

## PARK Engine Running

With the gear selector lever in the Park (P) position and the engine running, line pressure from the oil pump assembly is directed to various components in the valve body and oil pump.

### PRESSURE REGULATION

**Pressure Regulator Valve (216):** Regulates oil pump output (line pressure) in response to torque signal fluid pressure, spring force and line pressure acting on the end of the valve. The valve directs line pressure into both the converter feed and decrease fluid circuits.

**Pressure Relief Ball (228):** Controlled by spring force, this checkball limits the maximum value of line pressure to approximately 2240 to 2520 kPa (320 to 360 psi).

**Line Pressure Tap (39):** Provides a location to measure line pressure with a fluid pressure gage.

**Actuator Feed Limit Valve (374):** Biased by spring force and orificed AFL fluid pressure, it limits the maximum value of line pressure entering the AFL fluid circuit to approximately 795 kPa (115 psi). Below this limiting value, AFL fluid pressure equals line pressure.

**Pressure Control Solenoid (377):** Controlled by the Powertrain Control Module (PCM), it regulates filtered AFL fluid into torque signal fluid pressure in relation to throttle position and other vehicle operating conditions.

### TORQUE CONVERTER CLUTCH (TCC)

**Converter Clutch Signal Valve (380):** The CC signal valve blocks line pressure from entering the CC signal fluid circuit. If the valve is initially in a position to allow line pressure to enter the CC signal fluid circuit, this fluid is orificed to the end of the valve and closes the valve to block any further supply of line pressure. Any fluid in the CC signal fluid circuit will exhaust through the normally open TCC solenoid.

**Converter Clutch Apply Valve (224):** Held in the release position by spring force, it directs converter feed fluid into the release fluid circuit. Also, fluid returning from the converter in the apply fluid circuit is routed through the valve and into the cooler fluid circuit.

**Torque Converter (1):** Release fluid pressure unseats the TCC apply checkball (#9) in the turbine shaft, keeps the pressure plate released from the converter cover and fills the converter with fluid. Fluid exits the converter between the converter hub and stator shaft in the apply fluid circuit.

**Cooler and Lubrication System (see page 92):** Cooler fluid from the converter clutch apply valve is routed through the transmission fluid cooler and into the lubrication fluid circuits.

**Manual Valve (340):** Controlled by the selector lever and manual shaft, the manual valve is in the Park (P) position and directs line pressure into the PR (Park/Reverse) fluid circuit.

### LO AND REVERSE CLUTCH APPLIES

**Lo and Reverse Clutch Piston (695):** PR fluid seats the lo/reverse clutch checkball (#10) and is orificed to the outer area of the piston. Also, lo/reverse fluid pressure from the lo overrun valve acts on the inner area of the piston to increase the clutch holding capacity.

**Lo Overrun Valve (361):** Moved against spring force by PR fluid pressure, the valve directs PR fluid into the lo/reverse fluid circuit.

**Pressure Switch Assembly (PSA) (69):** All fluid circuits routed to the PSA are empty and the PSA signals the PCM that the transmission is in either Park or Neutral.

**Shift Solenoids (“A” and “B”):** Both shift solenoids, which are normally open, are energized by the PCM and block fluid from exhausting. This creates fluid pressure in the solenoid signal fluid circuits at the shift valves.

**Shift Valves (1-2, 2-3 and 3-4):** Signal “A” fluid pressure holds the 1-2 shift valve in the downshifted position and the 3-4 shift valve in the upshifted (First and Fourth gear) position. Solenoid signal fluid pressure at shift solenoid “B” holds the 2-3 shift valve train in the downshifted position.

### SUMMARY

SHIFT “A” SOL	SHIFT “B” SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
ON	ON								APPLIED

# PARK

## Engine Running

### PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

### COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

## REVERSE

When the gear selector lever is moved to the Reverse (R) position (from the Park position), the following changes occur to the transmissions hydraulic and electrical systems:

**Manual Valve (340):** The manual valve moves to the Reverse position and line pressure enters the reverse fluid circuit. As in Park, line pressure also fills the PR (Park/Reverse) fluid circuit. All other fluid circuits are blocked by the manual valve.

**Lo and Reverse Clutch:** As in Park, PR and lo/reverse fluid pressures act on the lo and reverse clutch piston to apply the lo and reverse clutch (*see Note Below*).

### REVERSE INPUT CLUTCH APPLIES

**Reverse Input Checkball (#3):** Reverse fluid pressure seats the #3 checkball, flows through orifice #17 and fills the reverse input fluid circuit. This orifice helps control the reverse input clutch apply rate when engine speed is approximately at idle.

**Reverse Abuse Valve (387):** Reverse fluid pressure acts on the end of the valve opposite of spring force. At engine speeds above idle (as shown), reverse fluid pressure, which is fed by line pressure, increases and moves the valve against spring force. Reverse fluid can then fill the reverse input fluid circuit through the reverse abuse valve. This bypasses the control of orifice #17 and provides a faster clutch apply.

**Boost Valve (219):** Reverse input fluid pressure moves the boost valve against the pressure regulator isolator spring (218). The spring acts on the pressure regulator valve to increase the operating range of line pressure in Reverse.

**Reverse Input Clutch Piston (607):** Reverse input fluid pressure moves the piston to apply the reverse input clutch plates and obtain Reverse.

**Reverse Input Air Bleed Checkball (237):** Located in the reverse input fluid circuit in the oil pump, this checkball provides an air escape when fluid fills the circuit. It also allows air into the circuit to displace the fluid when the clutch releases.

**Pressure Switch Assembly (PSA) (69):** Reverse input fluid pressure closes the normally open reverse switch in the PSA. The PSA signals the PCM that the manual valve is in the Reverse (R) position.

**Shift Solenoids (“A” and “B”):** Both solenoids are energized as in Park range. Solenoid signal fluids are blocked from exhausting through the shift solenoids to maintain fluid pressure in these circuits at the end of the shift valves.

**Shift Valves (1-2, 2-3 and 3-4):** Signal “A” fluid pressure holds the 1-2 shift valve in the downshifted position and the 3-4 shift valve in the upshifted position (First and Fourth gear position). Solenoid signal fluid pressure at shift solenoid “B” holds the 2-3 shift valve train in the downshifted position.

**Pressure Control Solenoid (377):** It continues to regulate AFL fluid into torque signal fluid pressure. The PCM varies the current at the solenoid to regulate torque signal fluid pressure in response to throttle position and other PCM input signals. Torque signal fluid pressure is used to control line pressure at the boost and pressure regulator valves.

*Note: As in the Power Flow section, the explanation in each gear range is, for the most part, limited to what changes from the range on the previous page. However, some component descriptions are repeated for clarity and continuity. Also, refer to the appropriate General Motors Service Manual for specific application information.*

### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
ON	ON		APPLIED						APPLIED

# REVERSE

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

# NEUTRAL

## Engine Running

When the gear selector lever is moved to the Neutral position (N), from the Reverse position, the following changes occur to the transmissions hydraulic and electrical systems:

**Manual Valve (340):** In the Neutral position, the manual valve blocks line pressure from entering any fluid circuit and reverse and PR fluids exhaust past the valve.

### LO and REVERSE CLUTCH RELEASES

**Lo and Reverse Clutch Piston (695):** PR and lo/reverse fluids exhaust from the piston, thereby releasing the lo and reverse clutch plates. Exhausting PR fluid unseats the lo/reverse checkball (#10) for a quick exhaust.

**Lo Overrun Valve (361):** Spring force closes the valve when PR fluid pressure exhausts. Lo/reverse fluid exhausts through the valve, into the lo/1st fluid circuit, past the 1-2 shift valve, into the lo fluid circuit and through an exhaust port at the manual valve.

### REVERSE INPUT CLUTCH RELEASES

**Reverse Input Clutch Piston (607):** Reverse input fluid pressure exhausts from the piston, through the boost valve, past the #3 checkball and to the manual valve. With reverse input fluid exhausted, the reverse input clutch plates are released and the transmission is in Neutral.

**Reverse Abuse Valve (387):** Reverse fluid pressure exhausts and spring force closes the valve.

**Boost Valve (219):** Reverse input fluid pressure exhausts and line pressure returns to the normal operating range as in the Park and Overdrive positions.

**Reverse Input Checkball (#3):** Exhausting reverse input fluid unseats the ball for a quick exhaust through the reverse fluid circuit and past the manual valve.

**Pressure Switch Assembly (PSA) (69):** Reverse input fluid exhausts from the PSA. With no other fluid routed to it, the PSA signals the PCM that the transmission is operating in either Park or Neutral.

*Note: In Park, Reverse, and Neutral the shift solenoids are shown energized. This is the normal operating state when the vehicle is stationary or at low vehicle speeds. However, the PCM will change the shift solenoid states depending on vehicle speed. For example, if Neutral is selected when the transmission is operating in Second Gear, the shift solenoids will remain in a Second Gear state. However, with the manual valve blocking line pressure, the shift solenoid states do not affect transmission operation in Park, Reverse and Neutral.*

### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
ON	ON								

# NEUTRAL

## Engine Running

### PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

### COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

## OVERDRIVE RANGE - FIRST GEAR

When the gear selector lever is moved to the Overdrive ( D ) position, from the Neutral position, the following changes occur to the transmissions hydraulic and electrical systems:

**Manual Valve (340):** The manual valve moves to the Overdrive position. Line pressure flows through the manual valve and fills the D4 fluid circuit.

### FORWARD CLUTCH APPLIES

**Forward Clutch Accumulator Checkball (#12):** D4 fluid pressure seats the ball and is orificed (#22) into the forward clutch feed fluid circuit. This orifice helps control the forward clutch apply rate.

**Forward Clutch Piston (630):** Forward clutch feed fluid pressure moves the piston to apply the forward clutch plates and obtain First gear.

**Forward Clutch Accumulator Piston (354):** Forward clutch feed fluid pressure moves the piston against spring force. This action absorbs some of the initial increase of forward clutch feed fluid pressure to cushion the forward clutch apply.

**Forward Clutch Abuse Valve (357):** D4 fluid pressure acts on the valve opposite of spring force. At engine speeds greater than idle (as shown), D4 fluid pressure increases and moves the valve against spring force. D4 fluid can then quickly fill the forward clutch feed fluid circuit. This bypasses the control of orifice #22 and provides a faster apply of the forward clutch.

**Pressure Switch Assembly (PSA) (69):** D4 fluid pressure is routed to the PSA and closes the normally open D4 fluid pressure switch. The PSA signals the PCM that the transmission is operating in Overdrive range ( D ).

**Shift Solenoid "A" (367):** Energized (ON) as in Neutral, the normally open solenoid is closed and blocks signal "A" fluid from exhausting. This maintains fluid pressure in the signal "A" fluid circuit.

**Shift Solenoid "B" (367):** Energized (ON) as in Neutral, the normally open solenoid is closed and blocks solenoid signal fluid from exhausting. This maintains solenoid signal fluid pressure at the end of the 2-3 shuttle valve.

**2-3 Shift Valve Train:** Solenoid signal fluid pressure acting on the 2-3 shuttle valve holds the valve train in the downshifted position against AFL fluid pressure acting on the 2-3 shift valve. In this position, the 2-3 shuttle valve blocks AFL fluid from entering the D432 fluid circuit.

**1-2 Shift Valve (366):** Signal "A" fluid pressure holds the valve in the downshifted position against spring force. In the First gear position the valve blocks D4 fluid from entering the 2nd fluid circuit.

**Accumulator Valve (371):** Biased by torque signal fluid pressure, spring force and orificed accumulator fluid pressure at the end of the valve, the accumulator valve regulates D4 fluid into accumulator fluid pressure. Accumulator fluid is routed to both the 1-2 and 3-4 accumulator assemblies in preparation for the 1-2 and 3-4 upshifts respectively.

**Rear Lube:** D4 fluid is routed through an orifice cup plug (#24) in the rear of the transmission case to feed the rear lube fluid circuit.

**Pressure Control Solenoid (377):** Remember that the pressure control solenoid continually varies torque signal fluid pressure in relation to throttle position and vehicle operating conditions. This regulation provides a precise control of line pressure.

**3-2 Control Solenoid (394):** The PCM keeps the solenoid OFF in First gear, as in Park, Reverse and Neutral. The normally closed solenoid blocks AFL fluid from entering the 3-2 signal fluid circuit.

### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
ON	ON				APPLIED	HOLDING		HOLDING	

# OVERDRIVE RANGE - FIRST GEAR

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG



## OVERDRIVE RANGE - SECOND GEAR

As vehicle speed increases, and other operating conditions are appropriate, the PCM de-energizes shift solenoid “A” to shift the transmission into Second gear.

**Shift Solenoid “A” (367):** De-energized (turned OFF) by the PCM, the normally open solenoid opens and signal “A” fluid exhausts through the solenoid.

*Note: Actuator feed limit (AFL) fluid continues to feed the signal “A” fluid circuit through orifice #25. However, the exhaust port through the solenoid is larger than orifice #25 to prevent a pressure increase in the signal “A” fluid circuit.*

### 2-4 BAND APPLIES

**1-2 Shift Valve (366):** Spring force moves the valve into the upshifted position. D4 fluid is routed through the valve and fills the 2nd fluid circuit.

**1-2 Shift Checkball (#8):** 2nd fluid pressure seats the #8 checkball, flows through orifice #16 and fills the 2nd clutch fluid circuit. Orifice #16 helps control the 2-4 band apply rate.

**2-4 Servo Assembly:** 2nd clutch fluid pressure moves the 2nd apply piston against servo cushion and servo return spring forces. The apply piston moves the band apply pin to apply the 2-4 band.

**1-2 Accumulator:** 2nd clutch fluid pressure moves the 1-2 accumulator piston against spring force and accumulator fluid pressure. This action absorbs initial 2nd clutch fluid pressure to cushion the 2-4 band apply rate. Also, the movement of the 1-2 accumulator piston forces some accumulator fluid out of the accumulator assembly.

**Accumulator Valve (371):** Accumulator fluid forced out of the 1-2 accumulator is orificed (#30) to the end of the accumulator valve. This pressure moves the valve against spring force and torque signal fluid pressure to regulate the exhaust of excess accumulator fluid. This regulation provides additional control for the 2-4 band apply rate. *Figure ?? shows the exhaust of accumulator fluid during the shift by the arrow directions in the accumulator fluid circuit.*

**2-3 Shift Valve Train:** Solenoid signal fluid pressure from shift solenoid “B” holds the valve train in the downshifted position. 2nd fluid is routed through the 2-3 shift valve and fills the servo feed fluid circuit.

**3-4 Relay Valve (384) and 4-3 Sequence Valve (383):** Spring force holds these valves in the downshifted position. 2nd fluid is blocked by the 3-4 relay valve and servo feed fluid is blocked by both valves in preparation for a 3-4 upshift.

**3-2 Downshift Valve (389):** Spring force holds the valve closed, blocking 2nd fluid and 2nd clutch fluid.

**3-2 Control Solenoid (394) and 3-2 Control Valve (391):** In Second gear, the PCM operates the normally closed solenoid at approximately a 90% duty cycle. This opens the solenoid and AFL fluid fills the 3-2 signal fluid circuit. 3-2 signal fluid pressure closes the 3-2 control valve against spring force.

**3-4 Shift Valve (385):** Signal “A” fluid pressure exhausts and spring force moves the valve into the downshift position.

### TORQUE CONVERTER CLUTCH

**Converter Clutch Signal Valve (380):** 2nd clutch fluid pressure opens the valve and the valve directs line pressure into the converter clutch (CC) signal fluid circuit. CC signal fluid is routed through a filter and orificed (#4) to the TCC solenoid.

**TCC Solenoid:** The PCM keeps the TCC solenoid OFF and converter clutch released in Second gear. CC signal fluid exhausts through the open solenoid and spring force keeps the converter clutch apply valve in the release position.

*Note: The orifice cup plug (#4) in the CC signal fluid circuit is smaller than the exhaust through the TCC solenoid. This prevents a fluid pressure increase at the end of the converter clutch apply valve.*

### SUMMARY

SHIFT “A” SOL	SHIFT “B” SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
OFF	ON	APPLIED			APPLIED	HOLDING			

# OVERDRIVE RANGE - SECOND GEAR

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

## OVERDRIVE RANGE - THIRD GEAR

As vehicle speed increases further, and other vehicle operating conditions are appropriate, the PCM de-energizes shift solenoid “B” to shift the transmission into Third gear.

**Shift Solenoid “B” (367):** De-energized (turned OFF) by the PCM, the solenoid opens and solenoid signal fluid exhausts through the solenoid.

*Note: AFL fluid continues to feed the solenoid signal fluid circuit through orifice #29. However, the exhaust port through shift solenoid “B” is larger than orifice #29 to prevent a pressure increase at the end of the 2-3 shuttle valve.*

### 3-4 CLUTCH APPLIES

**2-3 Shift Valve Train:** AFL fluid pressure acting on the 2-3 shift valve moves the valve train toward the solenoid. In the upshifted position the following changes occur:

- AFL fluid is routed through the 2-3 shuttle valve and fills the D432 fluid circuit.
- 2nd fluid is blocked from entering the servo feed fluid circuit and is orificed (#28) into the 3-4 signal fluid circuit. This orifice helps control the 3-4 clutch apply rate.
- Servo feed fluid exhausts past the valve, into the 3-4 accumulator fluid circuit and past the 3-4 relay valve.

**3-4 Clutch Exhaust Checkball (#4):** 3-4 signal fluid unseats the ball and enters the 3-4 clutch fluid circuit.

**3-4 Clutch Piston (623):** 3-4 clutch fluid pressure moves the piston to apply the 3-4 clutch plates and obtain 3rd gear. *However, the 2-4 band must release as the 3-4 clutch applies.*

### 2-4 BAND RELEASES and 3-4 CLUTCH ACCUMULATION

**3rd Accumulator Checkball (#2):** 3-4 clutch fluid pressure unseats the ball and fills the 3rd accumulator fluid circuit.

**3rd Accumulator Exhaust Checkball (#7):** 3rd accumulator fluid seats the ball against the orificed exhaust and is routed to the release side of the 2nd apply piston. Before the #7 checkball seats, air in the 3rd accumulator fluid circuit is exhausted through the orifice.

**2-4 Servo Assembly:** 3rd accumulator fluid pressure, in addition to servo return spring force, moves the 2nd apply piston and apply pin to release the 2-4 band. This action also serves as an accumulator by absorbing initial 3-4 clutch fluid to cushion the 3-4 clutch apply rate. *Remember that the 3rd accumulator fluid circuit is fed by 3-4 clutch fluid.*

**3-2 Downshift Valve (389):** 3-4 clutch fluid pressure moves the valve against spring force. This opens the valve and 2nd fluid feeds the 2nd clutch fluid circuit through the valve.

**3-2 Control Solenoid (394) and 3-2 Control Valve (391):** The solenoid remains at approximately a 90% duty cycle and routes AFL fluid into the 3-2 signal fluid circuit. This keeps the 3-2 control valve closed against spring force and blocking the 3rd accumulator and 3-4 clutch fluid circuits.

**Shift Solenoid “A” (367) and 1-2 Shift Valve (366):** Shift solenoid “A” remains de-energized and signal “A” fluid is exhausted through the solenoid. Also, D432 fluid pressure from the 2-3 shuttle valve assists spring force to hold the 1-2 shift valve in the upshifted position.

**3-4 Shift Valve (385):** Spring force holds the valve in the downshifted position, blocking 3-4 clutch fluid in preparation for a 3-4 upshift.

### TORQUE CONVERTER CLUTCH

**TCC Solenoid:** The PCM keeps the normally open TCC solenoid de-energized under normal operating conditions in Overdrive Range - Third Gear. CC signal fluid exhausts through the open solenoid and spring force keeps the converter clutch apply valve in the release position. However, under heavy throttle conditions at high speed, the PCM will command TCC apply in Third gear.

### SUMMARY

SHIFT “A” SOL	SHIFT “B” SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
OFF	OFF				APPLIED	HOLDING	APPLIED		

# OVERDRIVE RANGE - THIRD GEAR

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

## OVERDRIVE RANGE - FOURTH GEAR (Torque Converter Clutch Applied)

When vehicle operating conditions are appropriate, the PCM energizes shift solenoid “A” to shift the transmission into Fourth gear.

**Shift Solenoid “A” (367):** Energized by the PCM, the normally open solenoid closes and blocks signal “A” fluid from exhausting. This creates pressure in the signal “A” fluid circuit.

**1-2 Shift Valve (366):** D432 fluid pressure and spring force hold the valve in the upshifted position against signal “A” fluid pressure.

### 2-4 BAND APPLIES

**3-4 Shift Valve (385):** Signal “A” fluid pressure moves the valve into the upshifted position against spring force. In this position, the valve routes 3-4 signal fluid into the 4th signal fluid circuit.

**3-4 Relay Valve (384) and 4-3 Sequence Valve (383):** 4th signal fluid pressure moves both valves into the upshifted (Fourth gear) position against spring force acting on the 4-3 sequence valve. This causes the following changes:

- Orificed (#7) 2nd fluid is routed through the 3-4 relay valve and into the servo feed fluid circuit.
- Servo feed fluid is routed through the 4-3 sequence valve and into the 4th fluid circuit.
- 3-4 accumulator fluid is blocked by both valves. 3-4 accumulator fluid is fed by servo feed fluid through the 2-3 shift valve.

**2-4 Servo Assembly:** 4th fluid is routed through the center of the servo pin and acts on the apply side of the 4th apply piston. This fluid pressure moves the 4th apply piston and apply pin to apply the 2-4 band and obtain Fourth gear.

### 2-4 BAND APPLY ACCUMULATION

**3-4 Accumulator Assembly:** 3-4 accumulator fluid pressure moves the 3-4 accumulator piston against spring force and orificed accumulator fluid pressure. This action absorbs initial 4th clutch apply fluid pressure to cushion the 2-4 band apply. As 3-4 accumulator fluid fills the accumulator, any air in the system will exhaust through orifice #19. The piston movement forces some orificed accumulator fluid out of the 3-4 accumulator assembly.

**Accumulator Valve (371):** The accumulator valve regulates the exhaust of accumulator fluid routed from the 3-4 accumulator. Refer to page ?? for a complete description of 3-4 accumulation.

**3-2 Control Solenoid (394) and 3-2 Control Valve (391):** Similar to Third gear, the PCM operates the solenoid at approximately a 90% duty cycle, AFL fluid fills the 3-2 signal fluid circuit and 3-2 signal fluid pressure holds the 3-2 control valve against spring force.

### TORQUE CONVERTER CLUTCH APPLIES

**TCC Solenoid:** When operating conditions are appropriate, the PCM energizes the normally open TCC solenoid. This closes the solenoid, blocks converter clutch signal fluid from exhausting and creates pressure in the converter clutch signal fluid circuit.

**Converter Clutch Apply Valve (224):** Converter clutch signal fluid pressure moves the valve against spring force and into the apply position. In this position, release fluid is open to an exhaust port and converter feed fluid fills the apply fluid circuit. Converter feed fluid also feeds the cooler fluid circuit through orifice #3.

**Torque Converter (1):** Release fluid from behind the pressure plate exhausts through the end of the turbine shaft. Apply fluid pressure is routed between the converter hub and stator shaft where it enters the torque converter. This fluid pressure applies the converter clutch against the converter cover and keeps the converter filled with fluid.

**TCC Apply Checkball (#9):** Located in the end of the turbine shaft, the #9 checkball is seated by exhausting release fluid pressure. This fluid is orificed around the ball to help control the converter clutch apply rate.

### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
ON	OFF	APPLIED			APPLIED		APPLIED		

# OVERDRIVE RANGE - FOURTH GEAR

(Torque Converter Clutch Applied)

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

# OVERDRIVE RANGE - 4-3 DOWNSHIFT

## (Torque Converter Clutch Released)

When the transmission is operating in Fourth gear, a forced 4-3 downshift will occur if there is a significant increase in throttle position. At minimum throttle, vehicle speed will decrease gradually (coastdown) and the PCM will command a 4-3 downshift. The PCM will also initiate a forced 4-3 downshift when throttle position remains constant but engine load is increased, such as driving up a steep incline. To achieve a 4-3 downshift, the PCM de-energizes shift solenoid “A” and the following changes occur to the transmissions electrical and hydraulic systems:

**Shift Solenoid “A” (367):** De-energized by the PCM, the solenoid opens and signal “A” fluid exhausts.

### 2-4 BAND RELEASES

**3-4 Shift Valve (385):** With signal “A” fluid pressure exhausted, spring force moves the valve into the downshifted position. In this position, the valve blocks 3-4 signal fluid and 4th signal fluid exhausts past the valve.

**3-4 Relay Valve (384) and 4-3 Sequence Valve (383):** These valves control the timing of the 2-4 band release. With 4th signal fluid pressure exhausted, 3-4 accumulator fluid pressure moves the 3-4 relay valve into the Third gear position (*see inset in Figure ?? on page ??*). This opens 3-4 accumulator fluid to an orificed exhaust (#5) past the 3-4 relay valve (shown by red arrows). Because the exhaust is orificed, exhausting 3-4 accumulator fluid pressure momentarily holds the valve against spring force acting on the 4-3 sequence valve to regulate 4th fluid exhaust past the end of the valve.

When exhausting 3-4 accumulator fluid pressure decreases sufficiently, spring force will move the 4-3 sequence valve into the Third gear position as shown in Figure ???. This opens 3-4 accumulator fluid to a quick exhaust past the 4-3 sequence valve. Also, the 4th fluid circuit is opened completely for a quick exhaust past the end of the 4-3 sequence valve. In this position the valve blocks 2nd fluid from entering the servo feed fluid circuit.

*Note: During a 4-2 downshift, the 2-4 band must remain applied as the 3-4 clutch is released. The 3-4 relay and 4-3 sequence valves are used in a similar manner as described above to keep the 2-4 band applied during a 4-2 downshift.*

**2-4 Servo Assembly:** 4th fluid exhausts from the 4th apply piston in the servo assembly. Apply pin spring force moves the 4th apply piston and apply pin to release the band from the reverse input drum and shift the transmission into Third gear.

**3-4 Accumulator Assembly:** 3-4 accumulator fluid exhausts from the 3-4 accumulator piston. Orificed accumulator fluid pressure and spring force move the piston to a Third gear position.

**3-4 Accumulator Checkball (#1):** As accumulator fluid fills the 3-4 accumulator it seats the #1 checkball and is forced through orifice #18. This orifice controls the rate at which accumulator fluid pressure fills the 3-4 accumulator and 3-4 accumulator fluid exhausts from the accumulator assembly.

**Accumulator Valve (371):** Biased by torque signal fluid pressure and spring force, the accumulator valve regulates D4 fluid into the accumulator fluid circuit.

**2-3 Shift Valve Train:** AFL fluid pressure acting on the 2-3 shift valve holds the valves in the upshifted position. Servo feed fluid exhausts through the valve, into the 3-4 accumulator fluid circuit and past the 4-3 sequence valve.

**Torque Converter Clutch:** The PCM releases the converter clutch prior to initiating a 4-3 downshift. Under normal operating conditions the converter clutch is not applied in Third gear. However, at heavy throttle positions and vehicle speeds above approximately 105 km/h (65 mph), the PCM will command TCC apply in Third gear.

### SUMMARY

SHIFT “A” SOL	SHIFT “B” SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
OFF	OFF				APPLIED	HOLDING	APPLIED		

# OVERDRIVE RANGE - 4-3 DOWNSHIFT

(Torque Converter Clutch Released)

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG



## OVERDRIVE RANGE - 3-2 DOWNSHIFT

Similar to a forced 4-3 downshift, a forced 3-2 downshift can occur due to either minimum throttle (coastdown conditions) or heavy throttle conditions. To achieve a forced 3-2 downshift, the PCM energizes shift solenoid “B” and the following changes occur:

**Shift Solenoid “B” (367):** Energized by the PCM, the normally open solenoid closes and blocks solenoid signal fluid from exhausting. This creates pressure in the solenoid signal fluid circuit at the solenoid end of the 2-3 shuttle valve.

**2-3 Shift Valve Train:** Solenoid signal fluid pressure moves both valves to the downshifted position against AFL fluid pressure acting on the 2-3 shift valve. This causes the following changes:

- The 2-3 shuttle valve blocks AFL fluid and D432 fluid exhausts past the valve.
- The 2-3 shift valve blocks 2nd fluid from feeding the 3-4 signal fluid circuit. 2nd fluid is routed into the servo feed fluid circuit.
- 3-4 signal fluid exhausts past the 2-3 shift valve. 3-4 clutch fluid and 3rd accumulator fluid, which were fed by 3-4 signal fluid, also exhaust.

### 3-4 CLUTCH RELEASES and 2-4 BAND APPLIES

**3-4 Clutch Piston (623):** 3-4 clutch fluid exhausts from the piston and the 3-4 clutch plates are released.

**3-4 Clutch Exhaust Checkball (#4):** Exhausting 3-4 clutch fluid seats the #4 checkball and is forced through orifice #13. This orifice helps control 3-4 clutch fluid exhaust and the 3-4 clutch release rate.

**2-4 Servo Assembly:** 3rd accumulator fluid exhausts from the servo assembly and 2nd clutch fluid pressure moves the 2nd apply piston against servo return spring force. This action moves the apply pin to apply the 2-4 band.

**3-2 Downshift Valve (389) and 1-2 Upshift Checkball (#8):** 3-4 clutch fluid exhausts from the valve and spring force moves the valve into the Second gear position. However, before spring force overcomes exhausting 3-4 clutch fluid pressure, 2nd fluid feeds the 2nd clutch fluid circuit through the valve. This bypasses the control of orifice #16 at the #8 checkball and provides a faster 2-4 band apply. *Remember that the #8 checkball and orifice #16 are used to help control the 2-4 band apply during a 1-2 upshift.*

**3rd Accumulator Checkball (#2):** Exhausting 3rd accumulator fluid seats the #2 ball and is forced through orifice #12. Orifice #12 slows the exhaust of 3rd accumulator fluid and delays the 2-4 band apply rate.

*Note: The #12 orifice is not used on some models. For these models, all of the exhausting 3rd accumulator fluid is routed to the 3-2 control valve when the #2 checkball seats.*

**3-2 Control Solenoid (394) and 3-2 Control Valve (391):** These components are used to control the timing between the 3-4 clutch release and 2-4 band apply. This is done by the PCM controlling the duty cycle of the pulse width modulated 3-2 control solenoid. The PCM varies the 3-2 control solenoid’s duty cycle to regulate AFL fluid into the 3-2 signal fluid circuit. The lower the vehicle speed, the lower the solenoid duty cycle during the shift.

A lower solenoid duty cycle corresponds to lower 3-2 signal fluid pressure which allows spring force to keep the 3-2 control valve open farther. This provides a faster exhaust of 3rd accumulator fluid through the 3-2 control valve. However, this exhausting fluid creates a pressure backup in the 3-4 clutch fluid circuit due to the #4 checkball and #13 orifice. This delays the 3-4 clutch release at lower speeds for proper shift timing.

At higher vehicle speeds, the solenoid duty cycle during the shift is greater and 3-2 signal fluid pressure is increased. Under these conditions, 3-2 signal fluid pressure closes the 3-2 control valve further against spring force, thereby slowing the exhaust of 3rd accumulator fluid into the 3-4 clutch fluid circuit. This prevents the pressure backup in the 3-4 clutch fluid circuit and allows the 3-4 clutch to release faster for proper shift timing.

### SUMMARY

SHIFT “A” SOL	SHIFT “B” SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
OFF	ON	APPLIED			APPLIED	HOLDING			

# OVERDRIVE RANGE - 3-2 DOWNSHIFT

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

## MANUAL THIRD - THIRD GEAR

### (from Overdrive Range - Fourth Gear)

A manual 4-3 downshift is accomplished by moving the selector lever into the Manual Third (D) position. This moves the manual valve and immediately downshifts the transmission into Third gear. In Manual Third the transmission is prevented, both hydraulically and electronically, from shifting into Fourth gear. The following information explains the additional changes during a Manual 4-3 downshift as compared to a forced 4-3 downshift. *Refer to Overdrive Range: 4-3 Downshift for a complete description of a 4-3 downshift.*

**Manual Valve (340):** The selector lever moves the manual shaft and manual valve into the Manual Third position (D) and line pressure enters the D3 fluid circuit.

**Pressure Switch Assembly (PSA) (69):** D3 fluid is routed to the PSA and opens the normally closed D3 fluid pressure switch. The PSA signals the PCM that the transmission is operating in Manual Third.

#### FOURTH GEAR PREVENTED

**3-4 Shift Valve (385):** D3 fluid pressure assists spring force to keep the valve in the downshifted position and hydraulically prevent Fourth gear. In this position the valve blocks 3-4 signal fluid and the 4th signal fluid circuit is open to an exhaust port past the valve.

**Shift Solenoid "A" (367):** When Manual Third is selected, the PCM de-energizes shift solenoid "A" to immediately downshift the transmission into Third gear. This electronically prevents Fourth gear.

#### OVERRUN CLUTCH APPLIED

**2-3 Shift Valve Train:** With shift solenoid "B" de-energized and open, AFL fluid acting on the 2-3 shift valve holds both valves in the upshifted position. D3 fluid feeds the overrun fluid circuit through the 2-3 shift valve.

**Overrun Clutch Feed Checkball (#5):** Overrun fluid pressure seats the ball against the empty D2 fluid circuit.

**Overrun Clutch Control Checkball (#6):** Overrun fluid pressure seats the #6 checkball and is orificed (#20) into the overrun clutch feed fluid circuit. Orifice #20 controls the overrun clutch apply rate.

**3-4 Relay Valve (384) and 4-3 Sequence Valve (383):** 4th signal fluid exhausts from the 3-4 relay valve and overrun clutch feed fluid pressure, in addition to spring force, closes both valves immediately. This is unlike a forced 4-3 downshift when the 4-3 sequence valve is momentarily held against spring force by exhausting 3-4 accumulator fluid pressure. This provides a faster exhaust of 3-4 accumulator fluid and 4th fluid for a faster 2-4 band release.

**Overrun Clutch Piston (632):** Overrun clutch fluid pressure moves the piston to apply the overrun clutch plates.

**Overrun Clutch Air Bleed Checkball (237):** This ball and capsule is located in the overrun clutch fluid circuit in the oil pump. It allows air to exhaust from the circuit as fluid pressure increases during clutch apply. The ball also allows air into the circuit to displace the fluid when the clutch releases.

**Torque Converter Clutch:** The PCM de-energizes the TCC solenoid to release the converter clutch prior to downshifting (assuming the converter clutch is applied in Overdrive Range - Fourth Gear when Manual Third is selected). In Manual Third, the PCM keeps the same schedule for TCC apply as in Overdrive. With Fourth gear prevented, the converter clutch will apply in Manual Third - Third Gear under normal operating conditions.

#### MANUAL THIRD - FIRST and SECOND GEARS: OVERRUN CLUTCH RELEASED

In Manual Third the transmission upshifts and downshifts normally between First, Second and Third gears. However, in First and Second gears, shift solenoid "B" is energized and the 2-3 shift valve train is in the downshifted position. The shift valve blocks D3 fluid from entering the overrun fluid circuit and opens the overrun fluid circuit to an exhaust port at the valve. This prevents overrun clutch apply and engine compression braking in Manual Third - First and Second Gears.

#### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
OFF	OFF			APPLIED	APPLIED	HOLDING	APPLIED		

# MANUAL THIRD - THIRD GEAR

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
- (51) 3-2 CONTROL SOLENOID SCREEN
- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

# MANUAL SECOND - SECOND GEAR

## (from Manual Third - Third Gear)

A manual 3-2 downshift can be accomplished by moving the gear selector lever into the Manual Second (2) position when the transmission is operating in Third gear. This causes the transmission to shift immediately into Second gear regardless of vehicle operating conditions. In Manual Second, the transmission is prevented from operating in First, Third or Fourth gears (*see Note Below*). The following information explains the additional changes during a manual 3-2 downshift as compared to a forced 3-2 downshift. Refer to *Overdrive Range: 3-2 Downshift* for a complete description of a 3-2 downshift.

**Manual Valve (340):** The selector lever moves the manual shaft and manual valve into the Manual Second (2) position and line pressure enters the D2 fluid circuit.

**Pressure Switch Assembly (PSA) (69):** D2 fluid is routed to the PSA where it opens the normally closed D2 fluid pressure switch. The PSA signals the PCM that the manual valve is in the Manual Second position.

### THIRD and FOURTH GEARS PREVENTED

**Shift Solenoid "B" (367):** Energized by the PCM, it blocks solenoid signal fluid from exhausting, thereby creating pressure in the solenoid signal fluid circuit. With shift solenoid "B" ON, Third and Fourth gears are electronically prevented.

**2-3 Shift Valve Train:** D2 fluid is routed between the 2-3 shift and 2-3 shuttle valves and causes the following:

- D2 fluid pressure holds the 2-3 shift valve in the downshifted position against AFL fluid pressure.
- Solenoid signal fluid pressure holds the 2-3 shuttle valve in the downshifted position against D2 fluid pressure.
- The 2-3 shift valve blocks 2nd fluid from entering the 3-4 signal fluid circuit and the 3-4 signal fluid circuit is open to an exhaust port at the valve. This hydraulically prevents Third and Fourth gears.
- 2nd fluid fills the servo feed fluid circuit but has no function in Manual Second.
- AFL fluid is blocked by the 2-3 shuttle valve and D432 fluid exhausts through the valve.
- D3 fluid is blocked by the 2-3 shift valve and overrun fluid exhausts through the valve.

**1-2 Shift Valve (366):** Shift solenoid "A" is OFF, signal "A" fluid exhausts through the solenoid and spring force holds the valve in the upshifted position.

### OVERRUN CLUTCH REMAINS APPLIED

**Overrun Clutch Feed Checkball (#5):** Orificed D2 fluid pressure seats the #5 checkball against the exhausting overrun clutch fluid circuit. This is done simultaneously with overrun clutch fluid exhausting such that there is a continuous fluid supply to the overrun clutch feed fluid circuit. This keeps the overrun clutch applied in Manual Second.

### FIRST GEAR PREVENTED

The prevention of First gear is controlled electronically by the PCM through shift solenoid "A". The PCM keeps shift solenoid "A" de-energized regardless of vehicle operating conditions when the PSA signals Manual Second gear range. This keeps signal "A" fluid exhausted and spring force holds the 1-2 shift valve in the upshifted position.

*Note: With some applications, a 2-1 downshift is possible in Manual Second during heavy throttle when operating at low speeds. Refer to the appropriate General Motors Service Manual for specific application information.*

**Torque Converter Clutch:** The converter clutch is released prior to downshifting into Manual Second - Second Gear. The TCC will not re-apply in Second gear.

**Pressure Control Solenoid (PCS) (377):** The PCM output signal to the PCS increases the operating range of torque signal fluid pressure in Manual Second. This provides increased line pressure for the additional torque requirements during engine compression braking and increased engine loads.

### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
OFF	ON	APPLIED		APPLIED	APPLIED	HOLDING			

# MANUAL SECOND - SECOND GEAR

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
- (11) CASE SERVO ORIFICED PLUG
- (38) ACCUMULATOR BLEED PLUG
- (39) LINE PRESSURE TAP
- (40) 3RD ACCUM. RETAINER AND BALL ASSEMBLY (#7)
- (49) SHIFT SOLENOIDS SCREEN
- (50) PRESSURE CONTROL SOLENOID SCREEN
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- (61) CHECKBALLS (#1, 2, 3, 4, 5, 6, 8, 12)
- (91) CHECKBALL (#10)
- (92) TCC SCREEN
- (232) OIL PUMP COVER SCREEN
- (237) CHECK VALVE RETAINER AND BALL ASSEMBLY
- (238) CONVERTER CLUTCH SIGNAL ORIFICED CUP PLUG
- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG

# MANUAL FIRST - FIRST GEAR

## (From Manual Second - Second Gear)

A manual 2-1 downshift can be accomplished by moving the gear selector lever into the Manual First (1) position when the transmission is operating in Second gear. The downshift to First gear is controlled electronically by the PCM. The PCM will not energize shift solenoid "A" to initiate a 2-1 downshift until vehicle speed is below approximately 48 to 56 km/h (30 to 35 mph). Above this speed, the transmission will operate in a Manual First - Second Gear state. The following text explains the manual 2-1 downshift.

**Manual Valve (340):** The selector lever moves the manual shaft and manual valve into the Manual First (1) position and line pressure enters the lo fluid circuit.

**Pressure Switch Assembly (PSA) (69):** Lo fluid is routed to the PSA where it closes the normally open lo pressure switch. The PSA signals the PCM that the manual valve is in the Manual First position.

**Shift Solenoid "A" (367):** Below approximately 48 to 56 km/h (30 to 35 mph) the PCM energizes the normally open solenoid. This closes the solenoid and blocks signal "A" fluid pressure from exhausting. Above this speed, the PCM keeps the solenoid de-energized and the transmission operates in Manual First - Second Gear.

**1-2 Shift Valve (366):** Signal "A" fluid pressure moves the valve against spring force and into the downshifted position. Lo fluid from the manual valve is routed into the lo-1st fluid circuit and D4 fluid is blocked from entering the 2nd fluid circuit. 2nd fluid exhausts through an orifice and an annulus exhaust port around the valve land. Orifice #26 helps control the 2-4 band release during a 2-1 downshift.

### 2-4 BAND RELEASES

**2-4 Servo Assembly:** 2nd clutch fluid, which was fed by 2nd fluid, exhausts from the servo. Servo cushion and servo return spring forces move the 2nd apply piston and apply pin to release the 2-4 band.

**1-2 Accumulator Assembly:** 2nd clutch fluid also exhausts from the 1-2 accumulator assembly. Spring force and accumulator fluid pressure move the accumulator piston to assist 2nd clutch fluid exhaust.

**Accumulator Valve (371):** The accumulator valve regulates D4 fluid to fill the accumulator fluid circuit and 1-2 accumulator assembly. *Refer to page ?? for a complete description of the accumulator system.*

**1-2 Upshift Checkball (#8):** Exhausting 2nd clutch fluid pressure unseats the ball and is routed through the 2nd fluid circuit.

**Converter Clutch Signal Valve (380):** 2nd fluid exhausts from the converter clutch signal valve. *Refer to Park range on page ?? for a description of the CC signal valve operation.*

### LO and REVERSE CLUTCH APPLIES

**Lo Overrun Valve (361):** Lo 1st fluid is regulated through the lo overrun valve and into the lo/reverse fluid circuit to control the lo/reverse clutch apply.

**Lo/Reverse Clutch Piston (695):** Lo/reverse fluid pressure acts on the inner area of the piston to move the piston and apply the lo/reverse clutch plates.

### OVERRUN CLUTCH APPLIED

The overrun clutch stays applied in Manual First to provide engine compression braking.

**Pressure Control Solenoid (377):** Similar to Manual Second, the PCM output signal to the pressure control solenoid increases the operating range of torque signal fluid pressure. This provides increased line pressure for the additional torque requirements during engine compression braking and increased engine loads.

**3-2 Control Solenoid (394) and 3-2 Control Valve (391):** In First gear the solenoid is OFF, AFL fluid is blocked by the solenoid, 3-2 signal fluid exhausts through the solenoid and spring force opens the 3-2 control valve.

### SUMMARY

SHIFT "A" SOL	SHIFT "B" SOL	2-4 BAND	REVERSE INPUT CLUTCH	OVERRUN CLUTCH	FORWARD CLUTCH	FORWARD SPRAG CL. ASSEMBLY	3-4 CLUTCH	LO-ROLLER CLUTCH	LO-REV CLUTCH
ON	ON			APPLIED	APPLIED	HOLDING		HOLDING	APPLIED

# MANUAL FIRST - FIRST GEAR

## PASSAGES

- 1 SUCTION (INTAKE)
- 2 DECREASE
- 3 LINE
- 4 CONVERTER FEED
- 5 RELEASE
- 6 APPLY
- 7 TO COOLER
- 8 LUBE FROM COOLER
- 9 ACTUATOR FEED LIMIT
- 10 FILTERED ACTUATOR FEED
- 11 TORQUE SIGNAL
- 12 PR
- 13 D4-3-2
- 14 LO/REVERSE
- 15 REVERSE
- 16 REVERSE INPUT
- 17 D4
- 18 FORWARD CLUTCH FEED
- 19 REAR LUBE
- 20 ACCUMULATOR
- 21 ORIFICED ACCUMULATOR
- 22 SIGNAL A
- 23 SIGNAL B
- 24 2ND
- 25 2ND CLUTCH
- 26 C. C. SIGNAL
- 27 3-4 SIGNAL
- 28 3RD ACCUMULATOR
- 29 3-4 CLUTCH
- 30 4TH SIGNAL
- 31 SERVO FEED
- 32 4TH
- 33 3-4 ACCUMULATOR
- 34 D3
- 35 OVERRUN
- 36 OVERRUN CLUTCH FEED
- 37 OVERRUN CLUTCH
- 38 D2
- 39 ORIFICED D2
- 40 3-2 SIGNAL
- 41 LO
- 42 LO/1ST
- 43 EXHAUST
- 44 ORIFICED EXHAUST
- 45 VENT
- 46 SEAL DRAIN
- 47 VOID

## COMPONENTS ( )

- (8) REAR LUBE (ORIFICED CUP PLUG/REAR CASE)
- (10) OIL COOLER PIPE CONNECTOR
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- (239) OIL COOLER ORIFICED CUP PLUG
- (240) ORIFICED CUP PLUG