ON 82-86 MODELS
ONLY WHEN USED INTERNALLY
AS THIS PORT IS NOT GOV.
PRESSURE ON 1987 - UP.

CUT THE "D" WIRE ABOUT SIX INCHES
BACK FROM CASE CONNECTOR AND RUN
WIRES TO THE SWITCH.

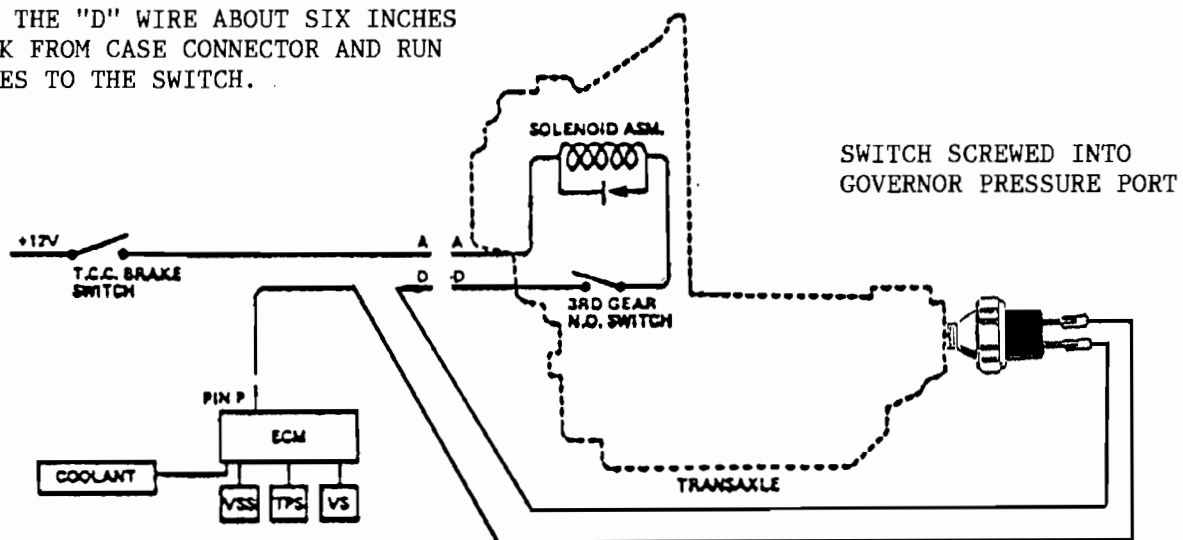


Figure 64

AUTOMATIC TRANSMISSION SERVICE GROUP



THM 125C (3T40) CONVERTER CLUTCH SHUDDER 1982 - 1986 MODELS ONLY

COMPLAINT: Converter clutch shudders during the application.

CAUSE: One cause may be low converter charge pressure. Another cause may be slow drain of converter release oil from the front side of the converter clutch piston.

CORRECTION: Install a stronger converter clutch regulator valve spring, OEM part number 8637887, or use a return spring from a 700 reverse input housing return spring assembly. Also drill the converter clutch exhaust hole in the spacer plate to .080". Refer to Figures 65 and 66.

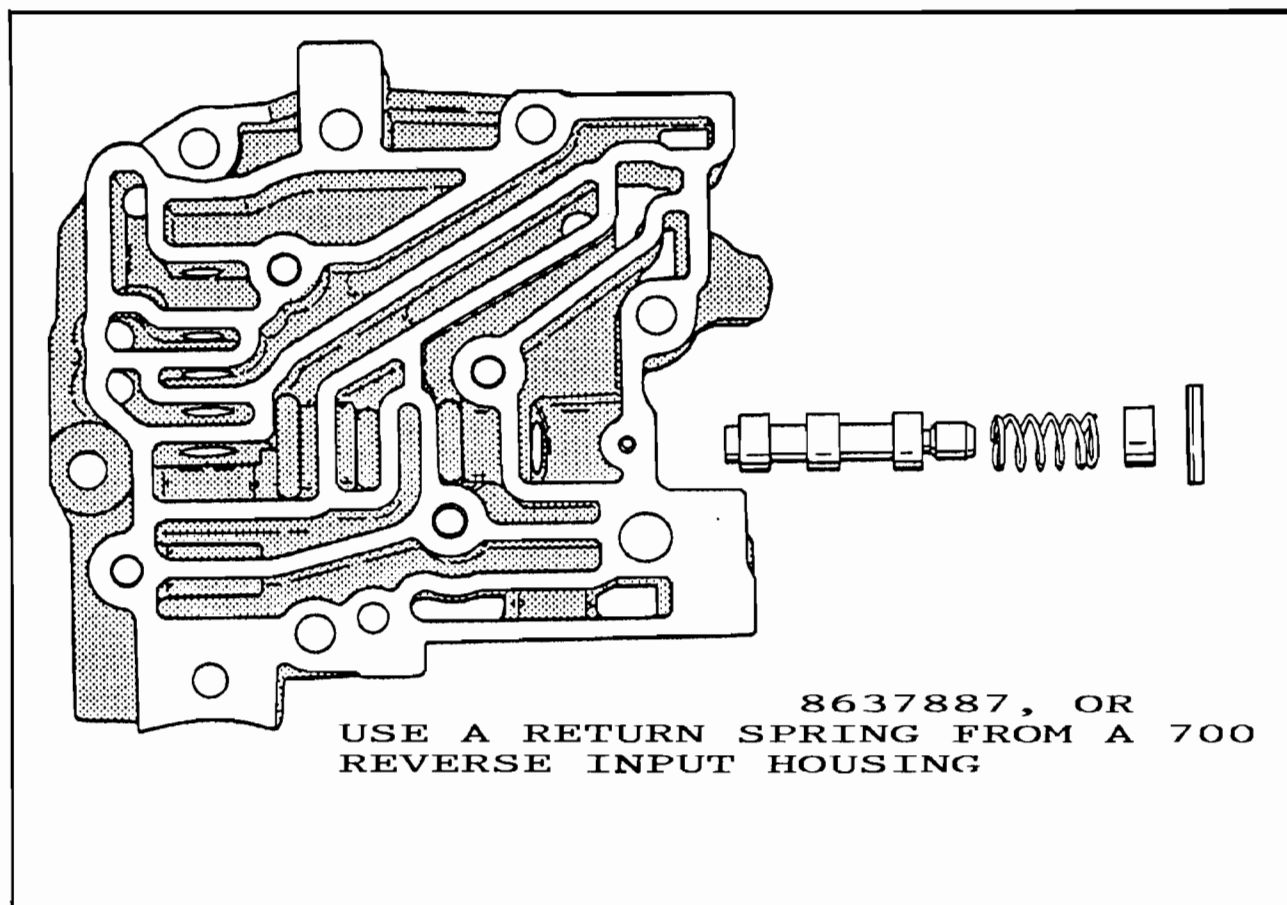


Figure 65

THM 125C (3T40)
1982 - 1986 MODELS ONLY

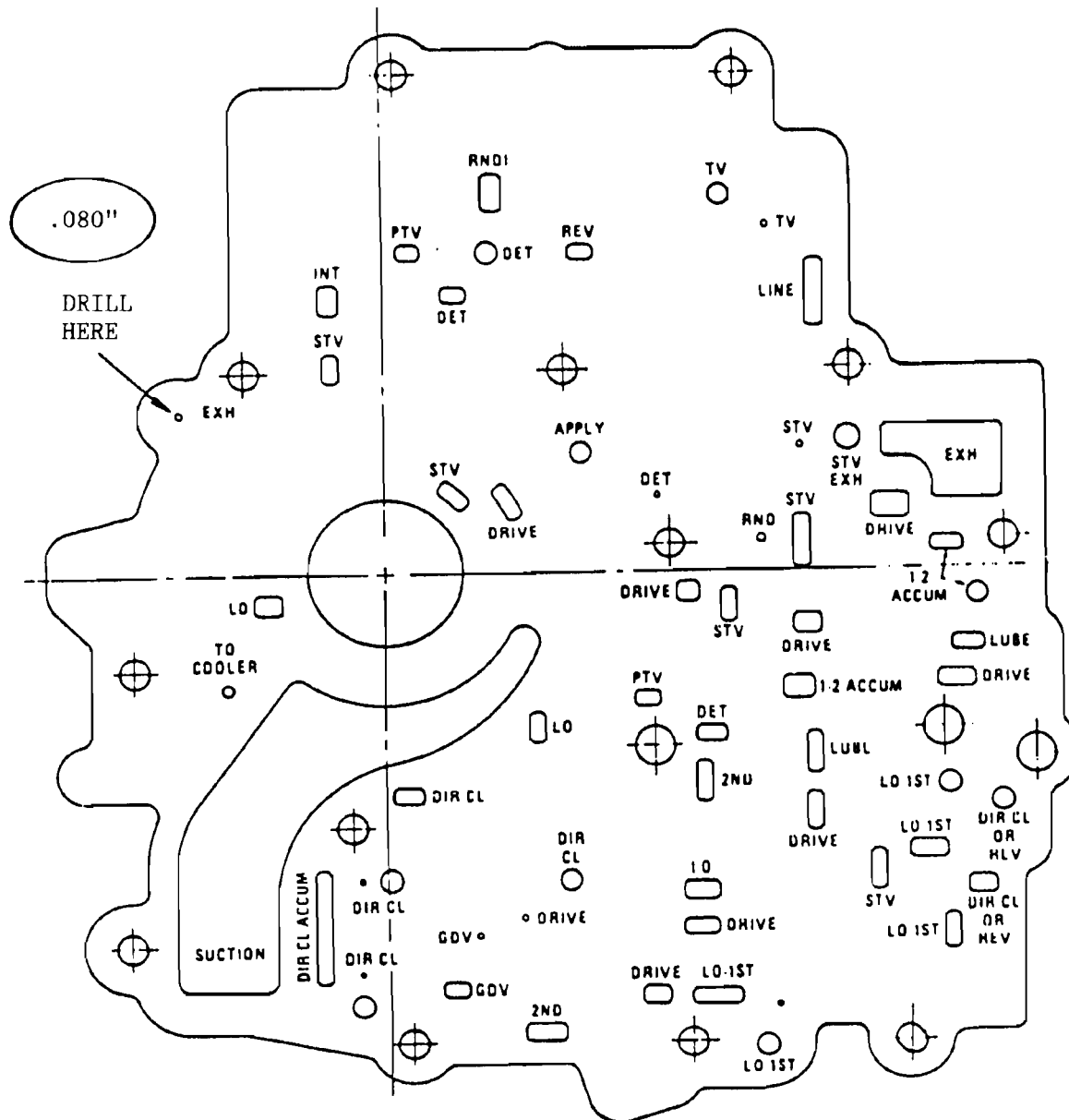


Figure 66

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 125C (3T40) CONVERTER CLUTCH SHUDDER 1987 OR LATER ONLY

COMPLAINT: Converter clutch apply shudder, only on 1987 or later,
THM 125C (3T40) Transaxles.

CAUSE: Not enough converter clutch apply oil.

CORRECTION: Install the 1988 (KDC) auxilliary valve body gasket with the
large hole (See Figure 67, or modify the 1987 gasket with the
small hole, by cutting on the dotted line (See Figure 67).

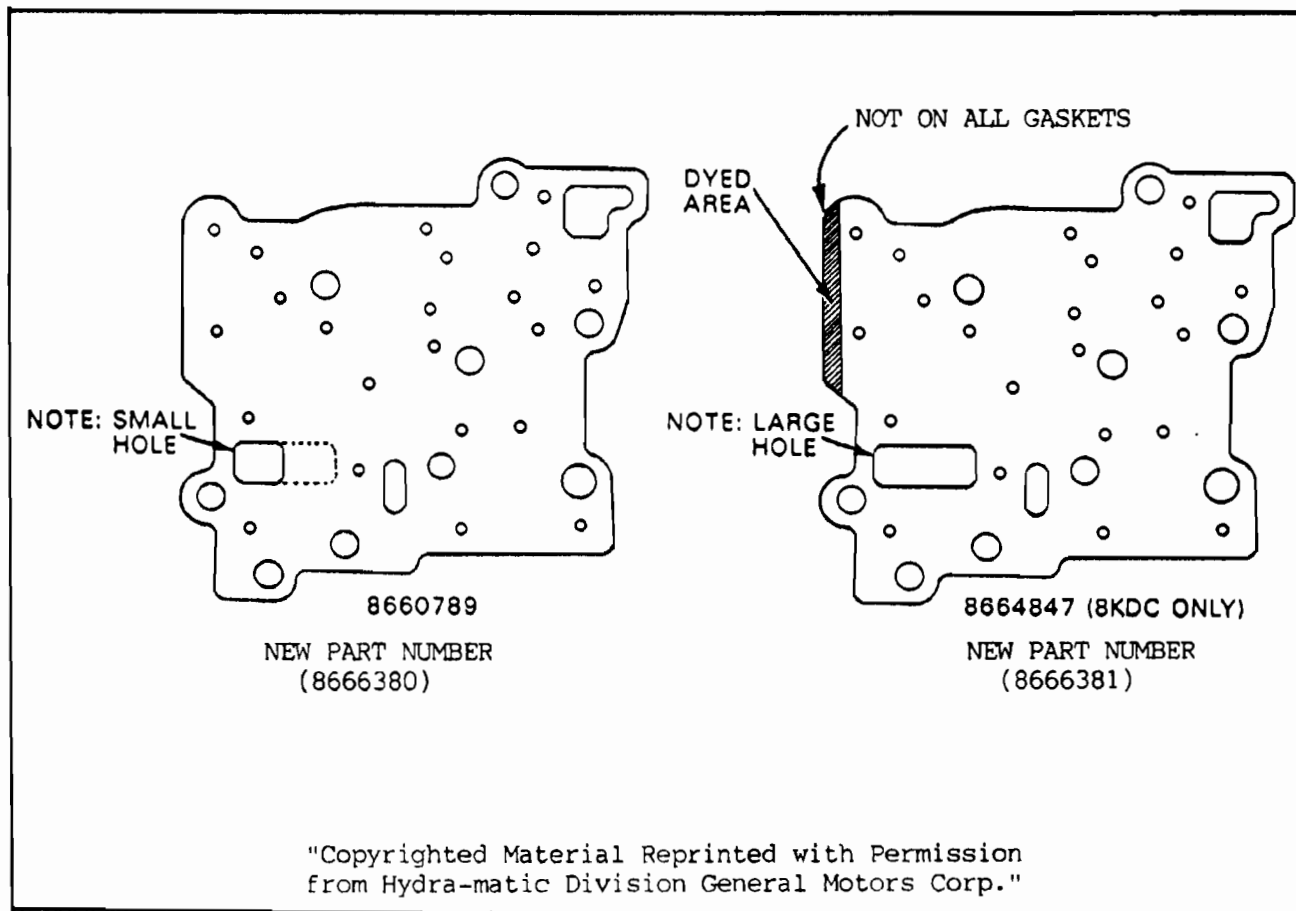


Figure 67

AUTOMATIC TRANSMISSION SERVICE GROUP

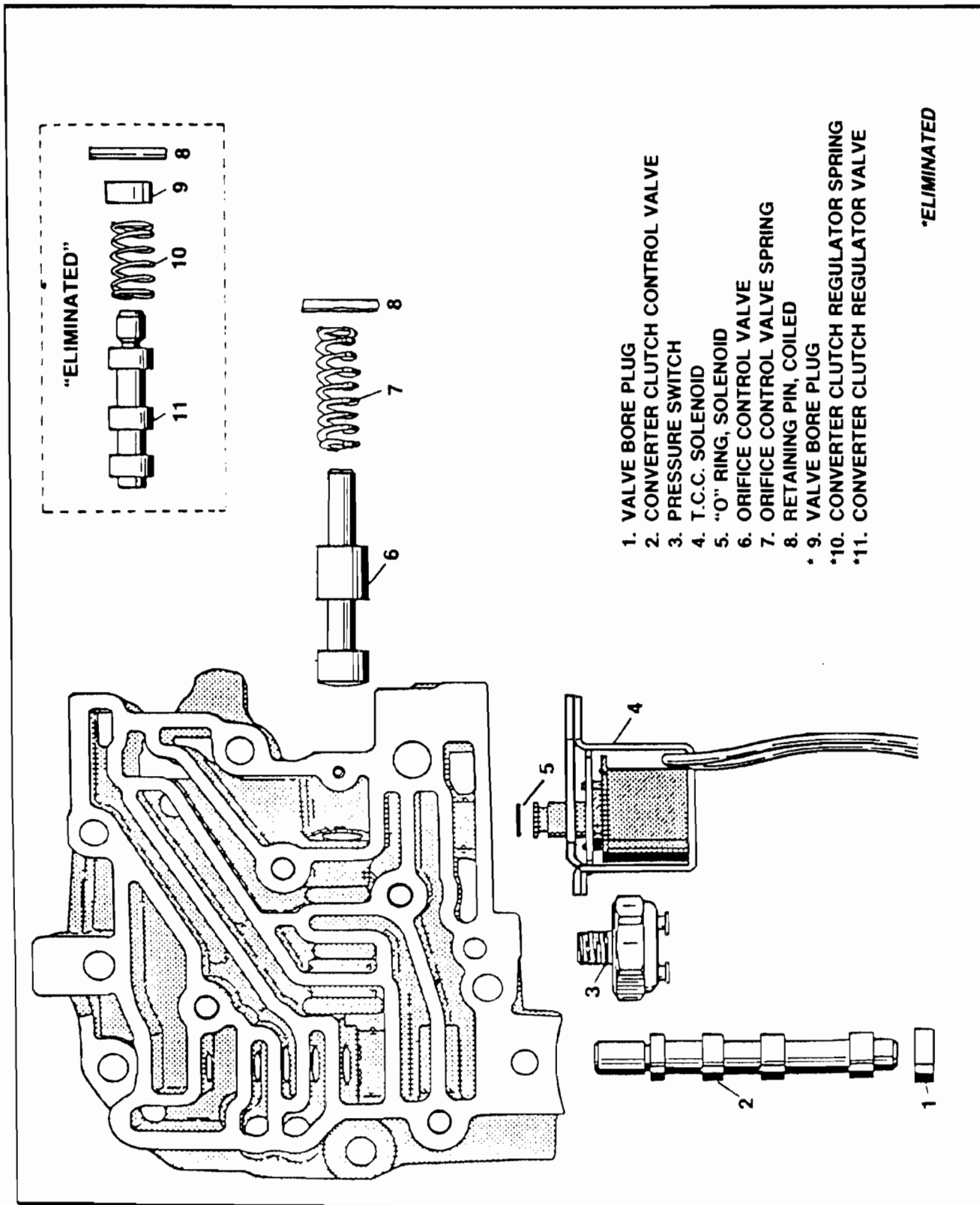


Figure 68

200-4R

NO SECOND GEAR - NO CONVERTER CLUTCH

A condition of no converter clutch apply, or no second gear, may result from mismatch of valve bodies & separator plates. An early plate installed on a late valve body may result in no converter clutch apply. A late plate installed on a early valve body may result in no second gear condition. Refer to figure 69 to identify the the separator plates.

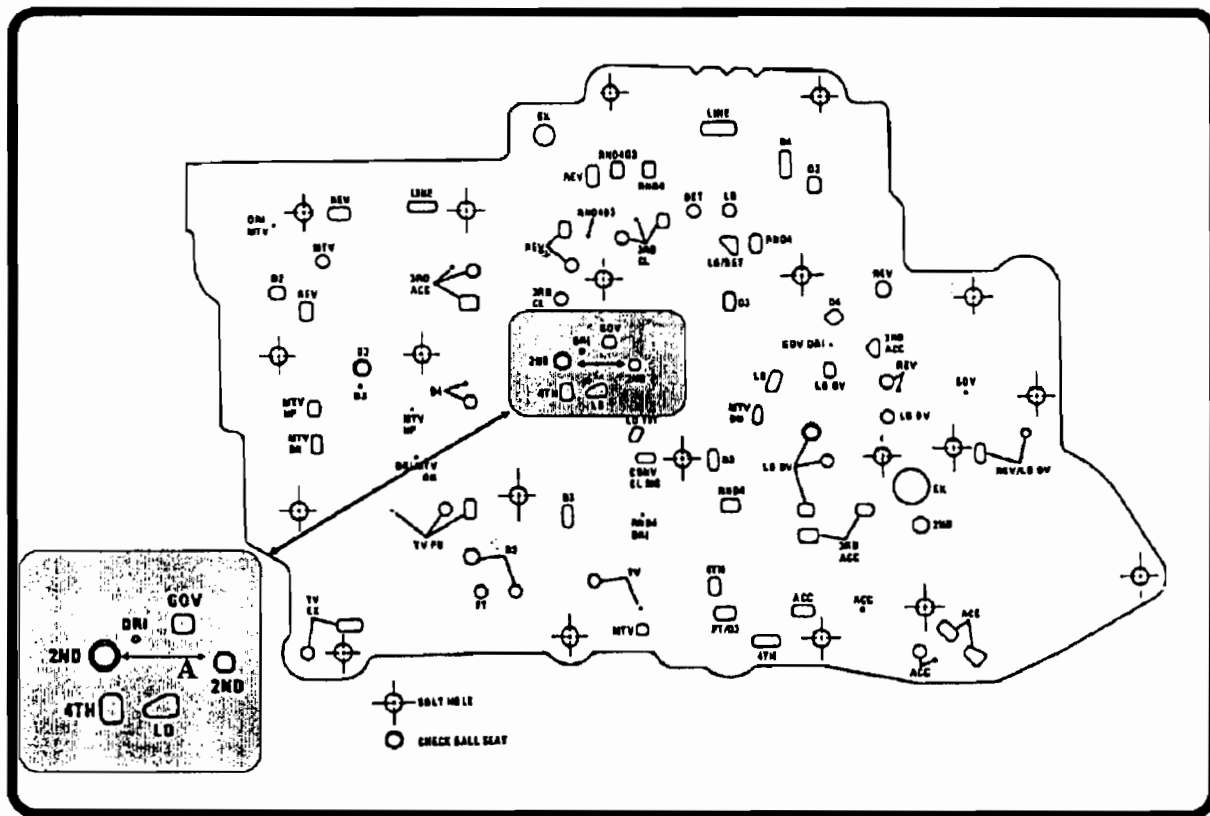


FIGURE 69

Measure Dimension "A", As Shown By Arrows.
 IF DIMENSION "A" IS : APPROXIMATELY 3/4" = EARLY PLATE
 IF DIMENSION "A" IS : APPROXIMATELY 1-1/8" = LATE PLATE

200-4R

VALVE BODY IDENTIFICATION

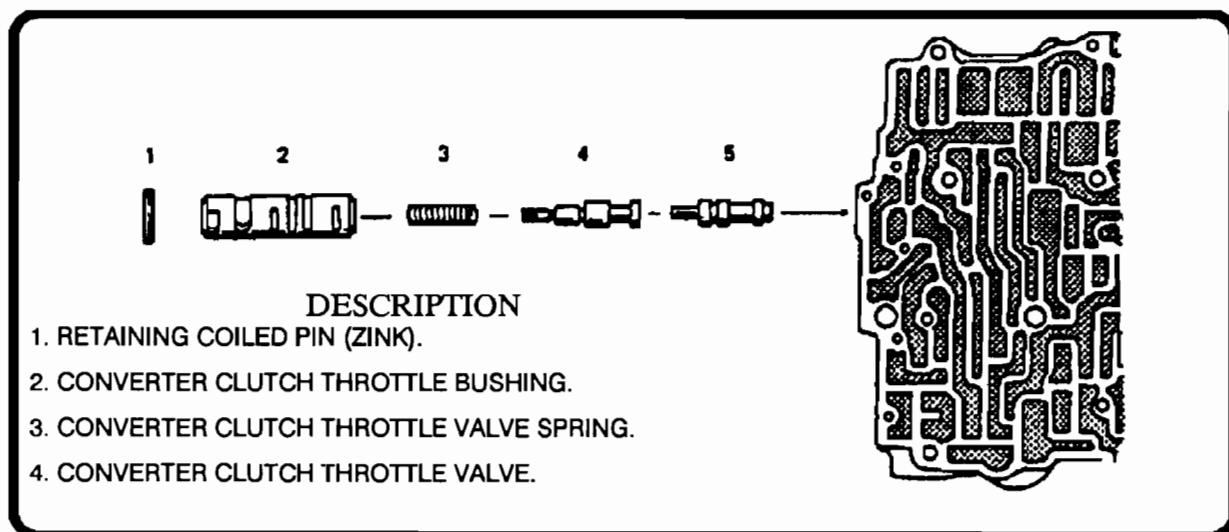


FIGURE 70 (EARLY DESIGN)

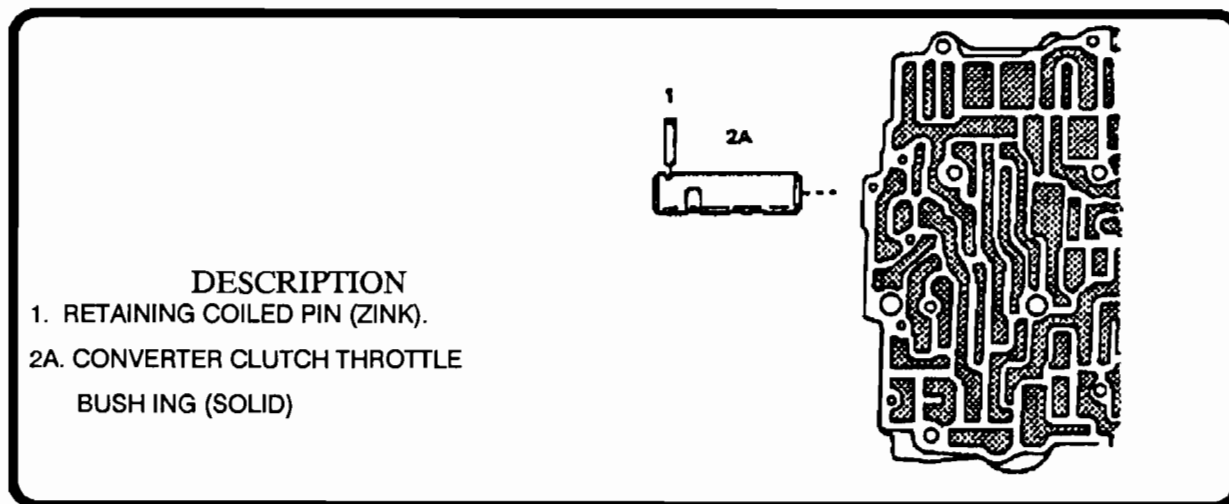


FIGURE 71 (LATE DESIGN)

If valve body has a converter clutch valve line up (FIGURE 70) it is an early valve body and must be used with an early plate.

If valve body has a plug in the converter clutch valve line up (FIGURE 71) it is a late valve body and must be used with a late plate.



THM 400 (3L80) COMPUTER CONTROLLED KICKDOWN

Beginning in the 1987 model year, on light duty trucks equipped with the THM 400 transmission, the detent or kickdown solenoid is activated by the ECM instead of the familiar switch on the accelerator pedal. Refer to Figure 1 for the new circuit wiring schematics.

There are three relays mounted on one panel, under a plastic cover, and located by the right hand fender well. One of these relays will be the Downshift Control Relay, and is energized with a ground signal from the ECM. The ground signal from the ECM is based upon Throttle Position Sensor, Vehicle Speed Sensor, and MAP (Manifold Absolute Pressure) Sensor Information. Remember that the signal to the detent solenoid is a 12-Volt lead. That is why the Downshift Control Relay is needed in this circuit, as the relay allows 12-Volts to go to the detent solenoid, causing a hydraulic downshift. Identification of the Downshift Control Relay is best done by checking the color code of the wire going down to the transmission, as the location of the relay on the panel will vary from model to model. Refer to Figure 72 for the wiring schematics.

NOTE: One the THM 400 equipped vehicles, mistakenly had THM 700 computers installed in them straight from the factory. This will create a complaint of "Falls out of 3rd gear, - After Warm". This occurs because the temperature sensor signals ECM that the engine is up to operating temperature. Then when it is time for the converter clutch application (700 Computer) the ECM sends a ground signal to the Downshift Relay and creates a 3-2 downshift.



THM 400 (3L80) WIRING SCHEMATICS

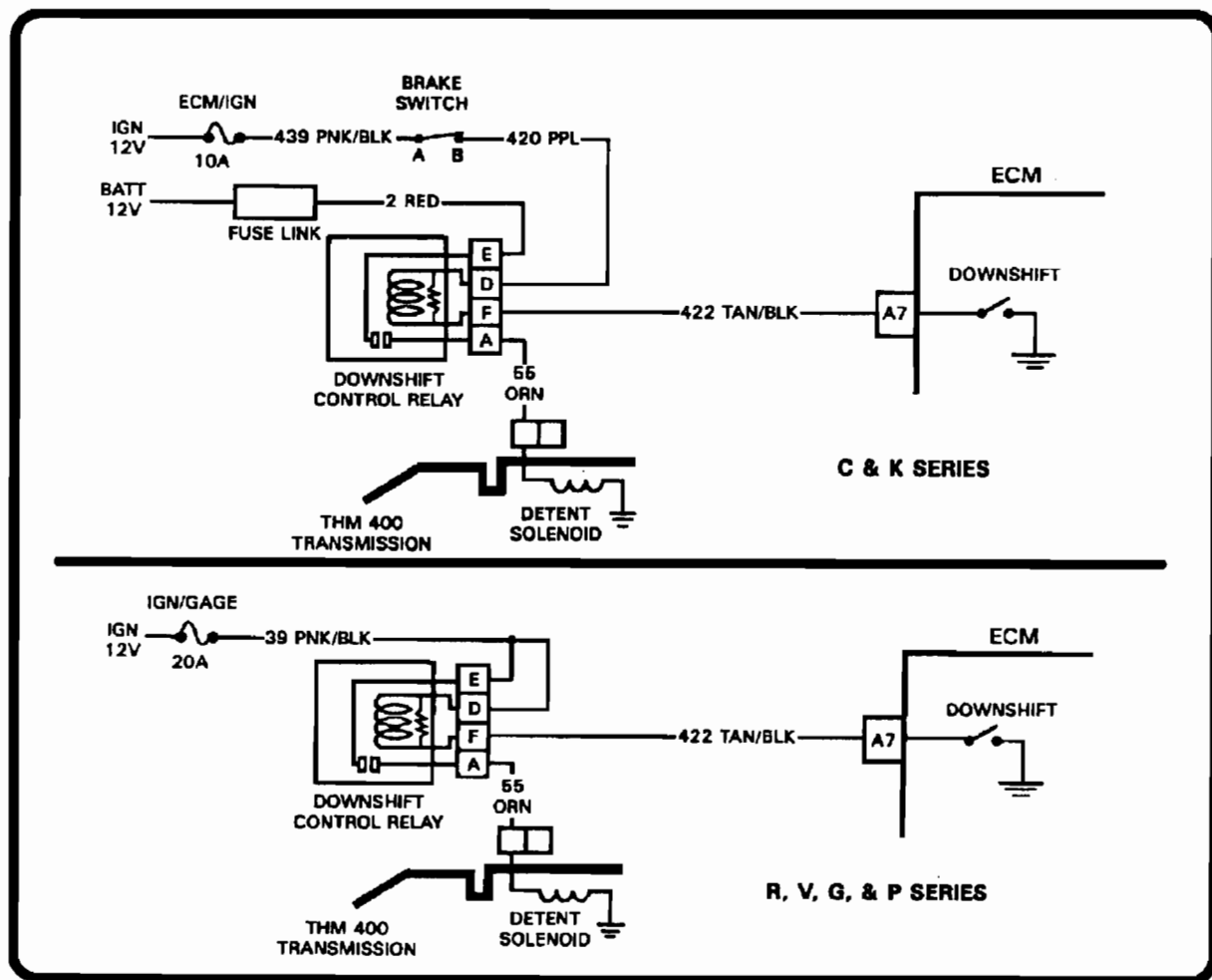


FIGURE 72

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 74.
- (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 73.
- (5) INSTALL PIECE OF RUBBER HOSE IN
PLACE OF SPRING AND INSTALL BORE
PLUG AND PIN. SEE FIGURE 73.
- (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).

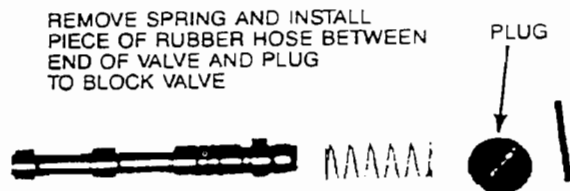
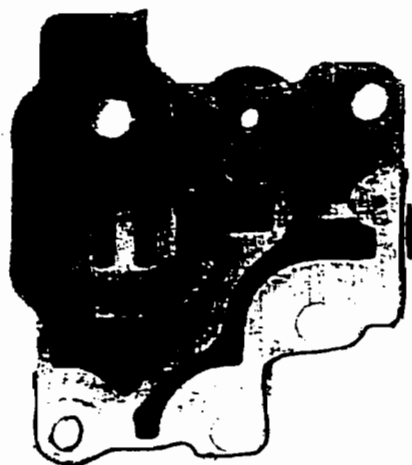


Figure 73

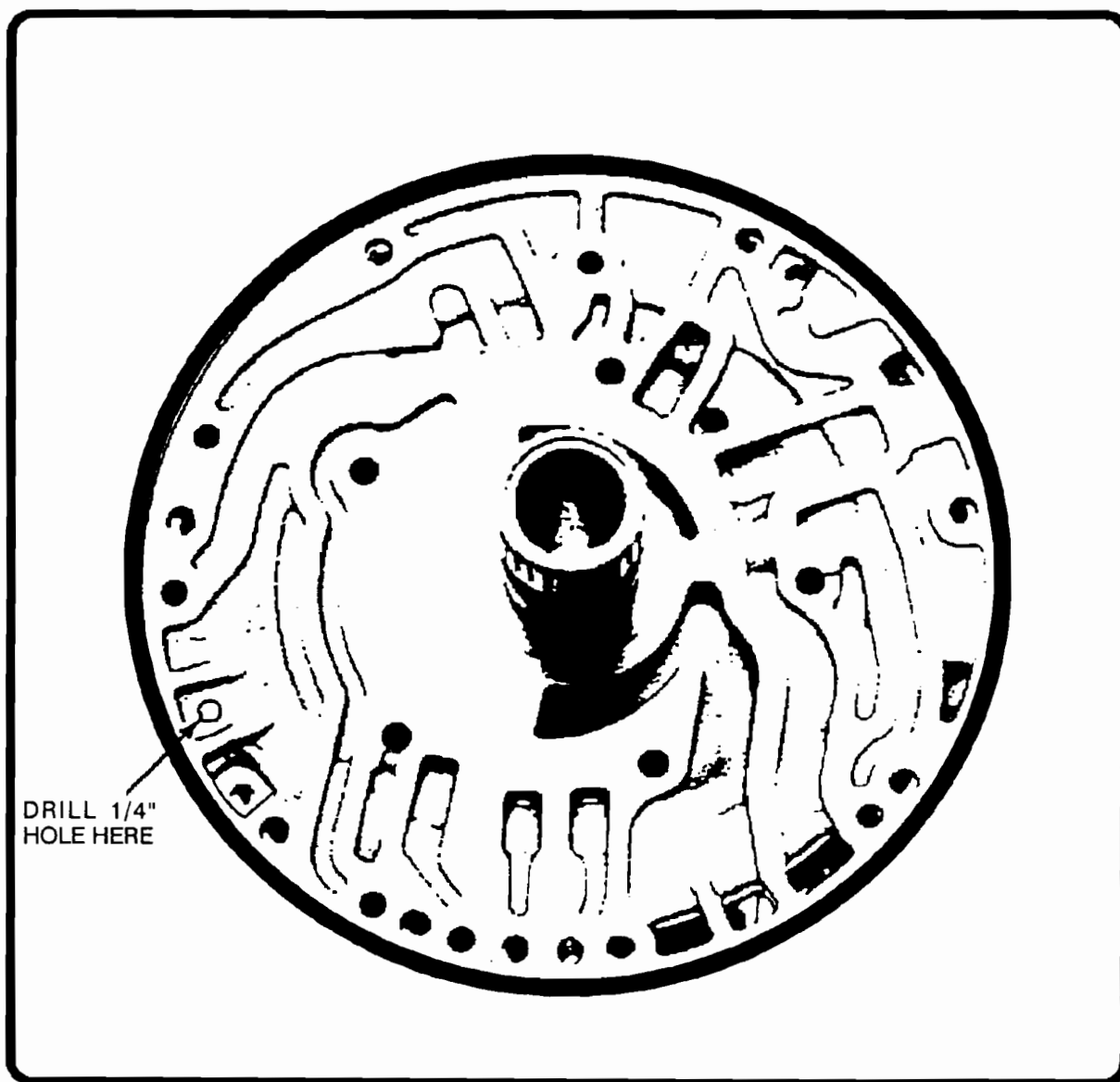
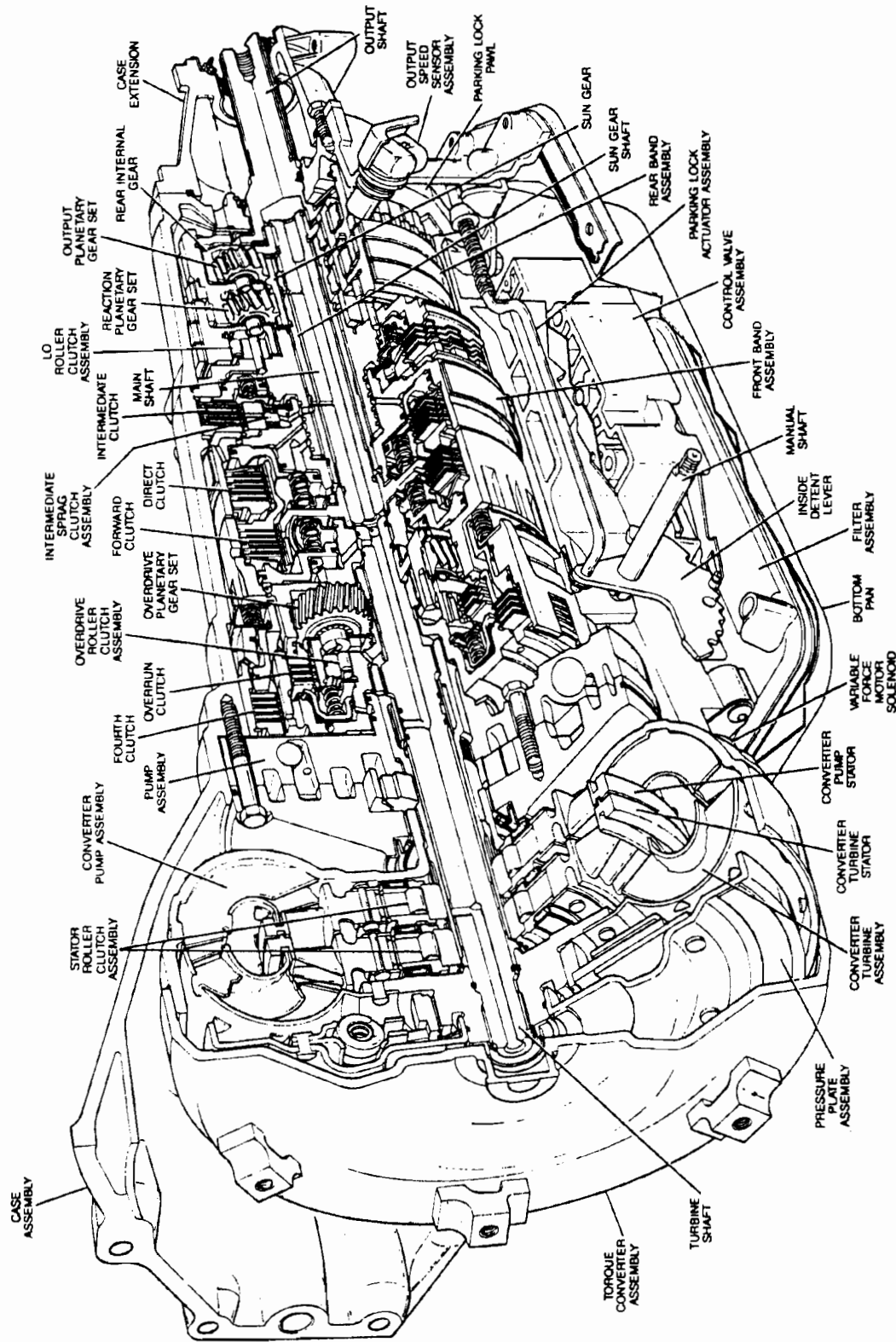


Figure 74

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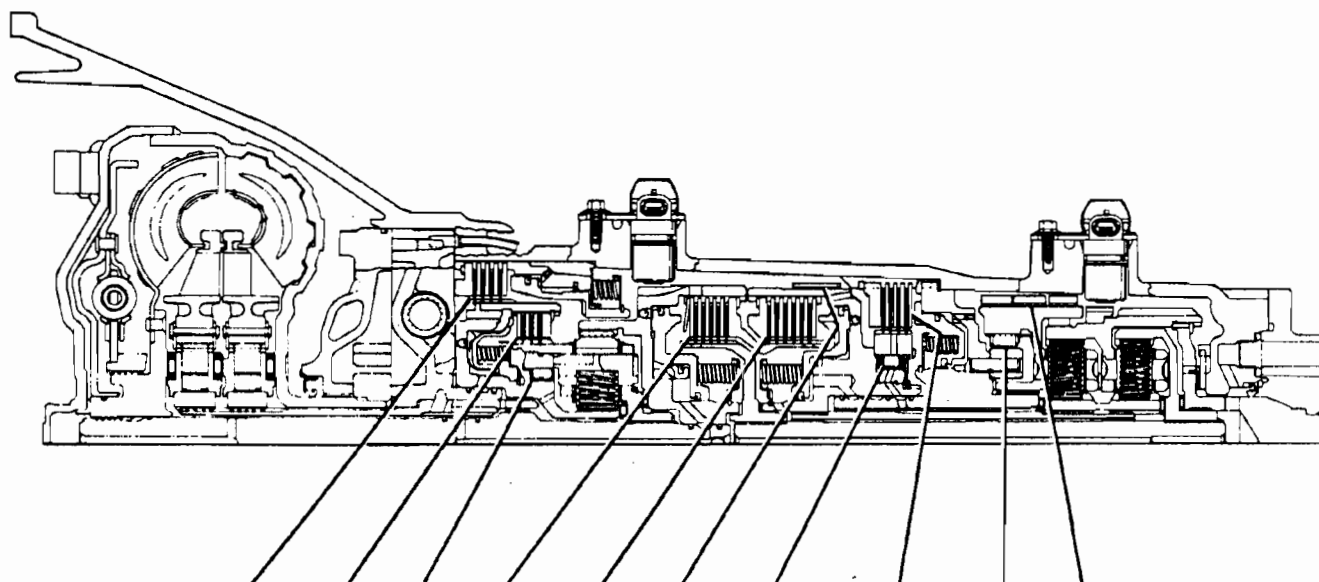


HYDRA-MATIC 4L80-E

Figure 75

HYDRA-MATIC 4L80-E GEAR RATIOS

FIRST	2.48	FOURTH	.75
SECOND	1.48	REVERSE	2.08
THIRD	1.00		



RANGE	GEAR	FOURTH CLUTCH	OVERDRUN CLUTCH	OVERDRIVE ROLLER CLUTCH	FORWARD CLUTCH	DIRECT CLUTCH	FRONT BAND	INTERMEDIATE SPRAG CLUTCH	INTERMEDIATE CLUTCH	LO ROLLER CLUTCH	REAR BAND	SOLENOID A	SOLENOID B
P-N											APPLIED	ON	OFF
D4	1st			HOLDING	APPLIED			*		HOLDING		ON	OFF
	2nd			HOLDING	APPLIED			HOLDING	APPLIED			OFF	OFF
	3rd			HOLDING	APPLIED	APPLIED			APPLIED			OFF	ON
	4th	APPLIED			APPLIED	APPLIED			APPLIED			ON	ON
D3	1st		APPLIED	HOLDING	APPLIED			*		HOLDING		Ⓢ ON	Ⓢ OFF
	2nd		APPLIED	HOLDING	APPLIED			HOLDING	APPLIED			Ⓢ OFF	Ⓢ OFF
	3rd		APPLIED	HOLDING	APPLIED	APPLIED			APPLIED			Ⓢ OFF	Ⓢ ON
D2	1st		APPLIED	HOLDING	APPLIED			*		HOLDING		Ⓢ ON	Ⓢ OFF
	2nd		APPLIED	HOLDING	APPLIED		APPLIED	HOLDING	APPLIED			Ⓢ OFF	Ⓢ OFF
D1	1st		APPLIED	HOLDING	APPLIED			*		HOLDING	APPLIED	Ⓢ ON	Ⓢ OFF
	2nd		APPLIED	HOLDING	APPLIED		APPLIED	HOLDING	APPLIED			Ⓢ OFF	Ⓢ OFF
R	REVERSE			HOLDING		APPLIED				*	APPLIED	ON	OFF

*HOLDING BUT NOT EFFECTIVE
 ON = SOLENOID ENERGIZED
 OFF = SOLENOID DE-ENERGIZED

Ⓢ THE SOLENOID'S STATE FOLLOWS A SHIFT PATTERN WHICH DEPENDS UPON VEHICLE SPEED AND THROTTLE POSITION. IT DOES NOT DEPEND UPON THE SELECTED GEAR.

Figure 76

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1991 HYDRA-MATIC 4L80-E LINE PRESSURE CHECK PROCEDURE

Line pressures are calibrated for two sets of gear ranges — Drive-Park-Neutral, and Reverse. This allows the transmission line pressure to be appropriate for different pressure needs in different gear ranges:

<u>Gear Range</u>	<u>Line Pressure Range</u>
Drive, Park or Neutral	35 - 171 PSI
Reverse	67 - 324 PSI

Before performing a line pressure check, verify that the force motor is receiving the correct electrical signal from the vehicle computer:

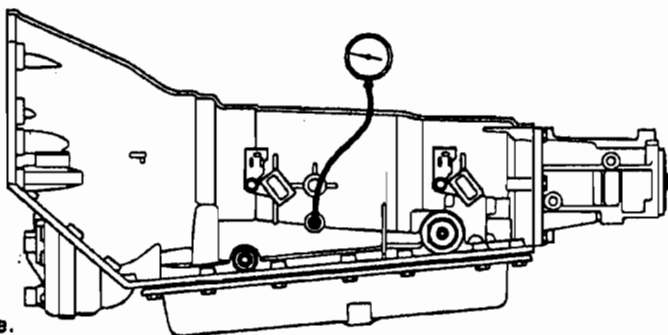
1. Install a scan tool.
2. Start the engine and set parking brake.
3. Check for a stored force motor malfunction code, and other malfunction codes.
4. Repair vehicle if necessary.

Inspect

- Fluid level (see Section 7A)
- Manual linkage

Install or Connect

- TECH 1 Scan tool
- Oil pressure gage at line pressure tap



5. Put gear selector in Park and set the parking brake.
6. Start engine and allow it to warm up at idle.
7. Access the "override force motor" test on the TECH 1 scan tool.
8. Increase FORCE MOTOR CURRENT in 0.1 Amp increments and read the corresponding line pressure on the pressure gage. (Allow pressure to stabilize for 5 seconds after each current change.)
9. Compare data to the Drive-Park-Neutral line pressure chart below.

Line pressure will pulse either high or low every ten seconds to keep the force motor plunger free. This is normal and will not harm the transmission.

***NOTICE** Total test running time should not exceed 2 minutes, or transmission damage could occur.

CAUTION Brakes must be applied at all times to prevent unexpected vehicle motion.

If pressure readings differ greatly from the line pressure chart, refer to the Diagnosis Charts contained in this section.

The TECH 1 scan tool is only able to control the force motor in Park and Neutral with the vehicle stopped at idle. This protects the clutches from extremely high or low pressures in Drive or Reverse ranges.

Force Motor Current (Amp)	Line Pressure (PSI)
0.02	157 - 177
0.10	151 - 176
0.20	140 - 172
0.30	137 - 162
0.40	121 - 147
0.50	102 - 131
0.60	88 - 113
0.70	63 - 93
0.80	43 - 73
0.90	37 - 61
0.98	35 - 55

Figure 77

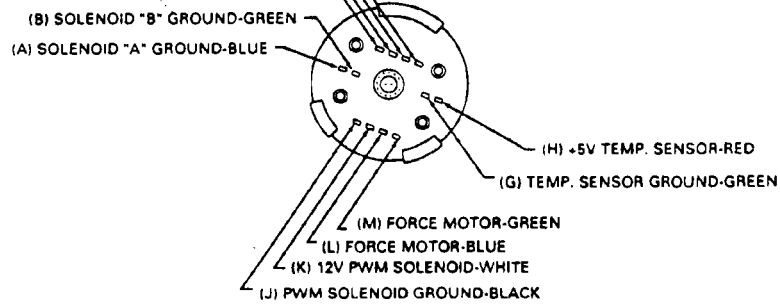
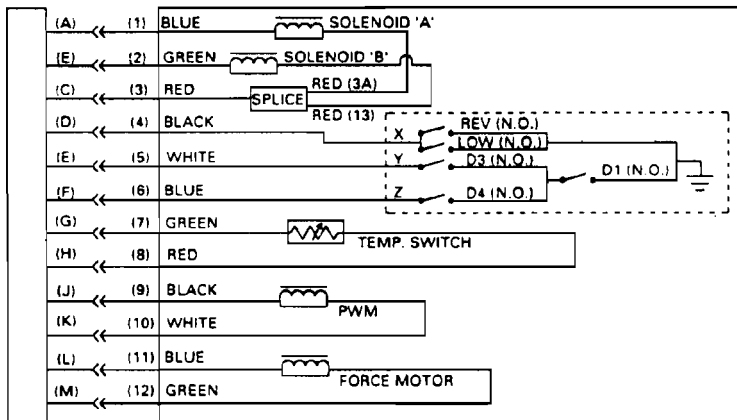
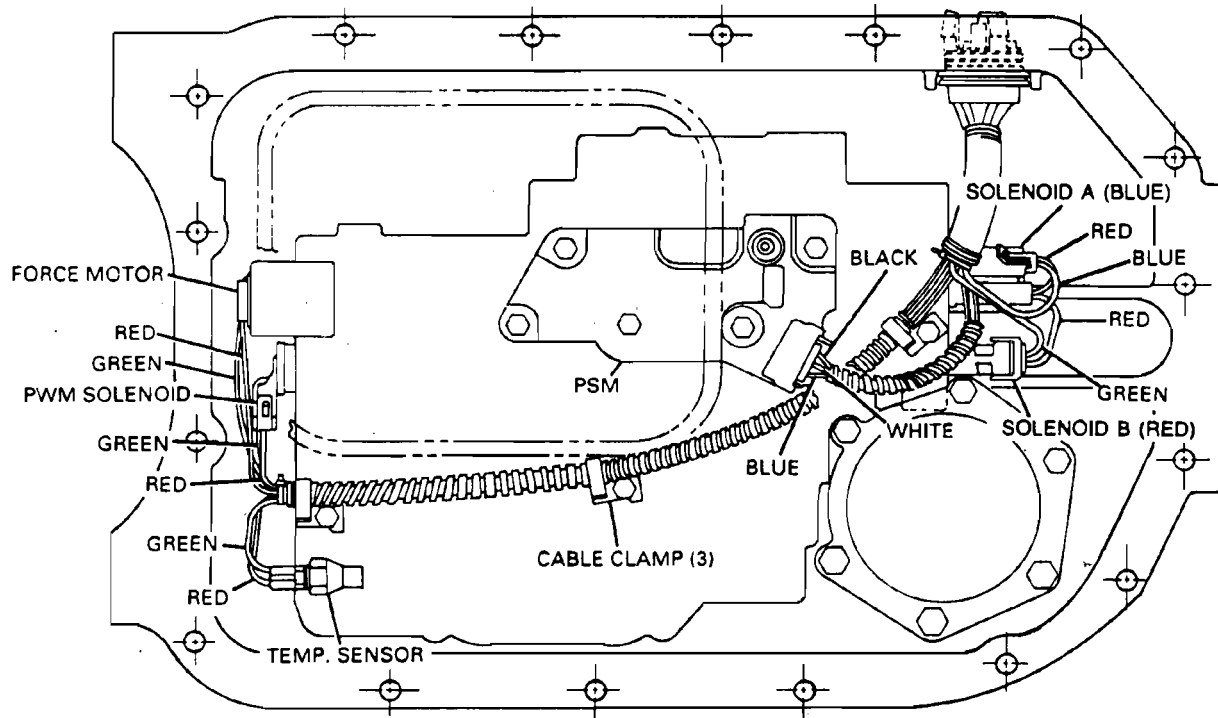


Figure 78

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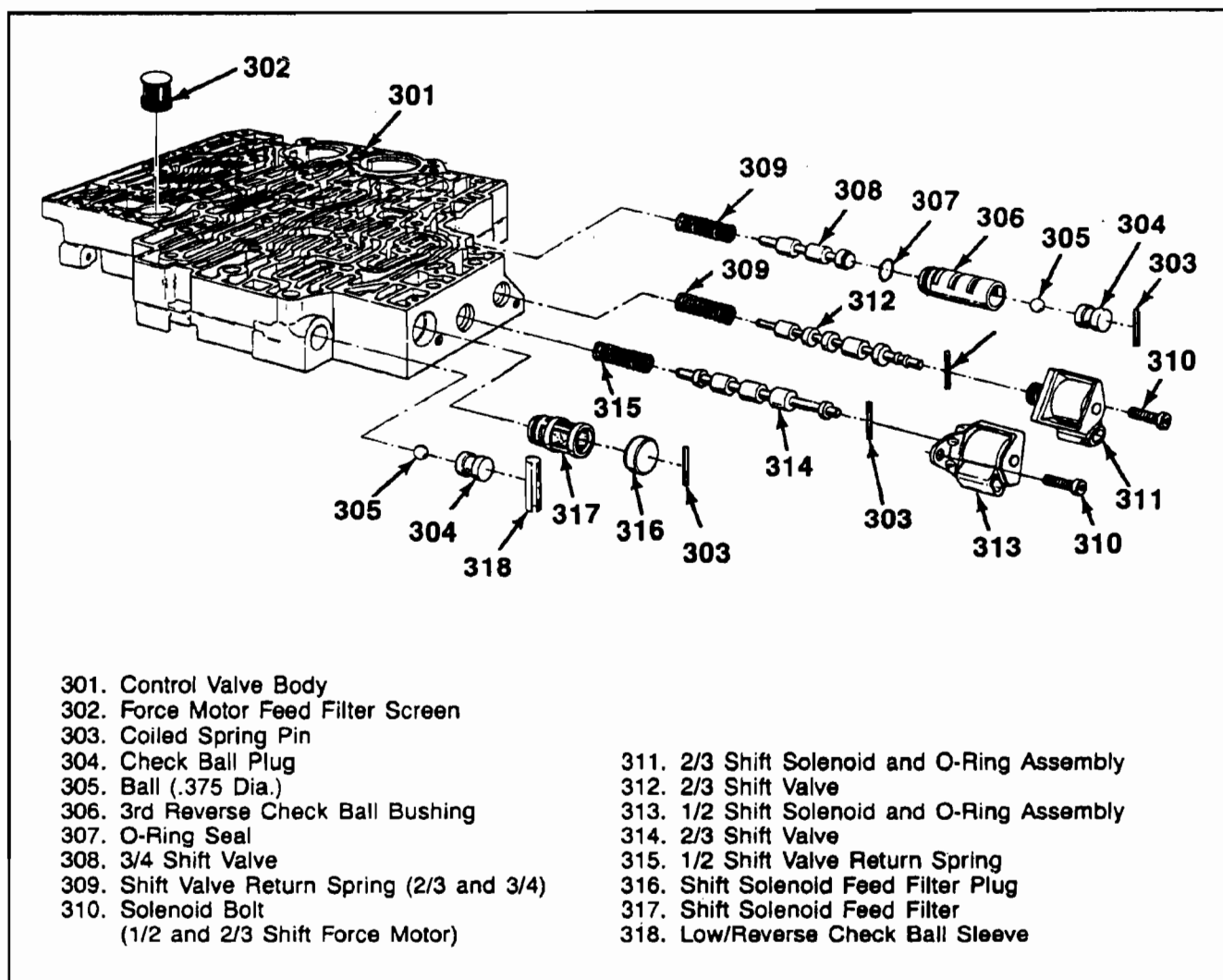


Figure 79

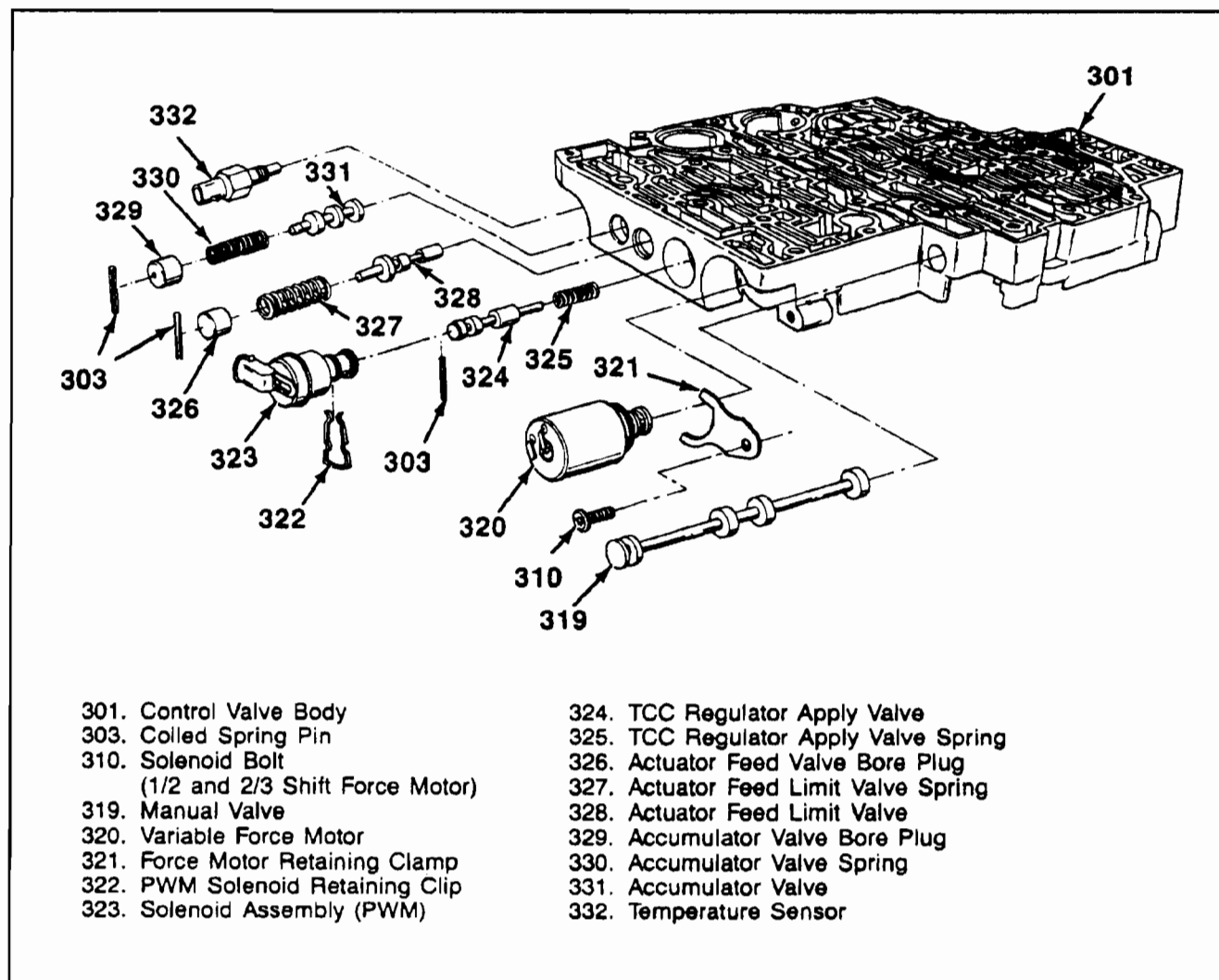


Figure 80