



INDEX

THM 125C (3T40).....	4
THM A-1 (3T40-A).....	18
THM 200-4R.....	26
THM 400.....	30
THM 700-R4 (4L60).....	51
TORQUEFLITE A604.....	67
FORD C-3.....	70
FORD AOD.....	72
FORD AXOD.....	78

AUTOMATIC TRANSMISSION SERVICE GROUP

SEMINARS 1990

TECHNICAL INFORMATION PACKAGE

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

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

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

COMPLAINTor problem
CAUSEthe part or condition creating the problem
CORRECTION ... what is needed to be done to fix the problem

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

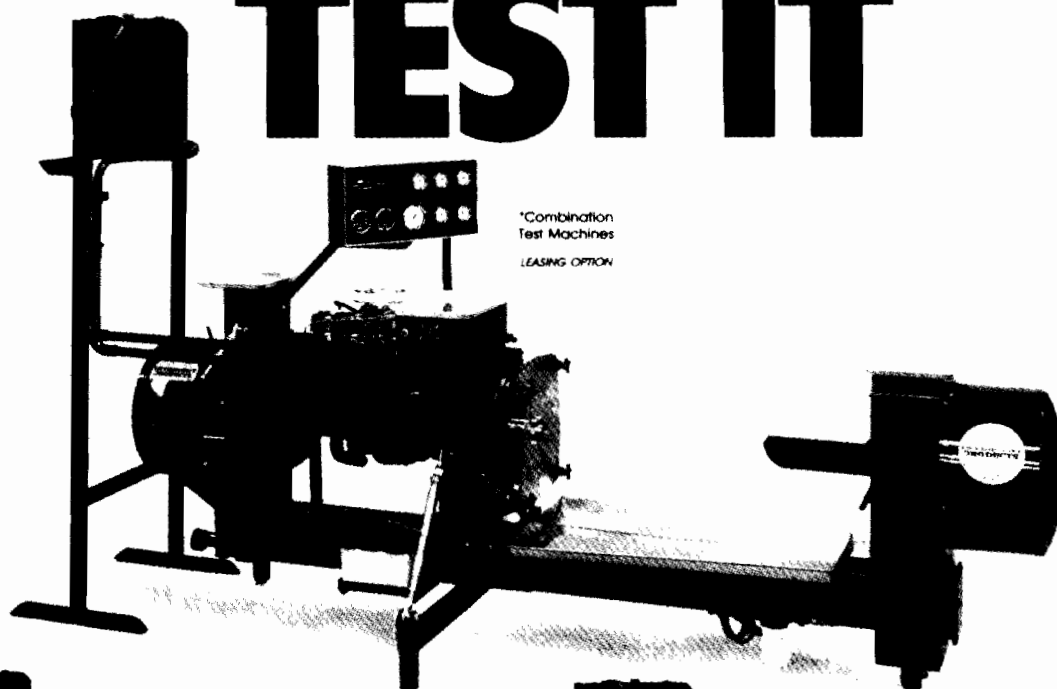
ROBERT D. CHERRNAY
Technical Director

DALE ENGLAND
Field Service Consultant

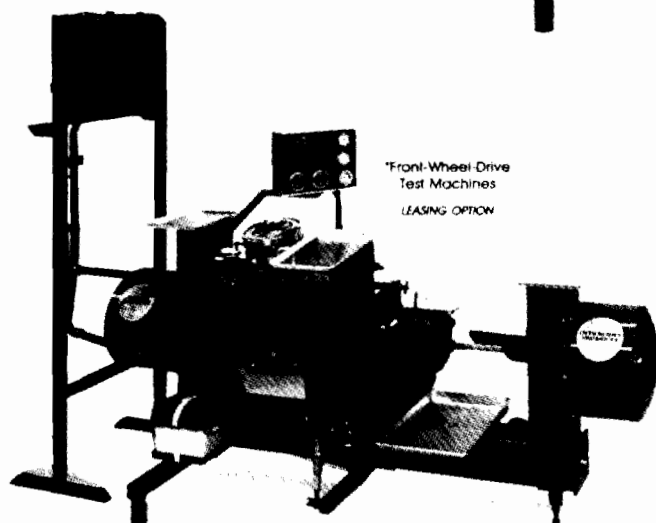


AUTOMATIC TRANSMISSION SERVICE GROUP
9200 South Dadeland Blvd. - Suite 114
Miami, Florida 33156

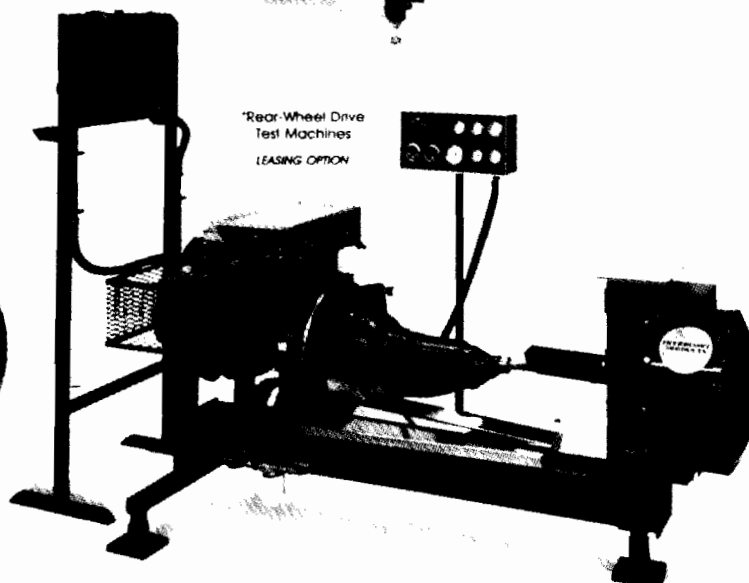
TEST IT



*Combination
Test Machines
LEASING OPTION



*Front-Wheel Drive
Test Machines
LEASING OPTION



*Rear-Wheel Drive
Test Machines
LEASING OPTION

ANALYZE AND EVALUATE — Intercont transmission test machines check and isolate production line building errors and component failures, test line pressure, shifting frequency and response, downshifts, converter lock-up and stall speeds and simulate vehicle load conditions

OPERATOR FRIENDLY — All testers allow operators to spot oil and pressure leaks, check hydraulics and system controls and make minor hydraulic repairs while on the machine.

COMPLETE — Intercont test machines come complete with necessary adaptors, tools and accessories

for immediate setup and use. Written test procedures are simple and concise.

UPDATES — Test procedures are continually updated to accommodate changes in the transmission industry, along with updates for new transmissions as they are introduced into the market.

TRAINING — Intercont offers a one-week free training course at our manufacturing facilities for complete instruction and training in the setup, maintenance and use of our transmission test machines. *Patent Pending.



TEST IT WITH INTERCONT

1719 W. Mt. Vernon, Springfield, Missouri 65802 [417] 869-9549

THM 125C (3T40)

NO TORQUE CONVERTER CLUTCH APPLICATION

COMPLAINT: Torque converter clutch does not apply on 1988 or 1989 models only. The vehicle may also exhibit intermittent "Service Soon" light and/or trouble code 62 or 26 stored in the ECM.

CAUSE: The cause may be a defective 2nd clutch switch located on the auxillary valve body (See Figure 1). The 2nd gear switch has a 3 digit code stamped on the metal portion of the switch (See Figure 1). The first 2 digits in the code represent the week in which the switch manufactured, and the 3rd digit represents the year manufactured. All switches built with number 179 or lower, will not carry the amperage required to operate the converter clutch solenoid, and should be replaced. Terminals will appear black in color and may be loose in the switch.

CORRECTION: Replace the 2nd clutch switch with OEM Part Number 8664388. Inspect the converter clutch solenoid, 3rd gear switch, and entire wiring harness for excessive heat.

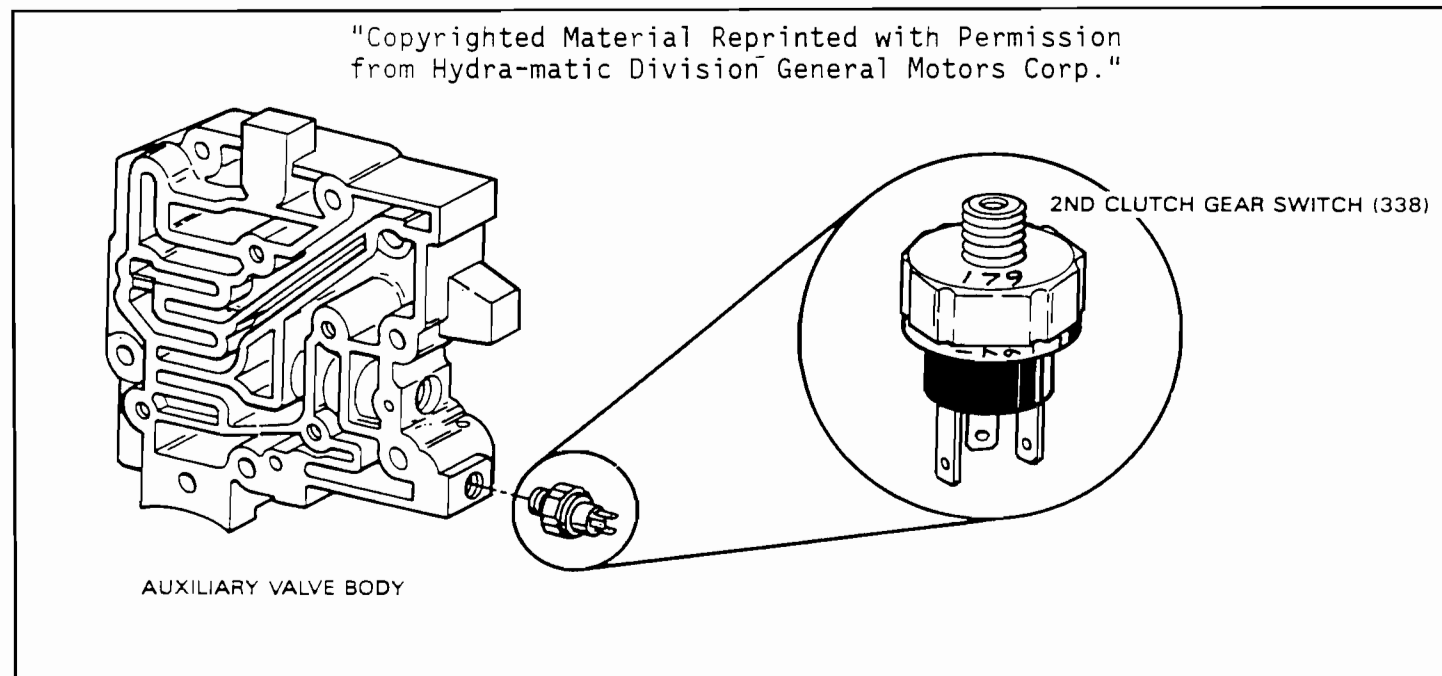


Figure 1

THM 125C (3T40) UNEXPLAINED RATTLE OR CLICKING NOISE

- COMPLAINT: An intermittent rattle and/or clicking noise that is most evident in 3rd gear.
- CAUSE: The noise may be caused by " Grooved " 1o-reverse lined clutch plates (See Figure 1).
- CORRECTION: Install " Smooth " 1o-reverse lined clutch plates, available under OEM Part No. 8666667 the new clutch plates went into production May 5, 1989 (Julian Date 125).

"Copyrighted Material Reprinted with Permission
from Hydra-matic Division G.M. Corp"

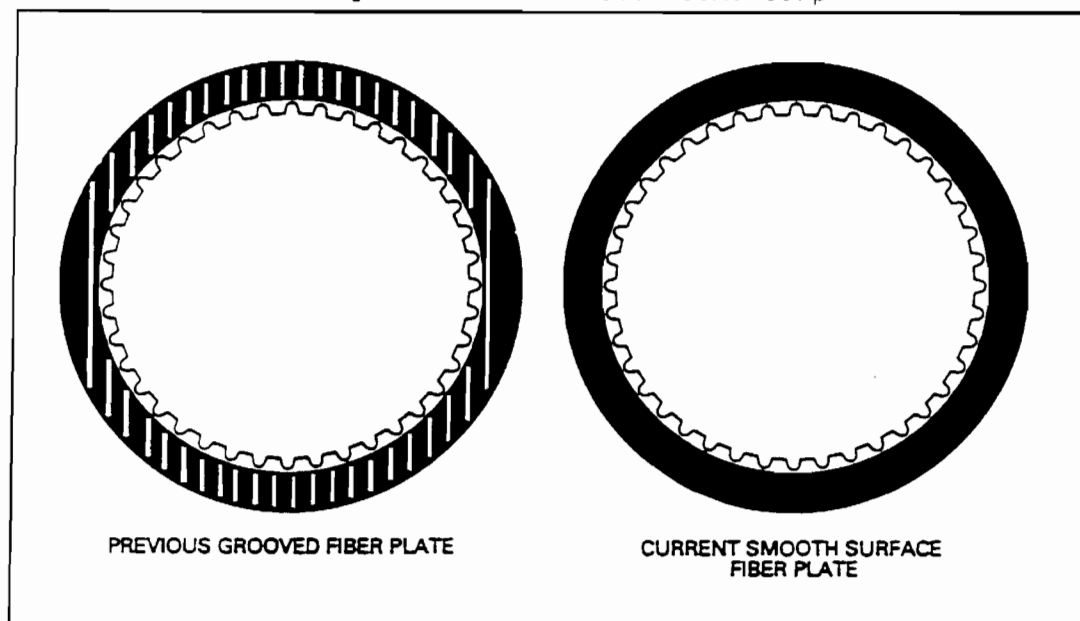


FIGURE 1

THM 125C AND THM 440-T4 FINAL DRIVE PINION WASHERS

There is now available from OEM, a new service package (See SERVICE INFORMATION) to service the final drive pinion washers on both the THM 125C and THM 440-T4 final drives.

These service packages contain 16 steel washers. The original bronze washer should be discarded, and two steel washers installed on each side of the pinion gears, as shown in Figure 1.

Measure pinion gear end play with a feeler gage. The proper end play range is .009" - .025".

SERVICE INFORMATION

Pinion Thrust Washer Package (16 Steel Washers)

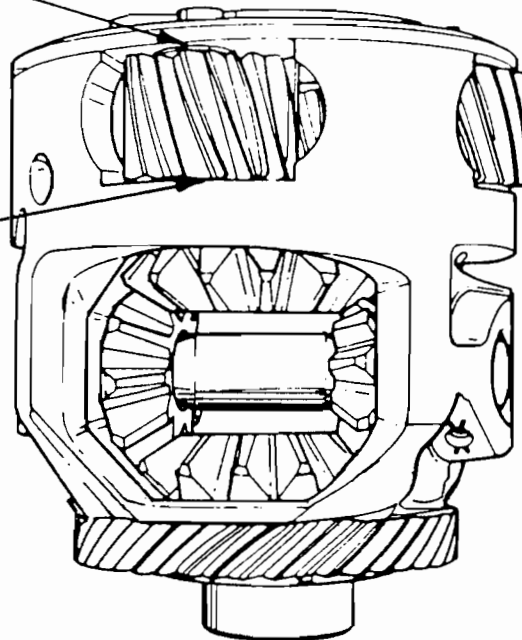
For 2.84 Ratio Final Drive.....8665957

Pinion Thrust Washer Package (16 Steel Washers)

For 3.06 and 3.33 Ratio Final Drives.....8665958

INSTALL TWO STEEL THRUST WASHERS
ON TOP OF EACH PINION GEAR

INSTALL TWO STEEL THRUST WASHERS
ON BOTTOM OF EACH PINION GEAR



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

Figure 1

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 1), or modify the 1987 gasket with the small hole, by cutting on the dotted line (See Figure 1).

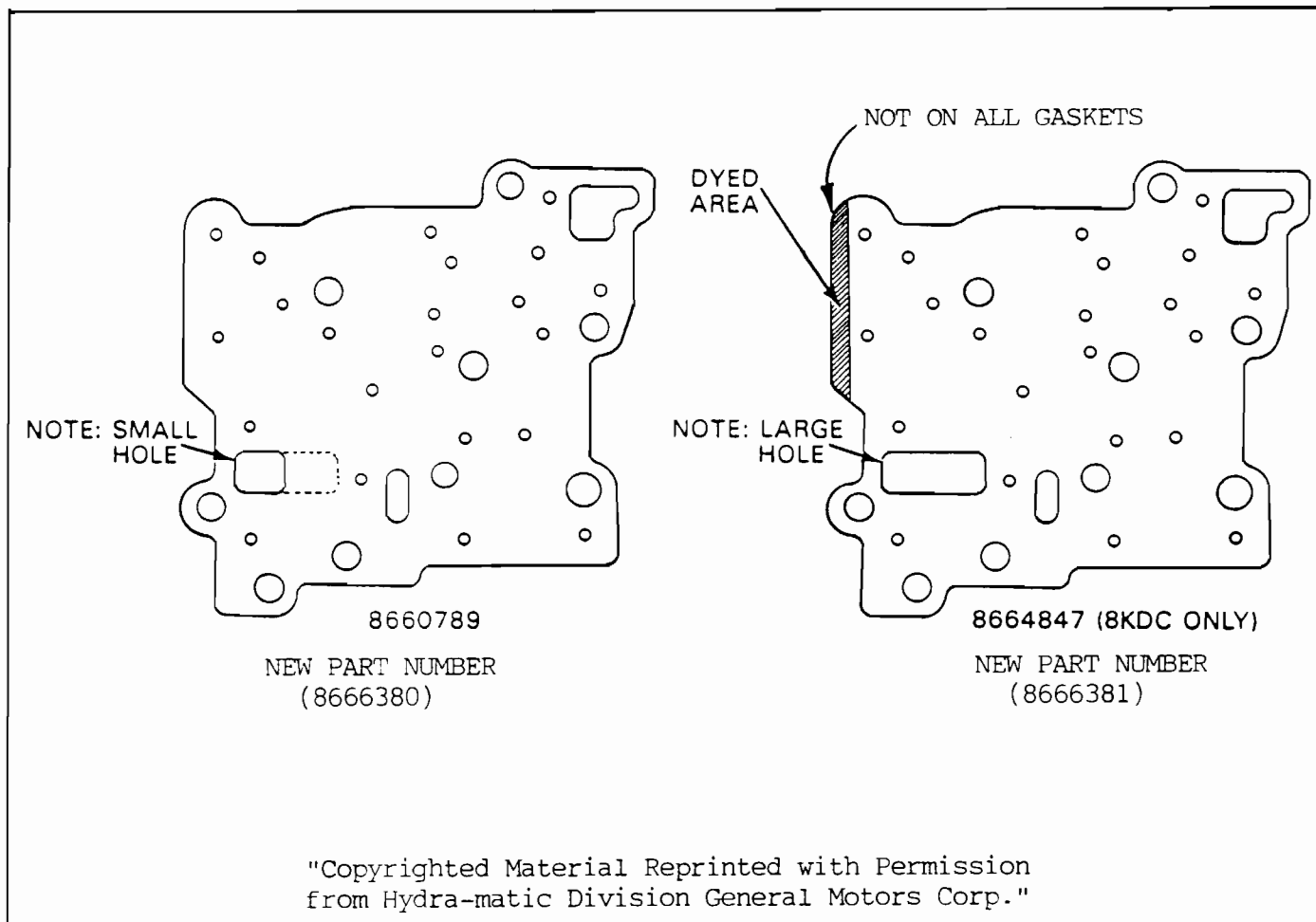


Figure 1

THM 125C

NEW FORWARD CLUTCH HOUSING

CHANGE: A new design forward clutch housing and thrust washer went into production on November 3, 1987, for all 1988 model 125C transaxles.

REASON: The new housing contains a new stamped channel which increases forward clutch feed oil, providing a quicker neutral to drive engagement. (See Figure 1).

PARTS AFFECTED:

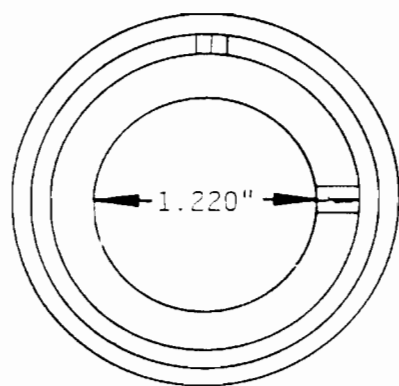
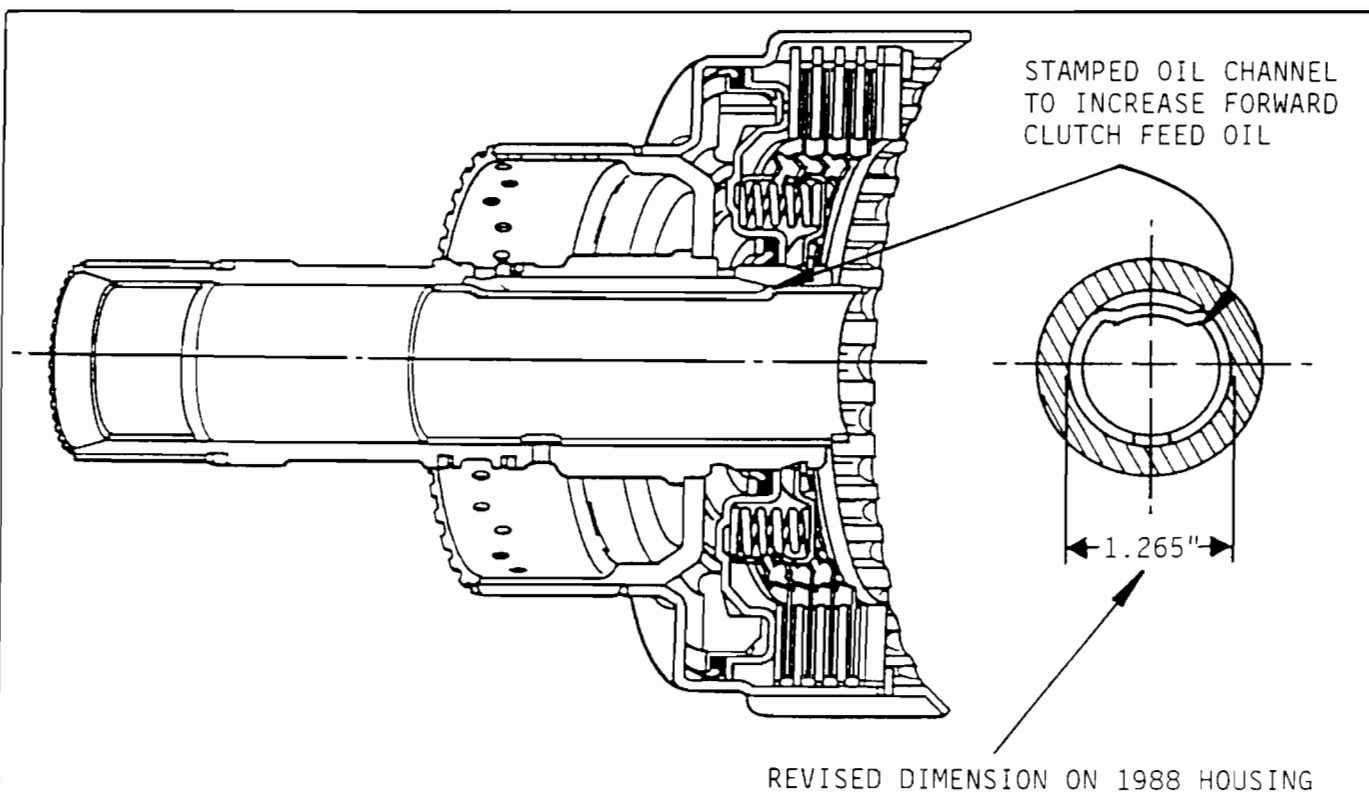
- (1) FORWARD CLUTCH HOUSING - Contains a stamped channel which increases the flow of forward clutch feed oil, and there is a revised dimension where the bronze washer is located (See Figure 1).
- (2) BRONZE THRUST WASHER - Revised dimension on the inside diameter of washer to fit the new clutch housing, and identified with a dimple stamped on both sides of the washer (See Figure 1).

INTERCHANGEABILITY:

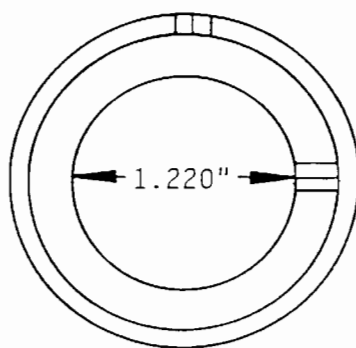
- (1) The new forward clutch housing will retro fit back to all previous models but you MUST use the 3rd design "Dimpled" washer.
- (2) The 1st design plastic washer, and the 2nd design bronze washer will not fit the new forward clutch housing.
- (3) If the 3rd design "Dimpled" bronze thrust washer is used on the previous forward clutch housing, it will create premature wear on the housing and washer.

SERVICE INFORMATION:

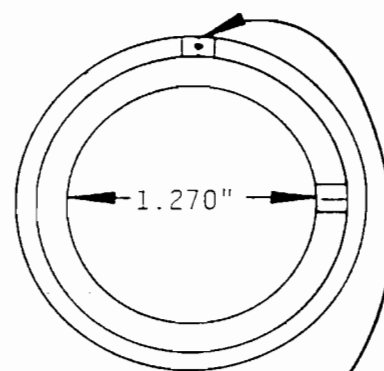
Bronze Thrust Washer (2nd Design).....8652759
Bronze Thrust Washer (3rd Design "Dimpled").....8664762
Forward Clutch Housing and Washer Kit (1988 Design).....8664982



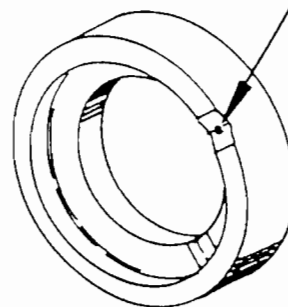
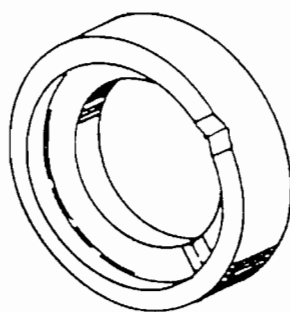
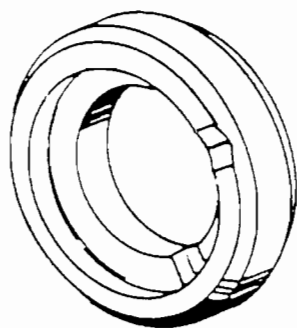
1ST DESIGN
PLASTIC WASHER



2ND DESIGN
BRONZE WASHER



3RD DESIGN
BRONZE WASHER



Copyright 1989 ATSG

Figure 1

THM 125C

PUMP ROTOR AND PUMP SLIDE CHANGES

CHANGE: Beginning in late 1985, the dimensions of the pump rotor and pump slide changed (See Figure 1).

REASON: Improved pump capacity.

PARTS AFFECTED:

- (1) PUMP ROTOR - The outside diameter of the rotor was made smaller. The previous rotor O.D. was 2.235", and the present rotor O.D. is 2.210". (See Figure 1).
- (2) PUMP SLIDE - The height of the pump slide stop was made shorter. The previous pump slide stop measures .426", and the present pump slide stop measures .406" (See Figure 1).

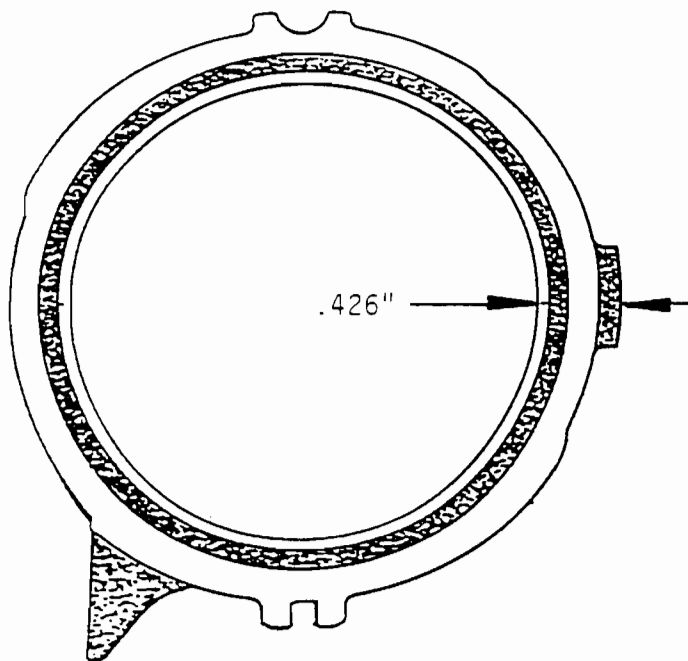
INTERCHANGEABILITY:

The pump rotor and pump slide are interchangeable, "ONLY AS A SET". You CANNOT mix these parts.

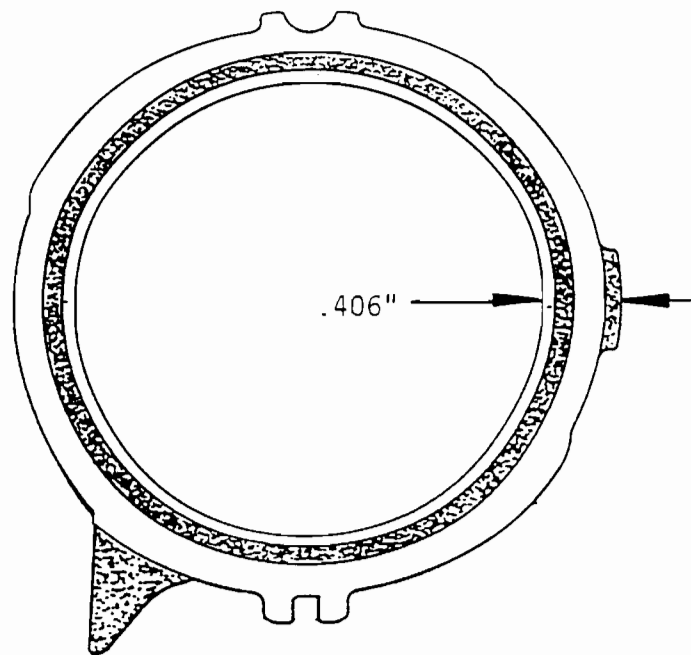
- (1) If you install the previous (Large) rotor with the present (Short) slide, interference will result and usually strip the rotor splines.
- (2) If you install the present (Small) rotor with the previous (Tall) slide, erratic line pressures can be encountered.
- (3) DO NOT MIX THESE PARTS.

SERVICE INFORMATION:

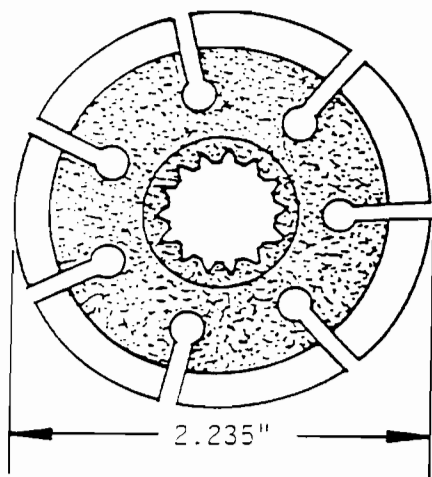
Description	Size	Part Number
PUMP ROTOR (SMALL)	.7054"-.7059"	8652248
PUMP ROTOR (SMALL)	.7059"-.7064"	8652249
PUMP ROTOR (SMALL)	.7064"-.7069"	8652245
PUMP ROTOR (SMALL)	.7069"-.7074"	8652246
PUMP ROTOR (SMALL)	.7074"-.7079"	8652247
PUMP SLIDE (SHORT)	.7068"-.7073"	8652240
PUMP SLIDE (SHORT)	.7074"-.7078"	8652241
PUMP SLIDE (SHORT)	.7079"-.7083"	8652242
PUMP SLIDE (SHORT)	.7084"-.7088"	8652243
PUMP SLIDE (SHORT)	.7089"-.7094"	8652244



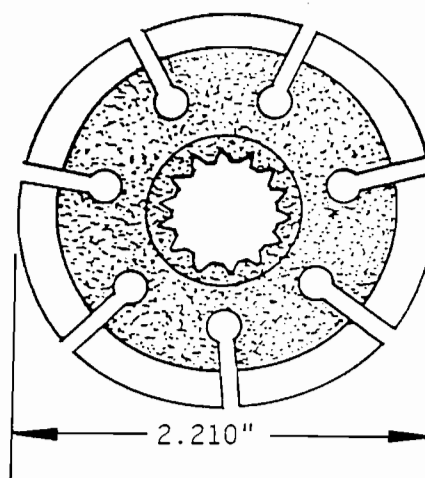
PREVIOUS PUMP SLIDE



PRESENT PUMP SLIDE



PREVIOUS PUMP ROTOR



PRESENT PUMP ROTOR

Copyright 1989 ATSG

Figure 1

1988/1989 THM 125C
NO SECOND GEAR

COMPLAINT: No second gear, manual or automatic, 1-3 shift only.

CAUSE: The cause may be a worn or torn lip seal (Small) on the intermediate servo piston, and created by a rough surface machine finish in the bore of the intermediate servo cover (See Figure 1). This rough finish will wear the lip off the (Small) intermediate servo seal.

CORRECTION: Replace the intermediate servo cover and intermediate servo piston lip seals.

SERVICE INFORMATION:

Intermediate Servo Cover (1.260" Bore Diameter)	8631702
Intermediate Servo Cover (1.495" Bore Diameter)	8631703
Intermediate Servo Cover (1.672" Bore Diameter)	8631704

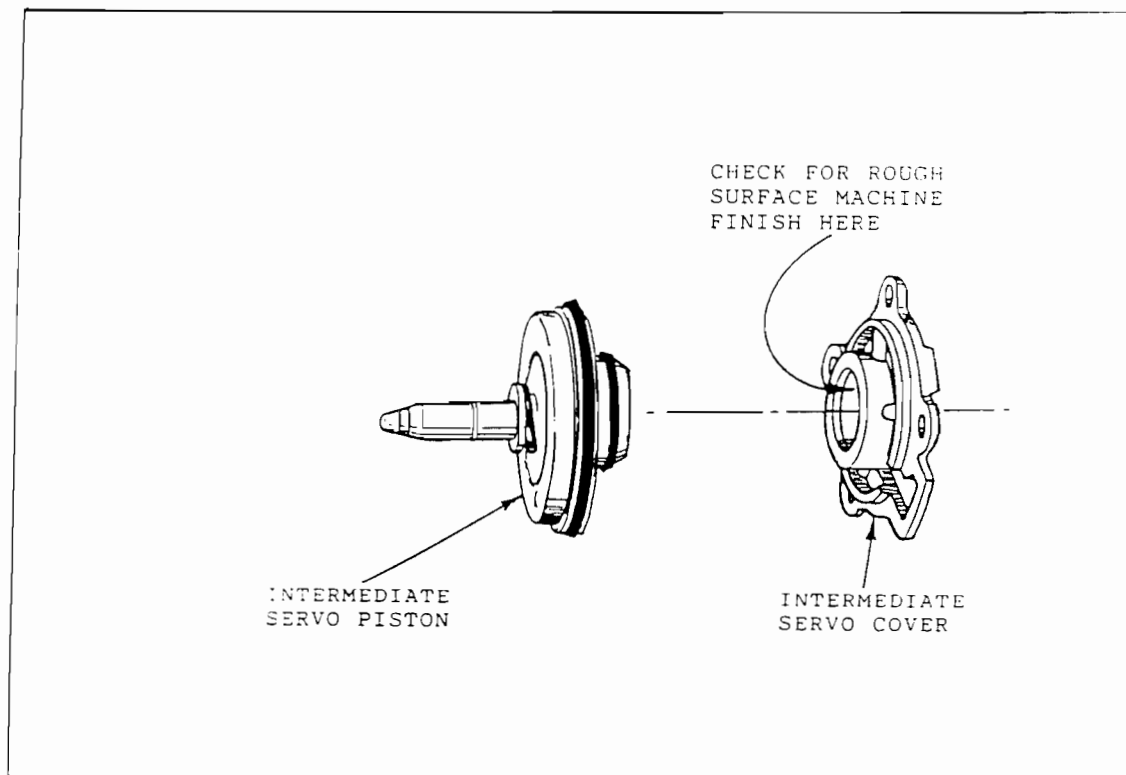


Figure 1

THM 125C ACCUMULATOR CHANGE

CHANGE: The 1-2 accumulator seal has been changed from solid Teflon seal to a lathe cut rubber seal, which also required a new design 1-2 accumulator piston (See Figure 1).

REASON: Reduced leakage in accumulator.

PARTS AFFECTED:

- (1) 1-2 Accumulator Piston - New design piston that has a flat bottom seal groove instead of a ridge in the bottom of the seal groove (See Figure 1).
- (2) 1-2 Accumulator Piston Seal - Now lathe cut rubber seal instead of Teflon.

INTERCHANGEABILITY:

The new 1-2 accumulator piston and seal can be used on all previous models as a complete assembly. The new lathe cut rubber seal CANNOT be used on the previous design piston. Do not attempt to mix these parts.

SERVICE INFORMATION:

1-2 Accumulator Piston and Seal (New Design)	8665920
1-2 Accumulator Seal (Rubber)	8665807

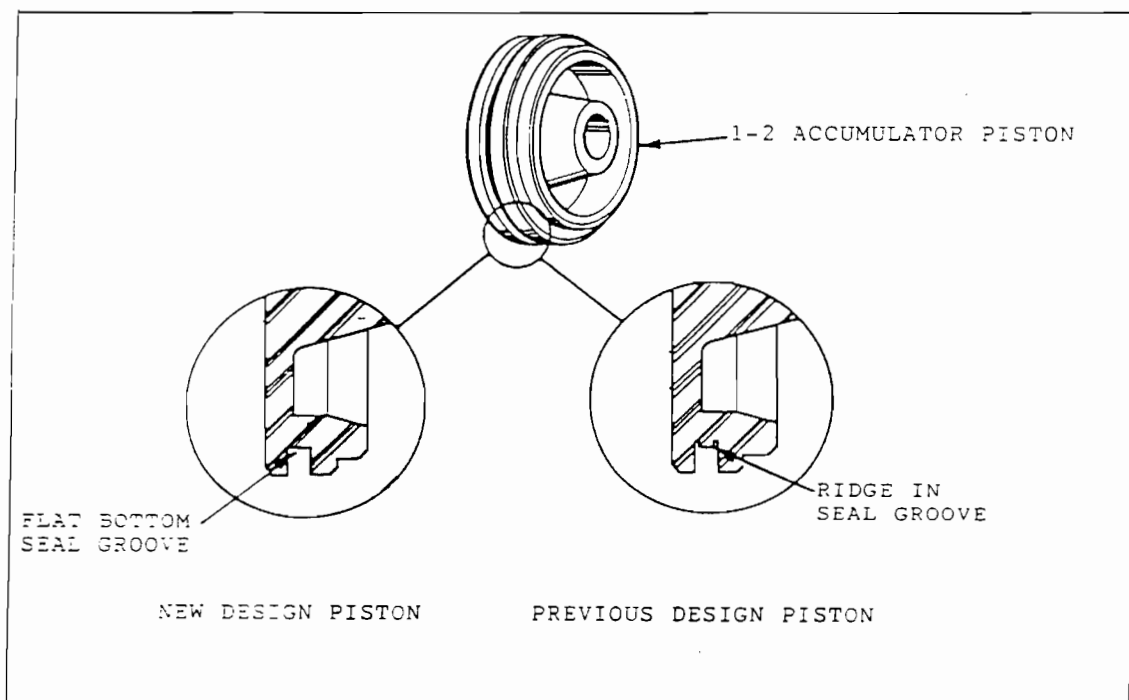


Figure 1

THM 125/125C
NEW CASE COVER DOWEL PINS

Beginning November 14, 1988 (Julian Date 319), a new case cover dowel pin went into production on all 1989 model 125/125C transaxles. The new dowel pin is in the form of a rolled pin (See Figure 1), and will retro fit back to all previous model 125/125C transaxles.

SERVICE INFORMATION:

Split Dowel Pins (2)..... 8665860

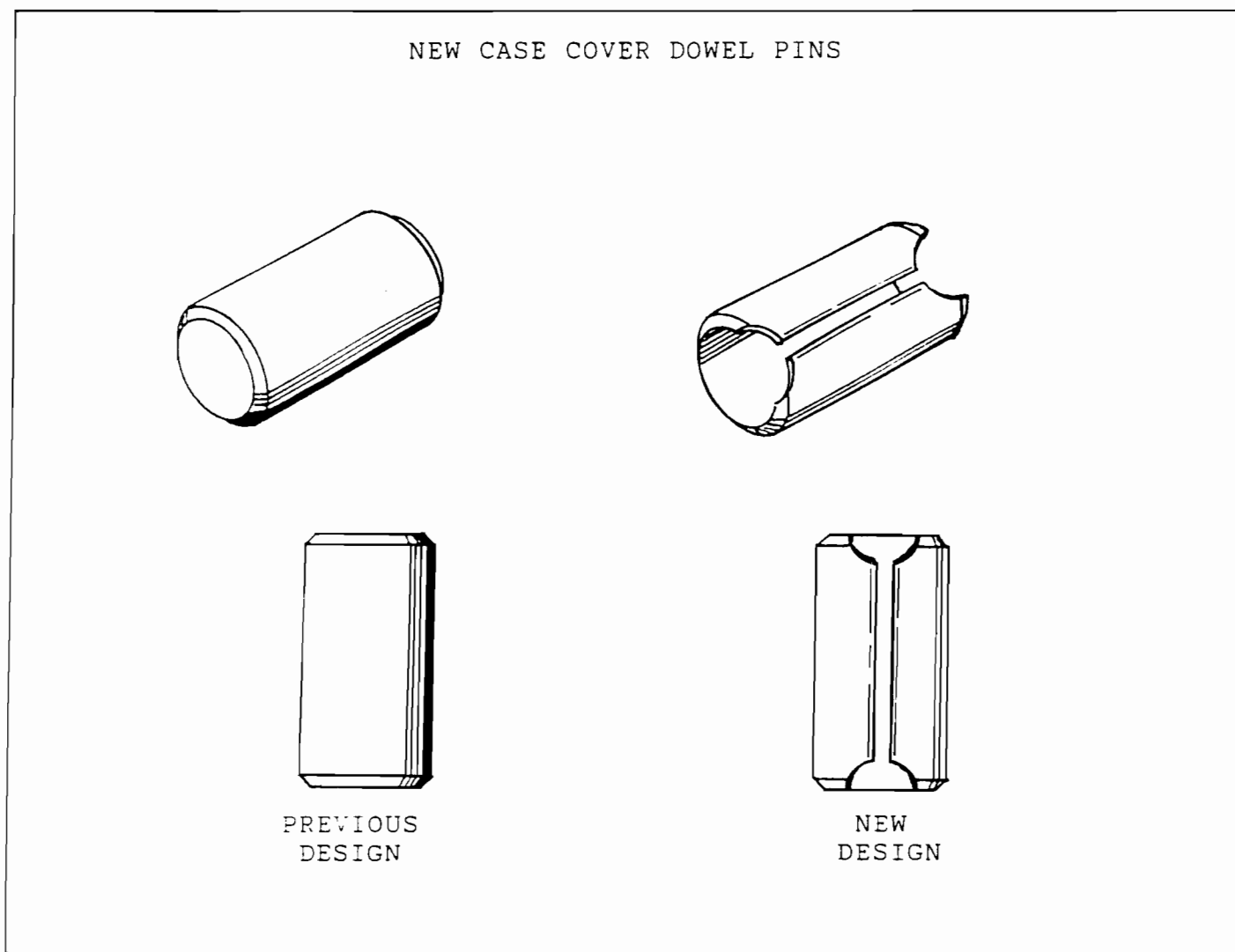


Figure 1

THM 125C (3T40)

REVISED DIRECT CLUTCH HOUSING

CHANGE: A new Direct Clutch Housing went into production on July 12, 1989 (Julian Date 193 for all THM 125C (3T40) transaxles.

REASON: To prevent the Direct Clutch Housing from warping when subjected to excessive heat from the intermediate band.

PARTS AFFECTED:

(1) DIRECT CLUTCH HOUSING - Increased the wall thickness .008" (Figure 1).

INTERCHANGEABILITY:

The new Direct Clutch Housing can be used on previous model 125C transaxles back to 1985 only.

The new Direct Clutch Housing cannot be used on 1980-1984 model 125C transaxles, because the snap ring location will not allow installation of the internal parts from those model years.

SERVICE INFORMATION:

Direct Clutch Housing (Revised Thickness)..... 8653971

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

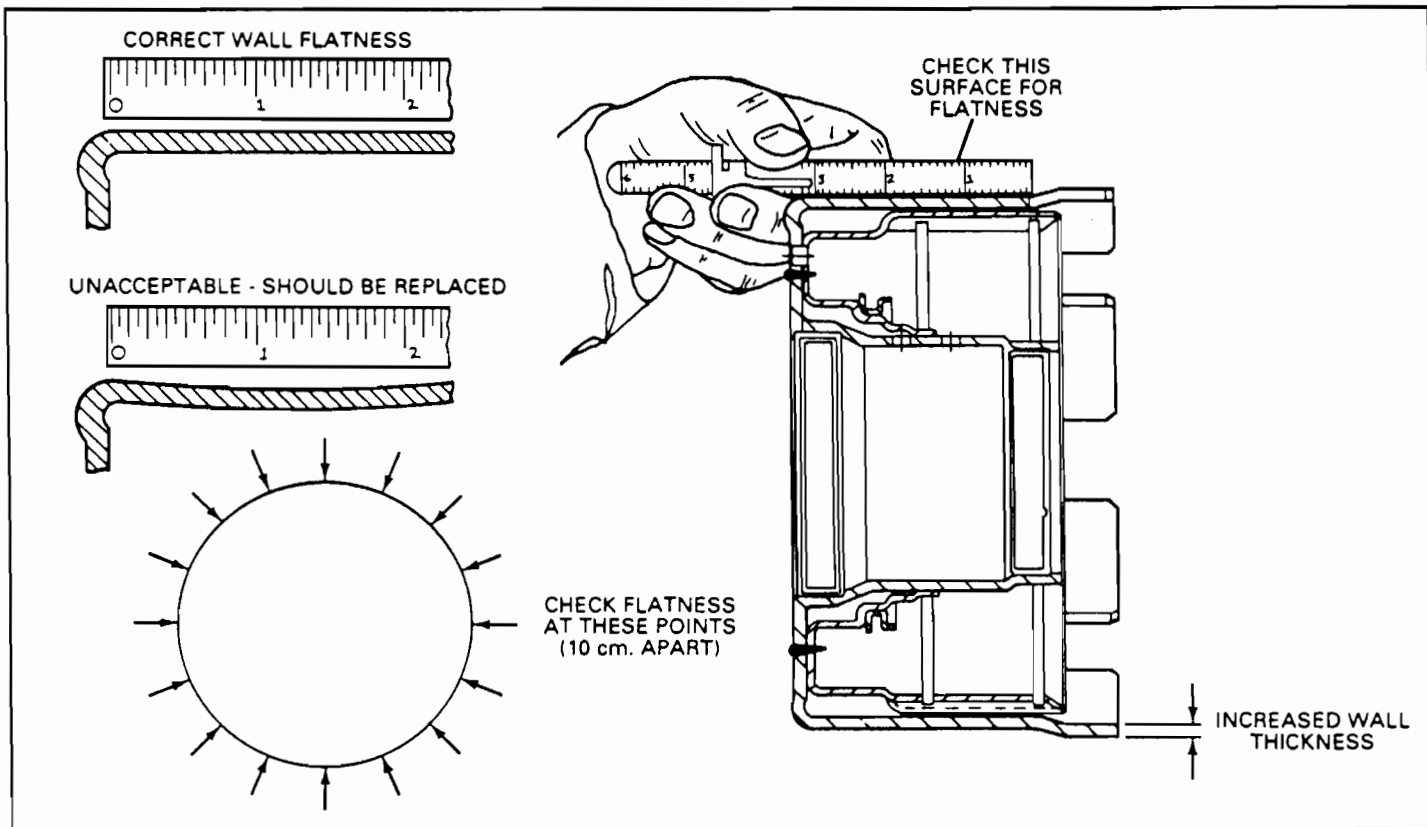


Figure 1

THM 125C (3T40)

DELAYED ENGAGEMENT COLD ONLY

COMPLAINT: Delayed drive application, when shifting from reverse to drive, in cold operating conditions on 1989 THM 125C (3T40) or 1989 THM A-1 (3T40-A) transaxles.

CAUSE: The cause may be the Manual Valve and Thermo Element Assembly. A new Manual Valve and Thermo Element Assembly went into production on June 12, 1989 (Julian Date 163).

CORRECTION: Install new design Manual Valve and Thermo Element Assembly, available under OEM part number 8666494. The new design Manual Valve has larger diameter cross drilled holes in the manual valve, and a second "Cold Window" added to the thermal element. (See Figure 1). The new manual valve can be used on all previous model THM 125C transaxles.

SERVICE INFORMATION:

Manual Valve and Thermo Element Asy (2nd Design)..... 8666494

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

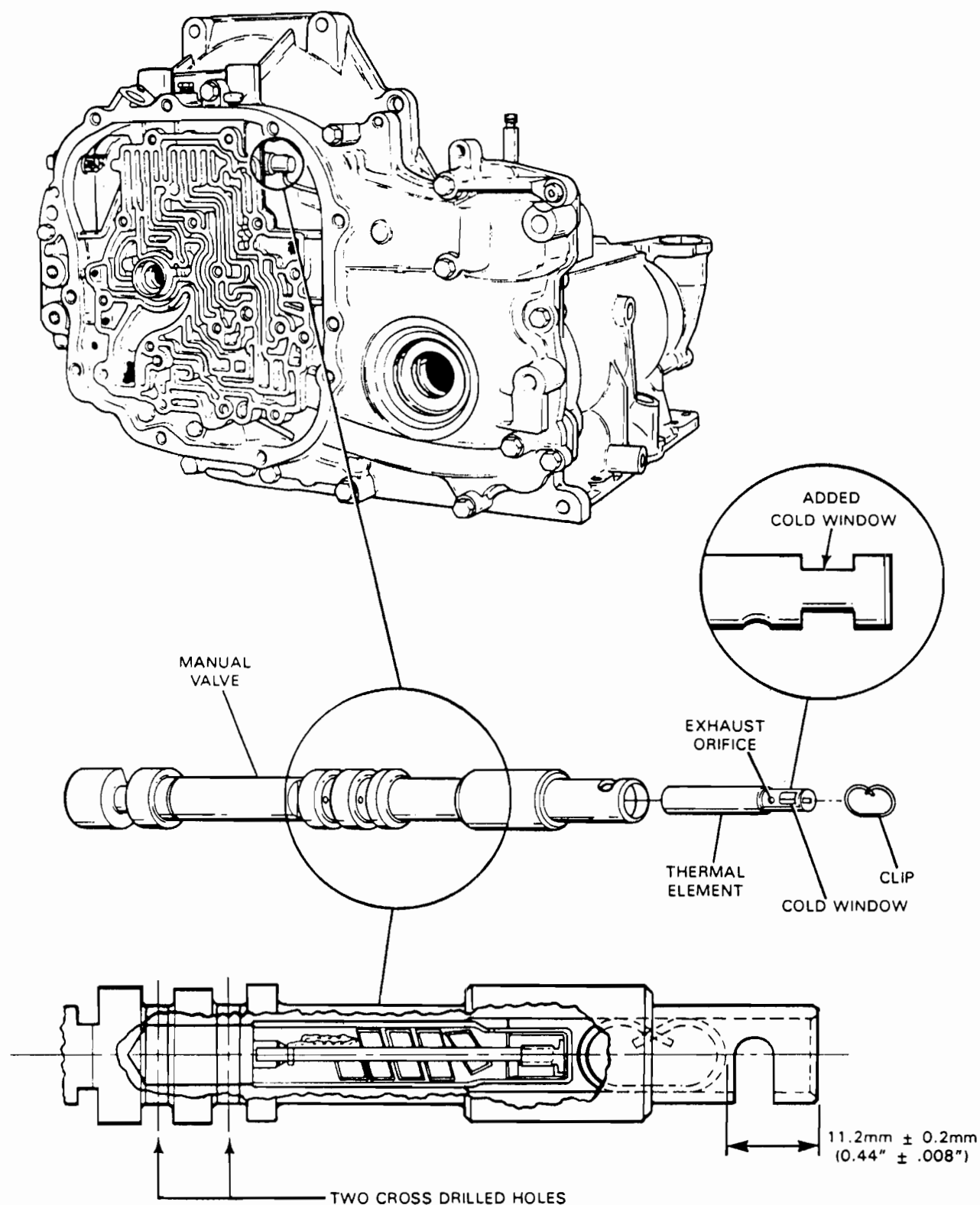


Figure 1

THM - A1 (3T40A) ALL WHEEL DRIVE 125C

This bulletin is to introduce you to the new THM A-1 transaxle, which is a THM 125C transaxle equipped with an all new drive unit to provide driving capability to the rear wheels. This transaxle was first seen in the 1988 Pontiac STE "All Wheel Drive".

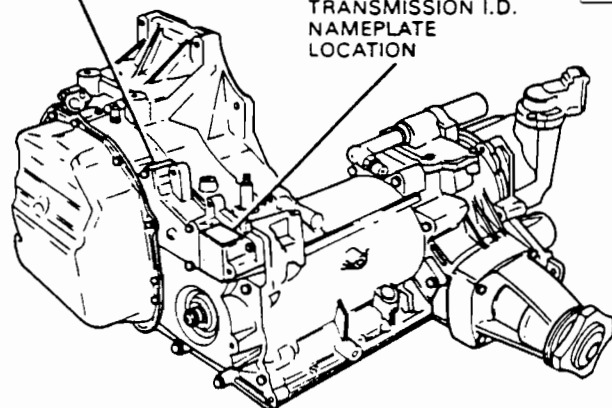
The THM A-1 transaxle is presently on an exchange program only, until further notice from Hydra-matic Division. Units requiring internal repairs are being returned to Hydra-matic Division for root cause analysis, so do not expect any dealer work right away.

This bulletin contains the following:

- * Electrical wiring diagrams to help in diagnosing any converter clutch problems that you may encounter. See Figure 1.
- * Line pressure chart to help in diagnosing internal transaxle problems, or shifting problems. See Figure 6.
- * Shift speed chart for proper shift speeds. See Figure 6.
- * List of components that can be serviced or repaired without removing the transaxle from the vehicle. See Figure 2.
- * Identification information. See Figure 1.
- * Chart for potential leak areas. See Figure 7.
- * Exploded drawings for familiarization. See Figures 3, 4, and 5.

V.I.N. LOCATION

TRANSMISSION I.D.
NAMEPLATE
LOCATION



WINDSOR, CANADA

SHIFT BUILT
A = FIRST SHIFT
B = SECOND SHIFT
C = THIRD SHIFT

PB . S
J ### 9XXCS

MODEL

WINDSOR,
CANADA

NO MEANING

JULIAN DATE
(OR DAY OF
THE YEAR)

MODEL YEAR
(8 = 1988)
(9 = 1989)

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

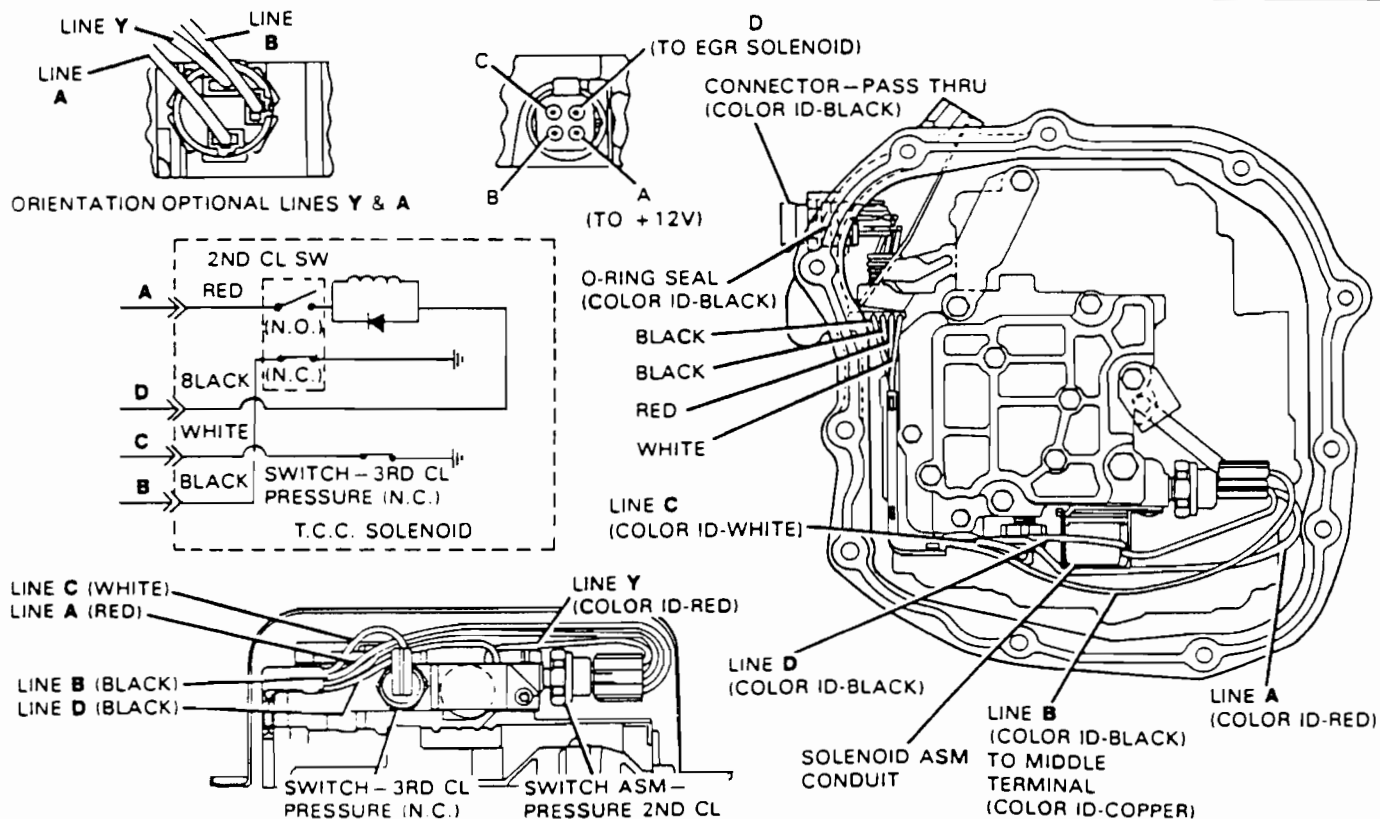


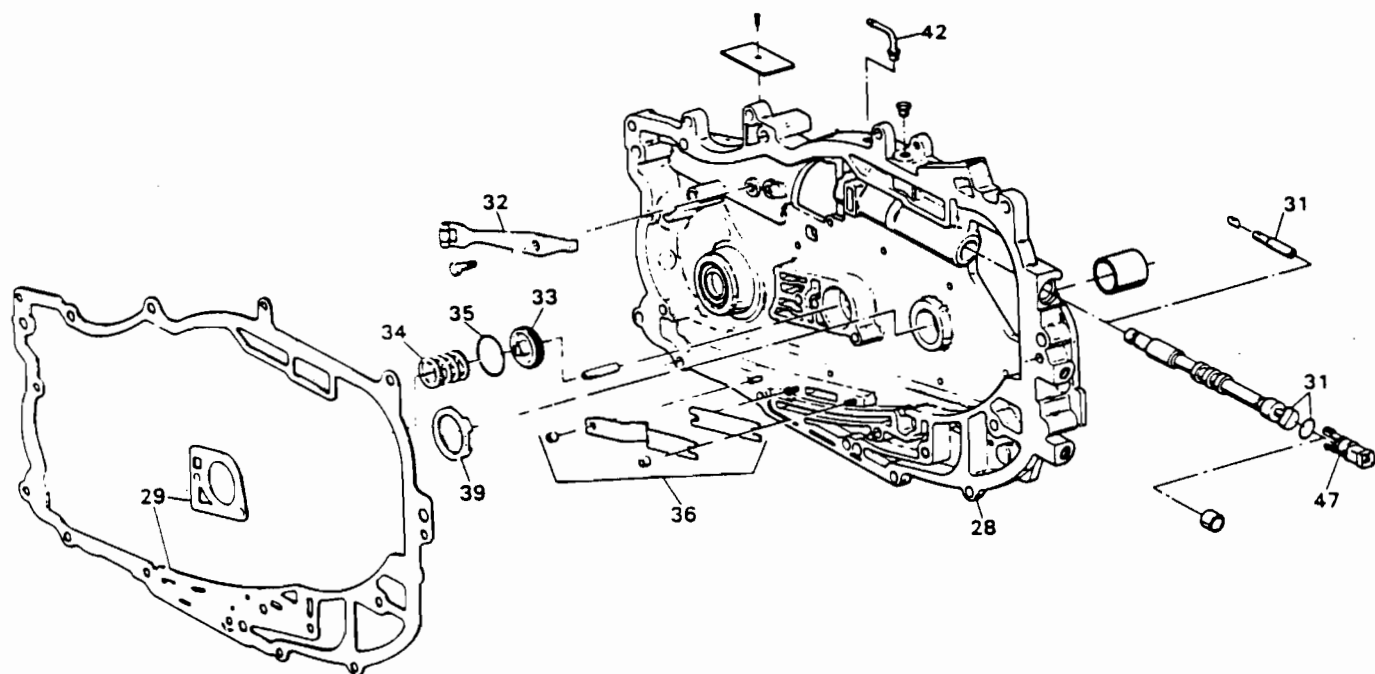
Figure 1

- Lo and Reverse Pipes(1) "O" ring(2) and cup plug(3)
- Parking Pawl, Lock Shaft, Return Spring, and Actuator Assembly(4)
- Fluid Level Indicator Stop Bracket(5)
- Intermediate Servo(6) and Direct Clutch Accumulator Check Valve(7)
- Speed Sensor Assembly(8)
- Speed Sensor Housing(9) and Housing "O" Ring(10)
- Filler Tube and Sleeve Seal(11)
- Output Shaft Oil Seals (Front Drive Axles)(12)
- Valve Body (Side Pan) Cover(13) and Gasket(14)
- Bottom Pan(15) and Gasket(16)
- * Oil Pan Baffle Bottom Front(17) and Rear(18)
- Magnet(19)
- Strainer Assembly(20) and "O" ring(21)
- Auxiliary Valve Body(22)
- Valve Body and Oil Pump Assembly(23)
- Valve Body Spacer Plate(24), Gaskets(25), T.V. Lever and Bracket Assembly
- Torque Converter Clutch Solenoid and Wiring(26)
- Governor Pressure Switch and 3rd Clutch Pressure Switches(27)
- Converter to Flywheel Bolts
- Lo Blow Off Ball, Spring, and Plug
- Case Cover(28) and Gaskets(29)
- Cooler Lines and/or Fittings(30)
- Manual Valve(31) and Manual Detent Spring and Roller Assembly(32)
- 1-2 Accumulator Piston(33), Spring(34) and Seal(35)
- Thermo-static Element Assembly(36)
- Drive Link(37), Sprockets(38) and Thrust Washers(39)
- Thrust Bearing(40)
- Oil Pump Shaft(41)
- Electrical Connector(47)
- T.V. Cable and Seal
- Vent Assembly(42)
- Transmission Mounts
- * Center Differential Locking Switch(43)
- * Seal — "O" Ring (Intermediate Case/Rear Output Housing)(44)
- * Seal — "O" Ring Electrical Connector Housing(45)
- * A-1 Transmission Assembly (removal from vehicle)(46)
- Engine Support Fixture

NOTE: Components noted with an asterisk (*) are unique to the THM A-1 Transfer Unit. The remaining components in Figure 1 are common to the THM 125/125C Transaxle.

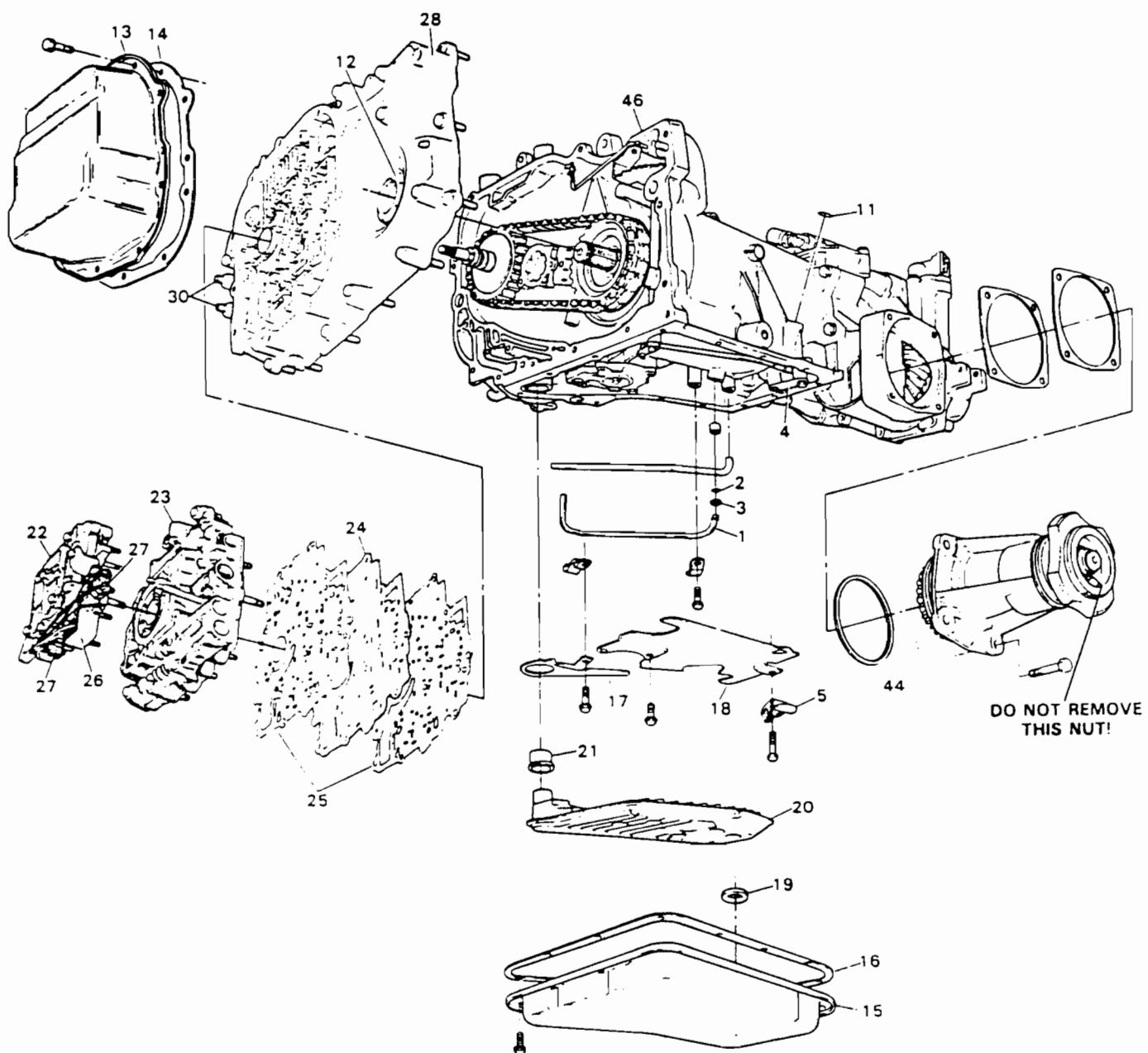
Figure 2

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



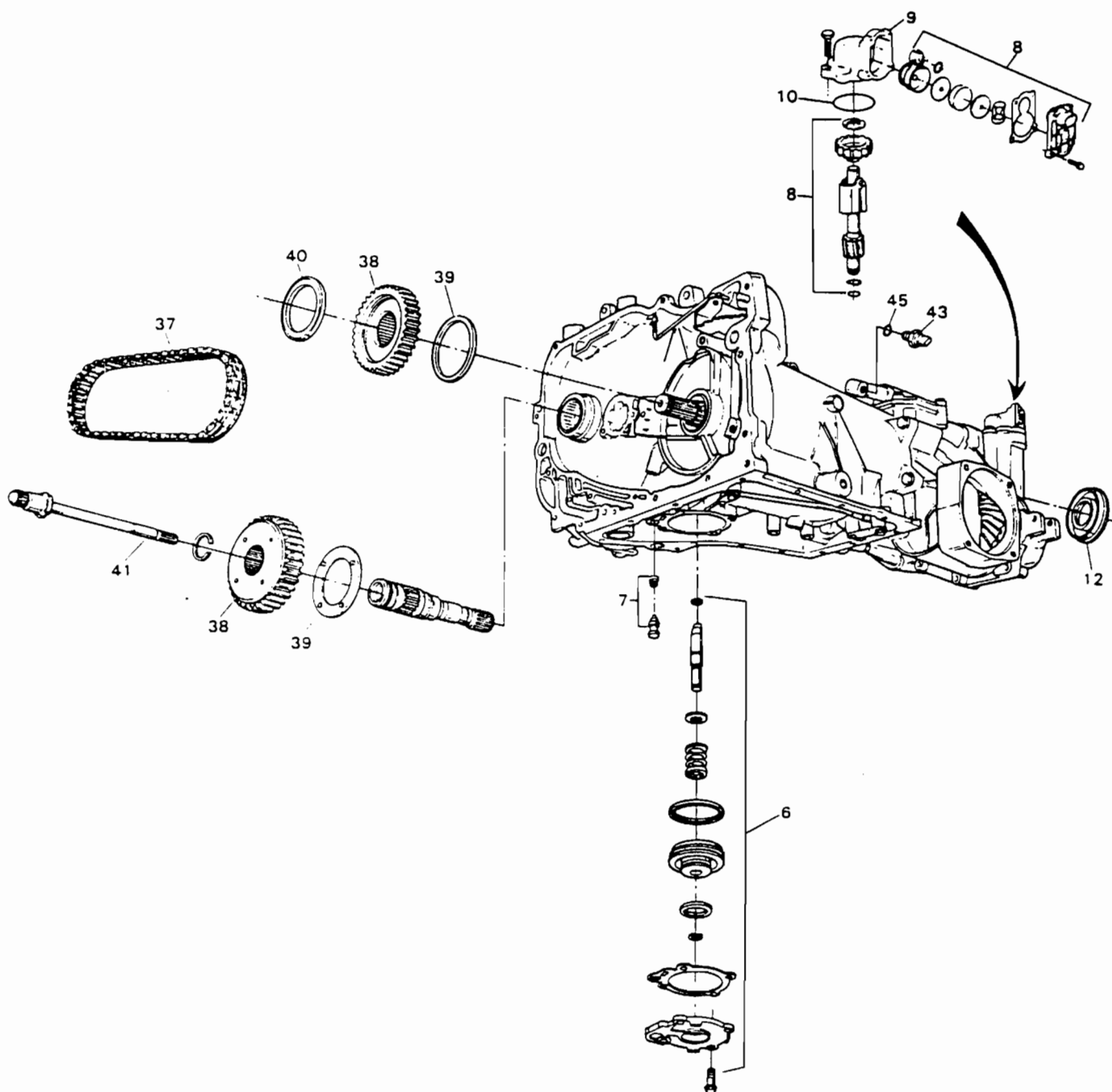
"Copyrighted Material Reprinted with Permission
from Hydra-matic Division General Motors Corp."

Figure 3



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

Figure 4



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

Figure 5

PRELIMINARY CHECK PROCEDURE

CHECK TRANSMISSION OIL LEVEL • CHECK AND ADJUST T.V. CABLE
CHECK OUTSIDE MANUAL LINKAGE AND CORRECT • CHECK ENGINE TUNE
INSTALL OIL PRESSURE GAGE* • CONNECT TACHOMETER TO ENGINE

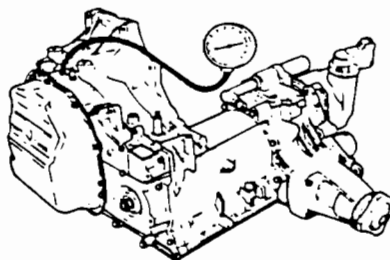
CHECK OIL PRESSURES IN THE FOLLOWING MANNER:

Minimum T.V. Line Pressure Check

Set the T.V. cable to specification; and with the brakes applied, take the line pressure readings in the ranges and at the engine r.p.m.'s indicated in the chart below.

Full T.V. Line Pressure Check

Full T.V. line pressure readings are obtained by tying or holding the T.V. cable to the full extent of its travel; and with the brakes applied, take the line pressure readings in the ranges and at the engine r.p.m.'s indicated in the chart below.



CAUTION Brakes must be applied at all times.

NOTICE Total running time for this combination not to exceed 2 minutes.

RANGE	PBS MODEL	MINIMUM T.V.		MAXIMUM T.V.	
		kPa	P.S.I.	kPa	P.S.I.
Park @ 1000 RPM		459 - 507	66 - 73	459 - 507	66 - 74
Reverse @ 1000 RPM		775 - 883	112 - 124	1926 - 2151	279 - 312
Neutral/ Drive @ 1000 RPM		459 - 505	66 - 73	1143 - 1276	166 - 185
Intermediate/ Lo @ 1000 RPM		1151 - 1267	167 - 184	1151 - 1267	167 - 184

Line pressure is basically controlled by pump output and the pressure regulator valve. In addition, line pressure is boosted in Reverse, Intermediate and Lo by the reverse boost valve.

Also, in the Neutral, Drive and Reverse positions of the selector lever, the line pressure should increase with throttle opening because of the T.V. system. The T.V. system is controlled by the T.V. cable, the throttle lever and bracket assembly and the T.V. link, as well as the control valve pump assembly.

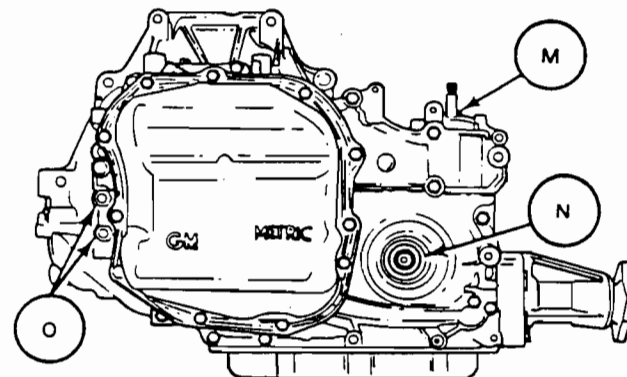
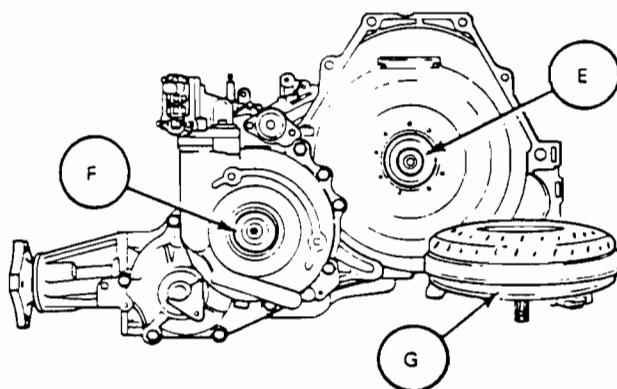
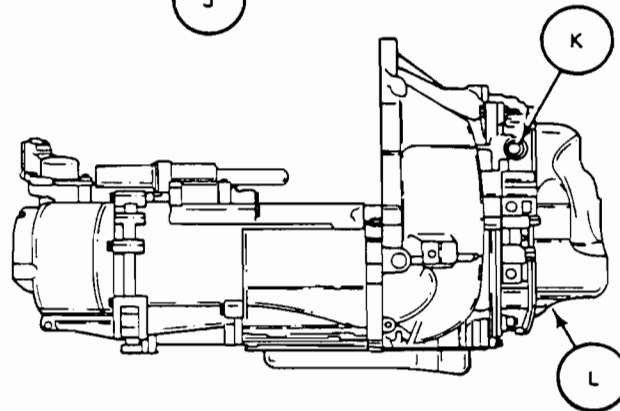
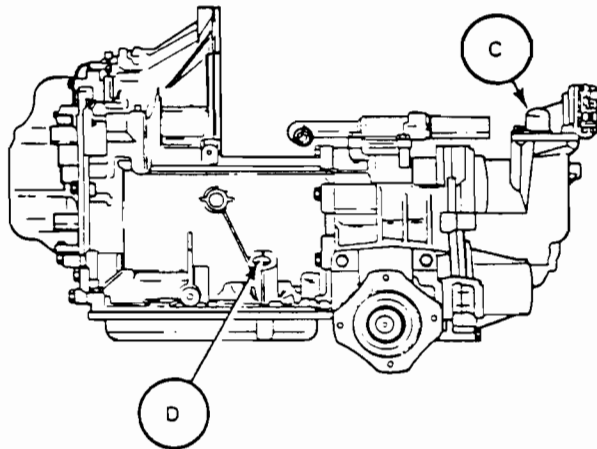
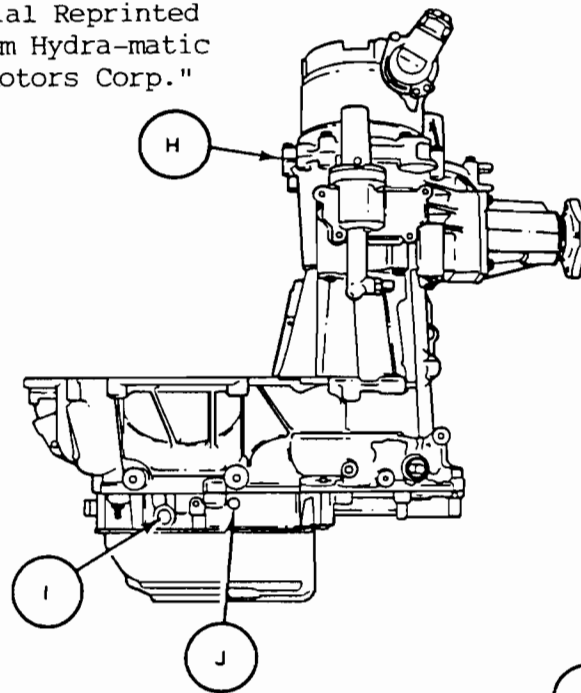
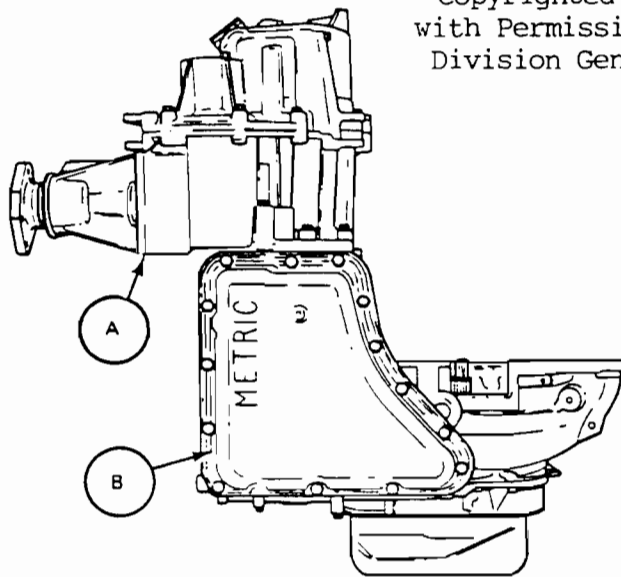
"Copyrighted Material Reprinted with Permission
from Hydra-matic Division General Motors Corp."

'THM A-1' SHIFT SPEED CHART

MODEL	FINAL DRIVE RATIO	1-2 MIN. THROTTLE	2-3 MIN. THROTTLE	3-2 PART THROTTLE	3-2 COAST DOWN	2-1 COAST DOWN	2-1 MAN LOW
PBS	2.84	9-12	20-21	43-50	18-20	6-10	43-49

Figure 6

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



- A INTERMEDIATE CASE/REAR OUTPUT HOUSING
- B OIL PAN (BOTTOM)
- C SPEED SENSOR
- D FILLER PIPE AND/OR SEAL
- E CONVERTER TO CASE SEAL
- F AXLE SEAL (RH)
- G TORQUE CONVERTER

- H CENTER DIFFERENTIAL LOCKING COVER
- I T.V. CABLE AND/OR CASE SEAL
- J OIL VENT
- K ELECTRICAL CONNECTOR
- L VALVE BODY COVER (SIDE PAN)
- M MANUAL LEVER SEAL
- N AXLE SEAL (LH)
- O COOLER FITTINGS

Figure 7

THM 200-4R

2ND GEAR STARTS

COMPLAINT: No 2-1 coastdown shift in cold weather conditions, and then may exhibit normal operating conditions after warm.

CAUSE: The cause may be an incorrect 1-2 throttle valve spring (See Figure 1). This affects ONLY 1987-1988 models CCF, CHF, CRF, CTF, CYF, and CZF.

CORRECTION: Replace the 1-2 throttle valve spring, available under OEM part number 8643619. Refer to Figure 1 for proper assembly of valves and sleeves.

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

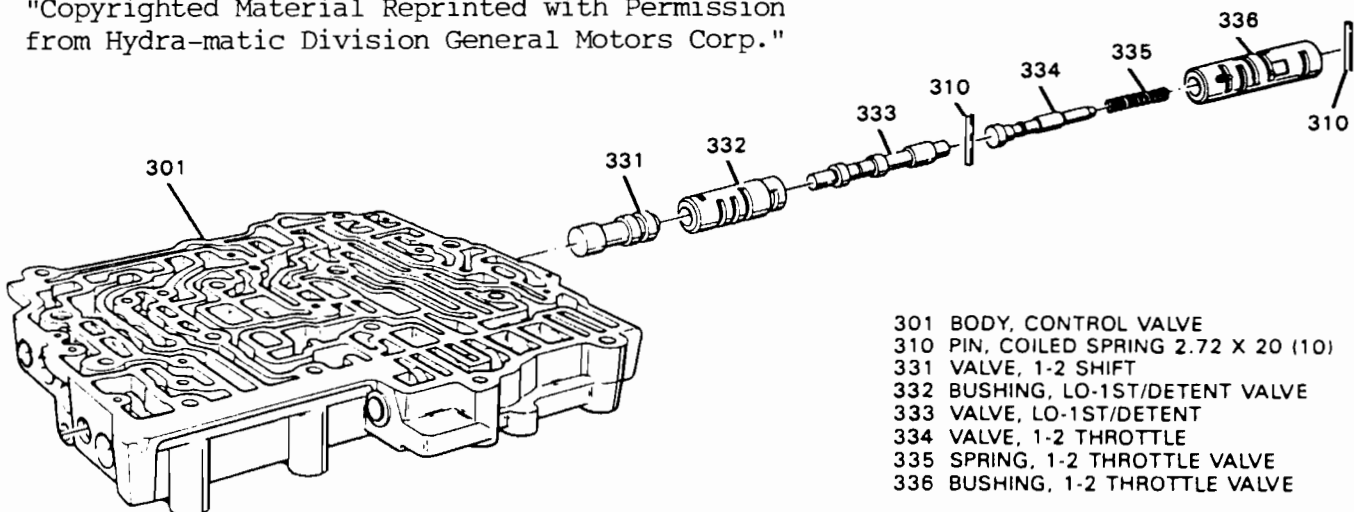


Figure 1

THM 200-4R HARSH REVERSE ENGAGEMENT

CHANGE: There has been a change made to the valve body spacer plate and the 1-2 accumulator housing on 1987 and 1988 THM 200-4R transmissions (See Figure 2 and Figure 3). This change affects the following models: 1987 or 1988 CCF, CHF, CRF, CYF, CZF, KCF, KJF, KTF.

REASON: The 1-2 accumulator will now function as a reverse accumulator also, to soften the reverse garage shift engagement.

PARTS AFFECTED:

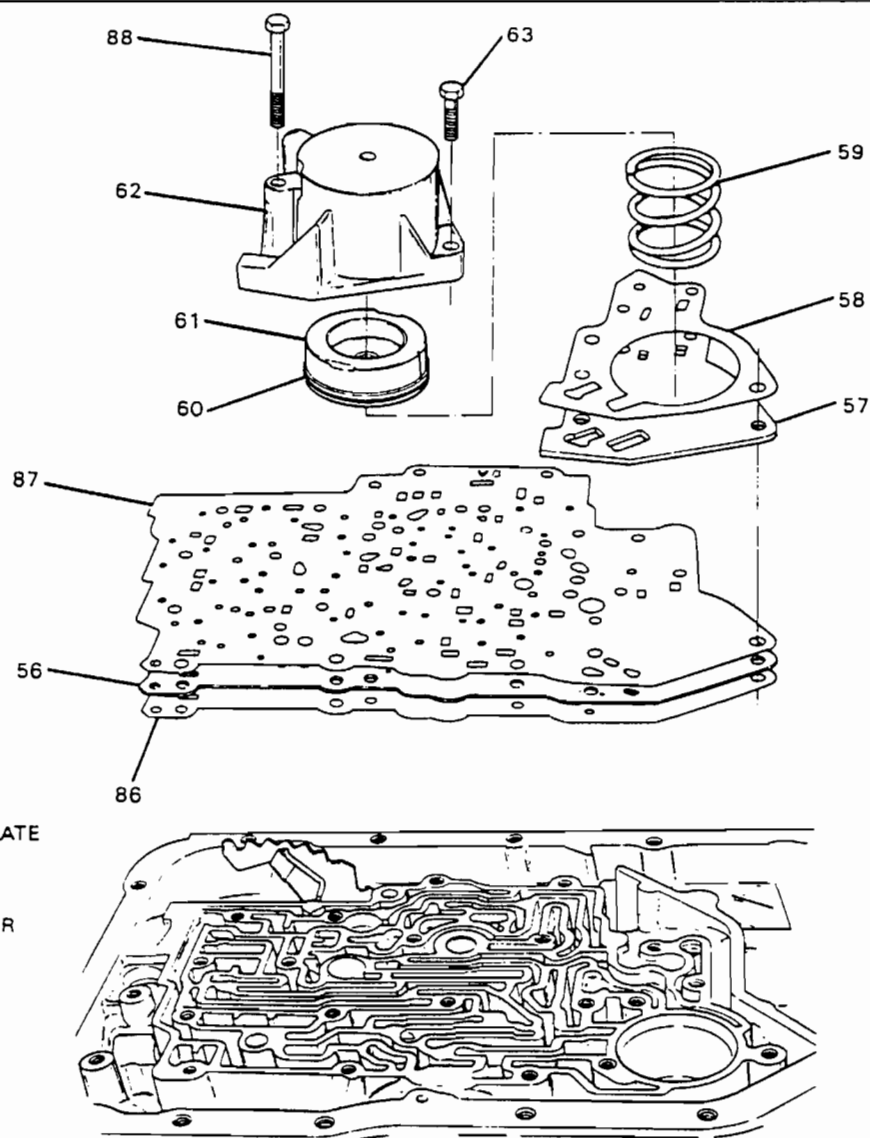
- (1) VALVE BODY SPACER PLATE - The new spacer plate has a round hole instead of the previous rectangular hole, as shown in Figure 2.
- (2) VALVE BODY GASKETS - Redesigned to accomodate the new spacer plate and accumulator housing.
- (3) ACCUMULATOR PLATE GASKET - Redesigned to accomodate the new accumulator housing and checkball assembly.
- (4) 1-2 ACCUMULATOR HOUSING - The new accumulator housing contains revised passages and a checkball and sleeve assembly as shown in Figure 3.

INTERCHANGEABILITY:

Can be used on previous models as long as "ALL" of the redesigned parts are used, and will soften the reverse garage shift engagement.

SERVICE INFORMATION:

1-2 Accumulator Housing Assembly.....	8657755
Valve Body Gaskets (2 Included).....	8643969
Accumulator Plate Gasket.....	8634166
Spacer Plate (ID Stamp "CD") 7CRF, 7CTF, 8CRF, 8CTF.....	8669050
Spacer Plate (ID Stamp "CH") 7KCF, 7KJF, 7KTF, 8KTF.....	8669060
Spacer Plate (ID Stamp "CE") 7CCF, 8CCF.....	8669051
Spacer Plate (ID Stamp "CC") 7CHF, 8CHF.....	8669049
Spacer Plate (ID Stamp "CF") 7CYF, 8CYF.....	8669052
Spacer Plate (ID Stamp "CA") 7CZF, 8CZF.....	8669047



- 56 PLATE, VALVE BODY SPACER
- 57 PLATE, ACCUMULATOR
- 58 GASKET, ACCUMULATOR HSG. TO ACCUM. PLATE
- 59 SPRING, 1-2 ACCUMULATOR PISTON
- 60 RING, OIL SEAL (1-2 ACCUMULATOR PISTON)
- 61 PISTON, 1-2 ACCUMULATOR
- 62 HOUSING & PIN ASSEMBLY, 1-2 ACCUMULATOR
- 63 BOLT, ACCUMULATOR HOUSING
- 86 GASKET, SPACER PLATE TO CASE
- 87 GASKET, VALVE BODY TO SPACER PLATE
- 88 BOLT, ACCUMULATOR HOUSING

Figure 1

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

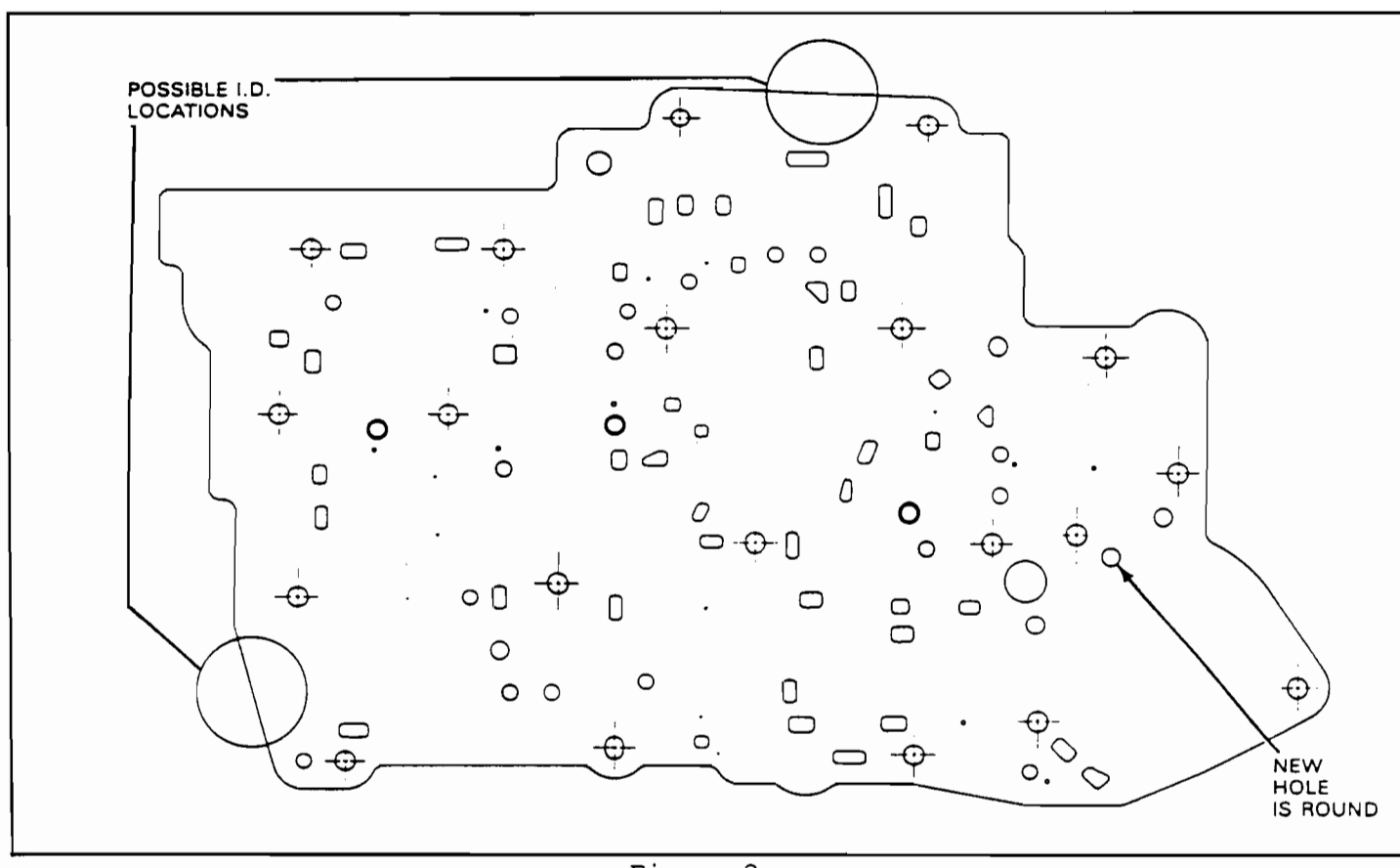


Figure 2

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

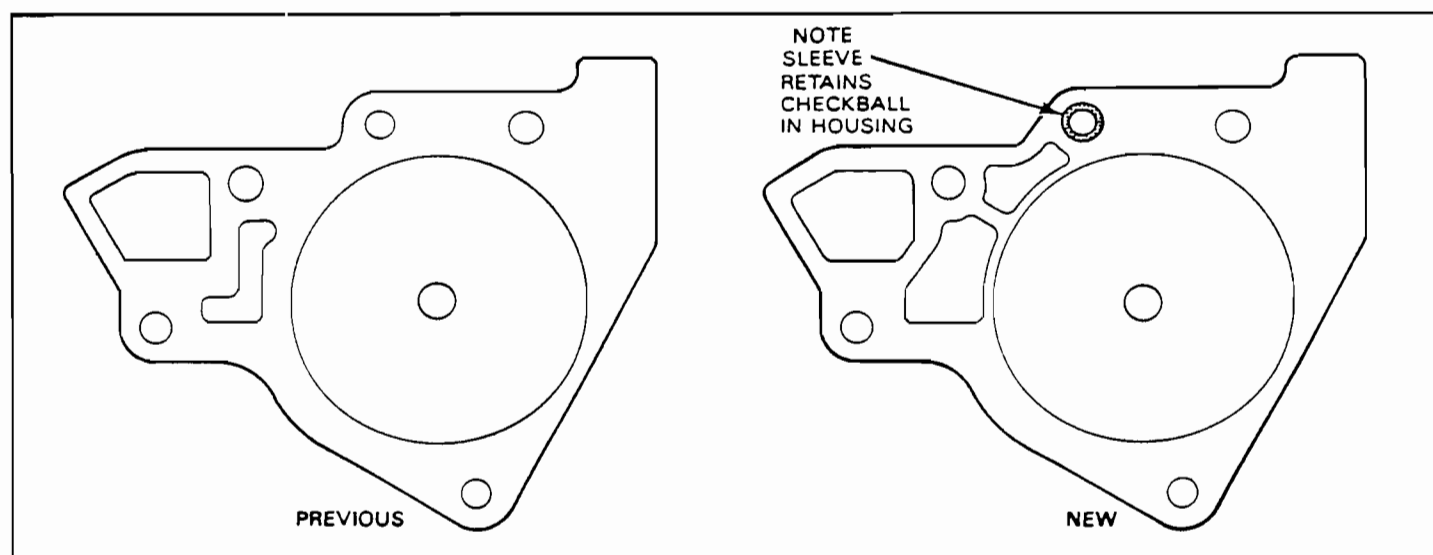


Figure 3

THM 400 NO ENGINE BRAKING IN D2

- COMPLAINT:** No engine braking when selector lever is placed in the manual second position.
May also exhibit slippage on upshifts into 2nd gear when in the drive range.
- CAUSE:** The cause may be a broken or cracked 2-3 accumulator piston in the valve body (See Figure 1).
- CORRECTION:** Replace the plastic 2-3 accumulator piston with a new die cast aluminum piston, available under OEM part number 8626883.

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

ILL. NO.	DESCRIPTION
301	BODY, CONTROL VALVE
302	RING, RETAINER (ACCUMULATOR PISTON)
303	PISTON, FRONT ACCUMULATOR
304	RING, OIL SEAL (ACCUMULATOR PISTON)
305	SPRING, FRONT ACCUMULATOR PISTON

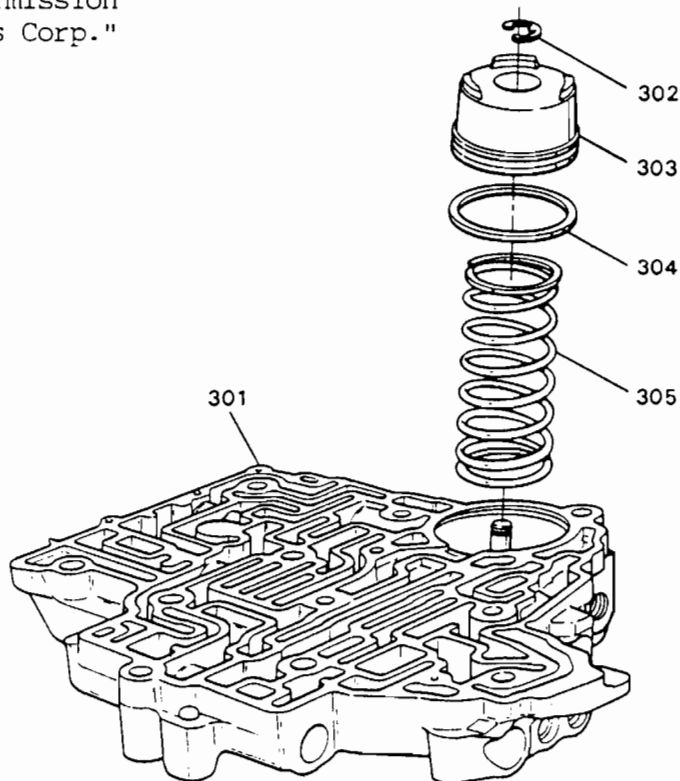
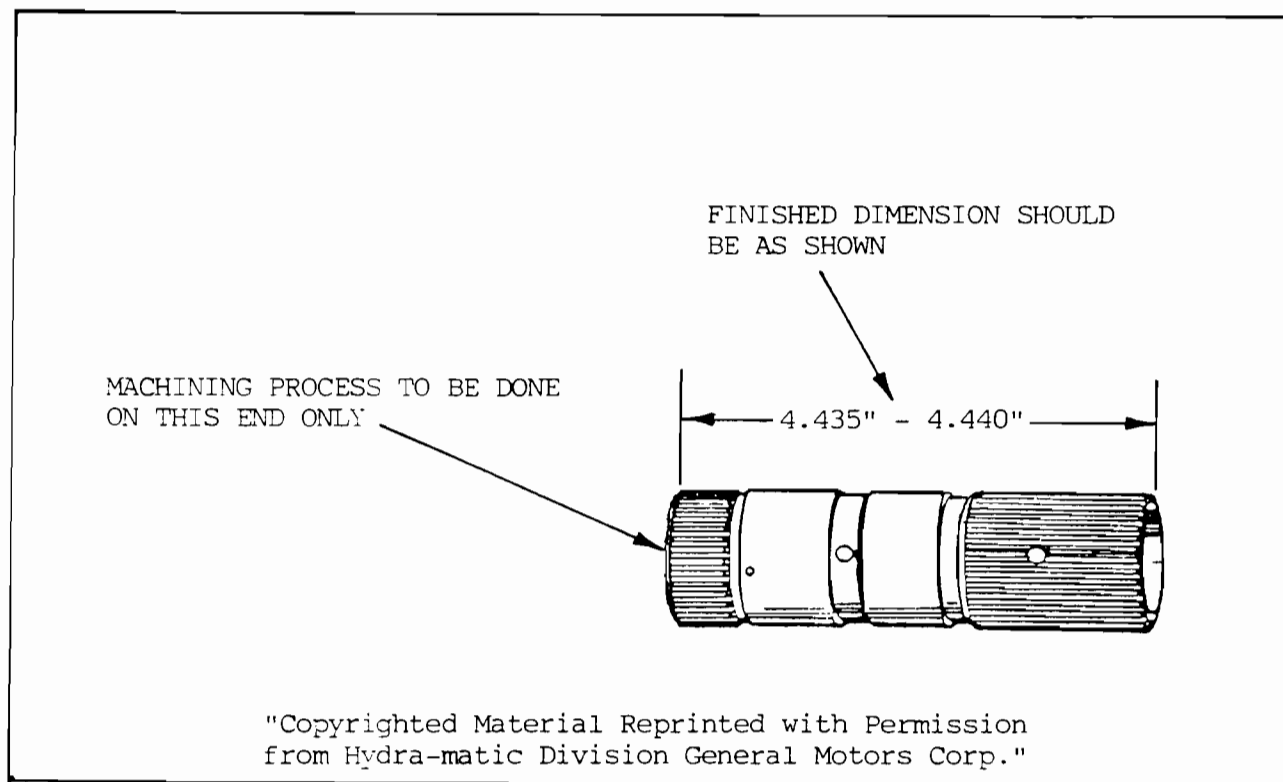


Figure 1

THM 440-T4 (4T60) LUBE DAM BROKEN

- COMPLAINT: Plastic lube dam located between the carriers (See Figure 2) in two pieces, appearing as if it had been machined.
- CAUSE: Final drive sun gear shaft is too long, and cuts plastic lube dam in half.
- CORRECTION: Machine final drive sun gear shaft, ON THE SHORT SPLINED END ONLY, to the dimension shown in Figure 1. Finished dimension should be 4.435" - 4.440". Non-machined final drive sun gear shaft will measure 4.480" - 4.490". Measure all final drive sun gear shafts to insure proper length.



Copyright 1989 ATSG

Figure 1

THM 440-T4 HARSH 3-2 DOWNSHIFT

COMPLAINT: Harsh 3-2 part throttle, or full throttle downshift

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" in this bulletin for proper part numbers, and refer to Figure 1 for installation procedure.

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

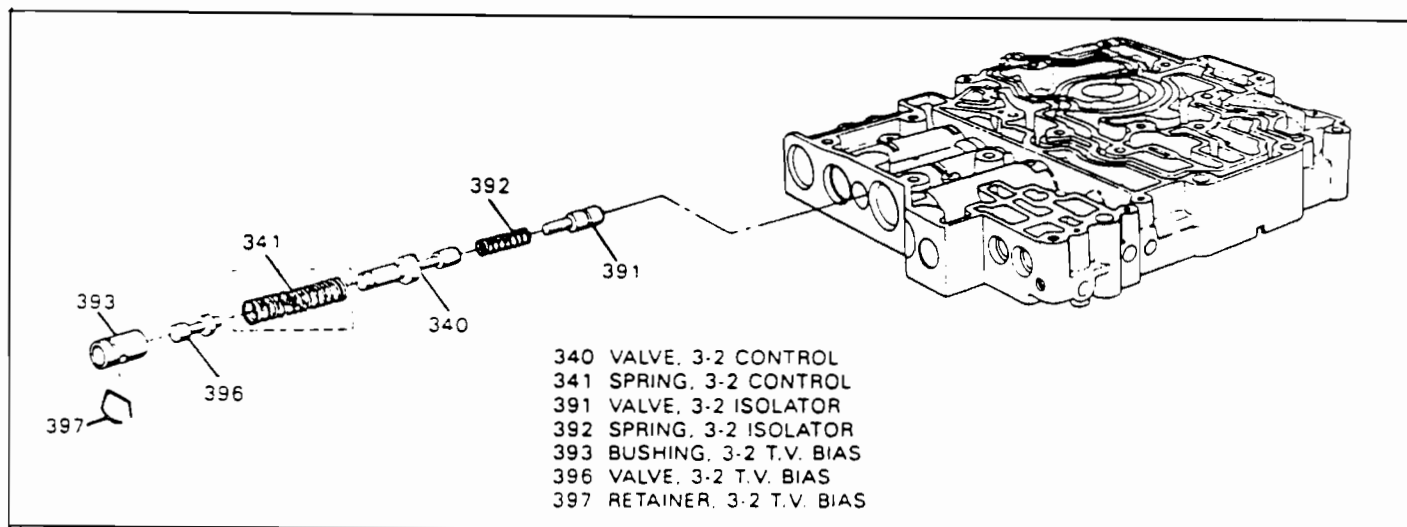


Figure 1

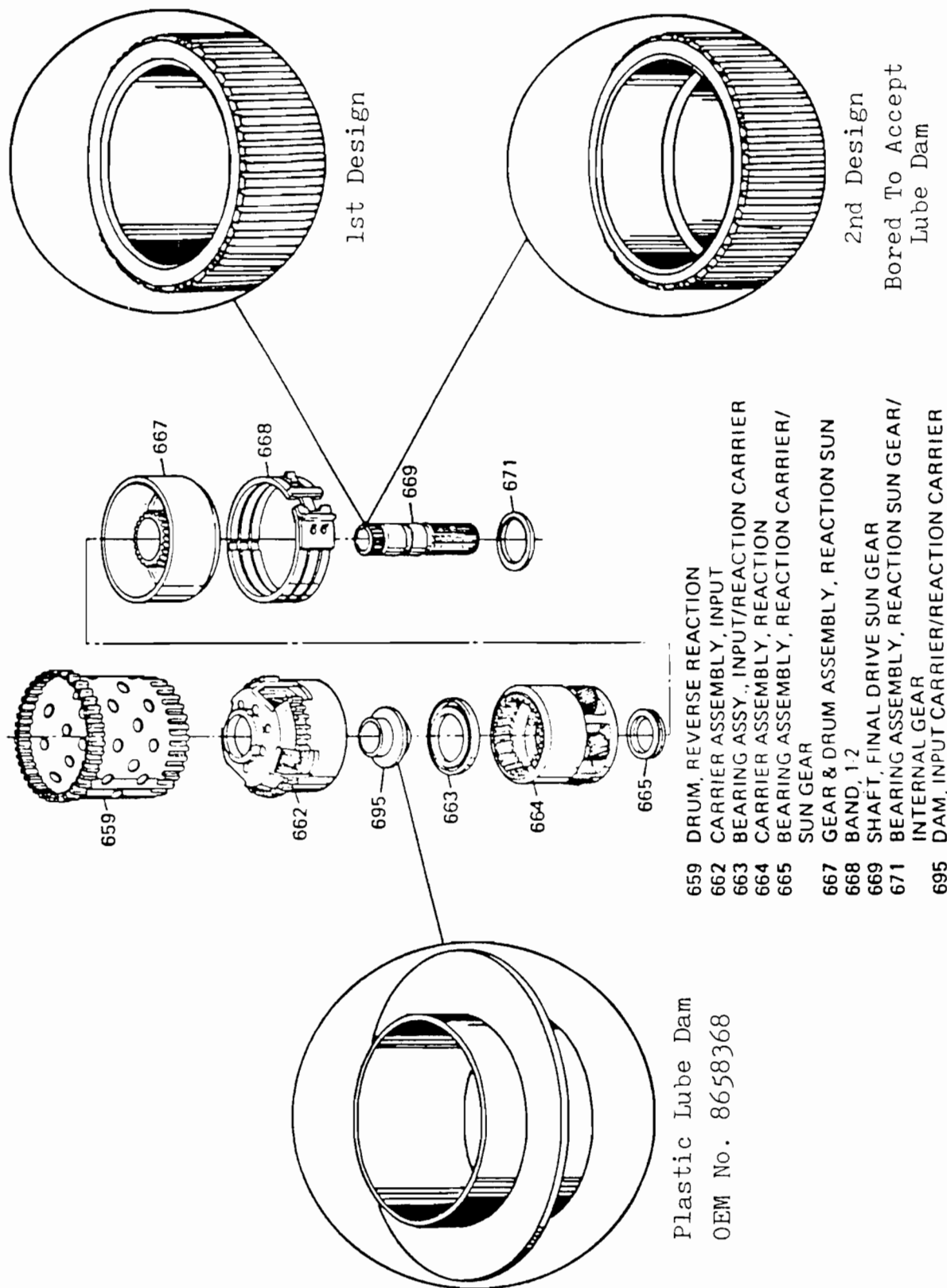
SERVICE INFORMATION:

HIGH ALTITUDE ONLY (Above 4000 Feet)

<u>Transaxle Model</u>	<u>Part Number</u>
8FCH.....	8646979
7FCH, 7FZH.....	8646979
6BCH, 6BDH, 6BMH, 6BZH, 6FCH, 6FZH.....	8646979
5BX.....	8646979
6BAH.....	8646980
6ACH, 6AWH.....	8646981
5AC, 5AY, 5BW.....	8646981
8BKH, 8FBH.....	8646982
7FBH, 7FKH.....	8646982
6AAH, 6AMH, 6AFH, 6APH, 6ASH, 6AYH, 6BBH, 6BHH, 6FBH.....	8646982
5AM.....	8646982
6CMH, 6CNH, 6CFH.....	8646983
5CM, 5CN.....	8646983
6BLH, 6BTH, 6BYH.....	8646992
8BJH, 8BRH, 8BTH, 8BYH, 8FJH.....	8646993
7FJH, 7FNH, 7FRH, 7FTH.....	8646993
6FTH, 6FYH.....	8646993
5BR, 5CP, 5CW.....	8646993
5BV.....	8646994

LOW ALTITUDE ONLY (Below 4000 Feet)

<u>Transaxle Model</u>	<u>Part Number</u>
8BJH, 8BTH, 8BYH, 8FJH.....	8646979
7FJH, 7FNH, 7FRH, 7FTH.....	8646979
6BAH, 6BLH, 6BTH, 6BYH, 6FTH, 6FYH.....	8646979
8BRH.....	8646980
6BBH.....	8646981
6BHH.....	8646982
8BKH, 8FBH.....	8646993
7FBH, 7FKH.....	8646993
6FBH.....	8646993
6CFH, 6CMH, 6CNH.....	8646994
6BCH, 6BDH, 6BMH, 6BZH.....	8662907
8FCH.....	8662932
7FCH, 7FZH.....	8662932
6FCH, 6FZH.....	8662932



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

Figure 2

1989 THM 440-T4
PREMATURE INPUT OR 3rd CLUTCH FAILURE

COMPLAINT: 1. Intermittent slip in forward and/or reverse.
2. Intermittent slip or flare on the 2-3 shift.

CAUSE: The cause may be due to one or more undersized input shaft oil sealing rings that feed both the input clutch and 3rd clutch. The sealing rings should take up most or all of the groove width (See Figure 1). Thin sealing rings may be found in any groove location, and will be about half the normal thickness. Proper width seals are .108" thick.

CORRECTION: Install proper width sealing rings on the input housing, following procedures outlined in the ATSG service manual. The sealing rings are solid and require special installation and re-sizing tools. The sealing rings are available under OEM Part No. 8656342.

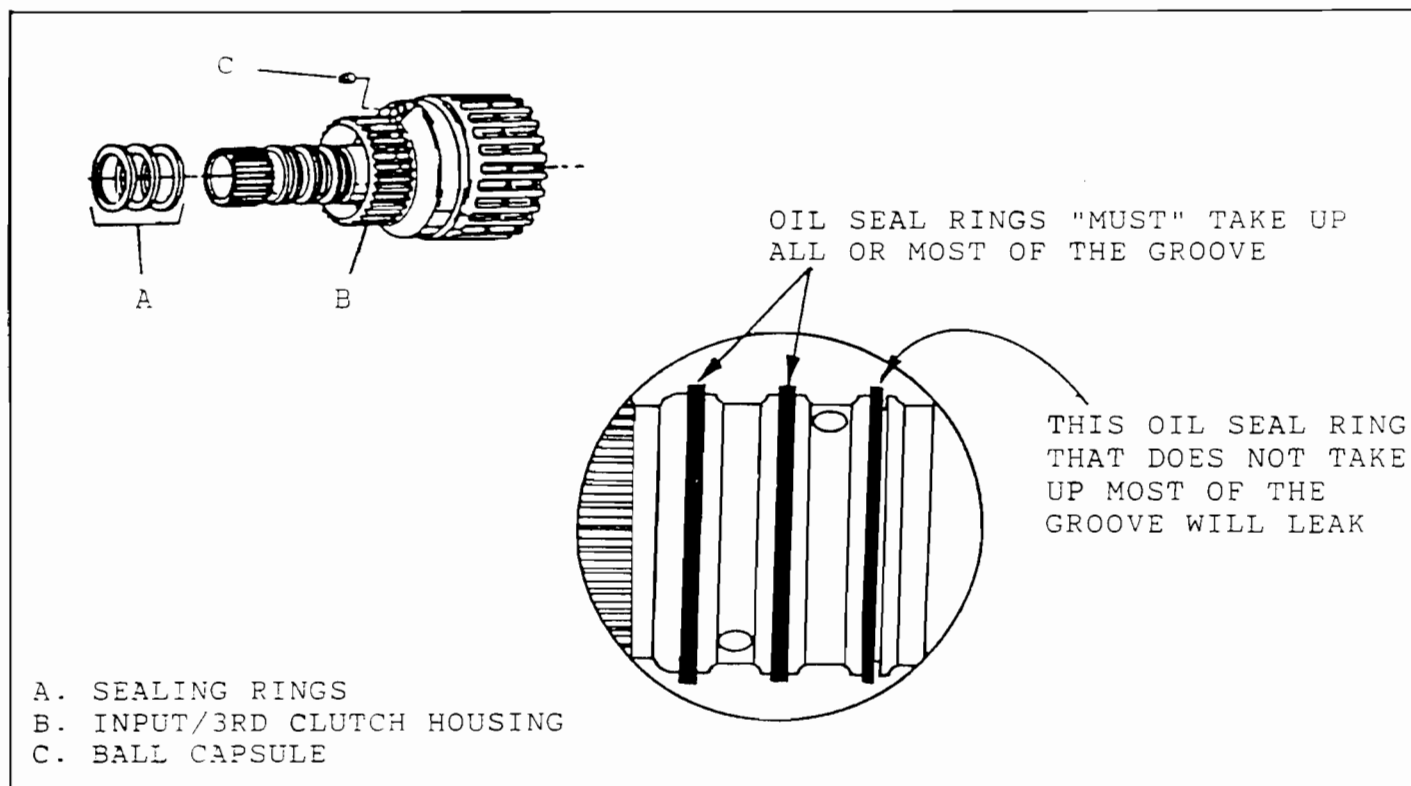


Figure 1

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 to sufficiently apply the 2nd clutch pack.

CORRECTION: Shorten the modulator boost valve spring by 1/8", or approximately 1 coil. 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 1). 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 some valve body kits on the market that have a spring that you are told to install in this location. There are currently 3 different diameters of modulator boost valves, and 3 different spring calibrations. There is no way that 1 spring will operate "Properly" in all 3 applications.

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

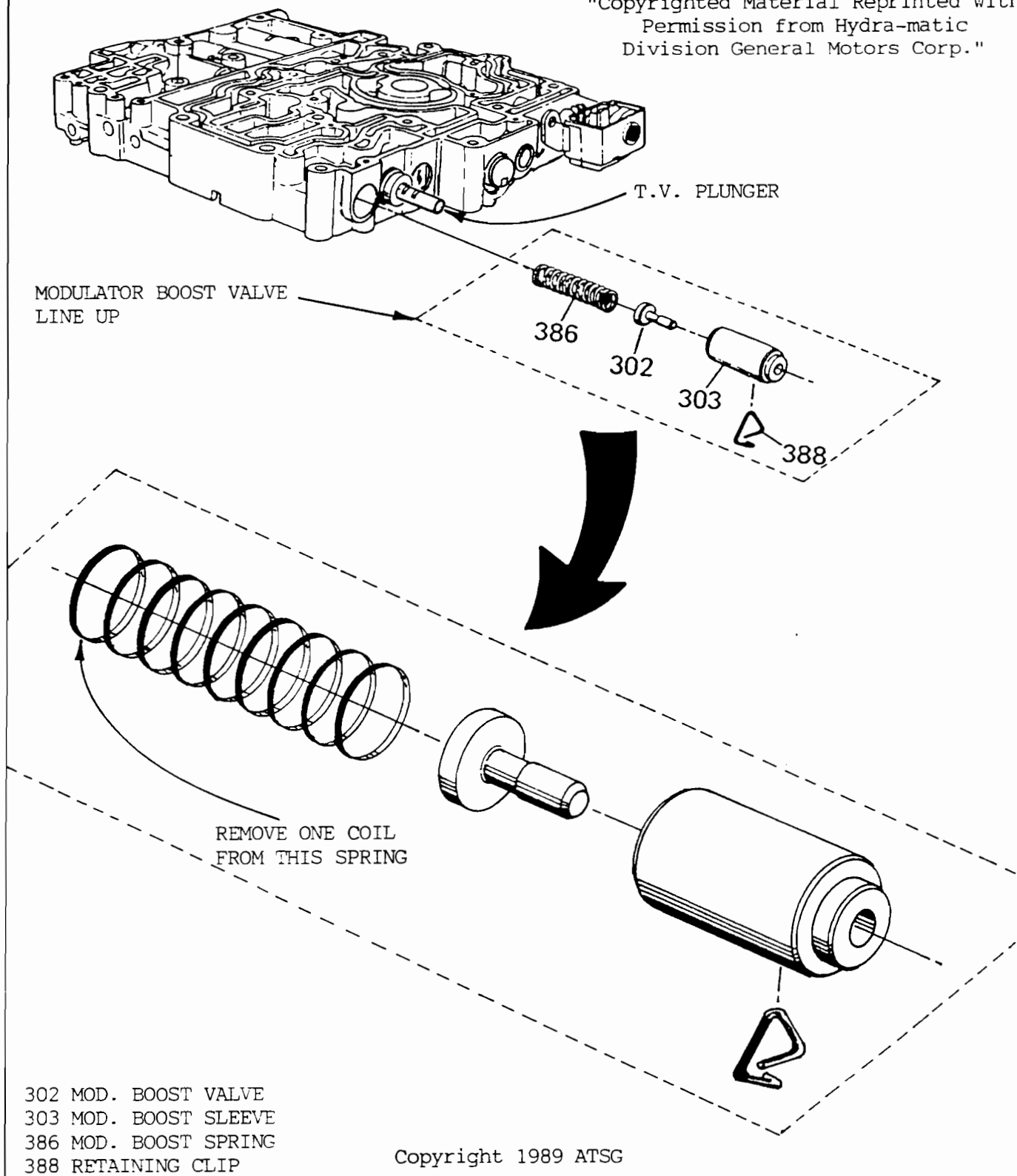


Figure 1

THM 440-T4

3RD ROLLER CLUTCH AND INPUT SPRAG FAILURE

COMPLAINT: Repeated failure of the 3rd roller clutch and/or the input sprag.

CAUSE: Lack of lube oil to 3rd roller clutch and input sprag.

CORRECTION: Modification as follows, of the parts indicated, will increase lube flow to both the 3rd roller clutch and the input sprag.

1. MODIFY OUTPUT SHAFT:
Grind four (4) flats on the output shaft at the front of the bearing in the locations shown in Figure 1.
2. MODIFY OUTPUT SHAFT BEARING:
Remove individual needle bearings as shown in Figure 2, in three equally spaced locations around the bearing, to provide three "Troughs" for additional lube oil to flow. Removing the needles does not impair the durability of the bearing assembly.
3. MODIFY ASSEMBLY PROCEDURE:
When installing the sprag assembly onto the input sun gear, align one of the three lube oil holes in the inner race, with one of the two lube oil holes in the input sun gear, as shown in Figure 3.

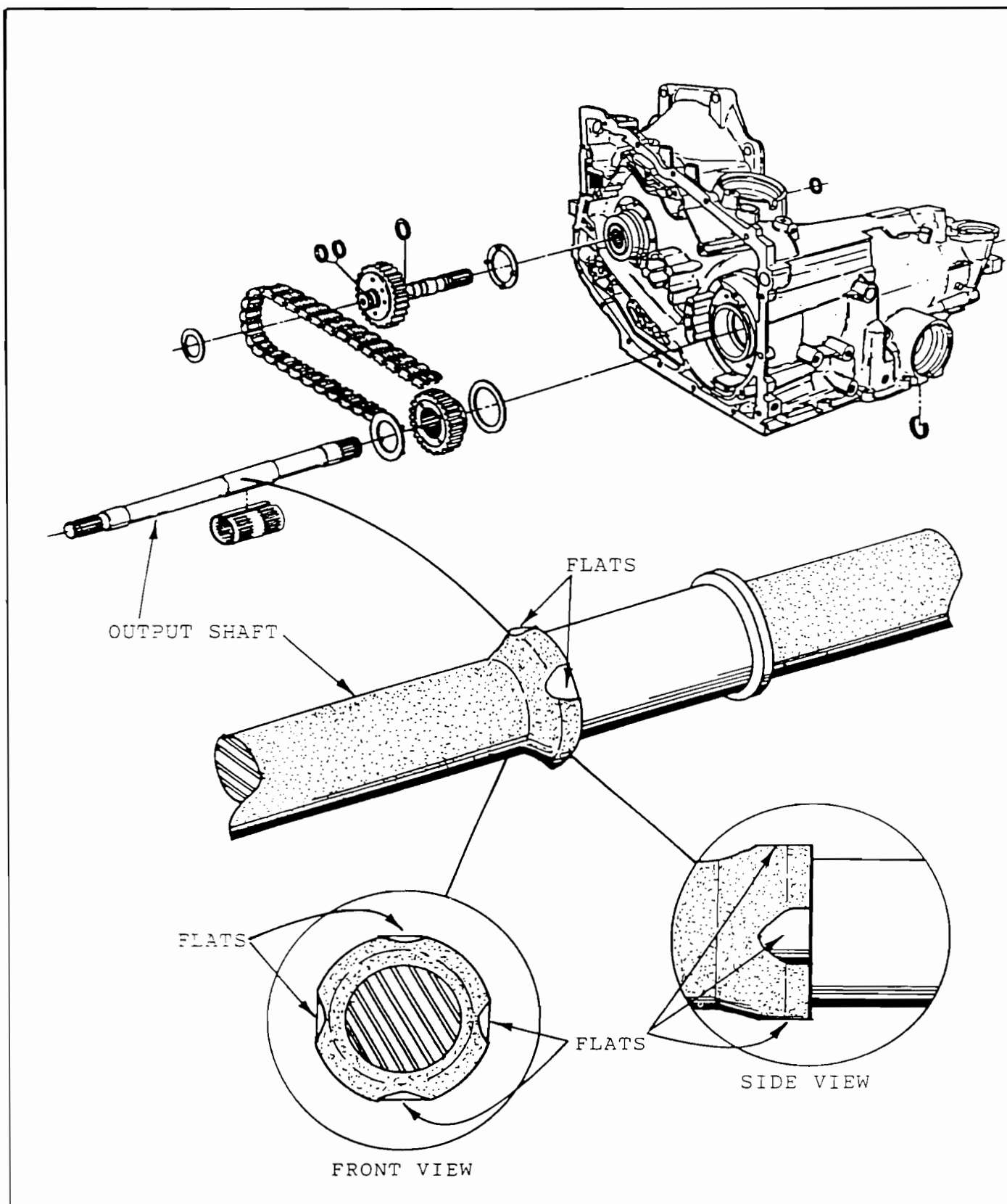
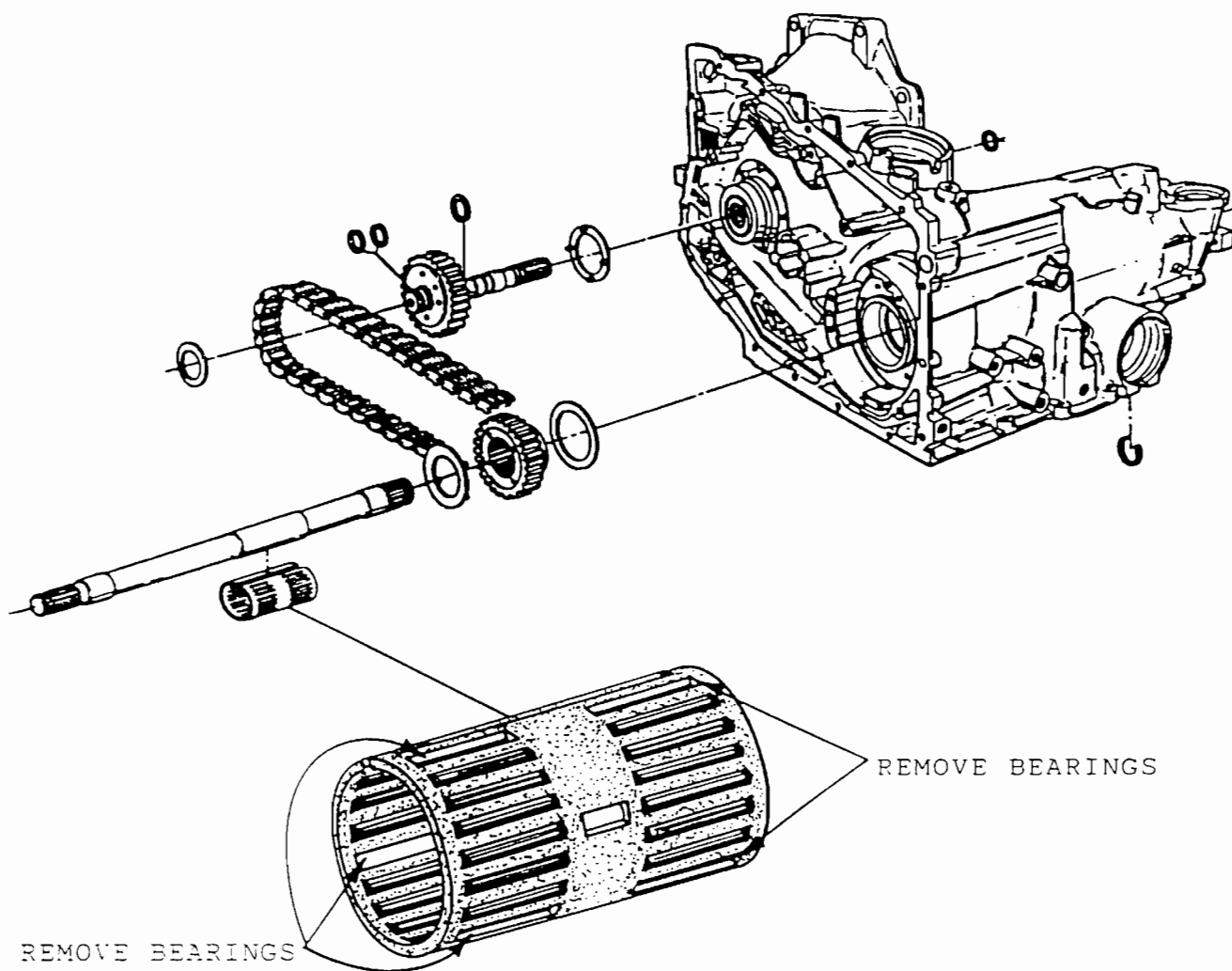


Figure 1



REMOVE INDIVIDUAL NEEDLE BEARINGS IN THREE EQUALLY SPACED LOCATIONS AROUND THE BEARING TO PROVIDE THREE "TROUGHES" FOR ADDITIONAL LUBE OIL TO FLOW.

Figure 2

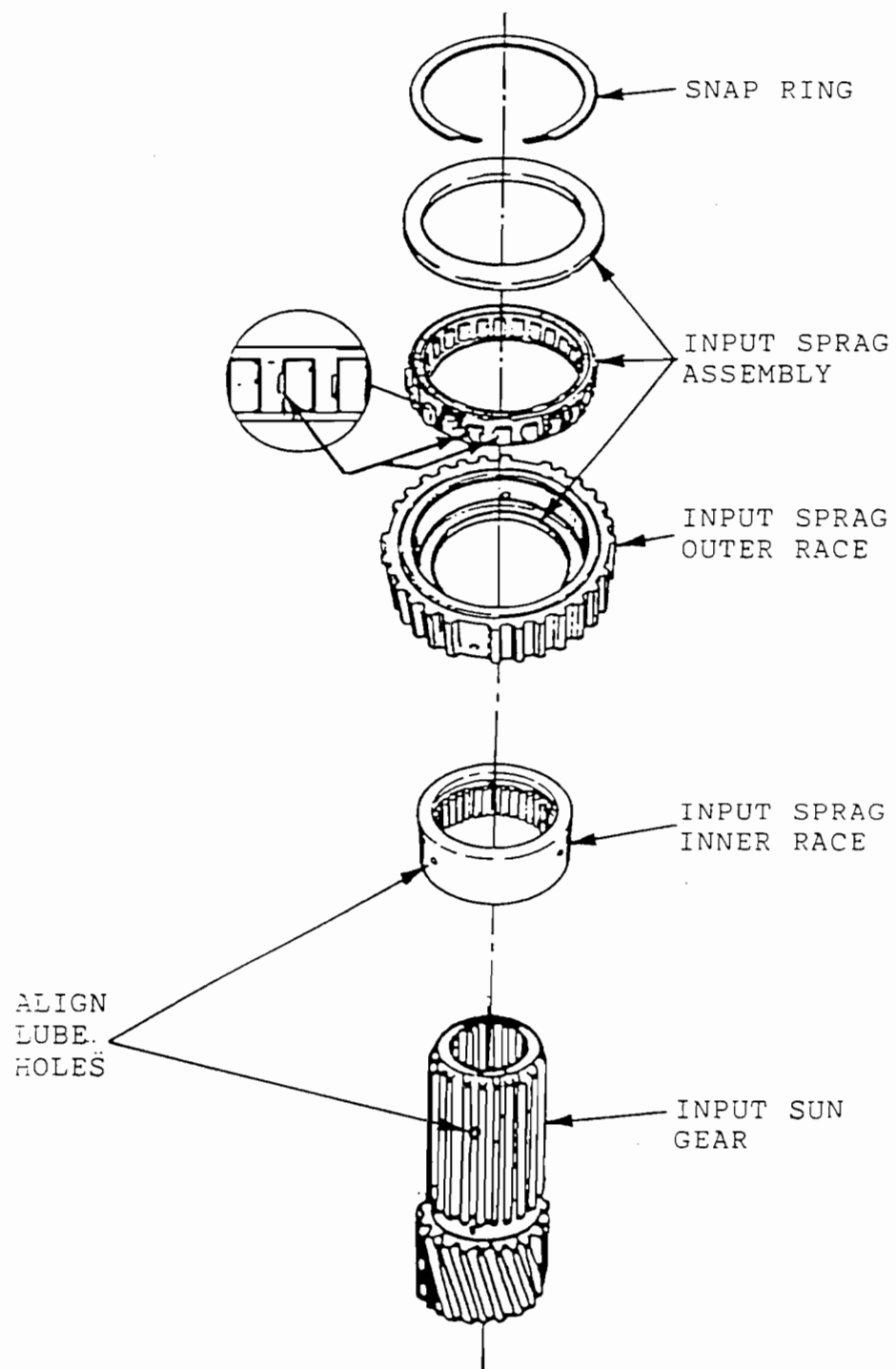


Figure 3

THM 440-T4 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 about 45 PSI.

CORRECTION: There is now available from the aftermarket suppliers a spring for the converter clutch regulator valve that raises the apply pressure to 61 PSI, and eliminates converter clutch shudder (See Figure 1).

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

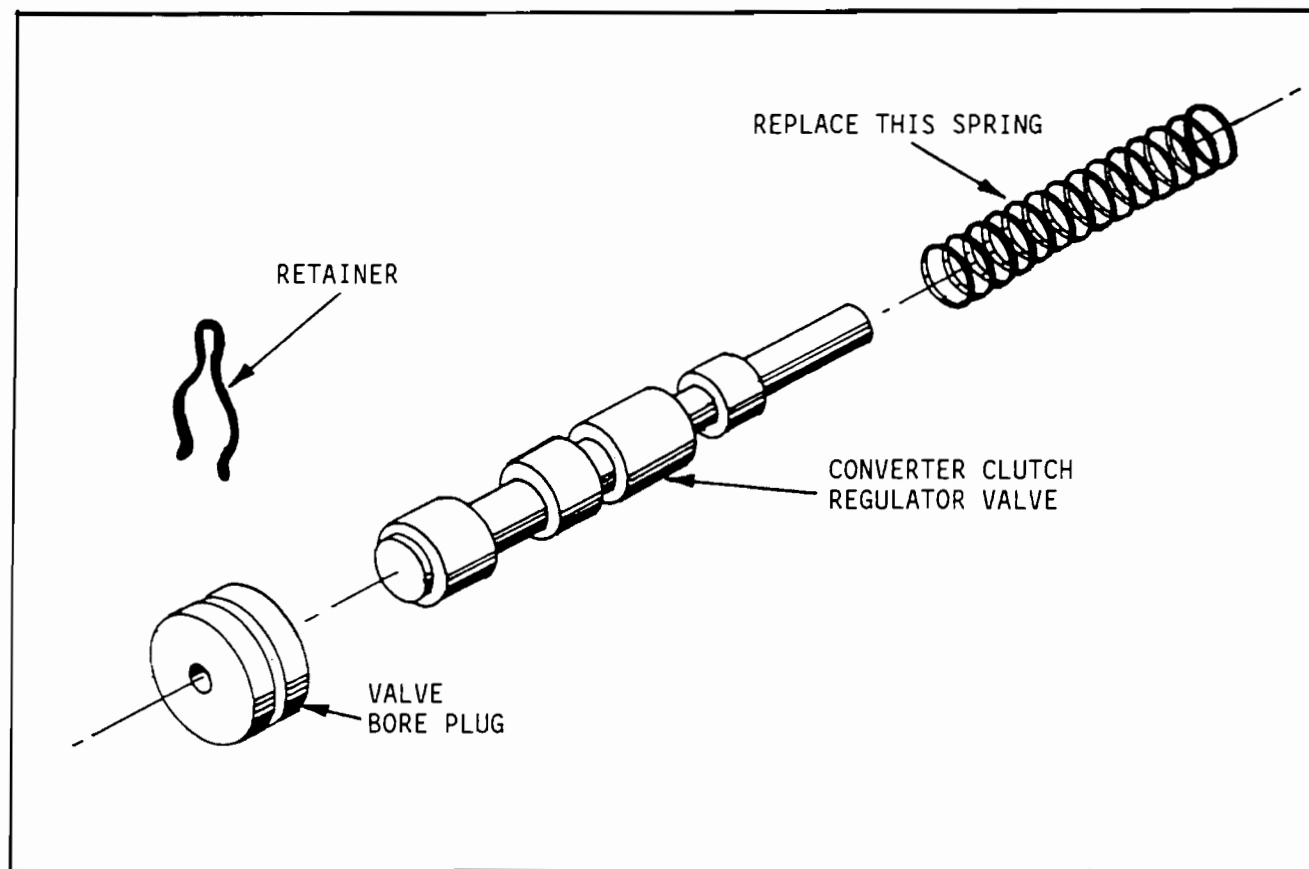


Figure 1

AUTOMATIC TRANSMISSION SERVICE GROUP

THM 440-T4 (4T60)

INTERMITTENT LOSS OF DRIVE ONLY

COMPLAINT: Intermittent loss of drive only, on any THM 440-T4 transaxle.
The vehicle will still have reverse.

CAUSE: The cause may be the 1-2 Band Stop (139) being below specification, allowing the 1-2 band to shift off location causing the 1-2 band apply pin to miss the 1-2 band while stroking, and creating a loss of drive only. You will still have reverse.

CORRECTION: Replace the 1-2 Band Stop (In The Vehicle) using the following procedure;

1. Remove the bottom transaxle oil pan, and oil filter.
2. Using a 3/16" punch and hammer, tap the black plastic adjusting tab in the center of the 1-2 band stop, into the 1-2 Band Stop Assembly, just enough so that the stop can be removed with pliers. (See Figure 1).
3. Install a "New" 1-2 band stop into the J-38229 installation tool, then push the 1-2 band stop into the hole in the case and while pushing up on the base, squeeze the handle of J-38229 installation tool to its preset stop (See Figure 2).
4. Cut off the remaining adjusting tab with diagonels, as shown in Figure 3.
5. The 1-2 band stop height can be checked during a overhaul. First ensure that the stop is not loose in the case. With the transaxle dis-assembled, the 1-2 band stop should protrude 9/16" through the case as shown in Figure 4.

SERVICE INFORMATION:

1-2 Band Stop Assembly (1984-1990)..... 8649302
1-2 Band Stop Installation Tool (Kent-Moore)..... J-38229

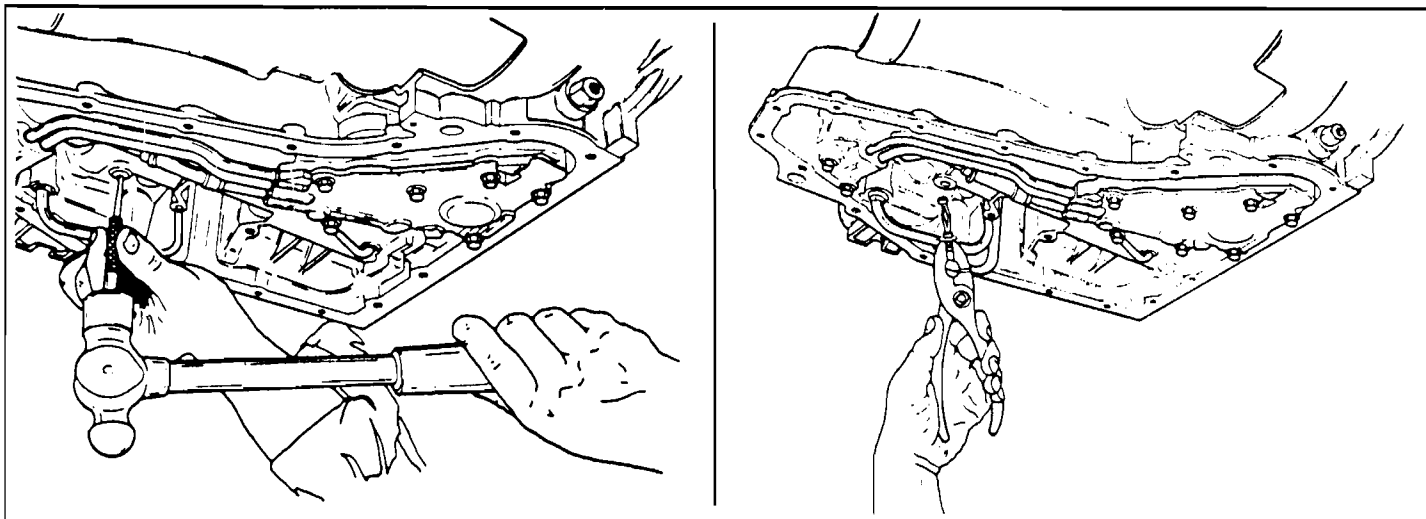


Figure 1

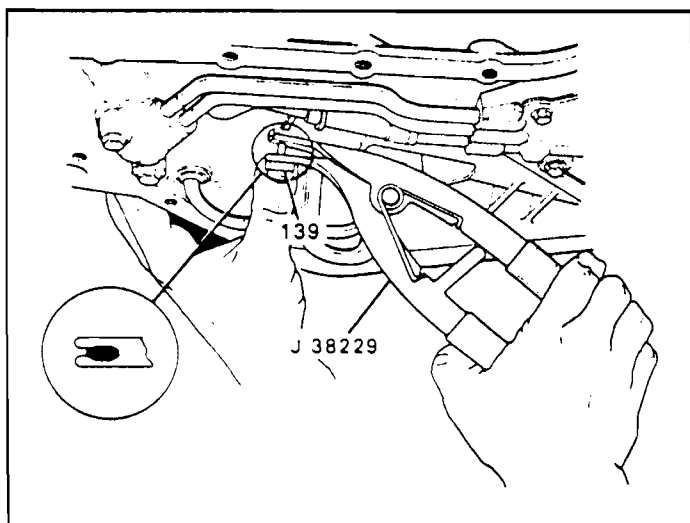


Figure 2

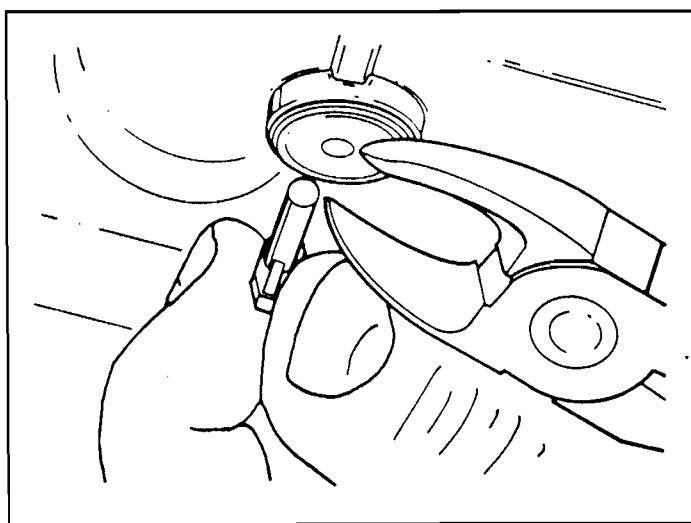


Figure 3

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

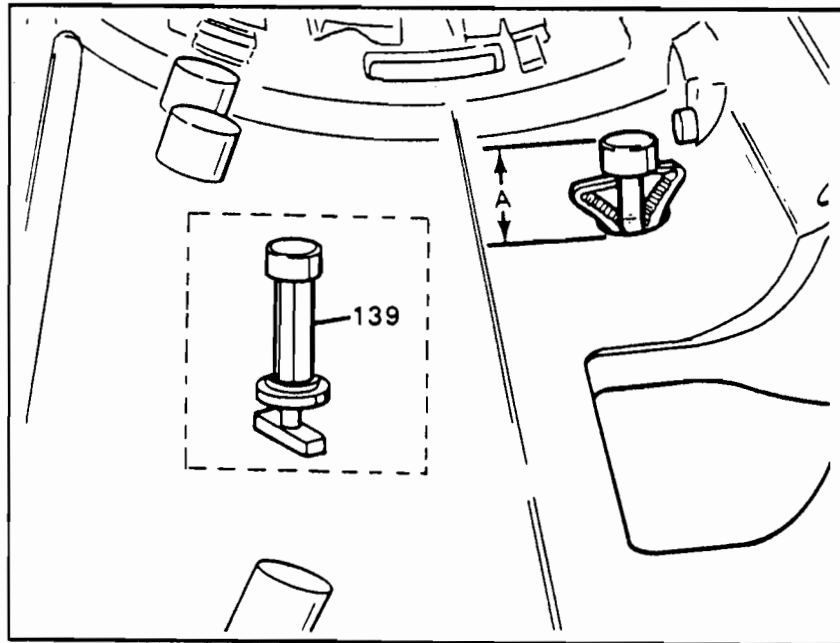


Figure 4

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

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 large screw driver through the hole in case.
- (2) Install selective washer and the bearing on the input housing.
- (3) Install driven sprocket support into the case.
- (4) Measure with feeler gage and straight edge, the distance between the driven sprocket support and the case (See Figure 1).

NOTE: DRIVEN SPROCKET SUPPORT MUST "ALWAYS" BE BELOW THE CASE SURFACE.

- (5) Measurement should be, minimum .006" and maximum .012".

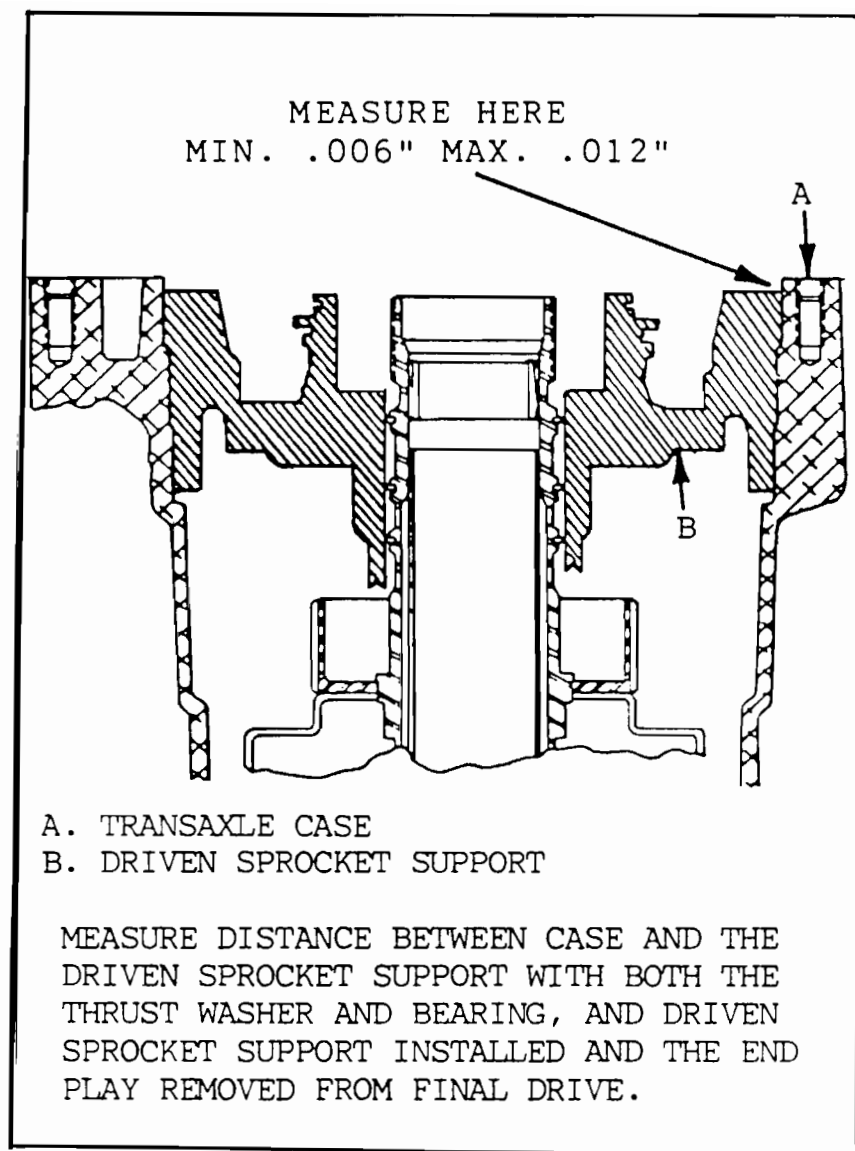


Figure 1

THM 440-T4 (4L60)

REVISED SERVO PIN DIMENSIONS

For revised 1-2 servo pin dimensions, and part numbers, refer to Figure 1.

For revised reverse servo pin dimensions, and part numbers, refer to Figure 2.

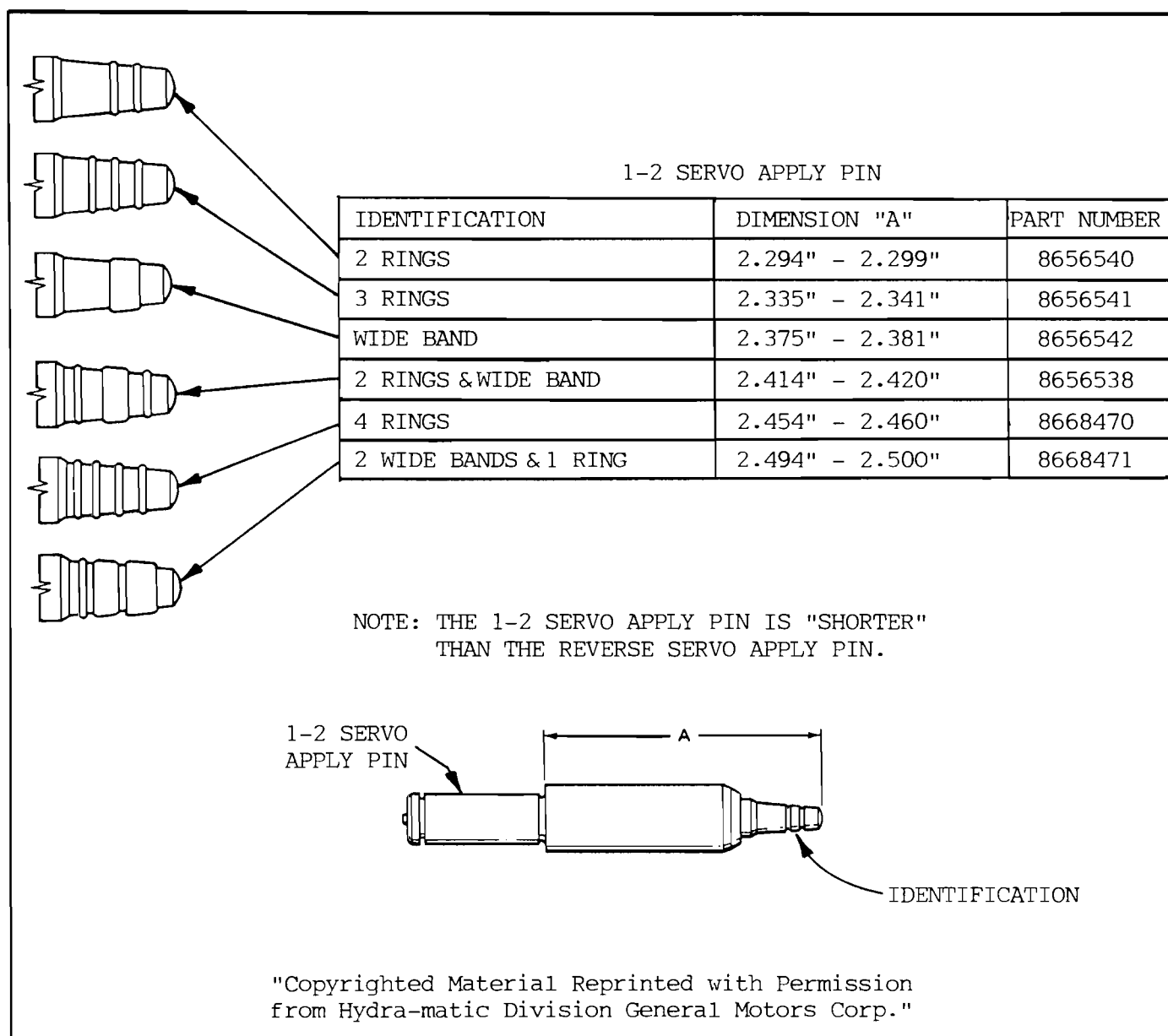


Figure 1

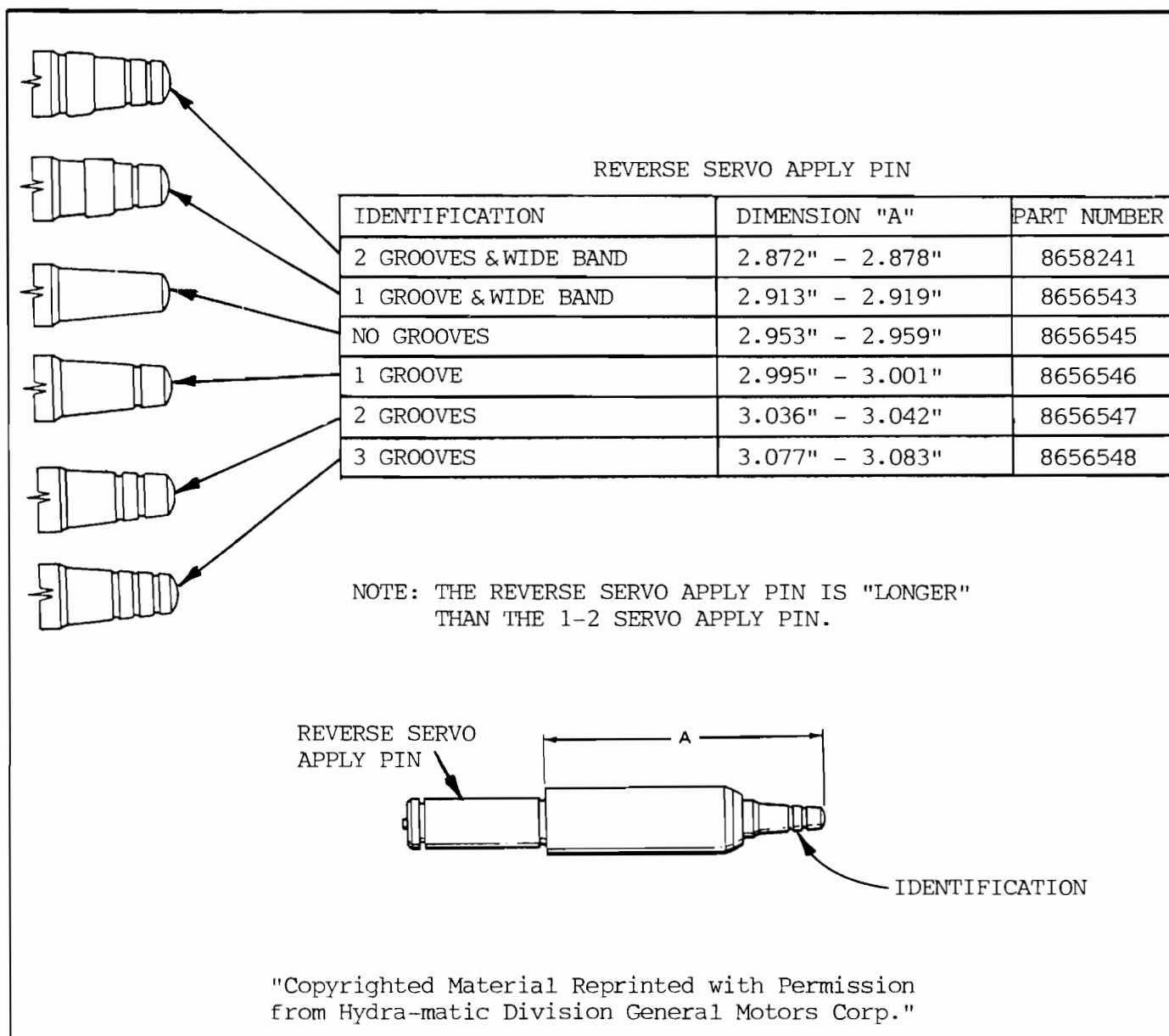


Figure 2

1989 125C AND 440-T4

FINAL DRIVE WEAR

COMPLAINT: On 1989 models only, a garage shift clunk when selecting any gear from park or neutral, and/or, noise when turning especially in tight turns. In severe cases it will "Resemble" limited slip differential that needs additive, and sometimes breaks the transaxle case in the final drive area.

CAUSE: The cause may be a worn or gaulded differential pinion shaft that supports the two pinions in the final drive (See Figure 1). The black coating flakes off of the pinion shaft because of improper hardening at the manufacturer.

CORRECTION: Inspect the differential pinion shaft for wear in the pinion gear area (See Figure 1). If the pinion shaft is worn (Black Coating Gone), replace the pinion shaft and both pinion gears. The pinion shaft and pinion gears in the 1989 models are different dimensions than the previous models and will not interchange. If the pinions are seized to the pinion shaft, then the entire final drive assembly should be replaced. Make certain that you select the same final drive ratio.

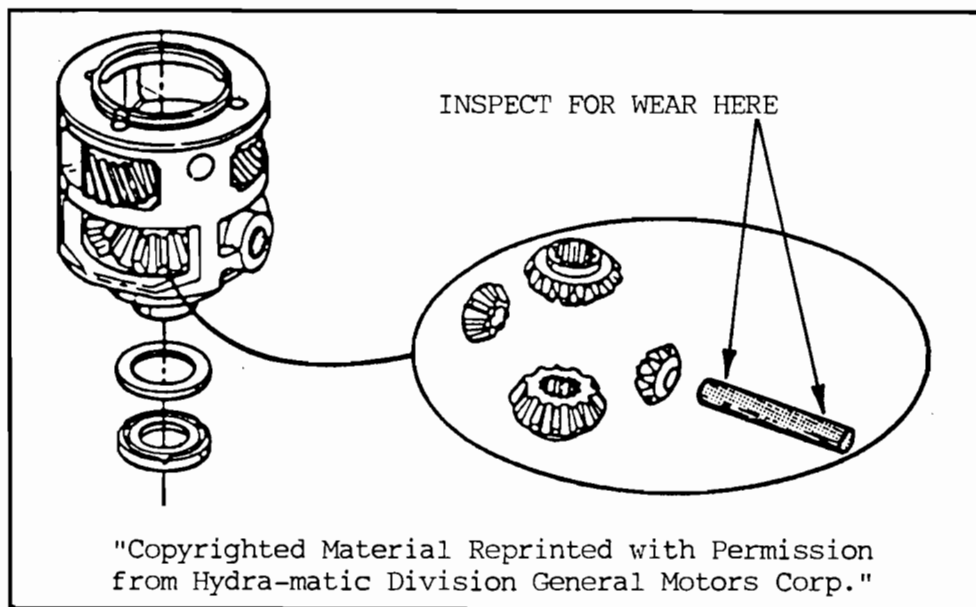


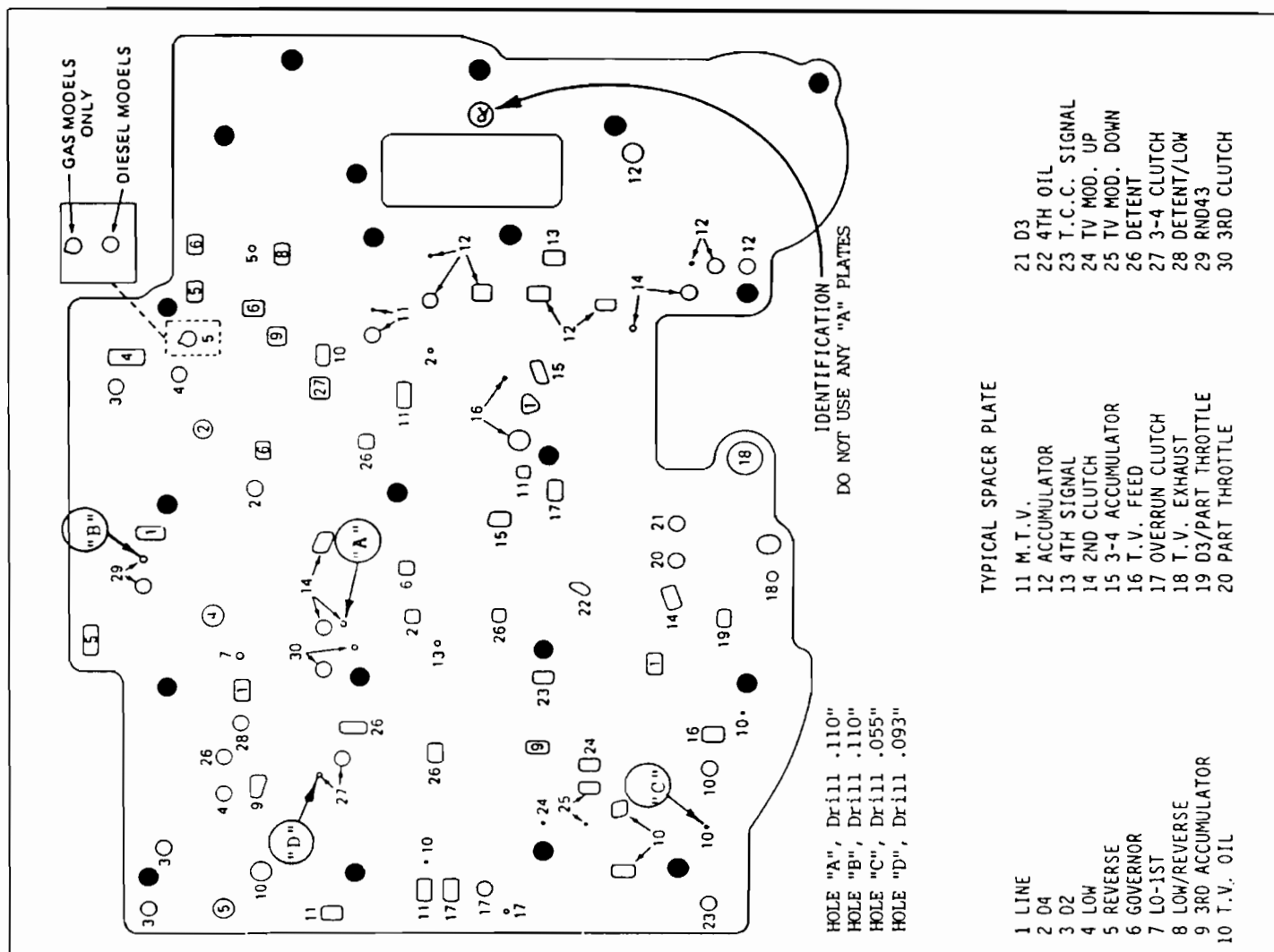
Figure 1

THM 700-R4 (4L60) SOFT UPSHIFTS

COMPLAINT: Soft or mushy upshifts on any THM 700-R4 transmission.

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

CORRECTION: Drill spacer plate at locations shown in Figure below, using drill sizes indicated.



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

THM 700-R4 NEW DESIGN LIP SEALS

CHANGE: Beginning on February 28, 1989 (Julian Date 059), all 1989 THM 700-R4 transmissions were built using lip seals with the new short lip design, on pistons designated with an asterisk in the "Service Information" section of this bulletin. The remaining 3 seals will change to the new short lip design at a later date.

REASON: Ease of assembly at the factory.

PARTS AFFECTED:

- (1) PISTON LIP SEALS - New shorter lip design; See Figure 1 for profile view of the lip seals.

INTERCHANGEABILITY:

The new design short lip seals are interchangeable with the previous lip seals. The new design will replace the current seal as stock is depleted.

SERVICE INFORMATION:

*Reverse Input Piston Outer Seal.....	8673356
Reverse Input Piston Inner Seal.....	8673357
*3-4 Piston Inner Seal.....	8673358
*3-4 Piston Outer Seal.....	8673359
*Forward Piston Outer Seal.....	8673360
Forward Piston Inner Seal.....	8673361
*Overrun Piston Outer Seal.....	8673362
Overrun Piston Inner Seal.....	8673363

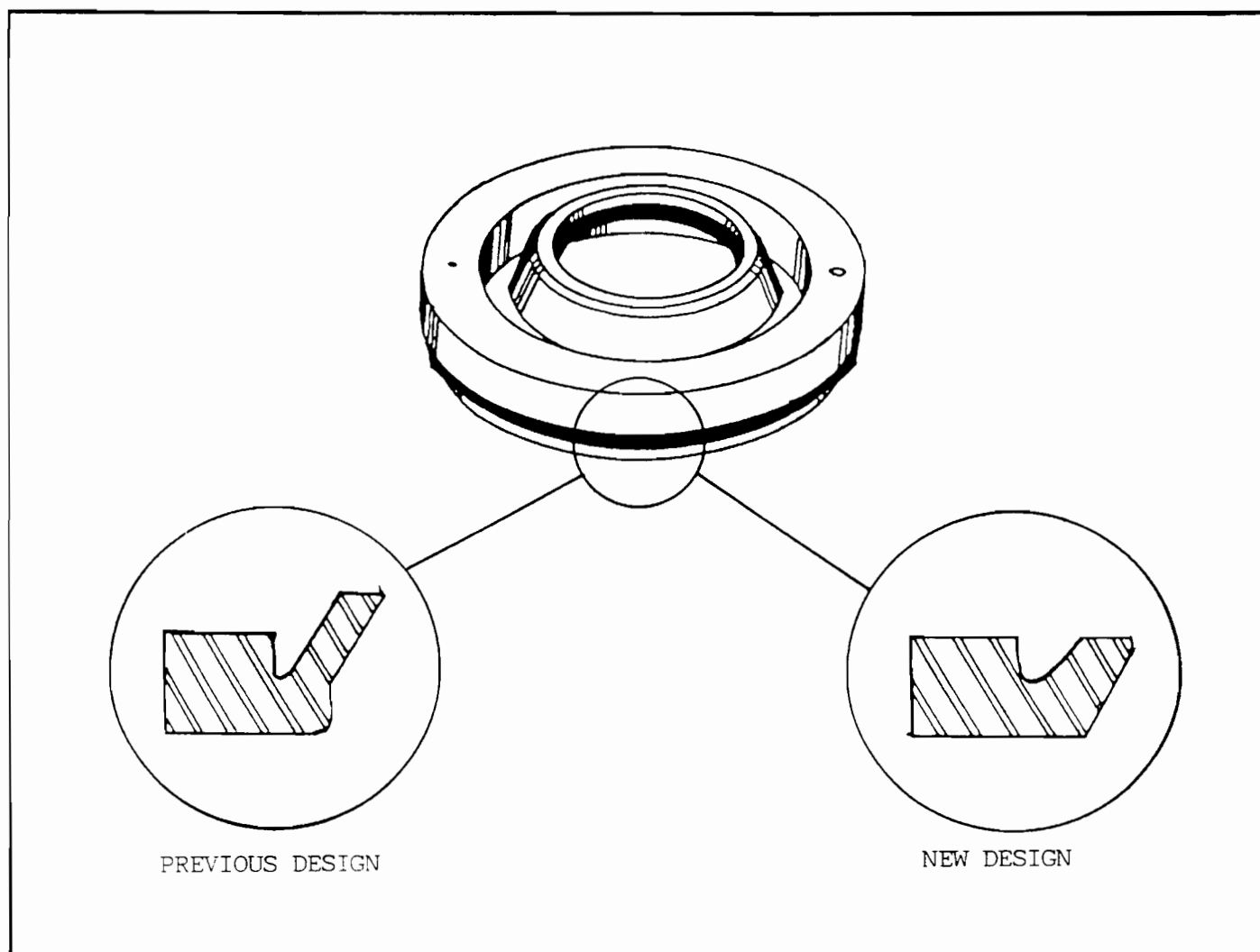


Figure 1

THM 700-R4 (4L60) 1989 CHANGE

CHANGE: Converter clutch throttle valve bore in valve body casting eliminated starting with the production of 1989 model THM 700-R4 (4L60).

REASON: No current production models using the converter clutch throttle valve, so the TCC bore is not needed.

PARTS AFFECTED:

- (1) Valve Body Casting - The new valve body casting will no longer have the TCC bore, and now contains a "Notch" in the worm track area allowing 2nd clutch oil into the TCC Signal circuit (See Figure 1).

INTERCHANGEABILITY:

- (1) Not interchangeable with 1987 or earlier model transmissions, is compatible with 1988 models only.

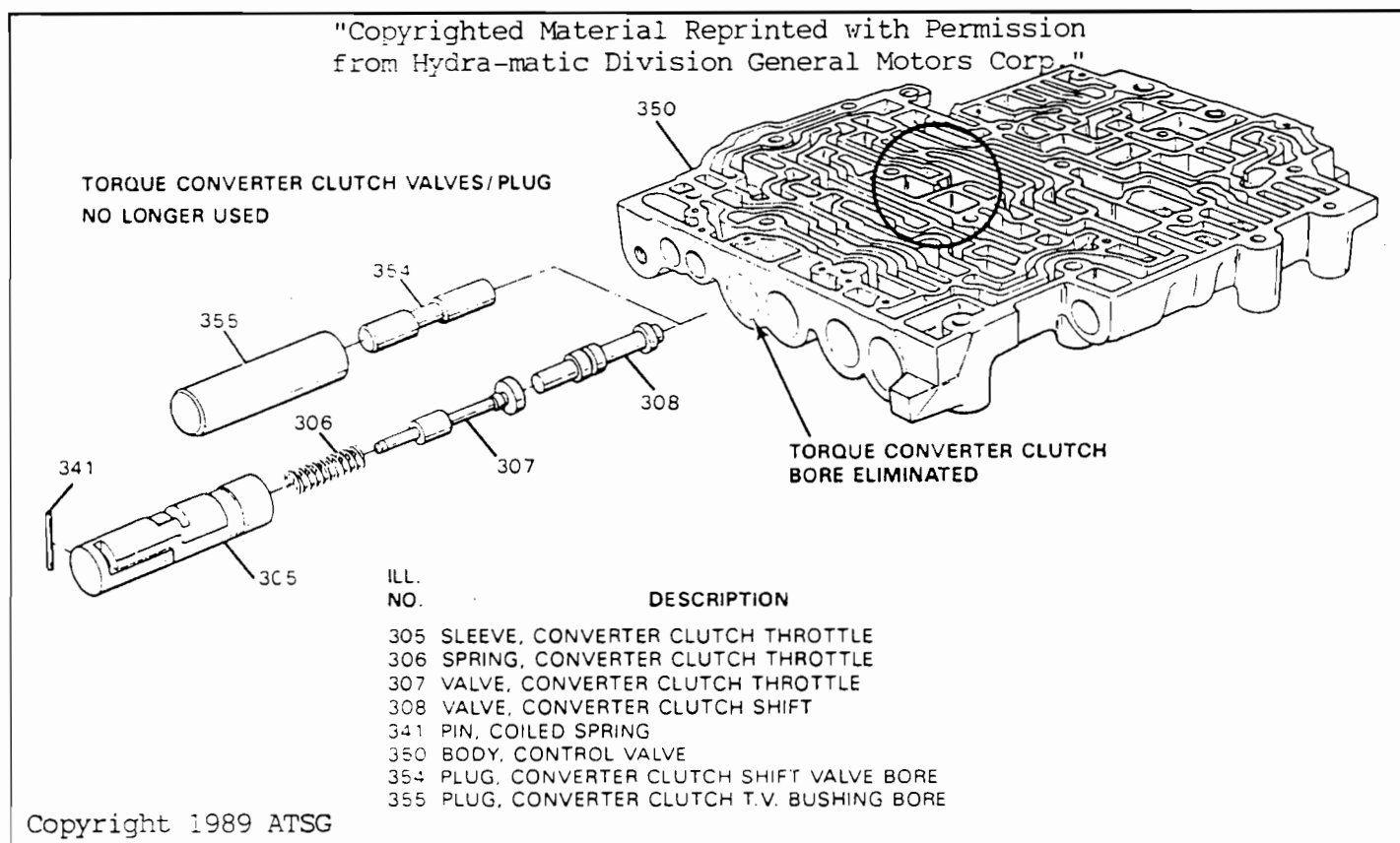
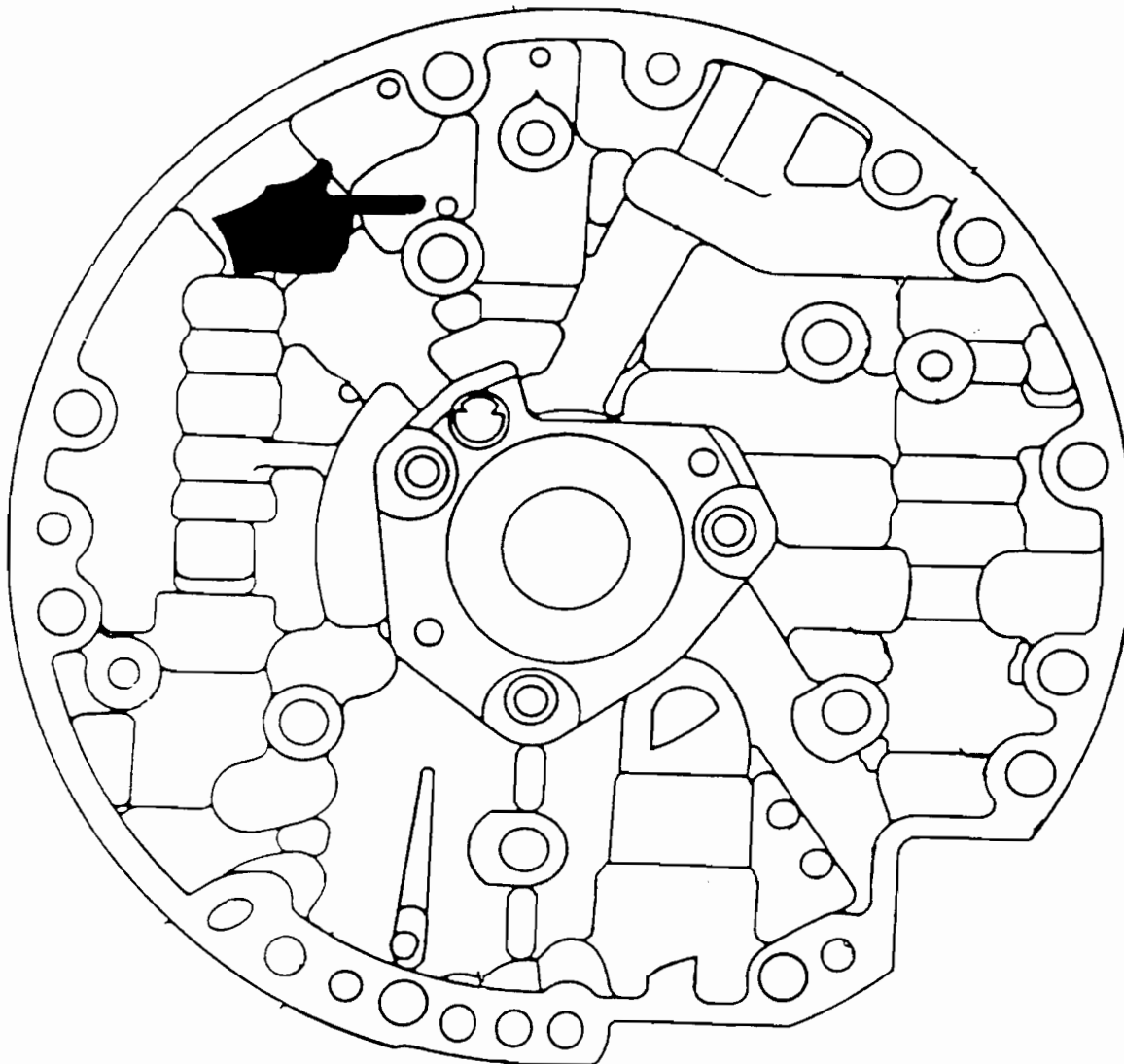


Figure 1

THM 700-R4

- COMPLAINT: Very harsh upshifts, all gears, harsh engagement forward gears and reverse.
- CAUSE: High line pressure. The cause of the high line pressure can be a hung pressure regulator valve, or a binding slide in the pump body. The bind of the slide can be caused by mis-tightening the pump body to the pump cover. Another possible cause can be a blown orifice cup plug located in the pump cover shown in Figure 1. This cup plug is in the reduce pressure oil circuit.
- CORRECTION: The problem can be corrected by replacing the orifice cup plug. The orifice in this plug is .040-.045.



THM 700-R4 NO LINE PRESSURE

COMPLAINT: No or Low line pressure in all ranges on any THM 700-R4.

CAUSE: The cause may be the snap ring popped out of the pressure regulator valve train in the pump cover.

CORRECTION: Install the snap ring with the rounded edge towards the line boost sleeve (See Figure 1). This will prevent the snap ring from popping out again.

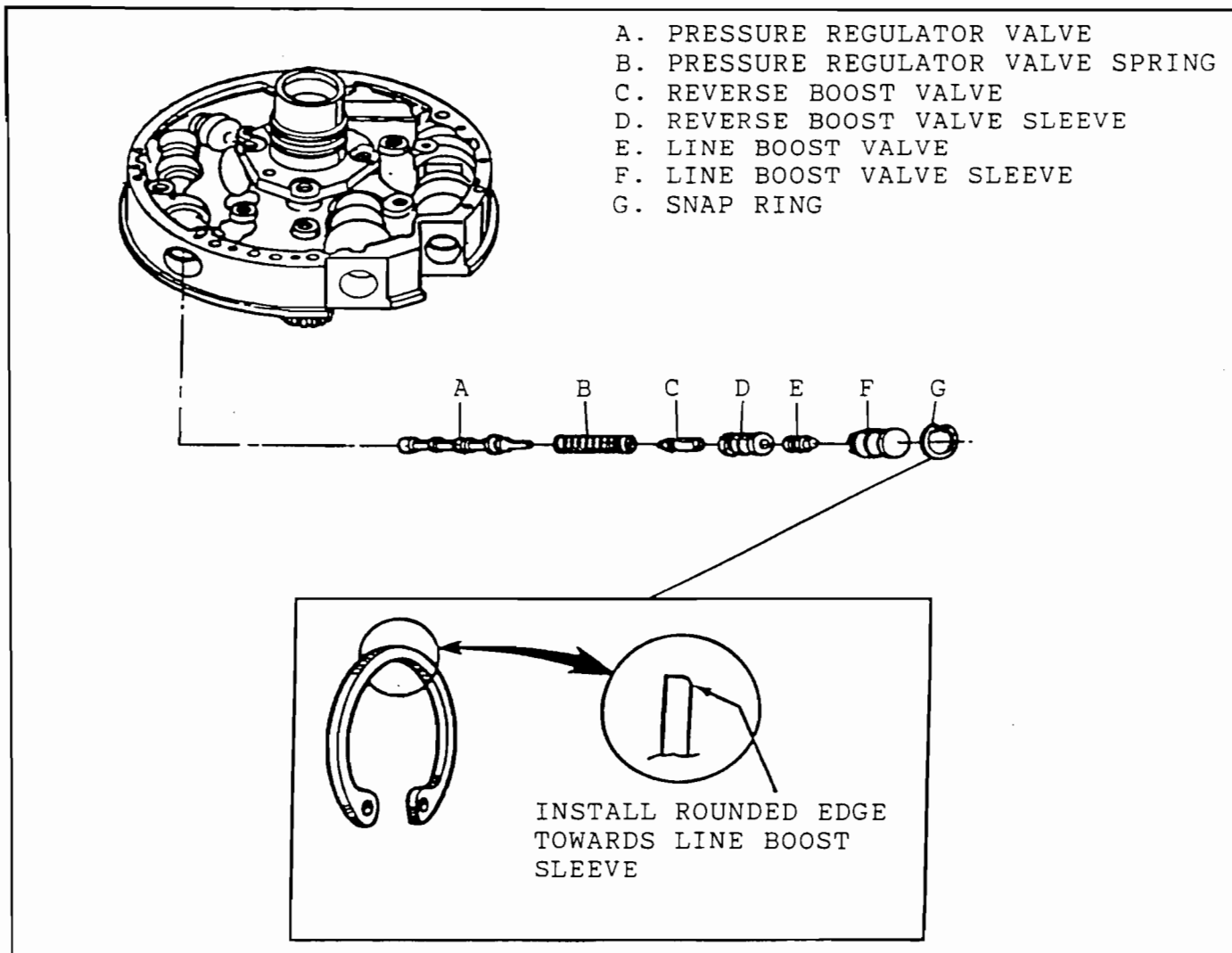


Figure 1

THM 200-4R AND THM 700-R4 NEW FRONT PUMP BODY

Beginning January 9, 1987 (Julian Date 009), there was a machined step added to the pump bushing bore in the pump body, to prevent the bushing from "Walking" towards the front pump seal (See Figure 1).

Because of the step added to the bore in the pump body, removal and installation procedures must be revised. The bushing must now be "Pressed Out" towards the pump rotor side, and "Pressed In" from the pump rotor side.

Care must be used when pressing the new bushing in, so as not to exert too much pressure, and break the added step in the pump bushing bore. Refer to Figure 1.

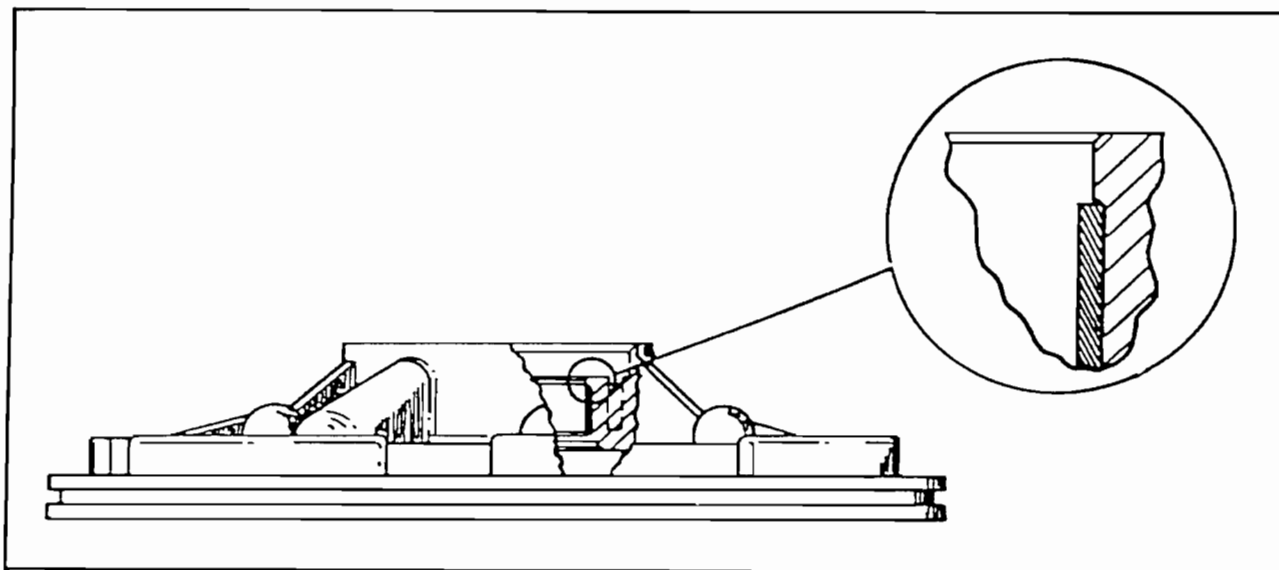


Figure 1

THM 700-R4 1989 MODEL - NEW WIRING HARNESS

Beginning with the start of production for the 1989 model year on the THM 700-R4, the factory introduced two new solenoid assemblies, Type 19 Solenoid and Wiring Harness and Type 21 Solenoid and Wiring Harness (See Figure 1 and 2).

The Type 19 Solenoid and Wiring Harness can be identified by the "Light Green" insulator on the solenoid assembly. The Type 21 Solenoid and Wiring Harness can be identified by the "Light Blue" insulator on the solenoid assembly.

SERVICE INFORMATION:

Solenoid and Wiring Harness (Type 19).....	10478101
Solenoid and Wiring Harness (Type 21).....	10478150

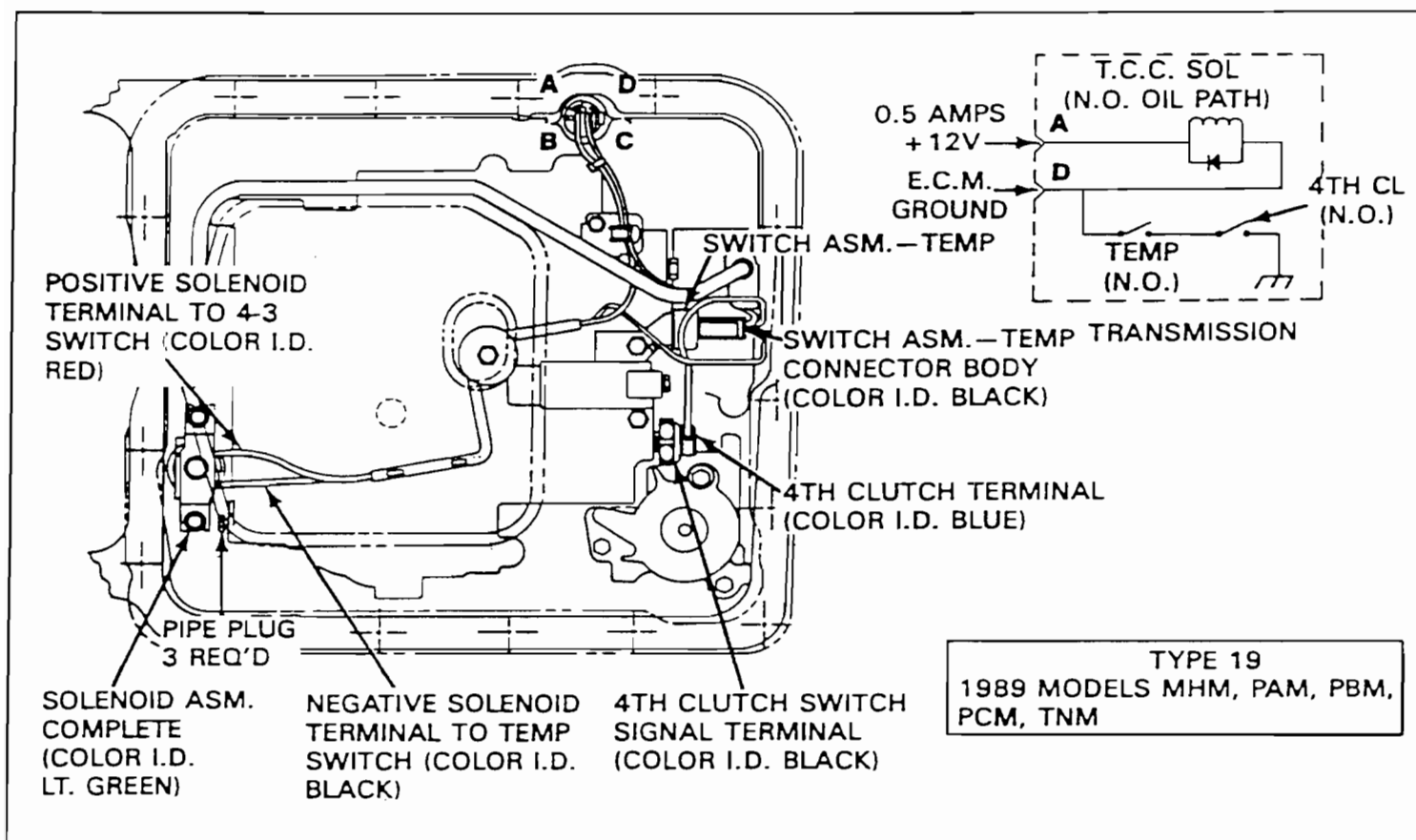


Figure 1

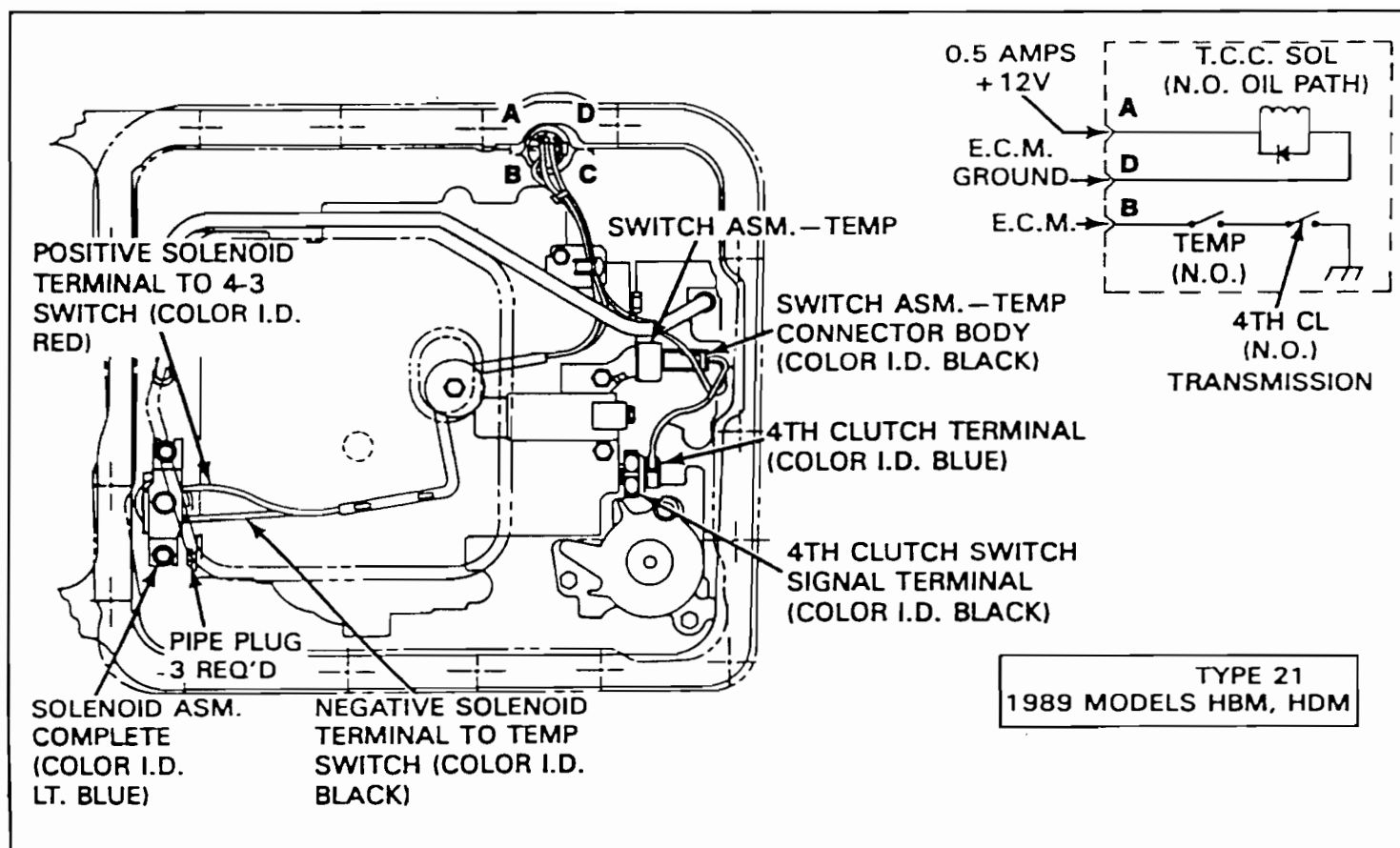


Figure 2

THM 700-R4 (4L60)

PREMATURE PLANETARY FAILURE

COMPLAINT: Repeated failure of the rear planetary carrier and related parts.

CAUSE: Lack of lube oil to planetary carrier and related parts.

CORRECTION: Lube oil enters the turbine shaft as shown in Figure 1, and exits the turbine shaft as shown in Figure 1. Obviously this passage must be open to allow lube oil into the output shaft passage. Check this passage with compressed air.

Lube oil enters the front of the output shaft, flows through the center of the shaft and feeds lube into the bushings, bearings, and gear sets located on the output shaft. The arrows in the cross section, in Figure 2, indicate the lube flow direction. As you can see the output shaft passages must also "All" be open. Check with compressed air to verify that "All" lube passages are open.

The Input Housing/Output Shaft Seal keeps lube oil from escaping, where the output shaft meets the input housing, and must always be in place (See Figure 1).

In 1985 the Reaction Carrier was modified to allow extra lube oil into the pinion roller bearings by using an oil deflector pressed onto the carrier (See Figure 3). Oil trapped by the oil deflector is then forced through the lube passage in each of the pinion pins, thereby providing more lube oil to the pinion needle rollers. A steel ball is installed on the back side of each pinion pin to prevent any possible loss of lube (See Figure 3). It is advisable to pry off the oil deflector and air check the passages in the pinion pins. Be sure to re-install the oil deflector.

The reaction ring gear support was also modified to accommodate the added oil deflector, and must be used if the reaction carrier with the oil deflector is used. This update is recommended by ATSG.

After you have transmission assembled, and before you install the extension housing, you can air check the lube circuit by blowing air into the cooler return line fitting (See Figure 4). The air will exit between the case bushing and the output shaft, by the governor, if the lube circuit is not blocked. However, 5 of the cross drilled holes in the output shaft could still have debris and pass this test, so check "All" holes in the output shaft while it is out.

SERVICE INFORMATION:

Reaction Carrier (With Oil Deflector).....	8654200
Ring Gear Support (For Oil Deflector).....	8654197

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

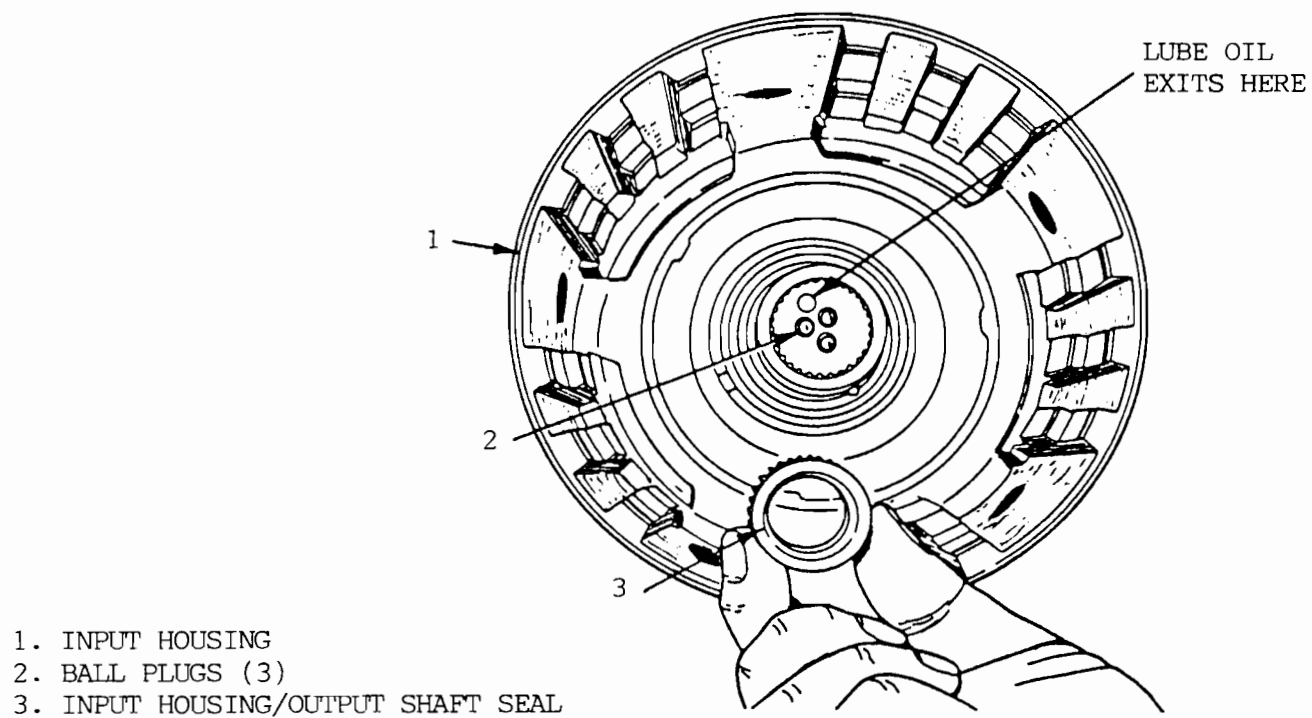
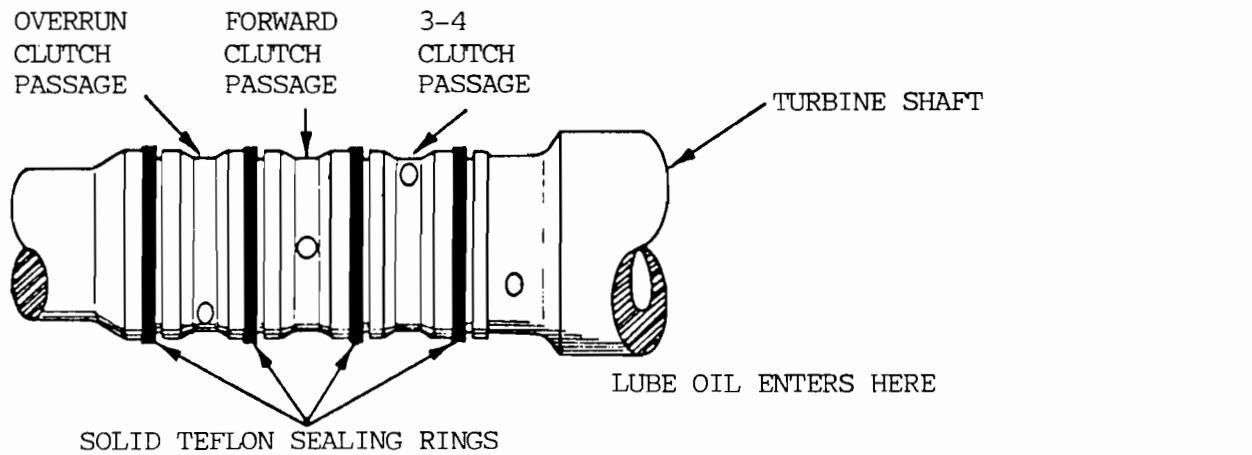
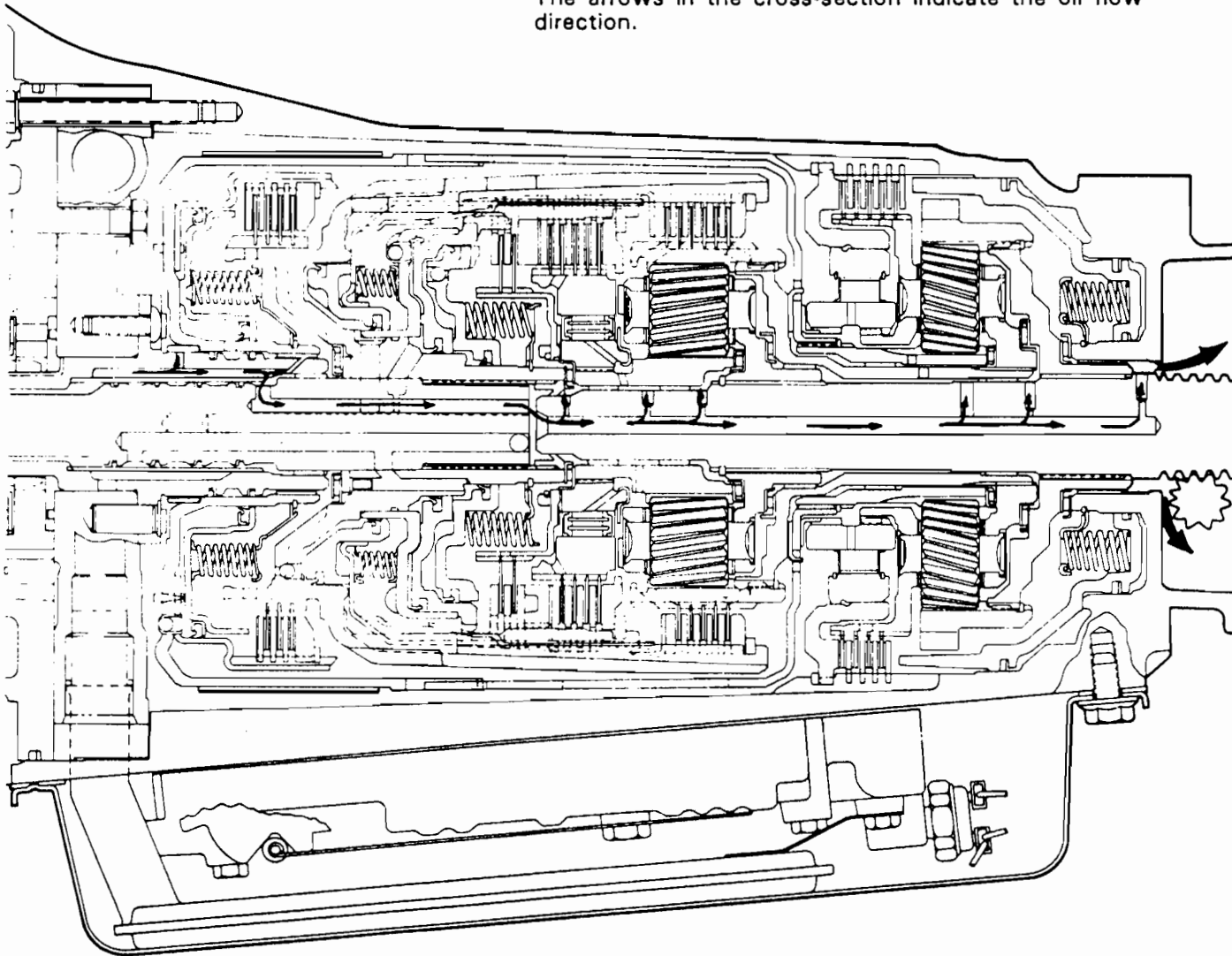


Figure 1

The arrows in the cross-section indicate the oil flow direction.



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

Figure 2

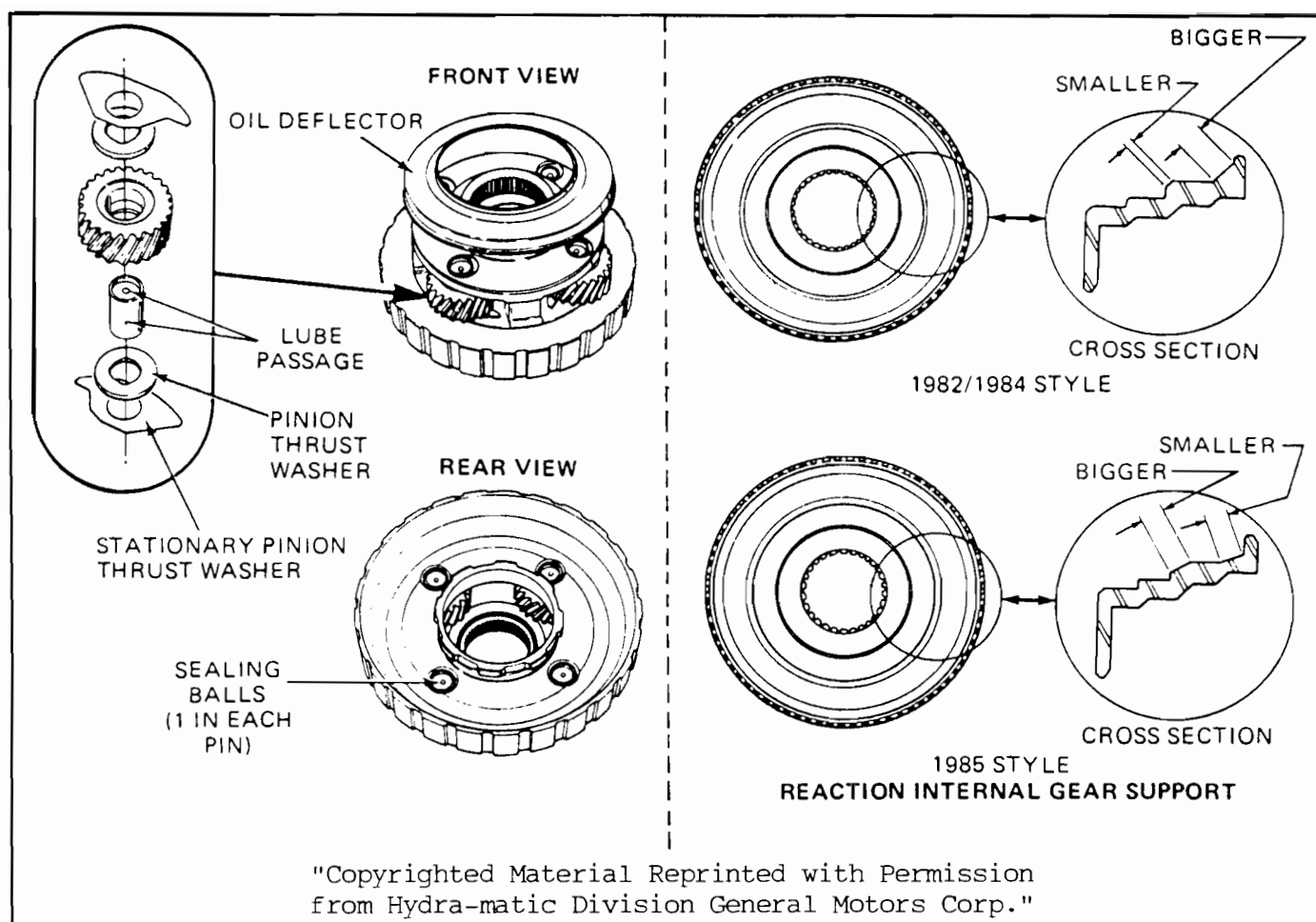


Figure 3

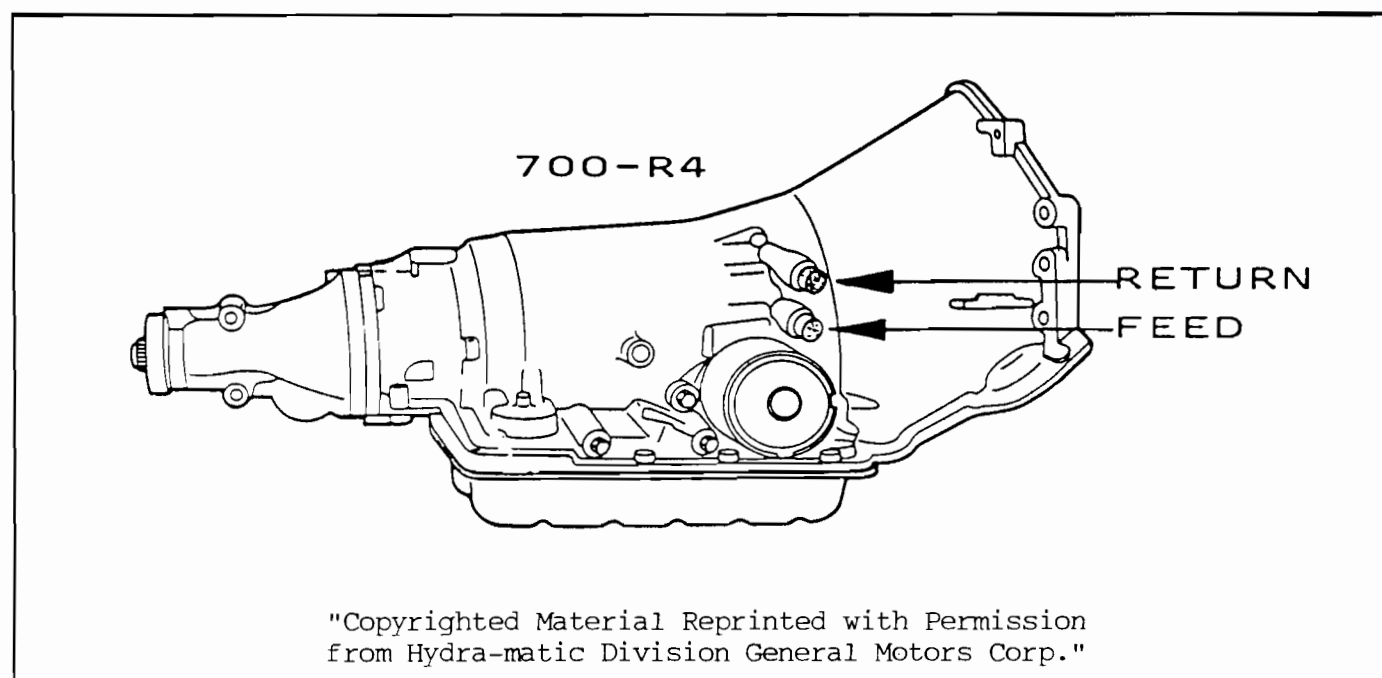


Figure 4

THM 700-R4 (4L60)

BINDS IN REVERSE

COMPLAINT: Any 1982 thru 1989 THM 700-R4 transmission that may exhibit a binding condition when reverse is selected.

CAUSE: The cause may be a stuck 4-3 sequence valve and/or a stuck 2-3 shift valve, both of which are located in the main valve body (See Figure 1).

CORRECTION: Inspect the 4-3 sequence valve and the 2-3 shift valve for sticking, and for debris present in the valve train. Clean and correct as necessary. Refer to Figure 1 for proper installation of valves and sleeves in valve body bores.

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

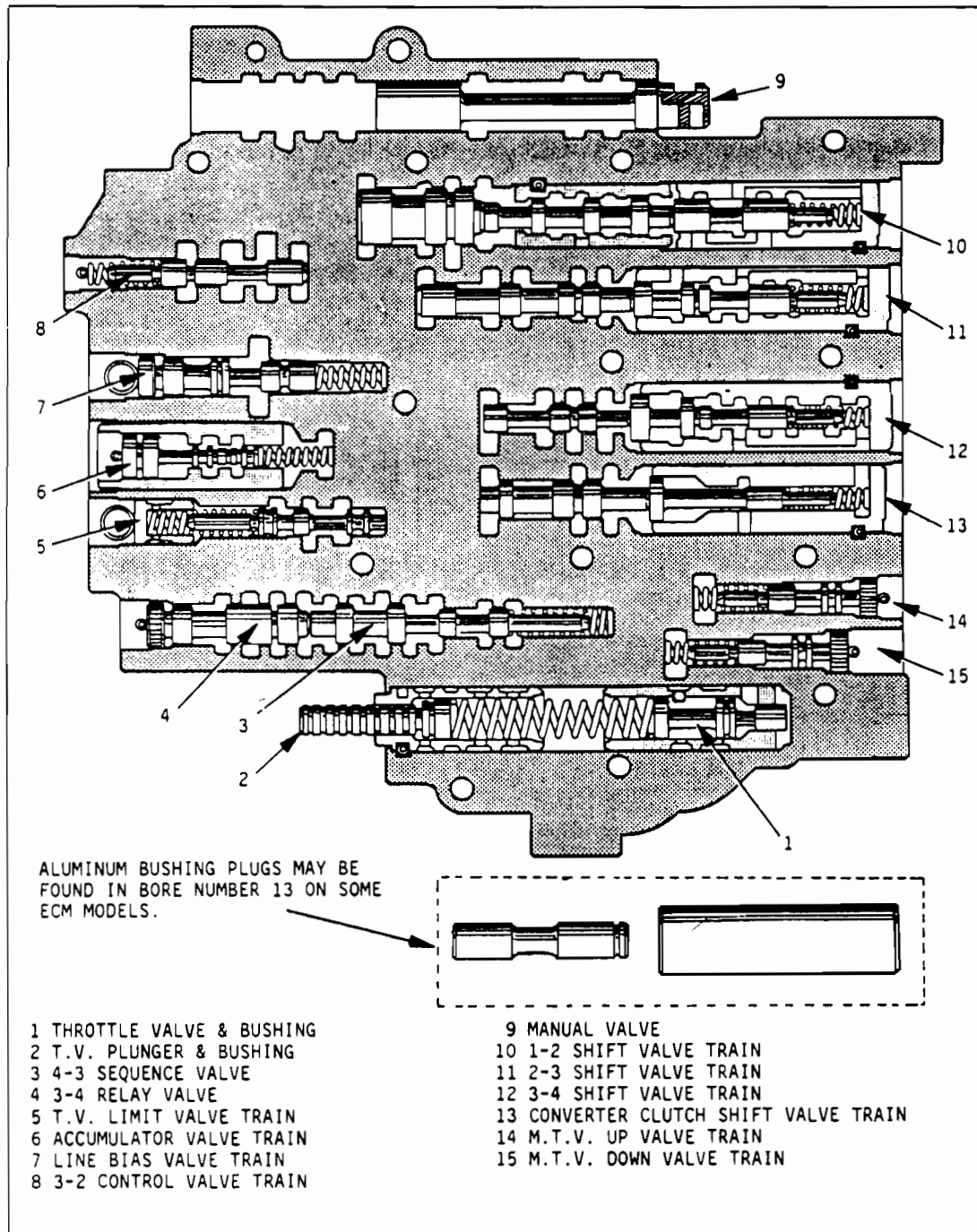


Figure 1

THM 700-R4 PREMATURE REVERSE INPUT CLUTCH FAILURE

COMPLAINT: Premature reverse input clutch failure on 1987 or 1988 models only.

CAUSE: The cause may be the orifice hole in the new aluminum piston, drilled too large (Original was .116").

CORRECTION: 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 32, Inset "A").

180 degrees from original orifice 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 32, Inset "B").

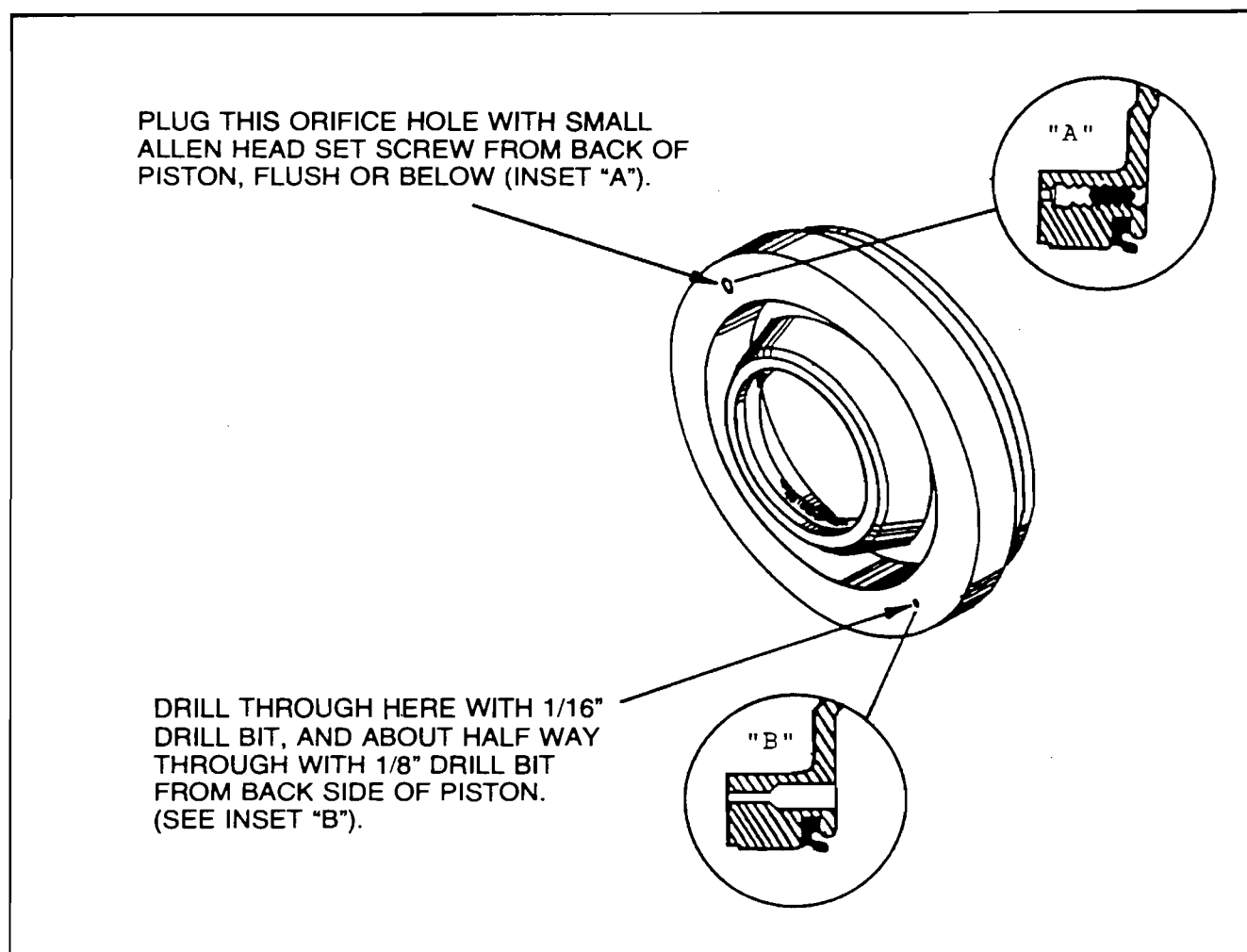


Figure 32

TORQUEFLITE A604 UPDATED REPAIR PACKAGE

This bulletin applies to all Dynasty, New Yorker, Landau, Ram Van, Caravan, and Voyager vehicles.

There is now available from OEM a new repair package, part number 4549248, that includes a new 4 ring front pump reaction shaft (See Figure 1), and a new input clutch hub with shallower "O" ring grooves to increase the compression of the "O" rings (See Figure 3). The new 4 ring front pump reaction shaft (Figure 1) provides better sealing for the overdrive clutch, and the new input clutch hub with shallower "O" ring grooves (Figure 3) provides better sealing for both the underdrive clutch and the reverse clutch. Both of these updated parts are highly recommended to provide better durability for the A604 transaxle.

There has also been a modification to the input clutch retainer as shown in Figure 2. The "Lip" can be machined off of the old style input clutch retainer, or it must be replaced with part number 4431609. Refer to Figure 2.

The new repair package also includes a new valve body spacer plate. Remove and "Discard" the old spacer plate, as the new spacer plate has a larger overdrive clutch feed orifice to provide increased oil flow to the overdrive clutch circuit.

If the transmission controller part number is 5234623, or 5234649, replace it with part number 5234678 (Or Subsequent) transmission controller.

During reassembly of the transaxle, select a washer to set input shaft end play to the "Preferred" setting of .005" - .015". The end play specification is actually .005" - .025" and is acceptable if the "Preferred" setting cannot be obtained.

SERVICE INFORMATION

New Repair Package.....	4549248
Gasket Package.....	4504558
Input Clutch Retainer (As Required).....	4431609
Transmission Controller (As Required).....	5234678

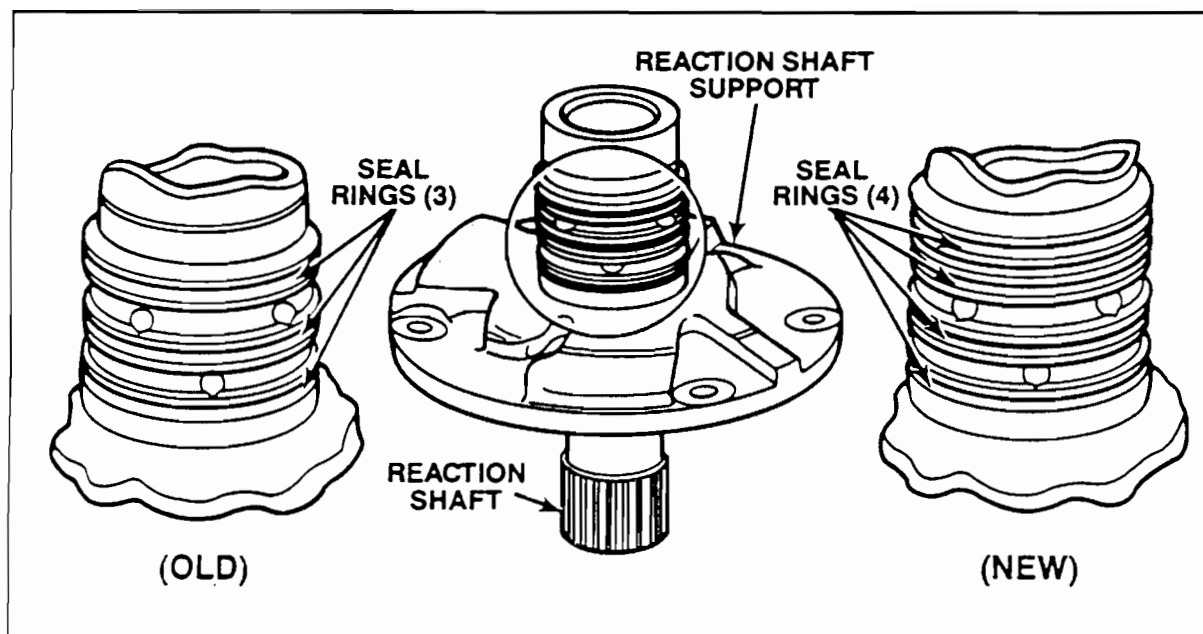


Figure 1

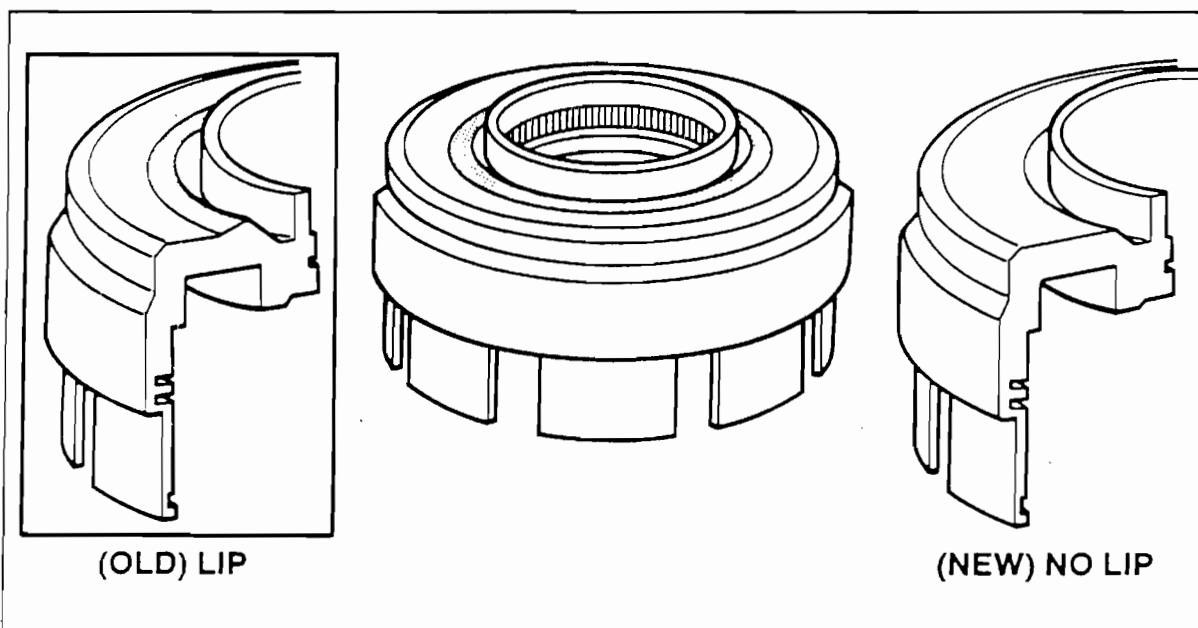


Figure 2

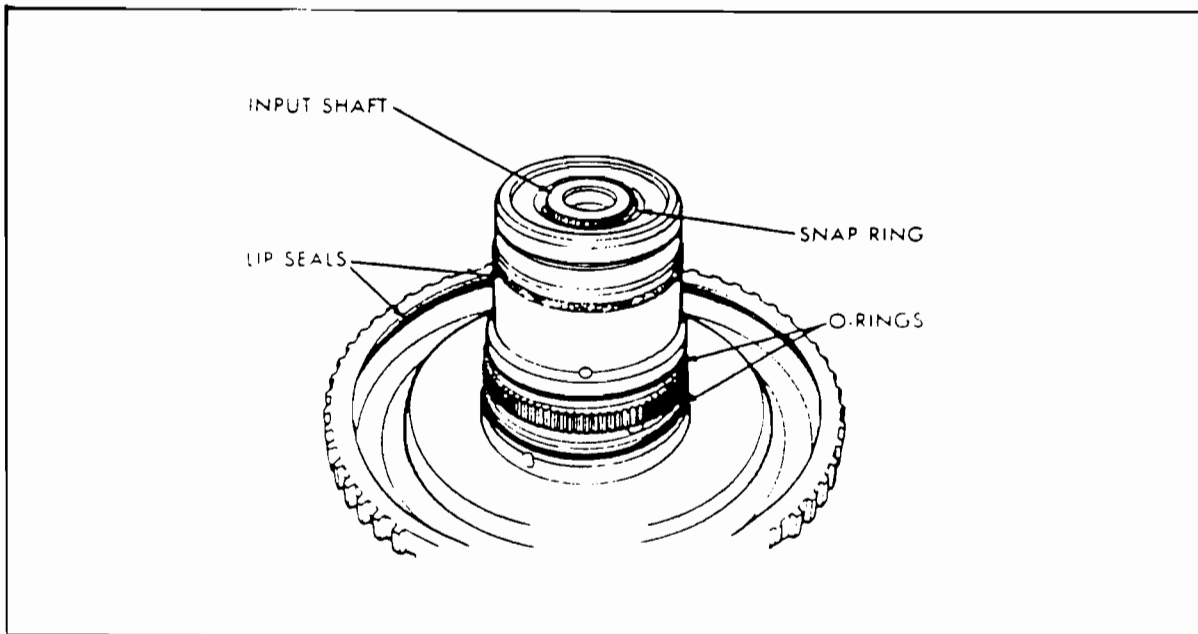


Figure 3

FORD C-3 TURBO MODULATOR IDENTIFICATION

The Ford C-3 Turbo Modulator, and Non Turbo Modulator, are different, and can be identified as follows:

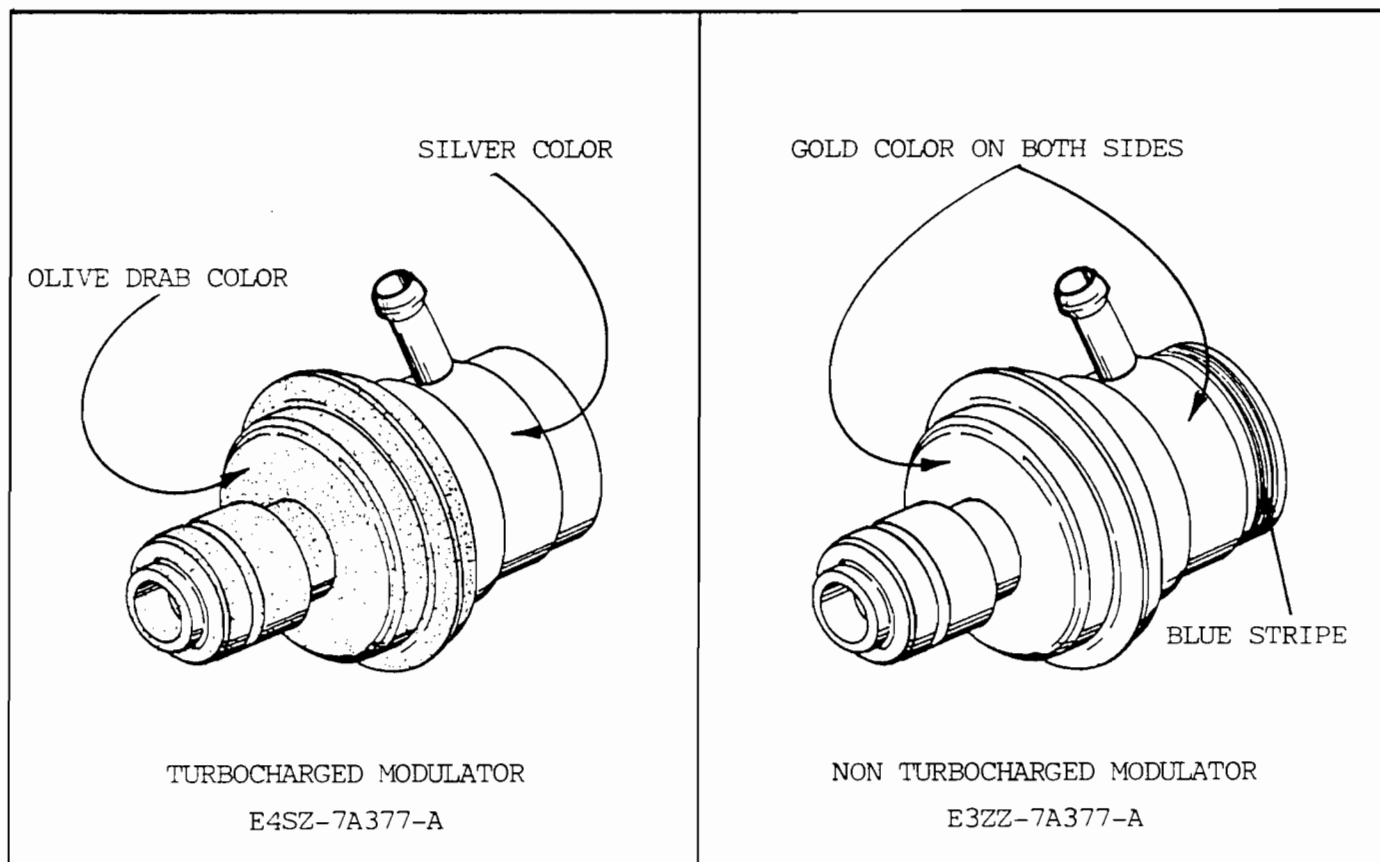
TURBOCHARGED MODULATOR:

The turbocharged modulator is identified by a "Olive Drab" color (Army Green) on the back half of the modulator, and silver color on the front side (See Figure 1). The OEM part number is E4SZ-7A377-A.

NON TURBOCHARGED MODULATOR:

The non turbocharged modulator is identified by a "Gold" color on both sides of the modulator, along with a blue stripe (See Figure 1). The OEM part number is E3ZZ-7A377-A.

NOTE: THESE MODULATORS "WILL NOT" INTERCHANGE.



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.

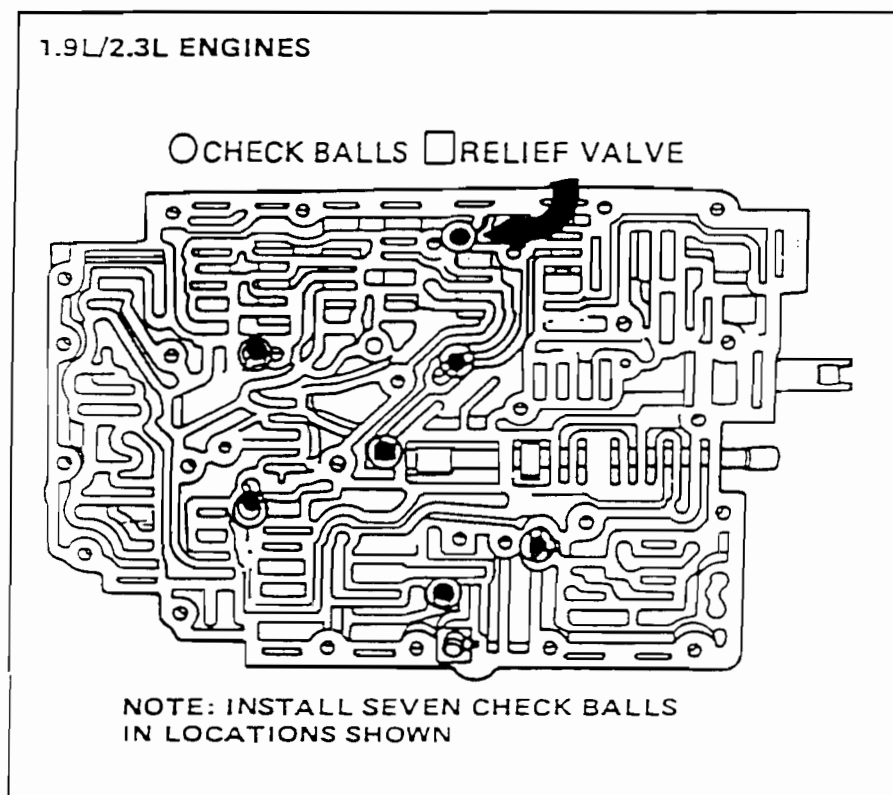


Figure 1

FORD AOD REPEATED PLANETARY FAILURE

COMPLAINT: Repeated burning of the planetary carrier, reverse sun gear & drive shell, and the forward sun gear. At times this will occur in less than 100 miles after rebuild.

CAUSE: The cause may be the converter drain back cross hole passage in the pump stator support blocked with debris, or the checkball stuck (See Figure 1).

CORRECTION: Inspect and air check the converter drain back passage in the pump stator support, and clean as necessary. If removal of the checkball and spring assembly are necessary, refer to Figure 1 for removal procedure.

SERVICE INFORMATION:

Spring and Ball Kit..... E5AZ-7A205-A

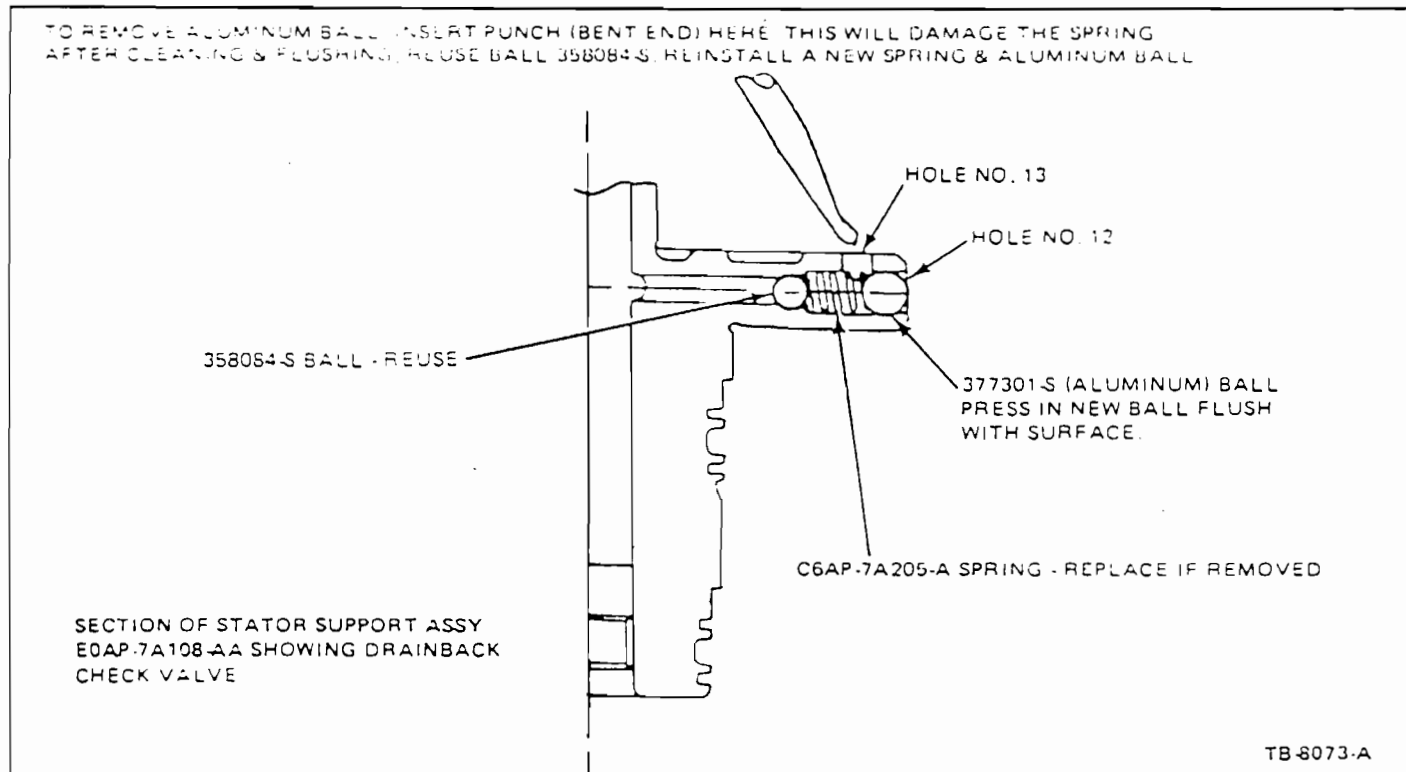


Figure 1

FORD AOD (1989 ONLY)

"SQUAWK" ON 2-3 SHIFT

COMPLAINT: Clutch noise or "Squawk" on the 2-3 shift, in 1989 models only.

CAUSE: In 1989 there was a new design stamped steel direct clutch housing (See Figure 1) introduced, that creates the noise.

CORRECTION: Install the previous design cast steel direct clutch housing.

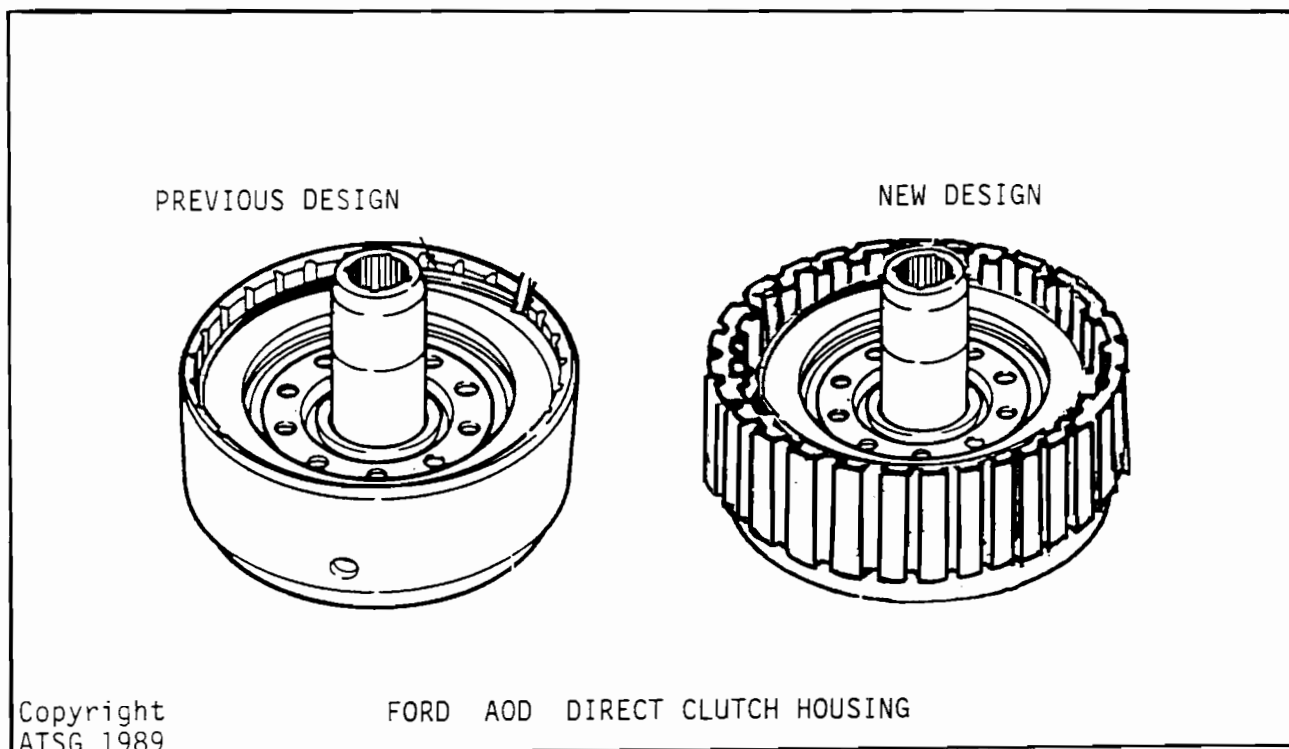


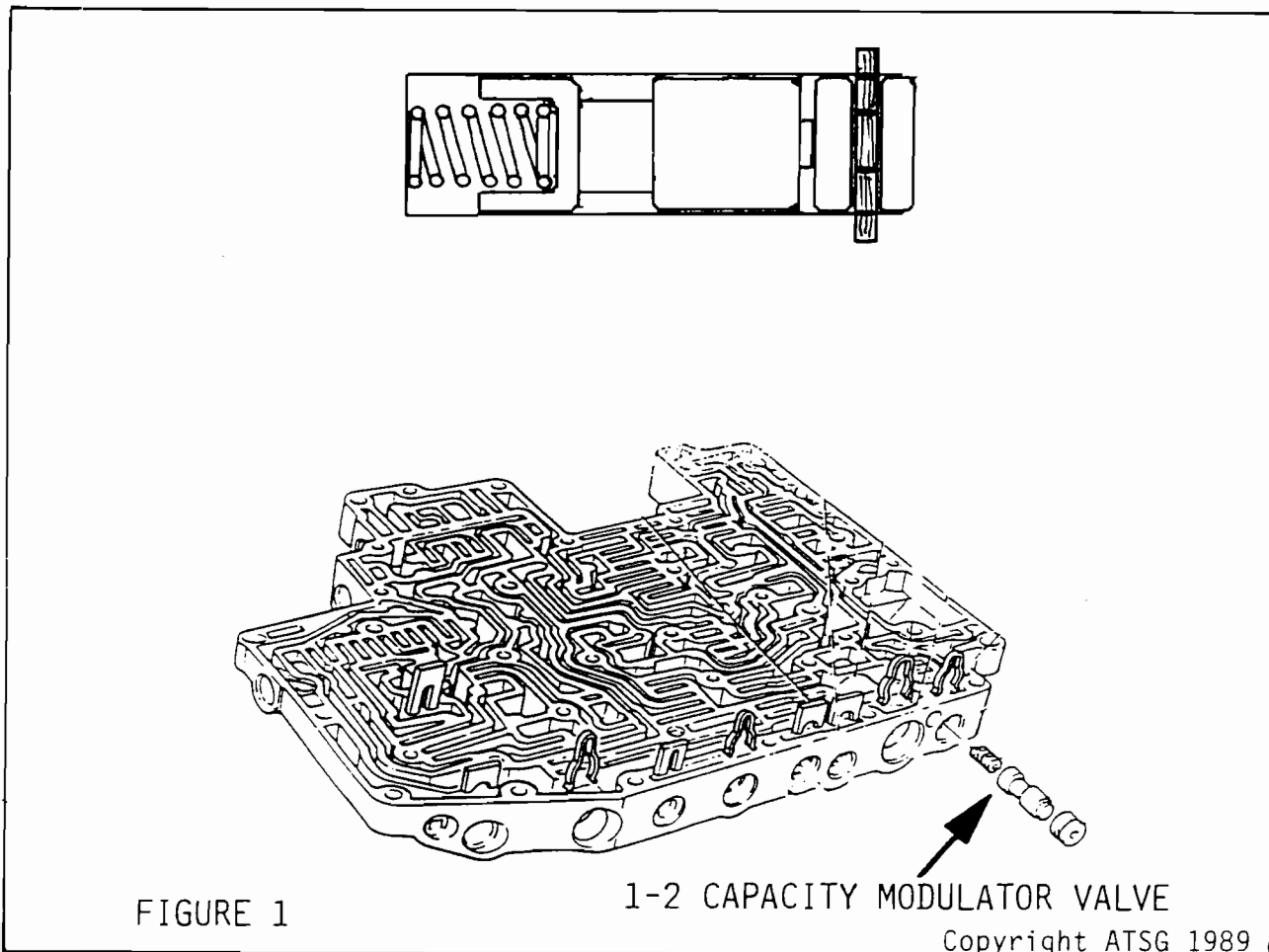
Figure 1

FORD AOD - HARSH 1-2 SHIFT

COMPLAINT: EXTREMELY HARSH 1-2 SHIFT, ALL OTHER SHIFTS OK.

CAUSE: 1-2 CAPACITY MODULATOR VALVE SPRING NOT FULLY SEATED IN MODULATOR VALVE POCKET. SEE FIGURE 1 FOR "PROPER" ASSEMBLY.

CORRECTION: REPOSITION SPRING PROPERLY, AS SHOWN IN FIGURE 1, USE PETROLATUM TO RETAIN SPRING IN MODULATOR VALVE POCKET DURING ASSEMBLY.



FORD A4LD

NO FOURTH GEAR

COMPLAINT: No 4th gear, or a 3-Neutral shift.

CAUSE: The cause may be the splined portion of the O.D. carrier and the sprag inner race broken (See Figure 1). The splined portion and inner race will remain in one piece, and usually turn in the carrier, but will not always separate itself from the carrier. The problem is not always detectable because the bearing inside the carrier hides the broken area of the carrier. The sprag inner race and splined area for the turbine shaft "MUST NOT" turn. Use a little force if necessary to check this.

CORRECTION: Replace overdrive carrier complete.

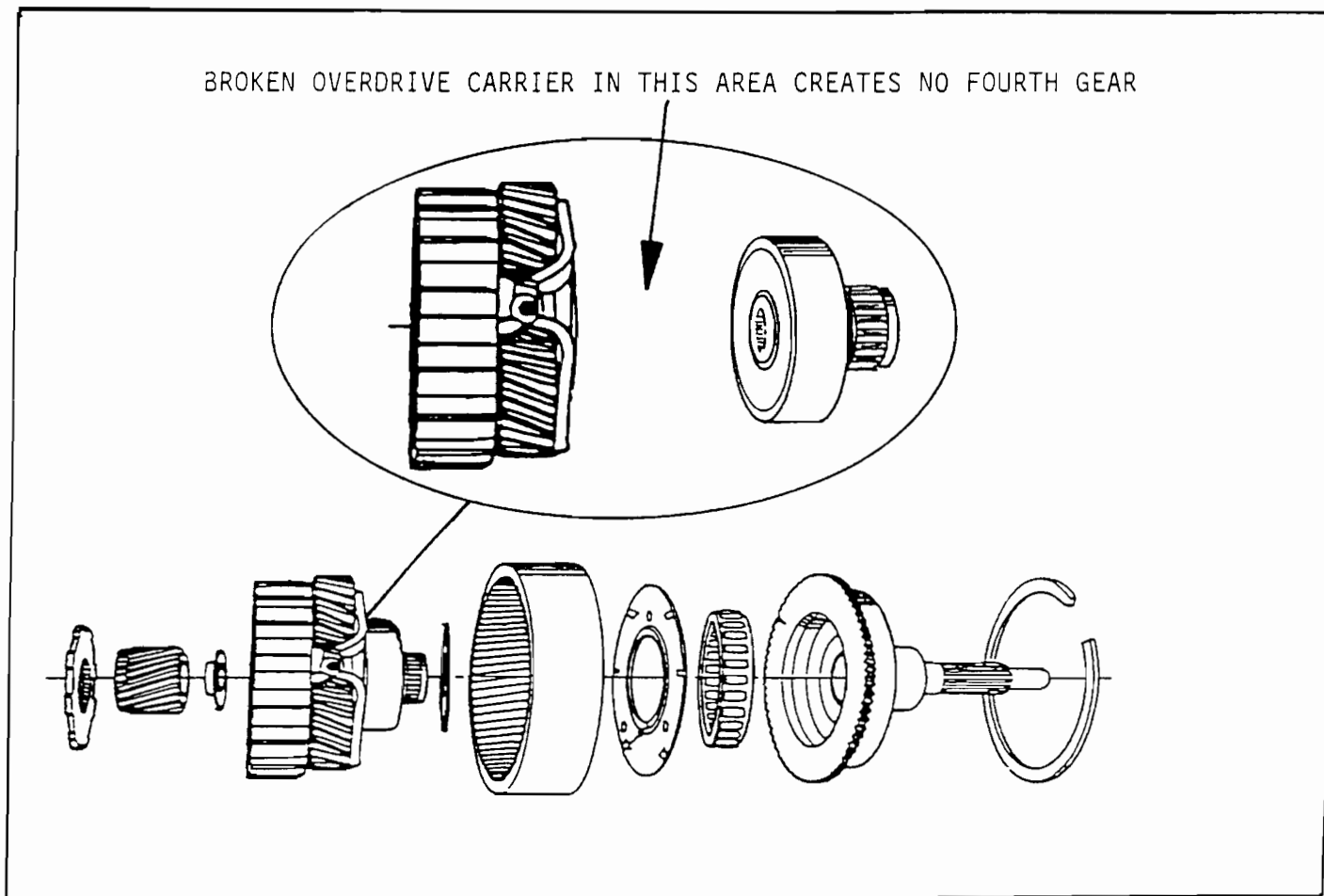


Figure 1

FORD A4LD

DIRECT CLUTCH FAILURE

COMPLAINT: Premature failure of the direct clutch pack.

CAUSE: Inspect for the following;

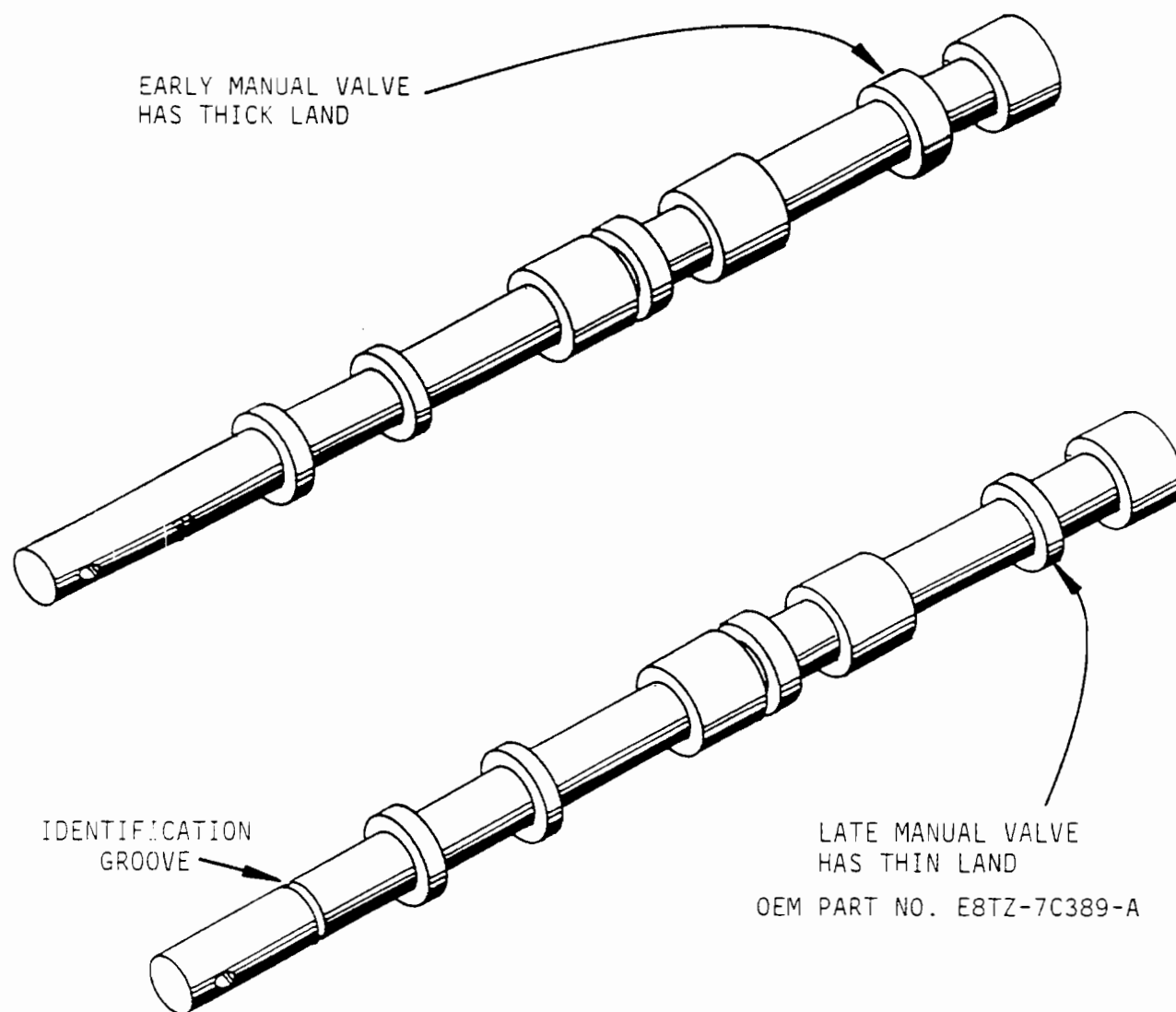
- * Rear end play out of specification. Select #4 thrust washer that will obtain an end play of close to .012". DO NOT go under .012".
- * Nicked or cut center support viton (Rubber) seals. DO NOT use steel or teflon seals in this location.
- * Direct clutch piston check ball leaking.
- * Shift Cable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

Copyright 1989 ATSG



Copyright 1989 ATSG

Figure 1

FORD AXOD HYDRAULICALLY LOCKED TV PLUNGER

COMPLAINT: With engine running, you cannot pull T.V. cable out.

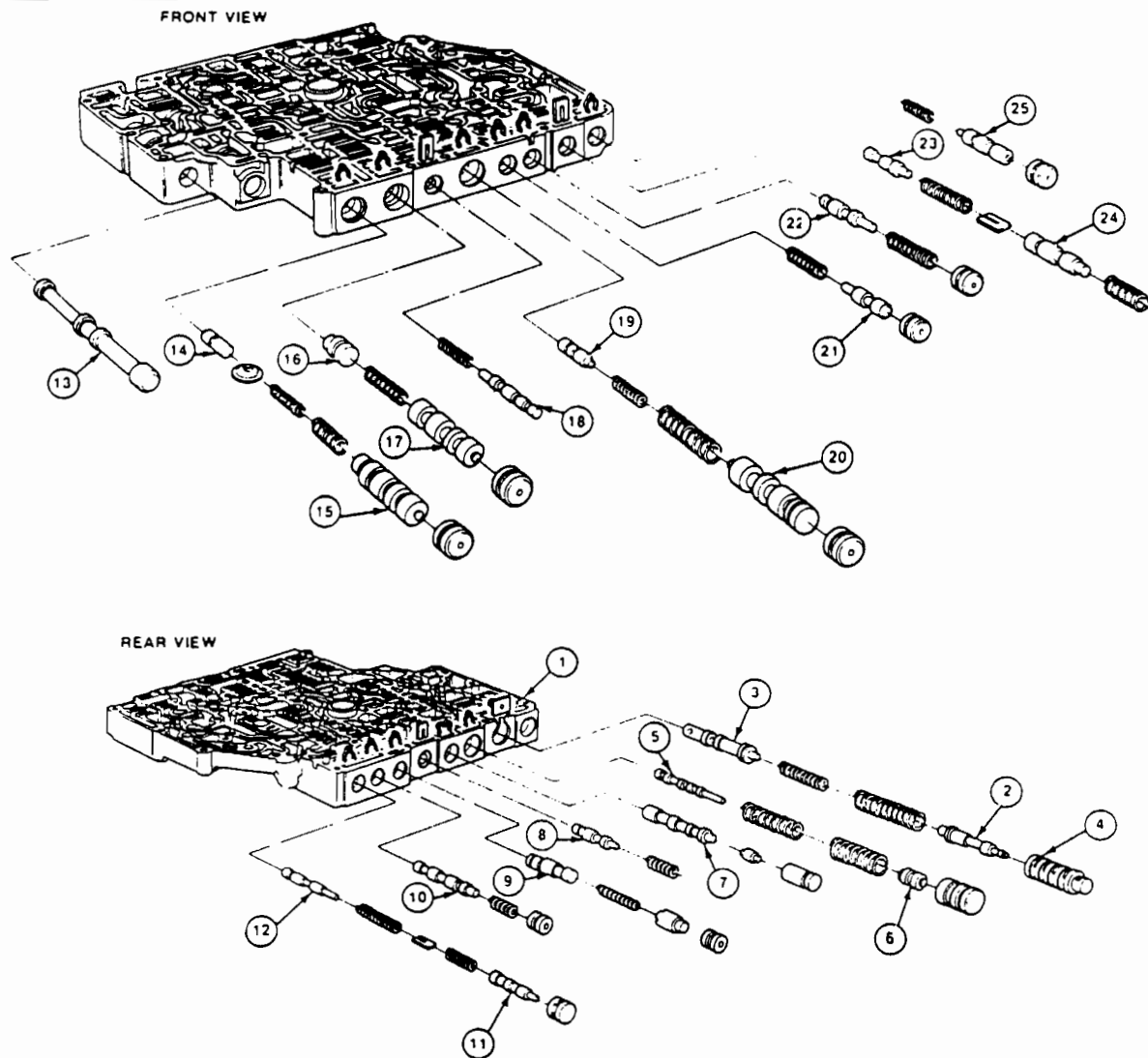
CAUSE: T.V. plunger hydraulically locked out with oil pressure.

CORRECTION: Check the following valves for sticking or debris:

- (1) T.V. LIMIT VALVE - (No. 24 in Figure 1).
Limits T.V. pressure to a maximum of 90 PSI.
- (2) TV/LINE MODULATOR VALVE - (No. 11 in Figure 1).
Modifies T.V. pressure for control of line pressure to more closely match engine torque and transaxle capacity requirements.
- (3) THROTTLE VALVE - (No. 2 in Figure 1).
Regulates T.V. pressure in relation to throttle plunger position.

NOTE:

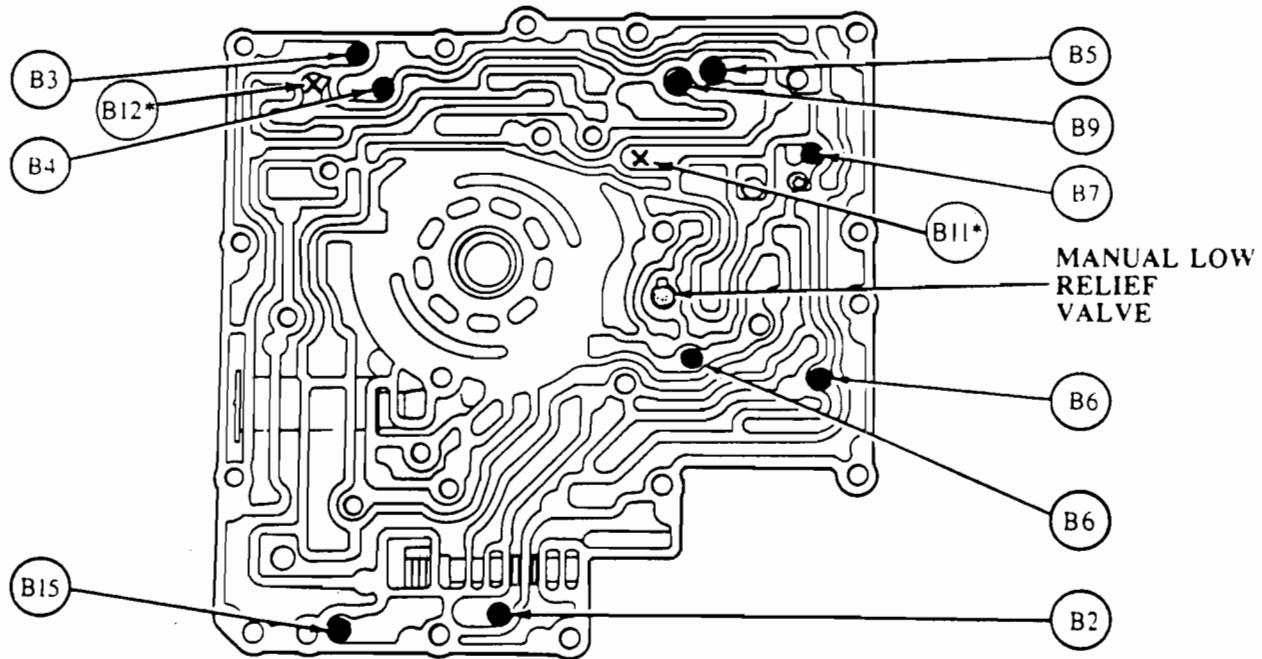
If debris is found in valve body, be sure to inspect all checkballs. They have a habit of deteriorating, and spreading through the valve trains. New checkballs are now available under OEM part number E7DZ-7E195-A, and come five in a package. See Figure 2 for proper checkball locations, as some of the manuals are wrong. See Figure 3 for checkball function.



- | | |
|----------------------------------|------------------------------|
| 1 VALVE BODY | 14 2-3 TV MODULATOR VALVE |
| 2 THROTTLE VALVE (TV) | 15 2-3 SHIFT VALVE |
| 3 TV PLUNGER | 16 1-2 THROTTLE DELAY VALVE |
| 4 TV VALVE SLEEVE | 17 1-2 SHIFT VALVE |
| 5 MAIN REGULATOR VALVE | 18 2-1 SCHEDULING VALVE |
| 6 MAIN REGULATOR BOOST VALVE | 19 3-4 TV MODULATOR VALVE |
| 7 CONVERTER CLUTCH CONTROL VALVE | 20 3-4 SHIFT VALVE |
| 8 CONVERTER REGULATOR VALVE | 21 2-4 INHIBIT VALVE |
| 9 ACCUMULATOR REGULATOR VALVE | 22 3-2 CONTROL VALVE |
| 10 BACKOUT VALVE | 23 N-D ENGAGEMENT VALVE |
| 11 TV/LINE MODULATOR VALVE | 24 TV LIMIT VALVE |
| 12 4-3 SCHEDULING VALVE | 25 2-3 SERVO REGULATOR VALVE |
| 13 MANUAL VALVE | |

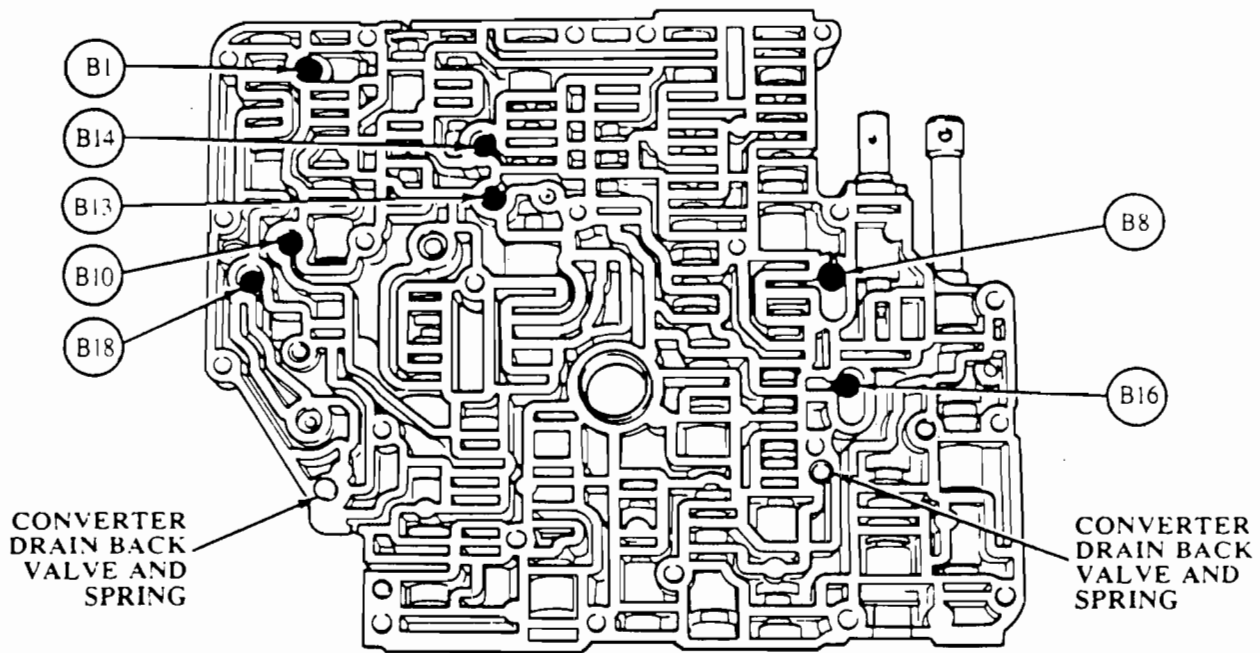
D5992-A

Figure 1



OIL PUMP

***Do not install ball check**



VALVE BODY

Figure 2

Valve Body Ball Checks

The following information describes the function of the valve body ball checks. The location of the different ball checks is shown in figure 31.

Ball Checks:

- B1: Forces reverse clutch feed oil through the A orifice and thermal element while allowing the clutch to exhaust without restriction.
- B2: Separates reverse clutch and forward clutch circuits feeding the forward clutch.
- B3: Separates manual low relief and TVLM passages to the main regulator boost valve.
- B4: Separates manual low relief and direct clutch circuits to the direct clutch.
- B5: Connects low/intermediate servo release and direct clutch passages during pressurization of these circuits while forcing low/intermediate servo release to be exhausted through the L orifice and the 3-2 control valve.
- B6: (2 required) Forces forward clutch feed oil through the K orifice for the 4-3 downshift while bypassing the orifice for a drive engagement.
- B7: Allows forward clutch to exhaust freely on the 3-4 upshift but forces forward clutch apply through the K orifice for the 4-3 downshift.
- B8: Separates low and kickdown circuits to the 2-3 shift valve.
- B9: Forces the direct clutch to exhaust through the M orifice on a 3-2 downshift while bypassing the orifice for the 3-1 downshift.
- B10: Exhausts low/intermediate servo apply directly through the manual valve on a drive-neutral or a drive-reverse engagement, bypassing the B orifice.
- B11: Not used.
- B12: Not used.
- B13: Forces direct clutch feed through the E and F orifices bypassing the M orifice.
- B14: Forces overdrive servo apply feed through the H and G orifices while bypassing the orifices for exhaust.
- B15: Applies forward clutch through the PP orifice as well as the K orifice for a manual 3-pull in.
- B16: Separates the low and backout circuits to the backout valve.
- B17: Not used.
- B18: Feeds the N-D accumulator through the RR and SS orifices in parallel and exhausts N-D accumulator through the RR and SS orifices in series.

Relief and Drainback Valves

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

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

Figure 3

FORD AXOD SOFT 1-2 SHIFT

COMPLAINT: Soft or mushy 1-2 upshift only.

CAUSE: Fill time for intermediate clutch too slow.

CORRECTION: Install stronger spring on the 1-2 capacity modulator valve located in pump body (See Figure 1).

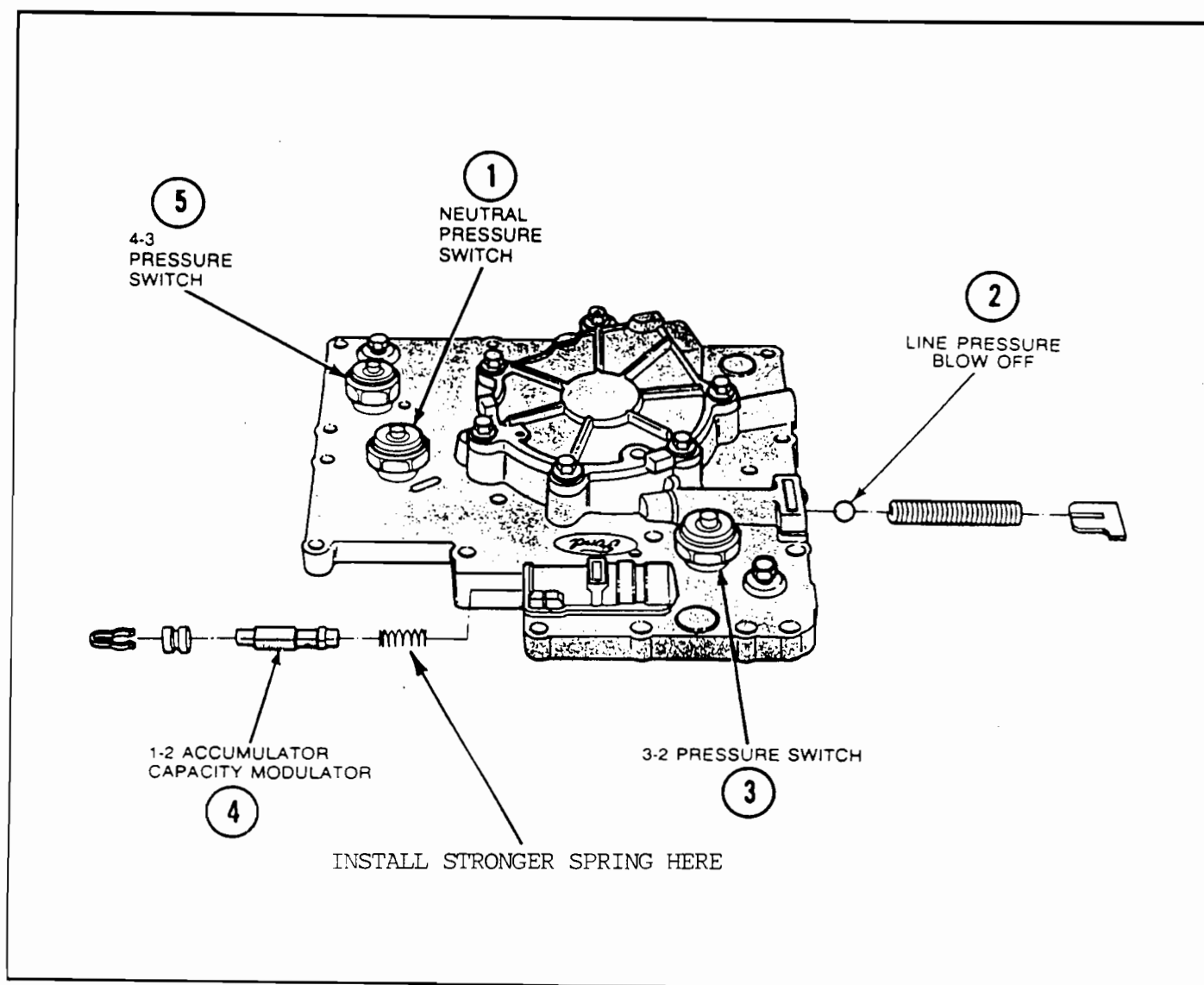


Figure 1

FORD AXOD HARSH TORQUE DEMAND DOWNSHIFT

(FORD: 1989 TAURUS - LINCOLN-MERCURY: 1989 CONTINENTAL, SABLE)

COMPLAINT: Harsh 3-2 and 2-1 light throttle downshifts between 10-20 MPH (16-32 km/H).

CAUSE: May be caused by throttle valve linkage that is out of adjustment.

CORRECTION: Check and adjust the throttle valve (TV) control linkage.

NOTE: THIS PROCEDURE REQUIRES THE USE OF A TV PRESSURE GAUGE WITH HOSE (0-60 PSI). USE ROTUNDA TOOL T86L-70002-A OR EQUIVALENT. THE RESULTS OF THE ADJUSTMENT PROCEDURE DEPENDS ON THE ACCURACY OF THE PRESSURE GAUGE.

The pressure guage must be checked every six months or when the following conditions occur.

1. The needle will not return to zero with no pressure applied.
2. The needle goes past zero (negative side) with no pressure applied.
3. The pressure guage has been bumped or dropped.

If the service tool is not available, use a 1/8" NPT (National Pipe Thread) "Hansen" quick connect fitting and calibrated 0-60 psi pressure guage with a male quick connect. Make sure there is enough flexible hose to make the guage accessible while operating the engine.

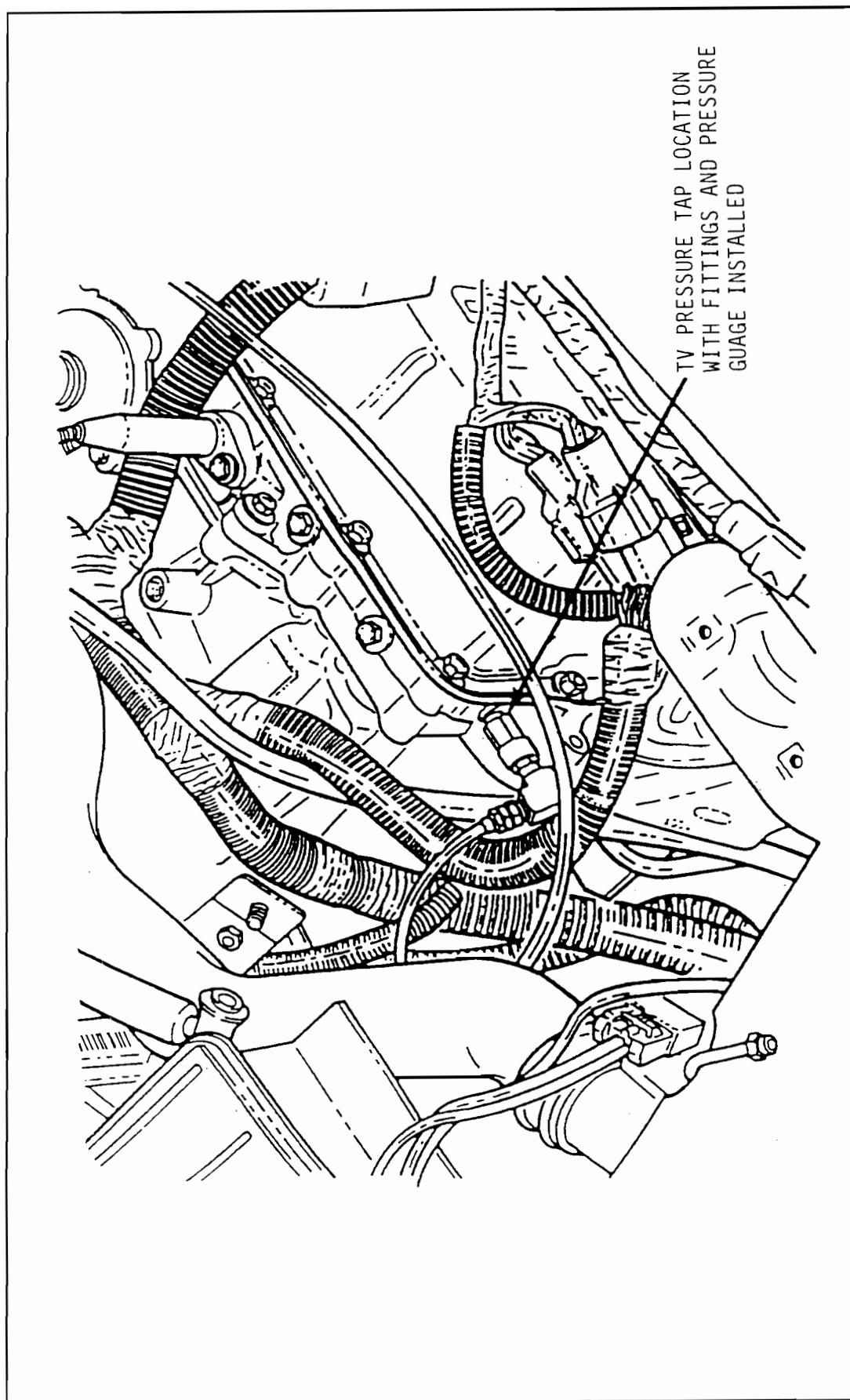


Figure 1

LINKAGE ADJUSTMENT USING TV CONTROL PRESSURE

NOTE: PLEASE REFER TO THE APPROPRIATE SHOP MANUAL FOR GENERAL THROTTLE VALVE LINKAGE ADJUSTMENT INFORMATION PRIOR TO PERFORMING THE FOLLOWING PROCEDURE.

1. Remove the screw securing the air cleaner assembly to the support.
2. Swing the air cleaner assembly toward the rear of the engine compartment.
3. Locate the TV pressure port which is directly above the transaxle cooler lines, Figure 1.
4. Remove the 7/16" hex TV pressure port pipe plug from the transaxle and install the pressure guage and hose (T86L-70002-A) or equivalent.
5. Proceed to take a pressure guage reading.
 - a. Bring the transaxle to normal operating temperature (about equal to 15-20 miles of city driving).
 - b. Tap the accelerator pedal to allow the engine to return to curb idle.
 - c. Hold the guage in a vertical position.
 - d. Read and record the TV pressure as indicated. (The TV pressure specification is 12-16 psi.)
6. If the pressure is not within specification, proceed as follows:
 - a. Turn off the engine.
 - b. Unclip the TV cable from the right hand side of the intake manifold.
 - c. Locate the throttle body primary lever, Figure 2.
 - d. Rotate, by hand, the lever to the wide open position, then release.
 - e. Install the cable on the intake manifold clip at the top position.
7. Start the engine and check the curb idle with the transaxle in the park position.
8. Check to see if the guage reading is between 12-16 psi. Proceed as follows:
 - a. If the pressure is less than 12 psi, go to step 10.
 - b. If the pressure is greater than 16 psi, go to step 9.
 - c. If the pressure is between 12-16 psi, stop engine and remove guage. Install TV port plug and tighten to 6-11 lb-ft (8-16 Nm) and re-install the air cleaner assembly.
9. If the pressure is greater than 16 psi, proceed as follows:
 - a. Turn off the engine.
 - b. While carefully wiggling the white threaded shank on the TV cable adjustment, push the shank toward the throttle body or the rear of the engine compartment.
 - c. Try to move the shank one tooth at a time. (A one tooth movement is equivalent to about two and one half psi reduction in TV pressure).
 - d. Start the engine and check the TV pressure.
 - e. When within specification, remove the guage and install the TV port plug. Tighten it to 6-11 lb-ft (8-16 Nm).
 - f. Re-install the air cleaner assembly.

NOTE: IF THIS CABLE ADJUSTMENT REDUCES TV PRESSURE BELOW 12 PSI, THE CABLE MUST BE ADJUSTED BY THE PROCEDURE DESCRIBED IN STEP 10.

10. If pressure is less than 12 psi, proceed as follows:
 - a. Turn off the engine.
 - b. Unclip the TV cable from the intake manifold bracket.
 - c. Span the space between the two adjuster spring rest segments with a large screwdriver or socket extension rod, Figure 3.
 - d. Compress the spring by pushing the screwdriver or socket extension rod toward the throttle body.
 - e. With the spring compressed, push the threaded shank into or toward the spring. The threaded shank should "Pop-Up" in the adjuster and be fully extended.

CAUTION: DO NOT PULL ON THE CABLE SHEATHING.

11. Locate the throttle body primary lever, Figure 2. Rotate the lever by hand to the wide open position and release. The threaded shank should "ratchet" into the spring rest.
12. Clip the TV cable to the intake manifold bracket.
13. Start the engine and read the TV pressure guage. Repeat the steps as required to bring the TV pressure between 12-16 psi.
14. When within specification, remove the guage and install the TV port plug. Tighten it to 6-11 lb-ft (8-16 Nm).
15. Re-install the air cleaner assembly.

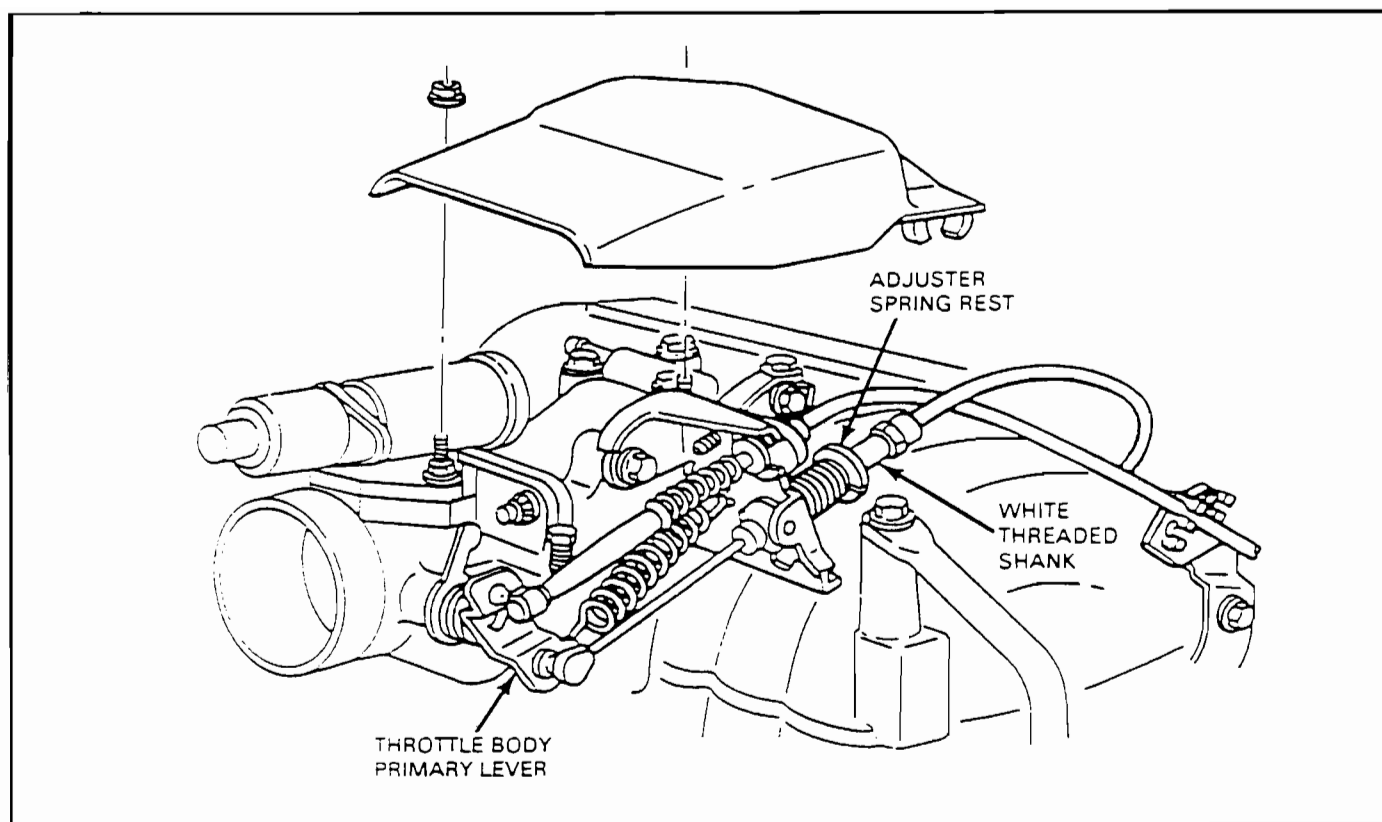
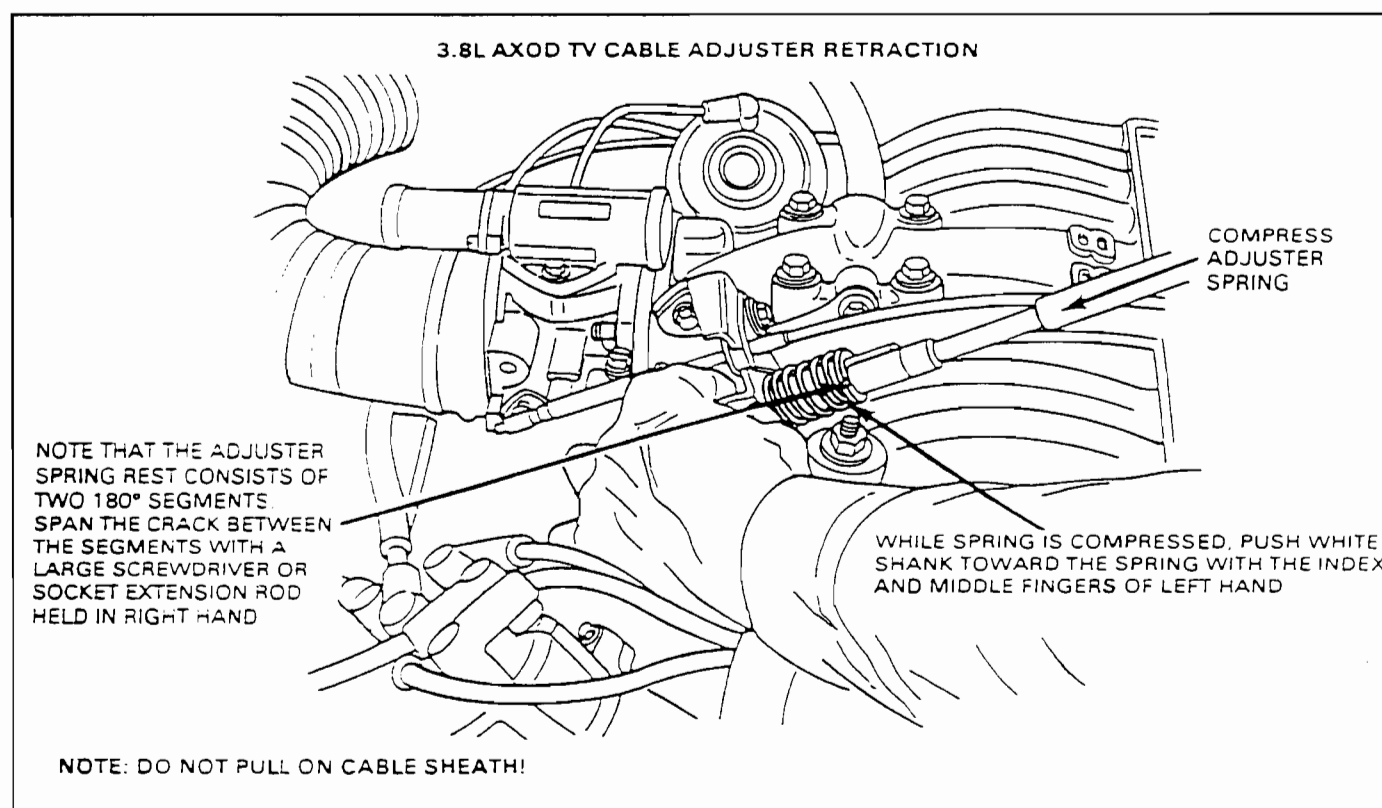


Figure 2



FORD AXOD

PROPER ROTATION - DIRECT OVERRUN CLUTCH

Hold the support in your right hand, as shown in Figure 1. Turn the direct overrun clutch outer race. It should FREEWHEEL CLOCKWISE and it should LOCK COUNTER-CLOCKWISE. The roller clutch cannot be installed on the support upside down.

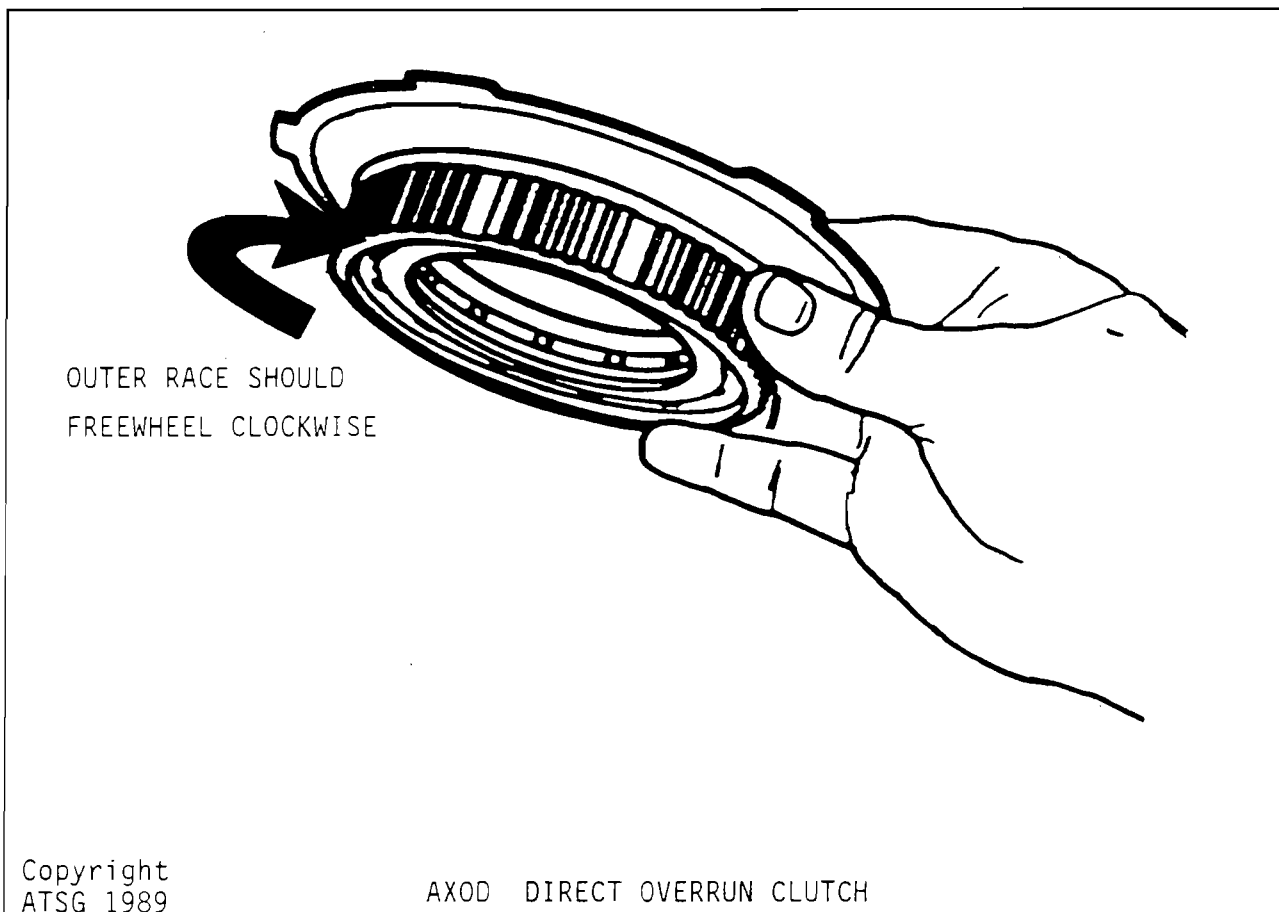


Figure 1

1989 FORD AXOD

NEW SCREEN IN CASE

CHANGE: A new filter has been added to the 1989 AXOD 1-2 servo apply circuit (See Figure 1).

REASON: The filter prevents large metal chips from entering the valve body.

PARTS AFFECTED:

- (1) CHAIN COVER - 1-2 servo passage changed to accomodate the new screen.
- (2) TRANSAXLE CASE - 1-2 servo passage changed to accomodate the new screen.

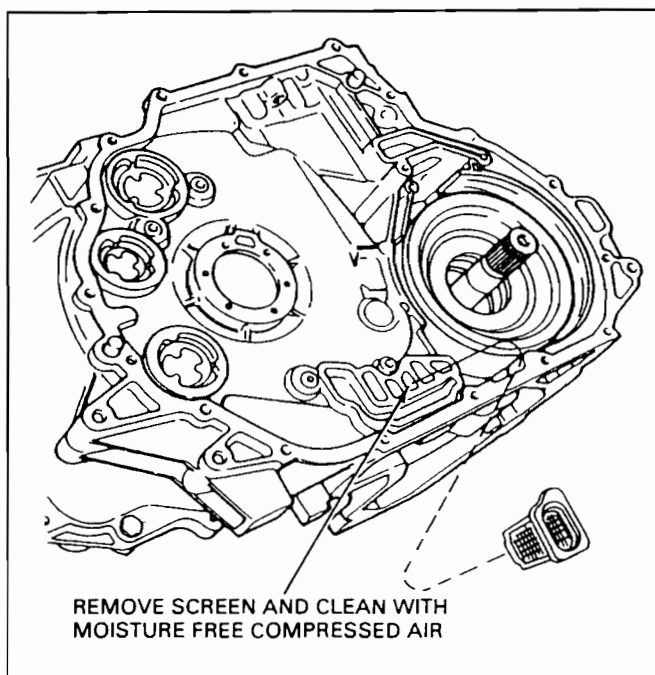
INTERCHANGEABILITY:

The new screen WILL NOT retro fit to previous models. The 1-2 servo passage on the previous models chain cover will not accomodate the new screen and an interference will occur.

NOTE: A no forward condition could occur if the filter becomes contaminated.

SERVICE INFORMATION:

New Filter..... E9DZ-7H162-A



AXOD GASKET IDENTIFICATION

We have shown in past bulletins the gasket changes in the AXOD transmissions. The gaskets "DO NOT" interchange between model years. The valve body, oil pump, and chain cover must also be matched, along with the proper gaskets. Refer to the charts below for proper identification.

GASKET IDENTIFICATION

1986 Hydraulics = Plain Black, without any ID marks.
1987 Hydraulics = White Stripe on pump and valve body gaskets.
1988 Hydraulics = Yellow Stripe on pump and valve body gaskets.
1989 Hydraulics = Yellow Stripe on pump and valve body gaskets.

PUMP IDENTIFICATION

1986 Hydraulics = Casting Number E6SP-7B324-AA
1987 Hydraulics = Casting Number E7DP-7B324-AA
1988 Hydraulics = Casting Number E8DP-7B324-AA

SEE FIGURE 1 FOR CASTING NUMBER LOCATION

VALVE BODY IDENTIFICATION

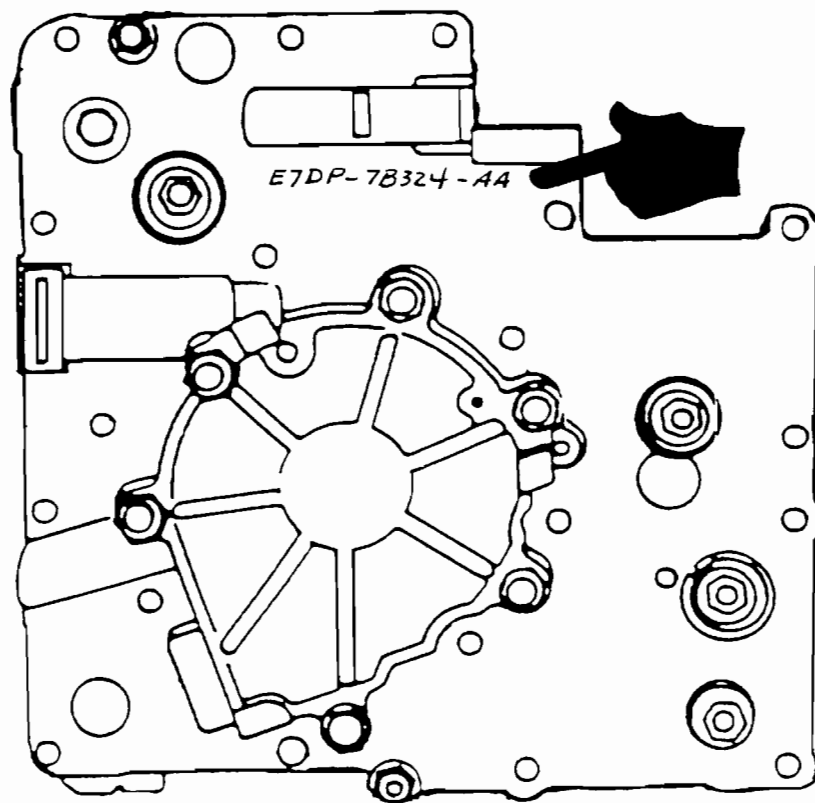
1986 Hydraulics = Casting Number E6SP-7A092-AD
1987 Hydraulics = Casting Number E7DP-7A092-BA
1988 Hydraulics = Casting Number E8DP-AA

SEE FIGURE 2 FOR CASTING NUMBER LOCATION

CHAIN COVER IDENTIFICATION

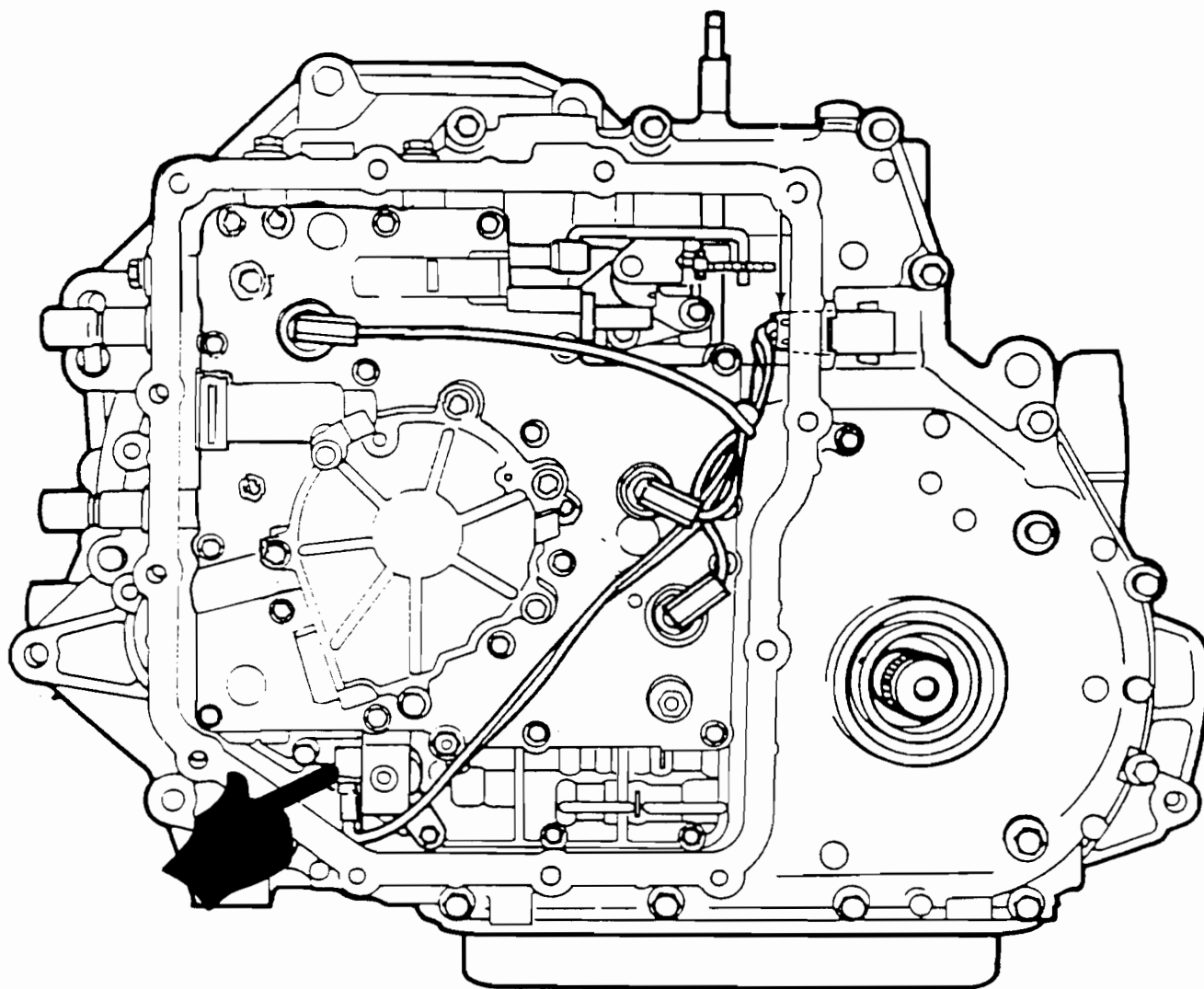
1986 Hydraulics = Casting Number E6SP-7G234-AA
1987 Hydraulics = Casting Number E7DP-7G234-AA
1988 Hydraulics = Casting Number E8DP-7G234-AA

SEE FIGURE 3 FOR CASTING NUMBER LOCATION



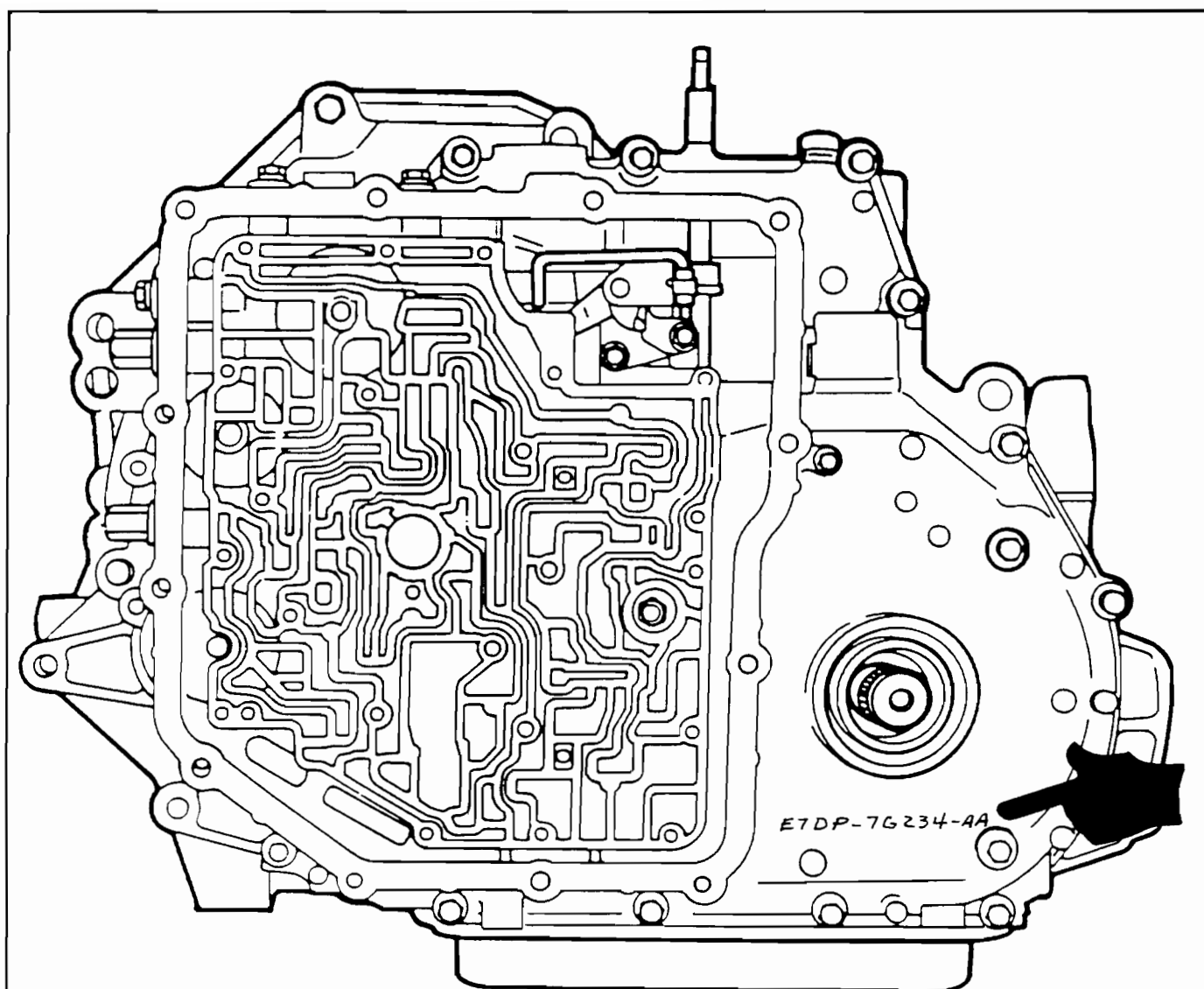
OIL PUMP CASTING NUMBER LOCATION

Figure 1



VALVE BODY CASTING NUMBER
LOCATED UNDER LOCK-UP SOLENOID

Figure 2



CHAIN COVER CASTING NUMBER LOCATION

Figure 3

AXOD
REVISED SEALING RINGS

The five sealing rings on the driven sprocket support have been re-designed to help eliminate leakage. The width of the sealing rings has been increased by approximately .015", and the new color I.D. is orange with green speckles (See Figure 1). The previous design sealing rings were plain orange color.

The new design sealing rings are available under OEM Part Number E6DZ-7D019-A, and should be used on all previous model AXOD's.

DO NOT USE PREVIOUS DESIGN SEALING RINGS.

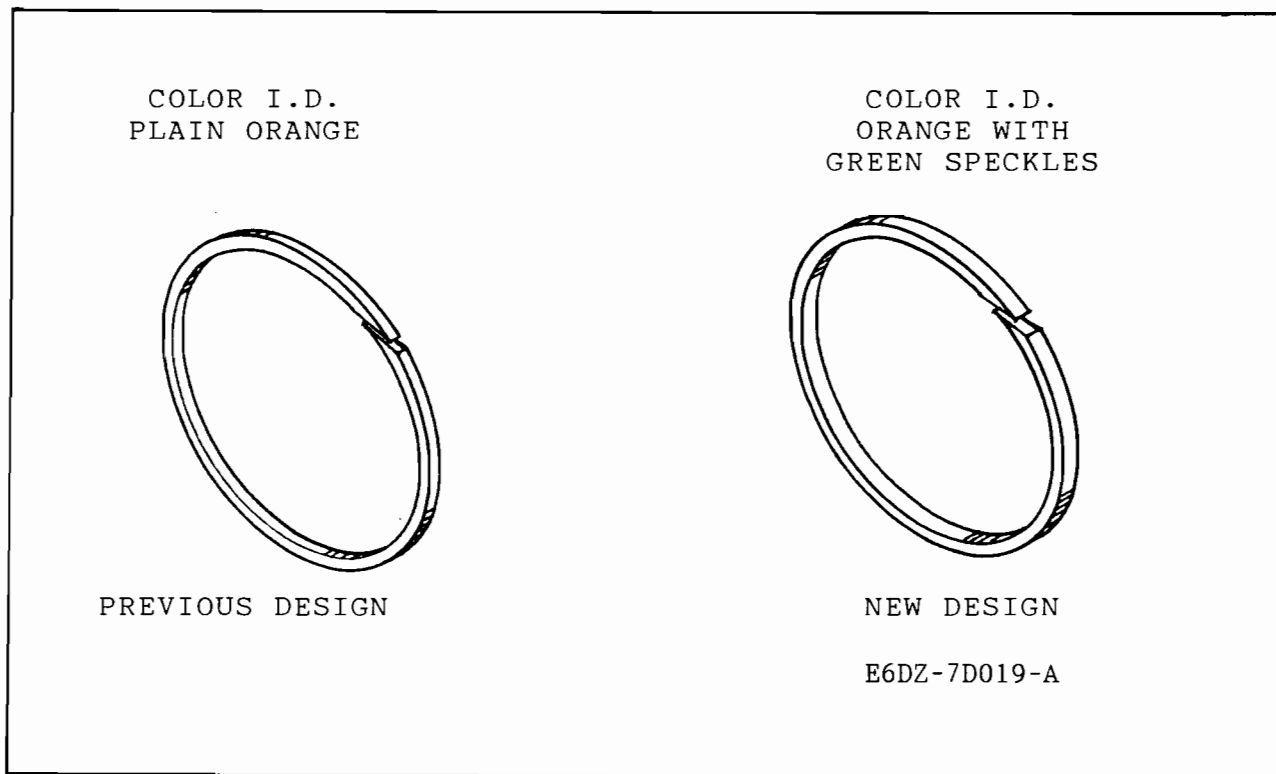


Figure 1

FORD - AXOD

ACCUMULATOR SPRING COLOR CODES

3.0L ENGINE

1986	}	1-2 Accumulator = YELLOW/YELLOW
1987		3-4 Accumulator = GREEN/GREEN
1988		N-D Accumulator = ORANGE/BLUE
1989		

3.8L ENGINE

1988	}	1-2 Accumulator = BROWN/BROWN/LIGHT BROWN
		3-4 Accumulator = PLAIN/PLAIN
		N-D Accumulator = ORANGE/BLUE
1989	}	1-2 Accumulator = BROWN/PURPLE/PURPLE
		3-4 Accumulator = WHITE/WHITE
		N-D Accumulator = ORANGE/BLUE

AXOD ACCUMULATOR SPRING LOCATION

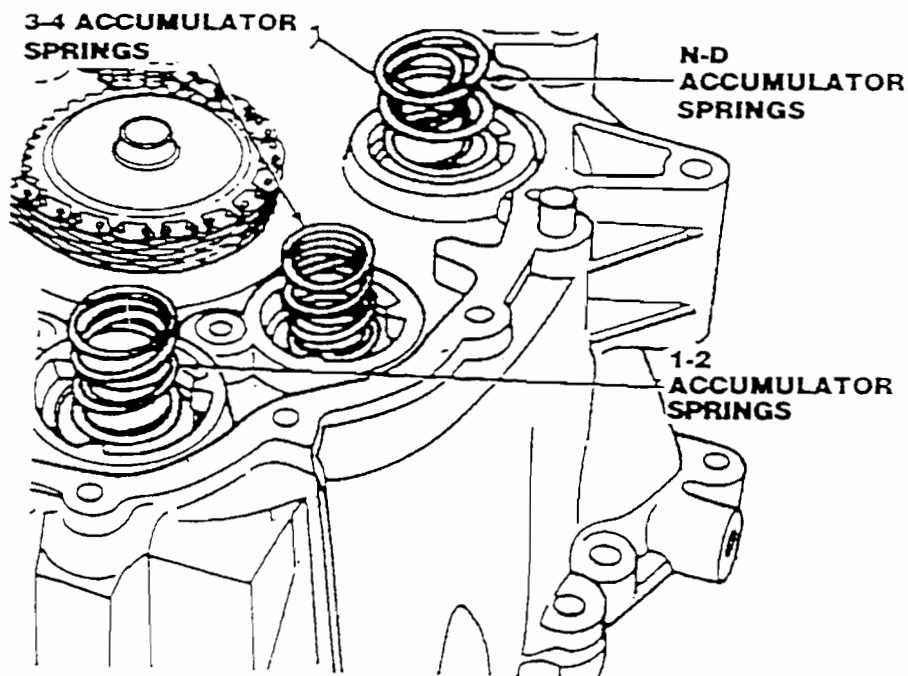


FIGURE 1

FORD - AXOD

SPROCKET RATIO IDENTIFICATION

	<u>YEAR</u>	<u>ENGINE SIZE</u>	<u>DRIVE SPRKT</u>	<u>DRIVEN SPRKT</u>
TAURUS & SABLE	ALL	3.0L ENGINE	37T	36T
	ALL	3.8L ENGINE	38T	35T
LINCOLN CONTINENTAL	1988	3.8L ENGINE	38T	35T
	1989	3.8L ENGINE	37T	36T

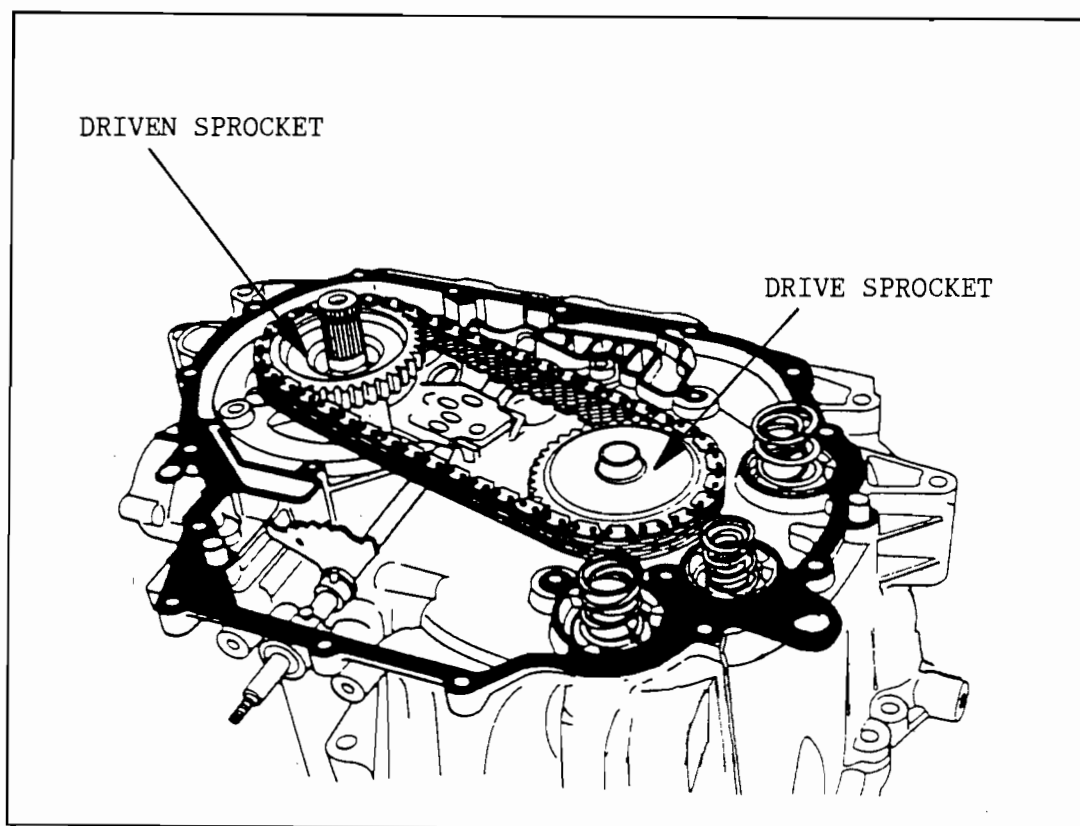


Figure 1