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INTRODUCTION

A-440F

TOYOTA

Toyota A-440F: The information covered in this manual describes the teardown/inspection and assembly of this four speed rear drive automatic overdrive transmission. We have included information on the operation of this unit along with the diagnosis section.

We thank Toyota for the information and the illustrations that have made this booklet possible. (This transmission is found in the Landcruiser models).

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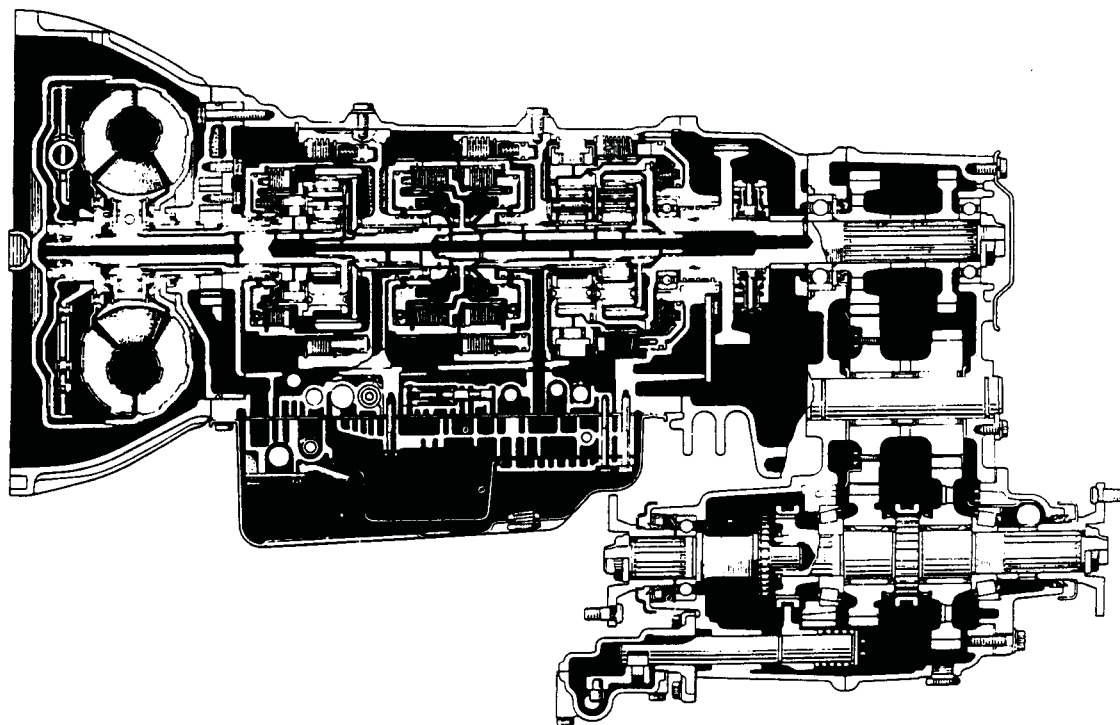


Technical Service Information

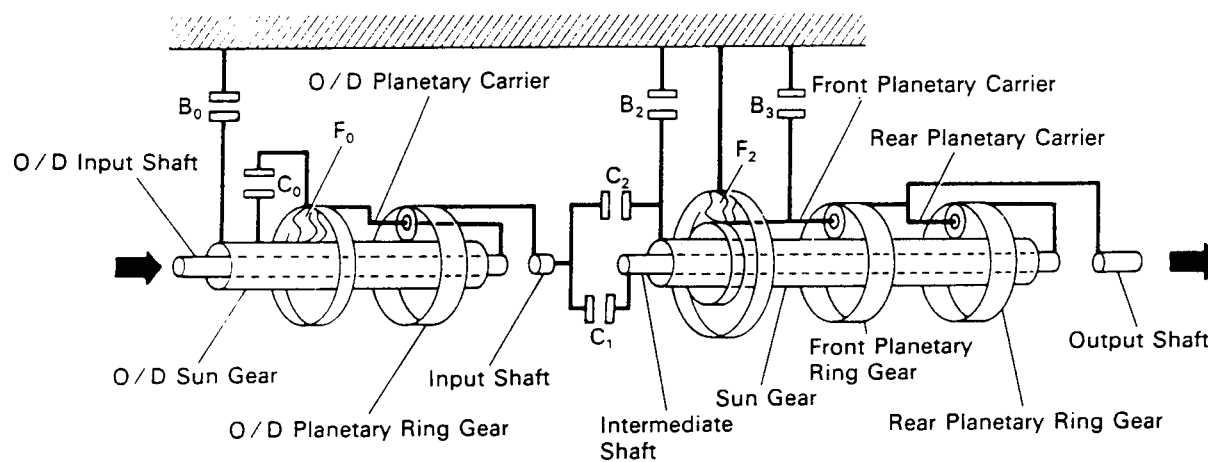
DESCRIPTION

GENERAL

The A440F automatic transmission is a four-speed automatic transmission with a two-speed transfer, developed with the aim of producing an easy-driving 4WD vehicle. A lock-up mechanism is built into the torque converter.



The A440F transmission is mainly composed of the torque converter, the overdrive (hereafter called O/D) planetary gear unit, 3-speed planetary gear unit, 2-speed transfer and the hydraulic control system.



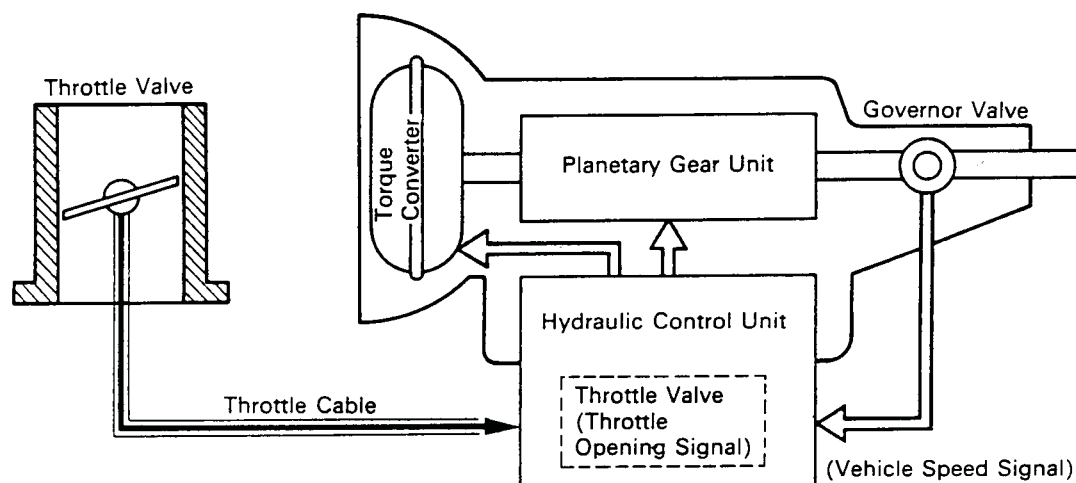
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Technical Service Information

SHIFT CONTROL

Shifting in the fully hydraulic controlled automatic transmission is carried out by the hydraulic control unit in the following way:



THROTTLE VALVE

The throttle valve in the hydraulic control unit generates hydraulic pressure in proportion to the amount that the accelerator pedal is depressed; this pressure (called "throttle pressure") acts as a throttle opening "signal" to the hydraulic control unit.

GOVERNOR VALVE

The governor valve generates hydraulic pressure in proportion to the speed of the vehicle; this pressure (called "governor pressure") acts as a vehicle speed "signal" to the hydraulic control unit.

HYDRAULIC CONTROL UNIT

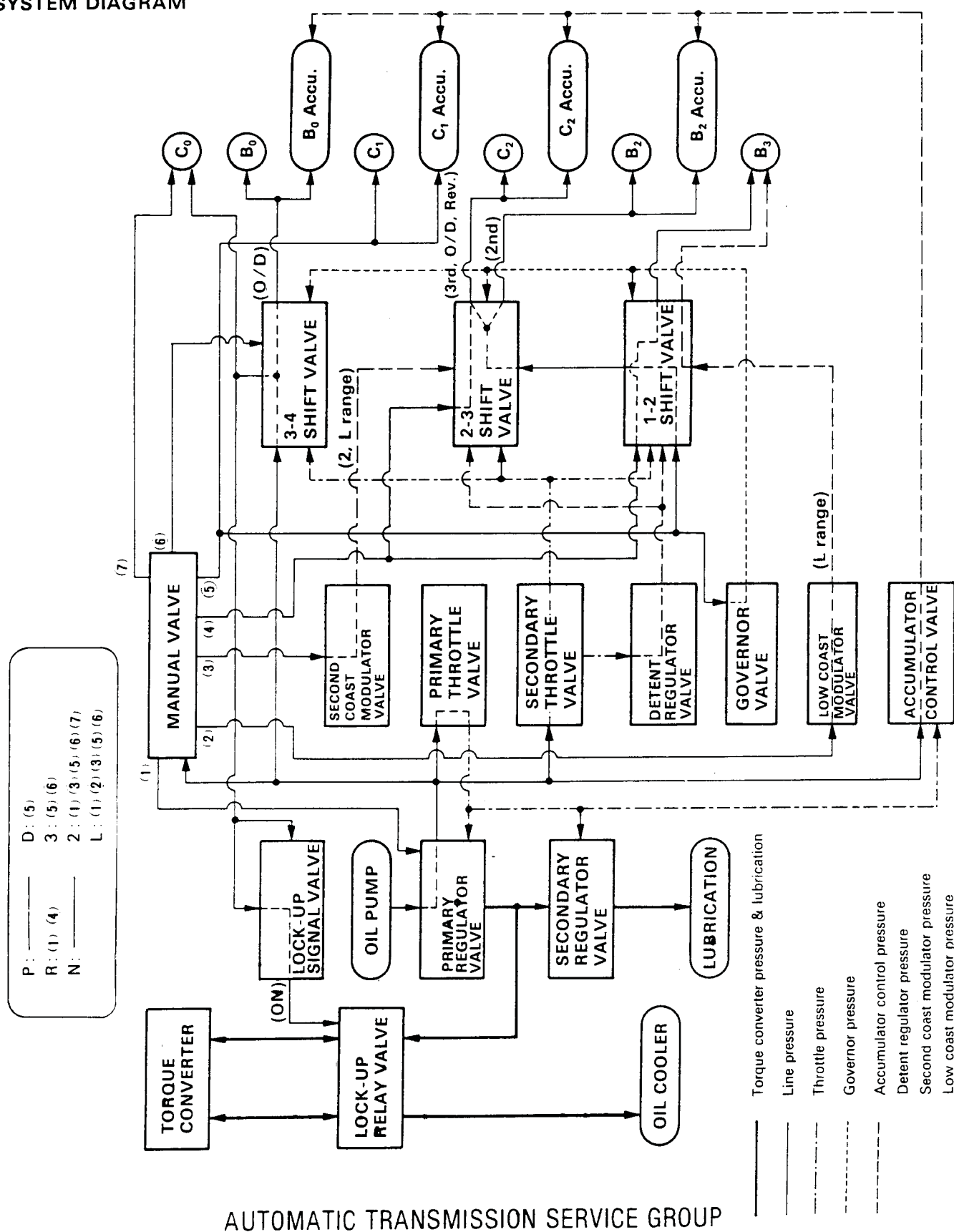
Governor pressure and throttle pressure cause the shift valves in the hydraulic control unit to operate; the strengths of these pressures control the movements of these valves, and these valves control the fluid passage to the clutches and brakes in the planetary gear unit, which in turn control the shifting of the transmission.

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Hydraulic Circuitry

SYSTEM DIAGRAM



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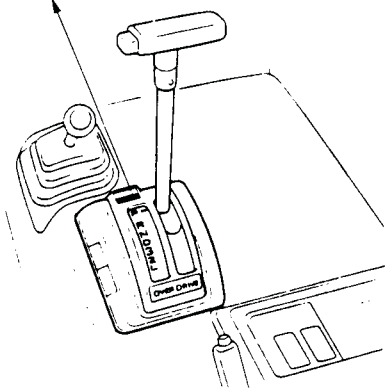


Technical Service Information

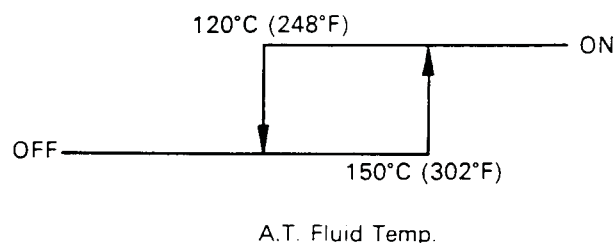
A. T. FLUID TEMPERATURE WARNING SYSTEM

The computer detects the A/T fluid temperature by means of a fluid temperature sensor fitted to the transfer front case. The A/T fluid may become extremely hot when the vehicle is under an extreme load, as when driving on sand or climbing uphill. Should the fluid temperature increase above 150°C (302°F), the computer lights the warning light located on the front side of shift indicator on the console. The light goes off when the temperature falls below 120°C (248°F).

A.T. OIL TEMP



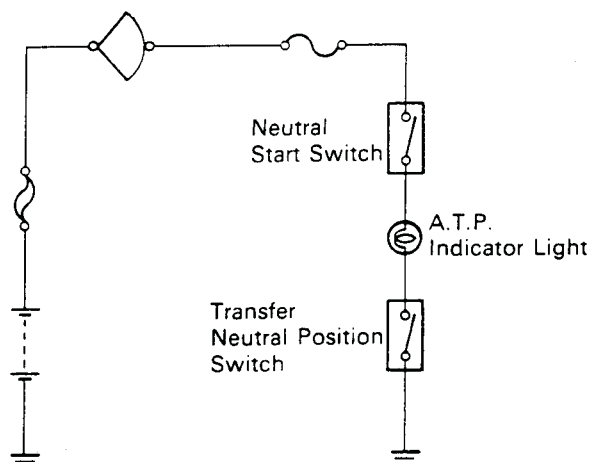
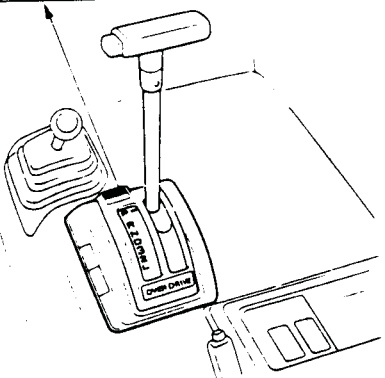
AT3919



A.T.P. (Automatic Transmission Parking) INDICATOR

The propeller shaft and wheels are free even when the transmission shift lever is set to "P" as long as the transfer shift lever is in "neutral" position. The A.T.P. indicator lights up to warn the driver that the propeller shaft and wheels are not locked. If the A.T.P. indicator light goes on, the transfer shift lever should be shifted to H2 or L4 position.

A.T. P



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Technical Service Information

General Troubleshooting

Problem	Possible cause	Remedy
Fluid discolored or smells burnt	Fluid contaminated Torque converter faulty Transmission faulty	Replace fluid Replace torque converter Disassemble and inspect transmission
Vehicle does not move in any forward range or reverse	Manual linkage out of adjustment Valve body or primary regulator faulty Parking lock pawl faulty Torque converter faulty Converter drive plate broken Oil pump intake strainer blocked Transmission faulty	Adjust linkage Inspect valve body Inspect parking lock pawl Replace torque converter Replace drive plate Clean strainer Disassemble and inspect transmission
Shift lever position incorrect	Manual linkage out of adjustment Manual valve and lever faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission
Harsh engagement into any drive range	Throttle cable out of adjustment Valve body or primary regulator faulty Accumulator pistons faulty Transmission faulty	Adjust throttle cable Inspect valve body Inspect accumulator pistons Disassemble and inspect transmission
Delayed 1-2, 2-3 or 3-O/D up-shift, or down-shifts from O/D-3 or 3-2 and shifts back to O/D or 3	Throttle cable out of adjustment Throttle cable and cam faulty Governor faulty Valve body faulty	Adjust throttle cable Inspect throttle cable and cam Inspect governor Inspect valve body
Slips on 1-2, 2-3 or 3-O/D up-shift, or slips or shudders on acceleration	Manual linkage out of adjustment Throttle cable out of adjustment Valve body faulty Transmission faulty	Adjust linkage Adjust throttle cable Inspect valve body Disassemble and inspect transmission
Drag, binding or tie-up on 1-2, 2-3 or 3-O/D up-shift	Manual linkage out of adjustment Valve body faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission

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Technical Service Information

General Troubleshooting (Cont'd)

Problem	Possible cause	Remedy
No lock-up	Valve body faulty Torque converter faulty Transmission faulty	Inspect valve body Replace torque converter Disassemble and inspect transmission
Harsh down-shift	Throttle cable out of adjustment Throttle cable and cam faulty Accumulator pistons faulty Valve body faulty Transmission faulty	Adjust throttle cable Inspect throttle cable and cam Inspect accumulator pistons Inspect valve body Disassemble and inspect transmission
No down-shift when coasting	Governor faulty Valve body faulty	Inspect governor Inspect valve body
Down-shift occurs too quickly or too late while coasting	Throttle cable out of adjustment Governor faulty Valve body faulty Transmission faulty	Adjust throttle cable Inspect governor Inspect valve body Disassemble and inspect transmission
No O/D-3, 3-2 or 2-1 kick-down	Throttle cable out of adjustment Governor faulty Valve body faulty	Adjust throttle cable Inspect governor Inspect valve body
No engine braking in 2 or L range	Valve body faulty Transmission faulty	Inspect valve body Disassemble and inspect transmission
Vehicle does not hold in P	Manual linkage out of adjustment Parking lock pawl cam and spring faulty	Adjust linkage Inspect cam and spring

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Mechanical System Tests

STALL TEST

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D and R ranges.

CAUTION:

- Perform the test at normal operating fluid temperature (50 – 80°C or 122 – 176°F).
- Do not continuously run this test longer than 5 seconds.

MEASURE STALL SPEED

- Warm up the transmission fluid.
- Chock the front and rear wheels.
- Connect a tachometer to the engine.
- Fully apply the parking brake.
- Step down strongly on the brake pedal with your left foot.
- Start the engine.
- Shift into the D range. Step all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 1,950 ± 150 rpm

- Perform the same test in R range.

EVALUATION

- If the stall speed is the same for both ranges but lower than specified value:

- Engine output may be insufficient
- Stator one-way clutch is not operating properly

NOTE: If more than 600 rpm below the specified value, the torque converter could be faulty.

- If the stall speed in D range is higher than specified:

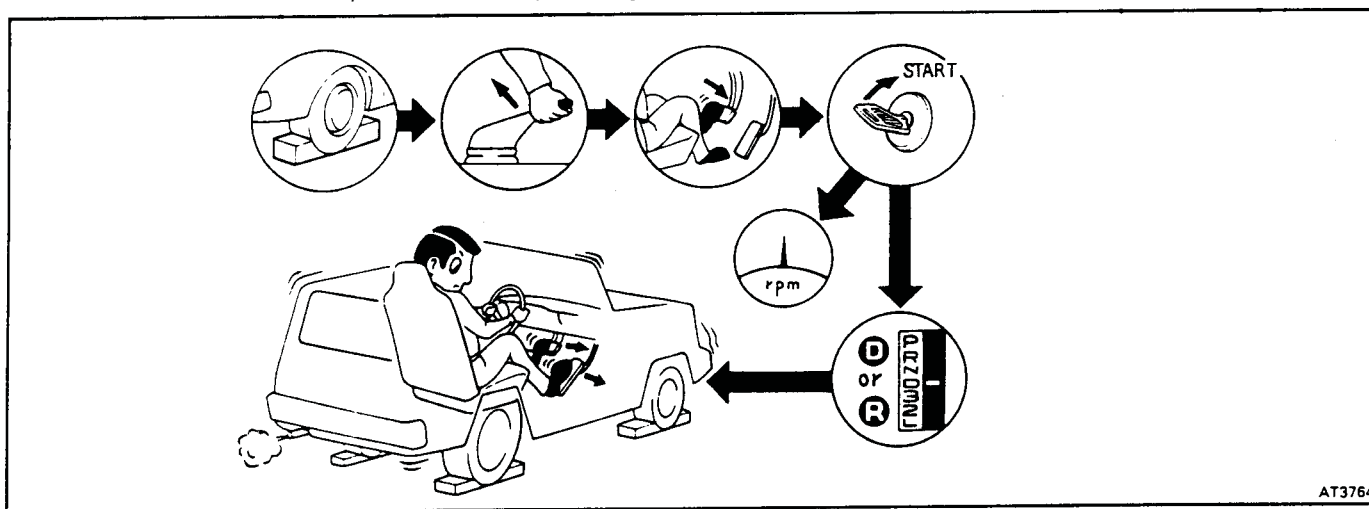
- Line pressure too low
- Front clutch slipping
- No. 2 one-way clutch not operating properly
- O/D one-way clutch not operating properly

- If the stall speed in R range is higher than specified:

- Line pressure too low
- Rear clutch slipping
- First and reverse brake slipping
- O/D one-way clutch not operating properly

- If the stall speed in both R and D ranges are higher than specified:

- Line pressure too low
- Improper fluid level
- O/D one-way clutch not operating properly



AT3764



Technical Service Information

HYDRAULIC TEST

1. MEASURE LINE PRESSURE

CAUTION: Perform the test at normal operating fluid temperature (50 – 80°C or 122 – 176°F).

- Warm up the transmission fluid.
- Remove the transmission case test plug and connect the hydraulic pressure gauge.
SST 09992-00094 (Oil pressure gauge)
- Fully apply the parking brake and chock the four wheels.
- Start the engine and check idling rpm.
- Step down strongly on the brake pedal with your left foot and shift into D range.
- Measure the line pressure when the engine is idling.
- Press the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
- In the same manner, perform the test in R range.

kg / cm² (psi, kPa)

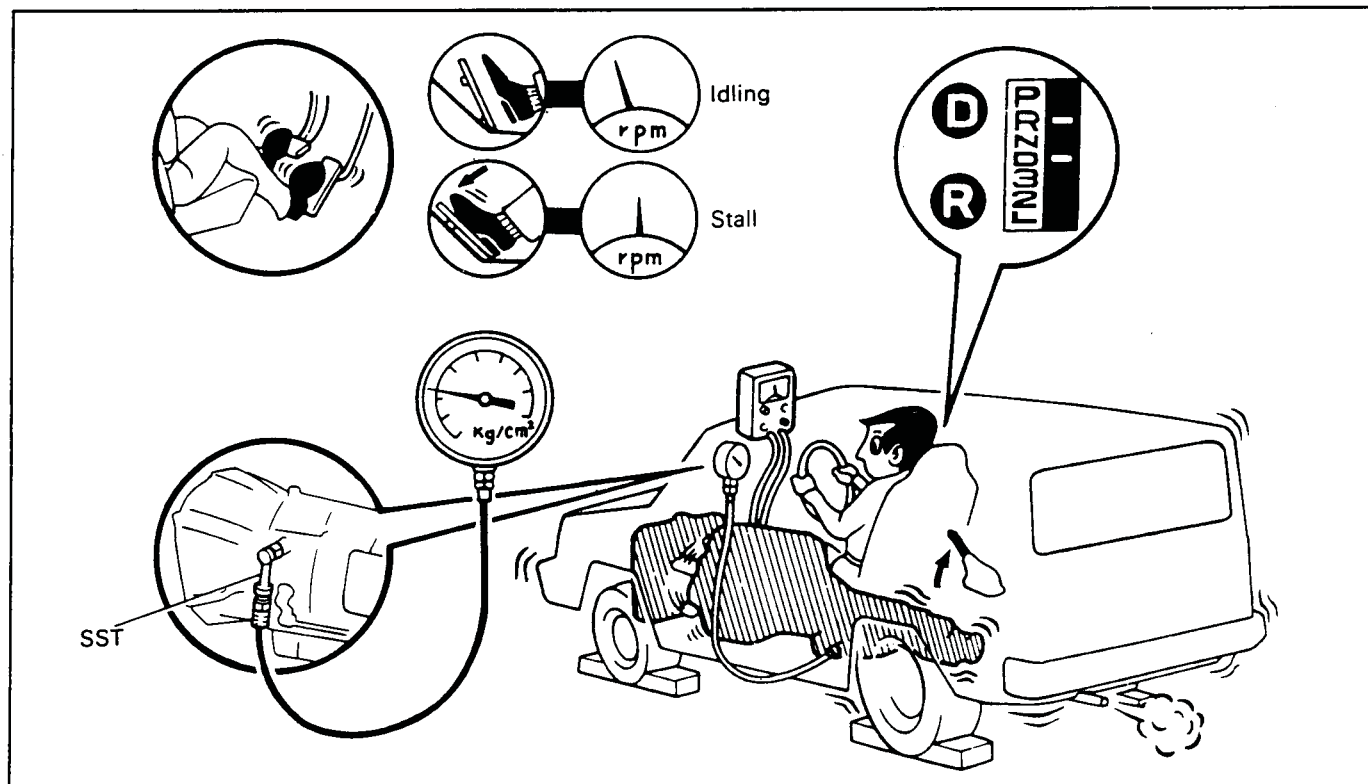
D range		R range	
Idling	Stall	Idling	Stall
3.7 – 4.3 (53 – 61, 363 – 422)	11.1 – 13.6 (158 – 193, 1,089 – 1,344)	4.5 – 5.5 (64 – 78, 441 – 539)	14.0 – 17.0 (199 – 242, 1,373 – 1,667)

If the measured pressures are not up to specified values, recheck the throttle cable adjustment and perform a retest.

EVALUATION

- If the measured values at all ranges are higher than specified:
 - Throttle cable out of adjustment
 - Throttle valve defective
 - Regulator valve defective
- If the measured values at all ranges are lower than specified:
 - Throttle cable out of adjustment
 - Throttle valve defective
 - Regulator valve defective
 - Oil pump defective
 - O/D direct clutch defective
- If pressure is low in the D range only:
 - D range circuit fluid leakage
 - Front clutch defective
- If pressure is low in the R range only:
 - R range circuit fluid leakage
 - Rear clutch defective
 - First and reverse brake defective

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Operating Mechanism for Each Gear

○ Operating

Shift lever position	Gear position	C ₀	C ₁	C ₂	B ₀	B ₂	B ₃	F ₀	F ₂
P	Parking	○						○	
R	Reverse	○		○			○	○	
N	Neutral	○						○	
D	1st	○	○					○	○
	2nd		○			○		○	
	3rd	○	○	○				○	
	O/D		○	○	○				
3	1st	○	○					○	○
	2nd		○			○		○	
	3rd	○	○	○				○	
2	2nd	○	○			○		○	
L	1st	○	○				○	○	○

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

2. MEASURE GOVERNOR PRESSURE

CAUTION:

- Perform the test at normal operating fluid temperature (50 – 80°C or 122 – 176°F).
- Measurement can be made with a 1,000 rpm test, but if tests are to be made at 1,800 and 3,500 rpm, it would be safer to do it on road or using a chassis dynamometer because an on-stand test could be hazardous.

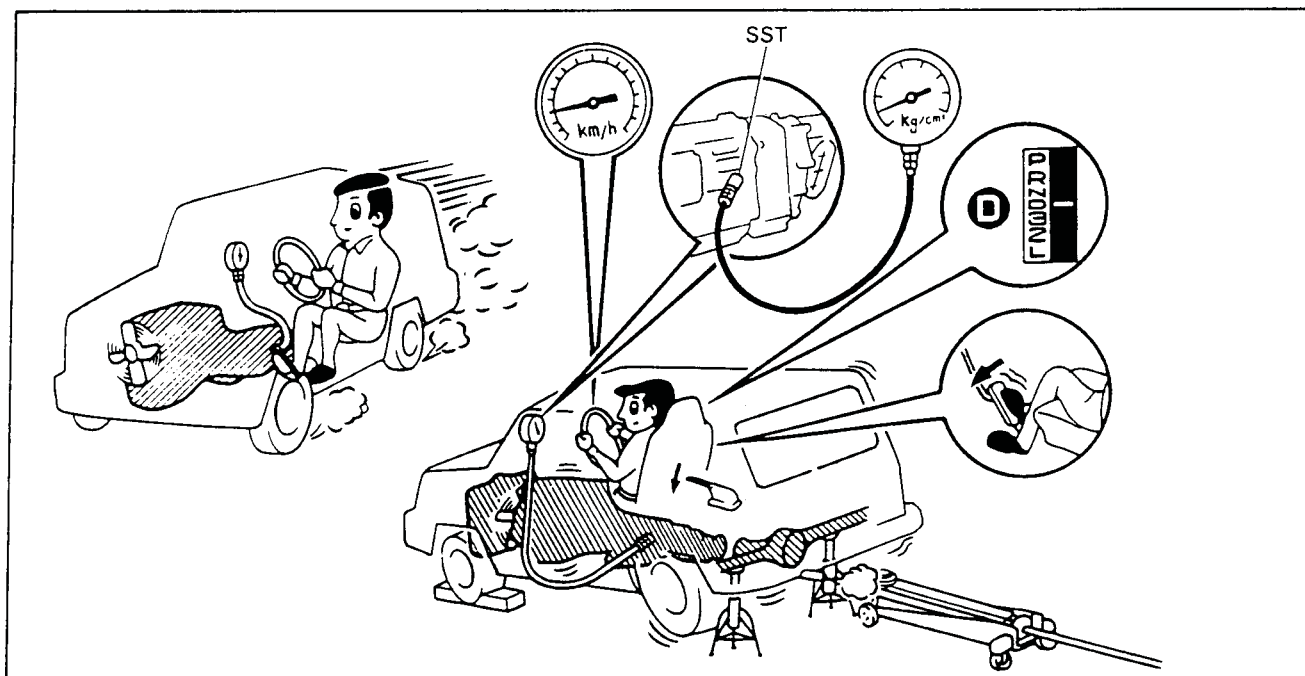
- Warm up the transmission fluid.
 - Shift the transfer shift lever to the "H2" position.
 - Chock the front wheels.
 - Jack up rear of the vehicle and support it on stands.
 - Remove the transmission case test plug and connect the hydraulic pressure gauge.
- SST 09992-00094 (Oil pressure gauge)
- Check that the parking brake is not applied.
 - Start the engine.
 - Shift into the D range and measure the governor pressures at the speeds specified in the table.

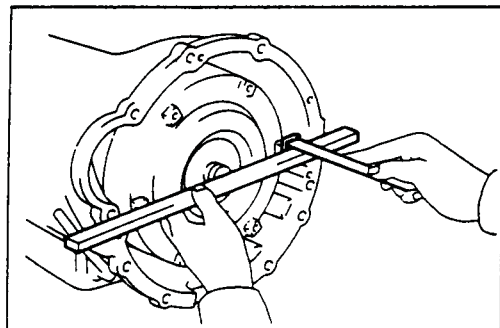
Output shaft rpm	Vehicle speed (Reference)	Governor pressure kg/cm ² (psi, kPa)
1,000	32 km/h (20 mph)	0.8 – 1.2 (11 – 17, 78 – 118)
1,800	57 km/h (35 mph)	1.9 – 2.3 (27 – 33, 186 – 226)
3,500	111 km/h (69 mph)	5.7 – 6.3 (81 – 90, 559 – 618)

EVALUATION

If governor pressure is defective:

- Line pressure defective
- Fluid leakage in governor pressure circuit
- Governor valve operation defective





(MAIN POINT OF INSTALLATION)

CHECK TORQUE CONVERTER INSTALLATION

Using calipers and a straight edge, measure from the installed surface of the torque converter to the front surface of the transmission housing.

Correct distance: 16.5 mm (0.650 in.) or more

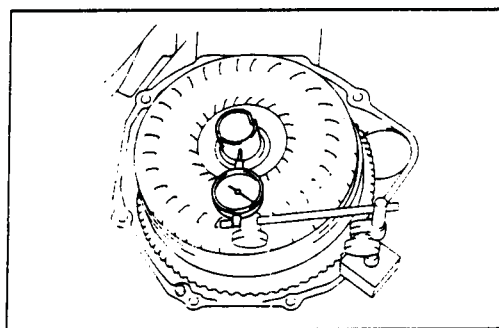
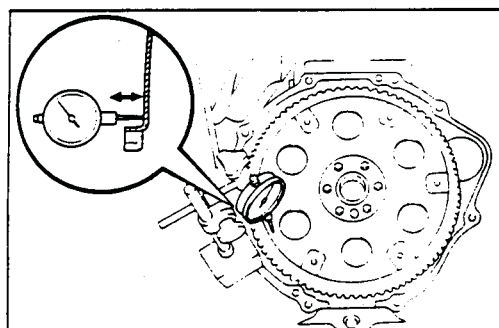
If the distance is less than the required standard, check for improper installation.

ADJUST TRANSMISSION THROTTLE CABLE

FILL TRANSMISSION WITH ATF AND CHECK FLUID LEVEL

CAUTION: Do not overfill.

Fluid type: ATF DEXRON® II



TORQUE CONVERTER AND DRIVE PLATE

INSPECTION OF TORQUE CONVERTER AND DRIVE PLATE

MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.

If runout exceeds 0.20 mm (0.0079 in.) or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tighten the bolts.

Torque: 890 kg-cm (64 ft-lb, 87 N·m)

MEASURE TORQUE CONVERTER SLEEVE RUNOUT

(a) Temporarily mount the torque converter to the drive plate. Set up a dial indicator.

If runout exceeds 0.30 mm (0.0118 in.), try to correct by reorientating the installation of the converter. If excessive runout cannot be corrected, replace the torque converter.

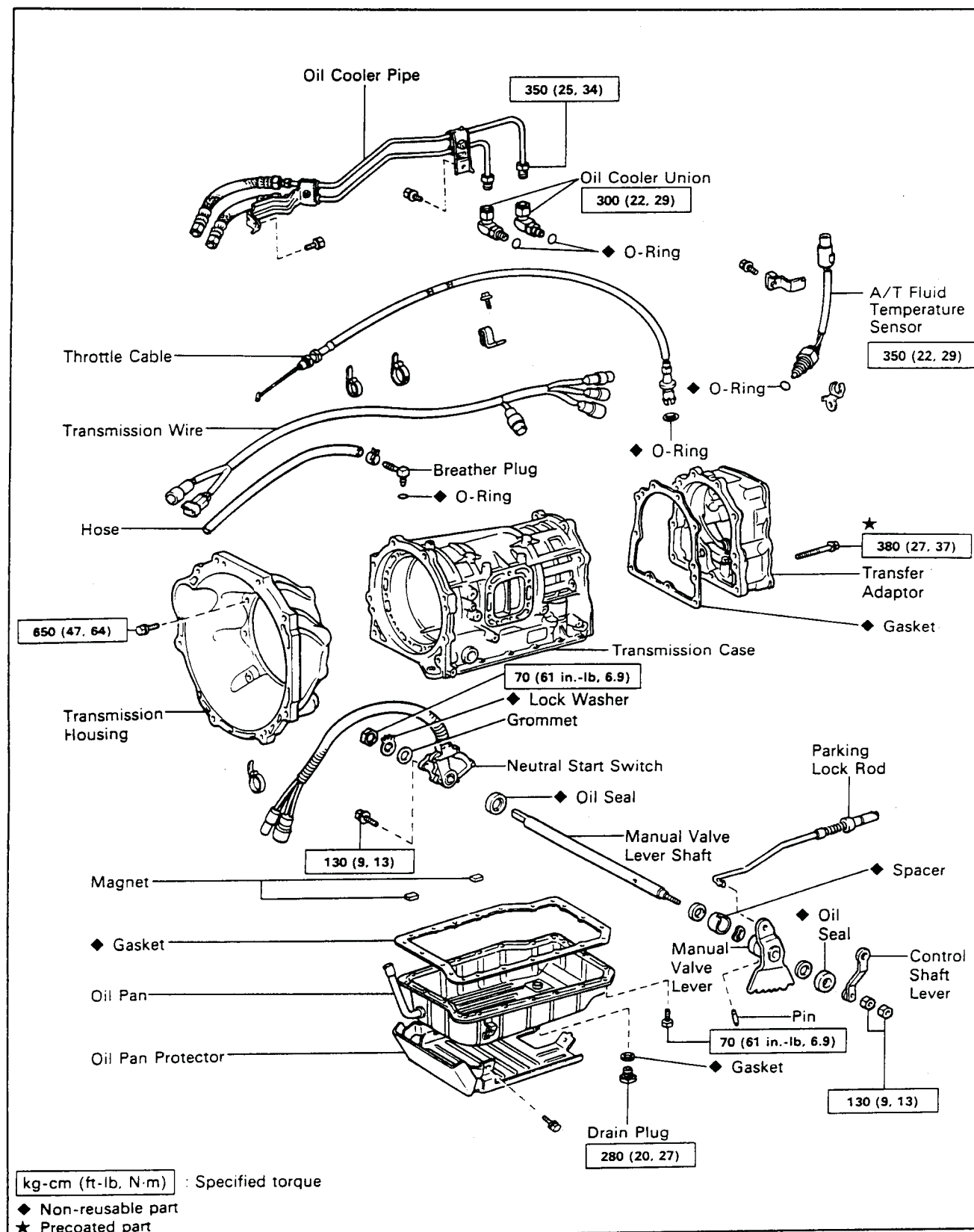
NOTE: Mark the position of the converter to ensure correct installation.

(b) Remove the torque converter.

Technical Service Information

REMOVAL OF COMPONENT PARTS

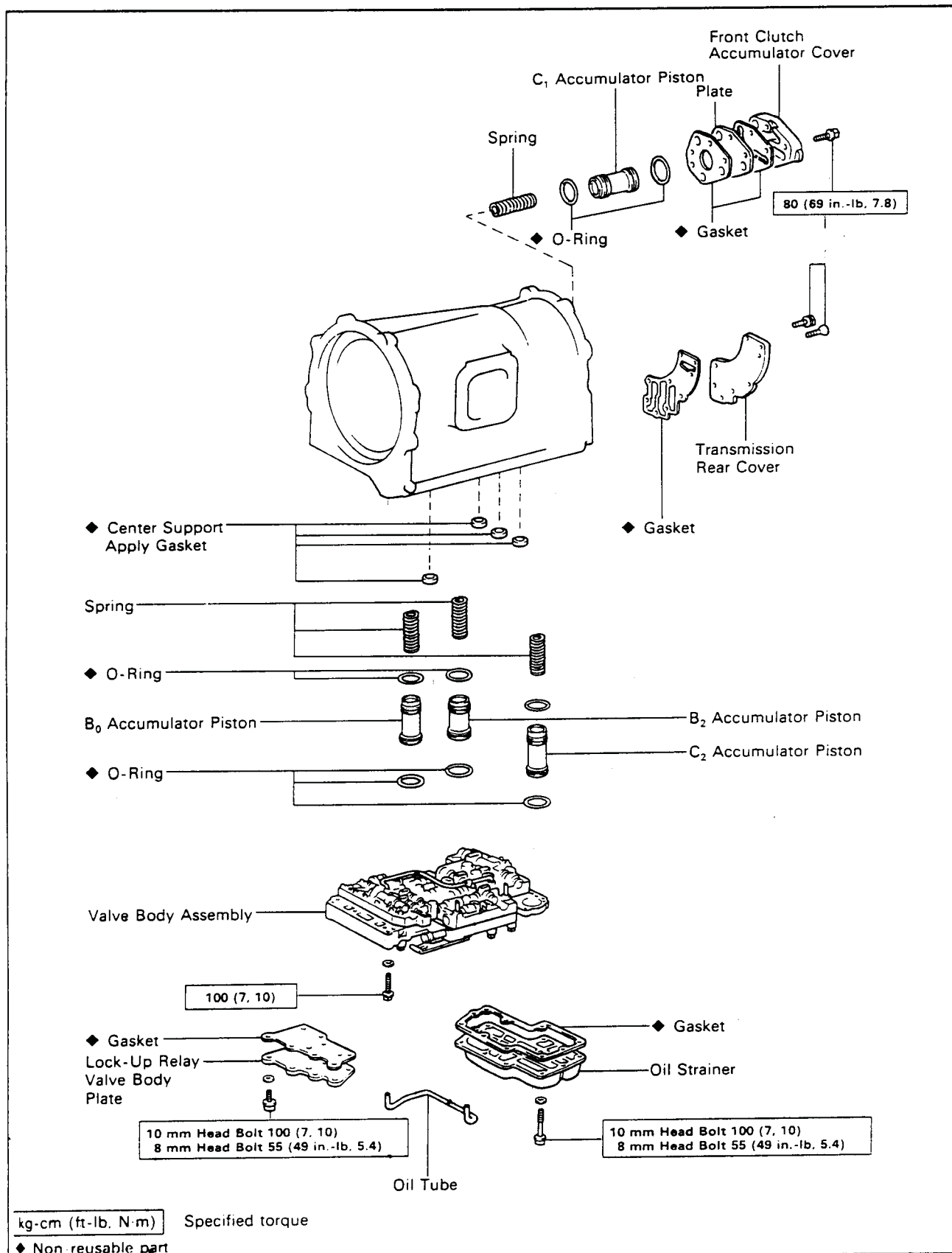
COMPONENTS



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Technical Service Information

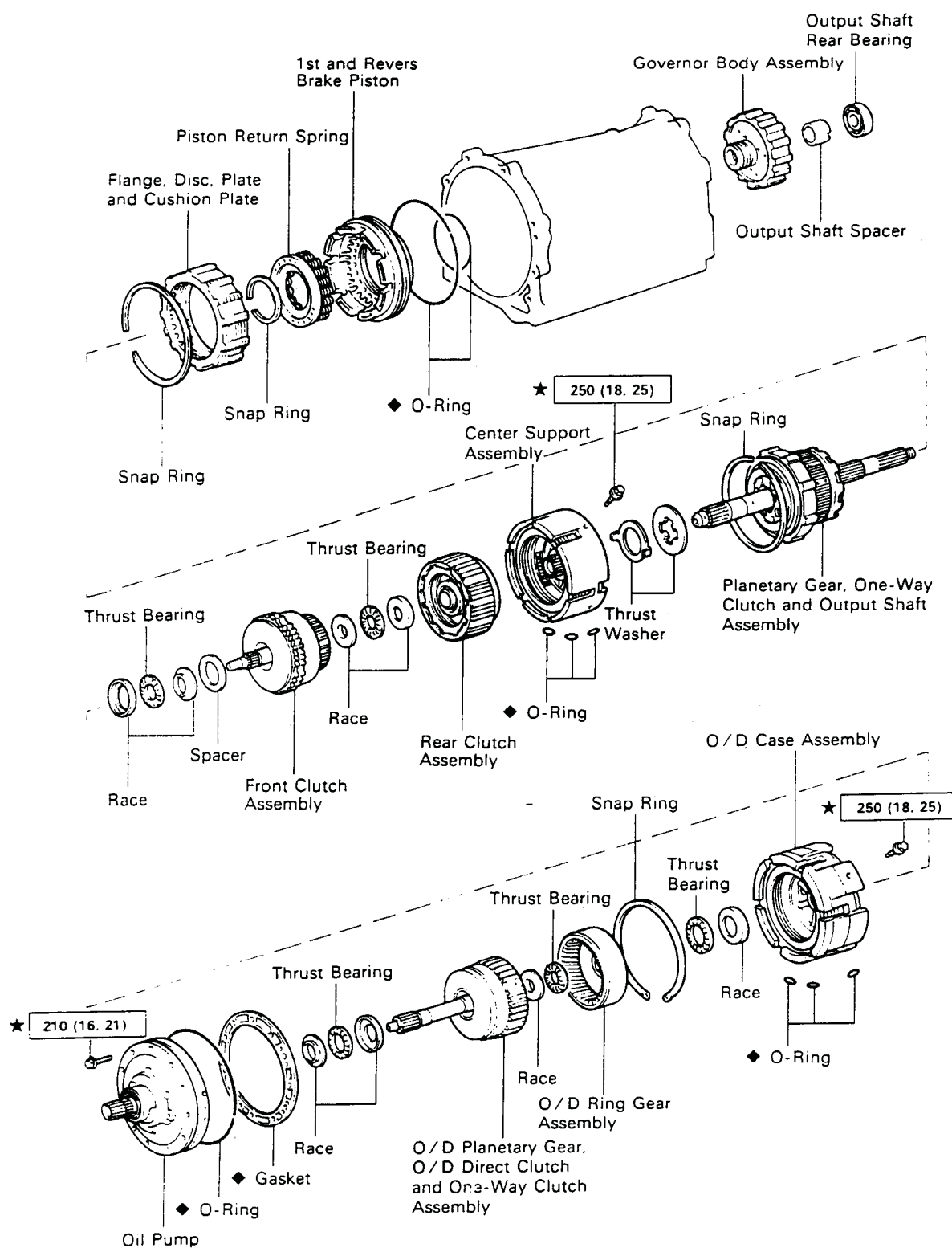
COMPONENTS (Cont'd)



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Technical Service Information COMPONENTS (Cont'd)



kg-cm (ft-lb, N-m) : Specified torque

◆ Non-reusable part

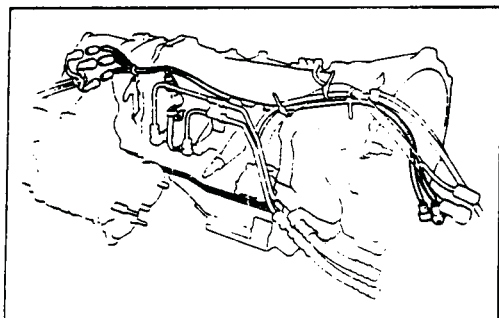
★ Precoated part

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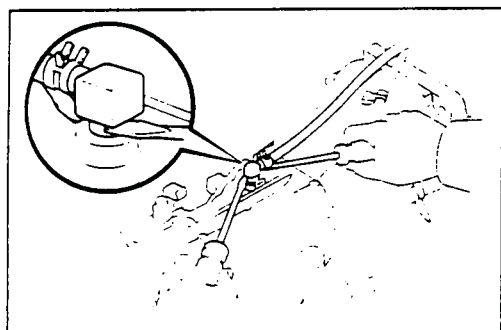
Technical Service Information

SEPARATE BASIC SUBASSEMBLY



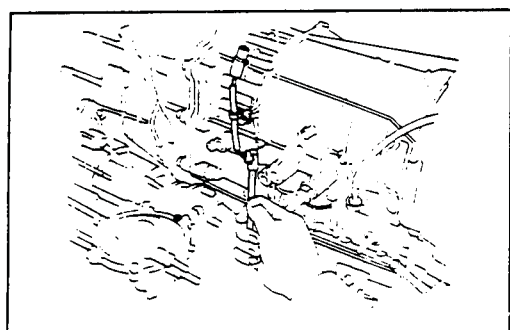
REMOVE TRANSMISSION WIRE

Disconnect the four connectors, and remove the transmission wire.



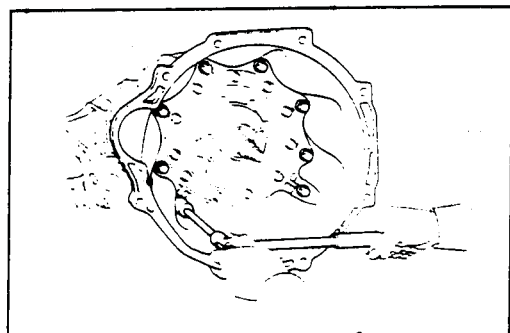
REMOVE BREATHER PLUG AND HOSE

- (a) Using two screwdrivers, pry out the breather plug.
- (b) Remove the O-ring from the breather plug.



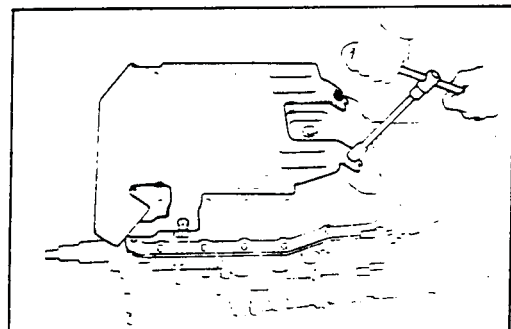
REMOVE A/T FLUID TEMPERATURE SENSOR

- (a) Remove the wire clamp bolt.
- (b) Remove the sensor.
- (c) Remove the O-ring from the sensor.



REMOVE TRANSMISSION HOUSING

- (a) Remove the throttle cable clamp bolt.
- (b) Remove the eight bolts and transmission housing.

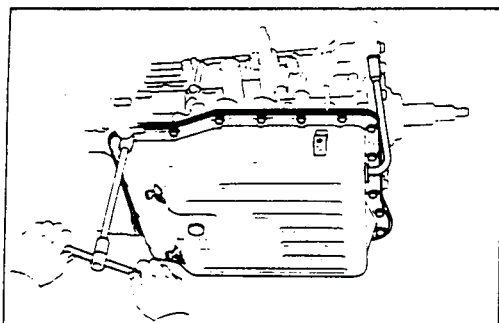


REMOVE OIL PAN PROTECTOR

Remove the six bolts and protector.



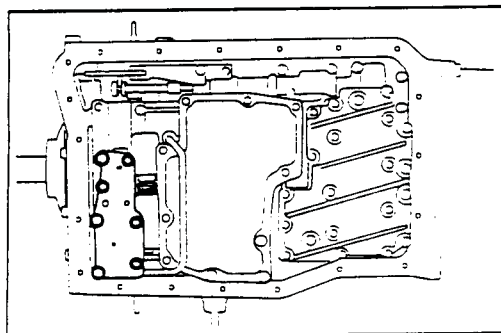
Technical Service Information



REMOVE OIL PAN

CAUTION: Do not turn the transmission over as this will contaminate the valve body with any foreign matter at the bottom of the pan.

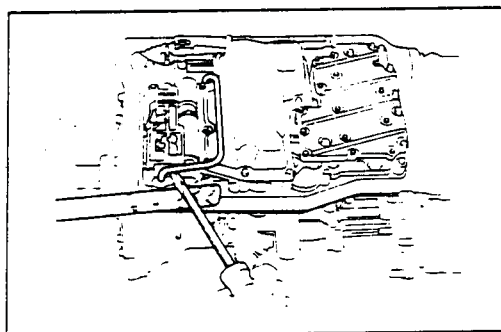
- (a) Position the oil pan so it does not tilt upright.
- (b) Remove the twenty bolts, oil pan and gasket.



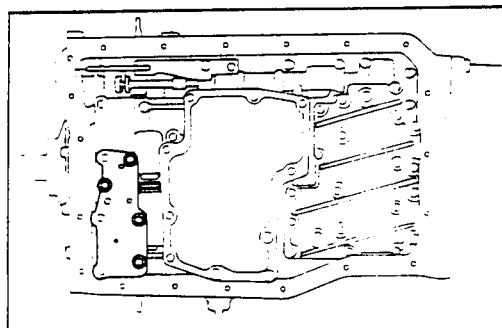
REMOVE OIL TUBE

Remove the seven bolts, four wave washers, lock-up relay valve body plate and gasket.

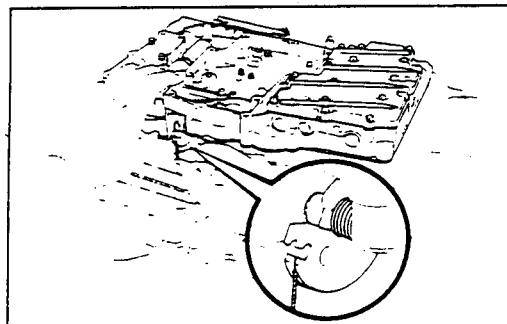
NOTE: Do not drop the lock-up relay valve pins.



Using a large screwdriver, remove the oil tube by prying both tube ends.



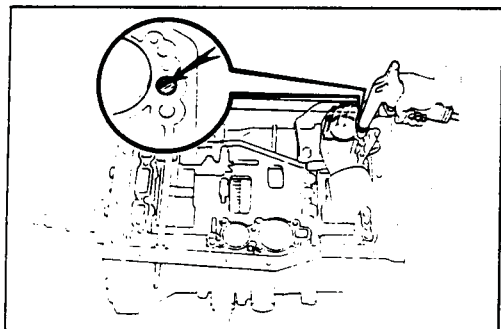
Temporarily install the lock-up relay valve body plate with the four short bolts.



Disconnect the throttle cable from the cam and remove the valve body.

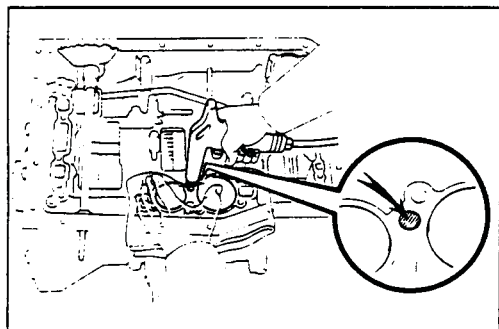


Technical Service Information



REMOVE C₂, B₀, B₂ ACCUMULATOR PISTONS AND SPRINGS

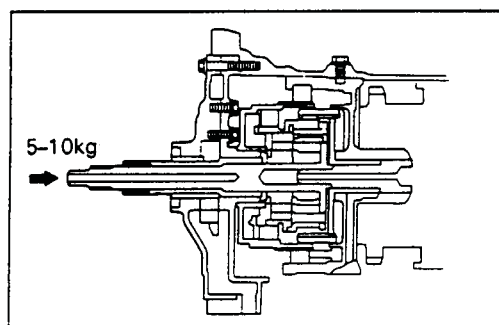
Remove the C₂ accumulator piston and spring by applying compressed air to the oil hole.



Remove the B₀ accumulator piston together with the B₂ accumulator piston by applying compressed air to the oil hole.

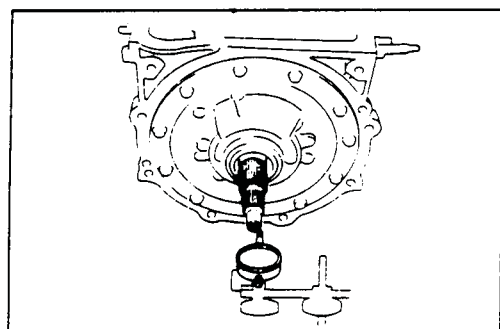
Remove the B₀ and B₂ accumulator springs.

Remove the O-rings from the accumulator pistons.



CHECK THRUST CLEARANCE OF OVERDRIVE INPUT SHAFT (OVERDRIVE PLANETARY GEAR)

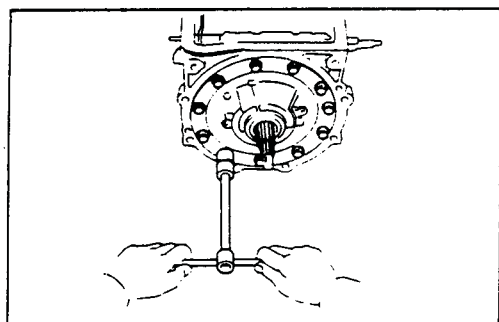
Push the O/D input shaft toward the rear of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).



Using dial indicator, measure the thrust clearance of the input shaft.

Standard thrust clearance: 0.40 – 0.90 mm
(0.0157 – 0.0354 in.)

Maximum thrust clearance: 0.90 mm (0.0354 in.)

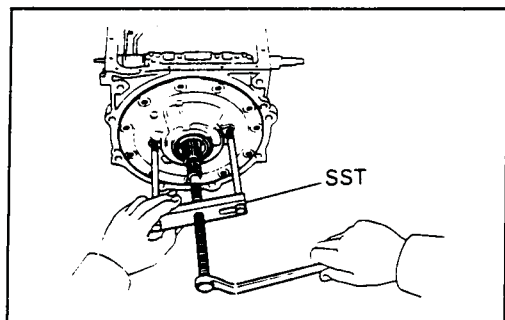


REMOVE OIL PUMP

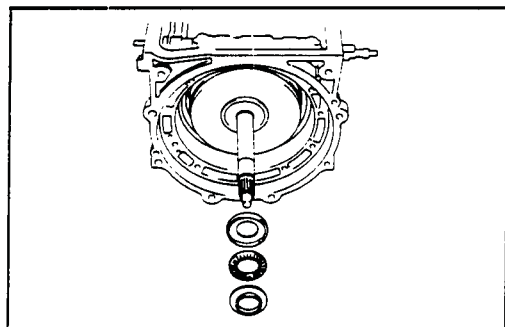
Remove the eleven bolts holding the oil pump to the transmission case.



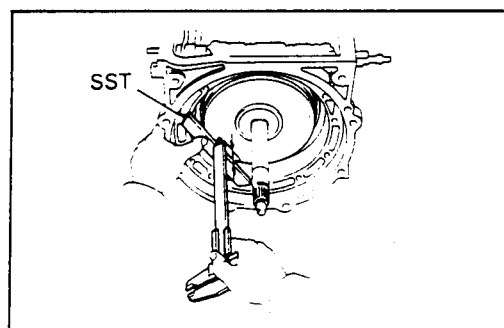
Technical Service Information



Using SST, remove the oil pump and gasket.
SST 09350-36010 (09350-06140)
Remove the O-ring from the oil pump.



Remove the two races and thrust bearing from the
O/D direct clutch drum or oil pump.

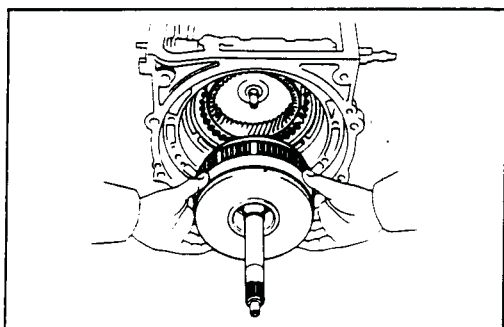


REMOVE OVERDRIVE PLANETARY GEAR, OVERDRIVE DIRECT CLUTCH AND ONE-WAY CLUTCH ASSEMBLY

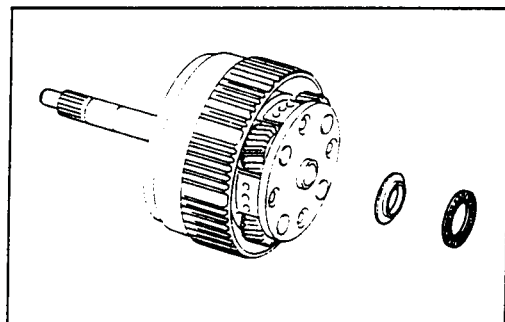
Place SST on the installation surface of the oil
pump.

SST 09350-36010 (09350-06090)

Using calipers, measure the distance between the
tops of SST and the clutch drum for assembly.



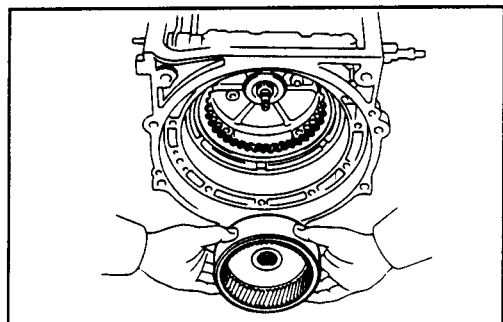
Remove the O/D planetary gear, direct clutch and
one-way clutch assembly.



Remove the bearing and race from the O/D plane-
tary gear or ring gear flange.

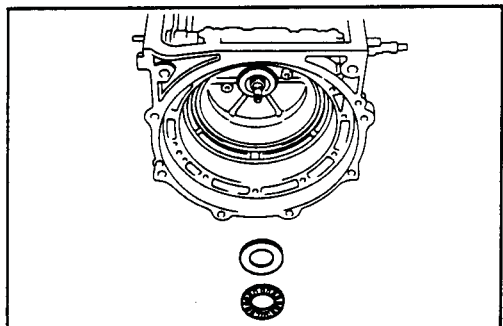


Technical Service Information

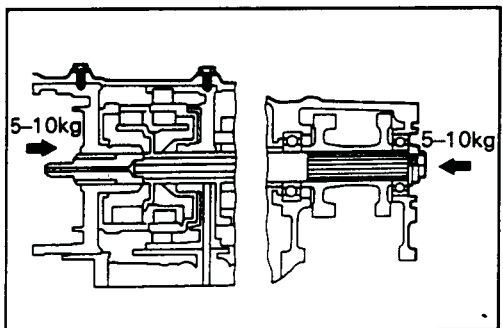


REMOVE OVERDRIVE PLANETARY RING GEAR ASSEMBLY

Remove the ring gear assembly from the O/D case.



Remove the thrust bearing and race from the O/D case or ring gear flange.



REMOVE TRANSFER NO.2 CASE COVER

CHECK THRUST CLEARANCE OF INPUT SHAFT (FRONT CLUTCH DRUM)

Push the transmission output shaft toward the front of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).

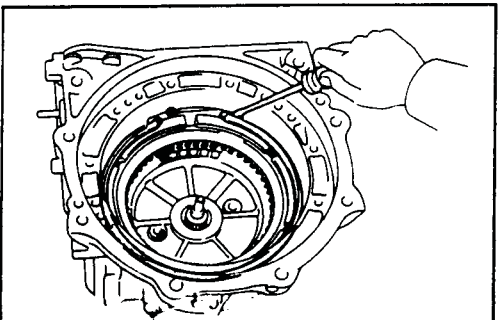
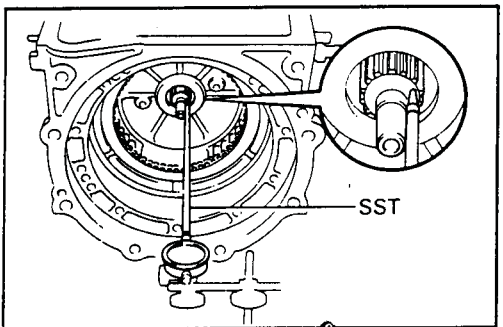
Push the O/D case toward the rear of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).

Using SST and a dial indicator, measure the thrust clearance of the input shaft.

SST 09350-36010 (09350-06130)

Standard thrust clearance: 0.30 – 0.70 mm
(0.0118 – 0.0276 in.)

Maximum thrust clearance: 0.70 mm (0.0276 in.)

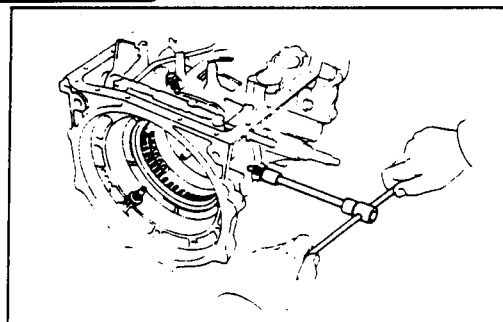


REMOVE OVERDRIVE CASE ASSEMBLY

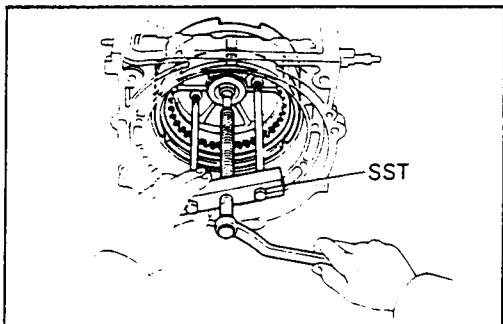
Using a screwdriver, remove the snap ring.



Technical Service Information

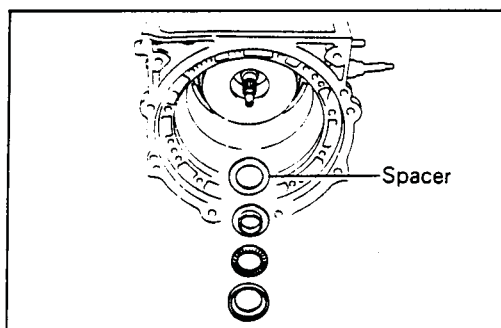


Remove the three O/D case set bolts.



Using SST, remove the O/D case assembly.
SST 09350-36010 (09350-06140)

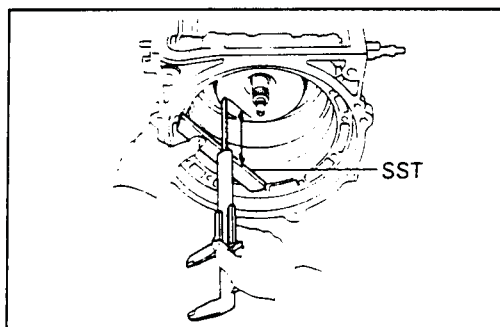
Remove the three O-rings from the oil holes of the O/D case.



Remove the oil seal ring from the input shaft.

Remove the two races, thrust bearing and spacer from the front clutch drum or O/D case.

Reinstall the oil seal ring to the input shaft.

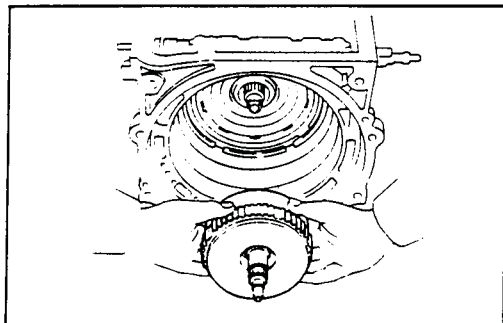


REMOVE FRONT CLUTCH ASSEMBLY

Place SST on the installation surface of the oil pump.

SST 09350-36010 (09350-06090)

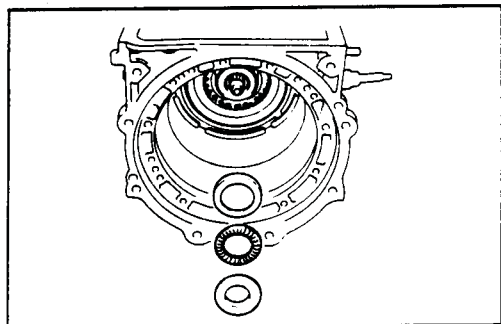
Using calipers, measure the distance between the tops of SST and the clutch drum for assembly.



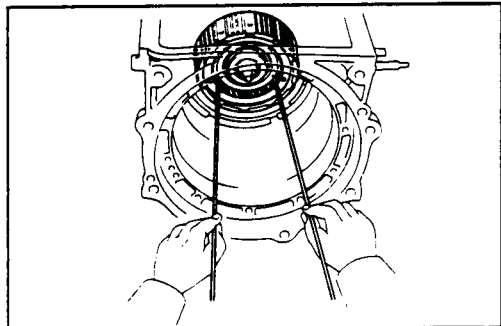
Remove the front clutch assembly.



Technical Service Information

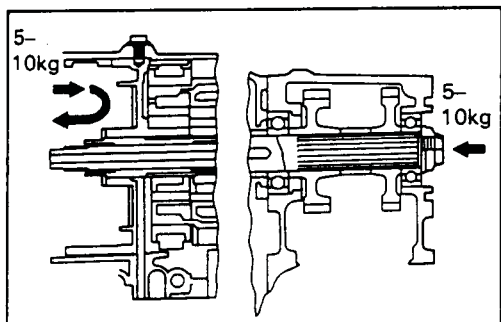


Remove the two races and thrust bearing from the rear clutch drum or front clutch hub.



REMOVE REAR CLUTCH ASSEMBLY

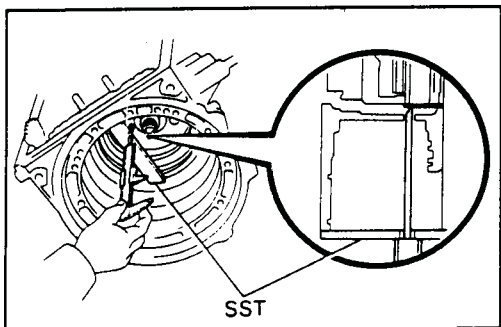
Insert two wires into flukes of the clutch discs, and remove the rear clutch assembly.



CHECK THRUST CLEARANCE OF CENTER SUPPORT, AND REMOVE CENTER SUPPORT ASSEMBLY

Push the transmission output shaft toward the front of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).

Push the center support toward the rear of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N), then pull with the same amount of force.

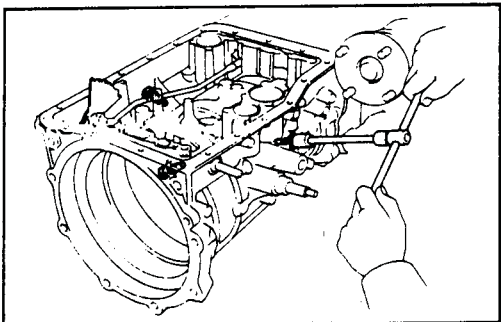


Place SST on the center support.

SST 09350-36010 (09350-06090)

Using calipers, measure distance (A) between the tops of SST and the thrust washer on the front planetary gear.

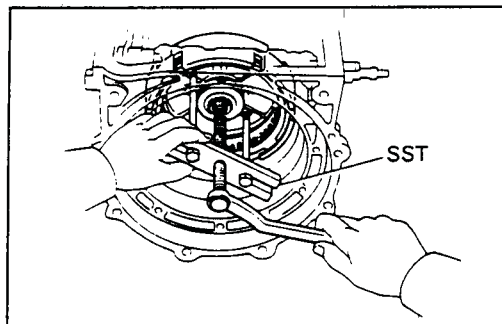
Using calipers, measure thickness (B) of SST.



Remove the three center support set bolts.

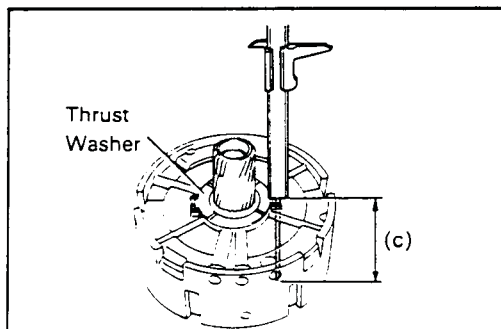


Technical Service Information



Using SST, remove the center support assembly.
SST 09350-36010 (09350-06140)

Remove the three O-rings from the oil holes of the center support.



Turn over the center support together with the thrust washer, and place it on a flat surface.

Inserting calipers into the thrust washer hole, measure the distance (C) between it and the flat surface.

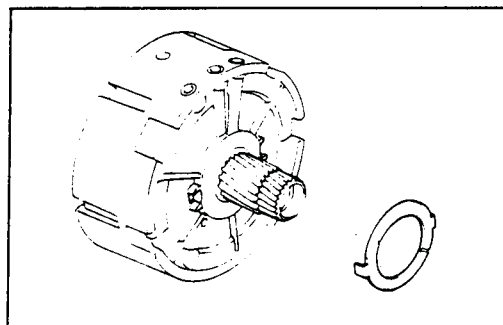
Center support thrust clearance:

$$A - (B + C)$$

Standard thrust clearance: 0.30 – 0.70 mm
(0.0118 – 0.0276 in.)

Maximum thrust clearance: 0.90 mm (0.0354 in.)

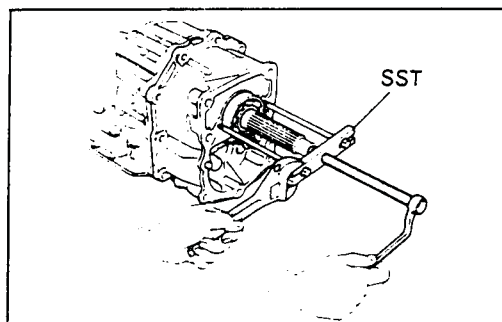
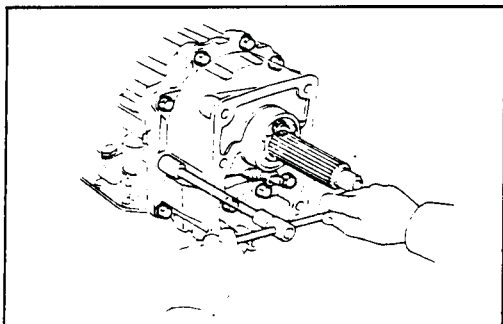
Remove the thrust washer from the center support.



REMOVE TRANSFER COMPONENT PARTS

REMOVE TRANSFER ADAPTOR AND OUTPUT SHAFT REAR BEARING

Remove the ten transfer adaptor bolts.



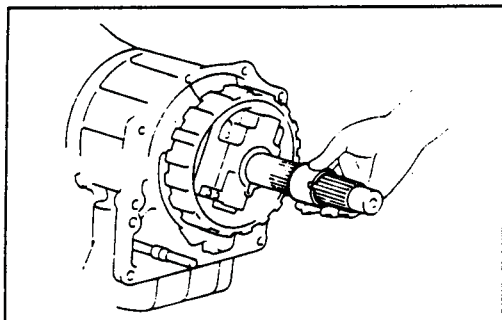
Using SST, remove the transfer adaptor together with the rear bearing.

SST 09350-36010 (09350-06140)

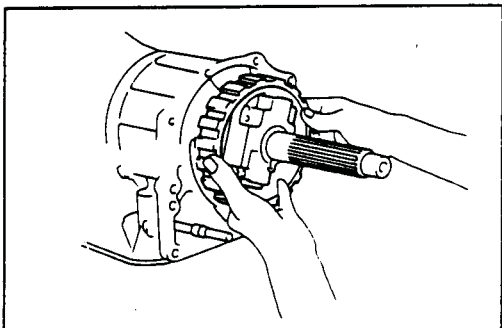
Remove the gasket.



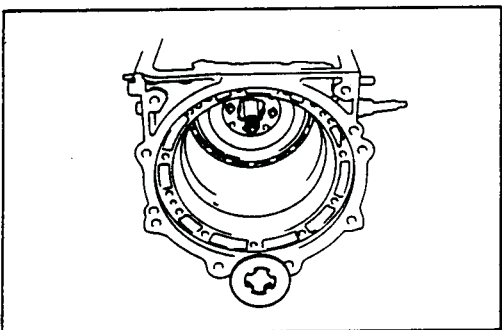
Technical Service Information



REMOVE OUTPUT SHAFT SPACER

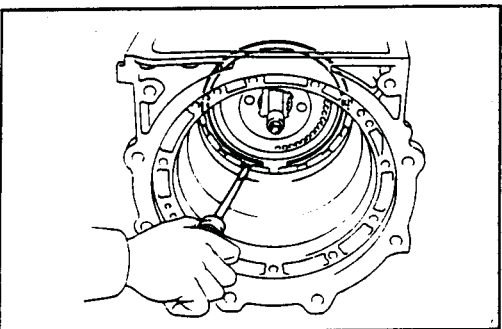


REMOVE GOVERNOR BODY ASSEMBLY

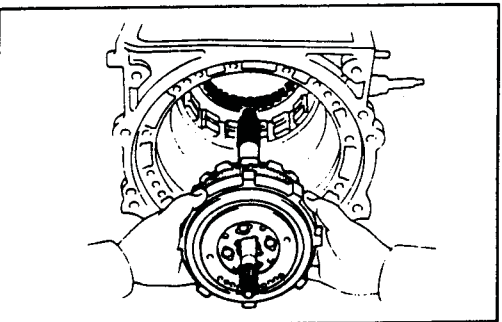


**REMOVE PLANETARY GEARS, ONE-WAY CLUTCH
AND OUTPUT SHAFT ASSEMBLY**

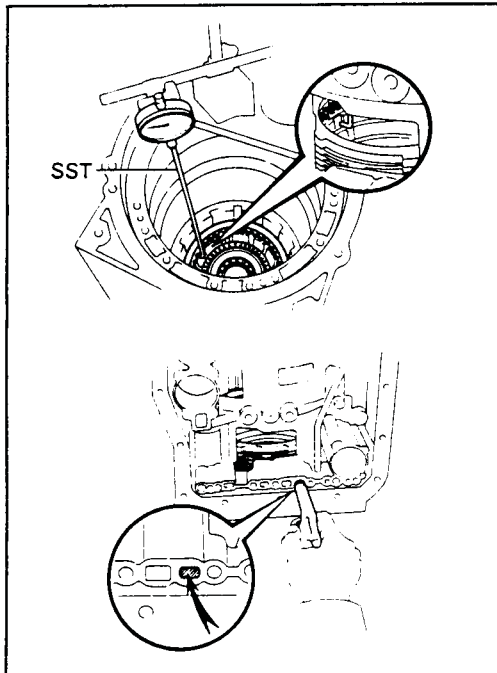
Remove the thrust washer from the planetary gear.



Using a screwdriver, remove the snap ring.



Remove the planetary gears, one-way clutch and
output shaft assembly.



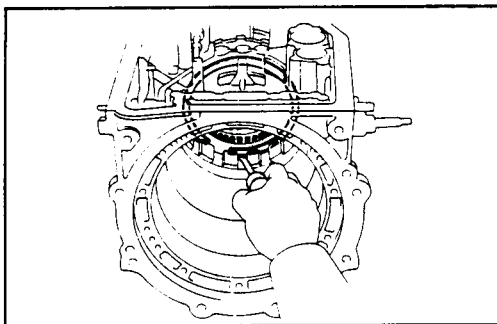
CHECK PISTON STROKE OF FIRST AND REVERSE BRAKE PISTON

Using SST and a dial indicator, measure the piston stroke by applying and releasing the compressed air (4 – 8 kg / cm², 57 – 114 psi or 392 – 785 kPa) as shown.

SST 09350-36010 (09350-06130)

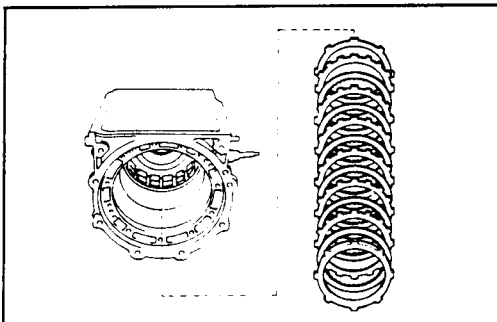
Piston stroke: 3.30 – 3.80 mm (0.1299 – 0.1496 in.)

If the piston stroke is not as specified, inspect the discs.
(See page AT-90)

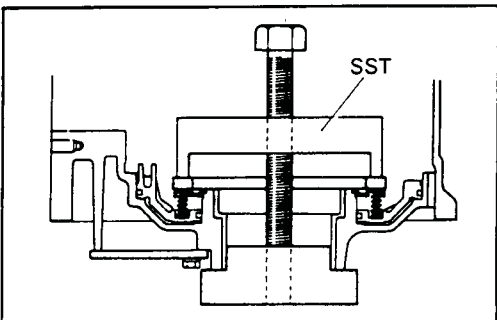


34. REMOVE FIRST AND REVERSE BRAKE PISTON

(a) Using a screwdriver, remove the snap ring.

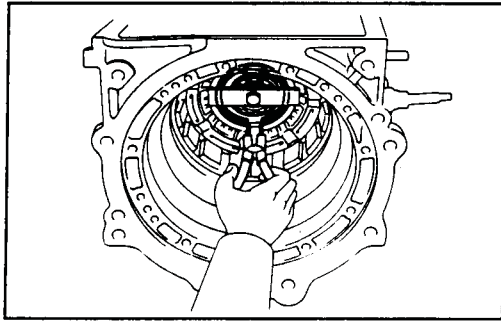


(b) Remove the flange, six discs, six plates and cushion plate.

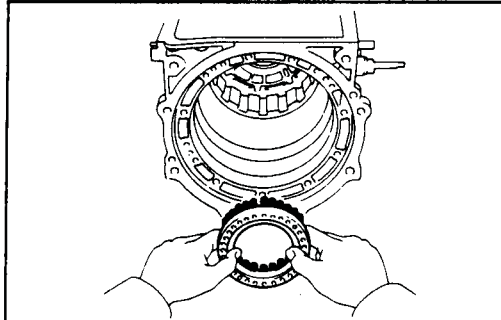


(c) Set SST on the spring retainer, and compress the return spring.

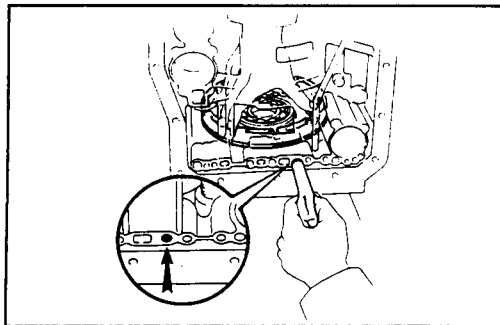
SST 09350-36010 (09350-06030)



Using snap ring pliers, remove the snap ring.



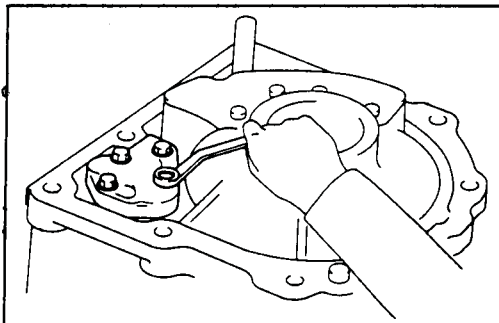
Remove the piston return spring.



Hold first and reverse brake piston with hand, remove first and reverse brake piston by applying compressed air into the oil hole of the transmission case.

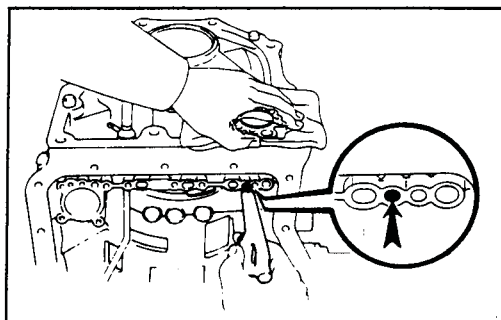
If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.

Remove the two O-rings from brake piston.



REMOVE C₁ ACCUMULATOR PISTON AND SPRING

Remove the four bolts, front clutch accumulator cover, two gaskets and plate.

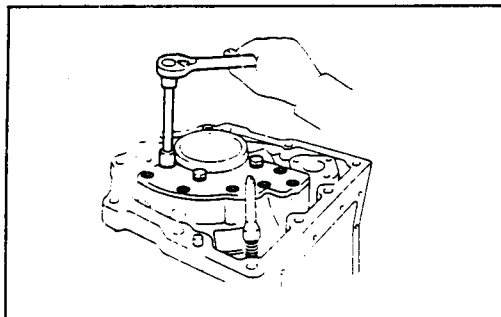


Remove the accumulator piston and spring by applying compressed air to the oil hole.

Remove the O-rings from accumulator piston.

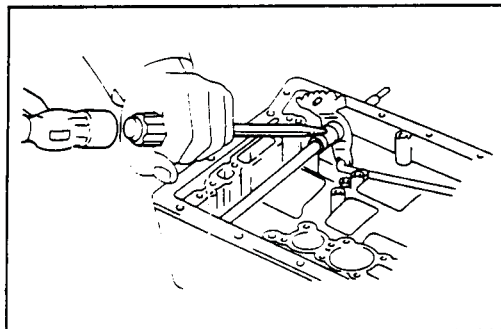


Technical Service Information



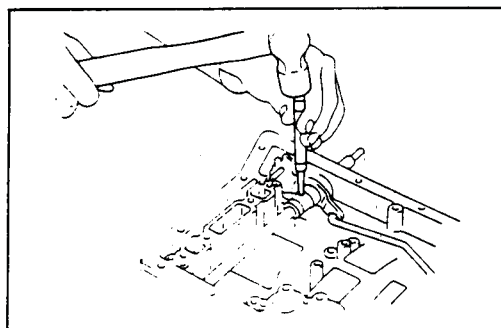
REMOVE TRANSMISSION REAR COVER

Remove the three bolts, six screws, rear cover and gasket.

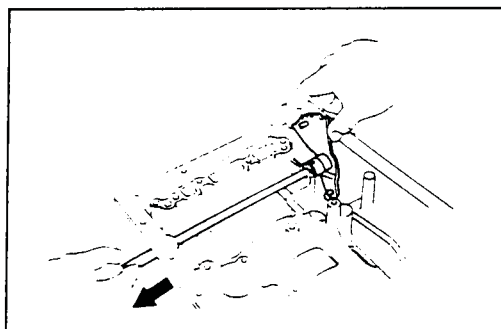


REMOVE MANUAL VALVE LEVER, SHAFT AND OIL SEALS

Using a screwdriver or chisel, cut off the spacer and remove it from the shaft.

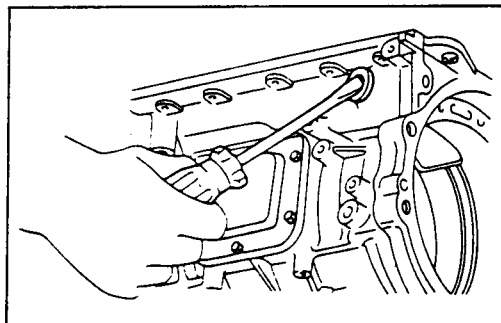


Using a pin punch, tap out the pin.



Pull the manual valve lever shaft out through the case, remove the manual valve lever, parking lock rod assembly, the two plate washers and wave washer.

Disconnect the parking lock rod from the manual valve lever.

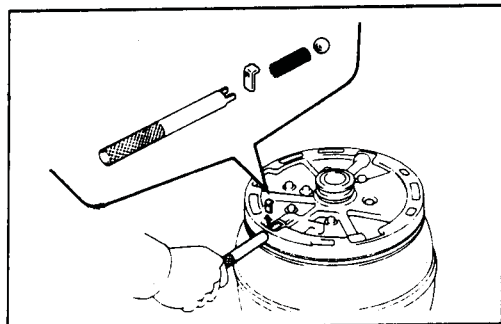
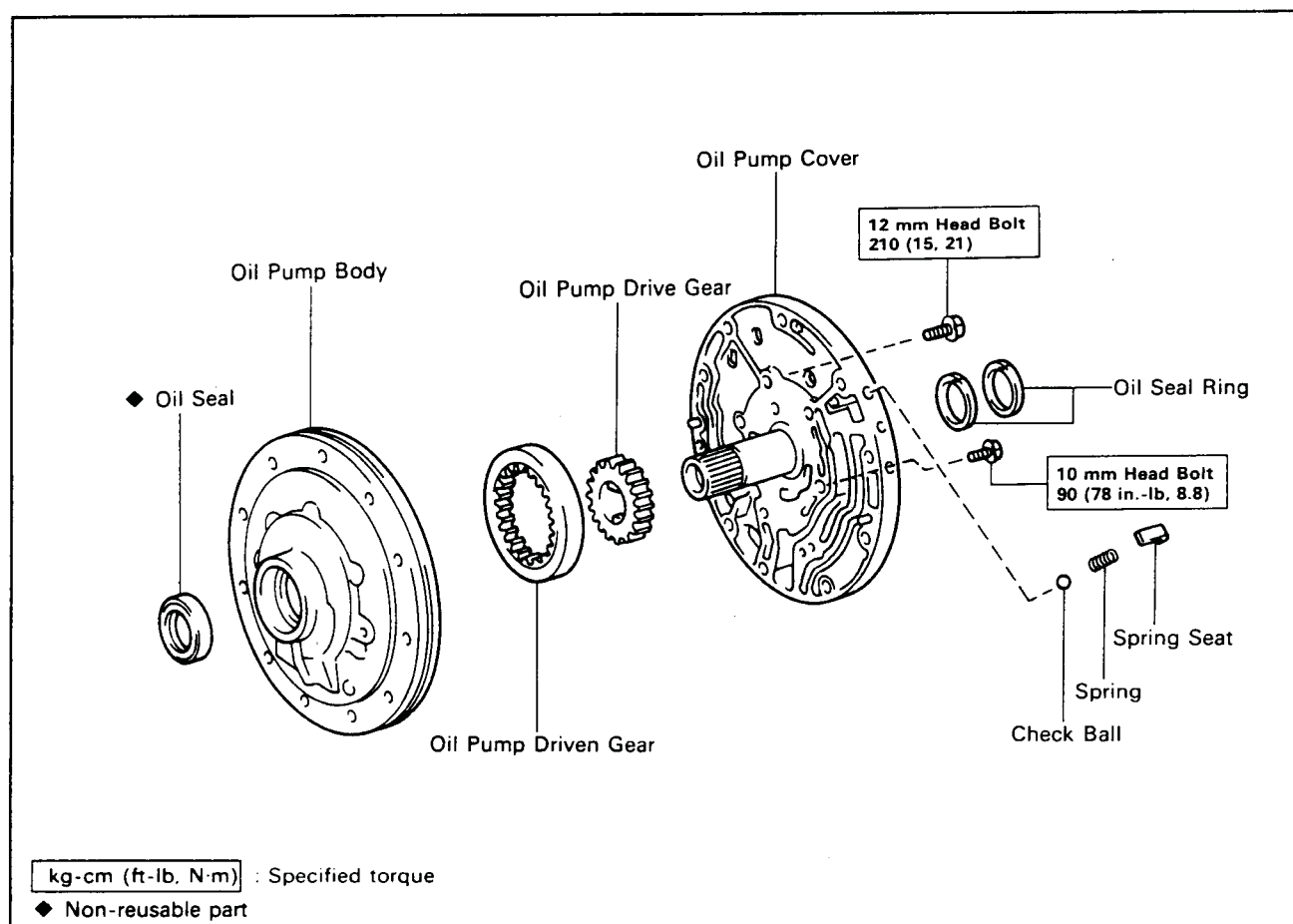


Using a screwdriver, pry out the two oil seals.



Technical Service Information

Oil Pump COMPONENTS

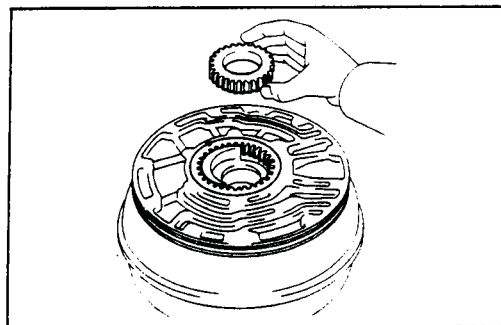


REMOVE CHECK BALL

Using SST, compress the spring and remove the spring seat.

SST 09350-36010 (09350-06100)

Remove the spring and check ball.

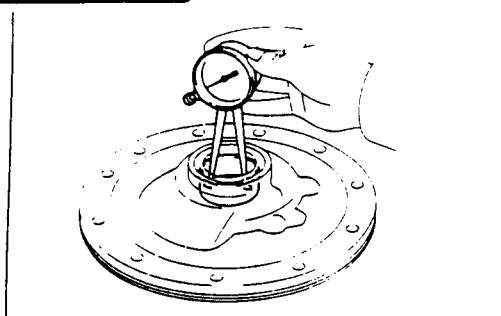


REMOVE OIL PUMP DRIVE AND DRIVEN GEARS



Technical Service Information

INSPECTION OF OIL PUMP



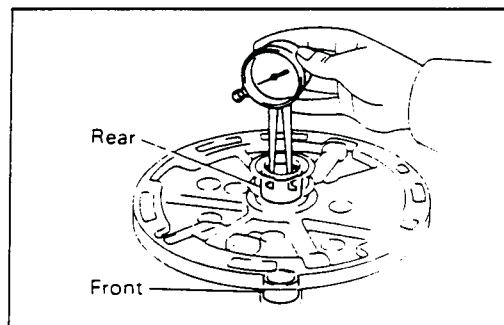
INSPECT BUSHING OF OIL PUMP BODY

Using a dial indicator, measure the inside diameter.

Standard inside diameter: 42.050 – 42.075 mm
(1.6555 – 1.6565 in.)

Maximum inside diameter: 42.13 mm (1.6587 in.)

If the inside diameter is greater than maximum, replace the pump body.



INSPECT BUSHINGS OF OIL PUMP COVER

Using a dial indicator, measure the inside diameter.

Standard inside diameter:

Front 24.000 – 24.021 mm
(0.9449 – 0.9457 in.)

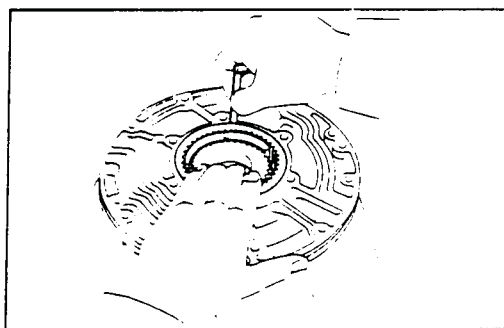
Rear 26.500 – 26.521 mm
(1.0433 – 1.0441 in.)

Maximum inside diameter:

Front 24.07 mm (0.9476 in.)

Rear 26.57 mm (1.0461 in.)

If the inside diameter is greater than maximum, replace the pump cover.



INSPECT BODY CLEARANCE OF DRIVEN GEAR

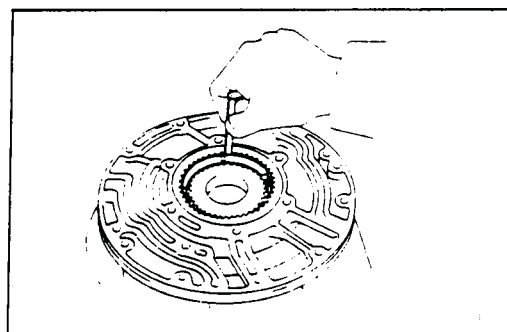
Push the driven gear to one side of the body.

Using a feeler gauge, measure the clearance between the driven gear and body.

Standard body clearance: 0.07 – 0.15 mm
(0.0028 – 0.0059 in.)

Maximum body clearance: 0.3 mm (0.012 in.)

If the body clearance is greater than maximum, replace the gears and pump body as a set.



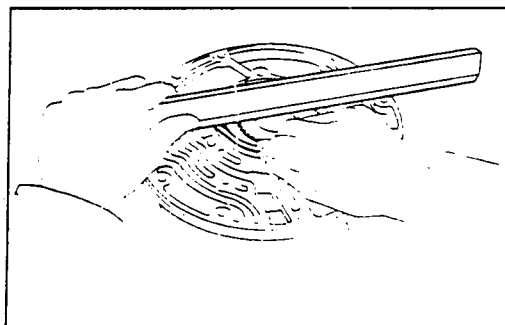
INSPECT TIP CLEARANCE OF DRIVEN GEAR

Using a feeler gauge, measure the clearance between the gear teeth and the crescent-shaped part of the pump body.

Standard tip clearance: 0.14 – 0.24 mm
(0.0055 – 0.0094 in.)

Maximum tip clearance: 0.3 mm (0.012 in.)

If the tip clearance is greater than maximum, replace the gears and pump body as a set.



INSPECT SIDE CLEARANCE OF DRIVE AND DRIVEN GEARS

Using a steel straight edge and a feeler gauge, measure the clearance between the gears and steel straight edge.

Standard side clearance: 0.02 – 0.05 mm
(0.0008 – 0.0020 in.)

Maximum side clearance: 0.1 mm (0.004 in.)

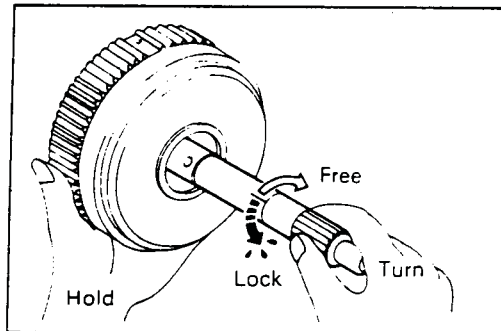
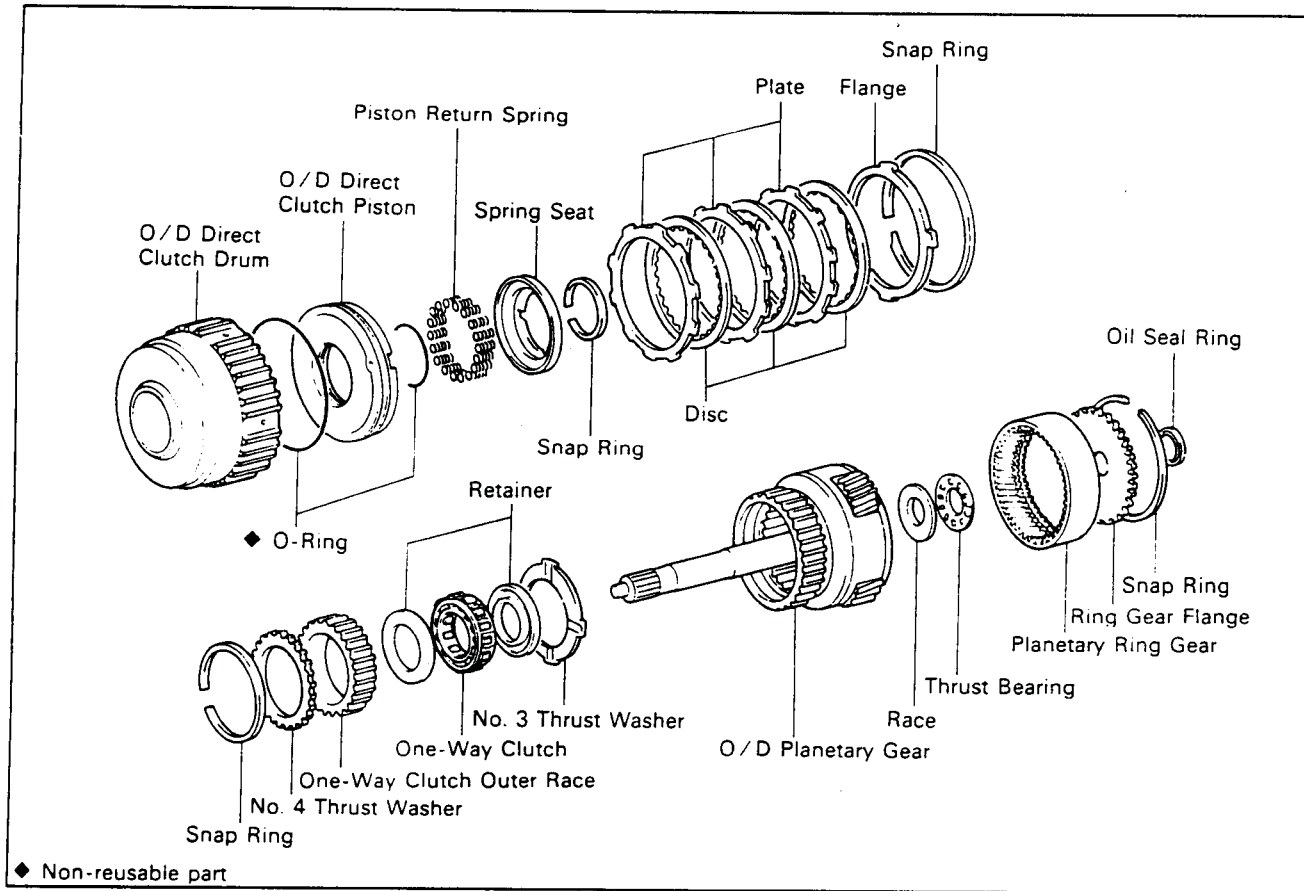
If the side clearance is greater than maximum, select and replace the gears as a set.



Technical Service Information

Overdrive Planetary Gear, Overdrive Direct Clutch and Overdrive One-Way Clutch

COMPONENTS



DISASSEMBLY OF OVERDRIVE PLANETARY GEAR, OVERDRIVE DIRECT CLUTCH AND OVERDRIVE ONE-WAY CLUTCH

CHECK OPERATION OF ONE-WAY CLUTCH

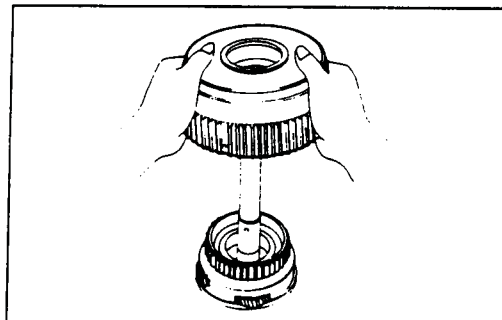
Hold the O/D direct clutch drum and turn the input shaft. The input shaft should turn freely clockwise and should lock counterclockwise.

REMOVE OVERDRIVE DIRECT CLUTCH ASSEMBLY FROM OVERDRIVE PLANETARY GEAR

INSTALL OVERDRIVE DIRECT CLUTCH ASSEMBLY

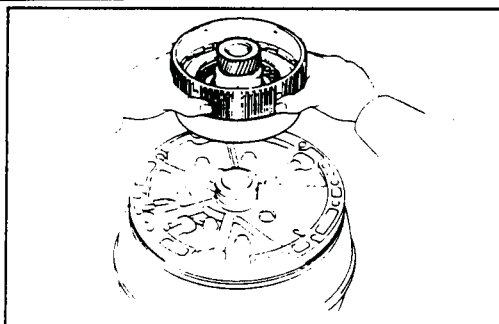
Install the direct clutch assembly onto the O/D planetary gear.

NOTE: Mesh the spline of the O/D planetary gear with the flukes of the discs by rotating and pushing the O/D direct clutch counterclockwise.



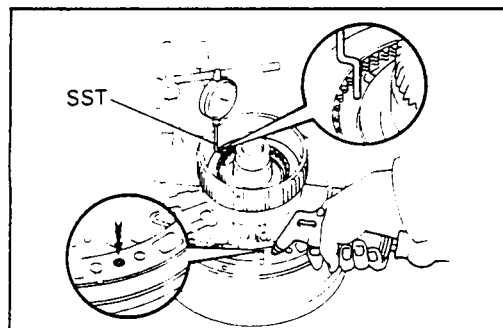


Technical Service Information



CHECK PISTON STROKE OF OVERDRIVE DIRECT CLUTCH

Place the oil pump onto the torque converter, and then place the O/D direct clutch assembly onto the oil pump.

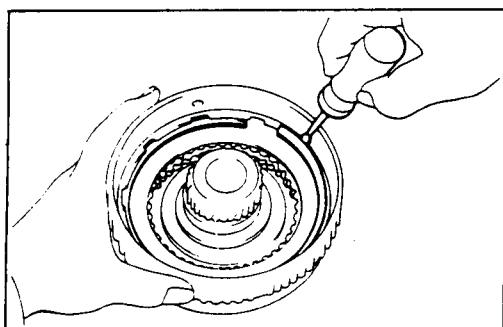


Using SST and a dial indicator, measure the piston stroke by applying and releasing the compressed air (4 - 8 kg/cm², 57 - 114 psi or 392 - 785 kPa) as shown.

SST 09350-36010 (09350-06110)

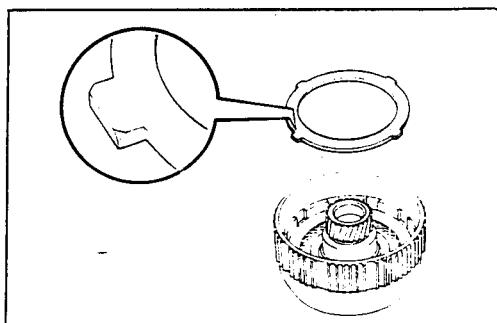
Piston stroke: 1.10 - 1.70 mm (0.0433 - 0.0669 in.)

If the piston stroke is not as specified, inspect the discs.

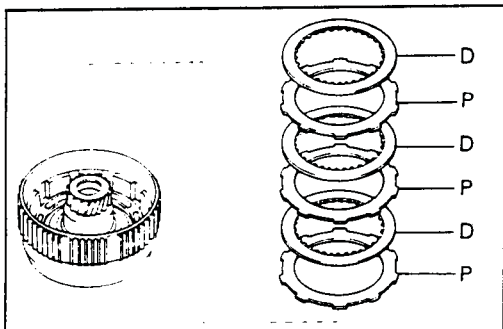


REMOVE FLANGE, PLATES AND DISCS

Using a screwdriver, remove the snap ring.



Install the flange, facing the rounded edge upward.



INSTALL PLATES, DISCS AND FLANGE

Install the three plates and three discs in order:

P = Plate D = Disc

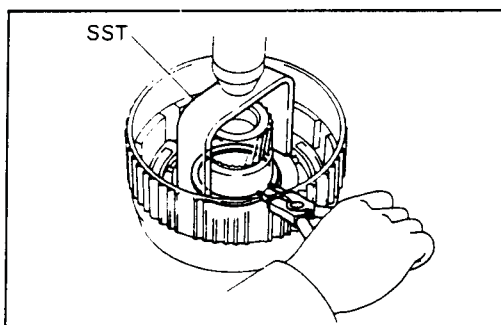
P-D-P-D-P-D

REMOVE PISTON RETURN SPRING

Place SST on the spring seat, and compress the return spring with a shop press.

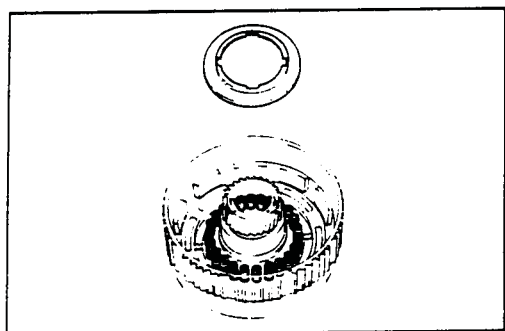
SST 09350-36010 (09350-06010)

Using snap ring pliers, remove the snap ring.





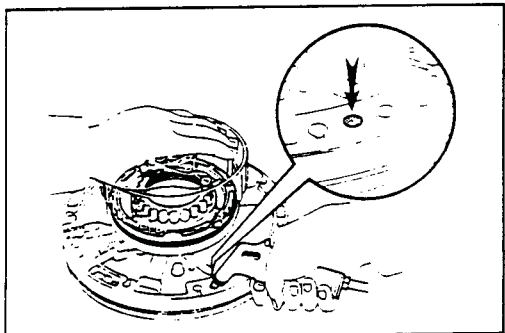
Technical Service Information



Remove the spring seat and twenty-four return springs.

INSTALL PISTON RETURN SPRING

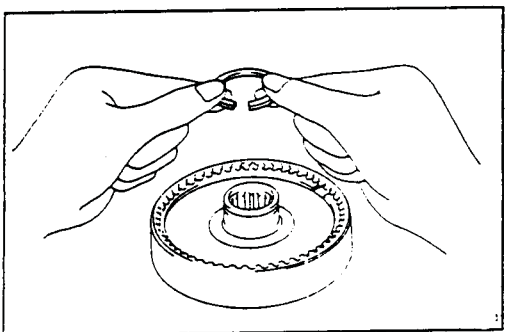
Place the twenty-four return springs and spring seat on the clutch piston.



REMOVE OVERDRIVE DIRECT CLUTCH PISTON

Place the oil pump onto the torque converter, and then place the O/D direct clutch onto the oil pump. Hold the clutch piston with hand, apply compressed air into the oil hole of the oil pump to remove the clutch piston.

Remove the two O-rings from the clutch piston.



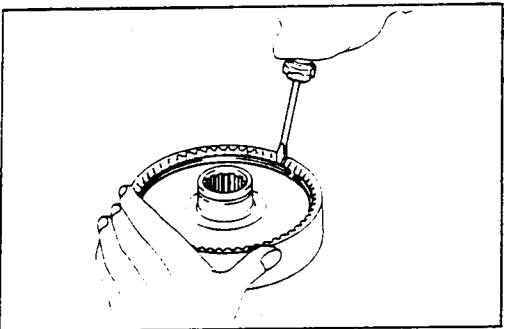
REMOVE OIL SEAL RING FROM RING GEAR FLANGE

INSTALL OIL SEAL RING

Coat the oil seal ring with ATF, and install it to the ring gear flange.

CAUTION: Do not spread the ring ends more than necessary.

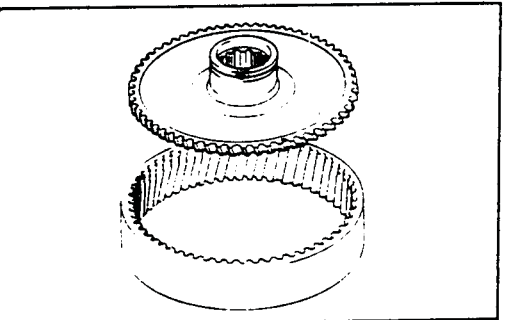
NOTE: After installing the oil seal ring, check that it moves smoothly.



REMOVE RING GEAR FLANGE

Using a small screwdriver, remove the snap ring.

Using a screwdriver, install the snap ring.



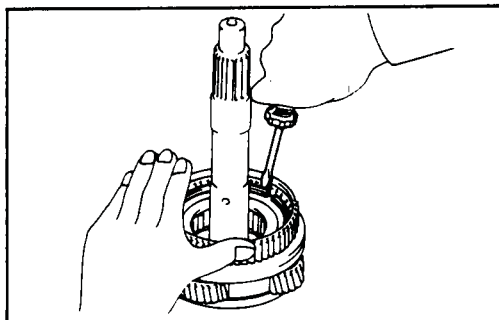
Remove the ring gear flange.

INSTALL RING GEAR FLANGE TO OVERDRIVE PLANETARY RING GEAR

Install the ring gear flange as shown.

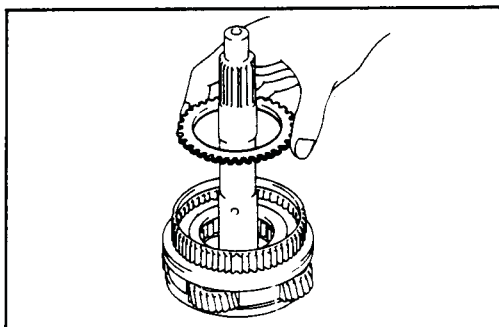


Technical Service Information

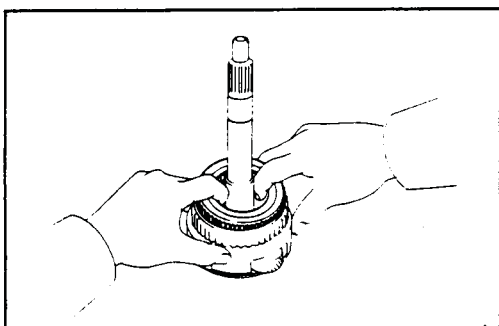


REMOVE ONE-WAY CLUTCH FROM OVERDRIVE PLANETARY GEAR

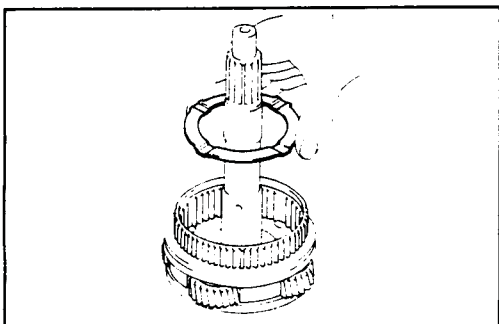
Using a small screwdriver, remove the snap ring.



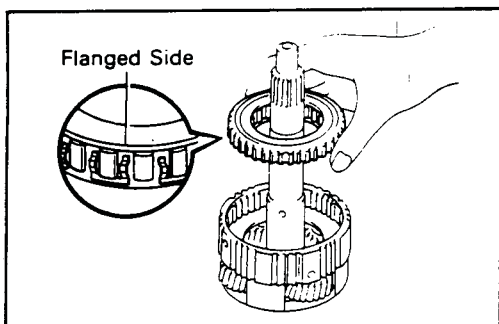
Remove the No.4 thrust washer.



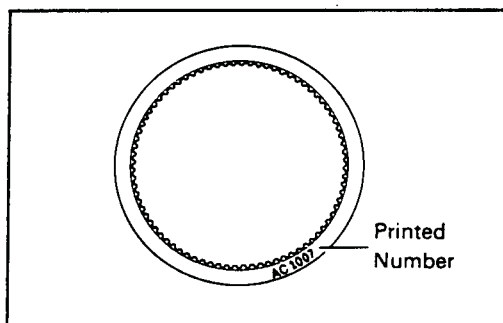
Remove the one-way clutch together with the outer race.



Remove the No.3 thrust washer.



- (c) Install the one-way clutch and outer race assembly, facing the flanged side of the one-way clutch upward.



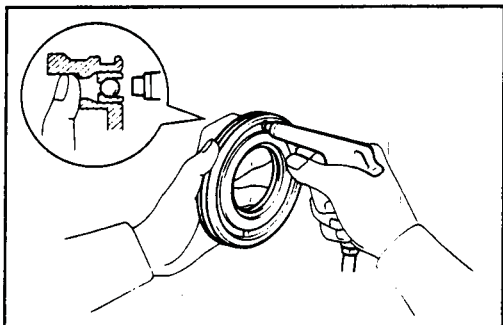
INSPECTION OF OVERDRIVE PLANETARY GEAR AND OVERDRIVE DIRECT CLUTCH

INSPECT DISCS, PLATES AND FLANGE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.

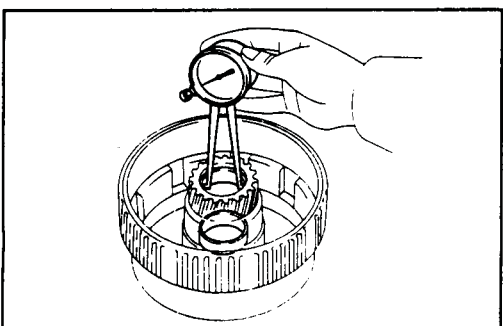
NOTE:

- If the lining of the disc is peeling off or discolored, or even if parts of the printed numbers are defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least two hours.



INSPECT OVERDRIVE DIRECT CLUTCH PISTON

- Check that check ball is free by shaking the piston.
- Check that the valve does not leak by applying low-pressure compressed air.



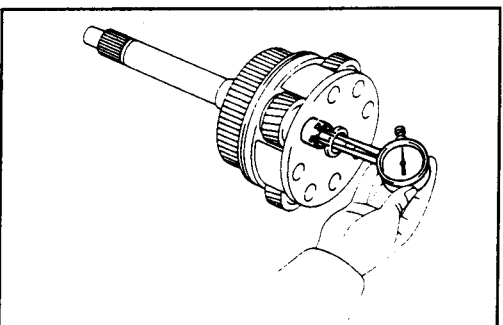
INSPECT BUSHINGS OF OVERDRIVE DIRECT CLUTCH DRUM

Using a dial indicator, measure the inside diameter.

Standard inside diameter: 26.500 – 26.521 mm
(1.0433 – 1.0441 in.)

Maximum inside diameter: 26.57 mm (1.0461 in.)

If the inside diameter is greater than maximum, replace the clutch drum.



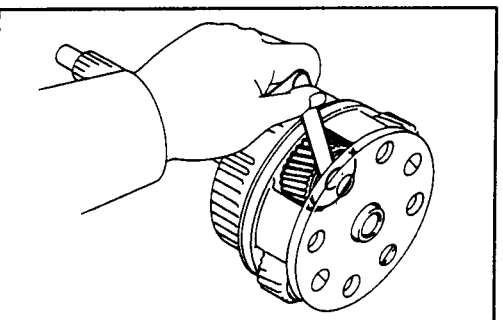
INSPECT BUSHING OF OVERDRIVE PLANETARY GEAR

Using a dial indicator, measure the inside diameter.

Standard inside diameter: 12.000 – 12.018 mm
(0.4724 – 0.4731 in.)

Maximum inside diameter: 12.07 mm (0.4752 in.)

If the inside diameter is greater than maximum, replace the planetary gear.



INSPECT PLANETARY PINION GEAR THRUST CLEARANCE

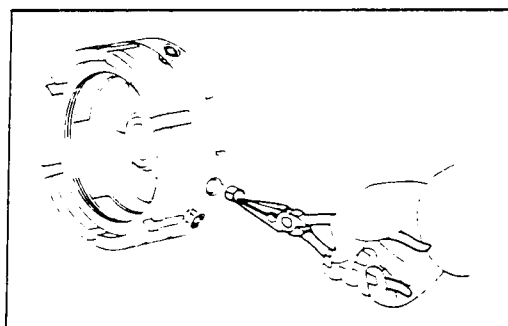
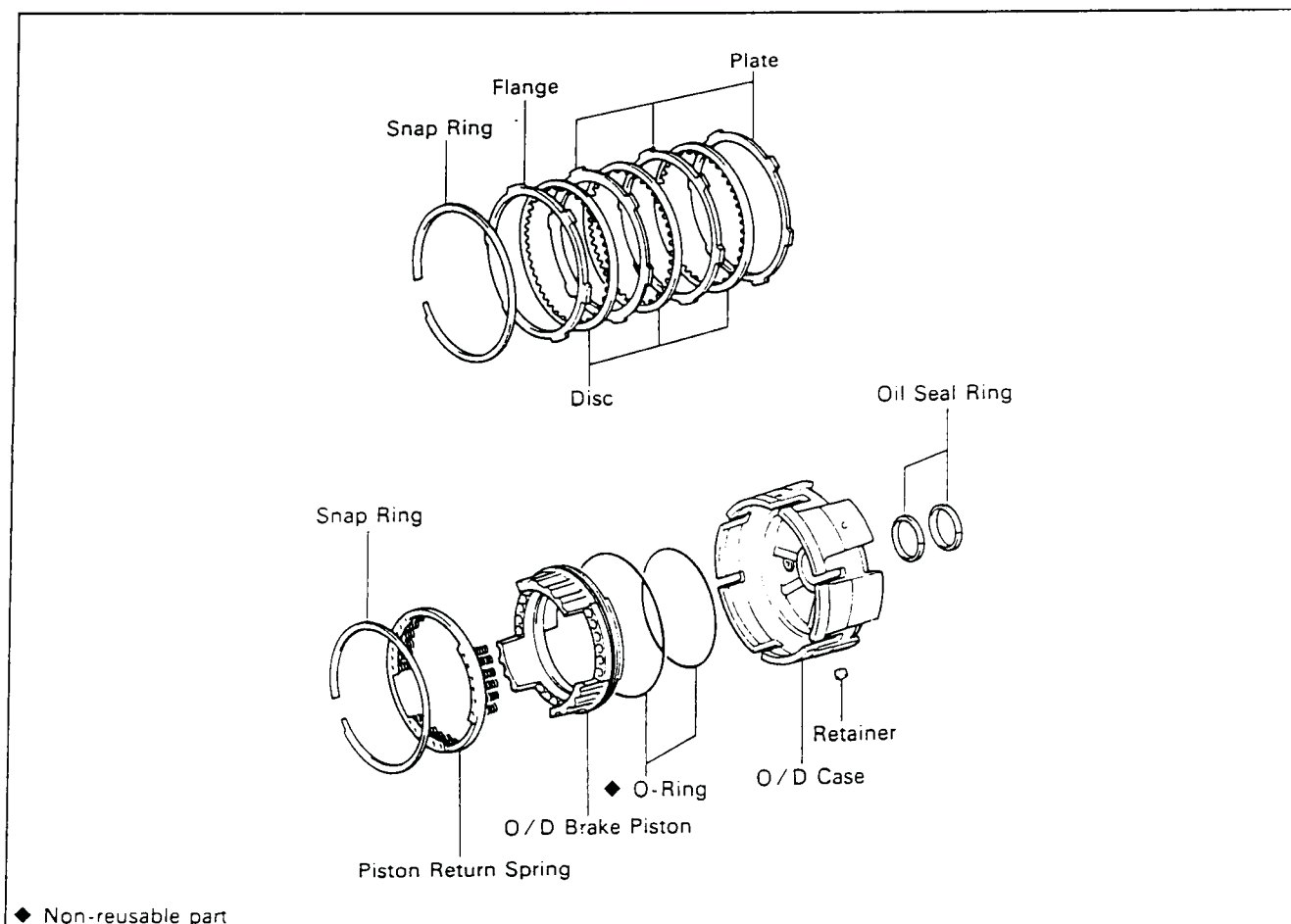
Using a feeler gauge, measure the thrust clearance between the pinions and carrier.

Standard clearance: 0.20 – 0.59 mm
(0.0079 – 0.0232 in.)

Maximum clearance: 0.80 mm (0.0315 in.)

If the thrust clearance is greater than maximum, replace the planetary gear.

Overdrive Brake COMPONENTS



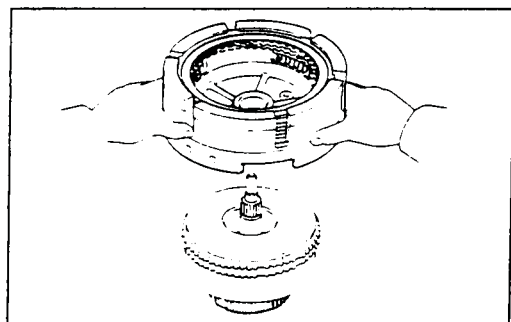
DISASSEMBLY OF OVERDRIVE BRAKE

REMOVE RING RETAINERS

Using needle nose pliers, remove the three ring retainers from the oil holes of the O/D case.

INSTALL RING RETAINERS

Using needle nose pliers, install the three ring retainers into the oil holes of the O/D case.

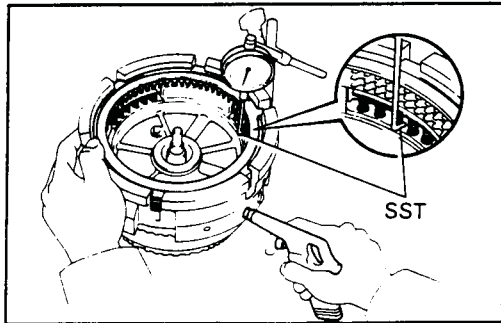


CHECK PISTON STROKE OF OVERDRIVE BRAKE

Place the O/D case assembly onto the rear clutch assembly.



Technical Service Information

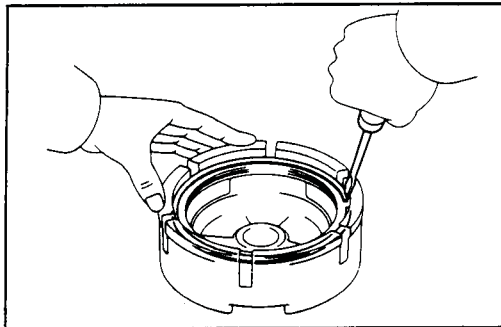


Using SST and a dial indicator, measure the piston stroke by applying and releasing the compressed air (4 – 8 kg/cm², 57 – 114 psi or 392 – 785 kPa) as shown.

SST 09350-36010 (09350-06120)

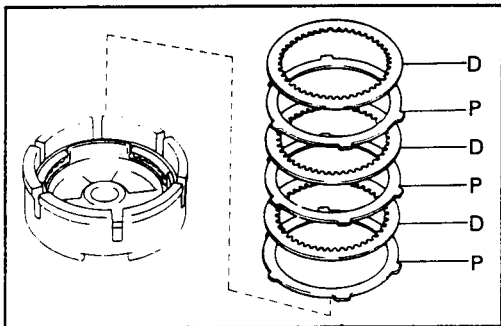
Piston stroke: 1.25 – 1.85 mm (0.0492 – 0.0728 in.)

If the piston stroke is greater than specified, inspect the discs.



REMOVE FLANGE, DISCS AND PLATES

Using a screwdriver, remove the snap ring.



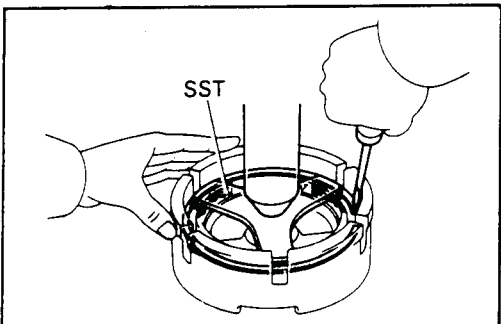
Remove the flange, three discs and three plates.

INSTALL PLATES, DISCS AND FLANGE

Install the three plates and three discs in order:

P = Plate D = Disc

P-D-P-D-P-D

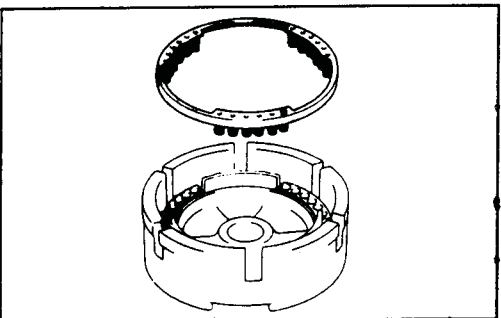


REMOVE PISTON RETURN SPRING

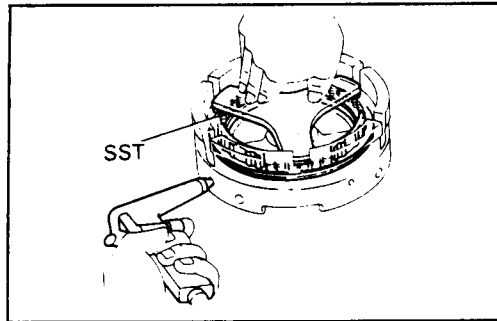
Place SST on the spring seat, and compress the return spring with a shop press.

SST 09350-36010 (09350-06020)

Using a screwdriver, remove the snap ring.



Remove the return spring.



REMOVE OVERDRIVE BRAKE PISTON

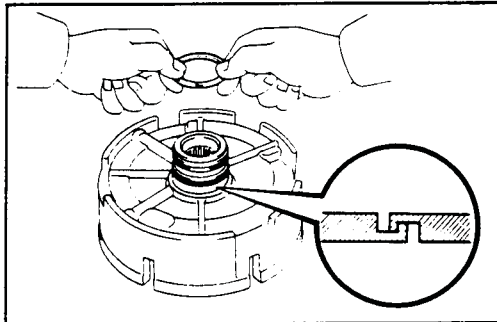
- (a) Place the return spring on the brake piston, and then place SST on the return spring.

SST 09350-36010 (09350-06020)

- (b) Hold SST so it does not slant, and apply compressed air into the oil hole of the O / D case to remove the brake piston.

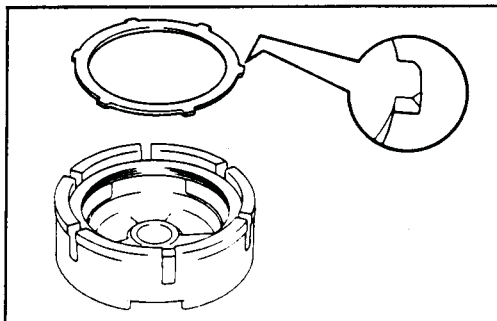
SST 09350-36010 (09350-06020)

- (c) Remove the two O-rings from the brake piston.

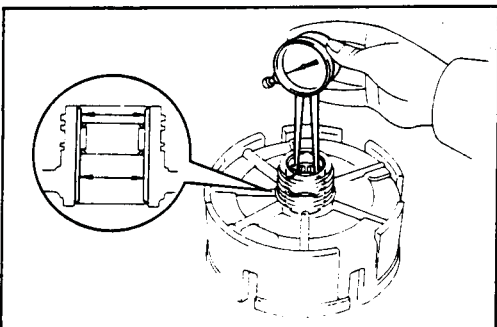


REMOVE OIL SEAL RINGS

Remove the two oil seal rings from the O / D case.



Install the flange, facing the rounded edge upward.



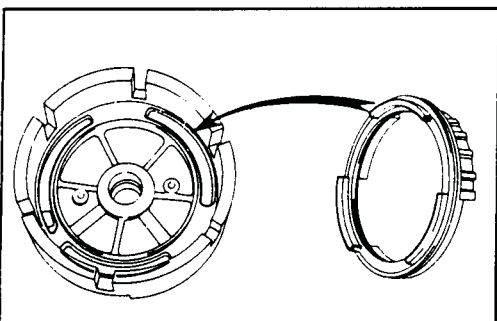
INSPECT BUSHING OF OVERDRIVE CASE

Using a dial indicator, measure the inside diameter.

Standard inside diameter: 33.100 – 33.150 mm
(1.3031 – 1.3051 in.)

Maximum inside diameter: 33.20 mm (1.3071 in.)

If the inside diameter is greater than maximum, replace the O / D case.



INSTALL OVERDRIVE BRAKE PISTON

Coat new two O-rings with ATF, and install them on the brake piston.

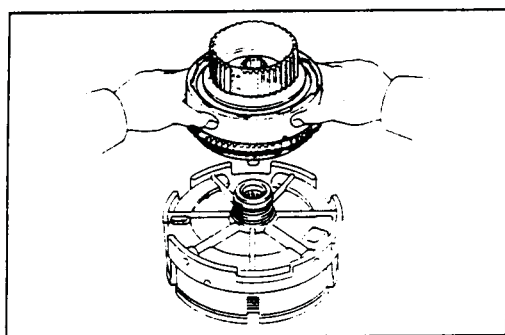
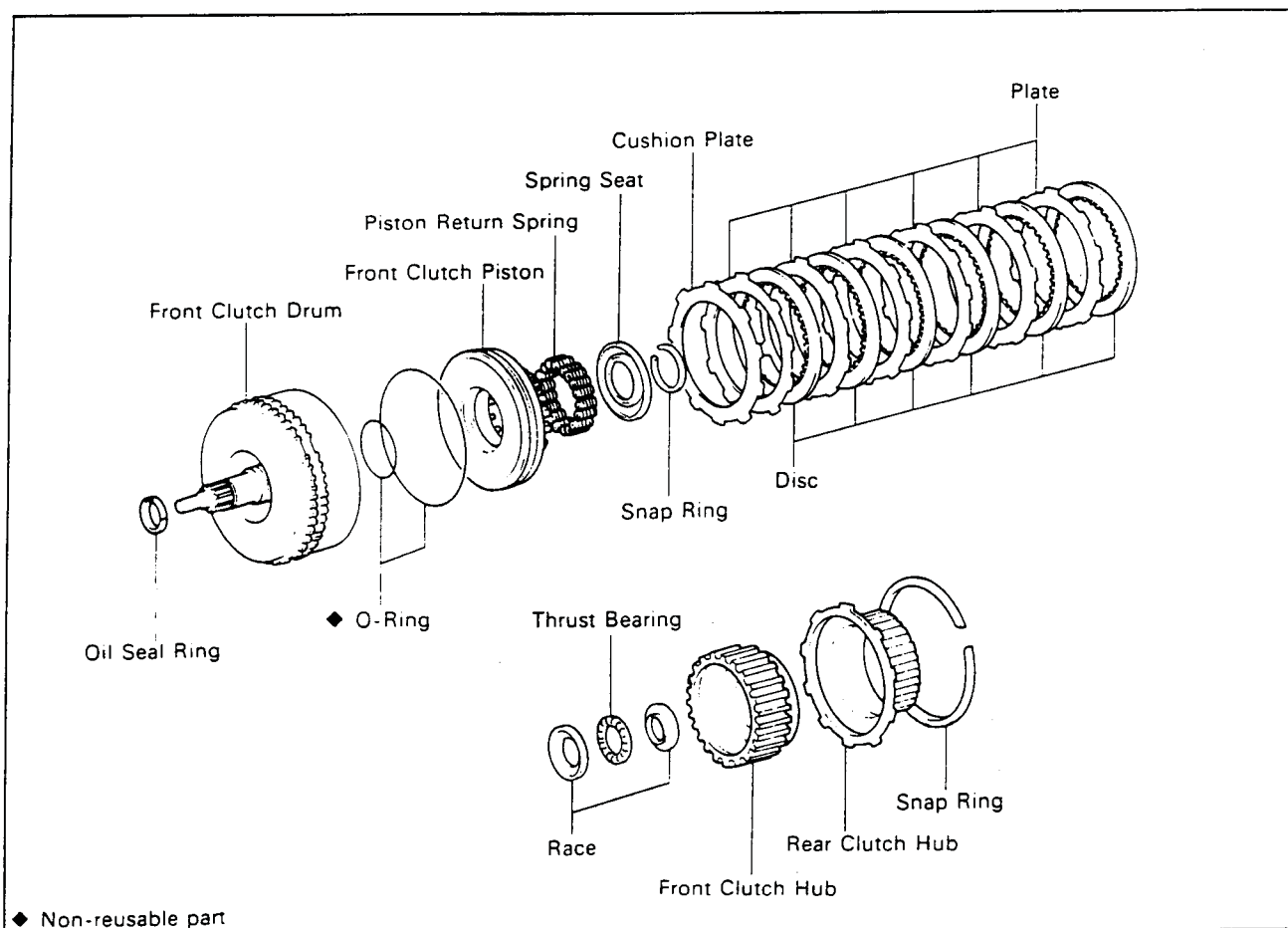
Align the protrusions of the brake piston with the grooves of the O / D case.



Technical Service Information

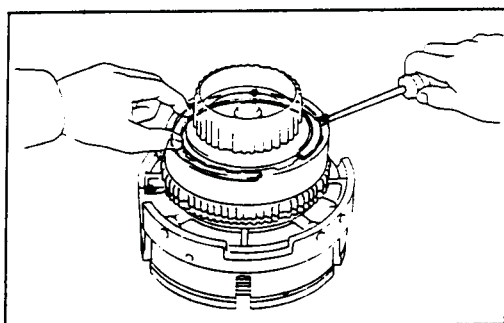
Front Clutch

COMPONENTS



DISASSEMBLY OF FRONT CLUTCH

PLACE FRONT CLUTCH ASSEMBLY ONTO
OVERDRIVE CASE ASSEMBLY



REMOVE REAR AND FRONT CLUTCH HUBS

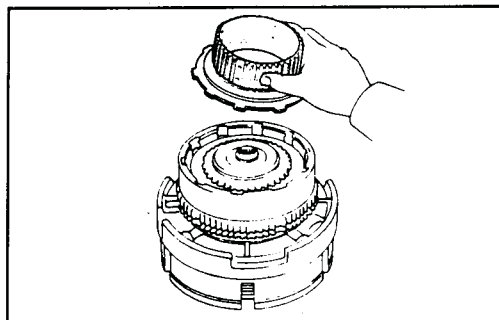
Using a screwdriver, remove the snap ring.

Using a screwdriver, install the snap ring.

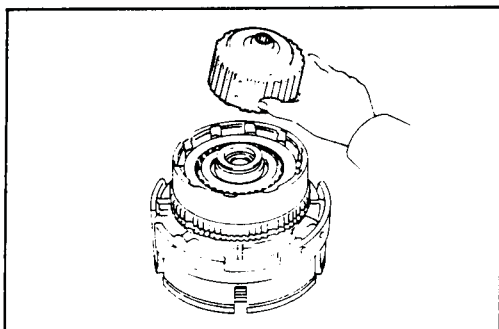
NOTE: Be sure the end gap of the snap ring is not aligned with the cutout portion of the front clutch drum.



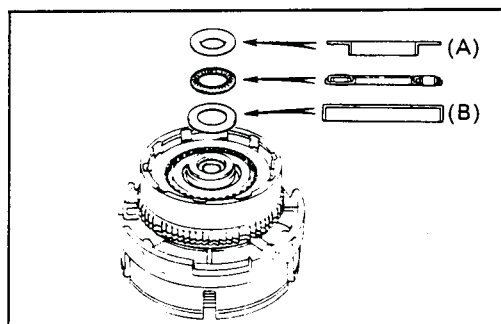
Technical Service Information



Remove the rear clutch hub.



Remove the front clutch hub.



Remove the two races and thrust bearing.

NOTE: Races and bearing diameter

mm (in.)

	Inside	Outside
Race (A)	32.8 (1.291)	50.4 (1.984)
Bearing	34.7 (1.366)	52.0 (2.047)
Race (B)	37.0 (1.457)	52.0 (2.047)

CHECK PISTON STROKE OF FRONT CLUTCH

Install SST to a dial indicator.

SST 09350-36010 (09350-06110)

Place the assembled SST and a dial indicator on the clutch piston.

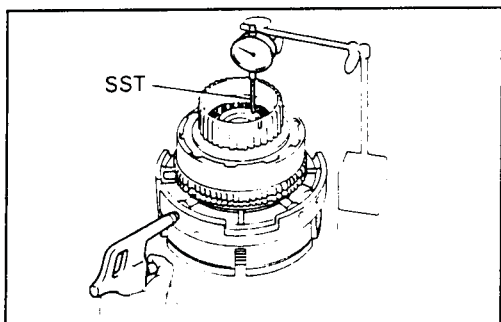
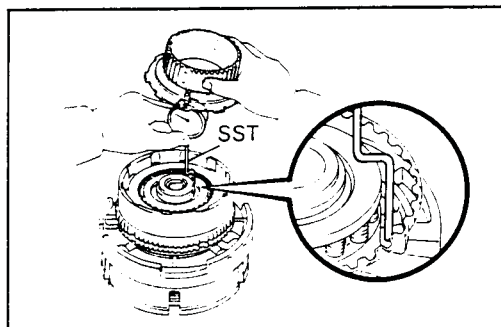
Install the rear clutch hub with the snap ring.

NOTE: There are four different thicknesses for plate.

mm (in.)

Thickness	
1.8 (0.071)	2.2 (0.087)
2.0 (0.079)	2.4 (0.094)

mm
r
s



Remove the snap ring and rear clutch hub.

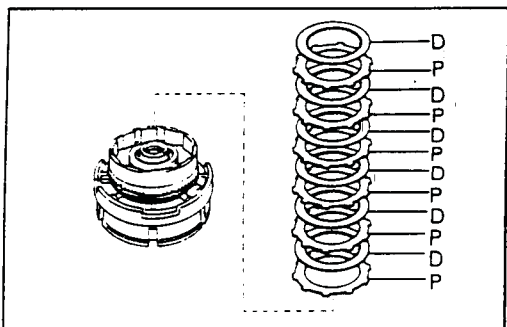
Piston stroke: 3.93 – 4.23 mm (0.1547 – 0.1665 in.)

If the piston stroke is greater than specified, inspect the discs.

Remove the snap ring and rear clutch hub.



Technical Service Information

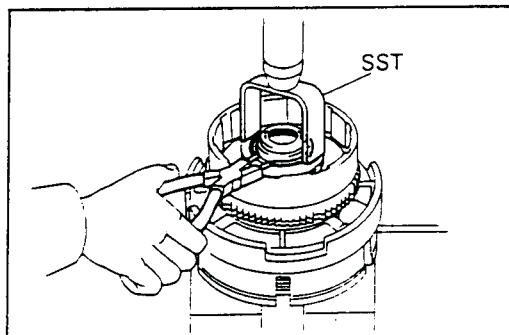


REMOVE DISCS, PLATES AND CUSHION PLATE
Remove the six discs, six plates and cushion plate.

Install the six plates and six discs in order:

P = Plate D = Disc

P-D-P-D-P-D-P-D-P-D-P-D

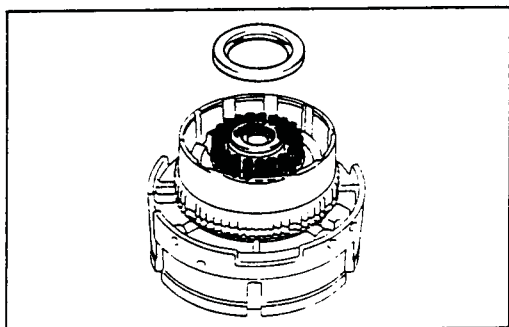


REMOVE PISTON RETURN SPRINGS

Place SST on the spring seat, and compress the return springs with a shop press.

SST 09350-36010 (09350-06010)

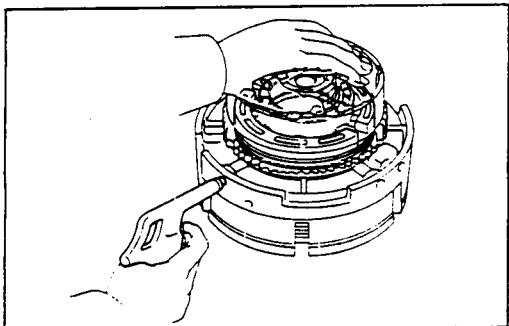
Using snap ring pliers, remove the snap ring.



Remove the spring seat and twenty-two return springs.

INSTALL PISTON RETURN SPRINGS

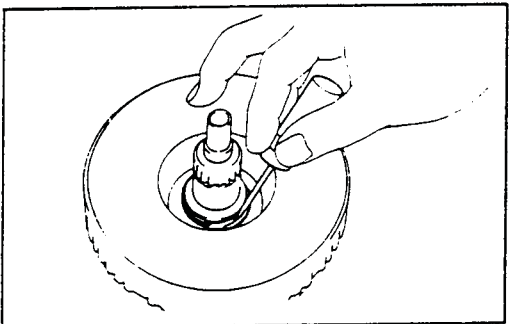
Place the twenty-two return springs and spring seat on the clutch piston.



REMOVE FRONT CLUTCH PISTON

Hold the clutch piston by hand, apply compressed air into the oil hole of the O/D case to remove the clutch piston.

Remove the two O-rings from the clutch piston.

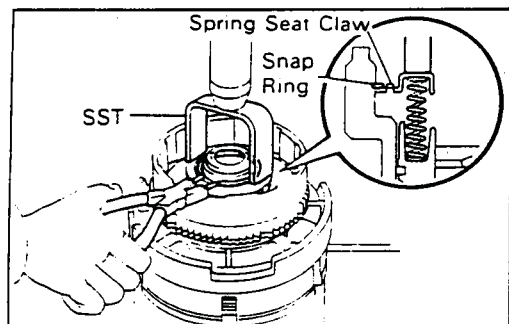


REMOVE OIL SEAL RING

Using a small screwdriver, remove the oil seal ring from the clutch drum.



Technical Service Information

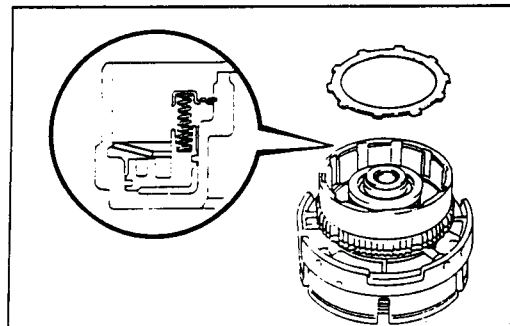


Place SST on the spring seat, and compress the return springs with a shop press.

SST 09350-36010 (09350-06010)

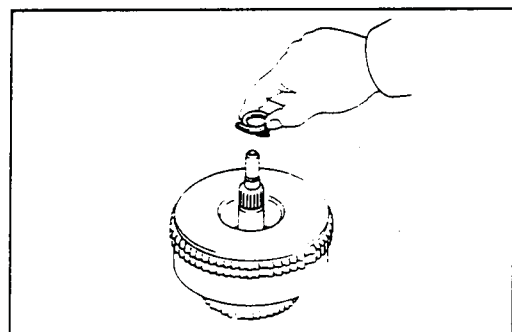
Using snap ring pliers, install the snap ring.

NOTE: Be sure the end gap of the ring is not aligned with the spring seat claw.



INSTALL CUSHION PLATE, PLATES AND DISCS

Install the cushion plate, facing the rounded edge downward.



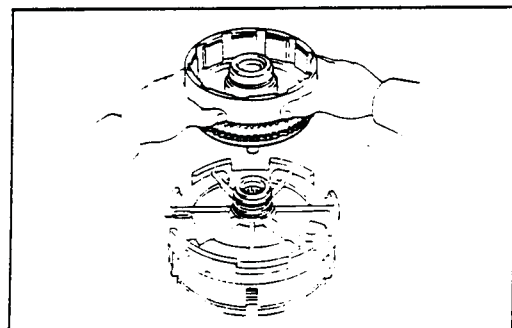
INSTALL OIL SEAL RING

Coat the oil seal ring with ATF.

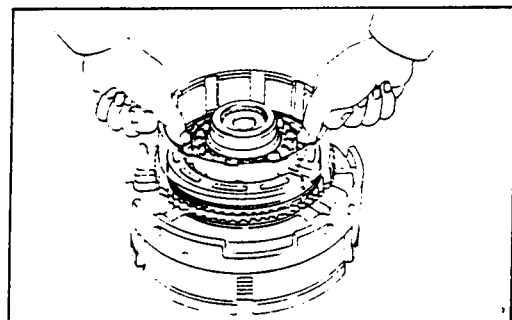
Contract the oil seal ring as shown, and install it onto the clutch drum.

CAUTION: Do not spread the ring ends more than necessary.

NOTE: After installing the oil seal ring, check that they rotate smoothly.



PLACE FRONT CLUTCH DRUM ONTO OVERDRIVE CASE ASSEMBLY



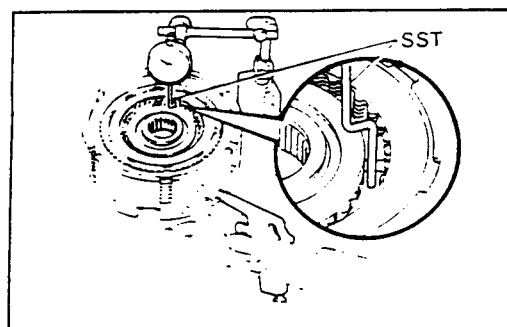
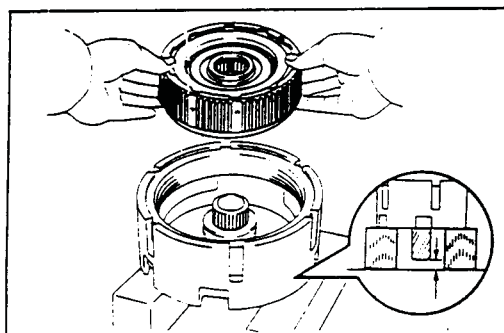
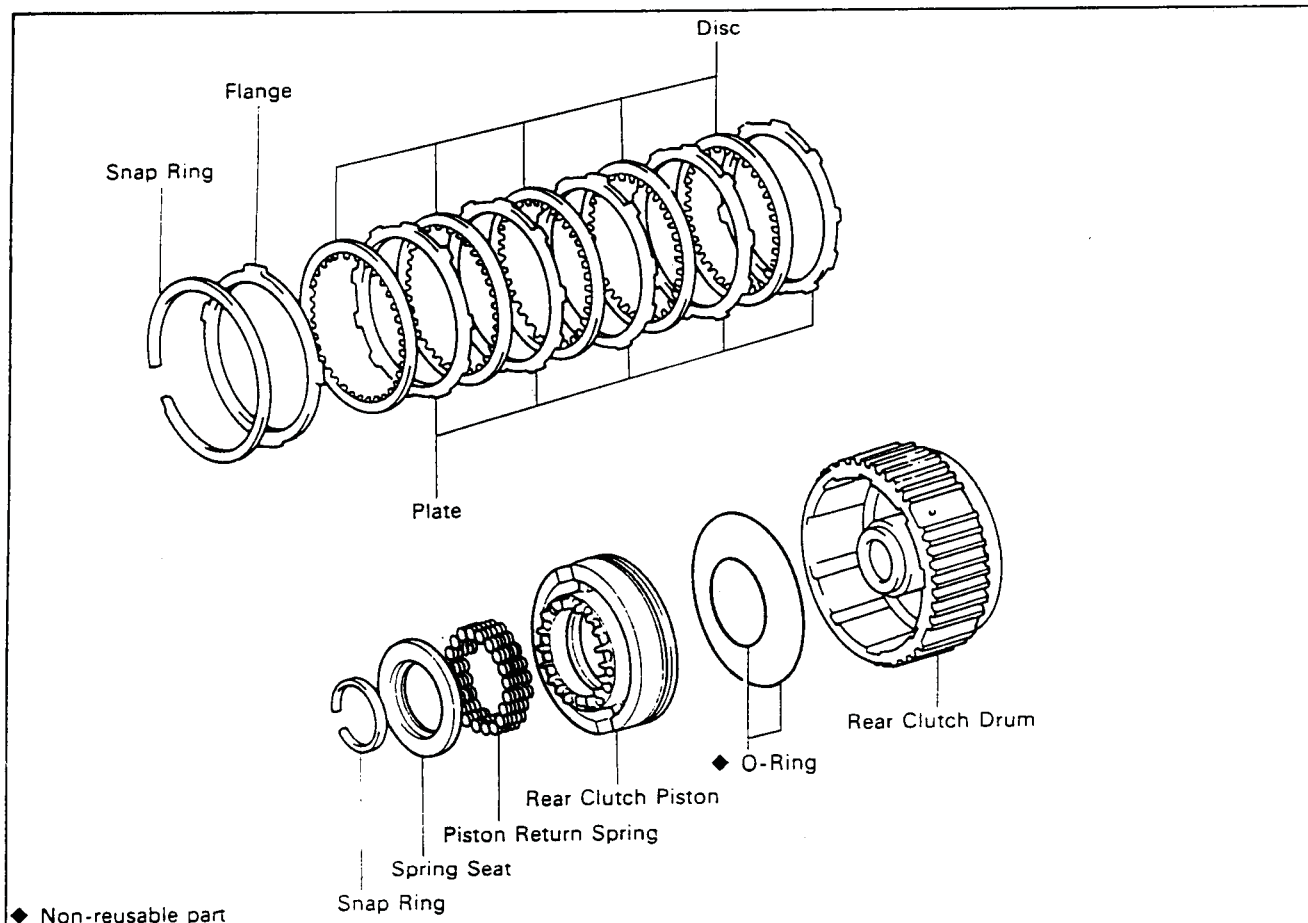
INSTALL FRONT CLUTCH PISTON

Coat new two O-rings with ATF, and install them on the clutch piston.

Push in the clutch piston into the clutch drum by both hands.

CAUTION: Be careful not to damage the O-rings.

Rear Clutch COMPONENTS



DISASSEMBLY OF REAR CLUTCH

CHECK PISTON STROKE OF REAR CLUTCH

Place the center support assembly on wooden blocks.

NOTE: Provide clearance so that the sun gear does not touch the rear clutch drum.

Place the rear clutch assembly into the center support assembly.

mm (in.)

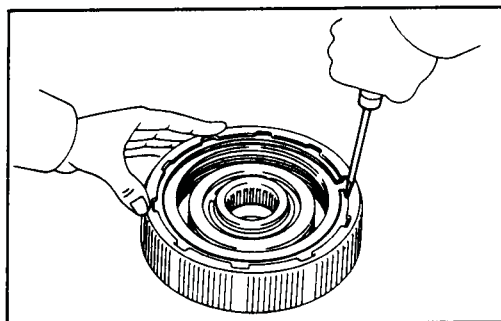
No.	Thickness	No.	Thickness
None	5.0 (0.197)	2	5.4 (0.213)
1	5.2 (0.205)	3	5.6 (0.220)

Piston stroke: 1.70 – 1.90 mm (0.0669 – 0.0748 in.)

If the piston stroke is greater than specified, inspect the discs.

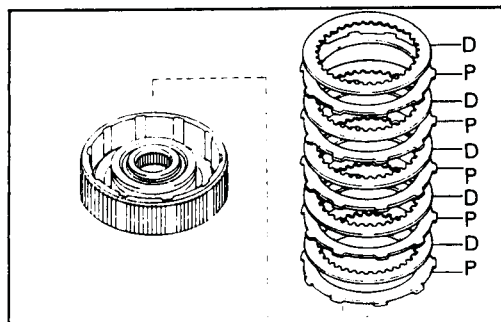


Technical Service Information



REMOVE FLANGE, DISCS AND PLATES

Using a screwdriver, remove the snap ring.

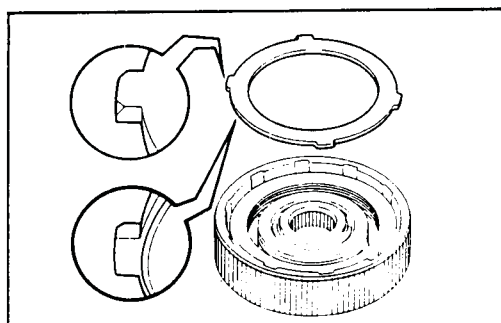


INSTALL PLATES, DISCS AND FLANGE

Install the five plates and five discs in order:

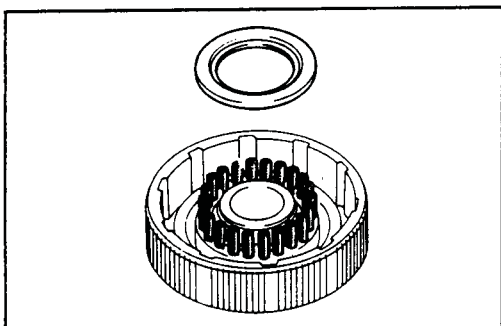
P = Plate D = Disc

P-D-P-D-P-D-P-D-P-D

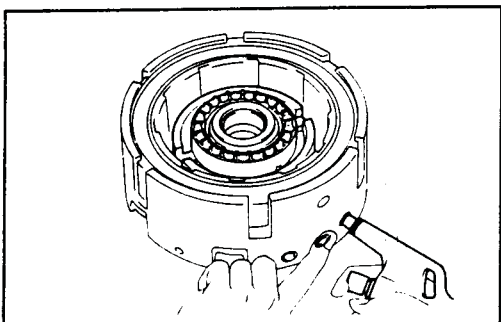


Install the flange, facing the rounded edge upward.

NOTE: If the flange is step-edged, install the flange with the step-edge, facing downward.



Remove the spring seat and twenty-two return springs.



REMOVE REAR CLUTCH PISTON

Place the center support assembly on wooden blocks. (See step (a) on page AT-72)

Place the clutch drum onto the center support assembly.

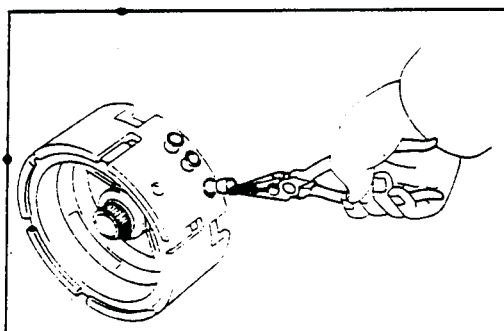
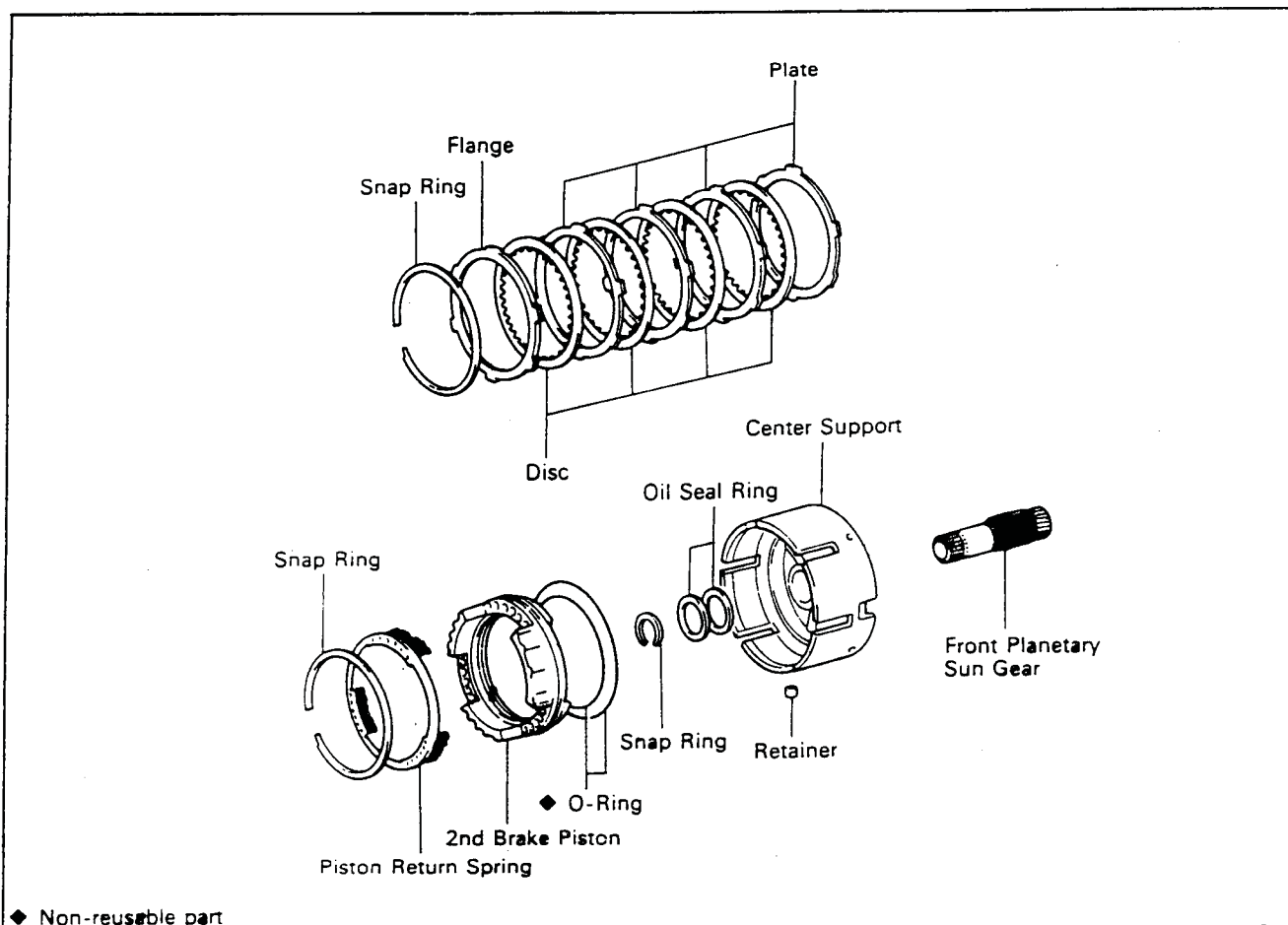
Hold the piston with hand, apply compressed air into the oil hole of the center support to remove the clutch piston.

Remove the two O-rings from the clutch piston.

Technical Service Information

Second Brake

COMPONENTS



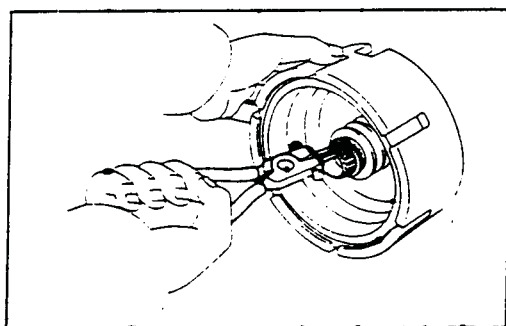
DISASSEMBLY OF SECOND BRAKE

REMOVE RING RETAINERS

Using needle nose pliers, remove the three ring retainers from the oil holes of the center support.

INSTALL RING RETAINERS

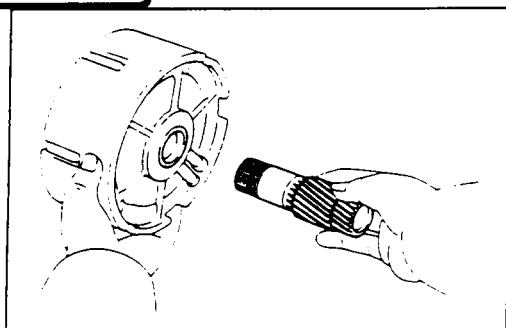
Using needle nose pliers, install the three ring retainers into the oil holes of the center support.



REMOVE FRONT PLANETARY SUN GEAR

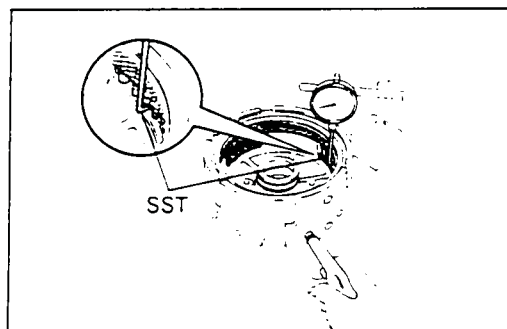
Using snap ring pliers, remove the snap ring.

Using snap ring pliers, install the snap ring.



Remove the sun gear.

Install the sun gear.



CHECK PISTON STROKE OF SECOND BRAKE

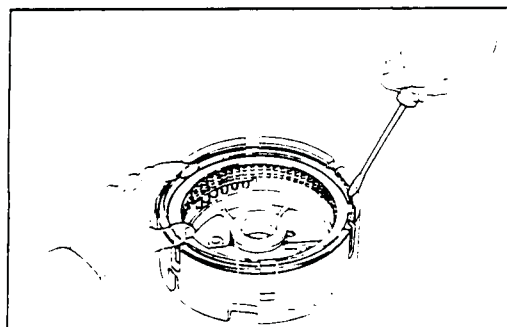
Piston stroke: 1.60 – 1.80 mm (0.0630 – 0.0785 in.)

If the piston stroke is less than specified, parts may have been assembled incorrectly, check and reassemble again.

If the piston stroke is not as specified, select another flange.

NOTE: There are four different thicknesses for flange.
mm (in.)

No.	Thickness	No.	Thickness
None	5.0 (0.197)	2	5.4 (0.213)
1	5.2 (0.205)	3	5.6 (0.220)

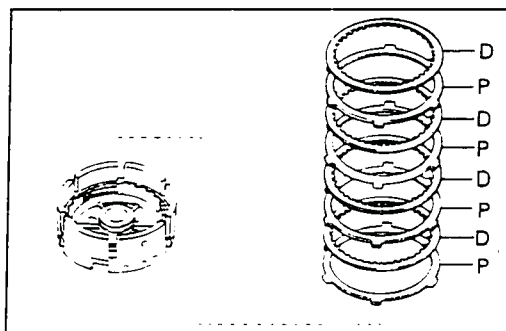


REMOVE FLANGE, DISCS AND PLATES

Using a screwdriver, remove the snap ring.

Using a screwdriver, install the snap ring.

NOTE: Be sure the end gap of the snap ring is not aligned the cutout portion of the center support.



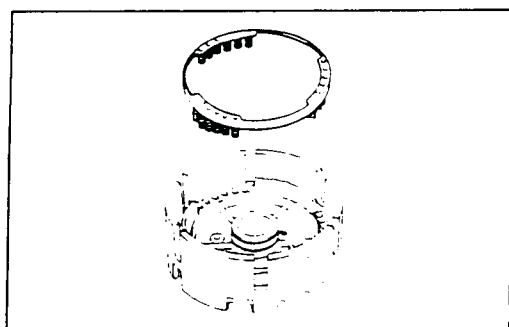
Remove the flange, four discs and four plates.

INSTALL PLATES, DISCS AND FLANGE

Install the four plates and four discs in order:

P = Plate D = Disc

P-D-P-D-P-D-P-D



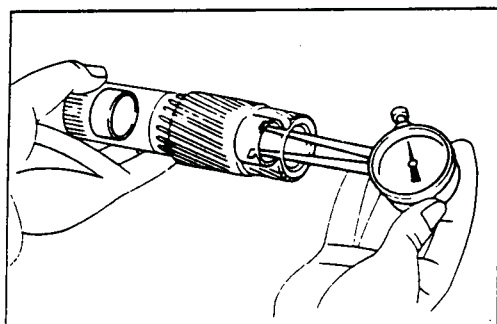
Remove the return spring.

INSTALL PISTON RETURN SPRING

Place the return spring on the brake piston.



Technical Service Information



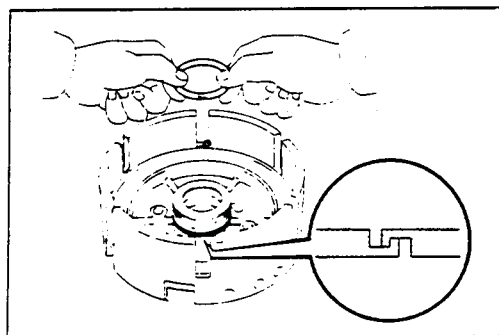
INSPECT BUSHINGS OF FRONT PLANETARY SUN GEAR

Using a dial indicator, measure the inside diameter.

Standard inside diameter: 24.000 – 24.021 mm
(0.9449 – 0.9457 in.)

Maximum inside diameter: 24.07 mm (0.9476 in.)

If the inside diameter is greater than maximum, replace the front planetary sun gear.



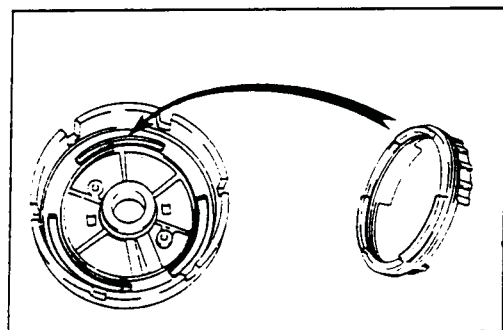
INSTALL OIL SEAL RINGS

Coat the two oil seal rings with ATF.

Contract the oil seals, and install them onto the center support.

CAUTION: Do not spread the ring ends more than necessary.

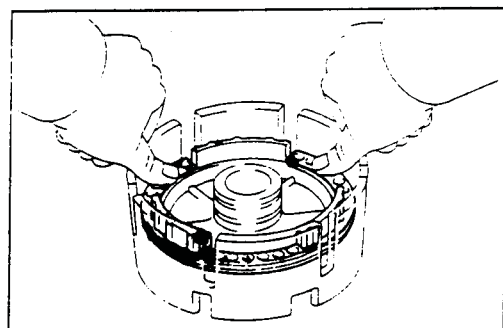
NOTE: After installing the oil seal rings, check that they rotate smoothly.



INSTALL SECOND BRAKE PISTON

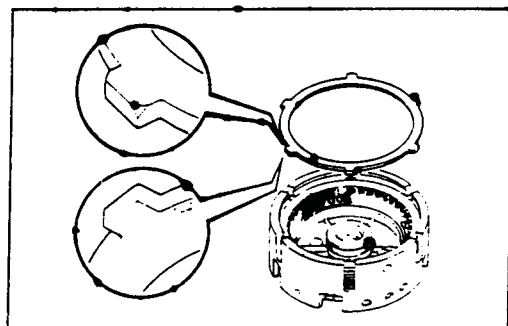
Coat new two O-rings with ATF, and install them on the brake piston.

Align the protrusions of the brake piston with the grooves of the center support.



Push in the brake piston into the center support with both hands.

CAUTION: Be careful not to damage the O-rings.



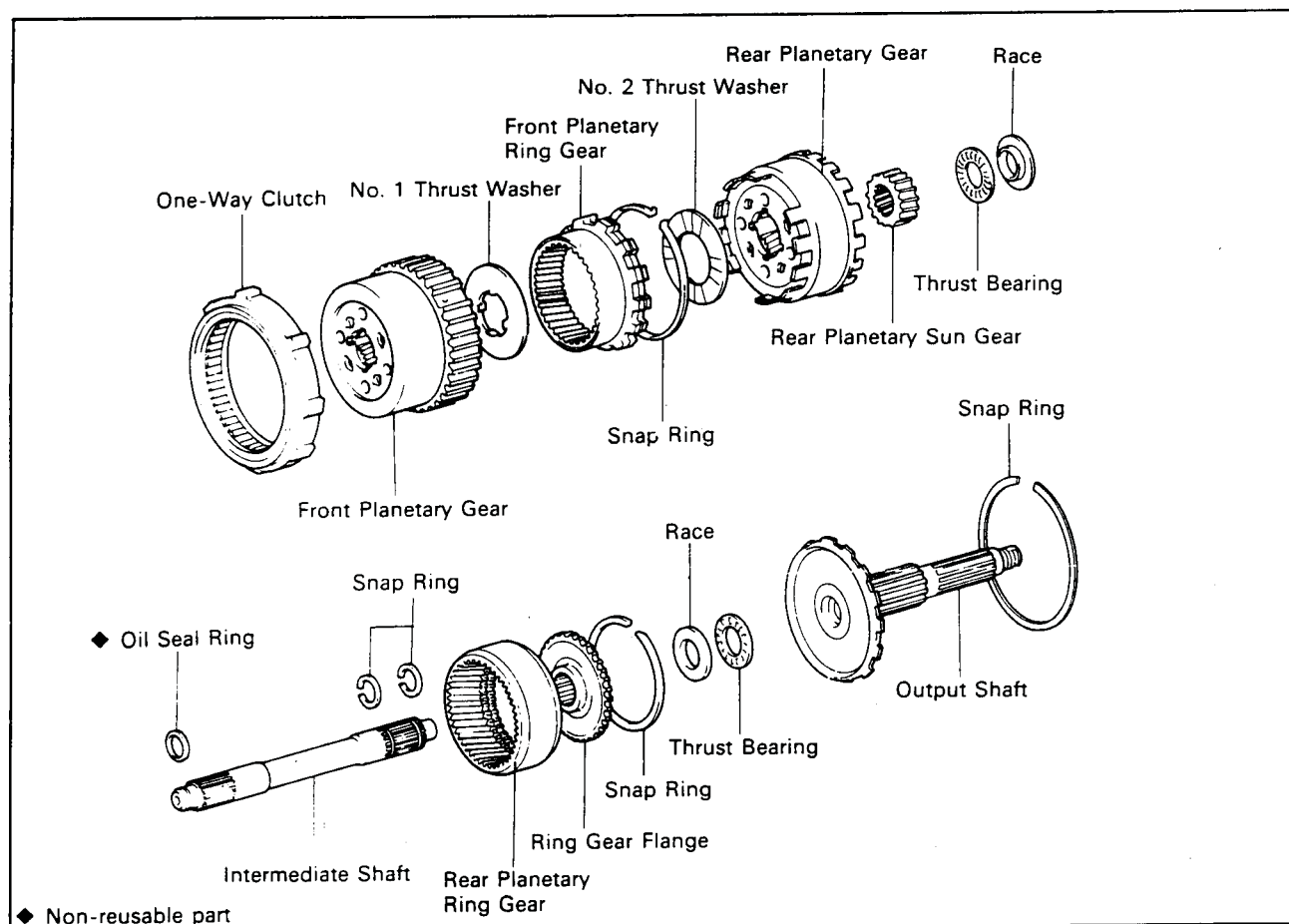
(b) Install the flange, facing the rounded edge upward.

NOTE: If the flange is step-edged, install the flange with the step-edge, facing downward.



Technical Service Information

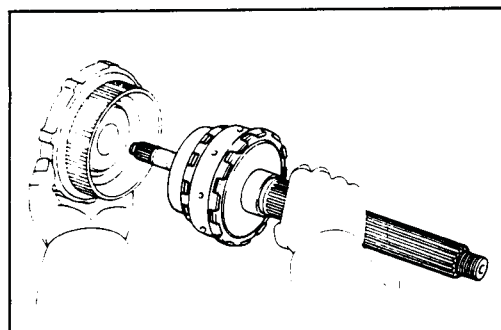
Planetary Gears, One-Way Clutch and Output Shaft COMPONENTS



DISASSEMBLY OF PLANETARY GEARS, ONE-WAY CLUTCH AND OUTPUT SHAFT

REMOVE REAR PLANETARY GEAR AND OUTPUT SHAFT ASSEMBLY

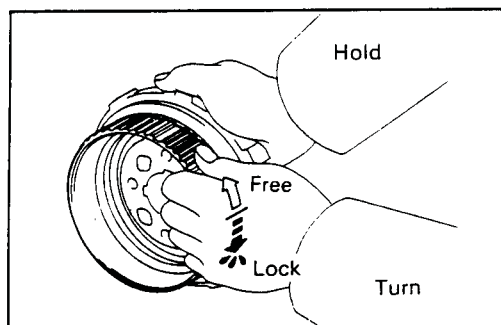
Remove the rear planetary gear and output shaft assembly from the front planetary gear.



CHECK OPERATION OF ONE-WAY CLUTCH

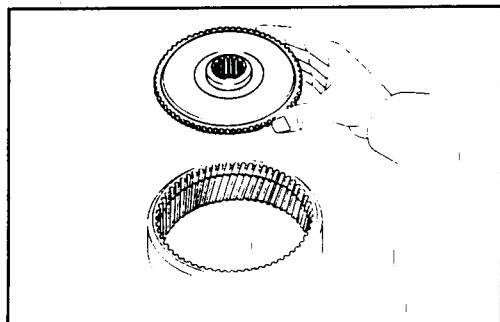
Hold the one-way clutch outer race and turn the front planetary gear. The front planetary gear should turn freely counterclockwise and should lock clockwise.

If operation is not as specified, replace the one-way clutch.

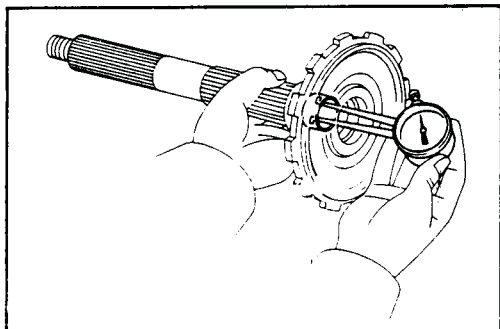




Technical Service Information



Remove the ring gear flange from the rear planetary ring gear.



INSPECTION OF PLANETARY GEARS AND OUTPUT SHAFT

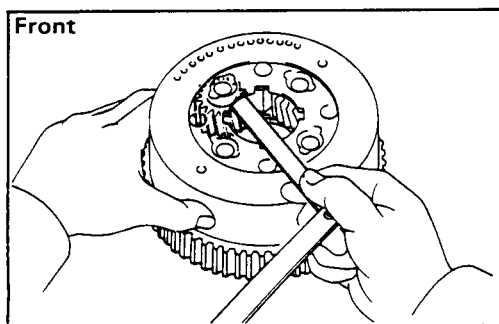
INSPECT BUSHING OF OUTPUT SHAFT

Using a dial indicator, measure the inside diameter.

Standard inside diameter: 17.000 – 17.018 mm
(0.6693 – 0.6700 in.)

Maximum inside diameter: 17.07 mm (0.6720 in.)

If the inside diameter is greater than maximum, replace the output shaft.



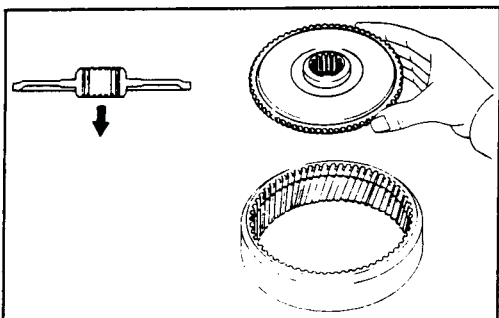
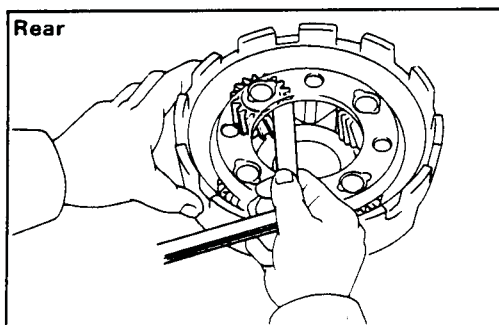
INSPECT PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance between the pinions and carrier.

Standard clearance: 0.20 – 0.50 mm
(0.0079 – 0.0197 in.)

Maximum clearance: 0.75 mm (0.0295 in.)

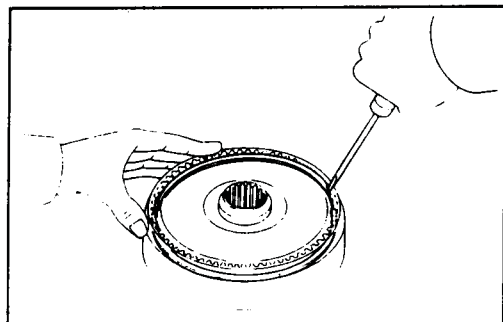
If the thrust clearance is greater than maximum, replace the planetary gear



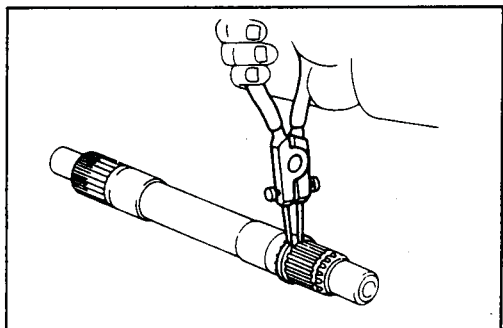
ASSEMBLY OF PLANETARY GEARS, ONE-WAY CLUTCH AND OUTPUT SHAFT

INSTALL REAR PLANETARY RING GEAR FLANGE

Install the ring gear flange to the rear planetary ring gear.

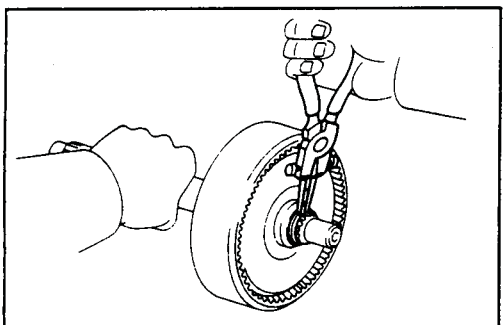


Using a small screwdriver, install the snap ring.



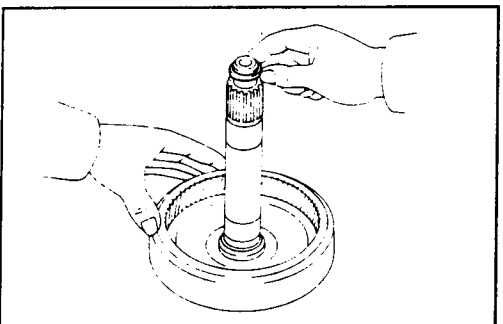
INSTALL REAR PLANETARY RING GEAR AND FLANGE ASSEMBLY

Using snap ring pliers, install the snap ring on the front side of the intermediate shaft.



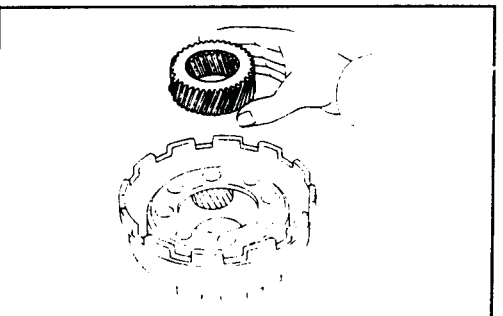
Install the ring gear and flange assembly.

Using snap ring pliers, install the snap ring on the rear side of the intermediate shaft.



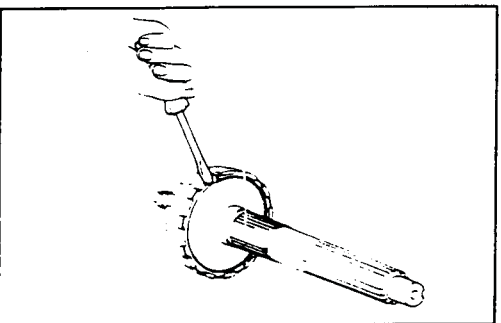
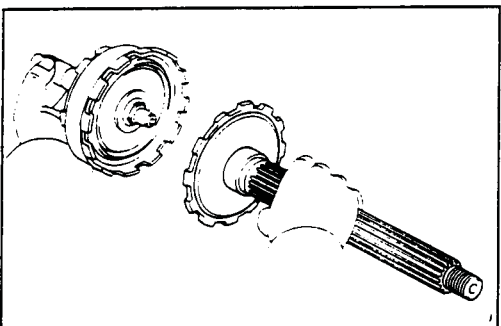
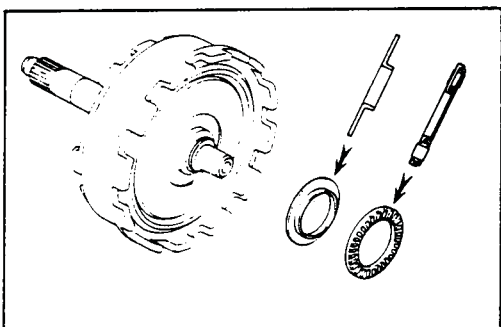
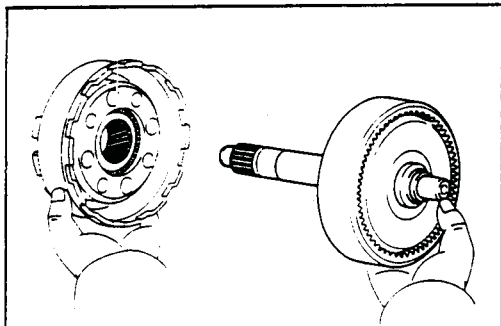
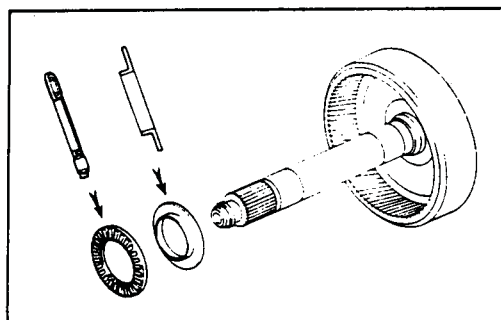
INSTALL OIL SEAL RING

Coat a new oil seal ring with ATF, and install it to the intermediate shaft.



INSTALL REAR PLANETARY SUN GEAR

Install the sun gear to the rear planetary gear.



INSTALL REAR PLANETARY RING GEAR AND INTERMEDIATE SHAFT ASSEMBLY

Coat the race and thrust bearing with petroleum jelly.

Install the race and thrust bearing onto the front side of the ring gear flange.

NOTE: Race and bearing diameter

mm (in.)

	Inside	Outside
Race	32.8 (1.291)	50.4 (1.984)
Bearing	34.7 (1.366)	52.0 (2.047)

Install the ring gear and intermediate shaft assembly to the rear planetary gear.

INSTALL OUTPUT SHAFT

Coat the race and thrust bearing with petroleum jelly.

Install the race and thrust bearing onto the rear side of the ring gear flange.

NOTE: Race and bearing diameter

mm (in.)

	Inside	Outside
Race	32.8 (1.291)	50.4 (1.984)
Bearing	34.7 (1.366)	52.0 (2.047)

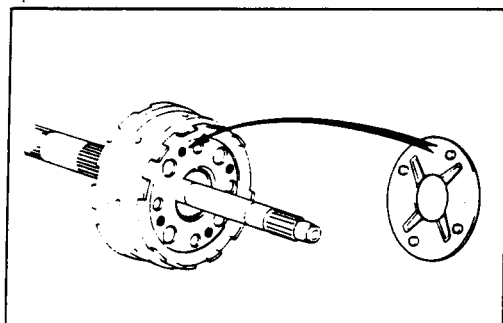
Install the output shaft to the rear planetary gear.

Using a screwdriver, install the snap ring.

NOTE: Be sure the end gap of the snap ring is not aligned with the cutout portion of the rear planetary gear.



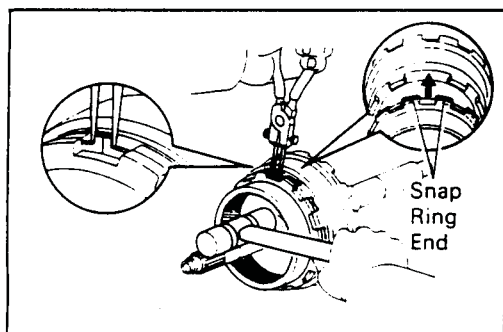
Technical Service Information



INSTALL NO.2 THRUST WASHER

Coat the thrust washer with petroleum jelly, and install it onto the rear planetary gear.

NOTE: Securely fit the lips of the thrust washer into the holes of the rear planetary gear.

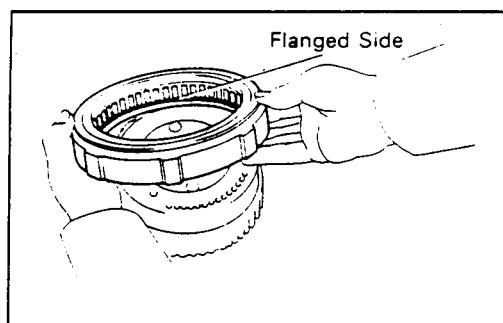


INSTALL FRONT PLANETARY RING GEAR

Align the snap ring end with the wide cutout portion of the rear planetary gear.

Using snap ring pliers and plastic-faced hammer, tap in the ring gear while compressing the snap ring.

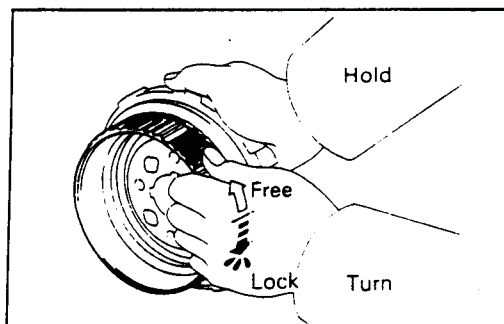
Check that the snap ring is installed into the groove of the rear planetary gear.



INSTALL ONE-WAY CLUTCH

Position the one-way clutch on the front planetary gear, facing the flanged side of the one-way clutch downward.

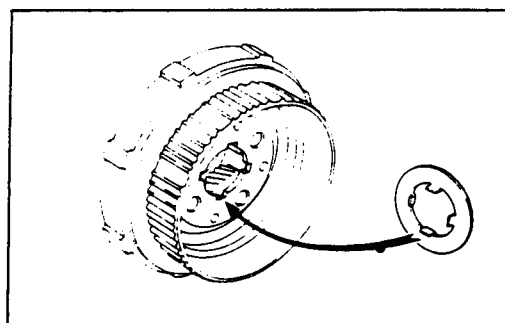
Install the one-way clutch to the front planetary gear by rotating the one-way clutch counterclockwise.



CHECK OPERATION OF ONE-WAY CLUTCH

Hold the one-way clutch outer race and turn the front planetary gear. The front planetary gear should turn freely counterclockwise and should lock clockwise.

If operation is not as specified, replace the one-way clutch.



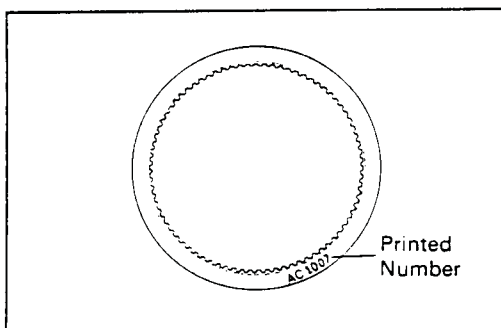
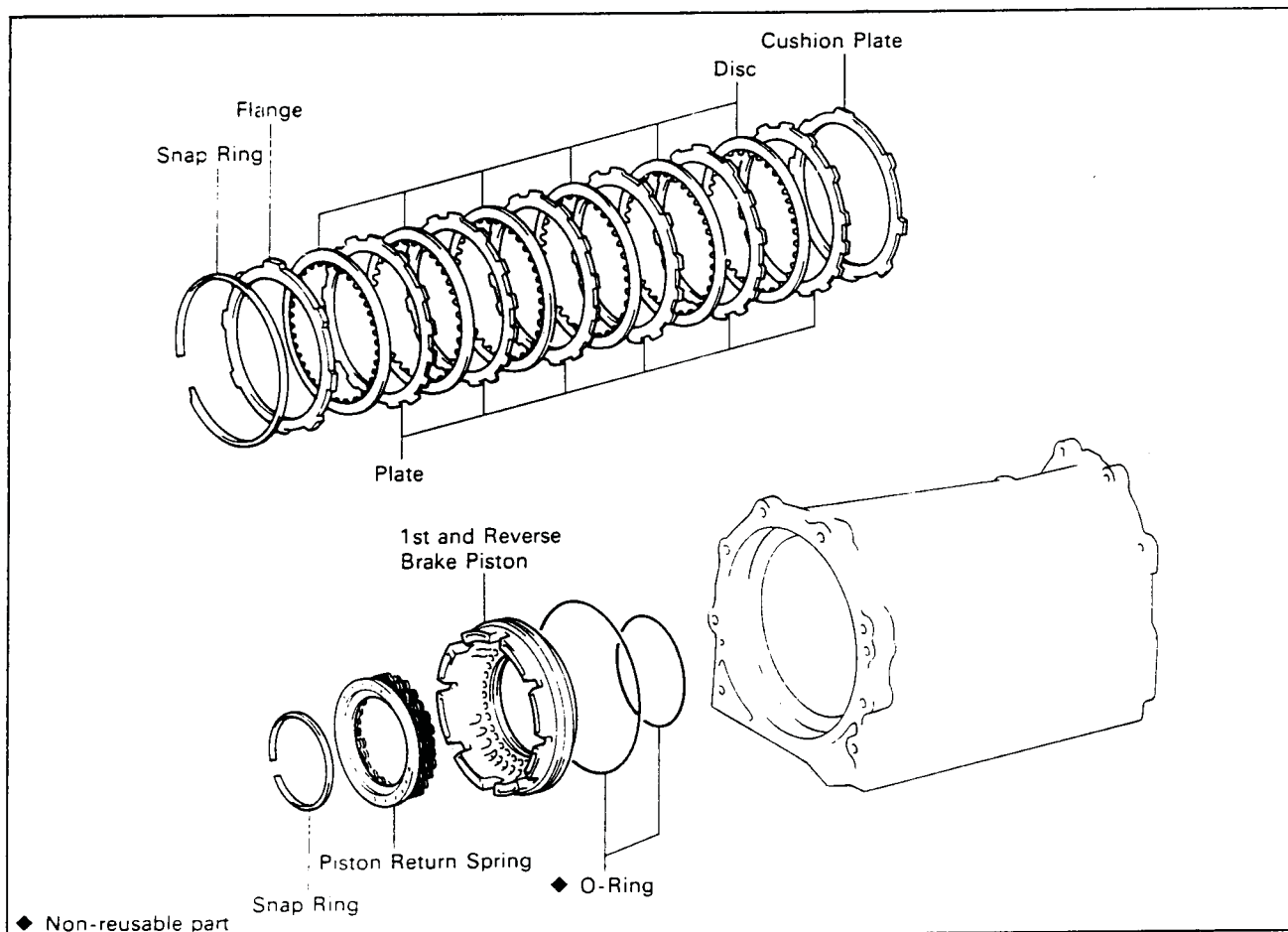
INSTALL NO.1 REAR THRUST WASHER

Coat the thrust washer with petroleum jelly, and install it onto the rear side of the front planetary gear.

NOTE: Securely fit the claws of the thrust washer into the grooves of the front planetary gear.

AUTOMATIC TRANSMISSION SERVICE GROUP

First and Reverse Brake COMPONENTS



INSPECTION OF FIRST AND REVERSE BRAKE

INSPECT DISCS, PLATES AND FLANGE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.

NOTE:

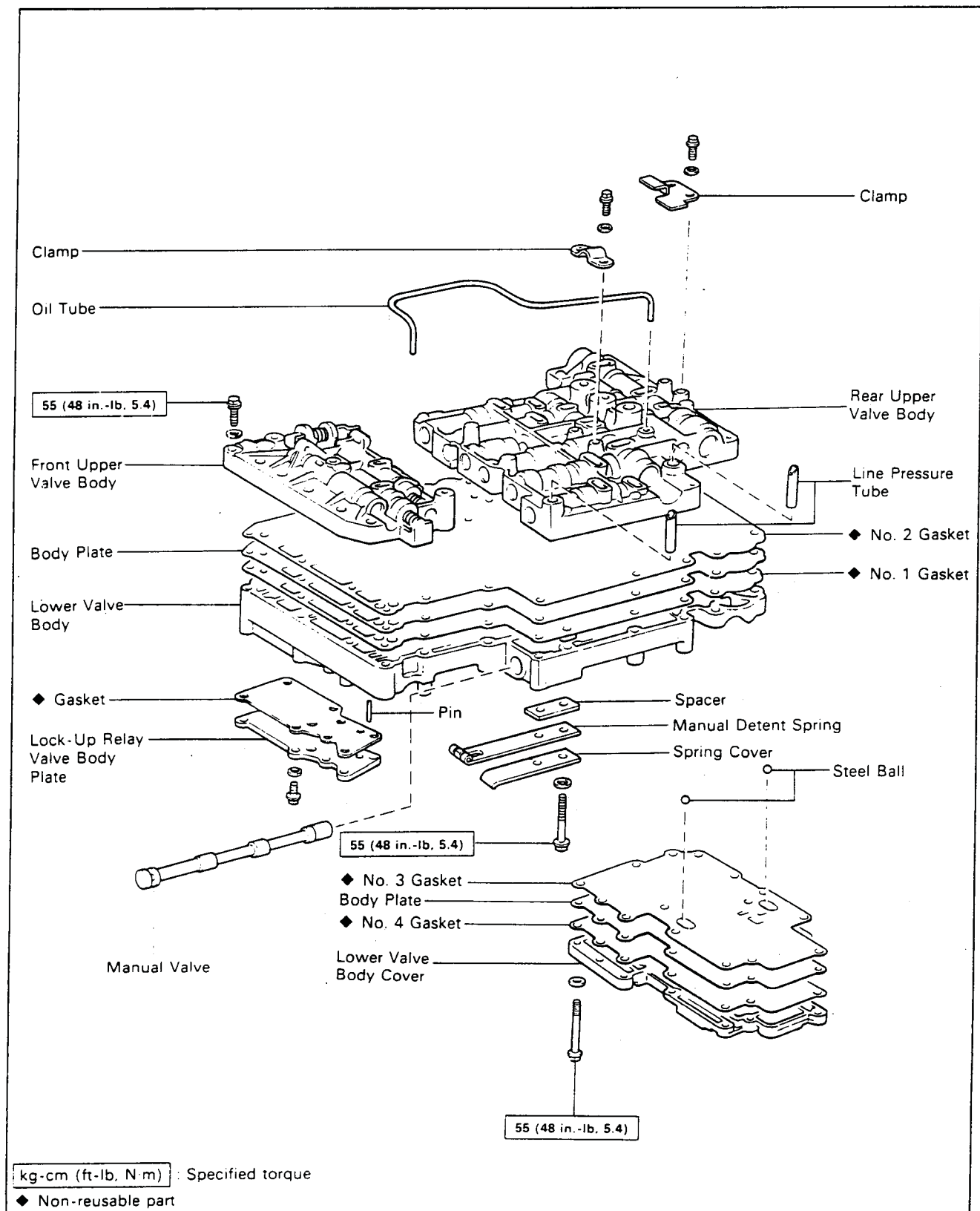
- If the lining of the disc is peeling off or discolored, or even if parts of the printed numbers are defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least two hours.



Technical Service Information

Valve Body

COMPONENTS

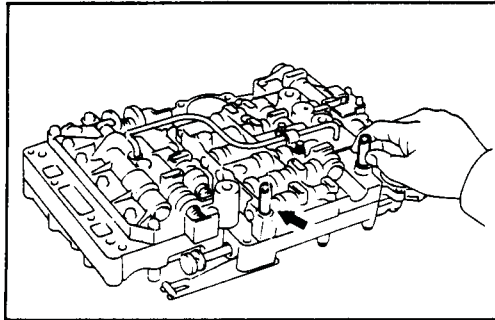


AUTOMATIC TRANSMISSION SERVICE GROUP

(Disassembly of Valve Body)

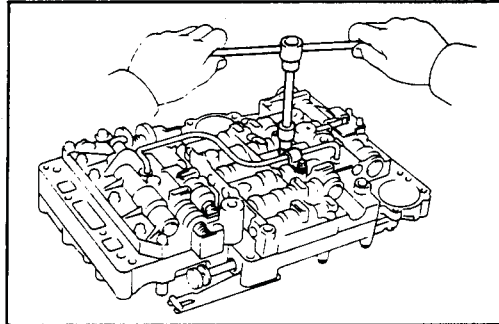
REMOVE LINE PRESSURE TUBES

Remove the two pressure tubes.

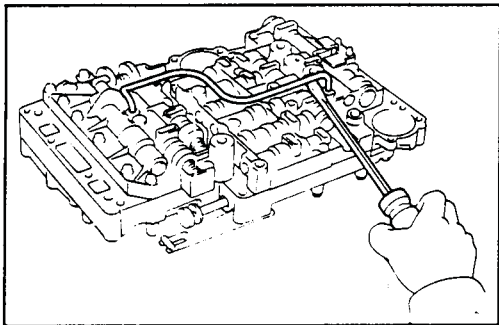


REMOVE OIL TUBE

Remove the two bolts, wave washers and tube clamp.



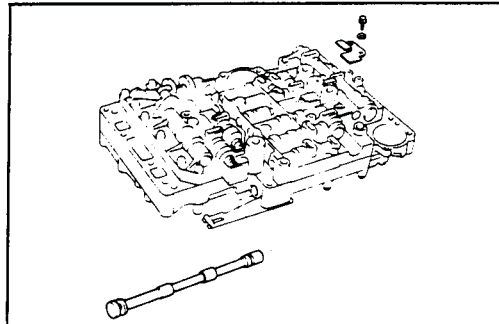
Using a large screwdriver, pry out the oil tube.



REMOVE MANUAL VALVE

REMOVE CLAMP

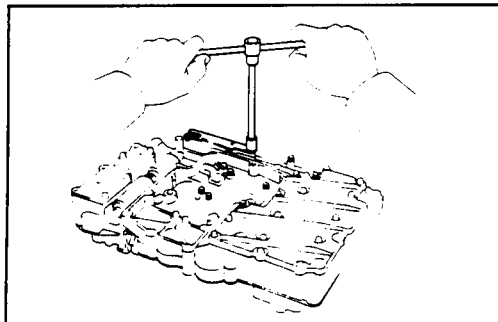
Remove the two bolts, wave washers and clamp.

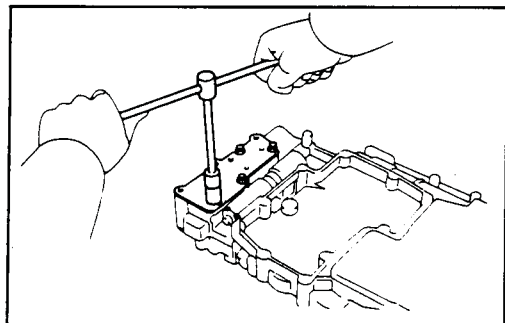


REMOVE MANUAL DETENT SPRING

Turn over the valve body assembly.

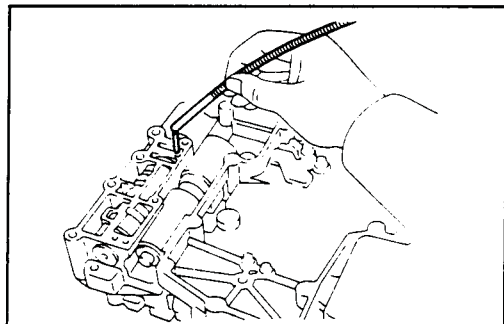
Remove the bolt, wave washer, spring cover, detent spring and spacer.





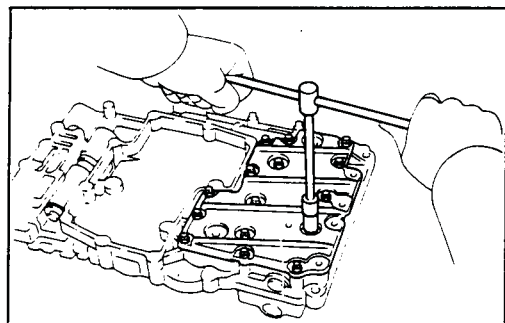
REMOVE LOCK-UP RELAY VALVE BODY PLATE

Remove the four bolts, wave washers, body plate and gasket.



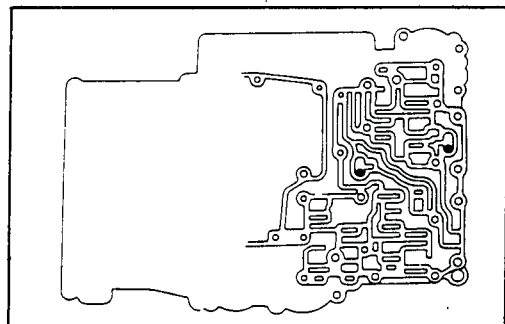
REMOVE LOCK-UP RELAY VALVE SLEEVE PIN

Using a magnetic finger, remove the sleeve pin.



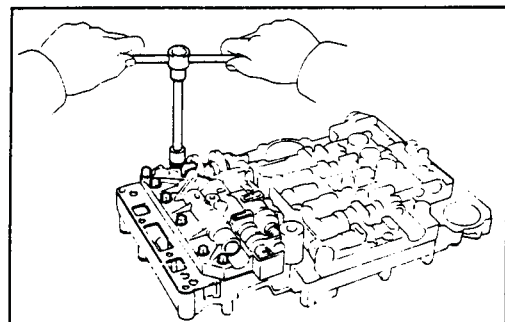
REMOVE LOWER VALVE BODY COVER AND PLATE

Remove the fifteen bolts, wave washers, body cover, two gaskets and body plate.



REMOVE CHECK BALL

Remove the two check balls from the lower valve body.



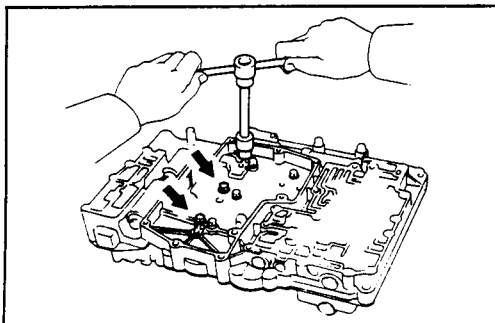
REMOVE FRONT UPPER VALVE BODY

Turn over the valve body assembly.

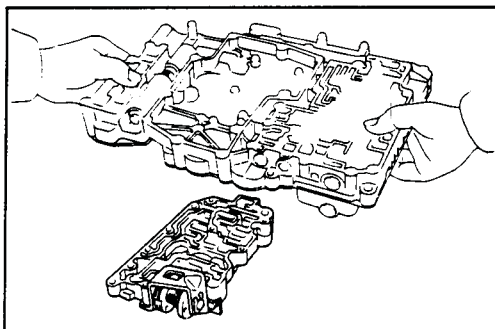
Remove the seven bolts and wave washers.



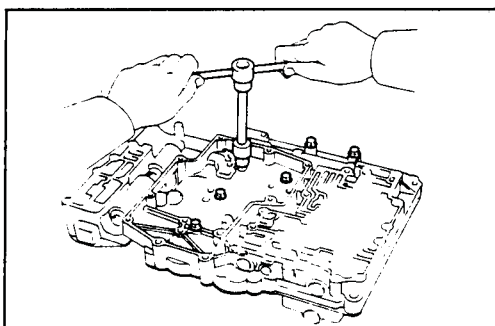
Technical Service Information



Turn over the valve body assembly.
Remove the three bolts and wave washers.

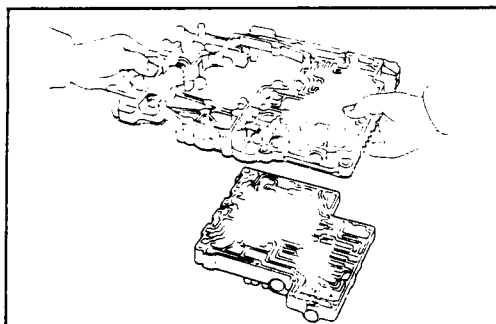


Remove the front upper valve body by lifting up the lower valve body.



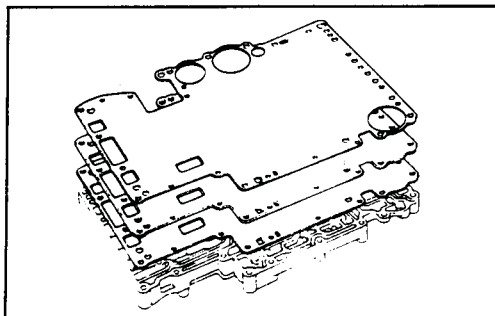
REMOVE REAR UPPER VALVE BODY

Remove the six bolts and wave washers.
Hold the valve body plate to the lower valve plate.



Remove the rear upper valve body by lifting up the lower valve body.

NOTE: Be careful that the check balls and springs do not fall out.



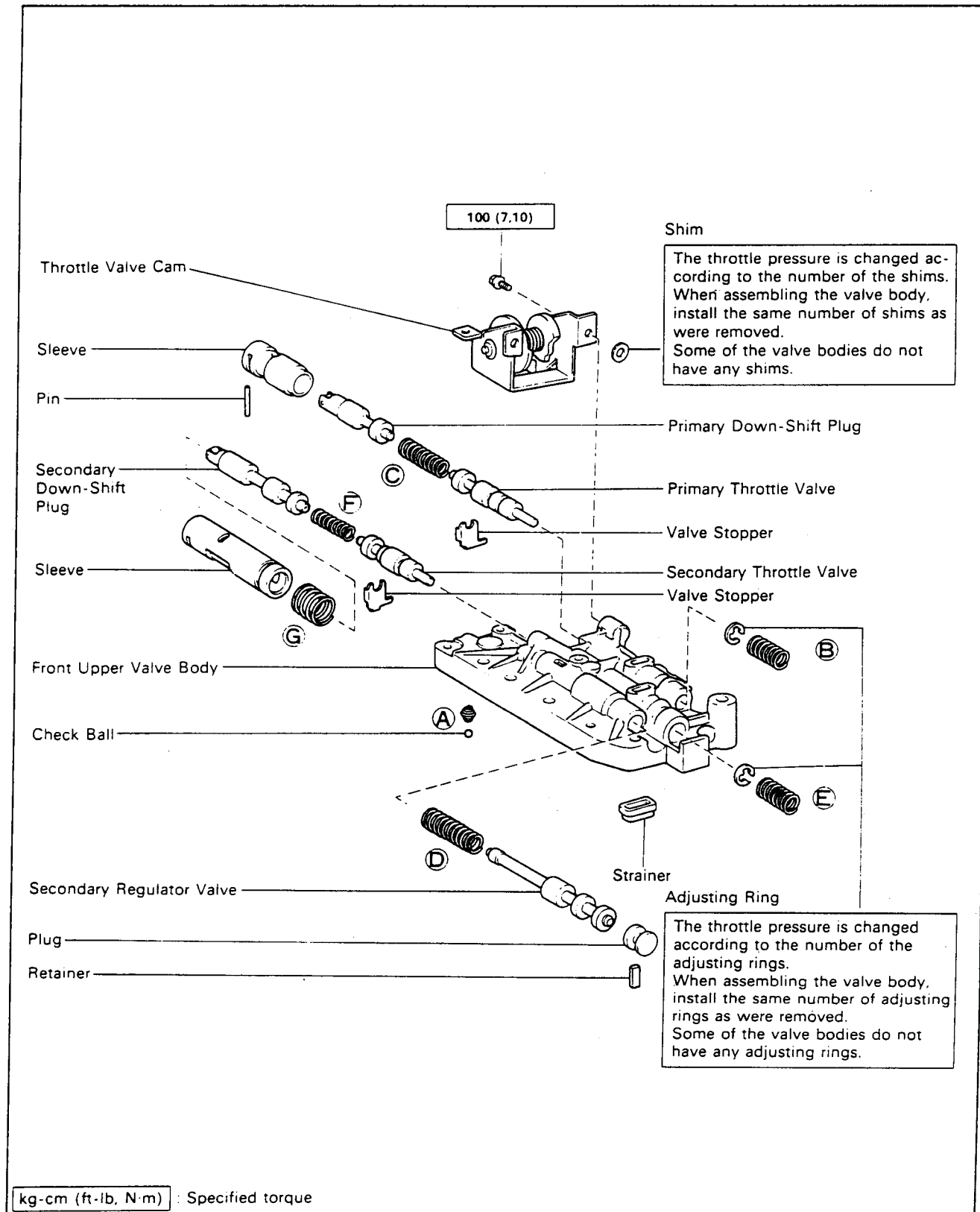
REMOVE VALVE BODY PLATE

Turn over the valve body assembly.
Remove the two gaskets and body plate.

Technical Service Information

(Front Upper Valve Body)

COMPONENTS



AUTOMATIC TRANSMISSION SERVICE GROUP



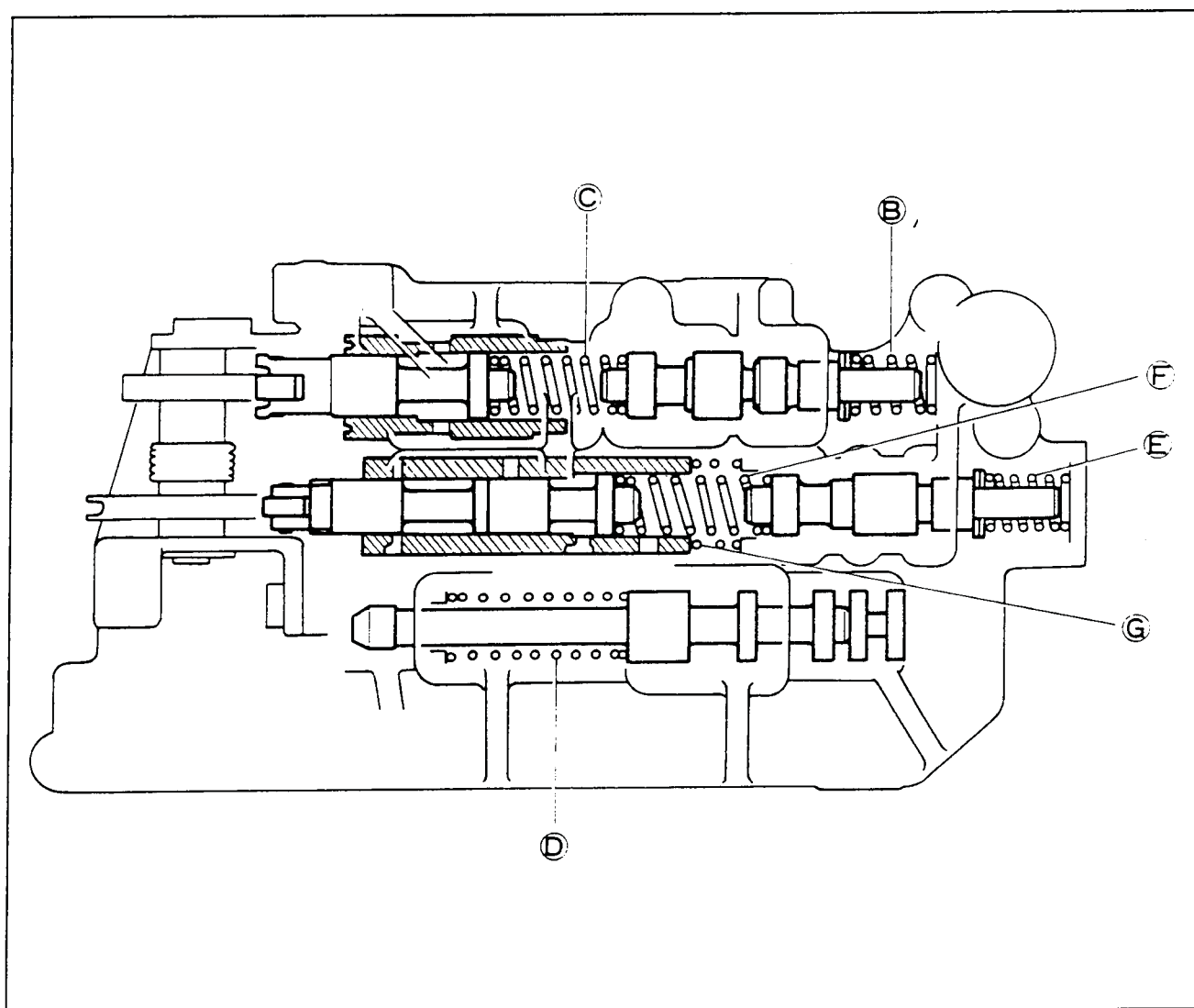
Technical Service Information

SPECIFICATIONS OF VALVE BODY SPRINGS

Spring		Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
Ⓐ	Check ball	13.0 (0.512)	8.4 (0.331)	8.0	None
Ⓑ	Primary throttle valve	25.3 (0.996)	9.2 (0.362)	9.5	White
Ⓒ	Primary down-shift plug	26.9 (1.059)	9.0 (0.354)	10.5	Blue
Ⓓ	Secondary regulator valve	46.0 (1.811)	13.3 (0.524)	15.0	None
Ⓔ	Secondary throttle valve	25.3 (0.996)	9.2 (0.362)	9.5	White
Ⓕ	Secondary down-shift plug	32.6 (1.283)	9.7 (0.382)	13.0	White
Ⓖ	Throttle valve sleeve	10.8 (0.425)	18.2 (0.717)	4.0	None

NOTE: During reassembly, please refer to the spring specifications above to help differentiate the different springs.

SECTIONAL VIEW OF VALVE BODY

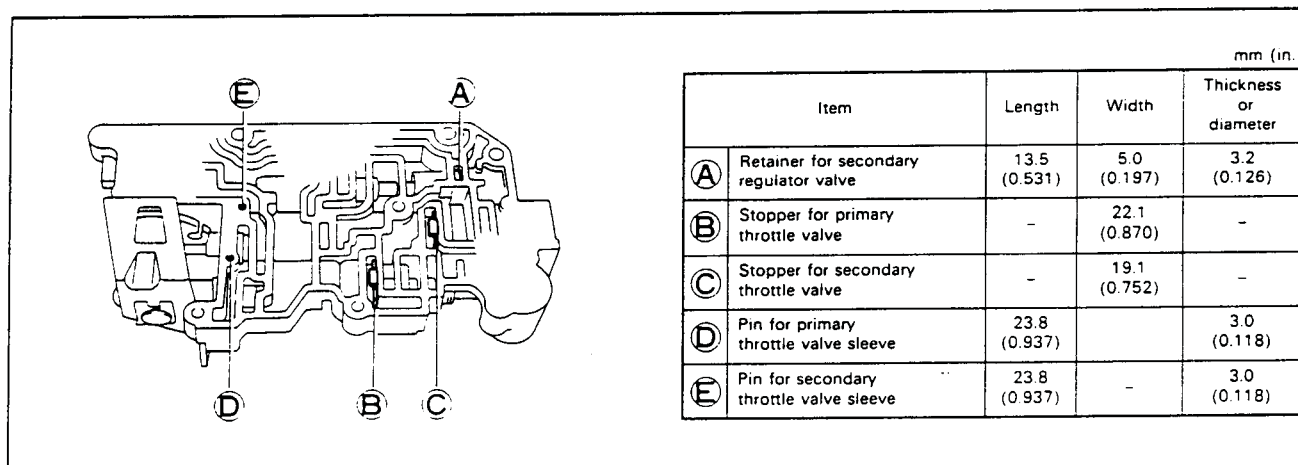




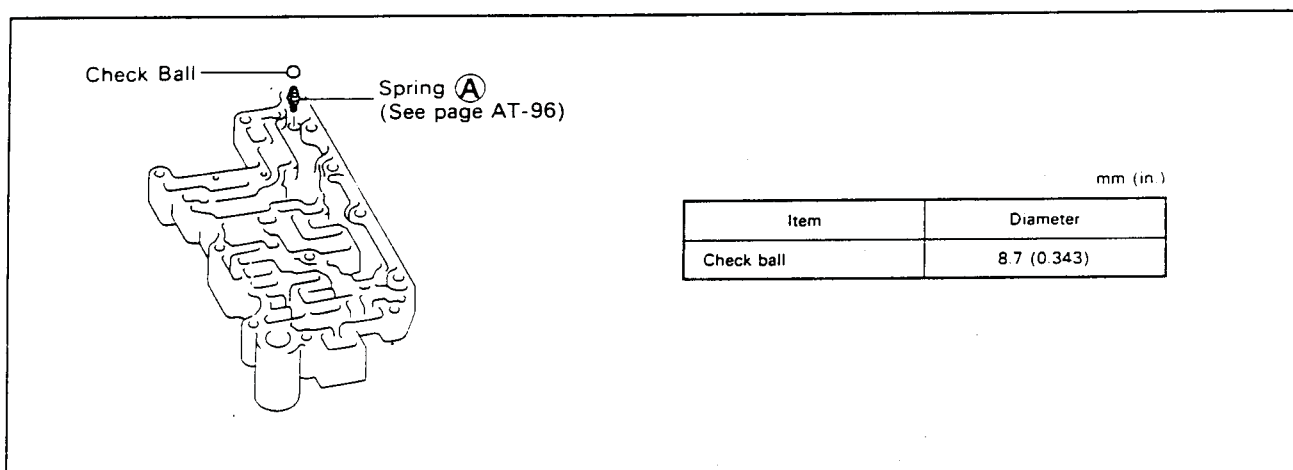
Technical Service Information

LOCATION OF RETAINER, PINS, STOPPERS, CHECK BALL, SPRING AND STRAINER

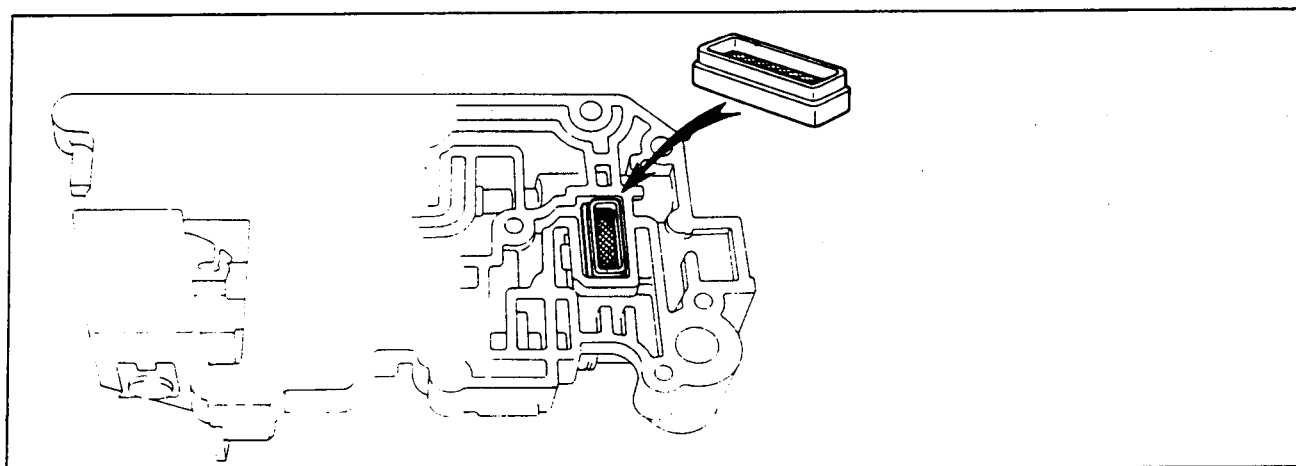
RETAINER, PINS AND STOPPERS



CHECK BALL AND SPRING



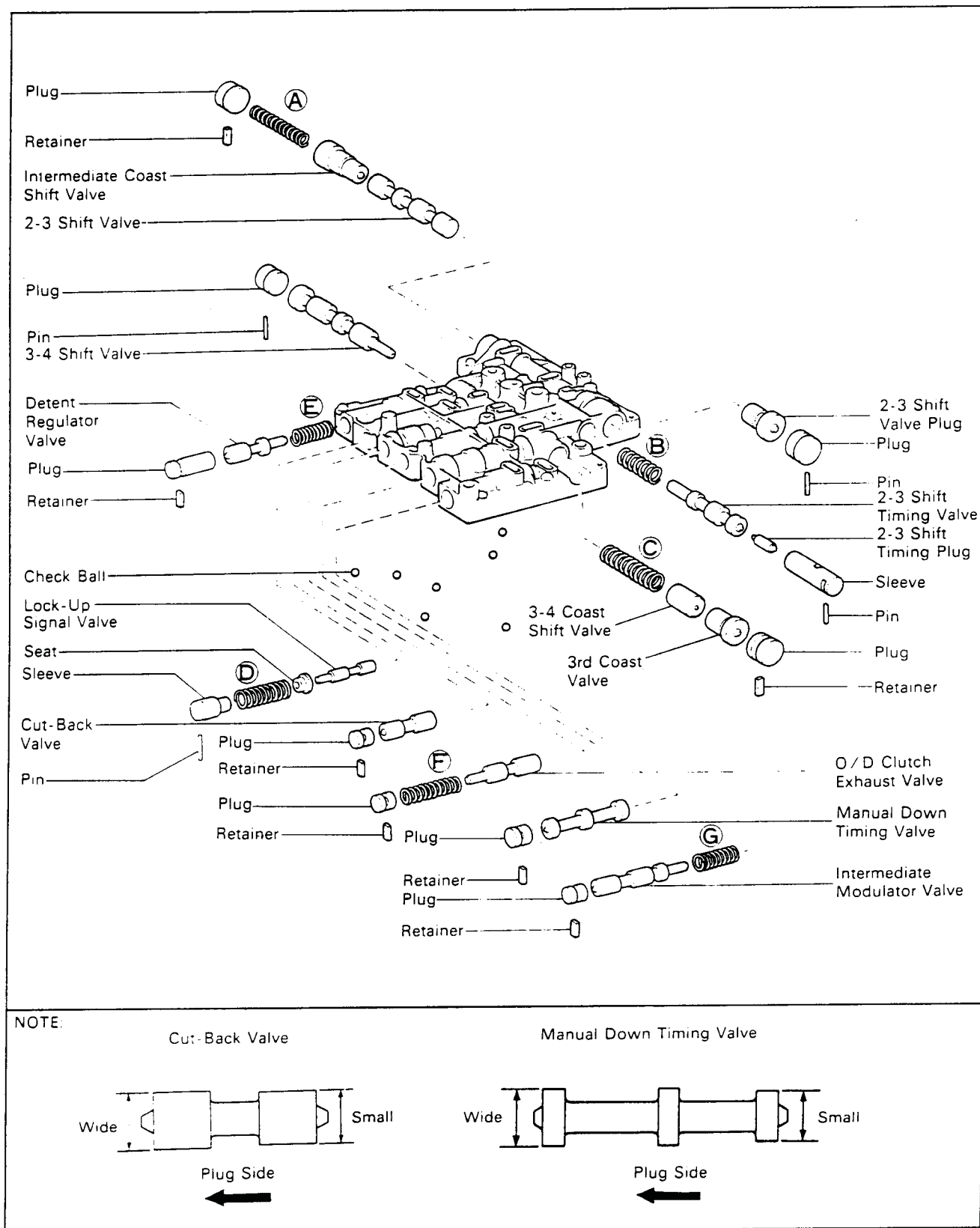
STRAINER



AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information (Rear Upper Valve Body) COMPONENTS



AUTOMATIC TRANSMISSION SERVICE GROUP



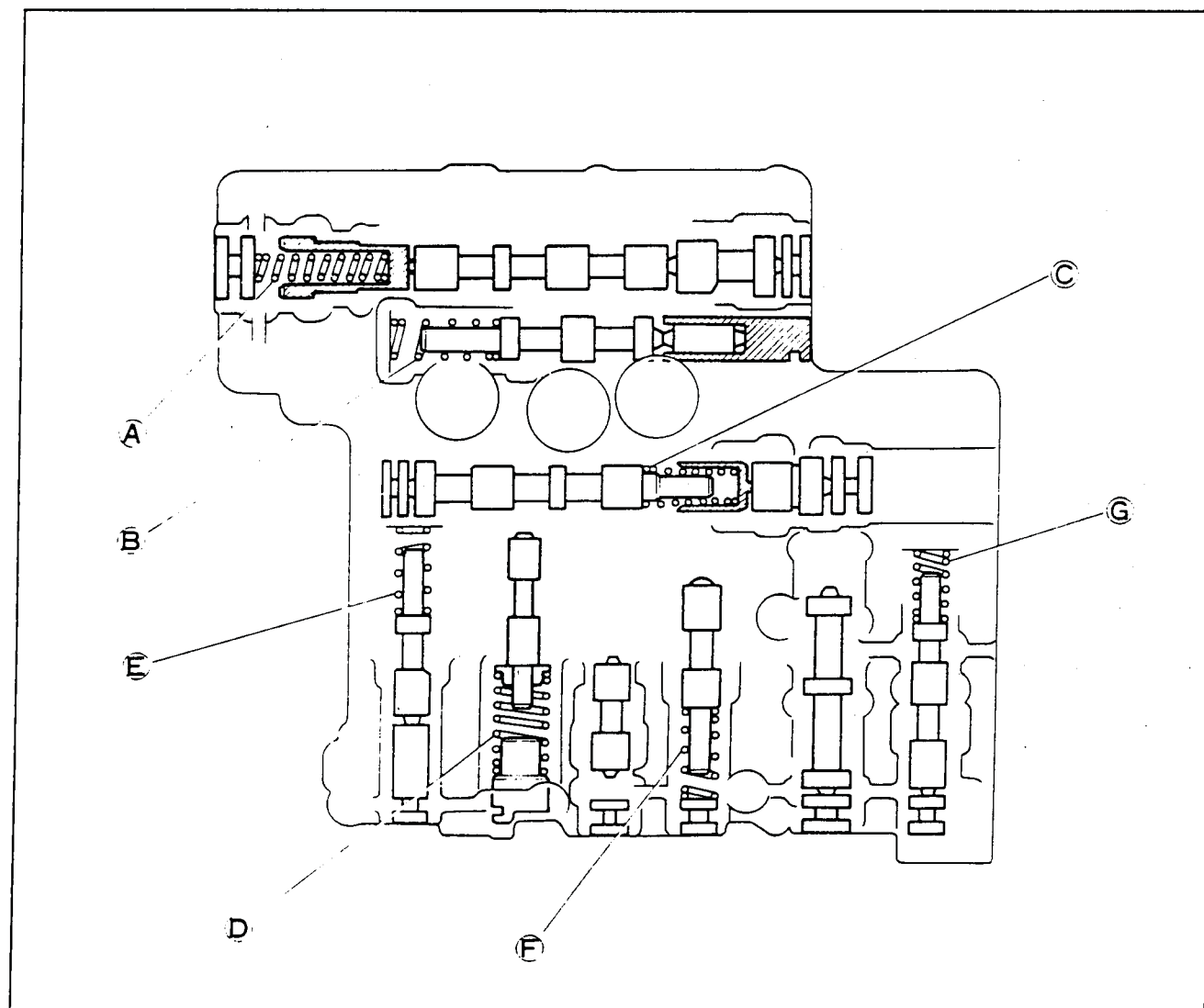
Technical Service Information

SPECIFICATIONS OF VALVE BODY SPRINGS

Spring		Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
A	2-3 shift valve	43.3 (1.705)	8.9 (0.350)	22.0	Brown
B	2-3 shift timing valve	39.2 (1.543)	9.2 (0.362)	18.0	Pink
C	3-4 shift valve	38.3 (1.508)	9.7 (0.382)	17.0	None
D	Detent regulator valve	30.4 (1.197)	7.4 (0.291)	16.0	White
E	Lock-up signal valve	53.4 (2.102)	13.7 (0.539)	16.0	Green
F	O/D clutch exhaust valve	33.3 (1.311)	8.2 (0.323)	14.0	Yellow
G	Intermediate modulator valve	22.5 (0.886)	7.7 (0.303)	12.0	Pink

NOTE: During reassembly, please refer to the spring specifications above to help differentiate the different springs.

SECTIONAL VIEW OF VALVE BODY



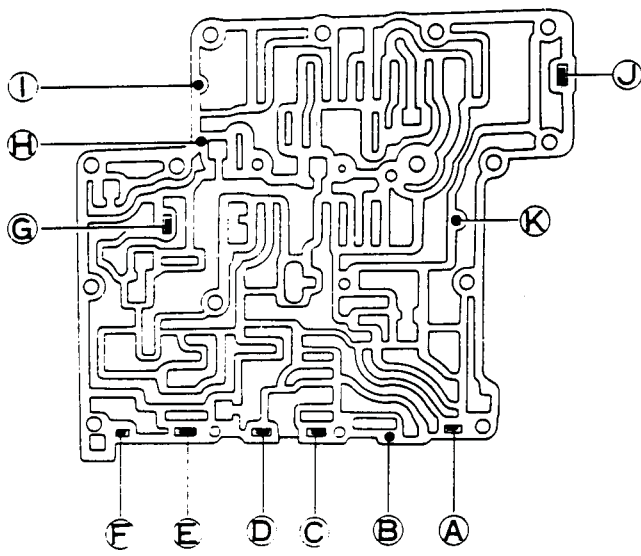
AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

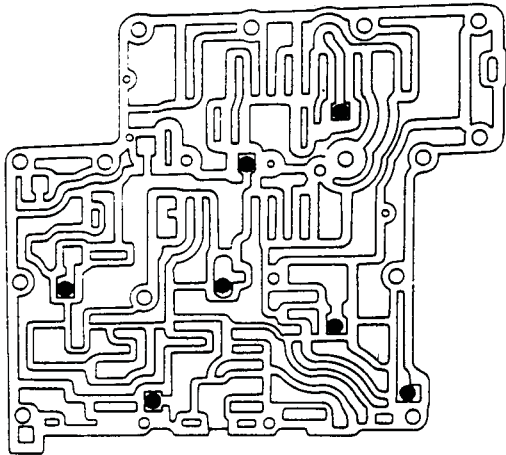
LOCATION OF RETAINERS, PINS AND CHECK BALLS

RETAINERS AND PINS



mm (in.)				
	Item	Length	Width Thickness or diameter	
A	Retainer for detent regulator valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
B	Pin for lock-up signal valve plug	21.8 (0.858)	-	2.5 (0.098)
C	Retainer for cut-back valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
D	Retainer for O/D clutch exhaust valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
E	Retainer for manual down timing valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
F	Retainer for intermediate modulator valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
G	Retainer for 3rd coast valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
H	Pin for 2-3 shift timing valve sleeve	21.8 (0.858)	-	2.5 (0.098)
I	Pin for 2-3 shift valve plug	12.8 (0.504)	-	2.0 (0.079)
J	Retainer for 2-3 shift valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
K	Pin for 3-4 shift valve plug	12.8 (0.504)	-	2.0 (0.079)

CHECK BALLS



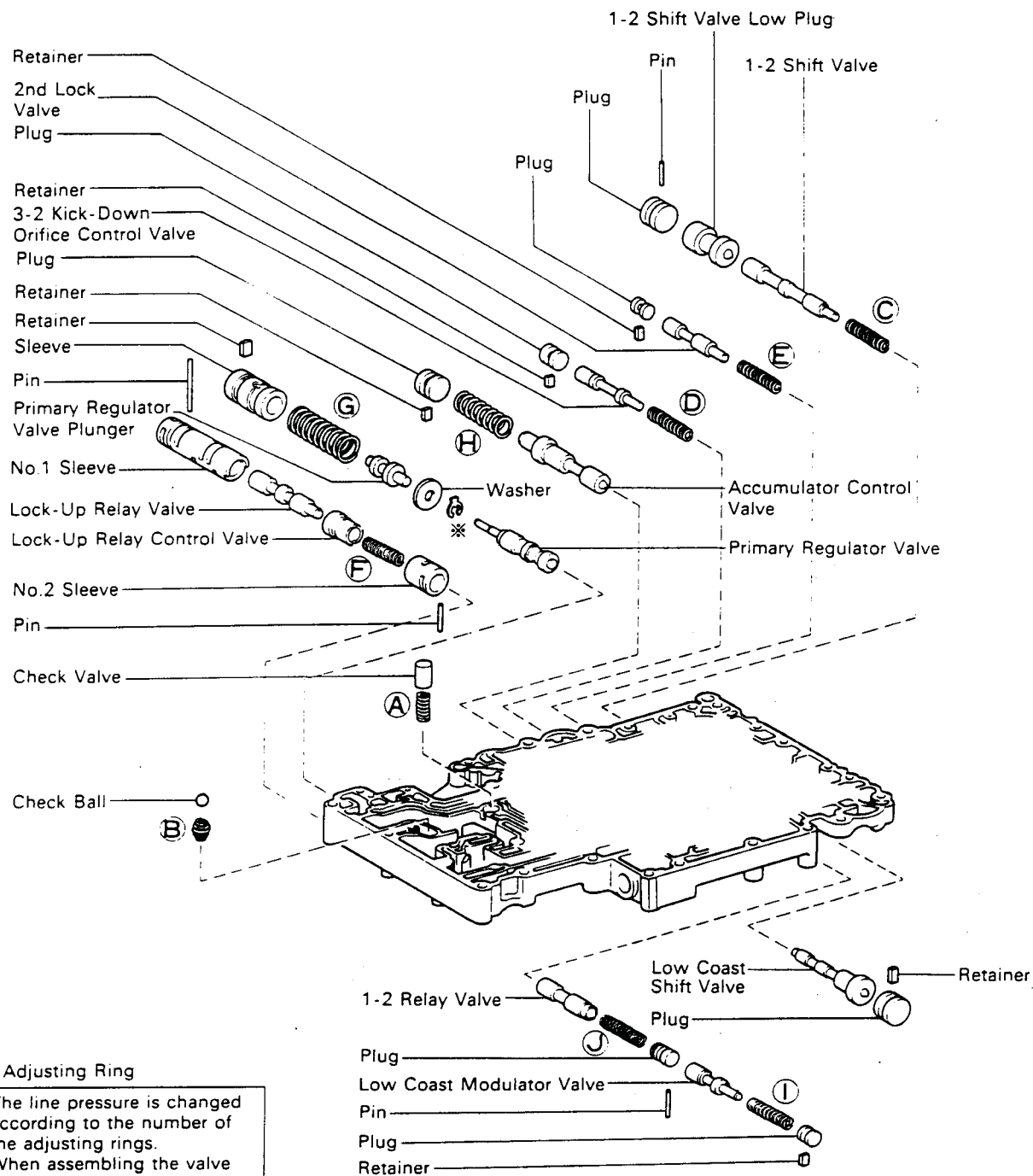
mm (in.)	
Item	Diameter
Check ball	6.4 (0.252)

AUTOMATIC TRANSMISSION SERVICE GROUP

Technical Service Information

(Lower Valve Body)

COMPONENTS



AUTOMATIC TRANSMISSION SERVICE GROUP



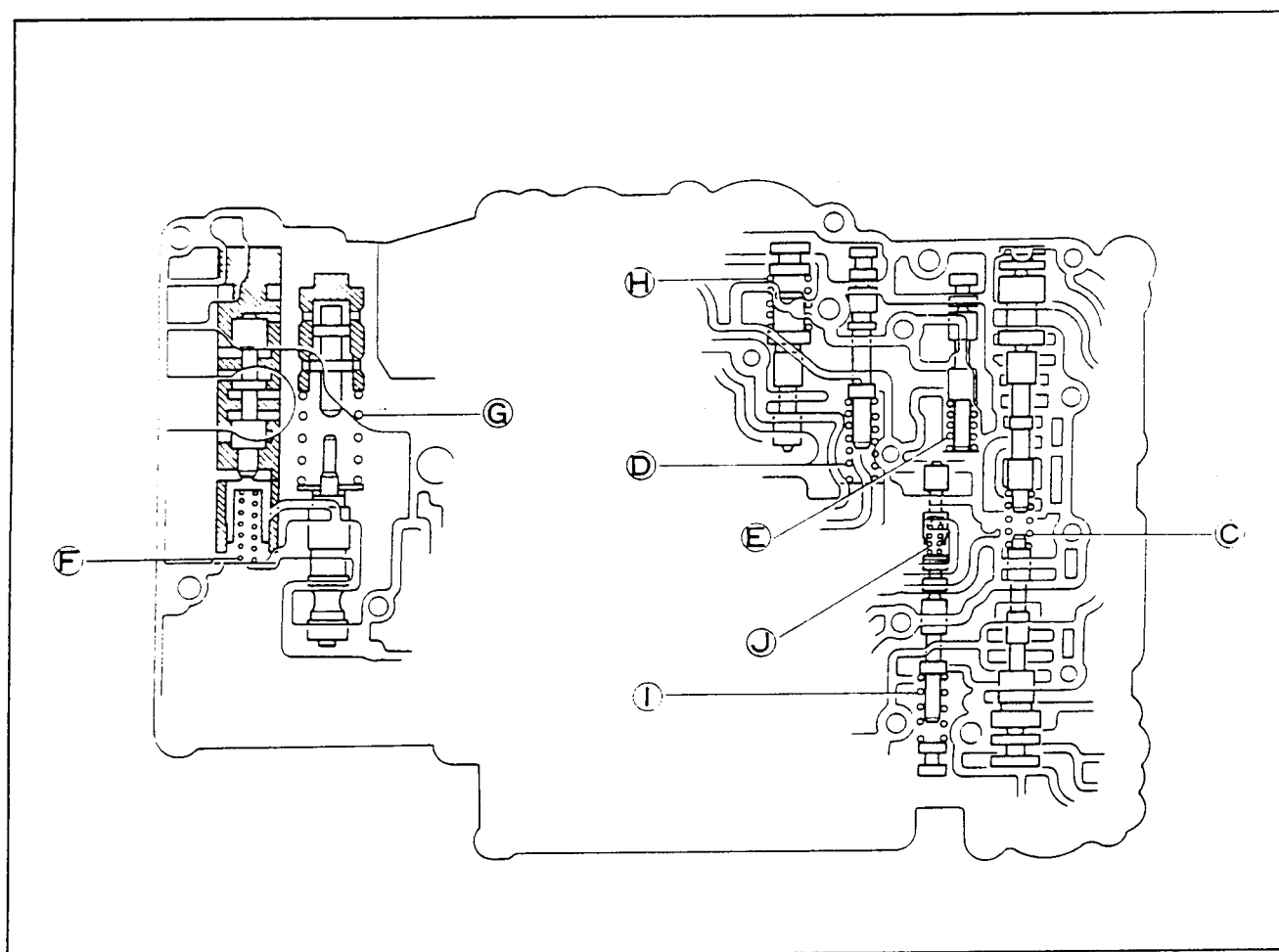
Technical Service Information

SPECIFICATIONS OF VALVE BODY SPRINGS

Spring	Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
A Check valve	27.7 (1.091)	8.2 (0.323)	13.0	None
B Check ball	13.0 (0.512)	8.4 (0.331)	8.0	None
C 1-2 shift valve	26.6 (1.047)	6.9 (0.272)	16.0	None
D 3-2 kick-down orifice control valve	32.5 (1.280)	8.3 (0.327)	14.0	Blue
E 2nd lock valve	29.4 (1.158)	8.3 (0.327)	14.0	Brown
F Lock-up relay valve	32.4 (1.276)	9.3 (0.366)	15.0	Pink
G Primary regulator valve	58.2 (2.291)	20.9 (0.823)	11.0	None
H Accumulator control valve	25.1 (0.988)	12.5 (0.492)	8.5	Red
I Low coast modulator valve	30.0 (1.181)	7.3 (0.287)	16.0	Yellow
J 1-2 relay valve	22.9 (0.902)	5.2 (0.205)	16.0	None

NOTE: During reassembly, please refer to the spring specifications above to help differentiate the different springs.

SECTIONAL VIEW OF VALVE BODY



AUTOMATIC TRANSMISSION SERVICE GROUP

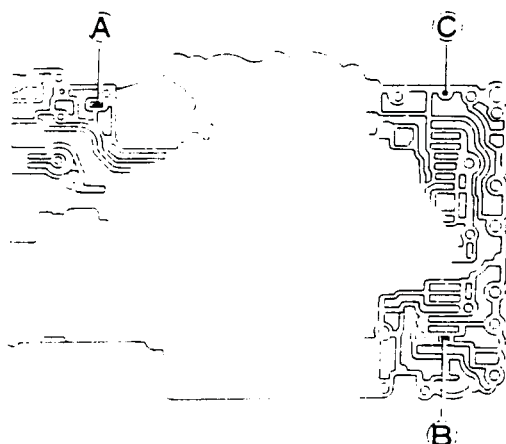


Technical Service Information

LOCATION OF RETAINERS, PINS, CHECK VALVE, BALL AND SPRINGS

RETAINERS AND PINS

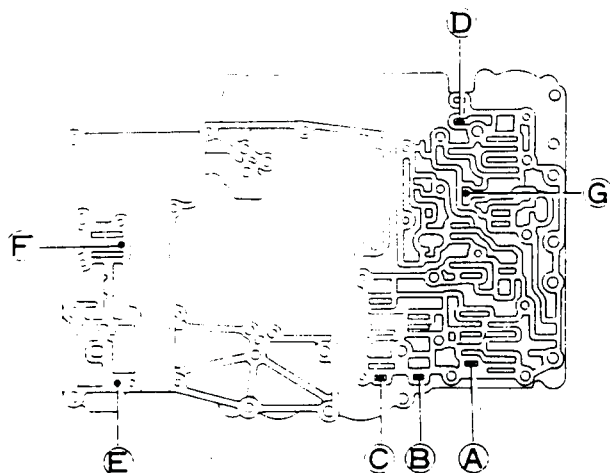
Upper Side



mm (in.)

	Item	Length	Width	Thickness or diameter
A	Retainer for primary regulator valve sleeve	17.0 (0.669)	8.5 (0.335)	3.2 (0.126)
B	Retainer for low coast shift valve plug	13.5 (0.531)	5.0 (0.197)	3.2 (0.126)
C	Pin for 1-2 shift valve low plug	13.8 (0.543)		2.5 (0.098)

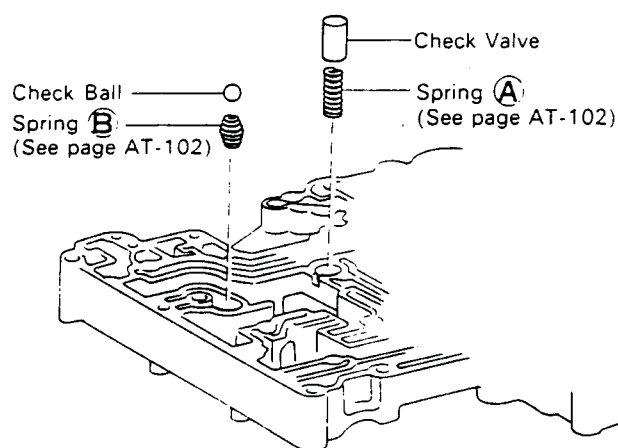
Lower Side



mm (in.)

	Item	Length	Width	Thickness or diameter
A	Retainer for 2nd lock valve plug	6.0 (0.236)	6.0 (0.236)	3.2 (0.126)
B	Retainer for 3-2 kick-down orifice control valve plug	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
C	Retainer for accumulator control valve plug	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
D	Retainer for low coast modulator valve plug	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
E	Pin for lock-up relay valve No.1 sleeve	21.8 (0.858)		2.5 (0.098)
F	Pin for lock-up relay valve No.2 sleeve	45.0 (1.772)		4.0 (0.157)
G	Pin for 1-2 relay valve plug	21.8 (0.858)		2.5 (0.098)

CHECK VALVE, BALL AND SPRINGS



mm (in.)

Item	Diameter
Check ball	8.7 (0.343)

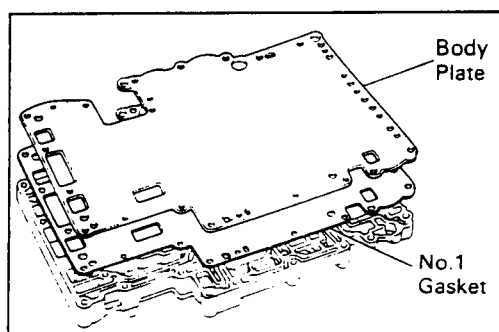
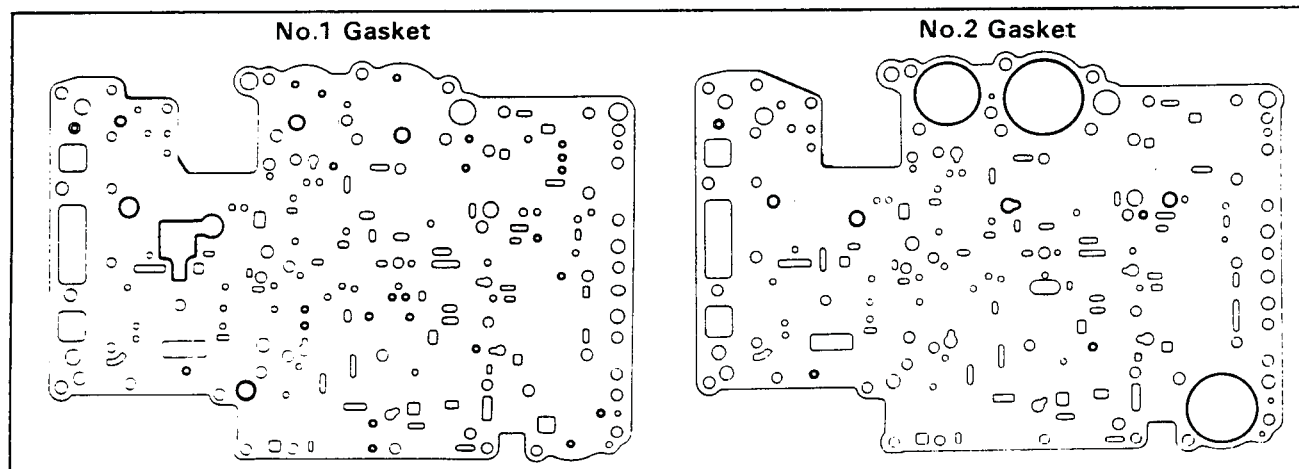
AUTOMATIC TRANSMISSION SERVICE GROUP



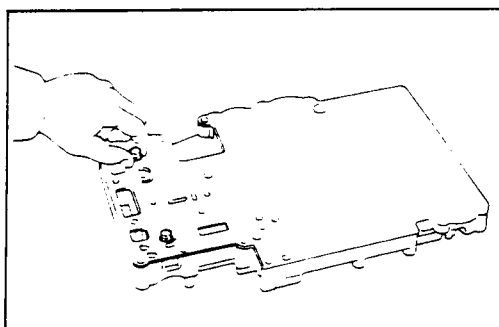
Technical Service Information (Assembly of Valve Body)

1. INSTALL VALVE BODY PLATE

NOTE: Since No.1 and No.2 gaskets look similar, use the illustrations below to differentiate them.

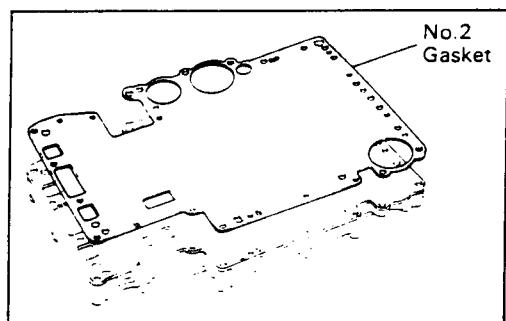


Place a new No.1 gasket and the body plate on the lower valve body.



Temporarily secure the body plate with the two bolts.

NOTE: Use the two bolts for the oil tube clamp.

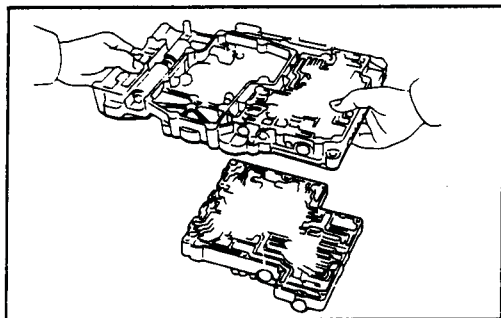


Place a new No.2 gasket on the body plate.

AUTOMATIC TRANSMISSION SERVICE GROUP

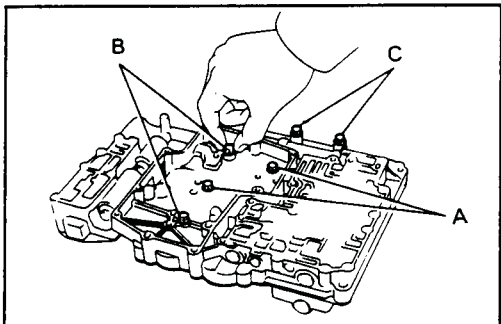


Technical Service Information



INSTALL REAR UPPER VALVE BODY

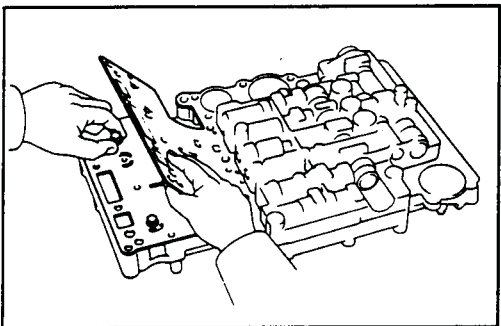
Place the lower valve body on the rear upper valve body.



Temporarily install the six wave washers and bolts.

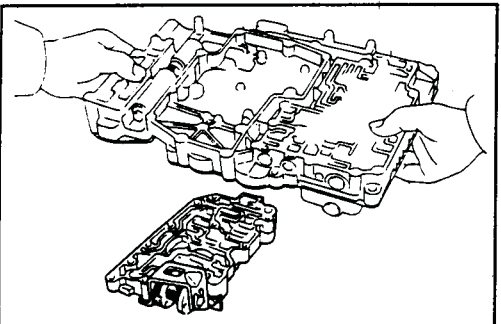
NOTE: Each bolt length (mm (in.)) is indicated in the figure.

Bolt length: A 29.5 mm (1.161 in.)
B 35 mm (1.38 in.)
C 44 mm (1.73 in.)

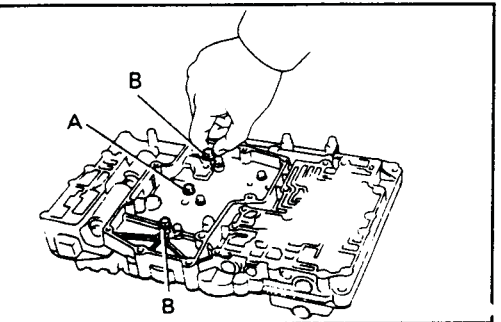


INSTALL FRONT UPPER VALVE BODY

Remove the two temporary installed bolts.



Place the lower valve body on the front upper valve body.



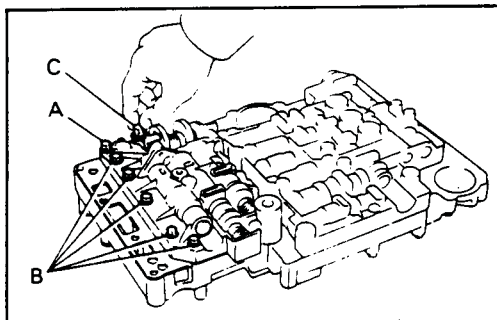
Temporarily install the three wave washers and bolts.

NOTE: Each bolt length (mm (in.)) is indicated in the figure.

Bolt length: A 29.5 mm (1.161 in.)
B 35 mm (1.38 in.)



Technical Service Information

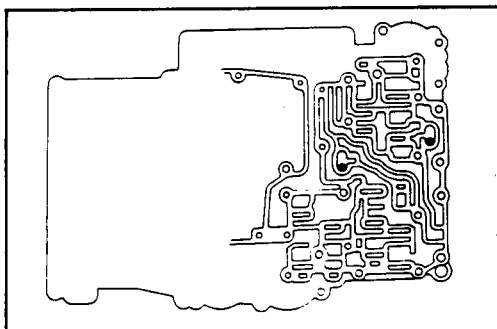


Turn over the valve body assembly.

Temporarily install the seven wave washers and bolts.

NOTE: Each bolt length (mm (in.)) is indicated in the figure.

Bolt length: A 25 mm (0.98 in.)
B 29.5 mm (1.161 in.)
C 39 mm (1.54 in.)



INSTALL CHECK BALLS

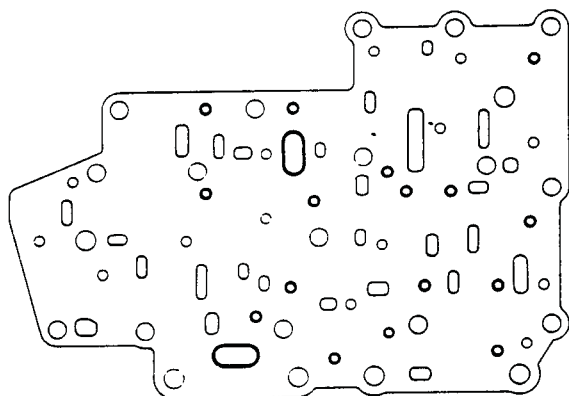
Turn over the valve body assembly.

Install the two check balls into the lower valve body.

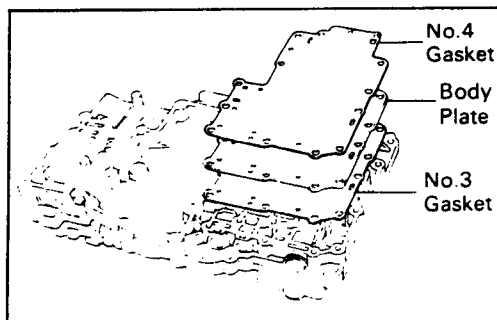
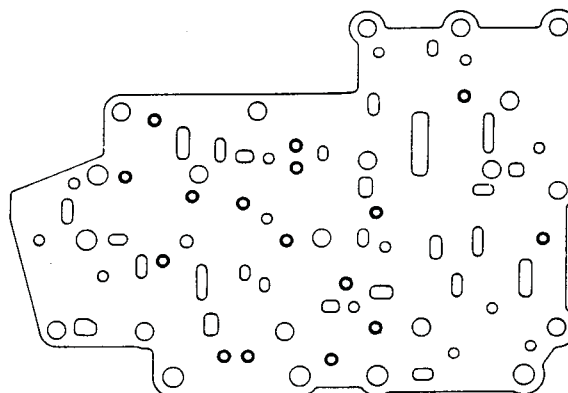
INSTALL LOWER VALVE BODY PLATE AND COVER

NOTE: Since No.3 and No.4 gaskets look similar, use the illustrations below to differentiate them.

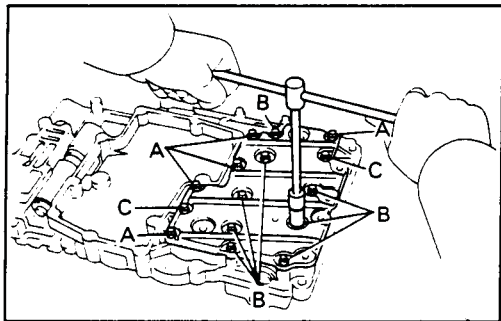
No.3 Gasket



No.4 Gasket



- (a) Place a new No.3 gasket, the body plate and a new No.4 gasket on the lower valve body.

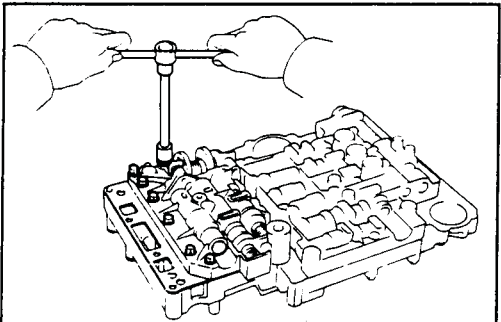


Install the body cover with the fifteen wave washers and bolts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

NOTE: Each bolt length (mm (in.)) is indicated in the figure.

Bolt length: A 18 mm (0.71 in.)
B 56 mm (2.20 in.)
C 60 mm (2.36 in.)

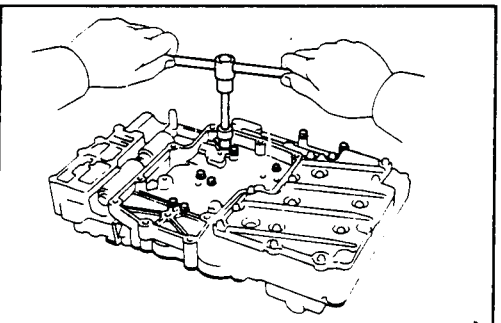


TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

(a) (Upper Side)

Tighten the seven bolts.

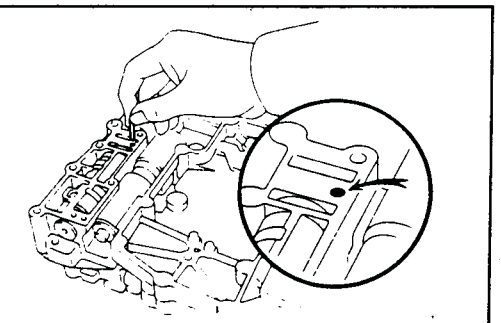
Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



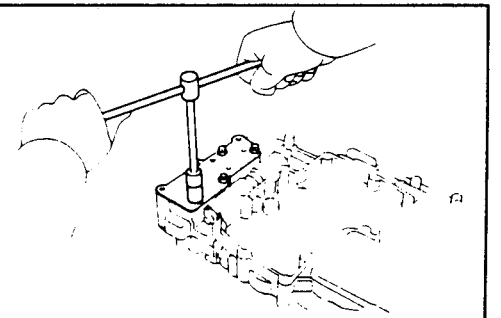
(b) (Lower Side)

Tighten the nine bolts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



INSTALL LOCK-UP RELAY VALVE SLEEVE PIN



TEMPORARILY INSTALL LOCK-UP RELAY VALVE BODY PLATE

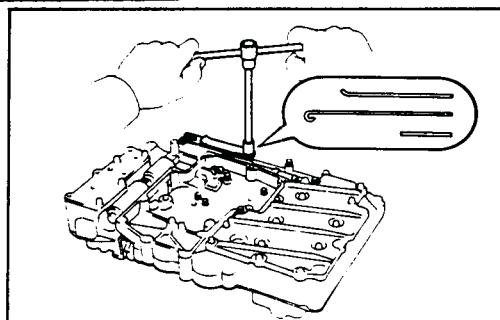
Install the body plate with the four bolts.

NOTE:

- Use the bolt which is 12 mm (0.47 in.) in length.
- Fully install the body plate when the valve body is installed in the transmission case.



Technical Service Information

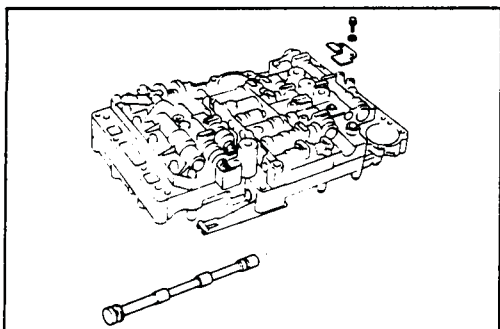


INSTALL MANUAL DETENT SPRING

Install the spacer, detent spring and cover with the wave washer and bolt.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

NOTE: Use the bolt which is 43 mm (1.69 in.) in length.

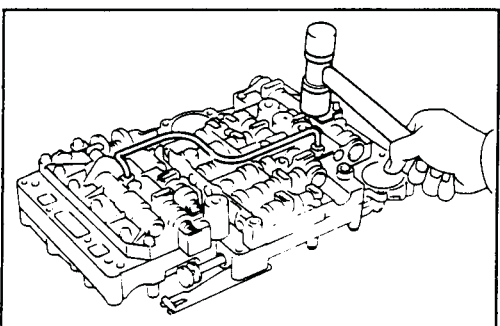


INSTALL MANUAL VALVE

INSTALL CLAMP

Install the clamp with the two bolts and wave washers.

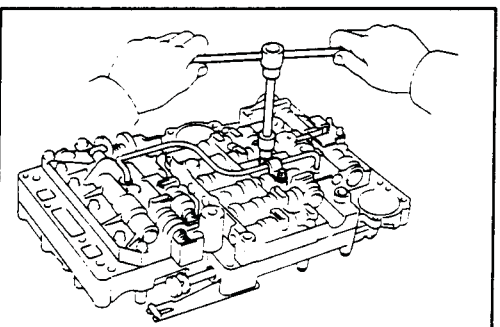
NOTE: Use the bolt which is 12 mm (0.47 in.) in length.



INSTALL OIL TUBE

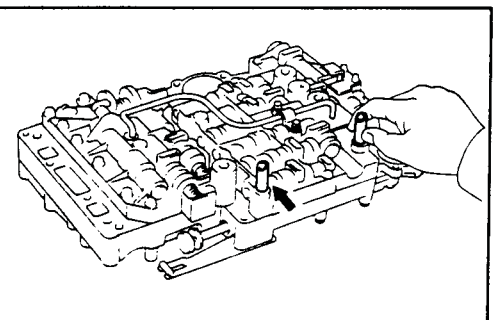
Using a plastic-faced hammer, tap in the oil tube.

CAUTION: Be careful not to bend or damage the tube.



Install the tube clamp with the two wave washers and bolts.

NOTE: Use the bolt which is 12 mm (0.47 in.) is length.



INSTALL LINE PRESSURE TUBES

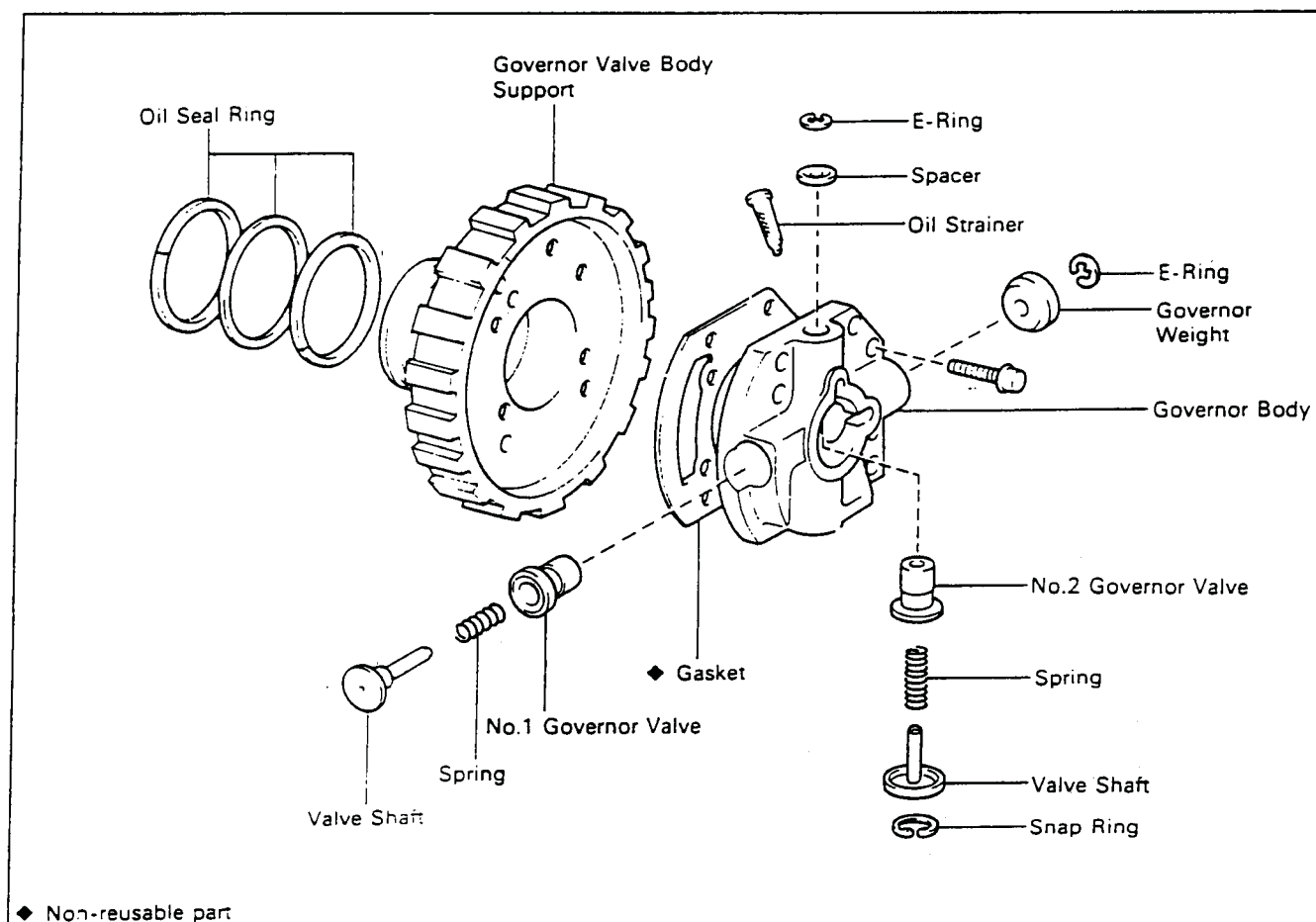
Install the two pressure tubes.



Technical Service Information

Governor Body

COMPONENTS

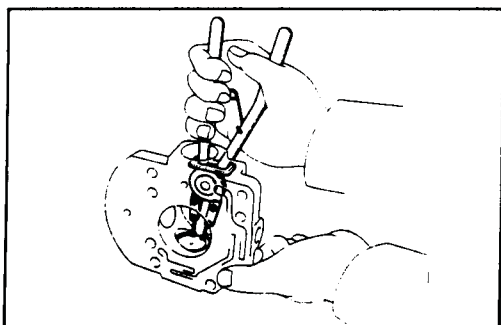
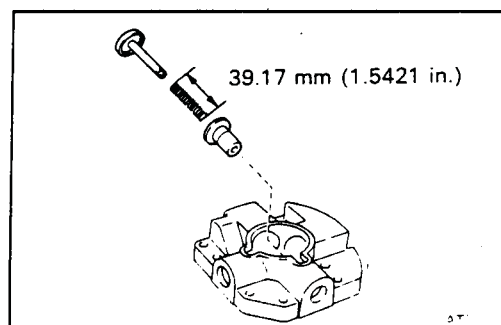


ASSEMBLY OF GOVERNOR BODY

INSTALL NO.2 GOVERNOR VALVE

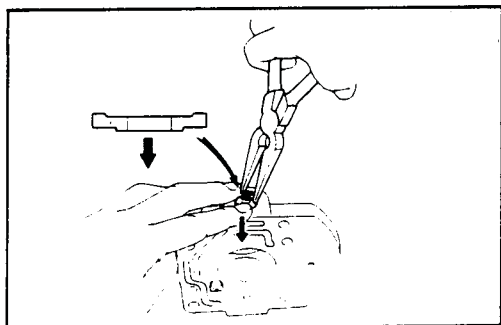
Coat the governor valve and shaft with ATF.
Install the governor valve, spring and valve shaft into the inside of the governor body.

Using snap ring pliers, install the snap ring.



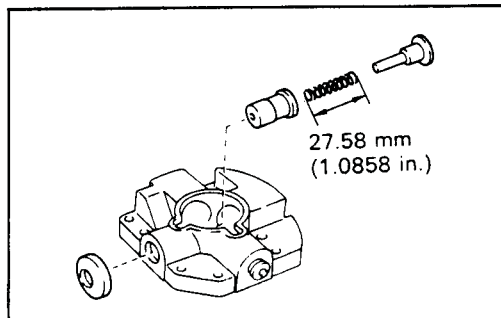


Technical Service Information



Install the spacer.

Using needle nose pliers, install the E-ring.

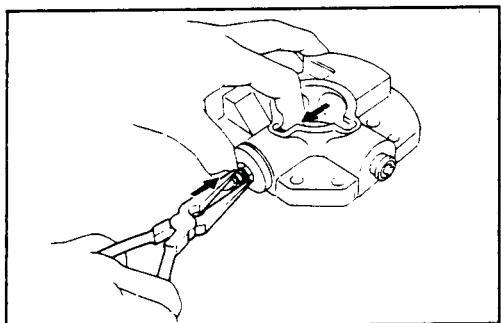


INSTALL NO.1 GOVERNOR VALVE

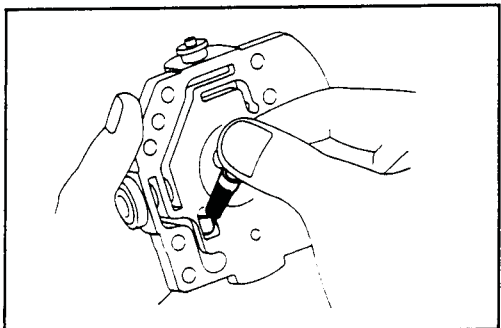
Coat the governor valve and shaft with ATF.

Install the governor valve, spring and valve shaft into the inside of the governor body.

Install the governor weight.

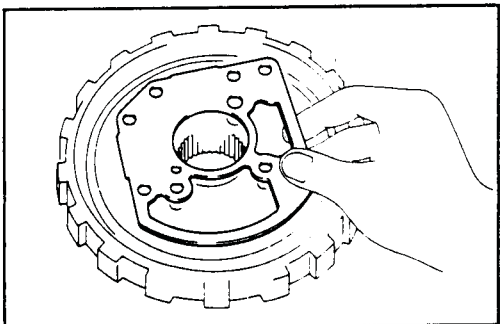


Using needle nose pliers, install the E-ring.



INSTALL GOVERNOR OIL STRAINER

Install the oil strainer into the governor body.



INSTALL GOVERNOR BODY

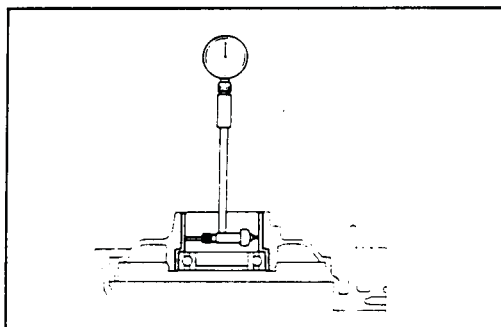
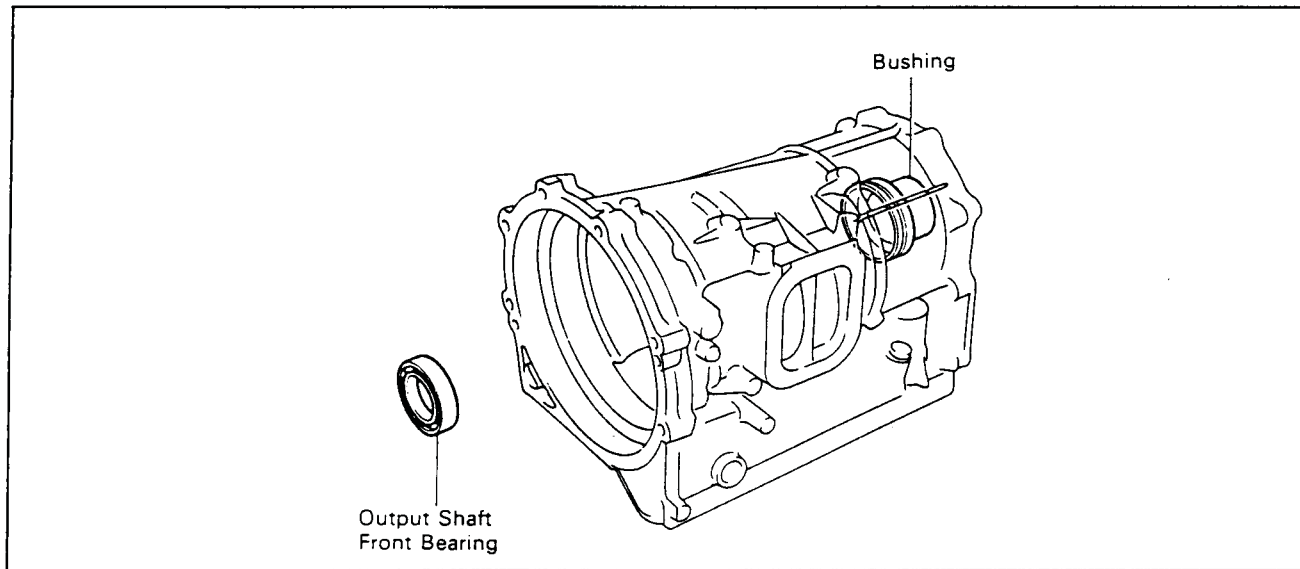
Coat a new gasket with ATF, and install it to the body support.



Technical Service Information

Transmission Case

COMPONENTS



INSPECTION OF TRANSMISSION CASE

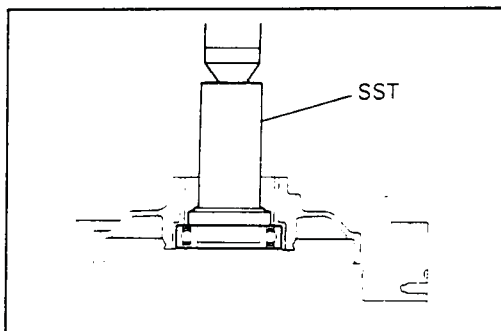
INSPECT BUSHING OF TRANSMISSION CASE

Using a cylinder gauge, measure the inside diameter of the transmission case rear bushing.

Standard inside diameter: 64.000 – 64.050 mm
(2.5197 – 2.5216 in.)

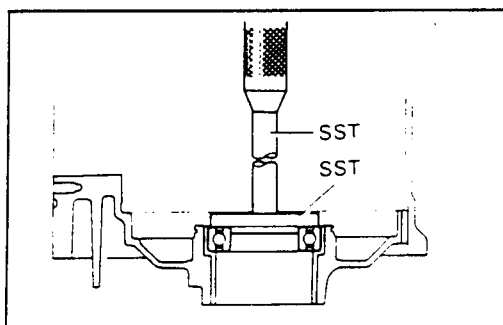
Maximum inside diameter: 64.10 mm (2.5236 in.)

If the inside diameter is greater than the maximum, replace the transmission case.



IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING

Using SST and a press, press out the bearing.
SST 09350-36010 (09350-06040)

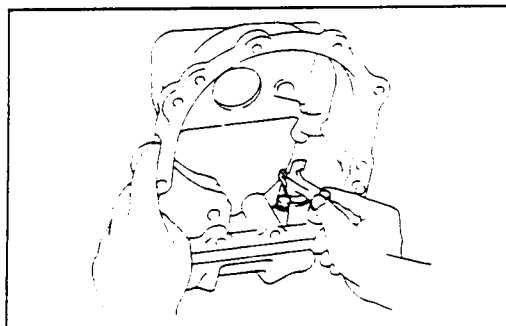
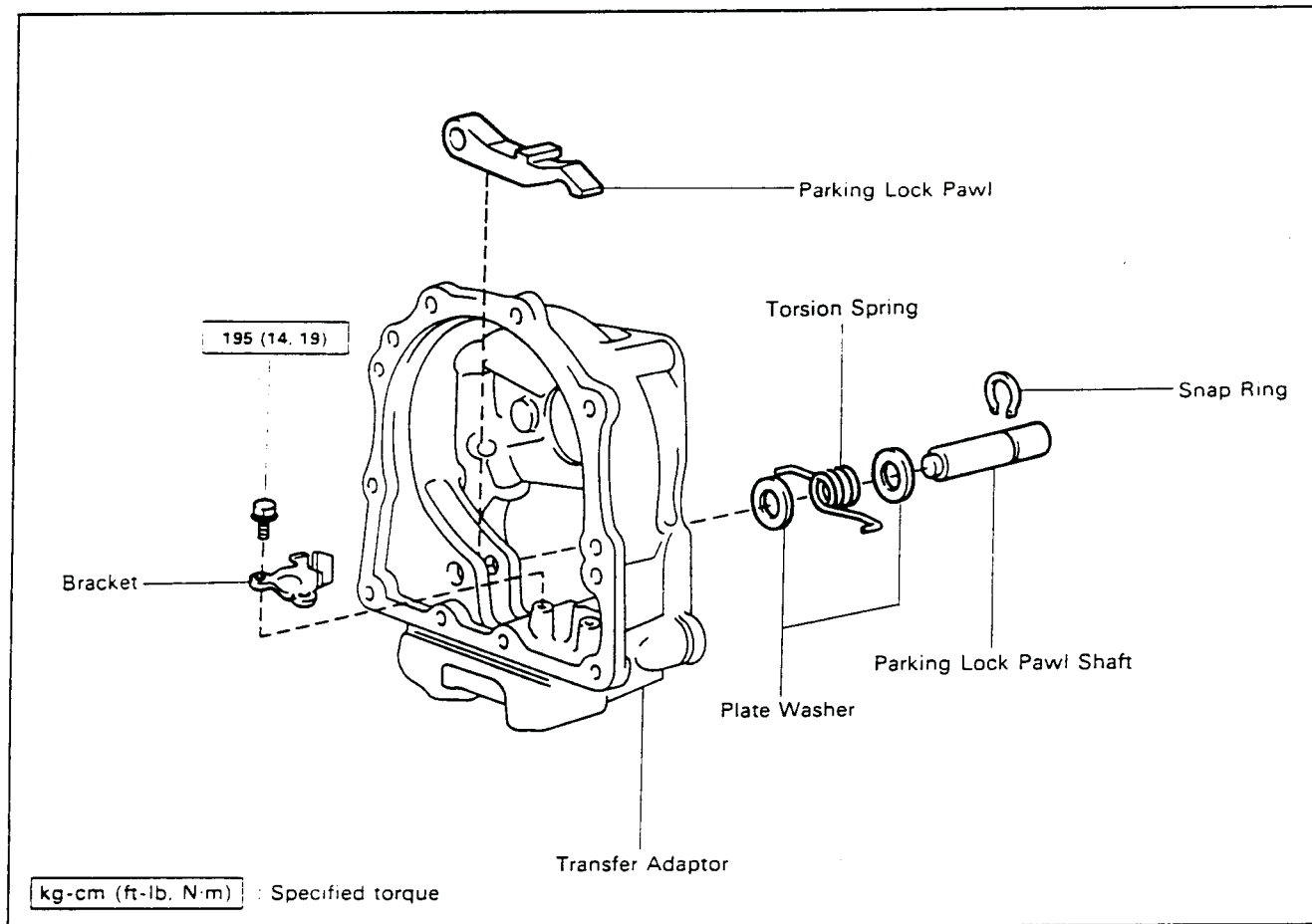


Using SST and a press, press in a new bearing.
SST 09350-36010 (09350-06050, 09350-06060)
Check that the bearing rotates smoothly.

AUTOMATIC TRANSMISSION SERVICE GROUP



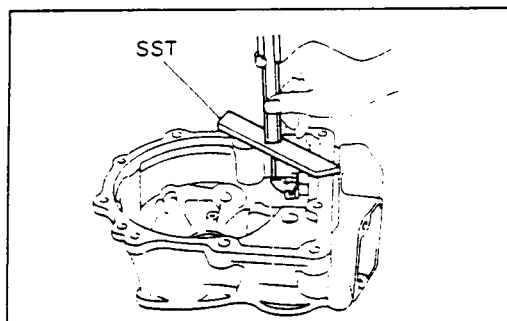
Technical Service Information Parking Lock Pawl COMPONENTS



ASSEMBLY OF PARKING LOCK PAWL

INSTALL PARKING LOCK PAWL BRACKET

Temporarily install the pawl bracket with the two bolts.



Using SST and calipers, set the pawl bracket so that so the distance between the transfer adaptor surface and the top of the bracket tab is specified distance.

Standard distance = Total distance - SST thickness

Standard distance: 47.5 - 47.6 mm (1.870 - 1.874 in.)

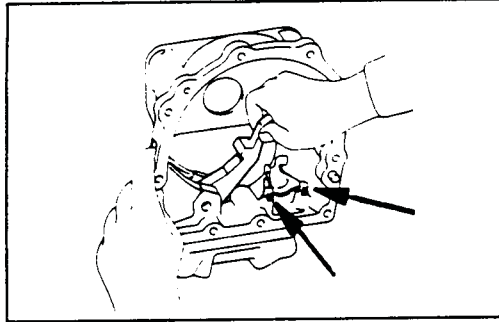
SST 09350-36010 (09350-06090)

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

INSTALL PARKING LOCK PAWL

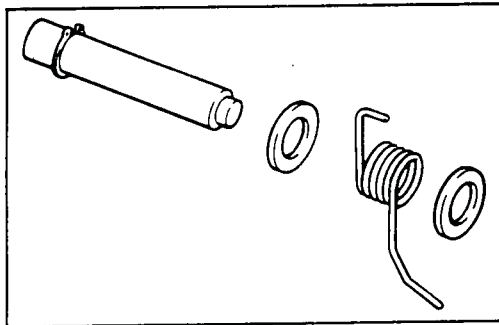
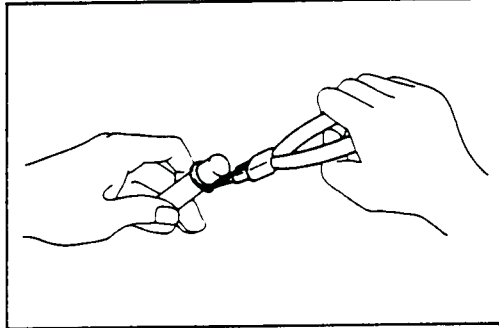


Tighten the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

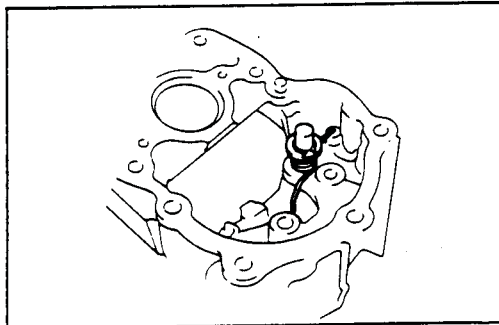
INSTALL PARKING LOCK PAWL SHAFT

Using snap ring pliers, install the snap ring.

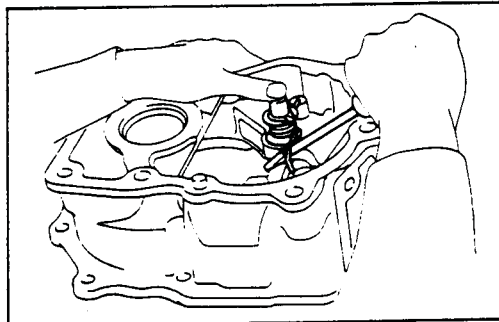


Install the following parts:

- (1) Plate washer
- (2) Spring
- (3) Plate washer



Insert the spring end to the hole of the transfer adaptor, and install the pawl shaft.



Hold the pawl shaft, hook another spring end to the pawl with a screwdriver.

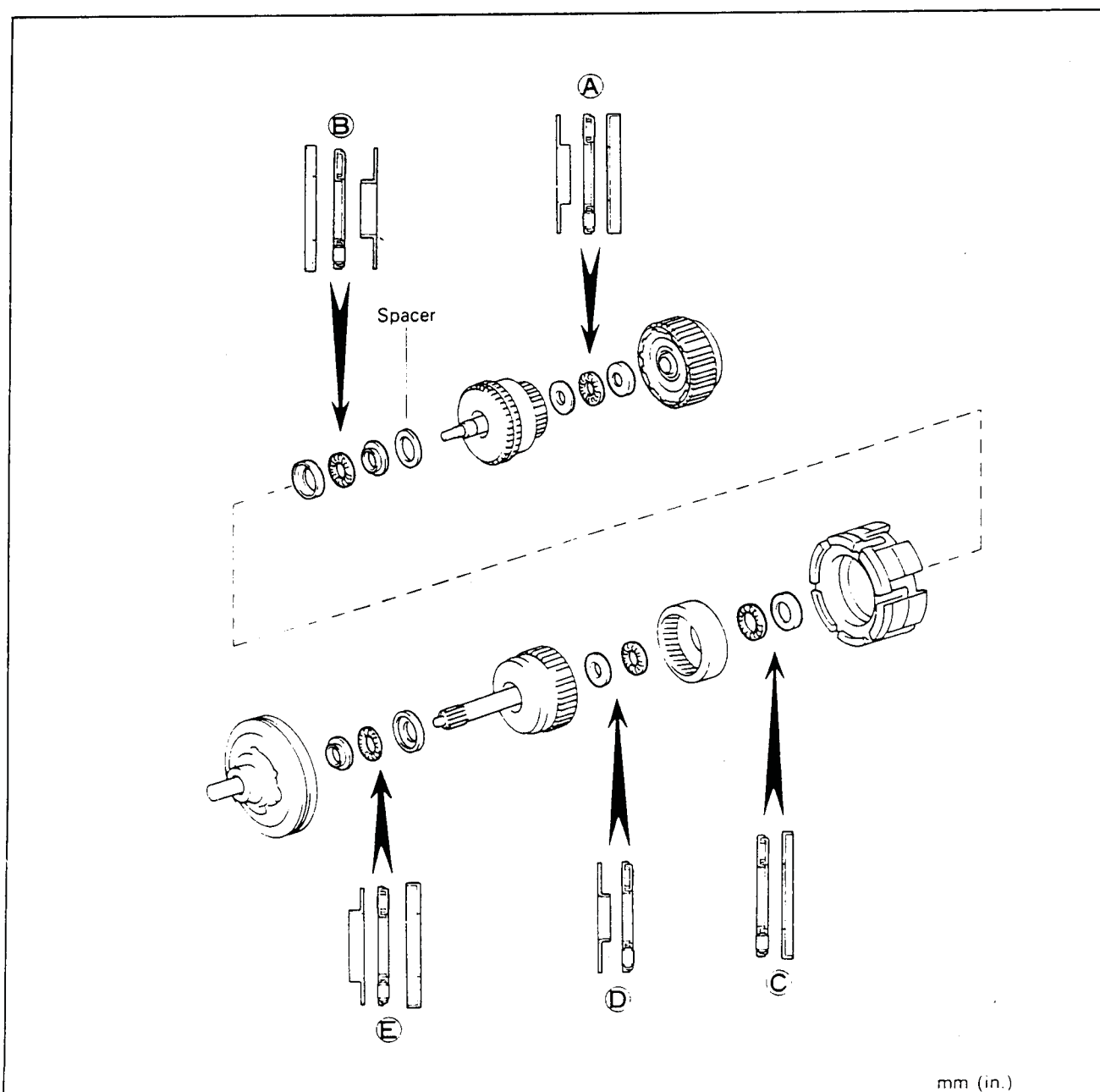
Make sure the pawl moves smoothly.

AUTOMATIC TRANSMISSION SERVICE GROUP

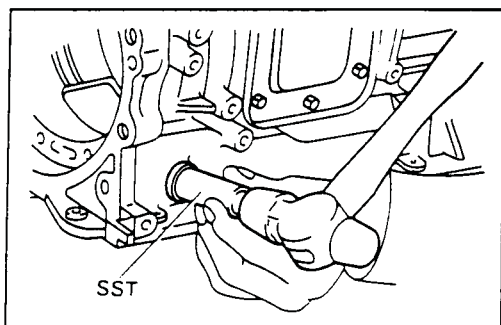


Technical Service Information

INSTALLATION POSITION AND DIRECTION OF BEARINGS AND RACES



	Thrust bearing diameter		Bearing race diameter			
			Front		Rear	
	Inside	Outside	Inside	Outside	Inside	Outside
A	34.7 (1.366)	52.0 (2.047)	32.8 (1.291)	50.4 (1.984)	37.0 (1.457)	52.0 (2.047)
B	34.7 (1.366)	52.0 (2.047)	37.0 (1.457)	52.0 (2.047)	32.8 (1.291)	50.4 (1.984)
C	34.7 (1.366)	52.0 (2.047)	-	-	37.0 (1.457)	52.0 (2.047)
D	25.0 (0.894)	42.0 (1.654)	23.2 (0.913)	42.0 (1.654)	-	-
E	28.5 (1.122)	46.2 (1.819)	27.1 (1.067), 27.9 (1.096) or 28.3 (1.114)		43.0 (1.693)	28.5 (1.122) 48.0 (1.890)

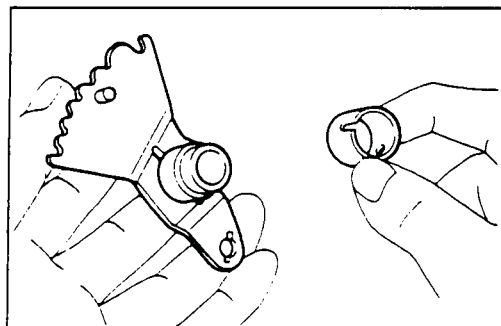


INSTALL MANUAL VALVE LEVER, SHAFT AND OIL SEALS

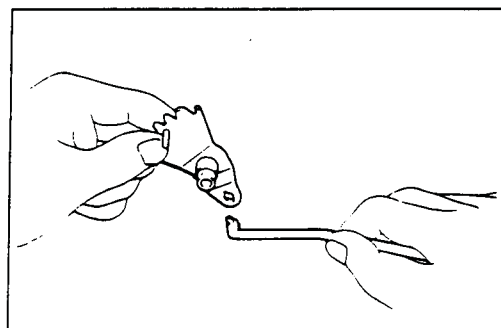
Using SST, tap in new two oil seals.

SST 09350-36010 (09350-06150)

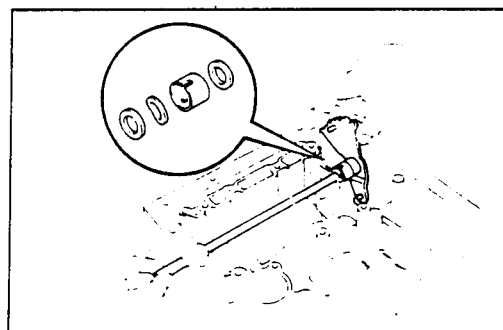
Apply MP grease to the oil seal lip.



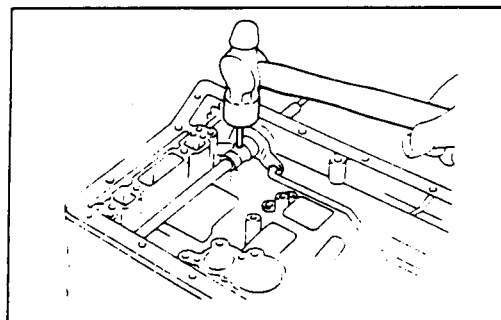
Assemble a new spacer to the manual valve lever.



Connect the parking lock rod to the manual valve lever.



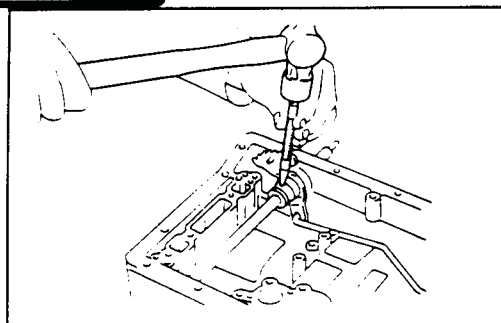
Install the manual valve lever shaft to the transmission case through the plate, wave washer, manual valve lever and plate .



Using a hammer, tap in the pin with the slot at a right angle to the shaft.

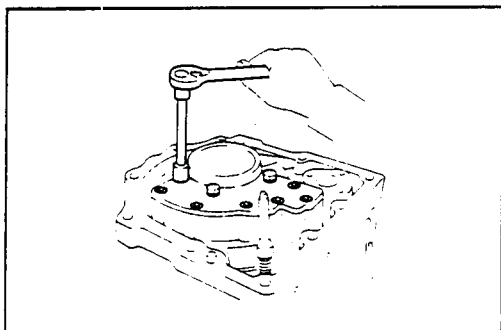


Technical Service Information



Match the spacer hole to the lever calking hollow and calk the spacer to the lever.

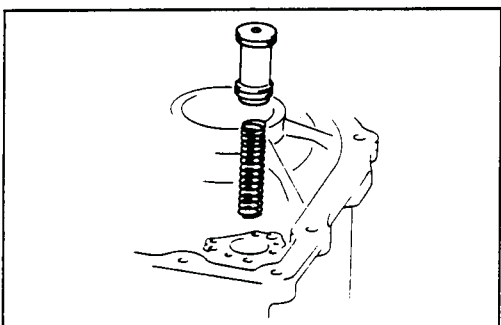
Make sure the manual valve lever shaft turns smoothly.



INSTALL TRANSMISSION REAR COVER

Install a new gasket and rear cover with the three bolts and six screws.

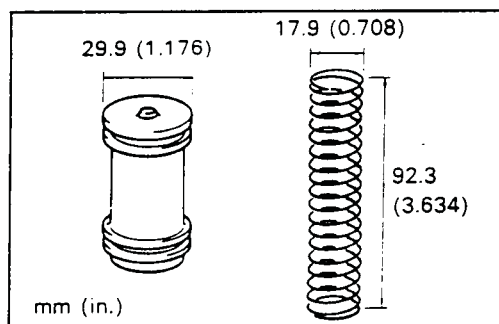
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



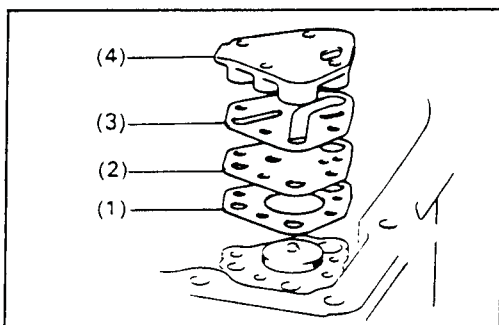
INSTALL C, ACCUMULATOR PISTON AND SPRING

Coat new O-rings with ATF, and install them to the piston.

Install the spring and accumulator piston into the bore of the transmission case.



NOTE: Piston, spring diameters and spring free length are shown in the figure.

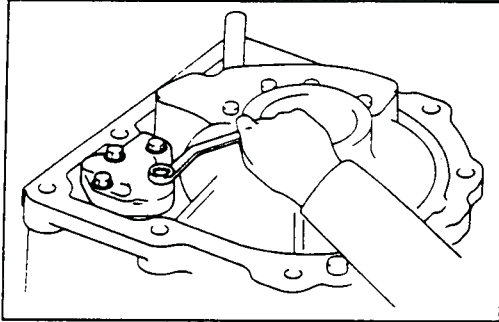


Place the following parts on the transmission case.

- (1) New gasket
- (2) Plate
- (3) New gasket
- (4) Front clutch accumulator cover

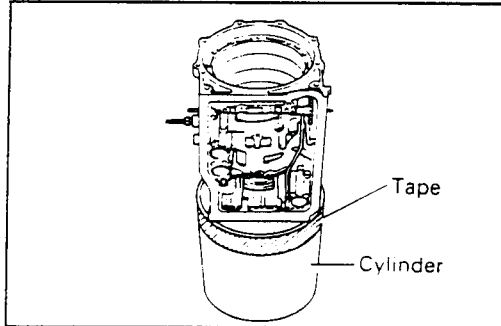


Technical Service Information



Install the four bolts.

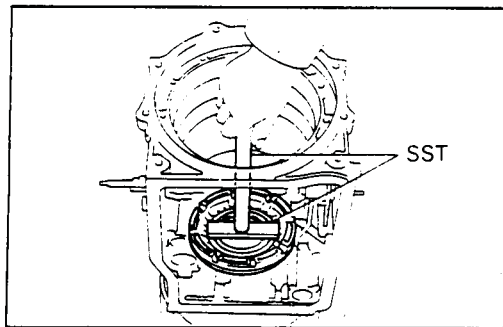
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



INSTALL FIRST AND REVERSE BRAKE PISTON

Place the transmission case on a cylinder.

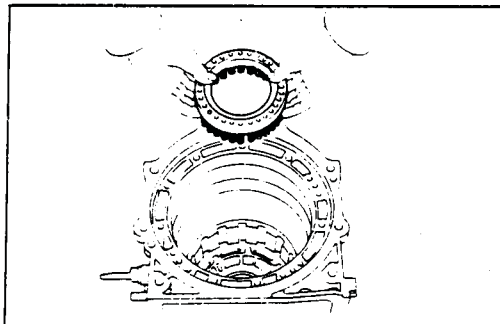
CAUTION: Be careful not to damage the transmission case. Tape the top of the cylinder.



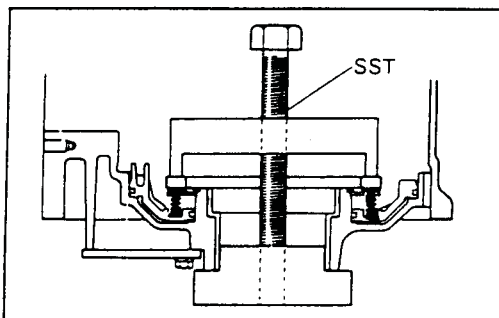
Coat new two O-rings with ATF, and install them to the brake piston.

Using SST, push in the brake piston.

SST 09350-36010 (09350-06035, 09350-06050)



Place the return spring on the brake piston.

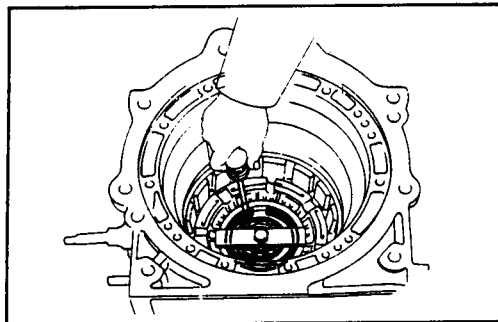


Using SST, compress the return spring.

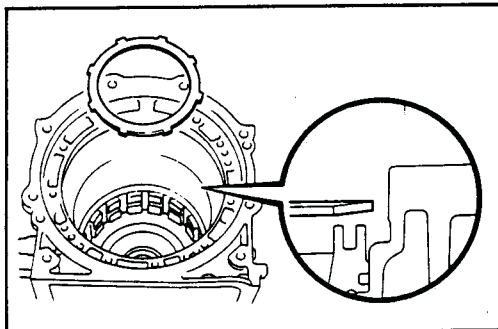
SST 09350-36010 (09350-06030)



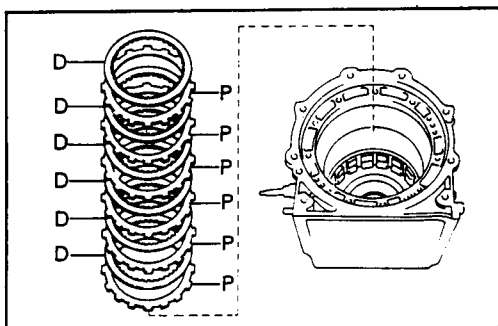
Technical Service Information



Using a screwdriver, install the snap ring.



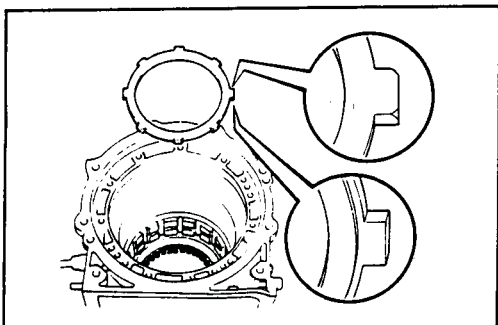
Install the cushion plate, facing the rounded edge inward.



Install the six plates and six discs in order:

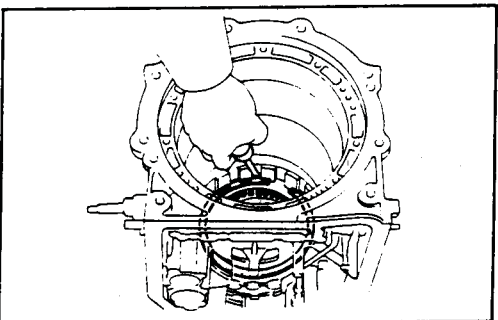
P = Plate D = Disc

P-D-P-D-P-D-P-D-P-D



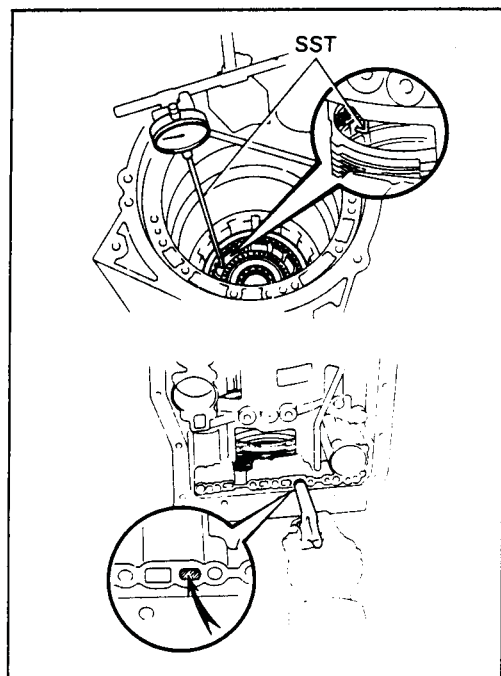
Install the flange, facing the rounded edge outward.

NOTE: If the flange is step-edged, install the flange with the step-edge, facing inward.



Install the snap ring.

NOTE: Be sure the end of the snap ring is not aligned with the cutout portion of the transmission case.



CHECK PISTON STROKE OF FIRST AND REVERSE BRAKE

Using SST and a dial indicator, measure the piston stroke by applying and releasing the compressed air (4 – 8 kg/cm², 57 – 114 psi or 392 – 785 kPa) as shown.

SST 09350-36010 (09350-06120, 09350-06130)

Piston stroke: 1.5 – 3.0 mm (0.059 – 0.118 in.)

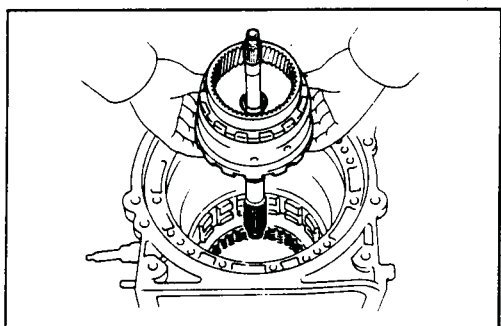
If the piston stroke is less than specified, parts may have been assembled incorrectly, check and reassemble again.

If the piston stroke is not as specified, select another flange.

NOTE: There are three different thicknesses for flange.

mm (in.)

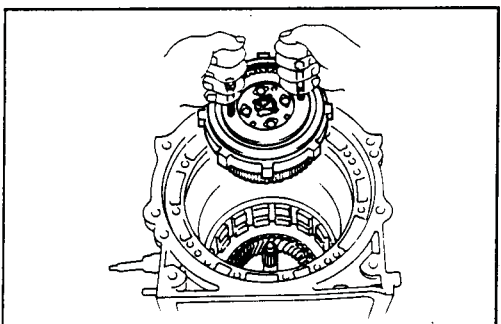
No.	Thickness
None	6.65 (0.2618)
1	7.05 (0.2776)
2	7.45 (0.2933)



INSTALL PLANETARY GEARS, ONE-WAY CLUTCH AND OUTPUT SHAFT ASSEMBLY

Place the transmission case on a cylinder.
(See step 4 (a) on page AT-121)

Install the rear planetary carrier and output shaft assembly to the transmission case.



Install two bolts to the front planetary carrier.

NOTE: Use two 6 mm (1 mm pitch) bolts. Do not screw over 5 revolutions.

Align the spline of the one-way clutch with the spline groove of the transmission case.

Install the front planetary carrier and one-way clutch assembly into the transmission case.

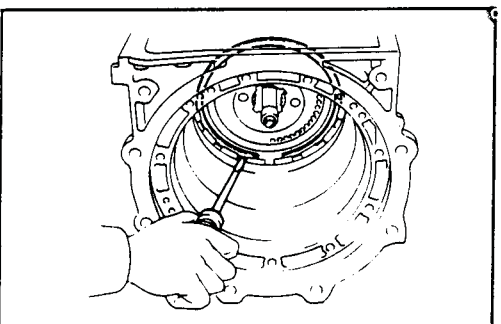
NOTE:

- Mesh the spline of the front planetary carrier with the flukes of the discs by rotating and pushing the front planetary carrier clockwise.

- If the front planetary carrier will not rotate clockwise, check the installation of the one-way clutch.

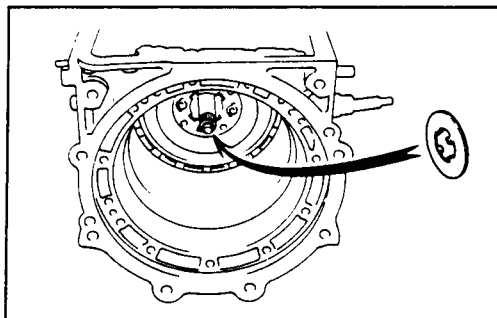
Using a screwdriver, install the snap ring.

NOTE: Be sure the end of the snap ring is not aligned with the cutout portion of the transmission case.



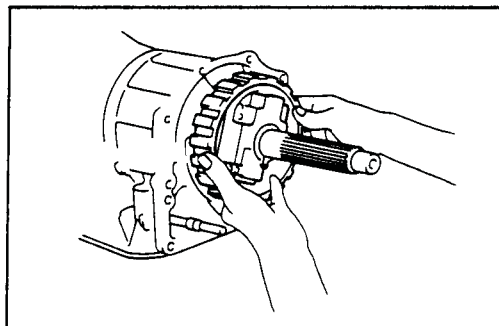


Technical Service Information



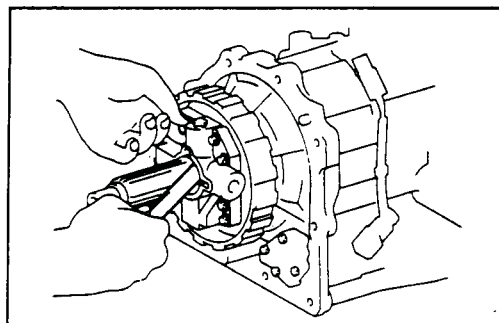
Coat the thrust washer with petroleum jelly, and install it onto the front planetary carrier.

NOTE: Securely fit the claws of the thrust washer into the grooves of the front planetary gear.



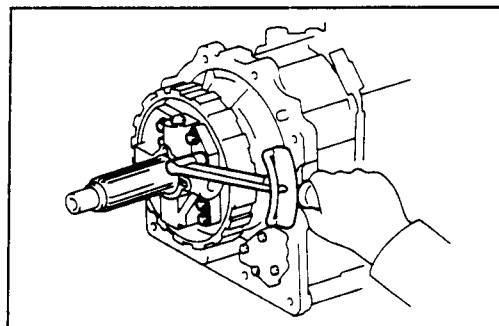
INSTALL GOVERNOR BODY

Install the governor body onto the output shaft.



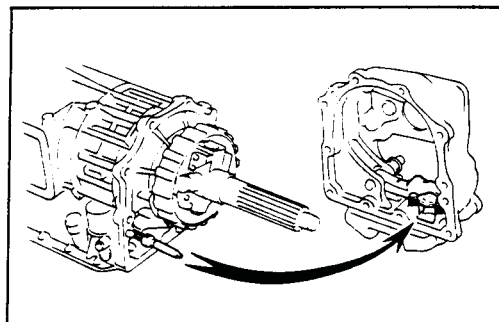
Insert a 0.01 mm (0.0004 in.) feeler gauge between the output shaft and governor body, and temporarily tighten the bolts.

Check that the clearance between the output shaft and governor body is even all the way around.



Tighten the bolts.

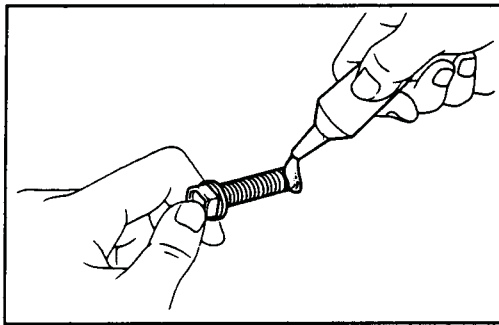
Torque: 100 kg-cm (7 ft-lb, 10 N·m)



INSTALL TRANSFER ADAPTOR

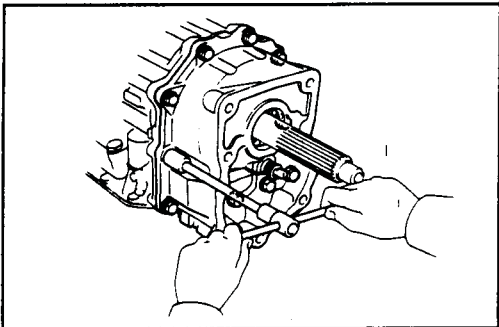
Place a new gasket on the transmission case.

Insert the parking lock rod between the parking lock pawl and bracket, and attach the transfer adaptor on the transmission case.



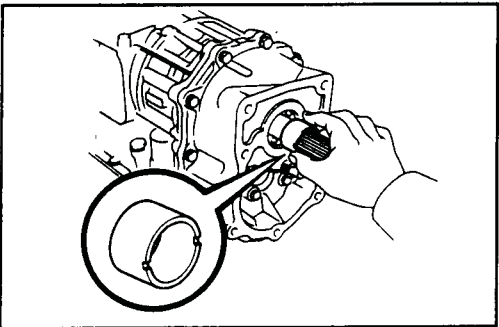
Apply sealant to the bolt threads.

Sealant: Part No.08833-00070, THREE BOND 1324 or equivalent



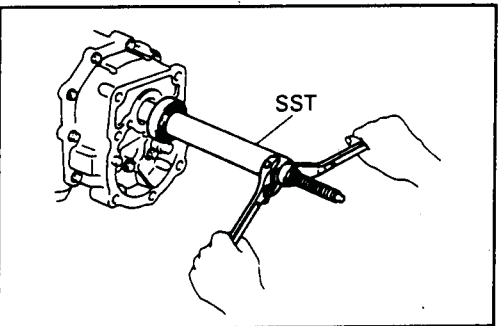
Install a new gasket and the transfer adaptor with the ten bolts.

Torque: 380 kg-cm (27 ft-lb, 37 N·m)



INSTALL OUTPUT SHAFT SPACER

Slide the spacer onto the output shaft, facing the cutout portion outward.

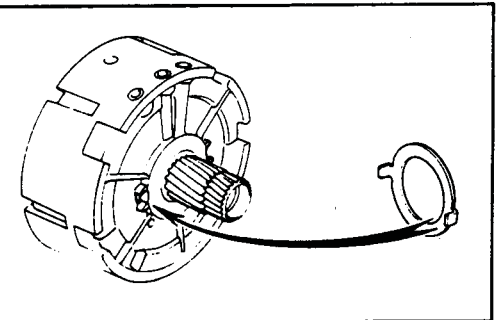


INSTALL OUTPUT SHAFT REAR BEARING

Using SST, install the bearing.

SST 09309-36033

INSTALL TRANSFER COMPONENT PARTS WITHOUT INSTALLING NO.2 TRANSFER CASE COVER
(See pages TF-35 to 43)



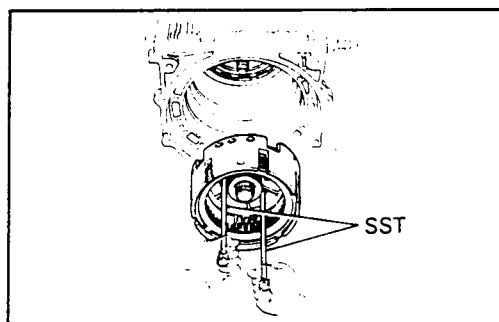
12. TEMPORARILY INSTALL CENTER SUPPORT ASSEMBLY

Coat the thrust washer with petroleum jelly, and install it onto the rear side of the center support.

NOTE: Securely fit the claws of the thrust washer into the grooves of the center support.



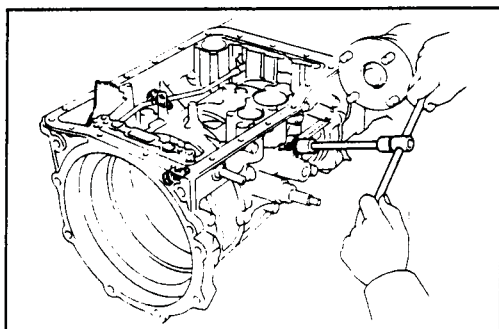
Technical Service Information



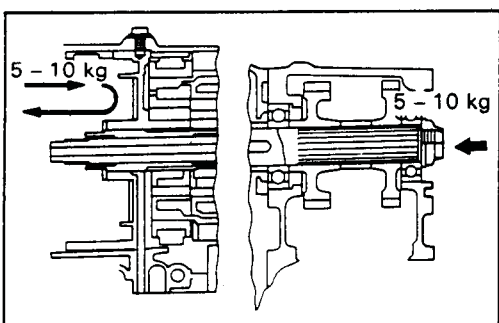
Install SST (two bolts) to the center support.
SST 09350-36010 (09350-06140)

Align the oil holes and bolt holes of the center support and transmission case.

Install the center support assembly into the transmission case.



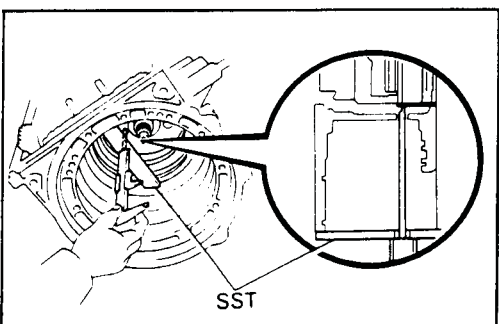
Install the three center support set bolts.
Torque: 250 kg-cm (18 ft-lb, 25 N·m)



ADJUST THRUST CLEARANCE OF CENTER SUPPORT

Push the transmission output shaft toward the front of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).

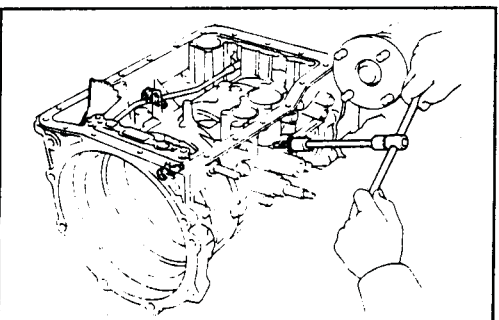
Push the center support toward the rear of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N), then pull with the same amount of force.



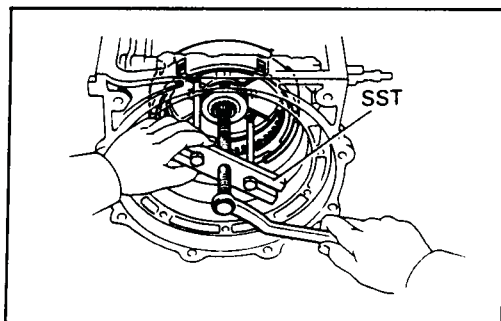
Place SST on the center support.
SST 09350-36010 (09350-06090)

Using calipers, measure distance (A) between the tops of SST and the thrust washer on the front planetary gear.

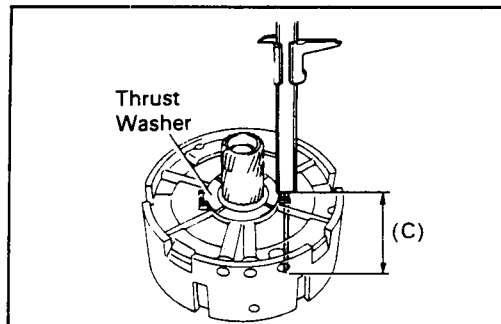
Using calipers, measure thickness (B) of SST.



Remove the three center support set bolts.



Using SST, remove the center support assembly from the transmission case.
SST 09350-36010 (09350-06140)



Turn over the center support together with the thrust washer, and place it on a flat surface.

Inserting calipers into the thrust washer hole, measure the distance (C) between it and the flat surface.

Center support thrust clearance:

$$A - (B + C)$$

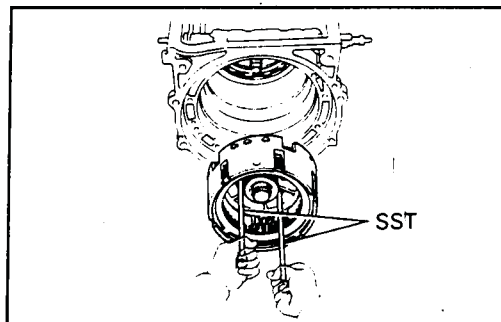
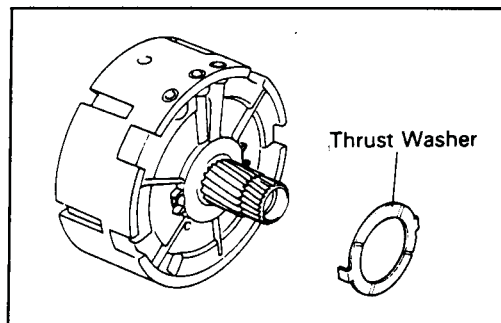
Standard thrust clearance: 0.30 – 0.70 mm
(0.0118 – 0.0276 in.)

Maximum thrust clearance: 0.90 mm (0.0354 in.)

If the thrust clearance is greater than maximum, select and install a thrust washer.

NOTE: There are four different thicknesses for thrust washer.

Thrust washer thickness mm (in.)	
1.8 (0.071)	2.4 (0.094)
2.1 (0.083)	2.6 (0.102)



INSTALL CENTER SUPPORT ASSEMBLY

Coat new three O-rings with ATF, and install them to the oil holes of the center support.

Install SST (two bolts) to the center support.

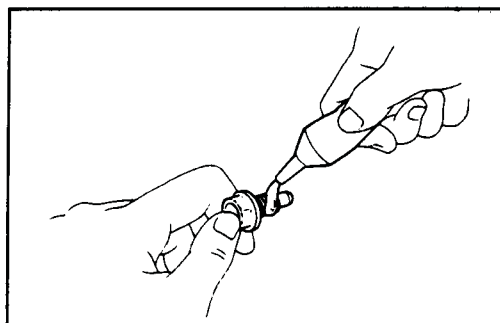
SST 09350-36010 (09350-06140)

Align the oil holes and bolt holes of the center support and transmission case.

Install the center support assembly into the transmission case.

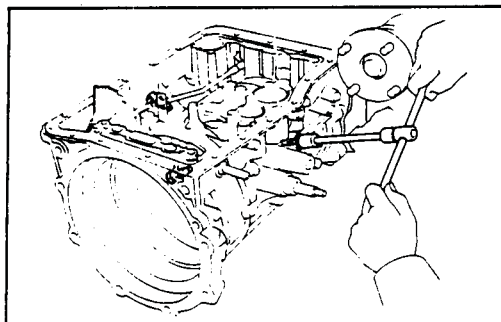
Apply sealant to the threads of the center support set bolts.

Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

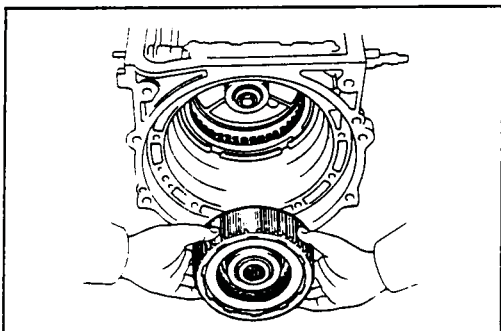




Technical Service Information



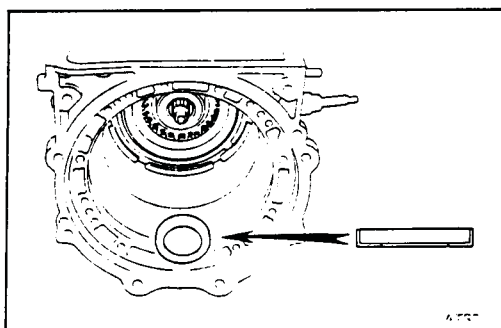
Install the three center support set bolts.
Torque: 250 kg-cm (18 ft-lb, 25 N·m)



INSTALL REAR CLUTCH ASSEMBLY

Install the rear clutch assembly into the transmission case.

NOTE: Mesh the spline of the rear clutch drum with the flukes of the discs by rotating and pushing the rear clutch drum clockwise or counterclockwise.



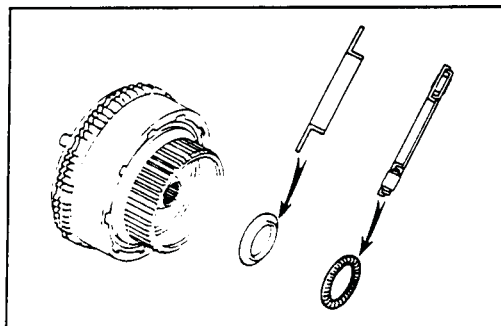
INSTALL FRONT CLUTCH ASSEMBLY

Coat the race with petroleum jelly, and install it onto the rear clutch drum.

NOTE: Race diameter

mm (in.)

	Inside	Outside
Race	37.0 (1.457)	52.0 (2.047)

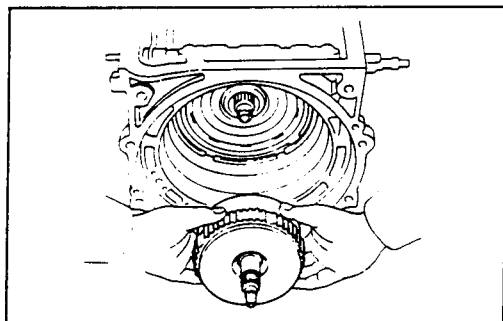


Coat the race and bearing with petroleum jelly, and install them onto the front clutch hub.

NOTE: Bearing and race diameters

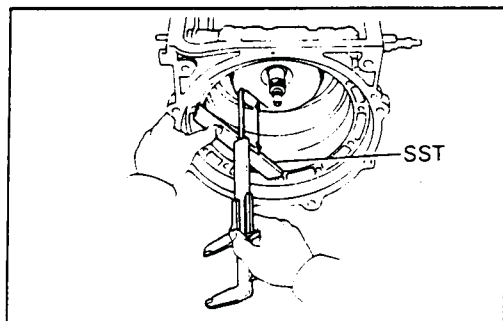
mm (in.)

	Inside	Outside
Bearing	34.7 (1.366)	52.0 (2.047)
Race	32.8 (1.291)	50.4 (1.984)



Install the front clutch assembly into the transmission case.

NOTE: Mesh the spline of the front clutch hub with the flukes of the discs by rotating and pushing the front clutch drum clockwise or counterclockwise.



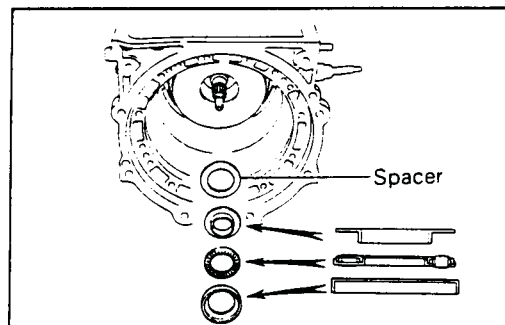
CHECK CORRECT INSTALLATION OF FRONT CLUTCH ASSEMBLY

(a) Place SST on the installation surface of the oil pump.

SST 09350-36010 (09350-06090)

(b) Using calipers, measure the distance between the tops of SST and the clutch drum.

If the distance corresponds to that during disassembly, the front clutch assembly is installed correctly.



TEMPORARILY INSTALL OVERDRIVE CASE ASSEMBLY

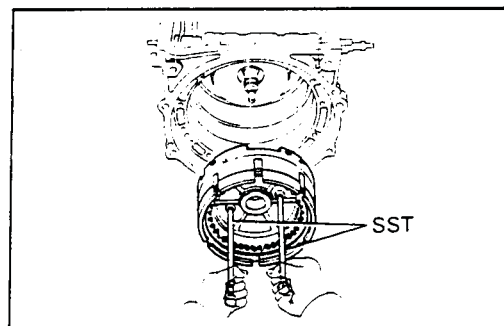
Remove the oil seal ring from the input shaft.

Coat the two races and bearing with petroleum jelly, and install the spacer and them onto the front clutch drum.

NOTE: Bearing and race diameter

mm (in.)

	Inside	Outside
Bearing	34.7 (1.366)	52.0 (2.047)
Race (Front)	37.0 (1.457)	52.0 (2.047)
Race (Rear)	32.8 (1.291)	50.4 (1.984)

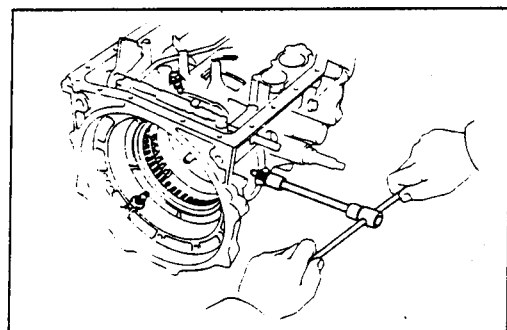


Install SST (two bolts) to the O/D case.

SST 09350-36010 (09350-06140)

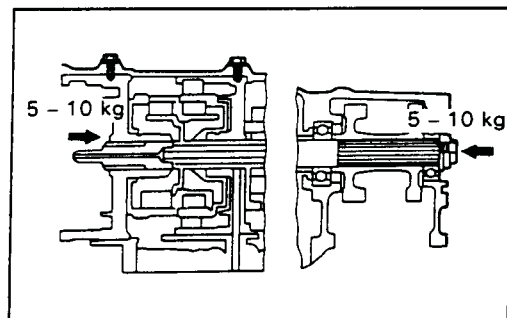
Align the oil holes and bolt holes of the O/D case and transmission case.

Install the O/D case assembly.



Install the three O/D case set bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



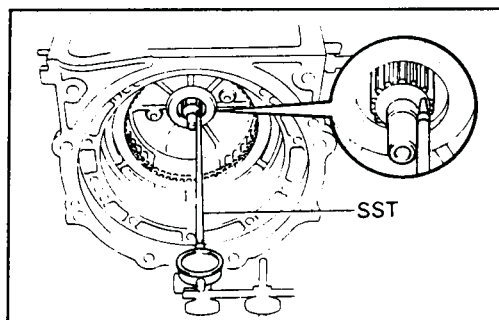
ADJUST THRUST CLEARANCE OF INPUT SHAFT (FRONT CLUTCH DRUM)

Push the transmission output shaft toward the front of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).

Push the O/D case toward the rear of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).



Technical Service Information



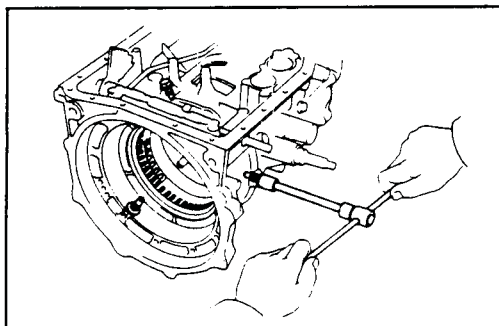
Using SST and a dial indicator, measure the thrust clearance of the input shaft.

SST 09350-36010 (09350-06130)

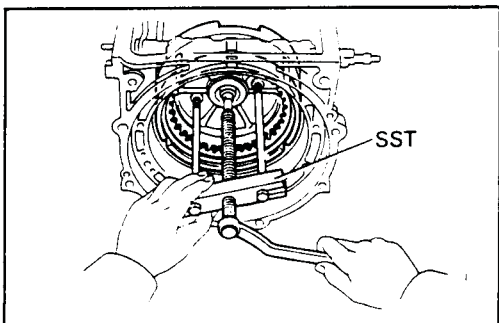
Standard thrust clearance: 0.30 – 0.70 mm
(0.0118 – 0.0276 in.)

Maximum thrust clearance: 0.70 mm (0.0276 in.)

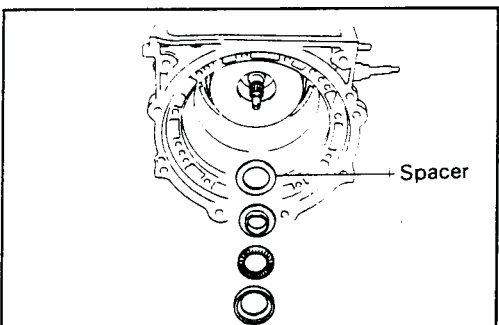
If the thrust clearance is greater than maximum, adjust with a spacer.



Remove the three O/D case set bolts.



Using SST, remove the O/D case assembly.
SST 09350-36010 (09350-06140)



Remove the two races, thrust bearing and spacer from the front clutch drum or O/D case.
Select a spacer.

NOTE: There are five different thicknesses for spacer.

Spacer thickness	mm (in.)
0.9 (0.035)	1.8 (0.071)
1.2 (0.047)	2.1 (0.083)
1.5 (0.059)	

Install the spacer, two races and bearing onto the front clutch drum.

Reinstall the oil seal ring to the input shaft.

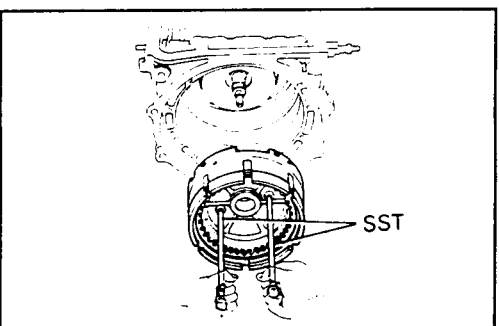
INSTALL OVERDRIVE CASE ASSEMBLY

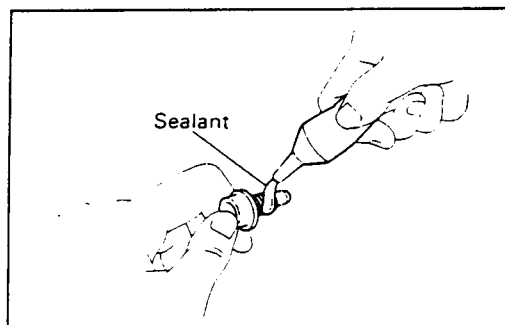
Coat new three O-rings with ATF, and install them to the oil holes of the O/D case.

Install SST (two bolts) to the O/D case.

SST 09350-36010 (09350-06140)

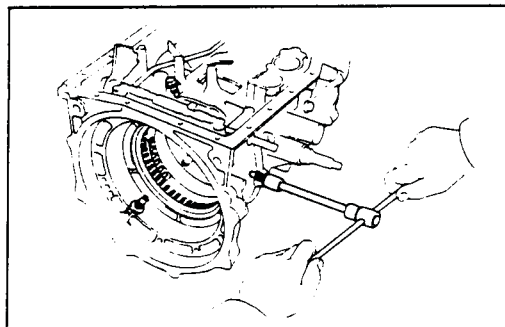
Align the oil holes and bolt holes of the O/D case and transmission case.





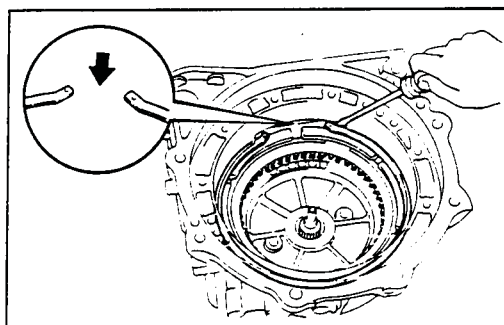
Apply sealant to the threads of the O / D case set bolts.

Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent



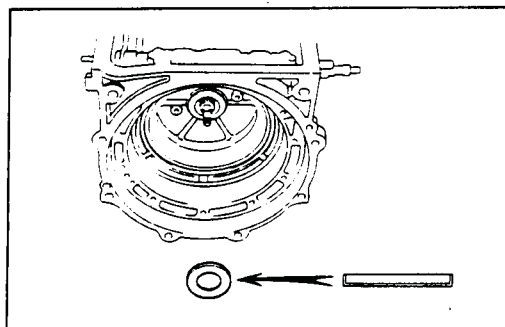
Install the three O / D case set bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N-m)



Using a screwdriver, install the snap ring.

INSTALL TRANSFER NO.2 CASE COVER



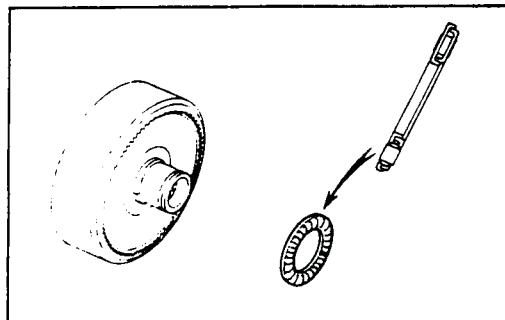
INSTALL OVERDRIVE RING GEAR ASSEMBLY

Coat the race with petroleum jelly, and install it onto the O / D case.

NOTE: Race diameter

mm (in.)

	Inside	Outside
Race	37.0 (1.457)	52.0 (2.047)



Coat the bearing with petroleum jelly, and install it onto the ring gear flange.

NOTE: Bearing diameter

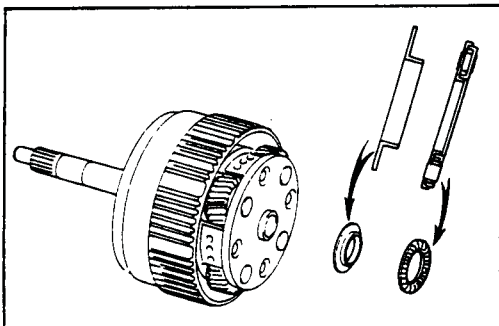
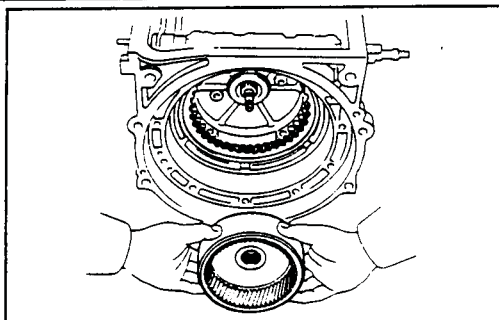
mm (in.)

	Inside	Outside
Bearing	34.7 (1.366)	52.0 (2.047)



Technical Service Information

Install the ring gear assembly into the O/D case.



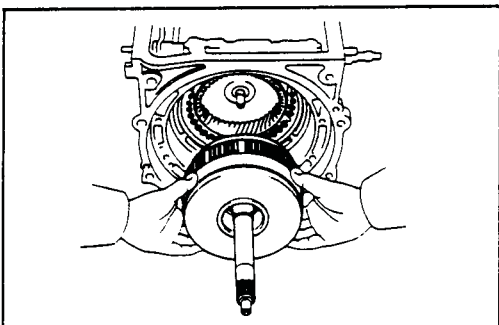
INSTALL OVERDRIVE PLANETARY GEAR, OVERDRIVE DIRECT CLUTCH AND ONE-WAY CLUTCH ASSEMBLY

Coat the bearing and race with petroleum jelly, and install them onto the planetary gear.

NOTE: Bearing and race diameters

mm (in.)

	Inside	Outside
Bearing	25.0 (0.984)	42.0 (1.654)
Race	23.2 (0.913)	42.0 (1.654)



Install planetary gear, direct clutch and one-way clutch assembly into transmission case.

NOTE: Mesh the spline of the O/D direct clutch drum with the flukes of the discs by rotating and pushing the O/D direct clutch drum clockwise or counterclockwise.

CHECK CORRECT INSTALLATION OF OVERDRIVE PLANETARY GEAR, OVERDRIVE DIRECT CLUTCH AND ONE-WAY CLUTCH ASSEMBLY

Place SST on the installation surface of the oil pump.

SST 09350-36010 (09350-06090)

Using calipers, measure the distance between the tops of SST and the clutch drum.

If the distance corresponds to that during disassembly the O/D planetary gear, O/D direct clutch and one-way clutch assembly is installed correctly.

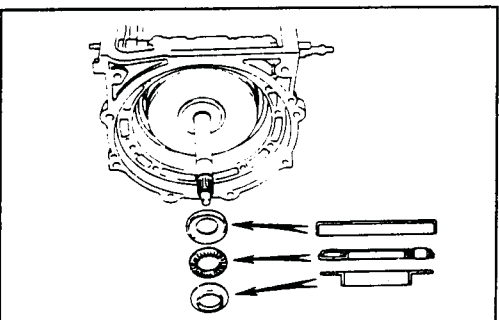
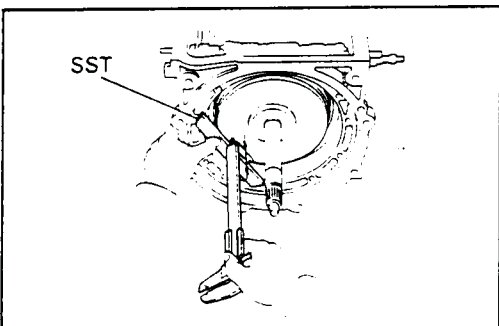
TEMPORARILY INSTALL OIL PUMP

Coat the two races and bearing with petroleum jelly and install them onto the clutch drum.

NOTE: Bearing and race diameters

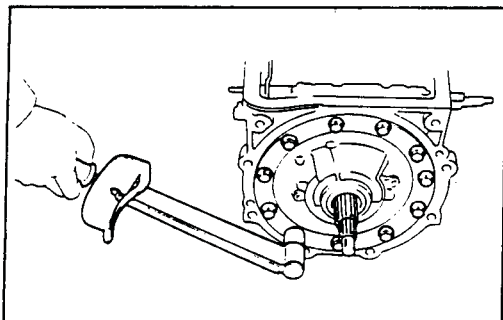
mm (in.)

	Inside	Outside
Bearing	28.5 (1.122)	46.2 (1.819)
Race (Front)	27.1 (1.067), 27.9 (1.098) or 28.3 (1.114)	43.0 (1.693)
Race (Rear)	28.5 (1.122)	48.0 (1.890)





Technical Service Information

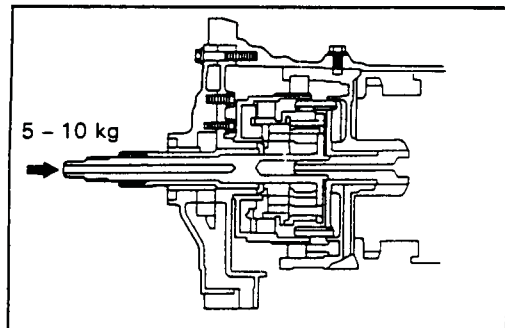


Place the gasket on the transmission case.

Align the bolt holes of the pump body and transmission case, and slide it.

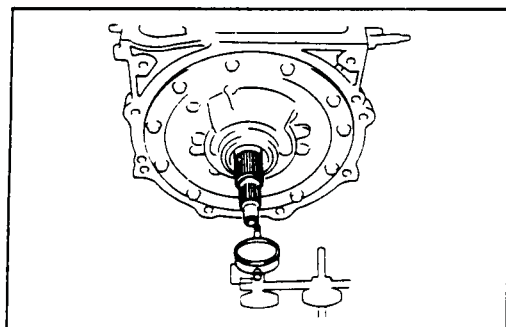
Install and tighten the eleven bolts.

Torque: 210 kg-cm (16 ft-lb, 21 N·m)



ADJUST THRUST CLEARANCE OF OVERDRIVE INPUT SHAFT (OVERDRIVE PLANETARY GEAR)

Push the O / D input shaft toward the rear of the transmission by applying a force of 5 – 10 kg (11.0 – 22.0 lb, 49 – 98 N).

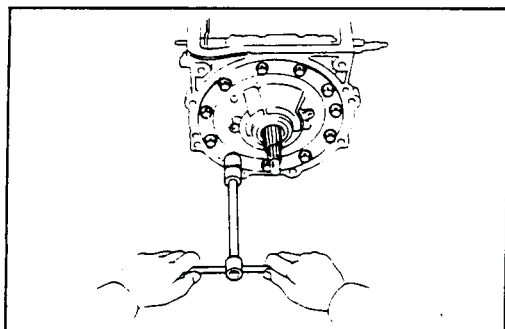


Using a dial indicator, measure the thrust clearance of the input shaft.

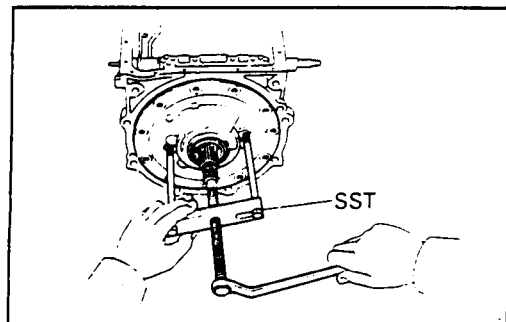
Standard thrust clearance: 0.40 – 0.90 mm
(0.0157 – 0.0354 in.)

Maximum thrust clearance: 0.90 mm (0.0354 in.)

If the thrust clearance is greater than maximum, adjust with a race.



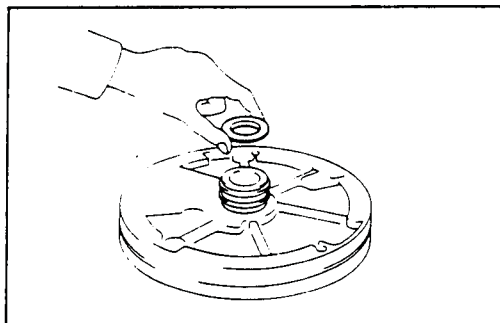
Remove the eleven oil pump set bolts.



Using SST, remove the oil pump and gasket.
SST 09350-36010 (09350-06140)



Technical Service Information



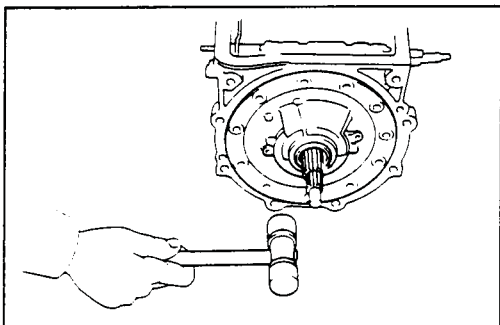
Remove the race from the oil pump cover.

Select a race.

NOTE: There are three different thicknesses for race.

Race thickness mm (in.)	
0.8 (0.031)	1.4 (0.055)
1.0 (0.039)	

Coat the race with petroleum jelly, and install it onto the oil pump cover.



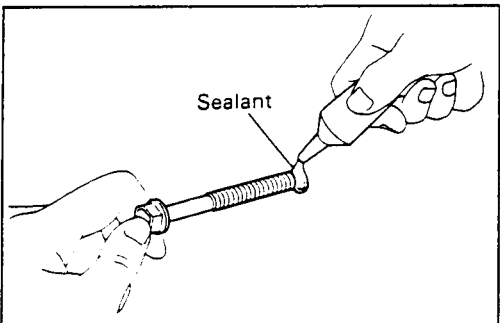
INSTALL OIL PUMP

Place a new gasket on the transmission case.

Coat a new O-ring with ATF, and install it to the oil pump body.

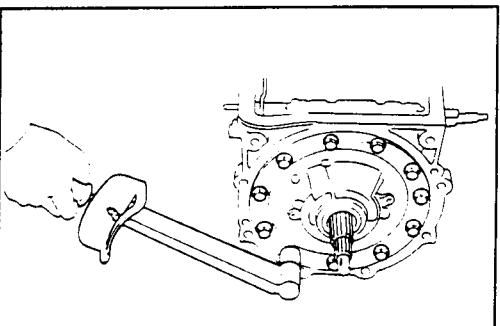
Align the bolt holes of the pump body and transmission case.

Using a plastic-faced hammer, lightly tap in the oil pump to transmission case.



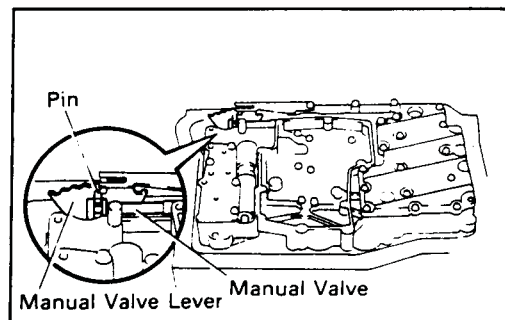
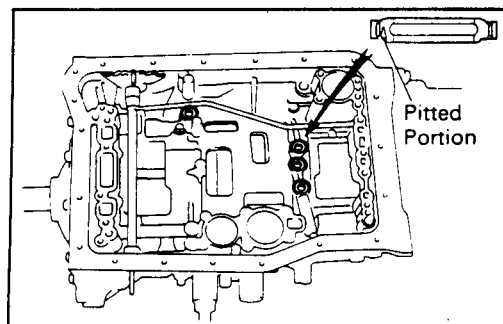
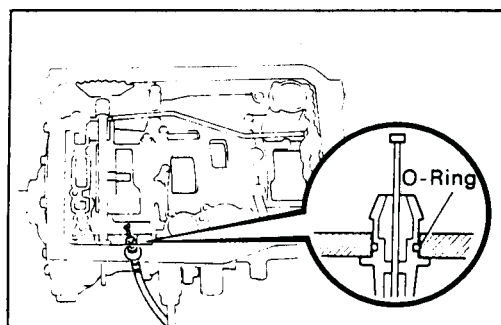
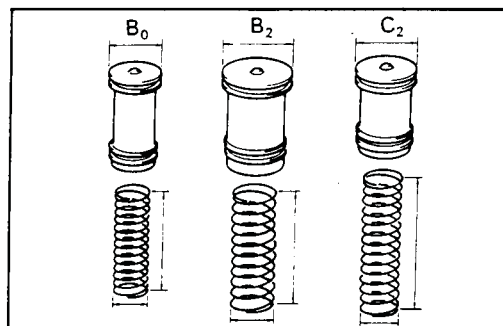
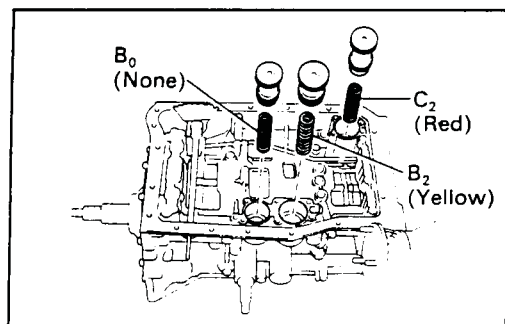
Apply sealant to the threads of the oil pump set bolts.

Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent



Install and tighten the eleven bolts.

Torque: 210 kg-cm (16 ft-lb, 21 N·m)



INSTALL C₂, B₀, B₂ ACCUMULATOR SPRINGS AND PISTONS

Coat new O-rings with ATF, and install them to the pistons.

Install the three springs and accumulator pistons into the bore of the transmission case as shown.

NOTE: Piston diameter

mm (in.)

Piston diameter	
B ₀	29.9 (1.177)
B ₂	39.9 (1.571)
C ₂	35.9 (1.413)

NOTE: Spring diameter and free length

mm (in.)

Spring	Color	Free length	Diameter
B ₀	None	64.1 (2.524)	21.1 (0.831)
B ₂	Yellow	65.0 (2.559)	25.1 (0.988)
C ₂	Red	87.3 (3.437)	21.8 (0.858)

INSTALL THROTTLE CABLE

Coat a new O-ring with ATF, and install it to the cable.

Install the cable to the transmission case.

INSTALL CENTER SUPPORT APPLY GASKETS

Install new four gaskets, facing the pitted side toward the transmission case.

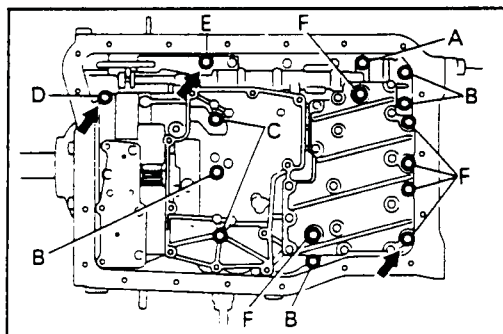
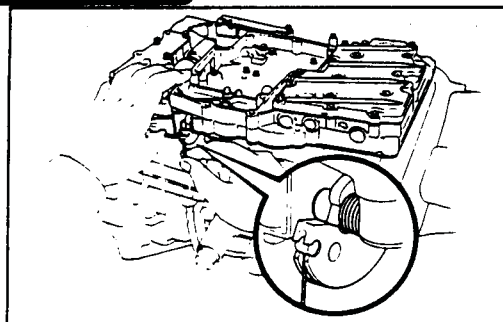
INSTALL VALVE BODY

Align the groove of the manual valve with the pin of the manual valve lever.



Technical Service Information

Connect the throttle cable to the cam.



Install the three bolts indicated by arrows.

Install the other bolts.

NOTE: Each bolt length (mm (in.)) is indicated below.

Bolt length:	A	22 mm (0.87 in.)
	B	32 mm (1.26 in.)
	C	36 mm (1.42 in.)
	D	41 mm (1.61 in.)
	E	45 mm (1.77 in.)
	F	57 mm (2.24 in.)

Check that the manual valve lever contacts the center of the roller at the tip of the detent spring.

Tighten the bolts.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the seven wave washers (for 8 mm head bolts) and ten bolts.

Torque:

8 mm head bolt	55 kg-cm (48 in.-lb, 5.4 N·m)
10 mm head bolt	100 kg-cm (7 ft-lb, 10 N·m)

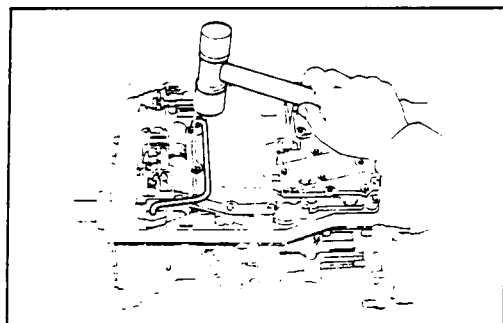
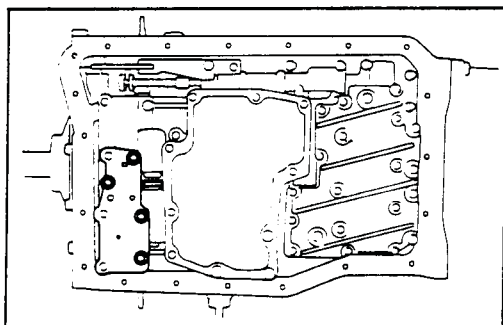
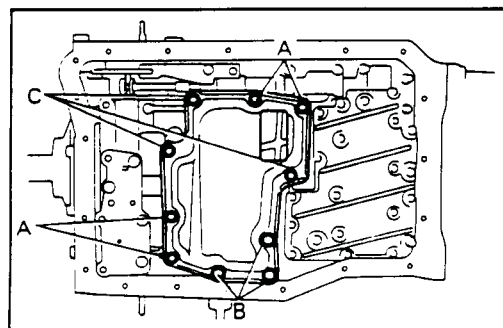
NOTE: Each bolt length (mm (in.)) is indicated below.

Bolt length:	A	12 mm (0.47 in.)
	B	45 mm (1.77 in.)
	C	47 mm (1.85 in.)

INSTALL OIL TUBE

Remove the lock-up relay valve body plate.

CAUTION: Do not drop the lock-up relay valve pins.

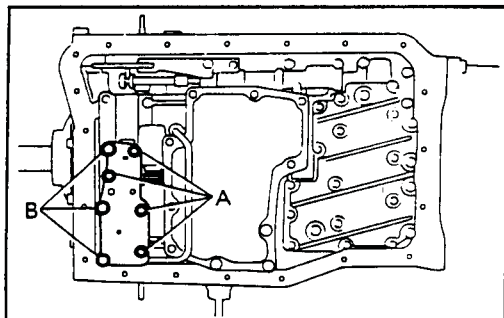


Using a plastic-faced hammer, install the tube into position.

CAUTION: Be careful not to bend or damage the tube.



Technical Service Information



Install a new gasket and the lock-up relay valve body plate with the four wave washers (for short bolts) and seven bolts.

Torque:

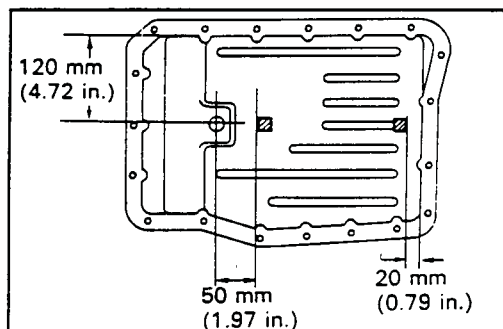
8 mm head bolt 55 kg-cm (48 in.-lb, 5.4 N·m)

10 mm head bolt 100 kg-cm (7 ft-lb, 10 N·m)

NOTE: Each bolt length (mm (in.)) is indicated below.

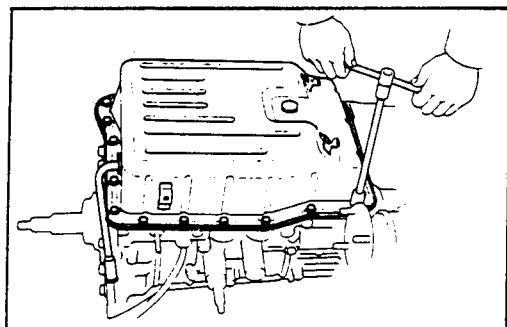
Bolt length: A 12 mm (0.47 in.)

B 64 mm (2.52 in.)



INSTALL MAGNETS IN PAN

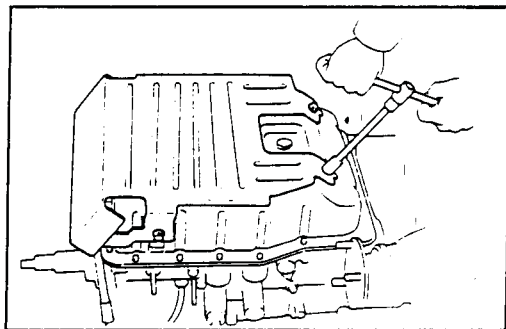
Install the two magnets in the oil pan as shown in the figure.



INSTALL OIL PAN

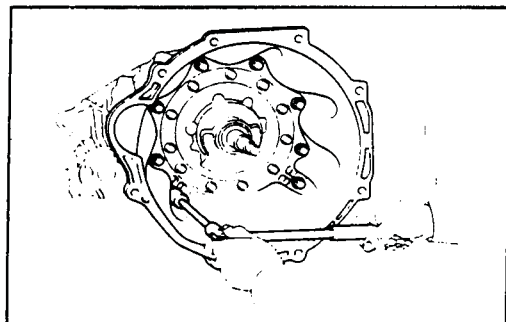
Install a new gasket and the oil pan with the twenty bolts.

Torque: 70 kg-cm (61 in.-lb, 6.9 N·m)



INSTALL OIL PAN PROTECTOR

Install the protector with the four bolts.



INSTALL TRANSMISSION HOUSING

Install the transmission housing with the eight bolts.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)

Install the throttle cable to the transmission case with the bolt.