G.M. 4T80-E

INDEX

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INTRODUCTION
THM 4T80-E

This booklet contains the general description, diagnosis charts, and the procedures necessary to overhaul, repair or service the General Motors THM 4T80-E four speed automatic overdrive transaxle. This information will assist you in training your technicians to provide your customers with the best possible transmission service that is available.
The THM 4T80-E is a fully automatic, front wheel drive, electronically controlled transaxle. It provides four forward speeds with 4th gear being overdrive. Shift points are controlled by the Powertrain Control Module (PCM) with two shift solenoids. Oil pressure is supplied by two gear type pumps. Oil pressure is regulated by the PCM using a Pressure Control Solenoid. Shift schedule and TCC apply rates are also controlled by the PCM and are influenced by many inputs from various sensors on the vehicle.

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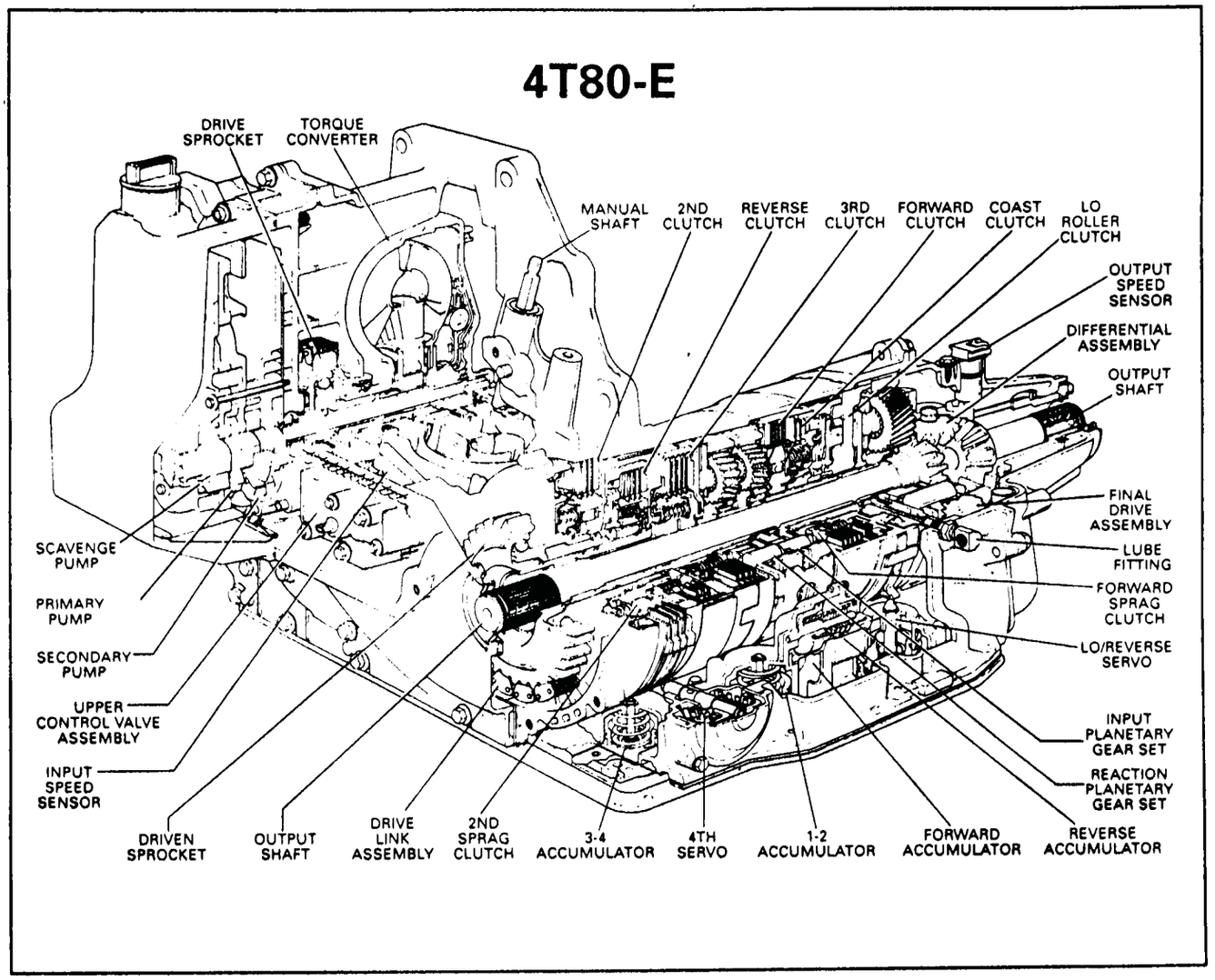
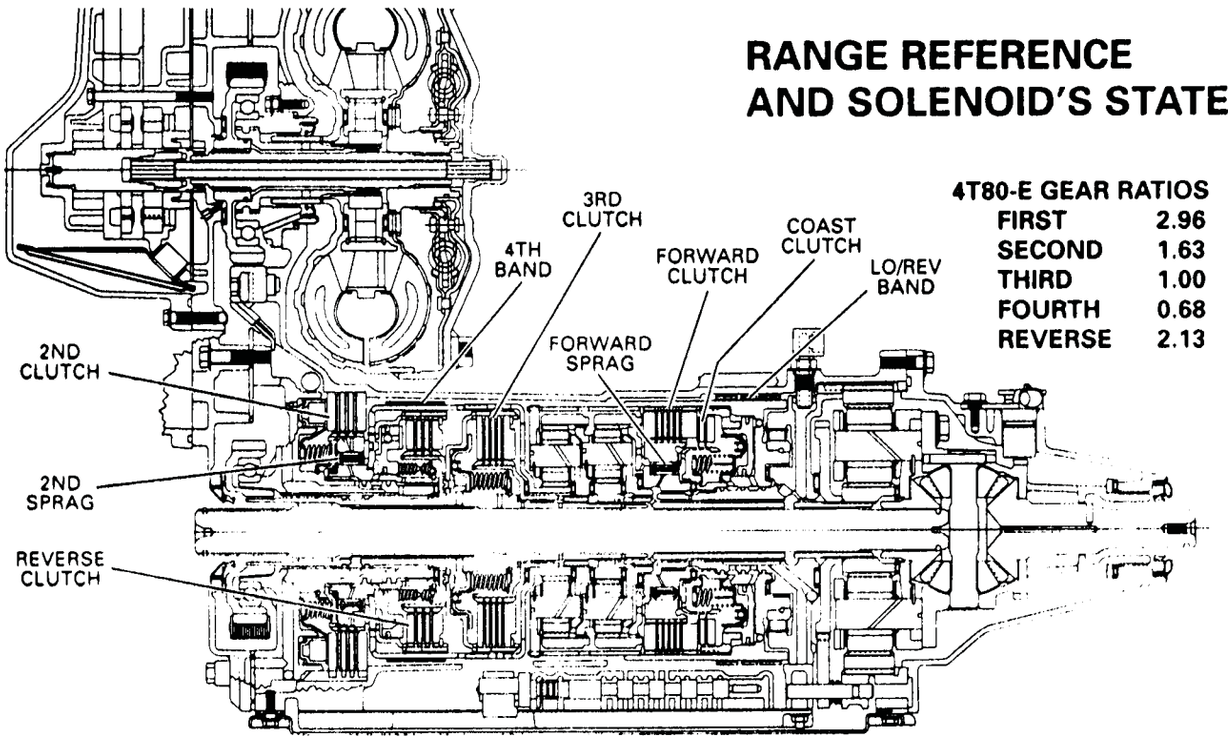


Figure 1

RANGE REFERENCE AND SOLENOID'S STATE



4T80-E GEAR RATIOS

FIRST	2.96
SECOND	1.63
THIRD	1.00
FOURTH	0.68
REVERSE	2.13

RANGE	GEAR	SHIFT "A" SOL	SHIFT "B" SOL	FORWARD	COAST	3RD CLUTCH	2ND CLUTCH	REVERSE	4TH BAND	LO/REV. BAND	LO ROLLER	2ND SPRAG	FORWARD SPRAG
PARK	N	ON	OFF							APPLIED			
REV	R	ON	OFF					APPLIED		APPLIED			
NEU	N	ON	OFF							APPLIED			
D4	1	ON	OFF	APPLIED						APPLIED	HOLDING		HOLDING
	2	OFF	OFF	APPLIED			APPLIED					HOLDING	HOLDING
	3	OFF	ON	APPLIED		APPLIED	APPLIED						HOLDING
	4	ON	ON	APPLIED		APPLIED	APPLIED		APPLIED				
D3	1	ON	OFF	APPLIED	APPLIED					APPLIED	HOLDING		HOLDING
	2	OFF	OFF	APPLIED	APPLIED		APPLIED					HOLDING	HOLDING
	3	OFF	ON	APPLIED	APPLIED	APPLIED	APPLIED						HOLDING
D2	1	ON	OFF	APPLIED	APPLIED					APPLIED	HOLDING		HOLDING
	2	OFF	OFF	APPLIED	APPLIED		APPLIED		APPLIED			HOLDING	HOLDING
D1	1	ON	OFF	APPLIED	APPLIED					APPLIED	HOLDING		HOLDING
	2	OFF	OFF	APPLIED	APPLIED		APPLIED		APPLIED			HOLDING	HOLDING

ON = SOLENOID ENEGERIZED
OFF = SOLENOID DE-ENEGERIZED
@ THE SOLENOID'S STATE FOLLOWS A SHIFT PATTERN WHICH DEPENDS UPON VEHICLE SPEED AND THROTTLE POSITION. IT DOES NOT DEPEND UPON THE SELECTED GEAR.

Figure 2

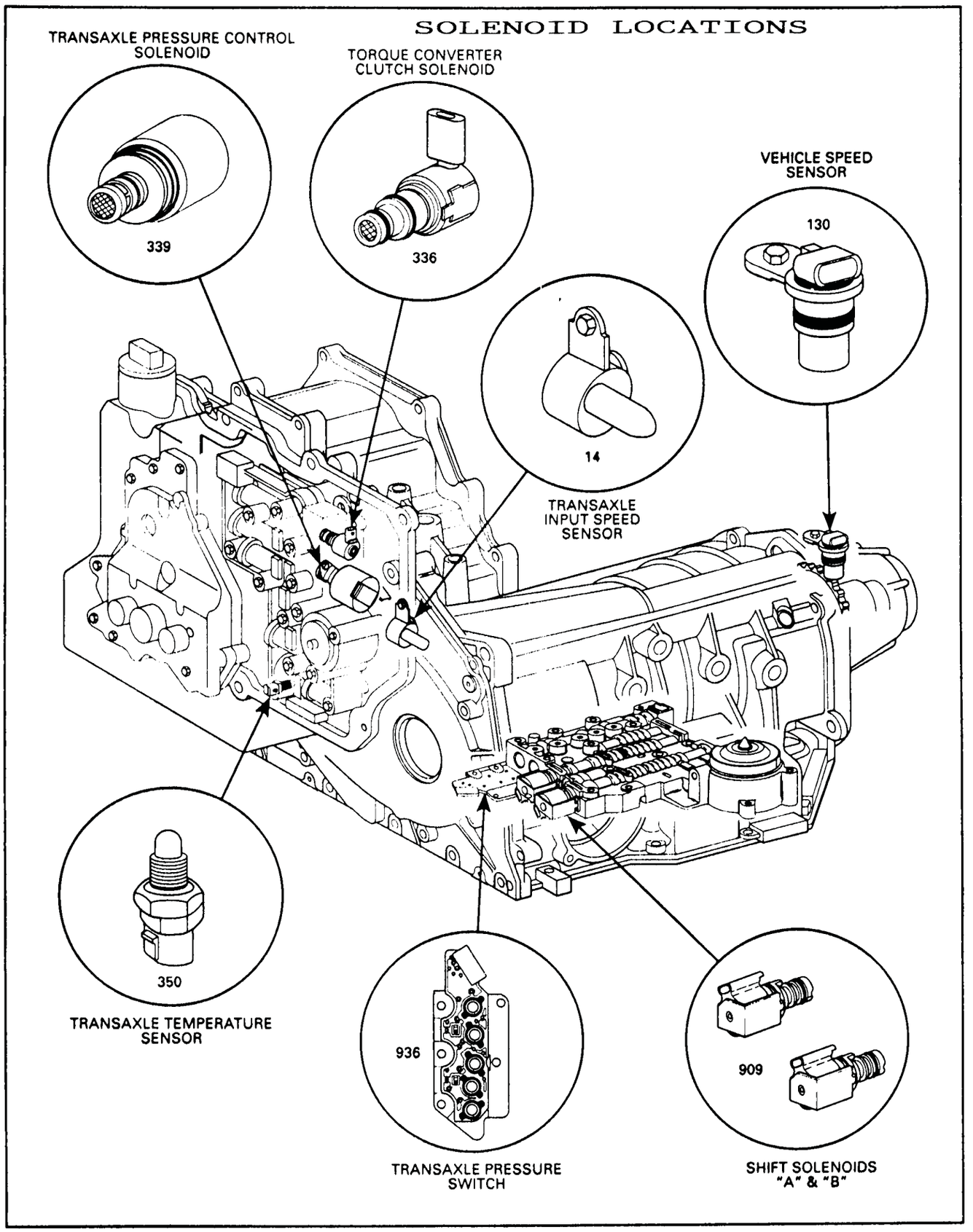


Figure 3

Torque Converter Clutch Solenoid

The TCC solenoid is a three-port assembly which uses negative (-) Duty Cycle, Pulse Width Modulation (Fixed 32 Hz) to control the rate of TCC apply-release. The solenoid's ability to "ramp" apply and release pressures result in a smoother apply and release of TCC in all conditions.

The TCC solenoid is a normally closed valve, mounted to the upper valve body and used to control the position of the TCC apply valve.

TCC solenoid resistance should be 10-15 ohms when measured at 20°C (68°F), at 88°C (190°F) 11-25 ohms. Maximum solenoid current flow should not exceed 1.5 amps.

On the 6-way transaxle connector, measure resistance across Pins E and F.

Transaxle Pressure Control Solenoid (Force Motor)

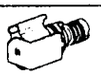
A Transaxle Pressure Control Solenoid (also known as a Force Motor) is a three-port, spool valve, electronic pressure regulator that controls pressure based on current flow through its coil-winding. The Transaxle Pressure Control Solenoid is attached to the upper valve body and controls main line pressure by moving a pressure regulator valve against spring pressure. The Transaxle Pressure Control Solenoid eliminates the need for a TV cable or vacuum modulator to adjust line pressure according to engine load changes. The Transaxle Pressure Control Solenoid position is controlled by a combination of two methods: High side and Low side control. One terminal of the Transaxle Pressure Control Solenoid receives a fixed frequency (292.5 Hz) signal which varies in positive (+) Duty Cycle. This feed circuit to the Transaxle Pressure Control Solenoid is called "Force HI". The opposite terminal of the Transaxle Pressure Control Solenoid is called "Force LO". Force LO is used to provide a ground for the solenoid. It is through this combination of "Force HI" and "Force LO" circuitry that actual Transaxle Pressure Control Solenoid current is finely controlled. This advanced control method assures instantaneous control of line pressure when changes in TPS and adaptive learning occur.

Force High	Force Low	Line Pressure
+ 0% Duty Cycle	0 Amps	Maximum
+ 40% Duty Cycle	1.1 Amps @ 4-5 V	Minimum

Transaxle Pressure Control Solenoid resistance should measure 3.5 - 4.6 ohms when measured at 20°C (68°F).

On the 6-way transaxle connector measure resistance across Pins C and D.

Shift Solenoids "A" and "B"



A shift solenoid is a two-port, feed bled device which consists of a coil/plunger-ball assembly. The solenoid assembly works in conjunction with an orifice to pressurize the shift valve end chamber when voltage is applied to its coil. The controlled pressure then moves the shift valve against a spring causing a shift to occur. When voltage is no longer applied, the chamber is then opened to exhaust and the opposite shift valve action occurs. Shift solenoids eliminate the need for TV and governor pressures to control shift valve operation.

The 4T80-E transaxle uses two shift solenoids: Solenoid "A" and Solenoid "B", which are attached to the lower valve body.

Shift solenoid resistance should measure 20-30 ohms when measured at 20°C (68°F), at 88°C (190°F) 23-50 ohms. Shift solenoid current flow should not exceed 0.75 amps. The shift solenoid should energize at a voltage of 7.5 volts or more (measured across the terminals). The shift solenoid should de-energize when voltage is one volt or less.

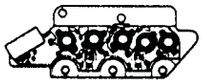
On the 8-way transaxle connector measure solenoid "A" resistance across Pins F and E.

On the 8-way transaxle connector measure solenoid "B" resistance across Pins F and G.

If both solenoids lose power, second gear only will result.

Figure 4

Transaxle Pressure Switch



The transaxle pressure switch contains five normally open pressure switch assemblies which are used to indicate transmission manual valve range through the use of Binary code. Each switch produces either an open or a ground for the three PCM/TCM signal lines, depending on which switches have pressure applied to them. The transaxle pressure switch is attached to the valve body. The sequence of which switches are open and which switches are closed will be used by the PCM/TCM to determine actual manual valve position (except park/neutral). This input is used for line pressure, TCC and shift solenoid control.

To monitor TPS operation, the PCM/TCM compares the voltage values it sees to a TPS combination chart stored in its memory. If the PCM/TCM does not recognize the TPS switch sequence (voltage sequence) for the range selected, a Code 028 will result.

For a given range, TPS signal voltage can be measured from each pin to ground and compared to the combination chart.

On the 8-way transaxle connector pin A is "mode A", pin B is "mode B", and pin H is "mode C". When checking for continuity transaxle harness remains connected, and wires must be probed.

12 = 12 Volts
0 = Grounded

Seven valid combinations and two invalid combinations are available from the TPS. Valid combinations for Circuits A, B and C are shown in Figure. Invalid combinations are A=0V, B=0V and C=0V; or A=0V, B=12V and C=0V.

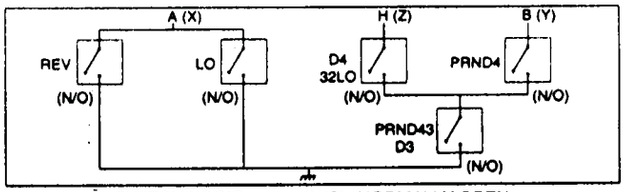
RANGE INDICATOR	OIL PRESSURE				
	REV	D4	PRND4	PRND43	LO
PARK			■	■	
REVERSE	■		■	■	
NEUTRAL			■	■	
D4		■	■	■	
D3		■		■	
D2		■			
LO		■			■

■ OIL PRESSURE PRESENT

VALID TPS COMBINATION CHART

	Z	Y	X
PARK	12	0	12
REVERSE	12	0	0
NEUTRAL	12	0	12
4TH	0	0	12
3RD	0	12	12
2ND	12	12	12
1ST	12	12	0
ILLEGAL	0	12	0
ILLEGAL	0	0	0

EXPECTED VOLTAGE READINGS



SWITCH LOGIC (N/O)- NORMALLY OPEN

Transaxle Vehicle Speed Sensor

The vehicle speed sensor is mounted on the transaxle case extension facing toward the right wheel. The sensor consists of a permanent magnet surrounded by a coil of wire. The sensor mounts into the extension and maintains a slight air gap (0.045 - 0.109 in.) between itself and a toothed ring located on the differential. The vehicle speed sensor can then measure the speed of the rotor which contains 31 teeth and is attached to the transaxle output shaft. As the differential is rotated, an AC signal is induced in the rear sensor, which varies in frequency and voltage output.

This input is used for TCC, line pressure, shift timing and torque management controls.

Sensor resistance should be 1260-1540 ohms when measure at 20°C (68°F). Output voltage will vary with speed from a minimum of 0.5 Volts AC at 100 RPM, to more than 100 Volts AC at 8000 RPM.

Measure vehicle speed sensor resistance at sensor.

- Low speed = low Hz and voltage amplitude.
- High speed = high Hz and voltage amplitude.

Transaxle Input Speed Sensor

The input speed sensor is mounted in the case cover facing the drive sprocket. The sensor consists of a permanent magnet surrounded by a coil of wire. The sensor mounts into the case and maintains a slight air gap (0.045 - 0.109 in.) between itself and the drive sprocket. An AC voltage signal is induced in the input sensor by rotating the drive sprocket which contains 39 teeth cut in its outside diameter. The voltage output and frequency will vary with housing speed:

- Low speed = low Hz and voltage amplitude.
- High speed = high Hz and voltage amplitude.

Inside the PCM/TCM, this analog signal is changed to a digital signal. This digital signal is then compared by the processor to a fixed clock signal internally within the PCM/TCM to determine actual turbine speed. The PCM/TCM uses input speed for control of line pressure and speed calculation.

Sensor resistance should be 1260-1540 ohms when measured at 20°C (68°F). Output voltage will vary with speed from a minimum of 0.5 Volts AC at 100 RPM, to more than 100 Volts AC at 8000 RPM.

On the 6-way transaxle connector measure I.S.S. resistance across Pins A and B.

Figure 5

Transaxle Temperature Sensor (Trans Temp)

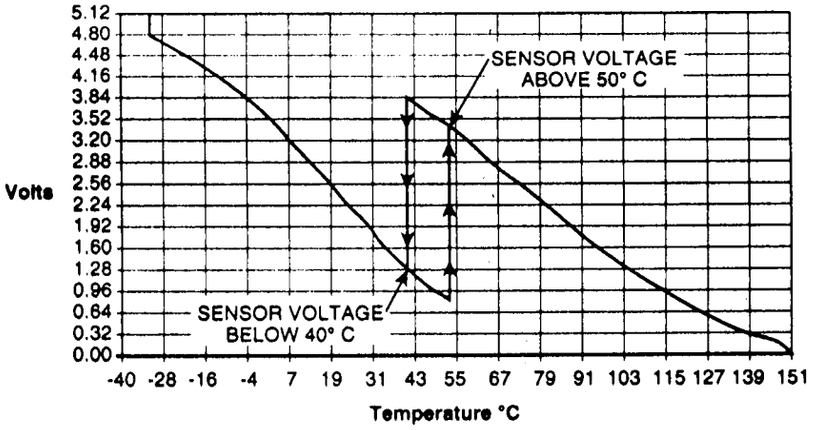
The transaxle temperature sensor is used to control TCC and line pressure.

The transaxle temperature sensor attaches to the upper control valve assembly. It signals the PCM regarding transaxle fluid temperature. The sensor is a negative temperature coefficient thermistor which receives a five volt signal from the PCM. When the temperature is cold, the sensor resistance is high; therefore, the PCM sees a high signal voltage. As the fluid warms, the sensor resistance decreases, the voltage drop across the sensor decreases so the signal voltage will become lower. The transaxle temperature sensor may be tested with a Voltmeter across pin terminals C and D of the 8-way transaxle connector. Nominal voltage readings at specified temperatures are given in Voltage levels at the PCM.

Temperature sensor mode:

1. Hot mode enable (Above 130°C [266°F]) — TCC On in 3rd at 30 mph, 0-10 degrees throttle angle and 4th at 39 mph, 0-10 degrees throttle angle – This reduces transaxle temperature by decreasing heat generated in the torque converter. It also provides maximum cooling by routing transaxle fluid directly to the transaxle cooler in the engine radiator.
2. Super-hot disable (270 HP RPO LD8 ENGINE) (Above 140°C [284°F]) – VCC Off, Inhibit operation of 4th – Super-hot is a condition where a hot engine adds heat to the transaxle through the transaxle cooler. By inhibiting VCC and 4th gear operation, the engine works under less load. This reduces the heat added to the transaxle fluid by the transaxle cooler. As both engine and transaxle cool off, VCC and 4th are permitted again.

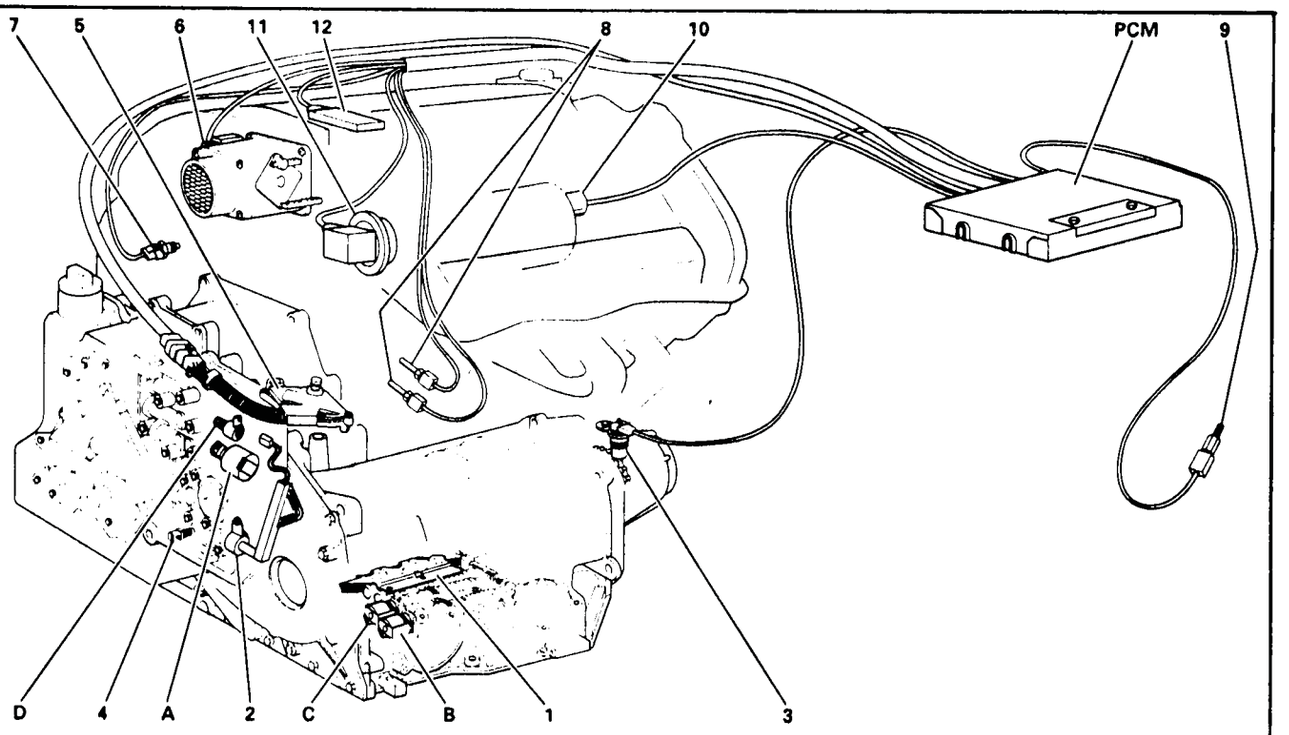
TRANSAXLE SENSOR VOLTAGE VS. TEMPERATURE



– NOTE –

A PCM INTERNAL SHUNT CIRCUIT WILL COME INTO PLAY AS TEMPERATURE INCREASES BEYOND 50°C. AS TEMPERATURE IS DECREASING, INTERNAL SHUNT COMES OUT AT 40°C. THERE IS A 10°C OVERLAP.

Figure 6



INPUTS

INFORMATION SENSORS

1. TRANSAXLE PRESSURE SWITCH
2. TRANSAXLE INPUT SPEED SENSOR
3. TRANSAXLE VEHICLE SPEED SENSOR
4. TRANSAXLE TEMPERATURE SENSOR
5. TRANSAXLE RANGE SWITCH
6. THROTTLE POSITION (TP) SENSOR
7. ENGINE COOLANT TEMPERATURE (ECT) SENSOR
8. CRANKSHAFT POSITION SENSORS
9. TORQUE MANAGEMENT BRAKE SWITCH
10. AIR CONDITIONING (A/C) SWITCH
11. CRUISE CONTROL OPERATION
12. MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

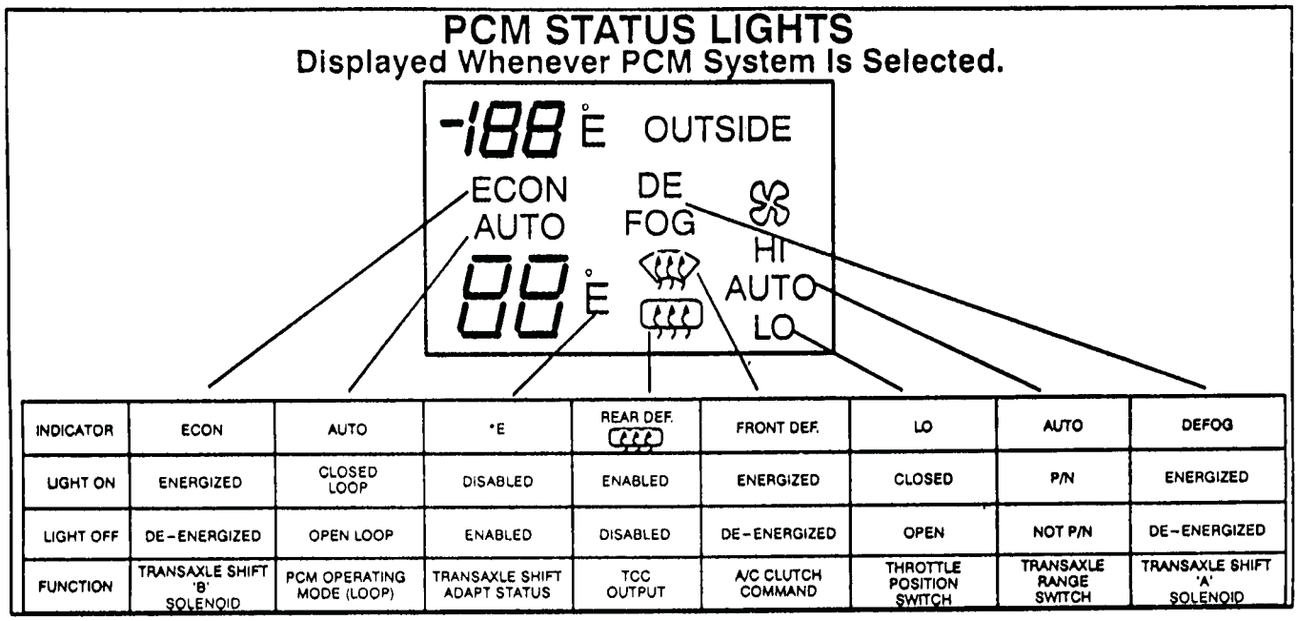
ELECTRONIC CONTROLLERS

- POWERTRAIN CONTROL MODULE (PCM)

OUTPUTS

ELECTRONICALLY CONTROLLED TRANSMISSION COMPONENTS

A. PRESSURE CONTROL SOLENOID
B. SHIFT SOLENOID "A"
C. SHIFT SOLENOID "B"
D. TCC CONTROL SOLENOID



INDICATOR	ECON	AUTO	°E	REAR DEF.	FRONT DEF.	LO	AUTO	DEFOG
LIGHT ON	ENERGIZED	CLOSED LOOP	DISABLED	ENABLED	ENERGIZED	CLOSED	P/N	ENERGIZED
LIGHT OFF	DE-ENERGIZED	OPEN LOOP	ENABLED	DISABLED	DE-ENERGIZED	OPEN	NOT P/N	DE-ENERGIZED
FUNCTION	TRANSAXLE SHIFT 'B' SOLENOID	PCM OPERATING MODE (LOOP)	TRANSAXLE SHIFT ADAPT STATUS	TCC OUTPUT	A/C CLUTCH COMMAND	THROTTLE POSITION SWITCH	TRANSAXLE RANGE SWITCH	TRANSAXLE SHIFT 'A' SOLENOID

Figure 7

As soon as "PCM?" is selected (See Pages 11 and 12), the Climate Control Center(CCC) panel begins display of PCM Status Lights. PCM Status Lights will continue to be displayed, as shown in Figure 7, until PCM diagnostic functions are exited. PCM Status Lights show the current state of certain discrete PCM inputs and outputs by turning on or off certain indicators on the CCC. (See Figure 7).

NOTE: PAGES 9 THROUGH 14 APPLY TO ELDORADO/SEVILLE ONLY.

ELDORADO/SEVILLE

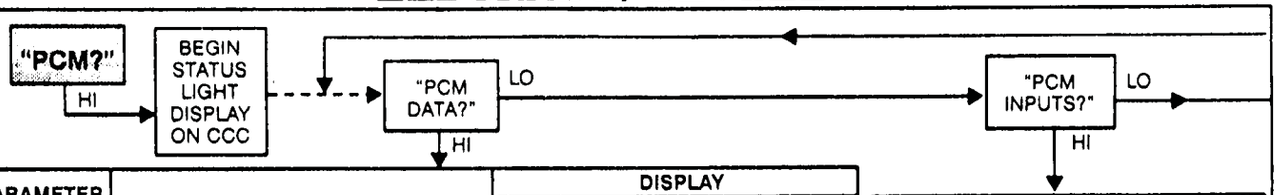
PCM DIAGNOSTIC CODES

CODE	DESCRIPTION	TELLTALE STATUS
P012	No 4X Reference Signal From Ignition Control Module	A
P013	Rear Heated Oxygen Sensor Not Ready	A
P014	Shorted Engine Coolant Temperature Sensor	A
P015	Open Engine Coolant Temperature Sensor	A
P016	Generator Voltage Out Of Range [EVAP, EGR, CRUISE, TCC Transaxle Pressure Control, Long Term Fuel Trim]	B
P017	Front Heated Oxygen Sensor Not Ready	A
P019	Shorted Fuel Pump Circuit	B
P020	Open Fuel Pump Circuit	B
P021	Shorted Throttle Position (TP) Sensor [TCC, Transaxle Pressure Control]	A
P022	Open Throttle Position (TP) Sensor [TCC, EGR]	A
P023	Ignition Control Circuit Problem [Ignition Control]	A
P024	Vehicle Speed Sensor Circuit Problem [TCC]	A
P025	24X Reference Signal Low	B
P026	Shorted Throttle Position (TP) Switch Circuit [EGR]	A
P027	Open Throttle Position (TP) Switch Circuit [EGR]	A
P028	Transaxle Pressure Switch/Circuit Problem	A
P029	Transaxle Shift 'B' Solenoid Problem [1st, 3rd, 4th Gear]	A
P030	Idle Speed Control (ISC) RPM Out Of Range	A
P031	Shorted Manifold Absolute Pressure (MAP) Sensor [Long Term Fuel Trim]	A
P032	Open Manifold Absolute Pressure (MAP) Sensor [Long Term Fuel Trim]	A
P033	Extended Travel Brake Switch Input Circuit Problem [Cruise]	B
P034	Manifold Absolute Pressure (MAP) Signal Too High [Long Term Fuel Trim]	A
P035	Ignition Ground Voltage Out of Range	C
P036	Exhaust Gas Recirculation (EGR) Valve Pintle Position Out Of Range [EGR]	A
P037	Shorted Intake Air Temperature (IAT) Sensor	A
P038	Open Intake Air Temperature (IAT) Sensor	A
P039	Torque Converter Clutch (TCC) Engagement Problem [4th Gear, TCC for Ignition Cycle]	A
P040	Power Steering Pressure Switch Open	A
P041	No Cam Reference Signal From Ignition Control Module	A
P042	Front Heated Oxygen Sensor Lean Exhaust Signal	A
P043	Front Heated Oxygen Sensor Rich Exhaust Signal	A
P044	Rear Heated Oxygen Sensor Lean Exhaust Signal	A
P045	Rear Heated Oxygen Sensor Rich Exhaust Signal	A
P046	Left To Right Bank Fueling Difference	A
P047	PCM/BCM Data Link Problem	B
P048	Exhaust Gas Recirculation (EGR) System Malfunction [EGR]	A
P051	PROM Checksum Mismatch	A
P052	PCM Keep Alive Memory Reset	C
P053	4X Reference Signal Interrupt From Ignition Control Module	C
P055	Closed Throttle Angle Out-Of-Range [TP Sensor Learn]	A
P056	Transaxle Input Speed Sensor Circuit Problem	A
P057	Shorted Transaxle Temperature Sensor Circuit	B
P058	PASS-Key® Fuel Enable Problem [PASS-Key® Fuel Inhibit]	D
P059	Open Transaxle Temperature Sensor Circuit	B
P060	Cruise Control – Transaxle Not In Drive [Cruise]	C
P061	Cruise Control – Vent Solenoid Problem [Cruise]	C
P062	Cruise Control – Vacuum Solenoid Problem [Cruise]	C
P063	Set vs Vehicle Speed Difference [Cruise]	C
P064	Vehicle Acceleration Too High [Cruise]	C
P065	Cruise Control Servo Position Sensor Failure [Cruise]	C
P066	Cruise Control – Engine RPM Too High [Cruise]	C
P067	Set/Coast Or Resume/Accel Input Shorted [Cruise]	C
P068	Cruise Control Servo Position Out Of Range [Cruise]	C
P069	Traction Control Active While In Cruise [Cruise]	C
P070	Intermittent Throttle Position (TP) Sensor	C
P071	Intermittent Manifold Absolute Pressure (MAP) Sensor	C
P073	Intermittent Engine Coolant Temperature Sensor	C
P074	Intermittent Intake Air Temperature (IAT) Sensor	C
P075	Vehicle Speed Sensor Signal Interrupt [TCC]	C
P076	Transaxle Pressure Control Solenoid Circuit Malfunction [Trans. Pressure Control]	A
P080	TP Sensor/Idle Learn Not Complete	A
P081	CAM To 4X Reference Correlation Problem	C
P083	24X Reference Signal High	A
P085	Idle Throttle Angle Too High	A
P086	Undefined Gear Ratio [Trans. Pressure Control]	A
P088	Torque Converter Clutch (TCC) Not Disengaging [Trans. Adapts]	A
P089	Long Shift and Maximum Adapt [Trans. Pressure Control]	A
P090	TCC Brake Switch Input Circuit Problem [Cruise]	E
P091	Transaxle Range Switch Problem [Cruise]	B
P092	Heated Windshield Request Problem	B
P093	Traction Control System PWM Link Failure	A
P094	Transaxle Shift 'A' Solenoid Problem [1st, 3rd, 4th Gear]	A
P095	Engine Stall Detected	C
P096	Torque Converter Overstress	A
P097	P/N To D/R At High Throttle Angle	E
P099	Cruise Control Servo Applied Not In Cruise	E
P102	Shorted Brake Booster Vacuum (BBV) Sensor [EVAP, Solenoid, EGR, Cruise, TCC, Lt Fuel Trim, Transaxle Adapts]	B
P103	Open Brake Booster Vacuum (BBV) Sensor [EVAP, EGR, Cruise, TCC, Lt Fuel Trim, Transaxle Adapts]	B
P105	Brake Booster Vacuum (BBV) Too Low	B
P106	Stop Lamp Switch Input Circuit Problem	E
P107	PCM/BCM Data Link Problem	C
P108	PROM Checksum Mismatch	A
P109	PCM Keep Alive Memory Reset	C
P110	Generator L-Terminal Circuit Problem	F
P112	Total EEPROM Failure	C
P117	Shift 'A'/Shift 'B' Circuit Output Open Or Shorted	C
P131	Active Knock Sensor Failure	A
P132	Knock Sensor Circuitry Failure	A
P137	Loss Of ABS/TCS Data	E

TELLTALE STATUS

A = 'SERVICE ENGINE SOON' Malfunction Indicator Lamp (MIL) ON
B = 'SERVICE VEHICLE SOON' message On DIC
C = No telltale or message
D = 'THEFT SYSTEM PROBLEM – CAR MAY NOT RESTART' message
E = 'REDUCED ENGINE POWER' message.
F = 'BATTERY NO CHARGE' message.
[ ] = BRACKETED SYSTEMS ARE DISABLED WHEN CODE IS CURRENT

ELDORADO/SEVILLE



PARAMETER NUMBER	PARAMETER	DISPLAY RANGE	DISPLAY UNITS
PD01	Throttle Position	-13.9 – 93.4	Degrees
PD02	Manifold Absolute Pressure	10 – 105	kPa
PD03	Computed Barometric Pressure	61 – 103	kPa
PD04	Engine Coolant Temperature	-40 – 151	°C
PD05	Intake Air Temperature	-40 – 151	°C
PD07	EGR Pintle Position	0 – 255	Counts
PD08	Spark Advance	-20 – 70	Degrees
PD09	Ignition Ground Voltage	.003 – 4.970	Volt
PD10	Fuel Pump Feedback Voltage	0 – 25.5	Volts
PD11	Engine RPM	0 – 6375	RPM
PD12	Vehicle Speed	0 – 255	MPH
PD13	EGR Pintle Position (Rescaled)	0 – 100	% of Travel
PD15	Ignition 1 Voltage	0 – 25.5	Volts
PD16	PCM Output Fault Status A	0000 – 1111	Code⊠
PD17	PCM Output Fault Status B	0000 – 1111	Code⊠
PD30	Front Injector Pulse Width	0 – 99.6	mS
PD31	Rear Injector Pulse Width	0 – 99.6	mS
PD32	Front Oxygen Sensor Voltage	0 – 1.16	Volts
PD33	Rear Oxygen Sensor Voltage	0 – 1.16	Volts
PD34	Front Oxygen Sensor Cross Counts	0 – 255	Number/Second
PD35	Rear Oxygen Sensor Cross Counts	0 – 255	Number/Second
PD36	Front Short Term Fuel Trim	0 – 255	Counts
PD37	Rear Short Term Fuel Trim	0 – 255	Counts
PD38	Front Long Term Fuel Trim	0 – 255	Counts
PD39	Rear Long Term Fuel Trim	0 – 255	Counts
PD40	Spark Retard due to Knock Sensor	0 – 44.80	Degrees
PD41	Knock Sensor	0 – 255	# per sec.÷8
PD42	Calculated Octane Level of Fuel	87, 90, or 93	Octane
PD70	Cruise Feedback	0 – 100	% of Travel
PD71	Transaxle Pressure Switch	000 – 111	Code◇
PD72	Transaxle Turbine Speed	0 – 8192	RPM
PD73	Torque Converter Slip Speed	0 – 8192	RPM
PD74	Transaxle Pressure Sol. Current	0 – 4.980	Amps
PD75	Trans. Press. Sol. Current Error	0 – 2.500	Amps
PD76	Transaxle Gear Ratio	0 – 4.000	Ratio
PD77	Transaxle Temperature	-40 – 152	°C
PD78	Transaxle Shift Adapt	-128 – 127	PSI
PD79	Transaxle Steady State Adapt	0 – 127	PSI
PD80	Transaxle P/N to D/R Shift Adapt	-3.000 – 3.000	Seconds
PD81	Torque Converter Clutch Solenoid	0 – 99.6	% Duty Cycle
PD82	Transaxle Shift Time	0 – 6.375	seconds
PD83	Non-drive Wheel Speed	2 – 255	KPH
PD84	Brake Booster Vacuum	-10.7 – 83.4	kPa
PD99	PCM PROM ID – Transaxle	0 – 9999	Code ●
PD98	Ignition Cycle Counter	0 – 255	Key Cycles
PD99	PCM PROM ID – Engine	0 – 9999	Code ●

PCM INPUTS ▼○

INPUT NUM	INPUT
PI70	Cruise Brake Switch
PI71	TCC Brake Switch
PI72	Throttle Position Switch
PI79	Park/Neutral Switch
PI82	Cruise On/Off
PI83	Cruise Set/Coast Switch †
PI84	Cruise Resume/Accel Switch †
PI85	Power Steering Pressure Switch
PI86	Extended Travel Brake Switch
PI87	Low Coolant Level Switch
PI88	Oil Level Switch
PI89	Stop Lamp Switch

◇Transaxle Pressure Switch Code

CODE	SELECTED GEAR
000	Illegal
001	D4
010	Illegal
011	D3
100	Reverse
101	Park/Neutral
110	D1
111	D2

NOTE: PD71 will read 111 with the engine not running

⊠ PCM Output Fault Status

PARAM.	STATUS A	STATUS B
1st Digit	TCC Sol/Engine Temp Lite	Shift 'A'/Shift 'B'
2nd Digit	EGR/EVAP/Starter Inhibit	Injectors
3rd Digit	Cooling Fans/Service Engine Soon MIL	Generator
4th Digit	A/C Clutch/Delivered Torque/RSS Lift/Dive	Not Used

KEY

To Select Another Test Within A Particular Test Type Press:
HI – To Increment
Lo – To Decrement

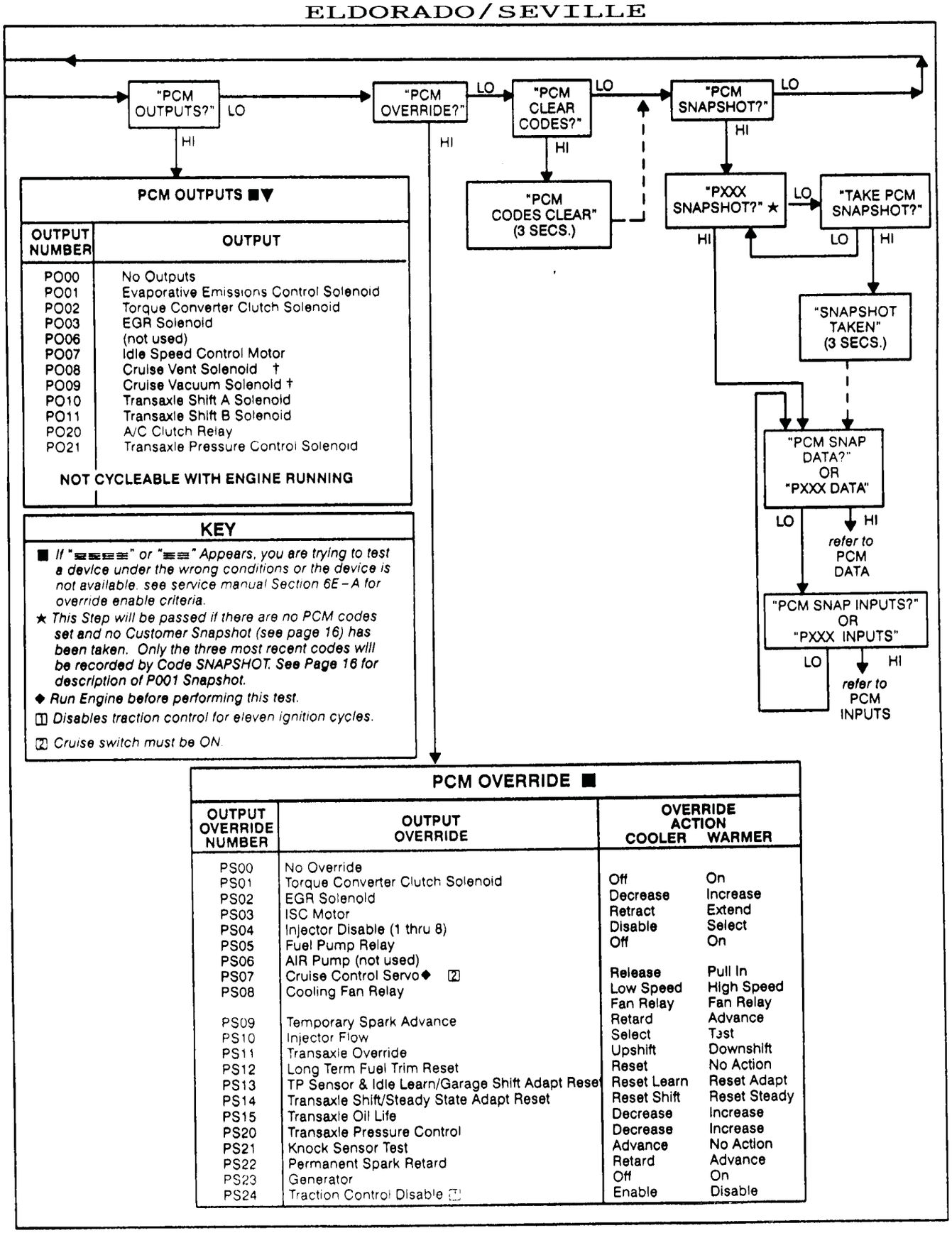
▼ "HI" = High Signal Voltage
"LO" = Low Signal Voltage

○ "O" = Input Same Since Displayed
"X" = Input Changed Since Displayed

● *PROM ID Code Number Identifies An Individual Calibration And Is Periodically Updated; Refer To Latest Service Publication For Correct ID Number.*

† *Switch Cruise ON Before Testing*

ELDORADO/SEVILLE



PCM OUTPUTS ■▼

OUTPUT NUMBER	OUTPUT
PO00	No Outputs
PO01	Evaporative Emissions Control Solenoid
PO02	Torque Converter Clutch Solenoid
PO03	EGR Solenoid
PO06	(not used)
PO07	Idle Speed Control Motor
PO08	Cruise Vent Solenoid †
PO09	Cruise Vacuum Solenoid †
PO10	Transaxle Shift A Solenoid
PO11	Transaxle Shift B Solenoid
PO20	A/C Clutch Relay
PO21	Transaxle Pressure Control Solenoid

NOT CYCLEABLE WITH ENGINE RUNNING

KEY

■ *If "≡≡≡" or "≡≡" Appears, you are trying to test a device under the wrong conditions or the device is not available. see service manual Section 6E–A for override enable criteria.*

★ *This Step will be passed if there are no PCM codes set and no Customer Snapshot (see page 16) has been taken. Only the three most recent codes will be recorded by Code SNAPSHOT. See Page 16 for description of P001 Snapshot.*

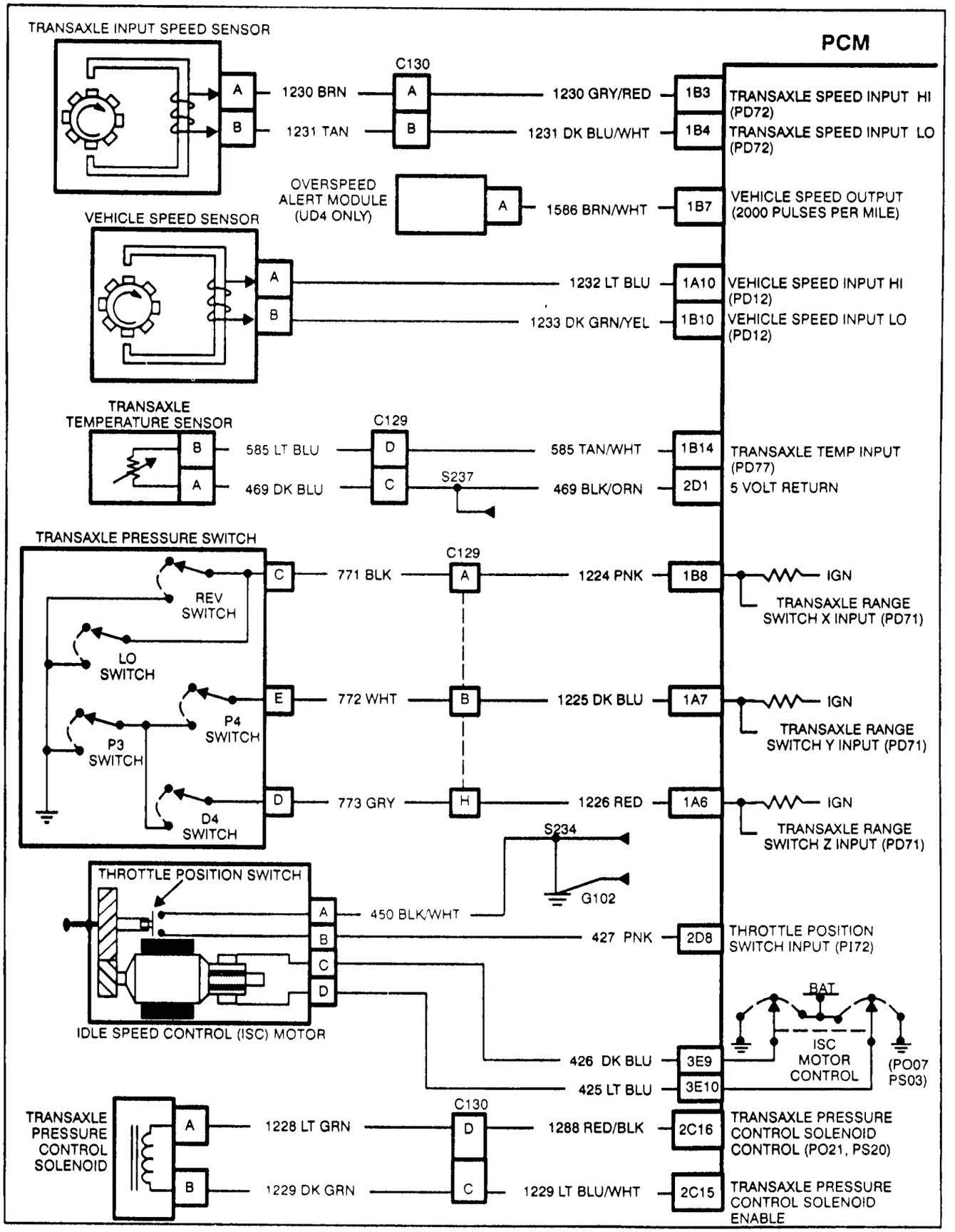
◆ *Run Engine before performing this test.*

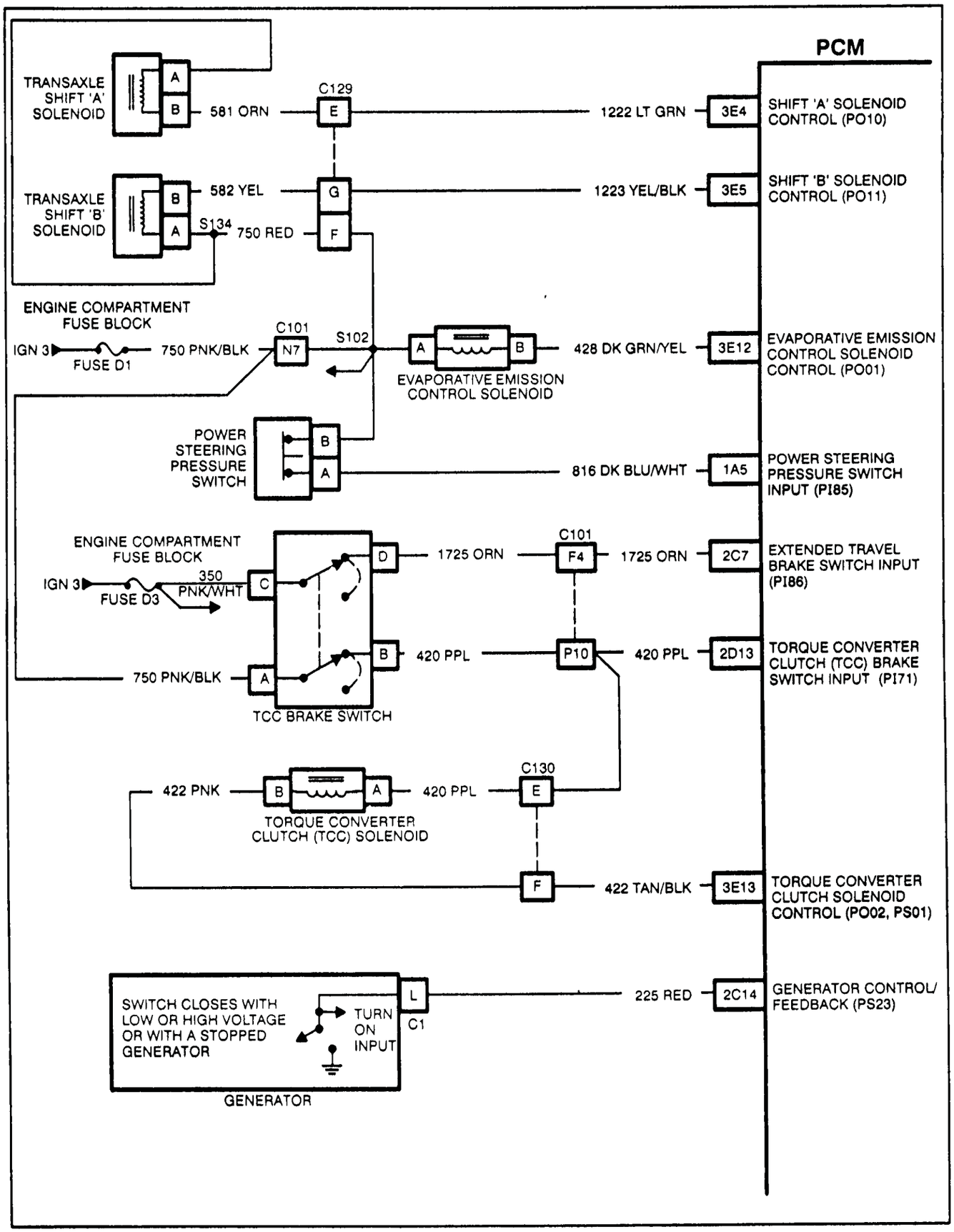
[1] *Disables traction control for eleven ignition cycles.*

[2] *Cruise switch must be ON.*

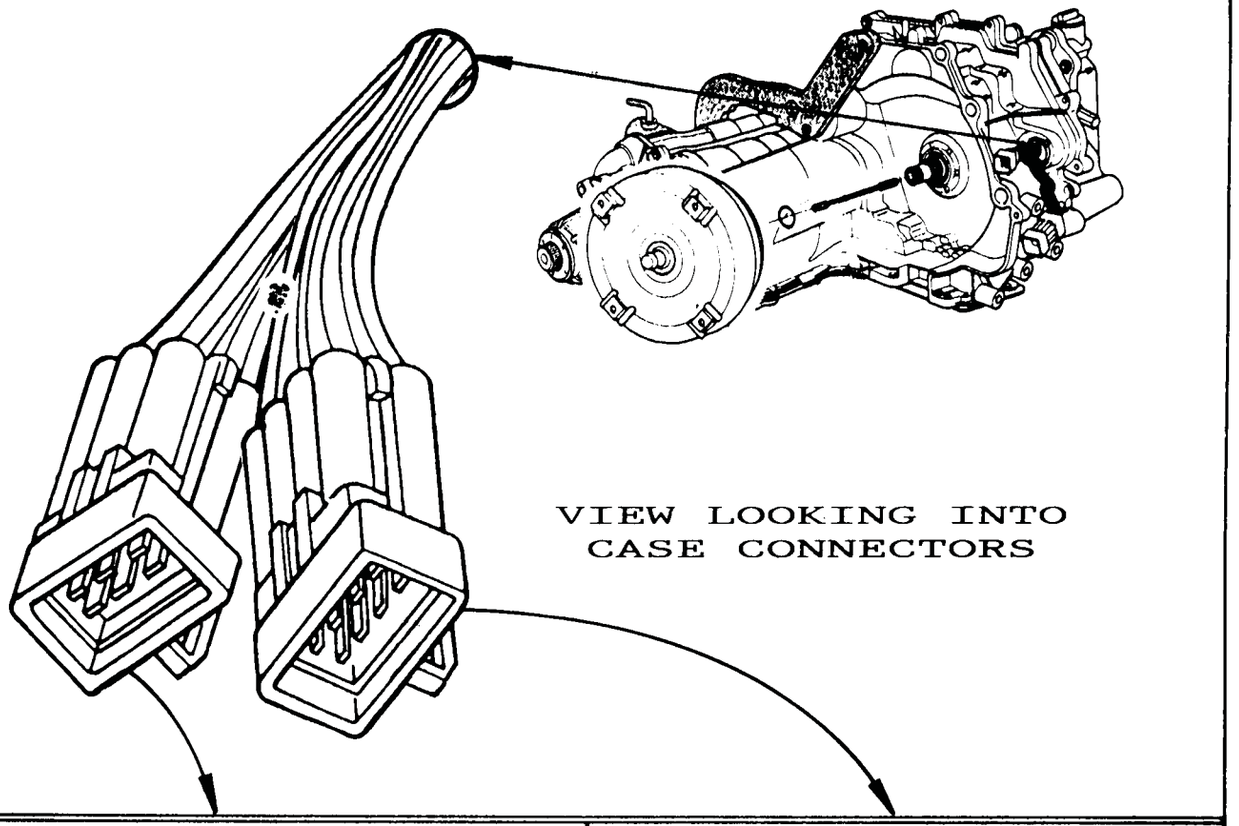
PCM OVERRIDE ■

OUTPUT OVERRIDE NUMBER	OUTPUT OVERRIDE	OVERRIDE ACTION COOLER	OVERRIDE ACTION WARMER
PS00	No Override		
PS01	Torque Converter Clutch Solenoid	Off	On
PS02	EGR Solenoid	Decrease	Increase
PS03	ISC Motor	Retract	Extend
PS04	Injector Disable (1 thru 8)	Disable	Select
PS05	Fuel Pump Relay	Off	On
PS06	AIR Pump (not used)		
PS07	Cruise Control Servo◆ [2]	Release	Pull In
PS08	Cooling Fan Relay	Low Speed Fan Relay	High Speed Fan Relay
PS09	Temporary Spark Advance	Retard	Advance
PS10	Injector Flow	Select	Test
PS11	Transaxle Override	Upshift	Downshift
PS12	Long Term Fuel Trim Reset	Reset	No Action
PS13	TP Sensor & Idle Learn/Garage Shift Adapt Reset	Reset Learn	Reset Adapt
PS14	Transaxle Shift/Steady State Adapt Reset	Reset Shift	Reset Steady
PS15	Transaxle Oil Life	Decrease	Increase
PS20	Transaxle Pressure Control	Decrease	Increase
PS21	Knock Sensor Test	Advance	No Action
PS22	Permanent Spark Retard	Retard	Advance
PS23	Generator	Off	On
PS24	Traction Control Disable [1]	Enable	Disable





CASE CONNECTOR LOCATION AND PIN IDENTIFICATION



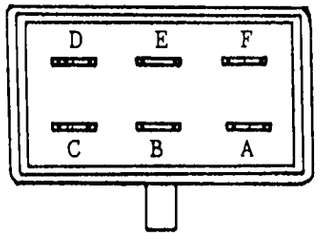
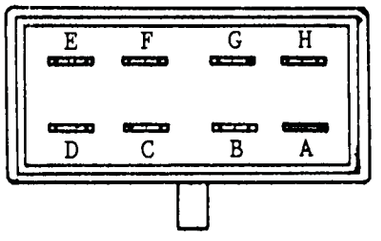
CONNECTOR NUMBER 130 6 PIN CONNECTOR	CONNECTOR NUMBER 129 8 PIN CONNECTOR
	
A = TRANSAXLE INPUT SENSOR (HI) B = TRANSAXLE INPUT SENSOR (LO) C = FORCE MOTOR D = FORCE MOTOR ENABLE E = TCC SOLENOID - 12V F = TCC SOLENOID - GROUND	A = PSM SWITCH "X" CIRCUIT INPUT TO PCM B = PSM SWITCH "Y" CIRCUIT INPUT TO PCM C = TEMP SENSOR - 5V RETURN D = TEMP SENSOR - INPUT E = SHIFT SOLENOID "A" GROUND F = SHIFT SOLENOIDS - 12V G = SHIFT SOLENOID "B" GROUND H = PSM SWITCH "Z" CIRCUIT INPUT TO PCM

Figure 8

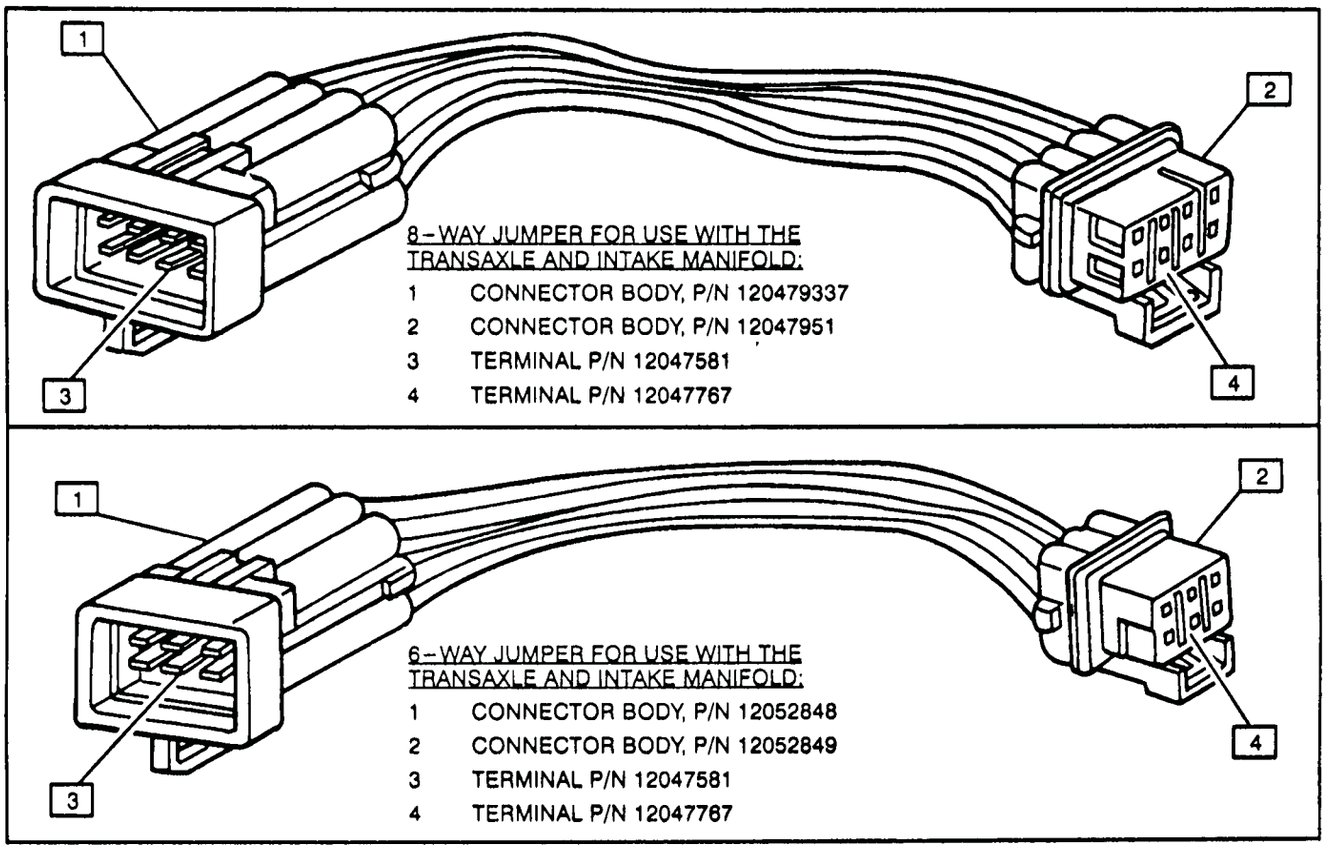
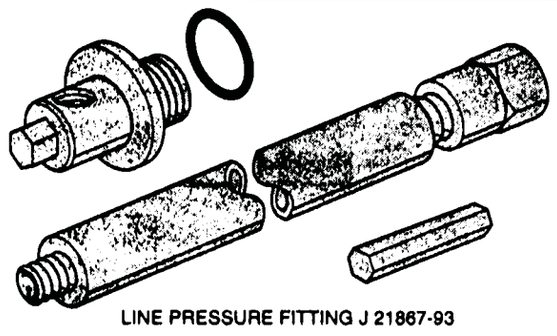
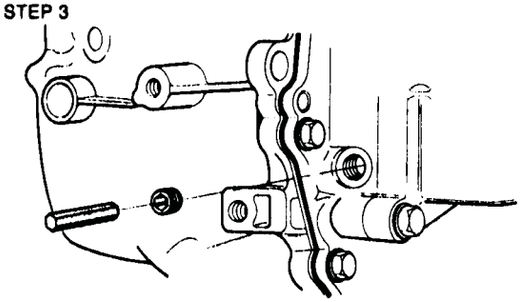


Figure 9

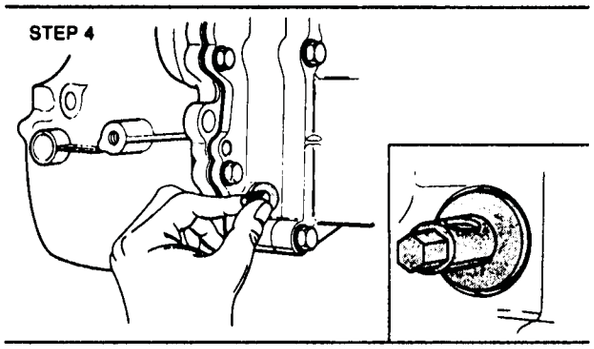


LINE PRESSURE FITTING J 21867-93

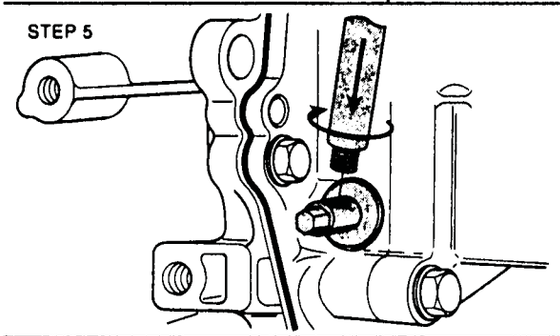
STEP 3



STEP 4



STEP 5



STEP 6

LINE PRESSURE TEST

1. Requires special line pressure fitting J-21867-93, as shown at left.
2. Remove the air cleaner assembly.
3. Raise vehicle and suitably support.
4. Install bar stock into pressure plug, and remove line pressure plug, as shown in Figure 10, Step 3.
5. Install line pressure fitting using a ratchet box wrench. Tighten adapter so the insert hole for the dowel rod is in a 1 O'Clock position. Refer to Figure 10, Step 4.
6. Lower vehicle and install dowel rod in fitting as shown in Figure 10, Step 5.
7. Attach line pressure gage and hose to dowel rod fitting as shown in Figure 10, Step 6.
8. Secure hose in a safe position to avoid damage during line pressure test.
9. To remove the line pressure gage, reverse the steps above.

Figure 10

1993 HYDRA-MATIC 4T80-E LINE PRESSURE CHECK PROCEDURE

Line pressures are calibrated for two sets of gear ranges - Drive-Park-Neutral, and Reverse. This allows the transaxle line pressure to be appropriate for different pressure needs in different gear ranges:

Gear Range	Line Pressure Range
Drive, Park or Neutral	Minimum line 50-55 psi., Maximum line 230-250 psi.
Reverse	Minimum line 90 psi., Maximum line 300 psi.

Before performing a line pressure check, verify that the transaxle pressure control solenoid is receiving the correct electrical signal from the vehicle computer:

1. Start the engine and set parking brake.
2. Enter On-board diagnostics.
3. Check for a stored transaxle pressure control solenoid malfunction code P076, or other malfunction codes.
4. Repair vehicle if necessary.

   Inspect
   - **Fluid level**
   - **Manual linkage at transaxle**
   - Install line pressure gage.
5. Put gear selector in Park and set the parking brake.
6. Start engine and allow it to warm up at idle.
7. Enter diagnostics and select "PCM output override" level.
8. Access the "override" transaxle pressure control solenoid test (PS20).
9. Increase TRANSAXLE PRESSURE CONTROL SOLENOID pressure signal and read the corresponding line pressure on the pressure gage. (Allow pressure to stabilize for 5 seconds after each pressure change.)
10. Compare data to the Drive-Park-Neutral line pressure chart below.
    NOTE: This line pressure is valid for TPC Solenoid overrides with vehicle stopped at idle and in Park-Neutral.

CAUTION Brakes must be applied at all times to prevent unexpected vehicle motion.

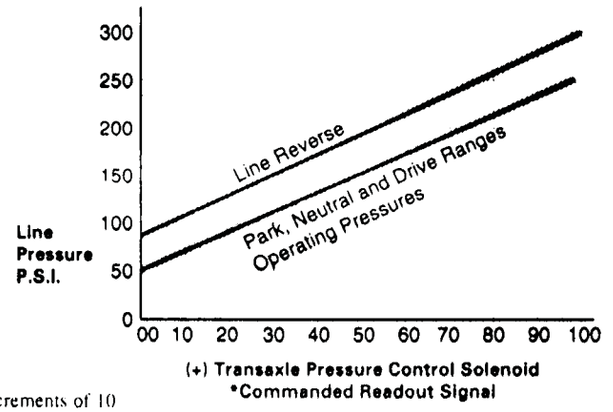
If pressure readings differ greatly from the line pressure chart, refer to the Diagnosis Charts contained in this section.

Dynamic Line Pressure Testing:

The vehicle diagnostic overrides are designed to control the transaxle pressure control solenoid in Park and Neutral with the vehicle stopped at idle and in a dynamic mode during road testing. Under dynamic testing conditions the transaxle pressure control solenoid pressure signal can be overridden to increase pressure from normal PCM commanded pressure. During road test conditions, high line pressures can be commanded to verify line pressure system response.

To verify line pressure response in the dynamic mode, access PCM output override transaxle pressure control solenoid test PS20 and drive the vehicle under normal road test conditions. While driving the vehicle, depress the warmer button to gradually increase the transaxle pressure control solenoid signal. As the transaxle pressure control solenoid signal increases transaxle upshifts should become progressively harsher. This occurs because higher than required line pressures are commanded in this test mode.

If pressure readings differ greatly from the line pressure chart, refer to the Diagnosis Charts contained in this section.



* (+) Signal time is shown in increments of 10

Cooler Flow Rates: 1500 + RPM = 7-9 Litres at Min Line, 12-14 at Max Line, Per Minute.

Figure 11

CONDITION	INSPECT	FOR CAUSE
High Line Pressure (Harsh Shifts)	• Press. Reg. Valve (211)	– Stuck at high torque signal due to under sized bore, sediment or T.P.C.S.
	• Pressure Control Solenoid (339) - Possible Codes; 56, 75, 76, 86, 89	– Failed "off", intermittent short – Loose connector
	• T.P.C.S. Feed Valve	– Stuck
	• P.R. Boost Valve (213)	– Stuck open
	• PSM (936)	– Loose connector
	• Transmission Harness (12)	– Loose connection at vehicle harness
	• Checkballs (65)	– Missing
(Harsh Engagement)	• Final Drive Internal Gear Snap Ring (135)	– Missing
	• Actuator Feed Limit Valve (309)	– Stuck open
Inadequate Lube or Low Line Pressure	• Scavenge Pump Body (225)	– Leakage at gasket or pump body
	• Scavenge Pipe (54)	– Restriction
	• Scavenge Pipe Seal (53)	– Damaged, cut or leaking
	• Primary Pump Body (200)	– Leakage at gasket or pump body
	• Scavenge Screens (51 and 52)	– Clogged
	• P.R.Valve (211)	– Stuck due to sediment
	• Secondary Pump Body (203)	– Leakage at gasket or pump body
	• Transaxle Fluid	– Low level
	• Cooler Lines	– Clogged or restricted
Second Gear Starts	• "A" Shift Solenoid (909) - Possible Codes; 29, 16, 94	– Stuck off – Pinched wire to ground
	• Transaxle Pressure Control Solenoid (339)	– Inoperative – Leakage – Pinched wire to ground
	• Starts At HI Line Only, Driven Sprocket Support (418)	– Staked checkball missing
Transaxle Slips in Reverse	• Fluid Level	– Too high or low
	• Line Pressure	– Too low
	• Scavenge Pump (223, 224, 225)	– Gears worn or broken
	• Primary Pump (200, 201, 202)	– Gears worn or broken
	• Scavenge Pipe (54)	– Debris in pipe
	• Scavenge Pipe Seal (53)	– Cut or damaged
	• Rev. Clutch Seals (506, 507)	– Cut, damaged or leaking
	• Plates (511, 512, 513)	– Damaged or burned
	• Reverse Band (13)	– Damaged, burned, slipping
	• Rev. Servo Piston (928)	– Damaged or cracked
	• Rev. Servo Seals (929 and 930)	– Cut, damaged or leaking
	• Rev. Servo Pin (931)	– Binding, too short
	• Rev. Band Anchor Pins (9)	– Loose, missing
Soft Shifts	• Line Pressure	– Too low
	• Transaxle Pressure Control Solenoid (339)	– Stuck "on"
	• Transaxle Pressure Switch (PSM) (Clip) Clamp (340)	– Broken clip causing leakage
	- Possible Code; 28	– Pinched wire to ground
	• Calibration Prom	– Incorrect

Figure 12

CONDITION	INSPECT	FOR CAUSE
D2, D3, D4 No First Gear	• Checkballs	– Missing from FWD/coast clutch
	• Lo/Rev Servo Apply Pin (931)	– Apply pin damage
	• 1-2 Shift Valve (919)	– Stuck in up shifted position
	• FWD/CC Support Seals (829)	– Damaged
	• FWD/CC Studs (5)	– Damaged, broken
	• Lo Roller Clutch (830)	– Worn or damaged
	• "A" Shift Solenoid (909)	– Debris, or fialed off
	- Possible Code 94	– Pinched or damaged wires, inoperative
	• Forward C. Piston (807)	– Damaged or cracked
	• Forward C. Piston Seals (808 and 809)	– Rolled, cut or damaged
	• Support Housing Seal Rings (829)	– Leaking, damaged or cut
	• Forward Sprag (716)	– Damaged, not holding
	• Checkball No. 8	– Missing
D2, D3 No Second Gear	• Clutch Plates (431-435)	– Burned or damaged
	• Piston (430)	– Cracked or damaged
	• Springs (428)	– Broken, out of position
	• Piston Seals on Piston (430)	– Rolled, damaged or leaking
	• 2nd Sprag (517)	– Damaged, not holding
	• "A" Shift Solenoid (909)	– Stuck on
	• 1-2 Shift Valve (919 and 920)	– Stuck in 1st gear
D3 No Third Gear	• 3/4 Shift Valve Bore Plug (914)	– Misassembled
	• Driven Sprocket Support (418)	– Exhaust valve cup plug or valve improperly installed
	• 3rd Clutch Plates (610-613)	– Burned, splines damaged
	• 3rd Clutch Piston (606)	– Cracked, damaged, checkball damage
	• 3rd Clutch Seals on Piston (606)	– Cut or rolled
	• Checkballs (437)	– Missing, stuck
	• "B" Shift Solenoid (909)	– Debris
	- Possible Codes; 29, 117	– Wires pinched or damaged
	• "A" Shift Solenoid (909)	– Inoperative
	- Code 94, 117	
No Fourth Gear	• "A" Shift Solenoid (909)	– Inoperative
	- possible code; 94	– Debris
		– Pinched wires
	• 4th Band (523)	– Burned, slipping, missing
	• 4th Servo Pin (527)	– Broken, seized
	• 4th Servo Piston (529)	– Damaged
	• 4th Servo Seals (525 and 532)	– Rolled, cut or damaged
	• 4th Servo Cover (524)	– Cracked
	• 3/4 Shift Valve Bore Plug (914)	– Misassembled

Figure 13

CONDITION	INSPECT	FOR CAUSE
No First Gear	• Lo Roller Clutch (830) • Forward Sprag (716) • Oil Transfer Sleeve • Forward Clutch Plate (815-817) • Seals (808 and 809) • Detent Lever (17) • FWD/Coast Housing (801) • Piston (807) • "A" and/or "B" Shift Solenoid (909) - Possible Codes; 16, 29, 94 • Manual Valve (916) • Checkball (437) in Housing	– Worn or damaged – Damaged, not holding – Misaligned, damaged, leaking – Burned, damaged – Leaking, cut or rolled – Misaligned – Broken or spline damage – Cracked or damaged – Debris – Pinched or damaged wires – "A" and "B" Shift Solenoids Disabled – Misaligned – Leaking
Inconsistent Shifts	• "A" and "B" Shift Solenoids (909)	– O-ring seal damage – No compression
Third and Fourth Gear Only	• "B" Shift Solenoid (909) - Possible Codes; 117	– Stuck "on" – Pinched wire to ground
No Engine Braking	• Oil Transfer Sleeve (824) • Drive Chain (414) • Sprockets (407 and 415) • Drive Axle	– Misaligned – Broken, slipping – Damaged – Splines damaged
No Overrun Braking in D3	• Coast C. Plates (812-814) • Coast C. Seal/Checkball (810) • Forward Clutch Housing (801) • Oil Level • 3-4 Shift Valve (912) • "A" Shift Solenoid (909) - Possible Code; 94	– Burned or damaged – Cut, worn or nicked – Splines damaged – Housing cracked – Low – Stuck in upshift position – Debris, stuck
No Overrun Braking in D2	• 4th Band (523) • 4th Band Servo Pin (527) • 4th Servo Piston (529) • 4th Servo Seals (525 and 532) • Coast Clutch Plates(812-814) • Coast Clutch Seal/Checkball (810) • Transaxle Pressure Switch - Code 28 • Coast Clutch Support Seals (829)	– Slipping, burned – Stuck, broken – Damaged, cracked – Cut, rolled or damaged – Burned, damaged – Cut, worn or nicked – Inoperative – Damaged, missing
No Engine Braking in D1	• Transaxle Pressure Switch (936) Possible Code; 28 • Coast Clutch Plates (812-814) • Coast Clutch Seal/Checkball (810) • Checkball No. 6 • Lo/Rev Band (13) • Lo/Rev Servo Piston (928) Seals (929 and 930)	– Inoperative – Burned, damaged – Cut, worn or nicked – Missing – Slipping, burned, damaged – Damaged, seized – Leaking, rolled

Figure 14

CONDITION	INSPECT	FOR CAUSE
Forward Motion in N	• Manual Valve (916)	– Mispositioned or stuck
	• Forward Clutch Springs (820)	– Jammed
	• Forward Clutch Piston (807)	– Jammed
	• Forward Clutch Plates (815-817)	– Seized or jammed
	• Forward Clutch Housing (801)	– Feed hole plugged, inspect tower
	• Sprocket Support Hub (822)	– Holes plugged
	• Shift Linkage	– Mispositioned – Disconnected
Engine Stall	• TCC	– Stuck on or dragging
	• Converter Feed Valve (312)	– Stuck open
	• TCC Solenoid (336) - Possible Code; 39	– Stuck on – Pinched wire to ground – Inoperative
	• Converter Feed Valve (312)	– Stuck open
	• Turbine Shaft (410)	– Spline damaged
Loss of Power	• Transaxle	– Low fluid
	• "A" and "B" Shift Solenoids (909) - Possible Codes; 16, 29, 94	– 2nd gear starts
	• TCC System	– TCC stuck on or dragging
	• Torque Converter (1)	– Debris
	• Turbine Shaft (410)	– Bushing damage
Loss of Drive	• Torque Converter (1)	– Broken lug, failed lug weld – Sheared lug bolts – Worn turbine shaft splines – Low fluid – Pump hub cracked or broken – Internal failure – Closure weld failure – Cover cracked at weld
	• Scavenger, Primary Pumps (225 and 200)	– Seized, broken pump gears
	• Pump Shaft (2)	– Broken
	• Channel Plates (33, 900)	– Damaged
	• Gaskets (228, 326, 328, 935)	– Damaged
	• Scavenge Pipe Seal (53)	– Damaged or missing
	• Drive Sprockets (407 and 415)	– Broken
	• Drive Chain (414)	– Broken
	• Driven Sprocket Support (418)	– Damaged, porosity, leaking
	• Final Drive	– Damaged, splines worn
	• F.D. Pinions (103)	– Spalled pins or pinions – Lack of lube
	• Roller, Forward Sprag	– Worn, broken or locked
	• Forward/Coast Support (822)	– No lube
	• Manual Valve and Link (915 and 916)	– Not attached to detent lever
	• Turbine Shaft (410)	– Dislodged, stripped splines

Figure 15

CONDITION	INSPECT	FOR CAUSE
Engine Starts in Gear	• Manual Valve (916)	– Not engaged to detent lever – Stuck in wrong position
	• Transaxle Range Switch	– Not working, mispositioned
No Gear Selections	• Detent Lever (17) • Manual Valve (916) • Spacer Plate Gasket (935) • Valve Bodies/Case	– Nut loose or missing – Stuck – Blocked holes – Blocked channels
Shift Lever Indicates Wrong Gear	• Manual Valve (916) • Detent Roller Pin (26) • Detent Roller (26) • Spring (27) • Manual Detent Pivot (26) • Manual Shaft (16) • Indicator Linkage	– Not engaged to detent lever – Missing, damaged – Broken or disconnected – Loose or missing – Flats not parallel – Misadjusted
No TCC	• TCC Solenoid (336)	– Stuck off – O-ring failed – No voltage to solenoid – Poor connection
	• PCM • Brake Switch	– No signal to solenoid – Contact corroded – Poor connection – Pinched wire – Misadjusted – No supply voltage
	• TCC Control Valve (317)	– Stuck off due to sediment or undersized bore
	• TCC Regulating Valve (318)	– Stuck off due to sediment or undersized bore
	• TCC Feed Valve (312)	– Stuck off due to sediment or undersized bore
	• Oil Pressure Screen (342) • O-Ring (412) • Torque Converter (1) • O-Ring (412) • Possible Codes; - 16, 29, 88, 117 - 39, 90	– Clogged – Damaged or leaking – Ballooning – Worn – TCC not engaging fully or slipping
Soft TCC Apply	• Turbine Shaft Seal (412) • TCC Solenoid (336) • Transmission Fluid • Conv. Clutch Feed Valve (312)	– Worn or damaged – Malfunction – Low – Sticking
Early TCC Engagement	• Trans Temp Sensor (350) - Possible Codes; - 59 Open Circuit	– Shorted
TCC Not Disengaging	• TCC Solenoid (336) • Converter Feed Valve (312)	– Stuck on due to debris – Stuck on due to debris
Converter Ballooning	• Converter Feed Valve (312)	– Stuck open due to sediment or undersized bore

Figure 16

CONDITION	INSPECT	FOR CAUSE
No Torque Multiplication	• Drive Sprocket Support (400)	– Broken or detached from case – Spline damage
No Reverse	• Reaction Carrier Shell (633) • Lo/Reverse Anchor Pin (9) • Driven Sprocket Support (418) Support Seals (422 and 423) Support Bolts • Reverse Band (13) • Reverse Band Apply Pin (931) • Reverse Piston (505) • Seal (506 and 507) • Checkball in Piston • Gasket (43 and 44) • Case Cover (33) • Fluid Pressure • Steel Plates (511) • Friction Plates (513) • Spring Assembly (508) • Housing (500) • Snap Ring (515)	– Missing, teeth damaged – Anchor pin broken or not positioned – Porosity or broken – Feed holes blocked – Leaking – Loose, not in grooves, mislocated – Broken, worn not anchored – Too short or binding in case. – Broken – Binding in case. – Leaking, damaged or worn – Missing – Damaged or displaced – Damaged – Too low – Splines worn – Splines or friction worn – Jammed – Cracked – Out
Will not stay in park	• Detent Spring (27) • Detent Lever (17) • Actuator Rod (21) • Park Pawl Pivot Pin (23) • Parking Lock Gear (833) • Park Pawl (22) • Manual Linkage	– Weak or broken – Mislocated or broken – Bent – Guide damaged – Missing – Damaged teeth – Damaged (tooth) – Misadjusted or disconnected
Extended or Delayed Upshifts	• Possible Codes; - 21, 22, 24 - Transaxle Pressure Switch Code 28 • Pressure Regulator Boost Valve (213)	 – Inoperative – Stuck in bushing
Transaxle Seized	• Cooler Circuit Lines • Cooler Fittings (3, 38) • Spacer Plate Gasket (328) • Scavenger Pipe (54) • Valve Bodies (300 and 903) • Filter (236) • Filter Seal (209) • Screen Assemblies (51 and 52)	– Blocked or leaking – Blocked or leaking – Holes missing, off location – Damaged, clogged – Poor seal at pipe – Loose, broken or missing bolts – Sitting in side cover – Cut damaged neck seal – Clogged or not seated in case
Noise	• Torque Converter (1) • Transaxle/Engine • Case Extension (134)	– Loose lug bolts – Out of balance – Internal failure – Misaligned – Axle support bushing worn

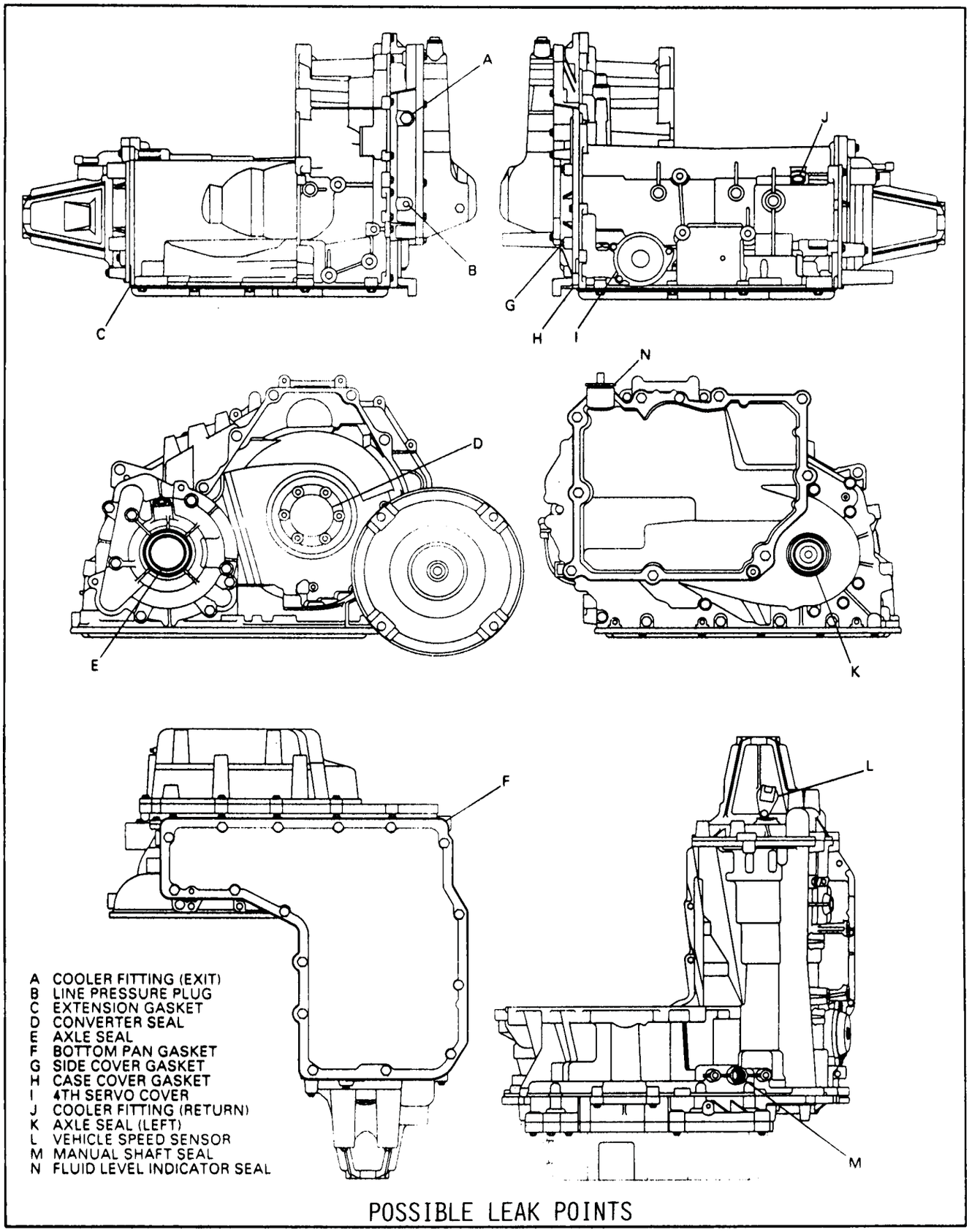
Figure 17

CONDITION	INSPECT	FOR CAUSE
NOISE IN ALL RANGES or (A whine which may RPM load sensitive or ceases when the TCC engages.)	• Torque Converter (1)	– Verify noise internal to torque converter by placing left foot on brake with gear or selector in Drive and momentarily stall engine. Torque converter noise increases under load.
A High Pitch WHINE which will intensify with engine RPM or is Oil Pressure sensitive.	• Oil Pump System	– Verify noise internal to oil pump during preliminary oil pressure check. An increase in line pressure will vary an oil pump noise.
A Popping noise similar to Popcorn popping.		– Pump cavitation-indicated by bubbles on fluid level indicator. – Transaxle fluid strainer for filter seam leak. – Transaxle fluid strainer seal for proper positioning or cut seal.
A BUZZ or High Frequency Rattle sound.	• Trace cooler pipes and check for binding or contact at the at the Radiator other than the Cooler pipe connectors	– Verify pressure buzz by watching for a needle vibration on the pressure gage. (Road test may be necessary.)
A Whine or Growl that increases and fades with Vehicle speed and is most Noticeable under Light Acceleration	• Drive Link Assembly System • Verify noise from sprockets and/or drive link assembly (chain) by placing left foot on brake and moving gear selector from Park or Reverse. If noise stops check items below: • Drive Chain (414) • Drive Sprocket and Driven Sprocket (407 and 415) • Drive Sprocket Support and Driven Sprocket Support (400 and 418)	– Stretched – Teeth broken or sheared – Bearing surfaces nicked or scored – Bearing race or roller bearing surfaces on gear Support Inner Bearings rough or pitted. – Bearing damage – Bearing outer race support rough or nicked.
A Final Drive Noise or Hum, is most noticeable Under light throttle Acceleration and/or turns	• Final Drive Gear Set (100) Final Drive Internal Gear (120) • Differential Carrier (110) Differential Side Gears (116)	– Worn, planet pinions or washers – Worn, tooth damage – Gears worn or pitted – Thrust washer damage
Noise in 1st, 2nd, 3rd or 4th	• Final Drive Sun Gear (121) Final Drive Pinions (103)	– Gear worn or damage – Gears worn or damaged

Figure 18

CONDITION	INSPECT	FOR CAUSE
Vibration	• Torque Converter (1)	– Out of balance – Internal failure
	• Transaxle/Engine	– Misaligned
	• Case Extension (134)	– Axle support bushing worn
	• Turbine Shaft (410)	– Worn bushing
	• Output Shaft (57)	– Out of balance
Leaks at: Bottom Pan	• Bottom Pan (59) • Gasket (61) • Case (6) • Bolts (62)	– Damaged or not flat – Damaged or off location – Porosity or cracked – Flange inside out, damage – High or low torque
Fluid Fill Indicator	• Seal on Indicator (31)	– Cut or nicked – Missing
Vehicle Speed Sensor	• O-Ring Seal (130)	– Cut, nicked or missing
Electrical Connector	• Electrical Connector (12) O-Ring Seal	– Damaged or not seated – Cut or nicked – Missing, porosity
	• Case (6)	– Porosity or cracked
Cooler Connectors	• Cooler Connectors (3, 38)	– Stripped threads – Damaged flare, seal damage – High or low torque
	• Case (6)	– Stripped threads – Porosity – Debris in threads
Case Extension	• Case Extension (134) • Case (6) • Seal (126)	– Porosity or cracked – Porosity or cracked – Cut or nicked – Missing
	• Bolts (128 and 127)	– Low torque – Missing
Manual Shaft	• Seal (20)	– Cut or nicked – Not seated
	• Linkage	– Misadjusted
Converter Seal	• Seal (403)	– Cut, nicked or worn – Missing garter spring
	• Torque Converter Bolt	– Low torque – Damaged hub
Drive Axle Seal	• Tri-Pot Joint	– Corrosion on Tri-Pot housing at mating surface
Fluid Foaming	• Fluid	– Contaminated (antifreeze) – Transaxle overfilled
	• Engine	– Overheated
	• Filter (236)	– Cracked or not seated
	• Seal (209)	– Damaged or not seated
	• Vehicle	– Overloaded
	• Scavenger Screens (51, 52)	– Clogged

Figure 19



POSSIBLE LEAK POINTS

Figure 20

1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
3 SCAVENGE OUTLET
56 VOID

OIL PUMP PASSAGES
SCAVENGER SIDE

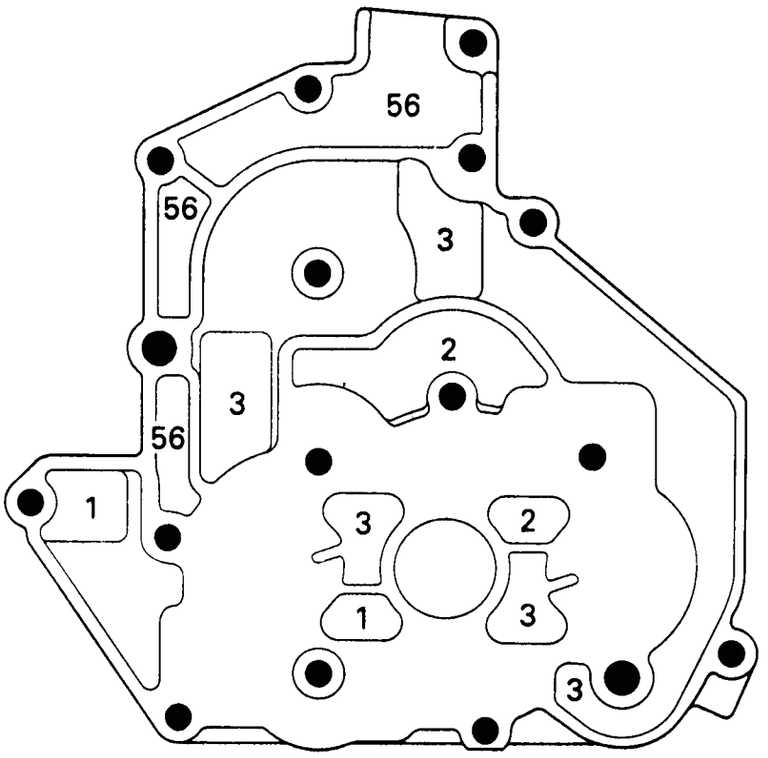


Figure 21

1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
3 SCAVENGE OUTLET
6 LINE
56 VOID

OIL PUMP PASSAGES
PRIMARY SIDE

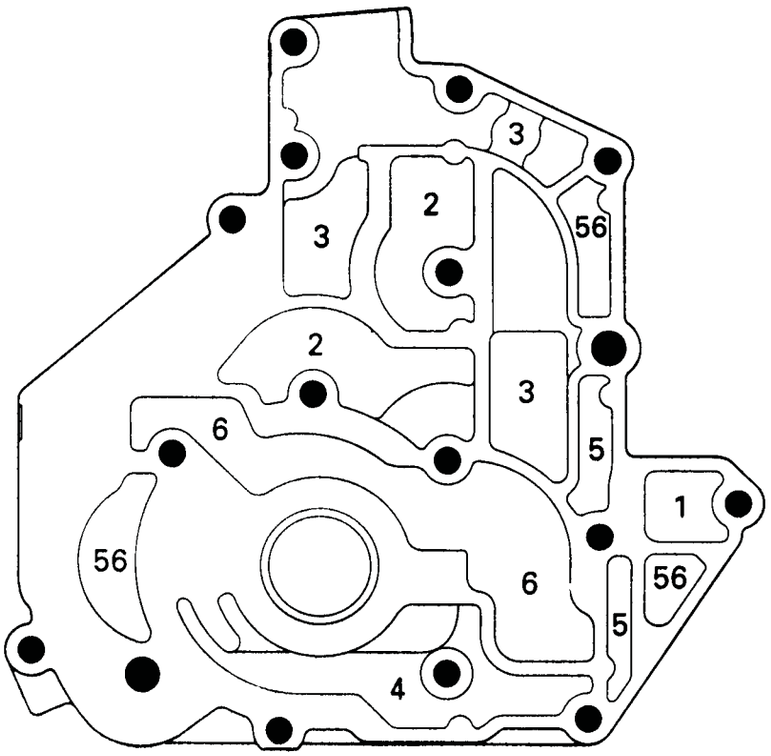
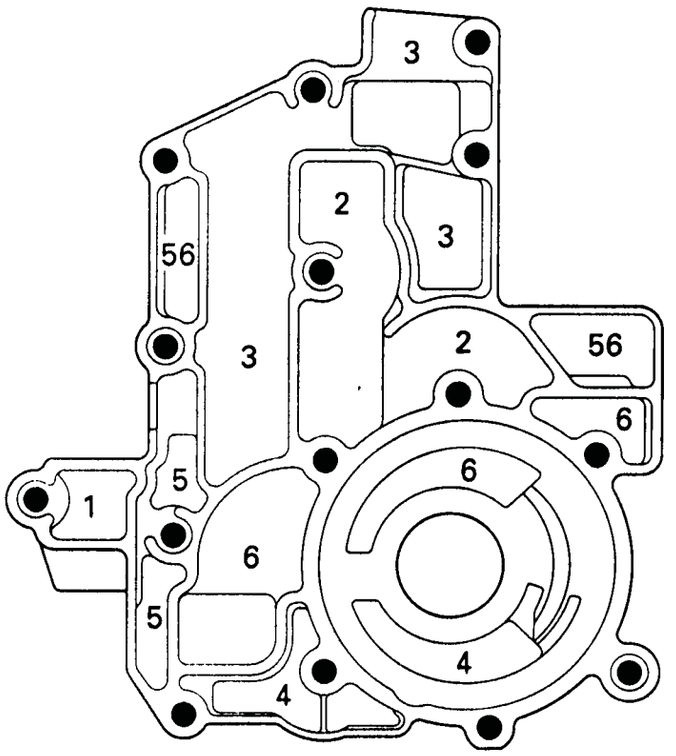


Figure 22

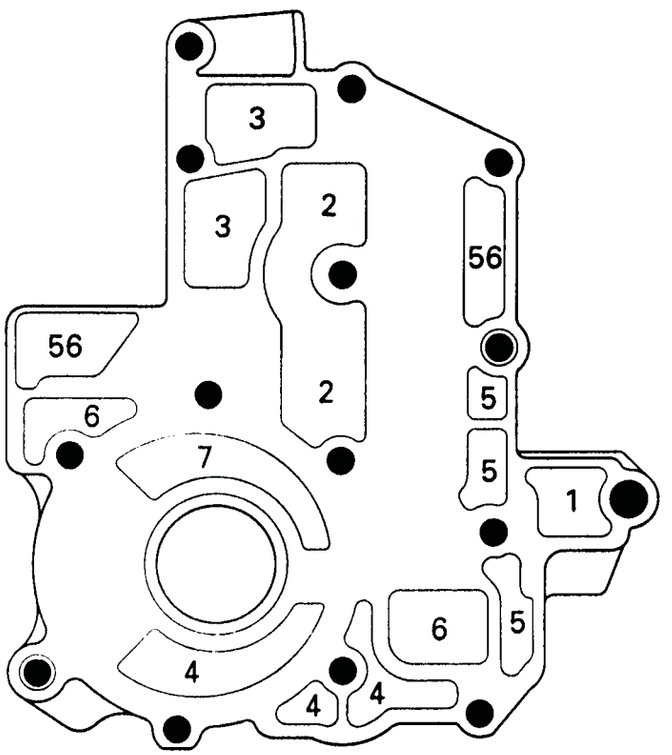
1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
3 SCAVENGE OUTLET
4 MAIN PUMP SUCTION
5 SUMP
6 LINE
7 SECONDARY LINE
56 VOID



PRIMARY PUMP BODY
SCAVENGE PUMP SIDE

Figure 23

1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
3 SCAVENGE OUTLET
4 MAIN PUMP SUCTION
5 SUMP
6 LINE
7 SECONDARY LINE
56 VOID



PRIMARY PUMP BODY
SECONDARY SIDE

Figure 24

1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
4 MAIN PUMP SUCTON
5 SUMP
6 LINE
7 SECONDARY LINE
8 CONVERTER FEED
9 LUBE 2
11 CONVERTER RELEASE
22 TORQUE SIGNAL
32 REVERSE
40 3RD CLUTCH
56 VOID

SECONDARY PUMP BODY
CASE COVER SIDE

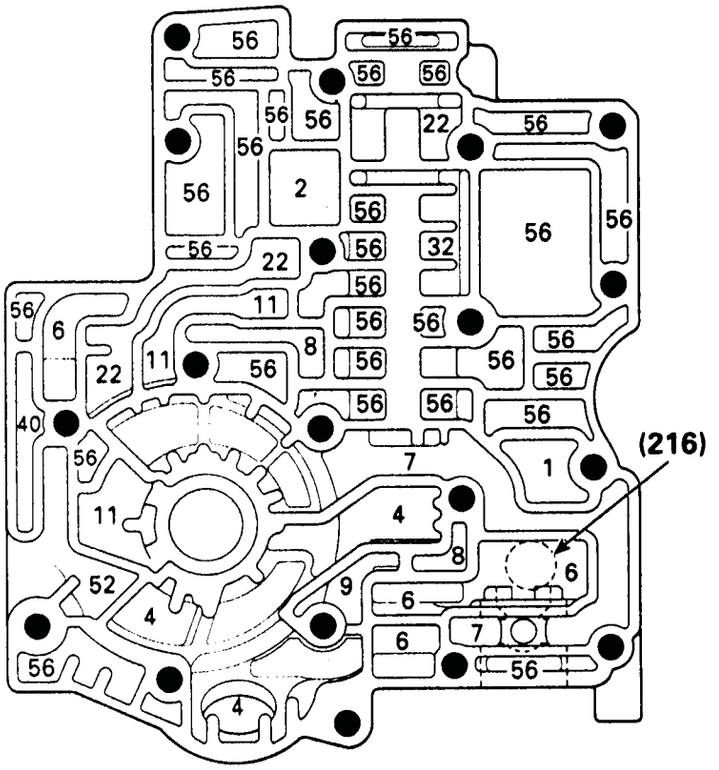


Figure 25

1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
3 SCAVENGE OUTLET
4 MAIN PUMP SUCTON
6 LINE
7 SECONDARY LINE
56 VOID

SECONDARY PUMP BODY
PRIMARY SIDE

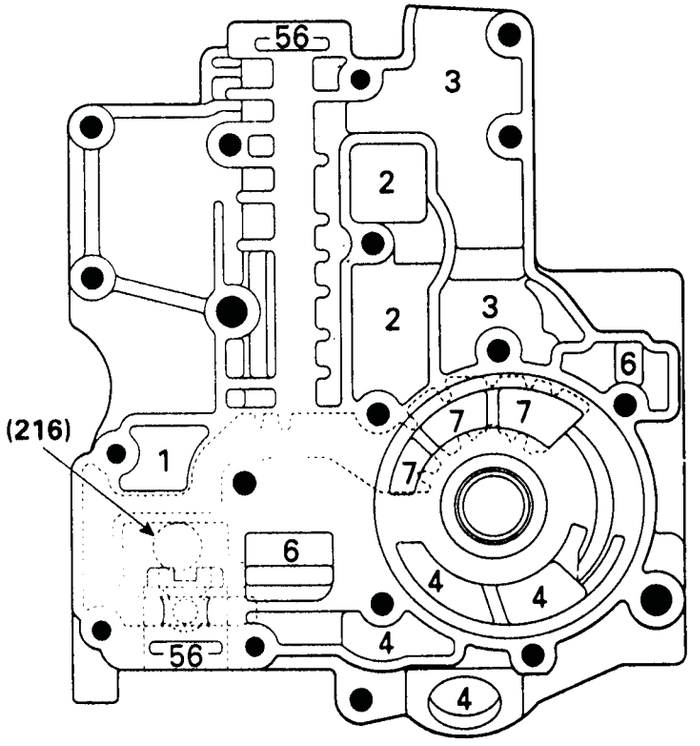
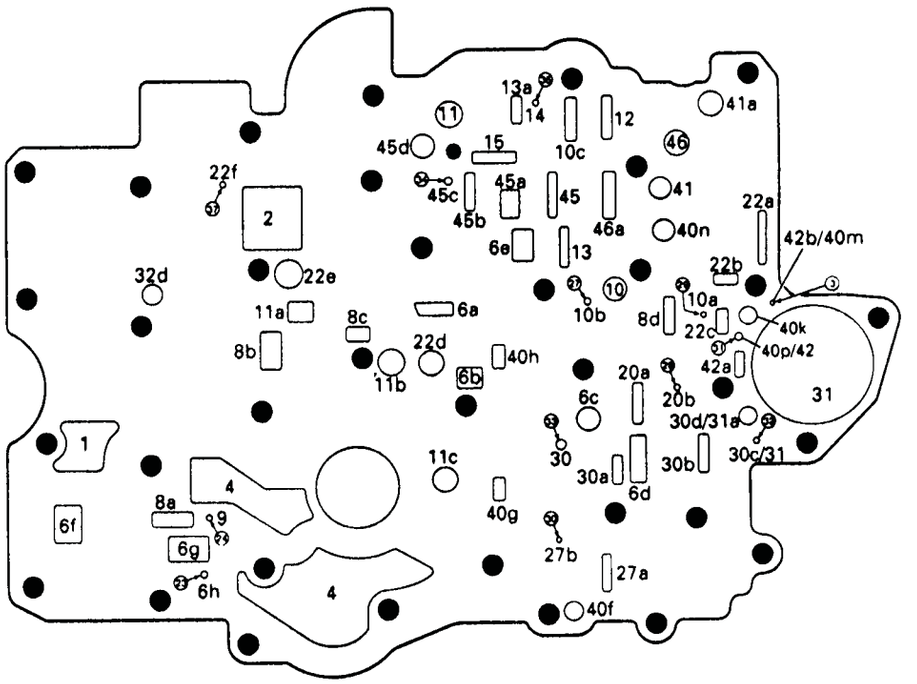


Figure 26

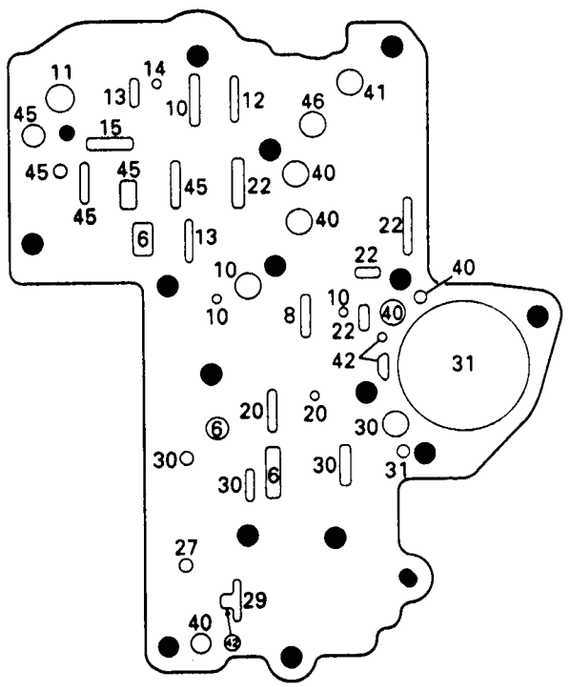
1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
4 MAIN PUMP SUCTON
6 LINE
8 CONVERTER FEED
9 LUBE 2
10 TCC FEED LIMIT
11 CONVERTER RELEASE
12 CONVERTER APPLY
13 TCC EXHAUST ENABLE
14 ORIFICE TCC EXHAUST ENABLE
15 TO COOLER
20 ACTUATOR FEED
22 TORQUE SIGNAL
27 PRIMARY ACCUMULATOR
30 SECONDARY 2-3 ACCUMULATOR
31 2-3 ACCUMULATOR
32 REVERSE
40 3RD CLUTCH
41 FILTERED 3RD CLUTCH
42 ORFICED 3RD CLUTCH
45 REGULATED APPLY
46 TCC CONTROL
52 EXHAUST



CHANNEL PLATE SPACER PASSAGES - UPPER

Figure 27

6 LINE
8 CONVERTER FEED
9 LUBE 2
10 TCC FEED LIMIT
11 CONVERTER RELEASE
12 CONVERTER APPLY
13 TCC EXHAUST ENABLE
14 ORIFICE TCC EXHAUST ENABLE
15 TO COOLER
20 ACTUATOR FEED
22 TORQUE SIGNAL
27 PRIMARY ACCUMULATOR
29 1-2 ACCUMULATOR
30 SECONDARY 2-3 ACCUMULATOR
31 2-3 ACCUMULATOR
40 3RD CLUTCH
41 FILTERED 3RD CLUTCH
42 ORIFICED 3RD CLUTCH
45 REGULATED APPLY
46 TCC CONTROL
52 EXHAUST



CONTROL VALVE ASSEMBLY GASKET - UPPER

Figure 28

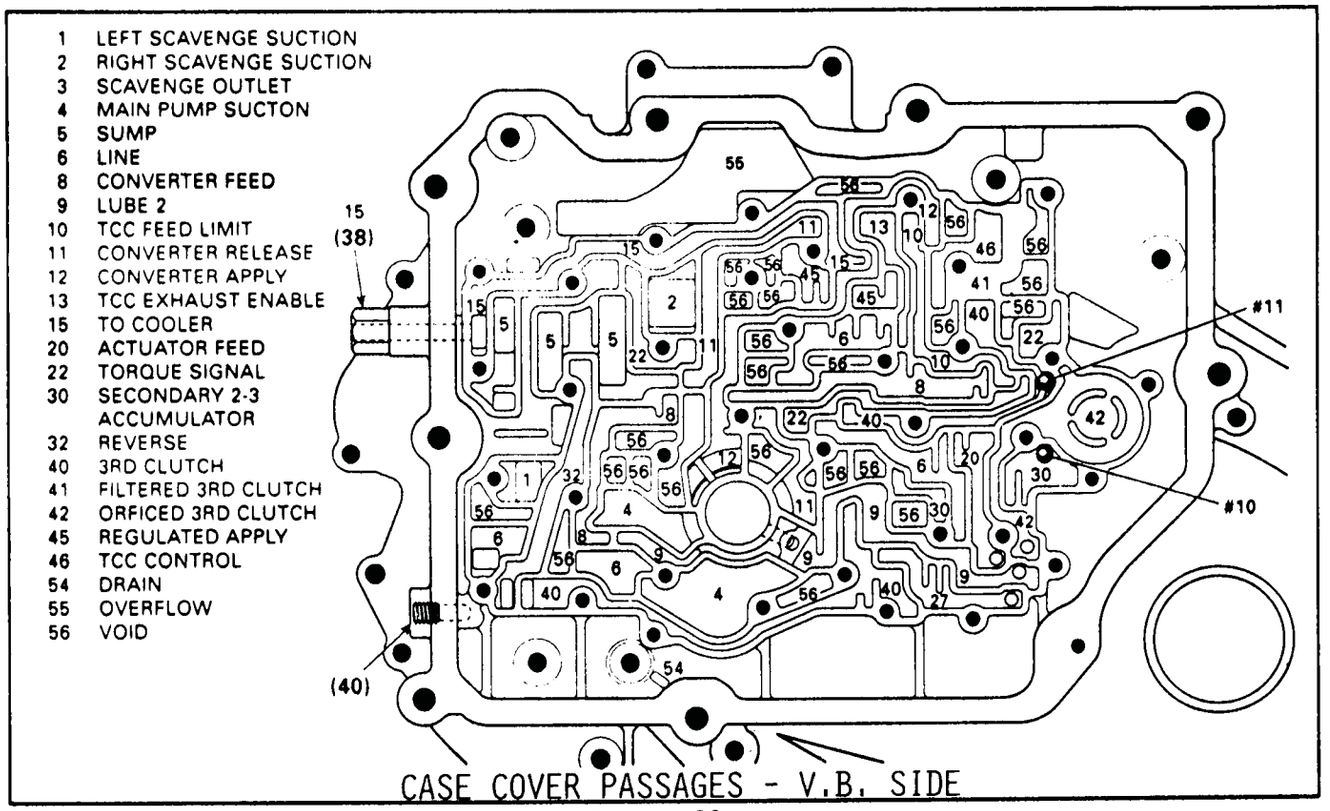


Figure 29

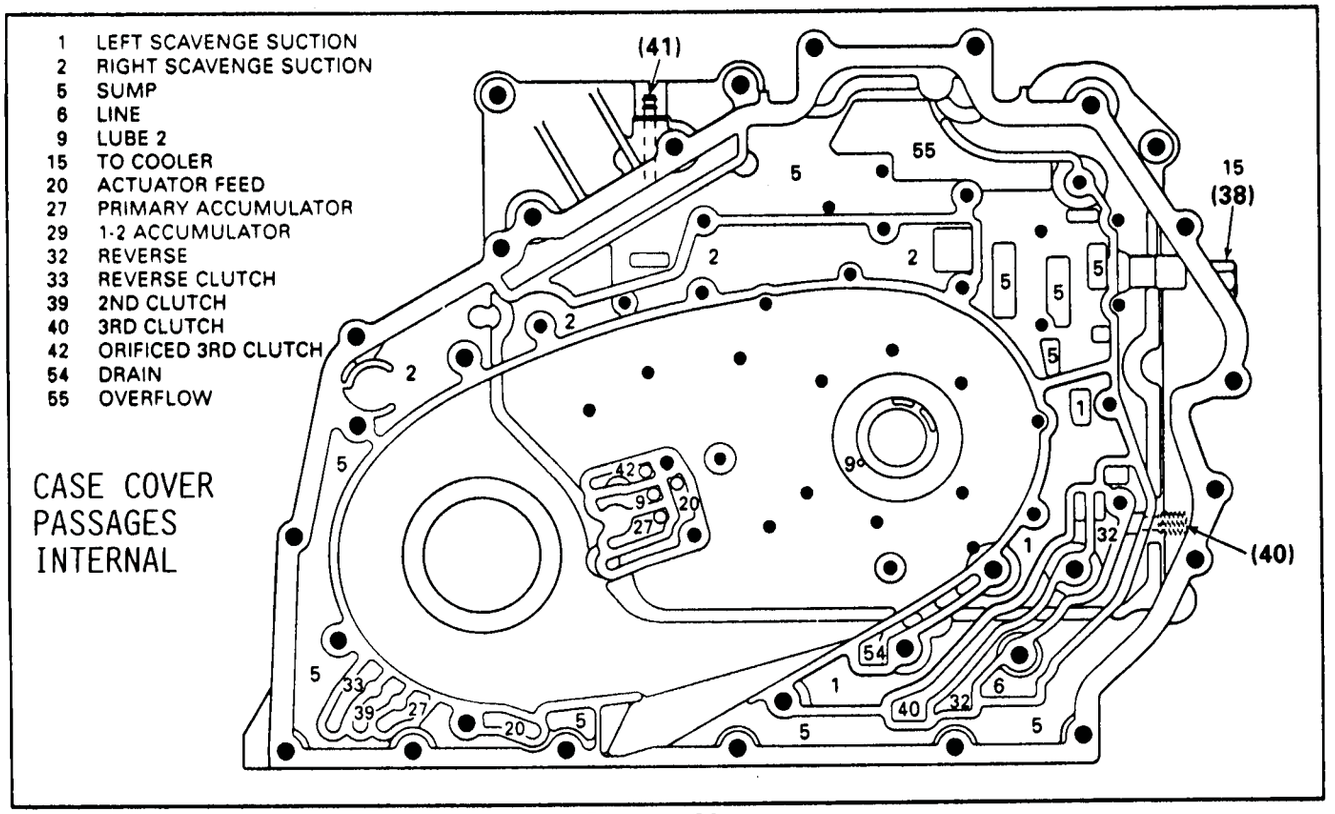
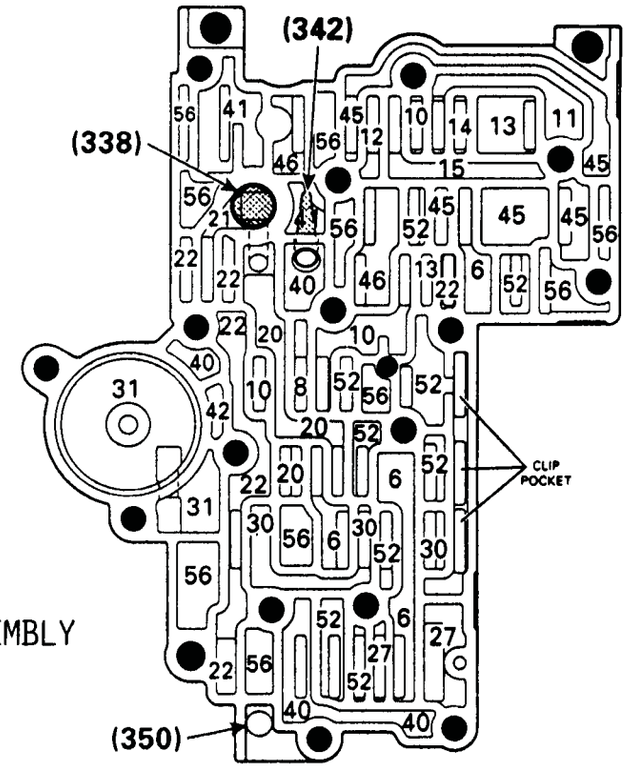


Figure 30

6 LINE
8 CONVERTER FEED
10 TCC FEED LIMIT
11 CONVERTER RELEASE
12 CONVERTER APPLY
13 TCC EXHAUST ENABLE
15 TO COOLER
20 ACTUATOR FEED
21 FILTERED ACTUATOR FEED
22 TORQUE SIGNAL
27 PRIMARY ACCUMULATOR
30 SECONDARY 2-3 ACCUMULATOR
31 2-3 ACCUMULATOR
40 3RD CLUTCH
41 FILTERED 3RD CLUTCH
45 REGULATED APPLY
46 TCC CONTROL
52 EXHAUST
56 VOID



UPPER CONTROL VALVE ASSEMBLY

Figure 31

1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUTION
5 SUMP
6 LINE
9 LUBE 2
16 LUBE
20 ACTUATOR FEED
27 PRIMARY ACCUMULATOR
29 1-2 ACCUMULATOR
32 REVERSE
33 REVERSE CLUTCH
39 2ND CLUTCH
40 3RD CLUTCH
42 ORIFICED 3RD CLUTCH
52 EXHAUST
54 DRAIN
55 OVERFLOW
56 VOID

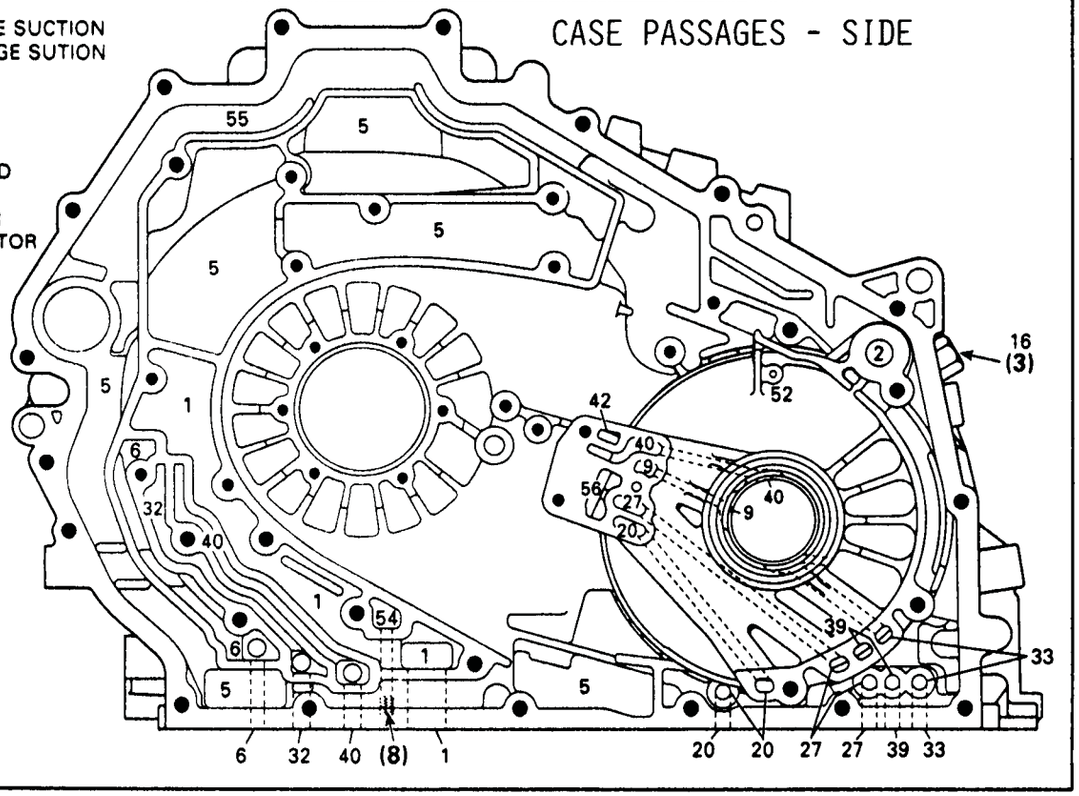
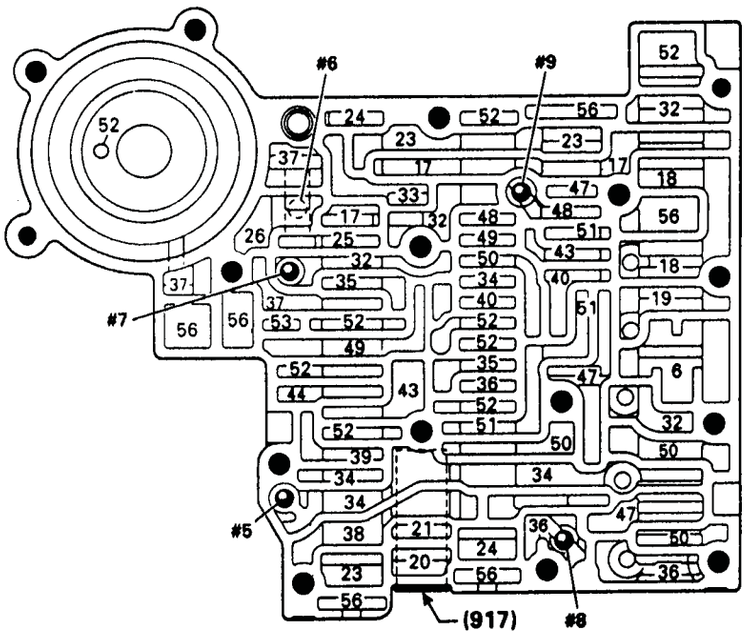


Figure 32

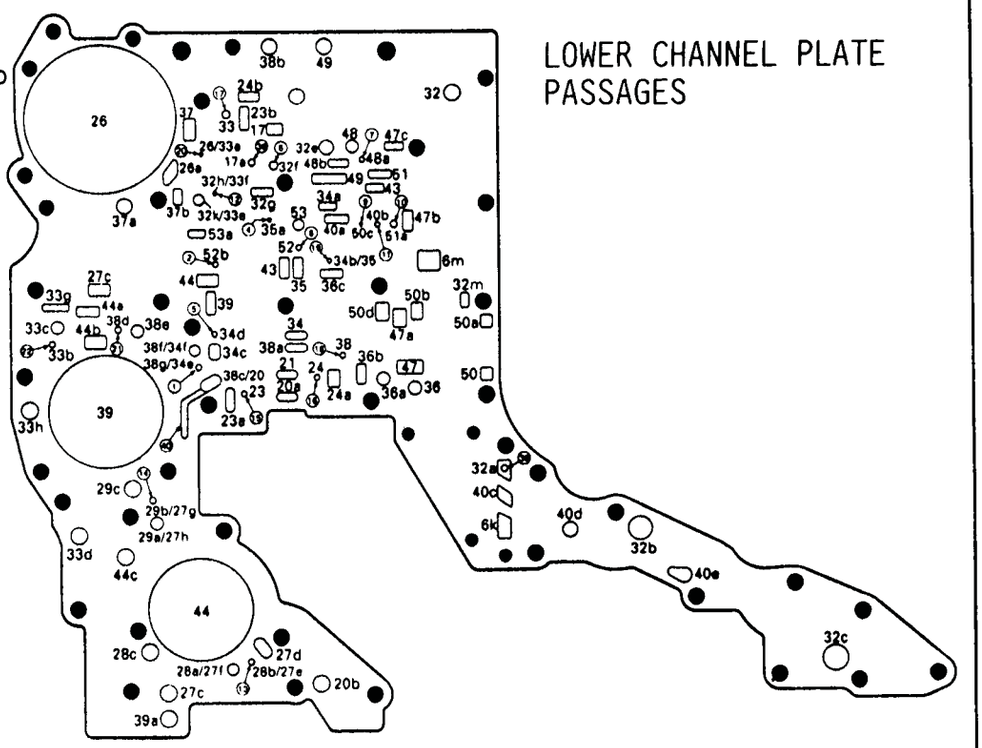
6 LINE
17 PRN
18 PRND4
19 PRND43
20 ACTUATOR FEED
21 FILTERED ACTUATOR FEED
23 SOLENOID A
24 SOLENOID B
25 LO & REVERSE BAND APPLY
26 REVERSE BAND
32 REVERSE
34 DRIVE
35 LO FEED
36 LO
37 LO & REVERSE BAND REDUCE
38 FORWARD CLUTCH
39 2ND CLUTCH
40 3RD CLUTCH
43 4TH BAND FEED
44 4TH BAND
47 D321
48 COAST CLUTCH FEED
49 COAST CLUTCH
50 D21
51 D21 Y
52 EXHAUST
56 VOID



LOWER CONTROL VALVE ASSEMBLY PASSAGES

Figure 33

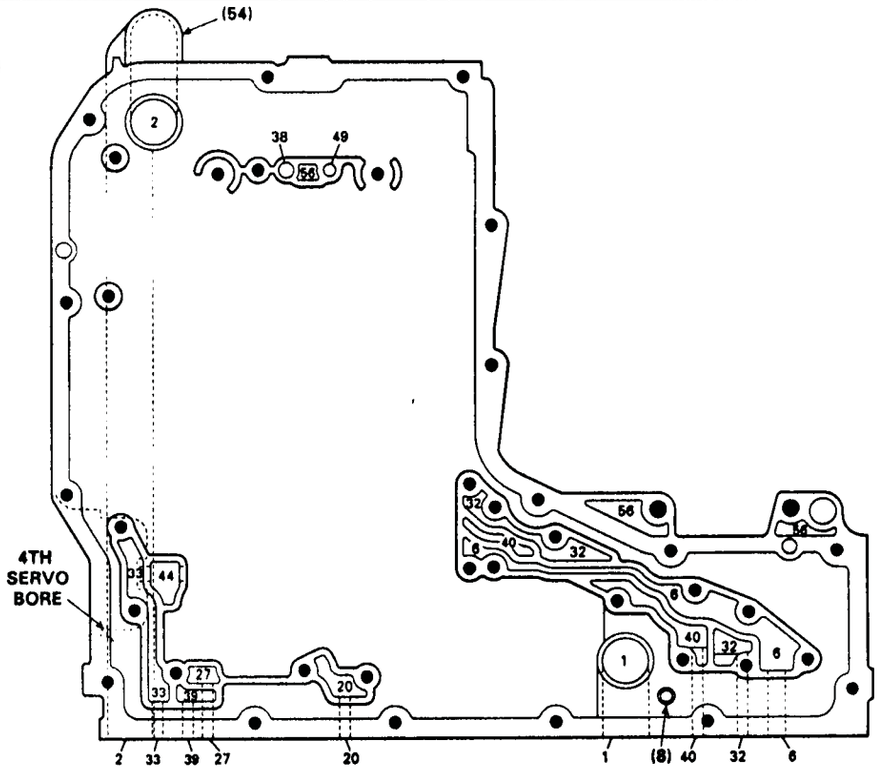
6 LINE
17 PRN
20 ACTUATOR FEED
21 FILTERED ACTUATOR FEED
23 SOLENOID A
24 SOLENOID B
26 REVERSE BAND
27 PRIMARY ACCUMULATOR
28 3-4 ACCUMULATOR
29 1-2 ACCUMULATOR
32 REVERSE
33 REVERSE CLUTCH
34 DRIVE
35 LO FEED
36 LO
38 FORWARD CLUTCH
39 2ND CLUTCH
40 3RD CLUTCH
43 4TH BAND FEED
44 4TH BAND
47 D321
48 COAST CLUTCH FEED
49 COAST CLUTCH
50 D21
51 D21 Y
52 EXHAUST
53 ORIFCED EXHAUST
56 VOID



LOWER CHANNEL PLATE PASSAGES

Figure 34

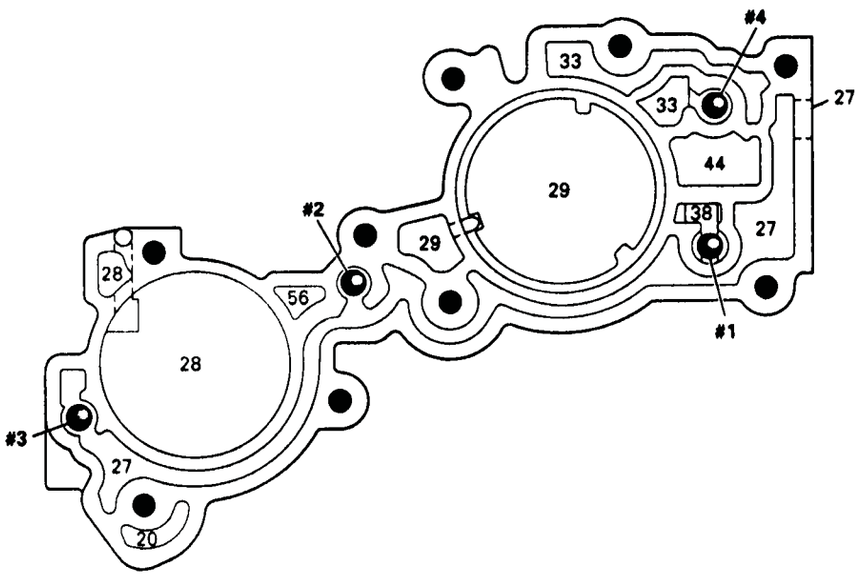
1 LEFT SCAVENGE SUCTION
2 RIGHT SCAVENGE SUCTION
6 LINE
20 ACTUATOR FEED
27 PRIMARY ACCUMULATOR
32 REVERSE
33 REVERSE CLUTCH
38 FORWARD CLUTCH
39 2ND CLUTCH
40 3RD CLUTCH
44 4TH BAND
49 COAST CLUTCH
56 VOID



CASE PASSAGES BOTTOM

Figure 35

27 PRIMARY ACCUMULATOR
28 3-4 ACCUMULATOR
29 1-2 ACCUMULATOR
33 REVERSE CLUTCH
38 FORWARD CLUTCH
44 4TH BAND
56 VOID



FORWARD AND REVERSE ACCUMULATOR HOUSING PASSAGES

Figure 36

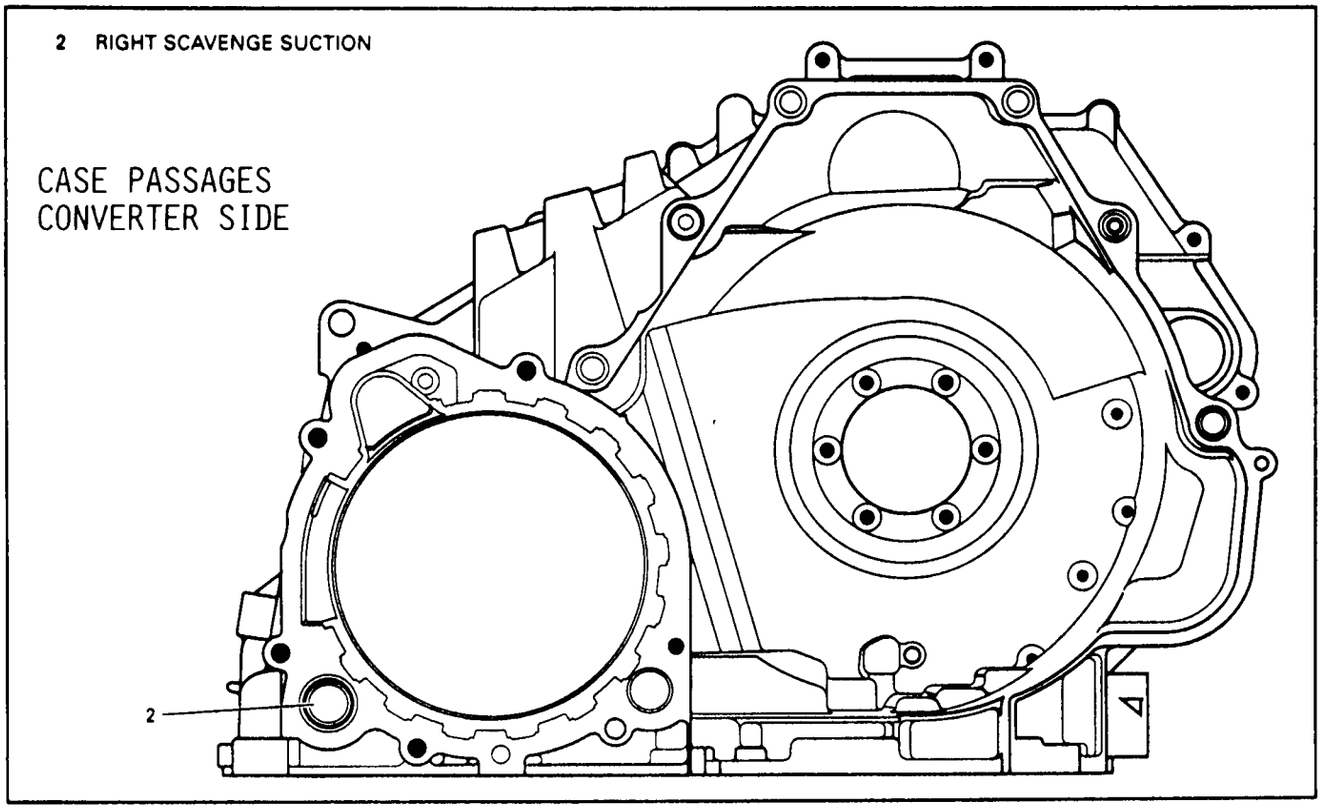


Figure 37

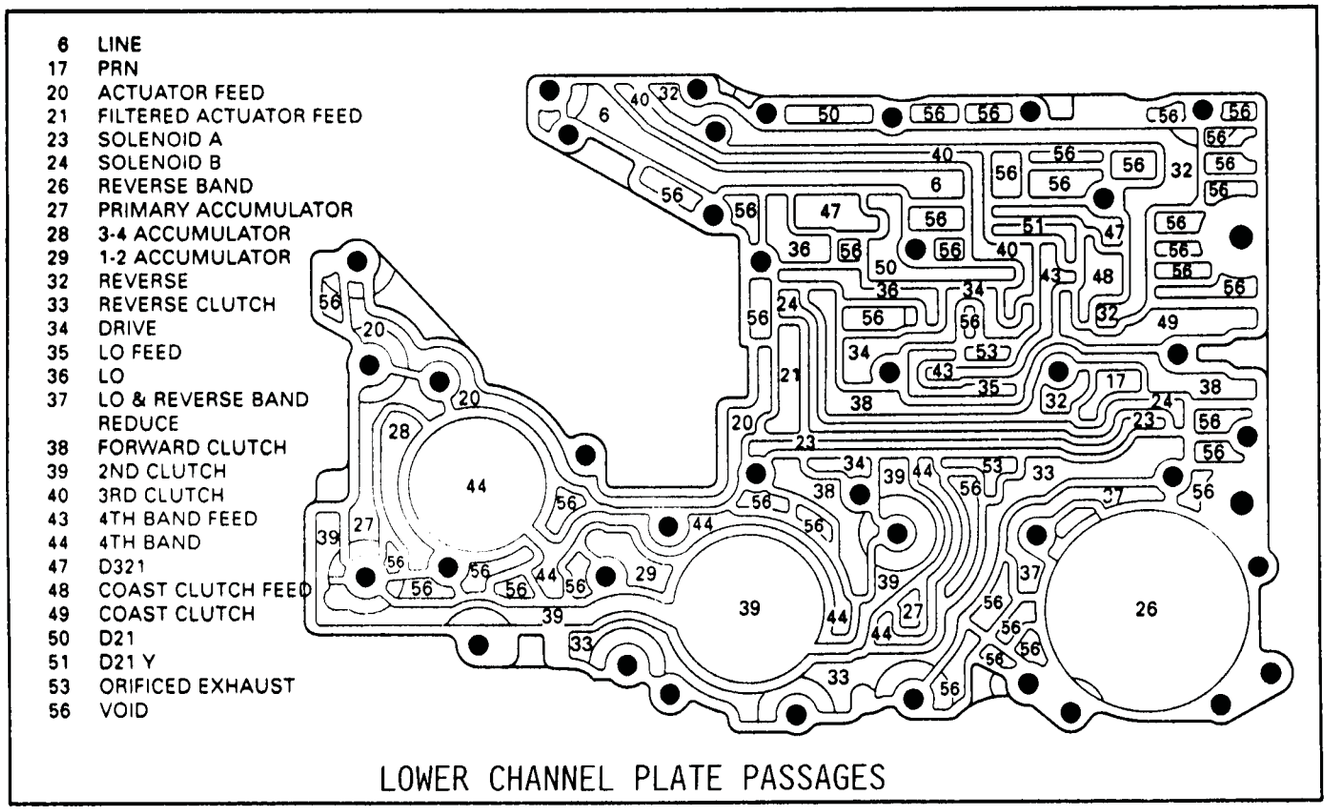


Figure 38

TRANSAXLE DISASSEMBLY

GENERAL SERVICE INFORMATION

Caution must be exercised when lifting or rotating this transaxle due to its considerable weight (296 lbs). Utilize the bore located in the holding fixture whenever lifting the unit is necessary and lift with a chain hoist and/or appropriate lifting equipment. It may be necessary to place a counterweight on the opposite side of your workbench for balance when you mount the 4T80-E transaxle in the bench fixture.

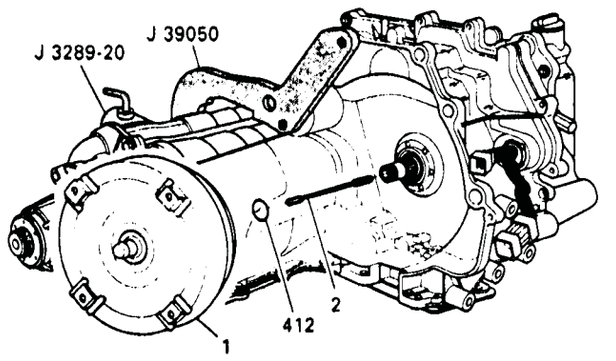
Make sure the work area is adequate and CLEAN for the layout, inspection and cleaning of component parts.

Do not over expand snap rings during disassembly or assembly process.

1. Install J-39050 support fixture onto the transaxle, as shown in Figure 39.

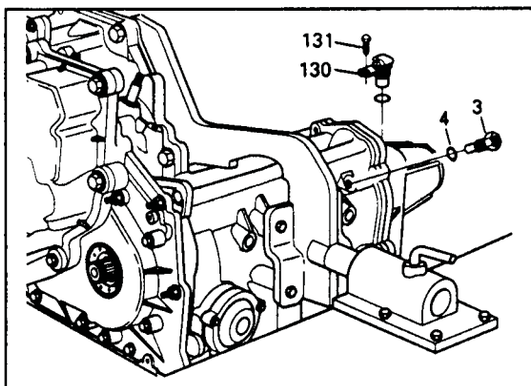
   CAUTION: TO AVOID THE POSSIBILITY OF PERSONAL INJURY AND DAMAGE TO THE TRANSAXLE, INSTALL ALL THE BOLTS FOR THE FIXTURE AND TORQUE TO 10 ft.lbs.

2. Install transaxle and fixture into the base fixture on bench, using suitable lifting device (See Figure 40)
3. Position transaxle with case extension pointing downward to allow fluid drain.
4. Insert pin into base to retain the transaxle in position to drain fluid.
5. Rotate transaxle in fixture to position shown in Figure 40, after drainage.
6. Remove one retaining bolt from speed sensor located in the case extension (See Figure 40).
7. Remove the speed sensor and seal.
8. Remove the cooler return line fitting using a 19mm wrench, from the case as shown in Figure 40.
9. Remove the oil pump drive shaft as shown in Figure 39.
10. Remove the turbine shaft "O" ring as shown in Figure 39.
11. Remove the three 10mm retaining bolts from the overdrive servo cover (See Figure 41).
    NOTE; HOLD THE SERVO COVER IN PLACE UNTIL ALL OF THE BOLTS ARE REMOVED. IF THIS IS NOT DONE, THE APPLY PIN WILL DAMAGE THE BORE IN THE CASE.
12. Remove the servo cover and overdrive servo assembly as shown Figure 41.



1 TORQUE CONVERTER ASSEMBLY
2 SHAFT, OIL PUMP DRIVEN
412 SEAL, O-RING

Figure 39



3 COOLER CONNECTOR, RETURN (CASE) (1, 19mm)
4 CONNECTOR, O-RING COOLER (RETURN)
130 SENSOR, SPEED OUTPUT ASSEMBLY
131 BOLT, SPEED SENSOR TO CASE EXTENSION (1, 10mm)

Figure 40

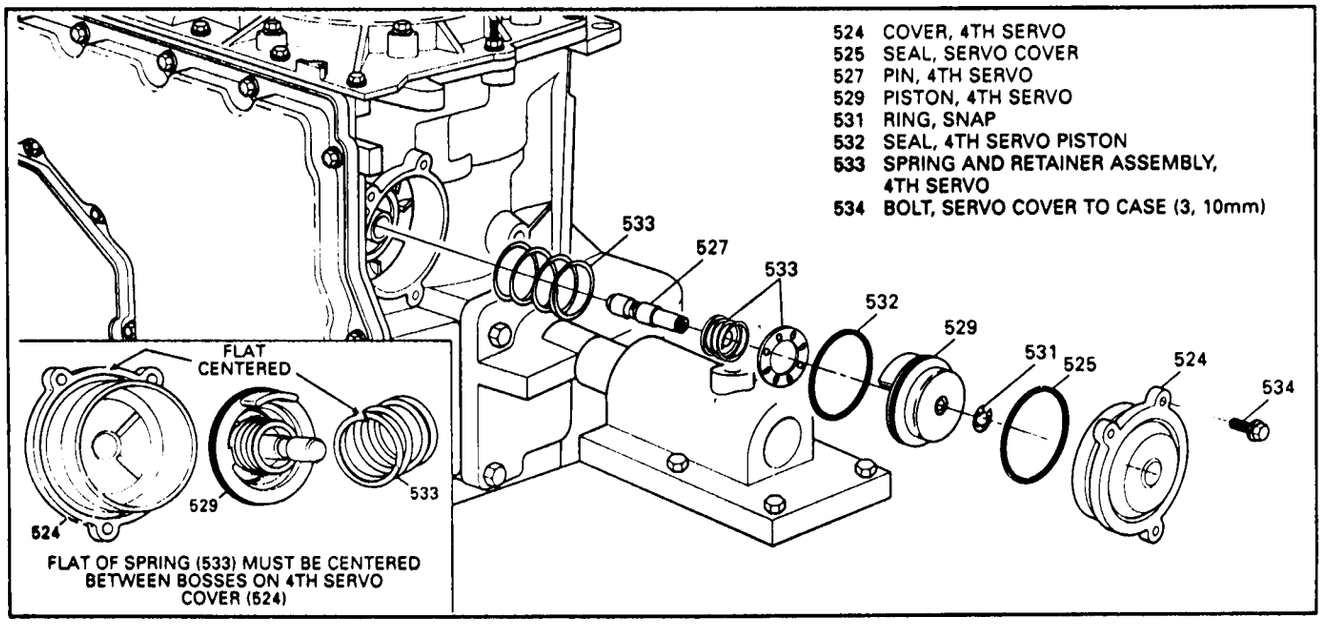
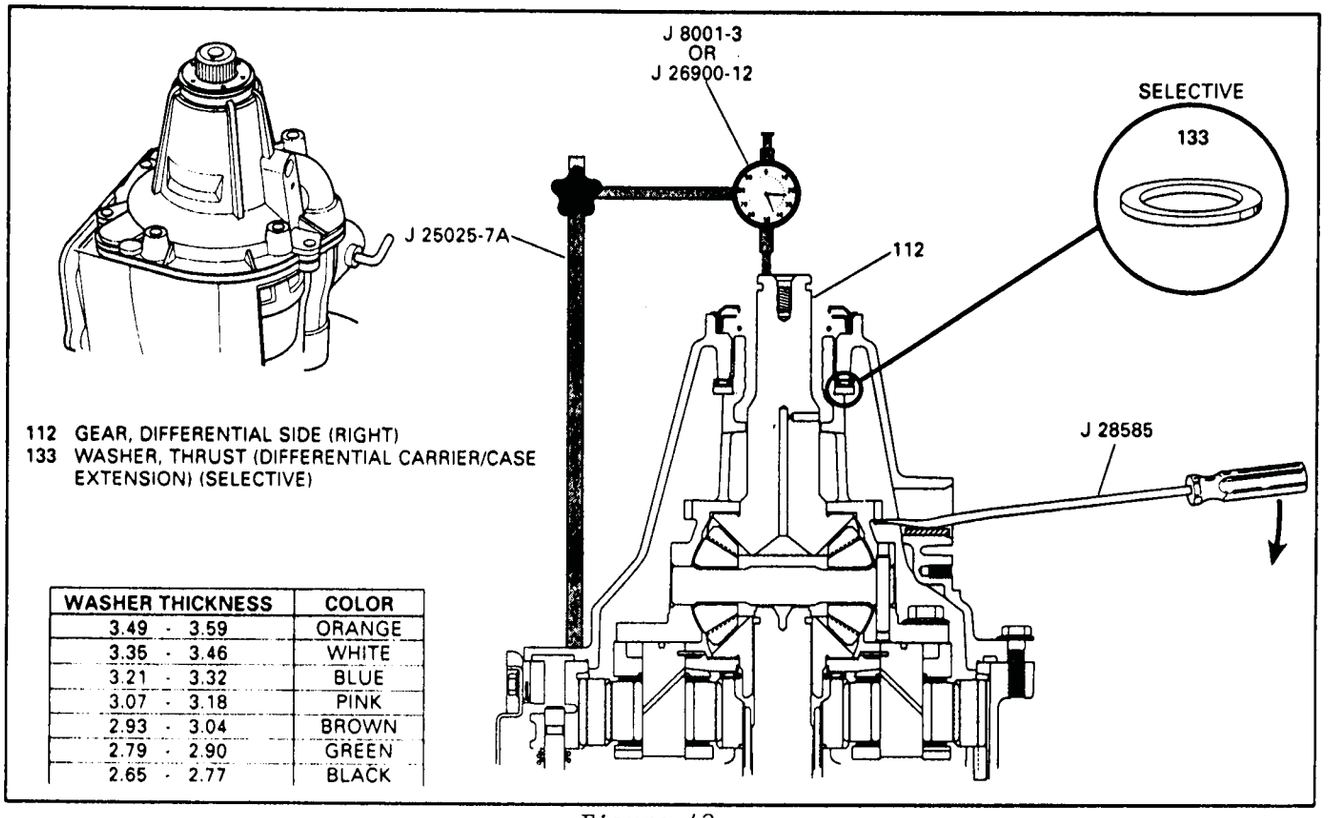


Figure 41



WASHER THICKNESS	COLOR
3.49 - 3.59	ORANGE
3.35 - 3.46	WHITE
3.21 - 3.32	BLUE
3.07 - 3.18	PINK
2.93 - 3.04	BROWN
2.79 - 2.90	GREEN
2.65 - 2.77	BLACK

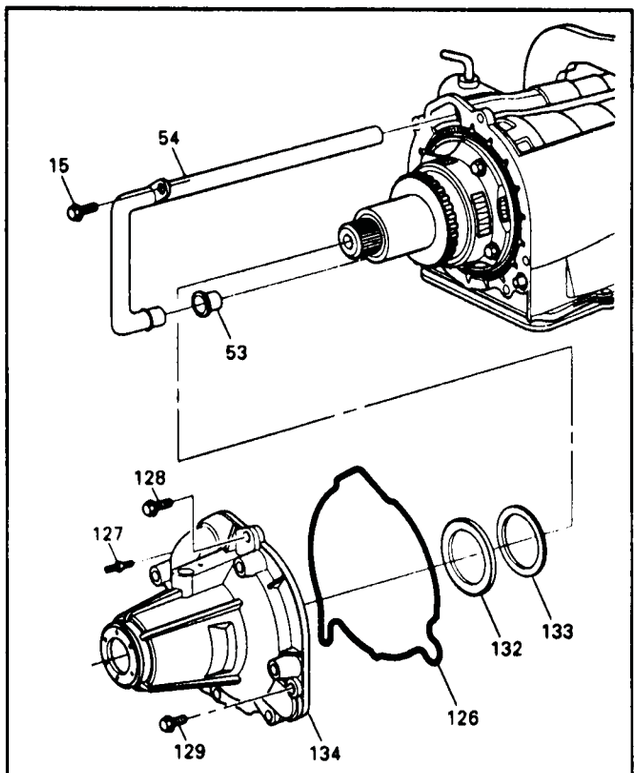
Figure 42

FINAL DRIVE END PLAY MEASUREMENT

1. Install dial indicator J-26900-12 onto transaxle, as shown in Figure 42.
2. Position dial indicator with stem on output shaft as shown in Figure 42.
3. Zero out the dial indicator.
4. Insert J-28585 through output speed sensor bore and lift speed sensor rotor for measurement (See Figure 42).
   NOTE: PROTECT SPEED SENSOR BORE WITH A PIECE OF WOOD OR USED FILLER TUBE SEAL, TO PREVENT DAMAGE.
5. Proper final drive end play should be .005"-.025" clearance.
6. Record measured specification and if necessary adjust with proper thickness selective thrust washer upon reassembly.
7. Use the chart in Figure 42 for the proper selective thrust washer.
8. Remove the dial indicator from the transaxle.

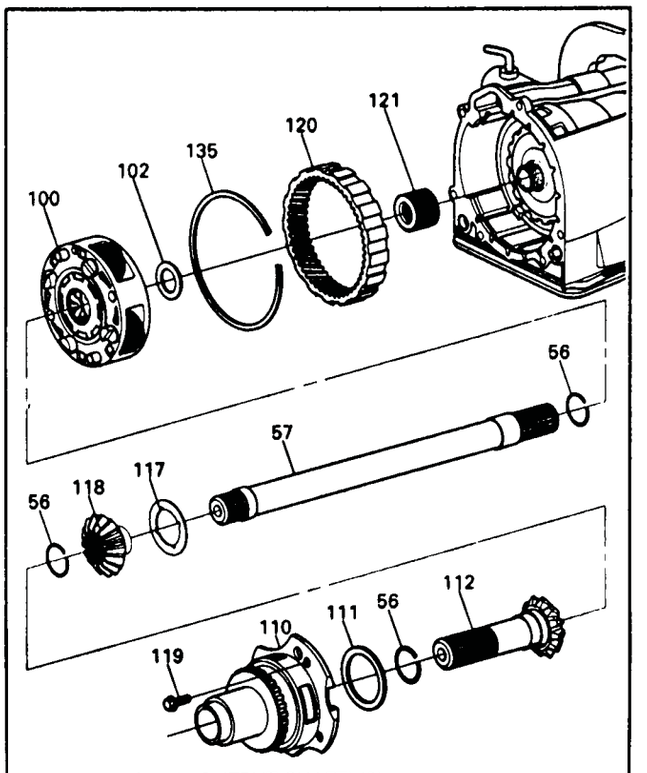
CASE EXTENSION AND SCAVENGE TUBE

1. Remove four 13mm bolts, one 10mm bolt, and one 15mm stud from case extension as shown in Figure 43.
2. Remove the case extension and seal. Seal may remain in extension.
3. Remove thrust bearing and selective washer from final drive.
4. Remove the 8mm bolt that retains the scavenge tube in case (See Figure 43).
5. Remove scavenge tube by prying on the differential with screwdriver. (See Figure 43).
6. Remove and discard scavenge tube seal. (See Figure 43).



15 BOLT, SCAVENGE TUBE (1, 8mm)
53 SEAL, SCAVENGE TUBE AND SCREENS
54 TUBE, SCAVENGE
126 SEAL, CASE EXTENSION TO CASE
127 STUD, CASE EXTENSION TO CASE (1, 15mm)
128 BOLT, CASE EXTENSION TO CASE (4, 13mm)
129 BOLT, CASE EXTENSION TO CASE (1, 10mm)
132 BEARING, THRUST
133 WASHER, THRUST (DIFFERENTIAL CARRIER/CASE EXTENSION) (SELECTIVE)
134 EXTENSION, TRANSAXLE CASE

Figure 43



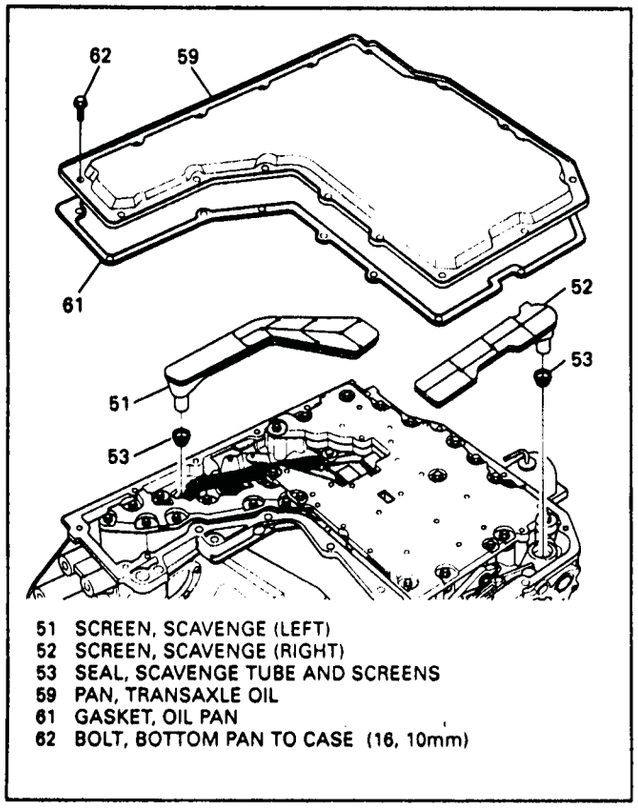
56 RING, SNAP (OUTPUT SHAFT) (3)
57 SHAFT, OUTPUT
100 CARRIER, FINAL DRIVE
102 BEARING, THRUST (SUNGEAR/CARRIER)
110 CARRIER, DIFFERENTIAL
111 WASHER, THRUST (DIFFERENTIAL) (RIGHT)
112 GEAR, DIFFERENTIAL SIDE (RIGHT)
117 WASHER, THRUST (DIFFERENTIAL) (LEFT)
118 GEAR, DIFFERENTIAL SIDE (LEFT)
119 BOLT, DIFFERENTIAL CARRIER TO FINAL DRIVE (4, 15mm)
120 GEAR, FINAL DRIVE INTERNAL
121 GEAR, FINAL DRIVE SUN
135 RING, SNAP

Figure 44

FINAL DRIVE ASSEMBLY AND OUTPUT SHAFT

1. Transaxle MUST be in park with the differential locked in place. If the differential can rotate, turn the manual shaft "counterclockwise" to the park position. Actuator rod will stick out of case.
2. Remove the four 15mm differential bolts (See Figure 44).
3. Remove the differential carrier(110) (See Figure 44).
4. Remove output shaft snap ring, as shown in Figure 44.
5. Remove the left side differential gear (See Figure 44).
6. NOTE: Output shaft can be removed through opposite end of case.
7. Remove thrust washer (117), as shown in Figure 44.
8. Remove the final drive carrier as shown in Figure 44.
9. Remove thrust bearing (102) as shown in Figure 44.
10. Remove final drive sun gear.
11. Remove snap ring from case that retains final drive ring gear (See Figure 44).
12. Remove final drive ring gear.

Continued on next Page.



51 SCREEN, SCAVENGE (LEFT)
52 SCREEN, SCAVENGE (RIGHT)
53 SEAL, SCAVENGE TUBE AND SCREENS
59 PAN, TRANSAXLE OIL
61 GASKET, OIL PAN
62 BOLT, BOTTOM PAN TO CASE (16, 10mm)

Figure 45

BOTTOM PAN, GASKET AND SCAVENGE SCREENS

1. Remove 16 bottom pan bolts using a 10mm socket (See Figure 45).
2. Remove bottom pan, and discard gasket.
3. Remove left scavenge screen and seal as shown in Figure 45.
4. Remove right scavenge screen and seal as shown in Figure 45.
5. A small screwdriver may be used to pry seals from the case using care not to damage the case bores.
6. Use a small screwdriver to disconnect shift solenoids A and B and transaxle pressure switch connectors by prying back small tabs, shown in Figure 46.
7. Remove nine 10mm bolts from the oil transfer plate (See Figure 47).
8. Remove oil transfer plate.
9. Remove manual valve linkage clip using a small screwdriver as shown in Figure 46.
10. Remove two 10mm bolts(958) and two 10mm nuts(955) from lower valve body assembly as shown in Figure 47

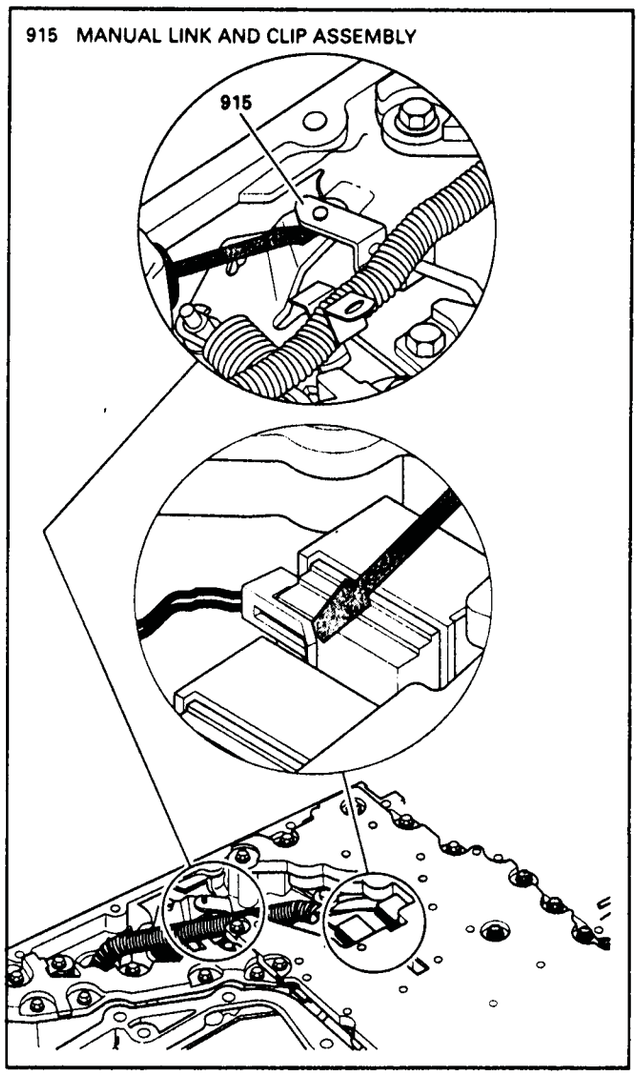
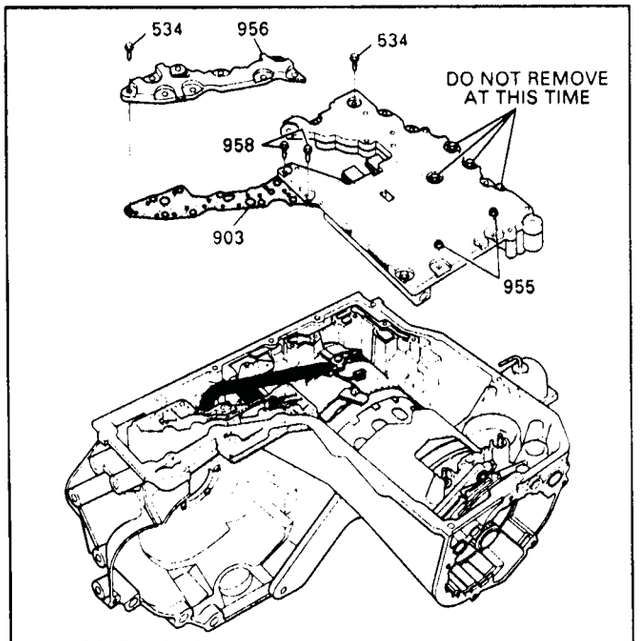


Figure 46

11. Remove nine 10mm bolts from lower valve body assembly as shown in Figure 47.
12. DO NOT remove the four bolts indicated in Figure 47 at this time.
13. Lift lower channel plate, valve body assembly and accumulator assembly from case as a single unit and set aside. (See Figure 47).

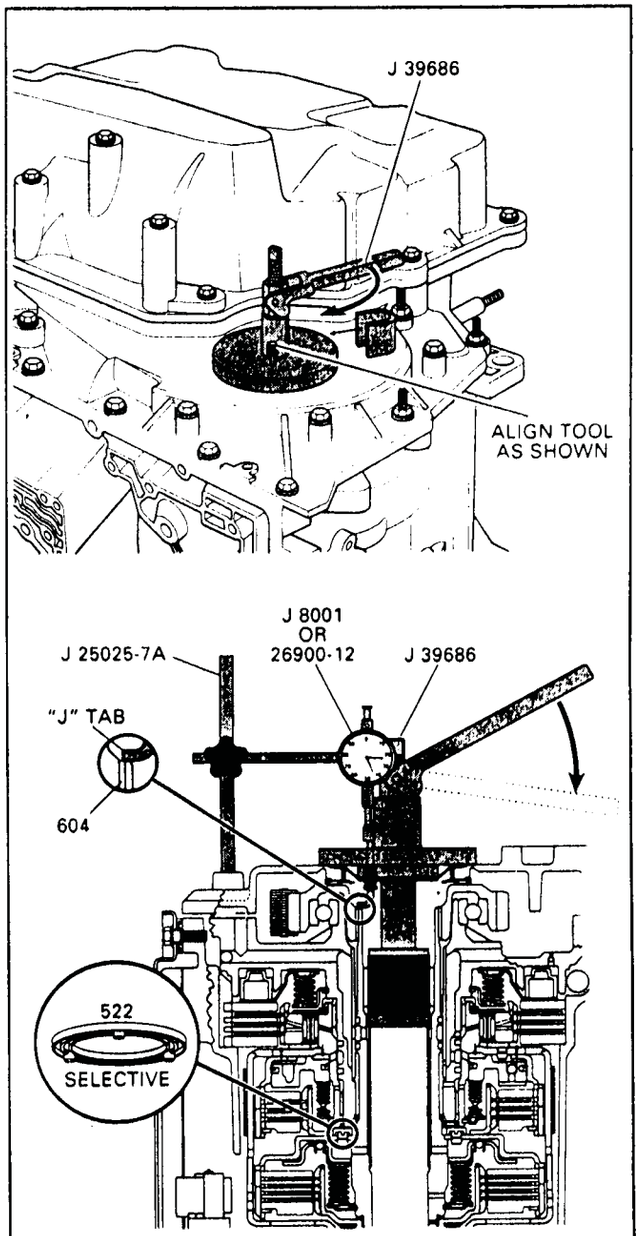


534 BOLT, (18, 10mm)
903 CHANNEL PLATE TO CONTROL VALVE AND HOUSING ASSEMBLY
955 NUT, CHANNEL PLATE TO CASE (2, 10mm)
956 PLATE, OIL TRANSFER
958 BOLT, CHANNEL PLATE TO CASE (2, 10mm)

Figure 47

INPUT SHAFT END PLAY MEASUREMENT

1. Install end play tool J-39686 into the case barrel as shown in Figure 48.
2. Locate the "J" tab on end play tool on top of input shaft as shown in Figure 48.
3. Tool J-39686 must rest flat on case cover seal as shown in Figure 48.
4. Rotate threaded shaft clockwise until tight (See Figure 48).
5. Insert collar between flange and the handle of end play tool as shown in Figure 48.
6. Install dial indicator as shown in Figure 48, with tip of dial indicator resting on top of tab.
7. Zero the dial indicator.
8. Push down on handle and check the end play measurement.
9. Proper end play is .004"-.033".
10. If the specification is out of range determine the proper selective washer using the chart in Figure 48.
11. Remove the dial indicator, end play tool, and post.



WASHER THICKNESS
2.27 - 2.49
2.58 - 2.80
2.89 - 3.11
3.20 - 3.42
3.51 - 3.73
3.82 - 4.04
4.13 - 4.35
4.44 - 4.66
4.75 - 4.97

522 WASHER, THRUST (DRIVEN SPROCKET SUPPORT) (SELECTIVE)
604 HOUSING, THIRD CLUTCH

Figure 48

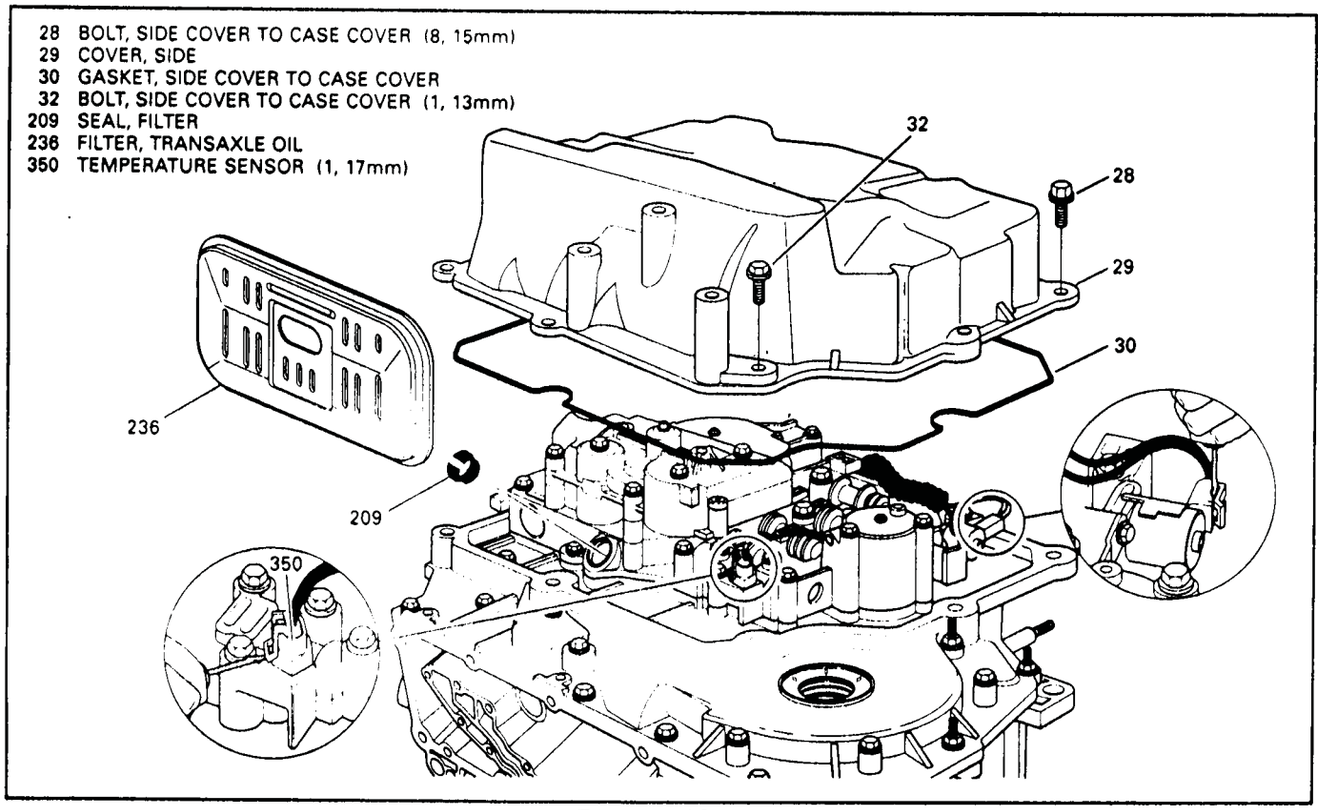
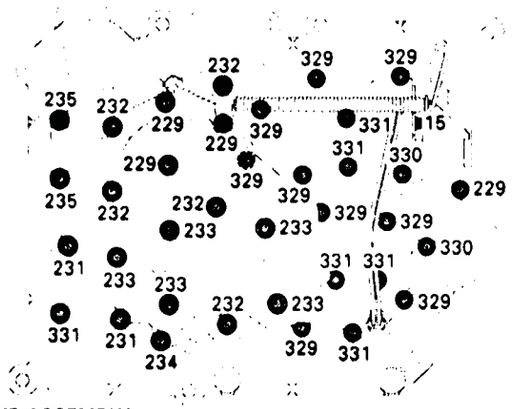


Figure 49

SIDE COVER AND RELATED PARTS

1. Remove nine side cover bolts, notice that one is larger than the others. (See Figure 49).
2. Remove the side cover and discard the side cover gasket.
3. Remove the main transaxle filter and filter seal (See Figure 49).
4. Seal may remain in secondary pump body, use small screwdriver to pry out (See Figure 49).
5. Use care not to damage seal bore in pump housing.
6. Use a small screwdriver to disconnect Temp Sensor, TCC Solenoid, and the Pressure Control Solenoid connectors by prying back tabs (See Figure 49).
7. Remove nineteen 8mm bolts located on the pump housings, and indicated in Figure 50.
8. Remove the scavenge, primary and the secondary pump assemblies as one unit as shown in Figure 51.
9. Remove the upper valve body bolts and remove the upper valve body, as shown in Figure 51.
10. Remove the spacer plate and gaskets.
11. Remove two checkballs from cover.



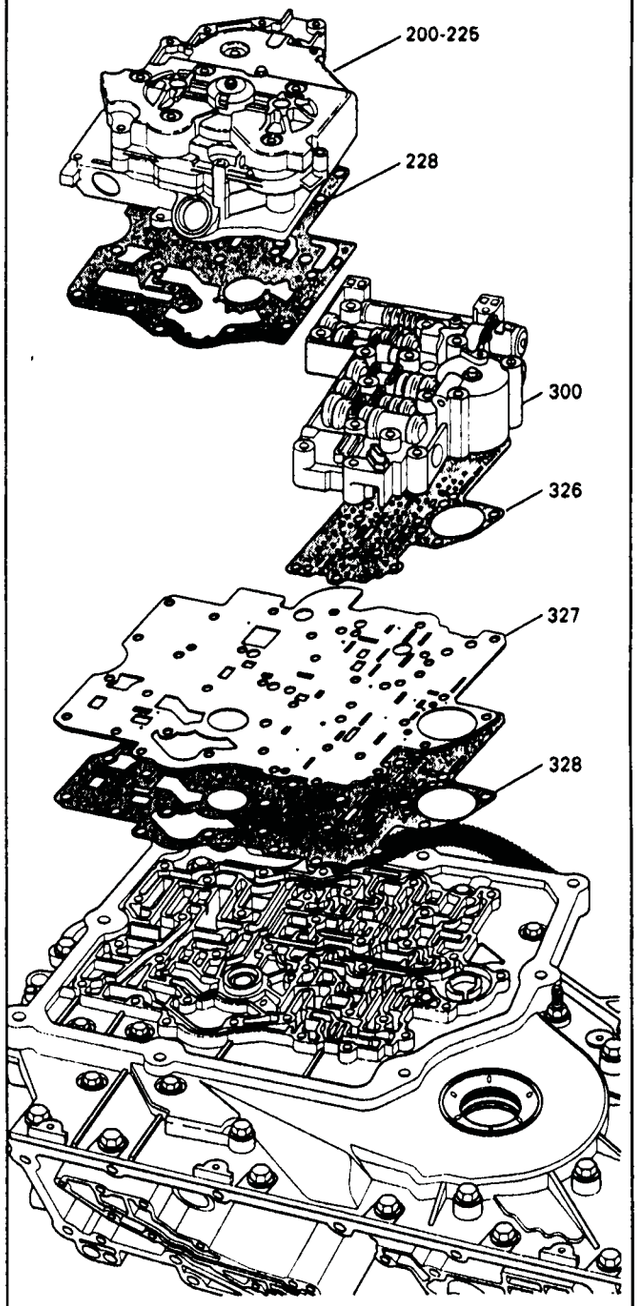
PUMP ASSEMBLY

229	BOLT, PUMP ASSEMBLY TO CASE (3, 8mm)
231	BOLT, PUMP ASSEMBLY TO CASE (2, 8mm)
232	BOLT, PUMP ASSEMBLY TO CASE COVER (5, 8mm)
233	BOLT, PUMP ASSEMBLY TO CASE COVER (5, 8mm)
234	BOLT, SECONDARY PUMP TO CASE COVER (1, 8mm)
235	BOLT, SECONDARY PUMP TO CASE COVER (2, 8mm)
331	BOLT, SECONDARY PUMP TO CASE (1, 8mm)

UPPER CONTROL VALVE BODY (UCVB) ASSEMBLY

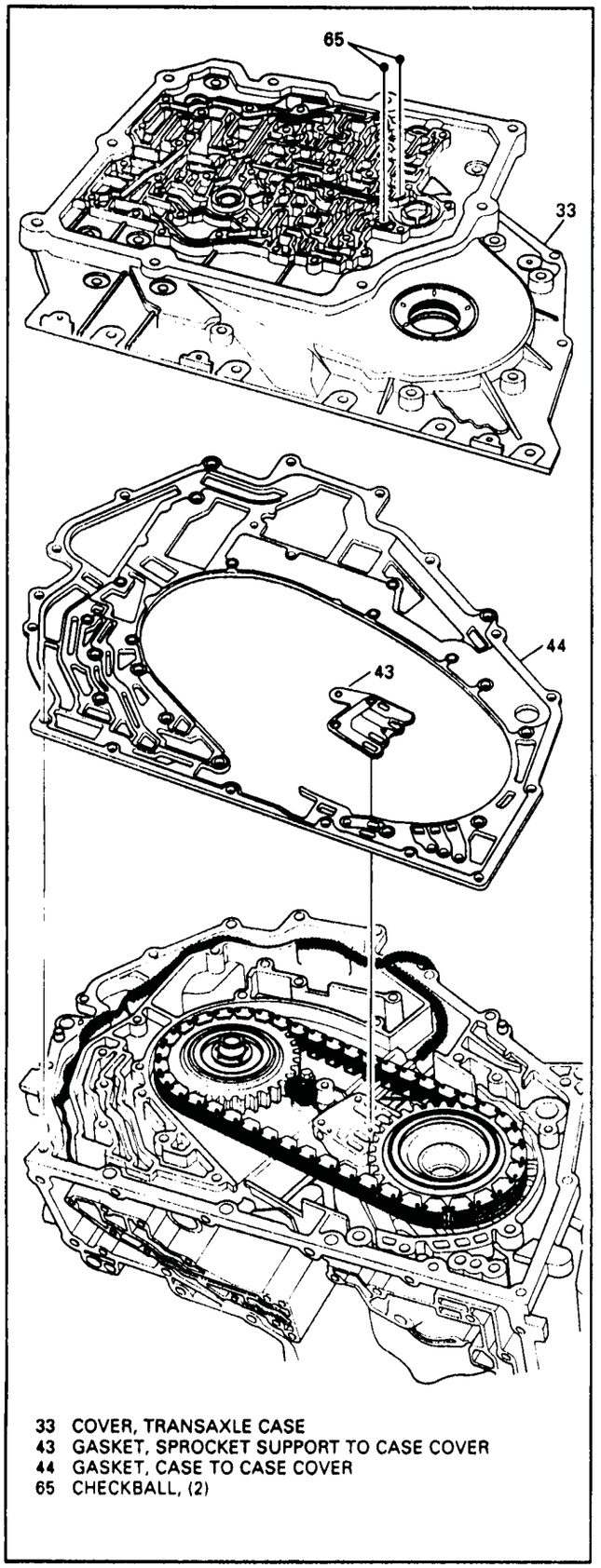
15	BOLT, PRESSURE CONTROL SOLENOID BRACKET TO UCVB (1, 8mm)
229	BOLT, UCVB TO CASE (1, 8mm)
329	BOLT, UCVB TO CASE COVER (9, 8mm)
330	BOLT, UCVB TO CASE COVER (2, 8mm)
331	BOLT, UCVB TO CASE (3, 8mm)
331	BOLT, UCVB TO DRIVEN SPROCKET SUPPORT (2, 8mm)

Figure 50



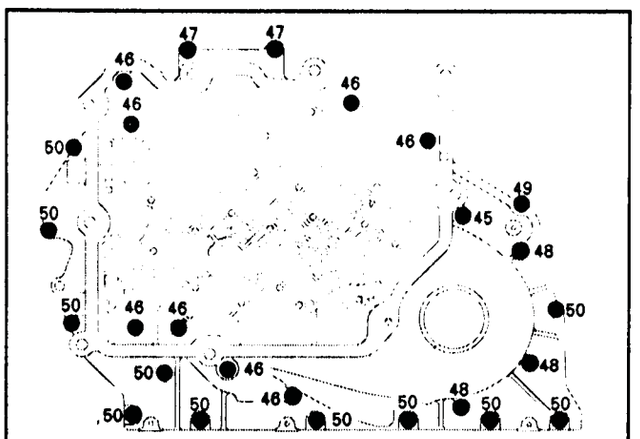
200-225	PRIMARY, SECONDARY AND SCAVENGE PUMP ASM.
228	GASKET, SECONDARY PUMP BODY TO SPACER PLATE
300	BODY, UPPER CONTROL VALVE ASSEMBLY
326	GASKET, VALVE BODY TO SPACER PLATE
327	SPACER PLATE, CASE COVER ASSEMBLY
328	GASKET, SPACER PLATE TO CASE COVER

Figure 51



33 COVER, TRANSAXLE CASE
43 GASKET, SPROCKET SUPPORT TO CASE COVER
44 GASKET, CASE TO CASE COVER
65 CHECKBALL, (2)

Figure 52



45 STUD, CASE COVER TO CASE (1, 13mm)
46 BOLT, CASE COVER TO CASE (8, 10mm)
47 STUD, CASE COVER TO CASE (2, 13mm)
48 BOLT, CASE COVER TO DRIVEN SPROCKET SUPPORT (3, 10mm)
49 STUD, CASE COVER TO CASE (1, 10mm)
50 BOLT, CASE COVER TO CASE (11, 13mm)

Figure 53

CASE COVER AND RELATED PARTS

1. Remove two checkballs from location in case cover, as shown in Figure 52.
2. Remove 26 case cover bolts and studs as shown in Figure 53.
3. Remove case cover passing the wiring harness through case cover.
4. Remove case cover gasket and island gasket and discard (See Figure 52).
5. Remove thrust bearings from the drive and driven sprockets (Figure 54).
6. Mark the drive chain to indicate the direction in which it was removed.
7. Pry up driven sprocket using 2 screw drivers to hold in place, then tap drive sprocket and turbine shaft off using a plastic mallet (Figure 54).
8. Remove drive sprocket and turbine shaft, driven sprocket and drive chain assembly as one unit.
9. Remove 6 drive sprocket support bolts using 8mm socket (See Figure 55).
10. Remove drive sprocket by tapping off using a plastic mallet from bell hsg. side (See Figure 55).
11. Remove the driven sprocket support assembly (See Figure 55).
12. Make sure scavenge tube seal remains in the driven sprocket support. If not, inspect scavenge tube case area for dislodged seal (See Figure 55).

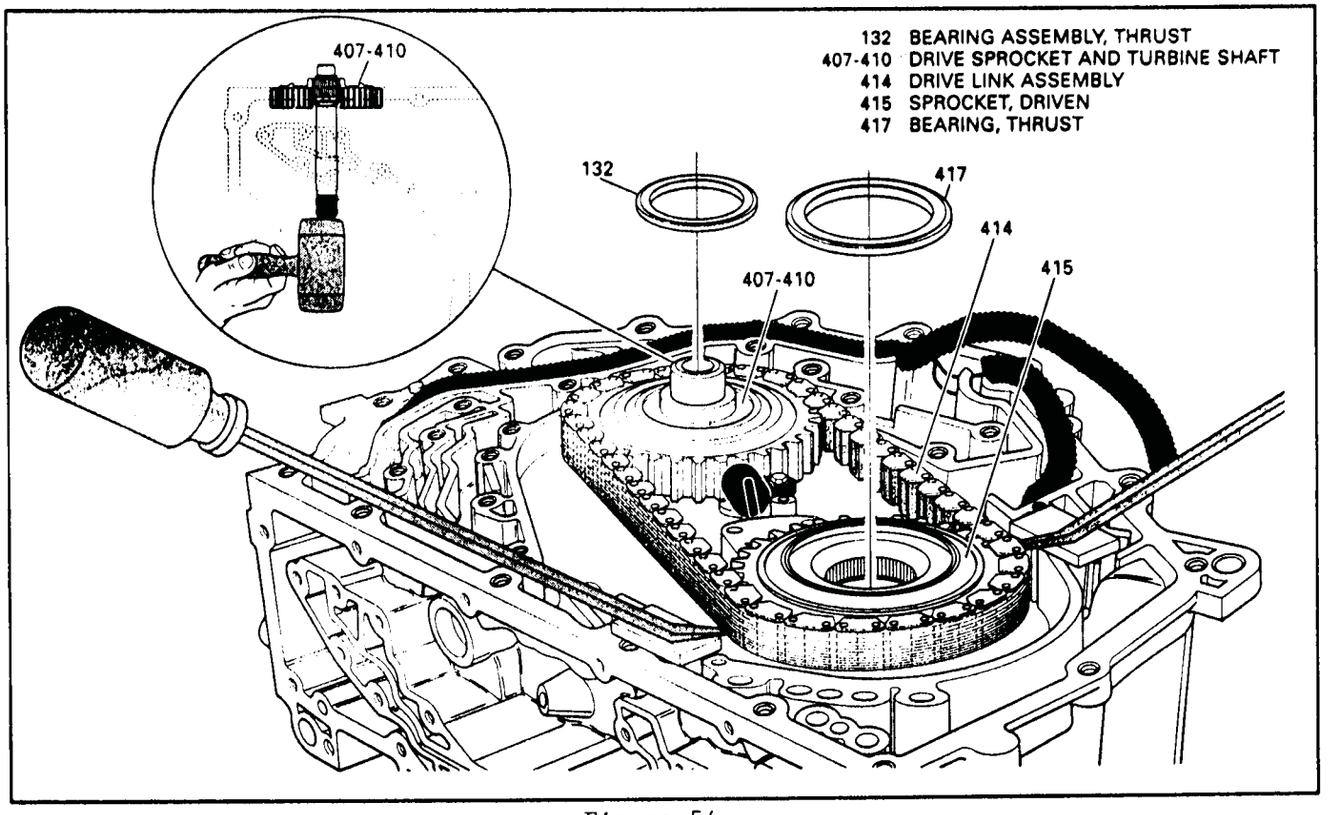


Figure 54

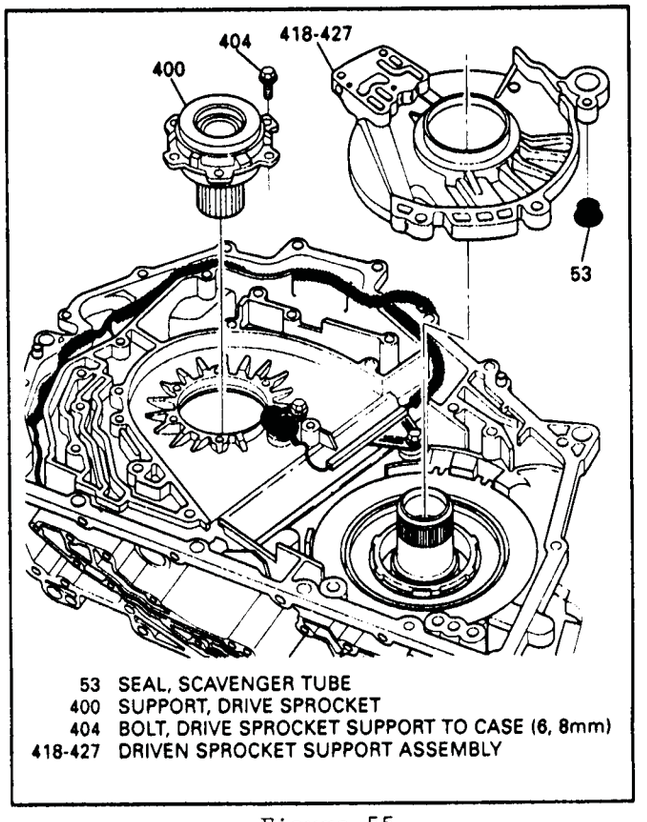
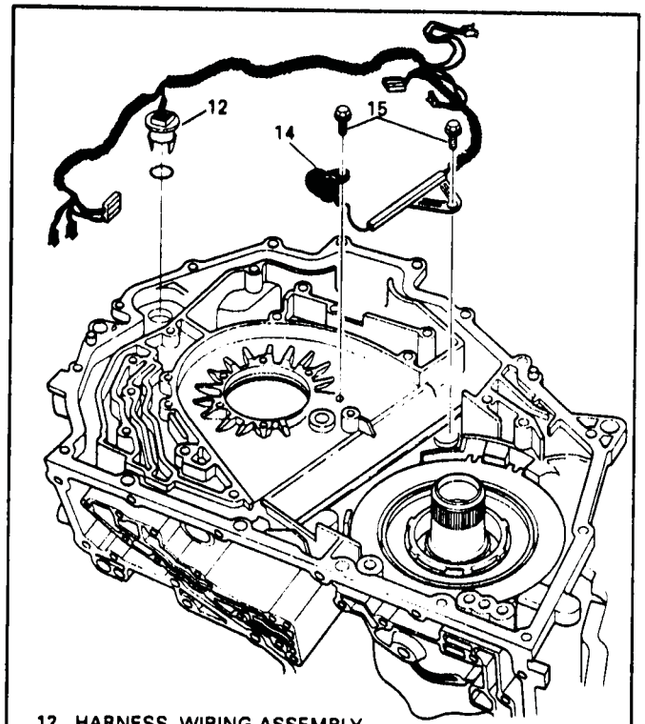


Figure 55

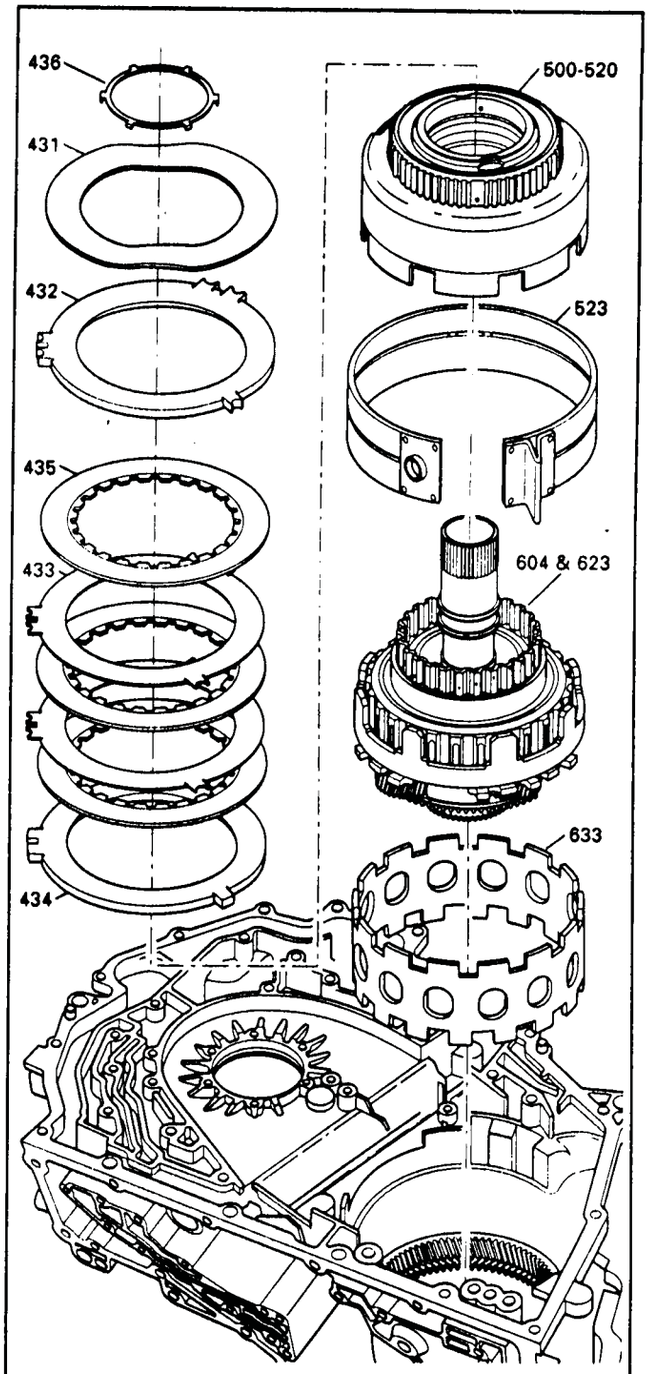


12 HARNESS, WIRING ASSEMBLY
14 INPUT SPEED SENSOR ASSEMBLY
15 BOLT, INPUT SPEED SENSOR (2, 8mm)

Figure 56

INPUT SPEED SENSOR AND WIRING HARNESS

1. Remove two 8mm bolts, one from speed sensor, and one from the wire harness retainer (See Figures 55 and 56).
2. Remove the case connector by pushing the 3 tabs inward from outside case.
3. Remove the input speed sensor and the wiring harness assembly from case. (See Figure 56).



431 PLATE, 2ND CLUTCH (WAVED)
432 PLATE, 2ND CLUTCH (APPLY)
433 PLATE, 2ND CLUTCH (STEEL) (2)
434 PLATE, 2ND CLUTCH (BACKING)
435 PLATE, 2ND CLUTCH (FIBER) (3)
436 WASHER, THRUST (SUPPORT/REV. CLUTCH)
500-520 REVERSE CLUTCH AND 2ND SPRAG ASSEMBLY
523 BAND, FOURTH
604 HOUSING, THIRD CLUTCH
623 CARRIER, REACTION
633 SHELL, REACTION CARRIER

Figure 57

2ND CLUTCH PLATES, REVERSE CLUTCH, 4TH BAND, 3RD CLUTCH AND REACTION SHELL

1. Remove the 2nd clutch plates, pushing up near scavenge tube channel and the bottom pan side (See Figure 57).
2. Remove reverse clutch support thrust washer (See Figure 57).
3. Remove reverse clutch housing and 2nd sprag assembly (See Figure 57).
4. Remove 4th band assembly.
5. Remove 3rd clutch housing and reaction carrier assemblies by grasping input shaft and lifting (See Figure 57).
6. Remove the reaction carrier shell. (See Figure 57).

PARKING PAWL

1. Move the manual shaft out of the park position.
2. Drive out the pivot pin retaining pin (24), as shown in Figure 58.
   NOTE: ONLY THE EARLY 1993 MODELS USED A RETAINING PIN AND PIVOT PIN WITH A NOTCH FOR THE RETAINING PIN. LATER MODELS USE A LONGER AND STRAIGHT PIVOT PIN WITHOUT A RETAINING PIN.
3. Drive parking pawl pivot pin towards side cover with pin punch. Push down on spring while driving shaft out.
4. Remove parking pawl and spring, as shown in Figure 58.
5. Remove actuator park lock sleeve using a rubber or plastic mallet.
6. Drive out towards case extension part of the case (See Figure 58).

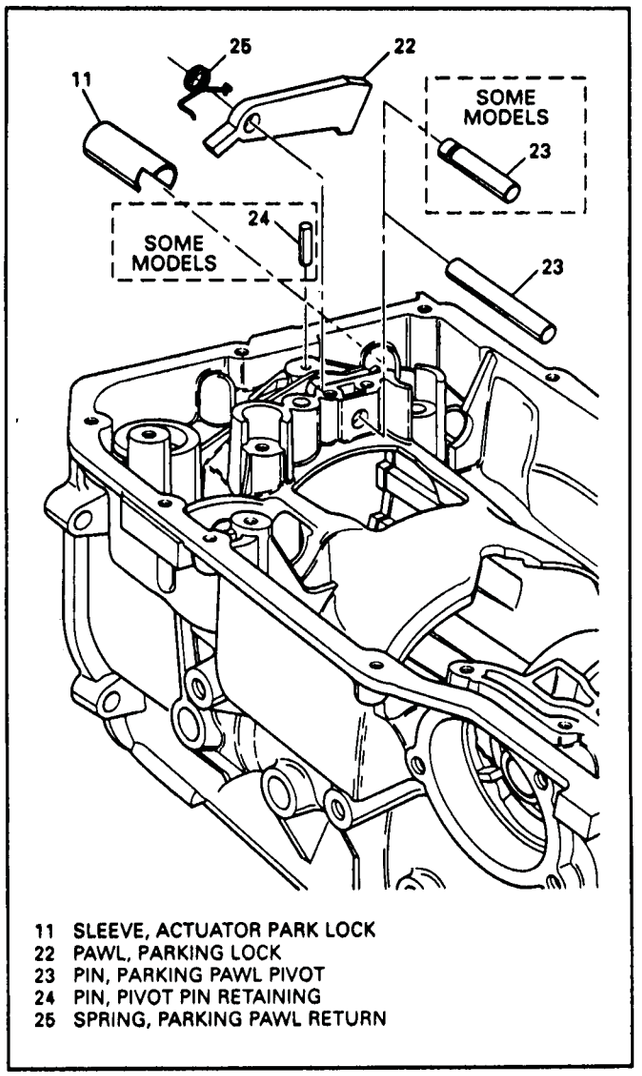


Figure 58

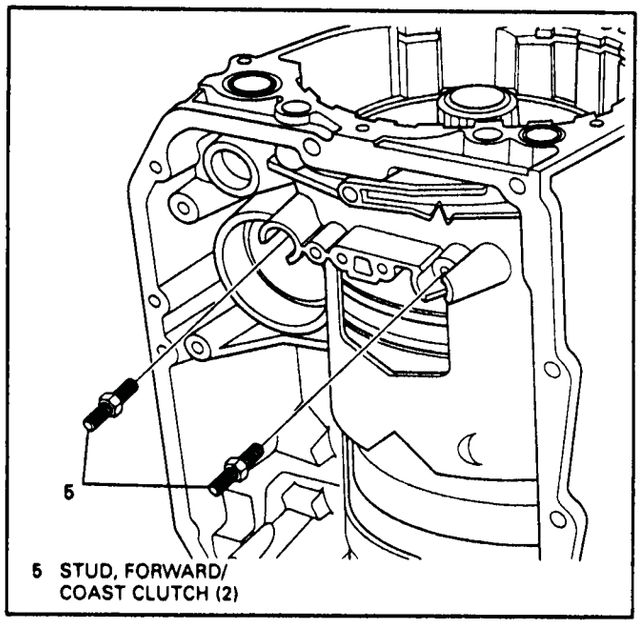


Figure 59

FORWARD CLUTCH, COAST CLUTCH ASSEMBLY AND LO/REVERSE BAND

1. Remove the two 13mm forward clutch support bolts from the case as shown in Figure 59.
2. Install forward/coast clutch puller J-39053 and tighten nut on puller as shown in Figure 60.
3. Lift the forward/coast clutch assembly out of the case with chain hoist or suitable lifting equipment.

CAUTION:
FORWARD/COAST CLUTCH ASSEMBLY WEIGHS APPROXIMATELY 60 LBS.

4. Remove the fretting ring (835), as shown in Figure 61. Note the position of the ring in case before removal.
5. Remove the Lo/Reverse band as shown in Figure 61.

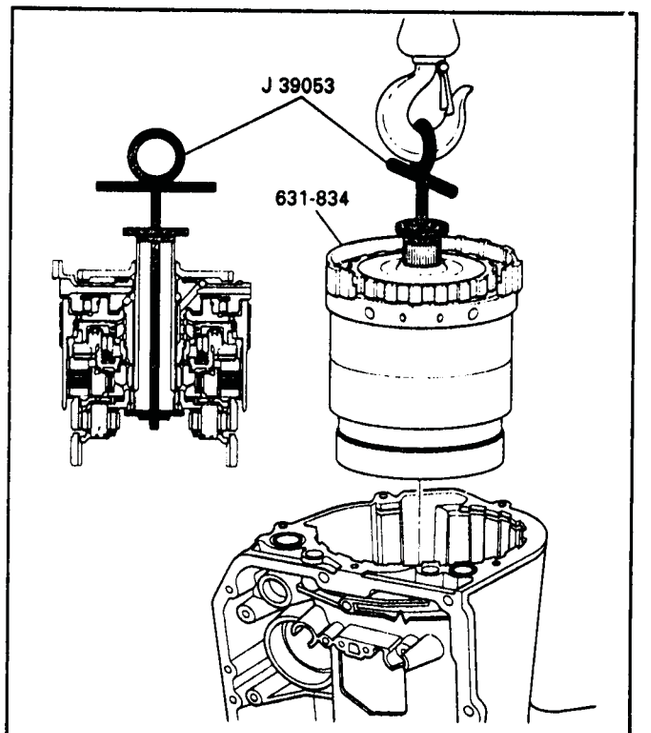


Figure 60

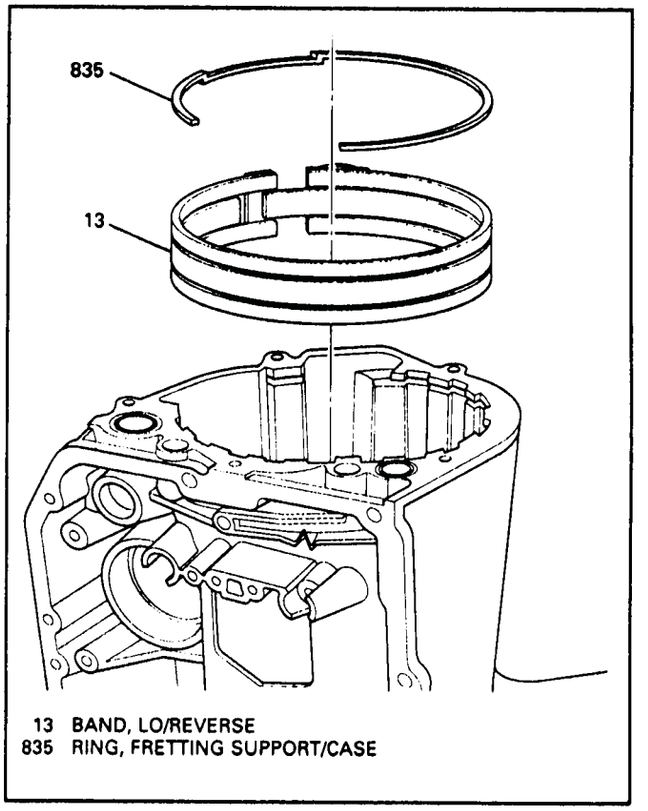
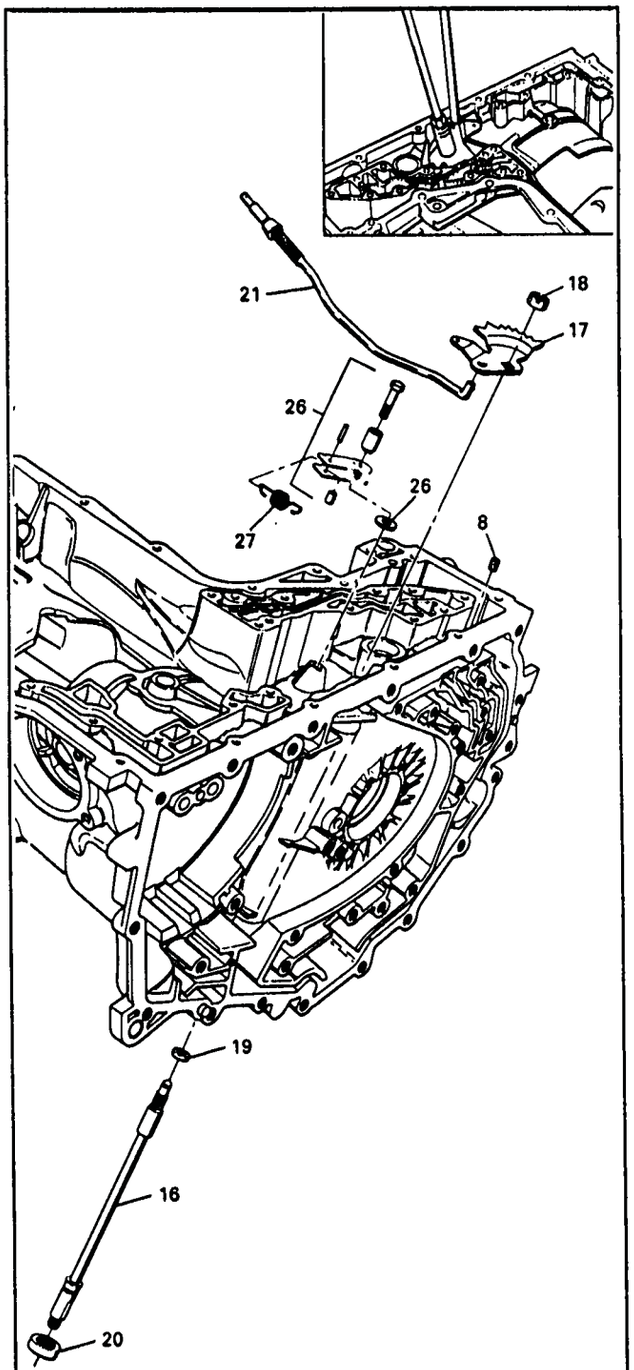


Figure 61

MANUAL SHAFT ASSEMBLY

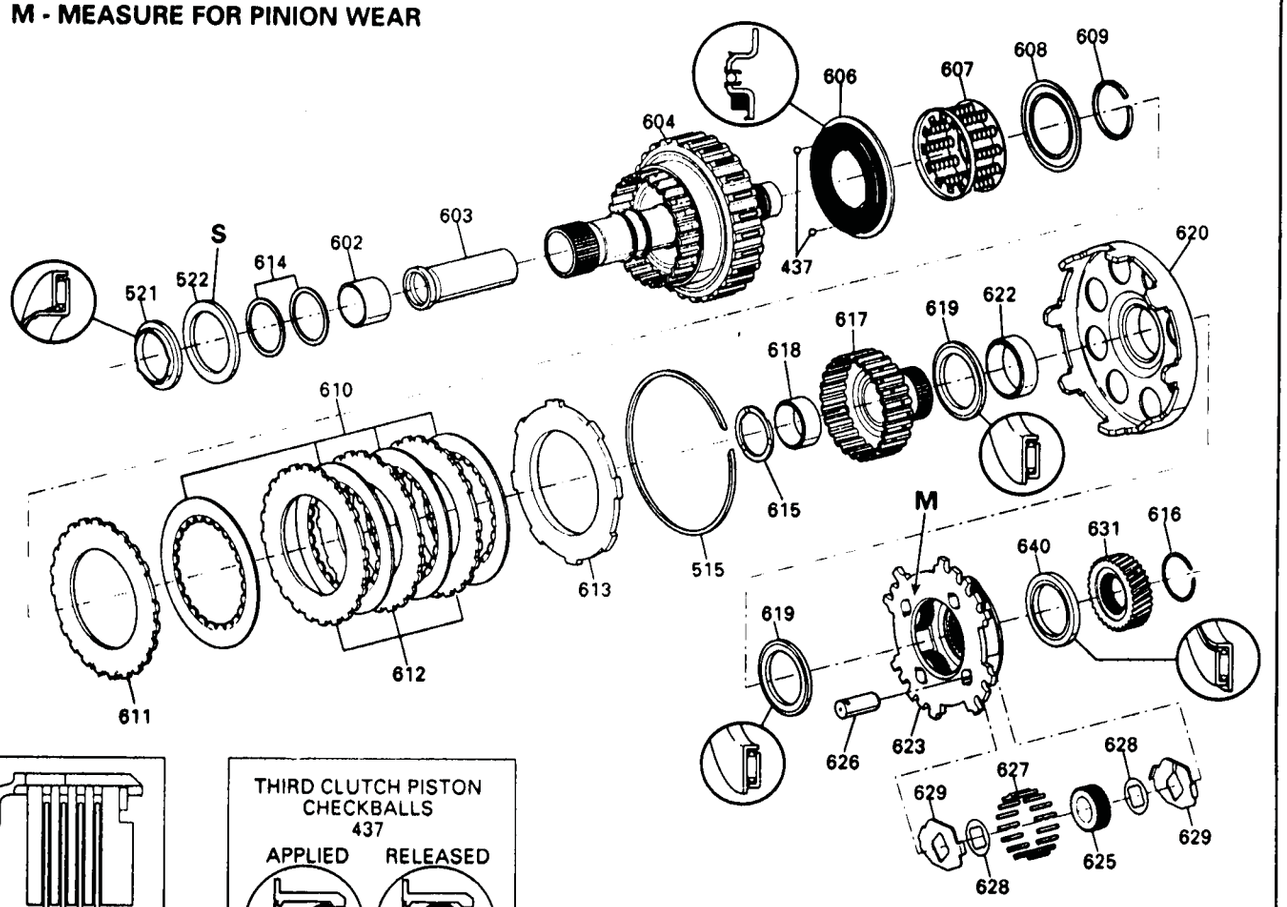
1. Remove the detent spring by grasping detent roller end of spring with a pair of pliers (See Figure 62).
2. Remove detent roller bolt, pivot arm, sleeve and washer (See Figure 62).
3. Remove the 15mm manual shaft nut.
   NOTE: DETENT LEVER MUST BE HELD IN PLACE WITH SCREWDRIVER WHEN REMOVING NUT, TO PREVENT DAMAGE.
4. Remove detent lever and actuator rod.
5. Remove the manual shaft by moving out through the top of bell housing. (See Figure 62).
6. Remove the manual shaft seal and the washer (See Figure 62).



8 PLUG
16 SHAFT, MANUAL
17 LEVER, INSIDE DETENT
18 NUT, HEX
19 WASHER, MANUAL SHAFT
20 SEAL, MANUAL SHAFT
21 ACTUATOR ASSEMBLY, PARK LOCK
26 DETENT LEVER AND ROLLER ASSEMBLY
27 SPRING, DETENT

Figure 62

S - SELECTIVE
M - MEASURE FOR PINION WEAR



437 CHECKBALL, .1875 DIAMETER
515 RING, SNAP
521 BEARING ASSEMBLY, THRUST
522 WASHER, THRUST (DRIVEN SPROCKET SUPPORT) (SELECTIVE)
602 BUSHING, INPUT SHAFT
603 SLEEVE, INPUT SHAFT/OIL TRANSFER
604 HOUSING, THIRD CLUTCH
606 PISTON ASSEMBLY, THIRD CLUTCH
607 SPRING AND RETAINER ASSEMBLY
608 RETAINER, SNAP RING
609 RING, RETURN SPRING SNAP
610 PLATE ASSEMBLY, THIRD CLUTCH (FIBER)
611 PLATE, APPLY (STEEL)
612 PLATE, THIRD CLUTCH
613 PLATE, BACKING
614 RING, OIL SEAL (2)
615 WASHER, THRUST (INPUT SHAFT/3RD HUB)
616 RING, SNAP (INPUT SHAFT/INPUT SUN GEAR)
617 HUB, THIRD CLUTCH
618 BUSHING, HUB
619 BEARING ASSEMBLY, THRUST (HUB/GEAR AND SHELL) (2)
620 GEAR AND SHELL ASSEMBLY, REACTION SUN
622 BUSHING, REACTION SUN GEAR
623 CARRIER, REACTION
625 PINION, PLANET (4)
626 PIN, PLANET PINION (4)
627 NEEDLE, ROLLER BEARING (68)
628 WASHER, PINION THRUST (STEEL) (8)
629 WASHER, PINION THRUST (BRONZE) (8)
631 SUN GEAR, INPUT
640 BEARING, THRUST (INPUT SUN GEAR TO REACTION CARRIER)

3RD CLUTCH AND REACTION CARRIER ASSEMBLY

Figure 63

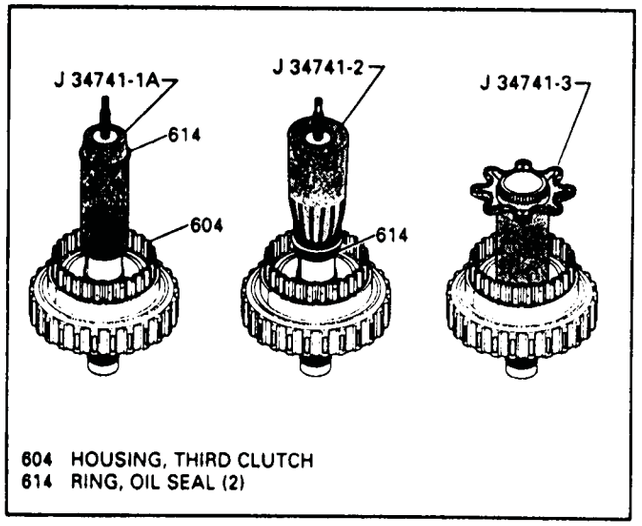


Figure 64

COMPONENT SUB-ASSEMBLY

3RD CLUTCH AND REACTION CARRIER ASSEMBLY

1. Disassemble and clean all parts using Figure 63 as a guide.
2. Inspect all parts shown in Figure 63 for any wear and/or damage.
3. Cut the solid oil seal rings, remove them from the input shaft.
4. Inspect the seal ring grooves for any nicks or burrs, and remove them as necessary.
5. Adjust tool J-34741-1A so that the bottom of the seal installer matches the bottom seal groove, as shown in Figure 64.
6. Lubricate the new seal ring with some transaxle fluid and position it on top of J-34741-1A (See Figure 64).
7. Using J-34741-2 quickly slide the seal into the seal ring groove (Fig. 64).
8. Repeat steps above for the remaining oil seal ring.
9. Slide J-34741-3 re-sizing tool over the seals with a twisting motion to size the seals (See Figure 64).
10. Leave the re-sizing tool in place until ready to install housing into transaxle. (See Figure 64).
11. Lubricate the 3rd clutch piston with Trans-Jel and install into 3rd clutch housing using a twisting motion while pushing down lightly.
12. Install return spring assembly and snap ring retainer on the piston. (See Figure 63).

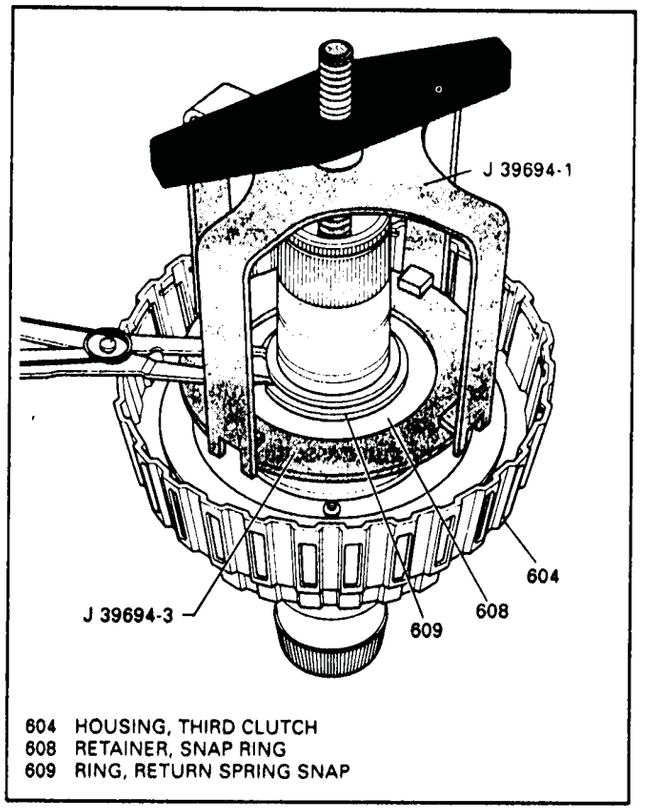
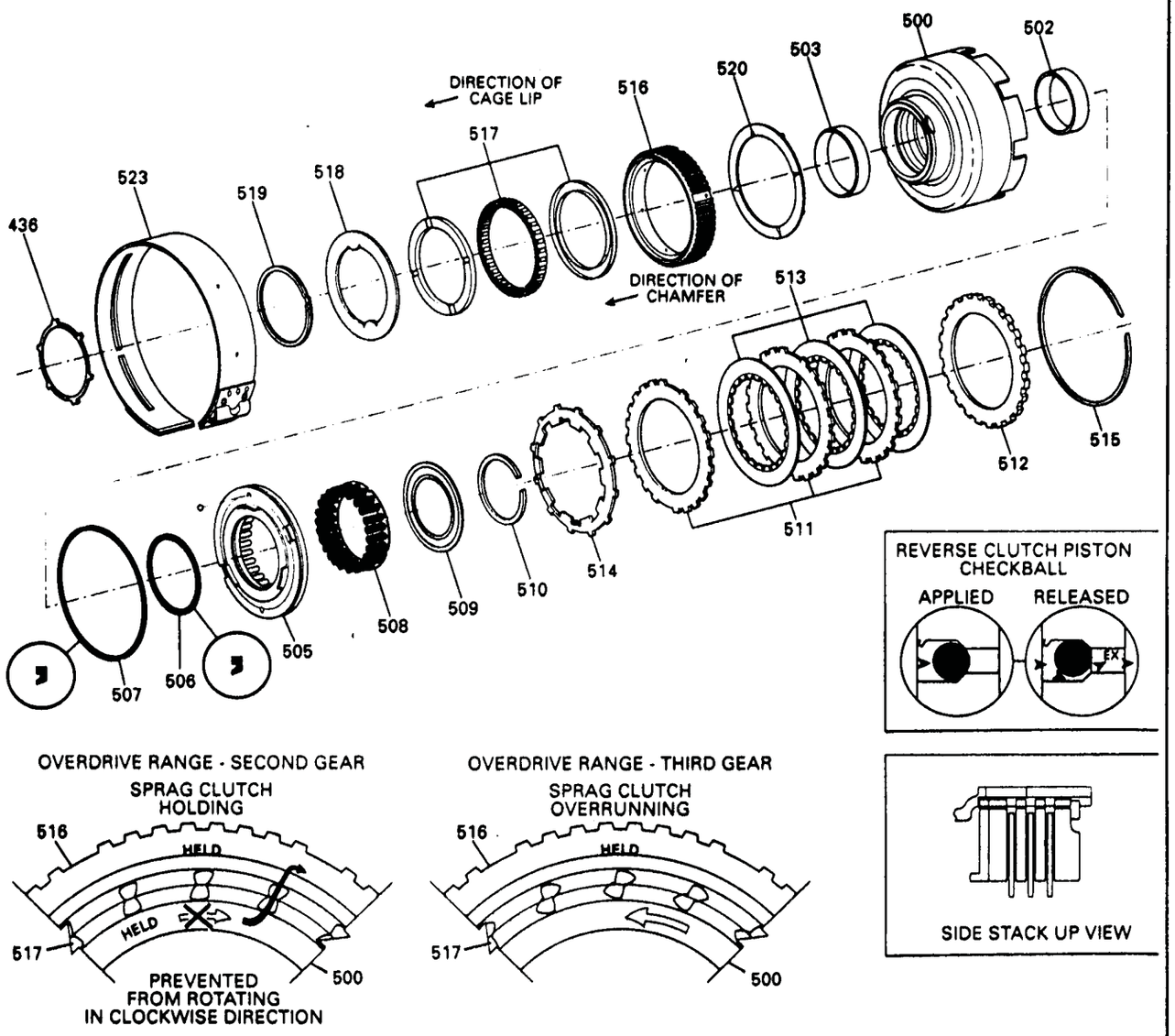


Figure 65

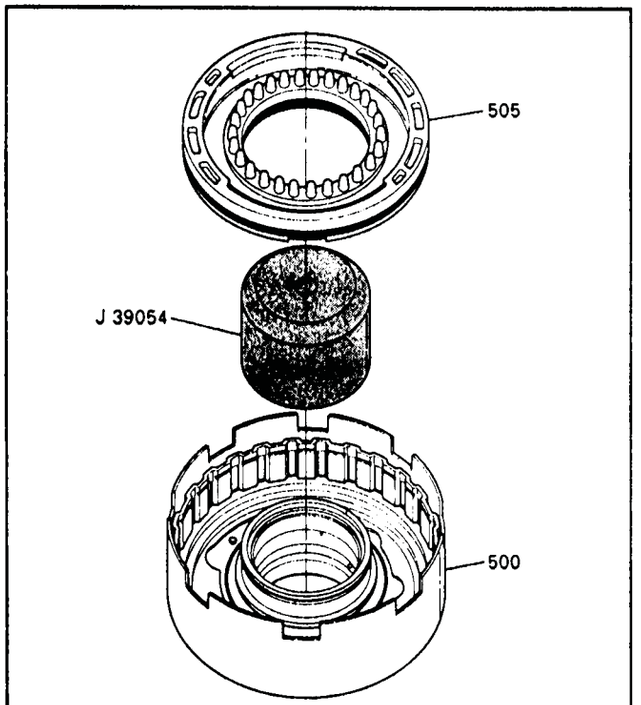
13. Compress the return spring using tool J-39694, as shown in Figure 65.
14. Install the snap ring as shown in Figure 65, and remove compressor.
15. Install the 3rd clutch apply plate which is the thickest of the flat steel plates (See Inset Figure 63).
16. Install 3rd clutch plates beginning with a lined plate and alternating with steel plate (See Figure 63).
17. Install 3rd clutch backing plate with stepped side up (See Inset Fig. 63).
18. Install backing plate snap ring.
19. Install thrust washer (615) as shown in Figure 63.
20. Install 3rd clutch hub by rotating into 3rd clutch plates.
21. Install thrust bearing with rolled inner lip facing hub (See Figure 63).
22. Install reaction sun gear shell Asm.
23. Check reaction carrier pinion end play for .003"-.035" clearance.
24. Install reaction carrier assembly.
25. Install thrust bearing (640) with black surface towards carrier (Figure 63).
26. Install sun gear (either direction) and install snap ring (See Figure 63).
27. Install selective washer and bearing and retain with petrolatum.



436 WASHER, THRUST (SUPPORT/REV. CLUTCH)
500 HOUSING, REVERSE CLUTCH AND RACE ASSEMBLY
502 BUSHING, (SMALL)
503 BUSHING, (LARGE)
505 PISTON ASSEMBLY, REVERSE CLUTCH
506 SEAL, (INNER)
507 SEAL, (OUTER)
508 SPRING AND RETAINER ASSEMBLY
509 RETAINER, SNAP RING
510 RING, SNAP (RETURN SPRING)
511 PLATE, REVERSE CLUTCH (STEEL) (3)
512 PLATE, REVERSE CLUTCH BACKING
513 PLATE ASSEMBLY, REVERSE CLUTCH (FIBER) (3)
514 PLATE, BELLEVILLE (APPLY)
515 RING, SNAP
516 RACE, 2ND SPRAG (OUTER)
517 CLUTCH ASSEMBLY, SECOND SPRAG
518 RETAINER, SECOND SPRAG CLUTCH
519 RING, LOCKING
520 WASHER, SECOND CLUTCH OUTER RACE
523 BAND, FOURTH

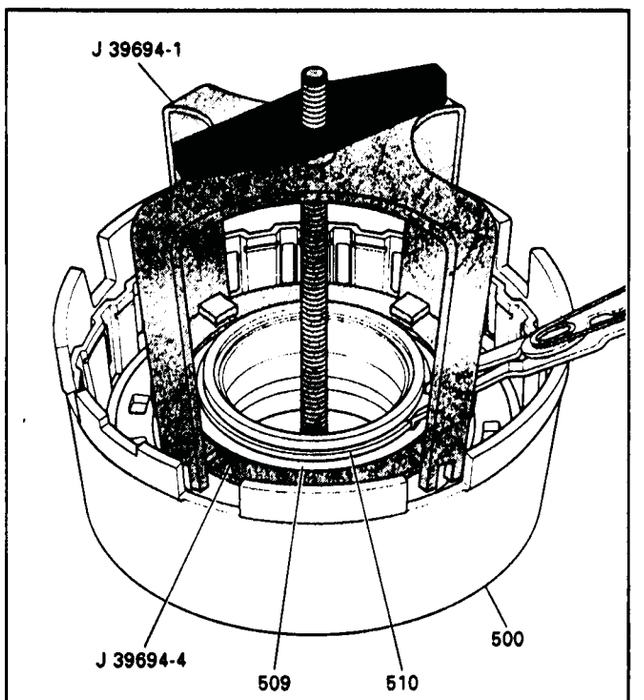
REVERSE CLUTCH AND 2ND SPRAG ASSEMBLY

Figure 66



500 HOUSING, REVERSE CLUTCH AND RACE ASSEMBLY
505 PISTON ASSEMBLY, REVERSE CLUTCH

Figure 67



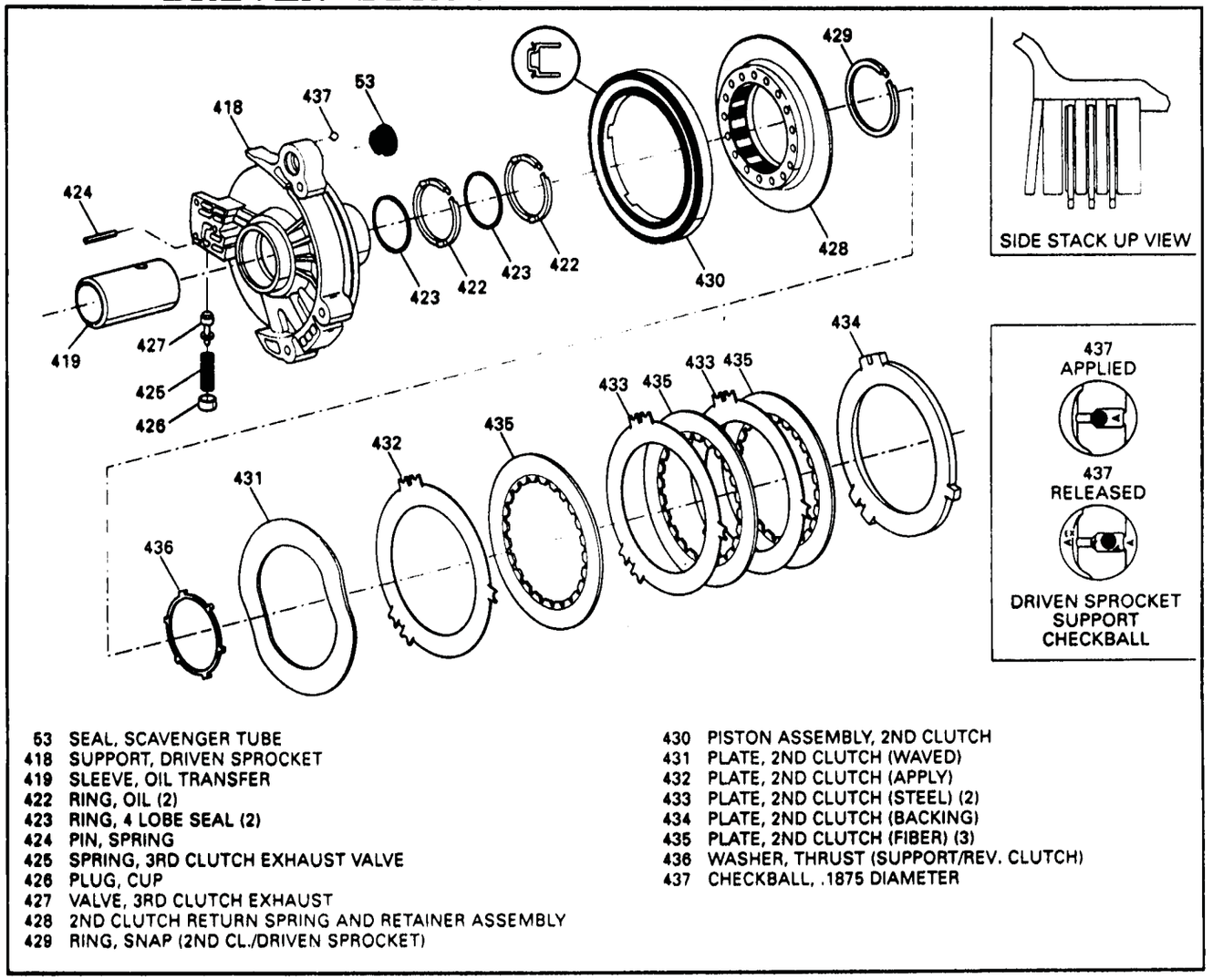
500 HOUSING, REVERSE CLUTCH AND RACE ASSEMBLY
509 RETAINER, SNAP RING
510 RING, SNAP (RETURN SPRING)

Figure 68

REVERSE CLUTCH AND 2ND SPRAG ASSEMBLY

1. Disassemble and clean all parts using Figure 66 as a guide.
2. Discard the spiral retaining ring on top of 2nd sprag retainer. It is NOT reusable.
3. Install new lip seals onto the reverse clutch piston with the lips facing the direction shown in Figure 66.
4. Lubricate lip seals with TransJel and install piston into reverse clutch housing (See Figure 67).
5. Use tool J-39054 to protect the inner lip seal as shown in Figure 67, and make sure the outer seal doesn't roll.
6. Install the return spring retainer onto the piston, and snap ring retainer on top of it (See Figure 66).
7. Compress spring assembly using tool J-39694 as shown in Figure 68.
8. Install snap ring as shown in Figure 68, and remove spring compressor.
9. Install belleville plate aligning belleville plate tangs with inserts in the reverse clutch piston.
10. Install reverse clutch plates starting with a steel plate, alternating with lined plate, until you have 3 of each (See Inset Fig. 66).
11. Install the backing plate with stepped side facing up (See Inset Figure 66).
12. Install the backing plate snap ring as shown in Figure 66.
13. Install 2nd clutch outer race thrust washer on housing and retain with TransJel (See Figure 66).
14. Install 2nd sprag assembly onto the reverse housing with the sprag cage lip facing up as shown Figure 66.
15. Install sprag outer race onto sprag by rotating clockwise, with chamfer facing up as shown in Figure 66.
16. Verify correct sprag rotation. Should freewheel clockwise and lock in a counterclockwise direction.
17. Install sprag clutch retainer with the tabs matching inserts in housing.
18. Install NEW spiral snap ring. Verify that spiral snap ring tabs lock into place and that snap ring is properly seated.
19. Set reverse clutch housing aside for final assembly.

2ND CLUTCH PISTON AND DRIVEN SPROCKET SUPPORT ASSEMBLY

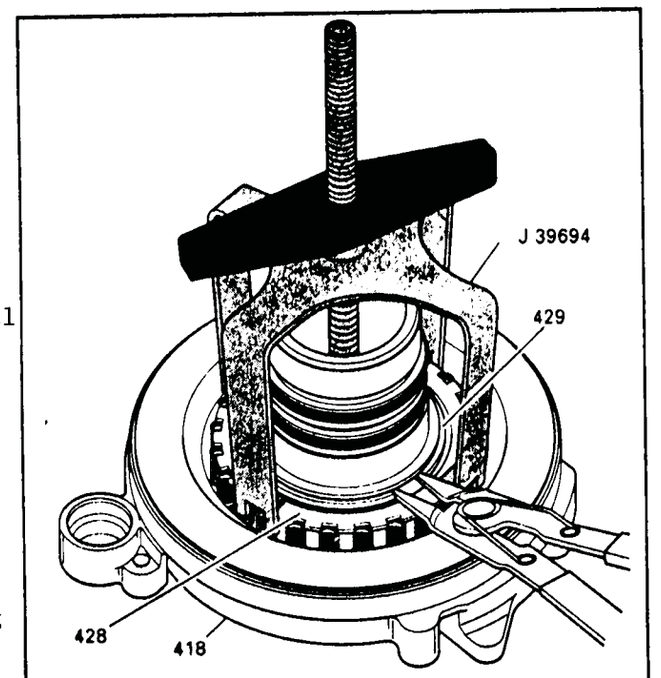


53 SEAL, SCAVENGER TUBE
418 SUPPORT, DRIVEN SPROCKET
419 SLEEVE, OIL TRANSFER
422 RING, OIL (2)
423 RING, 4 LOBE SEAL (2)
424 PIN, SPRING
425 SPRING, 3RD CLUTCH EXHAUST VALVE
426 PLUG, CUP
427 VALVE, 3RD CLUTCH EXHAUST
428 2ND CLUTCH RETURN SPRING AND RETAINER ASSEMBLY
429 RING, SNAP (2ND CL./DRIVEN SPROCKET)
430 PISTON ASSEMBLY, 2ND CLUTCH
431 PLATE, 2ND CLUTCH (WAVED)
432 PLATE, 2ND CLUTCH (APPLY)
433 PLATE, 2ND CLUTCH (STEEL) (2)
434 PLATE, 2ND CLUTCH (BACKING)
435 PLATE, 2ND CLUTCH (FIBER) (3)
436 WASHER, THRUST (SUPPORT/REV. CLUTCH)
437 CHECKBALL, .1875 DIAMETER

Figure 69

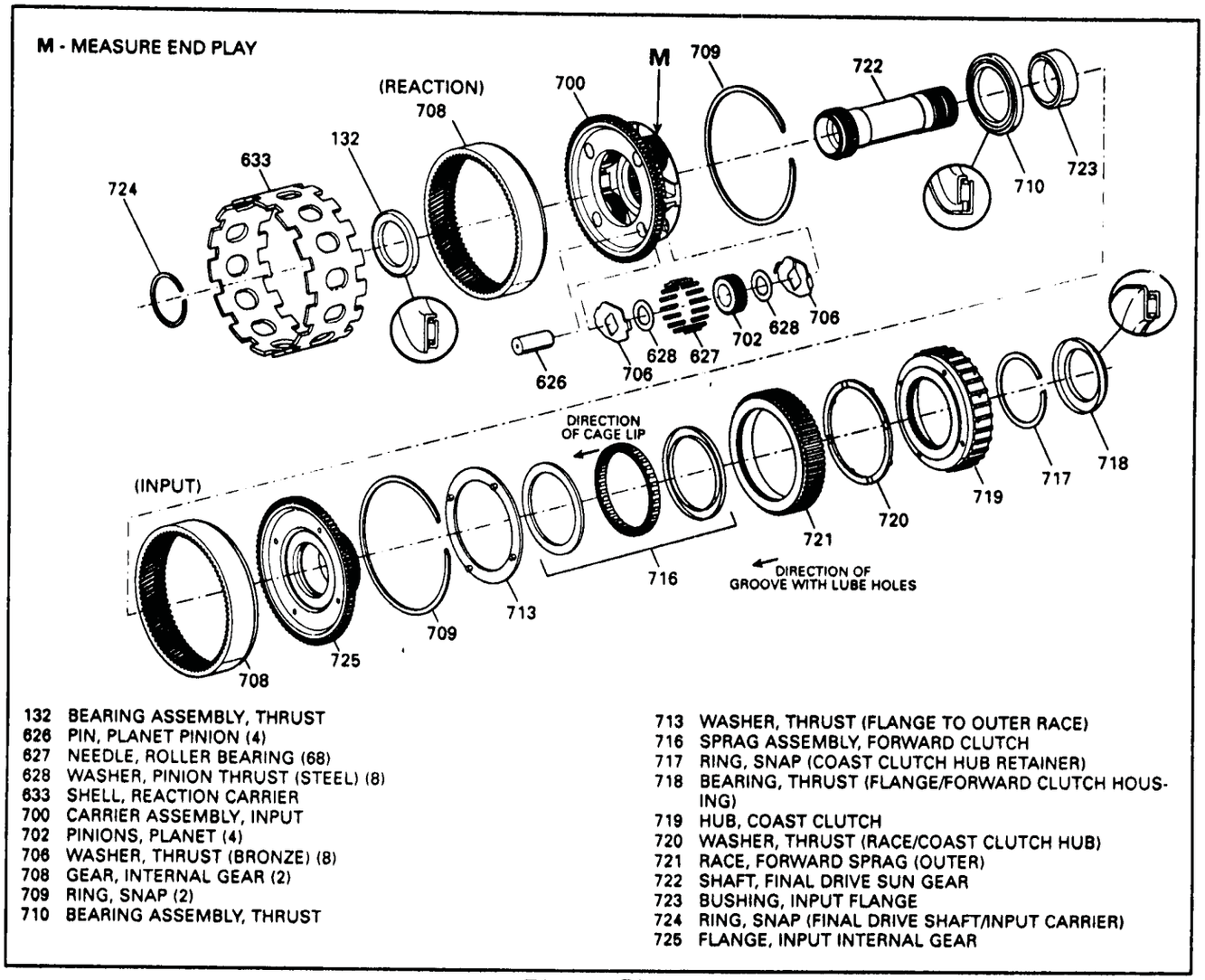
2ND CLUTCH PISTON AND DRIVEN SPROCKET SUPPORT ASSEMBLY

1. Disassemble and clean all parts using Figure 69 as a guide.
2. Inspect all parts shown in Figure 69 for any wear and/or damage.
3. Inspect 2nd clutch piston moulded seal carefully, replace as necessary.
4. Lubricate 2nd clutch piston with TransJel and install into driven sprocket support by twisting and pushing at same time.
5. Install 2nd clutch return spring onto 2nd clutch piston (See Figure 69).
6. Compress 2nd clutch spring and retainer using tool J-39694, as shown in Figure 70.
7. Install snap ring as shown in Figure 70.
8. Remove spring compressor.
9. Install 3rd clutch exhaust valve, spring and retainer as shown in Figure 69.
10. Install thrust washer (436) and retain with TransJel as shown in Figure 69.
11. Install scavenger tube seal into the driven sprocket support in the position shown in Figure 69.
12. Retain the scavenger tube seal with TransJel if necessary.
13. Set the driven sprocket support assembly aside for final assembly.



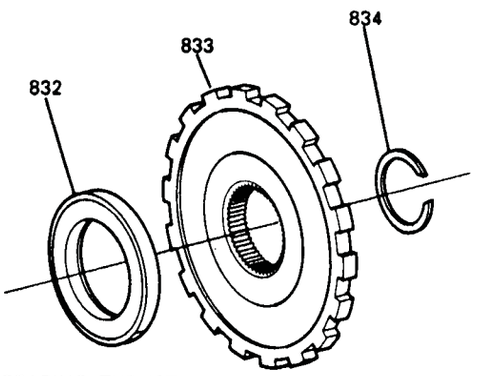
418 SUPPORT, DRIVEN SPROCKET
428 2ND CLUTCH RETURN SPRING AND RETAINER ASSEMBLY
429 RING, SNAP (2ND CL./DRIVEN SPROCKET)

Figure 70



132 BEARING ASSEMBLY, THRUST
626 PIN, PLANET PINION (4)
627 NEEDLE, ROLLER BEARING (68)
628 WASHER, PINION THRUST (STEEL) (8)
633 SHELL, REACTION CARRIER
700 CARRIER ASSEMBLY, INPUT
702 PINIONS, PLANET (4)
706 WASHER, THRUST (BRONZE) (8)
708 GEAR, INTERNAL GEAR (2)
709 RING, SNAP (2)
710 BEARING ASSEMBLY, THRUST
713 WASHER, THRUST (FLANGE TO OUTER RACE)
716 SPRAG ASSEMBLY, FORWARD CLUTCH
717 RING, SNAP (COAST CLUTCH HUB RETAINER)
718 BEARING, THRUST (FLANGE/FORWARD CLUTCH HOUSING)
719 HUB, COAST CLUTCH
720 WASHER, THRUST (RACE/COAST CLUTCH HUB)
721 RACE, FORWARD SPRAG (OUTER)
722 SHAFT, FINAL DRIVE SUN GEAR
723 BUSHING, INPUT FLANGE
724 RING, SNAP (FINAL DRIVE SHAFT/INPUT CARRIER)
725 FLANGE, INPUT INTERNAL GEAR

Figure 71



832 BEARING, THRUST
833 GEAR, PARKING LOCK
834 RING, SNAP (FINAL DRIVE SHAFT TO PARK GEAR)

Figure 72

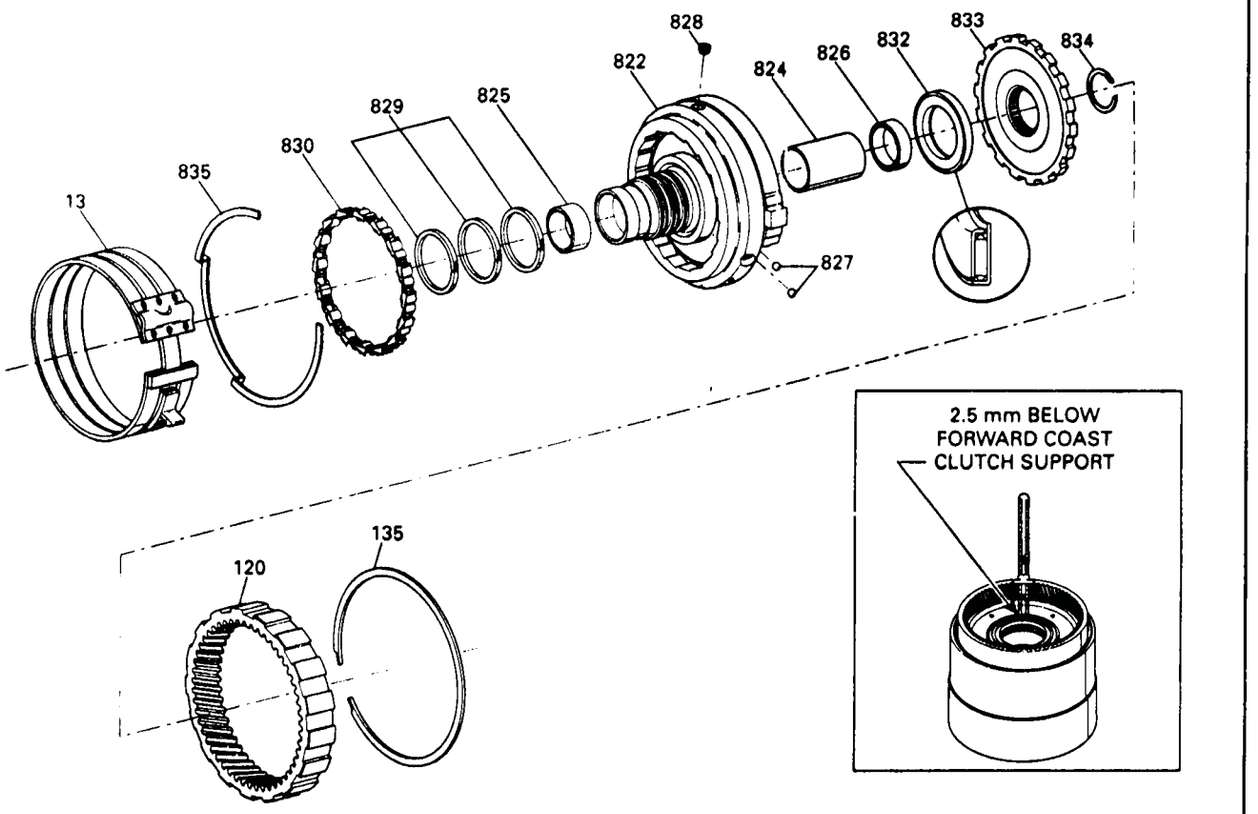
FORWARD/COAST CLUTCH & SUPPORT

DISASSEMBLE

1. Place Forward/Coast Clutch Assembly on bench with park gear facing up, and remove tool J-39053, (See Figure 60).
2. Remove snap ring (834) from final drive sun gear shaft (See Figure 72).
3. Remove park gear (833) from final drive sun gear shaft (See Figure 72).
4. Remove thrust bearing from support.
5. Lift forward/coast clutch support and Lo roller clutch assembly off of the forward/coast clutch housing.
6. Remove thrust bearing from forward/coast clutch housing. It may be stuck to the support assembly.
7. Lift forward/coast clutch housing off of the coast clutch hub and the forward sprag assembly.
8. Remove the final drive sun gear shaft.
9. Disassemble all components as shown in Figures 71, 73, and 75.
10. Clean thoroughly and blow dry with compressed air all components shown in Figures 71, 73, and 75.
11. Inspect all components shown in Figure 71, 73, and 75.

INPUT CARRIER/FORWARD SPRAG ASSEMBLY

1. Install input carrier (700) into the reaction internal gear (708) and then install snap ring (709) as shown in Figure 71.
   Note: Check input carrier pinion end play with a feeler gage. End play should be .003"-.035"
2. Install thrust bearing (710) onto the input carrier with lip facing down as shown in Inset in Figure 71. Retain with TransJel and set aside for final assembly.
3. Install input internal gear flange(725) to input internal gear (708) and instal snap ring (709) as shown in Figure 71.
4. Install thrust washer (713) onto input ring gear flange and retain with Trans Jel (See Figure 71).
5. Install forward sprag, with lip facing direction shown in Figure 71, and end bearings onto input ring gear flange.
6. Install forward sprag outer race (721) with groove facing direction shown in Figure 71, by rotating counterclockwise into place.
7. Install thrust washer (720) onto coast clutch hub (719) and retain W/TransJel. (See Figure 71).
8. Install the coast clutch hub onto the input gear flange splines.
9. Install snap ring (717) to retain the coast clutch hub (See Figure 71).
10. Install thrust bearing (718) onto the coast clutch hub with the lip facing down, as shown in inset in Figure 71. Retain bearing with TransJel.
11. Set this assembly aside for final assembly process.



13 BAND, LO/REVERSE
120 GEAR, FINAL DRIVE INTERNAL
135 RING, SNAP
822 SUPPORT, FORWARD/COAST CLUTCH
824 SLEEVE, OIL TRANSFER
825 BUSHING, SUPPORT/SUN SHAFT (LEFT)
826 BUSHING, SUPPORT/SUN SHAFT (RIGHT)
827 BALL, (OIL HOLE PLUGS)
828 SEAL, COOLER RETURN
829 RING, OIL SEAL (SUPPORT/HOUSING)
830 CLUTCH ASSEMBLY, LOW ROLLER
832 BEARING, THRUST (FWD CLUTCH SUPPORT/PARK GEAR)
833 GEAR, PARKING LOCK
834 RING, SNAP (FINAL DRIVE SHAFT TO PARK GEAR)
835 RING, FRETTING SUPPORT/CASE

Figure 73

FORWARD/COAST CLUTCH SUPPORT ASSEMBLY

1. Remove and discard the 3 oil seal rings on the support assembly (See Figure 73).
2. Remove and discard cooler return seal (828) from support assembly as shown in Figure 73.
3. Inspect all components shown in Figure 73, for any wear and/or damage.
4. Install a new cooler return seal into the support assembly using appropriate size socket (See Figure 73).
5. Install 3 new oil seal rings onto the support and lubricate with small amount of TransJel (See Figure 73).
6. Install the low roller clutch assembly into the support as shown Figure 74.
7. Turn the cage of the low roller clutch assembly counterclockwise as far as it can go. The tabs on roller clutch cage must rest on the face of the outer race surface (See Inset Figure 74).

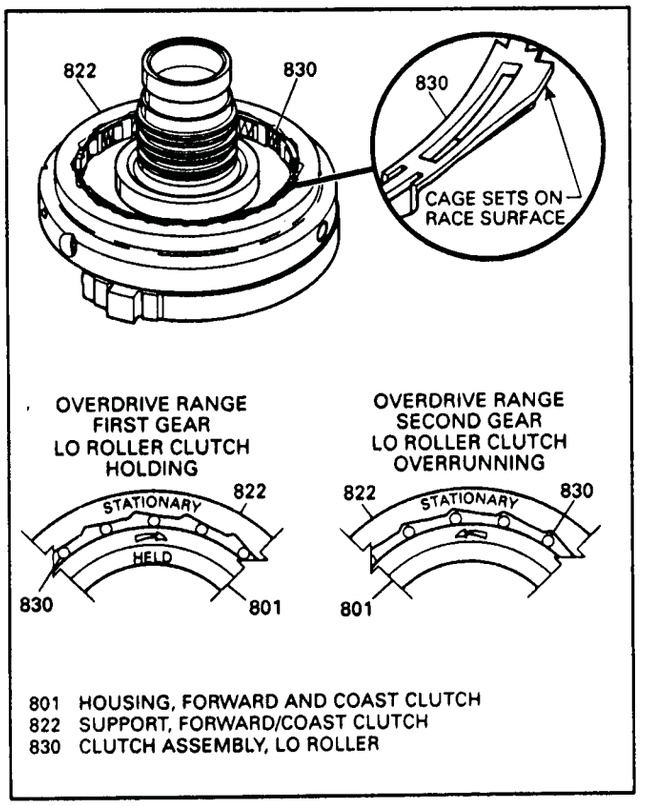
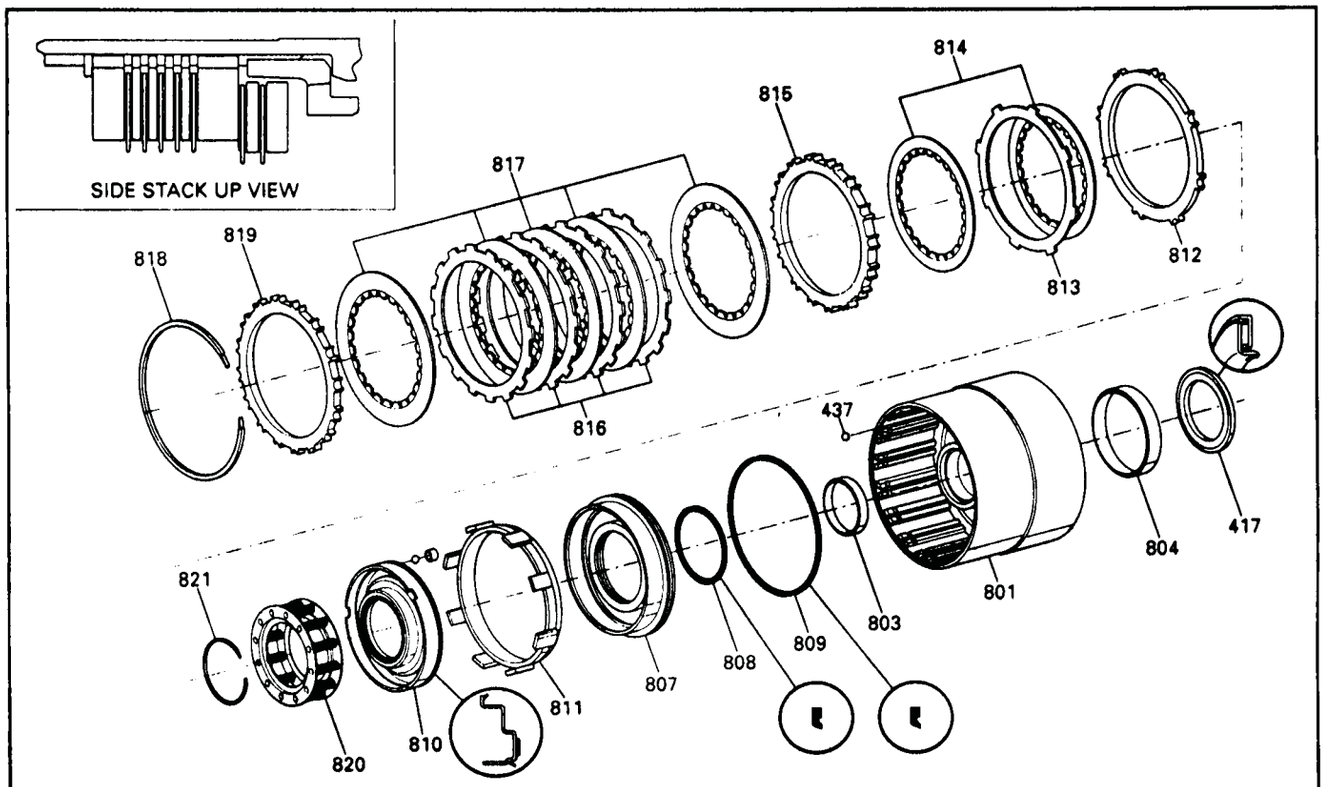
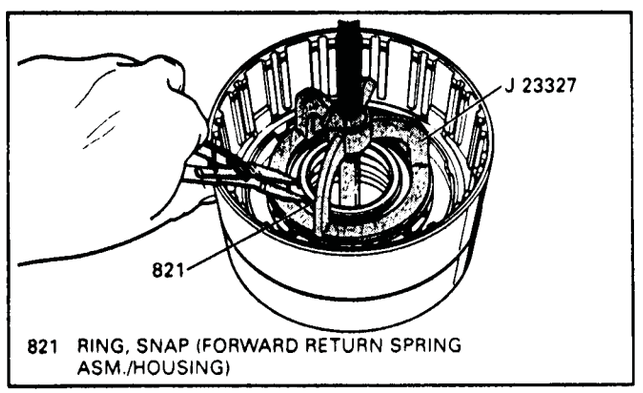


Figure 74



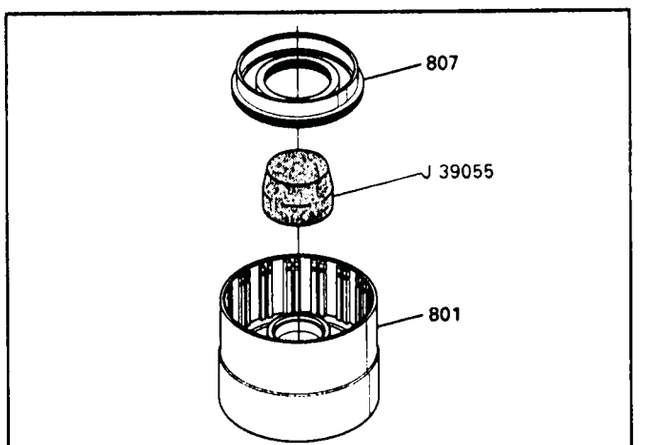
417 BEARING, THRUST
437 CHECKBALL, .1875 DIAMETER
801 HOUSING, FORWARD AND COAST CLUTCH
803 BUSHING, HOUSING (SMALL)
804 BUSHING, HOUSING (LARGE)
807 PISTON, FORWARD CLUTCH
808 SEAL, (INNER)
809 SEAL, (OUTER)
810 PISTON ASSEMBLY, COAST CLUTCH
811 RING, FORWARD CLUTCH (APPLY)
812 PLATE, COAST CLUTCH (APPLY)
813 PLATE, COAST CLUTCH (1) (STEEL)
814 PLATE, COAST CLUTCH (2) (FIBER)
815 PLATE, FORWARD AND COAST CLUTCH
816 PLATE, FORWARD CLUTCH (4) (STEEL)
817 PLATE, FORWARD CLUTCH (5) (FIBER)
818 RING, SNAP (FORWARD CLUTCH BACKING PLATE)
819 PLATE, FORWARD CLUTCH BACKING
820 SPRING ASSEMBLY, FORWARD CLUTCH RELEASE
821 RING, SNAP (FORWARD RETURN SPRING ASM./HOUSING)

Figure 75



821 RING, SNAP (FORWARD RETURN SPRING ASM./HOUSING)

Figure 76

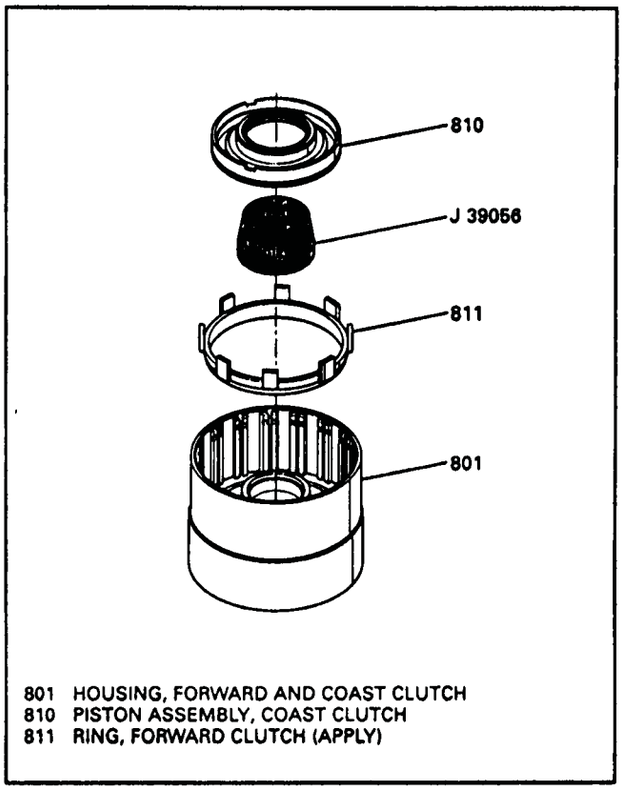


801 HOUSING, FORWARD AND COAST CLUTCH
807 PISTON, FORWARD CLUTCH

Figure 77

FORWARD/COAST CLUTCH HOUSING

1. Install new inner and outer lip seals onto forward clutch piston with lips facing down, as shown in Figure 75.
2. Lubricate lip seals with TransJel.
3. Install forward clutch piston into the housing using lip seal tool J-39055, as shown in Figure 77. Make sure the outer lip seal does not roll backwards.
4. Install forward clutch apply ring onto forward clutch piston. (See Figures 75 and 78).
5. Inspect the moulded seals on coast clutch piston for any wear and/or damage. Replace piston as necessary.
6. Lubricate piston seals with TransJel.
7. Install coast clutch piston into forward clutch piston using protector J-39056 as shown in Figure 78. Make sure outer seal does not roll backwards.
8. Install return spring assembly (820) as shown in Figure 75.
9. Lay snap ring on top of return spring assembly.
10. Compress return spring assembly using J-23327, and install snap ring in groove as shown in Figure 76.
11. Remove spring compressor tool.
12. Install coast clutch apply plate (812), as shown in Figure 75. See inset in Figure 75 for clutch plate stack-up.
13. Install coast clutch lined plates and 1 steel plate as shown in Figure 75. (See Inset).
14. Install forward clutch apply plate (815) on top of last lined coast clutch (See inset in Figure 75).
15. Install forward clutch plates beginning with a lined plate and alternating with steel plate (See inset Figure 75).
16. Install forward clutch backing plate (819), and backing plate snap ring. (See Figure 75).
17. Place the forward/coast clutch support on flat work surface with the sealing rings facing up.
18. Install thrust bearing onto hub of the support. Use the inset in Figure 75 for proper direction of bearing.
19. Install the forward/coast clutch housing onto the support using care not to damage sealing rings. You will have to rotate housing counterclockwise to engage the inner race on housing, into the low roller clutch (See Figure 74).

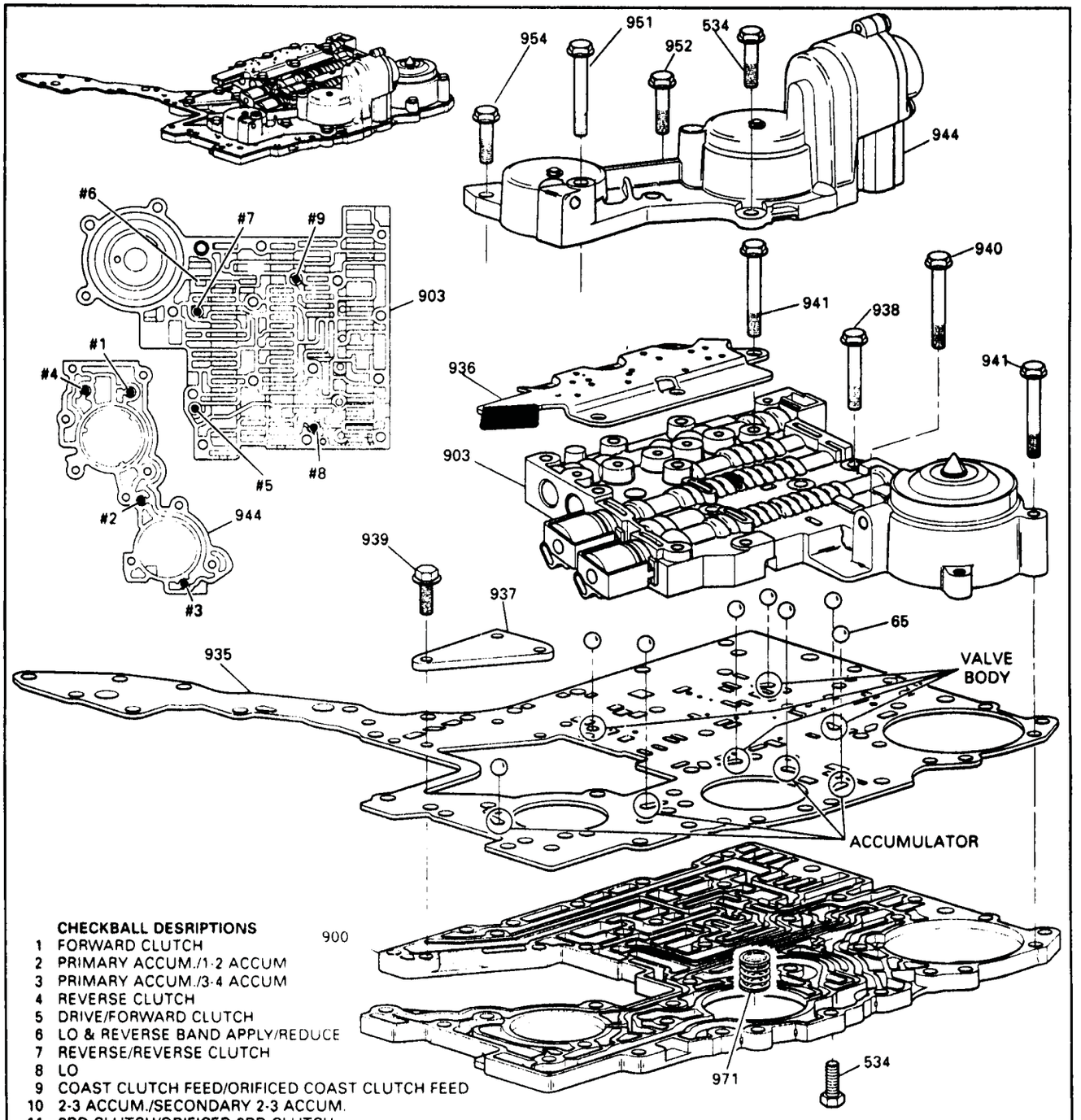


801 HOUSING, FORWARD AND COAST CLUTCH
810 PISTON ASSEMBLY, COAST CLUTCH
811 RING, FORWARD CLUTCH (APPLY)

Figure 78

20. Install Coast Clutch Hub/Forward Sprag/ Input Ring Gear Assembly, into the forward/coast clutch housing.
    NOTE: When splines on both hubs are both properly engaged, the bushing on the input ring gear hub will drop 2-3mm below the forward/coast clutch support hub, and a dull metal thud can be heard. (See Inset in Figure 73).
21. Install input carrier assembly with the thrust bearing into input internal gear.
22. Carefully turn the assembly over as it is very heavy (Approx. 65lbs).
23. Install the final drive sun gear shaft.
24. Install thrust bearing, see Figure 72.
25. Install parking gear, shown Figure 72.
26. Install snap ring on final drive sun gear shaft.
27. Install assembly holding fixture, shown in Figure 60. Tool No. J-39053.

    CAUTION; THIS ASSEMBLY MUST NOW BE MOVED WITH APPROPRIATE LIFTING DEVICE, SUCH AS CHAIN HOIST, AS IT IS VERY HEAVY. THIS ASSEMBLY WEIGHS APPROX. 65LBS.



CHECKBALL DESRIPTIONS

1 FORWARD CLUTCH
2 PRIMARY ACCUM./1-2 ACCUM
3 PRIMARY ACCUM./3-4 ACCUM
4 REVERSE CLUTCH
5 DRIVE/FORWARD CLUTCH
6 LO & REVERSE BAND APPLY/REDUCE
7 REVERSE/REVERSE CLUTCH
8 LO
9 COAST CLUTCH FEED/ORIFICED COAST CLUTCH FEED
10 2-3 ACCUM./SECONDARY 2-3 ACCUM.
11 3RD CLUTCH/ORIFICED 3RD CLUTCH

65 CHECKBALLS, (8)
534 BOLT, CHANNEL PLATE TO LCVB (1, 10mm)
534 BOLT, CHANNEL PLATE TO ACCUMULATOR HOUSING (3, 10mm)
534 BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE (1, 10mm)
900 CHANNEL PLATE, LOWER
903 CHANNEL PLATE/CONTROL VALVE AND HOUSING ASSEMBLY
935 PLATE ASM., SPACER/GASKET
936 SWITCH, TRANSAXLE PRESSURE
937 COVER, SPACER PLATE SUPPORT
938 BOLT, LCVB TO CHANNEL PLATE (5, 10mm)
939 BOLT, SPACER PLATE SUPPORT TO CHANNEL PLATE (3, 8mm)
940 BOLT, LCVB TO CHANNEL PLATE (2, 10mm)
941 BOLT, LCVB TO CHANNEL PLATE (8, 10mm)
944 ACCUMULATOR HOUSING
951 BOLT, ACCUM. ASM. TO CHANNEL PLATE (1, 10mm)
952 BOLT, ACCUM. ASM. TO CHANNEL PLATE (3, 10mm)
954 BOLT, ACCUM. ASM. TO CHANNEL PLATE (1, 10mm)
971 SPRING, ACCUMULATOR

LOWER VALVE BODY/ACCUMULATOR BODY

FIGURE 79

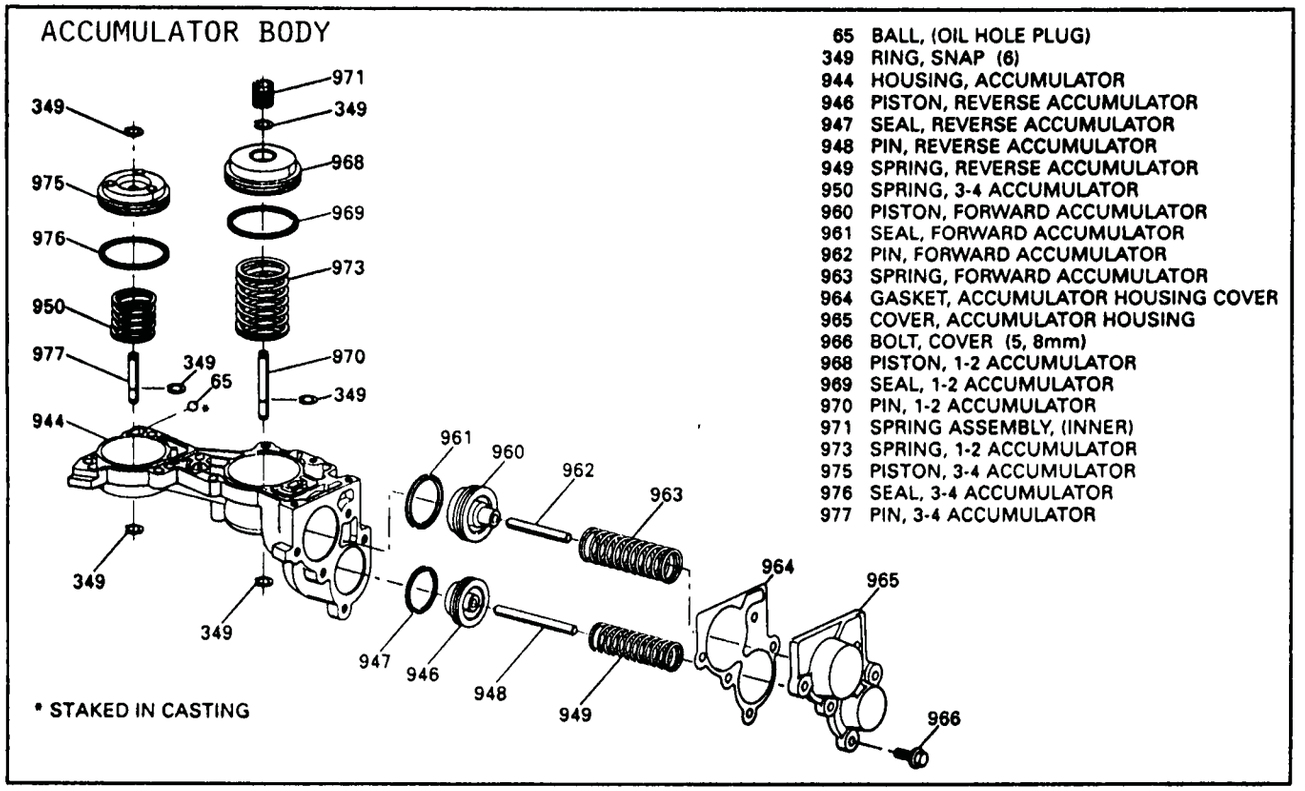
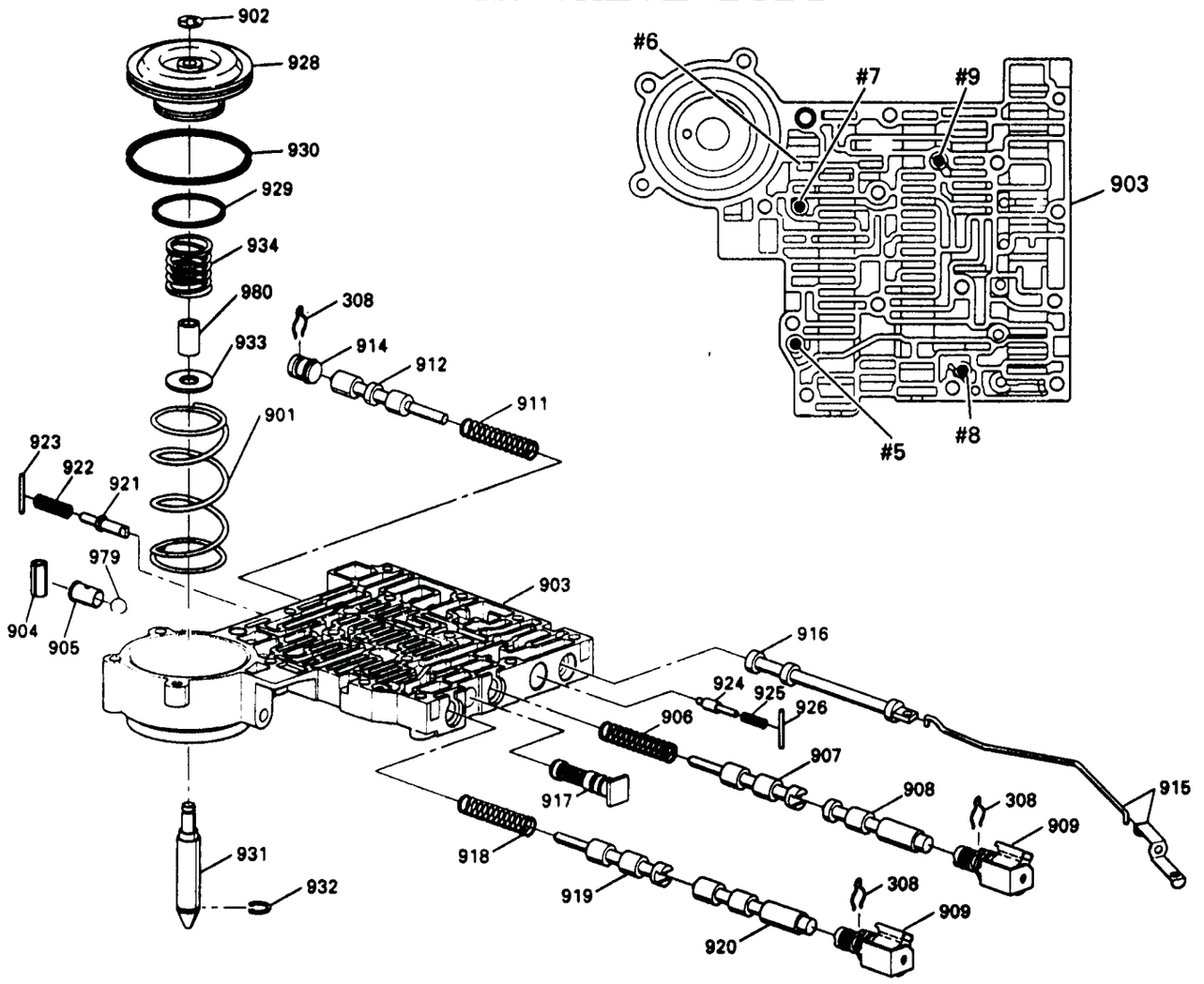


Figure 80

1-2/3-4/FWD/REV ACCUMULATORS

1. Clean the lower valve body/accumulator body assembly thoroughly in clean solvent.
2. Blow dry with compressed air.
3. Position the assembly on a clean dry work surface for disassembly.
4. Use Figures 79 and 80 to disassemble the accumulators.
5. Inspect and clean all components in Figures 79 and 80.
6. Inspect the spacer plate/gaskets(935) as shown in Figure 79.
   NOTE: The gaskets are moulded to the spacer plate and the entire assembly must be replaced if the gaskets are torn and/or damaged.
7. Use the illustrations in Figure 80 to reassemble the accumulator body, using new seals and gaskets.
8. Set the accumulator body aside for final assembly.

LOWER VALVE BODY



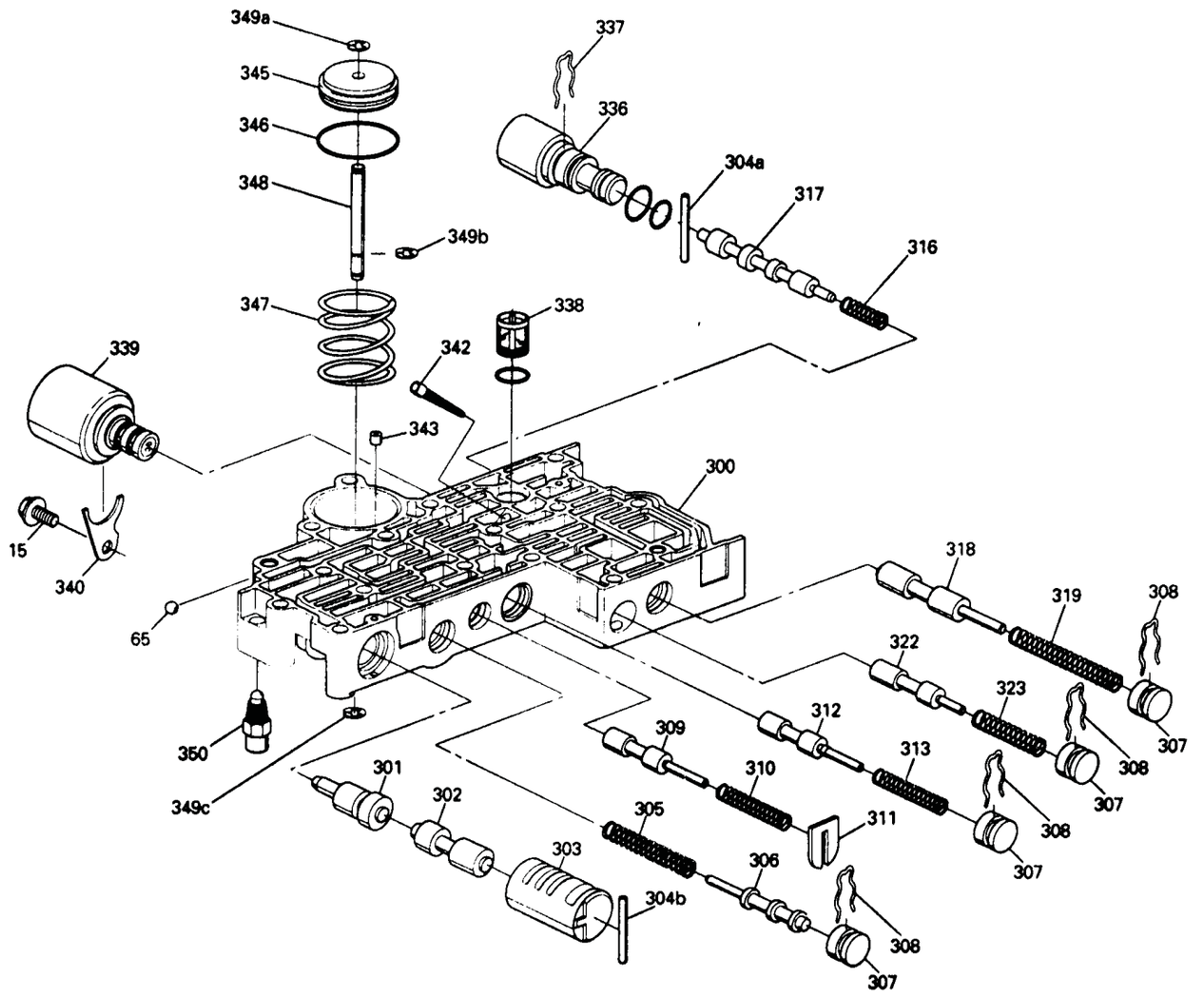
308	CLIP, RETAINER (3)
901	SPRING, RETURN
902	RING, RETAINING
903	VALVE BODY, LOWER CONTROL
904	RETAINER, SPRING
905	CAPSULE, BALL CHECK
906	SPRING, 2-3 SHIFT VALVE
907	VALVE, SHIFT 2-3 C
908	VALVE, SHIFT 2-3 D
909	SOLENOID, SHIFT (A & B)
911	SPRING, 3-4 SHIFT VALVE
912	VALVE, 3-4 SHIFT
914	PLUG, BORE
915	MANUAL LINK AND CLIP ASSEMBLY
916	VALVE, MANUAL
917	SCREEN ASSEMBLY, SOLENOID
918	SPRING, 1-2 SHIFT VALVE
919	VALVE, SHIFT 1-2 A
920	VALVE, SHIFT 1-2 B
921	VALVE, REVERSE ORIFICE BYPASS
922	SPRING, REVERSE ORIFICE BYPASS VALVE
923	PIN, COILED SPRING FLAG
924	VALVE, FORWARD ORIFICE BYPASS
925	SPRING, FORWARD ORIFICE BYPASS VALVE
926	PIN, COILED SPRING FLAG
928	PISTON, LOW/REVERSE SERVO
929	SEAL, LOW/REVERSE SERVO (SMALL)
930	SEAL, LOW/REVERSE SERVO (LARGE)
931	PIN, LOW/REVERSE SERVO APPLY
932	RING, RETAINING
933	WASHER, SERVO CUSHION SPRING
934	SPRING, SERVO CUSHION
979	BALL (.375 DIA.)
980	SLEEVE, LO REVERSE CUSHION

Figure 81

LOWER VALVE BODY ASSEMBLY

1. Clean the Lower Valve Body Assembly thoroughly, using clean solvent.
2. Move the valves with a pick or small screwdriver to ensure that any dirt or debris is dislodged.
3. Blow dry with compressed air.
4. Position lower valve body on a clean dry work surface.
5. Remove valve trains one at a time and begin in one corner of the valve body.
6. Some valves are under spring pressure, so cover the end of the bore when removing roll pins and/or retainers.
7. Valves, springs, and bushings should be laid out on a dry surface EXACTLY the way they are removed.
8. Clean all valves, springs, & bushings and dry with compressed air.
9. Inspect all valve body parts for wear and/or damage.
10. Use the illustrations in Figure 81, to reassemble the Lower Valve Body.
11. Ensure that all springs, valves, and bushings are in proper order. (See Figure 81).
12. Replace all "O" ring seals on solenoids and accumulators, and servo pistons before re-installing in valve body.
13. After assembling the lower valve body, lay it aside with the worm track facing up.

UPPER VALVE BODY

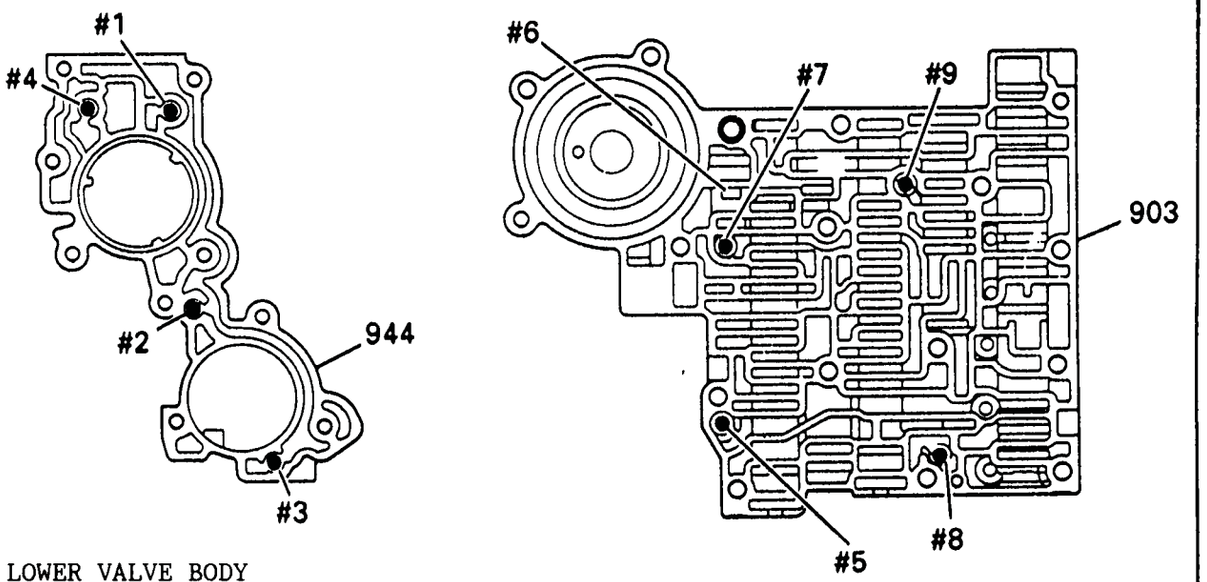


15 BOLT, CLAMP
65 BALL, (OIL HOLE PLUG)
300 BODY, UPPER CONTROL VALVE
301 VALVE, ACCUMULATOR BOOST
302 VALVE, 1-2 / 3-4 ACCUMULATOR
303 BUSHING, 1-2 / 3-4 ACCUMULATOR VALVE
304 PIN, COILED SPRING (2)
305 SPRING, 2-3 ACCUMULATOR VALVE
306 VALVE, 2-3 ACCUMULATOR
307 PLUG, BORE (4)
308 CLIP, RETAINER (4)
309 VALVE, ACTUATOR FEED LIMIT
310 SPRING, ACTUATOR FEED LIMIT
311 PLATE, SPRING RETAINER
312 VALVE, CONVERTOR FEED LIMIT
313 SPRING, CONVERTOR FEED LIMIT
316 SPRING, CONVERTOR CLUTCH CONTROL
317 VALVE, CONVERTOR CLUTCH CONTROL
318 VALVE, CONVERTOR REGULATOR
319 SPRING, CONVERTOR CLUTCH REGULATOR
322 VALVE, TCC ENABLE
323 SPRING, TCC ENABLE VALVE
336 SOLENOID, TCC PRESSURE
337 CLIP, SPRING RETAINER
338 FILTER AND SEAL, PRESSURE CONTROL SOLENOID
339 SOLENOID, PRESSURE CONTROL (FORCE MOTOR)
340 CLAMP, PC SOLENOID (FORCE MOTOR CLAMP)
342 SCREEN, OIL PRESSURE
343 PLUG, ORIFICED CUP
345 PISTON, 2-3 ACCUMULATOR
346 SEAL, 2-3 ACCUMULATOR PISTON
347 SPRING, 2-3 ACCUMULATOR PISTON
348 PIN, 2-3 ACCUMULATOR
349 RING, SNAP (3)
350 SENSOR, TEMPERATURE

Figure 82

UPPER VALVE BODY ASSEMBLY

1. Clean the Upper Valve Body Assembly thoroughly, using clean solvent.
2. Move the valves with a pick or small screwdriver to ensure that any dirt or debris is dislodged.
3. Blow dry with compressed air.
4. Position upper valve body on a clean dry work surface.
5. Remove valve trains one at a time and begin in one corner of the valve body.
6. Some valves are under spring pressure, so cover the end of the bore when removing roll pins and/or retainers.
7. Valves, springs, and bushings should be laid out on a dry surface EXACTLY the way they are removed.
8. Clean all valves, springs, & bushings and dry with compressed air.
9. Inspect all valve body parts for wear and/or damage.
10. Use the illustrations in Figure 82, to reassemble the Upper Valve Body.
11. Ensure that all valves, springs, and bushings are in their proper order. (Refer to Figure 82).
12. Replace all "O" ring seals on solenoids and accumulators, before re-installing into the Upper Valve Body.
13. After assembling the upper valve body, lay it aside with worm track facing up.
14. NOTE: The Filter and Seal (338) for the pressure control solenoid, and screen (342) shown in Figure 82 should also be replaced during rebuild.



903 LOWER VALVE BODY
944 ACCUMULATOR BODY

CHECKBALL LOCATIONS FOR
ACCUMULATOR BODY AND LOWER VALVE BODY

Figure 83

LOWER VALVE BODY ASSEMBLY AND ACCUMULATOR ASSEMBLY, SPACER PLATE/ SPACER GASKET, AND LOWER CHANNEL PLATE

1. Insert pins J-39630-1 into the lower channel plate, as illustrated in Figure 84. Turn lower channel plate over and rest on pin heads.
2. Install guide pins J-39630-2 (Total 6) into channel plate, as shown in Figure 85.
3. Install Spacer Plate/Gaskets.
   NOTE: THE GASKETS ARE MADE ONTO THE SPACER PLATE. IF GASKETS ARE DAMAGED THE ENTIRE SPACER PLATE MUST BE REPLACED.
4. Install four lower valve body check balls in the locations shown Figure 83, and retain with TransJel.
   NOTE: An alternative way is to place them on the spacer plate in locations shown in Figure 79 on Page 63.
5. Install lower valve body over guide pins (See Figure 86).
6. Install valve body bolts, other than bolts for pressure switch assembly, and hand tighten.
   NOTE: Refer to Figures 139 & 140 for bolt identification and lengths
7. Install tension plate and the three retaining bolts (See Figure 79).
   NOTE: Refer to Figures 139 & 140 for bolt identification and lengths.
8. Remove the guide pins.
9. Install transaxle pressure switch onto lower valve body and install bolts. (See Figure 79).
10. Install remaining valve body bolts, including bolt (534) on channel plate side (See Figures 79 & 84).
11. Torque all lower valve body bolts to 6-10 ft.lbs.
12. Install four checkballs in accumulator housing in the locations shown Figure 83, and retain with TransJel.
    NOTE: An alternative method is to place checkballs on spacer plate in locations shown in Figure 79.
13. Install guide pins J-39630-2 in channel plate for accumulator housing (See Figure 87).
14. Install spring (971) onto the channel plate with washer side down, as shown in Figure 79.
15. Install the pre-assembled accumulator housing assembly to lower channel plate and hand tighten (See Figure 79).
16. Remove guide pins and install remaining bolts, including three bolts on channel plate side (See Figure 79).
    NOTE: Refer to Figures 139 & 140 for bolt identification and lengths.

17. Torque all remaining bolts to 6-10 ft.lbs.
    NOTE: Refer to Figures 139 & 140 for bolt identification and lengths.
18. Set the completed Lower Valve Body Assembly aside for final assembly.

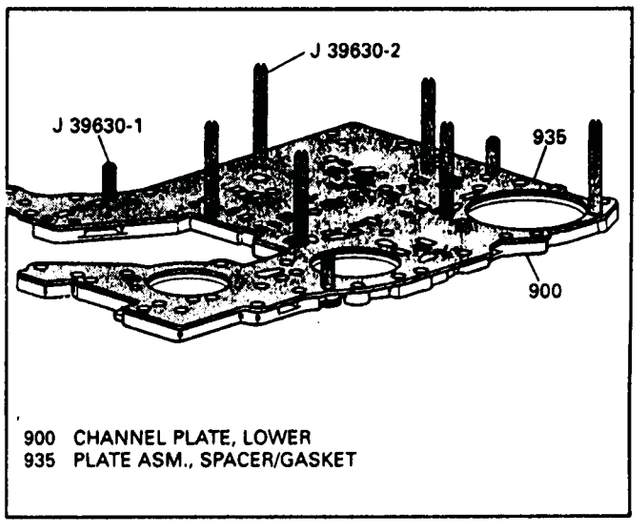


Figure 85

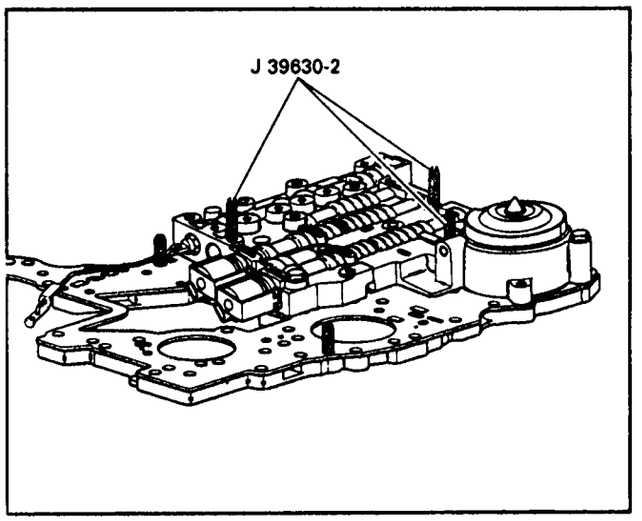


Figure 86

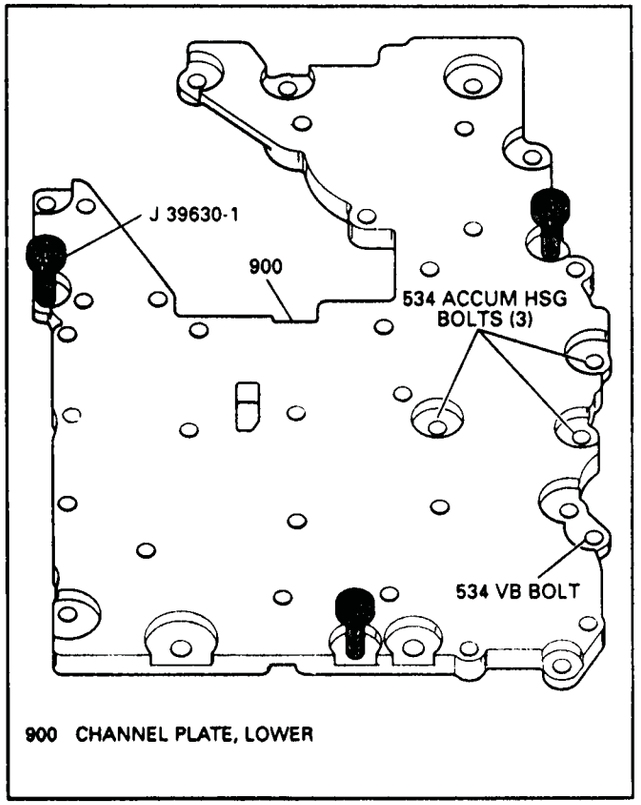


Figure 84

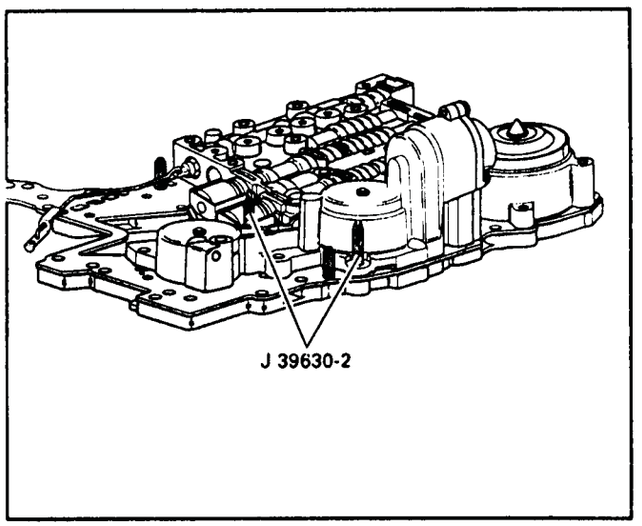
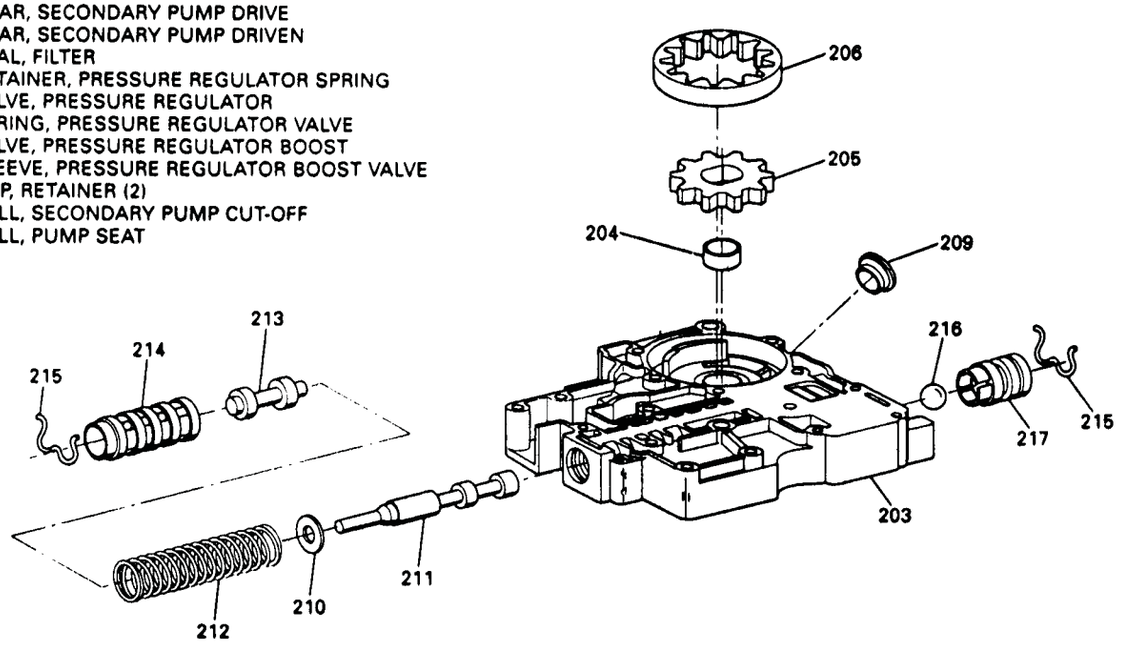


Figure 87

203 BODY, SECONDARY PUMP
204 BUSHING, SCAVENGE PUMP
205 GEAR, SECONDARY PUMP DRIVE
206 GEAR, SECONDARY PUMP DRIVEN
209 SEAL, FILTER
210 RETAINER, PRESSURE REGULATOR SPRING
211 VALVE, PRESSURE REGULATOR
212 SPRING, PRESSURE REGULATOR VALVE
213 VALVE, PRESSURE REGULATOR BOOST
214 SLEEVE, PRESSURE REGULATOR BOOST VALVE
215 CLIP, RETAINER (2)
216 BALL, SECONDARY PUMP CUT-OFF
217 BALL, PUMP SEAT



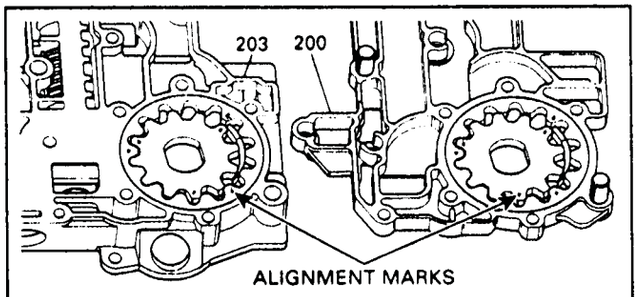
SECONDARY OIL PUMP ASSEMBLY

Figure 88

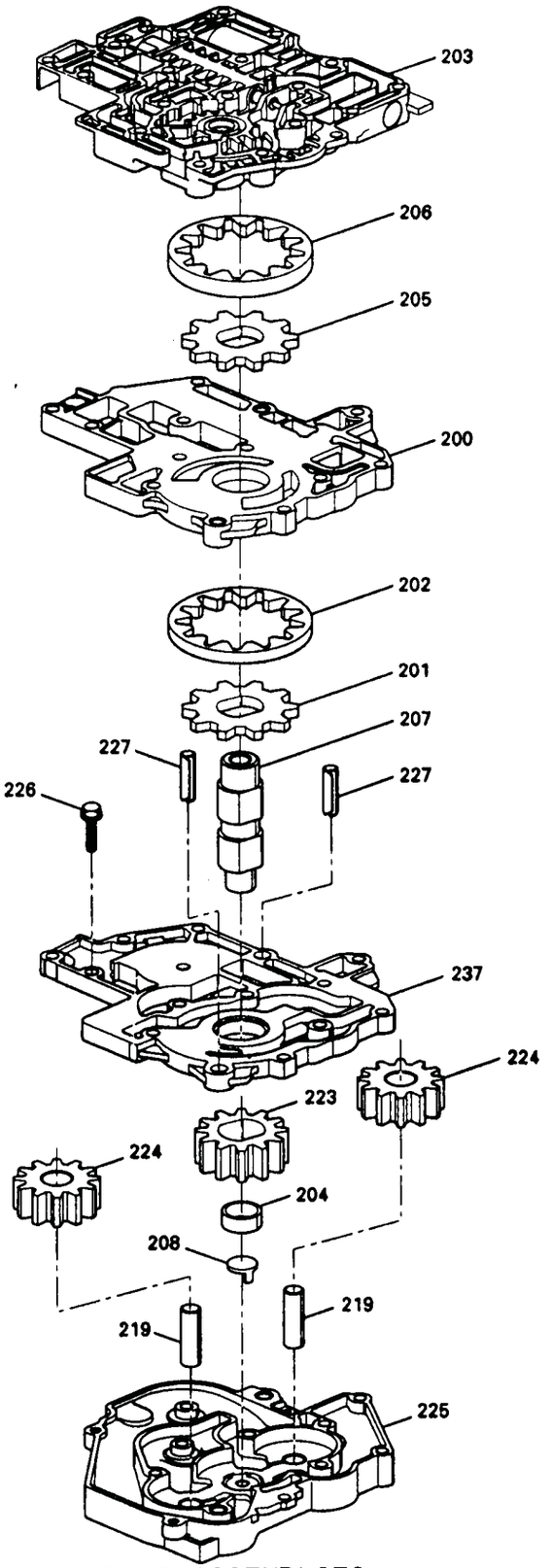
PRIMARY, SECONDARY, AND SCAVENGE
OIL PUMP ASSEMBLIES

1. Disassemble and clean all oil pump parts using the illustrations shown in Figures 88 and 89.
2. Inspect all oil pump parts shown in Figures 88 and 89 for any wear or damage.
3. Install the pressure regulator valve line-up EXACTLY as shown Figure 88.
4. Install cut off ball (216), pump ball seat and retainer clip (See Figure 88).
5. Install secondary pump gears into the secondary pump body, with the dimples facing up, as shown in Figure 89.
6. Install primary pump gears into the primary pump body, with the dimples facing up, as shown in Figure 89.
7. Lubricate both sets of pump gears with small amount of transmission fluid.
8. Install scavenge cover (237) onto the primary pump body over the dowel pins as shown in Figure 89. Tap the dowels to stick out of both the primary pump body and scavenge cover.
9. Install primary pump body assembly on secondary pump body and press entire assembly firmly together.
10. Install the oil pump driven shaft into the pump assembly (See Figure 89) The end of the shaft with four notches is located in the secondary pump.
11. Install thrust washer (208) into the scavenge pump body and retain with TransJel (See Figure 89).
12. Install scavenge pump driven gears in scavenge pump body over pins, shown in Figure 89.
13. Install scavenge pump drive gear over the oil pump driven shaft.
14. Install scavenge pump body on scavenge pump cover and press firmly in position.
15. Install two 10mm bolts (226) through scavenge pump cover into the scavenge pump body (See Figure 89).
16. Torque the bolts to 9 ft.lbs.
17. Set the completed oil pump assembly aside for final assembly.

200 BODY, PRIMARY PUMP
201 GEAR, PRIMARY PUMP DRIVE
202 GEAR, PRIMARY PUMP DRIVEN
203 BODY, SECONDARY PUMP
204 BUSHING, SCAVENGE PUMP
205 GEAR, SECONDARY PUMP DRIVE
206 GEAR, SECONDARY PUMP DRIVEN
207 SHAFT ASSEMBLY, OIL PUMP DRIVEN
208 WASHER, THRUST (OIL PUMP DRIVEN SHAFT)
219 PIN, SCAVENGE DRIVEN GEAR
223 GEAR, SCAVENGE PUMP DRIVE
224 GEAR, SCAVENGE PUMP DRIVEN (2)
225 BODY, SCAVENGE PUMP
226 BOLT, PUMP COVER TO SCAVENGE COVER (2)
227 BUSHINGS, DOWEL (2)
237 COVER, SCAVENGE PUMP

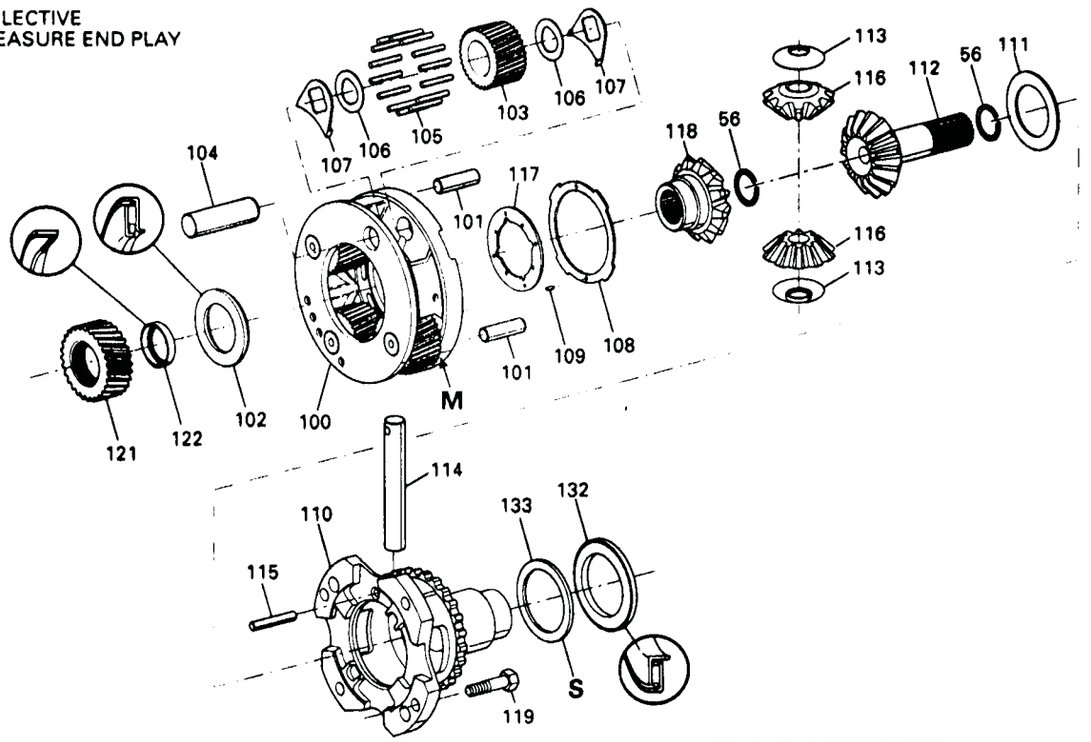


200 BODY, PRIMARY PUMP
203 BODY, SECONDARY PUMP



PRIMARY, SECONDARY, AND SCAVENGE PUMP ASSEMBLIES

Figure 89



56	RING, SNAP (OUTPUT SHAFT)	112	GEAR, DIFFERENTIAL SIDE (RIGHT)
100	CARRIER, FINAL DRIVE	113	WASHER, THRUST (DIFFERENTIAL PINION) (2)
101	DOWEL, DIFFERENTIAL CARRIER	114	SHAFT, DIFFERENTIAL PINION
102	BEARING, THRUST (SUN GEAR/CARRIER)	115	PIN, DIFFERENTIAL SHAFT RETAINING
103	PINION, FINAL DRIVE PLANET (4)	116	GEARS, DIFFERENTIAL PINION (2)
104	PIN, FINAL DRIVE PLANET PINION	117	WASHER, THRUST (DIFFERENTIAL) (LEFT)
105	BEARINGS, NEEDLE (ROLLER) (76)	118	GEAR, DIFFERENTIAL SIDE (LEFT)
106	WASHERS, THRUST (FINAL DRIVE PINION) (STEEL) (8)	119	BOLT, DIFFERENTIAL CARRIER FINAL DRIVE (4)
107	WASHERS, THRUST (FINAL DRIVE PINION) (BRONZE) (8)	121	GEAR, FINAL DRIVE SUN
108	RETAINER	122	SEAL, FINAL DRIVE SUN GEAR
109	PIN, ROLLED	132	BEARING ASSEMBLY, THRUST
110	CARRIER, DIFFERENTIAL	133	WASHER, THRUST (DIFFERENTIAL CARRIER/CASE EXTENSION) (SELECTIVE)
111	WASHER, THRUST (DIFFERENTIAL) (RIGHT)		

Figure 91

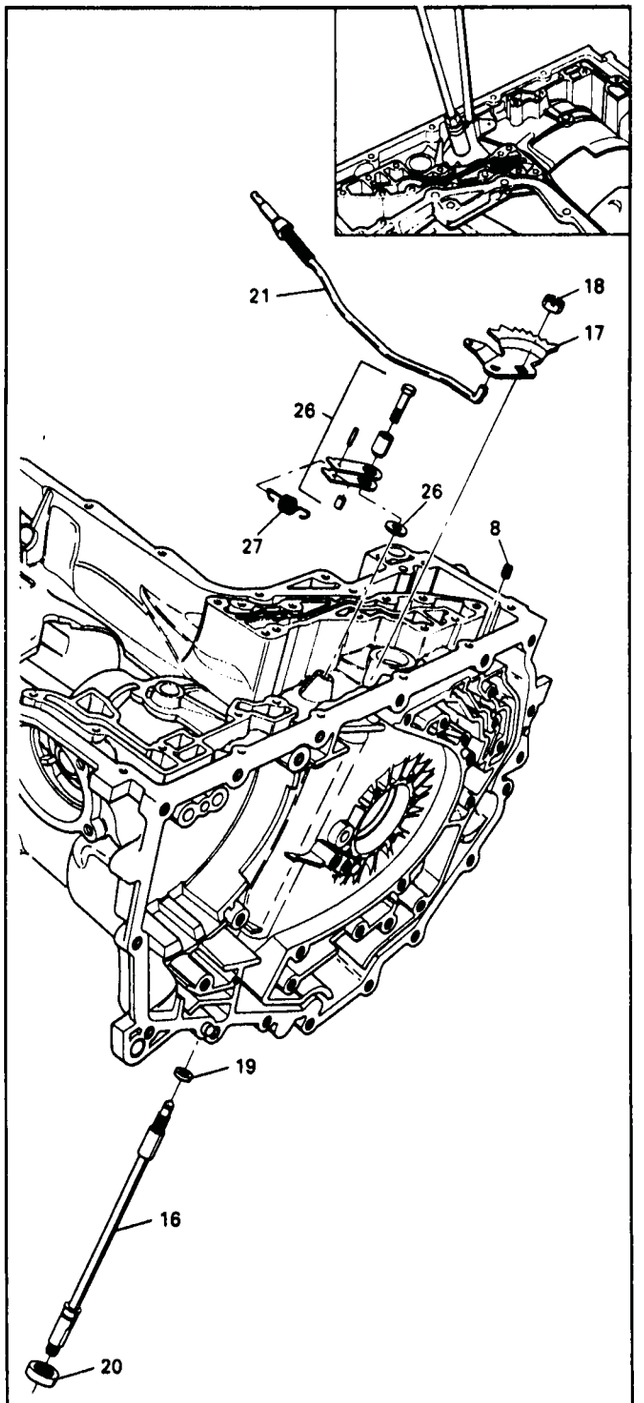
FINAL DRIVE ASSEMBLY

1. Clean and inspect all components that are shown in Figure 91.
2. Check final drive carrier pinion end play with a feeler gage. Pinion end play should be .008"-.012".
3. Remove the lube seal from the final drive sun gear and discard.
4. Install new seal (8678353 Long Lip) into final drive sun gear using a seal driver. Install the seal with the lip facing the direction shown in inset in Figure 91. Set the final drive sun gear aside for final Asm.
5. Install differential thrust washer (117) into carrier, and retain with TransJel.
6. Install differential side gear (118) into carrier (See Figure 91).
7. Install selective thrust washer (133) onto differential carrier, and retain with TransJel (See Figure 91).
8. Install thrust bearing on top of the selective washer in direction shown in Figure 91, and retain with TransJel.
9. Set final drive parts aside for final assembly.

TRANSAXLE CASE ASSEMBLY

1. Install new manual shaft seal on the manual shaft, and place manual shaft through case.
2. Seat the manual shaft seal with the appropriate size socket, so that it is flush with case.
3. Install washer (19) over manual shaft and into the case (See Figure 92).
4. Install actuator park lock sleeve (11) into case at extension housing. Refer to Figure 101.
5. Inspect the inside detent lever (17) VERY CLOSELY at the square hole where it sets on the manual shaft.
   NOTE: IF THERE IS ANY WEAR AT THIS LOCATION, THE INSIDE DETENT LEVER MUST BE REPLACED.
6. Install the inside detent lever, the actuator rod and nut to manual shaft. Hold detent lever with a screwdriver as shown in Figure 92, to prevent any damage or bending of actuator rod.
7. Torque the nut on manual shaft to 20-25 ft.lbs, while holding as shown in Figure 92.
8. Install detent roller assembly, washer, pivot arm, and sleeves.
9. Finger start detent roller bolt, and Then torque to 6-10 ft.lbs.
10. Install detent return spring to detent roller assembly and manual shaft, as shown in Figure 92.
11. Install with the small hook end of the spring around the top of the manual shaft.

Continued on next Page.



8 PLUG
16 SHAFT, MANUAL
17 LEVER, INSIDE DETENT
18 NUT, HEX
19 WASHER, MANUAL SHAFT
20 SEAL, MANUAL SHAFT
21 ACTUATOR ASSEMBLY, PARK LOCK
26 DETENT LEVER AND ROLLER ASSEMBLY
27 SPRING, DETENT

Figure 92

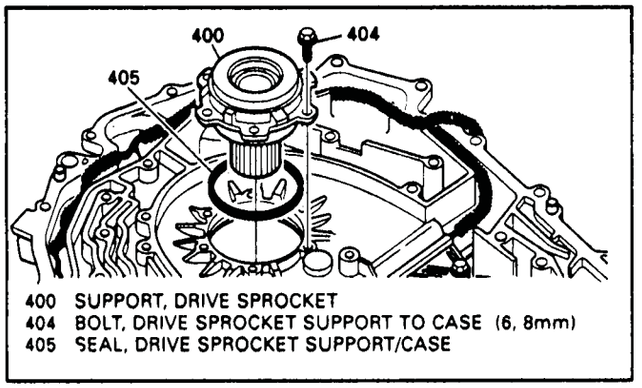


Figure 93

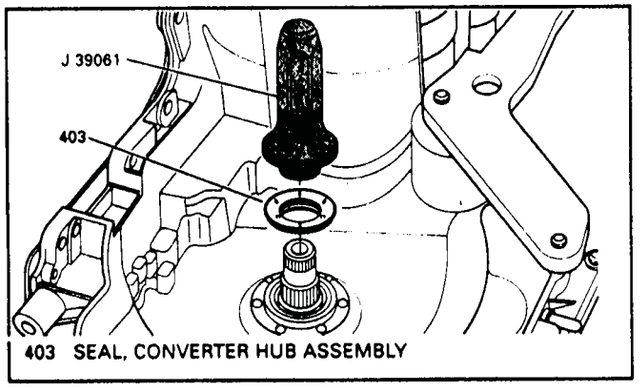


Figure 94

TRANSAXLE CASE ASSEMBLY (Continued)

12. Install new seal ring (405) onto the drive sprocket support, and retain with TransJel (See Figure 93).
13. Install six retaining bolts (404) and torque to 9 ft.lbs. (Figure 93).
14. Install converter seal into transaxle case using J-39061 seal driver, shown in Figure 94.
15. Inspect the wiring harness assembly for cut wire insulation, and any bent and/or broken connectors.
16. Install new "O" ring on case connector and lubricate with TransJel.
17. Install case connector into the case, and ensure a snap fit. Notch goes toward inside of case (Figure 95).
18. Insert the remainder of wire harness into the valleys of case housing, as shown in Figure 95.
19. Install the input speed sensor and bolt as shown in Figure 95.
20. Install speed sensor wiring harness bracket to center of case, as shown in Figure 95, torque bolts to 9 ft.lb.

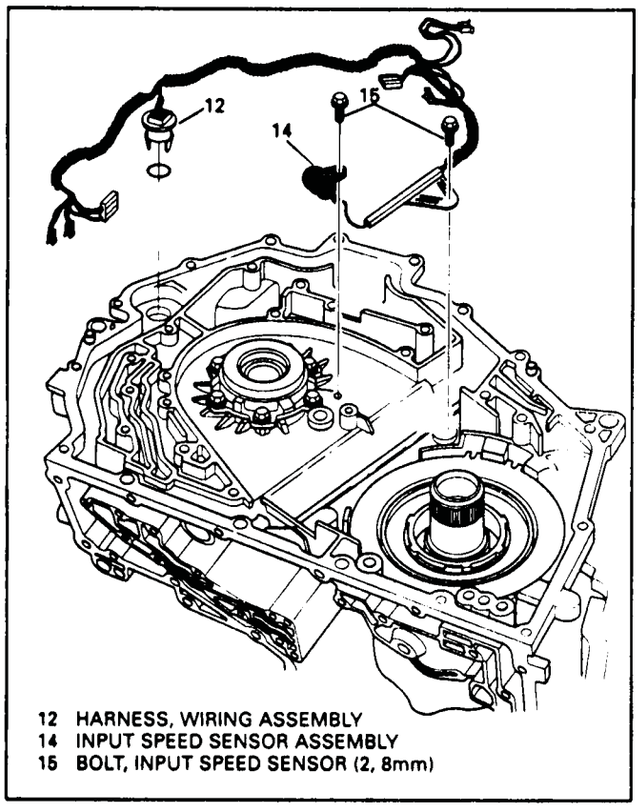


Figure 95

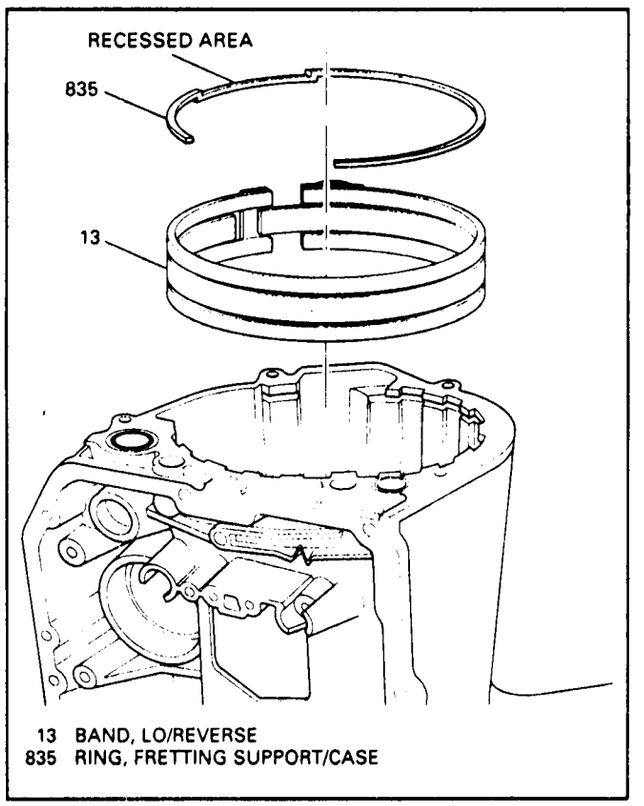


Figure 96

TRANSAXLE REASSEMBLY

LO/REVERSE BAND ASSEMBLY

1. Rotate transaxle case assembly in the fixture, so that the extension housing end is facing up, Figure 96.
2. Install the Lo/Reverse band assembly into the case (See Figure 96).
3. Band must be properly anchored in the case with the servo pin target area at the case bore.
4. Install the fretting snap ring (835) into the case as shown in Figure 96.
5. Keep the gap in fretting ring toward the bottom pan, with the recessed area next to the anchor pin, as shown in Figure 96.

Continued on next Page.

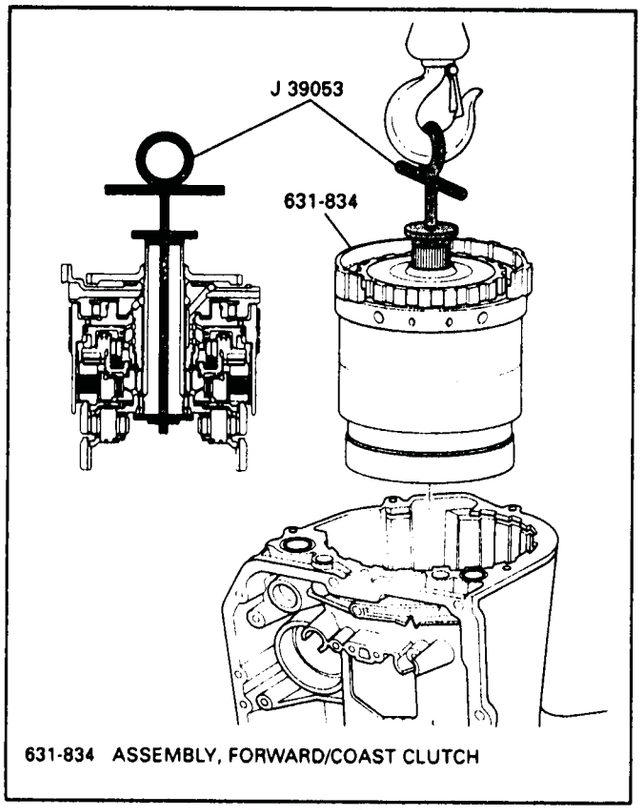


Figure 97

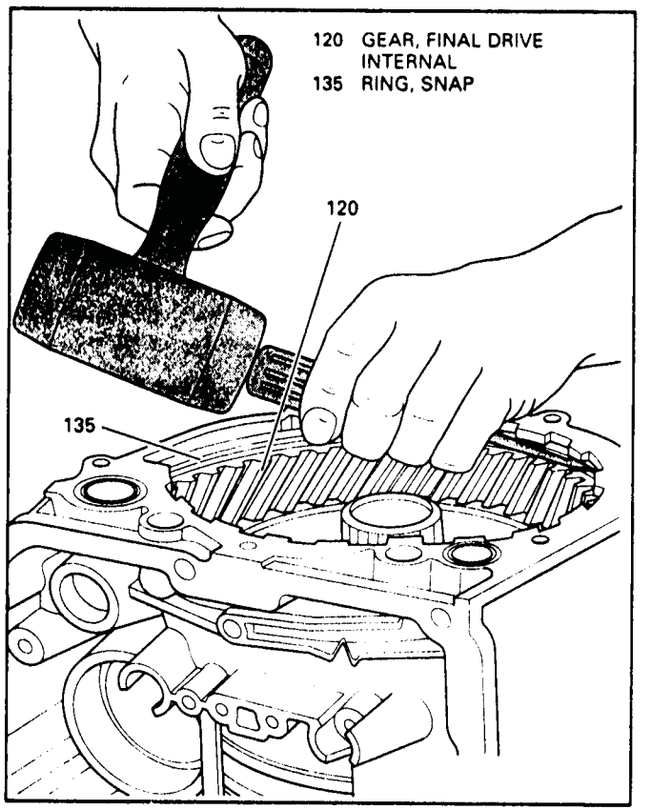


Figure 98

FORWARD/COAST CLUTCH ASSEMBLY

1. Lift the forward/coast clutch assembly into the case with chain hoist and/or sutiable lifting equipment, as shown in Figure 97.

CAUTION:
FORWARD/COAST CLUTCH ASSEMBLY
WEIGHS APPROXIMATELY 60 LBS.

2. As the assembly is lowered into case, the two bolt holes and feed holes must line up with the holes in bottom pan area of the case (See Figure 97).
3. Remove the lifting tool J-39053 from the assembly (See Figure 97).
4. Install final drive ring gear into the case as shown in Figure 98.
5. Install final drive ring gear with the groove facing up.
6. Install the final drive ring gear snap ring into case. Snap ring opening should be in scavenge tube area.
7. Set the snap ring with screwdriver and mallet, as shown in Figure 98.
8. Rotate the support counterclockwise by tapping on support with screwdriver and mallet, as shown in Figure 99.
9. Install and tighten the studs into the support as shown in Figure 100.
10. Tighten the stud nearest the bench, (Vehicle Rear), that holds the support to the case FIRST and then the stud on the other side.
11. Torque both studs to 19-20 ft.lbs.

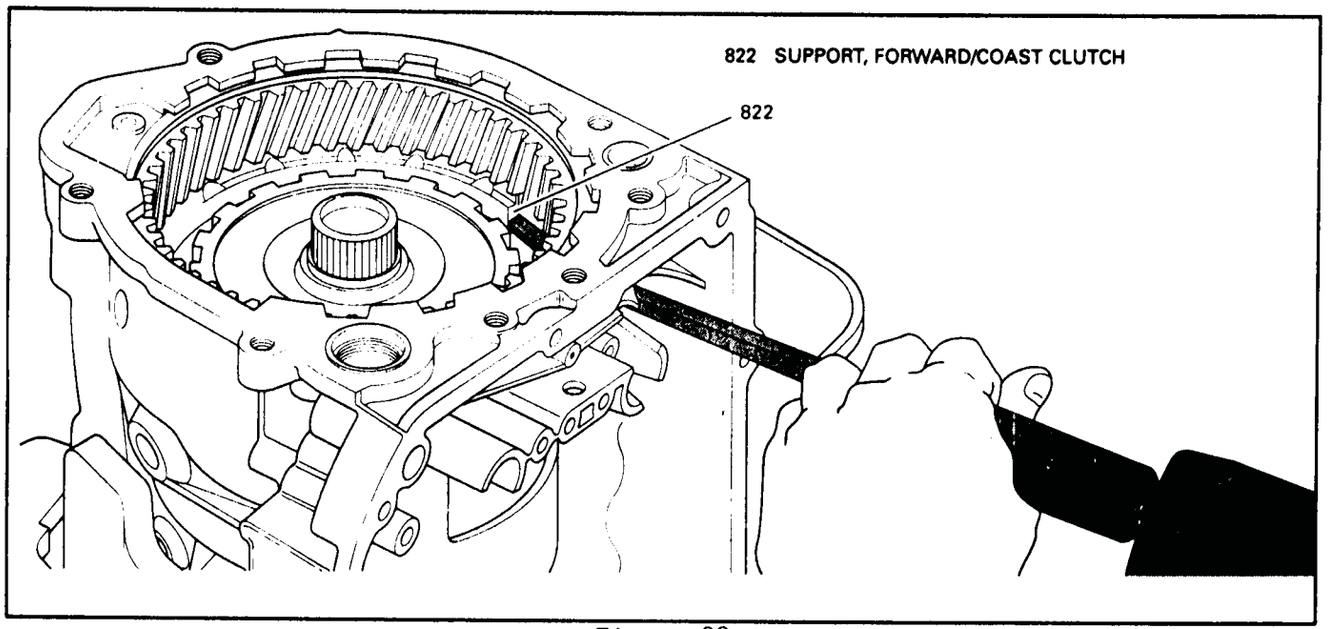


Figure 99

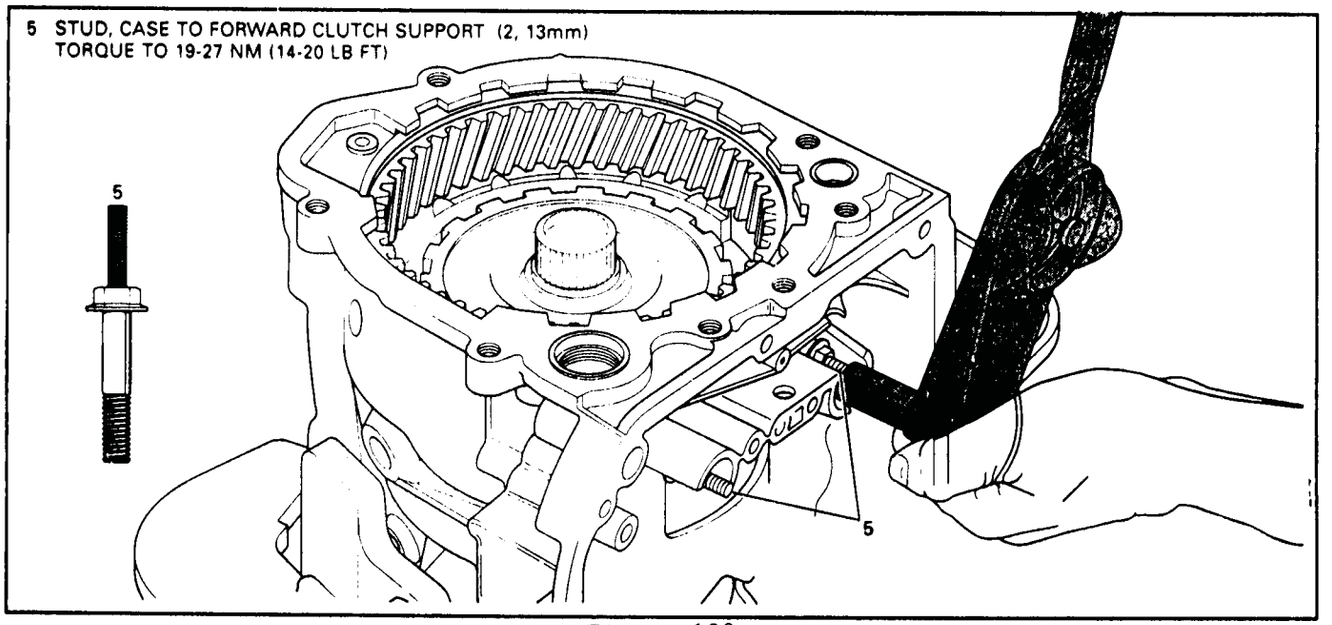


Figure 100

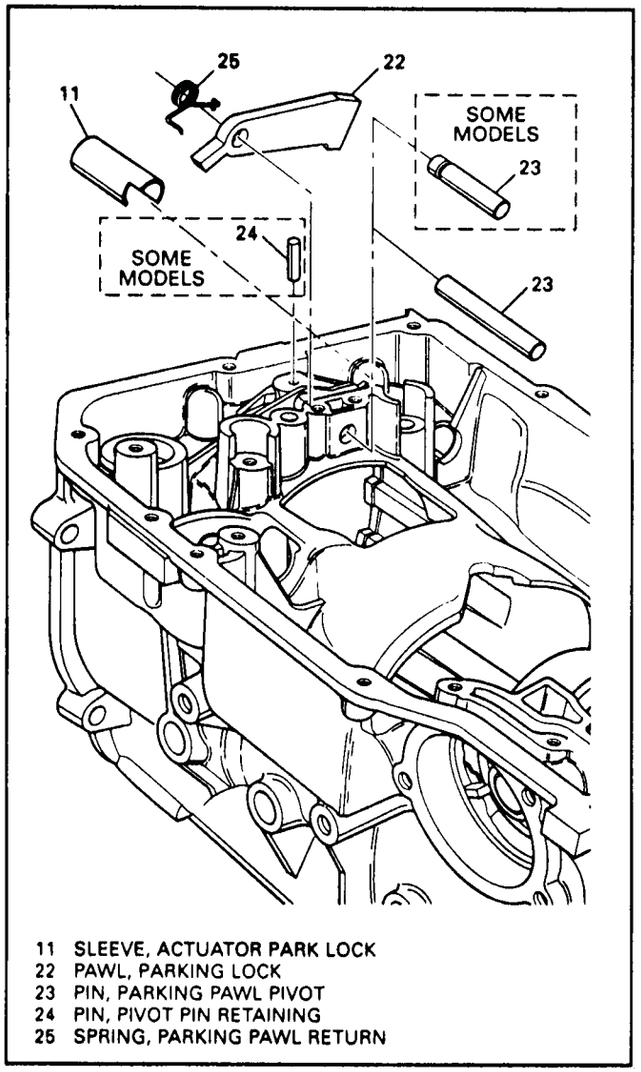


Figure 101

PARKING PAWL ASSEMBLY

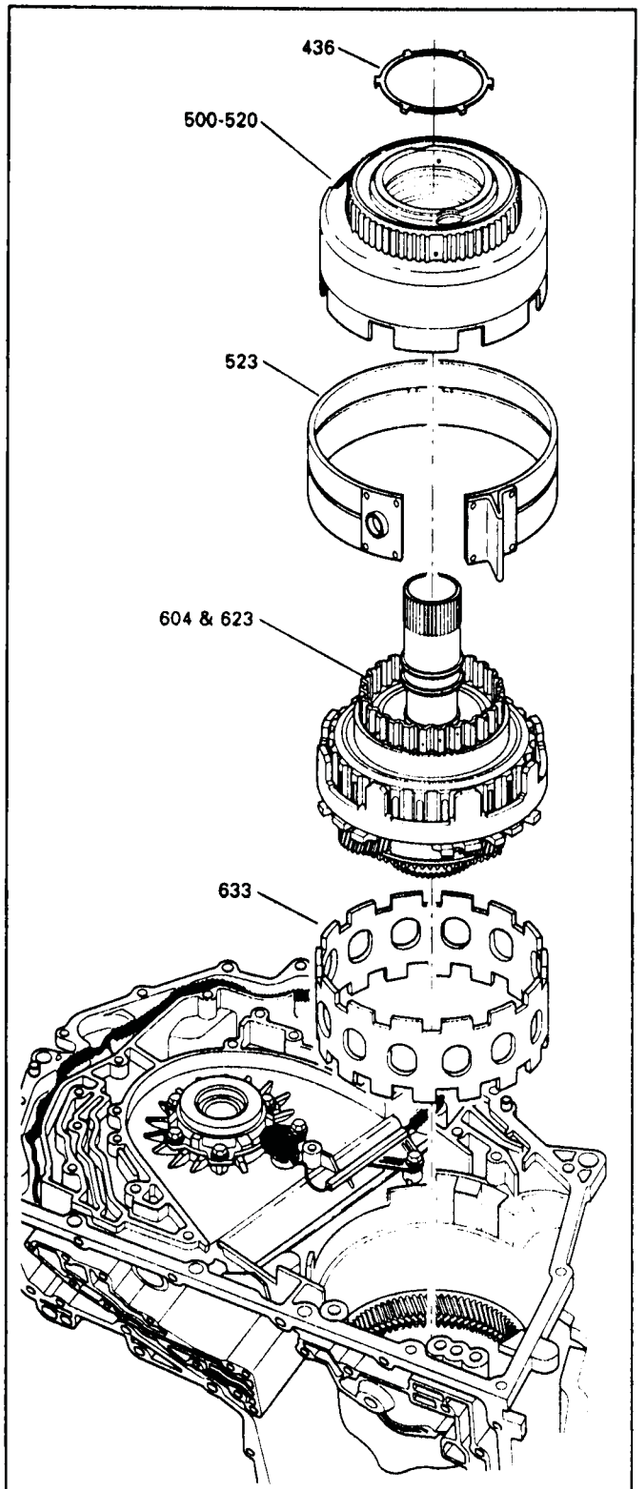
1. Place parking pawl in case slot and attach the spring to park pawl.
2. Insert the pivot pin through spring and parking pawl (See Figure 101).
3. The hook end of the spring locates on the case and the square end on top of the parking pawl.
4. Install the retaining pin (24) if used, using a hammer and pin punch. NOTE: ONLY EARLY 1993 MODELS USE A RETAINING PIN (24), OTHER MODELS USE A LONGER PIVOT PIN WITHOUT A NOTCH OR A RETAINING PIN (SEE FIGURE 101).
5. Verify correct function of parking pawl by moving the manual shaft and detent lever through the different ranges.

REACTION SHELL, THIRD CLUTCH, 4TH BAND, AND REVERSE CLUTCH HOUSING

1. Install the reaction shell (633) into the forward clutch housing, with the small teeth facing down (See Figure 102)
2. Install 3rd clutch housing and the reaction carrier assembly into case.
3. Twist the housing to install and ensure proper seating. The reaction carrier teeth must seat in reaction shell. Refer to Figure 102.
4. Install selective washer and thrust bearing onto 3rd clutch housing if they are not already there.
5. Install 4th band into case, as shown in Figure 102. The band must be seated on the anchor pin properly, with the servo pin seat toward the servo bore in the case.
6. Install reverse clutch housing and 2nd sprag assembly. External lugs on the reverse housing must seat into reaction sun shell (620), and reverse clutch teeth must engage and seat on the 3rd clutch hub (See Figure 102).
7. Install thrust washer (436) on top of reverse clutch housing with the tabs pointing down (See Figure 102).
8. Retain thrust washer with TransJel, if necessary.

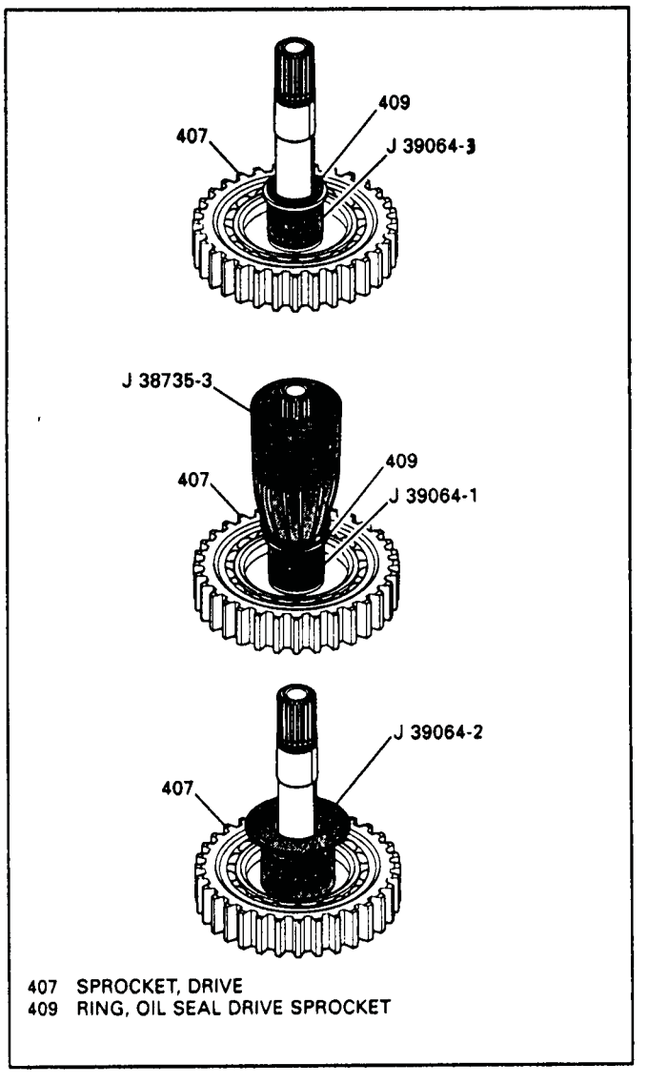
DRIVE SPROCKET SEAL

1. Remove drive sprocket seal by cutting.
2. Place tool J-39064-1 on drive sprocket as shown in Figure 103.
3. Place new drive sprocket seal on top of J-39064-1 as shown in Figure 103.
4. Using J-39064-3 installer, quickly push down and install seal into groove. (See Figure 103).
5. Use J-39064-2 to re-size the seal to proper size, as shown in Figure 103.



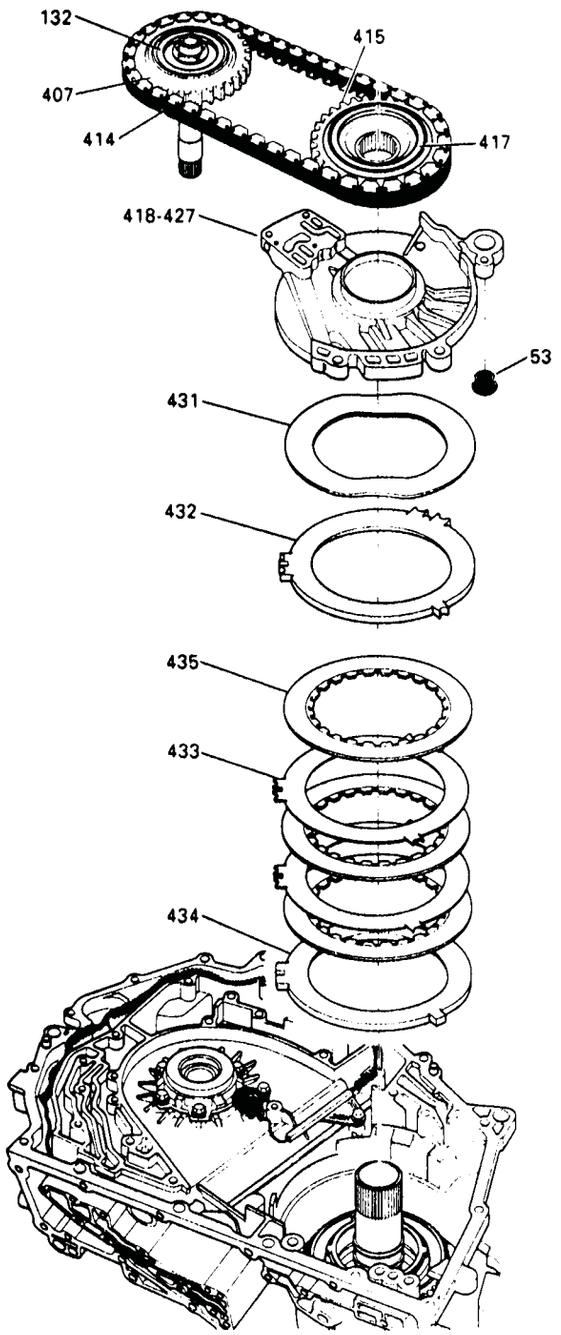
436 WASHER, THRUST (SUPPORT/REV. CLUTCH)
500-520 REVERSE CLUTCH AND RACE ASSEMBLY
523 BAND, FOURTH
604 HOUSING, THIRD CLUTCH
623 CARRIER, REACTION
633 SHELL, REACTION CARRIER

Figure 102



407 SPROCKET, DRIVE
409 RING, OIL SEAL DRIVE SPROCKET

Figure 103



53 SEAL, SCAVENGE TUBE
132 BEARING, THRUST
407 SPROCKET, DRIVE
414 DRIVE LINK ASSEMBLY
415 SPROCKET, DRIVEN
417 BEARING, THRUST
418-427 DRIVEN SPROCKET SUPPORT ASSEMBLY
431 PLATE, 2ND CLUTCH (WAVED)
432 PLATE, 2ND CLUTCH (APPLY)
433 PLATE, 2ND CLUTCH (STEEL) (2)
434 PLATE, 2ND CLUTCH (BACKING)
435 PLATE, 2ND CLUTCH (FIBER) (3)
436 WASHER, THRUST (SUPPORT/REV. CLUTCH)

Figure 104

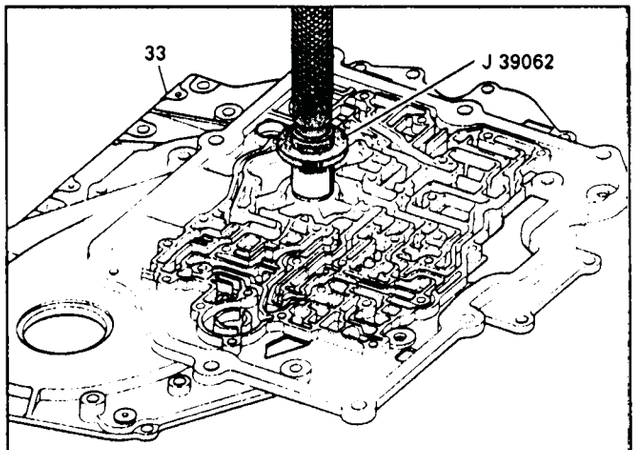
2ND CLUTCH, DRIVEN SPROCKET SUPPORT, DRIVE SPROCKET, DRIVEN SPROCKET, AND DRIVE CHAIN

1. Install the 2nd clutch backing plate as shown in Figure 104.
2. Install the 2nd clutch plates starting with a lined plate and alternating with steel plates as shown in Figure 104.
3. Install the 2nd clutch apply plate as shown in Figure 104.
4. Install the 2nd clutch wave plate on top of apply plate (See Figure 104).
5. Install preassembled driven sprocket support over input shaft as shown in Figure 104. Support will be flush with case line surface when fully seated.
6. Attach drive chain to both sprockets in same direction it was removed, as shown in Figure 104. If this is not done noise may result.
7. Install thrust bearings on top of the sprockets (See Figure 104).

CASE COVER SEALS INSTALL

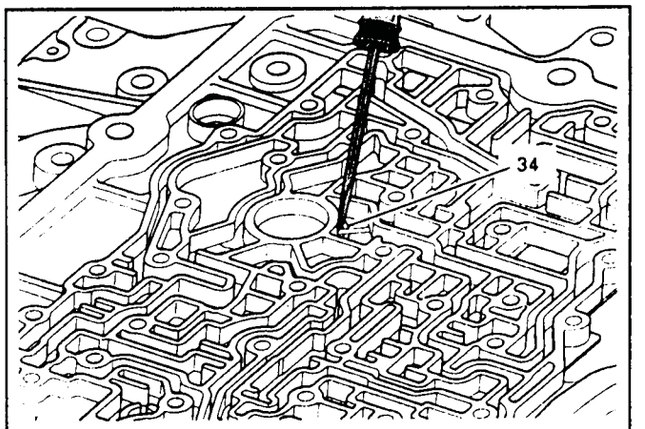
1. Remove case cover to turbine seal with tool J-39062 as shown in Figure 105.
2. Remove case cover to drive sprocket seal using a small screwdriver and tap out through slots in case cover, as shown in Figure 107.
3. Install new case cover to turbine seal using tool J-39062 (See Figure 106). This seal will go either direction as shown in inset in Figure 106.
4. Install case cover to drive sprocket seal using tool J-39648 (Figure 108). Install this seal with the lip facing down as shown in Figure 108.
5. Install new axle seal into case cover.

NOTE: THE CASE AND CASE COVER MUST BE COMPLETELY DRY OF ANY MINERAL SPIRITS OR ANY OTHER CLEANING FLUIDS. IF NOT, THE BEADED RIB SURFACE ON THE GASKET WILL TEAR AND SEPERATE FROM THE GASKET SURFACE.



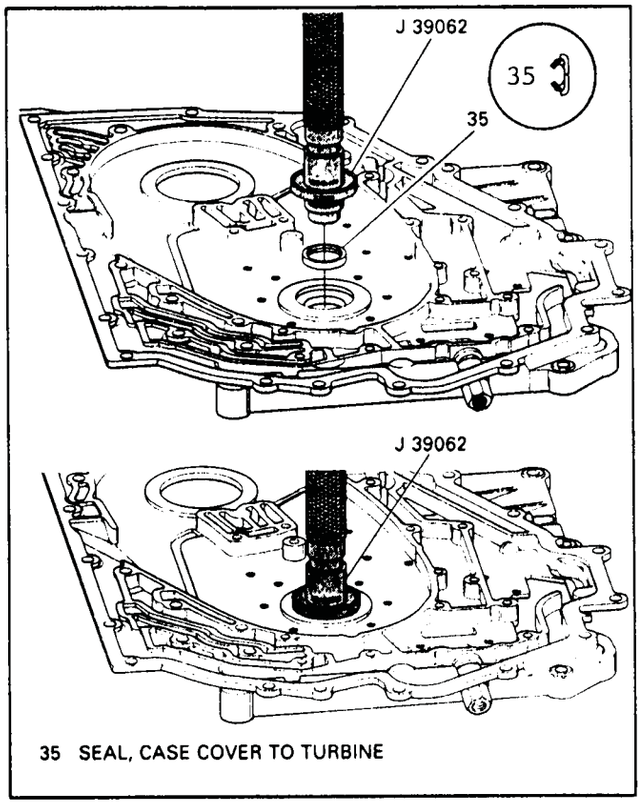
33 COVER, TRANSAXLE CASE

Figure 105



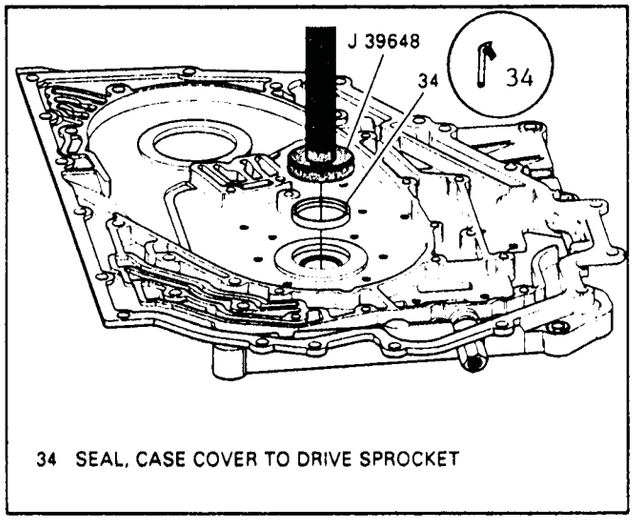
34 SEAL, CASE COVER TO DRIVE SPROCKET

Figure 107



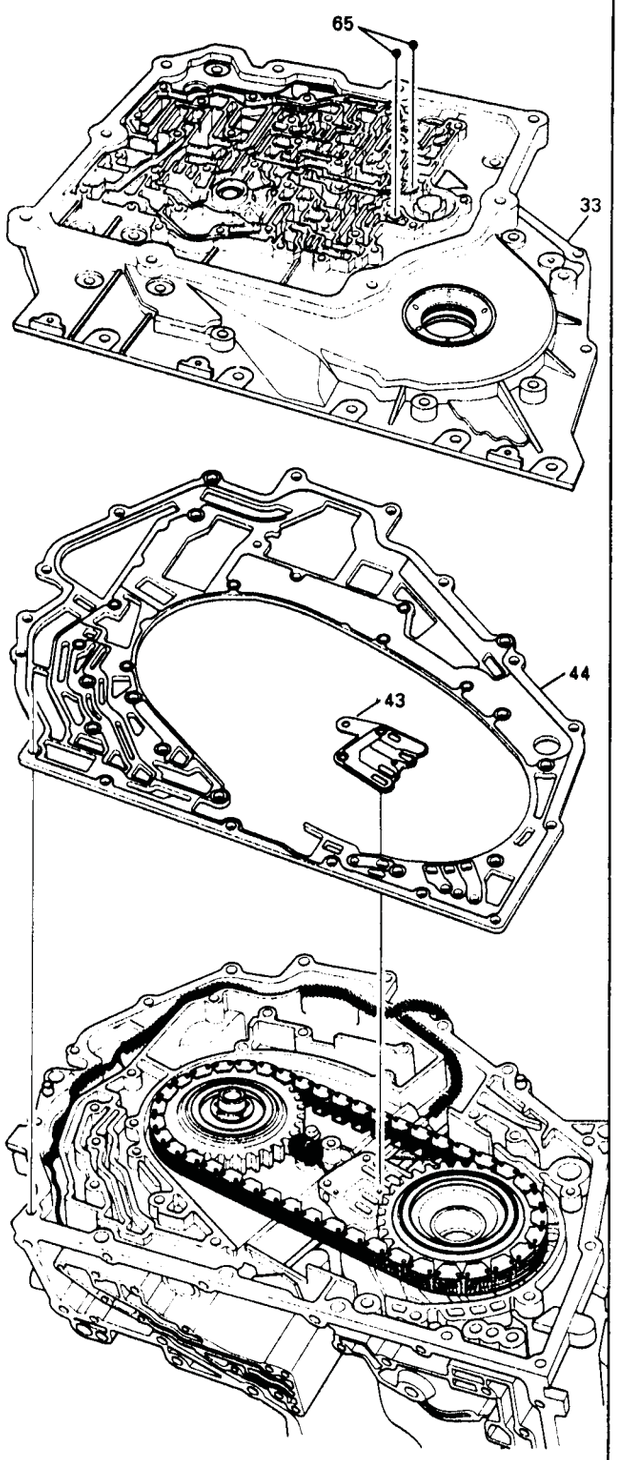
35 SEAL, CASE COVER TO TURBINE

Figure 106



34 SEAL, CASE COVER TO DRIVE SPROCKET

Figure 108



33 COVER, TRANSAXLE CASE
43 GASKET, SPROCKET SUPPORT TO CASE COVER
44 GASKET, CASE TO CASE COVER
65 CHECKBALL, (2)

Figure 109

INSTALL CASE COVER

1. Install guide pins J-39068 into driven sprocket support.
2. Install NEW island gasket (43) over guide pins onto sprocket support. (See Figure 109).
3. Install NEW case cover gasket over the dowel pins onto case (See Figure 109).
4. Pass wiring harness through the large opening at top of case cover gasket. Make sure wiring harness remains below gasket, other than portion where the connectors are attached.
5. Install the case cover over the dowel pins and onto case (See Figure 109).
6. Pass the wiring harness through the opening at top of case cover without pinching the wires.
7. Install case cover bolts and studs, and HAND TIGHTEN ONLY.
8. Torque bolts only after checking for proper end play on next page.
9. Use Figure 110 for torque sequence.
10. Torque specs are as follows:
    Stud (45) ..... 15-20 ft.lb.
    Bolts (46) ..... 15-20 ft.lb.
    Studs (47) ..... 20-23 ft.lb.
    Bolts (48) ..... 15-20 ft.lb.
    Studs (49) ..... 20-23 ft.lb.
    Bolts (50) ..... 20-23 ft.lb.

NOTE: DO NOT TORQUE BOLTS UNTIL YOU HAVE VERIFIED THE END PLAY SETTING. IF YOU TORQUE THE BOLTS AND HAVE TO REMOVE THE CASE COVER TO CHANGE THE SELECTIVE WASHER, YOU WILL HAVE TO BUY NEW CASE COVER GASKETS AGAIN. THEY ARE VERY EXPENSIVE, AS THEY ARE MOULDED TO A PIECE OF METAL.

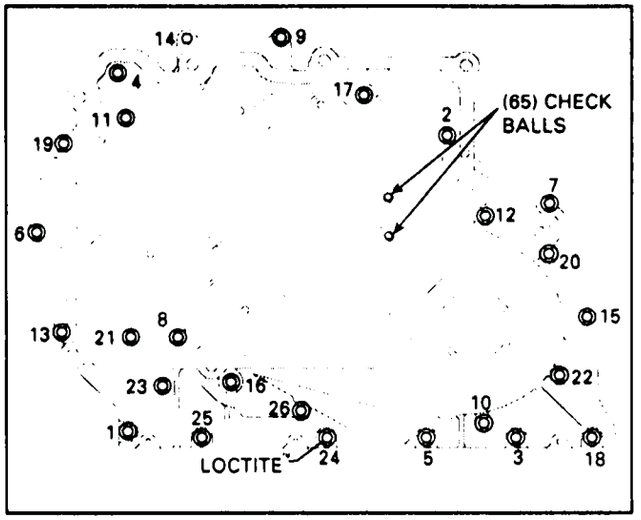
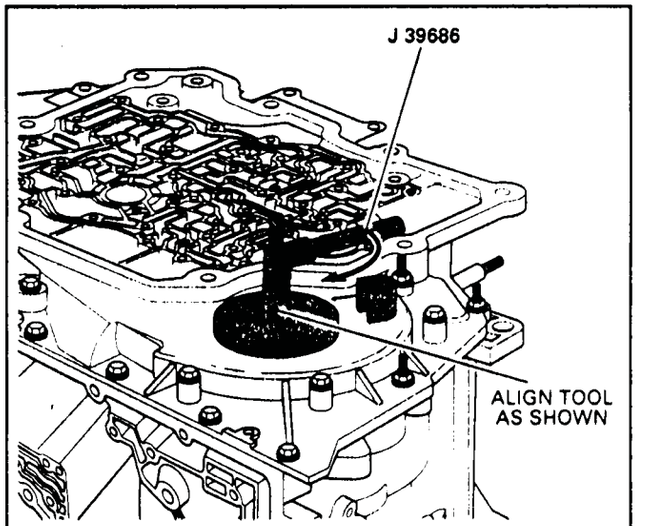
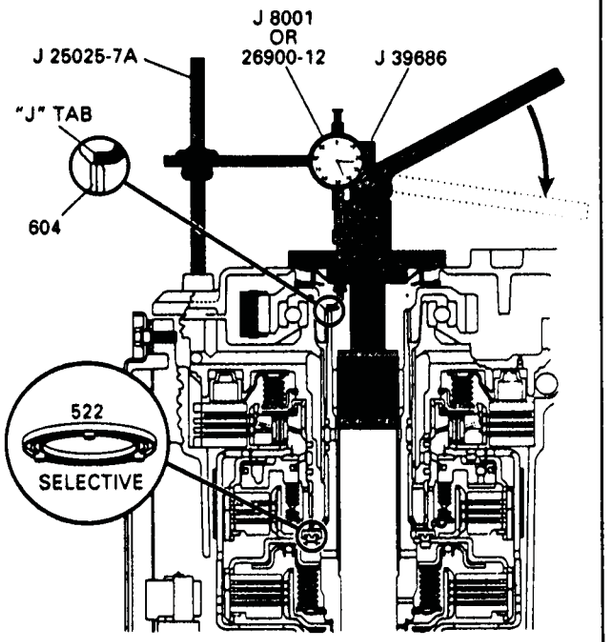


Figure 110

INPUT SHAFT END PLAY MEASUREMENT

1. Install end play tool J-39686 into the case barrel as shown in Figure 111.
2. Locate the "J" tab on end play tool on top of input shaft as shown in Figure 111.
3. Tool J-39686 must rest flat on case cover seal as shown in Figure 111.
4. Rotate threaded shaft clockwise until tight (See Figure 111).
5. Insert collar between flange and the handle of end play tool as shown in Figure 111.
6. Install dial indicator as shown in Figure 111, with the tip of the dial indicator resting on top of tab.
7. Zero the dial indicator.
8. Push down on handle and check the end play measurement.
9. Proper end play is .004"-.033".
10. Remove the dial indicator, end play tool, and the post.
11. NOW YOU CAN TORQUE THE BOLTS AND STUDS TO THEIR PROPER TORQUE AS SHOWN ON THE PREVIOUS PAGE.

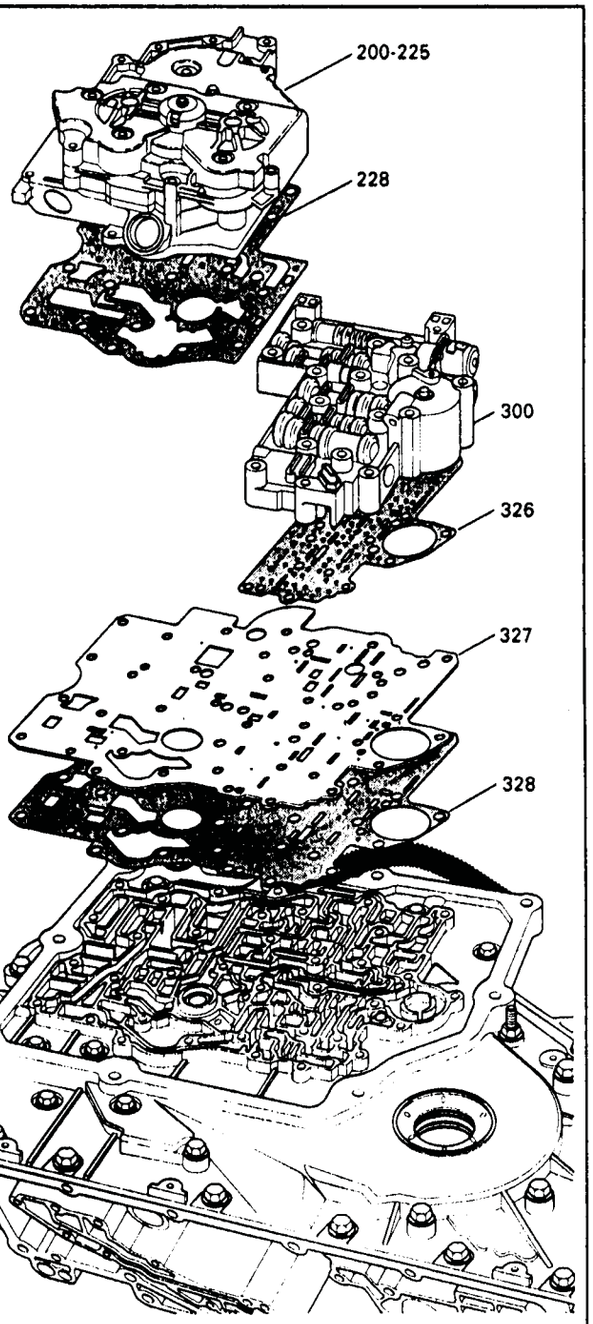




WASHER THICKNESS
2.27 - 2.49
2.58 - 2.80
2.89 - 3.11
3.20 - 3.42
3.51 - 3.73
3.82 - 4.04
4.13 - 4.35
4.44 - 4.66
4.75 - 4.97

522 WASHER, THRUST (DRIVEN SPROCKET SUPPORT) (SELECTIVE)
604 HOUSING, THIRD CLUTCH

Figure 111



200-225 PRIMARY,SECONDARY AND SCAVENGE PUMP ASM.
228 GASKET, SECONDARY PUMP BODY TO SPACER PLATE
300 BODY, UPPER CONTROL VALVE ASSEMBLY
326 GASKET, VALVE BODY TO SPACER PLATE
327 SPACER PLATE, CASE COVER ASSEMBLY
328 GASKET, SPACER PLATE TO CASE COVER

Figure 112

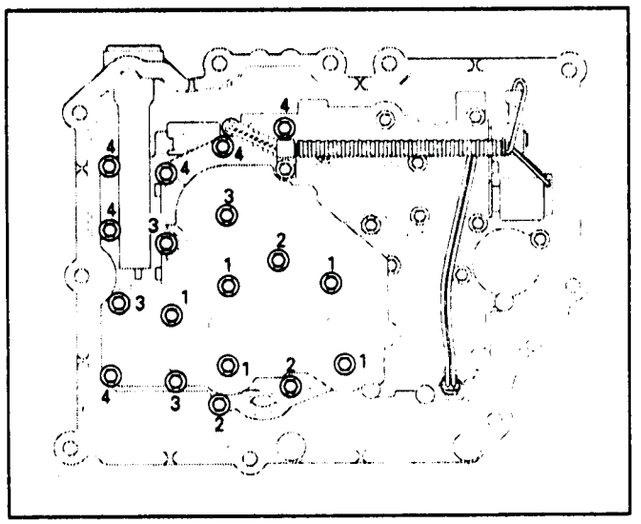


Figure 113

INSTALL UPPER VALVE BODY ASSEMBLY

1. Install two checkballs in the locations shown in Figure 29, into the case cover.
2. Install guide pins J-39068 for upper valve body assembly into case cover.
3. Install new upper valve body gasket on case cover, over the guide pins.
4. Install upper valve body spacer plate over the guide pins (See Figure 112).
5. Install new upper valve body to spacer plate gasket (326) over dowel pins. (See Figure 112).
6. Install upper valve body assembly on top of gasket on spacer plate.
7. Hand start bolts with wiring harness retaining clip properly attached. NOTE: Refer to Figure 137 for the bolt locations and identification.
8. Remove the guide pins and install the remaining bolts into valve body.
9. Torque the upper valve body bolts to 9 ft.lbs.
10. Connect the wiring harness to pressure control solenoid (Force Motor).
11. Connect the wiring harness to the TCC solenoid and temperature sensor.

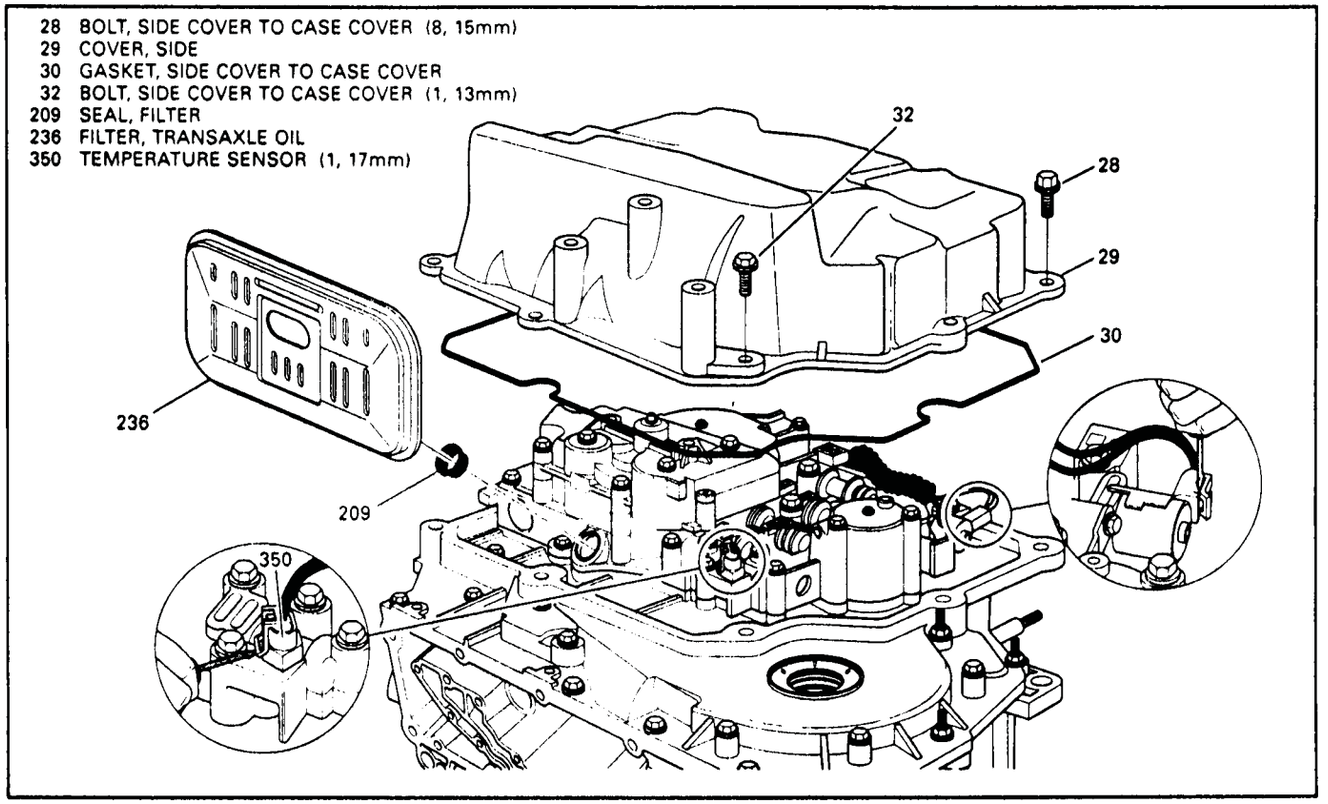


Figure 114

PRIMARY, SECONDARY, AND SCAVENGE PUMP ASSEMBLIES, AND SIDE COVER

1. Install guide pins J-39068 into case cover for pump assemblies.
2. Install new gasket over guide pins and onto spacer plate (Figure 112).
3. Install primary, secondary and the scavenge pump assemblies over the guide pins (See Figure 112).
4. Hand start the pump assembly bolts. NOTE: Refer to Figure 137 for bolt location and identification.
5. Remove the guide pins and install remaining bolts.
6. Torque pump bolts to 9 ft.lbs.
7. Use the sequence pattern as shown in Figure 113 for torquing pump.
8. Install new main filter seal (209) into pump as shown in Figure 114.
9. Install new main filter into the filter seal shown in Figure 114.
10. Install new gasket into the side cover (See Figure 114).
11. Install side cover on transaxle as shown in Figure 114.
12. Hand start all side cover bolts and then torque to 37-40 ft.lb. for bolt (28), and 15-20 ft.lb. for bolt (32). (See Figure 114).

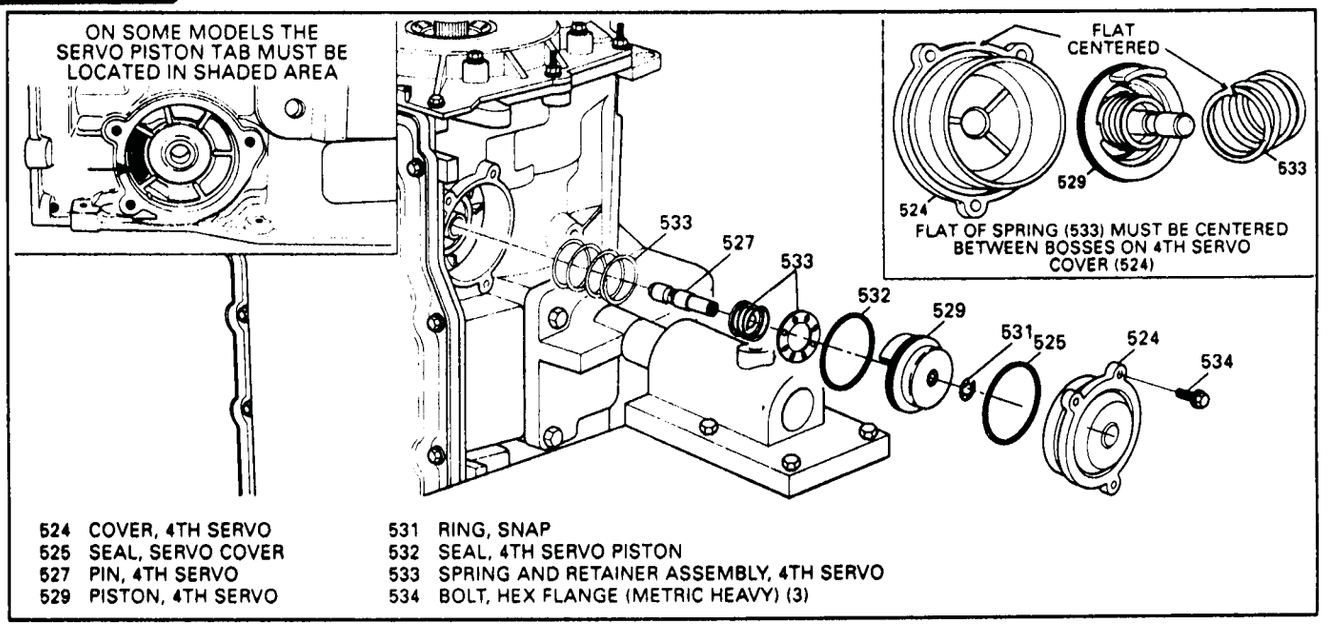


Figure 115

INSTALL 4TH SERVO ASSEMBLY

1. Install new seals onto the 4th servo piston and servo cover as shown in Figure 115, and lubricate with small amount of TransJel.
2. Assemble 4th servo assembly using Figure 115 as a guide.
3. Install 4th servo piston assembly in servo cover with return spring (See Figure 115).
4. Install 4th servo assembly into case bore. Make sure the tab on the piston is lined up with the notch in the case bore (EARLY MODELS ONLY). Refer to Figure 115.
5. Hand tighten the servo cover bolts while holding the piston compressed.
6. After all bolts are started and hand tightened, torque to 6-10 ft.lbs.

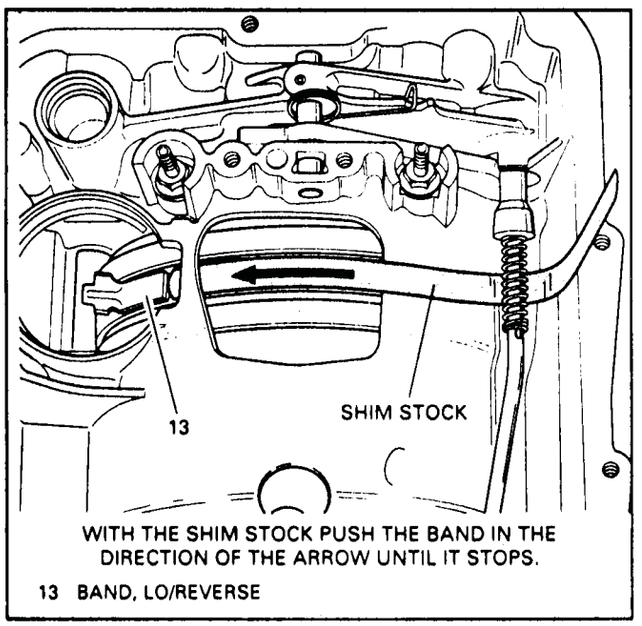


Figure 116

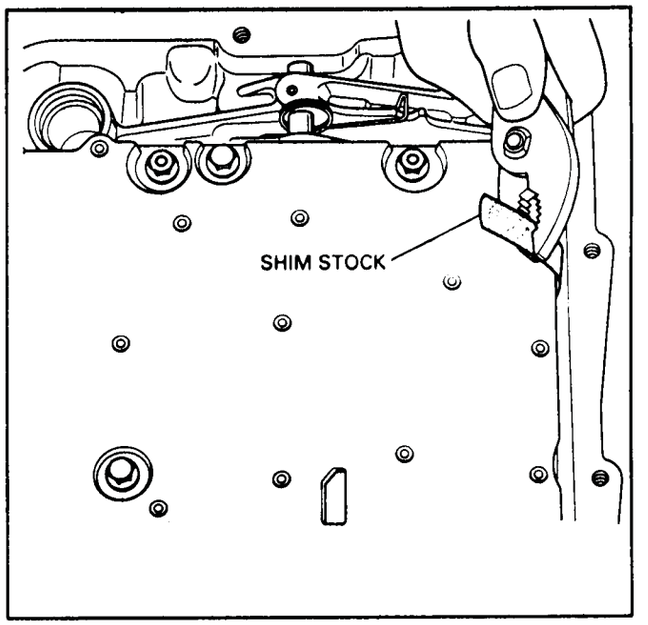
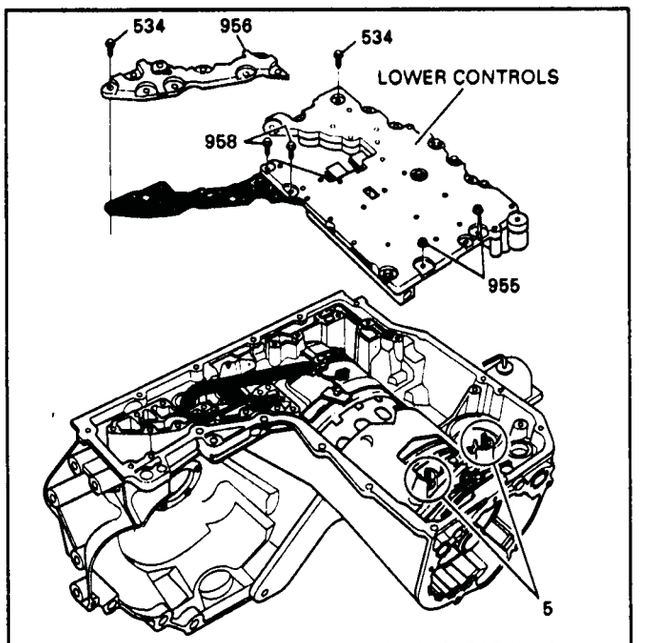


Figure 117

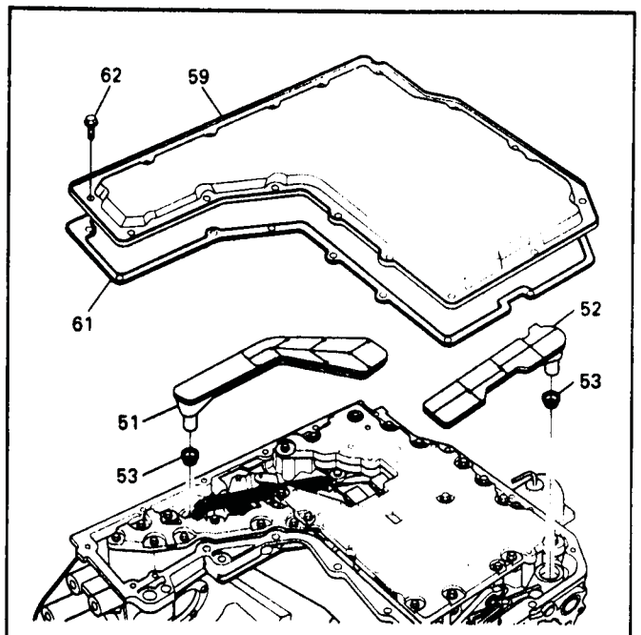
LOWER VALVE BODY ASSEMBLY

1. Rotate the transaxle in fixture so that bottom pan area is facing up, as shown in Figure 118.
2. Position the low/reverse band using a .020"-.030" long feeler gage as shown in Figure 116. With the feeler gage, push the band in the direction of the arrow until it stops (See Figure 116).
3. Place the pre-assembled lower valve body assembly over the forward support studs as shown in Figure 118.
4. Install valve body bolts and tighten by hand only.
5. Install two nuts on studs.
6. Refer to Figure 139 for bolt location and identification.
7. Remove the long feeler gage, as shown in Figure 117.
8. Place oil transfer plate (956) over open gasket area (See Figure 118).
9. Hand start all transfer plate bolts to hold in place, with wiring harness retaining clips attached properly.
10. Torque all bolts and nuts to 6-10ft.lb.
11. Connect manual valve to detent lever with manual valve retaining clip on top of detent lever.
12. Route wiring harness over spacer plate rib and the detent lever.
13. Connect the wiring harness to both of the shift solenoids and the transaxle pressure switch.



5 STUD, CASE TO FORWARD CLUTCH SUPPORT (2, 13mm)
534 BOLT, CHANNEL PLATE TO CASE (9, 10mm)
534 BOLT, OIL TRANSFER PLATE TO CASE (9, 10mm)
955 NUT, CHANNEL PLATE TO CASE (2, 10mm)
956 PLATE, OIL TRANSFER
958 BOLT, CHANNEL PLATE TO CASE (2, 10mm)

Figure 118



51 SCREEN, SCAVENGE CASE (LEFT)
52 SCREEN, SCAVENGE CASE (RIGHT)
53 SEAL, SCAVENGE SCREENS
59 PAN, TRANSAXLE OIL
61 GASKET, OIL PAN
62 BOLT, PAN TO CASE (16)

Figure 119

SCAVENGE SCREENS, BOTTOM PAN GASKET, AND BOTTOM PAN

1. Install both scavenge screen seals (53) into case, as shown in Figure 119.
2. Install new scavenge screens into the seals, as shown in Figure 119.
3. Install new bottom pan gasket onto the case (See Figure 119).
4. Install bottom pan and hand start all of the bottom pan bolts (Figure 119).
5. Torqueing of the bottom pan bolts MUST be done in TWO steps as follows.
   Step 1 = Torque to 4 ft.lbs.
   Step 2 = Torque to 9 ft.lbs.
6. Use the torque sequence as shown in Figure 120 for bottom pan.

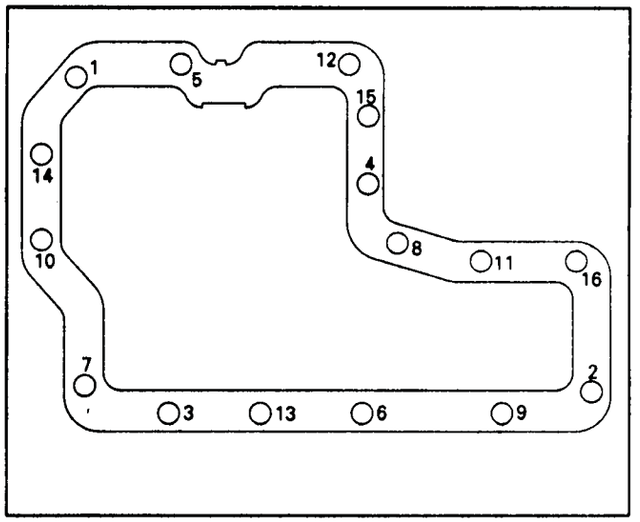
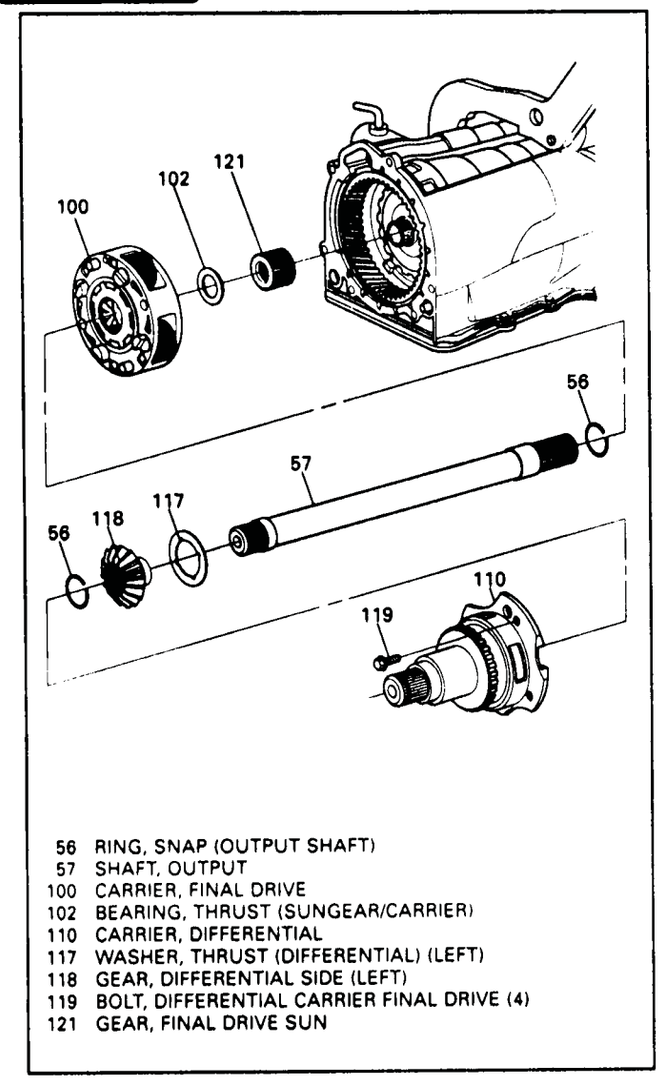


Figure 120

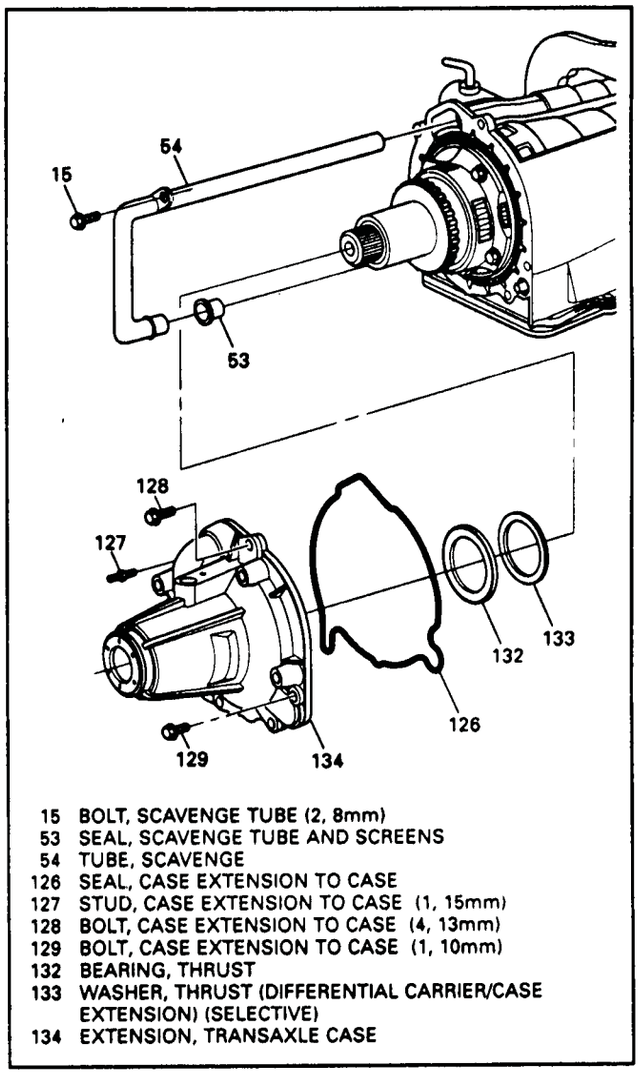
FINAL DRIVE DIFFERENTIAL ASSEMBLY AND OUTPUT SHAFT

1. Install final drive sun gear onto the final drive sun gear shaft splines, as shown in Figure 121, with the seal side side facing the differential.
2. Install the final drive carrier with the thrust bearing secured with TransJel on sun gear side, turning unit until it meshes with sun gear and ring gear. (See Figure 121).
3. Install left side thrust washer (117) on carrier and retain with TransJel. (See Figure 121).
4. Install left side differential side gear (118) as shown in Figure 121.
5. Install output shaft (57) from opposite side of transaxle, and spline it into differential side gear (Figure 121).
6. Install NEW snap ring (56) onto the output shaft. Do not overexpand the snap ring. It MUST seat down inside of the left differential side gear to allow proper assembly of differential carrier. (See Figure 121).
7. Place the transaxle in the park position with the manual shaft. This will lock the final drive unit.
8. Install differential housing (110) and hand start four bolts, as shown in Figure 121.
9. Differential housing MUST locate on the dowels on carrier (See Figure 121).
10. Torque bolts to 52-56 ft.lbs.



56 RING, SNAP (OUTPUT SHAFT)
57 SHAFT, OUTPUT
100 CARRIER, FINAL DRIVE
102 BEARING, THRUST (SUNGEAR/CARRIER)
110 CARRIER, DIFFERENTIAL
117 WASHER, THRUST (DIFFERENTIAL) (LEFT)
118 GEAR, DIFFERENTIAL SIDE (LEFT)
119 BOLT, DIFFERENTIAL CARRIER FINAL DRIVE (4)
121 GEAR, FINAL DRIVE SUN

Figure 121

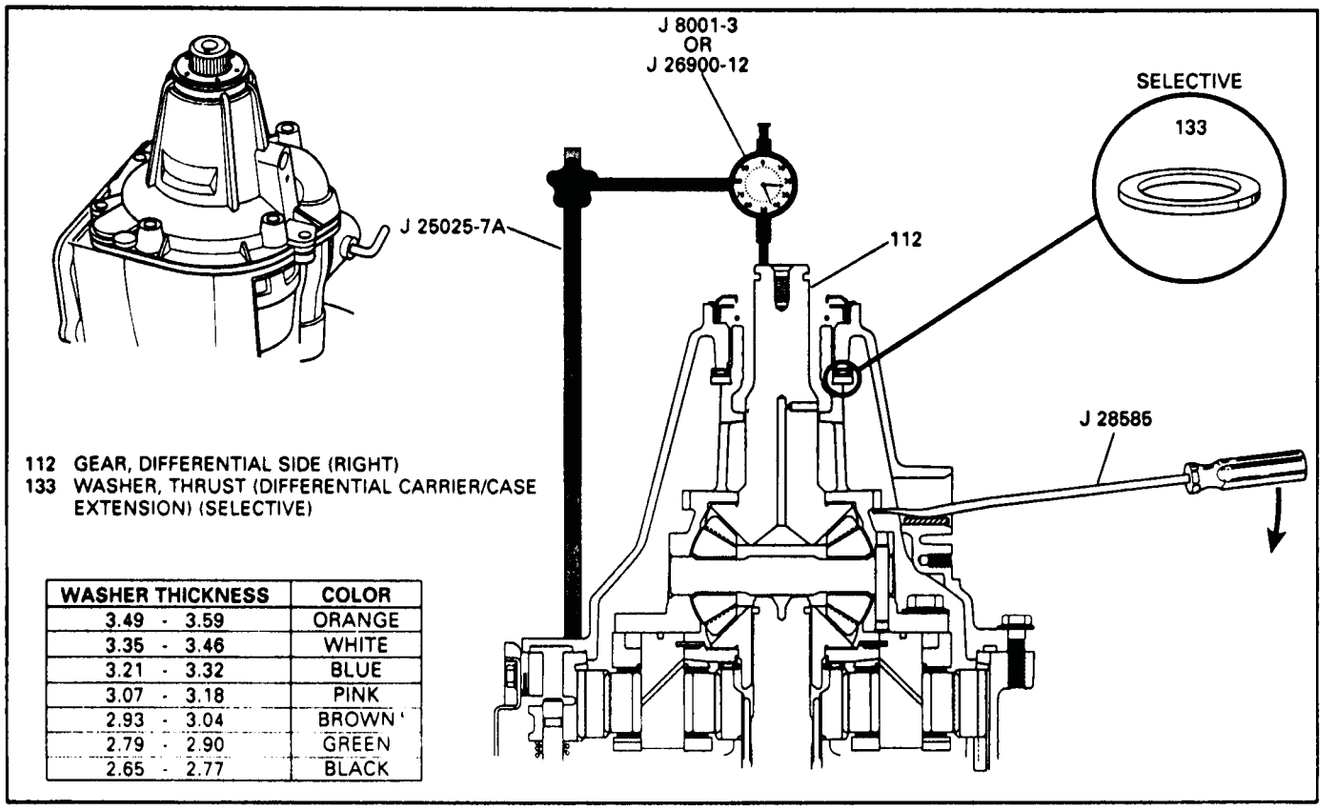


15 BOLT, SCAVENGE TUBE (2, 8mm)
53 SEAL, SCAVENGE TUBE AND SCREENS
54 TUBE, SCAVENGE
126 SEAL, CASE EXTENSION TO CASE
127 STUD, CASE EXTENSION TO CASE (1, 15mm)
128 BOLT, CASE EXTENSION TO CASE (4, 13mm)
129 BOLT, CASE EXTENSION TO CASE (1, 10mm)
132 BEARING, THRUST
133 WASHER, THRUST (DIFFERENTIAL CARRIER/CASE EXTENSION) (SELECTIVE)
134 EXTENSION, TRANSAXLE CASE

Figure 122

SCAVENGE TUBE ASSEMBLY AND
CASE EXTENSION

1. Install new scavenge tube seal (53) into the case (See Figure 122).
2. Install scavenge tube (54) into case, by tapping lightly using a plastic mallet to ensure fit in both seals. (See Figure 122). There is one seal in the case and one in the driven sprocket support.
3. The rib on the pipe will remain exposed. This is normal condition.
4. Install scavenge tube retaining bolt and torque to 6-10 ft.lbs. (See Figure 122).
5. Install selective washer and thrust bearing on to differential output shaft (See Figure 122).
6. Install new case extension axle seal into extension housing.
7. Install new case extension seal (126) into extension housing (Figure 122).
8. Install case extension onto the case and install stud and retaining bolts. (See Figure 122).
9. The stud goes in 11 o'clock position, as shown in Figure 122.
10. HAND TIGHTEN THE BOLTS UNTIL YOU HAVE VERIFIED THE FINAL DRIVE END PLAY ON NEXT PAGE.



WASHER THICKNESS	COLOR
3.49 - 3.59	ORANGE
3.35 - 3.46	WHITE
3.21 - 3.32	BLUE
3.07 - 3.18	PINK
2.93 - 3.04	BROWN
2.79 - 2.90	GREEN
2.65 - 2.77	BLACK

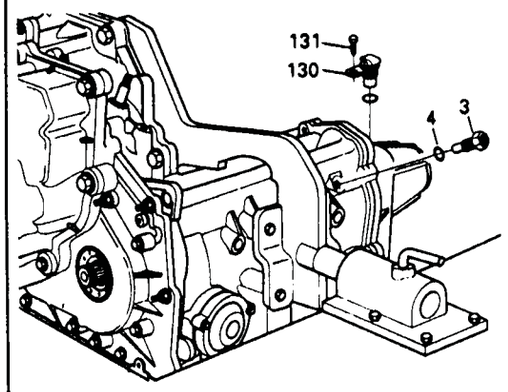
Figure 123

FINAL DRIVE END PLAY MEASUREMENT

1. Install dial indicator J-26900-12 onto transaxle, as shown in Figure 123.
2. Position dial indicator with stem on output shaft as shown in Figure 123.
3. Zero out the dial indicator.
4. Insert J-28585 through the output speed sensor bore and lift speed sensor rotor for measurement (See Figure 123).
   NOTE: PROTECT SPEED SENSOR BORE WITH A PIECE OF WOOD OR USED FILLER TUBE SEAL, TO PREVENT DAMAGE (FIGURE 123)
5. Proper final drive end play should be, .005"-.025" clearance.
6. Record measured end play and if necessary change selective washer.
7. Use the chart in Figure 123 for the proper selective thrust washer.
8. Remove the dial indicator from the transaxle.
9. Torque stud (127) and bolts (128) to 37-40 ft.lbs.
10. Torque bolts (129) to 15-20 ft.lbs.

VEHICLE SPEED SENSOR AND
RETURN COOLER LINE CONNECTOR

1. Install vehicle speed sensor and new seal into case extension, as shown in Figure 124.
2. Torque speed sensor bolt to 6-10 ft.lb.
3. Install return cooler line fitting in transaxle case, as shown in Figures 124 and 125.
4. There are two different designs of the return cooler line connector. Follow the torque specifications Figure 125.

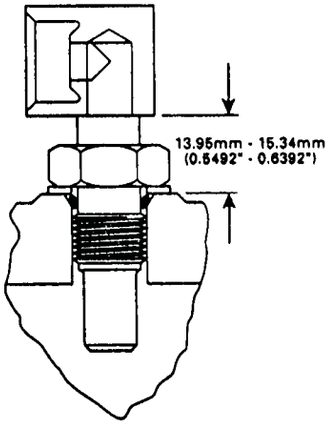


3 CONNECTOR, COOLER (RETURN)
4 CONNECTOR, O-RING COOLER (RETURN)
130 SENSOR, SPEED OUTPUT ASSEMBLY
131 BOLT, SHOULDER M6 X 1.0 X 14.0

Figure 124

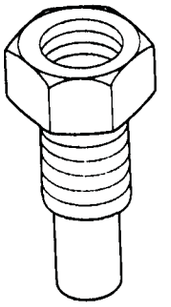
RETURN COOLER LINE FITTING

1ST DESIGN



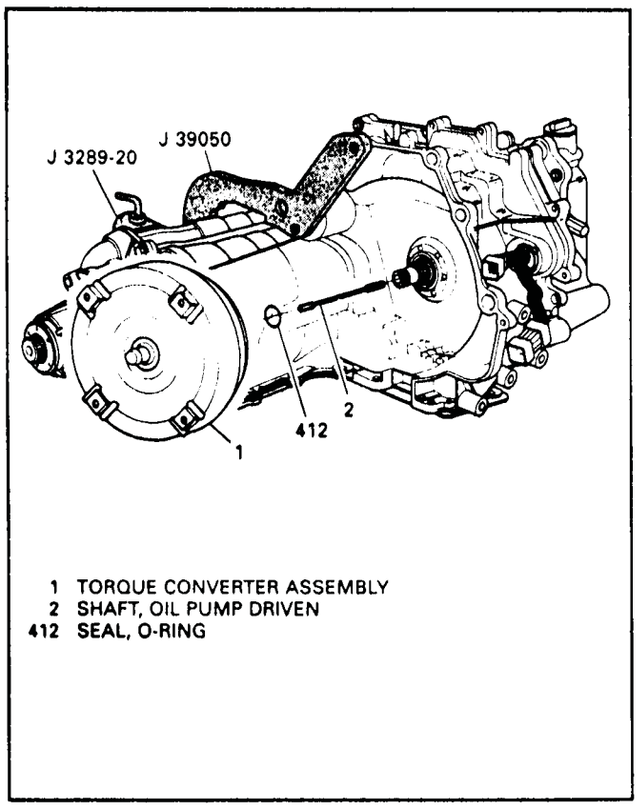
TORQUE LOCK NUT TO
19-21 FT.LB.

2ND DESIGN



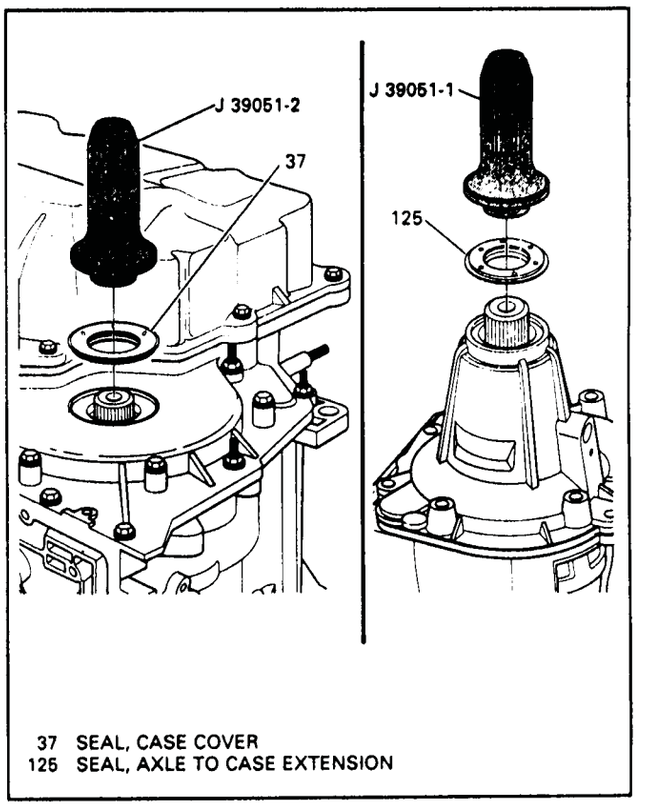
TORQUE FITTING TO
19-21 FT.LB.

Figure 125



1 TORQUE CONVERTER ASSEMBLY
2 SHAFT, OIL PUMP DRIVEN
412 SEAL, O-RING

Figure 126



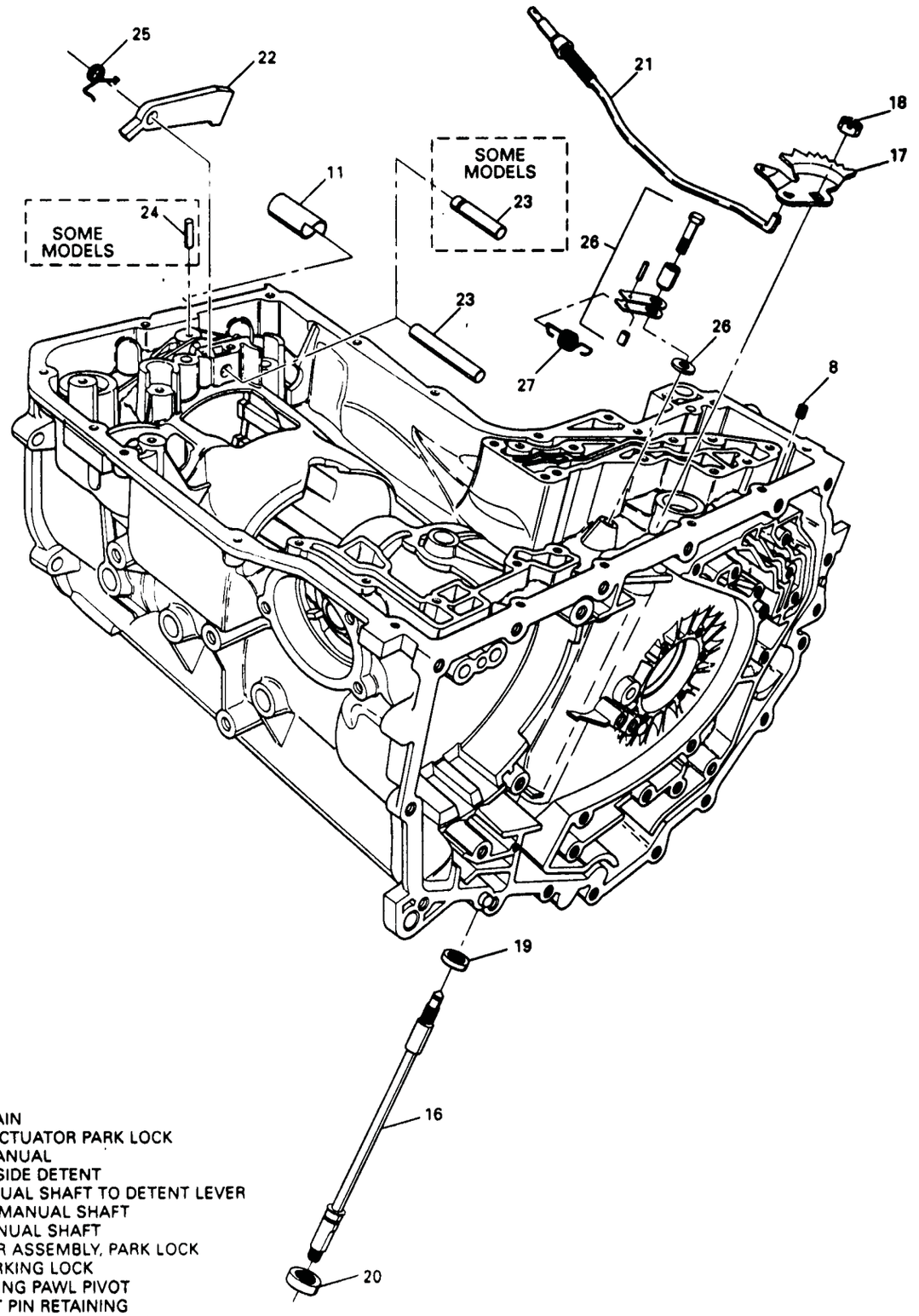
37 SEAL, CASE COVER
125 SEAL, AXLE TO CASE EXTENSION

Figure 127

PUMP DRIVE SHAFT, TORQUE CONVERTER, AND AXLE SEALS

1. Install new "O" ring on the turbine shaft (See Figure 126).
2. Install oil pump drive shaft through the turbine shaft, and rotate until it engages into oil pump. Refer to Figure 126.
3. Install torque converter onto the transaxle (See Figure 126).
4. Install new axle seals using the installation tools that are shown in Figure 127. The output shaft is used to pilot the seals and tool into the case.
5. Ensure that the snap rings are installed on output shaft.
6. Remove the transaxle from holding fixture.

CAUTION MUST BE EXERCISED WHEN REMOVING THE TRANSAXLE DUE TO ITS WEIGHT. (APPROX. 310 LBS.) CHAIN HOIST OR LIFTING DEVICE IS RECOMMENDED



8 PLUG, DRAIN
11 SLEEVE, ACTUATOR PARK LOCK
16 SHAFT, MANUAL
17 LEVER, INSIDE DETENT
18 NUT, MANUAL SHAFT TO DETENT LEVER
19 WASHER, MANUAL SHAFT
20 SEAL, MANUAL SHAFT
21 ACTUATOR ASSEMBLY, PARK LOCK
22 PAWL, PARKING LOCK
23 PIN, PARKING PAWL PIVOT
24 PIN, PIVOT PIN RETAINING
25 SPRING, PARKING PAWL RETURN
26 DETENT LEVER AND ROLLER ASSEMBLY
27 SPRING, DETENT

Figure 128

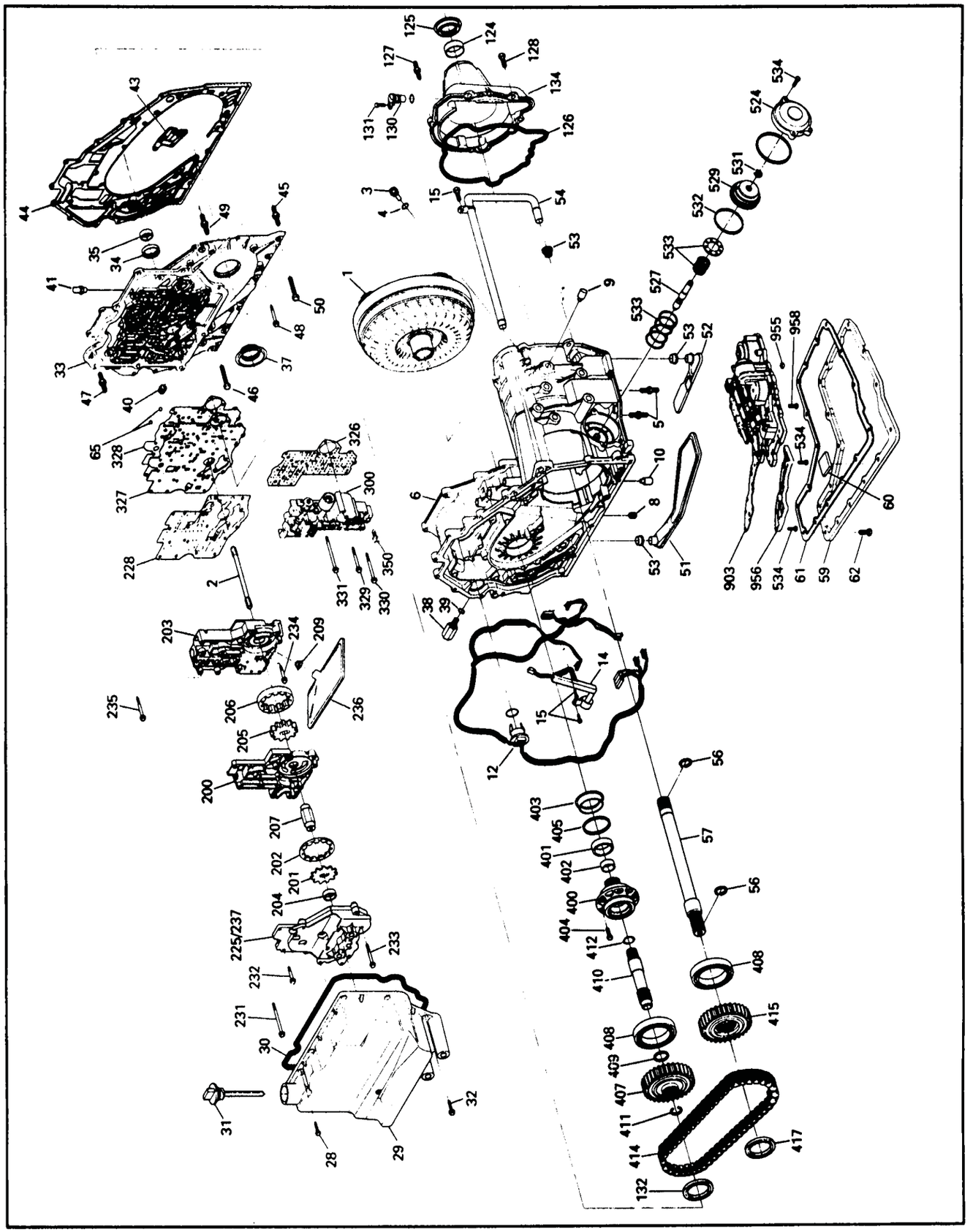


Figure 129

1 TORQUE CONVERTER ASSEMBLY
2 SHAFT, OIL PUMP DRIVEN
3 COOLER CONNECTOR, RETURN (CASE) (1, 19mm)
4 CONNECTOR, O-RING COOLER (RETURN)
5 STUD, CASE TO FORWARD CLUTCH SUPPORT (2, 13mm)
6 CASE, TRANSAXLE
8 PLUG, OIL DRAIN - BOTTOM PAN TO CASE COVER
9 PIN, ANCHOR (LO AND REVERSE)
10 PIN, ANCHOR (4TH BAND)
12 HARNESS, WIRING ASSEMBLY
14 INPUT SPEED SENSOR ASSEMBLY
15 BOLT, (4, 8mm)
28 BOLT, SIDE COVER TO CASE COVER (8, 15mm)
29 COVER, SIDE
30 GASKET, SIDE COVER TO CASE COVER
31 INDICATOR, FLUID LEVEL
32 BOLT, SIDE COVER TO CASE COVER (1, 13mm)
33 COVER, TRANSAXLE CASE
34 SEAL, CASE COVER TO DRIVE SPROCKET
35 SEAL, CASE COVER TO TURBINE SHAFT
37 SEAL, AXLE CASE COVER
38 COOLER CONNECTOR, (TO COOLER) (CASE COVER) (1, 19mm)
39 SEAL, O-RING COOLER CONNECTOR
40 PLUG, OIL TEST - #40 TORX (CASE COVER)
41 ADAPTER, TRANSAXLE VENT
43 GASKET, SPROCKET SUPPORT TO CASE COVER
44 GASKET, CASE TO CASE COVER
45 STUD, CASE COVER TO CASE (1, 13mm)
46 BOLT, CASE COVER TO CASE (8, 10mm)
47 STUD, CASE COVER TO CASE (2, 13mm)
48 BOLT, CASE COVER TO DRIVEN SPROCKET SUPPORT (3, 10mm)
49 STUD, CASE COVER TO CASE (1, 10mm)
50 BOLT, CASE COVER TO CASE (11, 13mm)
51 SCREEN, SCAVENGE (LEFT)
52 SCREEN, SCAVENGE (RIGHT)
53 SEAL, SCAVENGE TUBE AND SCREENS
54 TUBE, SCAVENGE
56 RING, SNAP (OUTPUT SHAFT) (3)
57 SHAFT, OUTPUT
59 PAN, TRANSAXLE OIL
60 MAGNET, CHIP COLLECTOR
61 GASKET, OIL PAN
62 BOLT, BOTTOM PAN TO CASE (16, 10mm)
65 CHECKBALL, (10)
124 BUSHING, CASE EXTENSION
125 SEAL, AXLE TO CASE EXTENSION
126 SEAL, CASE EXTENSION TO CASE
127 STUD, CASE EXTENSION TO CASE (1, 15mm)
128 BOLT, CASE EXTENSION TO CASE (4, 13mm)
129 BOLT, CASE EXTENSION TO CASE (1, 10mm)
130 SENSOR, SPEED OUTPUT ASSEMBLY
131 BOLT, OUTPUT SPEED SENSOR (1)
132 BEARING, THRUST
134 EXTENSION, TRANSAXLE CASE
200 BODY, PRIMARY PUMP
201 GEAR, PRIMARY PUMP DRIVE
202 GEAR, PRIMARY PUMP DRIVEN
203 BODY, SECONDARY PUMP
204 BUSHING, SCAVENGE PUMP
205 GEAR, SECONDARY PUMP DRIVE
206 GEAR, SECONDARY PUMP DRIVEN
207 SHAFT, OIL PUMP DRIVEN
209 SEAL, FILTER
225 BODY, SCAVENGE PUMP
228 GASKET, SECONDARY PUMP BODY TO SPACER PLATE
229 BOLT, (4, 8mm)
231 BOLT, PUMP ASSEMBLY TO CASE (2, 8mm)
232 BOLT, PUMP ASSEMBLY TO CASE COVER (5, 8mm)
233 BOLT, PUMP ASSEMBLY TO CASE COVER (5, 8mm)
234 BOLT, SECONDARY PUMP TO CASE COVER (1, 8mm)
235 BOLT, SECONDARY PUMP TO CASE COVER (2, 8mm)
236 FILTER, TRANSAXLE OIL
300 BODY, UPPER CONTROL VALVE
326 GASKET, VALVE BODY TO SPACER PLATE
327 SPACER PLATE, CASE COVER ASSEMBLY
328 GASKET, SPACER PLATE TO CASE COVER
329 BOLT, UPPER VALVE BODY TO CASE COVER (9, 8mm)
330 BOLT, UPPER VALVE BODY TO CASE COVER (2, 8mm)
331 BOLT, (6, 8mm)
350 TEMPERATURE SENSOR (1, 17mm)
400 SUPPORT, DRIVE SPROCKET
401 BUSHING, CONVERTER HUB
402 BUSHING, STATOR SHAFT (FRONT)
403 SEAL ASSEMBLY, CONVERTER HUB ASSEMBLY
404 BOLT, DRIVE SPROCKET SUPPORT TO CASE (6, 8mm)
405 SEAL, DRIVE SPROCKET SUPPORT TO CASE
407 SPROCKET, DRIVE
408 BEARING, BALL (2)
409 RING, DRIVE SPROCKET OIL SEAL
410 SHAFT, TURBINE
411 RING, SNAP
412 SEAL, O-RING
414 DRIVE LINK ASSEMBLY
415 SPROCKET, DRIVEN
417 BEARING, THRUST
524 COVER, 4TH SERVO
525 SEAL, SERVO COVER
527 PIN, 4TH SERVO
529 PISTON, 4TH SERVO
531 RING, SNAP
532 SEAL, 4TH SERVO PISTON
533 SPRINGS AND RETAINER ASSEMBLY, 4TH SERVO
534 BOLT, (23, 10mm)
903 CHANNEL PLATE TO CONTROL VALVE AND HOUSING ASSEMBLY
955 NUT, CHANNEL PLATE TO CASE (2, 10mm)
956 PLATE, OIL TRANSFER
958 BOLT, CHANNEL PLATE TO CASE (2, 10mm)

Figure 130

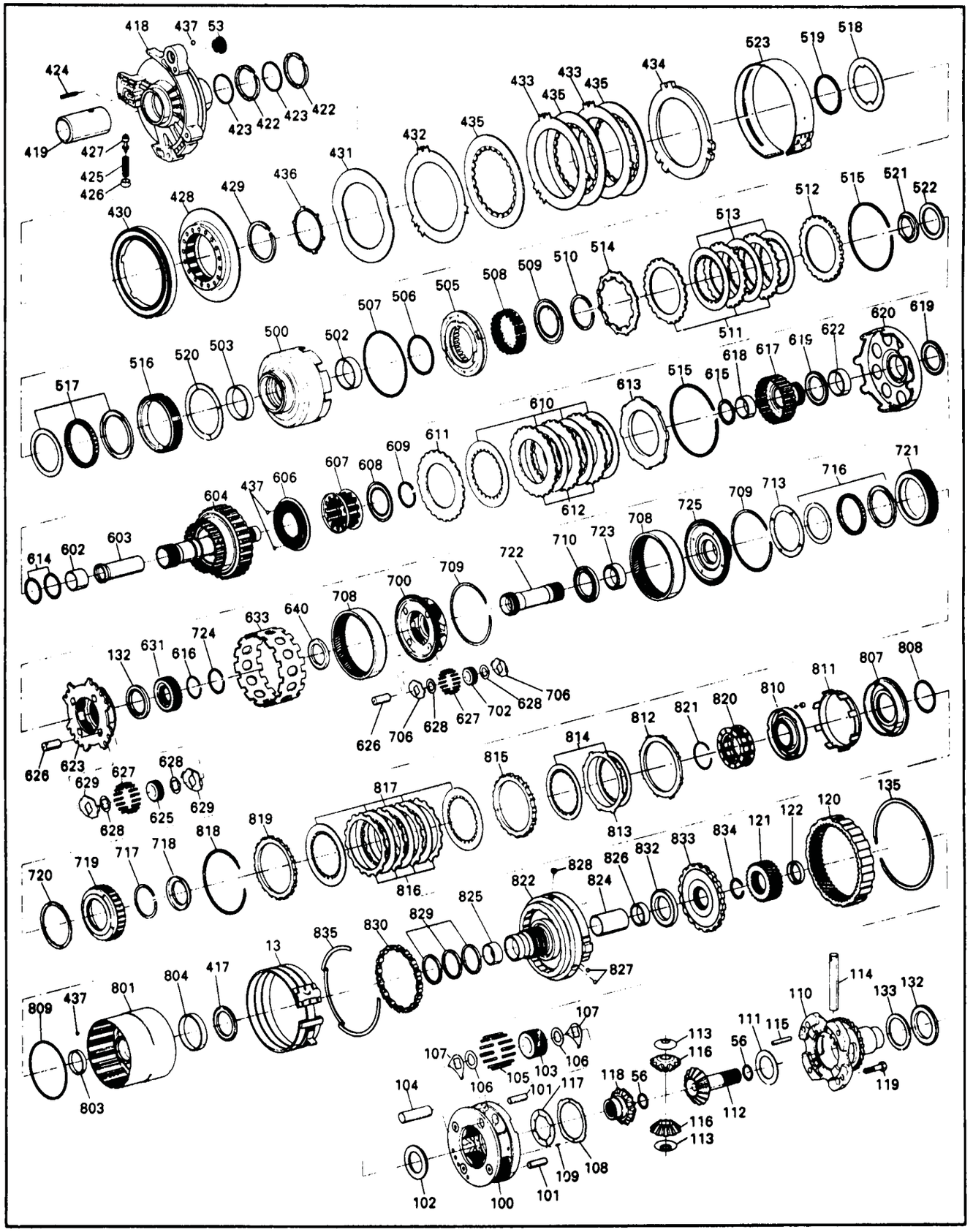
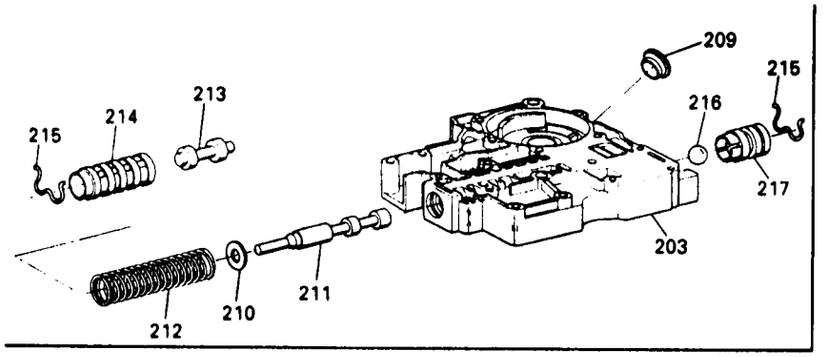
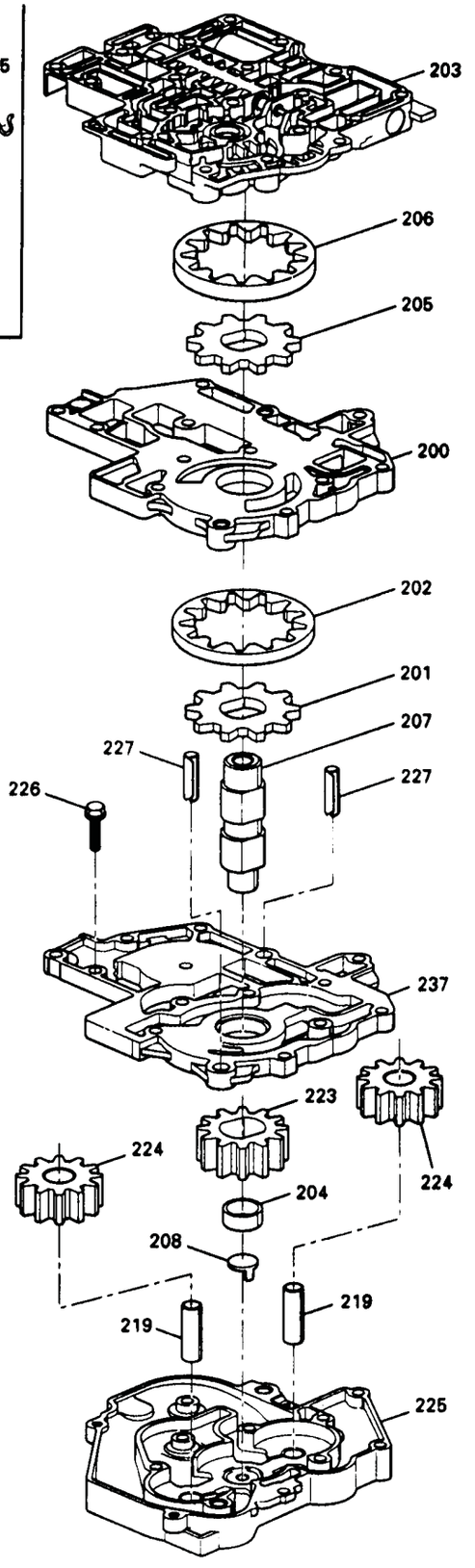


Figure 131

13 BAND, LO/REVERSE
53 SEAL, SCAVENGE TUBE
56 RING, SNAP (OUTPUT SHAFT) (3)
100 CARRIER, FINAL DRIVE
101 DOWEL, DIFFERENTIAL CARRIER (2)
102 BEARING, THRUST (SUN GEAR/CARRIER)
103 PINION, FINAL DRIVE PLANET (4)
104 PIN, FINAL DRIVE PLANET PINION (4)
105 BEARINGS, NEEDLE (ROLLER) (76)
106 WASHERS, THRUST (FINAL DRIVE PINION) (8) (STEEL)
107 WASHERS, THRUST (FINAL DRIVE PINION) (8) (BRONZE)
108 RETAINER, FINAL DRIVE CARRIER
109 PIN, ROLLED
110 CARRIER, DIFFERENTIAL
111 WASHER, THRUST (DIFFERENTIAL) (RIGHT)
112 GEAR, DIFFERENTIAL SIDE (RIGHT)
113 WASHER, THRUST (DIFFERENTIAL PINION) (2)
114 SHAFT, DIFFERENTIAL PINION
115 PIN, DIFFERENTIAL SHAFT RETAINING
116 GEARS, DIFFERENTIAL PINION (2)
117 WASHER, THRUST (DIFFERENTIAL) (LEFT)
118 GEAR, DIFFERENTIAL SIDE (LEFT)
119 BOLT, DIFFERENTIAL CARRIER FINAL DRIVE (4)
120 GEAR, FINAL DRIVE INTERNAL
121 GEAR, FINAL DRIVE SUN
122 SEAL, FINAL DRIVE SUN GEAR
132 BEARING ASSEMBLY, THRUST
133 WASHER, THRUST (DIFFERENTIAL CARRIER/CASE EXTENSION) (SELECTIVE)
135 RING, SNAP
417 BEARING, THRUST (FWD CLUTCH SUPPORT/PARK GEAR)
418 SUPPORT, DRIVEN SPROCKET
419 SLEEVE, OIL TRANSFER
422 RING, OIL (2)
423 RING, 4 LOBE SEAL (2)
424 PIN, SPRING
425 SPRING, 3RD CLUTCH EXHAUST VALVE
426 PLUG, CUP
427 VALVE, 3RD CLUTCH EXHAUST
428 2ND CLUTCH RETURN SPRING AND RETAINER ASSEMBLY
429 RING, SNAP (2ND CL /DRIVEN SPROCKET)
430 PISTON ASSEMBLY, 2ND CLUTCH
431 PLATE, 2ND CLUTCH (WAVED)
432 PLATE, 2ND CLUTCH (APPLY)
433 PLATE, 2ND CLUTCH (STEEL) (2)
434 PLATE, 2ND CLUTCH (BACKING)
435 PLATE, 2ND CLUTCH (FIBER) (3)
436 WASHER, THRUST (SUPPORT/REV. CLUTCH)
437 CHECKBALL, .1875 DIA.
500 HOUSING, REVERSE CLUTCH AND RACE ASSEMBLY
502 BUSHING, (SMALL)
503 BUSHING, (LARGE)
505 PISTON ASSEMBLY, REVERSE CLUTCH
506 SEAL, (INNER)
507 SEAL, (OUTER)
508 SPRING AND RETAINER ASSEMBLY
509 RETAINER, SNAP RING
510 RING, SNAP (RETURN SPRING)
511 PLATE, REVERSE CLUTCH (STEEL) (3)
512 PLATE, REVERSE CLUTCH BACKING (SELECTIVE)
513 PLATE ASSEMBLY, REVERSE CLUTCH (FIBER) (3)
514 PLATE, BELLEVILLE (APPLY)
515 RING, SNAP
516 RACE, 2ND SPRAG (OUTER)
517 CLUTCH ASSEMBLY, SECOND SPRAG
518 RETAINER, SECOND SPRAG CLUTCH
519 RING, LOCKING
520 WASHER, SECOND CLUTCH OUTER RACE
521 BEARING, THRUST
522 WASHER, THRUST (DRIVEN SPROCKET SUPPORT) (SELECTIVE)
523 BAND, FOURTH
602 BUSHING, INPUT SHAFT
603 SLEEVE, INPUT SHAFT/OIL TRANSFER
604 HOUSING, THIRD CLUTCH
606 PISTON ASSEMBLY, THIRD CLUTCH
607 SPRING AND RETAINER ASSEMBLY
608 RETAINER, SNAP RING
609 RING, RETURN SPRING SNAP
610 PLATE ASSEMBLY, THIRD CLUTCH (FIBER) (4)
611 PLATE, APPLY (STEEL)
612 PLATE, THIRD CLUTCH (3)
613 PLATE, BACKING
614 RING, OIL SEAL (2)
615 WASHER, THRUST (INPUT SHAFT/3RD HUB)
616 RING, SNAP (INPUT SHAFT/INPUT SUN GEAR)
617 HUB, THIRD CLUTCH
618 BUSHING, HUB
619 BEARING ASSEMBLY, THRUST
620 GEAR AND SHELL ASSEMBLY, REACTION SUN
622 BUSHING, REACTION SUN GEAR
623 CARRIER, REACTION
625 PINION, PLANET (4)
626 PIN, PLANET PINION (4)
627 NEEDLE, ROLLER BEARING (68)
628 WASHER, PINION THRUST (STEEL) (8)
629 WASHER, PINION THRUST (BRONZE) (8)
631 GEAR, INPUT SUN
633 SHELL, REACTION CARRIER
640 BEARING, THRUST (INPUT SUN GEAR TO REACTION CARRIER)
700 CARRIER, INPUT
702 PINIONS, PLANET (4)
706 WASHER, THRUST (BRONZE) (8)
708 GEAR, INTERNAL (2)
709 RING, SNAP (2)
710 BEARING ASSEMBLY, THRUST
713 WASHER, THRUST (FLANGE TO OUTER RACE)
716 SPRAG ASSEMBLY, FORWARD CLUTCH
717 RING, SNAP (COAST CLUTCH HUB RETAINER)
718 BEARING, THRUST (FLANGE/FORWARD CLUTCH HOUSING)
719 HUB, COAST CLUTCH
720 WASHER, THRUST (RACE/COAST CLUTCH HUB)
721 RACE, FORWARD SPRAG (OUTER)
722 SHAFT, FINAL DRIVE SUN GEAR
723 BUSHING, INPUT FLANGE
724 RING, SNAP (FINAL DRIVE SHAFT/INPUT CARRIER)
725 FLANGE, INPUT INTERNAL GEAR
801 HOUSING, FORWARD AND COAST CLUTCH
803 BUSHING, HOUSING (SMALL)
804 BUSHING, HOUSING (LARGE)
807 PISTON, FORWARD CLUTCH
808 SEAL, (INNER)
809 SEAL, (OUTER)
810 PISTON ASSEMBLY, COAST CLUTCH
811 RING, FORWARD CLUTCH (APPLY)
812 PLATE, COAST CLUTCH (APPLY)
813 PLATE, COAST CLUTCH (1) (STEEL)
814 PLATE, COAST CLUTCH (2) (FIBER)
815 PLATE, FORWARD AND COAST CLUTCH
816 PLATE, FORWARD CLUTCH (4) (STEEL)
817 PLATE, FORWARD CLUTCH (5) (FIBER)
818 RING, SNAP (FORWARD CLUTCH BACKING PLATE)
819 PLATE, FORWARD CLUTCH BACKING
820 SPRING ASSEMBLY, FORWARD CLUTCH RELEASE
821 RING, SNAP (FORWARD RETURN SPRING ASM./HOUSING)
822 SUPPORT, FORWARD/COAST CLUTCH
824 SLEEVE, OIL TRANSFER
825 BUSHING, SUPPORT/SUN SHAFT (LEFT)
826 BUSHING, SUPPORT/SUN SHAFT (RIGHT)
827 BALL, (OIL HOLE PLUGS)
828 SEAL, COOLER RETURN
829 RING, OIL SEAL (SUPPORT/HOUSING)
830 CLUTCH ASSEMBLY, LO ROLLER
832 BEARING, THRUST
833 GEAR, PARKING LOCK
834 RING, SNAP (FINAL DRIVE SHAFT TO PARK GEAR)
835 RING, FRETTING SUPPORT/CASE

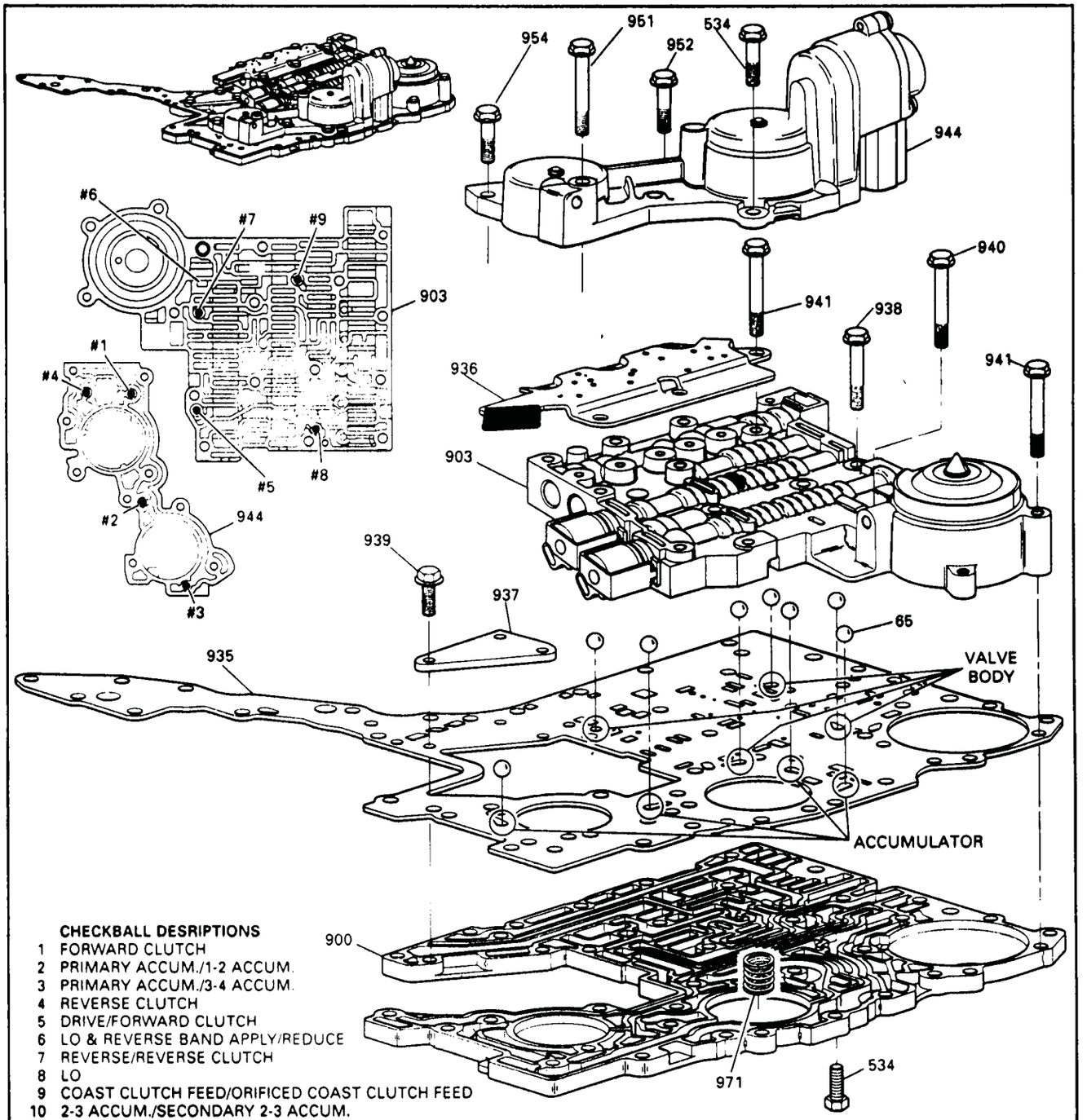
Figure 132





200 BODY, PRIMARY PUMP
201 GEAR, PRIMARY PUMP DRIVE
202 GEAR, PRIMARY PUMP DRIVEN
203 BODY, SECONDARY PUMP
204 BUSHING, SCAVENGE PUMP
205 GEAR, SECONDARY PUMP DRIVE
206 GEAR, SECONDARY PUMP DRIVEN
207 SHAFT ASSEMBLY, OIL PUMP DRIVEN
208 WASHER, THRUST (OIL PUMP DRIVEN SHAFT)
209 SEAL, FILTER
210 RETAINER, PRESSURE REGULATOR SPRING
211 VALVE, PRESSURE REGULATOR
212 SPRING, PRESSURE REGULATOR VALVE
213 VALVE, PRESSURE REGULATOR BOOST
214 SLEEVE, PRESSURE REGULATOR BOOST VALVE
215 CLIP, RETAINER (2)
216 BALL, SECONDARY PUMP CUT-OFF
217 BALL, PUMP SEAT
219 PIN, SCAVENGE DRIVEN GEAR
223 GEAR, SCAVENGE PUMP DRIVE
224 GEAR, SCAVENGE PUMP DRIVEN (2)
225 BODY, SCAVENGE PUMP
226 BOLT, PUMP COVER TO SCAVENGE COVER (2)
227 BUSHINGS, DOWEL (2)
237 COVER, SCAVENGE PUMP

Figure 133



CHECKBALL DESRIPTIONS

1 FORWARD CLUTCH
2 PRIMARY ACCUM./1-2 ACCUM.
3 PRIMARY ACCUM./3-4 ACCUM.
4 REVERSE CLUTCH
5 DRIVE/FORWARD CLUTCH
6 LO & REVERSE BAND APPLY/REDUCE
7 REVERSE/REVERSE CLUTCH
8 LO
9 COAST CLUTCH FEED/ORIFICED COAST CLUTCH FEED
10 2-3 ACCUM./SECONDARY 2-3 ACCUM.
11 3RD CLUTCH/ORIFICED 3RD CLUTCH

65 CHECKBALLS, (8)
534 BOLT, CHANNEL PLATE TO LCVB (1, 10mm)
534 BOLT, CHANNEL PLATE TO ACCUMULATOR HOUSING (3, 10mm)
534 BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE (1, 10mm)
900 CHANNEL PLATE, LOWER
903 CHANNEL PLATE/CONTROL VALVE AND HOUSING ASSEMBLY
935 PLATE ASM., SPACER/GASKET
936 SWITCH, TRANSAXLE PRESSURE
937 COVER, SPACER PLATE SUPPORT
938 BOLT, LCVB TO CHANNEL PLATE (5, 10mm)
939 BOLT, SPACER PLATE SUPPORT TO CHANNEL PLATE (3, 8mm)
940 BOLT, LCVB TO CHANNEL PLATE (2, 10mm)
941 BOLT, LCVB TO CHANNEL PLATE (8, 10mm)
944 ACCUMULATOR HOUSING
951 BOLT, ACCUM. ASM. TO CHANNEL PLATE (1, 10mm)
952 BOLT, ACCUM. ASM. TO CHANNEL PLATE (3, 10mm)
954 BOLT, ACCUM. ASM. TO CHANNEL PLATE (1, 10mm)
971 SPRING, ACCUMULATOR

Figure 134

BOLT LOCATIONS

Ill. No.	Description	Qty	Size	Specified Torque
CASE COVER				
45	STUD, CASE COVER TO CASE	(1,	13mm)	20-27 N•m
46	BOLT, CASE COVER TO CASE	(8,	10mm)	20-27 N•m
47	STUD, CASE COVER TO CASE	(2,	13mm)	27-31 N•m
48	BOLT, CASE COVER TO DRIVEN SPROCKET SUPPORT	(3,	10mm)	20-27 N•m
49	STUD, CASE COVER TO CASE	(1,	10mm)	27-31 N•m
50	BOLT, CASE COVER TO CASE	(11,	13mm)	27-31 N•m
PUMP ASSEMBLY				
226	BOLT, SCAVENGE PUMP COVER TO SCAVENGE PUMP BODY	(2,	10mm)	11-13 N•m
229	BOLT, PUMP ASSEMBLY TO CASE	(3,	8mm)	11-13 N•m
231	BOLT, PUMP ASSEMBLY TO CASE	(2,	8mm)	11-13 N•m
232	BOLT, PUMP ASSEMBLY TO CASE COVER	(5,	8mm)	11-13 N•m
233	BOLT, PUMP ASSEMBLY TO CASE COVER	(5,	8mm)	11-13 N•m
234	BOLT, SECONDARY PUMP TO CASE COVER	(1,	8mm)	11-13 N•m
235	BOLT, SECONDARY PUMP TO CASE COVER	(2,	8mm)	11-13 N•m
331	BOLT, SECONDARY PUMP TO CASE	(1,	8mm)	11-13 N•m
UPPER CONTROL VALVE BODY (UCVB) ASSEMBLY				
15	BOLT, PRESSURE CONTROL SOLENOID BRACKET TO UCVB	(1,	8mm)	11-13 N•m
229	BOLT, UCVB TO CASE	(1,	8mm)	11-13 N•m
329	BOLT, UCVB TO CASE COVER	(9,	8mm)	11-13 N•m
330	BOLT, UCVB TO CASE COVER	(2,	8mm)	11-13 N•m
331	BOLT, UCVB TO CASE	(3,	8mm)	11-13 N•m
331	BOLT, UCVB TO DRIVEN SPROCKET SUPPORT	(2,	8mm)	11-13 N•m
350	TEMPERATURE SENSOR	(1,	17mm)	Max. 3.4 N•m (30 in. lbs.)
CHANNEL PLATE and TRANSFER PLATE TO CASE				
534	BOLT, CHANNEL PLATE TO CASE	(9,	10mm)	8-14 N•m
534	BOLT, OIL TRANSFER PLATE TO CASE	(9,	10mm)	8-14 N•m
955	NUT, CHANNEL PLATE TO CASE	(2,	10mm)	8-14 N•m
958	BOLT, CHANNEL PLATE TO CASE	(2,	10mm)	8-14 N•m
LOWER CONTROL VALVE BODY (LCVB) ASSEMBLY and ACCUMULATOR HOUSING ASSEMBLY TO CHANNEL PLATE				
534	BOLT, CHANNEL PLATE TO LCVB	(1,	10mm)	8-14 N•m
534	BOLT, CHANNEL PLATE TO ACCUMULATOR HOUSING	(3,	10mm)	8-14 N•m
534	BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE	(1,	10mm)	8-14 N•m
938	BOLT, LCVB TO CHANNEL PLATE	(5,	10mm)	8-14 N•m
939	BOLT, SPACER PLATE SUPPORT TO CHANNEL PLATE	(3,	8mm)	8-14 N•m
940	BOLT, LCVB TO CHANNEL PLATE	(2,	10mm)	8-14 N•m
941	BOLT, LCVB TO CHANNEL PLATE	(8,	10mm)	8-14 N•m
951	BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE	(1,	10mm)	8-14 N•m
952	BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE	(3,	10mm)	8-14 N•m
954	BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE	(1,	10mm)	8-14 N•m
966	BOLT, ACCUMULATOR HOUSING COVER	(5,	8mm)	8-14 N•m

(Continued on next page.)

Figure 135

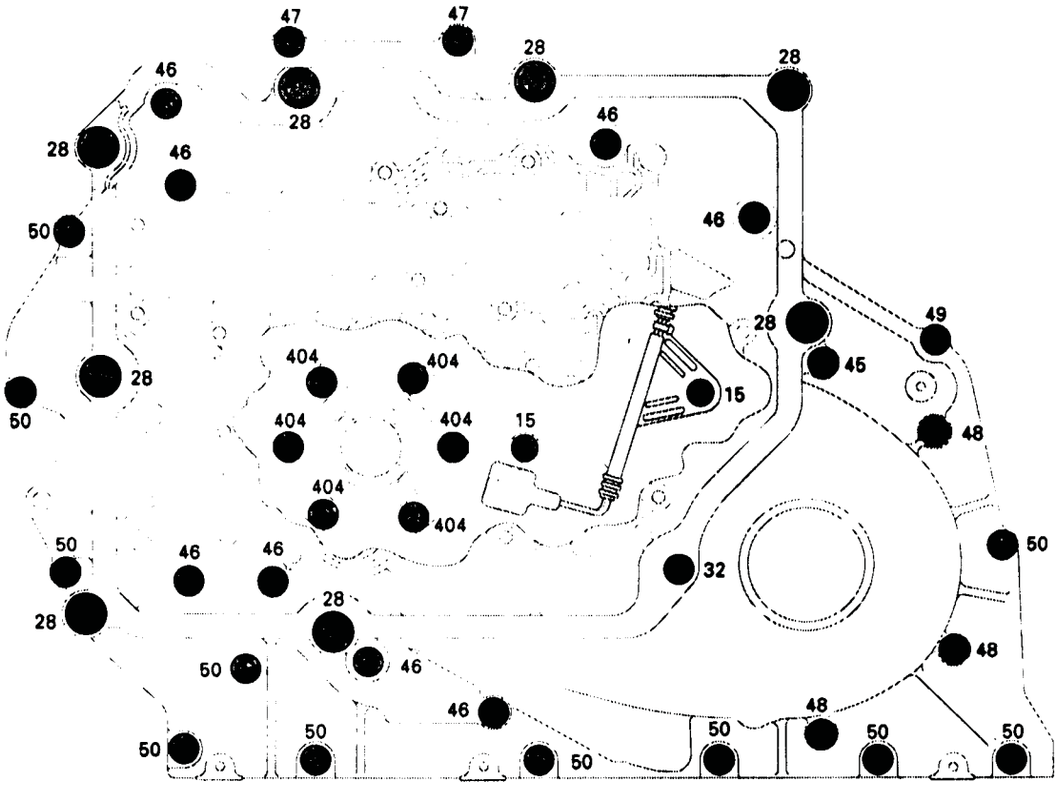
BOLT LOCATIONS (Continued)

Ill. No.	Description	Qty Size	Specified Torque
SIDE COVER			
28	BOLT, SIDE COVER TO CASE COVER	(8, 15mm)	50-55 N•m
32	BOLT, SIDE COVER TO CASE COVER	(1, 13mm)	20-27 N•m
BOTTOM PAN			
62	BOLT, BOTTOM PAN TO CASE	(16, 10mm)	10-12 N•m
CASE EXTENSION and FINAL DRIVE			
127	STUD, CASE EXTENSION TO CASE	(1, 15mm)	50-55 N•m
128	BOLT, CASE EXTENSION TO CASE	(4, 13mm)	50-55 N•m
129	BOLT, CASE EXTENSION TO CASE	(1, 10mm)	20-27 N•m
119	BOLT, DIFFERENTIAL TO FINAL DRIVE CARRIER	(4, 15mm)	70-76 N•m
MISCELLANEOUS			
3	COOLER CONNECTOR, RETURN (CASE)	(1, 19mm)	25-29 N•m
5	STUD, CASE TO FORWARD CLUTCH SUPPORT	(2, 13mm)	25-27 N•m
8	PLUG, OIL DRAIN - BOTTOM PAN TO CASE COVER		8-14 N•m
15	BOLT, SCAVENGE TUBE TO CASE	(1, 8mm)	8-14 N•m
15	BOLT, INPUT SPEED SENSOR TO CASE	(2, 8mm)	11-13 N•m
18	NUT, MANUAL SHAFT TO DETENT LEVER	(1, 15mm)	27-34 N•m
26	BOLT, DETENT LEVER AND ROLLER ASSEMBLY	(1, 13mm)	8-14 N•m
38	COOLER CONNECTOR (TO COOLER) (CASE COVER)	(1, 19mm)	20-27 N•m
40	PLUG, OIL TEST - #40 TORX (CASE COVER)		18-26 N•m
131	BOLT, SPEED SENSOR TO CASE EXTENSION	(1, 10mm)	8-14 N•m
404	BOLT, DRIVE SPROCKET SUPPORT TO CASE	(6, 8mm)	11-13 N•m
534	BOLT, SERVO COVER TO CASE	(3, 10mm)	8-14 N•m

ENGLISH CONVERSIONS

8-14	N•m	- 6-10	lb. ft.
10-12	N•m	- 8-9	lb. ft.
11-13	N•m	- 8-9.5	lb. ft.
20-27	N•m	- 15-20	lb. ft.
25-27	N•m	- 19-20	lb. ft.
25-29	N•m	- 19-21	lb. ft.
27-31	N•m	- 20-23	lb. ft.
27-34	N•m	- 20-25	lb. ft.
50-55	N•m	- 37-40	lb. ft.
70-76	N•m	- 52-56	lb. ft.

Figure 136



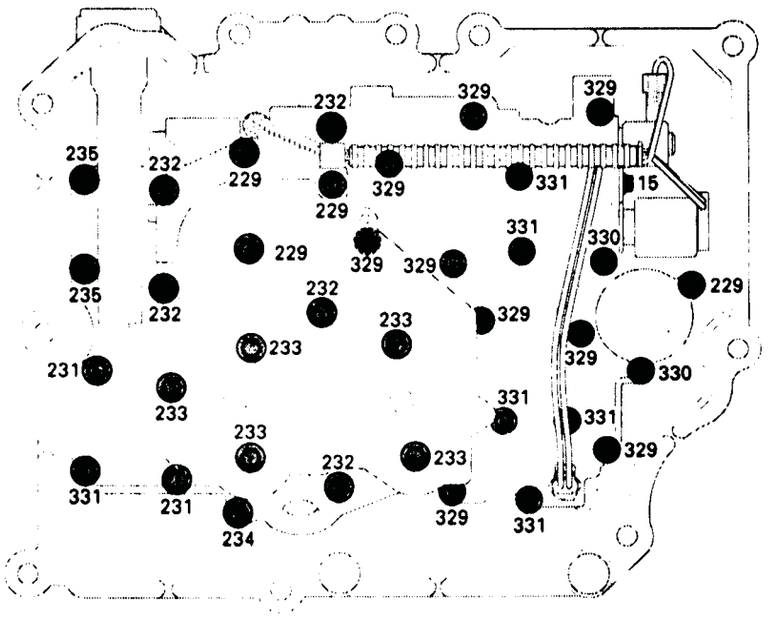
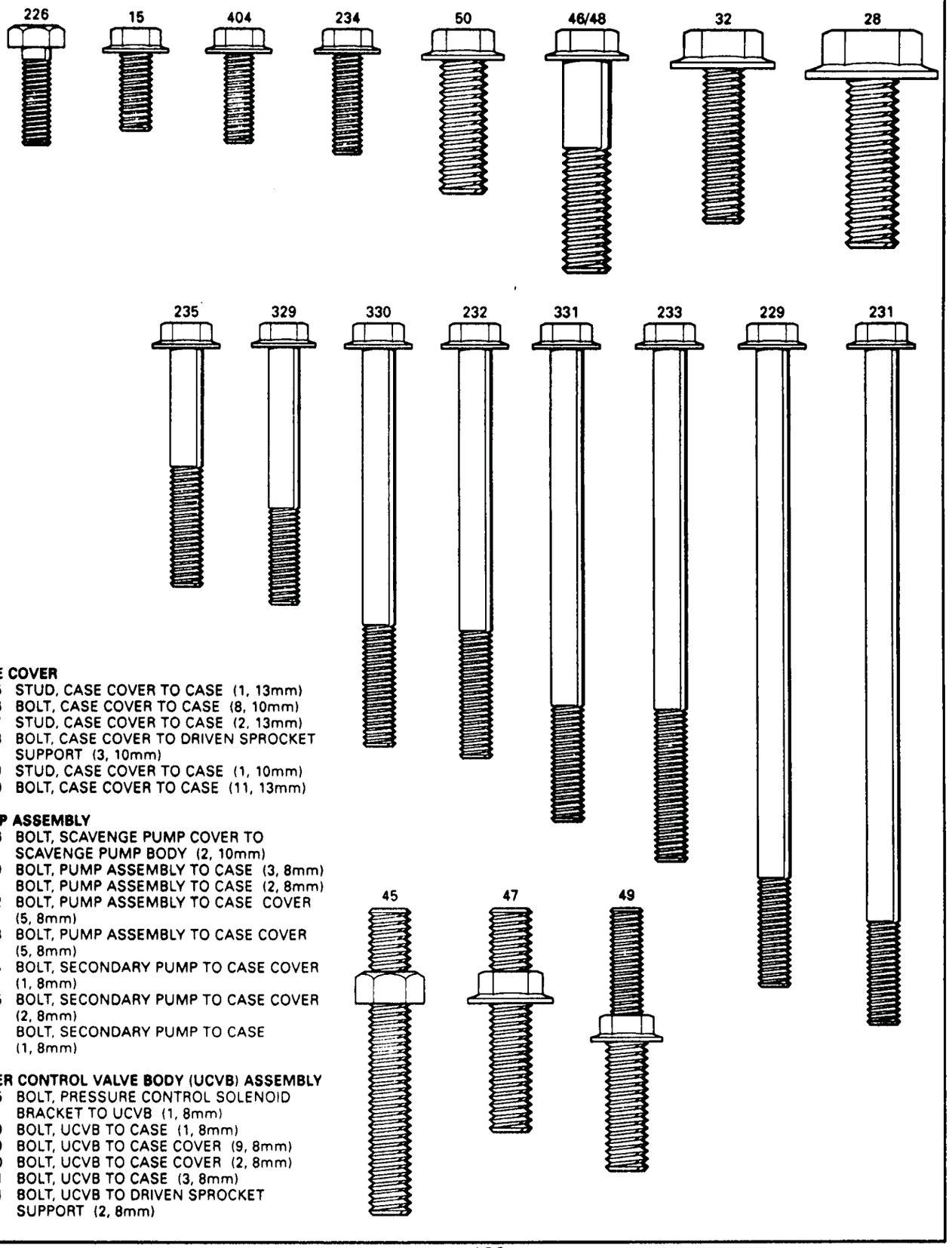


Figure 137



CASE COVER
- 45 STUD, CASE COVER TO CASE (1, 13mm)
- 46 BOLT, CASE COVER TO CASE (8, 10mm)
- 47 STUD, CASE COVER TO CASE (2, 13mm)
- 48 BOLT, CASE COVER TO DRIVEN SPROCKET SUPPORT (3, 10mm)
- 49 STUD, CASE COVER TO CASE (1, 10mm)
- 50 BOLT, CASE COVER TO CASE (11, 13mm)

PUMP ASSEMBLY
- 226 BOLT, SCAVENGE PUMP COVER TO SCAVENGE PUMP BODY (2, 10mm)
- 229 BOLT, PUMP ASSEMBLY TO CASE (3, 8mm)
- 231 BOLT, PUMP ASSEMBLY TO CASE (2, 8mm)
- 232 BOLT, PUMP ASSEMBLY TO CASE COVER (5, 8mm)
- 233 BOLT, PUMP ASSEMBLY TO CASE COVER (5, 8mm)
- 234 BOLT, SECONDARY PUMP TO CASE COVER (1, 8mm)
- 235 BOLT, SECONDARY PUMP TO CASE COVER (2, 8mm)
- 331 BOLT, SECONDARY PUMP TO CASE (1, 8mm)

UPPER CONTROL VALVE BODY (UCVB) ASSEMBLY
- 15 BOLT, PRESSURE CONTROL SOLENOID BRACKET TO UCVB (1, 8mm)
- 229 BOLT, UCVB TO CASE (1, 8mm)
- 329 BOLT, UCVB TO CASE COVER (9, 8mm)
- 330 BOLT, UCVB TO CASE COVER (2, 8mm)
- 331 BOLT, UCVB TO CASE (3, 8mm)
- 331 BOLT, UCVB TO DRIVEN SPROCKET SUPPORT (2, 8mm)

Figure 138

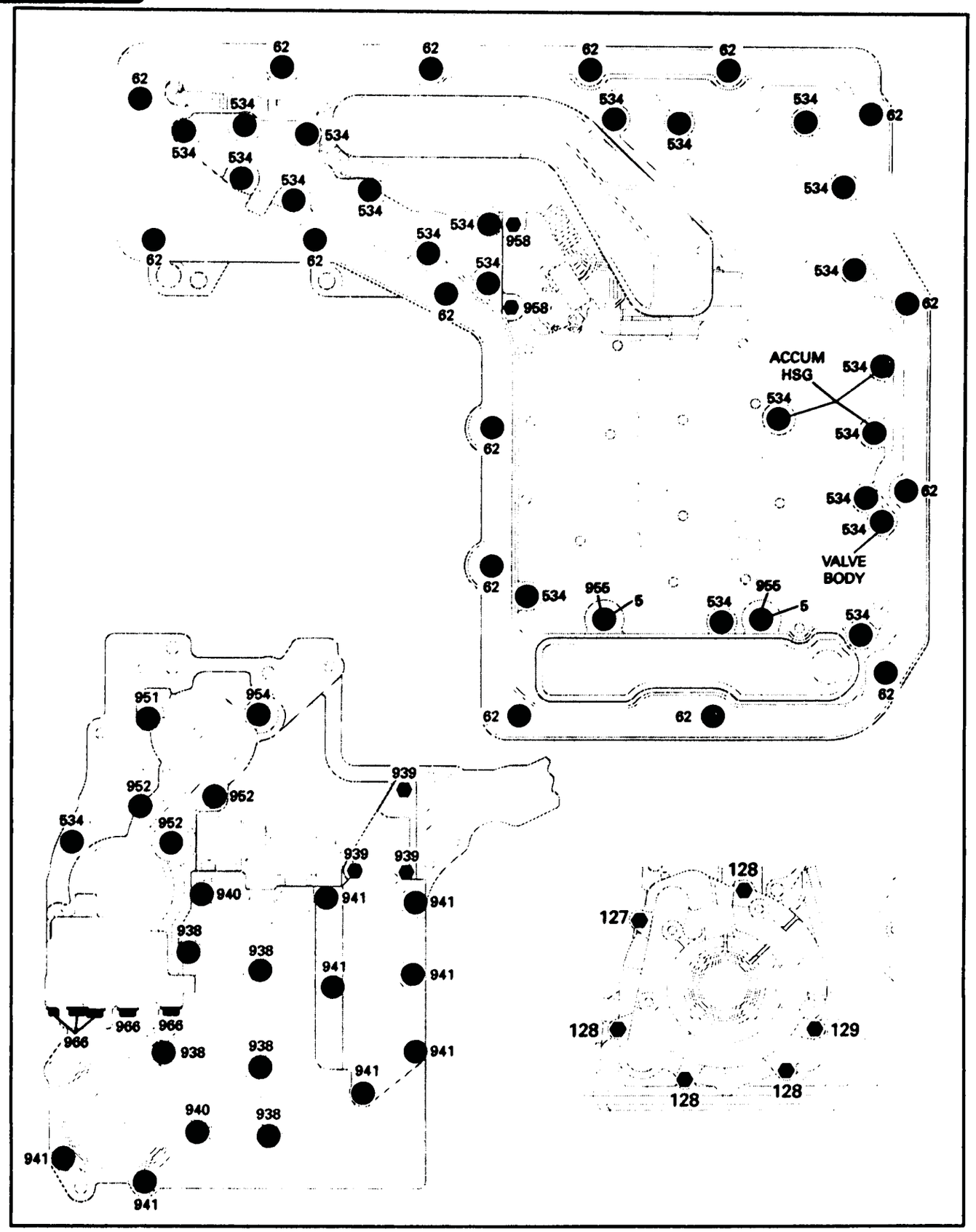
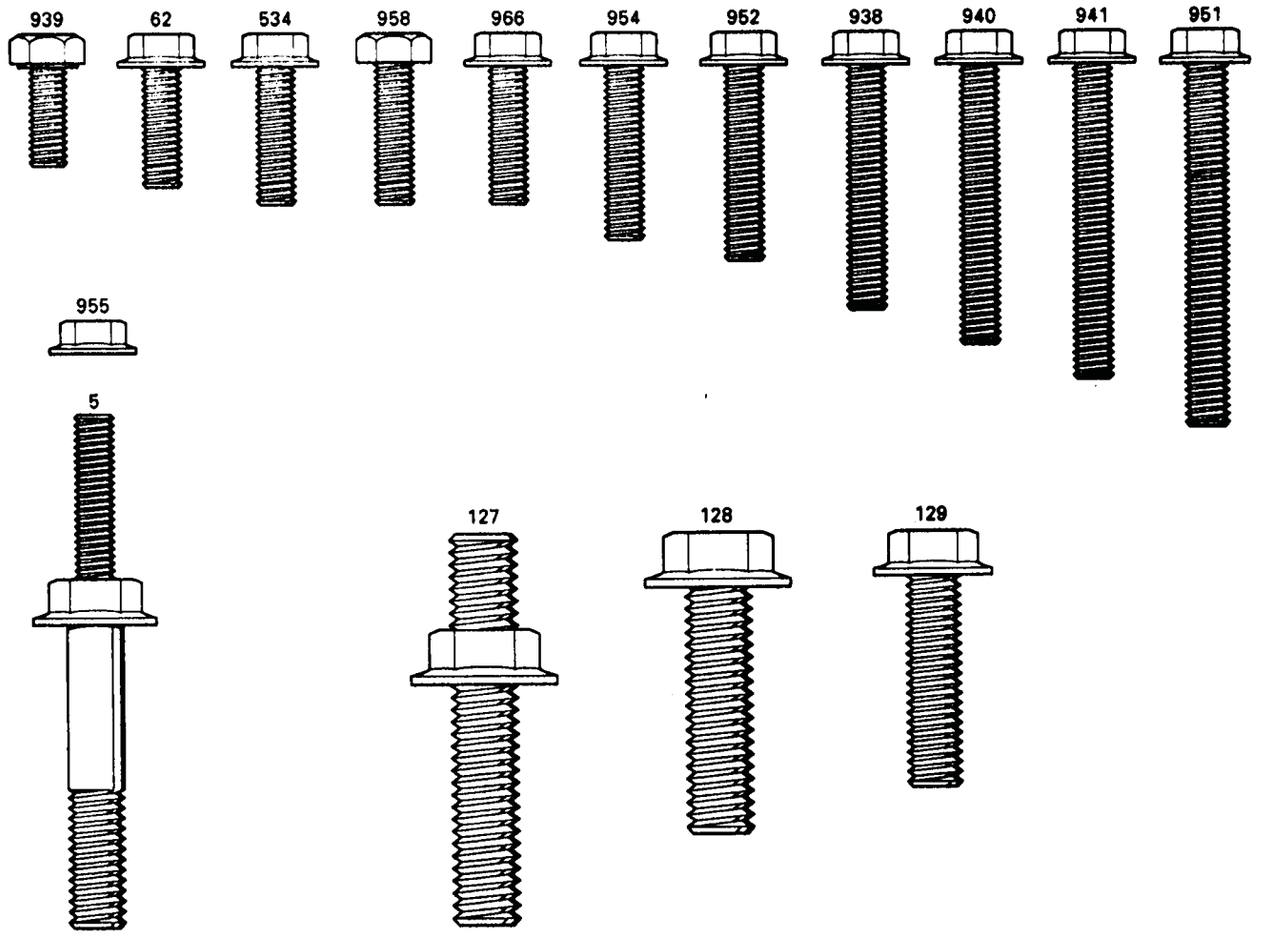


Figure 139



CHANNEL PLATE AND TRANSFER PLATE TO CASE
- 534 BOLT, CHANNEL PLATE TO CASE (9, 10mm)
- 534 BOLT, OIL TRANSFER PLATE TO CASE (9, 10mm)
- 955 NUT, CHANNEL PLATE TO CASE (2, 10mm)
- 958 BOLT, CHANNEL PLATE TO CASE (2, 10mm)

LOWER CONTROL VALVE BODY (LCVB) ASSEMBLY AND ACCUMULATOR HOUSING ASSEMBLY TO CHANNEL PLATE
- 534 BOLT, CHANNEL PLATE TO LCVB (1, 10mm)
- 534 BOLT, CHANNEL PLATE TO ACCUMULATOR HOUSING (3, 10mm)
- 534 BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE (1, 10mm)
- 938 BOLT, LCVB TO CHANNEL PLATE (5, 10mm)
- 939 BOLT, SPACER PLATE SUPPORT TO CHANNEL PLATE (3, 8mm)
- 940 BOLT, LCVB TO CHANNEL PLATE (2, 10mm)
- 941 BOLT, LCVB TO CHANNEL PLATE (8, 10mm)
- 951 BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE (1, 10mm)
- 952 BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE (3, 10mm)
- 954 BOLT, ACCUMULATOR HOUSING TO CHANNEL PLATE (1, 10mm)
- 966 BOLT, ACCUMULATOR HOUSING COVER (5, 8mm)

BOTTOM PAN
- 62 BOLT, BOTTOM PAN TO CASE (16, 10mm)

CASE EXTENSION AND FINAL DRIVE
- 127 STUD, CASE EXTENSION TO CASE (1, 15mm)
- 128 BOLT, CASE EXTENSION TO CASE (4, 13mm)
- 129 BOLT, CASE EXTENSION TO CASE (1, 10mm)
- 119 BOLT, DIFFERENTIAL TO FINAL DRIVE CARRIER (4, 15mm)

Figure 140

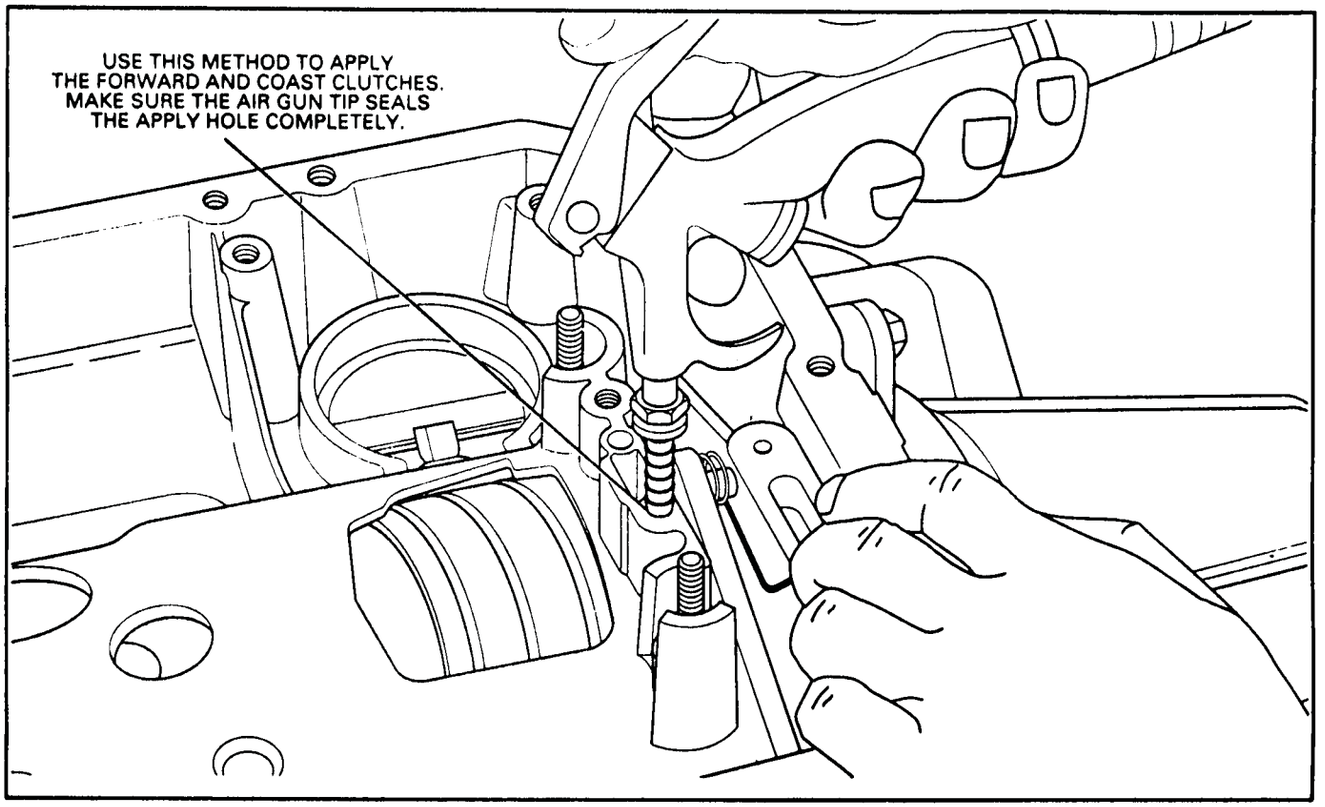
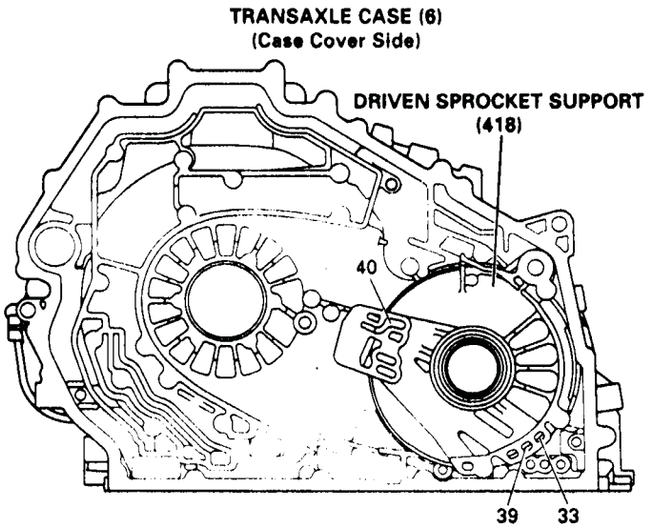


Figure 141

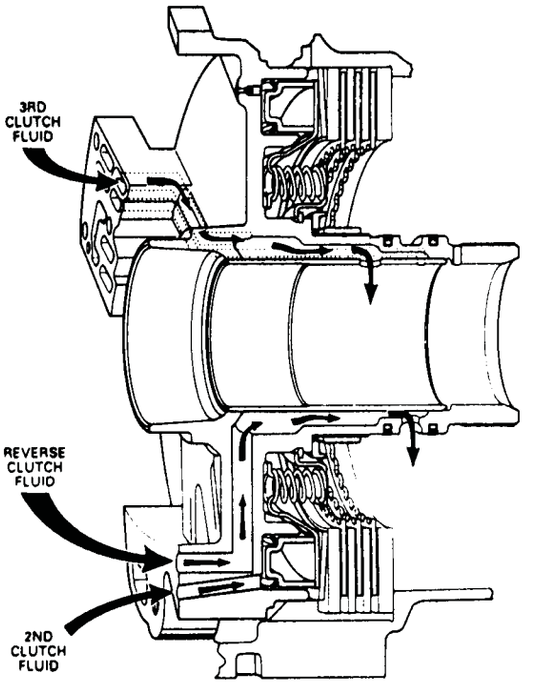
AIR CHECKING PROCEDURES

1. Use Figure 141 and 142 for air checking procedures, before case cover installed.
2. Use Figures 143 and 144 to make blocks for air checking clutch packs, after case cover is installed.



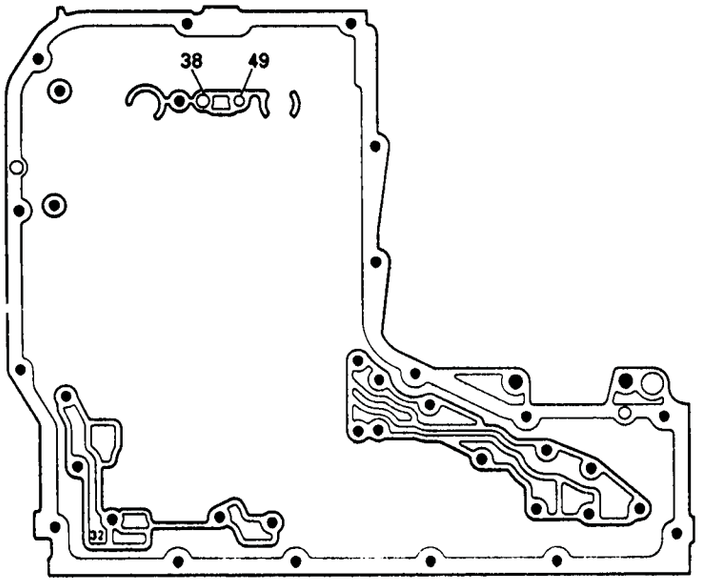
When Applying Air Pressure Through The Driven Sprocket Support (418), Use The Following Passages For The Clutches Listed Beolw:

33 REVERSE CLUTCH
39 SECOND CLUTCH
40 THIRD CLUTCH



When Applying Air Pressure Through The Transaxle Case (6), Use The Following Passages Near The Forward/Coast Studs For The Clutches Listed Beolw:

38 FORWARD CLUTCH
49 COAST CLUTCH



TRANSAXLE CASE (6)
(Bottom View)

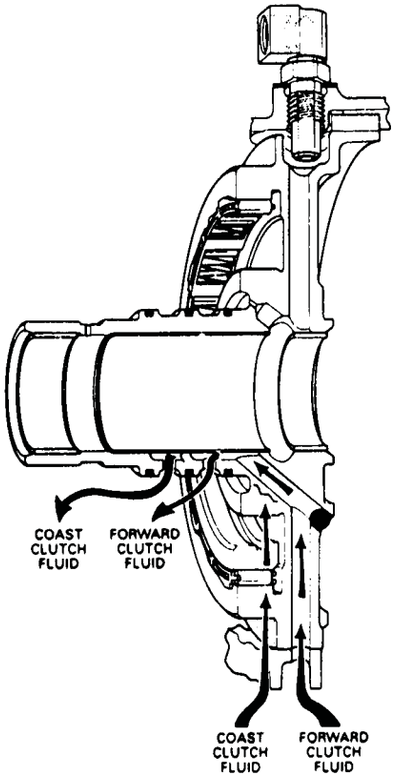
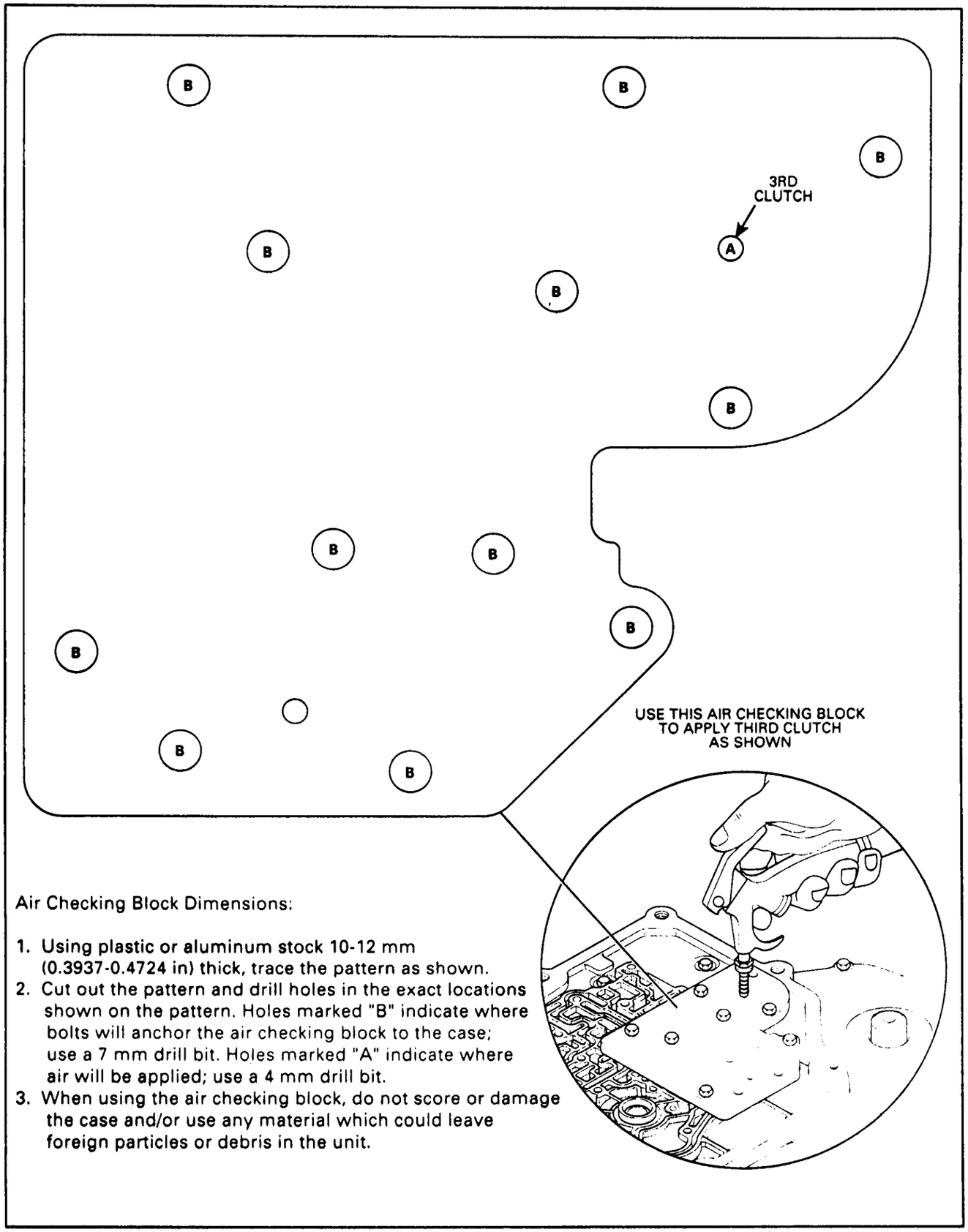


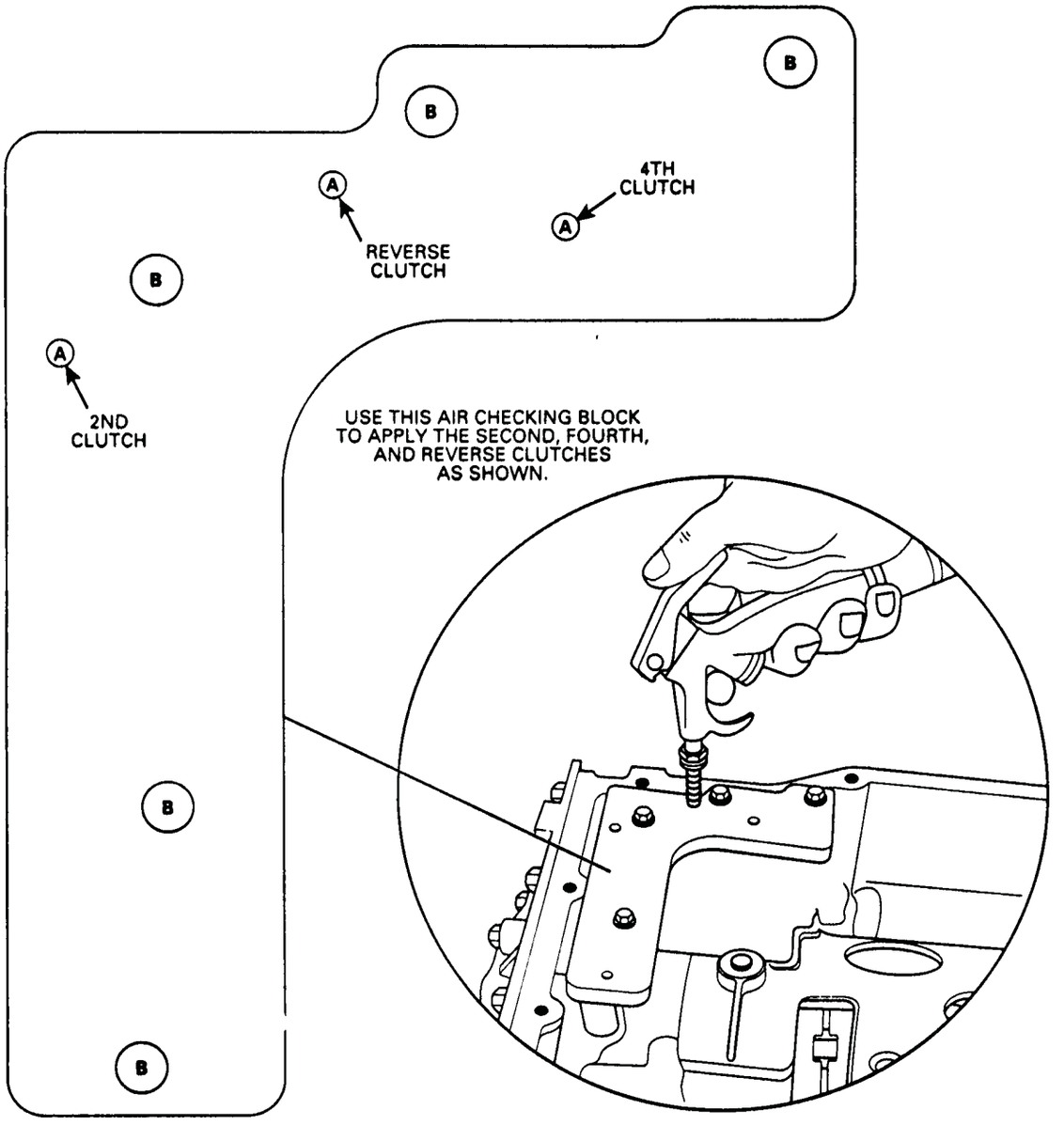
Figure 142



Air Checking Block Dimensions:

1. Using plastic or aluminum stock 10-12 mm (0.3937-0.4724 in) thick, trace the pattern as shown.
2. Cut out the pattern and drill holes in the exact locations shown on the pattern. Holes marked "B" indicate where bolts will anchor the air checking block to the case; use a 7 mm drill bit. Holes marked "A" indicate where air will be applied; use a 4 mm drill bit.
3. When using the air checking block, do not score or damage the case and/or use any material which could leave foreign particles or debris in the unit.

Figure 143



Air Checking Block Dimensions:

1. Using plastic or aluminum stock 10-12 mm (0.3937-0.4724 in) thick, trace the pattern as shown.
2. Cut out the pattern and drill holes in the exact locations shown on the pattern. Holes marked "B" indicate where bolts will anchor the air checking block to the case; use a 7 mm drill bit. Holes marked "A" indicate where air will be applied; use a 4 mm drill bit.
3. When using the air checking block, do not score or damage the case and/or use any material which could leave foreign particles or debris in the unit.

Figure 144

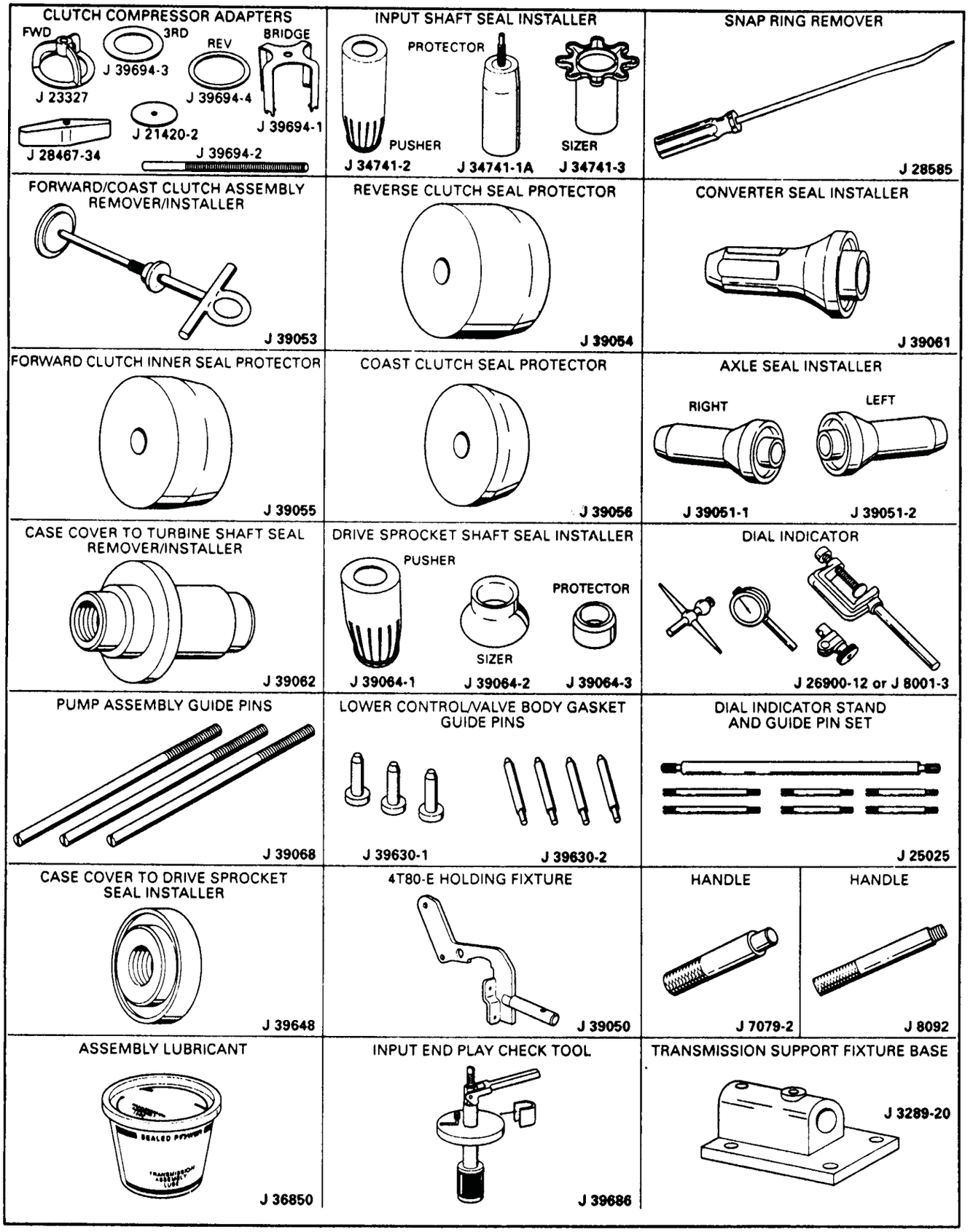


Figure 145