THE SEMINAR WITH MORE IN '94

INDEX

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

THE SEMINAR WITH MORE IN '94

INTRODUCTION

In this years seminar we will cover the imports that we see coming into our shops along with domestic units. Some of the units we will cover have been around for more than ten years. The most frequent hot-line calls have been used as a basis for the material we will cover. Since there are more types of units out there we will have three manuals this year to keep you updated on both the new and not so new units. This manual will cover the imports. Honda, Toyota, Nissan, and Mitsubishi plus some others. The Ford units, AXOD, AXODE, AOD, AODE, AND A4LD' Will be covered in this manual. We have tried to bring the most frequent complaints along with the fixes on the units mentioned. This information will be covered in both the slide and video portion of the seminar. WE have also listed many OEM part numbers.

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

ROBERT D. CHERRNAY
TECHNICAL DIRECTOR

DALE ENGLAND
FIELD SERVICE CONSULTANT

FRANK MIETUS
TECHNICAL CONSULTANT

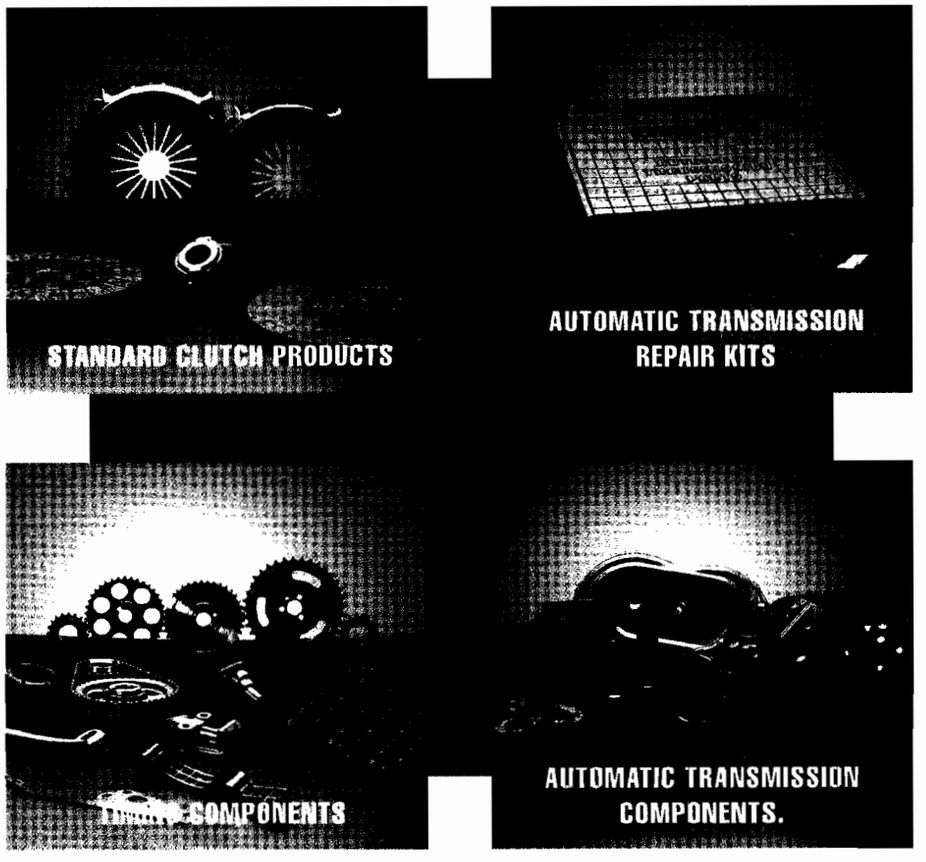
WAYNE COLONNA
TECHNICAL SUPERVISOR

ED KRUSE
LAYOUT

PETE LUBAN
TECHNICAL CONSULTANT

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

AN AUTOMOBILE'S PERFORMANCE IS JUDGED BY ITS PARTS.



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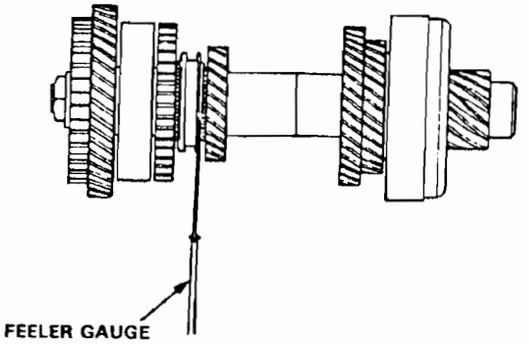
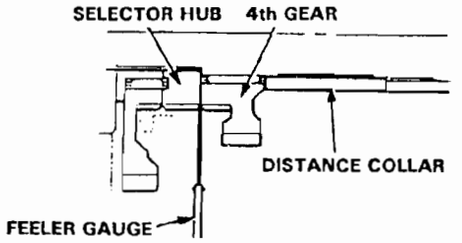
Distance Collar/Spline Washer Selecting

1. Remove the countershaft bearing from the transmission housing.
2. Assemble all parts including the counter-shaft bearing on the countershaft.
3. Torque the countershaft locknut to 30 N·m (3.0 kg-m, 22 lb-ft).
4. Measure the clearance between the shoulder on the selector hub and the shoulder on 4th gear.

Countershaft 4th Gear Clearance:
Standard: 0.07—0.15 mm (0.003—0.006 in.)



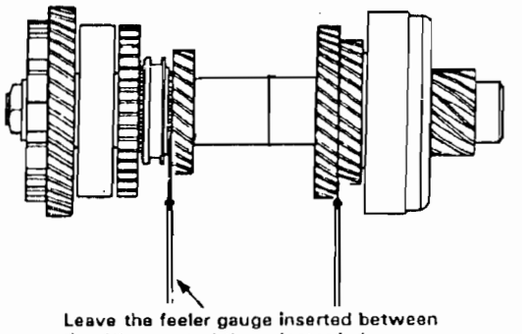


5. If clearance exceeds the service limit, measure the thickness of the distance collar and select one which will give the correct clearance.

Replacement distance collar:

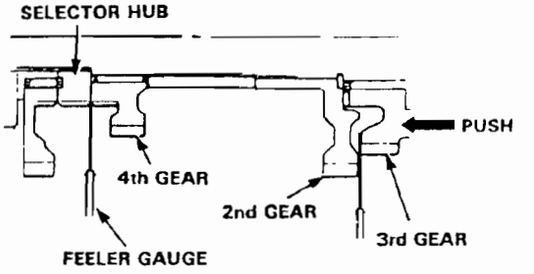
P/N	THICKNESS
90503—PC9—000	38.97—39.00 mm (1.534—1.535 in)
90504—PC9—000	39.07—39.10 mm (1.538—1.539 in)
90505—PC9—000	39.17—39.20 mm (1.542—1.543 in)
90507—PC9—000	39.27—39.30 mm (1.546—1.547 in)
90508—PC9—000	39.02—39.05 mm (1.536—1.537 in)
90509—PC9—000	39.12—39.15 mm (1.540—1.541 in)
90510—PC9—000	39.22—39.25 mm (1.544—1.545 in)
90511—PC9—000	39.87—39.90 mm (1.570—1.571 in)
90512—PC9—000	39.92—39.95 mm (1.572—1.573 in)

6. Slide the 3rd gear out fully.
Measure and record the clearance between the 2nd and 3rd gear with a feeler gauge.



- Slide the 3rd gear in fully and again measure the clearance between 2nd and 3rd gears.
- Calculate the difference between the two readings to determine the actual clearance.

Service Limit: 0.07—0.15 mm (0.003—0.006 in)



7. If the clearance exceeds the service limit, measure the thickness of the spline washer and select one which will give the correct clearance.

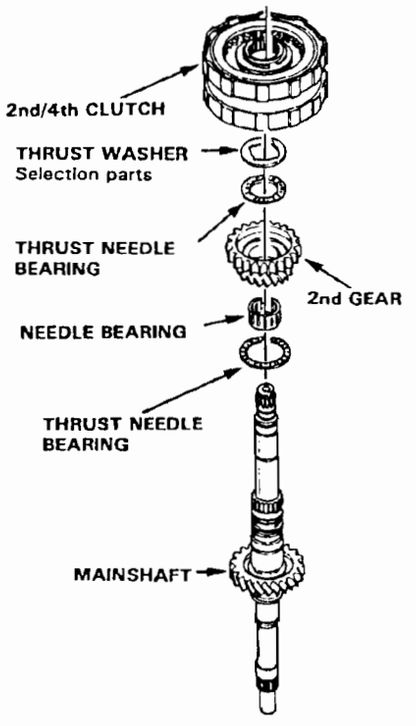
Replacement spline washer:

P/N	THICKNESS
90411—PF4—000	2.97—3.00 mm (0.117—0.118 in)
90412—PF4—000	3.02—3.05 mm (0.119—0.120 in)
90413—PF4—000	3.07—3.10 mm (0.121—0.122 in)
90414—PF4—000	3.12—3.15 mm (0.123—0.124 in)
90415—PF4—000	3.17—3.20 mm (0.125—0.126 in)
90416—PF4—000	3.22—3.25 mm (0.127—0.128 in)
90417—PF4—000	3.27—3.30 mm (0.129—0.130 in)
90418—PF4—000	3.32—3.35 mm (0.131—0.132 in)
90419—PF4—000	3.37—3.40 mm (0.133—0.134 in)

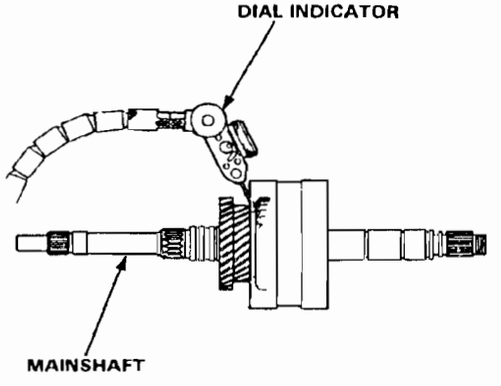
Mainshaft

Thrust Washer Selecting

1. Install the thrust needle bearing, needle bearing, 2nd gear, thrust needle bearing, thrust washer and 2nd/4th clutch assembly to the mainshaft.



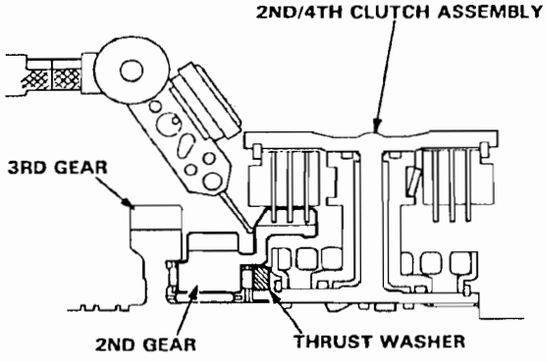
2. Attach the dial-indicator to the mainshaft 2nd gear.



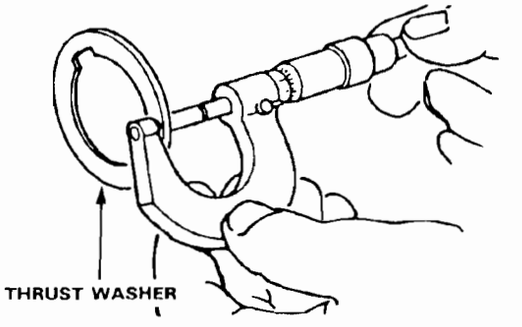
3. Measure the 2nd gear axial clearance while pushing the clutch assembly towards 3rd gear.

   NOTE: Measure the clearance at three places 120° apart, and take the average as the actual clearance.

   Standard: 0.07—0.15 mm (0.003—0.006 in)



4. If the clearance exceeds the service limit, measure the thickness of the thrust washer and select one which gives the proper clearance.



Replacement thrust washers:

P/N	THICKNESS
90441—PG4—010	3.97—4.00 mm (0.156—0.157 in)
90442—PG4—010	4.02—4.05 mm (0.158—0.159 in)
90443—PG4—010	4.07—4.10 mm (0.160—0.161 in)
90444—PG4—010	4.12—4.15 mm (0.162—0.163 in)
90445—PG4—010	4.17—4.20 mm (0.164—0.165 in)
90446—PG4—010	4.22—4.25 mm (0.166—0.167 in)
90447—PG4—010	4.27—4.30 mm (0.168—0.169 in)
90448—PG4—010	4.32—4.35 mm (0.170—0.171 in)
90449—PG4—010	4.37—4.40 mm (0.172—0.173 in)

HONDA ACCORD PX4B, APX4 and PRELUDE MP1A
CODE RETRIEVAL

When the A/T control unit senses an abnormality in the input or output system, the S indicator light (1990-91), or D4 indicator light (1992), in the gauge assembly will blink. However, when the Service Check Connector is crossed with a jumper wire, the S indicator light or D4 indicator light will blink the problem code when the ignition is turned on. See figure 1 for 1990-92 Honda Accord S and D4 indicator light and Service Check Connector location. Figure 2 shows the 1992 Honda Prelude D4 indicator light and Service Check Connector location.

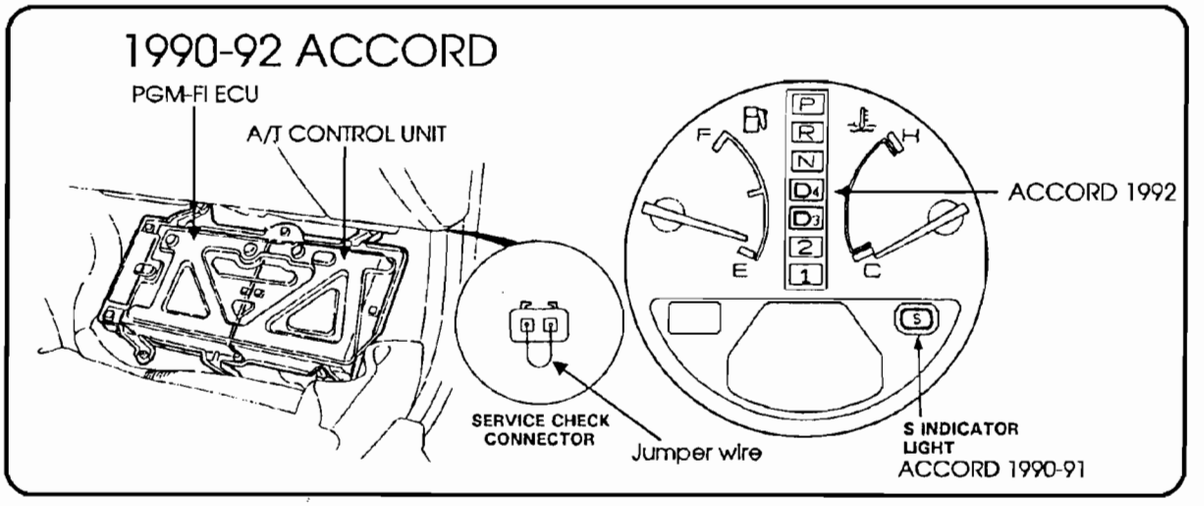


Figure 1

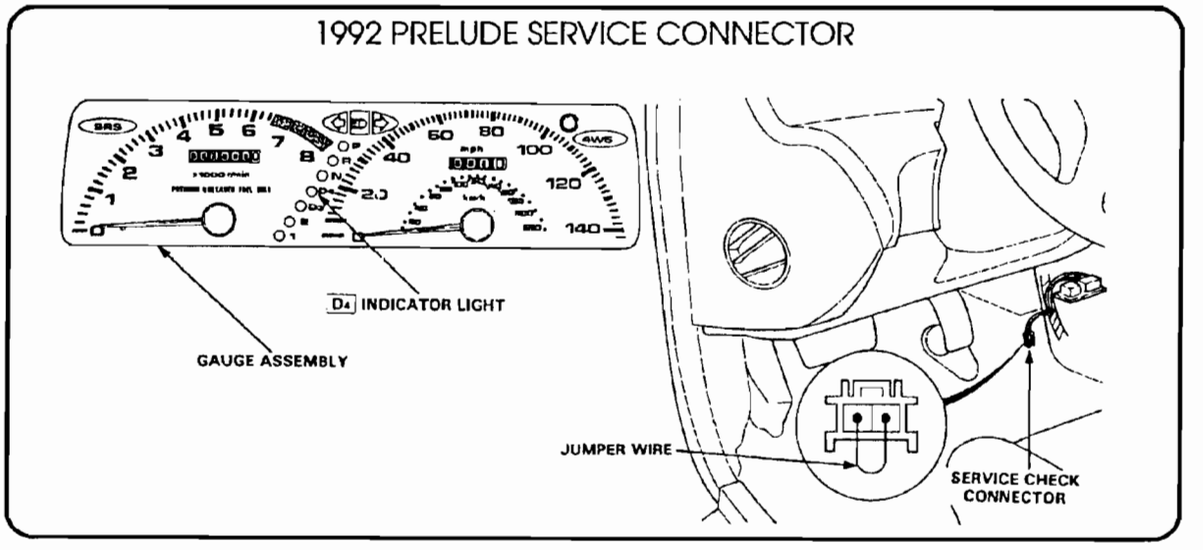


Figure 2

Once the two terminals in the service check connector has been crossed with a jumper wire, problem codes 1-9 are indicated by individual short blinks. Problem codes 10-15 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks to

determine the problem code. Figure 3 shows an example of codes 1, 2 and 14.

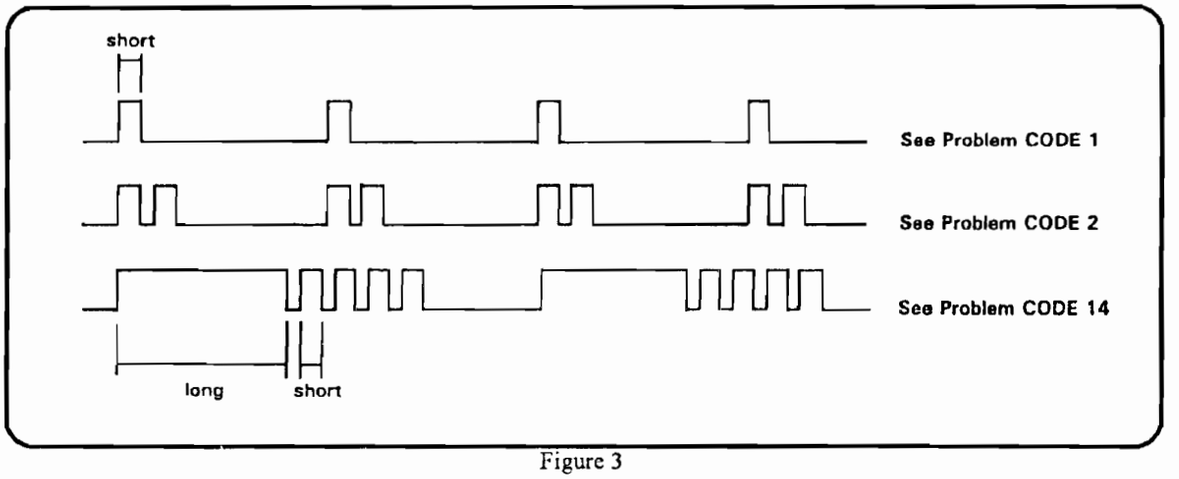


Figure 3

Once the code has been retrieved, refer to the Symptom-to-Component chart on the following pages for code identification.

ACCORD

Some PGM-FI problems will also make the S or D4 indicator light come on. After repairing the PGM-FI system, disconnect the 7.5 amp Back Up fuse in the under hood relay box for more than 10 seconds to reset the A/T control unit memory.

NOTE: Disconnecting the back up fuse also cancels the radio preset stations and the clock setting.

PRELUDE

Some PGM-FI problems will also make the D4 indicator light come on. After repairing the PGM-FI system, disconnect the 10 amp Clock Radio fuse in the under hood fuse/relay box for more than 10 seconds to reset the A/T control unit memory.

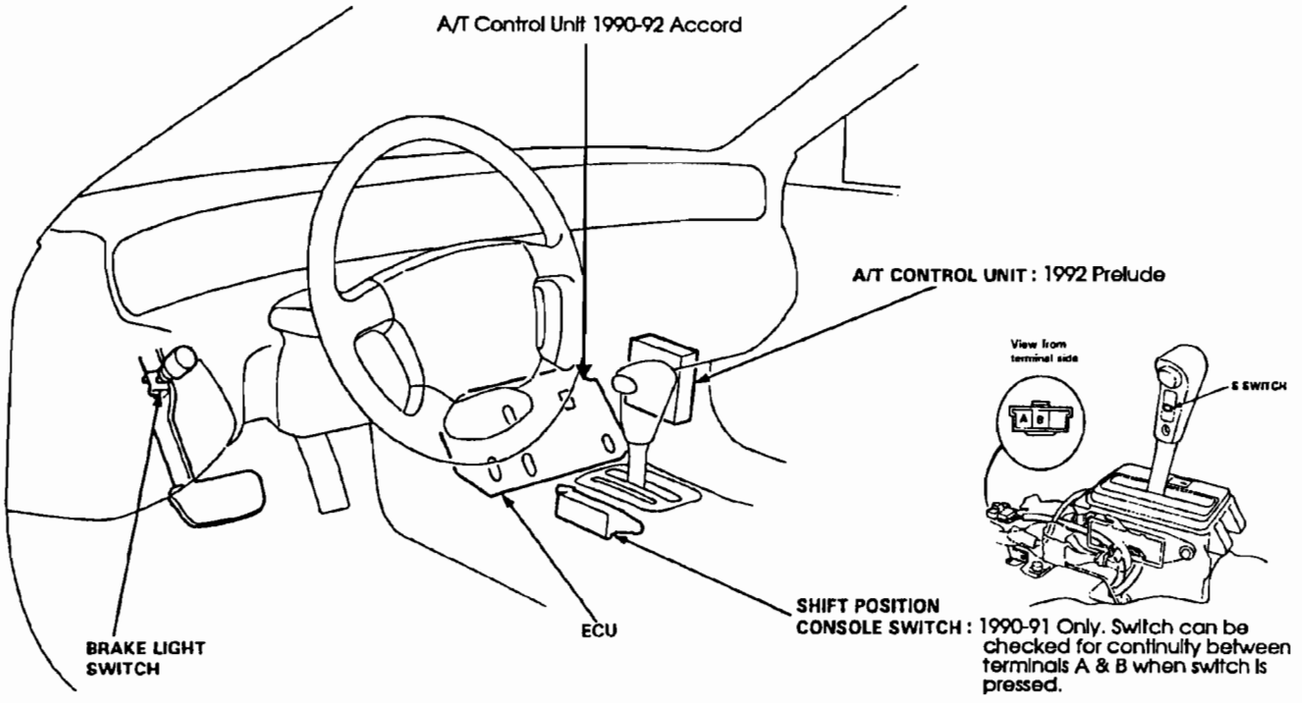
NOTE: Disconnecting the clock radio fuse also cancels the radio anti-theft code, preset stations and the clock settings. Get the customers anti-theft code to reset the radio. If you cannot get the code, do not reset the control unit by removing the clock fuse. Disconnect the plug at the A/T control unit for more than 10 seconds.

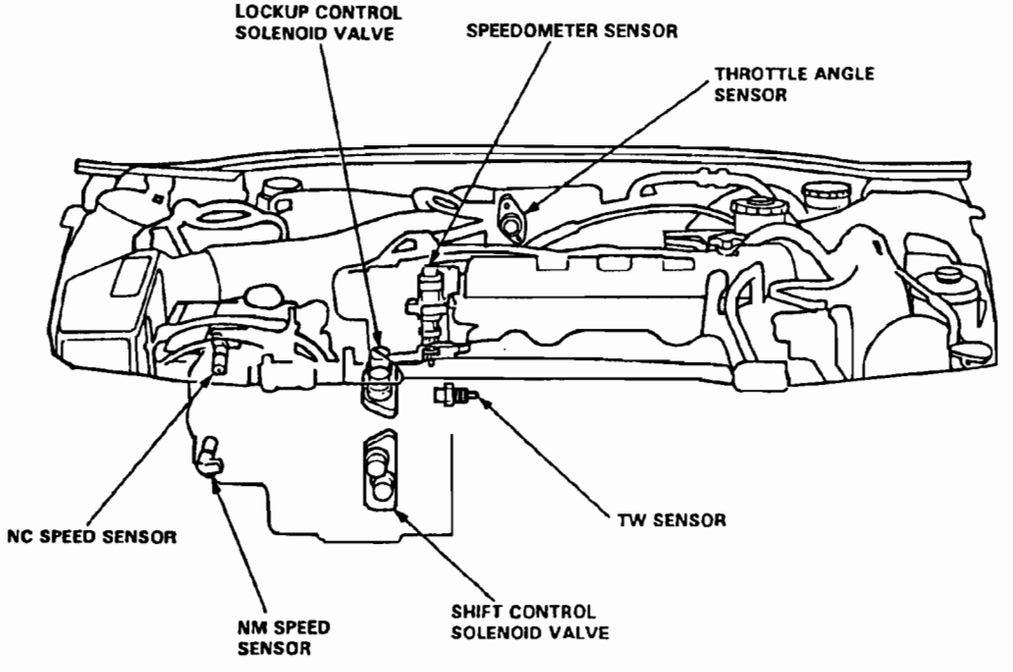
Symptom-to-Component Chart

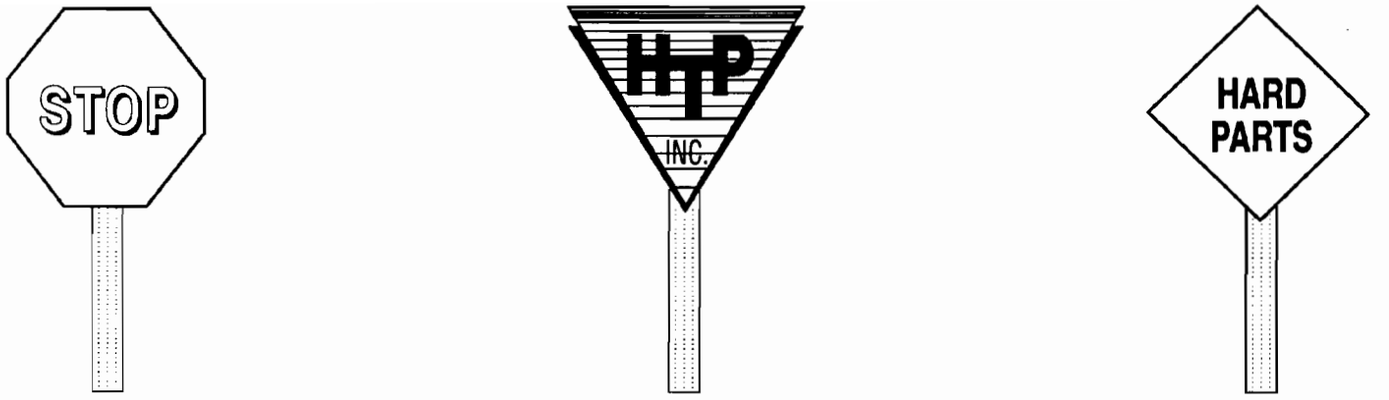
Number of LED display blinks	S indicator light	Possible Cause	Symptom
1	Blinks	• Disconnected lock-up control solenoid valve A coupler • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Frequent engine stalling.
2	Blinks	• Disconnected lock-up control solenoid valve B coupler • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B	• Lock-up clutch does not engage.
3	Blinks or OFF	• Disconnected throttle angle sensor,coupler • Short or open in throttle angle sensor wire • Faulty throttle angle sensor	• Lock-up clutch does not engage.
4	Blinks	• Disconnected sensor coupler • Short or open in speed sensor wire • Faulty speed sensor	• Lock-up clutch does not engage.
5	Blinks	• Short in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ⟷ 4th gears. • Lock-up clutch does not engage.
6	OFF	• Disconnected shift position console switch coupler • Open in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ⟷ 4th gears. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately.
7	Blinks	• Disconnected shift control solenoid valve A coupler • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	• Fails to shift (between 1st ⟷ 4th, 2nd ⟷ 4th or 2nd ⟷ 3rd gears only). • Fails to shift (stuck in 4th gear)
8	Blinks	• Disconnected shift control solenoid valve B coupler • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	• Fails to shift (stuck in 1st or 4th gears).

Number of LED display blinks	S indicator light	Possible Cause	Symptom
9	Blinks	• Disconnected NC speed sensor coupler • Short or open in the NC speed sensor wire • Faulty NC speed sensor	• Lock-up clutch does not engage.
10	Blinks	• Disconnected water temperature sensor coupler • Short or open in the water temperature sensor wire • Faulty water temperature sensor	• Lock-up clutch does not engage.
11	OFF	• Disconnected ignition coil coupler • Short or open in ignition coil wire • Faulty ignition coil	• Lock-up clutch does not engage.
14	OFF	• Short or open in FAS wire • Trouble in PGM-FI unit	• Transmission jerks hard when shifting.
15	OFF	• Disconnected NM speed sensor coupler • Short or open in NM speed sensor wire • Faulty NM speed sensor	• Transmission jerks hard when shifting.

COMPONENT LOCATION







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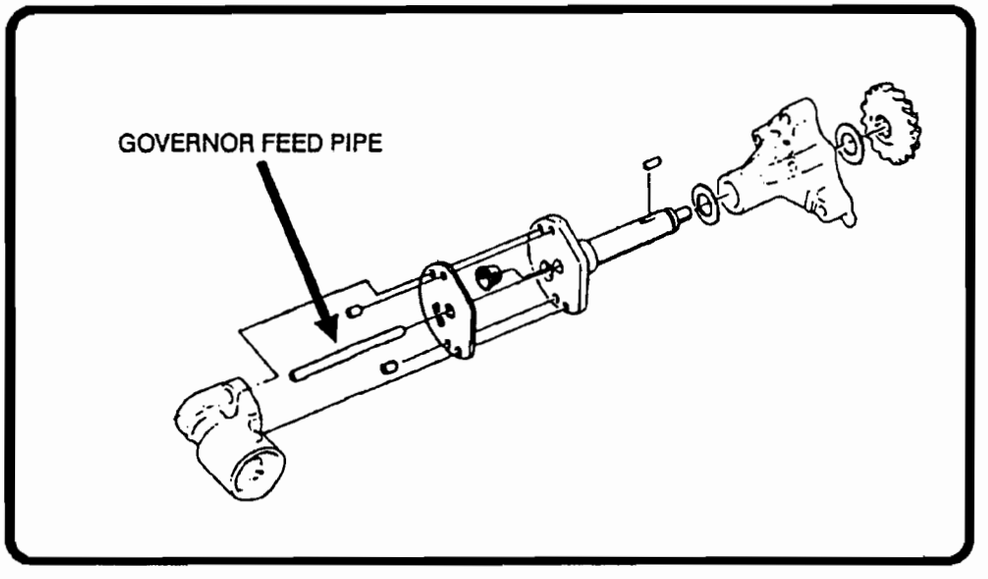
HONDA - ACURA 4 SPEED (HYDRAULIC)
NO REVERSE

COMPLAINT: No reverse.

CAUSE: Missing governor feed pipe.

CORRECTION: Replace feed pipe.

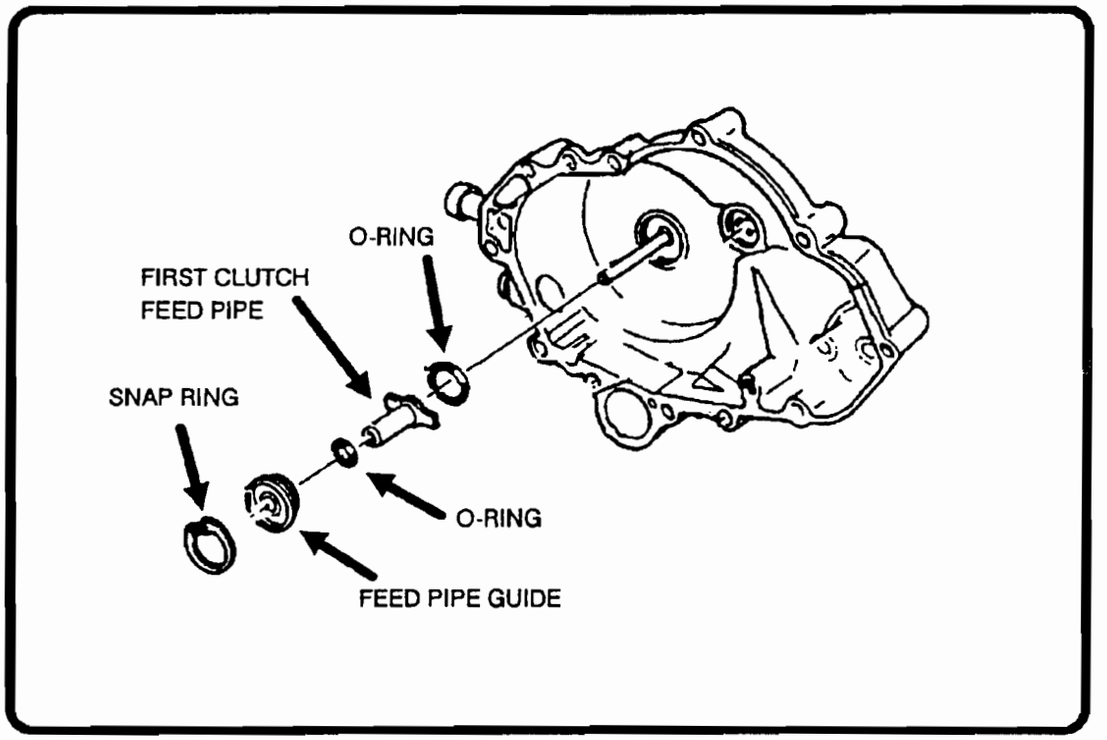


HONDA - ACURA 4 SPEED
SLIPPING OR NO FIRST GEAR

COMPLAINT: Slipping or no 1st gear.

CAUSE: Snap ring is not fully seated causing a sever leak at the first clutch feed pipe.

CORRECTION: Replace the o-ring and reinstall the snap ring pressing down all the way around the snap ring to make sure it is properly seated.



HONDA - ACURA 4 SPEED
HIGH LINE PRESSURE

COMPLAINT: Harsh engagement, harsh shifts, high line pressure.

CAUSE: Pressure regulator retaining bolt jamming spring retainer (figure 1).

CORRECTION: When installing retainer and bolt make sure that the slot on the retainer lines up with the bolt hole before installing the bolt (figure 2).

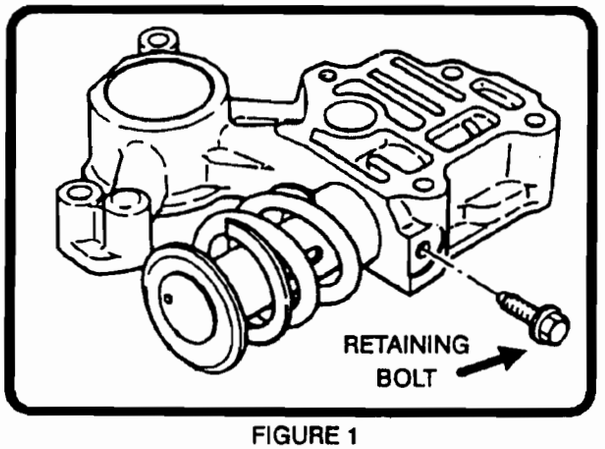


FIGURE 1

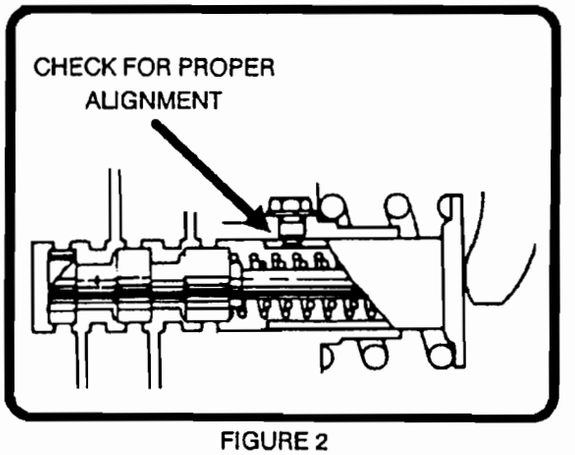
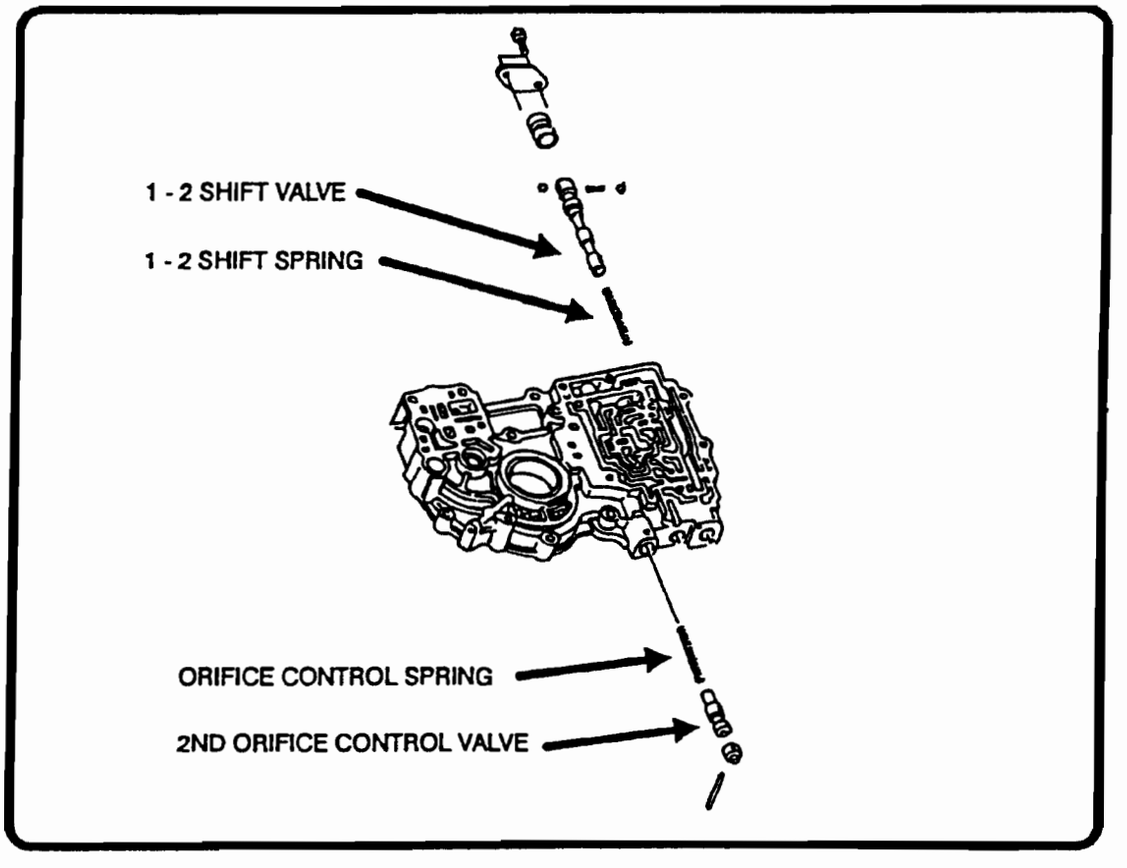


FIGURE 2

HONDA - ACURA 4 SPEED (HYDRAULIC)
LATE 1 - 2 SHIFT

COMPLAINT:	Late 1 - 2 shift.
CAUSE:	The second gear orifice control valve spring installed improperly into the 1 - 2 shift valve train.
CORRECTION:	Remove the springs and reinstall them into their proper locations.

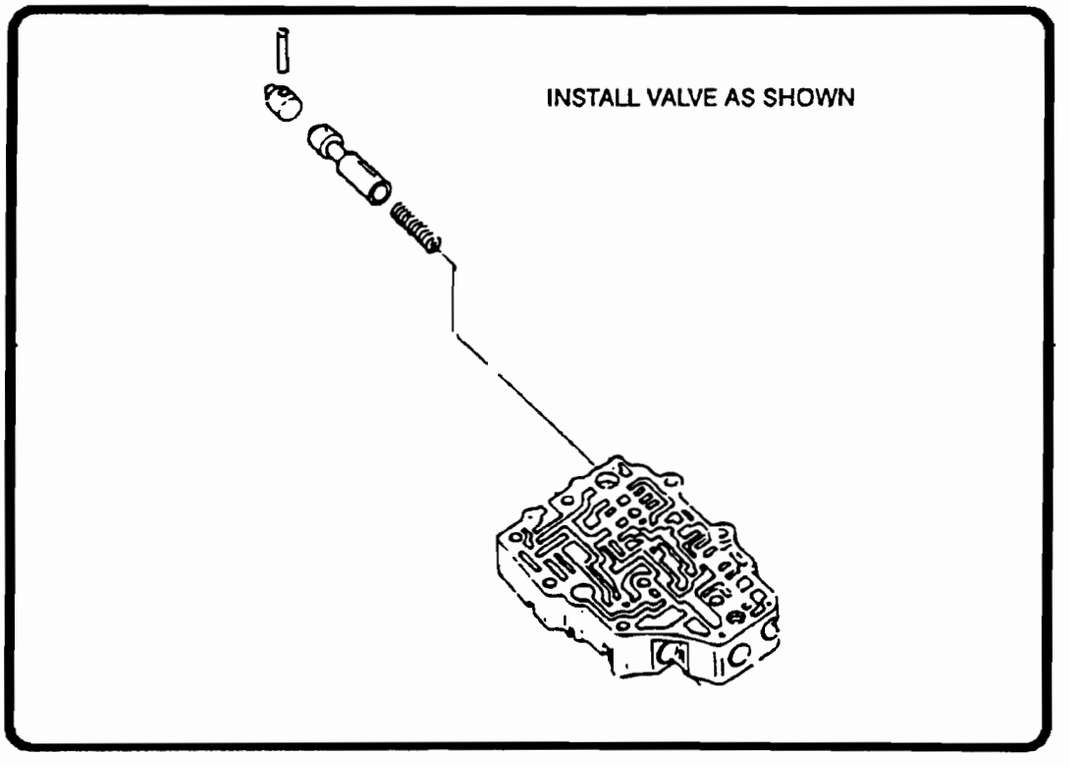


HONDA - ACURA 4 SPEED (HYDRAULIC)
NO UPSHIFT

COMPLAINT: No upshifts (T.V. and governor pressure ok).

CAUSE: Misassembly of the CPV valve and spring.

CORRECTION: Remove and install correctly.

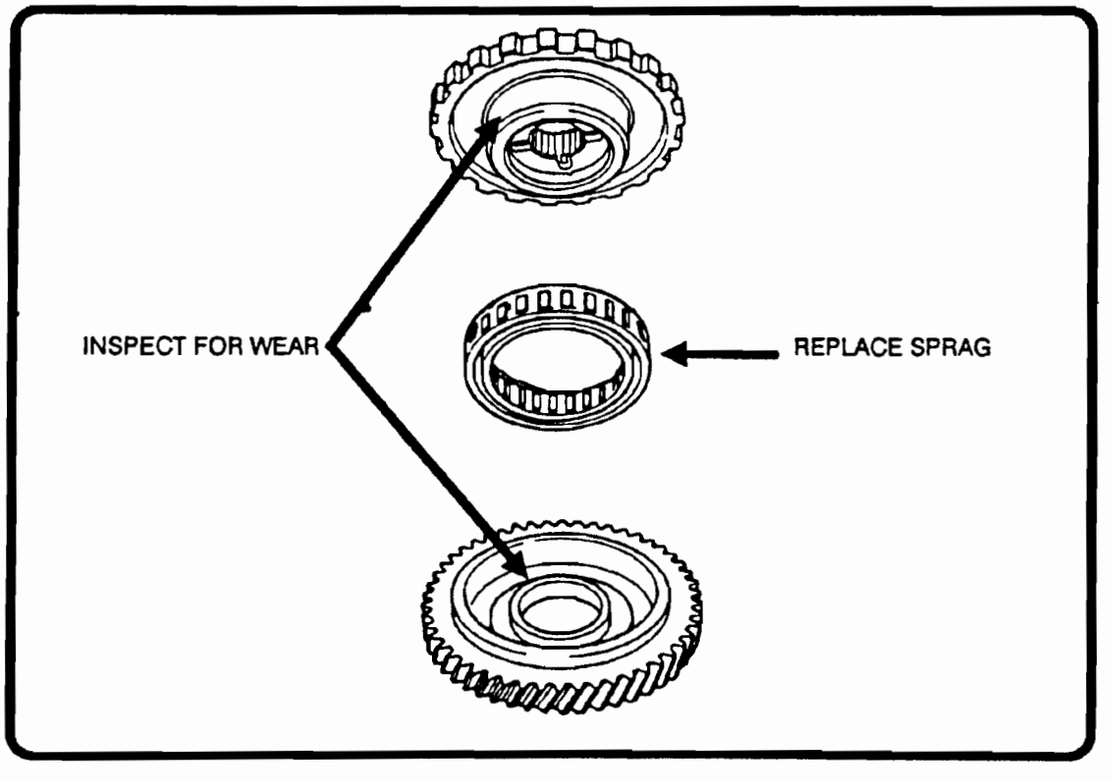


HONDA - ACURA 4 SPEED
SQUAWKING NOISE GOING INTO 1st

COMPLAINT: Screach or squawking noise going into 1st gear when hot.

CAUSE: Sprag is slipping.

CORRECTION: Replace sprag, also check inner and outer races for any wear and replace if necessary.



RE4RO1A AND RL4RO1A

SNAP RING REMOVAL

During teardown, it is very difficult if not impossible to remove the front carrier to output shaft snap ring. Even if only an inspection service is being performed, the tail housing and parking gear to output shaft snap ring must be removed first. See figure 1. This will allow the output shaft to be pushed far enough forward to remove the front carrier to output shaft snap ring without damaging it. See figure 2,

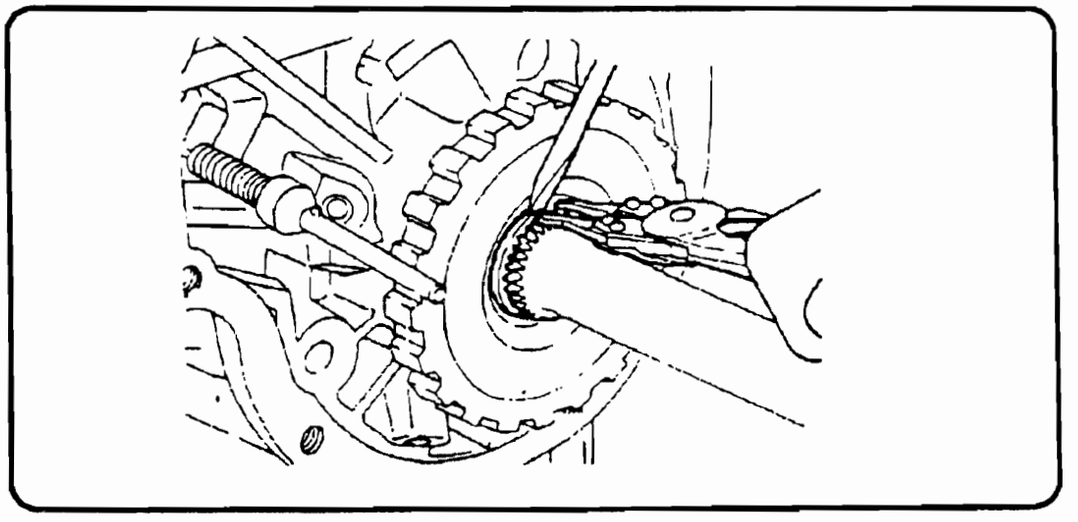


Figure 1.

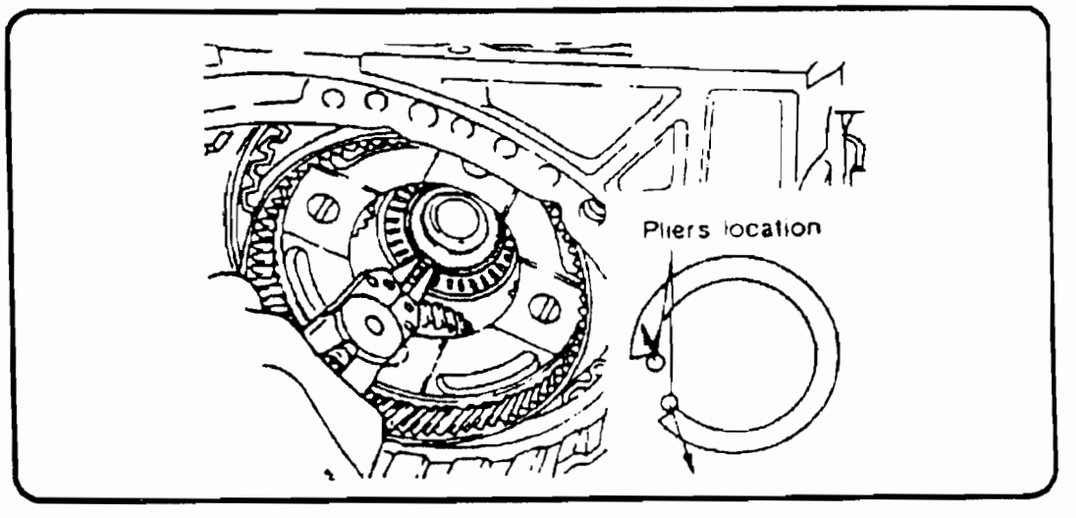


Figure 2.

NISSAN FRONT OR REAR DRIVE

PREMATURE PLANETARY FAILURE

COMPLAINT: Planetary gears failed due to lack of lubrication, while the hydraulic system and friction material does not seem to be damaged.

CAUSE: Lubrication may be restricted or even totally cut off due to clutch material from the converter clutch clogging the fins or tubes inside of the radiator cooler.

CORRECTION: 1. FRONT AND REAR DRIVE.
After a transmission repair, perform a cooler flow test on all suspect vehicles. There must be at least 1(one) quart of oil every 20 seconds returning to the transmission at idle. If the vehicle uses a **tube** type cooler, then it may be flushed using conventional methods. If the vehicle uses a **fin** type cooler, then the radiator MUST be replaced.
See figure 1 to determine the cooler type in the vehicle that you are working on.

CONTINUED ON NEXT PAGE.

COOLER APPLICATIONS

MODEL	MODEL YEAR	TRANSMISSION	ENGINE	COOLER TYPE	
				FIN	TUBE
300ZX	1990-1992	RE4RO1 (3)A	VG30	X	
Truck/	1988-1992	RE4RO1A	VG30	X	
Pathfinder	1990-1992	RL4RO1A	KA24		X
240SX	1989-1992	RE4RO1A	KA24		X
Maxima	1989-1992	RE4F02A	VG30		X
	1990	RE4F04A	VE30	X	
Stanza	1990-1992	RE4F02A(V)	KA24		X
Sentra/NX	1990-1992	RL3F01A	GA16		X
	1990-1992	RL4F03A(V)	GA16/SR20	X	

Figure 1.

NISSAN CONTINUED

CORRECTION: **2. RE4RO1A and RE4RO3A**

Check the case bushings for wear and replace them if they are worn. Also make sure that the case bushings have not moved so that they block the lubrication feed passage to the output shaft. To assure maximum lube to the output shaft and planets, remove and discard the orificed cup plug, the lube relief ball, and the spring as shown in figure 2 and and INSTALL A SOLID PLUG IN PLACE OF THE ORIFIFED CUP PLUG.

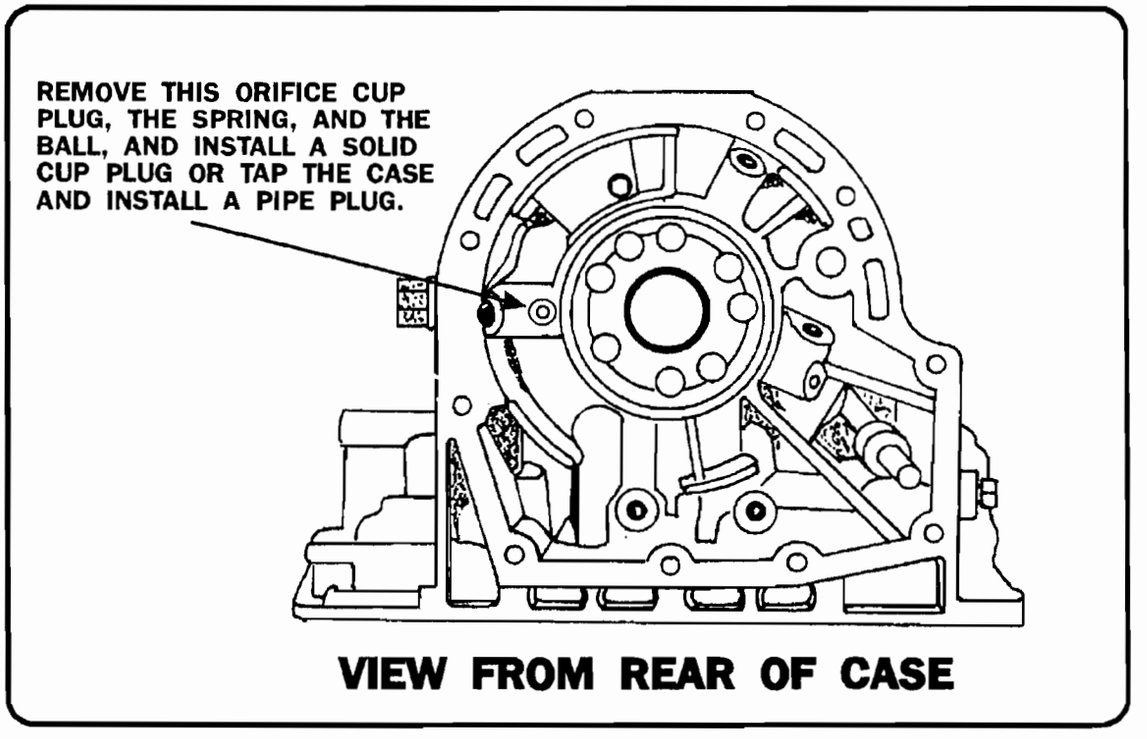
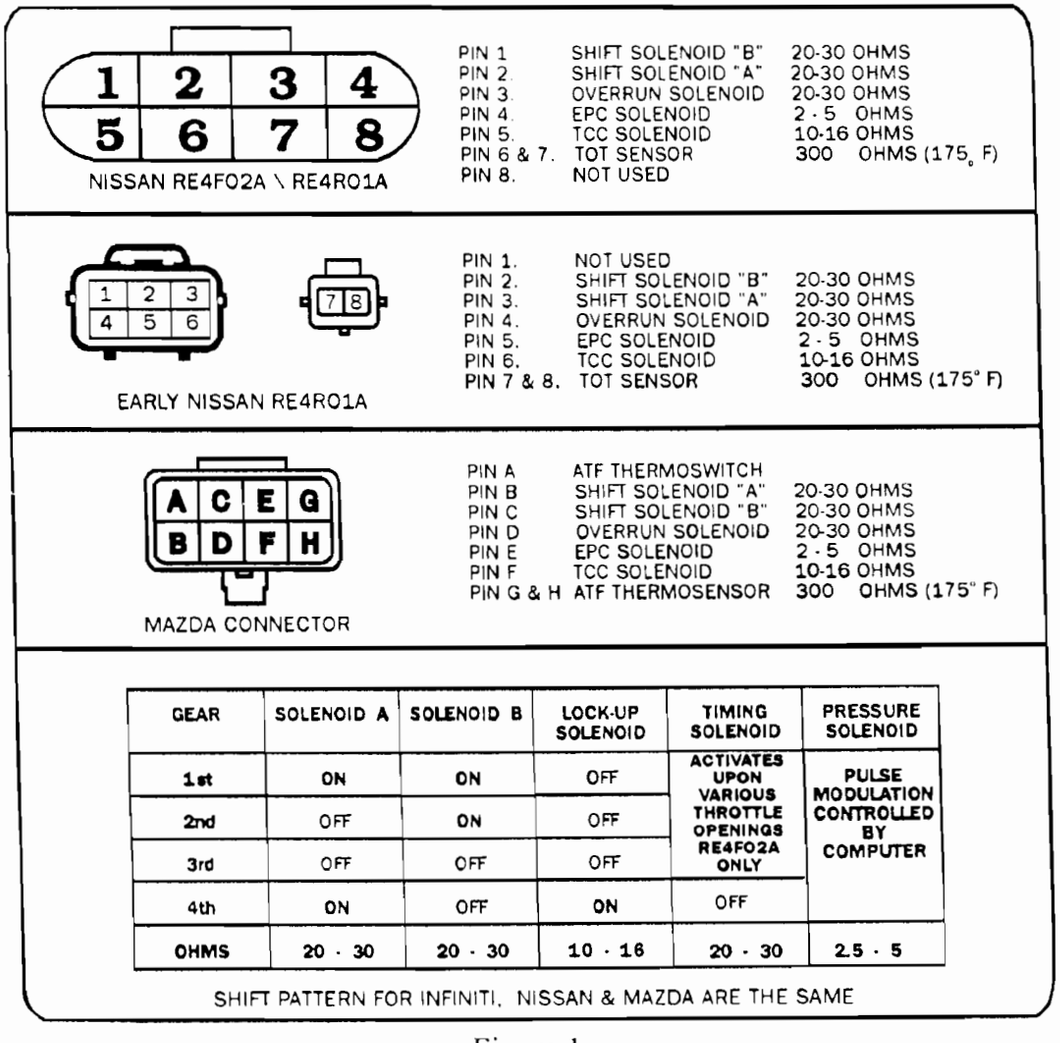


Figure 2.

NISSAN ELECTRICAL TESTS

All RE4 units have the same solenoid shift pattern. In order to "jump" the solenoids to see if the transmission shifts as it is commanded, it is necessary to first disconnect the wire harness connector going into the transmission. Energize the shift solenoids with battery voltage using jumper wires to the pins identified in **Figure 1**. These connectors are pictured looking into the connector after it has been disconnected. The pressure control solenoid (EPC) should not be jumped with battery voltage or damage to the solenoid may result

The solenoids can also be checked with an ohmmeter with the transmission in the car or on the bench.



GEAR	SOLENOID A	SOLENOID B	LOCK-UP SOLENOID	TIMING SOLENOID	PRESSURE SOLENOID
1st	ON	ON	OFF	ACTIVATES UPON VARIOUS THROTTLE OPENINGS RE4F02A ONLY	PULSE MODULATION CONTROLLED BY COMPUTER
2nd	OFF	ON	OFF		
3rd	OFF	OFF	OFF		
4th	ON	OFF	ON	OFF	
OHMS	20 - 30	20 - 30	10 - 16	20 - 30	2.5 - 5

SHIFT PATTERN FOR INFINITI, NISSAN & MAZDA ARE THE SAME

Figure 1.

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NISSAN MAXIMA AND STANZA

RE4F02A

POOR SHIFTS AND FRICTION MATERIAL FAILURE

COMPLAINT: Poor shift quality, especially after rebuild. The transaxle may shift okay at light throttle but gets increasingly softer with acceleration. If it is released to the customer, it comes back burn't up in a relatively short time. This unit may have been thoroughly air tested and put together with high quality parts and still have the same results.

CAUSE: No line pressure rise with throttle opening. This can be easily checked by connecting a pressure gauge to the line pressure tap on top of the case, near the front of the transaxle. See figure 1. Test the line pressure in drive at idle. It should be around **60 psi.** At increased throttle opening , pressures should smoothly increase to a maximum of around **180 psi.** at stall. If the line pressure stays at or near idle pressure, the cause is a weak or clogged pressure control solenoid.

CORRECTION: Remove the valve body and replace the 4-Unit Solenoid Assembly which contains the pressure control solenoid. See figure 2. The pressure control solenoid is not serviced separately. A new solenoid assembly is available from the Nissan dealer. The part number for the solenoid pack is **31940-27X66**.

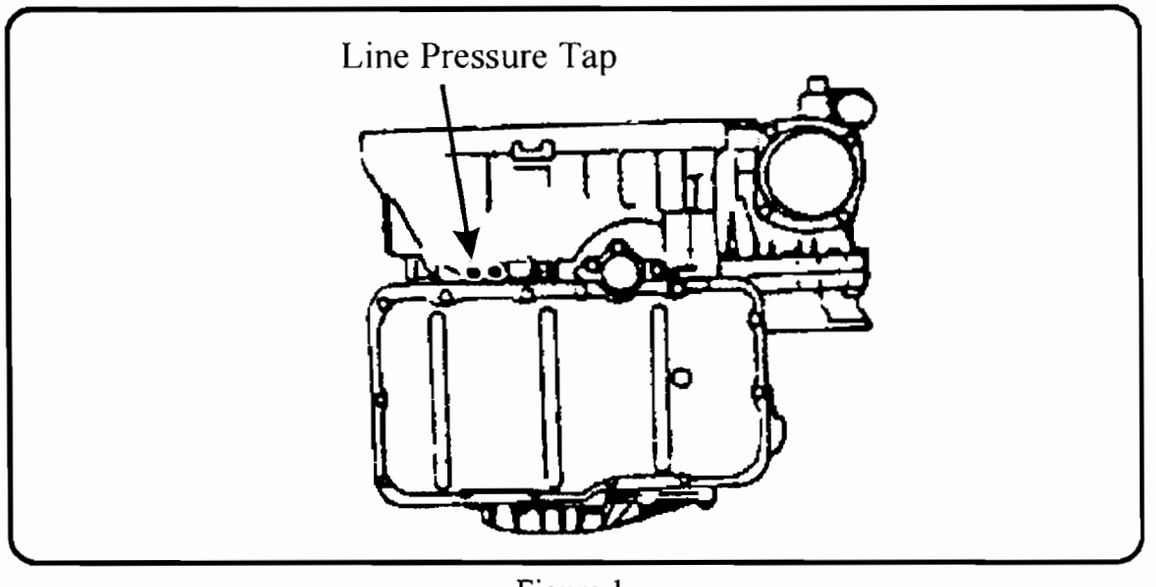
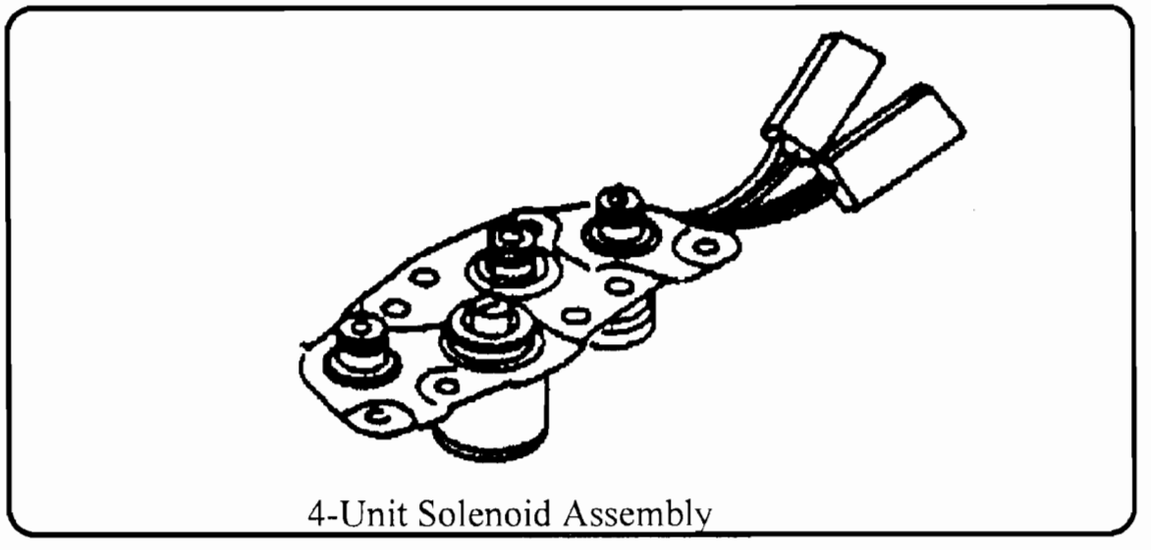


Figure 1.

NISSAN CONTINUED



4-Unit Solenoid Assembly

Figure 2.

RE4RO1A / RL4RO1A
NO SECOND GEAR

COMPLAINT: No 2nd gear after overhaul. 4th gear is ok.

CAUSE: The reverse servo piston may have been installed upside dow nallowing 2nd apply oil to dump to exhaust.

CORRECTION: Install the servo piston retainer with the notches facing away from the servo piston. Refer to Figure 1.

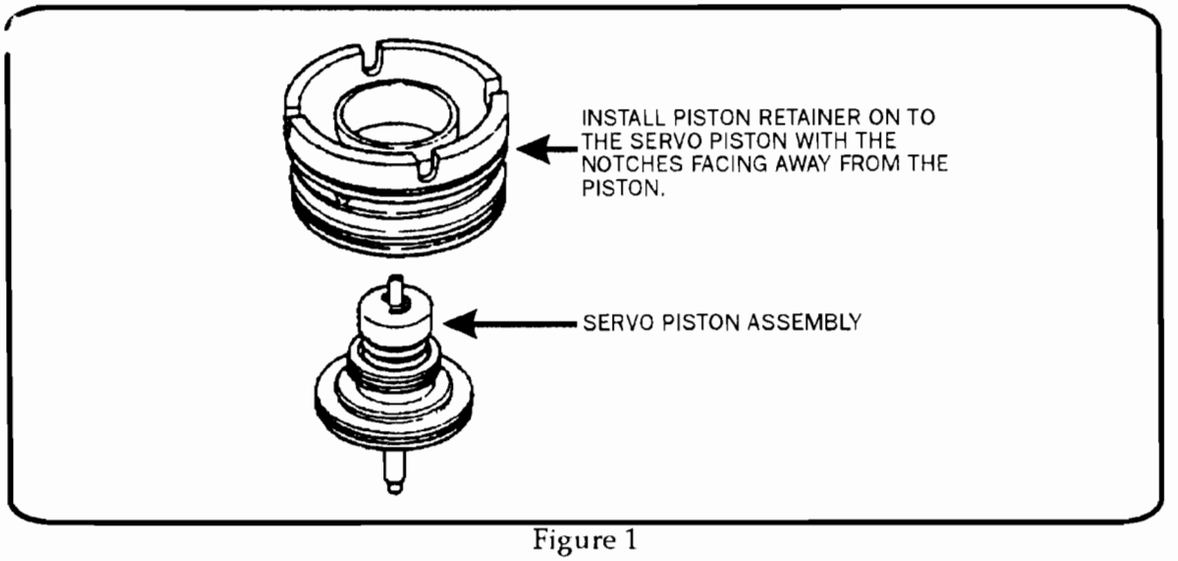


Figure 1

NISSAN RL4FO2A AND RE4FO2A

HIGH DRUM INTERCHANGE

Often during an overhaul of the front wheel drive Nissan 4 speeds, we find that the high clutch drum has deep grooving in the sealing ring area which renders the drum useless. Some companies are selling oversize sealing rings for the oil pump cover, so that the drum can be reused if it is honed or machined so that the rings will not tear upon installation. This has met with mixed success and is not recomended for a long term fix.

A Better Solution is the installation of a new high clutch drum. For a stronger fix you can use the high clutch drum assemby from an RL4RO1A or RE4RO1A with just a couple of minor changes to the unit. The RE4RO1A units use a larger high clutch and this adds longevity to the RE4FO2A. **Figure 1** shows both high clutch drums and their differences.

Besides changing the complete high clutch drum, the reverse lined clutches also must be changed, as well as the high clutch hub. **Figure 2** shows the differences in the reverse lined clutchesfrom the RE4FO2A to RE4RO1A models. The reason for also changing the high clutch hub is that the RE4RO1A high clutch drum clutches have a larger inner diameter. These differences are shown in **Figure 3.**

ALL OF THE DESCRIBED PARTS MUST BE CHANGED IN ORDER TO CONVERT THE RL4FO2A OR RE4FO2A TO THE LARGER DRUM STYLE.

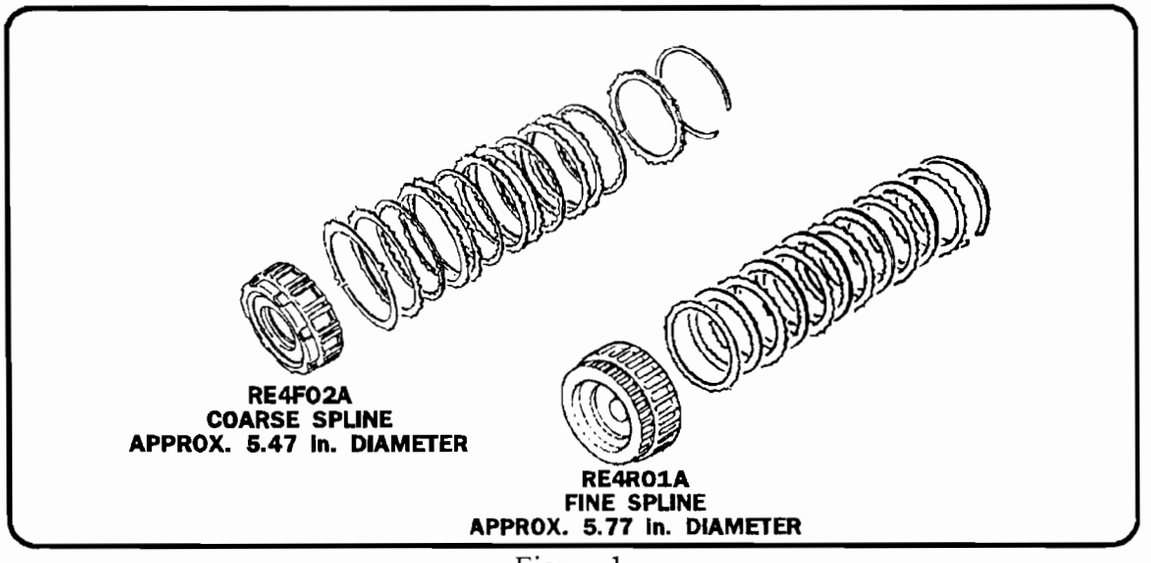


Figure 1.

NOTE: Lots of folks that are having problems with blown planetary gear sets in the RE4RO1A transmissions and as a result purchase cores to obtain planetaty gears. These cores are a good source of the parts necessary to change your RL4FO2A or RE4FO2A to the larger drum.

NISSAN DRUM INTERCHANGE CONTINUED

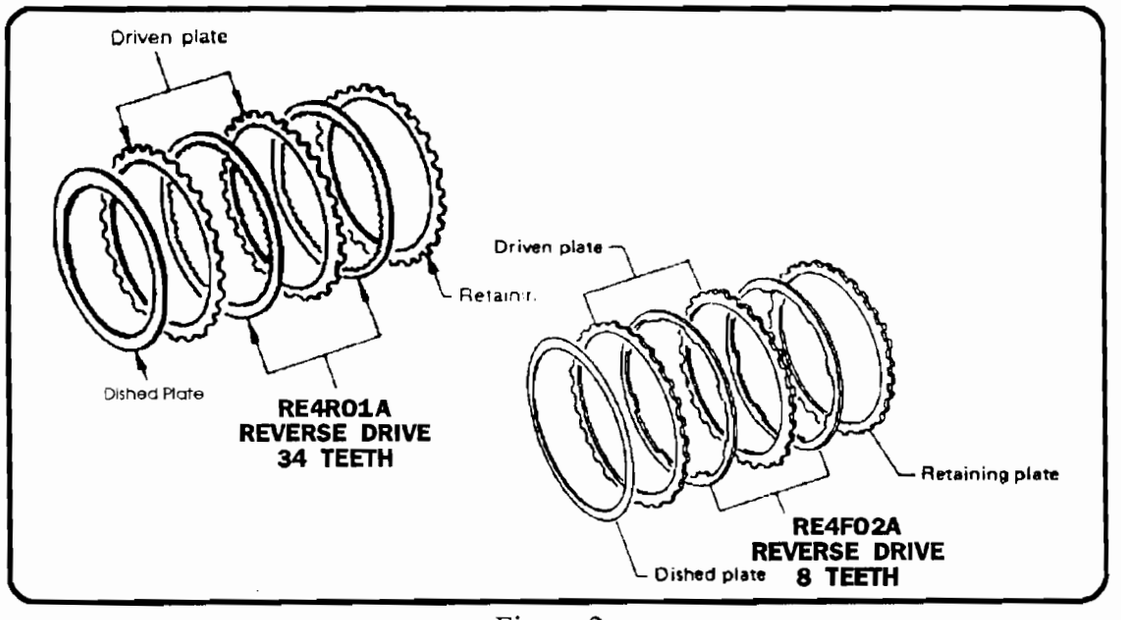


Figure 2.

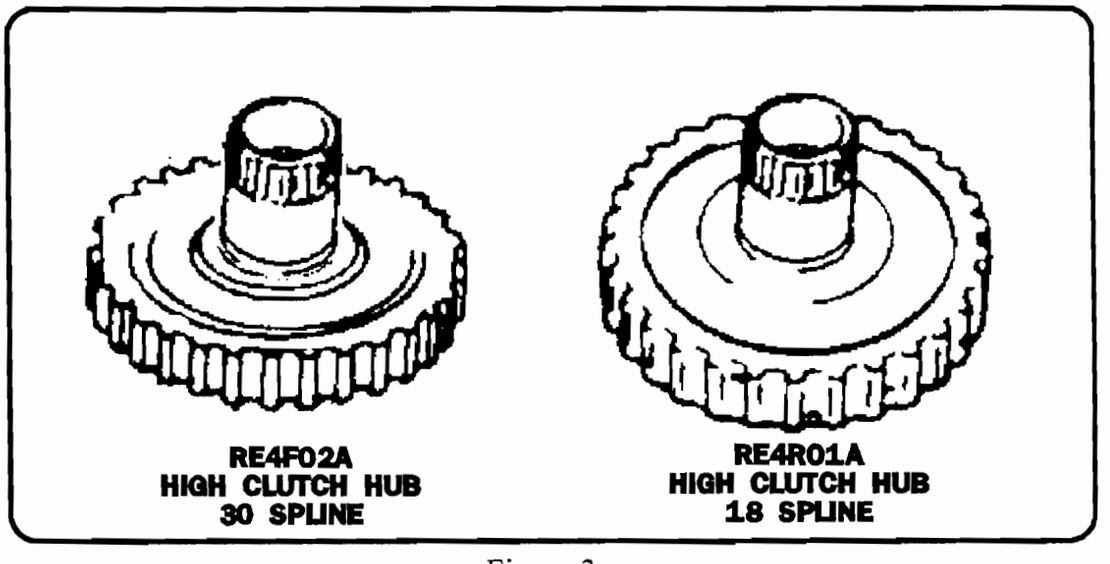


Figure 3.

RE4FO2A VALVE BODY CHECK BALL LOCATION

Slipping or no forward movement may occur if the small .187" check ball and retainer is left out of the valve body , See figure 1 for its location. Also, the bathtub ball near the bottom of the valve body is not used on some models. A 1-2 neutral or a 1-2 bind may occur depending on the mismatch. To determine if your valve body takes this ball or not, place the spacer over the bathtub. The plate will have two holes over the tub if it takes the ball, and only one if it doesn't take the ball.

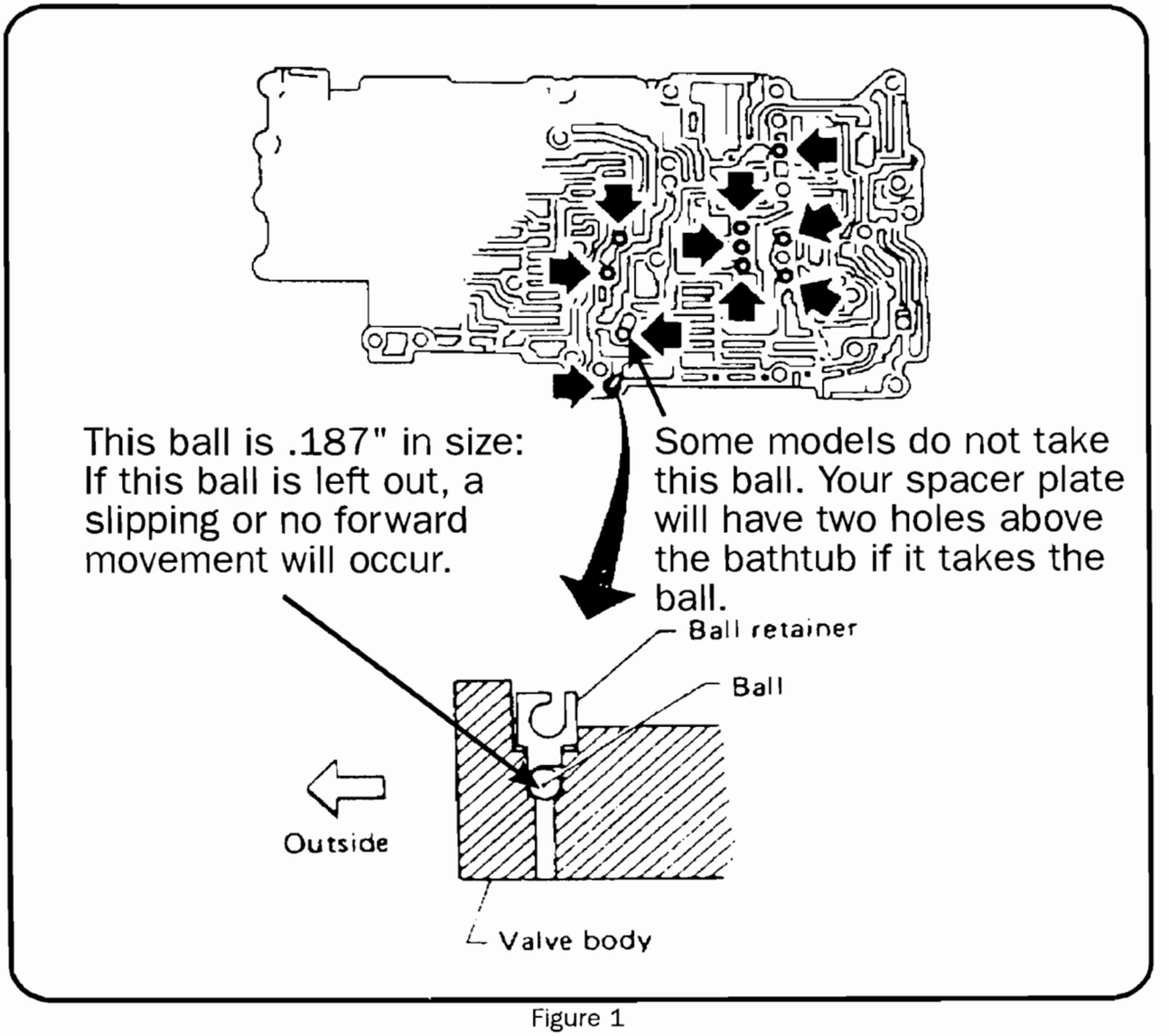


Figure 1

MAZDA N4AEL

OIL PAN BOLTS

Use caution when installing pan bolts into the N4AEL case. There is one short pan bolt which MUST go under the inhibitor(neutral) switch. **See Figure 1.** If a long bolt is put under the switch it will bind on the switch and cause it to malfunction. The result may be the loss one or more shifts.

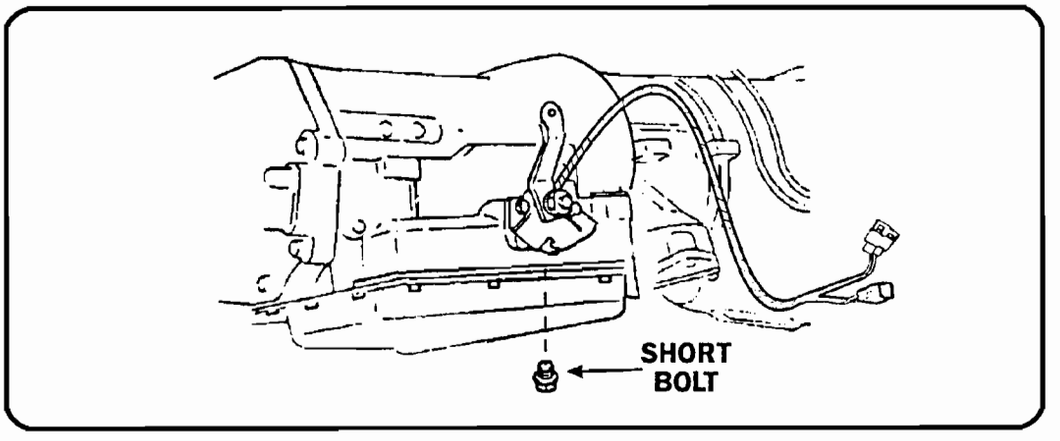


Figure 1.

OIL DISTRIBUTOR RINGS

The N4AEL oil distributor uses only two oil rings. **See Figure 2.** There is no ring in the front groove as there is no governor in this unit. The rings seal lubrication oil for the gear sets. Since it is drive oil which is sent to the rings, the better the rings, the less the loss of drive oil. It has been found that A4LD rubber governor rings can be used here and will provide a better seal. There will be less chance of forward clutch failure due to not enough drive oil.

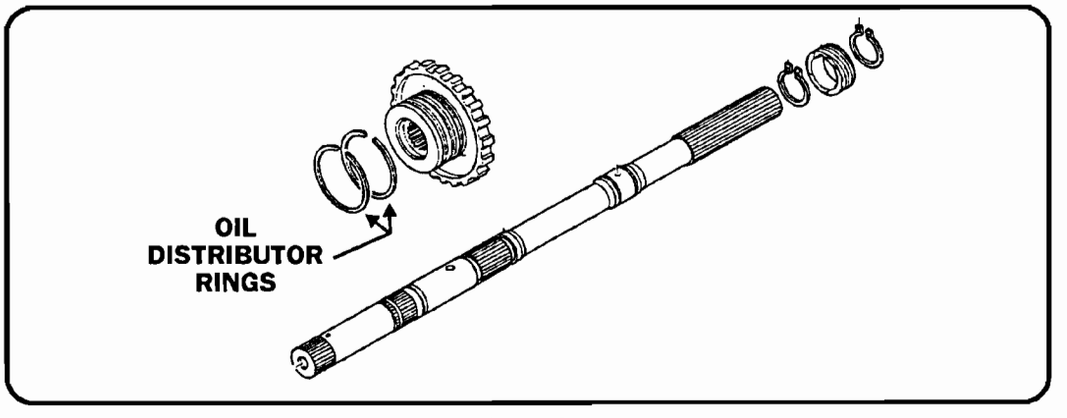


Figure 2.

E/L 4N71B JATCO

COMPLAINT: *Overdrive section wiped out - overheating evident after rebuild.*

CAUSE: *The overdrive accumulator ring is cutting off lube flow to the O.D. case (Figure 1).*

CORRECTION: *The O.D. accumulator ring should have a 1/4" gap when fitted in the accumulator bore. This 1/4" gap allows lube oil to flow into the O.D. case (Figure 2).*

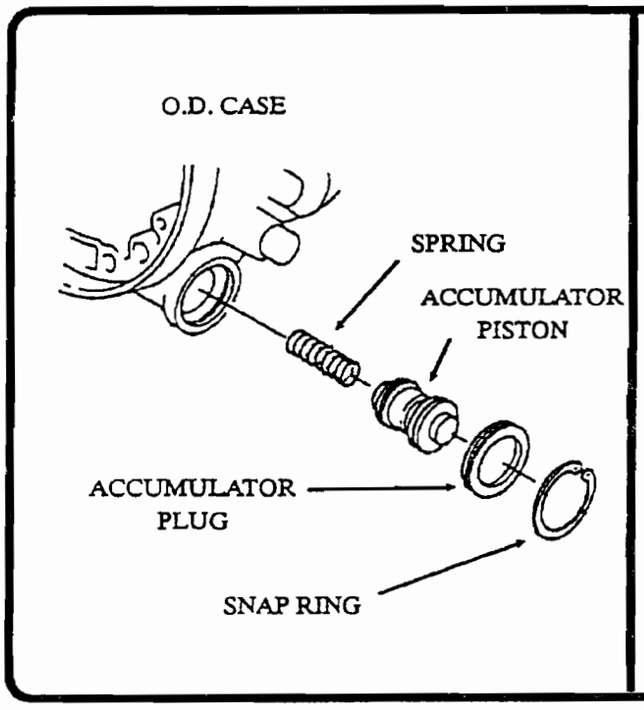


FIGURE 1

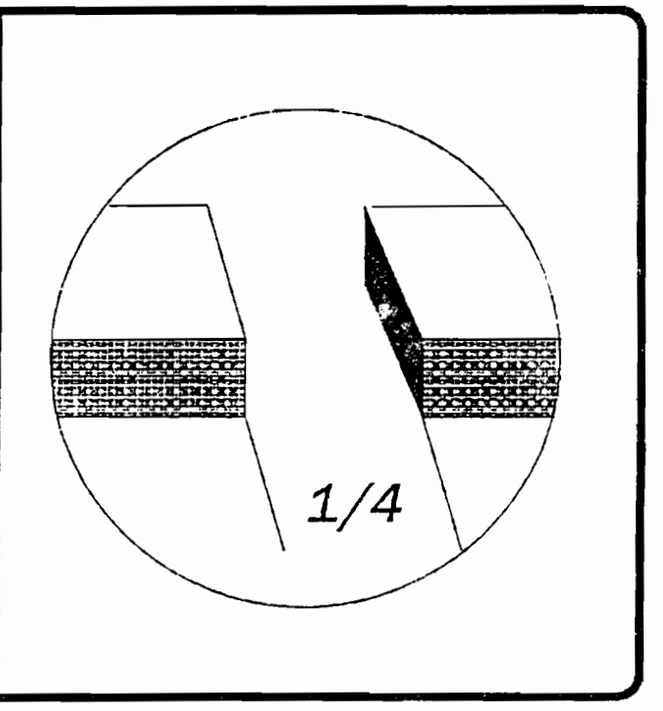


FIGURE 2

NISSAN RL4FO2A

EARLY /HARSH UPSHIFTS

VEHICLES AFFECTED: 1985-86 Maxima with automatic transaxle (A/T)

COMPLAINT: Some 1985-86 Maximas with A/T may exhibit early/harsh upshifts under light-throttle openings and/or a "clunk" on the closed-throttle 2-3 upshift.

CORRECTION: To improve this condition, a new governor and different shift springs are available.

SERVICE PROCEDURE - Governor Assembly Replacement

1. Remove the battery and its bracket.
2. Remove the air cleaner, air-flow meter and solenoid valves as an assembly.
3. Remove the governor cap and gasket.
4. Remove the four bolts that secure the governor assembly to the governor shaft (Figure 1).
5. Install the new governor assembly (P/N 31860-24X04) to the governor shaft. Tighten bolts to 3.6-5.1 ft-lb (0.5-0.7 kg-m).
6. Install the governor cap and gasket. Tighten bolts to 3.6-5.1 ft-lb (0.5-0.7 kg-m).

SERVICE PROCEDURE - Valve-Body-Spring Replacement

7. Disconnect the control cable and throttle wire. Remove the throttle lever (Figure 2). Then remove the transaxle oil pan.
8. Disconnect the harness connector on the valve-body and remove the valve-body assembly. Remove the bolts highlighted in Figure 3.
9. Remove and replace the six springs highlighted in Figure 4.
10. Install the valve-body assembly and connect the harness connector. Install the control cylinder and throttle lever, then connect the throttle wire and control cable.
11. Install the air damper/solenoids valves, air-flow meter, air cleaner, battery bracket and battery.

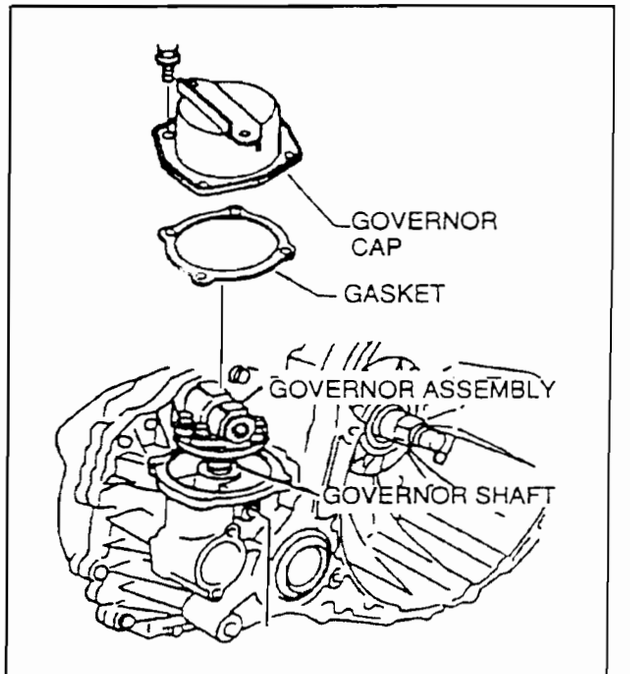


Figure 1

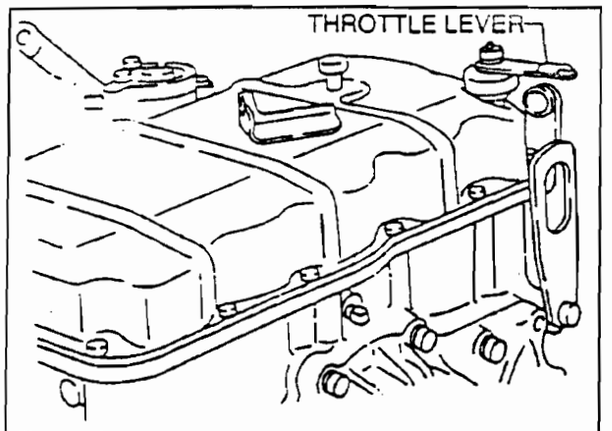


Figure 2

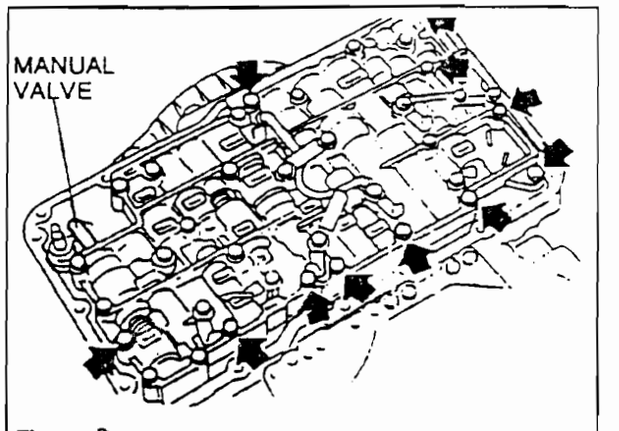
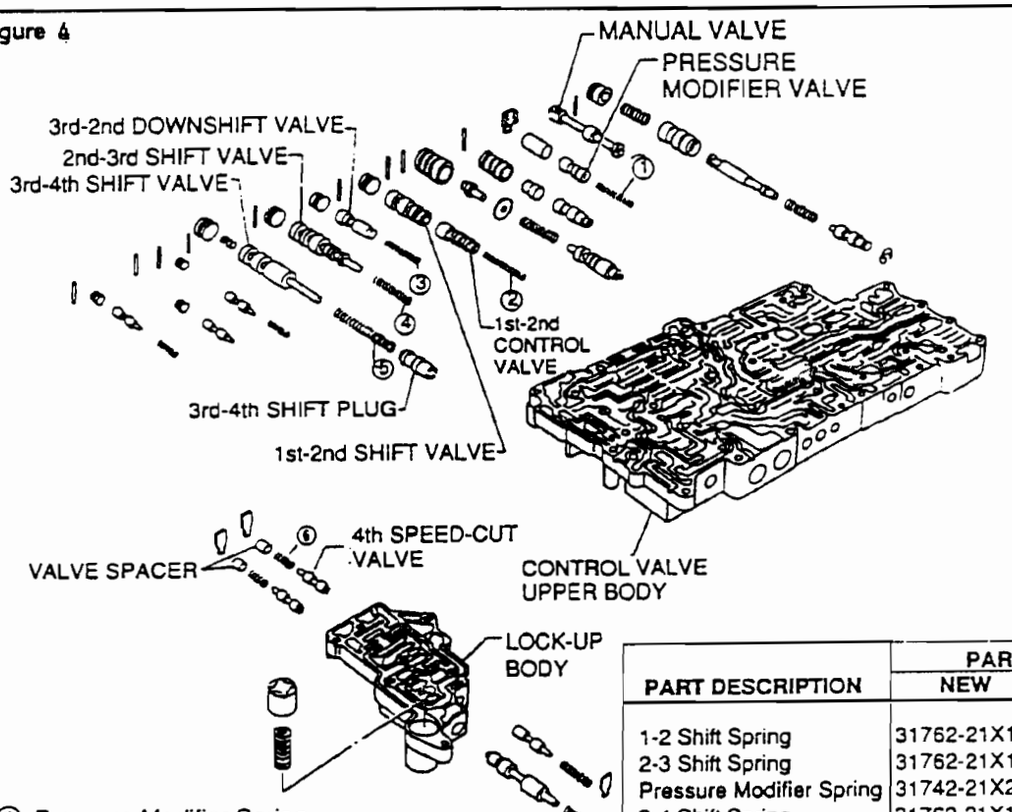


Figure 3

Figure 4



PART DESCRIPTION	PART NUMBER NEW	PART NUMBER FORMER
1-2 Shift Spring	31762-21X12	31762-21X04
2-3 Shift Spring	31762-21X13	31762-21X10
Pressure Modifier Spring	31742-21X20	31752-21X05
3-4 Shift Spring	31762-21X11	31762-21X07
4th Speed Cut Spring	31736-01X01	31835-21X02
3-2 Downshift Spring	31776-21X02	31776-21X03
Governor Body	31860-24X04	31860-22X64

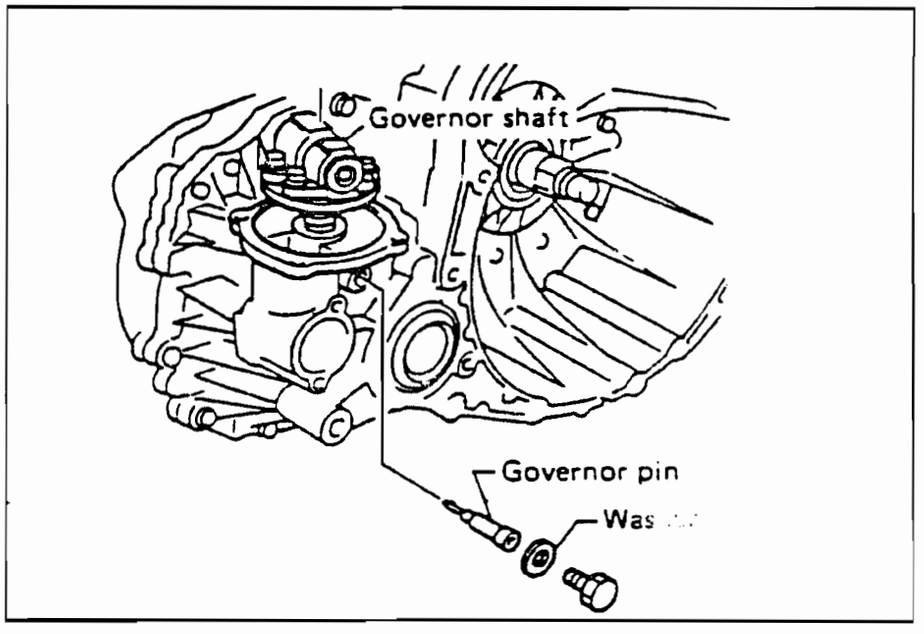
① Pressure Modifier Spring
② 1-2 Shift Spring (31762-21X12)
③ 3-2 Downshift Spring (31776-21X02)
④ 2-3 Shift Spring (31762-21X13)
⑤ 3-4 Shift Spring (31762-21X11)
⑥ 4th Speed-Cut Spring (31736-01X01)

NISSAN RL4F02A
FALLS OUT OF OVERDRIVE AT TIMES

COMPLAINT: TRANSAXLE UPSHIFTS OK, BUT DOWNSHIFTS 4-3 OR 4-2 AT HIGHWAY SPEEDS WHEN YOU LIFT YOUR FOOT OFF OF THE GAS PEDAL.

CAUSE: THE PROBLEM CAN BE EXCESSIVE END PLAY IN THE GOVERNOR SHAFT. THIS WILL CAUSE THE SHAFT TO MOVE UPWARD ON THE SPIRAL GEAR WHEN COASTING, AND BLOCK GOVERNOR FEED OIL.

CORRECTION: REMOVE THE BOLT AND PIN THAT HOLDS THE GOVERNOR SHAFT INTO THE CASE. INSPECT THE PIN FOR WEAR AND REPLACE IT IF NECCESSARY. SEE FIGURE 1.



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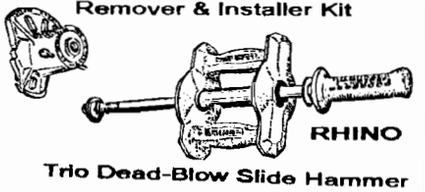

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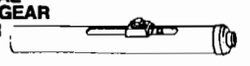
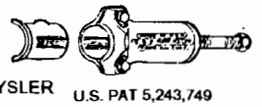
END CLEARANCE
GAUGE

E-Z UNIVERSAL
SPEEDOMETER GEAR
INSTALLER

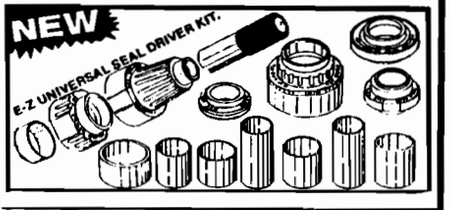


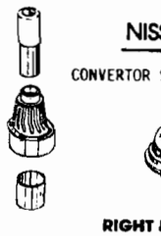
BIG 3
FRONT PUMP
PULLER
FORD, G.M., CHRYSLER



U.S. PAT 5,243,749

NEW





NISSAN RL4F02A

CONVERTOR SEAL DRIVER

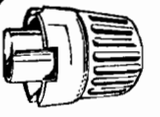
RIGHT & LEFT AXLE SEAL INSTALLER

TOOLS FROM A TO Z

#200 #125 #350

BUSHING DRIVERS BY TRANSMISSION TYPE

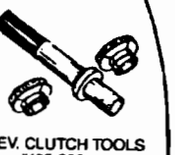
U.S. PATENT
TUFFY
#2994



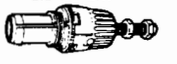
AXEL SEAL INSTALLER
#1250

CLUTCH SPRING
COMPRESSOR KIT
#2987 U.S PATENT

CHRYSLER
BEARING CUP & CONE
SERVICE TOOLS
U.S. PATENT NO. 4339865

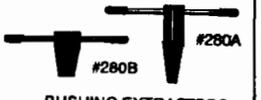


LO/REV. CLUTCH TOOLS
#125-200
U.S PATENT



EXT. HOUSING BUSHING
TOOL #2200
U.S. PATENT

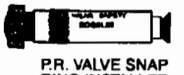
UNIVERSAL BUSHING
DRIVER SET
#1001



BUSHING EXTRACTORS

#280C
BUSHING & SEAL CUTTER
U.S. PATENT

NISSAN

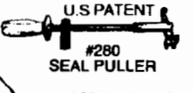


P.R. VALVE SNAP
RING INSTALLER
#2993

#2995

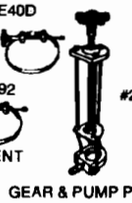
U.S. PATENT
#2997

VALVE
SPRING
COMPRESSOR



U.S PATENT
#280
SEAL PULLER

New E40D



#2991 #2992 #2996

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NISSAN L4N71B

THE ORIFICE IN THE OVERDRIVE SECTION GOES IN BALL AND SEAT FIRST IN THE TURBO VERSION, AND OPEN CAPSULE FIRST IN THE REGULAR VERSION. THE TURBO VERSION DOES NOT HAVE A SPRAG IN THE OVERDRIVE SECTION (SEE FIGURE 1).

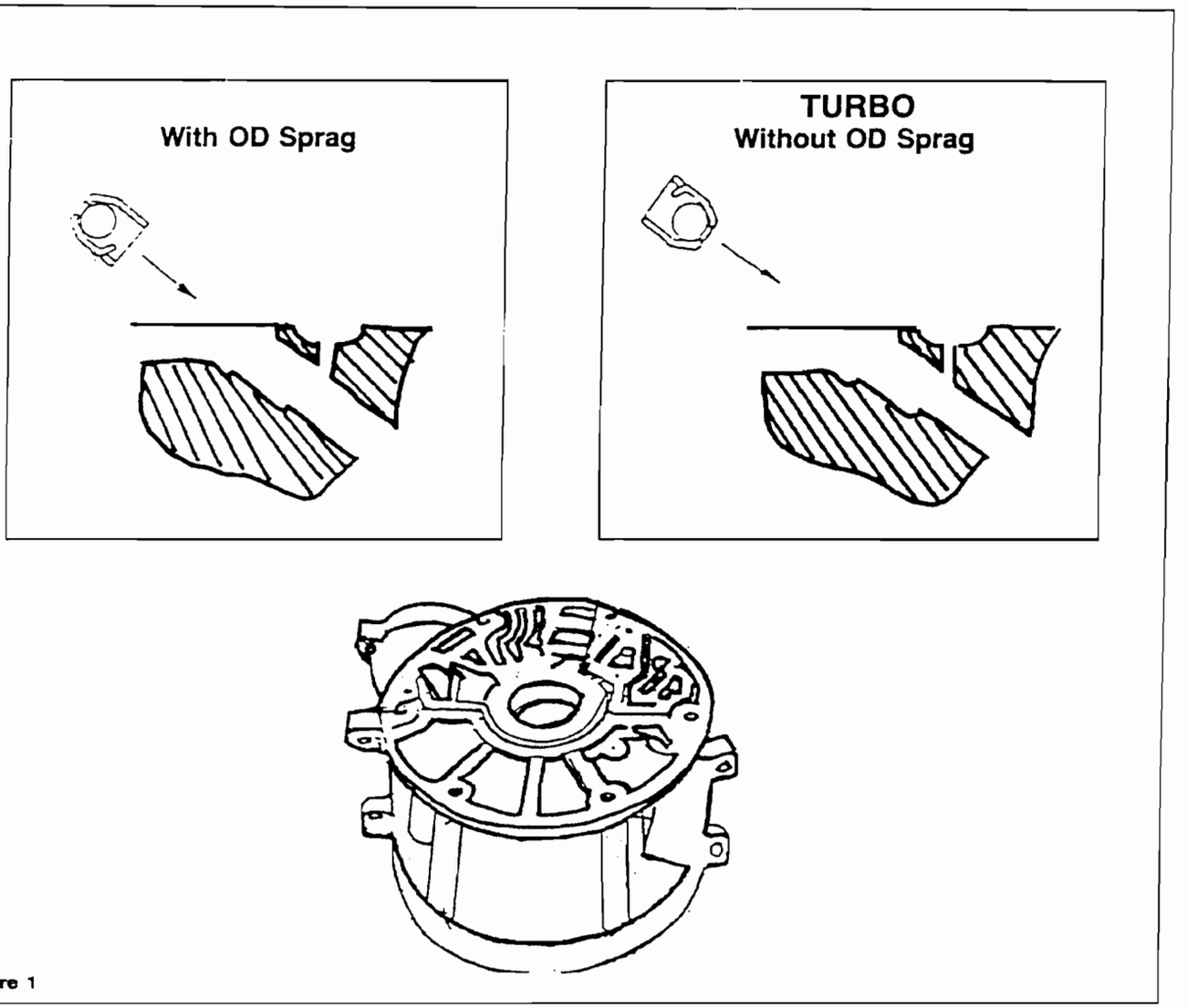


Figure 1

L4N71B

COMPLAINT: Transmission shifts into O.D. regardless of O.D. control switch position.

CAUSE: The cause may be the small "O" ring missing, or mis-installed in the groove of the O.D. cancel solenoid. The small "O" ring goes BEHIND the O.D. cancel solenoid, as shown in Figure 1, and seals against the bottom of the case bore (See Figure 1).

CORRECTION: Install "O" ring in proper location as shown in Figure 1.

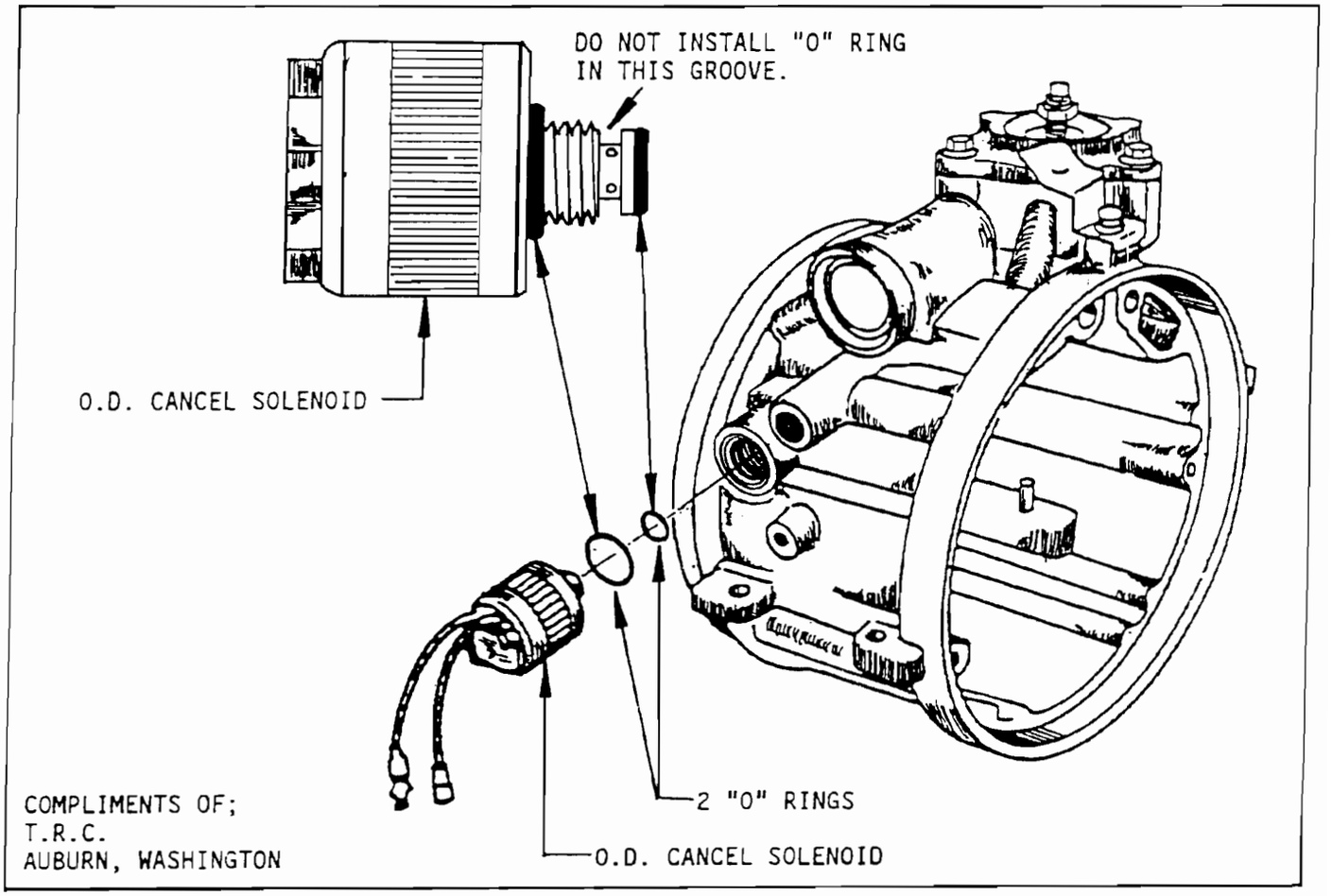


Figure 1

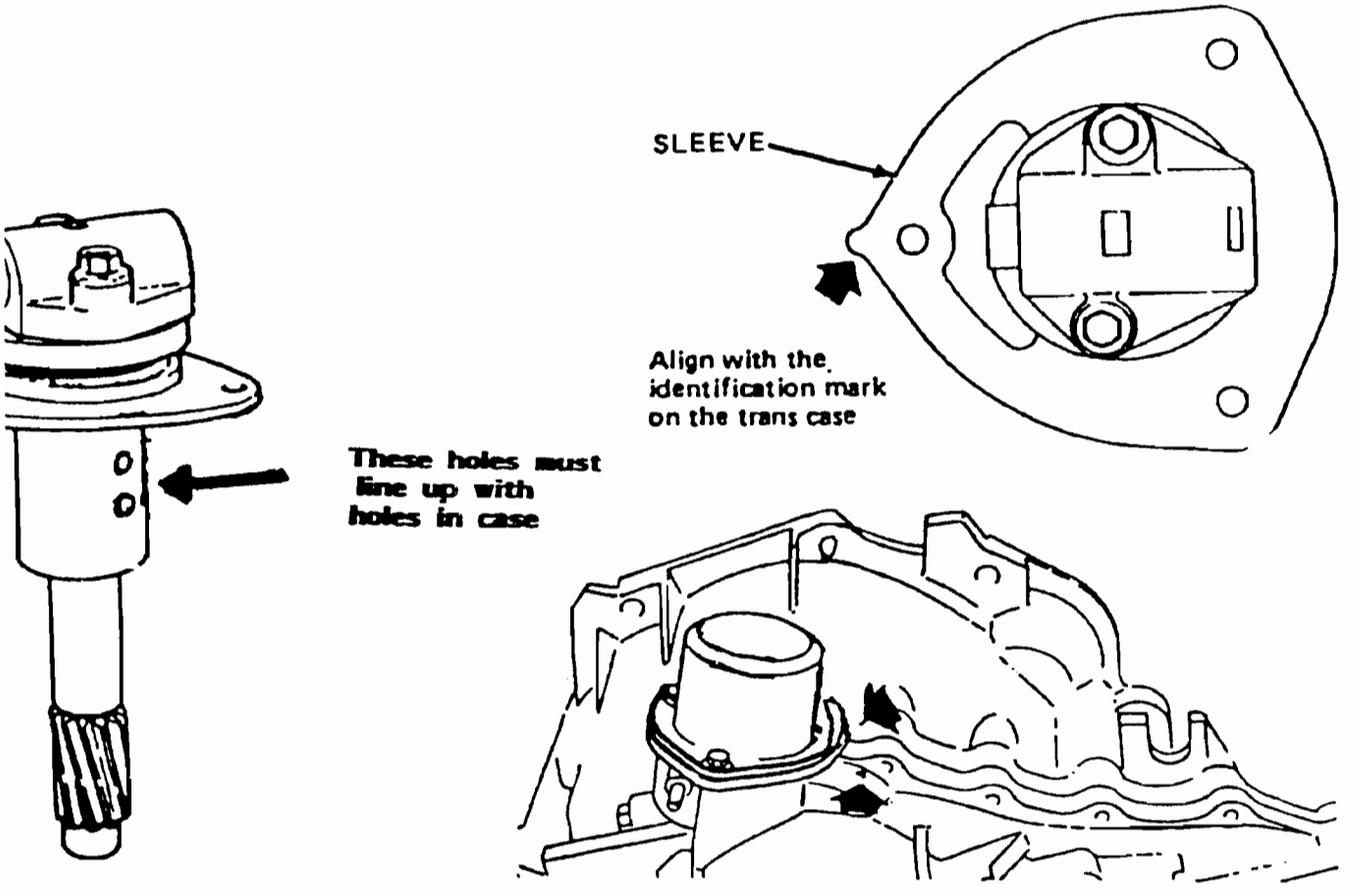
JATCO F3A

COMPLAINT: NO UPSHIFT AFTER REBUILD OR GOVERNOR SERVICE.

CAUSE: GOVERNOR IS INSTALLED INCORRECTLY.

CORRECTION: THE HOLES IN THE GOVERNOR SLEEVE MUST LINE UP WITH THE HOLES IN THE CASE (FIGURE 1). FIGURE 2 SHOWS THE WAY IT SHOULD BE ON FINAL INSTALLATION.

Figure 2



KM 175

Pump Gear Change

Change: Some KM 175 transaxle had a change made to the drive gear. The previous drive gear has a groove machined on the inside diameter to accommodate an O'ring which sealed against the converter neck. The drive gear now has an oil seal which is retained by a snap-ring. Figure 1 below shows the correct assembly procedure with the snap-ring facing the pump cover. The part number for the oil seal is: MD729928

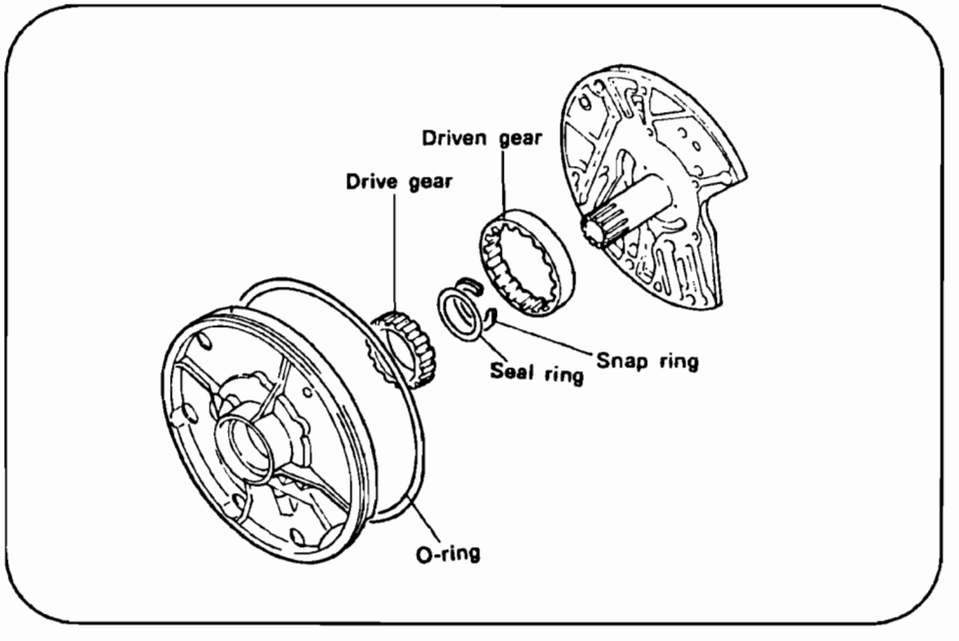


Figure 1

KM 177

Bind up or 2nd gear starts

Complaint: A bind up on a 2-3 shift and or 2nd gear starts. Or a bind up in reverse after overhaul.

Cause: The snap ring that holds the center support into the case may have been mis-positioned and when pulse generator A was installed, one end of the snap-ring came out of its groove and jammed against the sun shell.

Correction: Install the snap-ring so that the open end of the snap-ring faces the entrance hole in the case for pulse generator A. See figure 1 below.

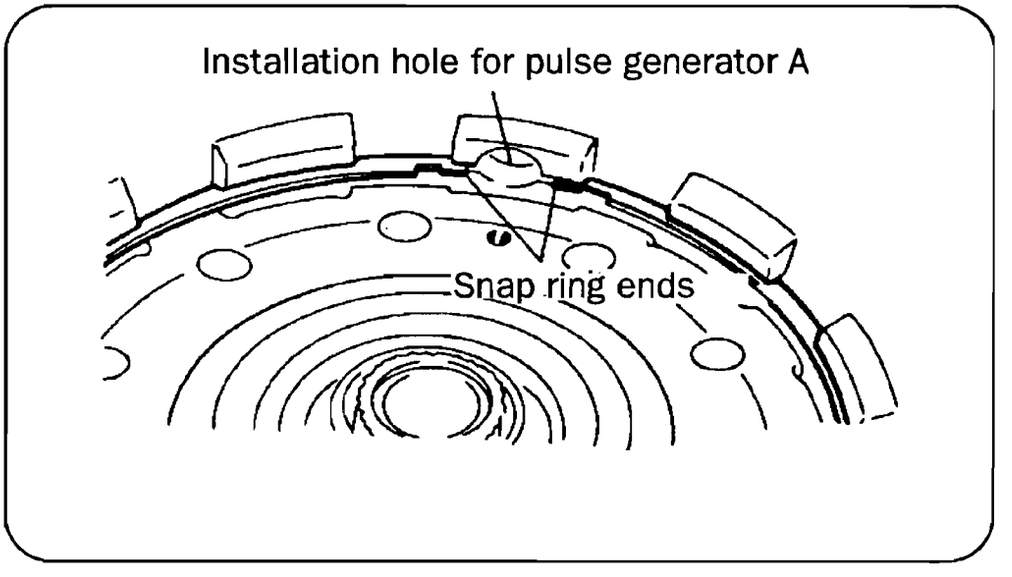


Figure 1

KM177

Slipping or no reverse

Complaint: Slipping or no reverse when hot after overhaul.

Cause: Missing or undersized O'rings on the center support causing a loss of low and reverse oil.

Correction: Install or replace O'rings with a thicker O'ring. A C4 inner linkage seal O'ring is thicker and fits nicely into the support. This will provide a better compressed seal when the support is placed into the case. See figure 1 below for the O'ring location on the center support.

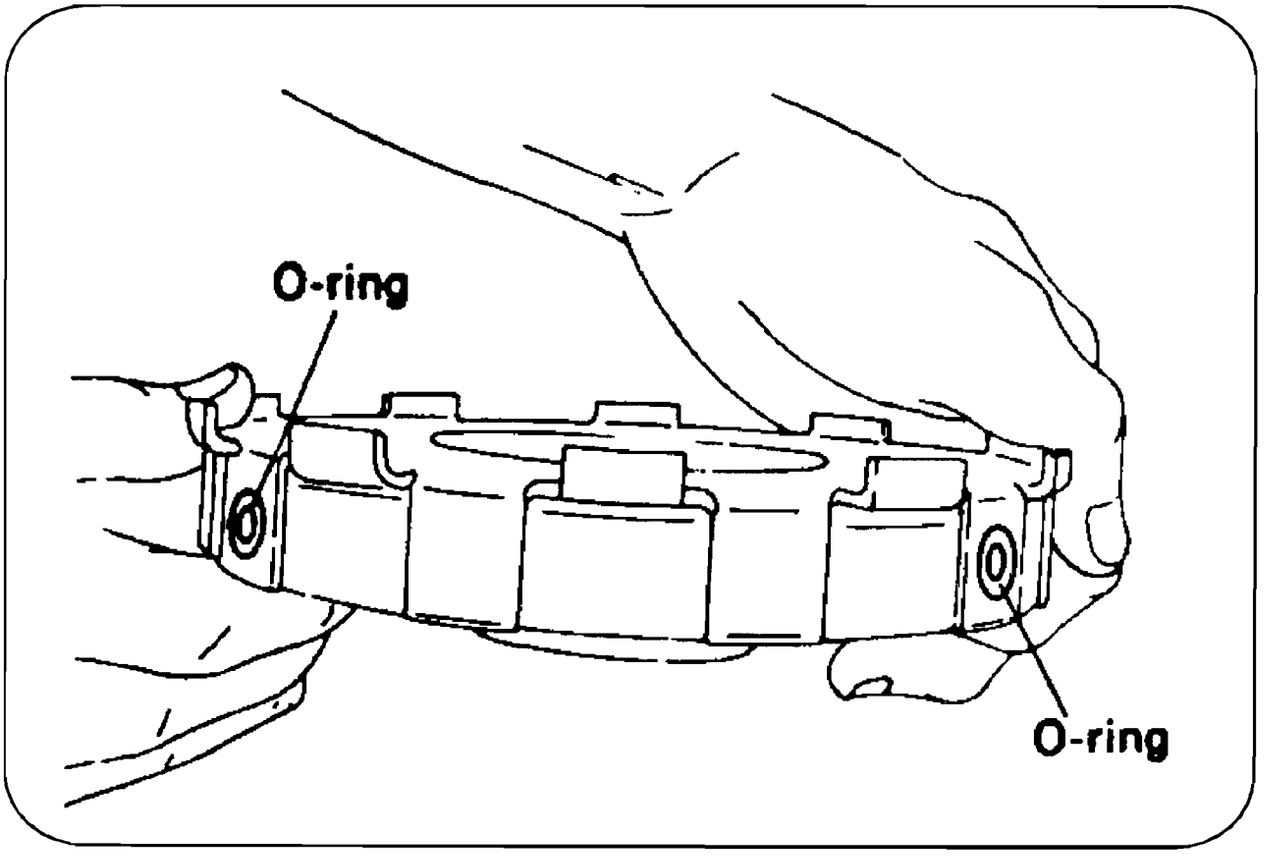


Figure 1

MITSUBISHI / HYUNDAI KM175-177

SHIFTS TO FAIL-SAFE AFTER OVERHAUL

COMPLAINT: After an overhaul, some KM175-177 series transaxles may go to fail-safe after making the first shift. If the key is turned off, the transaxle will start in first gear again until making the first shift.

CAUSE: Pulse Generator A and Pulse Generator B may be be switched. Both pulse generators plug in the same way and may be installed backwards.

CORRECTION: The pulse generator with the green (solid color) wires must go behind the bell housing. The pulse generator with the green with black tracer (striped color) wires must go to the output shaft (SEE FIGURE 1).

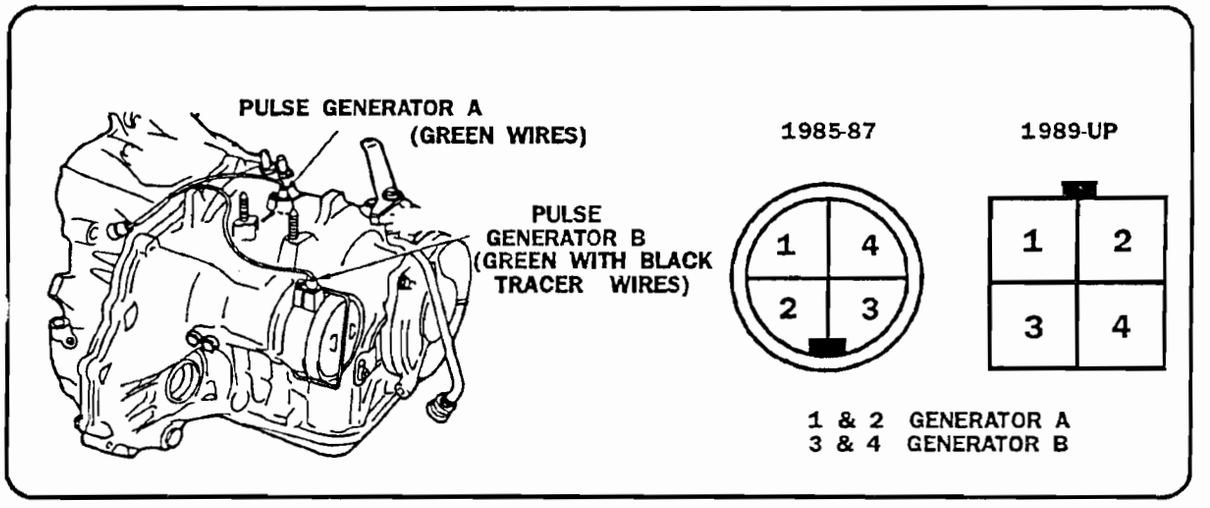


Figure 1.

KM 175 AUTOMATIC TRANSAXLE HARD SHIFT SYMPTOMS

PURPOSE

The KM175 automatic transaxle in 1985-1987 Galant vehicles may exhibit one or more of the following hard shift symptoms.

1) Harsh or hard 2nd-3rd upshift and/or 4th-3rd downshift.

2) Harsh or hard 1st-2nd upshift and/or 2nd-3rd slipshift.

A slipshift is a prolonged interval between shifts without a substantial increase of engine RPM.

These symptoms may be due to the kickdown servo piston not releasing properly. This is caused by hydraulic fluid leaking past the seal ring of the servo piston as a result of wear in the piston bore (Figure 1). Because wear of the piston bore varies between vehicles, the severity of the symptoms will also vary.

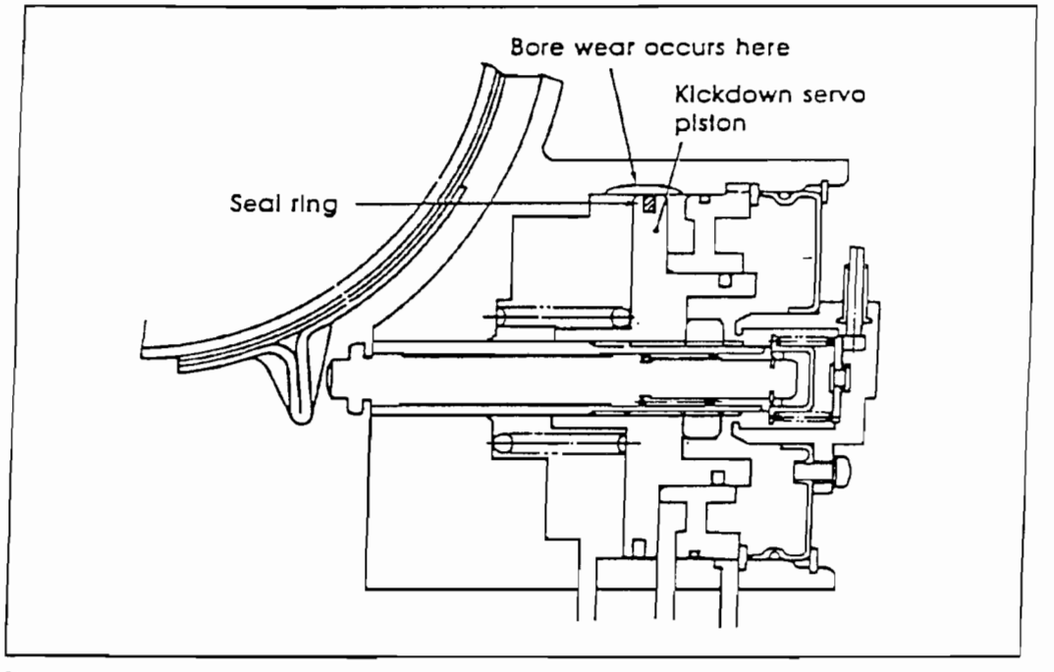


Figure 1

If hard shift symptoms are exhibited, remove the servo piston assembly from the transaxle and check the piston bore (transaxle case) for wear (Figure 2). If the bore wear is less than 0.023 in. (0.5 mm), the hard shift symptoms can be improved by installing a D-ring repair kit (P/N MD728665). This kit contains a rubber piston seal ring instead of the carbon material seal ring installed at the factory (Figure 3).

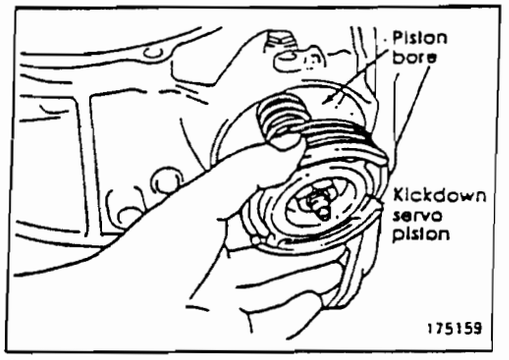


Figure 2

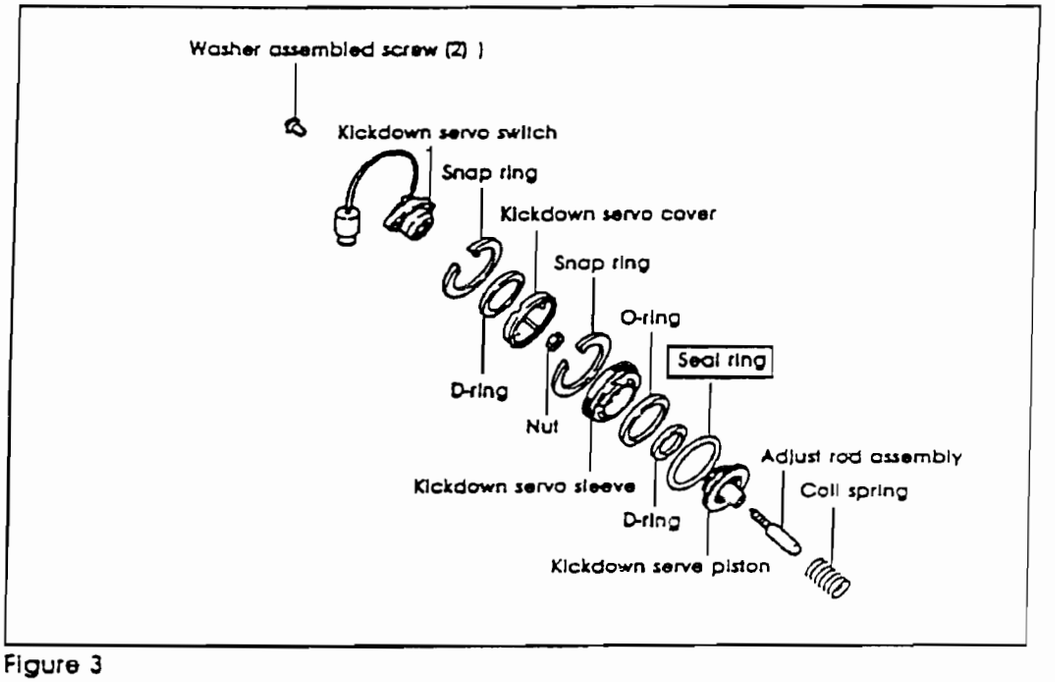


Figure 3

If the piston bore wear is greater than 0.023 in. (0.5 mm), the transaxle case must be replaced using a new carbon material servo piston seal ring (P/N MD727999).

MITSUBISHI KM-175

BINDING UP

COMPLAINT: *Bind up in D: second, third, or overdrive. And the low reverse clutches are burned.*

CAUSE: *Broken square cut waved spacer found underneath the diaphragm return spring in the low reverse clutch housing, and will not allow the clutch to release (see figure 1).*

CORRECTION: *Replace the wave spacer.*

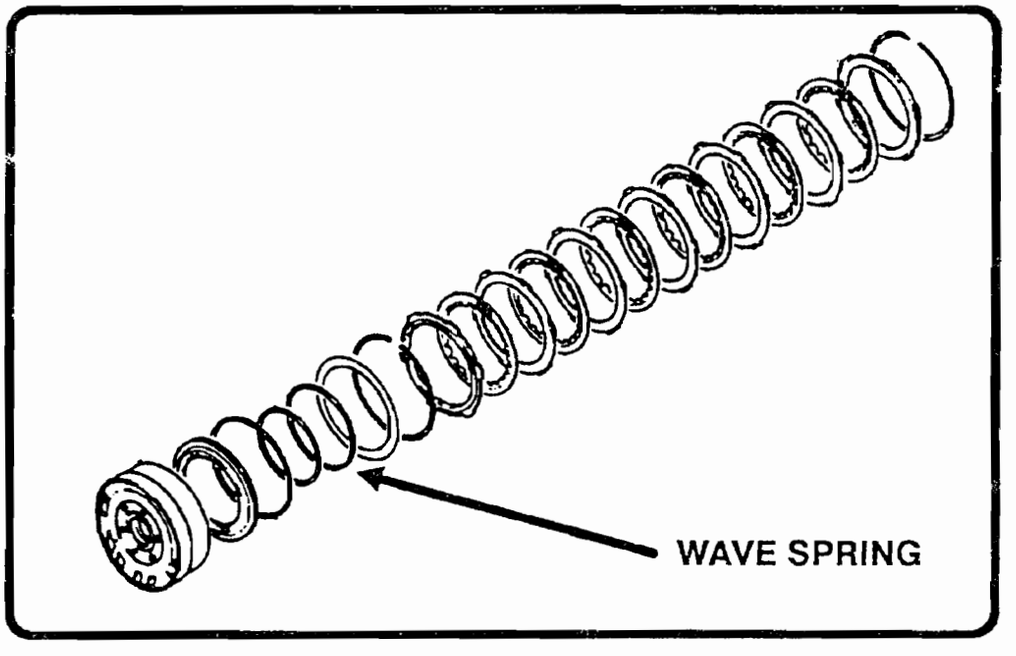


Figure 1

MITSUBUSHI KM 171 172

ENGINE SURGE AT STEADY CRUISE

Complaint: Engine may surge at full operating temperature with the vehicle at steady cruise/light load condition.

Diagnosis: If a surge from 100 to 200 rpm can be felt when the engine speed is between 1800 and 2600 rpm, disconnect the torque converter wire from the transaxle case connector. If the surge is gone, proceed with the following repair procedure.

Correction: Install Transaxle modification package part number MD728159. This procedure involves replacing the lower valve body damper clutch control valve, sleeve, spring, and the lock-up solenoid. This service package will consists of.

DESCRIPTION	PART #
Damper Clutch Control Valve	MD727246
Damper Clutch Control Sleeve	MD723456
Lower Valve Body	MD727244
Lower Valve Spring	MD725203
Solenoid Valve	MD727245
Oil Pan Gasket	MD707183
O-Ring	MD707603
O-Ring	MD707752

MITSUBISHI KM175

WRONG GEAR STARTS

COMPLAINT: After an overhaul, the KM175 may have wrong gear starts and possibly only one shift, similar to fail safe, but energizing Shift Solenoids A and B cannot make it start in first gear.

CAUSE: If the solenoids are not clogged or damaged, one or both of the stopper plates in the upper valve body may have gotten turned around or installed incorrectly when the valve body was opened for cleaning. The stopper plates can prevent the shift control valve from moving if they are installed incorrectly. See **figure 1** for valve body position.

CORRECTION: When installing both stopper plates in the upper valve body, be certain that they go in with the horseshoe end down. See **figure 2**. Next, check to make sure that the shift control valve is free to travel past the stopper plates in both directions, and that the end plugs are not straddled by the stopper plates.

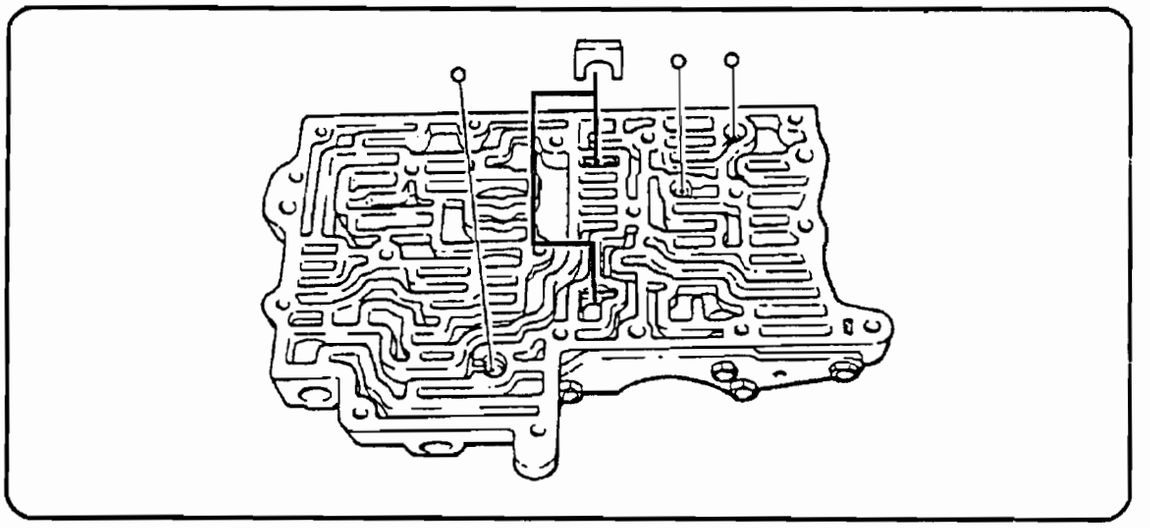


FIGURE 1.

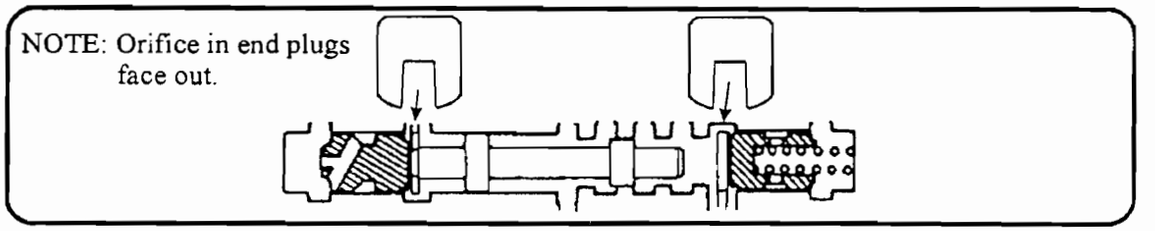


FIGURE 2.

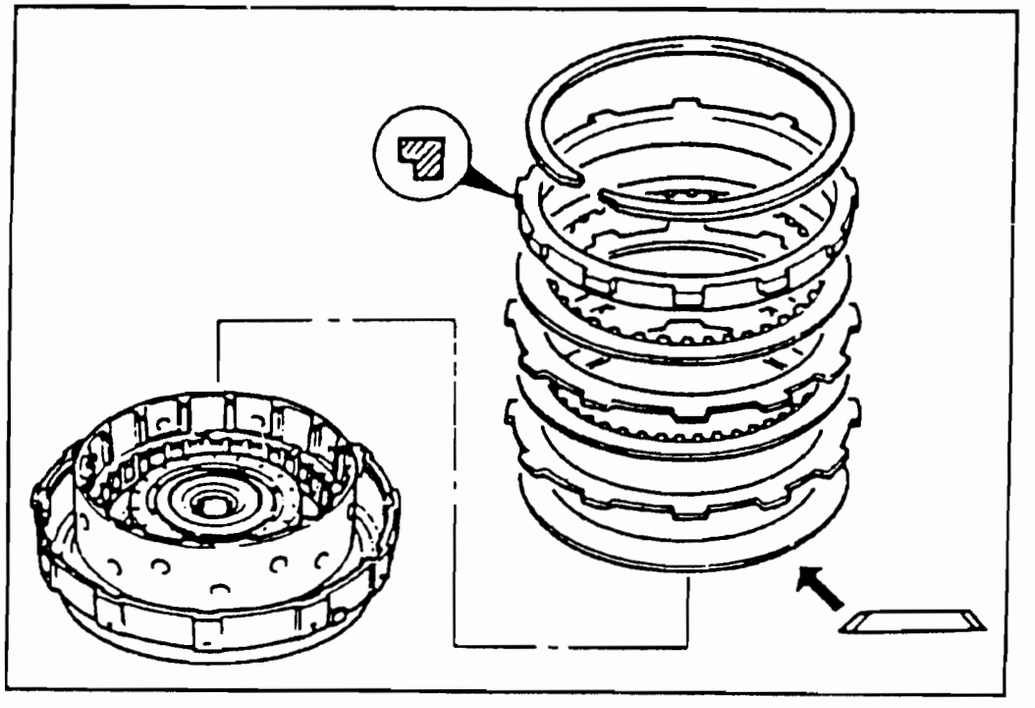
MAZDA G4A-EL/HL

COMPLAINT: Bind up in Reverse.

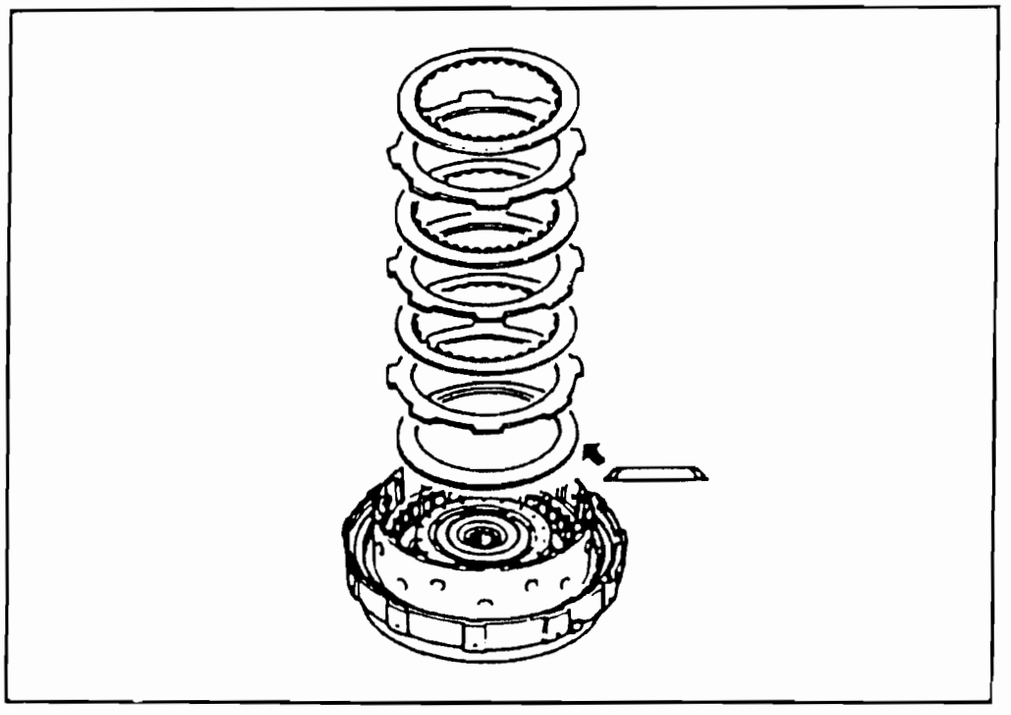
CAUSE: Dished Plates installed incorrectly.

CORECTION: Install dished plates as shown below.

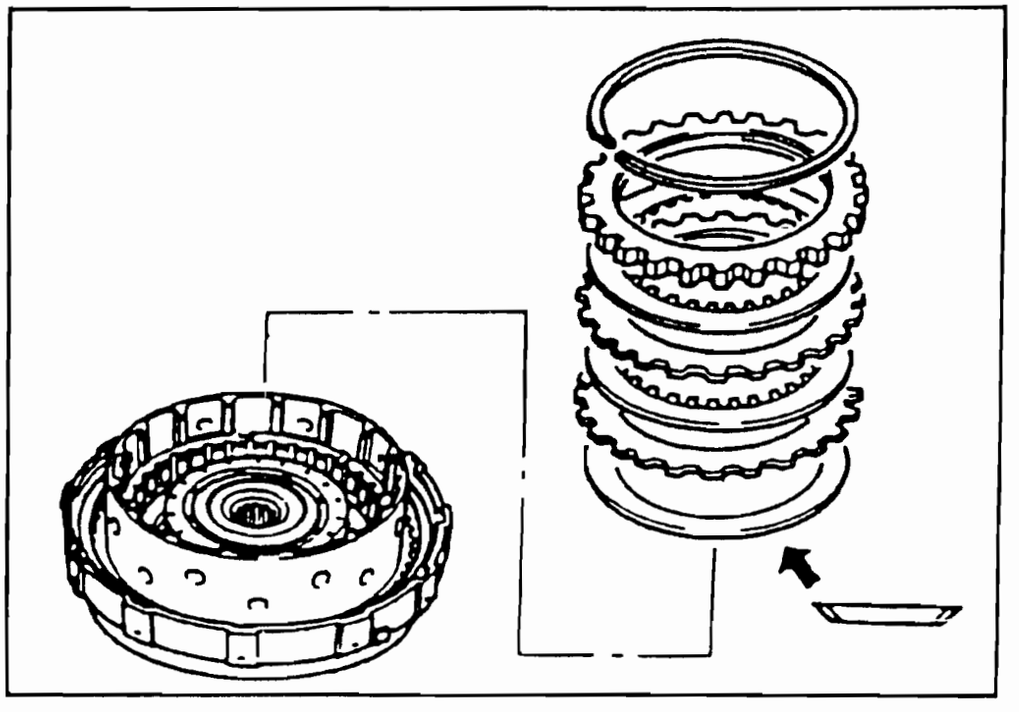
REVERSE CLUTCH



FORWARD CLUTCH



COASTING CLUTCH



MAZDA G4A-EL / FORD PROBE

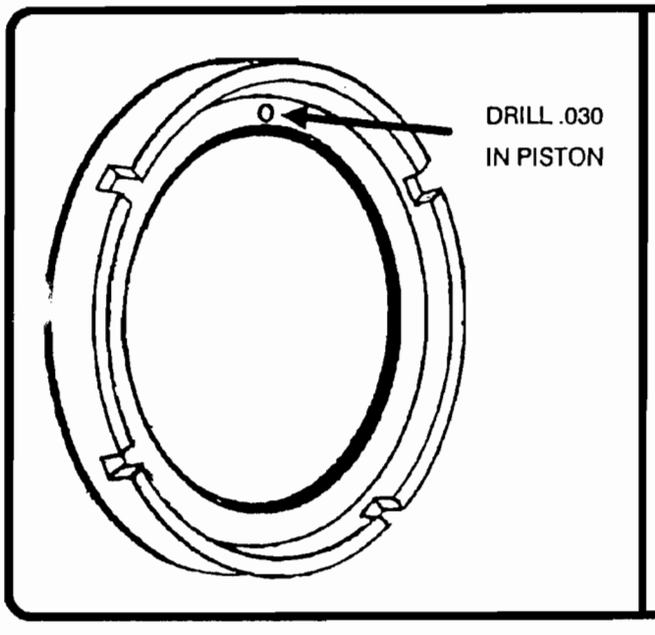
REVERSE CLUTCH FAILURE

COMPLAINT: *Repeated reverse clutch failure.*

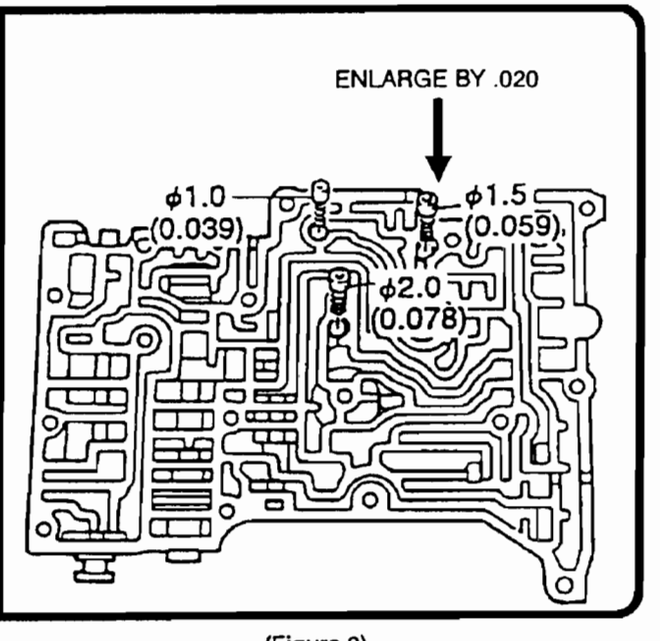
CAUSE: *Cross leak causing the reverse clutch to drag while in forward gears.*

CORRECTION: *Drill a .030 hole through the reverse piston (figure 1), also enlarge the reverse feed orifice by .020 (figure 2). Example: measure existing orifice size, if it is .059 then enlarge to .079.*

NOTE: Always use factory rings from Ford. These rings will work on on both Mazda and Probe. (part # E92Z-7D019-A).



(Figure 1)



(Figure 2)

MAZDA G4A-EL / FORD PROBE

LOW PUMP PRESSURE

COMPLAINT: *Low pump pressure.*

CAUSE: *The spool valve in the pump did not have a seat for the spring. The spring will hang the valve and cause low line pressure (figure 1).*

CORRECTION: *Order updated valve from Ford. It has a seat formed on the valve for the spring and will work on both units (figure 2) part # FO2Z-7Z306-A.*

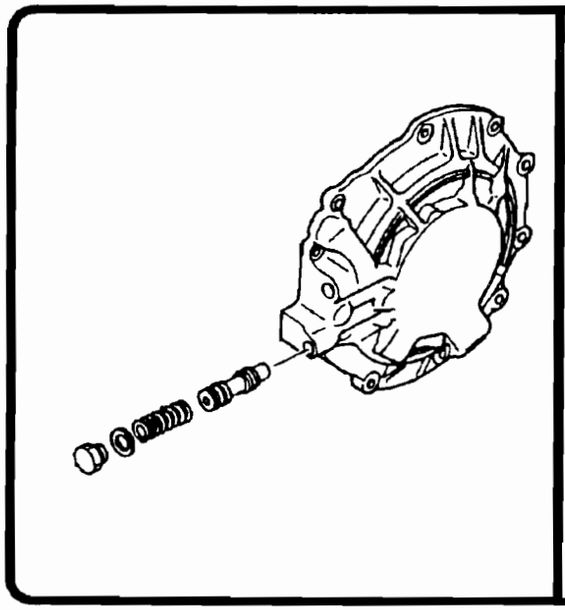


FIGURE 1

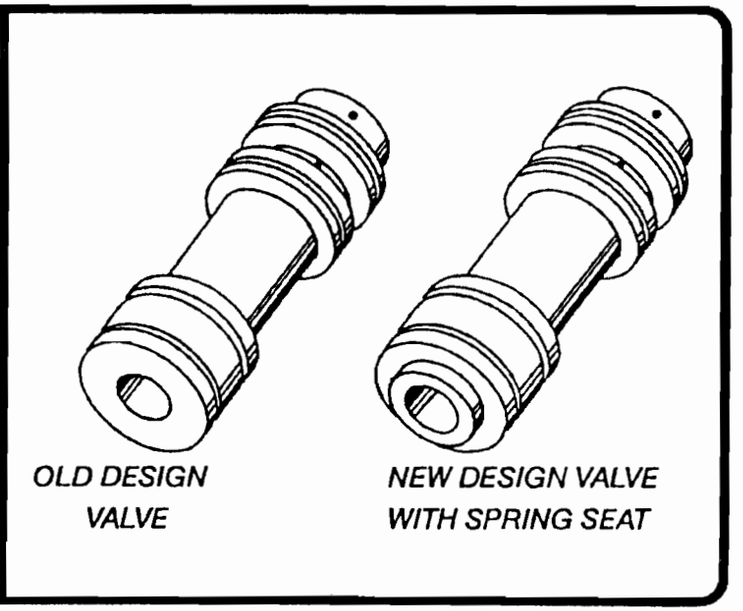


FIGURE 2

MAZDA G4A-HL

NO 3-4 SHIFT

COMPLAINT: G4A-HL hydraualically controlled transmissions in Mazda 323 cars can loose the 3-4 shift while all other ranges function normally. A pan and servo examination reveal nothing abnormal.

CAUSE: The cause may be that the 3-4 shift rear plug in the main valve body (SEE FIGURE 1) travels to far and jams. This prevents the 3-4 shift valve from stroking.

CORRECTION: 1) Shim the pocket that retains the 3-4 shift valve spring so that the 3-4 shift rear plug cannot travel far enough to jam. This will require a shim that is .080 -.100 inch thick and .250 -.300 inch in diameter (SEE FIGURE 2). Be sure that the shim is no more than .100 inch thick so as not to raise the 3-4 spring tension and create late 3-4 shifts.

2) Install the 3-4 shift sleeve with the identification notches facing inward (SEE FIGURE 2).

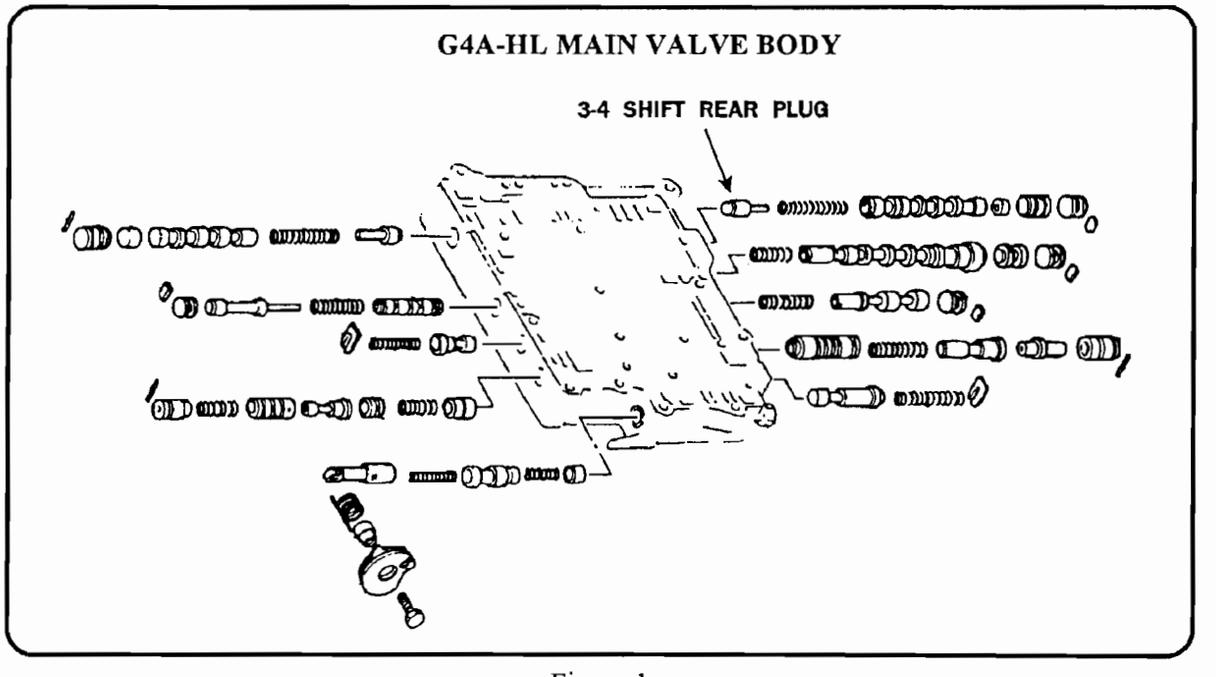


Figure 1.

MAZDA G4A-HL Continued

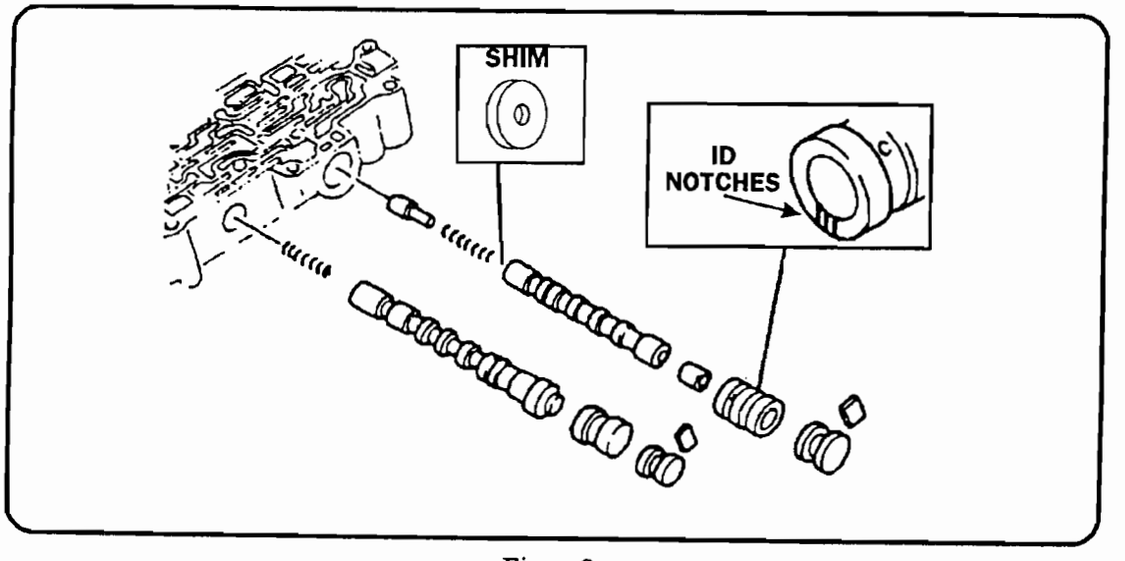


Figure2.

G4A-EL/HL

SLIPS OR NO 2/3 SHIFT

The 3-4 Clutch Drum In the G4A-EL (Mazda 626 and Probe vehicles) uses 5 lined clutch plates, 5 steel plates, and no cushion plate against the piston. The G4A-HL (Mazda 323 vehicles) use 4 lined clutch plates, 4 steel plates, and 1 dished cushion plate against the piston. See Figure 1.

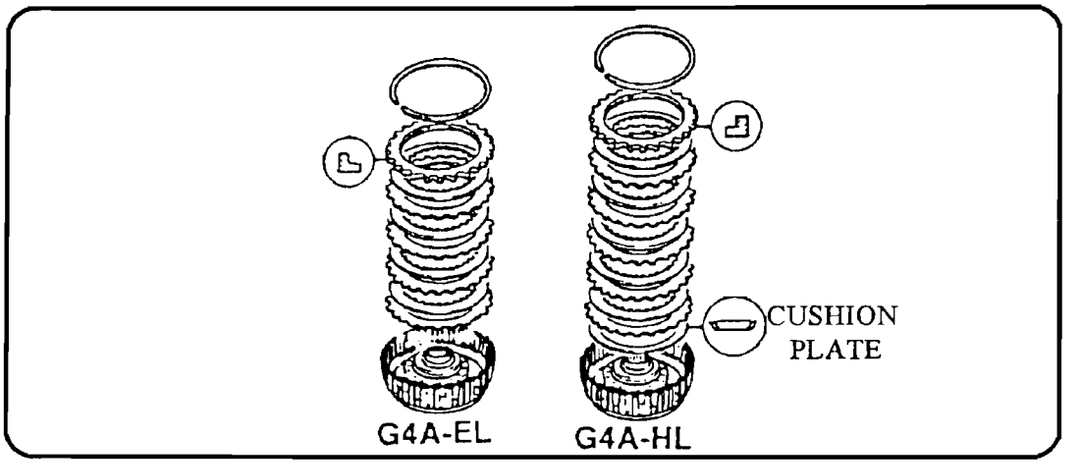


Figure 1.

The G4A-EL 3-4 clutch drum uses a lip seal in the drum to seal the inner portion of 3-4 piston. The G4A-HL uses an **"O" Ring** to seal the inner portion of the 3-4 piston. See Figure 2. Aftermarket gasket sets may include only the "O" Ring style inner piston seal for the 3-4 clutch drum, and specify its use for both applications. Care must be taken to install the proper inner seal. A mix up of the inner seal will cause leaks in the 3-4 clutch drum..

Note: Both use a "D" Ring seal on the outside of the 3-4 piston.

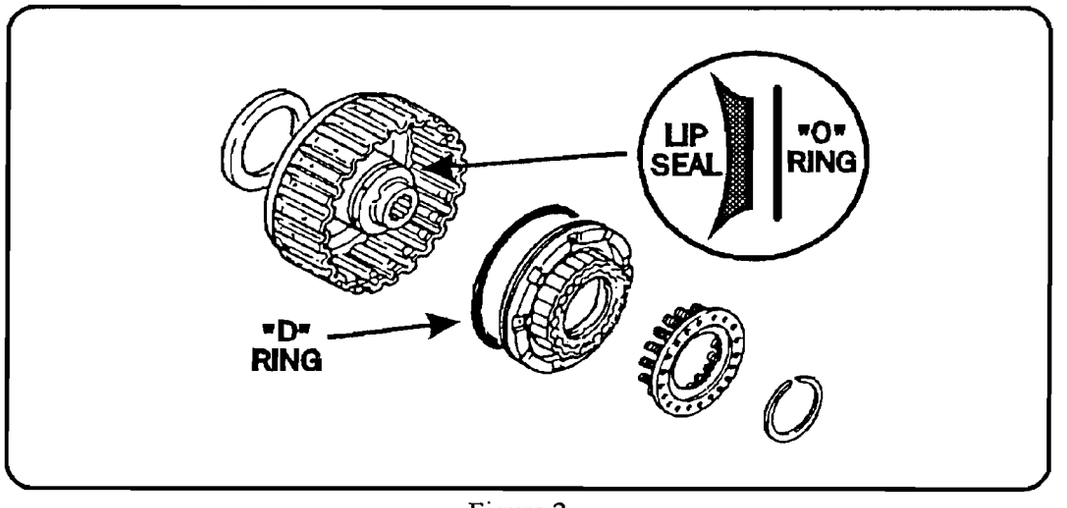


Figure 2.

AUDI 4000-5000 SERIES

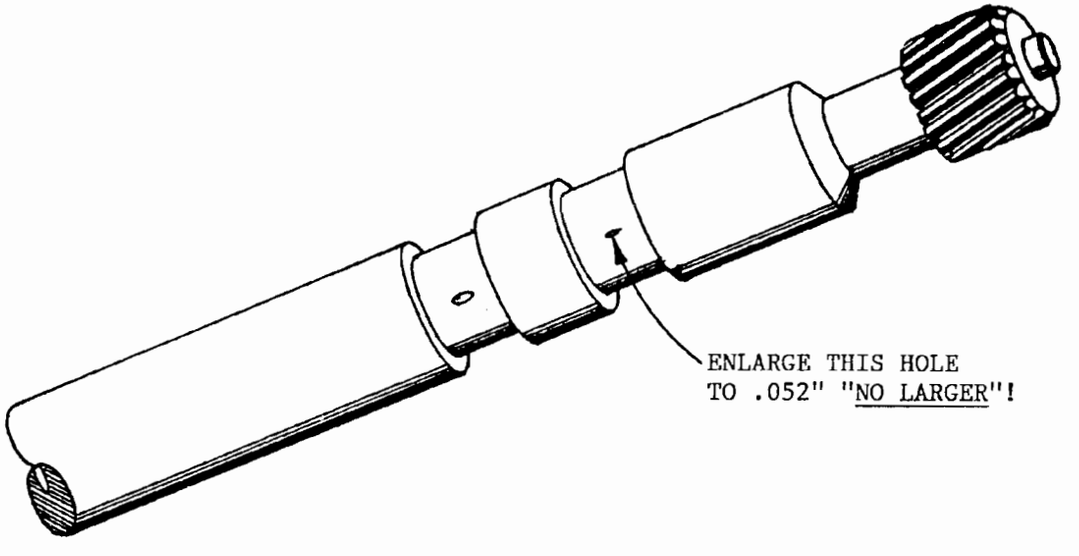
LATE AND/OR NO UPSHIFTS "COLD ONLY"

COMPLAINT: Some Audi 4000-5000 series vehicles may experience late upshifts and/or no upshifts "COLD ONLY". After the transmission fluid is warm, the transmission shifts properly for the rest of the day.

CAUSE: If all other possibilities have been eliminated, the cause may be not enough drive oil being fed to the governor. The volume of COLD oil that can get through the governor shaft orifice may not be sufficient to return governor pressure to the shift valves in the valve body.

CORRECTION: Enlarge the small governor shaft feed hole from the present size to .052", "NO LARGER". The governor feed hole is the one that is closest to the governor gear, as shown in Figure 1. The difference in size is very minimal and not much material will be removed from the governor shaft. Be certain to clean all material from governor and the governor shaft after this procedure.

AUDI GOVERNOR SHAFT



COMPLIMENTS OF: ED LEE
DELTRANS

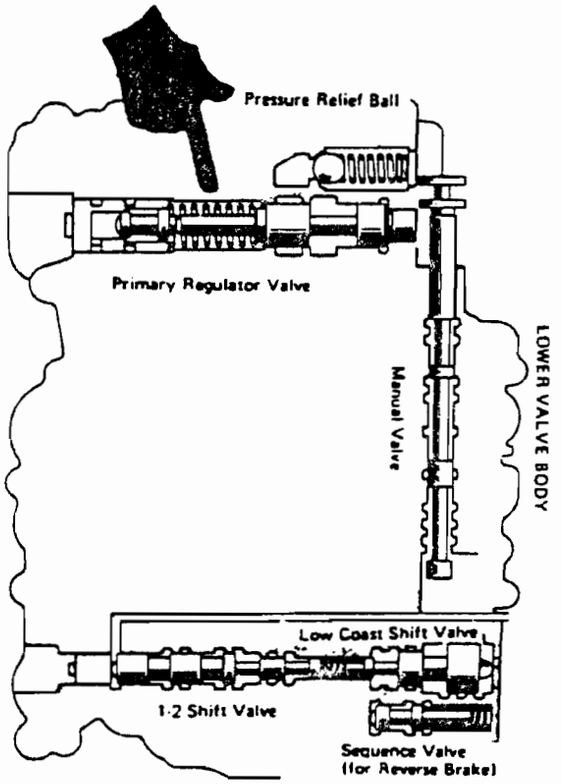
Figure 1

A43D/A43DE
HARSH 1-2 SHIFT

COMPLAINT: Harsh 1-2 shift.

CAUSE: Missing or mis-positioned check ball. High line pressure.

CORRECTION: Install check-ball in proper location or replace Primary Valve Spring with a new spring, part # 90501-18028.



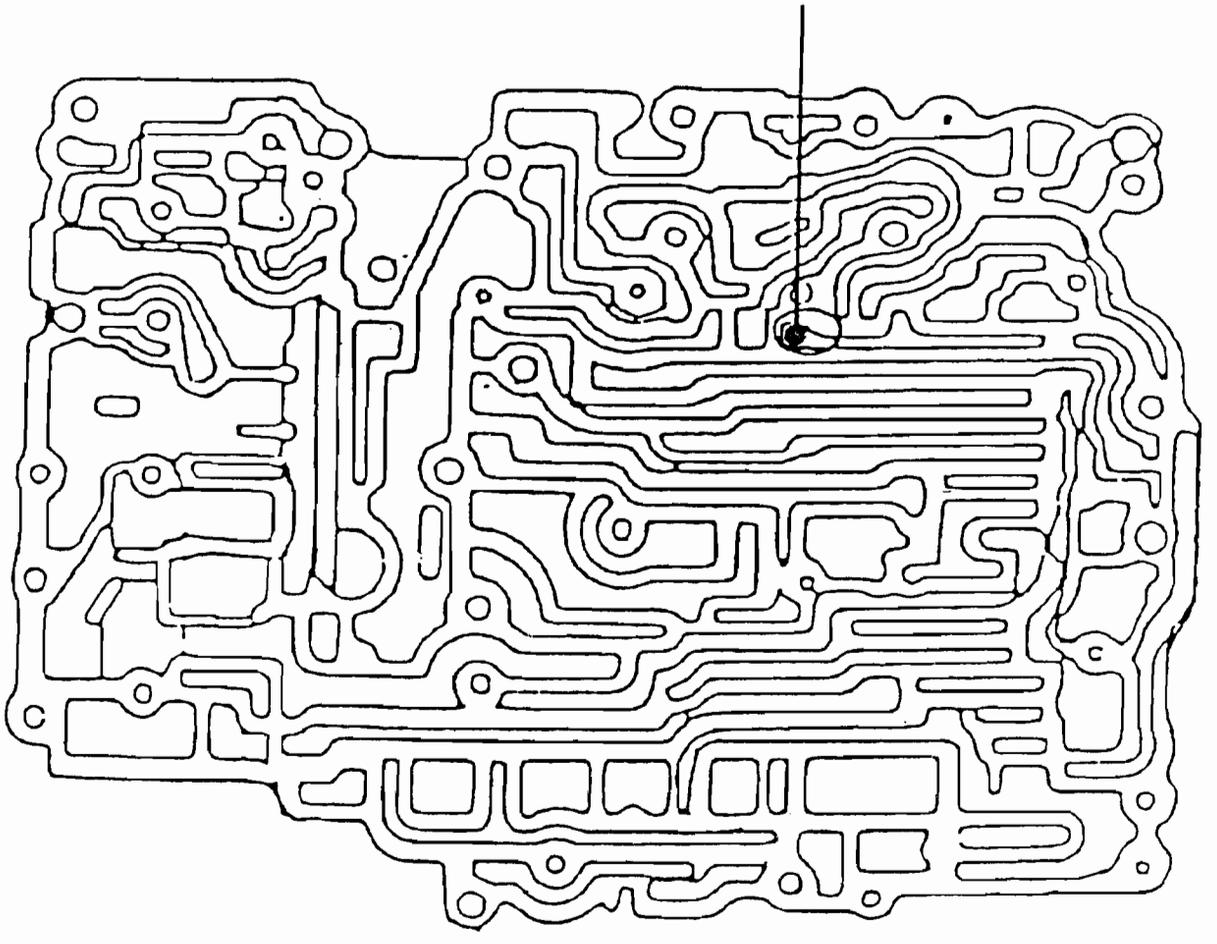
TOYOTA A-40D SERIES
A43DL AND A44DL

COMPLAINT: HARSH 1-2

CAUSE: MISSING VITON CHECK BALL

CORRECTION: INSTALL CHECK BALL IN CORRECT LOCATION

B 2 CHECK BALL, (ϕ5.5 mm/0.217 In.)

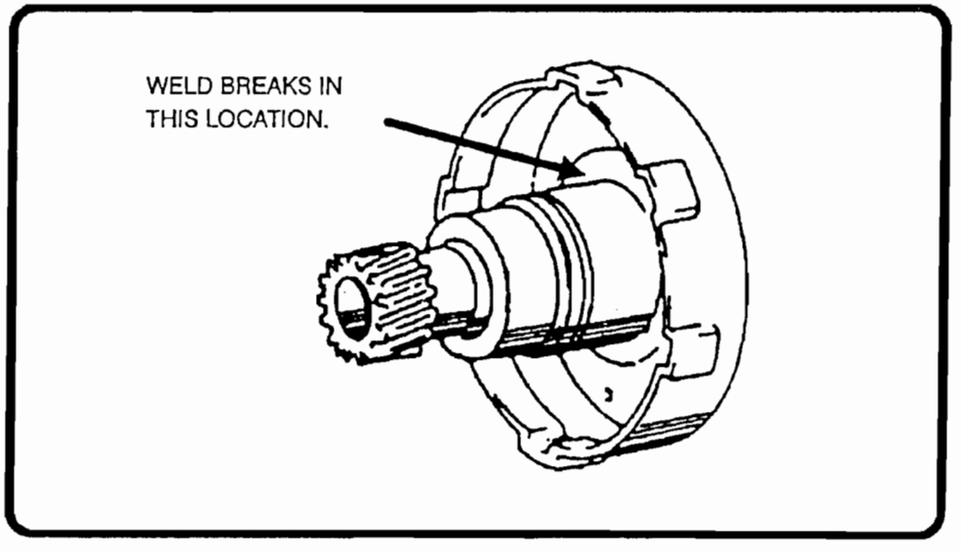


TOYOTA A-140
NO REVERSE

COMPLAINT: *Up shifts 1-2, 2-3, 3-4 good but has no reverse.*

CAUSE: *Weld for sun gear in overdrive drum broken. Piston must be removed in order to be checked properly .*

CORRECTION: *Replace drum.*



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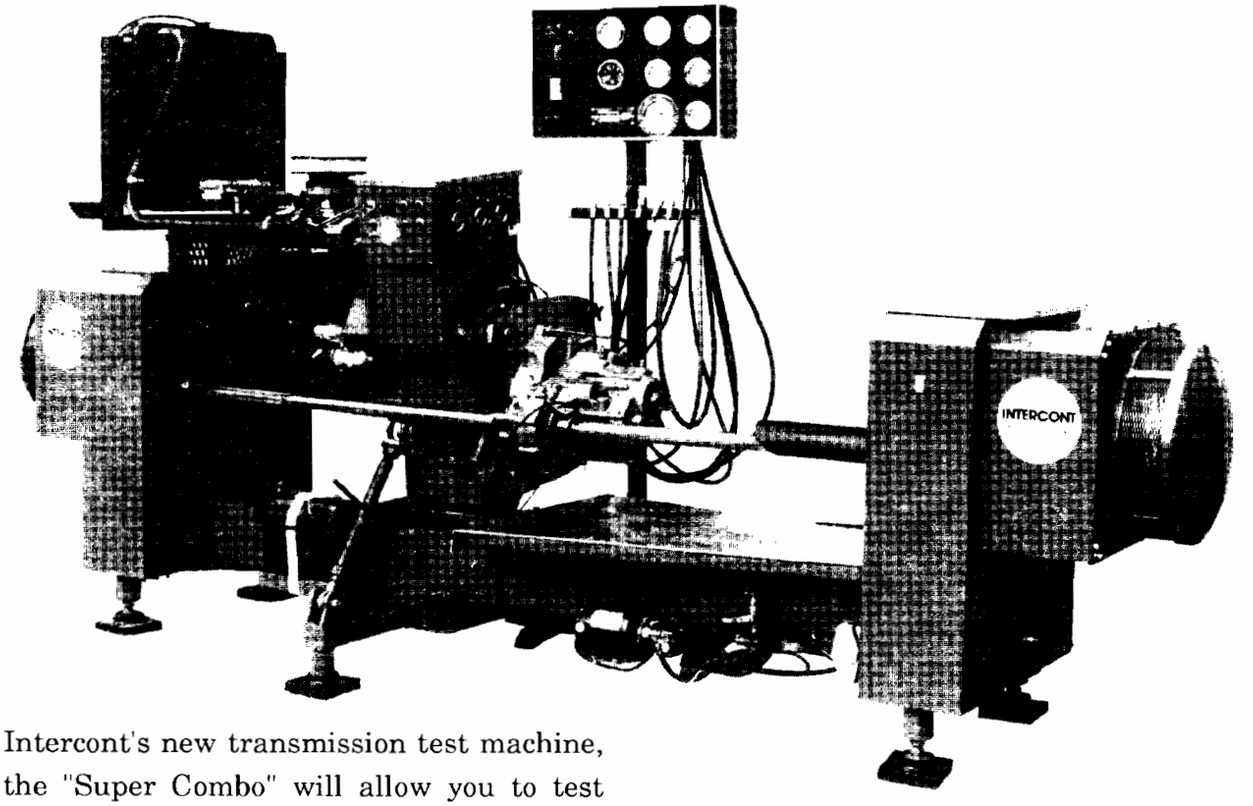

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TOYOTA A-140E

HARSH SHIFTS

COMPLAINT: Harsh shifts.

CAUSE: The cause may be a missing or worn check balls.

CORRECTION: Replace check balls in locations shown in Figure 1.

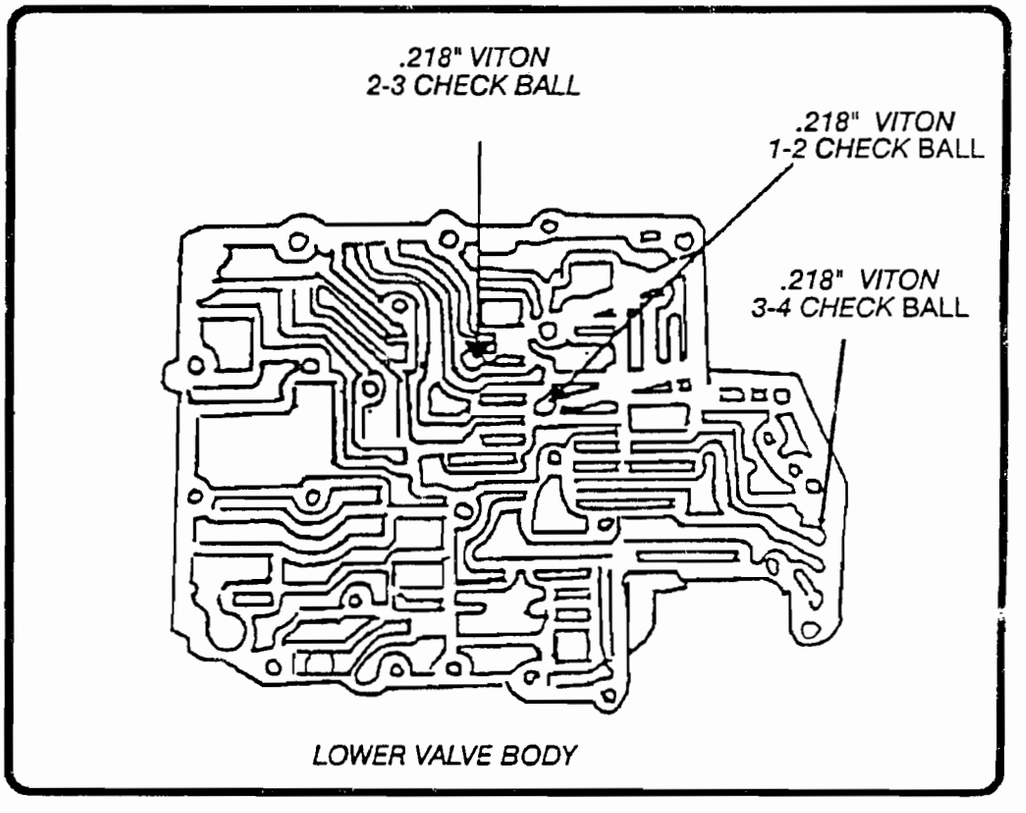


Figure 1

SUBARU 3 SPEED

FRONT SEAL POPS OUT

COMPLAINT: After a reseal or overhaul, the front seal pushes out of the converter housing.

CAUSE: The converter bushing may be pushed back in the converter housing preventing the oil coming out of the converter from getting past the stator shaft and out to the cooler. When the bushing is replaced, it can easily be pushed in so far that it can block the "converter out" passage. See figure 1. Also the stator support gasket may block fluid to the "converter out" passage due to mis-assembly or use of excessive sealant.

CORRECTION: 1. Check converter hub to bushing clearance. It should be no more than .0045 in. If it is more, then the bushing must be replaced.

2. When replacing the converter bushing, check that you leave sufficient clearance between the bushing and the rear of the stator support.

3. Orient the stator support and the gasket gasket so that both have the rounded side toward the starter hole in the bell housing. See figure 2. Also be sure that no sealer (silicone etc.) plugs or restricts the drain or cooler passages at the rear of the bell housing.

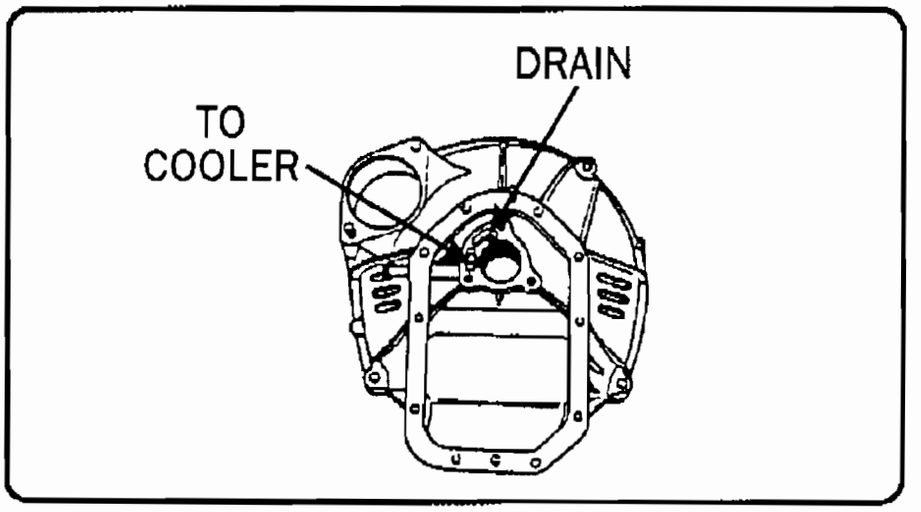


Figure 1.

SUBARU CONTINUED.

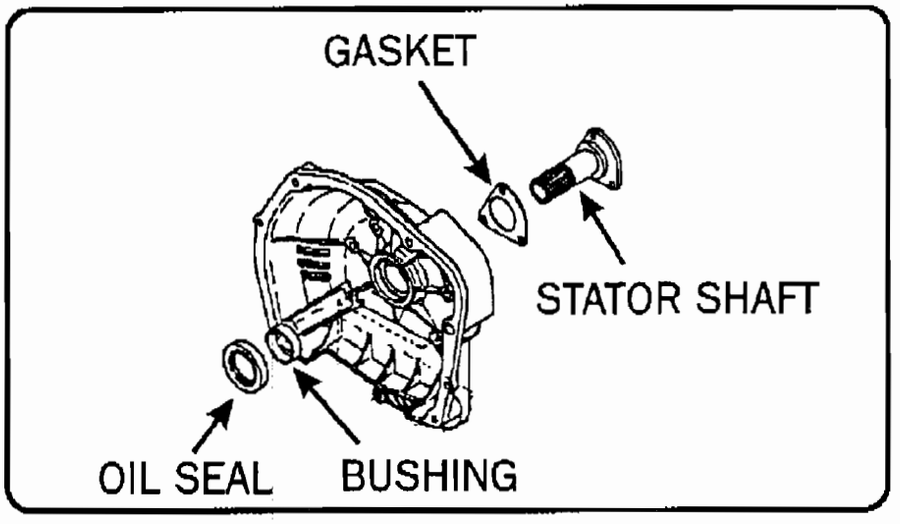


Figure 2.

FORD AXOD-E

REDESIGNED REAR LUBE TUBE, REAR LUBE TUBE SEAL AND REAR PLANETARY SUPPORT

CHANGE: The Rear Lube Cross-Over Tube, Lube Tube Seal, and the Rear Planetary Support have been redesigned beginning in mid-year 1993 and introduced as a running change in model year 1993.

REASON: Improved lube flow to the planetary gears.

PARTS AFFECTED:

(1) REAR LUBE CROSS-OVER TUBE - Has a longer, smaller diameter end to pass completely through the case and INTO the revised lube seal, which is now pressed into the new rear planetary support (See Figure 1).

(2) REAR LUBE TUBE SEAL - Now pressed into the new rear planetary support to accomodate the new rear lube cross-over tube (See Figure 2).

(3) REAR PLANETARY SUPPORT - Now bored to accept the new rear lube tube seal (See Figure 2)

INTERCHANGEABILITY:

(1) The redesigned parts listed above ARE NOT interchangeable with previous design level parts.

(2) The redesigned parts listed above may be used on any 1991 or 1992 AXOD-E transaxle, however ALL THREE PIECES MUST BE USED TOGETHER.

(3) The redesigned parts listed above CANNOT be used on 1986-1990 AXOD transaxles, because of the governor circuit.

SERVICE INFORMATION:

NOTE: The new design lube tube should be installed INTO THE NEW REAR LUBE SEAL FIRST, and then press the other end into the case, to prevent seal damage.

If the seal is damaged, a delay to drive will be the result, as this is in the drive oil circuit.

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

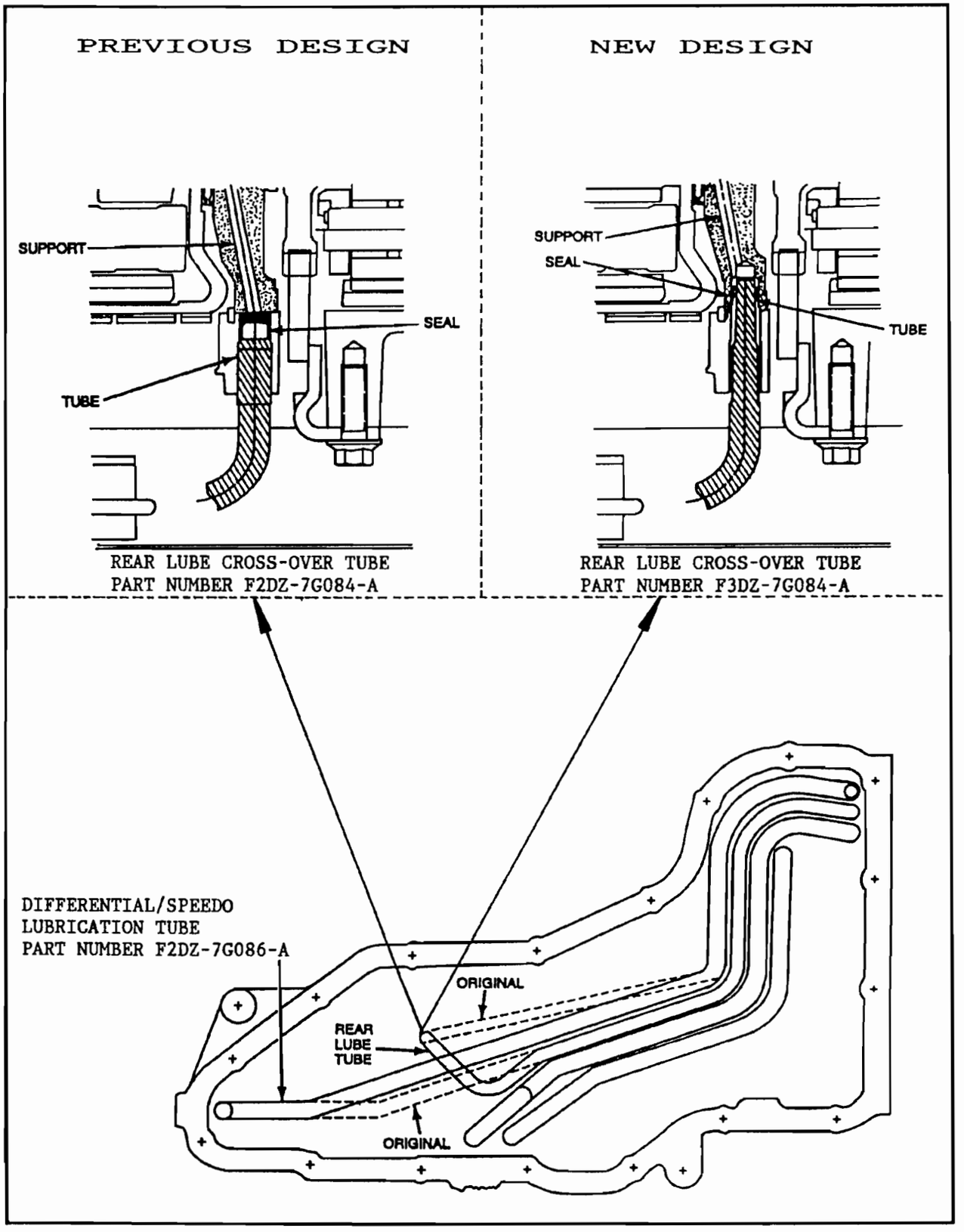
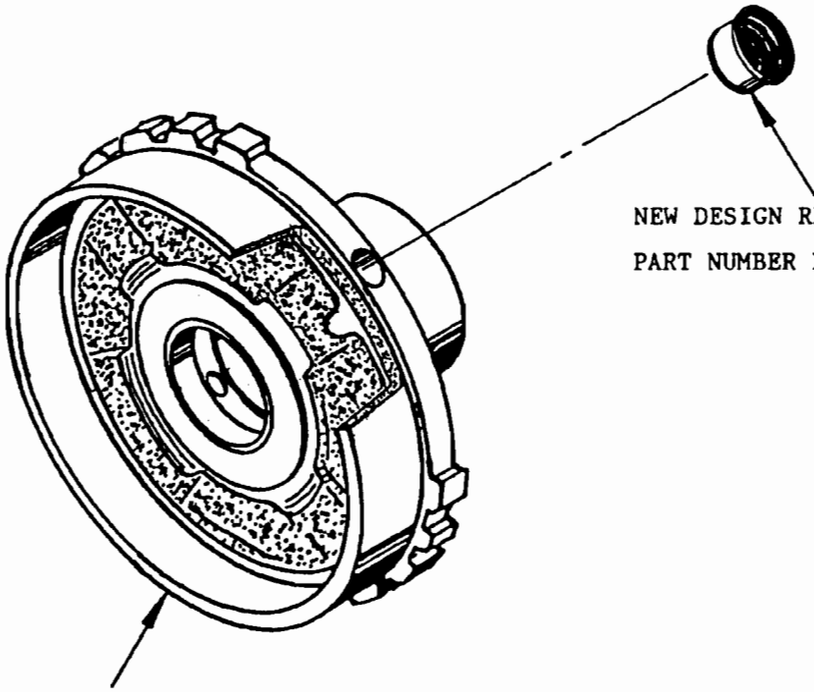

PREVIOUS DESIGN
NEW DESIGN
SUPPORT
SEAL
TUBE
SUPPORT
SEAL
TUBE
REAR LUBE CROSS-OVER TUBE
PART NUMBER F2DZ-7G084-A
REAR LUBE CROSS-OVER TUBE
PART NUMBER F3DZ-7G084-A
DIFFERENTIAL/SPEEDO
LUBRICATION TUBE
PART NUMBER F2DZ-7G086-A
ORIGINAL
REAR
LUBE
TUBE
ORIGINAL

Figure 1

NEW DESIGN REAR PLANETARY SUPPORT
AND REAR LUBE SEAL



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

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

Figure 2

FORD - AXOD-E

3-NEUTRAL KICKDOWN SHIFT

COMPLAINT: A delayed shift may occur during 3-2 forced downshifts, or "Kickdown", and/or the transaxle will shift to neutral during the 3-2 kickdown.

CAUSE: The cause may be, a broken spring retainer clip between the pull-in control valve spring and the 3-2 control valve spring, as shown in Figure 1.

CORRECTION: Replace the spring retainer clip with OEM part number F1DZ-7F194-A.

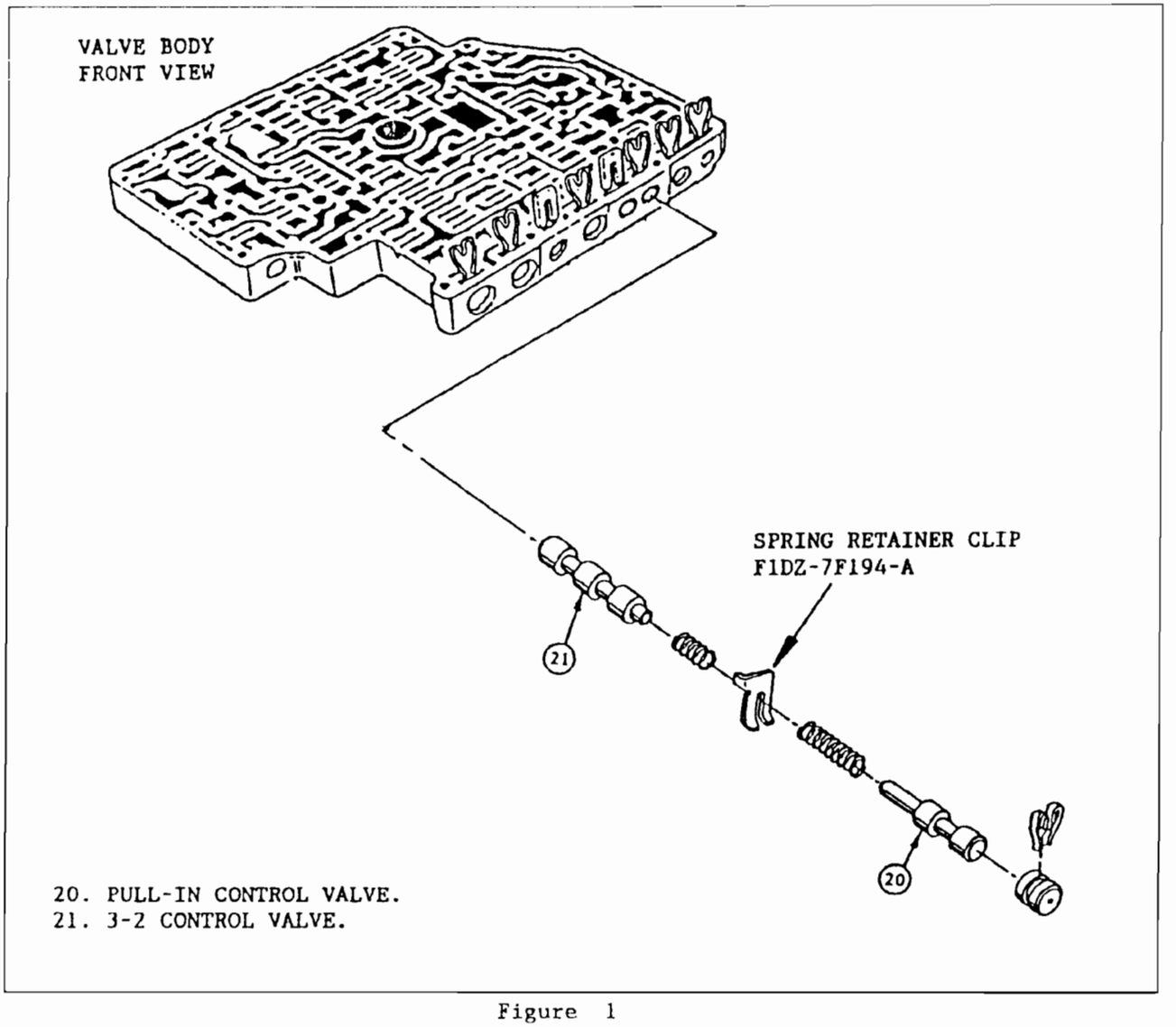


Figure 1

FORD AXODE

No Second Gear, 1-2 Slide or Flare or 3-2 Flare
1991 Taurus, Sable, Continental

COMPLAINT: The AXODE may have no second gear or a 1-2 slide or flare, a 3-2 slide or flare.

CAUSE: These conditions may occur because of intermediate clutch failure on some early built 1991 A be caused by a worn (B10) check ball in the pump assembly. Figure 5.

CORRECTION: If intermediate clutch wear is found in an AXODE with a serial number found in Figure 1 install a main control separator plate repair service kit. Figure 2 lists the part numbers and applications.

Each main control separator kit contains the following items:

-Separator plate for oil pump side of main control
-Separator plate for Valve Body side of main control
-11 check balls
-Spring retainer clip
-Backout valve
-Main control gasket
-Instruction sheet

NOTE: When the new check balls are installed, there will be one (1) less check ball used in the oil pump side of the main control. The B12 check ball is no longer used. The check ball locations will be the same as the later built 1991 models, Figure 5. Figure 4 shows the early check ball layout.

A 1991 AXODE with a serial number listed in Figure 1 will require checking the ID marking on the oil pump separator plate Figure 3. If the main separator plate has not been installed, it should be installed at this time. Which will update the main control to late 1991. Refer to Figures 3,6 and 7 for proper separator plate ID.

AXODE TRANSAXLE SERIAL NUMBER CHART			
APPLICATION	I.D. TAG COLOR	TRANS. ASSY. #	SERIAL #
3.0L Taurus/Sable	White	F1DP-BA	Up to 195343
3.8L Taurus/Sable	Yellow	F1DP-CA	Up to 54553
3.8L Taurus Police	Apricot	F1DP-EA	Up to 10936
3.8L Continental	Pink	F1DP-DA	Up to 39653

Figure 1

PART NUMBER	PART NAME
F1DZ-7A142-B	Main Control Separator Plate Service Repair Kit (3.0L Taurus/Sable)
F1DZ-7A142-C	Main Control Separator Plate Service Repair Kit (3.8L Taurus/Sable)
F1DZ-7A142-D	Main Control Separator Plate Service Repair Kit (3.8L Police)
F1OY-7A142-B	Main Control Separator Plate Service Repair Kit (3.8L Continental)

Figure 2

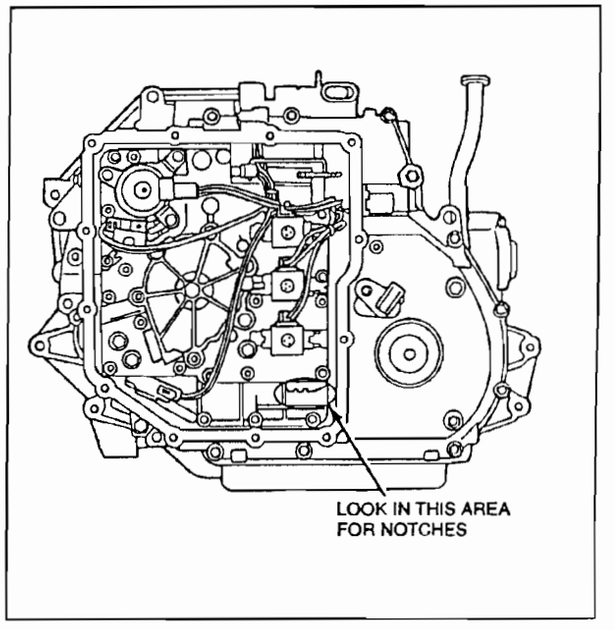


Figure3

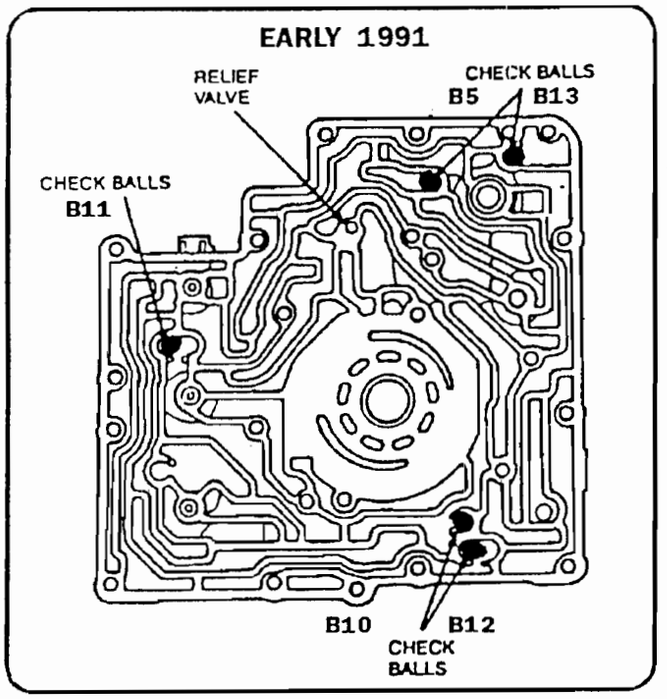


Figure 4

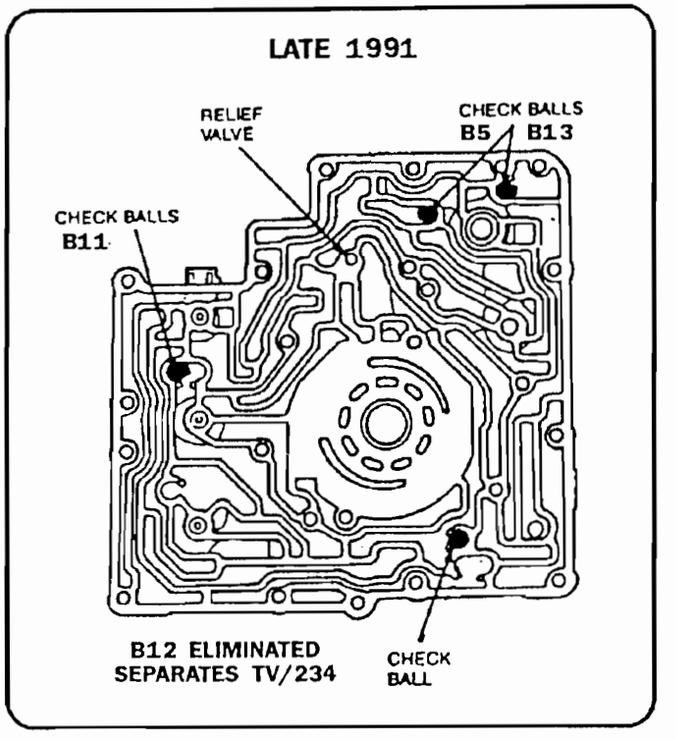


Figure 5

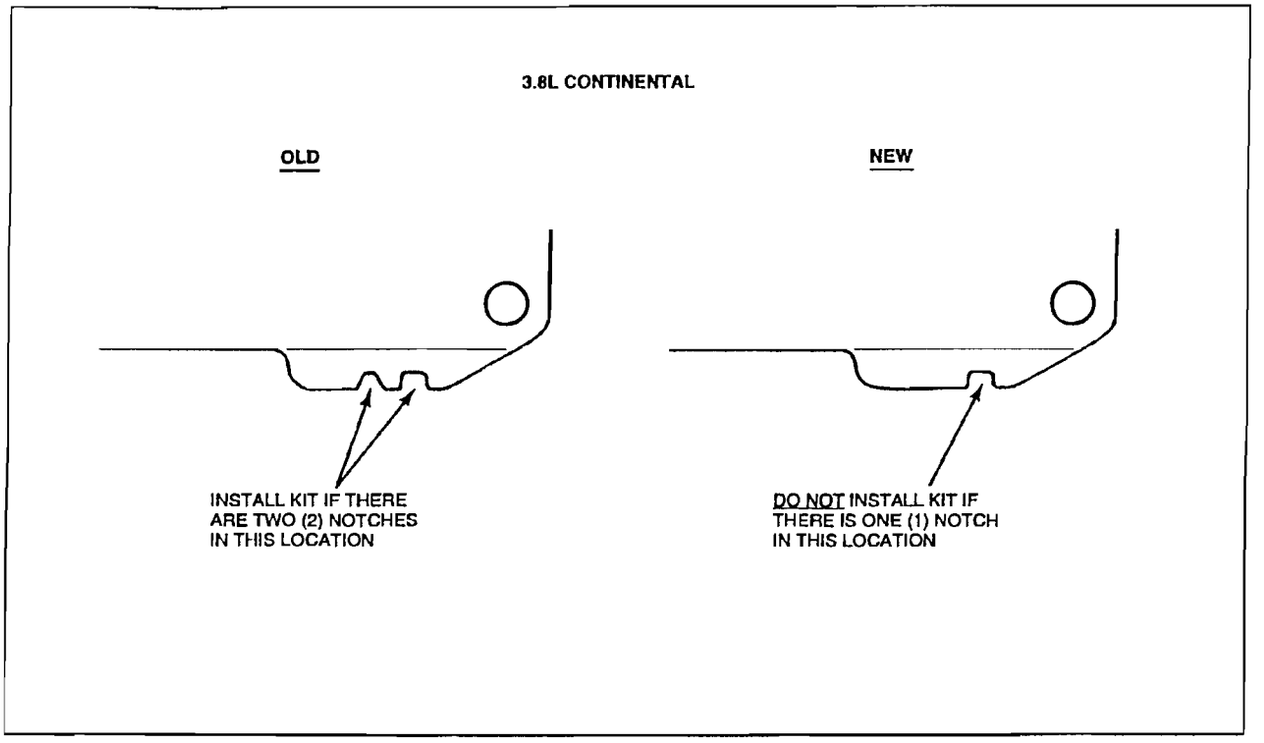


Figure 6

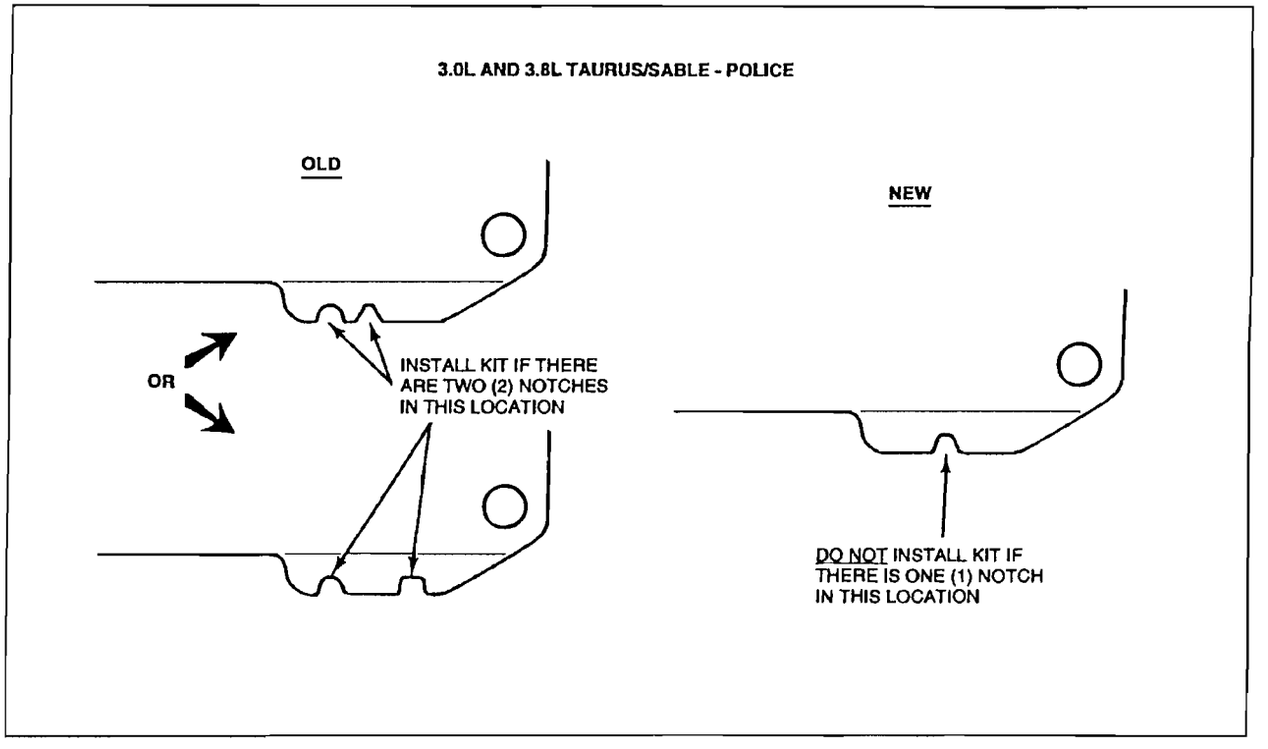


Figure 7

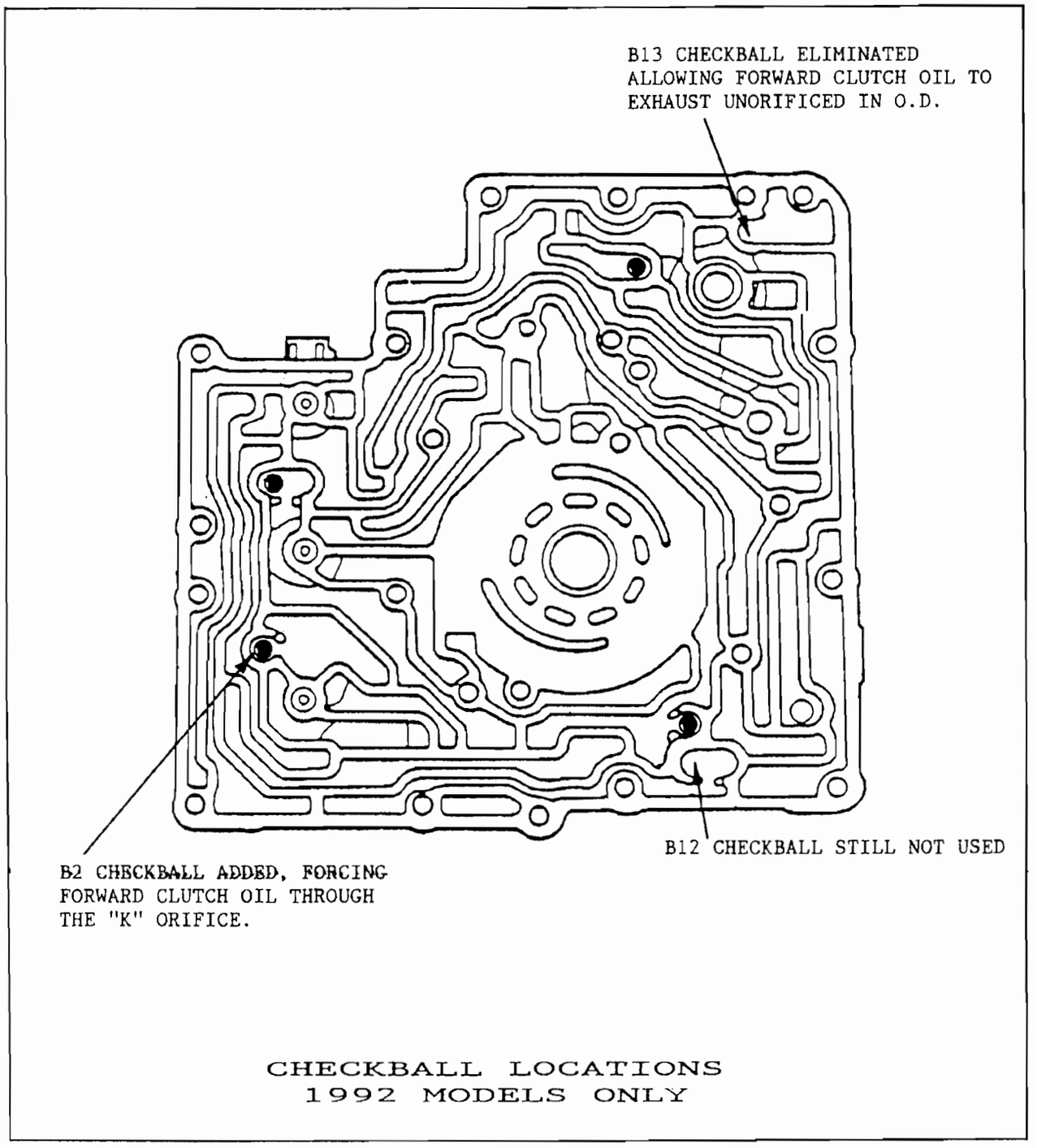

B13 CHECKBALL ELIMINATED
ALLOWING FORWARD CLUTCH OIL TO
EXHAUST UNORIFICED IN O.D.
B12 CHECKBALL STILL NOT USED
B2 CHECKBALL ADDED, FORCING
FORWARD CLUTCH OIL THROUGH
THE "K" ORIFICE.
CHECKBALL LOCATIONS
1992 MODELS ONLY

Figure 3

FORD AXOD-E

OIL PUMP AND VALVE BODY SPACER PLATE IDENTIFICATION

PUMP SPACER PLATES:

"EARLY" 1991 ONLY: Uses the number 12 checkball. This Pump Spacer Plate will have TWO holes over the bathtub at the No. 12 checkball location, as shown in Figure 1.

"LATE" 1991 ONLY: Eliminated No. 12 checkball. This Pump Spacer Plate will have ONE hole over the bathtub at the No. 12 checkball location, as shown in Figure 2.

Another difference in the pump plates is hole marked "A", as shown in Figures 1 and 2. This is the converter clutch solenoid feed hole.

If Hole "A" is .030" diameter = for Lock-Up Solenoid (LUS).
If Hole "A" is .215" diameter = for Modulated Lock-Up Solenoid (MLUS).

TO IDENTIFY WHICH TYPE OF SOLENOID YOU HAVE, REFER TO FIGURE 3, AS THEY ARE NOT INTERCHANGEABLE.

1991 TAURUS/SABLE REQUIRES - LOCK-UP SOLENOID (LUS)
1991 CONTINENTAL REQUIRES - MODULATED LOCK-UP SOLENOID (MLUS).
1992-UP "ALL MODELS" REQUIRES - MODULATED LOCK-UP SOLENOID (MLUS).

NOTE: The Lock-Up Solenoid (LUS) CANNOT be used on any vehicle wired for the Modulated Lock-Up Solenoid (MLUS).
The Modulated Lock-Up Solenoid (MLUS) CANNOT be used on any vehicle wired for the Lock-Up Solenoid (LUS). Refer to chart above.

THE PUMP SPACER PLATES MUST BE COMPATABLE WITH THE NUMBER 12 CHECK BALL, AND THE TYPE CONVERTER CLUTCH SOLENOID YOU ARE USING.

VALVE BODY SPACER PLATES:

"EARLY" 1991 ONLY: Uses the style backout valve in the valve body that is shown in Figure 4, and the spacer plate difference is shown inside the dotted circle. Compare to Figure 5.

"LATE" 1991 ONLY: Uses the style backout valve in the valve body that is shown in Figure 5, and the spacer plate difference is shown inside the dotted circle. Compare to Figure 4.

THE VALVE BODY SPACER PLATES MUST BE COMPATABLE WITH THE TYPE OF BACKOUT VALVE YOU ARE USING, AS SHOWN IN FIGURES 4 AND 5.

Continued on next Page.

SERVICE INFORMATION:

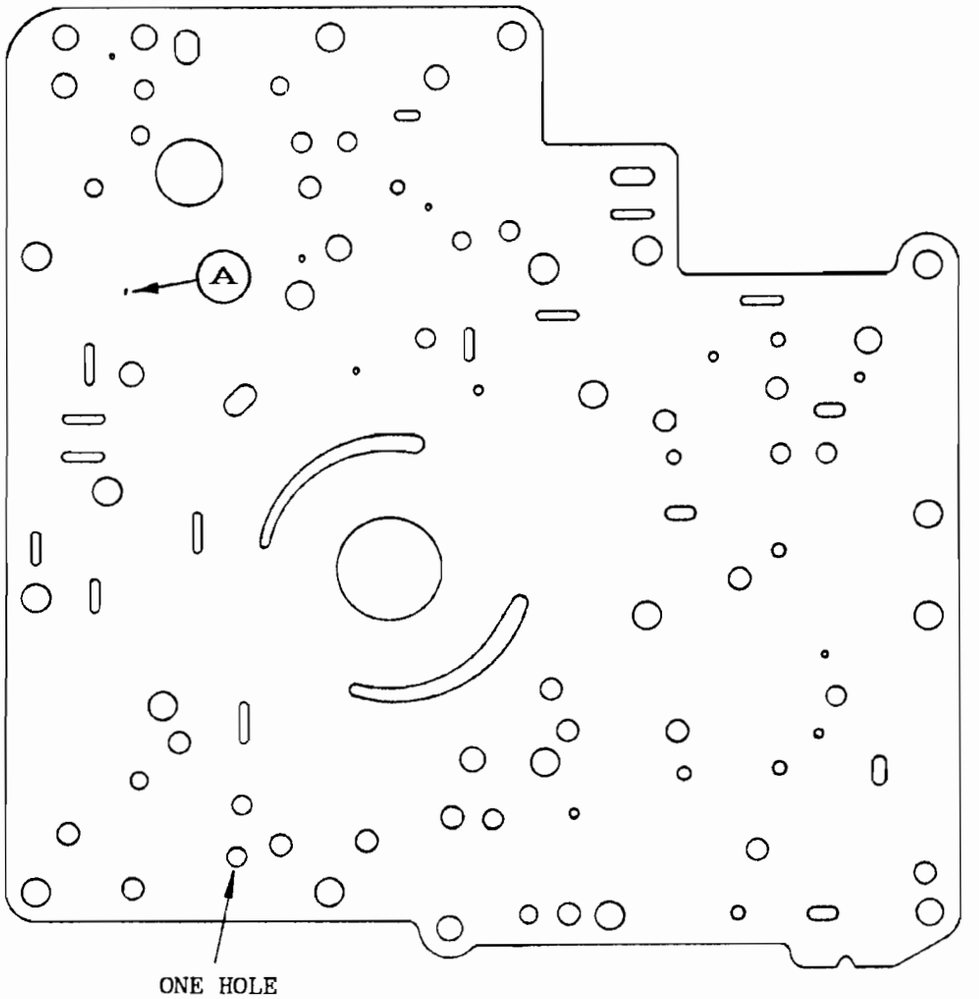
There are service kits available from Ford Motor Co. to "Update" your "Early" 1991 transaxle to a "Late" 1991 Transaxle and include the following:

1 Oil Pump Spacer Plate
1 Valve Body Spacer Plate
1 Backout Valve
11 Checkballs
1 3-2 Control Valve Spring Retainer Clip
1 (Complete Set) Pump and Valve Body Gaskets

1991	3.0L TAURUS/SABLE	F1DZ-7A142-B
1991	3.8L TAURUS/SABLE	F1DZ-7A142-C
1991	3.8L TAURUS/SABLE (POLICE)	F1DZ-7A142-D
1991	3.8L CONTINENTAL	F1OY-7A142-B

FOR AXOD-E TRANSAXLE IDENTIFICATION, SEE FIGURE 6.

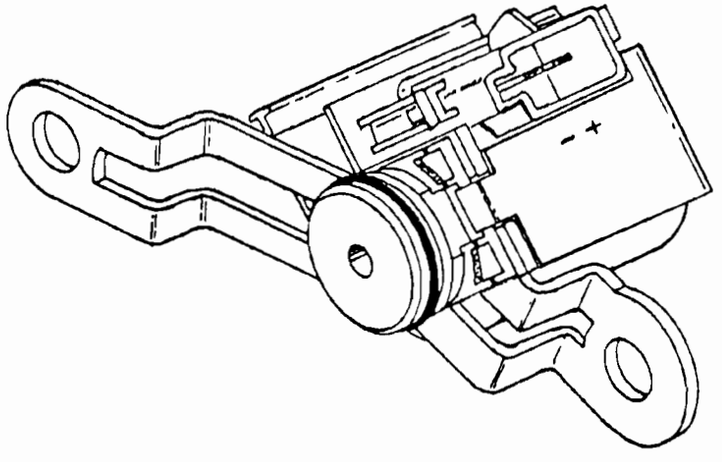
AXOD-E PUMP SPACER PLATE
"LATE" 1991 ONLY.



HOLE "A" .030" = LOCK-UP SOLENOID (LUS).
.215" = MODULATED LOCK-UP SOLENOID (MLUS).

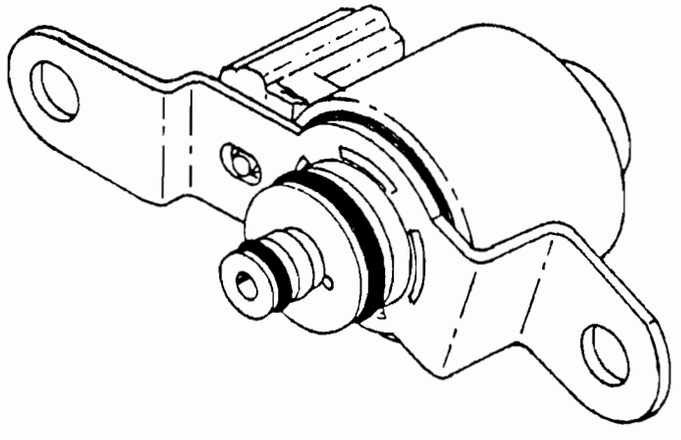
Figure 2

LOCK-UP SOLENOID (LUS)
FOUND IN: 1991 TAURUS/SABLE ONLY.



OEM PART NUMBER: F1DZ-7G136-A

MODULATED LOCK-UP SOLENOID (MLUS)
FOUND IN: 1991 CONTINENTAL ONLY.
FOUND IN: 1992 "ALL MODELS".



OEM PART NUMBER: F10Y-7G136-A

Figure 3

AXOD-E VALVE BODY SPACER PLATE
"LATE" 1991 ONLY.

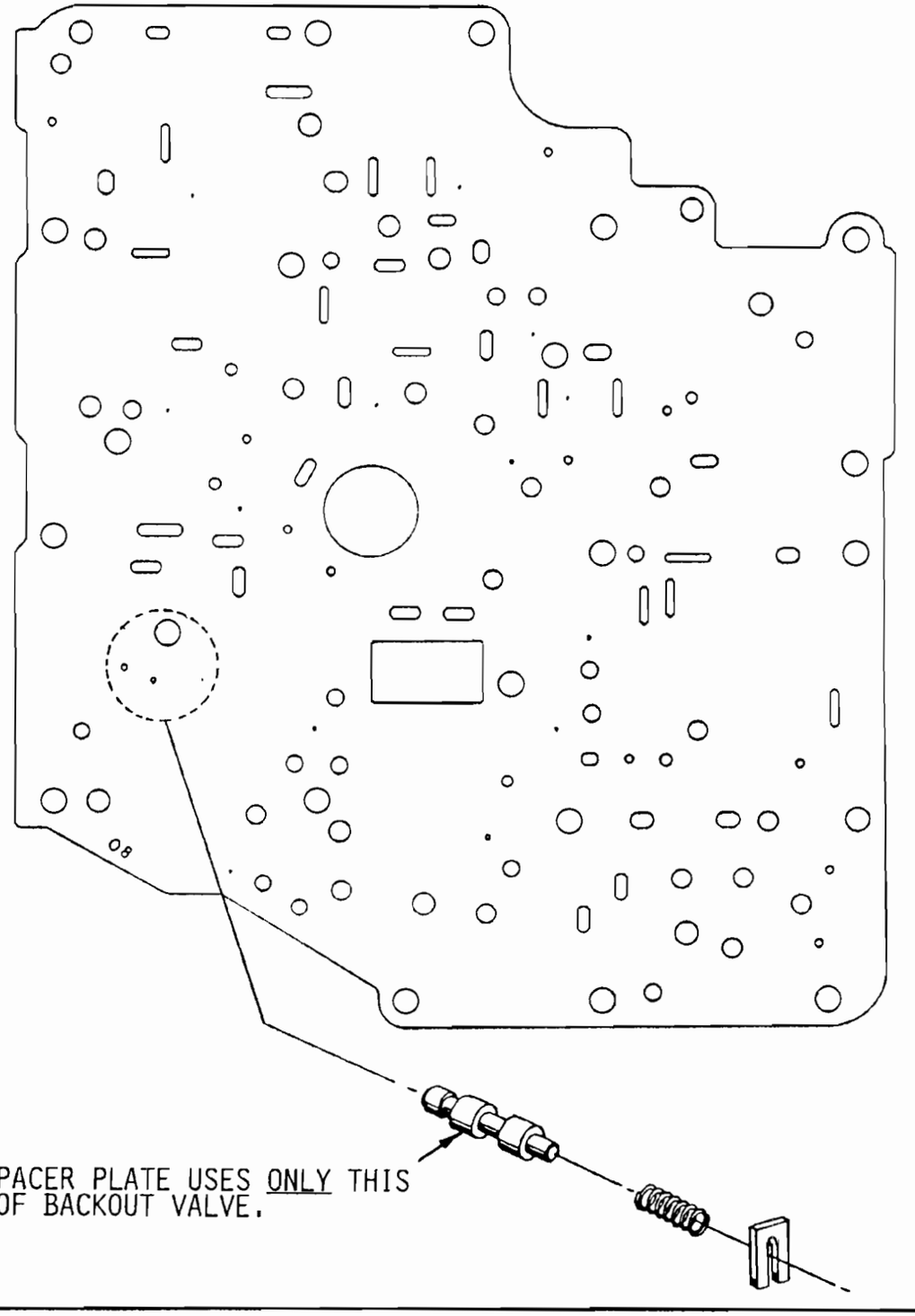
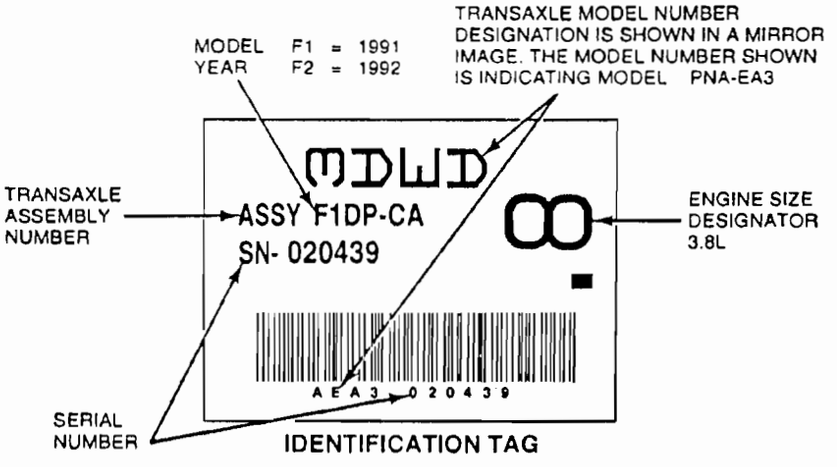


Figure 5

TRANSAXLE IDENTIFICATION

Early 1991 AXODE Transaxle Serial Numbers			
Application	**I.D. Tag Color**	**Trans Assembly #**	**Trans Serial #**
3.0L Taurus/Sable	White	FIDP-BA	Up to #195343
3.8L Taurus/Sable	Yellow	FIDP-CA	Up to #54553
3.8L Taurus Police	Apricot	FIDP-EA	Up to #10936
3.8L Continental	Pink	FIDP-DA	Up to #39653



Service Part No. F1DZ-7A142-B — 3.0L Taurus/Sable Service Part No. F1DZ-7A142-C — 3.8L Taurus/Sable Service Part No. F1DZ-7A142-D — 3.8L Police Service Part No. F1OY-7A142-B — 3.8L Continental		
Kit Contents		
Part Number	**Description**	**Quantity**
7A142	Separator Plate (Oil Pump Side of Main Control)	1
7A008	Separator Plate (Valve Body Side of Main Control)	1
E7DZ-7E195-A	Check Ball	11
7G202	Backout Valve	1
F1DZ-7F194-A	Spring Retainer Clip	1
F1DZ-7D100-A F1DZ-7C155-A F1DZ-7A136-A F1DZ-7G331-A	Main Control Gaskets (Note: All Main Control Gaskets Must Be Replaced With New Gaskets)	1

Figure 6

AXOD-E VALVE BODY SPACER PLATE
"EARLY" 1991 ONLY.

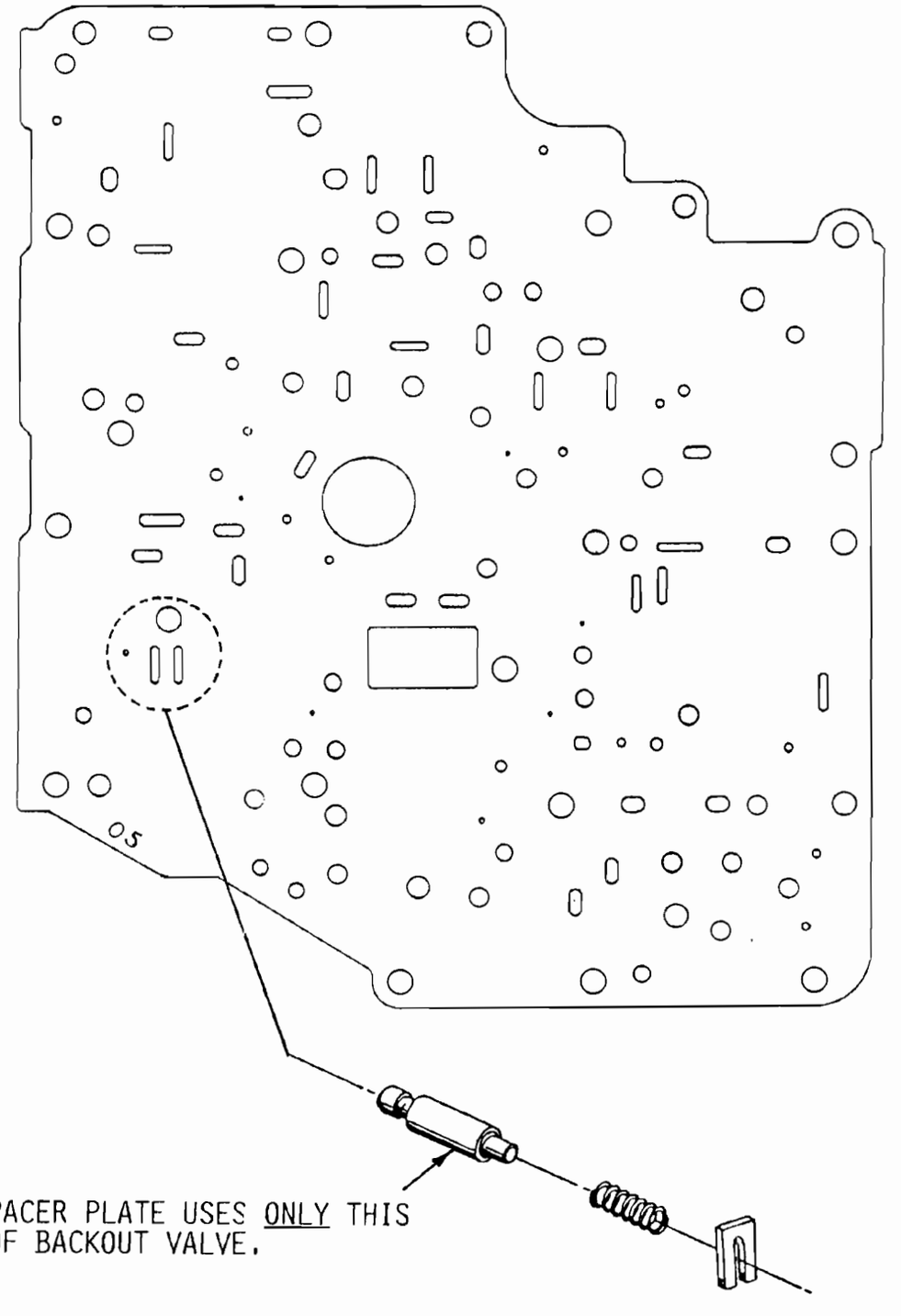


Figure 4

MAKE THE RIGHT CHOICE.

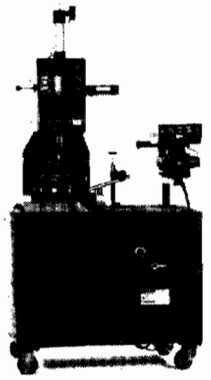
Chrysler, Ford Motor Company did. and so did Aarons Automotive, Art Carr Performance, TCI, Automatic Service Center (home of the ATRA school), various AAMCO shops, Cottmans shops, Jaspers Transmissions, and Joseph Industries. Top people in the Industry made the right choice. Add your name to the growing list of TCRS customers TODAY

The TCRS robotic 2001 "Auto Tack System™"
automatically indexes and fully tacks the convertor in seconds. Upon completion of the last tack it makes a complete 360 weld and automatically shuts off.

THE PLUS FACTOR, THATS WHAT YOU RECEIVE WITH TCRS EQUIPMENT

+ Qualified trained personel
+ Back-up when you need it
+ More machine tor your money
+ Guaranteed to do more than any other machine on the market

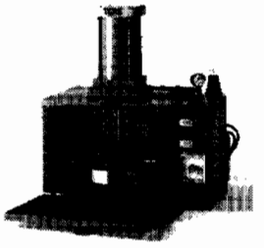
AUTO-WELD ALIGNER



+ Auto tack system
+ Air hold down-no bolting necessary
+ Air collet system-no chuck keys
+ All pilots and hub bushings included
+ Complete hubbing system to install new finished hubs on any impeller
+ Bowl build-up saves critical cores
+ Welds on ring gears
+ Delta weld 300
+ Tweeco Tam Gun
+ Concentricity, perendicularity, and parallelism

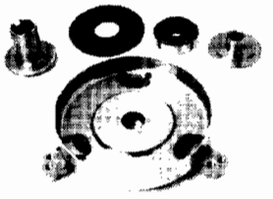
PATENT PENDING

PB-2002 PISTON BONDER



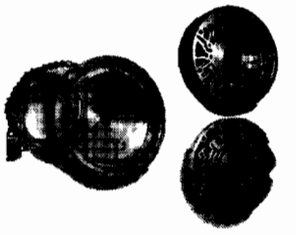
- Easy as 1-2-3
- Bonds a piston every 2 min.
- Adjustable heat & timer controls
- Aluminum bonder dies provide even heat distribution
- Compact & efficient
- No wait - no freight
- Comes with 20 die sets American & Foreign
- Pat. # 5.141.586

8" RACING KIT



Steel front cover with GM dual bolt hole pattern.
- 30 Spline turbine hub
- TCRS Racing Sprag
- Steel stator caps
- Complete bearing kit
- Pump hub & balloon plate
- Precision machined on TCRS CNC equipment

The highest quality & durable performance kit made today.



PUMP PALS

700R4/200R4/E40D
- Quick set-up
- Pump pal takes the eccentrics out of the pump rotor pockets
- Works on any 3 jaw chuck or backing plate
- Easy to do
- Cost effective - can pay for itself in just 1 day
- Comes w/ Mist kit, tool holder and Diamond tip

In a matter of minutes it comes out with a beautiful machined mirror-like finish.

10" STREET

PERFORMANCE KIT
- Steel front cover with GM dual bolt hole pattern
- 30 spline turbine hub
- Pump drive hub

Complete kit retrofits GM 245mm converter in 30 min. or less. The highest quality & durable performance kit on the market today.

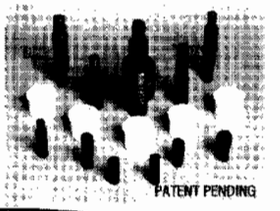
TCRS FB-4000

- Easy operator service
- Only ten seconds to balance
- Rugged motor drive system
- 110/220/ 50/60 HZ
- Push button calibration automatic true zero

- Fast, accurate, easy to use
- No bolting necessary
- Fluid or dry balance
- Add life to your shelf convertors-no rust build-up
- Two balancing modes-1 to 5 gram
- Computer touch key pad for entering torque convertor diam.

TCRS Introduces it's Universal Alignment "Collet System" for Precision Torque Convertor Balancing

- TCRS "Collet System" works on all hubs, oversized or undersized
- A twist of the wrist locks the "Collet System" securely on the hub. No messy O-rings, no scratched hubs
- 5 hub bushings cover virtually all convertors
- Quick change splined alignment pins are included with the "Collet System"
- The TCRS "Collet System" indexes the internal parts accuratley



PATENT PENDING

TCRS PRODUCTS

TCRS SPECIAL APPLICATION LATHE
RETROFITTED TURRET LATHE
PRECISION TOOLING
AUTO-WELD ALIGNER
TCB-2000 TORQUE CONVERTOR BALANCER
SUPERTANKER AIR TEST STAND
FB-4000 FLUID OR DRY COMPUTERIZED MOTORIZED BALANCER
TCB-2002 LOCK UP PISTON BONDER
SMALL AUTO-WELD TABLE
JET SPRAY WASHER • CONVEYOR WASHER
HEIGHT GAUGE
BAND RELINING MACHINE
PUMP PAL FOR 200R4/700R4 & E400 PUMPS
8" HIGH PERFORMANCE RACING KIT
10" STREET PERFORMANCE RACING KIT

1-800-598-1933

TCRS

TORQUE CONVERTER REBUILDING SYSTEMS

1-800-598-1933 FAX 702-331-1620 • 540 GREG ST., SPARKS, NV 89431

K E E P I N G Y O U O N T H E L E A D I N G E D G E O F T E C H N O L O G Y

FORD AXOD
HYDRAULICALLY LOCKED TV PLUNGER

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

CAUSE: T.V. plunger hydraulicly 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.

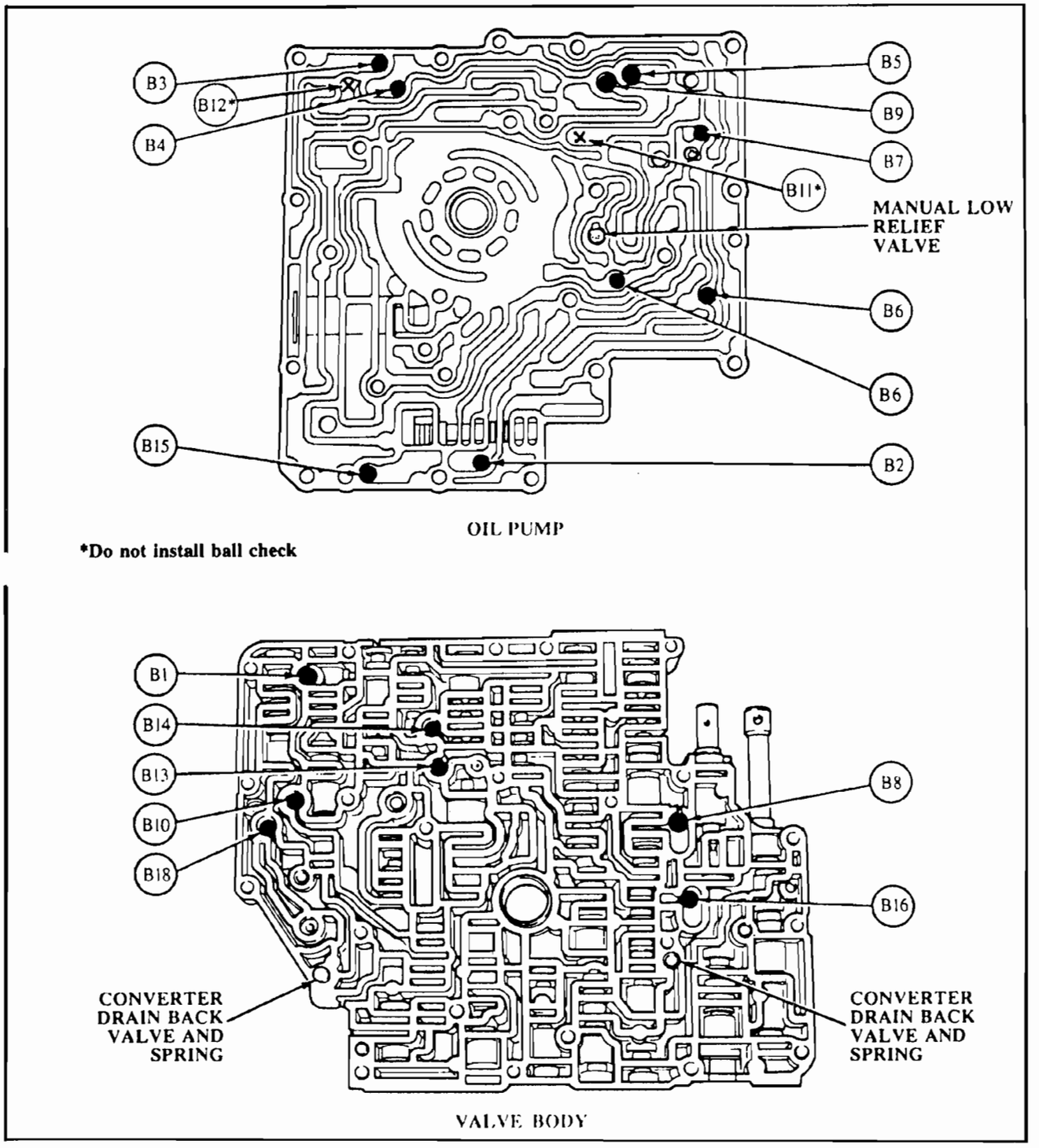

B3
B12*
B4
B5
B9
B7
B11*
MANUAL LOW
RELIEF
VALVE
B6
B6
B15
B2
OIL PUMP
*Do not install ball check
B1
B14
B13
B10
B18
B8
B16
CONVERTER
DRAIN BACK
VALVE AND
SPRING
CONVERTER
DRAIN BACK
VALVE AND
SPRING
VALVE BODY

Figure 2

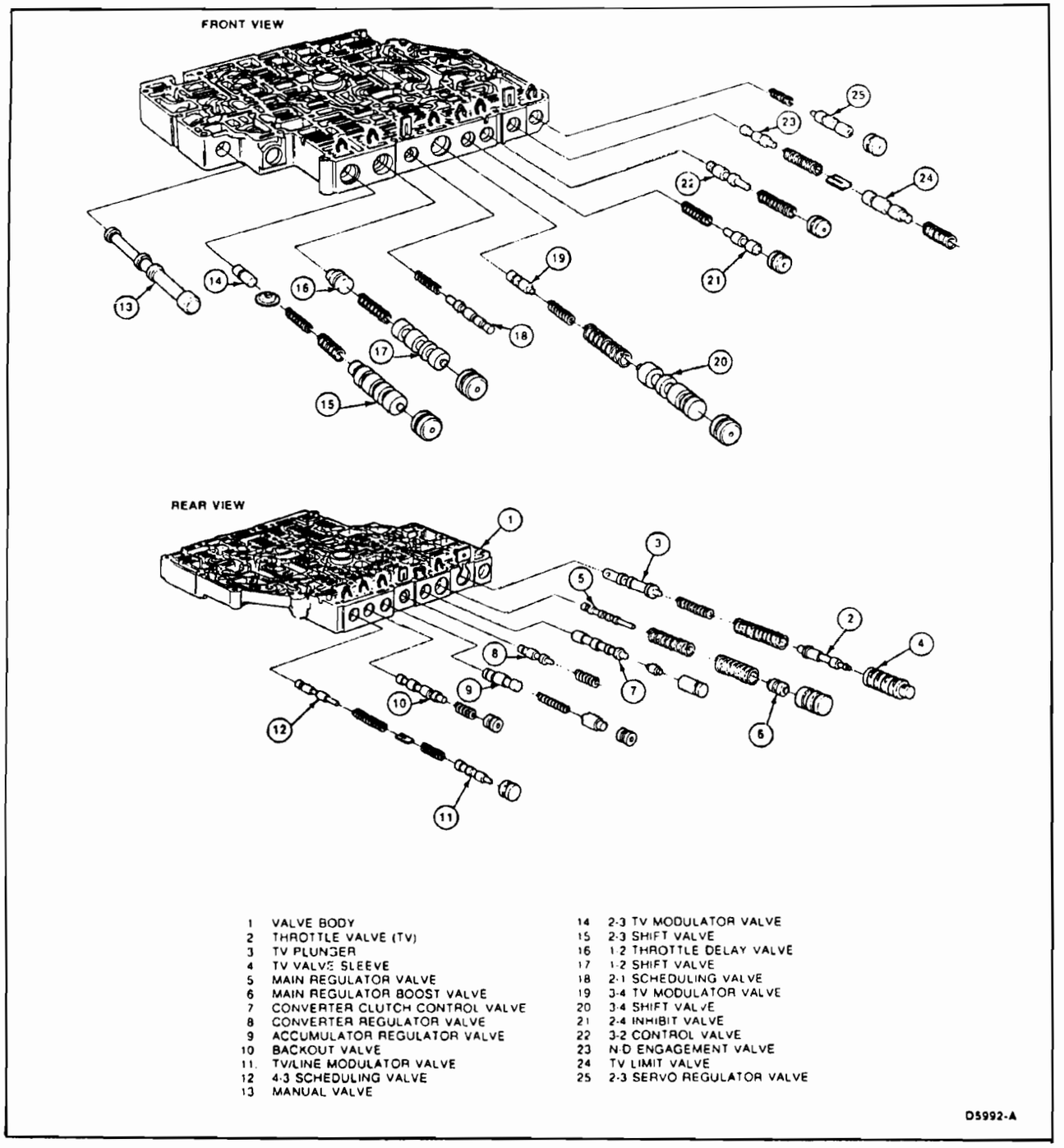

FRONT VIEW
REAR VIEW
1 VALVE BODY
2 THROTTLE VALVE (TV)
3 TV PLUNGER
4 TV VALVE SLEEVE
5 MAIN REGULATOR VALVE
6 MAIN REGULATOR BOOST VALVE
7 CONVERTER CLUTCH CONTROL VALVE
8 CONVERTER REGULATOR VALVE
9 ACCUMULATOR REGULATOR VALVE
10 BACKOUT VALVE
11 TV/LINE MODULATOR VALVE
12 4-3 SCHEDULING VALVE
13 MANUAL VALVE
14 2-3 TV MODULATOR VALVE
15 2-3 SHIFT VALVE
16 1-2 THROTTLE DELAY VALVE
17 1-2 SHIFT VALVE
18 2-1 SCHEDULING VALVE
19 3-4 TV MODULATOR VALVE
20 3-4 SHIFT VALVE
21 2-4 INHIBIT VALVE
22 3-2 CONTROL VALVE
23 N-D ENGAGEMENT VALVE
24 TV LIMIT VALVE
25 2-3 SERVO REGULATOR VALVE
D5992-A

Figure 1

FORD - AXOD

SHUDDER ON 1-2 UPSHIFT
DELAYED OR HARSH UPSHIFTS

COMPLAINT: NO. 1. A "Shudder" during a 1-2 upshift at moderate to heavy throttle after cleaning the valve body. The transmission will perform normally at light throttle openings.

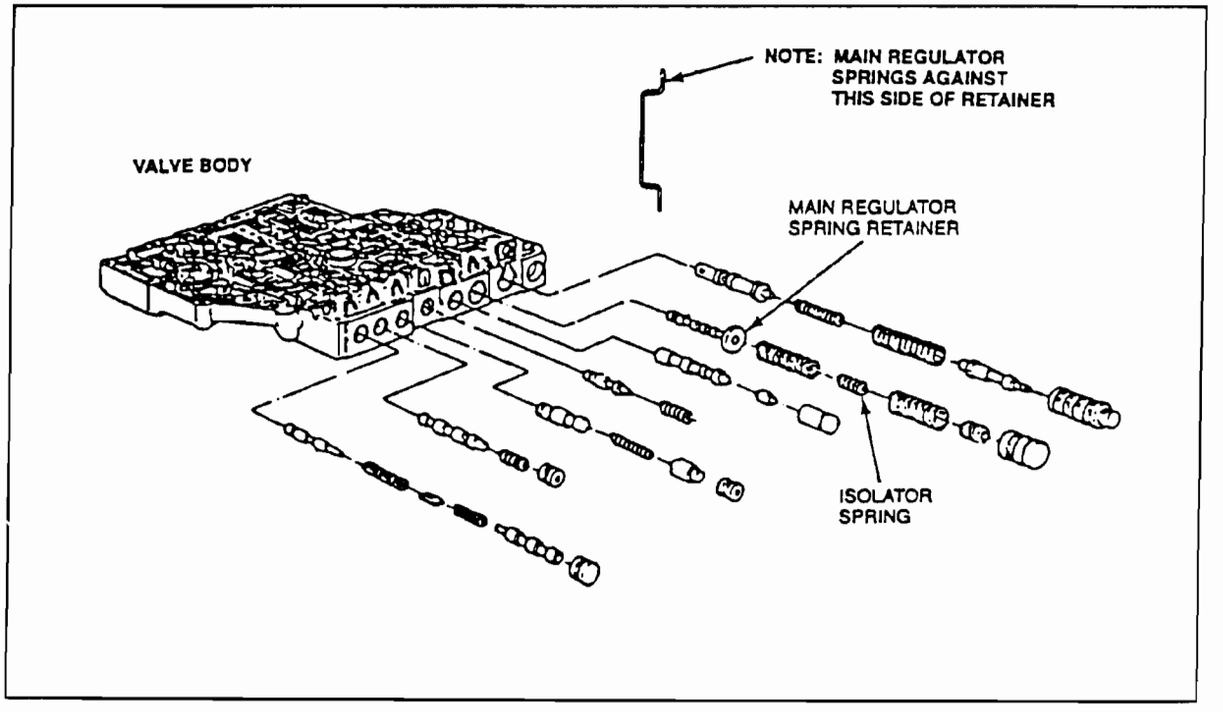
NO. 2. Delayed and/or harsh upshifts after cleaning the valve body.

CAUSE: NO. 1. A "Shudder" during a 1-2 upshift will occur if the main pressure regulator "Isolator" spring is not installed after cleaning the valve body (See Figure 1). This is caused by fluctuations in main line pressure at the time of the 1-2 shift.

NO. 2. Harsh and/or delayed upshifts can be caused by the pressure regulator spring retainer being installed backwards. This will create high main line pressure (See Figure 1).

CORRECTION: NO. 1. Insure that all three (3) pressure regulator springs are re-installed in the valve body regulator bore (See Figure 1).
1. Main Pressure Regulator Spring (Largest Diameter).
2. Main Regulator Boost Spring (Medium Diameter).
3. Main Regulator Isolator Spring (Smallest Diameter).

NO. 2. Insure that the main regulator spring retainer is installed in the proper direction (See Figure 1). The retainer is very similar to the one used in the AOD valve body, but is installed in the opposite direction of the AOD.


NOTE: MAIN REGULATOR SPRINGS AGAINST THIS SIDE OF RETAINER
VALVE BODY
MAIN REGULATOR SPRING RETAINER
ISOLATOR SPRING

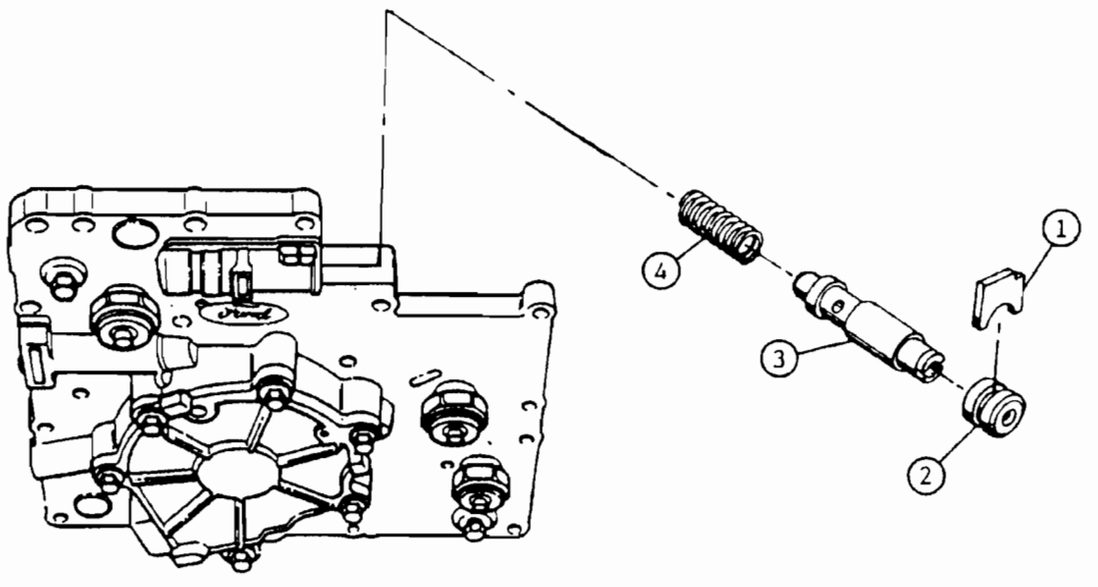
FORD AXOD
SOFT 1-2 AND 2-3 SHIFTS

COMPLAINT: Soft or mushy 1-2 shift and/or 2-3 shift.

CAUSE: The cause may be a lack of oil volume to the intermediate and/or direct clutch packs.

CORRECTION: FOR SOFT 1-2 SHIFT:
Replace the 1-2 capacity modulator valve spring with the Red spring manufactured by Shift Technology Products (Part # K006). The kit also comes with a new style bore plug retaining clip. Assemble into the oil pump as shown in Figure 1.

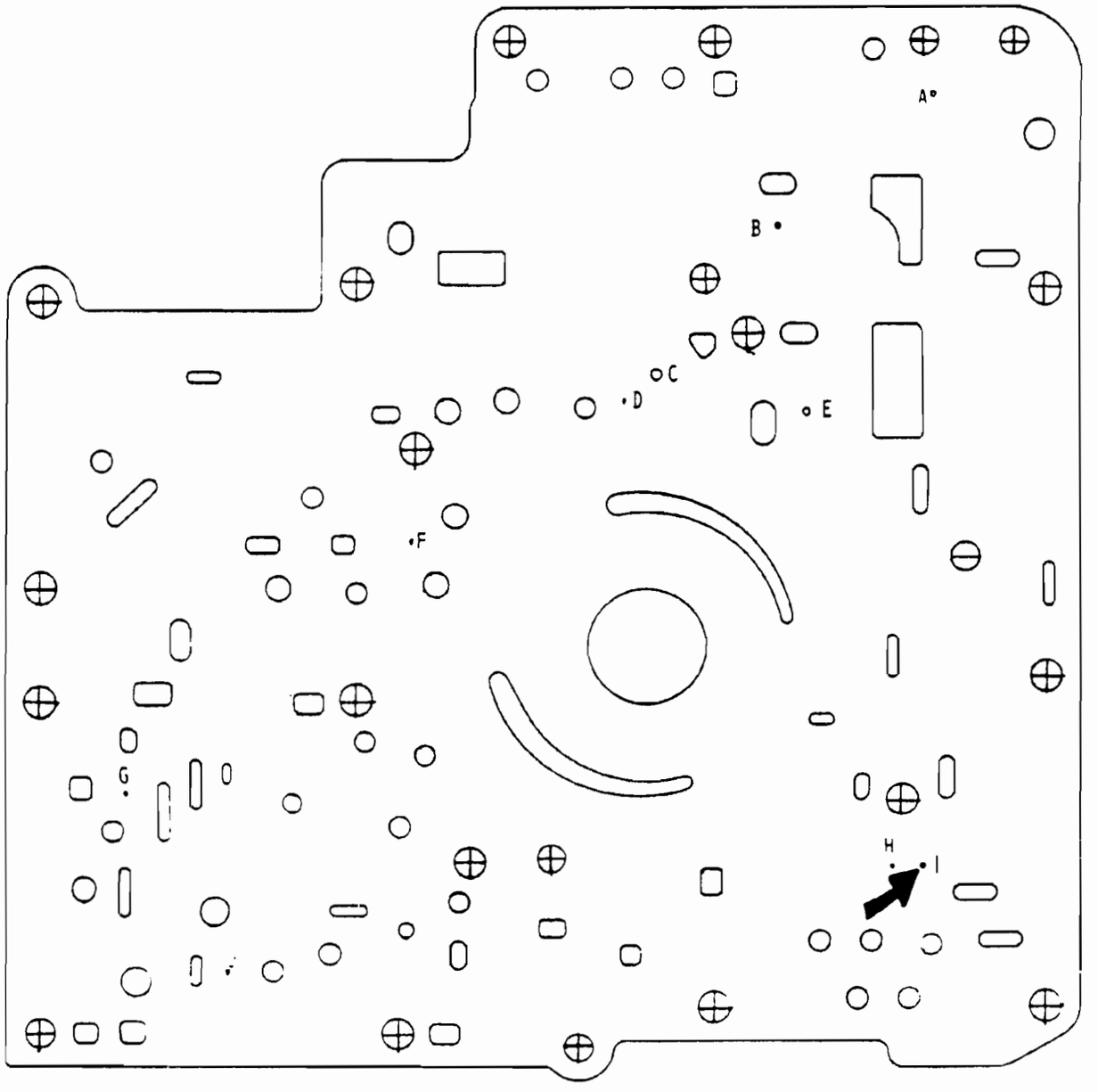
FOR SOFT 2-3 SHIFT:
Drill the direct clutch feed passage in the oil pump spacer plate, hole marked "I", out to .093" as shown in Figure 2.



1 NEW STYLE RETAINING CLIP.
2 1-2 CAPACITY MODULATOR VALVE BORE PLUG.
3 1-2 CAPACITY MODULATOR VALVE.
4 1-2 CAPACITY MODULATOR VALVE SPRING.

Figure 1

AXOD PUMP PLATE



ENLARGE HOLE INDICATED BY ARROW TO .093" FOR FIRMER 2-3 SHIFT.

Figure 2

FORD AXOD-E

COMPLAINT: NO MOVEMENT OR SLIPS FORWARD & REVERSE WHEN HOT.

CAUSE: CRACKED FORWARD CLUTCH PISTON. PROCEDURE FOR CHECKING PISTON IS SHOWN IN FIGURE 1.

CORRECTION: REPLACE PISTON WITH PART NUMBER F1DZ-7A262-A.

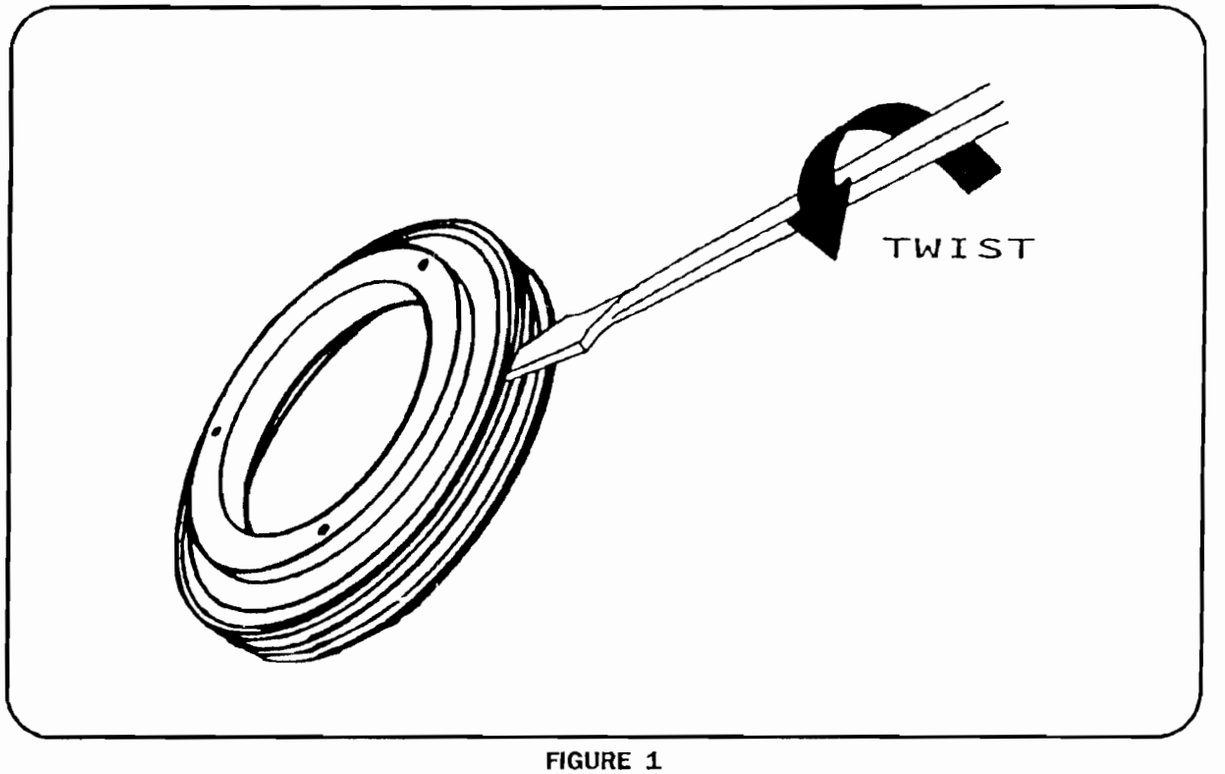


FIGURE 1

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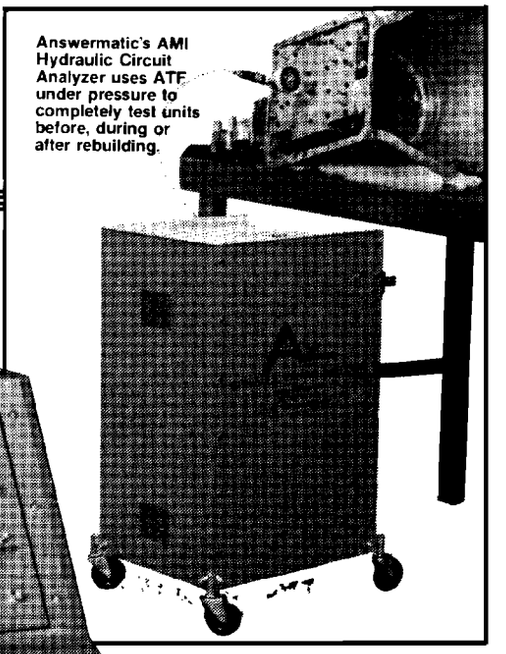
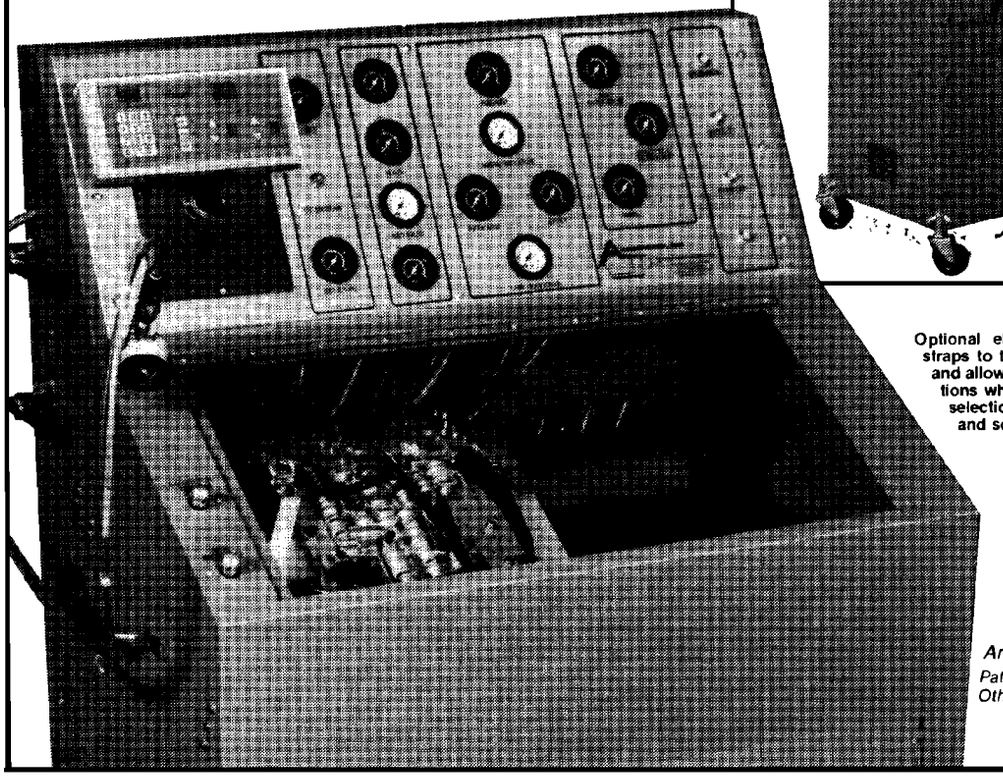


Answermatic's AMI Hydraulic Circuit Analyzer uses ATF under pressure to completely test units before, during or after rebuilding.



Optional electronic portable tester straps to the sun visor of a vehicle and allows monitoring of key functions while driving. Features gear selection, line pressure control and solenoid ampere's display.

Answermatic®
Patent #4809544, 4998437. Other patents pending.

FORD - AODE/4R70W

ENGAGEMENT CONCERNS AND/OR EARLY OR LATE SHIFT PATTERNS

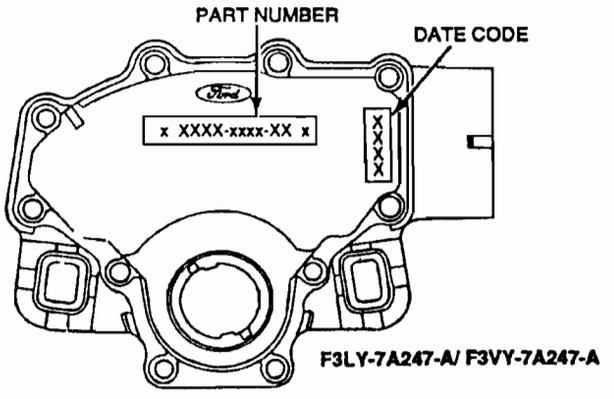
COMPLAINT: Some 1993 Crown Victoria, Grand Marquis, Mark VIII, and Town Cars may exhibit soft or harsh engagement and/or early or late shift pattern complaints.

CAUSE: The cause may be, internal contamination of the Manual Lever Position Sensor (MLPS).

CORRECTION: Replace the MLPS with a revised service level sensor that is more resistant to internal contamination (See Figure 1).
NOTE: WHEN REPLACING THE MLPS ON THE AODE/4R70W TRANSMISSION FOR ANY REASON, DO NOT USE MLP SENSORS WITH DATE CODES OF 2J21 TO 2L06.
The date code is stamped on the outer cover of the MLPS, as shown in Figure 1. Use the service part numbers listed below.

SERVICE INFORMATION: 93-17-8

Manual Lever Position Sensor
(Crown Victoria, Grand Marquis, Town Car) F3VY-7A247-A
Manual Lever Position Sensor
(Mark VIII) F3LY-7A247-A



BUILD DATE CODES					
2 J 21 — YEAR MONTH DAY	YEAR CODE	MONTH CODE			
	1991 – 1	JAN– A	APR–D	JUL–G	OCT–K
	1992 – 2	FEB– B	MAY–E	AUG–H	NOV–L
	1993 – 3	MAR–C	JUN–F	SEP –J	DEC–M
THERE IS NO LETTER "I" IN THE DATE CODE.					

Figure 1

FORD - AOD-E

NEW PCM CALIBRATIONS FOR 1992 MODELS

COMPLAINT: Some 1992 Crown Victoria and Grand Marquis (Includes Police) vehicles may display one or more of the following complaints:

- O "Groaning" or "Drumming" noise;
  This condition occurs when the vehicle is in overdrive operating in 4th gear between 34 and 42 MPH (55-68 KmH).
- O 4-3 coast tip-in bump or jerk;
  This concern occurs during 4-3 coasting downshifts. When the accelerator pedal is depressed, while coasting in 4th gear, a drive line "Bump" or "Jerk" may be felt.
- O Extended shift during acceleration;
  This occurs during acceleration when the accelerator is suddenly released. Normal torque converter clutch disengagement may be observed as an increase in engine speed.
- O Occasional firm 3-4 shift;
  This condition is caused by the torque converter clutch engaging prior to the 3-4 shift being completed.

CAUSE: These concerns may be caused by the operating strategy of the Powertrain Control Module (PCM).

CORRECTION: Replace the existing PCM with a new module which has a revised shift and converter clutch operating strategy, using the part numbers and Calibration Numbers listed below.

YOU MUST MATCH THE CALIBRATION NUMBER TO THE PART NUMBER!

Calibration number is found on a white sticker usually located on end of the left door or the left door jam.

SERVICE INFORMATION: 93-3-13

Powertrain Control Module (Calibration 2-18F-ROO)	F2PZ-12A650-RA
Powertrain Control Module (Calibration 2-18G-ROO)	F2PZ-12A650-SA
Powertrain Control Module (Calibration 2-18H-ROO)	F2PZ-12A650-TA
Powertrain Control Module (Calibration 2-18I-ROO)	F2PZ-12A650-UA
Powertrain Control Module (Calibration 2-18M-ROO)	F2PZ-12A650-VA
Powertrain Control Module (Calibration 2-18N-ROO)	F2PZ-12A650-XA

FORD - AODE/4R70W

LINE PRESSURE INSTABILITY

COMPLAINT: Line pressure instability created by lack of EPC Solenoid function and can create a variety of different concerns including soft shifts, soft engagements and repeated transmission clutch and band failures.

CAUSE NO. 1: Solvent or other cleaning solutions, which are used to clean the transmission case are being used while the EPC Solenoid is still mounted in the case. Contamination from the case is being washed into the case and EPC Solenoid assembly.

CAUSE NO. 2: The EPC Solenoid Retaining Bracket not installed back in the proper position to retain the EPC Solenoid into the case.

CAUSE NO. 3: Moisture or water contamination that has gathered in the vehicle wiring harness connector at the case connector on the passenger side of the vehicle.

CAUSE NO. 4: Defective and/or contaminated EPC Solenoid.

CORRECTION NUMBER 1:

The EPC Solenoid MUST be removed from the transmission case assembly prior to cleaning and washing the case with solvent, or in any power cleaning machine. The manual shift lever must be removed from the case to remove the EPC Solenoid. If this is not done, replace the EPC Solenoid with a new one, OEM part number F2VY-7G383-A.

CORRECTION NUMBER 2:

The EPC Solenoid Retaining Bracket must be installed with the "Fork" of the bracket securely over the body of the EPC Solenoid and the bracket secured with valve body bolt in the location shown in Figure 1. The EPC Solenoid may have to be repositioned slightly for "Fork" to engage in the proper position (See Figure 1).

CORRECTION NUMBER 3:

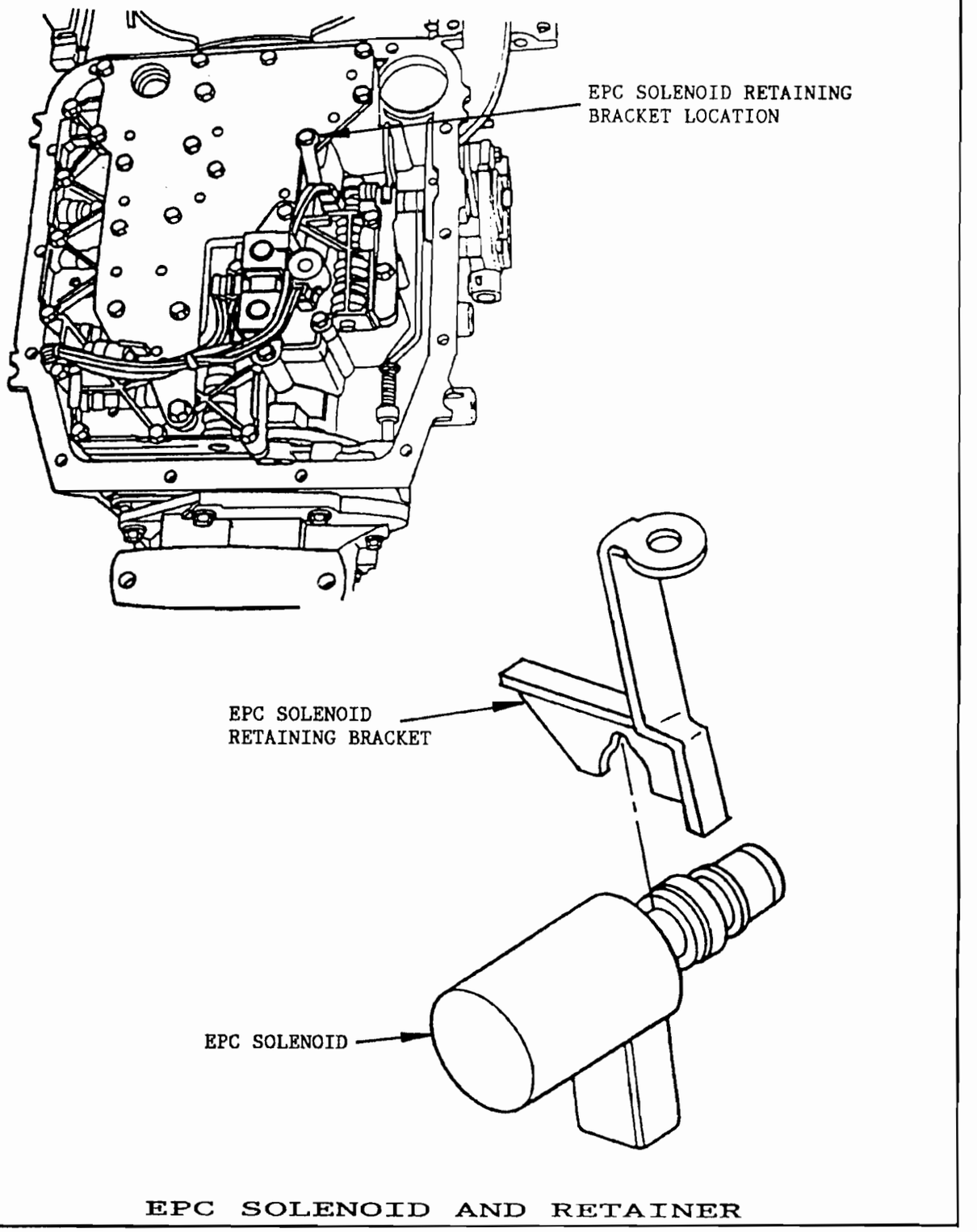
ALWAYS blow the vehicle wiring harness connector from both sides with compressed air to remove any moisture that may have accumulated. Also use a small amount of electrical grease, OEM part number F2AZ-19584-A, on the connector cavities to prevent corrosion.
IT MUST BE A NON-CONDUCTIVE GREASE.

CORRECTION NUMBER 4:

Replace the EPC Solenoid with OEM part number F2VY-7G383-A, and insure retaining bracket is secured in proper position as shown in Figure 1. Manual shift linkage must be removed from case to replace the solenoid.

SERVICE INFORMATION:

EPC Solenoid (All Models) F2VY-7G383-A
Electrical Grease (Non-Conductive) F2AZ-19584-A



EPC SOLENOID AND RETAINER

Figure 1

ROSTRA

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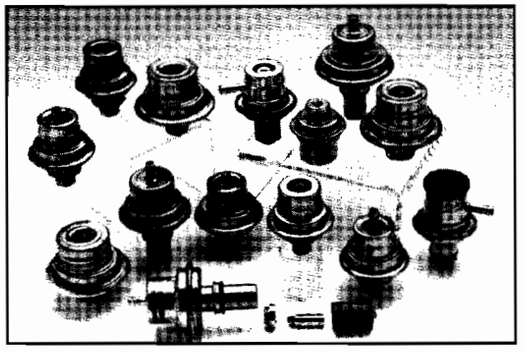

Rostra Modulators are recognized as the highest quality in our industry. Complete and universal, problem solving designs, function perfectly first time. . . every time! When quality counts, no one matches Rostra!

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- **AODE ADAPTER CABLE (works with S-450 module)**
- **1993 & up AXODE ADAPTER CABLE (works with S-450 module)**
- **1993 & up Toyota cables (works with S-150 module)**

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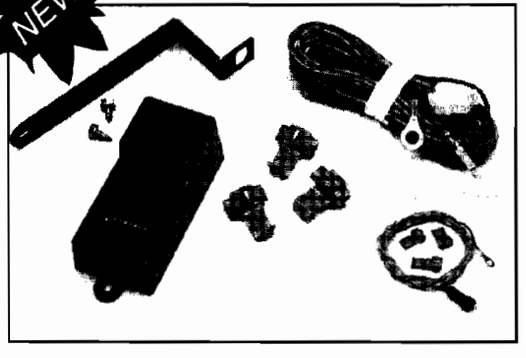
NEW



Rostra proudly introduces the LU-1 lockup delay module. The LU-1 is an electronic device that delays lockup until a preset speed is reached. The unit may be installed on any lockup system including all GM, Ford A4LD, AXOD, and Chrysler lockup systems. Plus with Rostra's Adapter Harness 250-4233 coverage is expanded to the Ford E40D. The LU-1 eliminates common problems such as early lockup, lockup hunting and lockup on top of shifting. Installation is easy. Just connect the appropriate color coded wires as shown in the illustrated instruction manual and set your desired lockup speed! All the necessary hardware is included too! Our free technical support is available to assist in your installation.

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TRANSMISSION—AOD—NO 3-4 UPSHIFT OR SLIPPING 4TH GEAR—DIAGNOSTIC INFORMATION

ISSUE: A no 3-4 upshift condition or a slipping 4th gear may result from

- Direct clutch checkball leaking
- Missing plug in end of output shaft
- Case bore wear
- Leakage at O/D band servo piston and/or case bore
- Seal leakage at 3-4 accumulator piston
- Blocked hydraulic circuit condition
- Improper valve body attaching bolt torque
- Leaking governor circuit
- Torque converter damper/hub malfunction

ACTION: Road test, diagnose and repair the transmission as required. Refer to the following diagnostic and repair procedure for service details.

PRELIMINARY CHECKS/INFORMATION

1. Road test the vehicle to verify the customer complaint. A no 3-4 upshift is characterized by staying in 3rd gear. A slipping 4th gear is characterized by engine cut-loose on 3-4 upshifts and limited or no 4th gear drive capability.
2. Check TV rod/cable to see if bent, kinked or sticking. Repair or replace rod/cable as required.
3. Check TV linkage (could be misadjusted long). On older models, bent, sticking or misadjusted TV Linkage will not properly synchronize with the carburetor/throttle body lever at the time a 3-4 upshift should occur.
4. Check control pressure and throttle pressure to identify that they are within specifications. Use the following guide pressure specifications:

GUIDE PRESSURE SPECIFICATIONS *		
GEAR RANGE	IDLE	W.O.T.
P,N,O/D,D,L Reverse	55-65 PSI 75-95 PSI	175-205 PSI 250-300 PSI

* Pressures are typical with TV pressure adjusted to specification per Service Manual (approx 32 psi using gauge block). Refer to applicable model-year AUTOMATIC TRANSMISSION SPECIAL SPECIFICATIONS ISSUE for exact specifications, if required.

DIRECT CLUTCH PRESSURE TEST

Leakage in the direct clutch circuit is usually caused by a leaking checkball in the direct clutch piston. Replacement of the direct clutch piston will alleviate this condition. However, since other factors can be involved, the following additional checks/verifications will aid in making a comprehensive diagnosis of no 3-4 upshift and/or no 4th gear symptoms.

The direct clutch pressure test outlined below will diagnose a low pressure condition or leakage in the direct clutch circuit. A difference of 15 psi or more between direct clutch pressure and line pressure (read at the forward clutch pressure tap) will prevent a 3-4 upshift.

1. Attach 0-300 psi (0-2068 kPa) pressure gauges to the forward clutch and to the direct clutch pressure tap, Figure 1.
   a. Gauge accuracy must be capable of distinguishing a 15 psi (110 kPa) difference (If this test is done in conjunction with a control pressure test, pressure gauges will be attached to all pressure taps).
   b. Connect sufficient flexible hose to be able to read the gauges inside the vehicle.

CAUTION: PRESSURE GAUGES AFFECT THE SHIFT QUALITY OF THE TRANSMISSION. DO NOT ACCELERATE OR DECELERATE RAPIDLY WHILE PRESSURE GAUGES ARE ATTACHED. TRANSMISSION FAILURE MAY RESULT.

2. Drive the vehicle. When pressure is applied to the direct clutch, note the difference between line pressure (read at the forward clutch pressure tap) and direct clutch pressure (read at the direct clutch pressure tap).
3. If the difference in pressure is less than 15 psi (110 kPa), the direct clutch circuit is OK.
4. If the difference is greater than 15 psi (110 kPa), there could be a leak in the direct clutch pressure circuit.
   a. The gauges on the forward and direct clutch pressure taps can be switched to confirm that gauge calibration difference is not the cause.
   b. If a 15+ psi (110 kPa) pressure differential can be confirmed, proceed to the "DIAGNOSTIC PROCEDURE NO. 1" (leakage indicated), or to "DIAGNOSTIC PROCEDURE NO. 2" (slips in 4th), if applicable.
   c. If a 15+ psi (110 kPa) pressure differential can not be confirmed, proceed to "DIAGNOSTIC PROCEDURE NO. 3" (no leakage indicated).

DIAGNOSTIC PROCEDURE NO. 1 - NO 3-4 UPSHIFT WITH DIRECT CLUTCH PRESSURE DIFFERENCE GREATER THAN 15 PSI (110 kPa) - (indicates leakage in direct clutch circuit)

NOTE: BURNT DIRECT CLUTCH PLATES WILL HELP TO CONFIRM LEAKAGE IN THE DIRECT CLUTCH CIRCUIT. REPLACING ONLY THE PLATES AND NOT FINDING THE CAUSE COULD RESULT IN A REPEAT REPAIR.

1. Check valve body bolt torque. Correct torque is 9-11 N·m (80-97 lb-in).
2. Remove the valve body and check to see if main control gasket is blocking an orifice.
3. Check valve body-to-case mating surfaces for nicks or porosity.
4. Check the direct clutch piston check ball for leakage (inspect check ball for freedom of movement). Improper seating of check ball will cause leakage:
   a. Turn piston upside down (flat side of piston facing you) allowing the check ball to seat in the piston.
   b. Pour a small quantity of solvent over the check ball. If solvent drops past the check ball, replace the piston.
5. Inspect the output shaft feed passages and the cup plug for leakage.
   a. Apply 5-10 psi (34-69 kPa) air to the output shaft feed passages, Figure 2.
   b. If air comes out of the wrong feed passage, replace the output shaft.
6. Check the direct clutch piston seal rings (inner and outer) for leakage.
7. Check all direct clutch output shaft seals for freedom of movement and for metal shavings and burrs between the seal and the output shaft, Figure 2
8. Check the direct clutch cylinder for groove marks on the inner ID of the drum, Figure 3.
   a. Groove marks indicate that the small cast iron rings are turning with the output shaft and grooving the cylinder.

b. Groove marks may also be caused by contamination or burrs in the output shaft seal ring grooves, causing the seal rings to turn with the output shaft.

c. Check the seal ring grooves carefully. replace the output shaft, seal rings and/or cylinder as required, and/or replace the case if the output shaft seal bore is grooved.

DIAGNOSTIC PROCEDURE NO. 2 - SLIPPING IN 4TH GEAR

NOTE: A burnt overdrive band will help to confirm leakage in the overdrive circuit. Replacing only the overdrive band without finding the cause will result in a repeat repair. If the overdrive band is not burnt, the torque converter damper/hub weld may be suspect.

1. Check the overdrive servo cover O-rings and servo piston seal for possible leakage. Replace the O-rings and seal if leakage is evident.
2. Make sure that the overdrive servo cover is not porous:
   a. Coat cover with fluid.
   b. Apply air to overdrive servo apply passage using Servo Piston Remover T80L-77030-B or Transmission Test Plate T82L-7006-A.
   c. Observe to see if air bubbles are present on overdrive servo cover.
3. Check the overdrive servo case apply passage to see if it is blocked (air pressure test). Replace the case if required.
4. Confirm that the overdrive band is seated correctly to the anchor pin.
5. Check the torque converter for damper/hub weld failure by performing the weld check procedure outlined in the Service Manual:
   a. Use Torque Converter Checking Tool T83L-7902-A.
   b. Replace the torque converter if shaft turns more than two (2) degrees, or if there is a grinding noise while applying 68 N·m (50 lb-ft) of torque.
6. Check splines on both ends of the direct drive shaft and in the direct clutch cylinder for damage/wear.

DIAGNOSTIC PROCEDURE NO. 3 - NO 3-4 UPSHIFT WITH DIRECT CLUTCH PRESSURE DIFFERENCE LESS THAN 15 PSI (110 kPa) - (Indicates no leakage in direct clutch circuit)

1. Clean the valve body:
   a. Check for a "sticking" condition at the following valves:
      - Overdrive servo regulator valve
      - 3-4 shift valve
      - 3-4 TV modulator valve
      - Orifice control valve
   b. If any valves are sticking and cannot be free, replace the valve body.
2. Reduce the valve body bolt torque to minimum specification, i.e. 9 N·m (80 lb-in).
3. Check the fit of the governor counterweight on the output shaft. If the fit is sloppy, replace the counterweight.
4. Check the governor-to-output shaft retaining ring to make sure it is properly seated on the output shaft; service as required.
5. Check the last two large seal rings on the output shaft (#9, #10), Figure 2.
   a. The seal rings should move freely on the output shaft.
   b. Check for metal or other contamination or burrs between the seal and the output shaft; replace the seals and/or output shaft as required.
6. Check the seal ring bore at the rear of the case for scoring. Light scoring is permissable, but deep grooving indicates case wear. Replace the case if deep grooving is found, Figure 4.

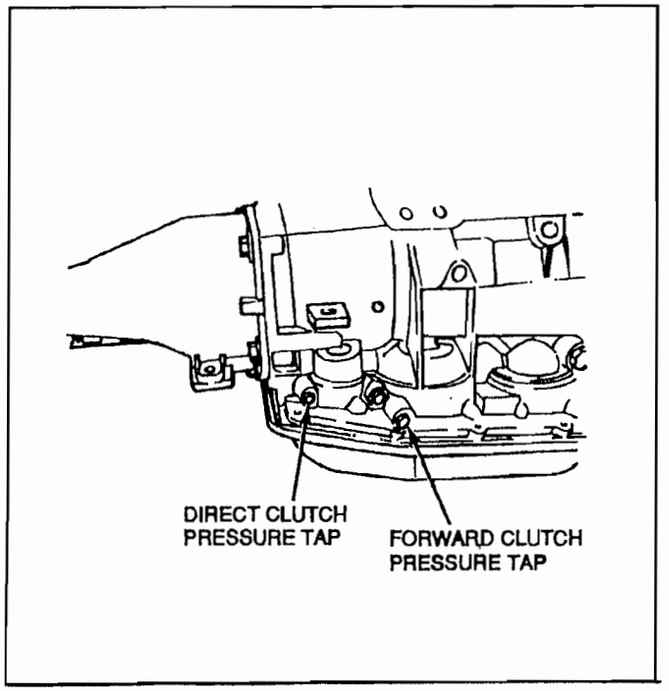


Figure 1

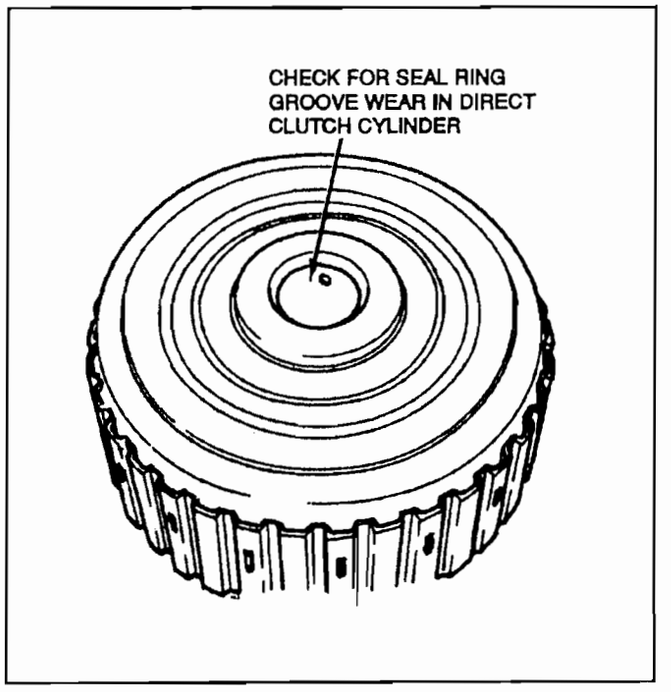


Figure 3

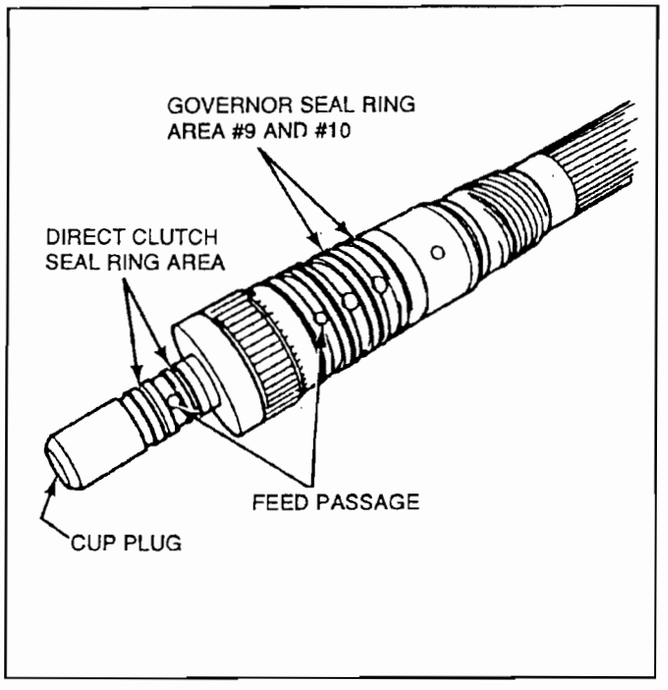


Figure 2

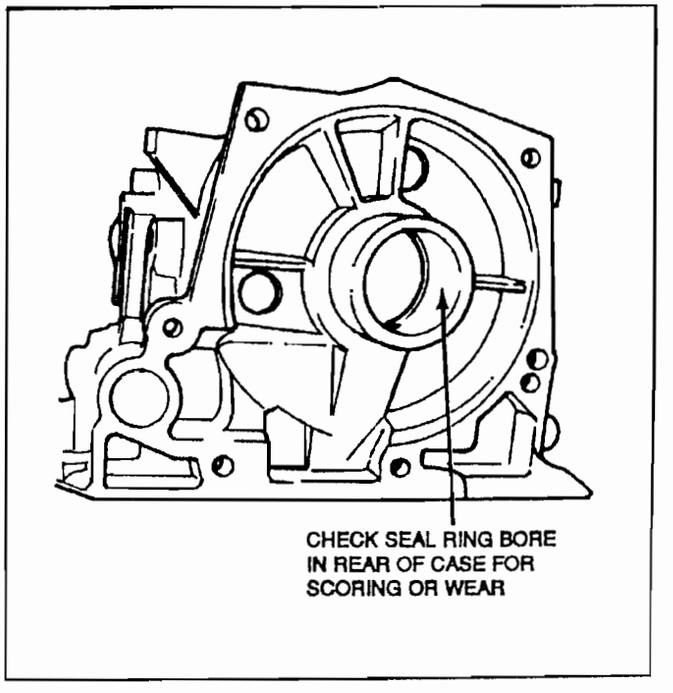


Figure 4

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.

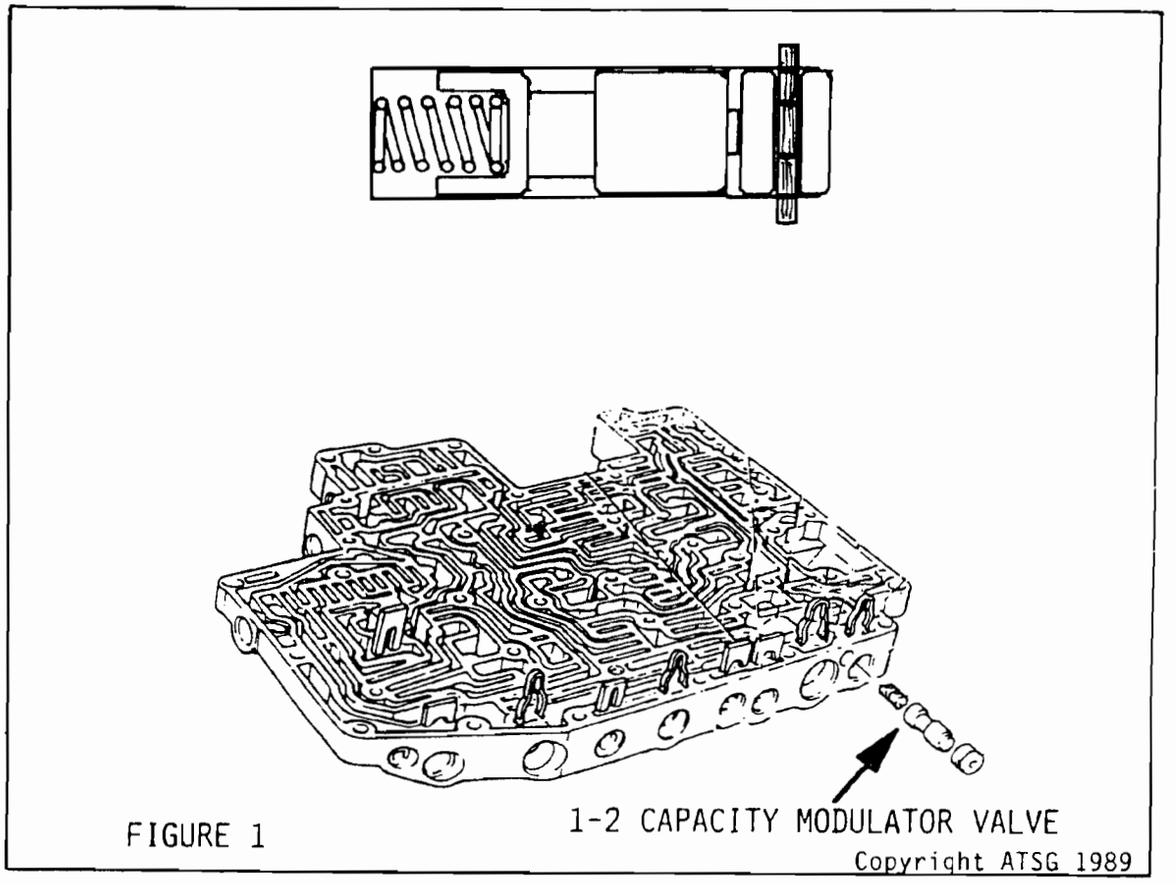


FIGURE 1

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.

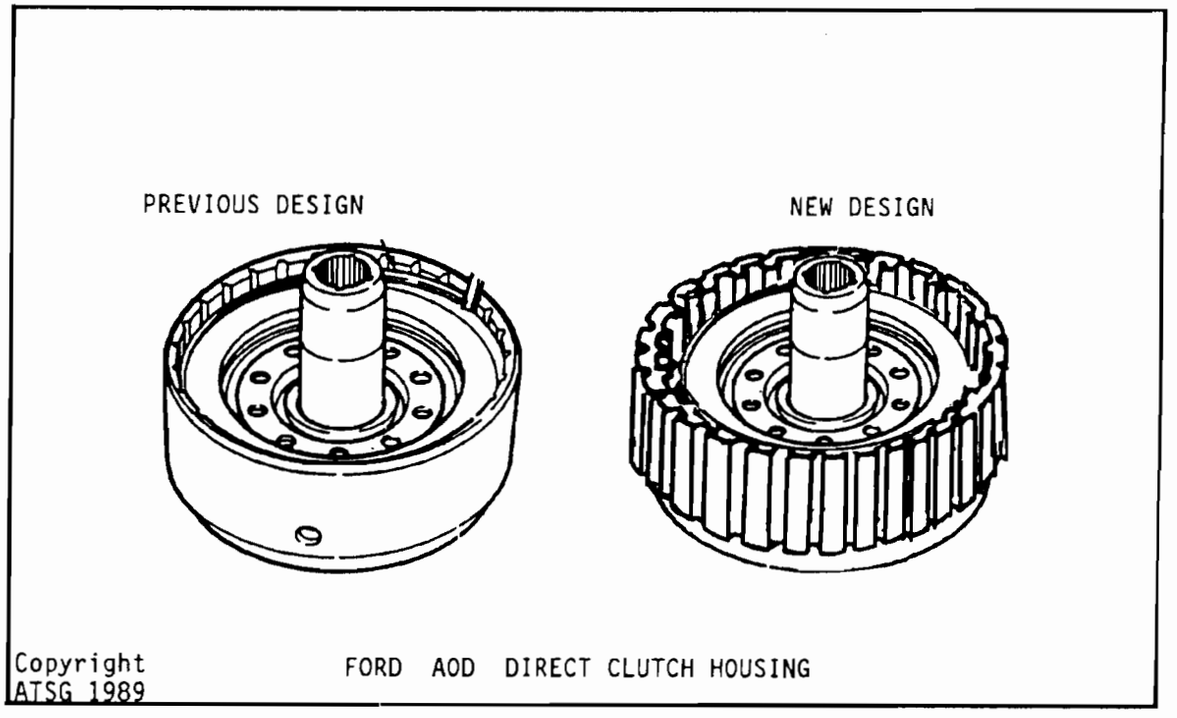


Figure 1

FORD AOD

REPEATED PLANETARY FAILURE

COMPLAINT: Repeated burning of the planetary carrier, reverse sun gear & drive shell and 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 3).

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 asssembly are necessary, refer to figure 39 for removal procedure.

SERVICE INFORMATION:

Spring and ball kit E5AZ-7A205-A

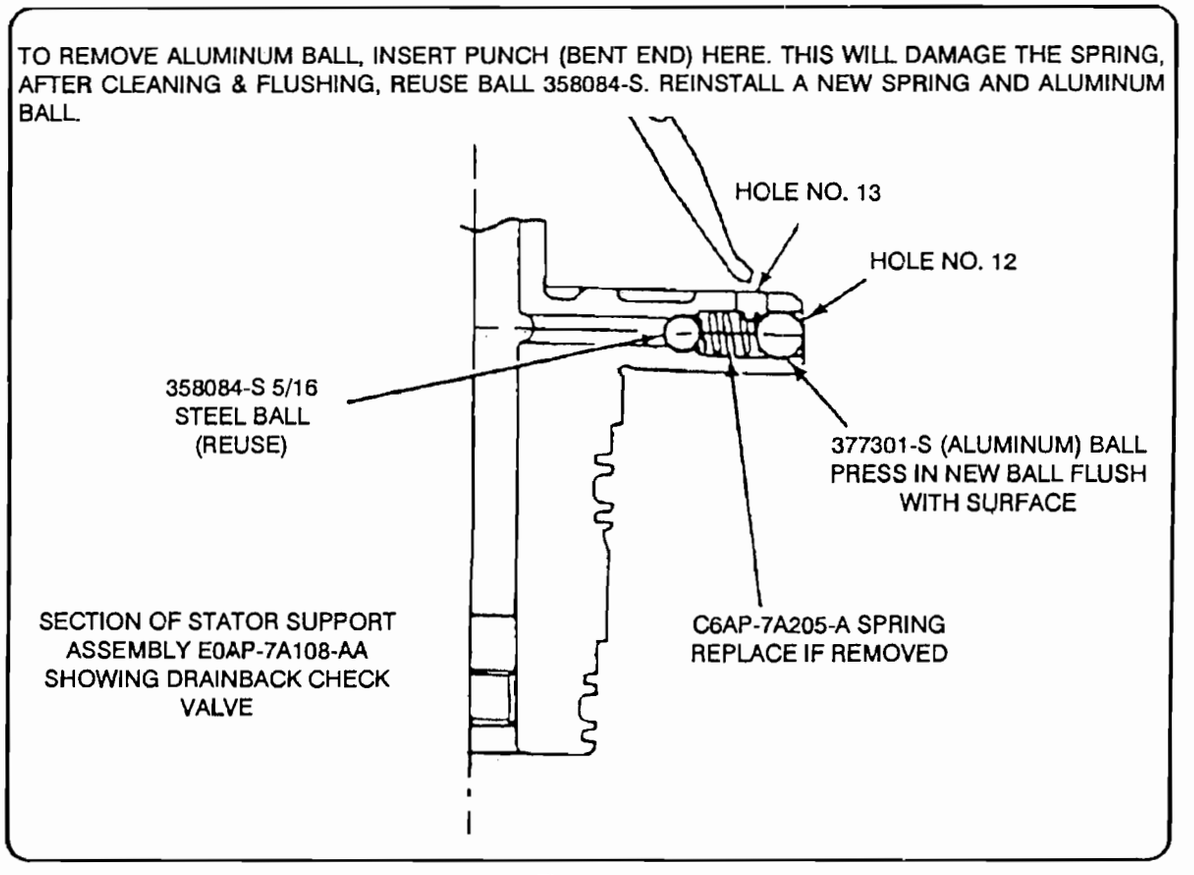


Figure 3

FORD - AOD

NO PASSING GEAR

COMPLAINT: No kickdown or passing gear at any vehicle speeds or any throttle position.

CAUSE: The cause may be the governor mis-assembled with the sleeve installed backwards. Proper installation is with the "Castles" towards the counterweight, as shown in Figure 1.

CORRECTION: Install sleeve with the "Castles" towards the counterweight, as shown in Figure 1.

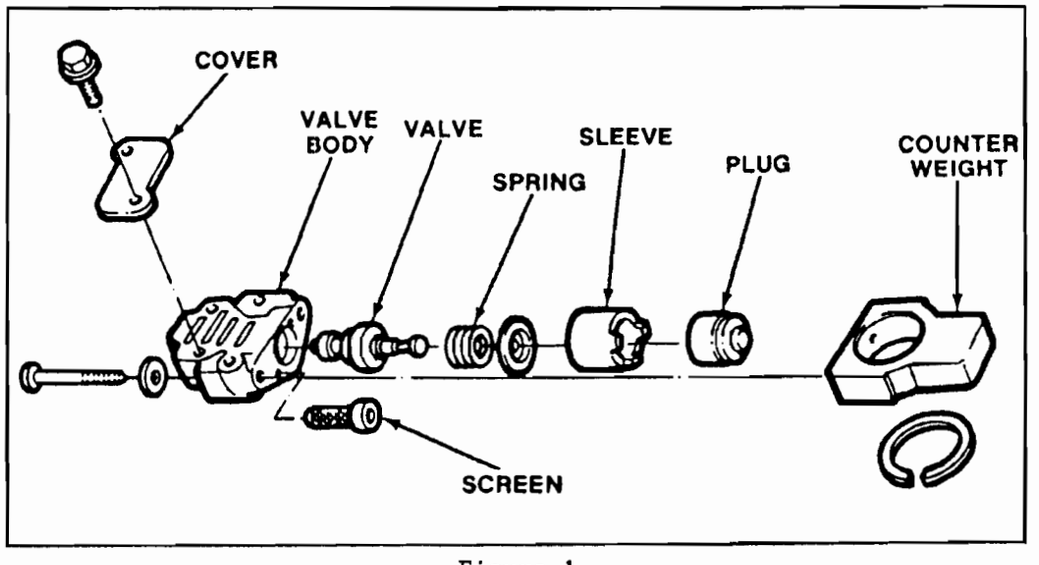


Figure 1

FORD AOD

FLARES OR NEUTRALS INTO OVERDRIVE

COMPLAINT: Cannot get solid shift into overdrive. The shift speed is okay and the throttle pressure is adjusted correctly. Sometimes it seems to neutral into overdrive at light throttle.

CAUSE: The surface area of the overdrive servo is not sufficient to hold the overdrive band on. Because a pressure cutback occurs on the 2-3 shift that lowers the mainline pressure, light throttle pressure may not raise the pressure high enough to overcome all internal leaks and still hold the band around the drum tightly.

CORRECTION: Install a larger overdrive servo. Early units and smaller V-8's used the standard "C" servo to apply the band. High output engines use the **"B" Servo** which provides 30% more band application force and is recommended for stronger 3-4 shifts. Also available is the **"A" Servo** which provides 16% more band application force than the **"B" Servo**. This "A" Servo is especially helpful in high performance and heavy duty applications. When changing the overdrive servo size, it will be necessary to change the servo piston, piston return spring, servo cover and the piston seal. The two cover seals remain the same for all servos. Figure 1 shows a chart with the Ford part numbers for the **"A" and "B" Servo** components.

PART	"B" SERVO	"A" SERVO
SERVO PISTON	E0AZ-7F200-B	E9SZ-7F200-A
RETURN SPRING	E0AZ-7F201-A	E9SZ-7F201-A
SERVO COVER	E0AZ-7D027-D	E9SZ-7D027-A
PISTON SEAL	E0AZ-7D024-B	E9SZ-7D024-A

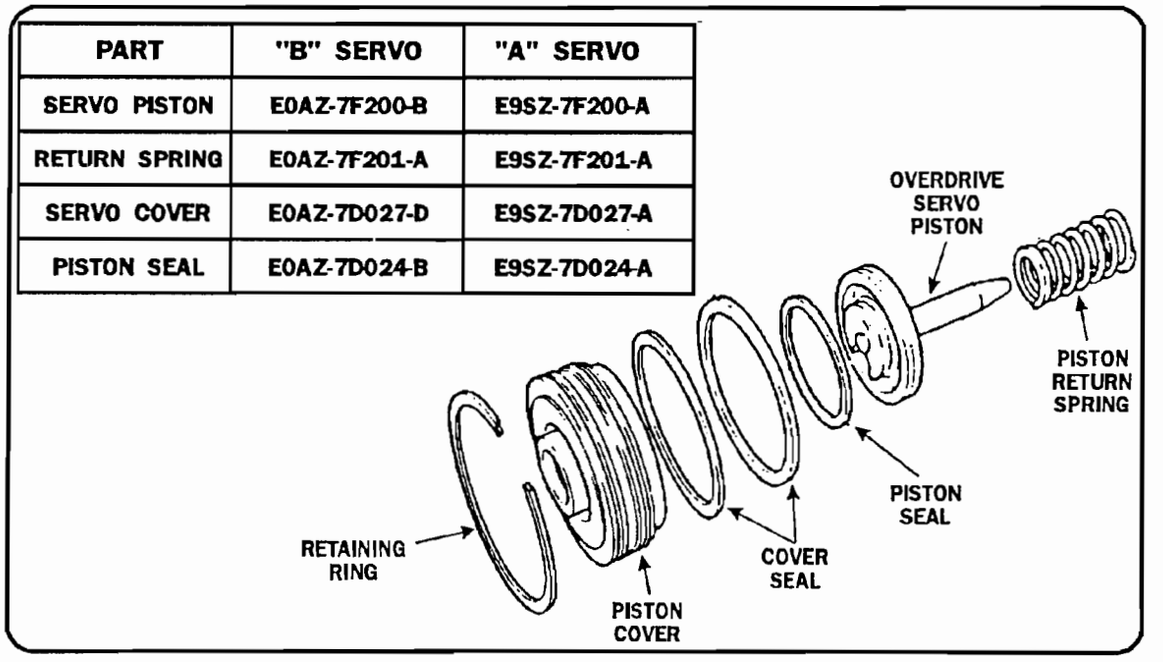
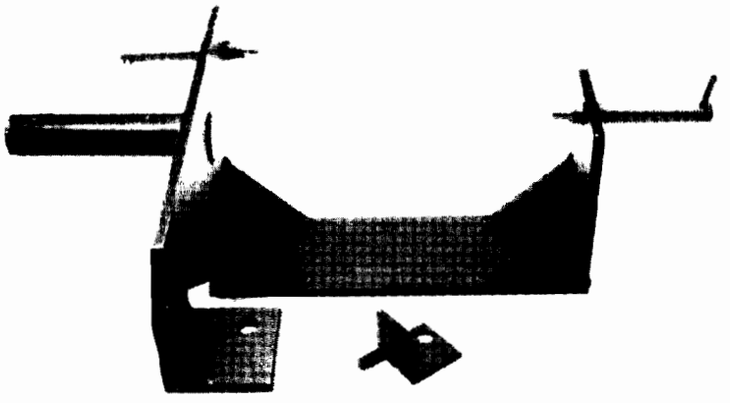
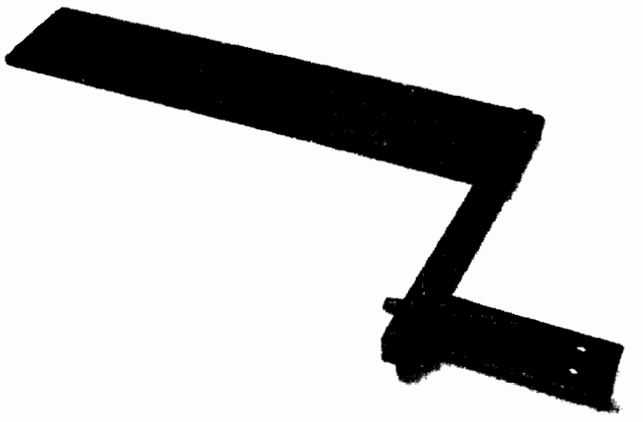


Figure 1.

Can you afford not to have the right tools for today's transmissions?



E4OD
T-2800-F
Holding Fixture



AXOD
T-2409-F
Holding Fixture

The answer is no! Professional rebuilders require professional tools.

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FORD E4OD
HARSH 3-4 SHIFT

COMPLAINT: Harsh 3-4 shift, and/or upon transmission dis-assembly the O.D. clutch retaining ring is dislodged from groove (See Figure 1).

CAUSE: Insufficient snap ring tension.

CORRECTION: Replace snap ring with updated (More Tension) snap ring available under OEM part number FOTZ-7A527-A.

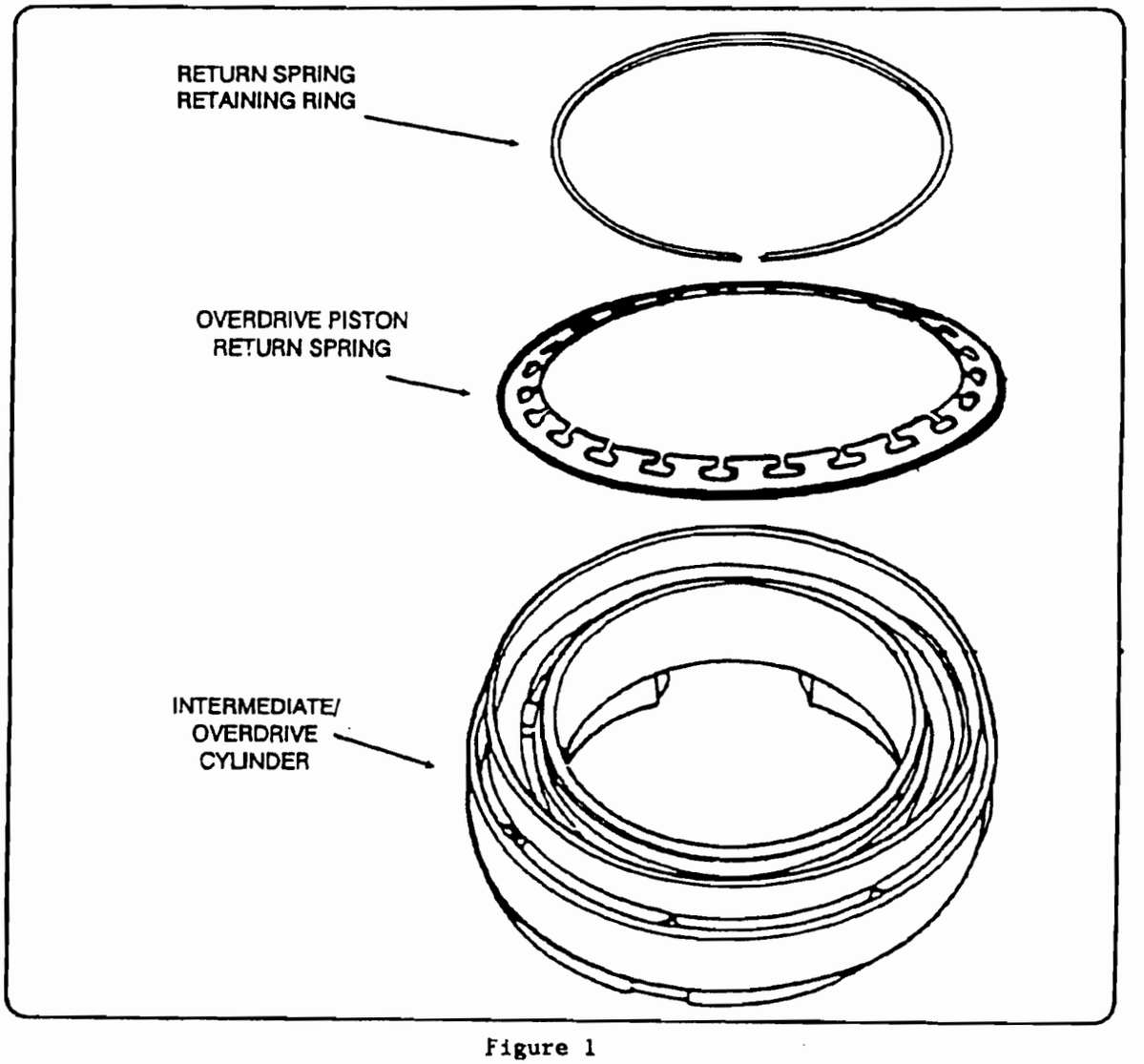


Figure 1

FORD E4OD
CONVERTER CLUTCH SHUDDER

COMPLAINT: Soft converter clutch engagement or shudder on hard acceleration

CAUSE: Low converter pressure and/or limited ability of the converter exhaust orifice to control converter clutch apply.

CORRECTION: Replace the converter regulator valve spring in the pump cover with a "SGSF E4OD" shudder fix spring (see figure 1), Drill the converter clutch exhaust orifice to .076 in. (see figure 1).

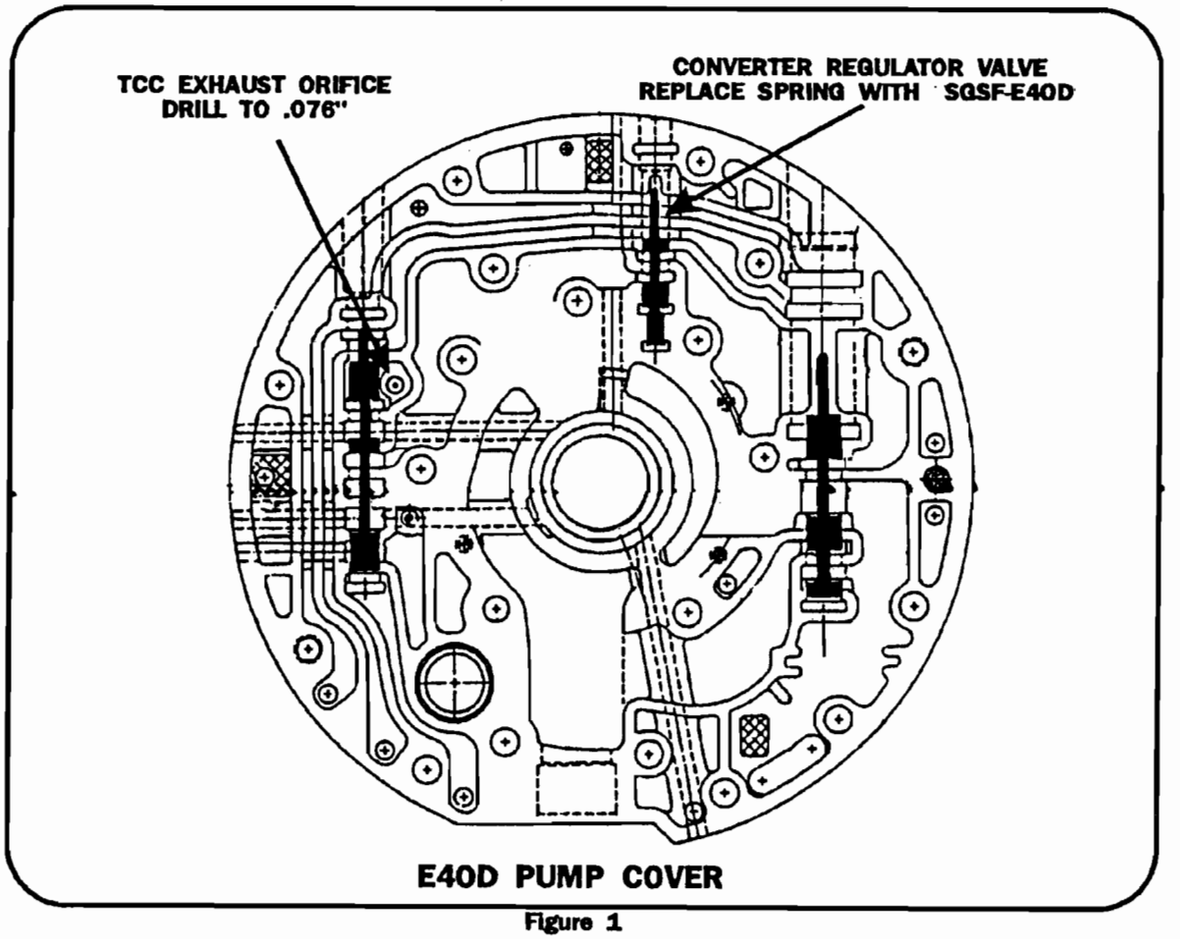


Figure 1

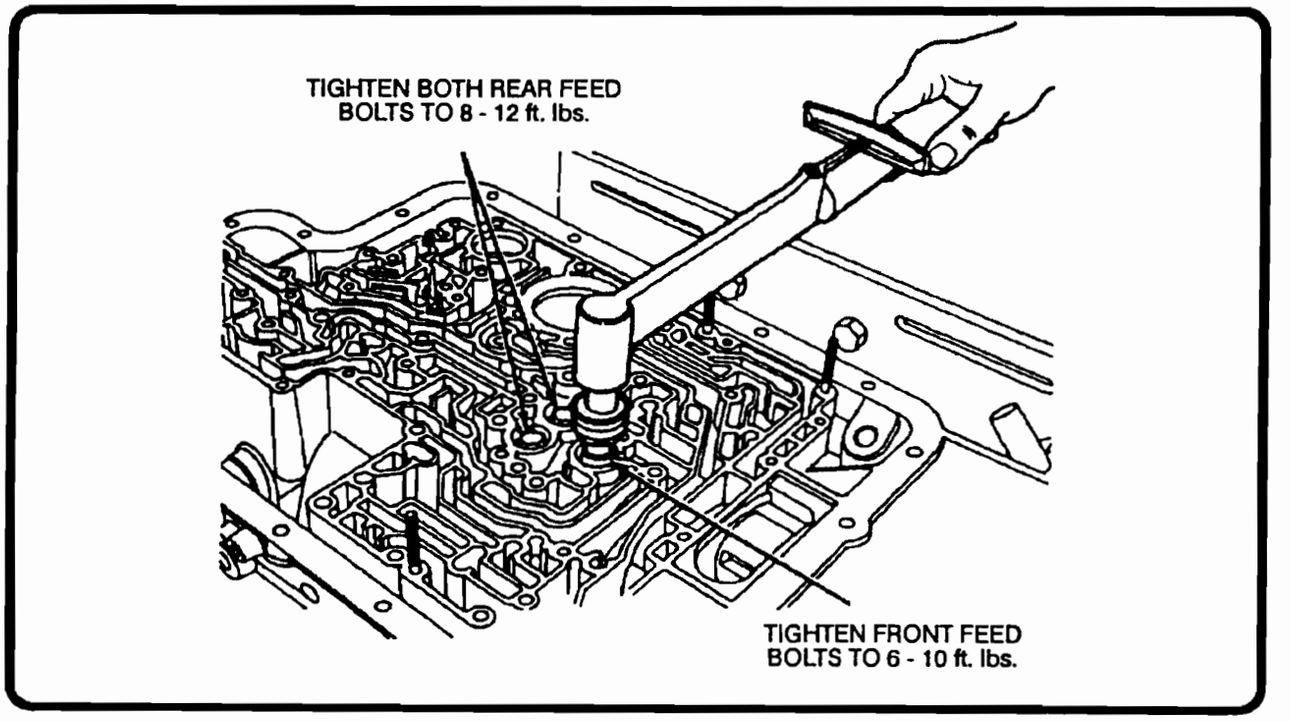
FORD - E4OD

1-2 SLIDE, 2-3 FLARE, OR SLIPS FORWARD AFTER REBUILD

COMPLAINT: *After rebuild, slips or delays in forward when hot, slides on the 1-2 shift, , or flares up on the 2-3 shift, and burns clutches especially when warm.*

CAUSE: *Over tightened center support to case bolts. This will cause leaks across oil feed passages to the clutches.*

CORRECTION: *Remove valve body and retorque center support bolts to 8 to 10 ft. lbs. In cases where distortion has been extreme, it may be necessary to use two gaskets between the spacer plate and the case.*



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 seperate 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.

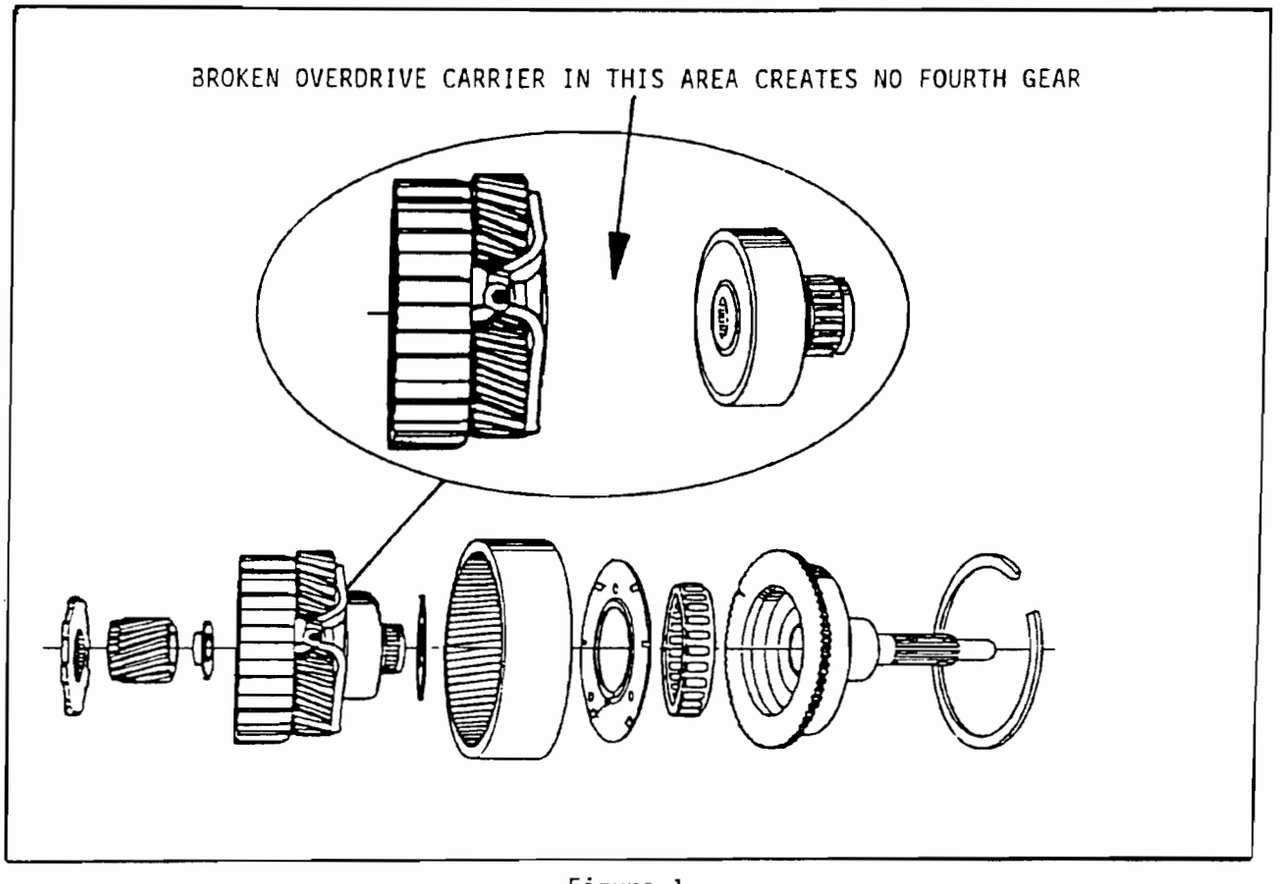


Figure 1

FORD A4LD
BLOWING FLUID OUT THE BREATHER

COMPLAINT: BOLWING FLUID OUT THE BREATHER VENT

CAUSE: ONE POSSIBLE CAUSE IS GOVERNOR RINGS LEAKING CAUSING PRESSURE TO BUILD UP IN THE CASE BLOWING FLUID OUT THE VENT.

CORRECTION: CHECK GOVERNOR BORE (FIGURE 1) FOR RING GROOVES, IF RING GROOVES ARE PRESENT REPLACE CASE OR INSTALL A SLEEVE KIT. ALSO CHECK GOVERNOR RINGS FOR DAMAGE (FIGURE 2) REPLACE IF NECESSARY.

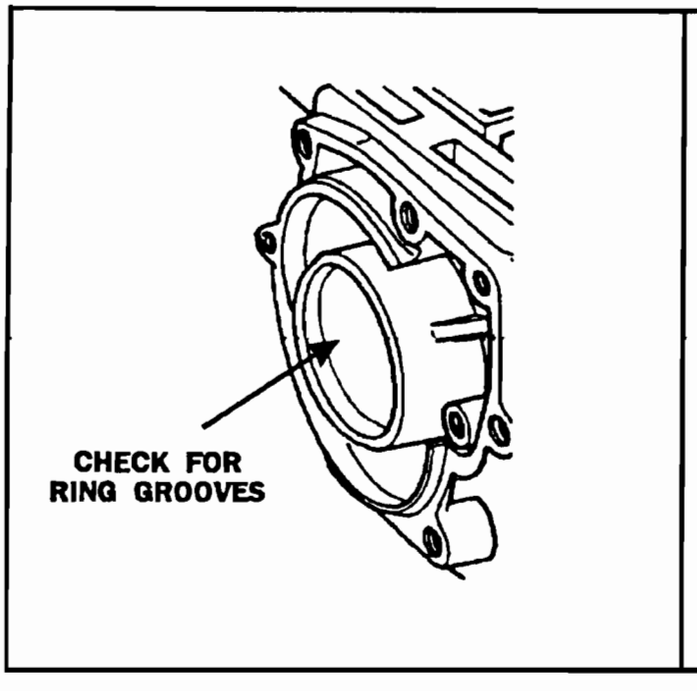


FIGURE 1

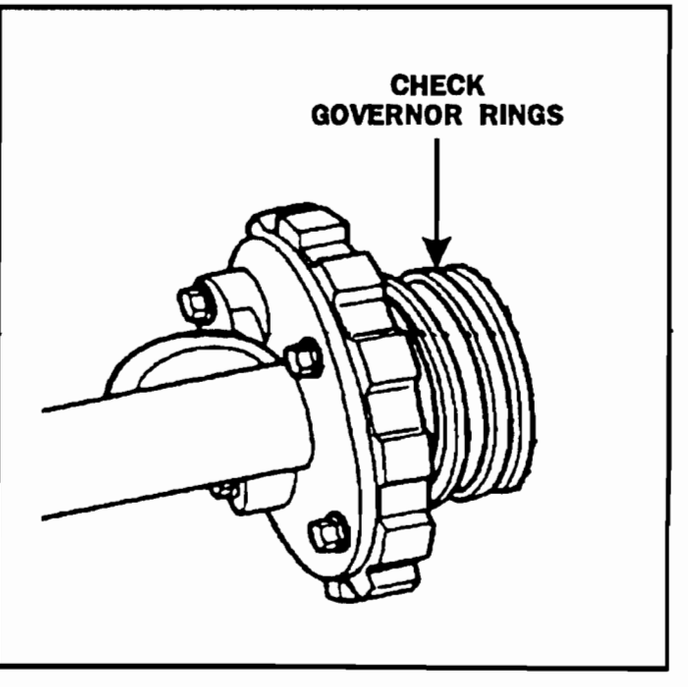


FIGURE 2

FORD - A4LD

3-4 SHIFT SOLENOID CHANGE

There has been a design change on the 3-4 shift solenoid on the Ford A4LD, and the new design level solenoid is still available under the old OEM number E8TZ-7M107-A.

The 1st design 3-4 shift solenoid had a sleeve that incorporated a screen for the solenoid as shown in Figure 1.

The 2nd design eliminates the screen, has dimensional changes on the solenoid itself, and includes a new plug with a boss machined on one end. The plug must be installed with the machined boss facing the solenoid as shown in Figure 1.

The 2nd design 3-4 shift solenoid WILL retro-fit back to all previous models, if it is required.

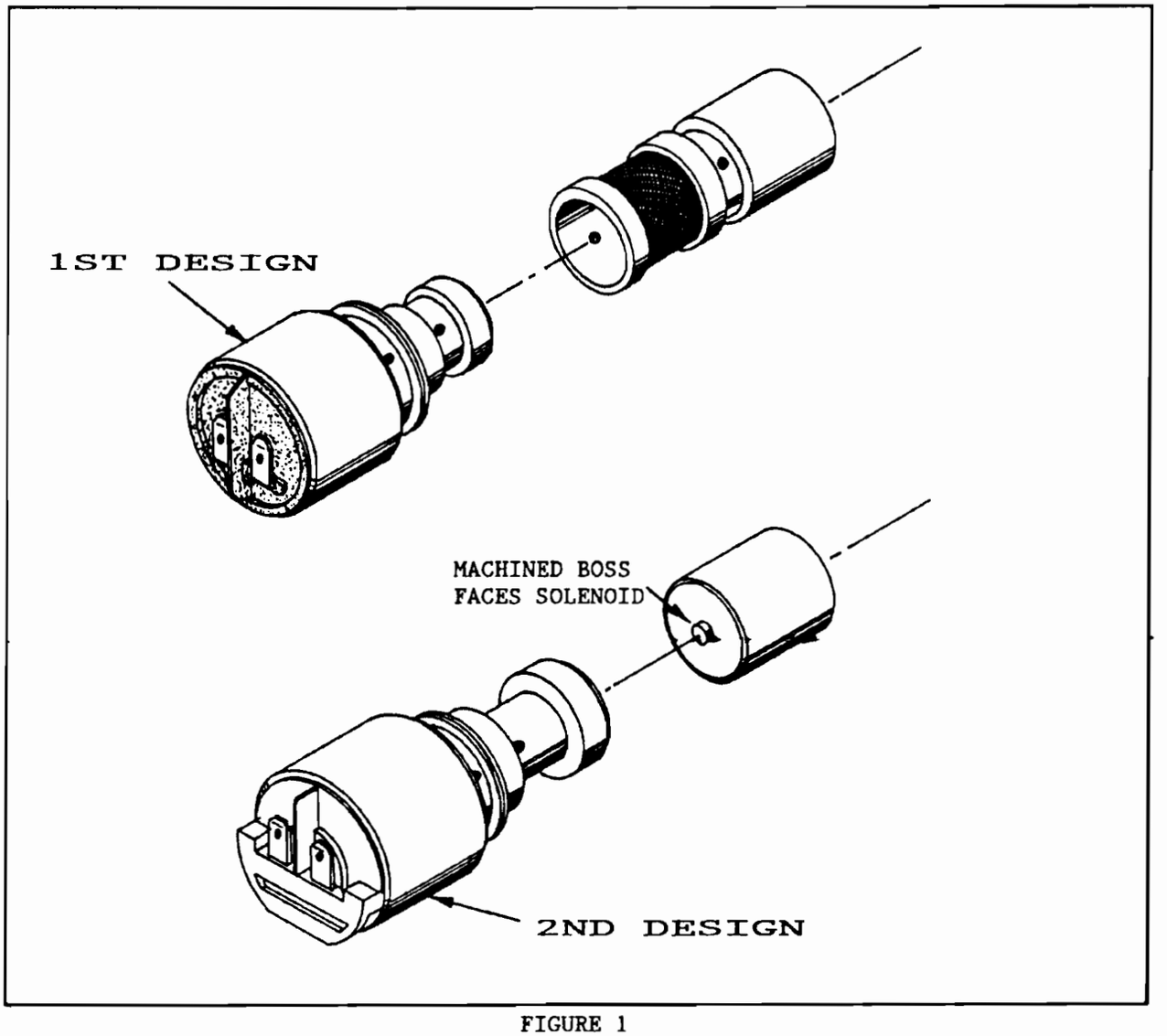


FIGURE 1

FORD A4LD

1990-92

AEROSTAR EXPLORER RANGER

COMPLAINT: Some of the involved vehicles with the A4LD transmission may exhibit a harsh 2-3 backout upshift under certain conditions. This may be better described as being harsh when releasing the accelerator pedal during the 2-3 upshift. This condition is most evident when the vehicle is operating at higher altitudes.

CAUSE: This is caused by the incorrect calibration of the 2-3 backout valve spring in the valve body.

CORRECTION: A new 2-3 backout valve spring is available from Ford that has a revised calibration. It is light blue in color. The part # is **F3TZ-7D230-B**. See figure 1 for the proper bore identification and spring location.

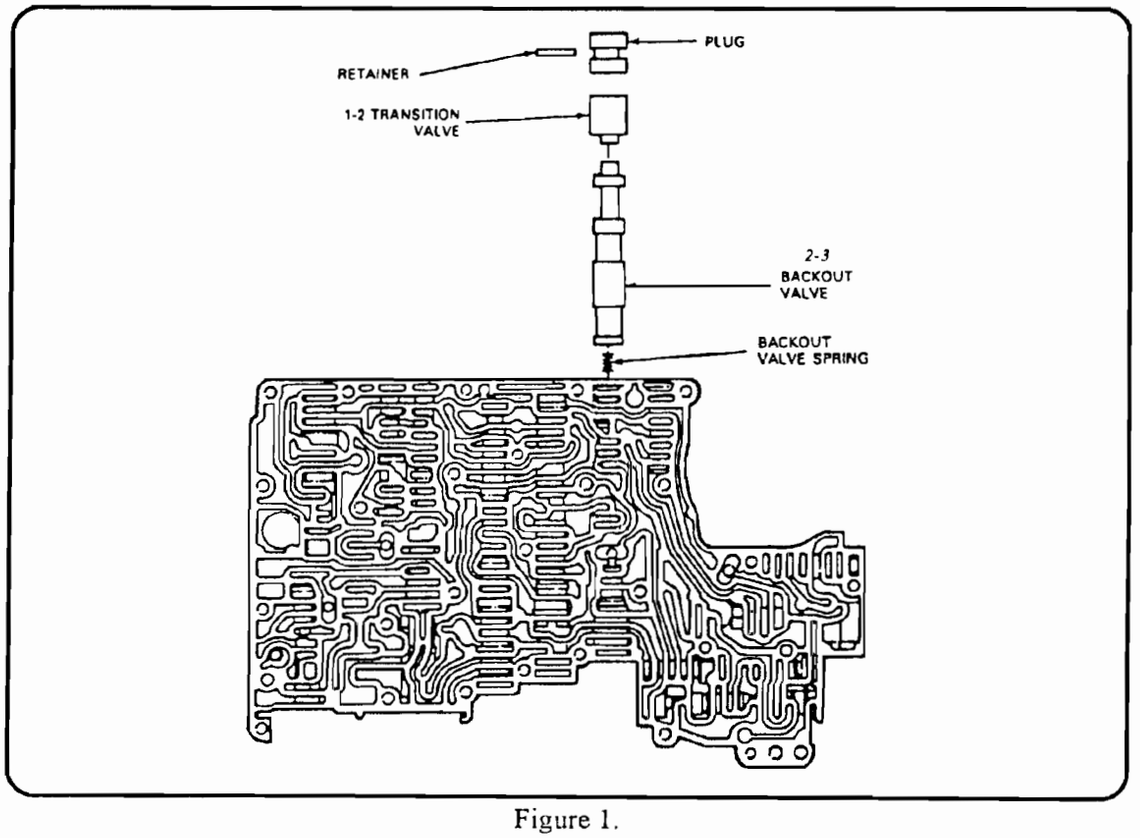


Figure 1.

FORD - A4LD

VALVE BODY CHECKBALL LOCATIONS

THERE ARE THREE DIFFERENT DESIGN LEVELS ON THE A4LD VALVE BODIES AND THEY HAVE THREE DIFFERENT CHECKBALL LOCATIONS. ALL THREE DESIGN LEVELS ARE LISTED BELOW.

1ST DESIGN - This valve body has ONE Solenoid for converter clutch apply and release. These valve bodies require six (6) checkballs placed in the locations shown in Figure 1. DO NOT install checkball in the locations marked with an "X".
(SEE FIGURE 1).

2ND DESIGN - This valve body has TWO Solenoids, 1 for converter clutch and 1 for the 3-4 shift, and DOES NOT use a reverse engagement valve. These valve bodies require five (5) checkballs placed in the locations shown in Figure 2. DO NOT install checkball in the locations marked with an "X".
(SEE FIGURE 2).

3RD DESIGN - This valve body has TWO Solenoids, 1 for converter clutch and 1 for the 3-4 shift, and DOES use a reverse engagement valve. These valve bodies require four (4) checkballs placed in the locations shown in Figure 3. DO NOT install checkball in the locations marked with an "X".
(SEE FIGURE 3).

THE CONDITIONS WILL VARY, IF YOU INSTALL A CHECKBALL IN THE WRONG LOCATION, AND DEPENDS ON WHICH CHECKBALL YOU DECIDE TO MOVE, AND WHICH CHECKBALL POCKET THAT YOU DECIDE TO PUT IT IN. USE FIGURES 1, 2, AND 3 FOR PROPER CHECKBALL LOCATION.

NOTE: Figure 4 shows all three design levels of the order in which the reverse engagement valve bore is loaded. The first two design levels do not use reverse engagement valve, but placement of retainers is critical.
(SEE FIGURE 4).

A4LD VALVE BODY
SINGLE SOLENOID CHECKBALL LOCATIONS

THESE VALVE BODIES REQUIRE SIX (6) CHECKBALLS PLACED IN THE LOCATIONS SHOWN BELOW. DO NOT INSTALL CHECKBALL IN LOCATION MARKED WITH AN "X".

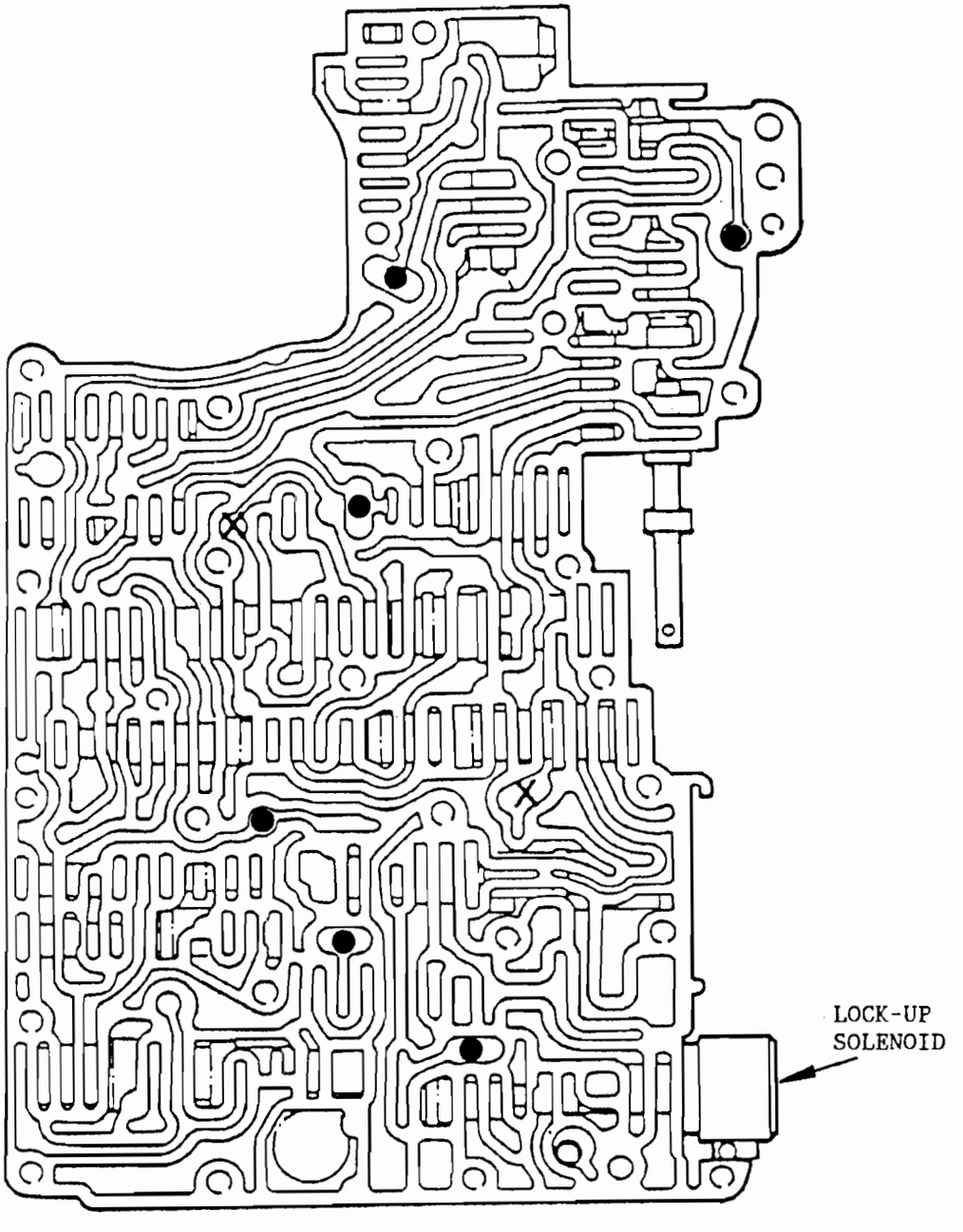


Figure 1

A4LD VALVE BODY
DOUBLE SOLENOID CHECKBALL LOCATIONS
(WITHOUT REVERSE ENGAGEMENT VALVE)

THESE VALVE BODIES REQUIRE FIVE (5) CHECKBALLS PLACED IN THE LOCATIONS SHOWN BELOW. DO NOT INSTALL CHECKBALL IN LOCATIONS MARKED WITH AN "X".

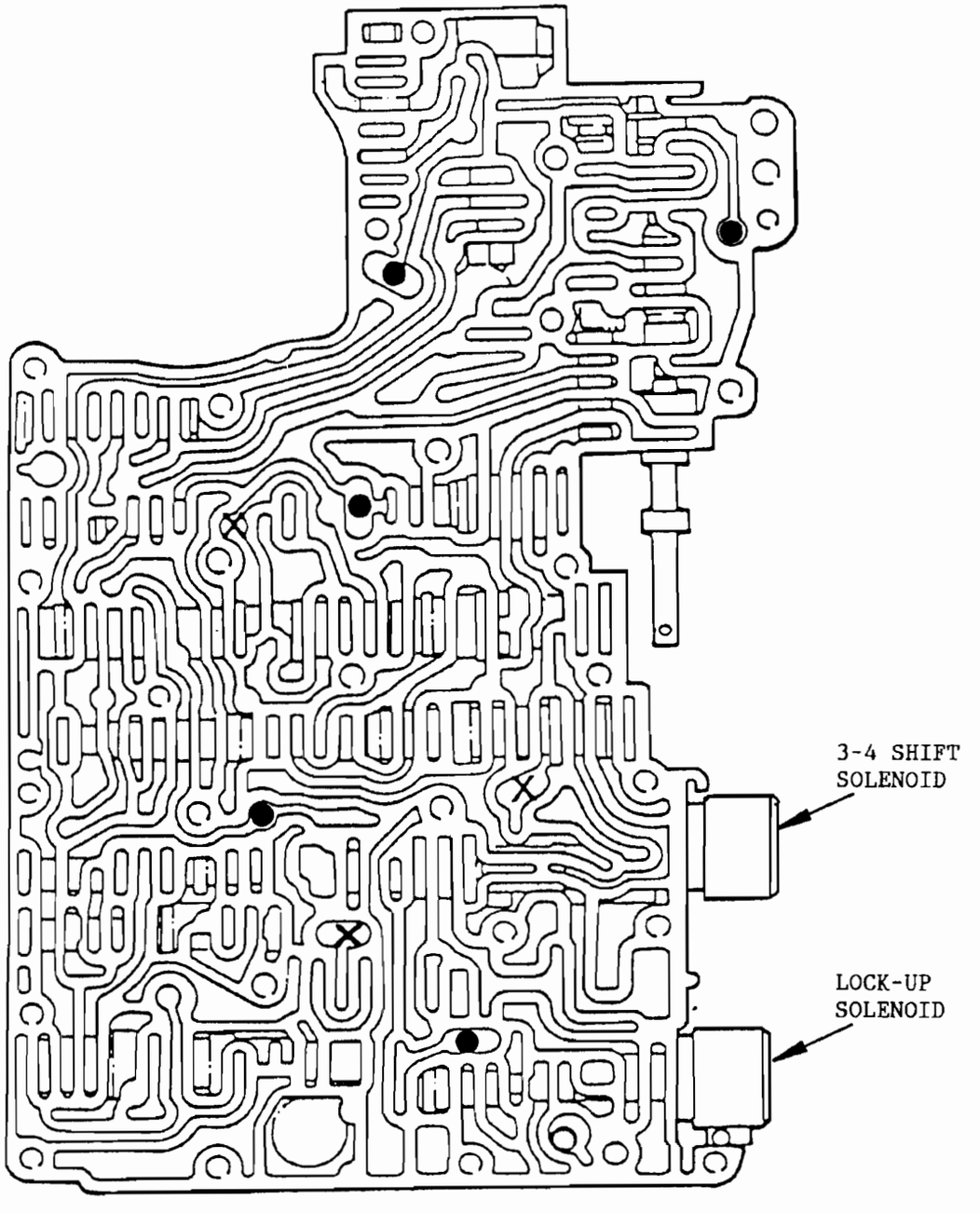


Figure 2

A4LD VALVE BODY
DOUBLE SOLENOID CHECKBALL LOCATIONS
(WITH REVERSE ENGAGEMENT VALVE)

THESE VALVE BODIES REQUIRE FOUR (4) CHECKBALLS PLACED IN THE LOCATIONS SHOWN BELOW. DO NOT INSTALL CHECKBALL IN LOCATIONS MARKED WITH AN "X".

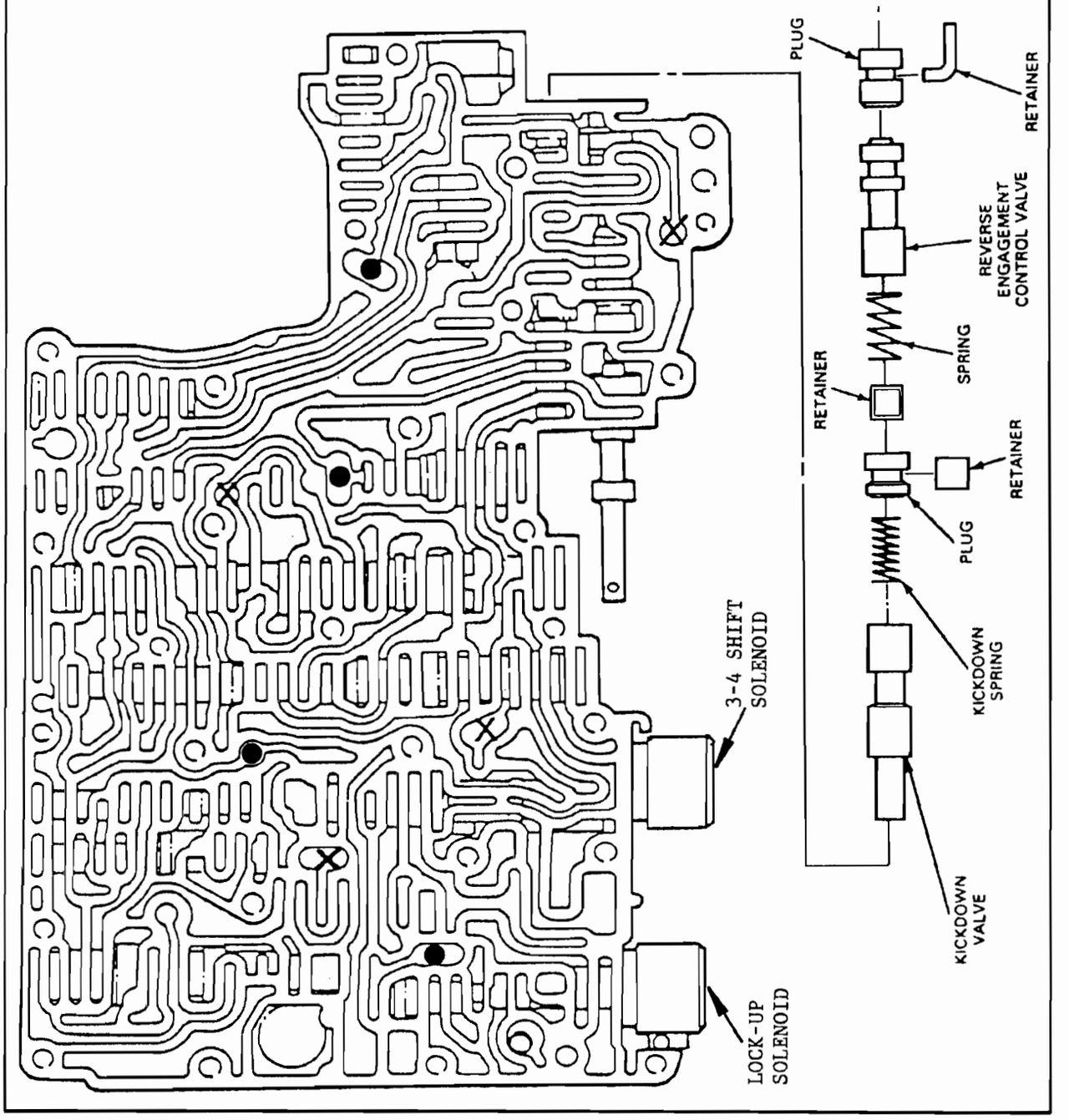


Figure 3

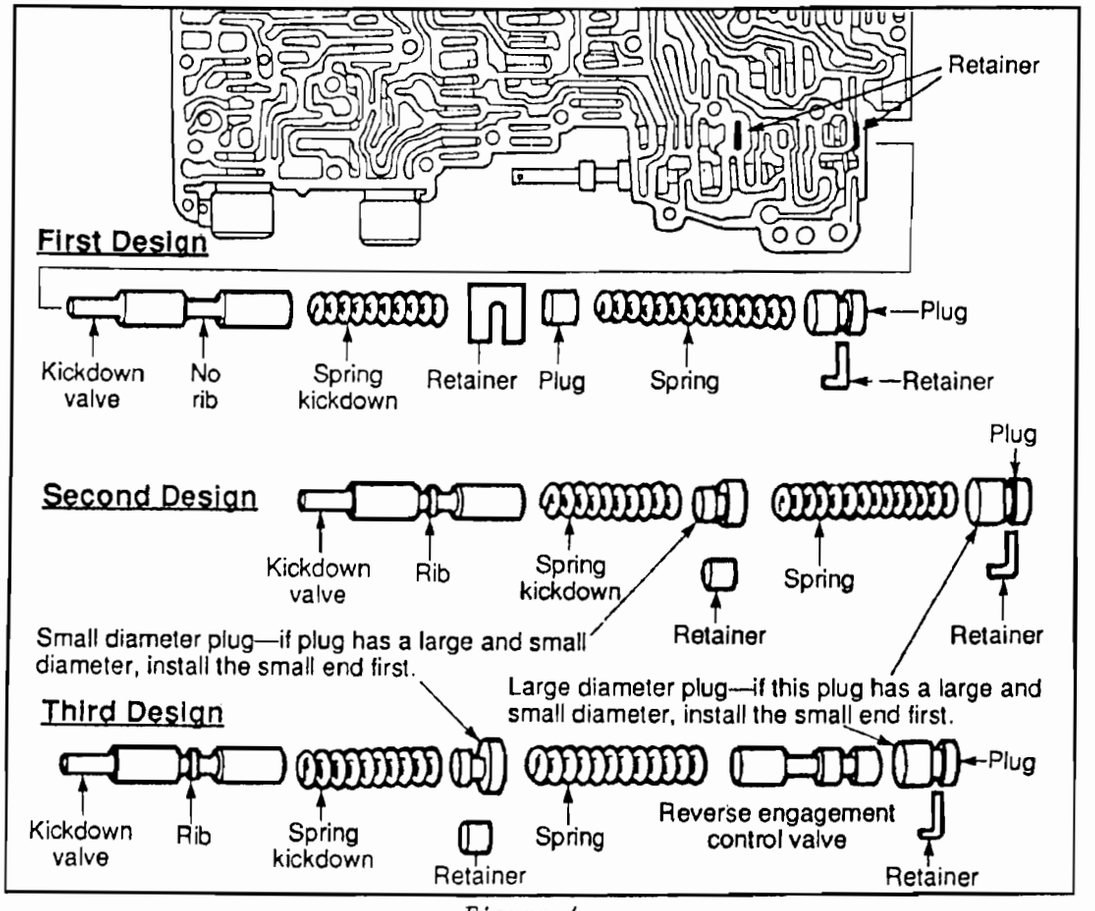

Retainer
First Design
Plug
Kickdown valve
No rib
Spring kickdown
Retainer
Plug
Spring
Retainer
Plug
Second Design
Kickdown valve
Rib
Spring kickdown
Spring
Small diameter plug—if plug has a large and small diameter, install the small end first.
Retainer
Retainer
Large diameter plug—if this plug has a large and small diameter, install the small end first.
Third Design
Plug
Kickdown valve
Rib
Spring kickdown
Retainer
Spring
Reverse engagement control valve
Retainer

Figure 4