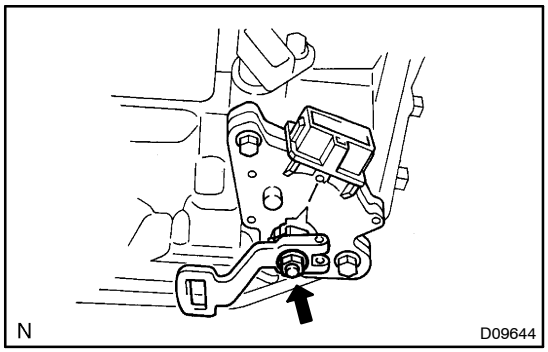
AUTOMATIC TRANSAXLE ASSY (U140E/U140F)

4006E–01

OVERHAUL

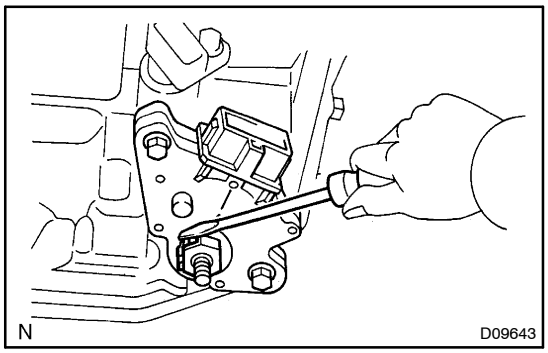
1. REMOVE SPEEDOMETER DRIVEN HOLE (ATM) COVER SUB–ASSY

(a) Remove the bolt and speedometer driven hole cover sub–assy from the transaxle assy.
(b) Remove the O–ring from the speedometer driven hole cover.

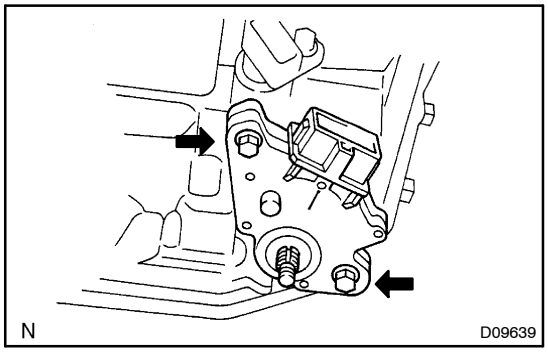


2. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

(a) Remove the nut, washer and control shaft lever.

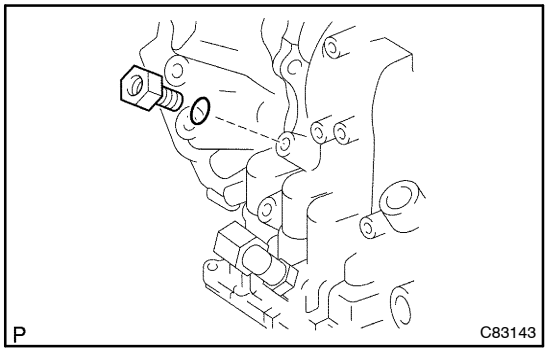


(b) Using a screwdriver, unstake the nut stopper remove the lock nut and stopper.



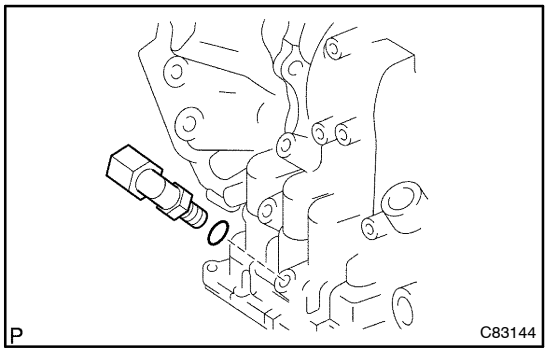
(c) Remove the 2 bolts and pull out the park/neutral position switch.

3. REMOVE BREATHER PLUG HOSE



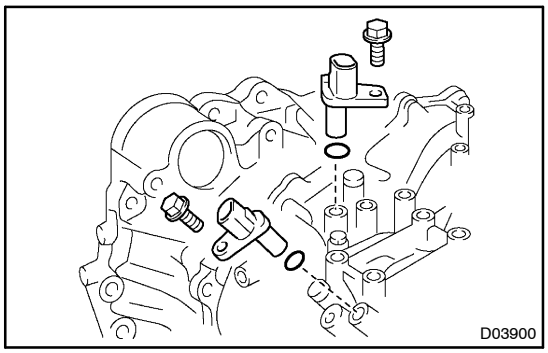
4. REMOVE OIL COOLER TUBE UNION(INLET OIL COOLER UNION)

(a) Remove the union.
(b) Remove the O–ring from the union.



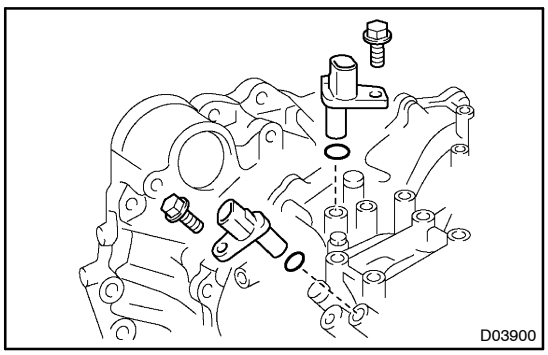
5. REMOVE OIL COOLER TUBE UNION(OUTLET OIL COOLER UNION)

(a) Remove the elbow.
(b) Remove the O–ring from the elbow.



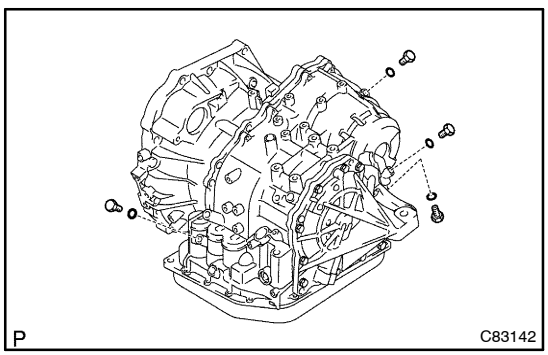
6. REMOVE SPEED SENSOR(TMC –MADE)

(a) Remove the 2 bolts and the 2 speed sensors from the transaxle assy.
(b) Remove the 2 O–rings from the sensors.



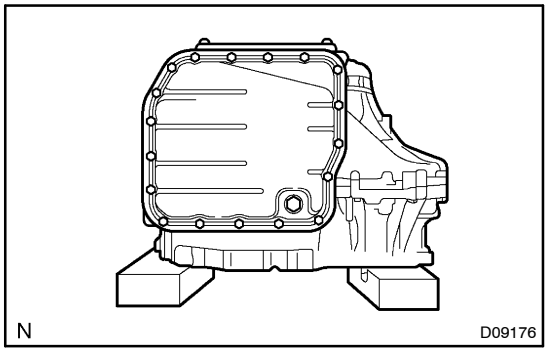
7. REMOVE TRANSMISSION REVOLUTION SENSOR(AISIN –MADE)

(a) Remove the 2 bolts and the 2 transmission revolution sensors from the transaxle assy.
(b) Remove the 2 O–rings from the sensors.

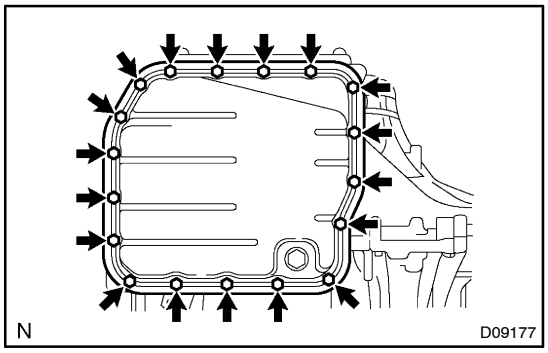


8. REMOVE TRANSAXLE CASE NO.1 PLUG

(a) Remove the 4 transaxle case No. 1 plugs from the transaxle case.
(b) Remove 4 O–rings from the 4 transaxle case No. 1 plugs.



9. FIX AUTOMATIC TRANSAXLE ASSY

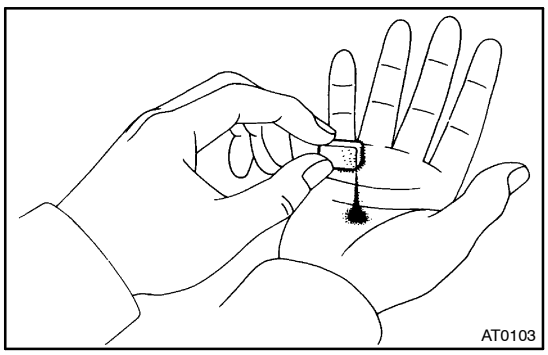


10. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB–ASSY

(a) Remove the 18 bolts.
(b) Remove the oil pan and 2 magnets.

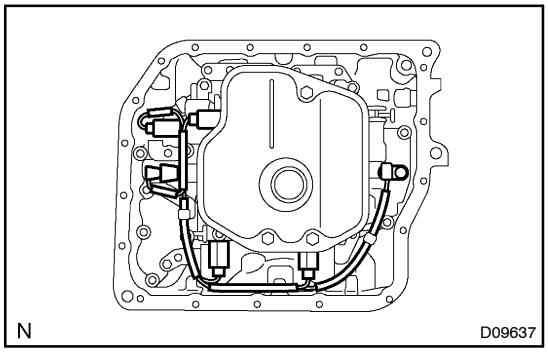
11. REMOVE AUTOMATIC TRANSAXLE OIL PAN GASKET

(a) Remove the gasket from the oil pan.



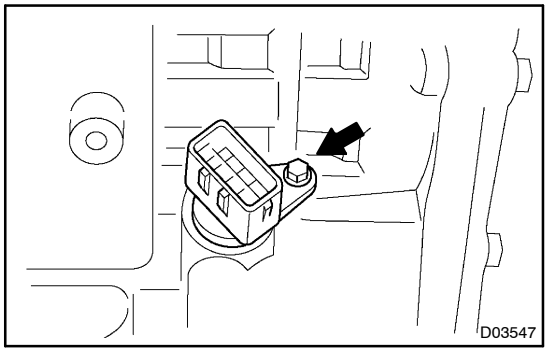
12. INSPECT AUTOMATIC TRANSAXLE OIL PAN SUB–ASSY

(a) Remove the magnets and use them to collect any steel chips. Examine the chips and particles in the pan and on the magnet to determine what type of wear has occurred in the transaxle:
Steel (magnetic).... bearing, gear and plate wear
Brass (non–magnetic).... bushing wear

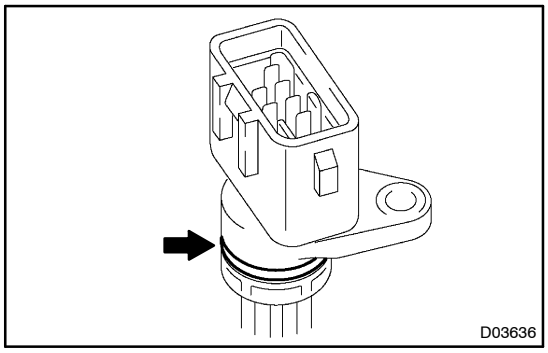


13. REMOVE TRANSMISSION WIRE

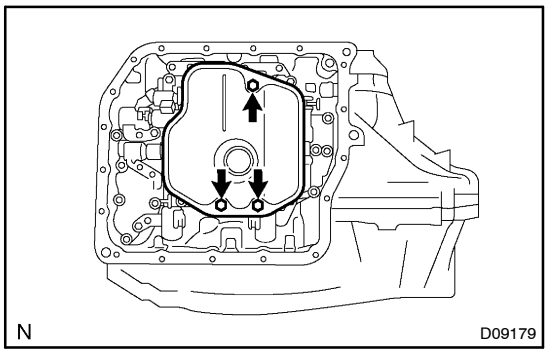
(a) Remove the 5 connectors from the shift solenoid valves.
(b) Remove the bolt, clamp and the ATF temperature sensor.



(c) Remove the bolt and transaxle solenoid wire from the transaxle case.

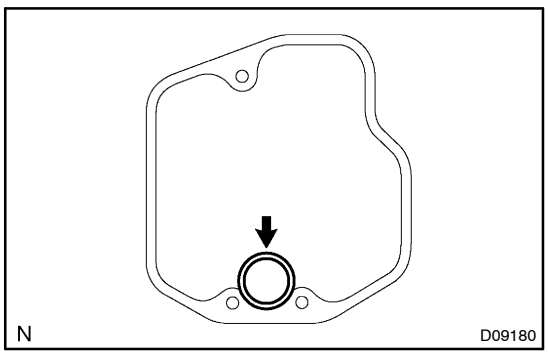


(d) Remove the O–ring from the transaxle solenoid wire.

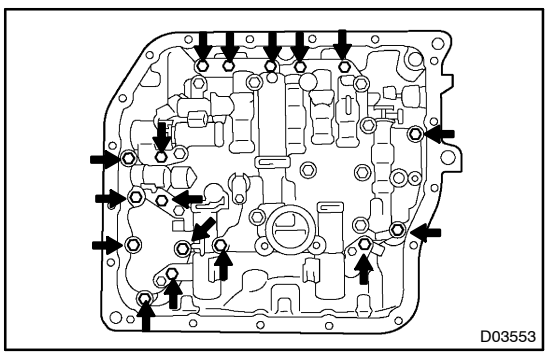


14. REMOVE VALVE BODY OIL STRAINER ASSY

(a) Remove the 3 bolts and oil strainer.

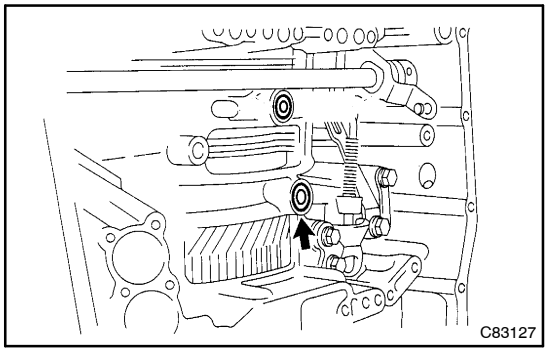


(b) Remove the O–ring from the oil strainer.



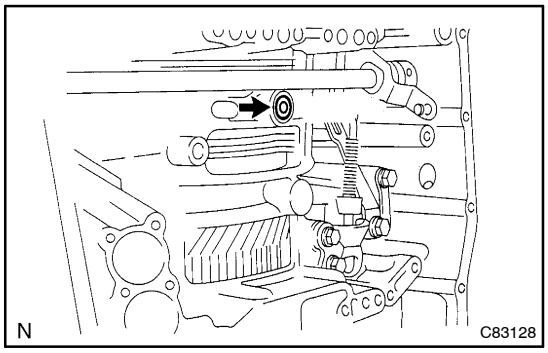
15. REMOVE TRANSMISSION VALVE BODY ASSY

(a) Support the valve body assy and remove the 17 bolts and the valve body assy.



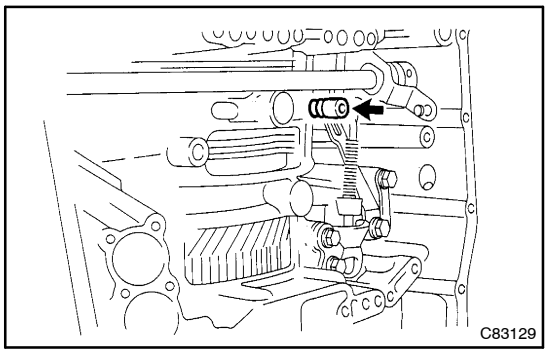
16. REMOVE GOVERNOR APPLY GASKET NO.1

(a) Remove the governor apply gasket No. 1 from the transaxle case.



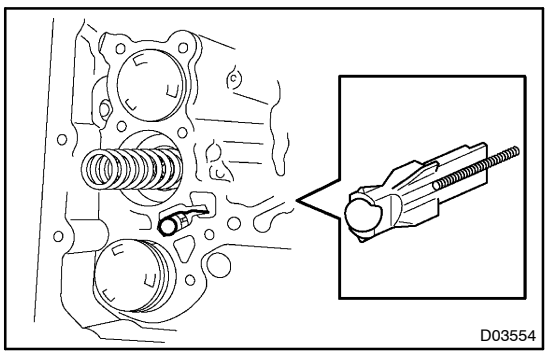
17. REMOVE TRANSAXLE CASE 2ND BRAKE GASKET

(a) Remove the transaxle case 2nd brake gasket from the transaxle case.



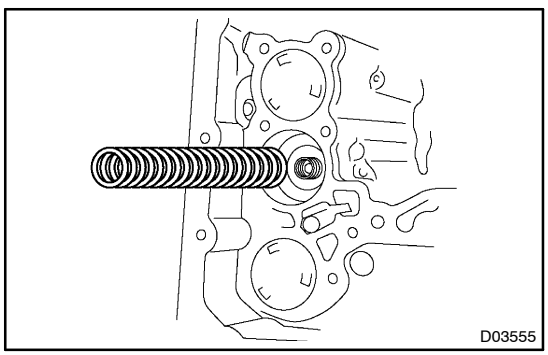
18. REMOVE BRAKE DRUM GASKET

(a) Remove the brake drum gasket from the transaxle case.



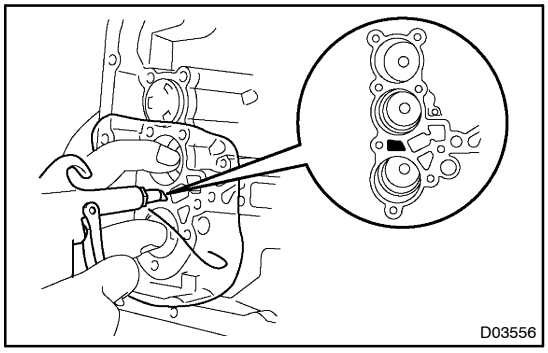
19. REMOVE CHECK BALL BODY

(a) Remove the check ball body and spring from the transaxle case.



20. REMOVE C–3 ACCUMULATOR PISTON

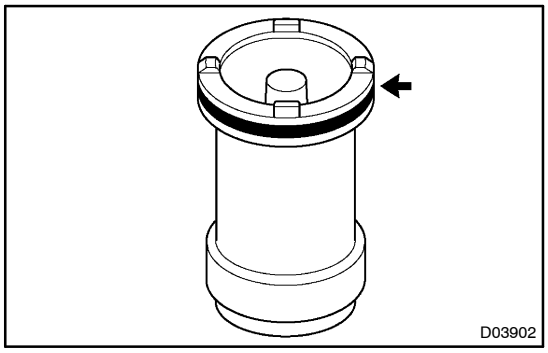
(a) Remove the spring from the C_3 accumulator piston.



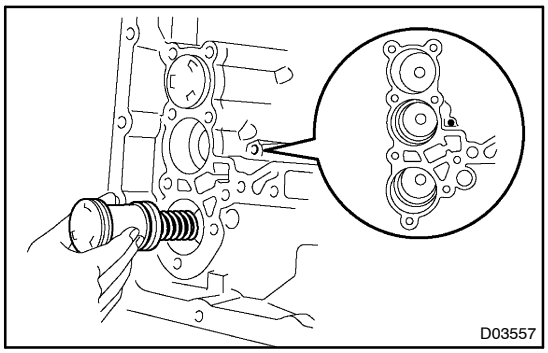
(b) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the C_3 accumulator piston.

NOTICE:

- **Blowing off the air may cause the piston's jump–out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air–blowing.**



(c) Remove the O–ring from the C_3 accumulator piston.

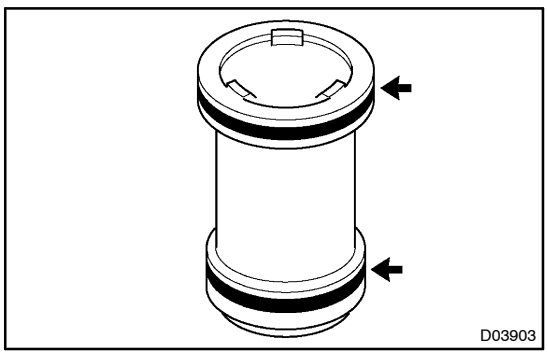


21. REMOVE C–1 ACCUMULATOR PISTON

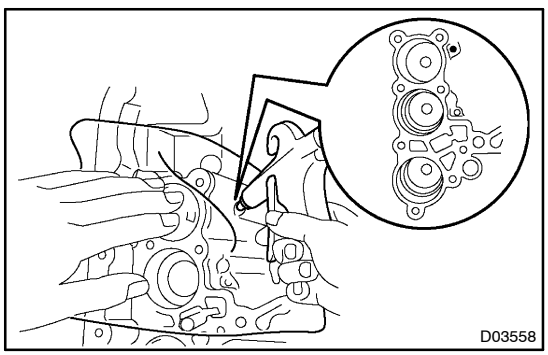
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the C_1 accumulator piston and spring.

NOTICE:

- **Blowing off the air may cause the piston's jump–out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air–blowing.**



(b) Remove the 2 O–rings from the C_1 accumulator piston.

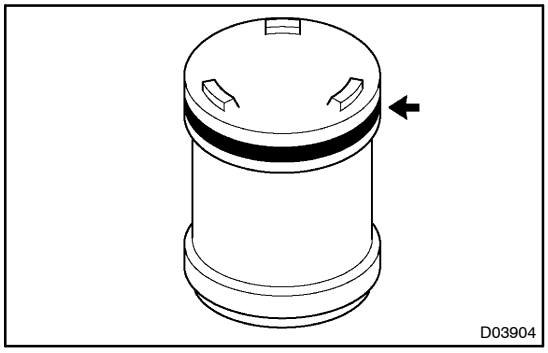


22. REMOVE B–3 ACCUMULATOR PISTON

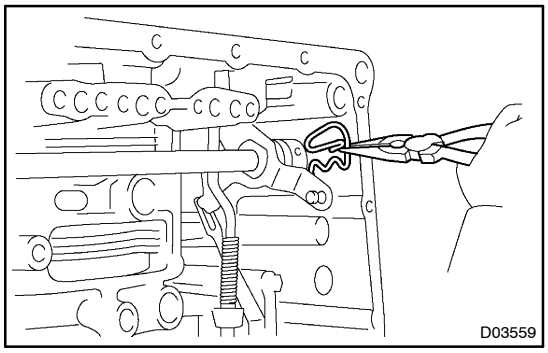
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the B_3 accumulator piston and 2 springs.

NOTICE:

- **Blowing off the air may cause the piston's jump–out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air–blowing.**

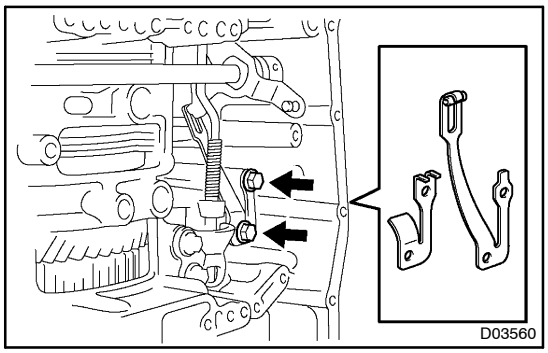


(b) Remove the O–ring from the B_3 accumulator piston.



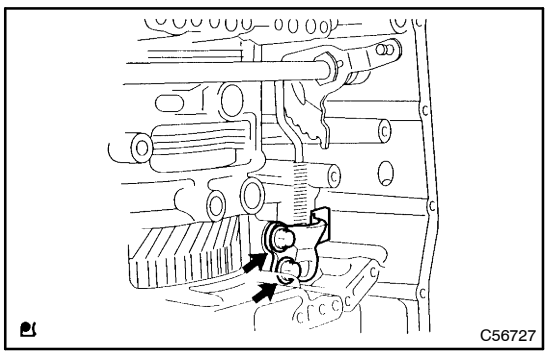
23. REMOVE MANUAL VALVE LEVER SHAFT RETAINER SPRING

(a) Using needle–nose pliers, remove the retainer spring.



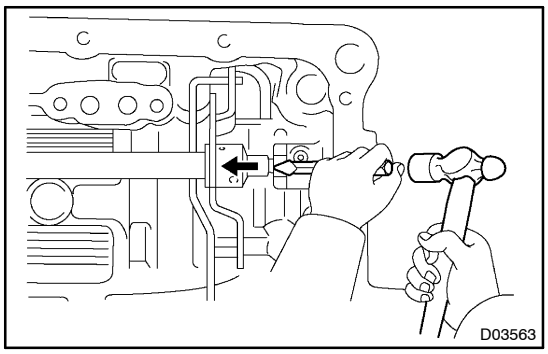
24. REMOVE MANUAL DETENT SPRING SUB–ASSY

(a) Remove the 2 bolts, the manual detent spring sub–assy and cover.



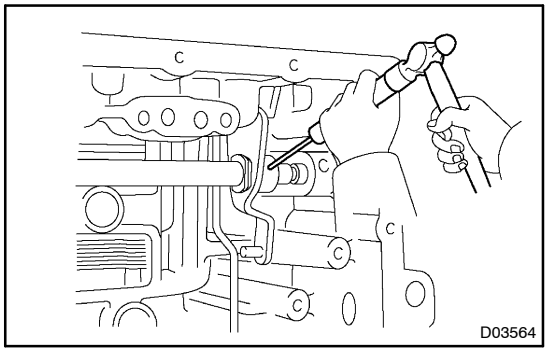
25. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 2 bolts and the parking lock pawl bracket.



26. REMOVE MANUAL VALVE LEVER SUB–ASSY

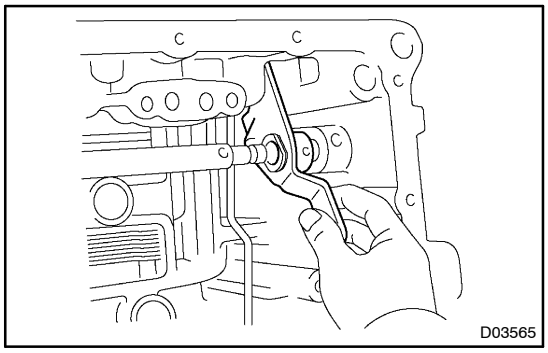
(a) Using a chisel and hammer, untake and remove the spacer.



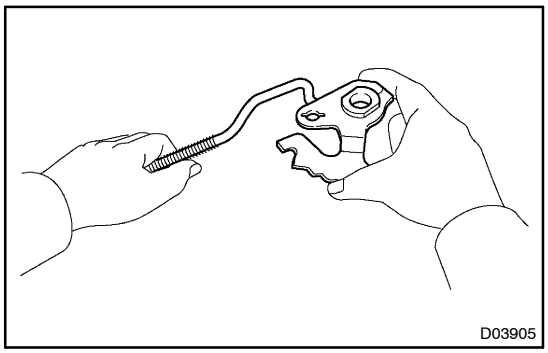
(b) Using a pin punch and hammer, drive out the pin.

HINT:

Slowly drive out the pin so that it will not fall into the transaxle case.

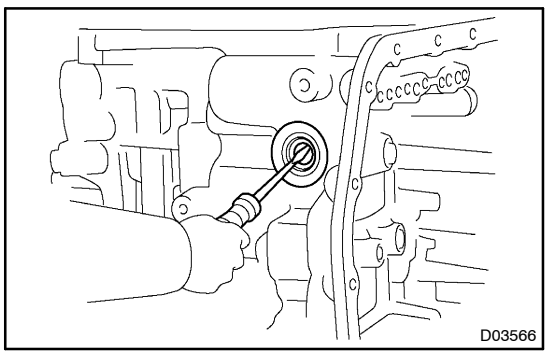


(c) Remove the manual valve lever shaft and manual valve lever.



27. REMOVE PARKING LOCK ROD SUB–ASSY

(a) Remove the parking lock rod from the manual valve lever.

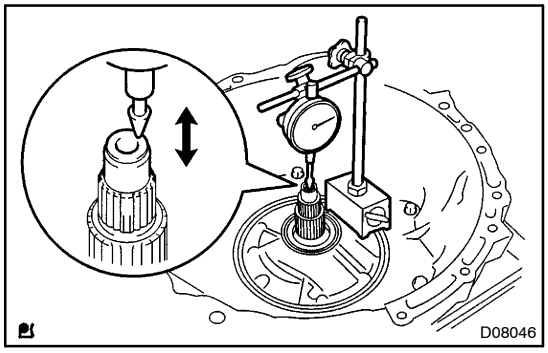


28. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using a screwdriver, remove the oil seal from the transaxle case.

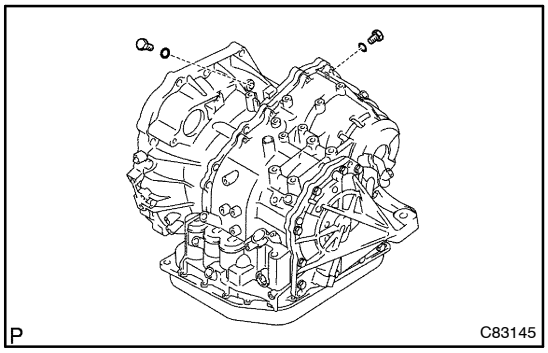
29. FIX AUTOMATIC TRANSAXLE ASSY

(a) Fix the transaxle case with the oil pump side facing up.



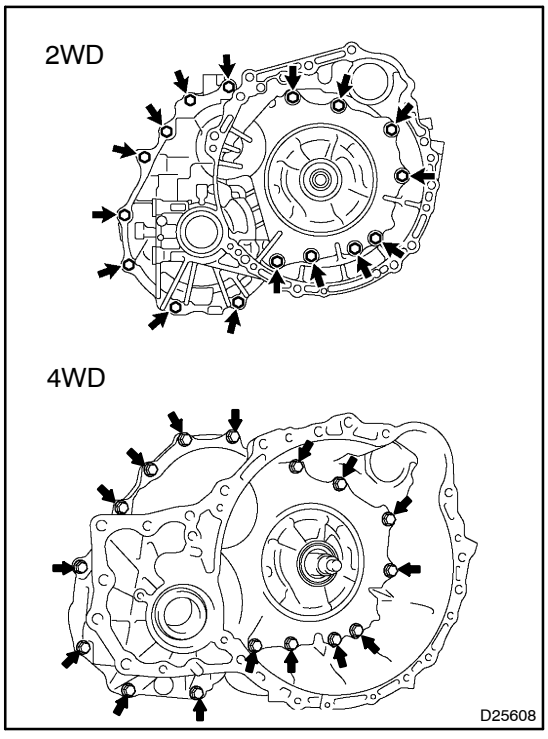
30. INSPECT INPUT SHAFT ENDPLAY

(a) Using a dial indicator, measure the input shaft end play.
End play: 0.262 – 1.249 mm (0.0103 – 0.0492 in.)



31. REMOVE TRANSAXLE CASE NO.1 PLUG

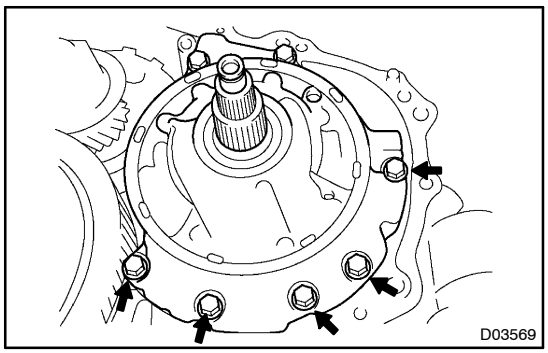
(a) Remove the 2 transaxle case No 1 plugs.
(b) Remove 2 O–rings from the 2 transaxle case No. 1 plugs.



32. REMOVE TRANSAXLE HOUSING

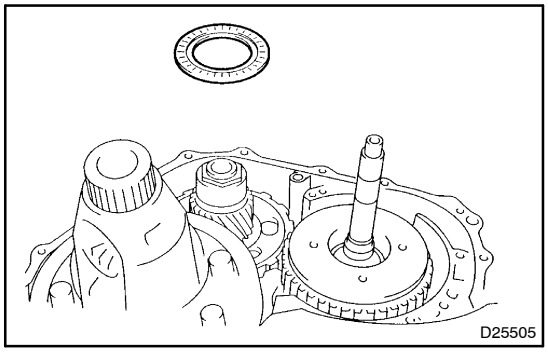
(a) Remove the 16 bolts.
(b) Tap on the circumference of the transaxle housing with a plastic hammer to remove the transaxle housing from the transaxle case.

NOTICE:
Differential may be accidentally removed when the transaxle housing is removed.



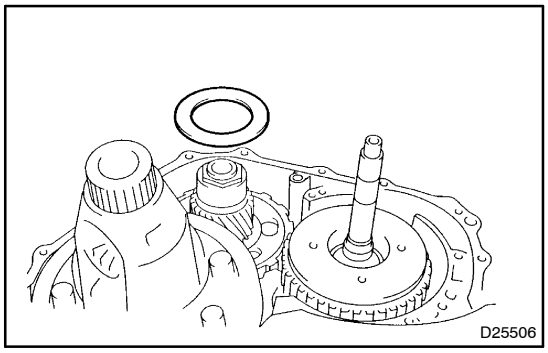
33. REMOVE OIL PUMP ASSY

(a) Remove the 7 bolts and oil pump from the transaxle case.



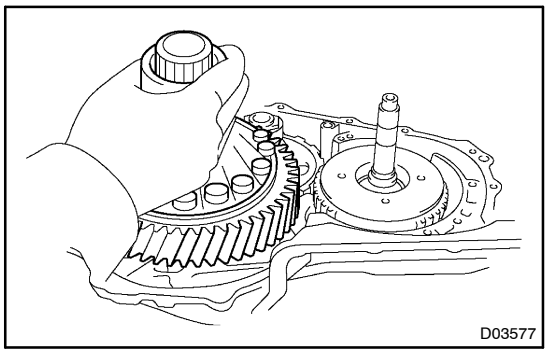
34. REMOVE THRUST NEEDLE ROLLER BEARING

(a) Remove thrust needle roller bearing from the U/D planetary gear assy.



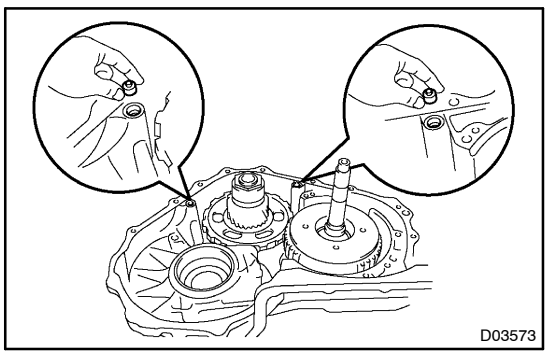
35. REMOVE THRUST BEARING UNDERDRIVE RACE NO.2

(a) Remove thrust bearing U/D race No. 2 from the U/D planetary gear assy.



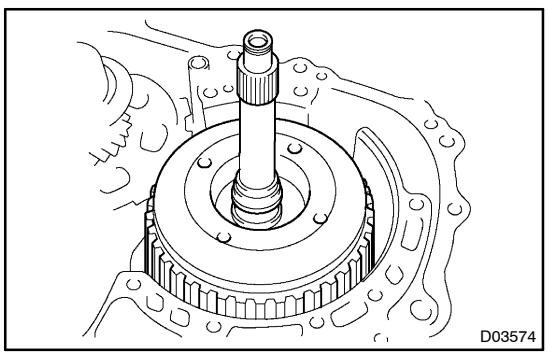
36. REMOVE DIFFERENTIAL GEAR ASSEMBLY

(a) Remove the differential gear assy from the transaxle case.



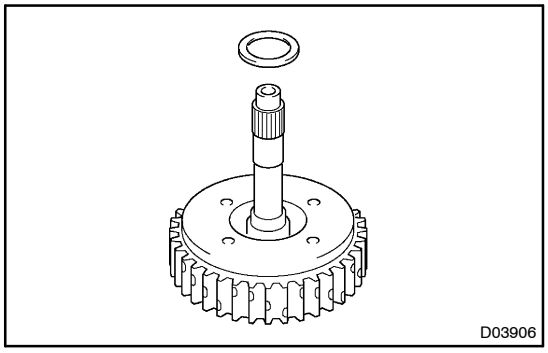
37. REMOVE OVERDRIVE BRAKE GASKET

(a) Remove 2 O/D brake gaskets from the transaxle case.

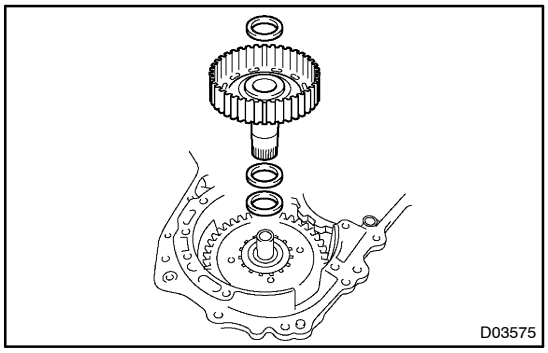


38. REMOVE FORWARD CLUTCH ASSY

(a) Remove the forward clutch from the transaxle case.

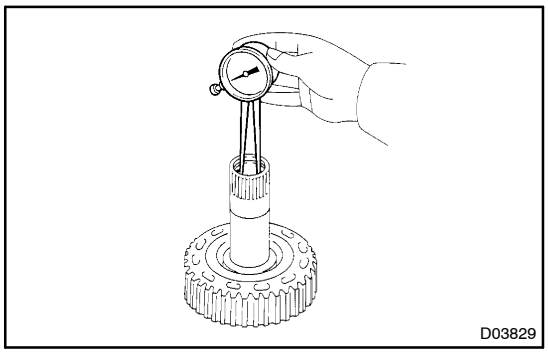


(b) Remove the thrust bearing from the forward clutch.



39. REMOVE MULTIPLE DISC CLUTCH CLUTCH HUB

(a) Remove the thrust bearing, multiple clutch hub, needle roller bearing and bearing race from the transaxle case.



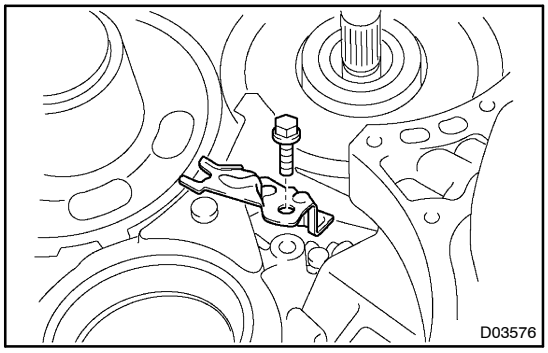
40. INSPECT MULTIPLE DISC CLUTCH CLUTCH HUB

(a) Using a dial indicator, measure the inside diameter of the forward clutch hub bushing
Standard inside diameter:
23.025 – 23.045 mm (0.9065 – 0.9073 in.)
Maximum inside diameter: 23.09 mm (0.9091 in.)

NOTICE:

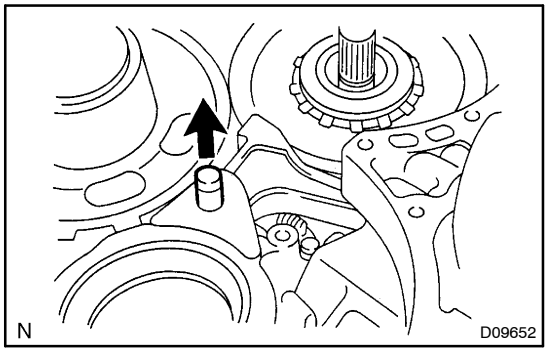
- **When the diameter is over the maximum, replace the multiple disc clutch hub with new one.**
- **Check the contact surface of the bush in the direct clutch shaft. If any scratch or discolor is identified, replace the direct clutch sub–assy with new one.**

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

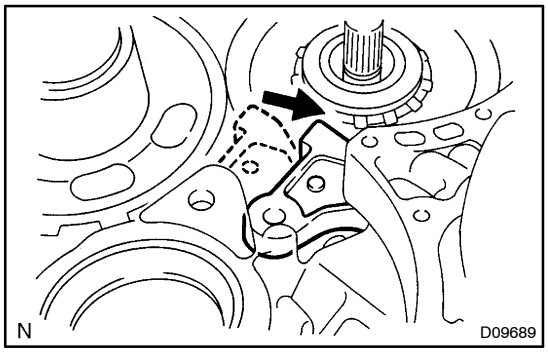


41. REMOVE UNDERDRIVE PLANETARY GEAR ASSY

(a) Remove the bolt and parking pawl shaft clamp.



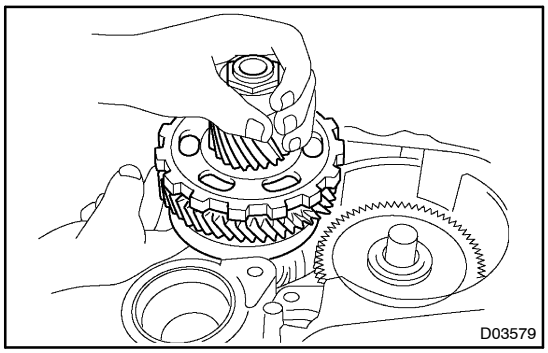
(b) Remove the parking lock pawl shaft.



(c) Push the parking lock pawn.

HINT:

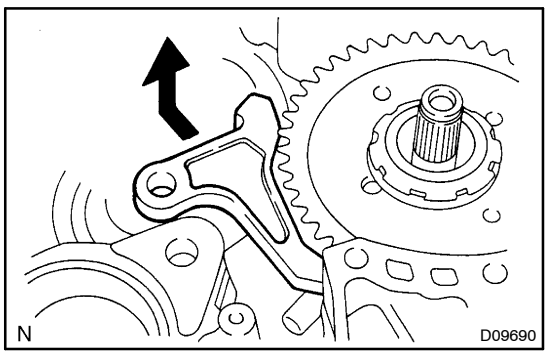
Failure to do so will cause interference when the U/D planetary gear is removed.



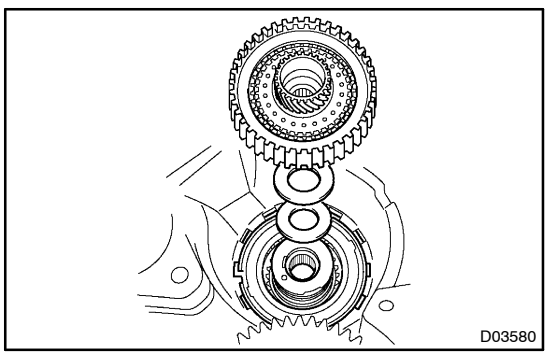
(d) Remove the U/D planetary gear assy from the transaxle case.

NOTICE:

Be careful so that the U/D planetary gear assy will not fall out.

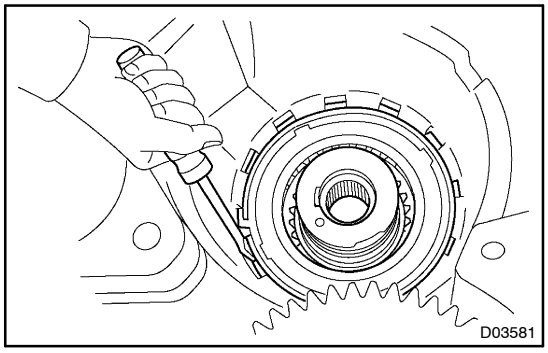


(e) Remove the spring, pawl pin and parking lock pawl.



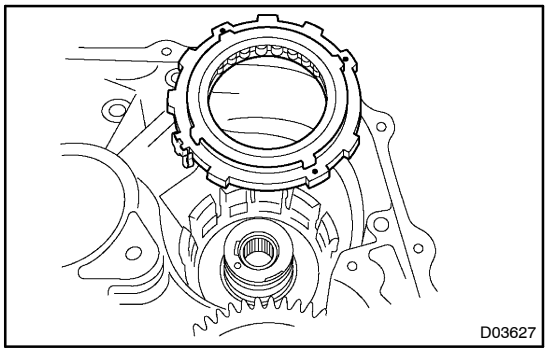
42. REMOVE UNDERDRIVE CLUTCH ASSY

(a) Remove the U/D clutch assy, thrust bearing and bearing race from the transaxle case.

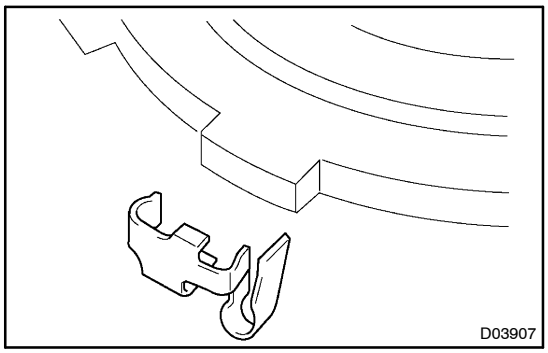


43. REMOVE UNDERDRIVE 1 WAY CLUTCH ASSY

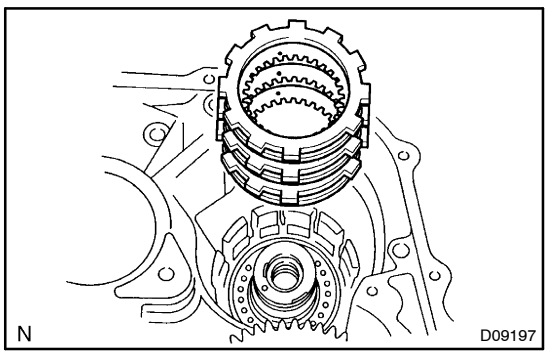
(a) Using a screwdriver, remove the snap ring from the transaxle case.



(b) Remove the 1–way clutch from the transaxle case.

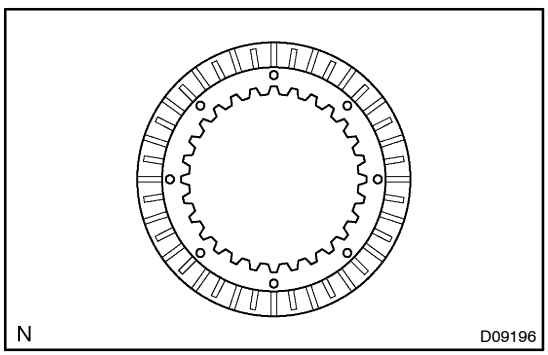


(c) Remove the outer race retainer from the 1–way clutch.



44. REMOVE UNDERDRIVE CLUTCH DISC NO.2

(a) Using a screwdriver, remove the snap ring.
(b) 1MZ–FE:
Remove the flange, 4 discs and 4 plates from the transaxle case.
(c) 2AZ–FE:
Remove the flange, 3 discs and 3 plates from the transaxle case.



45. INSPECT UNDERDRIVE CLUTCH DISC NO.2

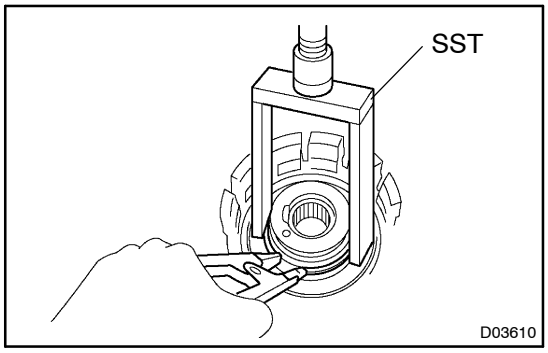
(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

NOTICE:

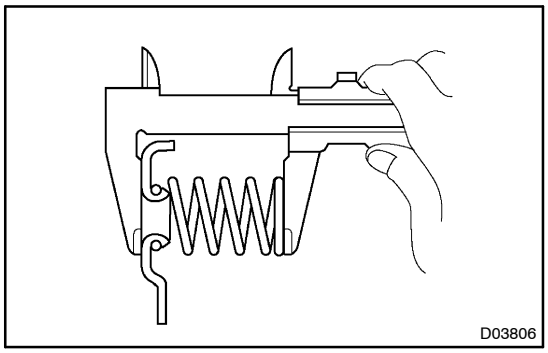
- **If the lining of the disc is peeling off or discolored, or even if a part of the groove is defaced, replace all discs.**

- **Before assembling new discs, soak them in ATF for at least 15 minutes.**



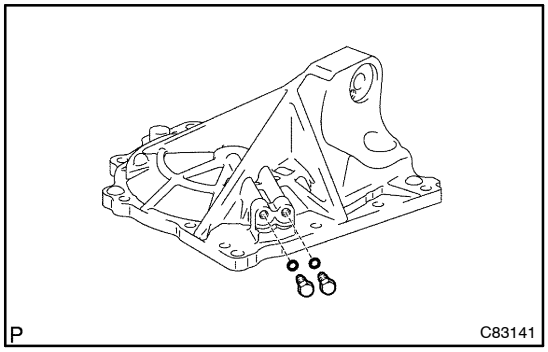
46. REMOVE UNDERDRIVE BRAKE RETURN SPRING SUB–ASSY

(a) Using SST, a snap ring expander and a press, remove the snap ring and piston return spring.
SST 09387–00020



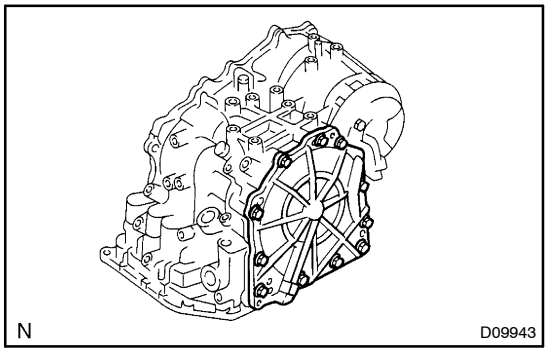
47. INSPECT UNDERDRIVE BRAKE RETURN SPRING SUB–ASSY

(a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 14.04 mm (0.5528 in.)



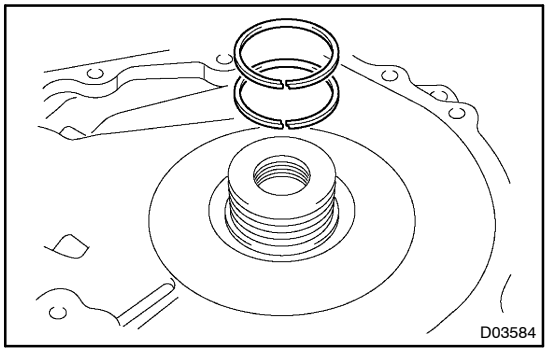
48. REMOVE TRANSAXLE CASE NO.1 PLUG

(a) Remove 2 transaxle case No. 1 plugs from the transaxle rear cover.
(b) Remove 2 O–rings from the 2 transaxle case No. 1 plugs.

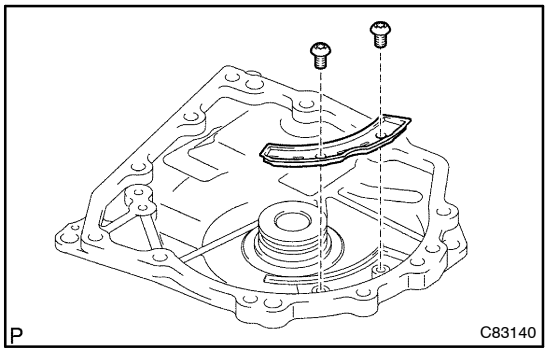


49. REMOVE TRANSAXLE REAR COVER SUB–ASSY

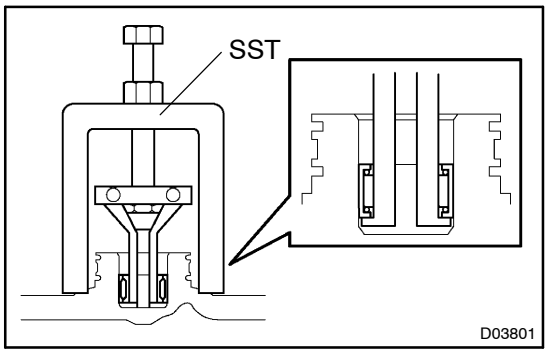
(a) Remove the 11 bolts.
(b) Tap in the circumference of the rear cover with a plastic hammer to remove the transaxle rear cover from the transaxle case.



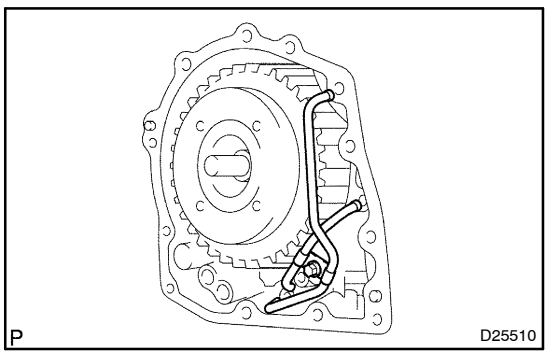
(c) Remove the 2 oil seal rings from the transaxle rear cover.



(d) Using a torx socket wrench (T30), remove the 2 screws and transaxle rear cover plate.



(e) Using SST, remove the needle–roller bearing from the transaxle rear cover.
SST 09387–00040 (09387–01010, 09387–01030, 09387–01040)

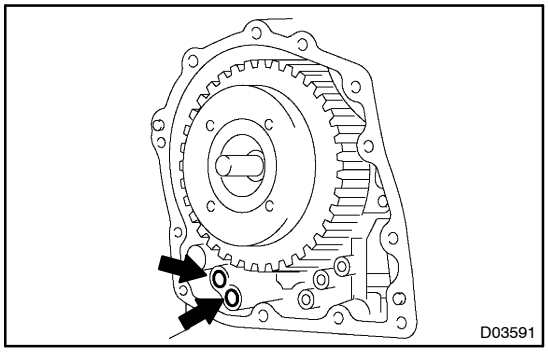


50. REMOVE BRAKE APPLY TUBE

(a) Remove a bolt, clamp and 2 brake apply tubes.
(b) Remove the brake apply tube from the clamp.

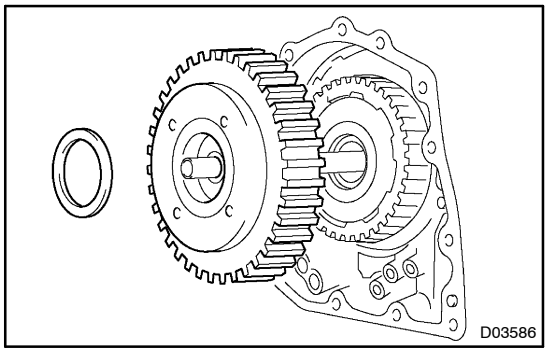
51. REMOVE FRONT CLUTCH APPLY TUBE

(a) Remove the front clutch apply tube from the clamp.



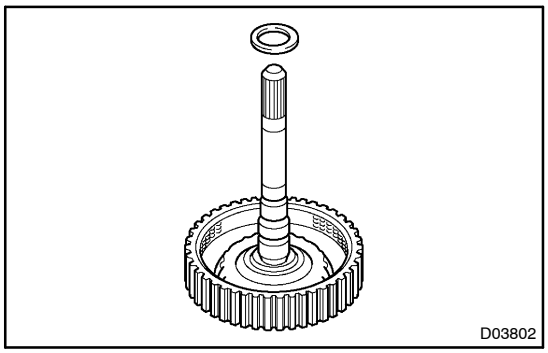
52. REMOVE GOVERNOR APPLY GASKET NO.1

(a) Using a screwdriver, remove the 2 apply gaskets.

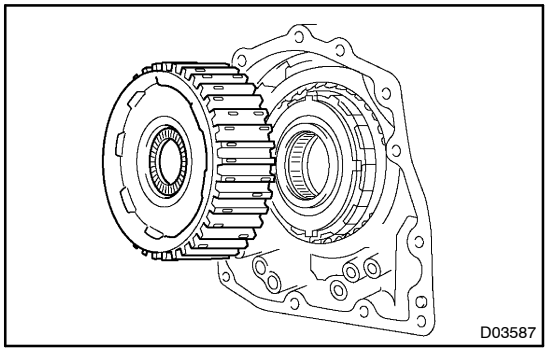


53. REMOVE DIRECT CLUTCH ASSY

(a) Remove the thrust bearing and the direct clutch assy from the transaxle case.

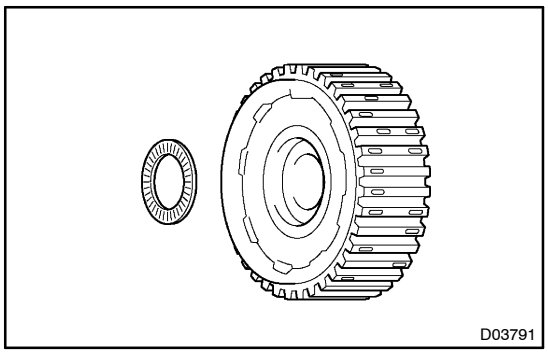


(b) Remove the bearing race from the direct clutch.

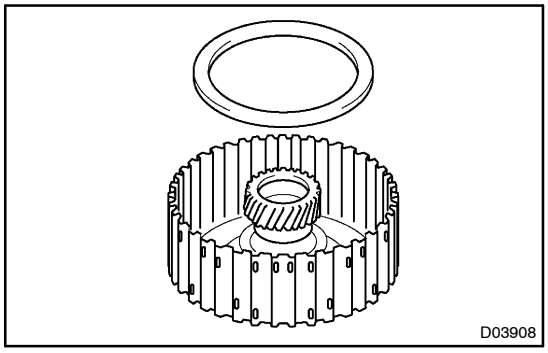


54. REMOVE REAR PLANETARY SUN GEAR ASSY

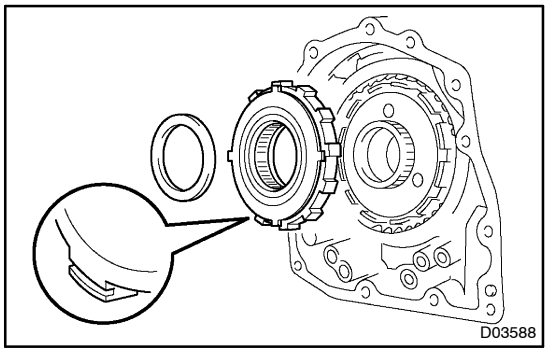
(a) Remove the rear planetary sun gear assy from the transaxle case.



(b) Remove the thrust bearing from the rear planetary sun gear.

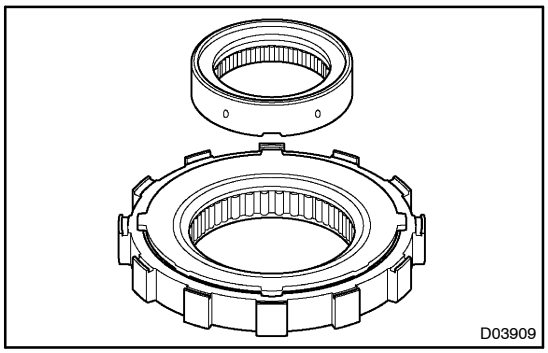


(c) Remove the thrust washer No. 1 from the rear planetary sun gear.

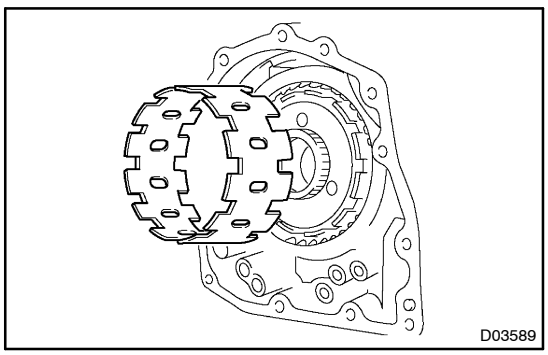


55. REMOVE 1 WAY CLUTCH ASSY

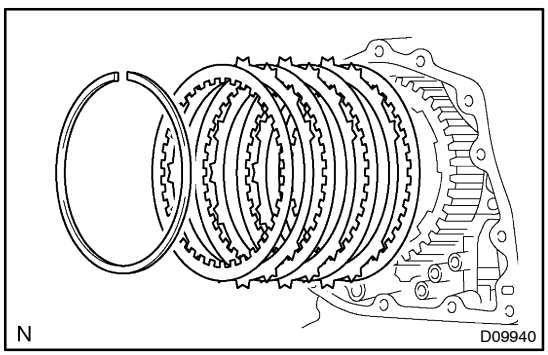
(a) Remove the 1–way clutch and the thrust bearing from the transaxle case.



(b) Remove the inner race from the 1–way clutch.

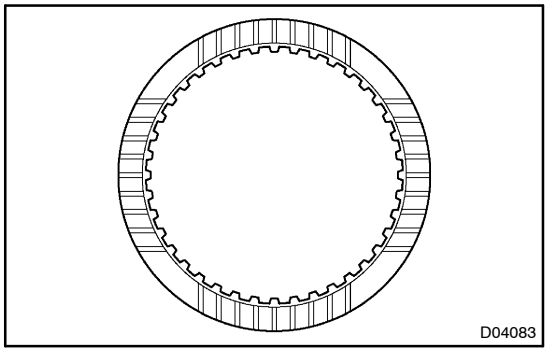


56. REMOVE 1WAY CLUTCH SLEEVE OUTER



57. REMOVE 2ND BRAKE CLUTCH DISC

(a) Using a screwdriver, remove the snap ring.
(b) 1MZ–FE:
Remove the flange, 4 discs and 4 plates from the transaxle case.
(c) 2AZ–FE:
Remove the flange, 3 discs and 3 plates from the transaxle case.



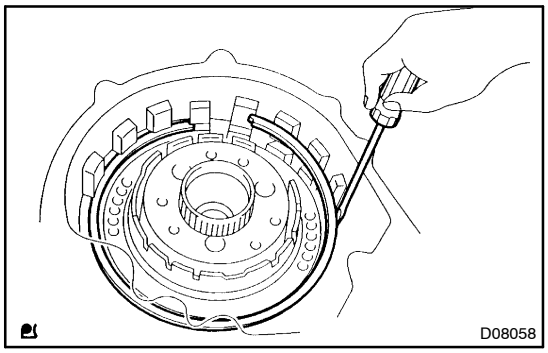
58. INSPECT 2ND BRAKE CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

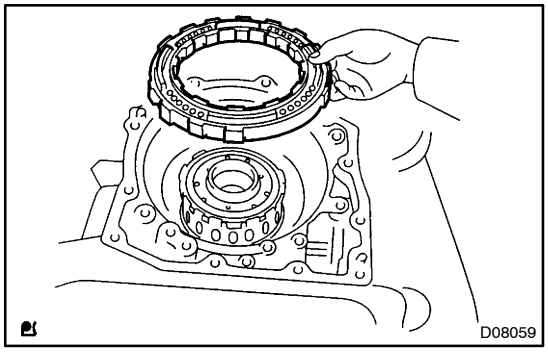
NOTICE:

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

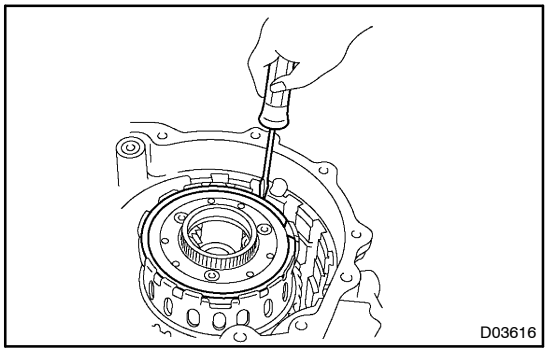


59. REMOVE SECOND BRAKE PISTON ASSY

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

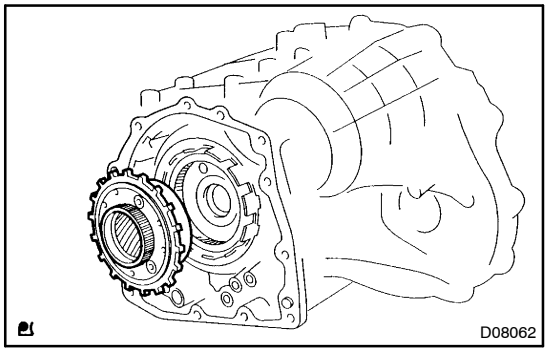


(b) Remove the 2nd brake piston assy from the transaxle case.

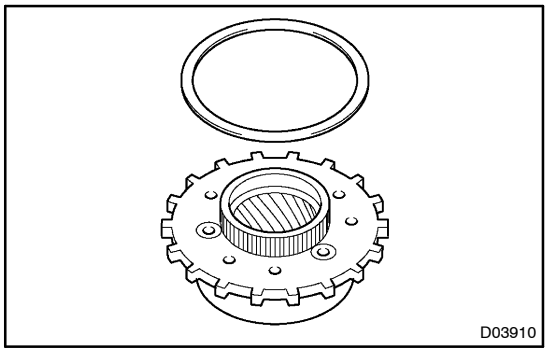


60. REMOVE REAR PLANETARY GEAR ASSY

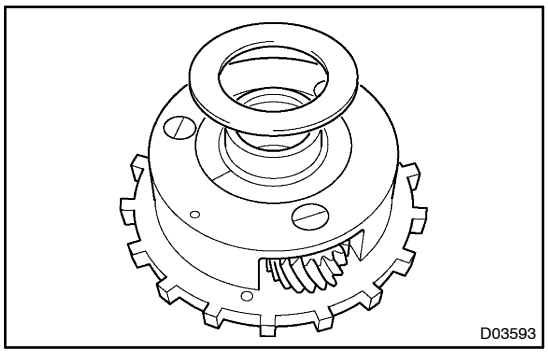
(a) Using a screwdriver, remove the snap ring.



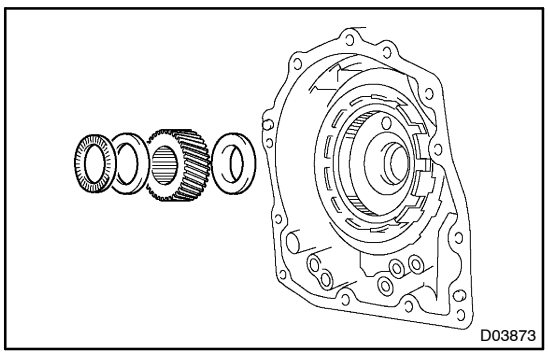
(b) Remove the rear planetary gear from the transaxle case.



(c) Remove the planetary carrier thrust washer No. 1 from the rear planetary gear.

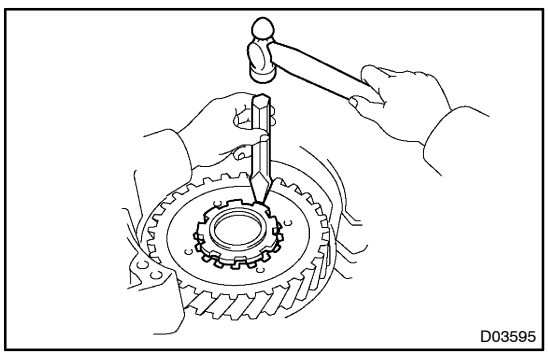


(d) Remove the bearing race from the rear planetary gear.



61. REMOVE INPUT SUN GEAR

(a) Remove the 2 thrust bearings, the bearing race and the input sun gear from the transaxle case.

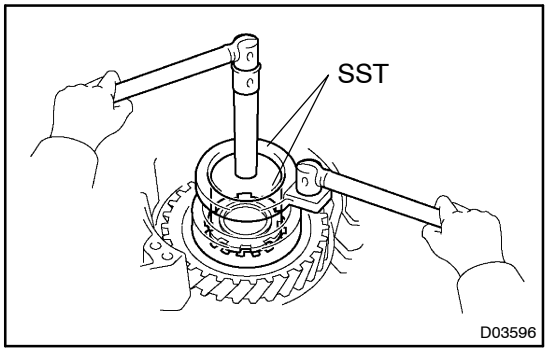


62. REMOVE FRONT PLANETARY GEAR ASSY

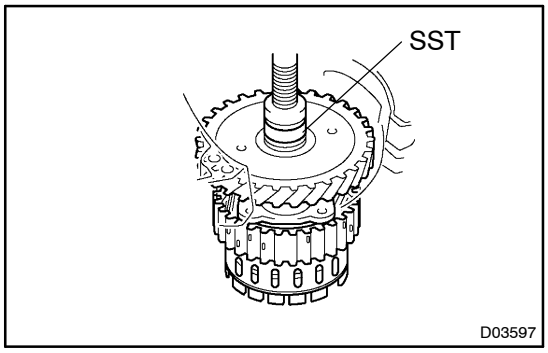
(a) Using a chisel and a hammer, unstake the lock washer.

NOTICE:

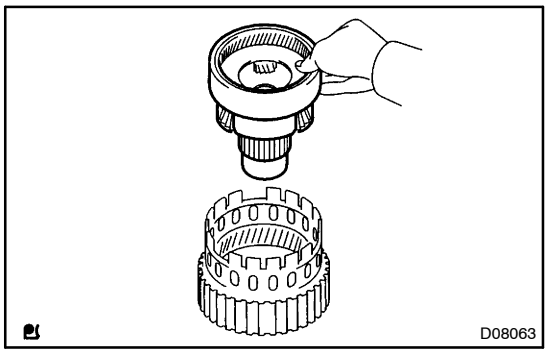
Push down all claws of the washer. Otherwise SST can not be fully pressed against the nut and can not loosen the nut.



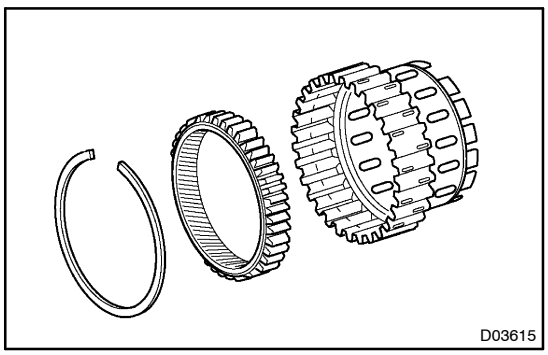
(b) Using SST, remove the nut.
SST 09387–00030, 09387–00080



(c) Using SST and a press, remove the front planetary gear assy from the counter drive gear.
SST 09950–60010 (09951–00450)

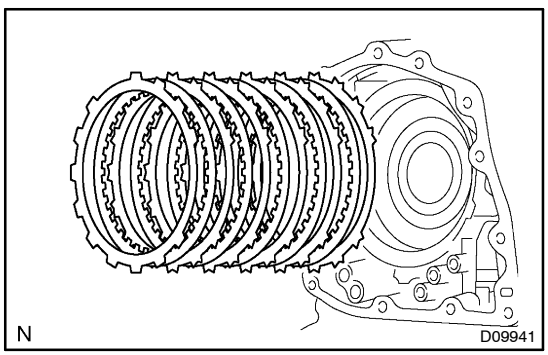


(d) Remove front planetary gear assy from the brake hub.



63. REMOVE FRONT PLANETARY RING GEAR

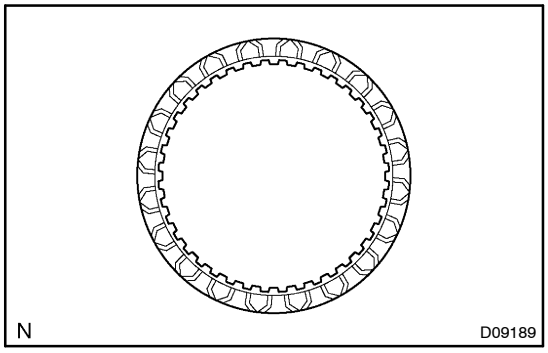
(a) Using a screwdriver, remove the snap ring and front planetary ring gear from the brake hub.



64. REMOVE 1ST & REVERSE BRAKE CLUTCH DISC

(a) 1MZ–FE:
Remove the flange, 7 discs and 7 plates from the transaxle case.

(b) 2AZ–FE:
Remove the flange, 5 discs and 5 plates from the transaxle case.



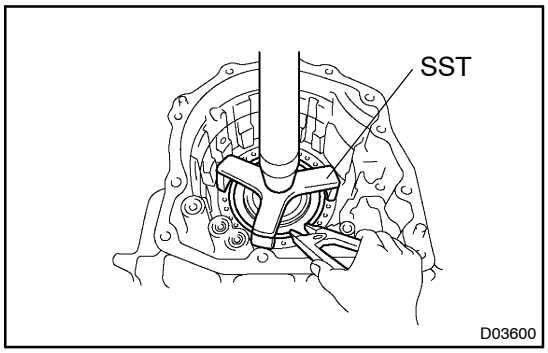
65. INSPECT 1ST & REVERSE BRAKE CLUTCH DISC

(a) Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

NOTICE:

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

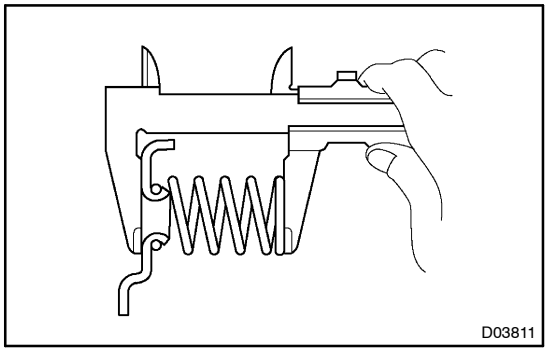


66. REMOVE 1ST & REVERSE BRAKE RETURN SPRING SUB–ASSY

(a) Using SST, a press and a snap ring expander, remove snap ring and the piston return spring.
SST 09387–00070

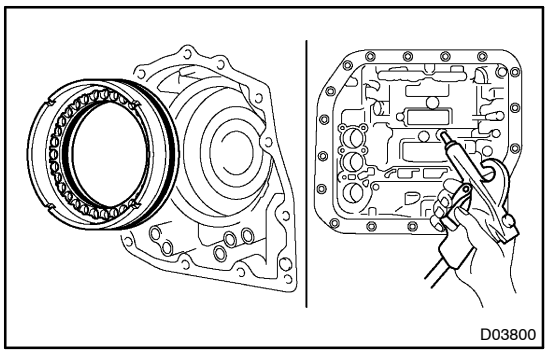
NOTICE:

- **Stop the press when the spring sheet is lowered 1 – 2 mm (0.039 – 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



67. INSPECT 1ST & REVERSE BRAKE RETURN SPRING SUB–ASSY

(a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 15.51 mm (0.6106 in.)

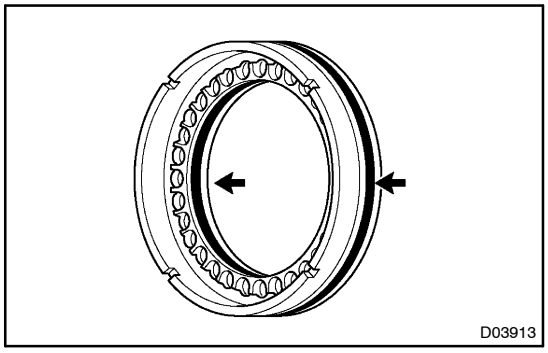


68. REMOVE 1ST & REVERSE BRAKE PISTON

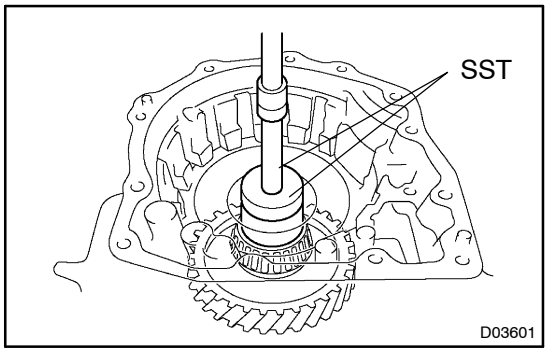
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove 1st & reverse brake piston.

NOTICE:

- **Blowing off the air may cause the piston jump–out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air–blowing.**

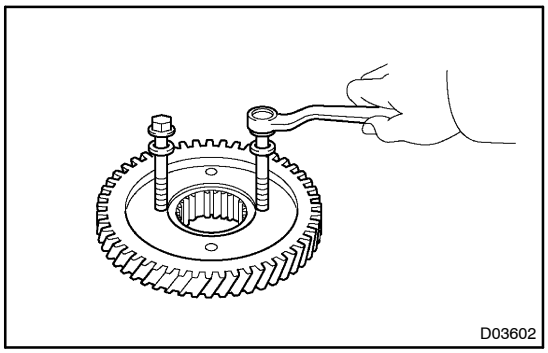


(b) Remove 2 O–rings from the 1st & reverse brake piston.

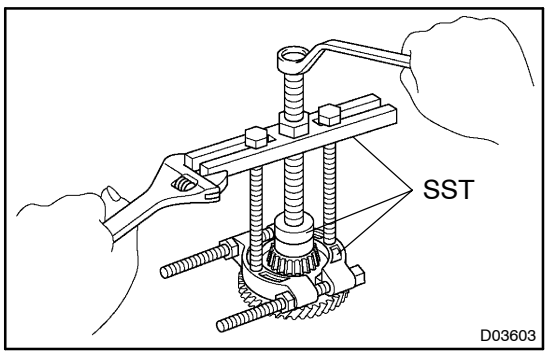


69. REMOVE COUNTER DRIVE GEAR

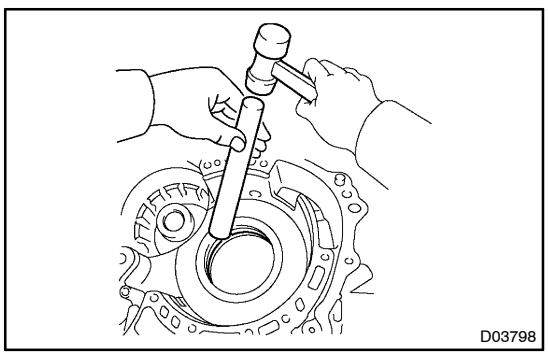
(a) Using SST and a press, remove the counter drive gear from the transaxle case.
SST 09950–60010 (09951–00580), 09950–70010 (09951–07100)



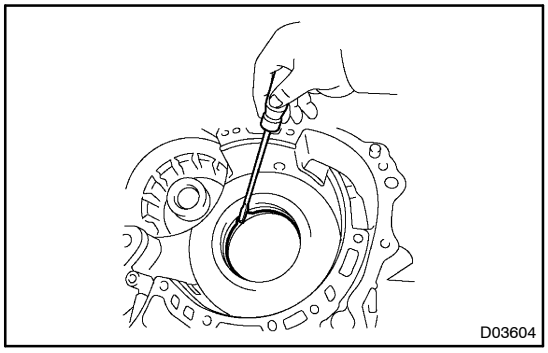
(b) As shown in the illustration, tighten 2 bolts evenly and make clearance of approx. 20.0 mm (0.797 in.) between the counter drive gear and the inner race.



(c) Using SST, remove the tapered roller bearing.
SST 09950–60010 (09951–00580), 09950–00020, 09950–00030



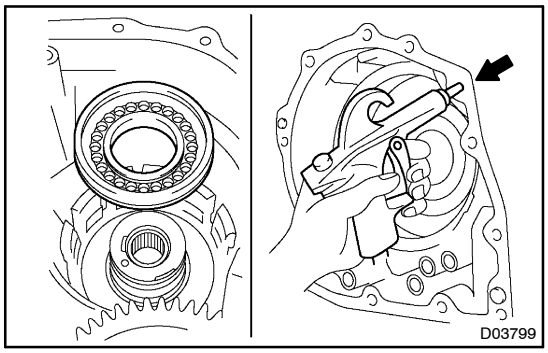
(d) Using a brass bar and a hammer, remove the 2 bearing outer races.



70. REMOVE COUNTER DRIVE GEAR HOLE SNAP RING

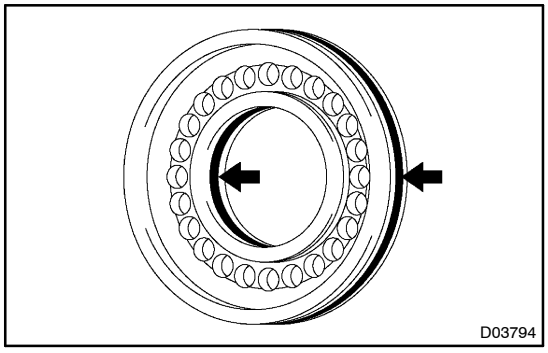
(a) Using a screwdriver, remove the snap ring from the transaxle case.

71. REMOVE BREATHER PLUG NO.2 (ATM)

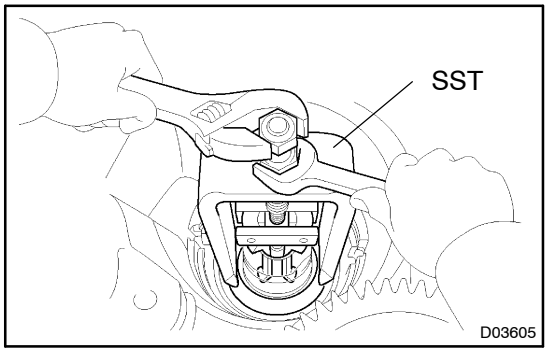


72. REMOVE UNDERDRIVE BRAKE PISTON

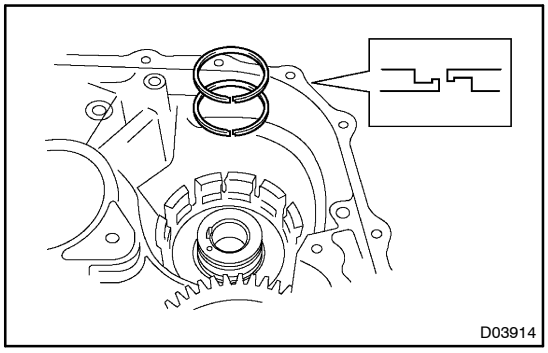
(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove the U/D brake piston.



(b) Remove the 2 O–rings from the U/D brake piston.

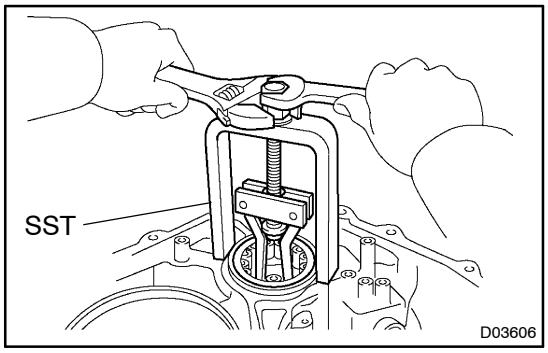


(c) Using SST, remove the needle–roller bearing from the transaxle case.
SST 09387–00040 (09387–01020, 09387–01030, 09387–01040)



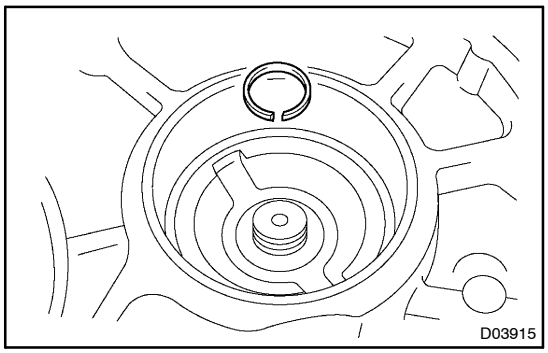
73. REMOVE UNDERDRIVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 2 oil seal rings from the transaxle case.



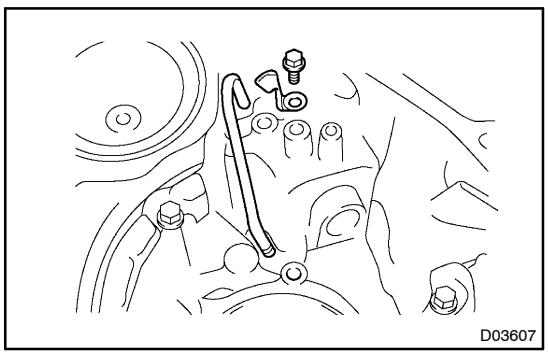
74. REMOVE UNDERDRIVE CYLINDRICAL ROLLER BEARING

(a) Using SST, remove the cylindrical roller bearing from the transaxle case.
SST 09514–35011



75. REMOVE UNDERDRIVE OUTPUT SHAFT OIL SEAL RING

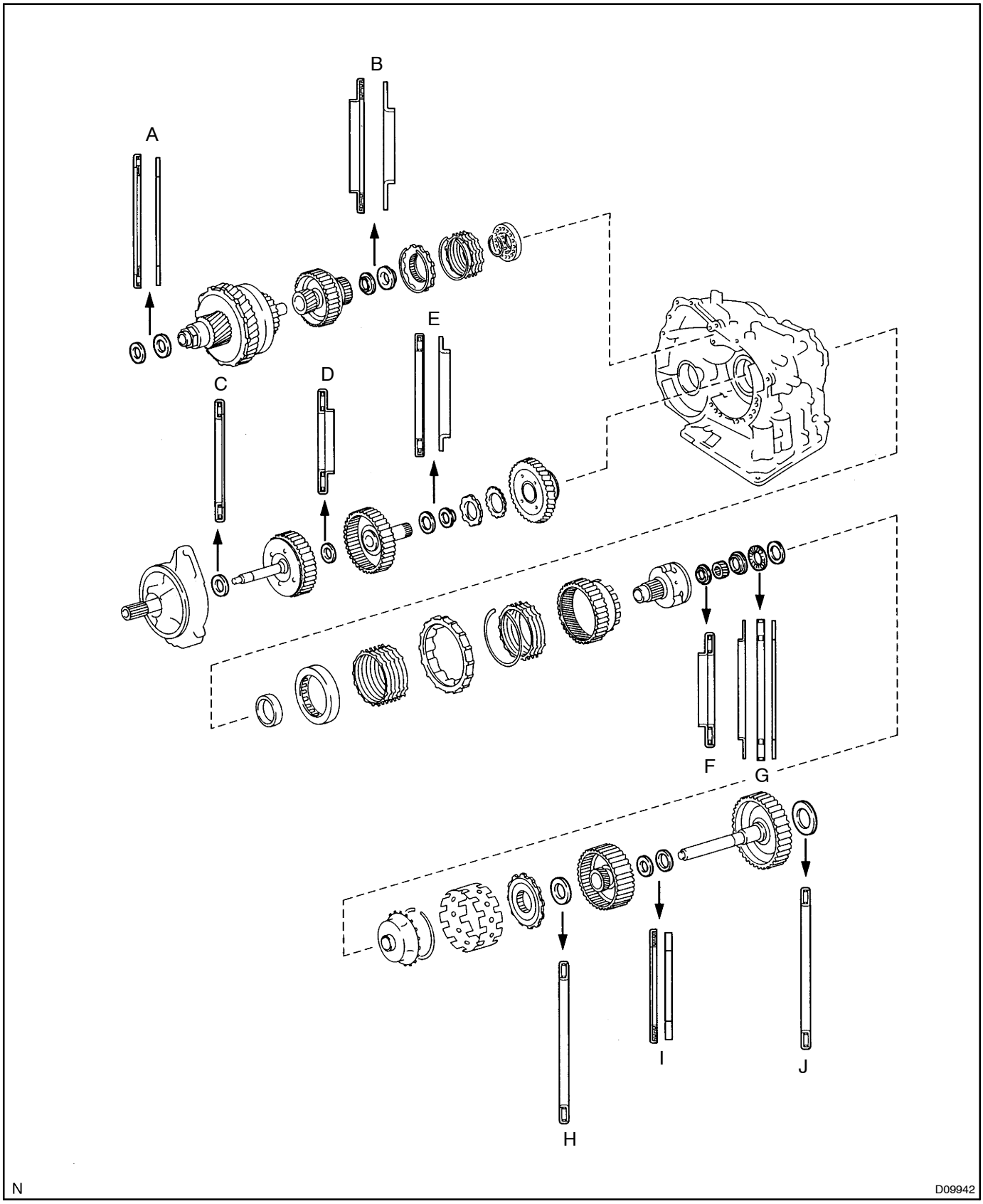
(a) Remove the oil seal ring from the transaxle housing.



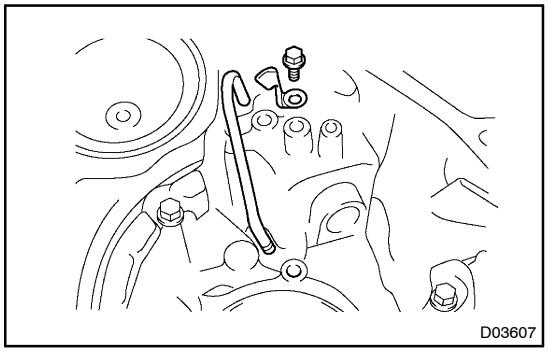
76. REMOVE DIFFERENTIAL GEAR LUBE APPLY TUBE

(a) Remove the bolt, the clamp and the apply tube from the transaxle case.

77. BEARING POSITION



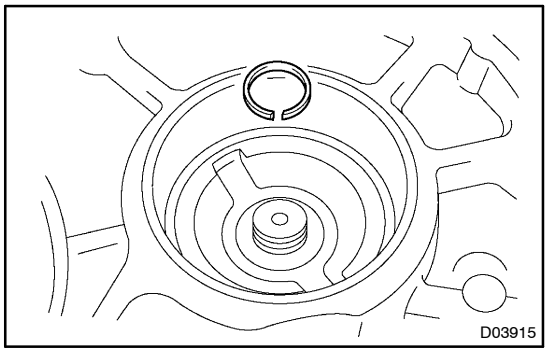
Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	–	57.2 (2.252) / 84.96 (3.3449)	56.4 (2.220) / 83.0 (3.268)
B	–	37.73 (1.4854) / 58.0 (2.283)	29.9 (1.177) / 55.5 (2.185)
C	–	33.85 (1.3327) / 52.2 (2.055)	–
D	–	23.5 (0.925) / 44.0 (1.732)	–
E	–	36.3 (1.429) / 52.2 (2.055)	34.5 (1.358) / 48.5 (1.909)
F	–	34.6 (1.362) / 52.2 (2.055)	–
G	40.3 (1.587) / 58.0 (2.283)	38.6 (1.520) / 60.0 (2.362)	38.6 (1.520) / 58.0 (2.283)
H	–	53.6 (2.110) / (69.6 (2.740)	–
I	–	33.8 (1.331) / 48.2 (1.898)	30.3 (1.193) / 46.0 (1.811)
J	–	53.6 (2.110) / 70.18 (2.763) or 69.6 (2.740)	–



78. INSTALL DIFFERENTIAL GEAR LUBE APPLY TUBE

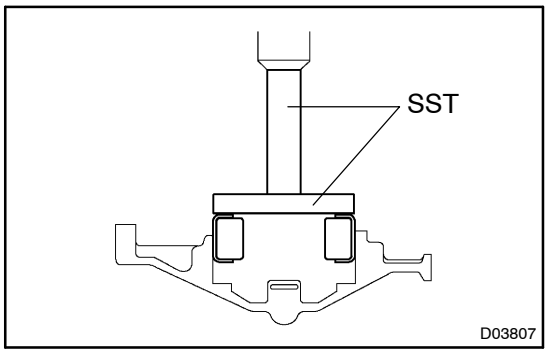
(a) Install the apply tube, and clamp with the bolt to the transaxle housing.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

NOTICE:
Make sure to insert the pipe to the stopper.



79. INSTALL UNDERDRIVE OUTPUT SHAFT OIL SEAL RING

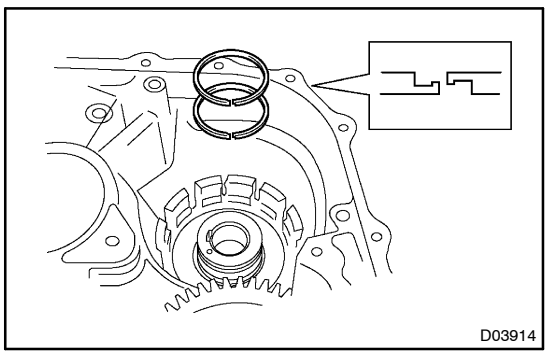
(a) Install the new oil seal ring to the transaxle housing.



80. INSTALL UNDERDRIVE CYLINDRICAL ROLLER BEARING

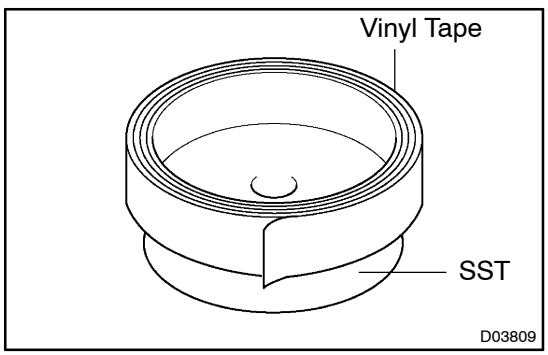
(a) Using SST and a press, install the U/D cylindrical roller bearing.
SST 09950–60020 (09951–00810), 09950–70010 (09951–07100)

NOTICE:
Do not apply excessive pressure to it.



81. INSTALL UNDERDRIVE CLUTCH DRUM OIL SEAL RING

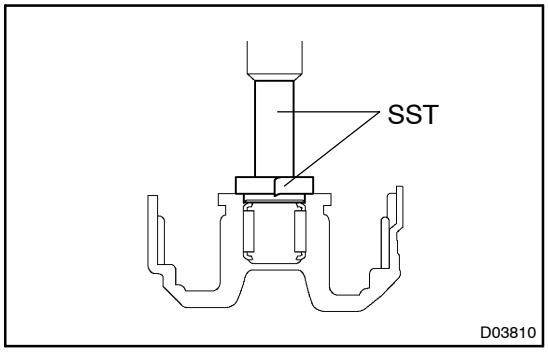
(a) Install the new 2 oil seal rings to the transaxle case.



82. INSTALL UNDERDRIVE BRAKE PISTON

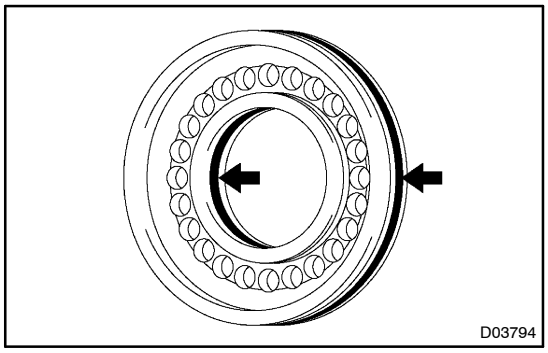
(a) Wind a vinyl tape around SST at the place 4.0 mm (0.157 in.) above from the bottom end until the thickness of the wound tape is about 5.0 mm (0.197 in.).
SST 09950–60010 (09951–00320)

NOTICE:
Clean SST to remove deposited oil, before winding a vinyl tape.

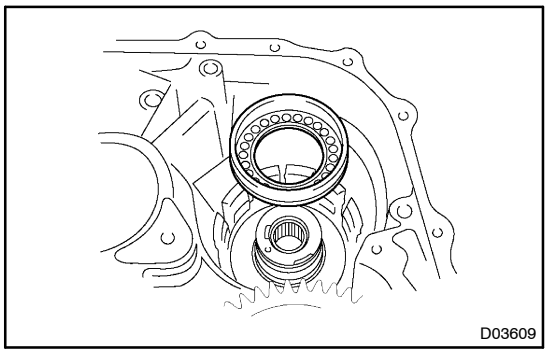


(b) Using SST and a press, install the needle–roller bearing to the transaxle case.
SST 09950–60010 (09951–00320), 09950–70010 (09951–07100)

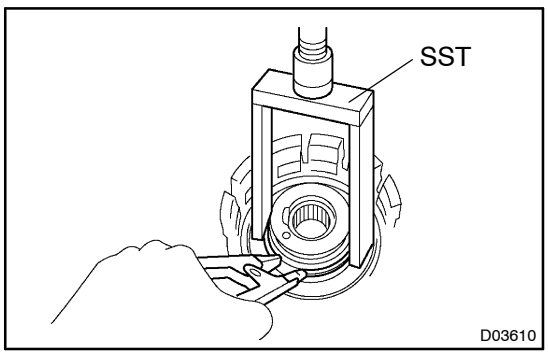
NOTICE:
When the wound vinyl tape contacts the transaxle case, stop press–fitting.



(c) Coat 2 new O–rings with ATF, install them to the U/D brake piston.



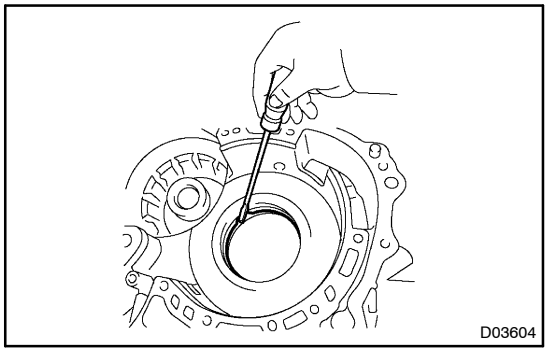
(d) Install the U/D brake piston to the transaxle case.



(e) Using SST, a snap ring expander and a press, install the piston return spring and snap ring to the transaxle case.
SST 09387–00020

NOTICE:
Do not apply excessive pressure to it.

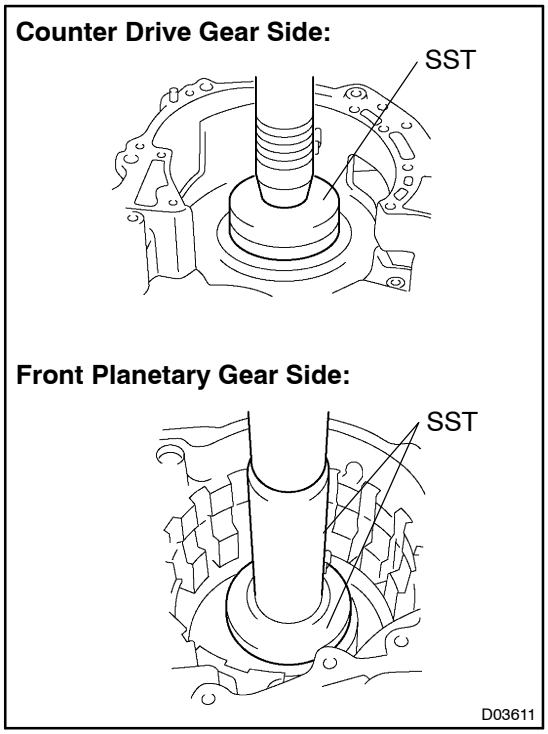
83. INSTALL BREATHER PLUG NO.2 (ATM)



84. INSTALL COUNTER DRIVE GEAR HOLE SNAP RING

(a) Using a screwdriver, instal the snap ring to the transaxle case.

Counter Drive Gear Side:

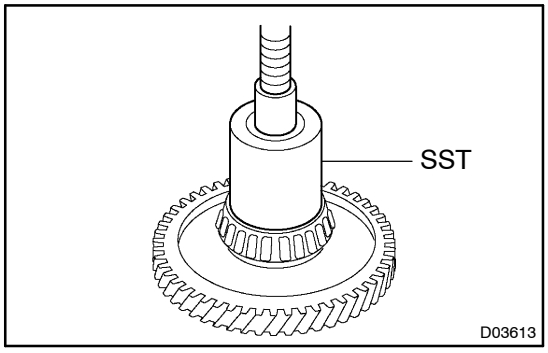


Front Planetary Gear Side:

85. INSTALL COUNTER DRIVE GEAR

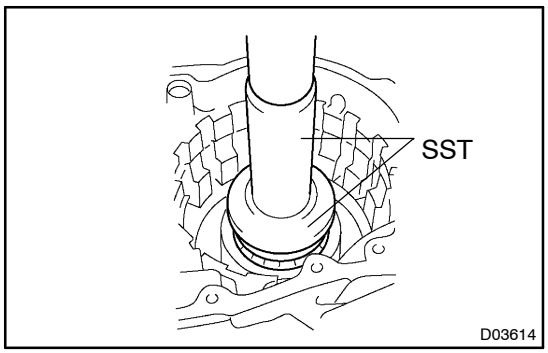
(a) Using SST and a press, instal the 2 bearings outer races to the transaxle case.
SST 09950–60020 (09951–00890), 09950–70010 (09951–07150)

NOTICE:
- **Press–fit the bearing race until it contacts the snap ring.**
- **Do not apply excessive pressure to it.**



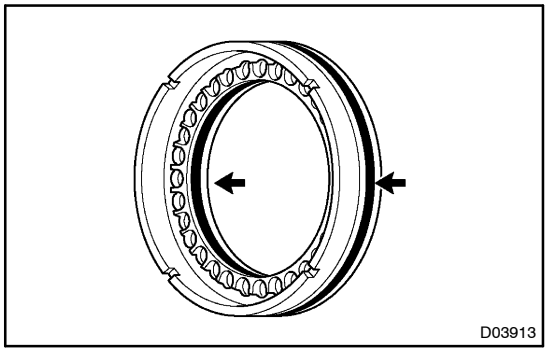
(b) Using SST and a press, install the tapered roller bearing to the counter drive gear.
SST 09649–17010

NOTICE:
- **Press–fit the bearing inner race until contacts the counter drive gear.**
- **Do not apply excessive pressure to it.**



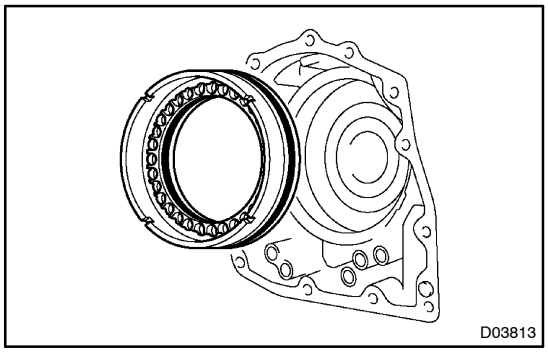
(c) Using SST and a press, install the counter drive gear and bearing to the transaxle case.
SST 09950–70010 (09951–07150), 09950–60020 (09951–00750)

NOTICE:
Do not apply excessive pressure to it.

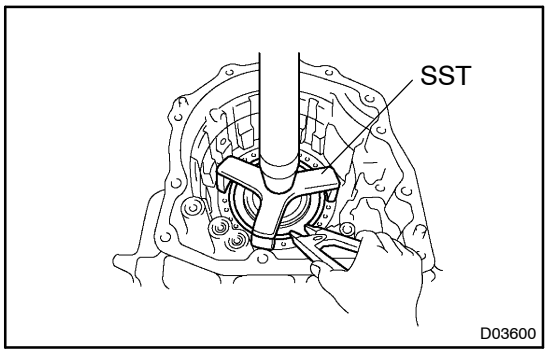


86. INSTALL 1ST & REVERSE BRAKE PISTON

(a) Coat 2 new O–rings with ATF.
(b) Install the 2 O–ring to the 1st & reverse brake piston.



(c) Coat a 1st & reverse brake piston with ATF, install it to the transaxle case.

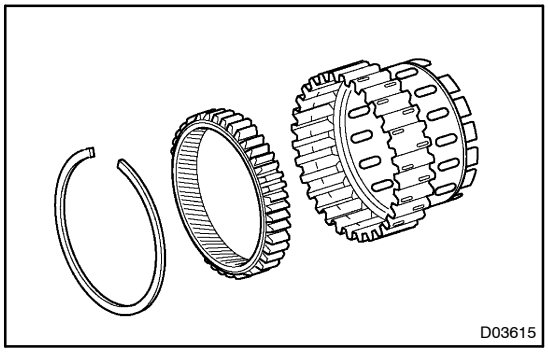


87. INSTALL 1ST & REVERSE BRAKE RETURN SPRING SUB–ASSY

(a) Using SST, a press and snap ring expander, install the piston return spring and snap ring to the transaxle case.
SST 09387–00070

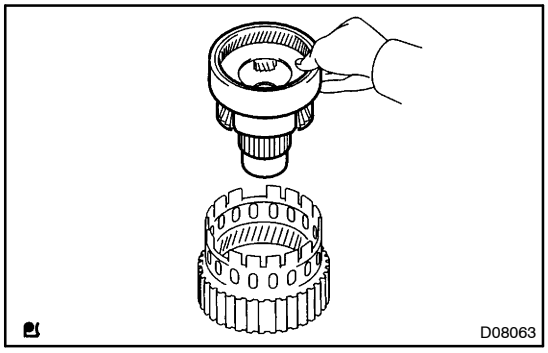
NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 – 2 mm (0.039 – 0.078 in.) from the snap ring groove, preventing the spring sheet from being deform.**
- **Do not expand the snap ring excessively.**



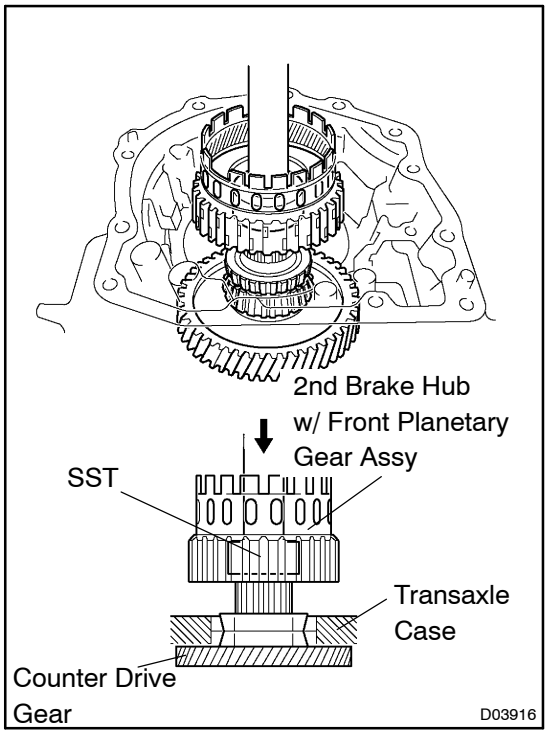
88. INSTALL FRONT PLANETARY RING GEAR

(a) Using a screwdriver, install the front planetary ring gear and snap ring to the brake hub.



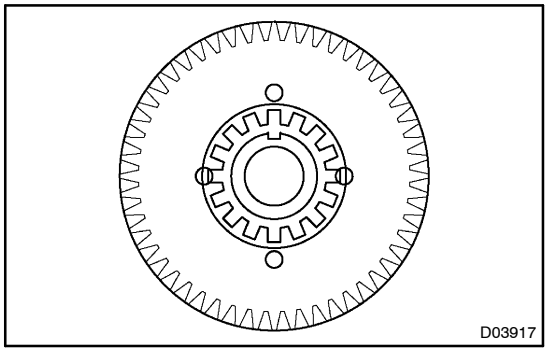
89. INSTALL FRONT PLANETARY GEAR ASSY

(a) Install the front planetary gear assy to the brake hub.

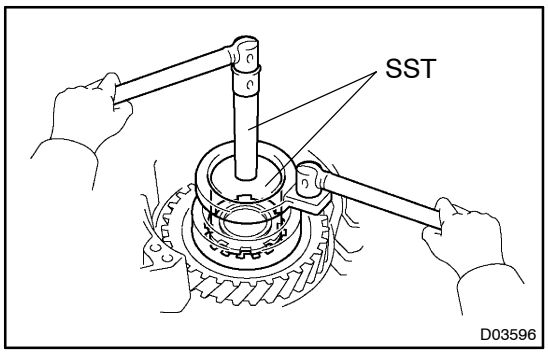


(b) Using SST and a press, press–fit the front planetary gear assy.
SST 09950–60010 (09951–00500), 09950–70010 (09951–07100)

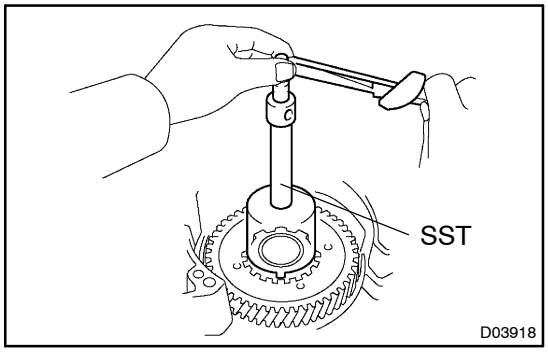
NOTICE:
Do not apply excessive pressure to it.



(c) Install the washer, as shown in the illustration.



(d) Using SST, install the nut.
SST 09387–00030, 09387–00080
Torque: 268 N·m (2,732 kgf·cm, 198 ft·lbf)



(e) Using SST and a torque wrench, measure the turning torque of the bearing while rotating SST at 60 rpm. When the measured value is not within the specified value, gradually tighten the nut until it reaches the specified value.

SST 09387–00080

Turning torque at 60 rpm:

New Bearing

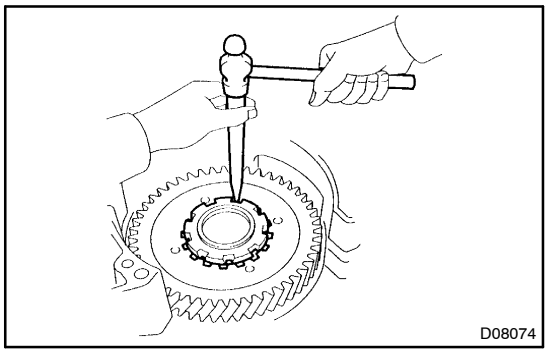
0.51 – 1.02 N·m (5.1 – 10.0 kgf·cm, 4.4 – 8.7 in.·lbf)

Used Bearing

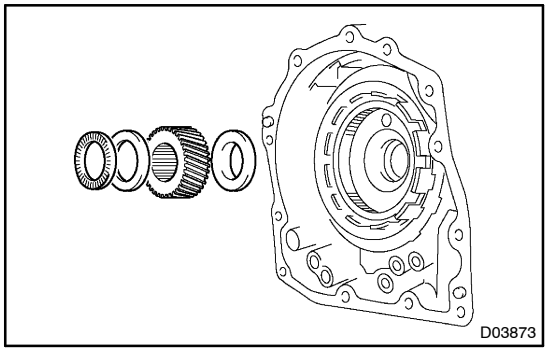
0.3 – 0.5 N·m (3.1 – 5.1 kgf·cm, 2.7 – 4.4 in.·lbf)

HINT:

Use a torque wrench with a fulcrum length of 160 mm (6.3 in.).



(f) Using a chesel and hammer, stake the front planetary gear washer.

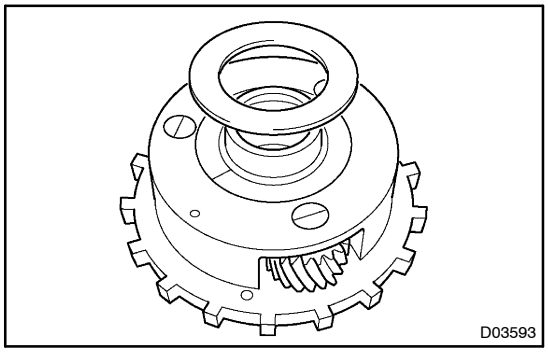


90. INSTALL INPUT SUN GEAR

(a) Install the 2 thrust bearings, the bearing race and the front planetary sun gear to the front planetary gear assy.

Bearing and race diameter: mm (in.)

	inside	outside
Bearing	34.6 (1.362)	52.2 (2.055)
Race	40.3 (1.587)	58.0 (2.283)
Bearing	38.6 (1.520)	60.0 (2.362)

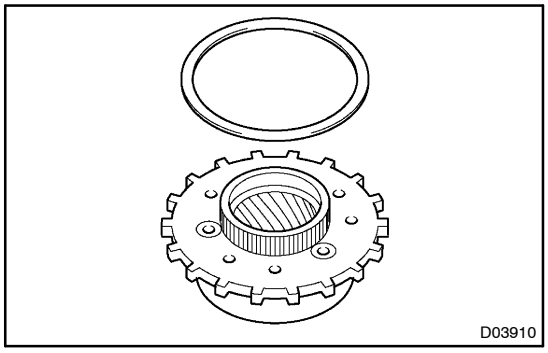


91. INSTALL REAR PLANETARY GEAR ASSY

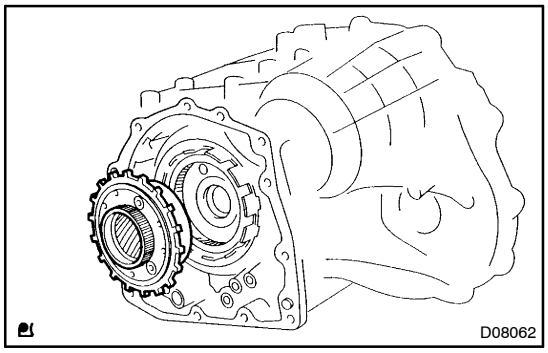
(a) Coat a bearing race with ATF, install it to the rear planetary gear assy.

Bearing race diameter: mm (in.)

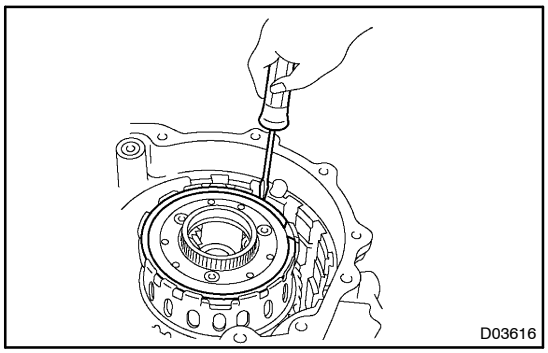
	inside	outside
Race	38.6 (1.520)	58.0 (2.283)



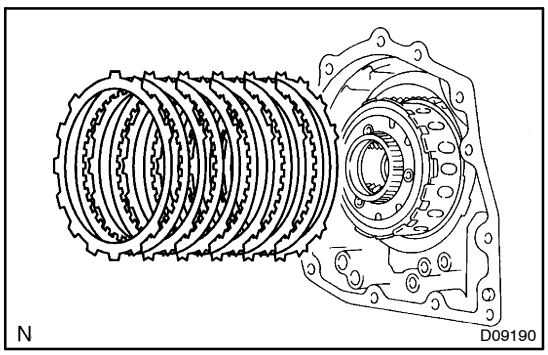
(b) Install the thrust washer No. 2.



(c) Install the rear planetary gear to the rear planetary ring gear.



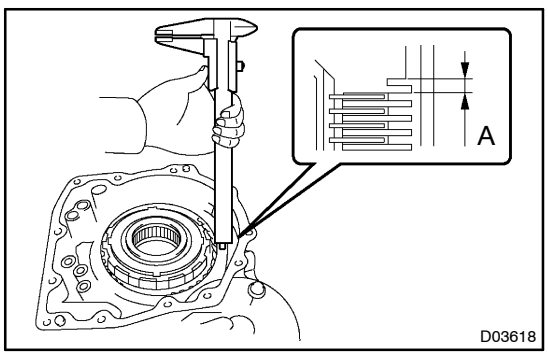
(d) Using a screwdriver, install the snap ring.



92. INSTALL 1ST & REVERSE BRAKE CLUTCH DISC

(a) 1MZ–FE:
Install the 7 plates and 7 discs.

(b) 2AZ–FE:
Install the 5 plates and 5 discs.



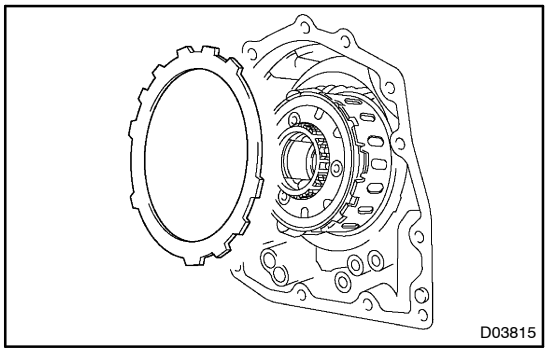
(c) Using vernier calipers,measure the distance between the disc surface and the contact surface of the 2nd brake cylinder and transaxle case.(Dimension A)

(d) Select an appropriate flange so that the pack clearance will meet the specified value.
Pack clearance:
1MZ–FE:
1.10 – 1.29 mm (0.0433 – 0.0508 in.)
2AZ–FE:
1.02 – 1.21 mm (0.0402 – 0.0476 in.)

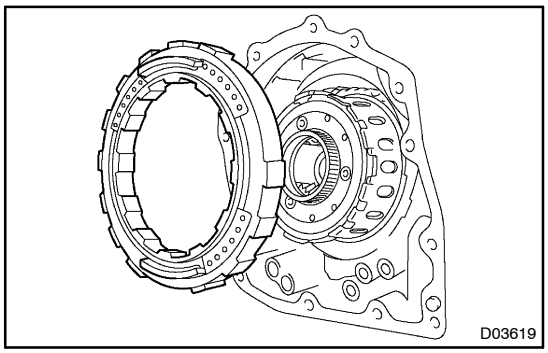
HINT:
Piston stroke = Dimension A –Flange thickness

Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	1.8 (0.071)	5	2.2 (0.087)
2	1.9 (0.075)	6	2.3 (0.091)
3	2.0 (0.079)	7	2.4 (0.094)
4	2.1 (0.083)	8	2.5 (0.098)



(e) Install the flange.



93. INSTALL SECOND BRAKE PISTON ASSY

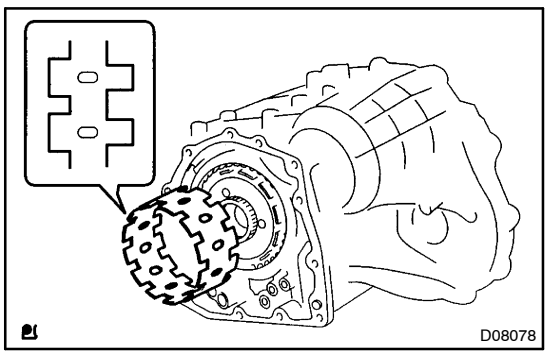
(a) Install the 2nd brake piston assy to the transaxle case.

(b) Install the snap ring and measure the inside diameter.

Inside diameter: More than 167 mm (6.57 in.)

NOTICE:

- **Because the taper snap ring has the positioning direction, check it when installing.**
- **When the diameter does not satisfy the specified value, replace the snap ring with new one.**

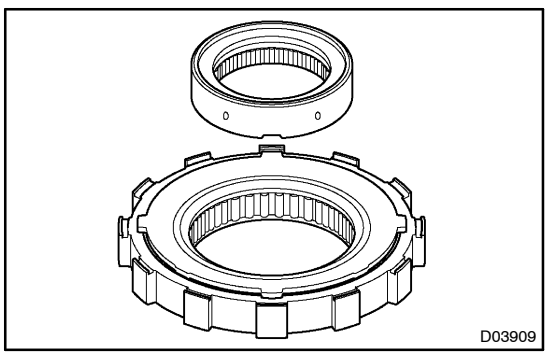


94. INSTALL 1WAY CLUTCH SLEEVE OUTER

(a) Install the 1–way clutch outer sleeve to the 2nd brake cylinder assy.

NOTICE:

Check the positioning direction of the outer sleeve.

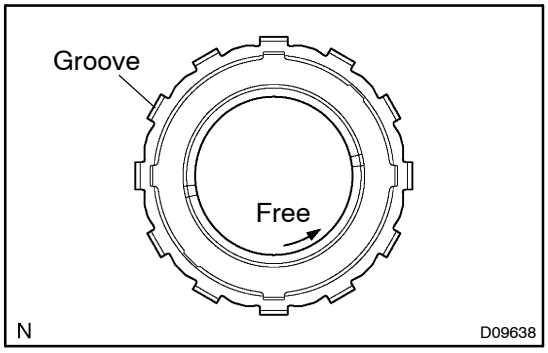


95. INSTALL 1 WAY CLUTCH ASSY

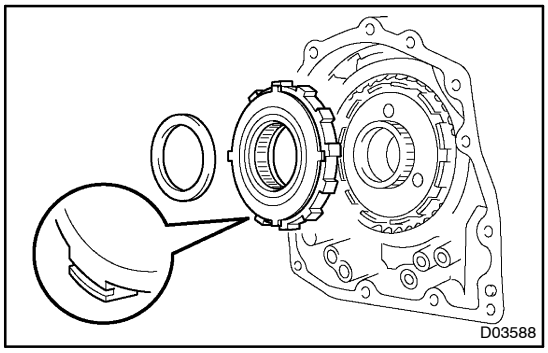
(a) Install the inner race to the 1–way clutch.

NOTICE:

Check the direction of the inner race.



(b) Check the rotating direction of 1–way clutch for the lock or free operation, as shown in illustration.



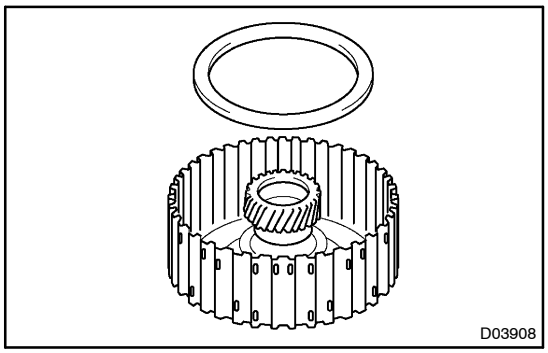
(c) Install the 1–way clutch and bearing to the 1–way clutch sleeve outer.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	53.6 (2.110)	69.6 (2.740)

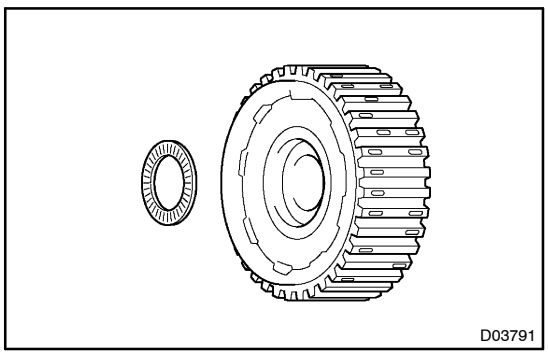
NOTICE:

Install the thrust bearing properly so that no–colored race will be visible.



96. INSTALL REAR PLANETARY SUN GEAR ASSY

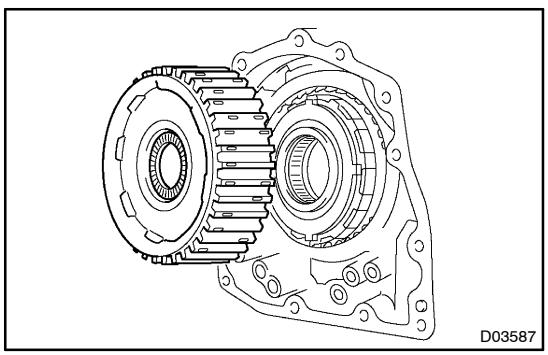
(a) Coat the thrust washer No. 1 with petroleum jelly, install it onto the rear planetary sun gear.



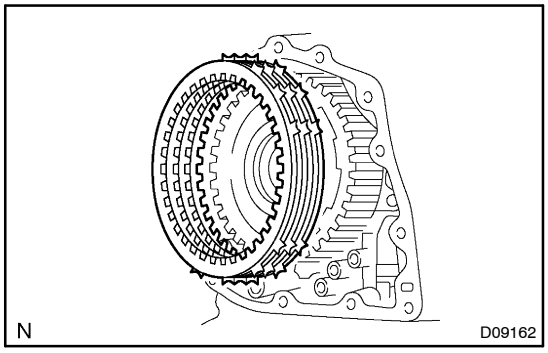
(b) Coat the bearing with petroleum jelly, install it onto the rear planetary sun gear.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	33.8 (1.331)	48.2 (1.898)

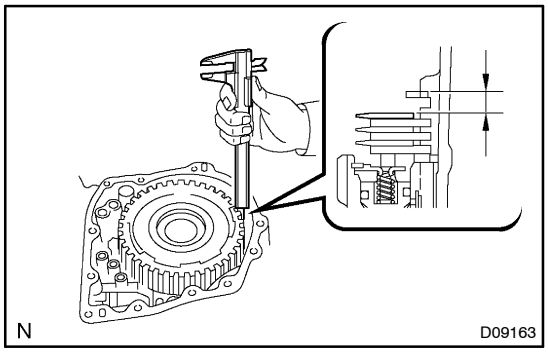


(c) Install the rear planetary sun gear assy to the rear planetary gear.



97. INSTALL 2ND BRAKE CLUTCH DISC

(a) 1MZ–FE:
Install the 4 discs and 4 plates to the transaxle case.
(b) 2AZ–FE:
Install the 3 discs and 3 plates to the transaxle case.
(c) Temporarily install the snap ring.



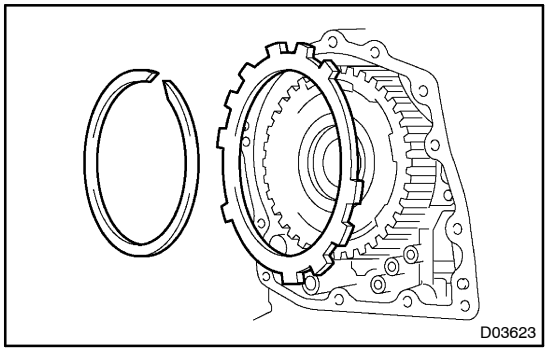
(d) Using vernier calipers, measure the distance between the disc surface and snap ring surface.
(e) Select an appropriate flange so that the pack clearance will meet the specified value.

Pack clearance: 0.62 – 0.91 mm (0.0244 – 0.0358 in.)

HINT:
Piston stroke = Clearance – Flange thickness – Snap ring thickness 1.6 mm (0.063 in.)

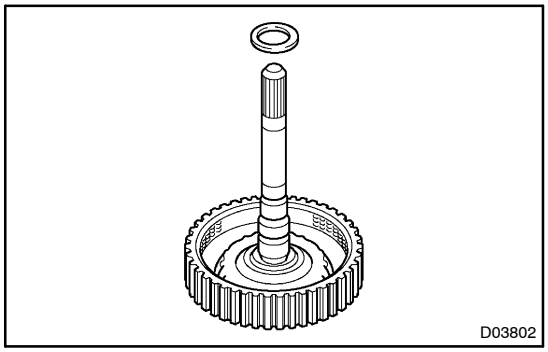
Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	5	3.4 (0.134)
2	3.1 (0.122)	6	3.5 (0.138)
3	3.2 (0.126)	7	3.6 (0.142)
4	3.3 (0.130)	8	–



(f) Temporarily remove the snap ring, attach the selected flange and restore the snap ring.

NOTICE:
Secure the snap ring so that its gap is visible through the groove of the transaxle case.

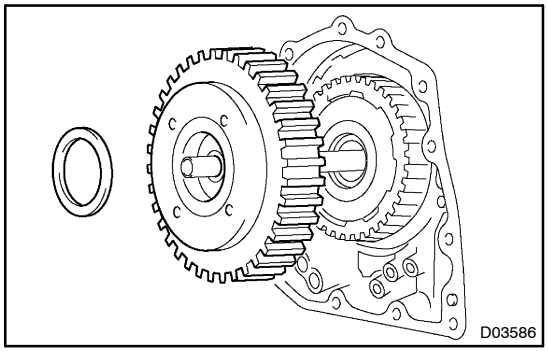


98. INSTALL DIRECT CLUTCH ASSY

(a) Install the bearing race to the direct clutch.

Bearing race diameter : mm (in.)

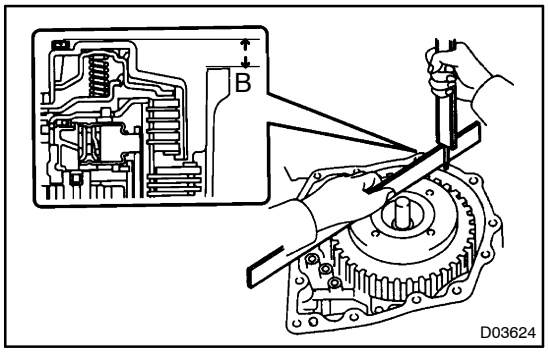
	Inside	Outside
Bearing race	30.3 (1.193)	46.0 (1.811)



(b) Install direct clutch assy and thrust bearing to the rear planetary sun gear assy.

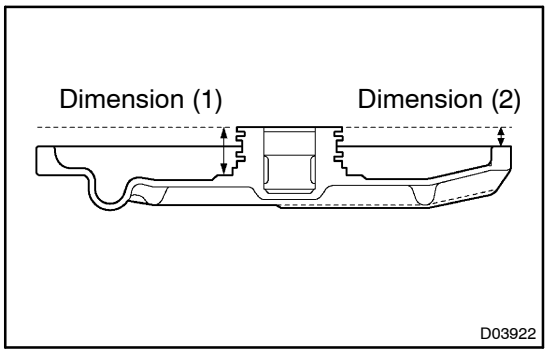
NOTICE:

The disc in the direct clutch should completely mate with the hub attached outside the rear planetary sun gear. Otherwise, the rear cover can not be installed.



(c) Clean the connecter part of the transaxle case and rear cover.

(d) As shown in the illustration, place a straight edge on the direct clutch drum and measure the distance between the the transaxle case and the straight edge using vernier calipers. (Dimension B)



(e) Measure the 2 places of the rear cover as shown in the illustration and calculate a dimension C using the following formula.

HINT:

Dimension C = Dimension (1) – Dimension (2)

(f) Calculate the end play value using the following formula. Select a thrust bearing which satisfies the end play value and install it.

End play: 0.198 – 0.936 mm (0.00800 – 0.03685 in.)

NOTICE:

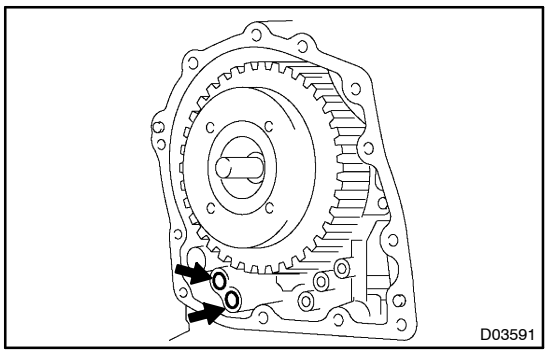
Make sure that the colored race side is facing the direct clutch assy.

HINT:

End play = Dimension C – Dimension B

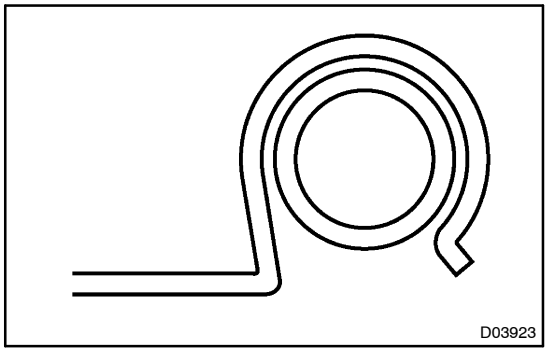
Bearing thickness and diameter : mm (in.)

Thickness	Inside	Outside
3.55 (0.1397)	53.6 (2.110)	69.6 (2.740)
3.85 (0.1515)	53.6 (2.110)	70.18 (2.763)



99. INSTALL GOVERNOR APPLY GASKET NO.1

(a) Install 2 new governor apply gaskets No 1.

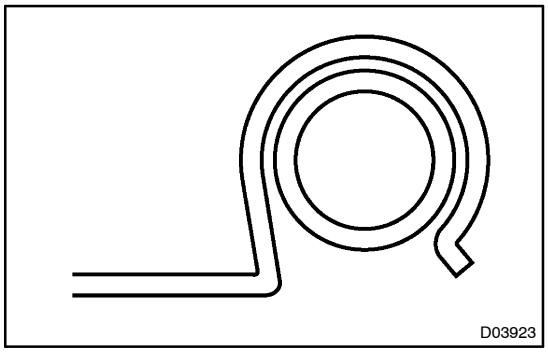


100. INSTALL FRONT CLUTCH APPLY TUBE

(a) Install the clamp to the front clutch apply tube.

NOTICE:

Make sure to install the clamp to the apply pipe before installing the apply pipe to the transaxle case. This prevents the apply pipe from being deformed or damaged.

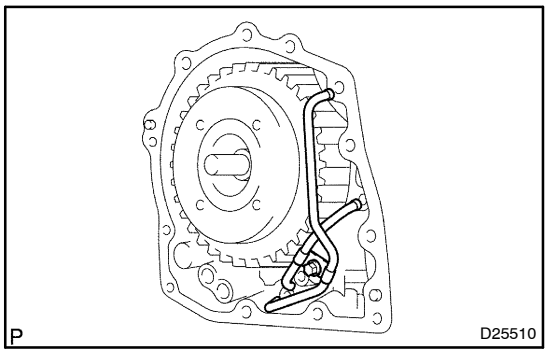


101. INSTALL BRAKE APPLY TUBE

(a) Install the clamp to the brake apply tube.

NOTICE:

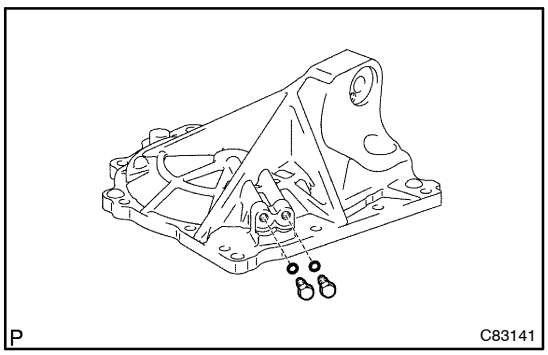
Make sure to install the clamp to the apply pipe before installing the apply pipe to the transaxle case. This prevents the apply pipe from being deformed or damaged.



(b) Install the 2 apply tubes and a bolt to the transaxle case.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

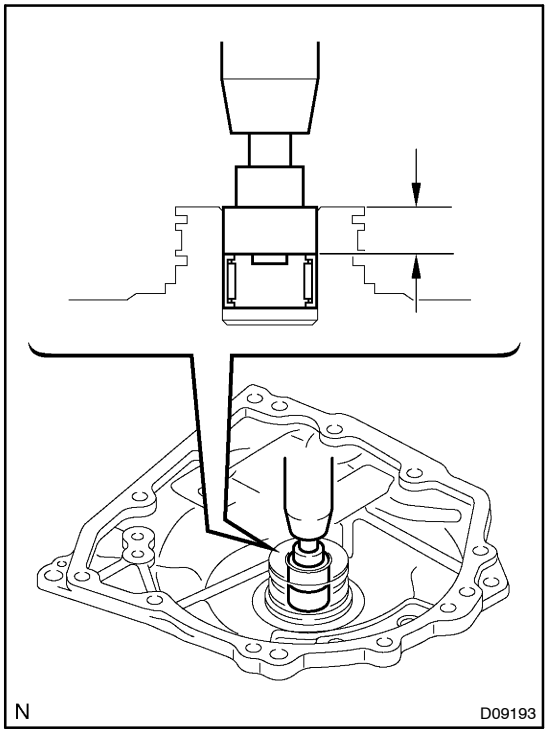
NOTICE:

Each pipe should be securely inserted until it reaches the stopper.



102. INSTALL TRANSAXLE CASE NO.1 PLUG

(a) Install 2 new O–rings to the 2 transaxle case No. 1 plugs.
(b) Install 2 transaxle case No. 1 plugs to the transaxle rear cover.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



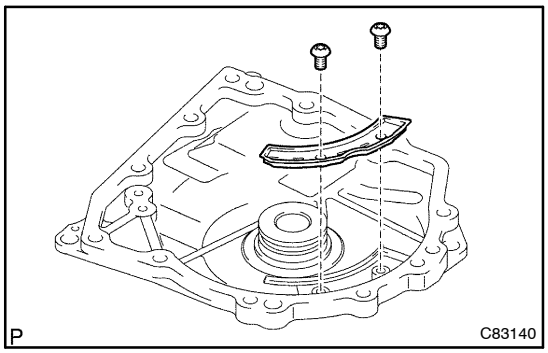
103. INSTALL TRANSAXLE REAR COVER SUB–ASSY

(a) Using SST and a press, install the bearing.
SST 09950–60010 (09951–00230, 09952–06010)
Press fit depth: 12.05 – 12.75 mm (0.4744 – 0.5020 in.)

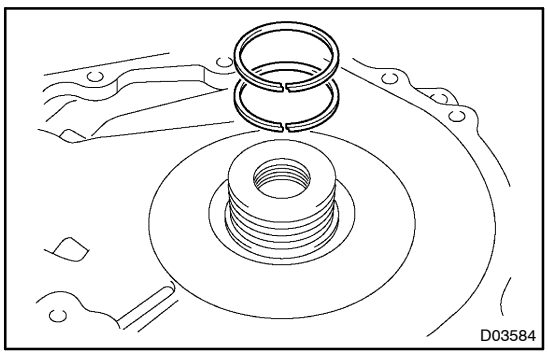
NOTICE:

- **Face the inscribed mark side of the bearing race up.**
- **Repeat the press fit until the specified value is obtained.**

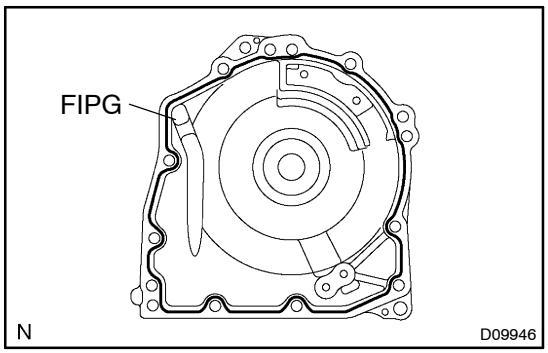
(b) Apply liquid sealer to the 2 screws.
Sealant:
Part No. 08833–00080, THREE BOND 2430 or equivalent.



(c) Using a torx socket wrench (T30), install the transaxle rear cover plate with the 2 screws.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



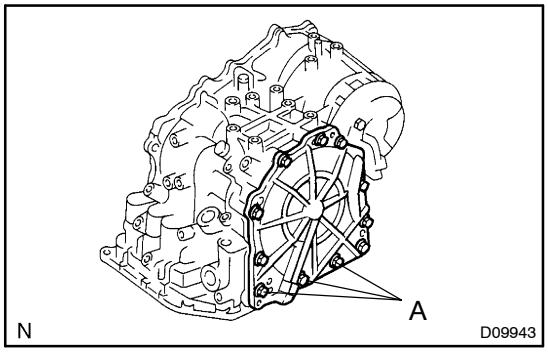
(d) Coat 2 new oil seal rings with ATF, install them to the transaxle rear cover.



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

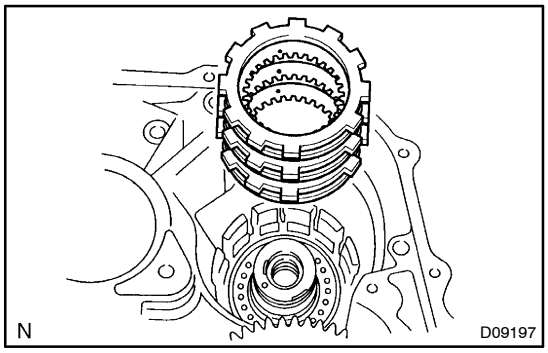
(f) Apply FIPG to the cover.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent.

(g) Coat a needle roller bearing with ATF.



(h) Apply liquid sealer to the "A" bolt threads.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent.

(i) Install the 11 bolts.
Torque:
Bolt A: 18.6 N·m (190 kgf·cm, 14 ft·lbf)
Other bolt: 24.5 N·m (250 kgf·cm, 18 ft·lbf)
SST 09950–60010 (09951–00230, 09952–06010)

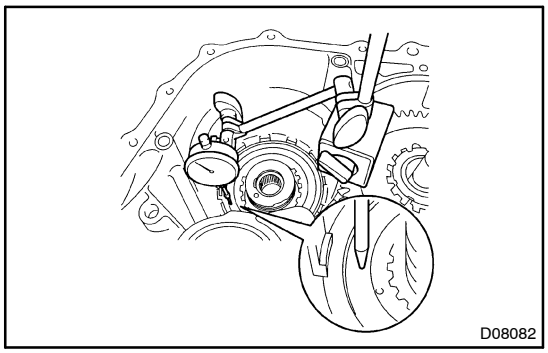


104. INSTALL UNDERDRIVE CLUTCH DISC NO.2

(a) 1MZ–FE:
Install the 4 discs and 4 plates to the transaxle case.

(b) 2AZ–FE:
Install the 3 discs and 3 plates to the transaxle case.

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



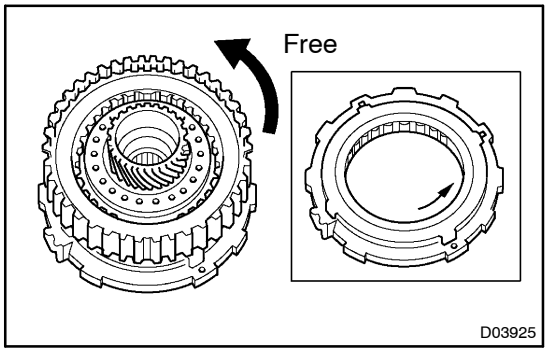
(d) Using a dial indicator, measure the U/D brake pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).
Pack clearance: 1.81 – 2.20 mm (0.0713 – 0.0866 in.)

HINT:
Select an appropriate flange from the table below so that it will meet the specified value.

Flange thickness: mm (in.)

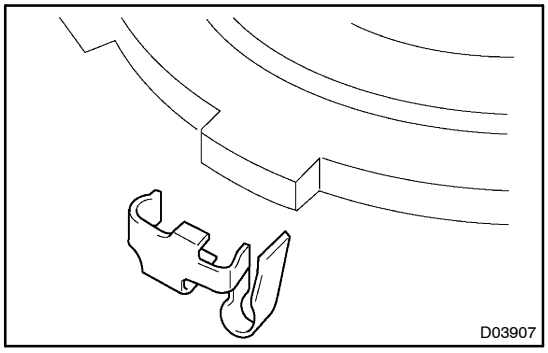
Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	3	3.4 (0.134)
2	3.2 (0.126)	–	–

(e) Temporally remove the snap ring and attach the flange. Restore the snap ring.



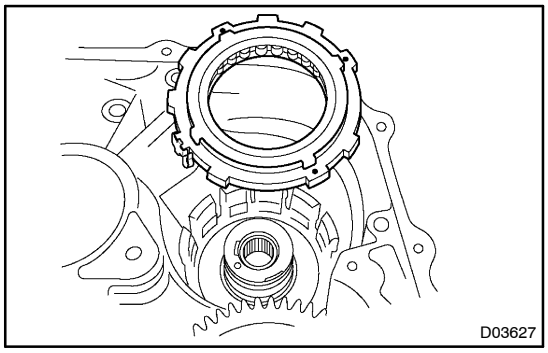
105. INSPECT UNDERDRIVE 1 WAY CLUTCH ASSY

(a) Install the U/D clutch assy to the 1–way clutch. Rotate the U/D clutch assy to check the rotating direction for the lock or free operation.



106. INSTALL UNDERDRIVE 1 WAY CLUTCH ASSY

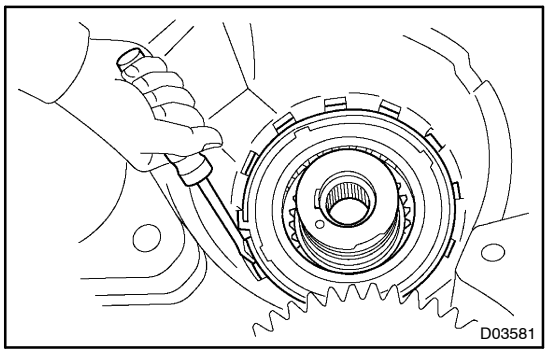
(a) Install the outer race retainer to the 1–way clutch.



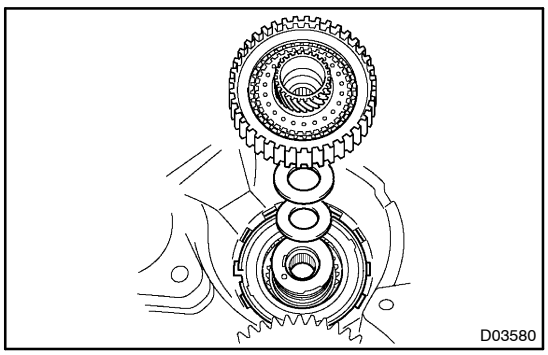
(b) Install the 1–way clutch to the transaxle case.

NOTICE:

Make sure that the mark on the 1–way clutch outer race is visible.



(c) Using screwdriver, install the snap ring to the transaxle case.



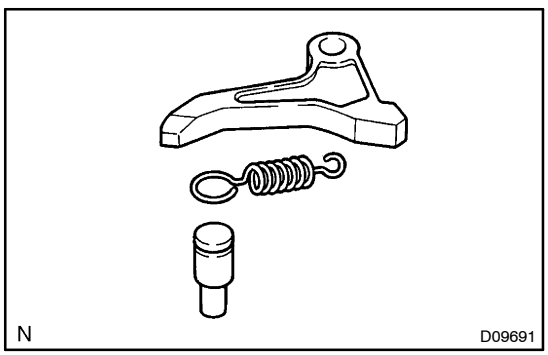
107. INSTALL UNDERDRIVE CLUTCH ASSY

(a) Coat the bearing and bearing race with petroleum jelly, install them onto the U/D clutch.

Race diameter: mm (in.)

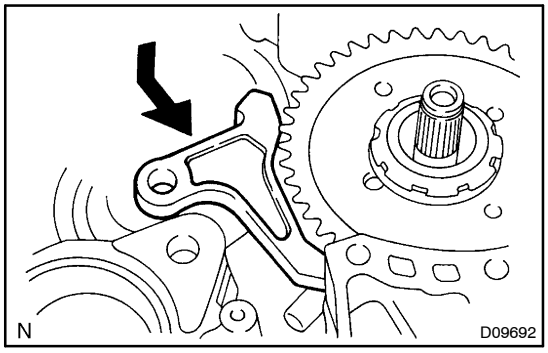
	Inside	Outside
Bearing	37.73 (1.4854)	58.0 (2.283)
Race	29.9 (1.177)	55.5 (2.185)

(b) Install the U/D clutch assy to the transaxle case.

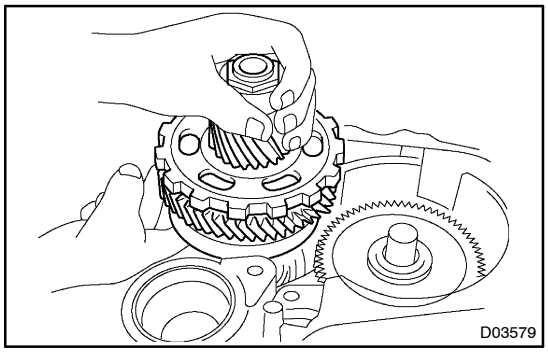


108. INSTALL UNDERDRIVE PLANETARY GEAR ASSY

(a) Install the pawl pin and spring to the parking lock pawl.



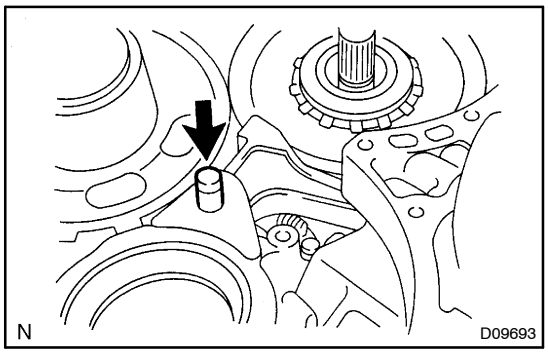
(b) Temporarily install the parking lock pawl, shaft and spring to the transaxle case as shown in the illustration.



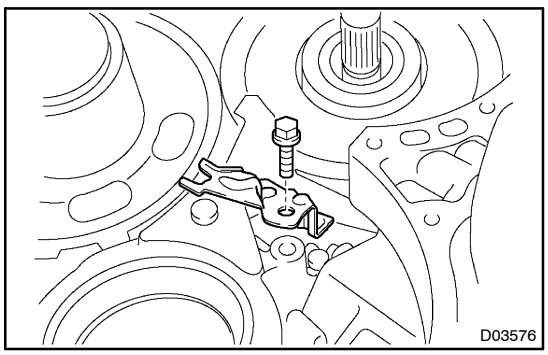
(c) Install the U/D planetary gear assy to the transaxle case.

NOTICE:

Engage all the discs of U/D clutch and hub splines of the U/D planetary gear assy firmly and assemble them securely.

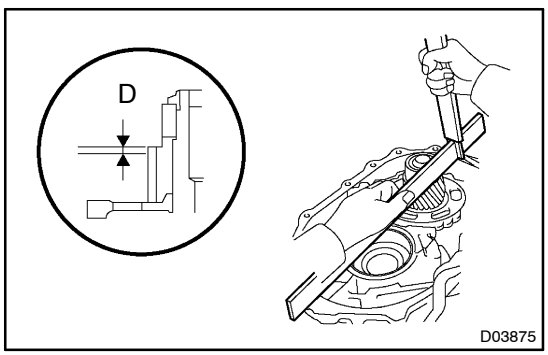


(d) Install the parking lock pawl shaft.



(e) Install the pawl shaft clamp with the bolt.

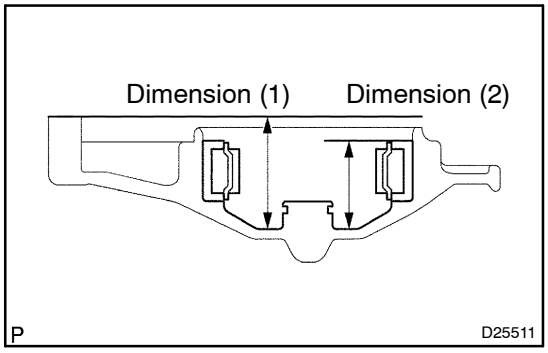
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)



(f) Using a straight edge and vernier calipers as shown in the illustration, measure the gap between the top of the differential drive pinion in the U/D planetary gear and contact surface of the transaxle case and housing. (Dimension D)

NOTICE:

Note down the dimension D as it is necessary for the following process.



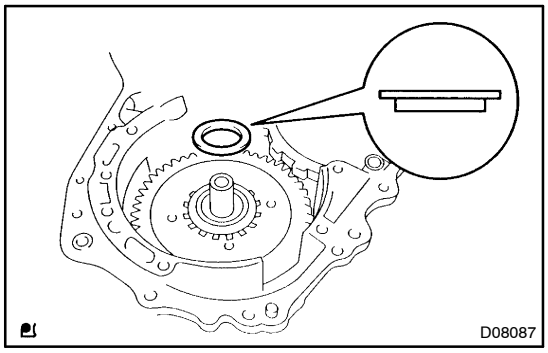
(g) As shown in the illustration, measure the 2 places of the transaxle housing, Calculate the dimension E using the formula.

NOTICE:

NOte down the dimension E as it is necessary for the following process.

HINT:

Dimension E = Dimension (1) – Dimension (2)

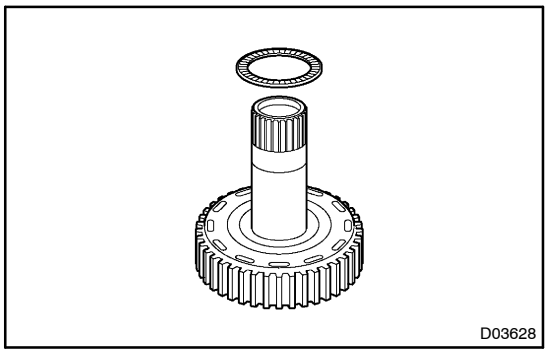


109. INSTALL MULTIPLE DISC CLUTCH CLUTCH HUB

(a) Install the bearing race to the transaxle while checking its direction.

Bearing race diameter: mm (in.)

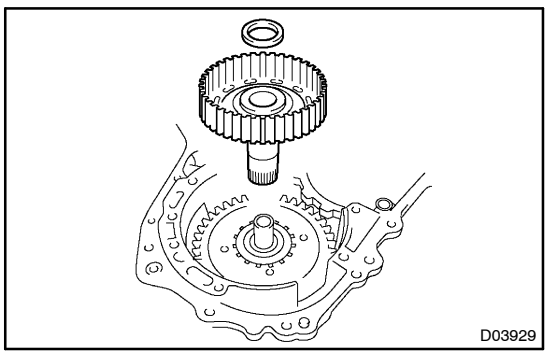
	Inside	Outside
Bearing race	34.5 (1.358)	48.5 (1.909)



(b) Coat the thrust bearing and race with petroleum jelly, install them onto the multiple disc clutch hub.

Thrust bearing and race diameter: mm (in.)

	Inside	Outside
Bearing	36.3 (1.429)	52.2 (2.055)

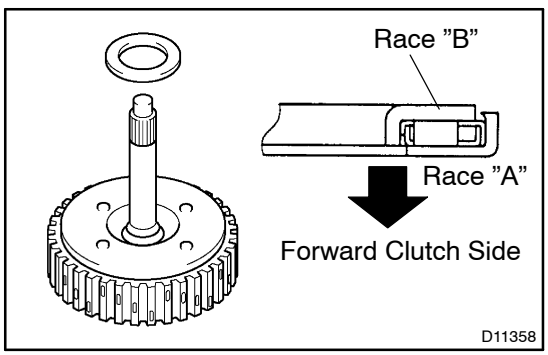


(c) Install the bearing to the multiple clutch hub.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	23.5 (0.925)	44.0 (1.732)

(d) Install the forward clutch hub to the transaxle case.



110. INSTALL FORWARD CLUTCH ASSY

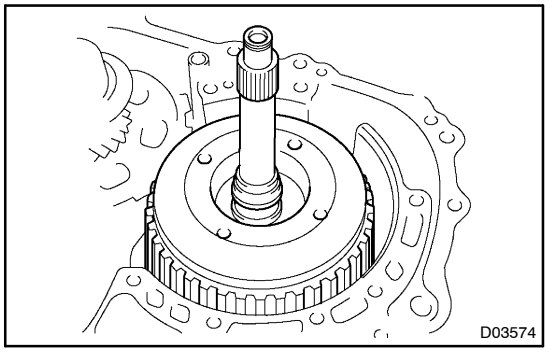
(a) Install the thrust bearing to the forward clutch.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	33.85 (1.3327)	52.2 (2.055)

NOTICE:

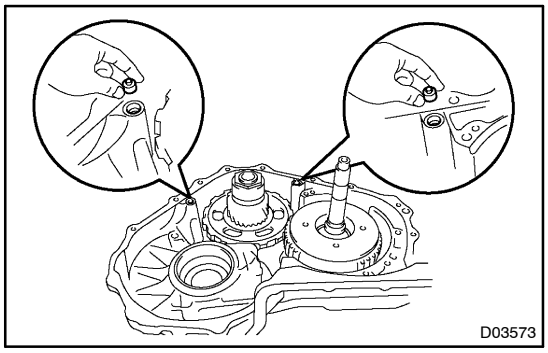
Install the thrust bearing properly so that the race "B" will be visible.



(b) Install the forward clutch to the multiple clutch hub.

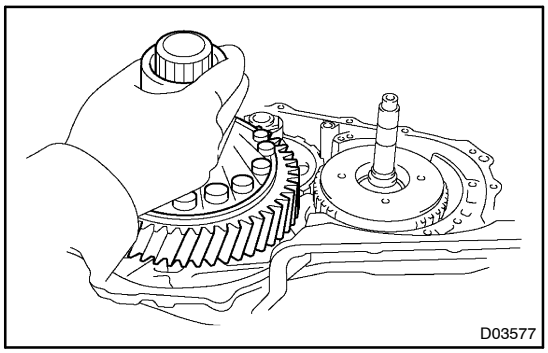
NOTICE:

Align the splines of all discs in the forward clutch with those of multiple clutch hub to assemble them securely.



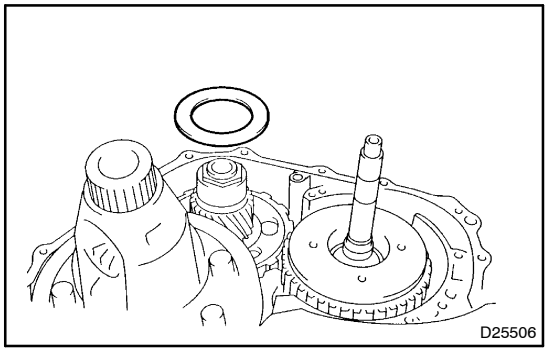
111. INSTALL OVERDRIVE BRAKE GASKET

(a) Install 2 new O/D brake gaskets.



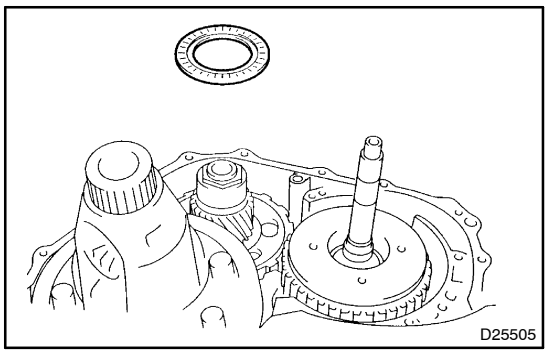
112. INSTALL DIFFERENTIAL GEAR ASSEMBLY

(a) Install the differential gear assy to the transaxle case.



113. INSTALL THRUST BEARING UNDERDRIVE RACE NO.2

(a) Install the thrust bearing race to the U/D planetary gear assy.



114. INSTALL THRUST NEEDLE ROLLER BEARING

(a) Calculate the end play value using the following formula and values of Dimension D and E that ware measured when installing cylindrical roller bearing and U/D planetary gear, Select an appropriate U/D planetary gear thrust bearing race No. 2 which satisfies the specified end play value, and install it.

End play: 0.498 – 0.993 mm (0.01961 – 0.03909 in.)

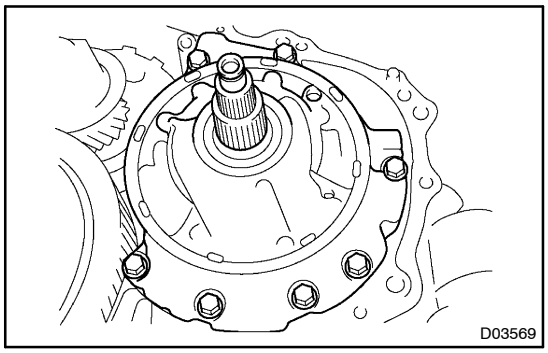
HINT:
End play = Dimension E – Dimension D – thrust bearing thickness 3.28 mm (0.1291 in.) – U/D thrust bearing race No. 2 thickness.

Race thickness: mm (in.)

E – D	Thickness
Less than 7.64 (0.3008)	3.5 (0.138)
7.64 (0.3008)	3.8 (0.150)

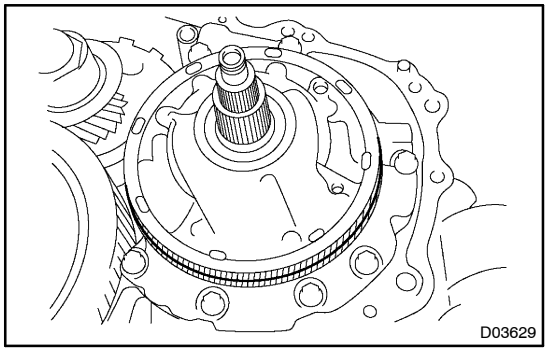
Bearing and bearing race diameter: mm (in.)

	Inside	Outside
Bearing	57.2 (2.252)	84.96 (3.3449)
Bearing race	56.4 (2.220)	83.0 (3.268)

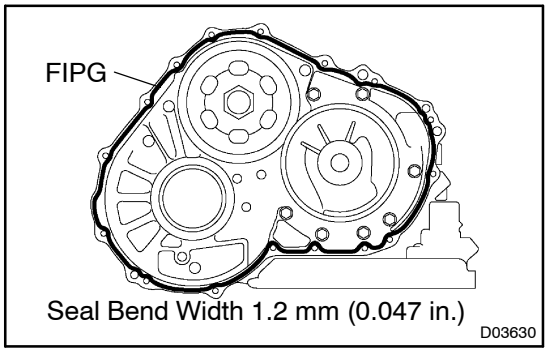


115. INSTALL OIL PUMP ASSY

(a) Install the oil pump and 7 bolts to the transaxle case.
Torque: 22 N·m (226 kgf·cm, 16 ft·lbf)



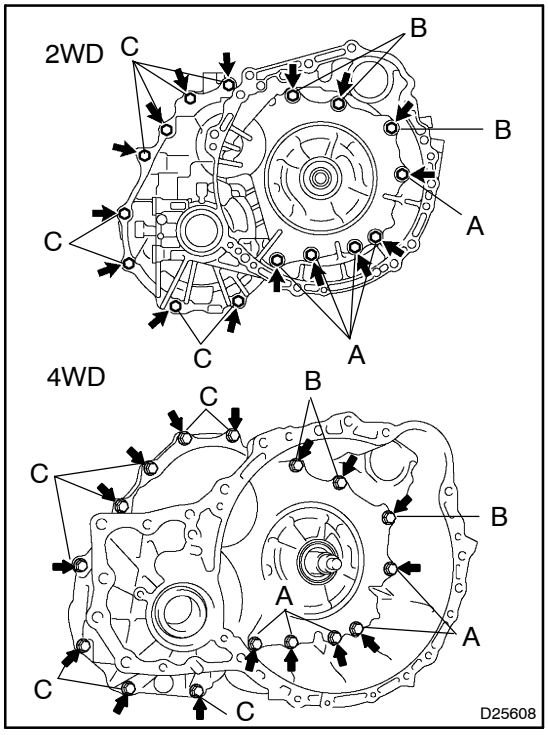
(b) Coat the O–ring of oil pump with ATF.



116. INSTALL TRANSAXLE HOUSING

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

(b) Apply FIPG to the transaxle case.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent



(c) Install the transaxle housing and 16 bolts to the transaxle case.

Torque:
Bolt A: 22.1 N·m (225 kgf·cm, 16.3 ft·lbf)
Bolt B and C: 29.4 N·m (300 kgf·cm, 21.7 ft·lbf)

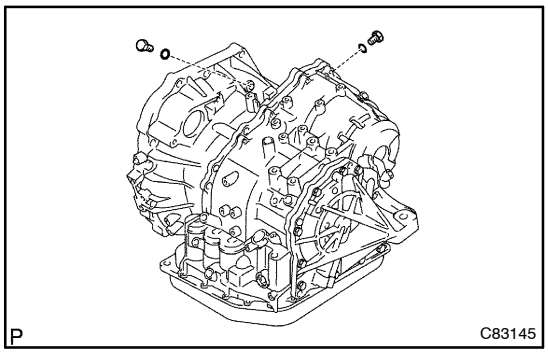
HINT:

Apply seal packing or equivalent to the bolt A.

Seal packing:
THREE BOND 2403 or equivalent
Bolt length:
Bolt A: 50 mm (1.969 in.)
Bolt B: 50 mm (1.969 in.)
Bolt C: 42 mm (1.654 in.)

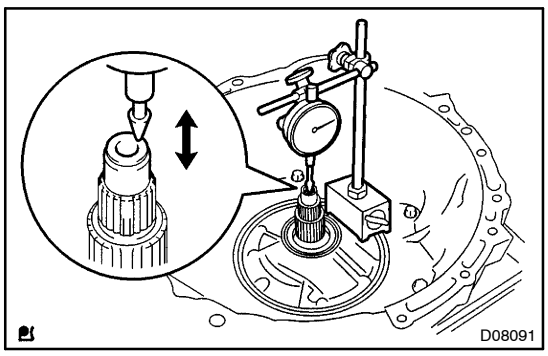
NOTICE:

Because the bolt A is a seal bolt, apply the seal packing to new bolts and tighten them within 10 minutes after application.



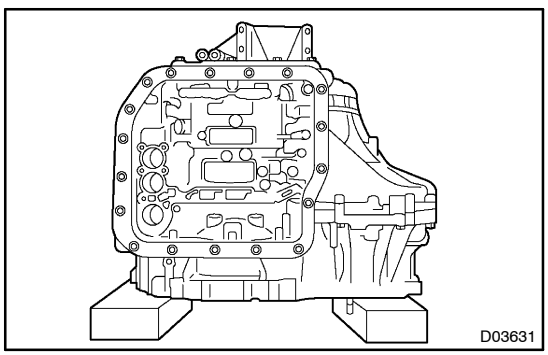
117. INSTALL TRANSAXLE CASE NO.1 PLUG

(a) Install 2 new O–rings to the 2 transaxle case No. 1 plugs.
(b) Install the 2 transaxle case No 1 plugs to the transaxle housing.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

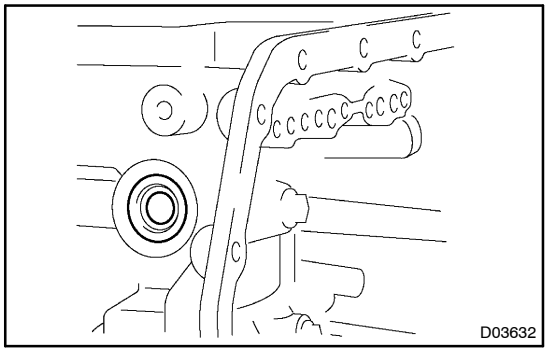


118. INSPECT INPUT SHAFT ENDPLAY

(a) Using a dial indicator, measure the input shaft end play.
End play: 0.262 – 1.249 mm (0.0103 – 0.0492 in.)

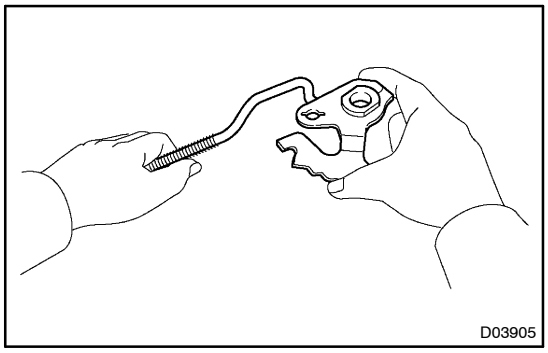


119. FIX AUTOMATIC TRANSAXLE ASSY



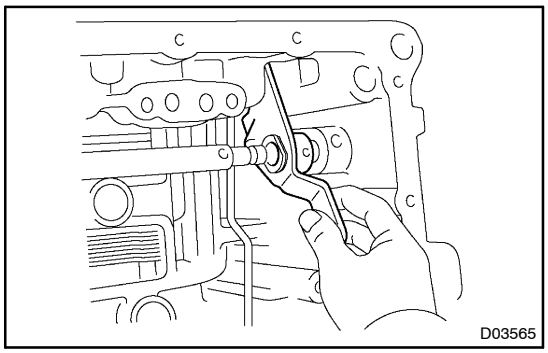
120. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Coat a new oil seal with ATF.
(b) Install the oil seal to the transaxle case.



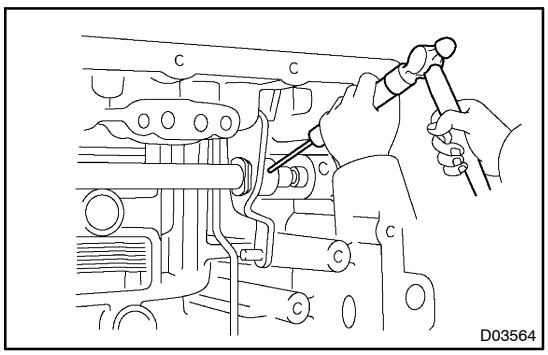
121. INSTALL PARKING LOCK ROD SUB–ASSY

(a) Install the parking lock rod to the manual valve lever.

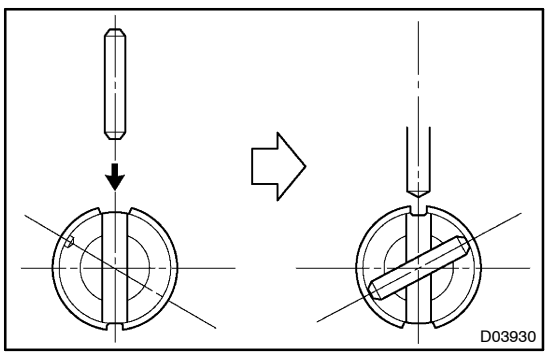


122. INSTALL MANUAL VALVE LEVER SUB–ASSY

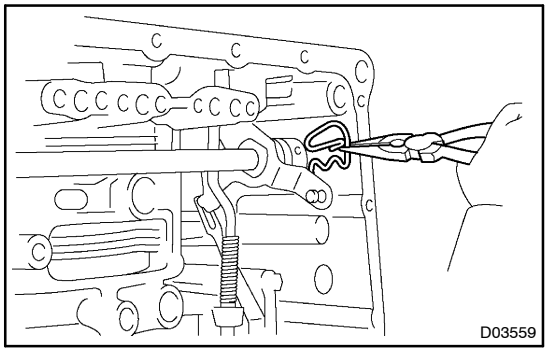
(a) Install a new spacer and manual valve lever shaft to the transaxle case.



(b) Using a pin punch and a hammer, drive in a new pin.

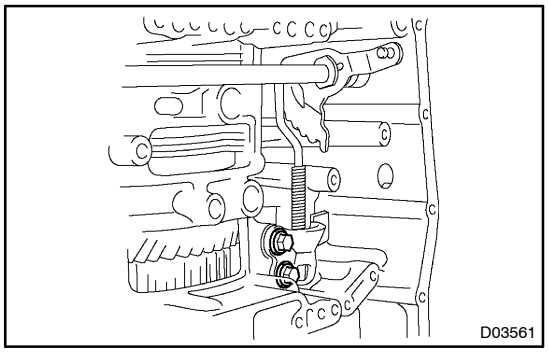


(c) Turn the spacer and the lever shaft to align the small hole for locating the staking position in the spacer with the staking position mark on the lever shaft.
(d) Using a pin punch, stake the spacer through the small hole.
(e) Check that the spacer does not turn.



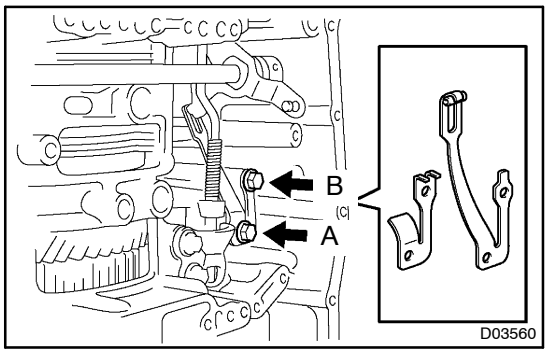
123. INSTALL MANUAL VALVE LEVER SHAFT RETAINER SPRING

(a) Using needle–nose pliers, install the retainer spring.



124. INSTALL PARKING LOCK PAWL BRACKET

(a) Install the parking lock pawl bracket with the 2 bolts.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)
Bolt length: 25 mm (0.984 in.)

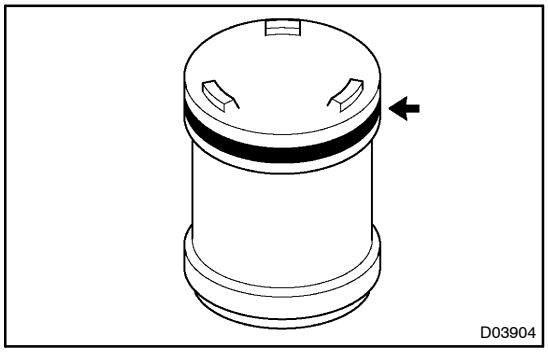


125. INSTALL MANUAL DETENT SPRING SUB–ASSY

(a) Install the manual detent spring with the 2 bolts.

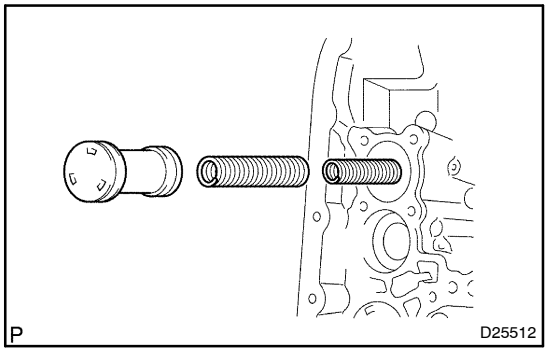
NOTICE:
Make sure to install the manual detent spring and cover in this order.

Torque:
Bolt A: 20 N·m (205 kgf·cm, 15 ft·lbf)
Bolt B: 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt length:
Bolt A: 27 mm (1.063 in.)
Bolt B: 16 mm (0.630 in.)



126. INSTALL B–3 ACCUMULATOR PISTON

(a) Coat a new O–ring with ATF, install it to the B_3 accumulator piston.



(b) Coat the piston with ATF, install it to the transaxle case.

1MZ–FE:

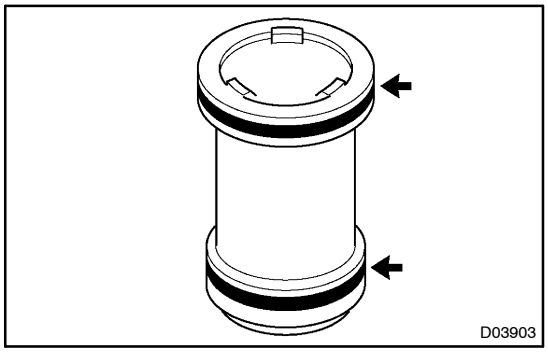
Accumulator spring:

Free length Outer diameter mm (in.)	Color
Inner 60.24 (2.3716) / 15.9 (0.626)	Green
Outer 74.61 (2.9374) / 21.7 (0.854)	Blue

2AZ–FE:

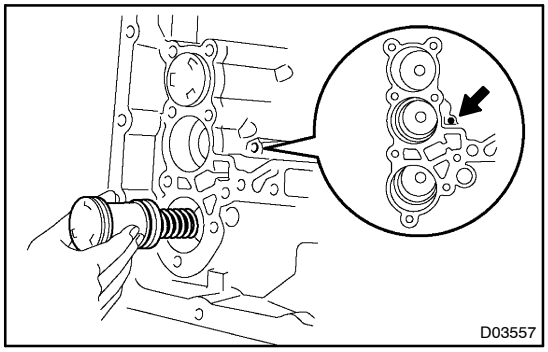
Accumulator spring:

Free length Outer diameter mm (in.)	Color
Inner 60.24 (2.3716) / 15.9 (0.626)	Yellowish green
Outer 74.61 (2.9374) / 21.7 (0.854)	Blue



127. INSTALL C–1 ACCUMULATOR PISTON

(a) Coat 2 new O–rings with ATF, install them to the C_1 accumulator piston.



(b) Coat the piston with ATF, install it to the transaxle case.

1MZ–FE:

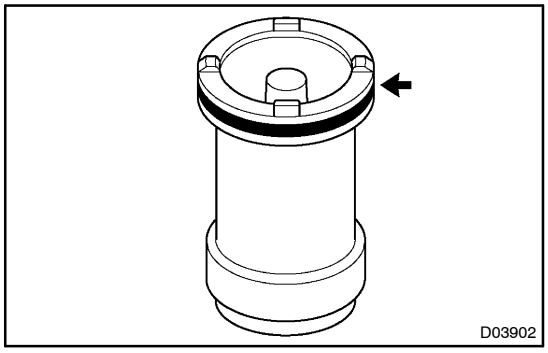
Accumulator spring:

Free length Outer diameter mm (in.)	Color
90.53 (3.5642) / 18.5 (0.728)	Red

2AZ–FE:

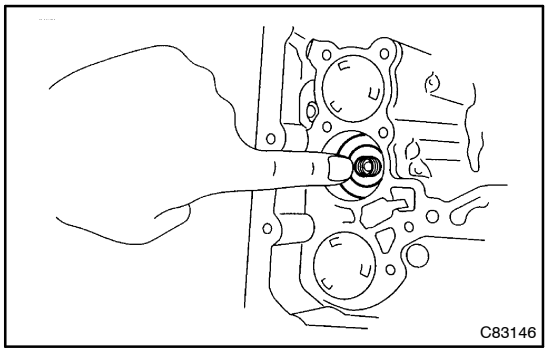
Accumulator spring:

Free length Outer diameter mm (in.)	Color
81.53 (3.2098) / 18.5 (0.728)	Pink



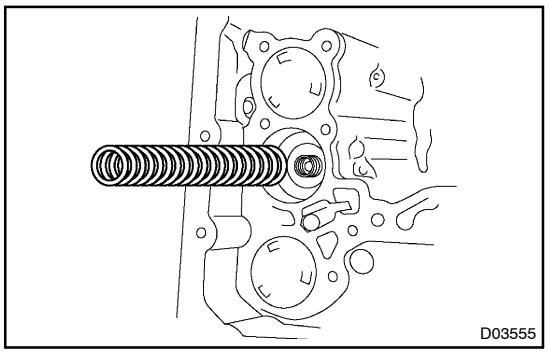
128. INSTALL C–3 ACCUMULATOR PISTON

(a) Coat a new O–ring with ATF, install it to the C_3 accumulator piston.

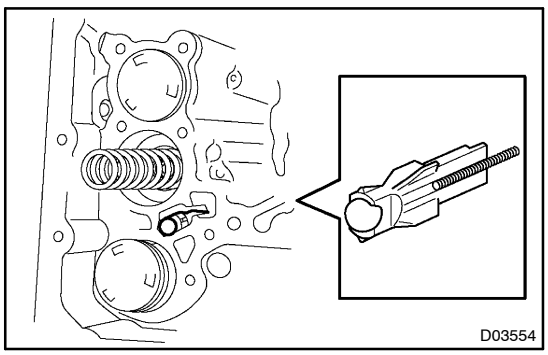


(b) Coat the piston with ATF, install it to the transaxle case.
Accumulator spring:

Free length Outer diameter mm (in.)	Color
90.49 (3.5626) / 19.2 (0.756)	White

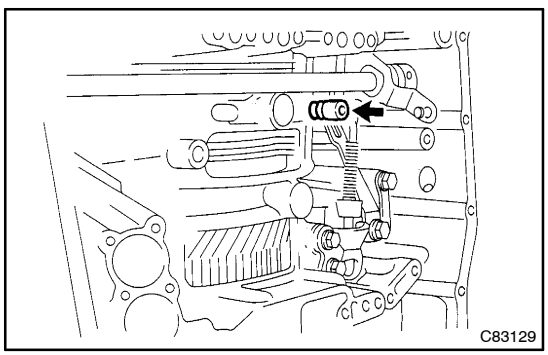


(c) Install the spring from the C_3 accumulator piston.



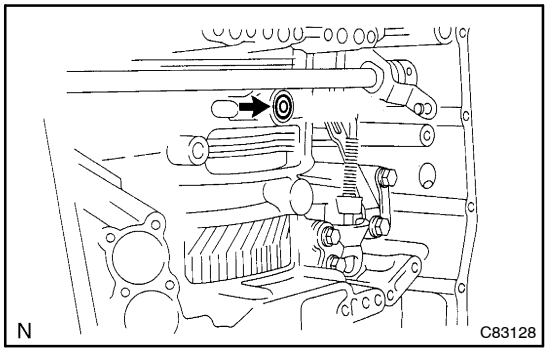
129. INSTALL CHECK BALL BODY

(a) Install the check ball body and spring.



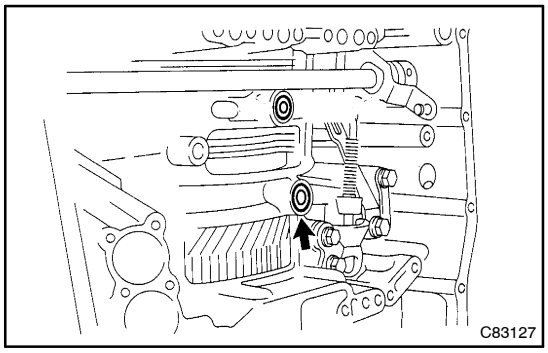
130. INSTALL BRAKE DRUM GASKET

(a) Coat a new brake drum gasket with ATF, install it to the transaxle case.



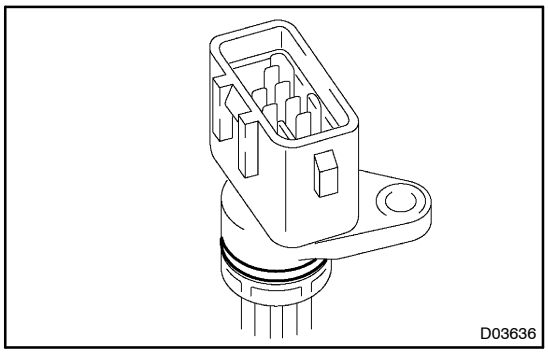
131. INSTALL TRANSAXLE CASE 2ND BRAKE GASKET

(a) Coat a new transaxle case 2nd brake gasket with ATF, install it to the transaxle case.



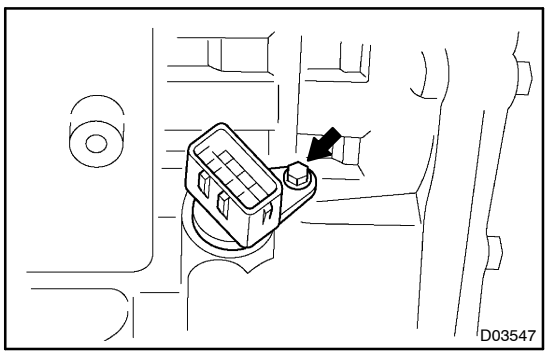
132. INSTALL GOVERNOR APPLY GASKET NO.1

(a) Coat a new governor apply gasket No. 1 with ATF, install it to the transaxle case.

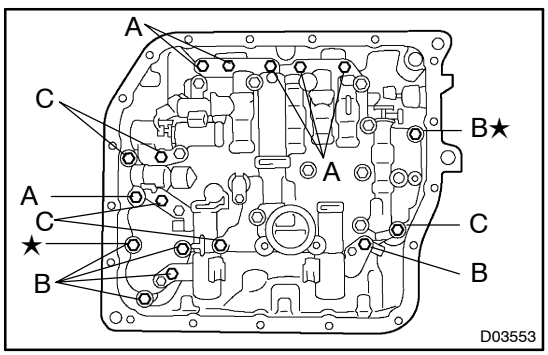


133. INSTALL TRANSMISSION WIRE

(a) Coat a new O–ring with ATF, install it to the transaxle solenoid wire.



(b) Install the solenoid wire retaining bolt
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

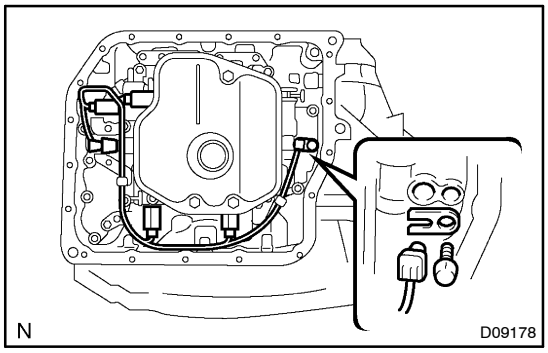


134. INSTALL TRANSMISSION VALVE BODY ASSY

(a) Make sure that the manual valve lever position, install the valve body with 17 bolts to the transaxle case.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt length:
Bolt A: 25 mm (0.984 in.)
Bolt B: 41 mm (1.614 in.)
Bolt C: 45 mm (1.771 in.)

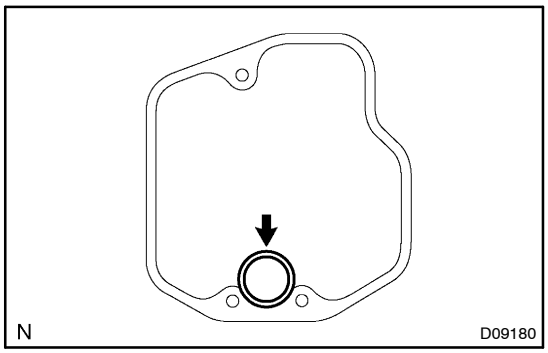
NOTICE:

- **Push the valve body against the accumulator piston spring and the check ball body to install it.**
- **When installing the valve body to the transaxle case, do not hold the solenoids.**
- **Tighten those bolts marked by ★ in the illustration first temporarily because they are positioning bolts.**



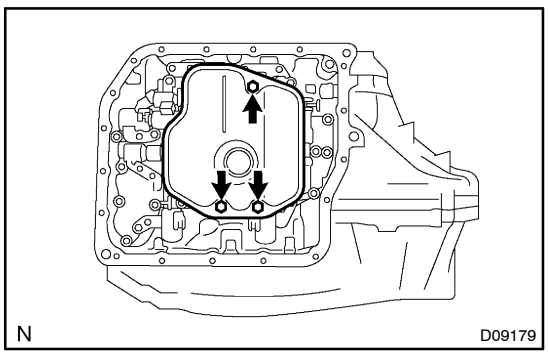
(b) Connect the 5 solenoid connectors.

(c) Install the ATF temperature sensor, clamp and bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



135. INSTALL VALVE BODY OIL STRAINER ASSY

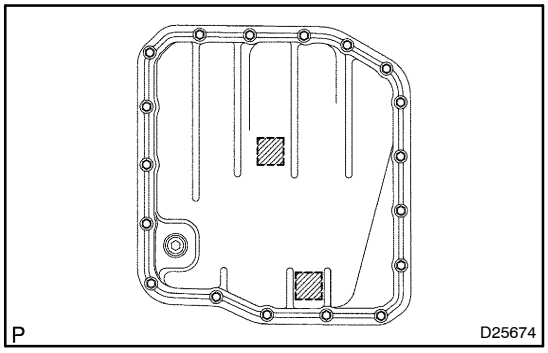
(a) Coat a new O–ring with ATF, install it to the oil strainer.



(b) Install the oil strainer and 3 bolts to the valve body.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

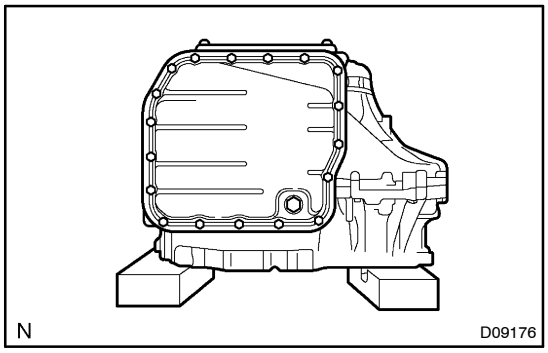
136. INSTALL AUTOMATIC TRANSAXLE OIL PAN GASKET

(a) Install a new oil pan gasket to the oil pan.



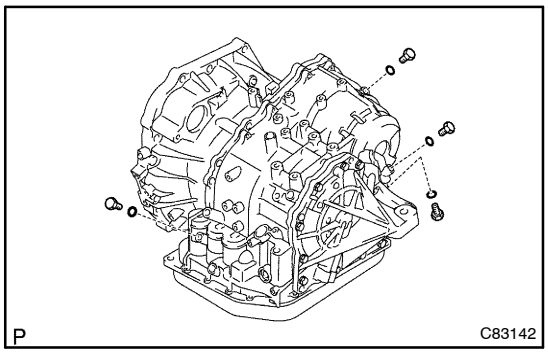
137. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB–ASSY

(a) Install the 2 magnets in the oil pan.
(b) Apply seal packing or equivalent to new 18 bolts.
Seal packing:
THREE BOND 2430 or equivalent



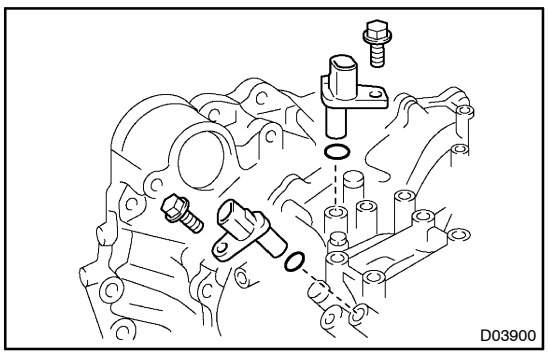
(c) Install oil pan and 18 bolts to the transaxle case.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

NOTICE:
Because the bolts should be seal bolts, apply seal packing to new bolts and tighten them within 10 minutes after application.



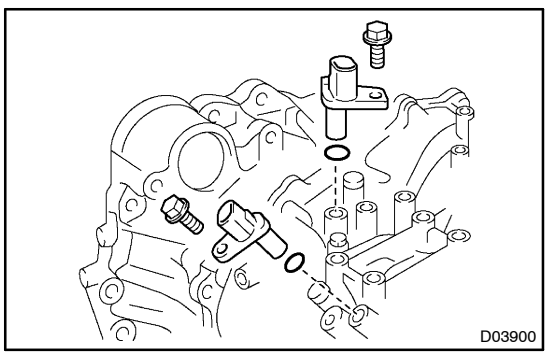
138. INSTALL TRANSAXLE CASE NO.1 PLUG

(a) Coat 4 new O–rings with ATF, install them to the 4 transaxle case No. 1 plugs.
(b) Install the 4 transaxle case No. 1 plugs to the transaxle case.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



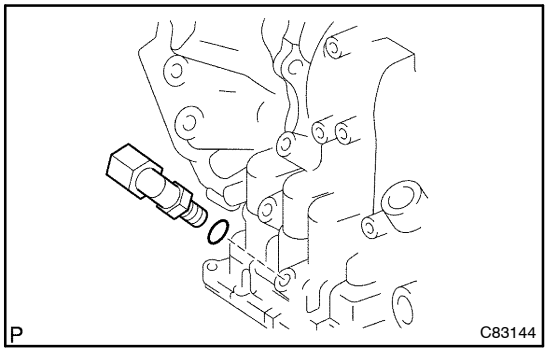
139. INSTALL TRANSMISSION REVOLUTION SENSOR(AISIN –MADE)

(a) Coat 2 new O–rings with ATF, install them to the 2 sensors.
(b) Install the 2 sensors with the 2 bolts to the transaxle case.
Torque: 11.3 N·m (115 kgf·cm, 8 ft·lbf)



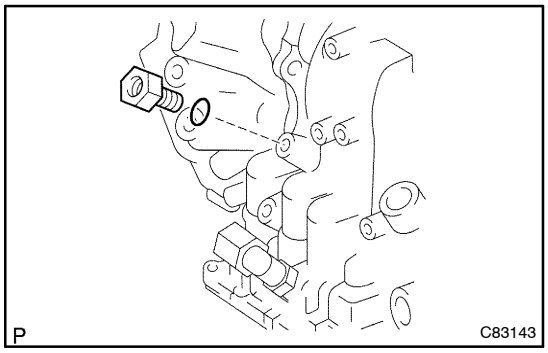
140. INSTALL SPEED SENSOR(TMC –MADE)

(a) Coat 2 new O–rings with ATF, install them to the 2 sensors.
(b) Install the 2 sensors with the 2 bolts to the transaxle case.
Torque: 11.3 N·m (115 kgf·cm, 8 ft·lbf)



141. INSTALL OIL COOLER TUBE UNION(OUTLET OIL COOLER UNION)

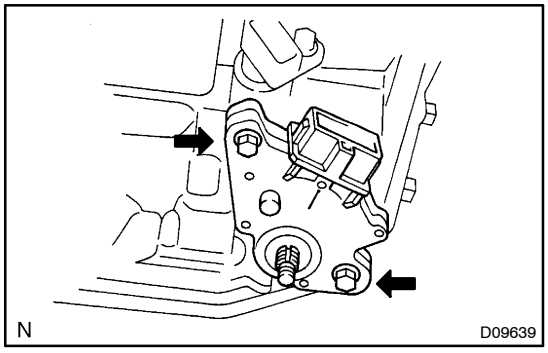
(a) Coat a new O–ring with ATF, install it to the elbow.
(b) Install the elbow to the transaxle case.
Torque: 27 N·m (276 kgf·cm, 20 ft·lbf)



142. INSTALL OIL COOLER TUBE UNION(INLET OIL COOLER UNION)

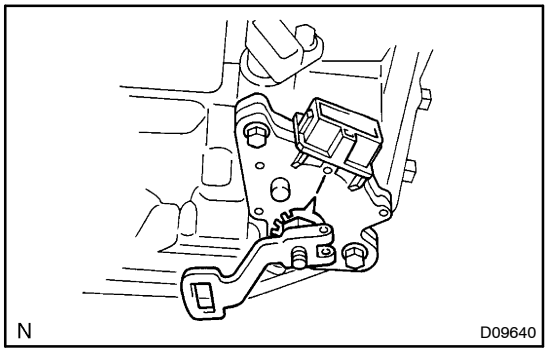
(a) Coat a new O–ring with ATF, install it to the union.
(b) Install the union to the transaxle case.
Torque: 27 N·m (276 kgf·cm, 20 ft·lbf)

143. INSTALL BREATHER PLUG HOSE

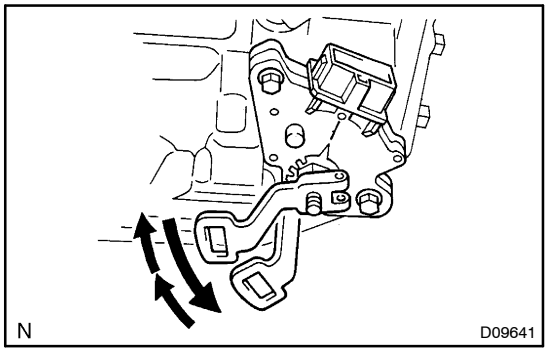


144. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

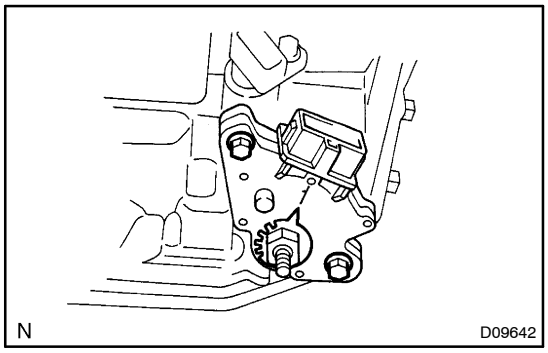
(a) Install the park/neutral position switch onto the manual valve lever shaft and temporarily install the 2 adjusting bolts.
(b) Install a new nut stopper and nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)



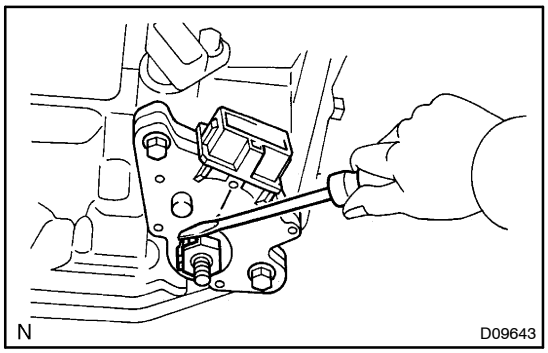
(c) Temporarily install control shaft lever.



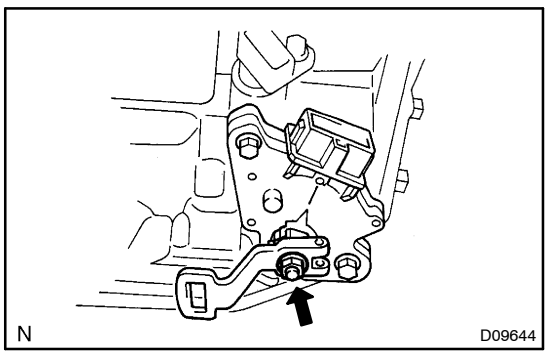
(d) Turn the lever counterclockwise until it stops, and then turn it clockwise 2 notches.
(e) Remove the control shaft lever.



(f) Align the groove with neutral basic line.
(g) Tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



(h) Using a screwdriver, stake the nut with the nut stopper.



(i) Install the control shaft lever, washer and nut.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

145. INSTALL SPEEDOMETER DRIVEN HOLE (ATM) COVER SUB–ASSY

(a) Coat the new O–ring with ATF and install it to the speedometer driven hole cover.
(b) Install the bolt and speedometer driven hole cover sub–assy to the transaxle assy.
Torque: 7.0 N·m (70 kgf·cm, 61 ft·lbf)