

AUTOMATIC TRANSAXLE ASSEMBLY

B3E051701030A29

Precaution

General notes

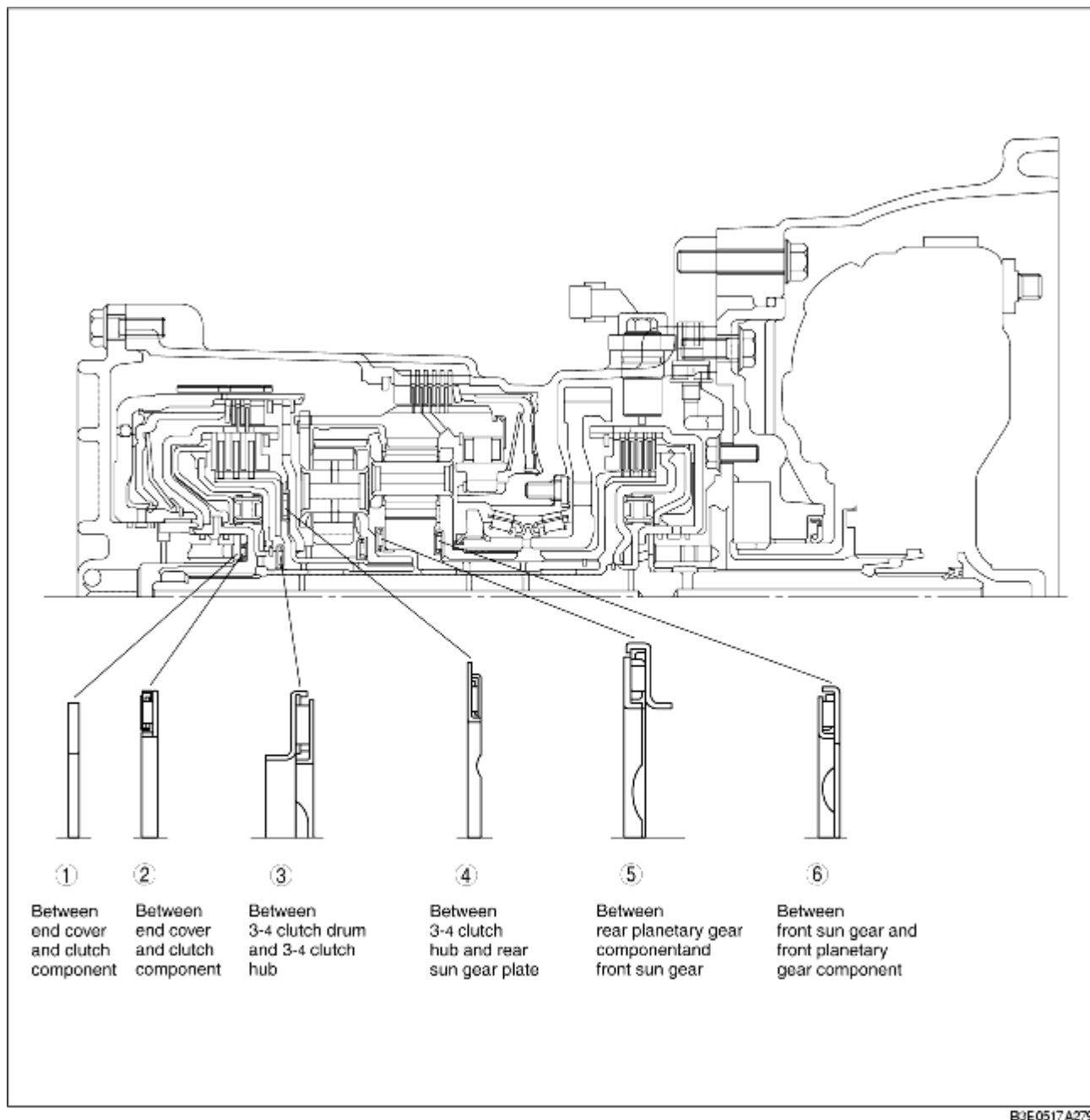
1. Select the adjustment shims, referring to **Bearing Preload**.
2. If the drive plates or 2-4 brake band are replaced with new ones, soak the new part in ATF for at least two hours before installation.
3. Before assembly, apply ATF to all seal rings, rotating parts, O-rings, and sliding parts.
4. All O-rings, seals, and gaskets must be replaced with the new ones included in the overhaul kit.
5. Use petroleum jelly, not grease, when assembling again.
6. When it is necessary to replace a bushing, replace the subassembly that includes that bushing.
7. Assemble the housing within 10 minutes after applying sealant, and allow it to cure for at least 30 minutes after assembly before filling the transaxle with ATF.

Warning

- Although the stand has a self-locking brake system, there is a possibility that the brake may not hold when the transaxle is held in a lopsided position on the stand. This would cause the transaxle to turn suddenly, causing serious injury. Never keep the transaxle tilted to one side. Always hold the rotating handle firmly when turning the transaxle.

Assembly

Bearing and race locations



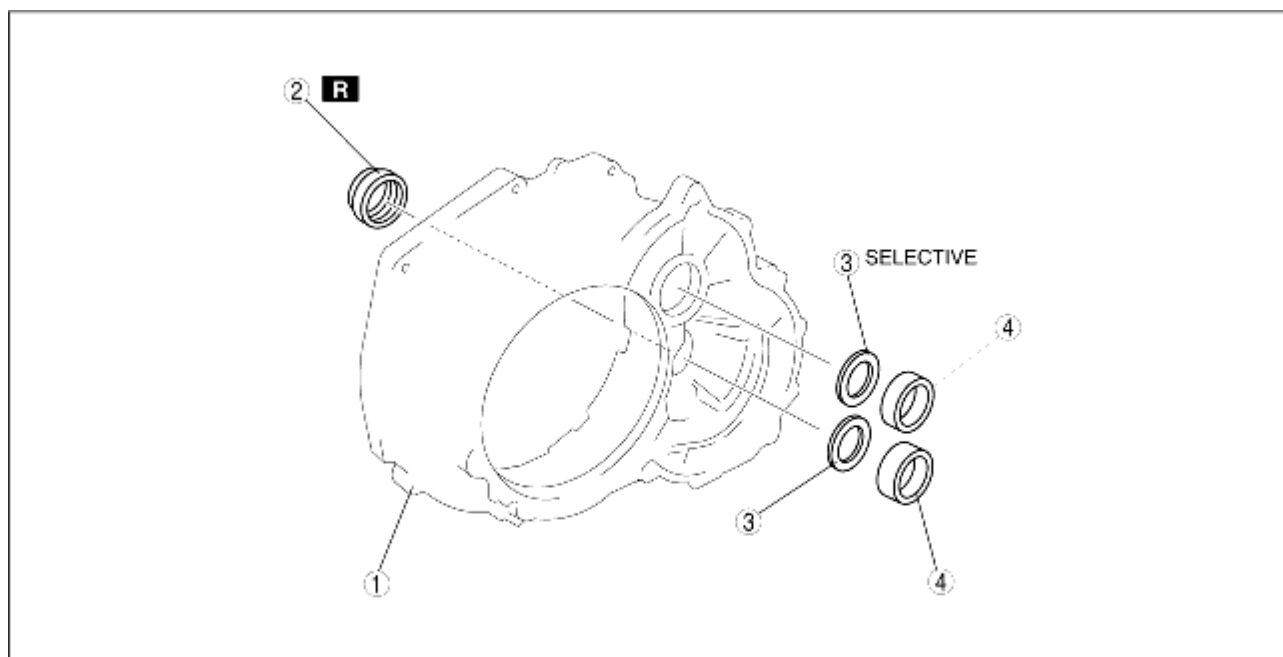
Note

- The bearing and race at locations 2, 3, 4, 5, and 6 are one-piece units.

Outer diameter of bearing and race

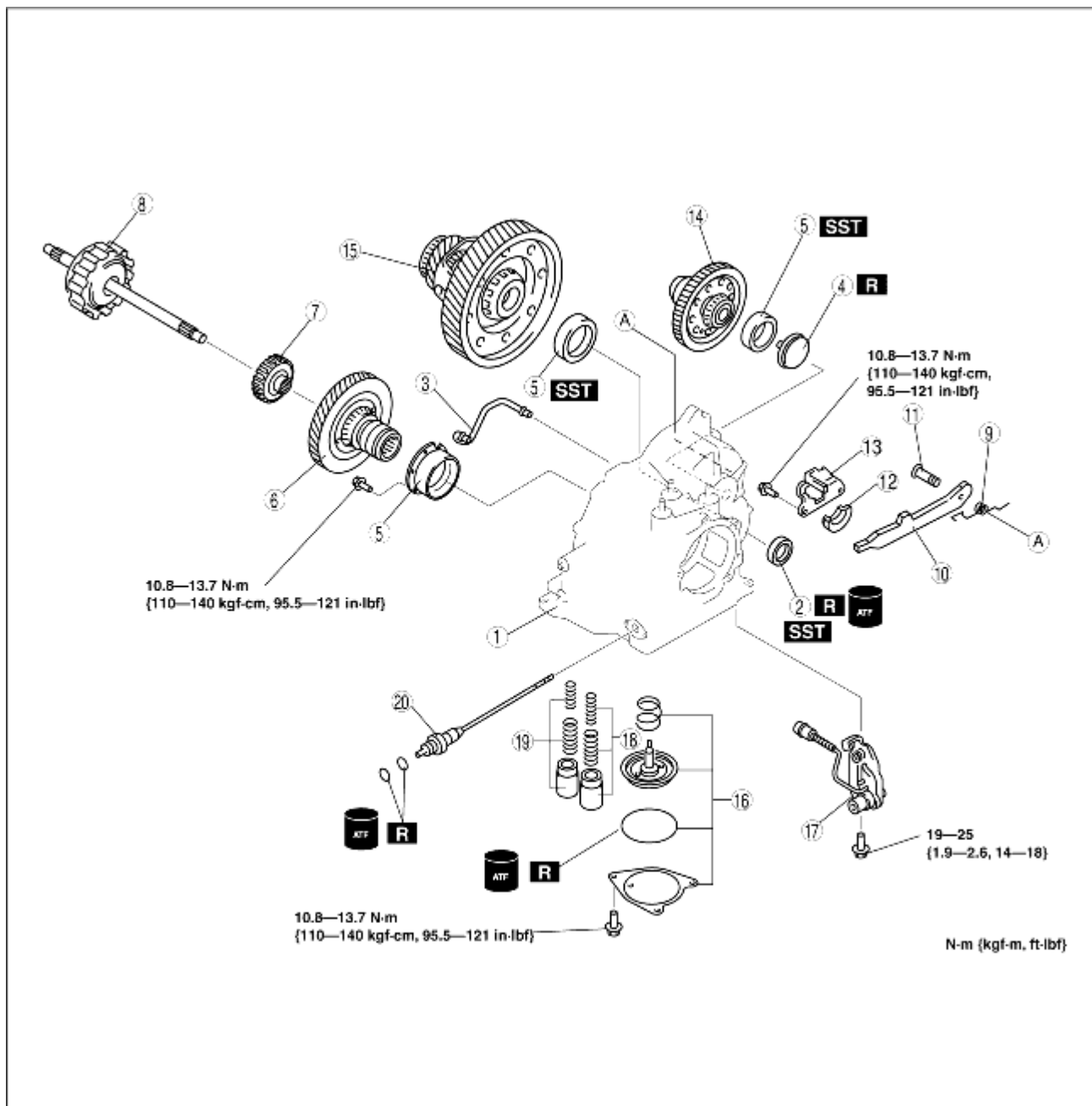
	1	2	3	4	5	6
Bearing (mm {in})	-	40.0 {1.57}	39.0 {1.54}	78.2 {3.08}	52.0 {2.05}	50.0 {1.97}
Race (mm {in})	40.2 {1.58}	-	-	-	-	-

Components



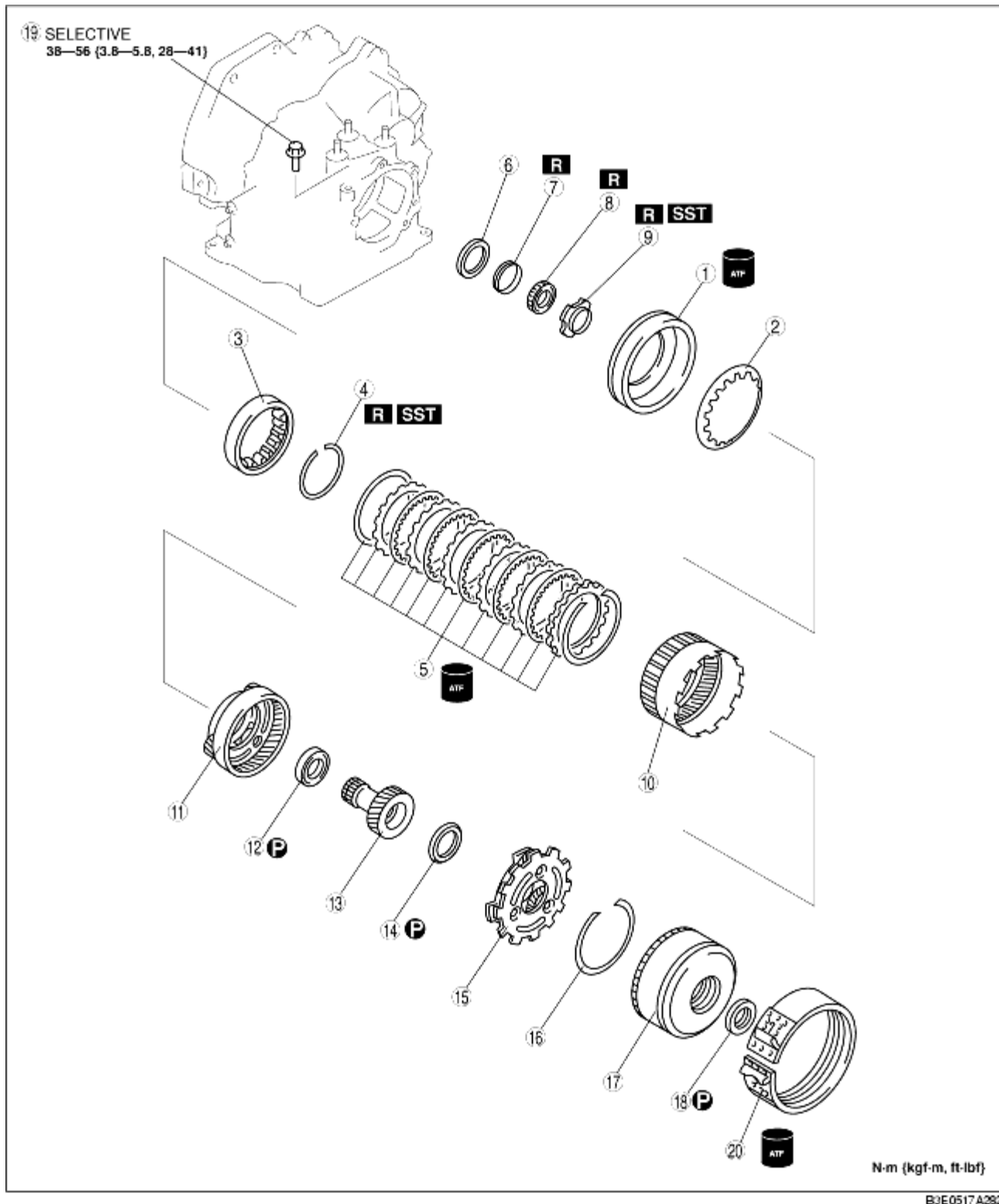
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1	Converter housing
2	Oil seal
3	Adjustment shim
4	Bearing race

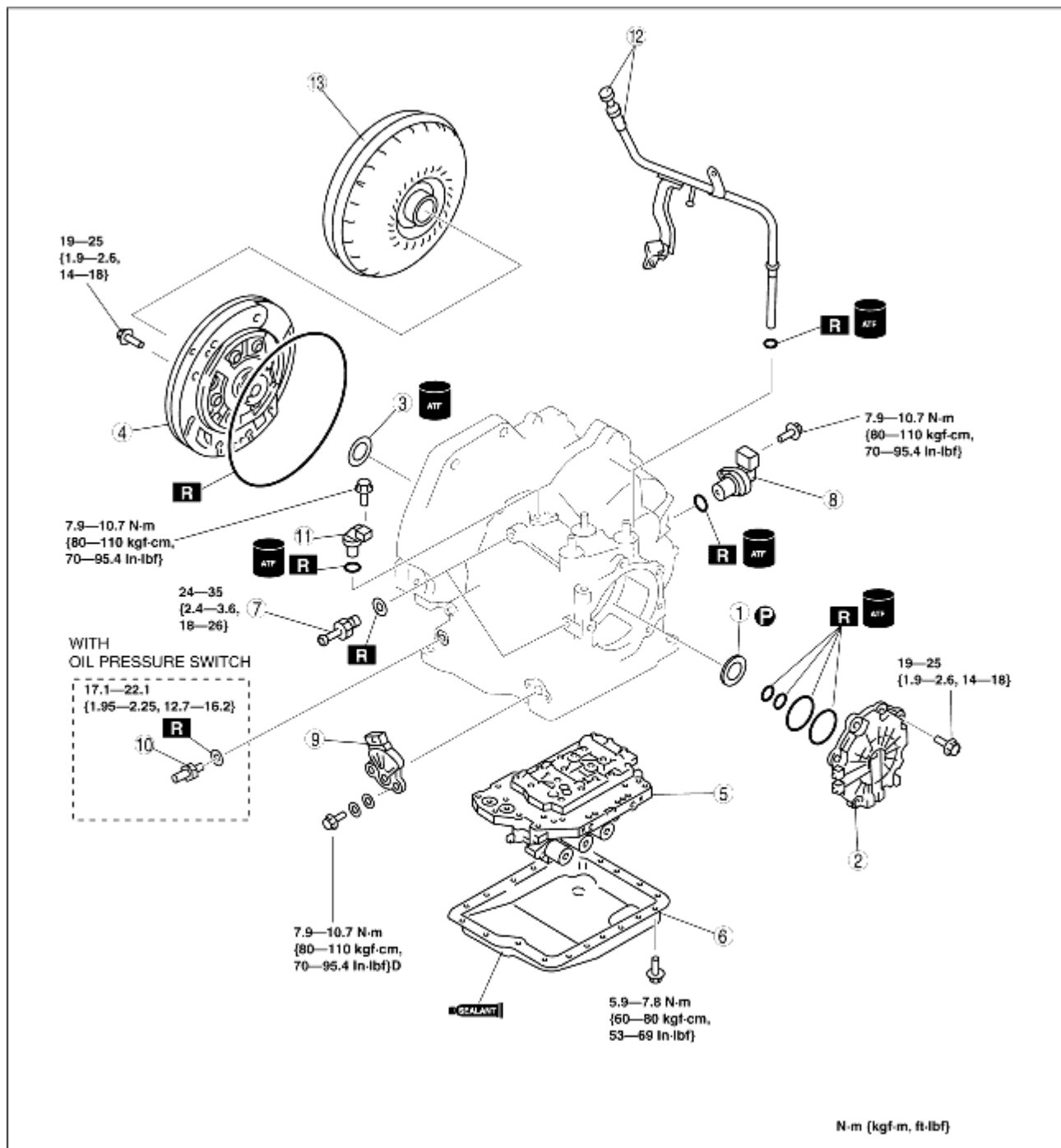


1	Transaxle case
2	Oil seal
3	Oil pipe
4	Funnel
5	Bearing race
6	Primary gear
7	Forward clutch hub
8	Forward clutch
9	Pawl return spring
10	Parking pawl
11	Parking pawl shaft
12	Support actuator
13	Actuator plate

14	Secondary gear and output gear
15	Differential
16	Band servo
17	Parking rod lever component
18	Forward accumulator
19	Servo apply accumulator
20	Manual shaft



1	Low and reverse brake piston
2	Low and reverse brake return spring
3	One-way clutch inner race
4	Snap ring
5	Low and reverse brake
6	Bearing race
7	Distance piece
8	Bearing
9	Locknut
10	Front internal gear and one-way clutch
11	Front planetary gear component
12	Needle bearing
13	Front sun gear
14	Needle bearing
15	Rear planetary gear component
16	Snap ring
17	Clutch component
18	Needle bearing
19	Band strut
20	2-4 brake band



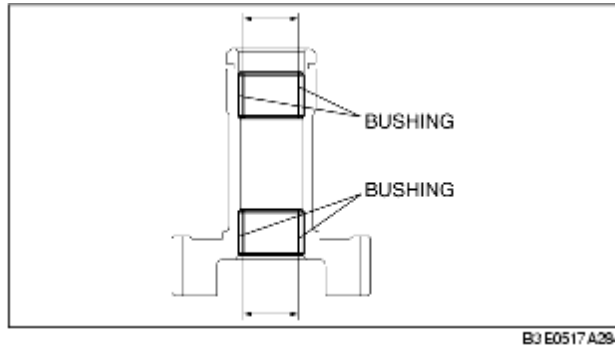
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1	Needle bearing
2	End cover
3	Thrust washer
4	Oil pump
5	Control valve body
6	Oil pan
7	Connector pipe
8	Vehicle speed sensor
9	Transaxle range switch
10	Oil pressure switch
11	Input/turbine speed sensor

12	Oil dipstick and oil filler tube
13	Torque converter

Assembly procedure

1. Measure the bushing of the front sun gear.



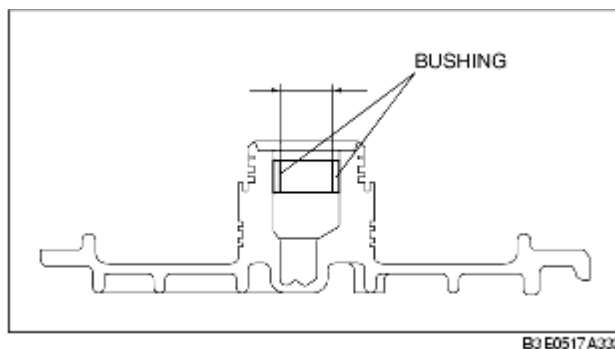
Bushing inner diameter

Standard: 18.000-18.018 mm

{0.70866-0.70936 in}

Maximum: 18.038 mm {0.71016 in}

2. If not as specified, replace the front sun gear.
3. Measure the bushing of the end cover.



Bushing inner diameter

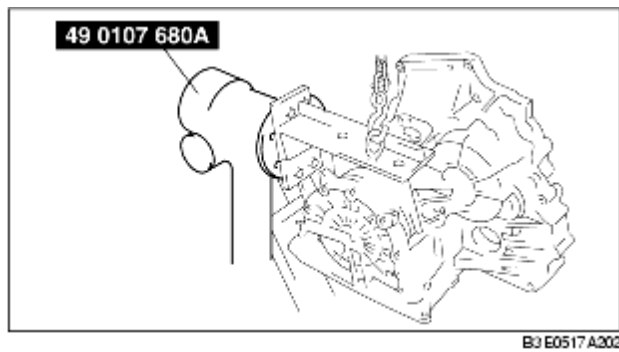
Standard: 23.600-23.621 mm

{0.92913-0.92995 in}

Maximum: 23.641 mm {0.93075 in}

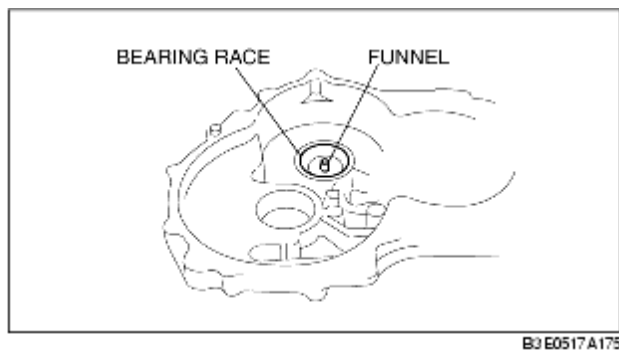
4. If not as specified, replace the end cover.
5. Assemble the **SST**.

6. Lift the transaxle case and mount it on the **SST**.

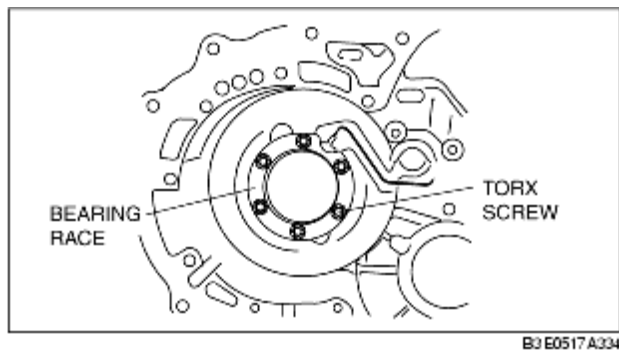


7. Install the oil pipe.

8. Install a new funnel and bearing race.



9. Install the bearing race, then tighten torx screws.

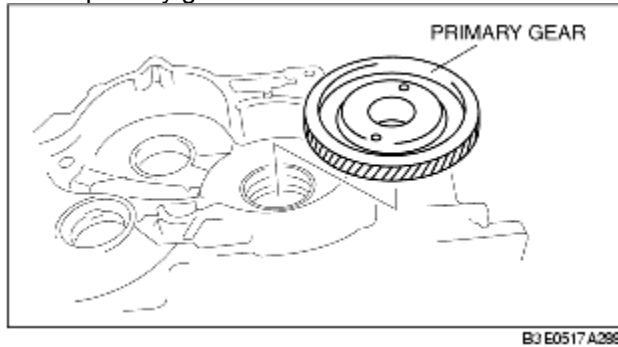


Tightening torque
10.8-13.7 N·m
{110-140 kgf·cm, 95.5-121 in·lbf}

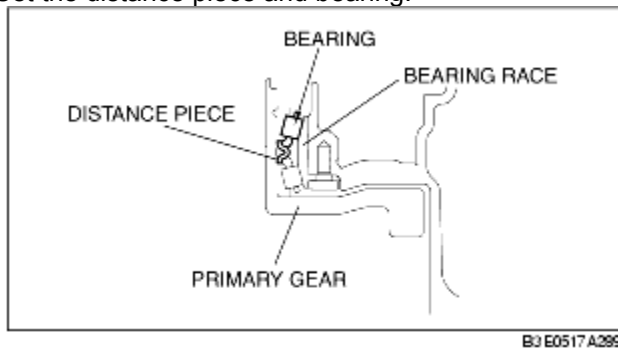
10. Install the bearing race to the transaxle case.

11. Install the locknut.

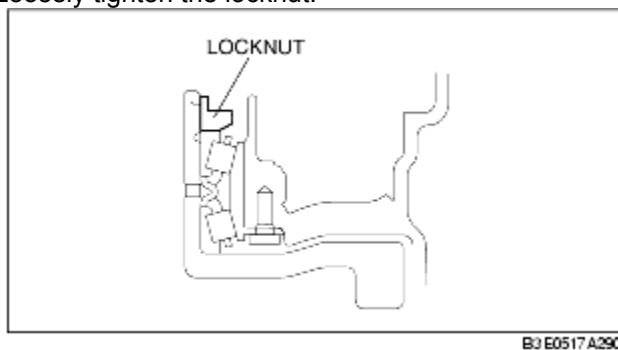
- (1) Set the primary gear.



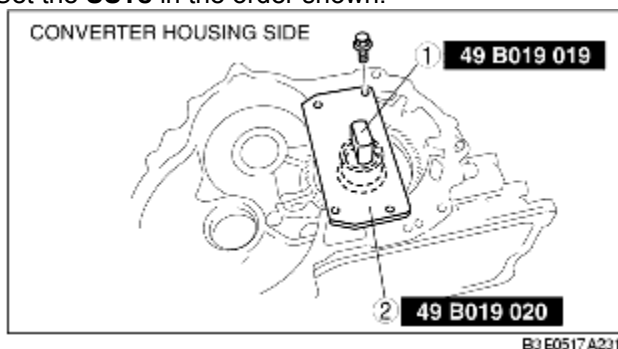
- (2) Set the distance piece and bearing.



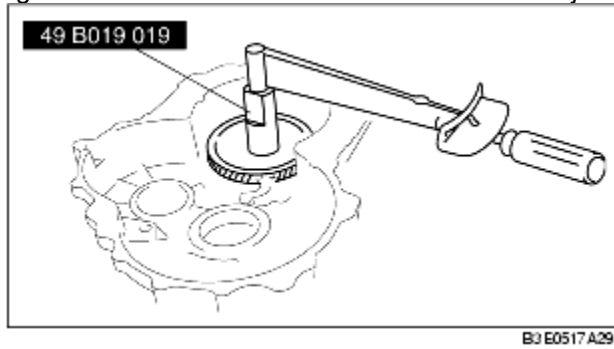
- (3) Loosely tighten the locknut.



- (4) Set the
- SSTs**
- in the order shown.



- (5) Tighten the locknut from the end cover side to adjust the preload within the specification.

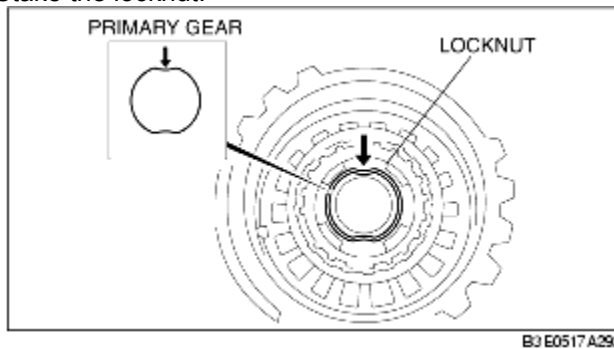


Preload

0.50-0.90 N·m

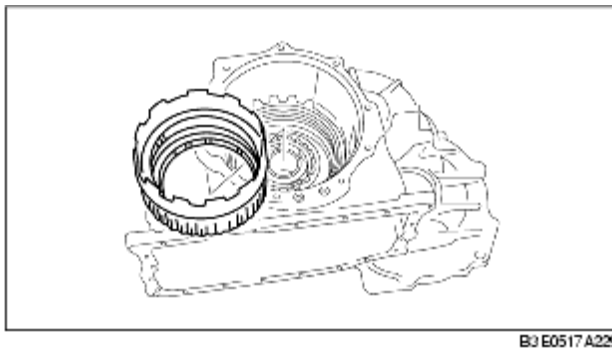
{5.10-9.17 kgf·cm, 4.42-7.96 in·lbf}

- (6) Stake the locknut.



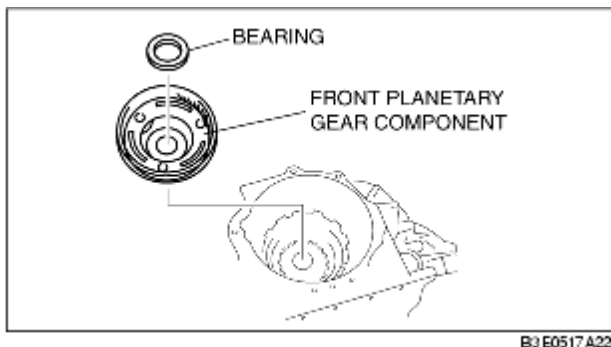
- (7) Remove the **SST**

12. Install the front internal gear and one-way clutch.

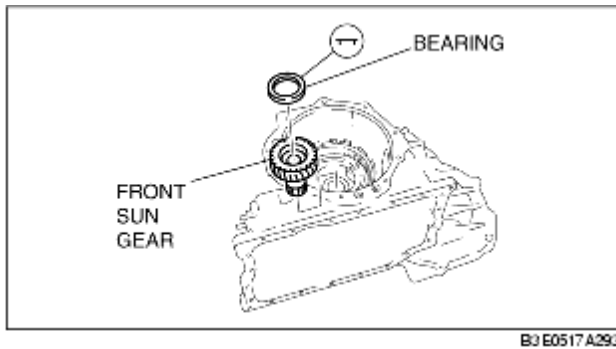


13. Apply petroleum jelly to the bearing, and secure it to the front planetary gear component.

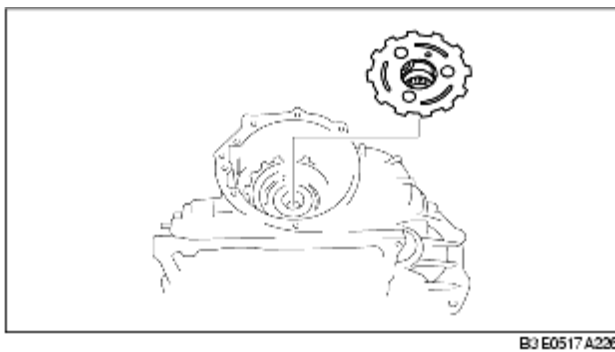
14. Install the front planetary gear component.



15. Apply petroleum jelly to the bearing, and secure it to the front sun gear.
16. Install the front sun gear.

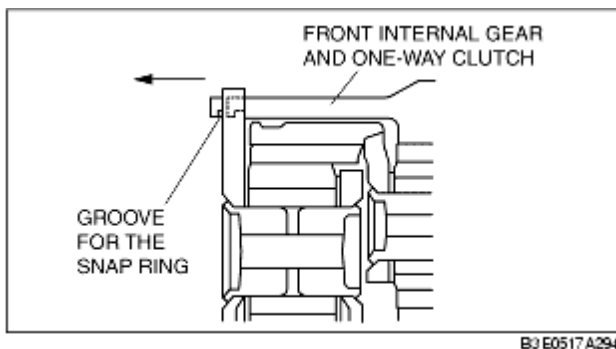


17. Install the rear planetary gear.



Note

- Rotate the engine stand so that the oil pan faces downward. Pull the front internal gear and one-way clutch component a little until the groove for the snap ring appears, then install the snap ring.

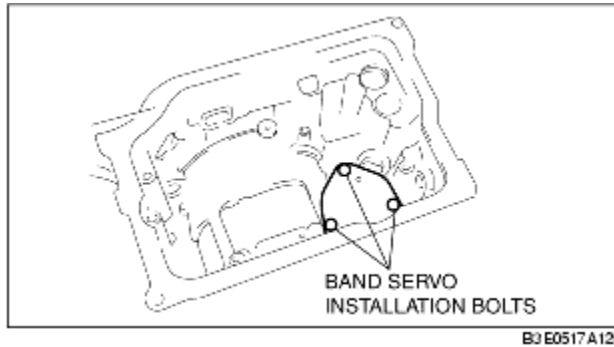


18. Install the snap ring.

19. Rotate the engine stand so that the end cover faces upward, and verify that the snap ring is installed accurately.

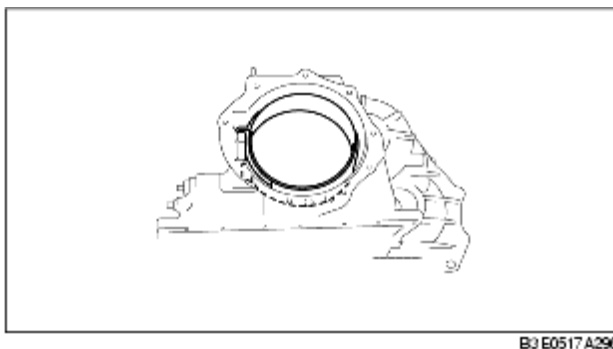
20. Install the band servo component.

- (1) Install the servo return spring and servo piston.
- (2) Apply ATF to the O-ring, and install it to the transaxle case.
- (3) Install the servo retainer.



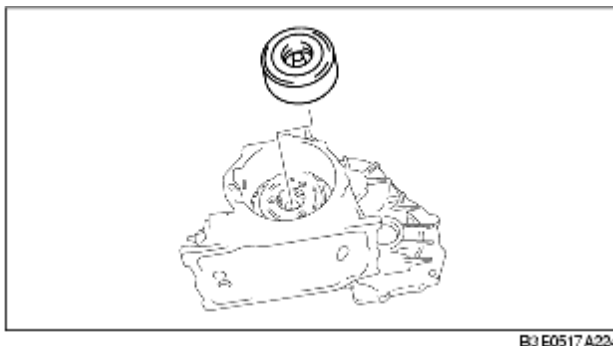
Tightening torque
10.8-13.7 N·m
{110-140 kgf·cm, 95.5-121 in·lbf}

21. Install the 2-4 brake band.



22. Apply petroleum jelly to the bearing, and secure it to the clutch component.

23. Install the clutch component.



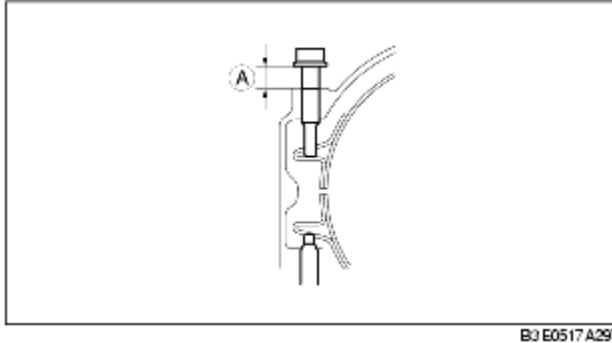
24. Select the band strut.

- (1) Find an appropriate bolt (under head length: **60-70 mm {2.36-2.75 in}**), and tighten the 2-4 brake band with the bolt.

Tightening torque

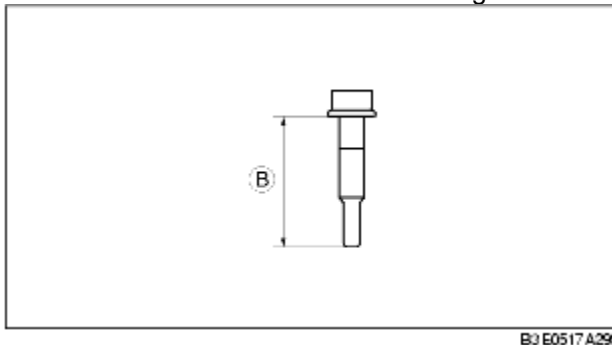
4.9 N·m {50 kgf·cm, 43 in·lbf}

- (2) Measure the dimension A shown in the figure.



- (3) Remove the bolt.

- (4) Measure the dimension B shown in the figure.



- (5) Calculate according to the formula below.

B - A = C (The middle of the under head length)

C - 4 = D (The lower limit of under head length)

C - 4.7 = E (The upper limit of under head length)

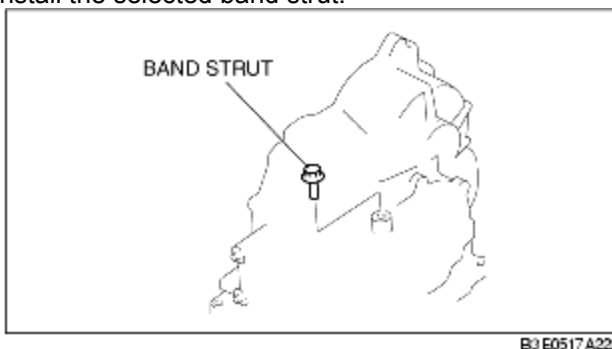
- (6) Select a band strut whose length should be between D and E.

Band strut length

mm {in}

36.0 {1.417}	36.5 {1.437}	37.0 {1.457}
37.5 {1.476}	38.0 {1.496}	38.5 {1.516}
39.0 {1.535}	-	-

- (7) Install the selected band strut.

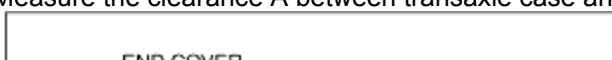


Tightening torque

37-52 N·m {3.8-5.3 kgf·m, 28-38 ft·lbf}

25. Use the following procedure to adjust the total end play.

- (1) Install the thickest bearing race (**2.6 mm {0.102 in}**) to the end cover.
- (2) Install the end cover to the clutch component.
- (3) Measure the clearance A between transaxle case and end cover.



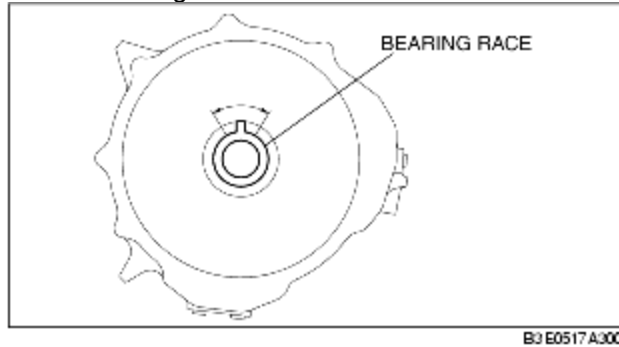
(4) Calculate according to the formulas below. Select an appropriate bearing race whose bearing thickness matches the calculated limits.

A - 2.6 mm {0.102} (Bearing thickness) = B

B - 0.25 = C (The lower limit of bearing thickness)

B - 0.50 = D (The upper limit of bearing thickness)

(5) Select a bearing race whose thickness is between D mm {in} and C mm {in}.



Bearing race sizes

mm {in}

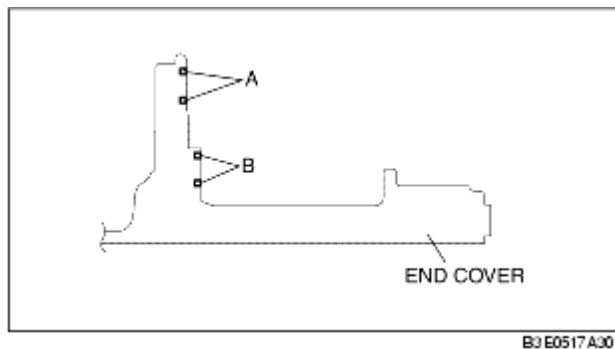
1.8 {0.071}	2.0 {0.079}	2.2 {0.087}
2.4 {0.094}	2.6 {0.102}	-

Caution

- The bearing race and end cover may be damaged if the end cover is not installed correctly to the transaxle case. Align the projection of the bearing race within the area of the arrows shown in the figure, and then install the end cover to the transaxle case.

(6) Remove the end cover, apply petroleum jelly to the selected bearing race, then install it to the end cover.

26. Apply ATF to new seal ring, and install it to the end cover.



Seal ring inner diameter

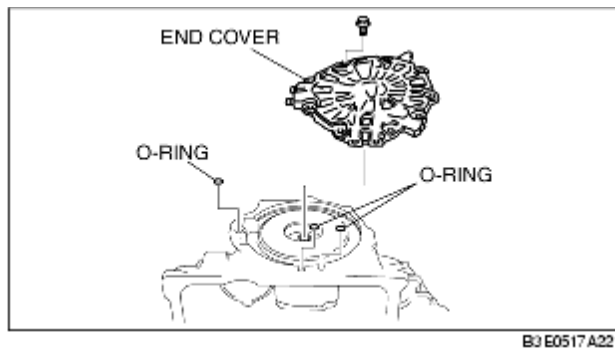
A: 47.1 mm {1.854 in}

B: 55.8 mm {2.197 in}

27. Apply a light coat of silicone sealant to the contact surfaces of the transaxle case and the end cover.

28. Apply ATF to the O-ring and install it to the transaxle case.

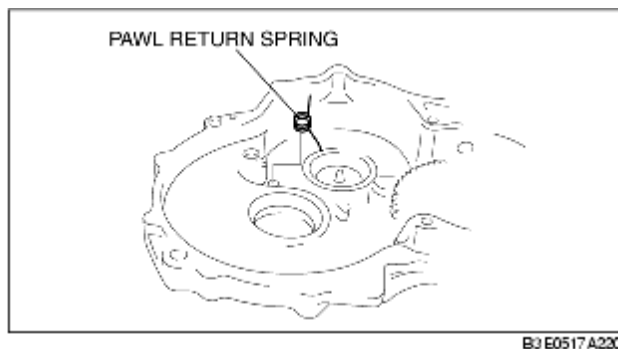
29. Install the end cover to the transaxle case.



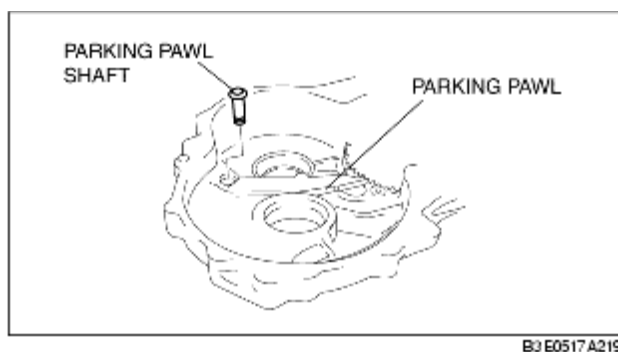
Tightening torque

19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}

30. Install the pawl return spring to the transaxle case.

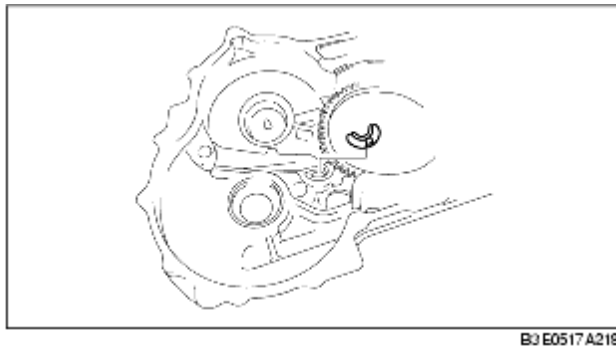


31. Install the parking pawl and parking pawl shaft to the transaxle case.

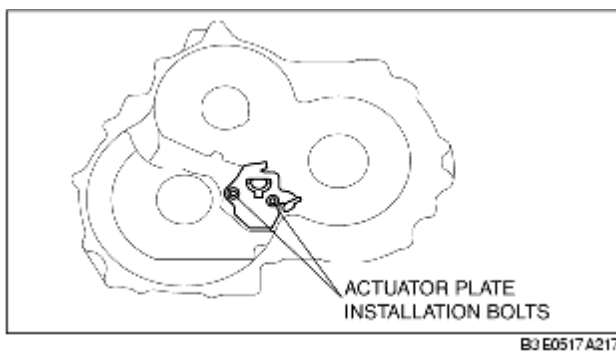


32. Install the pawl return spring to the parking pawl and parking pawl shaft.

33. Install the support plate to the transaxle case.



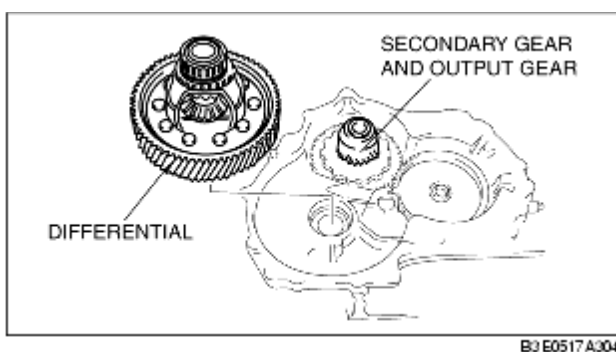
34. Install the actuator plate to the transaxle case.



Tightening torque
10.8-13.7 N·m
{110-140 kgf·cm, 95.5-121 in·lbf}

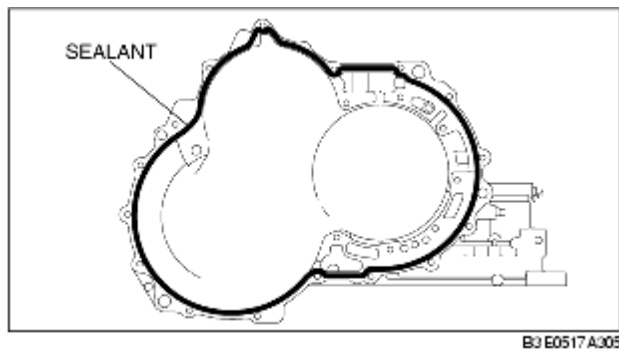
35. Install the secondary gear and output gear.

36. Install the differential.

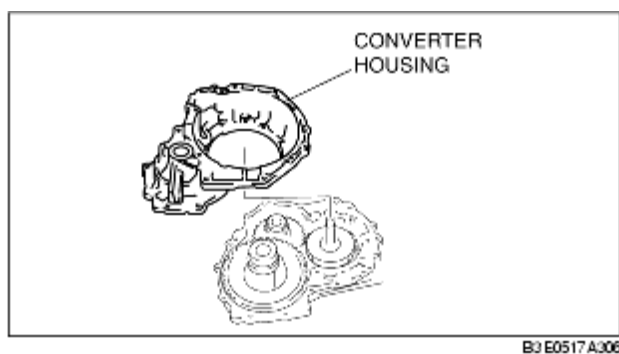


37. Install the forward clutch component.

38. Apply a light coat of silicone sealant to the contact surfaces of the converter housing and the transaxle case.



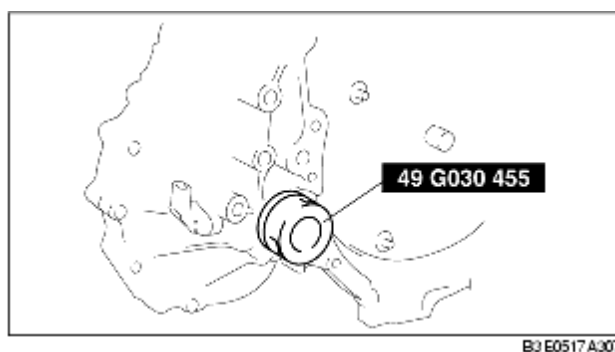
39. Install the converter housing.



Tightening torque

19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}

40. Install the **SST** into the differential side gears.

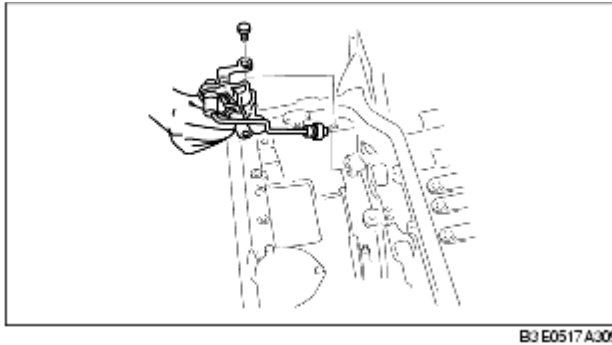


41. Apply ATF to the new O-ring and install it to the oil pump.

42. Install the oil pump.

Tightening torque**19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}**

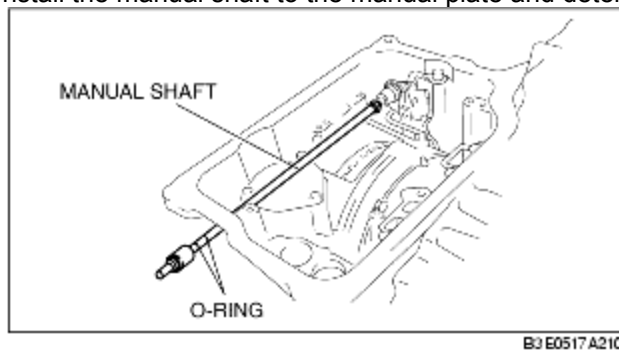
43. Install the parking rod lever component.

**Tightening torque****19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}**

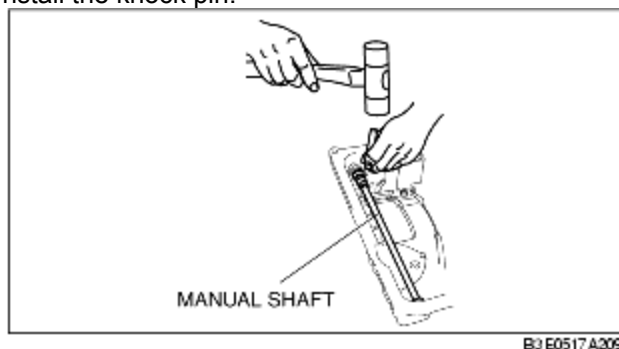
44. Apply ATF to the new O-ring and install it to the manual shaft.

45. Install the manual shaft.

(1) Install the manual shaft to the manual plate and detent bracket component.

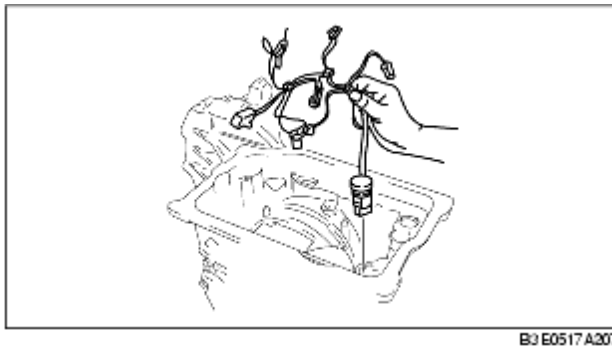


(2) Install the knock pin.



46. Install the accumulator component.

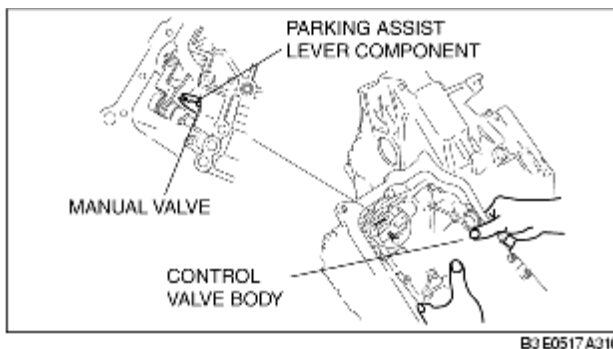
47. Install the coupler component.



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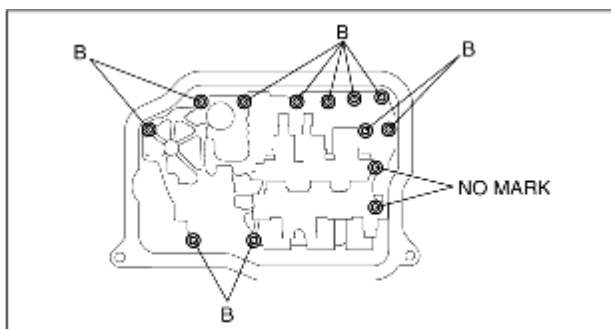
Caution

- Make sure that the head of the manual valve and the parking rod are assembled properly. If they are not, the ranges cannot be changed.



B3 E0517 A310

48. Install the control valve body.



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Tightening torque

7.8-10.8 N·m

{80-110 kgf·cm, 69-95.5 in·lbf}

Bolt length (measured from below the head)

B: 40 mm {1.575 in}

No mark: 70 mm {2.756 in}

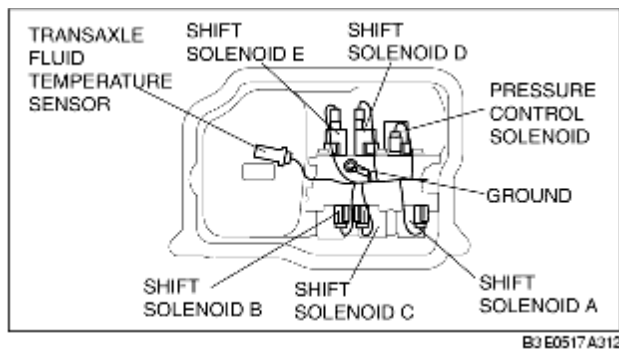
49. Apply ATF to the new O-ring and install it to the oil strainer.

50. Install the oil strainer.

51. Match the harness colors, then connect the solenoid connector and transaxle fluid temperature sensor.

Solenoid valve	Color of connector (harness side)
Pressure control solenoid	Black
Shift solenoid A	White
Shift solenoid B	Blue
Shift solenoid C	Green
Shift solenoid D	White
Shift solenoid E	Black

52. Install the ground.



Tightening torque

7.8-10.8 N·m

{80-110 kgf·cm, 69-95.5 in·lbf}

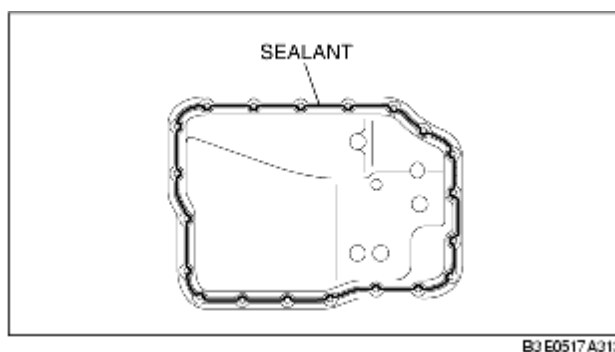
Warning

- Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.

Caution

- Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents before removal.
- If any old sealant gets into the transaxle during installation of the oil pan, trouble may occur in the transaxle case and oil pan, and clean with cleaning fluids.

53. Apply a light coat of silicone sealant to the contact surfaces of oil pan and transaxle case.



54. Install the oil pan.

Tightening torque**5.9-7.8 N·m****{60-80 kgf·cm, 53-69 in·lbf}**

55. Install the oil pipe.

Tightening torque**24-35 N·m****{2.4-3.6 kgf·cm, 18-26 in·lbf}**

56. Apply ATF to the new O-ring and install it to the vehicle speed sensor.

57. Install the vehicle speed sensor.

Tightening torque**7.8-10.8 N·m****{80-110 kgf·cm, 69-95.5 in·lbf}**

58. Apply ATF to the new O-ring and install it to the input/turbine speed sensor.

59. Install the oil pressure switch.

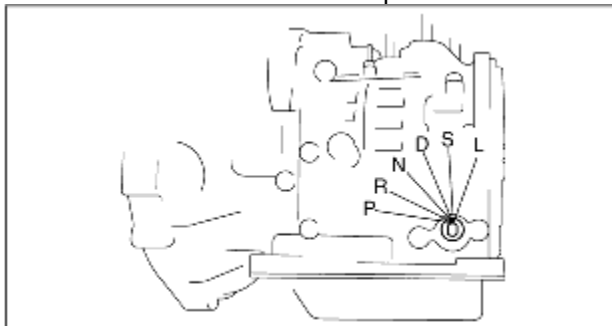
Tightening torque**17.1-22.1 N·m****{1.75-2.25 kgf·m, 12.7-16.2 ft·lbf}**

60. Install the input/turbine speed sensor.

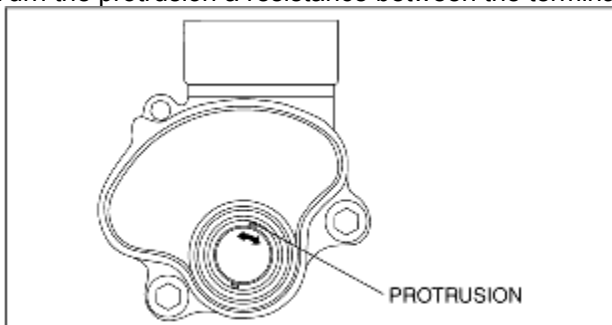
Tightening torque**7.8-10.8 N·m****{80-110 kgf·cm, 69-95.5 in·lbf}**

61. Install the transaxle range switch.

(1) Rotate the manual shaft to the N position.

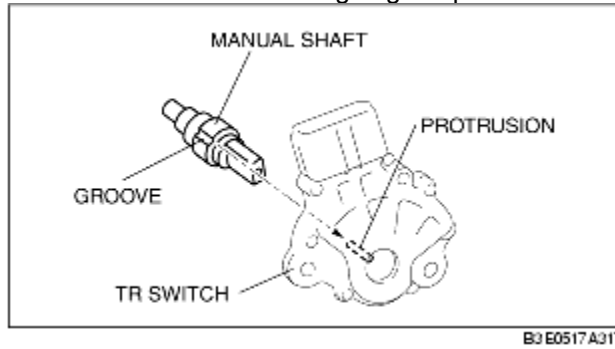


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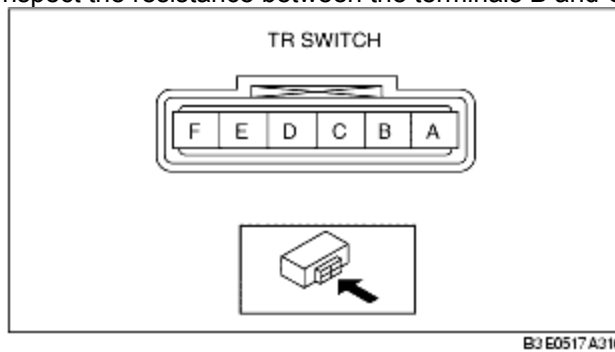
(2) Turn the protrusion a resistance between the terminals B and C become **750 ohms**.

B3 E0517 A015

- (3) Install the TR switch while aligning the protrusion and groove as shown.



- (4) hand- tighten the TR switch mounting bolts.
 (5) Inspect the resistance between the terminals B and C.



- If not as specified, readjust the TR switch.

Resistance

750 ohms

- (6) Tighten the TR switch mounting bolts

Tightening torque

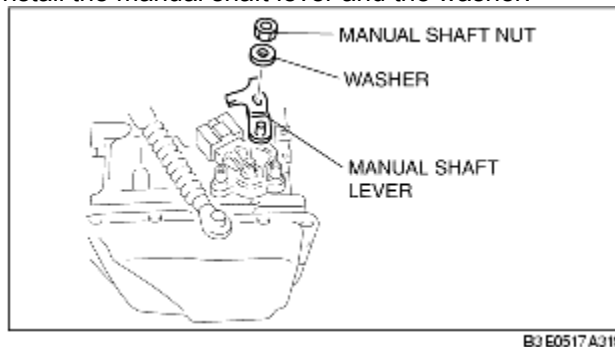
8-11 N·m

{82-112 kgf·cm, 71-97 in·lbf}

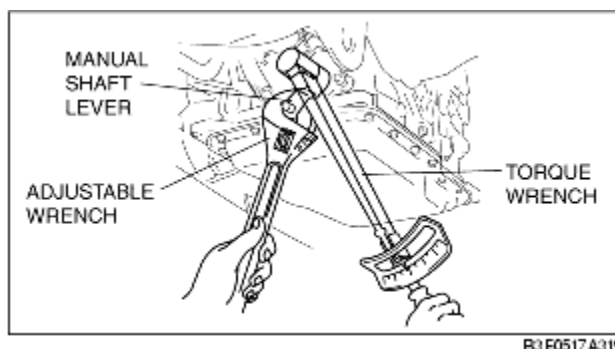
Caution

- Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, or the transaxle may be damaged.

- (7) Install the manual shaft lever and the washer.



- (8) Set the adjustable wrench as shown to hold the manual shaft lever, and tighten the manual shaft nut.

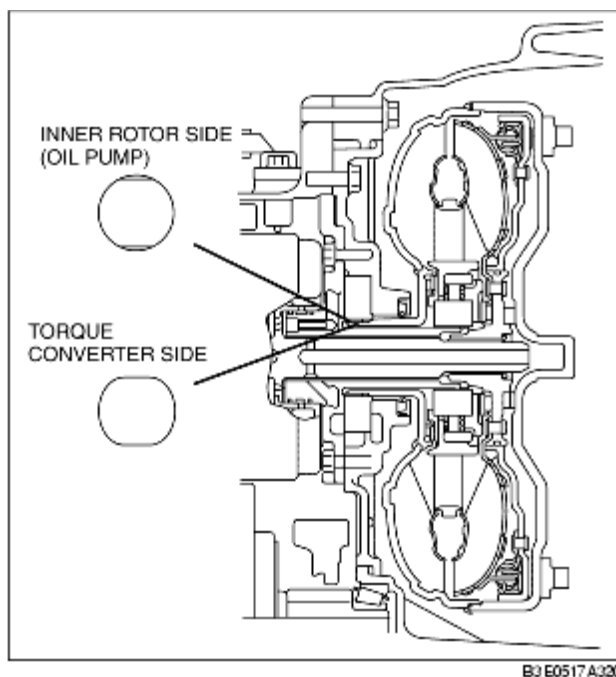


Tightening torque
32-46 N·m
{3.2-4.7 kgf·m, 24-33 ft·lbf}

62. Remove the transaxle from the **SST**.
63. Apply ATF to the new O-ring and install it to the oil filler tube.
64. Install the oil dipstick and oil filler tube to the transaxle.

Tightening torque
7.8-10.8 N·m
{80-110 kgf·cm, 69-95.5 in·lbf}

65. Drain any ATF remaining in the torque converter.
66. Pour in solvent (**approx. 0.5 L {0.53 US qt, 0.44 Imp qt}**),
67. Shake the torque converter to clean the inside.
68. Pour out the solvent.
69. Pour the ATF.
70. Install the torque converter by aligning its gap to the oil pump inner rotor gap as shown in the figure.



71. To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

Distance A**Mazda 3:****31.4 mm {1.24 in}****Mazda 6:****21.4 mm {0.84 in}**