FOREWORD

This Systematic Trouble Shooting booklet describes the necessary service procedures involved in the proper diagnosis and correction of the most common Hydra-matic model 400 and 425 transmission malfunctions.

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INTRODUCTION

The low percent of Turbo Hydra-matic transmission problems in the field has not provided the average service man with a steady flow of units 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 transmission trouble shooting the Hydra-matic way is designed for field service personnel who have had a minimum amount of training or experience in working on the Turbo Hydra-matic transmission. It will be valuable to a service organization from service writers and road testers to the mechanic who performs the repair operation.

This trouble shooting program is not intended to take the place of the Turbo Hydra-matic training course. It is intended to supplement it by making available to you a practical method and systematic approach to solving transmission malfunctions with the information that can be gained by oil pressure checks which can be made without a road test.

Internal oil leaks within the transmission that are fed through an orifice or orifices will not show up on an oil pressure check as low pressure; however, by following the Trouble Shooting Charts and with the information gained from the pressure checks, you will be led to the possible cause or causes of the malfunction and the corrective action.

PRELIMINARY CHECKING PROCEDURE

(Page 5)

"Preliminary Checking Procedure" has the normal oil pressure ranges under specific conditions listed. All of these can be made without a road test. Deviations from the normal oil pressure ranges are indicators to specific areas and causes of transmission malfunctions. But like working a jigsaw puzzle, in order to finish the picture, you need all the pieces. In this case you need all the pressure readings the chart lists and they can be made in the shop and do not require a road test.

In the majority of malfunctions this information will be required in order to efficiently diagnose the malfunction. If the customer complaint is unknown other than it just doesn't work right, the preliminary oil pressure check will be necessary to aid you in determining if a malfunction exists and in what area to look for the cause. However, an important and often overlooked aspect of diagnosis is precise determination of the customer's complaint. For this purpose, 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.

When the malfunction or complaint is known you can proceed to the Trouble Shooting Chart or Charts that cover the specific condition. In some instances you may correct the condition in the first few steps of the chart; in others, it will require that the pressure check be performed in order to lead you in the right direction to remedy the malfunction.

The first step when searching for the cause of a malfunction is to check the Transmission Oil Level; the procedure is outlined on Page 18.

The second step when searching for the cause of a malfunction is to check the Outside Manual Linkage; refer to Page 18.

If discrepancies are found in these first 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 take the oil pressure checks. Install the pressure gauge and proceed to follow the steps on the Preliminary Checking Procedure Chart and record the pressures and compare them with the normal pressures provided for each condition on Page 5.

If the malfunction is unknown and a road test can be made, (See Page 7) it can be combined with the Preliminary Checking Procedure. If a road test can not be made, and the complaint is delayed or no upshifts, and high pressures are recorded on the pressure checks, the electrical connector should be disconnected from the transmission and oil pressure rechecked. Normal pressures on recheck indicate that the cause of the malfunction is in the electrical circuit to the transmission, such as shorted downshift switch or wires, or crossed wires of variable stator transmissions (stator and detent).

With the information you have obtained through the Preliminary Checking Procedure, and Road Test, if it was required, you can now apply it to the chart or charts in the Systematic Trouble Shooting guide that fits the malfunction.
MODEL "425" TURBO HYDRA-MATIC TRANSMISSION CUTAWAY (TYPICAL)
<table>
<thead>
<tr>
<th>RANGE</th>
<th>GEAR</th>
<th>FORWARD CLUTCH</th>
<th>DIRECT CLUTCH</th>
<th>FRONT BAND</th>
<th>INT. CLUTCH</th>
<th>INT. SPRAG</th>
<th>LO ROLLER CLUTCH</th>
<th>REAR BAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARK—NEUT.</td>
<td></td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>INEFFECTIVE</td>
<td>INEFFECTIVE</td>
<td>OFF</td>
</tr>
<tr>
<td>DRIVE</td>
<td>FIRST</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>INEFFECTIVE</td>
<td>EFFECTIVE</td>
<td>OFF</td>
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<tr>
<td></td>
<td>SECOND</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>EFFECTIVE</td>
<td>INEFFECTIVE</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td>THIRD</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>INEFFECTIVE</td>
<td>INEFFECTIVE</td>
<td>OFF</td>
</tr>
<tr>
<td>INT.</td>
<td>FIRST</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>EFFECTIVE</td>
<td>INEFFECTIVE</td>
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<td>SECOND</td>
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<td>INEFFECTIVE</td>
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<tr>
<td>LO</td>
<td>FIRST</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>INEFFECTIVE</td>
<td>EFFECTIVE</td>
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<td>SECOND</td>
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<td>INEFFECTIVE</td>
<td>OFF</td>
</tr>
<tr>
<td>REV.</td>
<td></td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>INEFFECTIVE</td>
<td>INEFFECTIVE</td>
<td>ON</td>
</tr>
</tbody>
</table>

CLUTCH, BAND, INTERMEDIATE SPRAG & LO ROLLER CLUTCH APPLICATION CHART
(RANGE REFERENCE CHART)
**CHECK OIL PRESSURES IN FOLLOWING MANNER**

<table>
<thead>
<tr>
<th>RANGE</th>
<th>OIL PRESSURE</th>
<th>NORMAL P.S.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRIVE—BRAKES APPLIED ENGINE AT 1000 RPM</td>
<td>60 TO 90</td>
<td></td>
</tr>
<tr>
<td>SUPER OR LO—BRAKES APPLIED ENGINE AT 1000 RPM</td>
<td>135 TO 160</td>
<td></td>
</tr>
<tr>
<td>REVERSE—BRAKES APPLIED ENGINE AT 1000 RPM</td>
<td>95 TO 150</td>
<td></td>
</tr>
<tr>
<td>NEUTRAL—BRAKES APPLIED ENGINE AT 1000 RPM</td>
<td>55 TO 70</td>
<td></td>
</tr>
<tr>
<td>DRIVE IDLE SET ENGINE IDLE TO SPECIFICATIONS</td>
<td>60 TO 85</td>
<td></td>
</tr>
<tr>
<td>DRIVE—30 MPH CLOSED THROTTLE OR ON HOIST*</td>
<td>55 TO 70</td>
<td></td>
</tr>
</tbody>
</table>

*THE DRIVE—30 MPH CLOSED THROTTLE PRESSURE READING MAY BE TAKEN DURING A ROAD TEST OR:

1. VEHICLE ON HOIST—DRIVING WHEELS OFF GROUND, FOOT OFF BRAKE, IN DRIVE RANGE.
2. Engine 2000 RPM.
3. CLOSE THROTTLE (FOOT OFF ACCELERATOR) AND TAKE PRESSURE READING ENGINE 2000-1200 RPM.

**NOTE:** WITH CLOSED THROTTLE AND DRIVING WHEELS OFF THE GROUND, ENGINE RPM WILL DROP RAPIDLY. PRESSURE READING MUST BE TAKEN WITHIN RPM'S INDICATED AND WITH CLOSED THROTTLE.
Use Your Oil Pressure Gauge!

Use Your Vacuum Gauge!

VACUUM LINE TO ENGINE
Check All Shifts In The Following Manner:

**DRIVE RANGE:**
Position the 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 in some vehicles which have a high numerical axle ratio and/or high engine RPM.

**2ND GEAR — OVERRUN BRAKING:**
Position the selector lever in DRIVE RANGE, and with the vehicle speed at approximately 35 MPH, 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.
## Transmission Malfunction Related to Oil Pressure

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Drive Brakes Applied 1000 RPM</th>
<th>Reverse Brakes Applied 1000 RPM</th>
<th>Super or Lo Brakes Applied 1000 RPM</th>
<th>Neutral Brakes Applied 1000 RPM</th>
<th>Drive 30 MPH Closed Throttle</th>
<th>Drive Idle</th>
<th>Oil Pressure Drop Occurs While Engine RPM Increases from 1000 to 3000 RPM Wheels Free to Move* **</th>
<th>Possible Cause of Malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No 1-2 Upshift and/or Delayed Upshift</strong></td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Drop</td>
<td>Malfunction in Control Valve Assy.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>No Drop</td>
<td>Malfunction in Governor or Governor Feed System</td>
</tr>
<tr>
<td>High</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>High</td>
<td>--</td>
<td>--</td>
<td></td>
<td>Malfunction in Detent System</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Normal</td>
<td>High</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
<td>Malfunction in Modulator or Vacuum Feed System to Modulator</td>
</tr>
<tr>
<td><strong>Slipping—Reverse</strong></td>
<td>Normal</td>
<td>Low</td>
<td>Normal</td>
<td>Normal</td>
<td>--</td>
<td>--</td>
<td>Oil Leak in Feed System to the Direct Clutch</td>
<td></td>
</tr>
<tr>
<td><strong>Slipping—1st Gear</strong></td>
<td>Low</td>
<td>Normal</td>
<td>Low to Normal</td>
<td>Low to Normal</td>
<td>--</td>
<td>--</td>
<td>Oil Leak in Feed System to the Forward Clutch</td>
<td></td>
</tr>
<tr>
<td><strong>Downshift with Zero Throttle and No Engine Braking in Drive</strong></td>
<td>* Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Stator and Detent Wires Switched</td>
<td></td>
</tr>
</tbody>
</table>

* 1966 Cadillac with brakes applied will show high if stator and detent wires are switched.

** Drive range, vacuum line disconnected to modulator.
NO 1-2 UPHSHIFT AND/OR DELAYED UPHSHIFT OR 1-2 & 2-3 UPHSHIFT—FULL THROTTLE ONLY

CHECK TRANS. OIL LEVEL

DISCONNECT ELECT. PLUG FROM TRANS. AND TEST CAR

NO UPHSHIFT

WITH BRAKES APPLIED, CHECK LINE PRESSURE IN DR. AT 1000 RPM

60-90 PSI

SEE PAGE 21 FOR GOVERNOR—CONTROL VALVE ASSEMBLY CHECK PROCEDURE

90-130 PSI

WITH BRAKES APPLIED, CHECK LINE PRESSURE IN NEUT. AT 1000 RPM

55-70 PSI

DETENT SYS.

CHECK SOLENOID FOR FUNCTION OR DAMAGE

CHECK "LINE TO DETENT" ORIFICE IN SPACER PLATE SEE PAGES 31 & 32

CHECK DETENT VALVE TRAIN

70-160 PSI

CHECK MOD. FOR LEAKING DIAPHRAGM OR BENT NECK SEE PAGE 22

CHECK CASE FOR DAMAGE OR POROSITY AT MOD. VALVE

NORMAL UPHSHIFT OCCURS

CHECK AND CORRECT DETENT SWITCH OR WIRING—CHECK FOR SOLENOID CLICK

ROAD TEST

CHECK MODULATOR VALVE FOR FREENESS

CHECK FOR VACUUM LEAKS OR NO VACUUM SEE PAGE 21
1-2 SHIFT COMPLAINT

FIRM SHIFT, QUICK HARSH AND GENERALLY AGGRESSIVE, OR DELAYED

CHECK TRANS. OIL LEVEL

CHECK & CORRECT VACUUM
RECHECK SHIFT FEEL

WITH BRAKES APPLIED,
CHECK LINE PRESSURE
IN DRIVE AT 1600 RPM

HIGH

NORMAL

CHECK FOR CAUSE OF HIGH
PRESSURE SEE PAGE 29

REMOVE CONTROL
VALVE ASSEMBLY
AND SOLENOID

CHECK 1-2 ACCUM.
SYSTEM IN
CONTROL VALVE ASSY.

REAR ACCUM. STICK
Piston Or Leak

REAR ACCUM. FLOO RESTRICTED
IN TRANS. CASE

CHECK FOR CORRECT
NUMBER AND CORRECT
LOCATION OF CHECK BAILS

OK

REMOVE TRANS.
INSPECT INT. CLUTCH
IF BURNED CHECK
CAUSE—PAGE 17

CHECK FOR PROPER
NO. AND TYPE
OF PLATE
SEE PAGES 248, 25

SOFT SHIFT, SLIPS, OR LONG DRAWN OUT
SHIFT WITH END SLAP

CHECK VACUUM SYSTEM FOR RESPONSE AT
MODULATOR—VAC. SHOULD VARY AND
RESPOND RAPIDLY TO QUICK CHANGES IN
THROTTLE OPENINGS

POOR

NORMAL

WITH BRAKES APPLIED,
CHECK LINE PRESSURE
IN DRIVE AT 1600 RPM

LOW

NORMAL

CHECK VACUUM PIPE FOR
RESTRICTION & CORRECT

CHECK MOD. ASSY. PAGE 22

CORRECT CAUSE OF LOW
PRESSURE—PAGE 19

CHECK CONTROL VALVE ASSY.
BOAT TORQUE

REMOVE CONTROL VALVE ASSEMBLY AND DETENT SQUELCH

CHECK 1-2 ACCUM. VALVE SYSTEM
CHECK FRONT ACCUM. PISTON & OIL RINGS

CHECK SPACER PLATE FOR BLOCKED
ORIFICE (ILLUS.) PAGES 31 & 32

CHECK CENTER SUPPORT BOLT TORQUE AND
SUPPORT LOoseness, AIR CHECK INT. CLUTCH
FOR LEAKAGE AT SEALS OR RINGS

CHECK FOR DAMAGED REAR
SERVO PISTON OR OIL SEAL RING

EXCESSIVE

NORMAL

CHECK INT. CLUTCH FOR PROPER TYPE
CLUTCH PLATES AND NUMBER OF RELEASE
SPRINGS IN COILS (RELEASE SPRINGS—
PAGES 34 AND 35 CHECK INT. CLUTCH
Piston FOR PLATENESS

INTERMEDIATE CLUTCH PLATES
BURNED—CHECK CAUSE, PAGE 17
2-3 SHIFT COMPLAINT

CHECK TRANS. OIL LEVEL

- FIRE SHIFT, QUICK WASH AND
- GENERALLY AGGRESSIVE

CHECK ENGINE TUNE

- SOFT SHIFT, SURFS, OR EXTENDED
- TIME DURING SHIFT WITH END BUMP

WITH BRAKES APPLIED.
- CHECK LINE PRESSURE
IN DRIVE AT 1500 RPM

NORMAL

HIGH

- REMOVE CONTROL VALVE ASSY.
- CHECK CAUSE OF HIGH PRESSURE
- PAGE 20

- REMOVE CONTROL VALVE ASSY.
- CHECK CAUSE OF LOW PRESSURE
- PAGE 19

- CHECK SPACER PLATE
- FOR DAMAGE, BROKEN DIR. CLUTCH FRIED
- OR MISPLACED GASKET.

- AIR CHECK DIR. CL. FOR
- EXCESSIVE LEAK

- CHECK CONTROL
- VALVE ASSY. FOR
- DAMAGED OR STICKED VALVES

- REMOVE TRANS.
- INSPECT FOR EXCESSIVE LEAK
- CENTER SUPPORT OR DAMAGED SUPPORT

- AIR CHECK DIRECT CLUTCH
- TO OUTER AREA OF CLUTCH PISTON.
- LEAK COULD BE AT CENTER PISTON SEAL—2ND RING OR CENTER SUPPORT OR DAMAGED SUPPORT

* MODEL 400.49 "CY" DOES NOT USE A FRONT ACCUM. SPRING.

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

- CONTROL VALVE ASSY.
- 2-3 VALVE.
- GASKETS MISPLACED OR LEAKING

- DIRECT CLUTCH BURNT
- CHECK CAUSE
- PAGE 17

- IMPROPER VACUUM
- CHECK CAUSE
- PAGE 21

NO DETENT DOWNSHIFTS

- LIGHT ON

- DETENT SOLENOID
- CONNECTIVE CONNECTIONS, INOPERATIVE
- SHORTED WIRE, OPEN WIRE, VALVE STUCK,
- OR INCLUSION PLUG

- CHECK DETENT VALVE
- SEE PAGES 29 & 30

- VEHICLE ON LIFT, IGNITION ON
- ENGINES NOT OPERATING

- DISCONNECT ELECT. PLUG FROM TRANS.
- CONNECT BEET LIGHT TO "DETENT" TERMINAL
OF DISCONNECTED WIRE HARNESS
- SEE ILLUSTRATION BELOW

- DEPRESS ACCELERATOR FULLY

- LIGHT OFF

- DETENT SWITCH
1. MALJUDGED—REFER TO CAR
- WIPES SERVICE MANUAL FOR
- ADJUSTMENT PROCEDURE
2. DEFECTIVE SWITCH CONNECTIONS,
- FUSE, SHORTED WIRE

* SHORTED SOLENOID WIRE CAN CAUSE FUSE TO BLOW.
NO DRIVE IN DRIVE RANGE

CHECK TRANS. OIL LEVEL
SEE PAGE 18

CHECK OUTSIDE MANUAL LINKAGE & CORRECT
SEE PAGE 18

WITH BRAKES APPLIED, CHECK LINE
PRESSURE IN DRIVE AT 1000 R.P.M.

NORMAL

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

—FORWARD CLUTCH BURNED—
CHECK CAUSE—SEE PAGE 17

CHECK NO ROOFER CLUTCH OR NO SPRAG
CLUTCH FOR DAMAGE OR NO SPRAG
INSTALLED BACKWARDS

LOW

CORRECT CAUSE OF LOW
PRESSURE—SEE PAGE 19

NO REVERSE OR SLIPS IN REVERSE

CHECK TRANS. OIL LEVEL—PAGE 18

CHECK OUTSIDE MANUAL LINKAGE & CORRECT—
PAGE 18

WITH BRAKES APPLIED, CHECK LINE PRESSURE
IN REVERSE AT 1000 RPM

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, Gask-ets leaking.

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

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

DIRECT CLUTCH BURNED
CHECK CAUSE—PAGE 17

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

CENTER SUPPORT
OIL SEAL RINGS OR GROOVES DAMAGED OR
WORN

LOW

CORRECT CAUSE—PAGE 19
NO ENGINE BRAKING—INTERMEDIATE RANGE—SECOND GEAR

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

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

DRIVE IN NEUTRAL

CHECK OUTSIDE MANUAL LINKAGE & CORRECT PAGE 18

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

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

-FORWARD CLUTCH— 
BURNED PLATES—CHECK CAUSE—PAGE 17 
INCORRECT CLUTCH PLATE USAGE— 
SEE PAGES 24 & 25

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.

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

CHECK OUTSIDE MANUAL LINKAGE & CORRECT, PAGE 18

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

13
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 18)
- PLUGGED OR RESTRICTED FILTER,*
- WRONG FILTER (SEE PAGE 26)
- INTAKE PIPE "O" RING DAMAGED.
- INTAKE PIPE SPLIT, POROSITY IN CASE INTAKE PIPE BORE.
- WATER IN OIL.
- POROSITY OR VOID AT TRANS. CASE (PUMP FACE) INTAKE PORT.
- PUMP TO CASE GASKET OFF LOCATION.

---PUMP ASSEMBLY---
- GEARS DAMAGED, OR DEFECTIVE, DRIVING GEAR ASSEMBLED BACKWARDS.
- CRESSENT 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.

**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---

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

**FIRST, SECOND OR REVERSE ONLY**

---PLANETARY GEAR SET---
- GEARS OR THRUST BEARINGS DAMAGED.
- FRONT INTERNAL GEAR RING DAMAGED.

* 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 DEFECTIVE, DAMAGED, MISSING; SHAFT RING LANDS DEFECTIVE

---CASE ASSEMBLY---
STATOR ORIFICE PLUG BLOCKED

CONVERTER ASSY., DEFECTIVE

* 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
1. TRANSMISSION OIL PAN LEAKS
   A. ATTACHING BOLTS NOT CORRECTLY TORQUED.
   B. IMPROPERLY INSTALLED OR DAMAGED PAN GASKET.
   C. OIL PAN GASKET MOUNTING FACE NOT FLAT.

2. CASE EXTENSION LEAK
   A. ATTACHING BOLTS NOT CORRECTLY TORQUED.
   B. REAR SEAL ASSEMBLY—DAMAGED OR IMPROPERLY INSTALLED. (PROPELLER SHAFT YOKE DAMAGED).
   C. GASKET OR SEAL—(EXTENSION TO CASE) 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.
   B. MODULATOR ASSEMBLY "O" RING SEAL—DAMAGED OR IMPROPERLY INSTALLED.
   C. 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, AND SEALS—DAMAGED, MISSING. BOLTS LOOSE.
   C. CONVERTER—LEAK IN WELD.
   D. PUMP "O" RING SEAL—DAMAGED. (ALSO CHECK PUMP OIL RING GROOVE AND CASE BORE).
   E. POROUS CASTING (PUMP OR CASE).
   F. PUMP—DRAIN BACK HOLE NOT OPEN.

5. OIL COMES OUT VENT PIPE
   A. TRANSMISSION OVER-FILLED—SEE PAGE 18.
   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 BREATHING HOLE BLOCKED OR MISSING. (SEE PAGES 36 & 37).
   I. HOLE IN INTAKE PIPE.

6. OIL COOLER LINES
   A. CONNECTIONS AT RADIATOR LOOSE OR STRIPPED.
   B. CONNECTIONS AT CASE LOOSE OR STRIPPED.

7. MODULATOR ASSY.
   A. DIAPHRAGM DEFECTIVE (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 19).
   D. MANUAL VALVE MISPOSITIONED (SEE PAGE 18).
   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, CADILLAC 400 AND ALL 425) (SEE PAGE 35).
   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 19).
   G. INTERMEDIATE CLUTCH PLUG IN CASE MISSING. (SEE PAGE 35).
   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. DEFECTIVE MODULATOR BELLows (SEE PAGE 22).
   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 INSTALLED BACKWARDS.

NOTE: IF DIRECT CLUTCH PLATES AND FRONT BAND ARE BURNED, CHECK MANUAL LINKAGE (SEE PAGE 18).

NOTE: BURNED CLUTCH PLATES CAN BE CAUSED BY INCORRECT USAGE OF CLUTCH PLATES (SEE PAGES 24 AND 25). ALSO, ANTI-FREEZE IN TRANSMISSION FLUID CAN CAUSE SEVERE DAMAGE, SUCH AS LARGE PIECES OF COMPOSITION CLUTCH PLATE MATERIAL PEELING OFF.
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."
6. CHECK OIL LEVEL.
7. IF OIL IS LOW, CHECK FOR POSSIBLE CAUSES—REFER TO PAGE 16

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.

IF THE TRANSMISSION IS NOT AT OPERATING TEMPERATURE, THE OIL LEVEL SHOULD BE APPROXIMATELY \( \frac{1}{4} \)" BELOW THE "ADD" MARK WITH THE OIL AT APPROXIMATELY 75°F (ROOM TEMPERATURE). IF THE OIL LEVEL IS CORRECTLY ESTABLISHED AT ROOM TEMPERATURE (75°F), IT SHOULD BE AT THE "FULL" MARK ON THE DIP STICK WHEN THE TRANSMISSION REACHES NORMAL OPERATING TEMPERATURE (170°F).

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 CORRESPONDS 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 FAILURE. REFER TO THE CAR DIVISION SHOP MANUAL FOR MANUAL LINKAGE ADJUSTMENT PROCEDURE.


NOTE: THE "CP" MODEL TRANSMISSION WHICH IS USED IN ONE TON TRUCKS DOES NOT CONTAIN THE "PARK" MECHANISM.
CAUSE OF LOW LINE PRESSURE

1. LOW TRANSMISSION OIL LEVEL.

2. MODULATOR ASSEMBLY—SEE PAGE 22.

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—SEE PAGE 26.

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. PRESSURE REGULATOR SPRING, TOO WEAK.
   D. NOT ENOUGH SPACERS IN PRESSURE REGULATOR.
   E. PUMP TO CASE GASKET MISPOSITIONED.
   F. DEFECTIVE PUMP BODY AND/OR COVER.
   G. MISMATCH PUMP COVER/PUMP BODY—SEE PAGE 27.

5. INTERNAL CIRCUIT LEAKS.
   A. FORWARD CLUTCH LEAK (PRESSURE NORMAL IN NEUTRAL AND REVERSE—PRESSURE LOW IN DRIVE).
      1. CHECK PUMP RINGS.
      2. CHECK FORWARD CLUTCH SEALS.
   B. DIRECT CLUTCH LEAK (PRESSURE NORMAL IN NEUTRAL, LOW, INT, AND DRIVE—PRESSURE LOW IN REVERSE).
      1. CHECK CENTER SUPPORT OIL SEAL RINGS.
      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 35
   C. 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 31 & 32
   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. INCORRECT PRESSURE REG. SPRING.
   C. TOO MANY PRESSURE REG. VALVE SPACERS.
   D. PUMP CASTING BAD.
   E. PRESSURE BOOST VALVE INSTALLED BACKWARDS OR DEFECTIVE.
   F. ALUMINUM BORE PLUG HAS HOLE OR OTHERWISE DEFECTIVE.
   G. PRESSURE BOOST BUSHING BROKEN OR OTHERWISE DEFECTIVE.

5. CONTROL VALVE ASSEMBLY
   A. CONTROL VALVE ASSY. TO SPACER GASKET OFF LOCATION.
   B. GASKETS INSTALLED IN REVERSE ORDER.
CAUSES OF IMPROPER VACUUM AT MODULATOR

1. ENGINE
   A. TUNE UP
   B. LOOSE VACUUM FITTINGS
   C. VACUUM OPERATED ACCESSORY LEAK (HOSES, VACUUM ADVANCE, ETC).

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. CREASE IN PIPE (NO OR DELAYED UPHSHIFT-COLD)

CONTROL VALVE ASSEMBLY—GOVERNOR LINE PRESSURE CHECK

1. INSTALL LINE PRESSURE GAGE

2. DISCONNECT VACUUM LINE TO MODULATOR.

3. WITH CAR ON HOIST (REAR WHEELS, OFF GROUND), FOOT OFF BRAKE, IN DRIVE, CHECK LINE PRESSURE AT 1000 RPM.

4. SLOWLY INCREASE ENGINE RPM TO 3000 RPM AND DETERMINE IF A LINE PRESSURE DROP OCCURS (7 PSI OR MORE).

5. IF PRESSURE DROP OCCURS, DISASSEMBLE, CLEAN AND INSPECT CONTROL VALVE ASSEMBLY.

6. IF NO PRESSURE DROP OCCURS:
   A. INSPECT GOVERNOR
      1. STUCK VALVE.
      2. WEIGHT FREENESS.
      3. RESTRICTED ORIFICE IN GOVERNOR VALVE.
   B. GOVERNOR FEED SYSTEM
      1. CHECK SCREEN IN CONTROL VALVE ASSEMBLY.
      2. CHECK FOR RESTRICTIONS IN GOVERNOR PIPE.
MODULATOR ASSEMBLY DIAGNOSIS PROCEDURE

AFTER THOROUGH INVESTIGATION OF FIELD RETURNED MODULATOR ASSEMBLIES, IT HAS BEEN FOUND THAT OVER 50% OF THE PARTS RETURNED AS DEFECTIVE 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
   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 VAPOR 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, as shown in sketch below, compare the load of a known 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 \( \frac{3}{16} \) or less. If the distance is greater than this amount, the modulator in question should be replaced.

![Diagram showing ends to be square within \( \frac{3}{16} \) inch, scribed line, \( \frac{3}{16} \) to \( \frac{3}{8} \) inch round or flat stock.]

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.
### 400 Turbo Hydra-Matic Clutch Plate Usage

<table>
<thead>
<tr>
<th>PART NAME</th>
<th>FLAT STEEL CLUTCH PLATES</th>
<th>WAVED STEEL CLUTCH PLATES</th>
<th>PLATE ASS'Y CLUTCH COMPOSITION</th>
<th>PISTON RELEASE SPRINGS</th>
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### NOTES:

- NOT APPLICABLE
- A. IN EARLY PQ '67 PRODUCTION 1 WAVED PLATE WAS USED IN THE DIRECT CLUTCH. FOR SERVICE REPLACE WITH .0915 FLAT STEEL PLATE.
- B. STEEL PLATE THICKNESS IN HI TORQUE MODELS (AA, AB, OB, OH, OL, OK) IS .0915"—ALL OTHERS .0775".
- C. FLAT STEEL CLUTCH PLATES .0915" THICK.
- D. IN LATE '68, CADILLAC BEGAN USING 12 SPRINGS. FOR SERVICE REPLACE 3 SPRINGS WITH 12.
- E. IN EARLY OW '68 PRODUCTION 1 WAVED PLATE WAS USED IN THE INTERMEDIATE CLUTCH. FOR SERVICE REPLACE WITH .0990" FLAT STEEL PLATE.
- F. 12 USED IN '69 CADILLAC MODELS.
### 425 Turbo Hydra-Matic Clutch Plate Usage

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**NOTES:**
- NOT APPLICABLE.
- A. CLUTCH PLATE DISHED, .0540" THICK.
- B. DIRECT CLUTCH WAVED PLATE .0605" THICK. ALL FORWARD AND DIRECT CLUTCH FLAT STEEL PLATES ARE .0915" THICK.
CAUTION: WHEN SERVICE REPLACEMENT OF THE FILTER ASSEMBLY AND/OR PAN IS REQUIRED, THEY MUST BE USED IN THE FOLLOWING COMBINATIONS ONLY:

**COMBINATION 1**

FIRST TYPE FILTER (CONTAINS A BY-PASS VALVE) 1964-65-66 AND EARLY 1967

"O" RING 1363951
PART NO. 5579822

PART NO. 8623778 *

FIRST TYPE PAN

**COMBINATION 2**

SECOND TYPE FILTER (NO BY-PASS VALVE) LATE 1967 AND AFTER

PART NO. 6437741

GROMMET 6437746
INTAKE PIPE ASSEMBLY 8625428
"O" RING 1363951

PART NO. 6623777 *

SECOND TYPE PAN

* PART NUMBER 8623777 USED IN 1964 MODEL CADILLAC.

**MODEL "425" FILTER**

THERE ARE TWO TYPES OF FILTERS (EARLY AND LATE) USED IN THE MODEL "425" TRANSMISSIONS. THE EARLY TYPE FILTER, PART NUMBER 6425766, CONTAINS A BY-PASS VALVE. THE LATE TYPE FILTER, PART NUMBER 6436301, IS THE FULL FLOW DESIGN AND DOES NOT CONTAIN A BY-PASS VALVE. THESE TWO FILTERS ARE INTERCHANGEABLE, HOWEVER, IT IS SUGGESTED THAT STOCK ON HAND OF THE EARLY TYPE FILTER BE DEPLETED ON 1966 THRU 1968 MODEL TRANSMISSIONS.

**MODEL "400" OR "425"**

IF THE TRANSMISSION IS EQUIPPED WITH THE FILTER WHICH DOES NOT CONTAIN A BY-PASS VALVE, IT WILL NOT BE NECESSARY TO REPLACE THE CONVERTER, (UNLESS DEFECTIVE) IN THE EVENT OF A TRANSMISSION FAILURE THAT GENERATES DEBRIS OR SEDIMENT.
THM “400” PUMP BODY & COVER USAGE—FIXED STATOR

CAUTION: WHEN SERVICE REPLACEMENT IS REQUIRED OF THE FIXED STATOR TURBO HYDRAULIC “400” PUMP COVER AND/OR PUMP BODY, THEY MUST BE USED IN THE FOLLOWING COMBINATIONS ONLY: (SEE ILLUSTRATIONS.)

COMBINATION 1  PUMP COVER, TYPE 1, MAY BE USED WITH PUMP BODY, TYPE 1, TYPE 2, OR TYPE 3.
COMBINATION 2  PUMP COVER, TYPE 2, MAY ONLY BE USED WITH PUMP BODY, TYPE 3, DUE TO THE CHANGES IN OIL PASSAGES.

PUMP COVER

NOTE DIFFERENCES

Type 1          Type 2

PUMP BODY

NOTE DIFFERENCES

Type 1          Type 2          Type 3
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

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 THM 425 VALVE BODY ASSEMBLY

1. MANUAL VALVE
2. DETENT SOLENOID
3. GASKET
4. FRONT ACCUMULATOR SPRING
5. OIL RING
6. ACCUMULATOR PISTON
7. E-RING
8. 3-2 VALVE PIN
9. 3-2 VALVE SPRING
10. 3-2 VALVE
11. 3-2 BORE PLUG
12. RETAINER PIN
13. 2-3 VALVE
14. 3-2 INTERMEDIATE SPRING
15. 2-3 MODULATOR VALVE
16. 2-3 MODULATOR BUSHING
17. 2-3 VALVE SPRING
18. RETAINER PIN
19. 1-2 VALVE
20. 1-2 MODULATOR VALVE
21. 1-2 MODULATOR SPRING
22. 1-2 MODULATOR BUSHING
23. RETAINER PIN
24. DETENT REGULATOR PIN
25. DETENT REGULATOR SPRING
26. DETENT REGULATOR VALVE
27. DETENT VALVE
28. VALVE BORE PLUG
29. RETAINER PIN
30. VALVE BORE PLUG
31. RETAINER PIN
32. 1-2 PRIMARY ACCUMULATOR SPRING
33. 1-2 PRIMARY ACCUMULATOR VALVE
34. 1-2 ACCUMULATOR VALVE BUSHING
35. 1-2 ACCUMULATOR VALVE
36. 1-2 SECONDARY ACCUMULATOR SPRING
37. 1-2 ACCUMULATOR VALVE PLUG
38. RETAINING PIN

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.
425 SPACER-CONTROL VALVE ASSY. (TYPICAL)
CASE PASSAGES—MODEL 400

CENTER SUPPORT

CONSTANT BLEED ORIFICE PLUG
PUMP BODY & COVER
(VARIABLE STATOR TYPE CONVERTER)
PUMP BODY & COVER
(FIXED STATOR TYPE CONVERTER)

NOTE: SEE PAGE 27 FOR PROPER PUMP BODY AND/OR PUMP COVER USAGE — FIXED STATOR TURBO HYDRA-MATIC "400" TRANSMISSIONS.
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.
INTERMEDIATE SPRAG CLUTCH

INNER CAGE RIDGE (UP)

INNER CAGE RIDGE (DOWN)

400 THM

425 THM

CORRECT OUTER RACE ROTATION

OIL PASSAGES

(FIXED STATOR DESIGN)

OIL PASSAGES

(VARIABLE STATOR DESIGN)

1966 MODEL TURBINE SHAFTS

OIL PASSAGES

(FIXED STATOR DESIGN)

OIL RING GROOVE

OIL PASSAGE SHOULD NOT BE DRILLED THRU

(VARIABLE STATOR DESIGN)

(VARIABLE STATOR DESIGN)

1967 MODEL AND LATER TURBINE SHAFTS