

1997-98 AUTOMATIC TRANSMISSIONS

Hydra-Matic 4L30-E Electronic Controls & Overhaul

APPLICATION

TRANSMISSION APPLICATION

Application	Trans. Model Number	BMW Model Number
318i, 318is, 318ti, 323i, 323is, 328i, 328is, 528i & Z3	4L30-E	A4 S 310 R

IDENTIFICATION

Identification plate is located on side of transmission case. See **Fig. 1** . Identification plate information may be required when ordering replacement components.

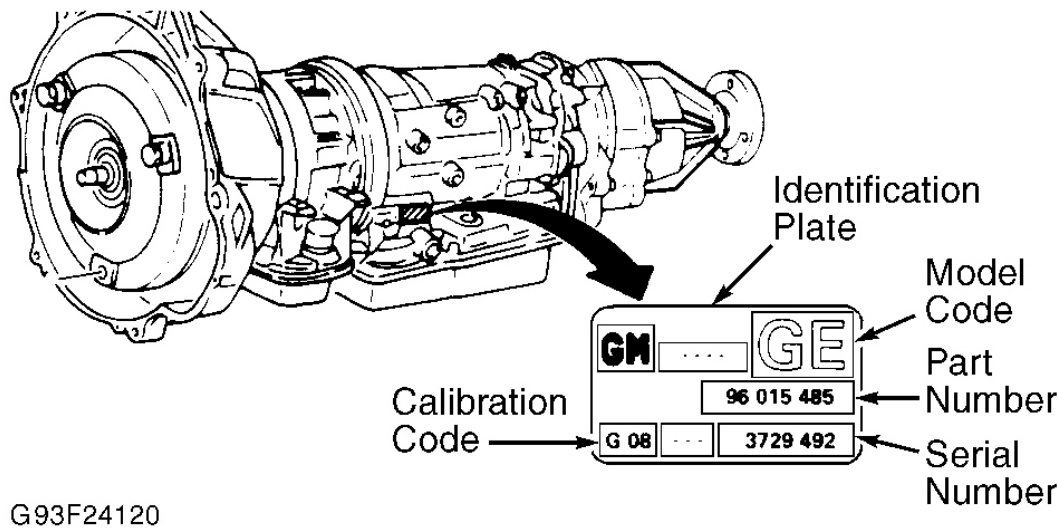


Fig. 1: Locating Transmission Identification Plate
Courtesy of ISUZU MOTOR CO.

DESCRIPTION & OPERATION

NOTE: Electronic control diagnosis and code retrieval procedures are not available for BMW. Wiring diagrams are included in this article. See **WIRING DIAGRAMS** .

Automatic transmission is electronically controlled, providing 4 forward speeds and one reverse speed. Transmission consists of a torque converter, clutches, planetary gears and brake band. See **Fig. 2** .

Transmission shifting and torque converter lock-up are controlled by the control module. Control module receives information from various input devices and uses this information to control shift solenoids, band apply solenoid and Torque Converter Clutch (TCC) solenoid. Control module uses input signals to control force motor solenoid operation, which activates pressure regulator valve for controlling line pressure.

A torque management control system is used to reduce engagement shock caused by a change in vehicle speed during shifting.

The control module contains a self-diagnostic system which stores a Diagnostic Trouble Code (DTC) if a specified failure or problem is present in the transmission electronic control system. If fault has set a DTC, the CHECK TRANS light on instrument panel will flash. The DTC may be retrieved to determine transmission problem area.

Transmission is capable of 3 different shift modes, Auto mode, Sport mode and Manual mode. Shift mode may be selected by "S" or "M" mode switch mounted on center console, near gearshift lever. Shift modes are used to change transmission shift points for various vehicle operating conditions.

The control module contains an emergency running system. When a failure or problem is present in the transmission electronic control system, the control module may go into a back-up mode using pre-programmed values, allowing vehicle to be driven. The CHECK TRANS light on instrument panel will flash to inform driver of a problem. Vehicle can be driven, but shifting must be done manually. When manually shifting transmission, if gearshift lever is placed in "D" or "3" position, transmission remains in 4th gear. If gearshift lever is placed in "2" position, transmission remain in 3rd gear. If gearshift lever is placed in "L" position, transmission remains in 1st gear. If gearshift lever is placed in "R" position, transmission will shift into reverse.

Transmission is equipped with shift and key lock systems. Shift lock system prevents gearshift lever from being moved from "P" position unless brake pedal is depressed, ignition is on and release button on gearshift lever is depressed.

Key lock system prevents ignition switch from being placed in LOCK position unless gearshift lever is in "P" position. Shift lock cable is connected between gearshift lever and ignition switch. When gearshift lever is placed in "P" position, shift lock cable moves lock on ignition switch so ignition switch may be placed in LOCK position.

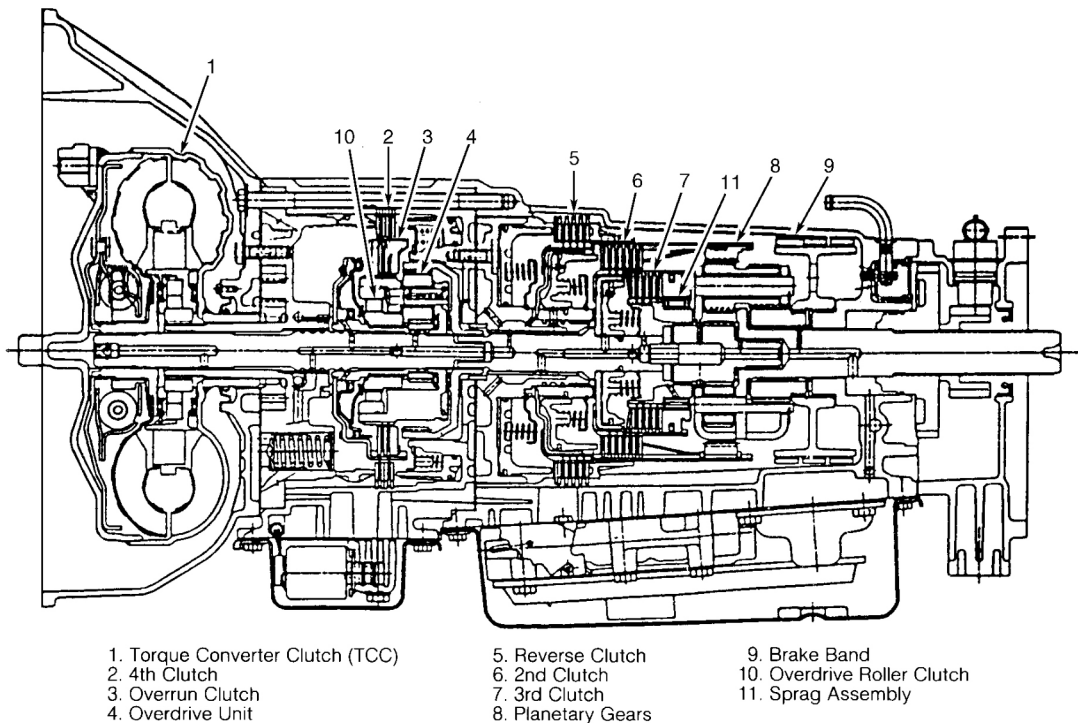


Fig. 2: Identifying Transmission Component Locations
Courtesy of ISUZU MOTOR CO.

LUBRICATION & ADJUSTMENTS

See 1997-98 AUTOMATIC TRANSMISSION SERVICING article.

ON-VEHICLE SERVICE

BRAKE BAND ADJUSTMENT

1. Drain fluid. Remove bolts, main case oil pan and gasket. See **Fig. 4** . Remove bolts, servo cover and gasket. Loosen lock nut on servo adjusting screw.
2. Using an INCH-lb. torque wrench, tighten servo adjusting screw to 40 INCH lbs. (4.5 N.m). Back off servo adjusting screw 5 revolutions. Hold sleeve on servo piston. Tighten lock nut to 14 ft. lbs. (19 N.m). Ensure servo adjusting screw does not rotate while tightening lock nut.
3. Using a NEW gasket, install servo cover. Install and tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Using a NEW gasket, install main case oil pan. Install and tighten bolts to specification. Fill transmission with Dexron-III ATF.

SHIFT LOCK CABLE ADJUSTMENT

Key lock system prevents ignition switch from being placed in "0" position unless gearshift lever is in "P"

position. Key lock system also prevents gearshift lever from moving out of "P" position with ignition switch in "0", or with key removed. Shift lock cable is connected between gearshift lever and ignition switch. When gearshift lever is placed in "P" position, check that ignition switch may be placed in "0" position. If ignition switch cannot be placed in "0" position, perform the following shift lock cable adjustment.

1. Ensure gearshift lever is in "P" position. Remove console components for access to shift lock cable at gearshift lever.
2. Loosen screw retaining cable in bracket allowing cable to move slightly.
3. Ensure that ignition switch is in "0" position. Press interlock lever at rear of gearshift lever down to its limit and tighten cable retaining screw.
4. Ensure ignition switch can be turned to "0" position only when gearshift lever is in "P" position. If operation is not as specified, readjust shift lock cable.

TROUBLE SHOOTING

NOTE: Before trouble shooting transmission, perform trouble shooting preliminary procedure. See **PRELIMINARY PROCEDURE** . Once trouble shooting preliminary procedure is performed, proceed to symptom diagnosis. See **SYMPTOM DIAGNOSIS** .

PRELIMINARY PROCEDURE

1. Before performing transmission trouble shooting, check fluid level, fluid condition and shift linkage adjustment.
2. Perform hydraulic pressure test to identify problem. See **HYDRAULIC PRESSURE TEST** under TESTS.

SYMPTOM DIAGNOSIS

Engine Cannot Be Started In "N" or "P", Or Can Be Started In All Positions

- Gearshift Lever Not In "N" Or "P"
- Shift Linkage Misadjusted
- Transmission Switch Faulty

"P" Does Not Engage

- Shift Linkage Between Gearshift Lever & Transmission Misadjusted
- Excessive Friction In Parking Lock Mechanism

"P" Does Not Hold

- Shift Linkage Misadjusted

Delayed Shift From "N" To "D"

- Low Transmission Fluid Level
- Low Line Pressure

Slip Or Shake In 1st Gear

- Low Line Pressure
- Torque Converter Fault
- Brake Band Misadjusted
- Fluid Loss In Brake Band Circuit
- 4th Gear Freewheel Or Planetary Gearset Freewheel Defective

No Reverse Gear

- Shift Linkage Misadjusted
- Oil Strainer Dirty
- Reverse Gear Clutch Faulty

Vehicle Moves Or Creeps In "N"

- Shift Linkage Misadjusted
- Brake Band Adjusted Too Tight

Hard Engagement From "N" To "D"

- Brake Band Locked Or Faulty

Poor Acceleration

- Emergency Shift Program Activated
- Torque Converter Faulty

No Upshift 1-2

- Shift Linkage Misadjusted
- Solenoid Valve Faulty
- Solenoid Valve Wiring Faulty
- Fluid Loss In 2nd Gear Clutch

1-2 Shift Problems

- Incorrect Pressure In 2nd Gear Clutch
- Fluid Loss In 2nd Gear Clutch
- Pressure Reservoir Valve For 1-2 Gear Clutch Seized Or Leaks

No Upshift 2-3

- Shift Linkage Misadjusted
- Solenoid Valve Faulty
- Solenoid Valve Wiring Faulty
- Shift Valve In Valve Body Faulty

2-3 Shift Problems

- Brake Band Misadjusted
- Solenoid Valve Brake Band Defective Or Blocked
- 3rd Gear Clutch Fluid Loss
- Fluid Loss In Brake Band Reservoir Return Pipe
- Incorrect Fluid Pressure

No 3-4 Upshift

- Shift Linkage Misadjusted
- Solenoid Valve Faulty
- Solenoid Valve Wiring Faulty
- 3rd Gear Clutch Fluid Loss

3-4 Shift Problems

- 4th Gear Clutch Fluid Loss
- Incorrect Fluid Pressure
- Overdrive Clutch Does Not Release In 4th Gear

No Torque Converter Clutch Lockup

- Solenoid Valve Faulty
- Solenoid Valve Wiring Faulty
- Fluid Loss In Supply Circuit

Torque Converter Clutch Noise

- Torque Converter Clutch Faulty
- Insufficient Fluid Pressure

Torque Converter Clutch Does Not Release

- Solenoid Valve Faulty
- Solenoid Valve Wiring Faulty
- Return Pipe Obstruction

No "S" Program

- Program Switch Faulty
- Open In Program Switch Supply Circuit

No "M" Program

- Program Switch Faulty
- Open In Program Switch Supply Circuit

No Kickdown

- Kickdown Switch Faulty
- Open In Kickdown Switch Supply Circuit

No Downshift

- 1-2 Solenoid Valve Or Circuit Faulty
- 3-4 Solenoid Valve Or Circuit Faulty
- Shift Valves In Valve Body Faulty

No Engine Braking (Selector In "D", 3rd Gear, "M" Program Lever In "3", "2" Or "1")

- 4th Gear Overdrive Clutch Defective
- Fluid Loss In Oil Circuit

Transmission Fluid Temperature High

- Fluid Level Too High
- No Torque Converter Clutch Lockup
- Extreme Load In Emergency Or "M" Program

Fluid Loss Through Vent

- Fluid Level Too High
- No Torque Converter Clutch Lockup
- Extreme Load In Emergency Or "M" Program

Fluid Leaking From Torque Converter Housing

- Input Shaft "O" Ring Failure
- Torque Converter Leaks At Seam
- Torque Converter Radial Oil Seal Leak

Fluid Loss Through Vent

- Fluid Level Too High
- Incorrect Fluid Type
- Contaminated Fluid
- Vent Cover Missing
- Damaged "O" Ring On Vent

ELECTRICAL SYSTEM & COMPONENT TESTING

Electronic control diagnosis and code retrieval procedures are not available for BMW.

TESTS

NOTE: Before beginning any testing, check fluid level, fluid condition and shift linkage adjustment.

TORQUE CONVERTER

Torque converter cannot be serviced and must be replaced if defective.

HYDRAULIC PRESSURE TEST

Pressure Test Preparation

Warm engine to normal operating temperature. Ensure transmission fluid level is correct. Apply parking brake. Block all wheels.

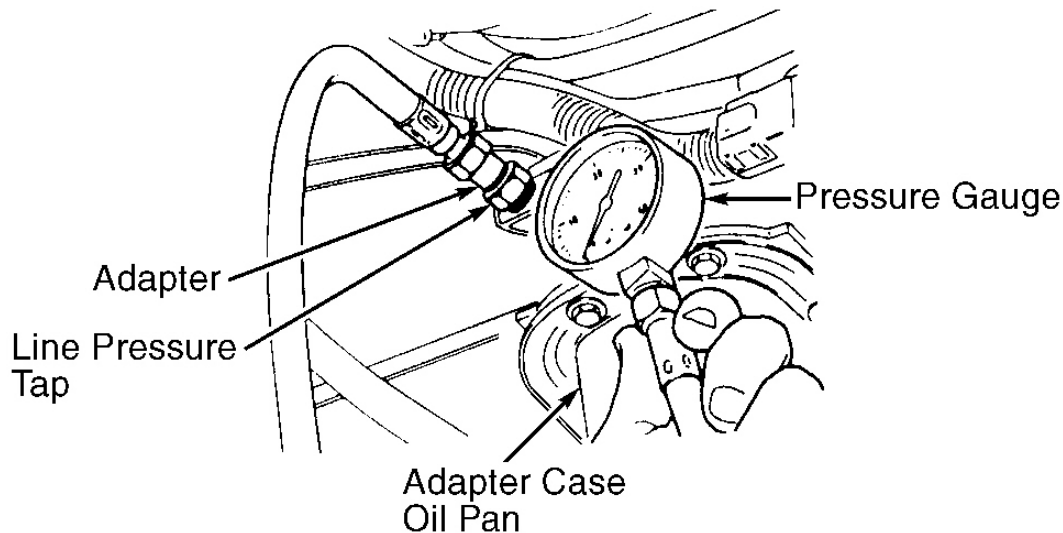
Line Pressure Test

1. With engine off, remove pressure tap plug from line pressure tap, located near torque converter housing on driver's side of transmission case, just above adapter case oil pan. See **Fig. 3**.
2. Install oil pressure gauge on line pressure tap. Start engine and allow it to idle.
3. Line pressure is checked in each transmission shift mode with engine idling and at torque converter stall speed with gearshift lever in specified position. Shift mode may be selected by "S" or "M" mode switch mounted on center console, near gearshift lever. When neither Sport or Manual mode are selected, transmission will remain in normal mode.
4. With engine idling, place gearshift lever in specified position and note line pressure. See **LINE PRESSURE SPECIFICATIONS**. Line pressure should be within specification.
5. To check line pressure at torque converter stall speed, fully depress brake pedal. Place gearshift lever in "D" position and in proper shift mode. Fully depress accelerator no more than 5 seconds and note line pressure reading.

**CAUTION: DO NOT perform line pressure test for more than 5 seconds at torque converter stall speed or transmission may be damaged.
Transmission must be cooled between pressure tests by placing**

gearshift lever in "N" position and operating engine at 1200 RPM for at least one minute.

6. Place gearshift lever in "N" position. Operate engine at 1200 RPM for at least one minute to cool transmission. Repeat line pressure test procedure at torque converter stall speed with gearshift lever in "3", "2", "L" and "R" positions in proper shift mode.
7. Line pressure should be within specification. See **LINE PRESSURE SPECIFICATION** . If line pressure is not within specification, see **LINE PRESSURE TEST** . Turn engine off.
8. Remove pressure gauge and adapter. Apply Loctite 242 on threads of pressure tap plug. Install and tighten pressure tap plug to specification. See **TORQUE SPECIFICATIONS** .



G95G20582

Fig. 3: Checking Line Pressure
Courtesy of ISUZU MOTOR CO.

LINE PRESSURE SPECIFICATIONS

Engine RPM	Shift Lever Position	Line Pressure psi (kPa)
1500	"P" Or "N"	139-152 (958-1048)
1500	"R"	187-202 (1289-1393)

LINE PRESSURE TEST

Application	Probable Cause
High Line Pressure ⁽¹⁾	Defective Throttle Position (TP) Sensor, Force Motor Solenoid Plunger Stuck, Defective Force Motor Solenoid Or Wiring Circuit, Stuck Feed Limit Valve In Adapter Case Valve Body, Loose Torque Converter Housing Bolts, Stuck Pressure Regulator Valve Or Boost Valve In Oil

	Pump, Missing Check Balls In Valve Bodies, Defective Seals Or Gaskets
Low Line Pressure	Low Fluid Level, Defective Throttle Position (TP) Sensor, Restricted Or Damaged Oil Filter, Force Motor Solenoid Plunger Stuck, Stuck Feed Limit Valve In Adapter Case Valve Body, Loose Torque Converter Housing Bolts, Stuck Pressure Regulator Valve Or Boost Valve In Oil Pump, Restricted Pressure Regulator Valve Oil Passages, Defective Oil Pump, Missing Check Balls In Valve Bodies, Defective Seals Or Gaskets
(1) When transmission is in emergency running mode, maximum line pressure will be obtained.	

REMOVAL & INSTALLATION

TRANSMISSION

See **REMOVAL & INSTALLATION - A4S 270R/310R** article.

TRANSMISSION DISASSEMBLY

VALVE BODIES & INTERNAL COMPONENTS

Disassembly

1. Remove torque converter. Remove "O" ring from end of turbine shaft.
2. Remove screws, cover and mode switch and wiring harness. See **Fig. 4** . Remove bolts, adapter case oil pan and gasket.
3. Disconnect electrical connectors at solenoids on adapter case valve body. Note location of adapter case valve body bolts for reassembly reference. Remove bolts, adapter case valve body, transfer plate and transfer plate gaskets.
4. Remove wiring harness for solenoids on adapter case valve body. Remove bolts, main case oil pan, magnet and gasket. Remove bolts and oil filter.
5. Remove bolts and manual detent. Disconnect wiring harness at solenoids on main valve body and the case 4-pin connector. Remove 4-pin connector.
6. Remove bolts, servo cover and gasket. Position transmission case with main valve body facing upward. Note location of main valve body bolts for reassembly reference. Note position of manual valve link, as long end fits into manual valve and short end fits into range selector.
7. Remove bolts, main valve body with manual valve link, transfer plate gaskets and transfer plate. Note location of 2 check balls in transmission case. See **Fig. 5** . Remove check balls from transmission case.

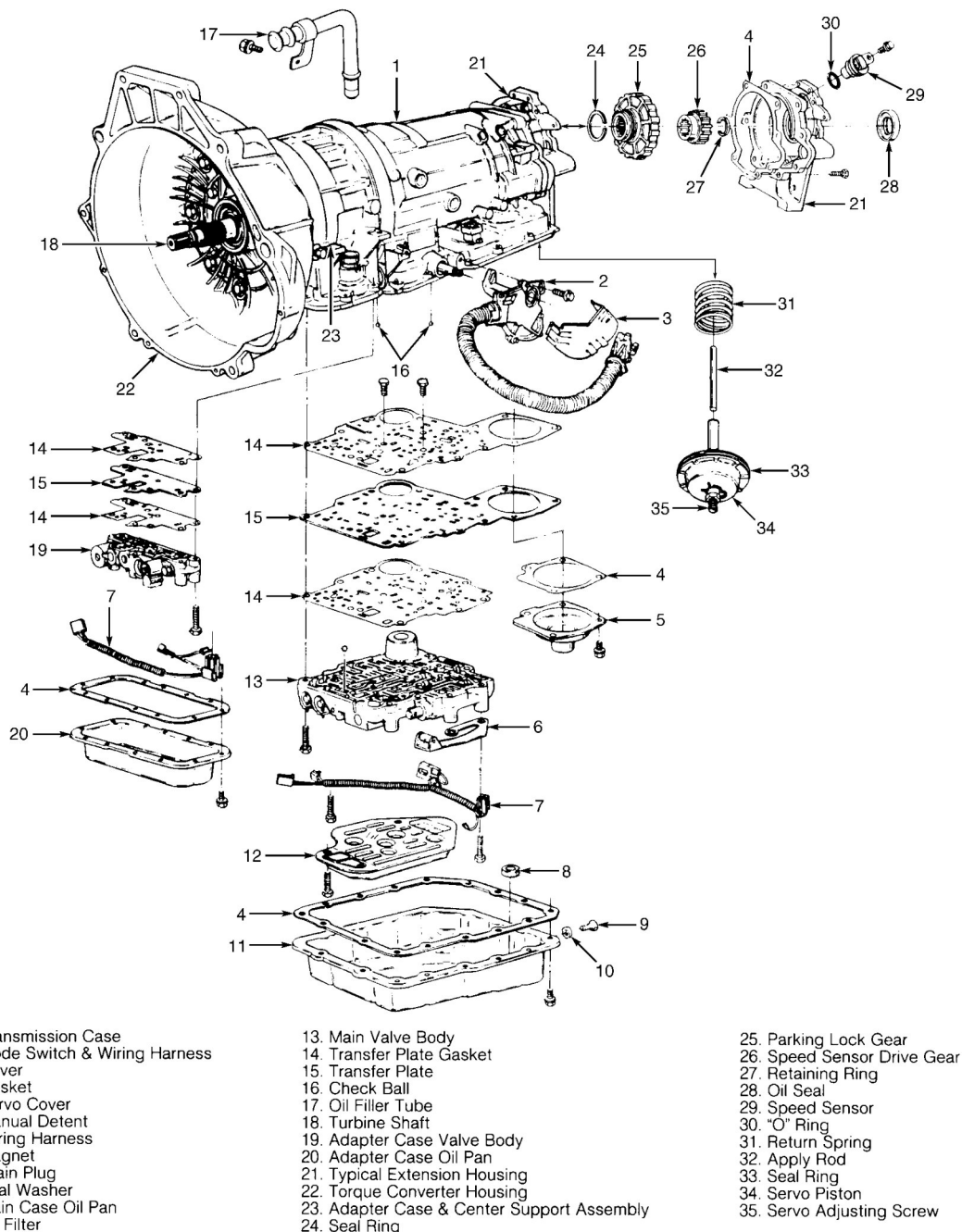


Fig. 4: Exploded View Of Transmission Case & Components
Courtesy of ISUZU MOTOR CO.

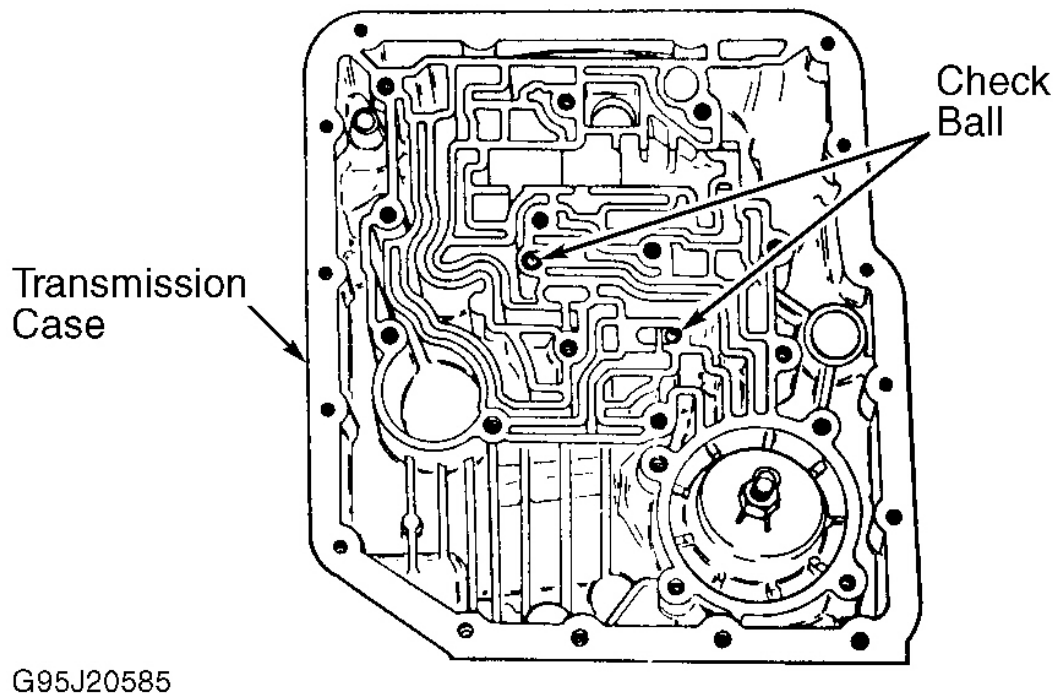


Fig. 5: Identifying Check Ball Locations In Transmission Case
 Courtesy of ISUZU MOTOR CO.

8. Using spring compressor, compress servo piston and return spring. Remove servo piston retaining snap ring. Slowly release spring compressor. Remove spring compressor, servo piston, apply rod and return spring. See **Fig. 4**.
9. Remove bolt and speed sensor with "O" ring from extension housing. Remove drive shaft companion flange nut, drive shaft companion flange and "O" ring from rear of transmission. Remove bolts, extension housing and gasket from transmission case.
10. Remove retaining ring, speed sensor drive gear and parking lock gear with seal ring from output shaft. Position transmission case in vertical position with torque converter housing facing upward.
11. If removing oil pump assembly from torque converter housing, loosen but DO NOT remove the 5 inner bolts on torque converter housing. These are the oil pump assembly-to-torque converter housing bolts.
12. On all applications, remove torque converter housing-to-adapter case bolts. These are the 7 outer bolts. Remove torque converter housing, outer seal ring, oil pump, gasket and selective thrust washer.
13. Remove 4th clutch retainer from turbine shaft. See **Fig. 6**. Pull upward on turbine shaft and lift overrun clutch assembly and 4th clutch plates and clutch discs from transmission case. Remove thrust bearing, overdrive internal gear and thrust washer.
14. Remove adapter case and center support assembly with 4th clutch piston. See **Fig. 7**. Remove seal ring, selective thrust washer and "O" rings from transmission case.
15. Using spring compressor, compress 4th clutch retainer and spring assembly. Remove snap ring from adapter case. Remove spring compressor, snap ring and 4th clutch retainer and spring assembly.

16. To remove 4th clutch piston from adapter case, hold adapter case and pull 4th clutch piston from adapter case. Remove converter housing-to-main case bolts.
17. While holding intermediate shaft, twist and pull out 2nd and 3rd clutch assemblies with reverse clutch plates and clutch discs from transmission case while holding onto output shaft. See **Fig. 7** . Separate 2nd and 3rd clutch assemblies. Remove thrust washer, reverse clutch plates and pressure plate.
18. Remove bearing, washer, planetary carrier and thrust bearing assembly from transmission case. See **Fig. 7** . Remove reaction sun gear, needle bearing, brake drum, brake band and thrust bearing assembly.
19. For reassembly reference, measure height of spring pin in relation to transmission case. Spring pin retains selector shaft in transmission case. See **Fig. 8** .
20. Insert wire into center of spring pin to prevent spring pin from collapsing during removal. Protect machined surface of transmission case. Remove spring pin.
21. Remove selector shaft nut from end of selector shaft. Remove parking lock and range selector lever with actuator rod from selector shaft. Remove selector shaft.

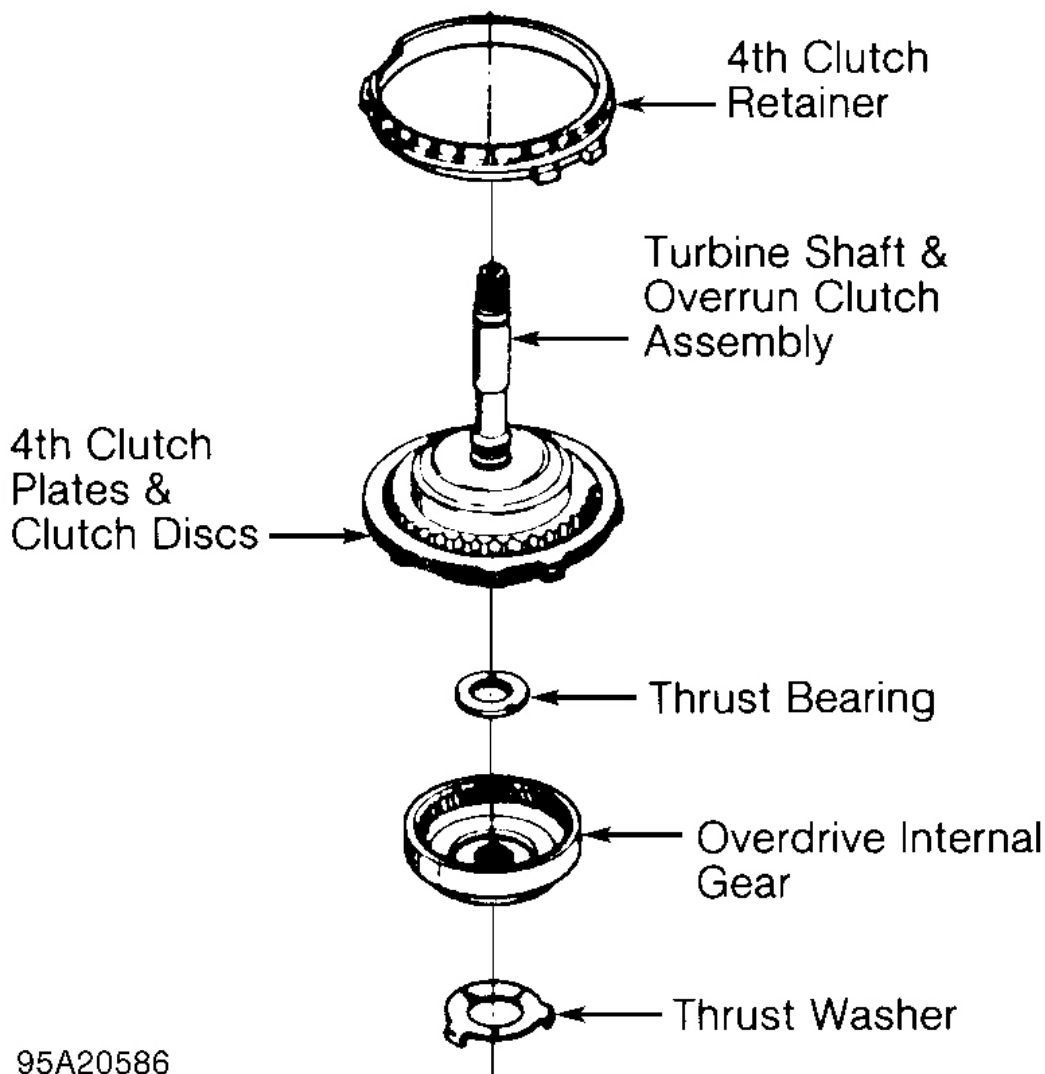
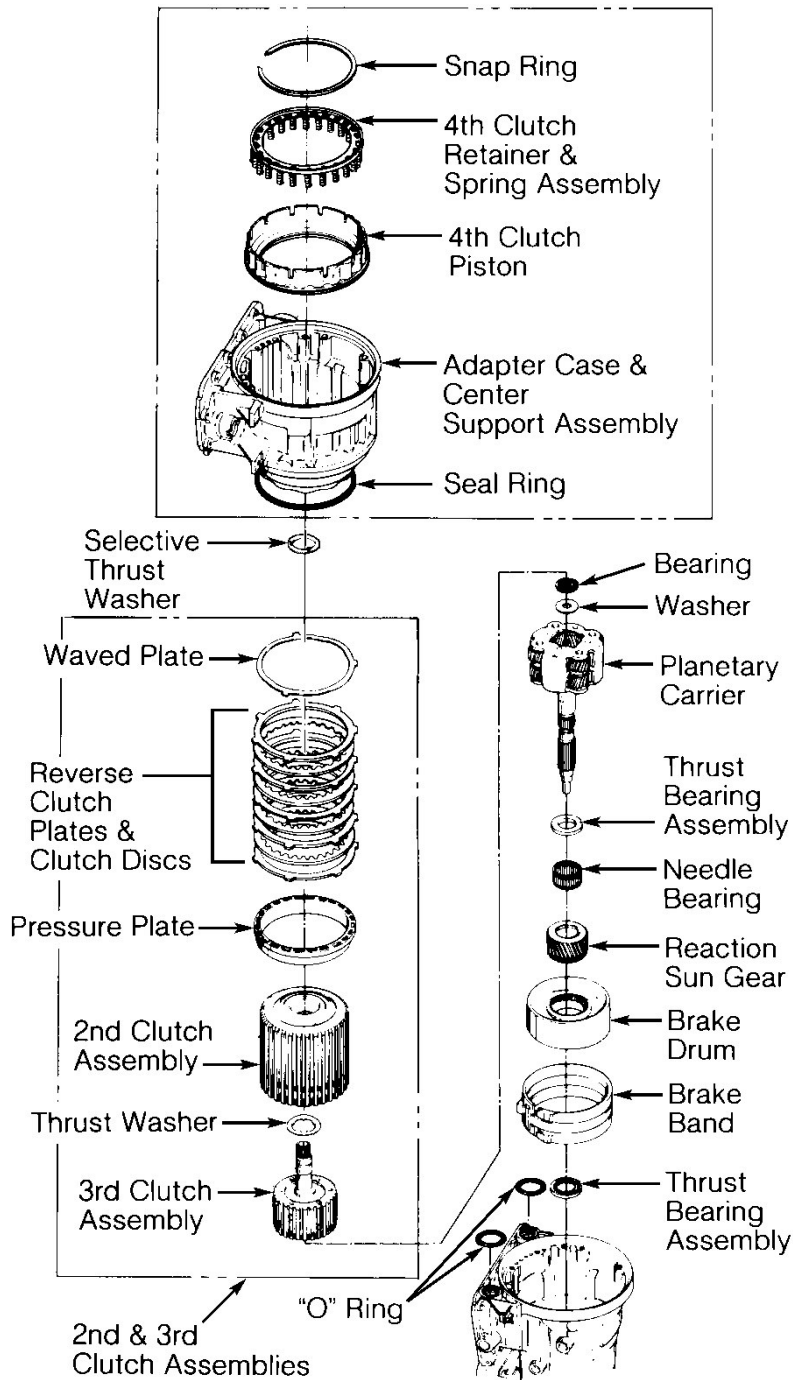
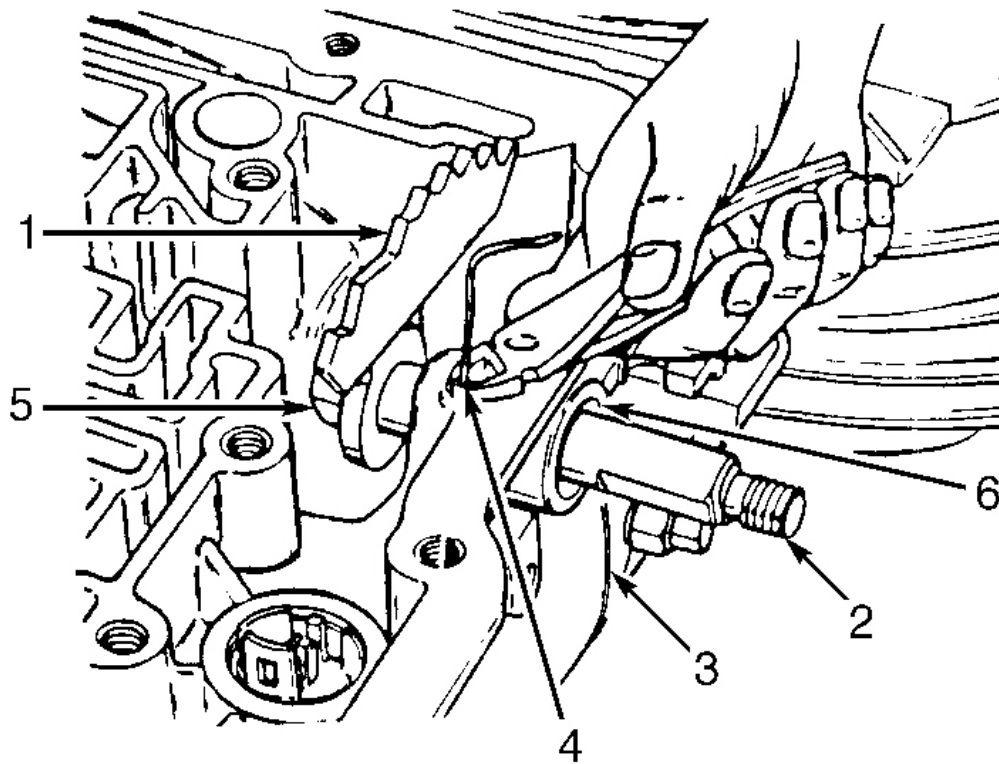


Fig. 6: Removing & Installing 4th Clutch Retainer, Turbine Shaft, Overrun Clutch Housing, 4th Clutch Plates, Overdrive Internal Gear, Thrust Bearing & Thrust Washer
Courtesy of ISUZU MOTOR CO.



95B20587

Fig. 7: Removing & Installing Adapter Case, 2nd & 3rd Clutch Assemblies, Planetary Carrier & Components
 Courtesy of ISUZU MOTOR CO.



- | | |
|---|-----------------------|
| 1. Parking Lock & Range
Selector Lever | 4. Spring Pin |
| 2. Selector Shaft | 5. Selector Shaft Nut |
| 3. Transmission Case | 6. Shaft Seal |

G95C20588

Fig. 8: Identifying Spring Pin, Selector Shaft, Parking Lock & Range Selector Lever
Courtesy of ISUZU MOTOR CO.

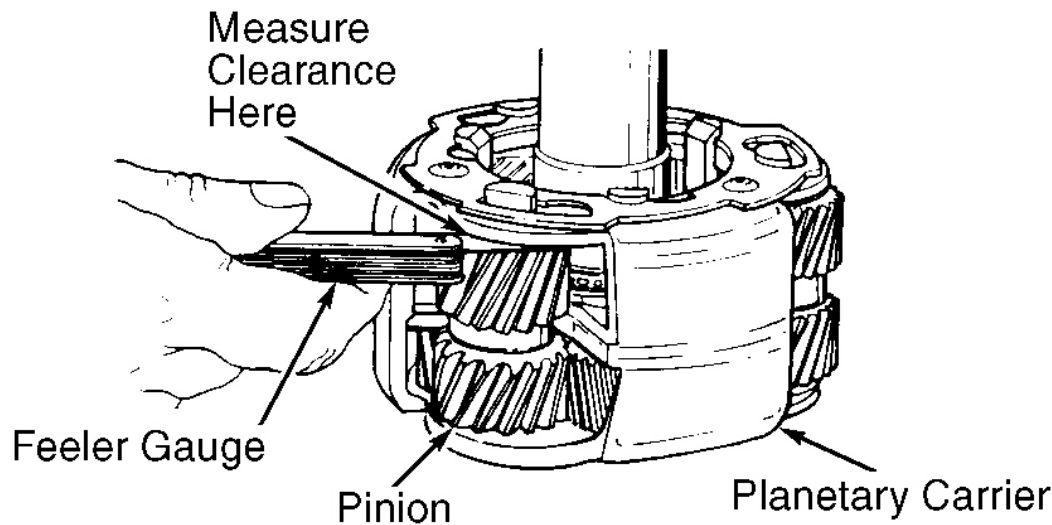
COMPONENT DISASSEMBLY & REASSEMBLY

PLANETARY CARRIER

Cleaning & Inspection

1. Clean components with solvent and dry with compressed air. Inspect all gears and shafts for chipped gears, excessive wear and damage. Replace components as necessary.
2. Using feeler gauge, measure planetary carrier pinion end clearance. See **Fig. 9** . Planetary carrier pinion end clearance should be .005-.035" (.13-.89 mm). Replace planetary carrier if pinion end clearance is not

within specification.



G95D20589

Fig. 9: Measuring Planetary Carrier Pinion End Clearance
Courtesy of ISUZU MOTOR CO.

TORQUE CONVERTER HOUSING & OIL PUMP ASSEMBLY

Disassembly

1. Remove oil pump assembly-to-torque converter housing bolts from center of torque converter housing. Remove torque converter housing, outer seal ring and wear plate from oil pump assembly. See **Fig. 10**.
2. Remove bolts and oil seal ring from center of torque converter housing. If disassembling oil pump assembly, place reference marks on drive and driven gears for reassembly reference to ensure gears are installed in original direction.
3. Remove components from oil pump assembly. See **Fig. 10**. Use care when removing pins and snap rings, as they are under spring pressure.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect for damage and excessive wear. Replace components as necessary. Replace oil seal, seal rings and gasket.

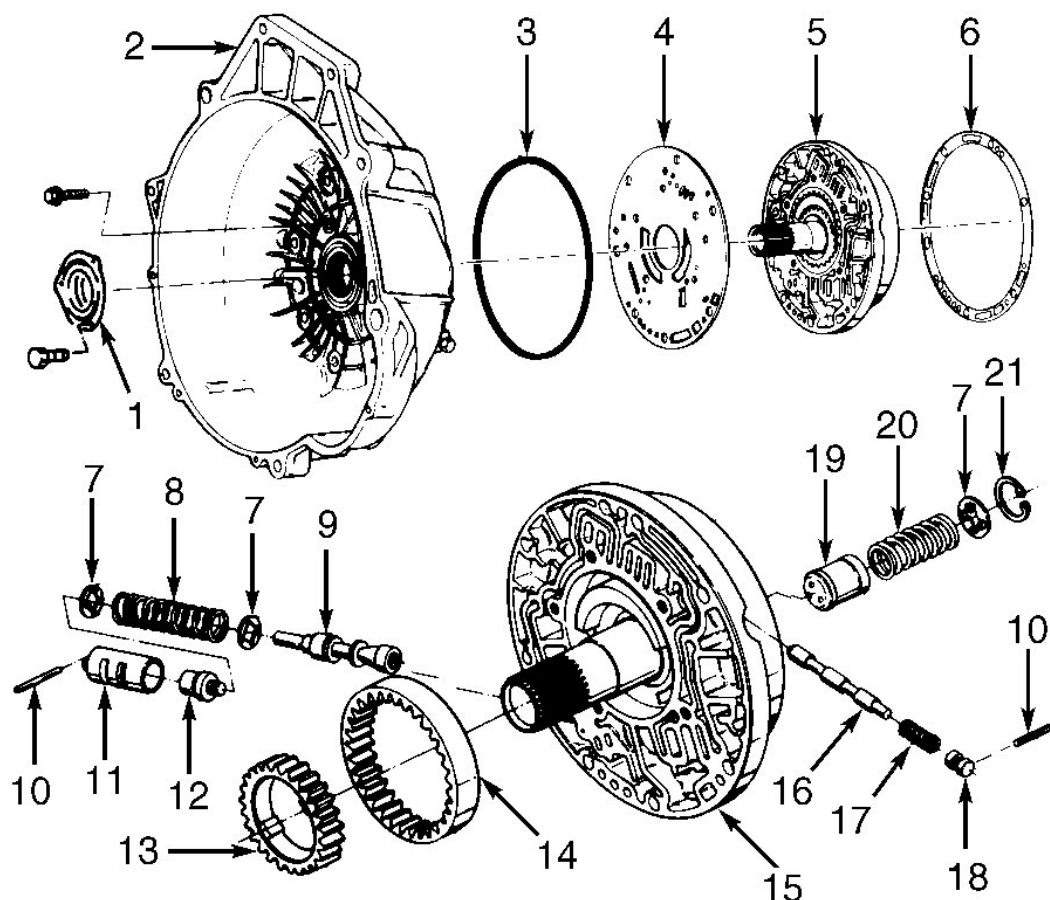
Reassembly

1. Lubricate all components with Dexron-III ATF. To reassemble oil pump assembly, reverse disassembly procedure.

2. Ensure spring seat is installed on pressure regulator valve with flat side of spring seat against shoulder on pressure regulator valve. Ensure spring seat is installed on throttle signal accumulator piston spring with flat side of spring seat away from the spring.

CAUTION: On oil pump assembly, spring seat must be installed on pressure regulator valve with flat side of spring seat against shoulder on pressure regulator valve. Spring seat must be installed on throttle signal accumulator piston spring with flat side of spring seat away from the spring. Ensure drive and driven gears are installed in original direction.

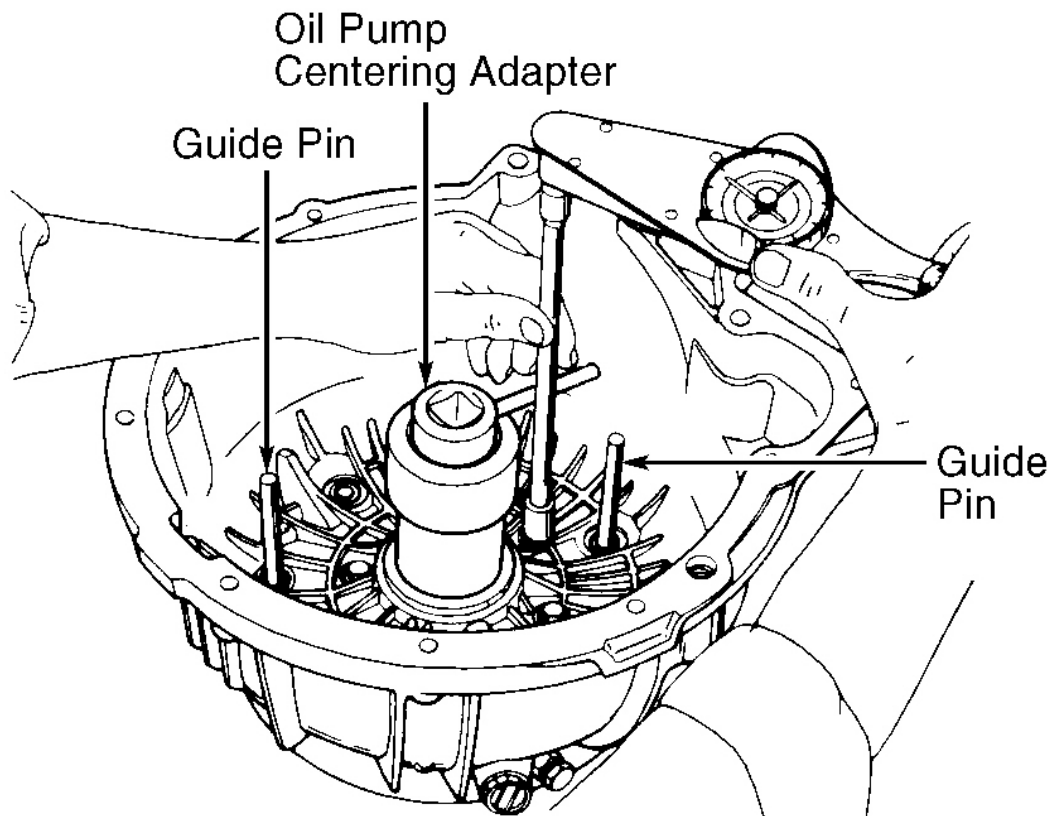
3. To reassemble torque converter housing, install NEW oil seal ring on torque converter housing. Install and tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
4. Install wear plate on oil pump assembly. Install NEW gasket and NEW outer seal ring. Install torque converter housing on oil pump assembly.
5. Install Guide Pins (J-38588) in torque converter housing and oil pump assembly. See **Fig. 11** . Loosely install oil pump assembly-to-torque converter housing bolts.
6. Using Oil Pump Centering Adapter (J-38557), center oil pump assembly on torque converter housing. Tighten oil pump assembly-to-torque converter housing bolts to specification in a crisscross pattern. Remove oil pump centering adapter and guide pins.



- | | |
|------------------------------------|--|
| 1. Oil Seal Ring | 12. Boost Valve |
| 2. Torque Converter Housing | 13. Drive Gear |
| 3. Outer Seal Ring | 14. Driven Gear |
| 4. Wear Plate | 15. Oil Pump Assembly |
| 5. Oil Pump Assembly | 16. Torque Converter Clutch (TCC) Control Valve |
| 6. Gasket | 17. Torque Converter Clutch (TCC) Control Valve Spring |
| 7. Spring Seat | 18. Plug |
| 8. Pressure Regulator Valve Spring | 19. Throttle Signal Accumulator Piston |
| 9. Pressure Regulator Valve | 20. Throttle Signal Accumulator Piston Spring |
| 10. Pin | 21. Snap Ring |
| 11. Sleeve | |

G95G20590

Fig. 10: Exploded View Of Torque Converter Housing & Oil Pump Assembly
Courtesy of ISUZU MOTOR CO.



G95H20591

Fig. 11: Installing Torque Converter Housing On Oil Pump Assembly
Courtesy of ISUZU MOTOR CO.

MAIN VALVE BODY

CAUTION: When disassembling main valve body, place components in order and mark spring locations for reassembly reference. DO NOT use force to remove components from main valve body. Remove solenoids by pulling on metal tip. DO NOT pull on electrical connector housing on solenoid.

Disassembly

1. Remove transfer plate-to-main valve body bolts. Remove transfer plate gaskets and transfer plate from main valve body. Note location of check ball in main valve body. See **Fig. 12**.
2. Remove components from main valve body. Use care when removing pins and plugs, as components are

under spring tension.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required. Ensure valves slide freely in bores on main valve body.

Reassembly

1. Lubricate all components with Dexron-III ATF. To reassemble, reverse disassembly procedure using NEW transfer plate gaskets. Ensure components are installed in correct location. See **Fig. 12**.
2. Use guide pins in main valve body when installing transfer plate gaskets and transfer plate on main valve body. Install and tighten transfer plate-to-main valve body bolts to specification. See **TORQUE SPECIFICATIONS**.

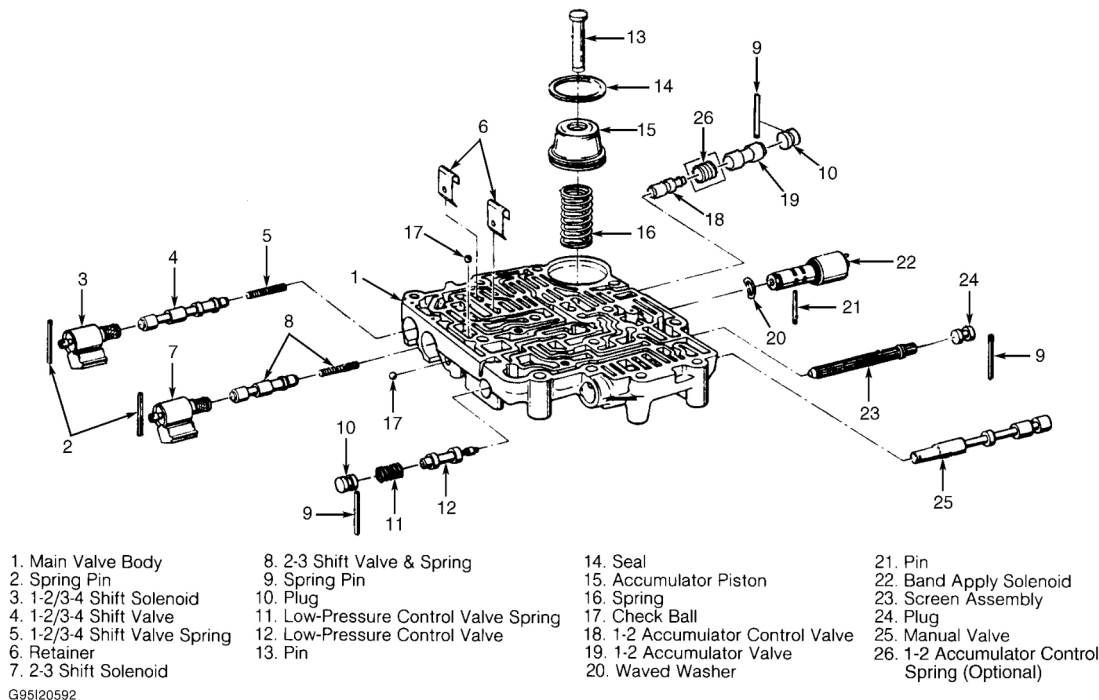


Fig. 12: Exploded View Of Main Valve Body
Courtesy of ISUZU MOTOR CO.

ADAPTER CASE VALVE BODY

CAUTION: When disassembling adapter case valve body, place components in order, and mark spring locations for reassembly reference. DO NOT use force to remove components from adapter case valve body.

Disassembly

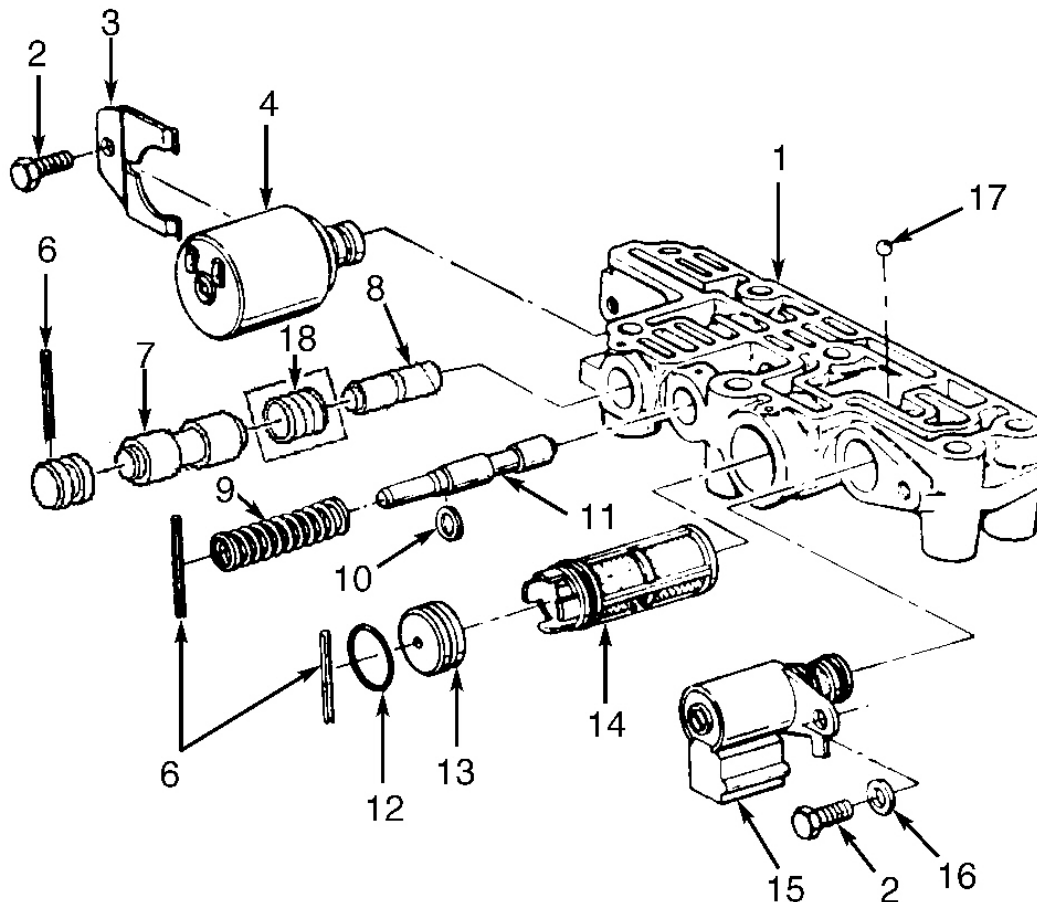
1. Remove components from adapter case valve body. See **Fig. 13** .
2. Use care when removing spring pins and plugs, as components are under spring tension. When removing plug for screen assembly, screw a 5-mm bolt in center of plug to aid in plug removal.

Cleaning & Inspection

Clean components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required. Ensure valves slide freely in bores on adapter case valve body.

Reassembly

1. Lubricate all components with Dexron-III ATF. To reassemble, reverse disassembly procedure using NEW "O" rings.
2. Ensure force motor solenoid is positioned with electrical connections on solenoid facing toward mounting surface on adapter case valve body. Tighten force motor solenoid and torque converter clutch solenoid retaining bolts to specification. See **TORQUE SPECIFICATIONS** .



- | | |
|----------------------------------|---|
| 1. Adapter Case Valve Body | 11. Feed Limit Valve |
| 2. Bolt | 12. "O" Ring |
| 3. Retainer | 13. Plug |
| 4. Force Motor Solenoid | 14. Screen Assembly |
| 5. Plug | 15. Torque Converter Clutch (TCC) Solenoid |
| 6. Spring Pin | 16. Washer |
| 7. 3-4 Accumulator Valve | 17. Check Ball |
| 8. 3-4 Accumulator Control Valve | 18. 3-4 Accumulator Valve Spring (Optional) |
| 9. Feed Limit Valve Spring | |
| 10. Retaining Ring | |

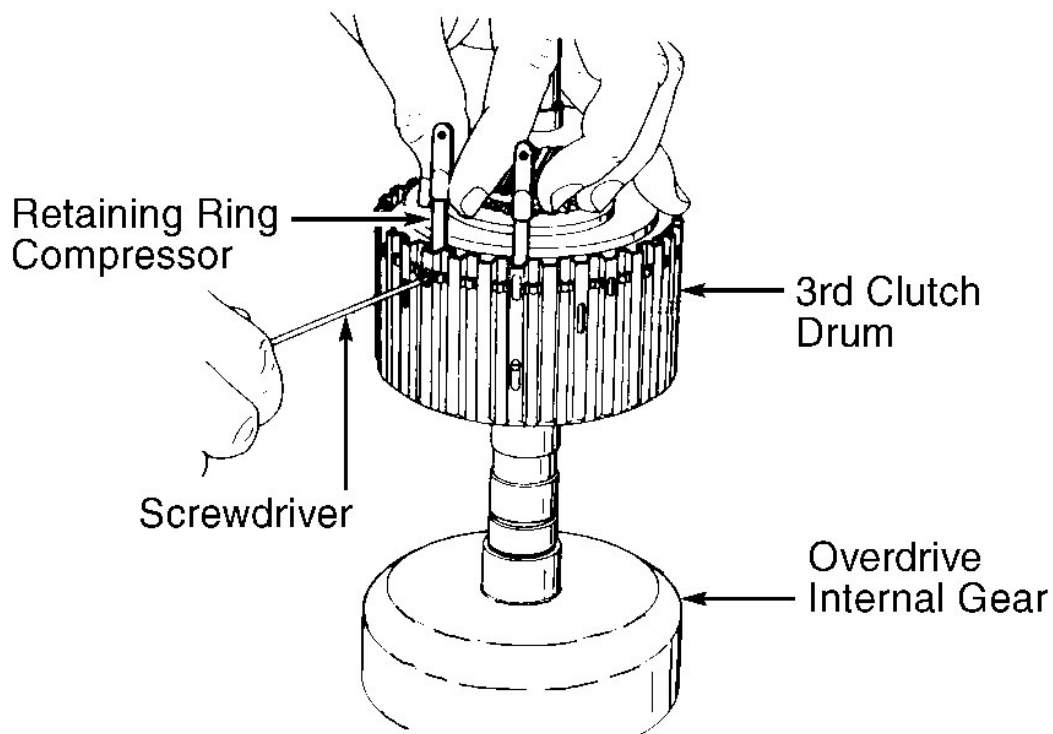
G95J20593

Fig. 13: Exploded View Of Adapter Case Valve Body
Courtesy of ISUZU MOTOR CO.

3RD CLUTCH & SPRAG ASSEMBLY

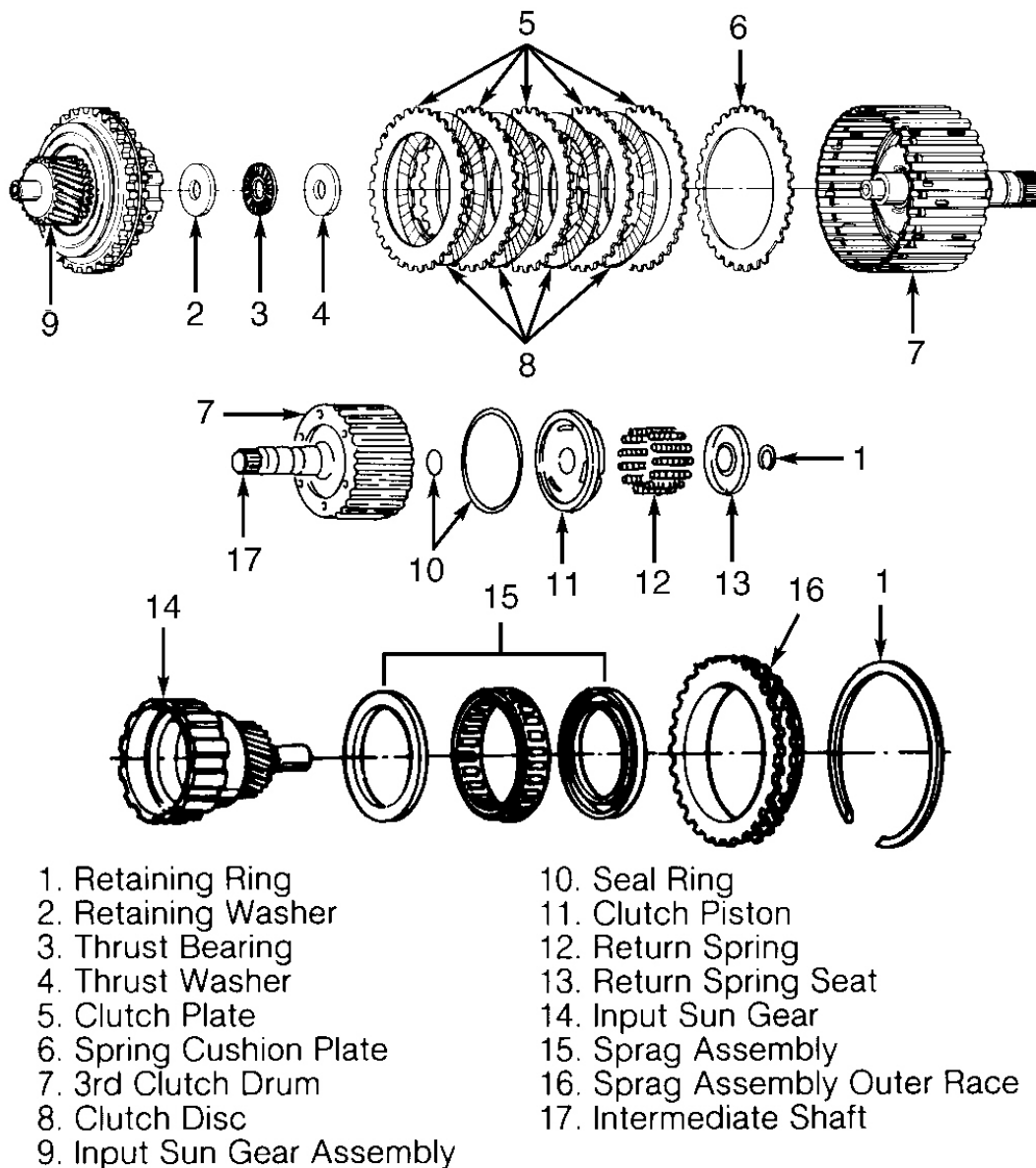
Disassembly

1. Place 3rd clutch drum and intermediate shaft upright, using overdrive internal gear as a support. See **Fig. 14**.
2. Locate end of retaining ring at opening on side of 3rd clutch drum. Using screwdriver, compress one end of retaining ring and install one Retaining Ring Compressor (J-38450) near end of retaining ring to hold retaining ring clear of groove in 3rd clutch drum. See **Fig. 14**.
3. Compress other end of retaining ring and install retaining ring compressor near end of retaining ring. Repeat procedure by installing 3 remaining retaining ring compressors at equal intervals between retaining ring and 3rd clutch drum. Ensure retaining ring is fully disengaged from 3rd clutch drum.
4. Pull upward on input sun gear assembly until retaining ring clears groove in 3rd clutch drum. Remove retaining ring compressors. Remove input sun gear assembly from 3rd clutch drum.
5. Remove retaining washer, thrust bearing and thrust washer from 3rd clutch drum. Remove clutch plates, clutch discs and spring cushion plate from 3rd clutch drum. Note direction of clutch plates, clutch discs and spring cushion plate installation for reassembly reference.
6. To remove clutch piston from 3rd clutch drum, using spring compressor, compress return springs and return spring seat. DO NOT over compress return springs and return spring seat.
7. Remove retaining ring from center of 3rd clutch drum. Release spring compressor. DO NOT allow return spring seat to bind in groove for retaining ring.
8. Remove spring compressor, return spring seat and return springs. Remove clutch piston from 3rd clutch drum. Remove seal rings from clutch piston.
9. To remove sprag assembly from input sun gear, remove sprag assembly outer race. See **Fig. 15**. Note direction of sprag assembly installation on input sun gear for reassembly reference. Remove sprag assembly from input sun gear.



G95B20595

Fig. 14: Removing & Installing Input Sun Gear Assembly
Courtesy of ISUZU MOTOR CO.



95A20594

Fig. 15: Exploded View Of 3rd Clutch & Sprag Assembly
Courtesy of ISUZU MOTOR CO.

Cleaning & Inspection

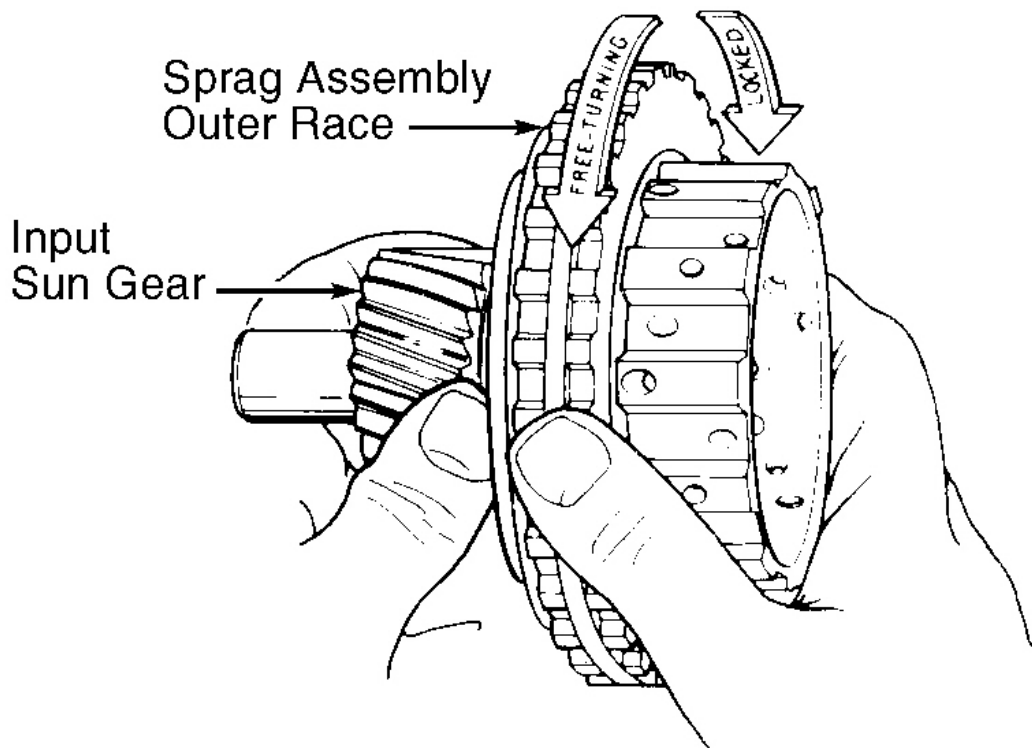
1. Clean metal components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required.
2. Ensure check ball is located in clutch piston. Shake clutch piston to ensure check ball moves freely in clutch piston.

Reassembly

CAUTION: Sprag assembly must be installed on input sun gear so flared shoulder on sprag assembly is toward input sun gear.

1. Lubricate all components with Dexron-III ATF. Place input sun gear on flat surface with sun gear facing upward.
2. Install sprag assembly outer race on sprag assembly. Install sprag assembly with sprag assembly outer race on input sun gear with flared shoulder on sprag assembly toward input sun gear. Push downward on sprag assembly while rotating input sun gear counterclockwise until sprag assembly seats on input sun gear.
3. To check sprag assembly operation, hold input sun gear. Rotate sprag assembly outer race. Sprag assembly outer race should rotate freely counterclockwise and lock when rotated clockwise. See **Fig. 16** . If sprag assembly operation is not as specified, sprag assembly is incorrectly installed on input sun gear.

CAUTION: Ensure sprag assembly outer race rotates freely counterclockwise and locks when rotated clockwise. See Fig. 16 .



NOTE: Sprag assembly should rotate freely counterclockwise & lock when rotated clockwise.

G95C20596

Fig. 16: Checking Sprag Assembly Operation
Courtesy of ISUZU MOTOR CO.

4. Install NEW seal rings on clutch piston so lip on seal ring faces toward shaft end of 3rd clutch drum (toward front of transmission). Lubricate seal rings with Dexron-III ATF.
5. Install clutch piston in 3rd clutch drum. Use care not to damage seal rings. Install return springs and return spring seat.
6. Using spring compressor, compress return springs and return spring seat. Use care to not allow return spring seat to bind in groove for retaining ring or over compress return springs and return spring seat.
7. Install retaining ring at center of 3rd clutch drum. Remove spring compressor. Place 3rd clutch drum and intermediate shaft upright, using overdrive internal gear as a support.

CAUTION: Spring cushion plate must be installed in 3rd clutch drum so beveled side of spring cushion plate is toward 3rd clutch drum. See [Fig. 15](#) .

8. Install spring cushion plate in 3rd clutch drum with beveled side of spring cushion plate toward 3rd clutch drum. See **Fig. 15**.
9. Install clutch plates and clutch discs in 3rd clutch drum, starting with clutch plate and alternating with clutch disc.
10. Install thrust washer, thrust bearing and retaining washer on 3rd clutch drum. Install input sun gear assembly on 3rd clutch assembly.
11. Ensure splines on sprag assembly fully engages with tangs on clutch discs. Rotate input sun gear assembly back and forth to ensure sprag assembly outer race engages with 3rd clutch drum.
12. Install retaining ring compressors at each side of retaining ring. Using screwdriver, compress retaining ring while pushing downward on sprag assembly outer race until retaining ring aligns with groove on 3rd clutch drum.
13. Remove retaining ring compressors. Ensure retaining ring fully engages in groove in 3rd clutch drum.

2ND CLUTCH

Disassembly

1. Remove retaining ring, ring gear, retaining ring and spacer from 2nd clutch drum. See **Fig. 17**.
2. Remove clutch plates, clutch discs and waved plate from 2nd clutch drum. Note direction of clutch plates, clutch discs and waved plate installation for reassembly reference.
3. To remove clutch piston from 2nd clutch drum, using spring compressor, compress return springs and return spring seat. Remove retaining ring from center of 2nd clutch drum.
4. Release spring compressor. DO NOT allow return spring seat to bind in groove for retaining ring. Remove spring compressor, return spring seat and return springs.
5. Remove clutch piston from 2nd clutch drum. Remove seal rings from clutch piston.

Cleaning & Inspection

1. Clean metal components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required.
2. Ensure check ball is located in clutch piston. Shake clutch piston to ensure check ball moves freely in clutch piston.

Reassembly

1. Lubricate all components with Dexron-III ATF. Install NEW seal rings on clutch piston so lip on seal ring faces toward inside of 2nd clutch drum (toward front of transmission).
2. Install clutch piston in 2nd clutch drum. Use care not to damage seal rings. Install return springs and return spring seat.
3. Using spring compressor, compress return springs and return spring seat. Ensure return spring seat does not bind in retaining ring groove.
4. Install retaining ring at center of 2nd clutch drum. Remove spring compressor. Install waved plate in 2nd clutch drum. Ensure waved plate is installed in original direction.
5. Install clutch plates and clutch discs in 2nd clutch drum, starting with clutch plate and alternating with

clutch disc. See **Fig. 17**.

6. Install spacer with proper end of spacer facing clutch plate. See **Fig. 17**. Install retaining ring, ring gear and remaining retaining ring.

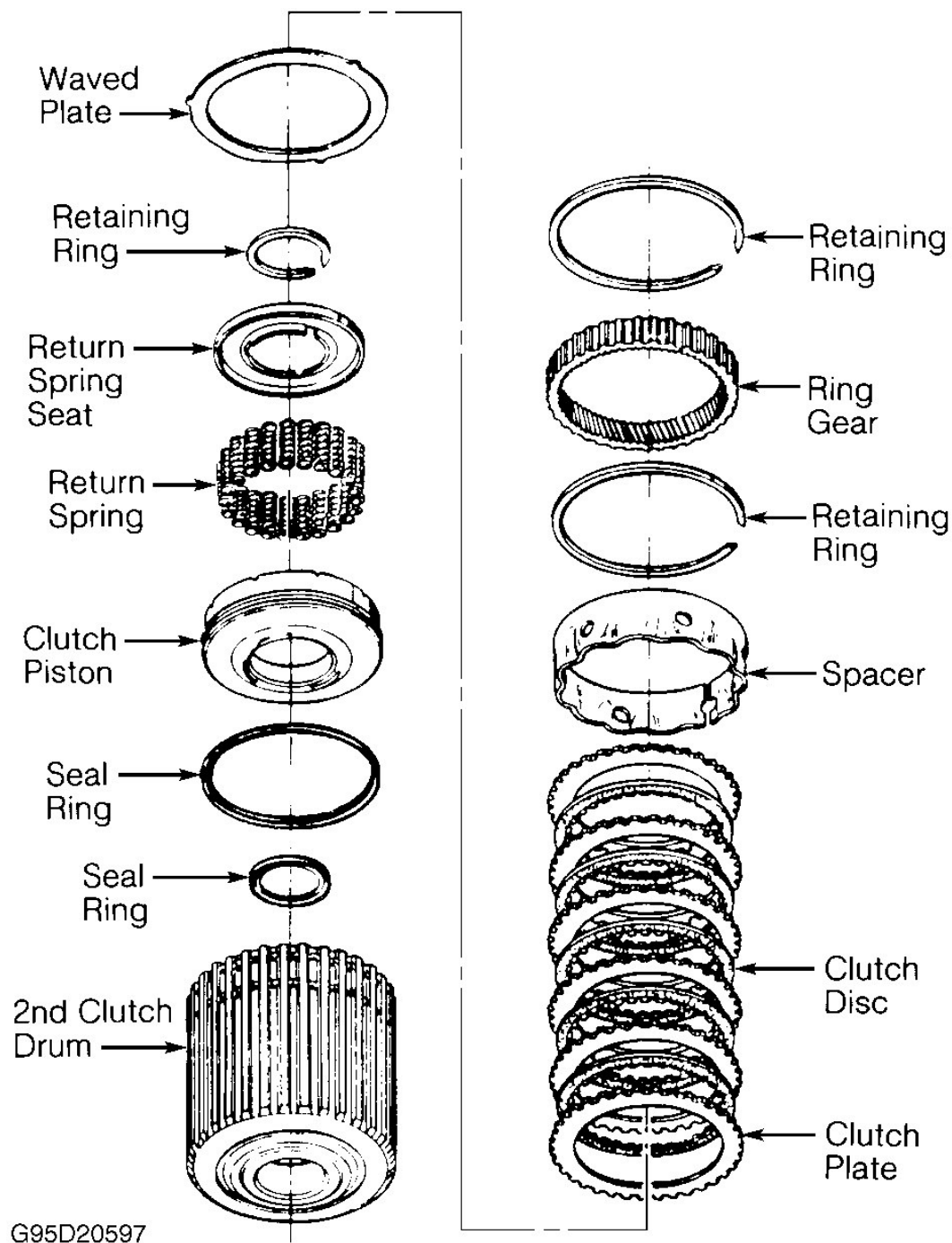


Fig. 17: Exploded View Of 2nd Clutch
 Courtesy of ISUZU MOTOR CO.

3-4 ACCUMULATOR

Disassembly

1. The 3-4 accumulator is located in adapter case. See **Fig. 18** . Using spring compressor, depress cover. Remove snap ring from adapter case. Remove spring compressor.
2. Using slide hammer screwed into the center of cover, pull cover from adapter case. Remove spring and 3-4 accumulator piston. Remove all seal rings.

Cleaning & Inspection

Clean metal components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required.

Reassembly

To reassemble, reverse disassembly procedure using NEW seal rings. Lubricate seal rings with Dexron-III ATF.

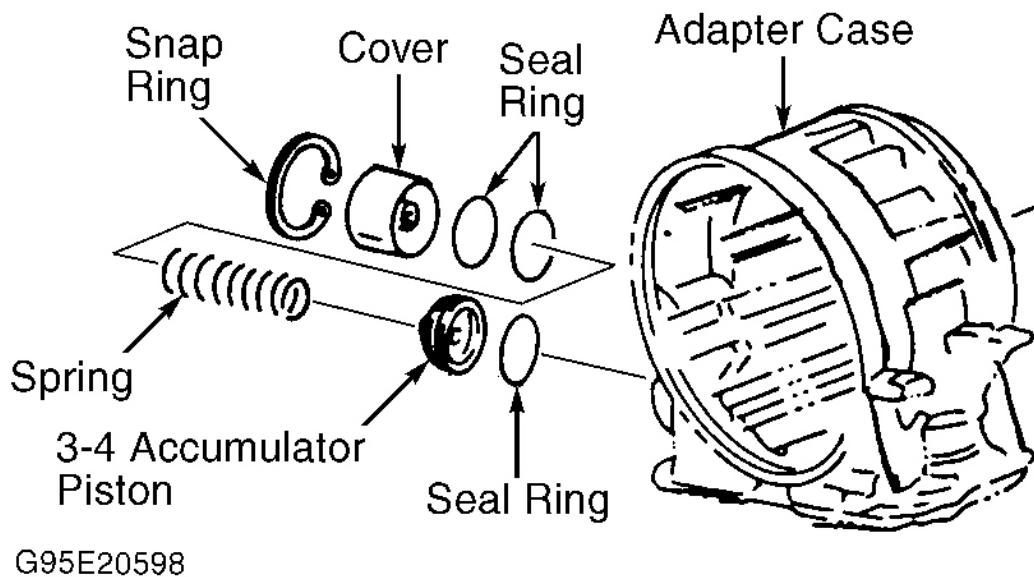


Fig. 18: Exploded View Of 3-4 Accumulator Piston
 Courtesy of ISUZU MOTOR CO.

REVERSE CLUTCH PISTON & CENTER SUPPORT

Disassembly

1. Using Spring Compressor (J-23327), compress return springs and return spring seat on center support. See **Fig. 19** . DO NOT over compress return springs and return spring seat or damage to return spring seat may result.
2. Remove retaining ring. Remove spring compressor, return spring seat and return springs. Remove rear clutch piston. See **Fig. 20** .
3. Remove bolts, center support, gasket, transfer plate and gasket from adapter case. See **Fig. 20** . Remove restrictor from adapter case. See **Fig. 21** .
4. Remove retainer plate from side of center support. See **Fig. 20** . Remove plug, overrun lock-out valve spring and overrun lock-out valve from center support.

Cleaning & Inspection

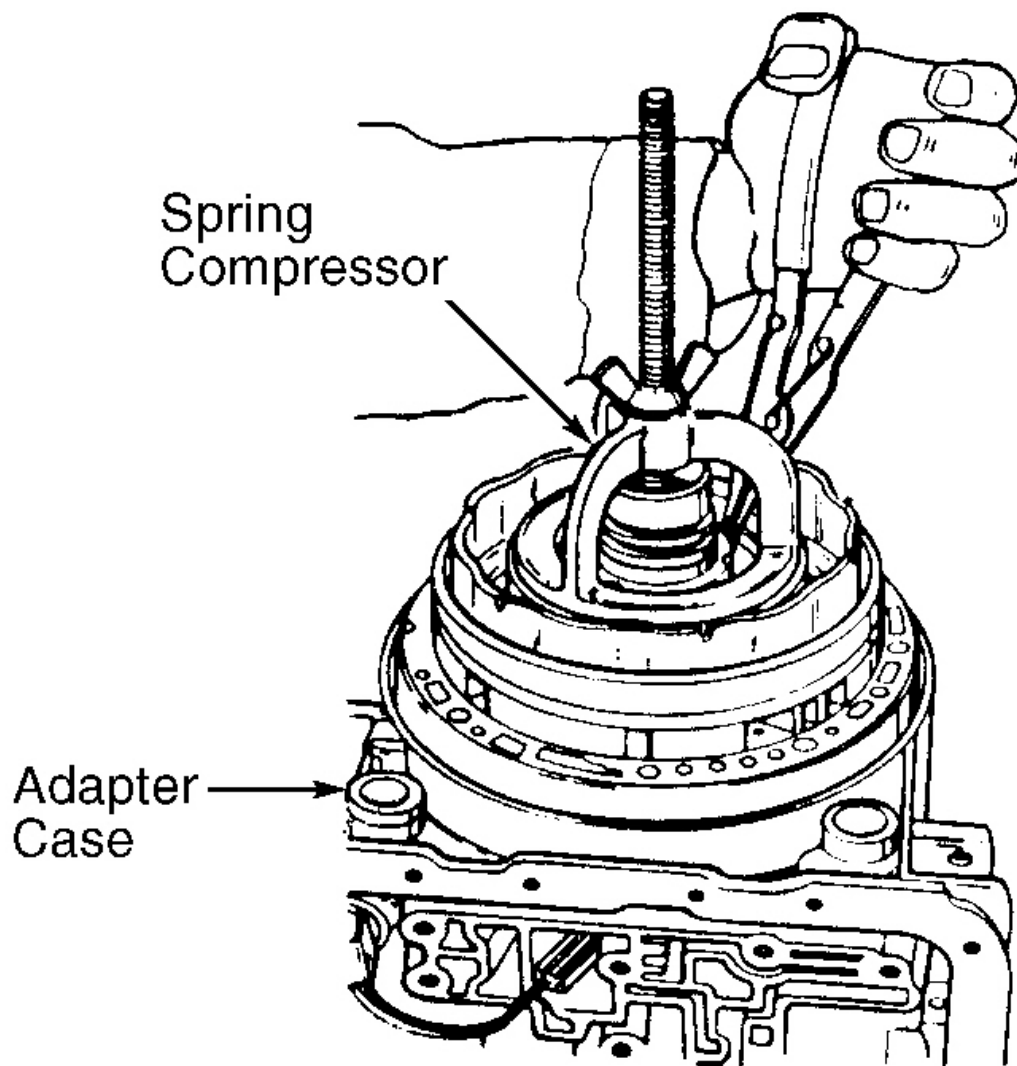
Clean components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required.

Reassembly

1. Lubricate all metal components with Dexron-III ATF. Install overrun lock-out valve in center support so small long diameter is toward the overrun lock-out valve spring area in center support. See **Fig. 20** . Install overrun lock-out valve spring.

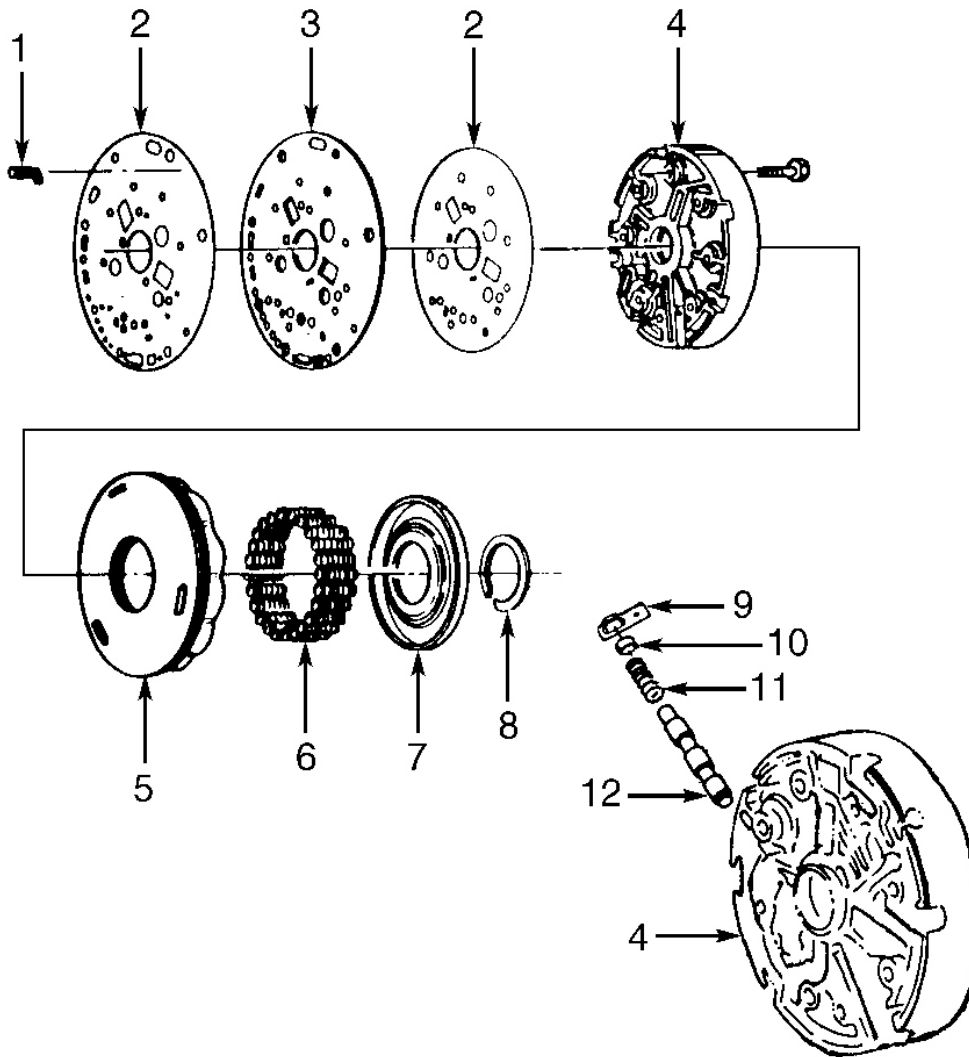
CAUTION: Ensure overrun lock-out valve is installed in center support with small long diameter toward overrun lock-out valve spring area in center support. See Fig. 20 .

2. Install plug and retainer plate on center support. Install restrictor in rear of adapter case. See **Fig. 21** .
3. Using NEW gaskets, install transfer plate and center support on adapter case. Install and tighten center support bolts to specification. See **TORQUE SPECIFICATIONS** .
4. Install reverse clutch piston on center support. Install return springs and return spring seat. Using spring compressor, compress return springs and return spring seat. Install retaining ring. Remove spring compressor.



G95F20599

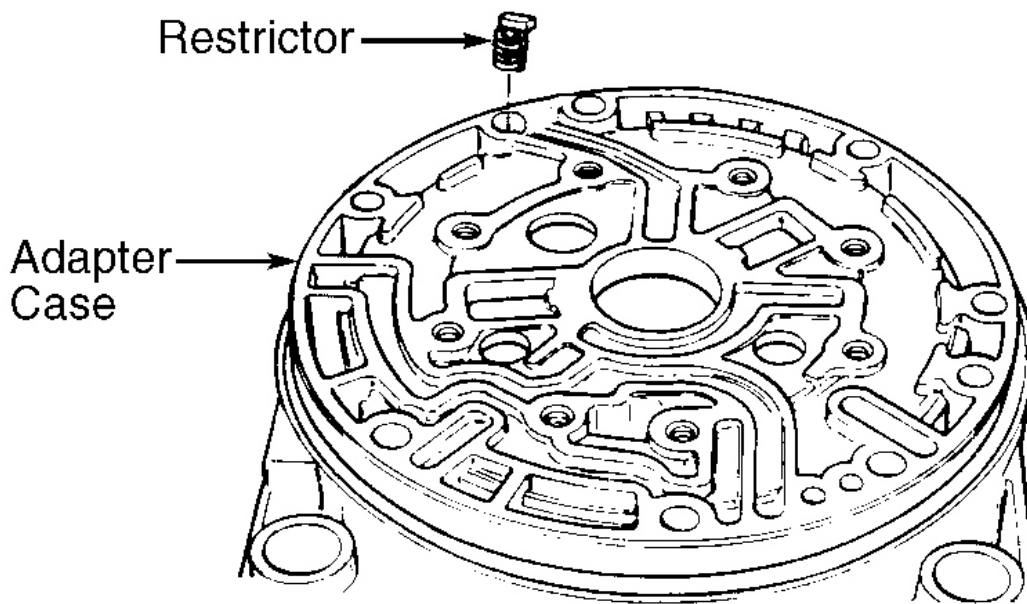
Fig. 19: Compressing Return Springs On Rear Clutch
Courtesy of ISUZU MOTOR CO.



- | | |
|--------------------------|-----------------------------------|
| 1. Restrictor | 7. Return Spring Seat |
| 2. Gasket | 8. Retaining Ring |
| 3. Transfer Plate | 9. Retainer Plate |
| 4. Center Support | 10. Plug |
| 5. Reverse Clutch Piston | 11. Overrun Lock-Out Valve Spring |
| 6. Return Spring | 12. Overrun Lock-Out Valve |

95I20600

Fig. 20: Exploded View Of Reverse Clutch Piston & Center Support
 Courtesy of ISUZU MOTOR CO.



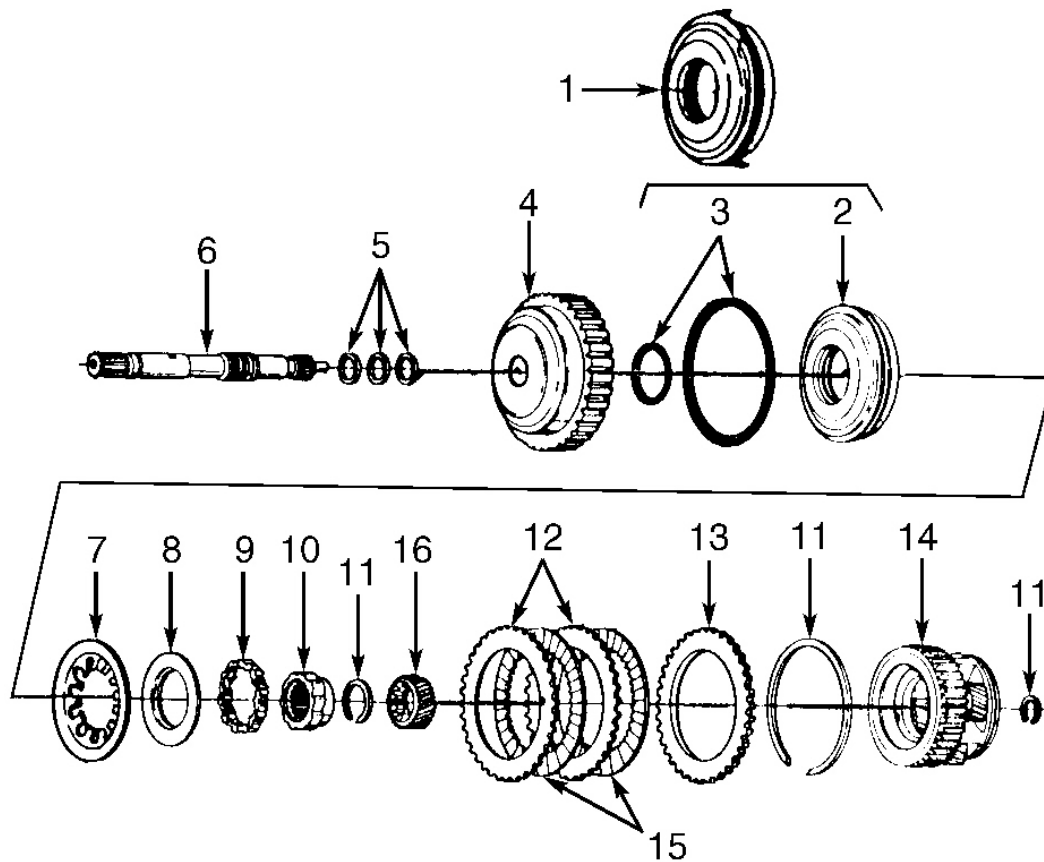
G95J20601

Fig. 21: Removing & Installing Restrictor In Adapter Case
Courtesy of ISUZU MOTOR CO.

TURBINE SHAFT & OVERRUN CLUTCH ASSEMBLY

Disassembly

1. Position overrun clutch assembly upright, using overdrive internal gear as a support. Remove snap ring and overdrive carrier assembly. See **Fig. 22**.
2. Remove sun gear and turbine shaft. Remove snap ring, backing plate, clutch discs and clutch plates. Note direction of clutch discs and clutch plate installation for reassembly reference.
3. Using spring compressor, compress release spring retainer and diaphragm spring. Remove snap ring from center of overrun clutch drum. Remove spring compressor.
4. Remove roller clutch cam, roller clutch, release spring retainer and diaphragm spring. Remove clutch piston from overrun clutch drum. Remove seal rings from clutch piston if seal rings are not molded onto clutch piston. Remove turbine shaft seal rings from turbine shaft.



- | | |
|--|--------------------------------|
| 1. Clutch Piston
(Optional Molded Type) | 9. Roller Clutch |
| 2. Clutch Piston | 10. Roller Clutch Cam |
| 3. Seal Ring | 11. Snap Ring |
| 4. Overrun Clutch Drum | 12. Clutch Plate |
| 5. Turbine Shaft Seal Ring | 13. Backing Plate |
| 6. Turbine Shaft | 14. Overdrive Carrier Assembly |
| 7. Diaphragm Spring | 15. Clutch Disc |
| 8. Release Spring Retainer | 16. Sun Gear |

95A20602

Fig. 22: Exploded View Of Turbine Shaft & Overrun Clutch Assembly
Courtesy of ISUZU MOTOR CO.

Cleaning & Inspection

1. Clean metal components with solvent and dry with compressed air. Inspect components for damage or signs of wear. Replace components as required.
2. Using feeler gauge, measure overdrive carrier assembly pinion end clearance. See **Fig. 23** . Overdrive

carrier assembly pinion end clearance should be .009-.025" (.25-.64 mm). Replace overdrive carrier assembly if pinion end clearance is not within specification.

Reassembly

1. Lubricate all metal components with Dexron-III ATF. Apply petroleum jelly on turbine shaft seal rings. Install turbine shaft seal rings on turbine shaft.
2. Install NEW seal rings on clutch piston if seal rings are not molded onto clutch piston. Install clutch piston in overrun clutch drum. Use care not to damage seal rings.

CAUTION: Diaphragm spring must be installed in proper direction in overrun clutch drum. See Fig. 20 .

3. Install diaphragm spring in overrun clutch drum. Ensure diaphragm spring is installed in proper direction on overrun clutch drum. See Fig. 22 .
4. Install release spring retainer, roller clutch and roller clutch cam in overrun clutch drum. Using spring compressor, compress release spring retainer and diaphragm spring. Install snap ring at center of overrun clutch drum. Remove spring compressor.
5. Install clutch plates and clutch discs in overrun clutch drum, starting with clutch plate and alternating with clutch disc. See Fig. 22 .

CAUTION: Sun gear must be installed with countersunk area on sun gear facing toward overrun clutch drum.

6. Install backing plate and snap ring. Install turbine shaft on overrun clutch drum. Install sun gear with countersunk area on sun gear facing toward overrun clutch drum.
7. Install overdrive carrier assembly. Rotate overdrive carrier assembly counterclockwise during installation until roller clutch fully engages overdrive carrier assembly. Rotate overdrive carrier assembly and listen for looseness in the rollers on roller clutch. Install snap ring on end of turbine shaft.

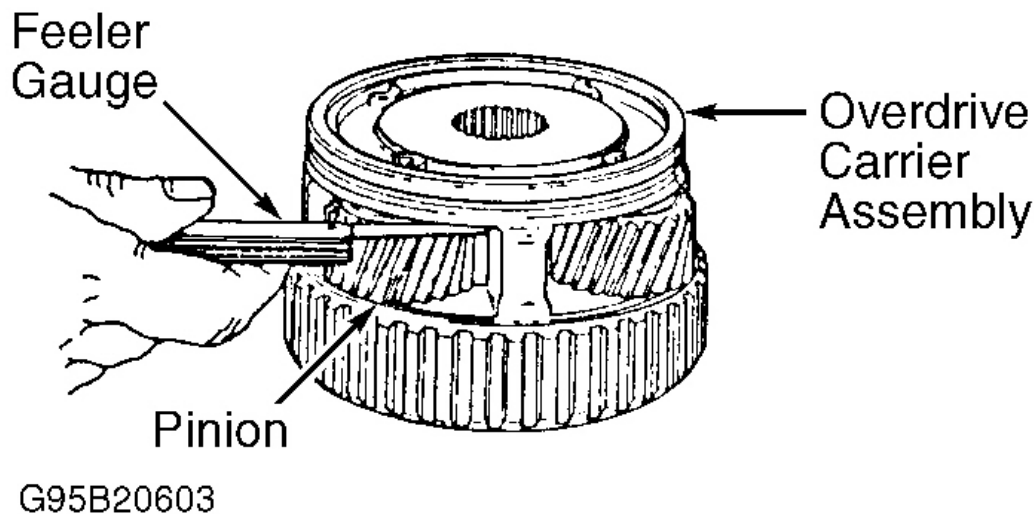


Fig. 23: Measuring Overdrive Carrier Assembly Pinion End Clearance
 Courtesy of ISUZU MOTOR CO.

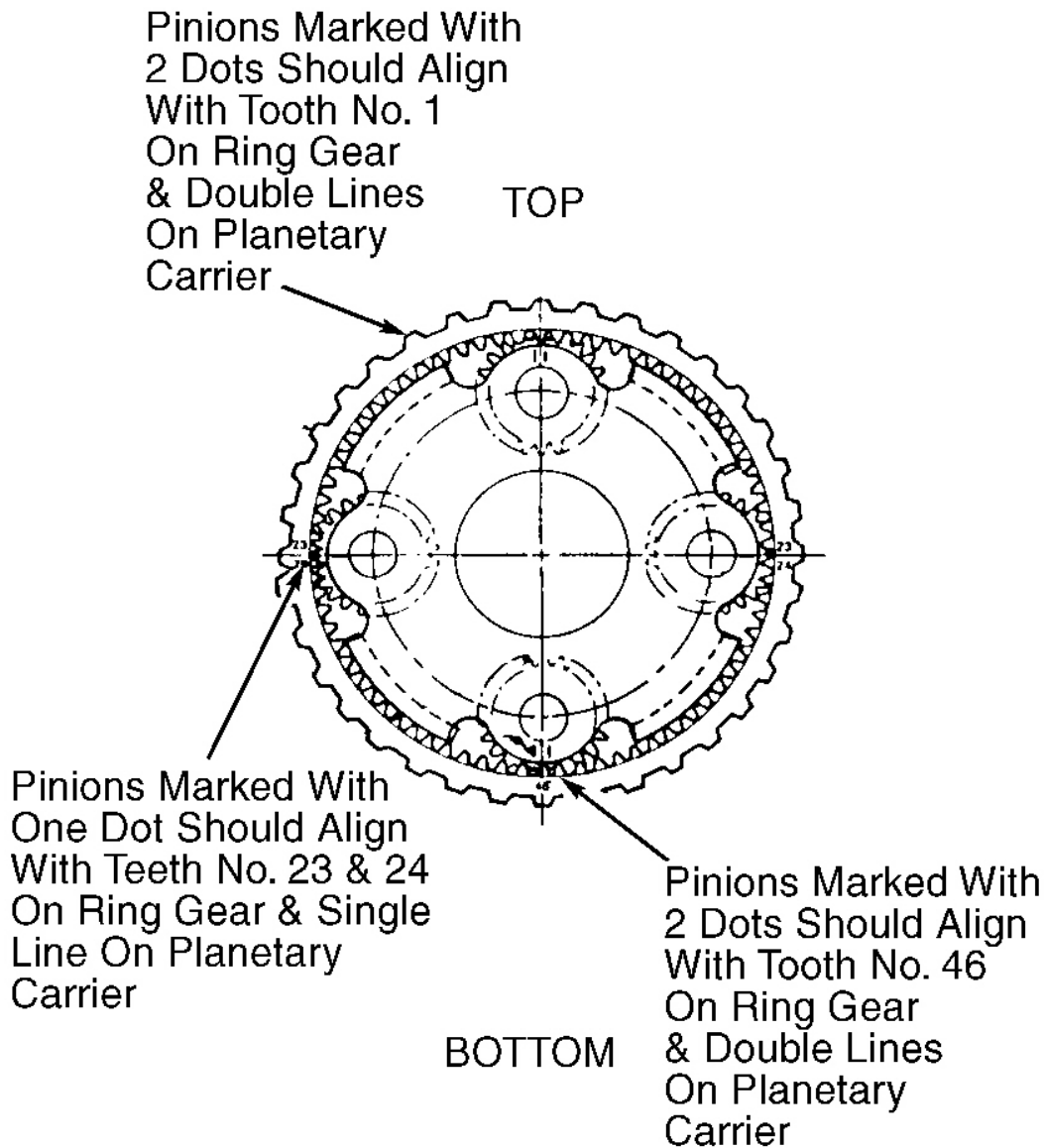
TRANSMISSION REASSEMBLY

VALVE BODIES & INTERNAL COMPONENTS

NOTE: Lubricate all components with Dexron-III ATF before reassembly. Coat all thrust bearing assemblies with petroleum jelly before installing.

1. Install NEW shaft seal for selector shaft in transmission case. Install selector shaft. Install spring pin in transmission case. See **Fig. 8** . DO NOT install spring flush with surface on transmission case.
2. Install parking lock and range selector lever with actuator rod on selector shaft. Install and tighten selector shaft nut to specification. See **TORQUE SPECIFICATIONS** .
3. Install brake band in transmission case. Ensure servo pin area aligns with servo hole. Install thrust bearing assembly in rear of transmission case.
4. Install brake drum, reaction sun gear and needle bearing. See **Fig. 7** . Install thrust bearing assembly on output shaft on planetary carrier.
5. Pinions on planetary carrier must be properly aligned. Each pinion is marked with 2 dots to indicate master tooth space and a single dot to indicate the master tooth. Planetary carrier is marked with double lines which should align with the 2 dots on 2 opposite pinions. Single lines on planetary carrier should align with single dot on the other 2 pinions. See **Fig. 24** .
6. Properly align all pinion on planetary carrier. Install 2nd and 3rd clutch assemblies on planetary carrier. If pinions are properly aligned, 2nd and 3rd clutch assembly should fit easily on planetary carrier.
7. Rotate 3rd clutch and ensure pinions with 2 dots are at tooth No. 1 and 46 on ring gear in 2nd clutch

assembly. See **Fig. 24** . Pinions with one dot should be between tooth No. 23 and 24 on ring gear in 2nd clutch assembly. If not as specified, realign as necessary.



G95C20604

Fig. 24: Aligning Pinions On Planetary Carrier
Courtesy of ISUZU MOTOR CO.

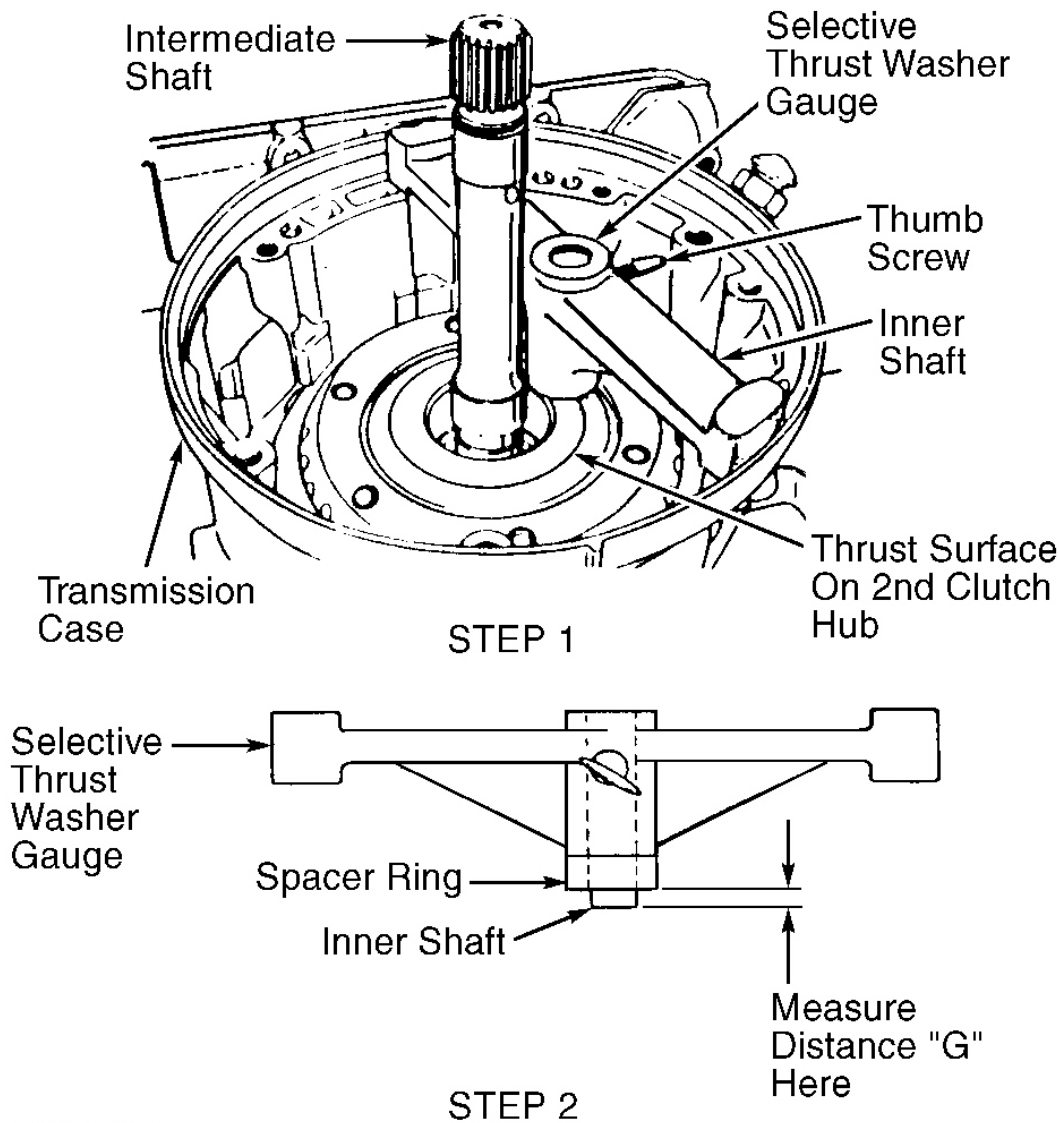
8. Once correct pinion alignment is obtained, install planetary carrier in transmission case. Install washer and bearing on planetary carrier. See **Fig. 7** .
9. Install thrust washer on 2nd clutch. Ensure tangs on thrust washer engage with slots on second clutch.

Align tangs on clutch plates in 2nd clutch. Install 3rd clutch assembly in 2nd clutch drum.

10. Install assembled 2nd and 3rd clutch assemblies in transmission case. Ensure planetary carrier is properly aligned. Rotate output shaft and clutch assemblies to ensure proper engagement.
11. Install pressure plate in transmission case. Ensure pressure plate is installed in proper direction with lip side facing upward. See **Fig. 7** . Tang side on pressure plate must be toward main valve body surface on transmission case.
12. Install reverse clutch plates and clutch discs, starting with clutch plate and alternating with clutch disc. Install waved plate with center tang facing valve body surface on transmission case.
13. The 2nd clutch end play must now be checked. Install Selective Thrust Washer Gauge (J-23085-A) on transmission case, against intermediate shaft. Move inner shaft on selective thrust washer gauge downward against thrust surface on 2nd clutch hub. Perform STEP 1. See **Fig. 25** . Tighten thumb screw on selective thrust washer gauge.
14. Remove selective thrust washer gauge from transmission case. Install spacer ring on inner shaft of selective thrust washer gauge. Measure distance "G" from end of inner shaft to surface on spacer ring. Perform STEP 2. See **Fig. 25** .
15. Using dimension "G", determine color code of selective thrust washer that fits on the center support. See **SELECTIVE THRUST WASHER SPECIFICATIONS** . This should provide a final 2nd clutch end play of .014-.031" (.36-.79 mm).

SELECTIVE THRUST WASHER SPECIFICATIONS

Dimension "G" In. (mm)	Washer Color
.060-.064 (1.53-1.63)	Yellow
.068-.072 (1.72-1.82)	Red
.075-.079 (1.91-2.01)	Black
.083-.087 (2.10-2.20)	Natural
.090-.094 (2.29-2.39)	Green
.098-.102 (2.48-2.58)	Blue



G95D20605

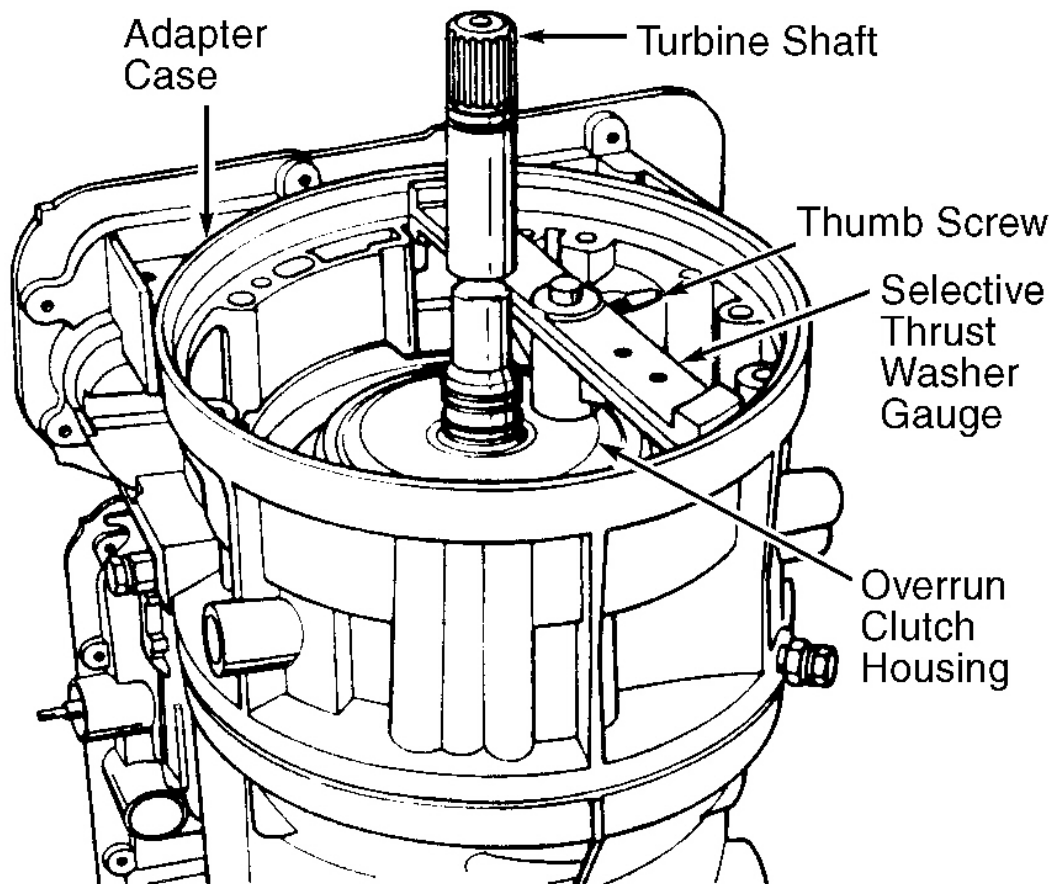
Fig. 25: Measuring 2nd Clutch End Play
 Courtesy of ISUZU MOTOR CO.

16. Install NEW seal rings on 4th clutch piston. Lubricate seal rings with Dexron-III ATF. Install 4th clutch piston in adapter case. Use care not to damage seal rings.
17. Install 4th clutch retainer and spring assembly on 4th clutch piston. See **Fig. 7** . Using spring compressor, compress 4th clutch spring retainer and spring assembly. Install snap ring in adapter case. Remove spring compressor.
18. Apply petroleum jelly on selective thrust washer. Install selective thrust washer on center support. Install NEW "O" rings on front of transmission case and NEW seal ring on adapter case. See **Fig. 7** .

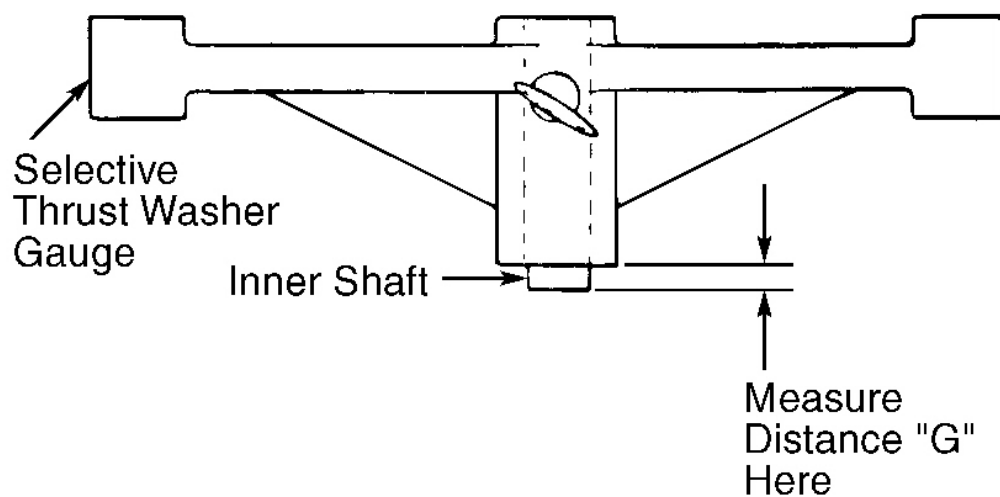
19. Install guide pins in front of transmission case for aligning adapter case. Install adapter case and center support assembly on transmission case.
20. Install thrust washer on adapter case. Ensure tangs on thrust washer engage with slots in adapter case. Apply petroleum jelly on thrust bearing and install at center of overdrive internal gear with Black side of thrust bearing facing upward. See **Fig. 6**.
21. Install overdrive internal gear with thrust bearing on turbine shaft and overrun clutch assembly. Install turbine shaft and overrun clutch assembly with overdrive internal gear in adapter case.
22. Install 4th clutch plates and clutch discs in following order: clutch plate, clutch disc, clutch plate, clutch plate, clutch disc and clutch plate. Clutch plates must be installed with short tang facing toward adapter case valve body surface.
23. Install 4th clutch retainer with notch area toward adapter case valve body surface. Overdrive clutch end play must now be checked.
24. Install Selective Thrust Washer Gauge (J-23085-A) on adapter case, against turbine shaft. Move inner shaft on selective thrust washer gauge downward against thrust surface on overrun clutch housing. Perform STEP 1. See **Fig. 26**. Tighten thumb screw on selective thrust washer gauge.
25. Remove selective thrust washer gauge from adapter case. Measure distance "G" from end of inner shaft to surface on selective thrust washer gauge. Perform STEP 2. See **Fig. 26**.
26. Using dimension "G", determine color code of selective thrust washer that fits on rear of oil pump assembly. See **SELECTIVE THRUST WASHER SPECIFICATIONS**. This should provide a final overdrive clutch end play of .004-.031" (.10-.80 mm).

SELECTIVE THRUST WASHER SPECIFICATIONS

Dimension "G" In. (mm)	Washer Code
.060-.064 (1.53-1.63)	Yellow
.068-.072 (1.72-1.82)	Red
.075-.079 (1.91-2.01)	Black
.083-.087 (2.10-2.20)	Natural
.090-.094 (2.29-2.39)	Green
.098-.102 (2.48-2.58)	Blue



STEP 1



STEP 2

G95E20606

Fig. 26: Measuring Overdrive Clutch End Play
Courtesy of ISUZU MOTOR CO.

27. Install NEW outer seal ring on torque converter housing and NEW gasket on oil pump assembly. See **Fig. 10** . Apply petroleum jelly to selective thrust and install on rear of oil pump assembly. Ensure selective thrust washer is fully seated on oil pump assembly.
28. Install torque converter housing with oil pump assembly on adapter case. Install and tighten torque converter housing-to-adapter case bolts to specification. Ensure oil pump gears rotate freely.
29. Install dial indicator, Turbine Shaft Puller (J-25022) and End Play Fixture (J-24773-1) onto turbine shaft. See **Fig. 27** . Pull turbine shaft upward until slight resistance is felt. Zero dial indicator.
30. Continue to pull turbine shaft upward and note turbine shaft end play. Turbine shaft end play should be .004-.031" (.10-.80 mm). Remove dial indicator, turbine shaft puller and end play fixture.
31. If turbine shaft end play is not within specification, different thickness selective thrust washer must be installed on rear of oil pump assembly. Repeat steps 24 -26 for selective thrust washer selection procedure.

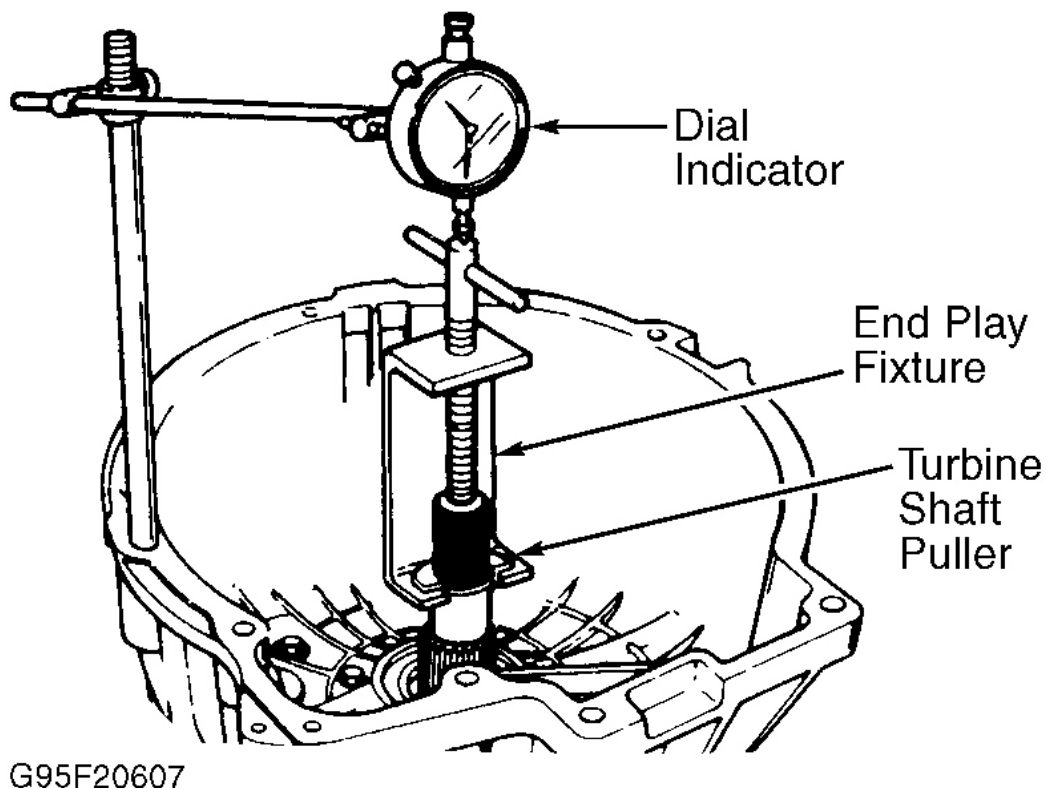


Fig. 27: Measuring Turbine Shaft End Play
Courtesy of ISUZU MOTOR CO.

32. Install NEW bearing in extension housing if replacement is required. Install NEW oil seal in extension housing. Install NEW seal ring on parking lock gear if seal ring is damaged. See **Fig. 4**.
33. Install parking lock gear, speed sensor drive gear and retaining ring on output shaft. See **Fig. 4**. Using NEW gasket, install extension housing. Ensure parking pawl shaft and actuator rod are aligned with extension housing. Install and tighten extension housing bolts to specification.
34. Install drive shaft companion flange and NEW "O" ring on output shaft. Install and tighten drive shaft companion flange nut to specification.
35. Using a NEW "O" ring, install speed sensor. Install and tighten bolt to specification. Position transmission with output shaft facing upward. Install dial indicator on extension housing with stem of dial indicator against output shaft. Zero dial indicator.
36. Manually push output shaft upward and note output shaft end play. Output shaft end play should be .014-.031" (.36-.80 mm). If output shaft end play is not within specification, different thickness selective thrust washer must be installed on center support. Repeat steps 13 -15 for selective thrust washer selection procedure.
37. Ensure brake band is correctly positioned, rotate output shaft if necessary. Install NEW seal ring on servo piston if necessary. Install apply rod in transmission case with rounded end of rod toward the brake band.
38. Install return spring and servo piston. Use care not to damage seal ring on servo piston. Using spring compressor, compress servo piston and return spring. Install servo piston retaining snap ring. Remove spring compressor.
39. To adjust brake band, loosen lock nut on servo adjusting screw. See **Fig. 4**. Using an INCH-lb. torque wrench, tighten servo adjusting screw to 40 INCH lbs. (4.5 N.m).
40. Back off servo adjusting screw 5 revolutions. Hold sleeve on servo piston. Tighten lock nut to 14 ft. lbs. (19 N.m). Ensure servo adjusting screw does not rotate while tightening lock nut.
41. Install 2 check balls in transmission case. See **Fig. 5**. Install case 4-pin connector and wiring harness. Install guide pins for main valve body in transmission case.
42. Install assembled main valve body and manual valve link assembly. Manual valve link must be extended, as long end fits into manual valve and short end fits into range selector. Remove guide pins. Install and tighten main valve body bolts to specification. Install electrical connectors at solenoids on main valve body.
43. Using a NEW gasket, install servo cover. Install and tighten bolts to specification. Install manual detent on main valve body. See **Fig. 4**. Install and tighten bolts to specification.
44. Install a NEW oil filter. Install and tighten bolts to specification. Using NEW gasket, install main case oil pan. Install and tighten bolts to specification.
45. Install 5-pin electrical connector in adapter case. Using NEW transfer plate gaskets, install adapter case valve body and transfer plate. Install and tighten bolts to specification. Install electrical connectors at solenoids on adapter case valve body.
46. Using a NEW gasket, install adapter case oil pan. Install and tighten bolts to specification. Using a NEW seal ring, install oil filler tube. Install and tighten bolt to specification.
47. Install and adjust mode switch. Install NEW "O" ring on end of turbine shaft. Install torque converter.

TRANSMISSION SPECIFICATIONS

TRANSMISSION SPECIFICATIONS

1998 BMW M Roadster

1997-98 AUTOMATIC TRANSMISSIONS Hydra-Matic 4L30-E Electronic Controls & Overhaul

Application	In. (mm)
Output Shaft End Play	.014-.031 (.36-.80)
Overdrive Carrier Assembly Pinion End Clearance	.009-.025 (.25-.64)
Overdrive Clutch End Play ⁽¹⁾	.004-.031 (.10-.80)
Planetary Carrier Pinion End Clearance	.005-.035 (.13-.89)
Turbine Shaft End Play	.004-.031 (.10-.80)
2nd Clutch End Play ⁽¹⁾	.014-.031 (.36-.79)
(1) For measuring procedure, see TRANSMISSION REASSEMBLY .	

TORQUE SPECIFICATIONS**TORQUE SPECIFICATIONS**

Application	Ft. Lbs (N.m)
Adapter Case Valve Body Bolt	
8mm Bolt	18 (25)
5/16" Bolt	24 (32)
Adapter Case Intermediate Plate Bolt	18 (25)
Brake Band Adjustment Lock Nut	15 (21)
Center Support Bolt	18 (24)
Drive Shaft Companion Flange Nut	76 (103)
Electrical Socket-To-Transmission Case	10 (14)
Extension Housing Bolt	24 (32)
Main Valve Body Bolt	15 (20)
Manual Detent Bolt	15 (20)
Oil Fill Pipe	72 (98)
Oil Filter Bolt	15 (20)
Oil Pan Drain Plug	18 (25)
Oil Pan Overfill Plug	24 (33)
Oil Pump Assembly-To-Torque Converter Housing Bolt	
1st Pass	7 (10)
2nd Pass	15 (20)
Oil Strainer Bolts	15 (20)
Output Flange Collar Nut	74 (100)
Reinforcement Plate-To-Transmission	17 (23)
Selector Shaft Nut	16 (22)
Servo Cover Bolt	18 (24)
Solenoid Valve-To-Valve Body Bolt	7 (10)
Torque Converter-To-Flywheel Bolt	33 (45)
Torque Converter Housing-To-Adapter Case Bolt	31 (42)
	INCH Lbs. (N.m)

1998 BMW M Roadster

1997-98 AUTOMATIC TRANSMISSIONS Hydra-Matic 4L30-E Electronic Controls & Overhaul

Adapter Case Oil Pan Bolt	106 (12)
Brake Band Adjustment Screw	44 (5)
Force Motor Solenoid Bolt	89 (10)
Main Case Oil Pan Bolt	106 (12)
Mode Switch Bolt	115 (13)
Oil Seal Ring Bolt	27 (3)
Pressure Tap Plug	106 (12)
Speed Sensor Bolt	80 (9)
Torque Converter Clutch Solenoid Bolt	89 (10)
Torque Converter Housing Radial Shaft Seal	27 (3)
Transfer Plate-To-Main Valve Body Bolt	115 (13)

WIRING DIAGRAMS



Fig. 28: 4L30-E Transmission Wiring Diagram - 1997 BMW 3-Series (1 Of 2)



Fig. 29: 4L30-E Transmission Wiring Diagram - 1997 BMW 3-Series (2 Of 2)



Fig. 30: 4L30-E Transmission Wiring Diagram - 1998 BMW 3-Series (1 Of 2)



Fig. 31: 4L30-E Transmission Wiring Diagram - 1998 BMW 3-Series (2 Of 2)



Fig. 32: 4L30-E Transmission Wiring Diagram - 1997-98 BMW Z3 1.9L (1 Of 2)



Fig. 33: 4L30-E Transmission Wiring Diagram - 1997-98 BMW Z3 1.9L (2 Of 2)



Fig. 34: 4L30-E Transmission Wiring Diagram - 1997-98 BMW Z3 2.8L (1 Of 2)



Fig. 35: 4L30-E Transmission Wiring Diagram - 1997-98 BMW Z3 2.8L (2 Of 2)