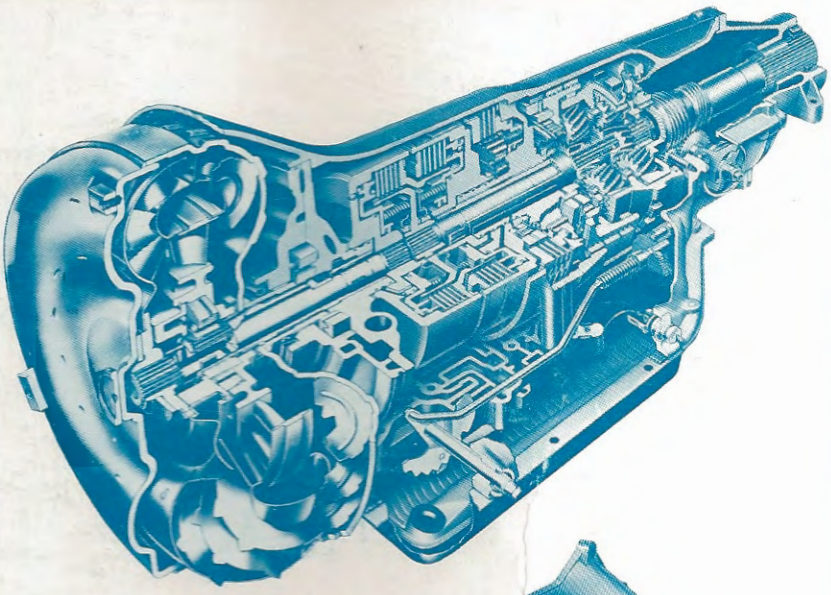
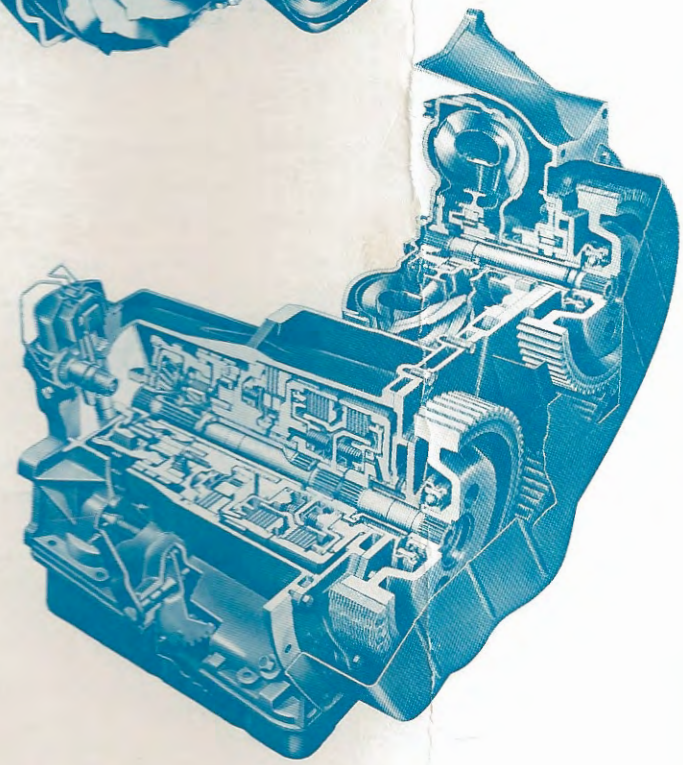
THM 375 400 475



425



SYSTEMATIC TROUBLE SHOOTING

HYDRA-MATIC

Fourth Edition

HYDRA-MATIC
Division of General Motors Corporation
Ypsilanti, Michigan 48197

Hydra-matic
375, 400, 475 & 425
SYSTEMATIC TROUBLE SHOOTING

FOREWORD

This booklet contains product information and describes Trouble Shooting procedures. It is not intended to replace service manuals or service bulletins.

This booklet applies to Turbo Hydra-matic models 375, 400, 475 and 425 only.

The 375, 400 and 475 models as used in conventional rear drive vehicles are essentially the same in appearance and function. The 425 model is used in front wheel drive vehicles.

HYDRA-MATIC

Division of General Motors Corporation
Ypsilanti, Michigan 48197

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INDEX

Introduction—How To Use Booklet 1
PRELIMINARY CHECKING PROCEDURE.... 2
Press. & Vac. Gages Connected To Trans..... 4
Hand Operated Vacuum Device Connected To Trans 5
Checking Trans. Oil Level 6
Manual Linkage Adjustment 6
Road Test 7
PRELIMINARY DIAGNOSIS CHART 8
SYSTEMATIC TROUBLE SHOOTING GUIDE . 9
Specific Transmission Malfunctions:
No Upshifts, Delayed Upshifts, or Full Throttle Upshifts Only 9
1-2 Shift Complaint..... 10
2-3 Shift Complaint..... 11
1st & 2nd Speeds Only, No 2-3 or Delayed 2-3..... 11
No Drive or Slips In Drive..... 12
No Reverse or Slips In Reverse 12
Misses Second Especially When Transmission Is At Operating Temperature ... 13
No Detent Downshifts..... 13
No Engine Braking-Inter. Range-2nd Gear.. 14
No Engine Braking-Lo Range-1st Gear 14
Drive In Neutral 14
Won't Hold In Park or Won't Release 14
Transmission Noisy..... 15
No Converter Stator Angle Change (Some Models Only) 16
Causes of Improper Vac. at Modulator 17
Control Val. Ass'y.-Gov. Line Press. Check..... 17
Causes of Oil Leaks..... 18
Causes of Burned Clutch Plates..... 19
Causes of Low Line Pressure..... 20
Causes of High Line Pressure..... 21
Modulator Ass'y. Diagnosis Procedure..... 22
"400" Turbo Hydra-matic Cutaway (Typical)... 24
Range Reference Chart 25
Oil Flow Diagram 26
Misc. Trans. Component Illustrations 27-41

Hydra-matic

Division of General Motors,
Willow Run, Ypsilanti, Michigan

Office of the General Manager

A MESSAGE FROM HYDRA-MATIC'S GENERAL MANAGER

This booklet was prepared to help you save time and effort when diagnosing complaints on models 375, 400, 425 and 475 Turbo Hydra-matic transmissions. The information is arranged so that even the most inexperienced serviceman can step-by-step follow the procedure and determine the item or area causing the complaint.

In developing "Systematic Trouble Shooting", the technician in the field was given prime consideration. The system requires only basic shop instruments and procedures to perform most of the checks. A broad knowledge of theory of operation is not required - the logic has been built into the system. The information used is not purely theoretical, but is based on actual data gathered by evaluating normal and malfunctioning units as well as information obtained from actual field reports. Experience has proven the booklet to be a valuable tool when properly used.

Sincerely,

G. W. Griffith

G. W. Griffith

INTRODUCTION

The low percentage of Turbo Hydra-matic 375, 400, 475 and 425 transmission problems in the field has not provided the average service man with a steady flow of transmissions to work on; and in some cases, there have been long periods of time between the training course and the first transmission malfunction he is required to diagnose.

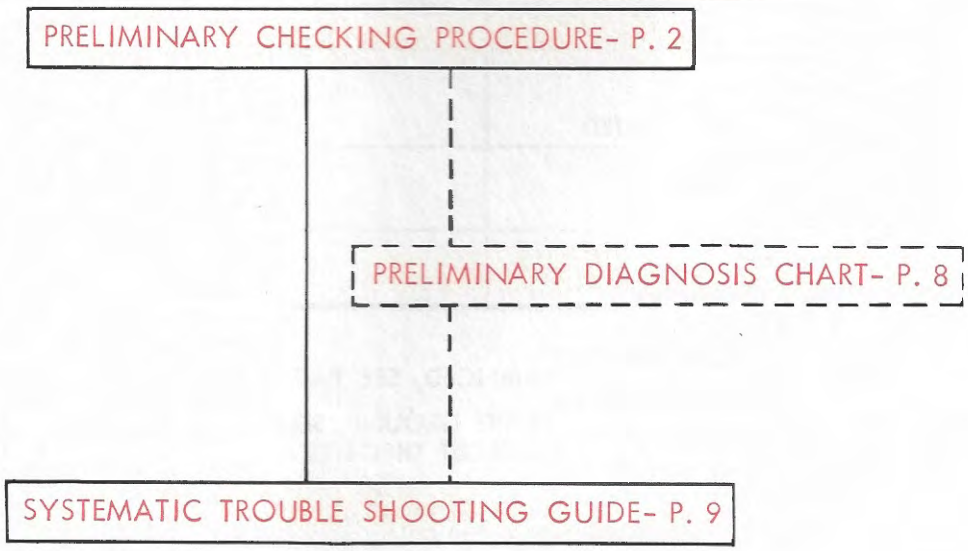
"Systematic Trouble Shooting" is designed for all field service personnel regardless of the amount of training or experience they have had in working on the Turbo Hydra-matic transmission. It should be valuable to any service organization, from service writers and road testers to the mechanic who performs the repair operation.

This trouble shooting booklet is not intended to take the place of Turbo Hydra-matic training courses, service manuals or service bulletins. It is intended to supplement them by making available a practical method and systematic approach to diagnosing Hydra-matic transmission malfunctions, with the information that can be obtained from oil pressure checks and/or road tests.

An important aspect of diagnosis is the precise determination of the customer's complaint. For this reason, a short ride with the customer will often prove beneficial. It may be found that the condition the customer wants corrected is standard and should not be altered. If a malfunction is found, the first step when searching for the cause is normally to check the transmission oil level; the procedure is outlined on Page 6. The second step is normally to check the outside manual linkage; refer to Page 6. If discrepancies are found in these two steps they should be corrected and the vehicle road tested to see if the malfunction has been corrected. If no discrepancies are found, or if after correcting discrepancies the malfunction still exists, the next step of the procedure is to make the oil pressure checks.

Install the pressure gauge as shown on Page 4 and proceed to follow the steps outlined in the Preliminary Checking Procedure section. Record the pressures and compare them with the normal pressures provided for each condition. With the information you have obtained through the Preliminary Checking Procedure and the road test (if one was made) you can now apply it to the chart or charts in the Systematic Trouble Shooting Guide that fits the malfunction. The Preliminary Diagnosis Chart on Page 8 may lead you quickly to the problem area.

Remember this order:



PRELIMINARY CHECKING PROCEDURE

CHECK TRANS. OIL LEVEL SEE PAGE 6

CHECK OUTSIDE MANUAL LINKAGE AND CORRECT SEE PAGE 6

CHECK ENGINE TUNE

CAUTION: TOTAL RUNNING TIME FOR THIS COMBINATION NOT TO EXCEED 2 MINUTES.

INSTALL OIL PRESSURE GAGE

CONNECT TACHOMETER TO ENGINE.

CHECK OIL PRESSURES IN FOLLOWING MANNER

	RANGE	OIL PRESSURE	NORMAL P.S.I.
1	NEUTRAL—BRAKES APPLIED ENGINE AT 1000 RPM		55 TO 70
2	DRIVE IDLE SET ENGINE IDLE TO SPECIFICATIONS		60 TO 85
3	DRIVE—BRAKES APPLIED ENGINE AT 1000 RPM		60 TO 90*
4	SUPER OR LO—BRAKES APPLIED ENGINE AT 1000 RPM		135 TO 160
5	REVERSE—BRAKES APPLIED ENGINE AT 1000 RPM		95 TO 150
6	DRIVE - BRAKES APPLIED ENGINE AT 1000 RPM DOWNSHIFT SWITCH ACTIVATED		90 TO 110
7	GOVERNOR CHECK - SEE PROCEDURE, PAGE 17		DROP OF 10 PSI OR MORE
8	DRIVE - 30 MPH - CLOSED THROTTLE ON ROAD, OR ON HOIST**		55 TO 70

*IF HIGH LINE PRESSURES ARE EXPERIENCED, SEE PAGE 3.

**VEHICLE ON HOIST, DRIVING WHEELS OFF GROUND, SELECTOR IN DRIVE, BRAKES RELEASED; RAISE ENGINE TO 3000 R.P.M., CLOSE THROTTLE AND READ PRESSURE BETWEEN 2000 AND 1200 R.P.M.

PRELIMINARY CHECKING PROCEDURE - CONTINUED

(IF LINE PRESSURES WERE INITIALLY HIGH)

ENGINES WITH EGR VALVES

On some engines with Exhaust Gas Recirculation (EGR), the throttle is open enough in "Drive" range 1000 rpm to cause the EGR valve to open. When the EGR valve opens, exhaust gas enters the intake manifold which lowers intake manifold vacuum. When intake manifold vacuum is lowered, the transmission line oil pressure raises accordingly, and may go above the upper specification limit. For this reason, if high line pressures are obtained, proceed as follows:

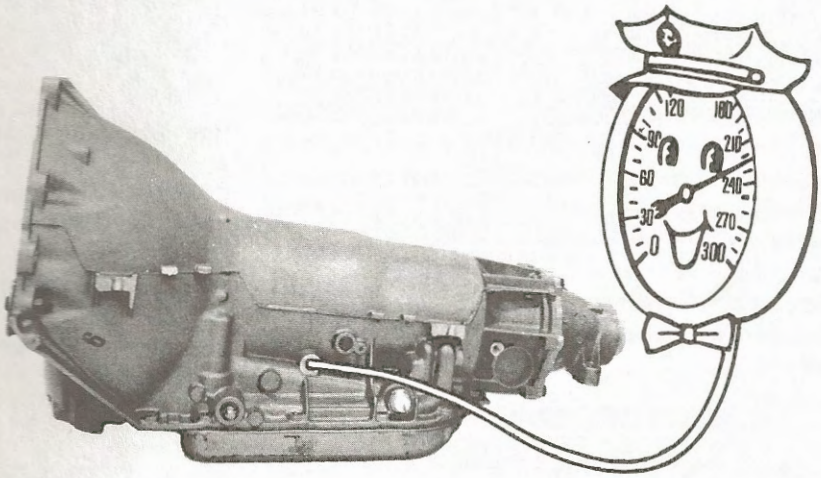
1. Disconnect the EGR vacuum line at the EGR valve and plug the vacuum line.
2. Recheck line pressures as indicated on the Preliminary Checking Procedure Chart on page 2.
3. If high line pressures are still obtained, continue below.

ENGINES WITHOUT EGR VALVE OR IF HIGH LINE PRESSURES WERE OBTAINED WITH THE EGR VACUUM LINE PLUGGED

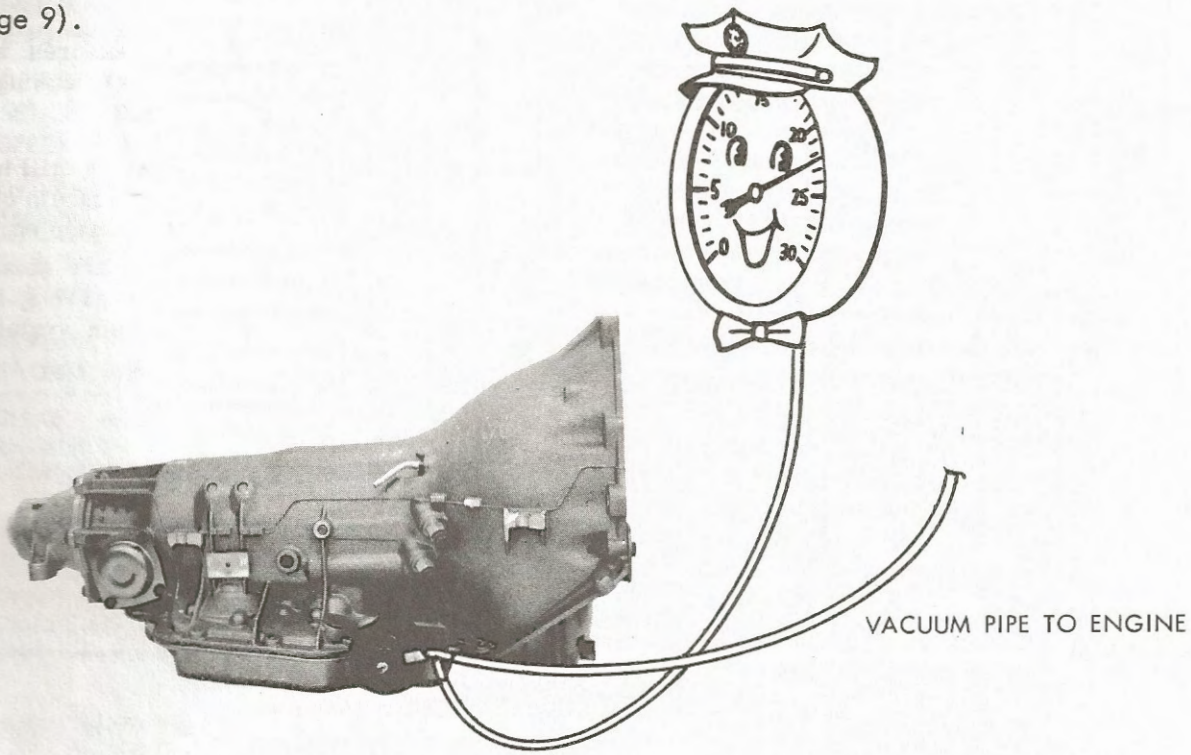
If high line pressures are experienced on vehicles without EGR or with EGR line plugged, it may be that the engine is not producing enough vacuum to lower transmission line pressure within specifications. The newer engines with emission controls characteristically have lower engine vacuum than older past model engines. To obtain line pressures suitable for evaluation, it is recommended that vacuum be applied to the modulator, using an external vacuum source such as a Kent-Moore J-23738 hand operated vacuum device or its equivalent. The unit allows definite amounts of vacuum to be applied to the modulator so that consistent line pressures may be obtained for evaluation as follows:

1. Disconnect the vacuum hose to the modulator at the modulator and plug the vacuum hose.
2. Attach the hand operated vacuum device as shown on page 5 and apply 20" of vacuum.
3. Recheck line pressures according to the Preliminary Checking Procedure Chart, on page 2.
4. If line pressures are still high, proceed to the specific diagnosis chart that applies to the malfunction encountered.
5. If line pressures are normal with external vacuum applied, check engine vacuum and vacuum systems for leaks (See page 17).

Use Your Oil Pressure Gage - In this manner during the PRELIMINARY CHECKING PROCEDURE (page 2).

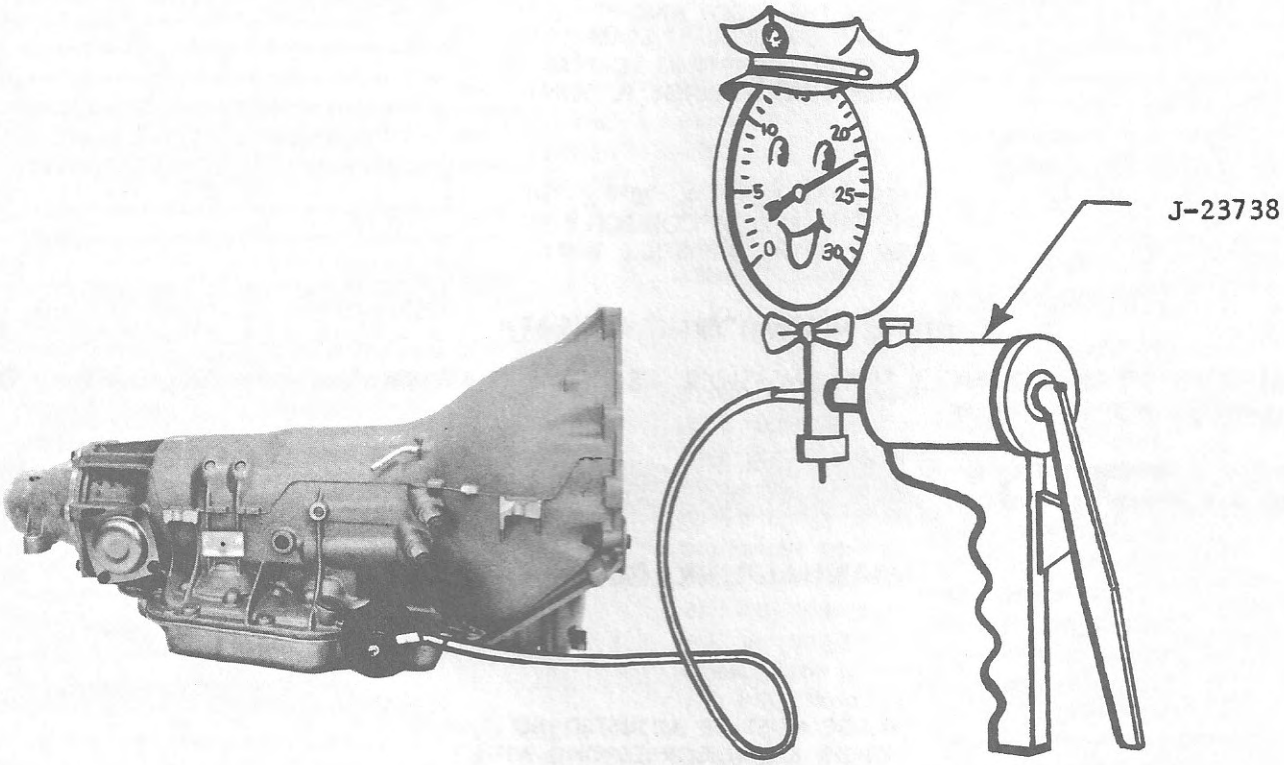


Use Your Vacuum Gage - In this manner when vacuum checks are called for in the SYSTEMATIC TROUBLE SHOOTING GUIDE (starting on page 9).



USING THE HAND OPERATED VACUUM DEVICE

WHEN USING THE HAND OPERATED VACUUM DEVICE TO PROVIDE A CONSISTENT VACUUM FOR LINE PRESSURE CHECKS AND/OR WHEN CHECKING A MODULATOR, APPLY 20" OF VACUUM. THE VACUUM SHOULD NOT BLEED DOWN ANY FOR AT LEAST 30 SECONDS. IF A BLEED DOWN OCCURS, A VACUUM LEAK IS INDICATED.



NOTE: BEFORE USING THIS VACUUM DEVICE EACH TIME, CHECK IT FOR LEAKS. HOLD A FINGER FIRMLY AGAINST THE END OF THE HOSE AND APPLY 20" OF VACUUM. VACUUM MUST NOT DROP ANY FOR AT LEAST 30 SECONDS. ALSO, MAKE SURE THE HOSE THAT FITS OVER THE MODULATOR VACUUM PIPE IS VERY TIGHT.

CHECKING TRANSMISSION OIL LEVEL

1. **ENGINE RUNNING.**
2. **VEHICLE ON LEVEL SURFACE.**
3. **BRAKES APPLIED**
4. **MOVE LEVER THROUGH ALL RANGES.**
5. **PLACE TRANSMISSION IN "PARK." (VEHICLES WITH NO "PARK" MECHANISM, PLACE IN "NEUTRAL")**
6. **CHECK OIL LEVEL.**
7. **IF OIL IS LOW, CHECK FOR POSSIBLE CAUSES—REFER TO PAGE 18**

THE OIL LEVEL SHOULD BE BETWEEN THE "ADD" AND "FULL" MARKS AT NORMAL OPERATING TEMPERATURE (170°F.). THIS TEMPERATURE IS OBTAINED AFTER AT LEAST 15 MILES OF EXPRESSWAY DRIVING OR EQUIVALENT CITY DRIVING. ALSO, AT NORMAL OPERATING TEMPERATURE, THE OIL WILL HEAT THE GAUGE END OF THE DIP STICK TO A DEGREE WHERE THE AVERAGE PERSON CAN NOT GRASP IT FIRMLY WITH HIS BARE HAND WITHOUT DISCOMFORT.

WITH THE OIL AT ROOM TEMPERATURE (APPROX. 70°F.), THE OIL LEVEL SHOULD BE APPROXIMATELY ¼" BELOW THE "ADD" MARK. IF THE OIL LEVEL IS CORRECTLY ESTABLISHED AT ROOM TEMPERATURE, (70°F.), IT SHOULD BE AT THE "FULL" MARK ON THE DIP STICK WHEN THE TRANSMISSION REACHES NORMAL OPERATING TEMPERATURE (170°F.).

MAINTAIN OIL LEVEL BETWEEN THE "ADD" and "FULL" MARKS AT NORMAL OPERATING TEMPERATURE.

CAUTION: DO NOT OVERFILL TRANSMISSION, AS THIS WILL CAUSE FOAMING AND LOSS OF OIL THROUGH THE VENT PIPE.

MANUAL LINKAGE ADJUSTMENT

THE TRANSMISSION MANUAL LINKAGE MUST BE ADJUSTED SO THAT THE POINTER ON THE INDICATOR QUADRANT AND LINKAGE DETENTS OR STOPS CORRESPOND WITH THE TRANSMISSION INSIDE DETENT LEVER DETENTS. IF THE LINKAGE IS NOT ADJUSTED PROPERLY, AN INTERNAL LEAK COULD OCCUR AT THE MANUAL VALVE WHICH COULD CAUSE A CLUTCH AND/OR FRONT BAND TO SLIP.
REFER TO THE CAR DIVISION SHOP MANUAL FOR MANUAL LINKAGE ADJUSTMENT PROCEDURE.

NOTE: IF A MANUAL LINKAGE ADJUSTMENT IS MADE, THE ASSOCIATED NEUTRAL SAFETY SWITCH (MODELS 1964 THRU 1969) SHOULD BE ADJUSTED, IF NECESSARY. THE NEUTRAL SAFETY SWITCH SHOULD BE ADJUSTED SO THAT THE ENGINE WILL START IN "PARK" AND "NEUTRAL" POSITIONS ONLY, WITH THE SELECTOR LEVER IN THE "PARK" POSITION, THE PARKING PAWL SHOULD FREELY ENGAGE AND PREVENT THE VEHICLE FROM ROLLING.

NOTE: THE "CP" AND "GT" MODEL TRANSMISSIONS DO NOT CONTAIN THE "PARK" MECHANISM.

ROAD TEST

(IF NECESSARY)

Check All Shifts In The Following Manner:

DRIVE RANGE:

Position selector lever in DRIVE RANGE and accelerate the vehicle from 0 MPH. A 1-2 and 2-3 shift should occur at all throttle openings. (The shift points will vary with the throttle opening). As the vehicle decreases in speed to 0 MPH, the 3-2 and 2-1 shifts should occur.

INTERMEDIATE RANGE:

Position the selector lever in INTERMEDIATE RANGE and accelerate the vehicle from 0 MPH. A 1-2 shift should occur at all throttle openings. (No 2-3 shift can be obtained in this range). The 1-2 shift point will vary with throttle opening. As the vehicle decreases in speed to 0 MPH, a 2-1 shift should occur. NOTE: The 1-2 shift in INTERMEDIATE RANGE is somewhat firmer than in DRIVE RANGE. This is normal.

LO RANGE:

Position the selector lever in LO RANGE and accelerate the vehicle from 0 MPH. No upshift should occur in this range, except possibly in some vehicles which have a high numerical axle ratio and/or engine RPM.

2ND GEAR – OVERRUN BRAKING:

Position the selector lever in DRIVE RANGE, and with the vehicle speed at approximately 35 MPH, with closed or 0 throttle, move the selector lever to INTERMEDIATE RANGE. The transmission should downshift to 2nd. An increase in engine RPM and an engine braking effect should be noticed. Line pressure should change from approximately 70 PSI to approximately 150 PSI in 2nd.

1ST GEAR – OVERRUN BRAKING:

Position the selector lever in INTERMEDIATE RANGE at approximately 30 to 40 MPH, with throttle closed, move the selector lever to Lo. A 2-1 downshift should occur in the speed range of approximately 40 to 20 MPH, depending on axle ratio and valve body calibration. The 2-1 downshift at closed throttle will be accompanied by increased engine RPM and an engine braking effect should be noticed. Line pressure should be approximately 150 PSI. Stop vehicle.

REVERSE RANGE:

Position the selector lever in REVERSE POSITION and check for reverse operation.

PRELIMINARY DIAGNOSIS CHART

TRANSMISSION MALFUNCTION RELATED TO OIL PRESSURE

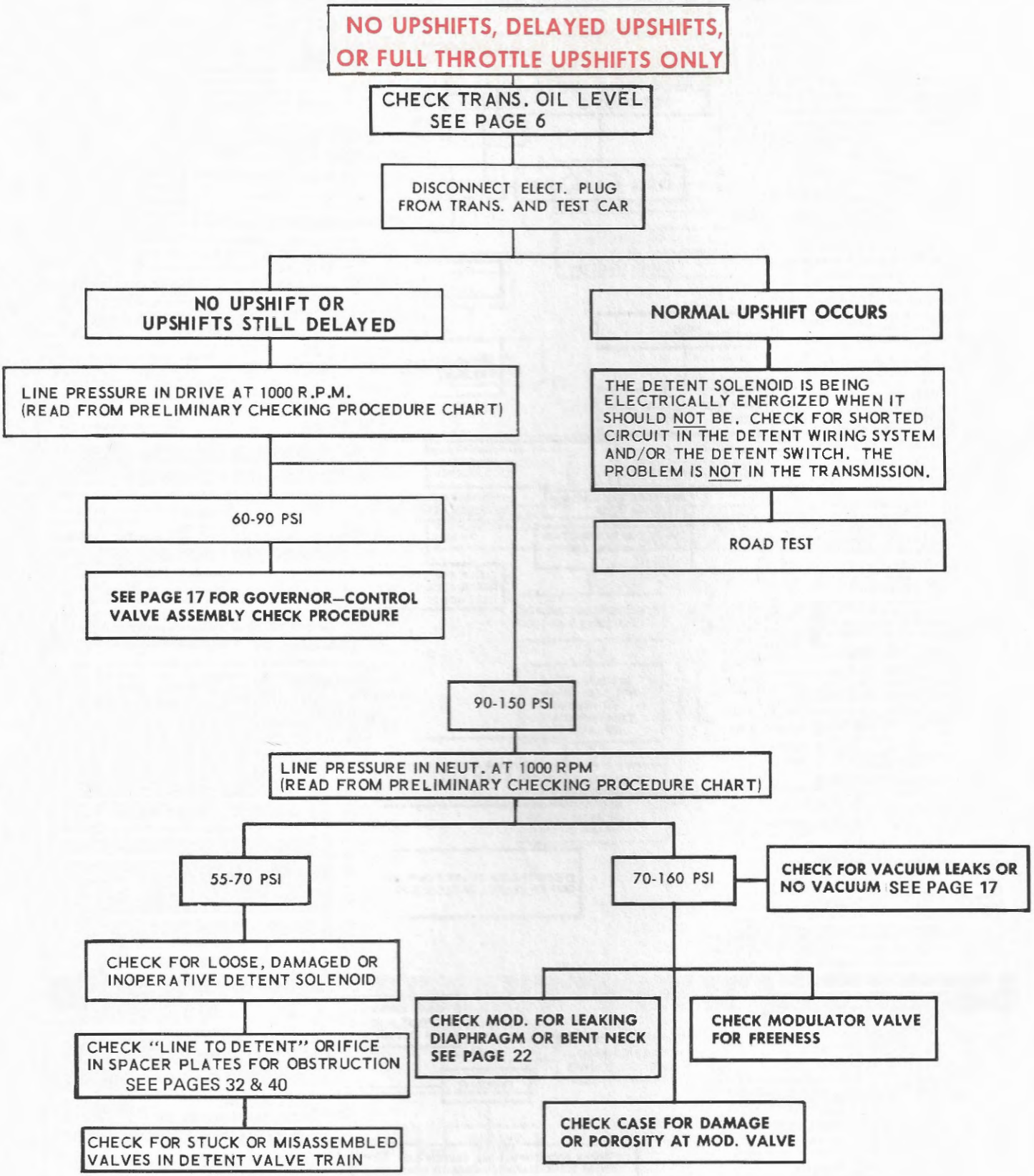
(PRESSURES OBTAINED BY THE PRELIMINARY CHECKING PROCEDURE, PAGE 2)

MALFUNCTION	1 NEUTRAL BRAKES APPLIED 1000 RPM OIL PRESSURE	2 DRIVE IDLE OIL PRESSURE	3 DRIVE BRAKES APPLIED 1000 RPM OIL PRESSURE	4 SUPER OR LO BRAKES APPLIED 1000 RPM OIL PRESSURE	5 REVERSE BRAKES APPLIED 1000 RPM OIL PRESSURE	6 DRIVE–BRAKES APPLIED 1000 RPM DOWNSHIFT SWITCH ACTIVATED OIL PRESSURE	7 PRESSURE DROP OCCURS WHILE ENGINE RPM INCREASES FROM 1000 TO 3000 RPM WHEELS FREE TO MOVE**	8 DRIVE 30 MPH CLOSED THROTTLE OIL PRESSURE	POSSIBLE CAUSE OF MALFUNCTION
NO 1-2 UPSHIFT AND/OR DELAYED UPSHIFT	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	10 PSI DROP OR MORE	NORMAL	MALFUNCTION IN CONTROL VALVE ASSY.
	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LESS THAN 10 PSI DROP	NORMAL	MALFUNCTION IN GOVERNOR OR GOVERNOR FEED SYSTEM
	NORMAL	HIGH	HIGH	NORMAL	NORMAL	NORMAL	DROP	HIGH	MALFUNCTION IN DETENT SYSTEM
	HIGH	HIGH	HIGH	NORMAL	HIGH	–	–	–	MALFUNCTION IN MODULATOR OR VACUUM FEED SYSTEM TO MODULATOR
SLIPPING–REVERSE	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL	DROP	NORMAL	OIL LEAK IN FEED SYSTEM TO THE DIRECT CLUTCH
SLIPPING–1ST GEAR	NORMAL	LOW TO NORMAL	LOW TO NORMAL	LOW TO NORMAL	NORMAL	LOW TO NORMAL	–	LOW TO NORMAL	OIL LEAK IN FEED SYSTEM TO THE FORWARD CLUTCH
DOWNSHIFT WITH ZERO THROTTLE AND NO ENGINE BRAKING IN DRIVE	NORMAL	HIGH	*NORMAL	NORMAL	NORMAL	–	–	HIGH	STATOR AND DETENT WIRES SWITCHED
NO DETENT DOWNSHIFTS	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL	NORMAL	MALFUNCTION IN DETENT SYSTEM

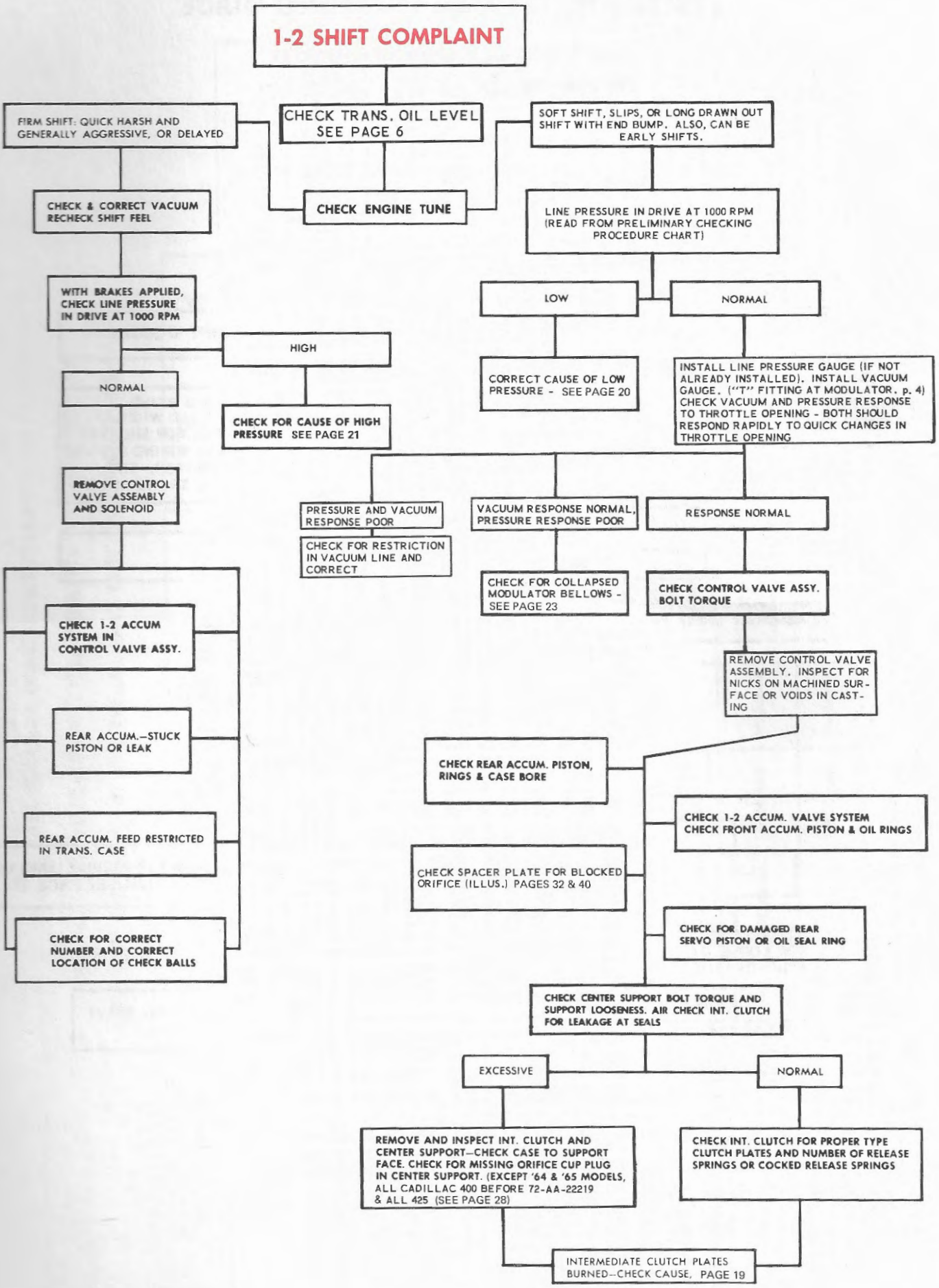
* 1966 CADILLAC WITH BRAKES APPLIED WILL SHOW HIGH IF STATOR AND DETENT WIRES ARE SWITCHED.
** DRIVE RANGE, VACUUM LINE DISCONNECTED FROM MODULATOR.

NOTE: A DASH (-) IN THE ABOVE CHART MEANS THAT THE OIL PRESSURE READING HAS NO MEANING UNDER THE TEST CONDITION.

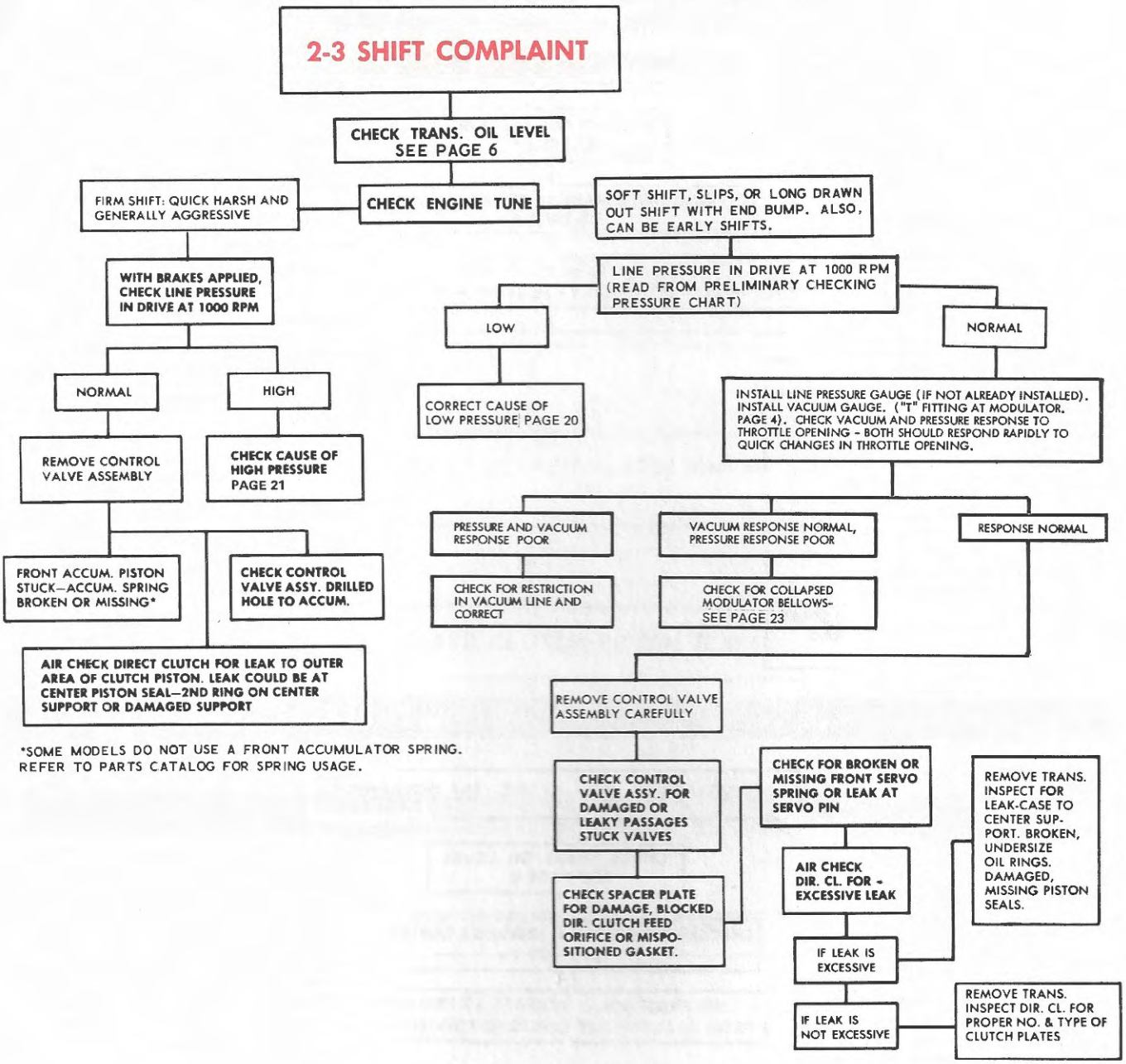
SYSTEMATIC TROUBLE SHOOTING GUIDE



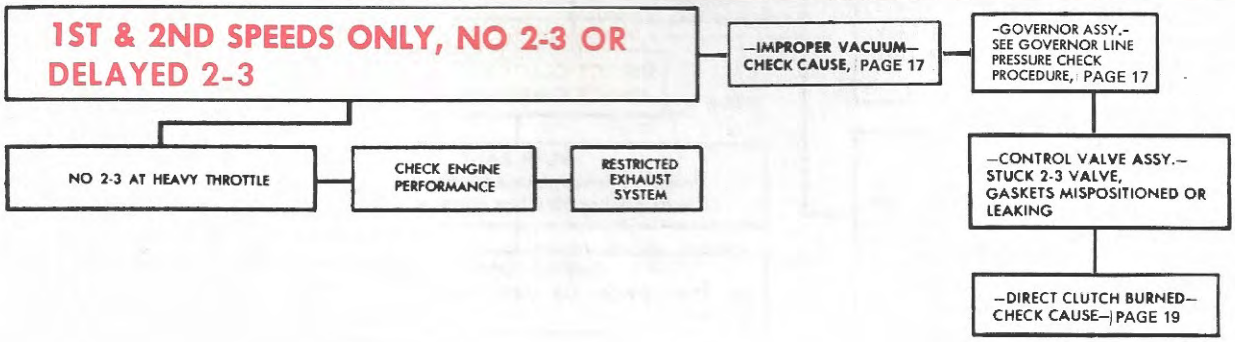
1-2 SHIFT COMPLAINT



2-3 SHIFT COMPLAINT



1ST & 2ND SPEEDS ONLY, NO 2-3 OR DELAYED 2-3



NO DRIVE OR SLIPS IN DRIVE

CHECK TRANS. OIL LEVEL SEE PAGE 6

CHECK OUTSIDE MANUAL LINKAGE & CORRECT SEE PAGE 6

LINE PRESSURE IN DRIVE AT 1000 R.P.M.
(READ FROM PRELIMINARY CHECKING PROCEDURE CHART)

NORMAL

—PUMP ASSY—
FORWARD CLUTCH FEED PASSAGE NOT DRILLED OR RESTRICTED

-FORWARD CLUTCH BURNED-
CHECK CAUSE—SEE PAGE 19

CHECK LO ROLLER CLUTCH OR LO SPRAG CLUTCH FOR DAMAGE OR LO SPRAG INSTALLED BACKWARDS

LOW

CORRECT CAUSE OF LOW PRESSURE—SEE PAGE 20

NO REVERSE OR SLIPS IN REVERSE

CHECK TRANS. OIL LEVEL
SEE PAGE 6

CHECK OUTSIDE MANUAL LINKAGE & CORRECT—
SEE PAGE 6

LINE PRESSURE IN REVERSE AT 1000 RPM
(READ FROM PRELIMINARY CHECKING PROCEDURE CHART)

LOW

CORRECT CAUSE—PAGE 20

NORMAL

CONTROL VALVE ASSEMBLY
1. 2-3 Valve Train Stuck Open (This Will Also Cause A 1-3 Upshift In Drive Range)
2. Reverse Feed Passage—Cross Channel Leak, Porosity In Case Or Valve Body Passage, Gaskets leaking.

REAR SERVO & ACCUMULATOR
1. Servo Piston Seal Ring Damaged or Missing.
2. Short Band Apply Pin (This Moy Also Cause No Overrun Braking Or Slips In Overrun Braking—Lo Range)
Refer To Shop Manual For Pin Selection
3. Damaged Reor Servo Piston or Bore.

FORWARD CLUTCH
Clutch Does Not Release (Will also cause Drive in Neutral)

DIRECT CLUTCH BURNED
CHECK CAUSE-PAGE 19

REAR BAND
Broken, Burned, Loose Lining, Apply Pin or Anchor Pins Not Engaged.

CENTER SUPPORT
OIL SEAL RINGS OR GROOVES DAMAGED OR WORN

MISSES SECOND ESPECIALLY WHEN TRANSMISSION IS AT OPERATING TEMPERATURE

The complaint is described in several ways, such as:

- Misses second gear.
- Transmission hunts 1-3-1.
- Shifts 1-3.
- Engine flare on downshift.
- Slips in second.
- Goes to neutral on downshift.
- No second except "Super".

FRONT BAND AND DIRECT CLUTCH PLATES MAY BE BURNT OR SHOW DISTRESS.

REPLACE INTERMEDIATE CLUTCH PISTON SEALS

NO DETENT DOWNSHIFTS

LIGHT ON

—DETENT SOLENOID—
POOR CONNECTIONS, INOPERATIVE, SHORTED WIRE, OPEN WIRE, VALVE STUCK, ORIFICE PLUGGED.

—CONTROL VALVE ASSY.—
CHECK DETENT VALVE TRAIN—
SEE PAGES 33 & 38

VEHICLE ON LIFT, IGNITION ON (ENGINE NOT OPERATING)

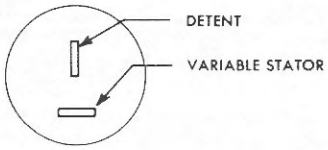
DISCONNECT ELECT. PLUG FROM TRANS.—CONNECT TEST LIGHT TO "DETENT" TERMINAL OF DISCONNECTED WIRE HARNESS & TO GROUND SEE ILLUSTRATION BELOW

DEPRESS ACCELERATOR FULLY

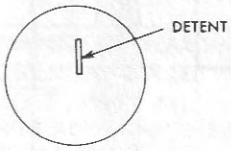
LIGHT OFF

- DOWNSHIFT SWITCH -
1. MALADJUSTED—REFER TO CAR MFG. SERVICE MANUALS FOR ADJUSTMENT PROCEDURES
2. INOPERATIVE SWITCH, CONNECTIONS, FUSE, SHORTED WIRE*

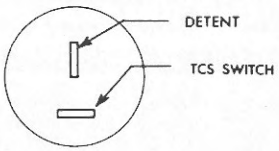
* SHORTED SOLENOID WIRE CAN CAUSE FUSE TO BLOW.



PLUG USED ON VARIABLE STATOR TRANS.
(SOME 1967 & PRIOR YEAR MODELS)



PLUG USED ON TRANSMISSIONS NOT USING TCS SYSTEM



PLUG USED ON TRANSMISSIONS USING TCS SYSTEM

NO ENGINE BRAKING—INTERMEDIATE RANGE—SECOND GEAR

—FRONT SERVO & ACCUMULATOR—
OIL RINGS AND/OR BORES LEAKING OR FRONT SERVO PISTON COCKED OR STUCK

INCORRECT COMBINATION OF FRONT SERVO AND ACCUMULATOR PARTS.

—FRONT BAND—
BROKEN, BURNED (CHECK FOR CAUSE), NOT ENGAGED ON ANCHOR PIN AND/OR SERVO PIN.

NO ENGINE BRAKING— LO RANGE— 1ST GEAR

—CASE ASSEMBLY—
LO—REVERSE CHECK BALL MISPOSITIONED OR MISSING. CASE DAMAGED AT LO—REVERSE CHECK BALL AREA.

—REAR SERVO—
OIL SEAL RING, BORE OR PISTON DAMAGED REAR BAND APPLY PIN SHORT, IMPROPERLY ASSEMBLED

—REAR BAND—
BROKEN, BURNED (CHECK FOR CAUSE), NOT ENGAGED ON ANCHOR PINS AND/OR SERVO PIN.

DRIVE IN NEUTRAL

CHECK OUTSIDE MANUAL LINKAGE & CORRECT PAGE 6

—INTERNAL LINKAGE—
MANUAL VALVE DISCONNECTED OR END BROKEN, INSIDE DETENT LEVER PIN BROKEN.

—PUMP ASSEMBLY—
TRANS. LUBE PRESSURE LEAKING INTO FORWARD CLUTCH APPLY PASSAGE.

WON'T HOLD IN PARK OR WON'T RELEASE FROM PARK

CHECK OUTSIDE MANUAL LINKAGE & CORRECT, PAGE 6

—INTERNAL LINKAGE—

1. Parking Brake Rod Assy. (Check Actuator For Chamfer)
2. Parking Pawl Broken, Chamfer Omitted.
3. Parking Brake Bracket Loose, Burr Or Rough Edges, or Incorrectly Installed.
4. Parking Pawl Return Spring Missing, Broken or Incorrectly Hooked.

CAUTION: BEFORE CHECKING TRANSMISSION FOR WHAT IS BELIEVED TO BE "TRANS. NOISE," MAKE CERTAIN THE NOISE IS NOT FROM THE WATER PUMP, ALTERNATOR, AIR CONDITIONER, POWER STEERING, ETC. THESE COMPONENTS CAN BE ISOLATED BY REMOVING THE PROPER BELT AND RUNNING THE ENGINE NOT MORE THAN TWO MINUTES AT ONE TIME.

TRANSMISSION NOISY

PARK, NEUTRAL & ALL DRIVING RANGES

—PUMP CAVITATION—
OIL LEVEL LOW (SEE PAGE 6).
PLUGGED OR RESTRICTED FILTER.*
WRONG FILTER
INTAKE PIPE "O" RING DAMAGED.
INTAKE PIPE SPLIT, POROSITY IN CASE INTAKE PIPE BORE.
WATER IN OIL.
POROSITY OR VOIDS AT TRANS. CASE (PUMP FACE) INTAKE PORT.
PUMP TO CASE GASKET OFF LOCATION.

—PUMP ASSEMBLY—
GEARS DAMAGED.
DRIVING GEAR ASSEMBLED BACKWARDS.
CRESCENT INTERFERENCE.
BUZZING NOISE—ORIFICE CUP PLUG IN PRESSURE REGULATOR DAMAGED OR MISSING.
SEAL RINGS DAMAGED OR WORN.

—CONVERTER—
LOOSE BOLTS (CONVERTER TO FLYWHEEL)
CONVERTER DAMAGE.
CRACKED OR BROKEN FLEX PLATE

DURING ACCELERATION— ANY GEAR

TRANSMISSION OR COOLER LINES GROUNDED TO UNDERBODY.
MOTOR MOUNTS LOOSE OR BROKEN.

425 MODEL ONLY—DRIVE LINK ASSEMBLY, WORN OR DAMAGED, MAY SOUND LIKE POPCORN POPPING.

SQUEAL AT LOW VEHICLE SPEEDS, ESPECIALLY HOT

SPEEDOMETER DRIVEN GEAR SHAFT SEAL—SEAL REQUIRES LUBRICATION OR REPLACEMENT.

IF SPEEDOMETER DRIVEN GEAR SHAFT APPEARS TWISTED, CHECK FOR PRESENCE OF ENGINE COOLANT IN TRANSMISSION. CHECK TRANSMISSION COOLER FOR LEAKS.

FIRST, SECOND AND/OR REVERSE

-PLANETARY GEAR SET-

1. THOROUGHLY CLEAN, DRY & INSPECT CLOSELY THE ROLLER THRUST BEARINGS AND THRUST RACES FOR A PITTING OR ROUGH CONDITION (SEE ILLUST., PAGE 41).
2. INSPECT GEARS FOR DAMAGE, WEAR, PITTING AND PINIONS FOR TILT.
3. INSPECT FRONT INTERNAL GEAR RING FOR DAMAGE.

* There is no approved way of checking or cleaning the filter. If the filter is suspected of being plugged or restricted, it must be replaced.

NO CONVERTER STATOR ANGLE CHANGE (SOME MODELS ONLY)*

—STATOR SWITCH—

FUSE, INOPERATIVE OR MALADJUSTED (REFER TO CAR DIVISION'S SERVICE MANUAL FOR ADJUSTMENT PROCEDURE)

—PUMP ASSEMBLY—

1. STATOR VALVE STUCK.
2. STATOR SOLENOID LEAD WIRE NOT CONNECTED AT OUTSIDE OR INSIDE TERMINAL OR GROUNDED OUT, MAY BE PINCHED.
3. FEED CIRCUIT TO STATOR RESTRICTED OR BLOCKED (CHECK FEED HOLE IN STATOR SHAFT).
4. CONVERTER OUT CHECK VALVE BROKEN OR MISSING.

—TURBINE SHAFT—

OIL SEAL RING DAMAGED, MISSING, OR SHAFT RING LANDS DAMAGED, CAUSING POOR SEALING.

—CASE ASSEMBLY—

STATOR ORIFICE PLUG BLOCKED

CONVERTER ASSY., DAMAGED INTERNALLY

* 1965—Cadillac-AA, All Buick, All Oldsmobile
1966—Cadillac-AA, All Buick, All Oldsmobile, Rolls Royce
1967—Cadillac-AA-AJ, All Buick, All Oldsmobile, Rolls Royce

CAUSES OF IMPROPER VACUUM AT MODULATOR

1. **ENGINE**
   - A. TUNE UP
   - B. LOOSE VACUUM FITTINGS
   - C. VACUUM OPERATED ACCESSORY LEAK (HOSES, VACUUM ADVANCE, ETC).
   - D. ENGINE EXHAUST SYSTEM RESTRICTED.
   - E. EXHAUST GAS RECIRCULATION (EGR) VALVE.

2. **VACUUM LINE TO MODULATOR**
   - A. LEAK
   - B. LOOSE FITTING
   - C. RESTRICTED ORIFICE, OR INCORRECT ORIFICE SIZE.
   - D. CARBON BUILD UP AT MOD. VAC. FITTING
   - E. PINCHED LINE
   - F. GREASE IN PIPE (NO OR DELAYED UPSHIFT-COLD)

CONTROL VALVE ASSEMBLY—GOVERNOR LINE PRESSURE CHECK

1. INSTALL LINE PRESSURE GAGE.
2. INSTALL TACHOMETER.
3. DISCONNECT VACUUM LINE TO MODULATOR.
4. WITH VEHICLE ON HOIST (DRIVING WHEELS OFF GROUND), FOOT OFF BRAKE, IN DRIVE, CHECK LINE PRESSURE AT 1000 RPM.
5. SLOWLY INCREASE ENGINE RPM TO 3000 RPM AND DETERMINE IF A LINE PRESSURE DROP OCCURS (10 PSI OR MORE).
6. IF PRESSURE DROP OF 10 PSI OR MORE OCCURS, DISASSEMBLE, CLEAN AND INSPECT CONTROL VALVE ASSEMBLY.
7. IF PRESSURE DROP IS LESS THAN 10 PSI:
   - A. INSPECT GOVERNOR
     1. STUCK VALVE.
     2. WEIGHT FREENESS.
     3. RESTRICTED ORIFICE IN GOVERNOR VALVE.
     4. CHECK GOVERNOR VALVE ENTRY AND EXHAUST (.020" min.) (FOR PROCEDURE, REFER TO CURRENT SERVICE MANUAL).
   - B. GOVERNOR FEED SYSTEM
     1. CHECK SCREEN IN CONTROL VALVE ASSEMBLY OR CASE.
     2. CHECK FOR RESTRICTIONS IN GOVERNOR PIPE.
     3. CHECK FOR FIT OF GOVERNOR PIPES IN CASE HOLES.

CAUSES OF OIL LEAKS

NOTE: MAKE SURE UNDERSIDE OF TRANSMISSION IS CLEAN IN ORDER TO ISOLATE OIL LEAKS AND DIAGNOSE THEM CORRECTLY.

1. TRANSMISSION OIL PAN LEAKS

A. ATTACHING BOLTS NOT CORRECTLY TORQUED.
B. IMPROPERLY INSTALLED OR DAMAGED PAN GASKET.

2. CASE EXTENSION LEAK

A. ATTACHING BOLTS NOT CORRECTLY TORQUED.
B. IF THE REAR SEAL IS SUSPECTED:
   1. CHECK SEAL FOR DAMAGE OR IMPROPERLY INSTALLED.
   2. CHECK SLIP YOKE FOR DAMAGE.
   3. SEE IF OIL IS COMING OUT THE VENT HOLE IN END OF THE SLIP YOKE. IF IT IS, INSPECT OUTPUT SHAFT "O" RING FOR DAMAGE ("O" RING USED ON SOME MODELS ONLY).
C. EXTENSION TO CASE GASKET OR SEAL DAMAGED OR IMPROPERLY INSTALLED.
D. POROUS CASTING.

3. CASE LEAK

A. FILLER PIPE "O" RING SEAL DAMAGED OR MISSING; MISPOSITION OF FILLER PIPE BRACKET TO ENGINE - "LOADING" ONE SIDE OF THE "O" RING. FILL PIPE CRACKED, OR MALFORMED "O" RING GROOVE.
B. MODULATOR ASSEMBLY "O" RING SEAL - DAMAGED OR IMPROPERLY INSTALLED.
C. ELECTRICAL CONNECTOR "O" RING SEAL DAMAGED OR IMPROPERLY INSTALLED.
D. GOVERNOR COVER, GASKET AND BOLTS - DAMAGED, LOOSE; CASE FACE DAMAGED OR POROSITY.
E. LEAK AT SPEEDOMETER DRIVEN GEAR HOUSING OR SEAL. LEAK AT SPEEDO HOLE PLUG.
F. MANUAL SHAFT SEAL - DAMAGED, IMPROPERLY INSTALLED.
G. LINE PRESSURE TAP PLUG - STRIPPED, SHY SEALER COMPOUND.
H. VENT PIPE (REFER TO ITEM 5).
I. POROUS CASE, OR CRACKED AT PRESSURE PLUG BOSS.

4. FRONT END LEAK

A. FRONT SEAL - DAMAGED (CHECK CONVERTER NECK FOR NICKS, ETC., ALSO FOR PUMP BUSHING MOVED FORWARD) GARTER SPRING MISSING.
B. PUMP ATTACHING BOLTS LOOSE; SEAL WASHERS DAMAGED.
C. CONVERTER LEAK AT WELDS.
D. LARGE "O" RING PUMP SEAL DAMAGED - ALSO CHECK CASE BORE.
E. POROUS CASTING (PUMP OR CASE).
F. PUMP DRAINBACK HOLE NOT OPEN (SEE PAGE 29 FOR LOCATION OF SEAL DRAINBACK HOLE).

5. OIL COMES OUT VENT PIPE

A. TRANSMISSION OVER-FILLED — SEE PAGE 6.
B. WATER IN OIL
C. FILTER "O" RING DAMAGED OR IMPROPERLY ASSEMBLED CAUSING OIL TO FOAM.
D. FOREIGN MATERIAL BETWEEN PUMP AND CASE OR BETWEEN PUMP COVER AND BODY, OR VARIABLE STATOR SOLENOID SCREWS TOO LONG - HOLDING PUMP HALVES APART.
E. CASE - POROUS, PUMP FACE IMPROPERLY MACHINED.
F. PUMP - SHY OF STOCK, POROUS.
G. PUMP TO CASE GASKET MISPOSITIONED.
H. PUMP BREATHER HOLE BLOCKED OR MISSING. (SEE PAGE 29 FOR LOCATION.)
I. HOLE IN INTAKE PIPE.
J. CHECK BALL IN FORWARD CLUTCH HOUSING STUCK OPEN OR MISSING.
K. DRAINBACK HOLE IN CASE PLUGGED OR RESTRICTED (SEE ILLUSTRATION FOR LOCATION, PAGE 36).
L. INSPECT TURBINE SHAFT BUSHING JOURNALS AND STATOR SHAFT BUSHINGS FOR SCORING OR OTHER DISTRESS.

6. OIL COOLER LINES

A. CONNECTIONS AT RADIATOR LOOSE OR STRIPPED.
B. CONNECTIONS AT CASE LOOSE OR STRIPPED.

7. MODULATOR ASSY.

A. VACUUM DIAPHRAGM LEAKING (SEE PAGE 22).

CAUSES OF BURNED CLUTCH PLATES

1. **FORWARD CLUTCH**
   A. CHECK BALL IN CLUTCH HOUSING DAMAGED, STUCK OR MISSING.
   B. CLUTCH PISTON CRACKED, SEALS DAMAGED OR MISSING.
   C. LOW LINE PRESSURE (SEE PAGE 20).
   D. MANUAL VALVE MISPOSITIONED (SEE PAGE 6).
   E. RESTRICTED OIL FEED TO FORWARD CLUTCH (EXAMPLES: CLUTCH HOUSING TO INNER AND OUTER AREAS NOT DRILLED, RESTRICTED OR POROSITY IN PUMP).
   F. PUMP COVER OIL SEAL RINGS MISSING, BROKEN OR UNDERSIZE; RING GROOVE OVERSIZE.
   G. CASE VALVE BODY FACE NOT FLAT OR POROSITY BETWEEN CHANNELS.
   H. MANUAL VALVE BENT AND CENTER LAND NOT GROUND PROPERLY.

2. **INTERMEDIATE CLUTCH**
   A. CONSTANT BLEED ORIFICE IN CENTER SUPPORT MISSING (EXCLUDING ALL '64 & '65 MODELS; ALL CADILLAC 400 BEFORE 72-AA-22219; AND ALL 425) (SEE PAGE 28).
   B. REAR ACCUMULATOR PISTON OIL RING, DAMAGED OR MISSING.
   C. 1-2 ACCUMULATOR VALVE STUCK IN CONTROL VALVE ASSEMBLY.
   D. INTERMEDIATE CLUTCH PISTON SEALS DAMAGED OR MISSING.
   E. CENTER SUPPORT BOLT LOOSE.
   F. LOW LINE PRESSURE (SEE PAGE 20).
   G. INTERMEDIATE CLUTCH PLUG IN CASE MISSING. (SEE PAGE 28.)
   H. CASE VALVE BODY FACE NOT FLAT OR POROSITY BETWEEN CHANNELS.
   I. MANUAL VALVE BENT AND CENTER LAND NOT GROUND PROPERLY.

3. **DIRECT CLUTCH**
   A. RESTRICTED ORIFICE IN VACUUM LINE TO MODULATOR (POOR VACUUM RESPONSE).
   B. CHECK BALL IN DIRECT CLUTCH PISTON DAMAGED, STUCK OR MISSING.
   C. LEAKING MODULATOR BELLOWS (SEE PAGE 23).
   D. CENTER SUPPORT BOLT LOOSE. (BOLT MAY BE TIGHT IN SUPPORT BUT NOT HOLDING SUPPORT TIGHT TO CASE).
   E. CENTER SUPPORT OIL RINGS OR GROOVES DAMAGED OR MISSING.
   F. CLUTCH PISTON SEALS DAMAGED OR MISSING.
   G. FRONT AND REAR SERVO PISTONS AND SEALS DAMAGED.
   H. MANUAL VALVE BENT AND CENTER LAND NOT CLEANED UP.
   I. CASE VALVE BODY FACE NOT FLAT OR POROSITY BETWEEN CHANNELS.
   J. INTERMEDIATE SPRAG CLUTCH OR ROLLER CLUTCH INSTALLED BACKWARDS (SEE CORRECT RACE ROTATION).
   K. 3-2 VALVE, 3-2 SPRING OR 3-2 SPACER PIN INSTALLED IN THE WRONG SEQUENCE IN 3-2 VALVE BORE.
   L. INCORRECT COMBINATION OF FRONT SERVO AND ACCUMULATOR PARTS.
   M. REPLACE INTERMEDIATE CLUTCH PISTON SEALS.

NOTE: IF DIRECT CLUTCH PLATES AND FRONT BAND ARE BURNED, CHECK MANUAL LINKAGE (SEE PAGES 6 & 13).

NOTE: BURNED CLUTCH PLATES CAN BE CAUSED BY INCORRECT USAGE OF CLUTCH PLATES. ALSO, ANTI-FREEZE IN TRANSMISSION FLUID CAN CAUSE SEVERE DAMAGE, SUCH AS LARGE PEICES OF COMPOSITION CLUTCH PLATE MATERIAL PEELING OFF.

CAUSES OF LOW LINE PRESSURE

1. **LOW TRANSMISSION OIL LEVEL.**

2. **MODULATOR ASSEMBLY**—PERFORM THE "BELLOWS COMPARISON CHECK" (SEE PAGE 23).

3. **FILTER**
   - A. BLOCKED OR RESTRICTED.*
   - B. "O" RING ON INTAKE PIPE AND/OR GROMMET OMITTED OR DAMAGED.
   - C. SPLIT OR LEAKING INTAKE PIPE.
   - D. WRONG FILTER ASSEMBLY.

4. **PUMP**
   - A. PRESSURE REGULATOR OR BOOST VALVE STUCK.
   - B. GEAR CLEARANCE, DAMAGED, WORN (PUMP WILL BECOME DAMAGED IF DRIVE GEAR IS INSTALLED BACKWARDS, OR IF CONVERTER PILOT DOES NOT ENTER CRANKSHAFT FREELY).
   - C. PUMP TO CASE GASKET MISPOSITIONED.
   - D. PUMP BODY AND/OR COVER MACHINING ERROR OR SCORING OF PUMP GEAR POCKET.
   - E. MISMATCH PUMP COVER/PUMP BODY TYPES.

5. **INTERNAL CIRCUIT LEAKS.**
   - A. FORWARD CLUTCH LEAK (PRESSURE NORMAL IN NEUTRAL AND REVERSE-PRESSURE LOW IN DRIVE).
     1. CHECK PUMP RINGS FOR DAMAGE
     2. CHECK FORWARD CLUTCH SEALS FOR DAMAGE
     3. CHECK TURBINE SHAFT JOURNALS FOR DISTRESS
     4. CHECK STATOR SHAFT BUSHINGS FOR DAMAGE
   - B. DIRECT CLUTCH LEAK (PRESSURE NORMAL IN NEUTRAL, LOW, INT. AND DRIVE-PRESSURE LOW IN REVERSE).
     1. CHECK CENTER SUPPORT OIL SEAL RINGS FOR DAMAGE.
     2. CHECK DIRECT CLUTCH OUTER SEAL FOR DAMAGE.
     3. CHECK REAR SERVO AND FRONT ACCUM. PISTONS AND RINGS FOR DAMAGE OR MISSING.

6. **CASE ASSEMBLY**
   - A. POROSITY IN INTAKE BORE AREA.
   - B. CHECK CASE FOR INTERMEDIATE CLUTCH PLUG LEAK OR BLOWN OUT.—SEE PAGE 28.
   - C. LOW LINE PRESSURE IN REVERSE OR LO IF LO-REVERSE CHECK BALL MISPOSITIONED OR MISSING (THIS WILL CAUSE NO REVERSE AND NO OVERRUN BRAKING IN LO RANGE).

* THERE IS NO APPROVED WAY FOR CHECKING OR CLEANING THE FILTER. IF THE FILTER IS SUSPECTED OF BEING PLUGGED OR RESTRICTED, IT MUST BE REPLACED.

CAUSES OF HIGH LINE PRESSURE

1. VACUUM LEAK

A. FULL LEAK, VACUUM LINE DISCONNECTED.
B. PARTIAL LEAK IN LINE FROM ENGINE TO MODULATOR.
C. IMPROPER ENGINE VACUUM.
D. VACUUM OPERATED ACCESSORY LEAK. (HOSES, VACUUM ADVANCE, ETC.)

2. DAMAGED MODULATOR

A. STUCK VALVE.
B. WATER IN MODULATOR.
C. NOT OPERATING PROPERLY.—SEE PAGE 22.

3. DETENT SYSTEM

A. DETENT SWITCH ACTUATED (PLUNGER STUCK) OR SHORTED.
B. DETENT WIRING SHORTED.
C. DETENT SOLENOID STUCK OPEN.
D. DETENT FEED ORIFICE IN SPACER PLATE BLOCKED.—SEE PAGES 32 & 40.
E. DETENT SOLENOID LOOSE.
F. DETENT VALVE BORE PLUG DAMAGED.
G. DETENT REG. VALVE PIN SHORT.

4. PUMP

A. PRESSURE REG. AND/OR BOOST VALVE STUCK.
B. PUMP CASTING POROUS OR IMPROPERLY MACHINED.
C. PRESSURE BOOST VALVE INSTALLED BACKWARDS OR IMPROPERLY MACHINED.
D. ALUMINUM BORE PLUG HAS HOLE OR IMPROPERLY MACHINED.
E. PRESSURE BOOST BUSHING BROKEN OR IMPROPERLY MACHINED.
F. WRONG TYPE PRESSURE REGULATOR VALVE (REFER TO PAGE 30).

5. CONTROL VALVE ASSEMBLY

A. CONTROL VALVE ASSY. TO SPACER GASKET OFF LOCATION.
B. GASKETS INSTALLED IN REVERSE ORDER.

MODULATOR ASSEMBLY DIAGNOSIS PROCEDURE

AFTER THOROUGH INVESTIGATION OF FIELD RETURNED MODULATOR ASSEMBLIES, IT HAS BEEN FOUND THAT OVER 50% OF THE PARTS RETURNED AS BAD WERE GOOD. FOR THIS REASON, THE FOLLOWING PROCEDURE IS RECOMMENDED FOR CHECKING TURBO HYDRA-MATIC MODULATOR ASSEMBLIES IN THE FIELD BEFORE REPLACEMENT IS ACCOMPLISHED.

1. VACUUM DIAPHRAGM LEAK CHECK

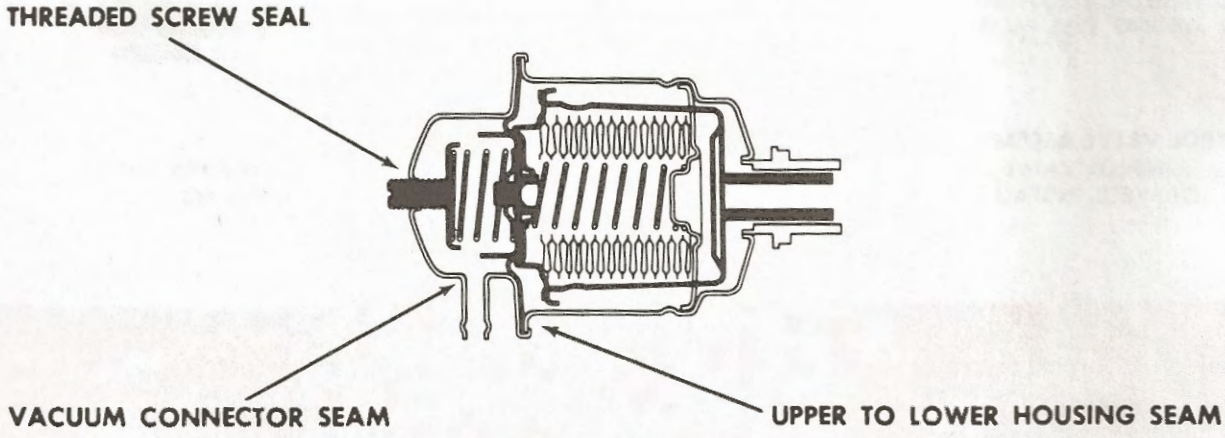
A. USE A VACUUM DEVICE AS SHOWN AND DESCRIBED ON PAGE 5.
NOTE: IF SUCH A DEVICE IS NOT AVAILABLE, USE PROCEDURE IN STEP B BELOW:

B. INSERT A PIPE CLEANER INTO THE VACUUM CONNECTOR PIPE AS FAR AS POSSIBLE AND CHECK FOR THE PRESENCE OF TRANSMISSION OIL. IF OIL IS FOUND, REPLACE THE MODULATOR. TRANSMISSION OIL MAY BE LOST THROUGH DIAPHRAGM AND BURNED IN ENGINE.
NOTE: GASOLINE OR WATER CONDENSATION MAY SETTLE IN THE VACUUM SIDE OF THE MODULATOR. IF THIS IS FOUND **WITHOUT** THE PRESENCE OF OIL THE MODULATOR SHOULD **NOT** BE CHANGED.

2. ATMOSPHERIC LEAK CHECK

APPLY A LIBERAL COATING OF SOAP BUBBLE SOLUTION (OBTAINABLE AT A 5c-10c STORE) TO THE VACUUM CONNECTOR PIPE SEAM, THE CRIMPED UPPER TO LOWER HOUSING SEAM, AND THE THREADED SCREW SEAL. USING A SHORT PIECE OF RUBBER TUBING, APPLY AIR PRESSURE TO THE VACUUM PIPE BY BLOWING INTO THE TUBE AND OBSERVE FOR LEAK BUBBLES. IF BUBBLES APPEAR, REPLACE THE MODULATOR.

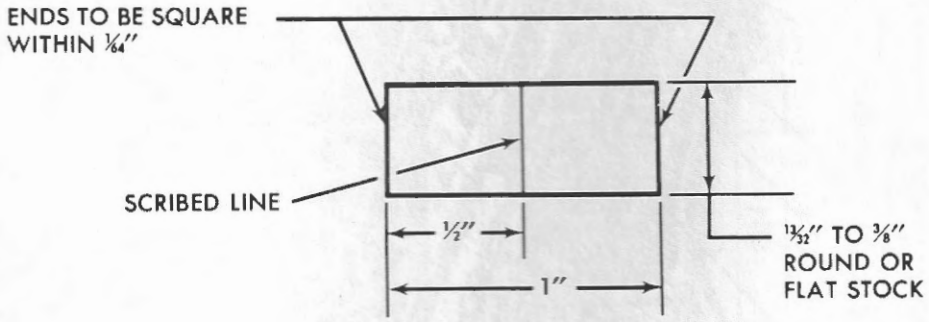
NOTE: DO NOT USE ANY METHOD OTHER THAN HUMAN LUNG POWER FOR APPLYING AIR PRESSURE, AS PRESSURES OVER 6 PSI MAY DAMAGE THE MODULATOR.



3. BELLOWS COMPARISON CHECK

USING A COMPARISON GAGE, SUCH AS KENT-MOORE J-24466 OR EQUIVALENT AS SHOWN IN THE SKETCH BELOW, COMPARE THE LOAD OF A KNOW GOOD HYDRA-MATIC MODULATOR WITH THE ASSEMBLY IN QUESTION.

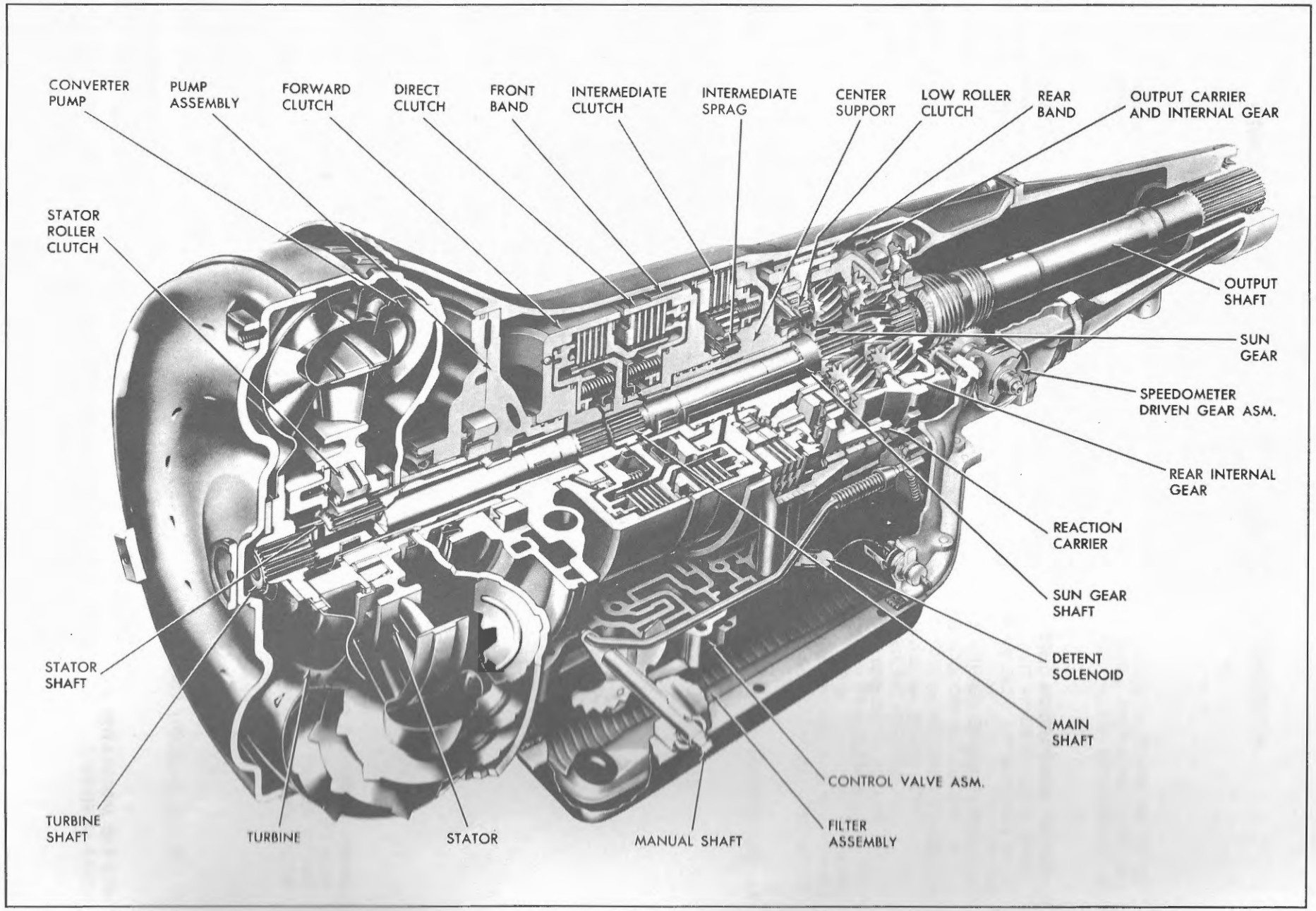
A. INSTALL THE MODULATOR THAT IS KNOWN TO BE ACCEPTABLE ON EITHER END OF THE GAGE.
B. INSTALL THE MODULATOR IN QUESTION ON THE OPPOSITE END OF THE GAGE.
C. HOLDING THE MODULATORS IN A HORIZONTAL POSITION BRING THEM TOGETHER UNDER PRESSURE UNTIL EITHER MODULATOR SLEEVE END **JUST TOUCHES** THE LINE IN THE CENTER OF THE GAGE. THE GAP BETWEEN THE OPPOSITE MODULATOR SLEEVE END AND THE GAGE LINE SHOULD THEN BE 1/16" OR LESS. IF THE DISTANCE IS GREATER THAN THIS AMOUNT, THE MODULATOR IN QUESTION SHOULD BE REPLACED.



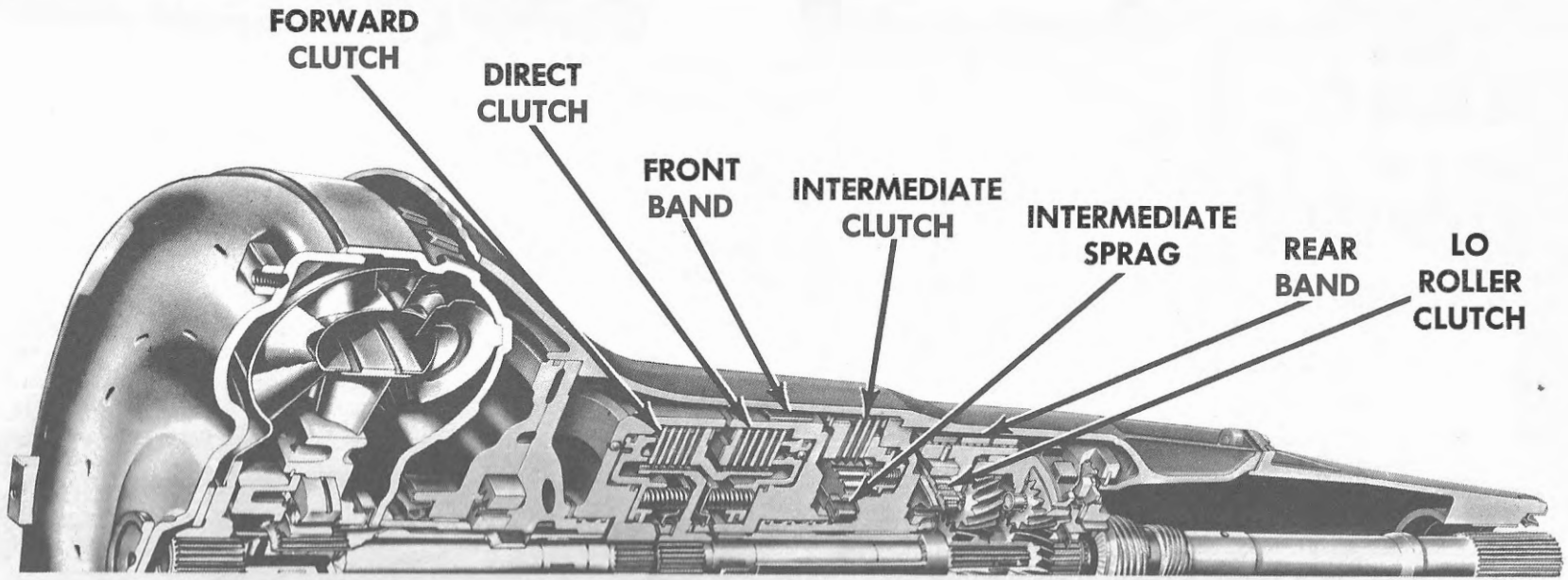
4. SLEEVE ALIGNMENT CHECK

ROLL THE MAIN BODY OF THE MODULATOR ON A FLAT SURFACE AND OBSERVE THE SLEEVE FOR CONCENTRICITY TO THE CAN. IF THE SLEEVE IS CONCENTRIC AND THE PLUNGER IS FREE, THE MODULATOR IS ACCEPTABLE.

ONCE THE MODULATOR ASSEMBLY PASSES ALL OF THE ABOVE TESTS, IT IS AN ACCEPTABLE PART AND SHOULD BE RE-USED.



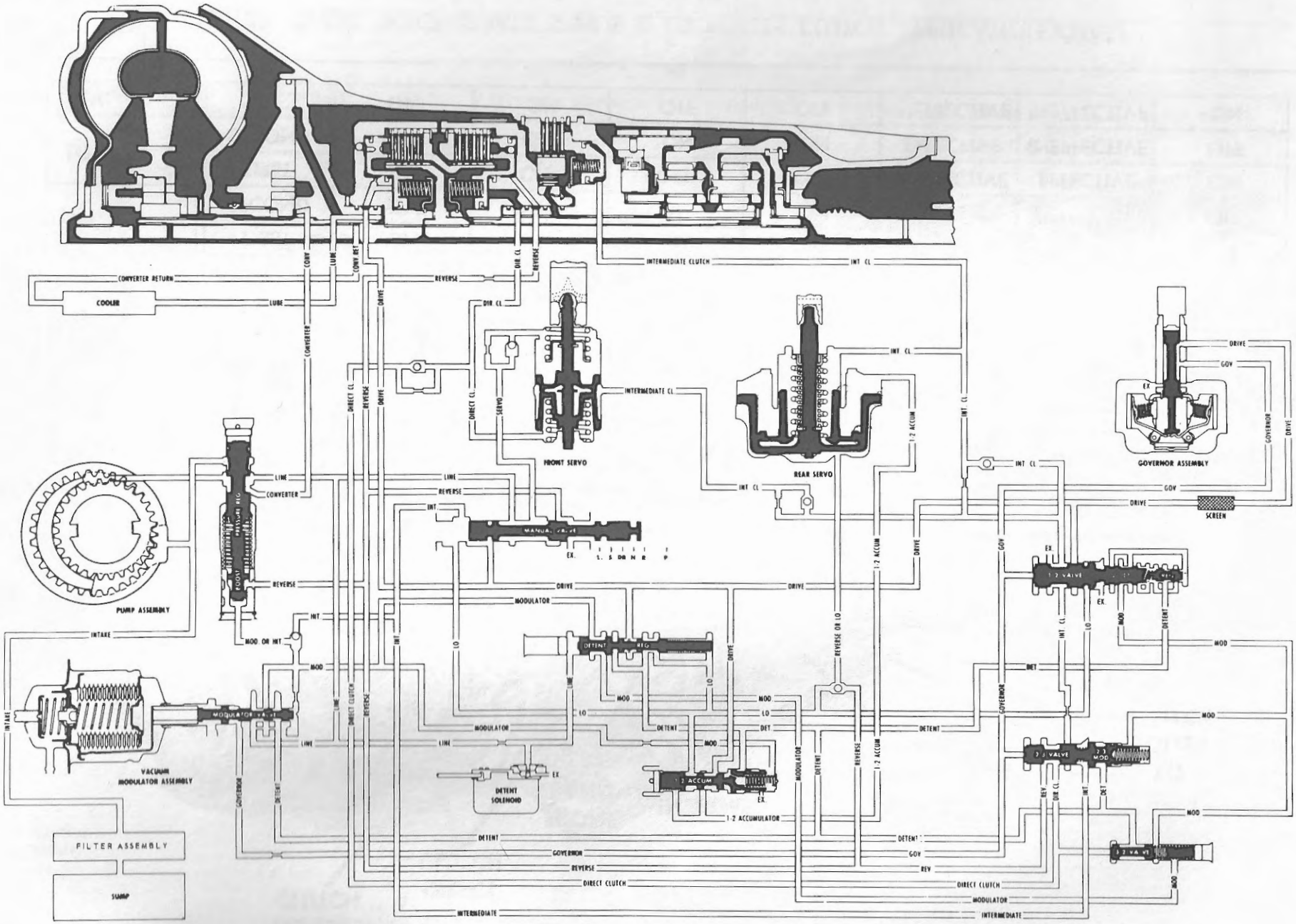
MODEL "400" TURBO HYDRA-MATIC CUTAWAY (TYPICAL)



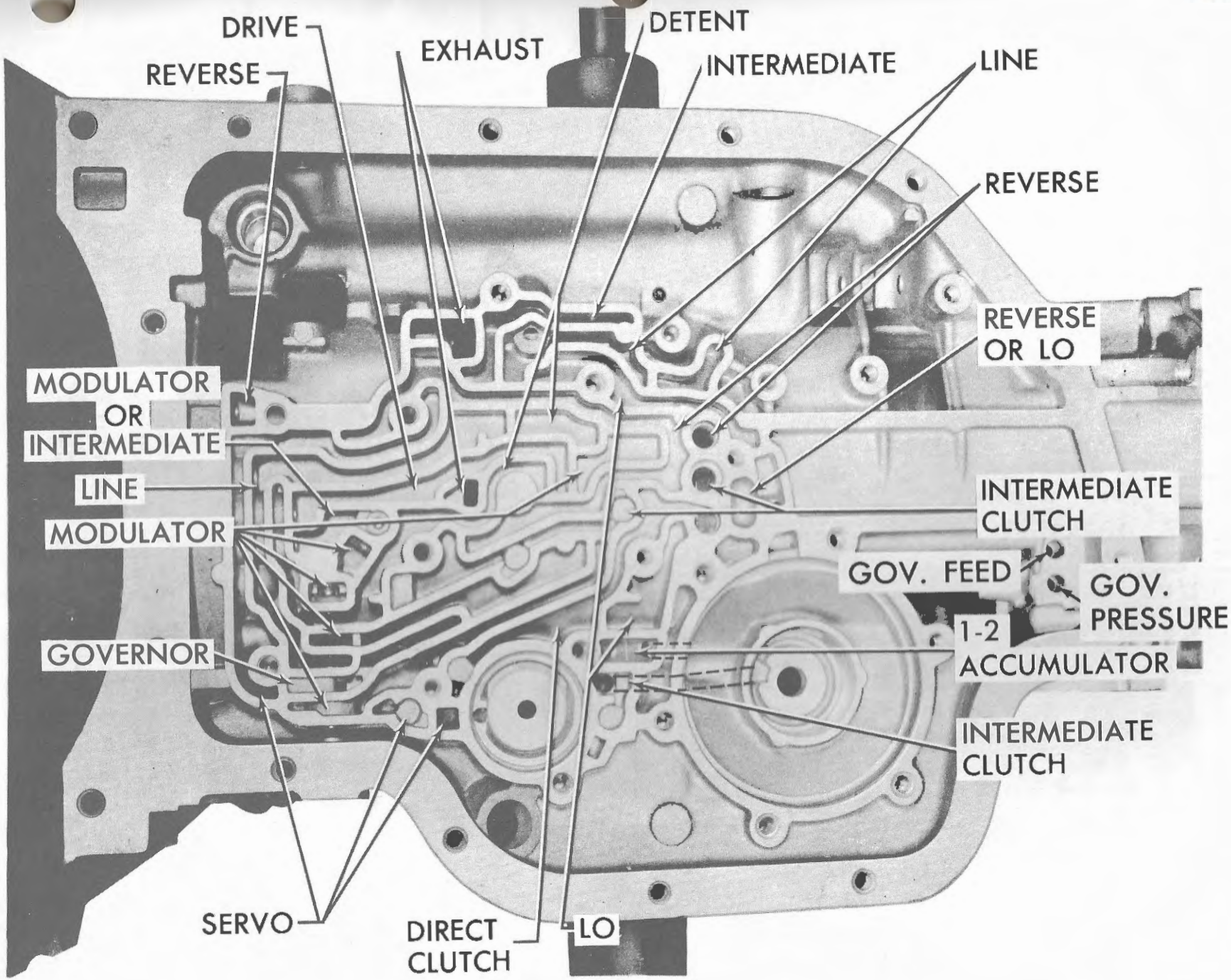
RANGE	GEAR	FORWARD CLUTCH	DIRECT CLUTCH	FRONT BAND	INT. CLUTCH	INT. SPRAG	LO ROLLER CLUTCH	REAR BAND
PARK—NEUT.		OFF	OFF	OFF	OFF	INEFFECTIVE	INEFFECTIVE	OFF
DRIVE	FIRST	ON	OFF	OFF	OFF	INEFFECTIVE	EFFECTIVE	OFF
	SECOND	ON	OFF	OFF	ON	EFFECTIVE	INEFFECTIVE	OFF
	THIRD	ON	ON	OFF	ON	INEFFECTIVE	INEFFECTIVE	OFF
INT.	FIRST	ON	OFF	OFF	OFF	INEFFECTIVE	EFFECTIVE	OFF
	SECOND	ON	OFF	ON	ON	EFFECTIVE	INEFFECTIVE	OFF
LO	FIRST	ON	OFF	OFF	OFF	INEFFECTIVE	EFFECTIVE	ON
	SECOND	ON	OFF	ON	ON	EFFECTIVE	INEFFECTIVE	OFF
REV.		OFF	ON	OFF	OFF	INEFFECTIVE	INEFFECTIVE	ON

CLUTCH, BAND, INTERMEDIATE SPRAG & LO ROLLER CLUTCH APPLICATION CHART

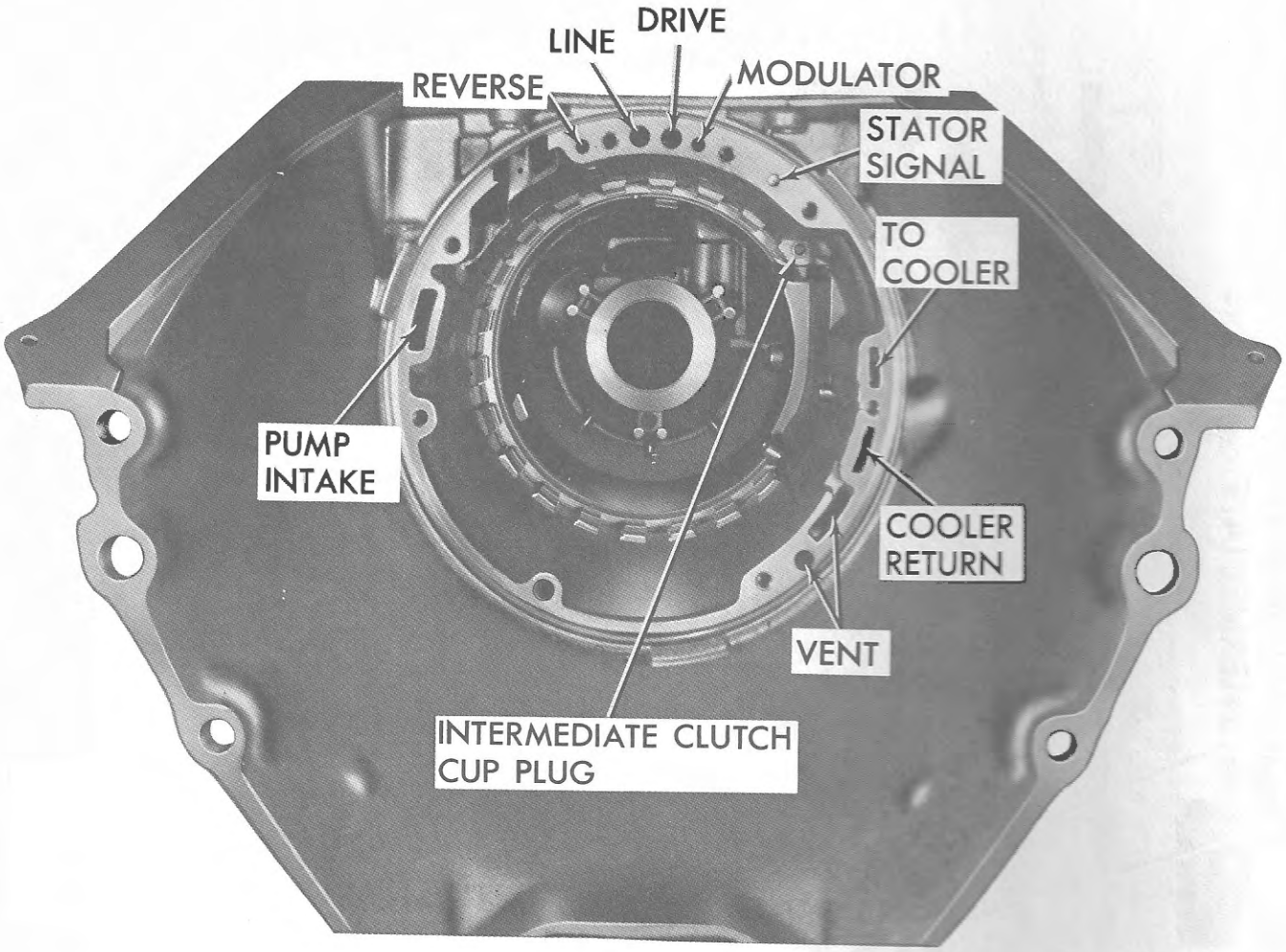
(RANGE REFERENCE CHART)



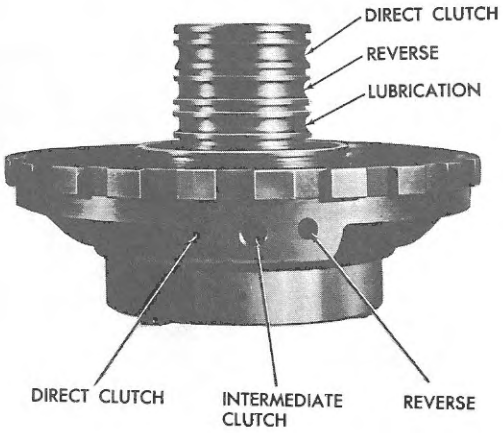
TYPICAL OIL FLOW DIAGRAM—FIXED STATOR
(VALVES IN NEUTRAL POSITION)

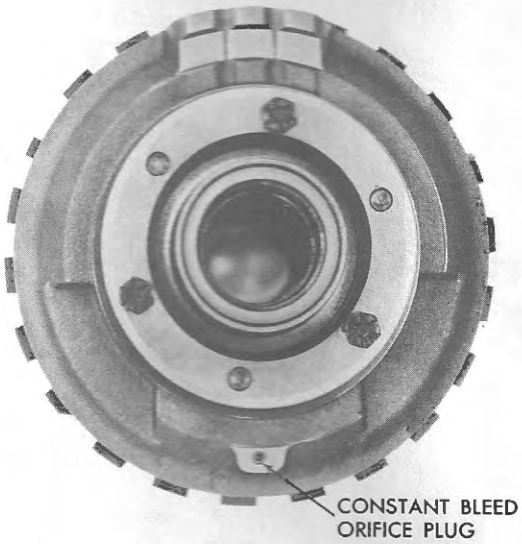


CASE PASSAGES—MODEL 400

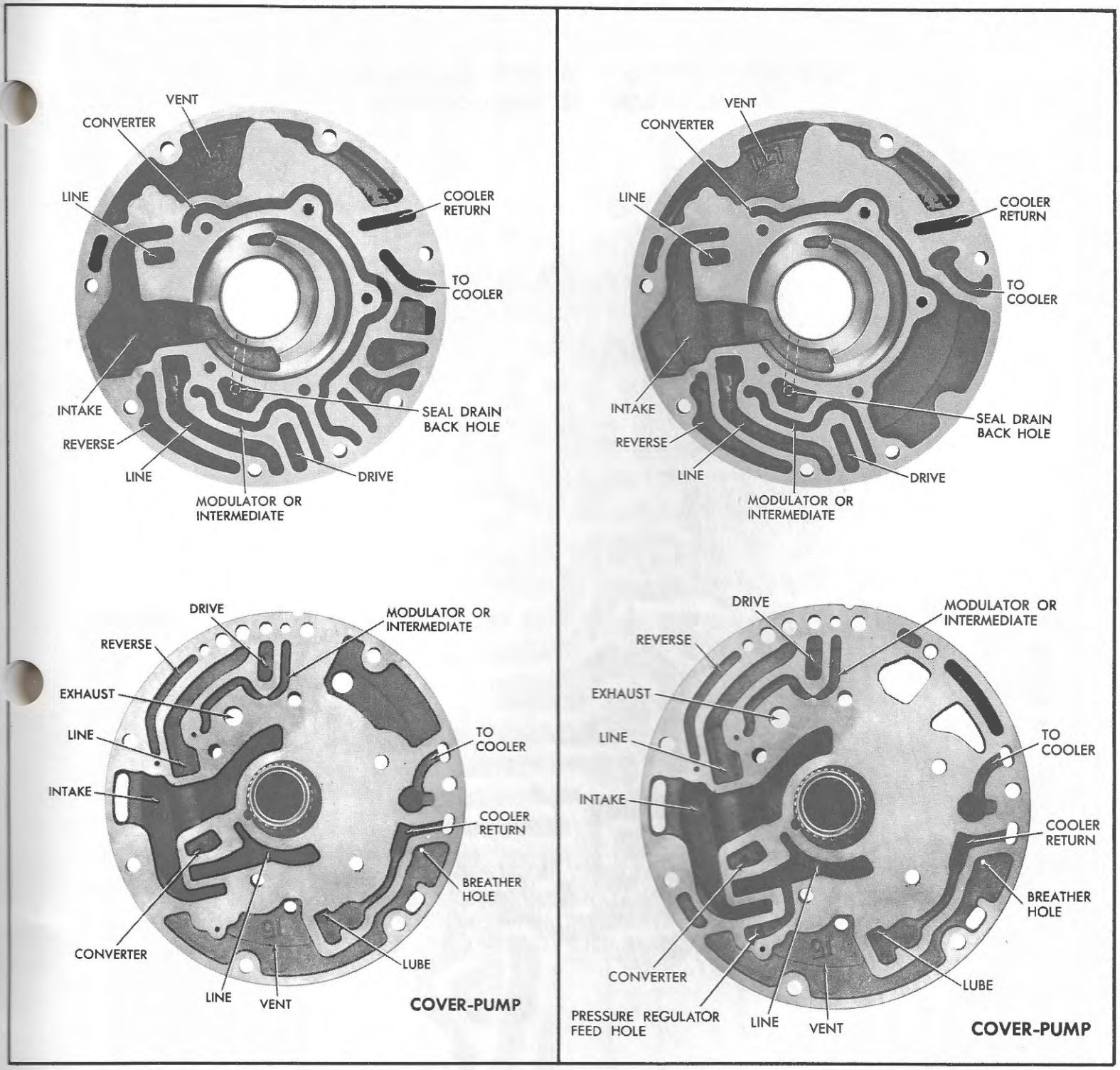


CASE PASSAGES—MODEL 400





CENTER SUPPORT



EARLY DESIGN (OPTIONAL & INTERCHANGEABLE) LATE DESIGN

PUMP BODY & COVER
(FIXED STATOR TYPE CONVERTER)

NOTE: SEE PAGE 41 FOR PROPER PUMP BODY AND/OR PUMP COVER USAGE - FIXED STATOR TURBO HYDRA-MATIC "375," "400," AND "475" TRANSMISSIONS.

THM "375," "400" & "475" PRESSURE REGULATOR VALVE USAGE AND IDENTIFICATION

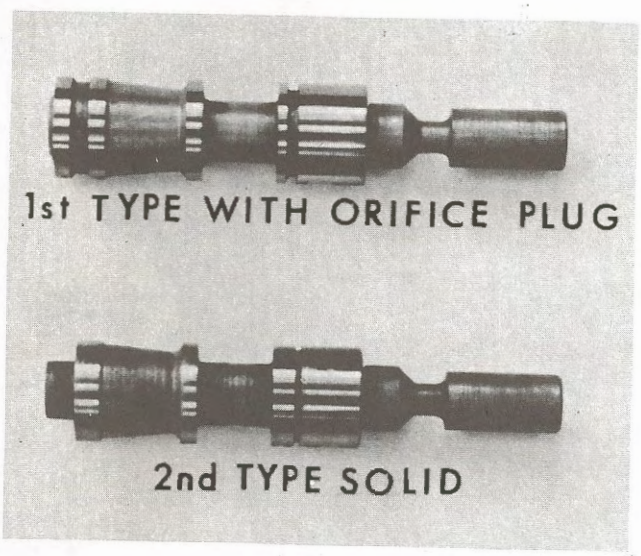


FIG. 1 PRESSURE REGULATOR VALVE

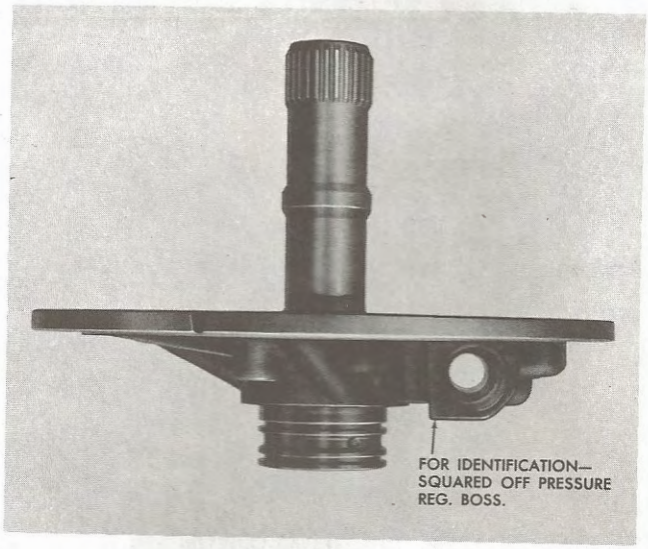
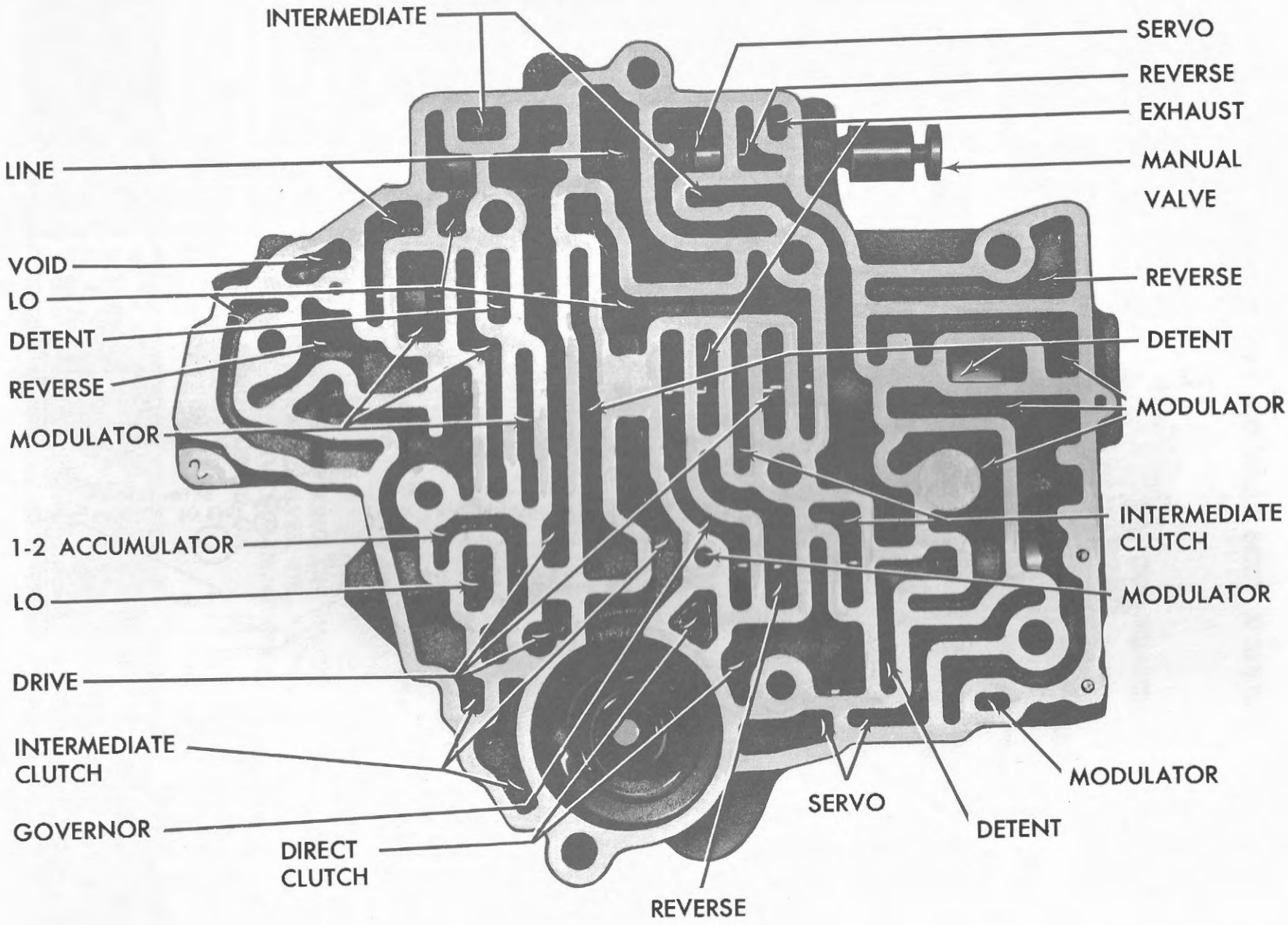
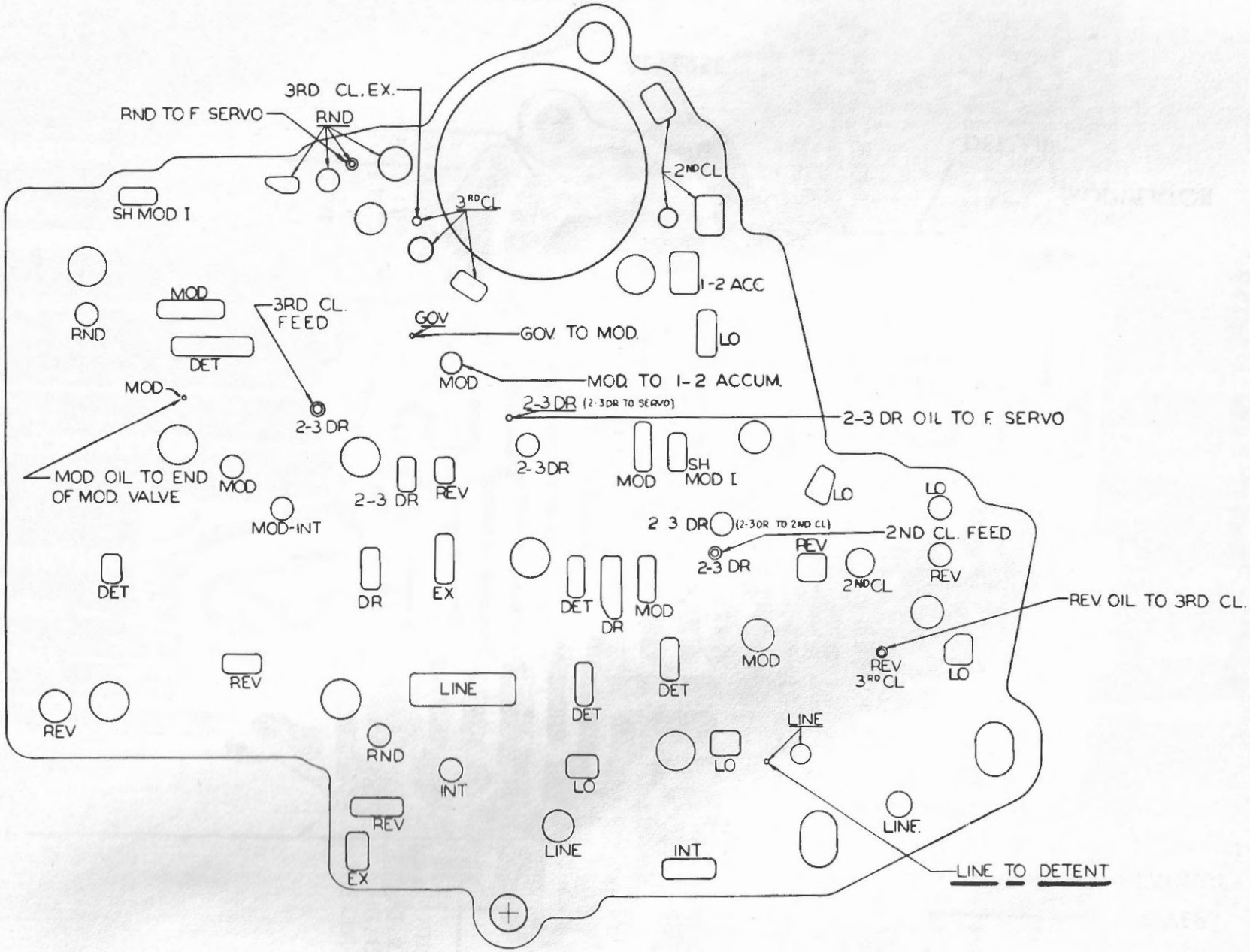


FIG. 2 PUMP COVER ASSEMBLY

NOTE: THE SOLID VALVE, 2ND TYPE, MUST ONLY BE USED IN THE PUMP COVER ASSEMBLY WITH THE SQUARED OFF PRESSURE REGULATOR BOSS (PRESSURE BOOST BUSHING END) FIG. 2. THE PRESSURE REGULATOR VALVE, 1ST TYPE, WITH OIL HOLES AND ORIFICE CUP PLUG, IS RELEASED FOR SERVICE AND CAN BE USED TO SERVICE EITHER PAST MODEL OR THE CURRENT PUMP COVER ASSEMBLY.

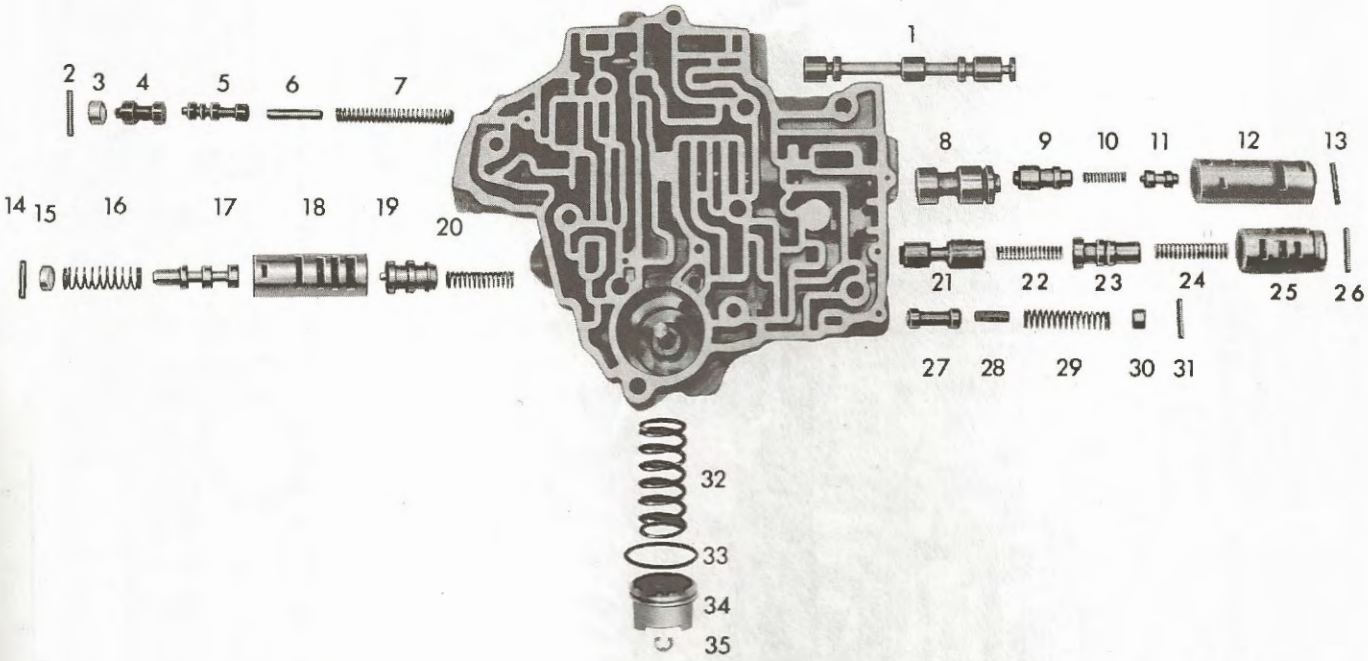


TYPICAL CONTROL VALVE BODY—MODEL 400



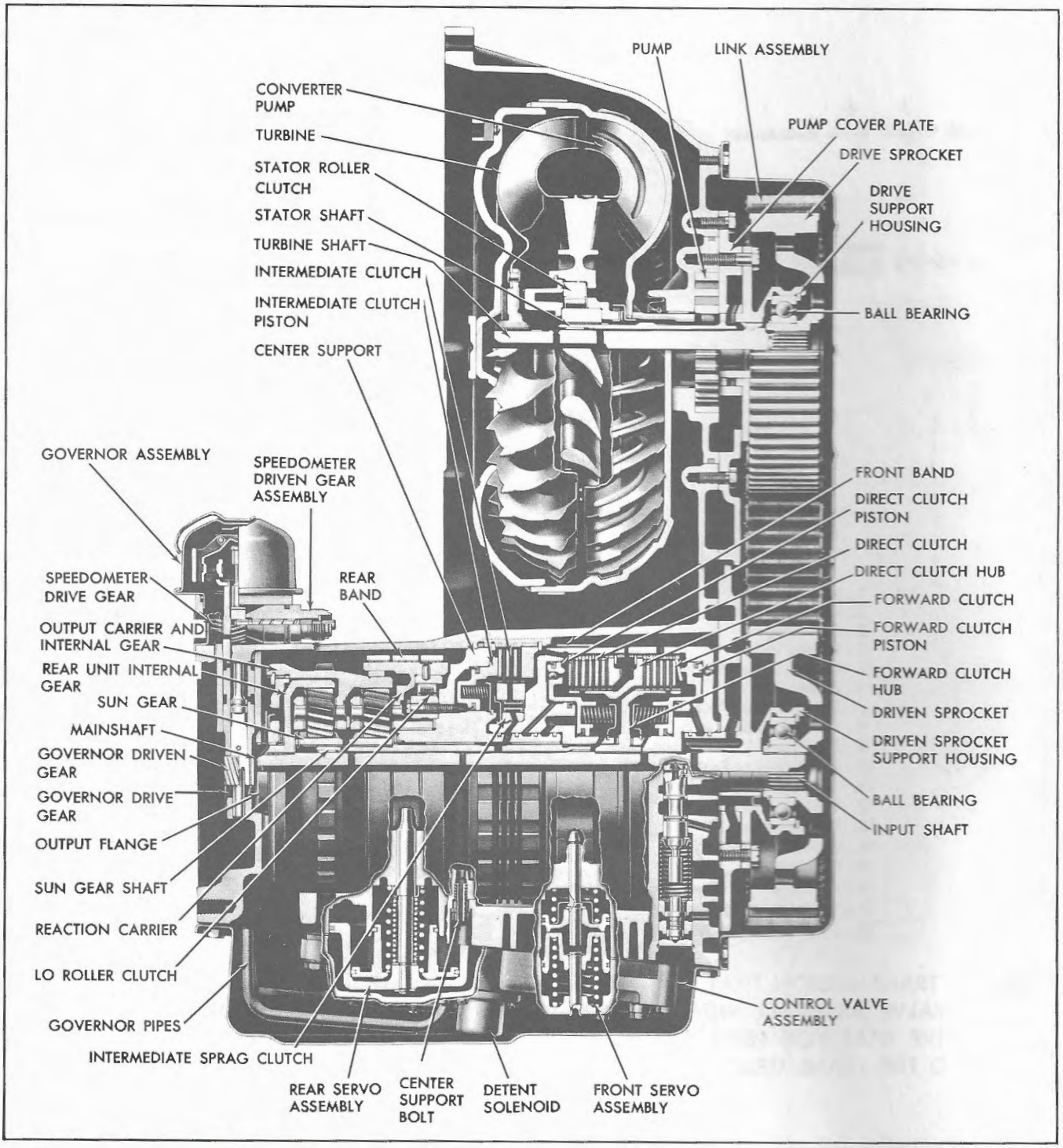
400 SPACER-CONTROL VALVE ASSY. (TYPICAL)

TYPICAL THM 400 VALVE BODY ASSEMBLY

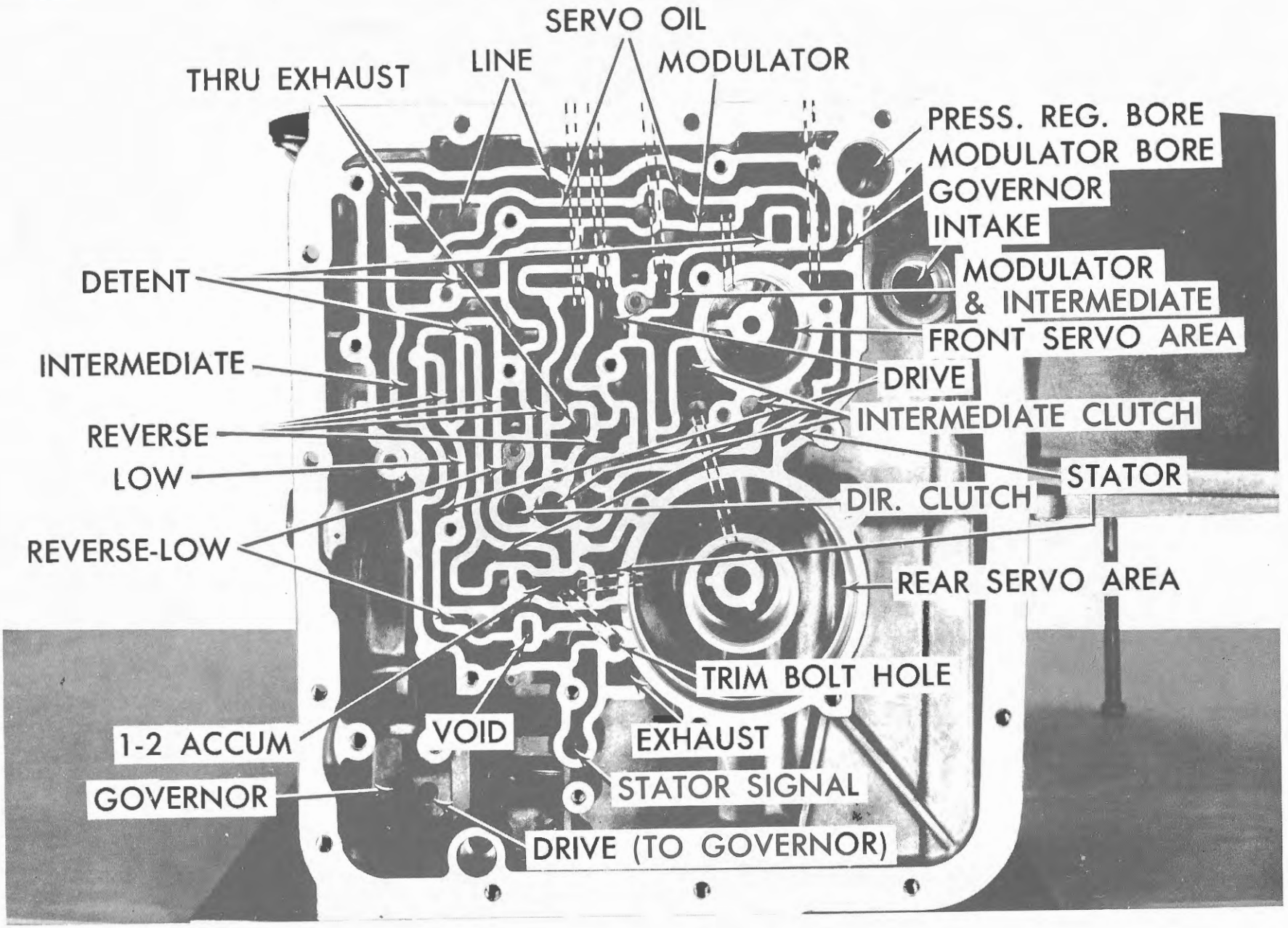


1. Manual Valve
2. Retaining Pin
3. Bore Plug
4. Detent Valve
5. Detent Regulator Valve
6. Spacer Pin
7. Detent Regulator Spring
8. 1-2 Shift Valve
9. 1-2 Detent Valve
10. 1-2 Regulator Spring
11. 1-2 Regulator Valve
12. 1-2 Modulator Bushing
13. Retaining Pin
14. Grooved Retaining Pin
15. Bore Plug
16. 1-2 Accumulator Secondary Spring
17. 1-2 Accumulator Secondary Valve
18. 1-2 Accumulator Bushing
19. 1-2 Primary Accumulator Valve
20. 1-2 Accumulator Primary Spring
21. 2-3 Shift Valve
22. 3-2 Intermediate Spring
23. 2-3 Modulator Valve
24. 2-3 Valve Spring
25. 2-3 Modulator Bushing
26. Retaining Pin
27. 3-2 Valve
28. Spacer Pin
29. 3-2 Valve Spring
30. Bore Plug
31. Retaining Pin
32. Front Accumulator Spring
33. Oil Seal Ring
34. Front Accumulator Piston
35. E-Ring

NOTE: THE TRANSMISSION THAT YOU ARE WORKING ON MAY OR MAY NOT CONTAIN A CONTROL VALVE ASSEMBLY WITH SPRINGS, VALVES, ETC., LIKE THIS PICTURE. THEREFORE, IT IS IMPERATIVE THAT YOU REFER TO THE SERVICE MANUAL AND/OR SERVICE BULLETINS PERTAINING TO THE TRANSMISSION BEING WORKED ON.

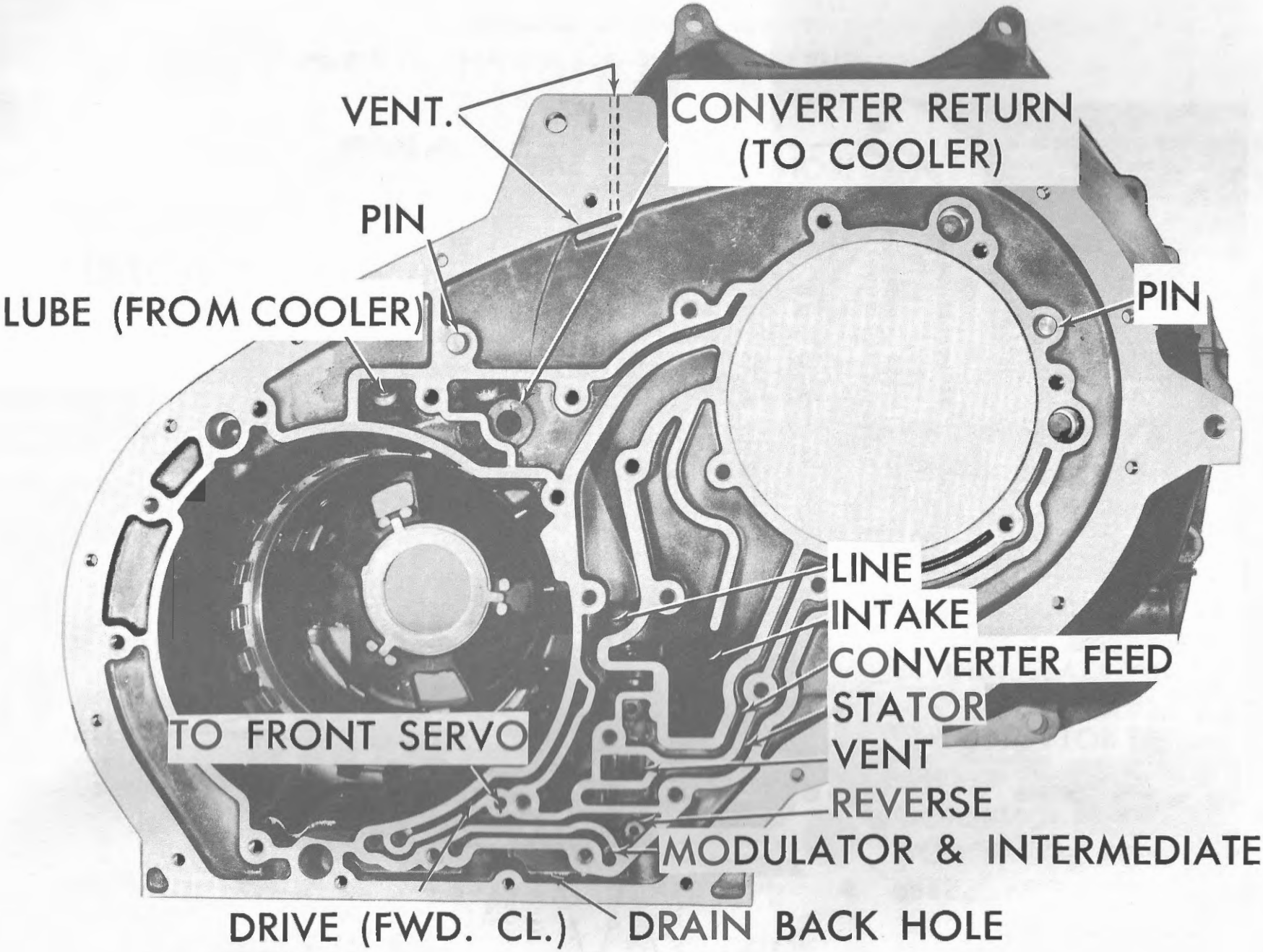


MODEL "425" TURBO HYDRA-MATIC TRANSMISSION CUTAWAY (TYPICAL)



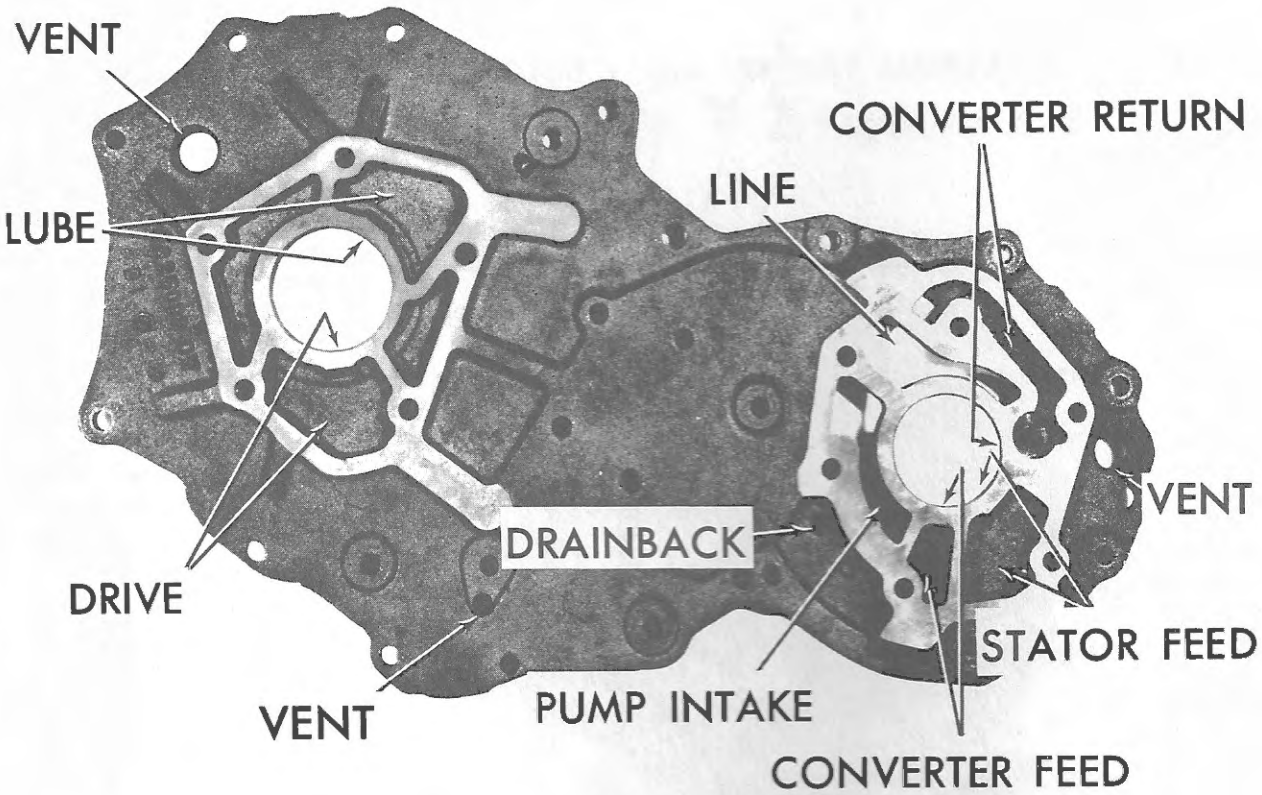
NOTE: STATOR PASSAGES VOID IN ALL MODELS AFTER 1967.

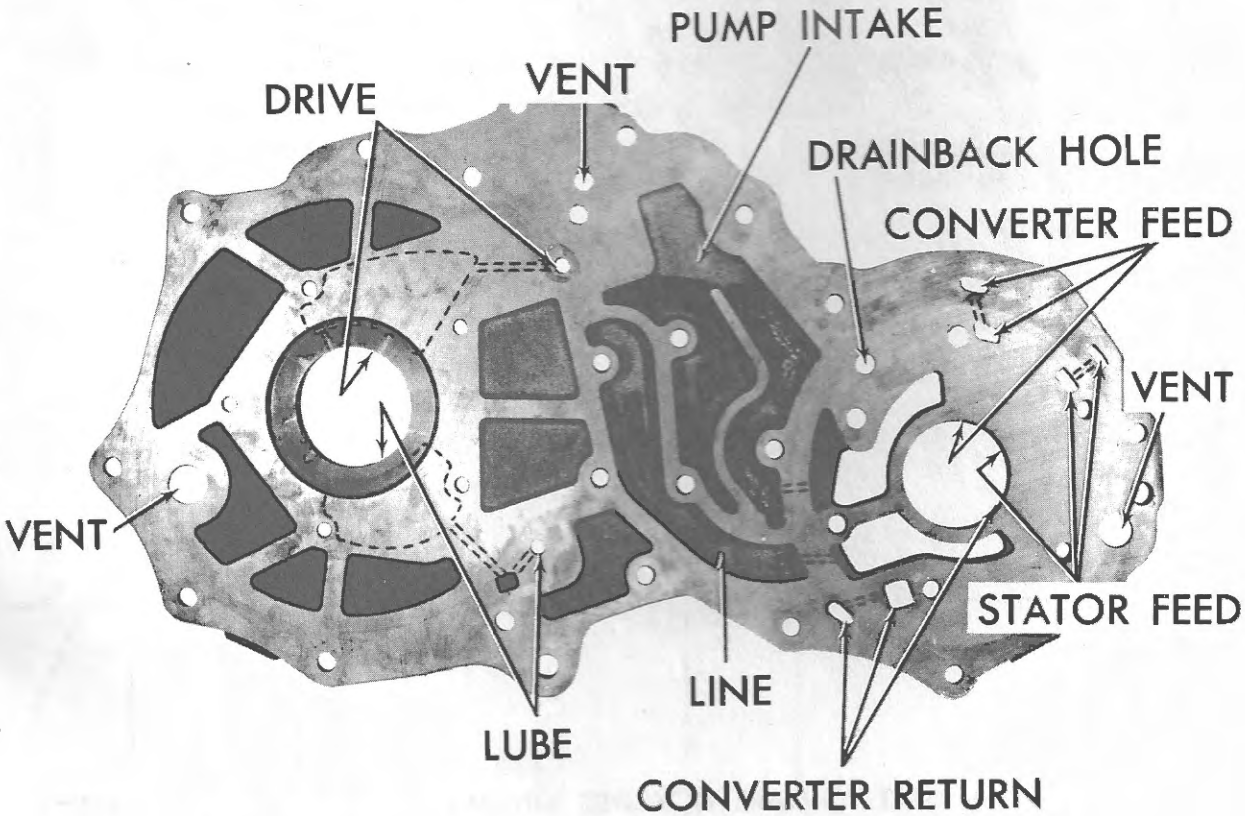
CASE PASSAGES-MODEL 425



NOTE: STATOR PASSAGES VOID IN ALL MODELS AFTER 1967.

CASE PASSAGES-MODEL 425

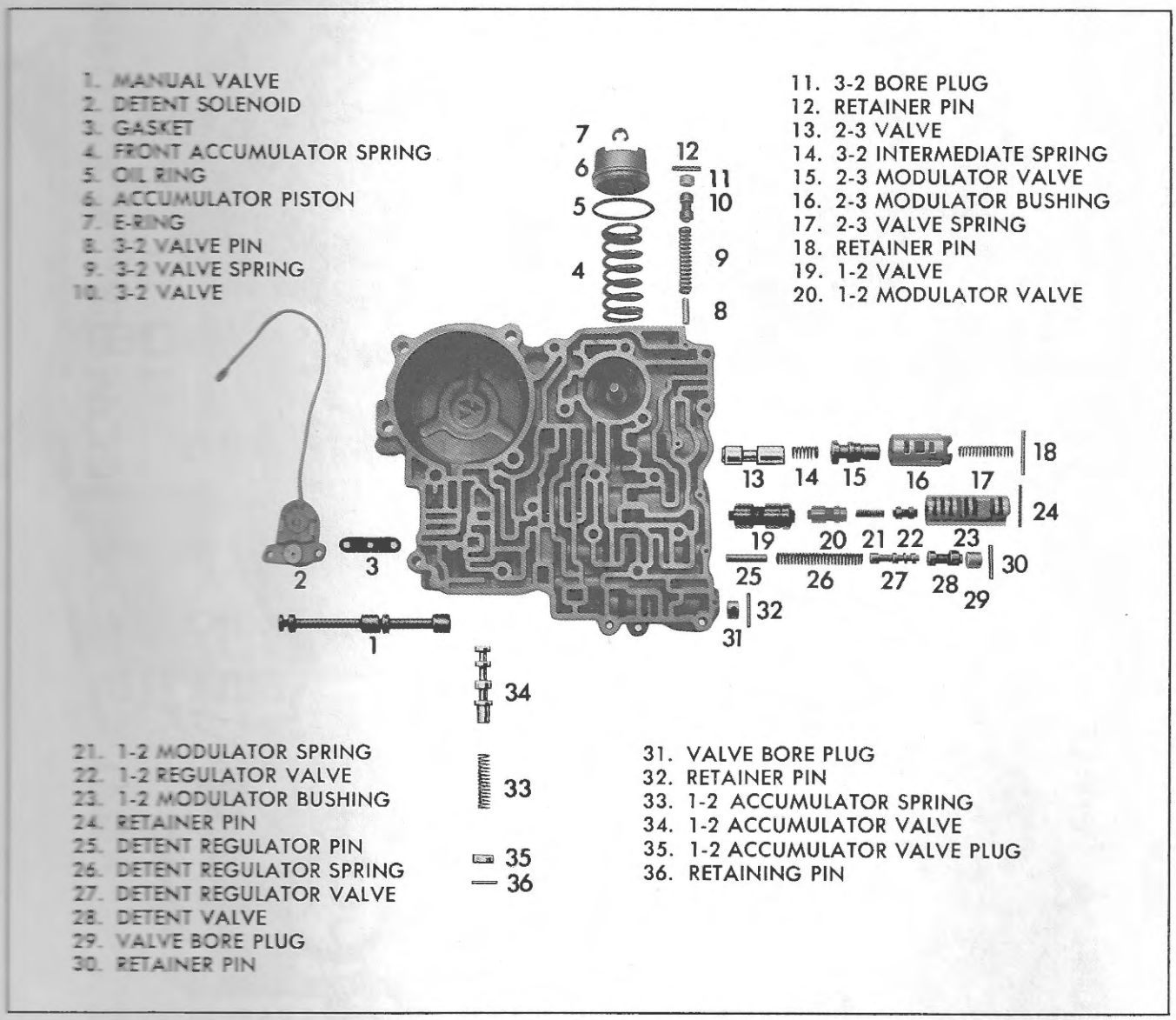




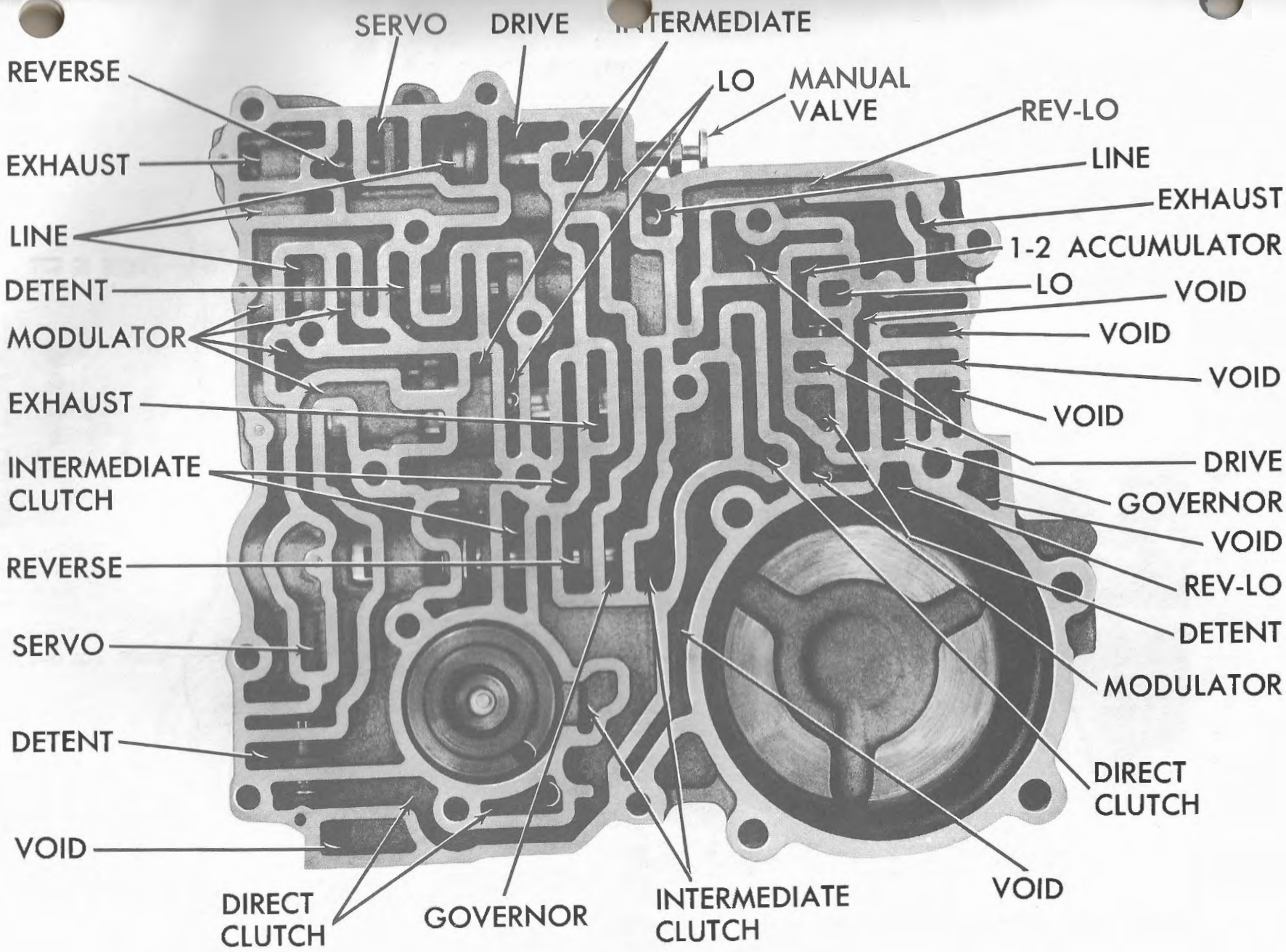
MODEL 425-PUMP COVER PLATE

NOTE: STATOR PASSAGES VOID IN ALL MODELS AFTER 1967.

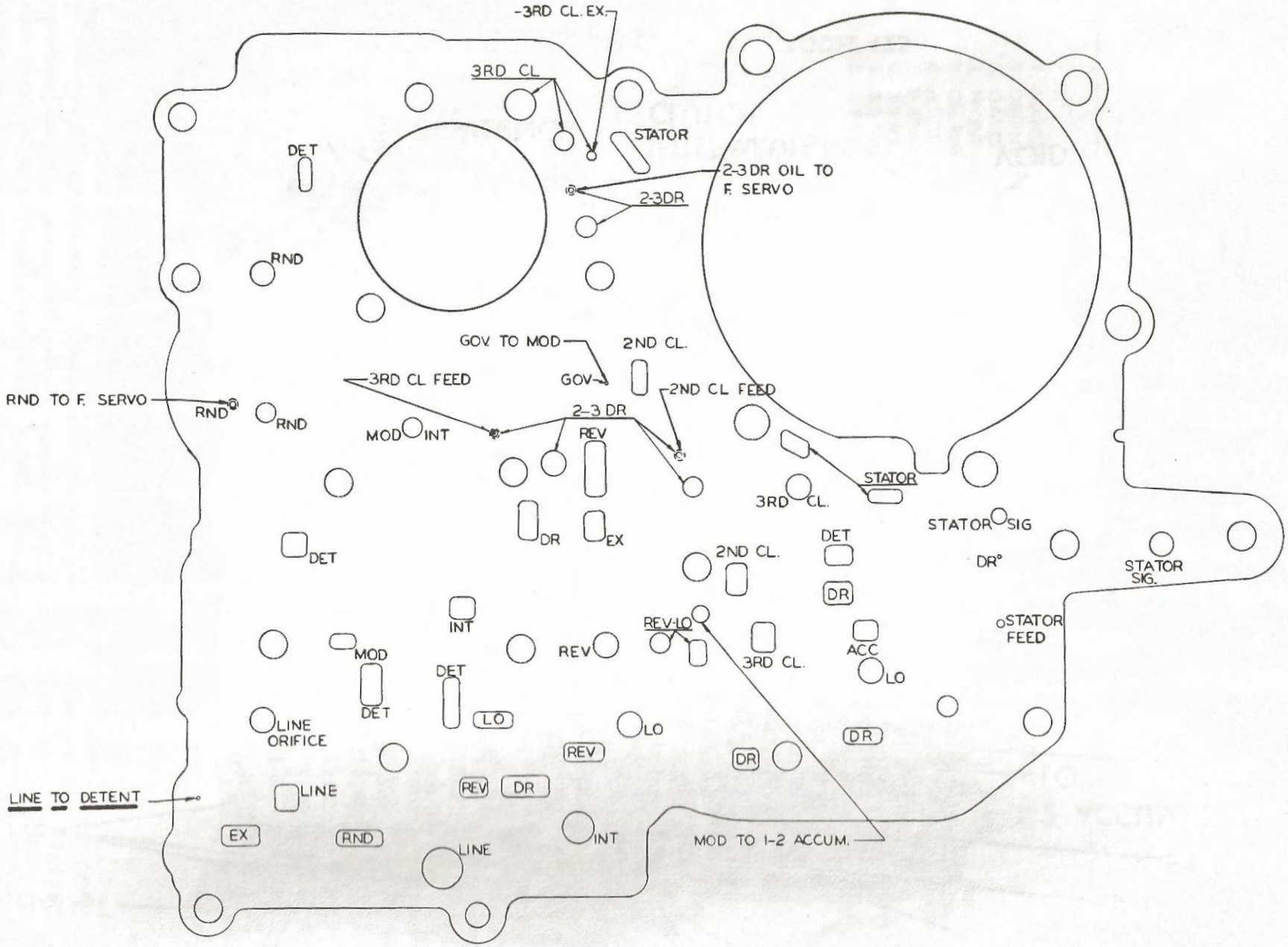
TYPICAL THM 425 VALVE BODY ASSEMBLY



NOTE: THE TRANSMISSION THAT YOU ARE WORKING ON MAY OR MAY NOT CONTAIN A CONTROL VALVE ASSEMBLY WITH SPRINGS, VALVES, ETC., LIKE THIS PICTURE. THEREFORE, IT IS IMPERATIVE THAT YOU REFER TO THE SERVICE MANUAL AND/OR SERVICE BULLETINS PERTAINING TO THE TRANSMISSION BEING WORKED ON.

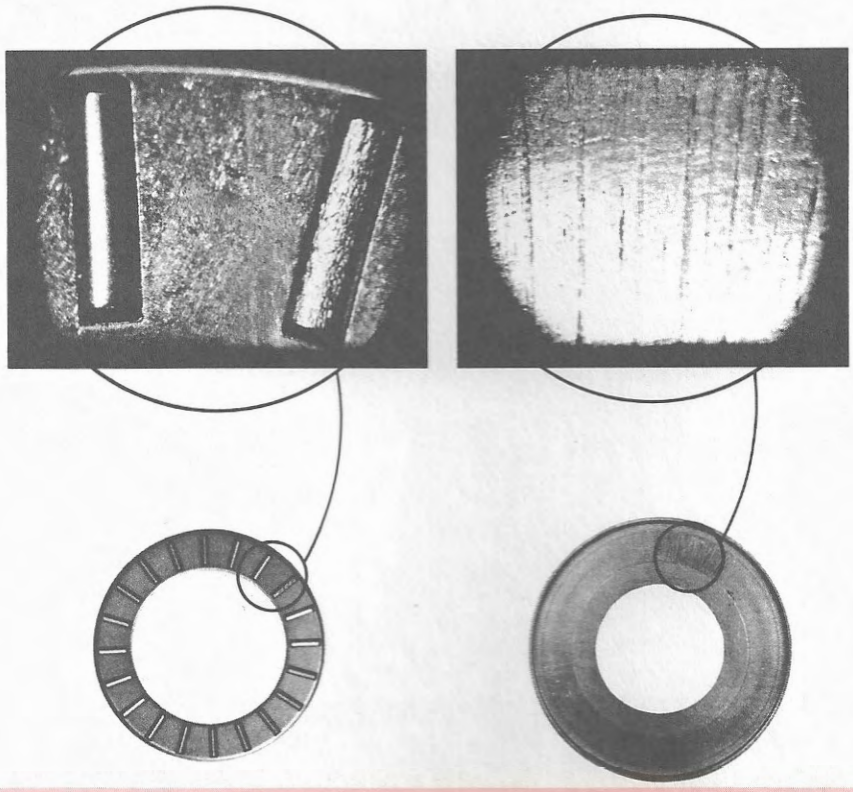


TYPICAL CONTROL VALVE BODY — MODEL 425

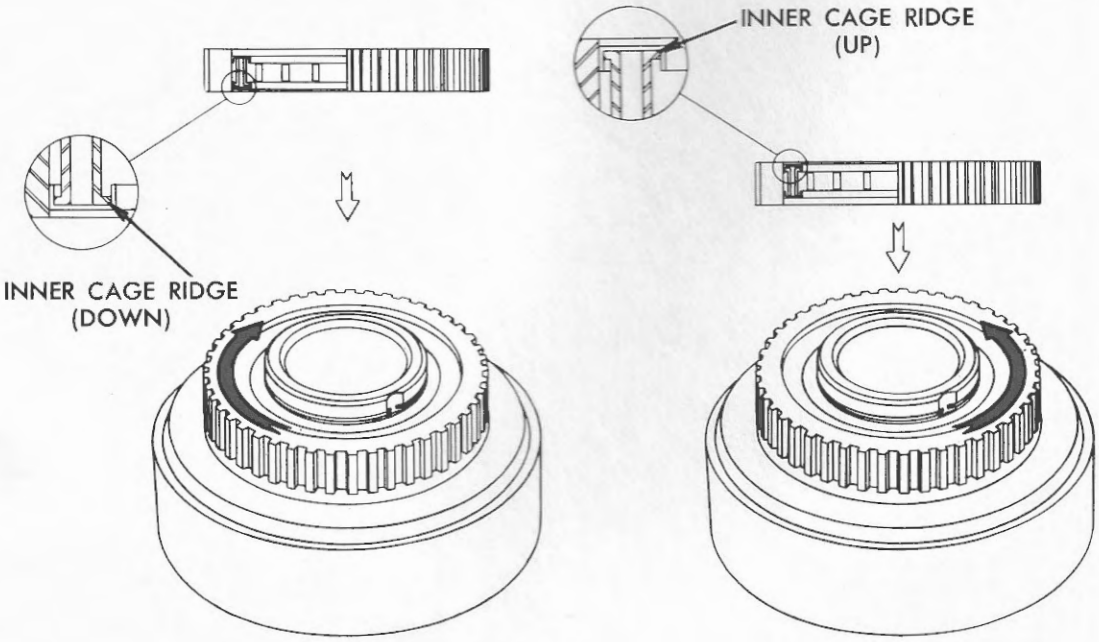


425 SPACER-CONTROL VALVE ASSY. (TYPICAL)

NOTE: IF PITTING OR ROUGHNESS, AS SHOWN IN THE ILLUSTRATIONS BELOW, IS APPARENT ON ANY THRUST BEARING ROLLER OR THRUST RACE, THEY MUST BE REPLACED.



INTERMEDIATE SPRAG CLUTCH



400 THM

425 THM

CORRECT OUTER RACE ROTATION

HYDRA-MATIC

FEBRUARY 1983
GENERAL MOTORS CORPORATION 5/M

LITHO IN USA