

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1983-93 AUTOMATIC TRANSMISSIONS**General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E****APPLICATION****THM 440-T4/4T60 & 4T60-E APPLICATION**

Application	Engine
Buick	
Century	2.5L, 2.8L, 3.0L, 3.3L & 4.3L
Electra	3.0L, 3.8L & 4.3L
LeSabre & Park Avenue	3.0L & ⁽¹⁾ 3.8L
Reatta (1991) & Riviera	3.0L & ⁽¹⁾ 3.8L
Regal	2.8, 3.1L & 3.8L
Cadillac	
Allante	4.1L & 4.5L
DeVille & Eldorado	4.1L, 4.3L, 4.5L & ⁽¹⁾ 4.9L
Fleetwood & Seville	4.1L, 4.3L, 4.5L & ⁽¹⁾ 4.9L
Chevrolet	
Celebrity	2.8L, 3.1L & 4.3L
Lumina	3.1L & ⁽¹⁾ 3.4L
Lumina APV	⁽¹⁾ 3.8L
Oldsmobile	
Cutlass Ciera & Cutlass Cruiser	2.8L, 3.0L & 3.3L
Cutlass Supreme	2.8L, 3.1L & ⁽¹⁾ 3.4L
Delta 88 & Eighty-Eight	3.0L, 4.3L & ⁽¹⁾ 3.8L
Ninety-Eight & Silhouette	3.0L, 4.3L & ⁽¹⁾ 3.8L
Toronado & Trofeo	3.0L, 4.3L & ⁽¹⁾ 3.8L
Pontiac	
Bonneville & Trans Sport	⁽¹⁾ 3.8L
Grand Prix	2.8L, 3.1L & ⁽¹⁾ 3.4L
6000	2.5L, 2.8L, 3.1L & 4.3L
⁽¹⁾ All 1992 models use THM 4T60-E transaxle. 1991 Cutlass Supreme, DeVille, Eldorado, Fleetwood, Grand Prix, Lumina, Reatta, Riviera & Seville also use THM 4T60-E transaxle.	

BODY CODE DESIGNATIONS (CARS)

Body	Model
"A" Body	Century, Cutlass Ciera, Cutlass Cruiser & 6000
"C" Body	DeVille, Fleetwood, Ninety-Eight & Park Avenue
"E" Body	Eldorado, Reatta, Riviera, Toronado & Trofeo

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

"H" Body	Bonneville, Eighty-Eight (Royale) & LeSabre
"K" Body	Seville
"W" Body	Cutlass Supreme, Grand Prix, Lumina & Regal

SERIES CODE DESIGNATIONS (VANS)

Series Designation	Model
"U" Series	Lumina APV, Silhouette & Trans Sport

IDENTIFICATION

NOTE: For testing and diagnostic procedures of electronic components, see [AUTO TRANS DIAGNOSIS - HYDRA-MATIC 4T60-E](#) article in AUTOMATIC TRANSMISSIONS.

NOTE: This article makes reference to the 4T60 transaxle. The 440-T4 transaxle's name was changed to 4T60 in 1990. The references to the 4T60 transaxle apply to both the 440-T4 and the 4T60.

All transaxles have a metal identification plate attached to the rear face of transaxle case. See [Fig. 1](#).

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

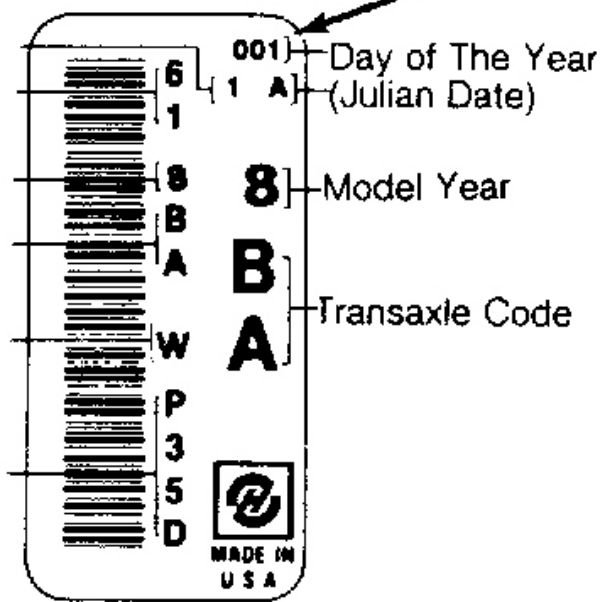
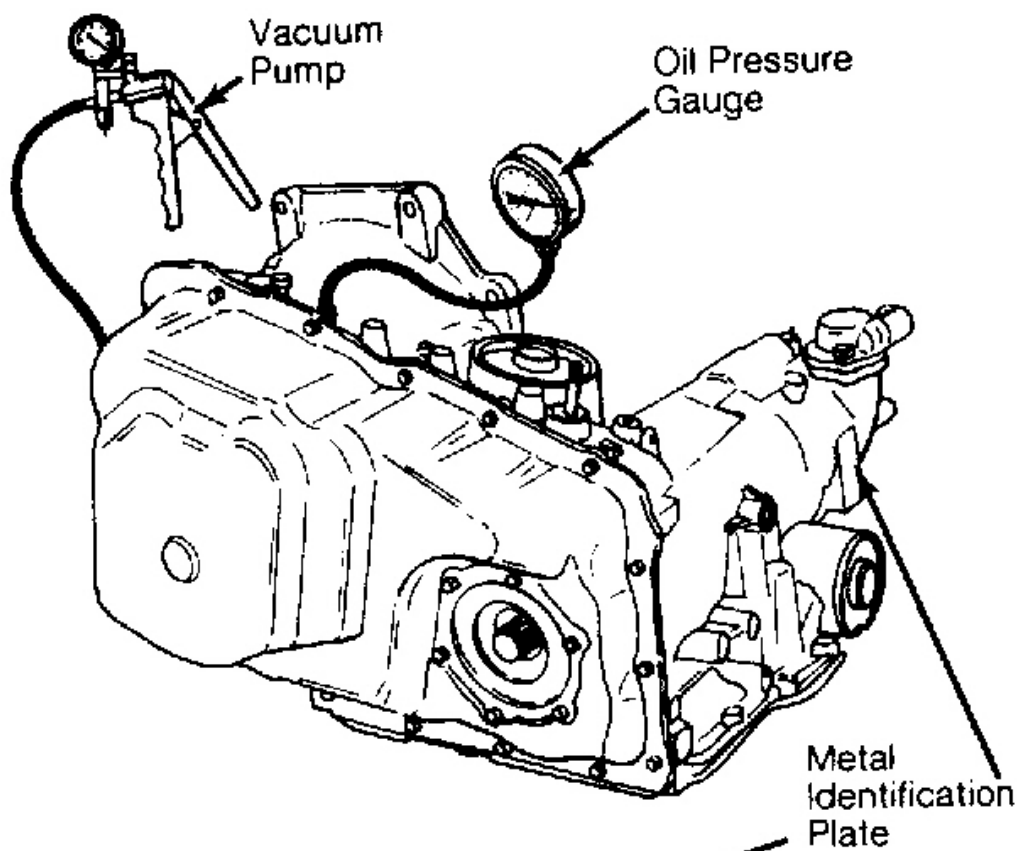


Fig. 1: Locating Transaxle Identification Information
Courtesy of GENERAL MOTORS CORP.

DESCRIPTION

The Hydra-Matic 4T60 and 4T60-E transaxles are fully automatic 4-speed units consisting primarily of a 3-element hydraulic torque converter and converter clutch. Transaxle uses a variable capacity vane-type pump to supply all hydraulic pressure needed for operation.

The multiplied torque from torque converter is transferred to the transaxle by a sprocket and drive link assembly. Other internal components consist of 4 multiple disc clutches, a roller clutch, a sprag clutch, 2 bands and a compound planetary gear set. The final drive gear and differential assemblies are an integral part of the transaxle.

The Hydra-Matic 4T60 differs from 4T60-E by the method of valve shifting control. The 4T60 uses conventional shift valves timed by modulation vs. governor pressure. The 4T60-E uses 2 electronic shift valves controlled by the Powertrain Control Module (PCM). Some 4T60-E models also use a Pulse Width Modulated (PWM) solenoid to control Torque Converter Clutch (TCC) lock-up.

LUBRICATION

See appropriate TRANSMISSION SERVICING article in the AUTOMATIC TRANSMISSION SERVICING section:

- For Passenger Cars, see **TRANSMISSION SERVICING - A/T**
- For U Series Vans, see **TRANSMISSION SERVICING - A/T**

ADJUSTMENTS

See appropriate TRANSMISSION SERVICING article in the AUTOMATIC TRANSMISSION SERVICING section:

- For Passenger Cars, see **TRANSMISSION SERVICING - A/T**
- For U Series Vans, see **TRANSMISSION SERVICING - A/T**

ON-VEHICLE SERVICE

The following components can be serviced without removing transaxle from vehicle.

- Case Side Cover Pan
- Converter-To-Flexplate Bolts
- Cooler Lines
- Drive Axles
- Filler Pipe
- Governor Assembly

- Reverse Servo
- Scavenger Oil Scoop
- Shift Control Cable
- Solenoid
- Speedometer Driven Gear & Seal
- Speed Sensor (If Equipped)
- Thermal Element
- Throttle Valve Control Cable
- Transaxle Pan
- Transaxle Filter
- Vacuum Modulator
- Valve Body
- Converter Clutch Wiring Harness
- 1-2 Servo
- 1-2 Or 3-4 Accumulator Assemblies
- 3rd & 4th Gear Pressure Switches

VALVE BODY

See **OIL PUMP & VALVE BODY** under TRANSAXLE DISASSEMBLY.

DRIVE AXLE SHAFTS

See appropriate AXLE SHAFTS - FRONT article in the DRIVE AXLES section:

- For Passenger Cars, see **AXLE SHAFTS - FRONT**
- For "U" Series Vans, see **AXLE SHAFTS - FRONT**

OIL COOLER FLUSHING

1. If available, fill Line Flusher (J-35944) with solution, and install oil cooler and line flusher to top transaxle cooler line on transaxle. Follow manufacturer's instructions to flush oil cooler and cooler lines.
2. If line flusher is not available, flush cooler and cooler lines with a mixture of clean solvent and water. Flush cooler in both directions until all old fluid and debris are removed. If necessary, replace plugged or damaged cooler and/or lines.

TROUBLE SHOOTING

NOTE: For testing/diagnostic procedures of electronic components, see **AUTO TRANS DIAGNOSIS - HYDRA-MATIC 4T60-E** article. For information on diagnosing torque converter clutch, see **AUTO TRANS DIAGNOSIS - GM TORQUE CONVERTER CLUTCH** article.

NOTE: For clutch and band applications, see appropriate **CLUTCH & BAND APPLICATION CHART**.

QUICK CHECK

1. Check level and condition of transaxle fluid. On 4T60-E, check PCM memory for stored trouble codes. See 4T60-E ELECTRONIC CONTROLS article in the AUTOMATIC TRANSMISSIONS section. If no trouble codes are present, go to next step. If codes are present, diagnose and repair all PCM-related trouble codes. Clear PCM trouble code memory.
2. Perform road test. See **ROAD TEST** under TESTING. During road test, record shift points. If shift point timing or shifting is incorrect, go to 4T60-E ELECTRONIC CONTROLS article.
3. If shift(s) is too harsh or too soft, see **HYDRAULIC PRESSURE TESTS** under TESTING.
4. For specific complaints, see appropriate condition(s) listed under TRANSAXLE under TROUBLE SHOOTING.

TRANSAXLE

NOTE: Models with 4T60-E transaxle use Powertrain Control Module (PCM) computer, which controls TCC, Pulse Width Modulated (PWM) solenoid (if equipped) and shifting solenoids "A" and "B". Models with 4T60 transaxle use Electronic Control Module (ECM) computer. This computer controls TCC only.

Oil Out Of Vent Or Foaming

Transaxle overfilled. Oil contaminated with antifreeze or engine overheating. Oil filter "O" ring damaged or missing. Thermo element in case does not close when hot, incorrect pin height or thermo element incorrectly installed. Modulator "O" ring incorrectly installed or damaged. Drive sprocket support drain back holes plugged.

High Or Low Line Pressure

Incorrect oil level. Vacuum line leaking, pinched, disconnected or cut. Aspirator "T" connection installed backward or blocked. Modulator diaphragm damaged. Modulator valve nicked, scored or stuck. Oil pump assembly seals or vanes damaged or slide stuck. Pump drive shaft damaged. Pressure regulator valve spring damaged or pressure regulator valve nicked or scored. Pressure relief valve spring damaged or ball missing. Check balls missing in control valve body. Pump or case cover leaking (bolts loose).

Delayed Engagement

Low fluid level. Oil cooler check ball not seating. Reverse servo or 1-2 servo seals cut or damaged. Cut or damaged input housing piston seal.

No Drive In "D"

1. Low oil level or pressure. Manual linkage misadjusted or disconnected. Piston or seal damaged in 1-2 servo assembly. Drive axles disengaged. Leaking or damaged 1-2 servo oil pipe seals. Damaged oil pump drive shaft or pump assembly. Incorrect No. 13 (No. 3 on 4T60-E) check ball location. Torque converter

stator roller clutch damaged. Input clutch accumulator piston seal damaged. Drive link assembly damaged, drive link chain broken or sprockets and bearings damaged.

2. Input clutch assembly clutch plates burned, clutch plates missing, check ball capsule leaking or missing. Input piston seals cut or damaged, or shaft feed passages blocked. Damaged or incorrectly assembled input sprag or input sun gear assembly. Burned 3rd roller clutch (due to lack of lubrication), oil lube pipe leaking or damaged.
3. Input carrier and reaction carrier assembly pinions, internal ring gear or sun gear damaged. Output shaft damaged or drive axles incorrectly assembled into differential. Burned 1-2 band assembly or band out of position. Parking pawl spring broken. Damaged final drive assembly or final drive sun gear, side gears, pinion gears or internal ring gear.

Slips In "D"

1. Low fluid level. Vacuum line pinched or cut. Damaged vacuum modulator. Low line pressure. Oil pump assembly seals or vanes damaged or slide stuck. Modulator valve stuck or binding. Damaged 1-2 servo assembly or leaking servo piston seal. Oil filter screen plugged. Leaking or damaged servo pipe seals. Torque converter stator roller clutch not holding. Input clutch accumulator piston or input shaft seals damaged. Leaking ball capsule or damaged input clutch assembly seals.
2. On 4T60-E transaxle, check for problem with solenoid "A" or "B". Check for switched wires between TCC and solenoid "B".

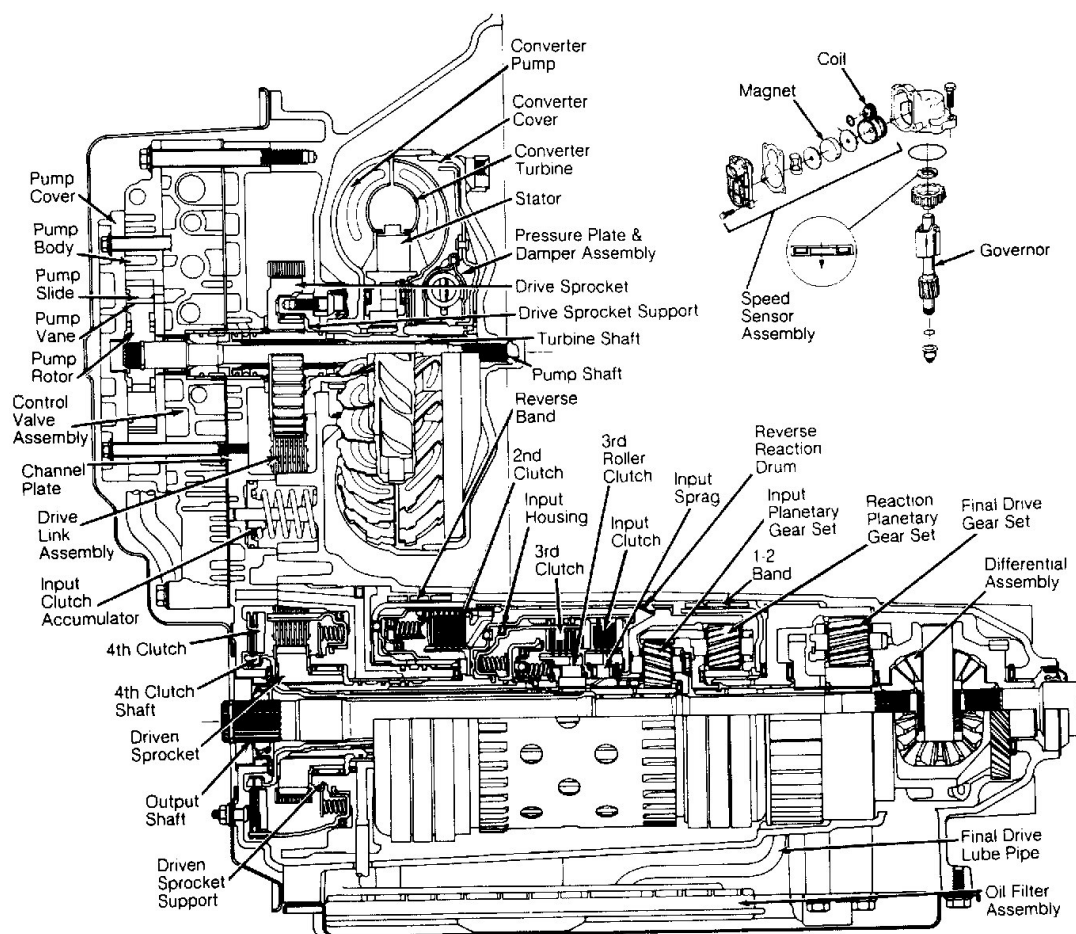


Fig. 2: Identifying Hydra-Matic 4T60 Transaxle Components
Courtesy of GENERAL MOTORS CORP.

No 1-2 Shift (1st Gear)

1. On 4T60, Throttle Valve (T.V.) cable out of adjustment. Damaged governor thrust bearing, springs or gear. Governor seal leaking. Governor exhaust check balls missing, damaged or not seating. Governor pipes leaking. Accumulator assembly cover leaking. Governor screen blocked. Governor orifice cup plug blocked or governor cover loose.
2. Check for binding or stuck 1-2 shift valve. Spacer plate or gaskets mispositioned or damaged. Drive sprocket support oil sealing rings damaged. Clutches in 2nd clutch assembly damaged. Piston or piston seals in 2nd clutch damaged. Incorrectly assembled 2nd clutch pack. Missing or damaged check ball capsule in 2nd clutch housing. Reverse reaction drum splines damaged or reverse reaction drum plate missing.

Harsh Or Soft 1-2 Shift

High or low line pressures. Accumulator piston seals damaged or piston springs missing. Accumulator cover

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

bolts improperly tightened or gaskets mispositioned. Accumulator valve in control valve body stuck. Incorrect No. 8 (4T60) or No. 2 (4T60-E) check ball location. Damaged seals on driven support sprocket.

Early Or Late 1-2 Shift (4T60)

Incorrectly adjusted or disconnected T.V. cable. Damaged governor thrust bearing, springs or gear. Governor seal leaking. Governor exhaust check balls missing, damaged or not seating. Governor pipes leaking. Bent or damaged T.V. linkage, lever or bracket assembly. Stuck or binding T.V. valve plunger.

Early Or Late 1-2 Shift (4T60-E)

Wrong PROM.

No 2-3 Shift (1st & 2nd Gears 4T60)

1. Check for damaged governor thrust bearing, springs or gear. Governor seal leaking. Governor exhaust check balls missing, damaged or not seating. Governor pipes leaking. Damaged coil or rotor in speed sensor (if equipped). Missing 1-2 servo orifice cup plug or leaking or stuck servo release ball capsule. Accumulator cover lube hole blocked or lube pipe leaking or damaged.
2. No. 11 check ball not seating. Stuck 2-3 shift valve in control valve body. No. 5 and 6 check balls mispositioned or not seating. Sticking 2-3 accumulator valve. Leaking or damaged seals for 1-2 servo release pipe. Channel plate gasket mispositioned. Blocked driven sprocket support lube passage. Input housing and shaft assembly seals damaged.
3. Blocked input shaft oil passages. Damaged 3rd clutch housing seals, piston or piston check ball. Burned 3rd clutch housing clutches. Mispositioned rollers or broken springs on 3rd roller clutch. Damaged 3rd roller clutch cage.

No 2-3 Shift (1st & 2nd Gears 4T60-E)

Check for trouble Code 26, 36 or 56. Solenoid "B" stuck on. Dirt in solenoid, PCM signal to solenoid "B" grounded or signal return wire shorted to ground.

1-4 Shift (Misses 2nd & 3rd Gears 4T60-E)

Check for trouble Code 26 or 56. Solenoid "A" stuck on. Dirt in solenoid, PCM signal to solenoid "A" grounded or signal return wire shorted to ground.

2-3 Shift Only (4T60-E Only)

Check for trouble code 26 or 56. Failed "A" solenoid ("A" solenoid off). Dirt in filter, PCM not grounded, leaking "O" ring, no supply voltage to "A" solenoid or wire disconnected.

1-2-4 Shift (No 2-3 Shift 4T60-E)

Stuck 2-3 shift valve or 3-2 manual shift valve. Mispositioned or damaged channel plate gasket. Blocked 3rd clutch port in driven sprocket support. Seals damaged or leaking in input shaft. Burned 3rd clutch assembly. Damaged or incorrectly assembled 3rd roller clutch assembly.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

Harsh Or Soft 2-3 Shift (4T60)

Low or high oil pressures. No. 7 check ball and capsule assembly leaking. Leaking 1-2 servo release pipe seals. Mispositioned No. 12 check ball.

Harsh Or Soft 2-3 Shift (4T60-E)

Low or high oil pressures. Mispositioned No. 4 check ball causing soft shift. Leaking 2-3 accumulator piston. Missing No. 9 check ball causing harsh shift.

Early Or Late 2-3 Shift (4T60)

Incorrectly adjusted or disconnected T.V. cable. Damaged governor thrust bearing, springs or gear. Governor seal leaking. Governor exhaust check balls missing, damaged or not seating. Governor pipes leaking. Bent or damaged T.V. linkage, lever or bracket assembly. Stuck or binding T.V. valve plunger.

Early Or Late 2-3 Shift (4T60-E)

Wrong PROM.

Shudder 1-2 Shift (4T60)

Wrong servo pin, glazed 1-2 band, worn or damaged 2nd clutch, leaky check valve ball, damaged driven sprocket seal rings.

3rd Gear Only (4T60-E)

Check for trouble Codes 16, 26, 36, 24 and 56. Check solenoid circuits "A" and "B" for loose, open or shorted wires. Check PCM for loose grounds, loose or corroded connections or bad quad drivers.

3-4 Shift (Misses 1st & 2nd Gears 4T60-E)

Check for trouble Code 26, 36 or 56. Solenoid "B" stuck off. Dirt in solenoid, "O" ring leaking, PCM signal to solenoid "B" grounded or signal return wire shorted to ground.

No 3-4 Shift

On 4T60, check for incorrectly adjusted or disconnected T.V. cable. Damaged coil or rotor in speed sensor (if equipped). Leaking governor feed or return pipes. On 4T60 and 4T60-E, check for manual shift linkage out of adjustment. Sticking 3-4 shift valve. Splines on 4th clutch shaft damaged. Burned 4th clutch assembly clutch plates, damaged piston seals or incorrect number of clutch plates.

Harsh Or Soft 3-4 Shift

High or low line pressures. Accumulator cover bolts improperly tightened. Damaged accumulator seals or pistons. Mispositioned No. 1 check ball (4T60). On 4T60-E, check for stuck 3-4 accumulator valve in control valve assembly or missing No. 10 check all.

Early Or Late 3-4 Shift (4T60)

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

Incorrectly adjusted or disconnected T.V. cable. Damaged governor thrust bearing, springs or gear. Governor seal leaking. Governor exhaust check balls missing, damaged or not seating. Governor pipes leaking. Bent or damaged T.V. linkage, lever or bracket assembly. Stuck or binding T.V. valve plunger.

Early Or Late 3-4 Shift (4T60-E)

Wrong PROM.

No Reverse

1. Oil pressure low. Reverse servo incorrectly assembled, piston or seal damaged or apply pin incorrect. Damaged oil pump drive shaft or oil pump assembly. Input clutch accumulator piston seal damaged. Drive link assembly damaged or drive link chain broken. Burned, damaged or mispositioned reverse band. Input clutch assembly clutch plates burned, clutch plates missing or check ball capsule leaking or missing.
2. Input piston seals cut or damaged, or shaft feed passages blocked. Damaged or incorrectly assembled input sprag or input sun gear assembly. Reverse reaction drum splines damaged. Burned 3rd roller clutch (due to lack of lubrication), or oil lube pipe leaking or damaged.
3. Input carrier and reaction carrier assembly pinions, internal ring gear or sun gear damaged. Output shaft damaged or drive axles incorrectly assembled into differential assembly.
4. Parking pawl spring broken. Damaged final drive assembly or final drive sun gear, side gears, pinion gears or internal ring gear.

Locked In Reverse

Damaged parking pawl binding on final drive internal gear.

Slips In Reverse

Low oil pressure. Reverse servo seal damaged. Reverse reaction drum splines stripped.

Vehicle Moves In Park

Manual linkage damaged or disconnected. Broken final drive park pawl spring, park pawl or park pawl gear in final drive internal gear assembly. Park actuator spring damaged.

Harsh Neutral-To-Drive Engagement

Engine idle too high. Loss of vacuum due to damaged lines, aspirator "T" or vacuum modulator. Aspirator "T" installed backward or plugged. Reverse servo cushion spring weak or broken. Check ball No. 9 (4T60) or 5 (4T60-E) missing (also harsh engagement in Reverse). Check ball No. 12 (4T60) or 6 (4T60-E) is missing. Control valve body spacer plate mispositioned. Thermal element does not close when warm. Reverse servo apply pin too long.

Vehicle Starts In 2nd Gear (4T60)

Line pressure high. Defective vacuum modulator or lines. Stuck 1-2 shift valve. Stuck governor weights in governor assembly. Bushing retainer for 1-2 throttle valve installed too deep.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

Vehicle Starts in 2nd Gear (4T60-E)

Stuck 1-2 shift valve.

Harsh Reverse

Scored 2nd clutch housing. Burned reverse band fiber. Reverse servo apply pin too short (4T60). On 4T60-E, check for missing or mispositioned check ball No. 5, or damaged or wrong servo cushion spring.

No Engine Breaking In Manual 2nd Or Low (4T60-E)

Burned 2-1 manual band. Apply pin not engaging 2-1 manual band. Apply servo seals leaking, servo cover loose or piston binding in bore.

Harsh 4-3 Downshift (4T60)

Missing No. 1 check ball in control valve body.

Harsh 4-3 Downshift (4T60-E)

Missing No. 10 check ball in control valve body. 3-4 accumulator valve stuck or 3-4 accumulator seal cut.

Harsh 3-2 Downshift (4T60)

Vacuum lines leaking or loss of vacuum to vacuum modulator. Faulty vacuum modulator. Stuck 1-2 servo control valve or missing No. 12 check ball. Stuck 3-2 control valve. Missing No. 4 check ball. Stuck 3-2 coast valve. No. 2 check ball missing or mispositioned.

Harsh 3-2 Downshift (4T60-E)

No. 9 check ball in control valve body missing. 2-3 accumulator valve stuck or 2-3 accumulator seal cut.

Harsh 2-1 Downshift

No. 8 check ball missing. No. 2 check ball missing or mispositioned. On 4T60-E, wrong spacer plate, stuck 1-2 accumulator valve or cut 1-2 accumulator seal.

NOTE: Models with 4T60-E transaxle use Powertrain Control Module (PCM) computer. This computer controls TCC, Pulse Width Modulated (PWM) solenoid (if equipped) and shifting solenoids "A" and "B". Models with 4T60 transaxle use Electronic Control Module (ECM) computer. This computer controls TCC only.

No Converter Clutch Apply

Verify proper ECM or PCM operation and vehicle wiring. Temperature switch damaged (4T60). Damaged wiring harness or pinched wires. Inoperative 3rd clutch switch (4T60). Solenoid inoperative. Converter clutch shift valve of control valve assembly stuck. Converter clutch apply valve stuck. Missing No. 10 check ball (4T60 only). Solenoid "O" ring leaking or screen blocked.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

Torque converter external leaks at hub weld area, or fluid unbalanced or contaminated. Turbine shaft seals damaged. Oil pump drive shaft seal damaged. Channel plate converter clutch blow-off check ball not seated or damaged. Damaged or missing TCC accumulator piston or seal (4T60-E without PWM only).

Converter Clutch Does Not Release

ECM- or PCM-controlled TCC solenoid does not exhaust. Control valve assembly converter clutch apply valve stuck in apply position. TCC orifice screen missing.

Converter Stuck On in 3rd & 4th (4T60-E)

TCC solenoid stuck on. Dirt in TCC solenoid. Wire between TCC solenoid and PCM shorted to ground.

Converter Applied With Maximum Pressure (4T60-E With PWM)

Possible trouble Code 26 (Code 56 on some models). PWM solenoid always off. Dirt in solenoid. Leaky "O" ring. No voltage to PWM solenoid. Open wire or no apply signal from PCM.

Converter Clutch Apply Rough, Slips Or Shudders

Control valve assembly converter clutch regulator valve stuck. Turbine shaft seals damaged or missing. Converter clutch blow-off check ball not sealed or damaged. Damaged channel plate converter clutch accumulator piston or seal (if equipped). Spring damaged. Wrong blow-off spring. Seals damaged or missing. Defective converter clutch.

No TCC (4T60-E)

Check for possible trouble Code 15, 26, 31, 38 or 56. Check the following solenoids and switches for faulty operation, dirt or binding: TCC solenoid, PWM, brake switch, PRNDL ("P"/"N" switch) and coolant temperature sensor. Also check the same solenoid and switch circuits for open or shorted wires between voltage supply or PCM.

CLUTCH & BAND APPLICATION CHART (4T60)

Selector Lever Position	Elements In Use
"D" (Drive)	
1st Gear	Input Clutch, ⁽¹⁾ Input Sprag & 1-2 Band
2nd Gear	2nd Clutch, ⁽²⁾ Input Clutch, ⁽³⁾ Input Sprag & 1-2 Band
3rd Gear	2nd Clutch, 3rd Clutch & ⁽¹⁾ 3rd Roller Clutch
Overdrive	4th Gear, 2nd Clutch, ⁽²⁾ 3rd Clutch & ⁽³⁾ 3rd Roller Clutch
"3" (Manual 3rd)	
3rd Gear	2nd Clutch, 3rd Clutch, ⁽¹⁾ 3rd

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

	Roller Clutch, Input Clutch & (1) Input Sprag
"2" (Manual 2nd)	
2nd Gear	2nd Clutch, ⁽²⁾ Input Clutch, ⁽³⁾ Input Sprag & 1-2 Band
"1" (Manual Low)	
1st Gear	3rd Clutch, ⁽¹⁾ 3rd Roller Clutch, Input Clutch, ⁽¹⁾ Input Sprag & 1-2 Band
"R" (Reverse)	Reverse Band, Input Clutch & ⁽¹⁾ Input Sprag
"N" (Neutral)	All Clutches & Bands Released Or Ineffective
"P" (Park)	All Clutches & Bands Released Or Ineffective
(1) Holding. (2) Applied but not effective. (3) Overrunning.	

CLUTCH & BAND APPLICATION CHART (4T60-E)

Gear Position	Solenoid Position	Elements In Use
"D"		
1st Gear	"A" ON/"B" ON	Input Clutch, ⁽¹⁾ Input Sprag, Forward Band & ⁽¹⁾ 1-2 Support Roller Clutch
2nd Gear	"A" OFF/"B" ON	2nd Clutch, ⁽²⁾ Input Clutch, ⁽³⁾ Input Sprag, Forward Band & ⁽¹⁾ 1-2 Support Roller Clutch
3rd Gear	"A" OFF/"B" OFF	2nd Clutch, 3rd Clutch, ⁽¹⁾ 3rd Roller Clutch, Forward Band & (3) 1-2 Support Roller Clutch
Overdrive	"A" ON/"B" OFF	4th Gear, 2nd Clutch, ⁽²⁾ 3rd Clutch, ⁽³⁾ 3rd Roller Clutch, Forward Band & ⁽³⁾ 1-2 Support Roller Clutch
"3"		
3rd Gear	"A" OFF/"B" OFF	2nd Clutch, 3rd Clutch, ⁽¹⁾ 3rd Roller Clutch, Input Clutch, ⁽¹⁾ Input Sprag, Forward Band & ⁽³⁾ 1-2 Support Roller Clutch
2nd Gear	"A" OFF/"B"	2nd Clutch, ⁽²⁾ Input Clutch, ⁽³⁾ Input

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

	ON	Sprag, Forward Band & ⁽¹⁾ 1-2 Support Roller Clutch
1st Gear	"A" ON/"B" ON	Input Clutch, ⁽³⁾ Input Sprag, Forward Band & ⁽¹⁾ 1-2 Support Roller Clutch
"2"		
2nd Gear	"A" OFF/"B" ON	2nd Clutch, ⁽²⁾ Input Clutch, ⁽³⁾ Input Sprag, Forward Band, ⁽¹⁾ 1-2 Support Roller Clutch & 1-2 Band
1st Gear	"A" ON/"B" ON	Input Clutch, ⁽¹⁾ Input Sprag, Forward Band, ⁽¹⁾ 1-2 Support Roller Clutch & 1-2 Band
"1"		
1st Gear	"A" ON/"B" ON	3rd Clutch, ⁽¹⁾ 3rd Roller Clutch, Input Clutch, ⁽¹⁾ Input Sprag, Forward Band, ⁽¹⁾ 1-2 Support Roller Clutch & 1-2 Band
"R"	"A" ON/"B" ON	Reverse Band, Input Clutch & ⁽¹⁾ Input Sprag
"N"	"A" ON/"B" ON	All Clutches & Bands Released Or Ineffective
"P" (Park)	"A" ON/"B" ON	All Clutches & Bands Released Or Ineffective
(1) Holding. (2) Applied but not effective. (3) Overrunning.		

ELECTRONIC SELF-DIAGNOSTICS & ELECTRONIC TESTING

NOTE: See AUTO TRANS DIAGNOSIS - HYDRA-MATIC 4T60-E article in AUTOMATIC TRANSMISSIONS.

TESTING

ROAD TEST

NOTE: Before road testing vehicle, engine and transmission must be at operating temperature. Torque converter clutch will not engage if engine coolant has not reached operating temperature.

Gear Selector Position "D" (Overdrive)

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1. With gear selector in "D" (overdrive) position, steadily increase throttle pressure to accelerate vehicle. Note shift speed engagement points in 2nd gear, 3rd gear and overdrive gear. Use chart as a reference for proper shift speeds. See **Fig. 3-Fig. 9** . Also note Torque Converter Clutch (TCC) engagement point while in 3rd gear or Overdrive.

NOTE: **Ensure TCC engages in 3rd gear or overdrive during the following steps. On vehicles with PWM solenoid, TCC engagement point may be hard to feel. Use Tech 1 scan tool to indicate TCC engagement and release points.**

2. At vehicle speeds of 40-50 MPH, quickly depress accelerator to half-open position (part throttle detent downshift). TCC should release, and transaxle should immediately downshift to 3rd gear.
3. At vehicle speeds of 40-50 MPH, quickly depress accelerator to wide open position (full throttle detent downshift). TCC should release, and transaxle should immediately downshift to 2nd gear.
4. At vehicle speeds of 40-55 MPH, release accelerator pedal while moving gear selector to the "3" (third gear) position. The TCC should release, transaxle should downshift into 3rd gear, and engine braking should slow vehicle.
5. Move gear selector to the "D" (overdrive) position, and accelerate to 40-45 MPH. Release accelerator pedal while moving gear selector to the "2" (2nd gear) position. The TCC should release, transaxle should downshift to 2nd gear immediately, and engine braking should slow vehicle.
6. Move gear selector to the "D" (overdrive) position, and accelerate to 25 MPH. Release accelerator pedal while moving gear selector to "1" (1st gear) position. TCC should release, transaxle should downshift to 1st gear and engine braking should slow vehicle.
7. With gear selector in the "D" (overdrive) position, accelerate vehicle to overdrive gear with TCC applied. Release accelerator pedal, and lightly apply brakes. The TCC should release. Note speeds at which vehicle downshifts. See **Fig. 3-Fig. 9**

NOTE: **The following shift charts are for 1991-92 model year vehicles. Other models are similar. Shift points may vary by as much 10%. Use the following shift charts as guidelines only.**

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1-2, 2-3 AND 3-4 SHIFT SPEEDS

MODEL	1-2 SHIFT SPEED IN TPS ±3 MPH										2-3 SHIFT SPEED IN TPS ±4 MPH										3-4 SHIFT SPEED IN TPS ±5 MPH									
	%	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50		
1WDH	MPH	16	17	18	19	21	22	23	26	28	24	29	33	37	41	44	46	49	51	48	56	63	70	76	82	—	—	—		
1WFH	MPH	16	17	18	19	20	22	23	26	28	24	29	34	37	40	43	47	49	52	48	63	70	76	82	—	—	—	—		
1WHH	MPH	17	19	20	22	23	24	25	26	27	26	27	31	34	37	39	42	43	46	48	48	55	61	67	72	77	81	85		
1WJH / 1WPH	MPH	17	18	20	21	23	25	28	30	32	30	35	38	41	44	47	49	51	54	58	64	71	76	82	85	—	—	—		
1WMH	MPH	17	19	20	21	22	23	25	27	30	26	30	35	39	42	45	48	51	53	58	65	73	79	84	88	93	97	—		
1WWH	MPH	17	19	20	21	23	24	25	26	27	26	28	31	34	37	40	42	45	47	52	58	64	69	73	82	—	—	—		
1WXH	MPH	17	18	20	21	22	23	24	25	26	26	29	33	36	38	41	43	46	48	54	60	66	71	76	81	85	—	—		
1YDH	MPH	17	18	19	20	22	23	24	25	26	26	29	33	36	39	42	44	47	49	48	52	55	57	60	63	65	67	69		
1YHH	MPH	17	18	20	21	22	23	24	25	26	27	30	33	37	39	43	45	48	50	50	53	56	59	61	64	67	69	71		
1YSH	MPH	16	17	18	19	20	21	22	23	24	24	27	31	34	37	39	41	44	46	46	49	51	54	57	59	61	63	65		
1YTH	MPH	16	18	19	20	21	22	23	24	25	25	28	32	35	38	41	43	45	48	47	50	53	56	58	61	63	65	67		

FINAL DRIVE / SPROCKETS RATIOS AND DOWNSHIFT SPEEDS

MODEL	RATIOS			4-3 PART THROTTLE	3-2 PART THROTTLE	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS*	OVERALL					
1WDH	3.06	37/33	2.73	57 - 70	45 - 52	40 - 50	15 - 17	10 - 12
1WFH	3.06	37/33	2.73	59 - 73	46 - 54	42 - 52	15 - 18	10 - 13
1WHH	3.06	35/35	3.06	55 - 68	41 - 47	42 - 51	16 - 19	10 - 13
1WJH / 1WPH	3.33	37/33	2.97	59 - 71	48 - 54	43 - 52	16 - 19	10 - 13
1WMH	2.84	35/35	2.84	59 - 73	47 - 54	41 - 52	16 - 19	11 - 13
1WWH	3.06	35/35	3.06	52 - 65	41 - 47	38 - 47	16 - 19	10 - 13
1WXH	3.33	37/33	2.97	57 - 69	42 - 48	43 - 52	16 - 19	9 - 13
1YDH	3.33	35/35	3.33	62 - 76	39 - 47	40 - 47	17 - 21	10 - 13
1YHH	3.33	35/35	3.33	64 - 78	40 - 48	41 - 49	18 - 21	10 - 13
1YSH	3.33	35/35	3.33	59 - 72	37 - 45	37 - 45	16 - 20	10 - 12
1YTH	3.33	35/35	3.33	61 - 74	38 - 46	39 - 46	17 - 20	10 - 13

NOTES:

- ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO KM/h = MPH × 1.609.
 - SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
 - THE UPSHIFT SPEEDS FOR 1-2, 2-3 AND 3-4 ARE BASED ON THROTTLE POSITION SENSOR (TPS) DATA AS A REFERENCE — USE A TECH 1 OR OTHER SCAN TOOL THAT GIVES PERCENTAGE OF THROTTLE OPENING INSTEAD OF VOLTAGE TO MONITOR THIS DATA.
- * DESIGNATES THE NUMBER OF TEETH ON THE DRIVE/DRIVEN SPROCKETS, RESPECTIVELY.
- * See Fig. 1 for Model I.D.

Fig. 3: Hydra-Matic 4T60 Shift Speed Chart (1991)
Courtesy of GENERAL MOTORS CORP.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

MODEL	RATIOS		1-2 MIN THROTTLE	2-3 MIN THROTTLE	3-4 MIN THROTTLE	3-2 DET DOWNSHIFT (Over 90 TPS)	2-1 DET DOWNSHIFT (Over 90 TPS)	1-2 W.O.T. (100 TPS)	2-3 W.O.T. (100 TPS)	3-4 W.O.T. (100 TPS)	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS											
YMW	2.84	35/35	12	21	46	76	33	5200 R.P.M.	5000 R.P.M.	—	40	19	10
YPW	3.33	35/35	12	21	46	68	31	5200 R.P.M.	5300 R.P.M.	4800 R.P.M.	40	19	10
YZW	3.06	35/35	12	21	46	74	32	5200 R.P.M.	5200 R.P.M.	—	40	19	10

NOTES:

1. ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO Km/h = MPH × 1.609.
2. SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
3. THE 3-2 AND 2-1 DETENT DOWNSHIFTS SPEEDS ARE THE MAXIMUM SPEEDS THAT A 3-2 OR 2-1 DETENT DOWNSHIFT (OVER 90 TPS) WILL OCCUR.
4. THE 1-2, 2-3 AND 3-4 WIDE OPEN THROTTLE (W.O.T.) SHIFT VALUES ARE GIVEN IN R.P.M.'s INSTEAD OF MPH.
(THE P.C.M. USES R.P.M. FOR THE W.O.T. SHIFTS — THE MPH WILL VARY DEPENDING ON TORQUE CONVERTER VARIATION)

* See Fig. 1 for Model 1.D.

Fig. 4: Hydra-Matic 4T60-E Shift Speed Chart (1991 - 1 of 2)
Courtesy of GENERAL MOTORS CORP.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1991 HYDRA-MATIC 4T60-E SHIFT SPEED CHART

1-2, 2-3 AND 3-4 SHIFT SPEEDS

MODEL	1-2 SHIFT SPEED IN % TPS ±3 MPH										2-3 SHIFT SPEED IN % TPS ±4 MPH										3-4 SHIFT SPEED IN % TPS ±5 MPH									
	TPS IN %	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50		
AHW	MPH	13	15	20	22	26	27	29	31	33	23	29	35	41	48	51	56	59	62	43	48	55	60	69	74	83	89	92		
AMW	MPH	13	15	18	20	24	25	27	29	30	23	27	34	38	44	47	52	54	57	43	46	52	55	62	65	74	81	85		
APW	MPH	13	15	18	20	24	25	27	29	30	23	27	34	38	44	47	52	54	57	43	46	52	55	62	65	74	81	85		
AVW	MPH	13	15	20	22	26	27	29	31	33	23	29	35	41	48	51	56	59	62	43	48	55	60	69	74	83	89	92		
AYW	MPH	13	15	17	19	23	25	29	31	32	23	27	34	38	45	47	51	53	54	43	43	46	49	54	58	67	73	76		
AZW	MPH	13	15	20	22	26	27	29	31	33	23	29	35	41	48	51	56	59	62	43	48	55	60	69	74	83	89	92		

FINAL DRIVE / SPROCKETS RATIOS AND SHIFT SPEEDS

MODEL	RATIOS			1-2 MIN THROTTLE	2-3 MIN THROTTLE	3-4 MIN THROTTLE	3-2 DET DOWNSHIFT (Over 90 % TPS)	2-1 DET DOWNSHIFT (Over 90 % TPS)	1-2 W.O.T. (100 % TPS)	2-3 W.O.T. (100 % TPS)	3-4 W.O.T. (100 % TPS)	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS*	OVERALL											
AHW	3.06	37/33	2.73	12	22	43	74	35	43	80	—	39	19	9
AMW	3.33	37/33	2.97	12	22	43	67	29/31	41	76	—	39	19	9
APW	3.33	37/33	2.97	12	22	43	67	31	41	76	—	39	19	9
AVW	3.06	37/33	2.73	12	22	43	74	29/35	43	80	—	39	19	9
AYW	3.33	35/35	3.33	12	22	41	62	28	35	70	100	38	19	9
AZW	3.06	37/33	2.73	12	22	43	74	29/35	43	80	—	39	19	9

NOTES:

1. ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO KM/h = MPH $\times$ 1.609.
2. SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
3. THE UPSHIFT SPEEDS FOR 1-2, 2-3 AND 3-4 ARE BASED ON THROTTLE POSITION SENSOR (TPS) DATA AS A REFERENCE — USE A TECH 1™ OR OTHER SCAN TOOL THAT GIVES PERCENTAGE OF THROTTLE OPENING INSTEAD OF VOLTAGE TO MONITOR THIS DATA.
4. THE 1-2, 2-3 AND 3-4 SHIFT SPEED CHART INFORMATION IS BASED ON PERCENTAGE OF THROTTLE OPENING. THE CONVERSION FACTOR FOR THE OUTPUT OF THE CADILLAC SELF-DIAGNOSTIC FEATURES FOR THE DRIVER INFORMATION CENTER (DIC) WOULD BE, PERCENT TPS $\times$ 0.819 TO GET THROTTLE ANGLE DATA. REFER TO SECTION 8D.
5. THE 3-2 AND 2-1 DETENT DOWNSHIFTS SPEEDS ARE THE MAXIMUM SPEEDS THAT A 3-2 OR 2-1 DETENT DOWNSHIFT (OVER 90 % TPS) WILL OCCUR. EUROPE AND JAPAN EXPORT VEHICLES WILL HAVE THE LOWER 2-1 DETENT VALVES.

* DESIGNATES THE NUMBER OF TEETH ON THE DRIVE/DRIVEN SPROCKETS, RESPECTIVELY.

* See Fig. 1 for Model I.D.

Fig. 5: Hydra-Matic 4T60-E Shift Speed Chart (1991 - 2 of 2)
Courtesy of GENERAL MOTORS CORP.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1992 HYDRA-MATIC 4T60 SHIFT SPEED CHARTS

1-2, 2-3 AND 3-4 SHIFT SPEEDS

MODEL	TPS IN %	1-2 SHIFT SPEED IN TPS ±3 MPH										2-3 SHIFT SPEED IN TPS ±4 MPH										3-4 SHIFT SPEED IN TPS ±5 MPH									
		10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35						
2YBH	MPH	14	17	18	21	22	24	26	28	30	26	29	33	36	39	42	44	47	50	50	50	50	54	58	61	-	-	-			
2YKH	MPH	14	16	18	21	23	24	27	28	31	24	28	31	33	36	38	41	43	45	46	46	47	50	53	56	-	-	-			
2WFH	MPH	14	17	19	21	23	25	27	29	32	25	31	35	38	42	45	48	51	53	50	58	65	72	79	84	-	-	-			
2WWH	MPH	14	17	18	21	23	25	27	29	32	23	27	32	34	37	39	42	45	47	45	52	58	63	70	74	-	-	-			

FINAL DRIVE / SPROCKETS RATIOS AND DOWNSHIFT SPEEDS

MODEL	RATIOS			4-3 PART THROTTLE	3-2 PART THROTTLE	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS*	OVERALL					
2YBH	3.33	35/35	3.33	48-60	41-50	43-51	18-21	10-13
2YKH	3.33	35/35	3.33	47-59	40-48	42-49	17-21	10-13
2WFH	3.06	33/37	2.73	60-73	46-54	42-52	15-18	10-13
2WWH	3.06	35/35	3.06	53-65	41-47	38-47	16-19	10-13

NOTES:

1. ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO KM/h = MPH x 1.609.
2. SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
3. THE UPSHIFT SPEEDS FOR 1-2, 2-3 AND 3-4 ARE BASED ON THROTTLE POSITION SENSOR (TPS) DATA AS A REFERENCE - USE A TECH 1* OR OTHER SCAN TOOL THAT GIVES PERCENTAGE OF THROTTLE OPENING INSTEAD OF VOLTAGE TO MONITOR THIS DATA.

* DESIGNATES THE NUMBER OF TEETH ON THE DRIVE/DRIVEN SPROCKETS, RESPECTIVELY.

* See Fig. 1 for Model I.D.

Fig. 6: Hydra-Matic 4T60 Shift Speed Chart (1992)
Courtesy of GENERAL MOTORS CORP.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1992 HYDRA-MATIC 4T60-E SHIFT SPEED CHART 1-2, 2-3 AND 3-4 SHIFT SPEEDS

MODEL	1-2 SHIFT SPEED IN % TPS ±3 MPH										2-3 SHIFT SPEED IN % TPS ±4 MPH										3-4 SHIFT SPEED IN % TPS ±5 MPH									
	TPS IN %	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50		
ABW	MPH	13	17	22	26	28	30	32	34	36	24	33	41	48	54	58	61	65	69	43	43	60	68	78	86	-	-	-		
AMW	MPH	14	16	20	24	26	28	30	32	34	24	30	38	44	50	53	57	60	64	43	43	55	62	70	78	-	-	-		
ANW	MPH	14	16	20	24	26	28	30	32	34	24	30	38	44	50	53	57	60	64	43	43	55	62	70	78	-	-	-		
APW	MPH	14	16	20	24	26	28	30	32	34	24	30	38	44	50	53	57	60	64	43	43	55	62	70	78	-	-	-		
AVW	MPH	13	17	22	26	28	30	32	34	36	24	33	41	48	54	58	61	65	69	43	43	60	68	78	86	-	-	-		
AWW	MPH	14	16	20	23	25	28	30	32	34	24	30	38	44	50	53	57	60	64	43	43	55	62	70	78	-	-	-		
AYW	MPH	14	16	20	24	26	28	30	32	34	24	30	38	45	50	52	54	57	59	41	43	49	54	62	71	-	-	-		
AZW	MPH	14	17	22	26	28	35	33	35	37	24	33	41	48	54	58	62	66	71	43	43	60	69	78	87	-	-	-		

FINAL DRIVE / SPROCKETS RATIOS AND SHIFT SPEEDS

MODEL	RATIOS			1-2 MIN THROTTLE	2-3 MIN THROTTLE	3-4 MIN THROTTLE	3-2 DET DOWNSHIFT (Over 90 % TPS)	2-1 DET DOWNSHIFT (Over 90 % TPS)	1-2 W.O.T. (100 % TPS)	2-3 W.O.T. (100 % TPS)	3-4 W.O.T. (100 % TPS)	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS*	OVERALL											
ABW	3.06	37/33	2.73	12	22	43	74	29/35	43	80	-	39	19	9
AMW	3.33	37/33	2.97	12	22	43	67	29/31	39	76	-	39	19	9
ANW	3.33	37/33	2.97	12	22	43	67	31	39	76	-	39	19	9
APW	3.33	37/33	2.97	12	22	43	67	31	39	76	-	39	19	9
AVW	3.06	37/33	2.73	12	22	43	74	29/35	43	80	-	39	19	9
AWW	3.33	37/33	2.97	12	22	43	67	31	39	76	-	39	19	9
AYW	3.33	35/35	3.33	12	22	41	62	27	34	70	-	39	19	9
AZW	3.06	37/33	2.73	12	22	43	74	35	43	80	-	39	19	9

NOTES:

- ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO KM/h = MPH x 1.609.
- SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
- THE UPSHIFT SPEEDS FOR 1-2, 2-3 AND 3-4 ARE BASED ON THROTTLE POSITION SENSOR (TPS) DATA AS A REFERENCE - USE A TECH 1™ OR OTHER SCAN TOOL THAT GIVES PERCENTAGE OF THROTTLE OPENING INSTEAD OF VOLTAGE TO MONITOR THIS DATA.
- THE 1-2, 2-3 AND 3-4 SHIFT SPEED CHART INFORMATION IS BASED ON PERCENTAGE OF THROTTLE OPENING. THE CONVERSION FACTOR FOR THE OUTPUT OF THE CADILLAC SELF-DIAGNOSTIC FEATURES FOR THE DRIVER INFORMATION CENTER (DIC) WOULD BE, PERCENT TPS X 0.819 TO GET THROTTLE ANGLE DATA. REFER TO SECTION 8D.
- THE 3-2 AND 2-1 DETENT DOWNSHIFTS SPEEDS ARE THE MAXIMUM SPEEDS THAT A 3-2 OR 2-1 DETENT DOWNSHIFT (OVER 90 % TPS) WILL OCCUR. EUROPE AND JAPAN EXPORT VEHICLES WILL HAVE THE LOWER 2-1 DETENT VALVES.

* DESIGNATES THE NUMBER OF TEETH ON THE DRIVE/DRIVEN SPROCKETS, RESPECTIVELY.

* See Fig. 1 for Model I.D.

Fig. 7: Hydra-Matic 4T60-E Shift Speed Chart (1992 - 1 of 3)
Courtesy of GENERAL MOTORS CORP.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

1-2, 2-3 AND 3-4 SHIFT SPEEDS

MODEL	1-2 SHIFT SPEED IN % TPS ±3 MPH										2-3 SHIFT SPEED IN % TPS ±4 MPH										3-4 SHIFT SPEED IN % TPS ±5 MPH									
	TPS IN %	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50		
BTW	MPH	14	17	20	23	27	29	31	34	36	24	30	35	39	44	49	51	53	56	45	50	58	65	79	-	-	-	-		
BYW	MPH	12	17	21	23	25	28	31	34	36	24	29	34	39	44	47	50	53	56	45	46	52	65	80	-	-	-	-		
CLW	MPH	13	16	20	23	27	28	31	34	36	24	30	35	39	44	48	50	53	56	45	49	56	65	79	-	-	-	-		
CSW	MPH	13	16	20	23	26	28	31	34	36	22	29	35	39	42	47	49	52	56	45	49	54	67	80	-	-	-	-		
CTW	MPH	12	17	21	23	25	28	31	34	36	24	29	34	39	44	47	50	53	56	45	46	52	65	80	-	-	-	-		
CXW	MPH	14	17	20	23	27	29	31	34	36	24	30	35	39	44	49	51	53	56	45	50	58	65	79	-	-	-	-		
CZW	MPH	13	17	19	21	23	25	28	30	32	23	27	31	35	40	44	46	49	51	46	49	57	65	80	-	-	-	-		
PHW	MPH	13	17	19	21	23	25	28	30	32	23	27	31	35	40	44	46	49	51	46	49	57	65	80	-	-	-	-		
WAW	MPH	14	17	21	23	27	29	31	34	36	24	30	35	39	45	48	51	53	56	45	49	58	65	80	-	-	-	-		
YLW	MPH	13	17	21	23	27	28	31	34	36	24	29	35	39	44	48	50	53	56	45	46	56	65	81	-	-	-	-		
YMW	MPH	13	16	20	23	27	28	31	34	36	24	30	35	39	44	48	50	53	56	45	49	56	65	79	-	-	-	-		
YPW	MPH	13	16	19	22	25	26	28	30	31	24	30	34	37	42	47	48	51	53	45	49	58	65	80	-	-	-	-		
YZW	MPH	13	16	20	23	26	28	31	34	36	22	29	35	39	42	47	49	52	56	45	49	54	67	80	-	-	-	-		

FINAL DRIVE / SPROCKETS RATIOS AND SHIFT SPEEDS

MODEL	RATIOS			1-2 MIN THROTTLE	2-3 MIN THROTTLE	3-4 MIN THROTTLE	3-2 DET DOWNSHIFT (Over 90 % TPS)	2-1 DET DOWNSHIFT (Over 90 % TPS)	1-2 W.O.T. (100 % TPS)	2-3 W.O.T. (100 % TPS)	3-4 W.O.T. (100 % TPS)	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS*	OVERALL											
BTW	3.33	37/33	2.97	11	20	45	62	35	39	74	-	40	16	10
BYW	3.06	35/35	3.06	11	20	45	62	35	39	74	-	40	19	10
CLW	2.84	35/35	2.84	11	20	45	62	35	39	74	-	40	19	10
CSW	3.06	35/35	3.06	11	20	45	62	35	39	74	-	40	19	10
CTW	3.06	35/35	3.06	11	20	45	62	35	39	74	-	40	19	10
CXW	3.33	37/33	2.97	11	20	45	62	35	39	74	-	40	16	10
CZW	3.33	37/33	2.97	11	19	45	62	35	37	64	-	40	18	10
PHW	3.33	37/33	2.97	11	19	45	62	35	37	64	-	40	18	10
WAW	3.06	35/35	3.06	11	20	45	62	35	39	74	-	40	16	10
YLW	2.84	35/35	2.84	11	20	45	62	35	39	74	-	40	19	10
YMW	2.84	35/35	2.84	11	20	45	62	35	39	74	-	40	19	10
YPW	3.33	35/35	3.33	11	20	45	62	35	35	70	-	40	19	10
YZW	3.06	35/35	3.06	11	20	45	62	35	39	74	-	40	19	10

NOTES:

- ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO KM/h = MPH x 1.609.
- SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
- THE UPSHIFT SPEEDS FOR 1-2, 2-3 AND 3-4 ARE BASED ON THROTTLE POSITION SENSOR (TPS) DATA AS A REFERENCE - USE A TECH 1™ OR OTHER SCAN TOOL THAT GIVES PERCENTAGE OF THROTTLE OPENING INSTEAD OF VOLTAGE TO MONITOR THIS DATA.
- THE 1-2, 2-3 AND 3-4 SHIFT SPEED CHART INFORMATION IS BASED ON PERCENTAGE OF THROTTLE OPENING. THE CONVERSION FACTOR FOR THE OUTPUT OF THE CADILLAC SELF-DIAGNOSTIC FEATURES FOR THE DRIVER INFORMATION CENTER (DIC) WOULD BE, PERCENT TPS X 0.819 TO GET THROTTLE ANGLE DATA. REFER TO SECTION 8D.
- THE 3-2 AND 2-1 DETENT DOWNSHIFT SPEEDS ARE THE MAXIMUM SPEEDS THAT A 3-2 OR 2-1 DETENT DOWNSHIFT (OVER 90 % TPS) WILL OCCUR. EUROPE AND JAPAN EXPORT VEHICLES WILL HAVE THE LOWER 2-1 DETENT VALVES.

* DESIGNATES THE NUMBER OF TEETH ON THE DRIVE/DRIVEN SPROCKETS, RESPECTIVELY.

* See Fig. 1 for Model I.D.

Fig. 8: Hydra-Matic 4T60-E Shift Speed Chart (1992 - 2 of 3)

Courtesy of GENERAL MOTORS CORP.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

MODEL	1-2 SHIFT SPEED IN % TPS ± 3 MPH										2-3 SHIFT SPEED IN % TPS ± 4 MPH										3-4 SHIFT SPEED IN % TPS ± 5 MPH									
	TPS IN %	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50	10	15	20	25	30	35	40	45	50		
CWW	MPH	9	11	15	17	21	25	28	30	32	**	**	**	**	**	42	45	48	51	22	22	28	33	38	62	78	-	-		

FINAL DRIVE / SPROCKETS RATIOS AND DOWNSHIFT SPEEDS

MODEL	RATIOS			1-2 MIN THROTTLE	2-3 MIN THROTTLE	3-4 MIN THROTTLE	3-2 DET DOWNSHIFT (Over 90 % TPS)	2-1 DET DOWNSHIFT (Over 90 % TPS)	1-2 W.O.T. (100 % TPS)	2-3 W.O.T. (100 % TPS)	3-4 W.O.T. (100 % TPS)	4-3 COAST DOWN	3-2 COAST DOWN	2-1 COAST DOWN
	FINAL DRIVE	SPROCKETS*	OVERALL											
CWW	3.06	33/37	3.43	7	22	22	71	8	6200 RPM	6000 RPM	-	21	17	6

NOTES:

- ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO KM/h = MPH x 1.609.
 - SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOAD AND VEHICLE OPTIONS.
 - THE UPSHIFT SPEEDS FOR 1-2, 2-3 AND 3-4 ARE BASED ON THROTTLE POSITION SENSOR (TPS) DATA AS A REFERENCE - USE A TECH 1* OR OTHER SCAN TOOL THAT GIVES PERCENTAGE OF THROTTLE OPENING INSTEAD OF VOLTAGE TO MONITOR THIS DATA.
 - THE 3-2 AND 2-1 DETENT DOWNSHIFT SPEEDS ARE THE MAXIMUM SPEEDS THAT A 3-2 OR 2-1 DETENT DOWNSHIFT (OVER 90 % TPS) WILL OCCUR.
 - THE 1-2, 2-3 AND 3-4 WIDE OPEN THROTTLE (W.O.T.) SHIFT VALUES ARE GIVEN IN R.P.M.'s INSTEAD OF MPH. (THE P.C.M. USES R.P.M. FOR THE W.O.T. SHIFTS - THE MPH WILL VARY DEPENDING ON TORQUE CONVERTER VARIATION.)
- * DESIGNATES THE NUMBER OF TEETH ON THE DRIVE/DRIVEN SPROCKETS, RESPECTIVELY.
 ** DESIGNATES THAT THE MINIMUM THROTTLE WILL BE A 2-4 UPSHIFT, NOT A 2-3 UPSHIFT.
 * See Fig. 1 for Model I.D.

Fig. 9: Hydra-Matic 4T60-E Shift Speed Chart (1992 - 3 of 3)
 Courtesy of GENERAL MOTORS CORP.

Gear Selector Position "3" (3rd Gear)

With vehicle stopped, move gear selector to "3" (3rd gear) position and steadily increase throttle pressure to accelerate vehicle. Note speeds at which vehicle into 2nd and 3rd gears. See **Fig. 3-Fig. 9** . Also note when TCC engages while in 3rd gear.

Gear Selector Position "2" (2nd Gear)

With vehicle stopped, move gear selector to the "2" (2nd gear) position. Accelerate vehicle and note speed at which vehicle shifts from 1st gear to 2nd gear. Accelerate vehicle to 25 MPH. Transaxle should not shift into 3rd gear, and TCC should not engage.

Gear Selector Position "1" (1st Gear)

With vehicle stopped, move gear selector to the "1" (1st gear) position. Accelerate vehicle to 15 MPH. Transaxle should not upshift, and TCC should not engage.

HYDRAULIC PRESSURE TESTS

CAUTION: Parking and service brakes must be applied throughout hydraulic pressure test. Total time for testing with vehicle in any driving gear should not exceed 2 minutes.

- Before performing hydraulic pressure tests, check fluid level and condition. Check Throttle Valve (T.V.)

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1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

and manual control linkages for correct adjustment, and ensure engine is properly tuned.

2. Connect tachometer to engine, hand-held vacuum pump to vacuum modulator and oil pressure gauge to line pressure test port. See **Fig. 1**. Test for correct line pressure at specified engine RPM. See **Fig. 10-Fig. 12**.

NOTE: Hydraulic pressure is controlled by pump output and regulated by pressure regulator valve. Line pressure is boosted by reverse boost valve when selector is in "R" and "D1" positions. Line pressure should increase with throttle opening due to decrease in engine vacuum to vacuum modulator.

Minimum Line Pressure Check

Start engine, and apply 18 in. Hg to vacuum modulator. Record line pressure readings in all gear selector positions with engine running at specified RPM, and compare recorded pressures to specifications. See **Fig. 10-Fig. 12**. If recorded pressure is incorrect, see **HIGH OR LOW LINE PRESSURE** under TROUBLE SHOOTING.

Full Line Pressure

Release vacuum applied to vacuum modulator. Record line pressure readings in all gear selector positions with engine running at specified engine RPM. Compare recorded pressures to specifications. See **Fig. 10 - Fig. 12**. If pressure recorded is incorrect, see **HIGH OR LOW LINE PRESSURE** under TROUBLE SHOOTING.

	RANGE	kPa	PSI
MINIMUM LINE @ 1250 R.P.M. 61 kPa (18 In. Hg.) Vacuum At Modulator	D4,D3,D2	422 - 475	61 - 69
	D1	998 - 1276	145 - 185
	P,R,N	422 - 551	61 - 80
FULL LINE @ 1250 R.P.M. 0 kPa (0 In. Hg.) Vacuum At Modulator	D4,D3,D2	1152 - 1393	167 - 202
	D1	998 - 1276	145 - 185
	P,R,N	1573 - 1901	228 - 277

Fig. 10: Line Pressure (4T60)

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	RANGE	kPa	PSI
MINIMUM LINE @ 1250 R.P.M. 61 kPa (18 In. Hg.) Vacuum At Modulator	D4,D3,D2	510 - 586	74 - 85
	D1	1088 - 1171	158 - 170
	P,R,N	544 - 654	79 - 95
FULL LINE @ 1250 R.P.M. 0 kPa (0 In. Hg.) Vacuum At Modulator	D4,D3,D2	1137 - 1412	165 - 205
	D1	1088 - 1171	158 - 170
	P,R,N	1757 - 2170	255 - 315

Fig. 11: Line Pressure (1991 4T60-E - Except Codes YMW, YPW & YZW)
Courtesy of GENERAL MOTORS CORP.

	RANGE	kPa	PSI
MINIMUM LINE @ 1250 R.P.M. 61 kPa (18 in. Hg.) Vacuum At Modulator	D4, D3, D2	422 - 475	61 - 69
	D1	998 - 1276	145 - 185
	P, R, N	422 - 551	61 - 80
FULL LINE @ 1250 R.P.M. 0 kPa (0 in. Hg.) Vacuum At Modulator	D4, D3, D2	1152 - 1393	167 - 202
	D1	998 - 1279	145 - 185
	P, R, N	1573 - 1901	228 - 277

Fig. 12: Line Pressure (1992 4T60-E & 1991 Codes YMW, YPW & YZW)

Courtesy of GENERAL MOTORS CORP.

REMOVAL & INSTALLATION

See appropriate TRANSMISSION REMOVAL - A/T article in the TRANSMISSION SERVICING section.

TORQUE CONVERTER

NOTE: See **AUTO TRANS DIAGNOSIS - GM TORQUE CONVERTER CLUTCH** article in the **AUTOMATIC TRANSMISSIONS** section for information on diagnosing torque converter clutch.

TORQUE CONVERTER INSPECTION

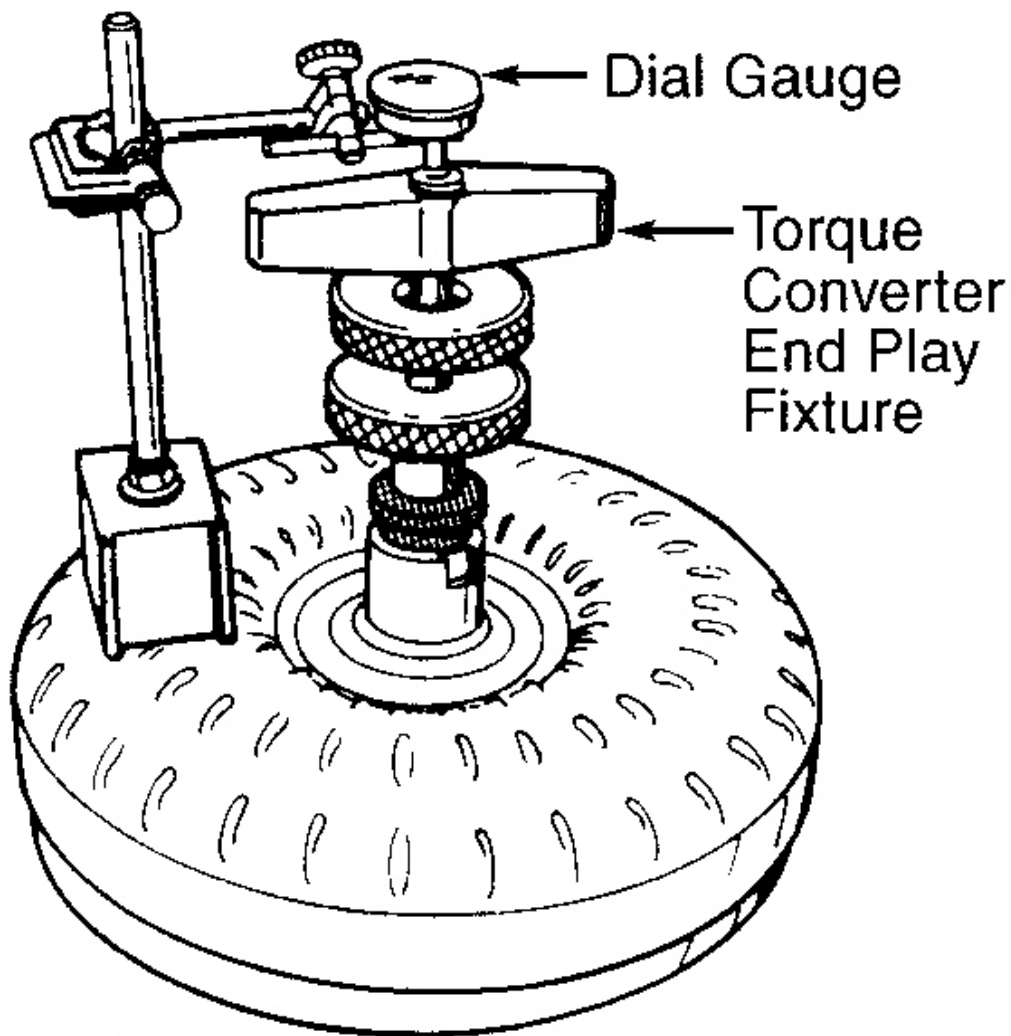
Torque converter must be replaced for any of the following reasons.

- Damage To Pump Assembly

- Metal Particles Present In Oil
- Leaks In Hub Weld Area
- Crankshaft Pilot Broken Or Damaged
- Hub Scored Or Damaged
- Stator Failure
- Torque Converter Imbalance
- Engine Coolant Contamination
- Excessive End Play

TORQUE CONVERTER END PLAY CHECK

Mount Torque Converter End Play Fixture (J-35138) and Dial Gauge (J-8001) on stand to check end play. End play should be 0-.020" (0-0.50 mm) for 245-mm torque converters and 0-.024" (0-0.60 mm) for 298-mm torque converters. See **Fig. 13**.



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Fig. 13: Measuring Torque Converter End Play
Courtesy of GENERAL MOTORS CORP.

TRANSAXLE DISASSEMBLY

SPEEDOMETER SENSOR/GOVERNOR

Thoroughly clean transaxle exterior. Drain fluid, and remove torque converter. Place transaxle in holding fixture. Remove speedometer sensor and governor assembly.

LOWER TRANSAXLE ASSEMBLY

Remove bottom oil pan, oil filter, accumulator cover with governor feed and return pipes. Remove modulator and modulator valve. Check modulator with known good modulator and Tester (36619). If necessary, replace modulator. Remove all retainers, gaskets, pipes and accumulator piston assemblies from bores (**DO NOT** interchange springs). See **Fig. 14**.

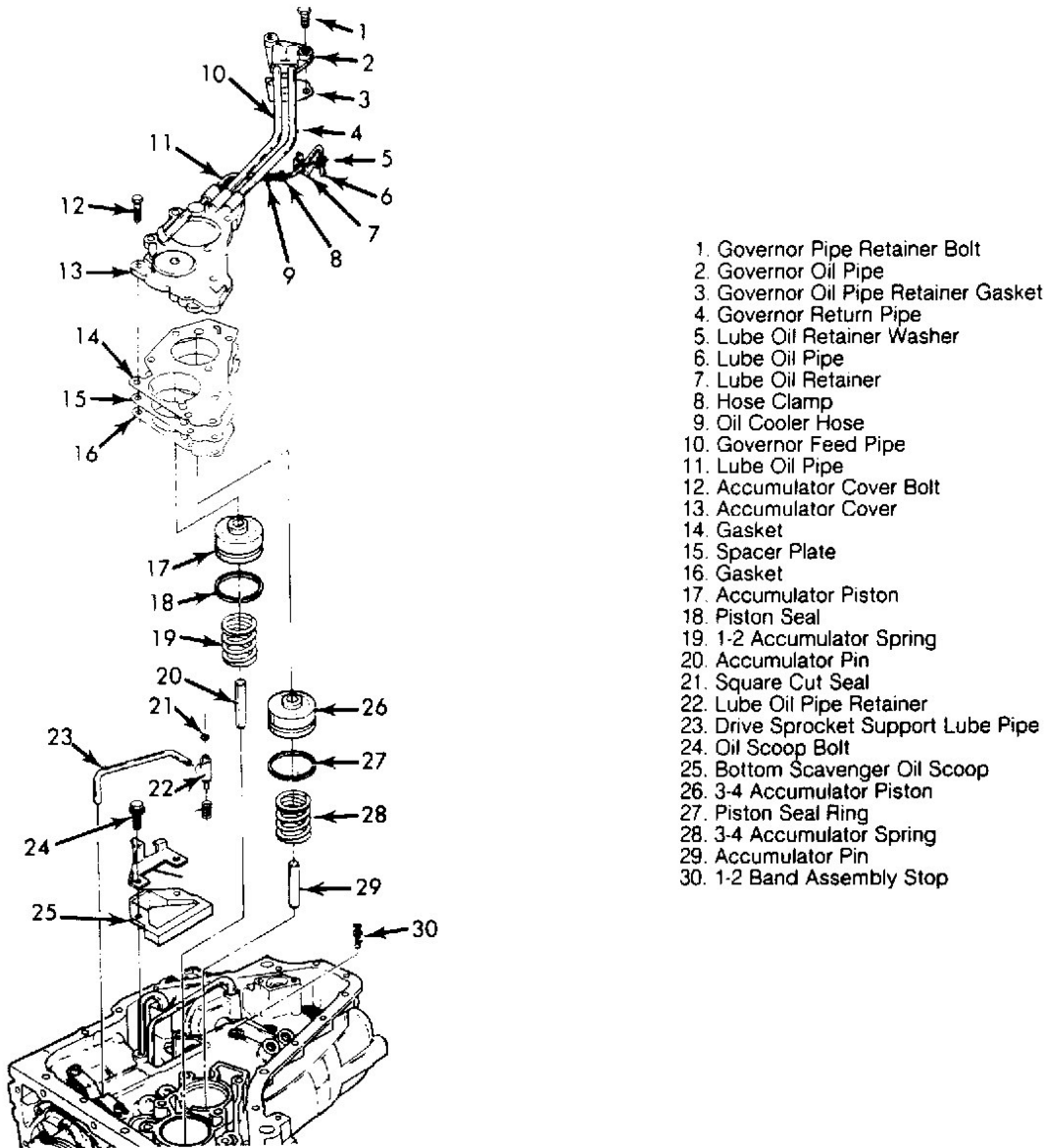


Fig. 14: Exploded View of Lower Transaxle Assembly
Courtesy of GENERAL MOTORS CORP.

SERVO ASSEMBLIES

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1. Apply inward pressure to top of reverse servo cover, and remove cover retaining ring. Remove reverse servo cover and reverse servo assembly from case. See **Fig. 15**.
2. Apply inward pressure to top of 1-2 servo cover, and remove servo cover retaining ring. Remove 1-2 servo cover and 1-2 servo assembly from case.

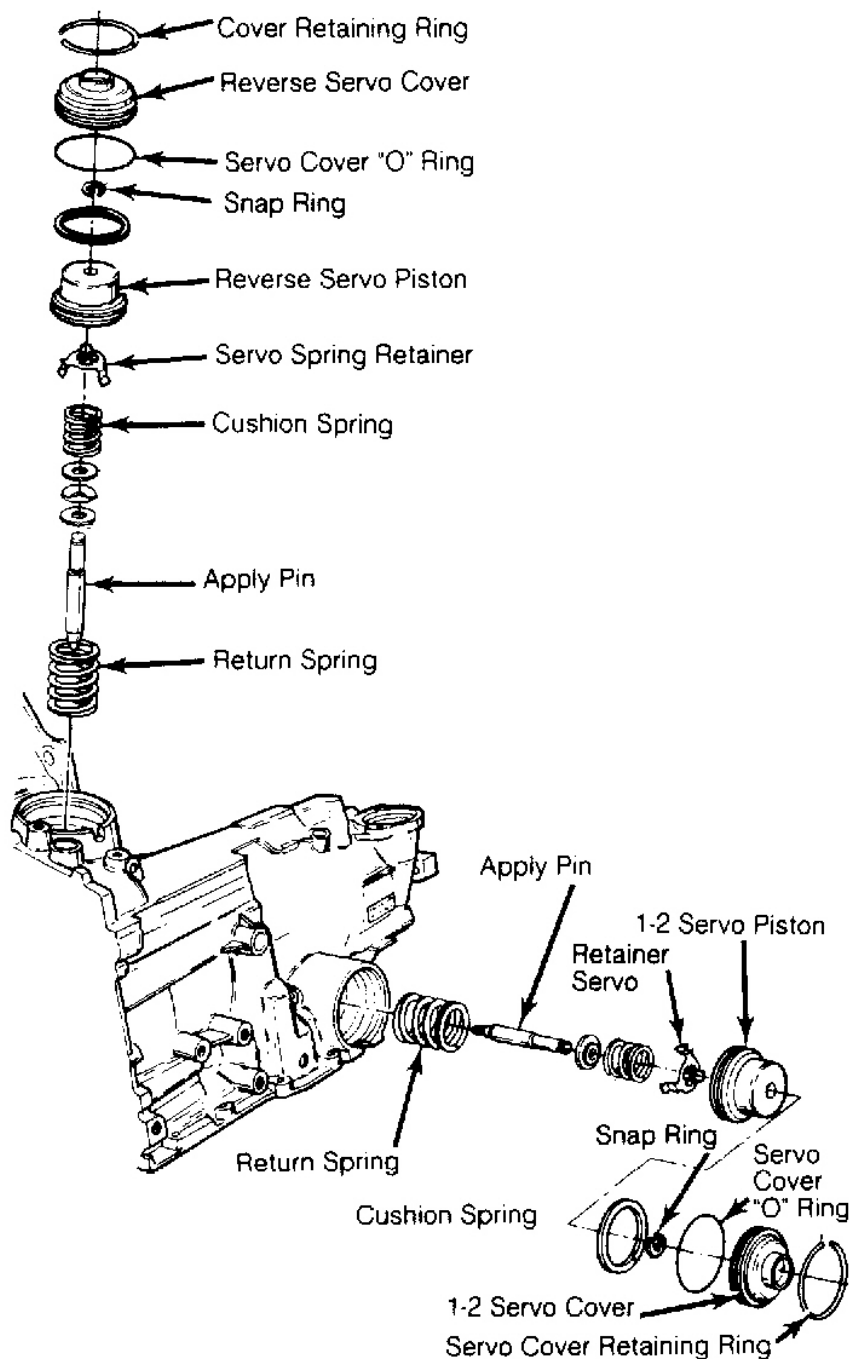


Fig. 15: Exploded View of Servo Assemblies
 Courtesy of GENERAL MOTORS CORP.

Band Apply Pin Selection (4T60 Only)

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1. Install Band Apply Pin Gauge (J-33382) with reverse servo apply pin. See **Fig. 16**. Apply 20 ft. lbs. (27 N.m) of torque to hex nut on gauge.
2. Check pin length using band apply pin gauge. If GO side will not slide under head, pin is too short. If NO GO side will slide under head, pin is too long. If GO side will slide under head and NO GO will NOT, pin length is correct.
3. Pins are available in various lengths. See **Fig. 17**.

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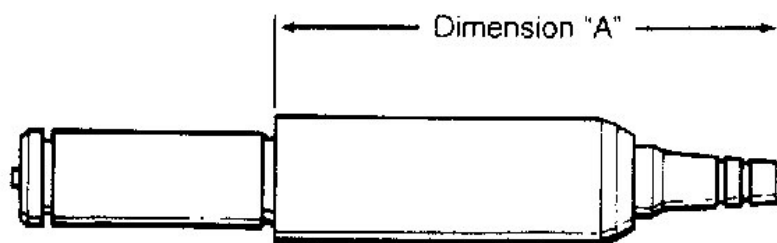
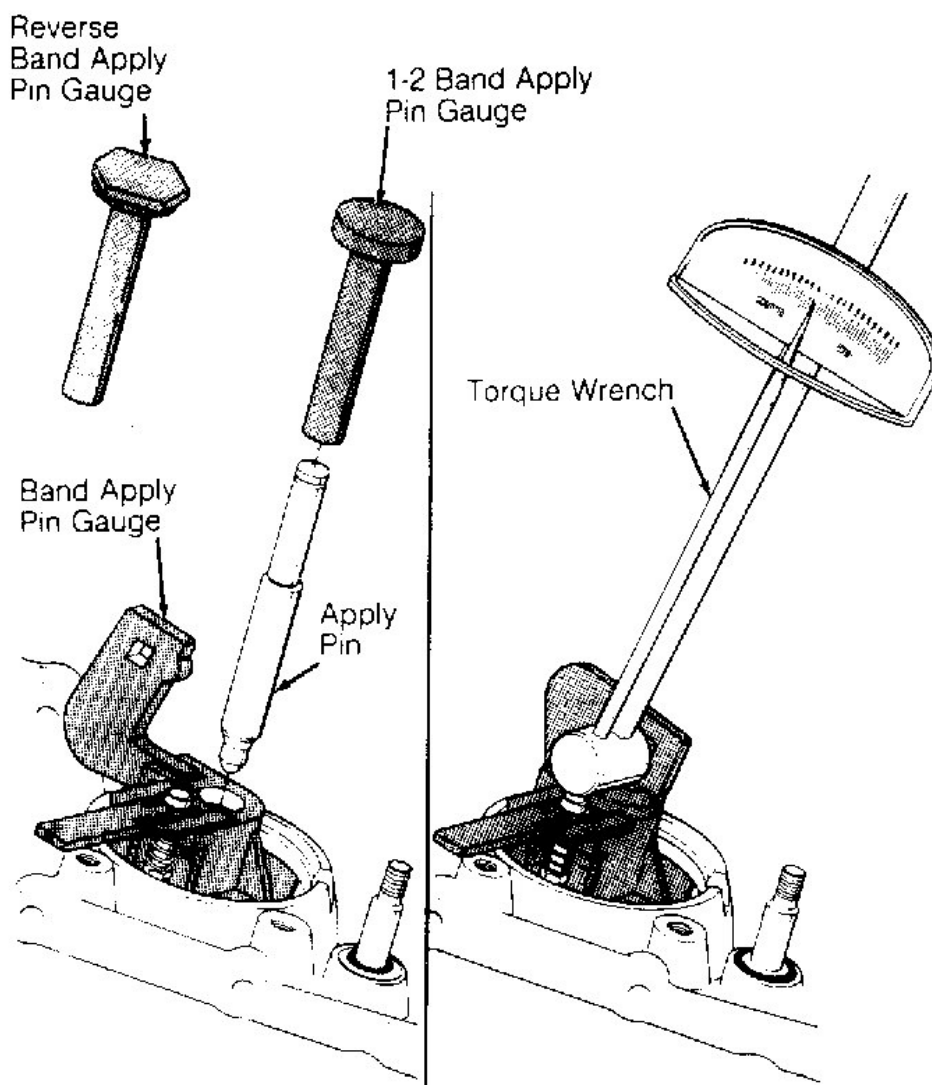


Fig. 16: Checking Band Apply Pin Length
Courtesy of GENERAL MOTORS CORP.

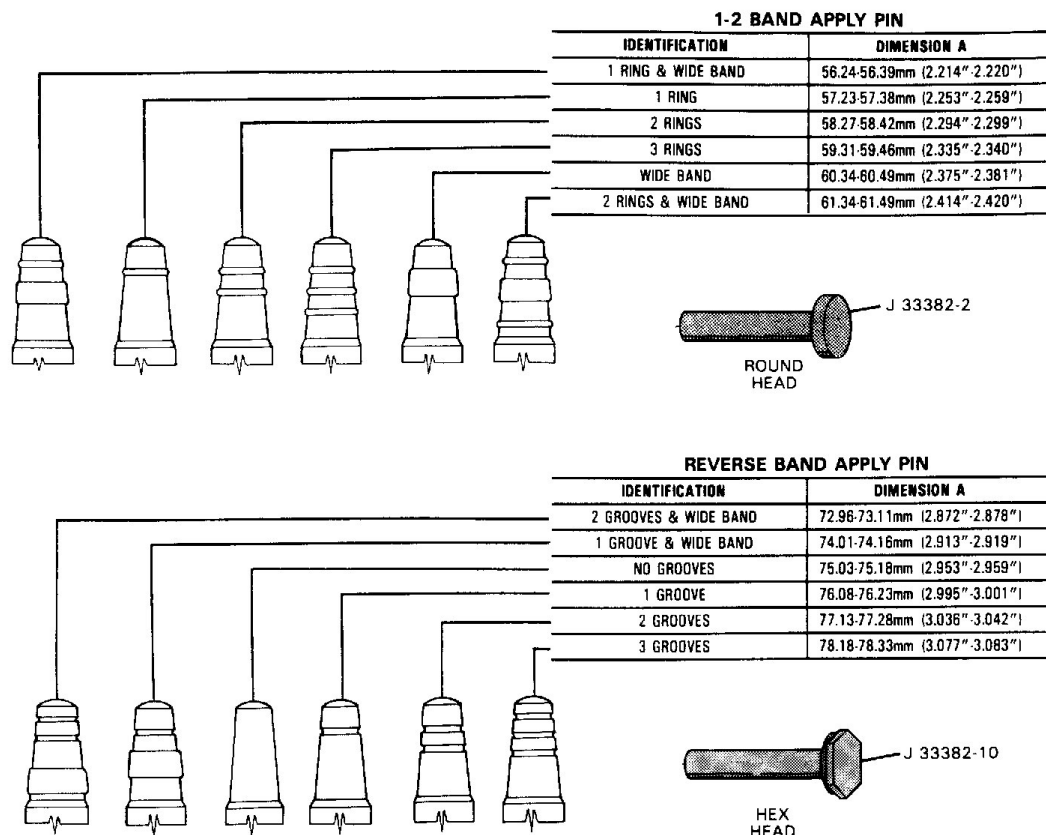


Fig. 17: Band Apply Selection Charts
Courtesy of GENERAL MOTORS CORP.

OIL PUMP & VALVE BODY

1. Remove side cover attaching bolts, nuts and washers. Remove side cover and gaskets. Disconnect wiring harness from pressure switches, solenoid and case connector. Remove wiring harness.
2. Remove T.V. lever, linkage and bracket from valve body assembly. Remove pump assembly cover bolts to remove pump cover from valve body. See **Fig. 18**. Remove servo pipe retainer bolt and retainer plate. Remove remaining mounting bolts from valve body, and remove valve body from channel plate.
3. Remove oil dam from cavity above 4th clutch assembly. Remove 4 check balls between spacer plate and valve body. Remove 8 check balls between channel plate and spacer plate.

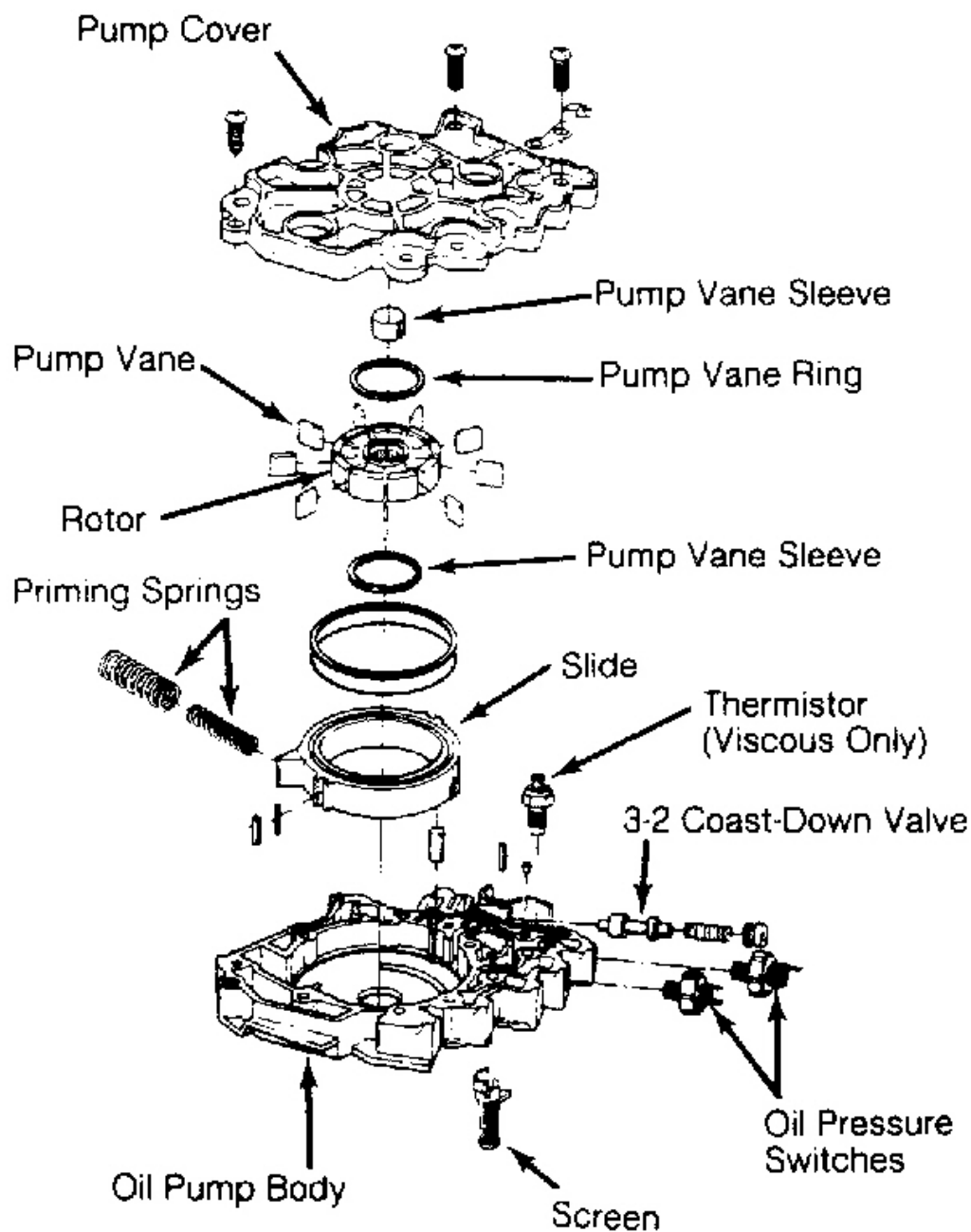


Fig. 18: Exploded View of Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

CHANNEL PLATE ASSEMBLY & 4TH CLUTCH

1. Disconnect manual valve link from manual valve, and pull spring back. Place detent lever in Park position for clip removal. Remove channel plate attaching bolts. Remove channel plate and channel plate gaskets.
2. Remove oil pump drive shaft. Remove input clutch accumulator piston assembly and converter clutch accumulator piston assembly. Remove 4th clutch plates and apply plate. Remove 4th clutch hub thrust bearing. Remove 4th clutch hub and shaft. See **Fig. 49**.

OUTPUT SHAFT

Removable "C" Ring Type

Rotate output shaft until "C" ring opening is visible from beneath lower tapered end of transaxle case. Using "C" Ring Remover/Installer (J-34757), push "C" ring partially off shaft, then rotate shaft and remove ring with needle-nose pliers. Ring can also be removed with 2 long thin screwdrivers.

Non-Removable "C" Ring Type

Using a thin screwdriver, insert blade between end of output shaft and pinion shaft. Pry output shaft to release "C" ring. Remove output shaft.

DRIVE LINK ASSEMBLY

NOTE: See **Fig. 46** for exploded view of all internal components (from drive link support to final drive assembly). See **Fig. 47** for thrust washer and bearing locations. See **Fig. 48** for lip seal locations.

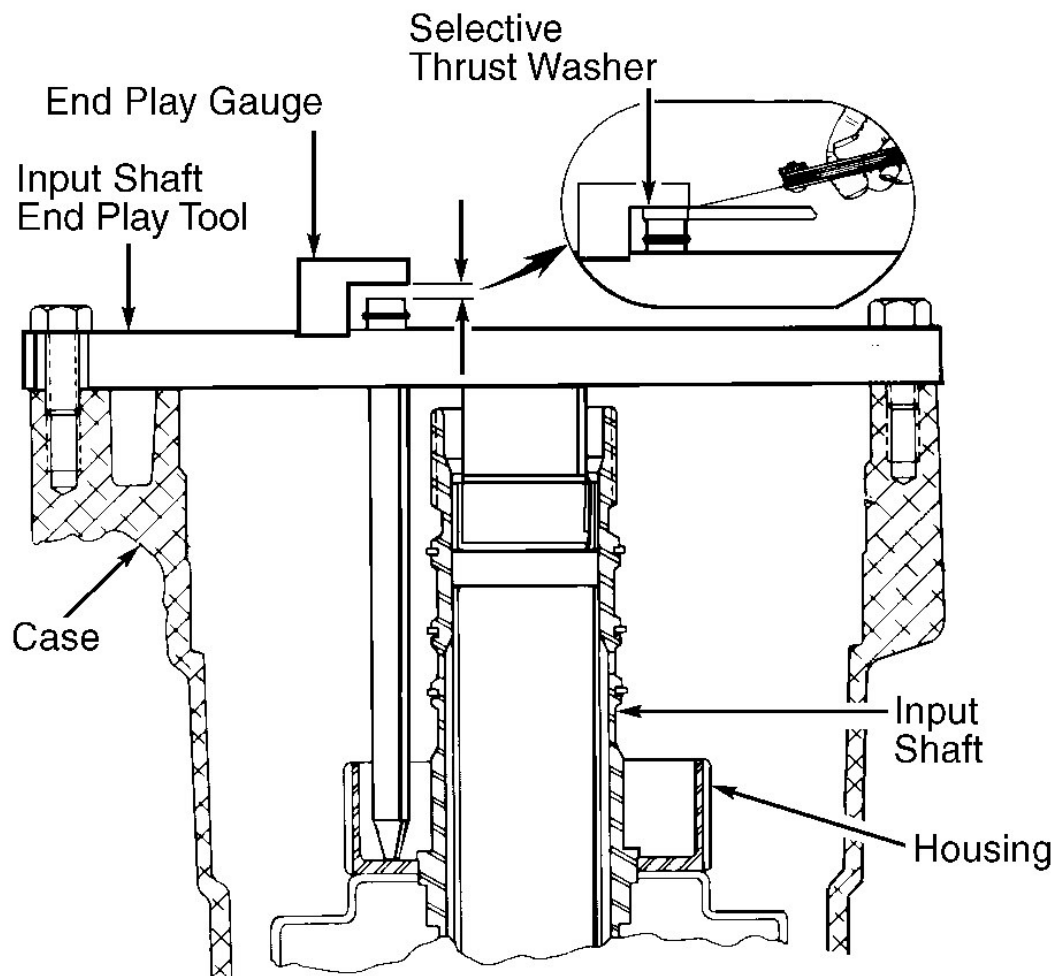
1. Remove "O" ring from turbine shaft. See **Fig. 49**. Remove turbine shaft drive sprocket, driven sprocket and drive link chain together as an assembly. Note position of Black-colored link on drive link chain; it should be installed facing up.
2. Remove drive sprocket and driven sprocket thrust washers from between sprockets and channel plate. Remove chain scavenging scoop and driven sprocket support with 2nd clutch thrust washer.

NOTE: If deflection of drive link chain exceeds 7/8", check drive link chain, sprockets and supports for wear; replace if necessary.

INPUT & 2ND CLUTCH ASSEMBLIES

1. Using Final Drive/Clutch Assembly Remover/Installer (J-33381), remove 2nd clutch and input shaft clutch housings as an assembly. See **Fig. 20**. Remove reverse band if it did not come out with 2nd clutch housing.
2. Remove thrust washers. Install input housing and shaft assembly back in transaxle. Install Loading Tool (J-26958) to transaxle case. See **Fig. 19**.
3. Measure input shaft clutch housing end play using End Play Gauge (J-33386). Record measurements for proper end play clearances during reassembly. See **Fig. 19**.
4. Fit proper selective thrust washer and measure clearance. Record measurement, and set aside proper selective washer for reassembly. Remove 2nd clutch and reverse band assembly as described previously.

in step 1).



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Fig. 19: Checking End Play on Input Shaft
Courtesy of GENERAL MOTORS CORP.

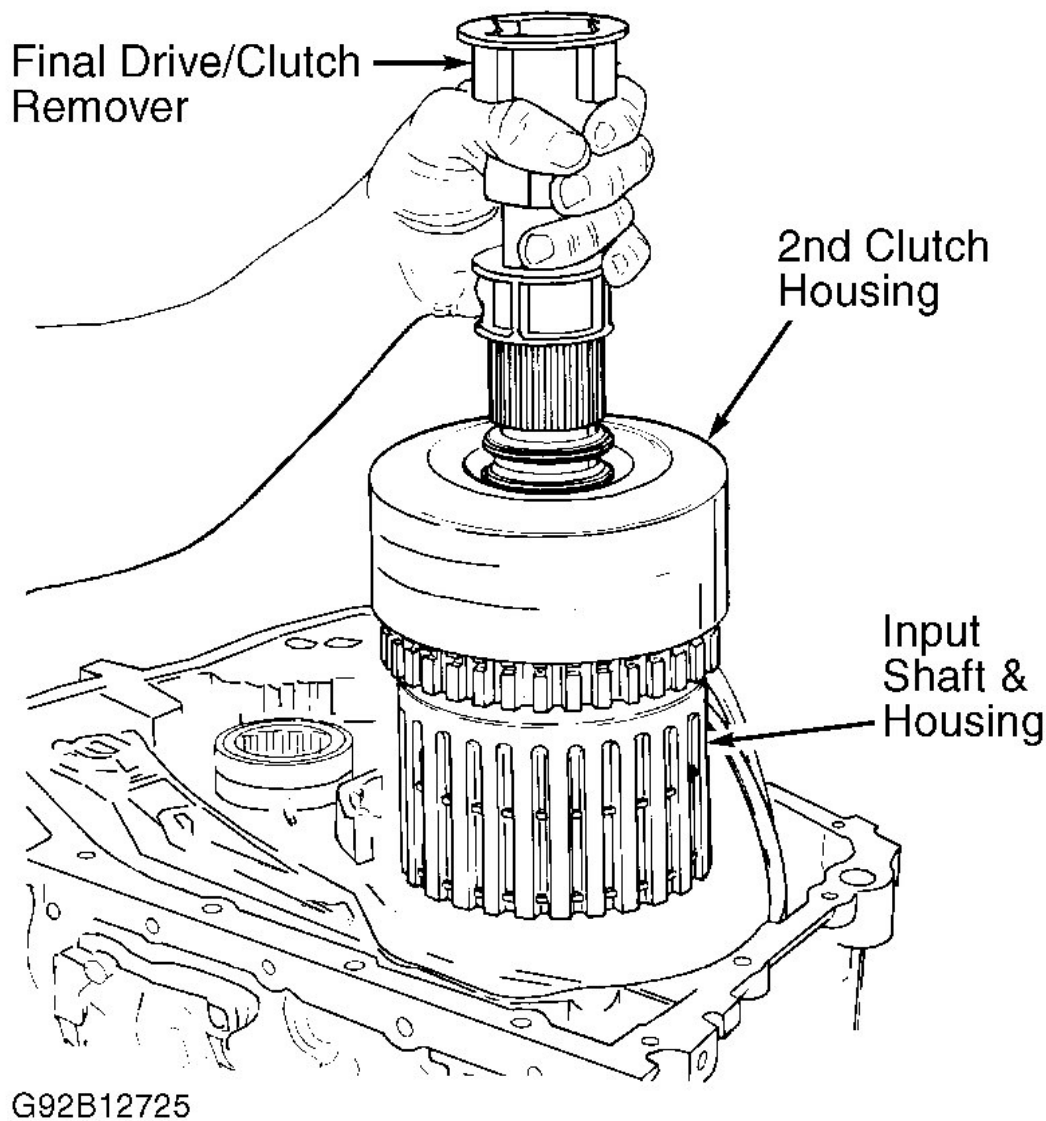


Fig. 20: Removing Input & 2nd Clutch Housings
 Courtesy of GENERAL MOTORS CORP.

INPUT SPRAG & 3RD ROLLER CLUTCH ASSEMBLIES

Remove input clutch sprag assembly, 3rd roller clutch assembly and input sun gear. Remove reverse band. Remove reverse reaction drum input carrier assembly and thrust bearing. Remove reaction carrier, reaction sun gear/drum assembly and 1-2 band. **DO NOT** clean assemblies in solvent.

FINAL DRIVE ASSEMBLY

Remove reaction sun gear thrust bearing and final drive sun gear shaft. Check final drive end play at this time. See **Fig. 24**. Remove internal gear snap ring from case. Using Final Drive/Clutch Remover/Installer (J-33381), remove final drive assembly and selective thrust washer and bearing. See **Fig. 21**.

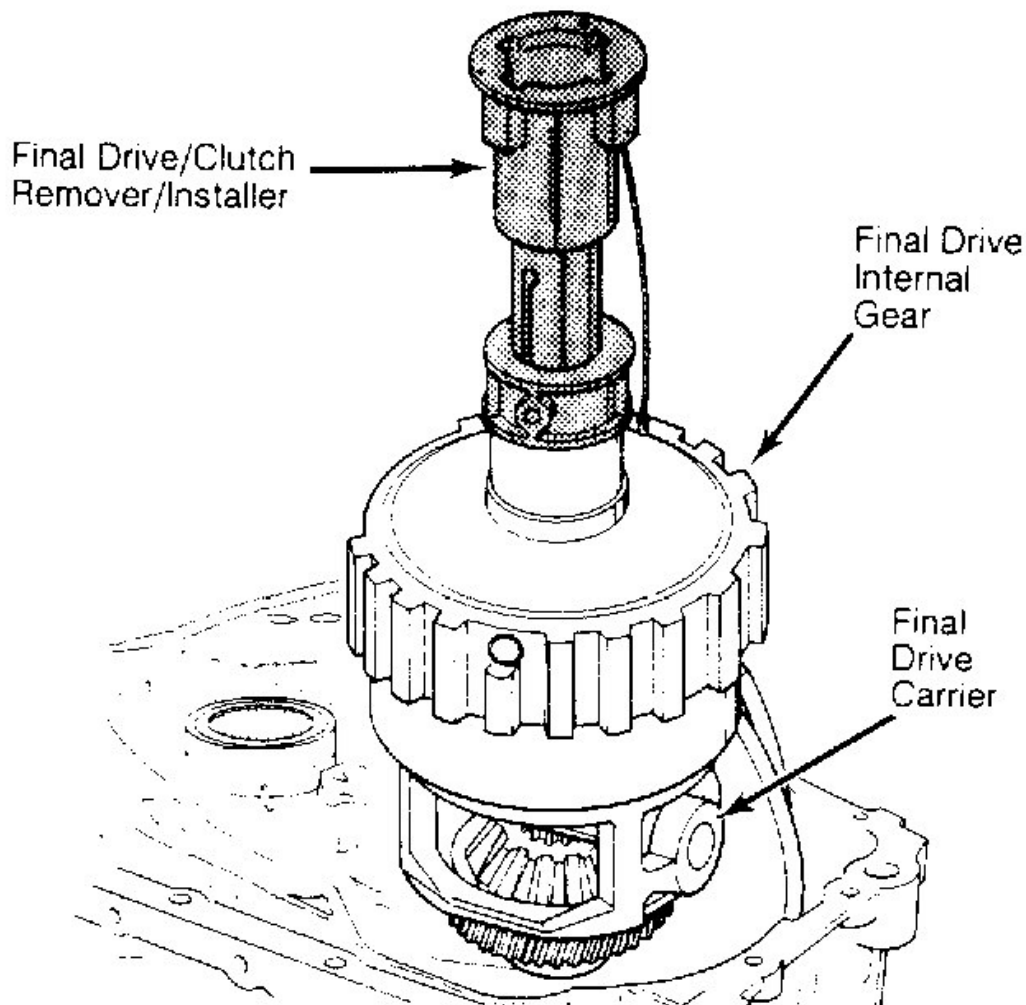


Fig. 21: Removing Final Drive Assembly
Courtesy of GENERAL MOTORS CORP.

COMPONENT DISASSEMBLY & REASSEMBLY

TRANSAXLE CASE

Cleaning & Inspection

Clean transaxle case thoroughly with solvent, and then air dry. Inspect transaxle case for damage to band lugs, snap ring grooves and drive sprocket bearings. Check for interconnected or damaged oil passages and servo bores. Inspect case for stripped threads in bolt holes or casting porosity. Repair or replace case if necessary.

Drive Sprocket Support

1. If removal of drive sprocket bearing from case is necessary, use Bearing Puller (J-26941) and Slide Hammer (J6125-1B). See **Fig. 22**. Remove support bearing, and install new bearing with Bearing Installer (J-28677) and Driver Handle (J-8092).
2. If drive sprocket support replacement is necessary, remove attaching screws and remove support. Install new support, and tighten attaching screws to specifications. See **TORQUE SPECIFICATIONS**.

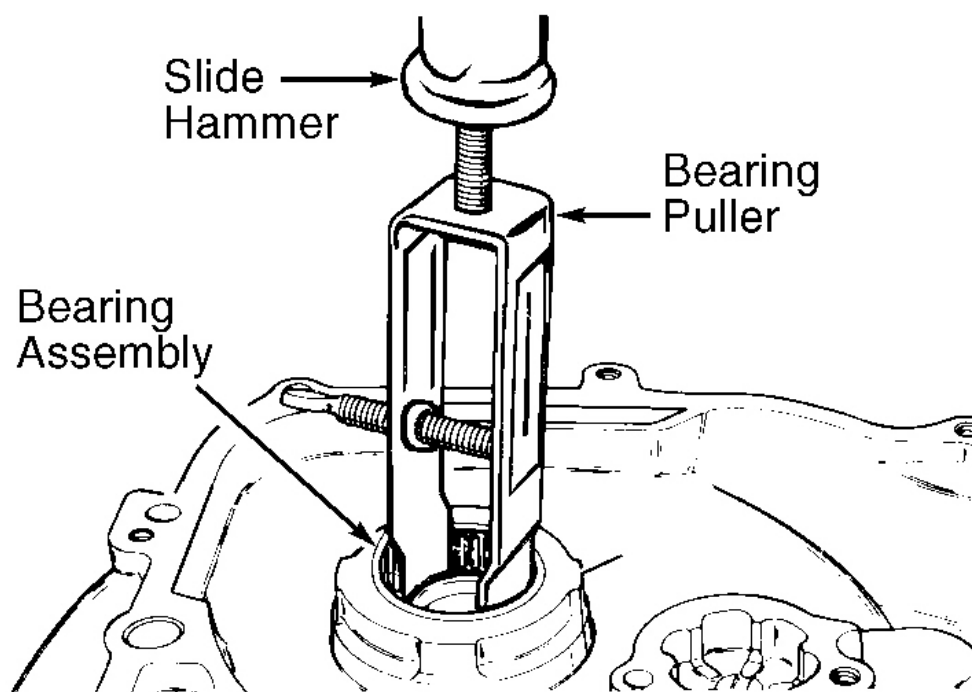
Case Check Ball & Capsule

If capsule replacement is necessary, flatten dimples retaining check ball and spring in capsule. Remove check ball and spring using magnet. Remove capsule from case using screw extractor. Install new capsule assembly into case using a 1/2" steel rod. Position capsule so slot opening is toward servo bore.

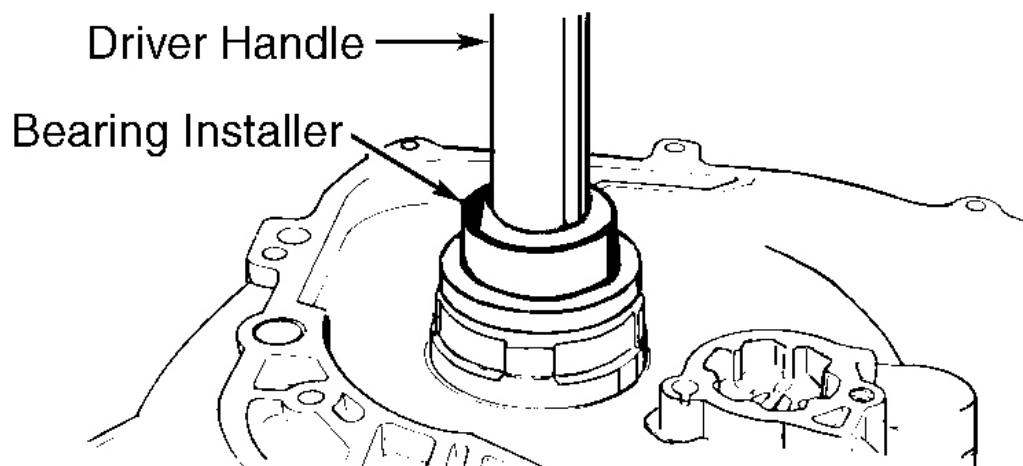
NOTE: **DO NOT remove these parts unless replacement is necessary.**

Manual Shaft, Detent Lever & Actuator Rod

If manual shaft, detent lever or actuator rod removal is necessary, remove pin and lock nut from manual shaft. Remove actuator rod from detent lever. Remove retaining pin from case. Remove actuator rod assembly from case. Remove "O" ring from actuator rod guide.



REMOVAL



INSTALLATION

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Fig. 22: Removing & Installing Drive Sprocket Bearing
Courtesy of GENERAL MOTORS CORP.

FINAL DRIVE ASSEMBLY

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Disassembly & Inspection

1. Inspect final drive internal gear for damaged teeth, worn bearing surfaces, broken parking pawl spring or damage to parking pawl. Inspect sun gear, thrust bearings, parking gear and governor drive gear for wear or damage.
2. Check final drive carrier pinion gears for excessive end play. Use a feeler gauge and measure end play between carrier and pinion gear thrust washer. End play should be .009-.030" (.24-.77 mm).
3. Using a pin punch, drive differential pinion shaft retainer pin from carrier. Remove pinion shaft, pinion and side gears, and thrust washers. See **Fig. 23**. Inspect all parts for damage or abnormal wear. Inspect final drive sun gear shaft for damaged splines or journals.

NOTE: **Square-cut washers are required to hold needle bearing inside gear during differential side gear reassembly. Replace bronze washers with steel washers.**

Reassembly

1. Assemble differential side gears and thrust washers into carrier. Using petroleum jelly, stick thrust washers onto pinion gears. Assemble pinion gears and washers into carrier.
2. Slide pinion shaft through both pinion gears for alignment, then remove shaft. Rotate pinion gears into position, then install pinion shaft. Tap retaining pin into position using a plastic hammer.
3. Tap governor drive gear (if removed) into position using soft mallet. Install sun gear with stepped side facing out. Assemble parking gear on sun gear. Assemble thrust bearing into internal gear. Install internal gear onto carrier.
4. Inspect carrier-to-case selective thrust washer for damage. Install thrust washer onto carrier hub. Install thrust bearing onto thrust washer and retain with petroleum jelly.
5. Move detent lever out of "P" position. Use pin to hold parking pawl in place, and install final drive assembly into case using Final Drive/Clutch Installer (J-33381).
6. Install snap ring into case. To measure final drive end play, install dial indicator so pointer contacts Adapter (J-26958-10). See **Fig. 24**. Lift governor drive gear with Snap Ring Remover (J-28585), and read dial indicator.
7. Correct end play is .005-.025" (.20-.62 mm). If necessary, adjust end play with selective carrier-to-case thrust washer. See **CARRIER-TO-CASE SELECTIVE THRUST WASHER SIZES**.

CARRIER-TO-CASE SELECTIVE THRUST WASHER SIZES

Washer ID	Thickness: In. (mm)
1	.059-.062 (1.5-1.6)
2	.062-.066 (1.6-1.7)
3	.066-.070 (1.7-1.8)
4	.070-.074 (1.8-1.9)
5	.074-.078 (1.9-2.0)
6	.078-.082 (2.0-2.1)

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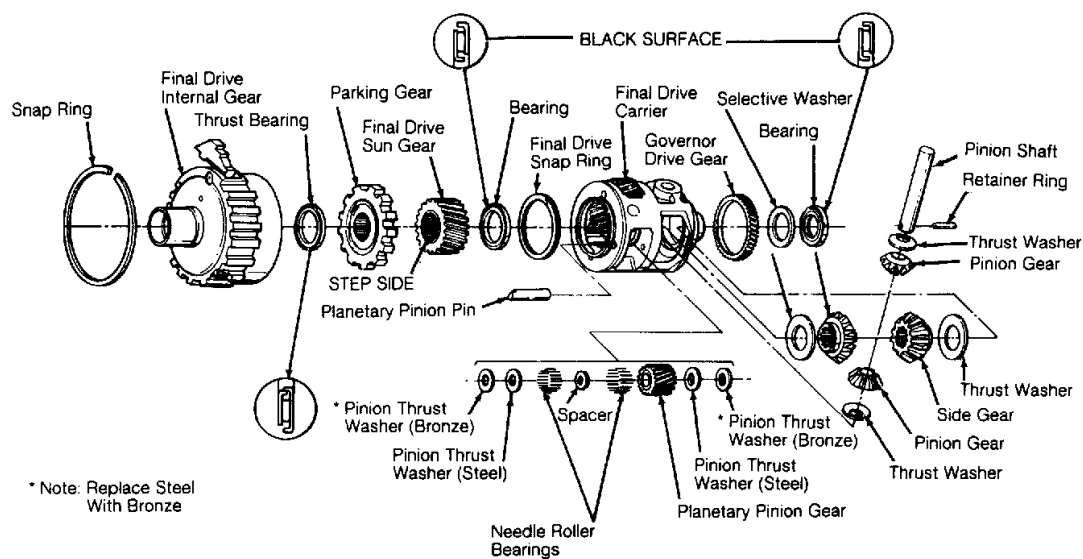


Fig. 23: Exploded View of Final Drive & Differential Assembly
Courtesy of GENERAL MOTORS CORP.

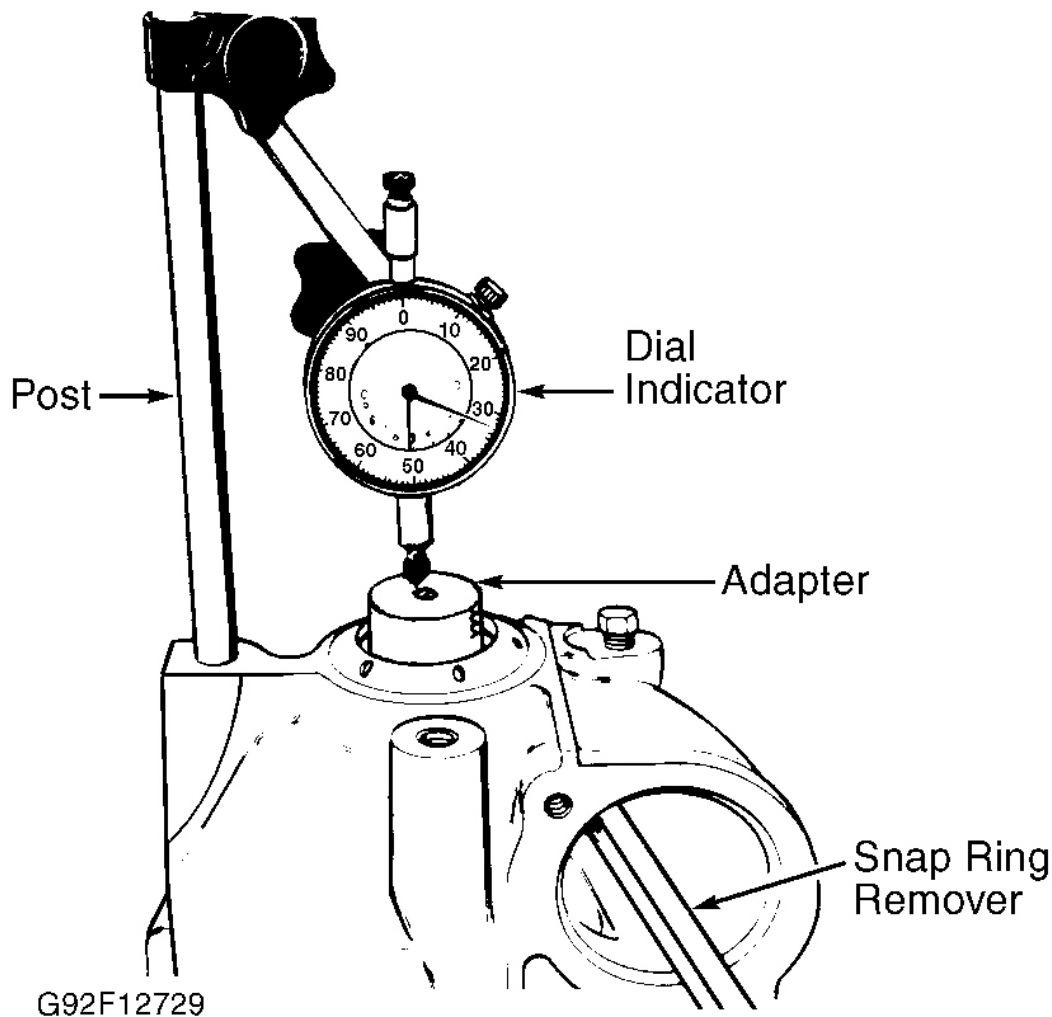


Fig. 24: Measuring Final Drive End Play
Courtesy of GENERAL MOTORS CORP.

SUN GEAR SHAFT

Inspection & Reassembly

Inspect final drive sun gear shaft for damaged splines or journals. See **Fig. 46**. Install thrust bearing. Install final drive sun gear shaft into final drive, ensuring splines engage with parking gear and sun gear.

NOTE: The 1-2 band assembly is presoaked in a friction solution. **DO NOT** wash band in solvent.

1-2 BAND ASSEMBLY

Inspection

DO NOT wash 1-2 band in solvent. Inspect 1-2 band assembly for heat damage, lining cracks and separation. Check band stop for damage and replace if necessary.

REACTION CARRIER & DRUM**Cleaning & Inspection**

Inspect reaction carrier and reaction drum for damaged teeth, scoring or warpage. Check thrust bearing for damage. Using a feeler gauge, check reaction carrier pinion gear end play. End play should be .009-.024" (.23-.61 mm). Check for damage to reaction carrier internal gear.

Reassembly

1. Install reaction sun gear-to-final drive internal gear thrust bearing, positioning inner race against internal gear. Assemble reaction sun gear and drum assembly onto final drive internal gear.
2. Install reaction carrier-to-sun gear thrust bearing, positioning inner race against reaction carrier. Retain bearing with petroleum jelly. Install reaction carrier, rotating carrier until pinions engage sun gear.

INPUT CARRIER ASSEMBLY**Inspection**

Check input carrier pinion gears for proper end play. Pinion gear end play should be .009-.024" (0.23-0.61 mm). Inspect internal gear and pinion gears for worn or damaged teeth, and ensure pinions rotate freely. Inspect thrust bearing for damage (thrust bearing cannot be removed from carrier).

Reassembly

Install thrust bearing with inside race against carrier. Retain thrust bearing with petroleum jelly. Install input carrier into case, and rotate into position.

REVERSE REACTION DRUM & REVERSE BAND**Inspection & Reassembly**

Inspect reverse reaction drum for damaged teeth and distortion. Install reverse reaction drum, making sure spline teeth engage input carrier. **DO NOT** wash reverse band in solvent. Inspect reverse band assembly for damage and replace if necessary.

3RD ROLLER CLUTCH, INPUT SPRAG & INPUT SUN GEAR**Disassembly**

1. Disassemble 3rd roller clutch and input sprag from input sun gear. Remove input sun gear spacer and retainer from sun gear. Remove 3rd roller clutch outer race and cam from roller assembly. See **Fig. 25**.
2. Remove inner race from input sprag assembly. Remove one input sprag snap ring. Disassemble input

sprag and wear plate.

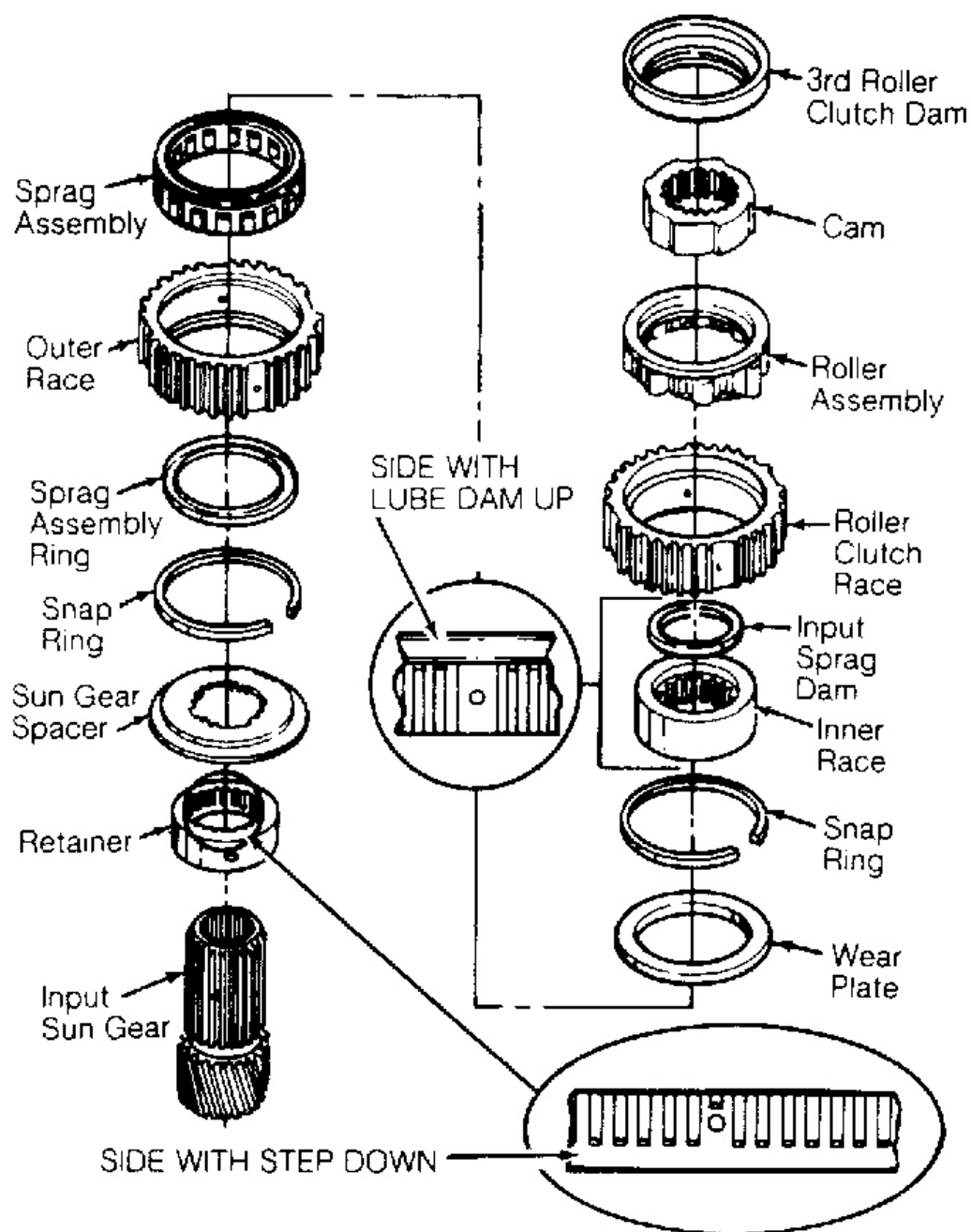


Fig. 25: Exploded View of Input Sprag & 3rd Roller Clutch Assemblies
 Courtesy of GENERAL MOTORS CORP.

Inspection

1. Inspect 3rd roller clutch outer race for scoring and wear. Inspect roller cam for cracks and damage. Inspect roller assembly for damaged rollers and springs. Install any loose roller by depressing spring and inserting roller.
2. Inspect input sprag inner and outer races for damage. Check sprag assembly for damaged sprags or cages. Check wear plates for scoring. Inspect input sun gear splines and bushing for damage.

Reassembly

1. Install roller cam into roller cage assembly, rotating cage so rollers are at lowest ramp position. Install roller clutch outer race over cage and cam.
2. Assemble one wear plate against snap ring. Install sprag assembly against wear plate with cross bar notches positioned correctly. See **Fig. 26**. Install other wear plate. Install snap ring.
3. Assemble spacer onto input sun gear. Assemble input sprag retainer, sprag assembly and roller clutch onto sun gear. Ensure input sprag and 3rd roller clutch hold while holding input sun gear. See **Fig. 27**.

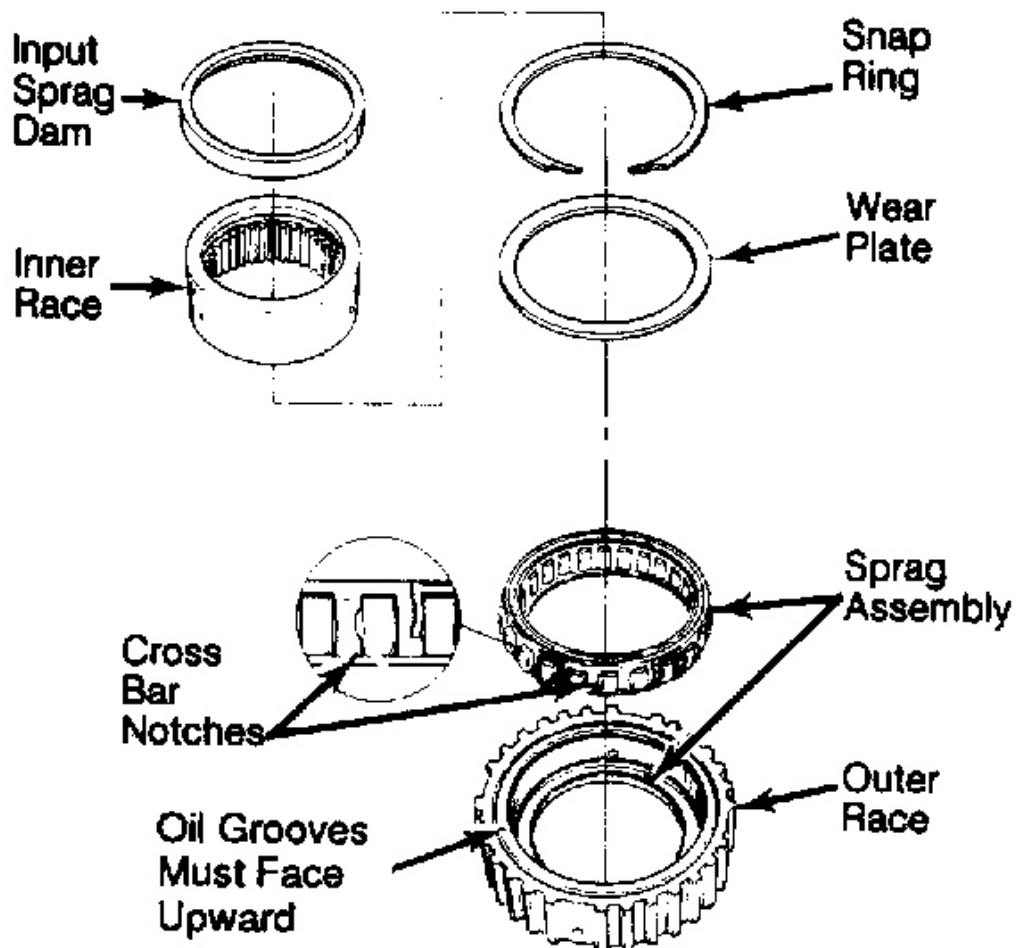


Fig. 26: Identifying Input Sprag Reassembly Order
 Courtesy of GENERAL MOTORS CORP.

Must Free Wheel In Direction Of Arrows
& Hold In Opposite Direction

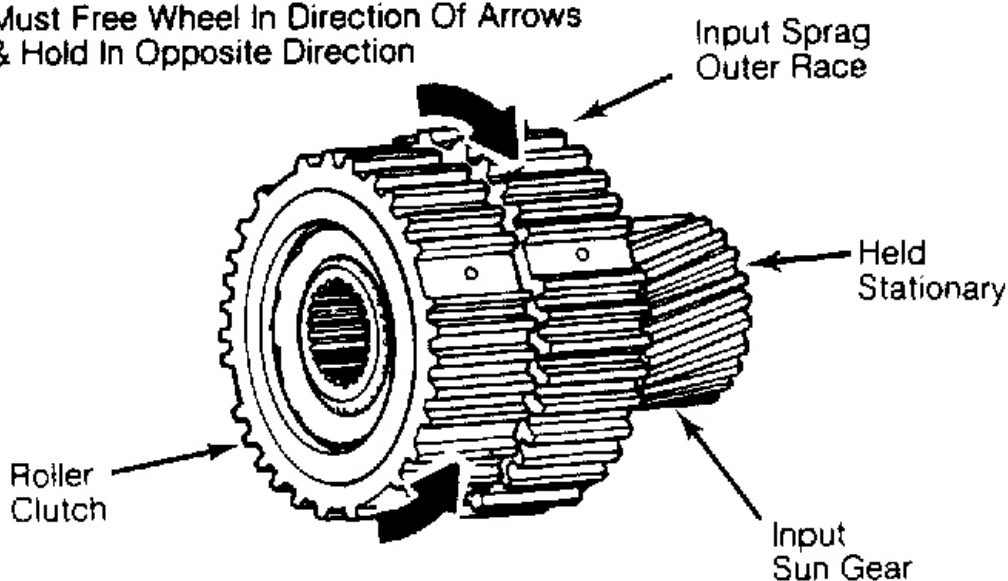


Fig. 27: Checking Rotation of Input Sprag & 3rd Roller Clutch
Courtesy of GENERAL MOTORS CORP.

INPUT CLUTCH ASSEMBLY

Disassembly

1. Remove input shaft thrust washer and input clutch backing plate snap ring. Remove input clutch backing plate. Remove input clutch steel and composition plates. Remove input clutch apply plate.
2. Remove 3rd clutch backing plate snap ring and backing plate. Remove 3rd clutch steel and composition plates. See **Fig. 28**. Remove 3rd clutch sprag retainer snap ring. Using Clutch Spring Compressor (J-23327) and Adapter (J-25018-A), compress and remove spring retainer.
3. Remove 3rd clutch piston from housing. Remove 3rd clutch piston inner seal from shaft. Compress piston housing, and remove snap ring. Remove "O" ring. Remove spring and retainer assembly. Remove input clutch piston and inner seal.

Inspection

Inspect all clutch plates for cracks, wear, lining separation, pits or other signs of damage. Inspect thrust washer for damage. Inspect input clutch housing and shaft for interconnected oil passages, damaged clutch hub, worn bushings, or damaged 3rd clutch shaft seal or oil seal rings.

Input Shaft Seal Replacement

1. Remove solid oil seal rings from input shaft. Inspect seal ring grooves for nicks or burrs. Lubricate each

oil seal ring, and position them one at a time on Seal Protector (J-34741-1). See **Fig. 29**.

2. Quickly slide each seal into ring groove when protector is in position. Use Seal Driver (J-34741-2) to push ring over seal protector. Size seal with Seal Sizer (J-34741-3). Gently twist seal sizer over each seal. Leave sizer in place until installation.

Retainer & Ball Assembly Replacement

Remove retainer and ball assembly from housing using a 3/8" drift. Install new retainer and ball assembly.

Piston Seal Replacement

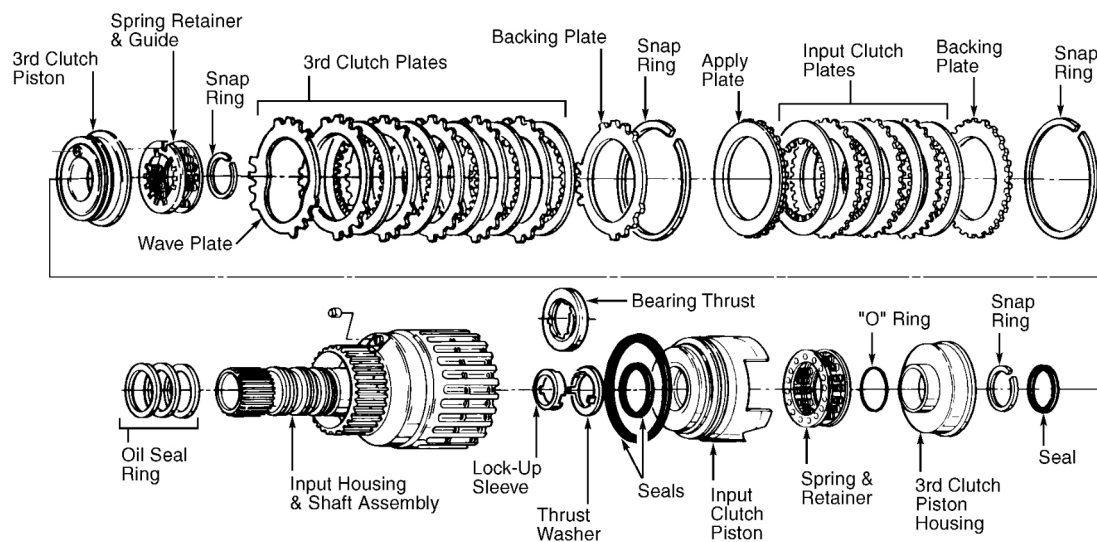
Remove seals from input clutch piston or 3rd clutch piston. Lubricate new seals with ATF, and install seals.

Reassembly

1. Lubricate input clutch piston inner seal with ATF, and install seal using Seal Driver (J-34093) and Protector (J-34092). Assemble input piston into input housing. Assemble "O" ring seal onto input shaft.
2. Install spring retainer and guide into piston. See **Fig. 28**. Install 3rd clutch piston housing into input housing. Using spring compressor, compress 3rd clutch housing, and install snap ring.
3. Install 3rd clutch inner seal. Install 3rd clutch piston into housing. Compress 3rd clutch spring retainer, and install snap ring.
4. Install wave plate. Assemble 3rd clutch plates; start with steel plate, and then alternate between composition and steel plates. Install 3rd clutch backing plate with stepped side facing up. Install snap ring.
5. Assemble input clutch plates; start with composition plate, and then alternate between steel and composition plates. Install input clutch backing plate with identification mark facing up.
6. Install snap ring. Apply air pressure to oil passages in input shaft, and check for proper operation of clutch. Air pressure must not exceed 90 psi (6.2 kg/cm²).

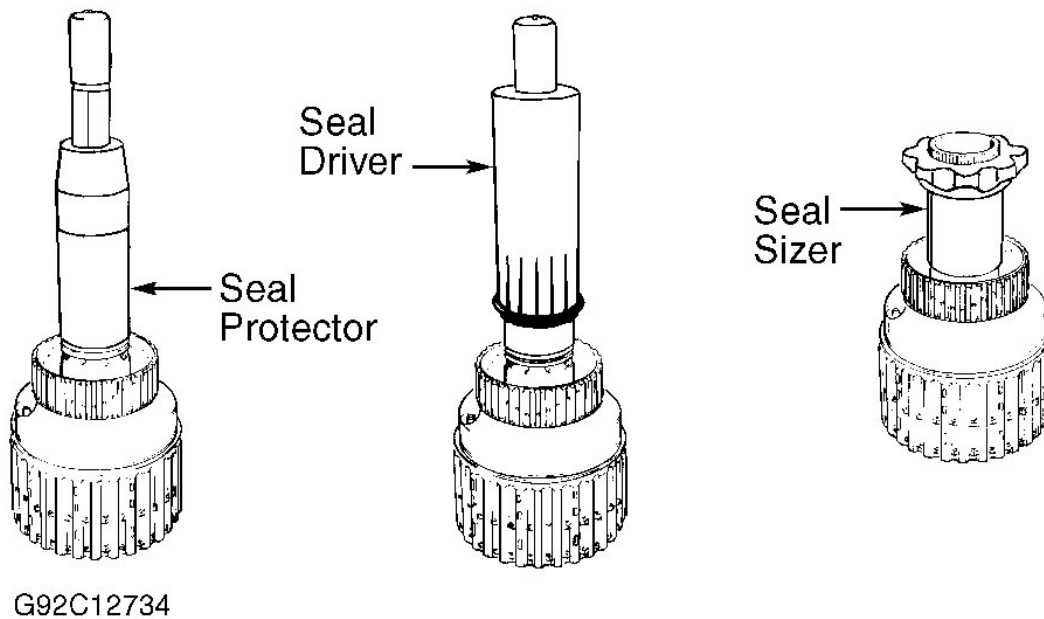
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1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E



92B12733

Fig. 28: Exploded View of Input Clutch Assembly
Courtesy of GENERAL MOTORS CORP.



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Fig. 29: Installing & Sizing Seal Rings to Housing
Courtesy of GENERAL MOTORS CORP.

2ND CLUTCH ASSEMBLY

Disassembly

Remove snap ring and backing plate. See **Fig. 30**. Remove clutch plates, waved plate and snap ring. Remove apply ring and spring return assembly. Remove apply piston.

Cleaning & Inspection

1. Inspect steel and composition plates for wear, lining separation, pitting or damage. Inspect apply ring and spring return for damage. Inspect piston and piston seals for damage.
2. Inspect 2nd clutch housing for damaged inner piston seal. Inspect for damaged bushings and spline teeth. Check for scored band surface. Check retainer and ball assembly for damage. Inspect housing for warpage.

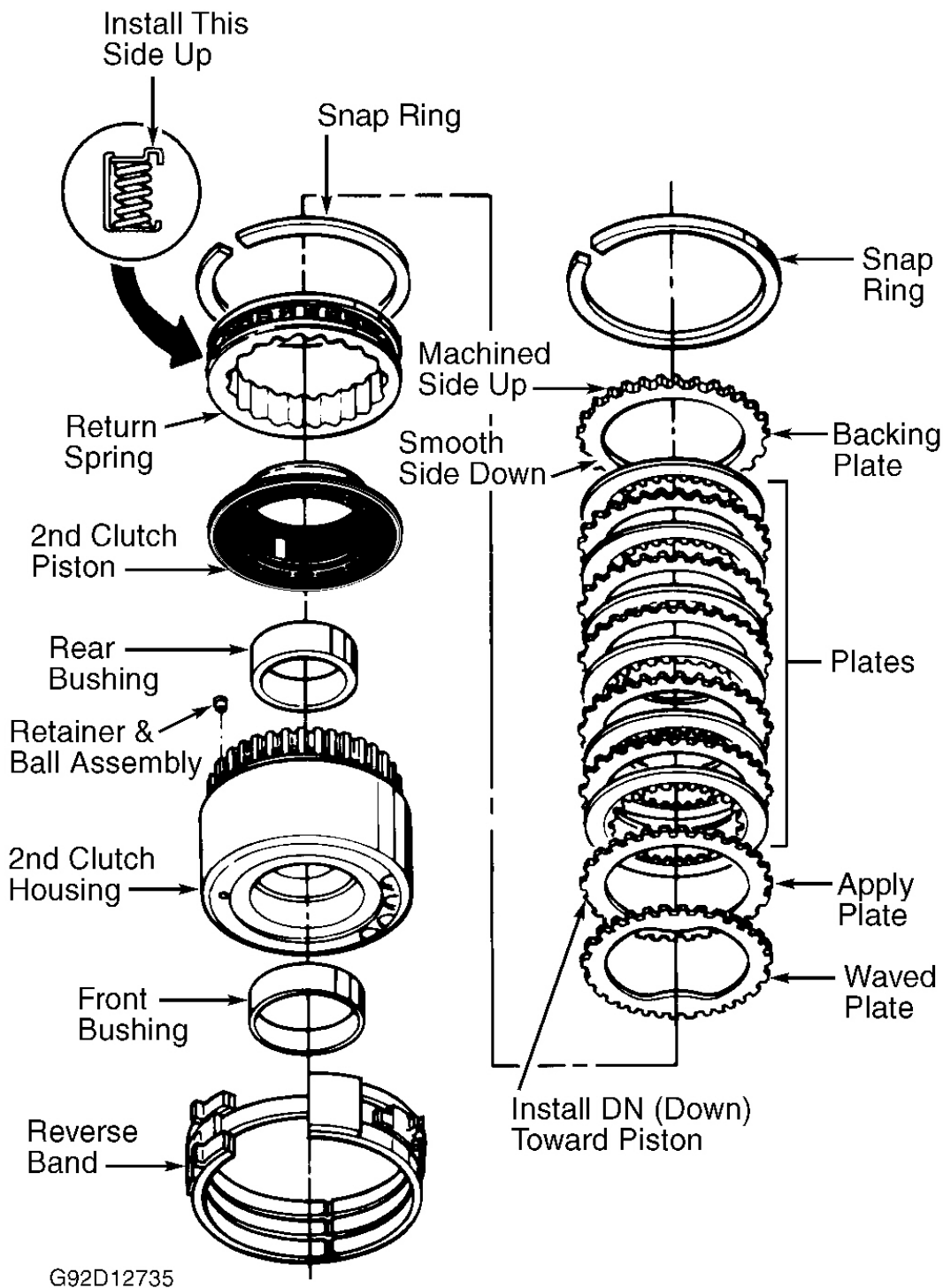


Fig. 30: Exploded View of 2nd Clutch Housing & Reverse Band
 Courtesy of GENERAL MOTORS CORP.

Piston Seal Replacement

Remove seal from 2nd clutch piston. Lubricate new seal with ATF and install.

Retainer & Ball Assembly Replacement

Remove retainer and ball assembly from housing using a 3/8" drift. Tap in new retainer using drift.

Reassembly

Assemble piston into housing. Install apply ring and spring return. See **Fig. 31**. Install snap ring and wave plate. Assemble clutch plates; start with steel plate, and then alternate between composition and steel plates. Install backing plate and snap ring. Apply 90-psi (6.2 kg/cm²) air pressure to passage marked "2" to check clutch operation.

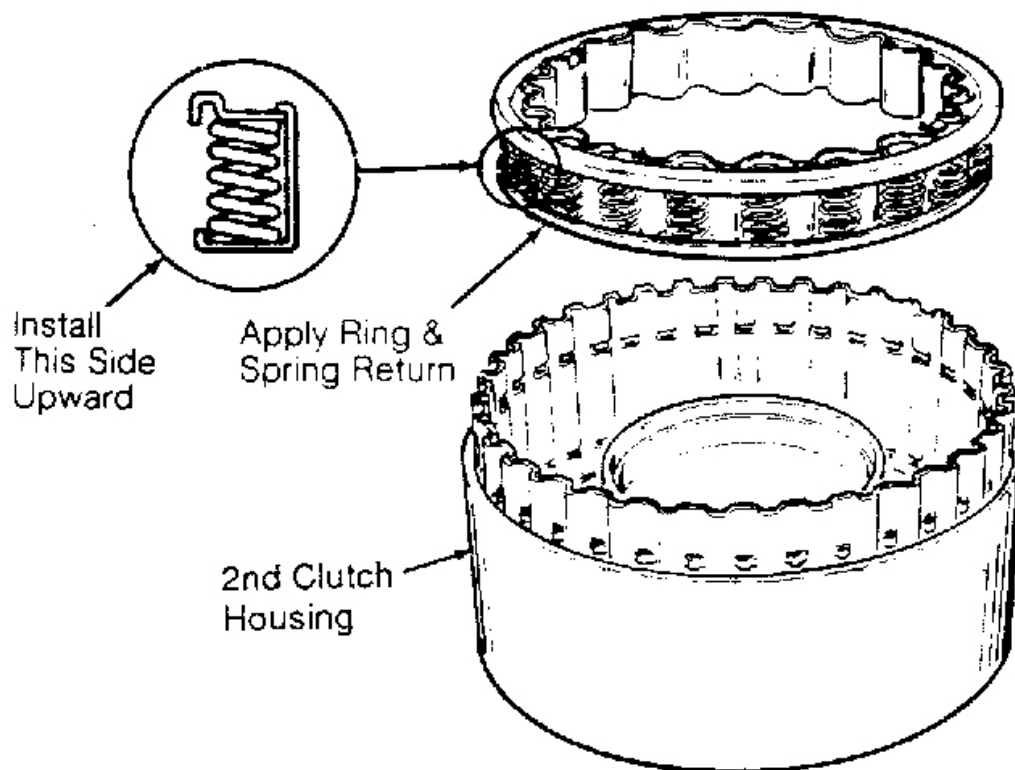


Fig. 31: Installing 2nd Clutch Apply Ring
Courtesy of GENERAL MOTORS CORP.

DRIVEN SPROCKET SUPPORT

Disassembly

Compress spring return using a press, and remove snap ring. Remove retainer and piston from sprocket support.

Cleaning & Inspection

1. Inspect driven sprocket support for worn or damaged oil seal rings. Check bushing and piston seal surface for damage. Check for blocked or interconnected oil passages and cup plug.
2. Check chain scavenging scoop and baffle for cracks. Inspect piston, seals and thrust washer for damage. Check spring retainer for distorted springs. Inspect driven sprocket bearing for damage.

OUTPUT SHAFT**Inspection**

Inspect output snap ring groove, splines, journal and bearings for damage. Replace if necessary.

DRIVE LINK ASSEMBLY & SPROCKETS**Cleaning & Inspection**

Inspect drive and driven sprockets for damaged or chipped teeth. Check drive link chain for deflection over 7/8". Replace drive link chain if too much wear is present. Check sprockets for damaged bearing surfaces or splines. Check thrust washers and drive link for excessive wear or damage. Inspect 4th clutch shaft and turbine shaft for damaged bushings, splines or seals. Replace if necessary.

4th Clutch Shaft Seal Replacement

1. Using Bushing Remover (J-29369-2) and slide hammer, remove lock-up sleeve. Expand bushing remover just enough to contact lock-up sleeve.
2. Install new seal into input shaft, aligning seal tab with shaft slot. Press lock-up sleeve into shaft using Bushing Installer (J-25019-6).

VALVE BODY**Disassembly**

1. Thoroughly clean and air dry valve body. Remove each valve train, beginning with upper left hand corner. Cover bores when removing roll pins, because some valves are under spring pressure.
2. Remove blind hole roll pins with a modified drill bit. Lay valves, springs and bushings on a clean surface in the order removed. Remove servo pipe lip seals. Clean valves, springs and bushings in solvent. NEVER use shop rags to clean valve body components.

Cleaning & Inspection

Inspect valves and bushings for scoring, nicks and scratches. Inspect springs for damaged or distorted coils. Inspect valve body casting for porosity, interconnected oil passages and damaged machined surfaces.

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

Reassembly

Reassemble valve body assembly. See **Fig. 32** or **Fig. 33** . Install new servo pipe lip seals.

NOTE: The 3-2 line control valves are matched to spacer plate. Ensure valve body parts are not mixed with parts from another transaxle.

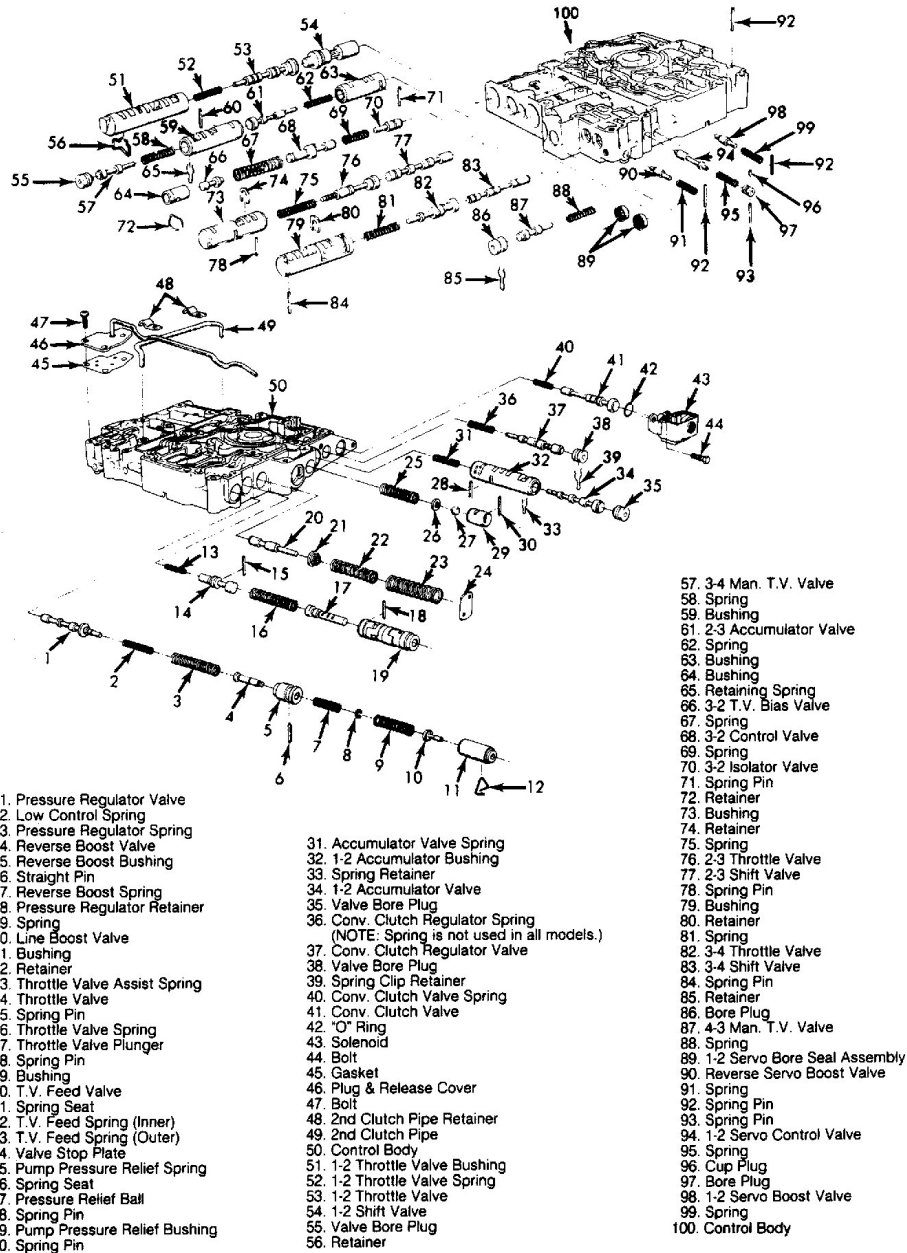


Fig. 32: Exploded View of Hydra-Matic 4T60 Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

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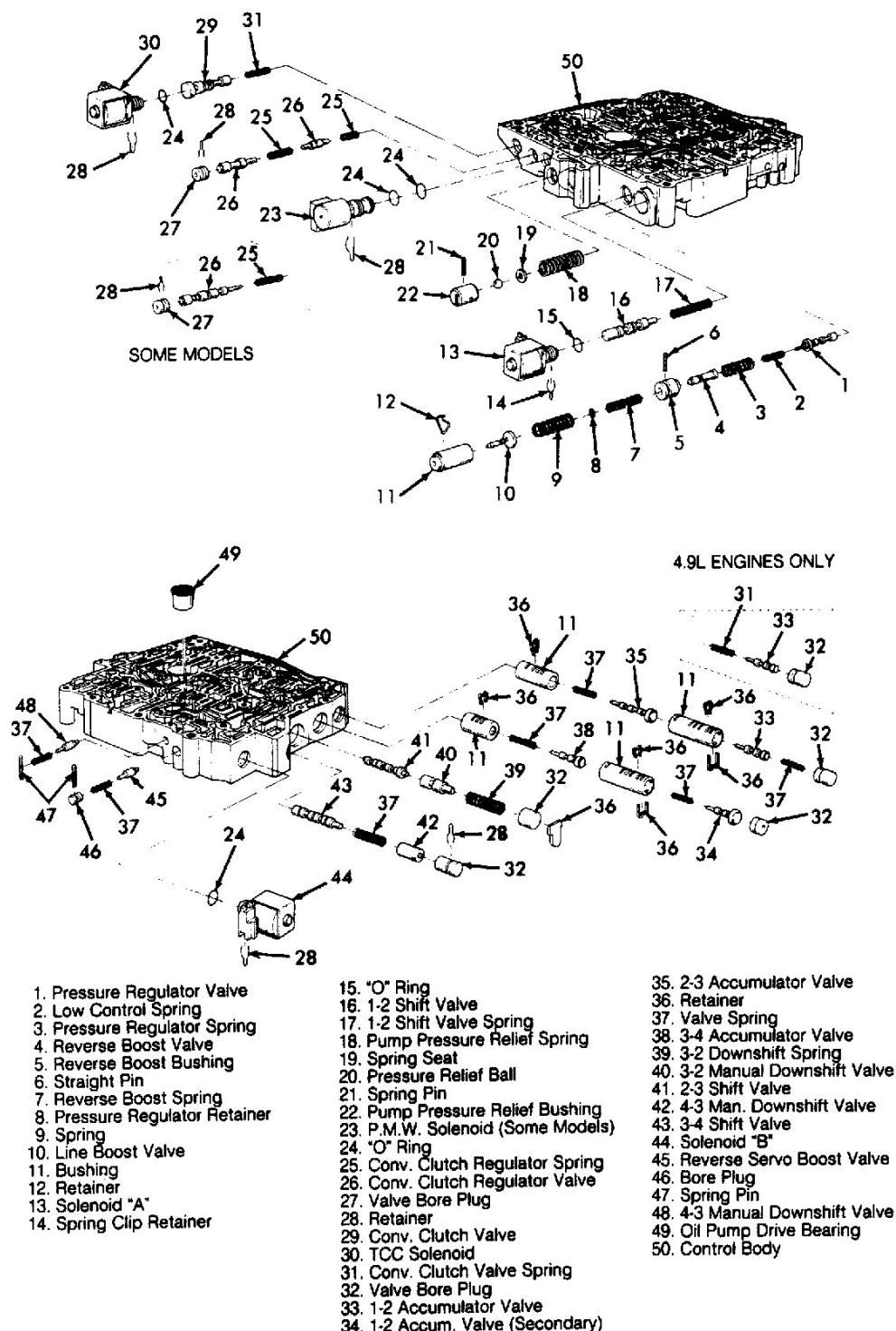


Fig. 33: Exploded View of Hydra-Matic 4T60-E Valve Body Assembly
 Courtesy of GENERAL MOTORS CORP.

OIL PUMP ASSEMBLY

Disassembly

Clean and air dry oil pump. Remove oil pump cover bolts. Remove vane ring, vanes and rotor. Remove seal and springs. Remove slide, slide seal support and slide seal. Remove pivot pin and roll pin. Remove 3-2 coast-down valve, spring and bore plug.

Cleaning & Inspection

1. Inspect pump body for porosity, interconnected oil passages, or damaged inner pump area surface or machine facing. Check slide, springs, rotor and vanes for damage. Inspect slide seal, slide support and seals for damage.
2. Measure undamaged area of rotor, vane or slide to check for proper size. See **OIL PUMP COMPONENT THICKNESS CHART**. Ensure replacement parts are matched for exact fit. See **Fig. 34**.

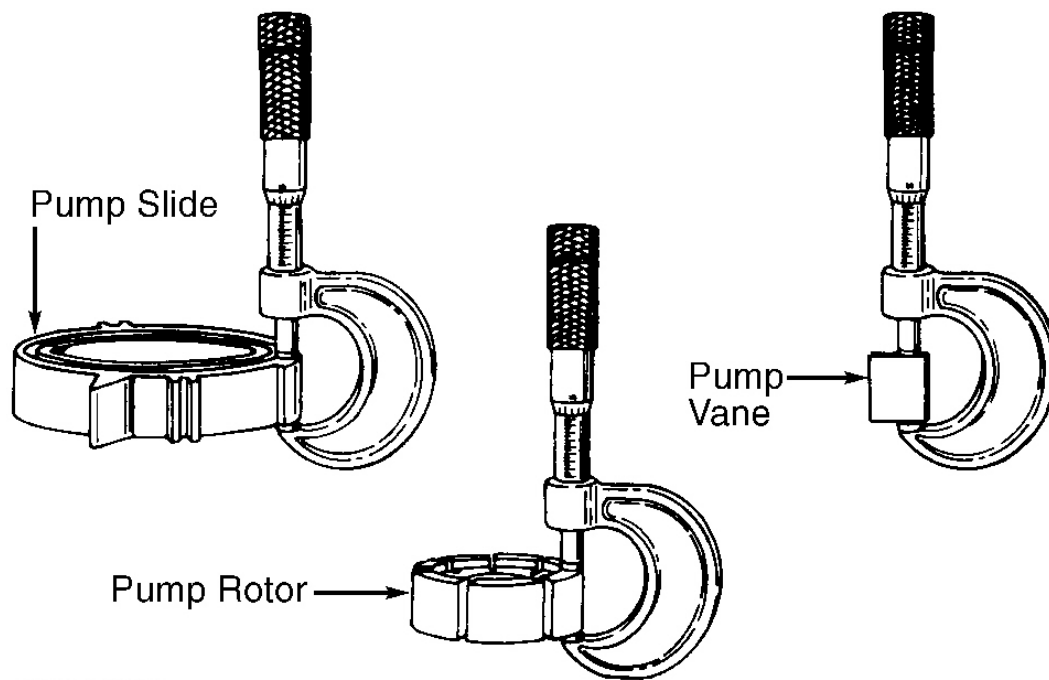
NOTE: Oil pump components are matched sets. **DO NOT** mix old and new parts.

OIL PUMP COMPONENT THICKNESS CHART

Component	In. (mm)
Pump Rotor	.7068-.7072 (17.953-17.963)
	.7072-.7076 (17.963-17.973)
	.7076-.7080 (17.973-17.983)
	.7080-.7084 (17.983-17.993)
	.7084-.7088 (17.993-18.003)
Pump Slide	.7080-.7084 (17.983-17.993)
	.7084-.7088 (17.993-18.003)
	.7088-.7092 (18.003-18.013)
	.7092-.7096 (18.013-18.023)
Pump Vane	.7064-.7071 (17.943-17.961)
	.7071-.7078 (17.961-17.979)
	.7078-.7085 (17.979-17.997)

Reassembly

1. Install 3-2 coast-down valve train into pump body. See **Fig. 18**. Install vane ring onto pump pocket. Install pump slide into pump body. Install seal and support into slide.
2. Install inner priming spring into outer priming spring. Press both springs into pump body. Install "O" ring and seal ring onto slide. Install rotor into pump body. Install vanes into rotor slots, ensuring vanes are flush with top of rotor.
3. Install pump cover onto body using cover bolts. Install pump pressure screen into pump (screen has one-way tab). Install pump onto valve body assembly. Install pump attaching bolts. See **Fig. 43**.



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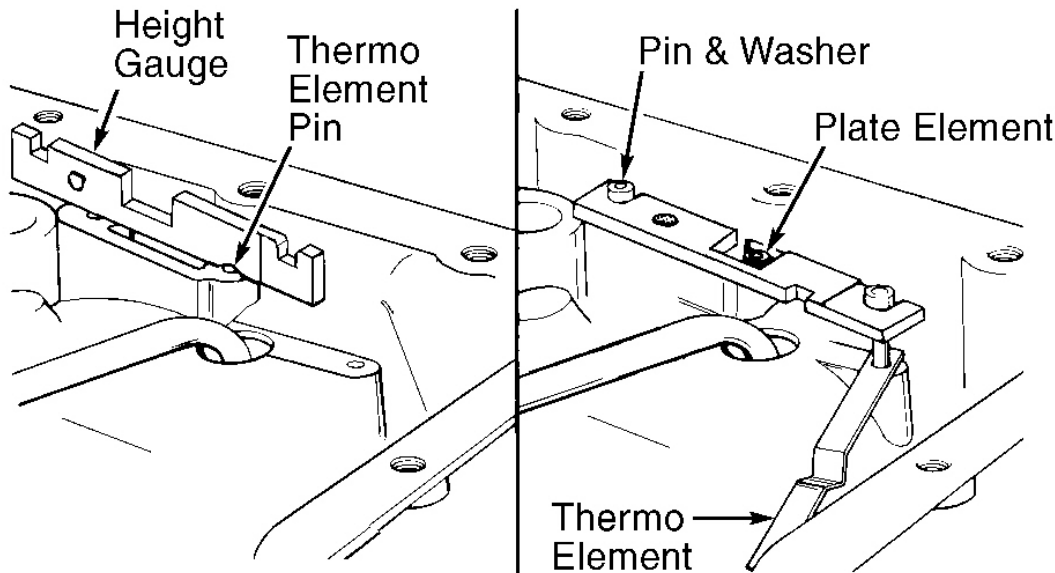
Fig. 34: Measuring Pump Slide, Rotor & Vanes
 Courtesy of GENERAL MOTORS CORP.

Thermo Element Replacement

If thermo element replacement is necessary, remove retainers, pins and thermo element. Remove plate element. For new element, set thermo pin height with Height Gauge (J-34094-A). See **Fig. 35**. Install element plate. Install pin and retainer assemblies, and set height with height gauge. Install new thermo element.

Reassembly

Assemble oil pipe into accumulator cover. Install governor screen (closed end first) into governor feed pipe. Install oil pipes into governor retainer.



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Fig. 35: Using Thermo Element Height Gauge
Courtesy of GENERAL MOTORS CORP.

1-2 & REVERSE SERVOS

Inspection

Inspect servo pistons and seals for damage or cracks. **DO NOT** remove seals unless replacement is required. Inspect springs for damaged coils.

Reassembly

DO NOT interchange servo parts. Assemble spring retainer onto pin. 1-2 servo spring retainer step must face spring. Reverse servo wave spring must be installed between 2 spring retainers. Install cushion spring, servo piston and snap ring onto pin. See **Fig. 15**.

TRANSAXLE REASSEMBLY

NOTE: All selective snap ring and thrust washer measurements taken during disassembly must be rechecked at appropriate reassembly stage.

1. Install and ensure sun gear shaft, 1-2 band, reaction sun gear and reverse band drum are in place. Ensure 1-2 band anchor pins engage band, and 1-2 band assembly stop is in place.
2. Install reverse band, making sure anchor engages band. Recheck end play of final drive. Install thrust washer onto input shaft and hold it in position with petroleum jelly. Install sprag, roller clutch and input

sun gear assembly into input clutch assembly. Clutch hubs must engage clutch plates.

3. Install input clutch roller clutch and sprag assemblies into case using Final Drive/Clutch Installer (J-33381). **DO NOT** install 2nd clutch housing, thrust bearing or thrust washer at this time.
4. Check input shaft end play. See **Fig. 19**. Install and tighten Aligner/Loader (J-26958-10). Install End Play Gauge (J-33386) and thrust washer. Using feeler gauge, check clearance between thrust washer and end play gauge. Clearance must be .000-.006" (.000-.152 mm). If clearance is not as specified, use different thrust washer. See **INPUT SHAFT THRUST WASHERS**.

INPUT SHAFT THRUST WASHERS

Washer Color	Thickness: In. (mm)
Orange/Green	.114-.118 (2.90-3.00)
Orange/Black	.120-.124 (3.05-3.15)
Orange	.126-.130 (3.20-3.30)
White	.132-.136 (3.35-3.45)
Blue	.138-.142 (3.50-3.60)
Pink	.144-.148 (3.65-3.75)
Brown	.150-.154 (3.80-3.90)
Green	.155-.159 (3.95-4.05)
Black	.161-.165 (4.10-4.20)
Purple	.167-.171 (4.25-4.35)
Purple/White	.173-.177 (4.40-4.50)
Purple/Blue	.179-.183 (4.55-4.65)
Purple/Pink	.185-.189 (4.70-4.80)
Purple/Brown	.191-.195 (4.85-4.95)
Purple/Green	.197-.201 (5.00-5.10)

5. Install reverse reaction plate and thrust washer. Install thrust bearing with large race facing down. Install 2nd clutch assembly onto input clutch assembly. Clutch plates must engage input clutch hub, and clutch housing must engage reverse reaction drum splines.
6. Install reverse band into case, locating band on anchor pins. Install thrust washer to driven sprocket support, and hold washer in position with petroleum jelly. Install driven sprocket support into case, ensuring support lube hole aligns with hole in bottom of case.
7. If removed, install driven sprocket support assembly. Install output shaft into case. On models with removable "C" ring, install "C" ring onto output shaft through bottom of case. Push "C" ring onto output shaft. On models without removable "C" ring, tap output shaft into differential until snap ring locks into place.
8. Coat Seal Installer (J-29569-1 and J-29829-1) with petroleum jelly, and place seal installer over turbine shaft. Slide oil ring seals into position. Using Seal Sizer (J-29569-2 and J-29829-1), size seals by gently twisting sizer over seal.
9. Install thrust washer onto drive sprocket, and hold washer in position with petroleum jelly. Install sprockets and drive link onto case. Ensure colored link faces upward.
10. Install thrust washer onto driven sprocket and retain with petroleum jelly. Insert 4th clutch shaft through driven sprocket, and install clutch apply plate with identification mark facing down. Install 4th clutch

plates. Ensure UP mark faces away from channel plate. See **Fig. 36**.

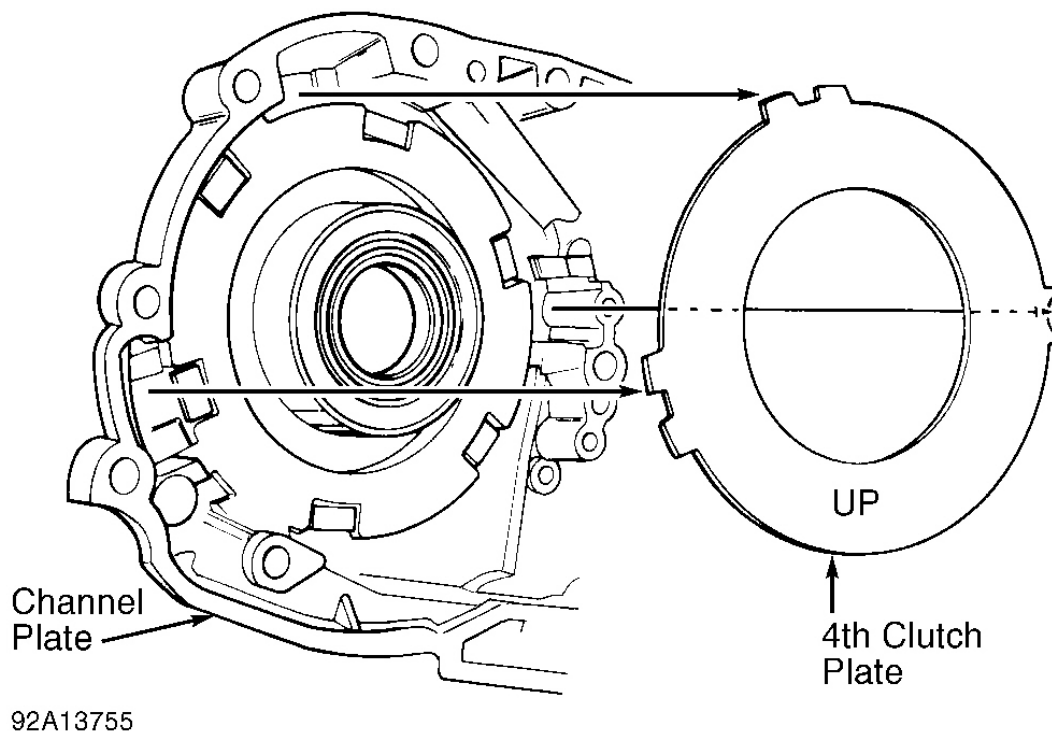
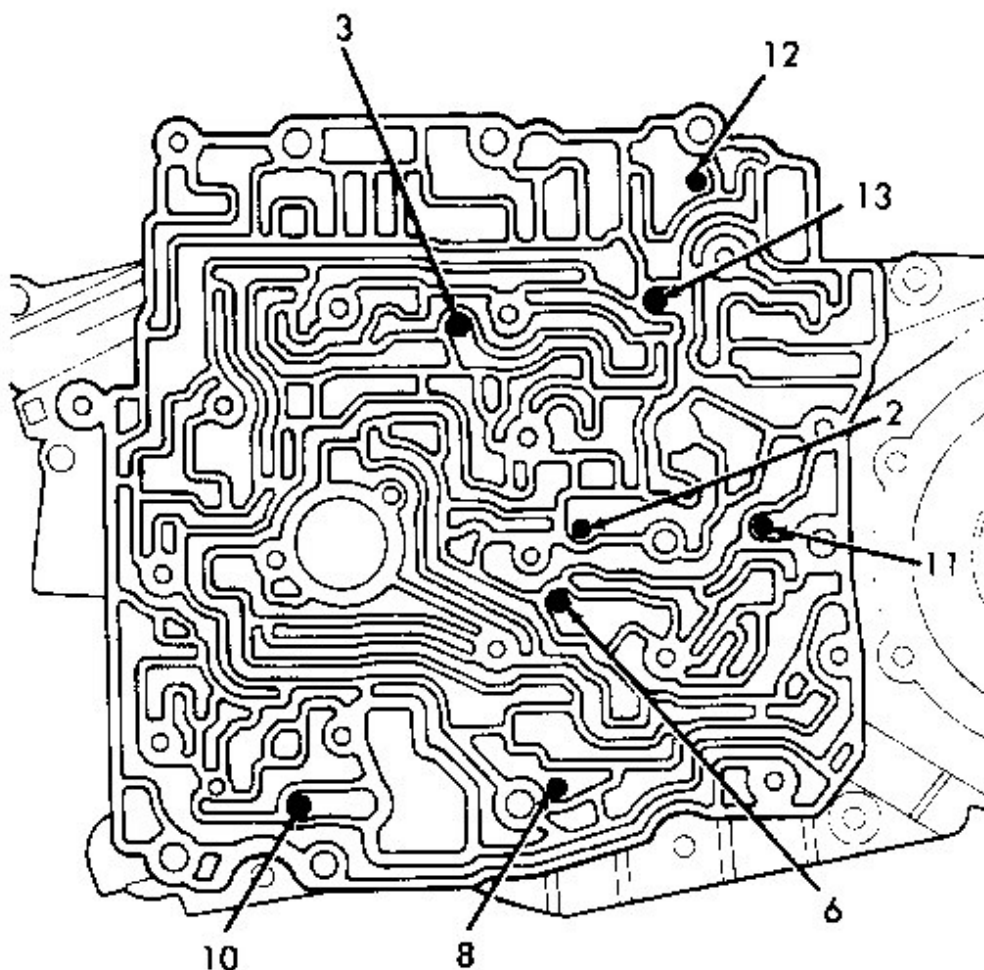


Fig. 36: Aligning Channel Plate & 4th Clutch Plate
Courtesy of GENERAL MOTORS CORP.

11. If necessary, pry out axle seal, and tap new seal into place. Install pistons and pins into channel plate. Install springs into case. Install channel plate gaskets and modulator port gasket. Install thrust washer onto channel plate.
12. Install channel plate onto case. Channel plate lugs must align with tangs on 4th clutch plates and apply plate. See **Fig. 36**. Install sleeve into channel plate. Install oil reservoir baffle, detent spring and roller. Install channel plate gaskets.
13. Install and tighten channel plate bolts. Install check balls in channel plate, using petroleum jelly to retain check balls. See **Fig. 37** or **Fig. 38**. Install converter clutch screen. Install detent spring and roller assembly.
14. Install a new spacer plate/channel plate gasket onto channel plate using the alignment pins. Install spacer plate onto gasket. Install new spacer plate/valve body gasket onto spacer plate. See **Fig. 39**.

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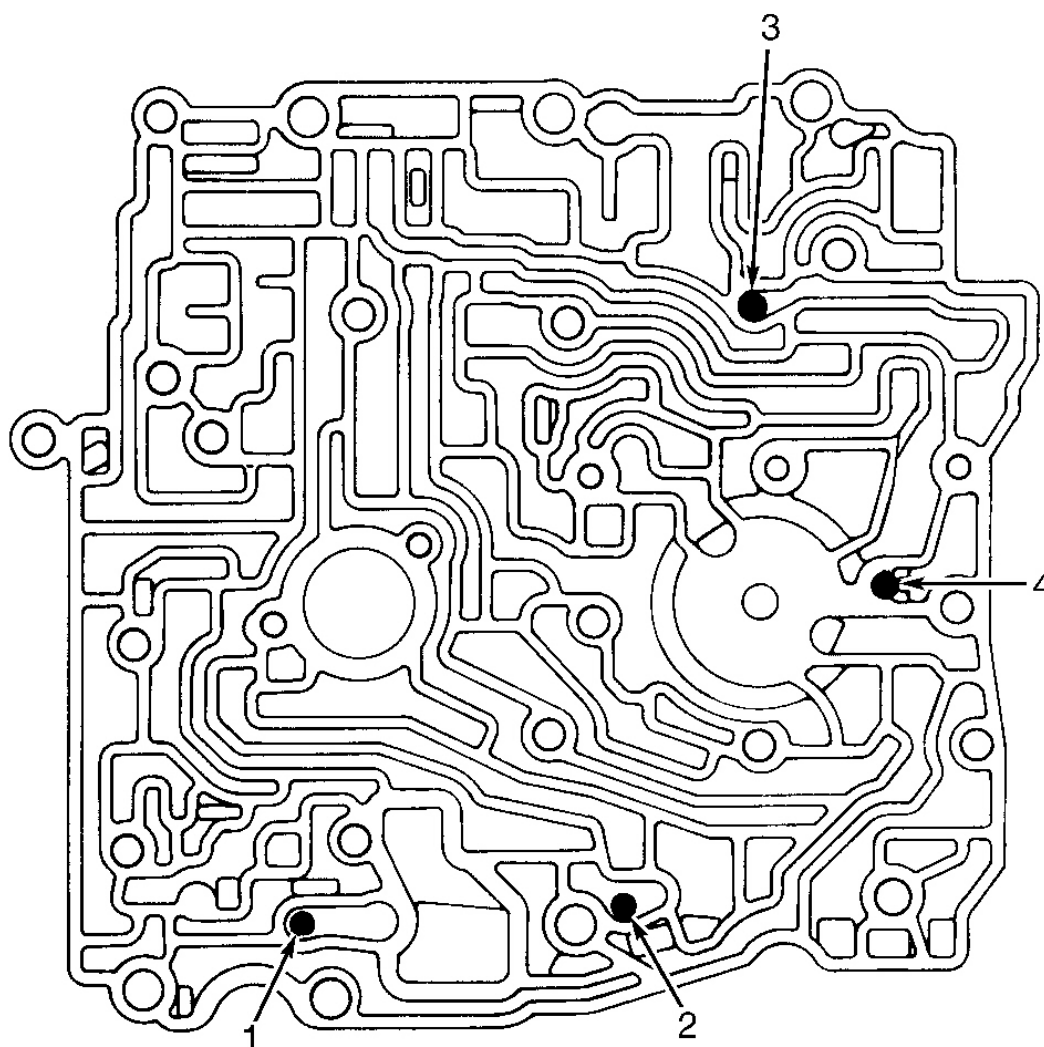
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- No. 2 Check Ball: 3-2 Control
- No. 3 Check Ball: Part Throttle & Drive 3
- No. 6 Check Ball: 2-3 Accumulator Exhaust
- No. 7 Check Ball: Located In Capsule In Case
- No. 8 Check Ball: 2nd Clutch
- No. 10 Check Ball: Converter Clutch Release/Apply
- No. 11 Check Ball: 3rd/Low/1st
- No. 12 Check Ball: 1-2 Servo Feed
- No. 13 Check Ball: Input Clutch/Reverse

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Fig. 37: Locating Channel Plate Check Balls (4T60)
Courtesy of GENERAL MOTORS CORP.



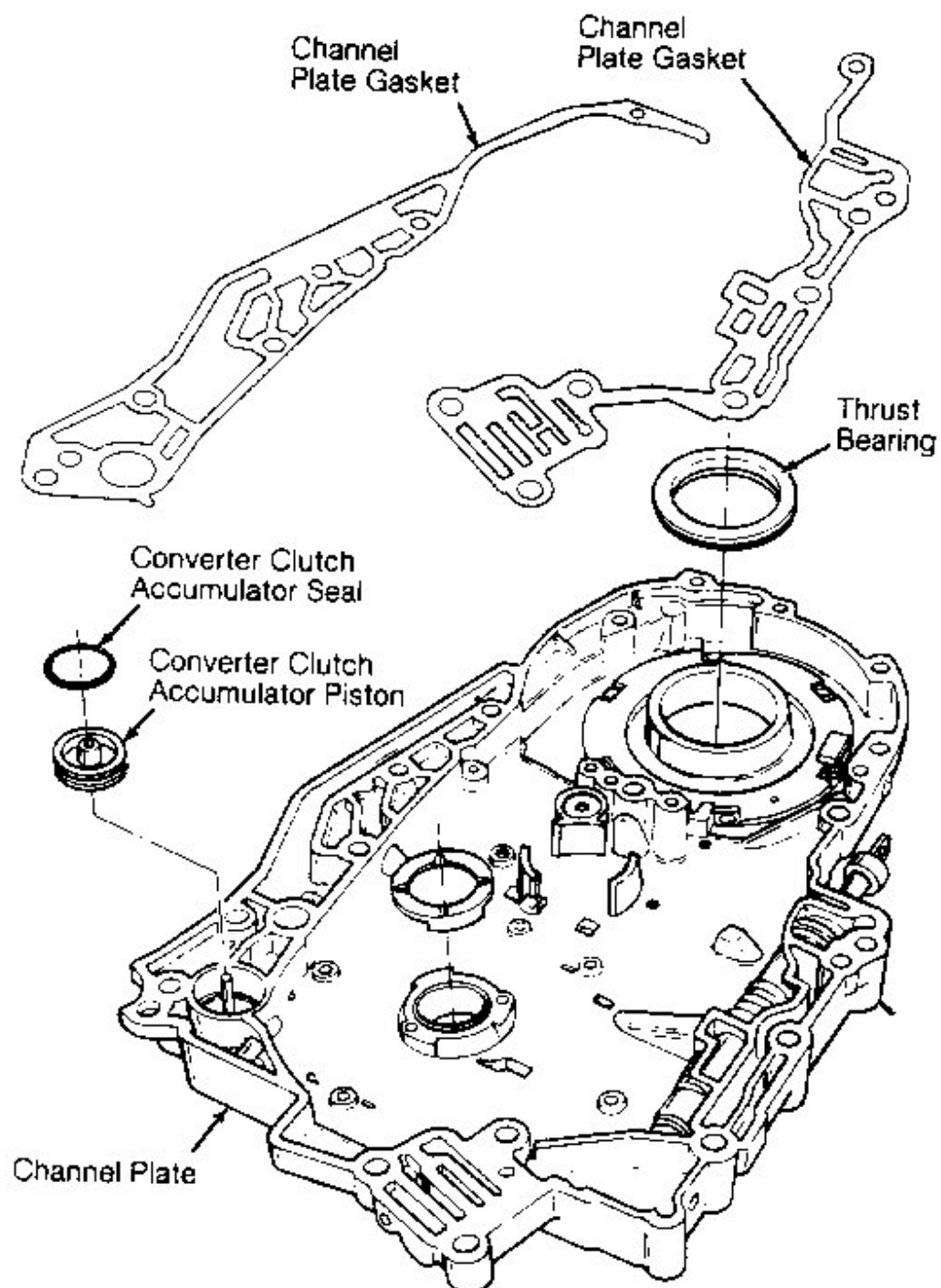
- 1. TCC/VCC Release/Apply Check Ball
- 2. 2nd Clutch Check Ball
- 3. Input Clutch Check Ball
- 4. 3rd Clutch Low/1st Check Ball

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Fig. 38: Locating Channel Plate Check Balls (4T60-E)
Courtesy of GENERAL MOTORS CORP.

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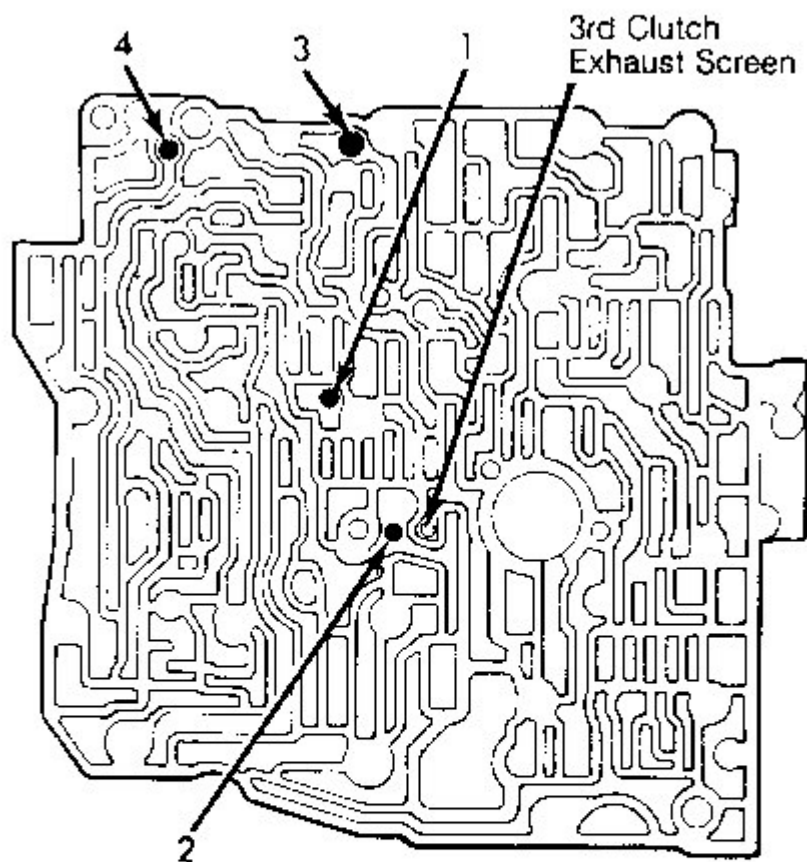
1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E



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Fig. 39: Channel Gaskets, Pistons & Thrust Washer (4T60 Shown; 4T60-E Similar)
Courtesy of GENERAL MOTORS CORP.

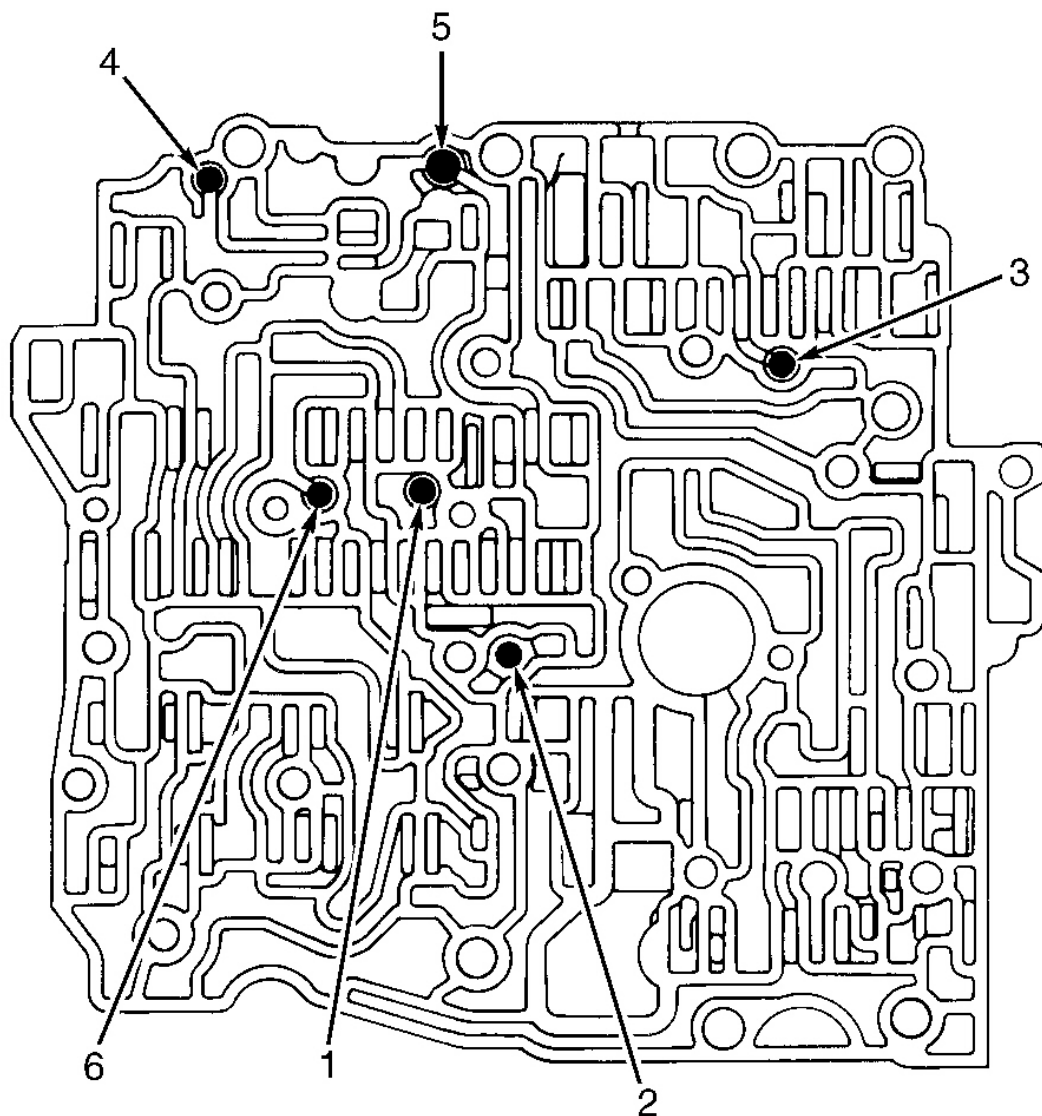
15. Install oil pump drive shaft and converter clutch solenoid screen. Install check balls into valve body assembly; use petroleum jelly to retain check balls in place. See **Fig. 40** or **Fig. 41** .
16. Install valve body assembly onto channel plate using alignment pins. See **Fig. 45**. Install servo pipes into valve body using retainer and bolt.
17. Install gaskets onto case and channel plate. Install side cover. Install accumulator pins into case. Install accumulator springs into case. Larger spring is for 3-4 accumulator.



- 1. 4th Clutch Check Ball
- 2. 3rd Clutch Check Ball
- 3. 2-3 Accumulator Feed Check Ball
- 4. Reverse Servo Feed Check Ball
- 5. Screen, 3rd Clutch Exhaust

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Fig. 40: Locating Valve Body Check Balls (4T60)
Courtesy of GENERAL MOTORS CORP.



1. 4th Clutch Check Ball
2. 3rd Clutch Check Ball
3. Low; Low-1st Feed Check Ball

4. Reverse Servo Feed Check Ball
5. Overdrive Servo Check Ball Large Check Ball
6. Manual D2; 2-1 Servo Feed Check Ball

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Fig. 41: Locating Valve Body Check Balls (4T60-E)
 Courtesy of GENERAL MOTORS CORP.

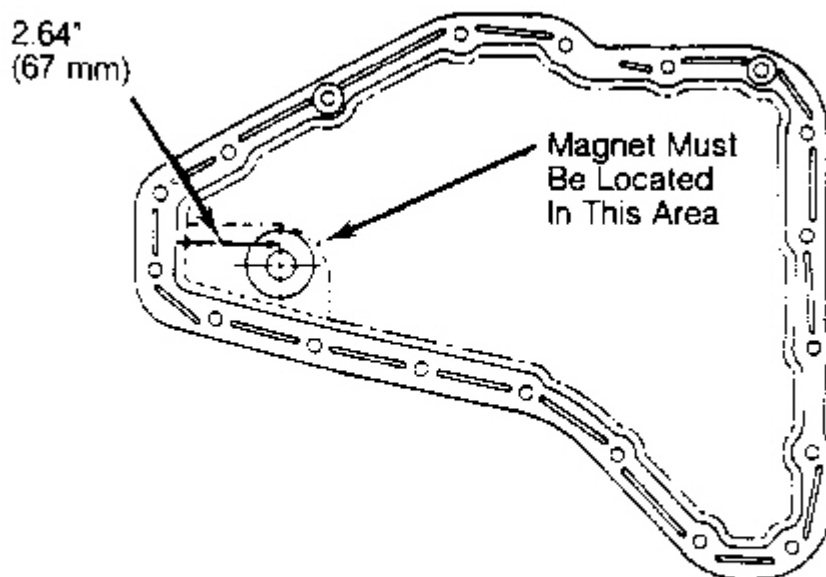
18. Install lube oil pipe retainer spring into pocket. Install lube oil pipe retainer onto lube oil pipe and "O"

ring onto retainer. Install lube oil pipe into case. Ensure pipe is installed into driven sprocket support lube hole.

19. Install spacer plate and new gaskets onto case. Install oil scavenger scoop. Install accumulator cover, pipes and governor retainer onto case as an assembly. See **Fig. 44**. Ensure lube oil pipe is installed into final drive internal gear.
20. Install new filter lip seal, filter and gasket into case. Install magnet over dimple in bottom of pan. See **Fig. 42**. Install pan.
21. Install 1-2 and reverse servo return springs into proper servo bore. Assemble each servo and then install into case. If necessary (4T60 only), use new servo apply pins selected during disassembly. Install new oil seal ring onto each servo cover. Install 1-2 and reverse servo covers into case. Install snap rings.

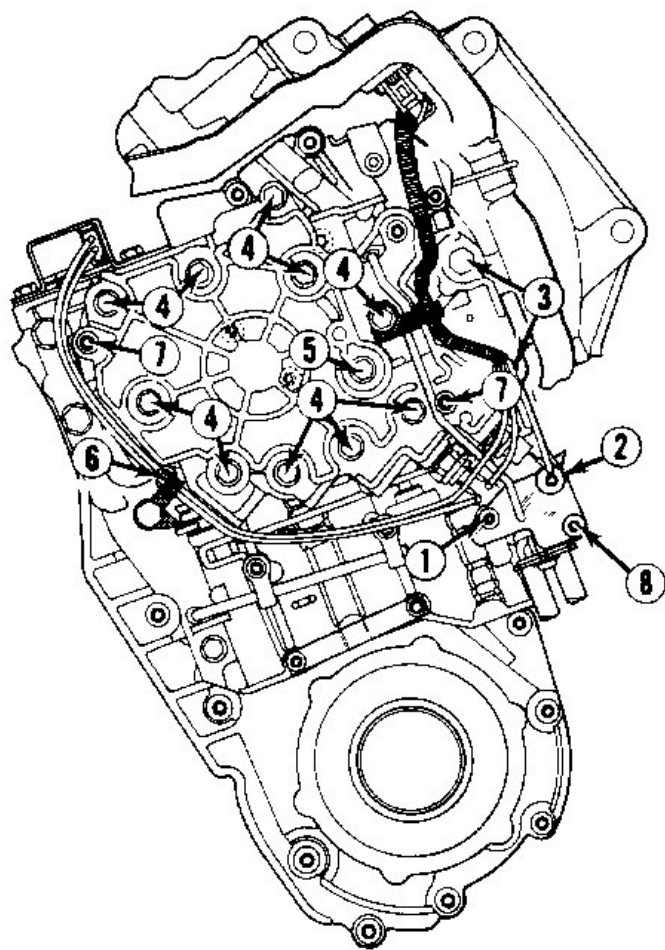
NOTE: **Install governor screen on governor shaft before inserting governor assembly into case.**

22. Install governor assembly into case. Install speedometer drive gear onto governor. Install bearing onto gear. Install new "O" ring onto governor cover. Install governor cover onto case, ensuring governor shaft fits into cover.
23. Install modulator valve into case. Install new "O" ring seal onto modulator. Install modulator into case. Install retainer and bolt. **DO NOT** use modulator to lift transaxle. Use Converter Holding Strap (J-21366) to hold torque converter in place for installation.



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Fig. 42: Locating Pan Magnet
Courtesy of GENERAL MOTORS CORP.

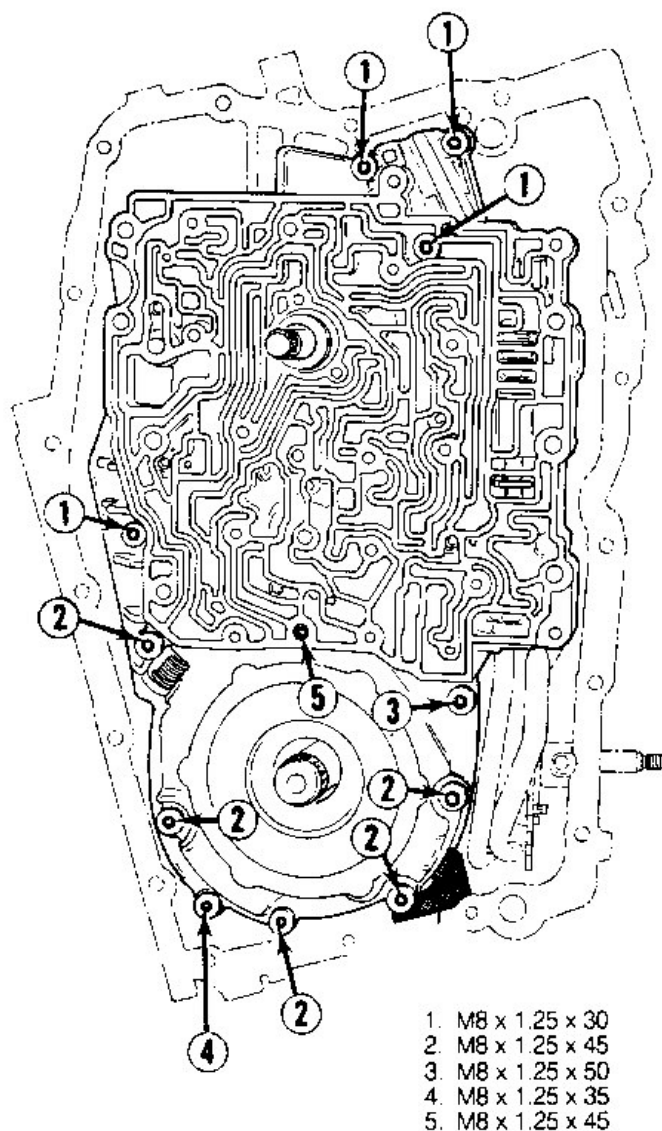


- | | |
|-------------------|-------------------|
| 1. M6 x 1.0 x 60 | 5. M6 x 1.0 x 45 |
| 2. M8 x 1.25 x 90 | 6. M6 x 1.0 x 35 |
| 3. M8 x 1.25 x 95 | 7. M8 x 1.25 x 20 |
| 4. M6 x 1.0 x 85 | 8. M6 x 1.0 x 16 |

Tightening Specifications
 72-120 Inch Lbs. (8-14 N.m) - Nos. 1, 4, 5, 6 & 8
 15-20 Ft. Lbs. (20-27 N.m) - Nos. 2, 3 & 7

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Fig. 43: Locating Oil Pump Bolts
 Courtesy of GENERAL MOTORS CORP.

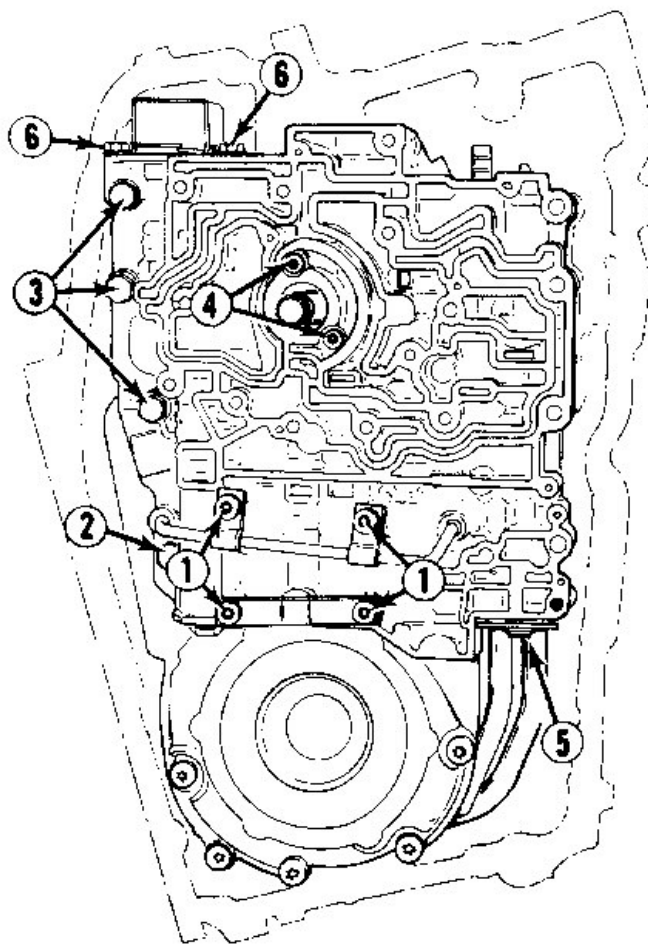


Tightening Specifications

72-120 INCH Lbs. (8-14 N.m) - No. 5
 15-20 Ft. Lbs. (20-27 N.m) - All Others

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Fig. 44: Locating Channel Plate Bolts
 Courtesy of GENERAL MOTORS CORP.



- | | |
|-------------------|------------------|
| 1. M6 x 1.0 x 60 | 4. M6 x 1.0 x 45 |
| 2. M6 x 1.0 x 35 | 5. M6 x 1.0 x 22 |
| 3. M8 x 1.25 x 70 | 6. M6 x 1.0 x 14 |

Tightening Specifications

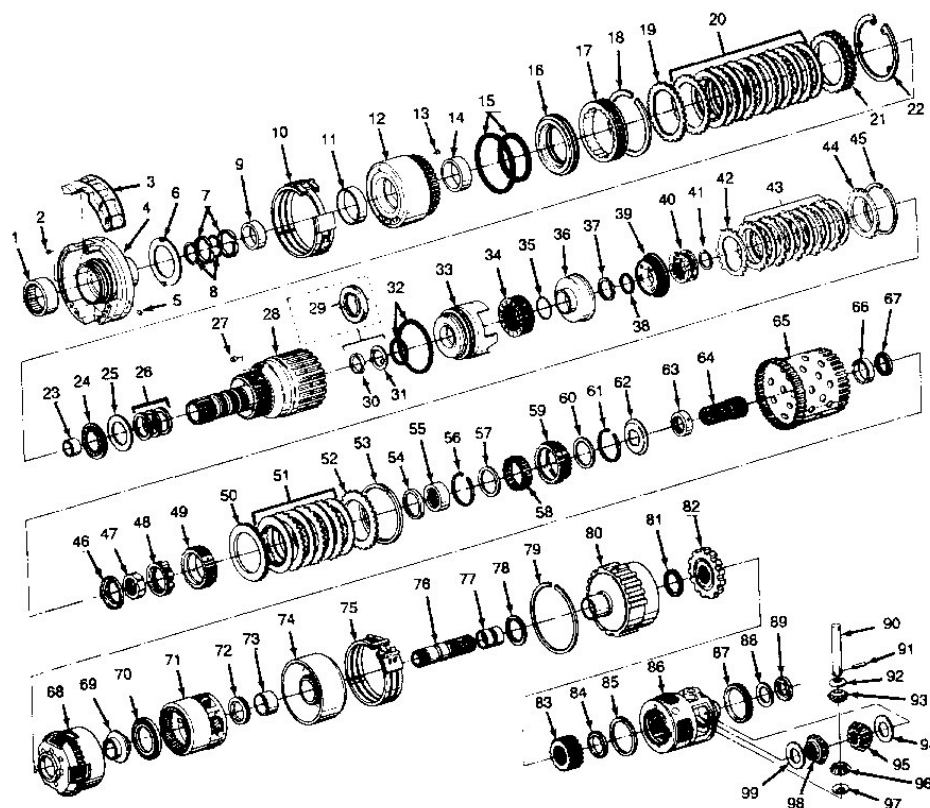
72-120 Inch Lbs. (8-14 N.m) - All Except No. 3
 15-20 Ft. Lbs. (20-27 N.m) - No. 3

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Fig. 45: Locating Control Valve Assembly Bolts
 Courtesy of GENERAL MOTORS CORP.

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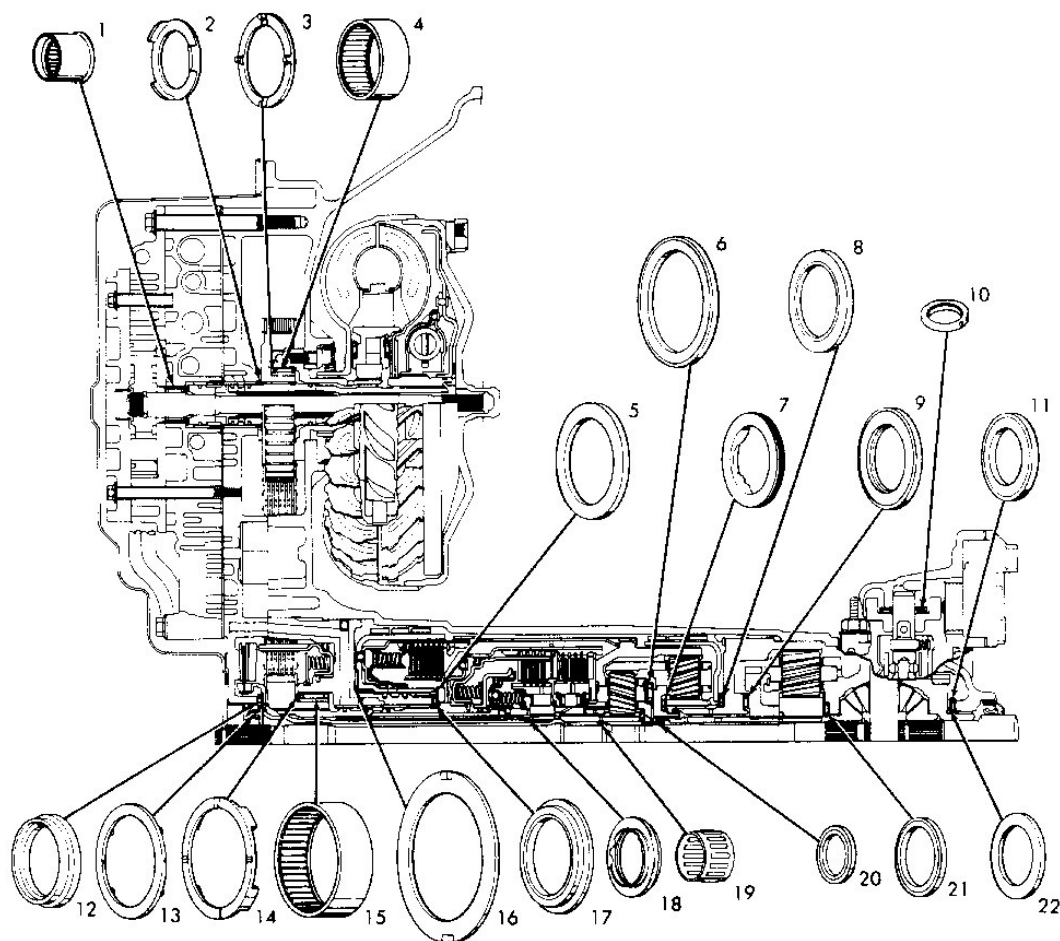
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- | | | |
|---------------------------------------|---|--|
| 1. Bearing Assembly | 34. Spring & Retainer Assembly (Input Clutch) | 68. Input Carrier Assembly |
| 2. Cup Plug (Orificed) | 35. "O" Ring Seal (Shaft 3rd CL. Housing) | 69. Input Carrier/Reaction Carrier Dam |
| 3. Chain Scavenging Scoop | 36. 3rd Clutch Piston Housing | 70. Bearing Assembly |
| 4. Driven Sprocket Support | 37. Snap Ring (Shaft 3rd Clutch Housing) | 71. Reaction Carrier Assembly |
| 5. Cup Plug (4) | 38. 3rd Clutch Piston Seal (Inner) | 72. Bearing Assembly |
| 6. Thrust Washer (Support 2nd Clutch) | 39. Seal Asm. & Retainer & Ball Asm. | 73. Reaction Sun Bushing |
| 7. Seal Rings (Support 2nd Clutch) | 40. 3rd Clutch Spring Retainer & Guide Asm. | 74. Reaction Sun Gear & Drum Asm. |
| 8. 4-Lobed Seals (Support 2nd Clutch) | 41. Snap Ring | 75. 1-2 Band |
| 9. Driven Sprocket Support Bushing | 42. 3rd Clutch Plate (Waved) | 76. Final Drive Sun Gear Shaft |
| 10. Reverse Band | 43. 3rd Clutch Plate Assembly | 77. Final Drive Internal Bushing |
| 11. 2nd Clutch Bushing (Front) | 44. 3rd Clutch Backing Plate | 78. Bearing Assembly |
| 12. 2nd Clutch Housing | 45. Snap Ring (3rd Clutch Backing Plate) | 79. Ring Snap (Internal Gear/Case) |
| 13. Retainer & Ball Assembly | 46. 3rd Roller Clutch Dam | 80. Final Drive Internal Gear |
| 14. 2nd Clutch Bushing (Rear) | 47. 3rd Roller Clutch Cam | 81. Bearing Assembly |
| 15. 2nd Clutch Piston Seals | 48. 3rd Clutch Roller Assembly | 82. Parking Gear |
| 16. 2nd Clutch Piston | 49. 3rd Roller Clutch Race | 83. Final Drive Sun Gear |
| 17. Apply Ring & Spring Return | 50. Input Clutch Apply Plate | 84. Thrust Bearing (Sun Gear/Carrier) |
| 18. Snap Ring (2nd Clutch Hub) | 51. Input Clutch Plate Assembly | 85. Snap Ring (Final Drive Carrier) |
| 19. 2nd Clutch Plate (Waved) | 52. Input Clutch Backing Plate | 86. Final Drive Carrier |
| 20. 2nd Clutch Plate Assembly | 53. Snap Ring | 87. Governor Drive Gear |
| 21. Backing Plate Support Ring | 54. Input Sprag Race Lube Dam | 88. Carrier/Case Washer (Selective) |
| 22. Snap Ring | 55. Input Sprag Race (Inner) | 89. Selective Washer/Case Bearing Asm. |
| 23. Input Shaft Bushing | 56. Snap Ring (Sprag) | 90. Differential Pinion Shaft |
| 24. Support Bearing (Selective) | 57. Wear Plate | 91. Differential Pinion Shaft Retainer |
| 25. Thrust Washer (Selective) | 58. Input Clutch Sprag Assembly | 92. Pinion Thrust Washer |
| 26. Oil Seal Ring (Input Shaft) | 59. Input Sprag Race (Outer) | 93. Differential Pinion |
| 27. Retainer & Ball Assembly | 60. Wear Plate | 94. Differential Side Gear Thrust Washer |
| 28. Input Housing & Shaft Assembly | 61. Snap Ring (Sprag) | 95. Differential Side Gear |
| 29. Thrust Bearing Assembly | 62. Input Sprag Retainer | 96. Differential Pinion |
| 30. Lock-Up Sleeve | 63. Input Sun Gear Spacer | 97. Pinion Thrust Washer |
| 31. Thrust Washer (Input Shaft/Sun) | 64. Input Sun Gear | 98. Differential Side Gear |
| 32. Input Clutch Piston Seals | 65. Reverse Action Drum | 99. Differential Side Gear Thrust Washer |
| 33. Input Clutch Piston | 66. Reaction Internal Gear Bushing | |
| | 67. Bearing Assembly | |

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Fig. 46: Internal Components (from 2nd Clutch to Final Drive)
Courtesy of GENERAL MOTORS CORP.



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Fig. 47: Identifying 4T60 & 4T60-E Thrust Washers & Bearing Locations
Courtesy of GENERAL MOTORS CORP.

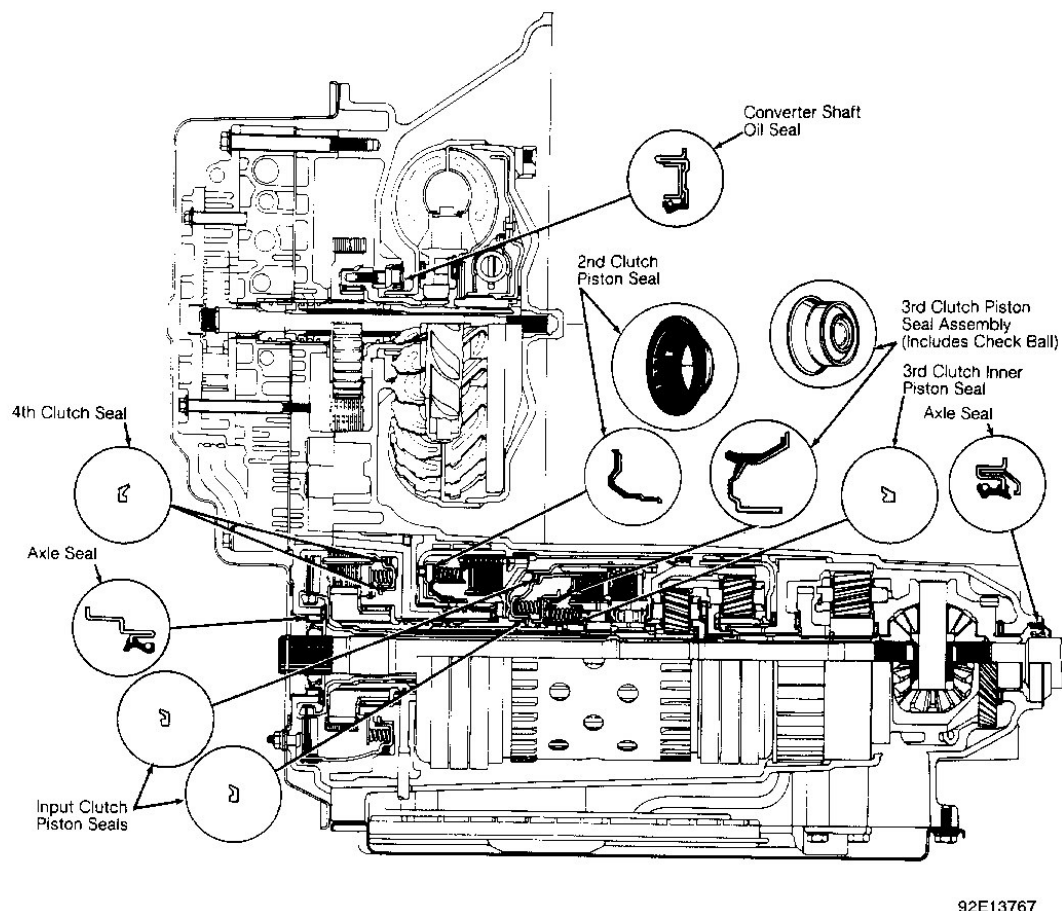
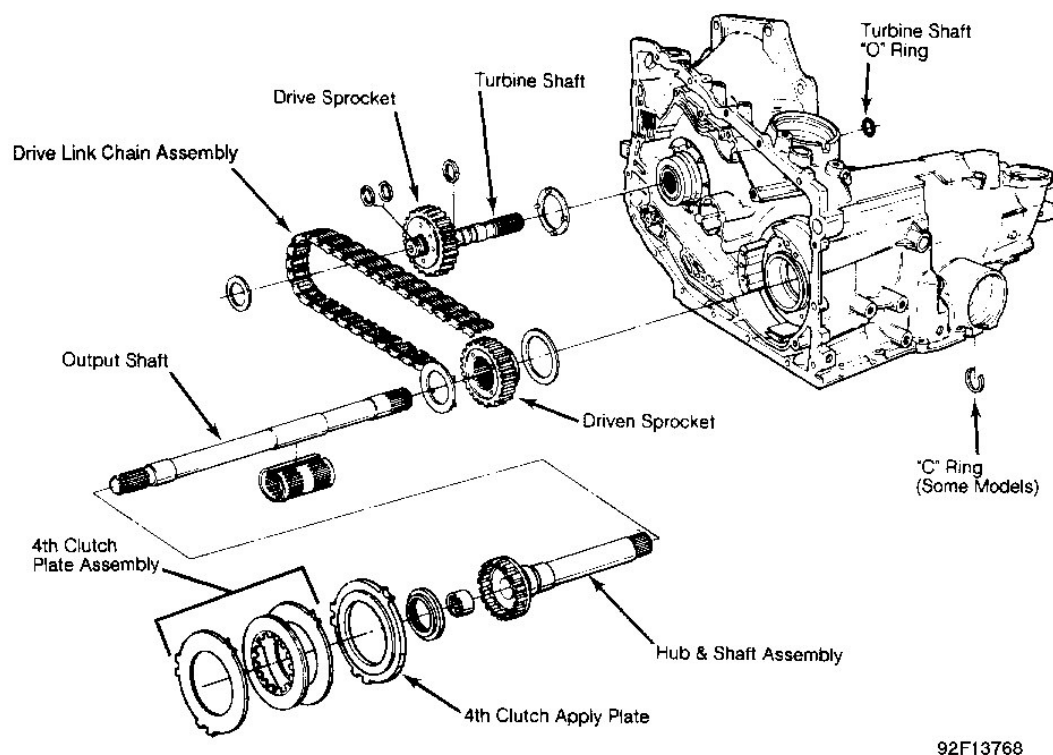


Fig. 48: Identifying Hydra-Matic 4T60 & 4T60-E Lip Seal Locations
Courtesy of GENERAL MOTORS CORP.



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Fig. 49: Identifying 4T60 Drive Link Assemblies & Output Shaft
Courtesy of GENERAL MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Axle Shaft Nut	185 (251)
Case-To-Drive Sprocket Support Bolts	18 (24)
Channel Plate-To-Case Bolts	18 (24)
Channel Plate-To-Driven Sprocket Support Bolts	18 (24)
Connector Cooler Fitting Bolts	29 (39)
Converter-To-Flywheel Bolts	46 (62)
Manual Shaft-To-Detent Lever Bolts	24 (33)
Modulator-To-Case Bolts	18 (24)
Oil Pan-To-Case Bolts	10 (13)
Pump Body-To-Case Bolts	18 (24)
Pump Cover-To-Pump Body Bolts	18 (24)
	INCH Lbs. (N.m)

1990 Chevrolet Celebrity

1983-93 AUTOMATIC TRANSMISSIONS General Motors Corp. - Hydra-Matic 440-T4/4T60 & 4T60-E

Accumulator Cover-To-Case Bolts	98 (11)
Case Side Cover-To-Channel Plate Bolts	98 (11)
Governor Control Body-To-Cover Bolts (4T60)	98 (11)
Governor Oil Pipe Retainer Bolts (4T60)	98 (11)
Governor-To-Case Bolts (4T60)	98 (11)
Oil Scoop-To-Case Bolts	71 (8)
Pipe Plug	71 (8)
Pressure Switch Bolts	98 (11)
Pump Cover-To-Channel Plate Bolts	98 (11)
Pump Cover-To-Valve Body Bolts	98 (11)
Servo Pipe Bracket-To-Valve Body Bolts	98 (11)
Side Cover-To-Case Bolts	98 (11)
Solenoid-To-Valve Body Bolts	98 (11)
Valve Body-To-Case Bolts	98 (11)
Valve Body-To-Channel Plate Bolts	98 (11)

WIRING DIAGRAMS

NOTE: See **AUTO TRANS DIAGNOSIS - HYDRA-MATIC 4T60-E** article in **AUTOMATIC TRANSMISSIONS**.