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SAAB SUPPLEMENT ZF-4HP-18

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INTRODUCTION SAAB 9000 SUPPLEMENT

The Saab 4-HP-18 is a four speed automatic transmission designed for front wheel drive transversely mounted engine vehicles. A fluid coupling (torque converter) is used to transmit power from the engine into the transmission via the turbine shaft. Built into the torque converter is a damper plate that connects the 3/4 clutch drum shaft mechanically to the crank shaft so as to drive the 3/4 clutch drum at crankshaft speed. The damper plate is also used to prevent a 2-3 and 3-4 shift shock. The converter also drives a positive displacement pump to provide the transmission with fluid pressure. The 4-HP-18 uses a Ravigneaux planetary gear train consisting of sun gears, planet gears, 1 planet carrier and 1 ring gear. The different ratios are obtained through this gear train by the driving and holding of specific elements in this gear set. This driving and holding of specific elements in the gear set is accomplished by the use of 5 different clutch packs, 1 band and 2 one-way holding devices.

The purpose of this supplemental manual is to show the engineering differences of the Saab 9000 version of the 4-HP-18 transmission. For tear down and reassembly, use the ATSG Eagle Premier, Dodge Monaco Tectran Manual on the 4-HP-18.

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

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TECHNICAL DATA

The Saab 9000 4-HP-18 transmission is similar in design to the 4-HP-18 transmission found in Eagle Premiers and Dodge Monacos. Major differences between the two transmissions can be seen in the gearcase area, the case, the governor and valve body. The Saab 9000 is equipped with either a turbo or non turbo engines which also introduces some subtle differences in the valve body between these two Saab 9000 transmissions. This supplement will deal specifically with some of these major differences to assist the technician in the overhaul and repair of this transmission. For tear down and reassembly information, use ATSG's 4-HP-18 Techtran Manual for Eagle Premier and Dodge Monaco vehicles.

GEAR RATIOS

Gear	Ratio
1st.	2.58
2nd.	1.41
3rd.	1.0
4th.	0.74
Reverse.	2.88

OIL CAPACITY AND SPECIFICATIONS

Oil capacity of the transmission including torque converter and cooler.....Approx. 8 - 9 quarts
 Transmission Fluid.....ATF DEXRON II
 Transmission weight without converter.....Approx. 121 lbs.
 Torque Converter.....Approx. 23 lbs.

GOVERNOR

A two stage governor or a three stage governor can be found in either a turbo or non turbo transmission. Shift timing will vary with the use of either governor assemblies. Refer to the chart below for the approximate minimum and maximum throttle opening and kickdown shift timing for both turbo and non turbo two stage and three stage governors.

SHIFT POINT AT MINIMUM THROTTLE

SHIFT POINTS	2 STAGE TURBO	3 STAGE TURBO	2 STAGE 9000i/S	3 STAGE 9000i/S
1-2 Upshift	16-24 mph	12-15 mph	11-17 mph	11-15 mph
2-3 Upshift	27-34mph	25-31 mph	24-30 mph	23-29 mph
3-4 Upshift	40-48mph	34-45 mph	36-44 mph	33-42 mph

SHIFT POINT AT MAXIMUM THROTTLE

SHIFT POINTS	2 STAGE TURBO	3 STAGE TURBO	2 STAGE 9000i/S	3 STAGE 9000i/S
1-2 Upshift @ 5400 rpm*	35-42 mph	34-41 mph	32-38 mph	32-38 mph
2-3 Upshift @ 5400 rpm*	68-75 mph	67-74 mph	63-70 mph	62-69 mph
3-4 Upshift @ 5400 rpm*	98-105 mph	87-97 mph	86-93 mph	81-91 mph

* = Approximate rpm, allow + or - 300 rpm

MAXIMUM KICKDOWN SHIFT POINTS

SHIFT POINTS	2 STAGE TURBO	3 STAGE TURBO	2 STAGE 9000i/S	3 STAGE 9000i/S
Max 4-3 downshift	86-94 mph	86-94 mph	78-84 mph	78-84 mph
Max 3-2 downshift	56-63 mph	56-62 mph	51-57 mph	51-57 mph
Max 3-1 downshift	34-40 mph	28-34 mph	28-34 mph	25-31 mph

THROTTLE CABLE ADJUSTMENT

The throttle cable adjustment is located at the end of the cable near the throttle body. The end or tip of the cable attaches to the throttle lever. The cable harness is held secure by adjusting nuts to a bracket mounted on the throttle body. Between the end of the cable harness and where the cable attaches itself to the throttle lever, there is a crimping on the cable. When the vehicle is at closed throttle, the space between the end of the cable harness and the crimping should be approximately .078" [2mm] (See Figure 1).

To ensure that the crimping is located correctly on the cable, open the throttle until the kickdown position of the cam begins to engage (See Figure 2).

The distance between the end of the harness and the crimping should be approximately 1.521" [39mm] (See Figure 3). If it is not, first check the throttle cable for improper routing or kinks. If necessary, move the crimp. If the crimp needs to be replaced, it is available under the part # 87-09-305 from Saab.

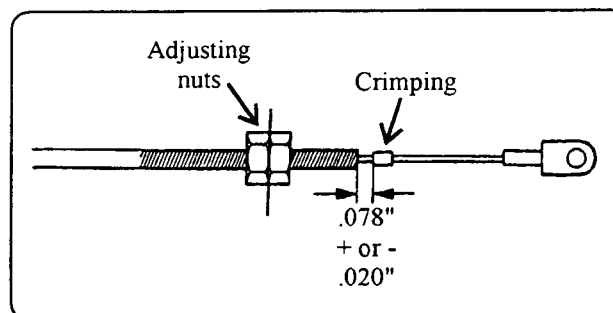


Figure 1

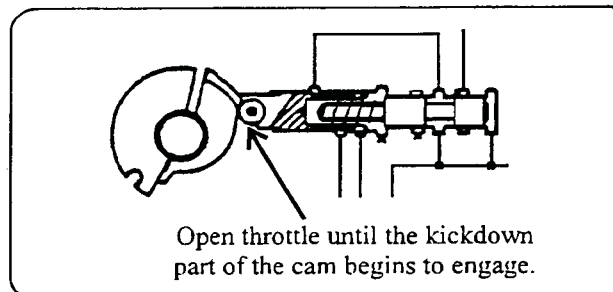


Figure 2

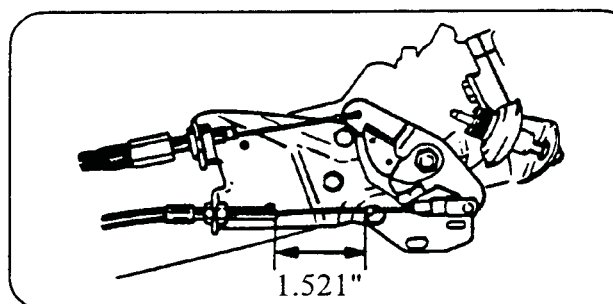


Figure 3

LINE PRESSURE CHECK

Unlike Eagle Premier vehicles, line pressure checks can be made on the Saab turbo and non turbo vehicles. Figure 4 shows where to connect the pressure gauge on a transmission that is found behind a transversely mounted turbo engine. A special pressure fitting adapter is available through Saab for this application. The part number is 8791865. Refer to the line pressure chart below for pressure specifications.

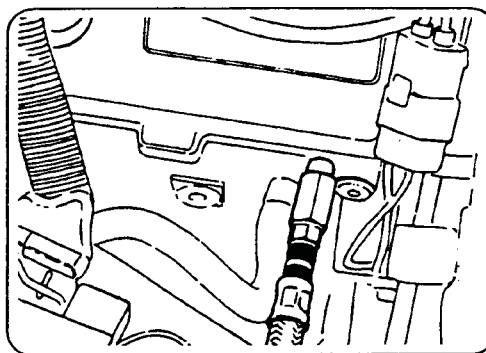


Figure 4
Diesel Engine

Figure 5 shows where to connect the pressure gauge on a transmission that is found behind a transversely mounted fuel injection engine. A special pressure fitting adapter is available through Saab for this application. The part number is 8791584. Refer to the line pressure chart below for pressure specifications.

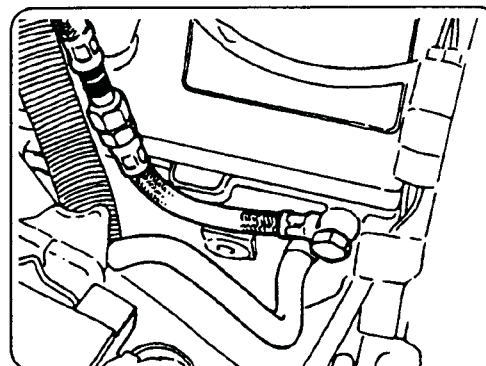


Figure 5
Injection Engine

TURBO

GEAR	ENGINE RPM	LINE PRESSURE AT IDLE	LINE PRESSURE WITH CABLE PULLED	STALL SPEED
R	950	150-179 psi		
N	875	103-115 psi	179-199 psi *	
D	950	103-115 psi		2600-3100
1	950	103-115 psi		2600-3100

* = @ 2000rpm's

INJECTION

GEAR	ENGINE RPM	LINE PRESSURE AT IDLE	LINE PRESSURE WITH CABLE PULLED	STALL SPEED
R	950	150-179 psi		
N	875	103-115 psi	168-188 psi *	
D	950	103-115 psi		2300-2700
1	950	103-115 psi		2300-2700

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BAND ADJUSTMENT

The 2/4 band (C') can be adjusted externally without removing the valve body from the transaxle by backing off the lock nut for the adjusting screw using a 22 mm wrench. Tighten the adjusting screw down to 10 Nm (7.3 ft. lbs.) using a 6mm Allen head socket. Back off the adjusting screw exactly 2 turns and tighten down the lock nut to 80 Nm (59 ft. lbs.).

If transmission fluid appears to be leaking from the adjusting screw, then removal of the parallel shaft and replacement of the two O rings on this shaft will be necessary (See Figure 5a). The valve body, lock nut and adjusting screw will have to be removed in order to gain access to the parallel pin. With the valve body, lock nut and adjusting screw removed, use a suitable drift pin to push the parallel pin out through the threaded hole in the case used for the adjusting screw.

Replace the two O rings found on the parallel shaft and reassemble. Once assembled, adjust the band as previously explained.

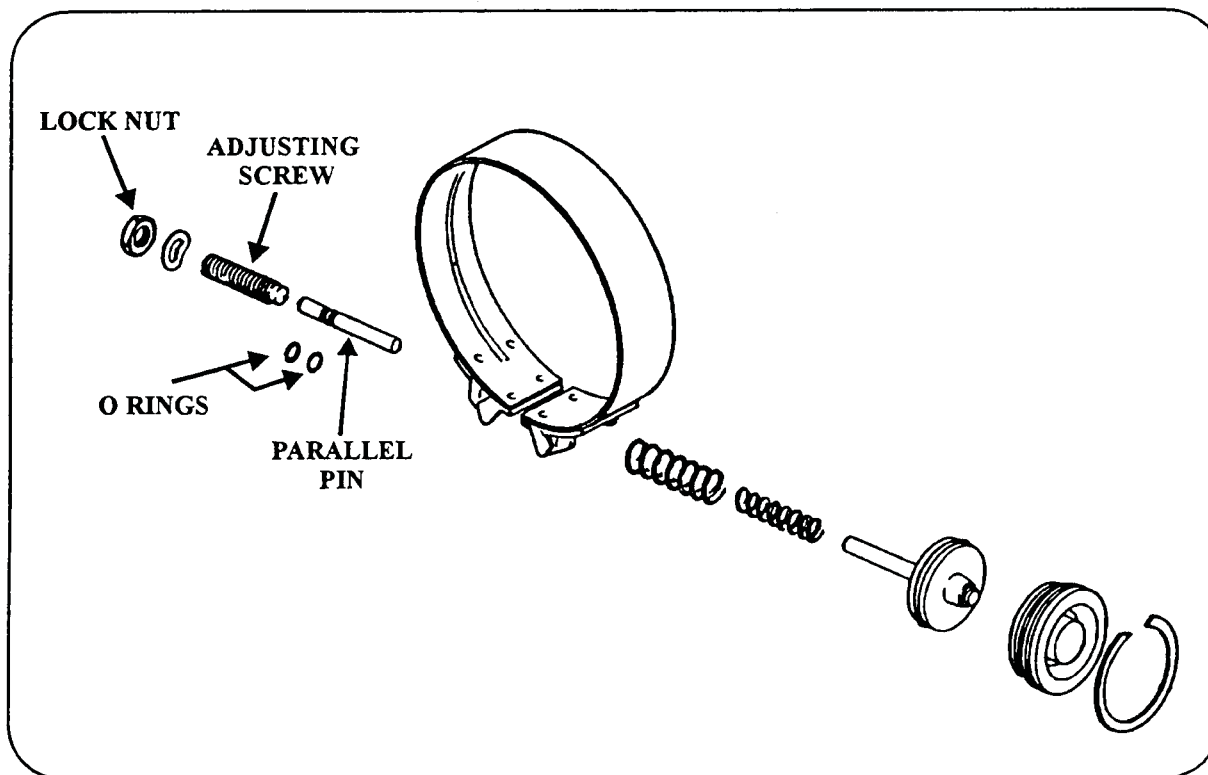
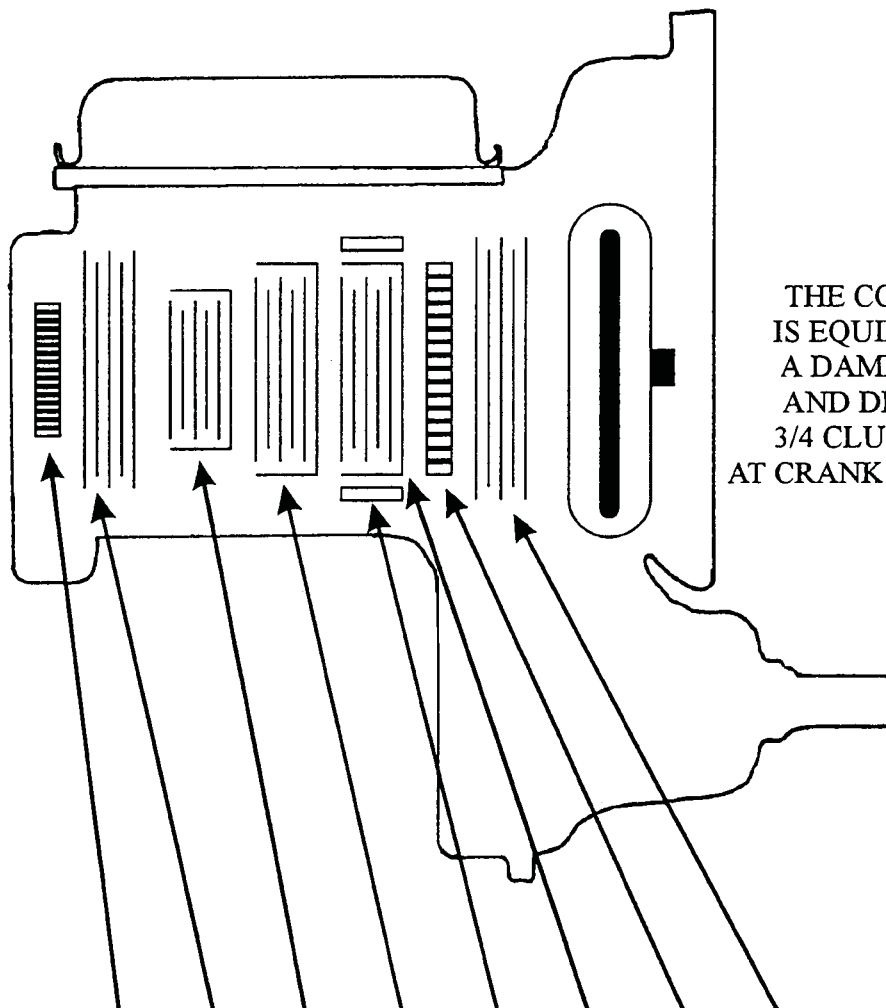


Figure 5a

CLUTCH AND BAND APPLICATION CHART



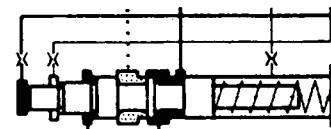
THE CONVERTER IS EQUIPPED WITH A DAMPER PLATE AND DRIVES THE 3/4 CLUTCH DRUM AT CRANK SHAFT SPEED

RANGE	GEAR	LOW ONEWAY CLUTCH	LOW REV CLUTCH	3-4 CLUTCH	FORWARD CLUTCH	2-4 BAND	REV IMPUT CLUTCH	INT SPRAG	INT CLUTCH
OD	1	ON			ON				
	2				ON	ON		ON	ON
	3			ON	ON				ON
	4			ON		ON			ON
D3	1	ON			ON				
	2				ON	ON		ON	ON
	3			ON	ON				ON
D2	1	ON			ON				
	2				ON	ON		ON	ON
D1	1	ON	ON		ON				
REVERSE			ON				ON		

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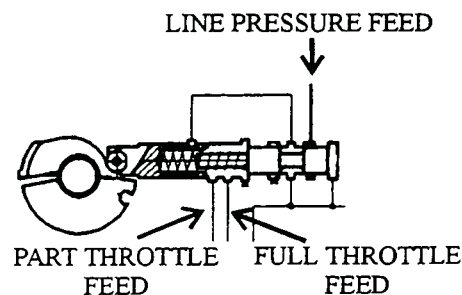
HYDRAULIC OPERATION

Pressure Regulator Valve : The pressure regulator valve controls the system pressure through out the entire transmission. It is also responsible in providing converter pressure.



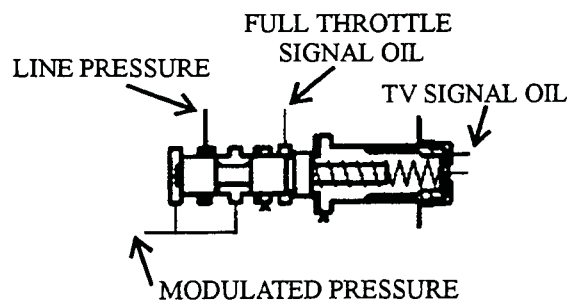
PRESSURE REGULATOR VALVE

Throttle Valve : When the plunger is depressed, the throttle valve regulates line pressure into the TV circuit in proportion to throttle opening. Throttle pressure is sent to the Modulator Valve and to the spring side of each shift valve.



THROTTLE VALVE

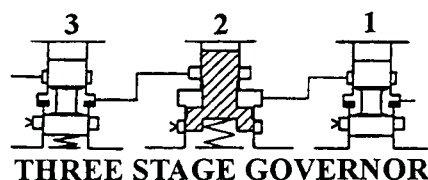
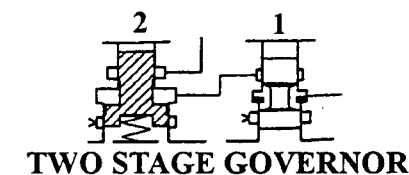
Modulator Valve : The modulator valve is used to vary line pressure in proportion to throttle opening. This is accomplished by providing throttle pressure to the spring side of the modulator valve. This TV pressure signal and spring tension working on one end of the valve modulates line pressure at the opposite end of the valve. This modulated pressure is then fed into the pressure regulator valve boost circuit. It is also sent to the 2-3-4 upshift sequence valve, the 3-4 traction valve and the C' and E accumulators. As the throttle valve signal oil pressure increases with throttle opening to the modulator valve, the higher "modulated" pressure is allowed to enter the pressure regulator valve boost circuit causing line pressure to rise in proportion to throttle opening.



MODULATOR VALVE

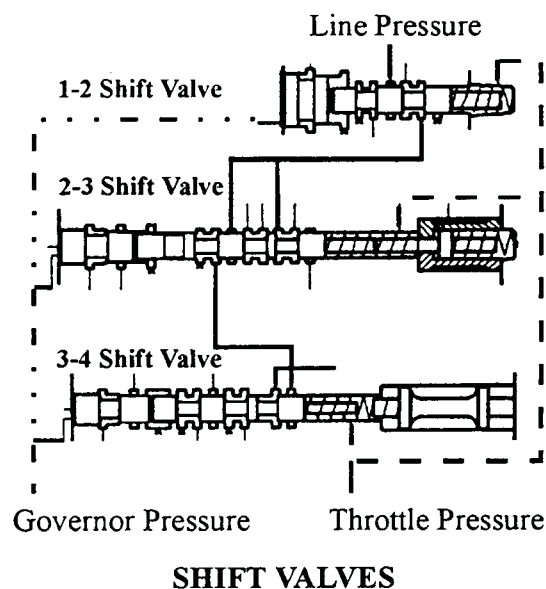
Hydraulic Operation Continued

Governor Valves : Governor pressure is a road speed signal oil going to each of the shift valves. Spring tension and throttle pressure are on the opposite side of the shift valve working against governor pressure. As governor pressure increases with road speed, it eventually overcomes the spring tension and throttle pressure working on the opposite end of the shift valve. When this occurs, the shift valve strokes and an upshift takes place. Either a two stage governor or a three stage governor is used to provide road speed signal oil. Shift timing with a two stage governor is slightly different when compared to a three stage governor assembly. Refer to the Technical Data section of this manual for specifications.



Shift Valves : The 1-2, 2-3 and 3-4 shift valves are fed with line pressure in a series configuration (one after another). After the 1-2 shift valve is stroked, line pressure is sent to the band (C') and to the Intermediate Clutch (C) to make the 1-2 shift. Line pressure also goes to the 2-3 shift valve where it is blocked until the 2-3 shift valve strokes. When the 2-3 shift valve strokes, it blocks line pressure feed to the band (C') and sends line pressure to the 3/4 clutch (E). It also sends line pressure to the 3-4 shift valve where it is blocked waiting for the valve to stroke. When the 3-4 shift valve strokes, line pressure is sent to the 3-4 Traction Valve which will cause the valve to stroke. When the 3-4 traction valve strokes, line pressure to the Forward Clutch (A) is blocked and the Forward Clutch circuit opens to an exhaust. Line pressure from the 3-4 shift valve is also routed back to and through the 2-3 shift valve where it continues on to apply the band (C').

Shift valves open and close by way of spring tension and throttle pressure signal oil on one end of the valve and governor pressure signal oil on the opposite end of the valve.

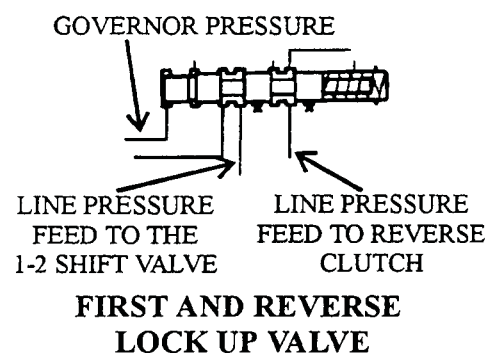


Hydraulic Operation Continued

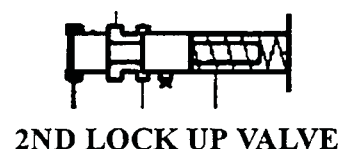
First and Reverse Lock up Valve : This valve provides two separate functions:

A) This valve prevents a reverse engagement from taking place if governor pressure indicates that the vehicle is moving. Since governor pressure is road speed signal oil, when the vehicle is stopped, zero psi of governor pressure is in the circuit. This allows the First and Reverse Lock up Valve to remain closed by spring tension allowing line pressure to enter and apply the reverse clutch (B). If governor pressure is ever high enough to stroke this valve, line pressure to the reverse clutch (B) is blocked and a no reverse condition will occur.

B) When the selector lever is placed into manual low, this valve routes line pressure to the spring side of the 1-2 shift valve to prevent a 1-2 upshift.



2nd Lock up Valve : This valve prevents a 2-3 upshift to take place when the selector lever is placed into manual second. It accomplishes this by routing line pressure to the spring side of the 2-3 shift valve.

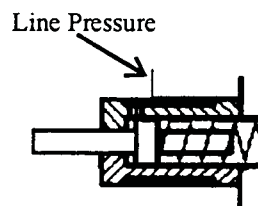


3rd Lock up Valve : This valve prevents a 3-4 upshift to take place when the selector lever is placed into manual third. When manual third is selected, line pressure strokes the 3rd lock up valve. This blocks line pressure from going to the 2-3-4 upshift sequence valve which causes the sequence valve to close blocking the governor circuit to the 3-4 shift valve. If the vehicle was already in fourth gear and the selector lever was pulled down into the manual third position, a downshift to third would immediately occur.



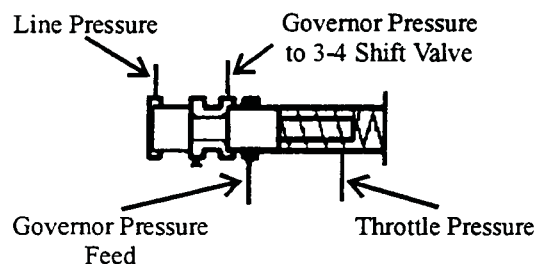
Hydraulic Operation Continued

1-2-3 Sequence Valve : This valve is located behind the 2-3 shift valve line up. Its purpose is to prevent a 1-3 upshift. When the 1-2 shift valve strokes to make a 1-2 upshift, line pressure is sent to this sequence valve to assist throttle pressure in keeping the 2-3 shift valve closed. This ensures that a sequential 1-2-3 upshift occurs.



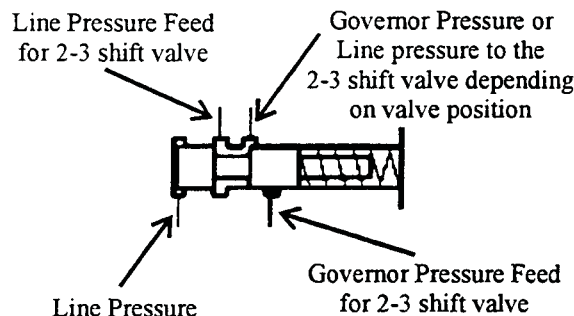
1-2-3 SEQUENCE VALVE

2-3-4 Sequence Valve : This valve will prevent a 2-4 upshift from taking place by blocking governor pressure to the 3-4 shift valve. When a 2-3 shift takes place, line pressure enters the 3/4 clutch (E) circuit and applies the clutch. The same oil used to apply the 3/4 clutch (E), is also routed to open the 2-3-4 sequence valve. When the sequence valve opens, governor pressure is allowed to pass through the valve and go to the 3-4 shift valve to make a 3-4 upshift. Thus providing a sequential 2-3-4 upshift. It also prevents a 3-4 upshift in the manual three range (Refer to the operation of the 3rd Lock up Valve).



2-3-4 UPSHIFT SEQUENCING VALVE

4-3-2 Sequence Valve : As the 2-3-4 sequence valve prevented a 2-4 upshift, a 4-3-2 sequence valve prevents a 4-2 downshift. The 4-3-2 sequence valve is held open with line pressure in 1st, 2nd and 3rd allowing governor pressure to pass through the valve and act on the end of the 2-3 shift valve. When a 3-4 shift occurs, the line pressure that kept the sequence valve open is exhausted at the 3-4 traction valve. This causes the sequence valve to close allowing line pressure to be directed into the governor circuit acting on the 2-3 shift valve. Now the 2-3 shift valve is held in a stroked position with line pressure so as to maintain a 3rd gear position of the shift valve for a 4-3 downshift.



4-3-2 DOWNSHIFT SEQUENCE VALVE

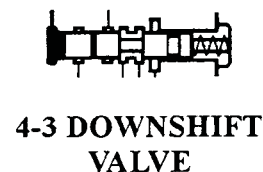
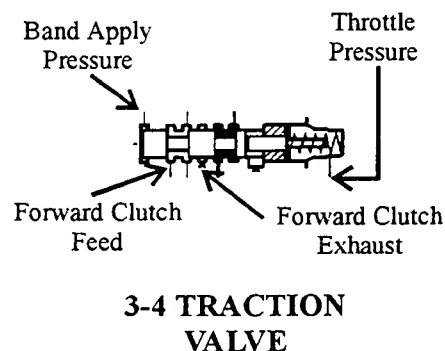
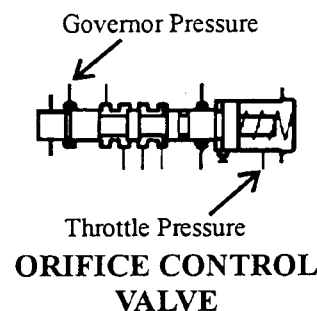
Hydraulic Operation Continued

Orifice Control Valve (Throttle Pressure Valve) : This orifice control valve is influenced by the use of throttle pressure and governor pressure. These pressures are used on this valve to sense engine load and vehicle speed to ensure that the 3-4 shift takes place at the proper time. When throttle pressure overcomes governor pressure, the orifice control valve will stroke. When the valve strokes, it allows band apply pressure to be supplied to the 3-4 shift valve. When the 3-4 shift valve strokes, this pressure goes on to stroke the 3-4 traction valve. When the 3-4 traction valve strokes, line pressure is shut off going to the forward clutch and opens the circuit to an exhaust.

3-4 Traction Valve : During a 3-4 upshift the 3-4 Traction Valve is stroked by band apply oil. When the traction valve is fully open, line pressure supply to the Forward Clutch (A) is blocked and the Forward Clutch (A) circuit is open to an exhaust.

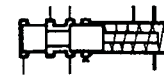
Time Control Valve : The Time control Valve regulates the overlap period that exists as the 2-4 band (C') is being released and the forward clutch (A) is being applied during a 4-3 downshift. It accomplishes this by influencing the 4-3 Downshift Valve and the 4-3 Traction Valve. The Time Control Valve also has an accumulator called the Time Control Accumulator. The overlap period corresponds with the operating time of this accumulator.

4-3 Downshift Valve : This valve plays a part in the timing of the 4-3 downshift. It prevents full release of the 2-4 band (C') until the forward clutch is filled. The exhaust for the band is restricted until the Time Control Valve begins to influence this valve.



Hydraulic Operation Continued

4-3 Traction Valve : This valve brings on the Forward Clutch (A) slowly during a 4-3 downshift. Once this valve receives a signal from the Time Control Valve., it allows full pressure to enter the Forward Clutch (A).



**4-3 TRACTION
VALVE**

A Clutch Accumulator : The A clutch accumulator is responsible for providing a smooth forward clutch engagement. The spring in this accumulator often times weakens or breaks and causes a harsh engagement into drive and a harsh 4-3 downshift.



**A CLUTCH
ACCUMULATOR**

C' Accumulator : The C' accumulator is responsible for providing a smooth apply of the band in second and fourth gear.



**C' CLUTCH
ACCUMULATOR**

D Clutch Accumulator : The D clutch accumulator is responsible for providing a smooth apply of the Low/Reverse clutches in reverse and manual low.



**D CLUTCH
ACCUMULATOR**

E Clutch Accumulator : The E clutch accumulator is responsible for providing a smooth apply of the 3/4 clutches during a 2-3 upshift.



**E CLUTCH
ACCUMULATOR**

MAIN VALVE BODY

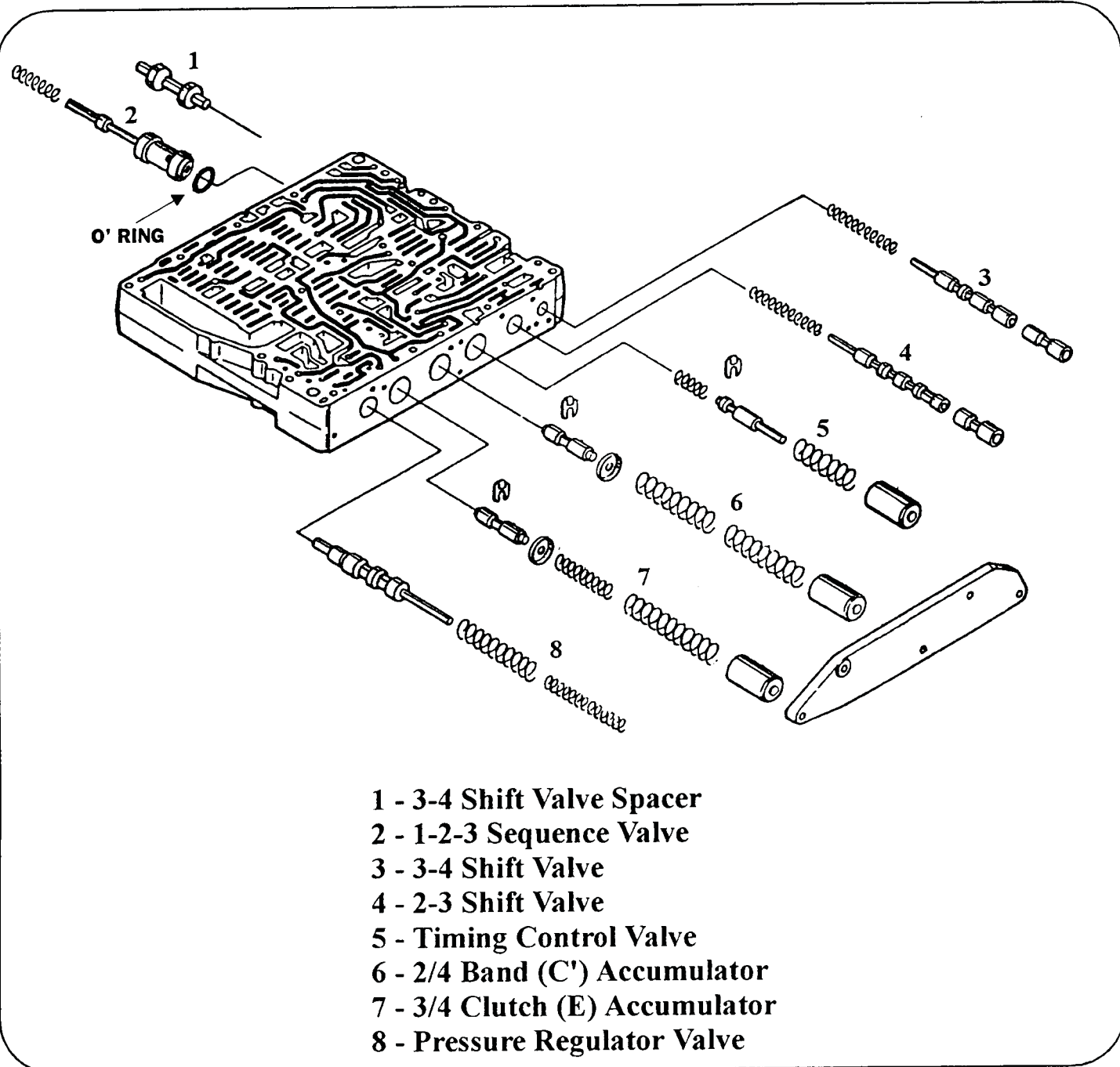
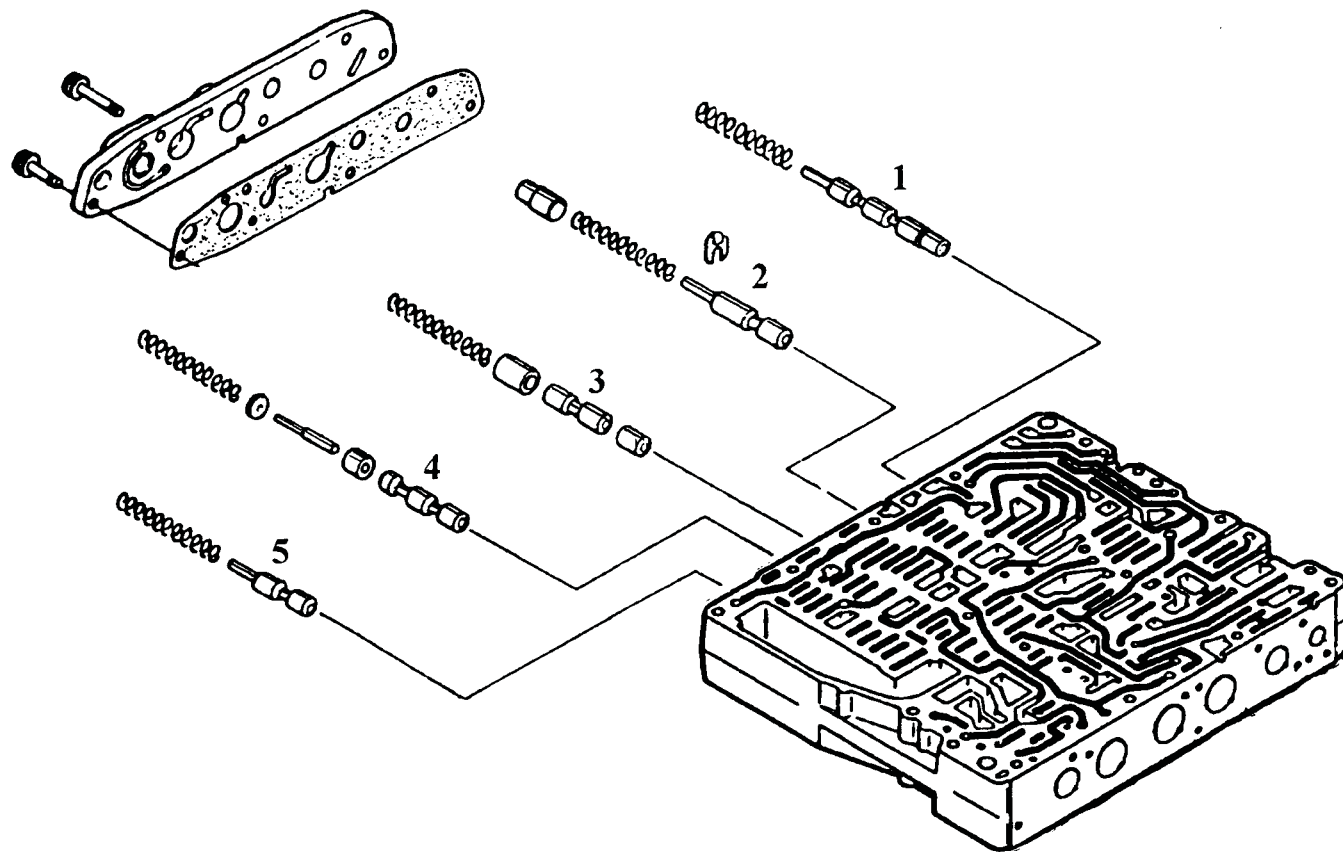


Figure 6

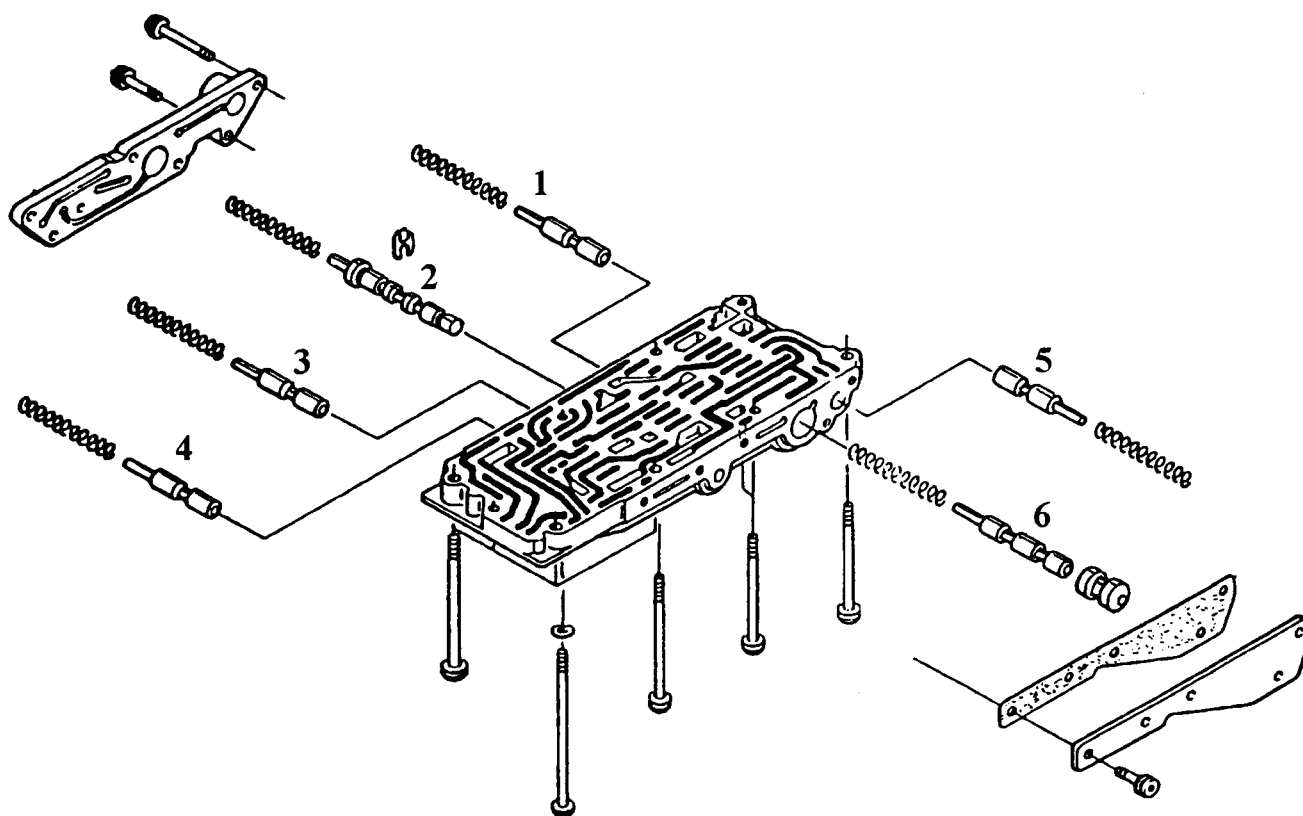
MAIN VALVE BODY



- 1 - 1st and Reverse Lockup Valve
- 2 - Modulator Valve
- 3 - 4-3 Downshift Valve
- 4 - 3-4 Traction Valve
- 5 - 4-3 Traction Valve

Figure 7

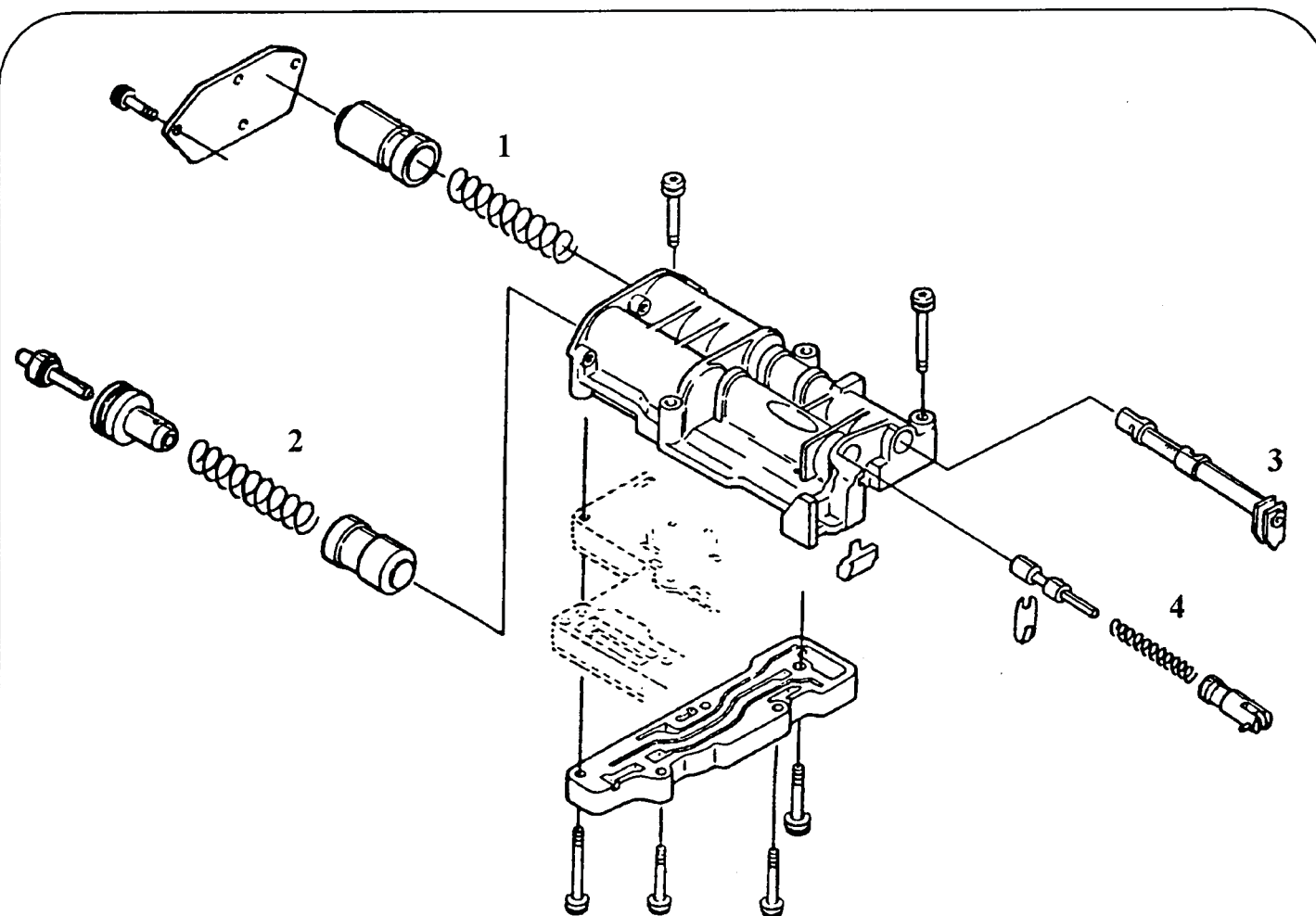
UPPER VALVE BODY



- 1 - 2nd Lock Valve
- 2 - Orifice Control Valve
- 3 - 3rd Lock Valve
- 4 - 4-3-2-Downshift Valve
- 5 - 2-3-4- Upshift Valve
- 6 - 1-2 Shift Valve

Figure 8

LOWER VALVE BODY



- 1 - Low/Reverse Clutch (D) Accumulator**
- 2 - Forward Clutch (A) Accumulator**
- 3 - Manual Valve**
- 4 - Throttle Valve, Spring and Plunger**

Figure 9

MAIN VALVE BODY ORIFICE AND BALL LOCATION

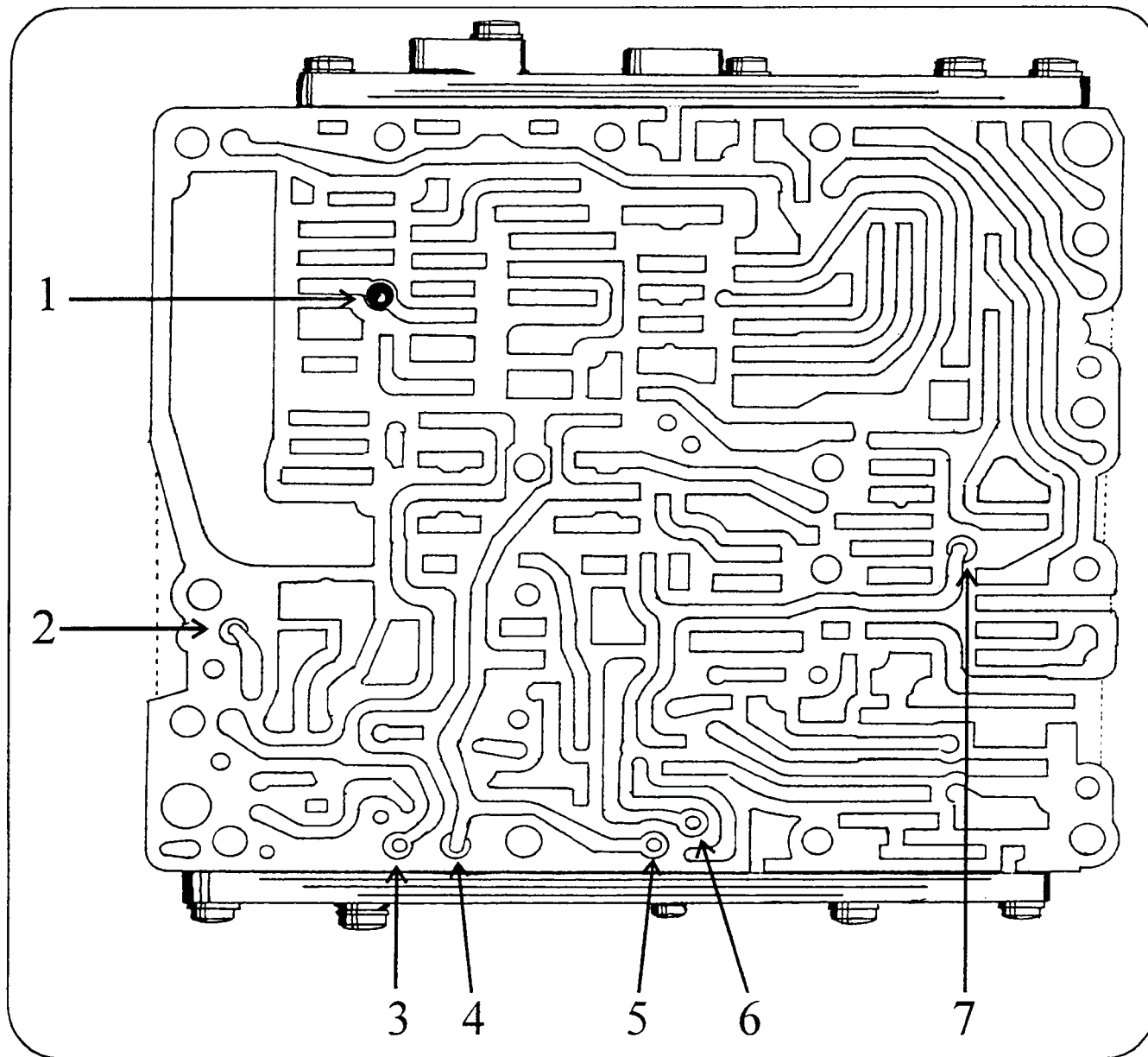


Figure 10

- 1 = .237" CHECK BALL
- 2 = .068" ORIFICE CUP DOWN (SILVER)
- 3 = .026" ORIFICE CUP UP (SILVER)
- 4 = .053" ORIFICE CUP DOWN (SILVER)
- 5 = .029" ORIFICE CUP UP (COPPER)
- 6 = .024" ORIFICE CUP UP (BLUE)
- 7 = .024" ORIFICE CUP DOWN (BLUE)

NOTE: ORIFICE SIZES MAY VARY. THE ORIFICE SIZES OBSERVED HERE CAME FROM A SAAB 9000 TURBO WITH #023-216 STAMPED ON THE FILTER COVER. USE THESE SIZES AS A REFERENCE ONLY.

TRANSFER PLATE ORIFICE AND BALL LOCATION

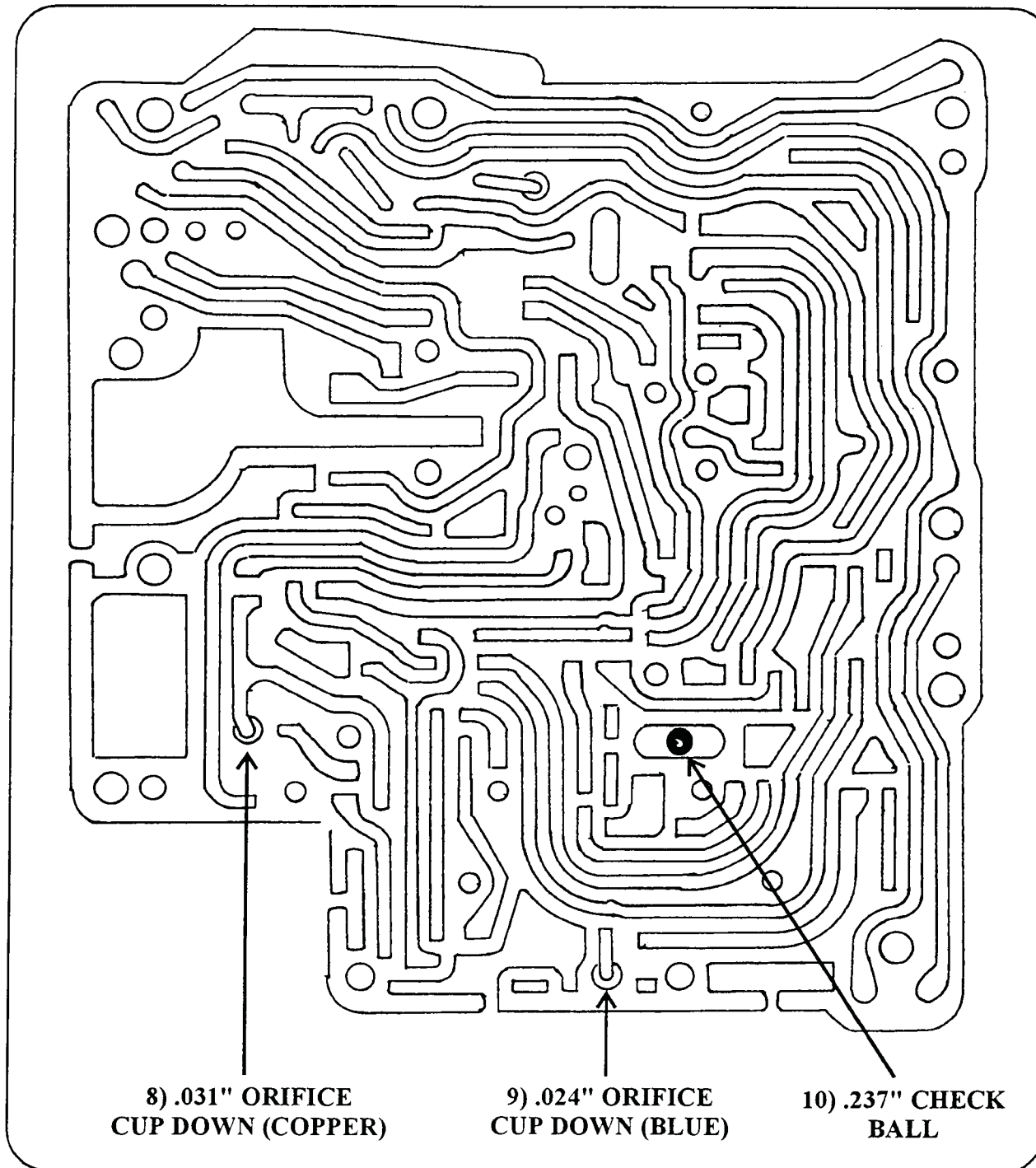


Figure 11

MAIN VALVE BODY CHECK BALL LOCATION

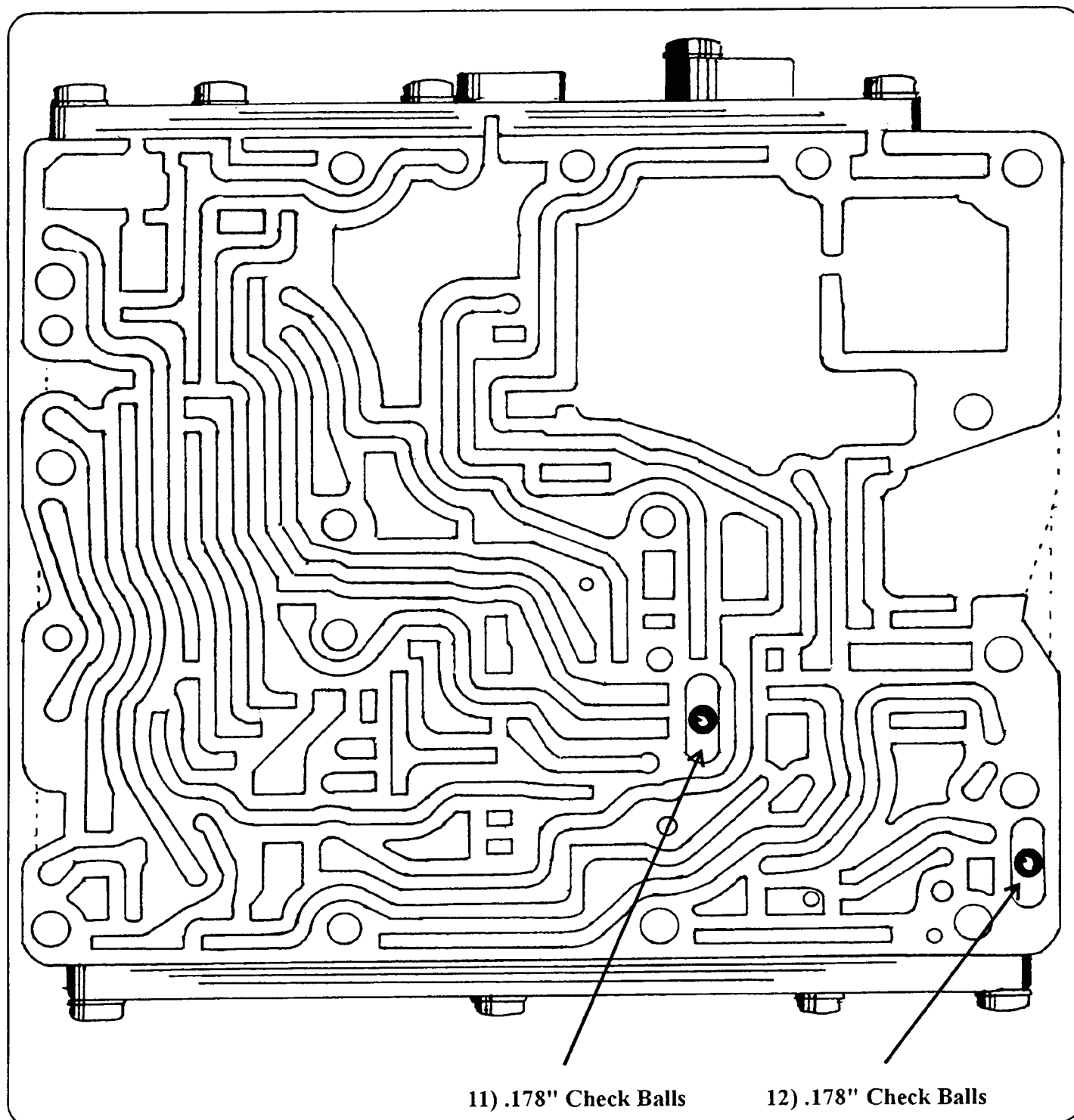


Figure 12

SAAB TURBO 9000

Saab 9000 vehicles that are turbo equipped, will have a tube that connects the turbo charger to the valve body. Its function is to provide pressure to the spring side of the 4-3 downshift valve during turbo boost periods. When a turbo 4-3 downshift takes place, the forward clutch will fully apply before the 2/4 band is released. This added shift overlap is needed during a turbo 4-3 downshift due to the increased torque demand. If the O ring that seals the pipe to the valve body end plate is missing or is damaged, transmission fluid will be drawn up through the turbo during none boost periods. This will allow the oil to be burned by the engine resulting in excessive white smoke exiting the tail pipe (See Figure 13 below).

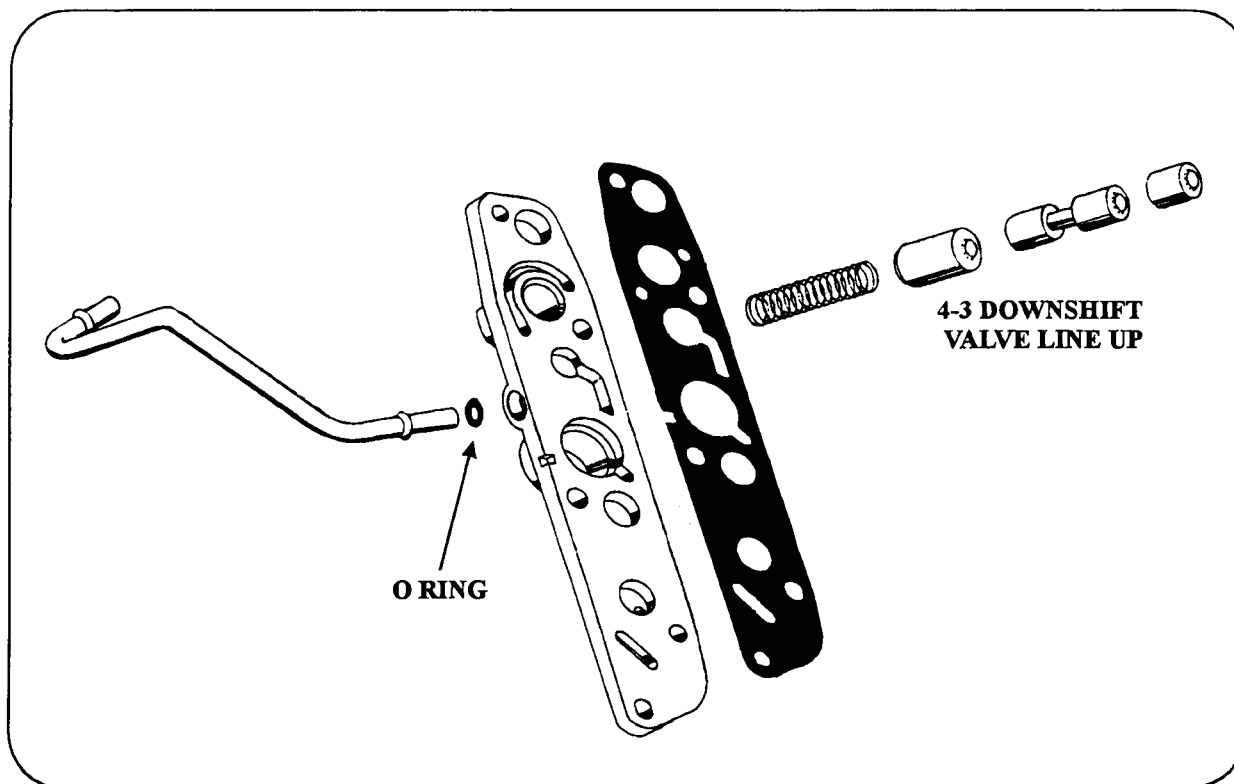


Figure 13

NO 3-4 OR STACKED 3-4 SHIFT

Both Saab and Eagle Premiers may exhibit a no 3-4 shift or a stacked 3-4 shift. One cause may be that the plastic spacer in the 3-4 shift valve line up had melted. The spacer could melt and block the 3-4 shift valve preventing the 3-4 shift, or it could melt and cause a loss of spring tension causing a stacked 3-4 shift. (see figure 14 below). This spacer can be purchased through a local authorized ZF distributor under the part # 1036 326 223. Dimensions of the spacer is provided below in figure 14 in the event one needs to be fabricated.

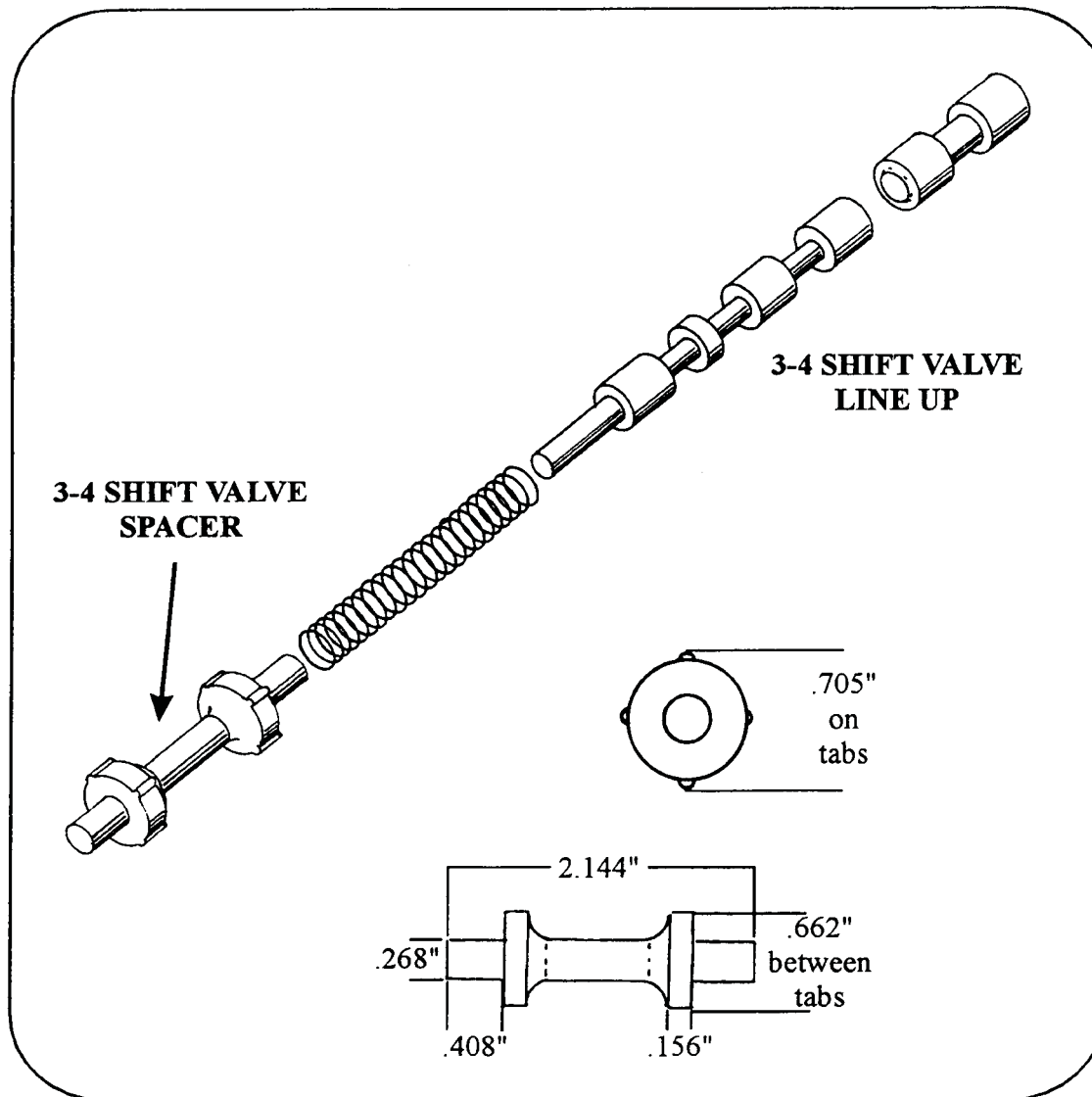


Figure 14

HARSH ENGAGEMENT INTO DRIVE AND A HARSH 4-3 DOWNSHIFT

Both the Saab and Eagle Premiers may exhibit a harsh engagement into drive and a harsh 4-3 downshift. One cause may be a faulty forward clutch (A clutch) accumulator spring (See Figure 15). This allows the forward clutch to come on abruptly when doing a 4-3 downshift or placing the selector lever into any forward ranges. If upon inspection of this spring you find that it is not broken, collapse the spring and see if there is uneven coil binding. A new spring can be ordered through a local authorized ZF distributor. To order the properly calibrated spring for the transmission you are working on, obtain the 3 digit number that is pressed into the identification plate (See Chart Below). Saab has this plate mounted on top of the bellhousing and Premiers mount the plate on the side of the case next to the servo. Once the number has been located, cross reference the number in the chart below to obtain the appropriate part number.

SAAB		PREMIER	
CODE #	PART #	CODE #	PART #
023 024	0732 042 051	010 015	0732 042 170
031 032		006	0732 042 211
048 049	0732 042 219	021	0732 042 185
058 059			
065			

OBTAIN NUMBER
HERE

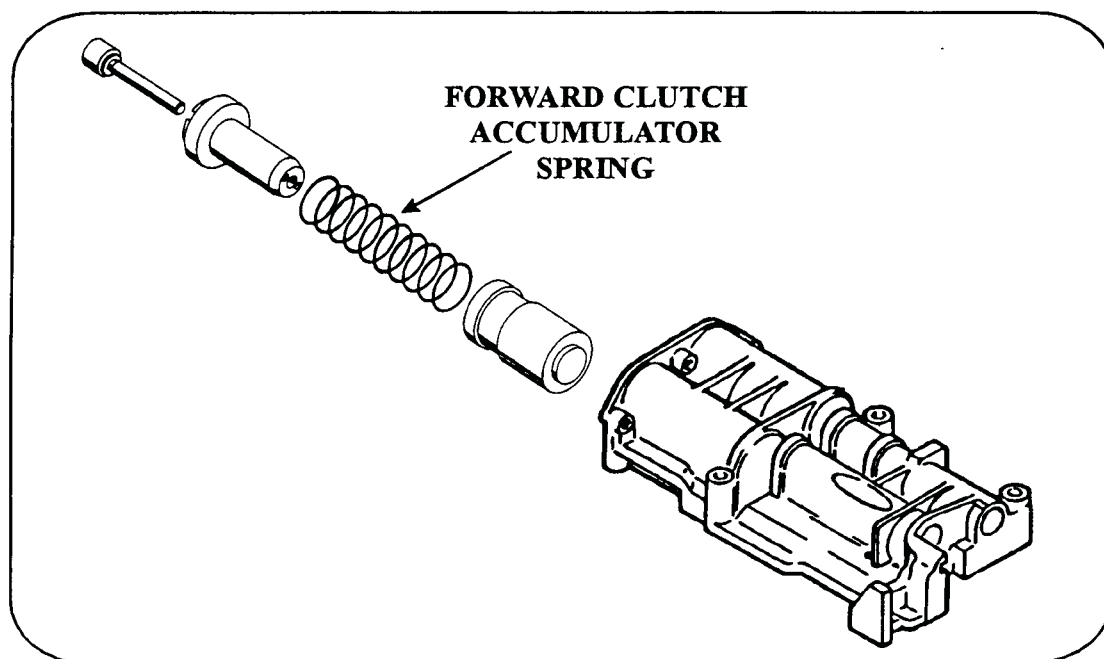
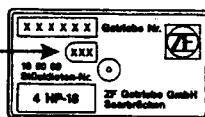


Figure 15

SAAB 9000/EAGLE PREMIER (ZF-4HP-18)

DELAYED OR NO REVERSE

COMPLAINT: ZF-4HP-18 transmissions may exhibit a long delay into reverse or no reverse range at all. The forward gears are unaffected.

CAUSE: One cause may be that the bushing in the reverse input drum has moved forward blocking the two oil feed holes (See Figure 16). The normal position of the bushing is about .060" above the drum surface and covers 50% of the feed holes (See Figure 17).

CORRECTION: Currently, this bushing is not serviced separately so the entire drum will need to be replaced to correct this condition.

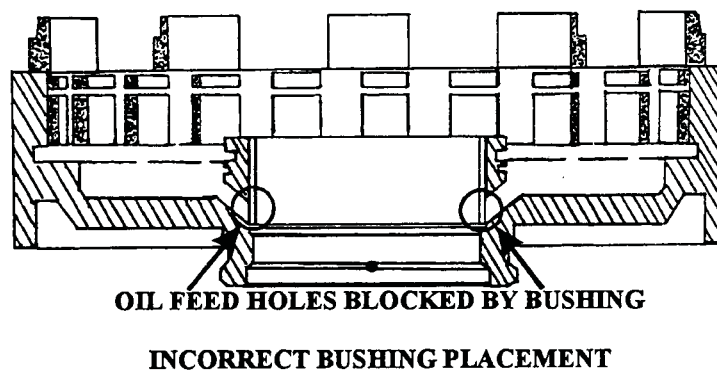


Figure 16

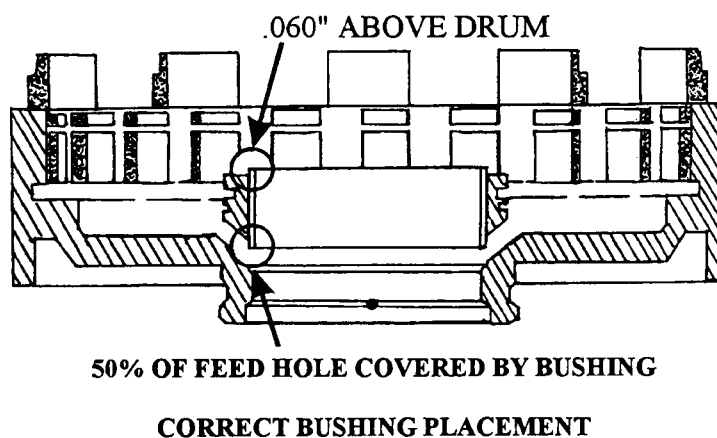


Figure 17

SAAB 9000/EAGLE PREMIER (ZF-4HP-18)

NO FORWARD GOOD REVERSE

COMPLAINT: ZF-4HP-18 transmissions may exhibit a no move condition in any forward range and reverse is uneffected.

CAUSE: One cause may be that either the 3-4 or 4-3 traction valve in the valve body has stuck in a stroked position preventing forward clutch apply (See Figure 18).

CORRECTION: Remove the valve body from the transaxle. Inspect and free the valve that is stuck.

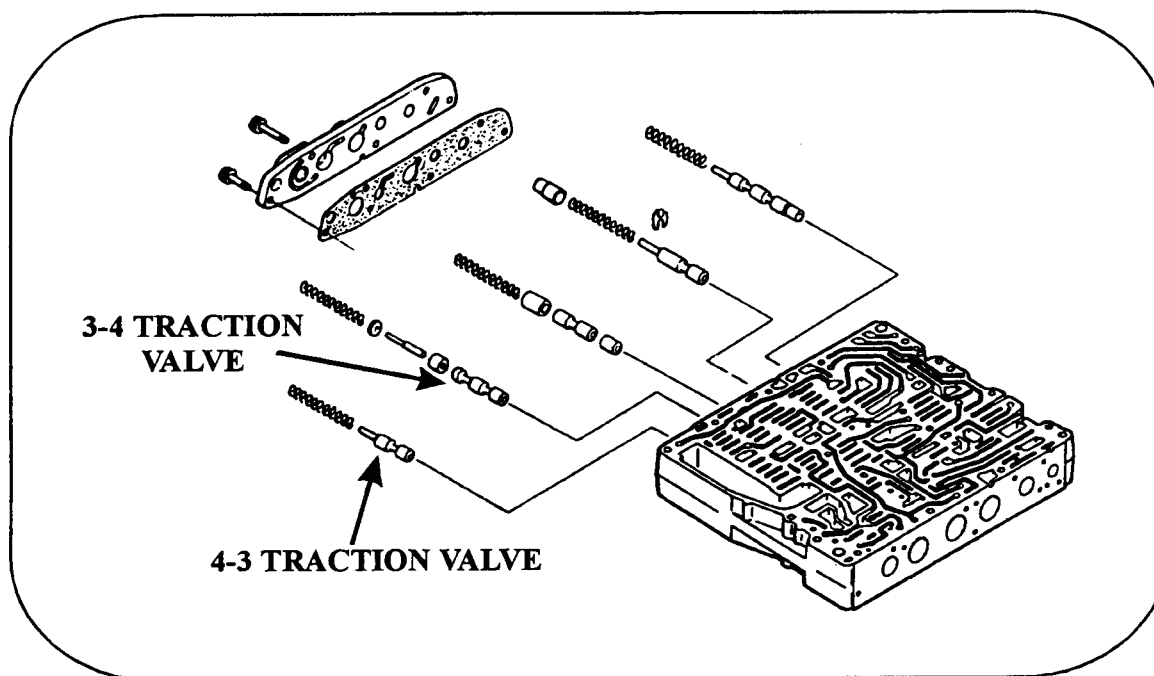


Figure 18

SAAB 9000/EAGLE PREMIER (ZF-4HP-18)

DELAYED FORWARD ENGAGEMENT OR PREMATURE FAILURE OF THE FORWARD CLUTCH

COMPLAINT: ZF-4HP-18 transmissions may exhibit a delayed forward engagement or premature forward clutch failure after overhaul.

CAUSE: One cause may be that the top sealing ring on the stator may have machined its groove wider causing a leak in the forward clutch circuit. The widening of the groove by the sealing ring is done so well that it may be overlooked during overhaul. Another cause may be the bushing in the stator having a ring groove cut into it by the turbine shaft sealing ring. This will also cause a forward clutch leak (See Figure 19).

CORRECTION: If a .040" or greater feeler gauge can fit into the groove along side the sealing ring, the stator will need to be replaced (See Figure 19). If the sealing ring groove is good and the bushing is bad, the bushing is serviced separately by aftermarket companies. Refer to your local supplier.

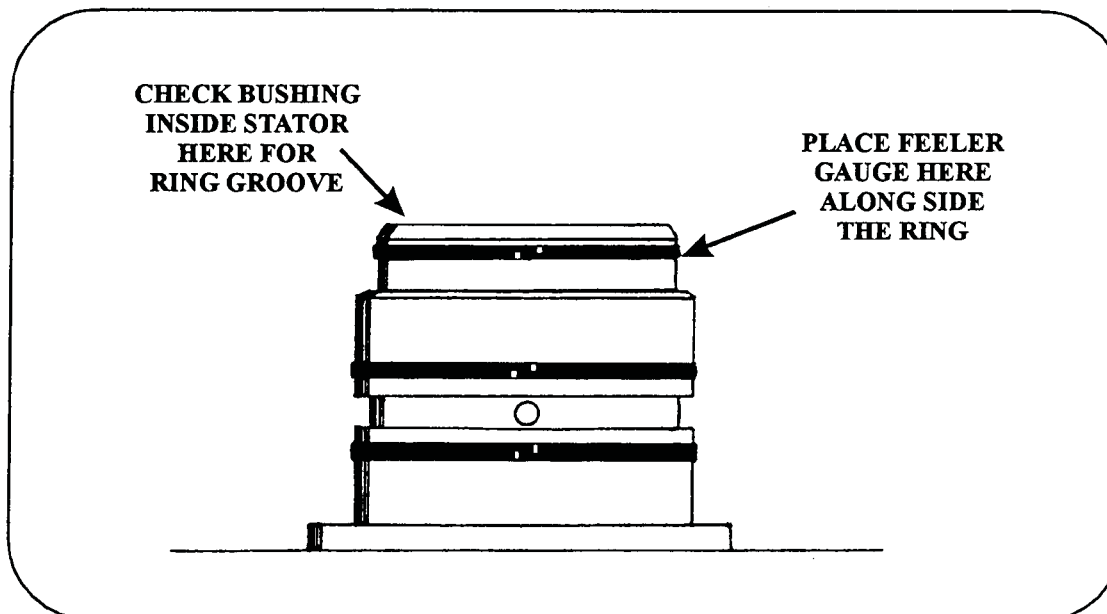


Figure 19

SAAB 9000 SERVICE INFORMATION

TRANSMISSION SHUDDER WHEN COMING TO A STOP

COMPLAINT : Vehicle exhibits a shudder or vibration when coming to a hard stop from fourth gear in cold weather. The problem may disappear after the vehicle is warm.

CAUSE : This symptom is caused by the 4-3-2 sequence valve not moving rapidly enough. This causes third gear to remain engaged longer than it should, causing a drastic reduction in engine RPM resulting in a shudder or vibration condition.

CORRECTION : Install a ZF Service kit by Saab. The part # is 7597867. This kit calibrates the valve body to ensure an improved sequential downshift. An instruction sheet is included in this kit.

QUALIFICATION : Before installing this kit, first locate the ID plate on top of the bell housing. There should be a variant code stamped onto the bell housing in red paint near the area of the ID plate. A stamp of 034 or higher indicates an upgraded valve body. This should also coincide with the following gearbox serial numbers on the ID plate:

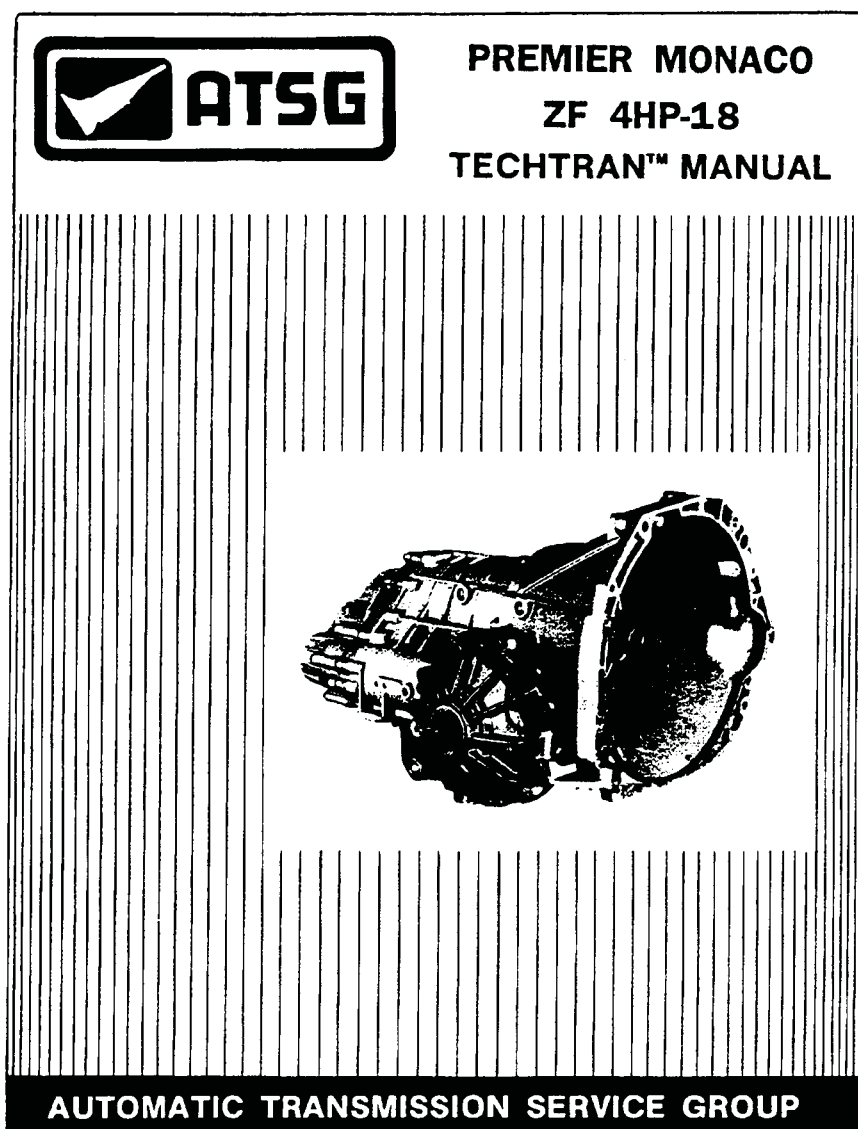
Saab 9000S	27434
Saab 9000 Turbo	26960

If the red paint stamp is missing, there is a code stamped onto the valve body. A code of 038 or higher on Saab 9000S vehicles, or 039 on Saab 9000 Turbo vehicles indicates that the valve body has been upgraded. The service kits should not be installed in these valve bodies.

CASE AND INTERNAL COMPONENTS

Since the majority of the internal components in a Saab 9000 transmission is the same as Premier and Monaco transmissions, this supplement manual will only provide a brief overview of the case and internal components starting on page 30 and ending on page 41. For a more detailed description of tear down, overhaul and reassemble procedures, refer to the Eagle Premier, Dodge Monaco Techtran Manual on the ZF-4HP-18 as seen below.

The following illustrations in this supplement manual that show the number of the clutches in each drum represents the higher capacity units. Some light duty models use one less lined plate in the Forward clutch pack, the 3/4 clutch pack, the Reverse Input clutch pack and L/R clutch pack.



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CASE COMPONENTS

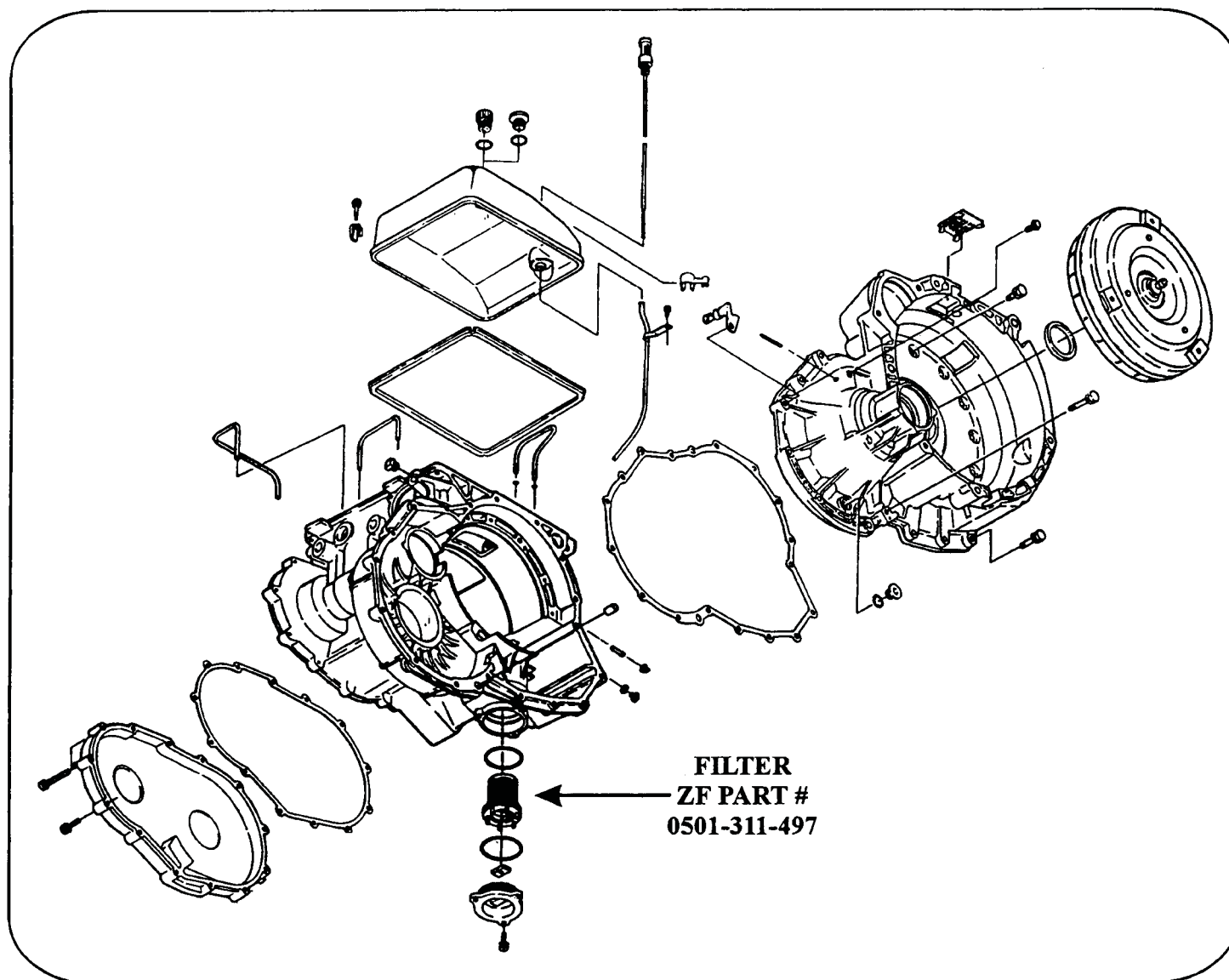


Figure 20

PUMP AND INTERMEDIATE (C) CLUTCH

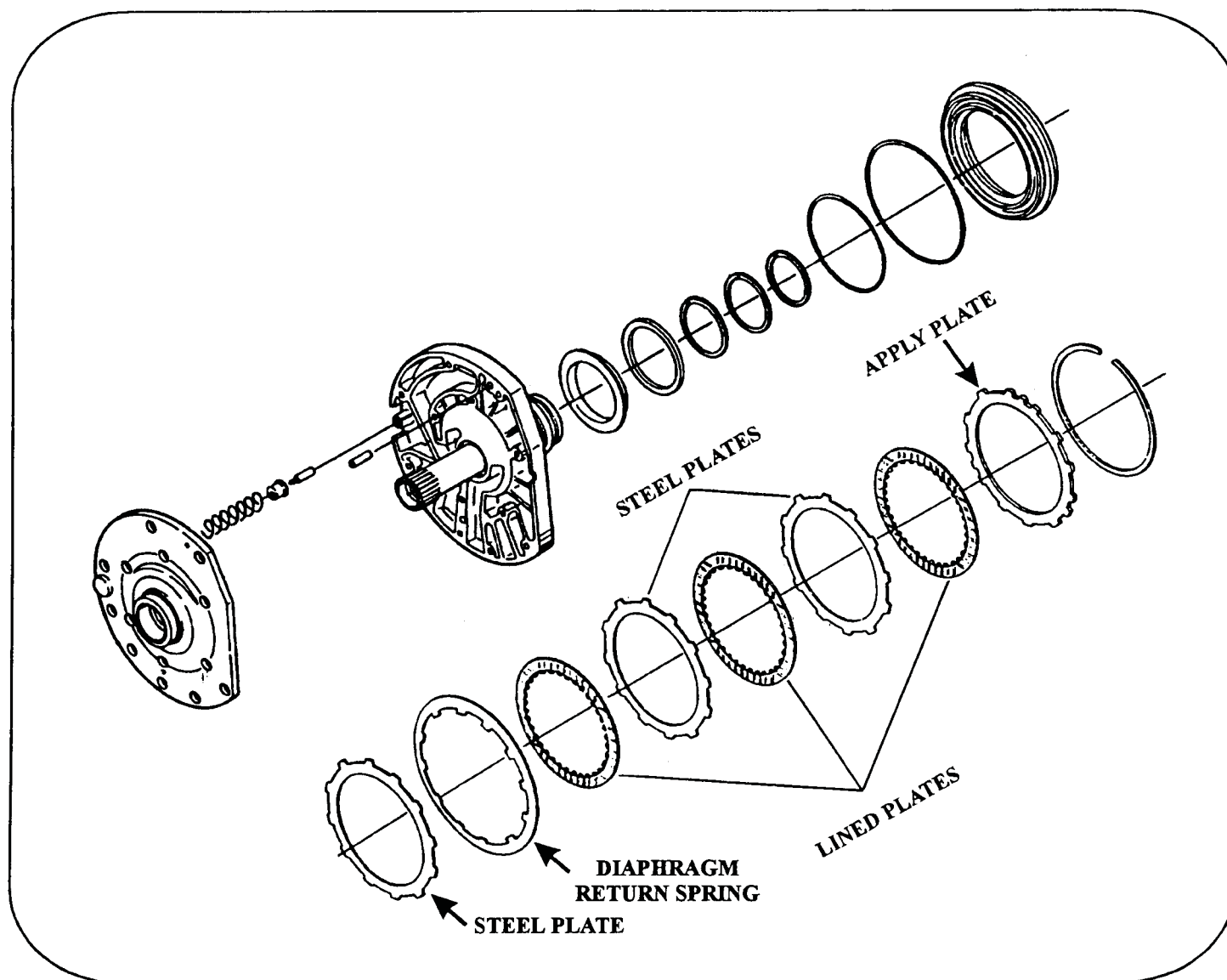


Figure 21

NOTE: WHEN BUILDING UP THE INTERMEDIATE CLUTCH PACK, A STEEL PLATE IS INSTALLED FIRST. ONCE THE STEEL PLATE HAS BEEN INSTALLED, THE DIAPHRAGM RETURN SPRING SITS ONTO THE STEEL PLATE LIKE A BOWL. A LINED PLATE CAN NOW BE INSTALLED FOLLOWED BY A STEEL PLATE AND SO ON. AN INCORRECT ASSEMBLY MAY EXHIBIT 2ND GEAR STARTS AND A BIND UP IN MANUAL LOW.

2/4 BAND (C')

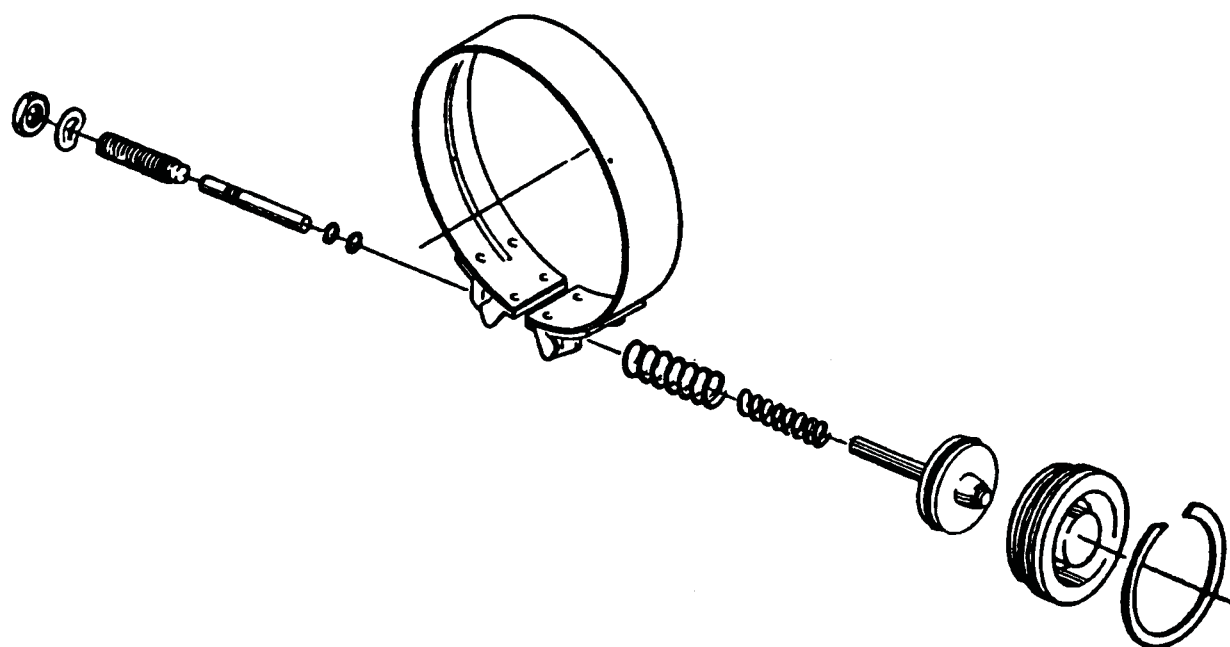


Figure 22

REVERSE INPUT (B) CLUTCH AND INTERMEDIATE SPRAG

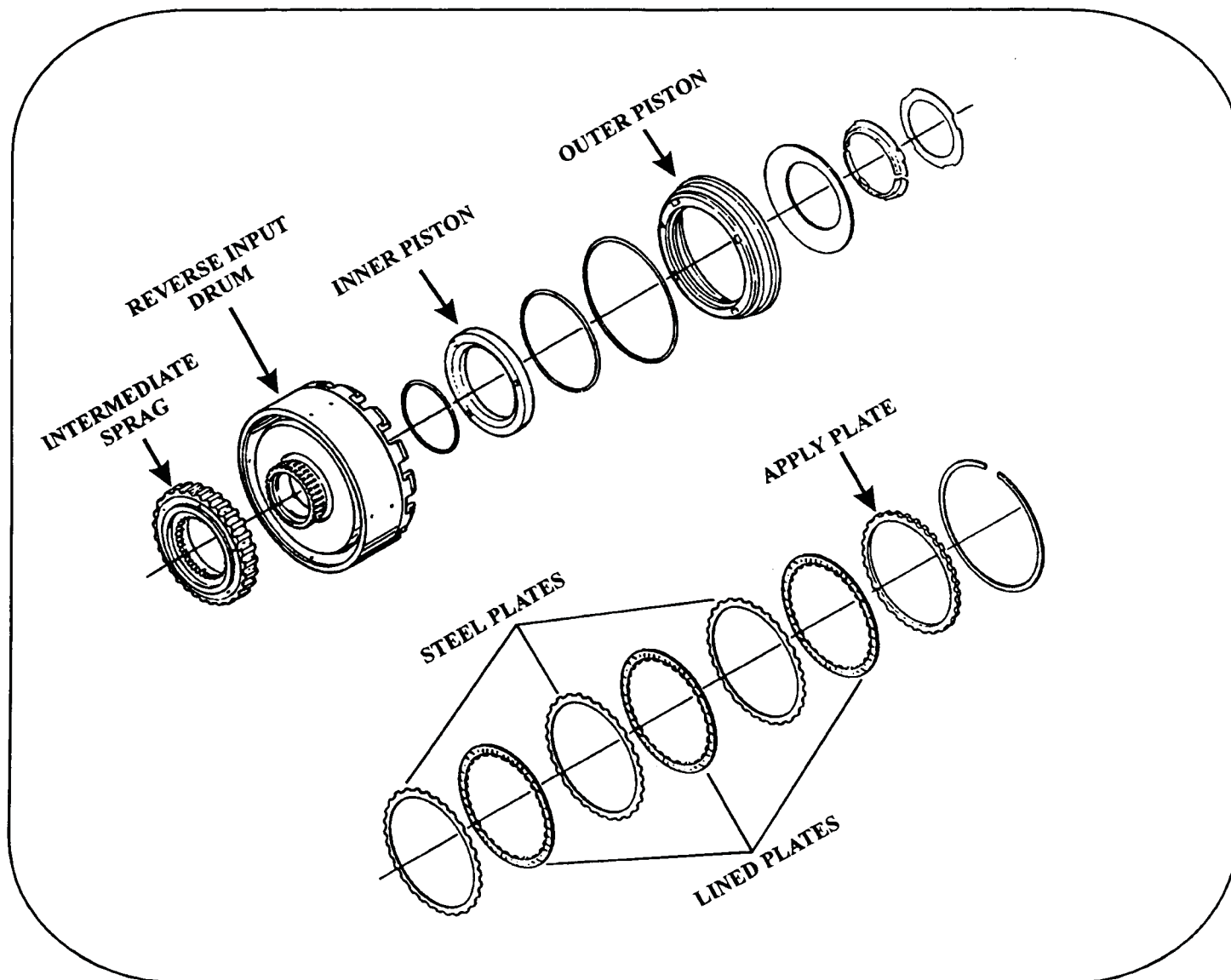


Figure 23

NOTE: TO DETERMINE IF THE INTERMEDIATE SPRAG HAS BEEN ASSEMBLED CORRECTLY, HOLD THE REVERSE INPUT DRUM STATIONARY. THE OUTER RACE WILL FREEWHEEL COUNTER CLOCKWISE AND LOCK CLOCKWISE.

FORWARD (A) CLUTCH

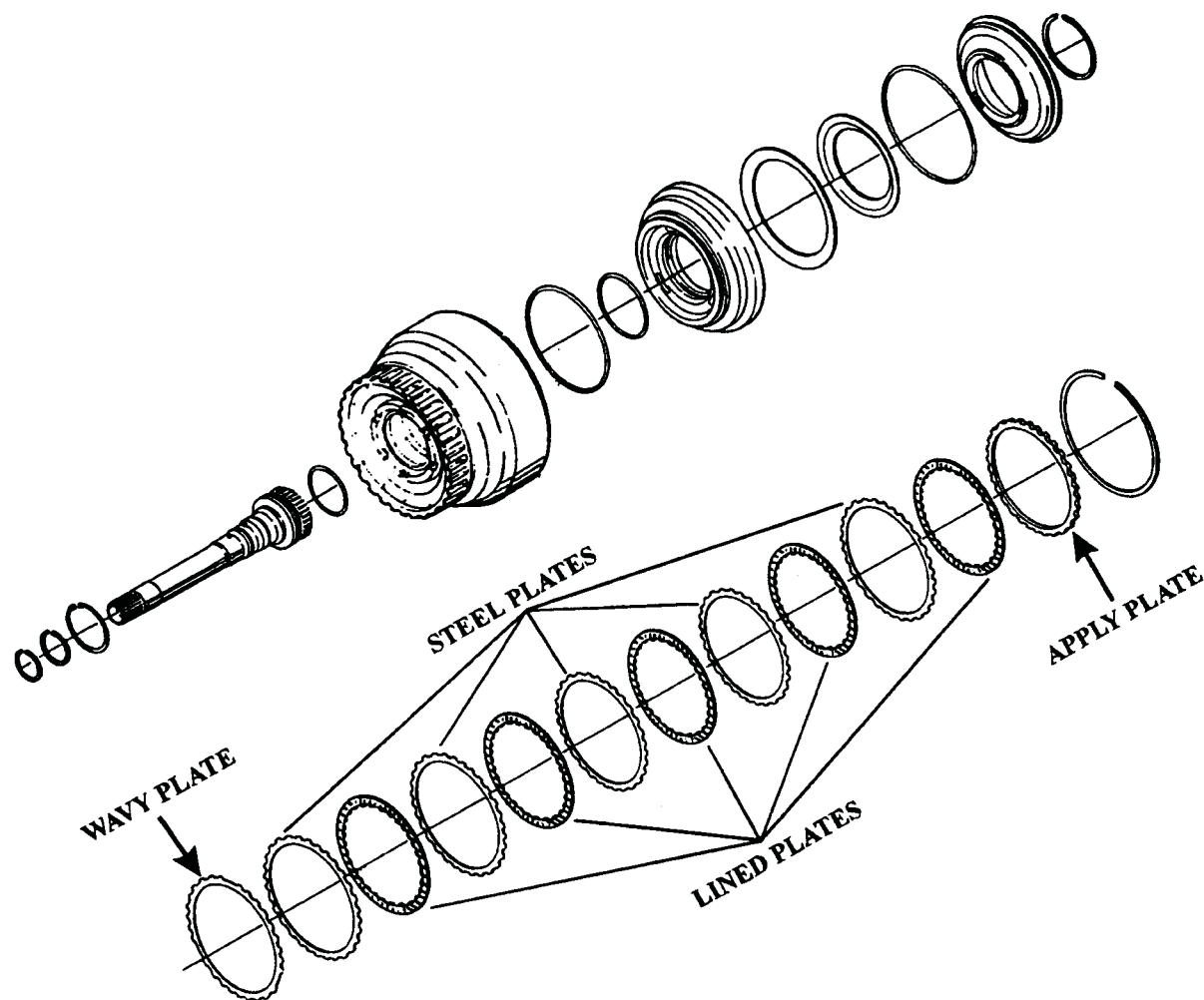


Figure 24

3/4 (E) CLUTCH

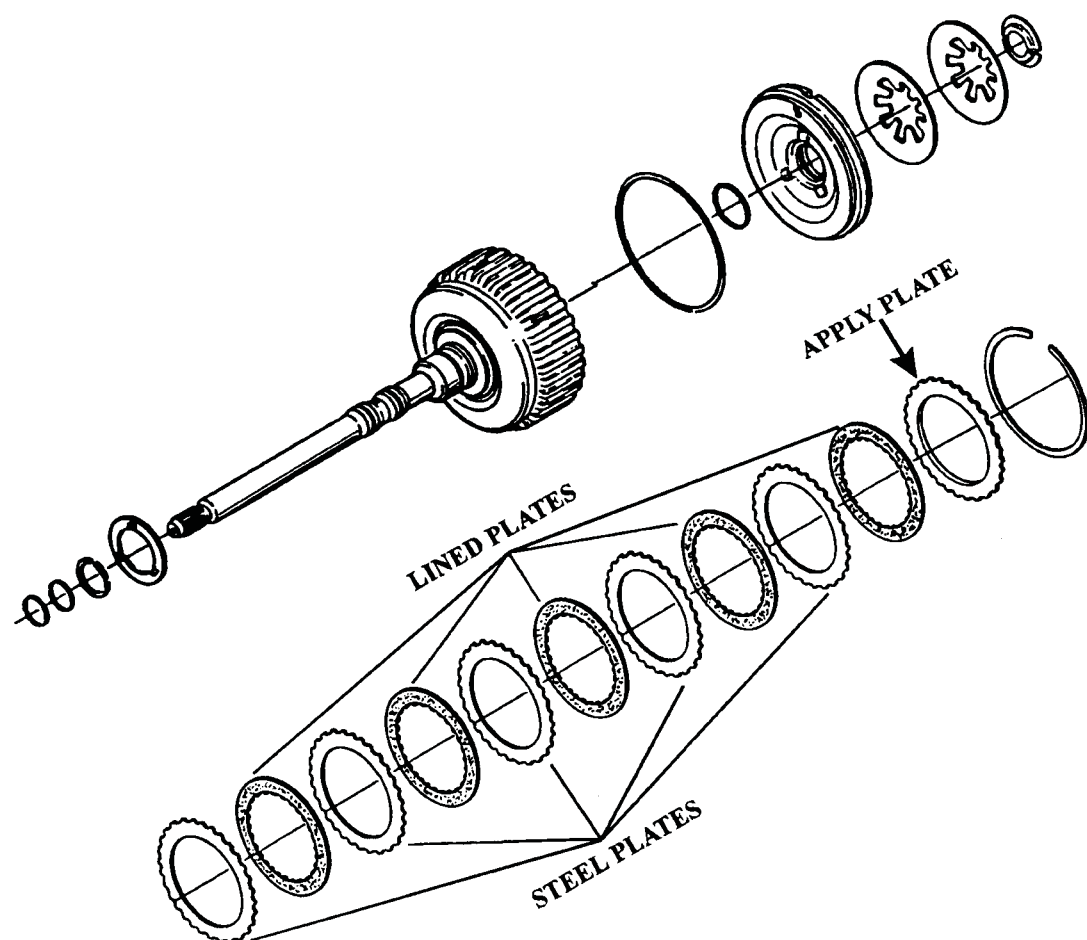


Figure 25

HUBS AND GEAR TRAIN

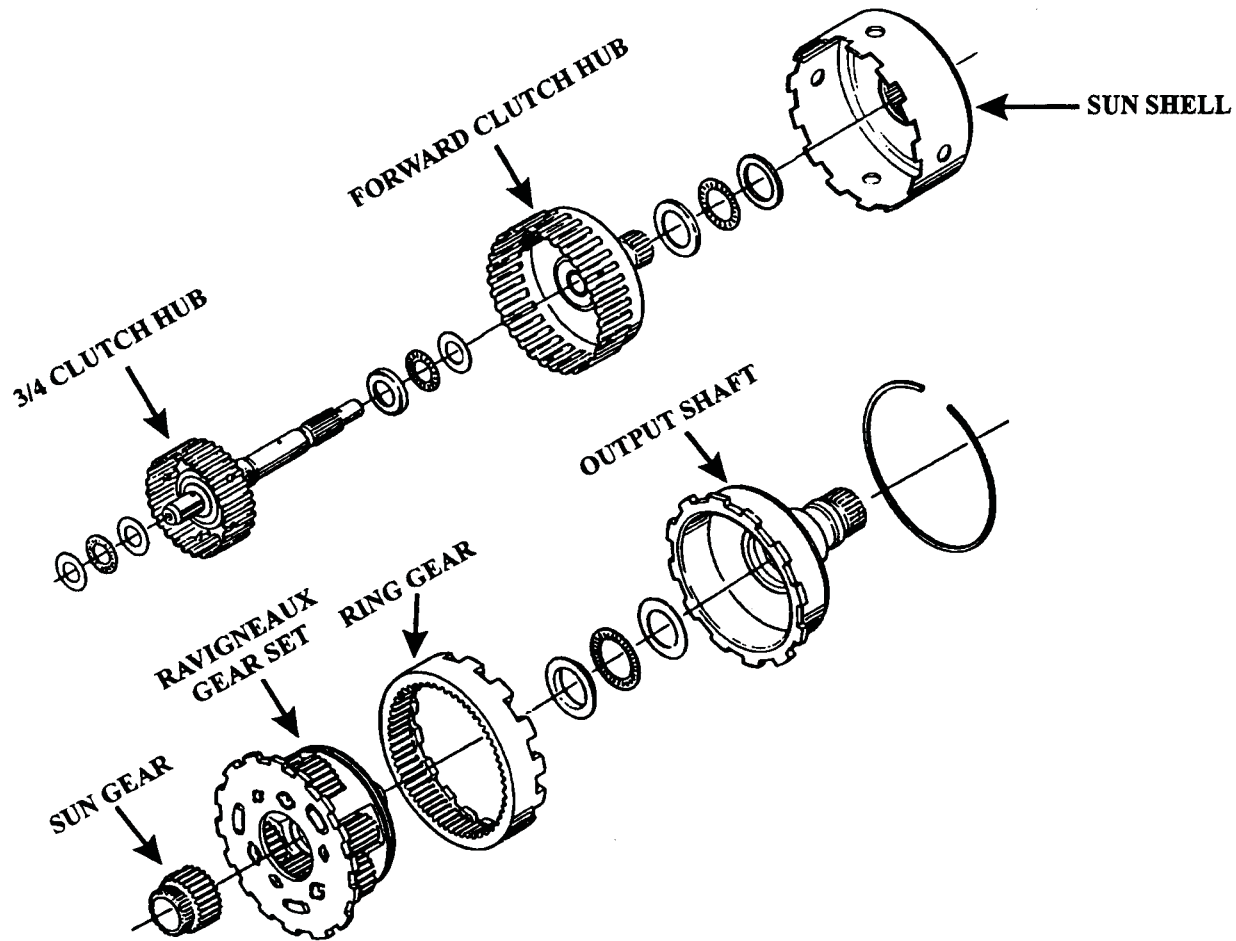


Figure 26

LOW/REVERSE (B) CLUTCH AND LOW ONE WAY CLUTCH

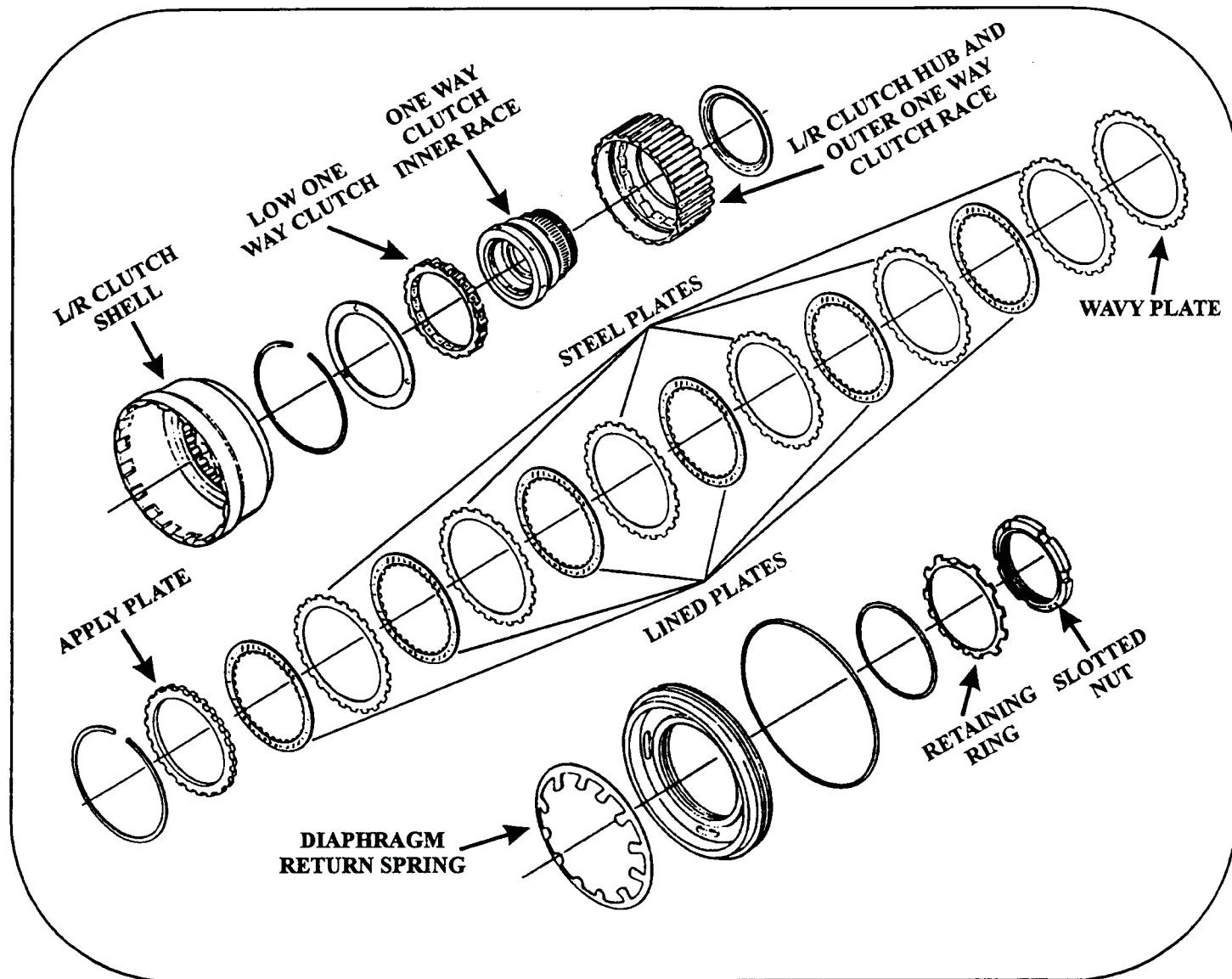


Figure 27

NOTE: WHEN THE LOW ONE WAY CLUTCH IS INSTALLED CORRECTLY, THE OUTER RACE WILL TURN CLOCKWISE AS WILL THE L/R CLUTCH SHELL.

TRANSFER GEARS AND PINION SHAFT

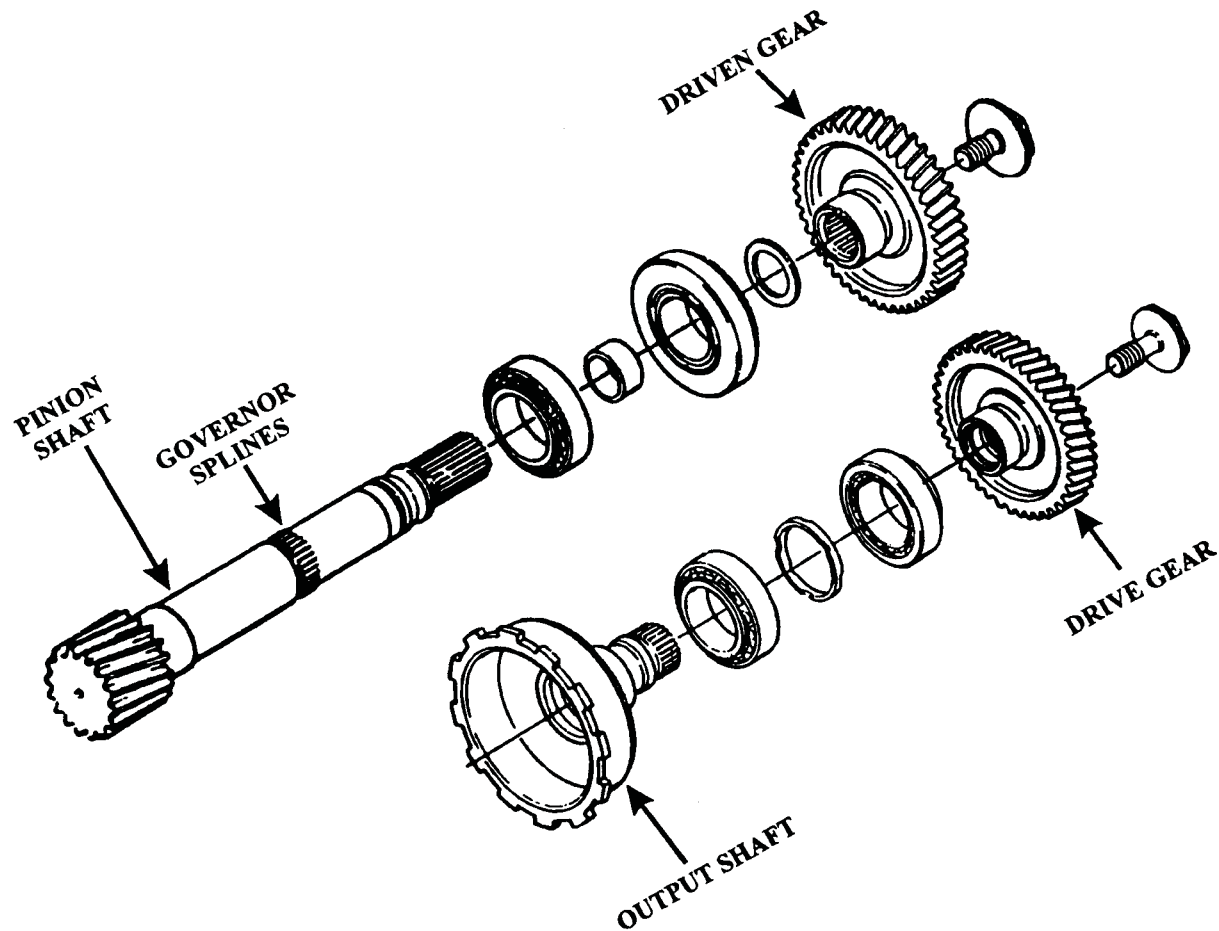


Figure 28

FINAL DRIVE AND AXLES

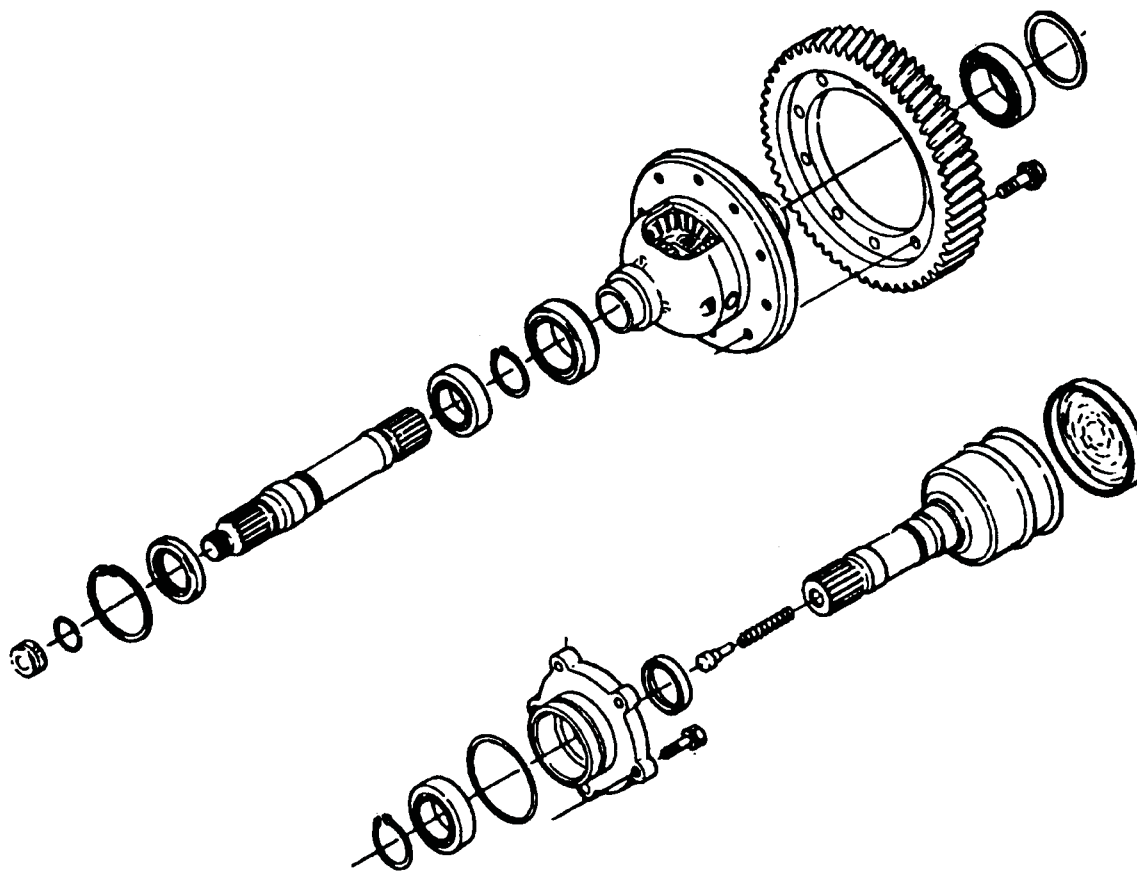


Figure 29

TWO STAGE AND THREE GOVERNORS

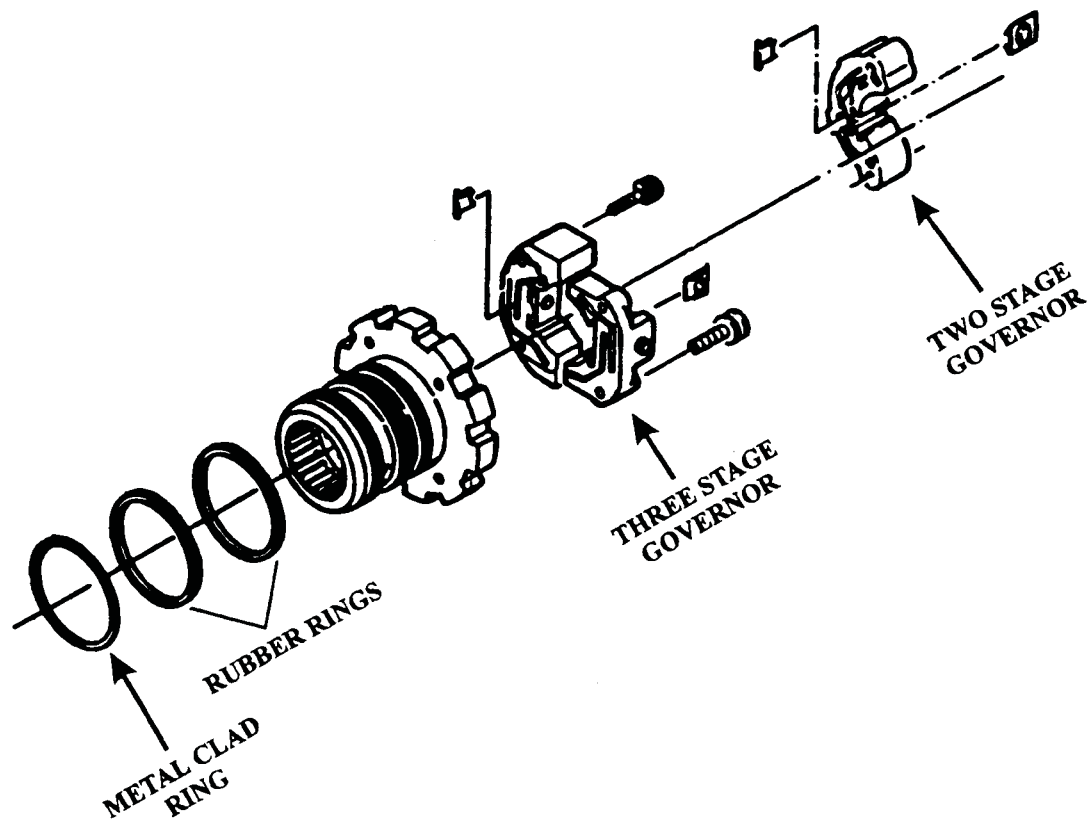


Figure 30

SPEEDOMETER - THROTTLE CABLE - INTERNAL LINKAGE

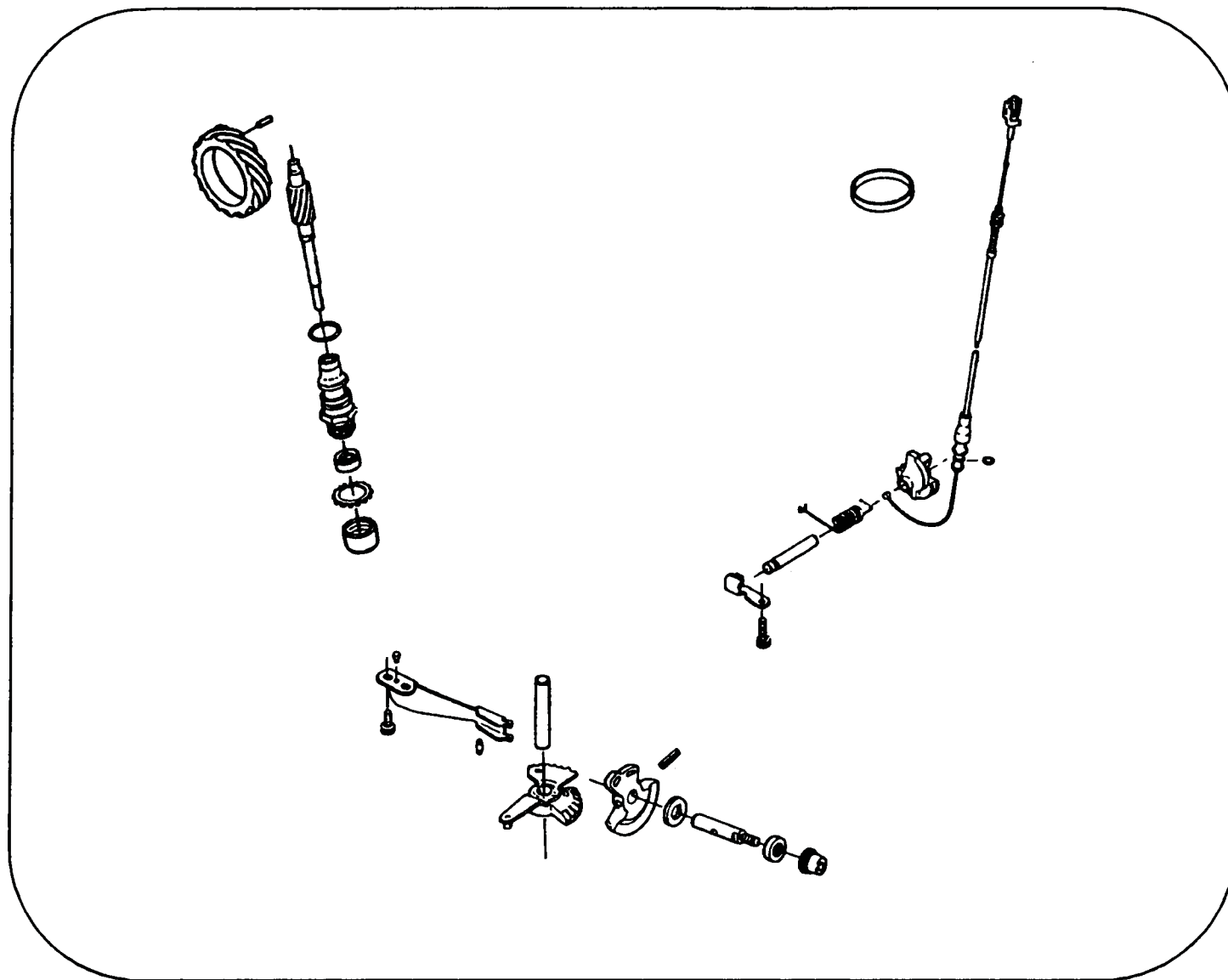
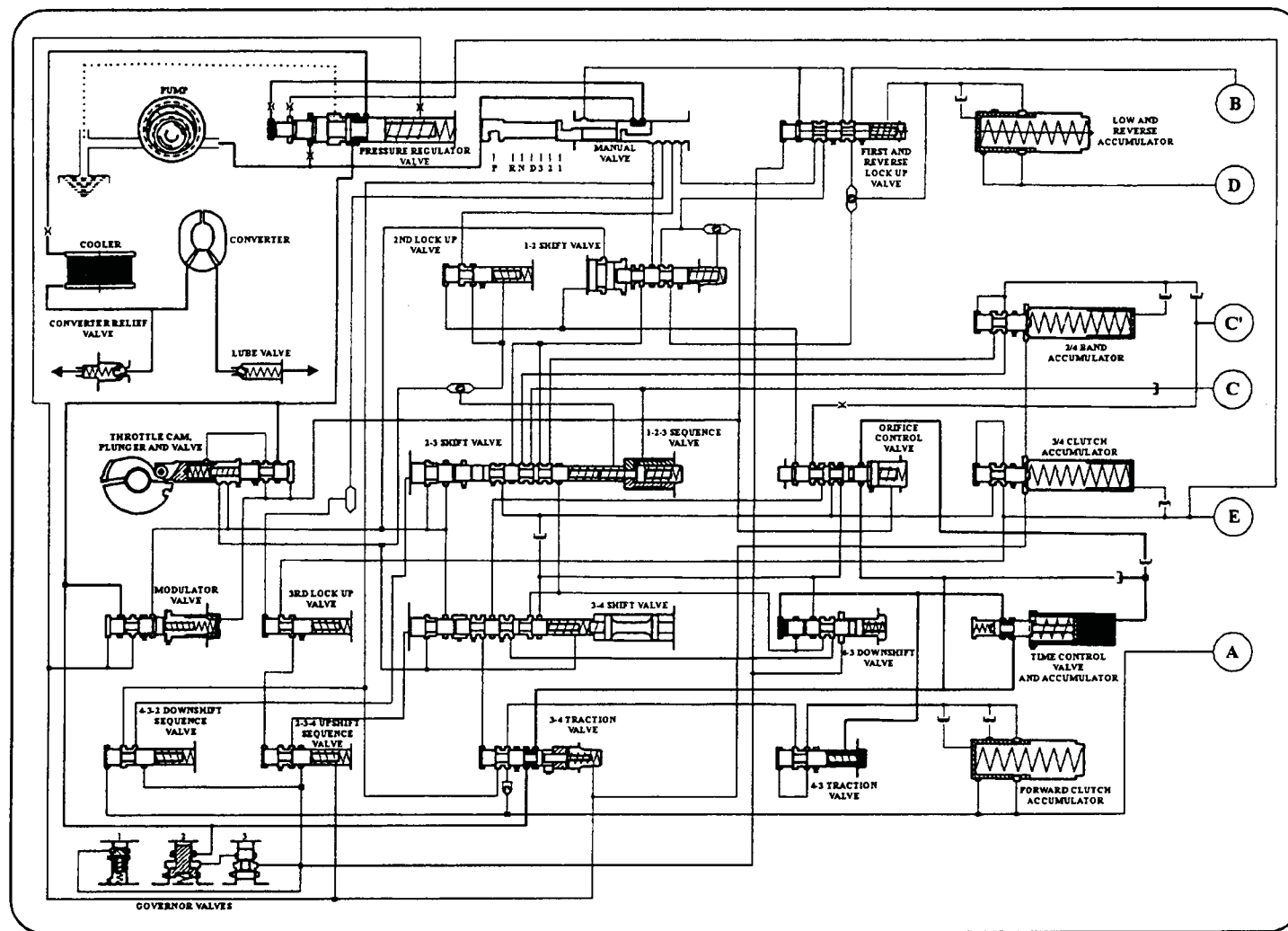


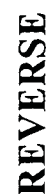
Figure 31

HYDRAULIC OIL SCHEMATICS

The following oil schematics can be used in diagnosing hydraulic concerns in both Saab and Dodge vehicles equipped with 4-HP-18 transmissions. The technician must keep in mind that these schematics are the best that is available and ATSG does not guarantee its accuracy.

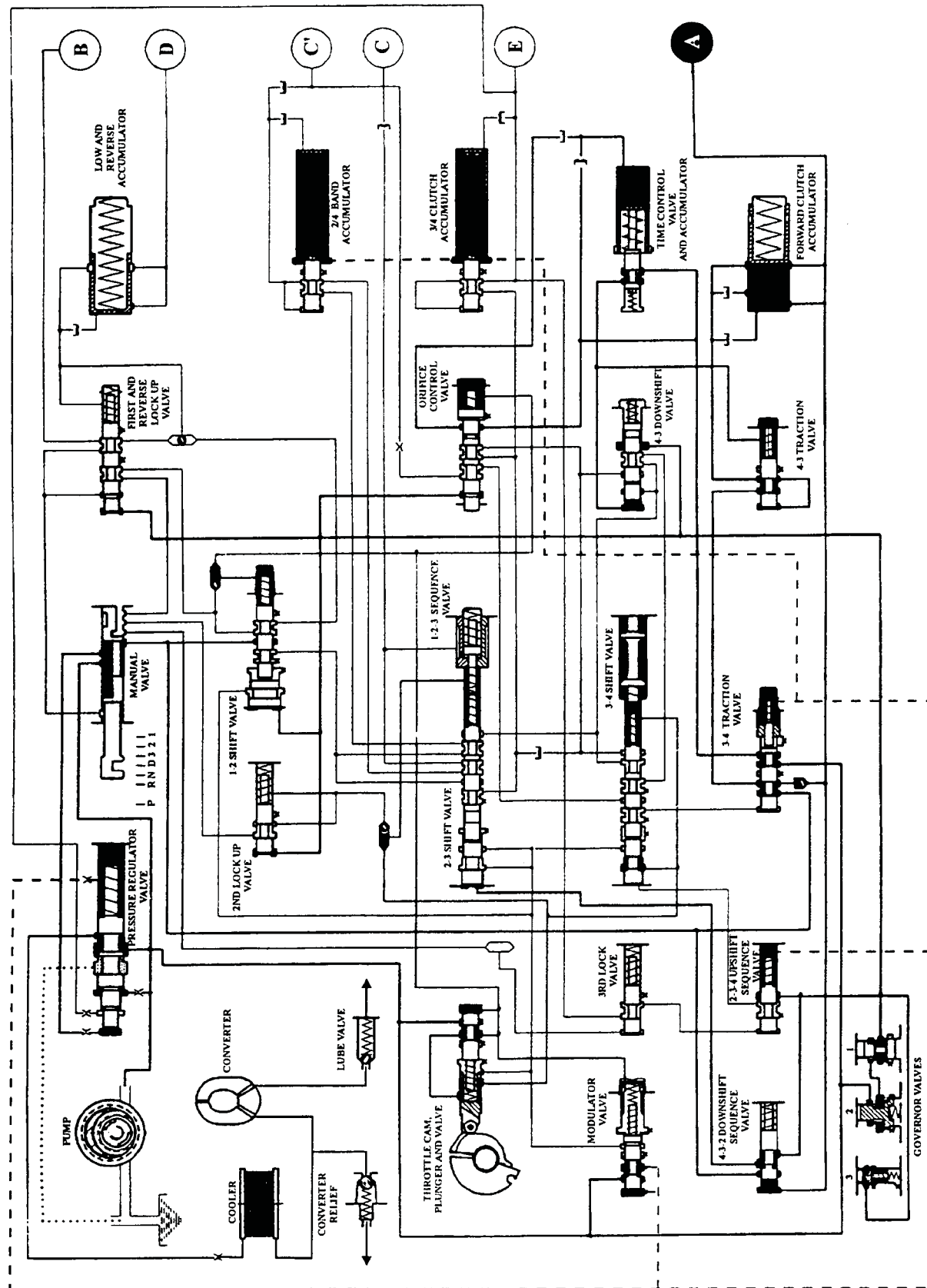


PARK



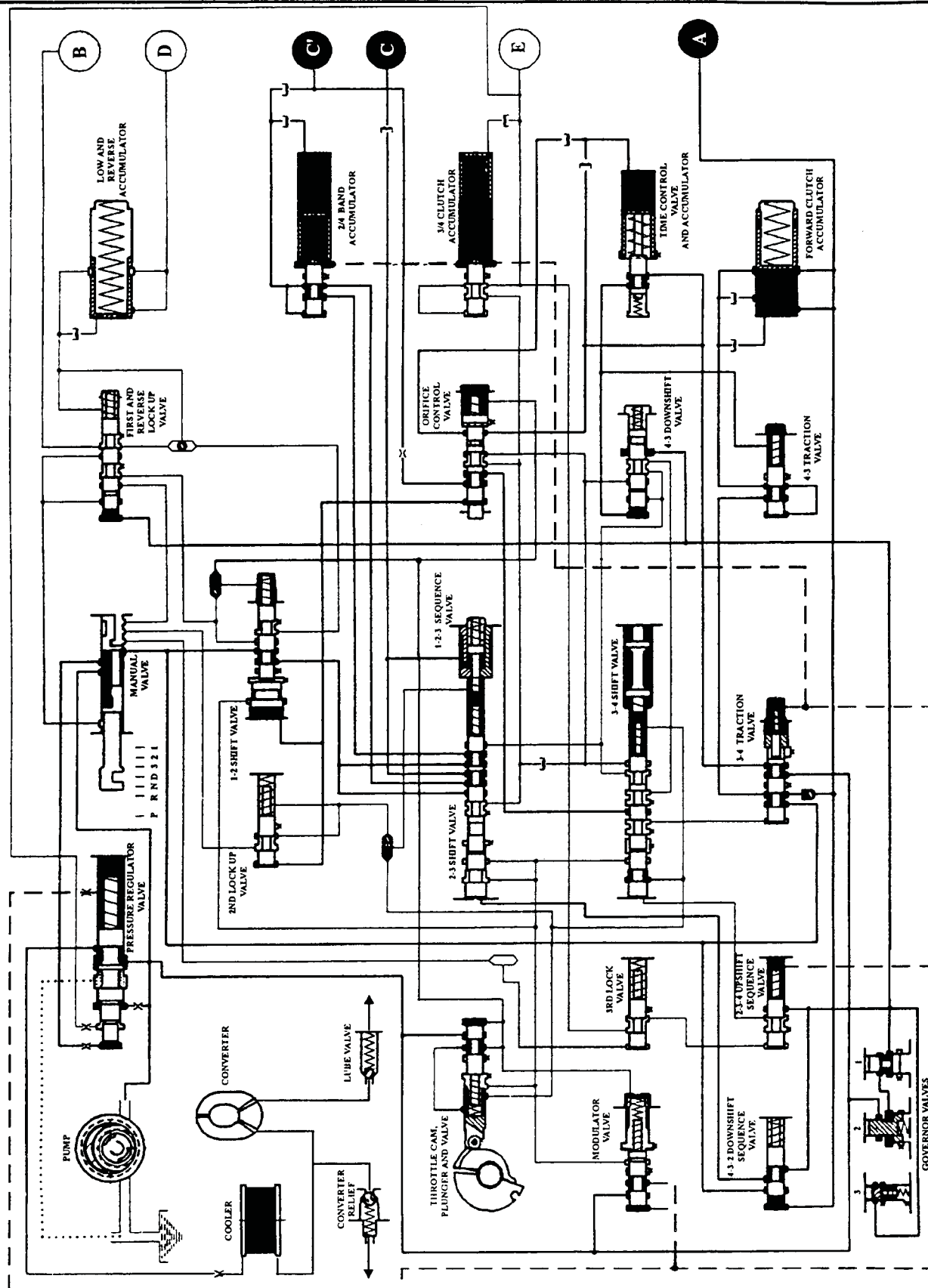


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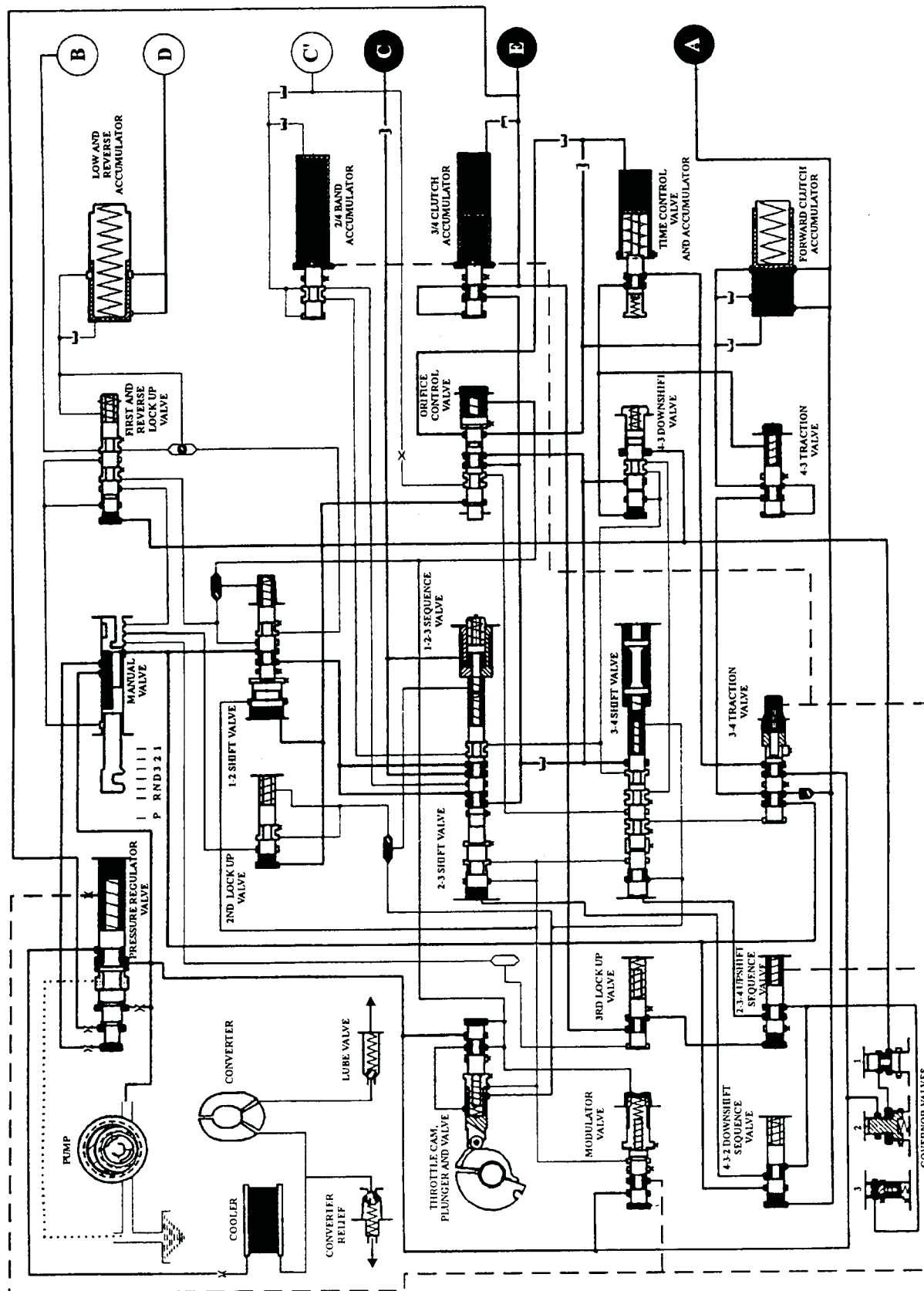
DRIVE FIRST GEAR

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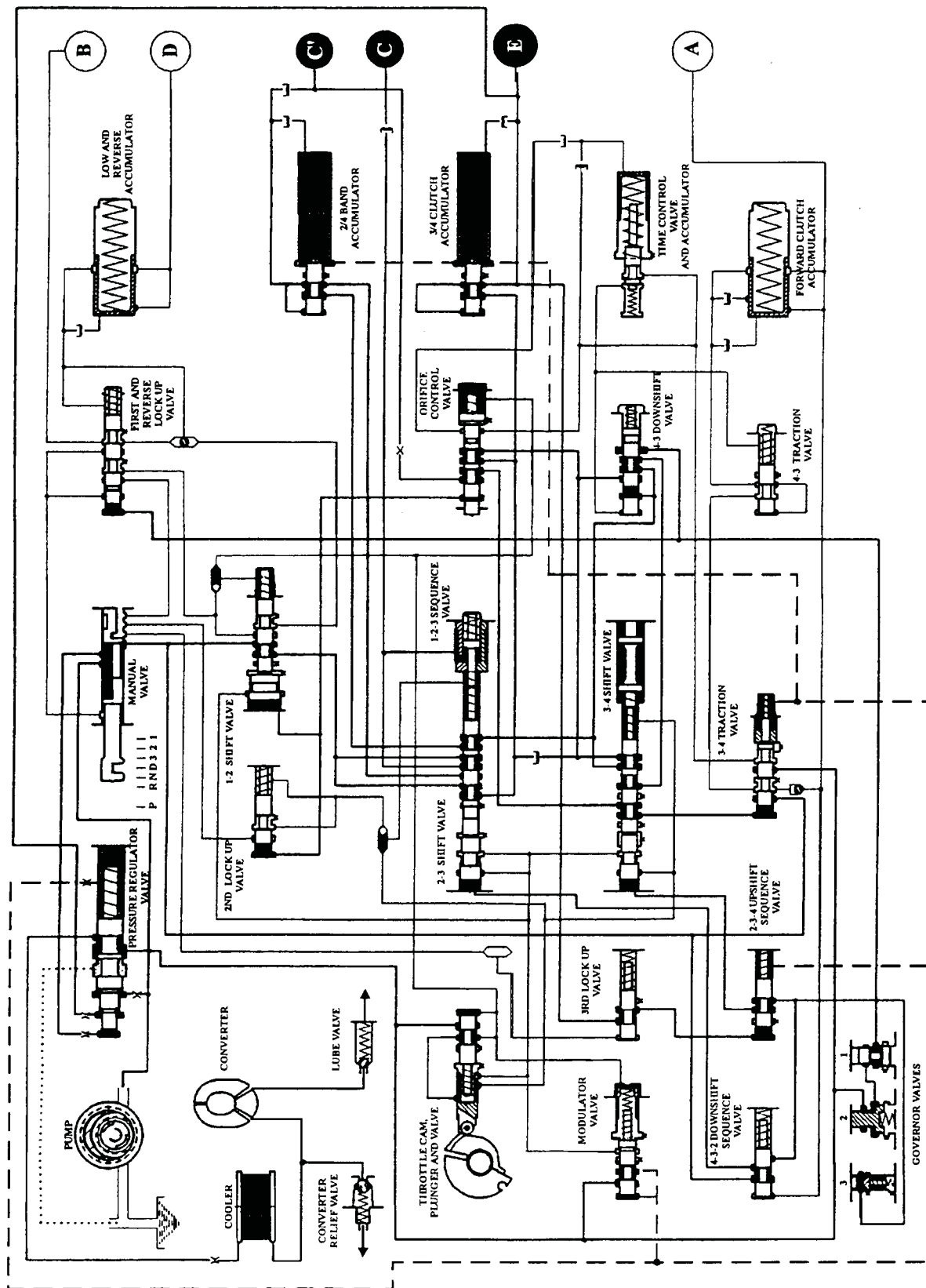


DRIVE SECOND GEAR

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DRIVE THIRD GEAR



DRIVE FOURTH GEAR