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AUTOMATIC TRANSMISSION SERVICE GROUP



INTRODUCTION

TOYOTA A130 TRANSAXLE

The A130 Transaxle is a front wheel drive fully automatic transmission with a converter clutch. Trouble-shooting, teardown-assembly, removal and installation is fully covered.

This transmission is currently found in the Toyota Corolla models.

We thank Toyota Corporation for the illustrations and information that made this booklet possible.

The information and part numbers contained in this booklet have been carefully compiled from industry sources known for their reliability, but ATSG does not guarantee its accuracy.

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ROBERT D. CHERRNAY
TECHNICAL DIRECTOR

DALE ENGLAND
FIELD SERVICE CONSULTANT

FRANK MIETUS
TECHNICAL CONSULTANT

WAYNE COLONNA
TECHNICAL CONSULTANT

WELDON BARNETT
TECHNICAL CONSULTANT

ED KRUSE
LAY OUT

*AUTOMATIC TRANSMISSION SERVICE GROUP
9200 SOUTH DADELAND BLVD., SUITE 720
MIAMI, FLORIDA 33156
(305) 661-4161*

NOTES---NOTES---NOTES---NOTES

NOTES---NOTES---NOTES---NOTES



Technical Service Information

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	T/M control cable out of adjustment Valve body or primary regulator faulty Transmission faulty	Adjust control cable Inspect valve body Disassemble and inspect transmission
Vehicle does not move in any range	Park lock pawl faulty Valve body or primary regulator faulty Torque converter faulty Converter drive plate broken Oil Pump intake strainer blocked Transmission faulty	Inspect park pawl Inspect valve body Replace torque converter Replace torque converter Clean strainer Disassemble and inspect transmission
Shift lever position incorrect	T/M control cable out of adjustment Manual valve and lever faulty Transmission faulty	Adjust control cable 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 up-shift, or down-shifts from 3 or 3-2 then shifts back to 3	Throttle cable out of adjustment Governor faulty Valve body faulty	Adjust throttle cable Inspect governor Inspect valve body
Slips on 1-2, 2-3 or 3 up-shift, or slips or shudders on take-off	T/M control cable out of adjustment Throttle cable out of adjustment Valve body faulty Transmission faulty	Adjust control cable Adjust throttle cable Inspect valve body Disassemble and inspect transmission
Drag, binding or tie-up on 1-2, 2-3 or 3 up-shift	T/M control cable out of adjustment Valve body faulty Transmission faulty	Adjust control cable Inspect valve body Disassemble and inspect transmission
Harsh down-shift	Throttle cable out of adjustment Accumulator pistons faulty Valve body faulty Transmission faulty	Adjust throttle cable 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

AUTOMATIC TRANSMISSION SERVICE GROUP

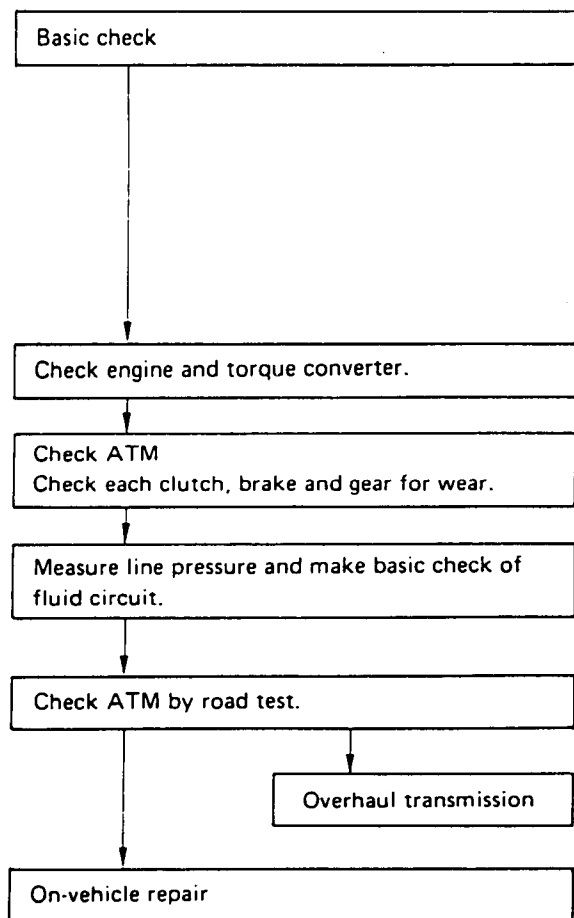


Technical Service Information

Problem	Possible cause	Remedy
Down-shift occurs too quick 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 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" range	Valve body faulty Transmission faulty	Inspect valve body Disassemble and inspect transmission
Vehicle does not hold in "P"	T/M control cable out of adjustment Parking lock pawl and rod	Adjust control cable Inspect lock pawl and rod

GENERAL NOTES

1. Troubles occurring with the automatic transmission can be caused by either the engine or the transmission itself. These two areas should be distinctly isolated before proceeding with troubleshooting.
2. Troubleshooting should begin with the simplest operation, working up in order of difficulty, but first determine whether the trouble lies within the engine or transmission.
3. Proceed with the inspection as follows.



(1) Preliminary Check

- (a) Check oil level.
- (b) Check throttle cable mark.
- (c) Check shift cable.
- (d) Check neutral start switch.
- (e) Check idle speed.
- (f) Check tire inflation pressure (See page FA-3). Repair as necessary.

(2) Stall Test

Repair as necessary.

(3) Time Lag Test

Confirm by road test and repair as necessary.

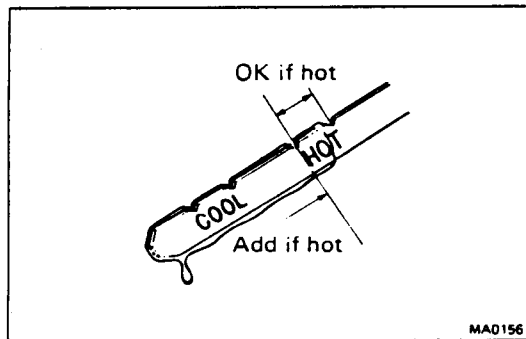
(4) Hydraulic Test

Confirm shift point and extent of shock by road test. Repair as necessary.

(5) Road Test

Confirm if trouble lies within ATM.

If noisy or vibrating, the possible cause could be with the compressor, engine, drive shaft, tires, etc.



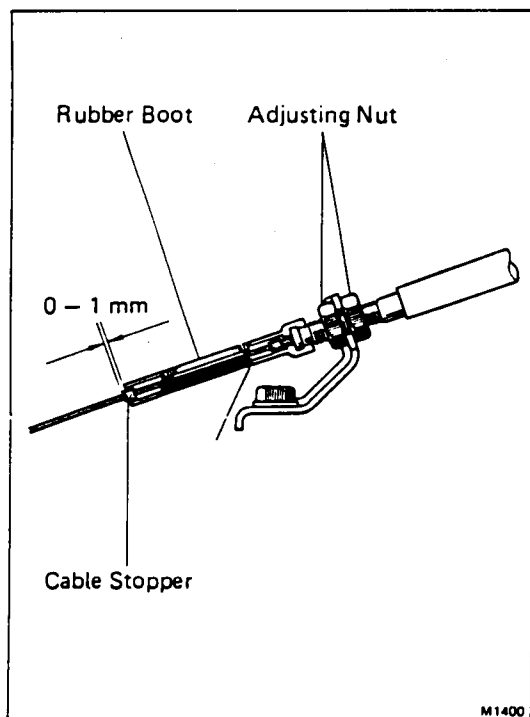
ATF INSPECTION

1. CHECK FLUID LEVEL
2. CHECK FLUID CONDITION
If the ATF smells burnt or is black, replace it.
3. REPLACE ATF

ADJUSTMENTS

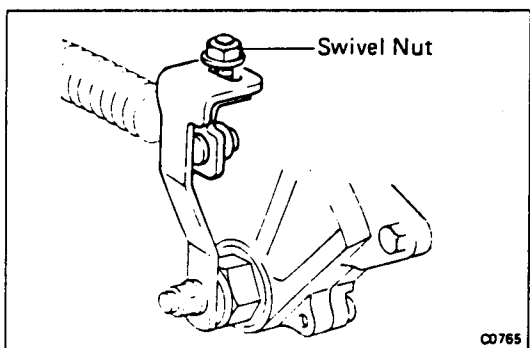
ADJUSTMENT OF THROTTLE CABLE

1. DEPRESS ACCELERATOR PEDAL ALL THE WAY AND CHECK THAT THROTTLE VALVE OPENS FULLY
If the throttle valve does not open fully, adjust the accelerator link.
2. FULLY DEPRESS ACCELERATOR
3. LOOSEN ADJUSTMENT NUTS
4. ADJUST THROTTLE CABLE
 - (a) Adjust the cable housing so that the distance between the end of the boot and the stopper on the cable is correct.
Distance: 0 – 1 mm (0 – 0.04 in.)
 - (b) Tighten the adjusting nuts.
 - (c) Recheck the adjustments.



ADJUSTMENT OF TRANSMISSION CONTROL CABLE

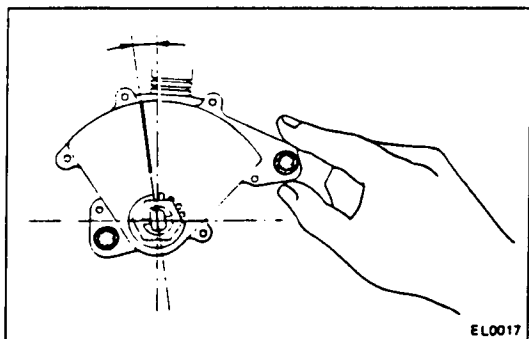
- (a) Loosen the swivel nut on the lever.
- (b) Push the manual lever fully toward the right side of the vehicle.
- (c) Return the lever two notches to the NEUTRAL position.
- (d) Set the shift lever in "N" range.
- (e) While holding the lever lightly toward the "R" range side, tighten the swivel nut.



ADJUSTMENT OF NEUTRAL START SWITCH

If the engine will start with the shift selector in any range other than "N" or "P" range, adjustment is required.

1. LOOSEN NEUTRAL START SWITCH BOLTS AND SET SHIFT SELECTOR IN "N" RANGE
2. ADJUST NEUTRAL START SWITCH
 - (a) Disconnect the neutral start switch connector.
 - (b) Connect an ohmmeter between the terminals.
 - (c) Adjust the switch to the point where there is continuity between terminals.
 - (d) Connect the neutral start switch connector.
3. TORQUE NEUTRAL START SWITCH BOLTS
Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)





Technical Service Information

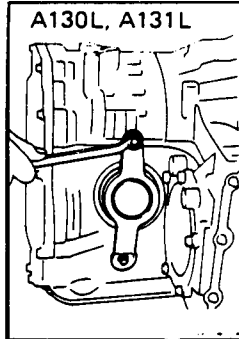
ON-VEHICLE REPAIR

REMOVAL OF GOVERNOR VALVE

REMOVE TRANSAXLE DUST COVER
(A130L, A131L)

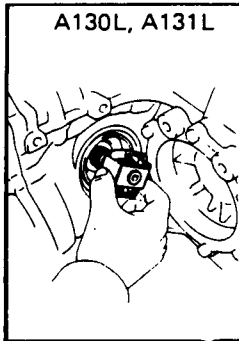
REMOVE LH DRIVE SHAFT (A130L, A131L)

REMOVE GOVERNOR COVER AND O-RING



REMOVE GOVERNOR BODY WITH THRUST
WASHER

REMOVE WASHER (A130L, A131L)



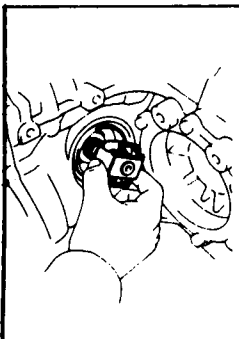
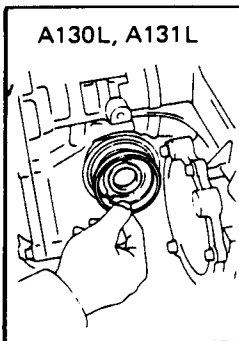
REMOVE GOVERNOR BODY ADAPTOR

INSTALLATION OF GOVERNOR VALVE

INSTALL GOVERNOR BODY ADAPTER

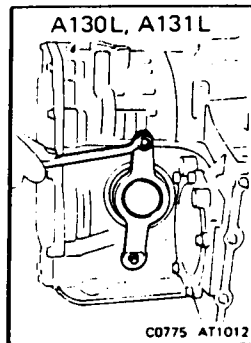
INSTALL GOVERNOR BODY WITH THRUST
WASHER

- (a) Install the washer to the governor body.
(A130L, A131L)
- (b) Install the governor body with thrust washer.
(A130L, A131L)





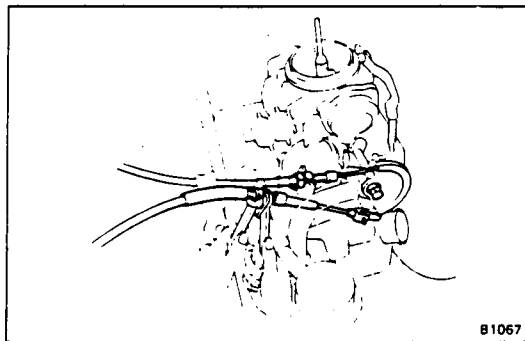
Technical Service Information



INSTALL GOVERNOR COVER WITH O-RING

INSTALL LH DRIVE SHAFT

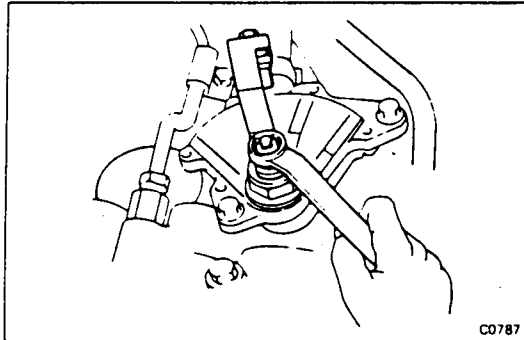
INSTALL TRANSAXLE DUST COVER



REMOVAL OF THROTTLE CABLE

DISCONNECT THROTTLE CABLE FROM ENGINE

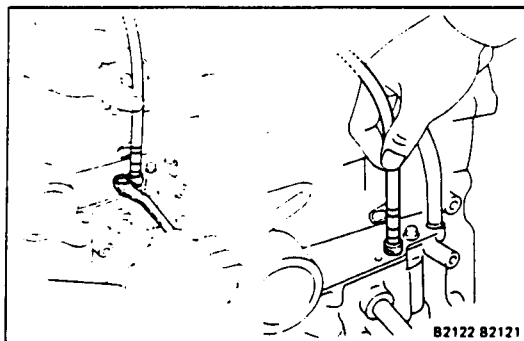
Disconnect the cable from the throttle linkage.



REMOVE NEUTRAL START SWITCH

- (a) Disconnect the transmission control cable from the manual shift lever.
- (b) Remove the manual shift lever.
- (c) Remove the neutral start switch.

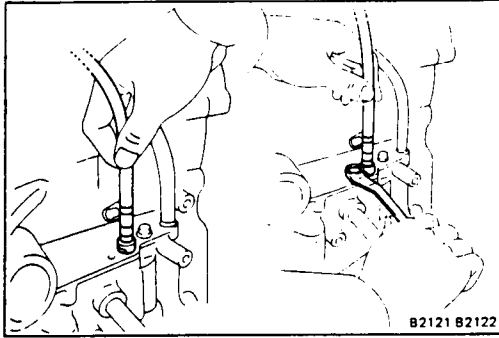
REMOVE VALVE BODY



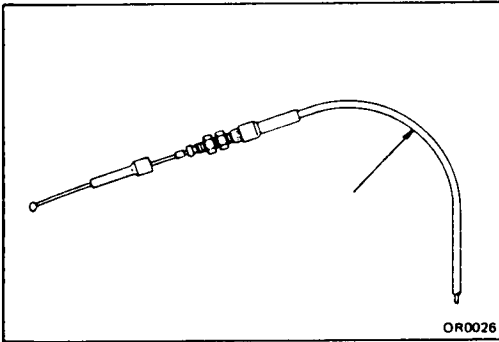
PULL THROTTLE CABLE OUT OF TRANSMISSION CASE

- (a) Remove the bolt and retaining plate.
- (b) Pull the cable out of the transmission case.

INSTALLATION OF THROTTLE CABLE



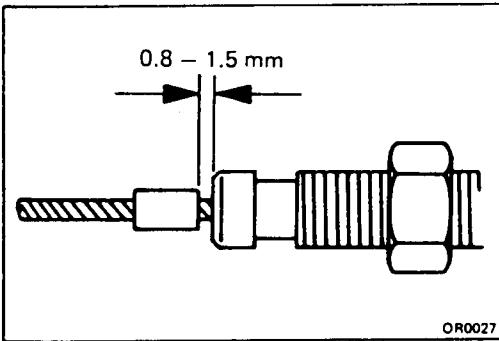
1. **INSTALL CABLE IN TRANSMISSION CASE**
 - (a) Be sure to push it in all the way.
 - (b) Install the retaining plate and bolt.
2. **INSTALL VALVE BODY**



3. **IF THROTTLE CABLE IS NEW, STAKE STOPPER ON INNER CABLE**

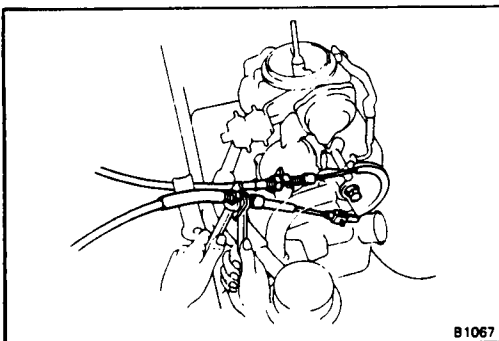
NOTE: New cable do not have a cable stopper staked.

- (a) Bend the cable about 200 mm (7.87 in.) in radius.

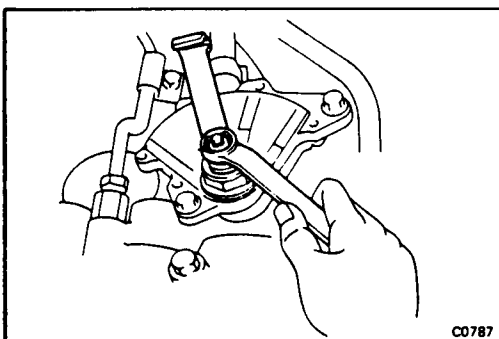


- (b) Pull the inner cable lightly until a slight resistance is felt, and hold it.

- (c) Stake the stopper as shown, 0.8 – 1.5 mm (0.031 – 0.059 in.) in width.



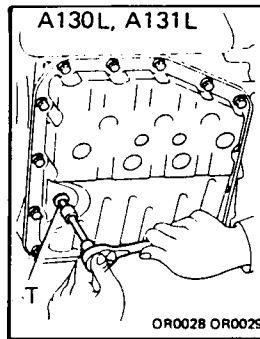
4. **CONNECT THROTTLE CABLE**
Connect the cable to the throttle linkage.
5. **ADJUST THROTTLE CABLE**



6. **INSTALL NEUTRAL START SWITCH**
 - (a) Install the neutral start switch.
 - (b) Install the manual shift lever.
 - (c) Adjust the neutral start switch.
(See page AT-4)
 - (d) Connect the transmission control cable.
7. **TEST DRIVE VEHICLE**



Technical Service Information



REMOVAL OF VALVE BODY

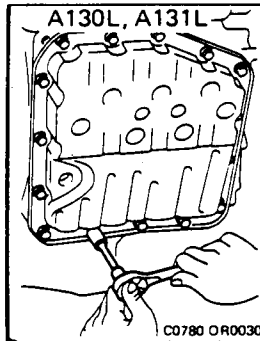
CLEAN TRANSMISSION EXTERIOR

To help prevent contamination, clean the exterior of the transmission.

DRAIN TRANSMISSION FLUID

Using SST, remove the drain plug and drain the fluid into suitable container. (A130L, A131L)

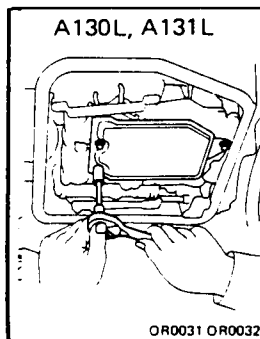
SST 09043-38100



REMOVE OIL PAN AND GASKET

CAUTION: Some fluid will remain in the oil pan.

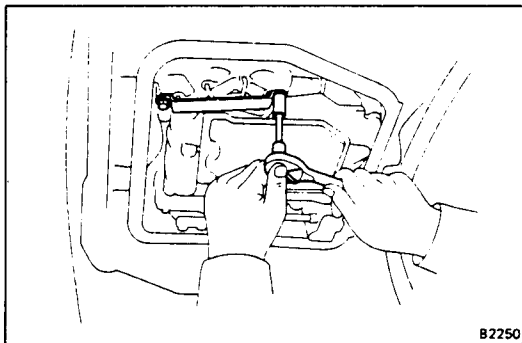
Remove all pan bolts, and carefully remove the pan assembly. Discard the gasket.



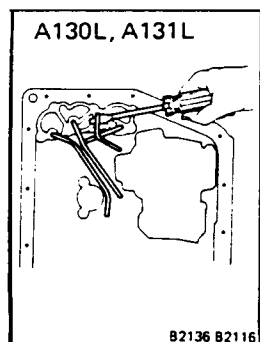
REMOVE OIL STRAINER

Remove the three bolts, and the oil strainer.

CAUTION: Be careful as some oil will come out with the strainer.



REMOVE TWO BOLTS AND APPLY TUBE BRACKET (A130L, A131L)

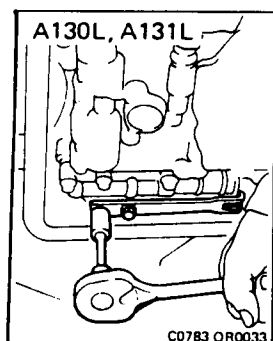


REMOVE OIL TUBES

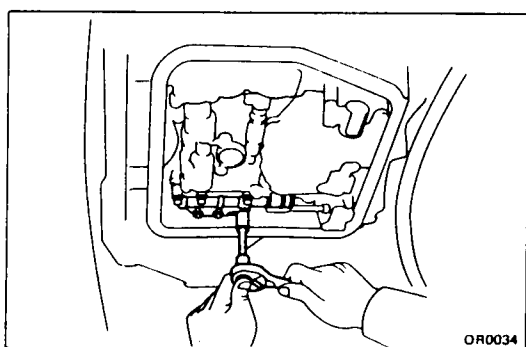
Pry up both tube ends with a large screwdriver and remove the tubes.



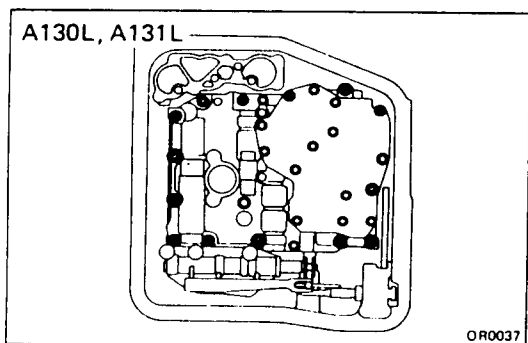
Technical Service Information



REMOVE MANUAL DETENT SPRING



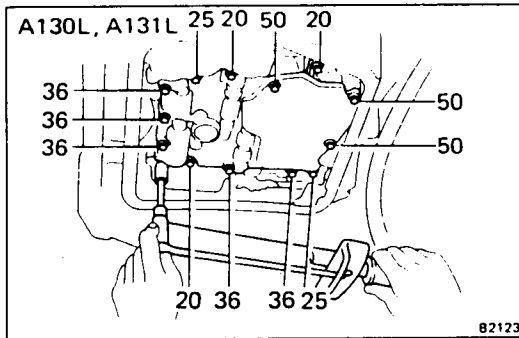
**REMOVE MANUAL VALVE AND VALVE BODY
(A130L, A131L)**



REMOVE VALVE BODY
(a) Remove the fourteen bolts.



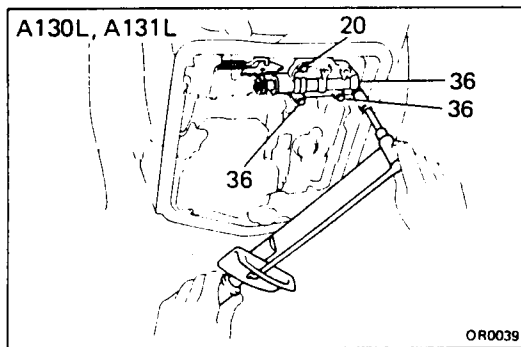
Technical Service Information



INSTALL FOURTEEN BOLTS IN VALVE BODY

NOTE: Each bolt length (mm) is indicated in the figure.
Finger tighten the all bolts first. Then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

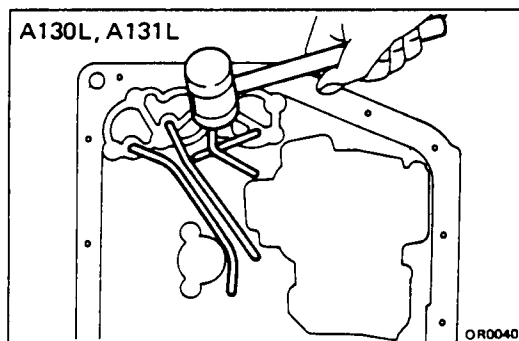
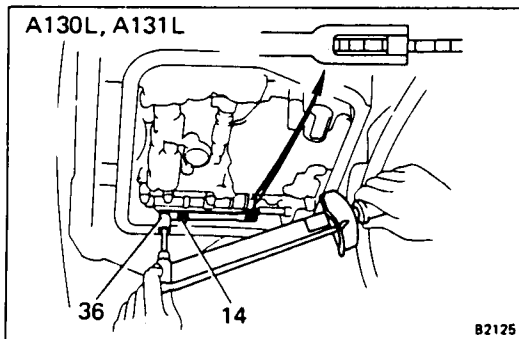


PLACE MANUAL VALVE AND BODY ON TRANSMISSION (A130L, A131L)

- Align the manual valve with the pin on the manual valve lever.
- Install the valve body into place.
- Finger tighten the four bolts first. Then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

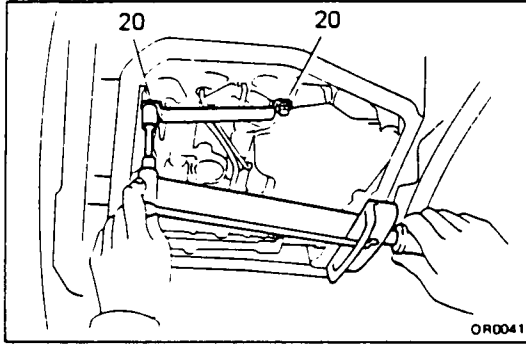
NOTE: Each bolt length (mm) is indicated in the figure.



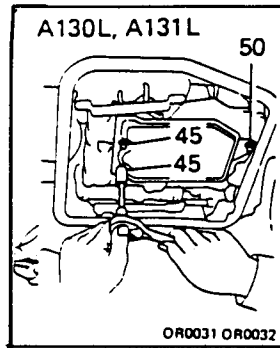
INSTALL OIL TUBES

Tap the tubes with a plastic hammer to install them into the positions indicated in the figure.

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



INSTALL APPLY TUBE BRACKET (A130L, A131L)
Each bolt length (mm) is indicated in the figure.

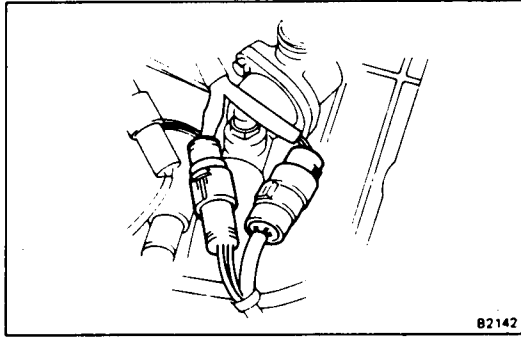


INSTALL OIL STRAINER
Each bolt length (mm) is indicated in the figure.

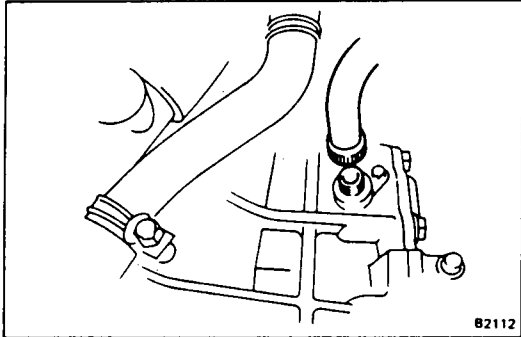


Technical Service Information

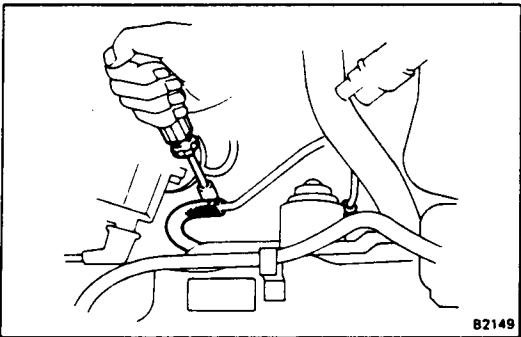
REMOVAL OF TRANSAXLE



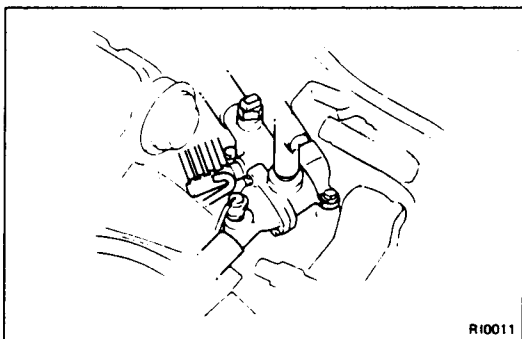
1. REMOVE NEGATIVE BATTERY TERMINAL
2. REMOVE AIR CLEANER
3. DISCONNECT NEUTRAL START SWITCH CONNECTOR
4. DISCONNECT SOLENOID VALVE CONNECTOR (A240L)



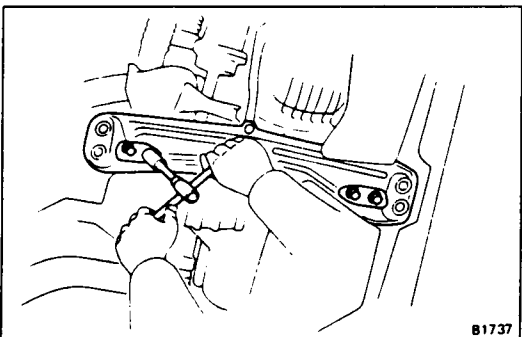
5. DISCONNECT SPEEDOMETER CABLE
6. REMOVE THROTTLE CABLE
7. REMOVE CONTROL CABLE
 - (a) Remove the clip.
 - (b) Remove the retainer.
 - (c) Remove the control cable bracket.



8. DISCONNECT OIL COOLER HOSE



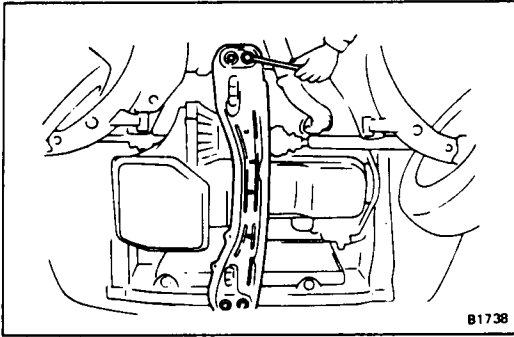
9. REMOVE WATER INLET (4A-C engine)
10. RAISE VEHICLE AND DRAIN TRANSAXLE
11. REMOVE ENGINE UNDER COVER



12. REMOVE FRONT AND REAR MOUNTING
 - (a) Remove the two dust covers from the member.
 - (b) Remove the four bolts.
 - (c) Remove the front and rear mounting.

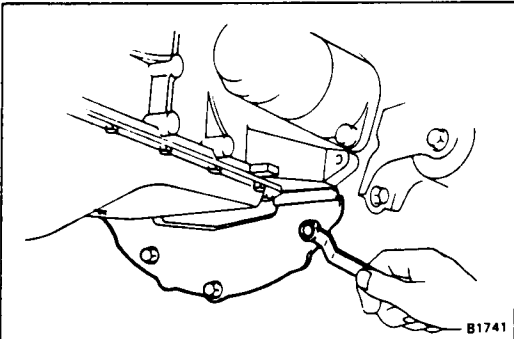


Technical Service Information



13. REMOVE ENGINE MOUNTING CENTER MEMBER

- (a) Remove the four bolts.
- (b) Remove the center member.



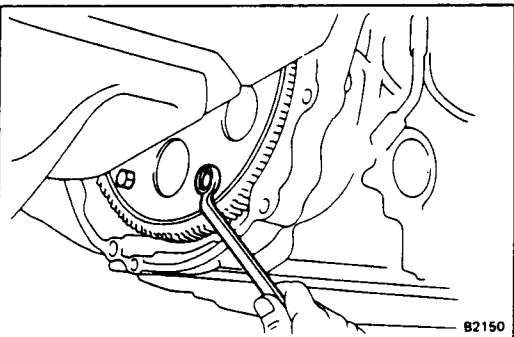
14. REMOVE DRIVE SHAFT

15. REMOVE STEERING KNUCKLE

16. REMOVE STARTER MOTOR

17. REMOVE ENGINE REAR END PLATE (4A-C engine)

18. REMOVE REAR END PLATE HOLE PLUG (1C engine)

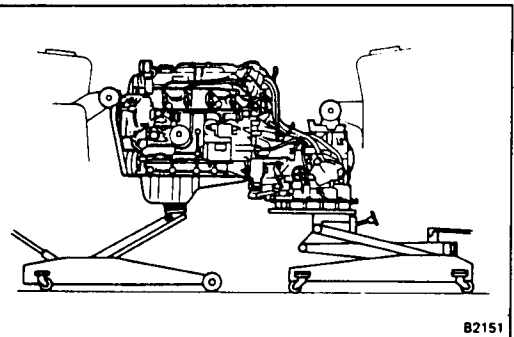


19. REMOVE SIX TORQUE CONVERTER MOUNTING BOLTS

- (a) Turn the crankshaft to gain access to each bolt.
- (b) Hold the crankshaft pulley nut with a wrench.
- (c) Remove the six bolts.

20. REMOVE LH ENGINE MOUNTING

- (a) Hold the engine and transaxle with two jacks, or a chain block and jack.
- (b) Remove the mounting set bolts.

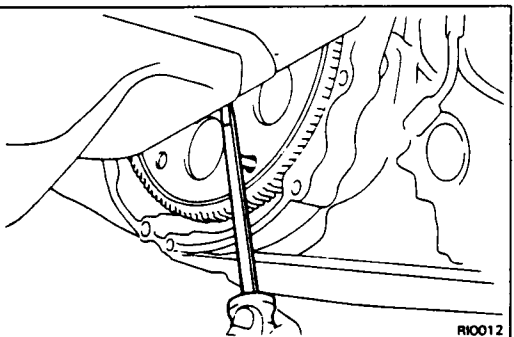


21. REMOVE TRANSAXLE MOUNTING BOLTS

22. INSTALL GUIDE PIN IN TORQUE CONVERTER

Install the guide pin in one of the torque converter bolt holes.

If necessary, a guide pin can be made by cutting off the head of a bolt.



23. PRY ON END OF GUIDE PIN TO BEGIN MOVING TRANSMISSION WITH CONVERTER

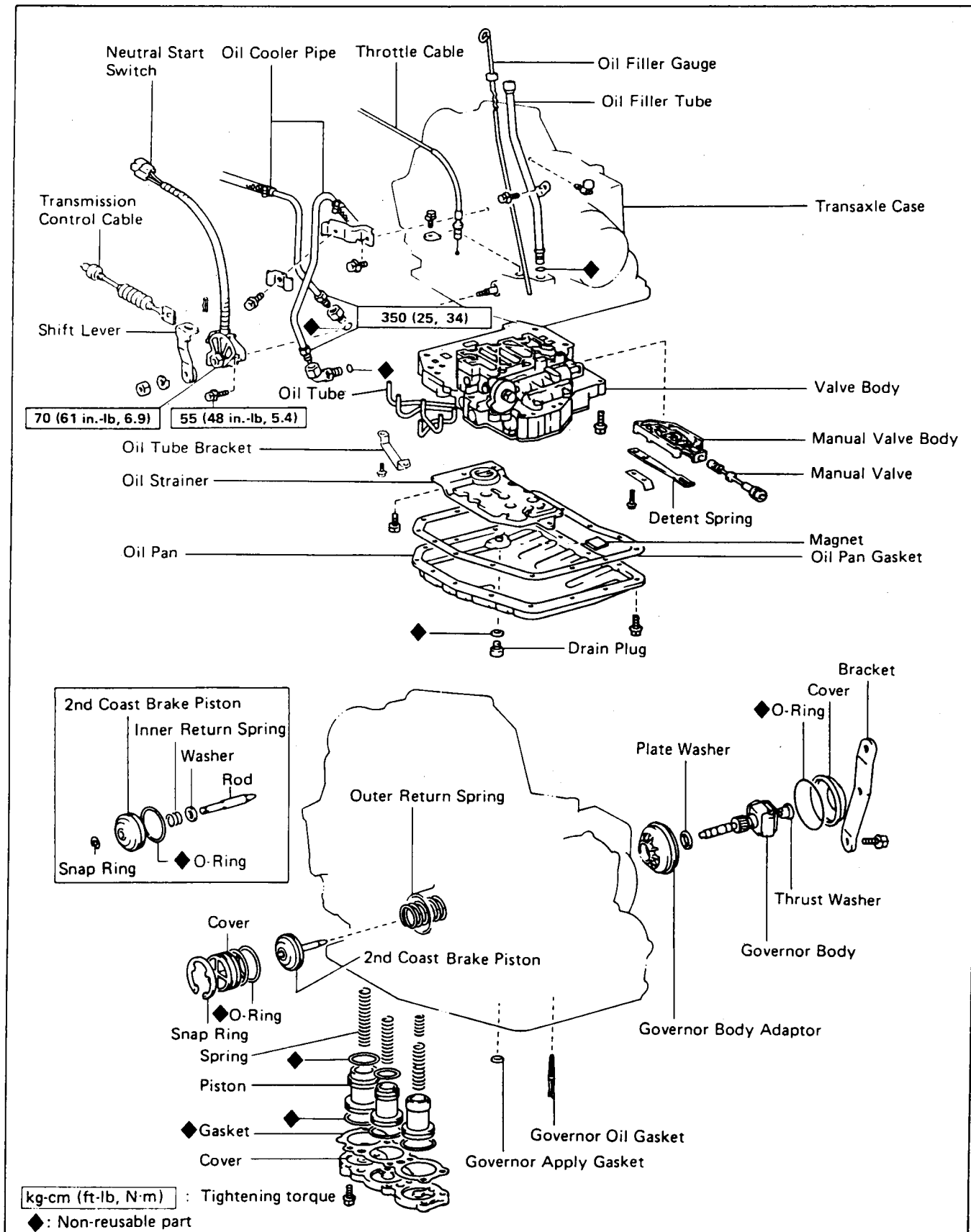
The guide pin helps keep the converter with the transmission.

24. REMOVE TRANSAXLE ASSEMBLY FROM ENGINE

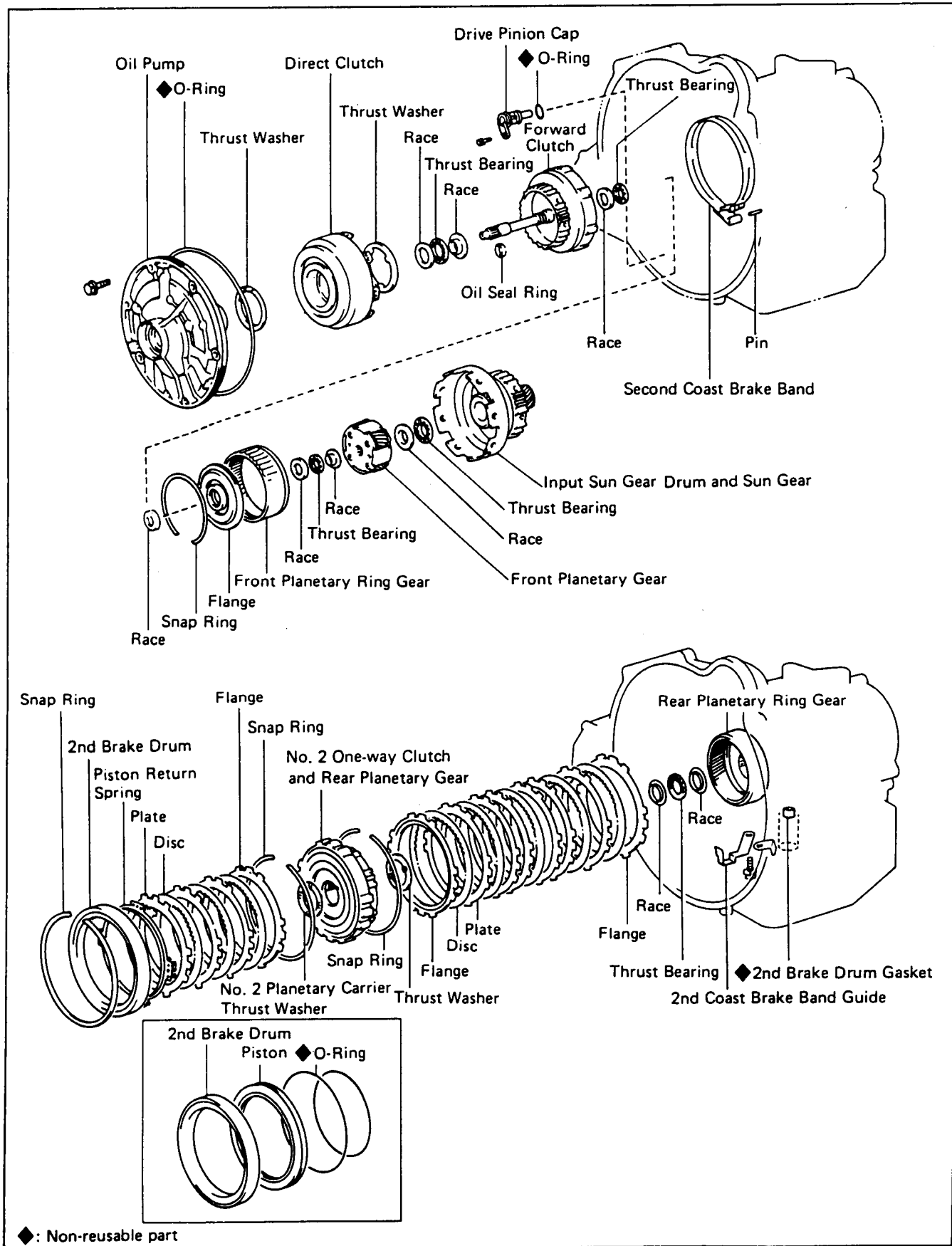
25. REMOVE TORQUE CONVERTER FROM TRANSMISSION

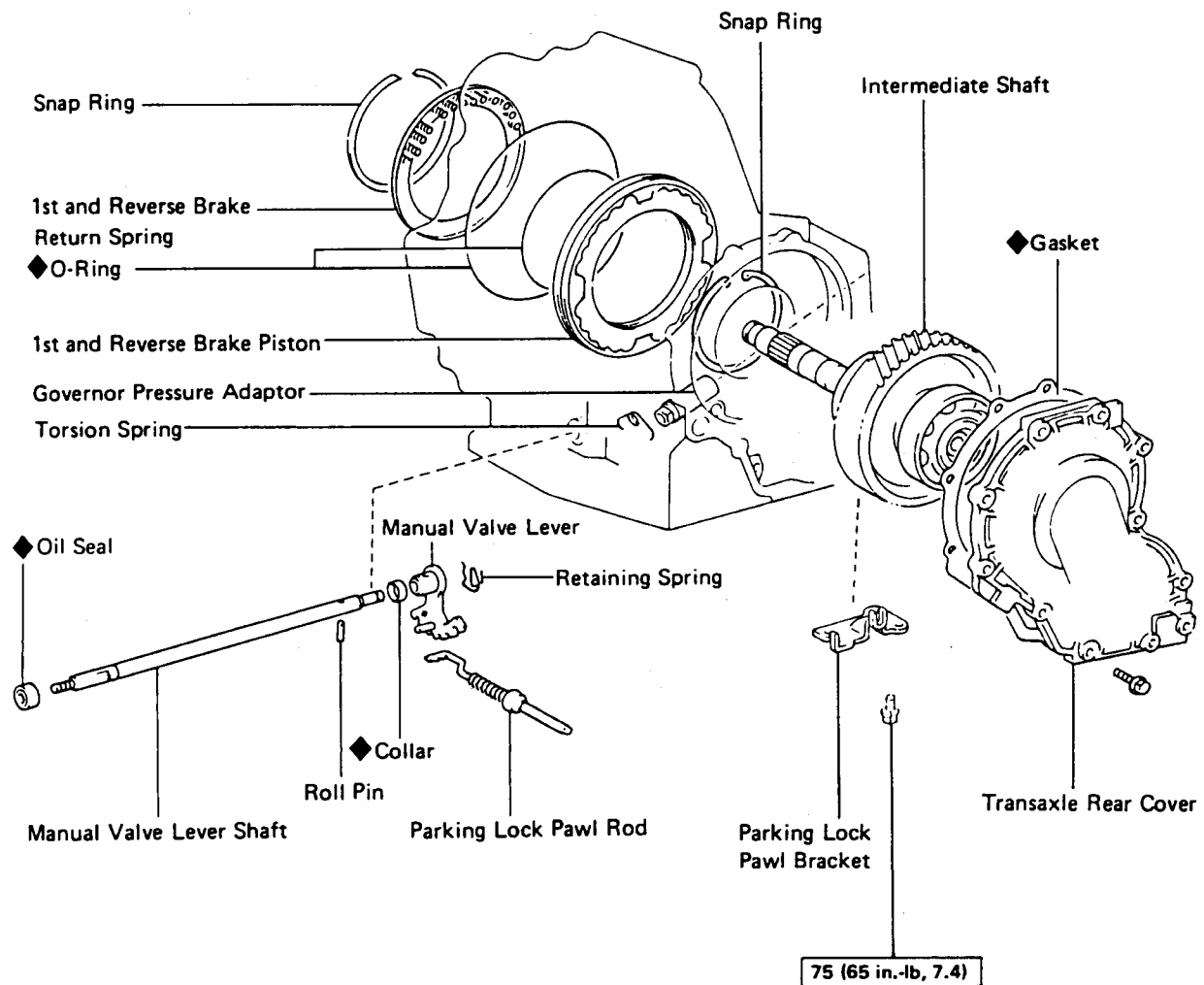
DISASSEMBLY OF TRANSMISSION (A130L, A131L)

COMPONENTS



COMPONENTS (Cont'd)



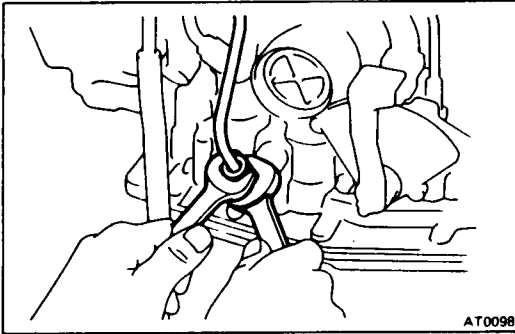


kg-cm (ft.-lb, N-m) : Tightening torque

◆ : Non-reusable part



Technical Service Information

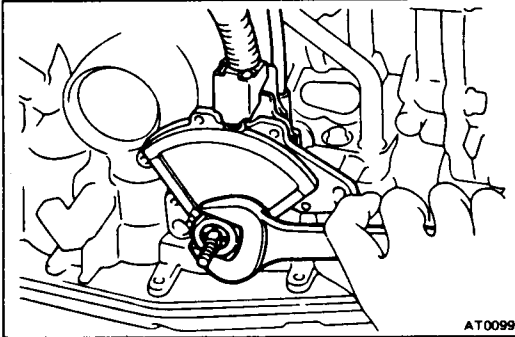


AT0098

SEPARATE BASIC SUBASSEMBLY

REMOVE TWO OIL COOLER PIPES

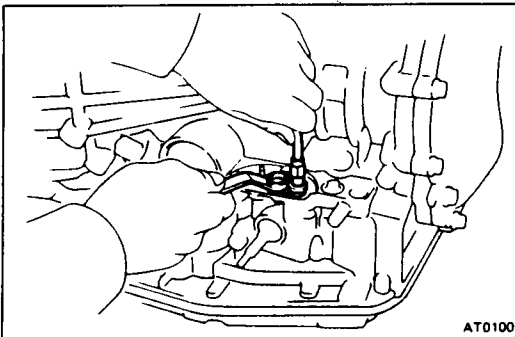
REMOVE MANUAL SHIFT LEVER



AT0099

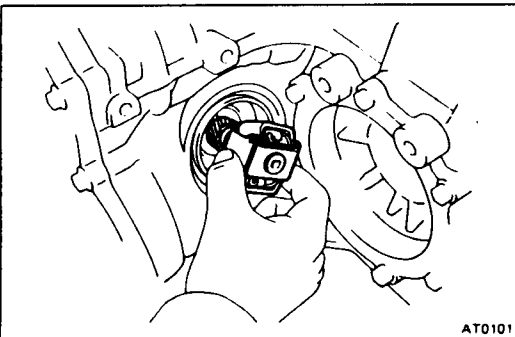
REMOVE NEUTRAL START SWITCH

REMOVE OIL FILLER GAUGE AND TUBE



AT0100

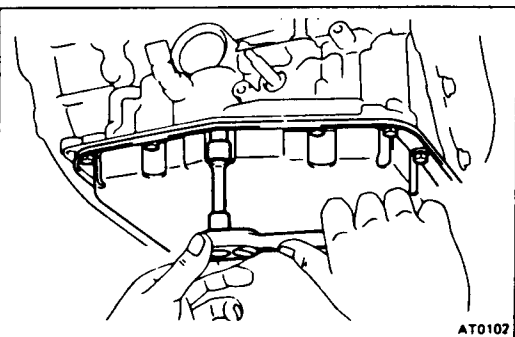
REMOVE THROTTLE CABLE RETAINING PLATE



AT0101

REMOVE GOVERNOR BODY

- Remove the two bolts and cover bracket.
- Remove the governor cover and O-ring.
- Remove the thrust washer from the governor body.
- Remove the governor body.
- Remove the plate washer and governor body adaptor.



AT0102

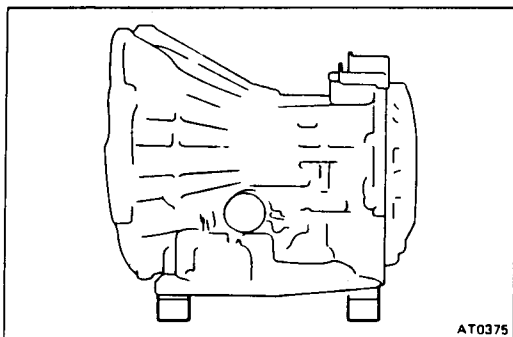
REMOVE PAN AND GASKET

- Remove the fifteen bolts.
- Remove the pan by lifting the transmission case.

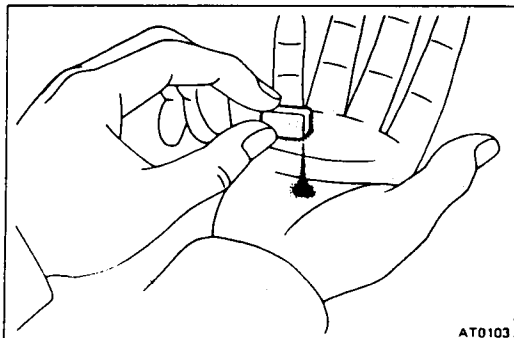
CAUTION: Do not turn the transmission over as it will contaminate the valve body with the foreign materials in the bottom of the pan.



Technical Service Information



- (c) Place the transmission on wooden blocks to prevent damage to the pipe bracket.

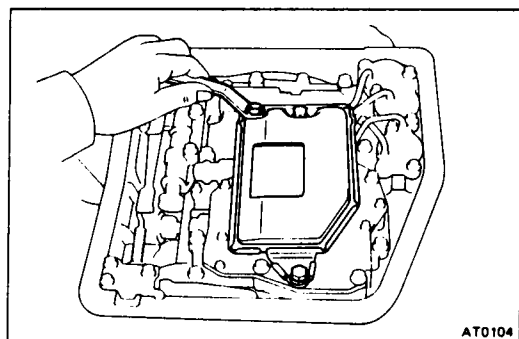


EXAMINE PARTICLES IN PAN

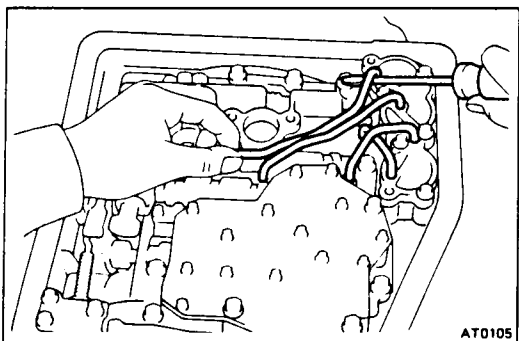
Remove the magnet and use it to collect any steel chips. Look carefully at the chips and particles in the pan and on the magnet to anticipate what type of wear you will find in the transmission:

Steel (magnetic) . . . bearing, gear and clutch plate wear

Brass (non-magnetic) . . . bushing wear

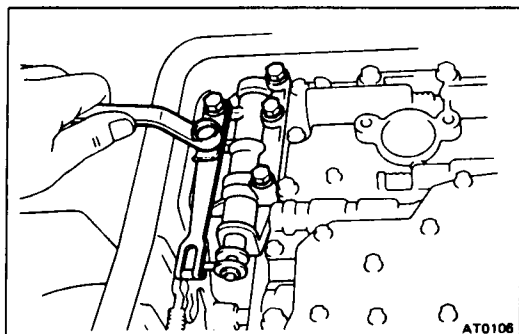


TURN TRANSMISSION OVER AND REMOVE OIL TUBE BRACKET AND OIL STRAINER



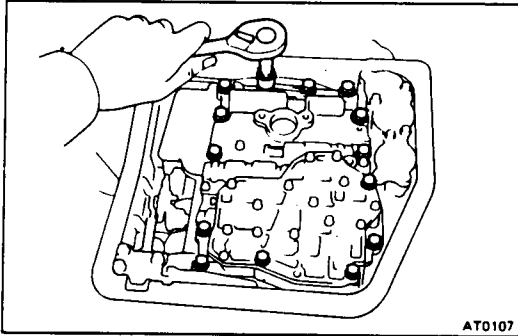
REMOVE FOUR OIL TUBES

Pry up both tube ends with a large screwdriver and remove the four tubes.



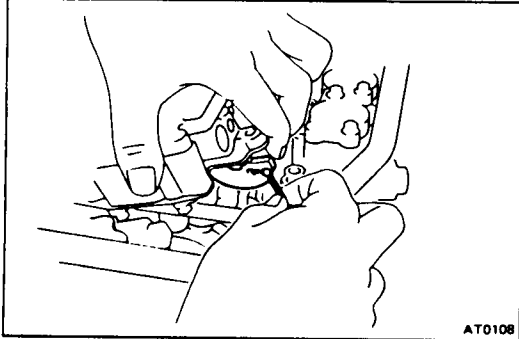
REMOVE MANUAL DETENT SPRING

REMOVE MANUAL VALVE AND MANUAL VALVE BODY

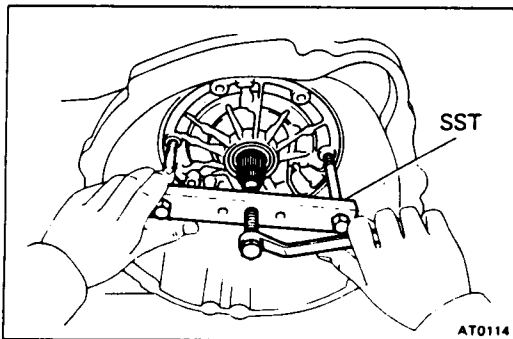


REMOVE VALVE BODY

(a) Remove the fourteen bolts.



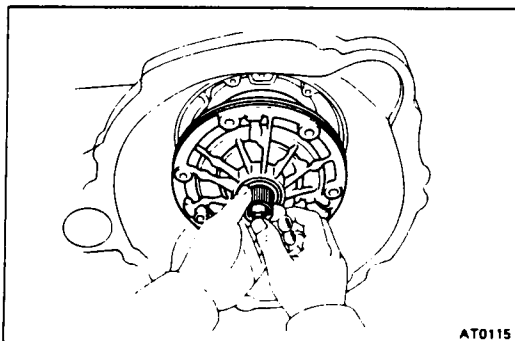
(b) Disconnect the throttle cable from the cam and remove the valve body.



REMOVE SEVEN BOLTS HOLDING OIL PUMP TO TRANSMISSION CASE

PULL OIL PUMP FREE FROM TRANSMISSION CASE WITH SST

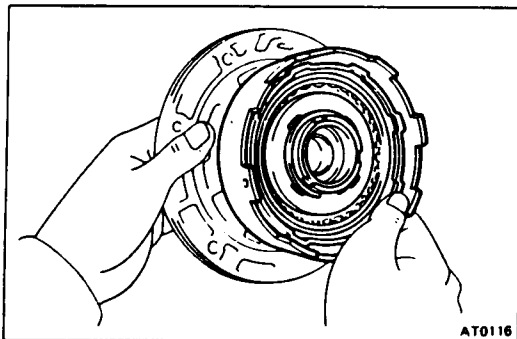
SST 09350-32011



REMOVE OIL PUMP AND DIRECT CLUTCH

While holding the input shaft, grasp the pump stator shaft and pull the oil pump and direct clutch together out of the transmission case.

NOTE: Push the 2nd brake band into the case, being careful not to catch it on the direct clutch drum.

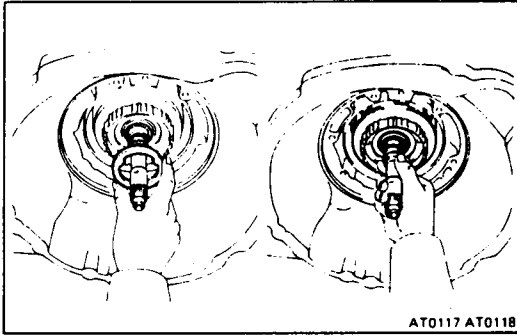


REMOVE DIRECT CLUTCH FROM OIL PUMP

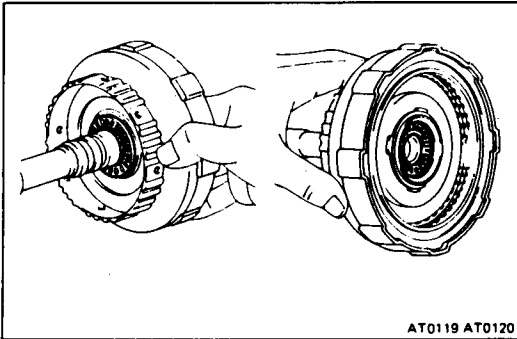
WATCH FOR RACE BEHIND OIL PUMP



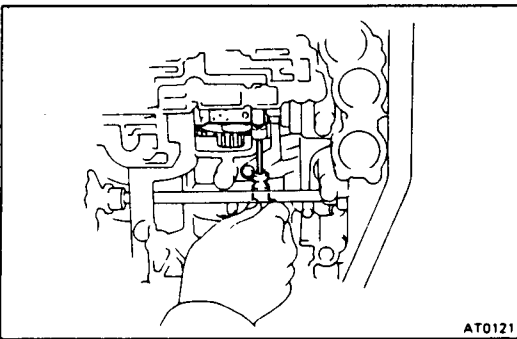
Technical Service Information



REMOVE CLUTCH DRUM THRUST WASHER
REMOVE FORWARD CLUTCH

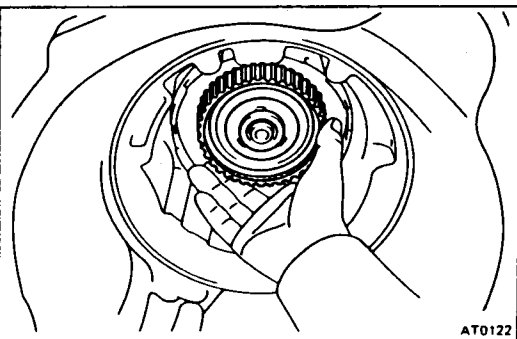


WATCH FOR BEARINGS AND RACES

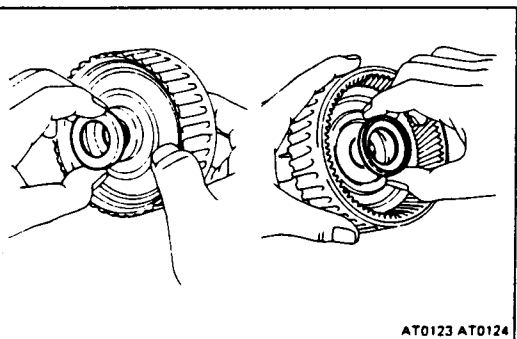


REMOVE SECOND COAST BRAKE BAND

- (a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.
- (b) Remove the brake band.



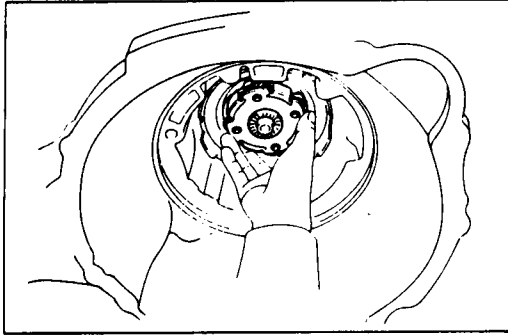
REMOVE FRONT PLANETARY RING GEAR



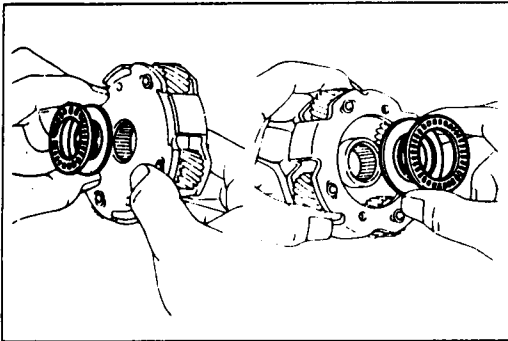
WATCH FOR RACES ON RING GEAR



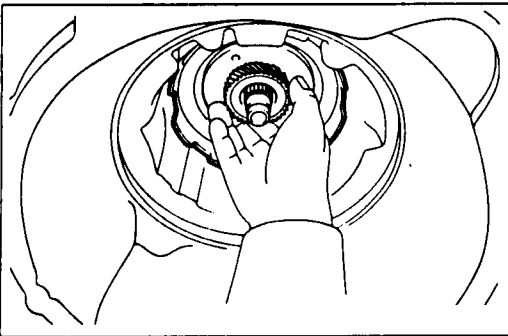
Technical Service Information



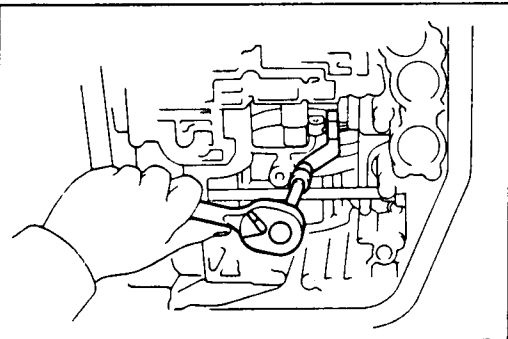
REMOVE PLANETARY GEAR



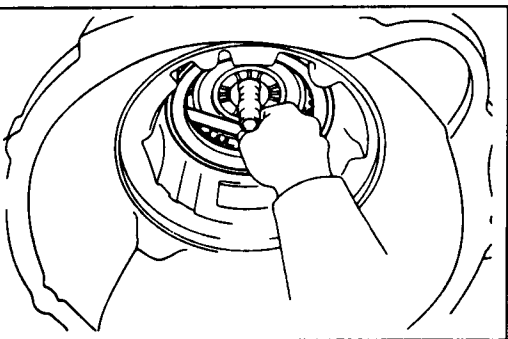
**WATCH FOR RACES AND BEARINGS ON
PLANETARY GEAR**



**REMOVE SUN GEAR, SUN GEAR INPUT DRUM,
SECOND BRAKE HUB AND NO.1 ONE-WAY CLUTCH**



**STAND TRANSMISSION CASE UP AND REMOVE
SECOND COAST BRAKE BAND GUIDE**



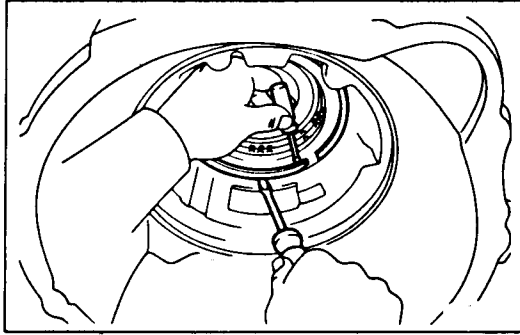
MEASURE CLEARANCE OF SECOND BRAKE

Using a thickness gauge, measure the clearance between the seat of the return spring assembly and top of the plate.

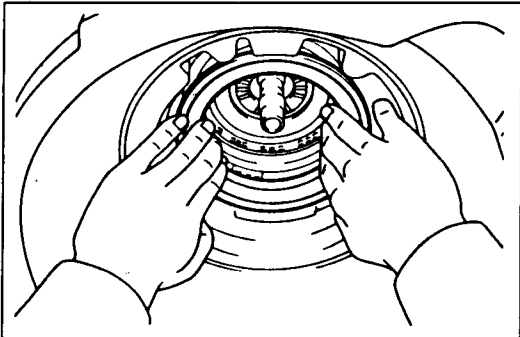
Clearance: 0.49 – 1.59 mm (0.0193 – 0.0626 in.)



Technical Service Information

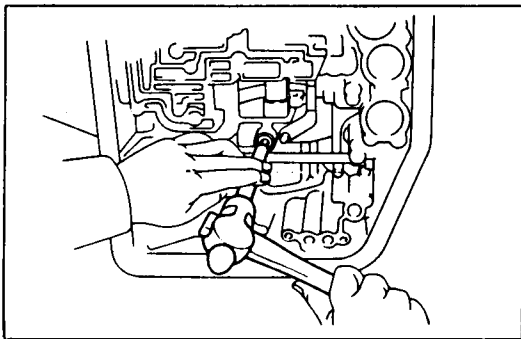


REMOVE SNAP RING HOLDING SECOND BRAKE DRUM TO CASE



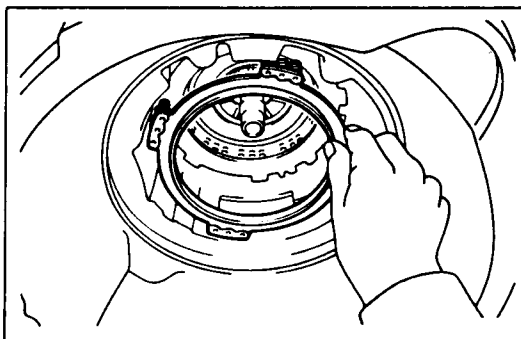
REMOVE SECOND BRAKE DRUM

If the piston is difficult to remove, lightly tap the drum with a wooden block.

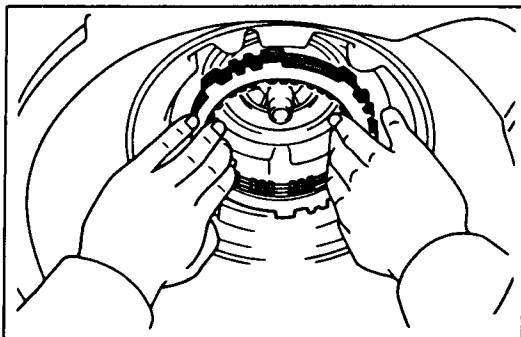


REMOVE SECOND BRAKE DRUM GASKET

Using a pin punch and hammer, tap out the 2nd brake drum seal.



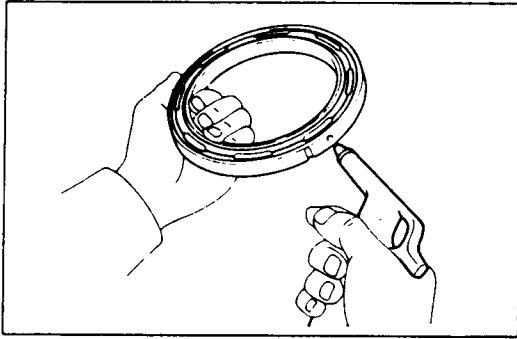
REMOVE SECOND BRAKE PISTON RETURN SPRING



REMOVE PLATES, DISCS AND FLANGE



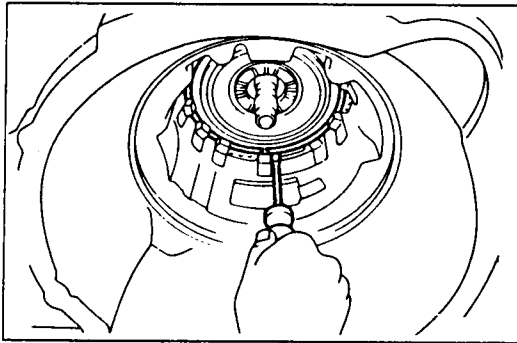
Technical Service Information



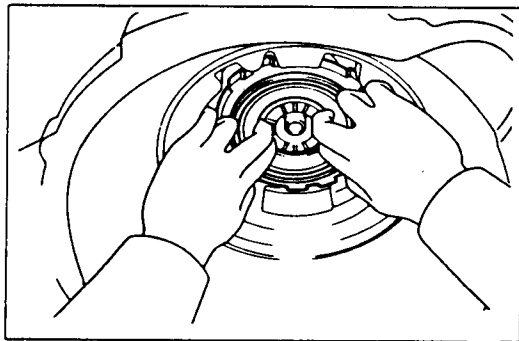
BLOW OUT PISTON WITH COMPRESSED AIR

Use compressed air to remove the piston.

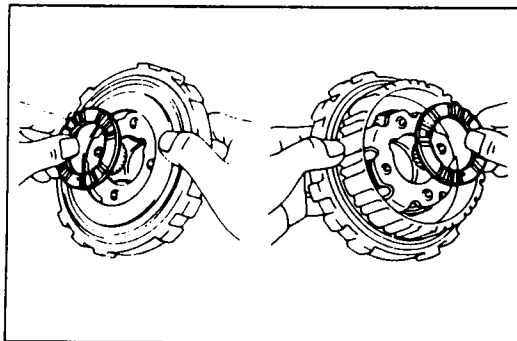
NOTE: Hold the piston so it is not slanted and then blow with the gun slightly away from the oil hole.



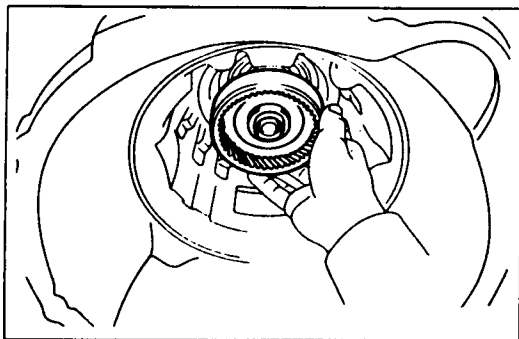
REMOVE SNAP RING HOLDING NO.2 ONE-WAY CLUTCH OUTER RACE TO CASE



REMOVE NO.2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR



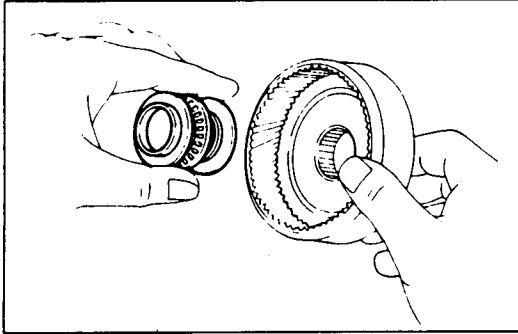
WATCH FOR THRUST WASHER OF PLANETARY CARRIER ON BOTH SIDES



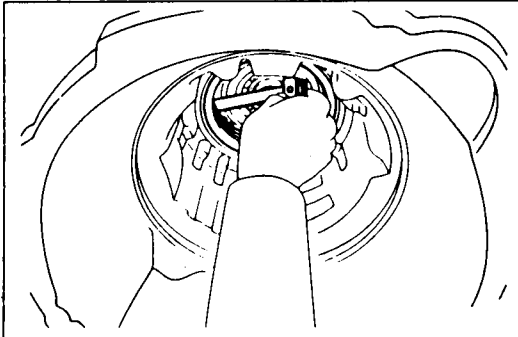
REMOVE REAR PLANETARY RING GEAR AND BEARING



Technical Service Information



WATCH FOR RACES AND BEARING ON RING GEAR

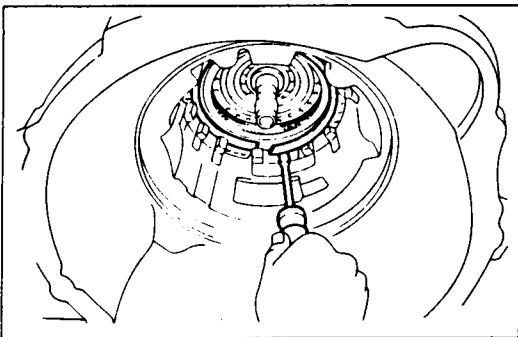


MEASURE CLEARANCE OF FIRST AND REVERSE BRAKE

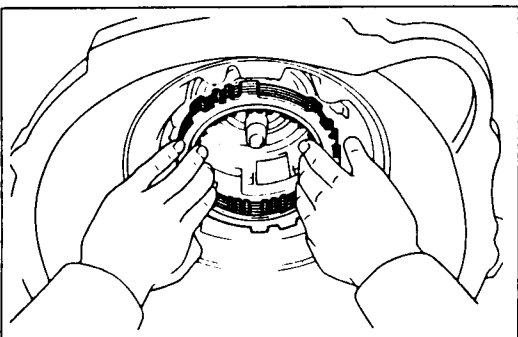
Using a thickness gauge, measure the clearance between the piston and the flange end.

Clearance:

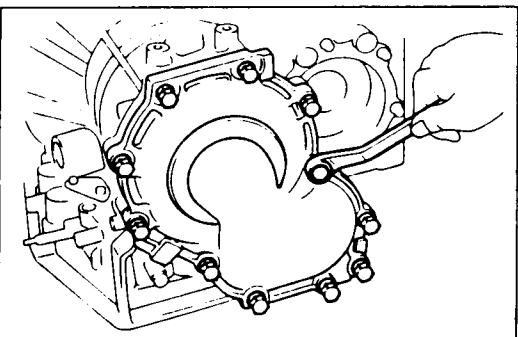
A130L (1C)	1.30 – 2.46 mm (0.0512 – 0.0969 in.)
A131L (4A-C)	0.89 – 2.11 mm (0.0350 – 0.0831 in.)



REMOVE SNAP RING HOLDING FLANGE TO CASE

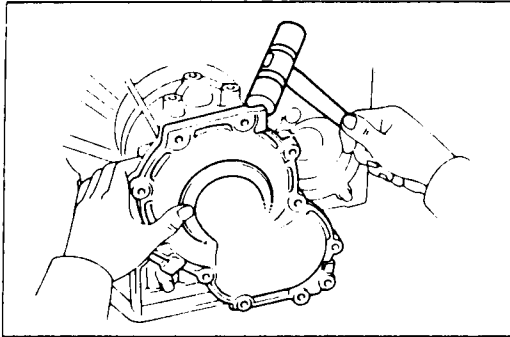


REMOVE FLANGES, PLATES AND DISCS



TURN TRANSMISSION CASE AROUND

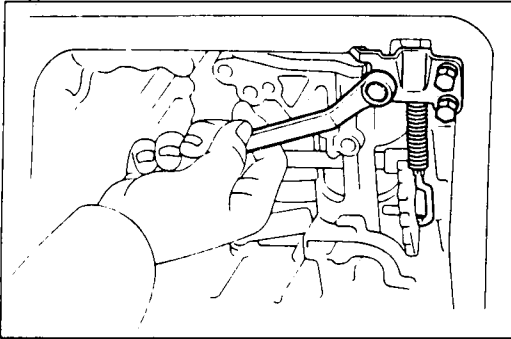
REMOVE ELEVEN BOLTS HOLDING TRANSAXLE REAR COVER TO TRANSMISSION CASE



REMOVE TRANSAXLE REAR COVER AND INTERMEDIATE SHAFT

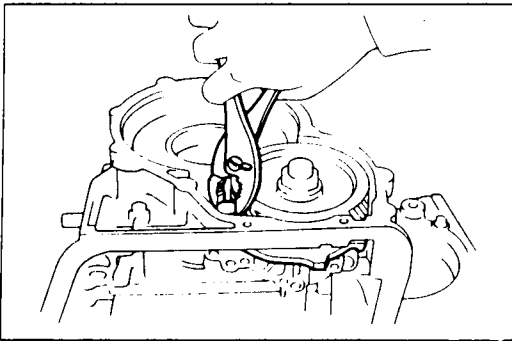
- (a) Tap on circumference of cover with a plastic hammer to remove the cover from the transmission case.
- (b) Remove the intermediate shaft if it stayed in the transmission.

REMOVE CASE GASKET



REMOVE PARKING LOCK PAWL BRACKET

REMOVE PARKING LOCK ROD



REMOVE PARKING LOCK PAWL SHAFT

REMOVE SPRING AND PARKING LOCK PAWL



COMPONENT GROUP DISASSEMBLY, INSPECTION AND ASSEMBLY

The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion of similar-looking parts from different subassemblies being on your workbench at the same time.

The component groups are inspected and repaired from the converter housing side.

As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.

Recommended ATF DEXRON II.

GENERAL CLEANING NOTES:

1. All disassembled parts should be washed clean and the fluid passages and holes blown through with compressed air to make sure that they are not clogged.
2. The recommended automatic transmission fluid or kerosene should be used for cleaning.
3. When using compressed air to dry parts, keep face away to avoid spraying ATF or kerosene in your face.

PARTS ARRANGEMENT:

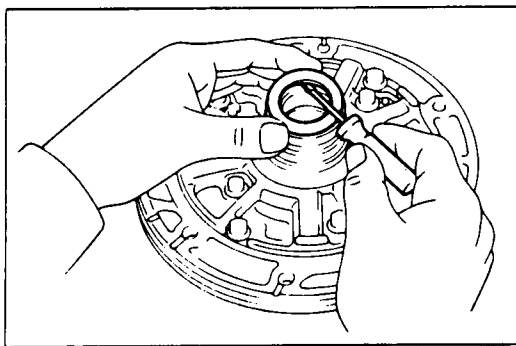
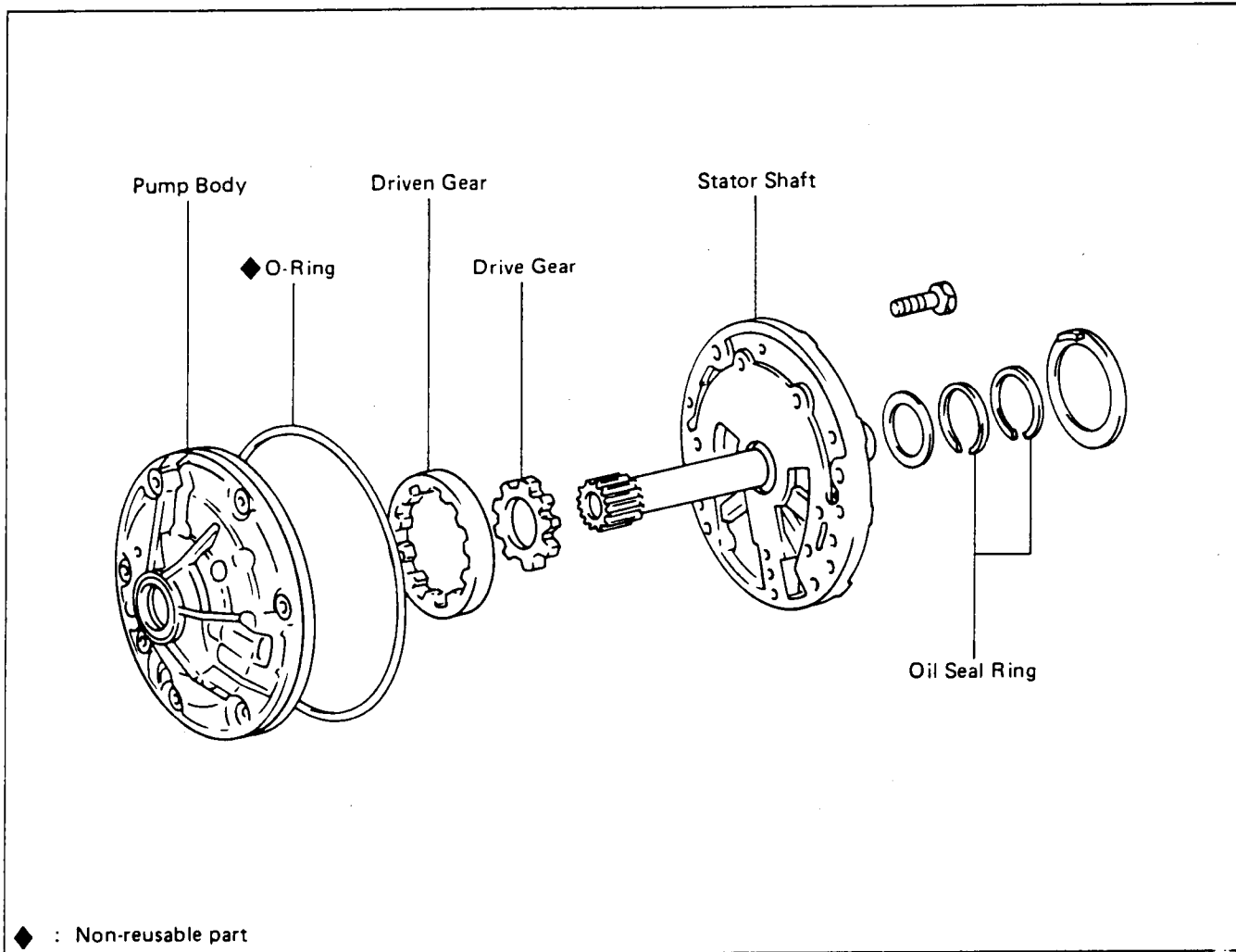
1. After cleaning, the parts should be arranged in proper order to allow performing inspection, repairs, and reassembly with efficiency.
2. When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
3. New brakes and clutches that are to be used for replacement must be soaked in transmission fluid for at least two hours before assembly.

GENERAL ASSEMBLY:

1. All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.
2. All gaskets and rubber O-rings should be replaced.
3. Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
4. If a worn bushing is to be replaced, the sub-assembly containing that bushing must be replaced.
5. Check thrust bearings and races for wear or damage. Replace if necessary.
6. Use petroleum jelly to keep parts in place.

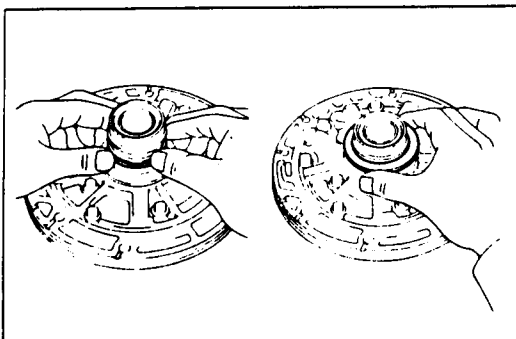
AUTOMATIC TRANSMISSION SERVICE GROUP

Oil Pump

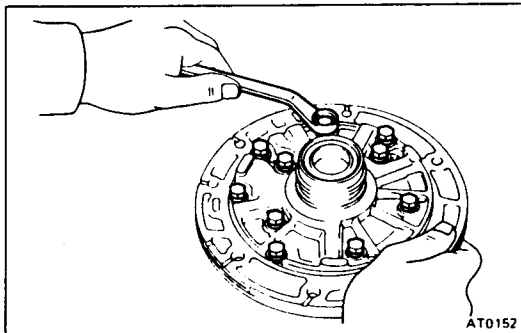


DISASSEMBLY OF OIL PUMP

1. REMOVE RACE FROM STATOR SHAFT
2. REMOVE O-RING FROM PUMP BODY

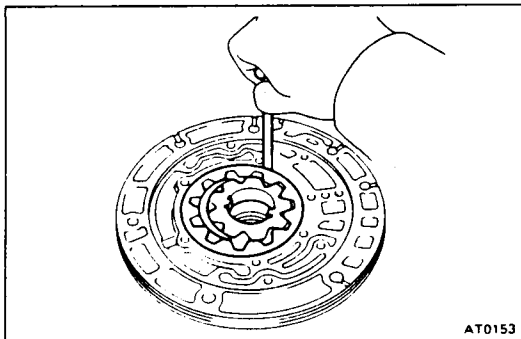


3. REMOVE TWO OIL SEAL RINGS FROM BACK OF STATOR SHAFT
4. REMOVE THRUST WASHER OF CLUTCH DRUM FROM STATOR SHAFT



5. REMOVE STATOR SHAFT

Remove the eleven bolts and the stator shaft.
Identify the top and bottom.
Keep gears in assembly order.



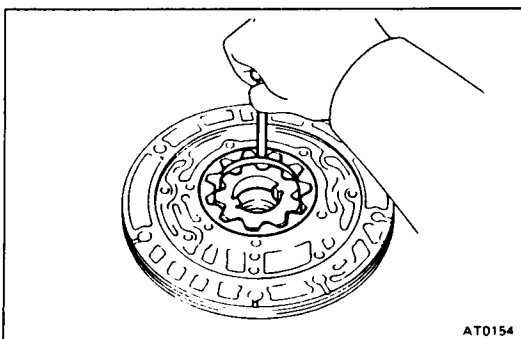
INSPECTION OF OIL PUMP

1. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body.
Using a feeler gauge, measure the clearance.

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

Maximum body clearance: 0.3 mm (0.012 in.)

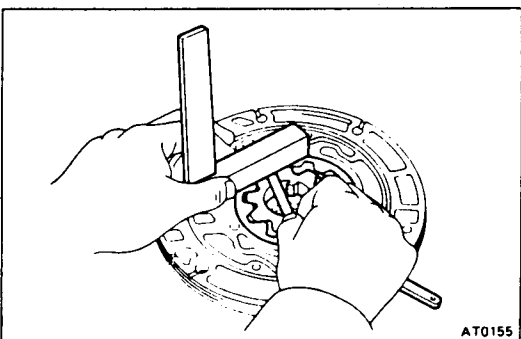


2. CHECK TIP CLEARANCE OF BOTH GEARS

Measure between the gear teeth and the crescent-shaped part of the pump body.

Standard tip clearance: 0.11 – 0.14 mm
(0.0043 – 0.0055 in.)

Maximum tip clearance: 0.3 mm (0.012 in.)

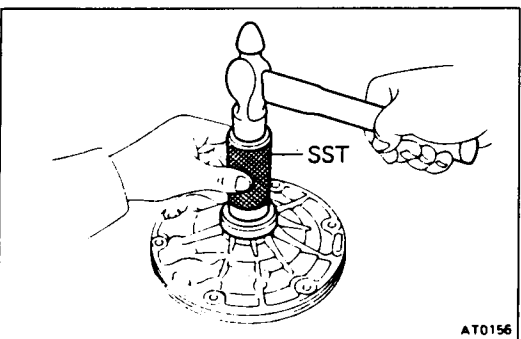


3. CHECK SIDE CLEARANCE OF BOTH GEARS

Using a steel straightedge and a feeler gauge, measure the side clearance of both gears.

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

Maximum side clearance: 0.1 mm (0.004 in.)



4. INSPECT FRONT OIL SEAL

Check for wear, damage or cracks.

5. IF NECESSARY, REPLACE FRONT OIL SEAL

(a) Pry off the oil seal with a screwdriver.

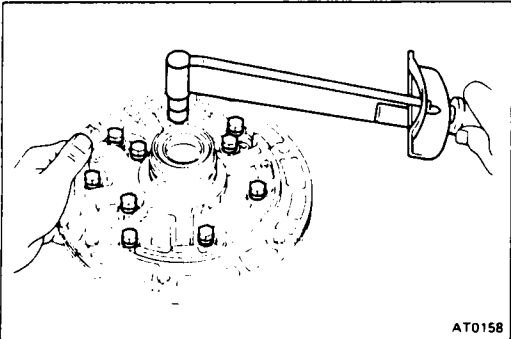
(b) Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

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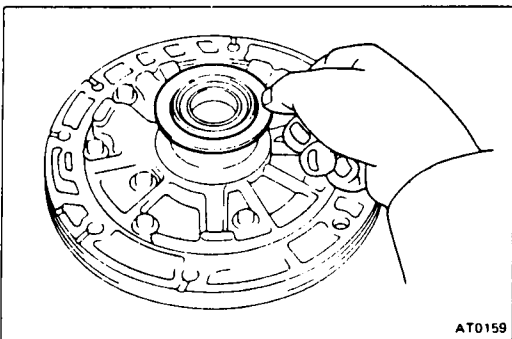
ASSEMBLY OF OIL PUMP



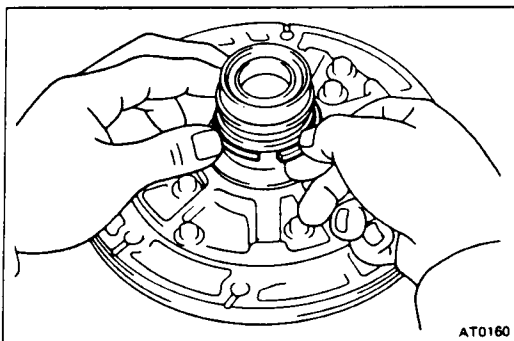
1. **INSTALL DRIVEN GEAR AND DRIVE GEAR**
Make sure the top of the gears are facing upward.



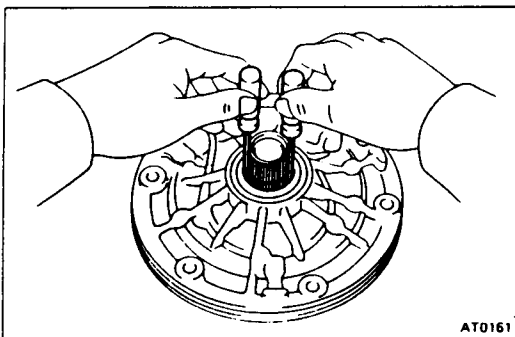
2. **INSTALL STATOR SHAFT ONTO PUMP BODY**
Align the stator shaft with each bolt hole.
3. **TIGHTEN ELEVEN BOLTS**
Torque: 100 kg-cm (7 ft-lb, 10 N-m)



4. **INSTALL THRUST WASHER**
 - (a) Coat the thrust washer with petroleum jelly.
 - (b) Align the tab of the washer with the hollow of the pump body.

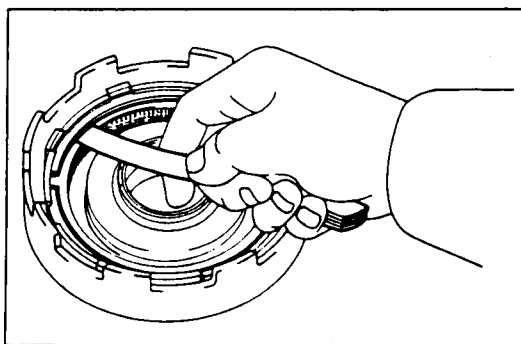
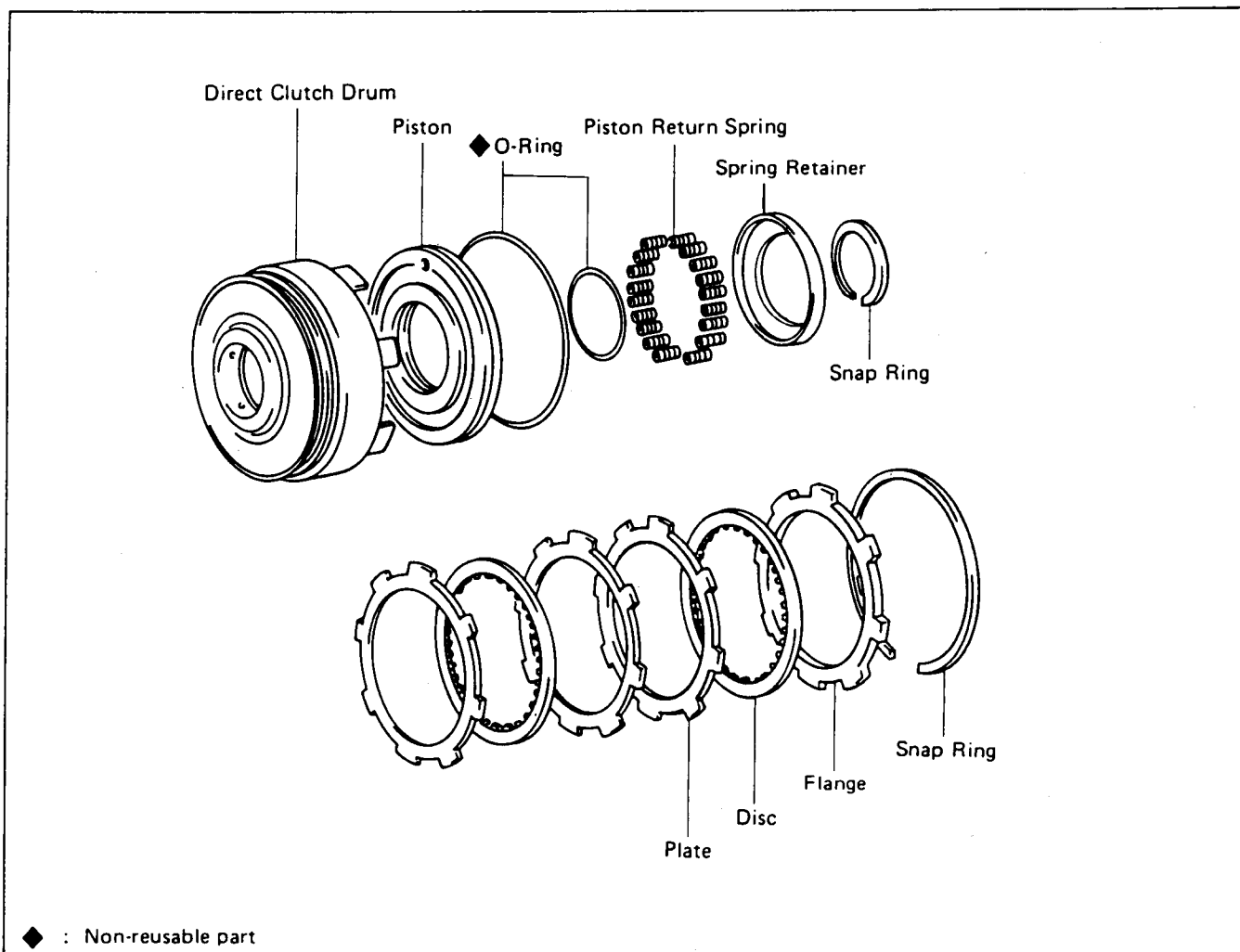


5. **INSTALL TWO OIL SEAL RINGS ON OIL PUMP**
CAUTION: Do not spread the ring ends too much.



6. **CHECK PUMP DRIVE GEAR ROTATION**
Turn the drive gear with two screwdrivers and make sure that it rotates smoothly.
7. **INSTALL NEW O-RING**
8. **INSTALL RACE ONTO STATOR SHAFT**

Direct Clutch

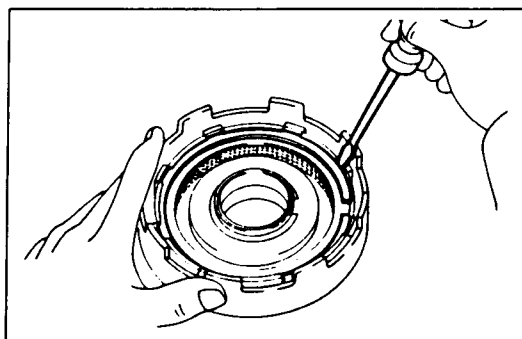


DISASSEMBLY OF DIRECT CLUTCH

1. MEASURE CLEARANCE OF DIRECT CLUTCH

Using a thickness gauge, measure the clearance between the snap ring and the flange.

Clearance: 0.89 – 1.46 mm (0.0350 – 0.0575 in.)

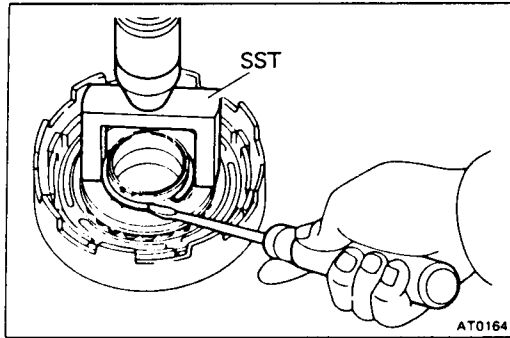


2. REMOVE SNAP RING FROM CLUTCH DRUM

3. REMOVE FLANGE, DISCS AND PLATES



Technical Service Information

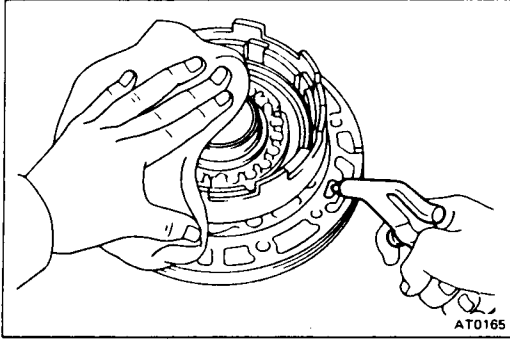


4. COMPRESS PISTON RETURN SPRINGS AND REMOVE SNAP RING

Place SST on the spring retainer and compress the springs with a shop press. Using a screwdriver, remove the snap ring.

SST 09350-32011

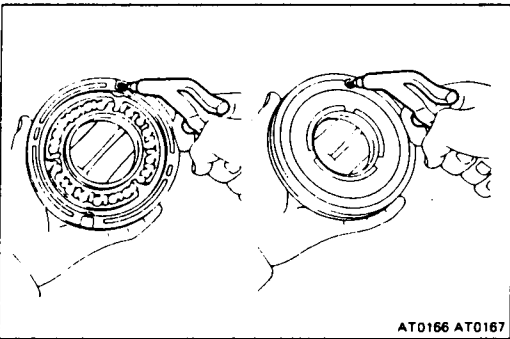
5. REMOVE SPRING RETAINER AND EIGHTEEN SPRINGS



6. ASSEMBLE DIRECT CLUTCH ON OIL PUMP AND BLOW OUT PISTON

- Slide the direct clutch onto the oil pump.
- Apply compressed air to the oil pump to remove the piston. (If the piston does not come out completely, use needle-nose pliers to remove it.)
- Remove the direct clutch from the oil pump.

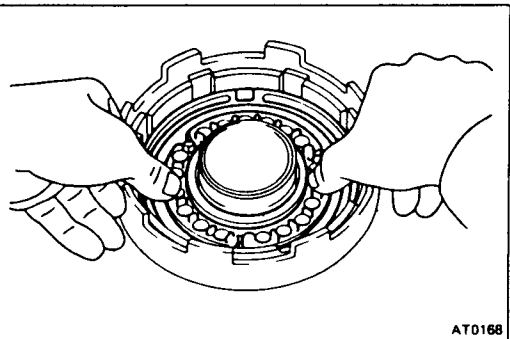
7. REMOVE CLUTCH PISTON O-RING



INSPECTION OF DIRECT CLUTCH

INSPECT 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.



ASSEMBLY OF DIRECT CLUTCH

(See page AT-72)

1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM

- Install new O-rings on the piston. Coat the O-rings with ATF.
- Press the piston into the drum with the cup side up, being careful not to damage the O-ring.

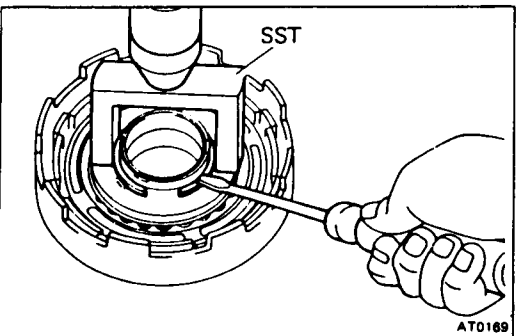
2. INSTALL EIGHTEEN PISTON RETURN SPRINGS AND SET RETAINER AND SNAP RING IN PLACE

3. COMPRESS RETURN SPRINGS AND INSTALL SNAP RING IN GROOVE

- Place SST on the spring retainer, and compress the springs with a shop press.

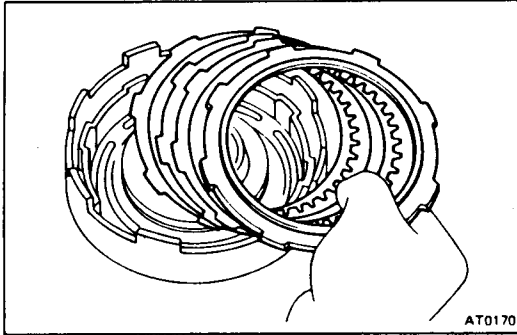
SST 09350-32011

- Install the snap ring with a screwdriver. Be sure the end gap of snap ring is not aligned with the spring retainer claw.

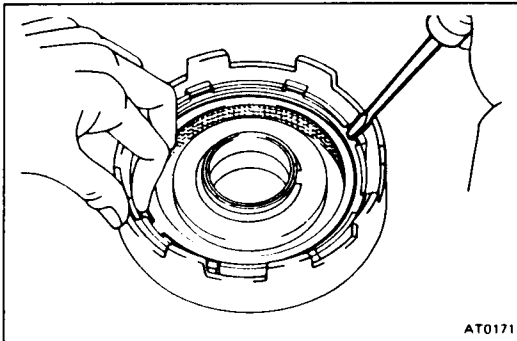




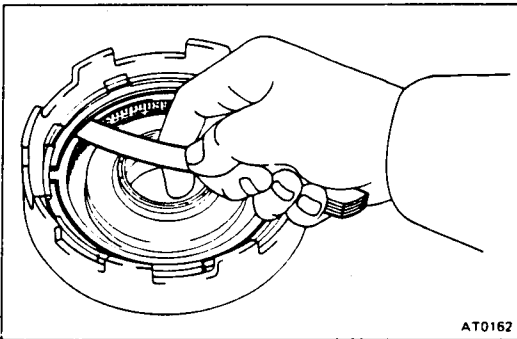
Technical Service Information



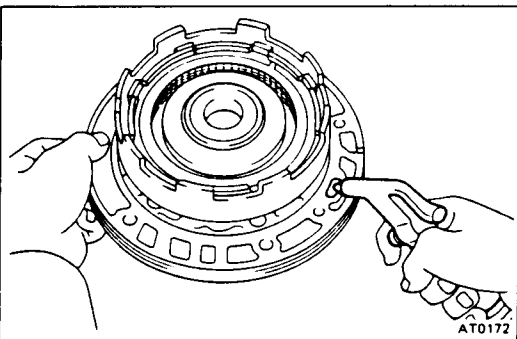
- 4. INSTALL PLATES, DISCS AND FLANGE**
Install in order: Plate-disc-plate-plate-disc
Install the flange, facing the flat end downward.



- 5. INSTALL OUTER SNAP RING**
Check that the end gap of the snap ring is not aligned with one of cutouts.

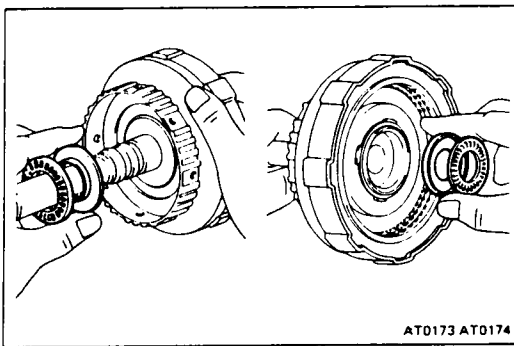
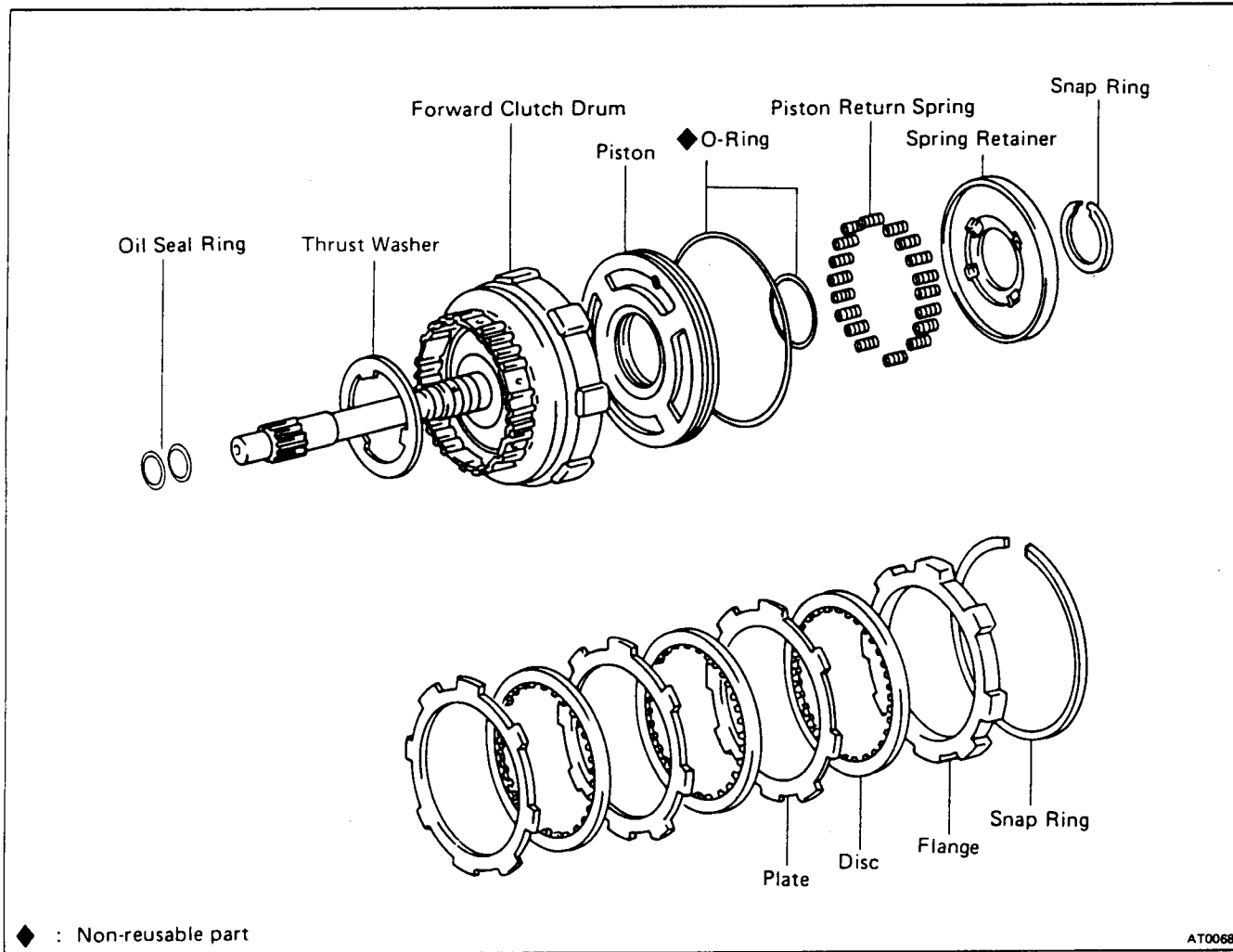


- 6. CHECK CLEARANCE OF DIRECT CLUTCH**
Using a thickness gauge, check the clearance between the snap ring and the flange.
Clearance: 0.89 – 1.46 mm (0.0350 – 0.0575 in.)
If not within specification, select a proper flange.
NOTE: There are two different flange thickness.
Flange thickness: 3.00 mm (0.1181 in.)
3.37 mm (0.1327 in.)



- 7. CHECK OPERATION OF DIRECT CLUTCH**
(a) Install the direct clutch onto the oil pump.
(b) Apply compressed air into the passage of the oil pump body and be sure that the piston moves.
If the piston does not move, disassemble and inspect.

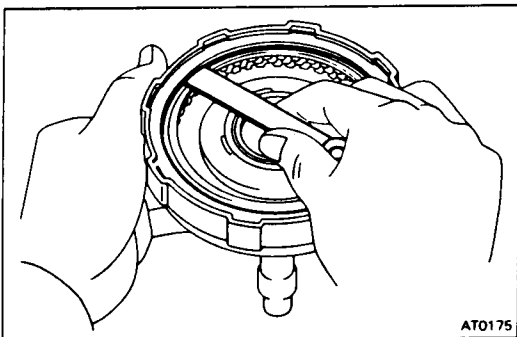
Forward Clutch



DISASSEMBLY OF FORWARD CLUTCH

1. REMOVE THRUST WASHER
2. REMOVE THRUST BEARINGS AND RACES FROM BOTH SIDES OF CLUTCH

Note the position of the races.



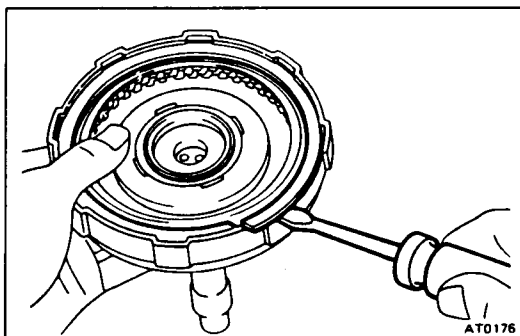
3. MEASURE CLEARANCE OF FORWARD CLUTCH

Using a thickness gauge, measure the clearance between the snap ring and the flange.

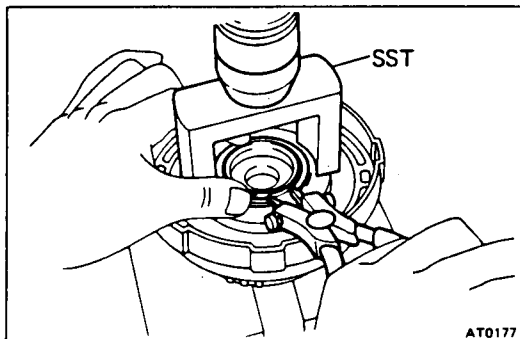
Clearance: 0.41 – 1.08 mm (0.0161 – 0.0425 in.)



Technical Service Information



4. REMOVE SNAP RING FROM CLUTCH DRUM
5. REMOVE FLANGE, DISCS AND PLATES



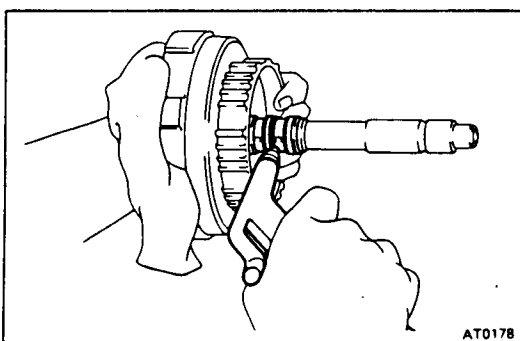
6. COMPRESS PISTON RETURN SPRINGS AND REMOVE SNAP RING

(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32011

(b) Remove the snap ring with snap ring pliers.

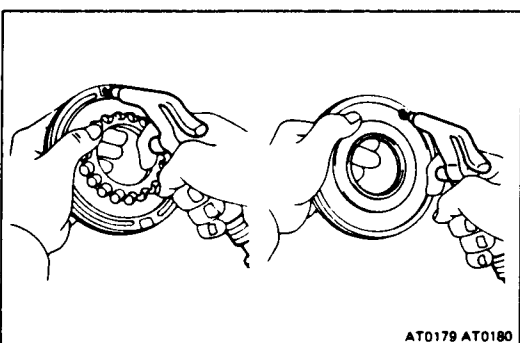
7. REMOVE SPRING RETAINER AND EIGHTEEN SPRINGS



8. BLOW OUT PISTON

Apply compressed air into the oil passage to remove the piston.

If the piston does not come out, use needle-nose pliers to remove it.



INSPECTION OF FORWARD CLUTCH

1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

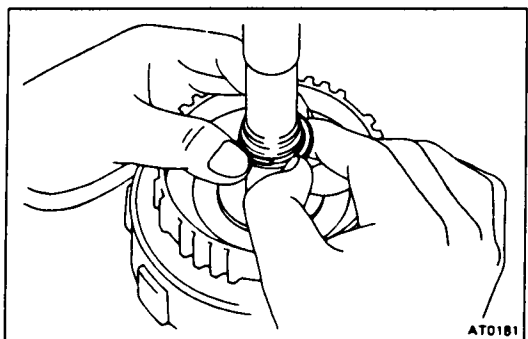
(b) Check that valve does not leak by applying low-pressure compressed air.

2. REPLACE OIL SEAL RINGS

(a) Remove the oil seal rings.

(b) Spread the rings apart and install them into the groove.

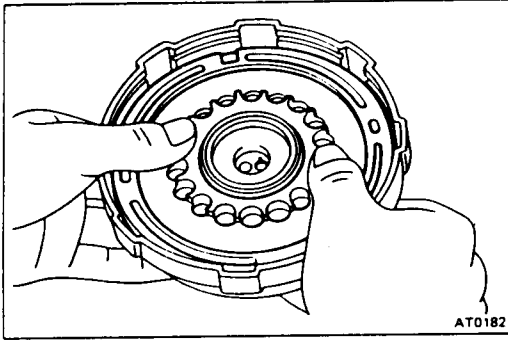
CAUTION: Do not spread the ring ends too much.





Technical Service Information

ASSEMBLY OF FORWARD CLUTCH

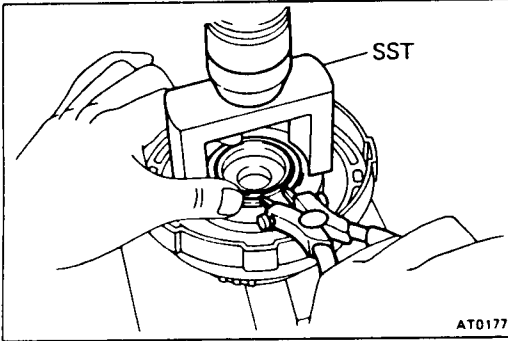


1. INSTALL NEW O-RINGS ON PISTON

Coat the O-ring with ATF.

2. INSTALL PISTON IN FORWARD CLUTCH DRUM

Press the piston into the drum with the cup side up, being careful not to damage the O-ring.



3. INSTALL EIGHTEEN PISTON RETURN SPRINGS, SPRING RETAINER AND SNAP RING IN PLACE

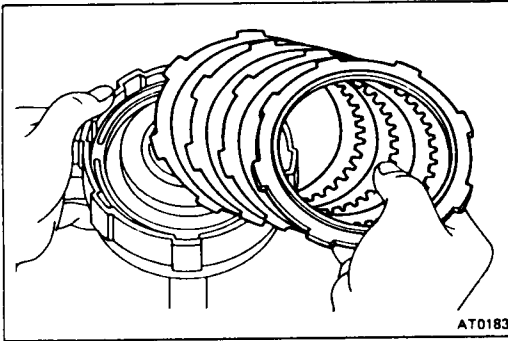
4. COMPRESS RETURN SPRINGS AND INSTALL SNAP RING IN GROOVE

(a) Place SST on the spring retainer, and compress the springs with a shop press.

SST 09350-32011

(b) Install the snap ring with screwdriver.

Be sure the end gap of snap ring is not aligned with the spring retainer claw.

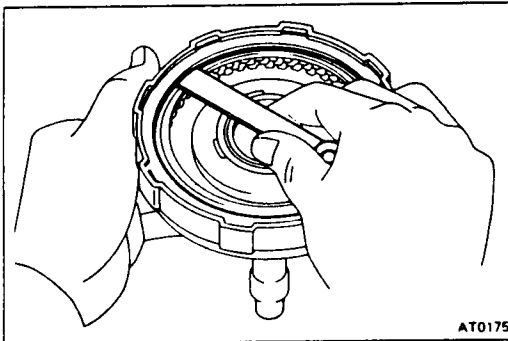


5. INSTALL PLATES, DISCS AND FLANGE

Install in order: plate-disc-plate-disc-plate-disc
Install the flange facing the flat end downward.

6. INSTALL OUTER SNAP RING

Check that the end gap of snap ring is not aligned with one of the cutouts.



7. CHECK CLEARANCE OF FORWARD CLUTCH

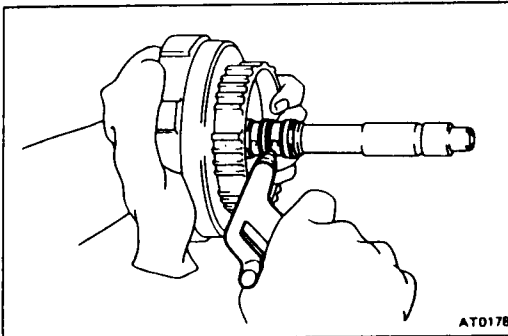
Using a thickness gauge, check the clearance between the snap ring and the flange.

Clearance: 0.41 – 1.08 mm (0.0161 – 0.0425 in.)
[Piston stroke: 1.11 – 1.47 mm (0.0437 – 0.0579 in.)]

If not within specification, select a proper flange.

NOTE: There are two different flange thickness.

Flange thickness: 3.00 mm (0.1181 in.)
3.37 mm (0.1327 in.)



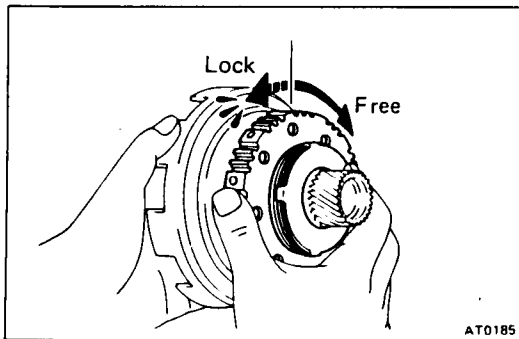
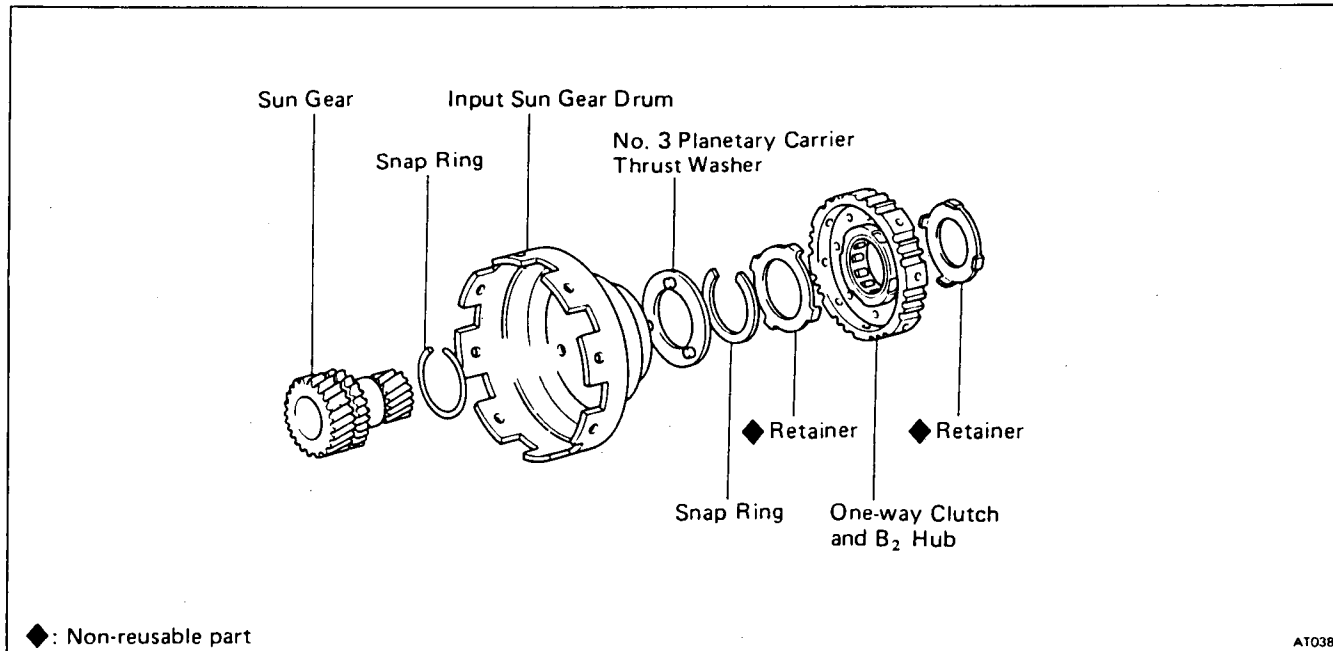
8. CHECK OPERATION OF FORWARD CLUTCH

Apply compressed air into the oil passage with the shaft and be sure that the piston moves.

If the piston does not move, disassemble and inspect.

9. INSTALL THRUST WASHER, RACES AND BEARINGS

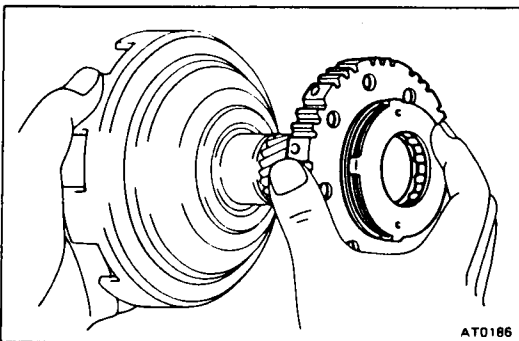
No.1 One-way Clutch and Sun Gear



DISASSEMBLY OF NO. 1 ONE-WAY CLUTCH AND SUN GEAR

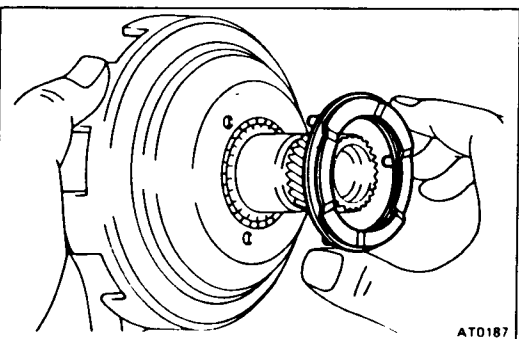
1. CHECK OPERATION OF ONE-WAY CLUTCH

Hold the sun gear and turn the hub.
The hub should turn freely clockwise and should lock counterclockwise.



2. REMOVE SECOND BRAKE HUB AND ONE-WAY CLUTCH FROM INNER RACE

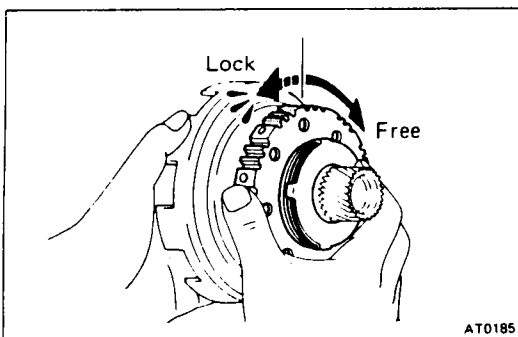
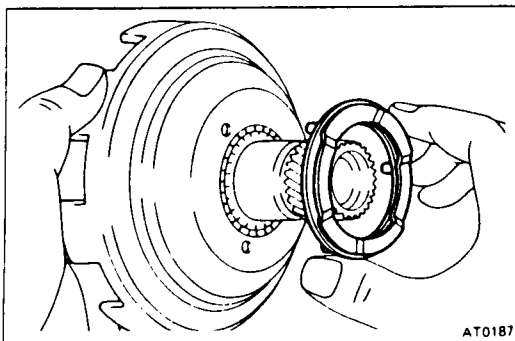
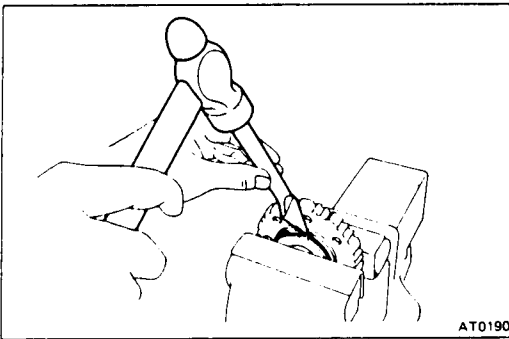
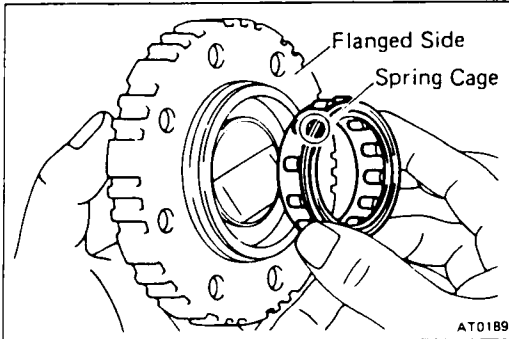
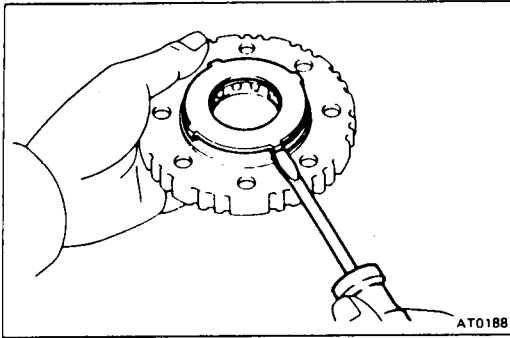
While turning the hub clockwise, remove the one-way clutch from the inner race.



3. REMOVE NO.3 PLANETARY CARRIER THRUST WASHER FROM SUN GEAR INPUT DRUM

4. REMOVE SNAP RING AND REMOVE SUN GEAR INPUT DRUM

5. REMOVE SNAP RING



INSPECTION OF NO. 1 ONE-WAY CLUTCH

1. IF NECESSARY, REPLACE ONE-WAY CLUTCH

- (a) Pry off the retainer with a screwdriver.
- (b) Remove the one-way clutch.
- (c) Install the one-way clutch into the brake hub, facing the spring cage inward from the flanged side of the brake hub.

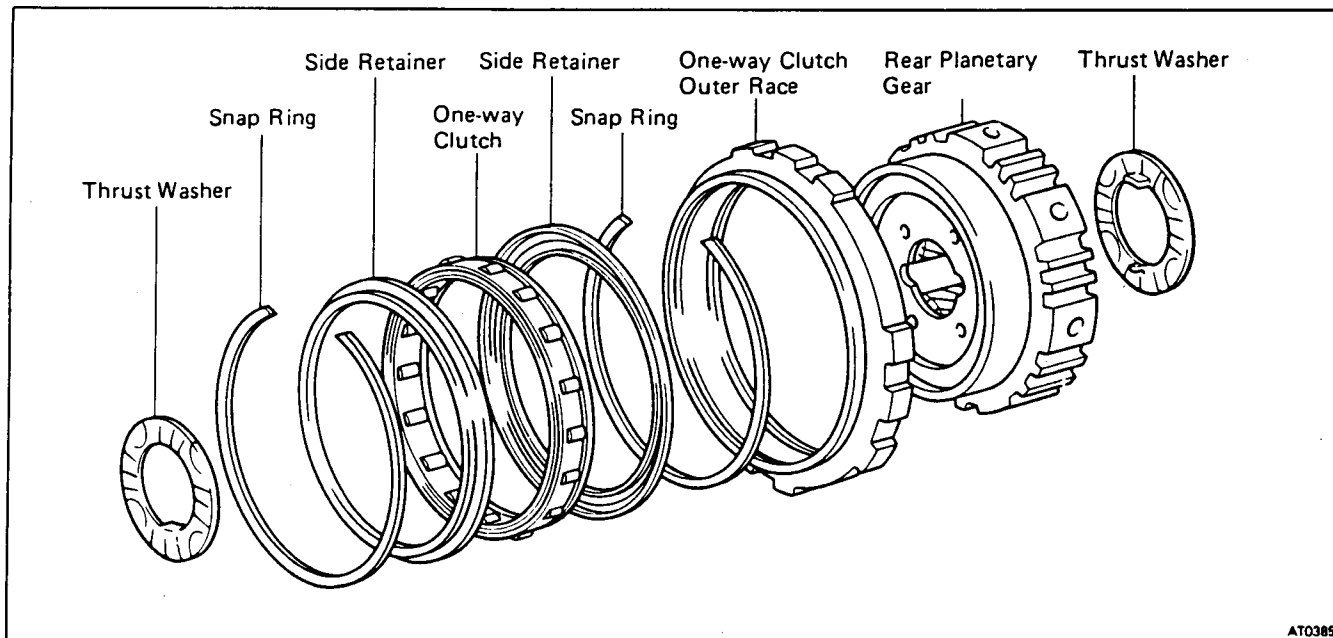
- (d) Hold the brake hub in a vise with soft jaws, and flatten the ears with a chisel.
- (e) Check to make sure that the retainer is centered.

2. CHECK OPERATION OF ONE-WAY CLUTCH

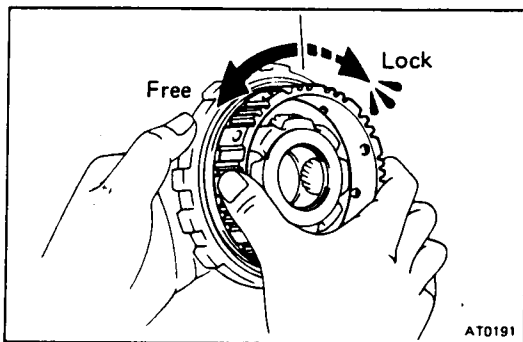
ASSEMBLY OF NO. 1 ONE-WAY CLUTCH AND SUN GEAR

1. INSTALL SHAFT SNAP RING ON SUN GEAR
2. INSTALL SUN GEAR INPUT DRUM ON SUN GEAR AND INSTALL SHAFT SNAP RING
3. INSTALL NO.3 PLANETARY CARRIER THRUST WASHER ON SUN GEAR INPUT DRUM
4. INSTALL ONE-WAY CLUTCH AND SECOND BRAKE HUB ON INNER RACE
While turning the hub clockwise, slide the one-way clutch onto the inner race.
5. RECHECK OPERATION OF NO.1 ONE-WAY CLUTCH

No.2 One-way Clutch and Rear Planetary Gear



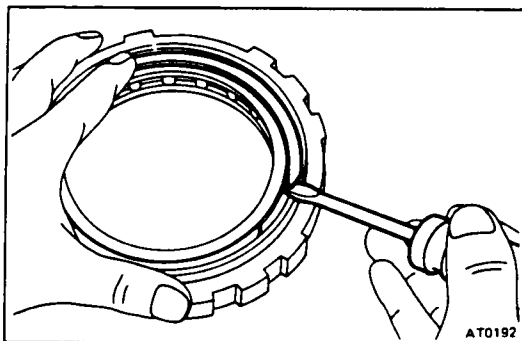
AT0385



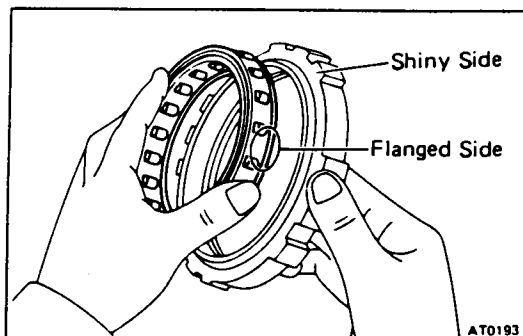
AT0191

DISASSEMBLY OF ONE-WAY CLUTCH

1. **CHECK OPERATION OF ONE-WAY CLUTCH**
Hold the outer race and turn the hub.
The hub should turn freely counterclockwise and should lock clockwise.
2. **REMOVE NO.2 PLANETARY CARRIER THRUST WASHER FROM BOTH SIDES OF CARRIER**
3. **DISASSEMBLE ONE-WAY CLUTCH**
Remove the hub and the planetary gear from the one-way clutch.
4. **REMOVE SNAP RING ON BOTH SIDES AND TWO SIDE RETAINERS**
5. **REMOVE ONE-WAY CLUTCH FROM OUTER RACE**



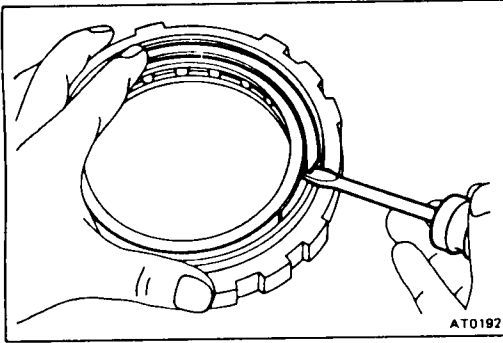
AT0192



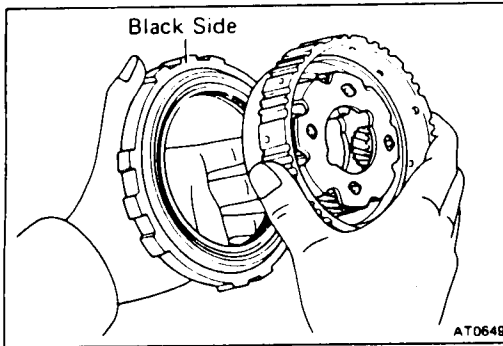
AT0193

ASSEMBLY OF ONE-WAY CLUTCH

1. **INSTALL ONE-WAY CLUTCH**
Install the one-way clutch into the outer race, facing the flanged side of one-way clutch inward from the shiny side of outer race.

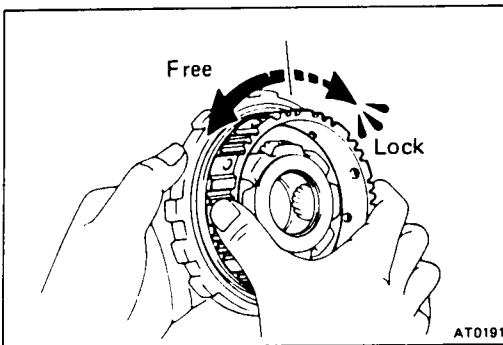


2. INSTALL BOTH RETAINERS AND TWO SNAP RINGS



3. INSTALL REAR PLANETARY GEAR INTO ONE-WAY CLUTCH

Install the planetary gear into the one-way clutch, facing the inner race of planetary gear inward from the black side of the outer race.

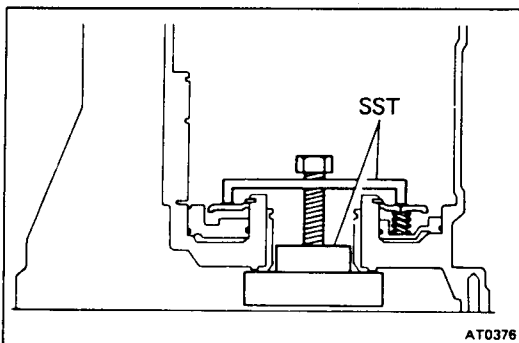
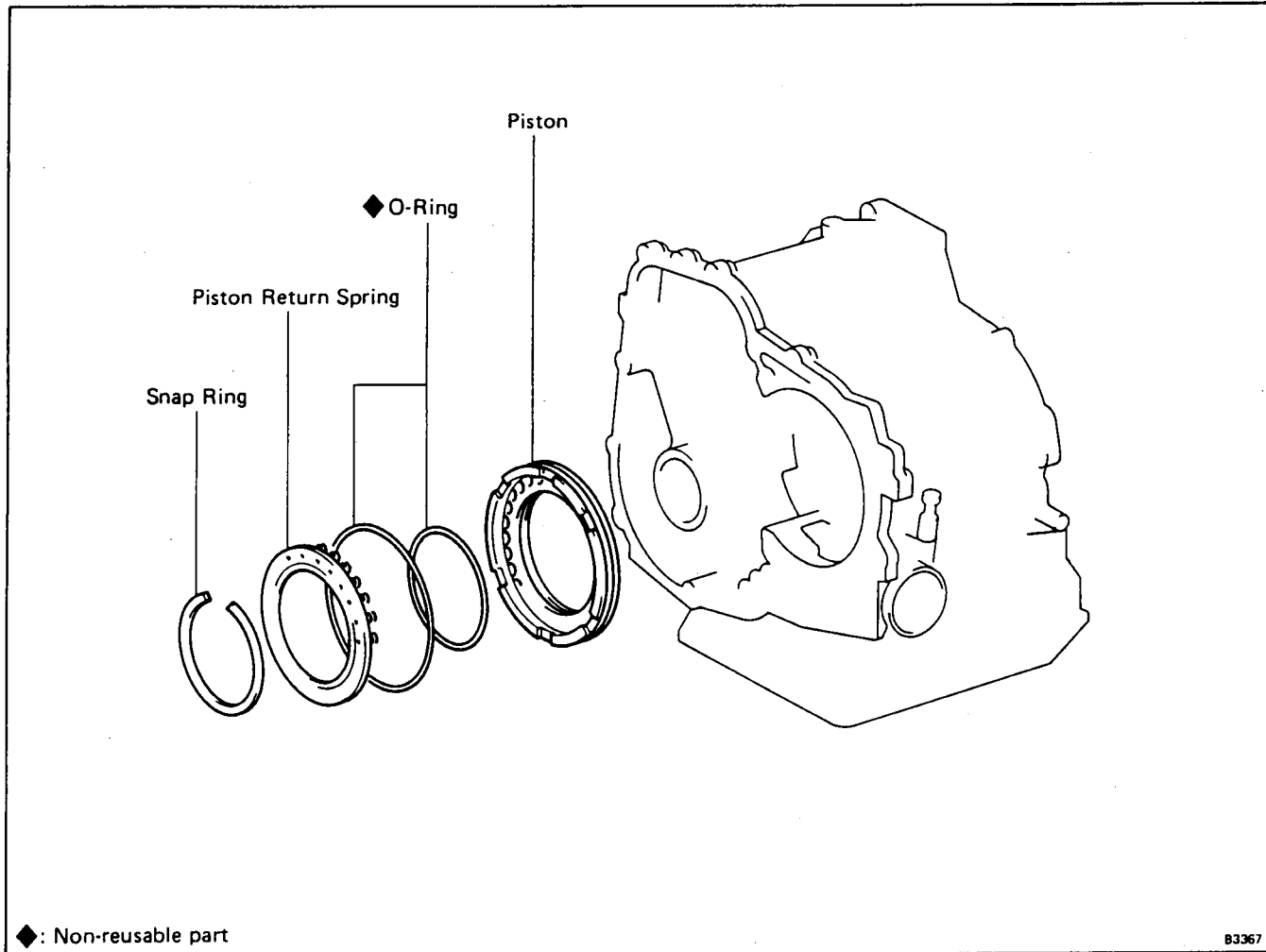


4. CHECK OPERATION OF ONE-WAY CLUTCH

5. INSTALL NO. 2 PLANETARY CARRIER THRUST WASHERS ONTO BOTH SIDES OF CARRIER

- (a) Coat the thrust washers with petroleum jelly.
- (b) Align the tab of the washers with the hollow of the carrier.

First and Reverse Brake Piston



DISASSEMBLY OF FIRST AND REVERSE BRAKE PISTON

1. COMPRESS RETURN SPRINGS AND REMOVE SPRING RETAINER SNAP RING

- (a) Install SST. Tighten the bolt gradually and evenly to compress the springs with SST.

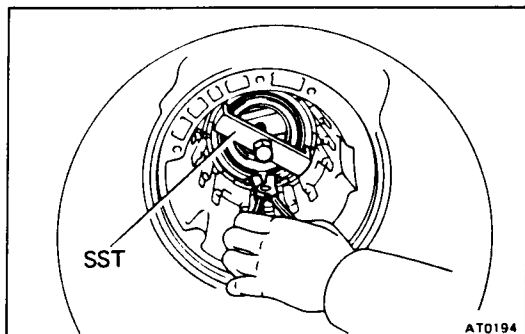
SST 09350-32011

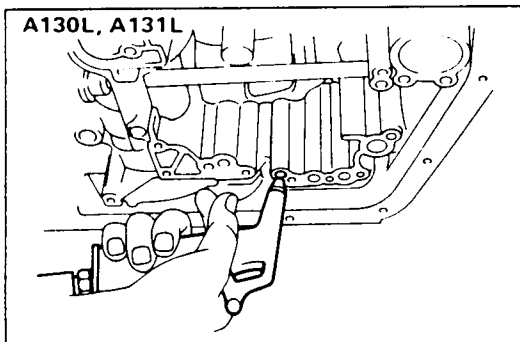
- (b) Using snap ring pliers, remove the snap ring.

- (c) Remove SST.

SST 09350-32011

2. REMOVE SNAP RING AND RETURN SPRING ASSEMBLY



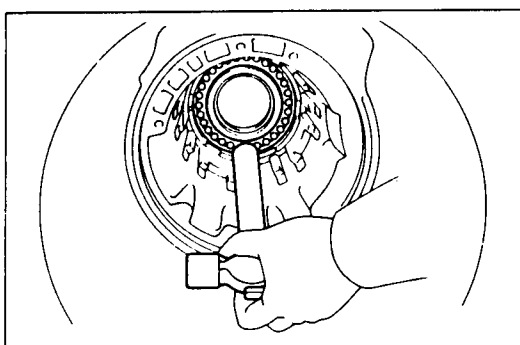


4. REMOVE O-RINGS FROM PISTON

ASSEMBLY OF FIRST AND REVERSE BRAKE PISTON

1. INSTALL NEW O-RINGS ON PISTON

Coat the O-rings with ATF.



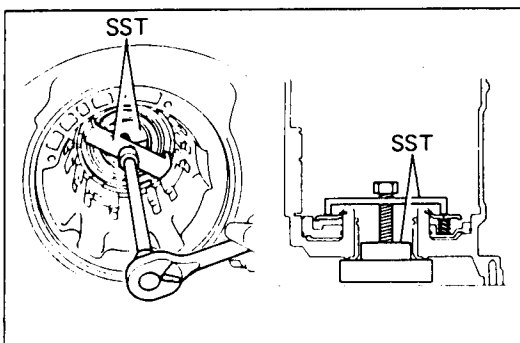
2. INSTALL PISTON IN TRANSMISSION CASE

Push the piston into the bore of the case, facing the spring seats upward.

3. PLACE SST BASE UNDER CASE

SST 09350-32011

4. INSTALL PISTON RETURN SPRING ASSEMBLY, SST AND SNAP RING IN PLACE

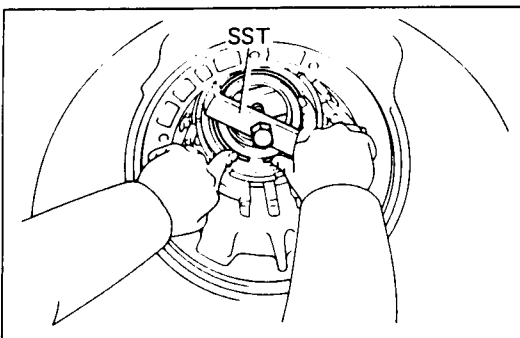


5. COMPRESS PISTON RETURN SPRINGS TO ALLOW INSTALLATION OF SNAP RING

CAUTION: Avoid bending the spring retainer by over-tightening the bolt.

Gradually tighten the bolt to compress the springs, being careful not to damage the transmission case with SST.

SST 09350-32011



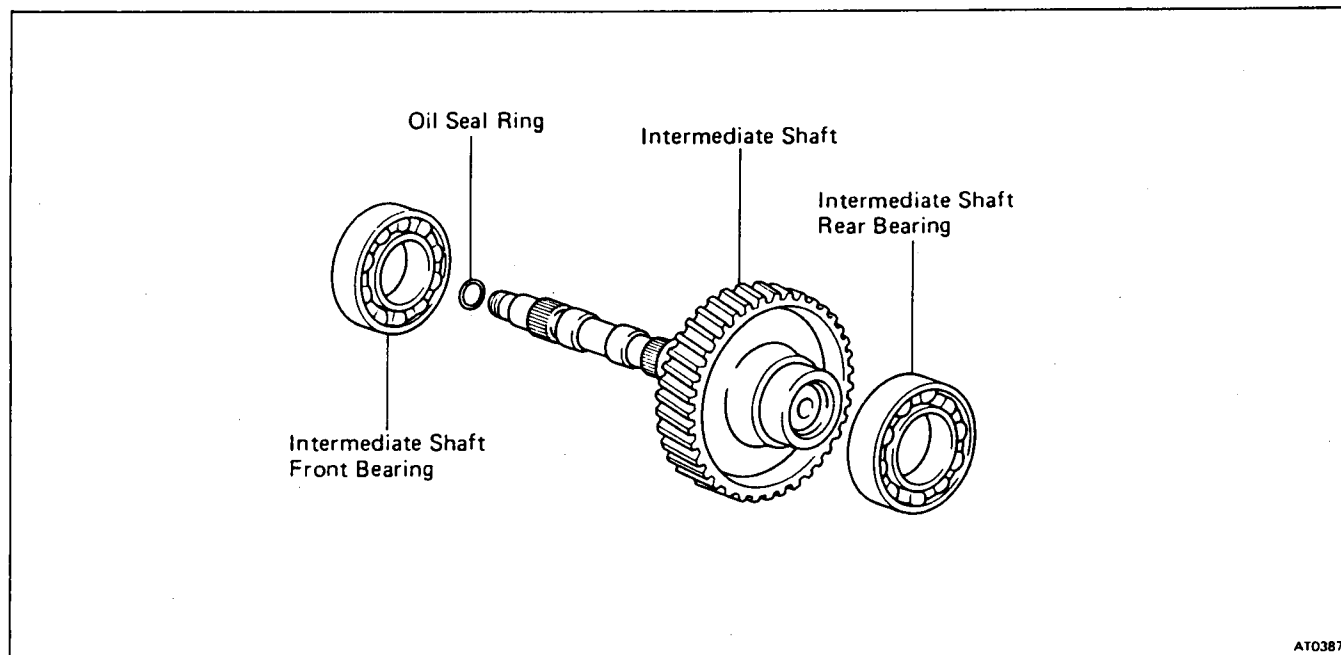
6. INSTALL SNAP RING

(a) Push the ring into place with your fingers. Visually check to make sure it is fully seated and centered by the three lugs on the spring retainer. Be sure the end gap of snap ring is not aligned with the spring retainer claw.

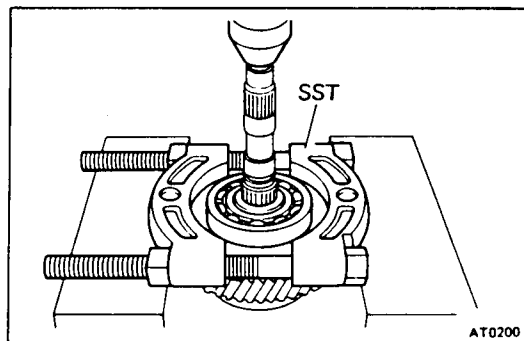
(b) Remove the SST.

SST 09350-32011

Intermediate Shaft



AT0387



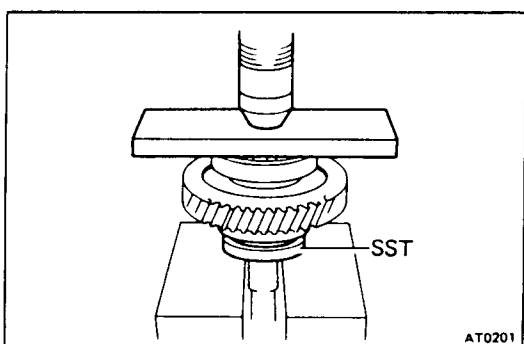
REPLACEMENT OF INTERMEDIATE SHAFT FRONT BEARING

1. REMOVE INTERMEDIATE SHAFT FRONT BEARING

Using SST, press out the bearing.

SST 09555-55010 (A240L)

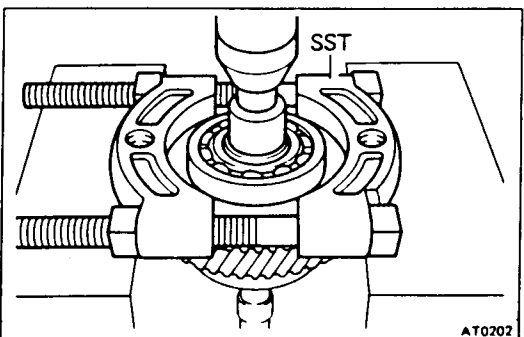
SST 09950-00020 (A130L, A131L)



2. INSTALL INTERMEDIATE SHAFT FRONT BEARING

Using SST, press in a new bearing.

SST 09350-32011



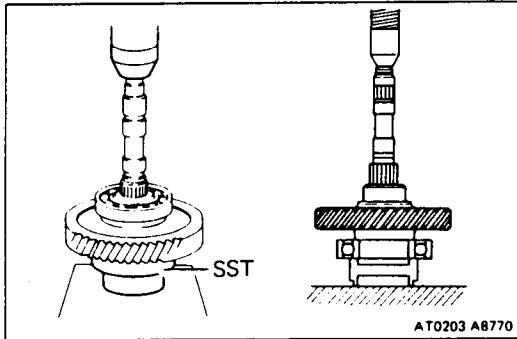
REPLACEMENT OF INTERMEDIATE SHAFT REAR BEARING

1. REMOVE INTERMEDIATE SHAFT REAR BEARING

Using SST, press out the bearing.

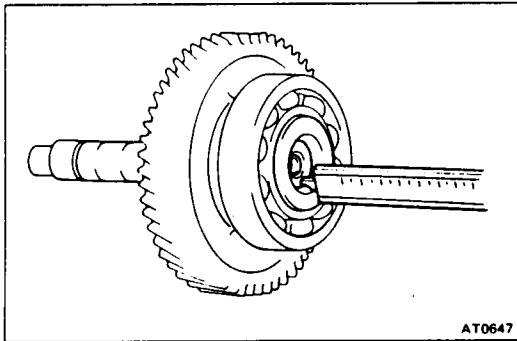
SST 09555-55010 (A240L)

SST 09950-00020 (A130L, A131L)



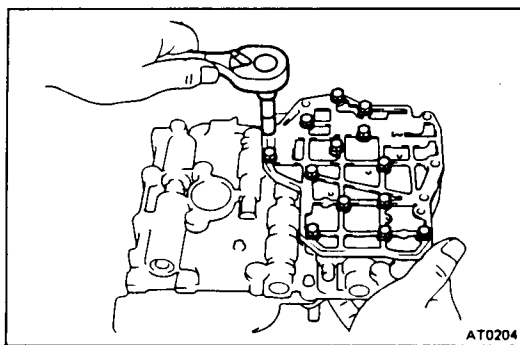
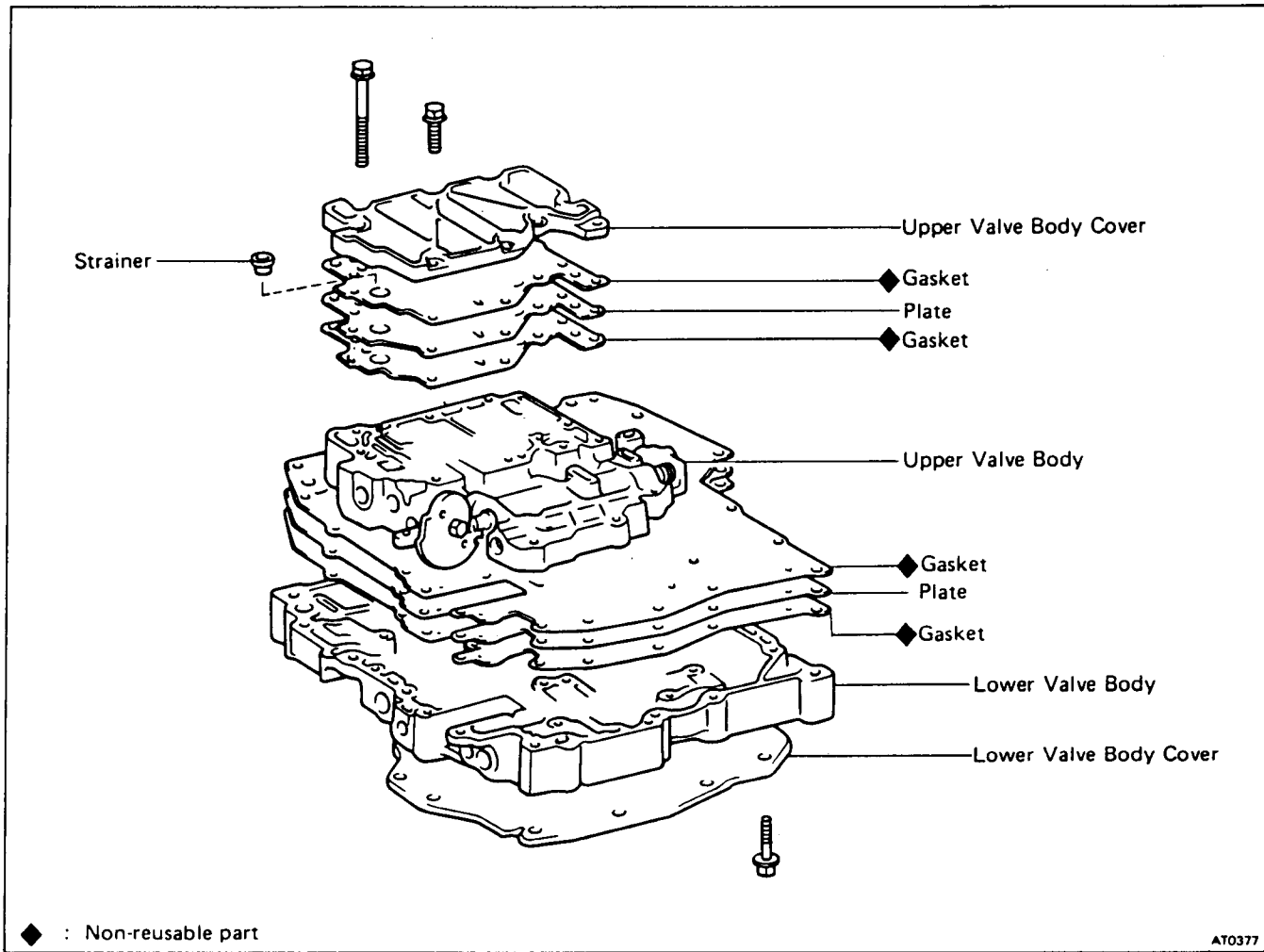
2. INSTALL INTERMEDIATE SHAFT REAR BEARING

- (a) Using SST, press in a new bearing.
SST 09350-32011



- (b) Check that the distance from the gear flange end to the intermediate shaft end should be about 9.0 mm (0.354 in.)/A240L or 5.0 mm (0.197 in.)/A130L, A131L.

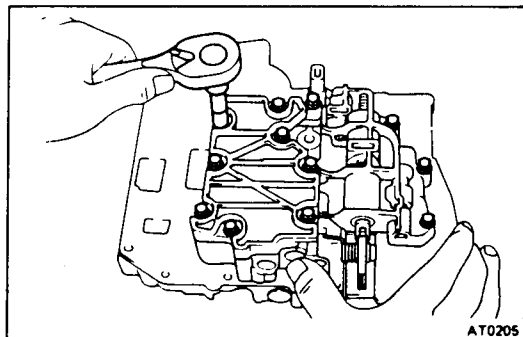
Valve Body (A130L, A131L)



(Disassembly of Valve Body)

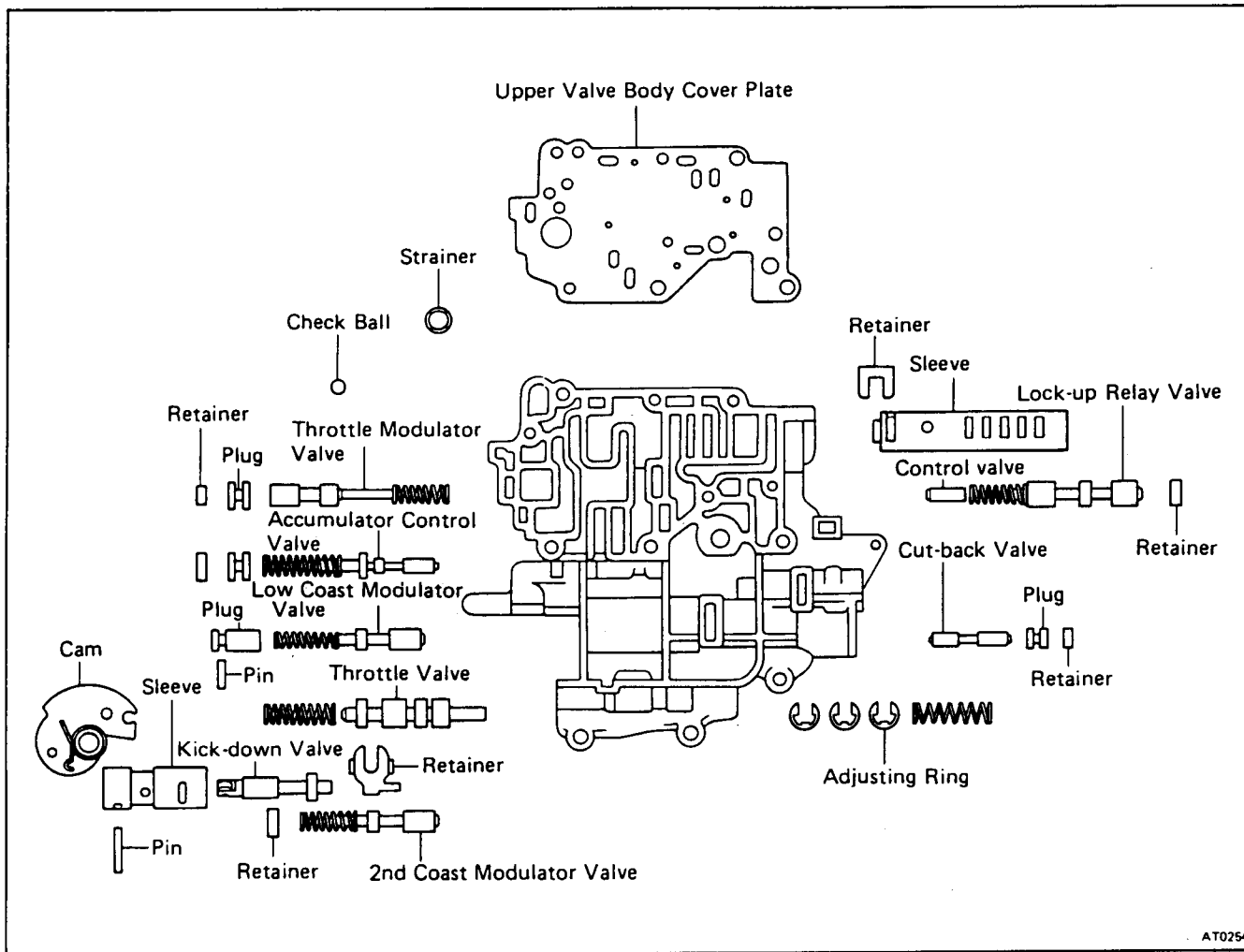
1. REMOVE LOWER VALVE BODY COVER

- (a) Remove the fourteen bolts.
- (b) Remove the cover and the gasket.

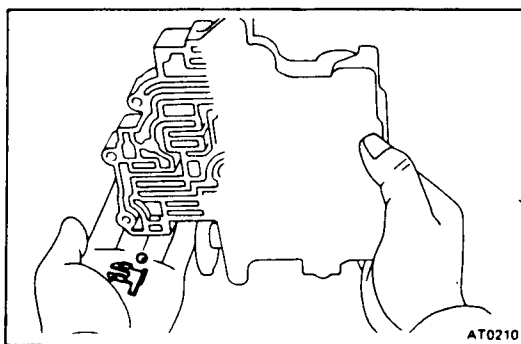


2. TURN ASSEMBLY OVER AND REMOVE TWELVE BOLTS FROM UPPER VALVE BODY AND UPPER VALVE BODY COVER

(Upper Valve Body)



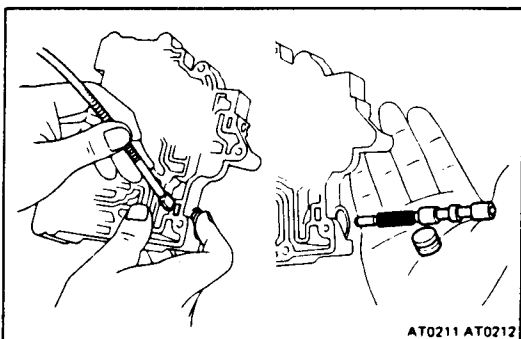
AT0254



AT0210

DISASSEMBLY OF UPPER VALVE BODY

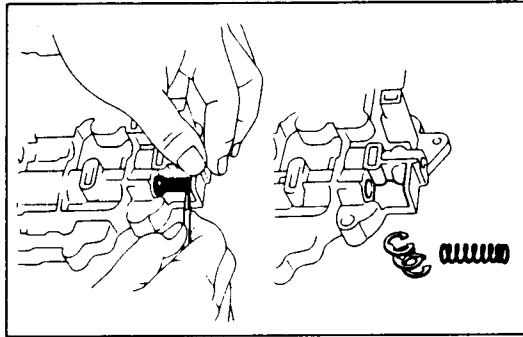
1. REMOVE THROTTLE VALVE RETAINER AND CHECK BALL



AT0211 AT0212

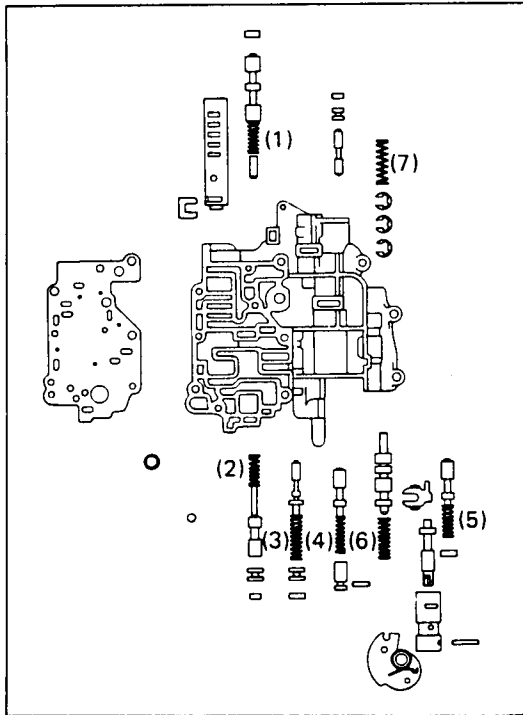
2. REMOVE LOCK-UP RELAY VALVE

- (a) Remove the retainer for the plug with a magnetic finger and remove the plug.
- (b) Remove the lock-up relay valve, control valve and spring.



REMOVE SPRING AND ADJUSTING RINGS

Note the number of adjusting rings installed.

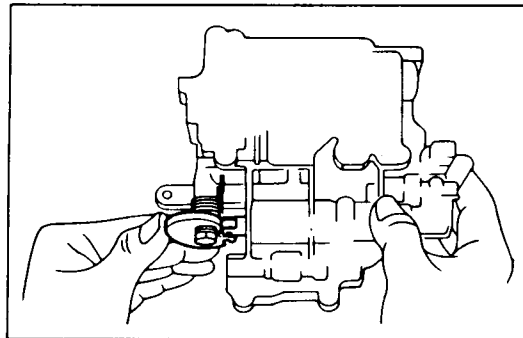


INSPECTION OF UPPER VALVE BODY

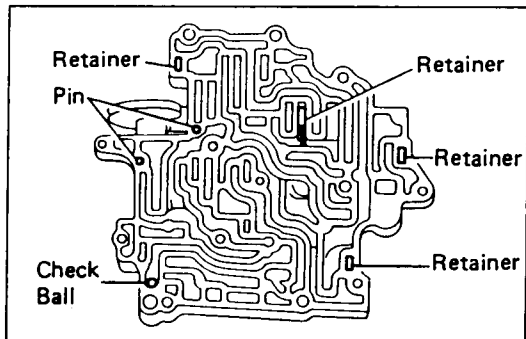
INSPECT VALVE SPRINGS

Check for damage, squareness, rust and collapsed coils. Measure the free length and replace any spring if less than that shown below.

Spring	Free length mm (in.)	Color
(1) Lock-up relay valve	26.56 (1.0457)	White
(2) Throttle modulator valve	21.70 (0.8543)	None
(3) Accumulator control valve		
A130L	23.82 (0.9378)	Light Blue
A131L	33.20 (1.3071)	None
(4) Low coast modulator valve	23.40 (0.9213)	Red
(5) 2nd coast modulator valve	20.93 (0.8240)	Yellow Green
(6) Kick-down valve		
A130L	31.00 (1.2205)	Gray
A131L	29.76 (1.1717)	White
(7) Throttle valve	30.70 (1.2087)	None



MAKE SURE THAT CAM MOVES ON ROLLER OF KICK-DOWN VALVE

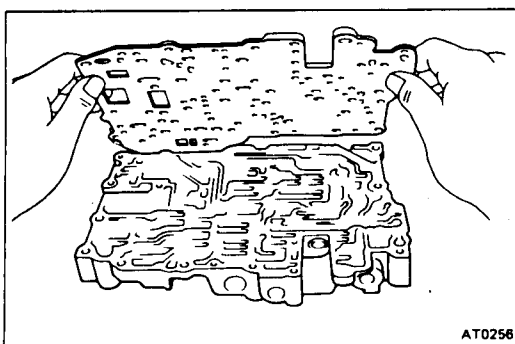
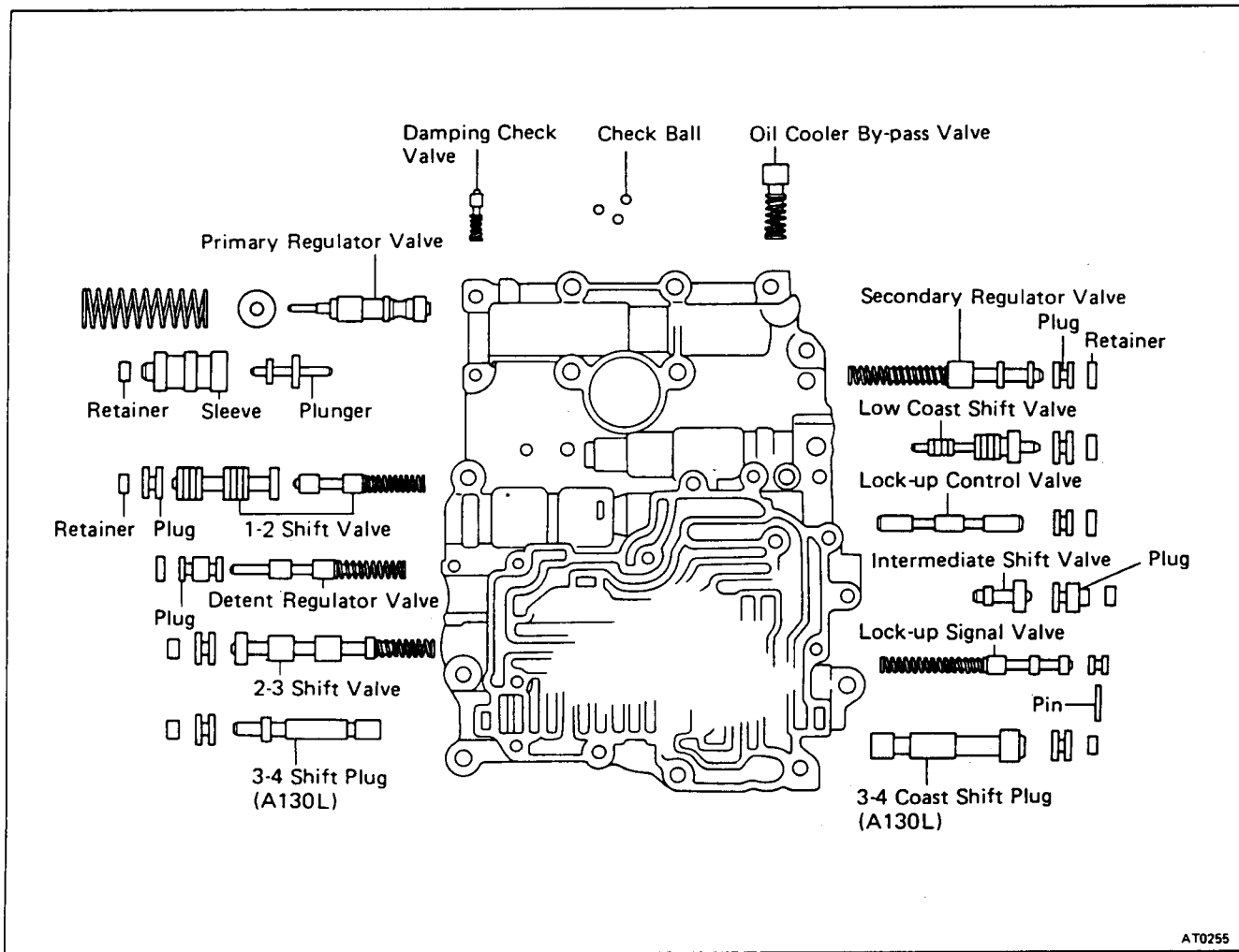


INSTALL CHECK BALL

MAKE SURE THAT PINS AND RETAINER ARE INSTALLED CORRECTLY

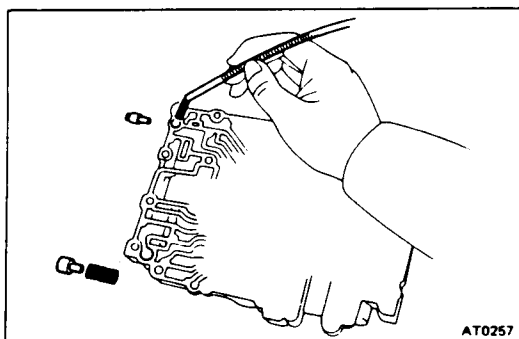
Technical Service Information

(Lower Valve Body)

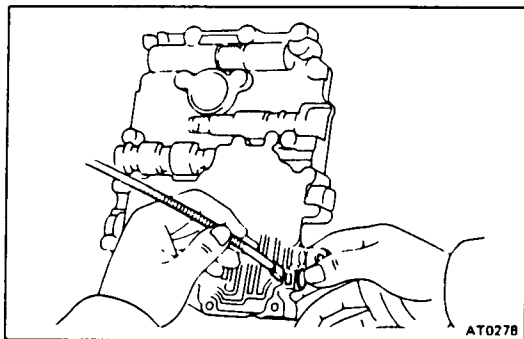


DISASSEMBLY OF LOWER VALVE BODY

1. REMOVE LOWER VALVE BODY PLATE AND GASKETS

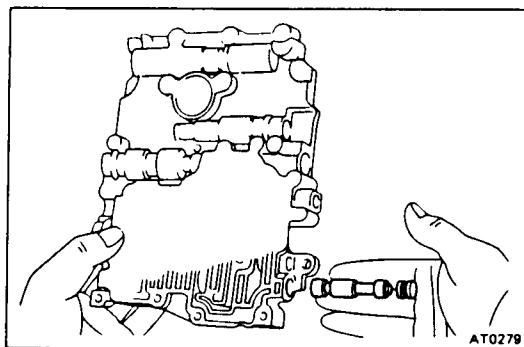


2. REMOVE COOLER BY-PASS VALVE AND SPRING
3. REMOVE DAMPING CHECK VALVE AND SPRING

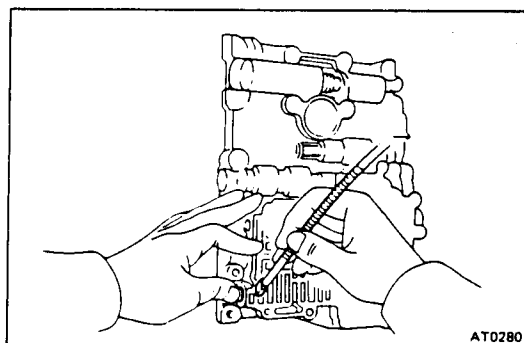


REMOVE 3-4 COAST SHIFT PLUG (A130L only)

(a) Remove the retainer with a magnetic finger.

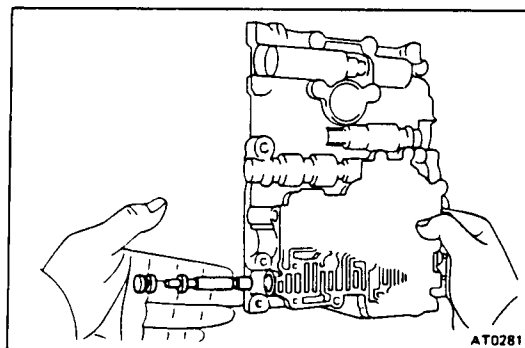


(b) Remove the plug and 3-4 coast shift plug.



REMOVE 3-4 SHIFT PLUG (A130L only)

(a) Remove the retainer with a magnetic finger.

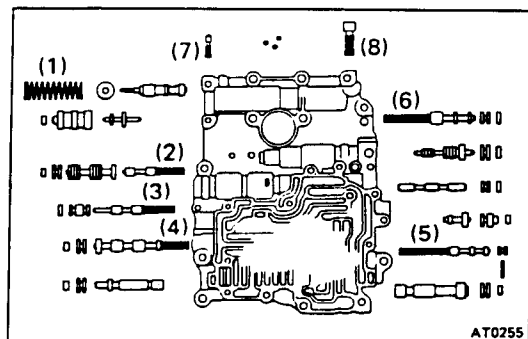


(b) Remove the plug and 3-4 shift plug.

INSPECTION OF LOWER VALVE BODY

INSPECT VALVE SPRINGS

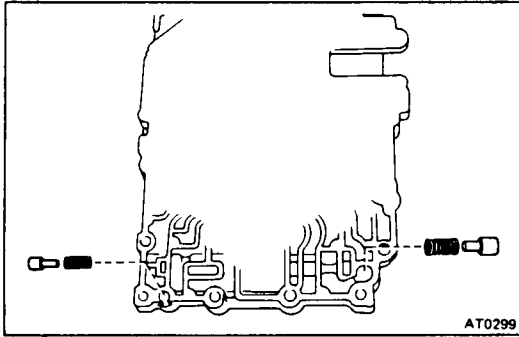
Check for damage, squareness, rust and distorted coils. Measure the free length and replace any spring if less than that shown below.



Spring	Free length mm (in.)		Color
(1) Primary regulator valve	66.65	(2.6240)	Purple
(2) 1-2 shift valve	27.17	(1.0697)	Yellow
(3) Detent regulator valve			
	A130L	29.05 (1.1437)	Orange
	A131L	30.64 (1.2063)	Blue
(4) 2-3 shift valve	27.74	(1.0921)	None
(5) Lock-up signal valve			
	A130L	36.90 (1.4528)	Yellow
	A131L	41.85 (1.6476)	Red
(6) Secondary regulator valve	43.60	(1.7165)	None
(7) Damping check valve	11.20	(0.4409)	None
(8) Cooler by-pass valve	19.90	(0.7835)	None

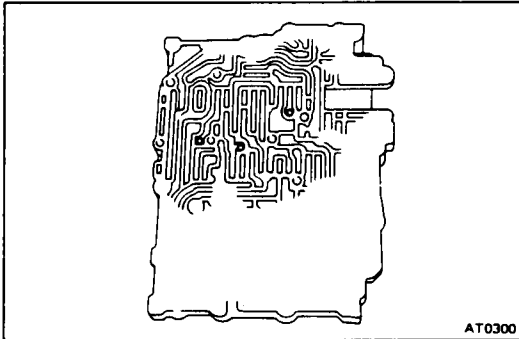


Technical Service Information



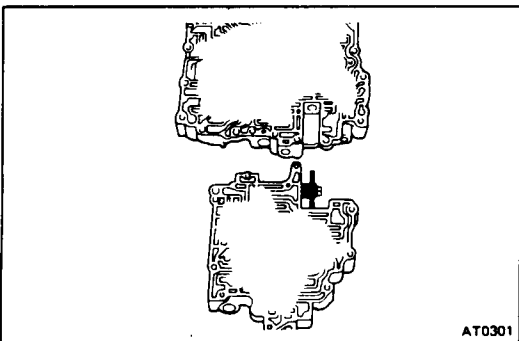
INSTALL SPRING AND COOLER BY-PASS VALVE

INSTALL SPRING AND DAMPING CHECK VALVE



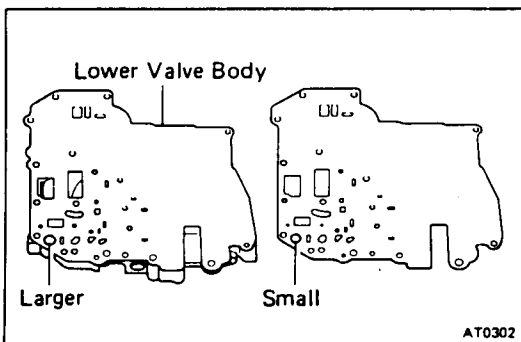
INSTALL CHECK BALLS AS SHOWN

Install the three rubber balls in the position shown in the figure.



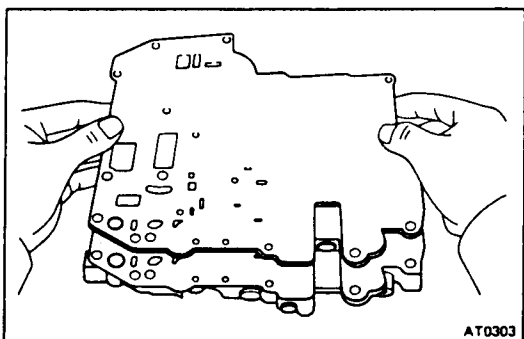
(Assembly of Valve Body)

NOTE: Install the lower valve body on the upper valve body together with the plate.



POSITION NEW GASKETS AND PLATE ON LOWER VALVE BODY

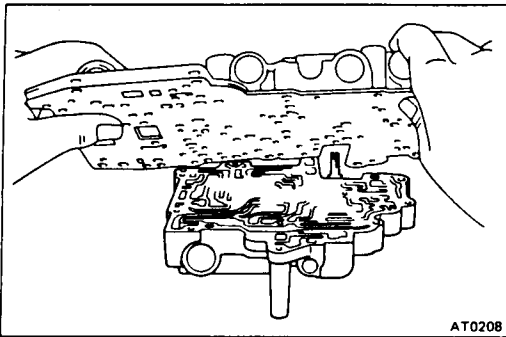
NOTE: As shown at left, assemble the gasket having larger cooler by-pass valve hole to the lower valve body.



- Place a new gasket and plate onto the lower valve body.
- Place another new gasket onto the plate.
- Align each bolt hole in the valve body with the two gaskets and plate.



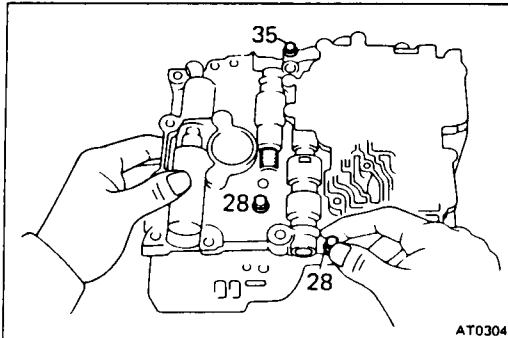
Technical Service Information



PLACE LOWER VALVE BODY AND GASKETS WITH PLATE ON TOP OF UPPER VALVE BODY

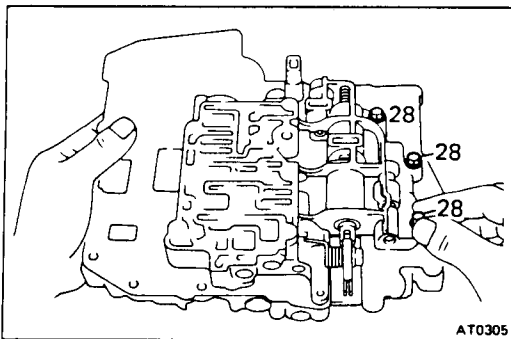
NOTE: Hold the lower valve body, gaskets and plate securely so they do not separate.

Align each bolt hole in the valve bodies with the gaskets and plate.



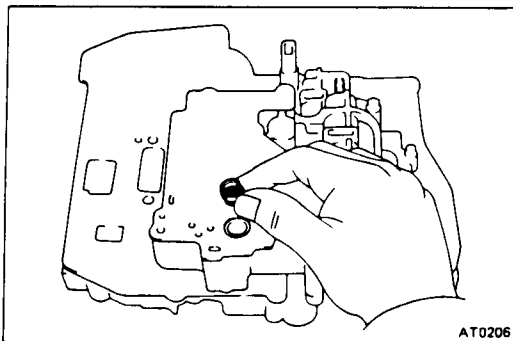
INSTALL AND FINGER TIGHTEN THREE BOLTS IN LOWER VALVE BODY TO SECURE UPPER VALVE BODY

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



TURN ASSEMBLY OVER AND FINGER TIGHTEN THREE BOLTS IN UPPER VALVE BODY

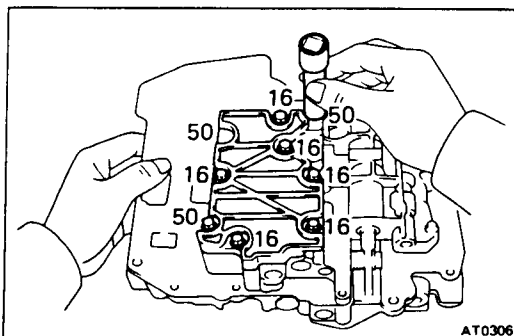
NOTE: Each bolt length (mm) is indicated in the figure.



INSTALL UPPER VALVE BODY COVER NEW GASKETS AND STRAINER

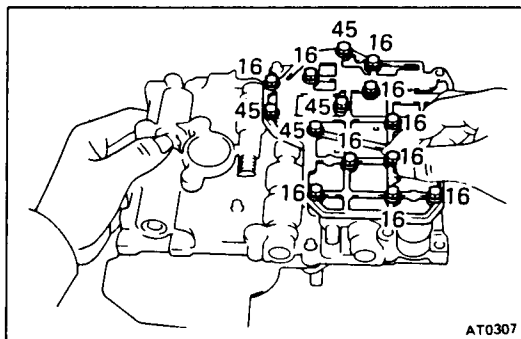
(a) Install a new gasket, plate and another new gasket.

(b) Install the strainer onto the plate.



(c) Install the valve body cover and finger tighten the nine bolts.

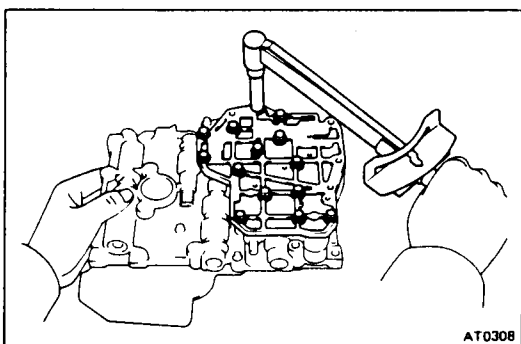
NOTE: Each bolt length (mm) is indicated in the figure.



TURN ASSEMBLY OVER AND INSTALL NEW GASKET AND LOWER VALVE BODY COVER

Install the cover over a new gasket and finger tighten the fourteen bolts on the valve body cover.

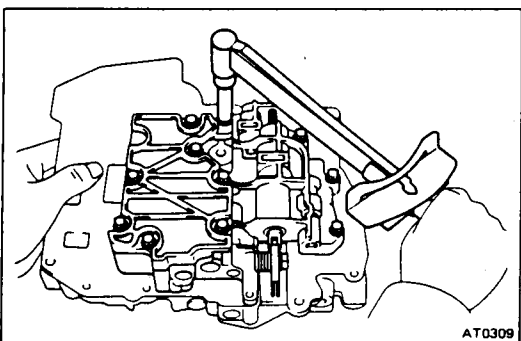
NOTE: Each bolt length (mm) is indicated in the figure.



TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODY

Recheck the alignment of the gaskets. Tighten the bolts.

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



TURN ASSEMBLY OVER AND TIGHTEN BOLTS OF UPPER VALVE BODY

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



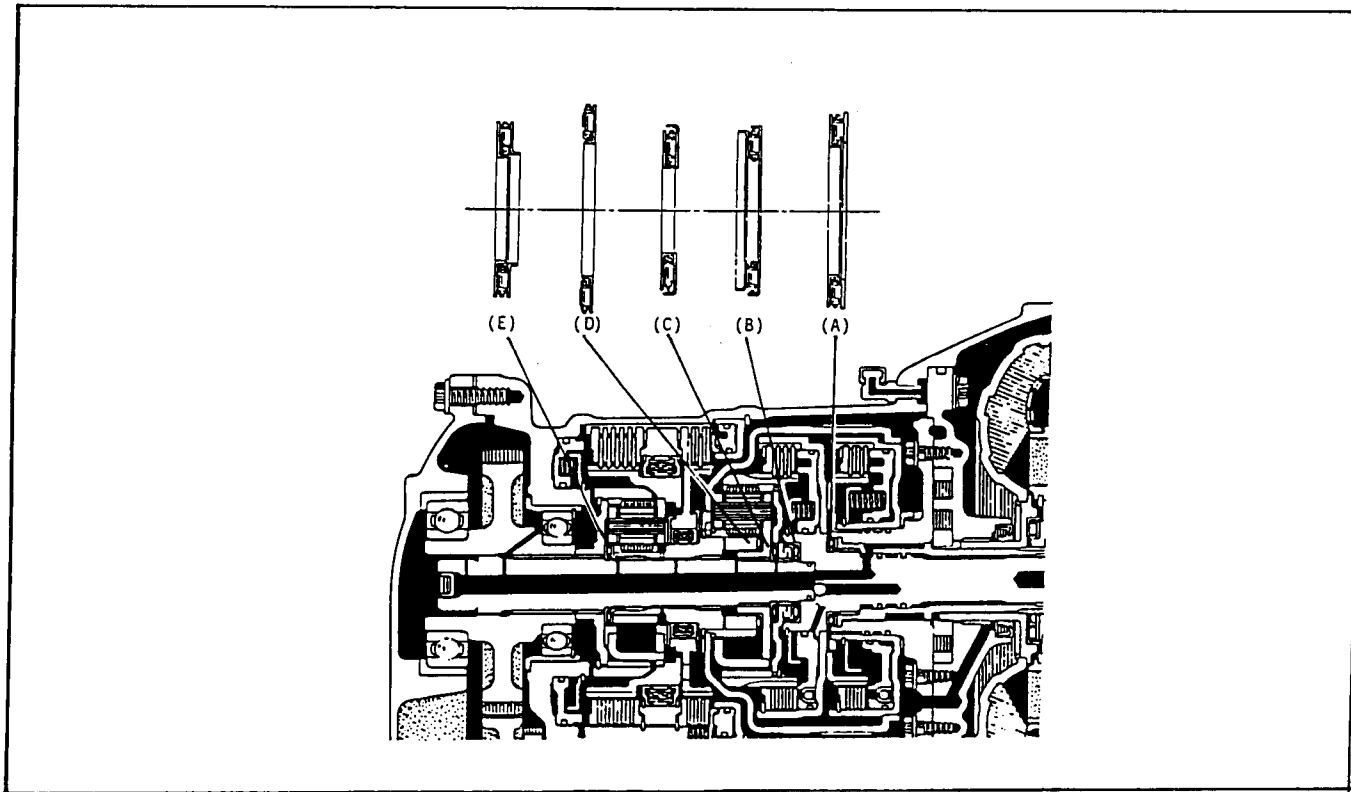
ASSEMBLY OF TRANSMISSION (A130L, A131L)

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter.

Before assembly, make sure again that all component groups are assembled correctly. If something wrong is found in a certain component group during assembly, inspect and repair this group immediately. Recommended ATF: DEXRON II.

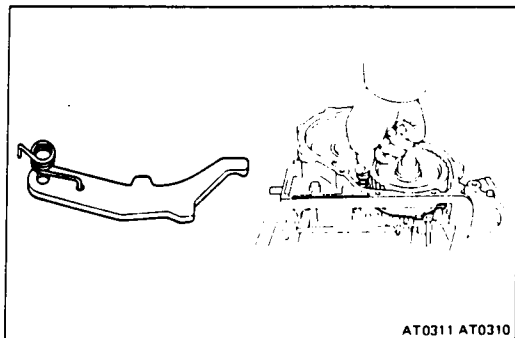
GENERAL ASSEMBLY NOTES:

1. The automatic transmission is composed of highly precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
2. Before assembling new clutch discs, soak them in automatic transmission fluid for at least two hours.
3. Apply automatic transmission fluid on the sliding or rotating surfaces of parts before assembly.
4. Use petroleum jelly to keep small parts in their places.
5. Do not use adhesive cements on gaskets and similar parts.
6. When assembling the transmission, be sure to use new gaskets and O-rings.
7. Dry all parts by blowing with compressed air. Never use shop rags.
8. Be sure to install the thrust bearings and races in the correct direction and position.



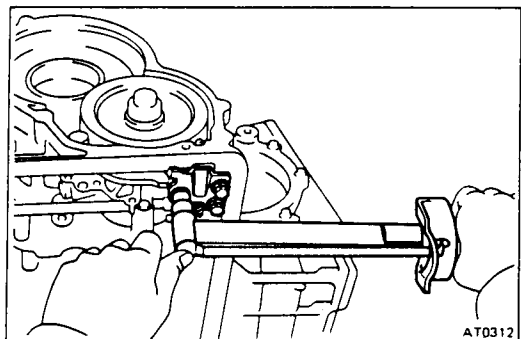


Technical Service Information



1. INSTALL PARKING LOCK PAWL

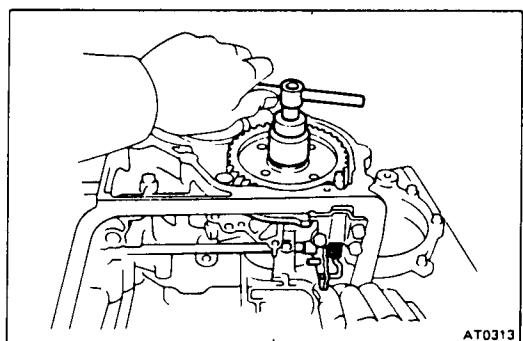
- (a) Place the parking pawl onto the case. Hook the spring ends to the case and pawl.
- (b) Install the pin into the hole of the case through the spring and the pawl.



2. INSTALL PARKING LOCK ROD

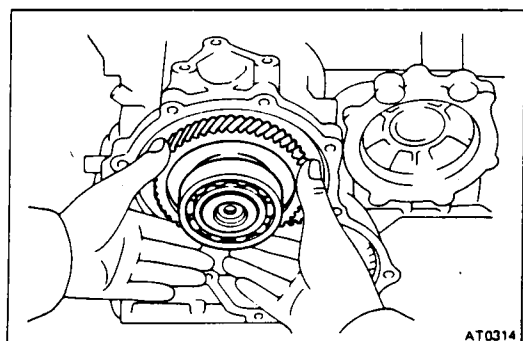
3. INSTALL PARKING LOCK PAWL BRACKET

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



4. CHECK OPERATION OF PARKING LOCK PAWL

Make sure the counter driven gear is locked when the manual valve lever is in P range.

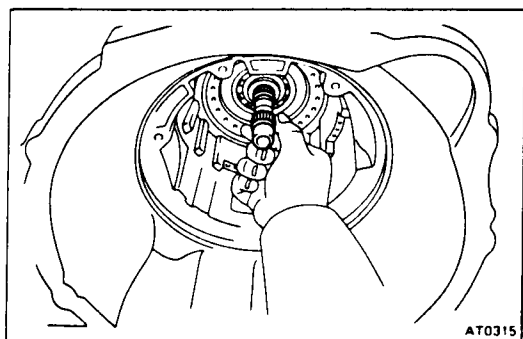


5. INSTALL INTERMEDIATE SHAFT

6. INSTALL TRANSAXLE REAR COVER OVER NEW GASKET

Align each bolt hole in a new gasket and the case. Tighten the bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

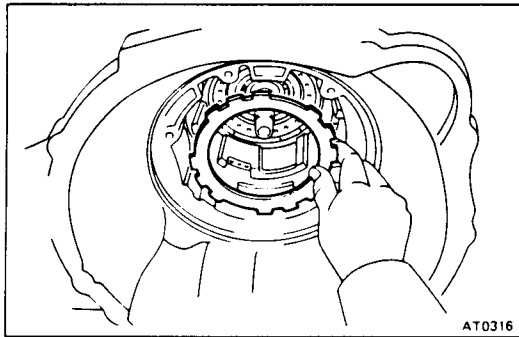


7. CHECK INTERMEDIATE SHAFT END PLAY

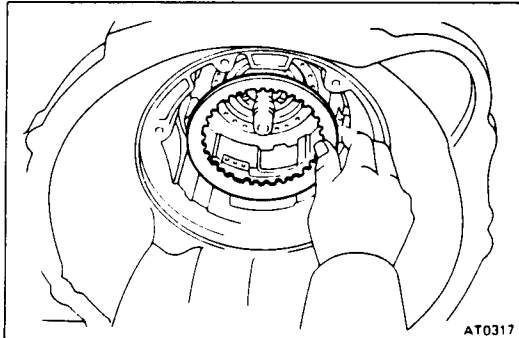
- (a) Make sure that the intermediate shaft has thrust play in axial direction.

Thrust play: 0.49 – 1.51 mm (0.0193 – 0.0594 in.)

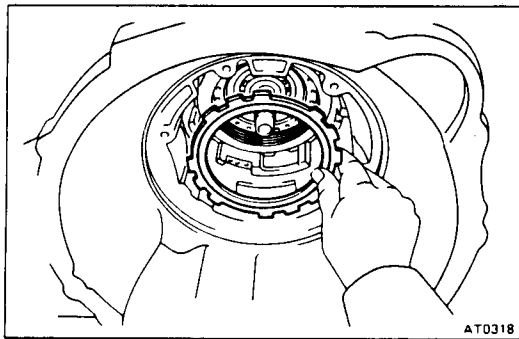
- (b) Make sure that the intermediate shaft turns smoothly.



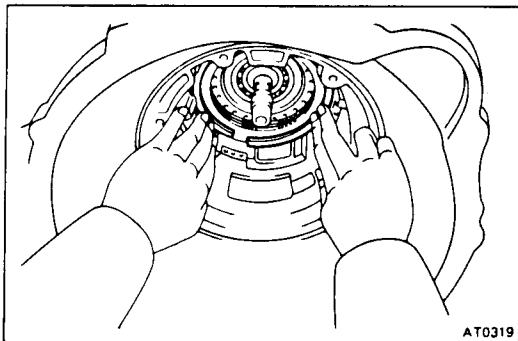
- 8. INSTALL FIRST AND REVERSE BRAKE IN CASE**
 (a) Install the inner flange, facing the flat end toward the oil pump side.



- (b) Install in order:
 (A130L) Disc-plate-plate-disc-plate-plate-plate-disc-plate-plate-disc
 (A131L) Disc-plate-disc-plate-disc-plate-disc-plate-disc

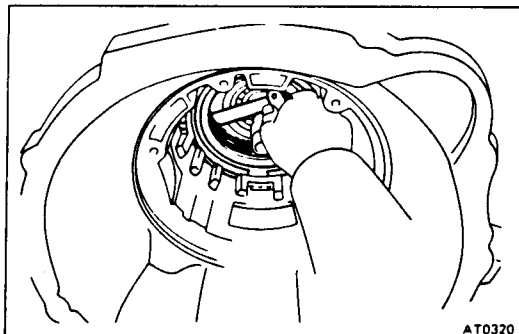


- (c) Install the outer flange, facing the flat end toward the piston side.



9. INSTALL SNAP RING

The snap ring end gap is installed into the groove.

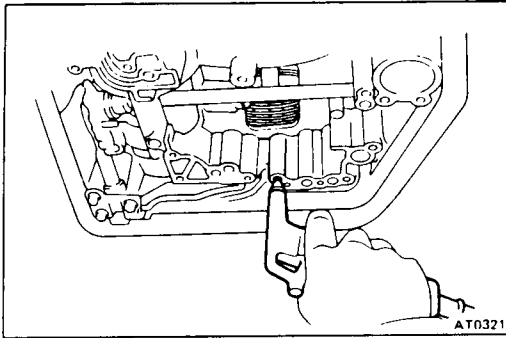


10. CHECK CLEARANCE OF FIRST AND REVERSE BRAKE

Using a thickness gauge, check the clearance between the piston and flange.

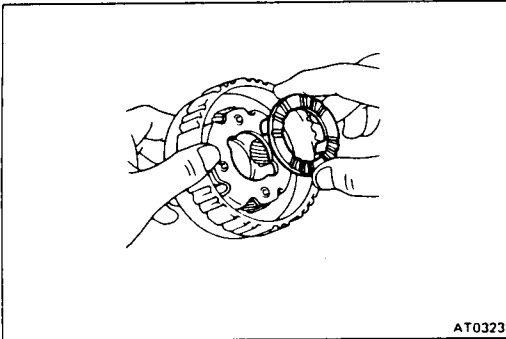
Clearance:

- A130L (1C) 1.30 – 2.46 mm (0.0512 – 0.0969 in.)
 A131L (4A-C) 0.89 – 2.11 mm (0.0350 – 0.0831 in.)



11. CHECK OPERATION OF FIRST AND REVERSE BRAKE

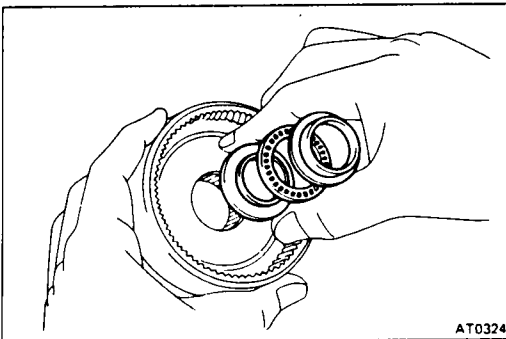
Apply compressed air into the oil passage with the case and be sure that the piston moves.



12. INSTALL NO.2 PLANETARY CARRIER THRUST WASHER

Coat thrust washer with petroleum jelly and install them onto the planetary carrier.

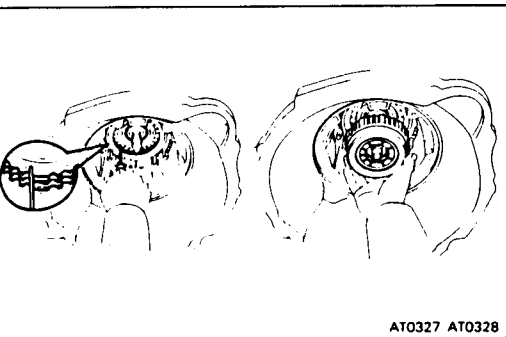
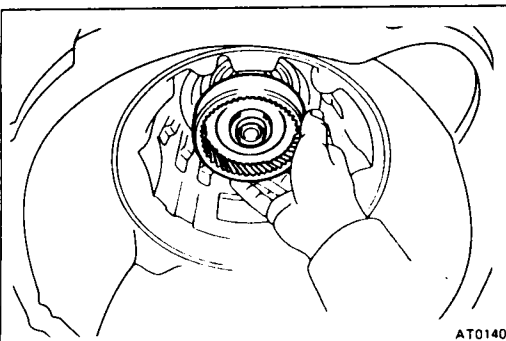
NOTE: Make sure that the different lug shapes match the openings on the carrier.



13. INSTALL RING GEAR INTO CASE

(a) Coat the races and bearing with petroleum jelly and install them onto the ring gear.

(b) Install the ring gear into the case.



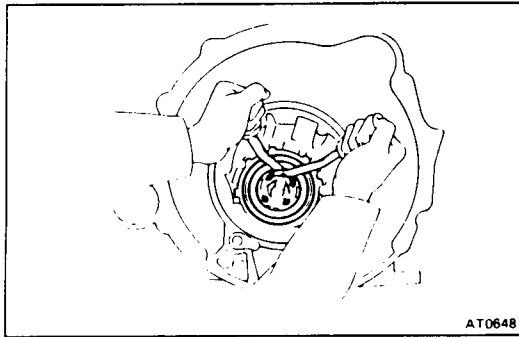
14. INSTALL REAR PLANETARY GEAR INTO CASE

(a) Align the flukes of the discs in the first and reverse brake.

(b) Align the spline of the planetary carrier with the flukes of the discs and install the planetary gear into the first and reverse brake discs.



Technical Service Information

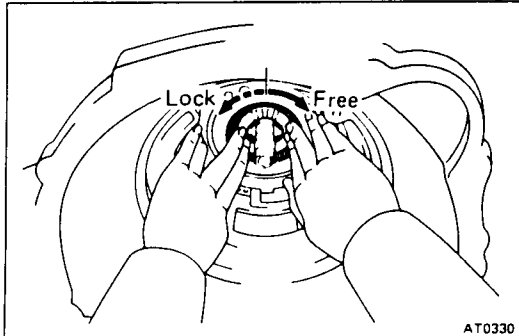


15. INSTALL NO. 2 ONE-WAY CLUTCH INTO CASE WITH SHINY SIDE UPWARD

- (a) Place the one-way clutch into the case facing the shiny side upward.
- (b) Install the one-way clutch onto the inner race while turning the planetary gear clockwise with SST.

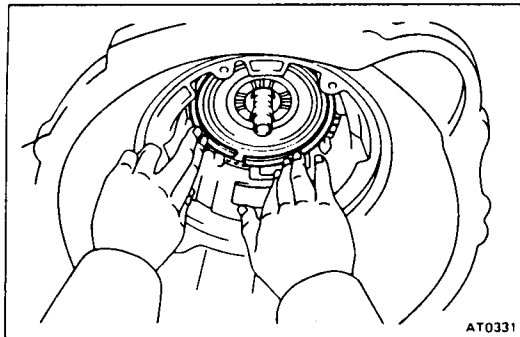
SST 09350-32011

- (c) Coat the thrust washer with petroleum jelly and install it onto the planetary gear.



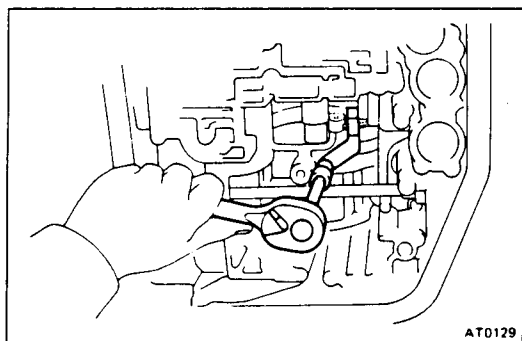
16. CHECK OPERATION OF NO.2 ONE-WAY CLUTCH

Turn the planetary carrier. The carrier should turn freely clockwise and should lock counterclockwise.



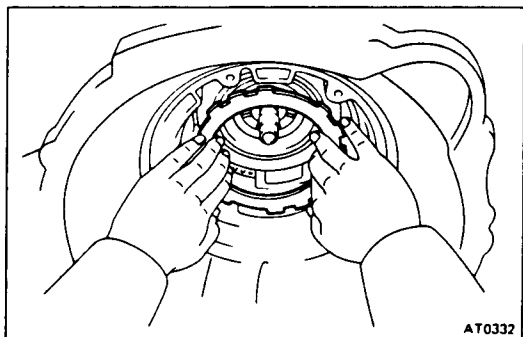
17. INSTALL SNAP RING

The snap ring end gap is installed into the groove.



18. INSTALL SECOND COAST BRAKE BAND GUIDE

Install the band guide so that its tip touches the case.

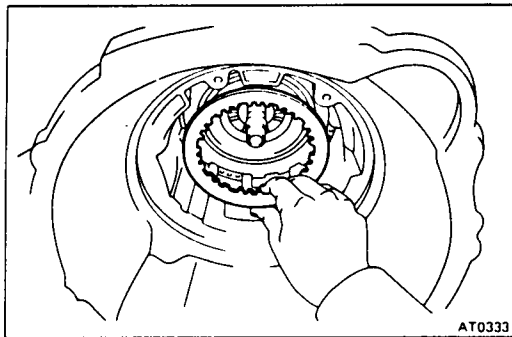


19. INSTALL SECOND BRAKE INTO CASE

- (a) Install the flange, facing the flat end toward you.

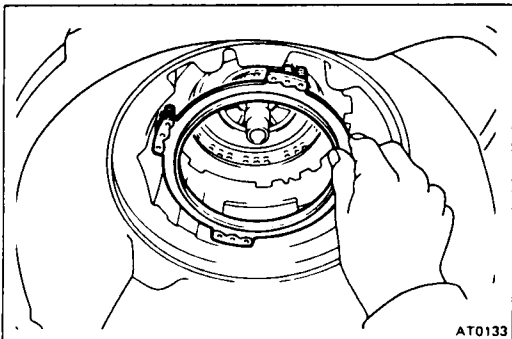


Technical Service Information



AT0333

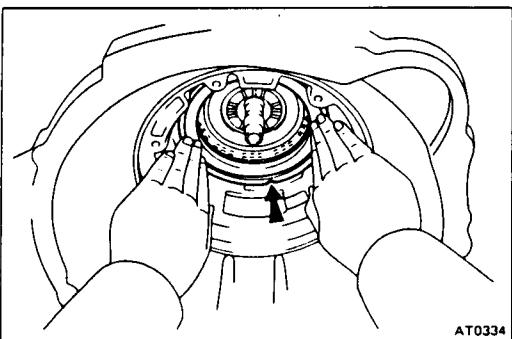
(b) Install in order: Disc-plate-plate-disc-plate-plate



AT0133

20. INSTALL PISTON RETURN SPRING ASSEMBLY

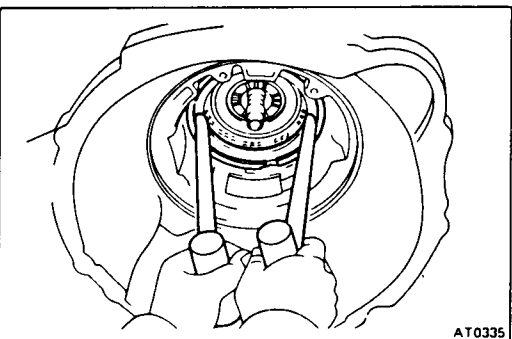
Install each of the springs over the protrusions in the case.



AT0334

21. INSTALL SECOND BRAKE DRUM INTO CASE

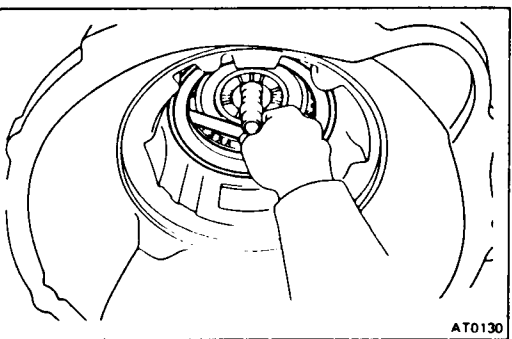
Align the groove of the drum with the bolt and place it into the case.



AT0335

22. INSTALL SNAP RING

- (a) Place the snap ring into the case so that the end gap is installed into the groove.
- (b) While compressing the piston return springs over the drum with hammer handles, install the snap ring into the groove.

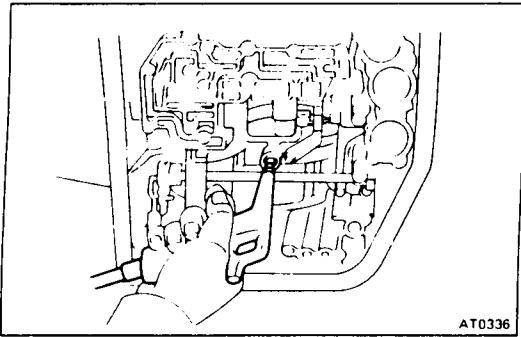


AT0130

23. CHECK CLEARANCE OF SECOND BRAKE

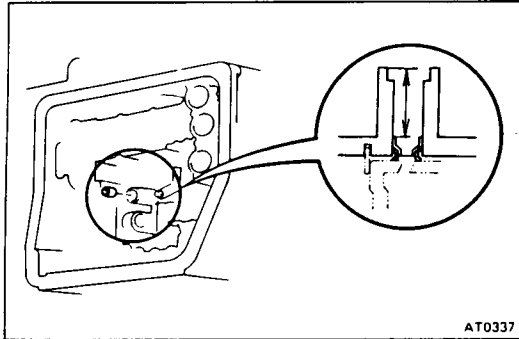
Using a thickness gauge, check the clearance between the plate and the seat of the return spring assembly.

Clearance: 0.49 – 1.59 (0.0193 – 0.0626 in.)



24. CHECK OPERATION OF SECOND BRAKE

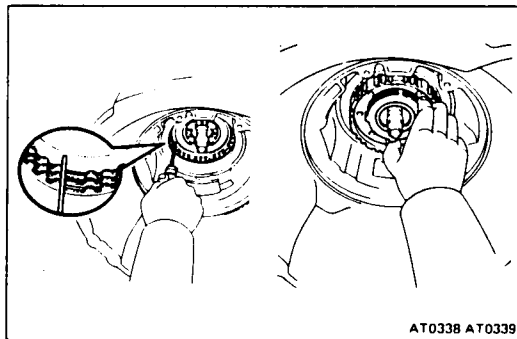
Apply compressed air into the oil passage of the case, and be sure that the piston moves.



25. INSTALL SECOND BRAKE DRUM GASKET

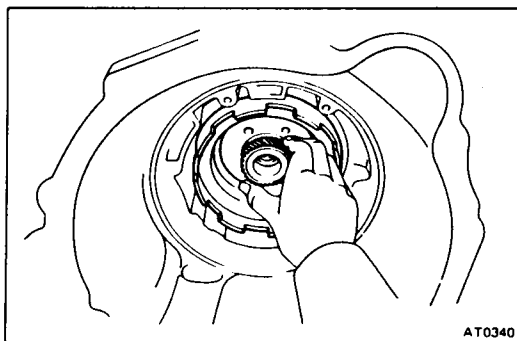
Drive in a new gasket until the distance between the surface of the case and the top of the gasket is 29 ± 0.05 mm (1.14 ± 0.0020 in.).

NOTE: Tap in the drum gasket until it makes contact with the 2nd brake drum.



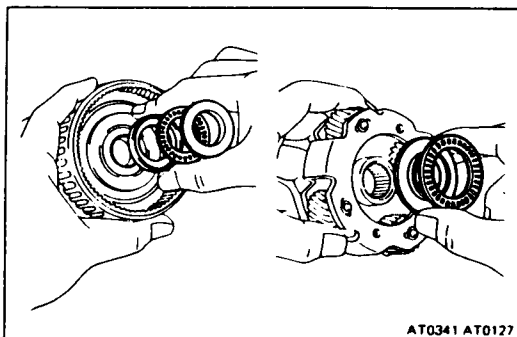
26. INSTALL NO.1 ONE-WAY CLUTCH AND SECOND BRAKE HUB

- (a) Align the flukes of the discs in the 2nd brake.
- (b) Align the spline of the hub with the flukes of the discs and install the hub to the 2nd brake discs.



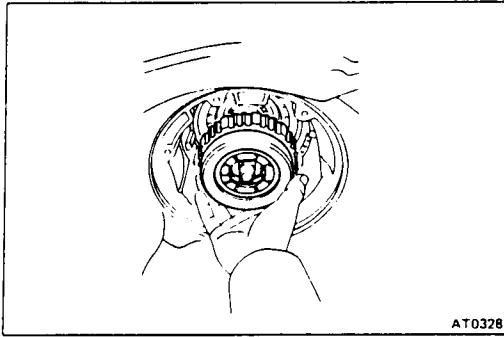
27. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

While turning the sun gear clockwise, install it into the one-way clutch.

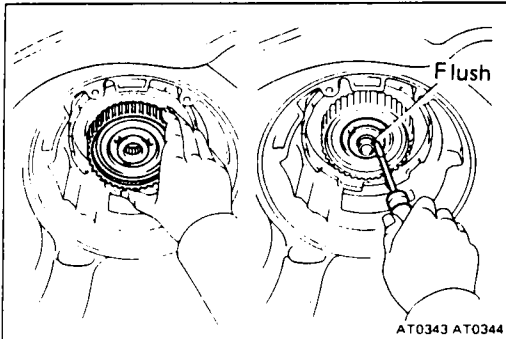


28. INSTALL FRONT PLANETARY GEAR

- (a) Coat the races and the bearing with petroleum jelly and install them onto the ring gear.
- (b) Coat the race and the bearing with petroleum jelly and install them onto planetary gear.

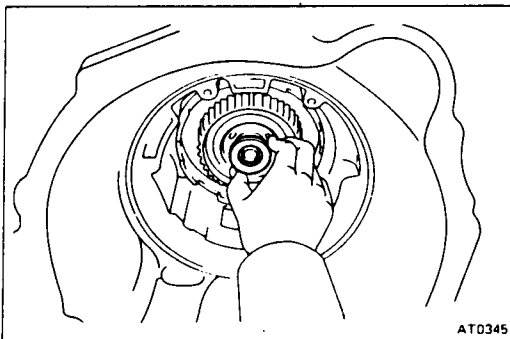


- (c) Install the planetary gear into the case.
- (d) Install the race and bearing.
- (e) Install the intermediate shaft oil seal ring.

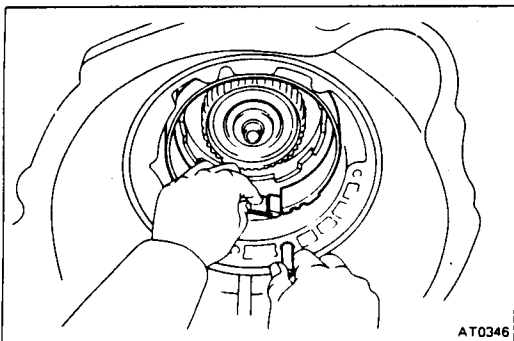


29. INSTALL RING GEAR

- (a) Install the ring gear.
- (b) If the planetary gear and the other parts are installed correctly into the case, the end of the bushing with the ring gear flange will be flush with a shoulder of the intermediate shaft.

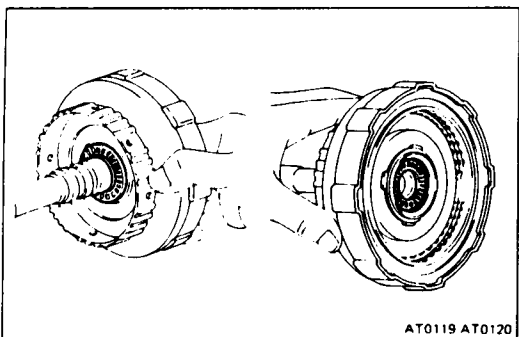


- (c) Coat the race with petroleum jelly and install it onto the tip of ring gear flange.



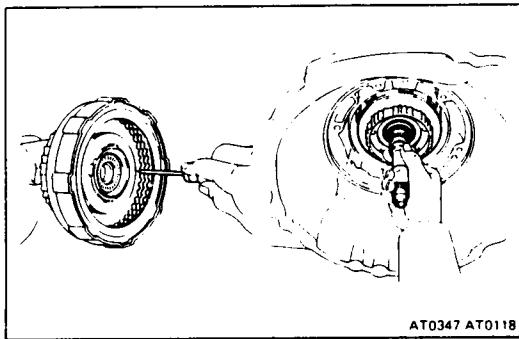
30. INSTALL SECOND COAST BRAKE BAND

- (a) Place the band into the case.
- (b) Install the pin through the oil pump mounting bolt hole.



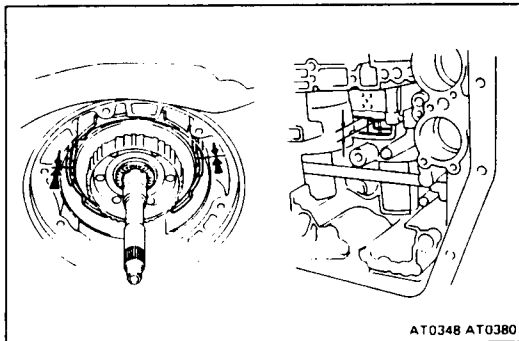
31. INSTALL FORWARD CLUTCH INTO CASE

- (a) Coat the races and bearings with petroleum jelly and install them onto both sides of the clutch drum.

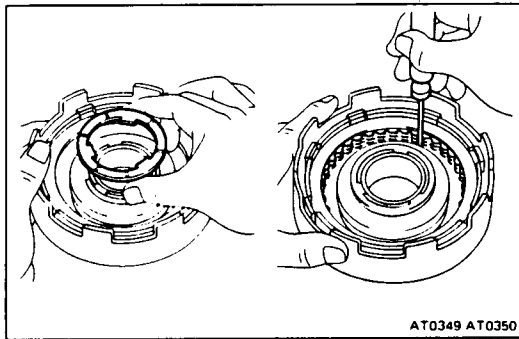


- (b) Align the flukes of the disc in the forward clutch.
- (c) Hold the sun gear input drum and rotate the input shaft to mesh the hub with the clutch discs of the forward clutch.

NOTE: Align the center of the input shaft and intermediate shaft, and while pushing on the input shaft, rotate it to mesh the hub and disc.

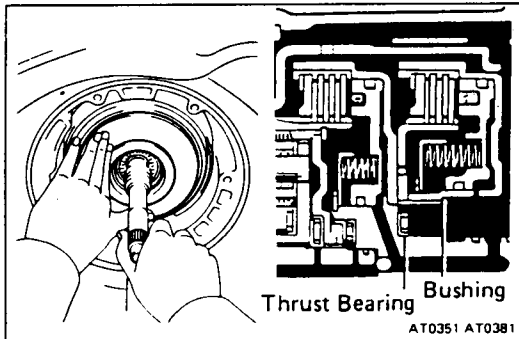


- (d) If the flukes of the discs are meshed with the hub correctly, the protrusion of the input shaft drum will have entered deeper than the tip of the sun gear input drum.

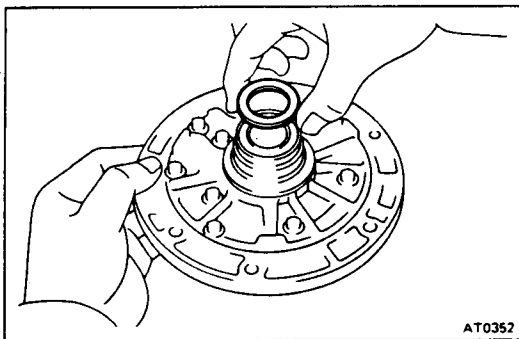


32. INSTALL DIRECT CLUTCH INTO CASE

- (a) Coat the clutch drum thrust washer with petroleum jelly and install it, facing the oil groove upward onto the drum.
- (b) Align the flukes of discs in the direct clutch.



- (c) Hold the input shaft, and put the direct clutch drum through in the 2nd coast brake band.
- (d) Mesh the hub with the flukes of the direct clutch while turning the clutch drum.
- (e) If the flukes of the discs are meshed with the hub correctly, the end of the bushing with the direct clutch drum will be flush with the thrust bearing on the forward clutch.



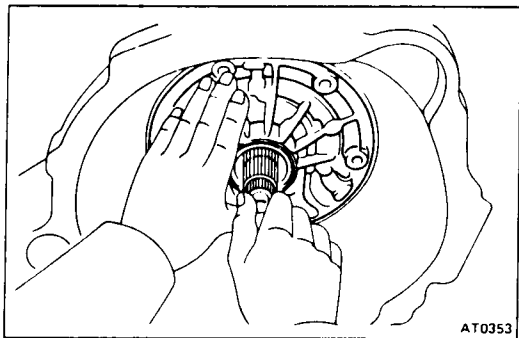
33. INSTALL OIL PUMP INTO CASE

- (a) Coat the race with petroleum jelly and install it onto stator shaft.

NOTE: After installing the oil pump, measure the input shaft thrust play.

If the thrust play is in excess of standard, select and insert one of the two different size races.

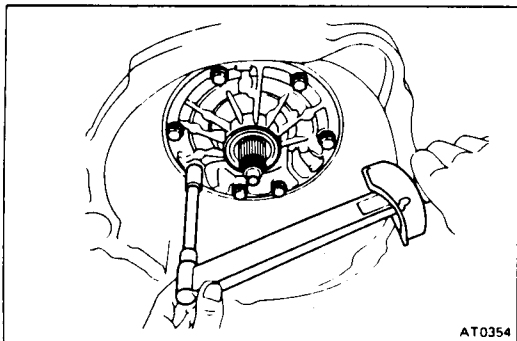
- (b) Install a new O-ring around the pump body.



(c) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

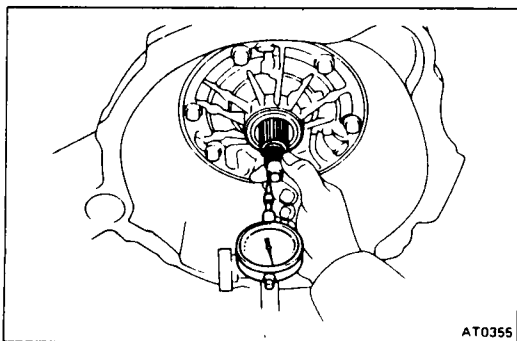
(d) Hold the input shaft, and lightly press the oil pump body to slide the oil seal rings on the stator shaft through the direct clutch drum.

CAUTION: Do not push on the oil pump strongly or the oil seal ring will stick to the direct clutch drum.



(e) Install the seven bolts.

Torque: 225 kg-cm (16 ft-lb, 22 N-m)



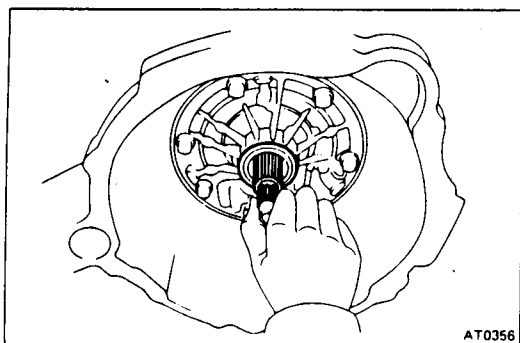
34. MEASURE THRUST PLAY OF INPUT SHAFT

Measure the thrust play with a dial gauge.

Thrust play: 0.3 – 0.9 mm (0.012 – 0.035 in.)

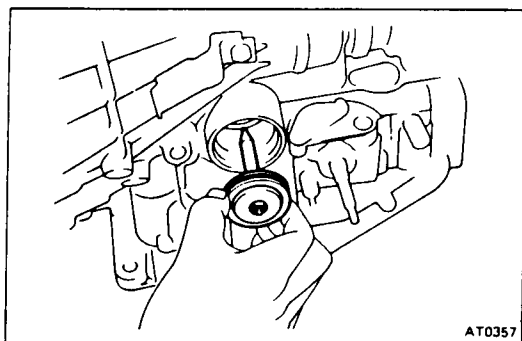
NOTE: There are two different thicknesses of races for the end of the stator shaft. If necessary, select one of them.

Race thicknesses: 0.8 mm (0.031 in.)
1.4 mm (0.055 in.)



35. CHECK INPUT SHAFT ROTATION

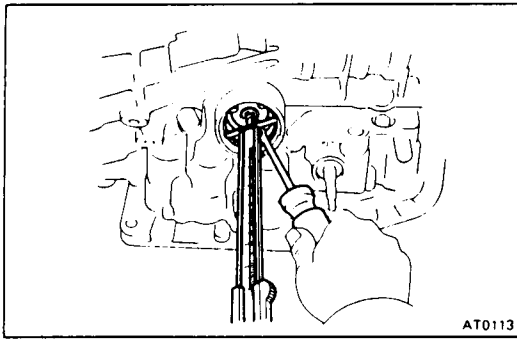
Make sure that the input shaft rotates smoothly.



36. CHECK SECOND COAST BRAKE PISTON STROKE

(a) Install the brake piston, without the outer spring, into the bore.

(b) Install the snap ring.



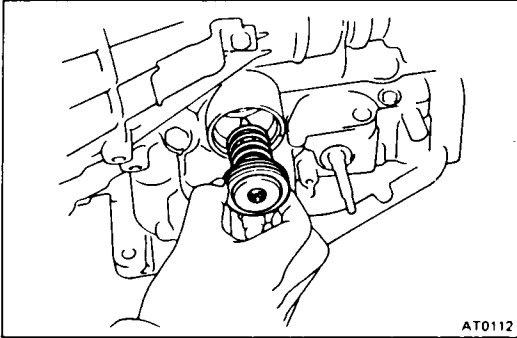
- (c) Push the end of the piston rod firmly. At this time, measure the distance between the tip of the piston rod and the outside of the snap ring.

Distance: 14.0 – 15.5 mm (0.551 – 0.610 in.)
 [Actual piston stroke is 1.5 – 3.0 mm (0.059 – 0.118 in.)]

If the stroke is more than specified, replace the piston rod with a longer one.

Piston rod length: 72.9 mm (2.870 in.)
 71.4 mm (2.811 in.)

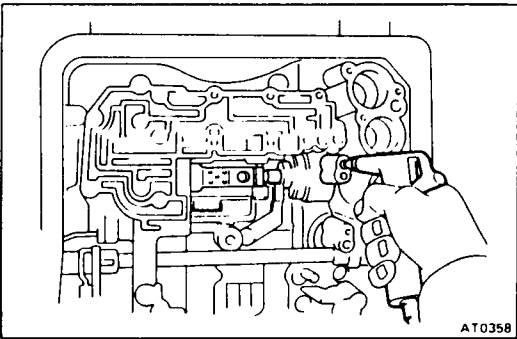
Re-measure the stroke. If it is still more than specified, replace the brake band with a new one.



37. INSTALL SECOND COAST BRAKE PISTON

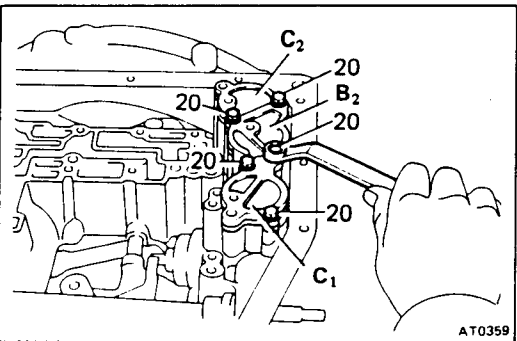
- Remove the installed parts from the bore.
- Install the outer spring with the piston.
- Place the cover into the bore.
- Using SST, install the snap ring while pressing the cover.

SST 09350-32011



38. CHECK OPERATION OF SECOND COAST BRAKE

Apply compressed air into the hole with the case and make sure that the piston rod moves.

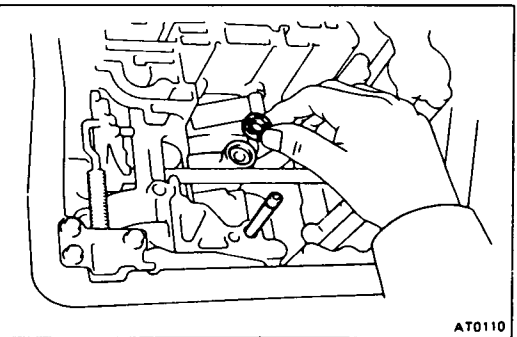


39. INSTALL ACCUMULATOR PISTONS AND SPRINGS

- Install the springs and pistons into the bore.
- Place the cover with the gasket and tighten the bolts a little at a time in sequence.

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

Spring		Free length mm(in.)		Color	Remarks
C ₁	No. 1	48.00	(1.8898)	Red	A130L, 131L
	No. 2	77.81	(3.0634)	Red	A130L, 131L
C ₂		66.68	(2.6252)	White	A131L
		70.75	(2.7854)	Orange	A130L
B ₂		70.82	(2.7882)	Orange	A130L, 131L

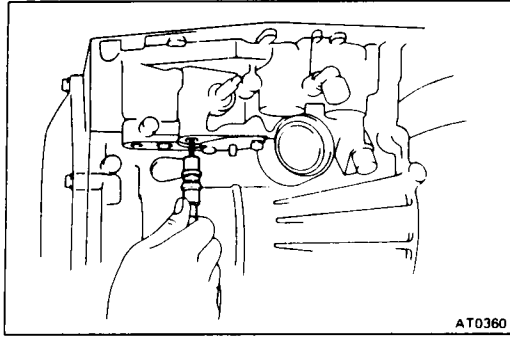


40. INSTALL GOVERNOR APPLY GASKET

41. INSTALL GOVERNOR OIL GASKET



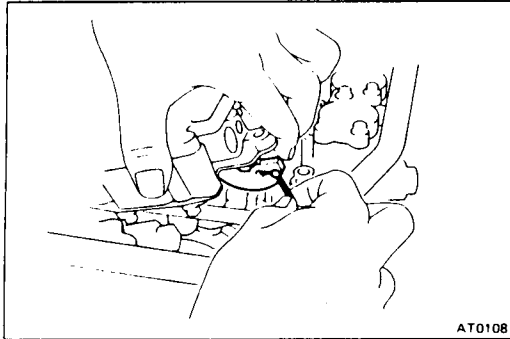
Technical Service Information



42. INSTALL THROTTLE CABLE IN CASE

Push the cable through the case, being careful not to damage the O-ring. Check for full seating.

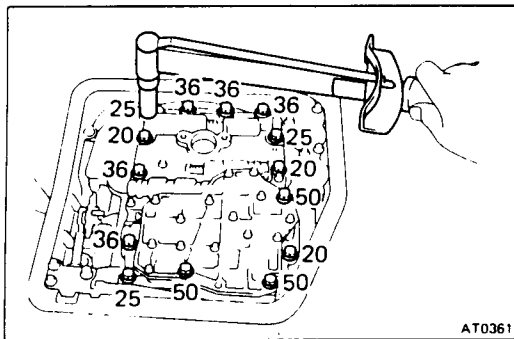
CAUTION: In subsequent work, do not roll the case over the cable to avoid breaking the cable fitting.



43. PLACE VALVE BODY ON TRANSMISSION

(a) While holding the cam down with your hand, slip the cable end into the slot.

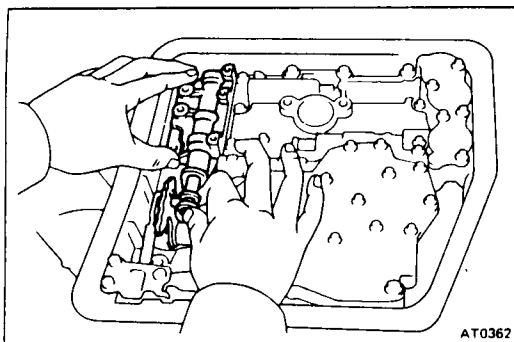
(b) Lower the valve body into place.



44. INSTALL FOURTEEN BOLTS IN VALVE BODY

NOTE: Each bolt length (mm) is indicated in the figure. Finger tighten all the bolts first. Then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



45. PLACE MANUAL VALVE AND BODY ON TRANSMISSION

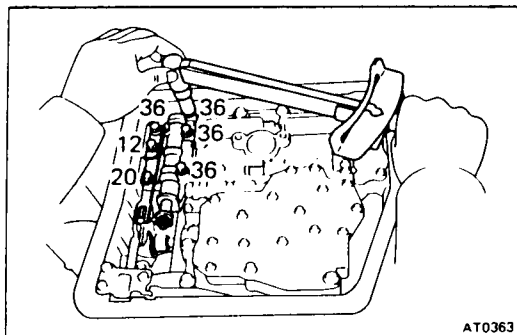
(a) Align the manual valve with the pin on the manual shaft lever.

(b) Lower the valve body into place.

(c) Finger tighten the four bolts first. Then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

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



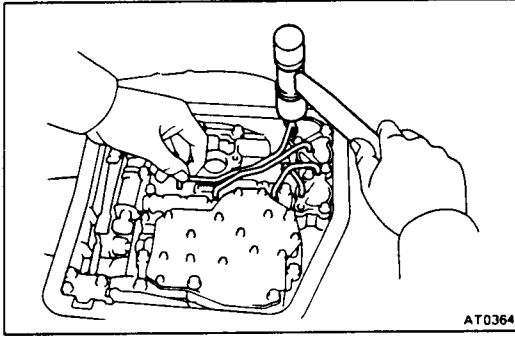
46. INSTALL DETENT SPRING

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

(a) Finger tighten the two bolts first. Then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

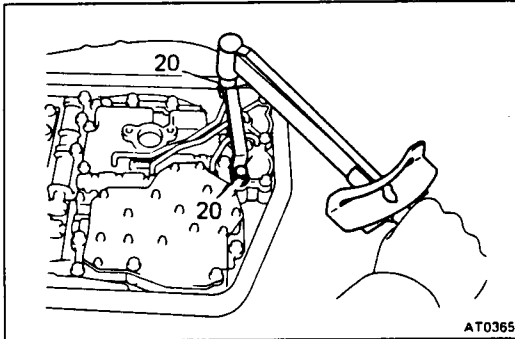
(b) Check that the manual valve lever is touching the center of the detent spring tip roller.



47. INSTALL OIL TUBES

Using a plastic hammer, install the tubes into the positions indicated in the figure.

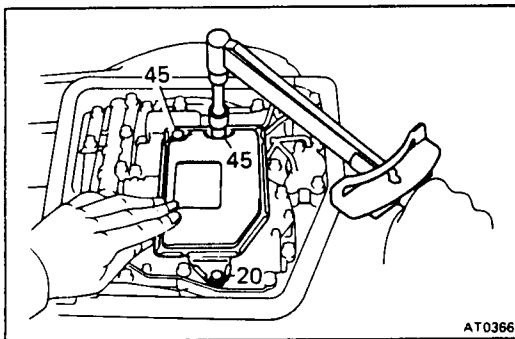
CAUTION: Be careful not to bend or damage the tubes.



48. INSTALL TUBE BRACKET

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

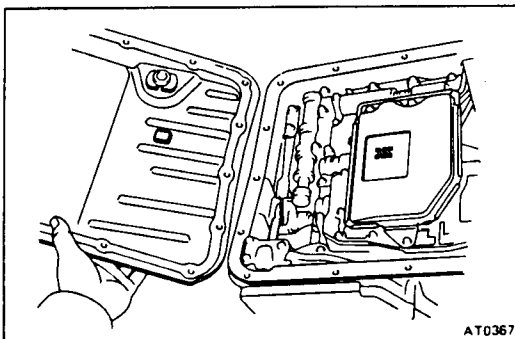
Torque: 100 kg-cm (7 ft-lb, 10 N-m)



49. INSTALL OIL STRAINER

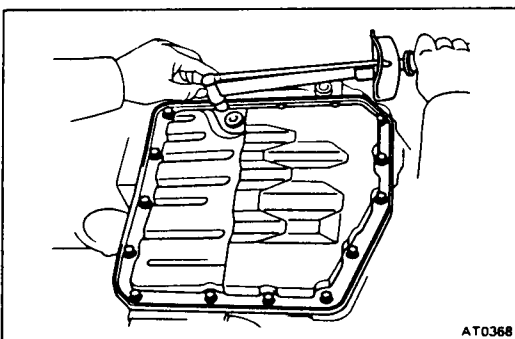
NOTE: Each bolt length (mm) is indicated in the figure.

Torque: 100 kg-cm (7 ft-lb, 10 N-m)



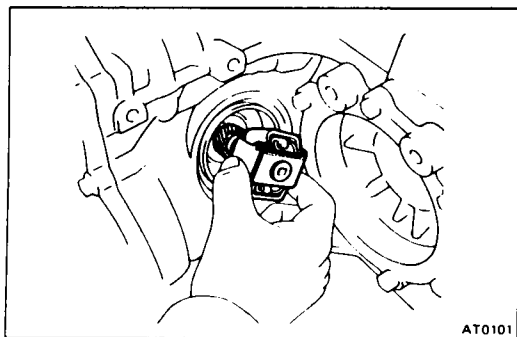
50. INSTALL MAGNET IN PLACE AS SHOWN

CAUTION: Make sure that the magnet does not interfere with the oil tubes.



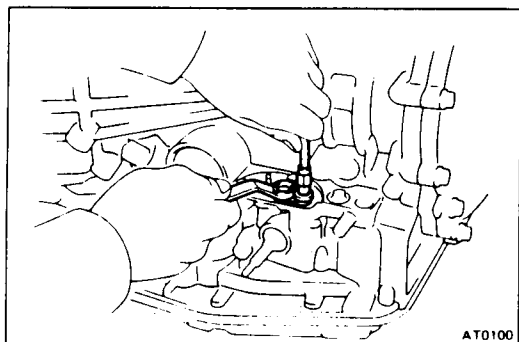
51. INSTALL OIL PAN WITH GASKET

Torque: 50 kg-cm (43 in.-lb, 4.9 N-m)



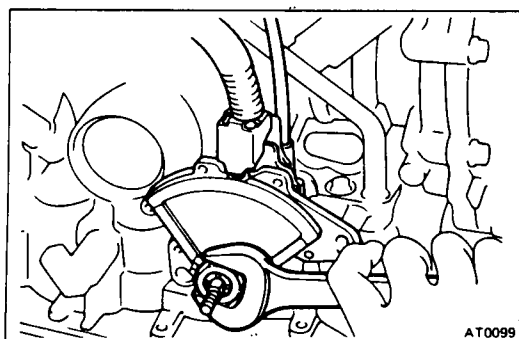
52. INSTALL GOVERNOR BODY

- (a) Install the governor body adaptor.
- (b) Install the governor body with the plate washer.
- (c) Install the thrust washer onto the governor body.
- (d) Install the cover over a new O-ring.
- (e) Install the cover bracket with the two bolts.



53. INSTALL THROTTLE CABLE RETAINING PLATE

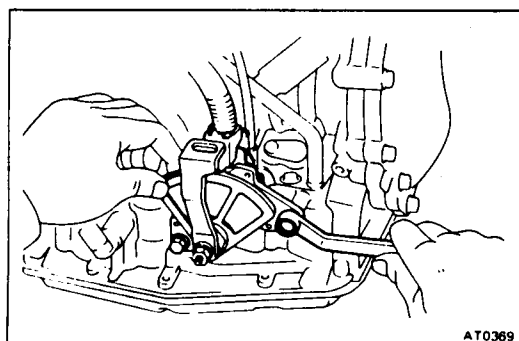
54. INSTALL TUBE AND FILLER GAUGE



55. INSTALL NEUTRAL START SWITCH

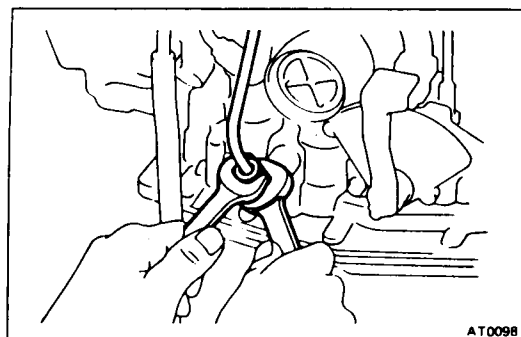
- (a) Install a new seal gasket, facing the lip inward.
 - (b) Tighten the nut and stake it with the lock washer.
- Torque: 70 kg-cm (61 in.-lb, 69 N·m)**

56. INSTALL MANUAL SHIFT LEVER



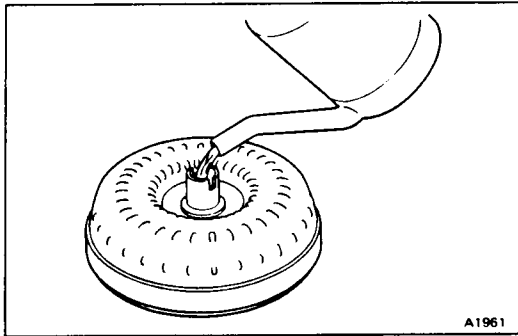
57. ADJUST NEUTRAL START SWITCH

- (a) Connect an ohmmeter between the terminals.
 - (b) Shift the lever into the "N" position.
 - (c) Adjust the switch to the point where there is continuity between the terminals.
 - (d) Lock the switch with two bolts.
- Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)**



58. INSTALL TWO OIL COOLER PIPES

- (a) Install the bracket onto the case.
 - (b) Connect the pipes to the union.
 - (c) Clamp the two pipes onto the bracket.
 - (d) Tighten the union nuts.
- Torque: 350 kg-cm (25 ft-lb, 34 N·m)**



A1961

INSTALLATION OF TRANSAXLE

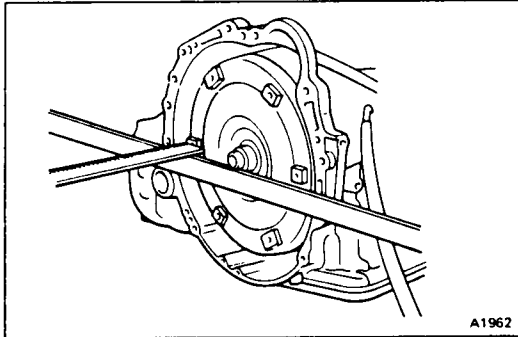
1. INSTALL TORQUE CONVERTER IN TRANSMISSION

If the torque converter has been drained and washed, refill with new ATF.

ATF capacity:

A240L, A131L 2.2 liters (2.3 US qts, 1.9 Imp. qts)
A130L 2.6 liters (2.7 US qts, 2.3 Imp. qts)

Fluid type: ATF DEXRON II



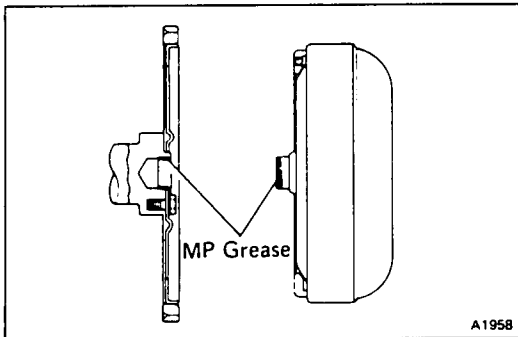
A1962

2. CHECK TORQUE CONVERTER INSTALLATION

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

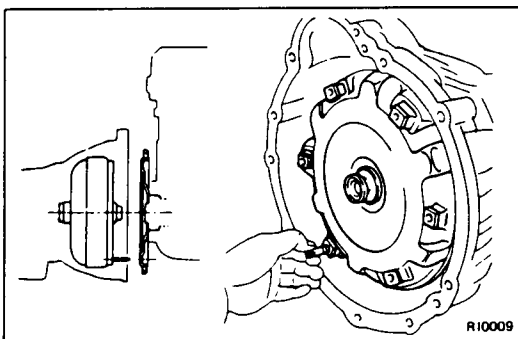
Correct distance:

A240L, A131L more than 20 mm (0.79 in.)
A130L more than 10 mm (0.39 in.)



A1958

3. APPLY MP GREASE TO CONTACT POINT OF TORQUE CONVERTER AND CRANKSHAFT

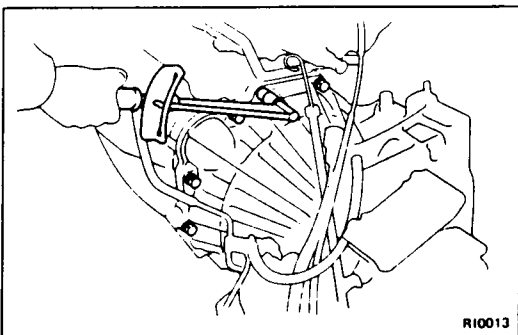


R10009

4. INSTALL GUIDE PIN IN TORQUE CONVERTER

5. ALIGN TRANSMISSION AT INSTALLATION POSITION

- Align the guide pin with one of the drive plate holes.
- Align the two knock pins on the block with the converter housing.
- Temporarily install one bolt.



R10013

6. INSTALL TRANSMISSION HOUSING MOUNTING BOLTS

Install the transmission housing mounting bolts.

Torque: 12 mm bolt 650 kg-cm (47 ft-lb, 64 N·m)
10 mm bolt 470 kg-cm (34 ft-lb, 46 N·m)

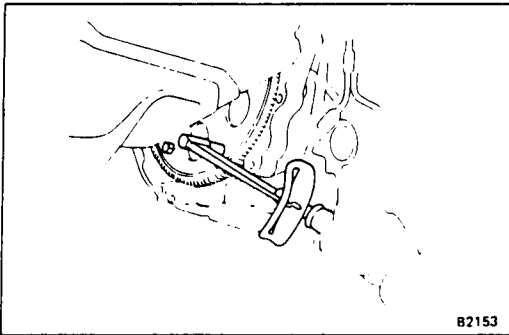
7. INSTALL LH ENGINE MOUNTING

Tighten the mounting bolts.

Torque: 530 kg-cm (38 ft-lb, 52 N·m)



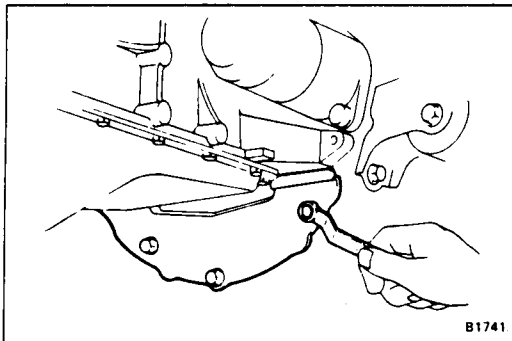
Technical Service Information



8. INSTALL SIX TORQUE CONVERTER BOLTS

- (a) Remove the guide pin.
- (b) First, install the white bolt and then the five yellow bolts.
- (c) Tighten the bolts evenly.

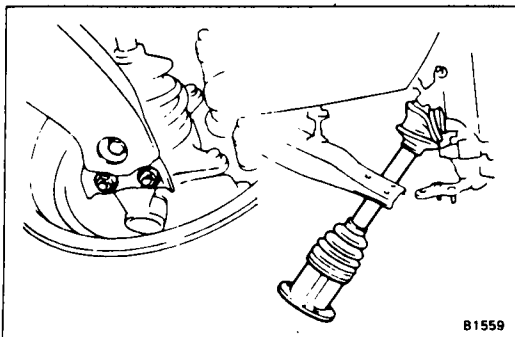
Torque: 185 kg-cm (13 ft-lb, 18 N·m)



9. INSTALL ENGINE REAR END PLATE (4A-C Engine)

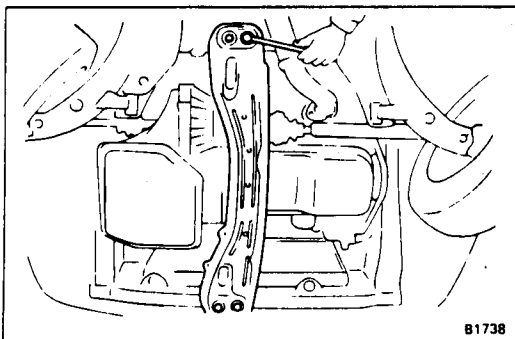
10. INSTALL ENGINE REAR END PLATE HOLE COVER (1C Engine)

11. INSTALL STARTER



12. INSTALL LH STEERING KNUCKLE (See page FA-19)

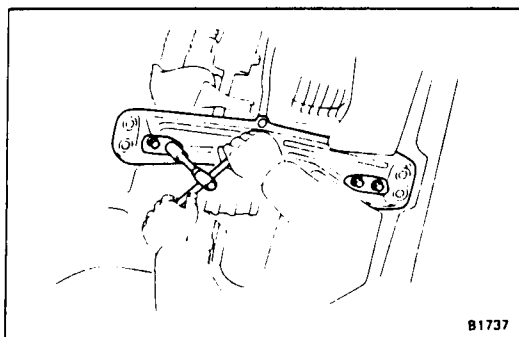
13. INSTALL DRIVE SHAFT (See page FA-19)



14. INSTALL ENGINE MOUNTING CENTER MEMBER

- (a) Install the cushion.
- (b) Tighten the four bolts.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)



15. INSTALL FRONT AND REAR MOUNTING

- (a) Tighten the four bolts.

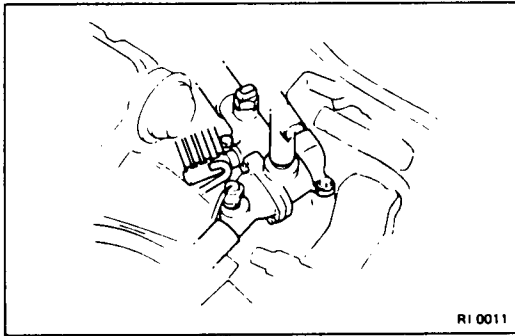
Torque: 400 kg-cm (29 ft-lb, 39 N·m)

- (b) Install the two covers.

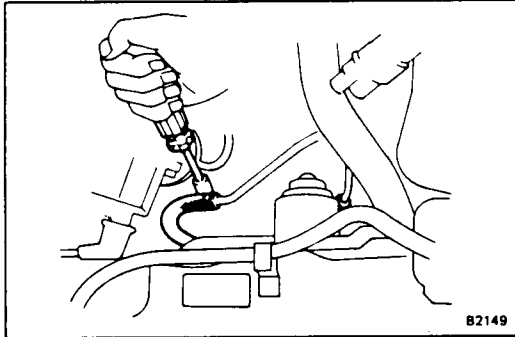
16. INSTALL ENGINE UNDER COVER



Technical Service Information



17. INSTALL WATER INLET (4A-C Engine)

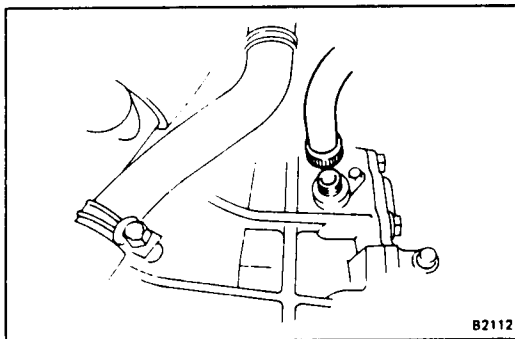


18. INSTALL OIL COOLER HOSE

19. INSTALL CONTROL CABLE

- (a) Install the control cable bracket.
- (b) Install the control cable to the swivel.
- (c) Install the clip.
- (d) Install the retainer.

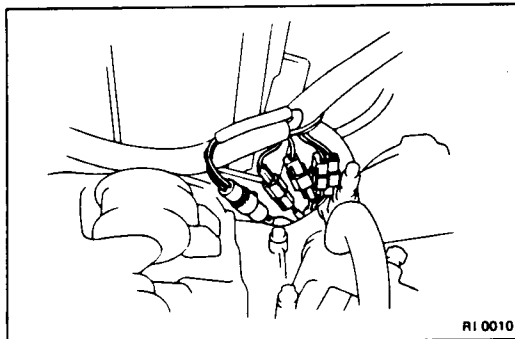
20. ADJUST CONTROL CABLE



21. INSTALL SPEEDOMETER CABLE

22. INSTALL THROTTLE CABLE

23. ADJUST THROTTLE CABLE



24. CONNECT NEUTRAL START SWITCH CONNECTOR

25. INSTALL AIR CLEANER

26. CONNECT NEGATIVE BATTERY TERMINAL

27. FILL TRANSAXLE

Automatic Transaxle

Fluid type: ATF DEXRON II

Capacity:

A240L (Contain differential)

7.2 liters (7.6 US qts, 6.3 Imp. qts)

A130L 5.9 liters (6.2 US qts, 5.2 Imp. qts)

A131L 5.5 liters (5.8 US qts, 4.8 Imp. qts)

Differential (A130L, A131L):

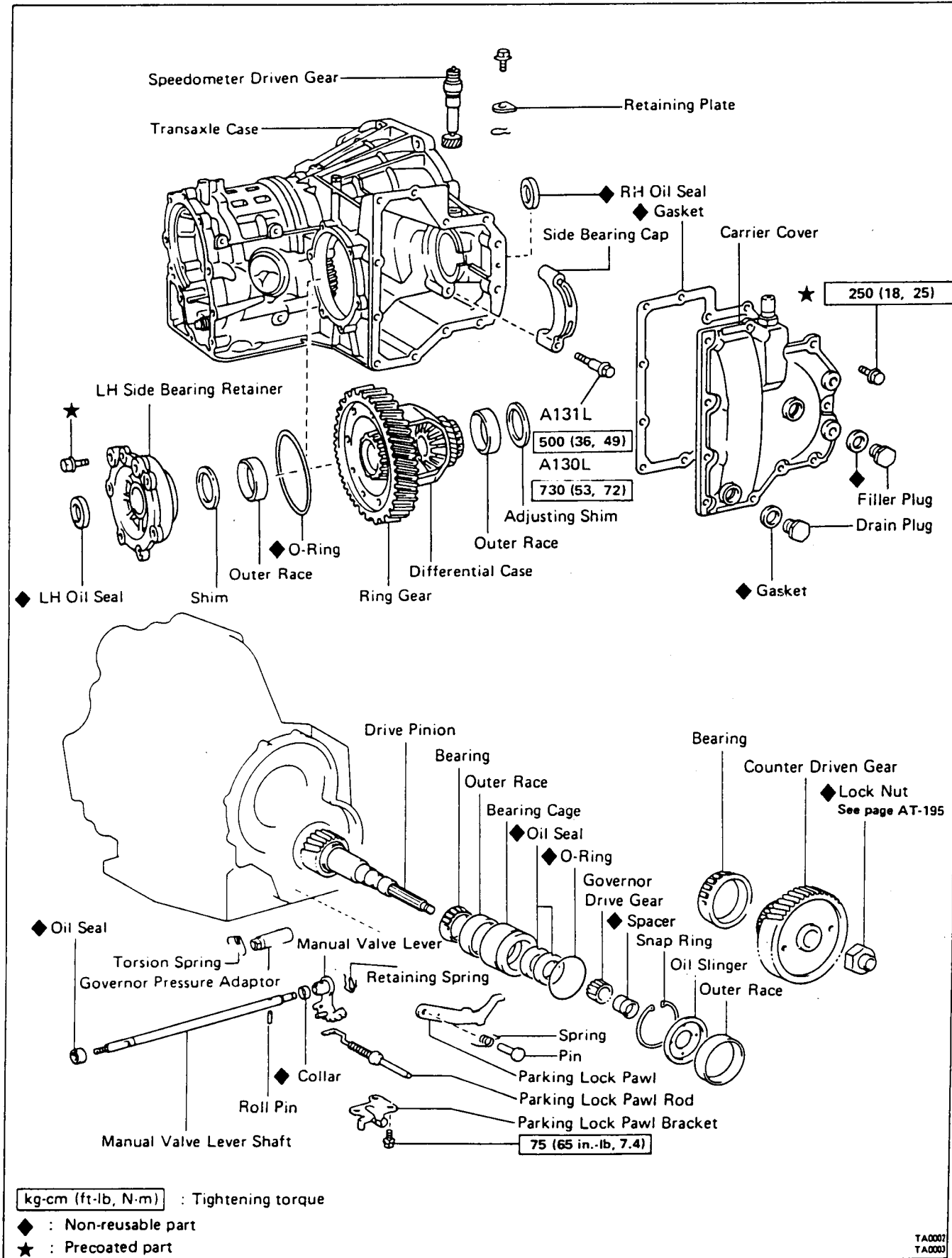
Fluid type: ATF DEXRON II

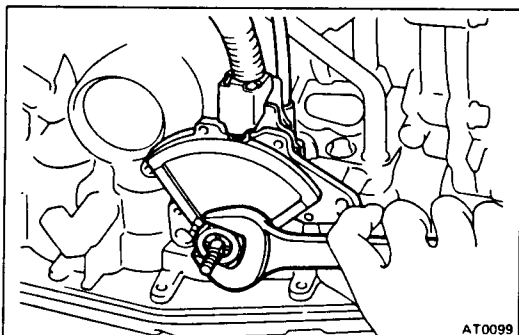
Capacity: 1.4 liters (1.5 US qts, 1.2 Imp. qts)

28. CHECK FLUID LEVEL

AUTOMATIC TRANSMISSION SERVICE GROUP

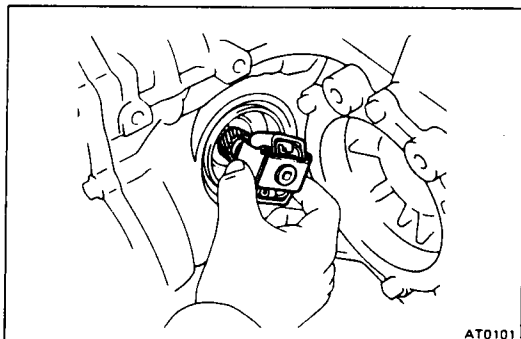
COMPONENTS (A130L, A131L)



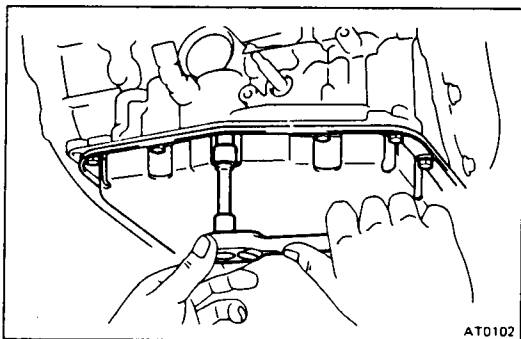


REMOVAL OF DIFFERENTIAL (A130L, A131L)

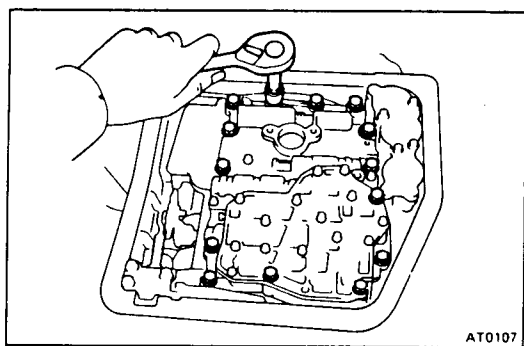
1. REMOVE NEUTRAL START SWITCH
2. REMOVE SPEEDOMETER DRIVEN GEAR



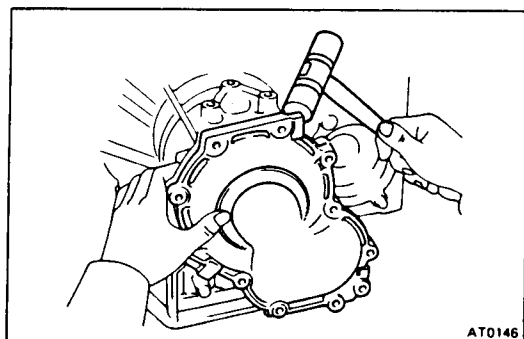
3. REMOVE GOVERNOR BODY



4. REMOVE OIL PAN



5. REMOVE VALVE BODY

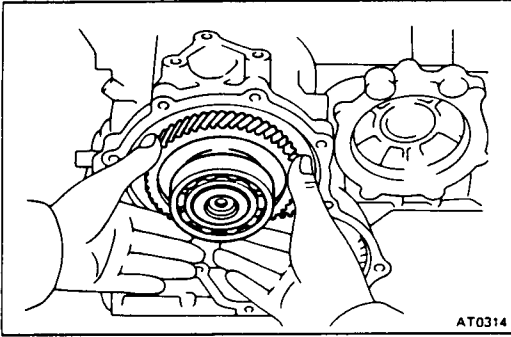


6. REMOVE TRANSAXLE REAR COVER

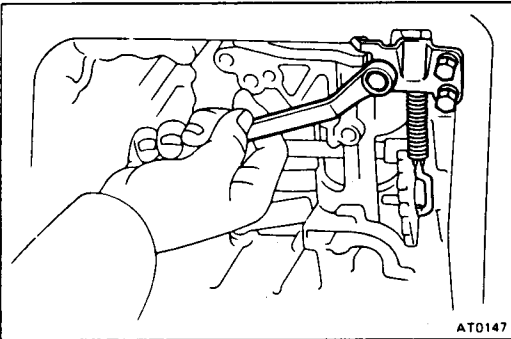
Remove the eleven bolts and tap the transaxle rear cover with a plastic hammer to remove it.



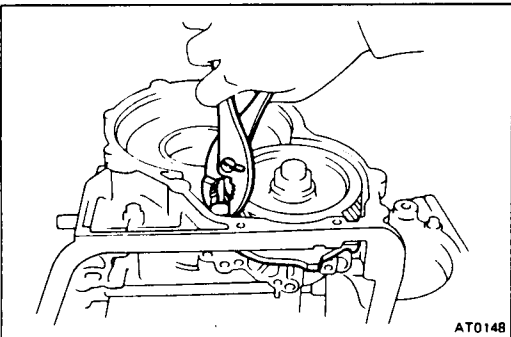
Technical Service Information



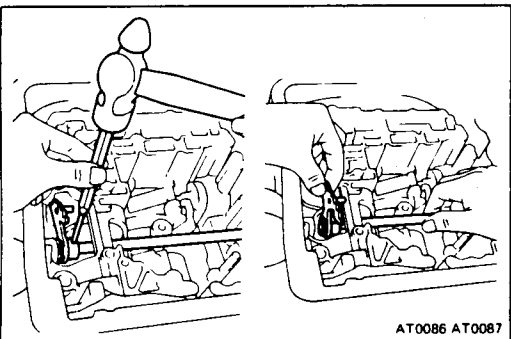
7. REMOVE INTERMEDIATE SHAFT



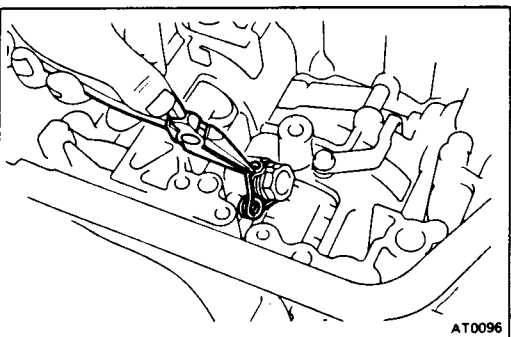
8. REMOVE PARKING LOCK PAWL BRACKET AND ROD



9. REMOVE PARKING LOCK PAWL

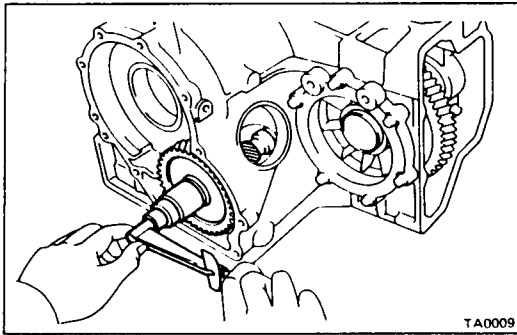


10. REMOVE MANUAL SHAFT AND LEVER



11. REMOVE GOVERNOR PRESSURE ADAPTER

12. REMOVE CARRIER COVER



TA0009

13. MEASURE TOTAL PRELOAD

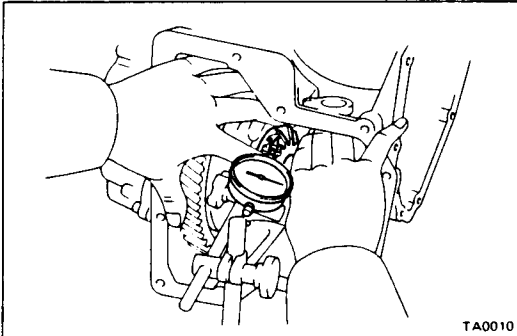
Using a torque meter, measure the total preload, and make a note of it.

Preload (at starting):

Add drive pinion preload

New bearing 2.9 – 4.5 kg-cm
(2.5 – 3.9 in.-lb, 0.3 – 0.4 N·m)

Reused bearing 1.4 – 2.2 kg-cm
(1.2 – 1.9 in.-lb, 0.1 – 0.2 N·m)



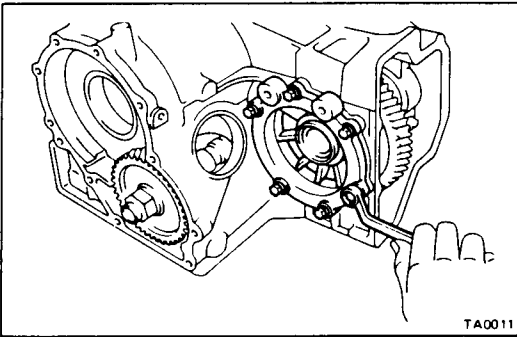
TA0010

14. MEASURE BACKLASH OF SIDE GEAR

Measure each side gear backlash while holding one pinion toward the case.

Standard backlash:

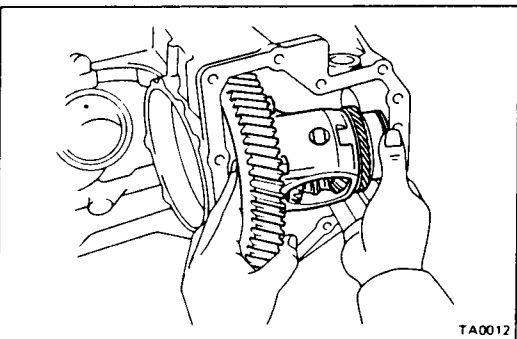
0.05 – 0.20 mm (0.0020 – 0.0079 in.)



TA0011

15. REMOVE LH BEARING RETAINER

- (a) Remove the six bolts.
- (b) Tap the retainer with a plastic hammer to remove it.
- (c) Remove the O-ring from the retainer.



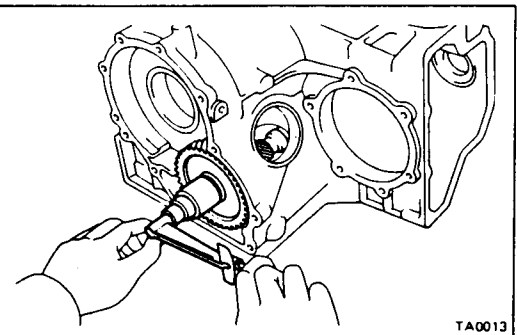
TA0012

16. REMOVE RH SIDE BEARING CAP

Remove the two bolts and the side bearing cap.

17. REMOVE DIFFERENTIAL CASE, OUTER RACE AND ADJUSTING SHIM

Remove the differential case, the outer race and the adjusting shim from the case.



TA0013

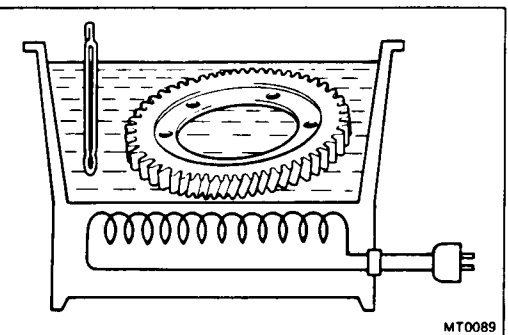
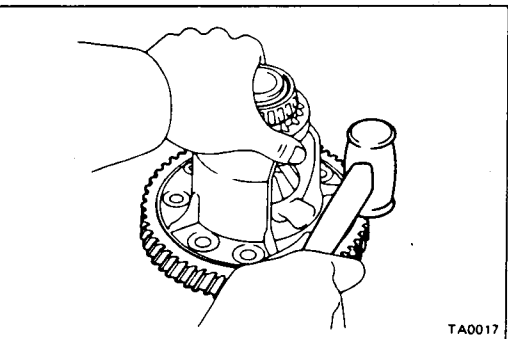
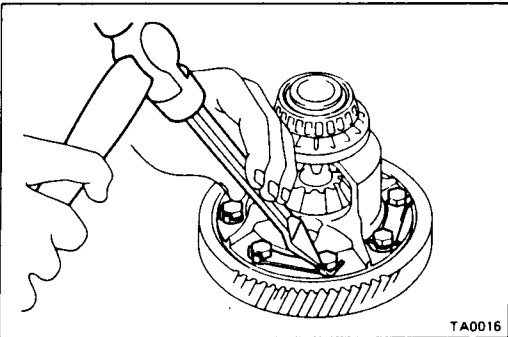
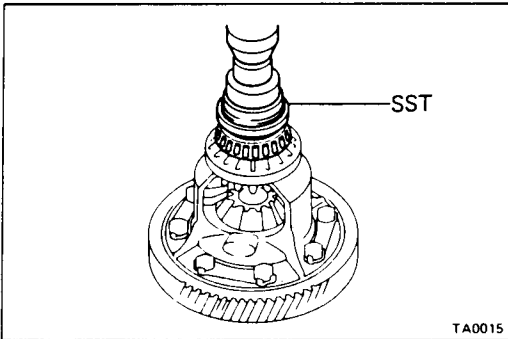
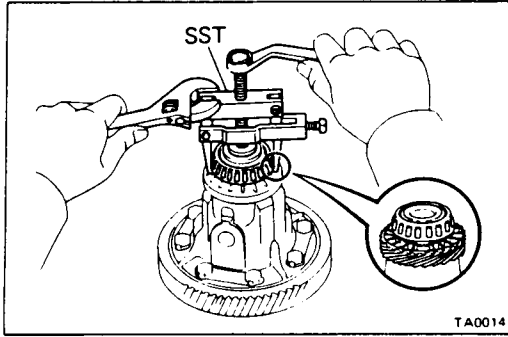
18. MEASURE DRIVE PINION PRELOAD

Using a torque meter, measure the drive pinion preload.

Preload (at starting):

New bearing 10 – 16 kg-cm
(8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)

Reused bearing 5 – 8 kg-cm
(4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)



REPLACEMENT OF DIFFERENTIAL

1. REMOVE SIDE BEARING FROM DIFFERENTIAL CASE

- (a) Setting SST to the cut-out portion on the speedometer drive gear, remove the bearings from both sides of the case.

SST 09502-10012

- (b) Remove the speedometer drive gear from the RH side.

- (c) Using SST and a press, press the side bearings onto the differential case.

SST 09350-32011

2. REPLACE RING GEAR

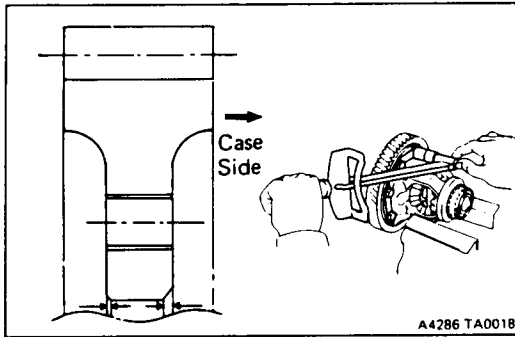
- (a) Loosen the staked part of the lock plate.
 (b) Place alignment marks on the ring gear and the case.

- (c) Remove the eight bolts and locking plates.
 (d) Using a copper hammer, tap on the ring gear to remove it from the case.

- (e) Clean the contact surface of the differential case.
 (f) Heat the ring gear to about 100°C (212°F) in an oil bath.

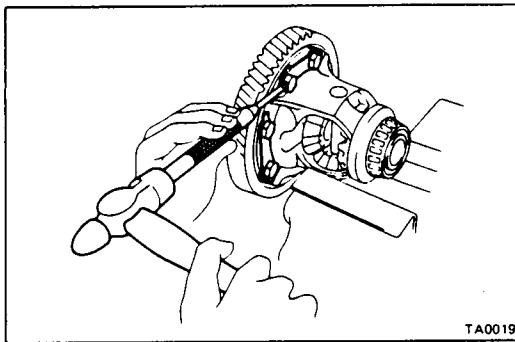
CAUTION: Do not heat the ring gear above 110°C (230°F).

- (g) Clean the contact surface of the ring gear with cleaning solvent.



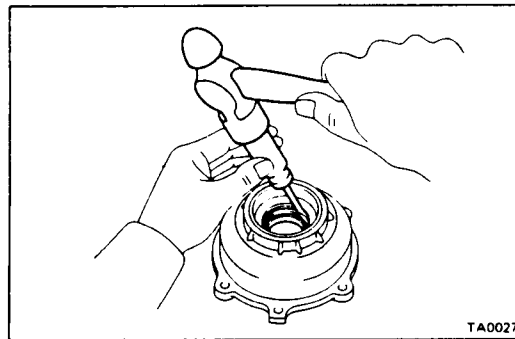
- (h) Quickly install the ring gear on the differential case.
- (i) Align the marks on the ring gear and differential case.
- (j) Install a new locking plates and set bolts.
Tighten the set bolts uniformly and a little at a time.
Torque the bolts.

Torque: A240L 1,000 kg-cm (72 ft-lb, 98 N·m)
 A130L, A131L 985 kg-cm (71 ft-lb, 97 N·m)



- (k) Using a hammer and drift punch, stake the locking plates.

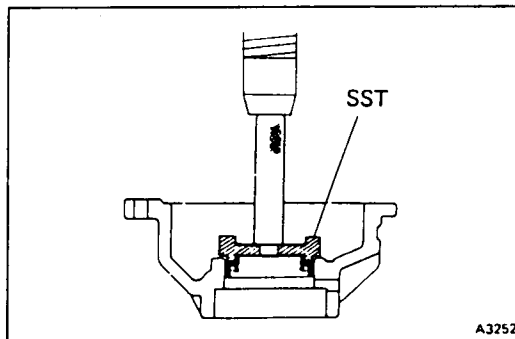
NOTE: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightening side.



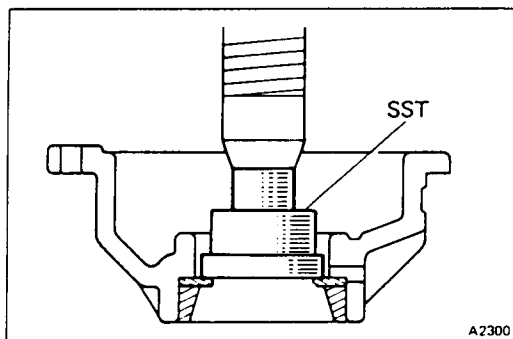
REPLACEMENT OF OIL SEAL AND OUTER RACE (A130L, A131L)

1. REPLACE LH OIL SEAL

- (a) Using a hammer and screwdriver, remove the oil seal.

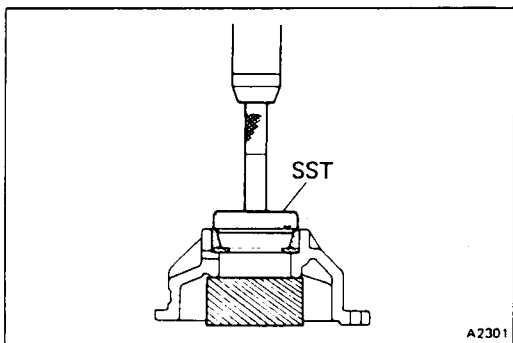


- (b) Using SST, drive in a new oil seal.
SST 09350-32011
- (c) Coat the lip of oil seal with MP grease.

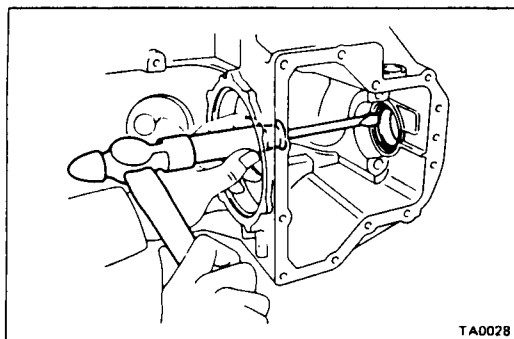


2. REPLACE LH SIDE BEARING OUTER RACE

- (a) Remove the oil seal.
- (b) Using SST, press out the outer race and shim.
SST 09350-32011

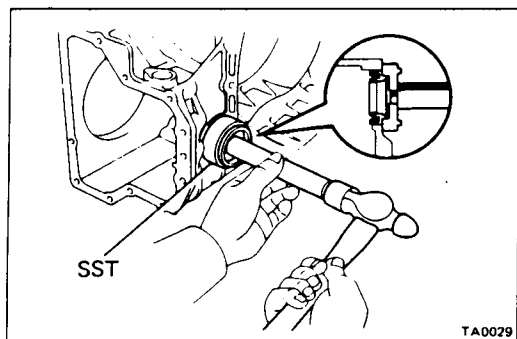


- (c) Place the shim onto the retainer.
- (d) Using SST, press the outer race into the retainer.
SST 09350-32011
- (e) Install a new oil seal.



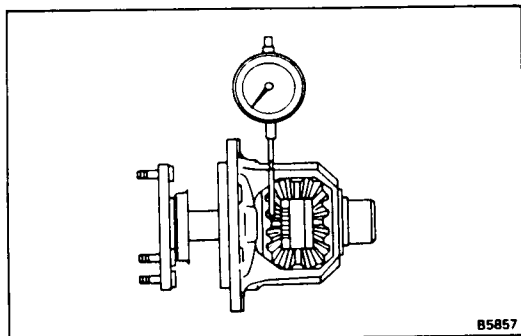
3. REPLACE RH OIL SEAL

- (a) Remove the oil seal.



- (b) Using SST, drive in a new oil seal to where its surface is flush with the surface of the case.
SST 09350-32011
- (c) Coat the lip of the seal with MP grease.

ADJUSTMENT OF DIFFERENTIAL CASE



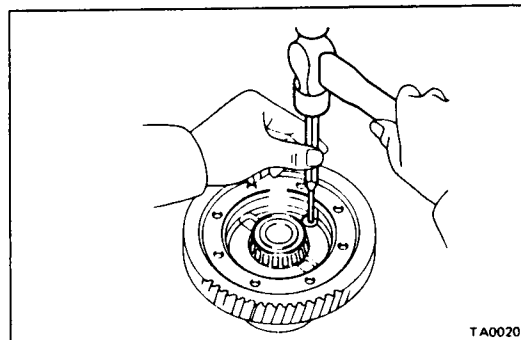
1. CHECK SIDE GEAR BACKLASH

Measure the backlash of one side gear while holding one pinion and the other side gear toward the case.

Standard backlash:

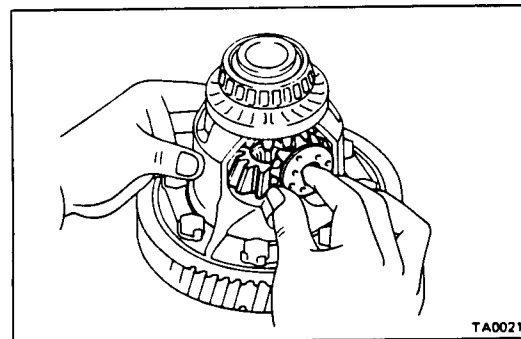
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is out of specification, install the correct thrust washer to the side gears.



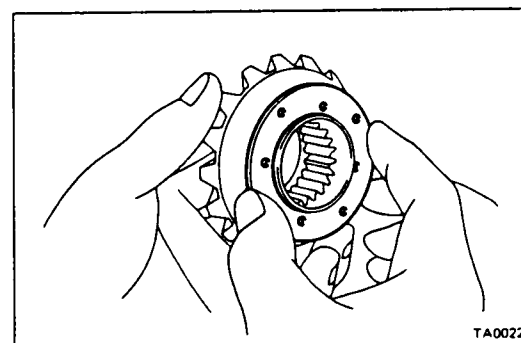
2. DISASSEMBLE DIFFERENTIAL CASE

(a) Drive out the pinion shaft lock pin from the side on which the ring gear is installed.



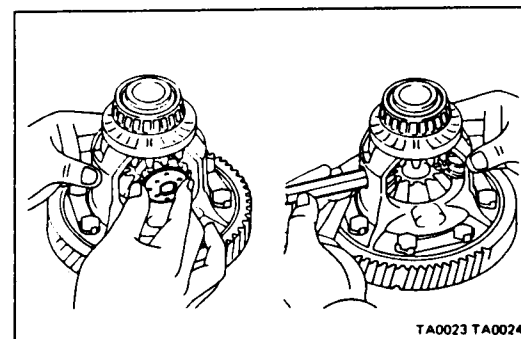
(b) Remove the pinion shaft from the case.

(c) Remove the two pinions and two side gears with the four thrust washers from each gear.



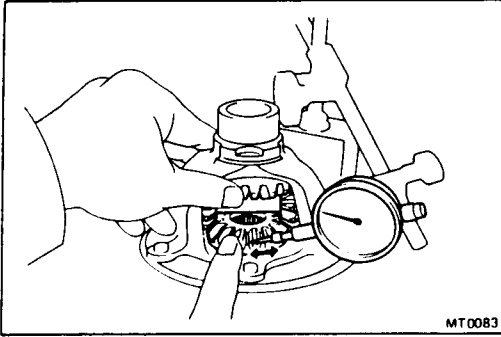
3. ASSEMBLE DIFFERENTIAL CASE

(a) Install the removed thrust washers.



(b) Install the thrust washers, side gears and pinion gears in the differential case.

(c) Install the pinion shaft.



(d) Check the side gear backlash.

Measure the side gear backlash while holding one pinion gear toward the case.

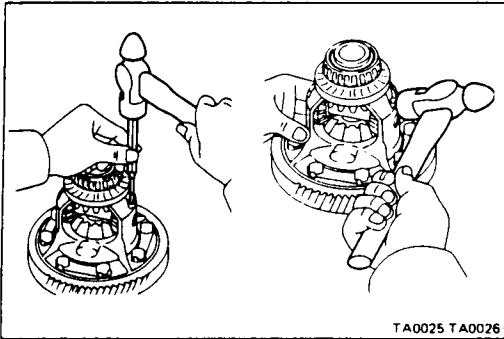
**Standard backlash: 0.05 – 0.20 mm
(0.0020 – 0.0079 in.)**

- (e) Referring to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size of both sides.

Thrust washer thickness

Thickness	mm (in.)	Thickness	mm (in.)
0.95	(0.0374)	1.10	(0.0433)
1.00	(0.0394)	1.15	(0.0453)
1.05	(0.0413)	1.20	(0.0472)

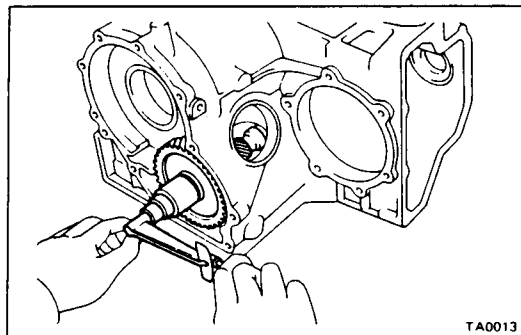
- (f) If the backlash is not within specification, install a thrust washer of different thickness.



(g) Install the lock pin.

- (1) Using a hammer and punch, drive the lock pin through the case and hole in the pinion shaft.
- (2) Stake the differential case.

DISASSEMBLY OF DRIVE PINION SHAFT

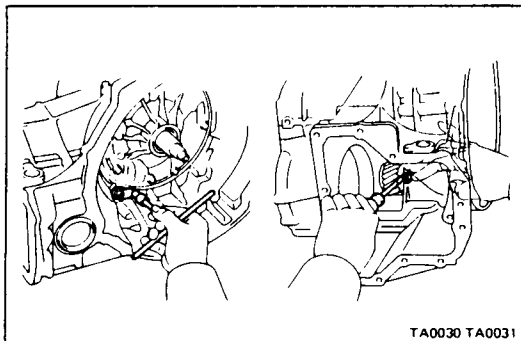


1. MEASURE DRIVE PINION PRELOAD

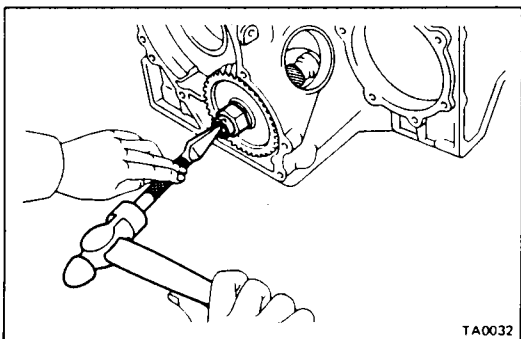
Using a torque meter, measure the preload of the drive pinion.

Preload:

New bearing	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
Reused bearing	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)

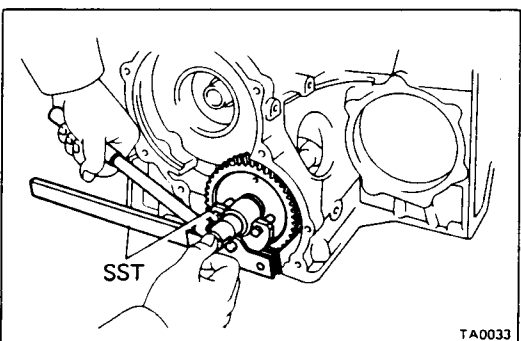


2. REMOVE DRIVE PINION CAP



3. REMOVE COUNTER DRIVEN GEAR

(a) Using a chisel, loosen the staked part of the nut.

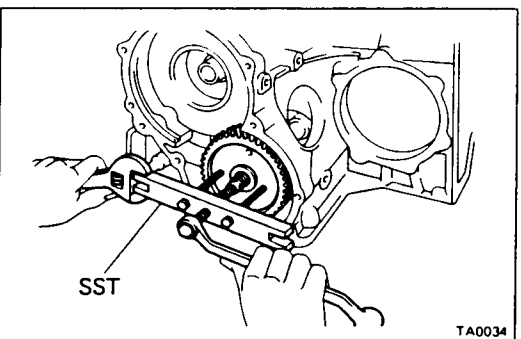


(b) Install SST onto the gear.

SST 09350-32011

(c) Using SST to hold the gear, remove the nut.

SST 09330-00020

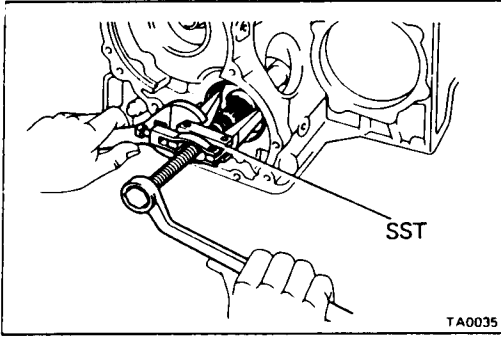


(d) Using SST, remove the gear and bearing.

SST 09350-32011



Technical Service Information



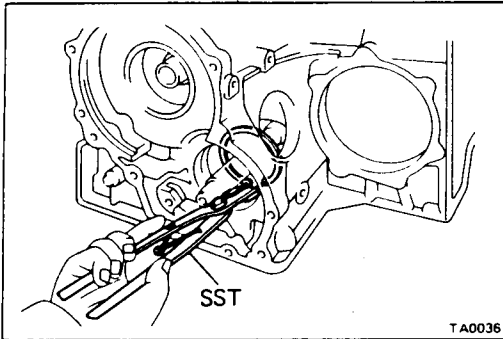
4. REMOVE OUTER RACE FROM CASE

Using SST, remove the outer race.

SST 09350-32011

5. REMOVE OIL SLINGER, SPACER AND GOVERNOR BODY DRIVE GEAR

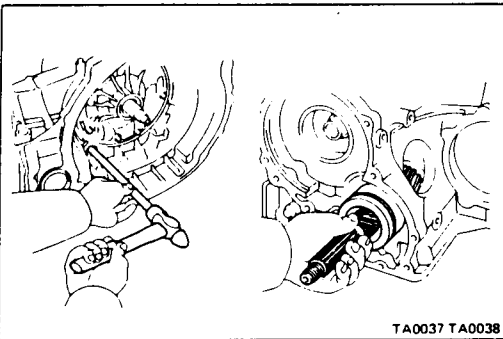
If the gear is too tight, remove it later.



6. REMOVE DRIVE PINION

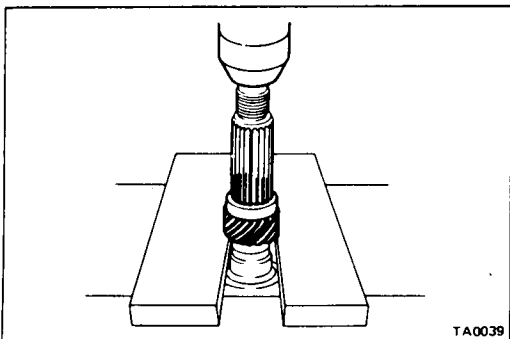
(a) Using SST, remove the snap ring.

SST 09350-32011



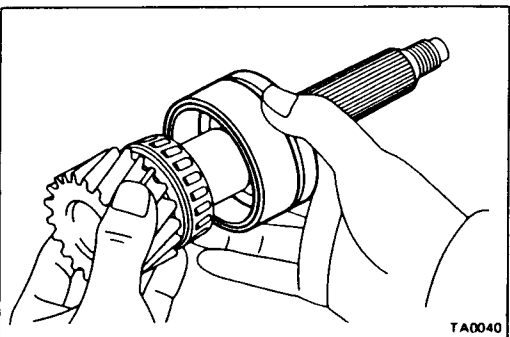
(b) Insert a brass bar into the case hole to tap out the drive pinion.

(c) Tap out the drive pinion and remove the bearing cage from the bore.



7. REMOVE GOVERNOR DRIVE GEAR

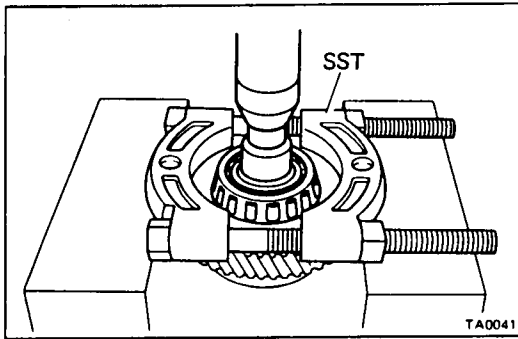
Using a shop press, press out the governor body drive gear.



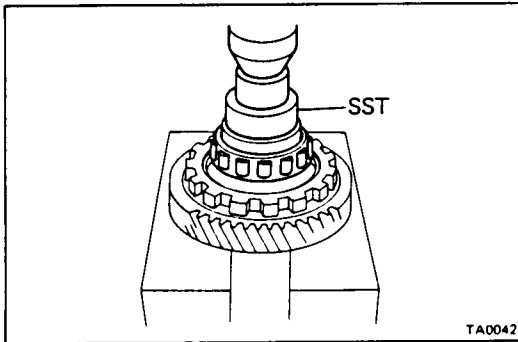
8. REMOVE BEARING CAGE FROM DRIVE PINION

9. REMOVE O-RING FROM BEARING CAGE

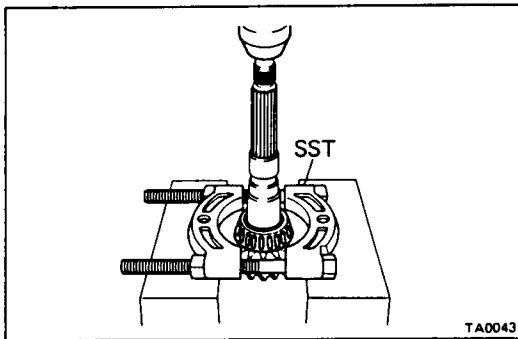
REPLACEMENT OF DRIVE PINION SHAFT COMPONENTS



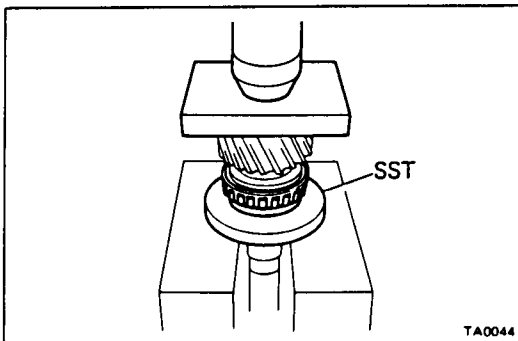
1. REPLACE BEARING OF COUNTER DRIVEN GEAR
 - (a) Using SST, press out the bearing.
SST 09950-00020



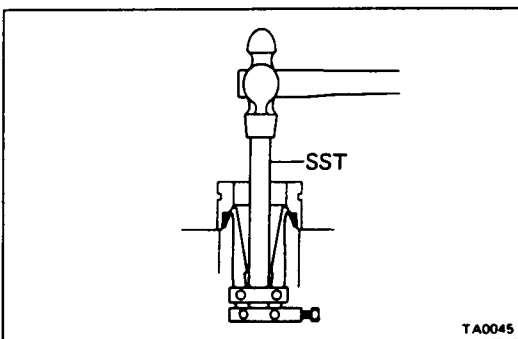
- (b) Using SST, press in a new bearing.
SST 09350-32011



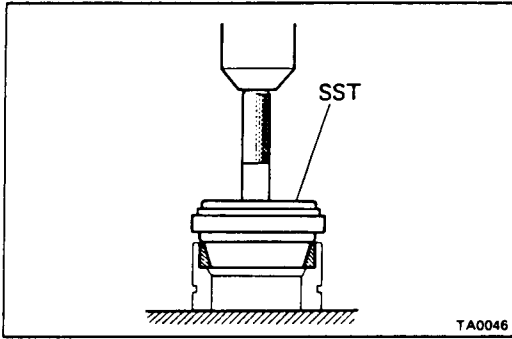
2. REPLACE BEARING AND OUTER RACE OF DRIVE PINION SHAFT
 - (a) Using SST, press out the bearing.
SST 09950-00020



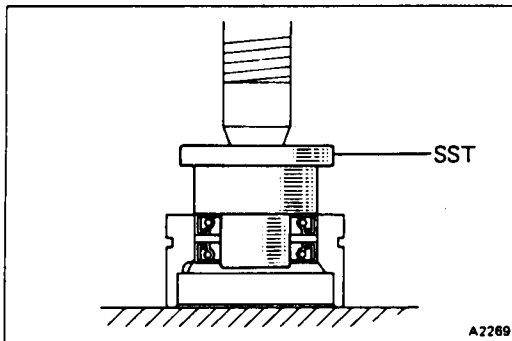
- (b) Using SST, press in the bearing.
SST 09350-32011



- (c) Using SST, drive out the outer race from the bearing cage.
SST 09350-32011
NOTE: Use SST without the bolt.

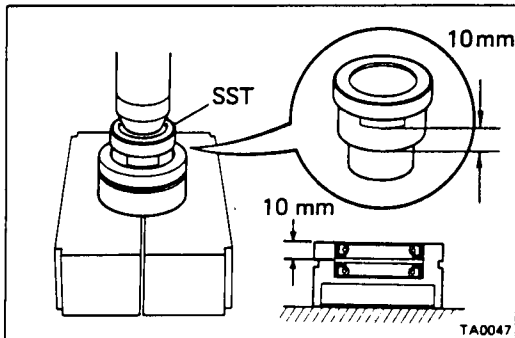


- (d) Using SST, press a new outer race into the bearing cage.
SST 09350-32011

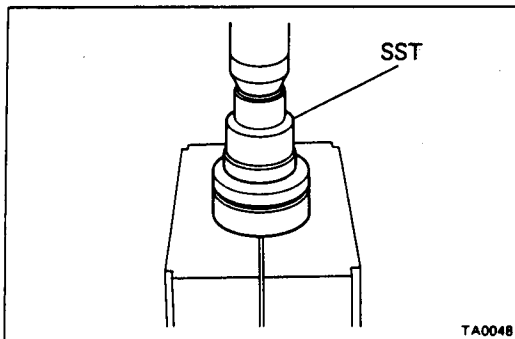


3. REPLACE OIL SEAL OF CAGE

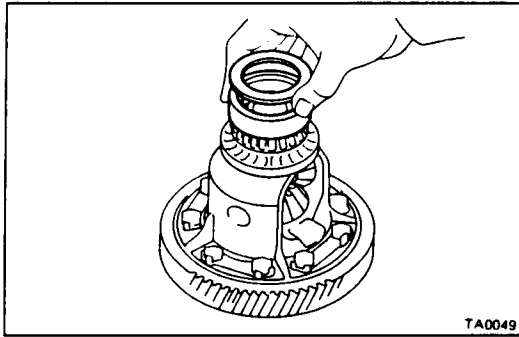
- (a) Using SST, press out the two oil seals together.
SST 09350-32011



- (b) Using SST, press in a new oil seal with the lip facing downward.
SST 09350-32011
Oil seal press in depth (from flat end): 10 mm (0.39 in.)
NOTE: As shown in the figure, make a mark at the 10 mm (0.39 in.) position.



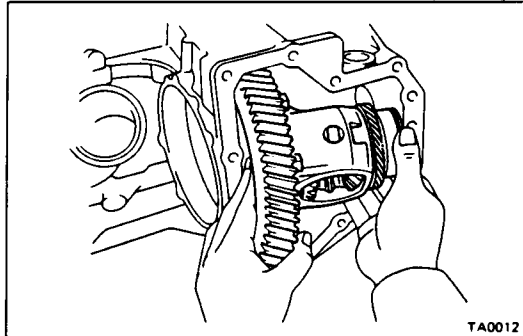
- (c) Using SST, face the lip of a new seal upward and press it in until its end is flush with the surface of the cage.
SST 09350-32011
(d) Coat the lip of the oil seal with MP grease.



ADJUSTMENT OF DIFFERENTIAL SIDE BEARING PRELOAD

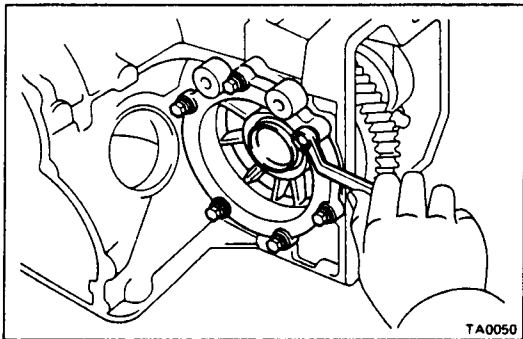
1. PLACE OUTER RACE AND ADJUSTING SHIM ONTO RH SIDE BEARING

Use the adjusting shim 2.40 mm (0.0945 in.).



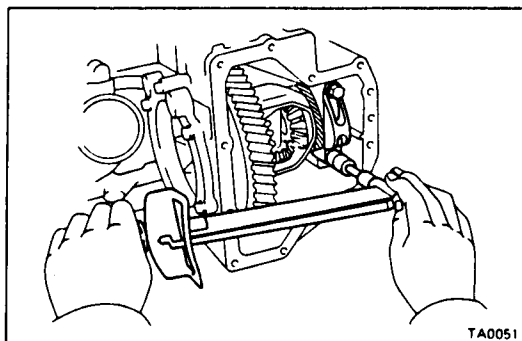
2. PLACE DIFFERENTIAL CASE INTO CASE

Be sure to install the adjusting shim.



3. INSTALL LH BEARING RETAINER

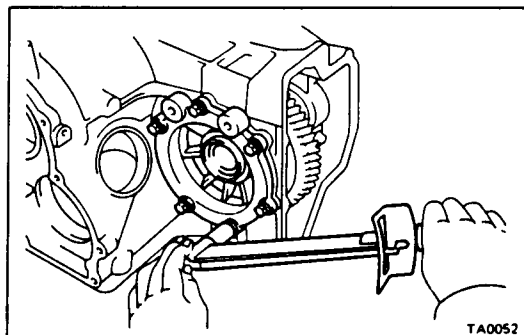
- (a) Do not install the O-ring yet.
- (b) Do not coat the bolt threads with sealer yet.
- (c) Temporarily tighten the bolts evenly and gradually while turning the ring gear.



4. INSTALL RH SIDE BEARING CAP

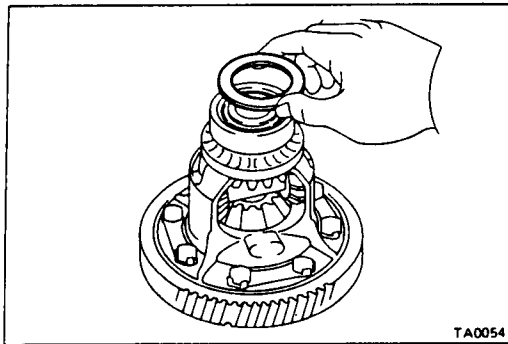
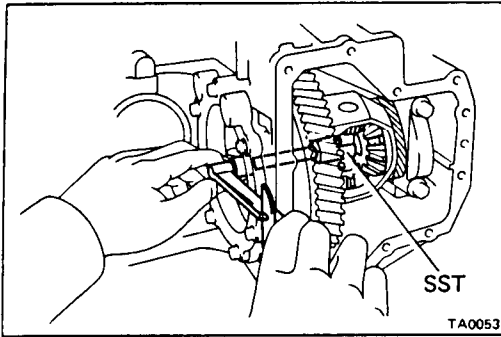
Tighten the bolts evenly and gradually while turning the ring gear.

Torque: A130L 730 kg-cm (53 ft-lb, 72 N·m)
A131L 500 kg-cm (36 ft-lb, 49 N·m)



5. TIGHTEN LH BEARING RETAINER

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



6. ADJUST DIFFERENTIAL SIDE BEARING PRELOAD

Using SST and a torque meter, measure the preload of the side bearing.

SST 09564-32011

NOTE: Install SST on the pinion shaft.

Preload (at starting):

New bearing	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
Reused bearing	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)

If the preload is not within specification, remove the differential from the case.

Re-select a RH adjusting shim.

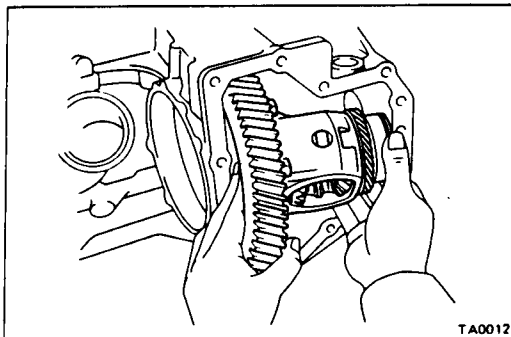
(A130L)		(A131L)	
Thickness mm (in.)		Thickness mm (in.)	
1.90 (0.0748)	2.45 (0.0965)	1.60 (0.0630)	2.15 (0.0846)
1.95 (0.0768)	2.50 (0.0984)	1.65 (0.0650)	2.20 (0.0866)
2.00 (0.0787)	2.55 (0.1004)	1.70 (0.0669)	2.25 (0.0886)
2.05 (0.0807)	2.60 (0.1024)	1.75 (0.0689)	2.30 (0.0906)
2.10 (0.0827)	2.65 (0.1043)	1.80 (0.0709)	2.35 (0.0925)
2.15 (0.0846)	2.70 (0.1063)	1.85 (0.0728)	2.40 (0.0945)
2.20 (0.0866)	2.75 (0.1083)	1.90 (0.0748)	2.45 (0.0965)
2.25 (0.0886)	2.80 (0.1102)	1.95 (0.0768)	2.50 (0.0984)
2.30 (0.0906)		2.00 (0.0787)	2.55 (0.1004)
2.35 (0.0925)		2.05 (0.0807)	2.60 (0.1024)
2.40 (0.0945)		2.10 (0.0827)	2.65 (0.1043)

NOTE: The preload will change about 3 – 4 kg-cm (2.6 – 3.5 in.-lb, 0.3 – 0.4 N·m) with each shim thickness.

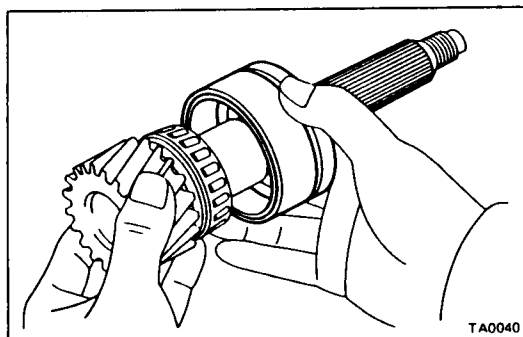
7. REMOVE DIFFERENTIAL CASE AND COMPONENT PARTS

If the preload is adjusted within specification, remove the bearing retainer, differential case, RH side bearing and shim.

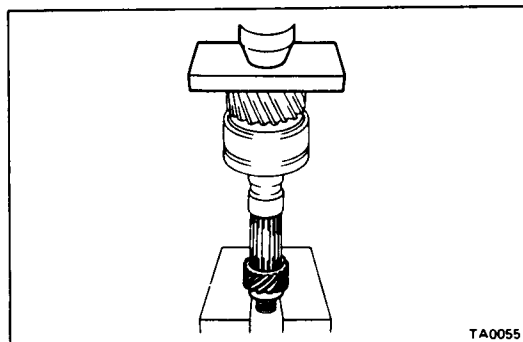
Be careful not to lose the adjusted shim.



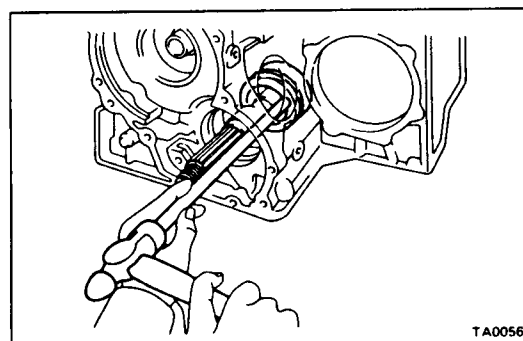
ASSEMBLY AND ADJUSTMENT OF DRIVE PINION SHAFT



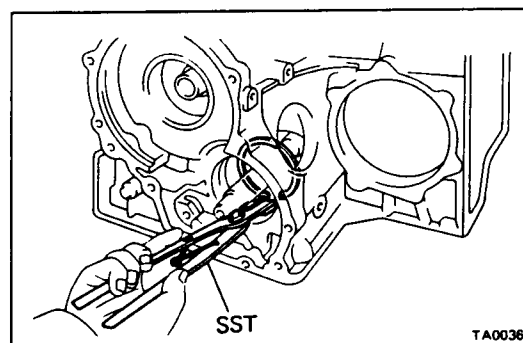
1. INSTALL NEW O-RING ONTO BEARING CAGE
2. PLACE BEARING CAGE ONTO DRIVE PINION SHAFT
Be careful not to damage the oil seal with the splines.



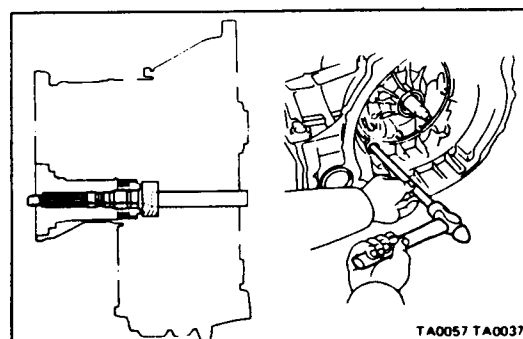
3. INSTALL GOVERNOR DRIVE GEAR



4. INSTALL DRIVE PINION SHAFT INTO CASE
Slightly tap the cage into the case until the groove with the bore can be seen.
NOTE: Drive in the bearing cage until the surface of the bearing cage passes through the groove with the bore.



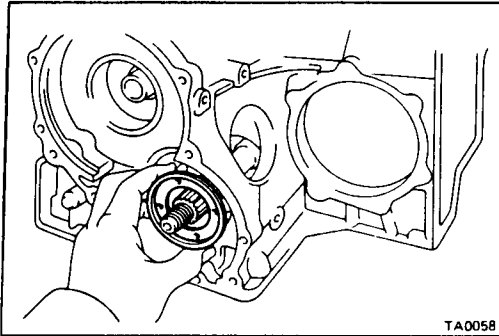
5. INSTALL SNAP RING INTO CASE
(a) Using SST, install the snap ring into the groove.
SST 09350-32011



- (b) Slightly tap the drive pinion to fit the snap ring into the groove.

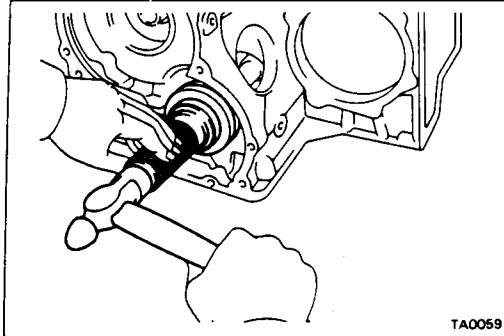


Technical Service Information



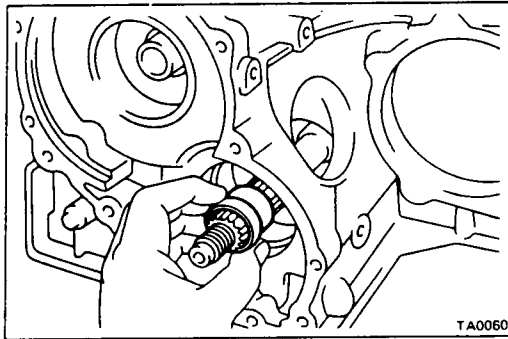
6. INSTALL OIL SLINGER

Install the oil slinger, facing the lip outward.



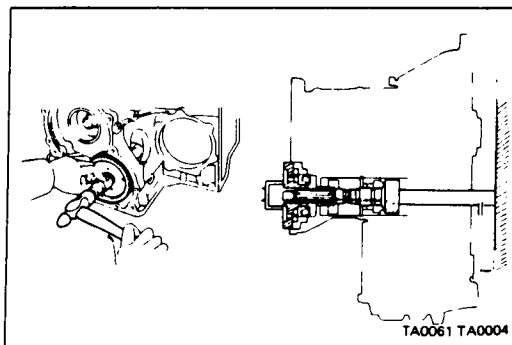
7. INSTALL OUTER RACE

Using SST, drive the outer race into the case.
SST 09350-32011



8. INSTALL NEW SPACER

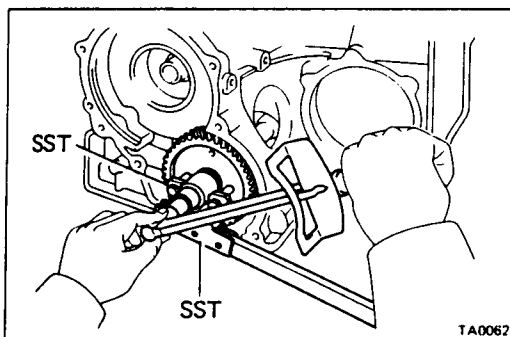
Always use a new spacer.
Install the spacer with the small end first.



9. INSTALL COUNTER DRIVEN GEAR ONTO SHAFT

- Place a bar at the drive pinion side and position the other end of the bar against a vise or such.
- Drive the gear onto the shaft until the nut can be installed on the threads of the shaft.

CAUTION: Be careful not to cause a shock to the transmission case.

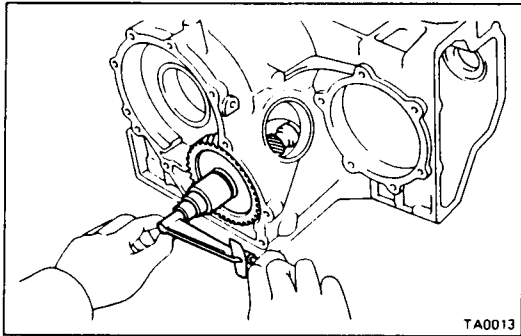


10. ADJUST DRIVE PINION PRELOAD

- Coat the threads and surface of the nut with MP grease.
- Using SST to hold the gear, tighten the nut.

Torque: 1,750 kg-cm (127 ft-lb, 172 N·m)

SST 09330-00020 and 09350-32011



- (c) Turn the gear counterclockwise and clockwise several times.
- (d) Using a torque meter, measure the preload of the drive pinion.

Preload (at starting):

New bearing	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
Reused bearing	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)

- If the preload is greater than specified, replace the bearing spacer.
- If the preload is less than specified, retighten the nut 130 kg-cm (9 ft-lb, 13 N·m) at a time until the specified preload is reached.

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

Do not back off the nut to reduce the preload.

Maximum torque: 2,950 kg-cm (213 ft-lb, 289 N·m)

- (e) If the preload is adjusted within specification, make a note of it.