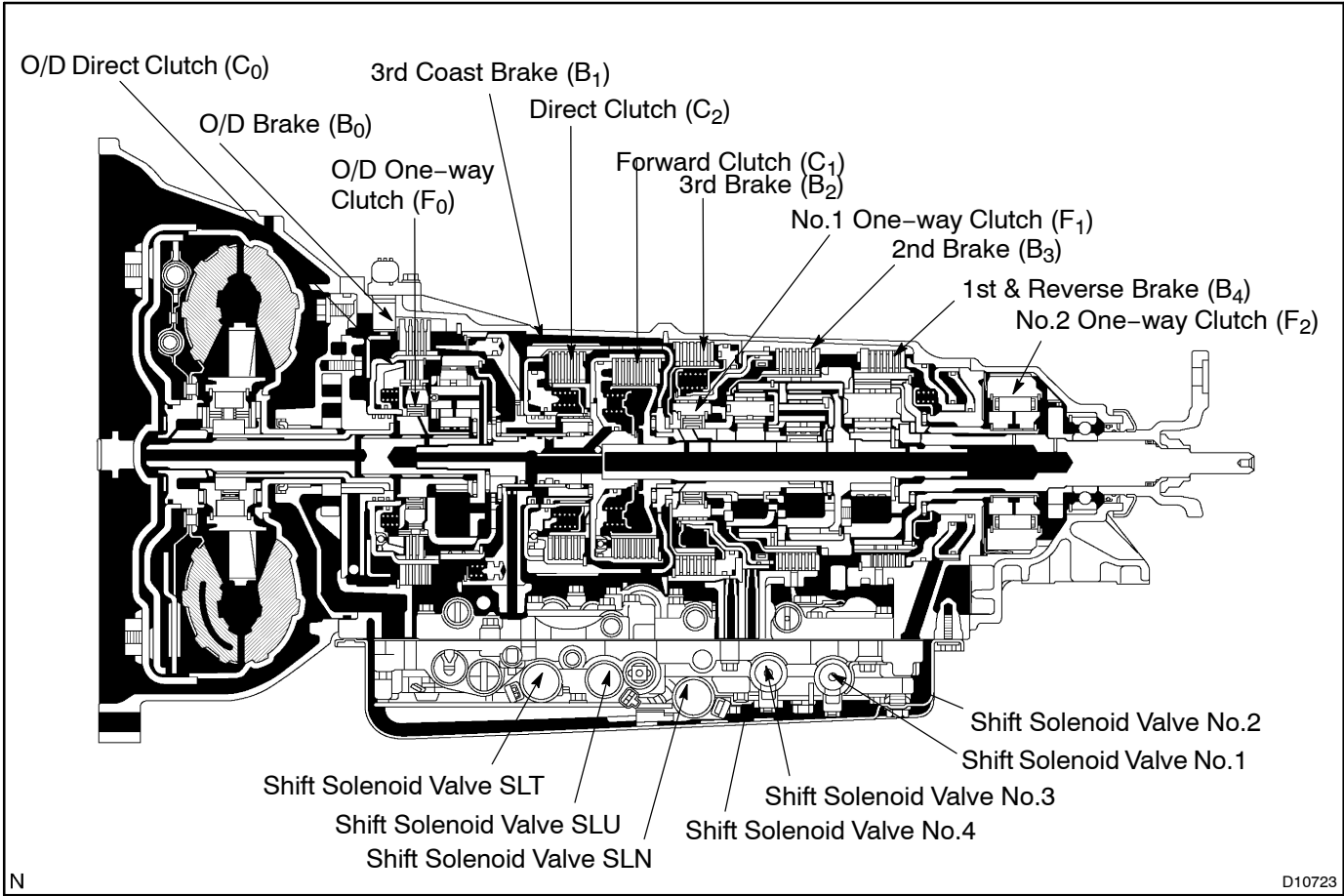


AUTOMATIC TRANSMISSION SYSTEM

OPERATION

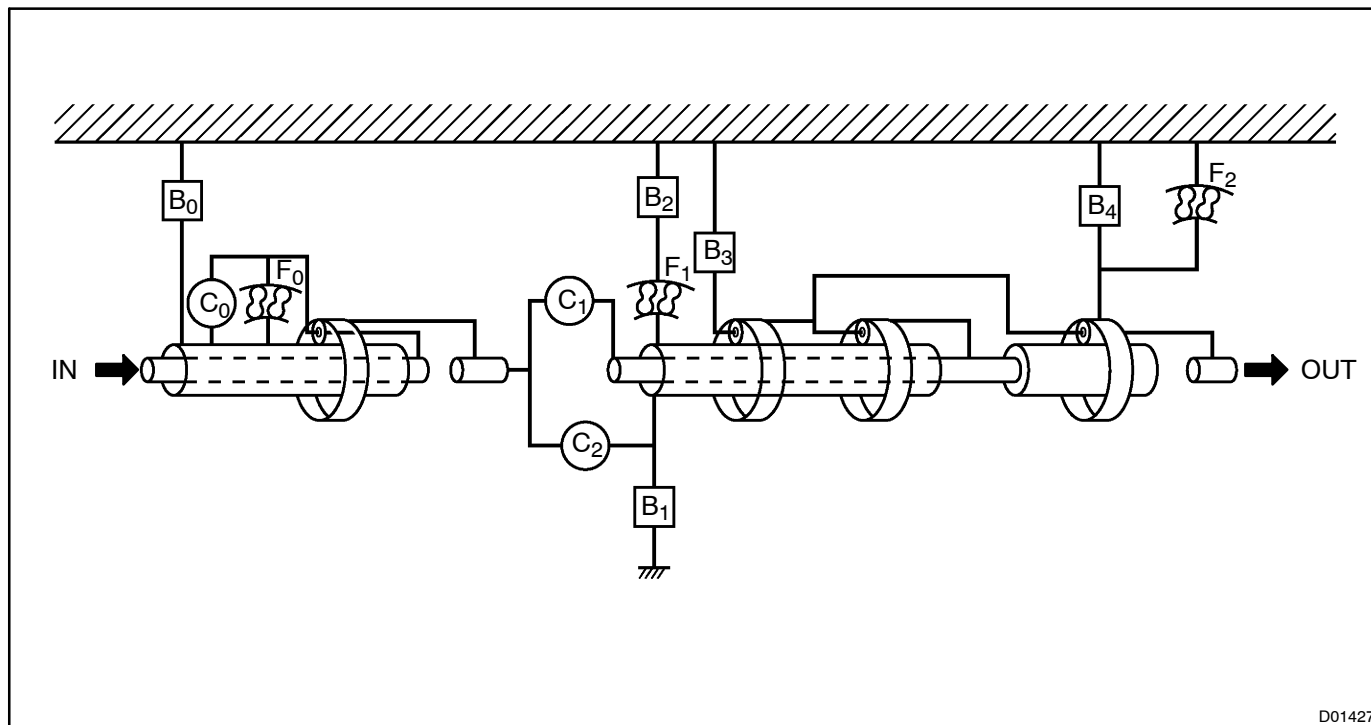
AT04A-03



Shift Lever Position	Gear Position	No. 1	No. 2	No. 3	No. 4	C ₀	C ₁	C ₂	B ₀	B ₁	B ₂	B ₃	B ₄	F ₀	F ₁	F ₂
P	Park	ON	OFF	ON	OFF	○										
R	Reverse	ON	OFF	OFF	ON			○	○				○			
N	Neutral	ON	OFF	ON	OFF	○										
D	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	ON	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
	5th	OFF	OFF	OFF	ON		○	○	○		○					
4	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	ON	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
3	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	ON	OFF	○	○					○		○		
	3rd	OFF	ON	ON	OFF	○	○			○	○			○	○	
2	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	ON	OFF	○	○					○		○		
L	1st	ON	OFF	OFF	OFF	○	○						○	○		○

○ : Operating

FUNCTION OF COMPONENTS



D01427

Component		Function
C ₀	O/D Direct Clutch	Connects O/D sun gear & O/D planetary carrier.
C ₁	Forward Clutch	Connects input shaft and rear planetary sun gear.
C ₂	Direct Clutch	Connects input shaft and front & center planetary sun gear.
B ₀	O/D Brake	Prevents O/D sun gear from turning either clockwise or counterclockwise.
B ₁	3rd Coast Brake	Prevents front & center planetary sun gear from turning either clockwise or counterclockwise.
B ₂	3rd Brake	Prevents outer race of F ₁ from turning either clockwise or counterclockwise thus preventing the front & center planetary sun gear from turning counterclockwise.
B ₃	2nd Brake	Prevents front planetary carrier from turning either clockwise or counterclockwise.
B ₄	1st & Reverse Brake	Prevents rear planetary ring gear from turning either clockwise or counterclockwise.
F ₀	O/D One-way Clutch	When the transmission is being driven by the engine, this clutch connects the O/D sun gear and O/D planetary carrier.
F ₁	No.1 One-way Clutch	When B ₂ is operating, this clutch prevents the front & center planetary sun gear from turning counterclockwise.
F ₂	No.2 One-way Clutch	Prevents rear planetary ring gear from turning clockwise.

COMPONENT PARTS

AT05S-02

PRECAUTION

GENERAL NOTES:

The automatic transmission is composed of highly precision-finished parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect performance. The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion from similar-looking parts of different sub-assemblies being on your workbench at the same time. The component groups are inspected and repaired from the converter housing side. As much as possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.

Recommended ATF: Type T-IV

GENERAL CLEANING NOTES:

- (a) All disassembled parts should be washed clean and any fluid passages and holes should be blown through with compressed air.
- (b) Dry all parts with compressed air—never use shop rags.
- (c) When using compressed air, always aim away from yourself to prevent accidentally spraying automatic transmission fluid or kerosene on your face.
- (d) The recommended automatic transmission fluid or kerosene should be used for cleaning.

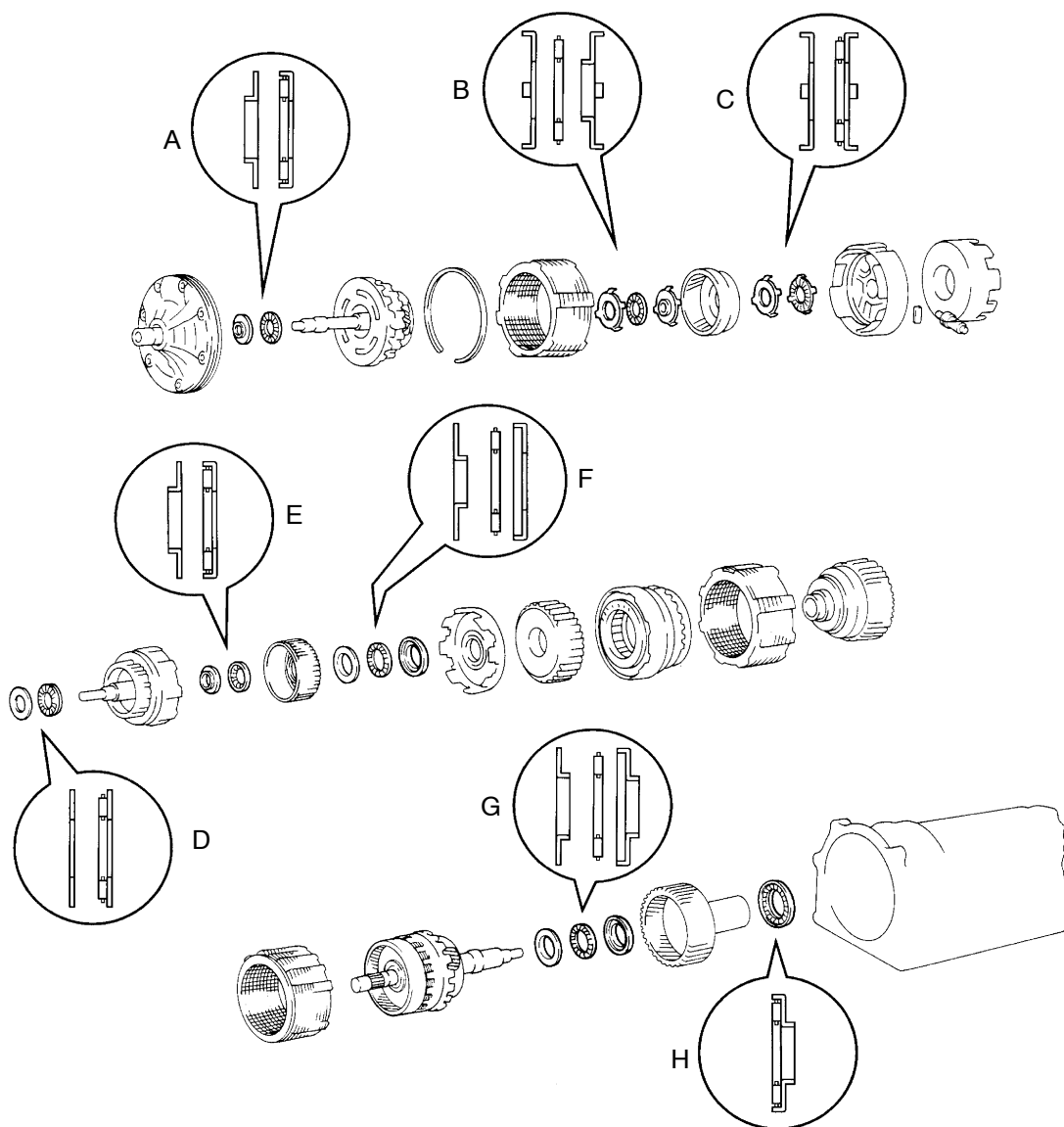
PARTS ARRANGEMENT:

- (a) After cleaning, the parts should be arranged in the correct order to allow efficient inspection, repairs, and reassembly.
- (b) When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
- (c) New discs for the brakes and clutches that are to be used for replacement must be soaked in transmission fluid for at least 15 minutes before reassembly.

GENERAL REASSEMBLY:

- (a) All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.
- (b) All gaskets and rubber O-rings should be replaced.
- (c) Do not use adhesive cements on gaskets and similar parts.
- (d) Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
- (e) If a worn bushing is to be replaced, the subassembly containing that bushing must also be replaced.
- (f) Check thrust bearings and races for wear or damage. Replace if necessary.
- (g) Use petroleum jelly to keep parts in place.
- (h) When working with FIPG material, you must observe the following.
 - Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces.
 - Thoroughly clean all components to remove all the loose material.
 - Clean both sealing surfaces with a non-residue solvent.
 - Parts must be reassembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

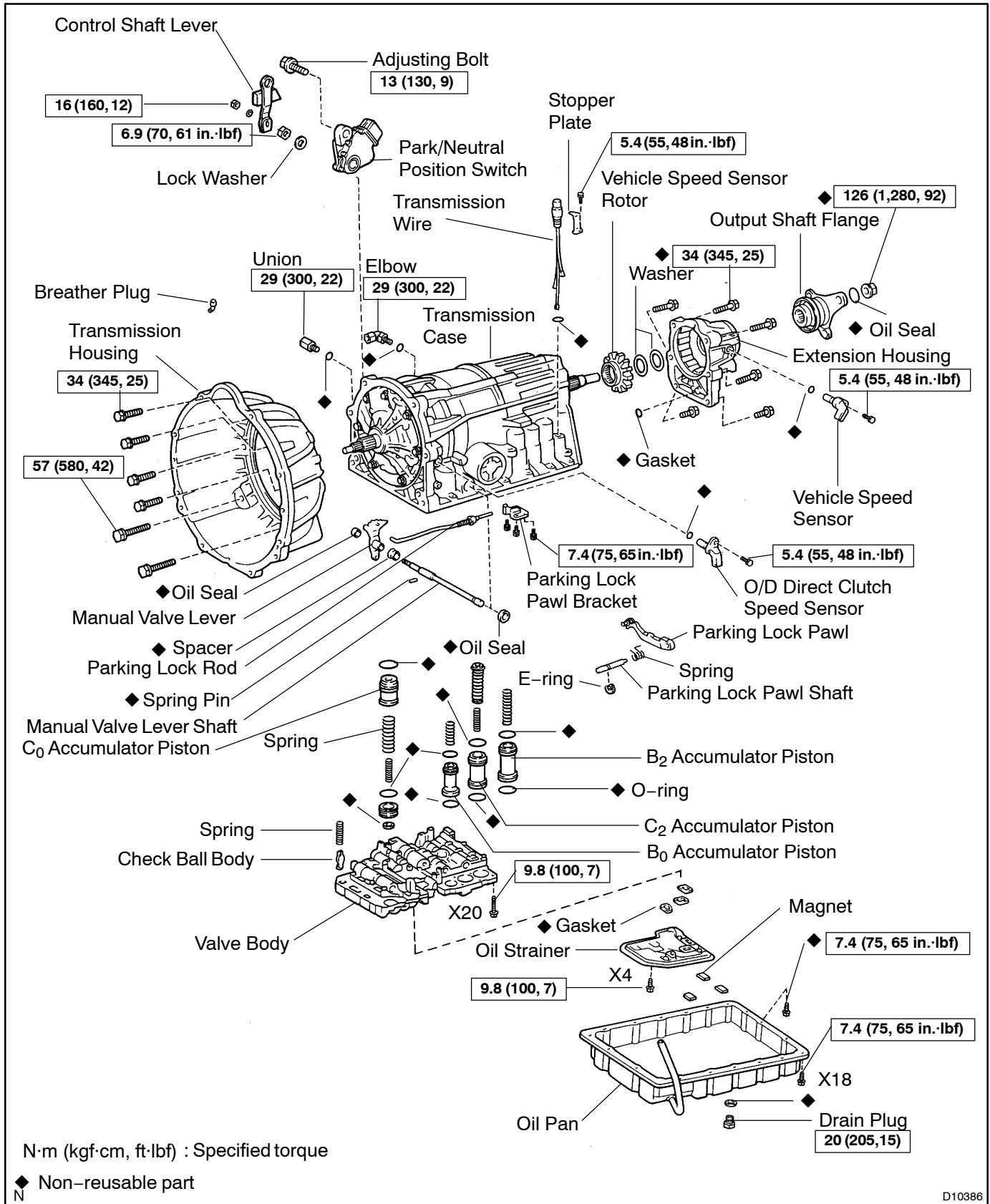
BEARING AND RACES INSTALLATION POSITION AND DIRECTION

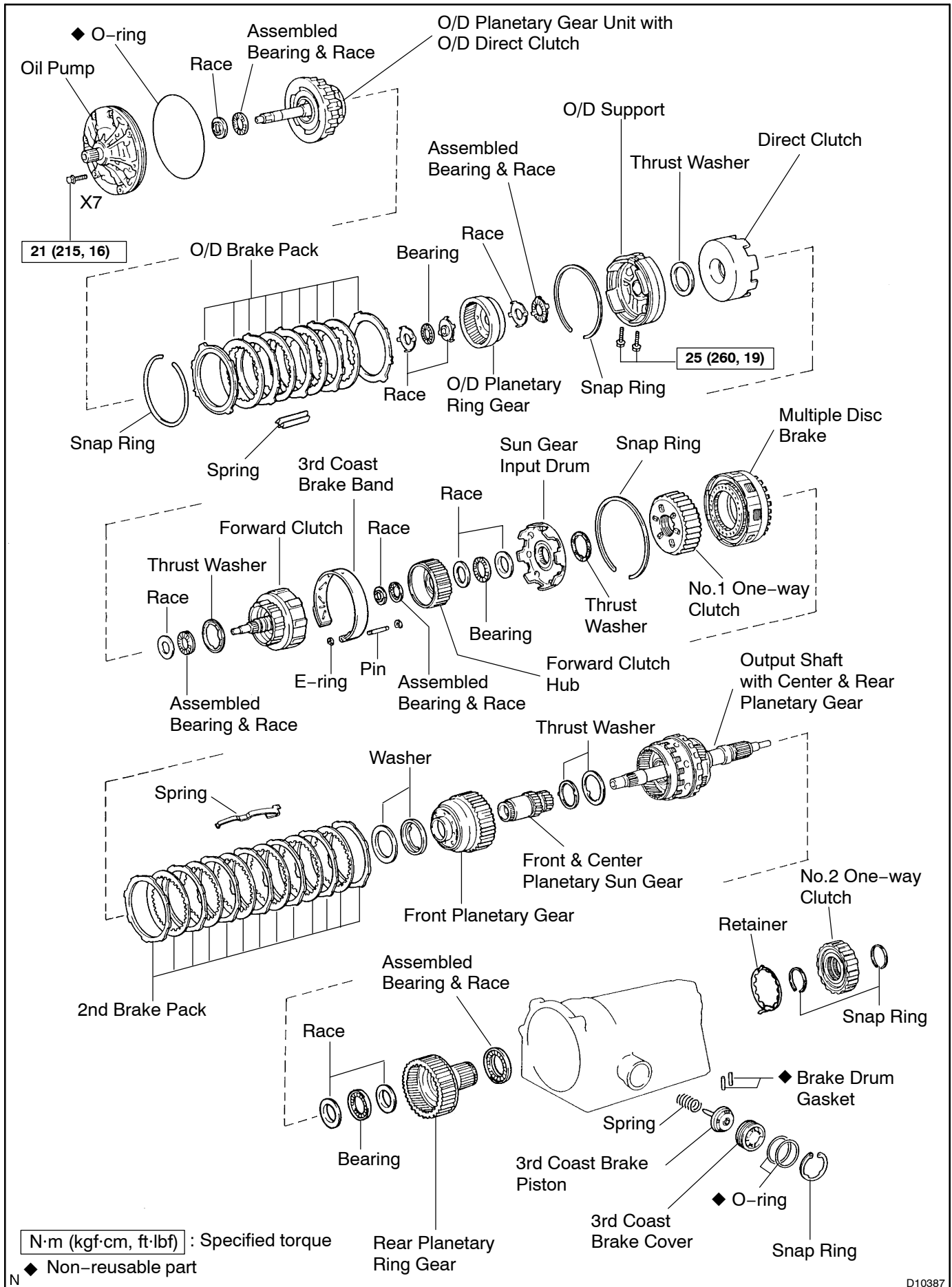


D01470

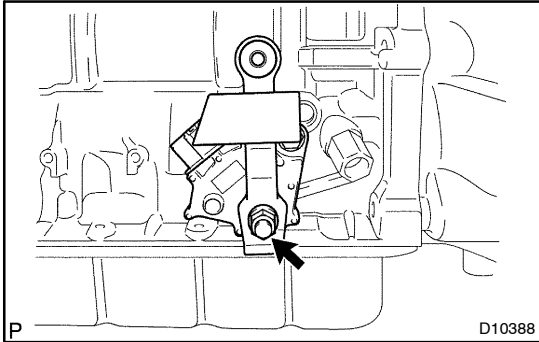
Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	28.1 (1.106) / 47.5 (1.870)	28.8 (1.134) / 50.4 (1.984)	–
B	27.2 (1.070) / 42.0 (1.654)	25.9 (1.020) / 47.0 (1.850)	24.0 (0.945) / 48.0 (1.890)
C	37.1 (1.461) / 59.0 (2.323)	33.6 (1.323) / 50.3 (1.980)	–
D	37.0 (1.457) / 51.0 (2.008)	33.5 (1.319) / 47.8 (1.882)	–
E	26.2 (1.031) / 41.1 (1.618)	26.3 (1.035) / 44.0 (1.732)	–
F	32.5 (1.280) / 59.0 (2.323)	43.5 (1.712) / 59.8 (2.354)	43.5 (1.712) / 61.5 (2.421)
G	39.2 (1.543) / 56.8 (2.236)	40.7 (1.602) / 57.0 (2.244)	41.2 (1.620) / 59.8 (2.354)
H	–	52.9 (2.083) / 70.6 (2.780)	–

COMPONENTS





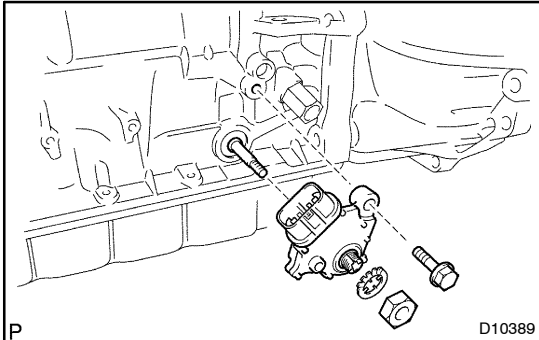
D10387



DISASSEMBLY

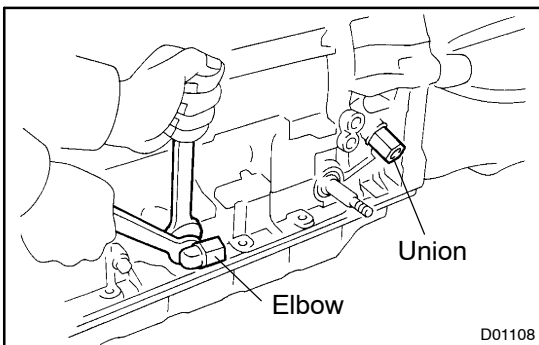
1. REMOVE CONTROL SHAFT LEVER

Remove the nut, washer and control shaft lever.



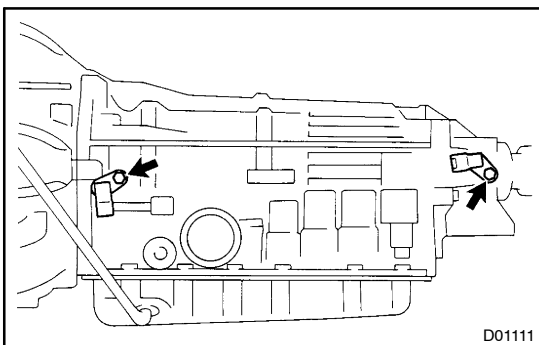
2. REMOVE PARK/NEUTRAL POSITION SWITCH

- (a) Using a screwdriver, unstake the lock washer.
- (b) Remove the lock washer, nut and bolt.
- (c) Remove the park/neutral position switch.



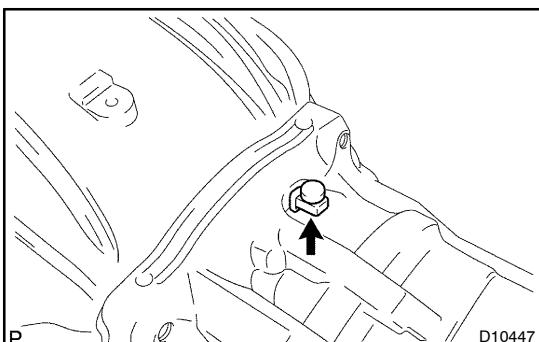
3. REMOVE UNION AND ELBOW

- (a) Remove the union and elbow.
- (b) Remove the 2 O-rings from the union and elbow.



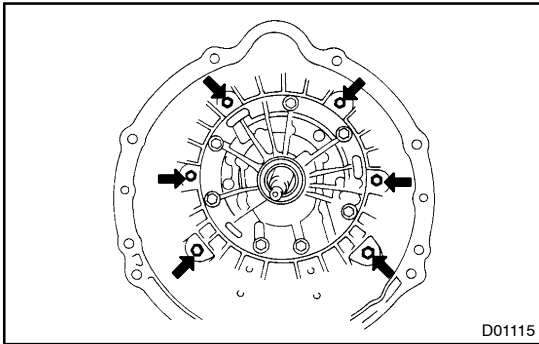
4. REMOVE SPEED SENSOR

- (a) Remove the 2 bolts and 2 speed sensors.
- (b) Remove the O-ring from each one.

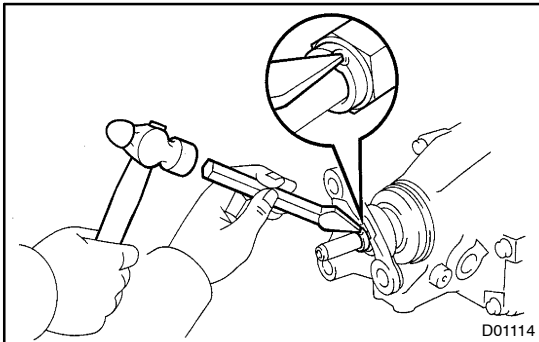


5. REMOVE TRANSMISSION HOUSING

- (a) Remove the breather plug.



- (b) Remove the 6 bolts.
- (c) Remove the transmission housing.

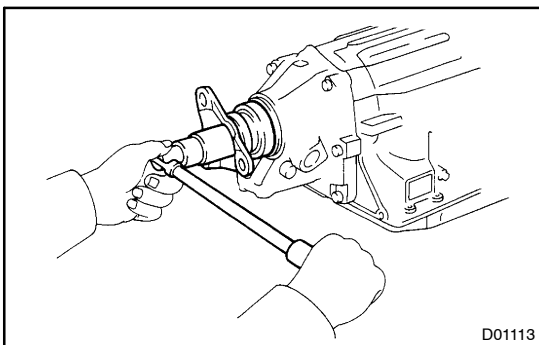


6. REMOVE TRANSMISSION OUTPUT FLANGE

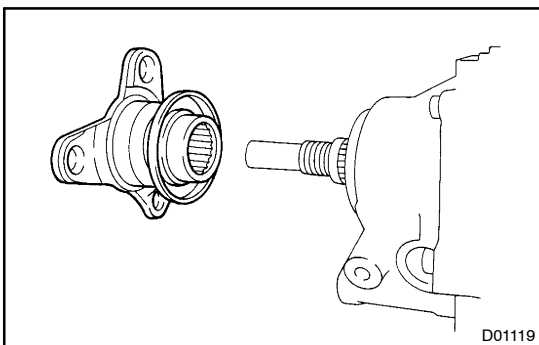
- (a) Using a hammer and chisel, loosen the staked part of the nut.

HINT:

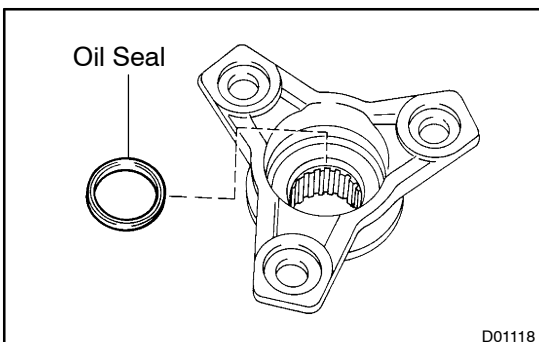
Shift the manual valve lever to the P position.



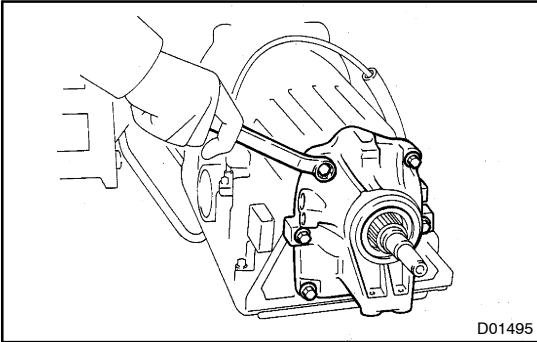
- (b) Using a deeper socket wrench of 30 mm, remove the nut.



- (c) Remove the output flange.

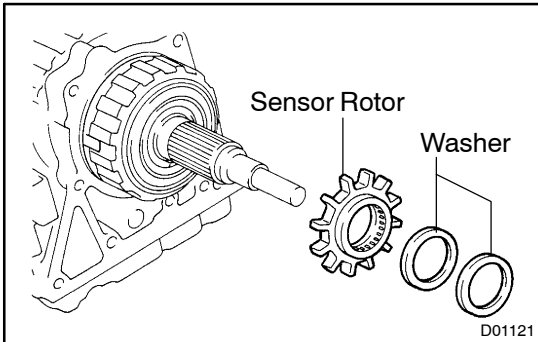


- (d) Remove the oil seal from the output flange.



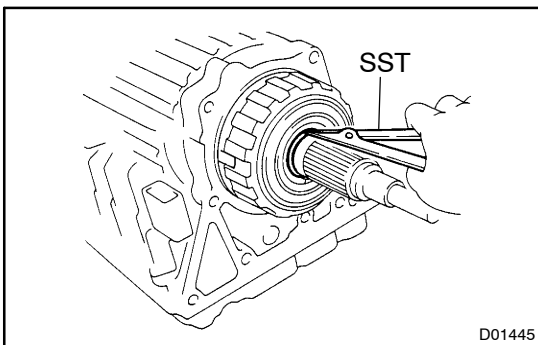
7. REMOVE EXTENSION HOUSING

- (a) Remove the 6 bolts.
 - (b) Remove the extension housing.
- HINT:**
Using a brass bar and hammer.
- (c) Remove the gasket from the extension housing.



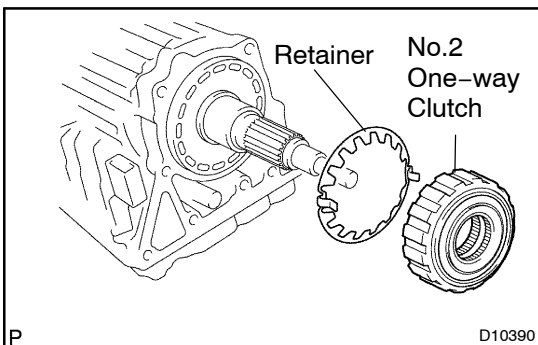
8. REMOVE VEHICLE SPEED SENSOR ROTOR

Remove the 2 washers and vehicle speed sensor rotor from the output shaft.

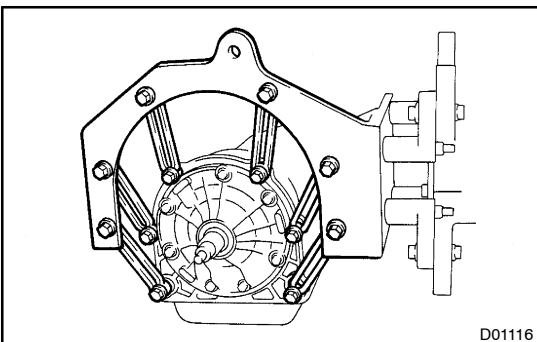


9. REMOVE ONE-WAY CLUTCH

- (a) Using SST, remove the snap ring.
SST 09350-30020 (09350-07070)



- (b) Remove the No.2 one-way clutch and the retainer.



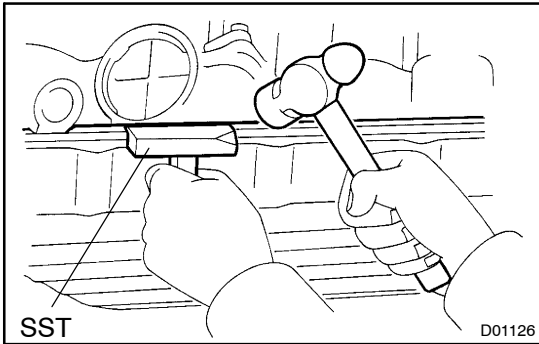
10. INSTALL TRANSMISSION CASE ON OVERHAUL ATTACHMENT

11. REMOVE OIL PAN

NOTICE:

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

- (a) Remove the 19 bolts.

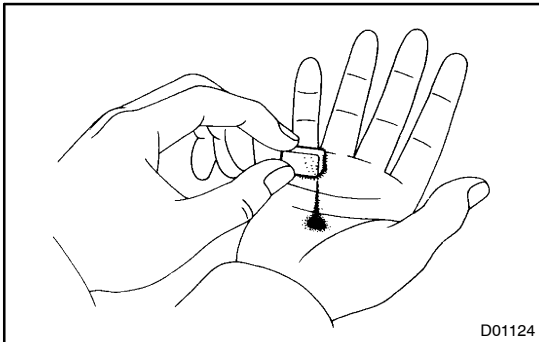


- (b) Insert the blade of SST between the transmission case and oil pan, cut off applied sealer.

SST 09032-00100

NOTICE:

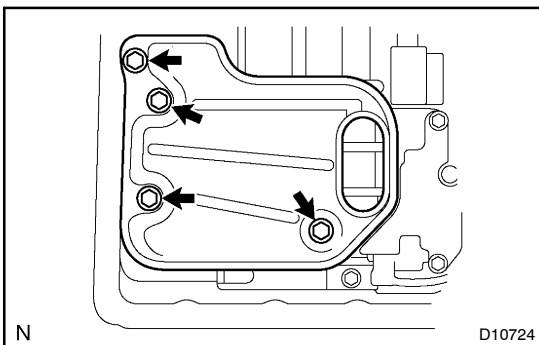
Be careful not to damage the oil pan flange.



12. EXAMINE PARTICLES IN PAN

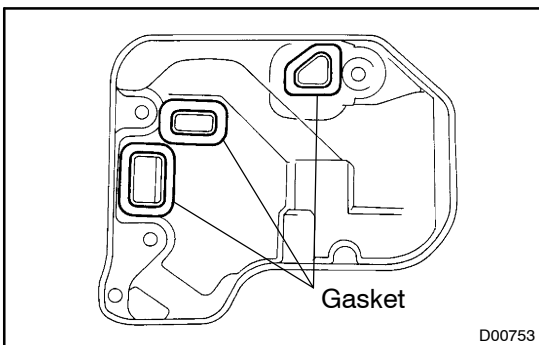
Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

- Steel (magnetic): bearing, gear and clutch plate wear
- Brass (non-magnetic): bushing wear

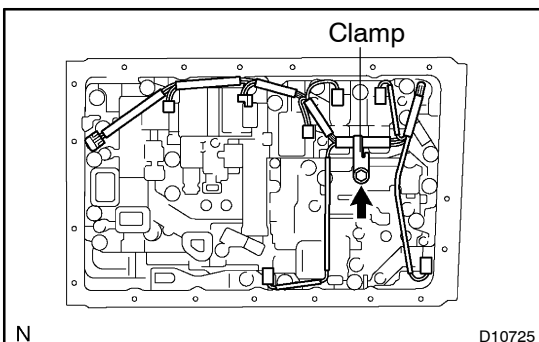


13. REMOVE OIL STRAINER

- (a) Turn over the transmission.
- (b) Remove the 4 bolts holding the oil strainer to the valve body.

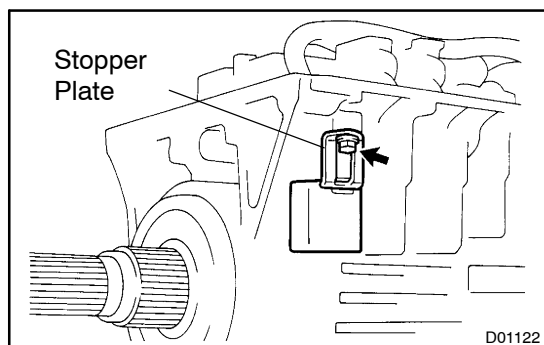


- (c) Remove the 3 gaskets from the oil strainer.

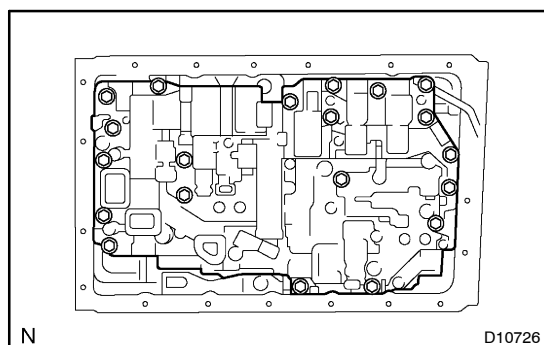


14. REMOVE TRANSMISSION WIRE

- (a) Remove the ATF temperature sensor.
- (b) Remove the bolt and clamp.
- (c) Disconnect the 7 connectors from the shift solenoid valves.

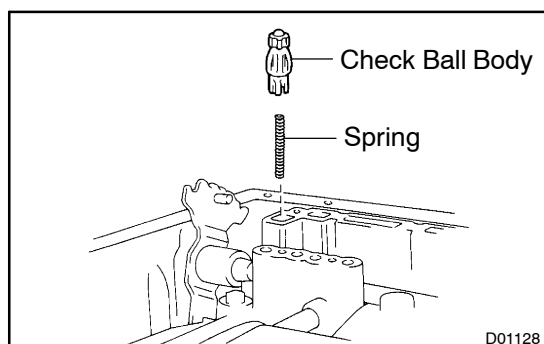


- (d) Remove the bolt and stopper plate from the case.
- (e) Pull the transmission wire out of the transmission case.
- (f) Remove the O-ring from the grommet.



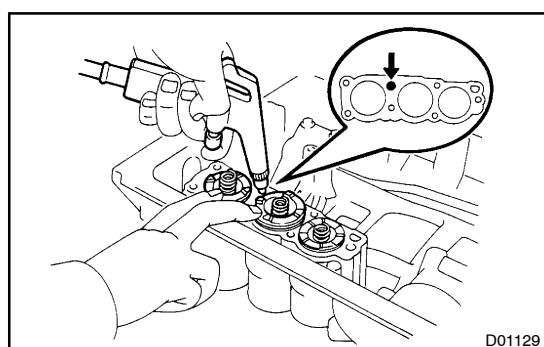
15. REMOVE VALVE BODY

- (a) Remove the 20 bolts.
- (b) Remove the valve body.



16. REMOVE CHECK BALL BODY

Remove the check ball body and spring.

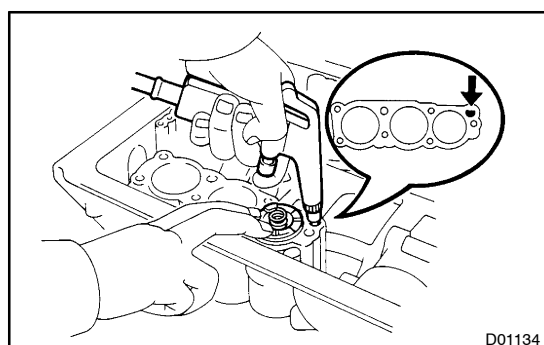


17. REMOVE ACCUMULATOR SPRING AND PISTON

- (a) Applying compressed air to the oil hole, remove the B_2 and C_2 accumulator pistons and springs.
- (b) Remove the O-rings from each pistons.

NOTICE:

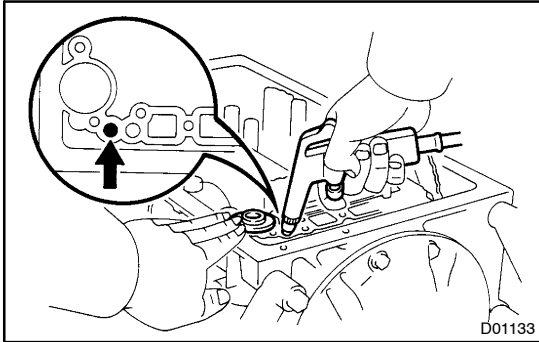
Take care as the B_0 and C_0 accumulator piston may jump out.



- (c) Applying compressed air to the oil hole, remove the B_0 accumulator piston and spring.
- (d) Remove the O-rings from the piston.

NOTICE:

Take care as the C_0 accumulator piston may jump out.

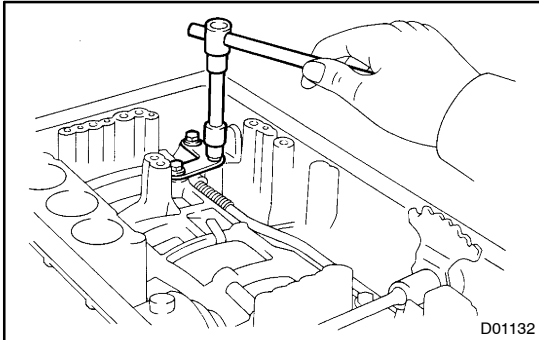


- (e) Applying compressed air to the oil hole, remove the C₀ accumulator piston and spring.

HINT:

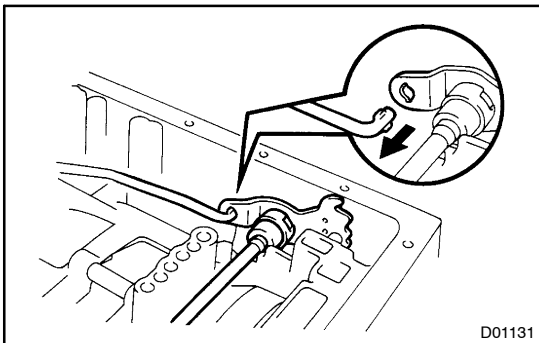
The C₀ accumulator piston is deviated in 2 parts, so if only the top part is removed, after removing the spring reapply compressed air to remove the bottom part.

- (f) Remove the O-rings from the piston.

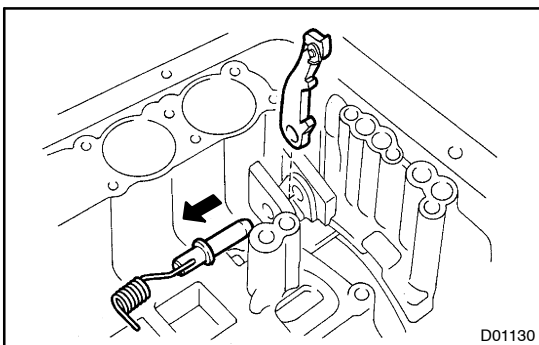


18. REMOVE PARKING LOCK ROD AND PAWL

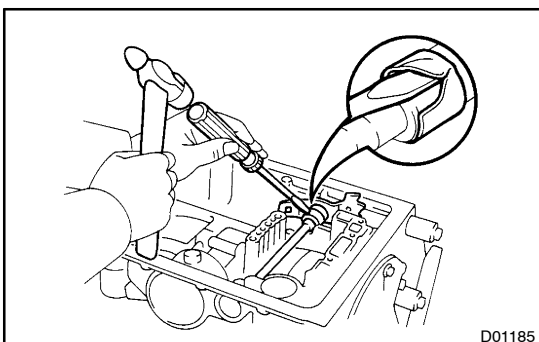
- (a) Remove the 3 bolts and parking lock pawl bracket.



- (b) Disconnect the parking lock rod from the manual valve lever.

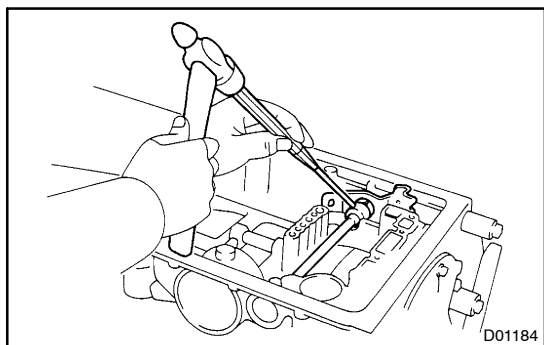


- (c) Pull out the parking lock pawl shaft from the front side, then remove the lock pawl and spring.
- (d) Remove the E-ring from the shaft.



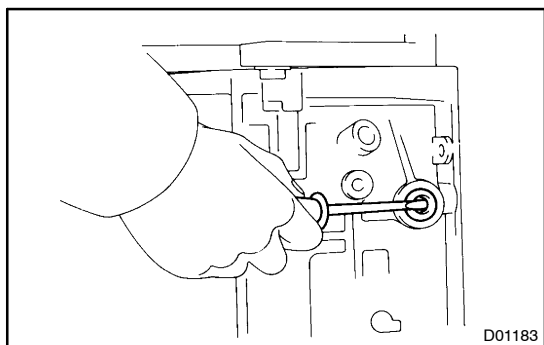
19. REMOVE MANUAL VALVE LEVER SHAFT

- (a) Using a hammer and screwdriver, cut off the spacer and remove it from the shaft.

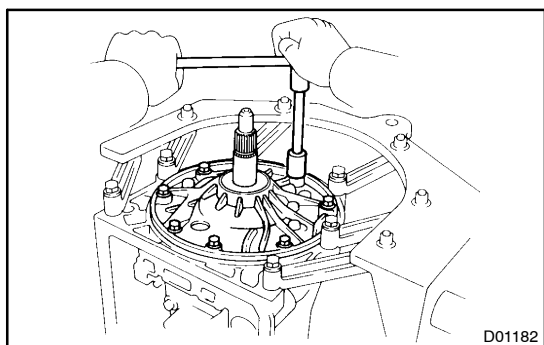


- (b) Using a pin punch and hammer, drive out the spring pin.
HINT:
Slowly drive out the spring pin so it does not fall into the transmission case.

- (c) Pull the manual valve lever shaft out through the case and remove the manual valve lever.

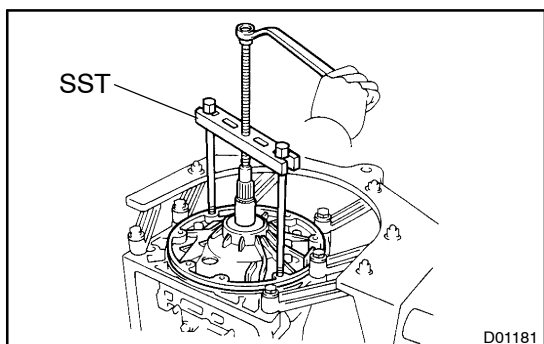


- (d) Using a screwdriver, remove the 2 oil seals.

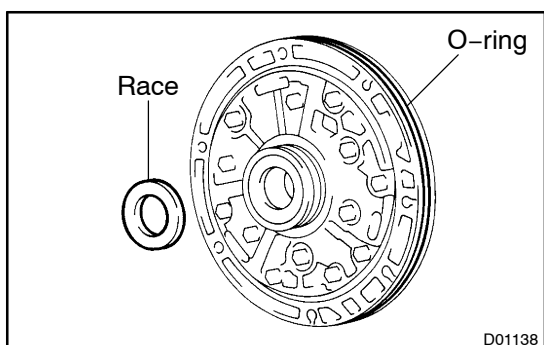


20. REMOVE OIL PUMP

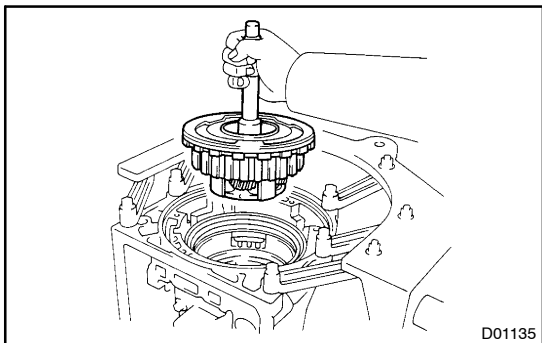
- (a) Remove the 7 bolts holding the oil pump to the transmission case.



- (b) Using SST, remove the oil pump.
SST 09350-30020 (09350-07020)

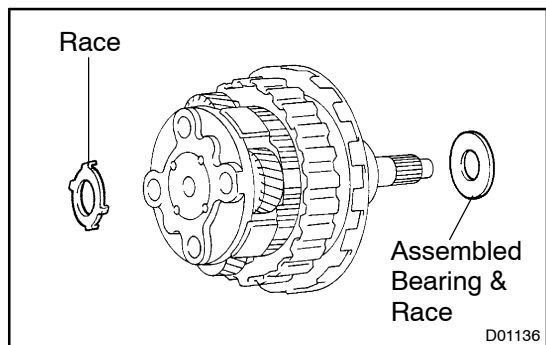


- (c) Remove the race from the oil pump.
(d) Remove the O-ring from the oil pump.

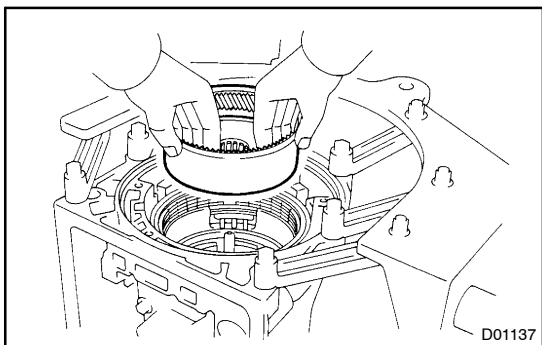


21. REMOVE O/D PLANETARY GEAR UNIT WITH O/D DIRECT CLUTCH

- (a) Remove the O/D planetary gear with the O/D direct clutch from the transmission case.

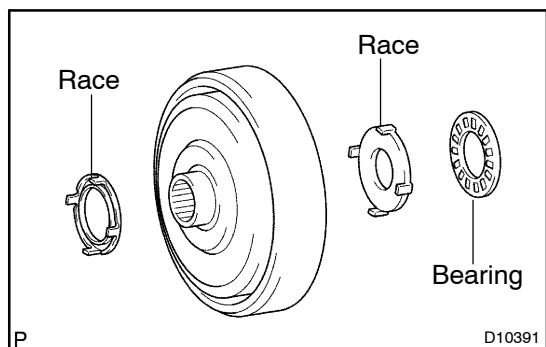


- (b) Remove the race and assembled bearing & race.

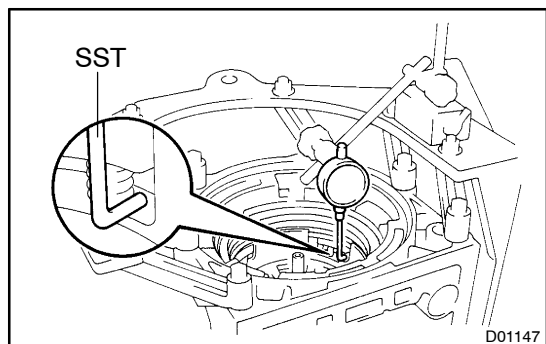


22. REMOVE O/D PLANETARY RING GEAR

- (a) Remove the O/D planetary ring gear from the transmission case.

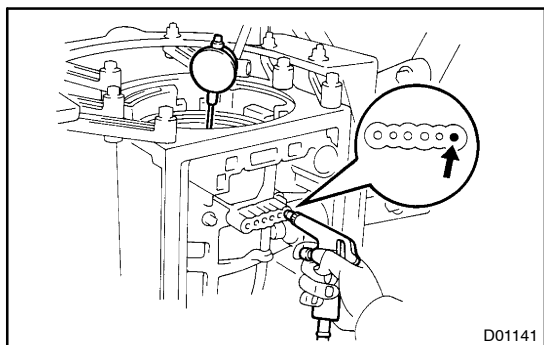


- (b) Remove the bearing and races assembled bearing & race from the planetary ring gear.



23. CHECK PISTON STROKE OF O/D BRAKE

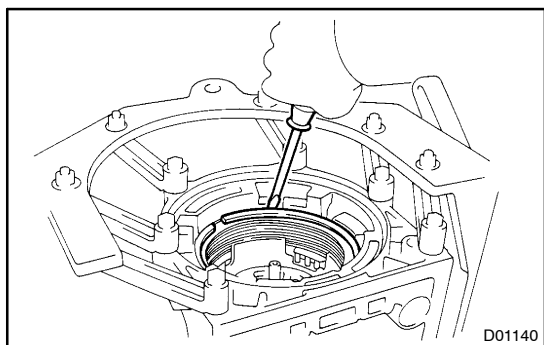
- (a) Place SST and dial indicator onto the O/D brake piston.
SST 09350-30020 (09350-06120)



- (b) Measure the stroke while applying and releasing compressed air (392 kPa, 4 kgf/cm², 57 psi).

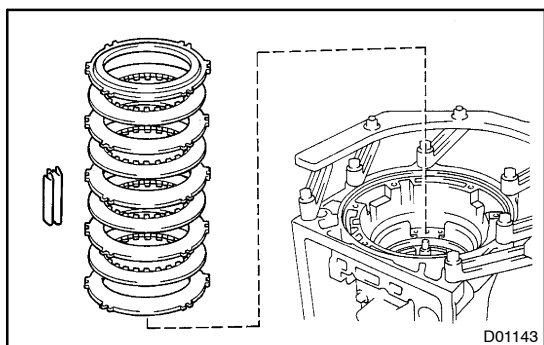
Piston stroke: 1.40 – 1.70 mm (0.055 – 0.067 in.)

If the stroke is non-standard, inspect the discs.



24. REMOVE FLANGE, PLATE AND DISC OF O/D BRAKE

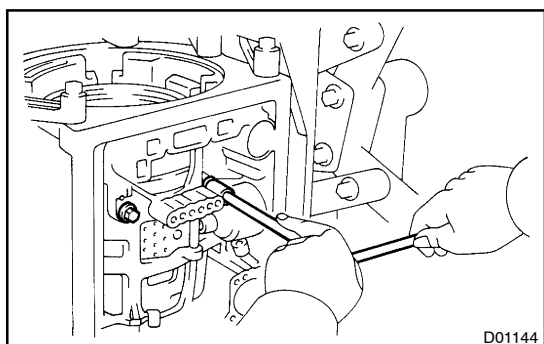
- (a) Using a screwdriver, remove the snap ring.



- (b) Remove the O/D brake pack (2 flanges, 4 discs and 3 plates).

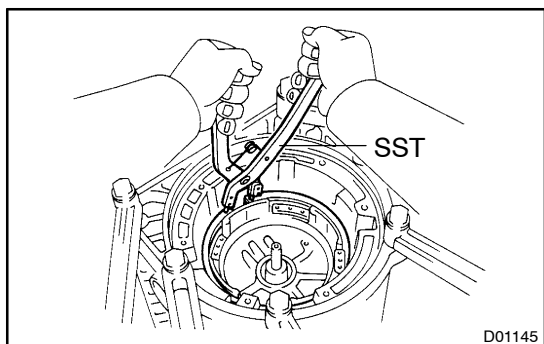
HINT:

- (c) Remove the spring from the case.

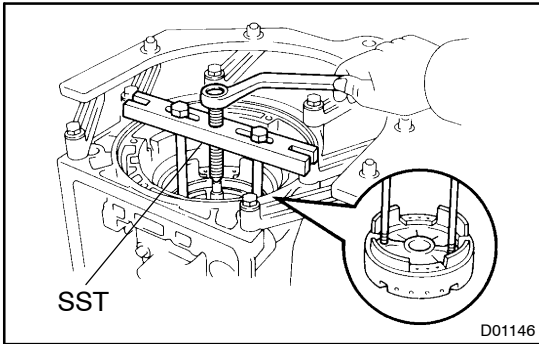


25. REMOVE O/D SUPPORT ASSEMBLY

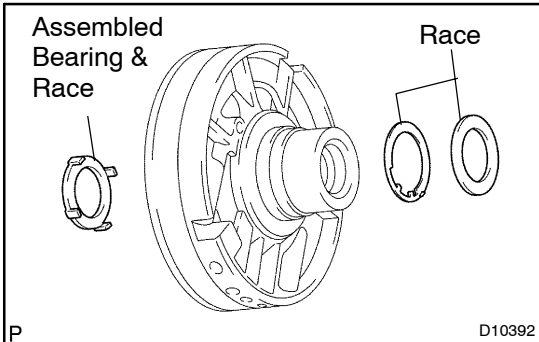
- (a) Remove the 2 bolts holding the O/D support assembly from the case.



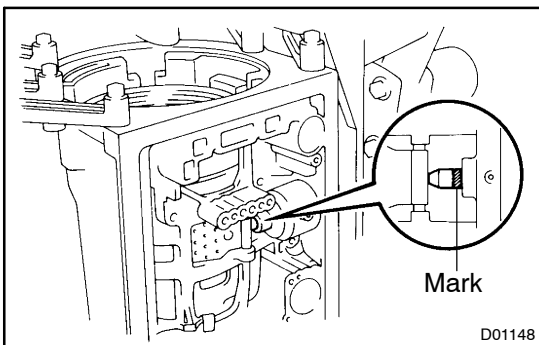
- (b) Using SST, remove the snap ring.
SST 09350-30020 (09350-07060)



- (c) Using SST, remove the O/D support assembly.
SST 09350-30020 (09350-07020)

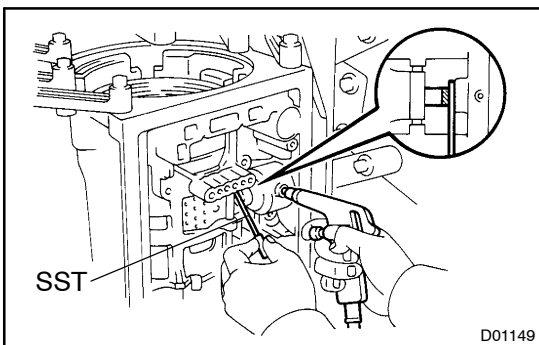


- (d) Remove the assembled bearing & race and race from the O/D support.



26. CHECK PISTON ROD STROKE OF 3RD COAST BRAKE

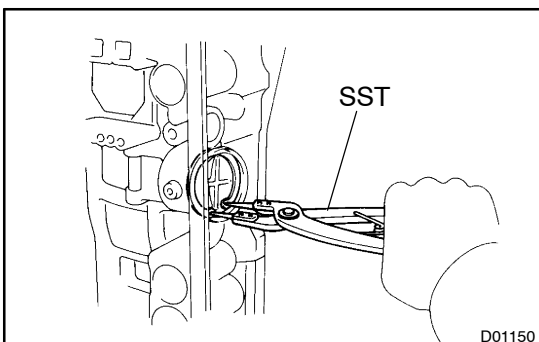
- (a) Using a water proof pen, place a mark in the 3rd coast brake piston rod, as shown in the illustration.



- (b) Using SST, measure the stroke while applying compressed air (392 kPa, 4 kgf/cm², 57 psi).
SST 09240-00020

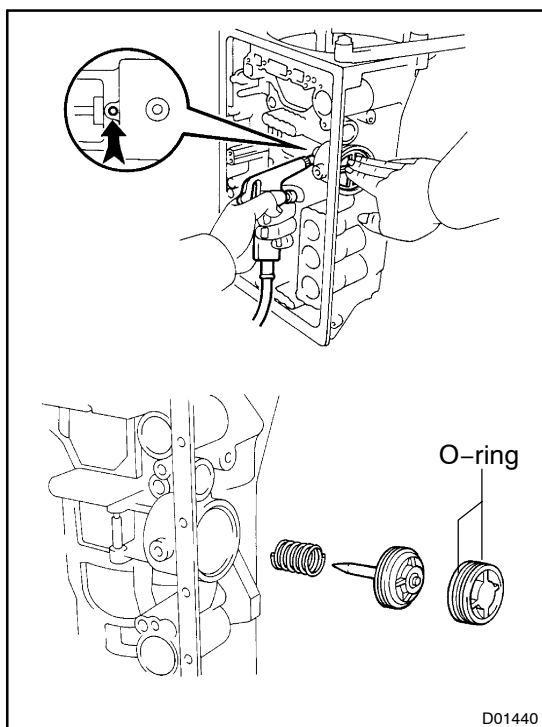
Piston rod stroke: 2.0 – 3.0 mm (0.079 – 0.118 in.)

If the stroke is non-standard, inspect the brake band.

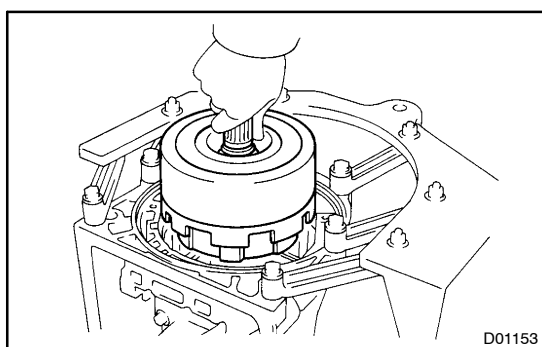


27. REMOVE 3RD COAST BRAKE COVER, PISTON ASSEMBLY AND SPRING

- (a) Using SST, remove the snap ring.
SST 09350-30020 (09350-07060)

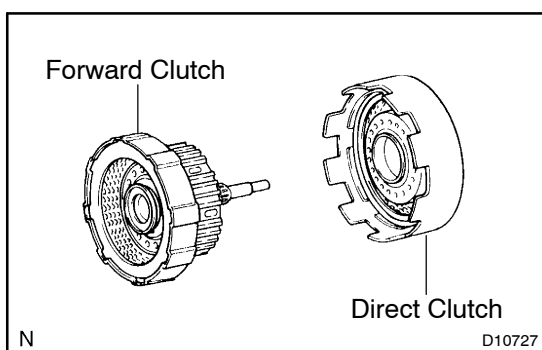


- (b) Applying compressed air to the oil hole, remove the 3rd coast brake cover, piston assembly and spring.
- (c) Remove the 2 O-rings from the cover.

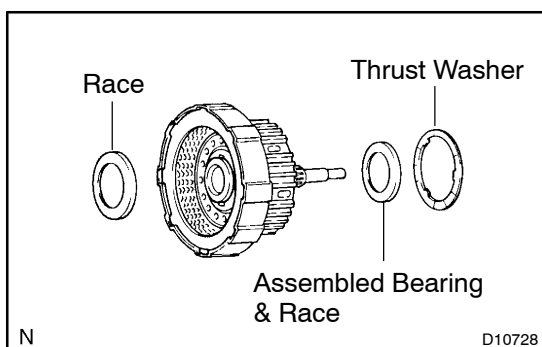


28. REMOVE DIRECT CLUTCH WITH FORWARD CLUTCH

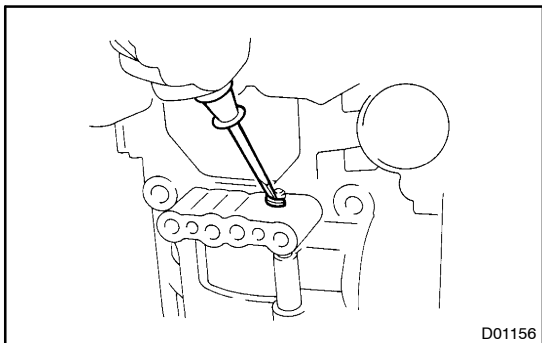
- (a) Remove the direct clutch with forward clutch from the case.



- (b) Remove the direct clutch from the forward clutch.



- (c) Remove the assembled bearing & race, thrust washer and race from the forward clutch.



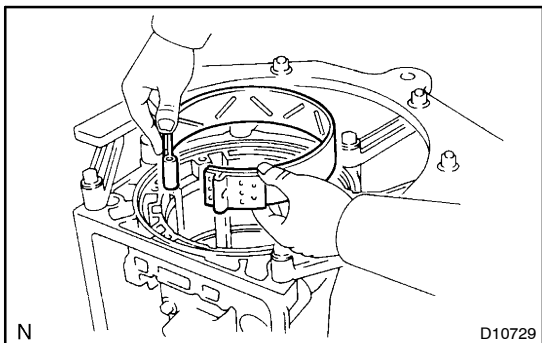
29. REMOVE 3RD COAST BRAKE BAND

- (a) Using a screwdriver, remove the E-ring from the pin.

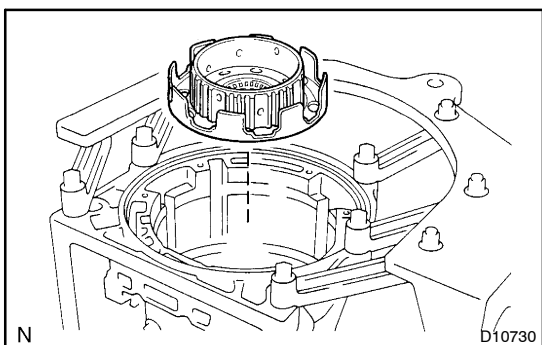
HINT:

Apply the grease to the E-ring and pin before the work so that the ring does not fly out.

- (b) Remove the pin from the brake band.
(c) Remove the E-ring from the pin.

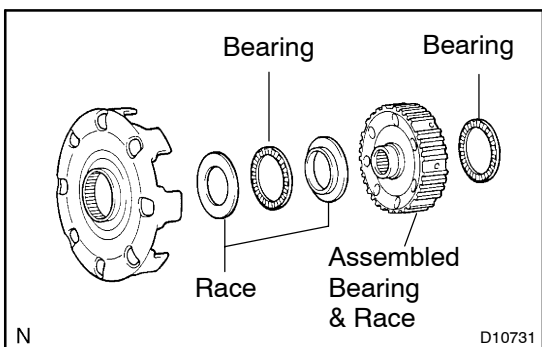


- (d) Remove the 3rd coast brake band from the case.

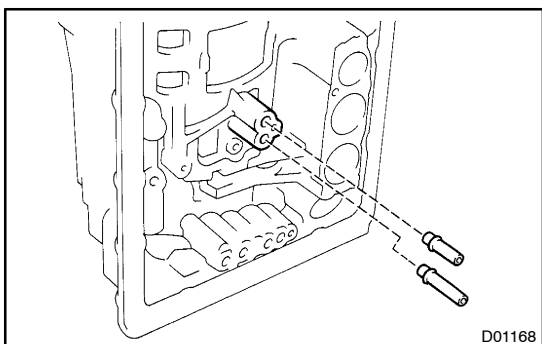


30. REMOVE FORWARD CLUTCH HUB AND SUN GEAR INPUT DRUM

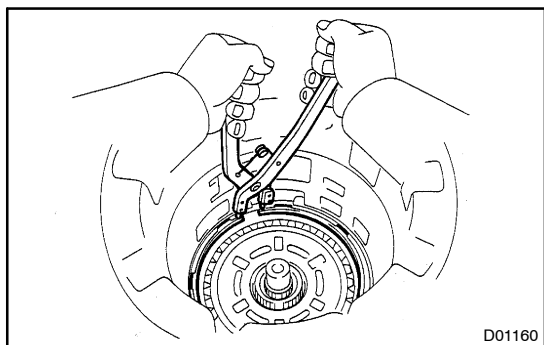
- (a) Remove the forward clutch hub and the sun gear input drum.



- (b) Remove the assembled bearing & race, 2 races, bearing and sun gear input drum, from forward clutch hub.

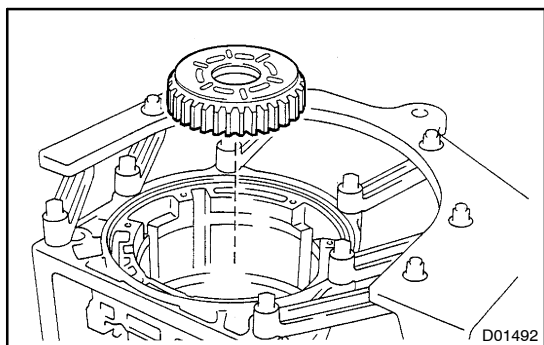


31. REMOVE 2 BRAKE DRUM GASKETS

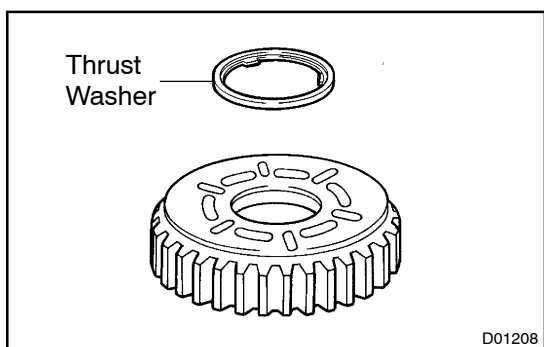


32. REMOVE NO.1 ONE-WAY CLUTCH MULTIPLE DISC BRAKE AND FRONT PLANETARY GEAR

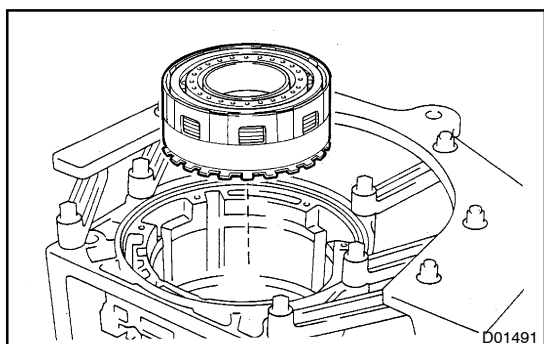
- (a) Using SST, remove the snap ring.
SST 09350-30020 (09350-07060)



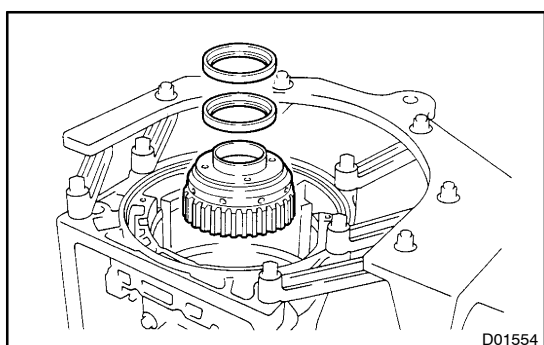
- (b) Remove the No.1 one-way clutch from the case.



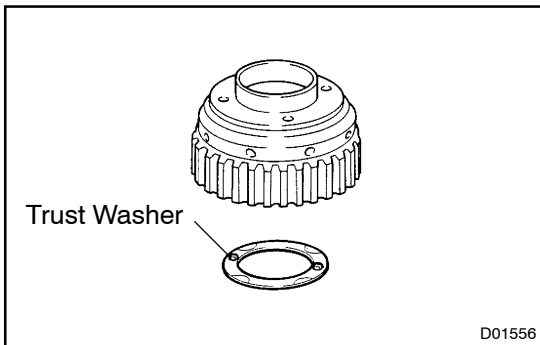
- (c) Remove the thrust washer from the No.1 one-way clutch.



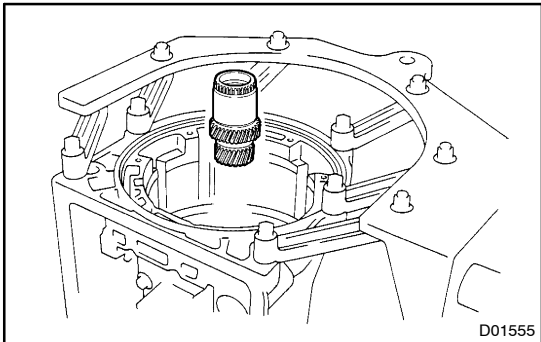
- (d) Remove the multiple disc brake from the case.



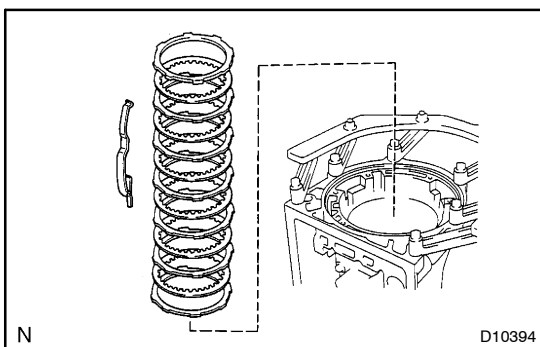
- (e) Remove the 2 washers and front planetary gear from the case.



- (f) Remove the thrust washer from the front planetary gear.

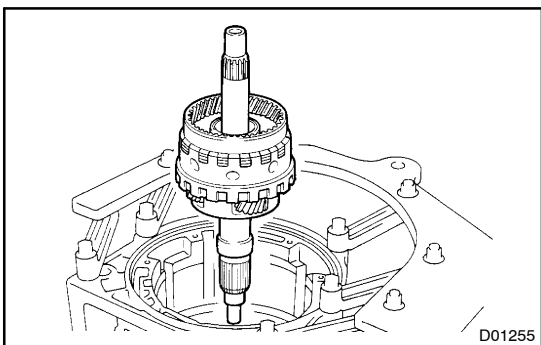


- (g) Remove the front & center planetary sun gear from the case.

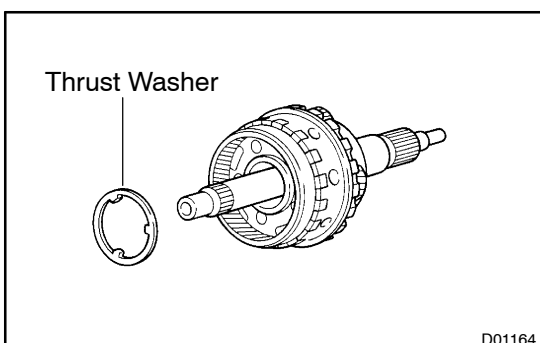


33. REMOVE OUTPUT SHAFT WITH CENTER & REAR PLANETARY GEAR

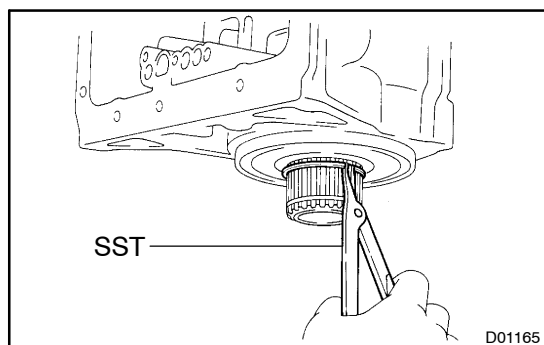
- (a) Remove the 2nd brake pack (flange, 6 discs and 6 plates) from the case.
- (b) Remove the spring from the case.



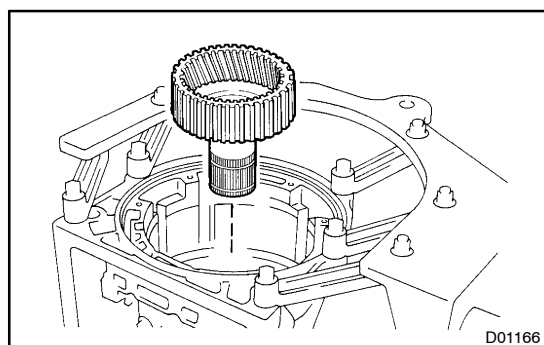
- (c) Remove the output shaft with center & rear planetary gear from the case.



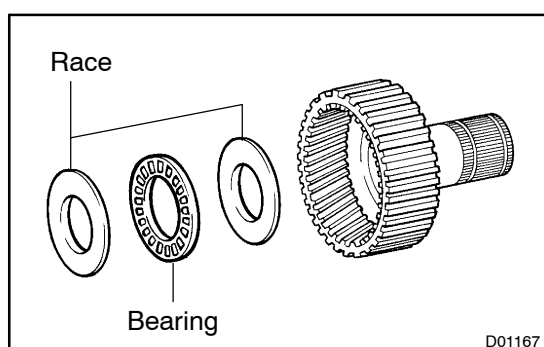
- (d) Remove the thrust washer from the output shaft with center & rear planetary gear.

**34. REMOVE REAR PLANETARY RING GEAR**

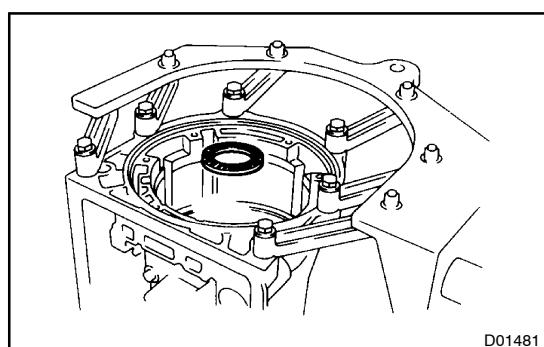
- (a) Using SST, remove the snap ring.
SST 09350-30020 (09350-07070)



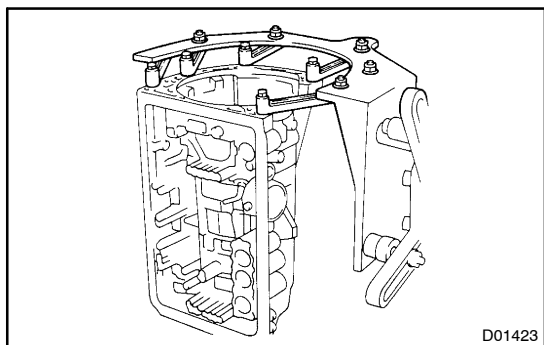
- (b) Remove the rear planetary ring gear from the case.



- (c) Remove the assembled bearing & race and 2 races from the rear planetary ring gear.

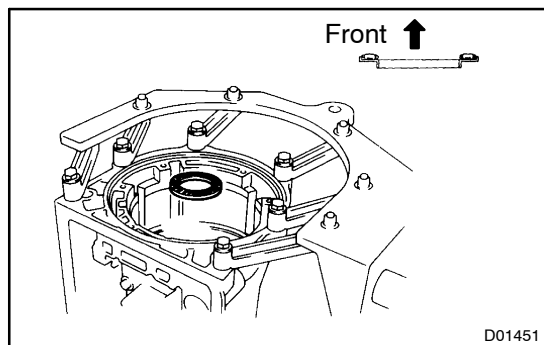


- (d) Remove the assembled bearing & race from the case.



REASSEMBLY

1. INSTALL TRANSMISSION CASE ON OVERHAUL ATTACHMENT

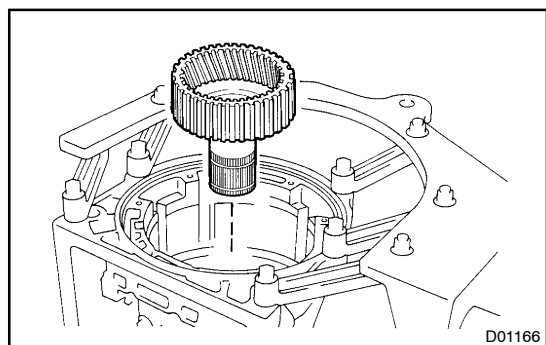


2. INSTALL REAR PLANETARY RING GEAR

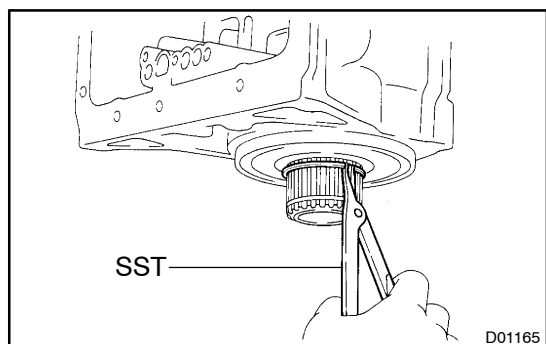
(a) Install the assembled bearing & race.

Assembled bearing & race diameter: mm (in.)

	Inside	Outside
Assembled bearing & race	52.9 (2.083)	70.6 (2.780)

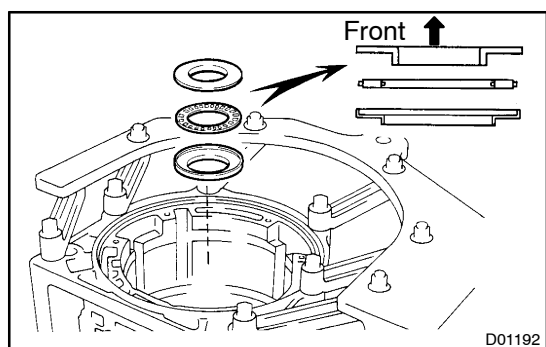


(b) Install the rear planetary ring gear.



(c) Using SST, install the snap ring.

SST 09350-03002 (09350-07070)

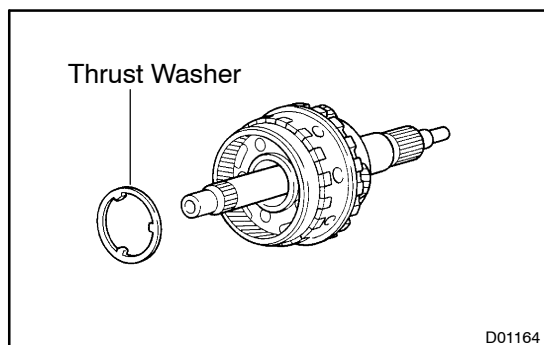


3. INSTALL OUTPUT SHAFT WITH CENTER AND REAR PLANETARY GEAR

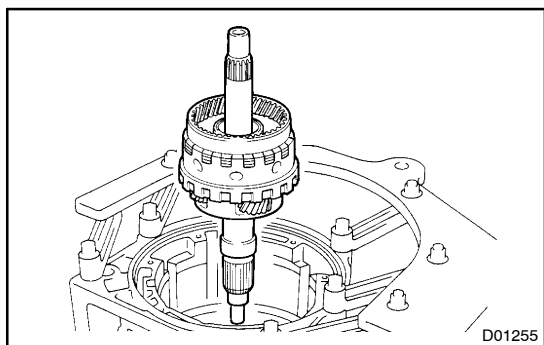
(a) Install the 2 races and bearing onto the rear planetary ring gear.

Bearing and race diameter: mm (in.)

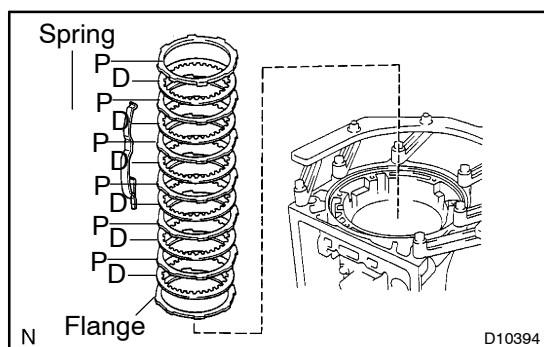
	Inside	Outside
Race	39.2 (1.543)	56.8 (2.236)
Bearing	40.7 (1.602)	57.0 (2.244)
Race	41.2 (1.620)	59.8 (2.354)



- (b) Install the thrust washer to the output shaft with center & rear planetary gear.



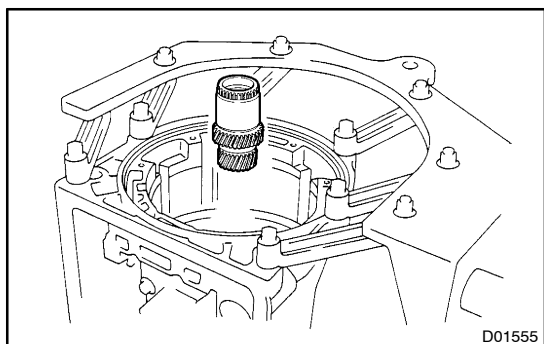
- (c) Install the output shaft with center & rear planetary gear.



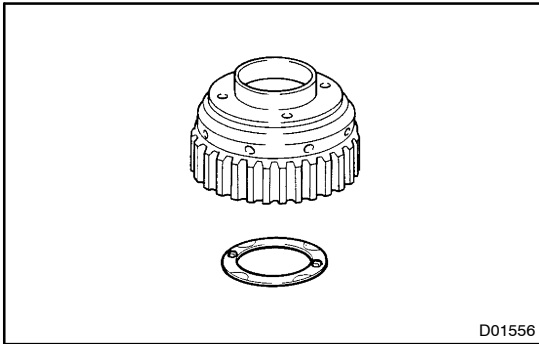
4. INSTALL FRONT PLANETARY GEAR

- (a) Install the spring to the case.
- (b) Install the 2nd brake pack (6 plates, 6 discs and flange).
Install in order: P = Plate, D = Disc
Flange – D – P – D – P – D – P – D – P – D – P – D – Flange
Flange thickness: mm (in.)

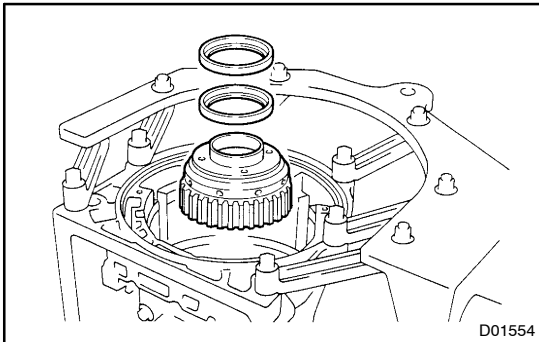
No.	Thickness	No.	Thickness
21	2.1 (0.083)	27	2.7 (0.106)
23	2.3 (0.091)	29	2.9 (0.114)
25	2.5 (0.098)	31	3.1 (0.122)



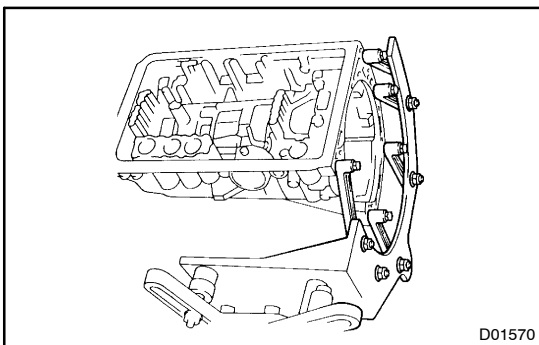
- (c) Install the front & center planetary sun gear from the case.



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

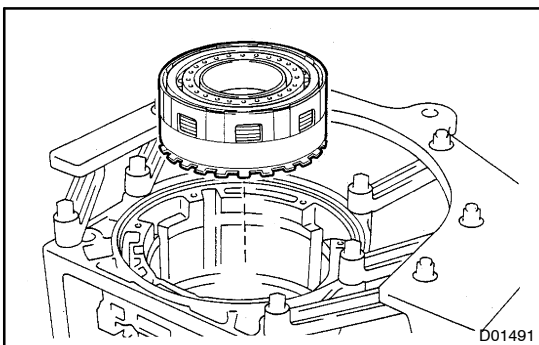


- (e) Install the front planetary gear and 2 washers from the case.

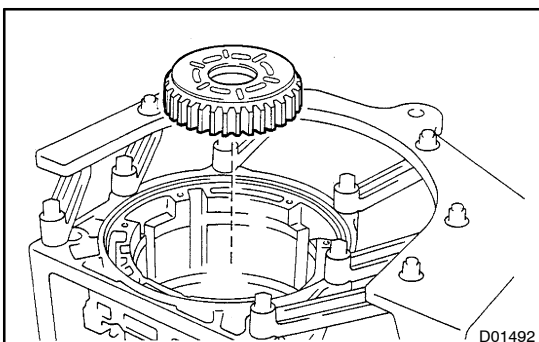


5. INSTALL MULTIPLE DISC BRAKE AND NO.1 ONE-WAY CLUTCH

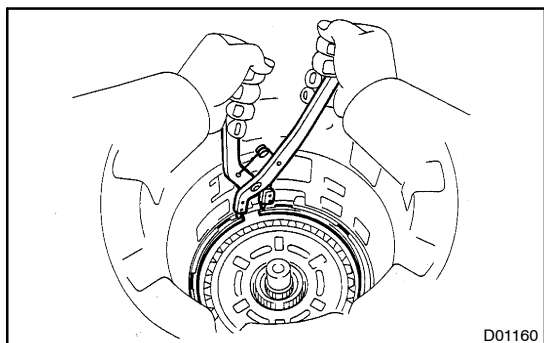
- (a) Lay the transmission case.



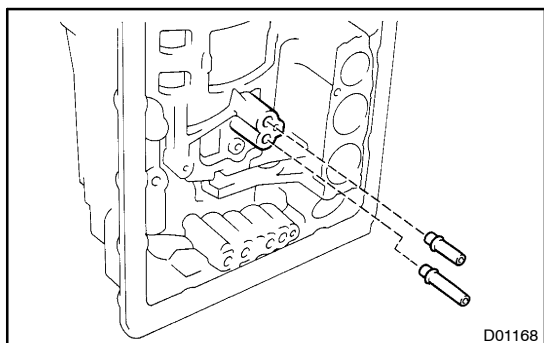
- (b) Install the multiple disc brake to the case.



- (c) Install the No.1 one-way clutch to the multiple disc brake.

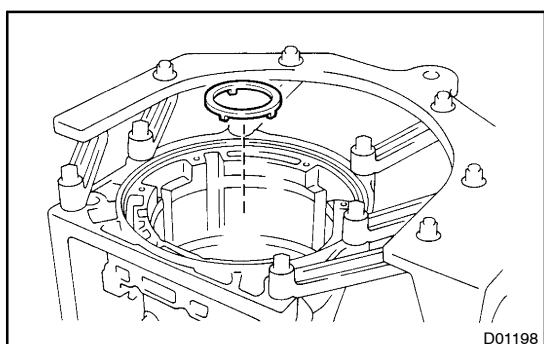


- (d) Using SST, install the snap ring.
SST 09350-30020 (09350-07060)



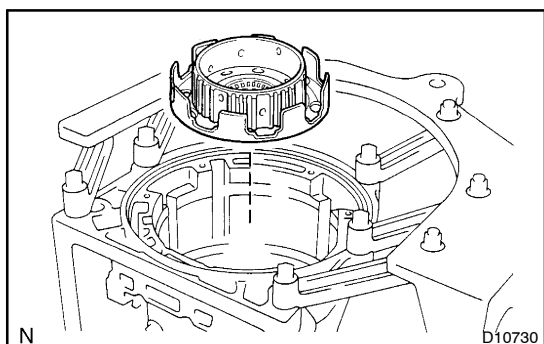
6. INSTALL BRAKE DRUM GASKET

- (a) Coat 2 new gaskets with ATF.
(b) Install the 2 brake drum gaskets.

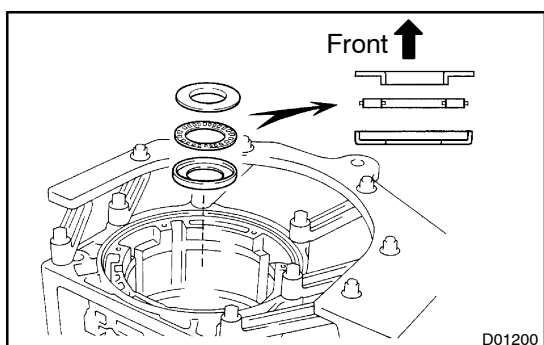


7. INSTALL SUN GEAR INPUT DRUM

- (a) Install the thrust washer.



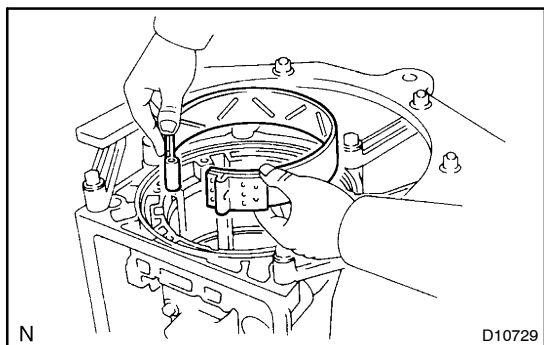
- (b) Install the sun gear input drum.



- (c) Coat the bearing, 2 races with petroleum jelly and install them onto the sun gear input drum.

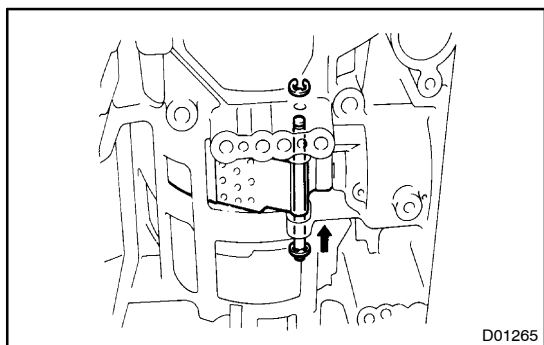
Bearing and race diameter: mm (in.)

	Inside	Outside
Race	32.5 (1.280)	59.0 (2.323)
Bearing	43.5 (1.712)	59.8 (2.354)
Race	43.5 (1.712)	61.5 (2.421)

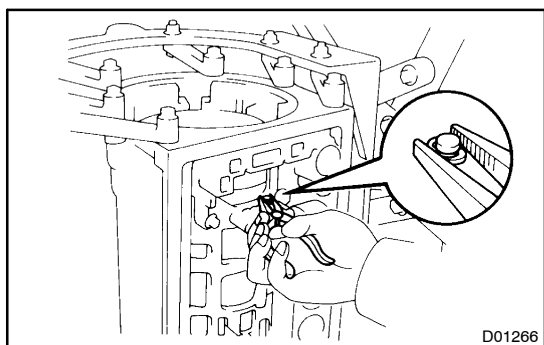


8. INSTALL 3RD COAST BRAKE BAND

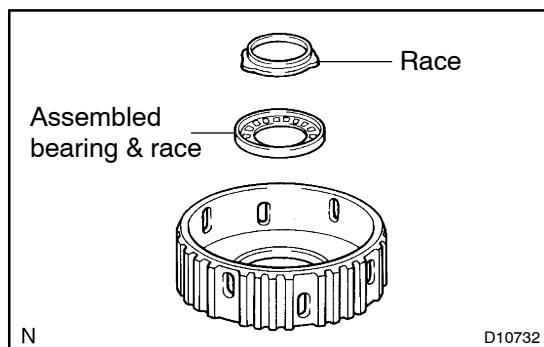
- (a) Install the 3rd coast brake band to the transmission case.



- (b) Install the E-ring to the pin.
(c) Install the pin through the brake band.



- (d) Using a needle nose plier, install the E-ring to the pin.

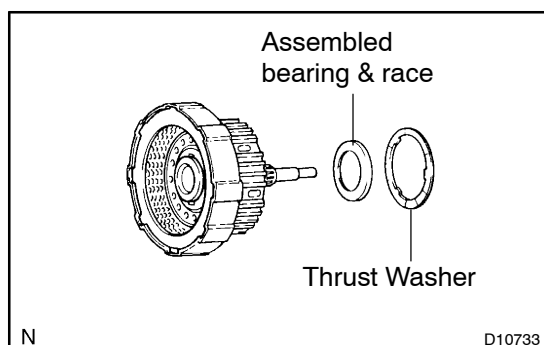


9. INSTALL DIRECT CLUTCH WITH FORWARD CLUTCH

- (a) Coat the assembled bearing & race, race with petroleum jelly and install them onto the forward clutch hub.

Assembled bearing & race and diameter:
mm (in.)

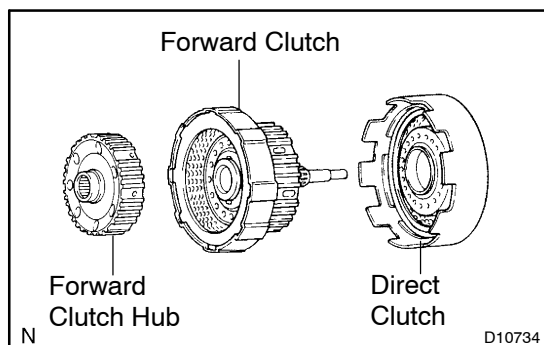
	Inside	Outside
Assembled bearing & race	26.3 (1.035)	44.0 (1.732)
Race	26.2 (1.031)	41.1 (1.618)



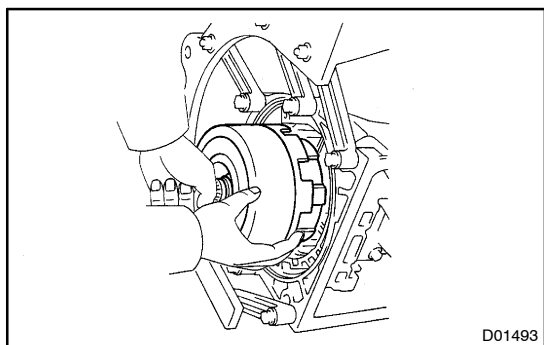
- (b) Install the assembled bearing & race and thrust washer to the forward clutch.

Assembled bearing & race diameter: mm (in.)

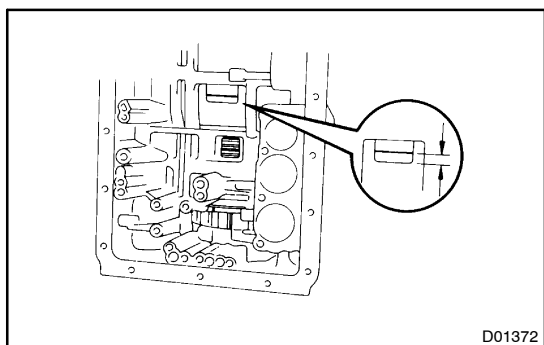
	Inside	Outside
Assembled bearing & race	33.5 (1.319)	47.8 (1.882)



- (c) Install the direct clutch and forward clutch hub to the forward clutch.



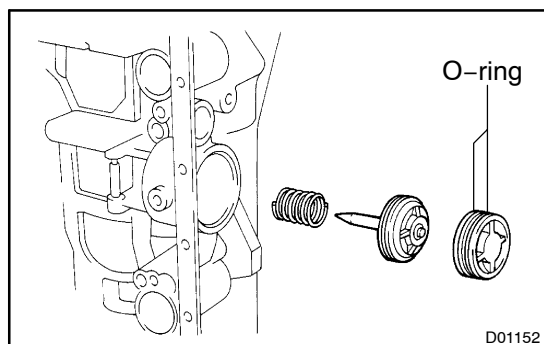
- (d) Insert the direct clutch with forward clutch to the case.



- (e) With the case set upright, using vernier calipers, measure the distance between the sun gear input drum and direct clutch drum.

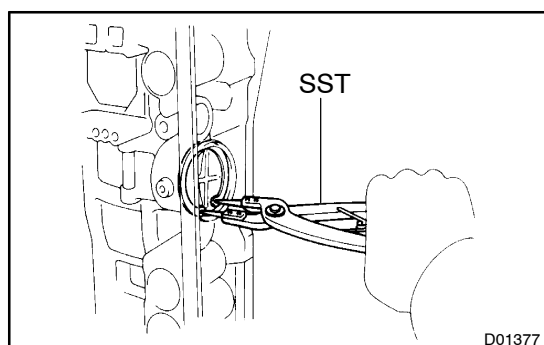
Height: 4.1 – 6.0 mm (0.161 – 0.236 in.)

If the height is non-standard, check for improper installation.

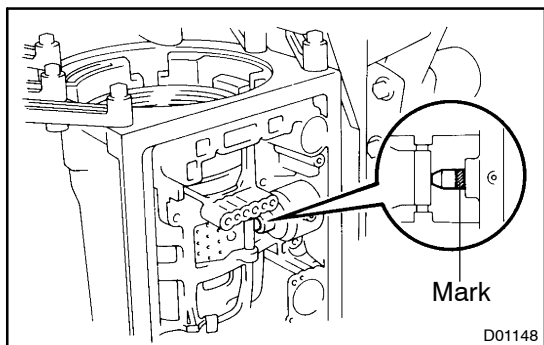


10. INSTALL 3RD COAST BRAKE COVER, PISTON ASSEMBLY AND SPRING

- (a) Coat 2 new O-rings with ATF and install them to the cover.
(b) Install the spring, piston assembly and cover to the case.

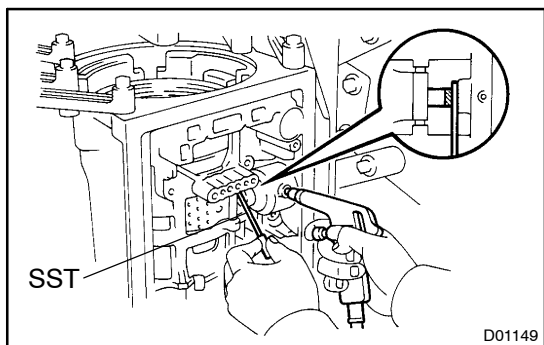


- (c) Using SST, install the snap ring.
SST 09350-30020 (09350-07060)



11. CHECK PISTON ROD STROKE OF 3RD COAST BRAKE

- (a) Place a mark on the 2nd coast brake piston rod.



- (b) Using SST, measure the stroke while applying and releasing compressed air (392 kPa, 4 kgf/cm², 57 psi).

SST 09240-00020

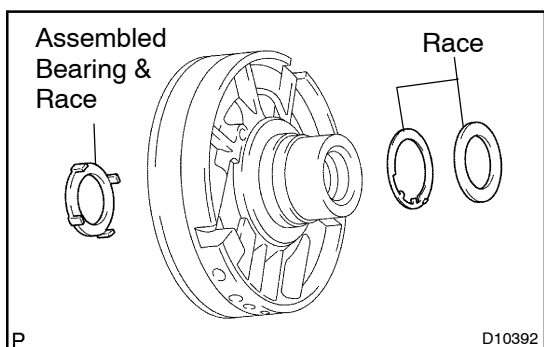
Piston rod stroke: 2.0 – 3.0 mm (0.079 – 0.118 in.)

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

Piston rod length: mm (in.)

77.65 (3.057)	79.90 (3.146)
78.40 (3.086)	
79.15 (3.116)	

If it is still more than standard value, replace the brake band with a new one.

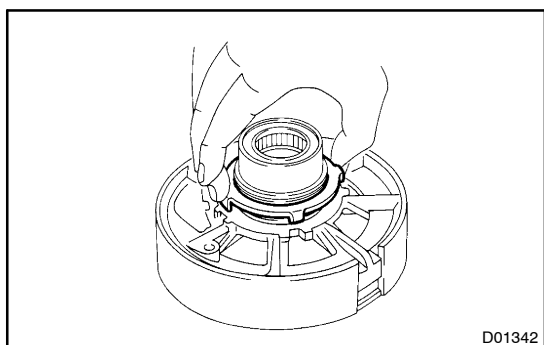


12. INSTALL O/D SUPPORT ASSEMBLY

- (a) Coat the assembled bearing & race and race with petroleum jelly and install them onto the O/D support assembly.

Assembled bearing & race and race diameter: mm (in.)

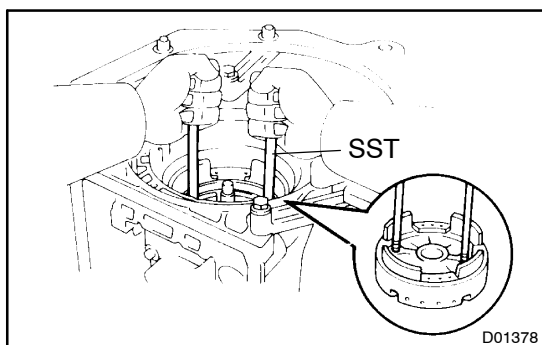
	Inside	Outside
Assembled bearing & race	33.6 (1.323)	50.3 (1.980)
Race	37.0 (1.457)	51.0 (2.008)



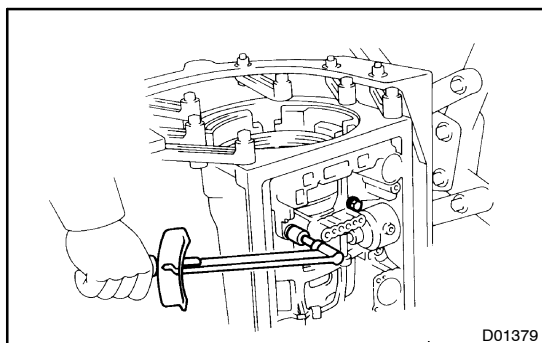
- (b) Coat the thrust washer with petroleum jelly and install it onto the O/D support assembly.

HINT:

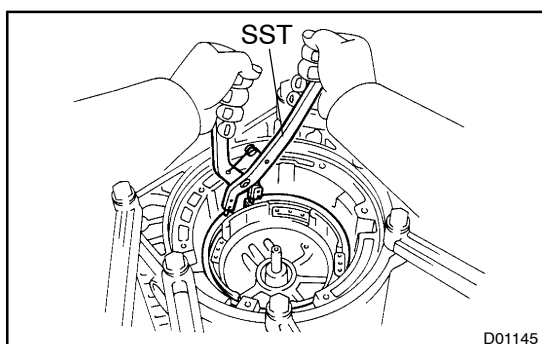
Make sure that the lug shapes match the holes on the O/D support.



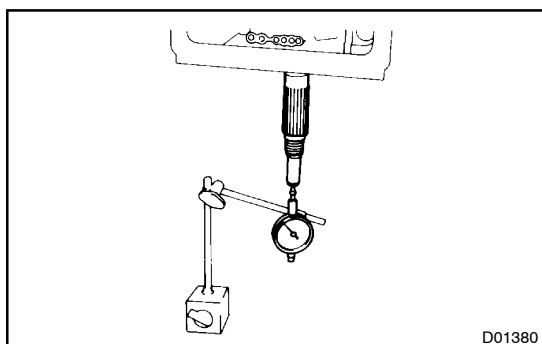
- (c) Using 2 bolts of SST, face the bolt and oil holes of the O/D support toward the valve body side, align them with the bolt holes of the transmission case and install the bolts.
SST 09350-30020 (09350-07020)



- (d) Install the 2 bolts.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)



- (e) Using SST, install the snap ring.
SST 09350-30020 (09350-07060)



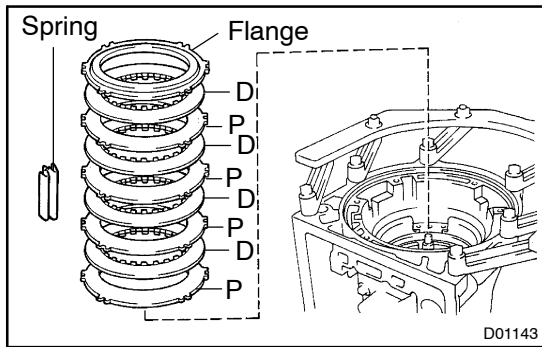
13. CHECK OUTPUT SHAFT

- (a) Using a dial indicator, measure the end play of the output shaft with hand.

End play: 1.63 – 2.89 mm (0.064 – 0.114 in.)

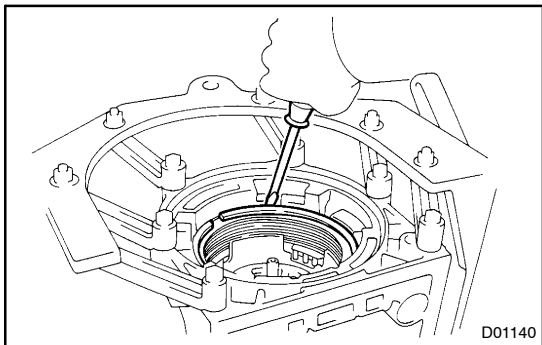
If the values are non-standard, check for improper installation.

- (b) Check to see that output shaft rotates smoothly.



14. INSTALL FLANGES, PLATES AND DISCS OF O/D BRAKE

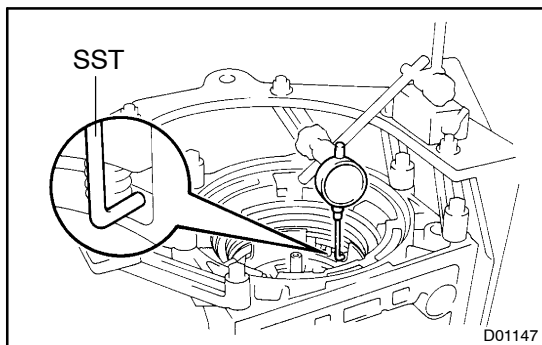
- (a) Install the O/D brake pack (1 flange, 4 discs and 4 plates).
Install in order: P = Plate, D = Disc
P – D – P – D – P – D – P – D
- (b) Install the flange (stepped ring) with the flat side of the flange facing the disc.
- (c) Install the spring to the case.



- (d) Using a screwdriver, install the snap ring.

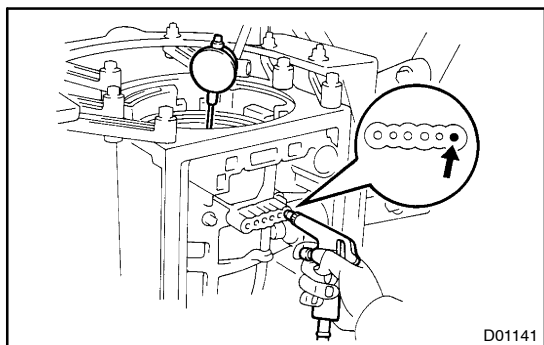
NOTICE:

Be sure the end gap of the snap ring is not aligned with cut-out portion of the brake drum.



15. CHECK PISTON STROKE OF O/D BRAKE

- (a) Place SST and a dial indicator onto the O/D brake piston.
SST 09350-30020 (09350-06120)



- (b) Measure the stroke while applying and releasing compressed air (392 kPa, 4 kgf/cm², 57 psi).

Piston Stroke: 1.40 – 1.70 mm (0.055 – 0.067 in.)

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

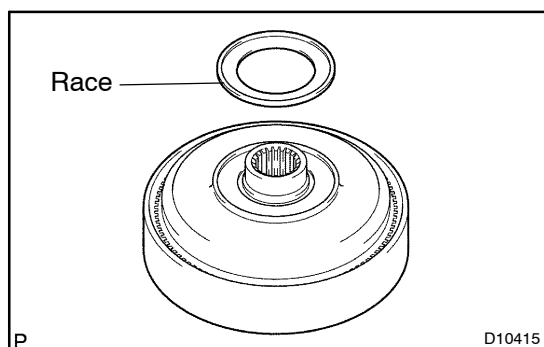
If the piston stroke is non-standard, select another flange.

HINT:

There are 7 different thickness for the flange.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
77	3.3 (0.130)	81	3.8 (0.150)
78	3.5 (0.138)	82	3.9 (0.154)
79	3.6 (0.142)	83	4.0 (0.157)
80	3.7 (0.146)	–	–

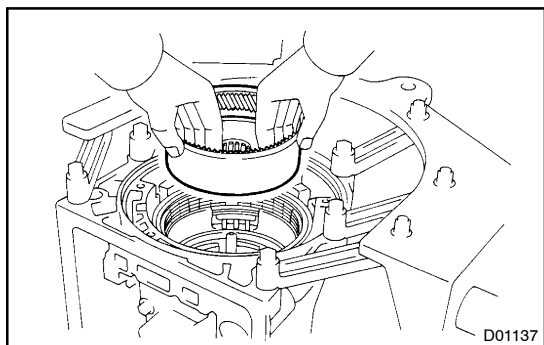


16. INSTALL O/D PLANETARY GEAR UNIT WITH O/D DIRECT CLUTCH & O/D ONE-WAY CLUTCH

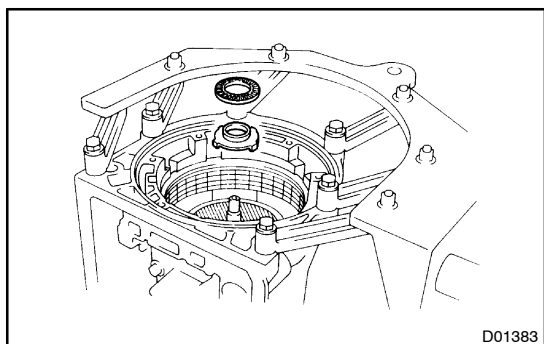
- (a) Coat the race with petroleum jelly and install it onto the O/D planetary ring gear.

Race diameter: mm (in.)

	Inside	Outside
Race	37.1 (1.461)	59.0 (2.323)



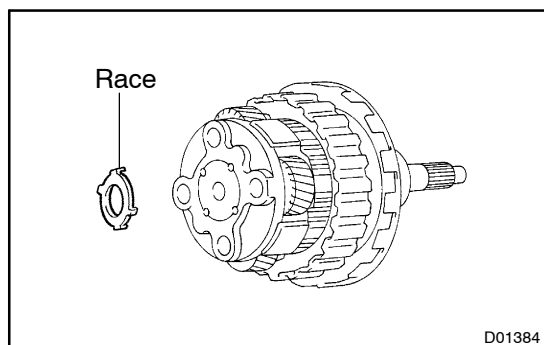
- (b) Install the O/D planetary ring gear.



- (c) Install the bearing and race onto the O/D planetary ring gear.

Bearing and race diameter: mm (in.)

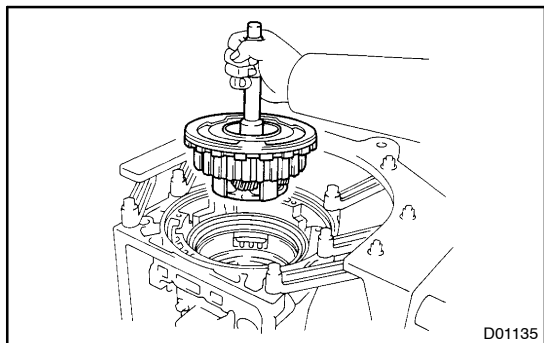
	Inside	Outside
Bearing	25.9 (1.020)	47.0 (1.850)
Race	24.0 (0.945)	48.0 (1.890)



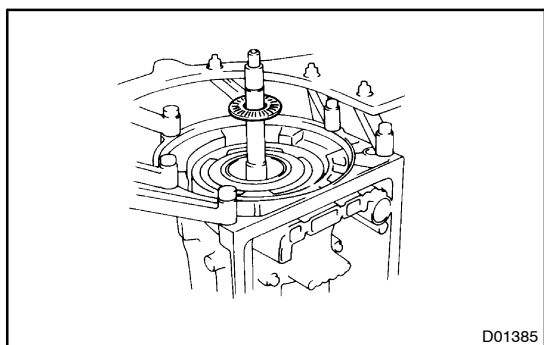
- (d) Coat the race with petroleum jelly and install it onto the O/D planetary gear.

Race diameter: mm (in.)

	Inside	Outside
Race	27.2 (1.071)	42.0 (1.654)



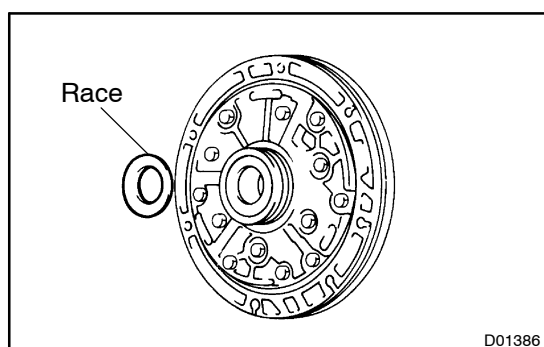
- (e) Install the O/D planetary gear with the O/D direct clutch & O/D one-way clutch.



- (f) Install the assembled bearing & race onto the O/D direct clutch.

Assembled bearing & race diameter: mm (in.)

	Inside	Outside
Assembled bearing & race	28.8 (1.134)	50.4 (1.984)



17. INSTALL OIL PUMP INTO CASE

- (a) Coat the race with petroleum jelly and install it onto the oil pump.

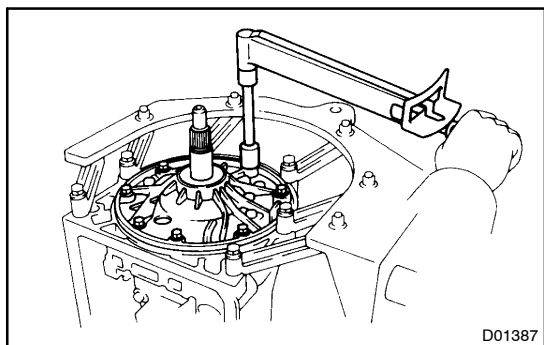
Race diameter: mm (in.)

	Inside	Outside
Race	28.1 (1.106)	47.5 (1.870)

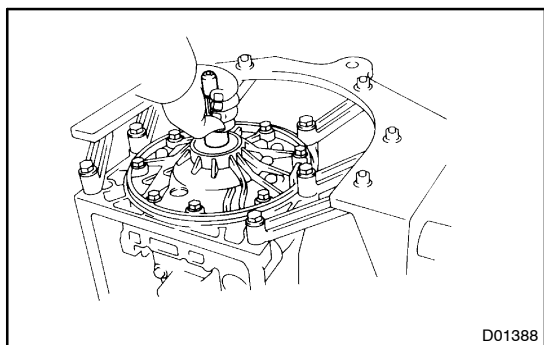
- (b) Coat a new O-ring with ATF and install it around the pump body.
- (c) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.
- (d) Hold the input shaft, and lightly press the oil pump body to slide the oil seal rings into the overdrive direct clutch drum.

NOTICE:

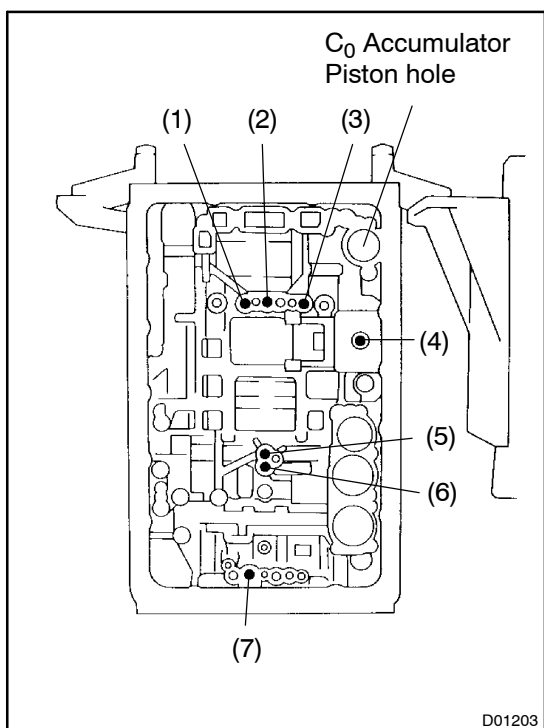
Do not push on the oil pump strongly, or the oil seal ring will stick to the direct clutch drum.



- (e) Install the 7 bolts.
Torque: 21 N·m (215 kgf·cm, 16 ft·lbf)



- 18. CHECK INPUT SHAFT ROTATION**
 Make sure the input shaft rotates smoothly.



19. INDIVIDUAL PISTON OPERATION INSPECTION

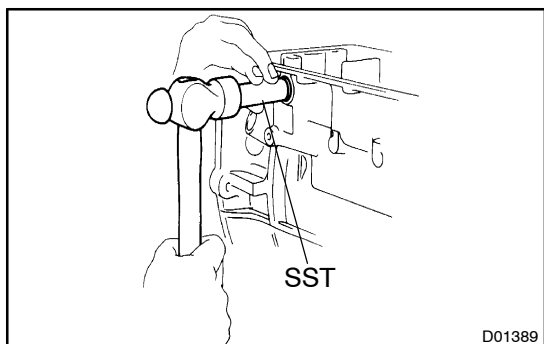
Check for the sound of operation while applying compressed air into the oil holes indicated in the illustration.

HINT:

When inspecting the O/D direct clutch, check with the C₀ accumulator piston hole closed.

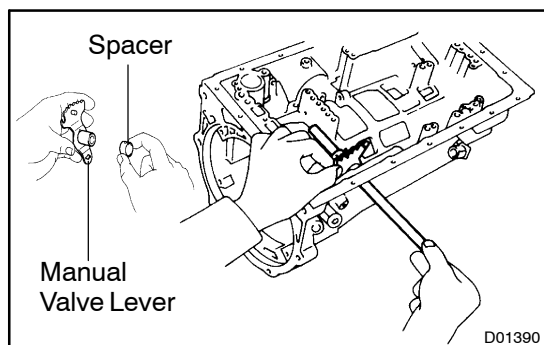
If there is no noise, disassemble and check the installation condition of the parts.

- (1) Forward clutch
- (2) Direct clutch
- (3) O/D brake
- (4) 3rd coast brake
- (5) 3rd brake
- (6) 2nd brake
- (7) 1st & reverse brake

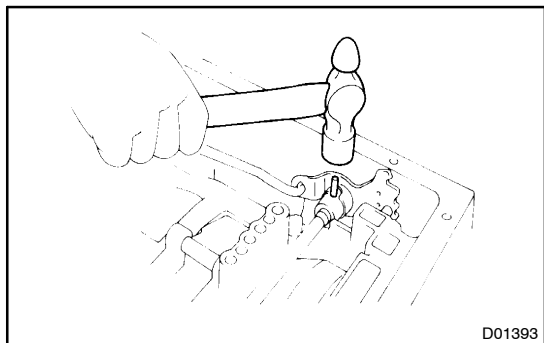


20. INSTALL MANUAL VALVE LEVER, SHAFT AND OIL SEAL

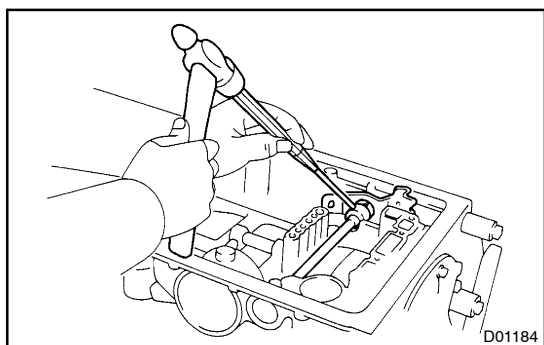
- (a) Using SST, drive in a 2 new oil seals.
 SST 09350-30020 (09350-07110)
- (b) Coat the oil seal lip with MP grease.



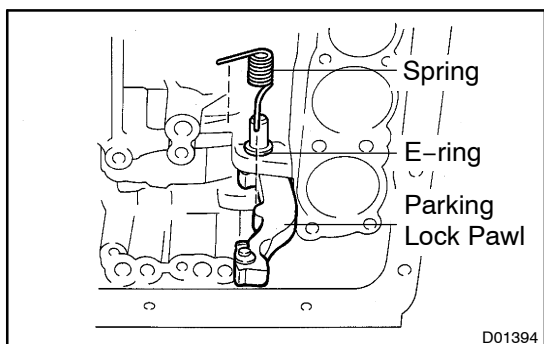
- (c) Install a new spacer to the manual valve lever.
- (d) Install the manual valve lever shaft to the transmission case through the manual valve lever.



- (e) Using a hammer, drive in a new spring pin.

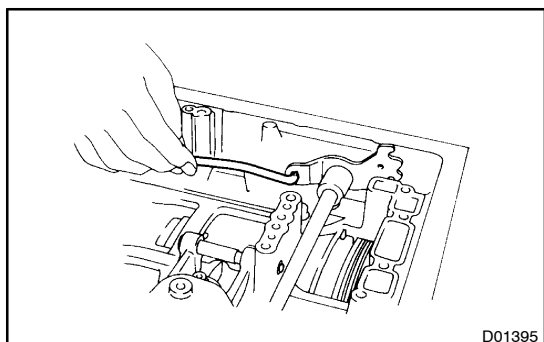


- (f) Match the manual valve lever indentation with the spacer hole and stake them together with the punch.
- (g) Make sure the shaft rotates smoothly.

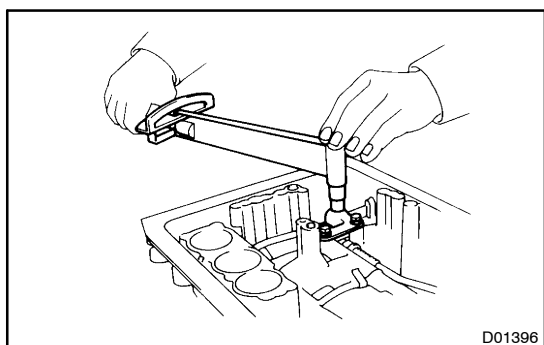


21. INSTALL PARKING LOCK PAWL AND ROD

- (a) Install the E-ring to the shaft.
- (b) Install the parking lock pawl, shaft and spring.

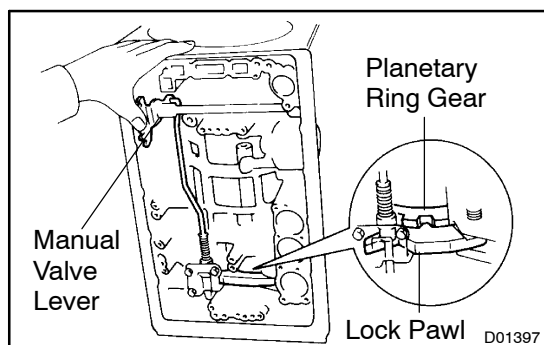


- (c) Connect the parking lock rod to the manual valve lever.

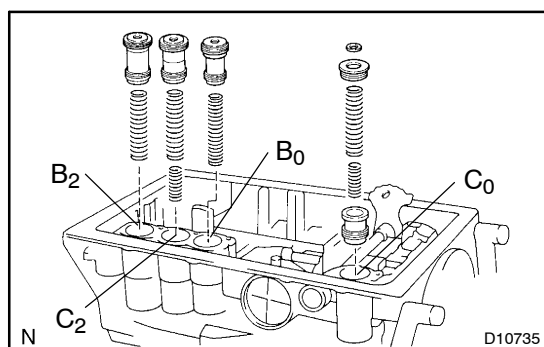


- (d) Place the parking lock pawl bracket onto the transmission case and torque the 3 bolts.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



- (e) Shift the manual valve lever to the P position, and confirm the planetary ring gear is correctly locked up by the lock pawl.

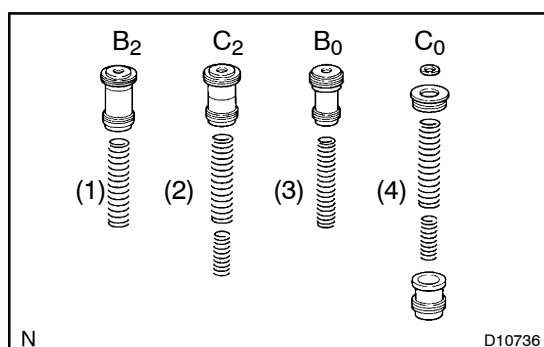


22. INSTALL ACCUMULATOR SPRINGS AND PISTONS

- (a) Coat new O-rings with ATF and install them to the pistons.
(b) Install the 4 springs and 4 accumulator pistons to the holes.

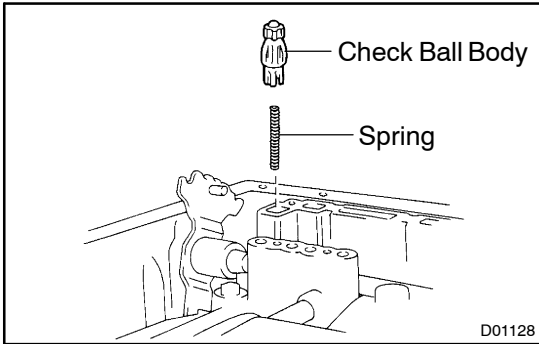
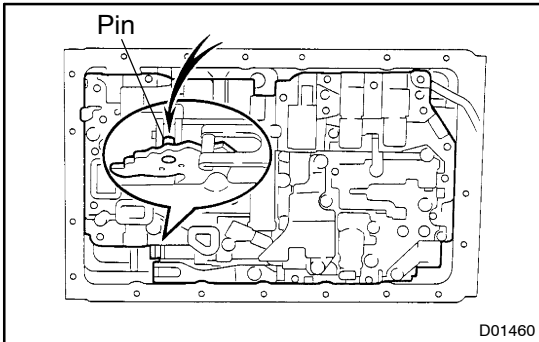
HINT:

The pistons are marked in relief with either C₀, B₀, C₂ or B₂ to discriminate each other.

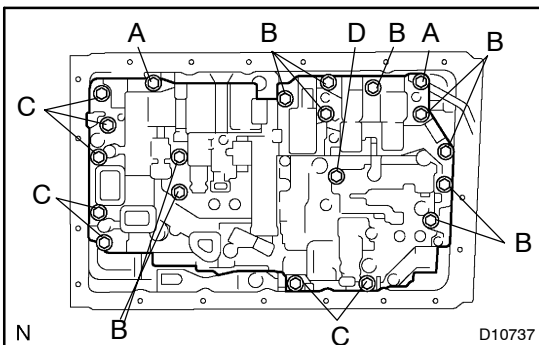


Accumulator spring:

Spring		Free length Outer diameter mm (in.)	Color
(1) B ₂		80.91 (3.185) 19.97 (0.786)	Pink & white
(2) C ₂	Inner	41.00 (1.614) 14.10 (0.555)	Orange
	Outer	75.20 (2.960) 20.10 (0.791)	White & Blue
(4) B ₀		69.40 (2.732) 16.25 (0.640)	White
(5) C ₀	Inner	32.92 (1.296) 14.03 (0.552)	Red
	Outer	56.00 (2.204) 20.59 (0.811)	Light green

**23. INSTALL SPRING AND CHECK BALL BODY****24. INSTALL VALVE BODY**

- (a) Align the groove of the manual valve with the pin of the lever.



- (b) Install the 20 bolts.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

HINT:

Each bolt length is indicated below.

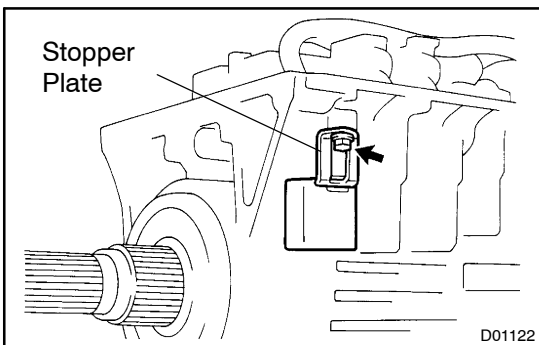
Blot length:

Bolt A: 23 mm (0.866 in.)

Bolt B: 28 mm (1.102 in.)

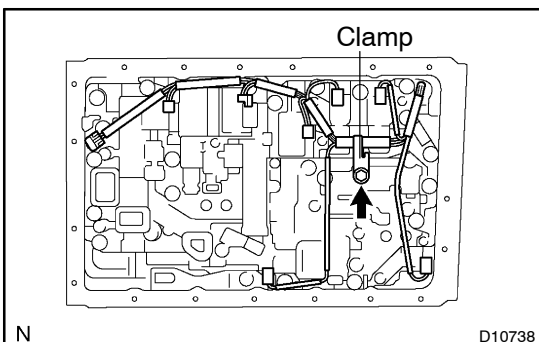
Bolt C: 36 mm (1.417 in.)

Bolt D: 55 mm (2.165 in.)

**25. INSTALL TRANSMISSION WIRE**

- (a) Coat a new O-ring with ATF and install it to the transmission wire.
- (b) Insert the transmission wire to the case and install the stopper plate with the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

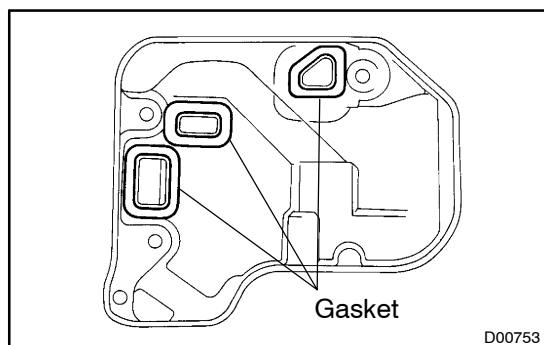


- (c) Connect the 7 solenoid connectors.

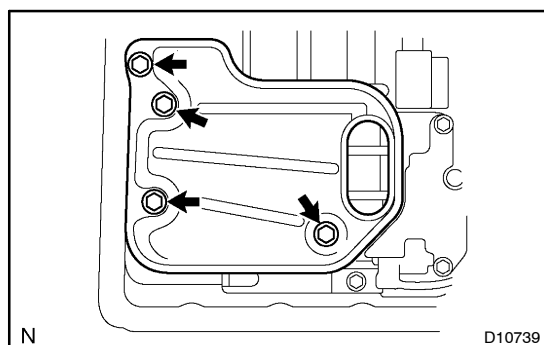
- (d) Install the ATF temperature sensor.

- (e) Install the clamp and bolt.

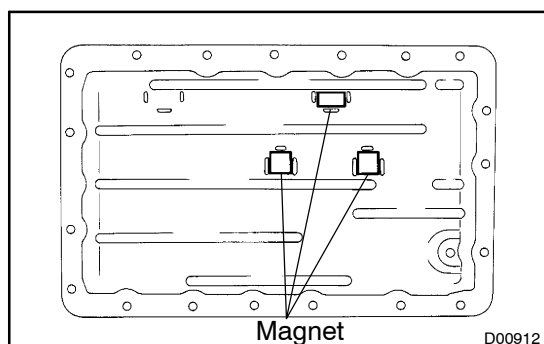
Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)

**26. INSTALL OIL STRAINER AND GASKET**

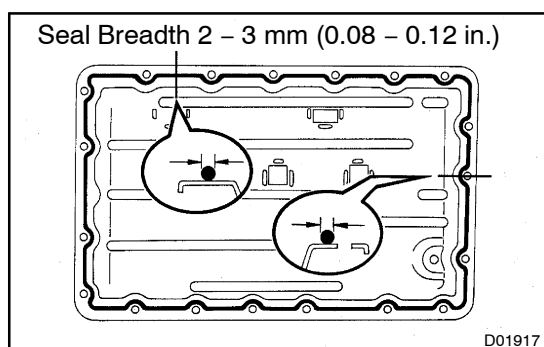
- (a) Install 3 new gaskets to oil strainer.



- (b) Install the oil strainer with the 4 bolts.
Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

**27. INSTALL OIL PAN**

- (a) Install the 3 magnets in the oil pan.

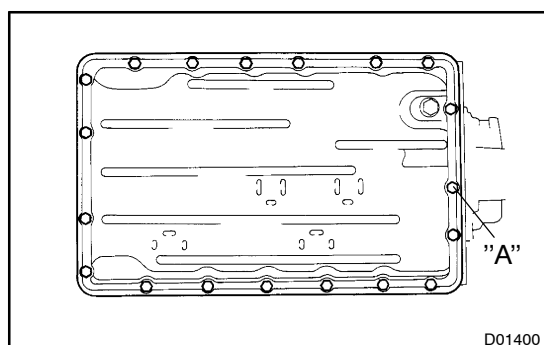


- (b) Remove any FIPG material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.

- (c) Apply FIPG to the oil pan.

FIPG:

Part No.08826-00090, THREE BOND 1281 or equivalent

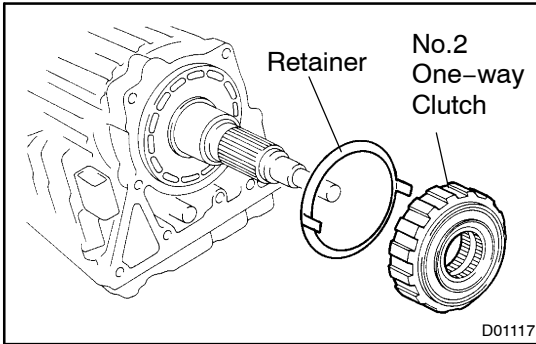


- (d) Install and torque the 19 bolts.

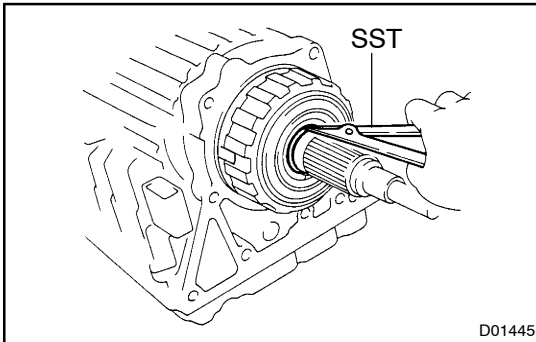
Torque: 7.4 N·m (75 kgf·cm, 65 in·lbf)

HINT:

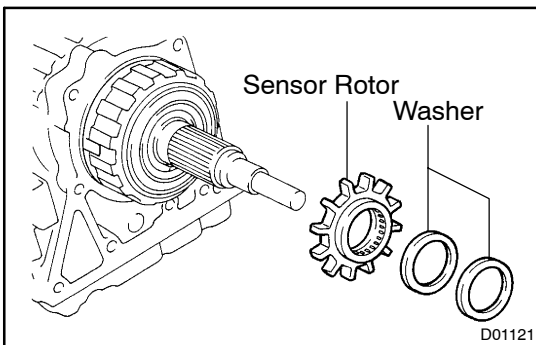
Replace the only "A" bolt with a new one.

**28. INSTALL ONE-WAY CLUTCH**

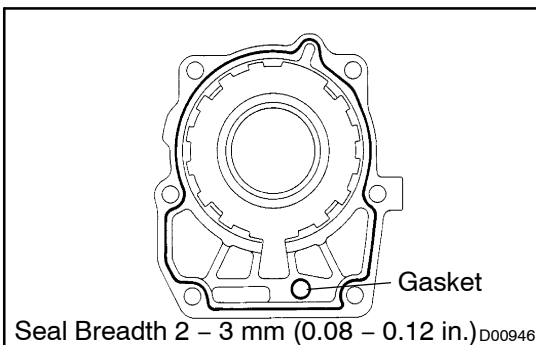
- (a) Install the retainer and the No.2 one-way clutch.



- (b) Using SST, install the snap ring.
SST 09350-30020 (09350-07070)

**29. INSTALL VEHICLE SPEED SENSOR ROTOR**

Install the vehicle speed sensor rotor and 2 washers.

**30. INSTALL EXTENSION HOUSING**

- (a) Install the gasket from the extension housing.

HINT:

Take care not to drop the gasket.

- (b) Clean the threads of the bolts and case with white gasoline.

- (c) Apply FIPG to the extension housing.

FIPG:

Part No.08826-00090, THREE BOND 1281 or equivalent

- (d) Install the extension housing with new 6 bolts.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

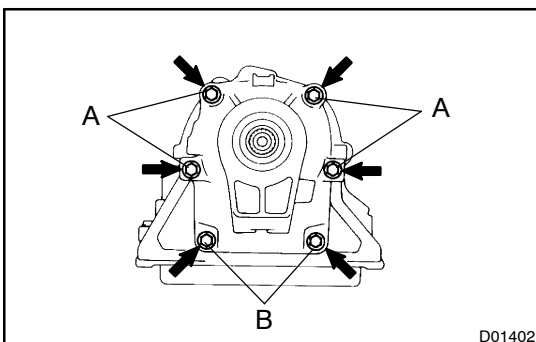
HINT:

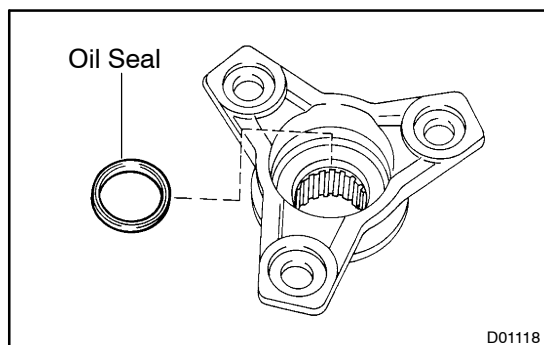
Each bolt length is indicated below.

Bolt length:

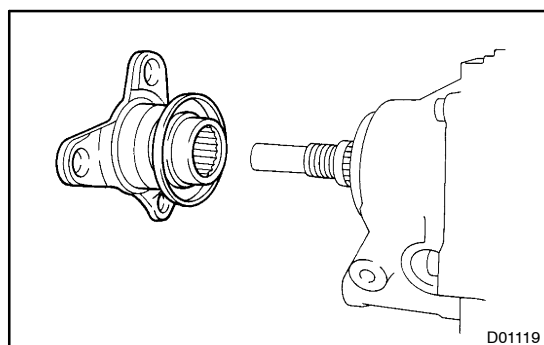
Bolt A: 45 mm (1.772 in.)

Bolt B: 35 mm (1.378 in.)

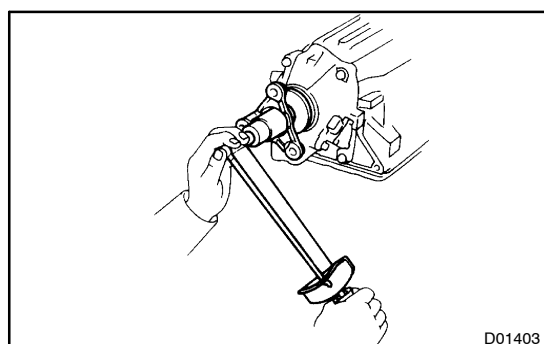


**31. INSTALL TRANSMISSION OUTPUT FLANGE**

- (a) Using SST, install a new oil seal to the output flange.
 SST 09950-60010 (09951-00350)
 09950-70010 (09951-07100)



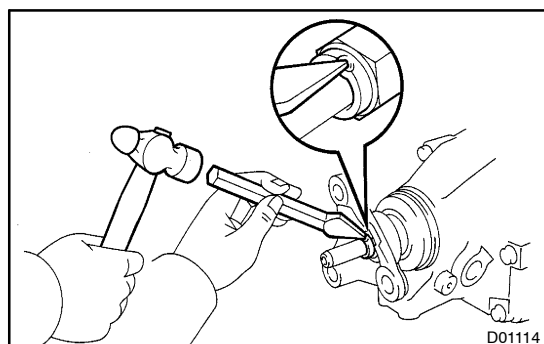
- (b) Install the output flange.



- (c) Using a deeper socket wrench of 30 mm, install a new nut.
Torque: 126 N·m (1,280 kgf·cm, 92 ft·lbf)

HINT:

Shift the manual valve lever to the P position.



- (d) Using a hammer and chisel, stake the nut.

32. REMOVE TRANSMISSION CASE FROM OVERHAUL ATTACHMENT**33. INSTALL TRANSMISSION HOUSING**

- (a) Clean the threads of the bolts and case with white gasoline.

- (b) Apply seal packing or equivalent to the 6 bolts.

Seal packing:

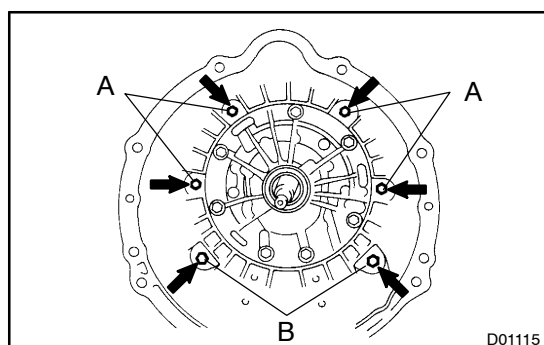
Part No. 08833-00070, THREE BOND 1324 or equivalent.

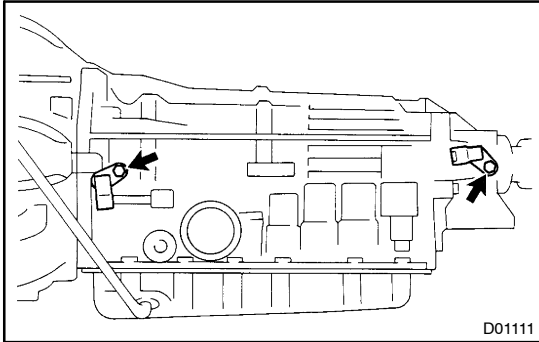
- (c) Install the transmission housing with the 6 bolts.

Torque:

A (14 mm bolt): 34 N·m (345 kgf·cm, 25 ft·lbf)

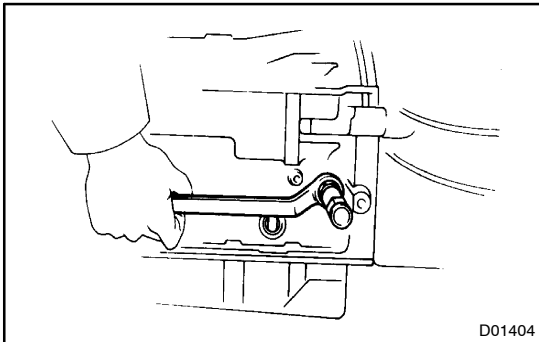
B (17 mm bolt): 57 N·m (580 kgf·cm, 42 ft·lbf)



**34. INSTALL VEHICLE SPEED SENSORS**

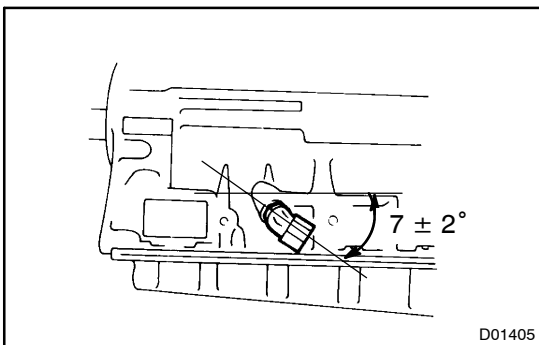
- (a) Coat 2 new O-rings with ATF and install it to the speed sensor.
- (b) Install the 2 vehicle speed sensors.
- (c) Install the bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

**35. INSTALL UNION AND ELBOW**

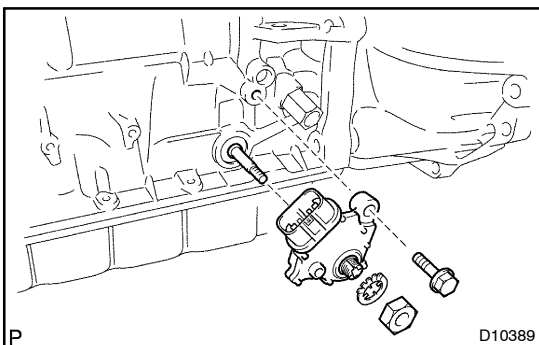
- (a) Coat 2 new O-rings with ATF, install them to union and elbow.
- (b) Install the union.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



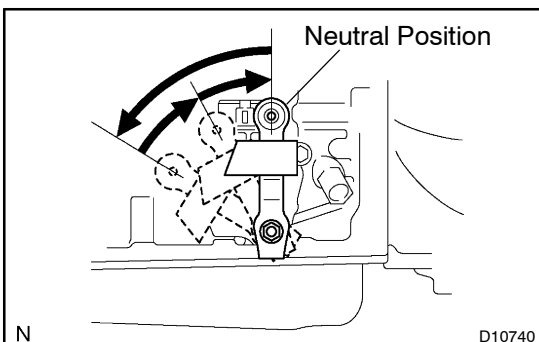
- (c) Install the elbow.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

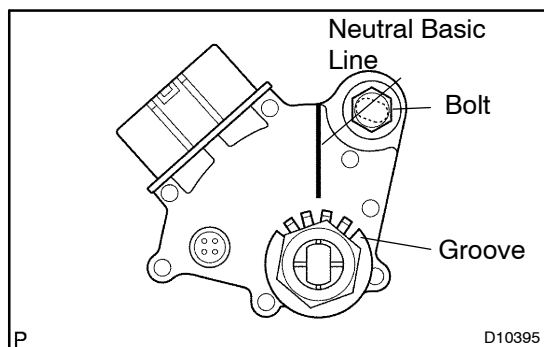
**36. INSTALL PARK/NEUTRAL POSITION SWITCH**

- (a) Install the park/neutral position switch onto the manual valve lever shaft and temporarily install the adjusting bolt.
- (b) Install the new lock washer. Install and torque the nut.

Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

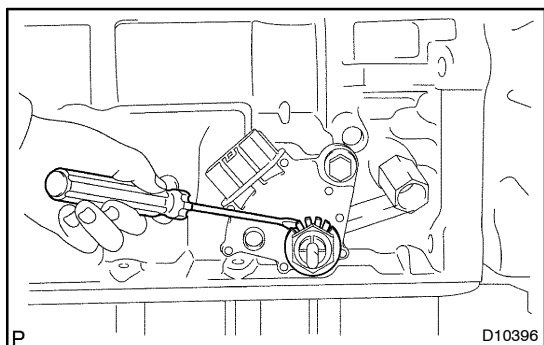


- (c) Using the control shaft lever, fully turn the manual lever shaft back and return 2 notches. It is now in neutral.



- (d) Align the neutral basic line with the switch groove, and tighten the adjusting bolt.

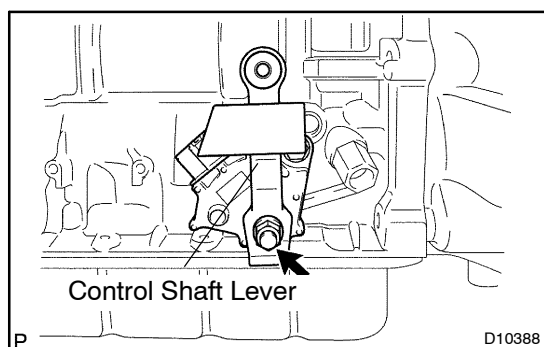
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



- (e) Using a screwdriver, bend the tabs of the lock washer.

HINT:

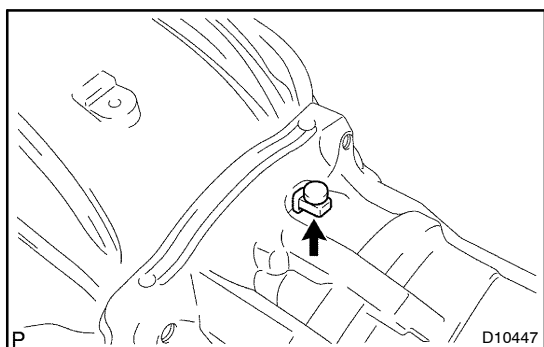
Bend at least 2 of the lock washer tabs.



37. INSTALL CONTROL SHAFT LEVER

Install the washer and nut to the control shaft lever.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

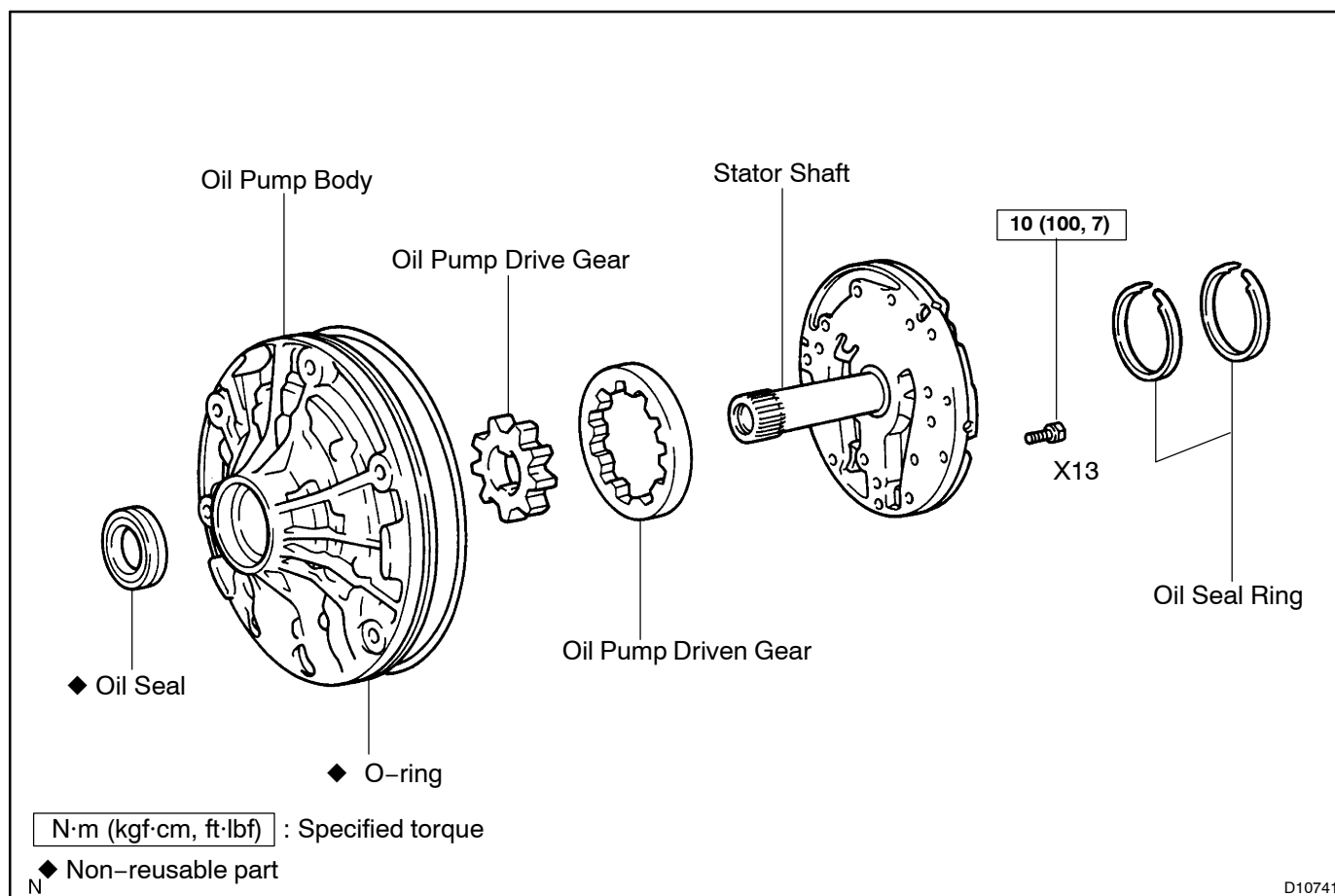


38. INSTALL BREATHER PLUG

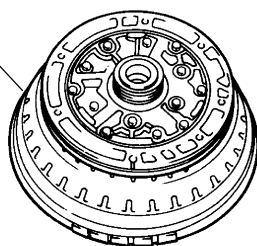
Install the breather plug.

OIL PUMP COMPONENTS

AT04B-03



D10741

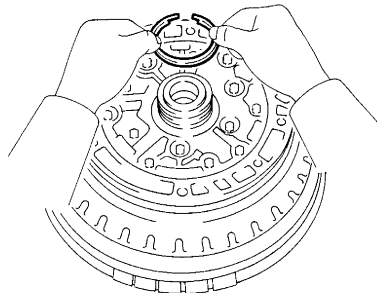
Torque Converter
Clutch

D01281

DISASSEMBLY

1. USE TORQUE CONVERTER CLUTCH AS WORK STAND

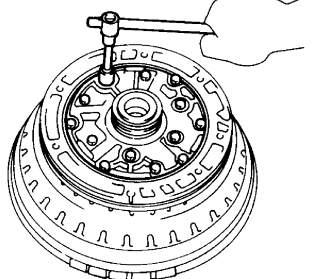
Place the oil pump body on the torque converter clutch.



D10742

2. REMOVE OIL SEAL RING

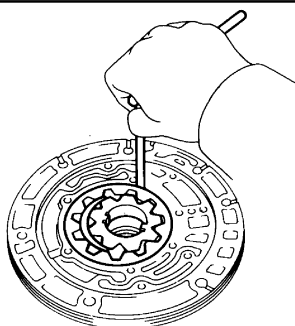
Remove the 2 oil seal rings.



D01283

3. REMOVE STATOR SHAFT

- Remove the 13 bolts, and then remove the stator shaft from the oil pump body.
- Remove the oil pump body from the torque converter clutch.



D01284

4. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body.

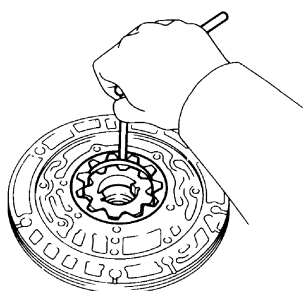
Using a feeler gauge, measure the clearance.

Standard body clearance:

0.07 – 0.15 mm (0.0028 – 0.0059 in.)

Maximum body clearance: 0.3 mm (0.012 in.)

If the body clearance is greater than the maximum, replace the drive gear, driven gear or pump body.



D01285

5. CHECK TIP CLEARANCE OF DRIVEN GEAR

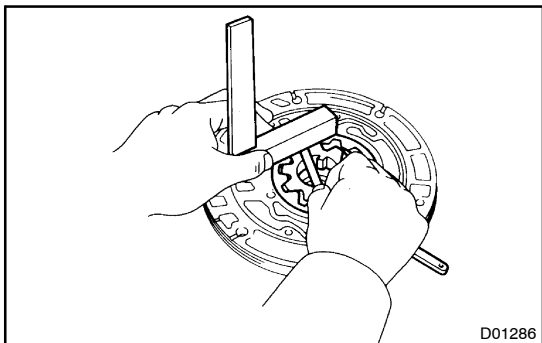
Using a feeler gauge, measure the clearance between the driven gear teeth and the crescent-shaped part of the pump body.

Standard tip clearance:

0.11 – 0.14 mm (0.0043 – 0.0055 in.)

Maximum tip clearance: 0.3 mm (0.012 in.)

If the tip clearance is greater than the maximum, replace the drive gear, driven gear or pump body.



6. CHECK SIDE CLEARANCE OF BOTH GEARS

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

Standard side clearance:

0.02 – 0.05 mm (0.0008 – 0.0020 in.)

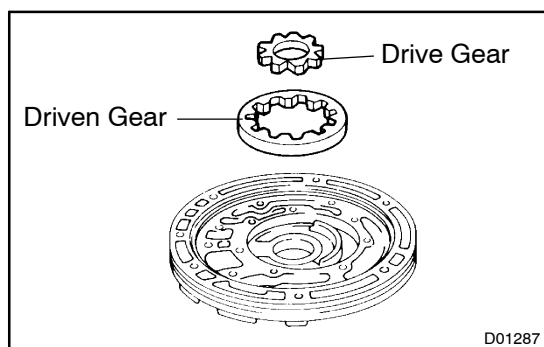
Maximum side clearance: 0.1 mm (0.004 in.)

There are 5 different thickness for drive and driven gears.

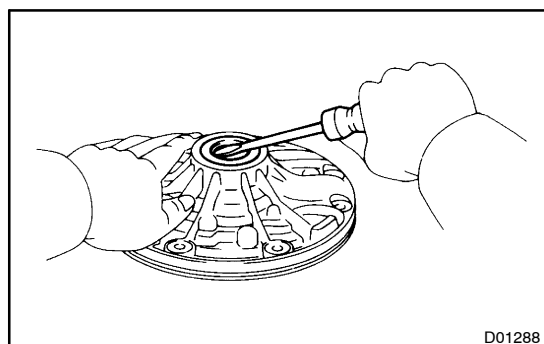
Drive and driven gears thickness: mm (in.)

M	11.690 – 11.699 (0.4602 – 0.4606)
N	11.700 – 11.709 (0.4606 – 0.4610)
P	11.710 – 11.720 (0.4610 – 0.4614)
R	11.721 – 11.730 (0.4615 – 0.4618)
S	11.731 – 11.740 (0.4618 – 0.4622)

If the side clearance is greater than the maximum, replace the drive gear, driven gear or pump body.



7. REMOVE OIL PUMP DRIVE GEAR AND DRIVEN GEAR

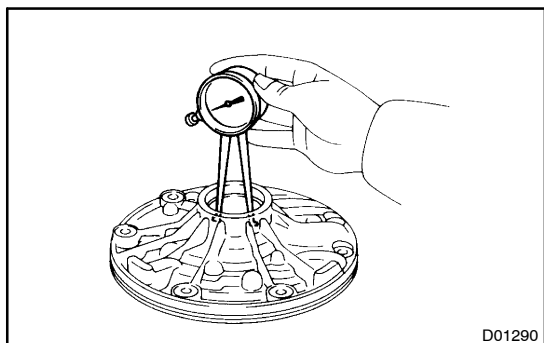


8. REMOVE OIL SEAL

Pry off the oil seal with a screwdriver.

NOTICE:

Be careful not to damage the bushing and oil pump body.



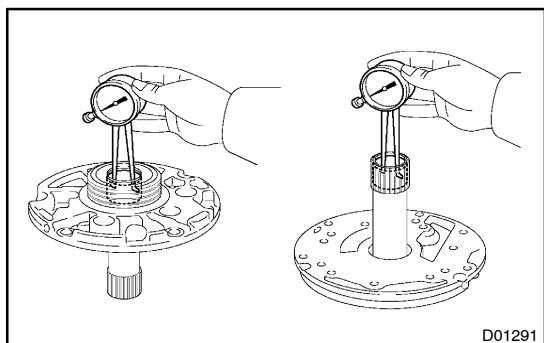
INSPECTION

1. CHECK OIL PUMP BODY BUSHING

Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Maximum inside diameter: 38.19 mm (1.5035 in.)

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



2. CHECK STATOR SHAFT BUSHING

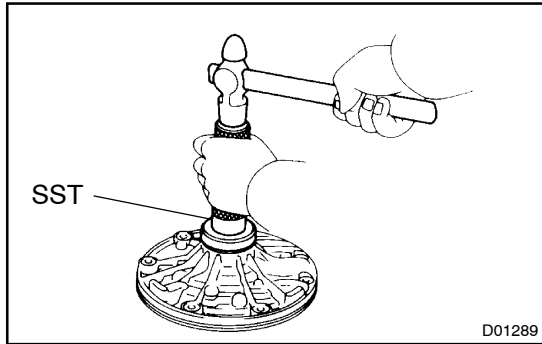
Using a dial indicator, measure the inside diameter of the stator shaft bushing.

Maximum inside diameter:

Front side: 21.58 mm (0.8496 in.)

Rear side: 27.08 mm (1.0661 in.)

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



REASSEMBLY

1. INSTALL OIL SEAL

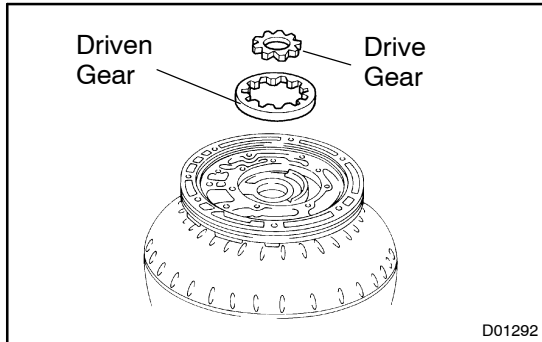
- (a) Using SST, install a new oil seal.

HINT:

The oil seal end should be flush with the outer edge of the pump body.

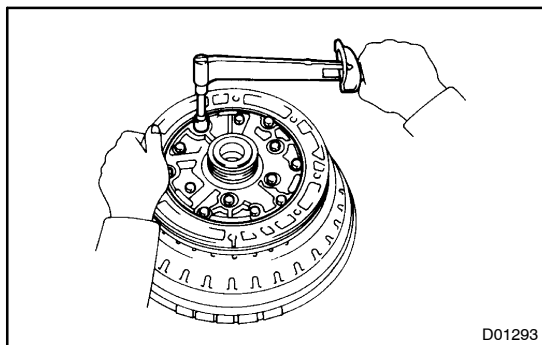
SST 09350-30020 (09351-32140)

- (b) Coat the oil seal lip with MP grease.



2. INSTALL DRIVEN GEAR AND DRIVE GEAR TO OIL PUMP BODY

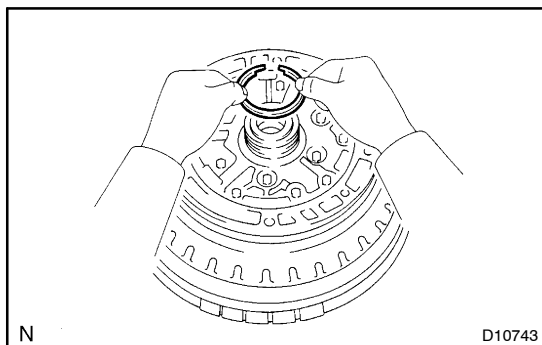
- (a) Place the oil pump body on the torque converter clutch.
 (b) Coat the driven gear and drive gear with ATF.
 (c) Install the driven gear and drive gear.



3. INSTALL STATOR SHAFT TO OIL PUMP BODY

- (a) Align the stator shaft with each bolt hole.
 (b) Install the 13 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



4. INSTALL OIL SEAL RINGS

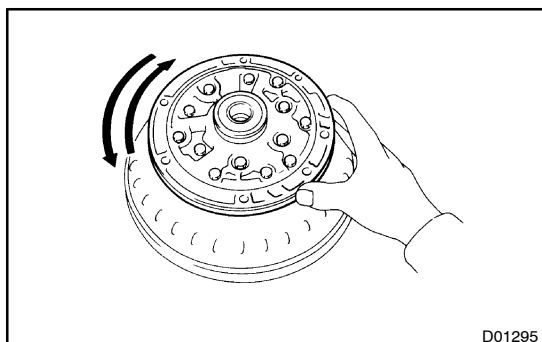
- (a) Coat the 2 oil seal rings with ATF.
 (b) Install the 2 oil seal rings to the stator shaft groove, then snug them down by squeezing their ends together.

NOTICE:

Do not spread the ring ends too much.

HINT:

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

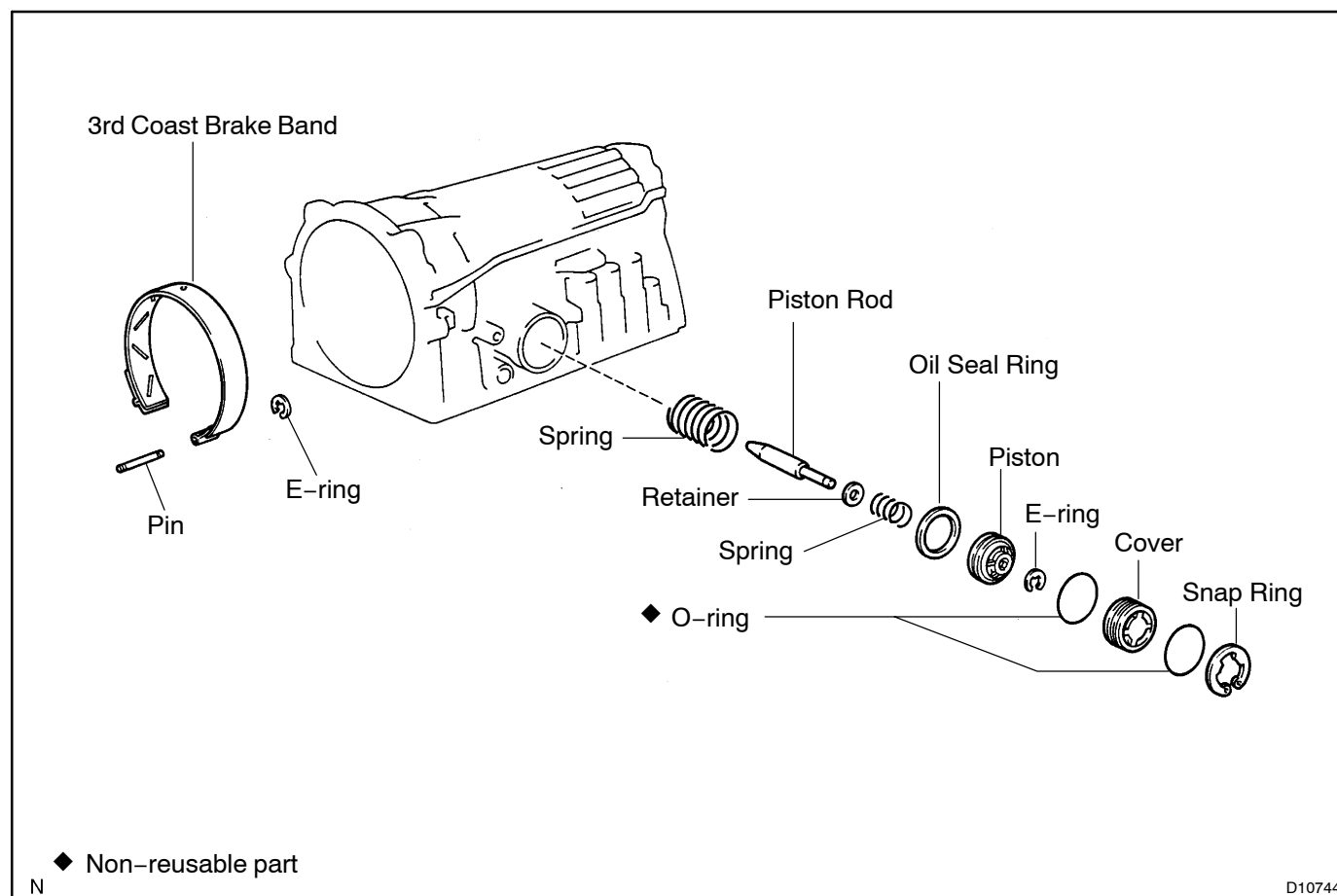


5. CHECK OIL PUMP DRIVE GEAR ROTATION

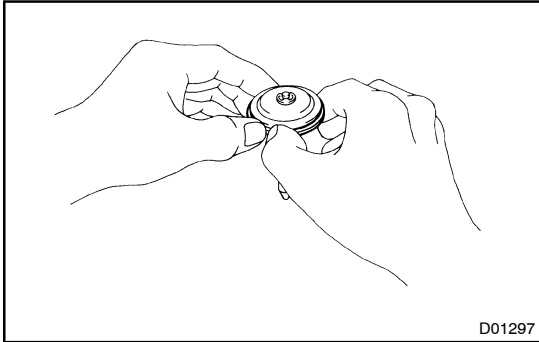
Make sure the drive gear rotates smoothly.

THIRD COAST BRAKE COMPONENTS

AT04F-03

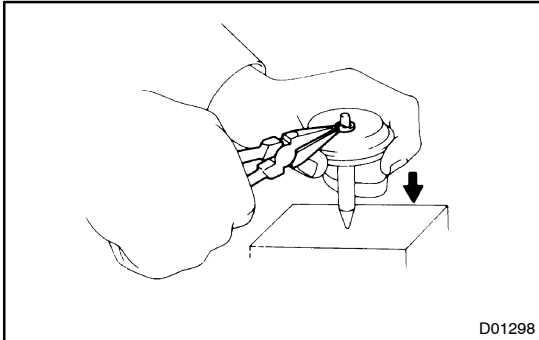


D10744



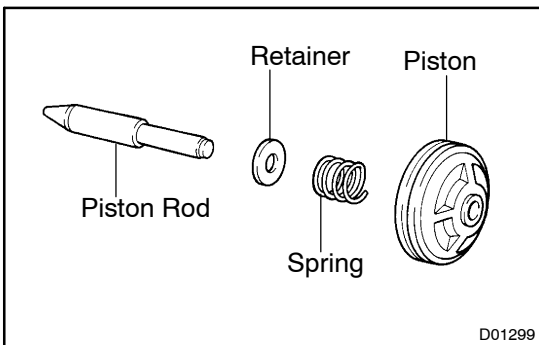
DISASSEMBLY

1. REMOVE 3RD COAST BRAKE PISTON OIL SEAL RING

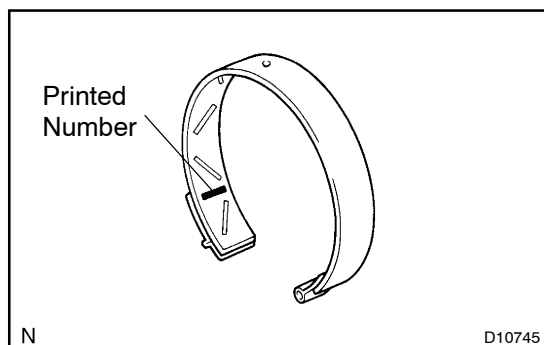


2. REMOVE 3RD COAST BRAKE PISTON ROD

- (a) Firmly hold down the piston, then compress the compression spring.
- (b) Remove the E-ring.



- (c) Remove the compression spring, retainer and piston rod.



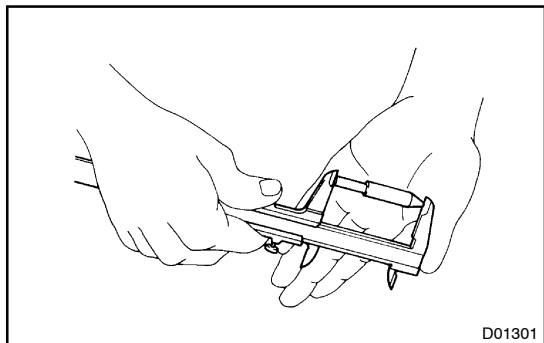
INSPECTION

INSPECT BRAKE BAND

If the lining of the brake band is peeling off or discolored, or even if a part of the printed numbers are defaced, replace the brake band.

HINT:

Before assembling the new band, soak it in ATF for at least 15 minutes.



REASSEMBLY

1. SELECT PISTON ROD

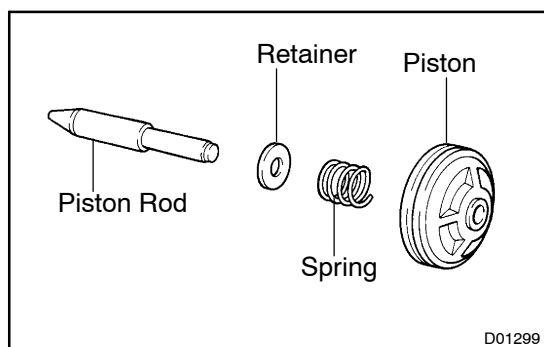
If the band is OK with piston rod stroke not within the standard value, select a new piston rod.

HINT:

There are 5 different lengths for piston rod.

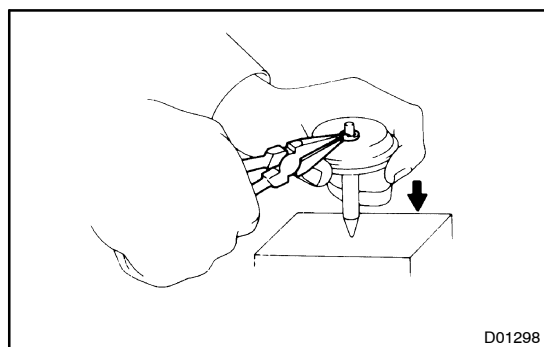
Piston rod length: mm (in.)

77.65 (3.057)	79.90 (3.146)
78.40 (3.087)	–
79.15 (3.116)	–

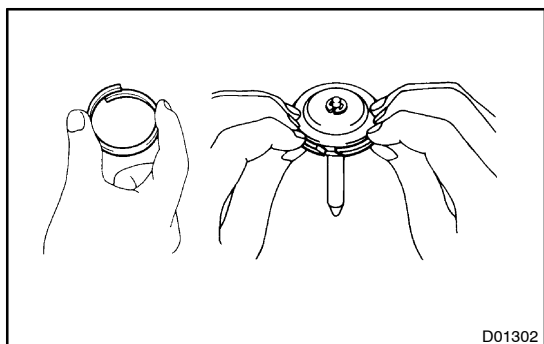


2. ASSEMBLE 3RD COAST BRAKE PISTON

- (a) Install the retainer, compression spring and piston to the piston rod.



- (b) Firmly hold down the piston, then compress the compression spring.
(c) Install the E-ring.



3. INSTALL 3RD COAST BRAKE PISTON OIL SEAL RING

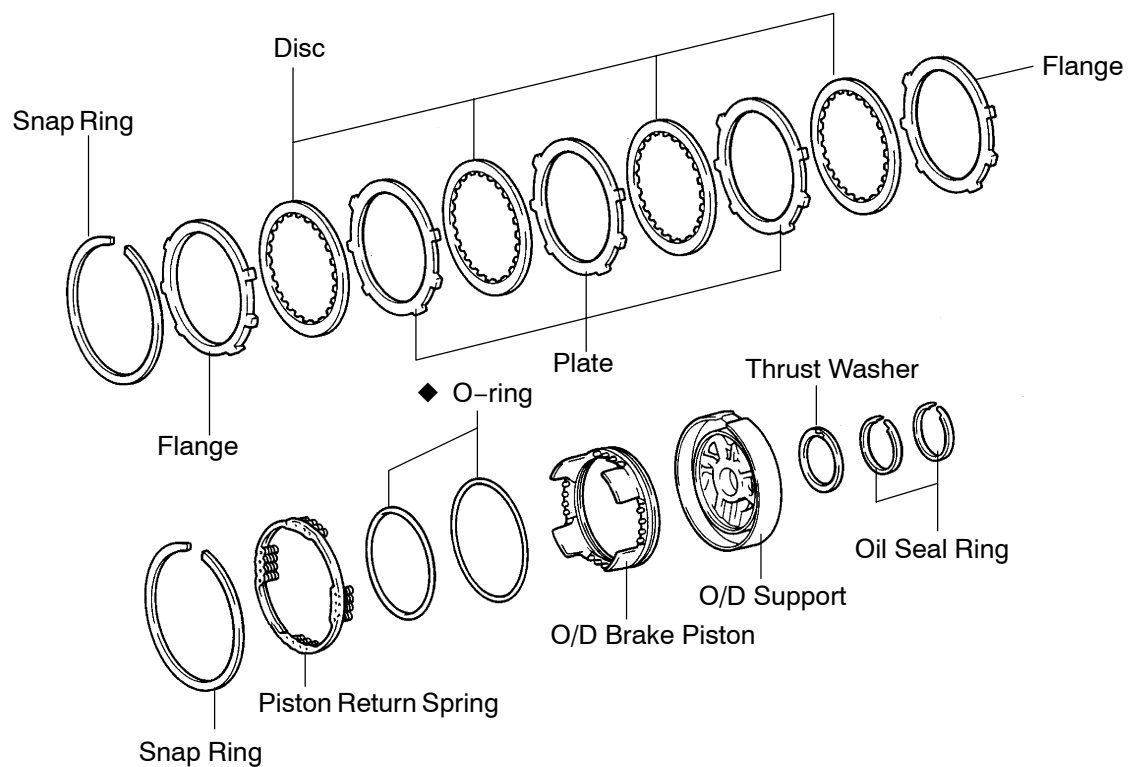
- (a) Coat the oil seal ring with ATF.
(b) Install the oil seal ring to the piston groove, then snug it down by squeezing its ends together.

NOTICE:

Do not spread the ring ends more than necessary.

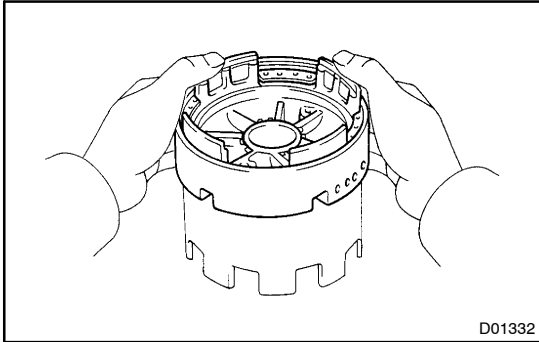
OVERDRIVE BRAKE COMPONENTS

AT04N-03



N

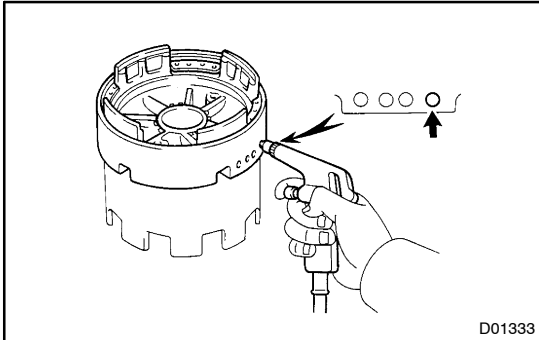
D10746



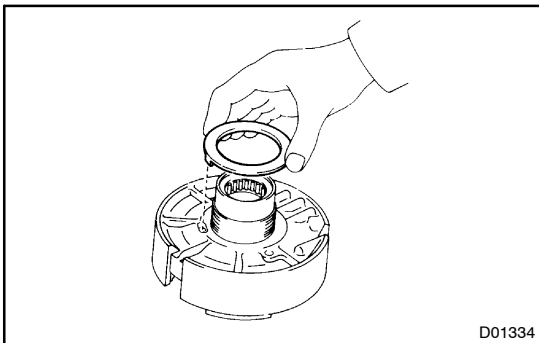
DISASSEMBLY

1. CHECK PISTON OPERATION OF O/D BRAKE

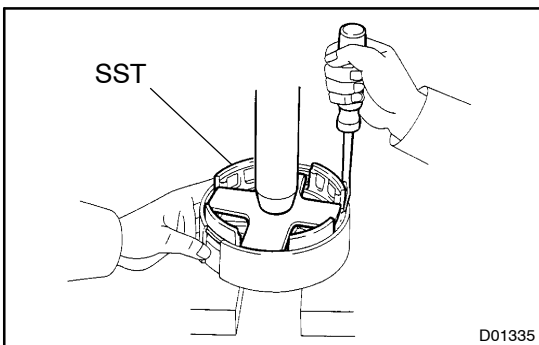
- (a) Place the O/D support assembly onto the direct clutch assembly.



- (b) Apply compressed air (392 kPa, 4 kgf/cm², 57 psi) into the oil passage and be sure that the O/D brake piston moves smoothly.

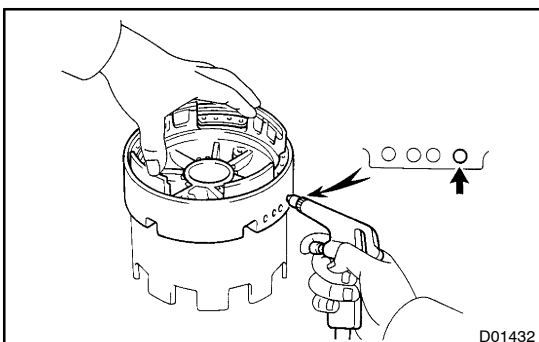


2. REMOVE CLUTCH DRUM THRUST WASHER FROM O/D SUPPORT



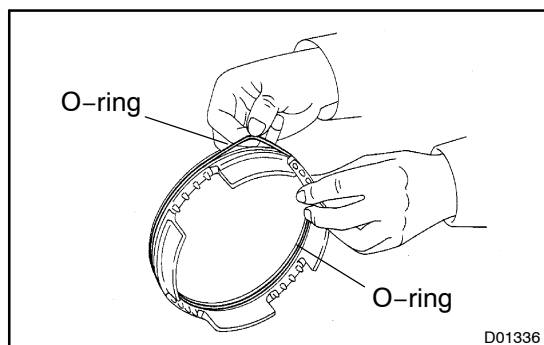
3. REMOVE PISTON RETURN SPRING

- (a) Place SST on the spring retainer, and compress the return spring with a press.
SST 09350-30020 (09350-07030)
- (b) Remove the snap ring with a screwdriver.
- (c) Remove the piston return spring.

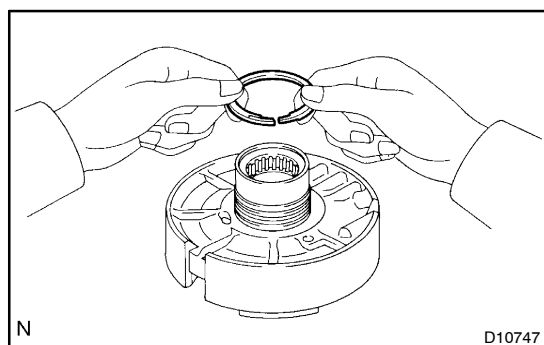


4. REMOVE O/D BRAKE PISTON

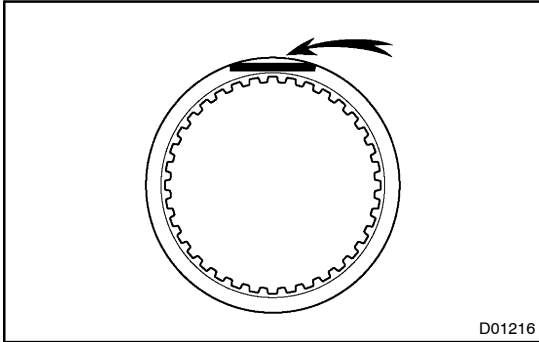
- (a) Place the O/D support onto the direct clutch assembly.
- (b) Hold the O/D brake piston so it does not slant, and apply compressed air (392 kPa, 4 kgf/cm², 57 psi) into the passage to remove the O/D brake piston.
- (c) Remove the O/D brake piston.



(d) Remove the 2 O-rings.



5. REMOVE 2 OIL SEAL RINGS



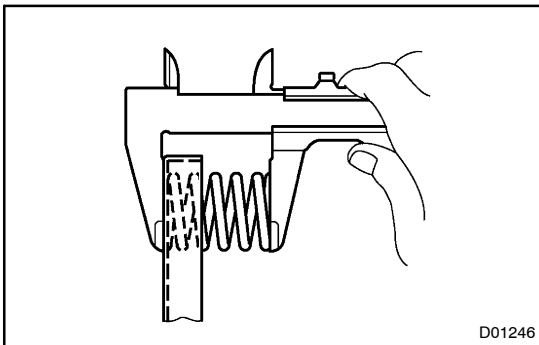
INSPECTION

1. INSPECT DISC, PLATE AND FLANGE

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

HINT:

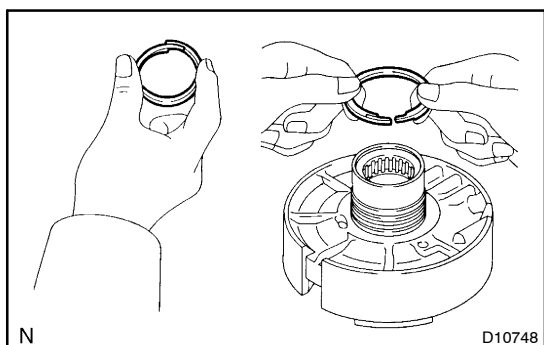
- If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



2. CHECK O/D BRAKE PISTON RETURN SPRING

Measure the free length of the spring together with the spring seat.

Standard free length: 17.82 mm (0.702 in.)



REASSEMBLY

1. INSTALL OIL SEAL RING

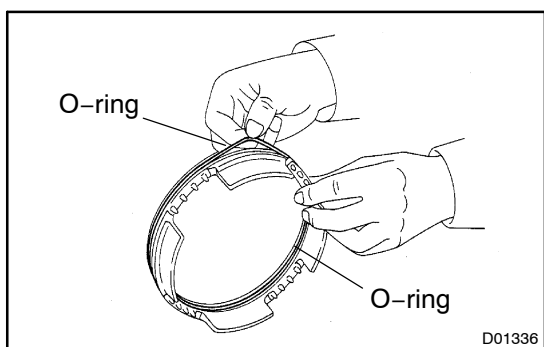
- (a) Coat the 2 oil seal rings with ATF.
- (b) Install the 2 oil seal rings to the O/D support groove, then snug them down by squeezing their ends together.

NOTICE:

Do not spread the ring ends more than necessary.

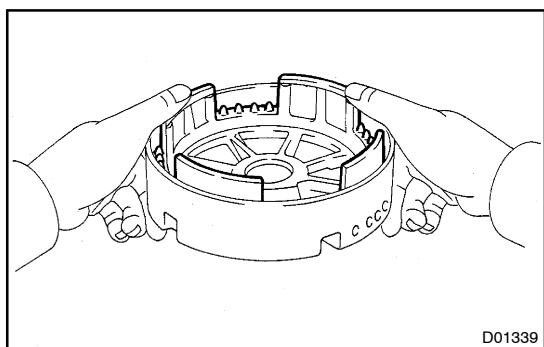
HINT:

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

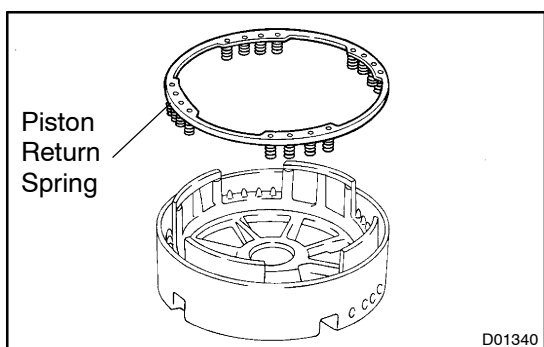


2. INSTALL O/D BRAKE PISTON

- (a) Coat 2 new O-rings with ATF and install them in the O/D brake piston.

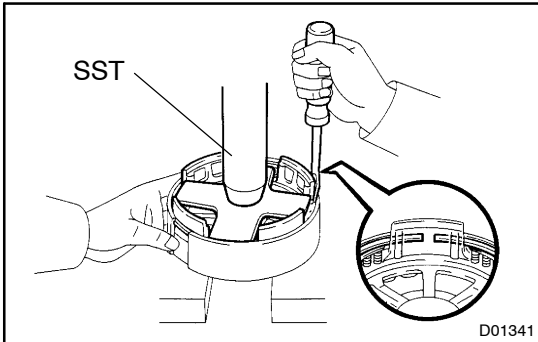


- (b) Being careful not to damage the O-rings, press in the brake piston into the O/D support with both hands.



3. INSTALL PISTON RETURN SPRING

- (a) Install the piston return spring.



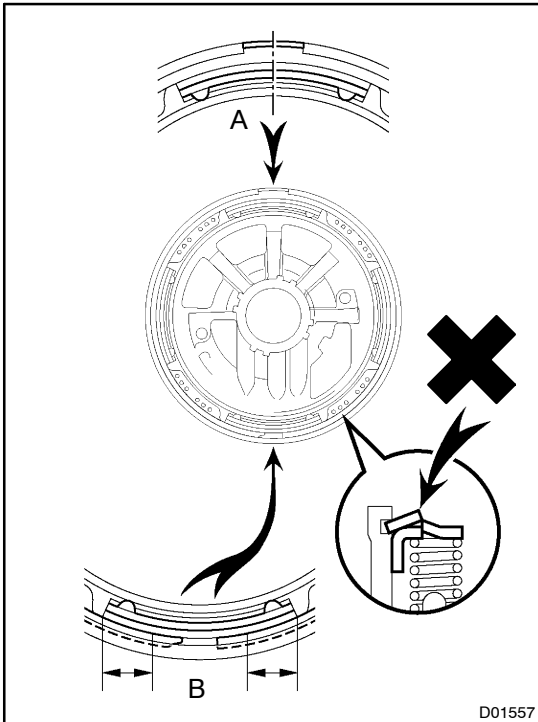
- (b) Place SST on the spring retainer, and compress the return spring with a shop press.

SST 09350-30020 (09350-07030)

- (c) Install the snap ring with a screwdriver.

NOTICE:

Be sure the end gap of the snap ring is not aligned with the cutout portion of the O/D support.

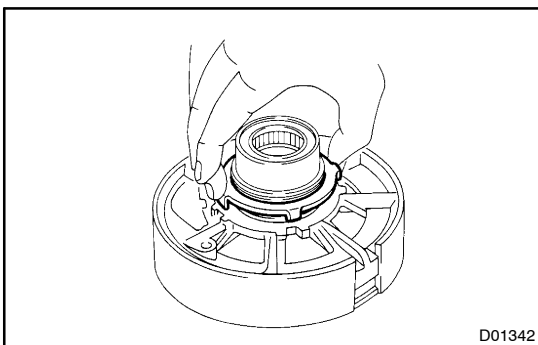


HINT:

After assembling the O/D support assembly completely, align the position of the piston with the position shown in the illustration "A".

Align the end gap of the snap ring as shown in the illustration "B".

Make sure that the snap ring is not on the part of return spring which prevents the spring from coming off. Check this on 8 places.

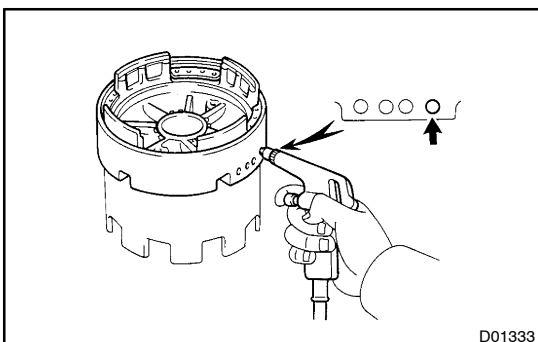


4. INSTALL CLUTCH DRUM THRUST WASHER

Coat the thrust washer with petroleum jelly and install it into the O/D support.

HINT:

Make sure that the lugs shapes match the holes on the O/D support.



5. CHECK PISTON OPERATION OF O/D BRAKE

- (a) Place the O/D support assembly onto the direct clutch assembly.

- (b) Apply compressed air (392 kPa, 4 kgf/cm², 57 psi) into the oil passage as shown, and be sure that the O/D brake piston moves smoothly.

OVERDRIVE DIRECT CLUTCH COMPONENTS

AT04J-03

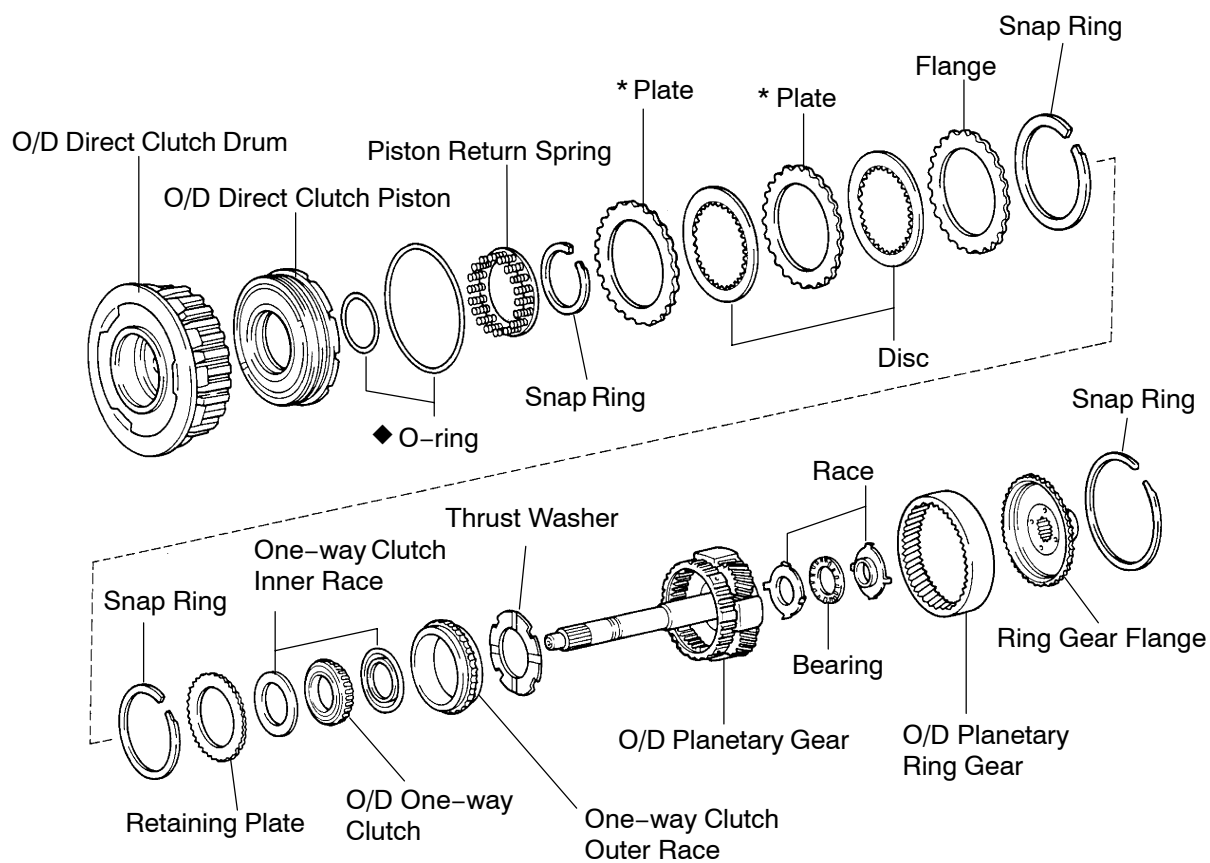


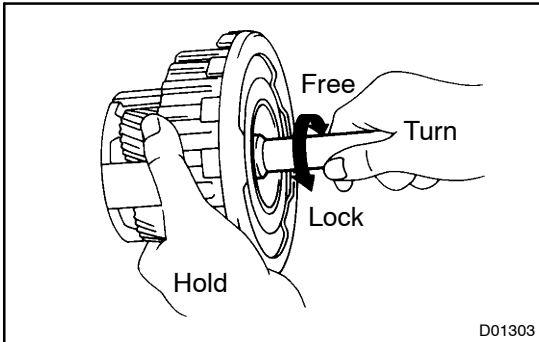
Plate thickness:

*: 2.0 mm (0.079 in.)

◆ Non-reusable part

N

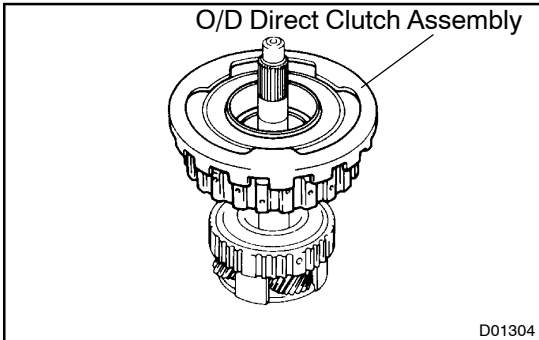
D10749



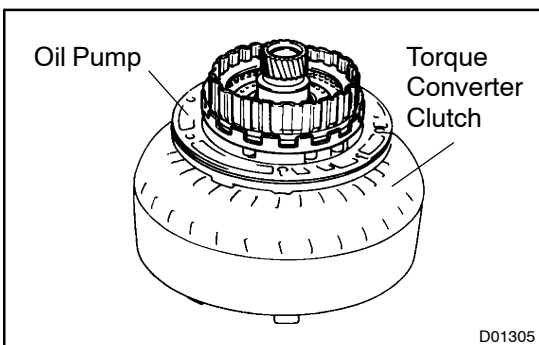
DISASSEMBLY

1. CHECK OPERATION OF ONE-WAY CLUTCH

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

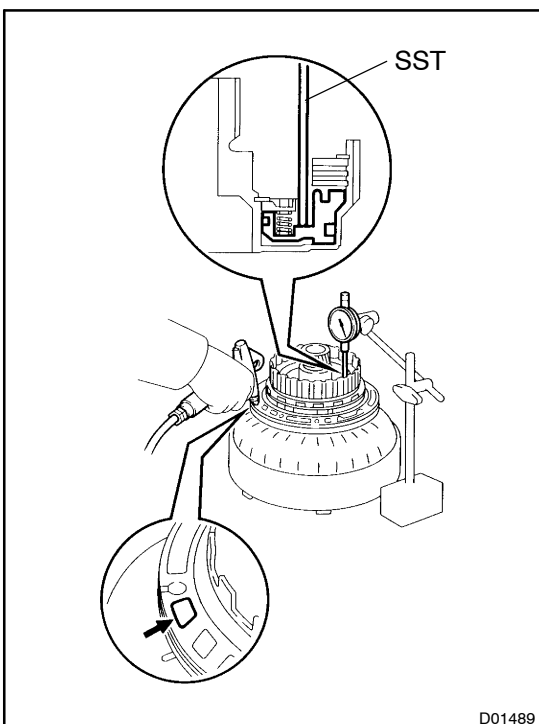


2. REMOVE O/D DIRECT CLUTCH ASSEMBLY FROM O/D PLANETARY GEAR



3. CHECK PISTON STROKE OF O/D DIRECT CLUTCH

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

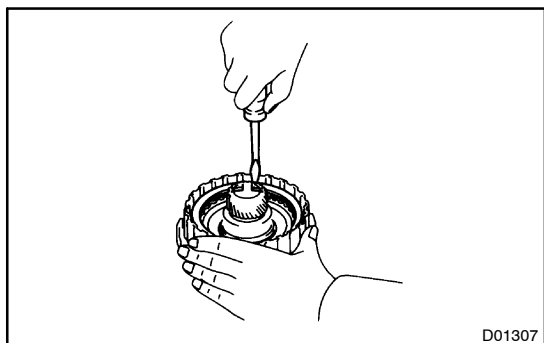


- (b) Using SST and a dial indicator, measure the O/D direct clutch piston stroke while applying and releasing compressed air (392 kPa, 4 kgf/cm², 57 psi).

SST 09350-30020 (09350-06120)

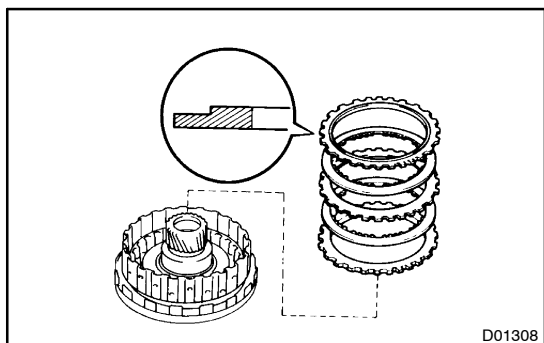
Piston stroke: 0.85 – 1.10 mm (0.033 – 0.043 in.)

If the stroke is non-standard, inspect the discs.

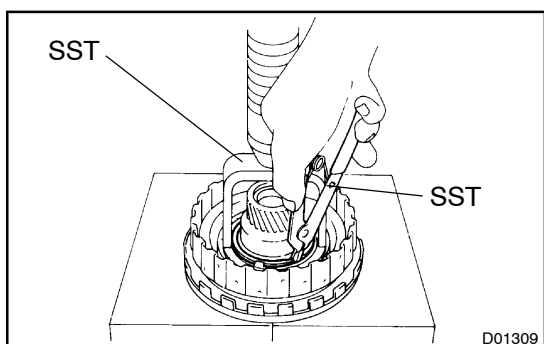


4. REMOVE FLANGE, PLATE AND DISC

- (a) Using a screwdriver, remove the snap ring from the O/D direct clutch drum.



- (b) Remove the flange, 2 plates and 2 discs.



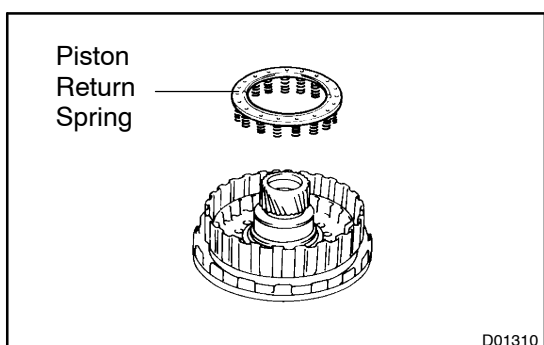
5. REMOVE PISTON RETURN SPRING

- (a) Place SST on the spring retainer and compress the return spring with a press.

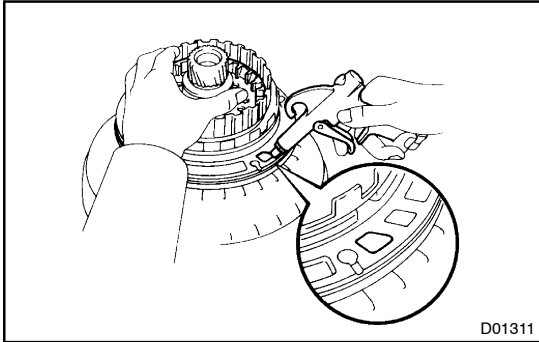
SST 09350-30020 (09350-07040)

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

SST 09350-30020 (09350-07070)



- (c) Remove the piston return spring.



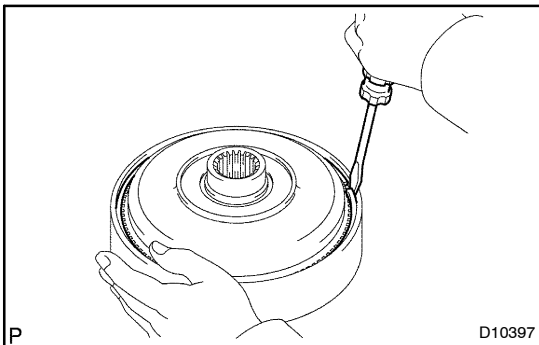
6. REMOVE O/D DIRECT CLUTCH PISTON

- (a) Place the oil pump onto the torque converter clutch and then place the O/D direct clutch onto the oil pump.
- (b) Hold the O/D direct clutch piston with hand, and apply compressed air (392 kPa, 4 kgf/cm², 5 psi) to the oil pump to remove the O/D direct clutch piston.
- (c) Remove the O/D direct clutch piston.

HINT:

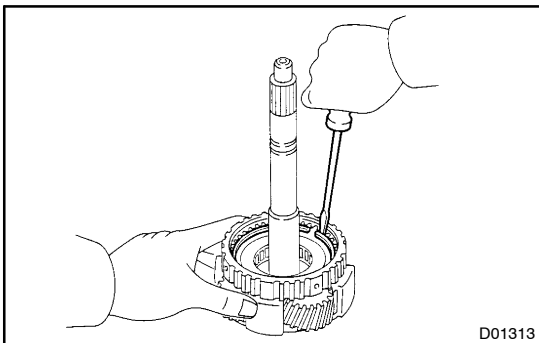
If the piston is at an angle and cannot be removed, press down on the side jutting out and again apply compressed air, or else wind vinyl tape around the piston end and remove it with needle nose pliers.

- (d) Remove the 2 O-rings from the piston.



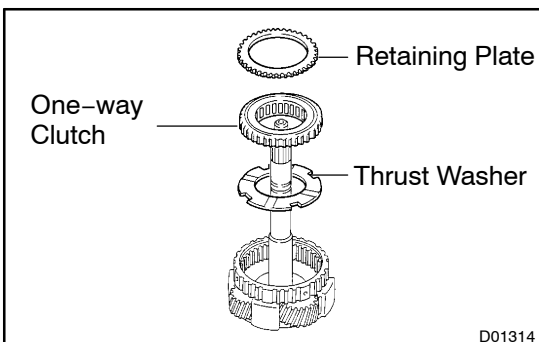
7. REMOVE RING GEAR FLANGE

- (a) Using a screwdriver, remove the snap ring.
- (b) Remove the ring gear flange.

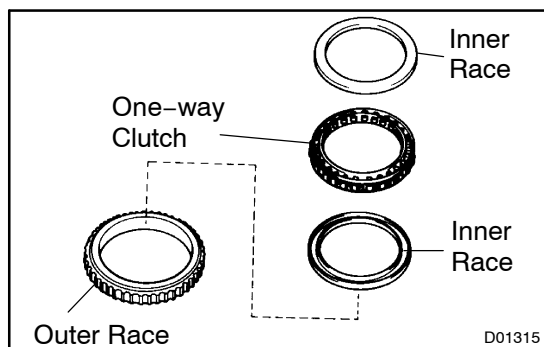


8. REMOVE RETAINING PLATE

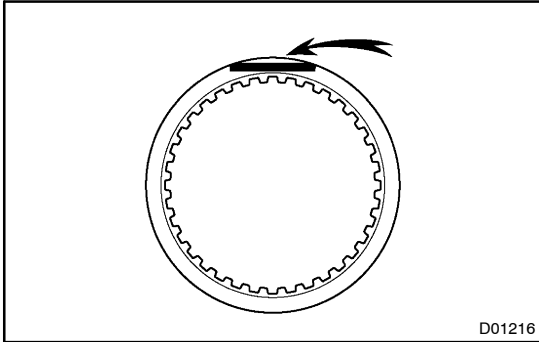
- (a) Using a screwdriver, remove the snap ring.



- (b) Remove the retaining plate, one-way clutch and thrust washer.

**9. REMOVE ONE-WAY CLUTCH FROM OUTER RACE**

Remove the 2 inner races and one-way clutch to the outer race.



D01216

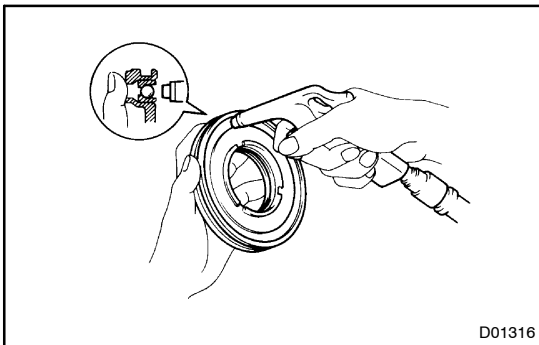
INSPECTION

1. INSPECT DISC AND FLANGE

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

HINT:

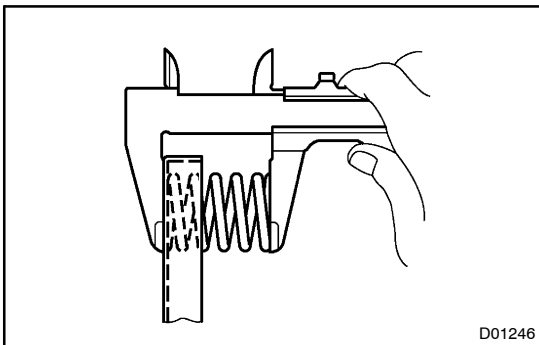
- If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



D01316

2. CHECK O/D DIRECT CLUTCH PISTON

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

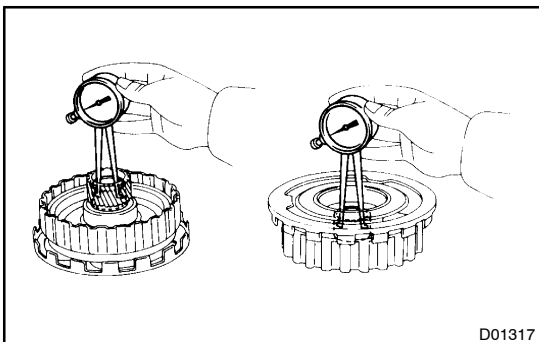


D01246

3. CHECK O/D DIRECT CLUTCH RETURN SPRING

Measure the free length of the spring together with the spring seat.

Standard free length: 15.8 mm (0.622 in.)



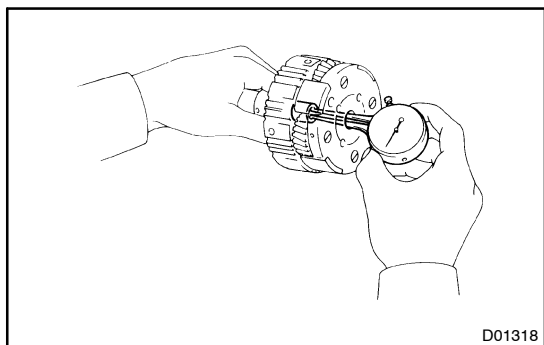
D01317

4. CHECK O/D DIRECT CLUTCH DRUM BUSHINGS

Using a dial indicator, measure the inside diameter of the clutch drum bushings.

Maximum inside diameter: 27.11 mm (1.067 in.)

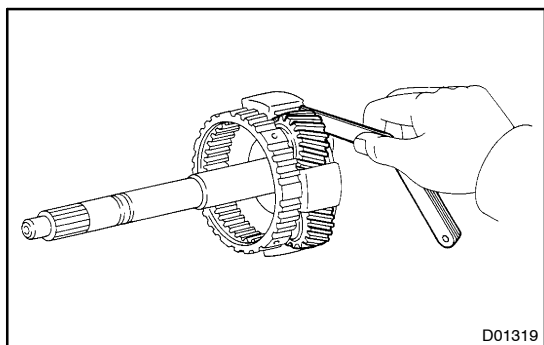
If the inside diameter is greater than the maximum, replace the clutch drum.

**5. CHECK O/D PLANETARY GEAR BUSHING**

Using a dial indicator, measure the inside diameter of the planetary gear bushing.

Maximum inside diameter: 11.27 mm (0.444 in.)

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

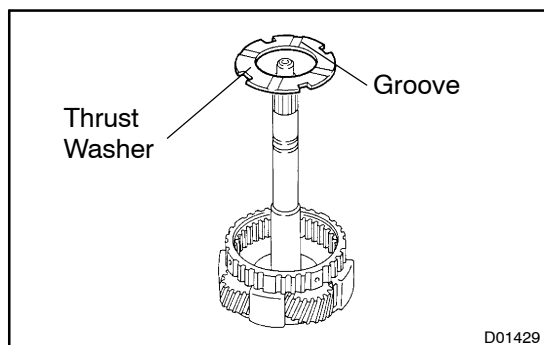
**6. MEASURE PLANETARY PINION GEAR THRUST CLEARANCE**

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.6 mm (0.008 – 0.024 in.)

Maximum clearance: 1.0 mm (0.039 in.)

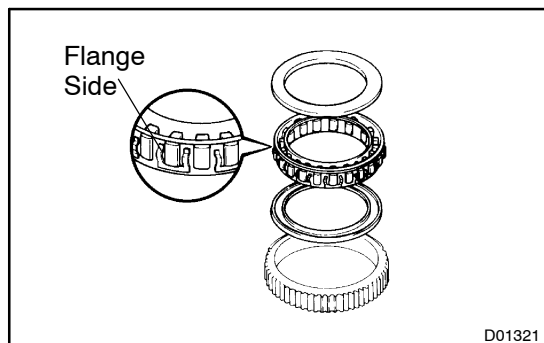
If the clearance is greater than the maximum, replace the planetary gear assembly.



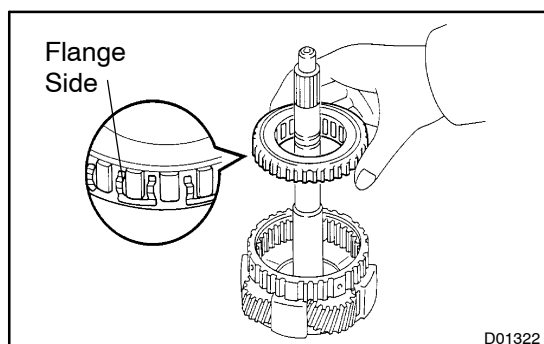
REASSEMBLY

1. INSTALL O/D ONE-WAY CLUTCH

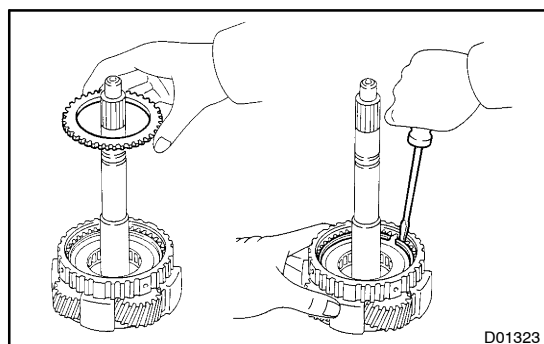
- (a) Install the thrust washer to the O/D planetary gear, the grooved side facing upward.



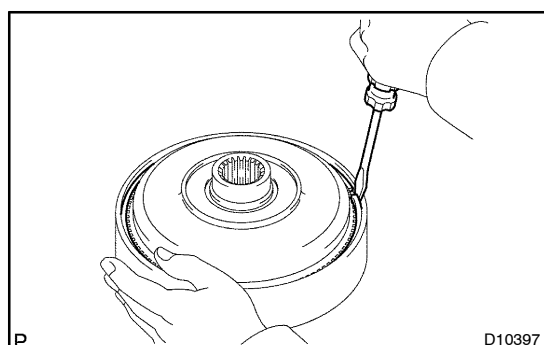
- (b) Install the one-way clutch and 2 inner races into the outer race with the flange side of the one-way clutch facing upward.



- (c) Install the O/D one-way clutch with the outer race to the O/D planetary gear.

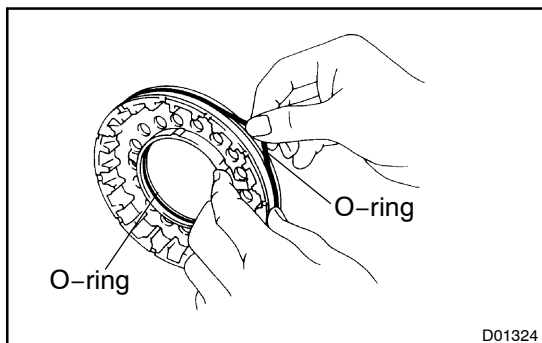


- (d) Install the retaining plate.
(e) Using a screwdriver, install the snap ring.



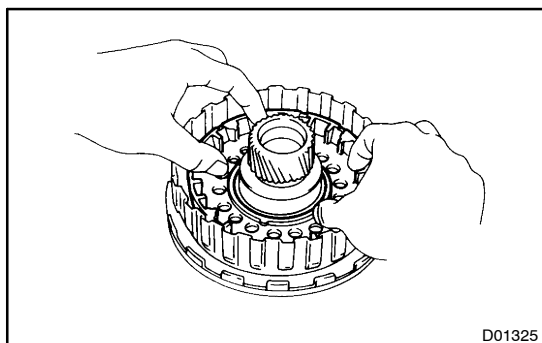
2. INSTALL RING GEAR FLANGE TO O/D PLANETARY RING REAR

- (a) Install the ring gear flange.
(b) Using a screwdriver, install the snap ring.

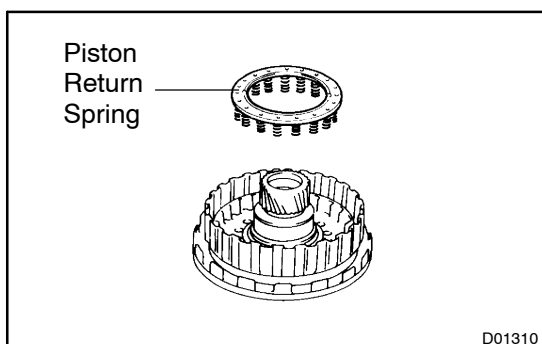


3. INSTALL O/D DIRECT CLUTCH PISTON

- (a) Coat 2 new O-rings with ATF and install them on the O/D direct clutch piston.

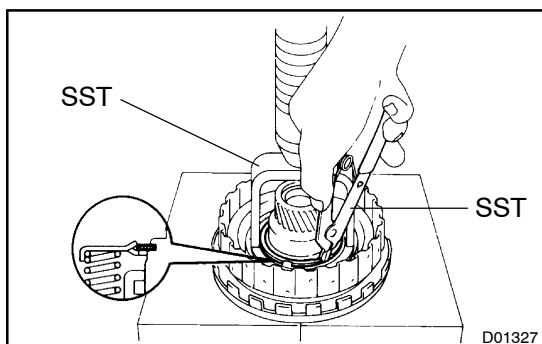


- (b) Being careful not to damage the O-rings, press the direct clutch piston into the clutch drum with both hands.



4. INSTALL PISTON RETURN SPRING

- (a) Install the piston return spring to the piston.



- (b) Place SST on the spring retainer, and compress the return spring with a press.

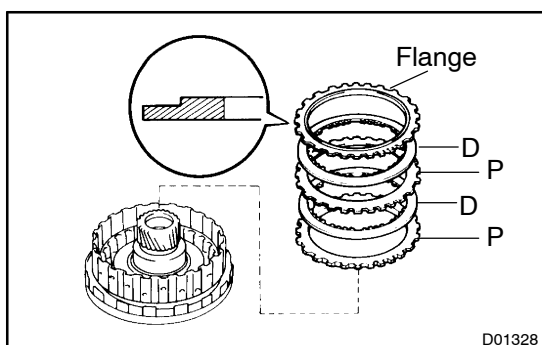
SST 09350-30020 (09350-07040)

- (c) Install the snap ring with SST.

SST 09350-30020 (09350-07070)

NOTICE:

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



5. INSTALL PLATES, DISCS AND FLANGE

- (a) Install the 2 plates and 2 discs.

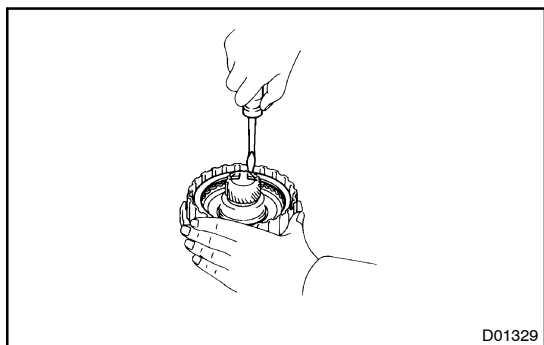
Install in order: P = Plate, D = Disc

P – D – P – D

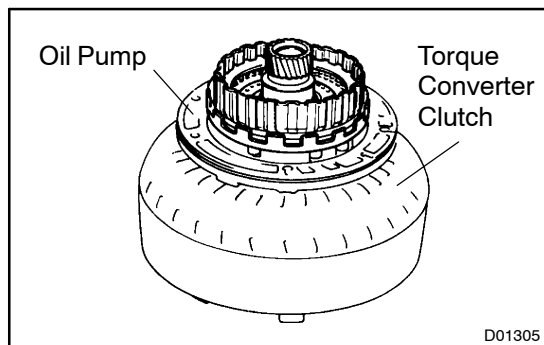
Plate thickness:

P: 2.0 mm (0.079 in.)

- (b) Install the flange, with the flat end facing downward.

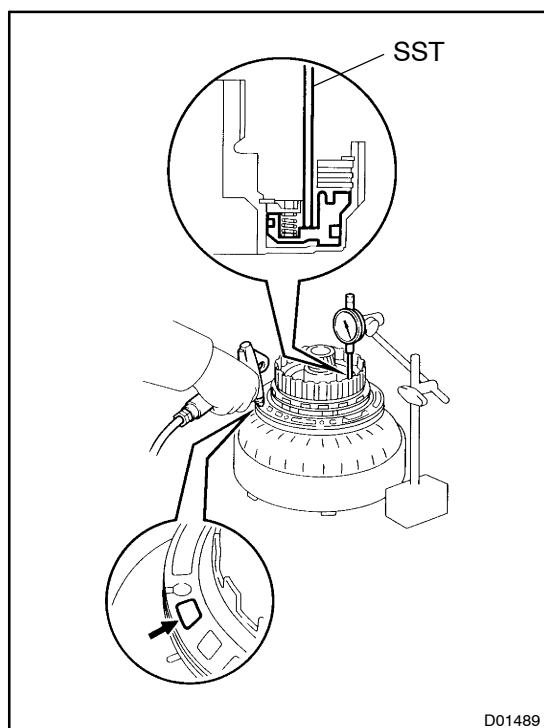


- (c) Using a screwdriver, install the snap ring.



6. CHECK PISTON STROKE OF O/D DIRECT CLUTCH

- (a) Place the oil pump onto the torque converter clutch, then place the O/D direct clutch assembly into the oil pump.



- (b) Using SST and a dial indicator, measure the O/D direct clutch piston stroke while applying and releasing compressed air (392 kPa, 4 kgf/cm², 57 psi).

SST 09350-30020 (09350-06120)

Piston stroke: 0.85 – 1.10 mm (0.033 – 0.043 in.)

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

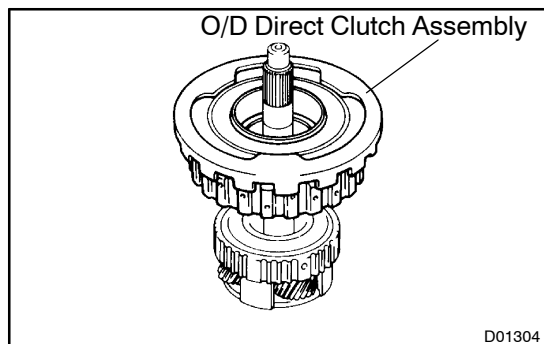
If the stroke is non-standard, select another flange.

HINT:

There are 8 flanges in different thickness.

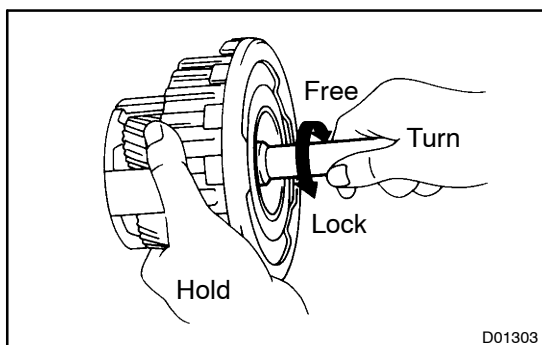
Flange Thickness: mm (in.)

No.	Thickness	No.	Thickness
23	3.8 (0.151)	18	3.4 (0.134)
22	3.7 (0.146)	19	3.3 (0.130)
16	3.6 (0.142)	20	3.2 (0.126)
17	3.5 (0.138)	21	3.1 (0.122)



7. INSTALL O/D DIRECT CLUTCH ASSEMBLY

- (a) Align the flukes of the discs in the direct clutch.
- (b) Install the direct clutch assembly onto the O/D planetary gear.

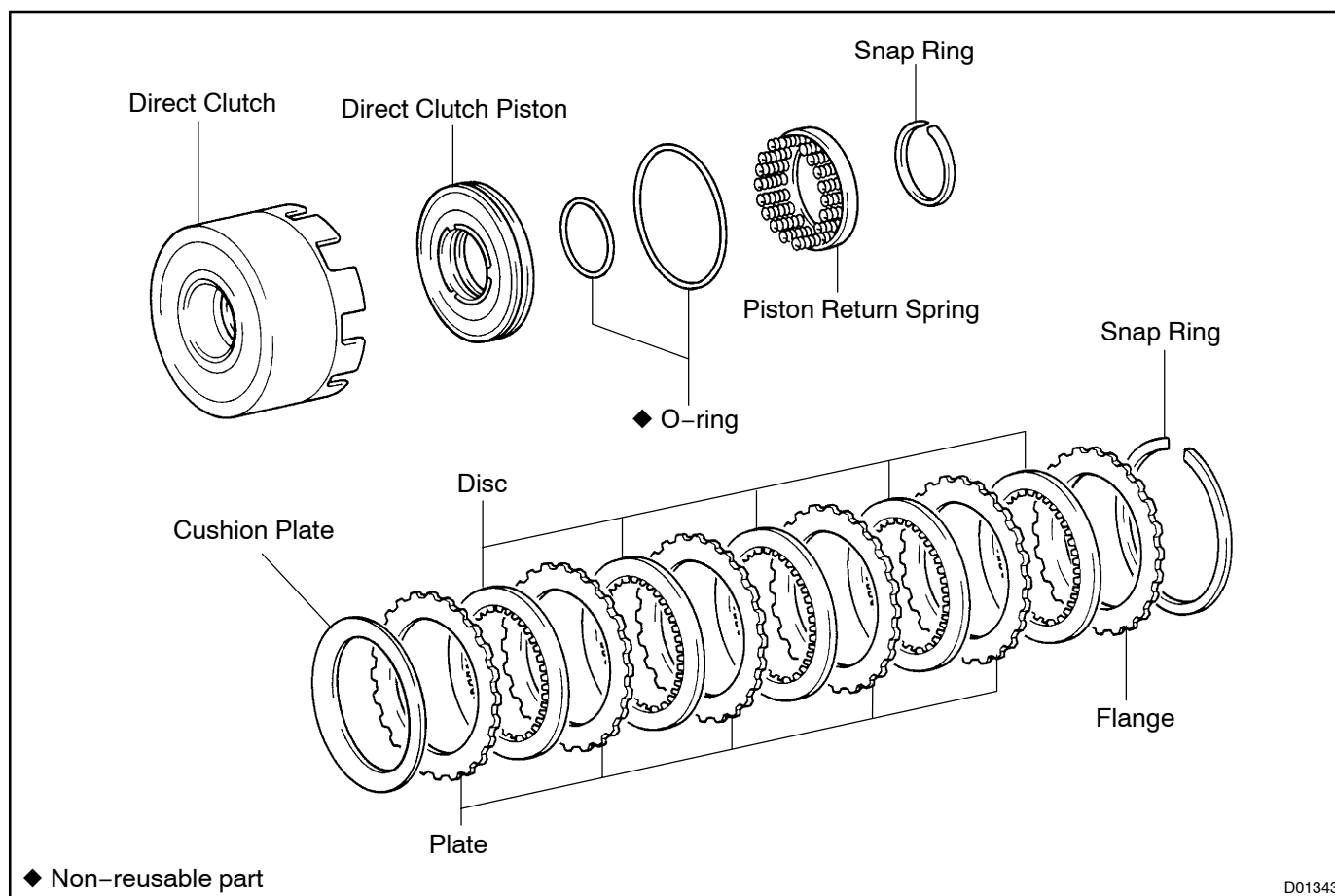
**8. CHECK OPERATION OF ONE-WAY CLUTCH**

Hold the O/D direct clutch drum and turn the input shaft.

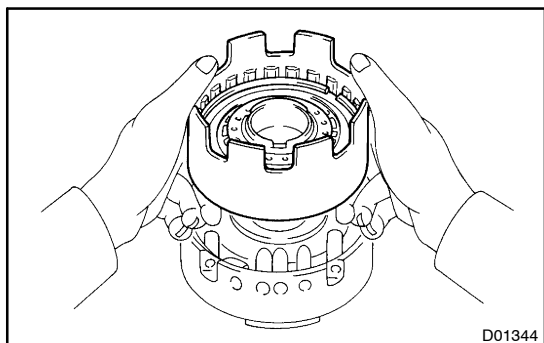
Check that the input shaft turns freely clockwise and locks counterclockwise.

DIRECT CLUTCH COMPONENTS

AT04R-03



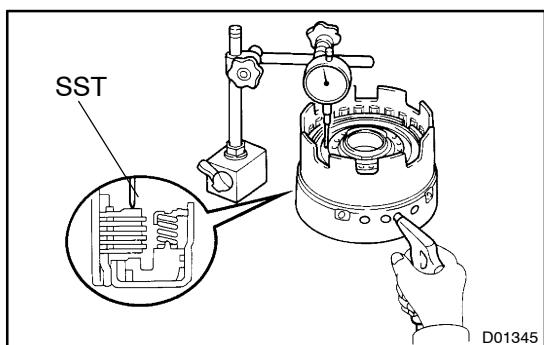
D01343



DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

- (a) Place the direct clutch assembly onto the O/D support assembly.

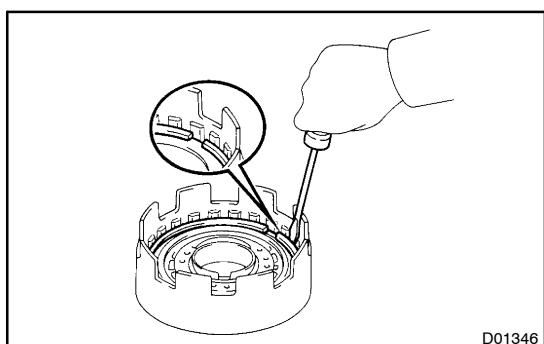


- (b) Using SST and a dial indicator, measure the direct clutch piston stroke while applying and releasing compressed air (186 – 206 kPa, 1.9 – 2.1 kgf/cm², 27 – 30 psi).

SST 09350-30020 (09350-06120)

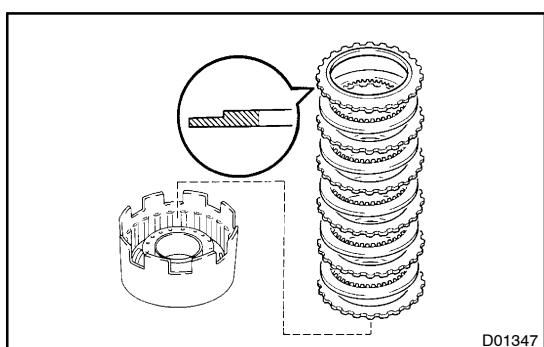
Piston stroke: 0.50 – 0.80 mm (0.020 – 0.032 in.)

If the clearance is non-standard inspect the discs.

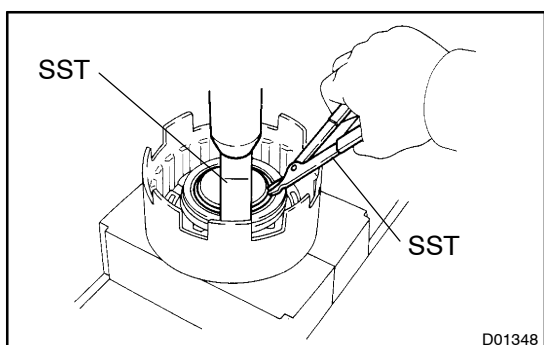


2. REMOVE FLANGE, PLATE AND DISC

- (a) Using a screwdriver, remove the snap ring from the direct clutch drum.

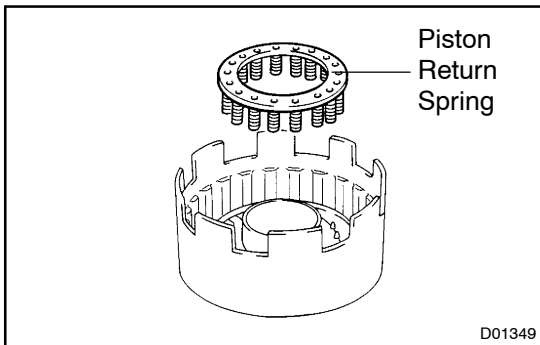


- (b) Remove the flanges, 5 plate and 5 discs.
(c) Remove the cushion plate.

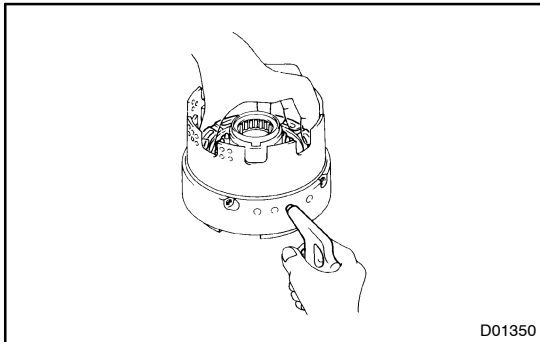


3. REMOVE PISTON RETURN SPRING

- (a) Place SST on the piston return spring and compress.
SST 09350-30020 (09350-07040)
(b) Using SST, remove the snap ring.
SST 09350-30020 (09350-07070)



- (c) Remove the piston return spring.



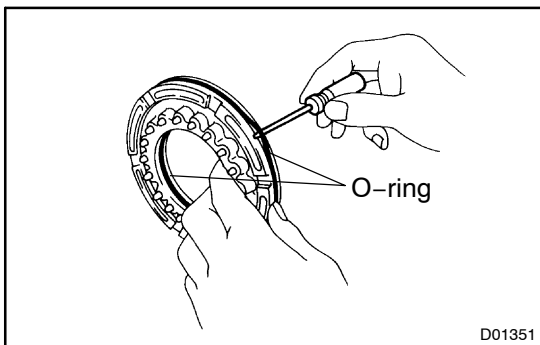
4. REMOVE DIRECT CLUTCH PISTON

- (a) Place the direct clutch drum onto the O/D support.
(b) Hold the direct clutch piston and apply compressed air (196 kPa, 2.0 kgf/cm², 28.5 psi) to the O/D support to remove the direct clutch piston.

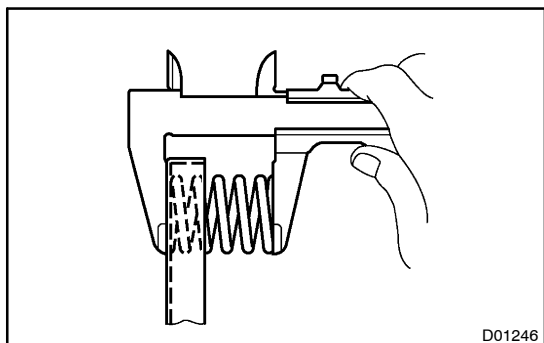
HINT:

Make sure the direct clutch piston squares in the drum before applying compressed air

- (c) Remove the direct clutch piston.



- (d) Using a small screwdriver, remove the 2 O-rings from the piston.



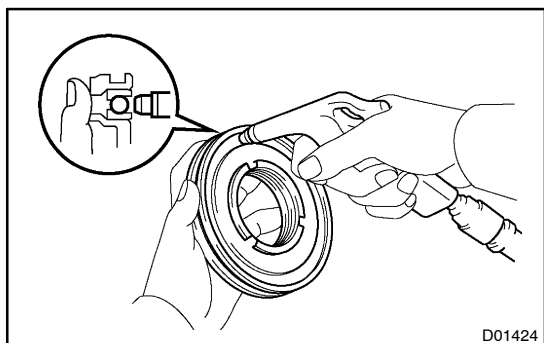
D01246

INSPECTION

1. CHECK DIRECT CLUTCH PISTON RETURN SPRING

Measure the free length of the spring together with the spring seat.

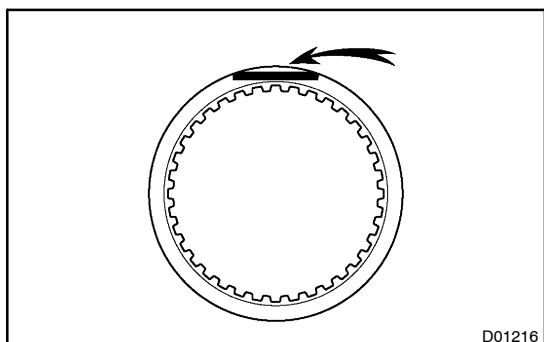
Standard free length: 23.25 mm (0.915 in.)



D01424

2. CHECK DIRECT CLUTCH PISTON

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



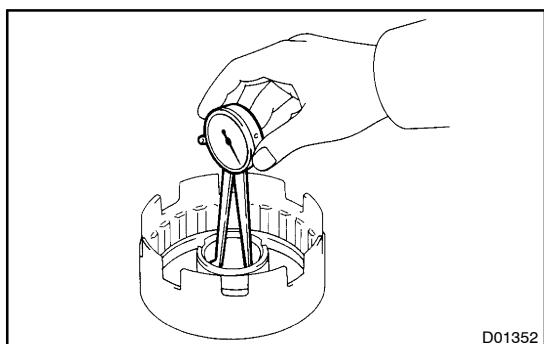
D01216

3. INSPECT DISC, PLATE AND FLANGE

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

HINT:

- If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



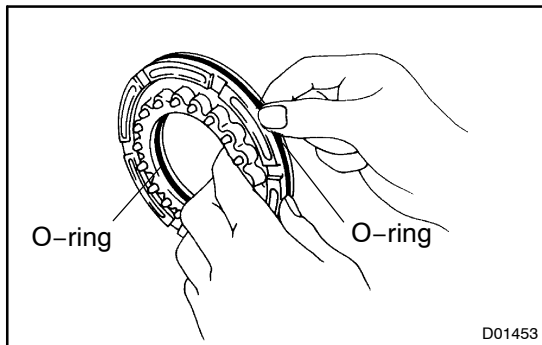
D01352

4. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the clutch drum bushing.

Maximum inside diameter: 53.97 mm (2.1248 in.)

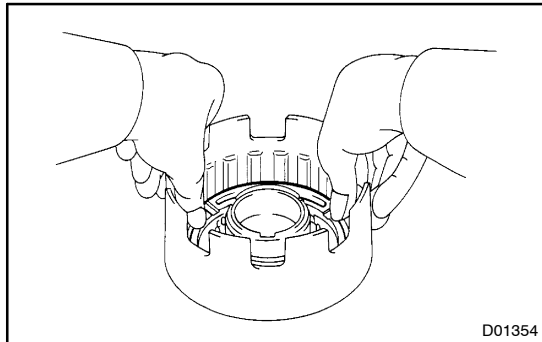
If the inside diameter is greater than the maximum, replace the clutch drum.



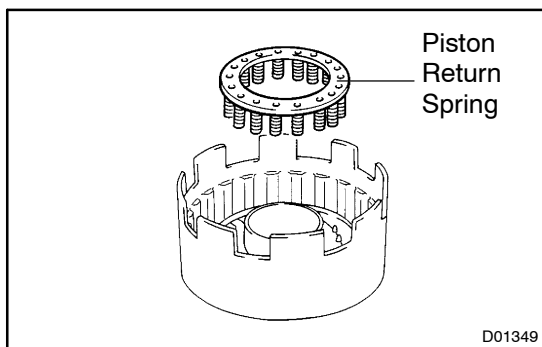
REASSEMBLY

1. INSTALL DIRECT CLUTCH PISTON TO DIRECT CLUTCH DRUM

- (a) Coat 2 new O-rings with ATF and install them in the direct clutch piston.

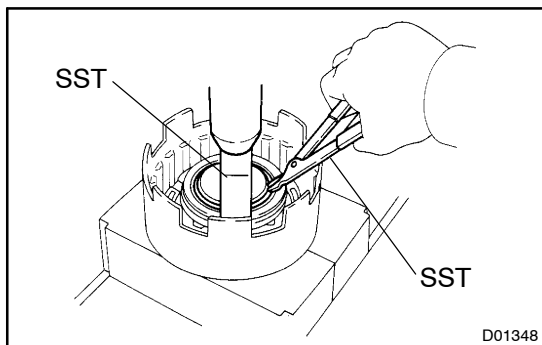


- (b) Being careful not to damage the O-rings press in the direct clutch piston into the clutch drum with both hands.



2. INSTALL PISTON RETURN SPRING

- (a) Install the piston return spring.



- (b) Place SST on the spring retainer, and compress the return spring with a press.

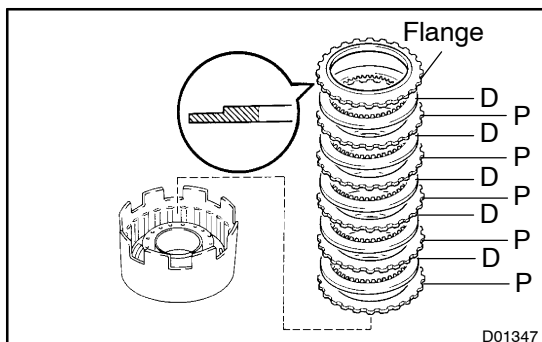
SST 09350-30020 (09350-07040)

- (c) Using SST, install the snap ring.

SST 09350-30020 (09350-07070)

NOTICE:

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



3. INSTALL PLATE, DISC AND FLANGE

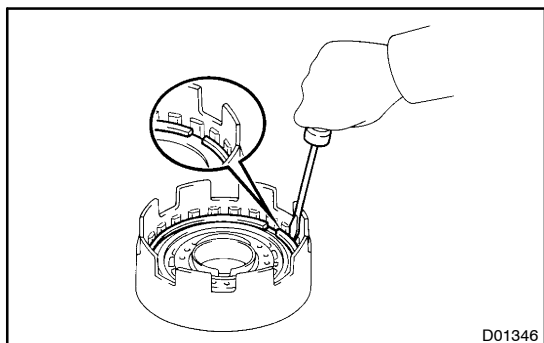
- (a) Install the cushion plate.

- (b) Install the 5 plates and 5 discs.

Install in order: P = Plate, D = Disc

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

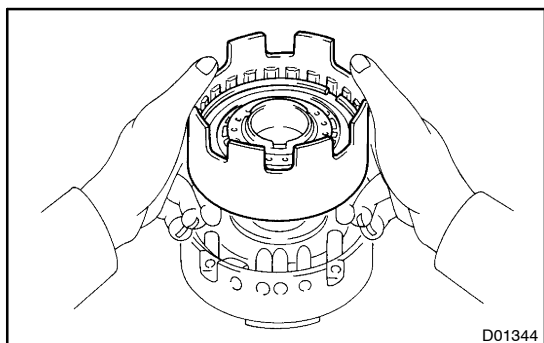
- (c) Install the flange, the flat end facing downward.



(d) Using a screwdriver, install the snap ring.

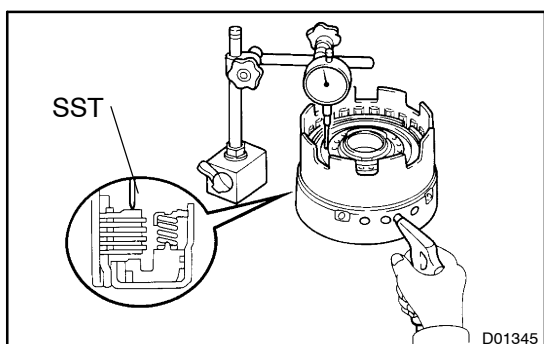
NOTICE:

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



4. CHECK PISTON STROKE OF DIRECT CLUTCH

(a) Place the direct clutch assembly onto the O/D support assembly.



(b) Using SST and a dial indicator, measure the direct clutch piston stroke while applying and releasing compressed air (186 – 206 kPa, 1.9 – 2.1 kgf/cm², 27 – 30 psi).

SST 09350-30020 (09350-06120)

Piston stroke: 0.50 – 0.80 mm (0.020 – 0.032 in.)

If the pack clearance is less than the limit of piston stroke, parts may have been assembled incorrectly, so check and reassemble again.

If the clearance is non-standard, select another flange.

HINT:

There are 10 different flanges in thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
33	3.3 (0.130)	38	3.8 (0.150)
34	3.4 (0.134)	39	3.9 (0.154)
35	3.5 (0.138)	40	4.0 (0.157)
36	3.6 (0.142)	41	4.1 (0.161)
37	3.7 (0.146)	42	4.2 (0.165)

FORWARD CLUTCH COMPONENTS

AT04V-03

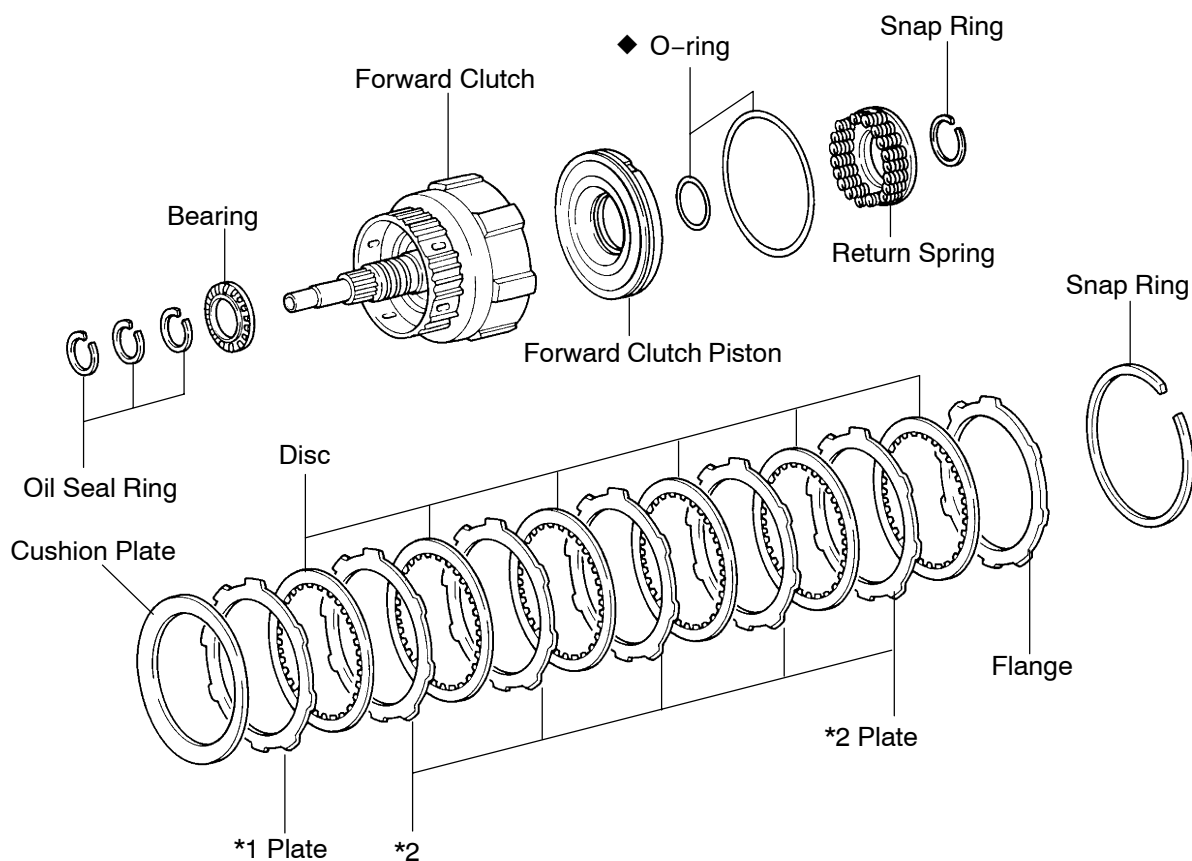


Plate thickness:

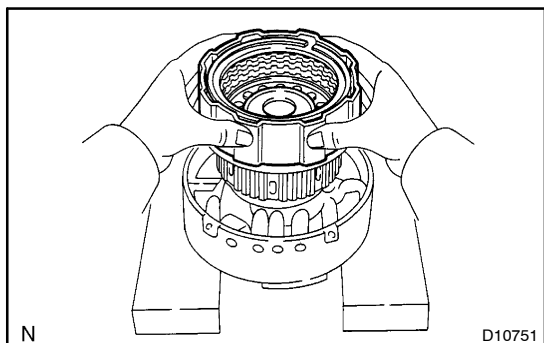
*1: 1.4 mm (0.055 in.)

*2: 1.8 mm (0.071 in.)

◆ Non-reusable part

N

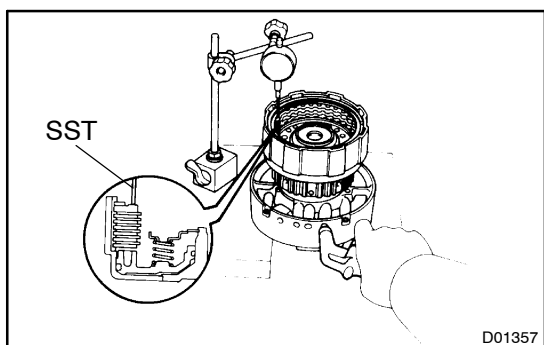
D10750



DISASSEMBLY

1. PLACE FORWARD CLUTCH INTO O/D SUPPORT

- (a) Place wooden blocks, etc, to prevent forward clutch shaft from touching the work stand, and place the O/D support on them.
- (b) Place the forward clutch into the O/D support.



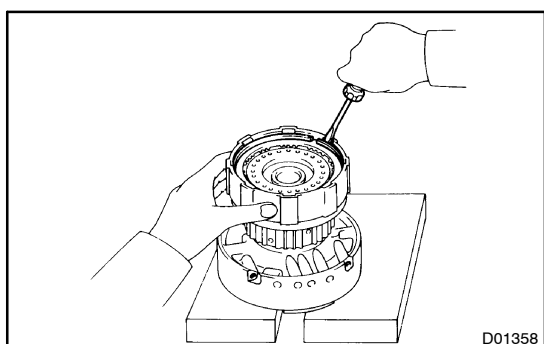
2. CHECK PISTON STROKE OF FORWARD CLUTCH

Using SST and a dial indicator, measure forward clutch piston stroke while applying and releasing compressed air (196 kPa, 2.0 kgf/cm², 28.5 psi).

SST 09350-30020 (09350-06120)

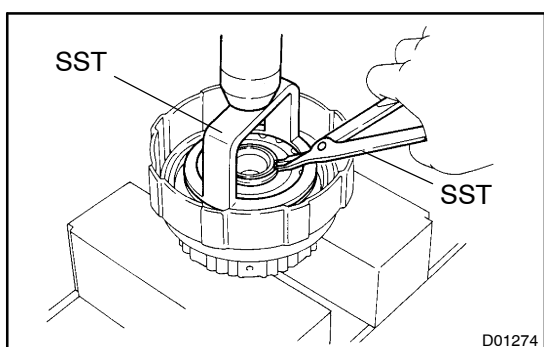
Piston stroke: 0.70 – 1.00 mm (0.028 – 0.039 in.)

If the clearance is non-standard, inspect the discs.



3. REMOVE FLANGE, PLATE AND DISC

- (a) Using a screwdriver, remove the snap ring from the forward clutch drum.
- (b) Remove the flange, 6 plates and 6 discs.
- (c) Remove the cushion plate.



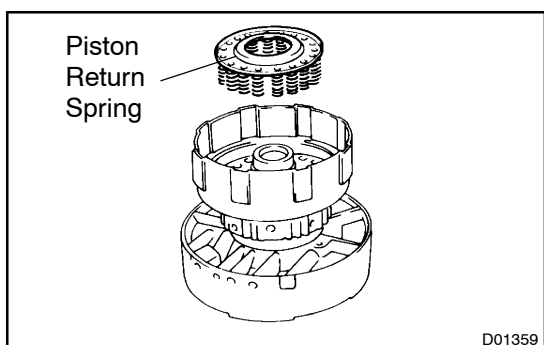
4. REMOVE PISTON RETURN SPRING

- (a) Place SST on the spring retainer and compress the return spring with a press.

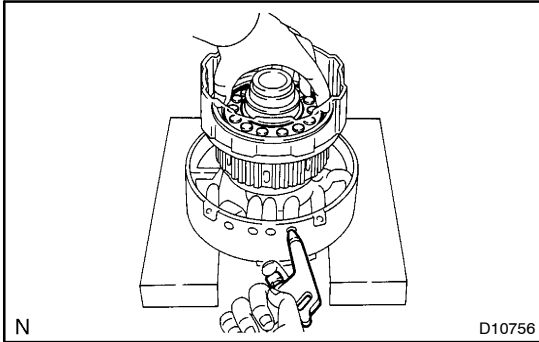
SST 09350-30020 (09350-07040)

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

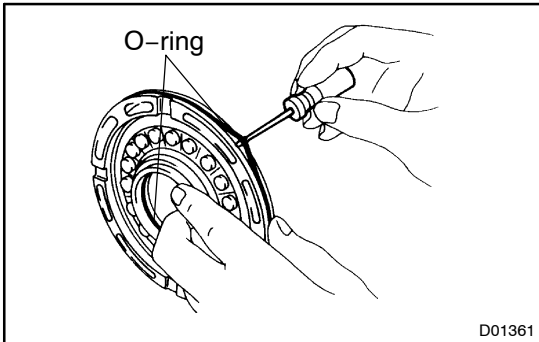
SST 09350-30020 (09350-07070)



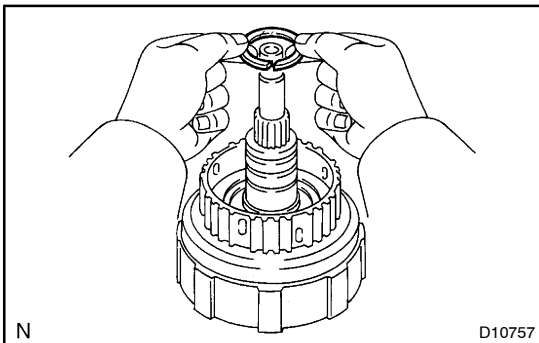
- (c) Remove the piston return spring.

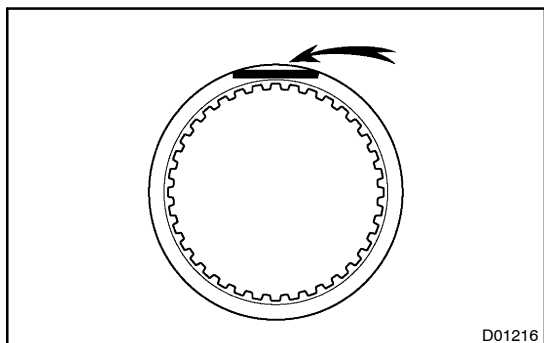
**5. REMOVE FORWARD CLUTCH PISTON**

- (a) Place the forward clutch drum onto the O/D support.
- (b) Hold the forward clutch piston with hand, apply compressed air (196 kPa, 2.0 kgf/cm², 28.5 psi) to the O/D support to remove the forward clutch piston.
- (c) Remove the forward clutch piston.

**6. REMOVE 2 O-RINGS FROM PISTON**

Using a small screwdriver, remove the 2 O-rings.

**7. REMOVE 3 OIL SEAL RINGS FROM FORWARD CLUTCH**



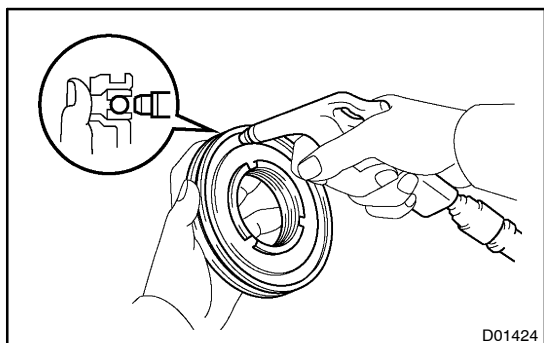
INSPECTION

1. INSPECT DISC, PLATE AND FLANGE

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

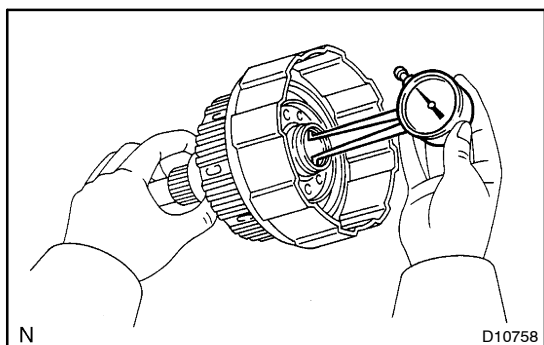
HINT:

- If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



2. CHECK FORWARD CLUTCH PISTON

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

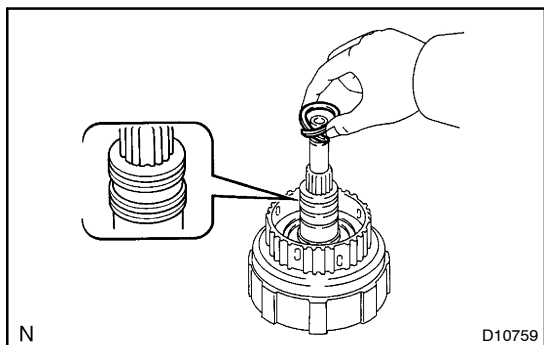


3. CHECK FORWARD CLUTCH DRUM BUSHING

Using a dial indicator, measure the inside diameter of the forward clutch drum bushing.

Maximum inside diameter: 20.08 mm (0.790 in.)

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



REASSEMBLY

1. INSTALL OIL SEAL RING

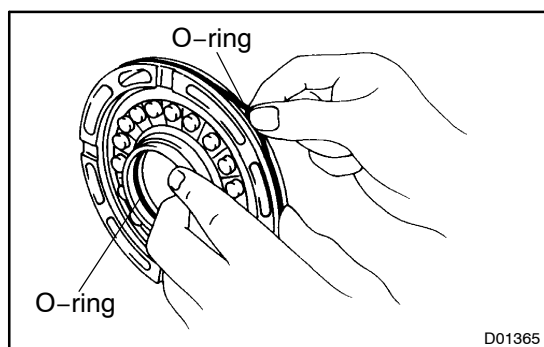
- (a) Coat the 3 oil seal rings with ATF.
- (b) Install the 3 oil seal rings to the forward clutch drum groove, then snug them down by squeezing their ends together.

NOTICE:

Do not spread the ring ends more than necessary.

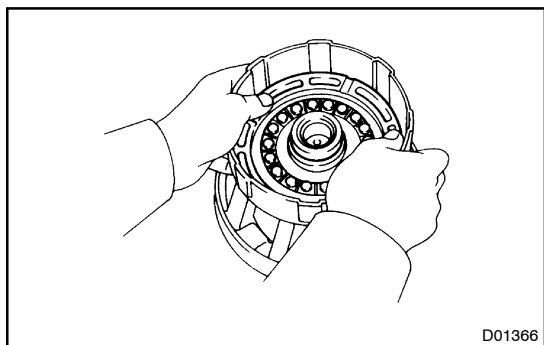
HINT:

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

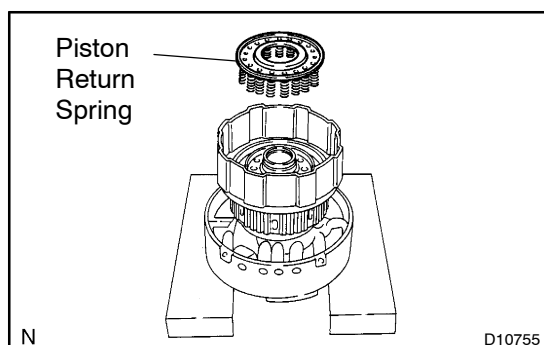


2. INSTALL FORWARD CLUTCH PISTON

- (a) Coat 2 new O-rings with ATF and install them on the forward clutch piston.

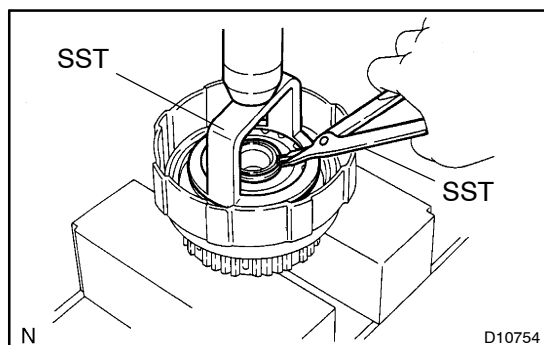


- (b) Being careful not to damage the O-rings, press the clutch piston into the forward clutch drum with both hands.



3. INSTALL PISTON RETURN SPRING

- (a) Install the piston return spring.



- (b) Place SST on the spring retainer, and compress the return spring with a press.

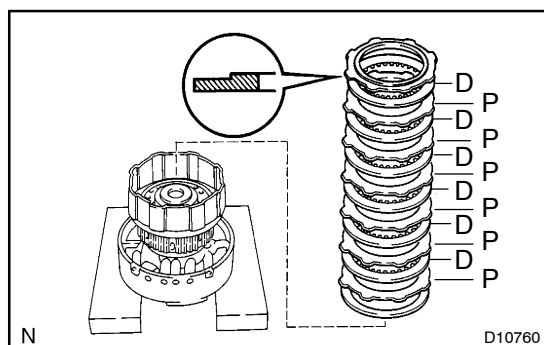
SST 09350-30020 (09350-07040)

- (c) Using SST, install the snap ring.

SST 09350-30020 (09350-07070)

NOTICE:

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



4. INSTALL PLATE, DISC AND FLANGE

- (a) Install the cushion plate.

- (b) Install the 6 plates and 6 discs.

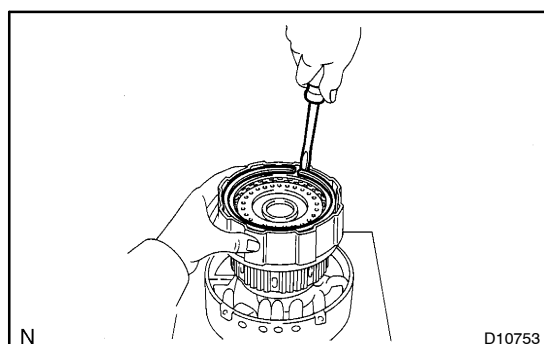
Install in order: P = Plate, D = Disc

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

HINT:

Only the thickness of the plate on the bottom is 1.4 mm (0.055 in.) and the other plates is 1.8 mm (0.071 in.).

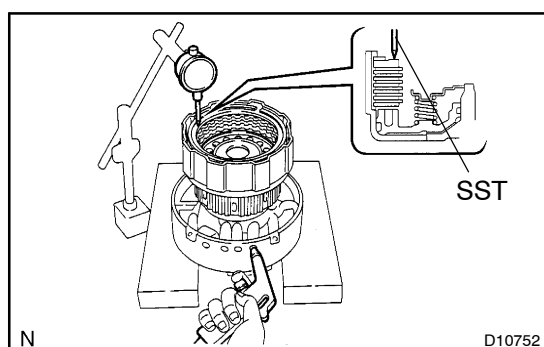
- (c) Then install the flange, with the flat end facing downward.



- (d) Install the snap ring with a screwdriver.

NOTICE:

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



5. CHECK PISTON STROKE OF FORWARD CLUTCH

- (a) Using SST and a dial indicator, measure the forward clutch piston stroke while applying and releasing compressed air (196 kPa, 2.0 kgf/cm², 28.5 psi).

SST 09350-30020 (09350-06120)

Piston stroke: 0.70 – 1.00 mm (0.028 – 0.039 in.)

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

If the clearance is non-standard, select another flange.

HINT:

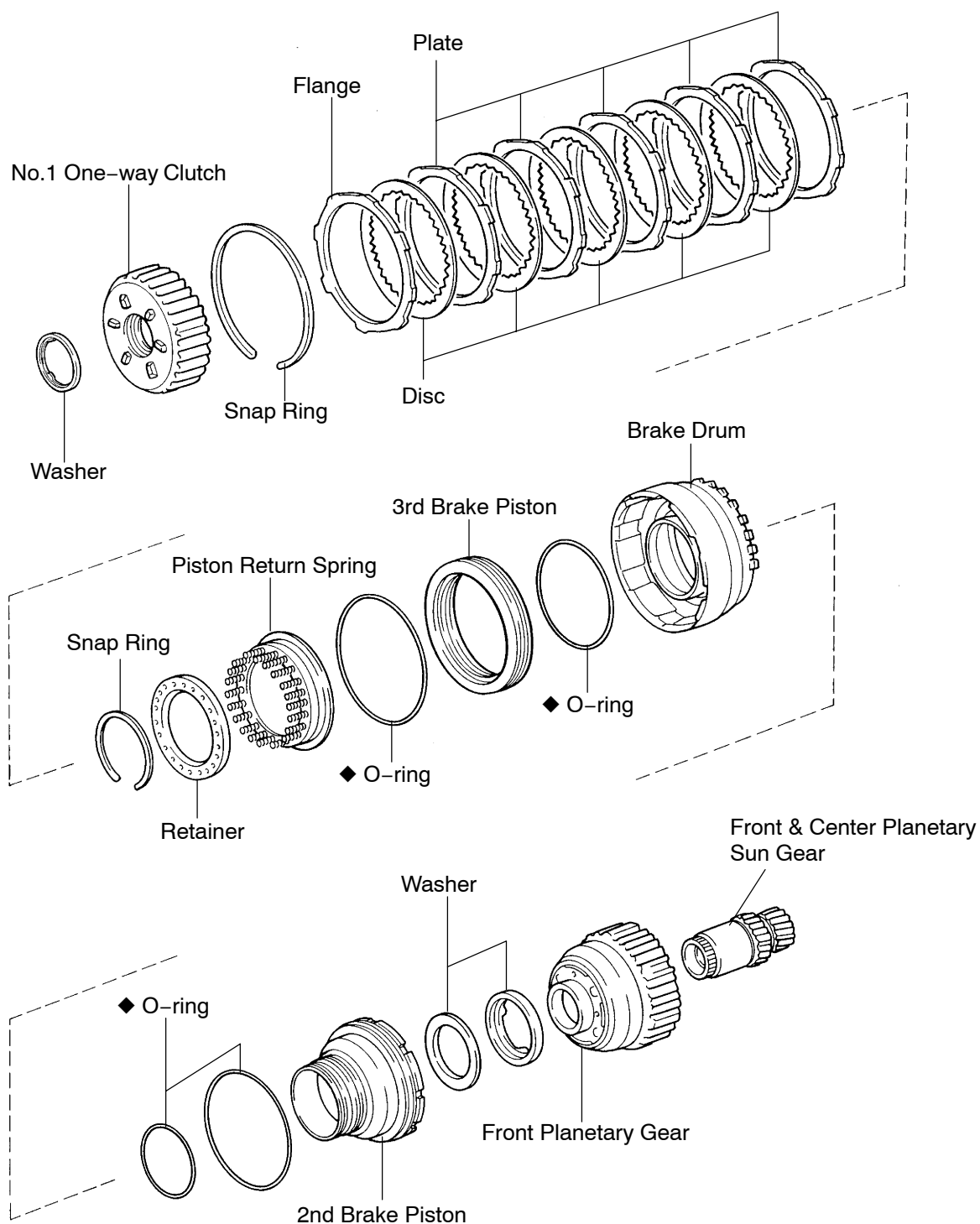
There are 6 different flanges in thickness.

Flange thickness

No.	Thickness	No.	Thickness
42	4.0 (0.157)	45	3.4 (0.134)
44	3.8 (0.150)	60	3.2 (0.126)
62	3.6 (0.142)	61	3.0 (0.118)

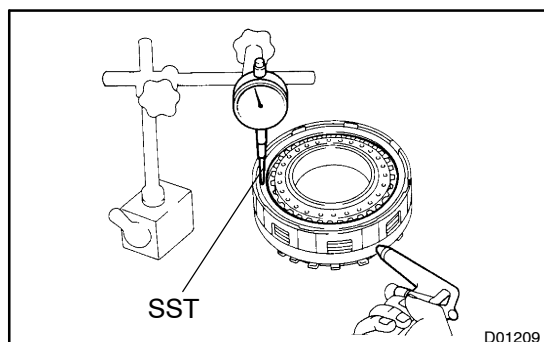
MULTIPLE DISC BRAKE COMPONENTS

AT04Z-03



◆ Non-reusable part

D01472



DISASSEMBLY

1. CHECK PISTON STROKE OF 3RD BRAKE PISTON

- (a) Using SST and a dial indicator, measure the 3rd brake piston stroke while applying and releasing compressed air (392 kPa, 4 kg/cm², 57 psi).

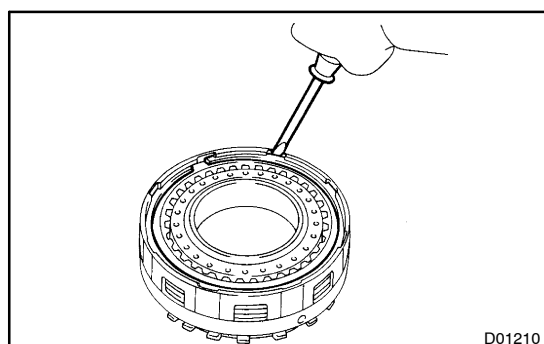
SST 09350-30020 (09350-06120)

If the stroke is non-standard, inspect the disc.

Piston stroke: 0.70 – 1.00 mm (0.028 – 0.039 in.)

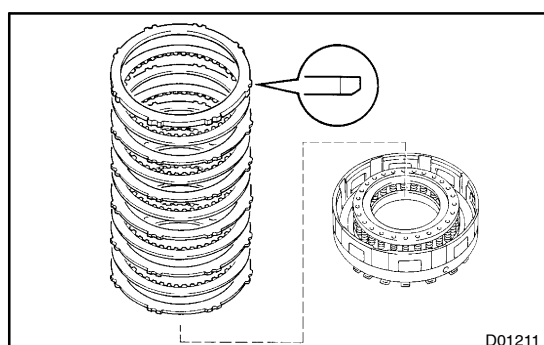
NOTICE:

Do not applying compressed air into the 2nd brake hole.

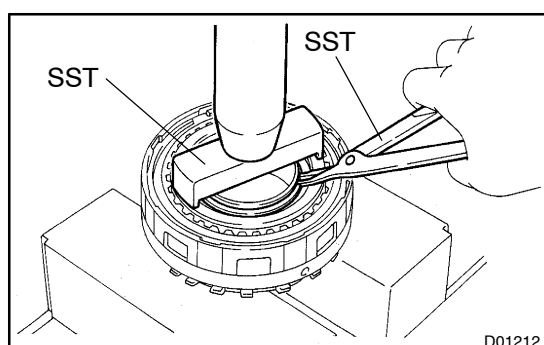


2. REMOVE FLANGE, PLATE AND DISC

- (a) Using a screwdriver, remove the snap ring from the brake drum.



- (b) Remove the flange, 5 plates and 5 discs.



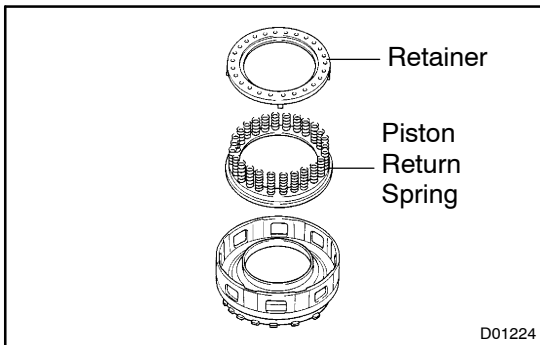
3. REMOVE PISTON RETURN SPRING

- (a) Place SST on the spring retainer and compress the return spring with a press.

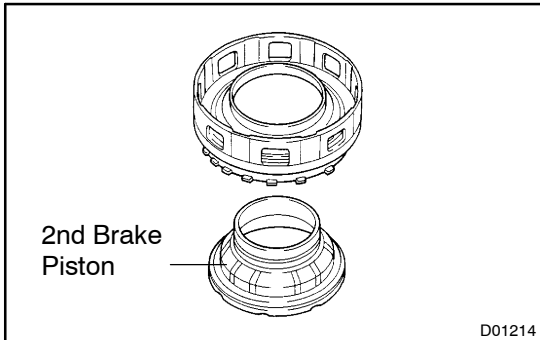
SST 09351-32014 (09350-32040)

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

SST 09350-30020 (09350-07070)

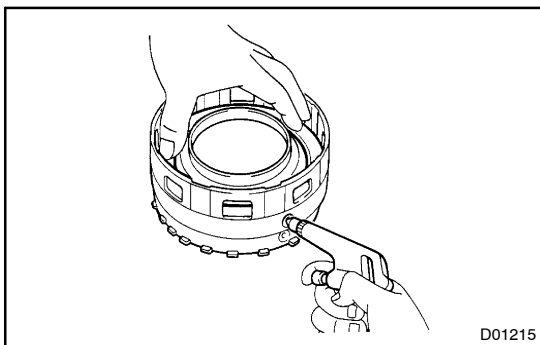


- (c) Remove the retainer and piston return spring.

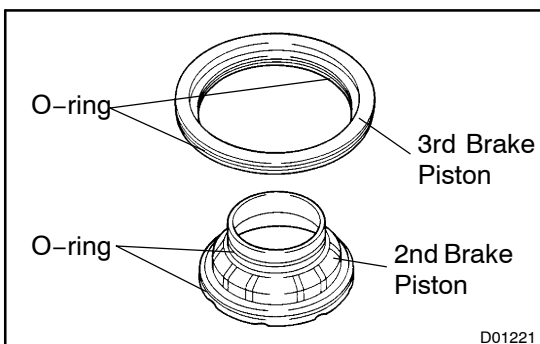


4. REMOVE 3RD AND 2ND BRAKE PISTON

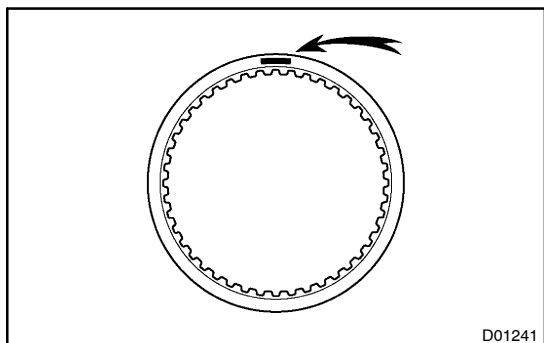
- (a) Push the 2nd brake piston down with fingers to remove.



- (b) Hold the 3rd brake piston so that it does not slant, and apply compressed air (392 kPa, 4 kg/cm², 57 psi) into the passage to remove the 3rd brake piston.



- (c) Remove the 4 O-rings from the 3rd and 2nd brake pistons.



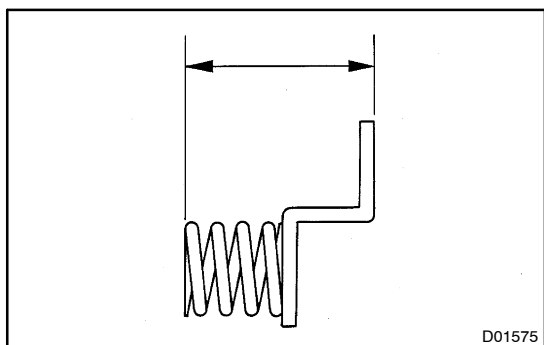
INSPECTION

1. INSPECT DISC AND FLANGE

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

HINT:

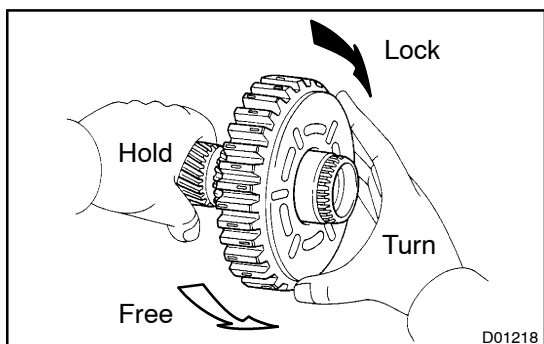
- If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



2. CHECK PISTON RETURN SPRING

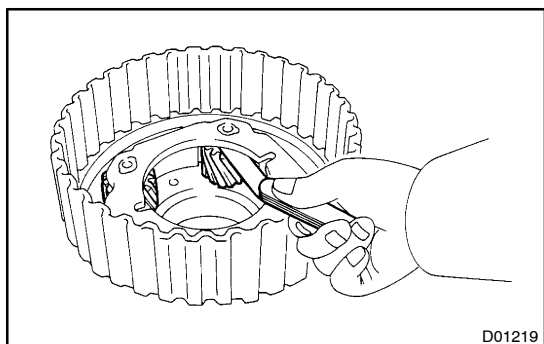
Measure the free length of the spring together with the spring seat.

Standard free length: 36.8 mm (1.449 in.)



3. CHECK OPERATION OF ONE-WAY CLUTCH

Hold the front & center planetary sun gear and turn the hub. The hub must be able to turn freely clockwise and locks counter-clockwise.



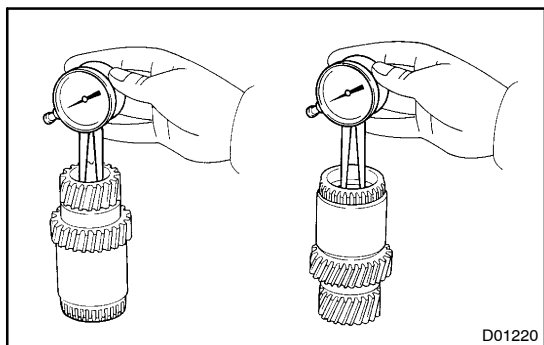
4. MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.6 mm (0.008 – 0.024 in.)

Maximum clearance: 1.0 mm (0.039 in.)

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

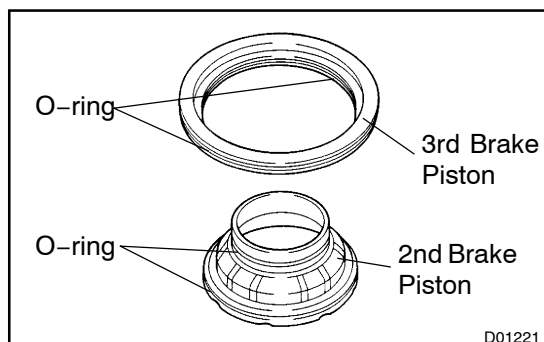


5. CHECK FRONT & CENTER PLANETARY SUN GEAR BUSHING

Using a dial indicator, measure the inside diameter of the planetary sun gear bushing.

Maximum inside diameter: 24.79 mm (0.976 in.)

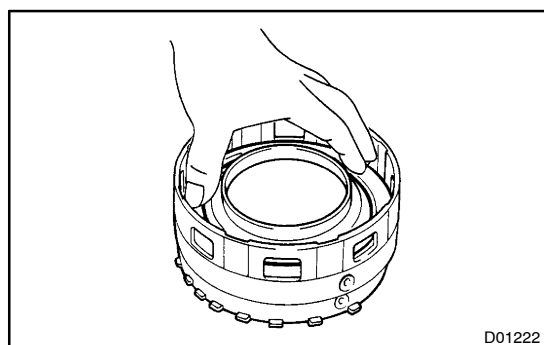
If the inside diameter is greater than the maximum, replace the planetary sun gear.



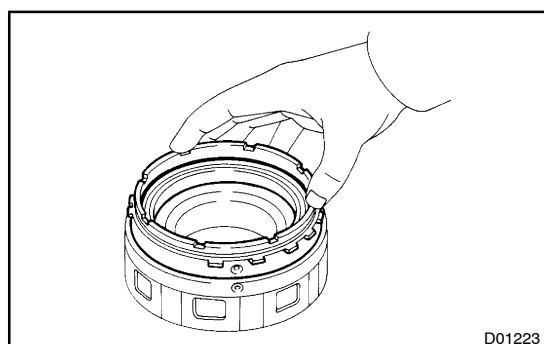
REASSEMBLY

1. INSTALL 3RD & 2ND PISTON

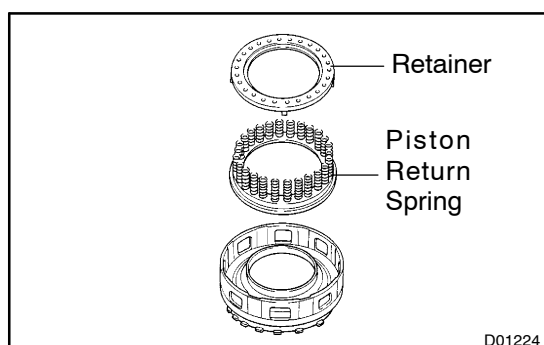
- (a) Coat 4 new O-rings with ATF and install them on 3rd and 2nd brake pistons.



- (b) Being careful not to damage the O-rings, press the 3rd brake piston into the brake drum with both hands.

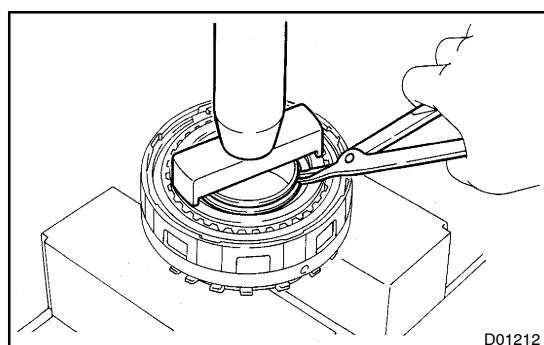


- (c) Being careful not to damage the O-rings, press the 2nd brake piston into the brake drum with both hands.



2. INSTALL PISTON RETURN SPRING

- (a) Install the piston return spring.
- (b) Install the piston retainer.



- (c) Place SST on the spring retainer, and compress the return spring with a press.

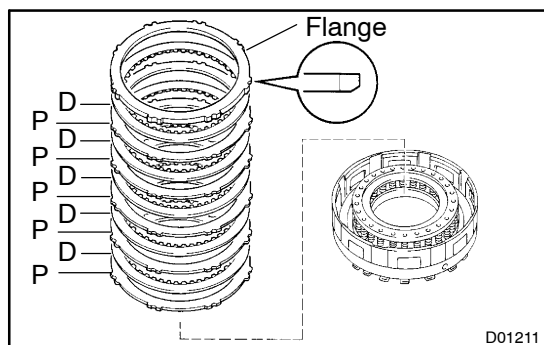
SST 09350-32014 (09350-32040)

- (d) Using SST, install the snap ring.

SST 09350-30020 (09350-07070)

NOTICE:

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



3. INSTALL PLATE, DISC AND FLANGE

- (a) Install the 5 plates and 5 discs.

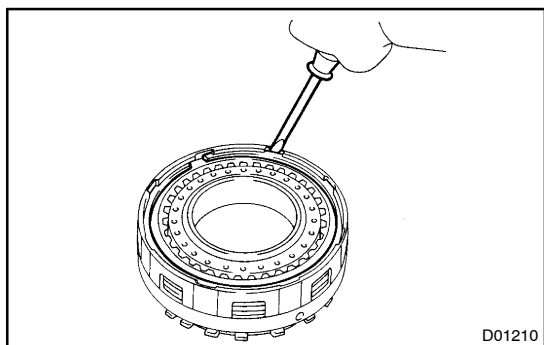
Install in order: P = Plate, D = Disc

P – D – P – D – P – D – P – D – P – D

- (b) Install the flange, with the Facing its bevelled part downward.

HINT:

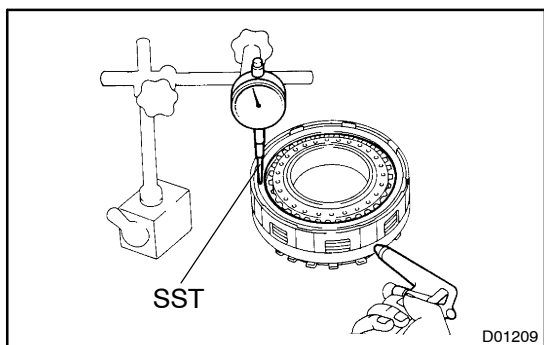
Assemble the flange to the brake drum with facing a carved mark on the flange upward.



- (c) Using a screwdriver, install the snap ring.

NOTICE:

Be sure the end gap of the snap ring is not aligned with cutout portion of the brake drum.



4. CHECK PISTON STROKE OF 3RD BRAKE PISTON

Using SST and a dial indicator, measure the 3rd piston stroke while applying and releasing compressed air (392 kPa, 4 kgf/cm², 57 psi).

SST 09350-30020 (09350-06120)

Piston stroke:

0.70 – 1.00 mm (0.028 – 0.039 in.)

NOTICE:

Do not applying compressed air into the 2nd brake piston hole.

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

If the clearance is non-standard, select another flange.

HINT:

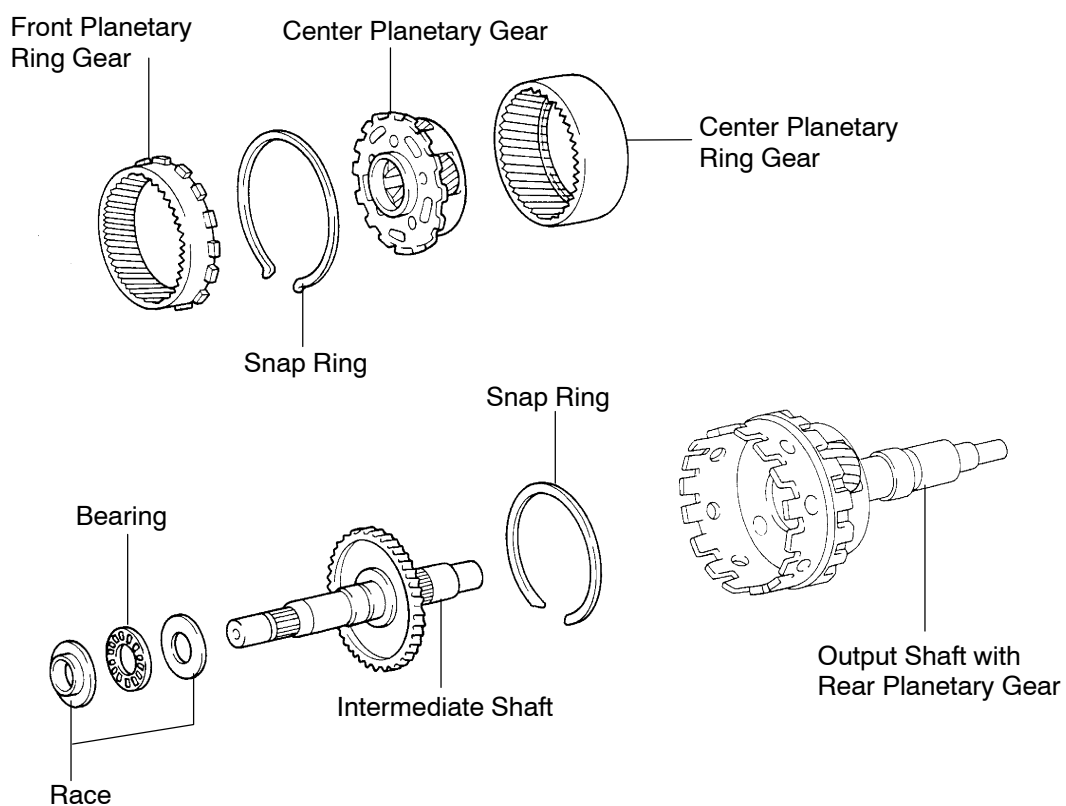
There are 6 different flanges in thickness.

Flange thickness: mm (in.)

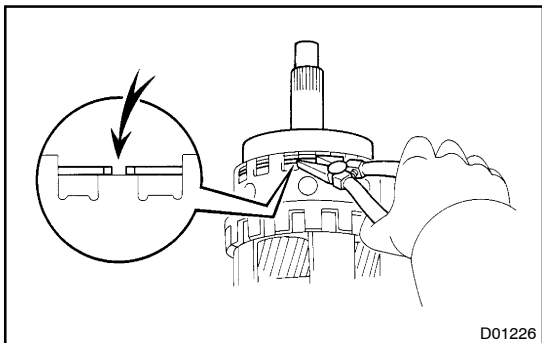
No.	Thickness	No.	Thickness
36	3.6 (0.142)	39	3.9 (0.154)
37	3.7 (0.146)	40	4.0 (0.157)
38	3.8 (0.150)	41	4.1 (0.161)

CENTER PLANETARY GEAR COMPONENTS

AT053-02



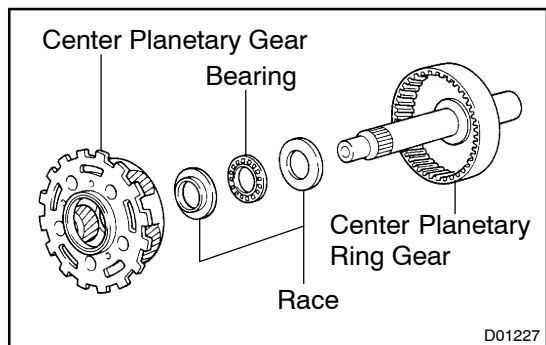
D01473



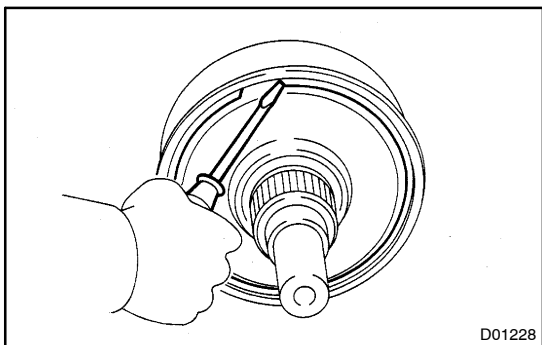
DISASSEMBLY

1. REMOVE CENTER PLANETARY GEAR

- (a) Using a needle nose plier, nip the snap ring to remove the front planetary ring gear.

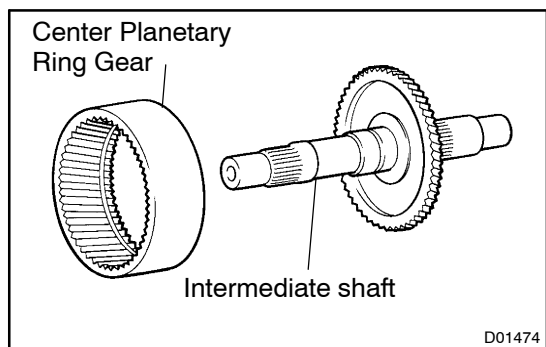


- (b) Remove the center planetary gear, bearing and 2 races from center planetary ring gear.

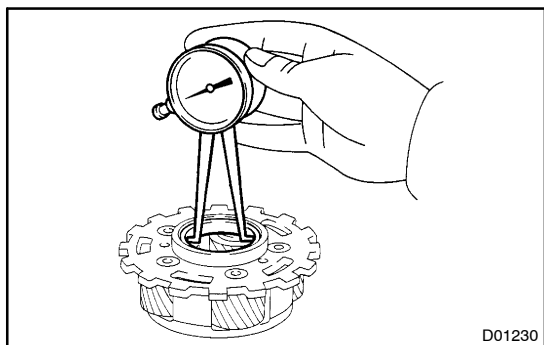


2. REMOVE CENTER PLANETARY RING GEAR

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



- (b) Remove the center planetary ring gear from the intermediate shaft.



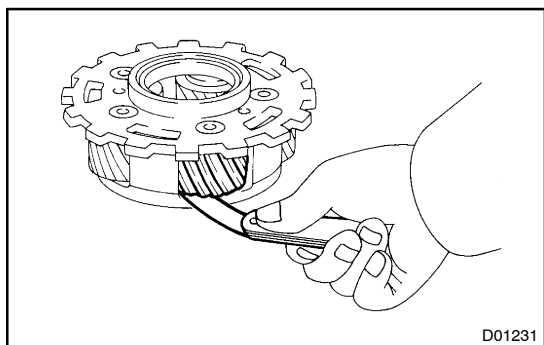
INSPECTION

1. CHECK CENTER PLANETARY GEAR BUSHING

Using a dial indicator, measure the inside diameter of the planetary gear bushing

Maximum inside diameter: 41.31 mm (1.626 in.)

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



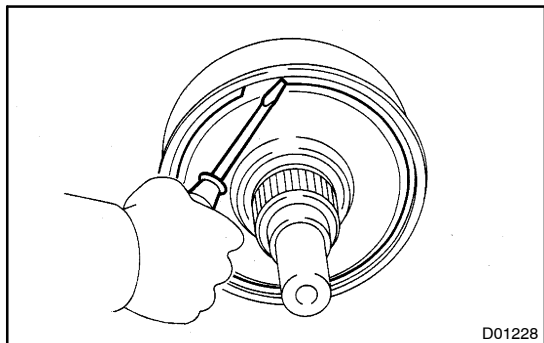
2. MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.6 mm (0.008 – 0.024 in.)

Maximum clearance: 1.0 mm (0.039 in.)

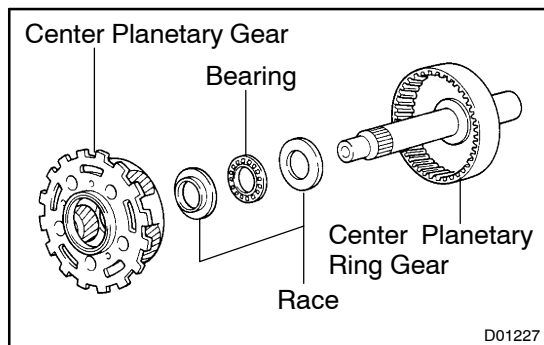
If the clearance is greater than the maximum, replace the planetary gear assembly.



REASSEMBLY

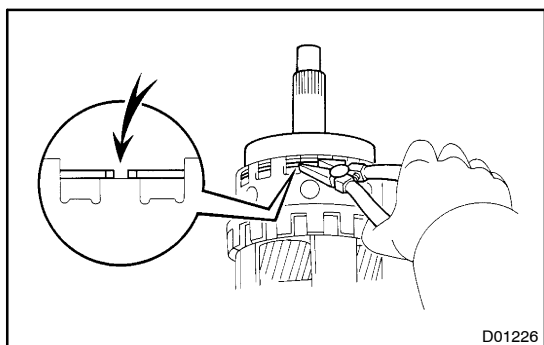
1. INSTALL CENTER PLANETARY RING GEAR

- (a) Install the center planetary ring gear to the intermediate shaft.
- (b) Using a screwdriver, install the snap ring.



2. INSTALL CENTER PLANETARY GEAR

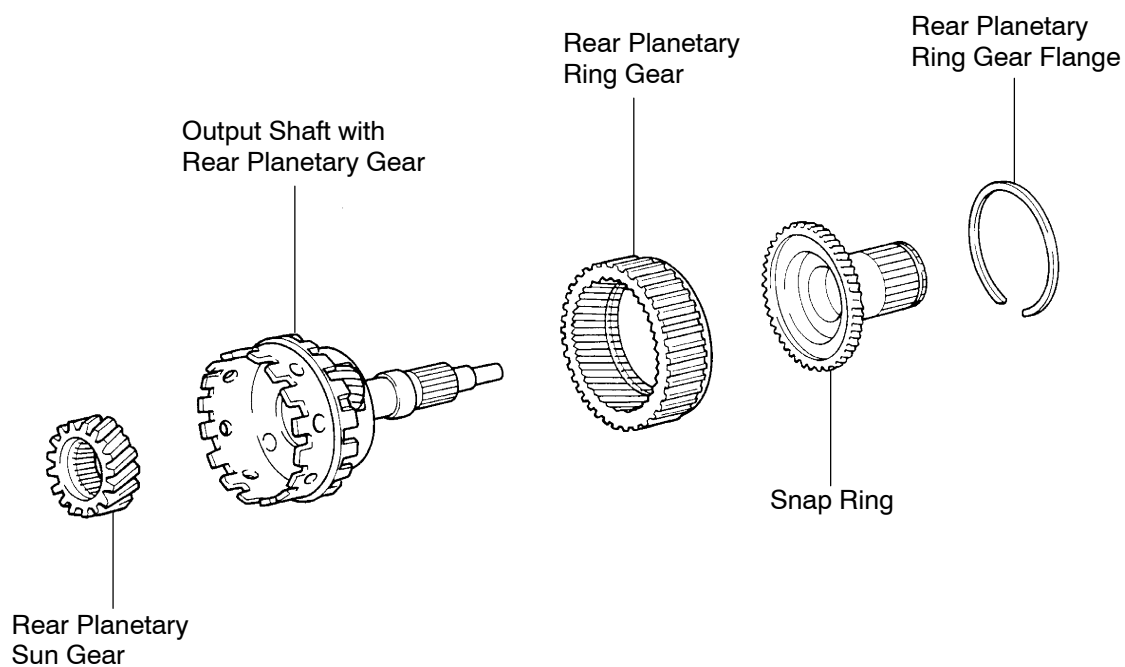
- (a) Install the bearing and 2 races to the center planetary ring gear.
- (b) Install the center planetary gear.



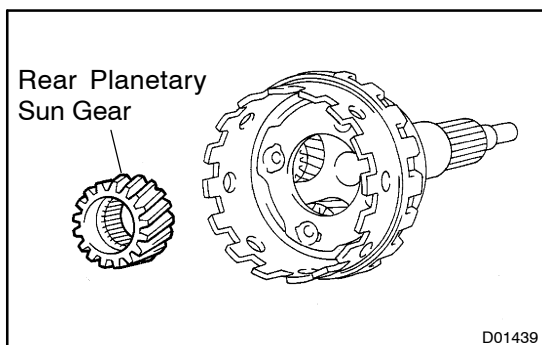
- (c) Assemble the snap ring to the front planetary ring gear. Nip the both ends of snap ring using needle nose pliers and install them to the output shaft with rear planetary gear so that the end gap of the snap ring comes on the indented part of the output shaft with rear planetary gear.

REAR PLANETARY GEAR COMPONENTS

AT057-02

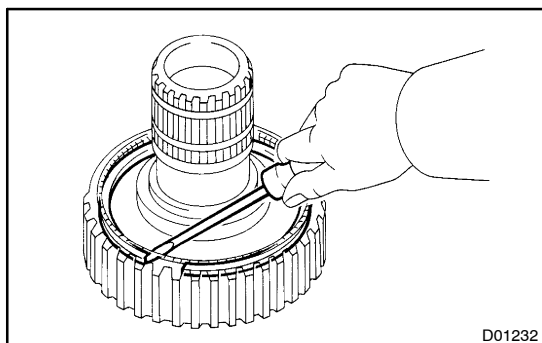


D01475



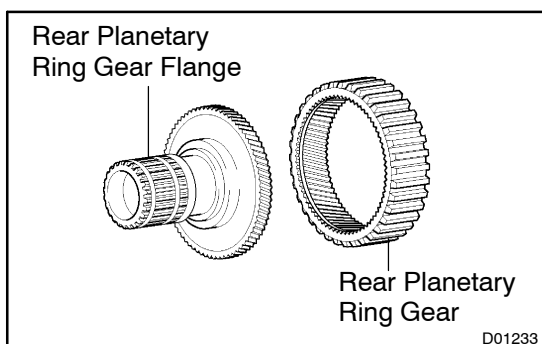
DISASSEMBLY

1. REMOVE REAR PLANETARY SUN GEAR

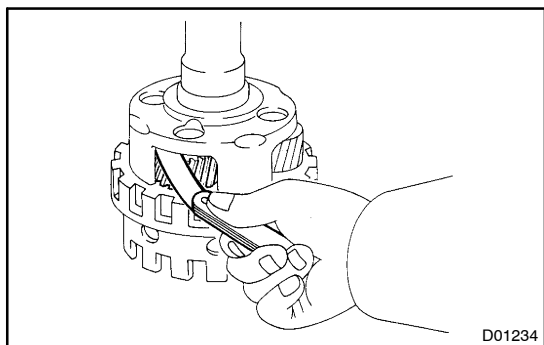


2. REMOVE REAR PLANETARY RING GEAR FLANGE

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



(b) Remove the rear planetary ring gear flange from the rear planetary ring gear.



INSPECTION

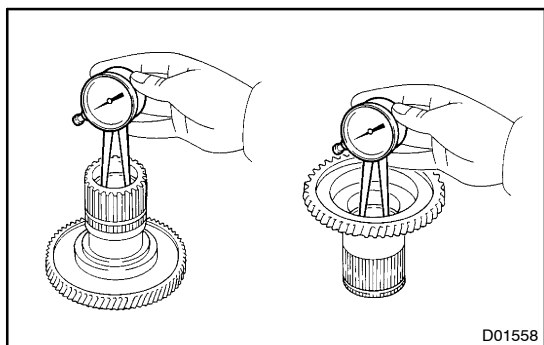
1. MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.6 mm (0.008 – 0.024 in.)

Maximum clearance: 1.0 mm (0.039 in.)

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

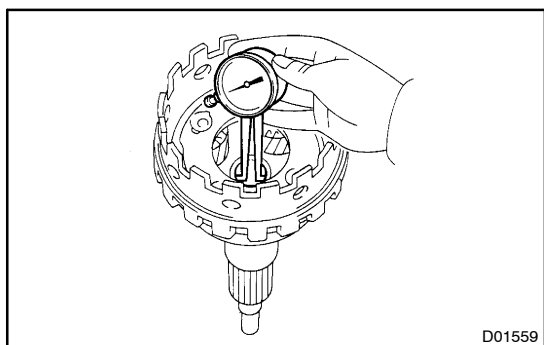


2. CHECK REAR PLANETARY RING GEAR BUSHING

Using a dial indicator, measure the inside diameter of the rear planetary ring gear bushing.

Maximum inside diameter: 38.56 mm (1.518 in.)

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

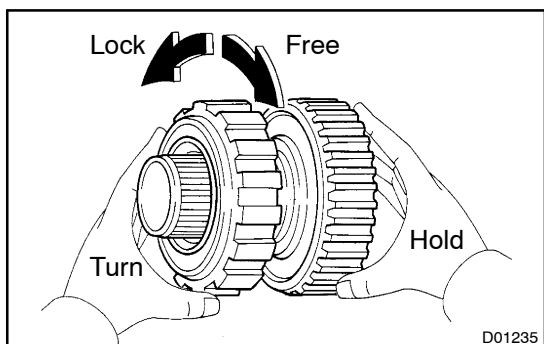


3. CHECK OUTPUT SHAFT BUSHING

Using a dial indicator, measure the inside diameter of the output shaft bushing.

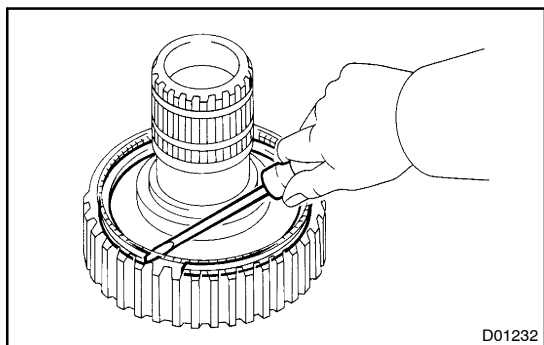
Maximum inside diameter: 20.08 mm (0.791 in.)

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



4. CHECK OPERATION ONE-WAY CLUTCH

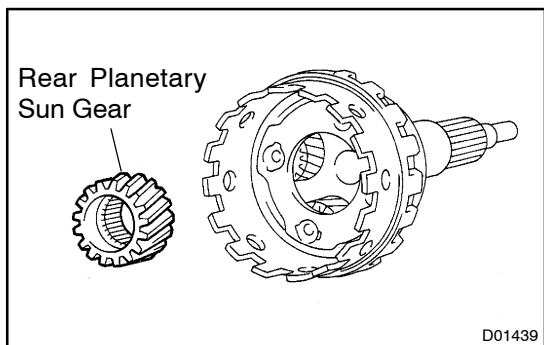
- Install the No.2 one-way clutch to rear planetary ring gear.
- Hold the rear planetary ring gear and turn the one-way clutch.
- The one-way clutch turns freely clockwise and locks counterclockwise.
- Remove the No.2 one-way clutch from rear planetary ring gear.



REASSEMBLY

1. INSTALL RING GEAR FLANGE

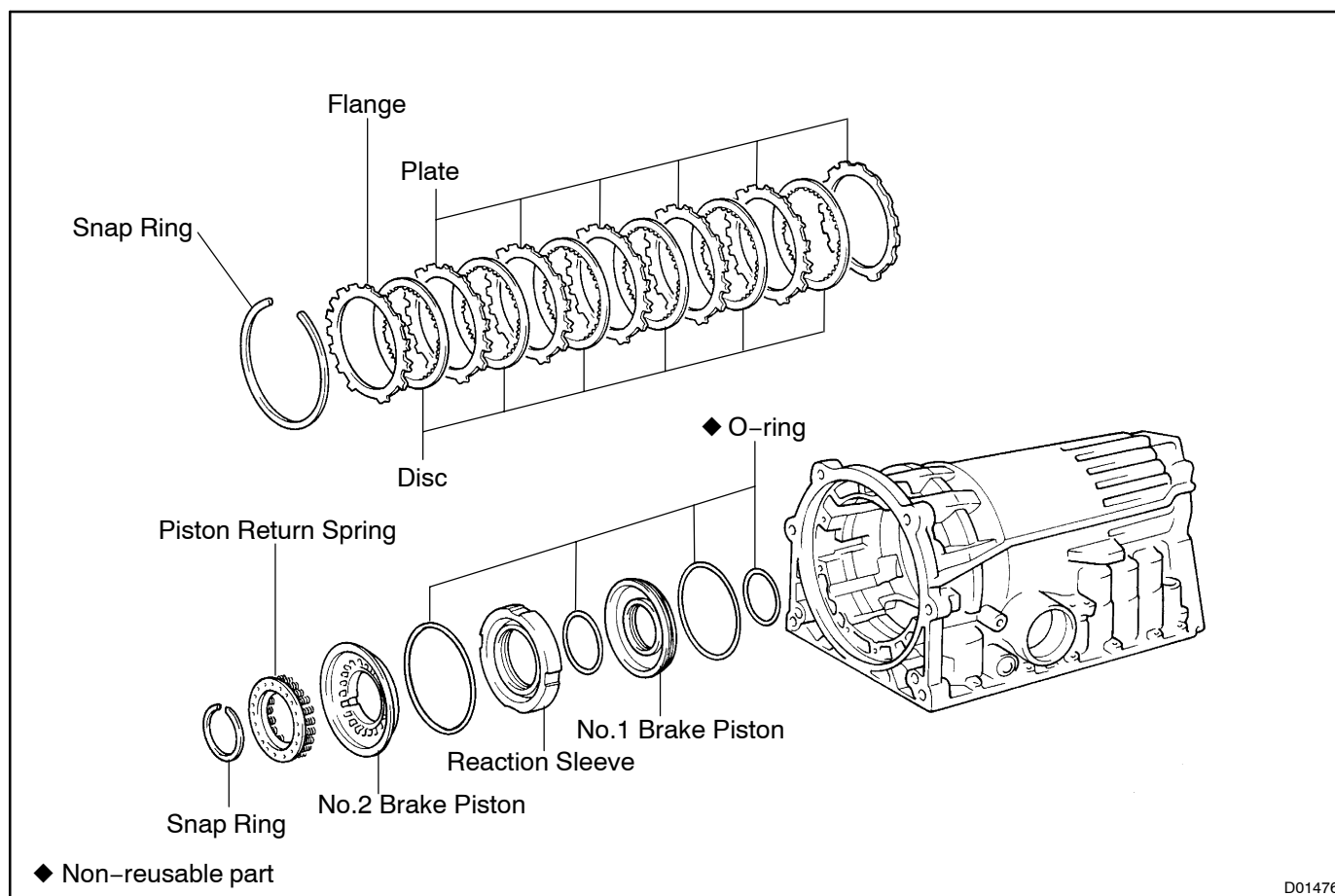
- (a) Install the ring gear flange to the rear planetary ring gear.
- (b) Using a screwdriver, install the snap ring.



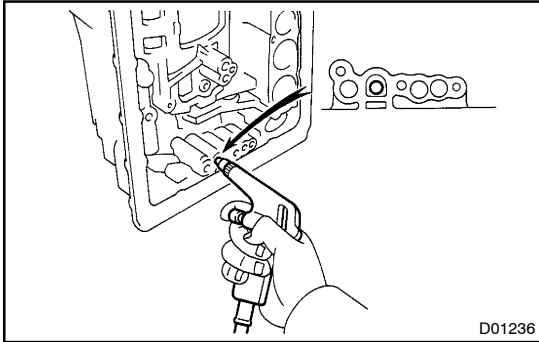
2. INSTALL REAR PLANETARY SUN GEAR

FIRST AND REVERSE BRAKE COMPONENTS

AT05B-03



D01476

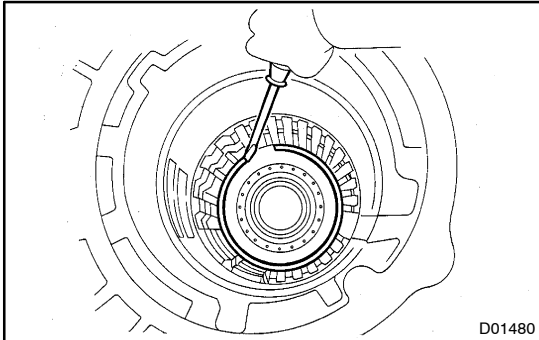


DISASSEMBLY

1. CHECK PACK CLEARANCE OF 1ST & REVERSE BRAKE

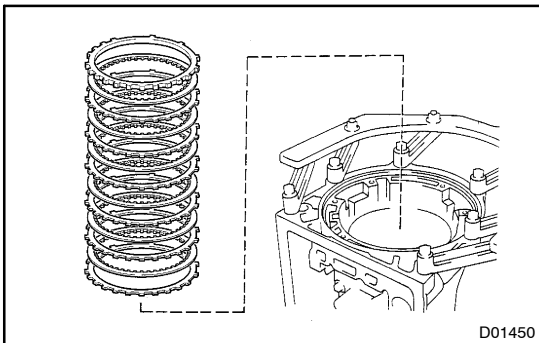
Using feeler gauge, measure 1st & reverse brake pack clearance between the snap ring and the flange.

Pack clearance: 0.60 – 0.90 mm (0.024 – 0.035 in.)

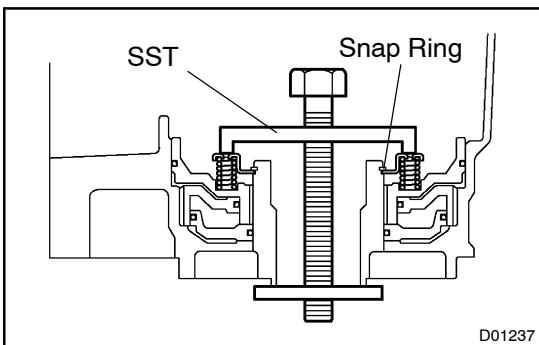


2. REMOVE DISC, PLATE AND FLANGE

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



(b) Remove the flange, 6 discs and 6 plates.



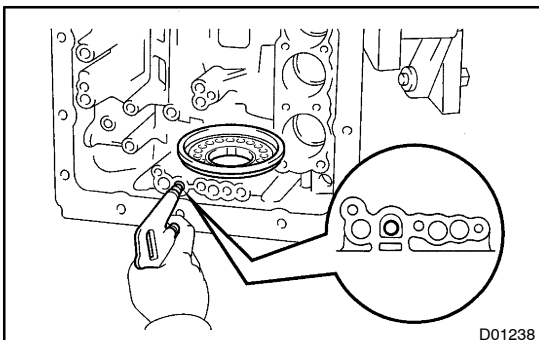
3. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the return spring.

SST 09350-30020 (09350-07050)

(b) Using SST, remove the snap ring and return spring.

SST 09350-30020 (09350-07070)



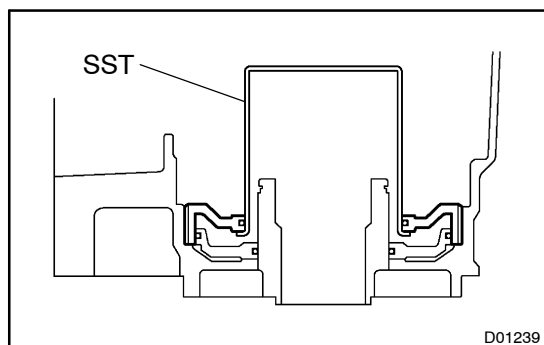
4. REMOVE NO.2 BRAKE PISTON

(a) Hold No.2 brake piston by hand, apply compressed air (392 kPa, 4 kgf/cm², 57 psi) to transmission case to remove No.2 brake piston.

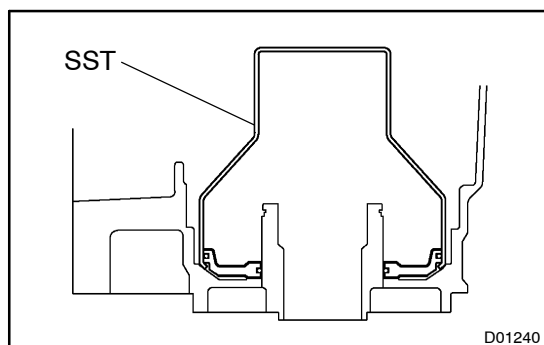
HINT:

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

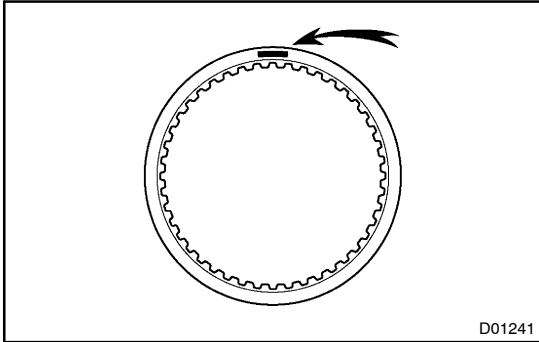
(b) Remove the O-ring from No.2 brake piston.

**5. REMOVE REACTION SLEEVE**

- (a) Using SST, remove the reaction sleeve.
SST 09350-30020 (09350-07080)
- (b) Remove the O-ring from the reaction sleeve.

**6. REMOVE NO.1 BRAKE PISTON**

- (a) Using SST, remove the No.1 brake piston.
SST 09350-30020 (09350-07090)
- (b) Remove the 2 O-rings from the No.1 piston.



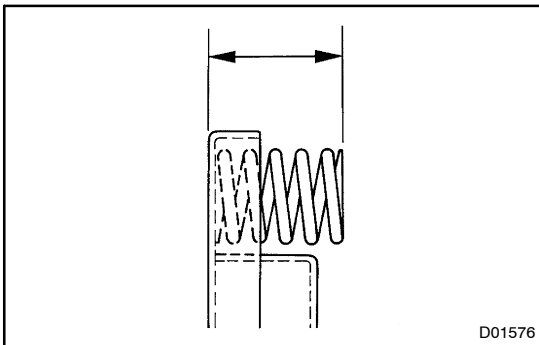
INSPECTION

1. CHECK DISC, PLATE AND FLANGE

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

HINT:

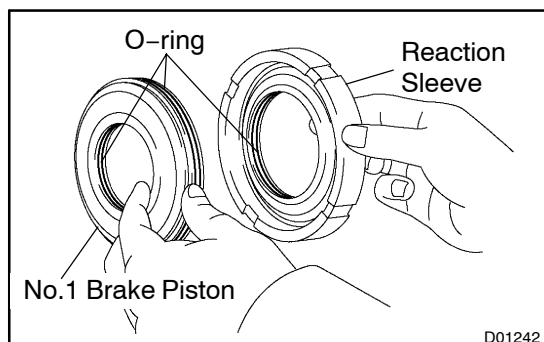
- If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



2. CHECK PISTON RETURN SPRING

Measure the free length of the spring together with the spring seat.

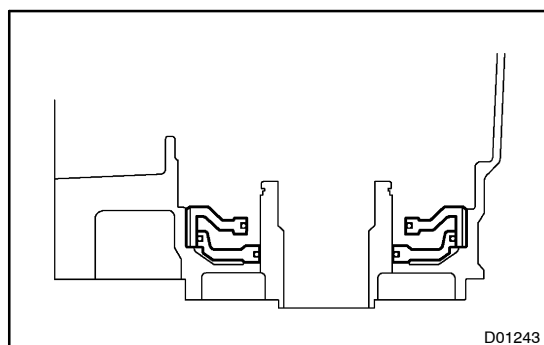
Standard free length: 20.0 mm (0.787 in.)



REASSEMBLY

1. INSTALL NO.1 BRAKE PISTON

- Coat 3 new O-rings with ATF.
- Install the 2 O-rings on No.1 brake piston.
- Install the O-ring on the reaction sleeve.
- Install the No.1 brake piston to the reaction sleeve.

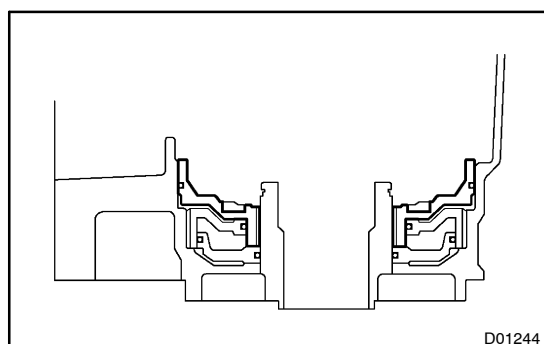


2. INSTALL REACTION SLEEVE AND NO.1 BRAKE PISTON TO TRANSMISSION CASE

With the No.1 brake piston underneath (the rear side), install the brake reaction sleeve and No.1 brake piston to the transmission case.

NOTICE:

Be careful not to damage the O-rings.

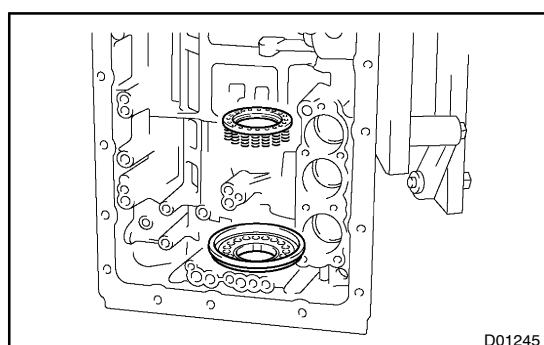


3. INSTALL NO.2 BRAKE PISTON

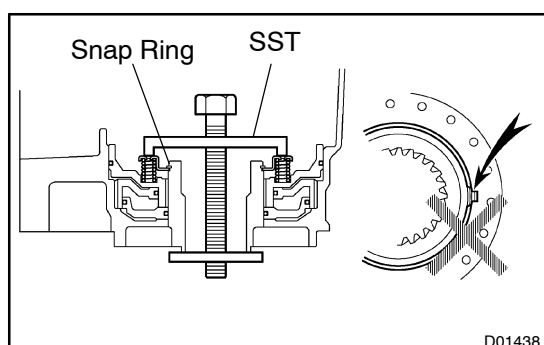
- Coat new O-ring with ATF.
- Install the O-ring on No.2 brake piston.
- With the spring seat of the piston upwards (the front side), place the piston in the transmission case.

NOTICE:

Be careful not to damage the O-ring.

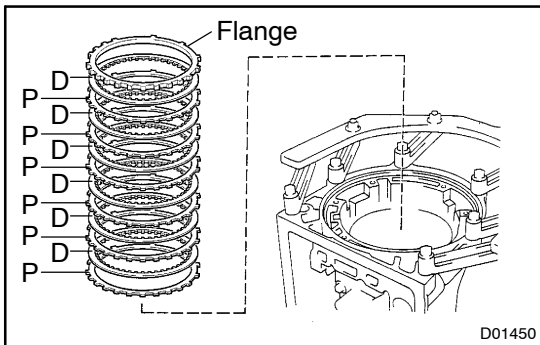


- Place the piston return spring onto the No.2 brake piston.



4. INSTALL PISTON RETURN SPRING

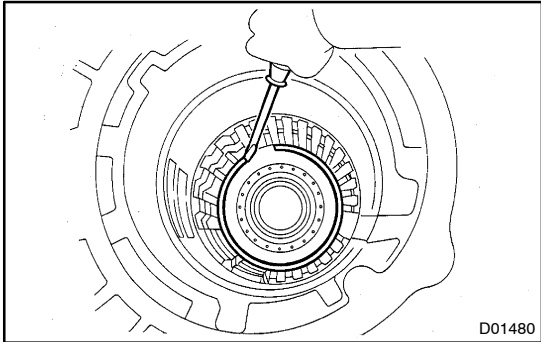
- Place SST on the spring retainer and compress the return spring.
SST 09350-30020 (09350-07050)
- Using SST, install the snap ring.
SST 09350-30020 (09350-07070)

**5. INSTALL PLATE, DISC AND FLANGE**

- (a) Install the 6 plates, 6 discs and flange.

Install in order: P = Plate, D = Disc

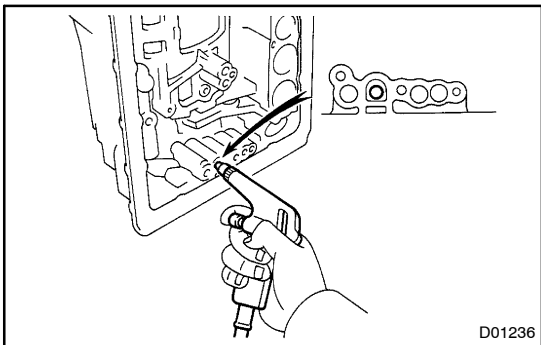
P – D – P – D – P – D – P – D – P – D – P – D



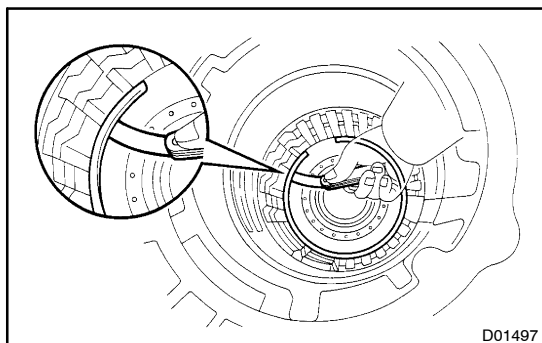
- (b) Using a screwdriver, install the snap ring.

NOTICE:

Be sure the end gap of the snap ring is not aligned with the cutout portion of the case.

**6. CHECK PACK OPERATION OF 1ST & REVERSE BRAKE**

- (a) Make sure the 1st & reverse brake pistons move smoothly when applying and releasing the compressed air (392 kPa, 4 kgf/cm², 57 psi) into the transmission case.



D01497

- (b) Using feeler gauge, measure 1st & reverse brake pack clearance between the snap ring and the flange.

Pack clearance: 0.60 – 0.90 mm (0.024 – 0.035 in.)

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

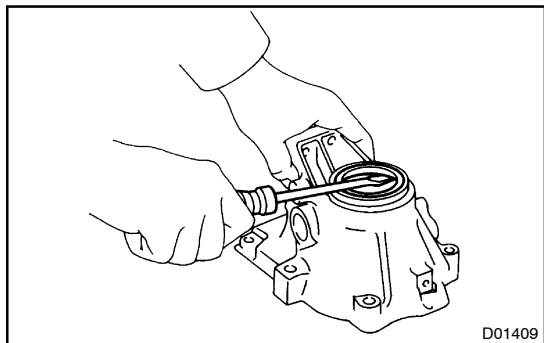
If the stroke is non-standard, select another plate.

HINT:

There are 13 different plates in thickness for the bottom plate. For the other plates, the thickness is 1.8 mm (0.071 in.).

Plate thickness: mm (in.)

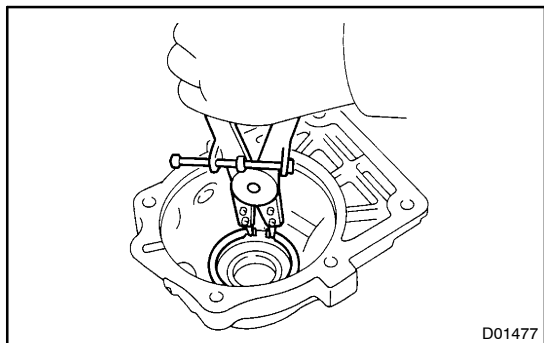
No.	Thickness	No.	Thickness
01	1.8 (0.071)	08	2.5 (0.098)
02	1.9 (0.075)	09	2.6 (0.102)
03	2.0 (0.079)	10	2.7 (0.106)
04	2.1 (0.083)	11	2.8 (0.110)
05	2.2 (0.087)	12	2.9 (0.114)
06	2.3 (0.090)	13	3.0 (0.118)
07	2.4 (0.094)	–	–



EXTENSION HOUSING DISASSEMBLY

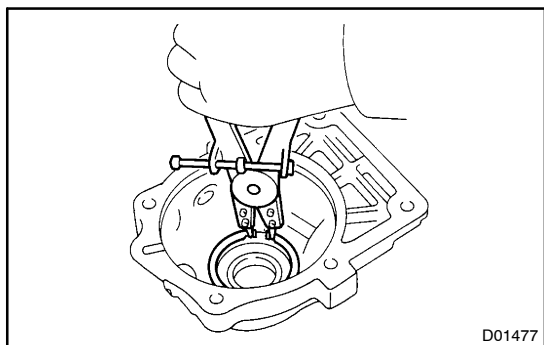
1. REMOVE OIL SEAL EXTENSION HOUSING

Using a screwdriver, remove the oil seal.



2. REMOVE EXTENSION HOUSING BEARING

- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove the bearing from the extension housing.

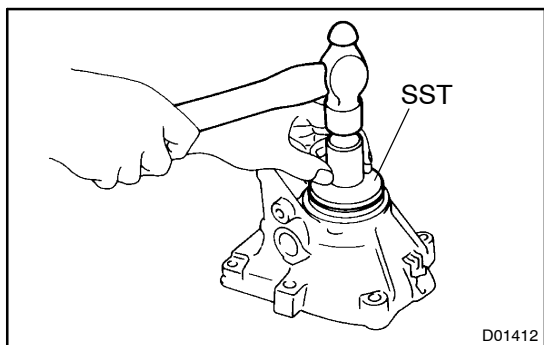


D01477

REASSEMBLY

1. INSTALL EXTENSION HOUSING BEARING

- (a) Install the bearing to the extension housing.
- (b) Using snap ring pliers, install the snap ring.



D01412

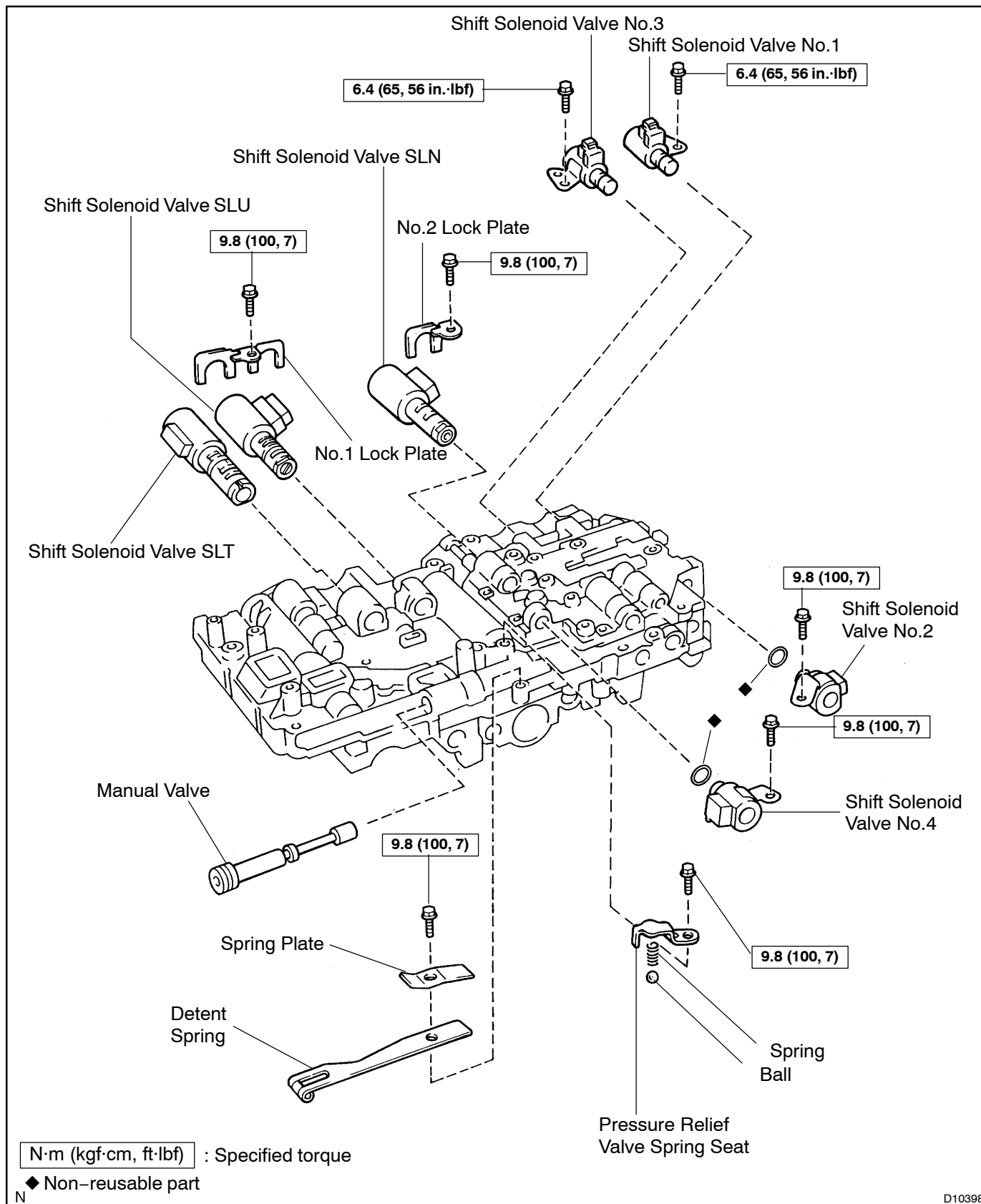
2. INSTALL OIL SEAL TO EXTENSION HOUSING

Using SST, install the new oil seal.

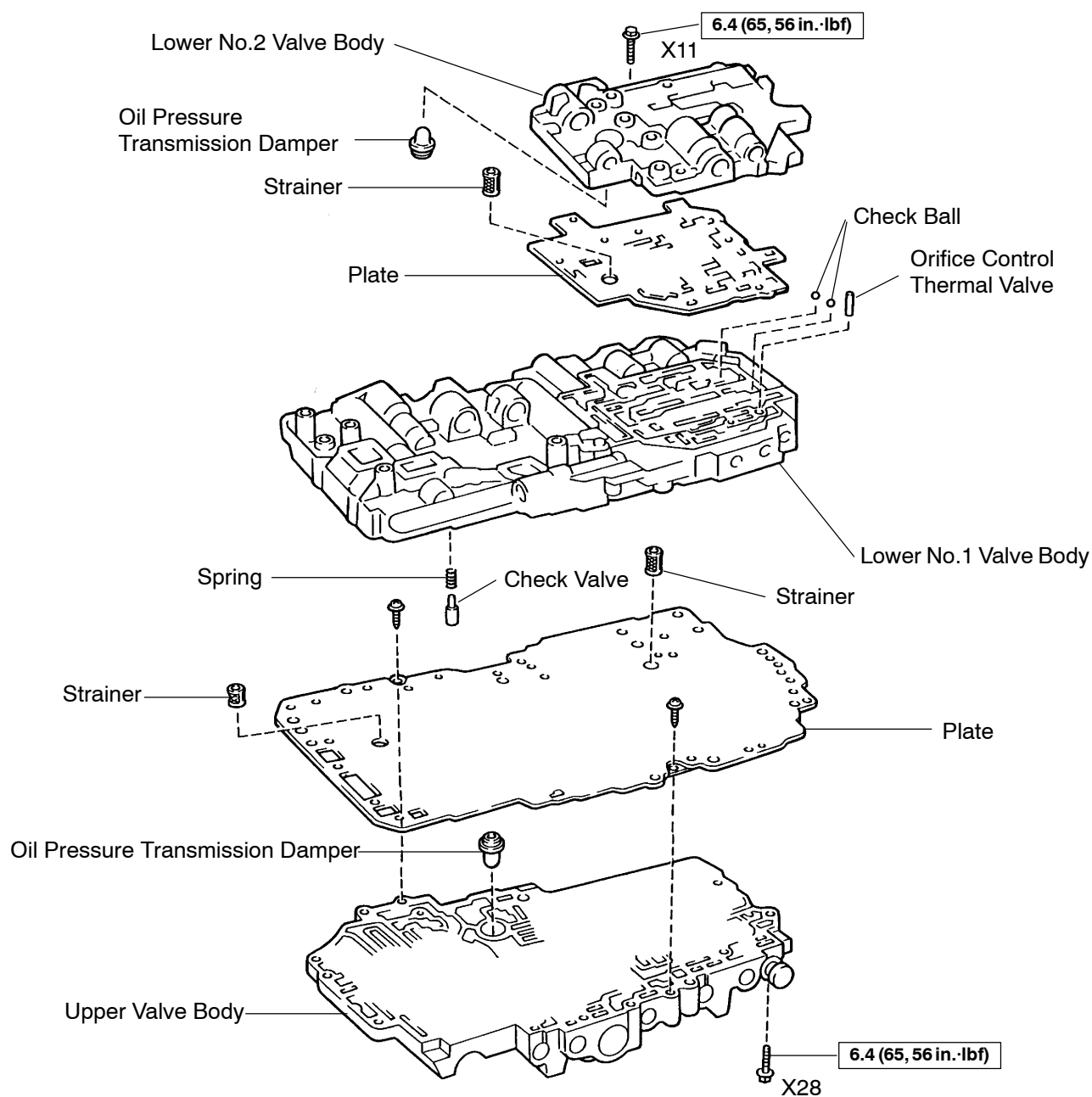
SST 09309-37010

VALVE BODY COMPONENTS

AT05H-03



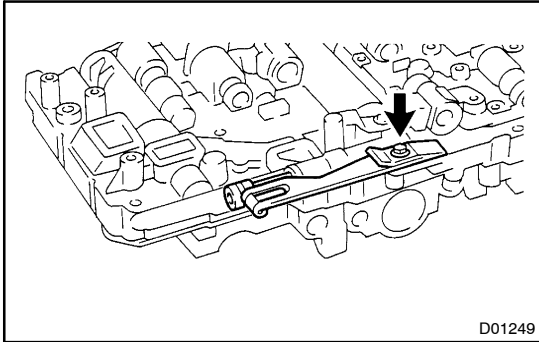
D10398



N·m (kgf·cm, ft·lbf) : Specified torque

N

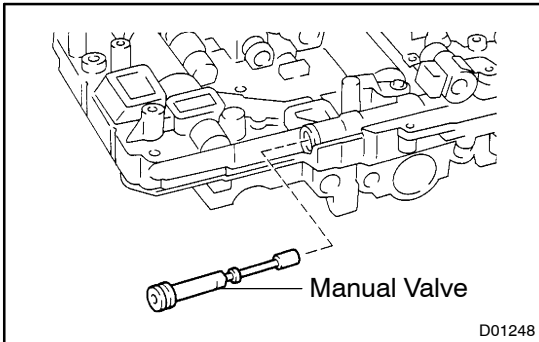
D10399



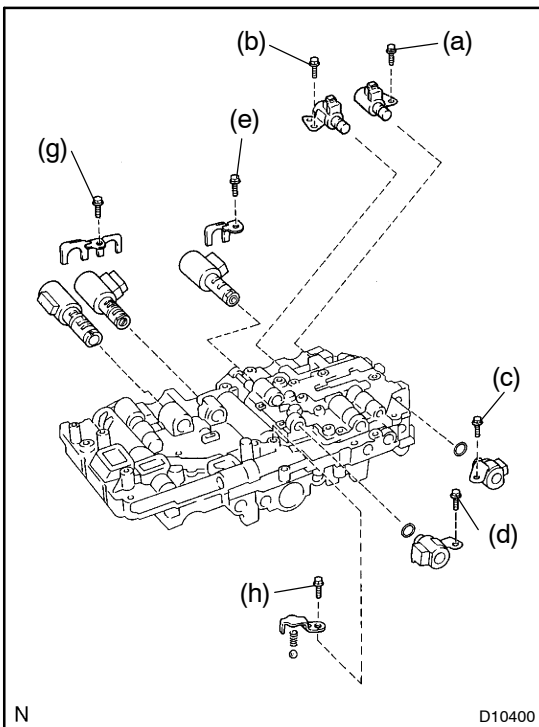
DISASSEMBLY

1. REMOVE DETENT SPRING AND SPRING PLATE

Remove the bolt, detent spring and spring plate.

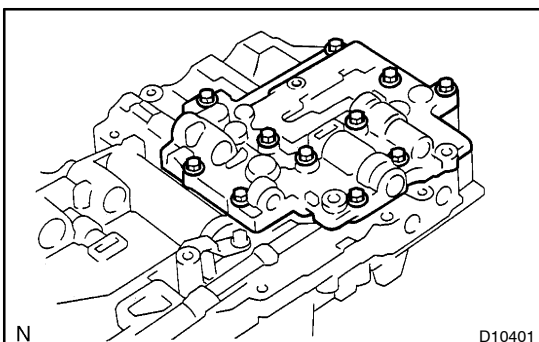


2. REMOVE MANUAL VALVE



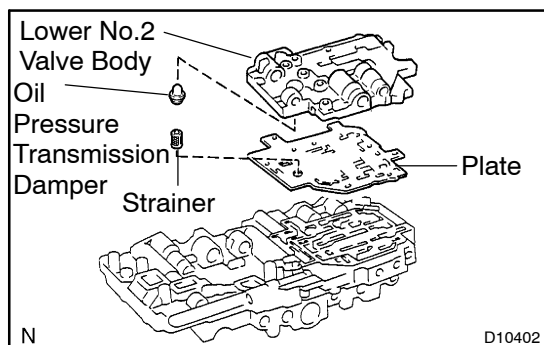
3. REMOVE 7 SOLENOIDS

- (a) Remove the bolt and shift solenoid valve No.1.
- (b) Remove the bolt and shift solenoid valve No.3.
- (c) Remove the bolt and shift solenoid valve No.2.
- (d) Remove the bolt and shift solenoid valve No.4.
- (e) Remove the bolt, No.2 lock plate and linear solenoid valve SLN.
- (f) Remove the bolt, No.1 lock plate and linear solenoid valve SLU, SLT.
- (g) Remove the bolt, pressure relief valve spring seat, spring and ball.
- (h) Remove the 2 O-rings from shift solenoid valve No.2 and No.4.

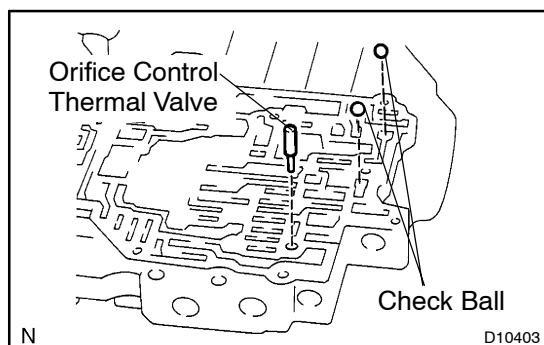


4. REMOVE LOWER NO.2 VALVE BODY

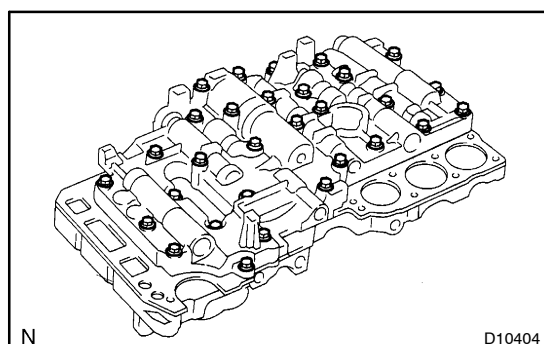
- (a) Remove the 11 bolts.



- (b) Remove the lower No.2 valve body.
- (c) Remove the plate.
- (d) Remove the strainer.
- (e) Remove the oil pressure transmission Damper.

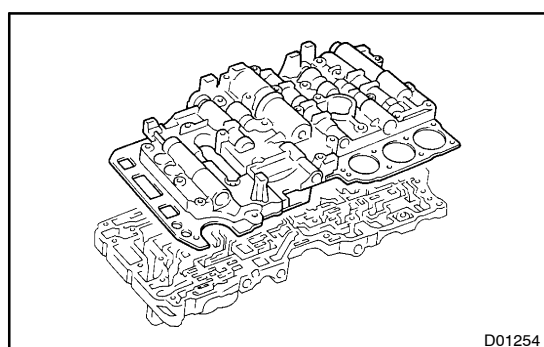


- (f) Remove the orifice control thermal valve and check ball.

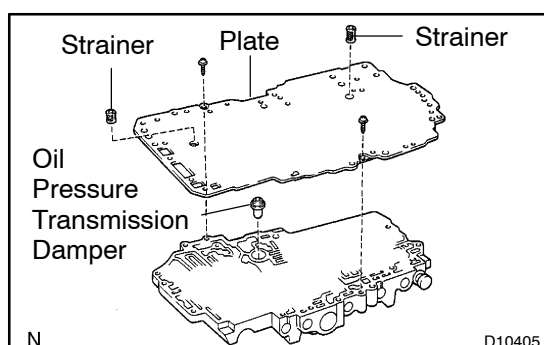


5. REMOVE UPPER VALVE BODY

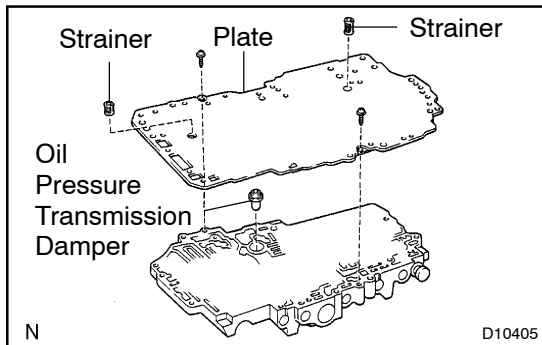
- (a) Turn over assembly and remove the 30 bolts.
- (b) Remove the plate from the upper valve body.



- (c) Remove the upper valve body with the plate.
- (d) Remove the check valve and spring.



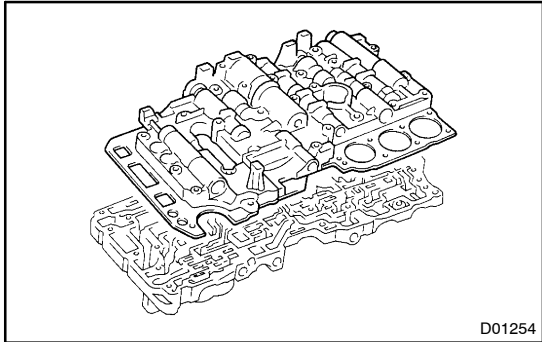
- (e) Turn over upper valve body, remove the 2 screws and plate.
- (f) Remove the 2 strainers.
- (g) Remove the oil pressure transmission Damper.



REASSEMBLY

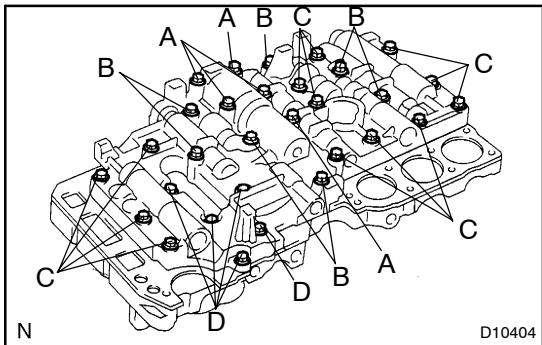
1. INSTALL PLATE ON UPPER VALVE BODY

- Coat oil pressure transmission damper with ATF and install them.
- Align the plate with each bolt hole and install the 2 screws.
- Install the 2 strainers.



2. PLACE UPPER VALVE BODY WITH PLATE ON TOP OF NO.1 LOWER VALVE BODY

- Install the spring and check valve.
- Align the plate in the valve body with each bolt hole.



3. INSTALL UPPER VALVE BODY TO NO.1 LOWER VALVE BODY WITH 30 BOLTS

Install the plate from the upper valve body.

Torque: 6.4 N·m (65 kgf·cm, 56 in.·lbf)

HINT:

Each bolts length is indicated below.

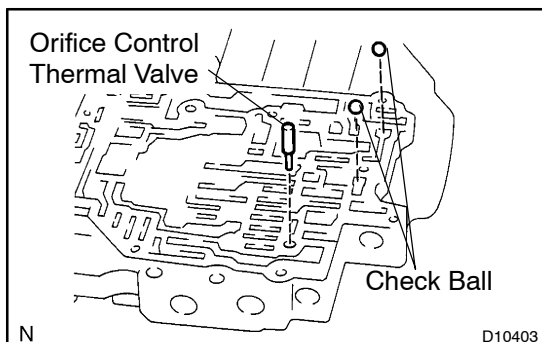
Bolt length:

Bolt A: 40 mm (1.575 in.)

Bolt B: 35 mm (1.378 in.)

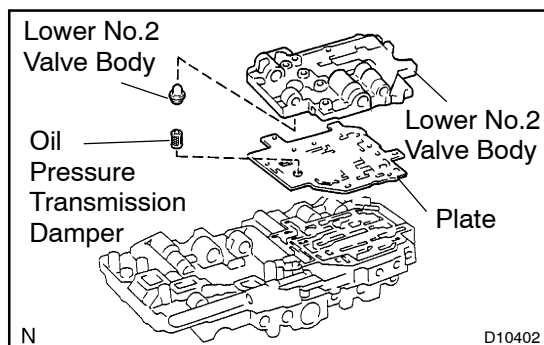
Bolt C: 28 mm (1.102 in.)

Bolt D: 20 mm (0.787 in.)

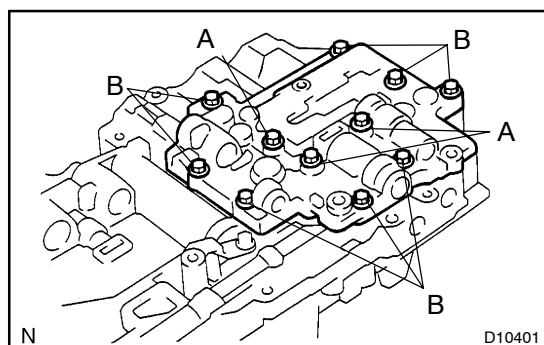


4. INSTALL THE LOWER NO.2 VALVE BODY AND PLATE TO LOWER NO.1 VALVE BODY

- Install the check ball and orifice control thermal valve.
- Install the strainer.



- (c) Align the holes of lower No.2 valve body with those of plate and place them on the lower No.1 valve body with aligning all the holes.



- (d) Install the 11 bolts.

Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)

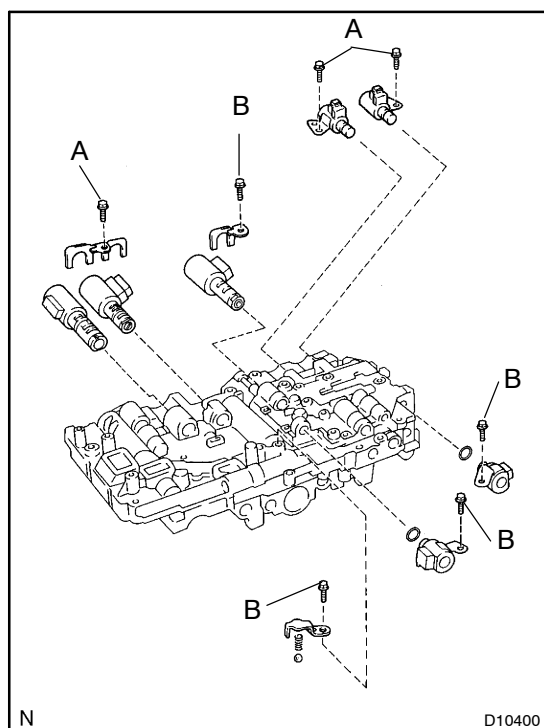
HINT:

Each bolts length is indicated below.

Bolt length:

Bolt A: 28 mm (1.102 in.)

Bolt B: 20 mm (0.787 in.)



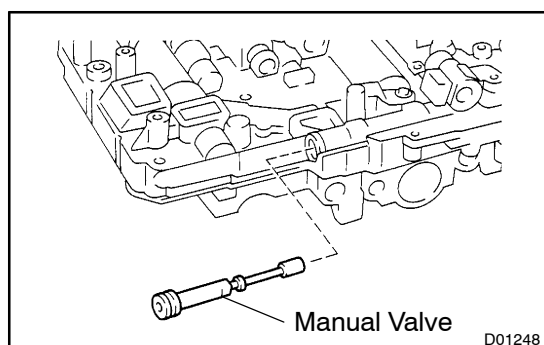
5. INSTALL 7 SOLENOIDS

- Coat 2 new O-rings with ATF and install them on the shift solenoid No.2 and No.4.
- Install the shift solenoid valve No.1 and the bolt.
- Install the shift solenoid valve No.3 with the bolt.
- Install the shift solenoid valve No.2 with the bolt.
- Install the shift solenoid valve No.4.
- Install the linear solenoid valve SLN, and No.1 solenoid lock plate.
- Install the linear solenoid valve SLU, SLT, and No.2 solenoid lock plate with the bolt.
- Install the ball, spring, pressure relief valve spring seat and bolt.

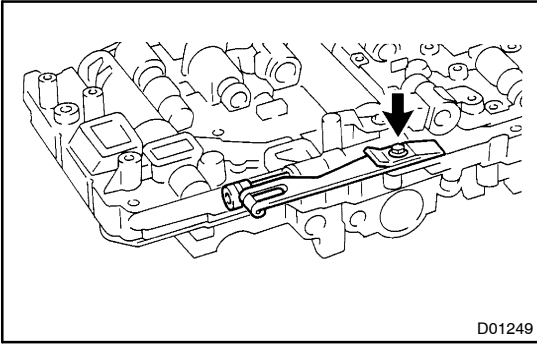
Torque:

Bolt A: 6.4 N·m (65 kgf·cm, 56 in·lbf)

Bolt B: 9.8 N·m (100 kgf·cm, 7 ft·lbf)



6. INSTALL MANUAL VALVE



7. **INSTALL DETENT SPRING AND SPRING PLATE**
Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)
8. **MAKE SURE MANUAL VALVE MOVES SMOOTHLY**

UPPER VALVE BODY

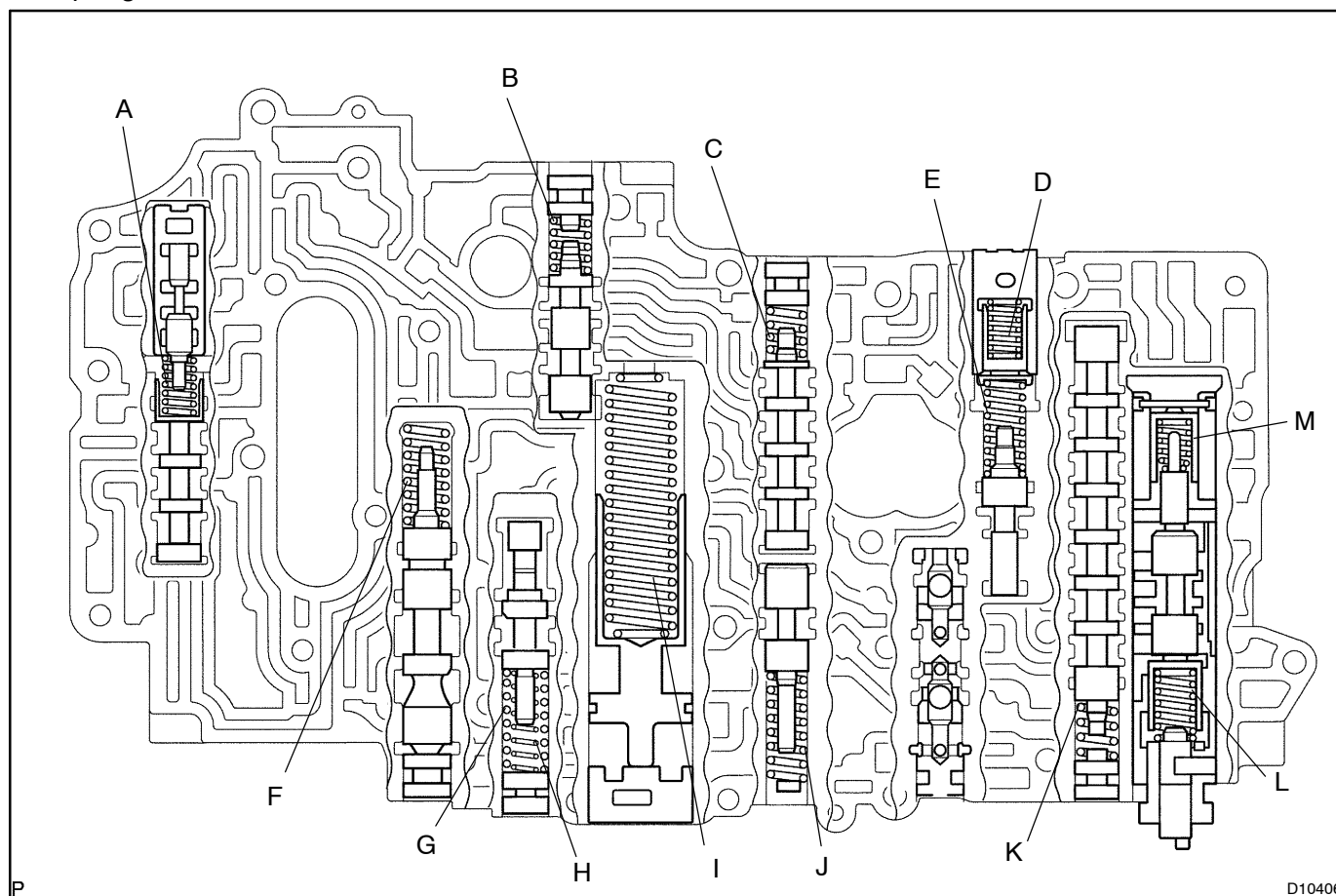
LOCATION

AT05L-02

1. SPRING

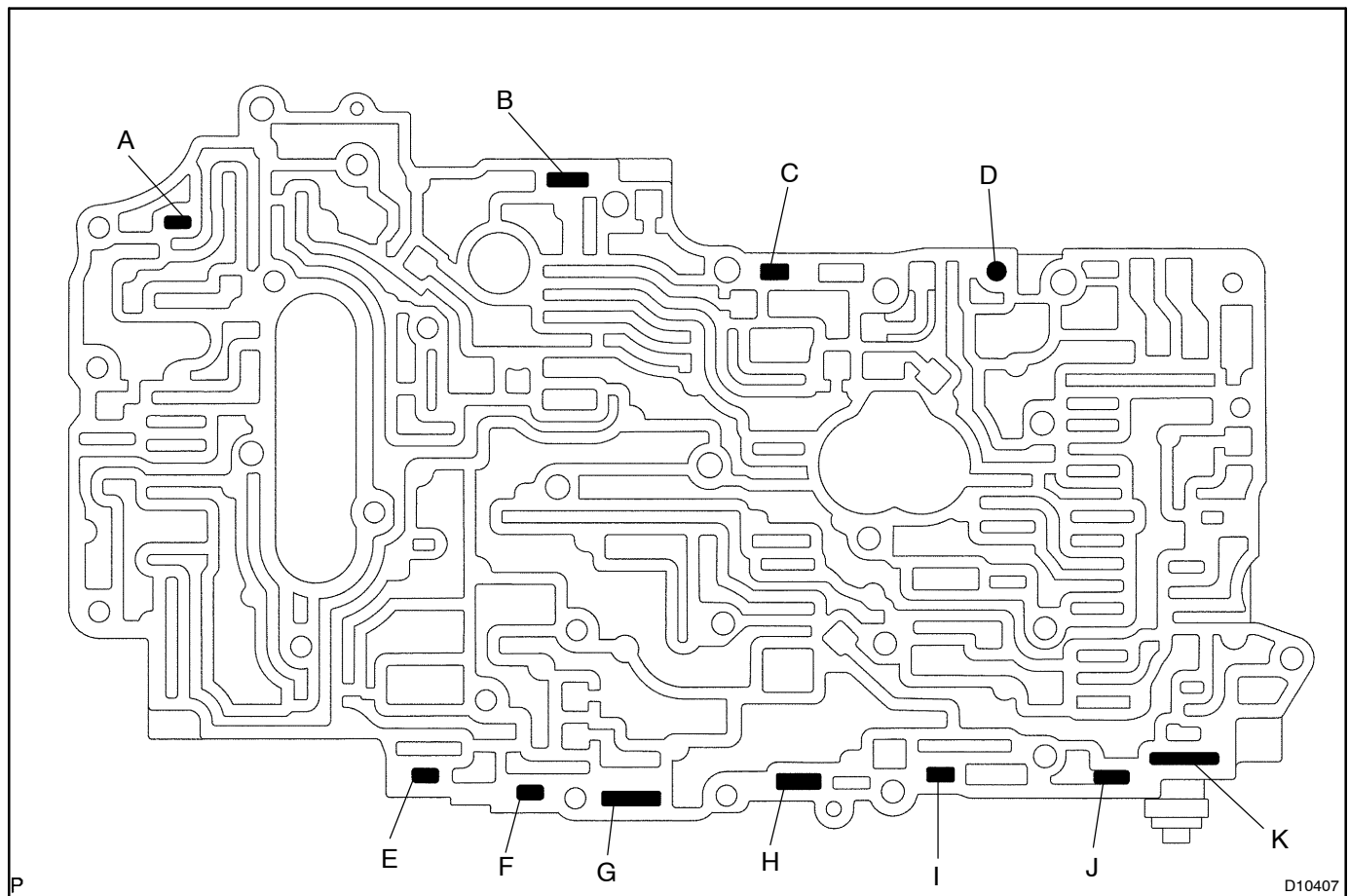
HINT:

During reassembly, please refer to the spring specifications below to help you differentiate among the different springs.

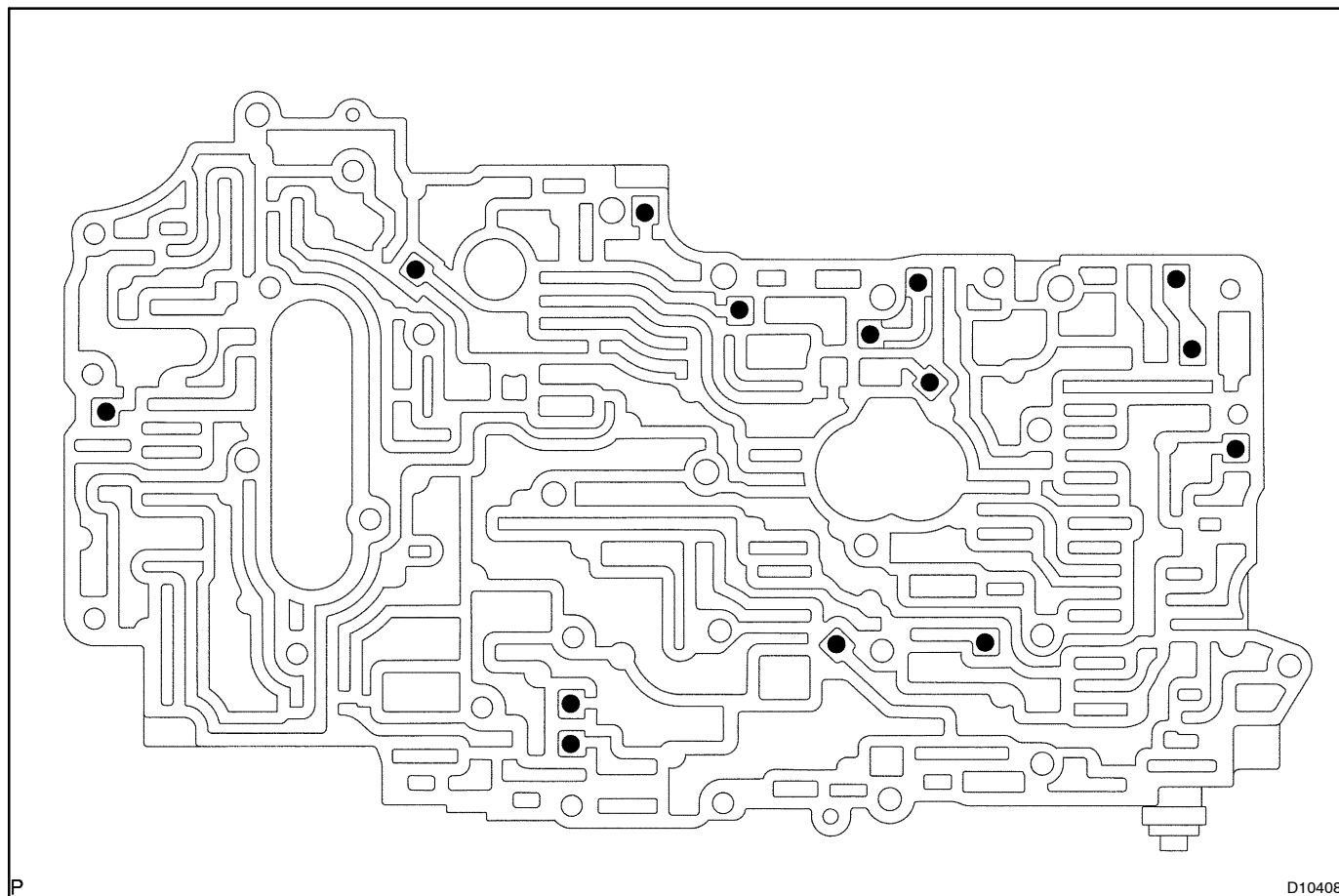


Mark	Name (Color)	Free length / Outer diameter mm (in.)	Total No. of coils
A	Lock-up Relay Valve (Red)	23.42 (0.922) / 5.86 (0.231)	12.25
B	C-0 Exhaust Valve (Orange)	24.25 (0.955) / 8.70 (0.343)	7.58
C	4-5 Shift Valve (Red)	25.50 (1.004) / 9.73 (0.383)	7.75
D	Coast Brake Control Valve (Green)	26.92 (1.060) / 8.70 (0.343)	10.53
E	Coast Brake Control Valve (White)	22.0 (0.866) / 5.90 (0.232)	15.55
F	Secondary Regulator Valve (Red)	34.48 (1.357) / 9.22 (0.363)	13.5
G	C-1 Orifice Control Valve (White)	37.13 (1.461) / 11.14 (0.439)	11.25
H	C-1 Orifice Control Valve (None)	21.50 (0.846) / 7.76 (0.306)	11.5
I	C-1 Accumulator Valve (Yellow)	78.16 (3.077) / 17.50 (0.689)	15.9
J	Solenoid Modulator Valve (Light blue)	35.99 (1.417) / 8.30 (0.327)	13.8
K	2-3 Shift Valve (White)	29.0 (1.14) / 7.5 (0.30)	12.29
L	B-3 Control Valve	28.09 (1.106) / 7.8 (0.307)	12.20
M	B-3 Control Valve (White)	22.28 (0.877) / 7.70 (0.303)	9.85

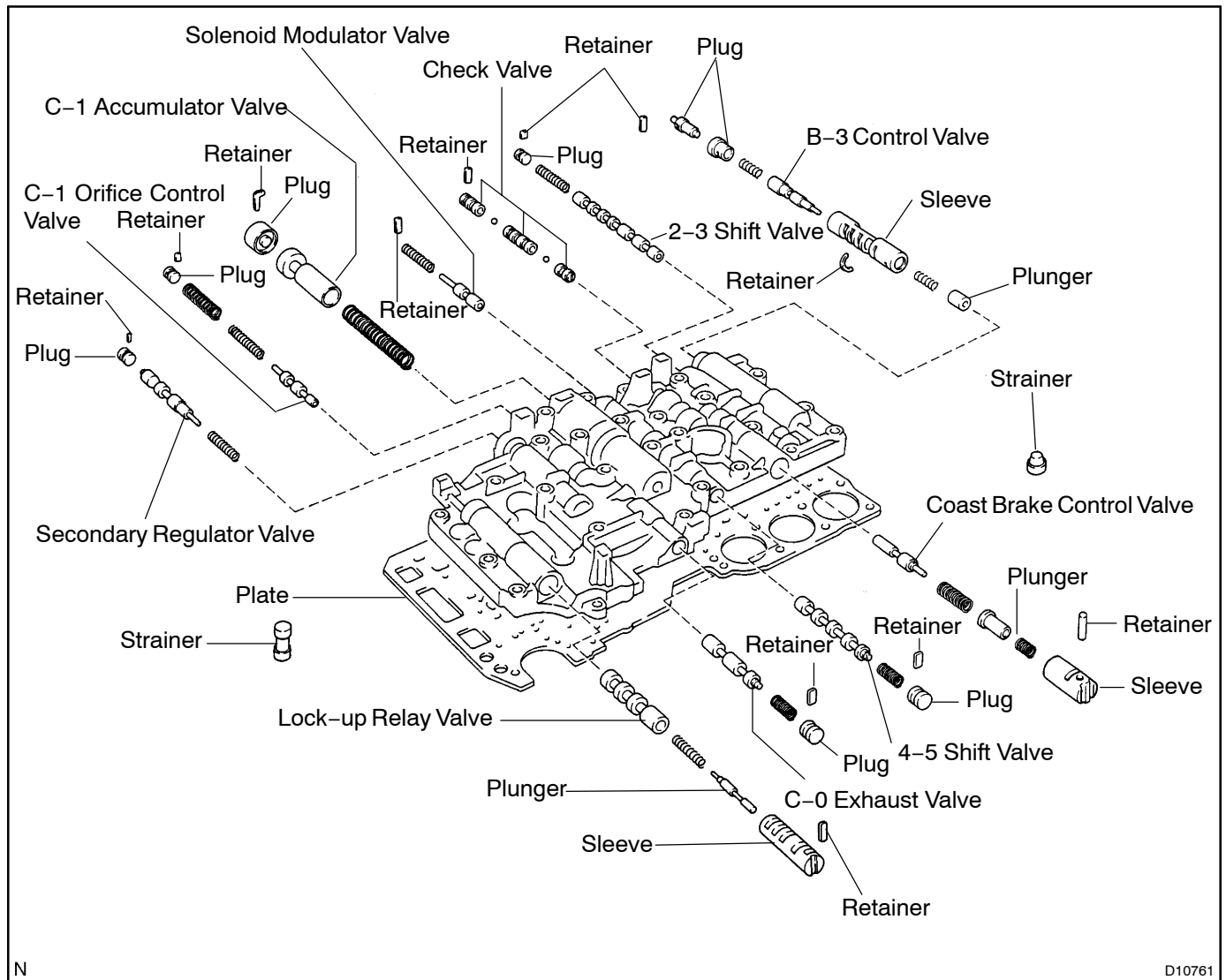
2. RETAINER



Mark	Retainer	Height / Width / Thickness mm (in.)
A	Lock-up Relay Valve	14.0 (0.551) / 5.0 (0.197) / 3.2 (0.126)
B	C-0 Exhaust Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
C	4-5 Shift Valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
D	Coast Brake Control Valve	15.0 (0.591) / $\varnothing$ 5.0 ($\varnothing$ 0.197) / $\varnothing$ 5.0 ($\varnothing$ 0.197)
E	Secondary Regulator Valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
F	C-1 Orifice Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
G	C-1 Accumulator Valve	36.5 (1.437) / - / 3.2 (0.126)
H	Solenoid Modulator Valve	21.0 (0.827) / - / 3.2 (0.126)
I	Check Valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
J	2-3 Shift Valve	8.0 (0.315) / 8.0 (0.315) / 3.2 (0.126)
K	B-3 Control Valve	16.5 (0.650) / 6.0 (0.236) / 3.2 (0.126)

3. CHECK BALL

COMPONENTS



LOWER NO.1 VALVE BODY

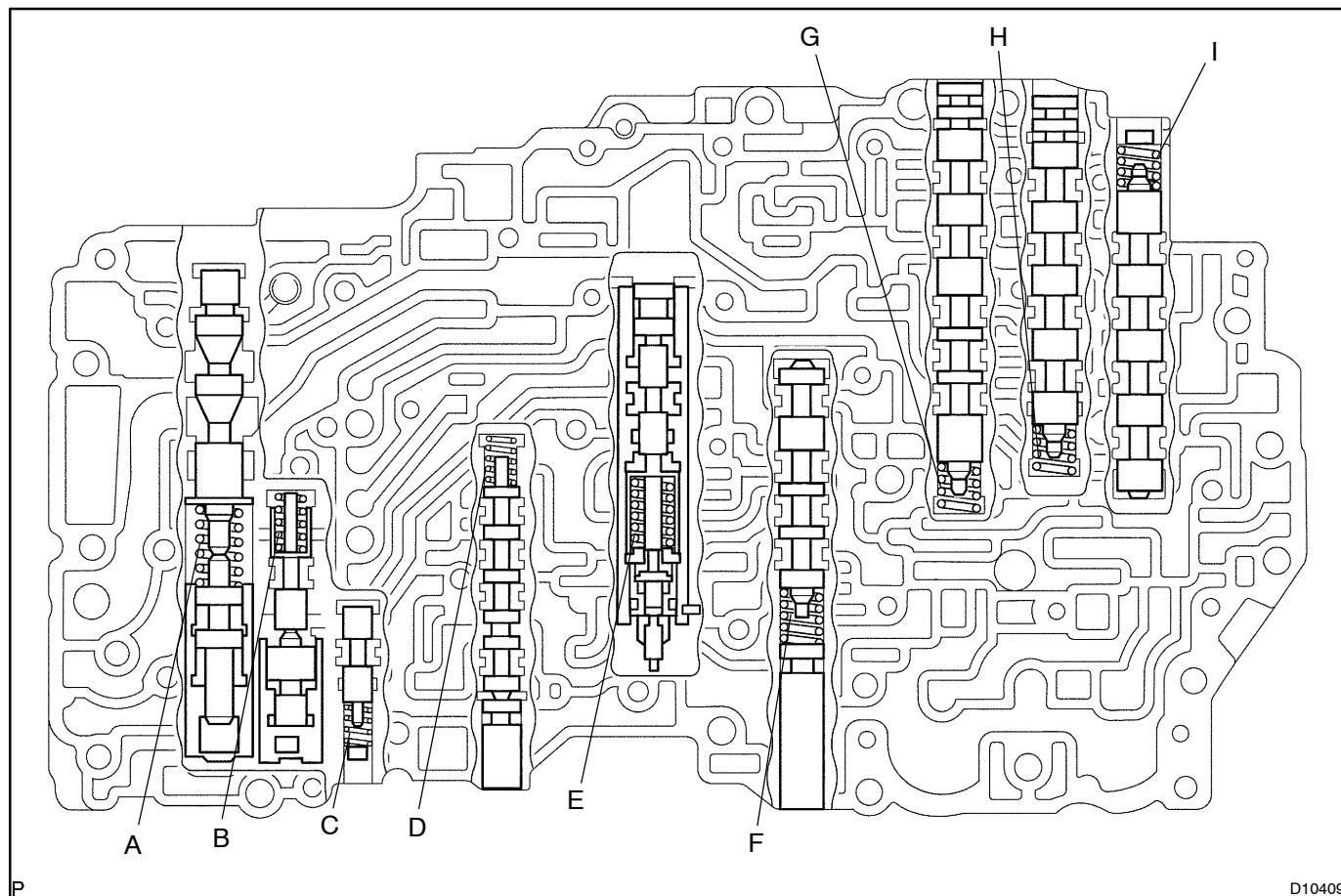
AT05N-02

LOCATION

1. SPRING

HINT:

During reassembly, please refer to the spring specifications below to help you differentiate among the different springs.

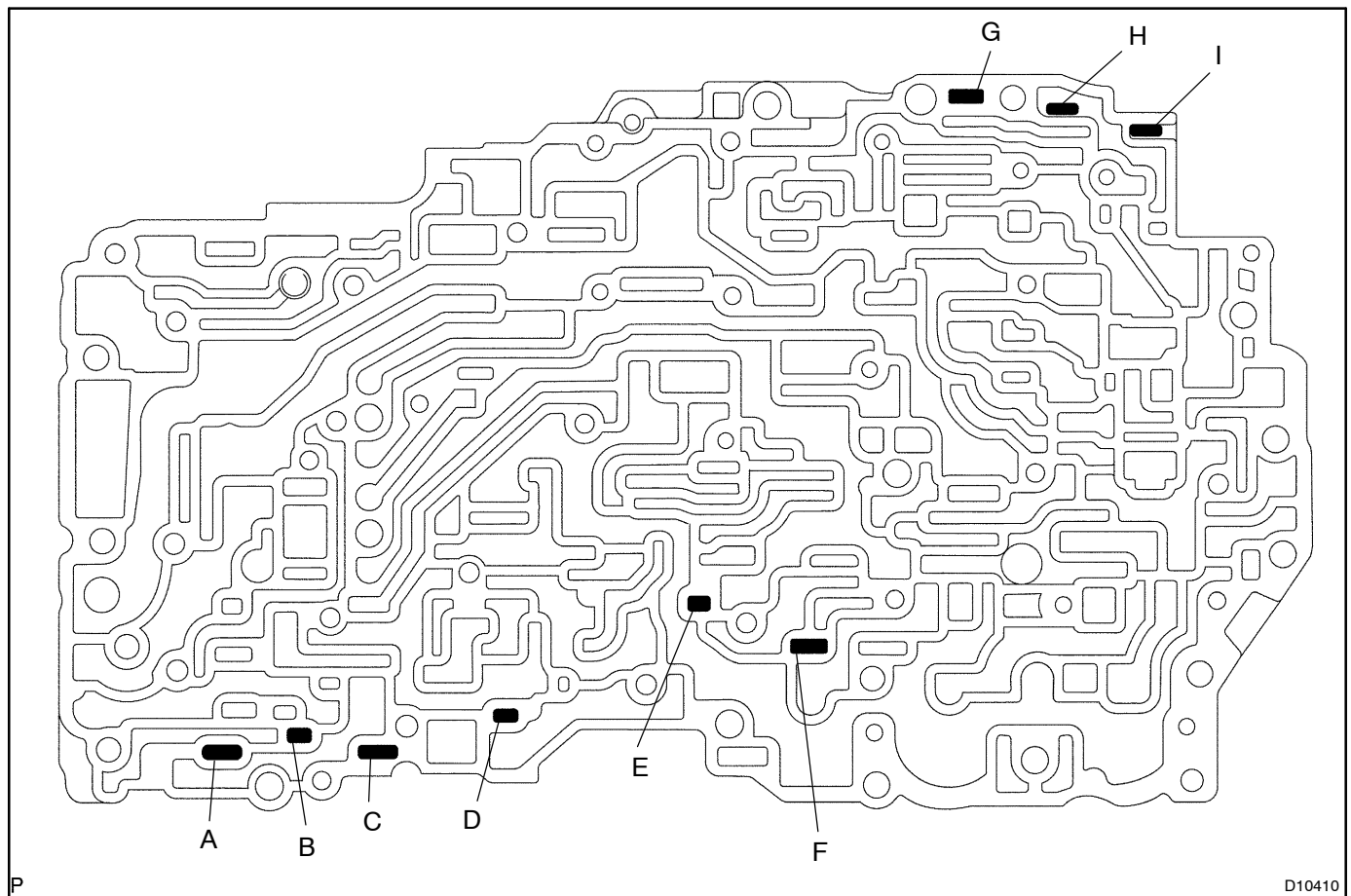


P

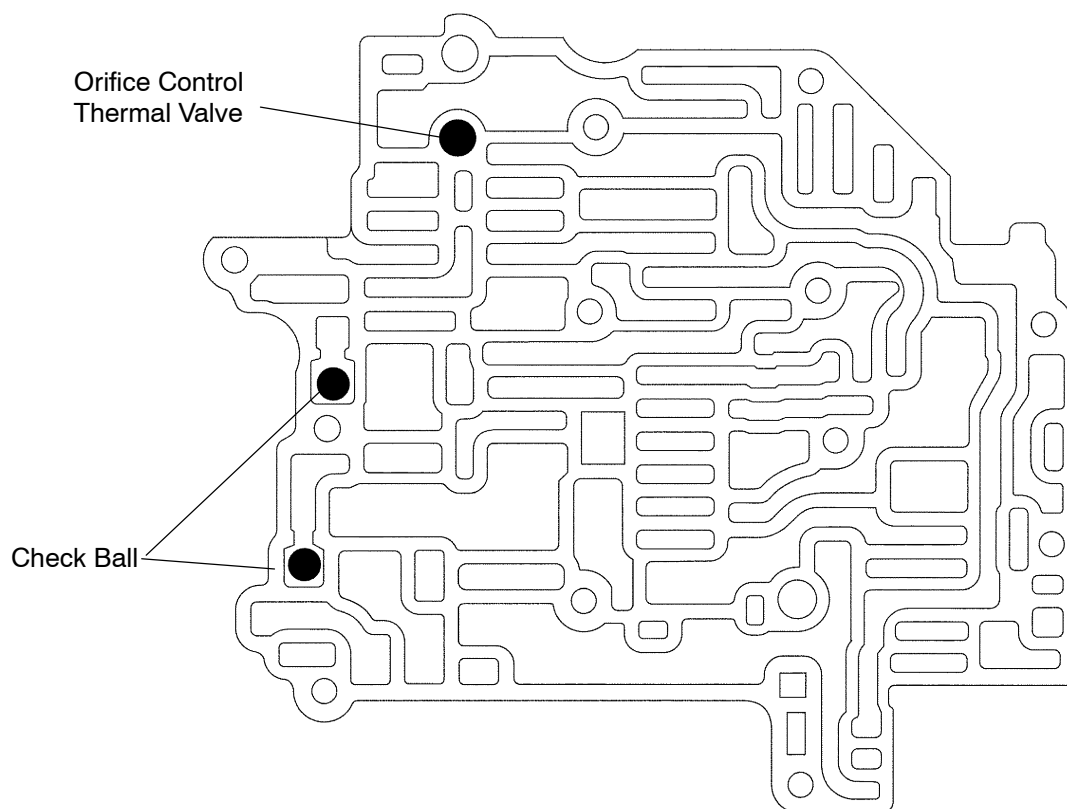
D10409

Mark	Name (Color)	Free length / Outer diameter mm (in.)	Total No. of coils
A	Primary Regulator Valve (Light green)	39.78 (1.566) / 18.88 (0.743)	6.65
B	Lock-up Control Valve (Yellow)	20.87 (0.822) / 5.55 (0.219)	11.15
C	Cut Back Valve (None)	22.60 (0.890) / 8.13 (0.320)	8.0
D	C-0 Control Relay Valve (None)	20.30 (0.799) / 6.10 (0.240)	12.75
E	Accumulator Control Valve (Light green)	27.47 (1.081) / 8.85 (0.348)	11.59
F	Solenoid Relay Valve (Beige)	32.11 (1.264) / 8.80 (0.346)	8.6
G	3-4 Shift Valve (Red)	25.50 (1.004) / 9.73 (0.383)	7.75
H	1-2 Shift Valve (Red)	25.50 (1.004) / 9.73 (0.383)	7.75
I	B-2 Release Control Valve (Orange)	24.25 (0.955) / 8.70 (0.343)	7.58

2. RETAINER



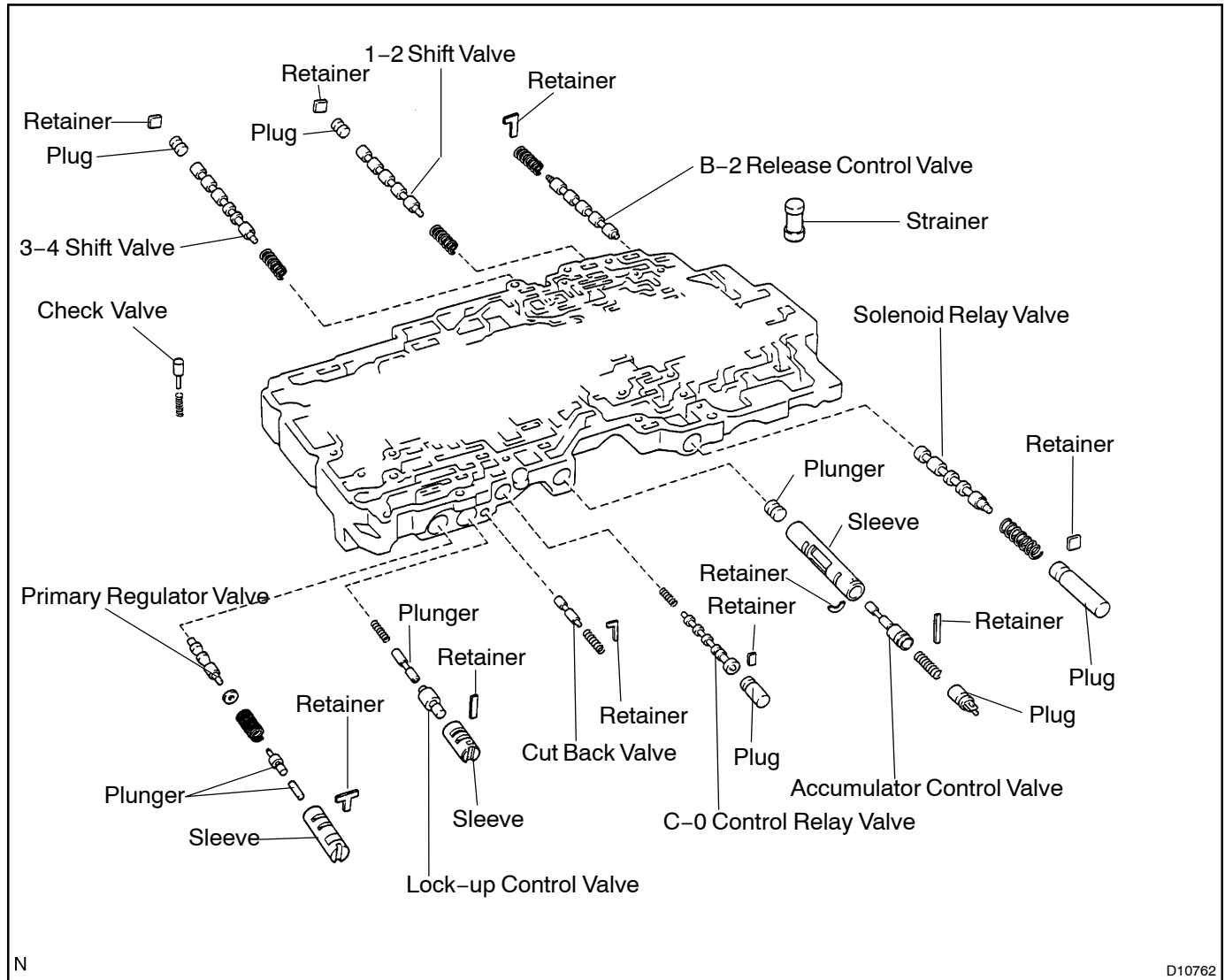
Mark	Retainer	Height / Width / Thickness mm (in.)
A	Primary Regulator Valve	- / - / 3.2 (0.126)
B	Lock-up Control Valve	19.0 (0.748) / 5.0 (0.195) / 3.2 (0.126)
C	Cut Back Valve	21.0 (0.827) / - / 3.2 (0.126)
D	C-0 Control Relay Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
E	Accumulator Control Valve	29.0 (1.142) / 5.0 (0.197) / 3.2 (0.126)
F	Solenoid Relay Valve	8.0 (0.315) / 8.0 (0.315) / 3.2 (0.126)
G	3-4 Shift Valve	8.0 (0.315) / 8.0 (0.315) / 3.2 (0.126)
H	1-2 Shift Valve	8.0 (0.315) / 8.0 (0.315) / 3.2 (0.126)
I	B-2 Release Control Valve	21.0 (0.827) / - / 3.2 (0.126)

3. CHECK BALL AND ORIFICE CONTROL THERMAL VALVE

P

D10411

COMPONENTS



LOWER NO.2 VALVE BODY

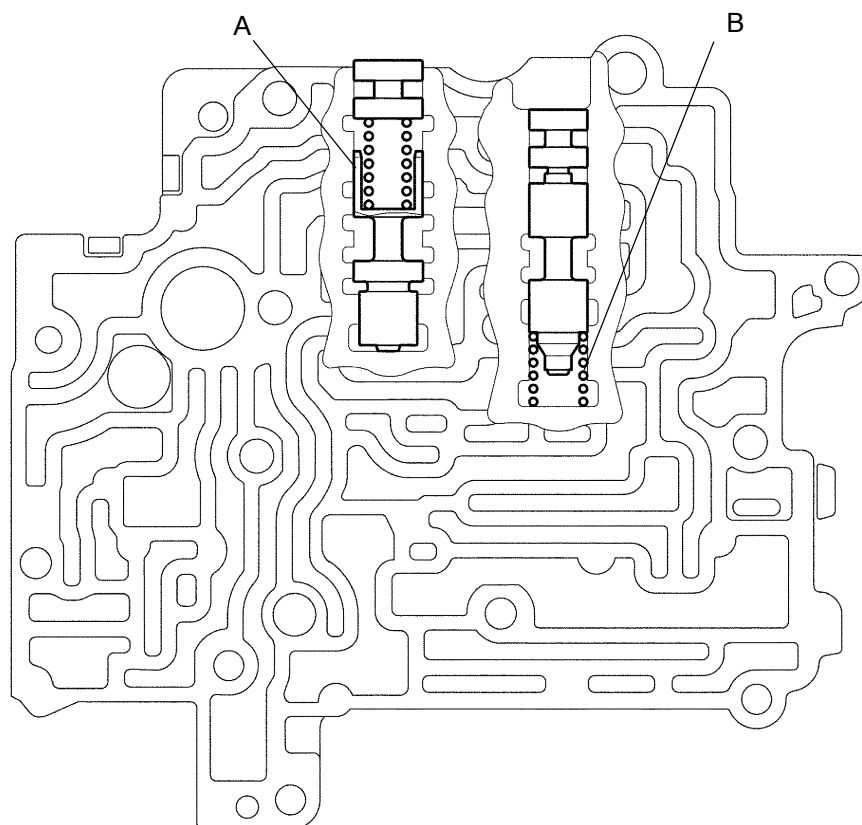
LOCATION

AT05P-02

1. SPRING

HINT:

During reassembly, please refer to the spring specifications below to help you differentiate among the different springs.

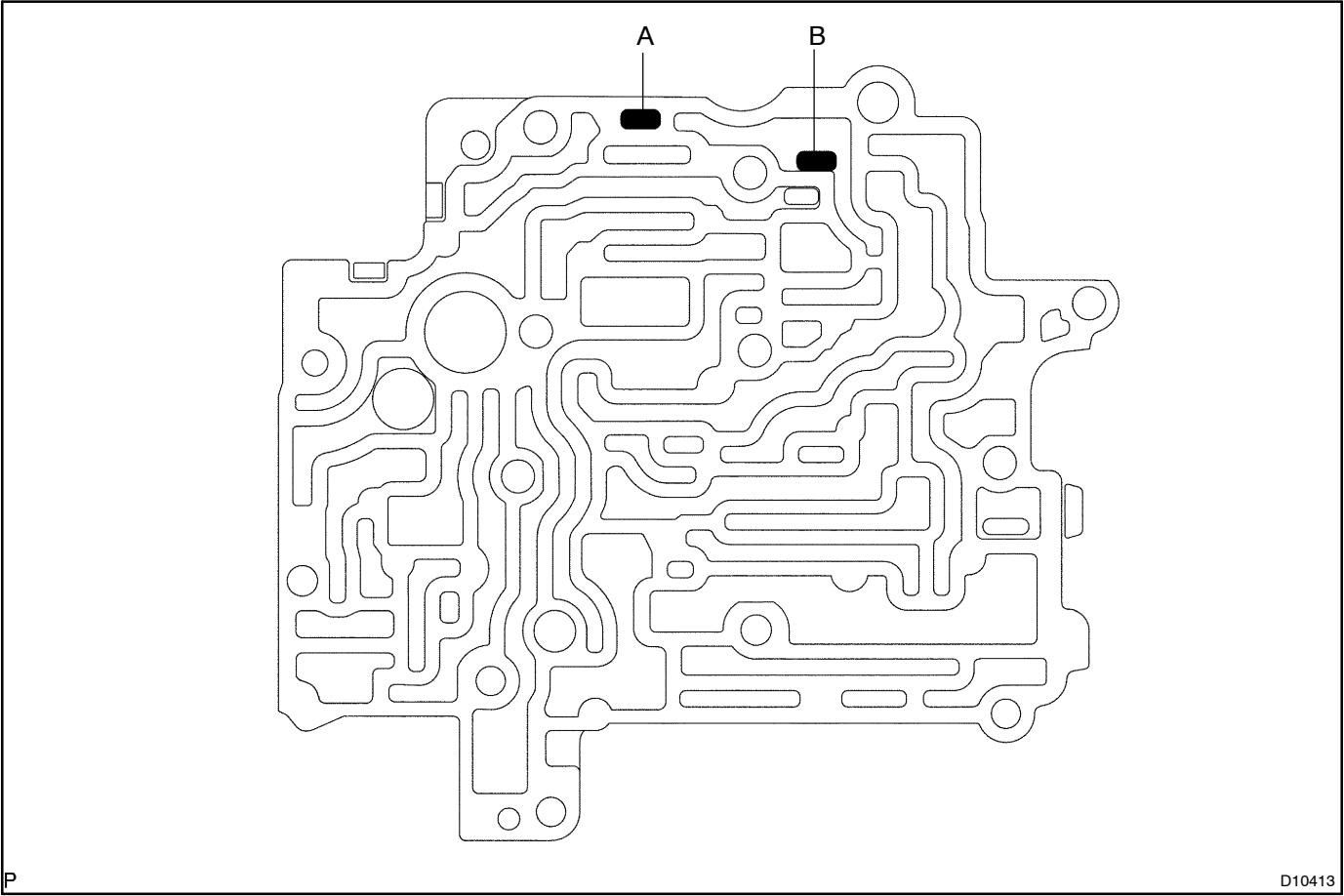


P

D10412

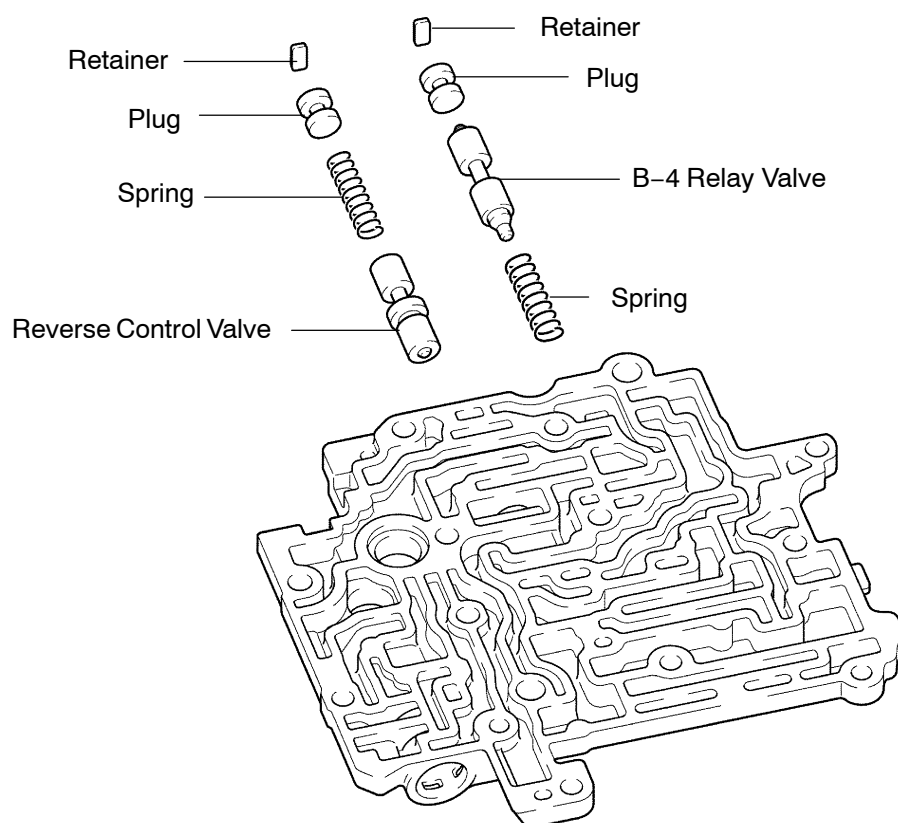
Mark	Name (Color)		Free length / Outer diameter mm (in.)	Total No. of coils
A	Reverse Control Valve	(None)	25.58 (1.007) / 8.64 (0.340)	8.75
B	B-4 Relay Valve	(Red)	25.50 (1.004) / 9.73 (0.383)	7.75

2. RETAINER



Mark	Retainer	Height / Width / Thickness mm (in.)
A	Reverse Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
B	B4 Relay Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)

COMPONENTS



P

D10414