INDEX

AUTOMATIC TRANSMISSION SERVICE GROUP

Technical Service Information

INTRODUCTION
TOYOTA A240

The A-240 transaxle is a 4 speed 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 the Toyota Corporation for the illustrations and information that have made this booklet possible.

ROBERT D. CHERRNAY
TECHNICAL DIRECTOR

DALE ENGLAND
FIELD SERVICE CONSULTANT

FRANK MIETUS
HOTLINE TECHNICIAN

WAYNE COLONNA
HOTLINE TECHNICIAN

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

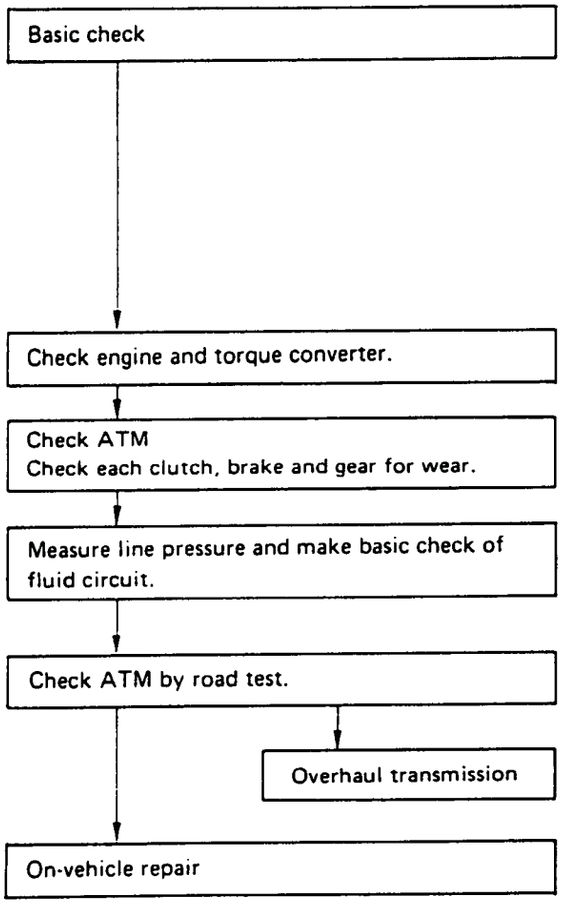
TROUBLESHOOTING

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-OD up-shift, or down-shifts from OD-3 or 3-2 then shifts back to OD or 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-OD 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-OD 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

Problem	Possible cause	Remedy
Down-shift occurs too quick or too late while coasting	Throttle cable out of adjustment	Adjust throttle cable
	Governor faulty	Inspect governor
	Valve body faulty	Inspect valve body
	Transmission faulty	Disassemble and inspect transmission
No OD-3, 3-2 or 2-1 kick-down	Throttle cable out of adjustment	Adjust throttle cable
	Governor faulty	Inspect governor
	Valve body faulty	Inspect valve body
No engine braking in "2" range	Valve body faulty	Inspect valve body
	Transmission faulty	Disassemble and inspect transmission
Vehicle does not hold in "P"	T/M control cable out of adjustment	Adjust control cable
	Parking lock pawl and rod	Inspect lock pawl and rod

GENERAL NOTES

1. Troubles occuring 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 simpliest 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) Preminary 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.

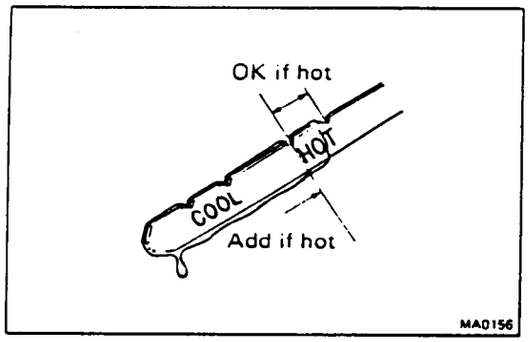
(4) Hydraulic Test

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.

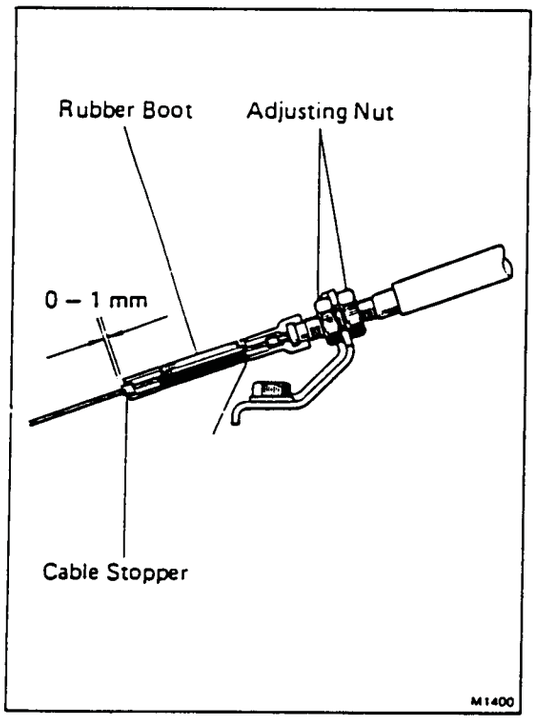


ATF INSPECTION

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

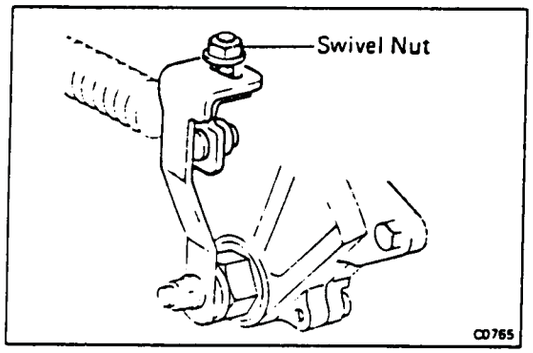
ADJUSTMENTS

ADJUSTMENT OF THROTTLE CABLE



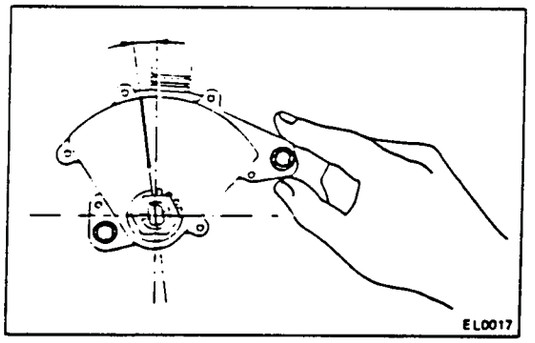
1. DEPRESS ACCELERATOR PEDAL ALL THE WAY AND CHECK THAT THROTTLE VALVE OPENS FULLY
   If the throttle valve does not open fully, adjust the accelerator link.
2. FULLY DEPRESS ACCELERATOR
3. LOOSEN ADJUSTMENT NUTS
4. ADJUST THROTTLE CABLE
   (a) Adjust the cable housing so that the distance between the 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

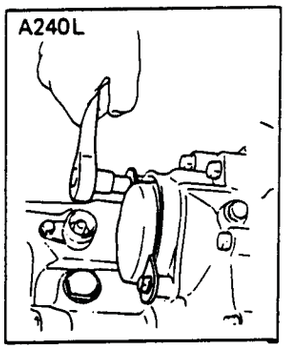


If the engine will start with the shift selector in any range other than "N" or "P" range, adjustment is required.

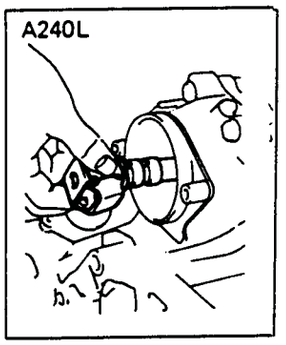
1. LOOSEN NEUTRAL START SWITCH BOLTS AND SET SHIFT SELECTOR IN "N" RANGE
2. ADJUST NEUTRAL START SWITCH
   (a) Disconnect the neutral start switch connector.
   (b) Connect an ohmmeter between the terminals.
   (c) Adjust the switch to the point where there is continuity between terminals.
   (d) Connect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

ON-VEHICLE REPAIR

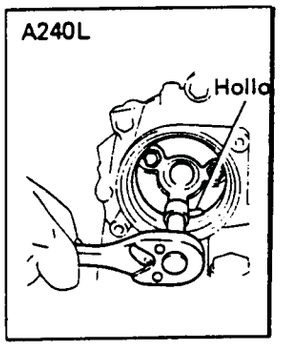
REMOVAL OF GOVERNOR VALVE



REMOVE GOVERNOR COVER AND O-RING



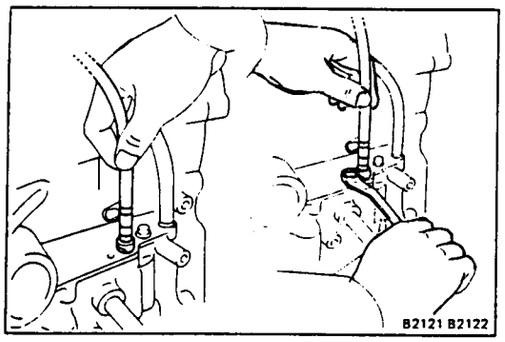
REMOVE GOVERNOR BODY WITH THRUST WASHER



REMOVE GOVERNOR BODY ADAPTOR

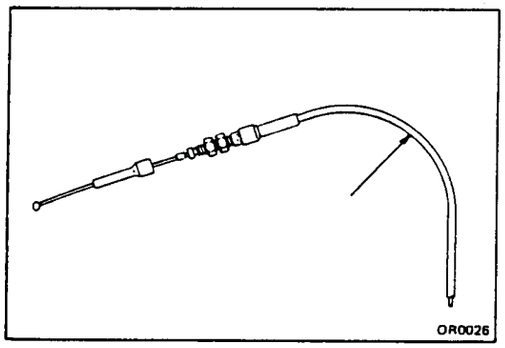
INSTALLATION OF GOVERNOR VALVE

INSTALL GOVERNOR BODY ADAPTER



INSTALLATION OF THROTTLE CABLE

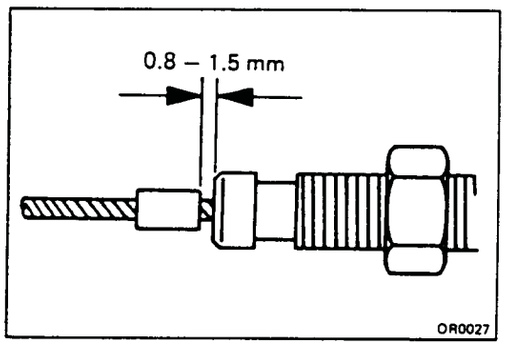
1. INSTALL CABLE IN TRANSMISSION CASE
   (a) Be sure to push it in all the way.
   (b) Install the retaining plate and bolt.
2. INSTALL VALVE BODY



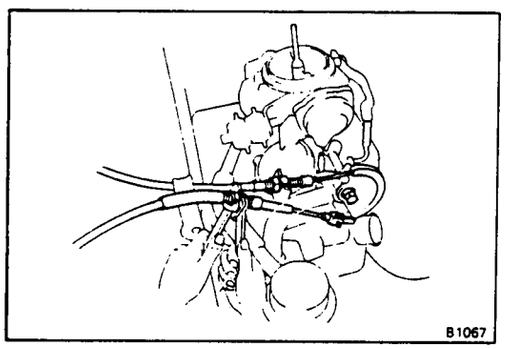
3. IF THROTTLE CABLE IS NEW, STAKE STOPPER ON INNER CABLE

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

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



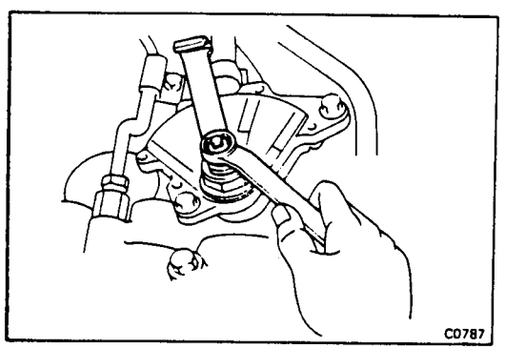
   (b) Pull the inner cable lightly until a slight resistance is felt, and hold it.
   (c) Stake the stopper as shown, 0.8 – 1.5 mm (0.031 – 0.059 in.) in width.



4. CONNECT THROTTLE CABLE

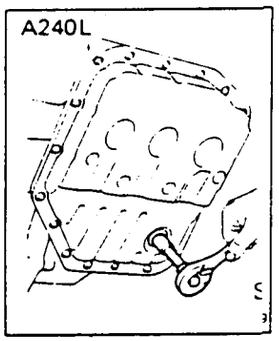
   Connect the cable to the throttle linkage.

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

REMOVAL OF VALVE BODY



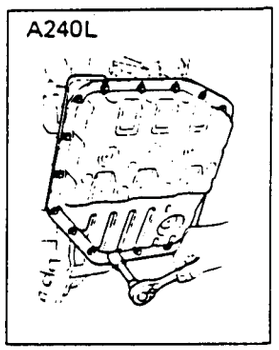
CLEAN TRANSMISSION EXTERIOR

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)

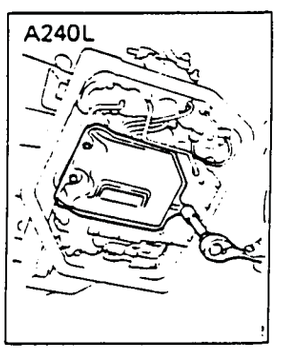
SST 09043-38100



REMOVE OIL PAN AND GASKET

CAUTION: Some fluid will remain in the oil pan.

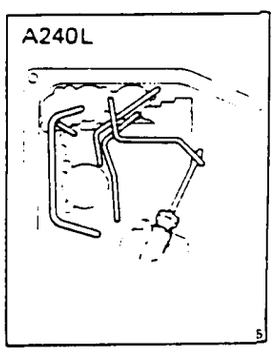
Remove all pan bolts, and carefully remove the pan assembly. Discard the gasket.



REMOVE OIL STRAINER

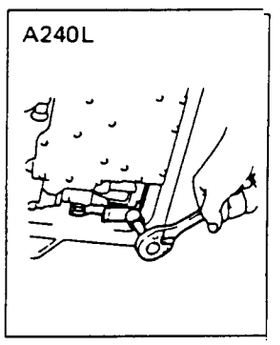
Remove the three bolts, and the oil strainer.

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

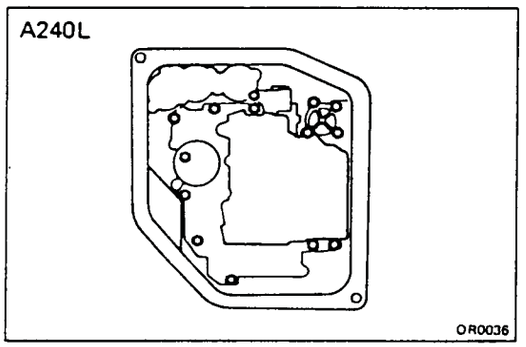


REMOVE OIL TUBES

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

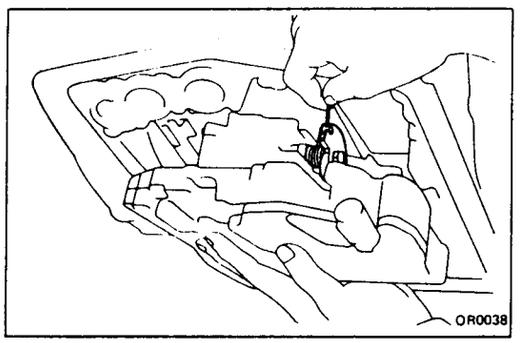


REMOVE MANUAL DETENT SPRING

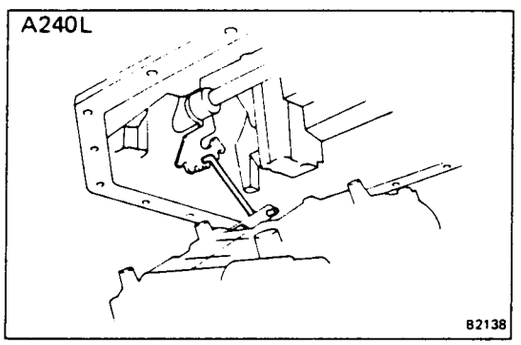


REMOVE VALVE BODY

(a) Remove the fourteen bolts.

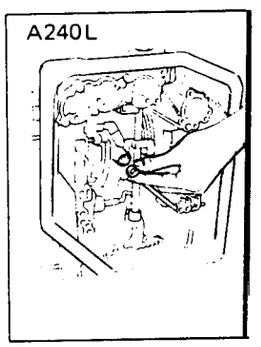


(b) Disconnect the throttle cable.



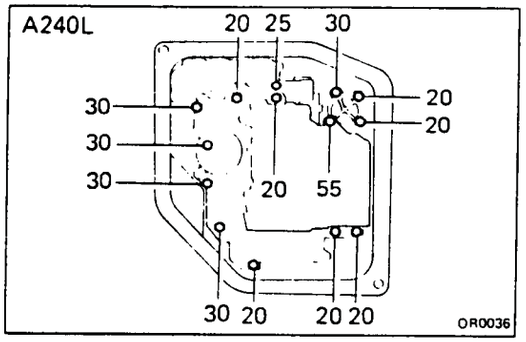
(c) Disconnect the manual valve connecting rod. (A240L)

(d) Remove the valve body.



REMOVE GOVERNOR APPLY GASKET

INSTALLATION OF VALVE BODY

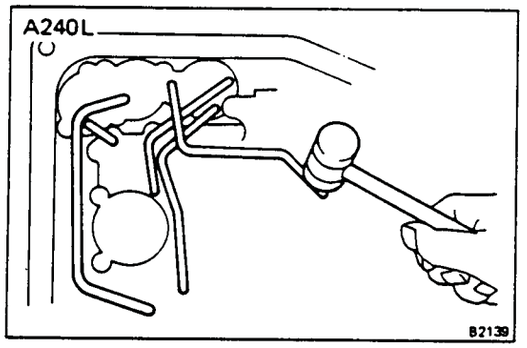


INSTALL FOURTEEN BOLTS IN VALVE BODY

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

Finger tighten the all bolts first. Then tighten them with a torque wrench.

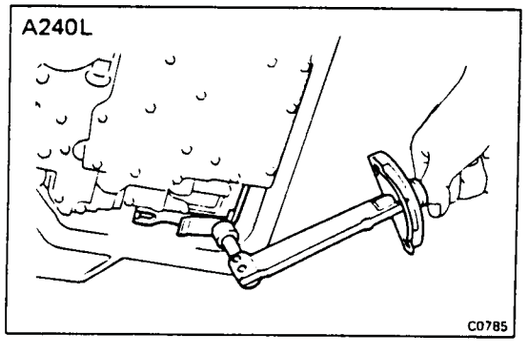
Torque: 100 kg-cm (7 ft-lb, 10 N·m)



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.



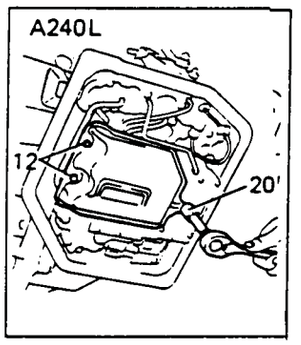
INSTALL DETENT SPRING

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

(a) Finger tighten the all 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 in contact with the center of the roller at the tip of the detent spring.

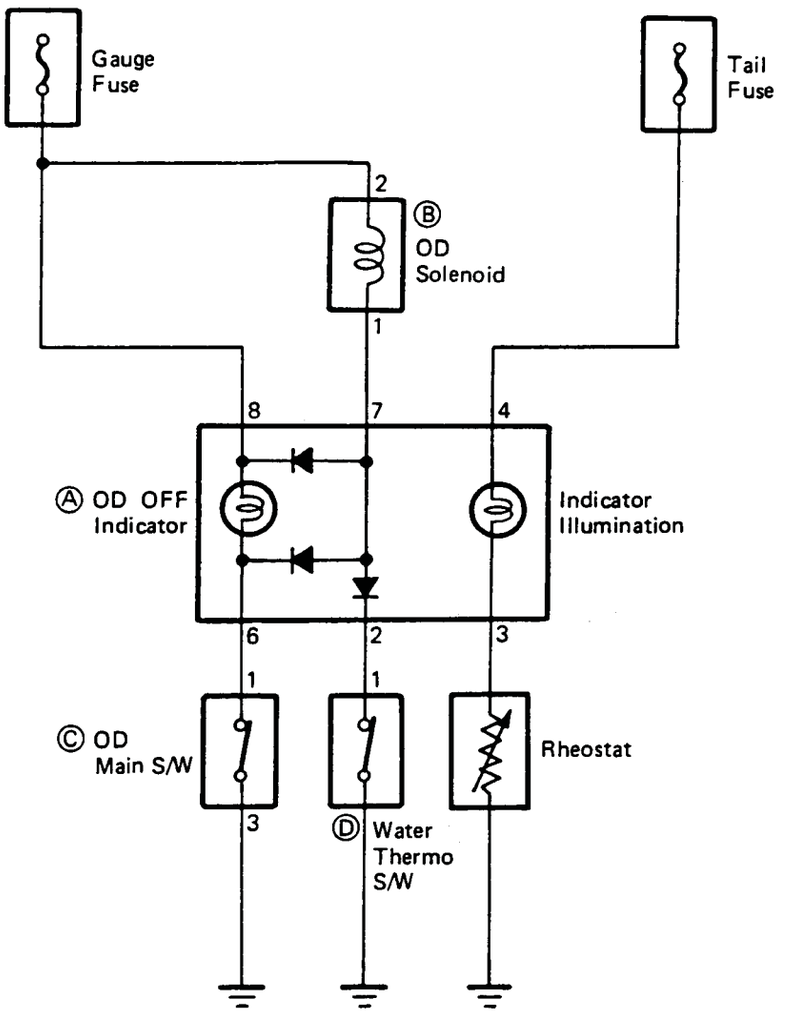


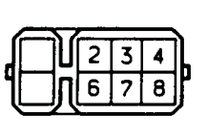
INSTALL OIL STRAINER

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

ELECTRIC CONTROL (A240L)

CIRCUIT





Ⓐ OD OFF Indicator (Wire side)

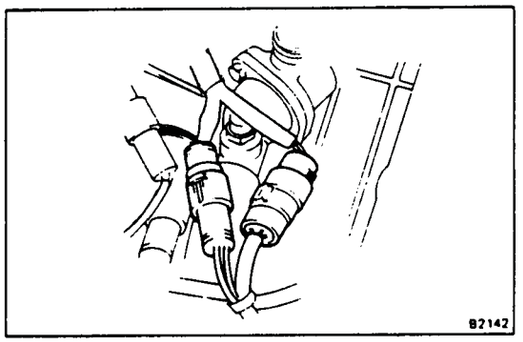
Ⓑ OD Solenoid (S/W side)

Ⓒ OD Main S/W (S/W side)

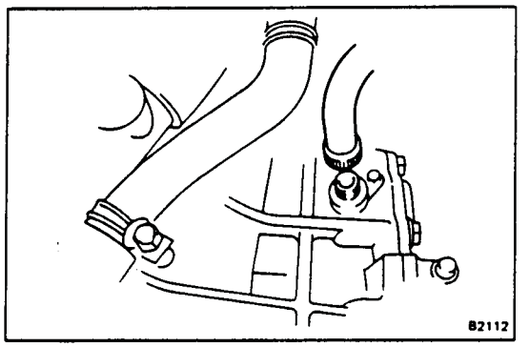
Ⓓ Water Thremo S/W (S/W side)

AT1015
GA-8-1-A IH-2-2 GA-4-1 IH-2-2

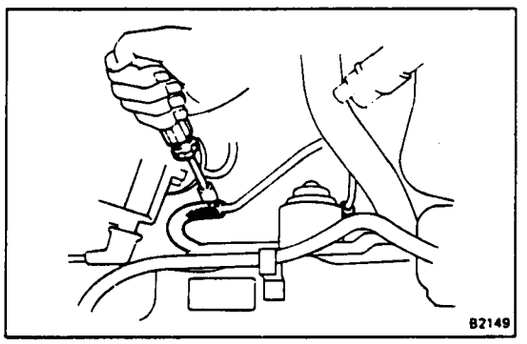
REMOVAL OF TRANSAXLE



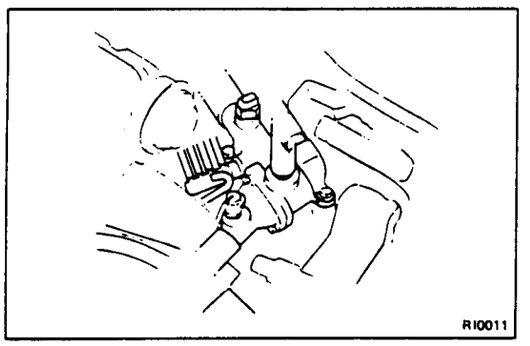
1. REMOVE NEGATIVE BATTERY TERMINAL
2. REMOVE AIR CLEANER
3. DISCONNECT NEUTRAL START SWITCH CONNECTOR
4. DISCONNECT SOLENOID VALVE CONNECTOR (A240L)



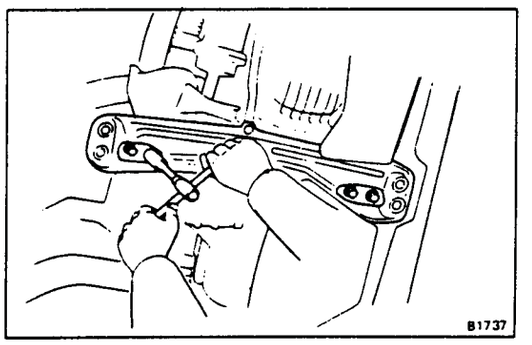
5. DISCONNECT SPEEDOMETER CABLE
6. REMOVE THROTTLE CABLE
7. REMOVE CONTROL CABLE
   (a) Remove the clip.
   (b) Remove the retainer.
   (c) Remove the control cable bracket.



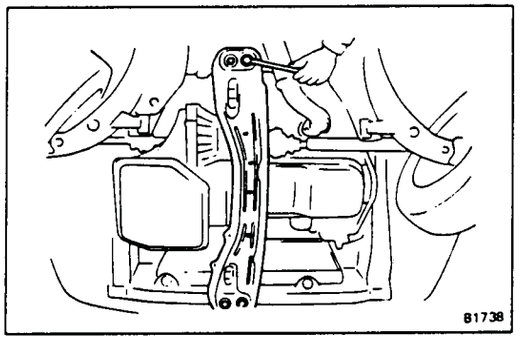
8. DISCONNECT OIL COOLER HOSE



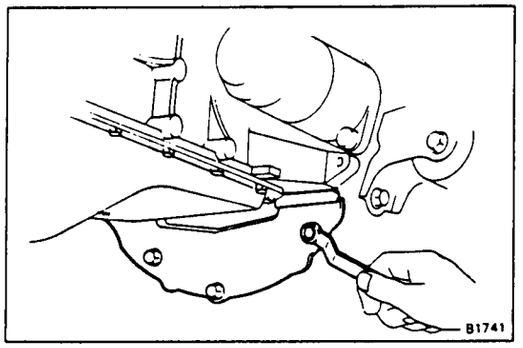
9. REMOVE WATER INLET (4A-C engine)
10. RAISE VEHICLE AND DRAIN TRANSAXLE
11. REMOVE ENGINE UNDER COVER



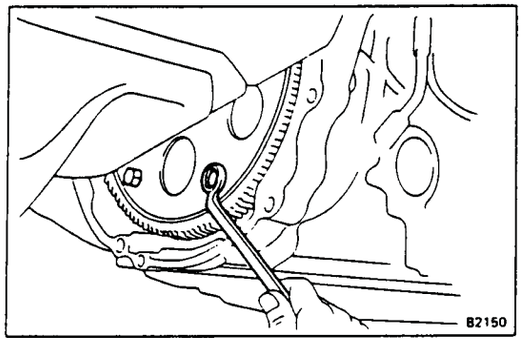
12. REMOVE FRONT AND REAR MOUNTING
    (a) Remove the two dust covers from the member.
    (b) Remove the four bolts.
    (c) Remove the front and rear mounting.



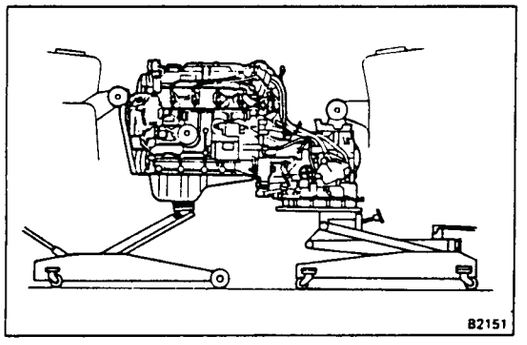
13. REMOVE ENGINE MOUNTING CENTER MEMBER
    (a) Remove the four bolts.
    (b) Remove the center member.



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)



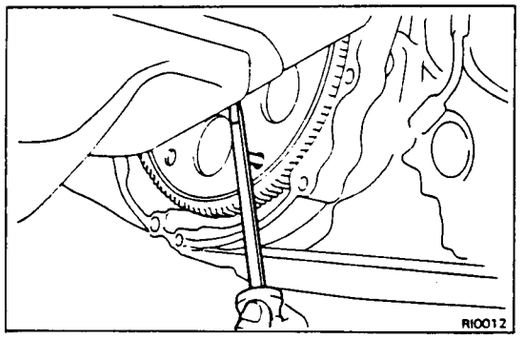
19. REMOVE SIX TORQUE CONVERTER MOUNTING BOLTS
    (a) Turn the crankshaft to gain access to each bolt.
    (b) Hold the crankshaft pulley nut with a wrench.
    (c) Remove the six bolts.
20. REMOVE LH ENGINE MOUNTING
    (a) Hold the engine and transaxle with two jacks, or a chain block and jack.
    (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.



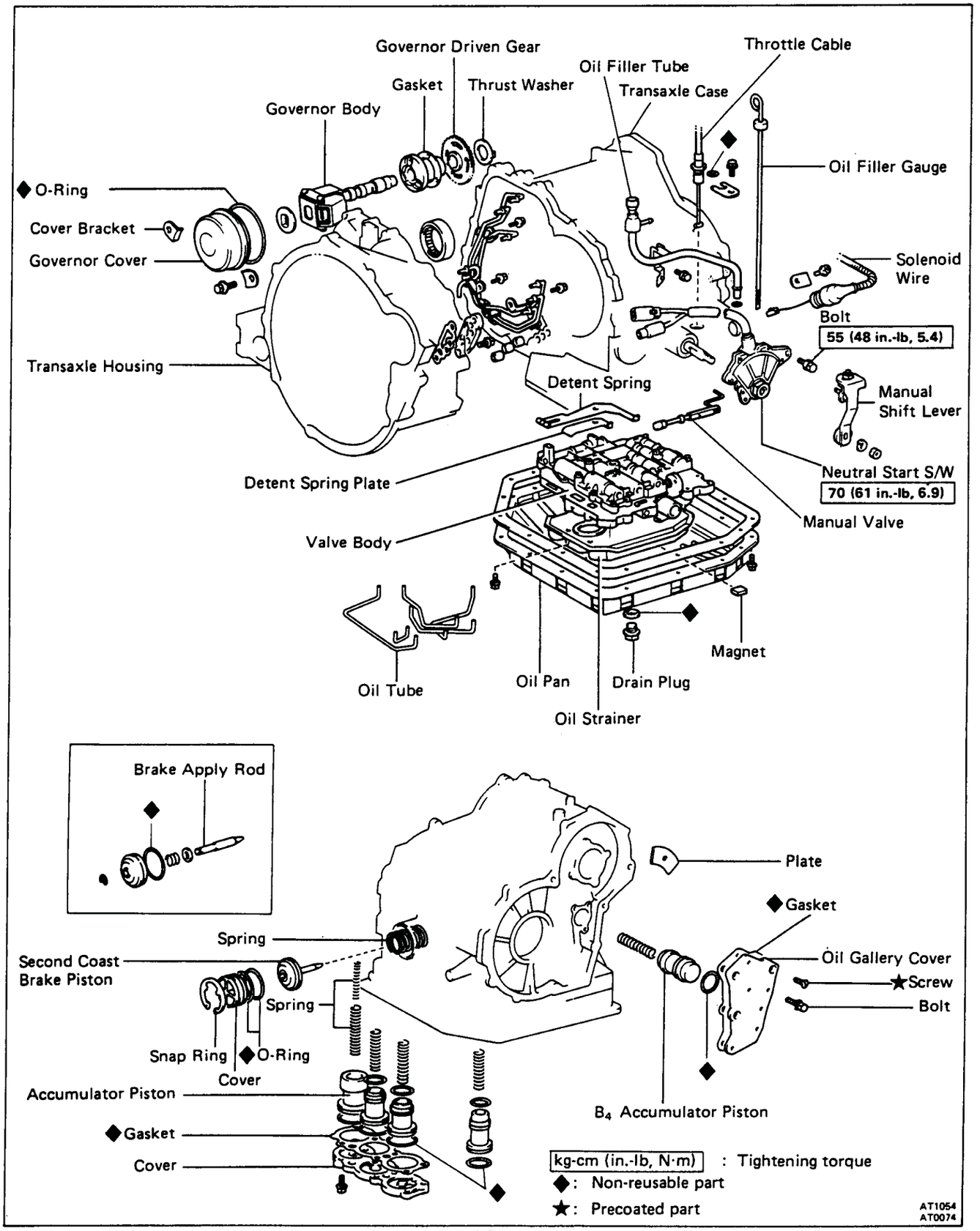
23. PRY ON END OF GUIDE PIN TO BEGIN MOVING TRANSMISSION WITH CONVERTER

    The guide pin helps keep the converter with the transmission.

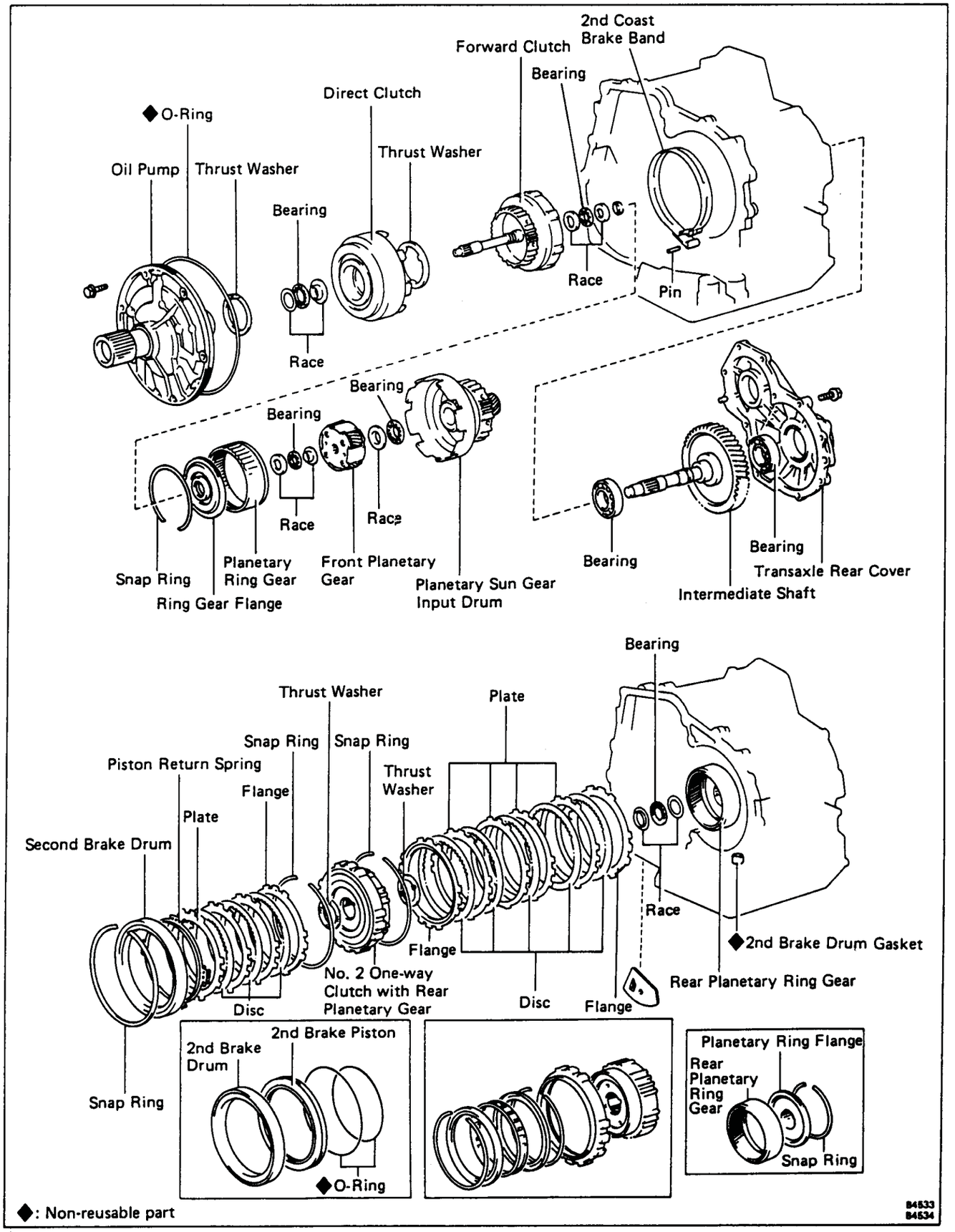
24. REMOVE TRANSAXLE ASSEMBLY FROM ENGINE
25. REMOVE TORQUE CONVERTER FROM TRANSMISSION

DISASSEMBLY OF TRANSMISSION (A240L)

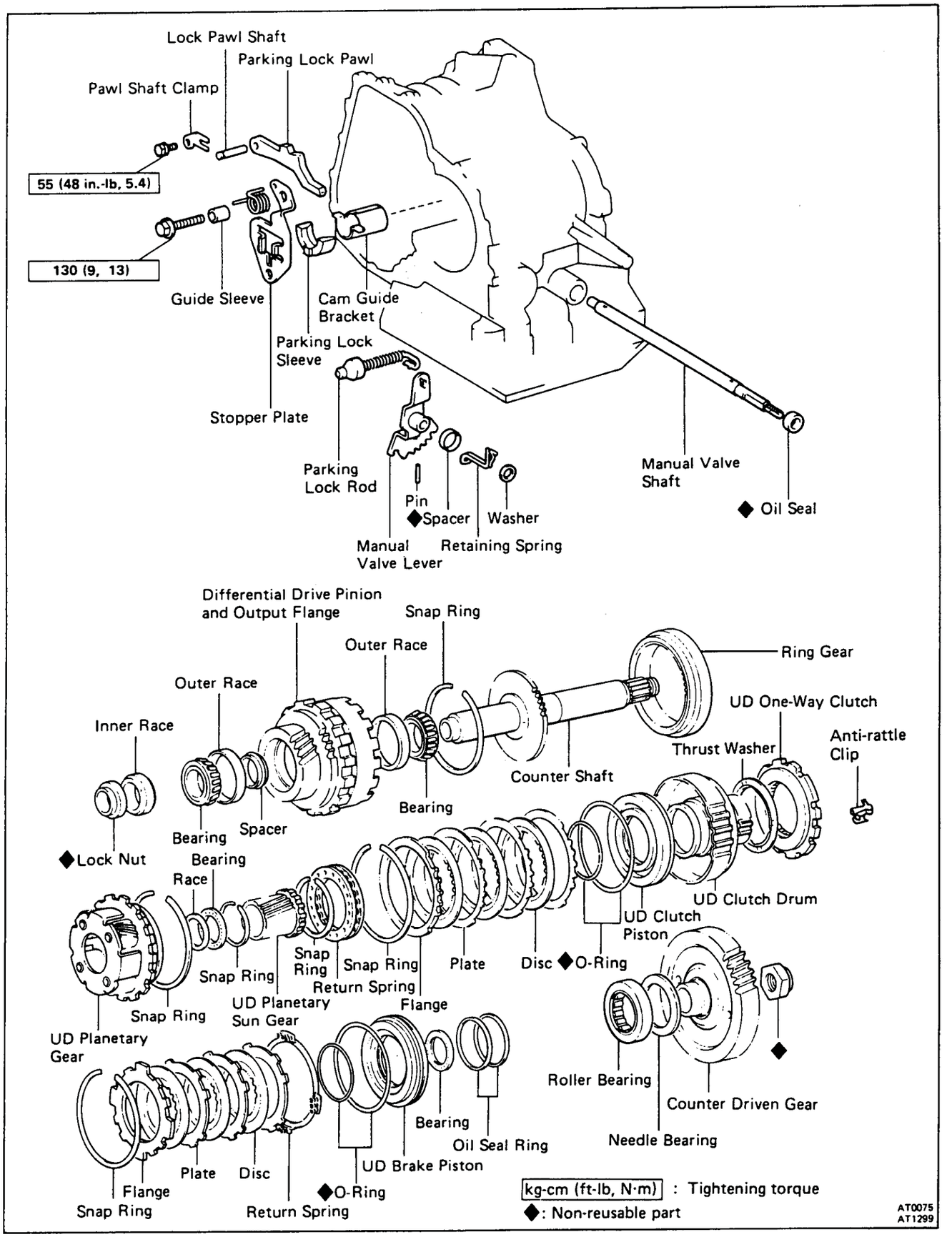
COMPONENTS

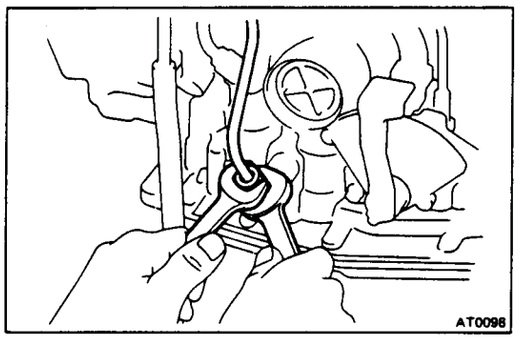


COMPONENTS (Cont'd)



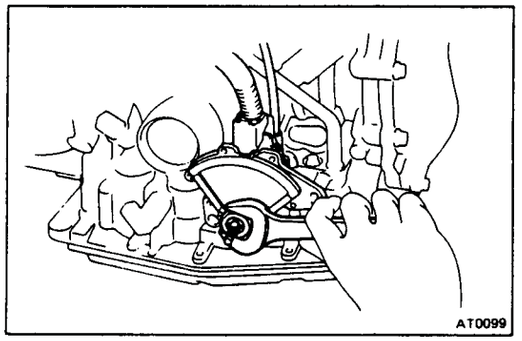
COMPONENTS (Cont'd)



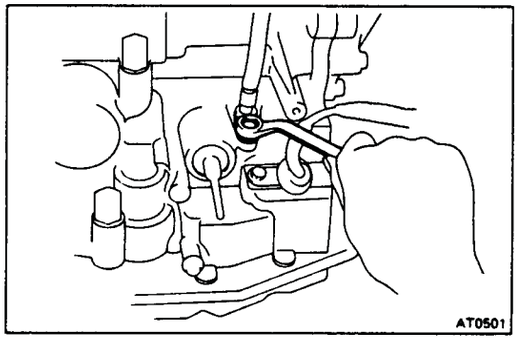


SEPARATE BASIC SUBASSEMBLY

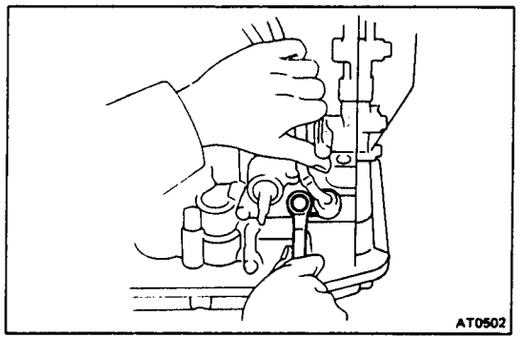
1. REMOVE TWO OIL COOLER PIPES
2. REMOVE OIL FILLER GAUGE AND TUBE
3. REMOVE MANUAL SHIFT LEVER



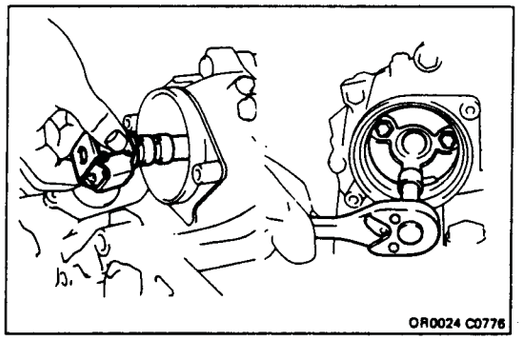
4. REMOVE NEUTRAL START SWITCH



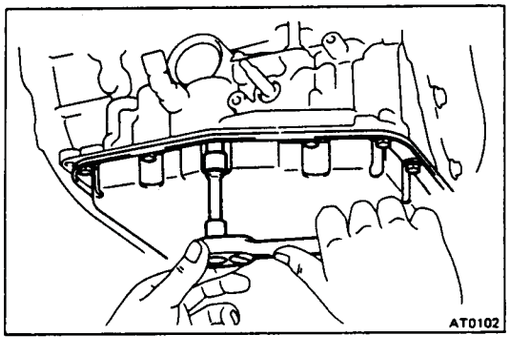
5. REMOVE THROTTLE CABLE RETAINING PLATE



6. REMOVE SOLENOID WIRE RETAINING PLATE



7. REMOVE GOVERNOR BODY
   - (a) Remove the two bolts and cover brackets.
   - (b) Remove the governor cover and O-ring.
   - (c) Remove the governor body with thrust washer.
   - (d) Remove the three bolts and governor body adaptor.
   - (e) Remove the gasket.



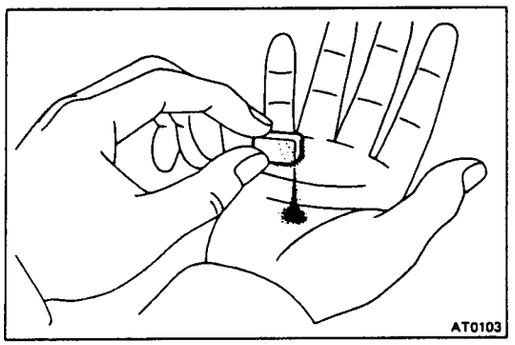
8. REMOVE PAN AND GASKET

(a) Remove the eighteen bolts.

(b) 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.

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

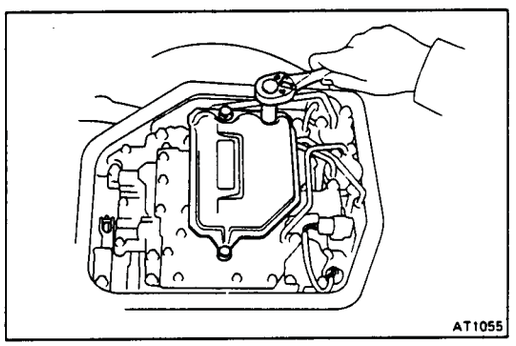


9. EXAMINE PARTICLES IN PAN

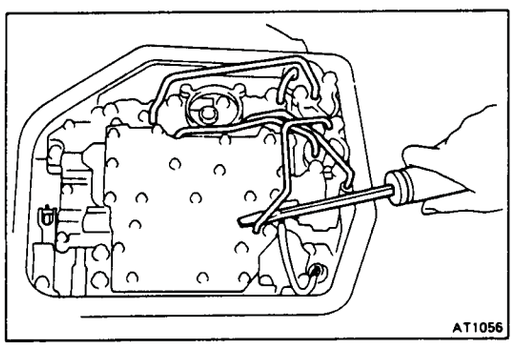
Remove the magnet and use it to collect any steel chips. Look carefully at the chips and particles in the pan and on the magnet to anticipate what type of wear you will find in the transmission:

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

Brass (non-magnetic) . . . bushing wear

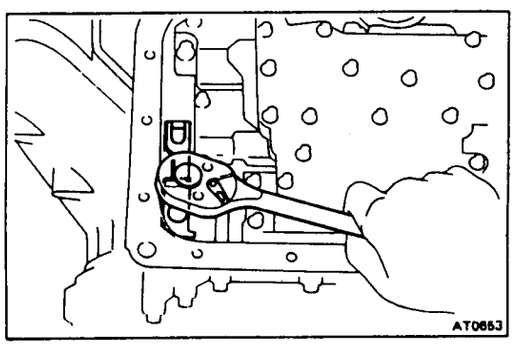


10. TURN TRANSMISSION OVER AND REMOVE OIL STRAINER

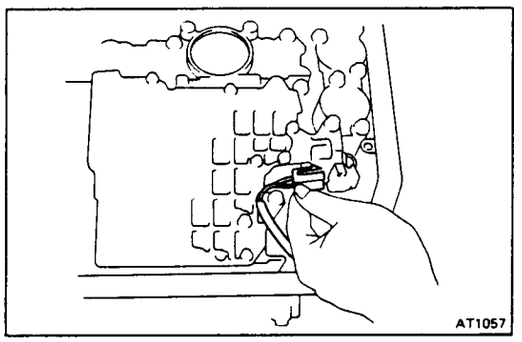


11. REMOVE FIVE OIL TUBES

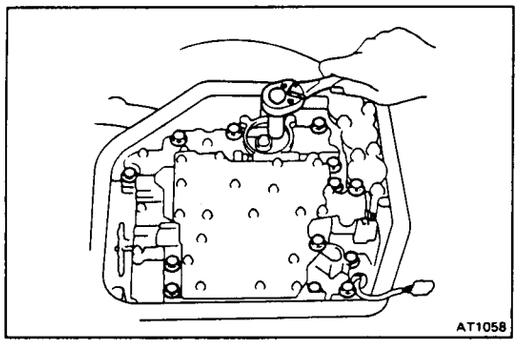
Pry up both tube ends with a large screwdriver and remove the five tubes.



12. REMOVE MANUAL DETENT SPRING



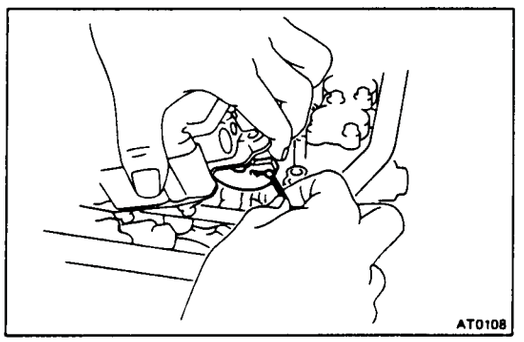
13. DISCONNECT SOLENOID



14. REMOVE VALVE BODY

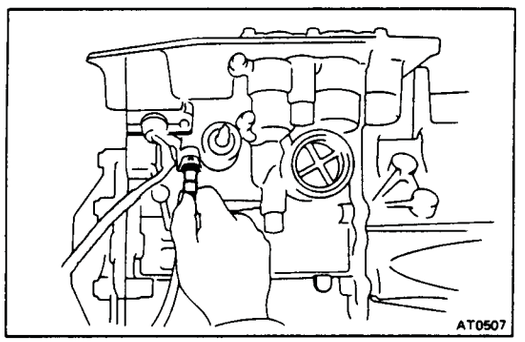
(a) Remove the solenoid set bolt.

(b) Remove teh thirteen bolts and wire retainer.

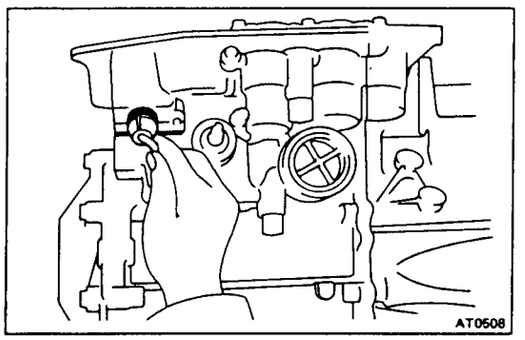


(c) Disconnect the throttle cable from the cam.

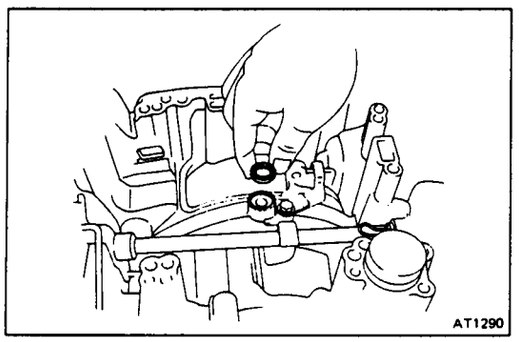
(d) Disconnect manual valve connecting rod from the manual valve lever and remove the valve body.



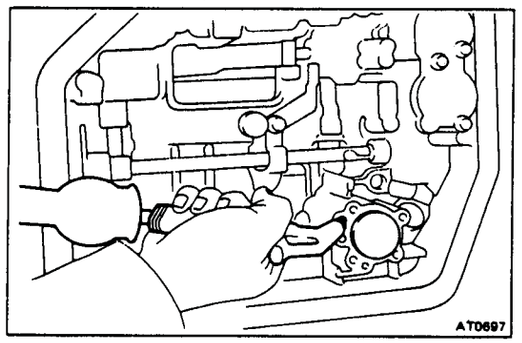
15. REMOVE THROTTLE CABLE FROM CASE



16. REMOVE SOLENOID WIRE

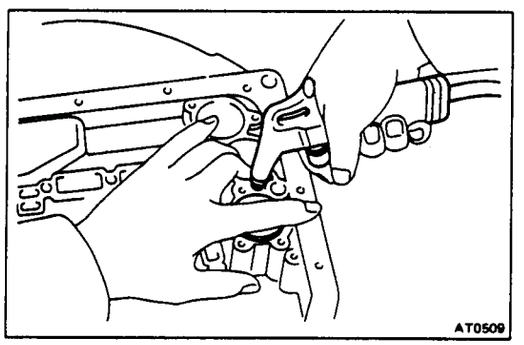


17. REMOVE GOVERNOR APPLY GASKET



18. REMOVE C_3 ACCUMULATOR PISTON AND SPRING

Using low pressure compressed air (1 kg/cm², 14 psi or 98 kPa) pop out the piston into a rag. Force air into the hole shown and remove the piston and spring.



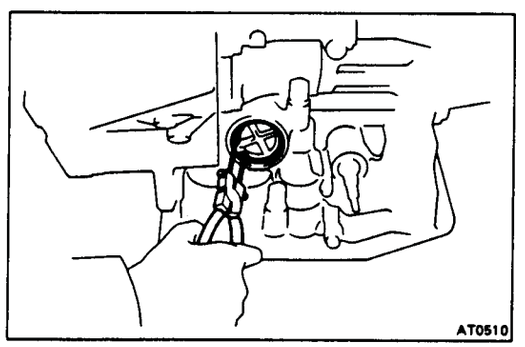
19. REMOVE ACCUMULATOR PISTON AND SPRINGS

(a) Loosen the six bolts one turn at a time until the spring tension is released.

(b) Remove the cover and the gasket.

(c) Remove the piston and spring for C_1.

(d) Using low-pressure compressed air (1 kg/cm², 14 psi or 98 98 kPa) pop out piston B_2 and C_2 into a rag. Force air into the hole shown and remove the piston and springs.



20. TURN TRANSMISSION OVER AND MEASURE PISTON STROKE OF SECOND COAST BRAKE

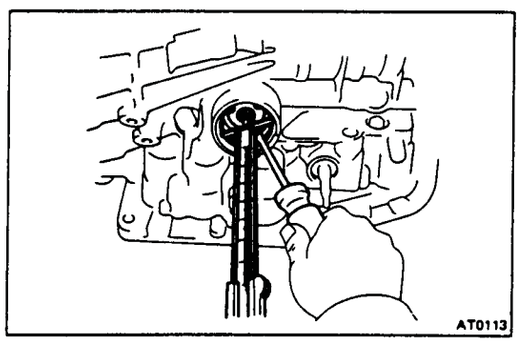
(a) Remove the snap ring.

(b) Remove the cover.

(c) Remove the piston and the outer spring.

(d) Install the piston without the outer spring.

(e) Install the snap ring.

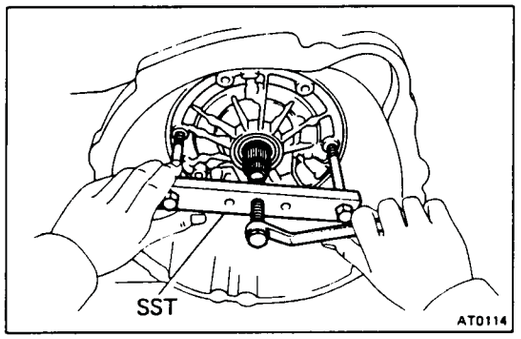


(f) Firmly push the brake apply rod into the case. At this time, measure the distance between the outside of the snap ring and the tip of the piston rod as shown.

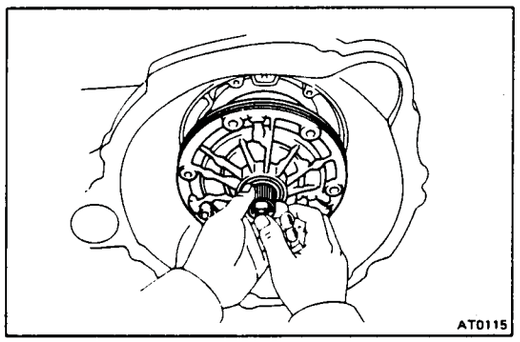
Distance: 14.0 – 15.5 mm (0.551 – 0.610 in.)

[Actual piston stroke is 1.5 – 3.0 mm (0.059 – 0.118 in.)]

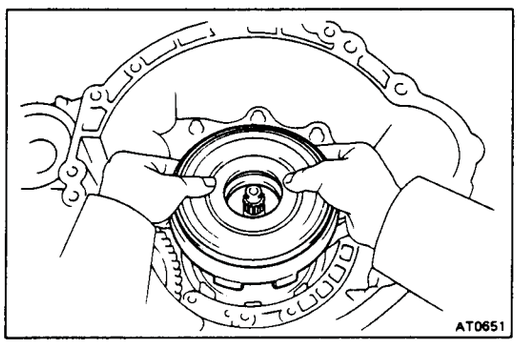
(g) Remove the snap ring and piston.



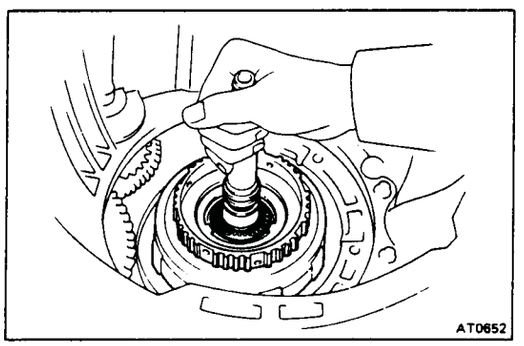
21. REMOVE SIX BOLTS HOLDING OIL PUMP TO TRANSMISSION CASE
22. PULL OIL PUMP FREE FROM TRANSMISSION CASE WITH SST
    SST 09350-32011



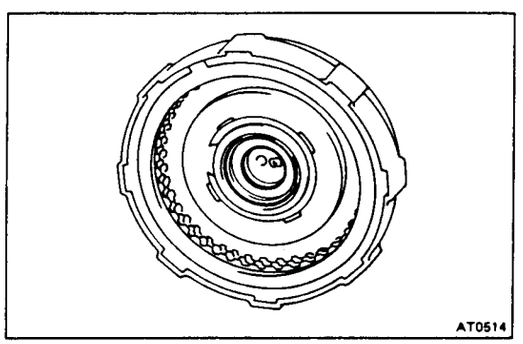
23. REMOVE OIL PUMP
24. WATCH FOR RACE AND BEARING BEHIND OIL PUMP



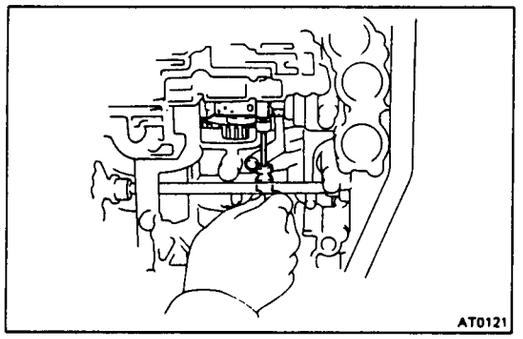
25. REMOVE DIRECT CLUTCH



26. REMOVE FORWARD CLUTCH



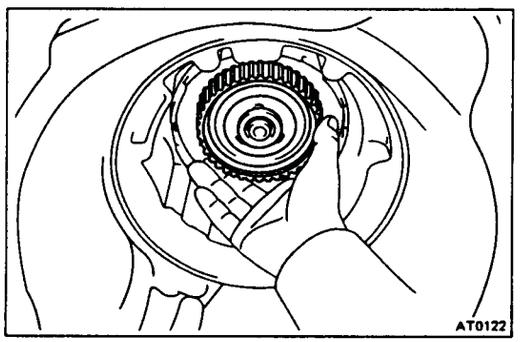
27. WATCH FOR RACE



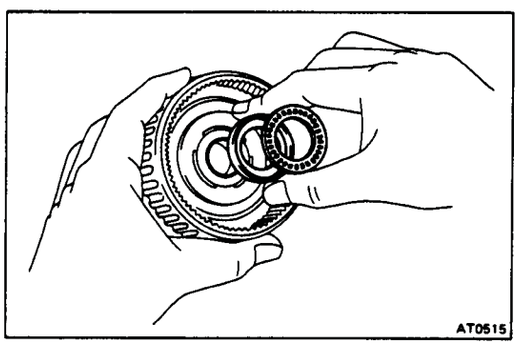
28. REMOVE SECOND COAST BRAKE BAND

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

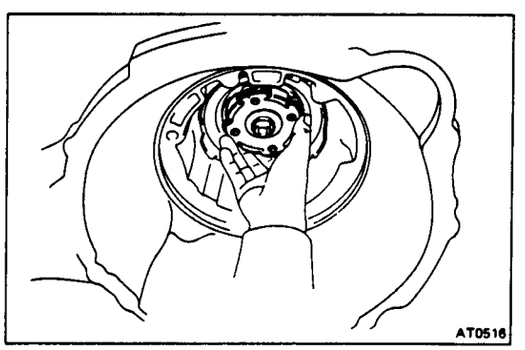
(b) Remove the brake band.



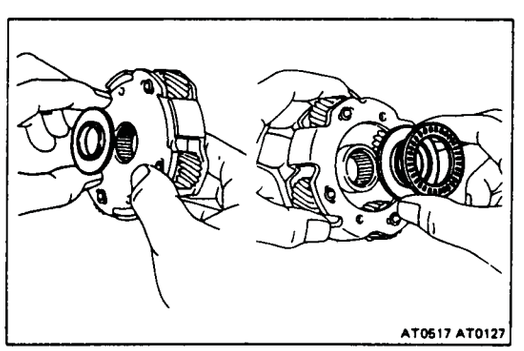
29. REMOVE FRONT PLANETRARY RING GEAR WITH BEARING AND RACE



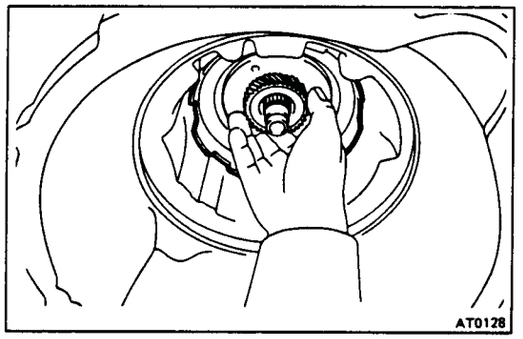
30. WATCH FOR RACE AND BEARING ON RING GEAR



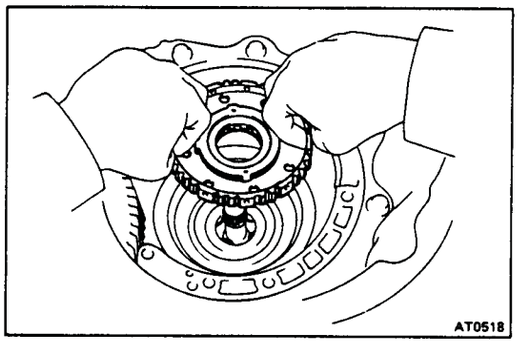
31. REMOVE FRONT PLANETARY GEAR WITH RACE



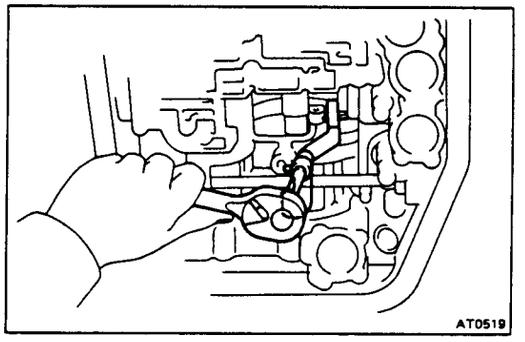
32. WATCH FOR RACES AND BEARING ON FRONT PLANETARY GEAR



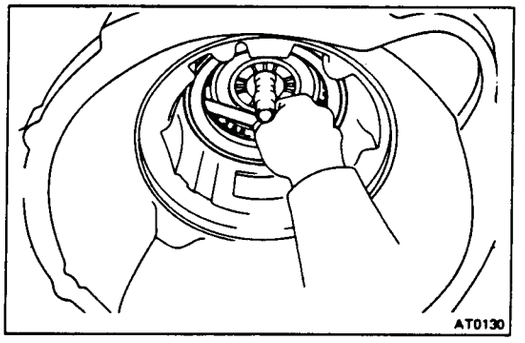
33. REMOVE SUN GEAR, SUN GEAR INPUT DRUM AND THRUST WASHER



34. REMOVE SECOND BRAKE HUB AND NO. 1 ONE-WAY CLUTCH



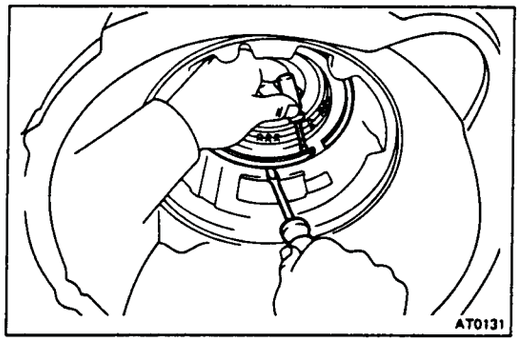
35. REMOVE SECOND COAST BRAKE BAND GUIDE



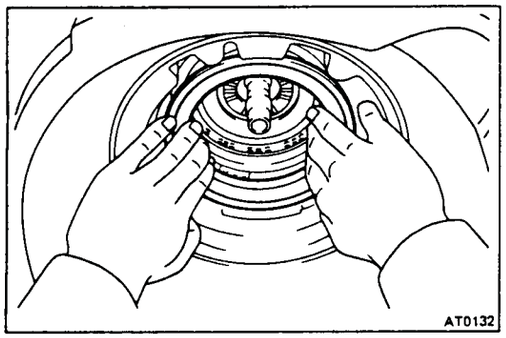
36. MEASURE CLEARANCE OF SECOND BRAKE

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

Clearance: 0.37 – 1.56 mm (0.0146 – 0.0614 in.)



37. REMOVE SNAP RING HOLDING SECOND BRAKE DRUM TO CASE

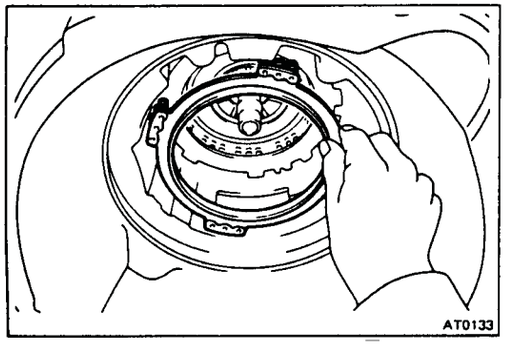


38. REMOVE SECOND BRAKE DRUM

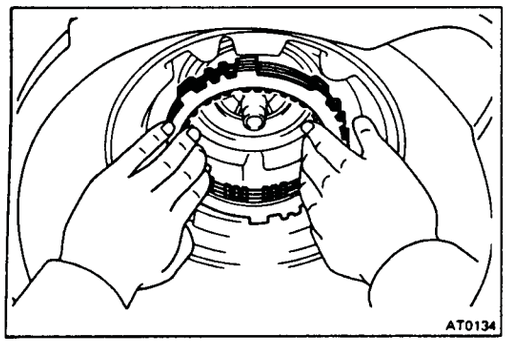
If the piston is difficult to remove, lightly tap the drum with a wooden block.

39. REMOVE SECOND BRAKE DRUM SEAL

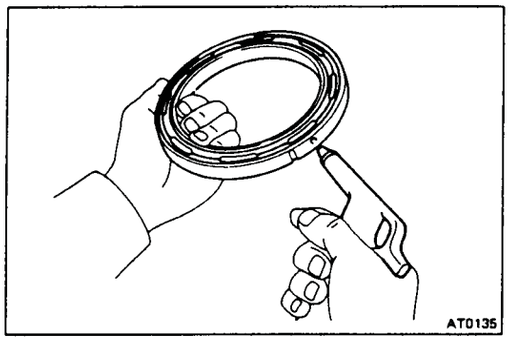
Using a pin punch and hammer, tap out the 2nd brake drum seal.



40. REMOVE SECOND BRAKE PISTON RETURN SPRING



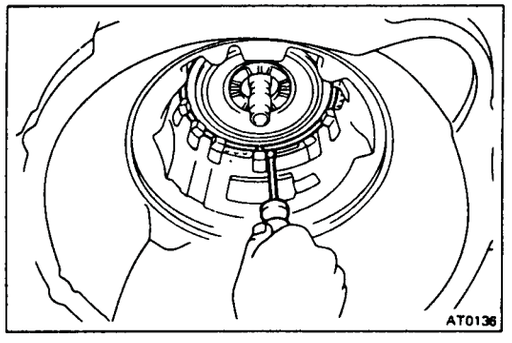
41. REMOVE PLATE, DISC AND FLANGE



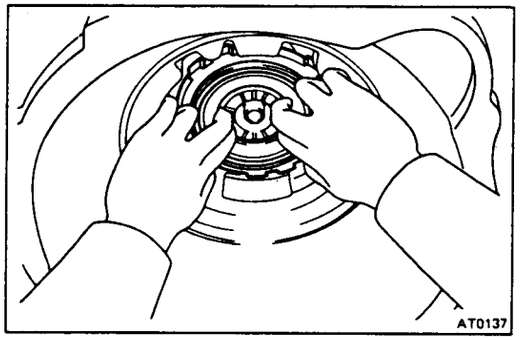
42. BLOW OUT PISTON WITH COMPRESSED AIR

Use compressed air to remove the piston.

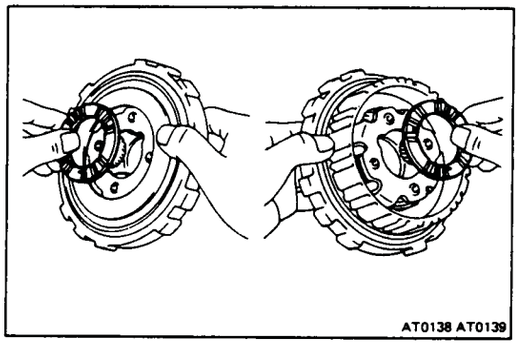
NOTE: Hold the piston so it is not slanted and then blow with the gun slightly away from the oil hole.



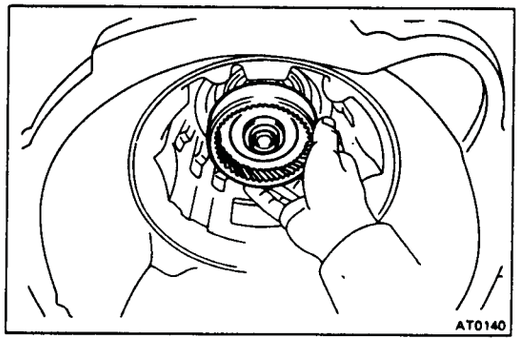
43. REMOVE SNAP RING HOLDING NO. 2 ONE-WAY CLUTCH OUTER RACE TO CASE



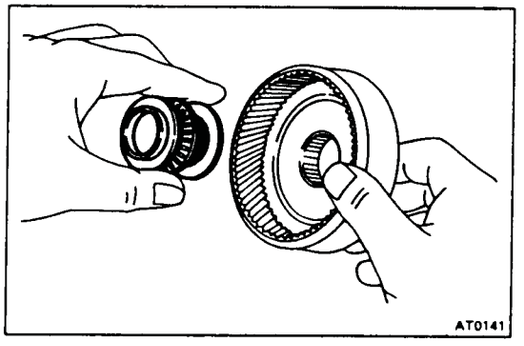
44. REMOVE NO. 2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR WITH THRUST WASHERS



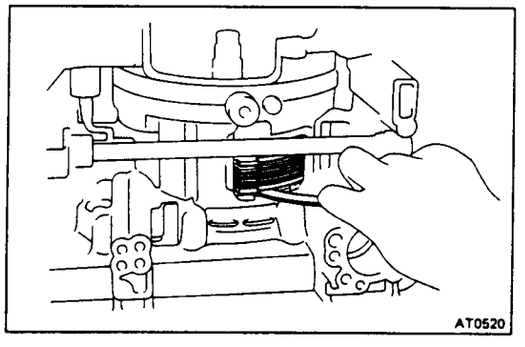
45. WATCH FOR THRUST WASHERS OF PLANETARY CARRIER ON BOTH SIDES



46. REMOVE REAR PLANETARY RING GEAR AND BEARING



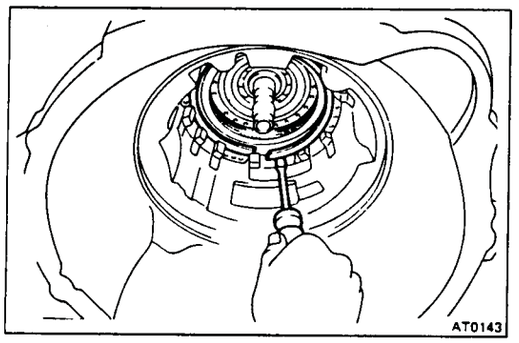
47. WATCH FOR RACES AND BEARING ON RING GEAR



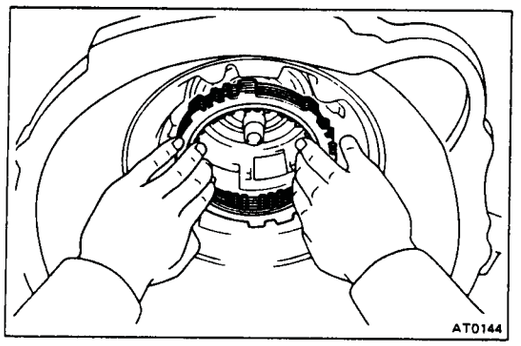
48. MEASURE CLEARANCE OF FIRST AND REVERSE BRAKE

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

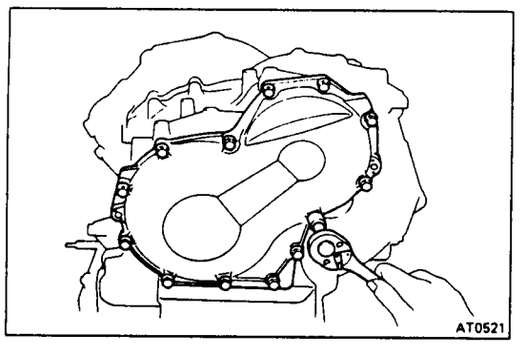
Clearance: 0.89 – 2.11 mm (0.0350 – 0.0831 in.)



49. REMOVE SNAP RING HOLDING FLANGE TO CASE

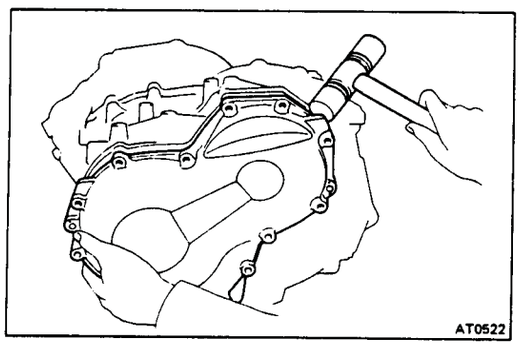


50. REMOVE FLANGES, PLATES AND DISCS



51. TURN TRANSMISSION CASE AROUND

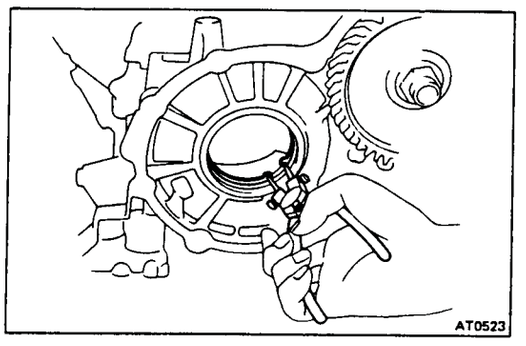
52. REMOVE THIRTEEN BOLTS HOLDING TRANSAXLE REAR COVER TO TRANSMISSION CASE



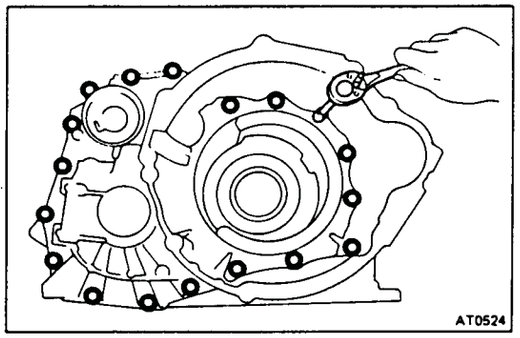
53. REMOVE TRANSAXLE REAR COVER AND INTERMEDIATE SHAFT

(a) Tap on the circumference of the cover with a plastic hammer to remove the cover from the transmission case.

(b) Remove the intermediate shaft if it stayed in the transmission.

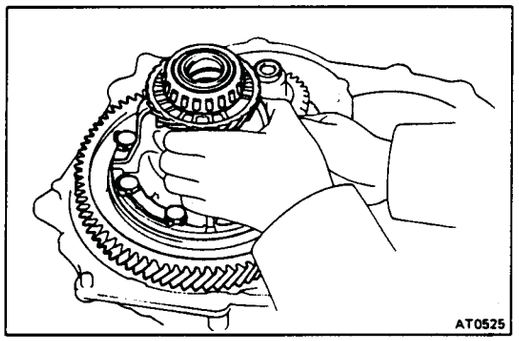


54. REMOVE SNAP RING

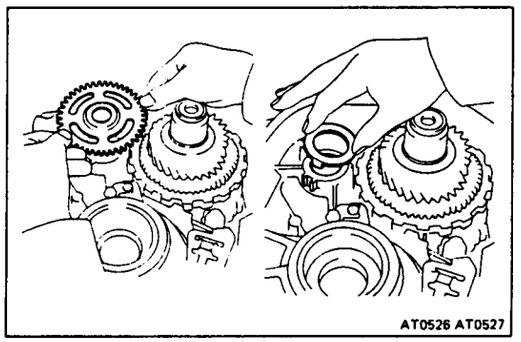


55. REMOVE TRANSAXLE HOUSING

Remove the eighteen bolts and transaxle housing.



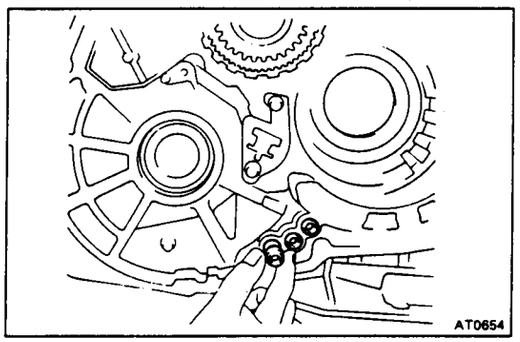
56. REMOVE DIFFERENTIAL



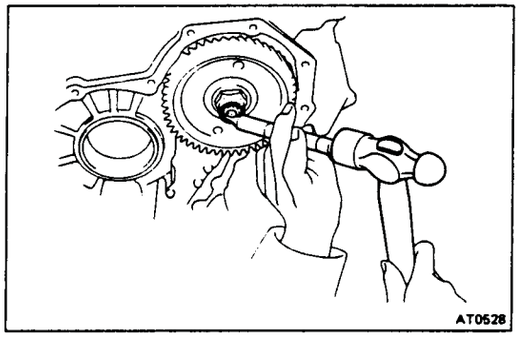
57. REMOVE GOVERNOR DRIVEN GEAR

(a) Remove the governor driven gear.

(b) Remove the thrust washer.

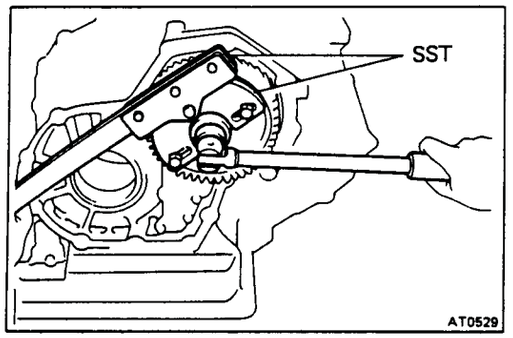


58. REMOVE THREE OIL SEALS



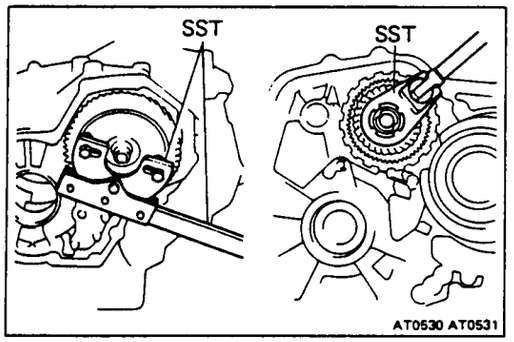
59. REMOVE COUNTER SHAFT LOCK NUTS

(a) Using a chisel and hammer, unstake the counter shaft lock nuts on both sides.



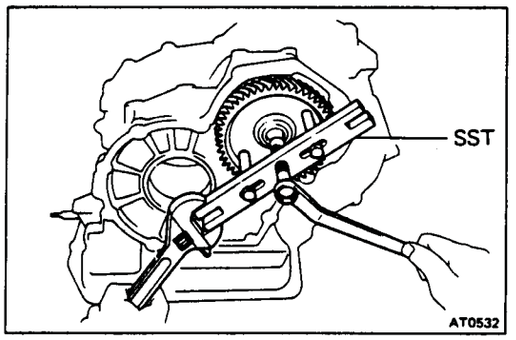
(b) Using SST, remove the lock nut of the driven gear side.

SST 09330-00020 and 09350-32011



(c) Using SST to hold the driven gear, remove the lock nut of the front side.

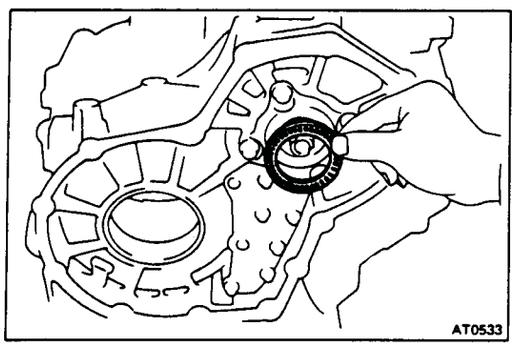
SST 09330-00020 and 09350-32011



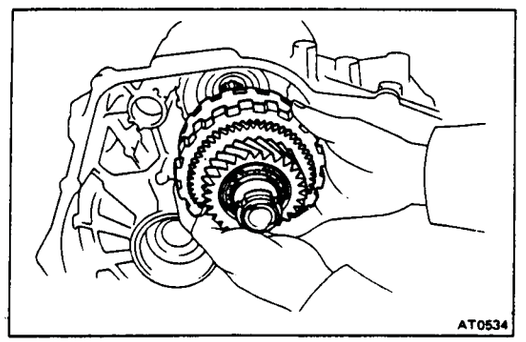
60. REMOVE COUNTER DRIVEN GEAR

Using SST, remove the driven gear.

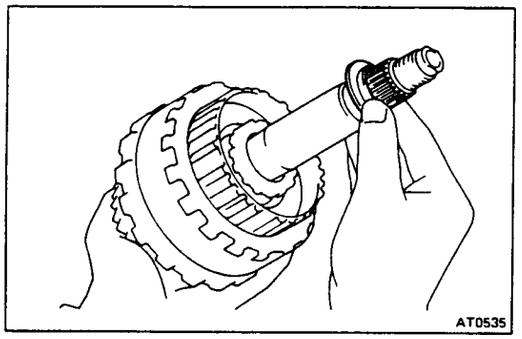
SST 09350-32011



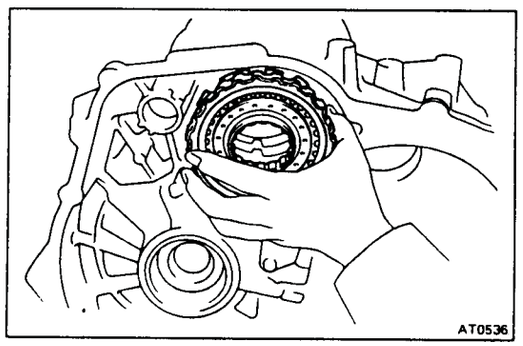
61. REMOVE THRUST NEEDLE BEARING



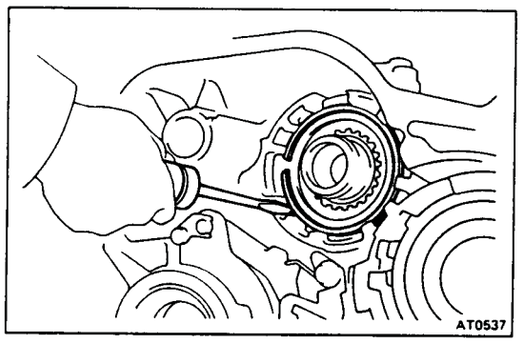
62. REMOVE COUNTER SHAFT ASSEMBLY AND ANTI-RATTLE CLIP



63. REMOVE THRUST BEARING WITH RACE

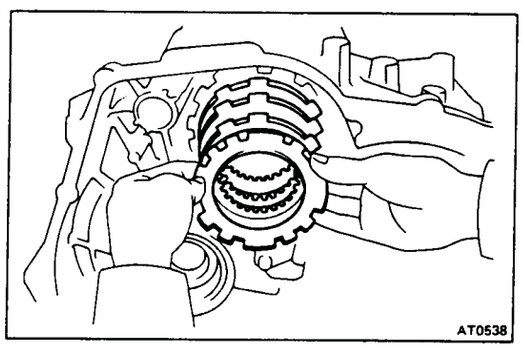


64. REMOVE UNDERDRIVE CLUTCH DRUM

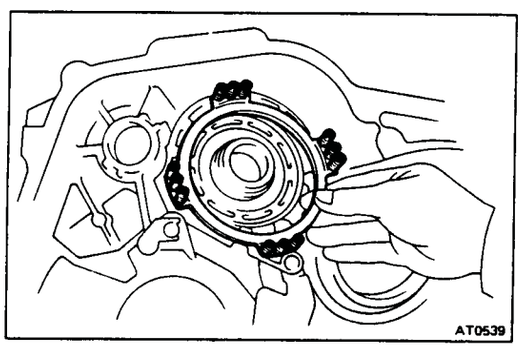


65. REMOVE SNAP RING

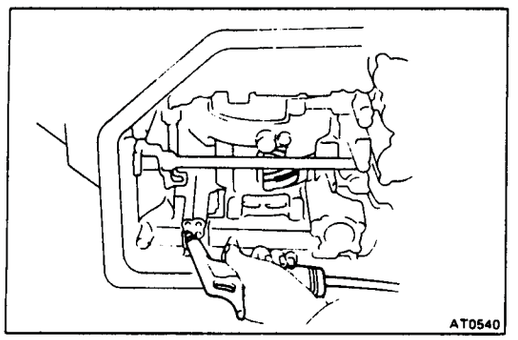
CAUTION: The snap ring is cushioned by the return spring, so when removing be careful that is does not fly off.



66. REMOVE FLANGE PLATES AND DISCS

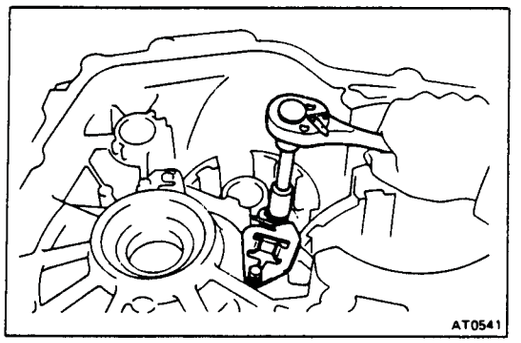


67. REMOVE BRAKE RETURN SPRING

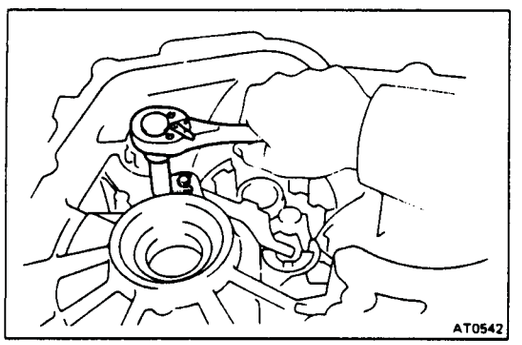


68. REMOVE UNDERDRIVE BRAKE PISTON

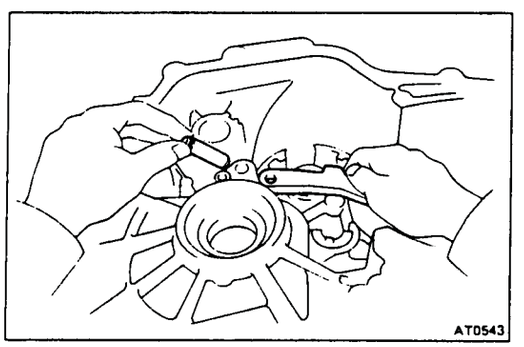
Using low-pressure compressed air (1 kg/cm², 14 psi or 98 kPa) pop out the brake piston into a rag. Force air into the hole shown and remove the brake piston.



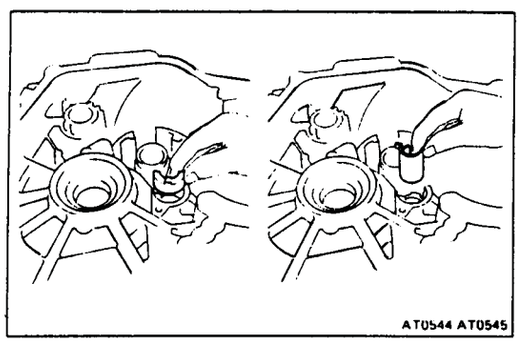
69. REMOVE PARKING LOCK PAWL STOPPER PLATE, TORSION SPRING AND SPRING GUIDE



70. REMOVE PAWL SHAFT CLAMP

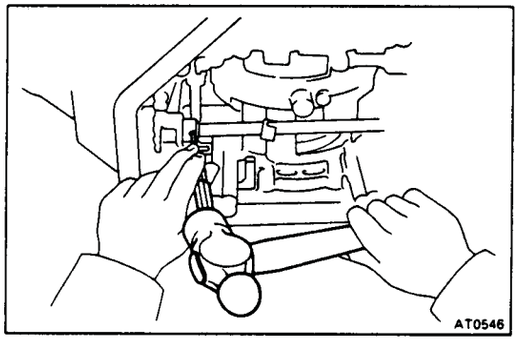


71. REMOVE PARKING LOCK PAWL SHAFT AND LOCK PAWL



72. REMOVE PARKING LOCK SLEEVE

73. REMOVE CAM GUIDE BRACKET

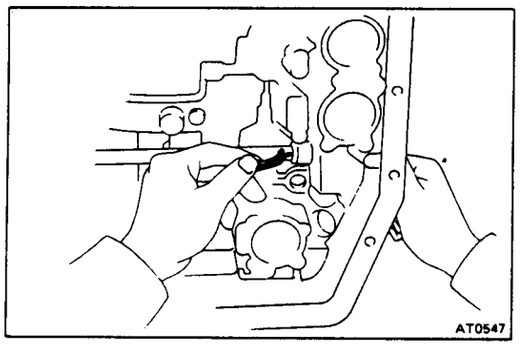


74. REMOVE MANUAL VALVE SHAFT SPACER

Unstake the spacer and remove it.

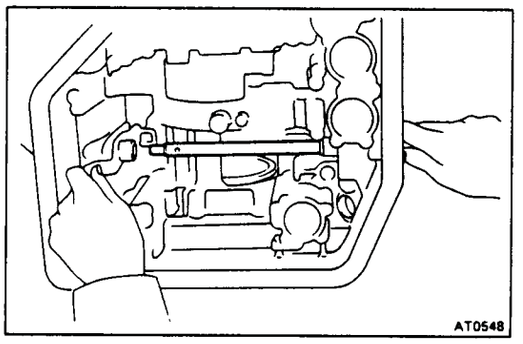
75. REMOVE PIN

Using a punch and hammer, drive out the pin.

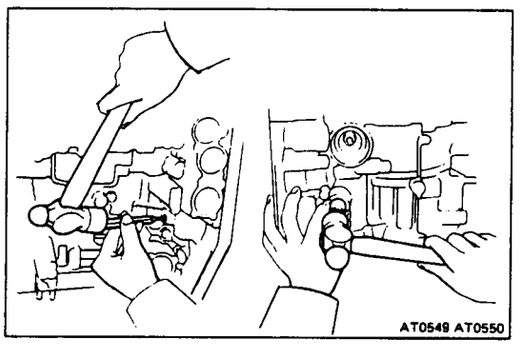


76. REMOVE MANUAL VALVE SHAFT AND LEVER

(a) Remove the retaining spring.



(b) Slide out the manual valve shaft and remove the manual valve lever and washer.

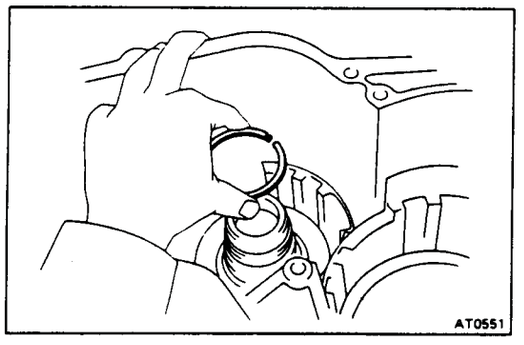


77. IF NECESSARY, REPLACE OIL SEAL OF MANUAL SHAFT

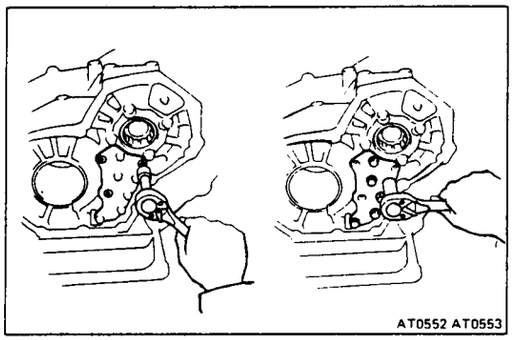
(a) Remove the oil seal with a punch.

(b) Drive in a new oil seal.

(c) Apply MP grease to the oil seal lip.



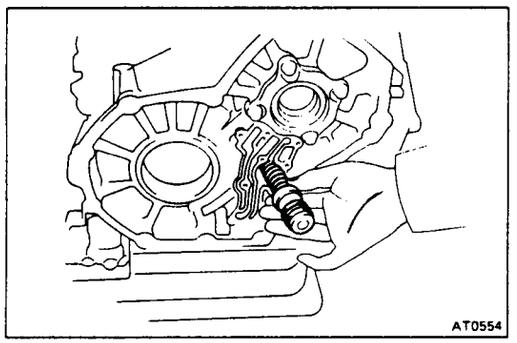
78. REMOVE OIL SEAL RINGS



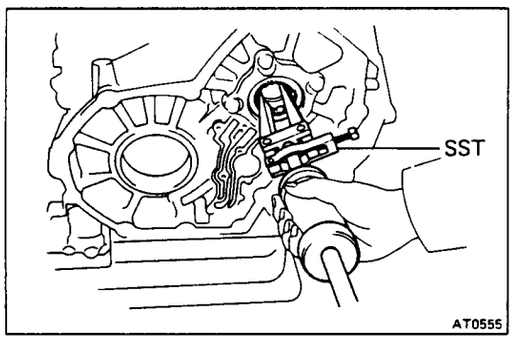
79. REMOVE OIL GALLERY COVER AND GASKET

(a) Remove the three screws and six bolts.

(b) Remove the gallery cover and gasket.



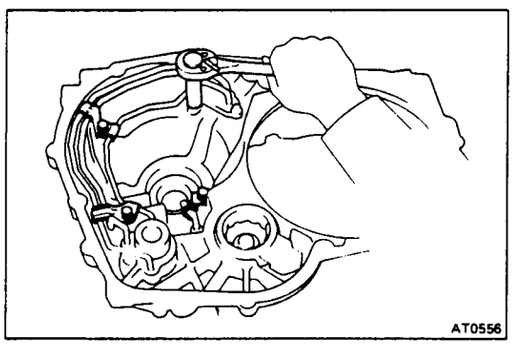
80. REMOVE B_4 ACCUMULATOR PISTON AND SPRING



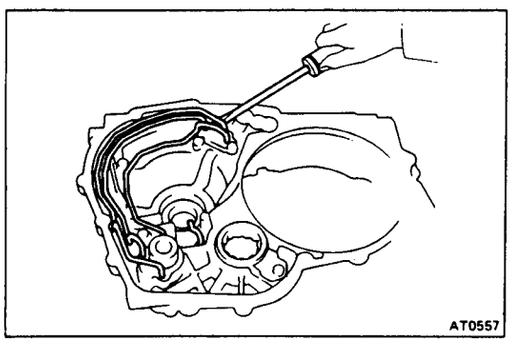
81. REMOVE BEARING

Using SST, remove the bearing.

SST 09308-00010

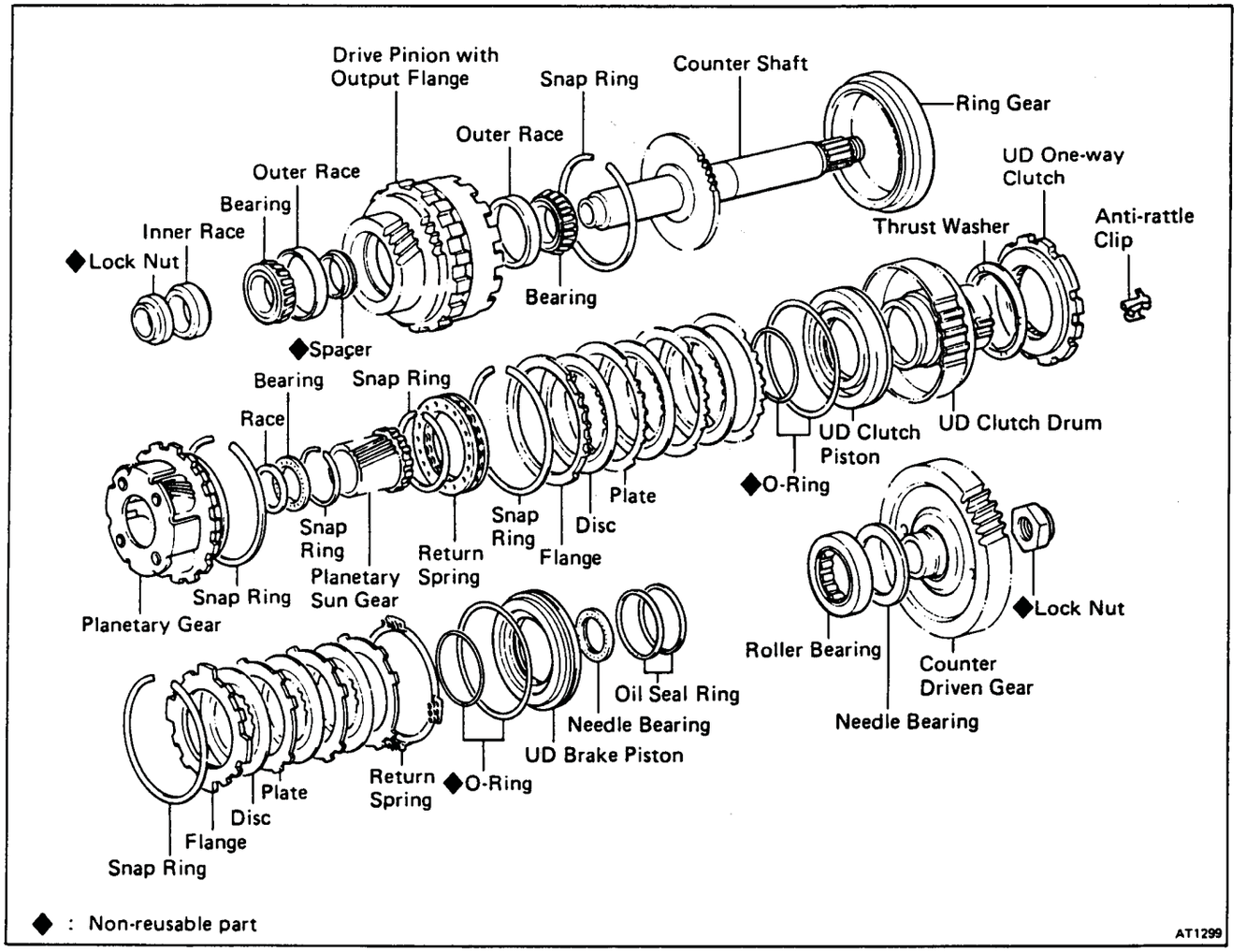


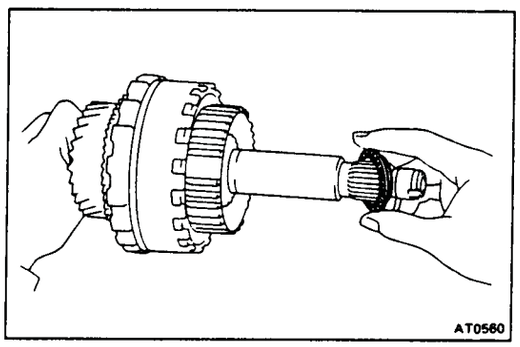
82. REMOVE FOUR OIL TUBE CLAMPS



83. REMOVE FOUR OIL TUBES WITH SCREWDRIVER

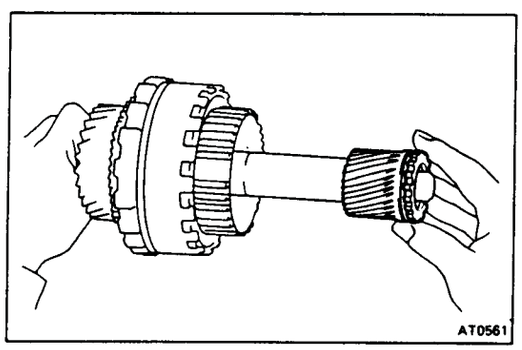
Counter Shaft (A240L)



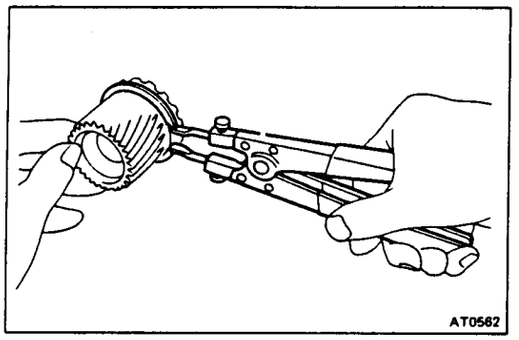


DISASSEMBLY OF COUNTER SHAFT

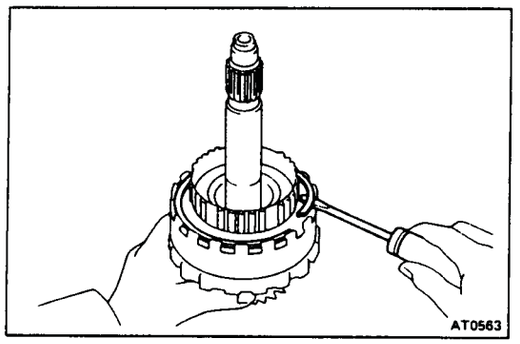
1. REMOVE BEARING



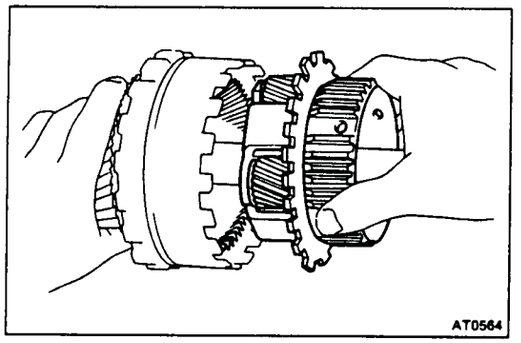
2. REMOVE UNDERDRIVE PLANETARY SUN GEAR FROM COUNTER SHAFT



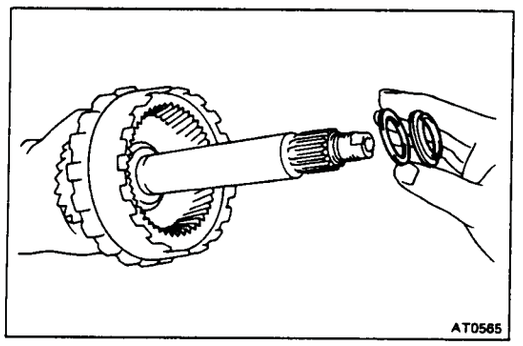
3. REMOVE SNAP RING FROM SUN GEAR WITH SNAP RING PLIERS



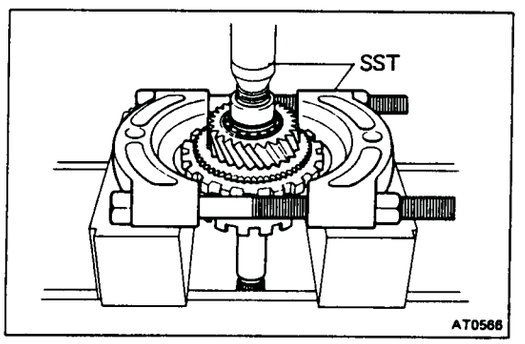
4. REMOVE SNAP RING FROM COUNTER SHAFT ASSEMBLY



5. REMOVE UNDERDRIVE PLANETARY GEAR



6. REMOVE THRUST NEEDLE BEARING AND RACE

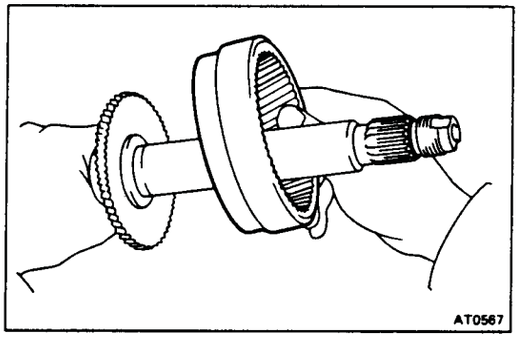


7. REMOVE DRIVE PINION WITH OUTPUT FLANGE, BEARING INNER RACE AND SPACER

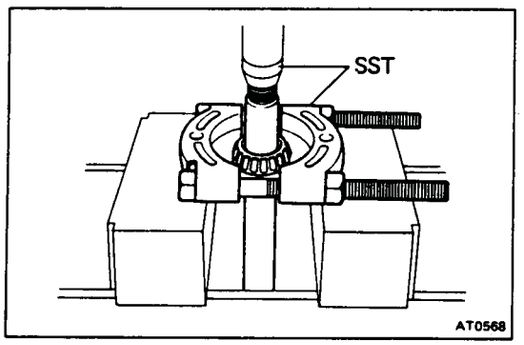
(a) Using SST and press, remove the drive pinion with output flange, bearing and inner race.

SST 09350-32011 and 09555-55010

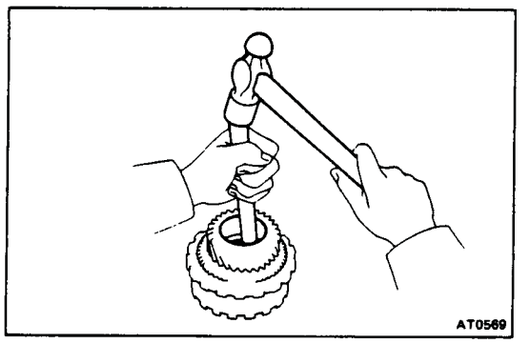
(b) Remove the spacer.



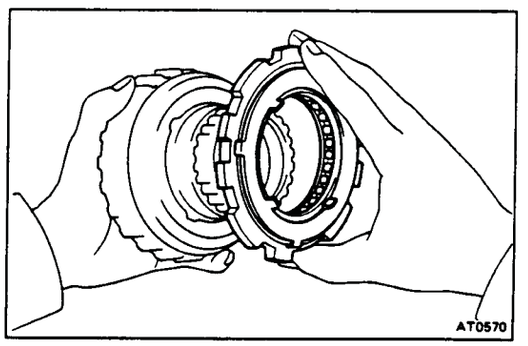
8. REMOVE SNAP RING
9. REMOVE RING GEAR



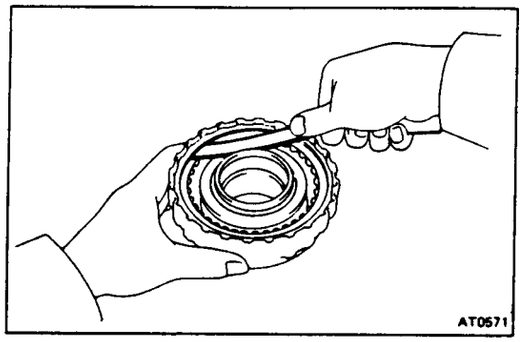
10. REMOVE BEARING
Using SST and press, remove the bearing.
SST 09350-32011 and 09950-00020



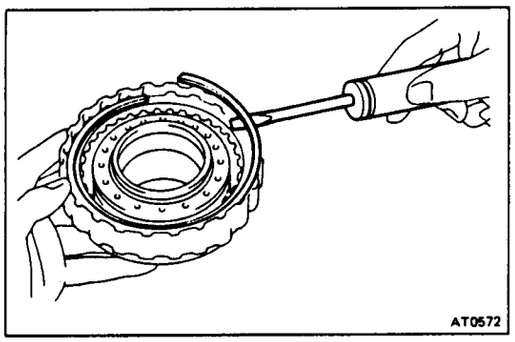
11. REMOVE BEARING OUTER RACE WITH BRASS BAR AND HAMMER



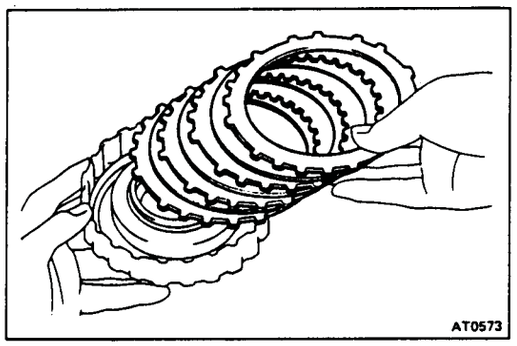
12. REMOVE UNDER DRIVE ONE-WAY CLUTCH FROM CLUTCH DRUM
13. REMOVE THRUST WASHER



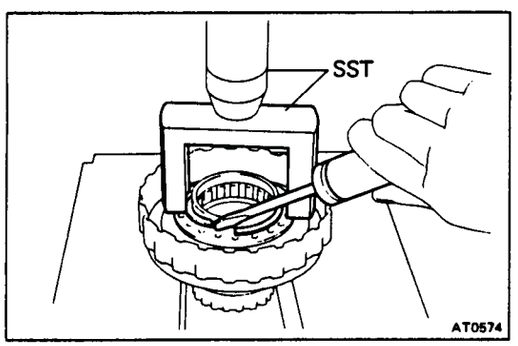
14. MEASURE CLEARANCE OF UNDERDRIVE CLUTCH
Using a thickness gauge, measure the clearance between the snap ring and flange.
Clearance: 0.80 – 1.48 mm (0.0315 – 0.0583 in.)



15. REMOVE SNAP RING



16. REMOVE FLANGE, DISCS AND PLATES

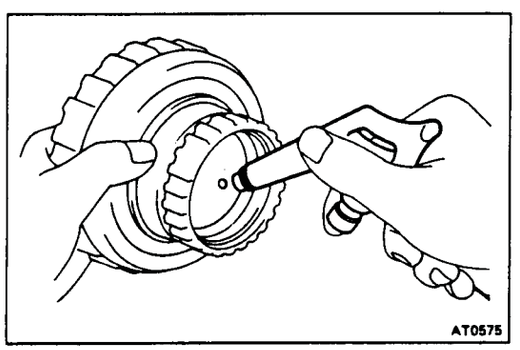


17. COMPRESS PISTON RETURN SPRING AND REMOVE SNAP RING
    (a) Place SST on the spring retainer and compress the springs with a press.

    SST 09350-32011

    (b) Remove the snap ring.

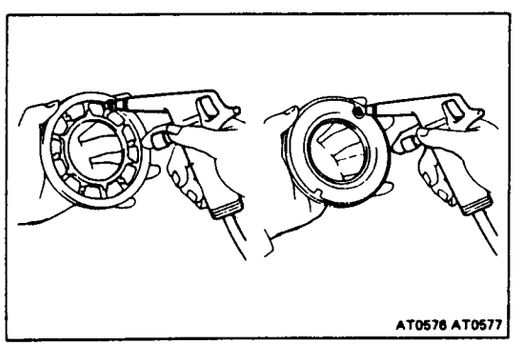
18. REMOVE RETURN SPRING



19. 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.



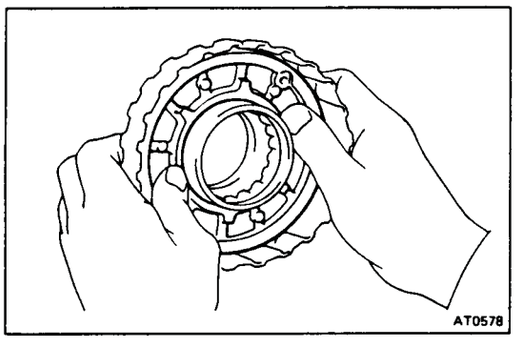
INSPECTION OF UNDERDRIVE UNIT

INSPECT UNDERDRIVE CLUTCH PISTON

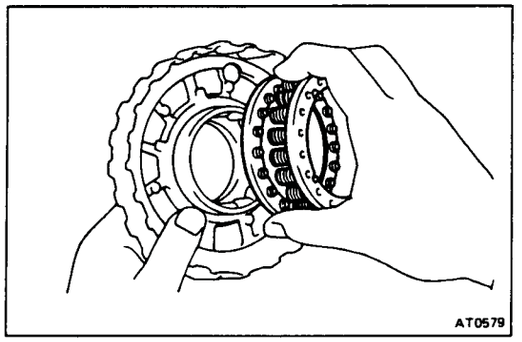
(a) Check that the check ball is free by shaking the piston.

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

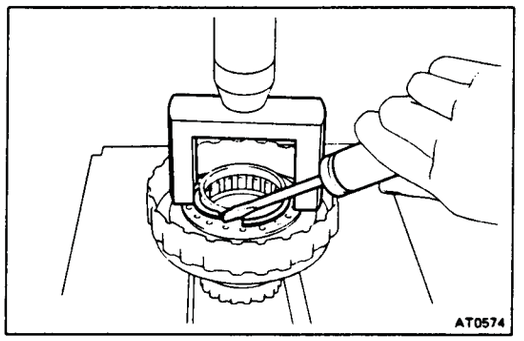
ASSEMBLY OF COUNTER SHAFT



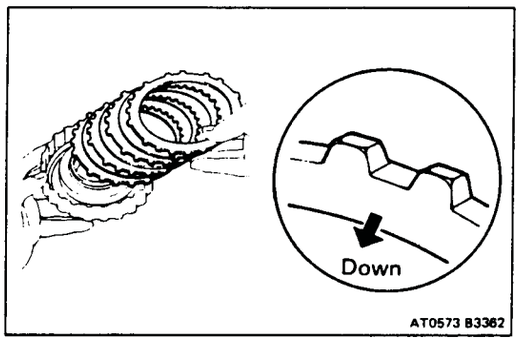
1. **INSTALL NEW O-RINGS ON PISTON**
   Coat the O-rings with ATF.
2. **INSTALL UNDERDRIVE CLUTCH PISTON IN CLUTCH DRUM**
   Be careful not to damage the O-rings.



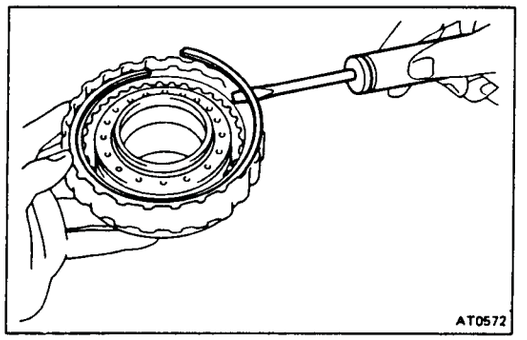
3. **PLACE RETURN SPRING ON CLUTCH PISTON**



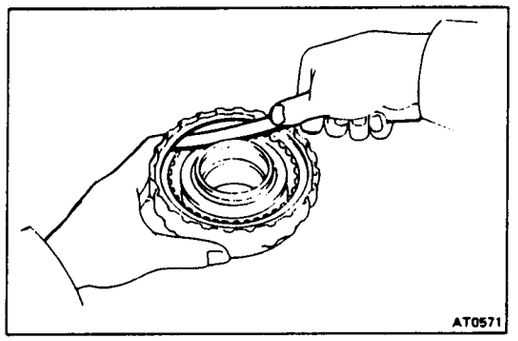
4. **COMPRESS RETURN SPRING AND INSTALL SNAP RING IN GROOVE**
   (a) Place SST on the spring retainer, and compress the spring with a press.
   SST 09350-32011
   (b) Install the snap ring by hand.
   Be sure the end gap of snap ring is not aligned with the spring retainer claw.



5. **INSTALL PLATES, DISCS AND FLANGE**
   Install in order: plate-disc-plate-disc-plate-disc-flange(round end downward)



6. **INSTALL SNAP RING**



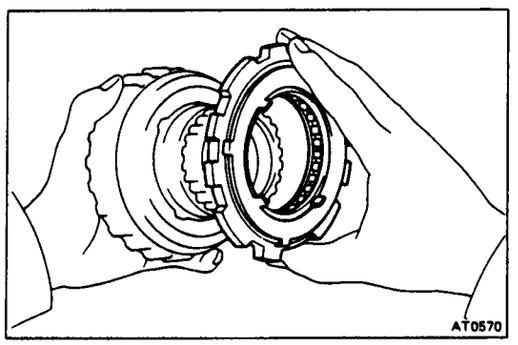
7. CHECK CLEARANCE OF UNDERDRIVE CLUTCH

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

Clearance: 0.80 – 1.48 mm (0.0315 – 0.0583 in.)

NOTE: There are two different thicknesses of the flange. If necessary, select an appropriate one.

Flange thickness: 3.04 mm (0.1197 in.)
3.40 mm (0.1339 in.)



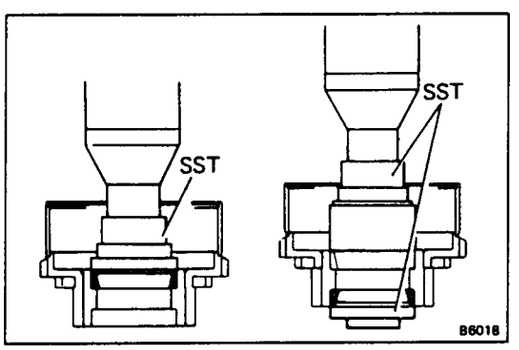
8. INSTALL THRUST WASHER TO CLUTCH DRUM

9. INSTALL UNDERDRIVE ONE-WAY CLUTCH

Install the one-way clutch with the claw of retainer up.

10. CHECK OPERATION OF ONE-WAY CLUTCH

Hold the clutch drum and turn the one-way clutch. The one-way clutch should turn freely counterclockwise and should lock clockwise.



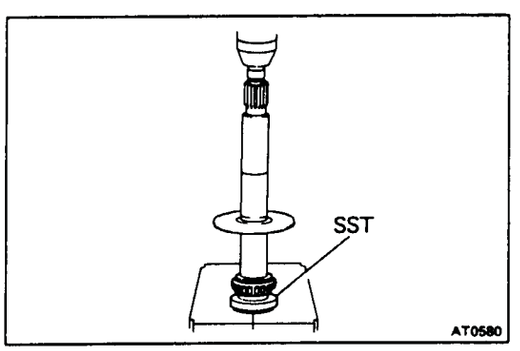
11. INSTALL BEARING OUTER RACES

(a) Using SST and press, press in the thick race to the flange side of the drive pinion with output flange.

SST 09350-32011

(b) Using SST and press, press in the thin race to the another side.

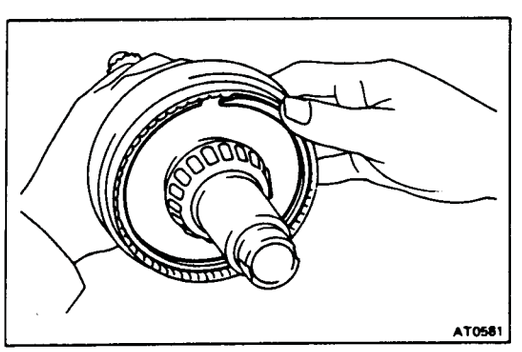
SST 09350-32011



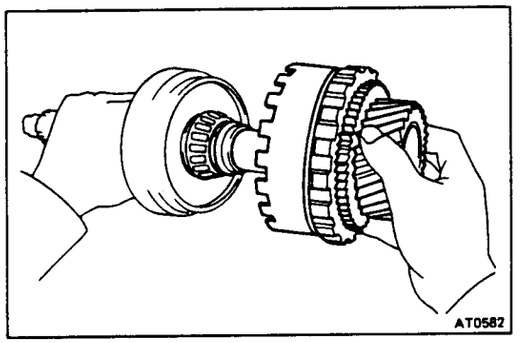
12. INSTALL BEARING TO COUNTER SHAFT

Using SST and press, press in the bearing of the thick inner race side.

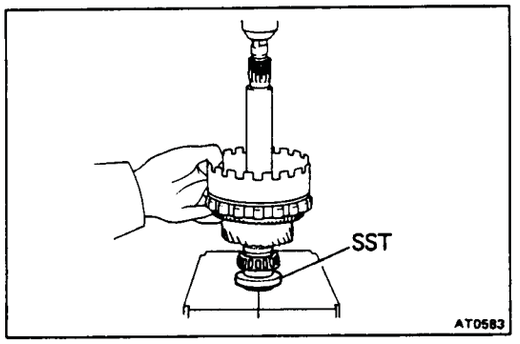
SST 09350-32011



13. INSTALL RING GEAR AND SNAP RING



14. INSTALL NEW SPACER AND DRIVE PINION WITH OUTPUT FLANGE

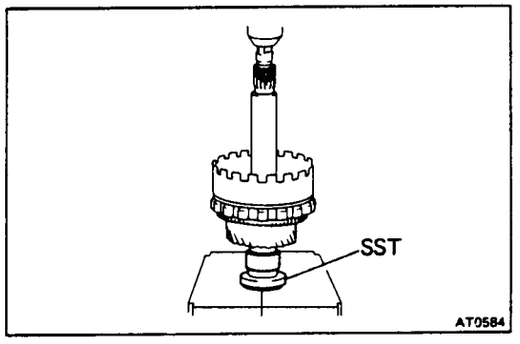


15. INSTALL ANOTHER BEARING TO COUNTER SHAFT

Using SST and press, press in the another bearing.

SST 09350-32011

CAUTION: Be sure that there is some clearance between the output flange and bearing.



16. INSTALL BEARING INNER RACE

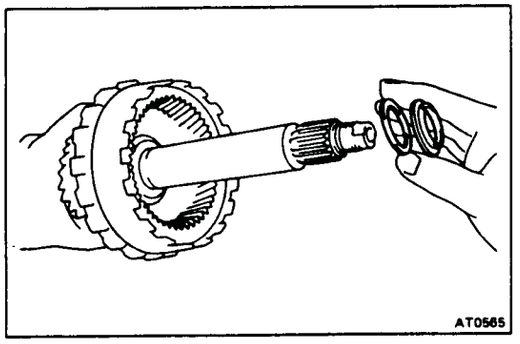
Using SST and press, press in the inner race.

SST 09350-32011

CAUTION: Be sure that there is some clearance.

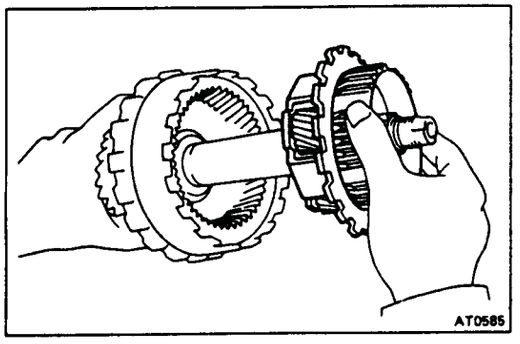
17. INSTALL LOCK NUT

18. ADJUST PRELOAD OF COUNTER SHAFT



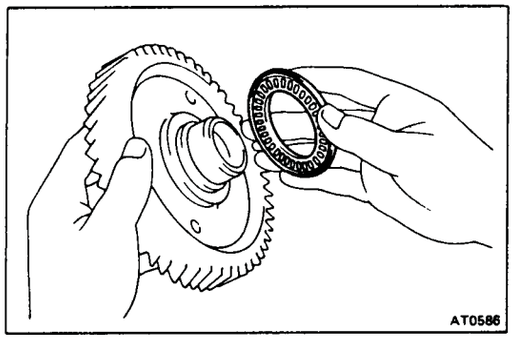
19. INSTALL RACE AND BEARING

Coat the race and bearing with petroleum jelly and install them.



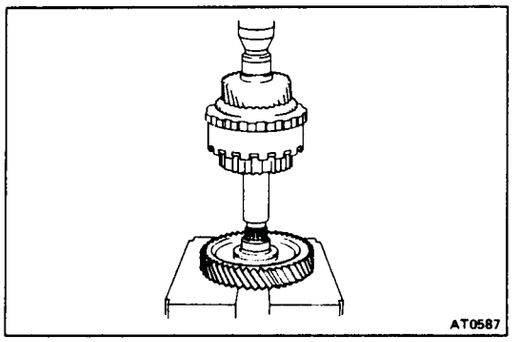
20. INSTALL UNDERDRIVE PLANETARY GEAR

21. INSTALL SNAP RING



22. INSTALL THRUST BEARING TO COUNTER DRIVEN GEAR

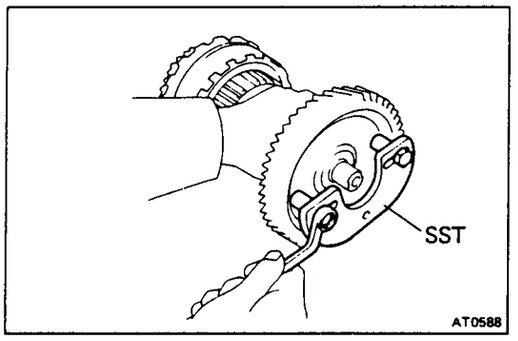
Coat the thrust bearing with petroleum jelly and install it onto the counter driven gear.



ADJUSTMENT OF COUNTER SHAFT PRELOAD

1. TEMPORARY INSTALL COUNTER DRIVEN GEAR

Using a press, press in the driven gear to the counter shaft.

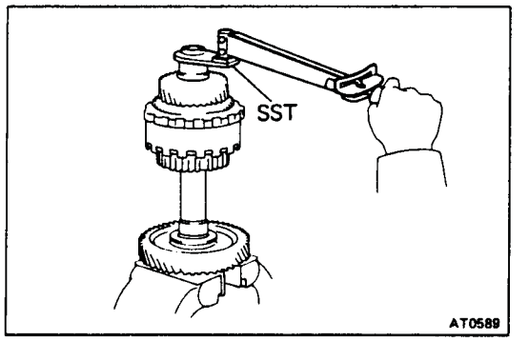


2. INSTALL SST TO COUNTER DRIVEN GEAR

(a) Install SST to the driven gear.

(b) Secure the counter shaft in a vise.

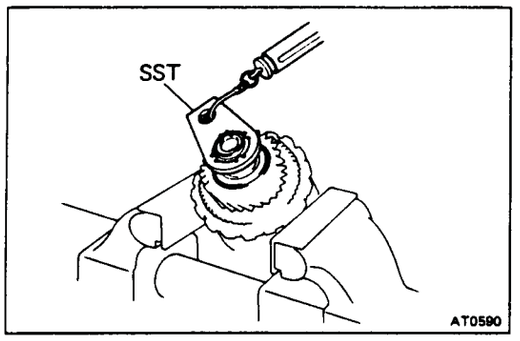
SST 09350-32011



3. TIGHTEN NEW LOCK NUT WITH SST

SST 09350-32011

Torque (Reference): 1,800 – 2,200 kg-cm (131 – 159 ft-lb, 177 – 215 N·m)



4. MEASURE STARTING TORQUE OF COUNTER SHAFT

(a) Snug down the bearing by turning the counter shaft.

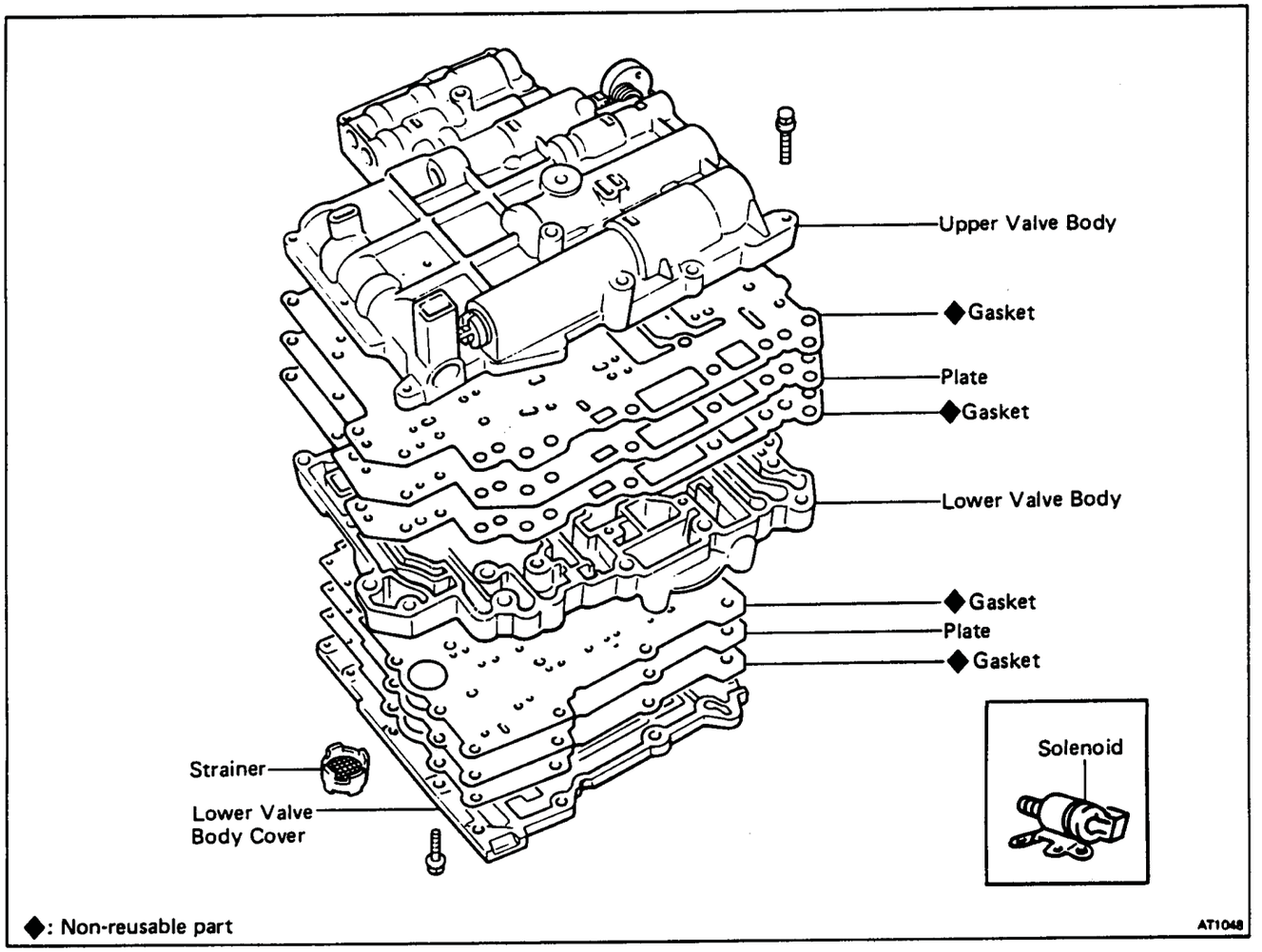
(b) Using SST and spring tension gauge, measure the starting torque of the counter shaft.

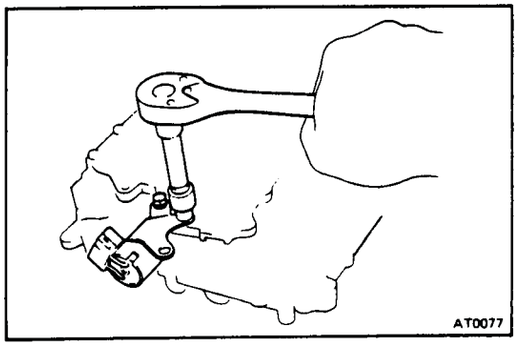
SST 09350-32011

Torque: 1.2 – 2.0 kg (2.6 – 4.4 lb, 12 – 20 N) with tension gauge

NOTE: If the torque is over, replace the spacer. Then recheck the torque.

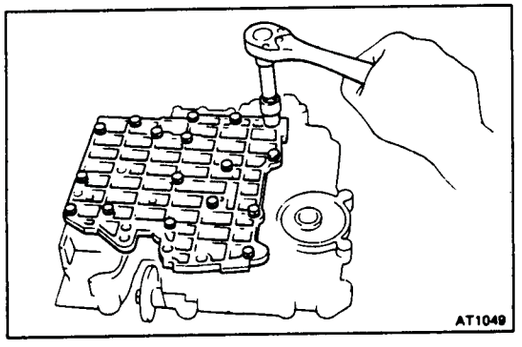
Valve Body (A240L)



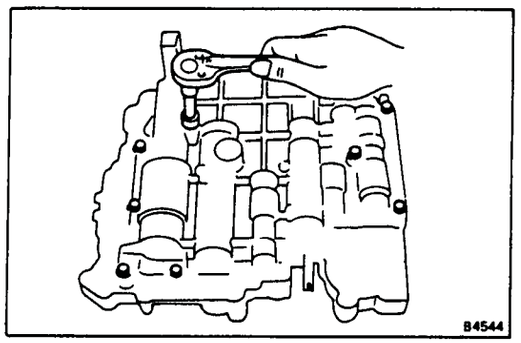


(Disassembly of Valve Body)

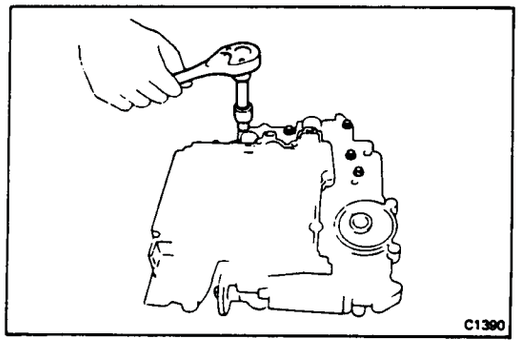
1. REMOVE SOLENOID VALVE



2. REMOVE LOWER VALVE BODY COVER
   (a) Remove the seventeen bolts.
   (b) Remove the cover, gaskets and plate.
3. REMOVE STRAINER



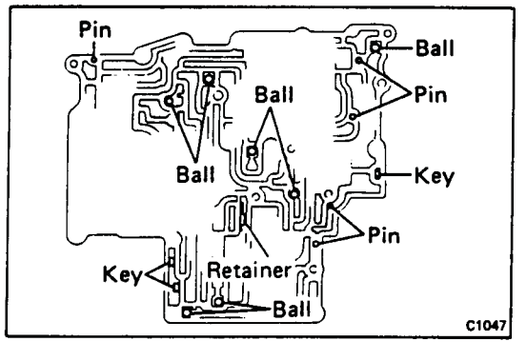
4. **TURN ASSEMBLY OVER AND REMOVE EIGHT BOLTS FROM UPPER VALVE BODY**



5. **TURN ASSEMBLY OVER AND REMOVE FIVE BOLTS FROM LOWER VALVE BODY, AND REMOVE LOWER VALVE BODY**

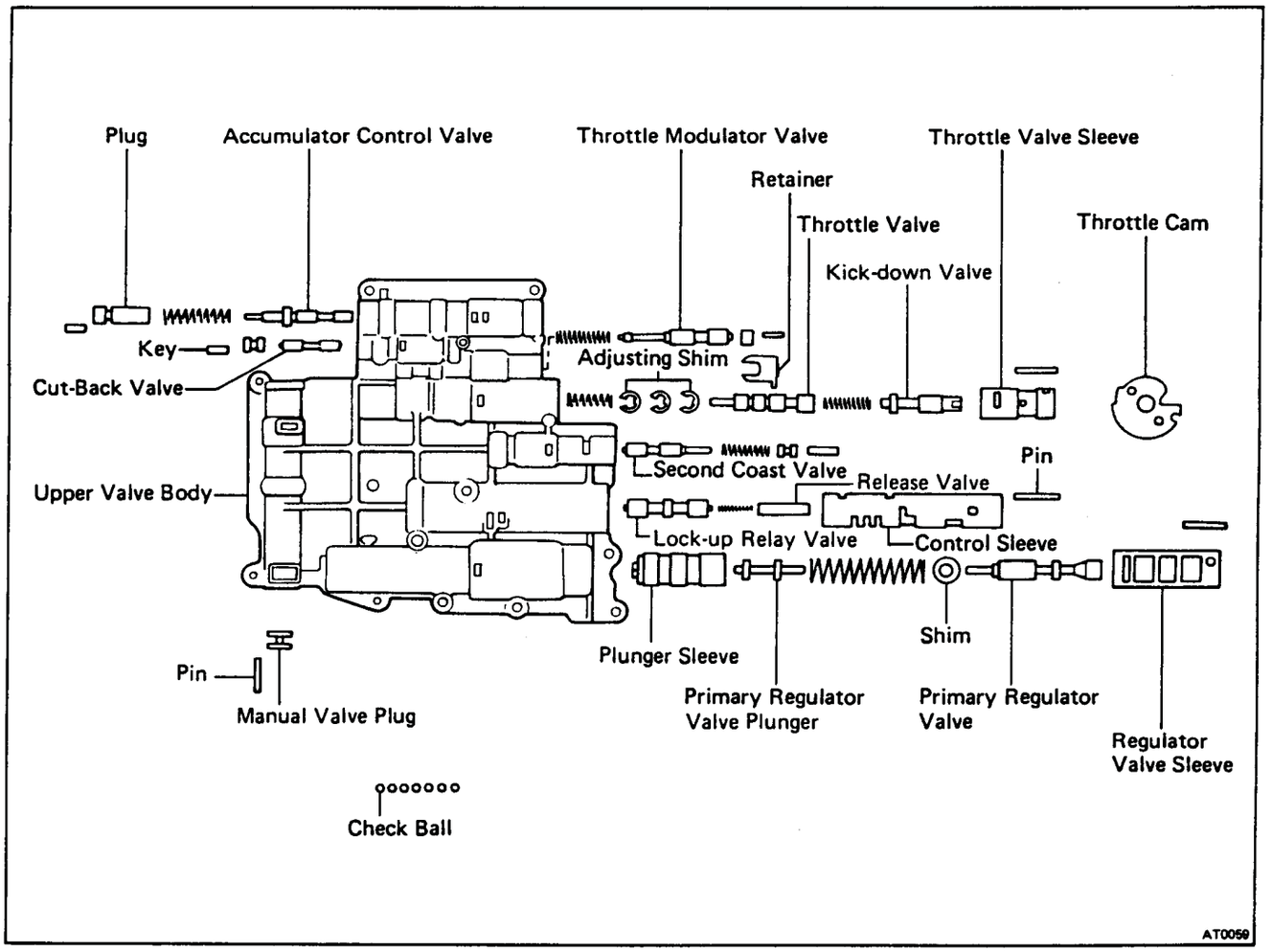
Hold valve body plate to lower valve body.

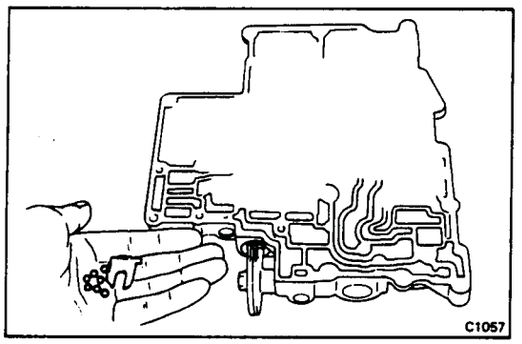
NOTE: Be careful of the strainer, by-pass valve and pressure relief valve.



6. **WATCH FOR CHECK BALLS, RETAINER, KEYS AND PINS IN VALVE BODY**

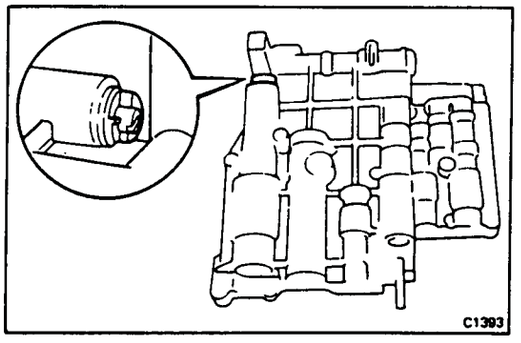
(Upper Valve Body)





DISASSEMBLY OF UPPER VALVE BODY

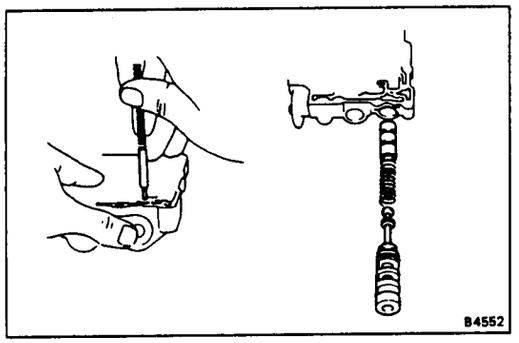
1. REMOVE THROTTLE VALVE RETAINER AND SEVEN CHECK BALLS



2. REMOVE PRIMARY REGULATOR VALVE

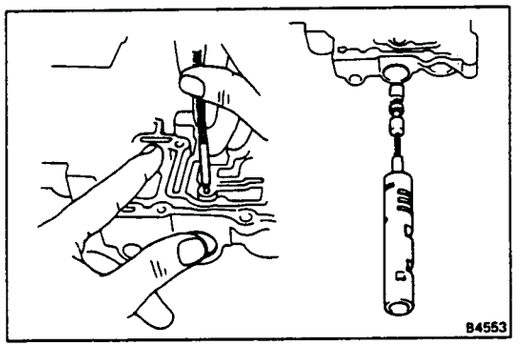
(a) Note which step from the end the plunger sleeve contacts the valve body.

NOTE: It is important to remember which step is in contact because the line pressure changes accordingly.



(b) Push in the valve sleeve and remove the pin with a magnetic finger.

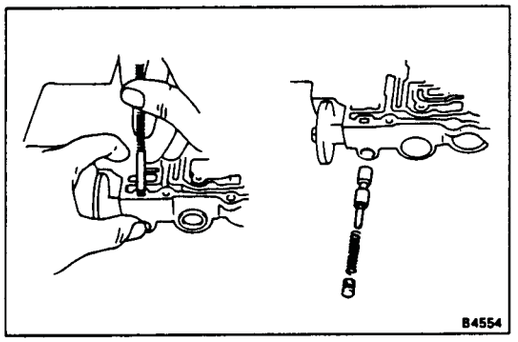
(c) Remove the valve sleeve, primary regulator valve, valve plunger, plunger sleeve, shim and spring.



3. REMOVE LOCK-UP RELAY VALVE

(a) Remove the pin with a magnetic finger.

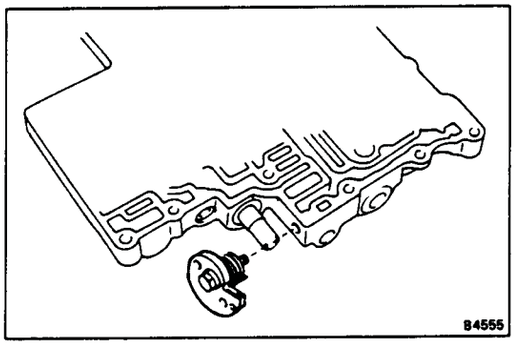
(b) Remove the valve sleeve, lock-up relay valve, spring and release valve.



4. REMOVE SECOND COAST MODULATOR VALVE

(a) Push the plug, remove the key and plug with a magnetic finger.

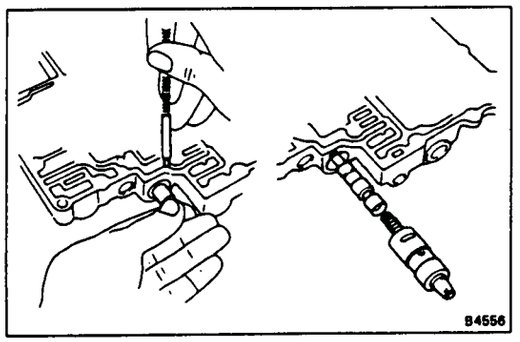
(b) Remove the modulator valve and spring.



5. REMOVE THROTTLE CAM

(a) Remove the bolt.

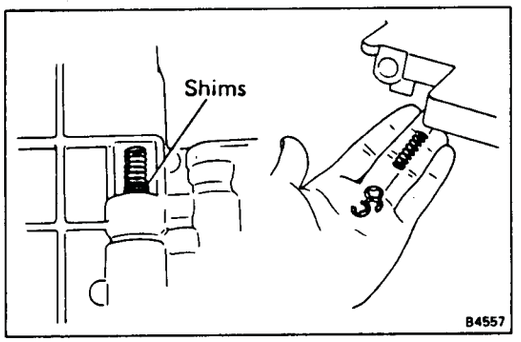
(b) Remove the throttle cam, collar and spring.



6. REMOVE THROTTLE VALVE

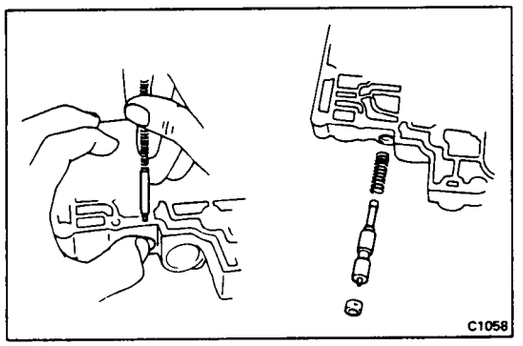
(a) Remove the pin with a magnetic finger.

(b) Remove the valve sleeve, kick-down valve, throttle valve and spring.



(c) Remove the spring and adjusting shims from the upper side of the upper valve body.

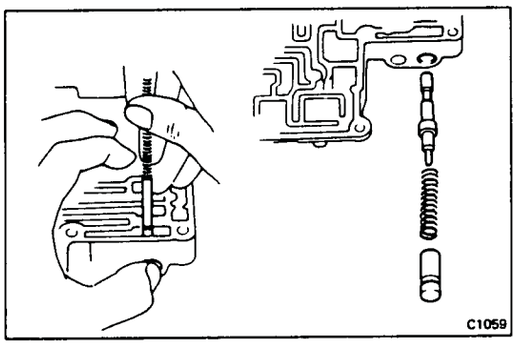
NOTE: Throttle pressure changes in accordance with the number of shims so make a note.



7. REMOVE THROTTLE MODULATOR VALVE

(a) Push in the plug and remove the pin and plug with a magnetic finger.

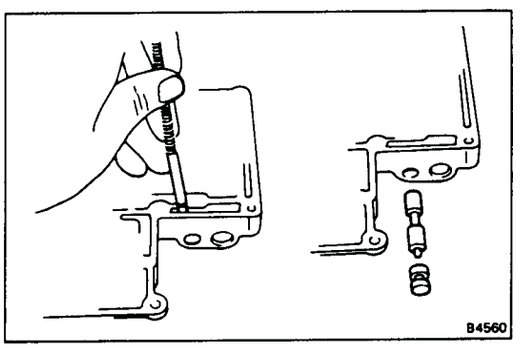
(b) Remove the modulator valve and spring.



8. REMOVE ACCUMULATOR CONTROL VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

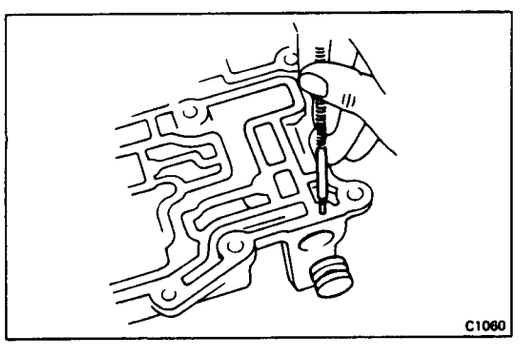
(b) Remove the valve and spring.



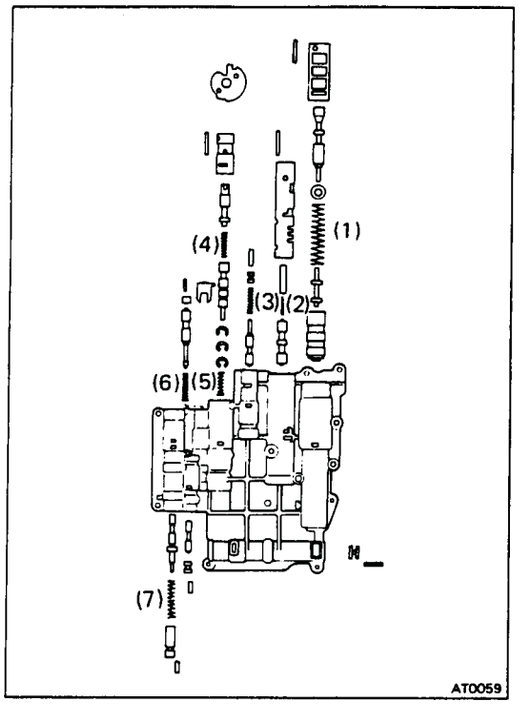
9. REMOVE CUT-BACK VALVE

(a) Remove the key and plug with a magnetic finger.

(b) Remove the cut-back valve.



10. REMOVE MANUAL VALVE PLUG AND PIN WITH MAGNETIC FINGER

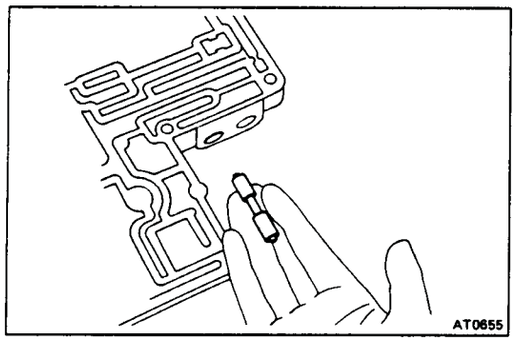


INSPECTION OF UPPER VALVE BODY

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) Primary regulator valve	66.65 (2.6240)	Purple
(2) Lock-up relay valve	18.80 (0.7402)	None
(3) 2nd coast modulator valve	29.63 (1.1665)	Red
(4) Kick-down valve	29.76 (1.1717)	White
(5) Throttle valve	29.18 (1.1488)	Yellow Green
(6) Throttle modulator valve	29.90 (1.1772)	Green
(7) Accumulator control valve	38.20 (1.5039)	Yellow



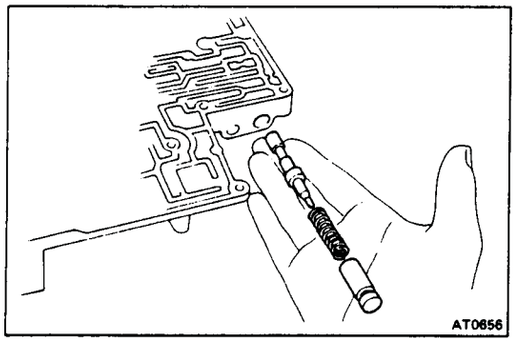
ASSEMBLY OF UPPER VALVE BODY

(See page AT-96)

1. INSTALL CUT-BACK VALVE

(a) Install the cut-back valve with the small end first.

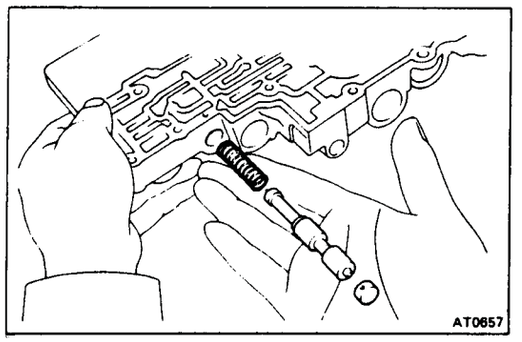
(b) Install the plug and key.



2. INSTALL ACCUMULATOR CONTROL VALVE

(a) Install the control valve and spring.

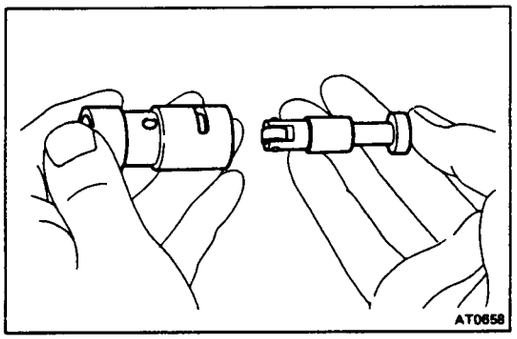
(b) Install the plug thick end first and pin.



3. INSTALL THROTTLE MODULATOR VALVE

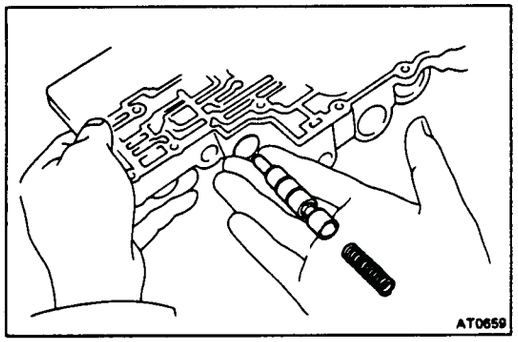
(a) Install the spring and modulator valve.

(b) Install the plug flat end first and pin.



4. INSTALL KICK-DOWN VALVE

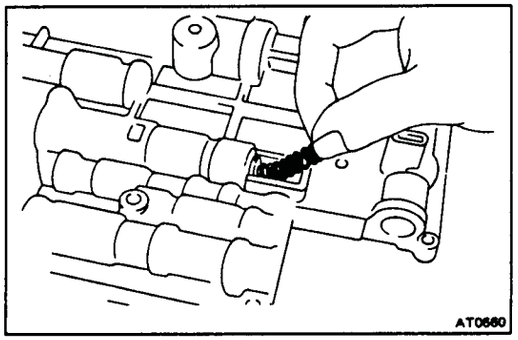
Install the kick-down valve to the throttle valve sleeve.



5. INSTALL THROTTLE VALVE

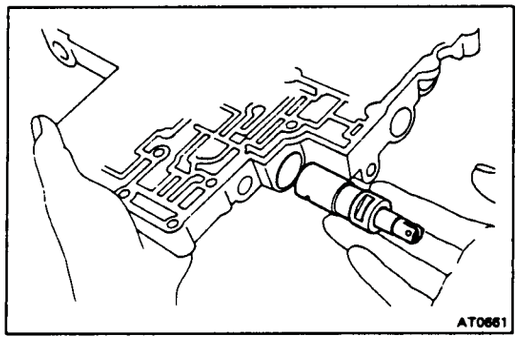
(a) Install the throttle valve with the small end first.

(b) Install the spring.



(c) Install the same number of adjusting shims as was removed during disassembly.

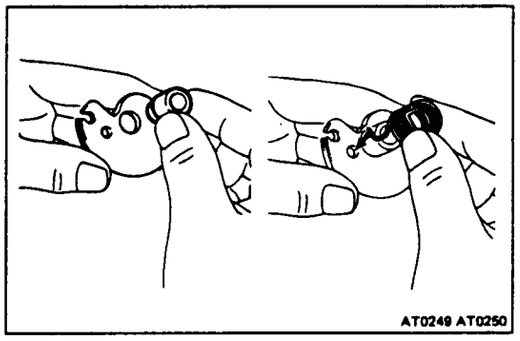
(d) Install the spring.



6. INSTALL KICK-DOWN VALVE WITH THROTTLE VALVE SLEEVE

(a) Install the kick-down valve with the sleeve.

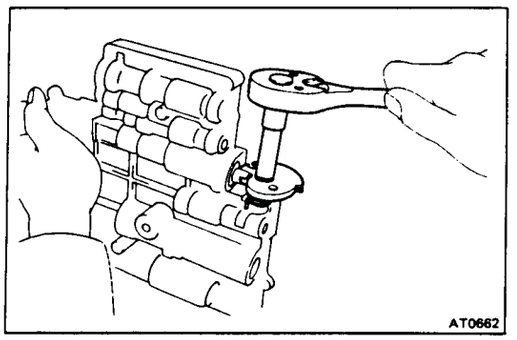
(b) Install the pin to hold the sleeve inplace.



7. ASSEMBLE THROTTLE CAM

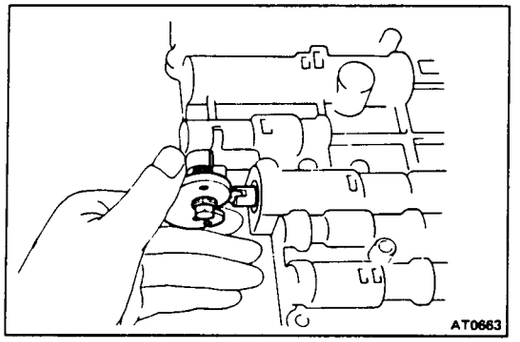
(a) Install the collar through one side of the cam.

(b) Install the spring with the hook through the hole in the cam.

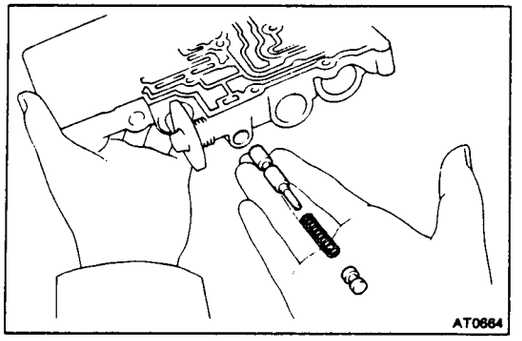


8. **INSTALL THROTTLE CAM ASSEMBLY TO UPPER VALVE BODY**

Check the position of the spring ends.
Tighten the bolt.

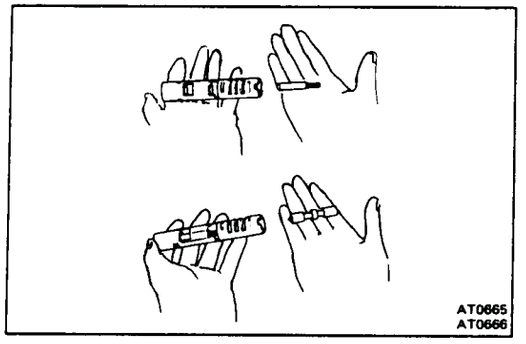


9. **MAKE SURE THAT THROTTLE CAM MOVES ON ROLLER OF KICK-DOWN VALVE**



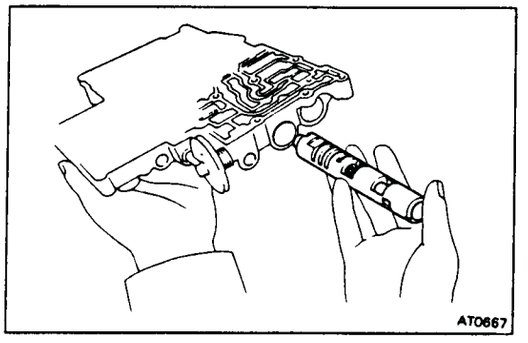
10. **INSTALL SECOND COAST MODULATOR VALVE**

(a) Install the modulator valve and spring.
(b) Install the plug and key.



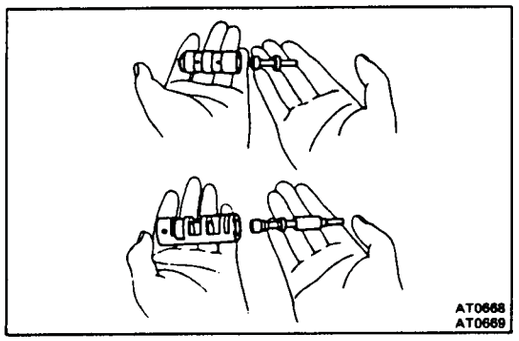
11. **ASSEMBLE LOCK-UP RELAY VALVE**

(a) Install the release valve flat end first to the valve sleeve, and install the spring.
(b) Install relay valve to the valve sleeve.



12. **INSTALL LOCK-UP RELAY VALVE SLEEVE TO UPPER VALVE BODY**

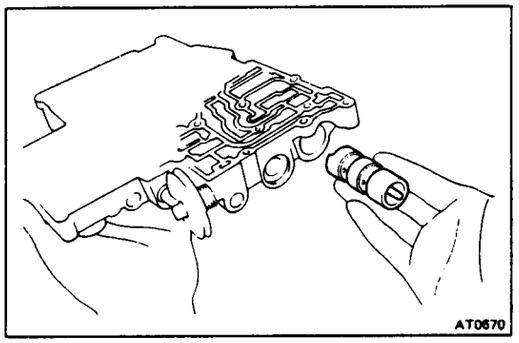
(a) Install the valve sleeve to the upper valve body.
(b) Install the pin to hold the valve sleeve.



13. ASSEMBLE PRIMARY REGULATOR VALVE

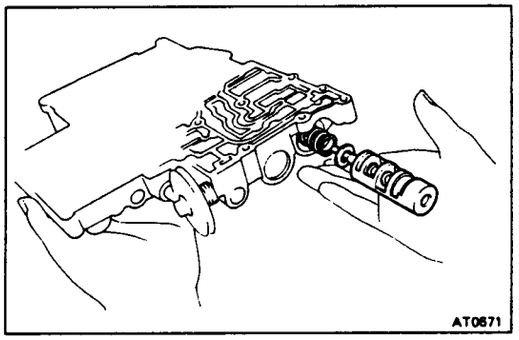
(a) Install the valve plunger small end first to the plunger sleeve.

(b) Install the regulator valve to the valve sleeve.

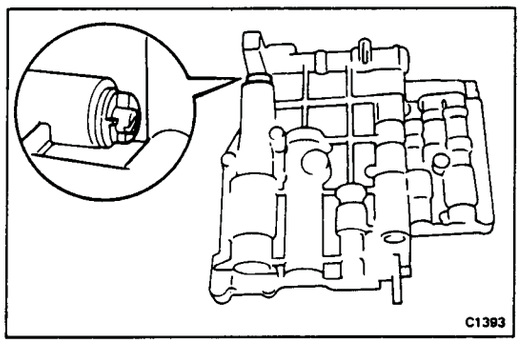


14. INSTALL PRIMARY REGULATOR VALVE

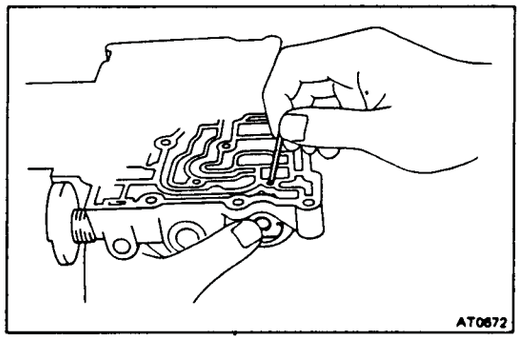
(a) Install the plunger sleeve assembly to the upper valve body.



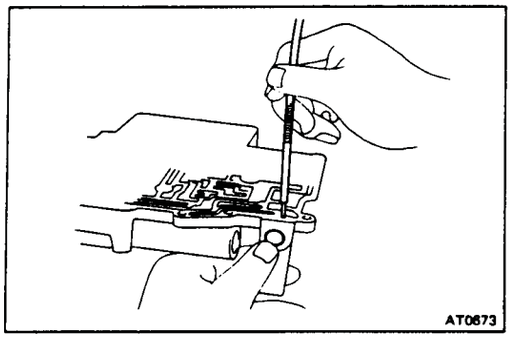
(b) Install the spring, shim and regulator valve assembly to the upper valve body.



NOTE: Assemble so the end of the plunger sleeve is making contact with the valve body at the same step as when it was disassembled.

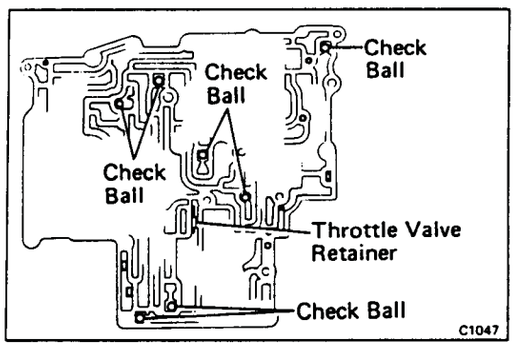


(c) Install the pin to hold the valve sleeve.



15. INSTALL MANUAL VALVE PLUG AND PIN

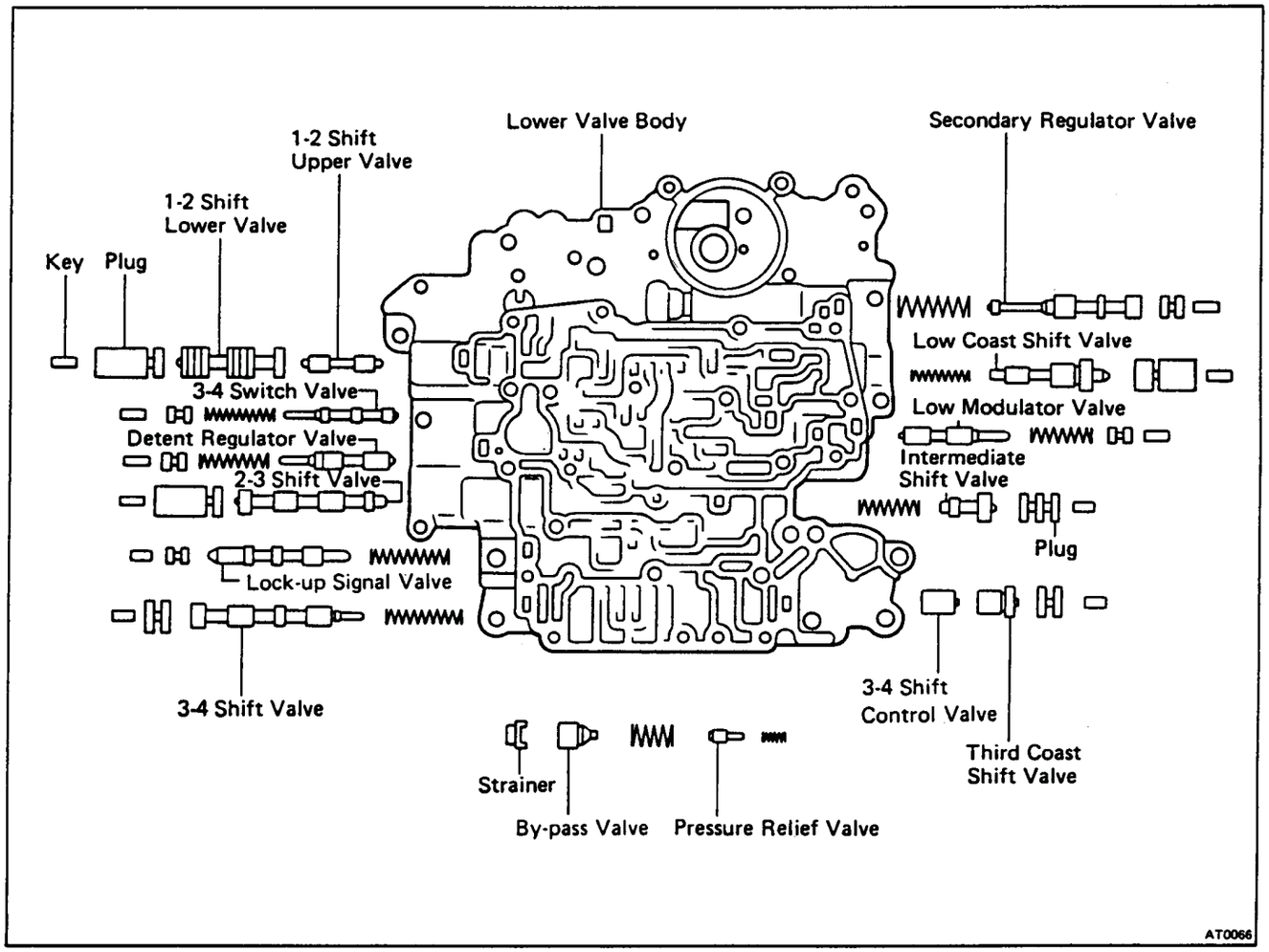
Coat the pin with petroleum jelly, install the pin and plug.

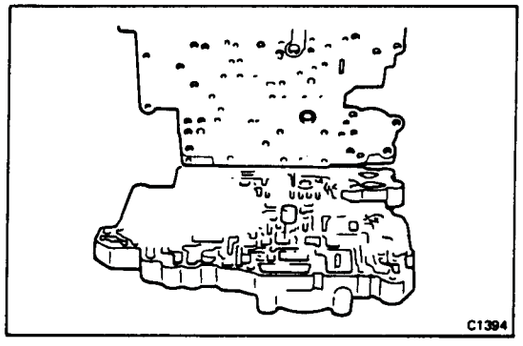


16. INSTALL SEVEN CHECK BALLS AND THROTTLE VALVE RETAINER

Coat the valve retainer with petroleum jelly, install the throttle valve retainer and seven check balls.

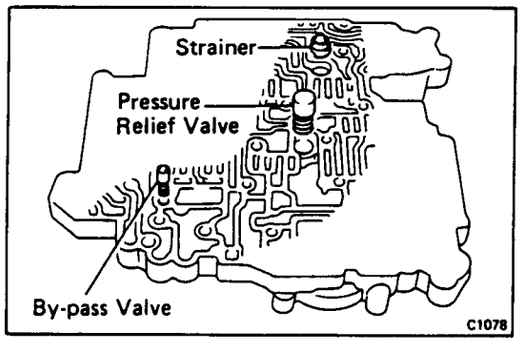
(Lower Valve Body)



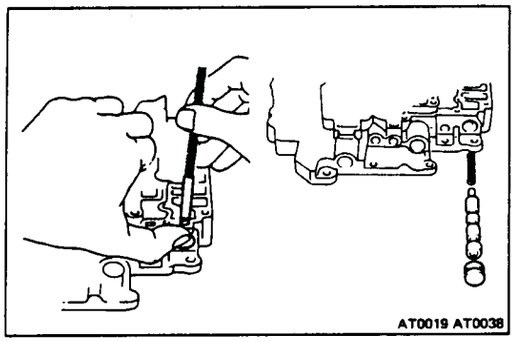


DISASSEMBLY OF LOWER VALVE BODY

1. REMOVE LOWER VALVE BODY PLATE AND GASKETS



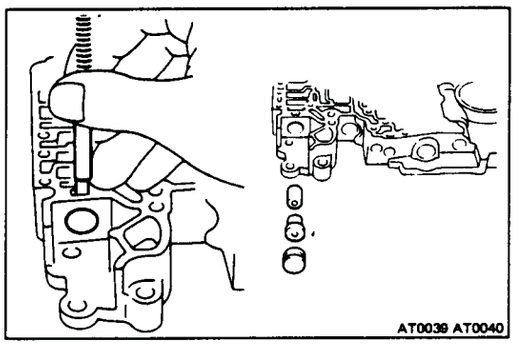
2. REMOVE BY-PASS VALVE AND SPRING
3. REMOVE PRESSURE RELIEF VALVE AND SPRING
4. REMOVE STRAINER



5. REMOVE 3-4 SHIFT VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

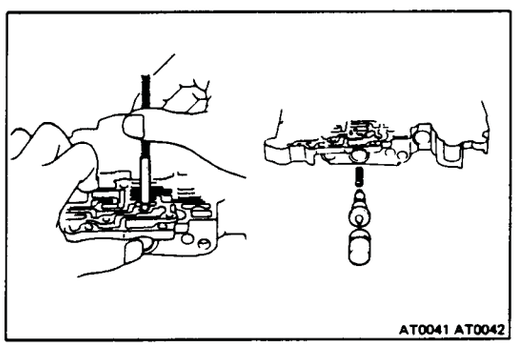
(b) Remove the 3-4 shift valve and spring.



6. REMOVE 3-4 SHIFT CONTROL VALVE AND THIRD COAST SHIFT VALVE

(a) Remove the key and plug with a magnetic finger.

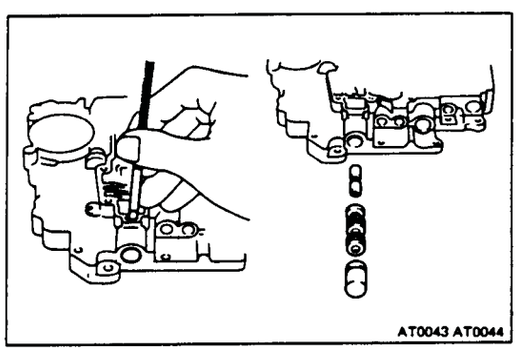
(b) Remove the 3-4 shift control valve and third coast shift valve.



7. REMOVE LOW COAST SHIFT VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

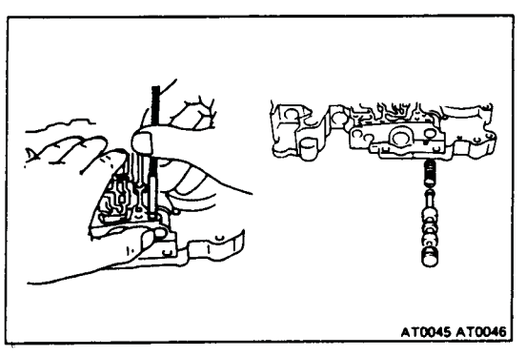
(b) Remove the low coast shift valve and spring.



8. REMOVE 1-2 SHIFT LOWER VALVE AND UPPER VALVE

(a) Remove the key and plug with a magnetic finger.

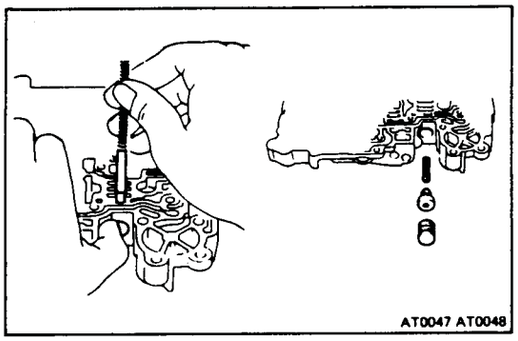
(b) Remove the 1-2 shift lower valve and upper valve.



9. REMOVE SECONDARY REGULATOR VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

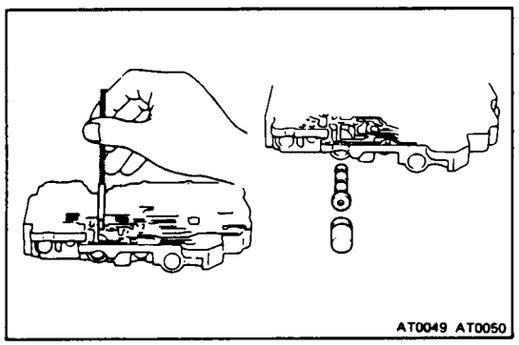
(b) Remove the regulator valve and spring.



10. REMOVE INTERMEDIATE SHIFT VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

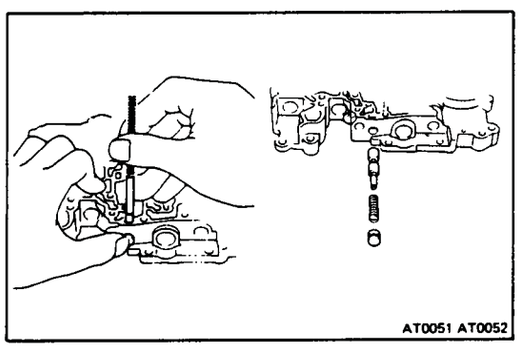
(b) Remove the intermediate shift valve and spring.



11. REMOVE 2-3 SHIFT VALVE

(a) Remove the key and plug with a magnetic finger.

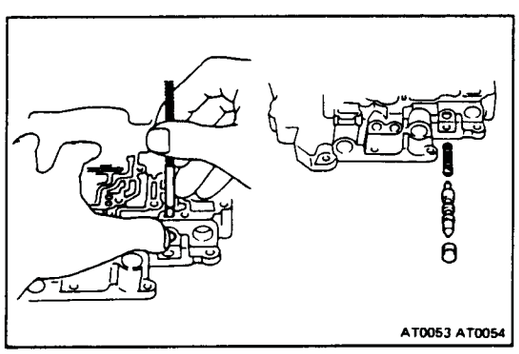
(b) Remove the 2-3 shift valve.



12. REMOVE LOW MODULATOR VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

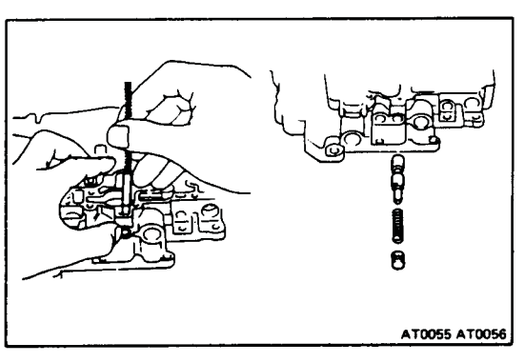
(b) Remove the low modulator valve and spring.



13. REMOVE LOCK-UP SIGNAL VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

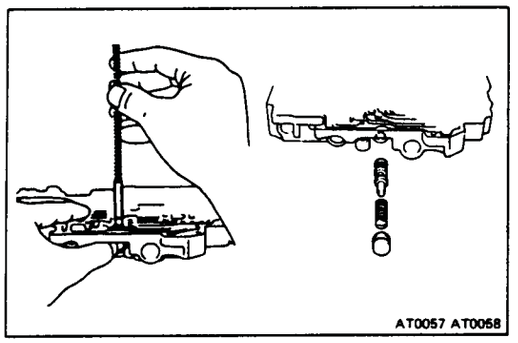
(b) Remove the signal valve and spring.



14. REMOVE DETENT REGULATOR VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

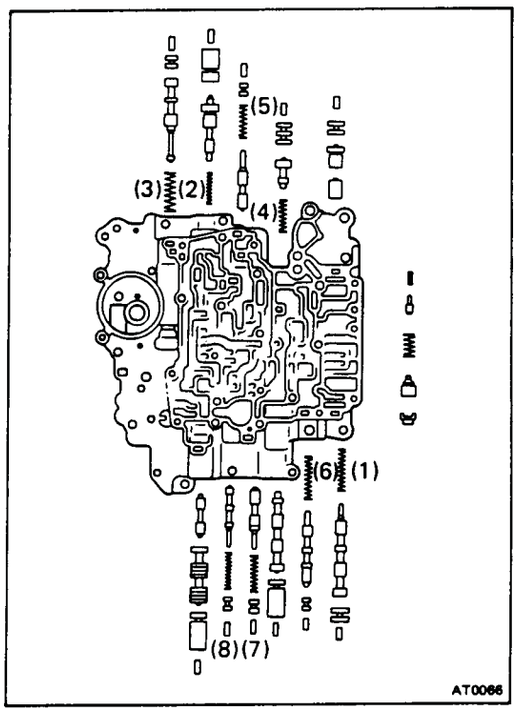
(b) Remove the regulator valve and spring.



15. REMOVE 3-4 SWITCH VALVE

(a) Push in the plug and remove the key and plug with a magnetic finger.

(b) Remove the 3-4 switch valve and spring.

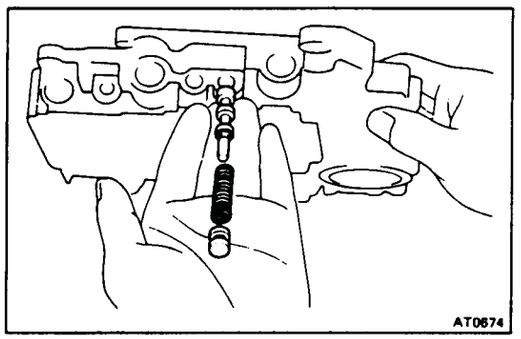


INSPECTION OF LOWER VALVE BODY

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) 3-4 shift valve	34.86	(1.3724)	None
(2) Low coast shift valve	27.17	(1.0697)	Yellow
(3) Secondary regulator valve	32.86	(1.2937)	Orange
(4) 2-3 shift valve	27.74	(1.0921)	None
(5) Low modulator valve	29.15	(1.1476)	None
(6) Lock-up signal valve	41.40	(1.6299)	White
(7) Detent regulator valve	33.34	(1.3126)	Pink
(8) 3-4 switch valve	30.90	(1.2165)	None



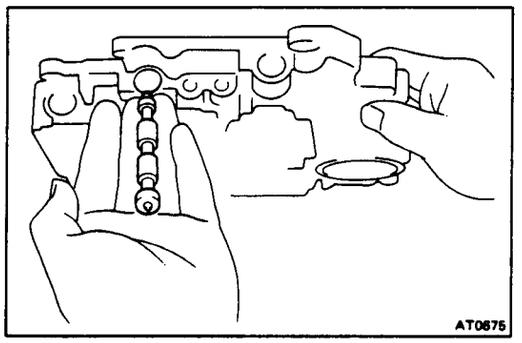
ASSEMBLY OF LOWER VALVE BODY

(See page AT-104)

1. INSTALL 3-4 SWITCH VALVE

(a) Install the 3-4 switch valve and spring.

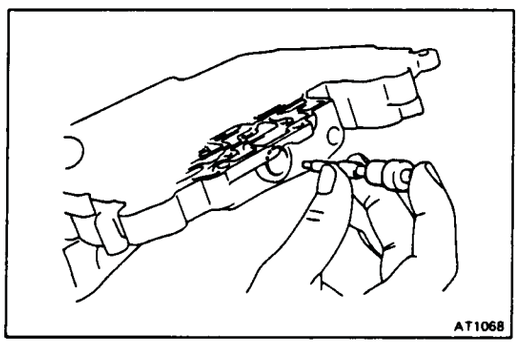
(b) Install the plug and key.



2. INSTALL 2-3 SHIFT VALVE

(a) Install the 2-3 shift valve with the small end first.

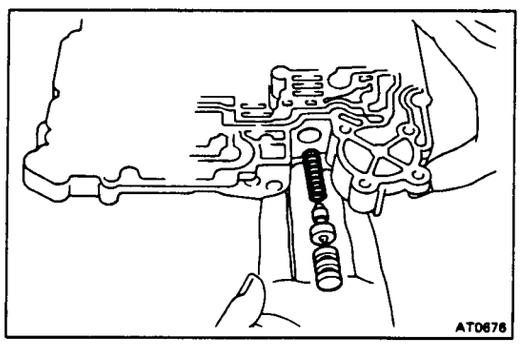
(b) Install the plug and key.



3. INSTALL LOW COAST SHIFT VALVE

(a) Install shift valve with the small end first.

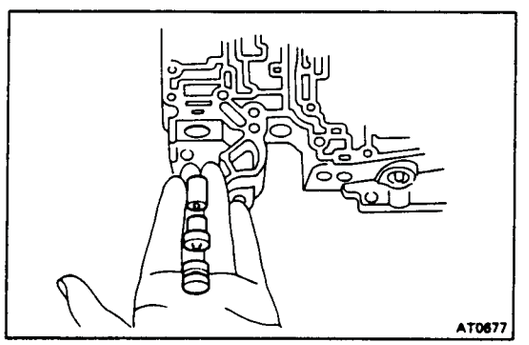
(b) Install the plug thin end first and key.



4. INSTALL INTERMEDIATE SHIFT VALVE

(a) Install the spring and shift valve.

(b) Coat the key with petroleum jelly, install the key and plug.

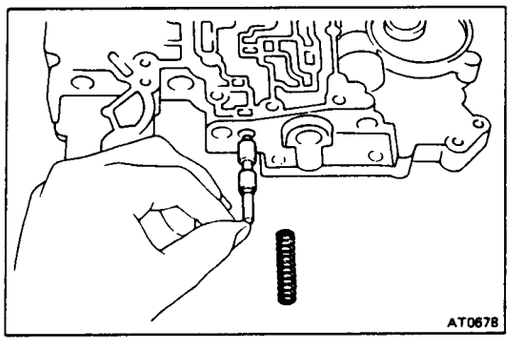


5. TURN ASSEMBLY OVER INSTALL 3-4 SHIFT CONTROL VALVE AND THIRD COAST SHIFT VALVE

(a) Install the 3-4 shift control valve with the cup side first.

(b) Install the third coast shift valve with the flat end first.

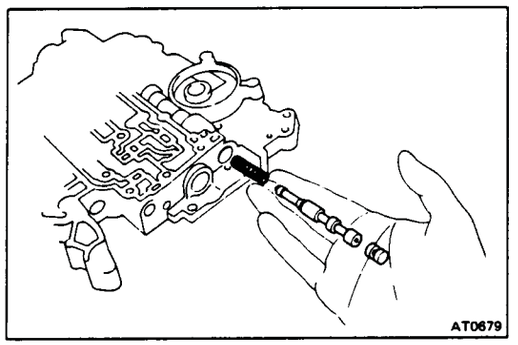
(c) Install the plug and key.



6. INSTALL LOW MODULATOR VALVE

(a) Install the modulator valve and spring.

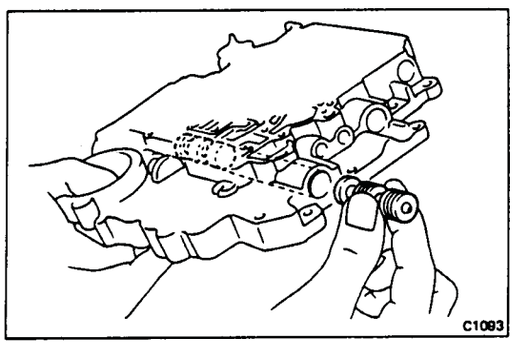
(b) Install the plug and key.



7. INSTALL SECONDARY REGURATOR VALVE

(a) Install the spring and regulator valve.

(b) Install the plug and key.



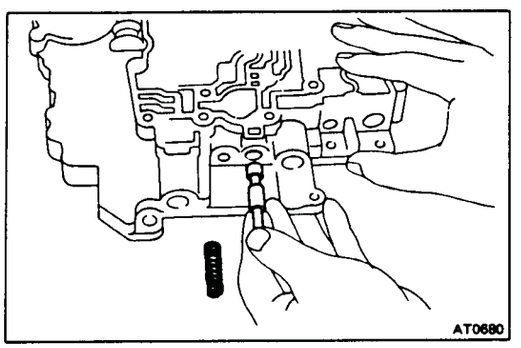
8. INSTALL 1-2 SHIFT UPPER VALVE AND LOWER VALVE

(a) Install the spring for the low coast shift valve.

(b) Install the upper valve.

(c) Install the lower valve flat end first.

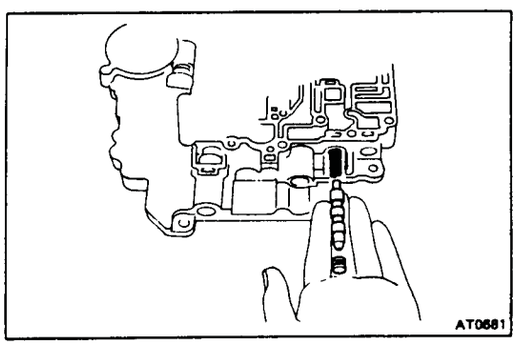
(d) Install the plug thin end first and key.



9. INSTALL DETENT REGULATOR VALVE

(a) Install the regulator valve and spring.

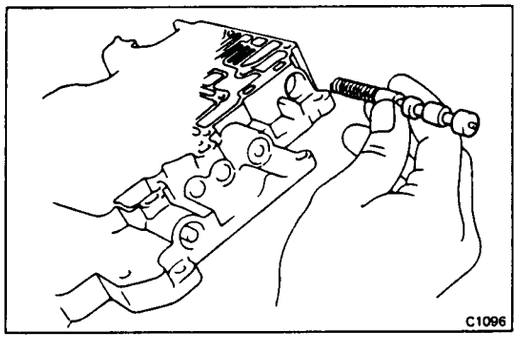
(b) Install the plug and key.



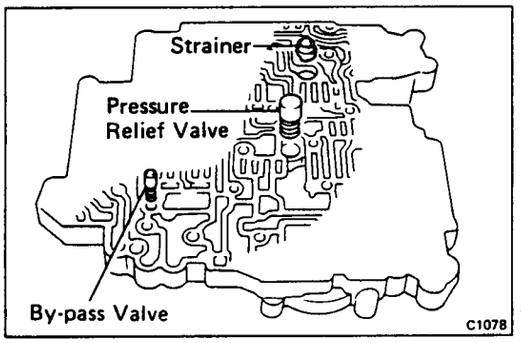
10. INSTALL LOCK-UP SIGNAL VALVE

(a) Install the spring and signal valve.

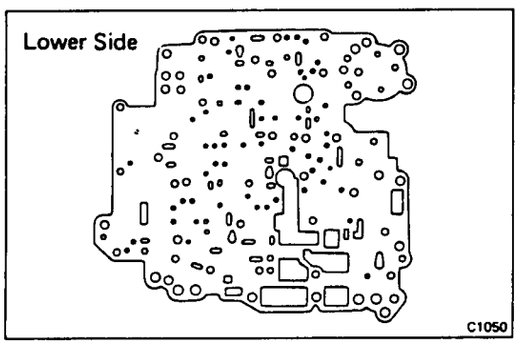
(b) Install the plug and key.



11. INSTALL 3-4 SHIFT VALVE
    (a) Install the spring and 3-4 shift valve.
    (b) Install the plug and key.



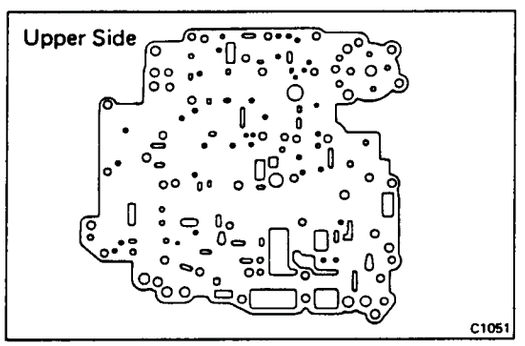
12. TURN ASSEMBLY OVER INSTALL BY-PASS VALVE AND SPRING
13. INSTALL PRESSURE RELIEF VALVE AND SPRING
14. INSTALL STRAINER



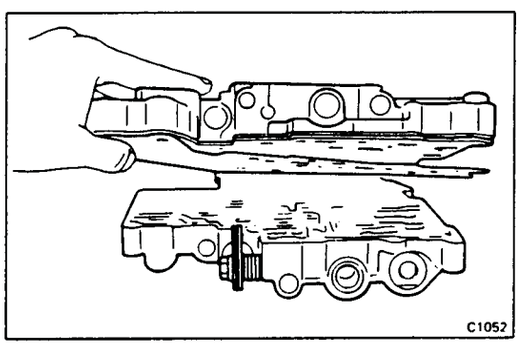
(Assembly of Valve Body)

(See page AT-94)

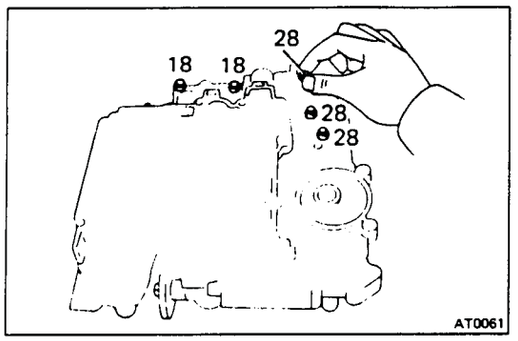
1. POSITION NEW GASKETS AND PLATE ON LOWER VALVE BODY
    (a) Place a new gasket onto the lower valve body.
    (b) Place the plate onto the lower valve body.



    (c) Place another new gasket onto the plate.
    (d) Align each bolt hole in the valve body with the two gaskets and plate.

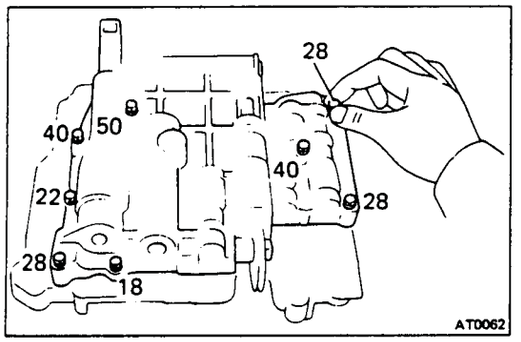


2. PLACE LOWER VALVE BODY AND GASKETS WITH PLATE ON TOP OF UPPER VALVE BODY
    (a) Hold the lower valve body, gaskets and plate securely so they do not separate.
    (b) Align each bolt hole in the valve bodies with the gaskets and plate.



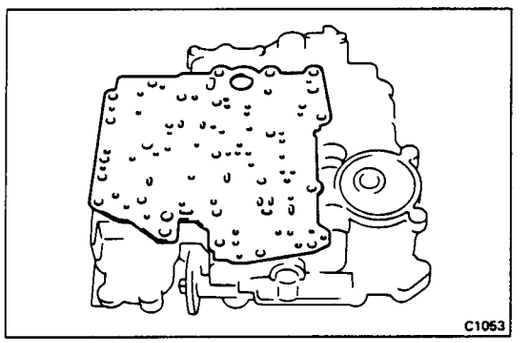
3. **INSTALL AND FINGER TIGHTEN FIVE BOLTS IN LOWER VALVE BODY TO SECURE UPPER VALVE BODY**

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



4. **TURN ASSEMBLY OVER AND FINGER TIGHTEN EIGHT BOLTS IN UPPER VALVE BODY**

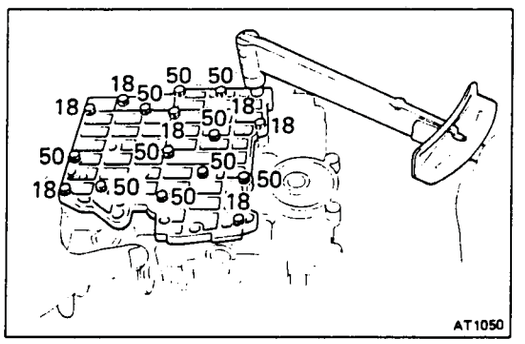
NOTE: Each bolt length (mm) is indicated in the figure.



5. **TURN ASSEMBLY OVER AND INSTALL STRAINER, NEW GASKETS AND PLATE**

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

(b) Install the strainer onto the plate.



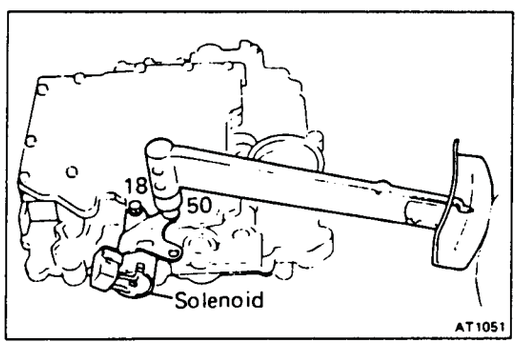
6. **INSTALL LOWER VALVE BODY COVER**

Install the cover over the gasket and finger tighten the seventeen bolts on the valve body cover.

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

7. **TIGHTEN THIRTY BOLTS IN VALVE BODY**

Torque: 65 kg-cm (56 in.-lb, 6.4 N·m)



8. **INSTALL SOLENOID**

Torque: 65 kg-cm (56 in.-lb, 6.4 N·m)

ASSEMBLY OF TRANSMISSION (A240L)

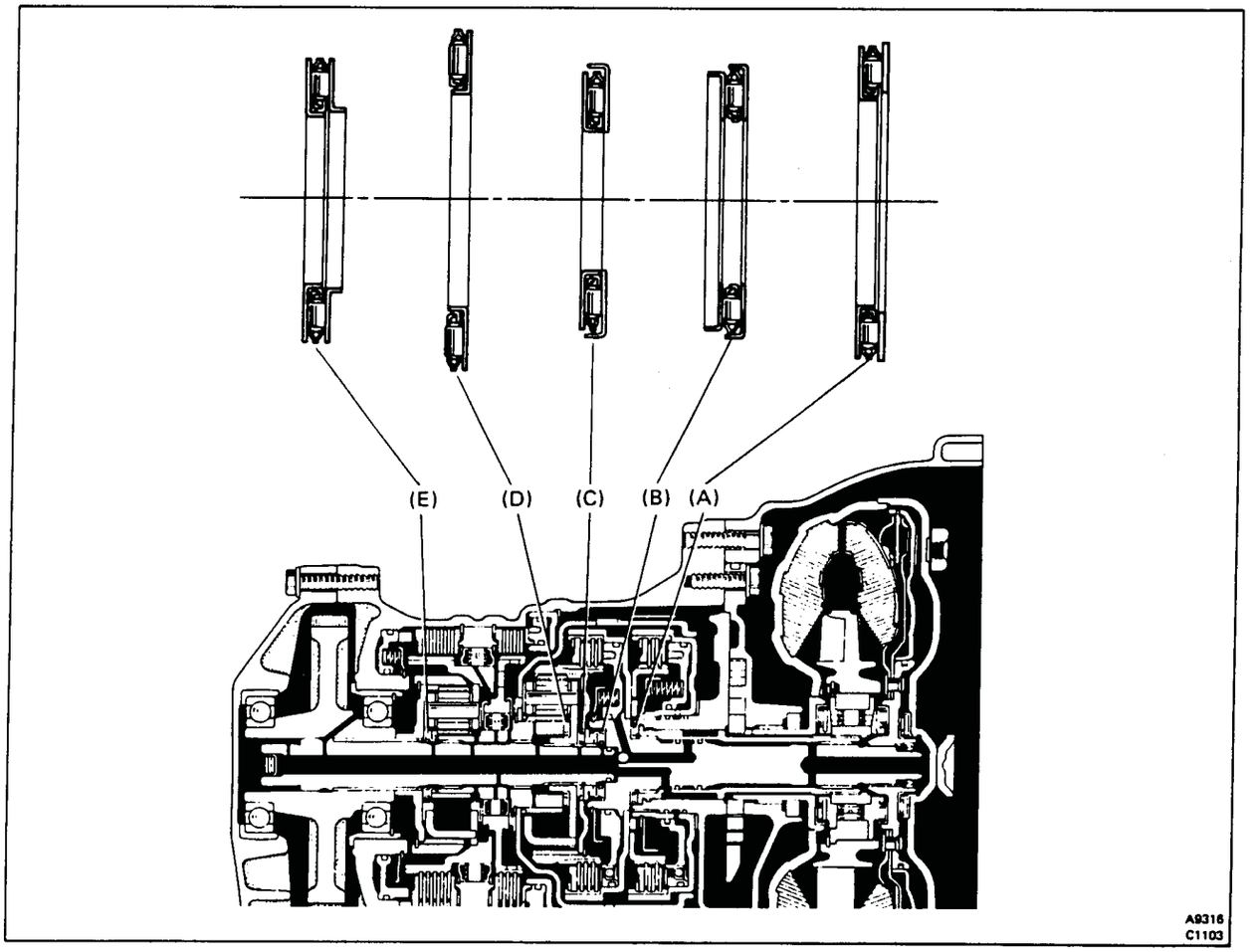
(See pages AT-35 to 37)

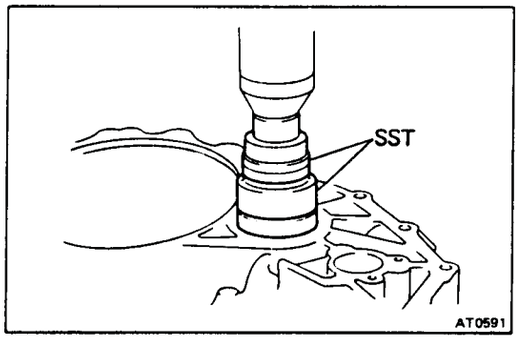
Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter.

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.

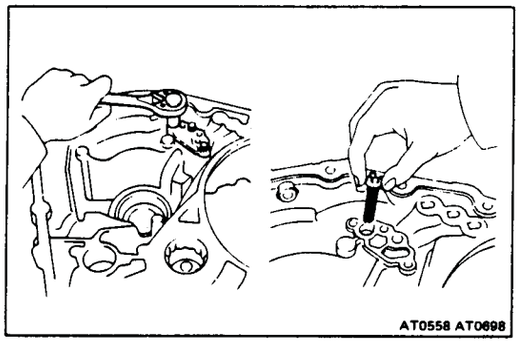
GENERAL ASSEMBLY NOTES:

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.

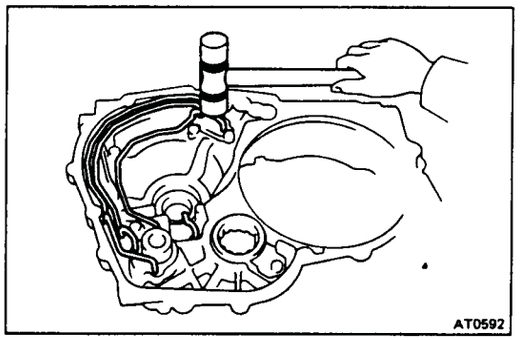




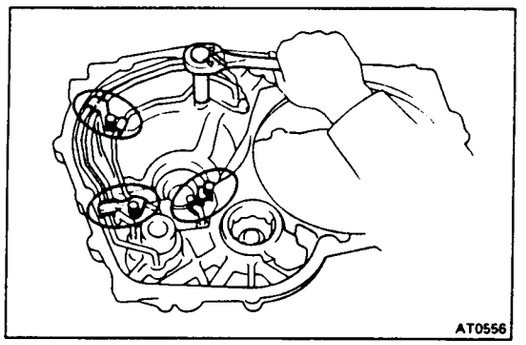
1. **INSTALL BEARING TO TRANSAXLE HOUSING**
   (a) Using SST and a press, press the bearing into the transaxle housing.
   SST 09350-32011
   (b) Install the bearing stopper.



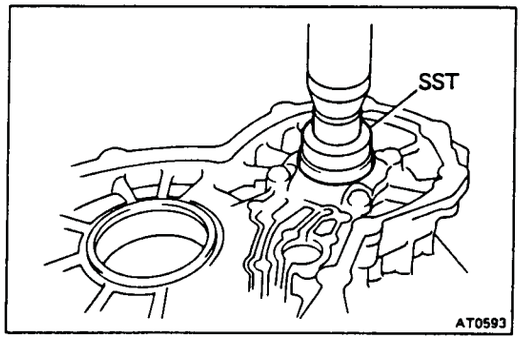
2. **INSTALL OIL TUBE APPLY COVER, GASKET AND STRAINER**



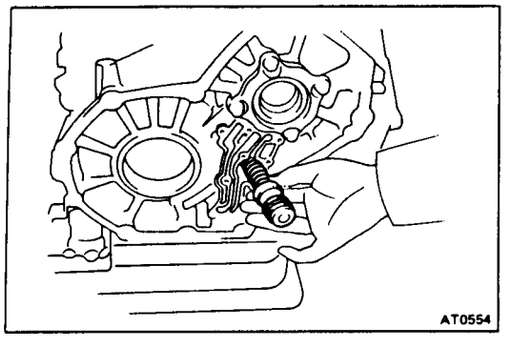
3. **INSTALL OIL TUBES**
   Using a plastic hammer, install the tubes.
   CAUTION: Be careful not to bend or damage the tubes.



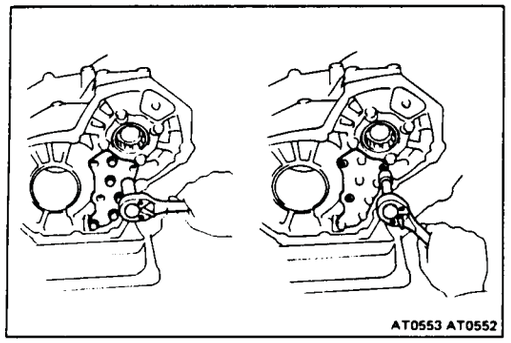
4. **INSTALL OIL TUBE CLAMPS**



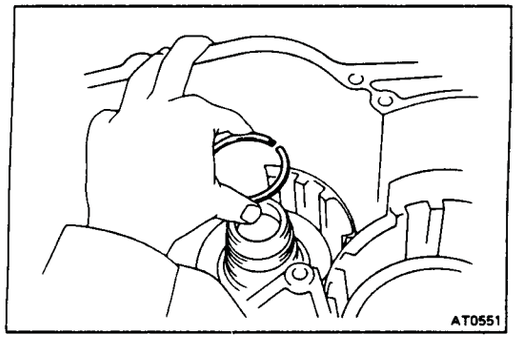
5. **INSTALL BEARING TO TRANSMISSION CASE**
   Using SST and a press, press in the bearing.
   SST 09350-32011



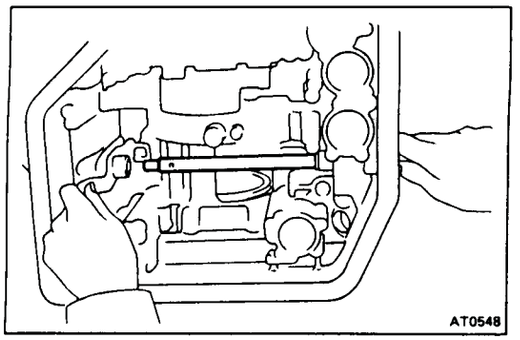
6. INSTALL B_4 ACCUMULATOR PISTON AND SPRING



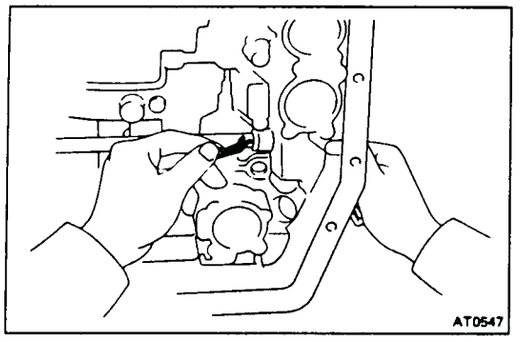
7. INSTALL OIL GALLERY COVER AND GASKET
   (a) Install the oil gallery cover and gasket.
   (b) Install and tighten the six bolts.
   (c) Apply seal packing or equivalent to the three screws.
   Seal packing: 08833-00070 or THREE BOND 1324
   (d) Install and tighten the three screws.



8. INSTALL OIL SEAL RINGS TO TRANSMISSION CASE

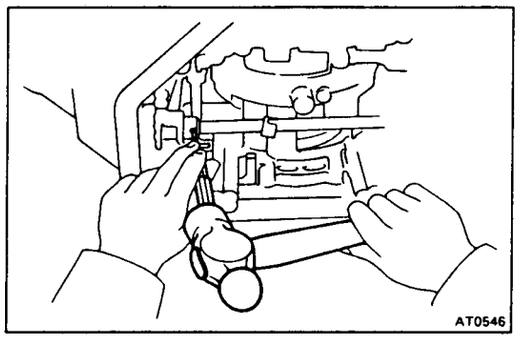


9. INSTALL MANUAL SHAFT AND LEVER
   (a) Slide in the shaft and install the washer and manual lever.



   (b) Install the retaining spring.

   NOTE: Make sure there is a washer between the retaining spring and case.

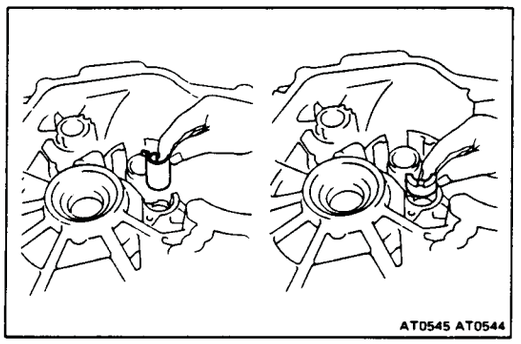


10. **INSTALL PIN**

    Using a punch and hammer, drive in the pin.

11. **INSTALL MANUAL SHAFT SPACER**

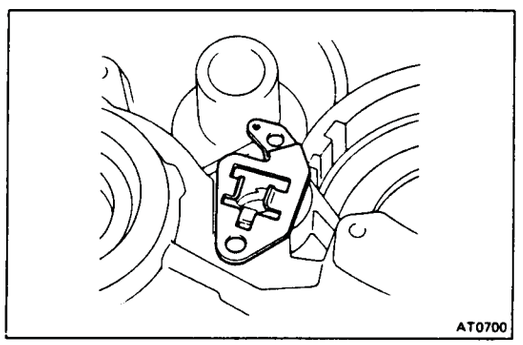
    Install and stake the spacer.



12. **INSTALL CAM GUIDE BRACKET**

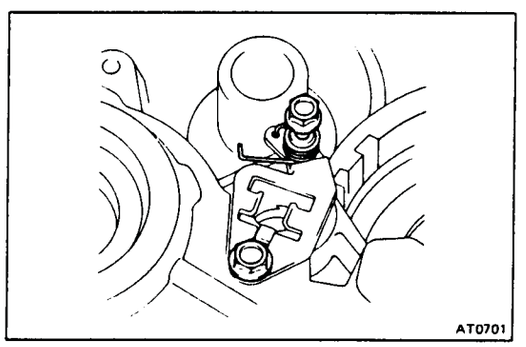
    Install the cam guide bracket and then insert the parking lock rod into the guide bracket.

13. **INSTALL PARKING LOCK SLEEVE PROTRUDING PORTION UPWARD**

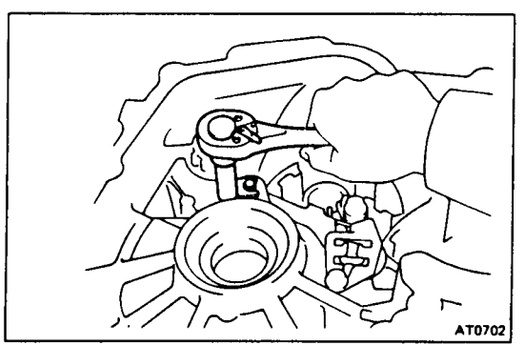


14. **PLACE STOPPER PLATE**

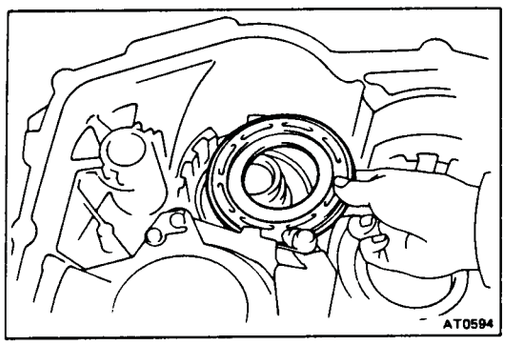
    Place the stopper plate on the protruding portion of lock sleeve.



15. **INSTALL GUIDE SLEEVE AND SPRING**



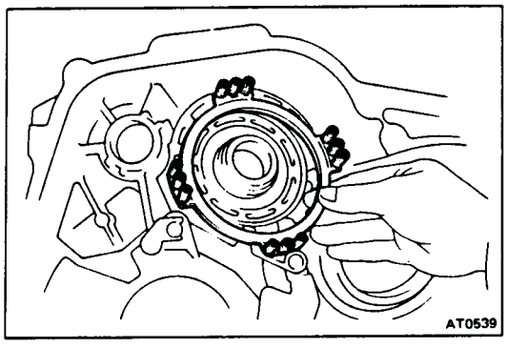
16. **INSTALL PARKING LOCK PAWL, PAWL SHAFT AND SHAFT CLAMP**



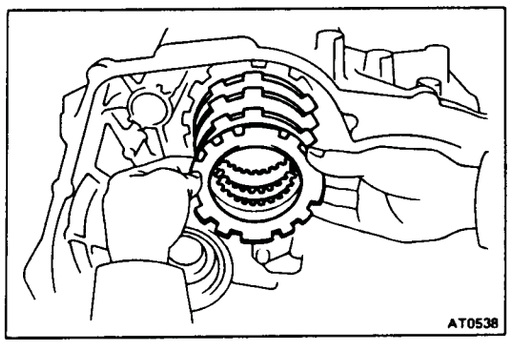
17. INSTALL UNDERDRIVE BRAKE PISTON

(a) Install new O-rings on the piston.
Coat the O-rings with ATF.

(b) Place the piston into the case with the cup side up, being careful not to damage the O-rings.



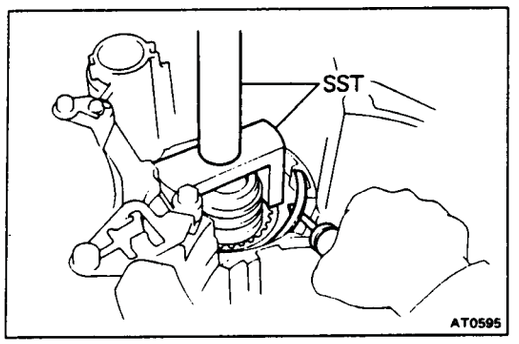
18. INSTALL BRAKE PISTON RETURN SPRING



19. INSTALL PLATES, DISCS AND FLANGE

(a) Install in order: plate-disc-plate-disc-plate-disc

(b) Install the flange facing the flat end upward.



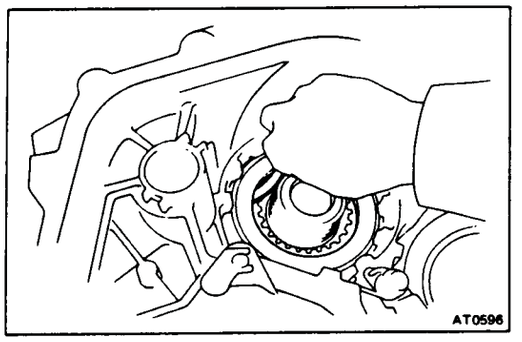
20. COMPRESS RETURN SPRING AND INSTALL SNAP RING IN GROOVE

(a) Place SST on the flange, and compress the return spring with a press.

SST 09350-32011

(b) Install the snap ring.

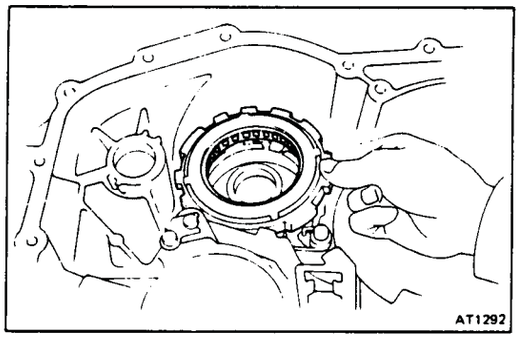
NOTE: Be sure the end gap of the snap ring is not aligned with one of the cutouts.



21. CHECK CLEARANCE OF UNDERDRIVE BRAKE PISTON

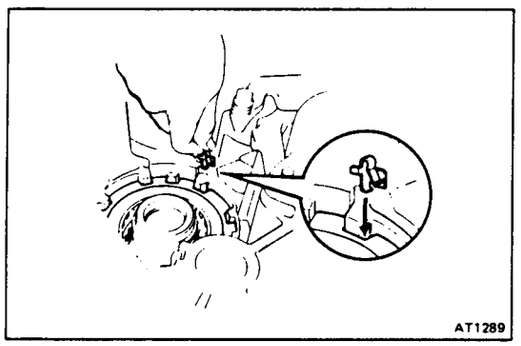
Using a thickness gauge, check the clearance between the snap ring and the flange.

Clearance: 1.07 – 2.05 mm (0.0421 – 0.0807 in.)

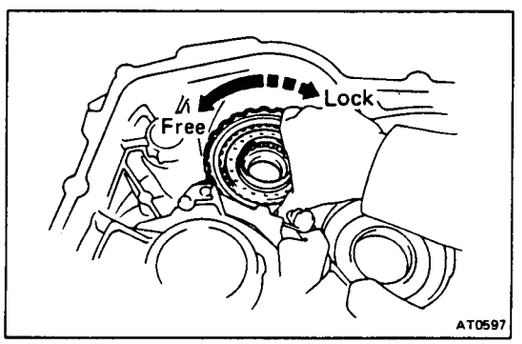


22. INSTALL UNDERDRIVE ONE-WAY CLUTCH AND ANTI-RATTLE CLIP

(a) Install the underdrive one-way clutch.



(b) In the place shown in the figure (the space between the one-way clutch outer race and case), push the anti-rattle clip in until you hear the "click".

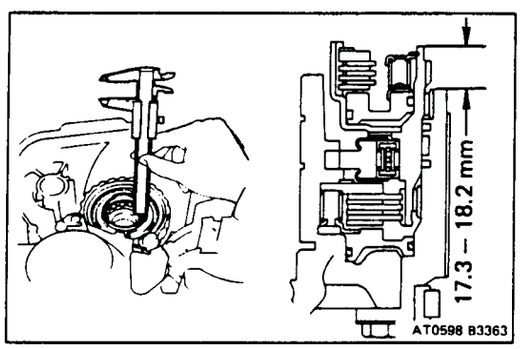


23. INSTALL UNDERDRIVE CLUTCH ASSEMBLY

(a) Align the flukes of discs in the underdrive brake.

(b) Install the clutch assembly.

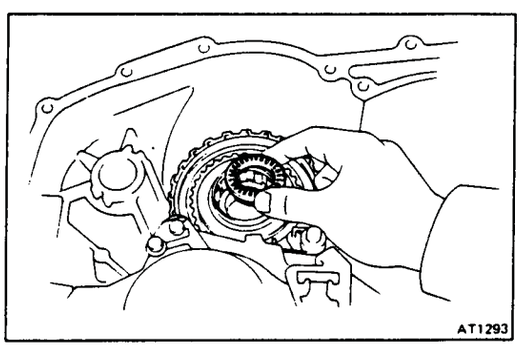
(c) Turn the clutch assembly. The clutch assembly should turn freely counterclockwise and should lock clockwise.



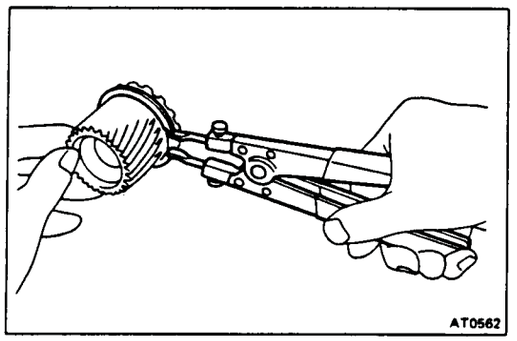
24. CHECK HEIGHT CLUTCH ASSEMBLY

Using vernier calipers, check the height from the sleeve to the inner race.

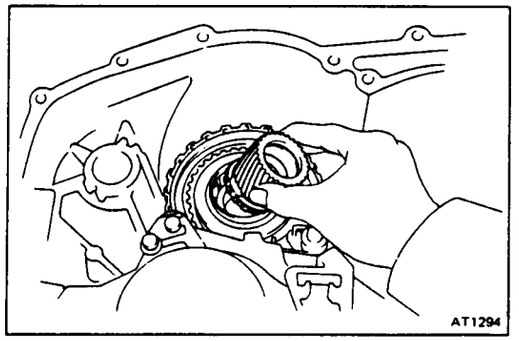
Height: 17.3 – 18.2 mm (0.681 – 0.717 in.)



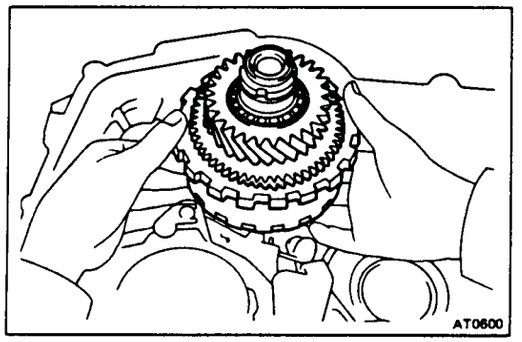
25. INSTALL RACE WITH BEARING



26. INSTALL SNAP RING TO SUN GEAR WITH SNAP RING PLIERS



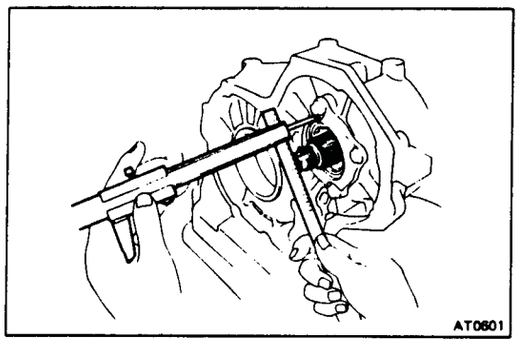
27. INSTALL SUN GEAR TO CASE



28. INSTALL COUNTER SHAFT ASSEMBLY

(a) Align the flukes of the discs in the underdrive clutch.

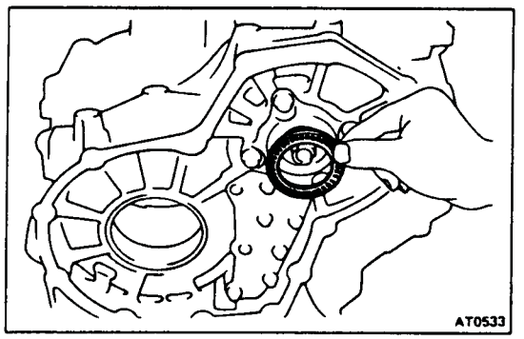
(b) Install the counter shaft assembly.



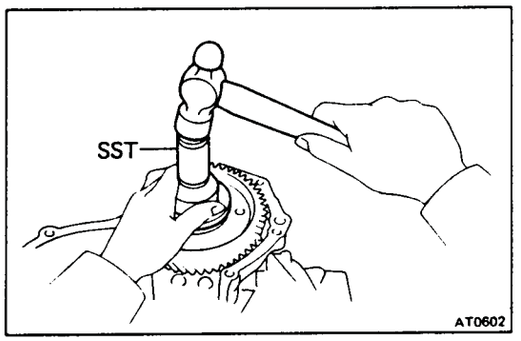
29. CHECK HEIGHT OF COUNTER SHAFT

Using vernier calipers, measure the distance between the tip of the counter shaft and bolt seat of the clutch support.

Height: 38.3 – 40.5 mm (1.508 – 1.594 in.)



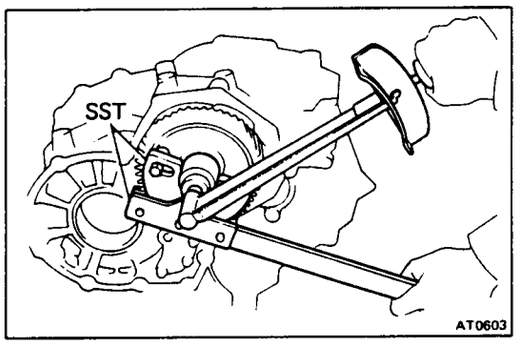
30. INSTALL THRUST NEEDLE BEARING



31. INSTALL COUNTER DRIVEN GEAR

Using SST and a hammer, tap in the driven gear.

SST 09223-50010

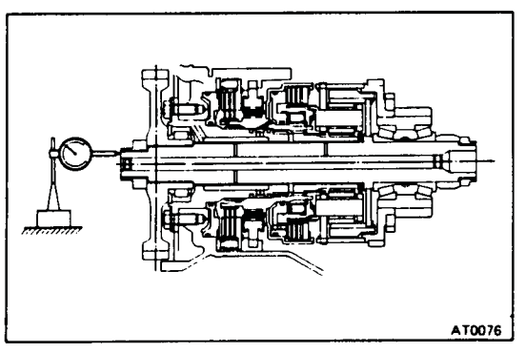


32. TIGHTEN NEW LOCK NUT

Using SST to hold the driven gear, tighten a new lock nut.

SST 09330-00020 and 09350-32011

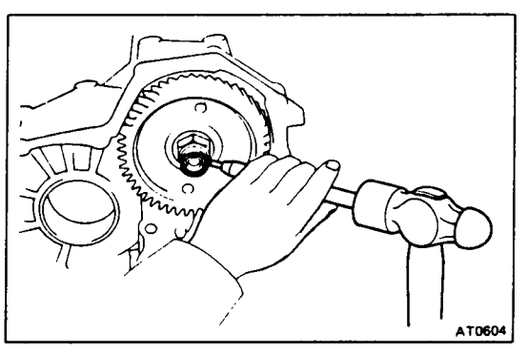
Torque: 1,600 kg-cm (116 ft-lb, 157 N·m)



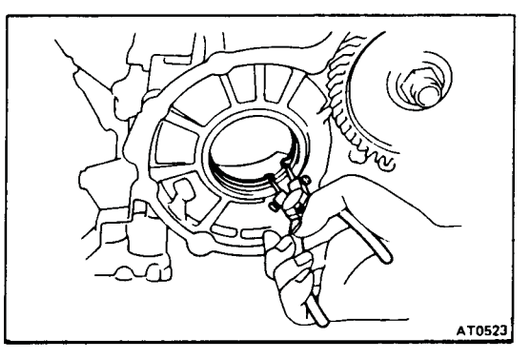
33. CHECK END PLAY OF COUNTER SHAFT

Using a dial indicator, measure the end play of the counter shaft by hand.

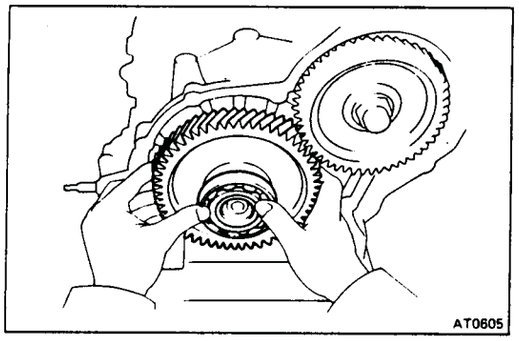
End play: 0.23 – 0.89 mm (0.0091 – 0.0350 in.)



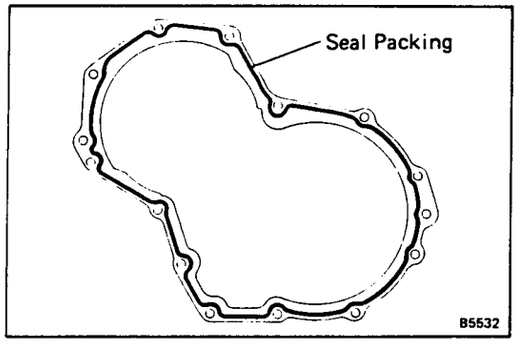
34. STAKE LOCK NUT



35. INSTALL SNAP RING TO TRANSMISSION CASE



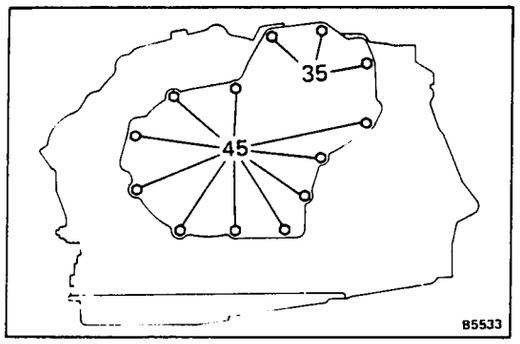
36. INSTALL INTERMEDIATE SHAFT



37. INSTALL TRANSAXLE REAR COVER

(a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle rear cover or transmission case.

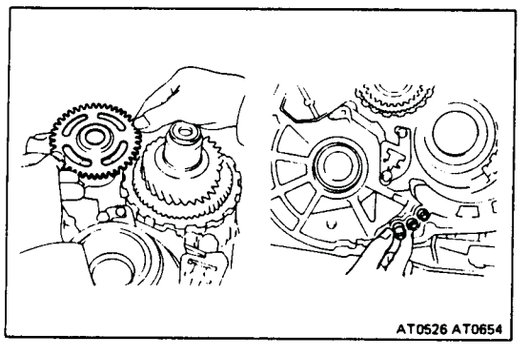
(b) Apply seal packing (LOCTITE No. 518) to the rear cover as shown.



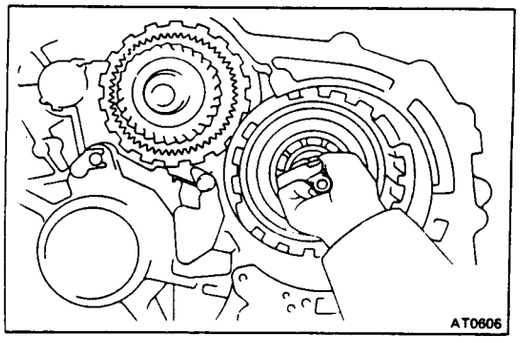
(c) Install and tighten the thirteen bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

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

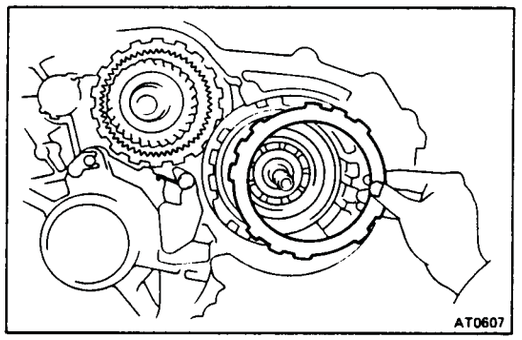


38. INSTALL THRUST WASHER, GOVERNOR DIVEN GEAR AND THREE OIL SEALS



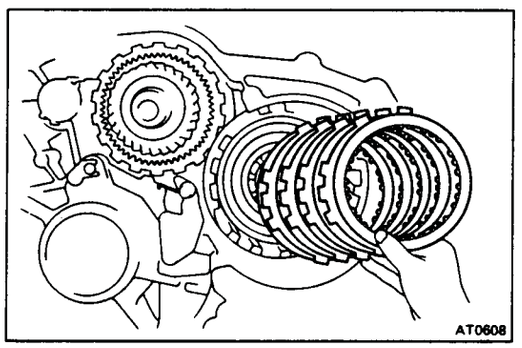
39. CHECK INTERMEDIATE SHAFT

Make sure that the intermediate shaft turns smoothly.

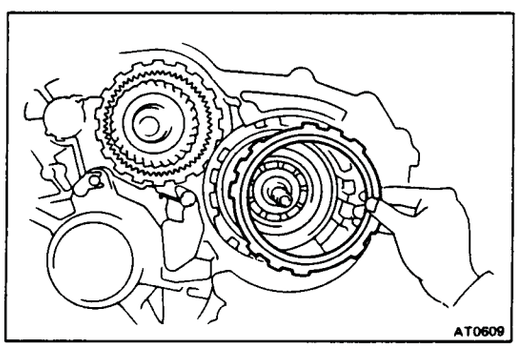


40. INSTALL FIRST AND REVERSE BRAKE IN CASE

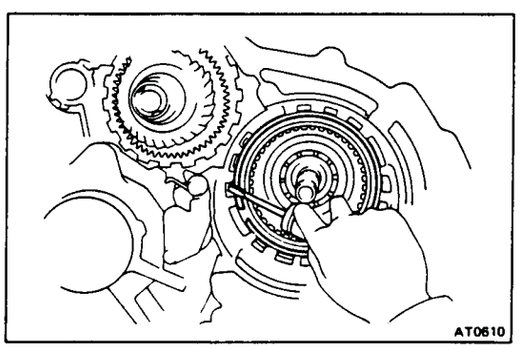
(a) Install the inner flange, facing the flat end toward you.



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

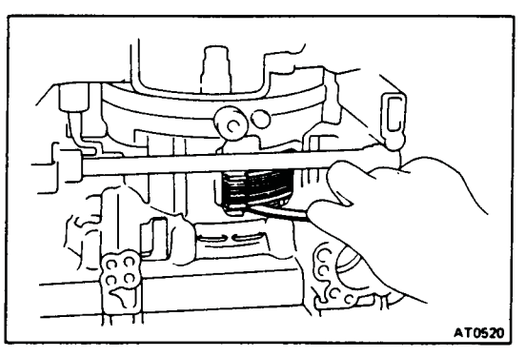


(c) Install the outer flange, facing the flat end toward the inner side.



41. INSTALL SNAP RING

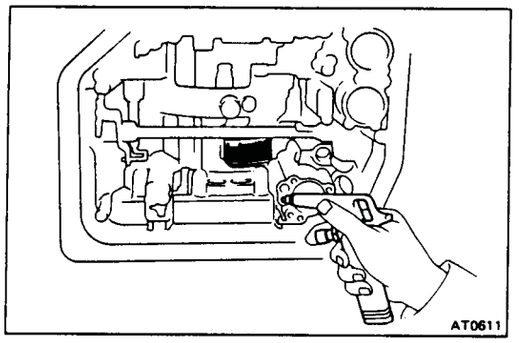
The snap ring end gap is installed into the groove.



42. CHECK CLEARANCE OF FIRST AND REVERSE BRAKE

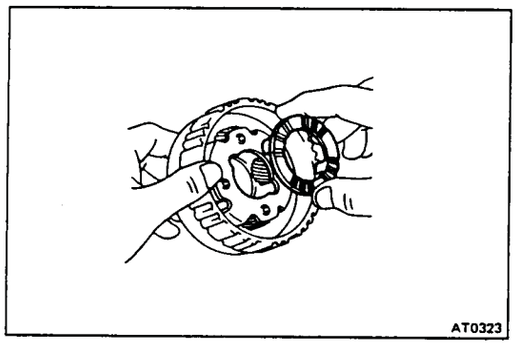
Using a thickness gauge, check the clearance between the piston and flange.

Clearance: 0.89 – 2.11 mm (0.0350 – 0.0831 in.)



43. CHECK OPERATION OF FIRST AND REVERSE BRAKE

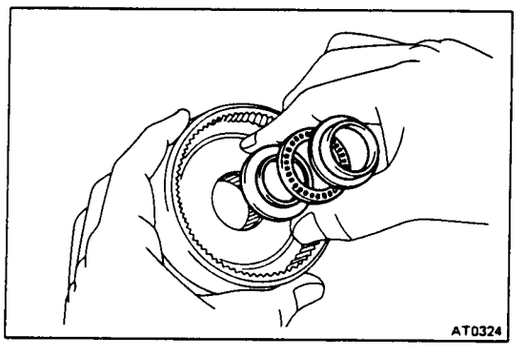
Apply compressed air into the oil passage with the case and be sure that the piston moves.



44. INSTALL NO. 2 PLANETARY CARRIER THRUST WASHER

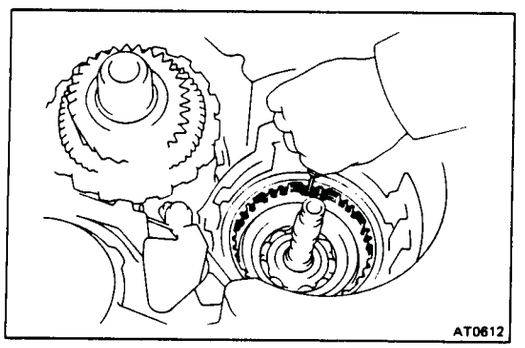
Coat thrust washer with petroleum jelly and install it onto the planetary carrier.

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



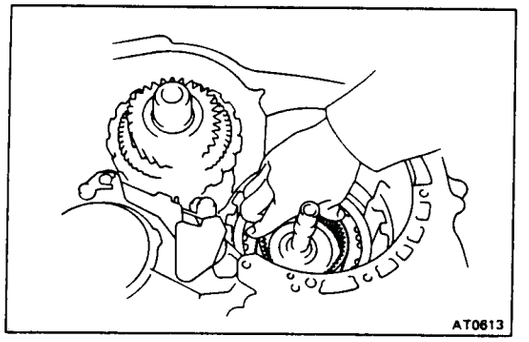
45. INSTALL RACES AND BEARING

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

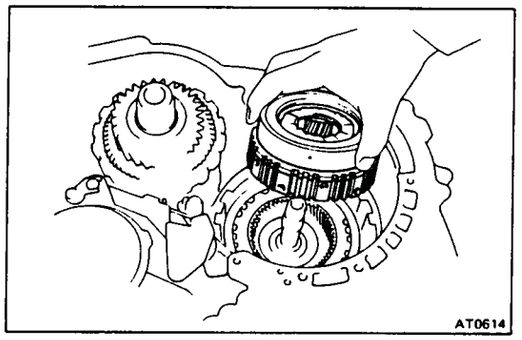


46. INSTALL REAR PLANETARY RING GEAR INTO CASE

(a) Align the flukes of the discs.

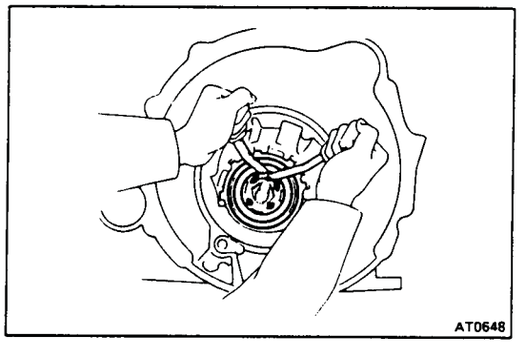


(b) Install the rear planetary ring gear into the case.



47. INSTALL REAR PLANETARY GEAR

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.



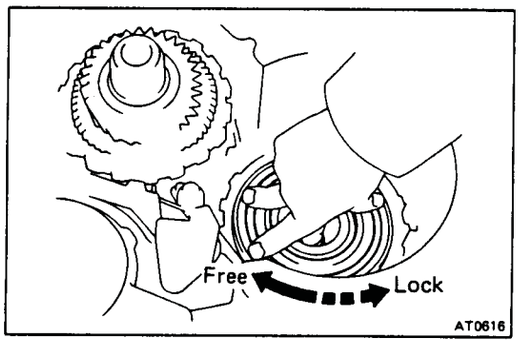
48. INSTALL NO. 2 ONE-WAY CLUTCH INTO CASE WITH SHINY SIDE UPWARD

(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.

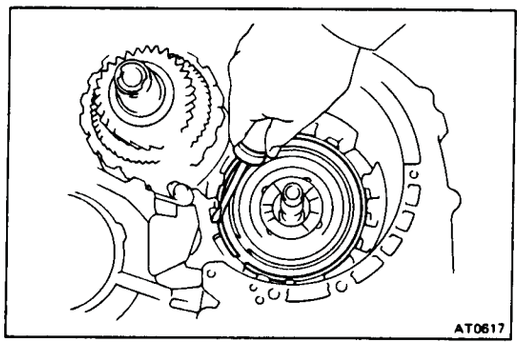
SST 09350-32011

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



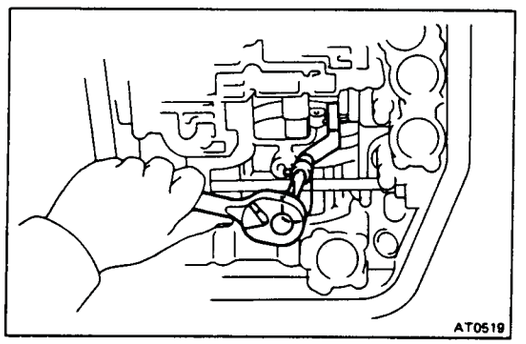
49. CHECK OPERATION OF NO. 2 ONE-WAY CLUTCH

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



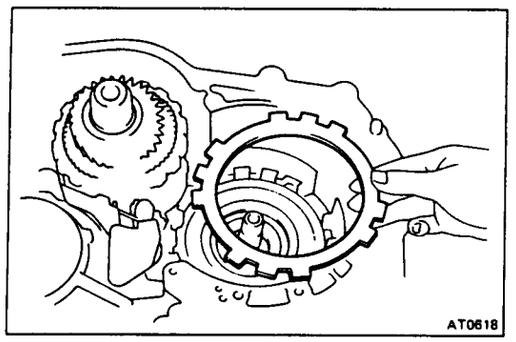
50. INSTALL SNAP RING

The snap ring end gap is installed into the groove.



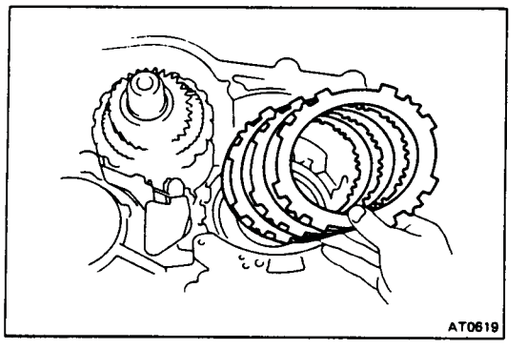
51. INSTALL SECOND COAST BRAKE BAND GUIDE

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

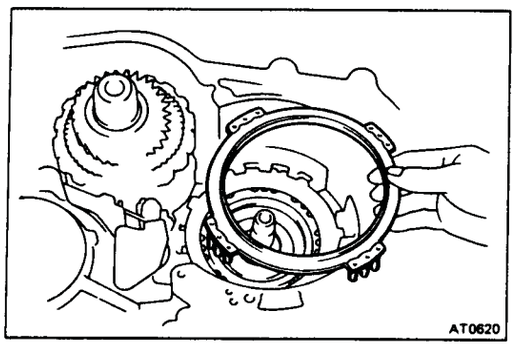


52. INSTALL SECOND BRAKE INTO CASE

(a) Install the flange, facing the flat end upward.

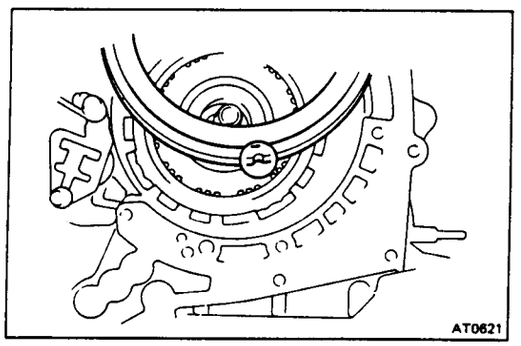


(b) Install in order: disc-plate-disc-plate-disc-plate



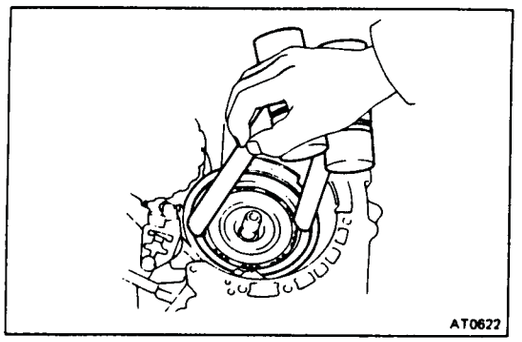
53. INSTALL PISTON RETURN SPRING ASSEMBLY

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



54. INSTALL SECOND BRAKE DRUM INTO CASE

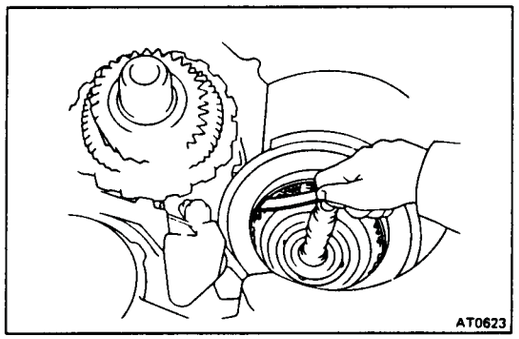
Align the groove of the drum with the bolt and place it into the case.



55. INSTALL SNAP RING

(a) Place the snap ring into the case so that the end gap is installed into the groove.

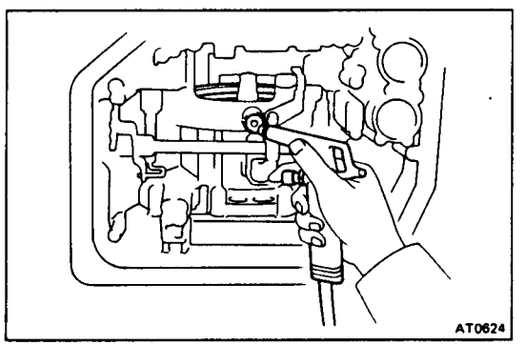
(b) While compressing the piston return springs over the drum with hammer handles, install the snap ring into the groove.



56. CHECK CLEARANCE OF SECOND BRAKE

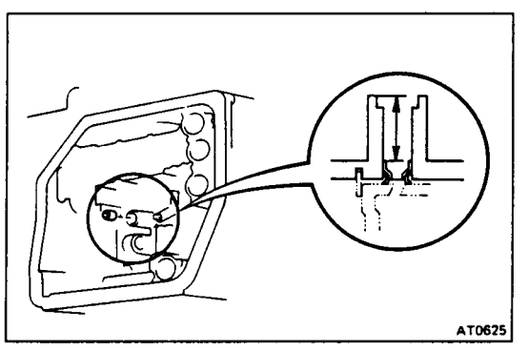
Using a thickness gauge, check the clearance between the plate and the seat of the return spring assembly.

Clearance: 0.37 – 1.56 mm (0.0146 – 0.0614 in.)



57. CHECK OPERATION OF SECOND BRAKE

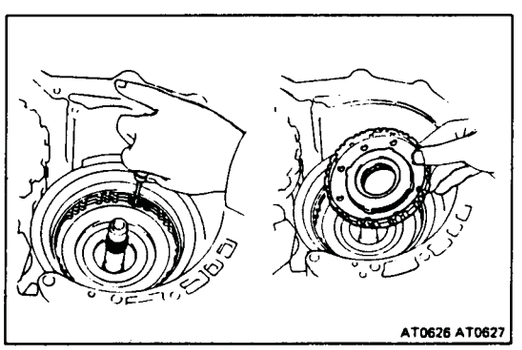
Apply compressed air into the oil passage of the case, and be sure that the piston moves.



58. 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 16.1 ± 0.05 mm (0.634 ± 0.0020 in.).

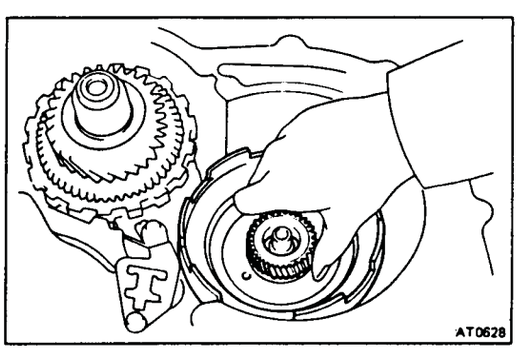
NOTE: Tap in the drum gasket until it makes contact with 2nd brake drum.



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

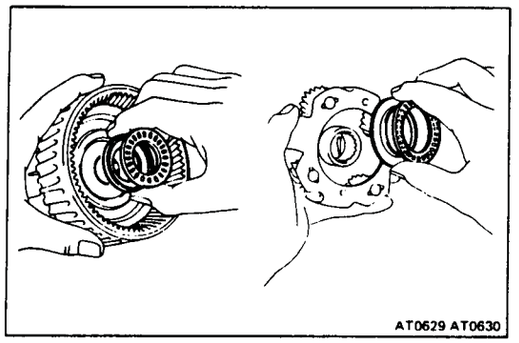
(a) Align the flukes of the discs in the 2nd brake.

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



60. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

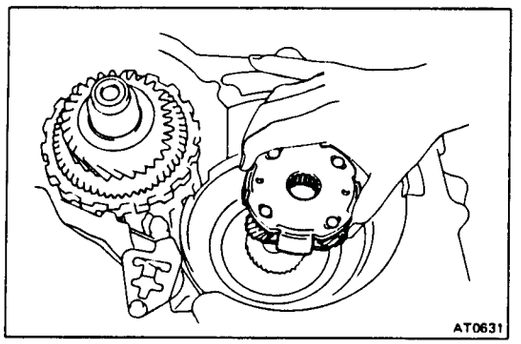
While turning the sun gear clockwise, install it into the one-way clutch.


AT0629 AT0630

61. INSTALL RACES AND BEARINGS

(a) Coat the race 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 the planetary gear.

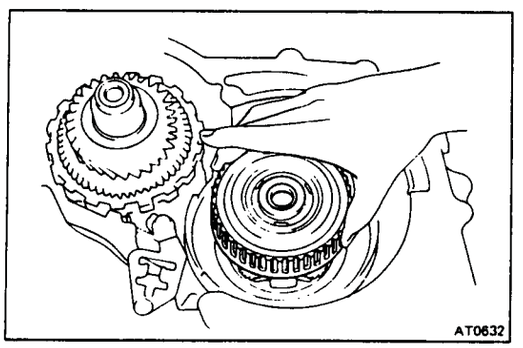

AT0631

62. INSTALL FRONT PLANETARY GEAR

(a) Install the planetary gear.

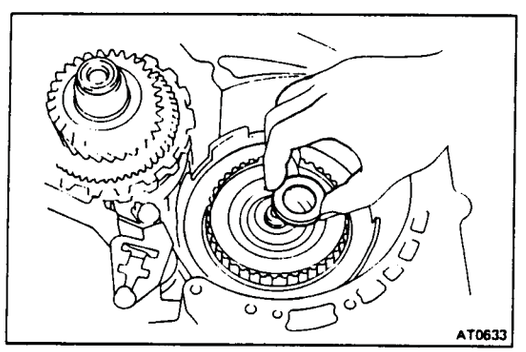
(b) Install the race.

(c) Install the intermediate shaft oil seal ring.

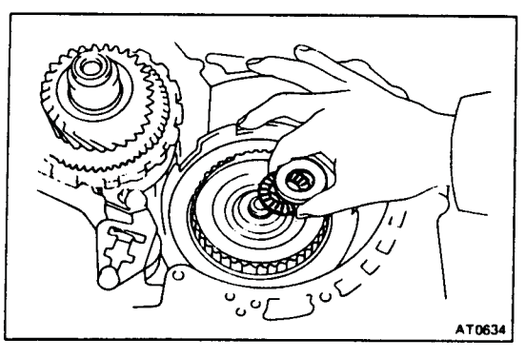

AT0632

63. INSTALL FRONT PLANETARY RING GEAR

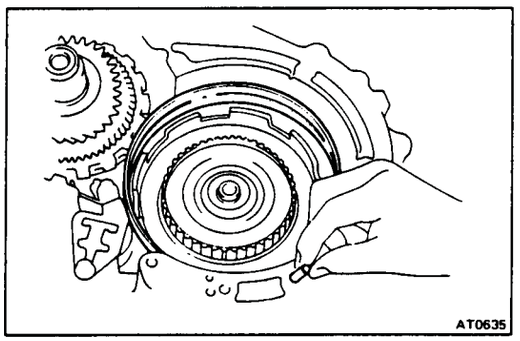
(a) If the planetary gear and the other parts are installed correctly into the case, the end of the bushing with the ring gear flange will be flush with a shoulder of the intermediate shaft.


AT0633

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


AT0634

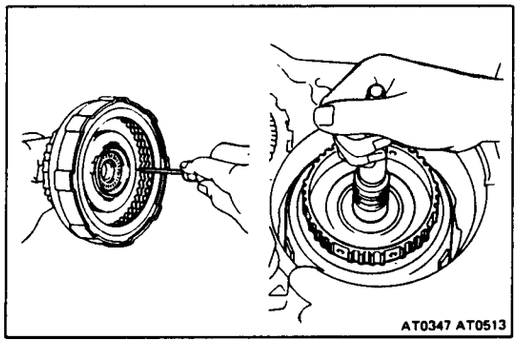
(c) Coat the race and bearing with petroleum jelly and install them.


AT0635

64. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

(b) Install the pin through the oil pump mounting bolt hole.

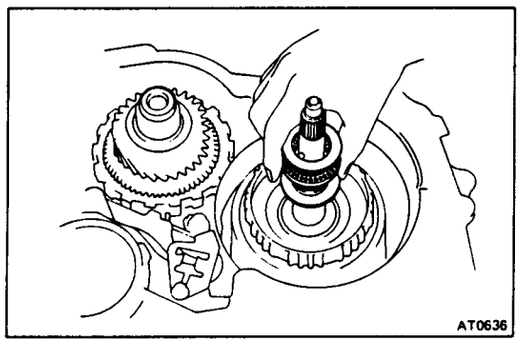

AT0347 AT0513

65. INSTALL FORWARD CLUTCH INTO CASE

(a) Align the flukes of the disc in the forward clutch.

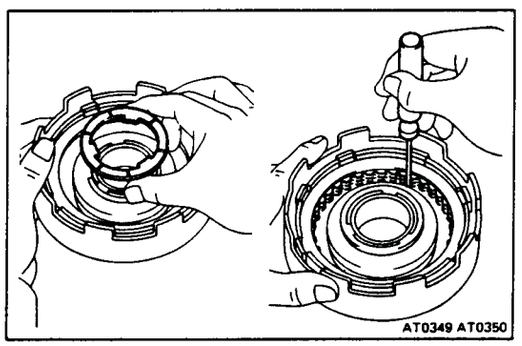
(b) Hold the sun gear input drum and rotate the input shaft to mesh the hub with the clutch discs of the forward clutch.

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.


AT0636

66. INSTALL RACES AND BEARING

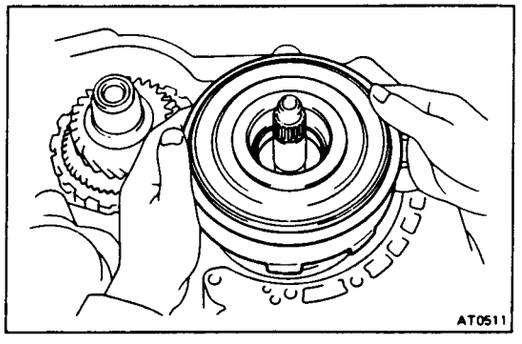
Coat the races and bearing with petroleum jelly and install them.


AT0349 AT0350

67. 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.

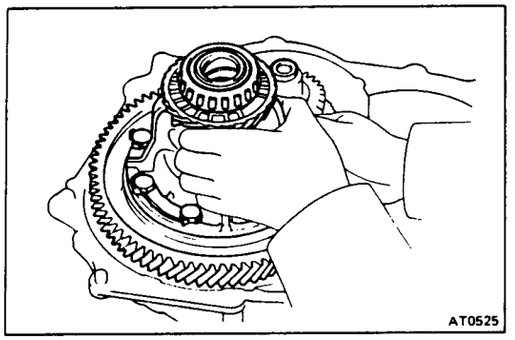
(b) Align the disc flukes in the direct clutch.


AT0511

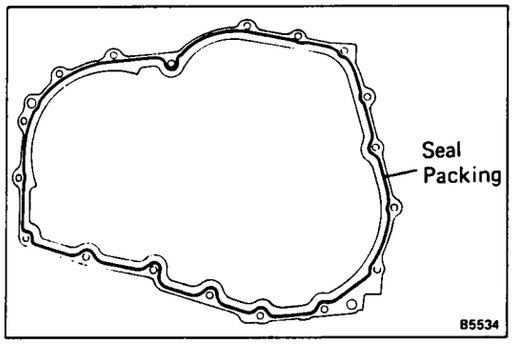
(c) Hold the input shaft, and put the direct clutch drum through in the 2nd coast brake band.

(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.



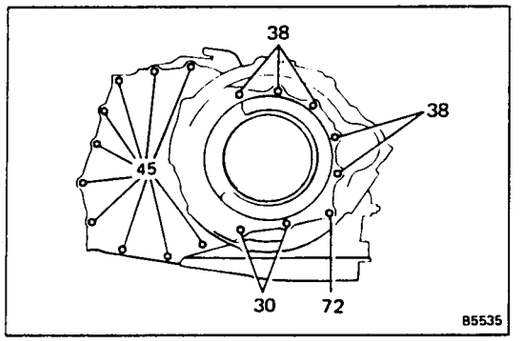
68. INSTALL DIFFERENTIAL



69. INSTALL TRANSAXLE HOUSING

(a) Remove any packing material and be careful not to oil on the contacting surfaces of the transaxle housing or transmission case.

(b) Apply seal packing (LOCTITE No. 518) to the transaxle housing as shown.

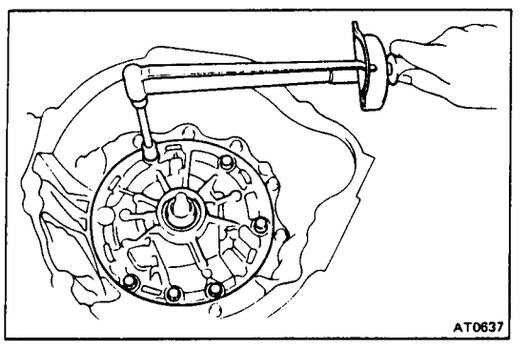


(c) Install and tighten the eighteen bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

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

70. CHECK PRELOAD OF DIFFERENTIAL SIDE BEARING



71. INSTALL OIL PUMP INTO CASE

(a) Coat the O-ring with ATF.

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

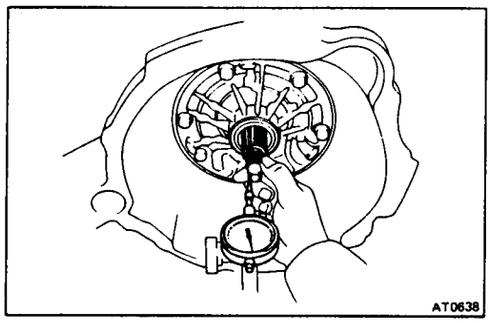
(c) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

(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 six bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



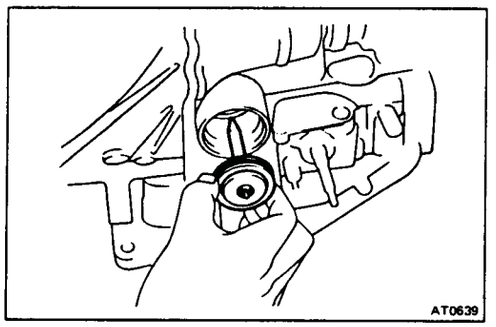
72. MEASURE THRUST PLAY OF INPUT SHAFT

Measure the thrust play in axial direction.

Thrust play: 0.2 – 0.9 mm (0.008 – 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.)



73. CHECK INPUT SHAFT ROTATION

Make sure that the input shaft rotates smoothly.

74. CHECK SECOND COAST BRAKE PISTON STROCK

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

(b) Install the snap ring.

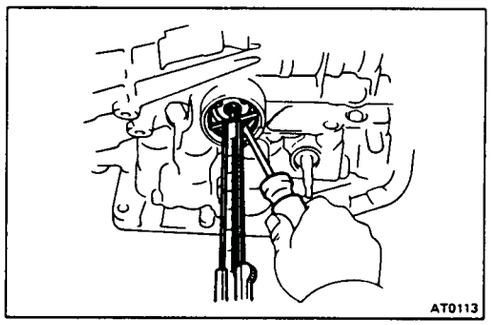
(c) Push the end of the piston rod firmly. At this time, measure the distance between the tip of the piston rod and the outside of snap ring.

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 standard value, 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 standard value, replace the brake band with a new one.



75. INSTALL SECOND COAST BRAKE PISTON

(a) Remove the installed parts from the bore.

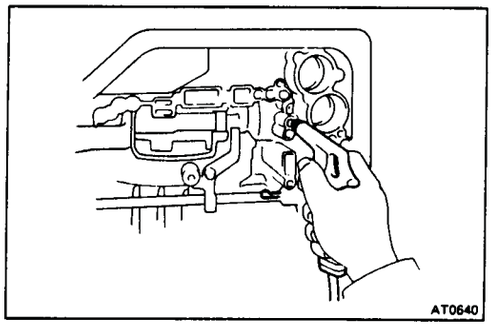
(b) Install the outer spring with the piston.

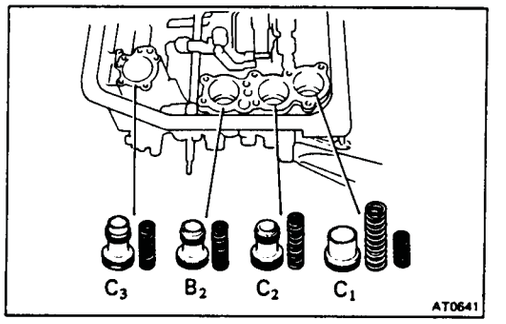
(c) Place the cover into the bore.

(d) Using SST, install the snap ring while pressing the cover.

SST 09350-32011

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



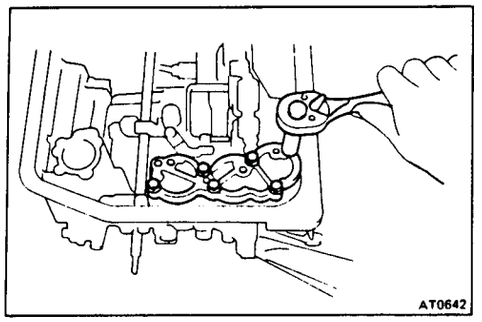


76. INSTALL ACCUMULATOR PISTONS AND SPRINGS

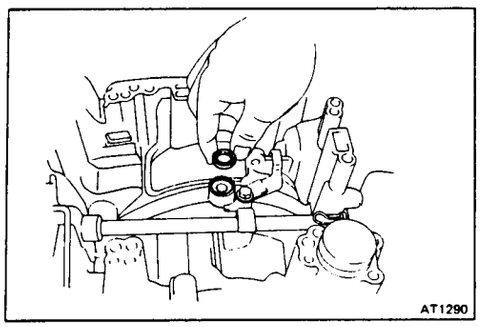
(a) Coat new O-rings with ATF, install them to the pistons.

(b) Install the pistons and springs.

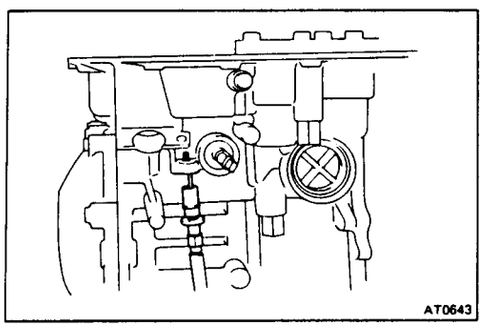
Spring		Free length mm (in.)	Color
C_1	No. 1	77.80 (3.0630)	None
	No. 2	42.50 (1.6732)	None
C_2		63.50 (2.5000)	Orange
B_2		66.68 (2.6252)	Pink
C_3		61.47 (2.4201)	White



(c) Install a new gasket and accumulator cover.



77. INSTALL GOVERNOR APPLY GASKET

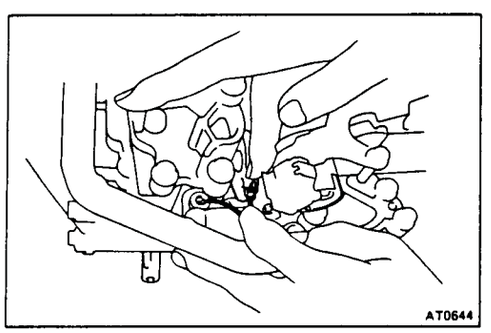


78. INSTALL THROTTLE CABLE IN CASE

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

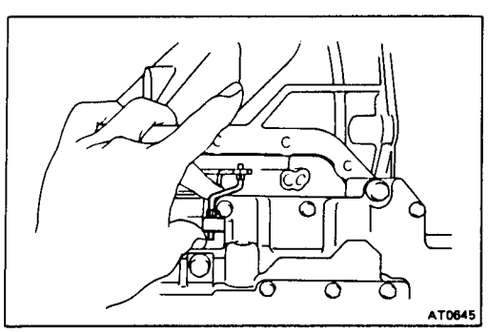
CAUTION: **In subsequent work, do not roll the case over the cable to avoid breaking the cable fitting.**

79. INSTALL SOLENOID WIRE IN CASE



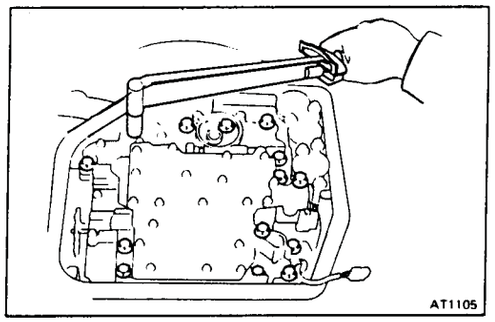
80. PLACE VALVE BODY ON TRANSMISSION

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



(b) Connect the connecting rod to the manual valve lever.

(c) Lower the valve body into the place.

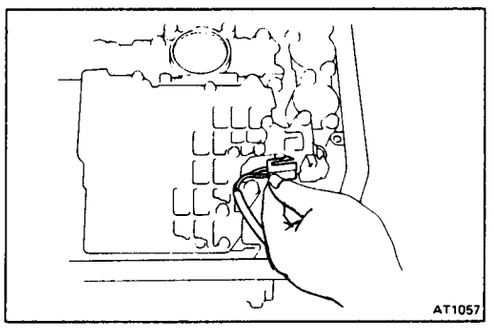


81. INSTALL FOURTEEN BOLTS IN VALVE BODY

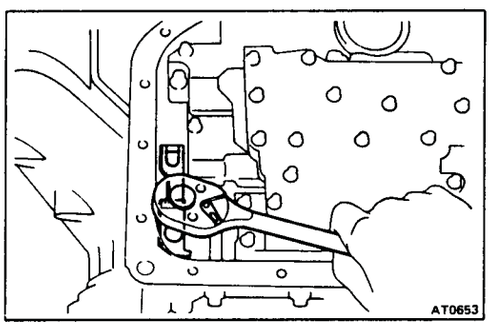
NOTE: Each bolt length (mm) is indicated in the figure.

Finger tighten all the bolts first. Then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



82. CONNECT SOLENOID CONNECTOR



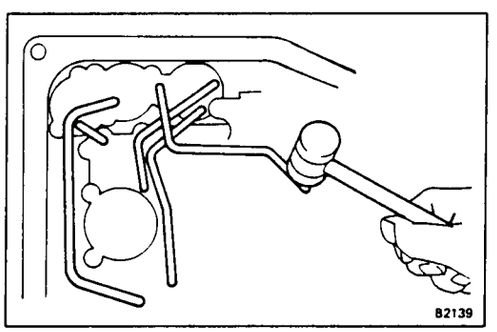
83. INSTALL DETENT SPRING

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

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

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

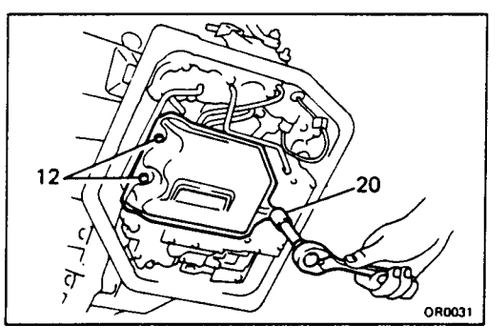
(b) Check that the manual valve lever is in contact with the center of the roller at the tip of the detent spring.



84. INSTALL OIL TUBES

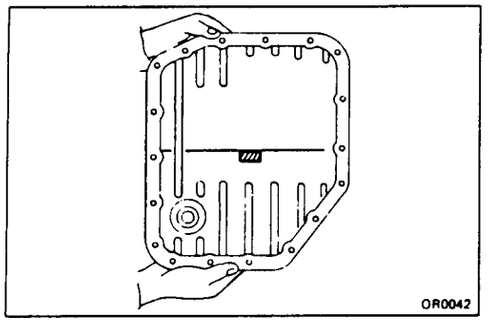
Tap the tubes with a plastic hammer to install them into the positions indicated in the figure.

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



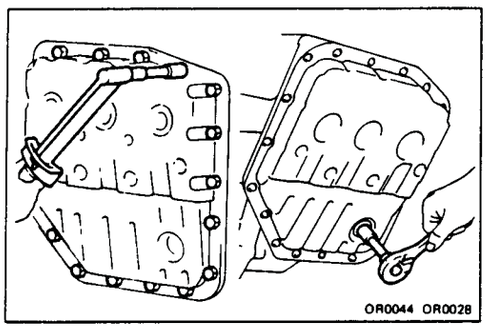
85. INSTALL OIL STRAINER

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



86. INSTALL MAGNET IN PAN

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

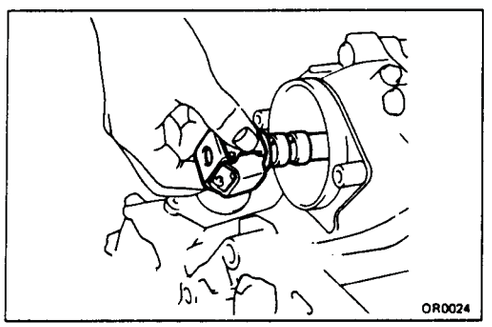


87. INSTALL OIL PAN WITH NEW GASKET

Torque: 50 kg-cm (43 in.-lb, 4.9 N·m)

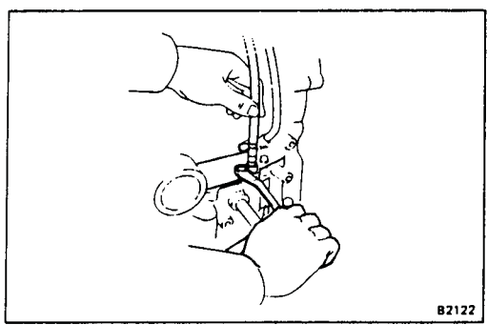
88. INSTALL DRAIN PLUG WITH NEW GASKET

Torque: 175 kg-cm (13 ft-lb, 17 N·m)



89. INSTALL GOVERNOR BODY

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



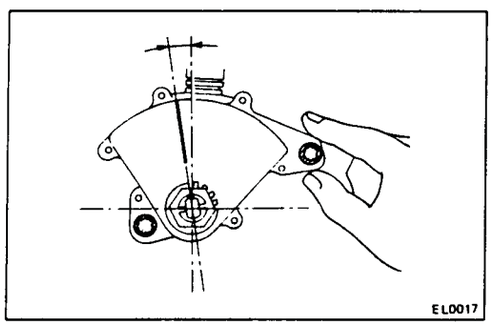
90. INSTALL THROTTLE CABLE RETAINING PLATE

91. INSTALL SOLENOID RETAINER PLATE

92. INSTALL NEUTRAL START SWITCH

Tighten the nut and stake it with the lock washer.

93. INSTALL MANUAL SHIFT LEVER



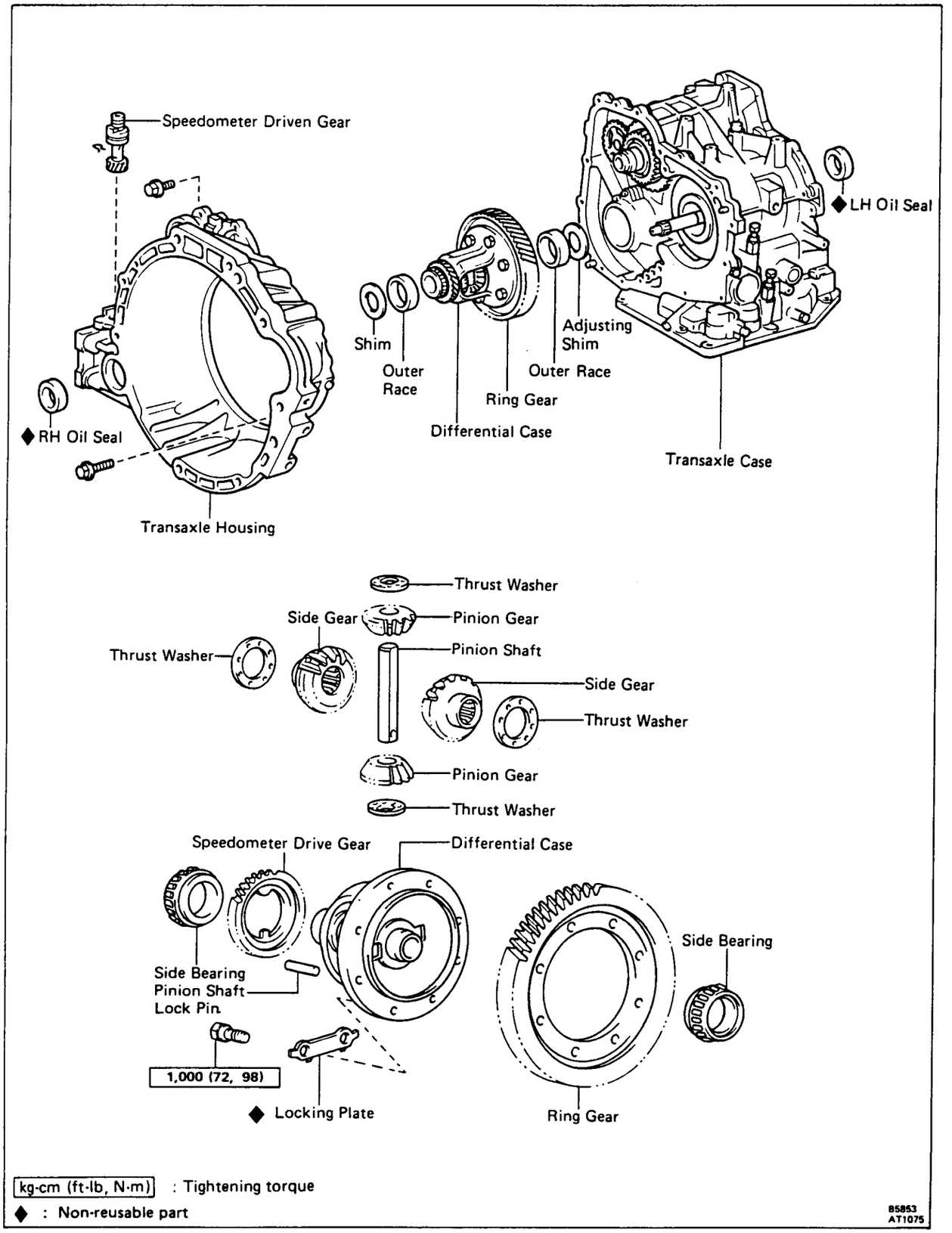
94. ADJUST NEUTRAL START SWITCH
(See page AT-4)

95. INSTALL TWO OIL COOLER PIPES

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

DIFFERENTIAL AND DRIVE PINION

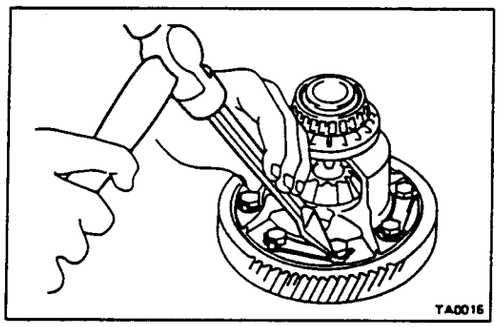
COMPONENTS (A240L)



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

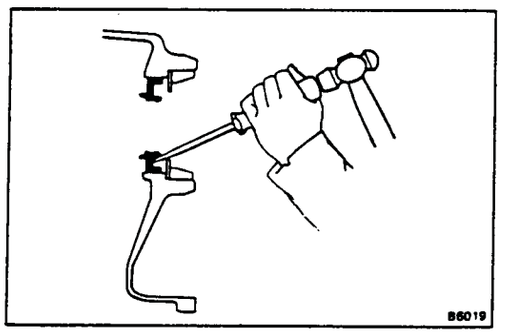
◆ : Non-reusable part

85853
AT1075



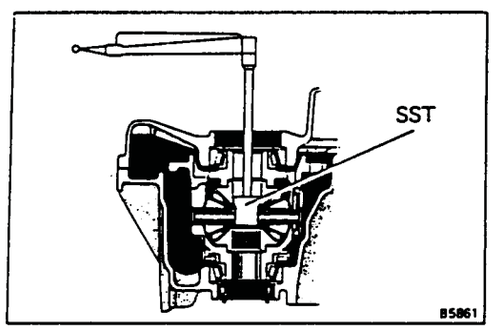
ADJUSTMENT OF DIFFERENTIAL SIDE BEARING PRELOAD (A240L)

REMOVE RING GEAR FROM DIFFERENTIAL



REPLACE LH ADJUSTING SHIM

(a) Remove the LH oil seal.



ADJUST DIFFERENTIAL SIDE BEARING PRELOAD

(a) Rotate the differential in both directions to snug the bearing down.

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

SST 09564-32011

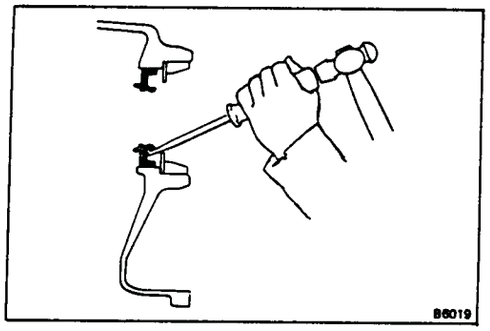
Preload (at starting):

New bearing	**8 — 14 kg-cm (6.9 — 12.2 in.-lb, 0.8 — 1.4 N·m)**
Reused bearing	**4 — 7 kg-cm (3.5 — 6.1 in.-lb, 0.4 — 0.7 N·m)**

If the preload is not within specification, remove the differential from the transaxle case.
Re-select LH adjusting shim.

Thickness mm (in.)		Thickness mm (in.)	
2.00	(0.0787)	2.50	(0.0984)
2.05	(0.0807)	2.55	(0.1004)
2.10	(0.0827)	2.60	(0.1024)
2.15	(0.0846)	2.65	(0.1043)
2.20	(0.0866)	2.70	(0.1063)
2.25	(0.0886)	2.75	(0.1083)
2.30	(0.0906)	2.80	(0.1102)
2.35	(0.0925)	2.85	(0.1122)
2.40	(0.0945)	2.90	(0.1142)
2.45	(0.0965)		

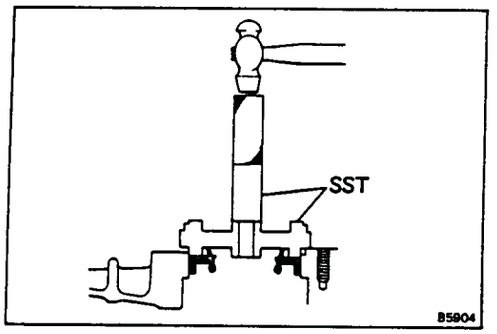
NOTE: The preload will change about 3 — 4 kg-cm (2.6 — 3.5 in.-lb, 0.3 — 0.4 N·m) with each shim thickness.



REPLACEMENT OF OIL SEAL AND OUTER RACE (A240L)

REPLACE LH OIL SEAL

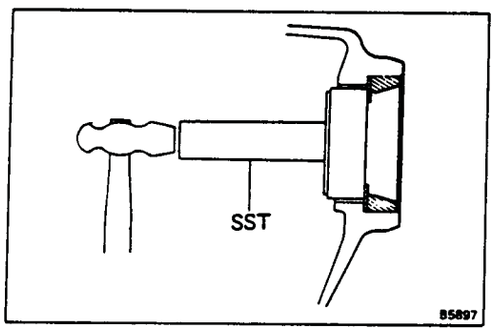
(a) Remove the oil seal.



(b) Using SST, drive in a new oil seal.

SST 09350-32011

(c) Coat the lip of oil seal with MP grease.

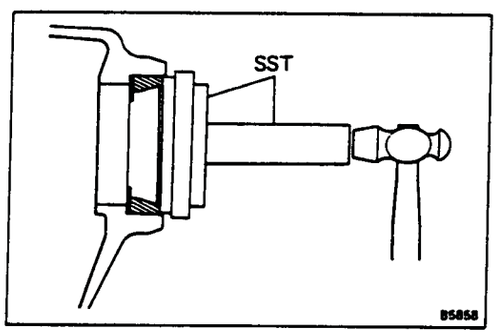


REPLACE LH SIDE BEARING OUTER RACE

(a) Remove the oil seal.

(b) Using SST, drive out the outer race and shim.

SST 09350-32011

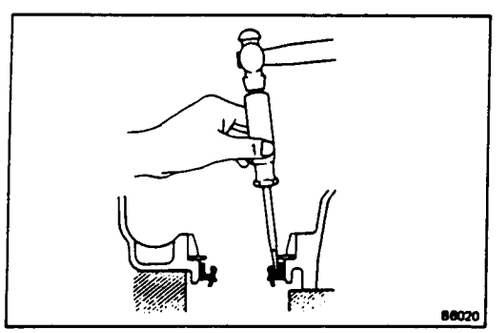


(c) Place the shim onto the transaxle case.

(d) Using SST, drive in a new outer race into the transaxle case.

SST 09350-32011

(e) Install a new oil seal.

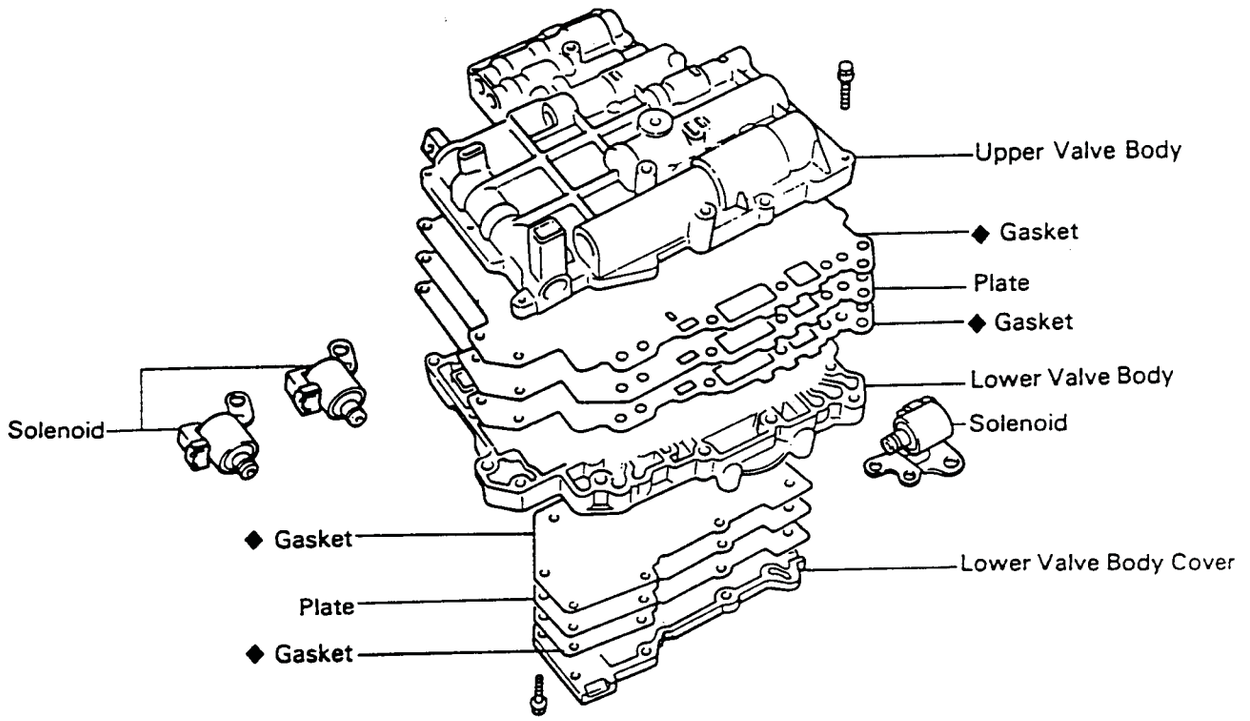


REPLACE RH OIL SEAL

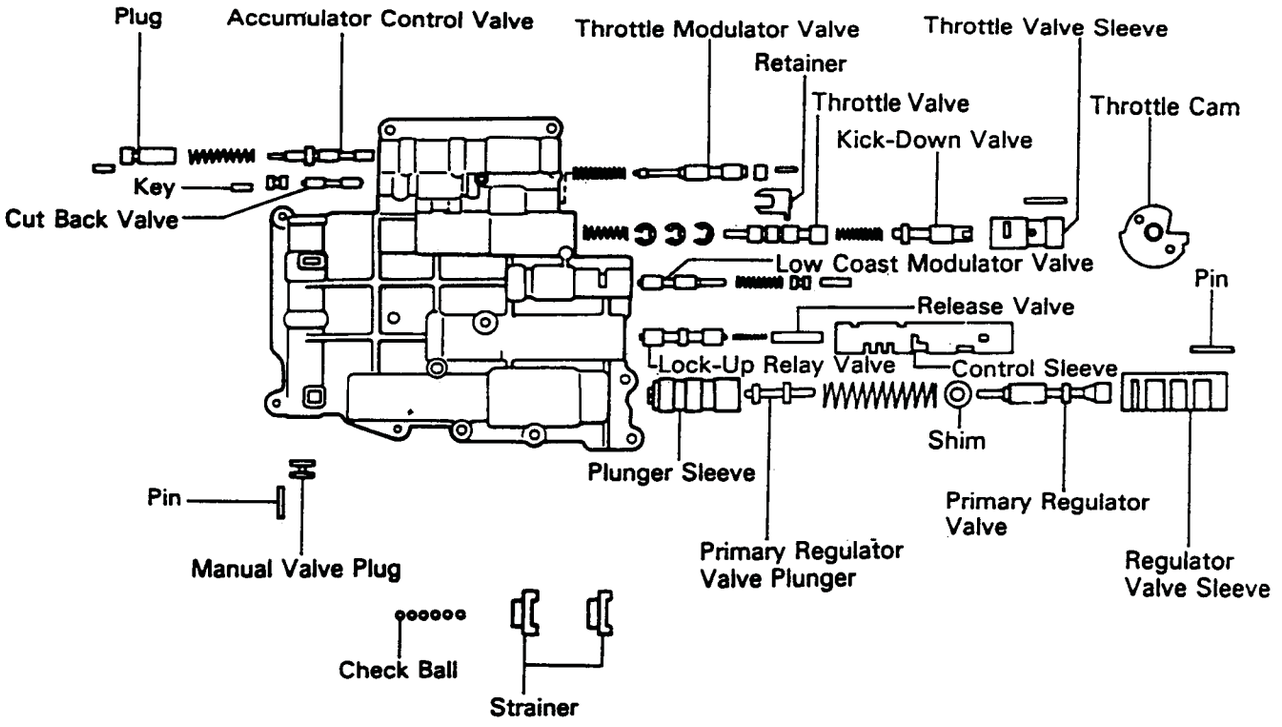
(a) Remove the oil seal.

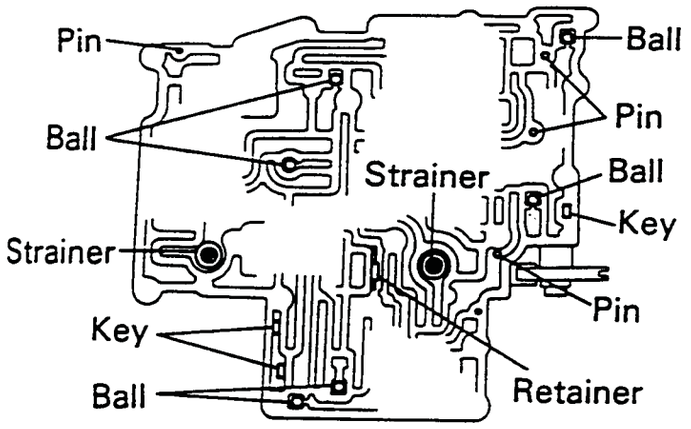
A-240E

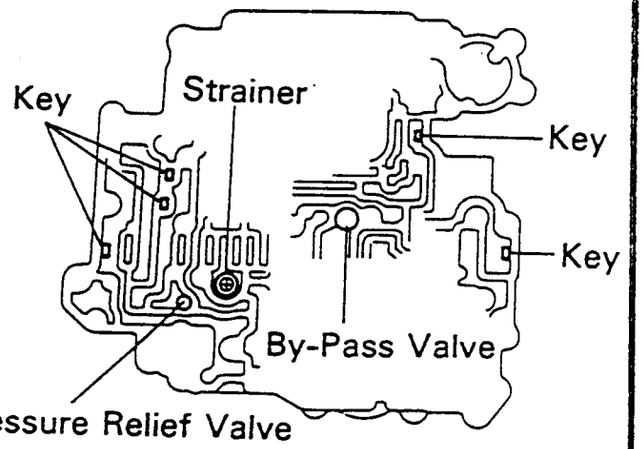
Valve Body



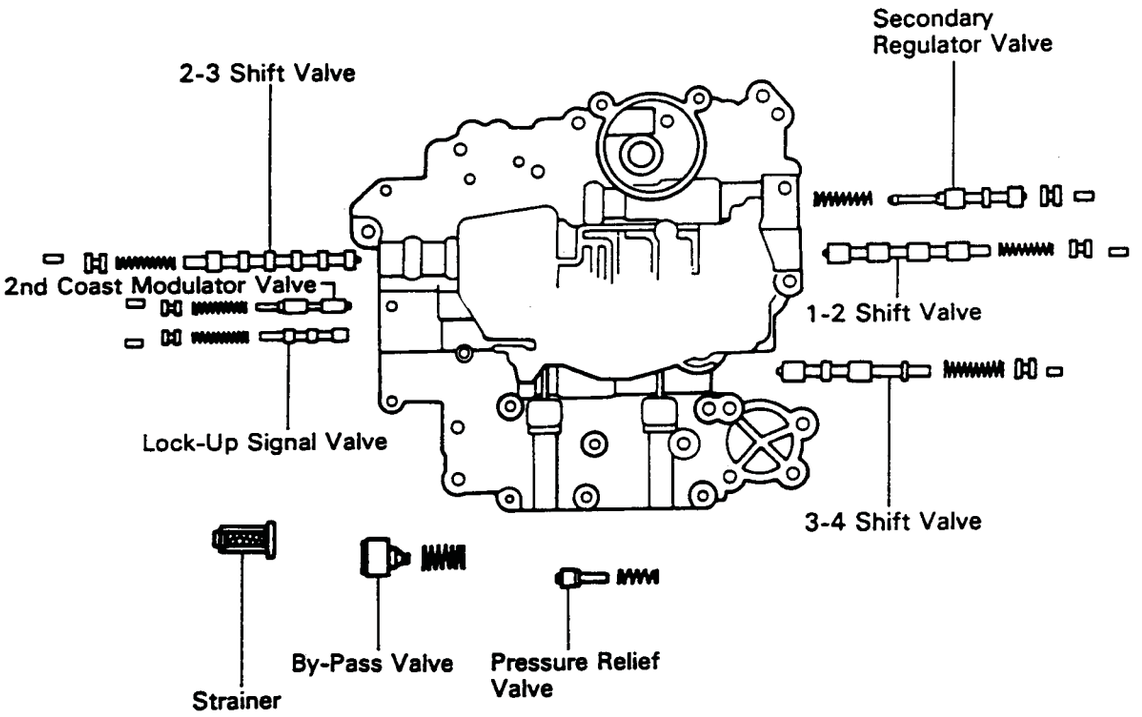
(Upper Valve Body)

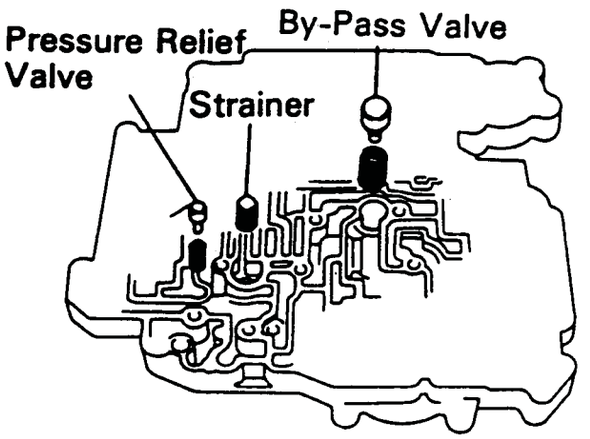






(Lower Valve Body)





INSPECT SOLENOID

(a) Disconnect the connector from the ECT computer.

(b) Measure the resistance between S_1, S_2, S_L and ground.

STD: 11 – 15Ω

(c) Apply battery voltage to the solenoid.
Check that an operation noise can be heard form the solenoid.