2005-08 TRANSMISSION

Automatic Transaxle Overhaul (AW6A-EL) - CX-7, CX-9 & Mazda 6

AUTOMATIC TRANSAXLE

AUTOMATIC TRANSAXLE DISASSEMBLY

Precaution

The following are precautions that must be followed when performing removal/installation.

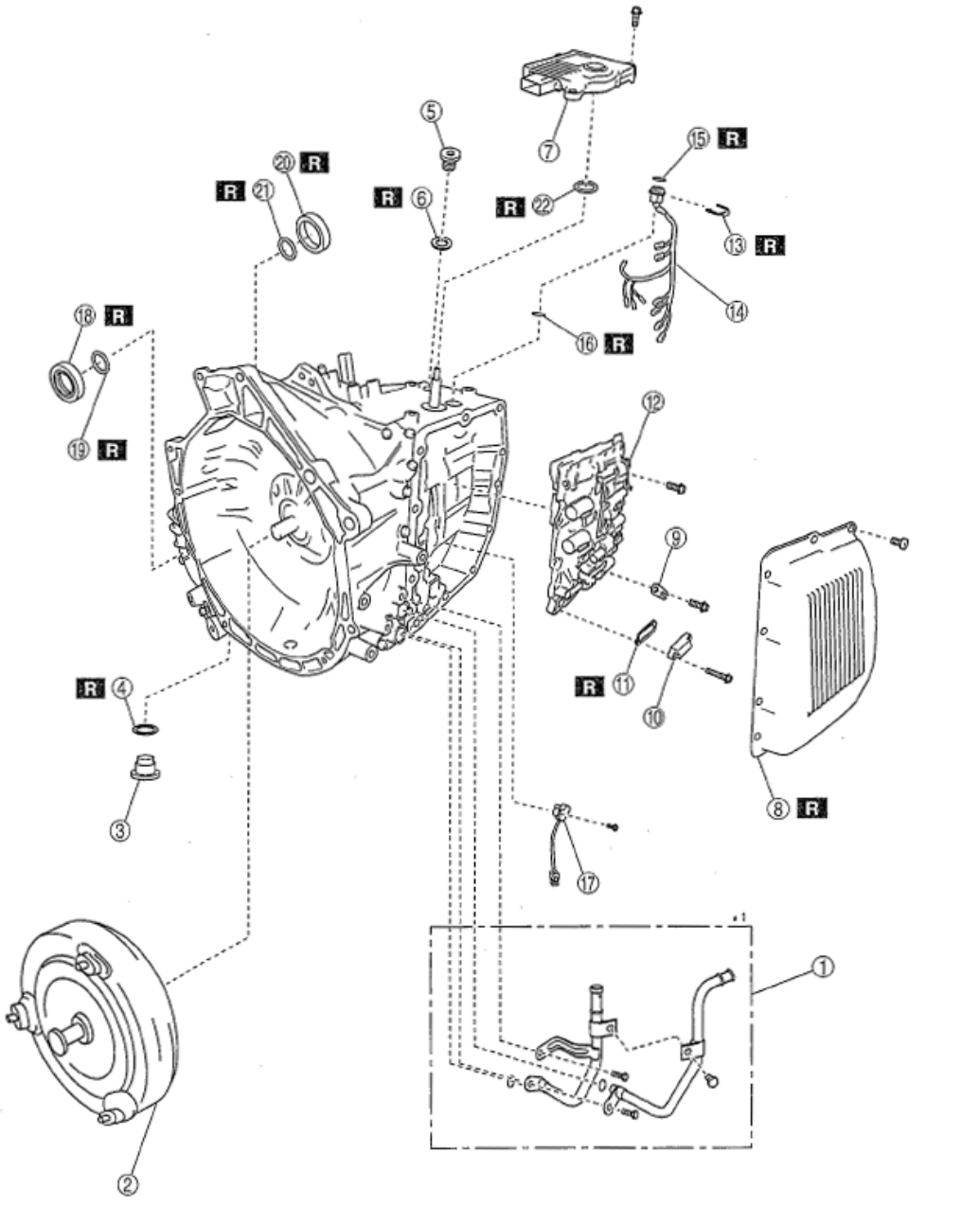
1. Handle electronic parts with care
   - Do not pull the wiring harness forcibly when disconnecting the connector. Unlock the lock first and pull the connector.
   - When connecting the connector, verify to insert it until it is properly locked. (Verify that a click sound is heard.)
   - Do not shock electronic parts. Replace with new parts if they have been dropped or subjected to shock.
2. Prevent foreign matter from penetrating
   - Be sure to remove foreign matter such as dust and sand from the automatic transaxle before removing parts.
   - Protect removed parts from dust with an object such as a vinyl sheet.
   - Do not use cotton work gloves or shop rags as frayed strings might get caught in the unit. Thus work with bare hands or use vinyl gloves.
3. Prevent scratching
   - Do not pry with a screwdriver forcibly. Slightly hit the case with a plastic hammer when separating component cases at seams.
   - Do not pull the valve forcibly.
   - Be careful not to get the wire harness caught between parts during installation.
4. Prevent incorrect installation and lack of or missing parts
   - Be careful not to install parts incorrectly or lose parts since there are similar types of O-rings, snap rings, bearings and races. Take great care for straightening parts and checking installation direction.
   - Be careful not to drop small parts such as check balls or lose them during installation.
5. Wash parts and apply oil
   - Wash each part before installing and dry using compressed air, and then apply the specified ATF type JWS3309.
   - Soak disks in ATF type JWS3309 before installing. In particular, soak new disks for **2 h or more** so that the oil seeps into the lining.
   - If the thrust bearing or race falls during installation, use a small amount of yellow petrolatum grease.
   - Apply ATF type JWS3309 to contact and rotating surfaces.

- Do not apply oil or drive the vehicle immediately after installing a part applied with sealant. Leave it for one hour or more.
- Do not wash aluminum parts or rubber parts with alkaline chemicals.
- Do not wash the rubber parts with white gasoline.

6. Handling ATF with care
   - If you spill ATF on the floor, wipe it off immediately, as it is quite slippery and dangerous.
   - Be sure to use JWS3309 type ATF.

Disassembly

Components



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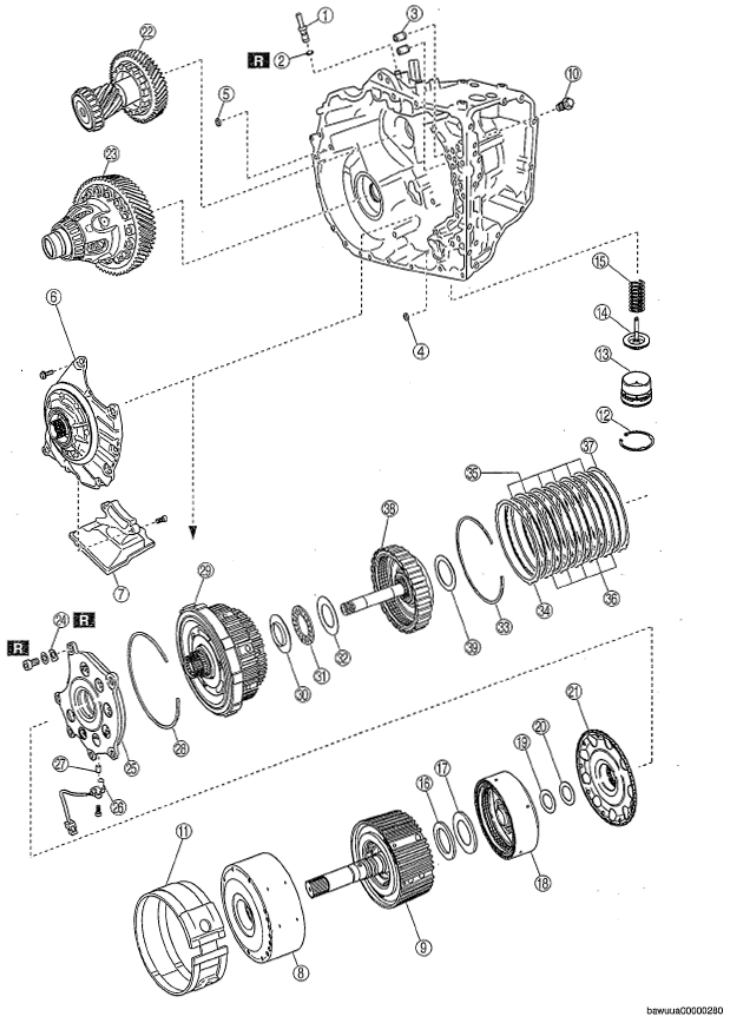
1	Oil pipe and O-ring
2	Torque converter
3	Drain plug
4	Gasket
5	Filler plug
6	O-ring
7	TCM
8	Control valve body cover
9	Lock plate
10	Suction cover
11	Gasket
12	Control valve body component

13	Coupler component lock plate
14	Coupler component
15	O-ring
16	Gasket
17	Input/turbine speed sensor
18	Oil seal (converter housing side)
19	O-ring (converter housing side) (2WD)
20	Oil seal (transaxle case side)
21	O-ring (transaxle case side)
22	Oil seal (manual shaft)

Fig. 1: Identifying Automatic Transaxle Disassembly Components (1 Of 4)
Courtesy of MAZDA MOTORS CORP.

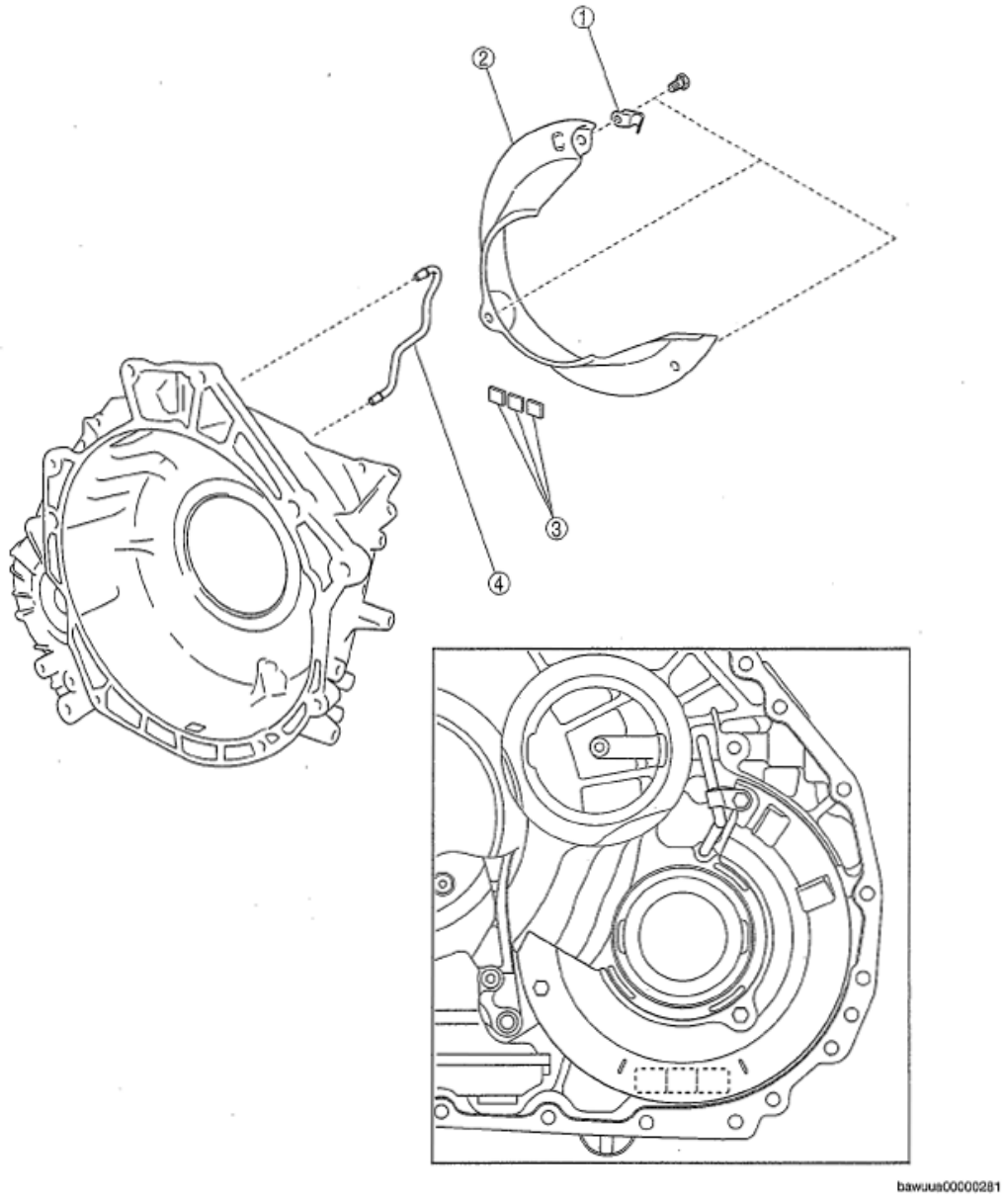


1	Breather pipe
2	O-ring
3	Transaxle case gasket
4	Gasket
5	Gasket
6	Oil Pump component
7	Oil strainer
8	C3 clutch component
9	Front planetary gear component and input shaft
10	Brake band anchor bolt
11	B1 brake band
12	Snap ring
13	Brake piston cover
14	B1 brake piston
15	Piston return spring
16	Thrust bearing
17	Bearing race
18	C1 clutch component
19	Thrust bearing
20	Bearing race
21	Sun gear input drum
22	Counter gear component
23	Differential component

24	Lock washer
25	Counter drive gear
26	Vehicle speed sensor (VSS)
27	Spacer
28	Snap Ring
29	Rear planetary gear component and one-way clutch component
30	Bearing race
31	Thrust bearing
32	Bearing race
33	Snap ring
34	Retaining plate
35	Drive plate
36	Driven plate
37	Retaining plate
38	C2 clutch component
39	Thrust bearing

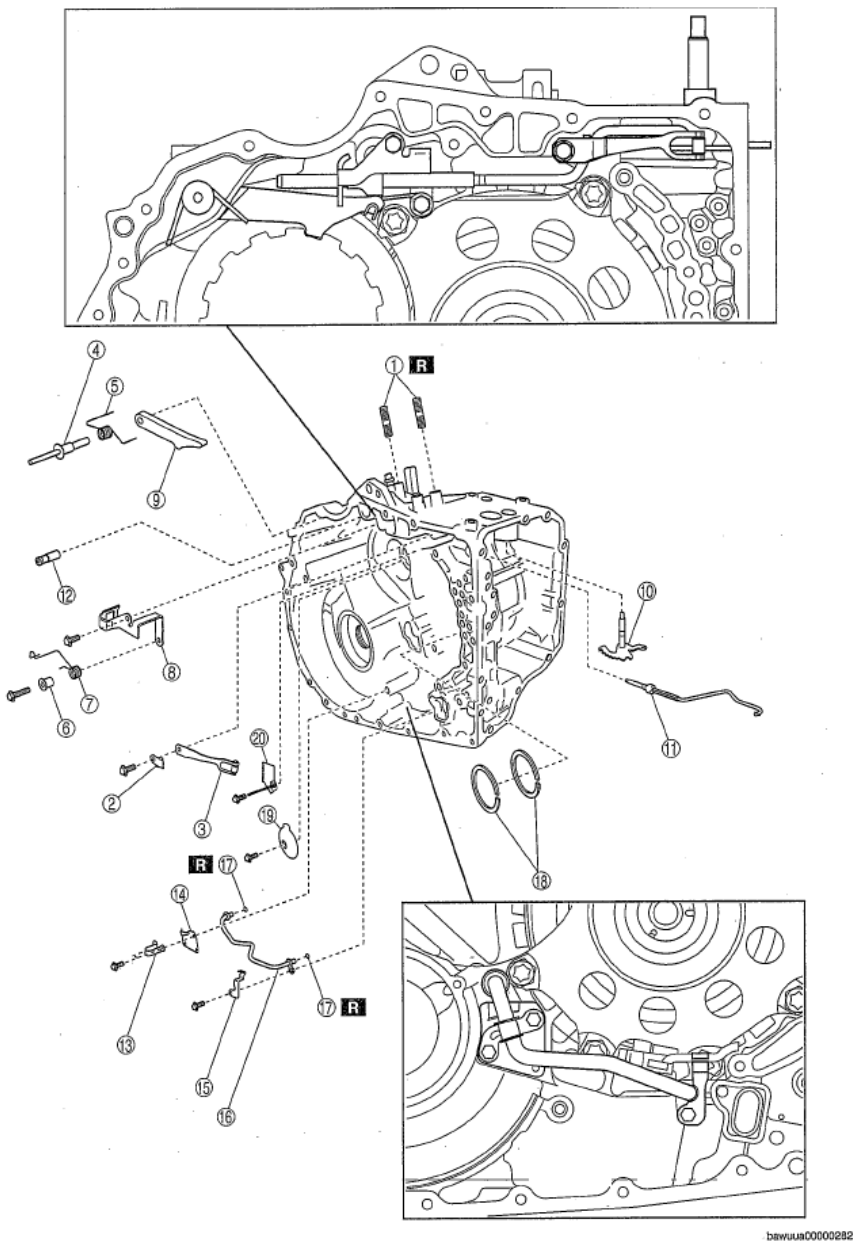
Fig. 2: Identifying Automatic Transaxle Disassembly Components (2 Of 4)

Courtesy of MAZDA MOTORS CORP.



1	Tube clamp	3	Magnet
2	Oil reservoir lock plate	4	Oil pipe

Fig. 3: Identifying Automatic Transaxle Disassembly Components (3 Of 4)
Courtesy of MAZDA MOTORS CORP.



1	Stud bolt
2	Detent spring cover
3	Detent spring
4	Parking pawl shaft
5	Pawl return spring
6	Spring guide sleeve
7	Torsion spring
8	Parking pawl bracket
9	Parking pawl
10	Manual valve lever

11	Parking rod
12	Parking pin
13	Pipe clamp
14	Transaxle case No.1 plate
15	Wiring harness clip
16	Oil cooler outlet tube
17	O-ring
18	Seal ring
19	Transaxle case plate No.2
20	Transaxle case plate No.3

Fig. 4: Identifying Automatic Transaxle Disassembly Components (4 Of 4)
Courtesy of MAZDA MOTORS CORP.

Disassembly procedure

1. Remove the oil pipes and O-rings. (Refer to the appropriate article .)

CAUTION:
- **Do not damage the oil seal.**
- **Do not drop the torque converter.**

2. Remove the torque converter.

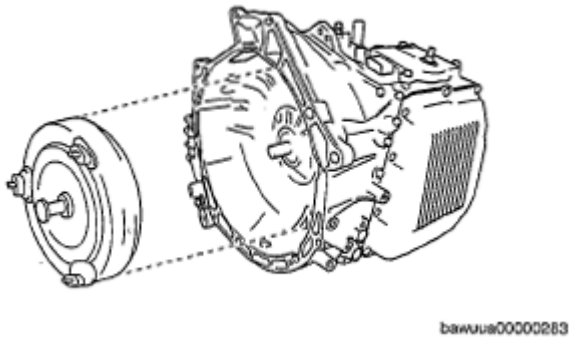


Fig. 5: Identifying Torque Converter
Courtesy of MAZDA MOTORS CORP.

3. Remove the drain plug and gasket.
4. Drain the ATF.

CAUTION:
- **Do not repair the threads using a tap or other tools.**

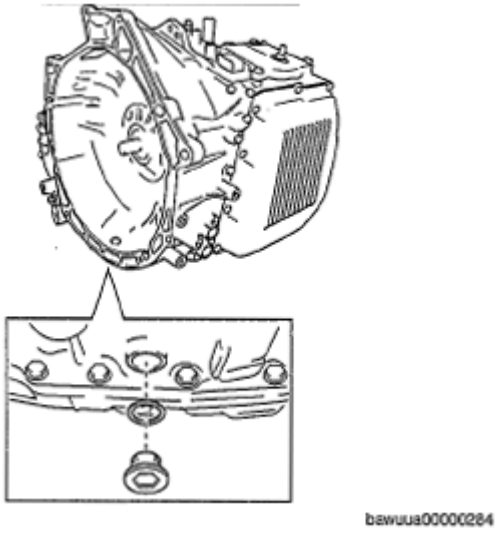


Fig. 6: Identifying Drain Plug And Gasket
Courtesy of MAZDA MOTORS CORP.

5. Remove the stud bolts.

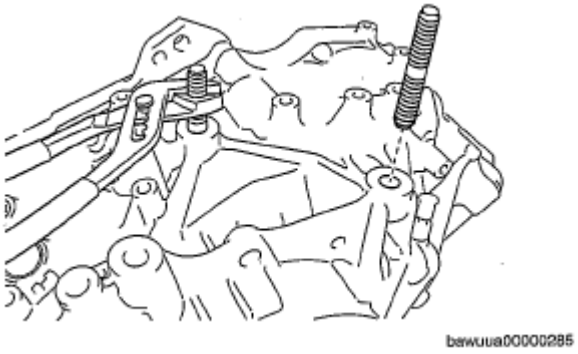


Fig. 7: Identifying Stud Bolts
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Do not touch the terminals.**

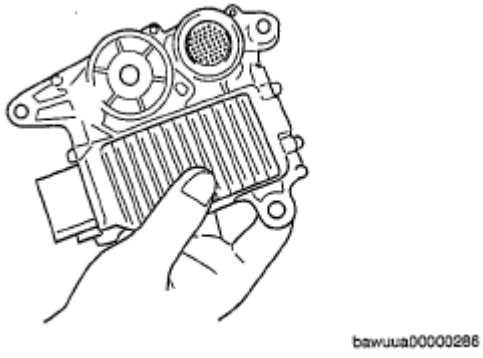


Fig. 8: Caution - Do Not Touch Terminals
Courtesy of MAZDA MOTORS CORP.

6. Remove the TCM.

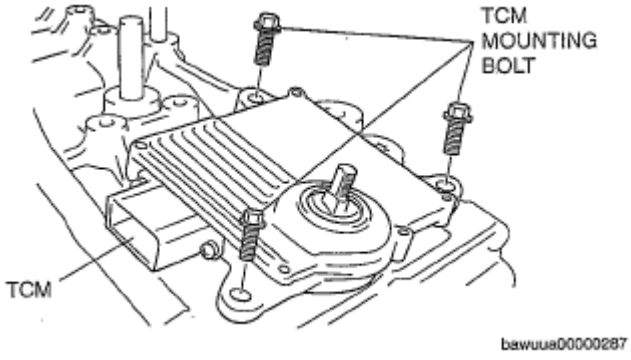


Fig. 9: Identifying TCM Mounting Bolt
Courtesy of MAZDA MOTORS CORP.

7. Set the **SST** as shown in the figure.

CAUTION:
- **When installing the SST to the transaxle, use bolts (M12x1.25) with a thread length of 90 mm {3.54 in}.**

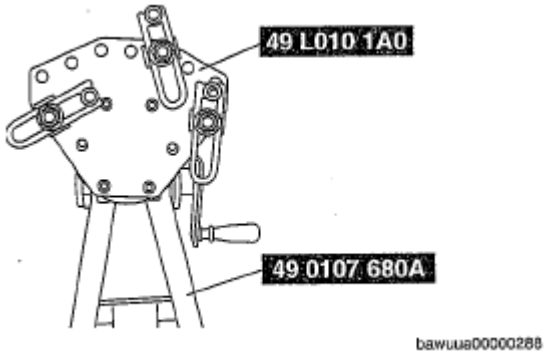


Fig. 10: Identifying SST
Courtesy of MAZDA MOTORS CORP.

8. Install the **SST** to the position where the transaxle stud bolts were removed.

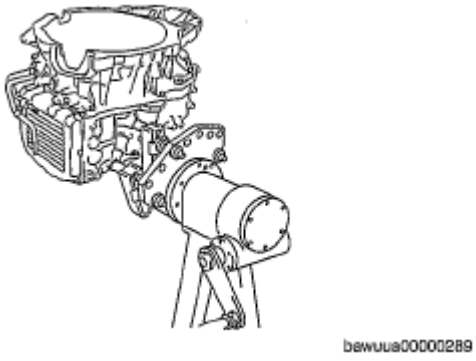


Fig. 11: Identifying SST And Transaxle Position
Courtesy of MAZDA MOTORS CORP.

9. Remove the control valve body cover installation bolt.

CAUTION:
- **Do not damage the fitting surface of the transaxle case and the control valve body cover.**
- **Do not deform the control valve body cover.**

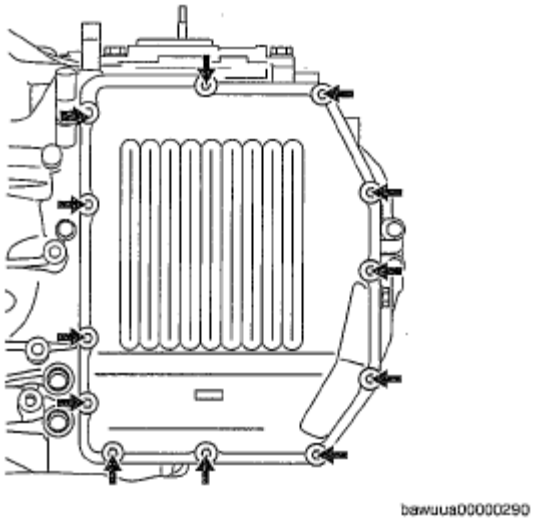


Fig. 12: Identifying Control Valve Body Cover Bolts
Courtesy of MAZDA MOTORS CORP.

10. Using a plastic hammer, tap the control valve body cover to remove it.

CAUTION:
- **Be careful not to damage the solenoid valves and connectors.**
- **Do not pull the wiring harnesses when removing the connector.**

NOTE:
- **Disconnect the solenoid connector according to the following procedure:**

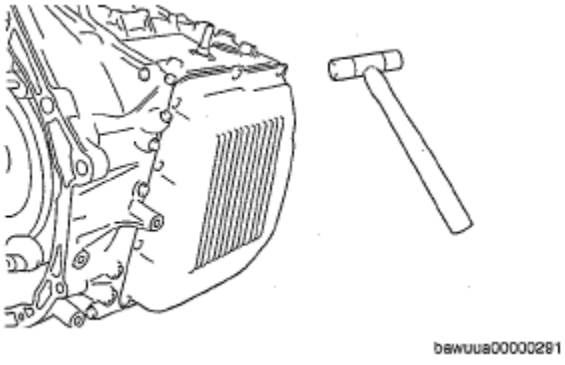


Fig. 13: Tapping Control Valve Body Cover
Courtesy of MAZDA MOTORS CORP.

1. Insert a precision screwdriver from the backside into the connector as shown in the figure.

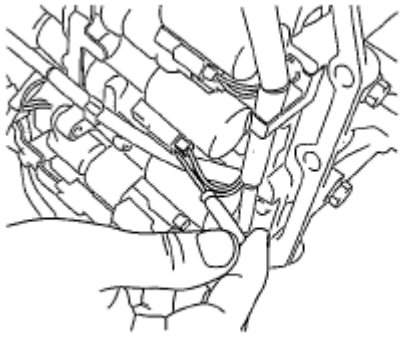


Fig. 14: Inserting Precision Screwdriver From Backside Into Connector
Courtesy of MAZDA MOTORS CORP.

2. Pry the screwdriver in the direction of the arrow and disconnect the connector.

CAUTION:
- **Do not damage the solenoid valves and connectors with the screwdriver.**
- **When disconnecting connectors, grasp the connectors, not the wiring harnesses. Otherwise, the wiring harnesses may be pulled out of the connector causing poor contact.**

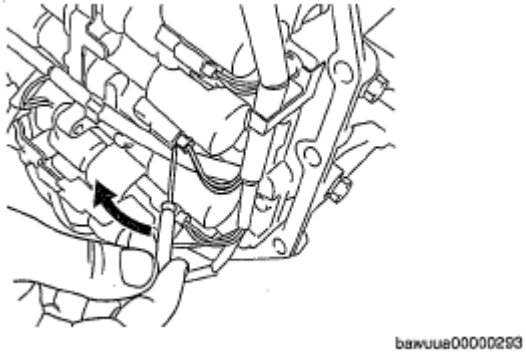


Fig. 15: Prying Screwdriver In Direction Of Arrow
Courtesy of MAZDA MOTORS CORP.

11. Disconnect the solenoid connectors, VSS connector and the input/turbine speed sensor connector.
12. Disconnect the coupler component from the clamp.

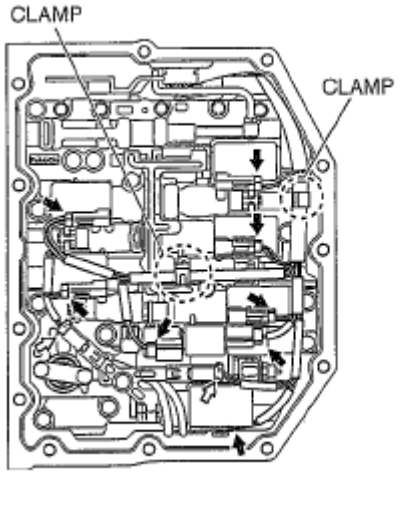


Fig. 16: Identifying Solenoid Connectors, VSS Connector And Input/Turbine Speed Sensor Connector
Courtesy of MAZDA MOTORS CORP.

13. Remove the lock plate, and pull out the TFT sensor from the control valve body.
14. Remove the O-ring from the TFT sensor.

NOTE:

- **Be sure to secure the coupler component with tape so that it will not interfere with the control valve body component.**

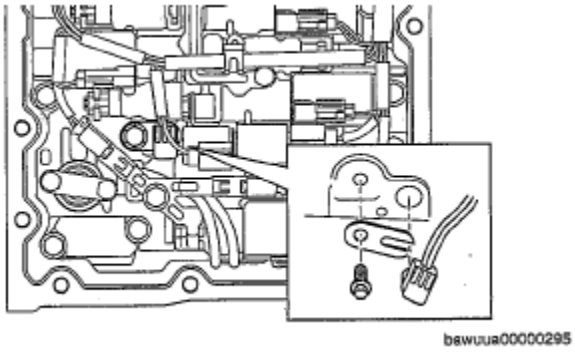


Fig. 17: Identifying Lock Plate And TFT Sensor
Courtesy of MAZDA MOTORS CORP.

15. Fix the coupler component with tape to the transaxle case as shown in the figure.

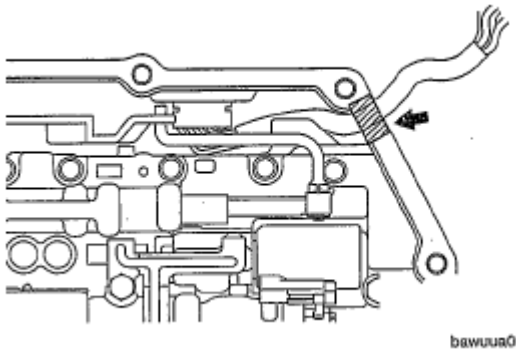


Fig. 18: Fixing Coupler Component With Tape To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

16. Remove the VSS connector and input/turbine speed sensor connector from the solenoid clamp.

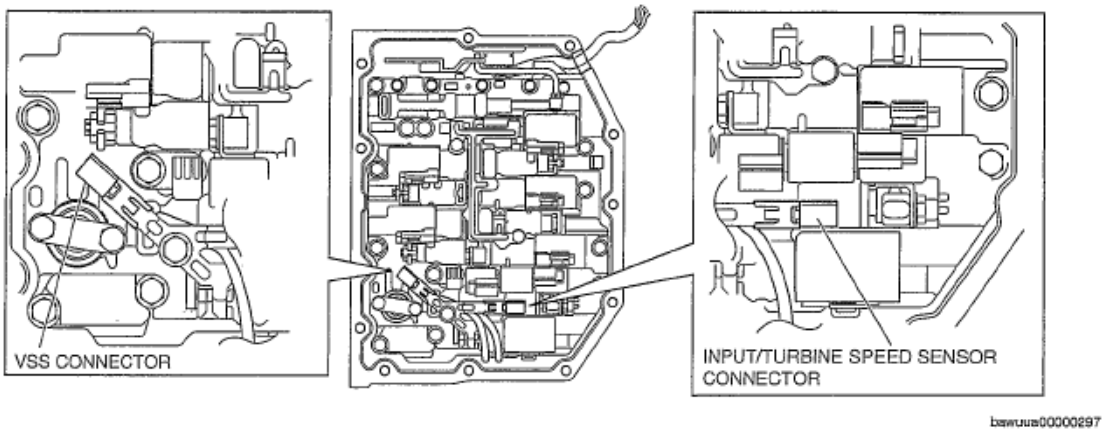


Fig. 19: Identifying VSS Connector And Input/Turbine Speed Sensor Connector
Courtesy of MAZDA MOTORS CORP.

NOTE:

- **Be sure to secure the VSS and input/turbine speed sensor with tape so that they do not interfere with the control valve body component.**

17. Secure the VSS wiring harness and input/turbine speed sensor wiring harness with tape to the transaxle case as shown in the figure.

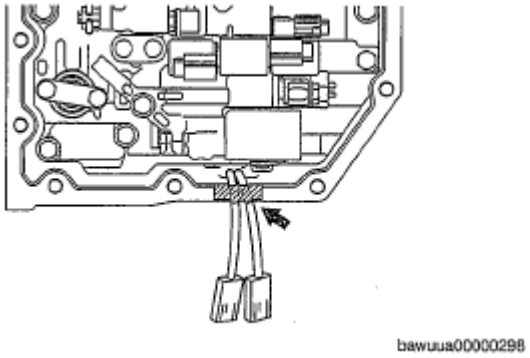


Fig. 20: Securing VSS Wiring Harness And Input/Turbine Speed Sensor Wiring Harness With Tape
Courtesy of MAZDA MOTORS CORP.

18. Remove the suction cover and the gasket.

CAUTION:
- **Loosen the bolts evenly a little at a time in the order shown in the figure.**

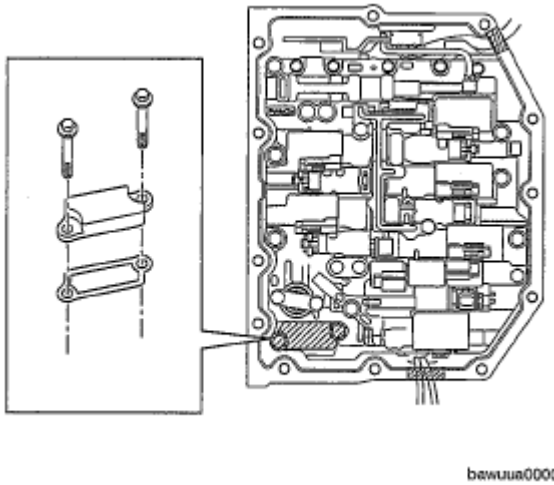


Fig. 21: Identifying Suction Cover And Gasket
Courtesy of MAZDA MOTORS CORP.

19. Remove the control valve body installation bolts.

CAUTION:
- **Do not drop the control valve body component.**

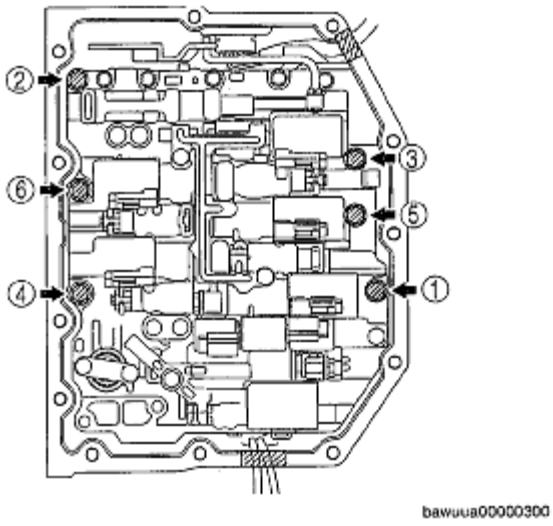


Fig. 22: Identifying Control Valve Body Bolts
Courtesy of MAZDA MOTORS CORP.

20. Disconnect the manual valve link and remove the control valve body component.

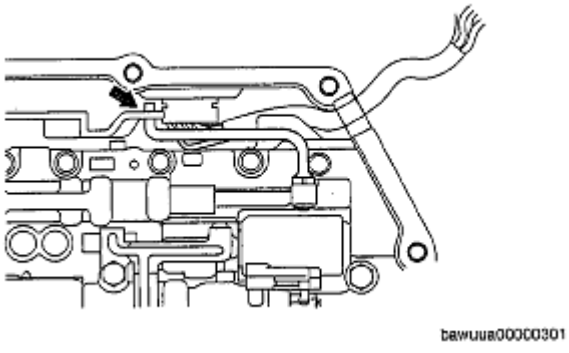


Fig. 23: Identifying Manual Valve Link
Courtesy of MAZDA MOTORS CORP.

21. Remove the coupler component lock plate.

CAUTION:
- **Do not damage the wiring harness.**
- **Do not pull hard on the wiring harness.**

22. Remove the coupler component from the transaxle case.

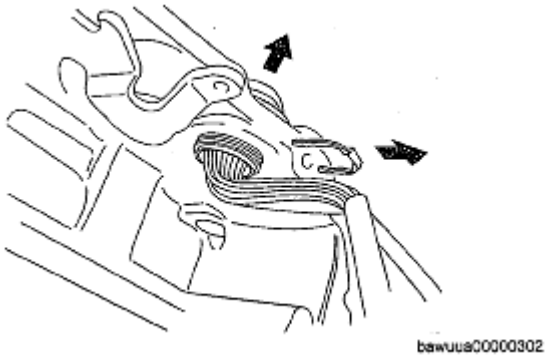


Fig. 24: Identifying Coupler Component Lock Plate
Courtesy of MAZDA MOTORS CORP.

23. Remove the O-ring and the gasket from the coupler component.

CAUTION:
- **Do not damage the input/turbine speed sensor.**

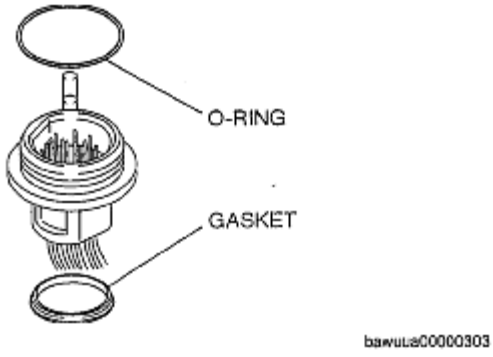


Fig. 25: Identifying O-Ring And Gasket
Courtesy of MAZDA MOTORS CORP.

24. Remove the input/turbine speed sensor.
25. Remove the bolts as shown in the figure.

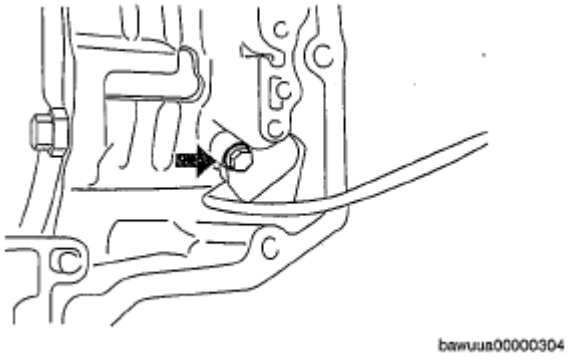


Fig. 26: Identifying Bolts Of Transaxle Case (1 Of 2)
Courtesy of MAZDA MOTORS CORP.

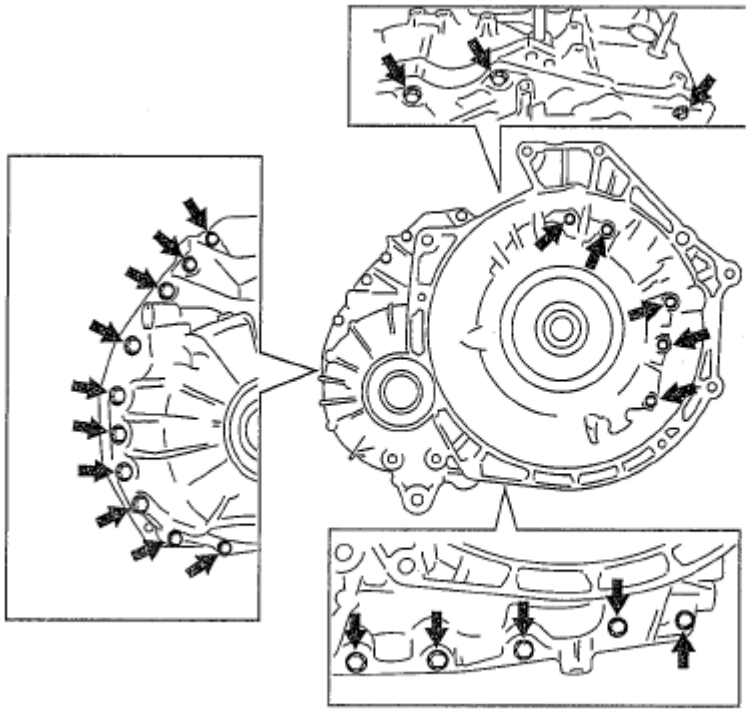


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Fig. 27: Identifying Bolts Of Transaxle Case (2 Of 2)
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Do not damage the fitting surface of the converter housing and the transaxle case.**

26. Using a plastic hammer, tap the converter housing to remove it.

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Fig. 28: Tapping Converter Housing
Courtesy of MAZDA MOTORS CORP.

27. Remove the transaxle case gaskets as shown in the figure.

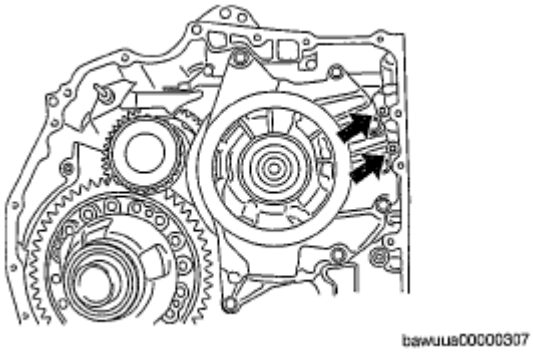


Fig. 29: Identifying Transaxle Case Gaskets
Courtesy of MAZDA MOTORS CORP.

28. Remove the gaskets as shown in the figure.

CAUTION:
- **Do not damage the oil reservoir lock plate.**

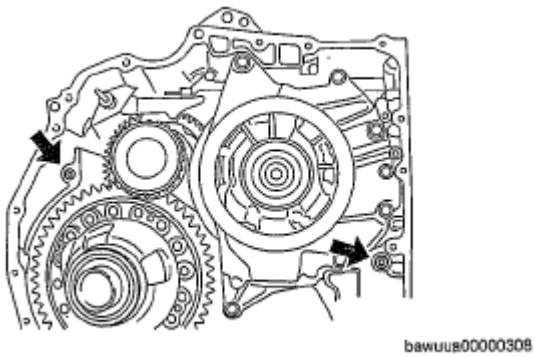


Fig. 30: Identifying Gaskets
Courtesy of MAZDA MOTORS CORP.

29. Remove the tube clamp and the oil reservoir lock plate.

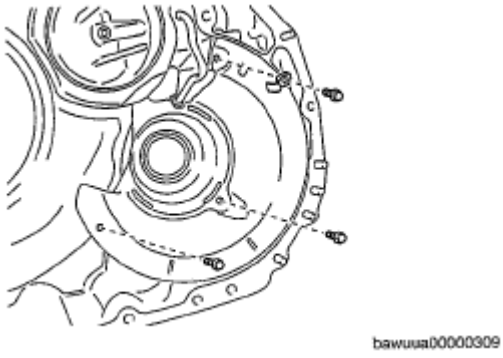


Fig. 31: Identifying Tube Clamp And Oil Reservoir Lock Plate Bolts
Courtesy of MAZDA MOTORS CORP.

30. Remove the magnets from the oil reservoir lock plate.

CAUTION:
- **Do not damage the differential gear lube apply tube.**

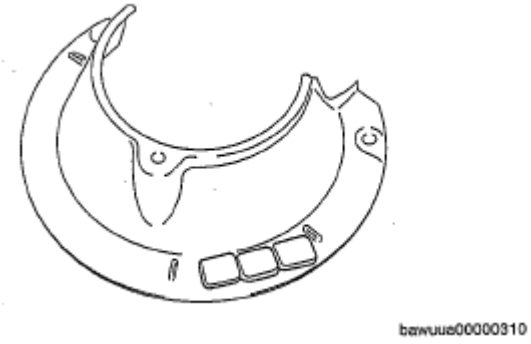


Fig. 32: Identifying Magnets Of Oil Reservoir Lock Plate
Courtesy of MAZDA MOTORS CORP.

31. Using a flathead screwdriver, remove the oil pipe.

CAUTION:
- **Do not damage the converter housing.**
- **If using a screwdriver, use a wooden block or equivalent to avoid damaging the fitting surface of the converter housing.**

32. Remove the oil seal lip using a razor.

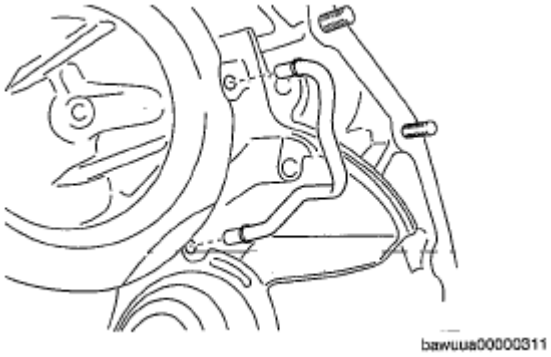


Fig. 33: Identifying Oil Pipe
Courtesy of MAZDA MOTORS CORP.

33. Using a tape-wrapped flathead screwdriver, remove the oil seal (converter housing side).

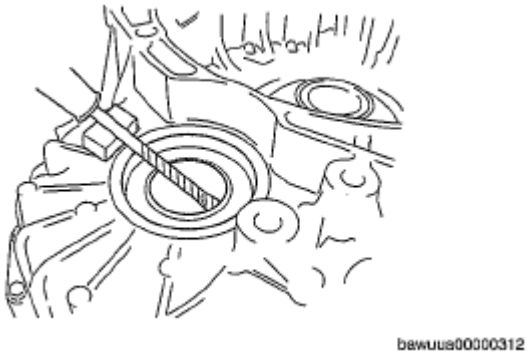


Fig. 34: Removing Oil Seal (Converter Housing Side)
Courtesy of MAZDA MOTORS CORP.

34. Remove the oil pump component.

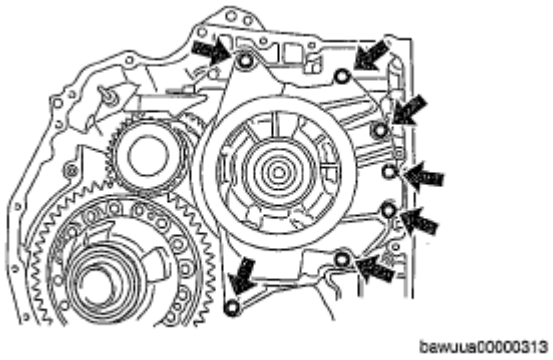


Fig. 35: Identifying Oil Pump Component Bolts
Courtesy of MAZDA MOTORS CORP.

35. Remove the oil seal and the oil strainer from the oil pump component.

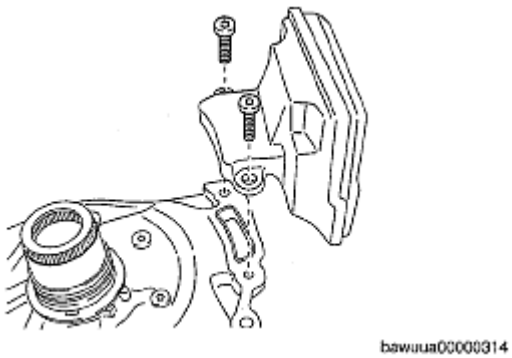


Fig. 36: Identifying Oil Seal And Oil Strainer
Courtesy of MAZDA MOTORS CORP.

36. Remove the C3 clutch component, input shaft and the front planetary gear component.

NOTE:

- **In some cases, the input shaft may be detached with the thrust roller bearing attached.**

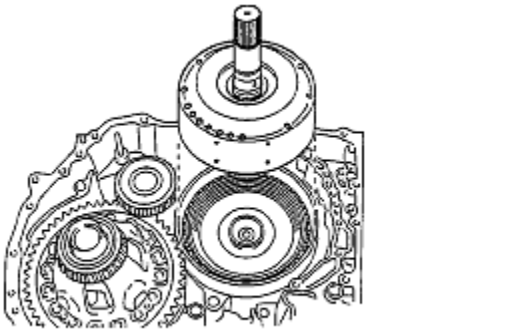


Fig. 37: Identifying C3 Clutch Component, Input Shaft And Front Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

37. Remove the C3 clutch component from the input shaft and the front planetary gear component.

NOTE:

- **In some cases, the C3 clutch component may be detached with the thrust washer attached.**

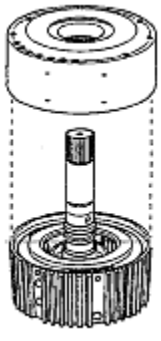


Fig. 38: Identifying C3 Clutch Component
Courtesy of MAZDA MOTORS CORP.

38. Remove the brake band anchor bolt.

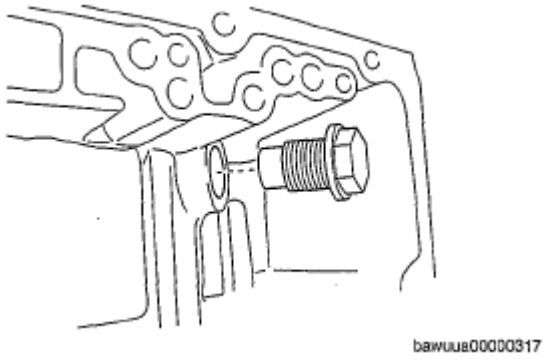


Fig. 39: Identifying Brake Band Anchor Bolt
Courtesy of MAZDA MOTORS CORP.

39. Remove B1 the brake band.

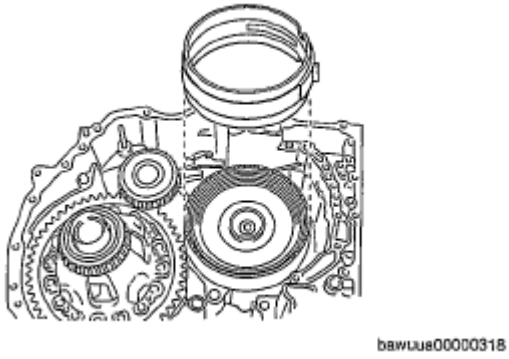


Fig. 40: Identifying B1 Brake Band
Courtesy of MAZDA MOTORS CORP.

40. Inspect the lining of the brake band.
    - If the lining is flaking or has changed color, or if it is worn or the print mark is wearing away, replace with a new brake band and C3 clutch.

      When replacing, inspect the contact surfaces between the C3 clutch drum and B1 brake band. If they are scratched or have changed color, replace with new parts.

NOTE:

- **Before replacing with a new B1 brake band, soak it at least 2 h in ATF.**

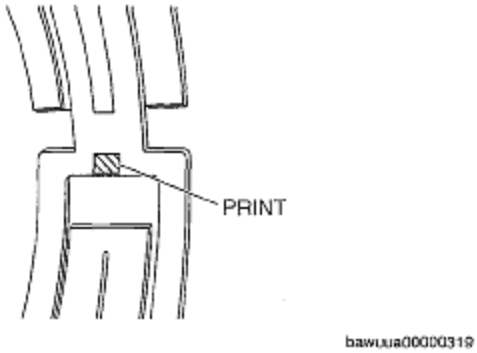


Fig. 41: Inspecting Print Mark Of Brake Band
Courtesy of MAZDA MOTORS CORP.

41. Remove the snap ring using snap ring pliers.

CAUTION:
- **The brake piston cover will fly off due to the force of the piston return spring.**
- **Do not drop the brake piston cover.**
- **Do not drop the B1 brake piston.**

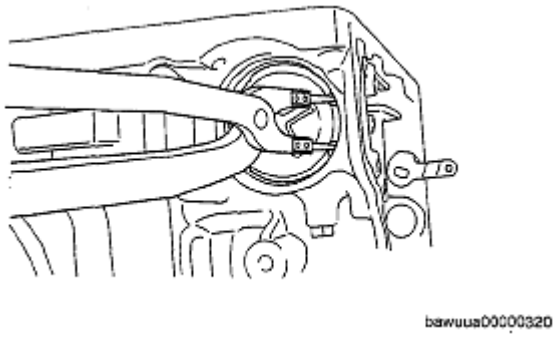


Fig. 42: Removing Snap Ring
Courtesy of MAZDA MOTORS CORP.

42. Remove the brake piston cover, B1 brake piston and the piston return spring.

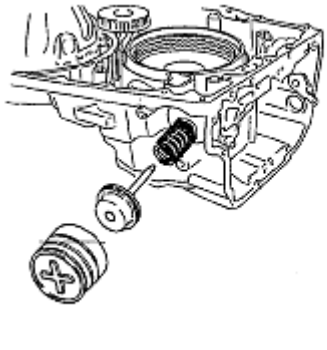


Fig. 43: Identifying Brake Piston Cover, B1 Brake Piston And Piston Return Spring
Courtesy of MAZDA MOTORS CORP.

43. Remove the thrust bearing, bearing race and the C1 clutch component.

NOTE:

- **In some cases, the C1 clutch component may be detached with the thrust bearing attached.**

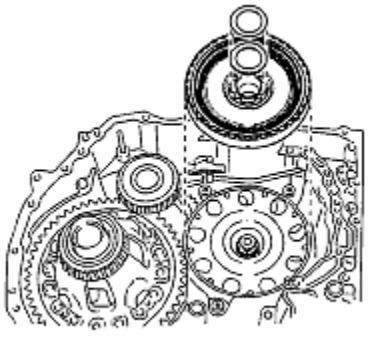


Fig. 44: Identifying Thrust Bearing, Bearing Race And C1 Clutch Component
Courtesy of MAZDA MOTORS CORP.

44. Remove the thrust bearing, bearing race and the sun gear input drum.

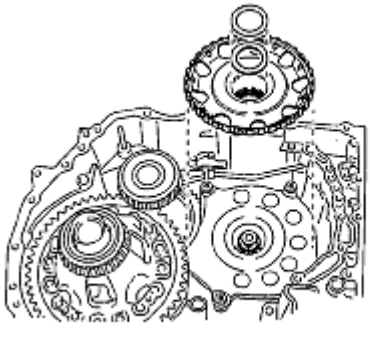


Fig. 45: Identifying Thrust Bearing, Bearing Race And Sun Gear Input Drum
Courtesy of MAZDA MOTORS CORP.

45. Remove the detent spring cover and detent spring.

CAUTION:
- **Be careful not to apply too much force to the pawl return spring.**

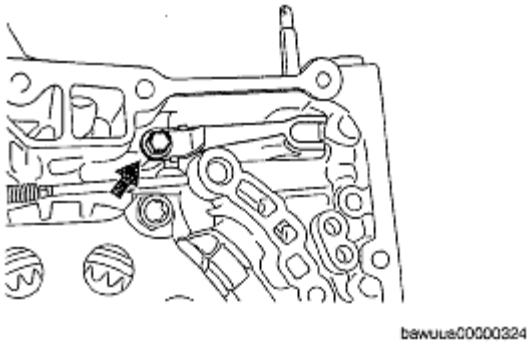


Fig. 46: Identifying Detent Spring Bolt
Courtesy of MAZDA MOTORS CORP.

46. Remove the pawl return spring and the parking pawl shaft.

CAUTION:
- **Be careful not to apply too much force to the torsion spring.**

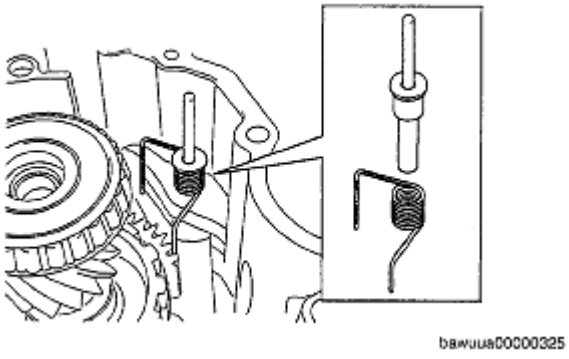


Fig. 47: Identifying Pawl Return Spring And Parking Pawl Shaft
Courtesy of MAZDA MOTORS CORP.

47. Remove the torsion spring and the spring guide sleeve.

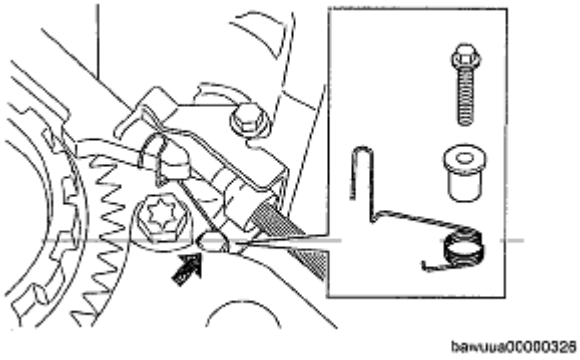


Fig. 48: Identifying Torsion Spring And Spring Guide Sleeve
Courtesy of MAZDA MOTORS CORP.

48. Remove the parking pawl and the parking pawl bracket.

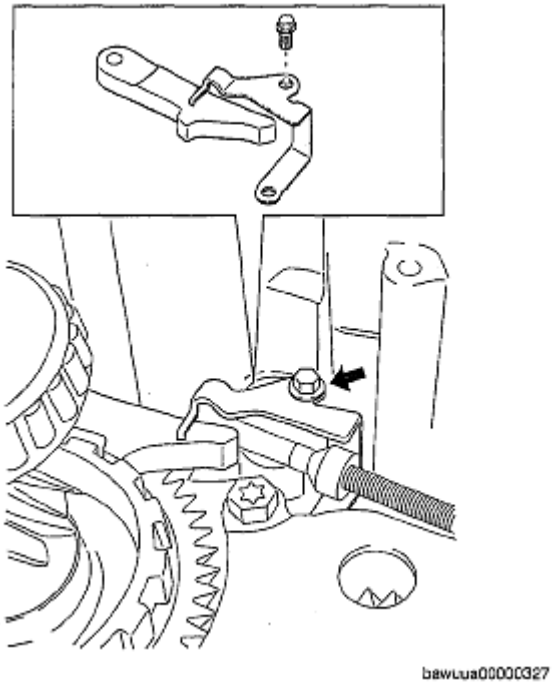


Fig. 49: Identifying Parking Pawl And Parking Pawl Bracket
Courtesy of MAZDA MOTORS CORP.

49. Disconnect the parking rod from the manual valve lever.

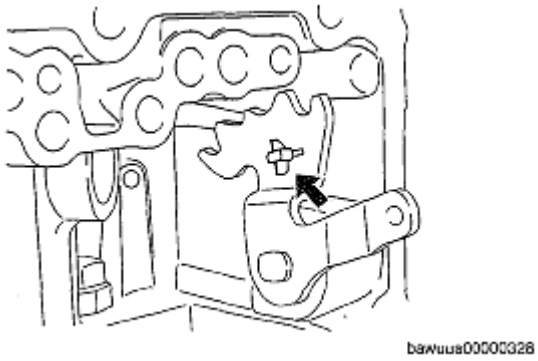


Fig. 50: Identifying Parking Rod And Manual Valve Lever
Courtesy of MAZDA MOTORS CORP.

50. Remove the manual valve lever from the transaxle case.

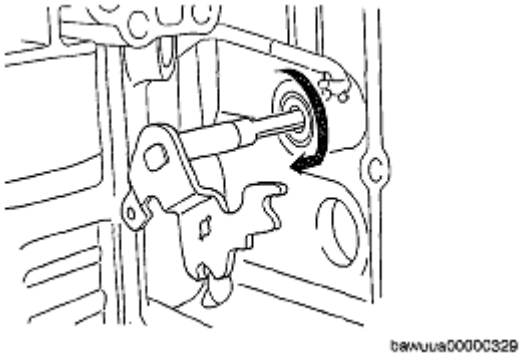


Fig. 51: Identifying Manual Valve Lever Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

51. Remove the parking rod from the transaxle case.

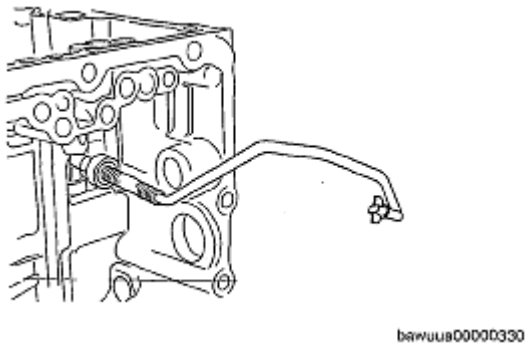


Fig. 52: Identifying Parking Rod
Courtesy of MAZDA MOTORS CORP.

52. Remove the parking pin from the transaxle case.

NOTE:

- **Inspect the direction of the parking pin.**

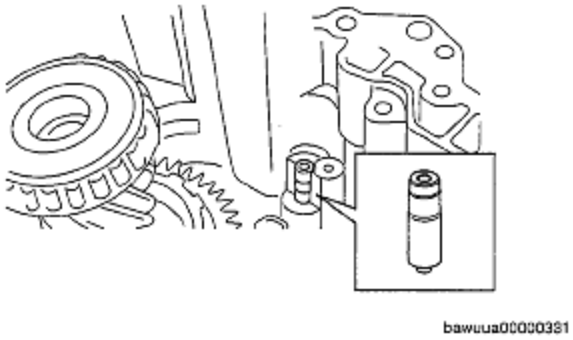


Fig. 53: Identifying Parking Pin
Courtesy of MAZDA MOTORS CORP.

53. Remove the counter gear component.

NOTE:

- **For easy removal, tilt the counter gear component slightly.**

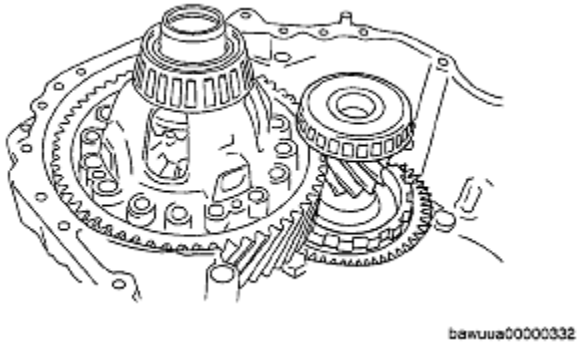


Fig. 54: Identifying Counter Gear Component
Courtesy of MAZDA MOTORS CORP.

54. Remove the differential component.

CAUTION:

- **Do not damage the VSS wiring harness.**
- **Do not pull hard on the VSS wiring harness.**

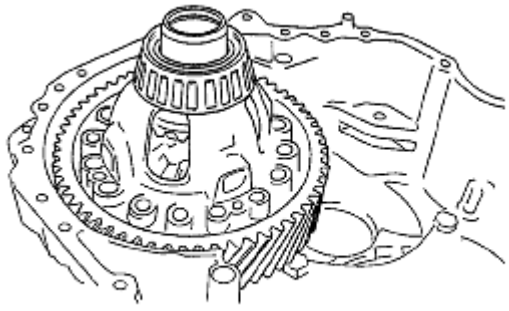


Fig. 55: Identifying Differential Component
Courtesy of MAZDA MOTORS CORP.

55. Disconnect the VSS wiring harness from the tube wiring clamp.

CAUTION:
- **Do not damage the oil cooler outlet tube.**

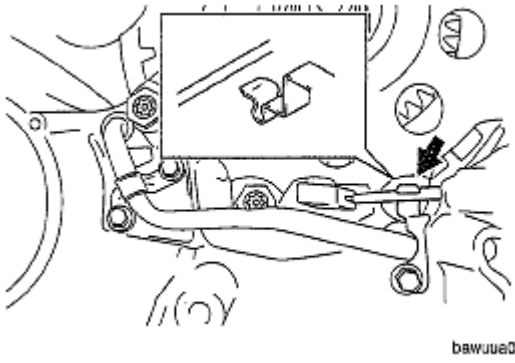


Fig. 56: Identifying Tube Wiring Clamp
Courtesy of MAZDA MOTORS CORP.

56. Remove the pipe clamp, transaxle case No.1 plate, wiring harness clip and the oil cooler outlet tube.
57. Remove the O-rings from the oil cooler outlet tube.

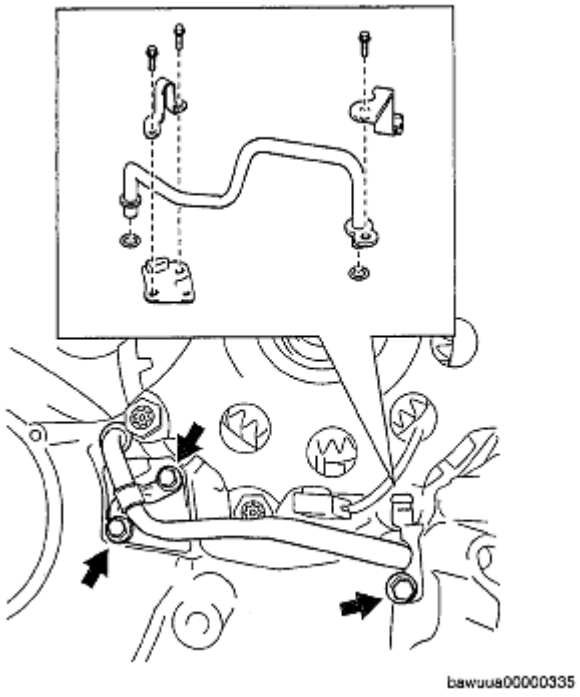


Fig. 57: Identifying O-Rings Of Oil Cooler Outlet Tube
Courtesy of MAZDA MOTORS CORP.

58. Using a flathead screwdriver and a hammer, pry back the crimp on the lockwashers.

CAUTION:
- **If the lockwasher crimp is not completely pried back, the tool cannot fit over the bolt properly and the bolt cannot be loosened.**

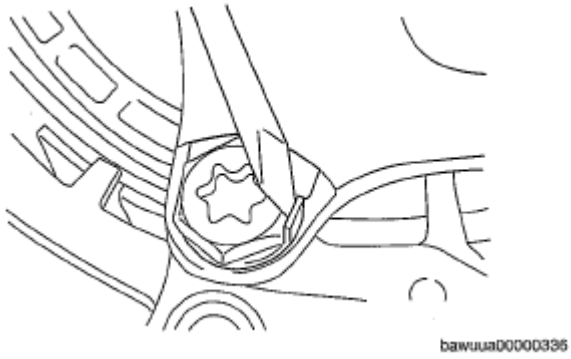


Fig. 58: Prying Back Crimp On Lockwashers
Courtesy of MAZDA MOTORS CORP.

59. Remove the lockwashers, washers and the counter drive gear.

CAUTION:
- **Do not damage the VSS wiring harness.**

- **Do not pull hard on the VSS wiring harness.**
- **Do not damage the VSS.**

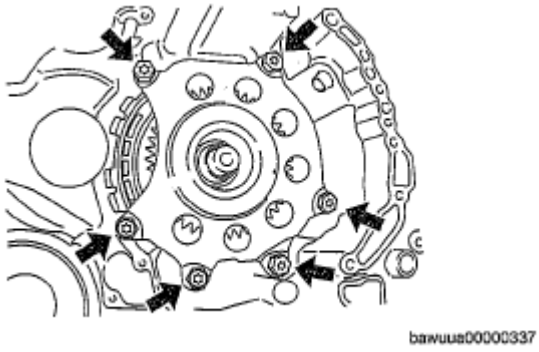


Fig. 59: Identifying Bolts Of Counter Drive Gear Plate
Courtesy of MAZDA MOTORS CORP.

60. Remove the VSS and spacer from the counter drive gear.

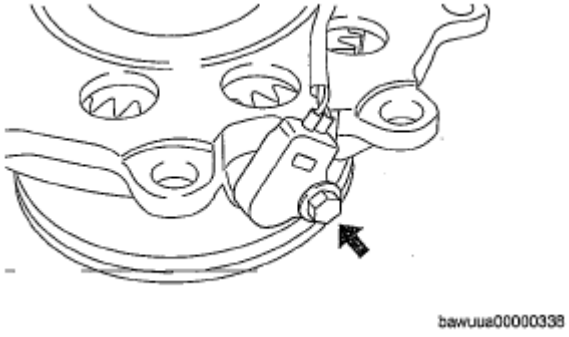


Fig. 60: Identifying VSS And Spacer
Courtesy of MAZDA MOTORS CORP.

61. Using a flathead screwdriver, remove the snap ring.

CAUTION:
- **Do not drop the sun gear.**

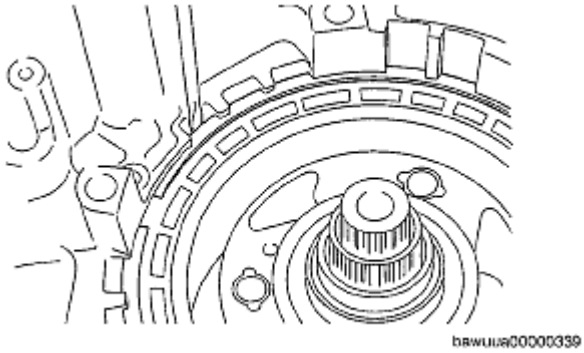


Fig. 61: Removing Snap Ring
Courtesy of MAZDA MOTORS CORP.

62. Remove the rear planetary gear component and the one-way clutch.

NOTE:

- **In some cases, the sun gear may be detached with the bearing race attached.**

NOTE:

- **Remove the sun gear in the center while holding it.**
- **The thrust washer of the rear planetary gear on the rear side might remain on the transaxle case side when removing the rear planetary gear component.**

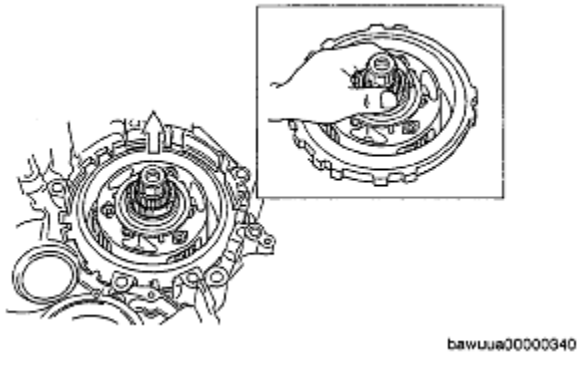


Fig. 62: Removing Rear Planetary Gear Component And One-Way Clutch
Courtesy of MAZDA MOTORS CORP.

63. Remove the thrust bearing and the bearing races.

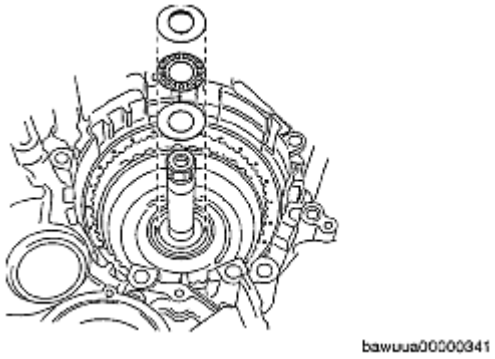


Fig. 63: Identifying Thrust Bearing And Bearing Races
Courtesy of MAZDA MOTORS CORP.

64. Using a flathead screwdriver, remove the snap ring.

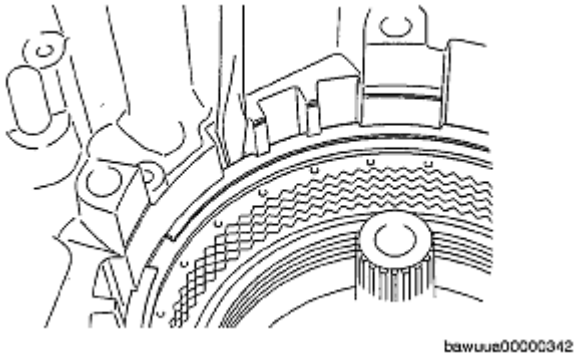


Fig. 64: Removing Snap Ring
Courtesy of MAZDA MOTORS CORP.

65. Remove the retaining plates, drive and driven plates.

NOTE:

- **Inspect the number of drive plates and driven plates.**

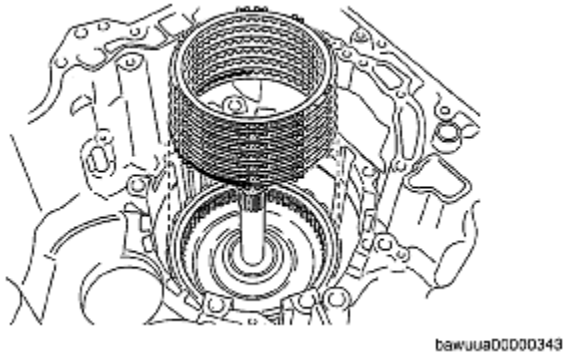


Fig. 65: Identifying Retaining Plates, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

66. Inspect the lining of all drive plates.
    - If the lining is flaking or has changed color, or if it is worn or the print mark is wearing away, replace with a new drive plate. When replacing, inspect the contact surfaces between the retaining plate, driven plate and drive plate. If they are scratched or have changed color, replace with new parts.

NOTE:

- **Before replacing with new drive plates, soak them at least 2 h in ATF.**

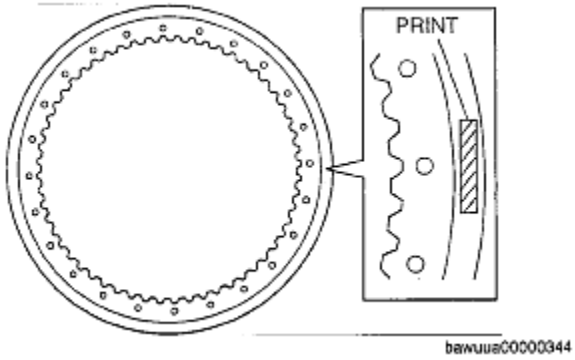


Fig. 66: Inspecting Print Mark Of All Drive Plates
Courtesy of MAZDA MOTORS CORP.

67. Remove the C2 clutch component and the thrust bearing.

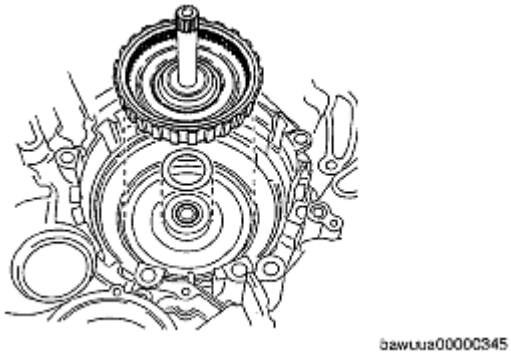


Fig. 67: Identifying C2 Clutch Component And Thrust Bearing
Courtesy of MAZDA MOTORS CORP.

68. Remove the seal rings from the transaxle case.

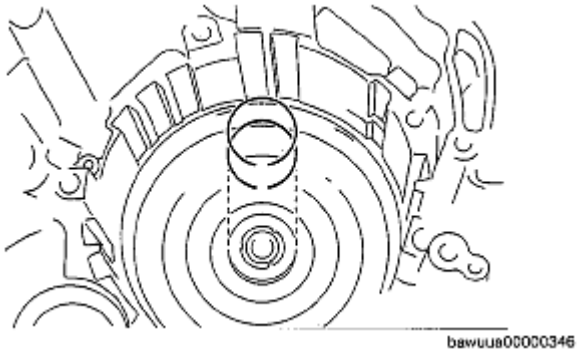


Fig. 68: Identifying Seal Rings
Courtesy of MAZDA MOTORS CORP.

69. Remove the transaxle case plate No.2.

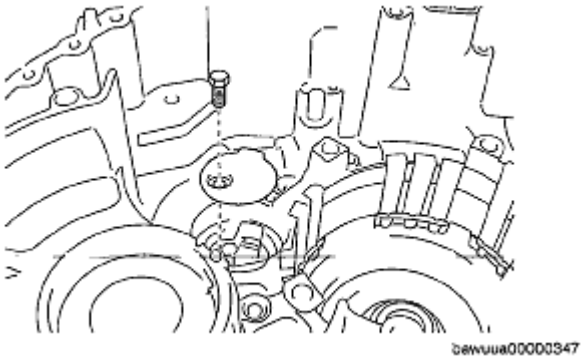


Fig. 69: Identifying Transaxle Case Plate No.2 Bolt
Courtesy of MAZDA MOTORS CORP.

70. Remove the transaxle case plate No.3.

CAUTION:
- **Do not damage the transaxle case.**
- **If using a screwdriver, use a wooden block or equivalent to avoid damaging the fitting surface of the transaxle case.**

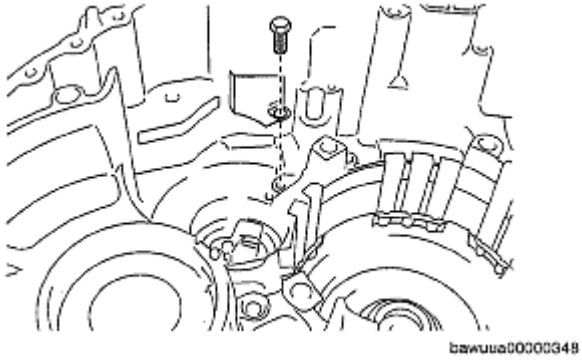


Fig. 70: Identifying Transaxle Case Plate No.3 Bolt
Courtesy of MAZDA MOTORS CORP.

71. Remove the oil seal lip using a razor.
72. Using a tape-wrapped flathead screwdriver, remove the oil seal (transaxle case side).

CAUTION:
- **Do not damage the transaxle case.**
- **If using a screwdriver, use a wooden block or equivalent to avoid damaging the fitting surface of the transaxle case.**

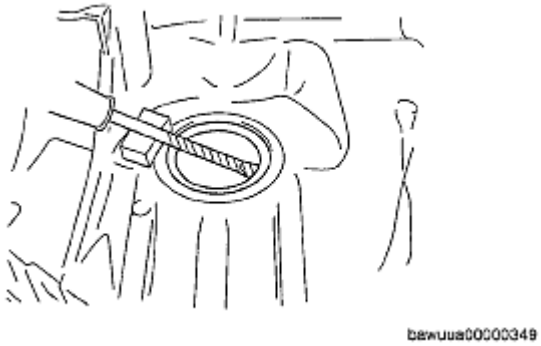


Fig. 71: Removing Oil Seal (Transaxle Case Side)
Courtesy of MAZDA MOTORS CORP.

73. Using a tape-wrapped flathead screwdriver, remove the oil seal (manual shaft).

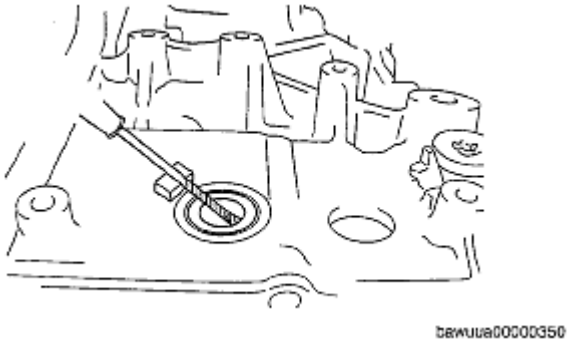
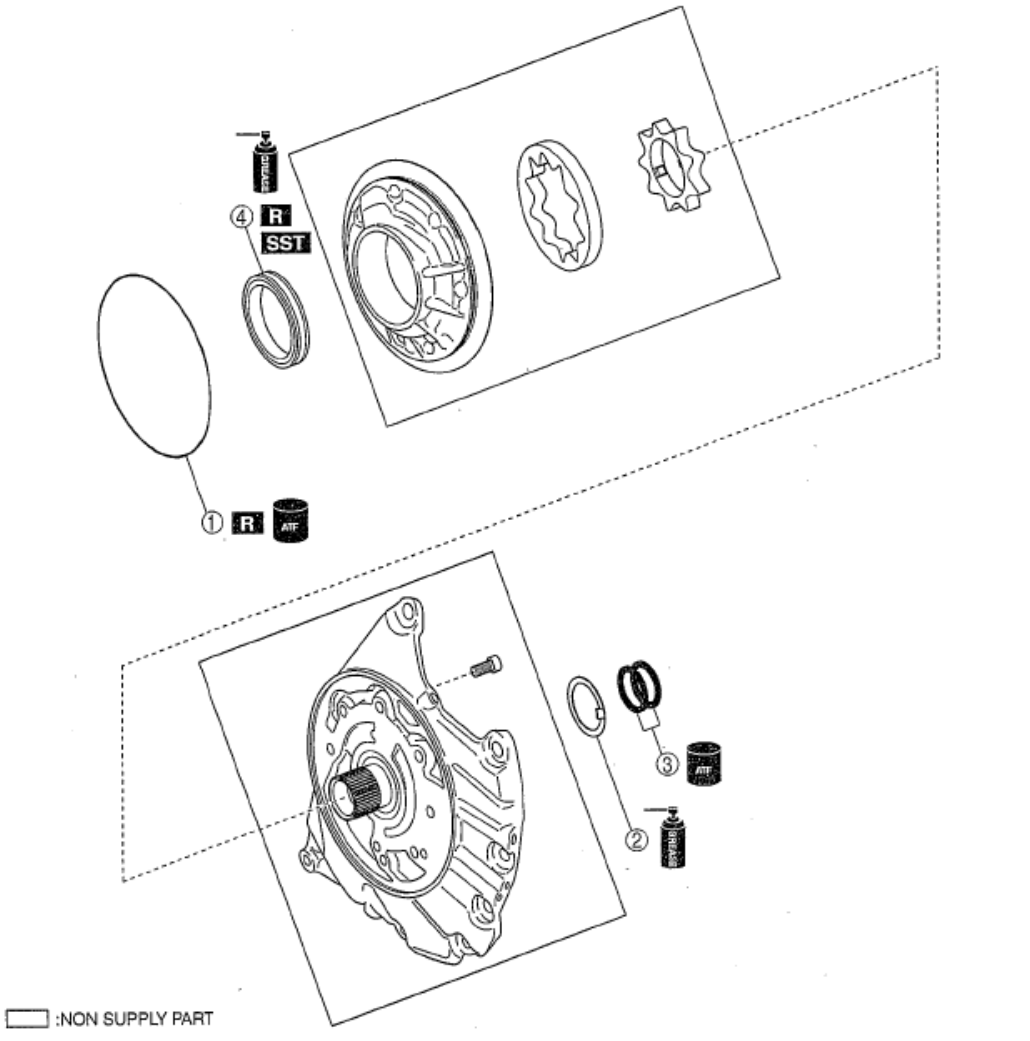


Fig. 72: Removing Oil Seal (Manual Shaft)
Courtesy of MAZDA MOTORS CORP.

OIL PUMP DISASSEMBLY/ASSEMBLY

Components



1	O-ring
2	Thrust washer

3	Seal ring
4	Oil seal

Fig. 73: Identifying Oil Pump Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Remove the O-ring from the oil pump.

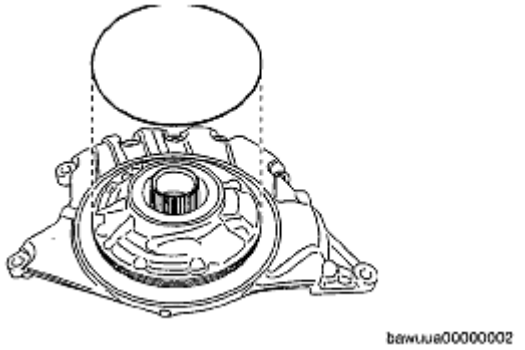


Fig. 74: Identifying O-Ring Of Oil Pump
Courtesy of MAZDA MOTORS CORP.

2. Remove the thrust washer from the oil pump.

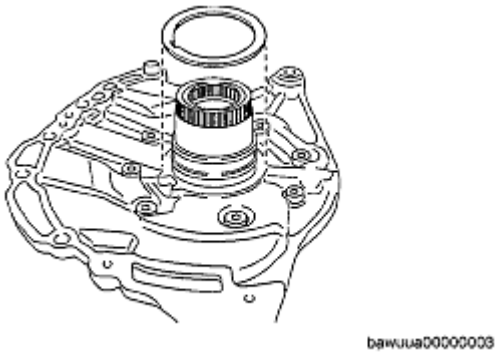


Fig. 75: Identifying Thrust Washer Of Oil Pump
Courtesy of MAZDA MOTORS CORP.

3. Remove the seal rings from the oil pump.

CAUTION:
- **Do not damage the bushing on the oil pump body.**

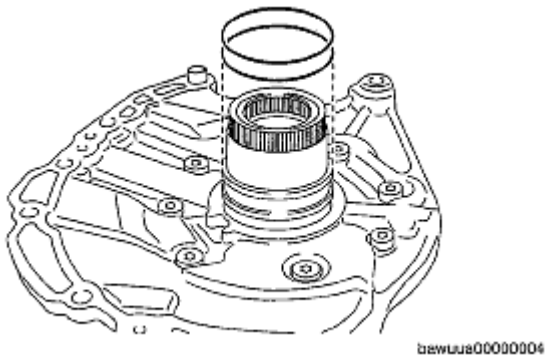


Fig. 76: Identifying Seal Rings Of Oil Pump
Courtesy of MAZDA MOTORS CORP.

4. Using a tape-wrapped flathead screwdriver, remove the oil seal from the oil pump body.

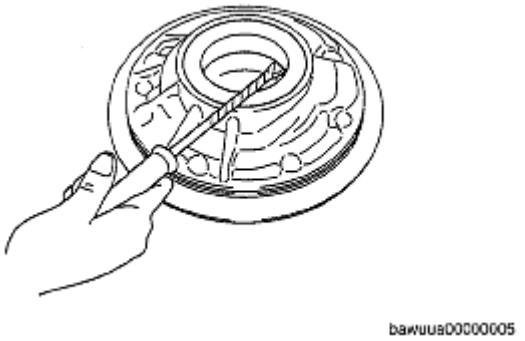


Fig. 77: Removing Oil Seal From Oil Pump Body
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

CAUTION:
- **Do not damage the oil seal.**

1. Using the **SST** and a hammer, install the new oil seal to the oil pump body.

   Substitution SST

   - 49 U027 003

     Outer diameter: 67 mm {2.64 in} or more

     Inner diameter: 54- 61 mm {2.13- 2.40 in}

     Plate thickness: 2 mm {0.08 in} or more

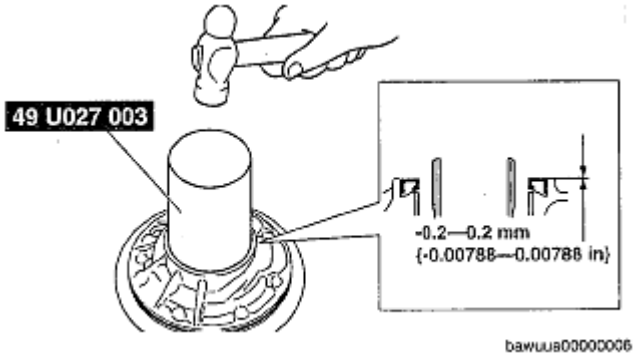


Fig. 78: Installing Oil Seal To Oil Pump Body Using Special Tool
Courtesy of MAZDA MOTORS CORP.

2. Apply grease to the oil seal lip.
3. Apply ATF to the new seal rings and sliding surface of the oil pump component.

CAUTION:
- **Do not expand the seal rings too much.**
- **Be careful not to shorten the seal rings too much, when installing the seal rings.**

4. Compress the seal rings as shown in the figure. Then install the seal rings to the oil pump component.

NOTE:
- **Verify that oil seal rings rotate smoothly after installing them.**

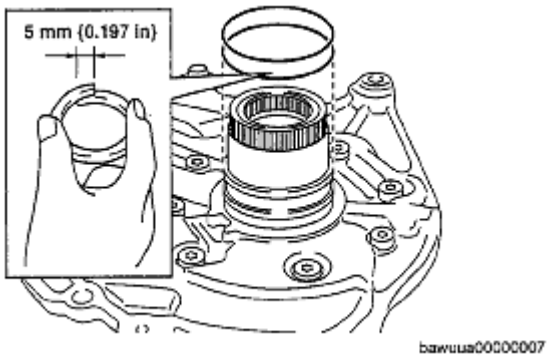


Fig. 79: Compressing Seal Rings
Courtesy of MAZDA MOTORS CORP.

5. Apply grease to the thrust washer.

CAUTION:
- **Apply grease to the mounting surface of the thrust washer so that it does not drop when installed.**

6. Install the thrust washer to the oil pump component.

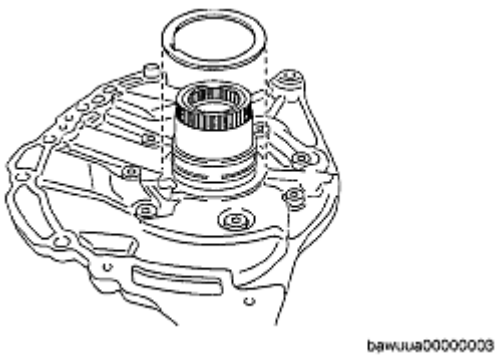


Fig. 80: Identifying Thrust Washer Of Oil Pump Component

Courtesy of MAZDA MOTORS CORP.

7. Apply ATF to a new O-ring.
8. Install the O-ring to the oil pump component.

CAUTION:
- **Do not damage the oil seal lip.**

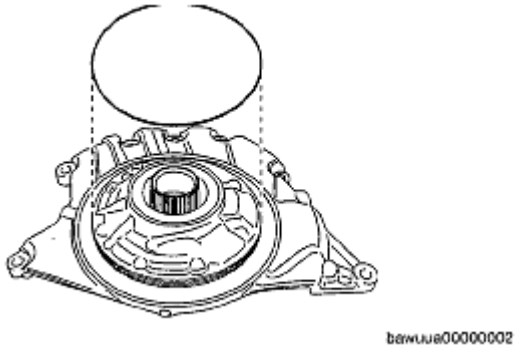


Fig. 81: Identifying O-Ring Of Oil Pump Component
Courtesy of MAZDA MOTORS CORP.

9. Turn the drive gear with flathead screwdrivers and verify it rotates smoothly.

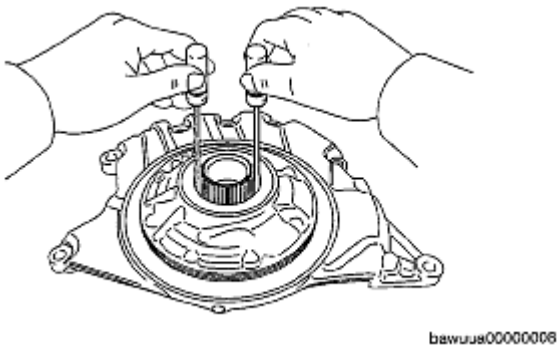


Fig. 82: Turning Drive Gear With Flathead Screwdrivers
Courtesy of MAZDA MOTORS CORP.

B1 BRAKE PISTON DISASSEMBLY/ASSEMBLY

Components

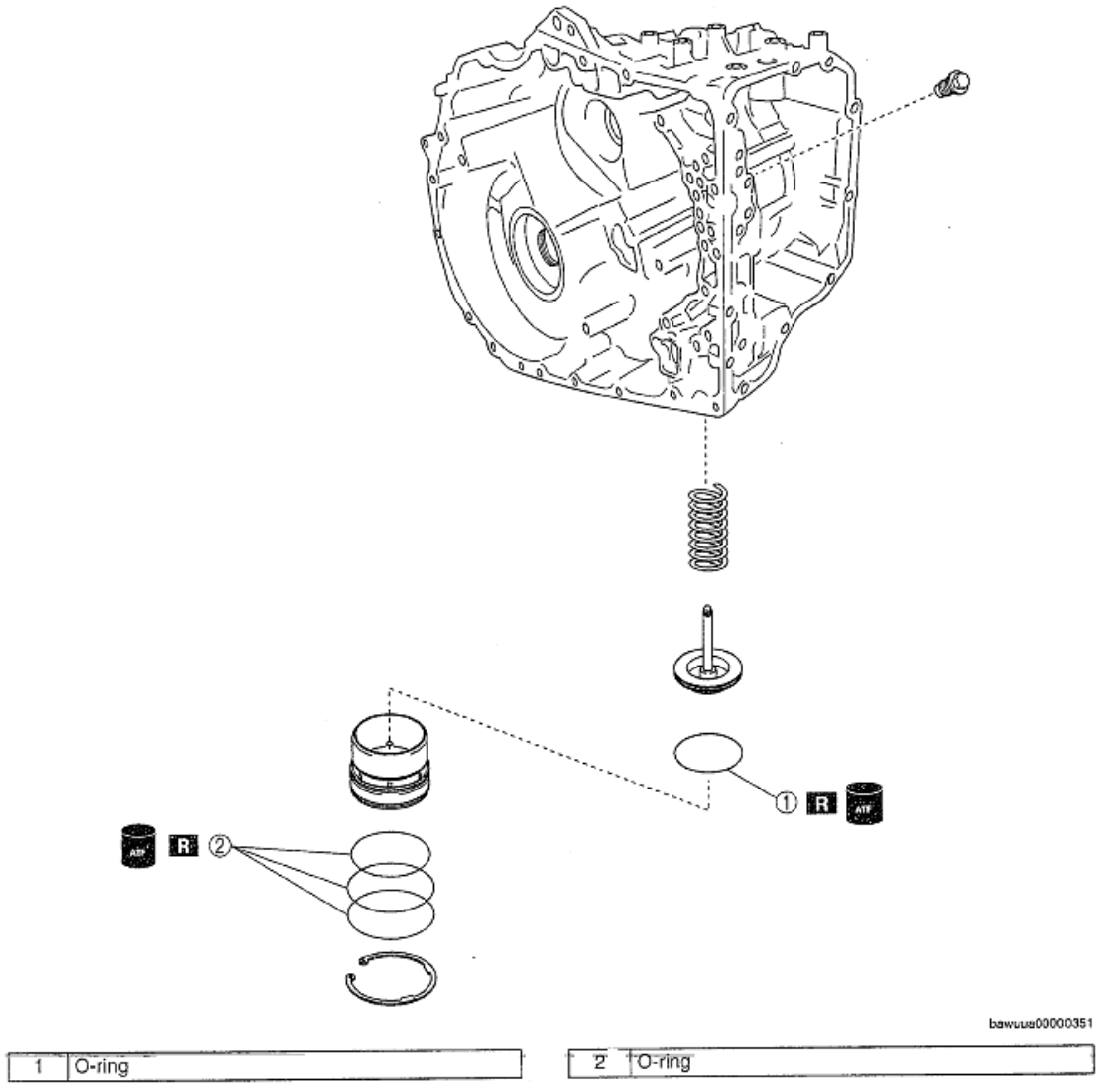


Fig. 83: Identifying B1 Brake Piston Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Remove the O-ring from the B1 brake piston.

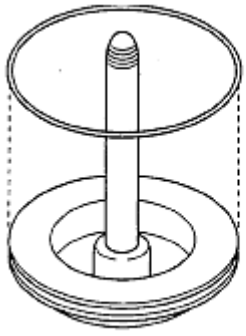


Fig. 84: Identifying O-Ring Of B1 Brake Piston
Courtesy of MAZDA MOTORS CORP.

2. Remove the O-rings from the brake piston cover.

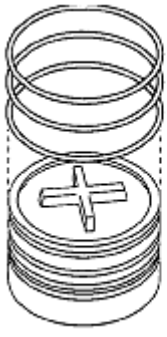


Fig. 85: Identifying O-Rings Of Brake Piston Cover
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

1. Apply ATF to the new O-rings.
2. Install the O-rings to the brake piston cover.

   Number of O-ring

   - AJ:3
   - L3 with TC: 2
3. Apply ATF to a new O-ring.

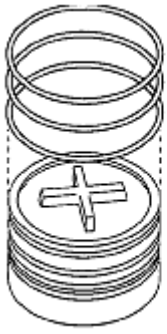


Fig. 86: Identifying O-Rings Of Brake Piston Cover
Courtesy of MAZDA MOTORS CORP.

4. Install the O-ring to the B1 brake piston.

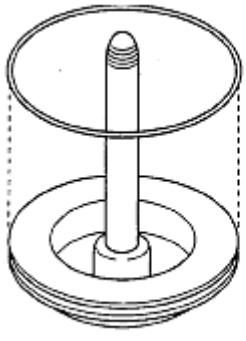
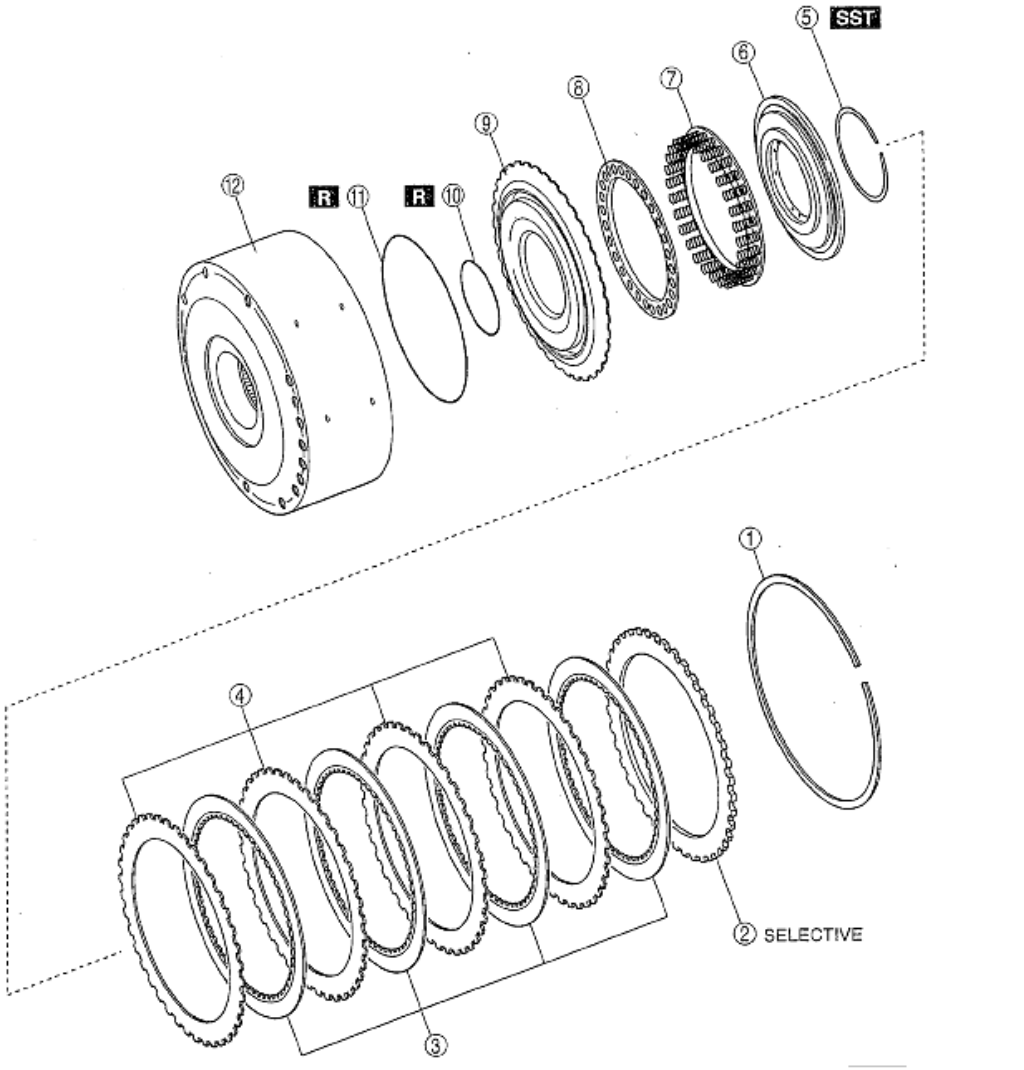


Fig. 87: Identifying O-Ring Of B1 Brake Piston
Courtesy of MAZDA MOTORS CORP.

C3 CLUTCH COMPONENT DISASSEMBLY

Components



1	Snap ring
2	Retaining plate
3	Drive plate
4	Driven plate
5	Snap ring
6	C3 clutch balancer

7	Piston return spring
8	Spring retainer
9	C3 clutch piston
10	O-ring
11	O-ring
12	C3 clutch drum

Fig. 88: Identifying C3 Clutch Disassembly Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Using a flathead screwdriver, remove the snap ring from the C3 clutch drum.

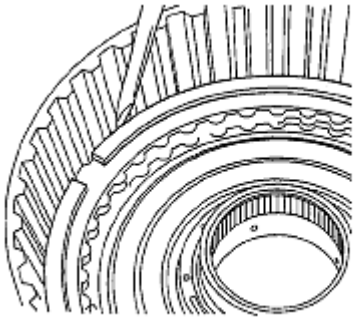


Fig. 89: Removing Snap Ring From C3 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

2. Remove the retaining plate, drive and driven plates from the C3 clutch drum.

NOTE:
- **Inspect the number of drive and driven plates.**

Fig. 90: Identifying Retaining Plate, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

3. Place the **SST** on the clutch balancer and compress the return spring with a press.

CAUTION:
- **Be careful not to expand the snap ring too much.**

4. Remove the snap ring using snap ring pliers.

CAUTION:
- **Do not damage the seal on the clutch balancer.**

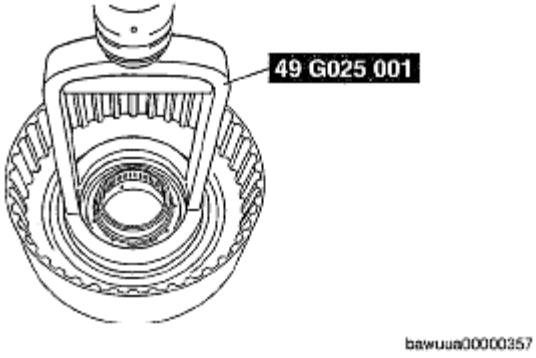


Fig. 91: Placing SST On Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

5. Remove the clutch balancer, return spring and the retainer from the C3 clutch drum.

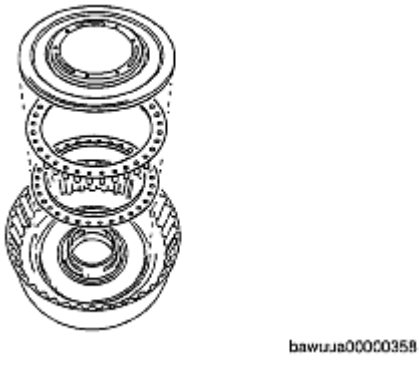


Fig. 92: Identifying Clutch Balancer, Return Spring And Retainer
Courtesy of MAZDA MOTORS CORP.

6. While pushing the C3 clutch piston by hand, apply compressed air into the oil passage as shown in the figure and remove the C3 clutch piston from the C3 clutch drum.

Air pressure 392 kPa {4.0 kgf/cm^2 , 57 psi}

NOTE:

- **When applying compressed air, shut the 3 oil passages of the C3 clutch drum as shown in the figure.**

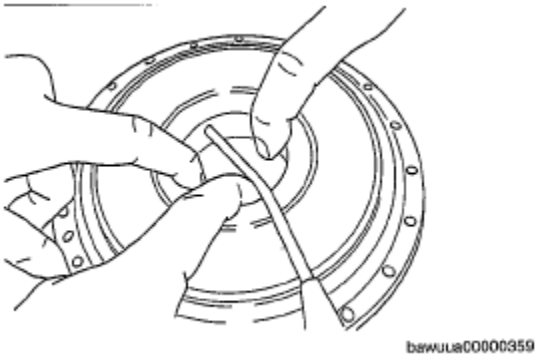


Fig. 93: Applying Compressed Air Into Oil Passage
Courtesy of MAZDA MOTORS CORP.

7. Remove the O-rings from the C3 clutch drum.

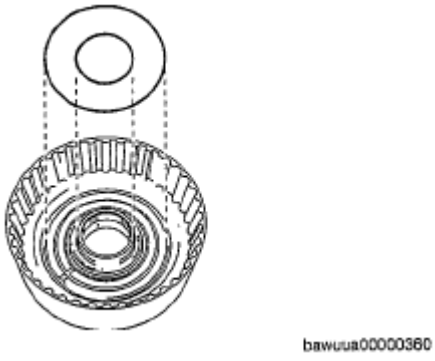


Fig. 94: Identifying O-Rings Of C3 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

C3 CLUTCH INSPECTION

1. Inspect the lining of all drive plates.
   - If the lining is flaking or has changed color, or if it is worn or the print mark is wearing away, replace with a new drive plate. When replacing, inspect the contact surfaces between the retaining plate, driven plate and drive plate. If they are scratched or have changed color, replace with new parts.

NOTE:
- **Before replacing with new drive plates, soak them at least 2 h in ATF.**

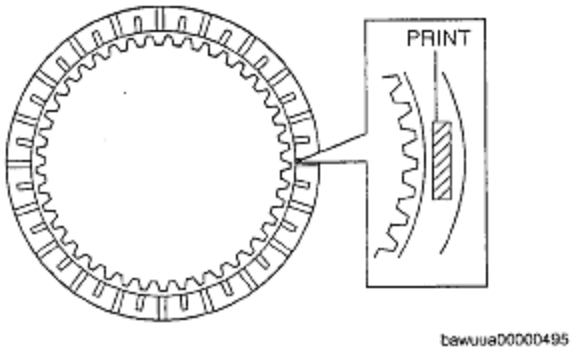


Fig. 95: Inspecting Lining Of All Drive Plates
Courtesy of MAZDA MOTORS CORP.

2. Using vernier calipers, measure the free length of the piston return spring.

   C3 clutch return spring free length Standard: 12.91 mm {0.5083 in}

   - If it is less than the specification, replace the piston return spring with a new one.

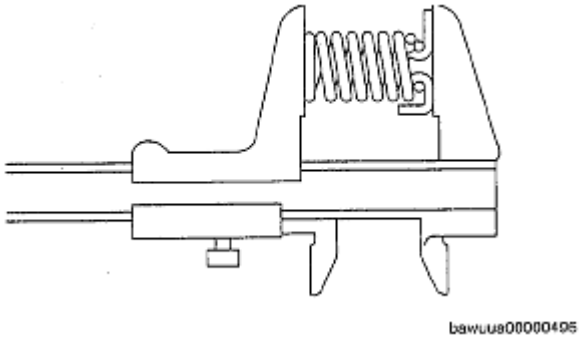
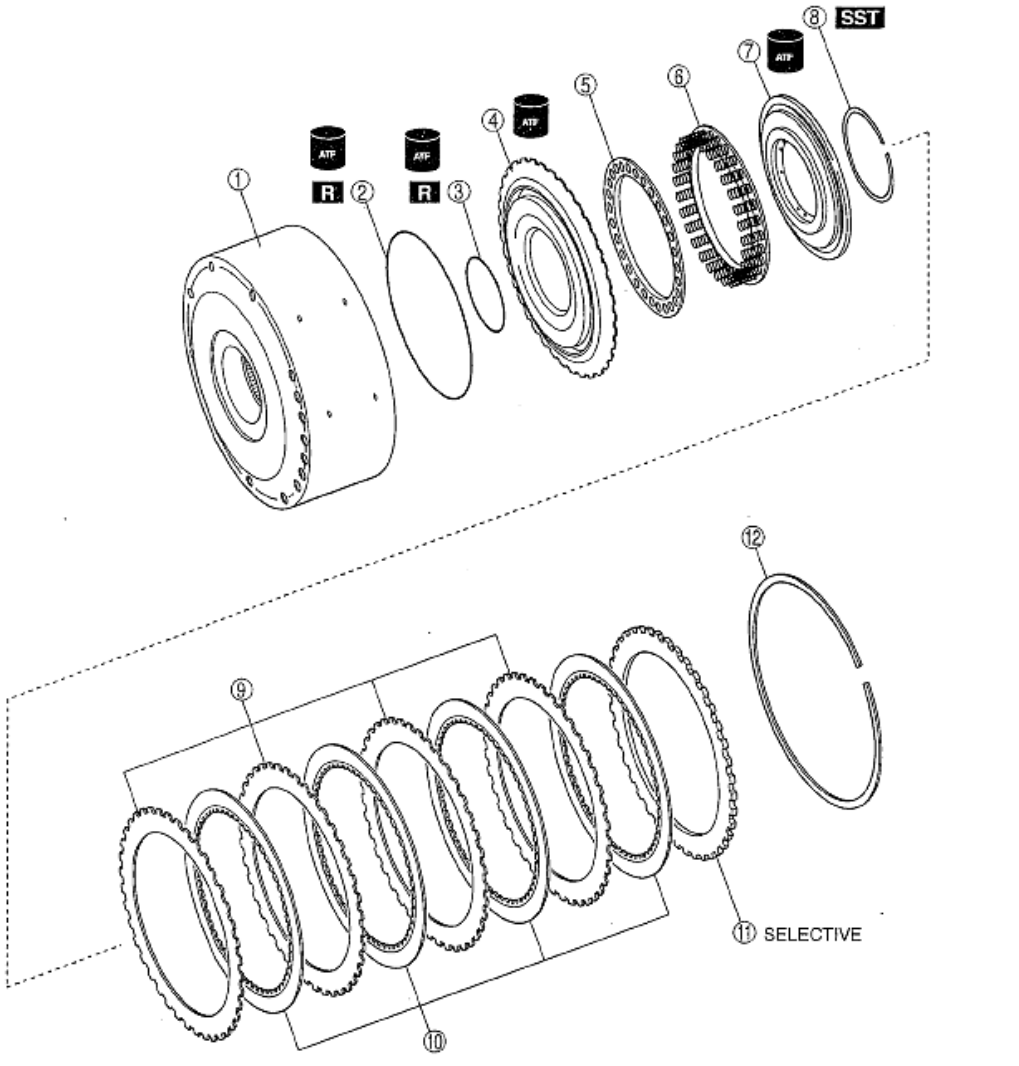


Fig. 96: Measuring Free Length Of Piston Return Spring
Courtesy of MAZDA MOTORS CORP.

C3 CLUTCH COMPONENT ASSEMBLY

Components



1	C3 clutch drum
2	O-ring
3	O-ring
4	C3 clutch piston
5	Spring retainer
6	Piston return spring

7	C3 clutch balancer
8	Snap ring
9	Driven plate
10	Drive plate
11	Retaining plate
12	Snap ring

Fig. 97: Identifying C3 Clutch Assembly Components
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

1. Apply ATF to the new O-rings and the C3 clutch drum.
2. Install the O-rings to the C3 clutch drum.
3. Apply ATF to the sliding surface of the C3 clutch piston.

CAUTION:
- **Do not damage the seal on the piston and O-rings.**

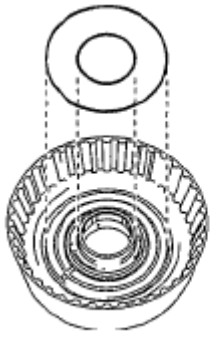


Fig. 98: Identifying O-Rings Of C3 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

4. Install the C3 clutch piston to the C3 clutch drum.
5. Apply ATF to the seal on the clutch balancer.

CAUTION:
- **Do not damage the seal on the clutch balancer.**

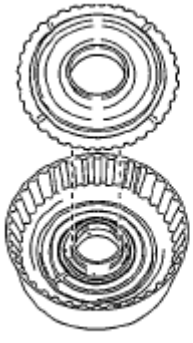


Fig. 99: Identifying C3 Clutch Piston
Courtesy of MAZDA MOTORS CORP.

6. Install the retainer, return spring and the clutch balancer to the C3 clutch drum.

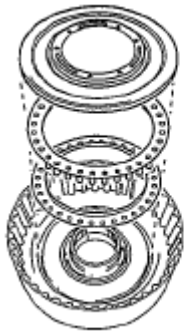


Fig. 100: Identifying Retainer, Return Spring And Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

7. Place the **SST** on the clutch balancer and compress the piston return spring with a press.

CAUTION:
- **When installing the snap ring, set the end gap of the snap ring as shown in the figure.**
- **Do not expand the snap ring too much.**

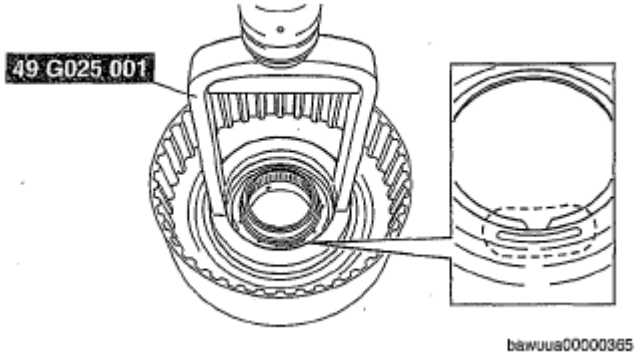


Fig. 101: Placing SST On Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

8. Install the snap ring in the groove using snap ring pliers.
9. Install the driven plates, drive plates and the retaining plate in the following order to the C3 clutch drum as shown in the figure.
   - Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

Fig. 102: Identifying Drive Plates And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Inspect the number and order of the retaining plate, drive and driven plates.**

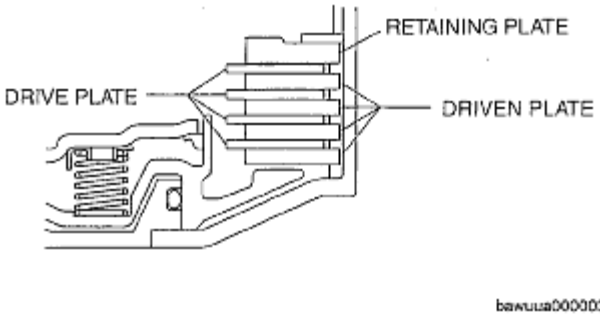


Fig. 103: Inspecting Number And Order Of Retaining Plate, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

10. Using a flathead screwdriver, install the snap ring in the groove.

CAUTION:
- **When installing the snap ring, set the end gap of the snap ring as shown in the figure.**

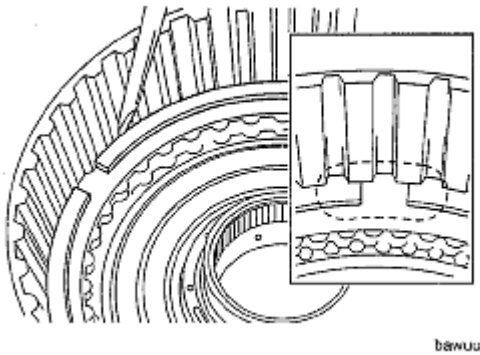


Fig. 104: Installing Snap Ring In Groove
Courtesy of MAZDA MOTORS CORP.

11. Install the C3 clutch component to the oil pump and set a dial indicator as shown in the figure.
12. Apply compressed air as shown in the figure and measure the C3 clutch piston stroke.

Air pressure 200 kPa {2.0 kgf/cm^2 , 29 psi}

C3 clutch piston stroke 0.6 - 0.8 mm {0.024 - 0.031 in}

- If not within the specification, select an appropriate retaining plate.

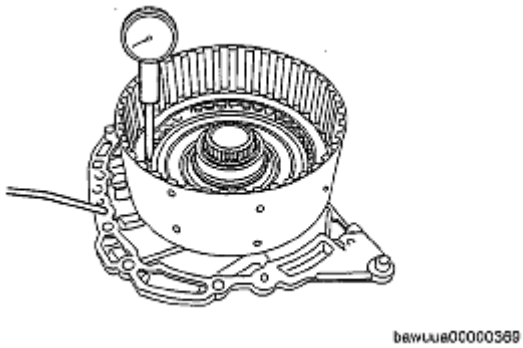


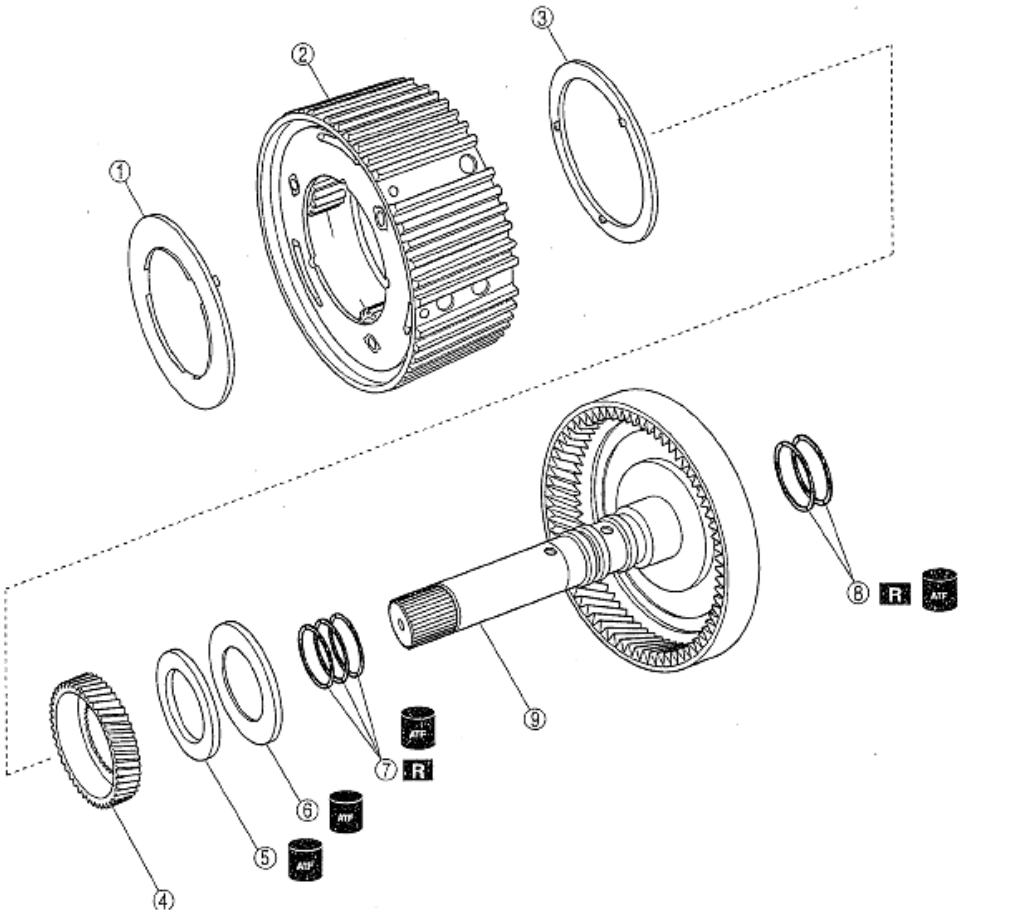
Fig. 105: Setting Dial Indicator And Measuring C3 Clutch Piston Stroke
Courtesy of MAZDA MOTORS CORP.

RETAINING PLATE SIZE

Identification mark	Thickness (mm {in})
1	2.8{0.110}
A	2.85{0.112}
2	2.9{0.114}
B	2.95{0.116}
3	3.0{0.118}
C	3.05{0.120}
4	3.1 {0.122}
5	3.2{0.126}
6	3.3{0.130}
7	3.4{0.134}
8	3.5{0.138}

FRONT PLANETARY GEAR COMPONENT INPUT SHAFT DISASSEMBLY/ASSEMBLY

Components



1	Thrust washer
2	Front planetary gear component
3	Thrust washer
4	Front planetary sun gear
5	Thrust bearing

6	Bearing race
7	Seal ring
8	Seal ring
9	Input shaft

Fig. 106: Identifying Front Planetary Gear Component Input Shaft Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Remove the thrust washer from the front planetary gear component.

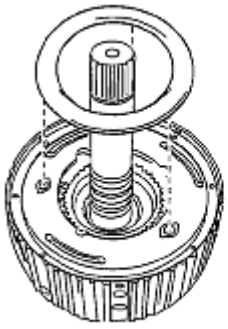


Fig. 107: Identifying Thrust Washer
Courtesy of MAZDA MOTORS CORP.

2. Remove the front planetary gear component from the input shaft.

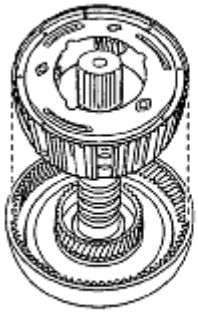


Fig. 108: Identifying Front Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

3. Remove the thrust washer from the front planetary gear component.

NOTE:

- **In some cases, the thrust washer may be detached with the input shaft attached.**

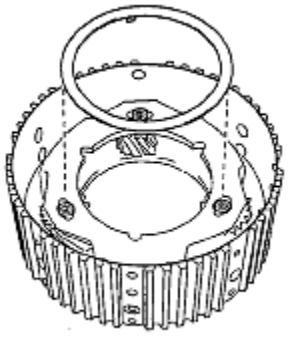


Fig. 109: Identifying Thrust Washer

Courtesy of MAZDA MOTORS CORP.

4. Remove the front planetary sun gear, thrust bearing and the bearing race from the input shaft.

NOTE:

- **If it is difficult to remove the bearing race, pry it off gently using a flathead screwdriver.**

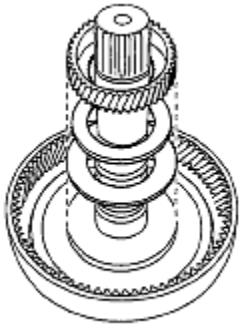


Fig. 110: Identifying Front Planetary Sun Gear, Thrust Bearing And Bearing Race
Courtesy of MAZDA MOTORS CORP.

5. Remove the seal rings from the input shaft.

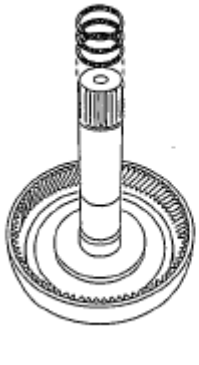


Fig. 111: Identifying Seal Rings Of Input Shaft
Courtesy of MAZDA MOTORS CORP.

6. Remove the seal rings from the input shaft.

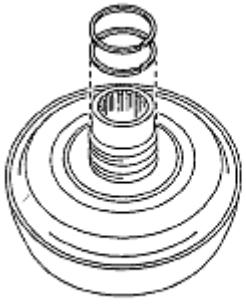


Fig. 112: Identifying Seal Rings Of Input Shaft
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

1. Apply ATF to the new seal rings and sliding surface of the input shaft.

CAUTION:
- **Do not expand the seal ring too much.**
- **Be careful not to shorten the seal rings too much, when installing the seal rings.**

2. Compress the seal rings as shown in the figure. Then install the seal rings to the input shaft.

NOTE:
- **Verity that seal rings rotate smoothly after installing them.**

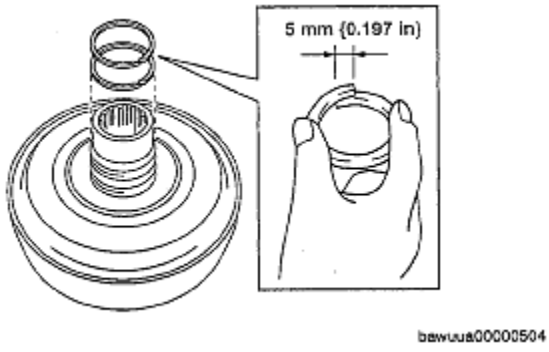


Fig. 113: Compressing Seal Rings
Courtesy of MAZDA MOTORS CORP.

3. Apply ATF to the bearing race.
4. Install the bearing race to the input shaft.

CAUTION:
- **Apply grease to the mounting surface of the thrust washer so that it does not drop when the front planetary gear component is installed.**

- **Do not apply grease to the oil holes of the thrust washer.**
- **Do not drop the thrust washer.**

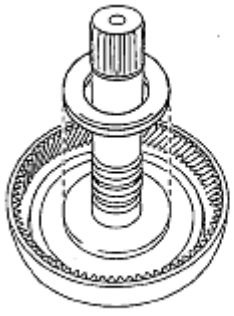


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Fig. 114: Identifying Bearing Race Of Input Shaft
Courtesy of MAZDA MOTORS CORP.

5. Apply grease to the thrust washer.
6. Install the thrust washer to the front planetary gear component.

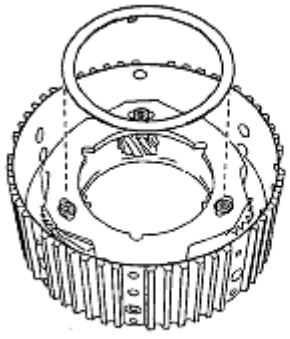

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Fig. 115: Identifying Thrust Washer Of Front Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

7. Install the front planetary gear component to the input shaft.

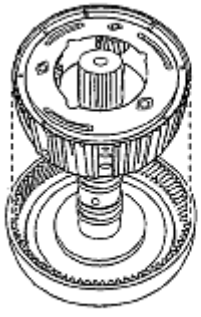

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Fig. 116: Identifying Front Planetary Gear Component Of Input Shaft
Courtesy of MAZDA MOTORS CORP.

8. Apply ATF to the thrust bearing.
9. Install the thrust bearing to the input shaft as shown in the figure.

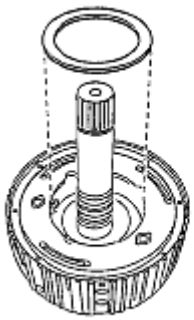


Fig. 117: Identifying Thrust Bearing Of Input Shaft
Courtesy of MAZDA MOTORS CORP.

10. Install the front planetary sun gear to the input shaft as shown in the figure.
11. Apply ATF to the new seal rings and sliding surface of the input shaft.

CAUTION:
- **Do not expand the oil seal rings too much.**
- **Be careful not to shorten the seal rings too much, when installing the seal rings.**

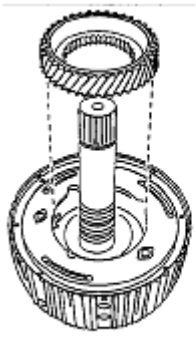


Fig. 118: Identifying Front Planetary Sun Gear Of Input Shaft
Courtesy of MAZDA MOTORS CORP.

12. Compress the seal rings as shown in the figure.

Then install the seal rings to the input shaft.

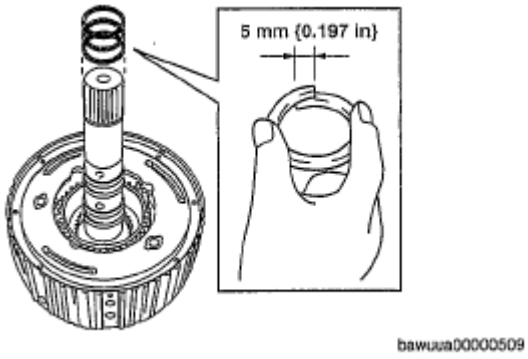


Fig. 119: Compressing Seal Rings
Courtesy of MAZDA MOTORS CORP.

NOTE:
- **Verify that seal rings rotate smoothly after installing them.**

CAUTION:
- **Apply grease to the mounting surface of the thrust washer so that it does not drop when the front planetary gear component is installed.**
- **Do not coat grease to the oil holes of the thrust washer.**

13. Apply grease to the thrust washer.
14. Install the thrust washer to the front planetary gear component.

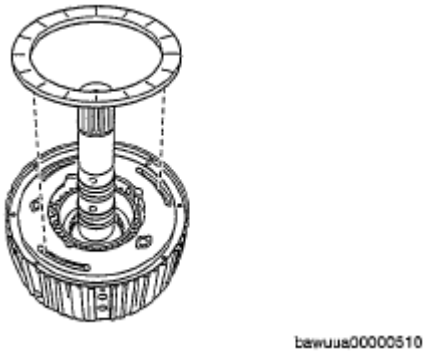
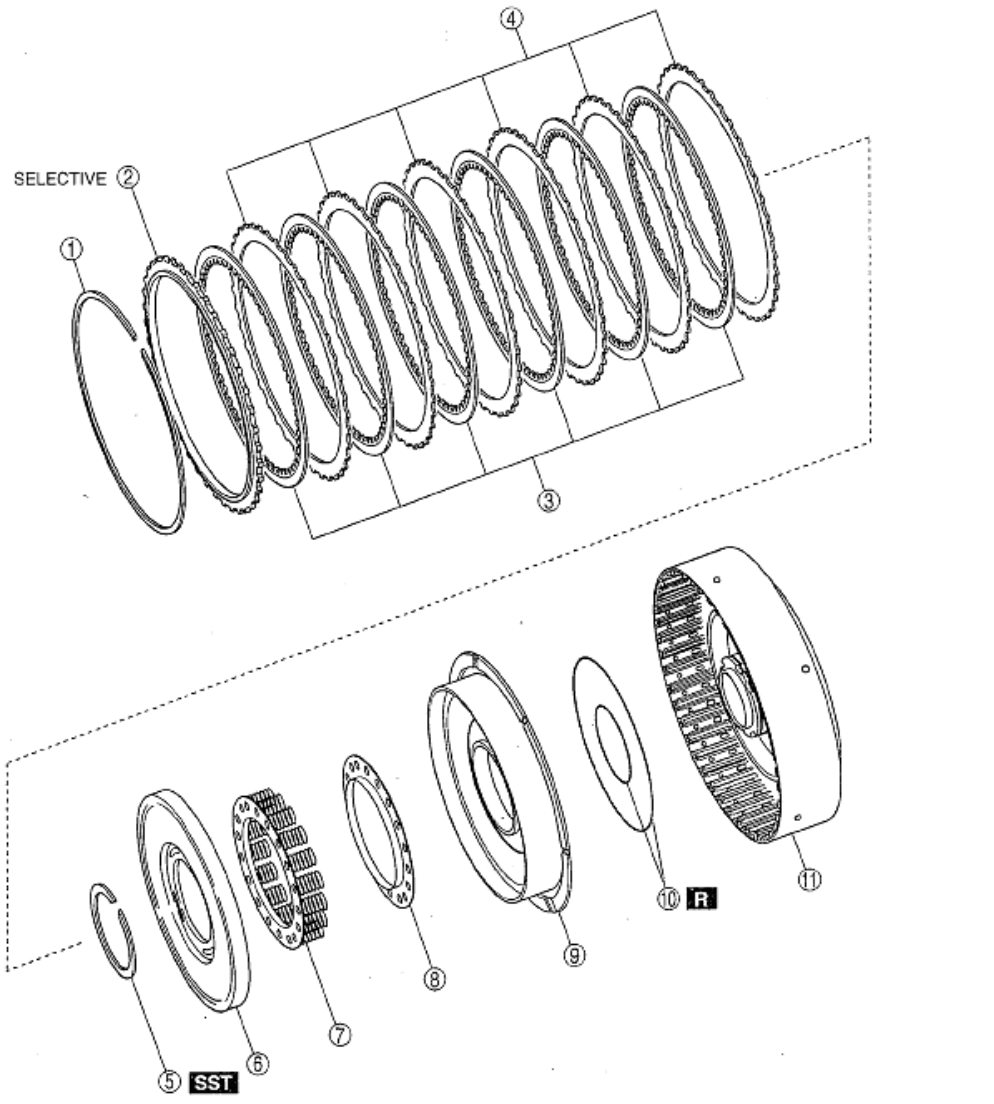


Fig. 120: Identifying Thrust Washer Of Front Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

C1 CLUTCH COMPONENT DISASSEMBLY

Components



1	Snap ring
2	Retaining plate
3	Drive plate
4	Driven plate
5	Snap ring
6	C1 clutch balancer

7	Piston return spring
8	Spring retainer
9	C1 clutch piston
10	O-ring
11	C1 clutch drum

Fig. 121: Identifying C1 Clutch Disassembly Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Using a flathead screwdriver, remove the snap ring from the C1 clutch drum.

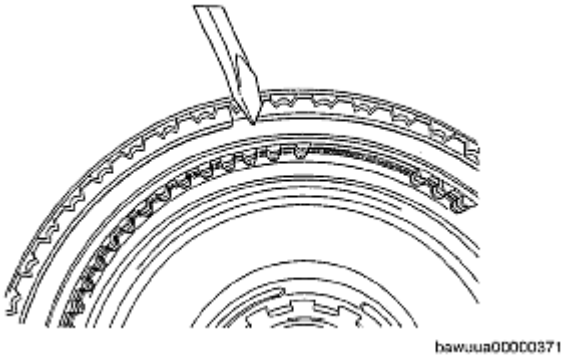


Fig. 122: Removing Snap Ring From C1 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

2. Remove the retaining plate, drive and driven plates from the C1 clutch drum.

NOTE:

- **Inspect the number of drive and driven plates.**

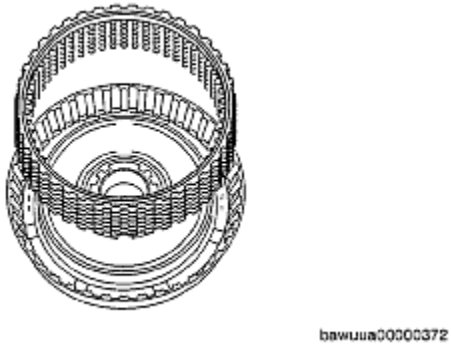


Fig. 123: Identifying Retaining Plate, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

3. Place the **SST** on the clutch balancer and compress the return spring with a press.

CAUTION:

- **Do not expand the snap ring too much.**

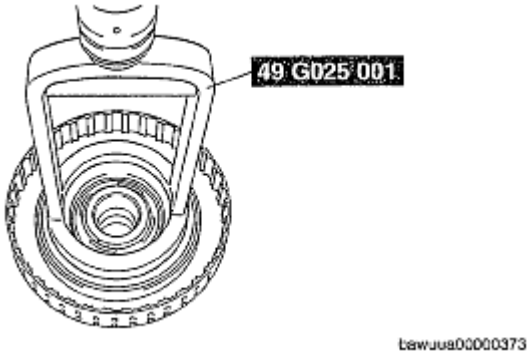


Fig. 124: Placing SST On Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

4. Remove the snap ring using snap ring pliers.

CAUTION:
- **Do not damage the seal on the clutch balancer.**

5. Remove the clutch balancer, return spring and the retainer from the C1 clutch drum.

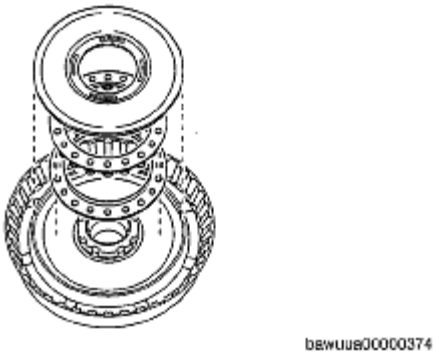


Fig. 125: Identifying Clutch Balancer, Return Spring And Retainer
Courtesy of MAZDA MOTORS CORP.

6. While pushing the C1 clutch piston by hand, apply compressed air into the oil passage as shown in the figure and remove the forward clutch piston from the C1 clutch drum.

Air pressure 392 kPa {4.0 kgf/cm^2 , 57 psi}

NOTE:
- **When applying compressed air, block the one oil passage of the C1 clutch drum as shown in the figure.**

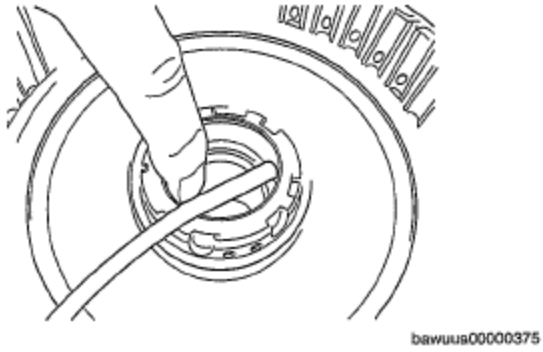


Fig. 126: Applying Compressed Air Into Oil Passage
Courtesy of MAZDA MOTORS CORP.

7. Remove the O-rings from the C1 clutch drum.

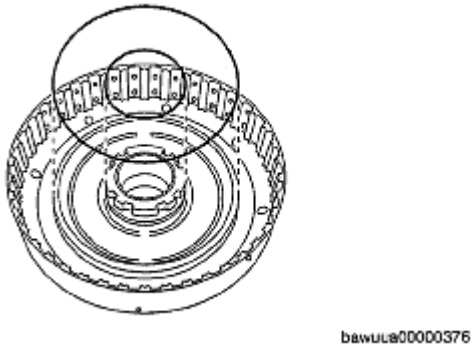


Fig. 127: Identifying O-Rings Of C1 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

C1 CLUTCH INSPECTION

1. Inspect the lining of all drive plates.
   - If the lining is flaking or has changed color, or if it is worn or the print mark is wearing away, replace with a new drive plate. When replacing, inspect the contact surfaces between the retaining plate, driven plate and drive plate. If they are scratched or have changed color, replace with new parts.

NOTE:
- **Before replacing with new drive plates, soak them at least 2 h in ATF.**

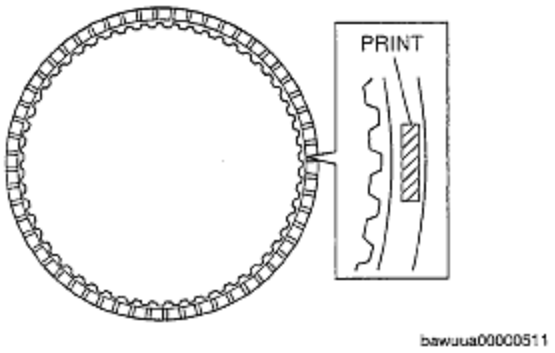


Fig. 128: Inspecting Lining Of All Drive Plates
Courtesy of MAZDA MOTORS CORP.

2. Using vernier calipers, measure the free length of the piston return spring.

   C1 clutch return spring free length Standard: 17.01 mm {0.6697 in}

   - If it is less than the specification, replace the piston return spring with a new one.

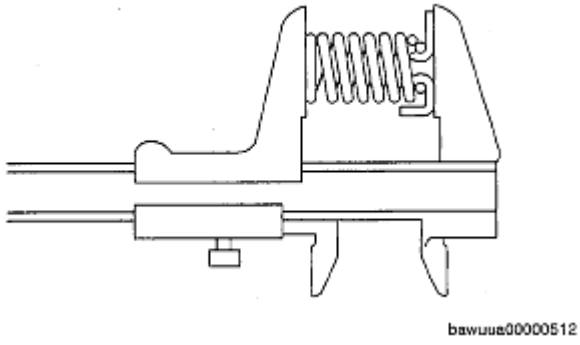
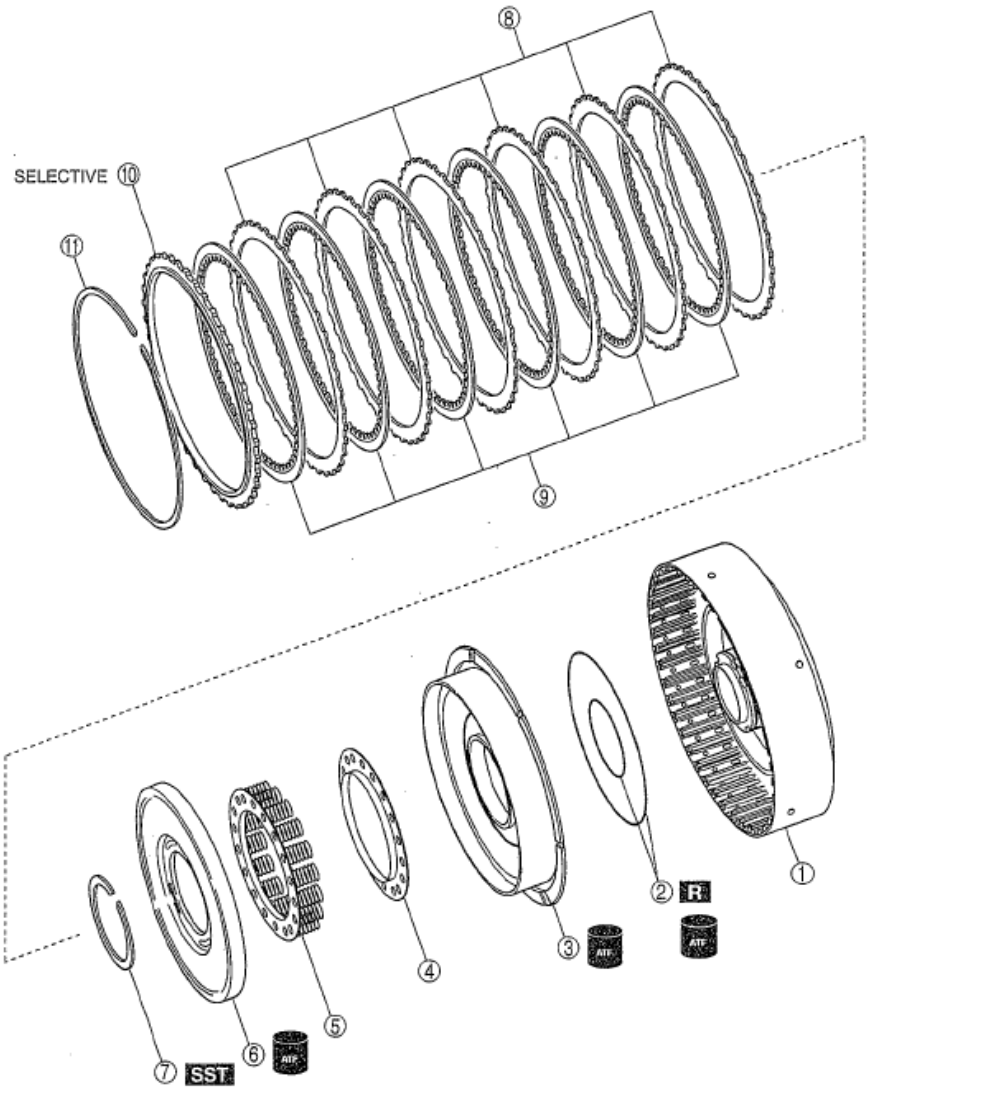


Fig. 129: Measuring Free Length Of Piston Return Spring
Courtesy of MAZDA MOTORS CORP.

C1 CLUTCH COMPONENT ASSEMBLY

Components



1	C1 clutch drum
2	O-ring
3	C1 clutch piston
4	Spring retainer
5	Piston return spring
6	C1 clutch balancer

7	Snap ring
8	Driven plate
9	Drive plate
10	Retaining plate
11	Snap ring

Fig. 130: Identifying C1 Clutch Assembly Components
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

1. Apply ATF to the new O-rings and the C1 clutch drum.
2. Install the O-rings to the C1 clutch drum.

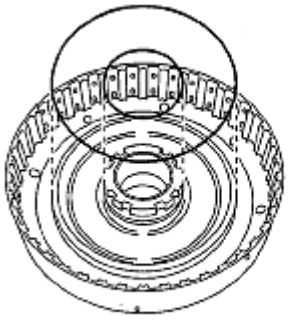


Fig. 131: Identifying O-Rings Of C1 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

3. Apply ATF to the sliding surface of the forward clutch piston.

CAUTION:
- **Do not damage the seal on the piston and O-ring.**

4. Install the C1 clutch piston to the C1 clutch drum.

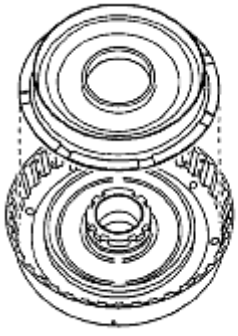


Fig. 132: Identifying C1 Clutch Piston Of C1 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

5. Apply ATF to the seal on the clutch balancer.

CAUTION:
- **Do not damage the seal on the clutch balancer.**

6. Install the retainer, return spring and the clutch balancer to the C1 clutch drum.

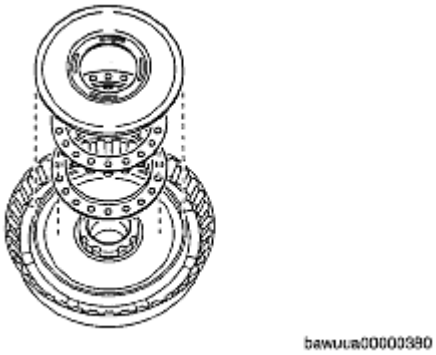


Fig. 133: Identifying Retainer, Return Spring And Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

7. Place the **SST** on the clutch balancer and compress the return spring component with a press.

CAUTION:
- **When installing the snap ring, set the end gap of the snap ring as shown in the figure.**
- **Do not expand the snap ring too much.**

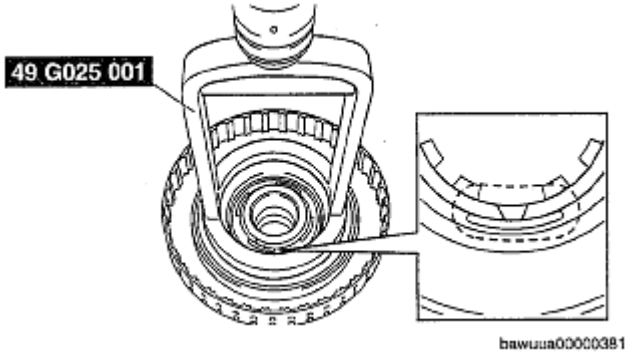


Fig. 134: Placing SST On Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

8. Install the snap ring in the groove using snap ring pliers.
9. Install the driven plates, drive plates and the retaining plate in the following order to the C1 clutch drum as shown in the figure.

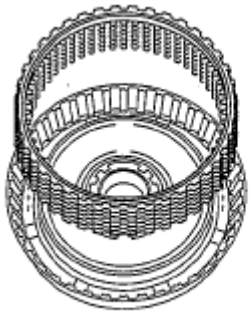
Six drive plates type

- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

Seven drive plates type

- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive-

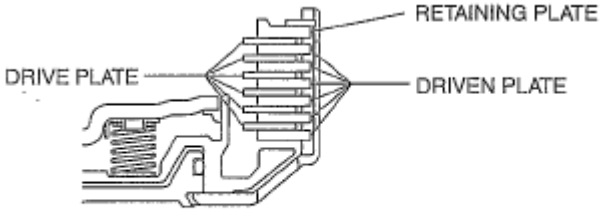
Driven- Drive- Retaining



bawuua00000382

Fig. 135: Identifying Drive Plates And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Inspect the number and order of the retaining plate, drive and driven plates.**



bawuua00000383

Fig. 136: Inspecting Number And Order Of Retaining Plate, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

10. Using a flathead screwdriver, install the snap ring in the groove.

CAUTION:
- **When installing the snap ring, set the end gap of the snap ring as shown in the figure.**

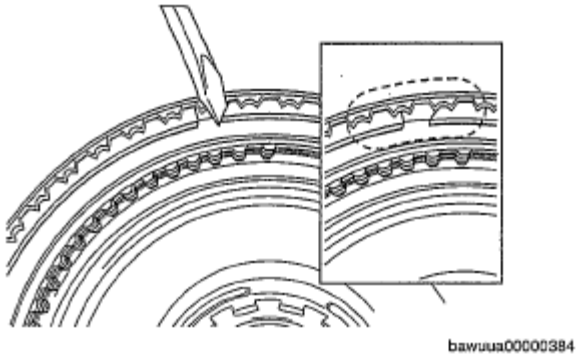


Fig. 137: Installing Snap Ring In Groove
Courtesy of MAZDA MOTORS CORP.

11. Install the C1 clutch component on the input shaft and set a dial indicator as shown in the figure.
12. Apply compressed air as shown in the figure and measure the C1 clutch piston stroke.

Air pressure 200 kPa {2.0 kgf/cm^2 , 29 psi}

C1 clutch piston stroke 1.2-1.4 mm {0.047- 0.055 in}

- If not within the specification, select an appropriate retaining plate.

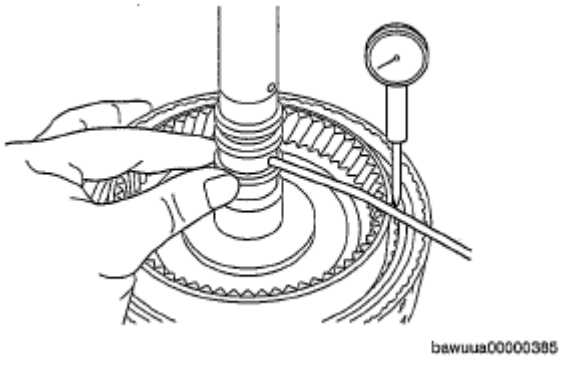


Fig. 138: Applying Compressed Air And Measuring C1 Clutch Piston Stroke.
Courtesy of MAZDA MOTORS CORP.

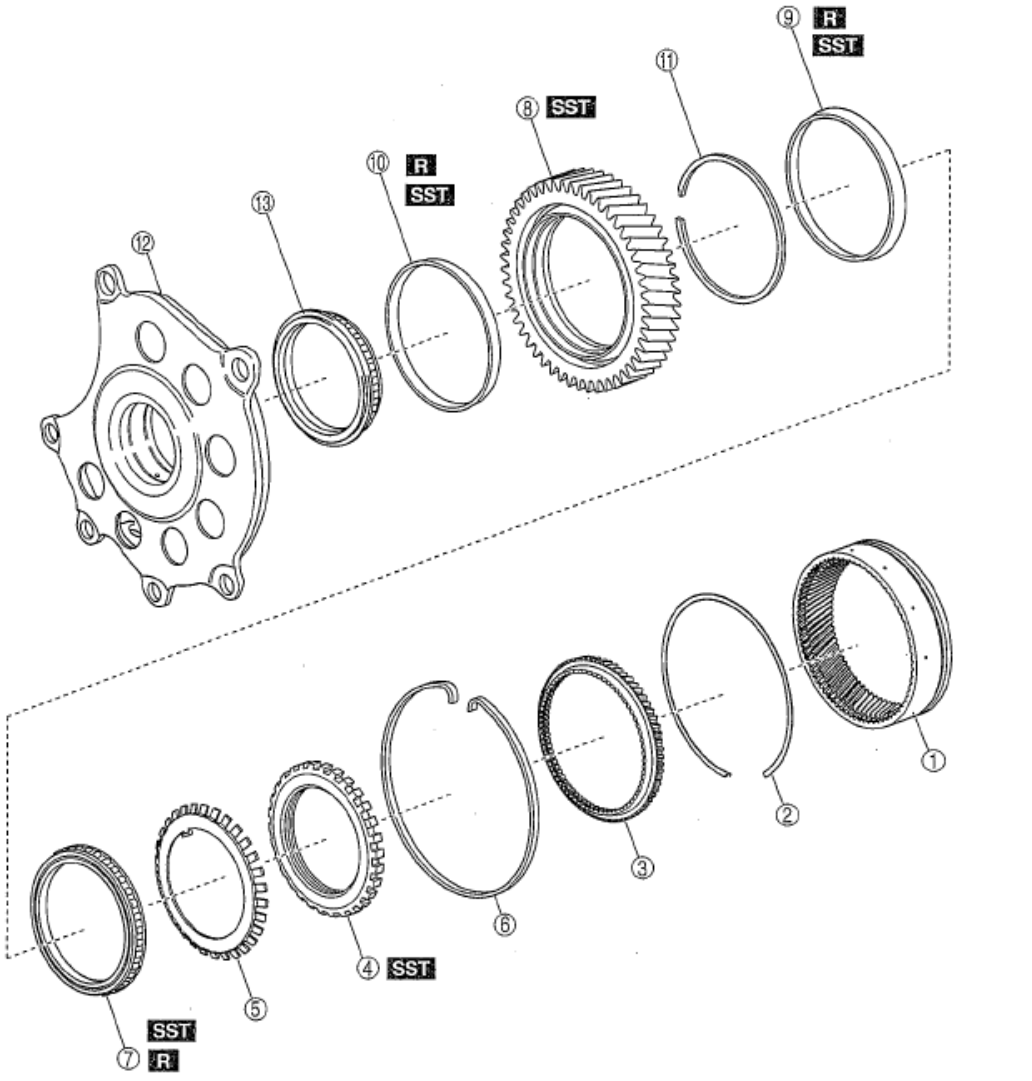
RETAINING PLATE SIZE

Identification mark	Thickness (mm {in})
1	2.8 {0.110}
2	2.9 {0.114}
3	3.0 {0.118}
4	3.1 {0.122}
A	3.15 {0.124}
5	3.2 {0.126}

B	3.25 {0.128}
6	3.3 {0.130}
C	3.35 {0.132}
7	3.4 {0.134}
8	3.5 {0.138}

COUNTER DRIVE GEAR DISASSEMBLY/ASSEMBLY

Components



1	Rear planetary ring gear
2	Snap ring
3	Rear planetary ring gear flange
4	Nut
5	Washer
6	Snap ring
7	Tapered roller bearing

8	Counter drive gear
9	Bearing race
10	Bearing race
11	Snap ring
12	Center support
13	Tapered roller bearing

Fig. 139: Identifying Counter Drive Gear Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Using the snap ring pliers, loosen the snap ring and remove the rear planetary ring gear.

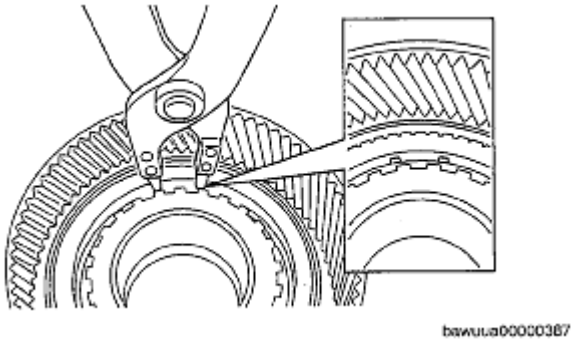


Fig. 140: Loosening Snap Ring
Courtesy of MAZDA MOTORS CORP.

2. Using a flathead screwdriver, remove the snap ring from the rear planetary ring gear.
3. Remove the ring gear flange from the rear planetary ring gear.

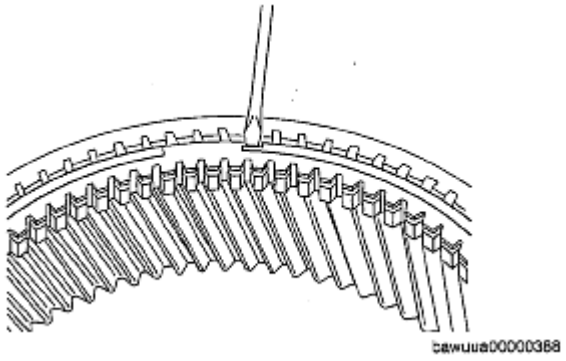


Fig. 141: Removing Snap Ring From Rear Planetary Ring Gear
Courtesy of MAZDA MOTORS CORP.

4. Using a flathead screwdriver and hammer, pry back the crimps locking the washer.

CAUTION:
- **If the lockwasher crimps are not completely pried back, the tool cannot fit over the bolt properly and the bolt cannot be loosened.**

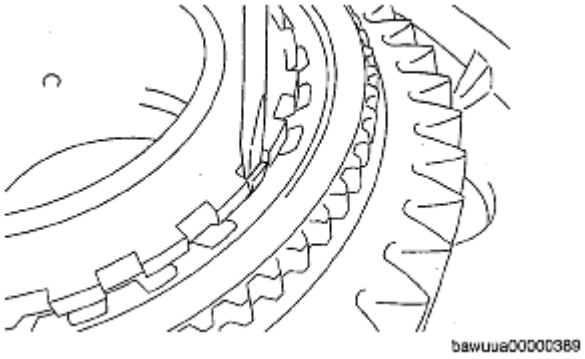


Fig. 142: Prying Back Crimps Locking Washer
Courtesy of MAZDA MOTORS CORP.

5. Using the **SST** , remove the nut and the washer.

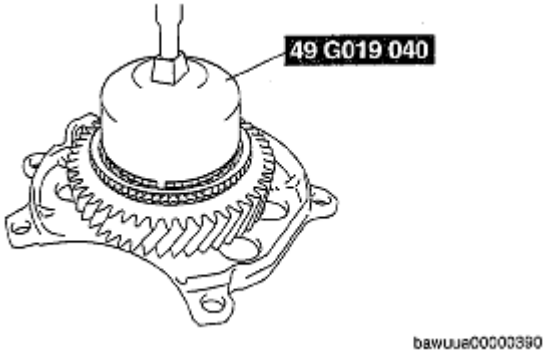


Fig. 143: Identifying SST
Courtesy of MAZDA MOTORS CORP.

6. Using a flathead screwdriver, remove the snap ring from the counter drive gear.

CAUTION:
- **Do not drop the tapered roller bearing.**

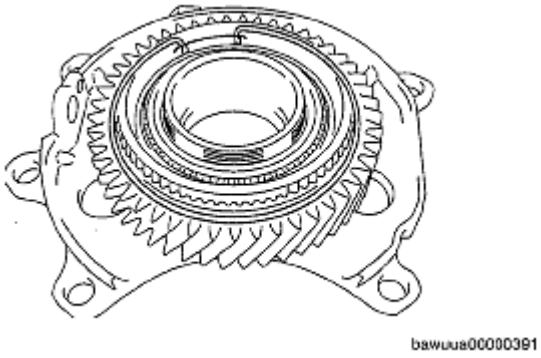


Fig. 144: Identifying Snap Ring Of Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

7. Using the **SST** , remove the counter drive gear and tapered roller bearing.

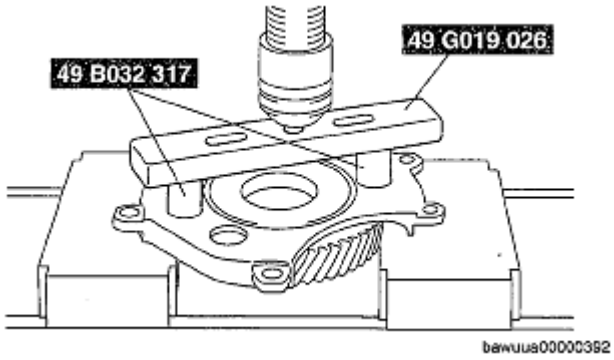


Fig. 145: Identifying SST
Courtesy of MAZDA MOTORS CORP.

8. Using a flathead screwdriver and hammer, remove the bearing race inner from the counter drive gear.

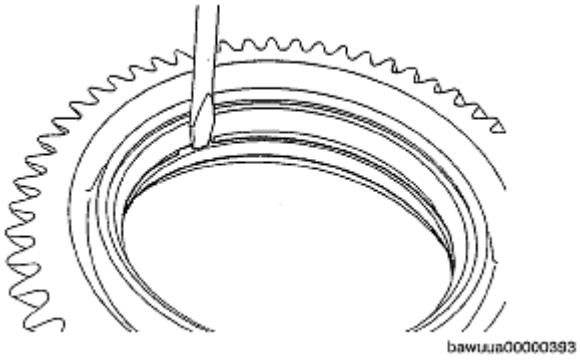


Fig. 146: Removing Bearing Race Inner From Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

9. Using a flathead screwdriver and hammer, remove the bearing race outer from the counter drive gear.

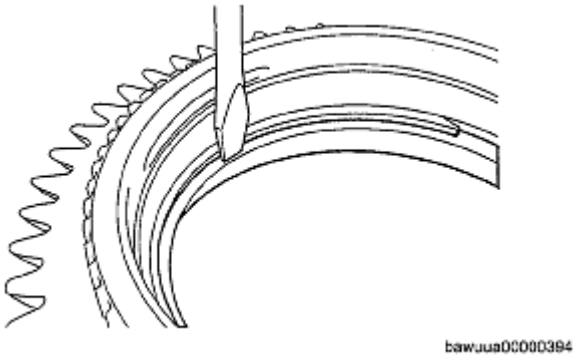


Fig. 147: Removing Bearing Race Outer From Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

10. Using a flathead screwdriver, remove the snap ring from the counter drive gear.

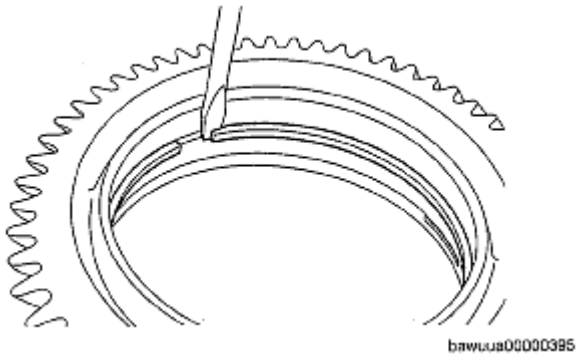


Fig. 148: Removing Snap Ring From Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

NOTE:

- **The tapered roller bearing cannot be removed from the center support.**
- **The tapered roller bearing and center support must be replaced as a set.**

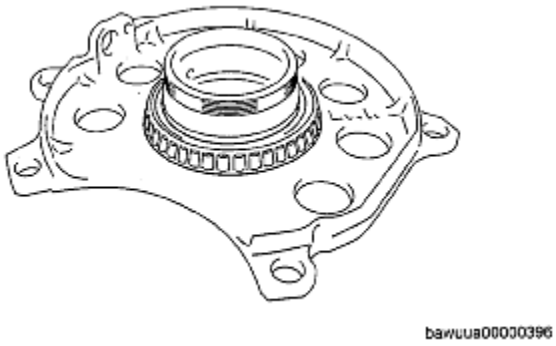


Fig. 149: Identifying Tapered Roller Bearing And Center Support
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

NOTE:

- **The tapered roller bearing and bearing race outer must be replaced as a set.**

1. Using the **SST** and a press, install the tapered roller bearing to the center support.

   Substitution SST

   - **49 L033 101**

Outer diameter: 70-76 mm {2.76-2.99 in}

Inner diameter: 68.2 mm {2.69 in} or more

Plate thickness: 1 mm {0.04 in} or more

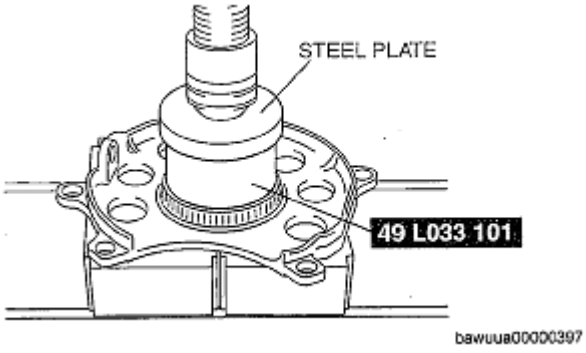


Fig. 150: Installing Tapered Roller Bearing To Center Support
Courtesy of MAZDA MOTORS CORP.

2. Using a flathead screwdriver, install the hole snap ring to the counter drive gear.

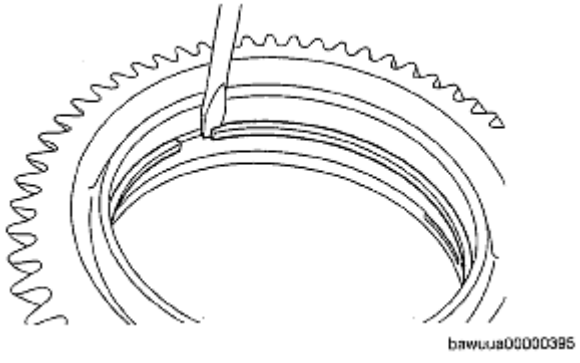


Fig. 151: Installing Hole Snap Ring To Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

3. Using the old bearing race and the steel plate as shown in the figure, install the new bearing race outer to the counter drive gear.

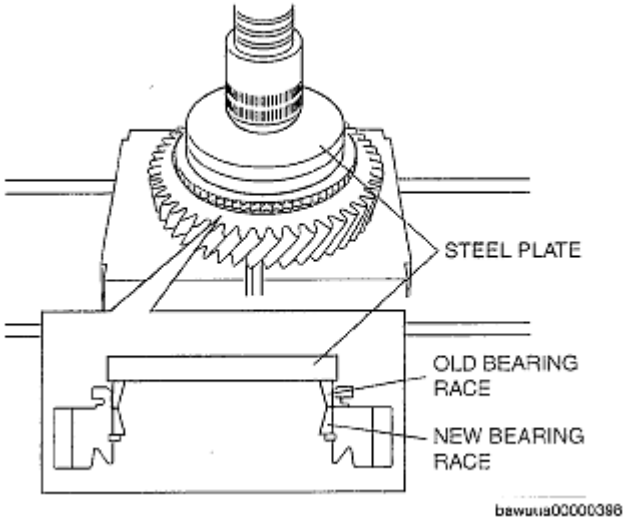


Fig. 152: Installing Bearing Race Outer To Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

4. Using the old bearing race and the steel plate as shown in the figure, install the new bearing race inner to the counter drive gear.

CAUTION:
- **Do not press fit the bearing too deeply.**
- **Verify that the bearing is press fit to allow the installation of the nut.**

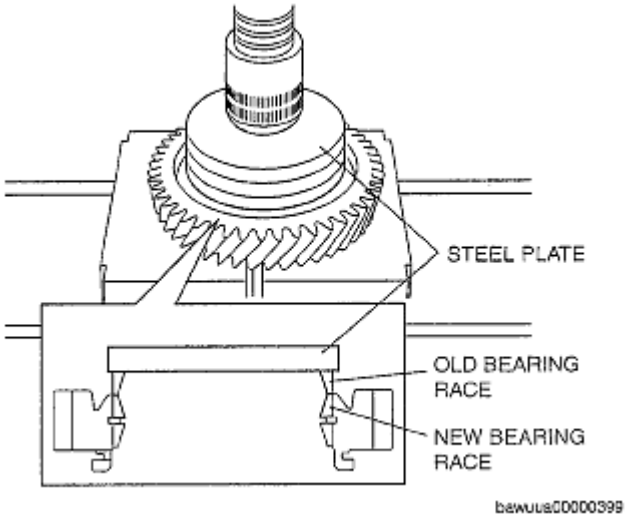


Fig. 153: Installing Bearing Race Inner To Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

5. Using the **SST** and a press, install the counter drive gear with the tapered roller bearing.

Substitution SST

- **49 W027 001**

  Outer diameter: 70-81 mm {2.76-3.18 in}

  Plate thickness: 1 mm {0.04 in} or more

NOTE:

- **Verify that the claw of the washer is fit into the groove on the center support.**
- **Verify that the nut is installed in the correct direction.**

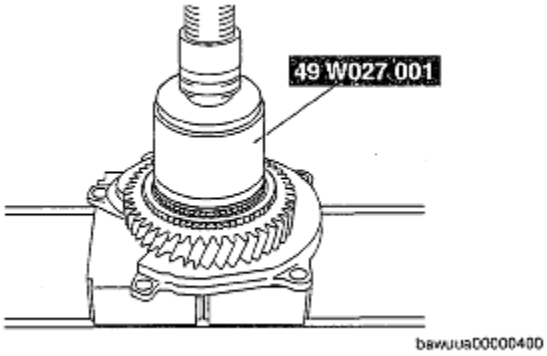


Fig. 154: Installing Counter Drive Gear With Tapered Roller Bearing
Courtesy of MAZDA MOTORS CORP.

6. Install the washer and nut.

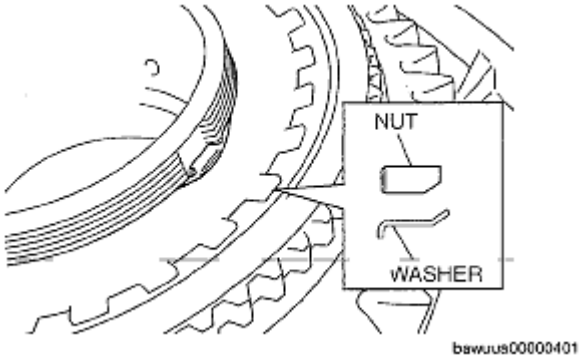


Fig. 155: Identifying Washer And Nut
Courtesy of MAZDA MOTORS CORP.

7. Using the **SST** , tighten the nut.
8. Using a spring balance, measure the starting and rotating torque of the counter drive gear.

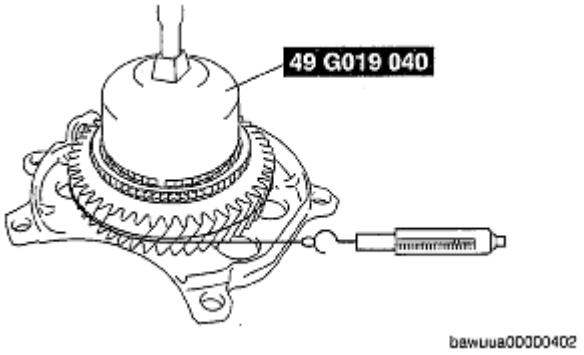


Fig. 156: Measuring Starting And Rotating Torque Of Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

COUNTER DRIVE GEAR STARTING AND ROTATING TORQUE

		N.m {kgf.cm, in.lbf}
Bearing	**Starting torque**	**Rotating torque**
New	0.40 - 0.50 {4.08 - 5.09, 3.55 - 4.41}	0.40 - 0.48 {4.08 - 4.89, 3.55 - 4.24}
Reused	0.20 - 0.25 {2.04 - 2.54, 1.77 - 2.20}	0.20 - 0.24 {2.04 - 2.44, 1.77 - 2.11}

- Adjust the starting and rotating torque by tightening the nut.
- If the starting and rotating torque does not fall within the specification, loosen the nut and retighten the nut to adjust torque.

9. Using a flathead screwdriver and hammer, crimp down the washer.

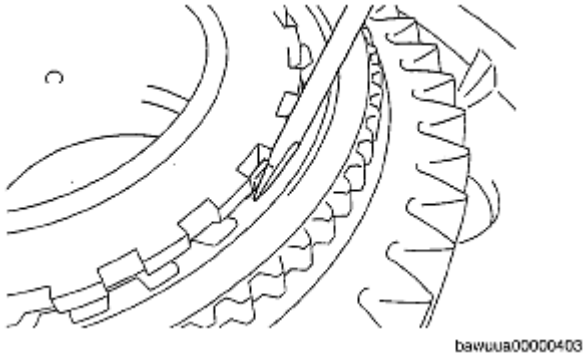


Fig. 157: Crimping Down Washer
Courtesy of MAZDA MOTORS CORP.

10. Using a flathead screwdriver, install the hole snap ring to the counter drive gear.
11. Install the rear planetary ring gear flange to the rear planetary ring gear.

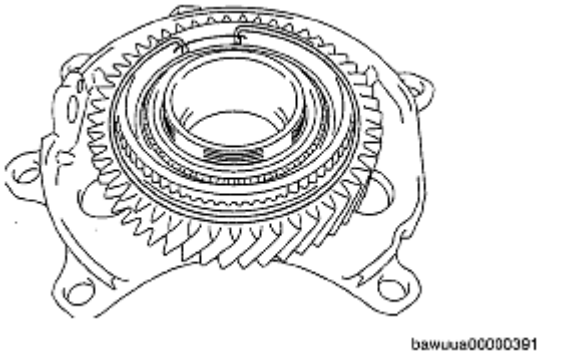


Fig. 158: Identifying Rear Planetary Ring Gear Flange
Courtesy of MAZDA MOTORS CORP.

12. Using a flathead screwdriver, install the snap ring in the groove.

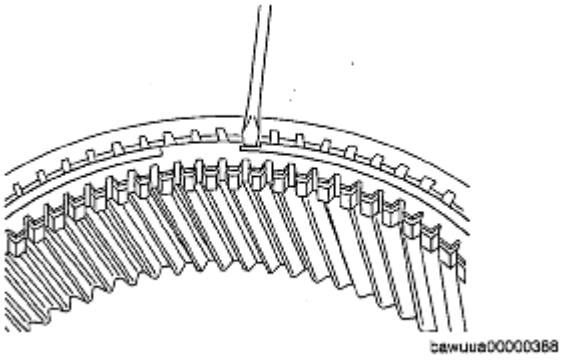


Fig. 159: Installing Snap Ring In Groove
Courtesy of MAZDA MOTORS CORP.

13. Install the rear planetary ring gear to the counter drive gear.
14. Using the snap ring pliers, while loosening the snap ring, install the rear planetary ring gear.

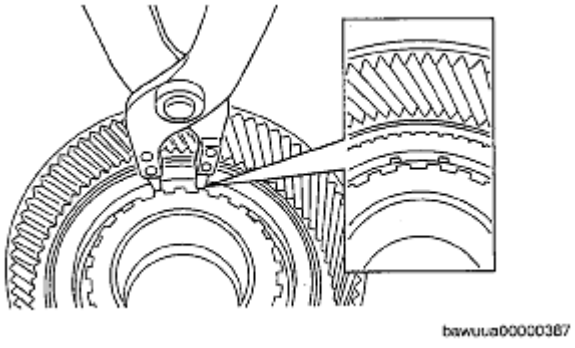


Fig. 160: Loosening Snap Ring
Courtesy of MAZDA MOTORS CORP.

ONE-WAY CLUTCH COMPONENT INSPECTION

1. Hold the one-way clutch component in place. Verify that the rear planetary gear rotates when turned clockwise and does not rotate when turned counterclockwise.

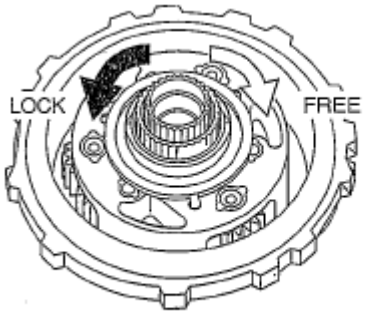
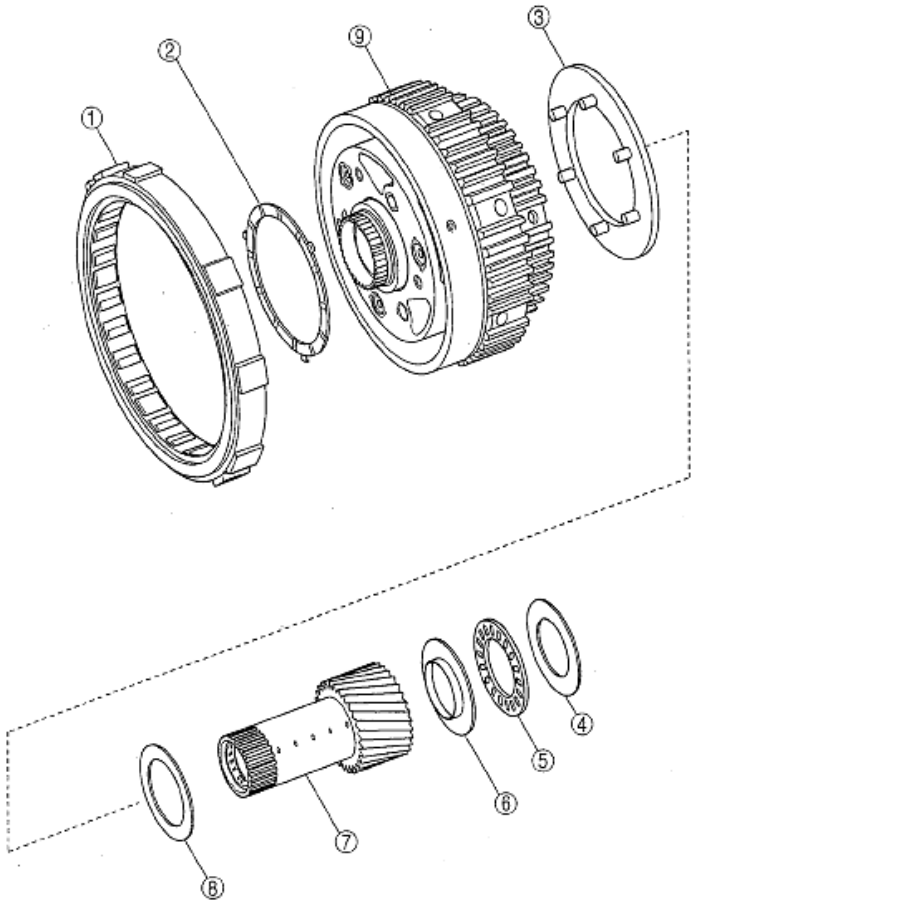


Fig. 161: Inspecting One-Way Clutch Component
Courtesy of MAZDA MOTORS CORP.

REAR PLANETARY GEAR COMPONENT AND ONE-WAY CLUTCH COMPONENT DISASSEMBLY

Components



1	One-way clutch component
2	Thrust washer
3	Thrust washer
4	Bearing race
5	Thrust bearing

6	Bearing race
7	Planetary sun gear
8	Bearing race
9	Rear planetary gear component

Fig. 162: Identifying Rear Planetary Gear Component And One-Way Clutch Disassembly Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Remove the one-way clutch component from the rear planetary gear component.

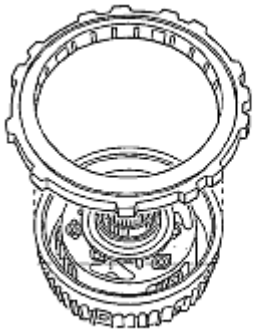


Fig. 163: Removing One-Way Clutch Component From Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

2. Remove the thrust washer from the rear planetary gear component.

Fig. 164: Identifying Thrust Washer Of Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

3. Remove the thrust washer from the rear planetary gear component.

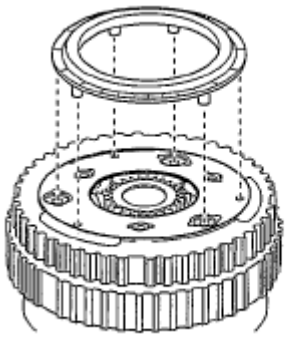


Fig. 165: Identifying Thrust Washer Of Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

4. Remove the planetary sun gear and bearing races from the rear planetary gear component.

NOTE:

- **If it is difficult to remove the bearing race, remove it gently using a flathead screwdriver.**

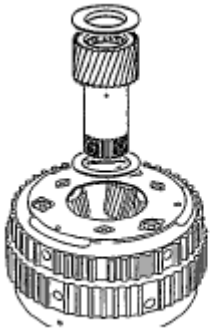


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Fig. 166: Identifying Planetary Sun Gear And Bearing Races Of Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

REAR PLANETARY GEAR INSPECTION

NOTE:

- **Measure at different places and take an average.**

1. Using a dial indicator, measure the inner diameter of the rear planetary gear bushings.

   Rear planetary gear bushing inner diameter

   Front side: 33.26 - 33.286 mm {1.3095 - 1.3104 in}

   Rear side: 33.26 - 33.286 mm {1.3095 - 1.3104 in}

   - If it exceeds the specification, replace the rear planetary gear component with a new one.
   - When the rear planetary gear component is replaced, inspect the contact surface opposed to the planetary sun gear.

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Fig. 167: Measuring Inner Diameter Of Rear Planetary Gear Bushings
Courtesy of MAZDA MOTORS CORP.

- If the surface of it is scratched or has changed color, replace the planetary sun gear with a new one.

2. Using a dial indicator, measure the inner diameter of the planetary sun gear bushings.

   Rear planetary sun gear bushing inner diameter

   Front side: 24.2 - 24.226 mm {0.9528 - 0.9537 in}

   Rear side: 24.2 - 24.226 mm {0.9528 - 0.9537 in}

   - If it exceeds the specification, replace the planetary sun gear component with a new one.

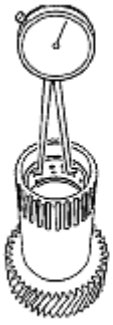

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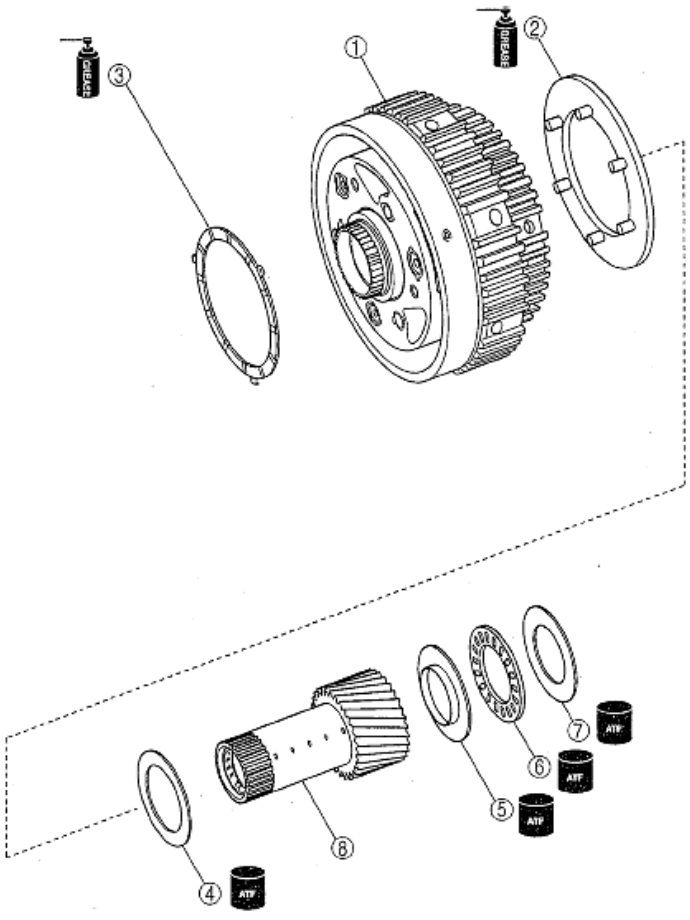
Fig. 168: Measuring Inner Diameter Of Planetary Sun Gear Bushings
Courtesy of MAZDA MOTORS CORP.

- When the planetary sun gear component is replaced, inspect the contact surface opposed to the intermediate shaft.
- If the surface of it is scratched or has changed color, replace the intermediate shaft with a new one.

REAR PLANETARY GEAR COMPONENT AND ONE-WAY CLUTCH COMPONENT ASSEMBLY

Components



1	Rear planetary gear component
2	Thrust washer
3	Thrust washer
4	Bearing race

5	Bearing race
6	Thrust bearing
7	Bearing race
8	Planetary sun gear

Fig. 169: Identifying Rear Planetary Gear Component And One-Way Clutch Component Assembly
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

CAUTION:
- **Apply grease to the mounting surface of the thrust washer so that it will not drop when the rear planetary gear component is installed.**
- **Do not apply grease to the oil holes of the thrust washer.**

1. Apply grease to the thrust washer.
2. Install the thrust washer to the rear planetary gear component.

CAUTION:
- **Apply grease to the mounting surface of the thrust washer so that it will not drop when the rear planetary gear component is installed.**

- **Do not apply grease to the oil holes of the thrust washer.**

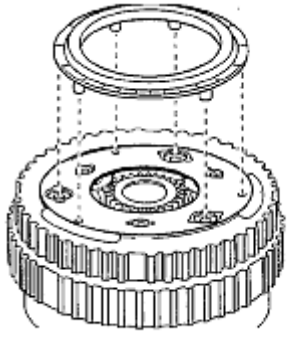


Fig. 170: Identifying Thrust Washer Of Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

3. Apply grease to the thrust washer.
4. Install the thrust washer to the rear planetary gear component.

CAUTION:
- **Apply grease to the mounting surface of the thrust washer so that it will not drop when the rear planetary gear component is installed.**
- **Do not apply grease to the oil holes of the thrust washer.**

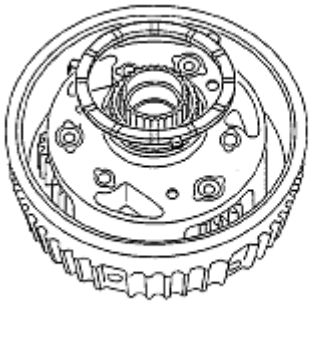


Fig. 171: Identifying Thrust Washer Of Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

5. Apply ATF to the bearing races and the thrust bearing.
6. Install the bearing races to the planetary sun gear as shown in the figure.
7. Install the planetary sun gear to the rear planetary gear component.

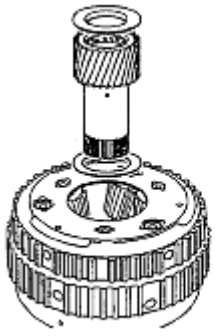
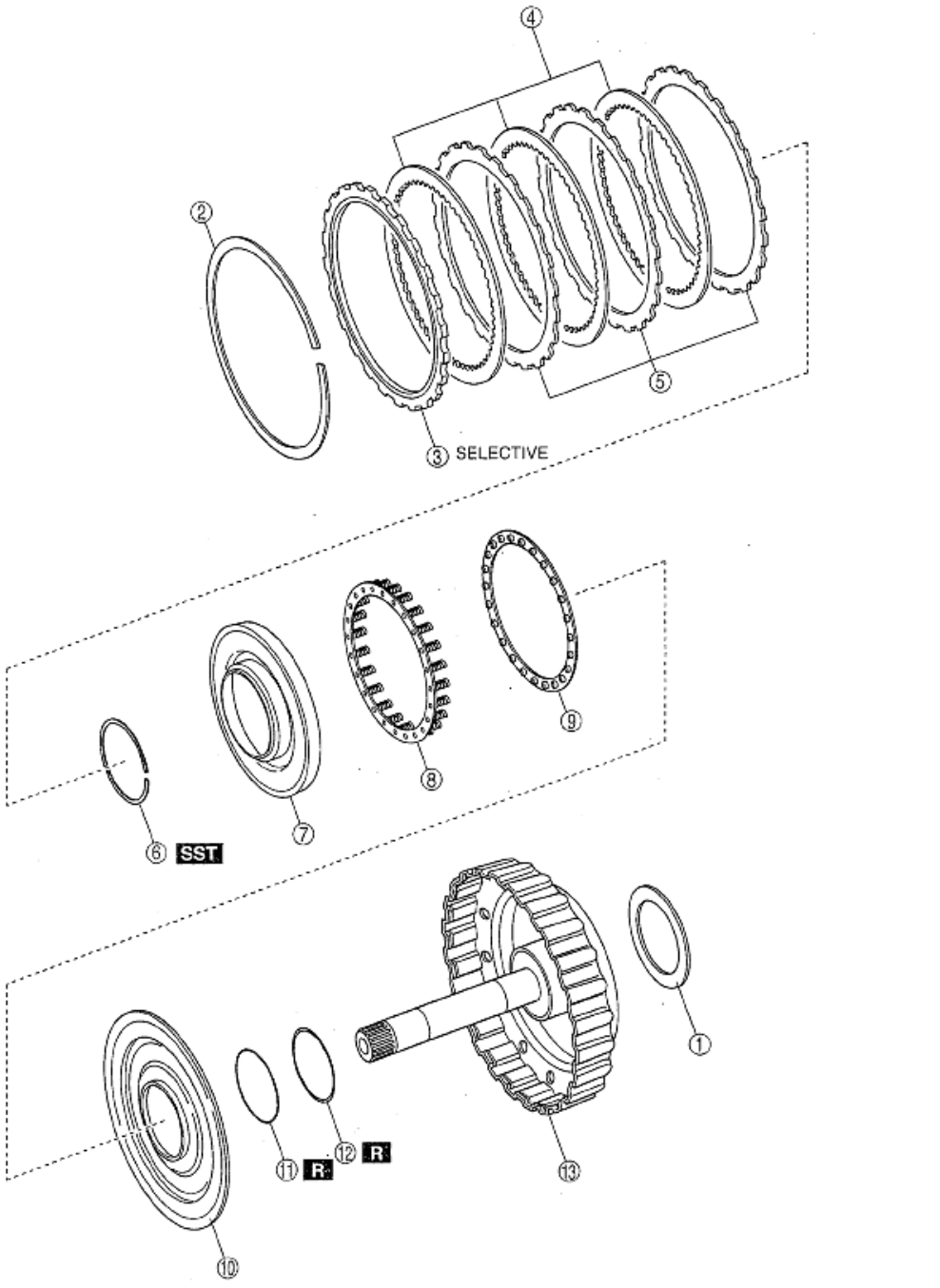


Fig. 172: Identifying Bearing Races Of Planetary Sun Gear
Courtesy of MAZDA MOTORS CORP.

C2 CLUTCH COMPONENT DISASSEMBLY

Components



1	Thrust bearing
2	Snap ring
3	Retaining plate
4	Drive plate
5	Driven plate
6	Snap ring

7	C2 clutch balancer
8	Piston return spring
9	Spring retainer
10	C2 clutch piston
11	O-ring
12	O-ring
13	Intermediate shaft

Fig. 173: Identifying C2 Clutch Component Disassembly
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

1. Remove the thrust bearing from the intermediate shaft.

NOTE:

- **If the bearing is difficult to remove, blow air between the bearing and the intermediate shaft.**

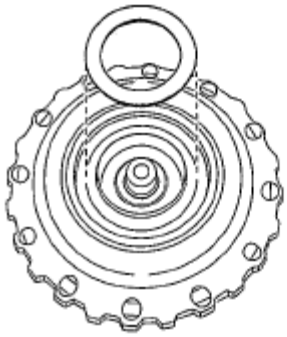


Fig. 174: Identifying Thrust Bearing Of Intermediate Shaft
Courtesy of MAZDA MOTORS CORP.

2. Using a flathead screwdriver, remove the snap ring from the intermediate shaft.

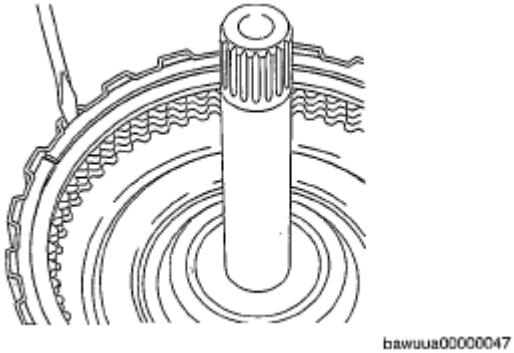


Fig. 175: Removing Snap Ring From Intermediate Shaft
Courtesy of MAZDA MOTORS CORP.

3. Remove the retaining plate, drive and driven plates from the intermediate shaft.

NOTE:

- **Inspect the number of drive and driven plates.**

Fig. 176: Identifying Retaining Plate, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

4. Place the **SST** on the clutch balancer and compress the return spring with a press.

CAUTION:
- **Do not contract the return spring too much.**
- **Do not expand the snap ring too much.**

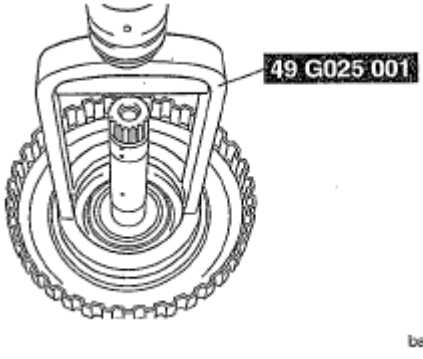


Fig. 177: Placing SST On Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

5. Remove the snap ring using snap ring pliers.

CAUTION:
- **Do not damage the seal on the clutch balancer.**

6. Remove the clutch balancer, return spring and the spring retainer from the intermediate shaft.

CAUTION:
- **Do not damage the seal on the piston.**

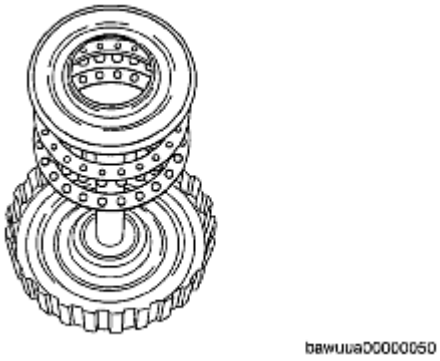


Fig. 178: Identifying Clutch Balancer, Return Spring And Spring Retainer
Courtesy of MAZDA MOTORS CORP.

7. While pushing the C2 clutch piston by hand, apply compressed air into the oil passage as shown in the figure and remove the C2 clutch piston from the intermediate shaft.

Air pressure

392 kPa {4.0 kgf/cm^2 , 57 psi}

NOTE:

- **When applying compressed air, block the three oil passages of the intermediate shaft as shown in the figure.**

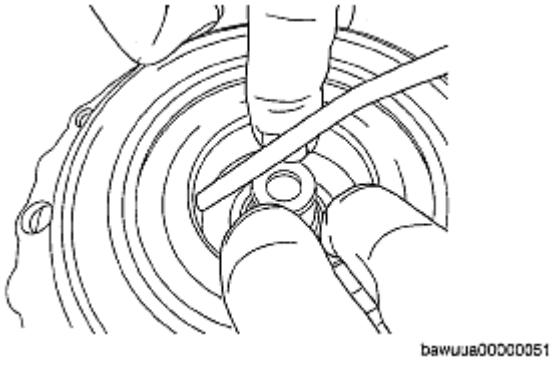


Fig. 179: Applying Compressed Air Into Oil Passage
Courtesy of MAZDA MOTORS CORP.

8. Remove the O-rings from the intermediate shaft.

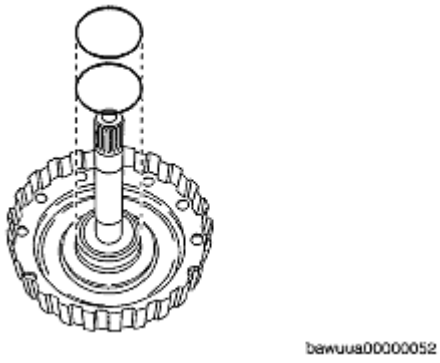


Fig. 180: Identifying O-Rings Of Intermediate Shaft
Courtesy of MAZDA MOTORS CORP.

C2 CLUTCH INSPECTION

1. Inspect the lining of all drive plates.
   - If the lining is flaking or has changed color, or if it is worn or the print mark is wearing away, replace with a new drive plate. When replacing, inspect the contact surfaces between the retaining plate, driven plate and drive plate. If they are scratched or have changed color, replace with new parts.

NOTE:
- **Before replacing with new drive plates, soak them at least 2 h in ATF.**

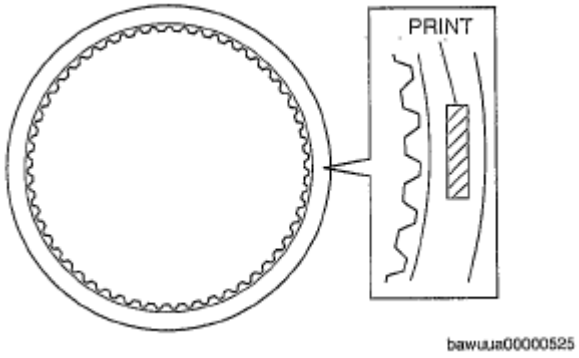


Fig. 181: Inspecting Lining Of All Drive Plates
Courtesy of MAZDA MOTORS CORP.

2. Using vernier calipers, measure the free length of the piston return spring.

   C2 clutch return spring free length

   Standard: 14.02 mm {0.5520 in}

   - If it is less than the specification, replace the piston return spring with a new one.

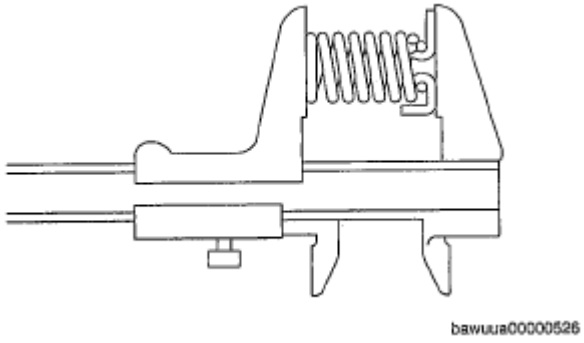
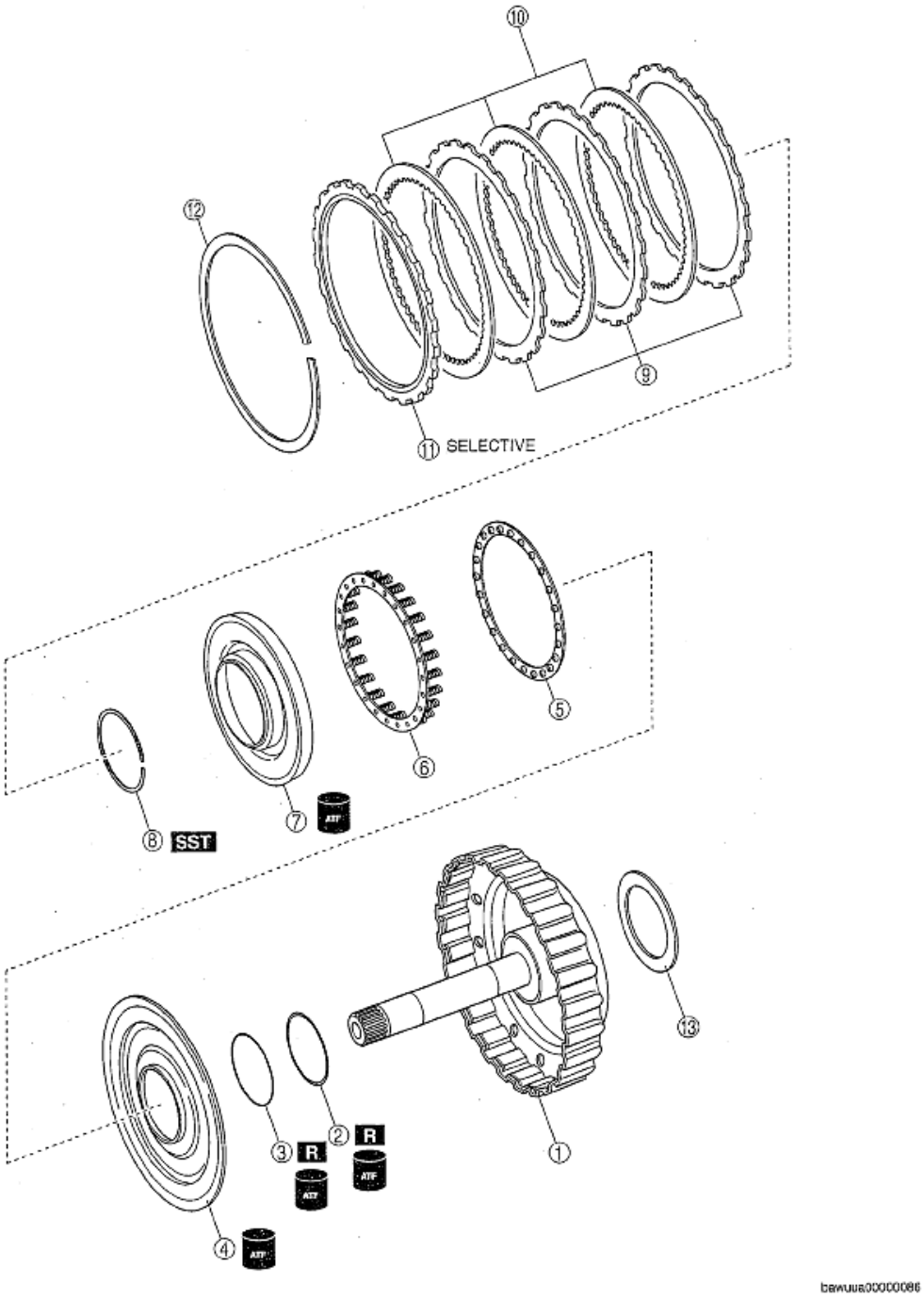


Fig. 182: Measuring Free Length Of Piston Return Spring
Courtesy of MAZDA MOTORS CORP.

C2 CLUTCH COMPONENT ASSEMBLY

Components



1	Intermediate shaft
2	O-ring
3	O-ring
4	C2 clutch piston
5	Spring retainer
6	Piston return spring

7	C2 clutch balancer
8	Snap ring
9	Driven plate
10	Drive plate
11	Retaining plate
12	Snap ring
13	Thrust bearing

Fig. 183: Identifying C2 Clutch Component Assembly

Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

1. Apply ATF to the new O-rings and the intermediate shaft.
2. Install the O-rings to the intermediate shaft.

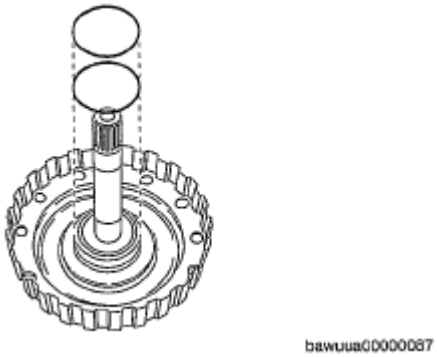


Fig. 184: Identifying O-Rings Of Intermediate Shaft
Courtesy of MAZDA MOTORS CORP.

O-RING SIZE

		mm {in}
	Inner diameter	**Thickness**
Upper	51.90 {2.043}	1.60 {0.0630}
Lower	50.40 {1.984}	2.62 {0.1031}

3. Apply ATF to the sliding surface of the C2 clutch piston.

CAUTION:
- **Do not damage the seal on the piston and O-ring.**

4. Install the C2 clutch piston to the intermediate shaft.
5. Apply ATF to the seal on the clutch balancer and sliding surface.

CAUTION:
- **Do not damage the seal on the clutch balancer.**
- **Do not damage the O-ring.**

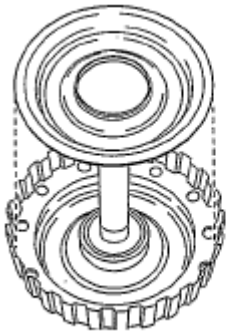


Fig. 185: Identifying C2 Clutch Piston Of Intermediate Shaft
Courtesy of MAZDA MOTORS CORP.

6. Install the spring retainer, return spring and the clutch balancer to the intermediate shaft.

CAUTION:
- **Be careful not to shorten the spring too much. If it is too short, it will bite into the O-ring.**

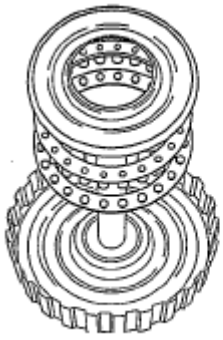


Fig. 186: Identifying Spring Retainer, Return Spring And Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

7. Place the **SST** on the clutch balancer and compress the return spring with a press.

CAUTION:
- **Do not expand the snap ring too much.**

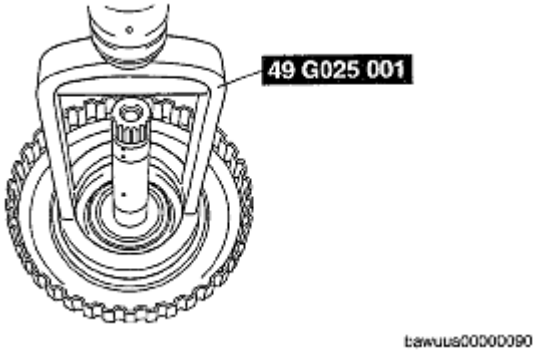


Fig. 187: Placing SST On Clutch Balancer
Courtesy of MAZDA MOTORS CORP.

8. Install the snap ring into the groove using snap ring pliers.
9. Install the driven plates, drive plates and the retaining plate in the following order to the intermediate shaft as shown in the figure.

Three drive plates type

- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

Four drive plates type

- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

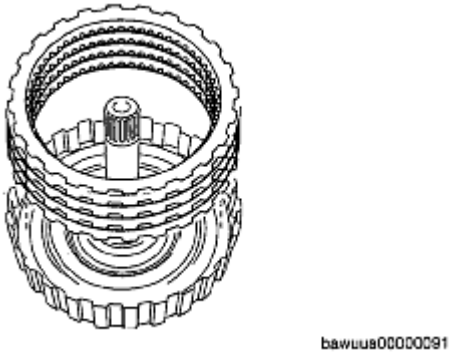


Fig. 188: Identifying Driven Plates, Drive Plates And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Inspect the number and order of the retaining plate, drive and driven plates.**

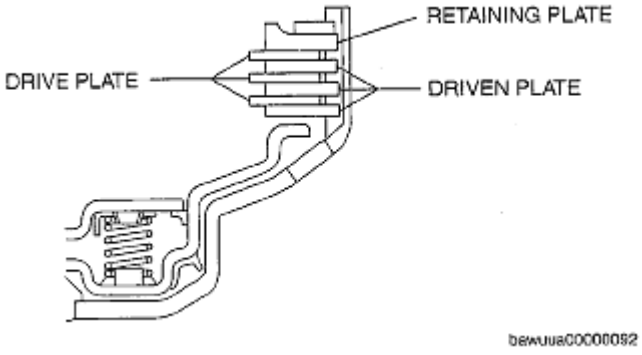


Fig. 189: Inspecting Number And Order Of Retaining Plate, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

10. Using a flathead screwdriver, install the snap ring into the groove.

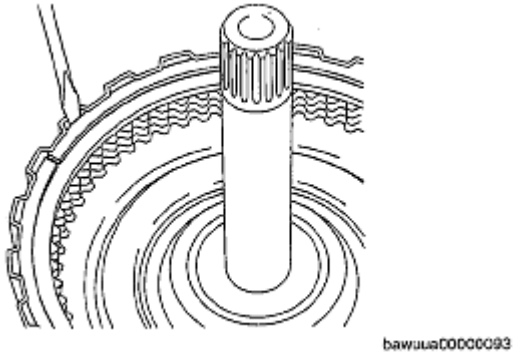


Fig. 190: Installing Snap Ring Into Groove
Courtesy of MAZDA MOTORS CORP.

11. Apply ATF to the thrust bearing.

NOTE:
- **Install the bearing in the correct direction as shown in the figure.**

12. Install the thrust bearing to the intermediate shaft.

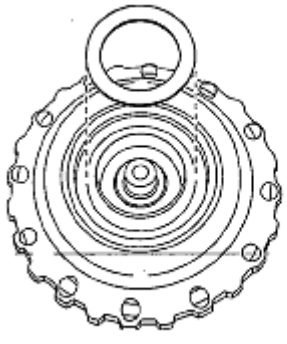


Fig. 191: Identifying Thrust Bearing Of Intermediate Shaft
Courtesy of MAZDA MOTORS CORP.

13. Install the intermediate shaft on the transaxle case and set a dial indicator as shown in the figure.
14. Apply compressed air as shown in the figure and measure the C2 clutch piston stroke.

Air pressure

400 kPa {4.1 kgfcm^2 , 58 psi}

C2 clutch piston stroke

0.45 - 0.65 mm {0.0178 - 0.0255 in}

- If not within the specification, select an appropriate retaining plate.

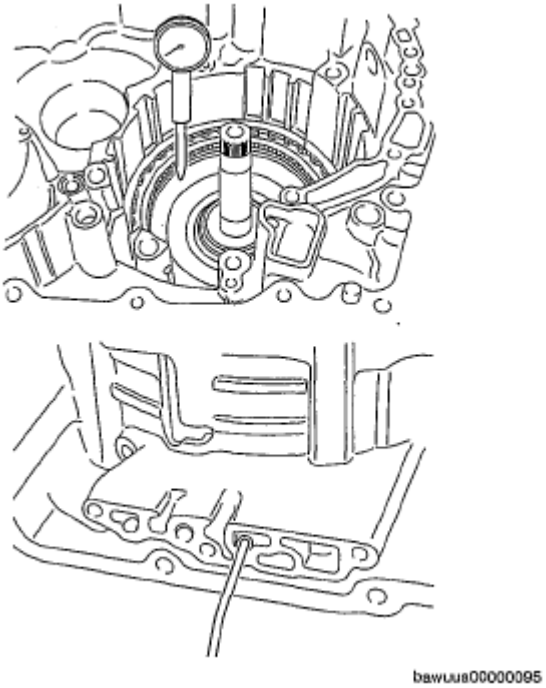


Fig. 192: Measuring C2 Clutch Piston Stroke
Courtesy of MAZDA MOTORS CORP.

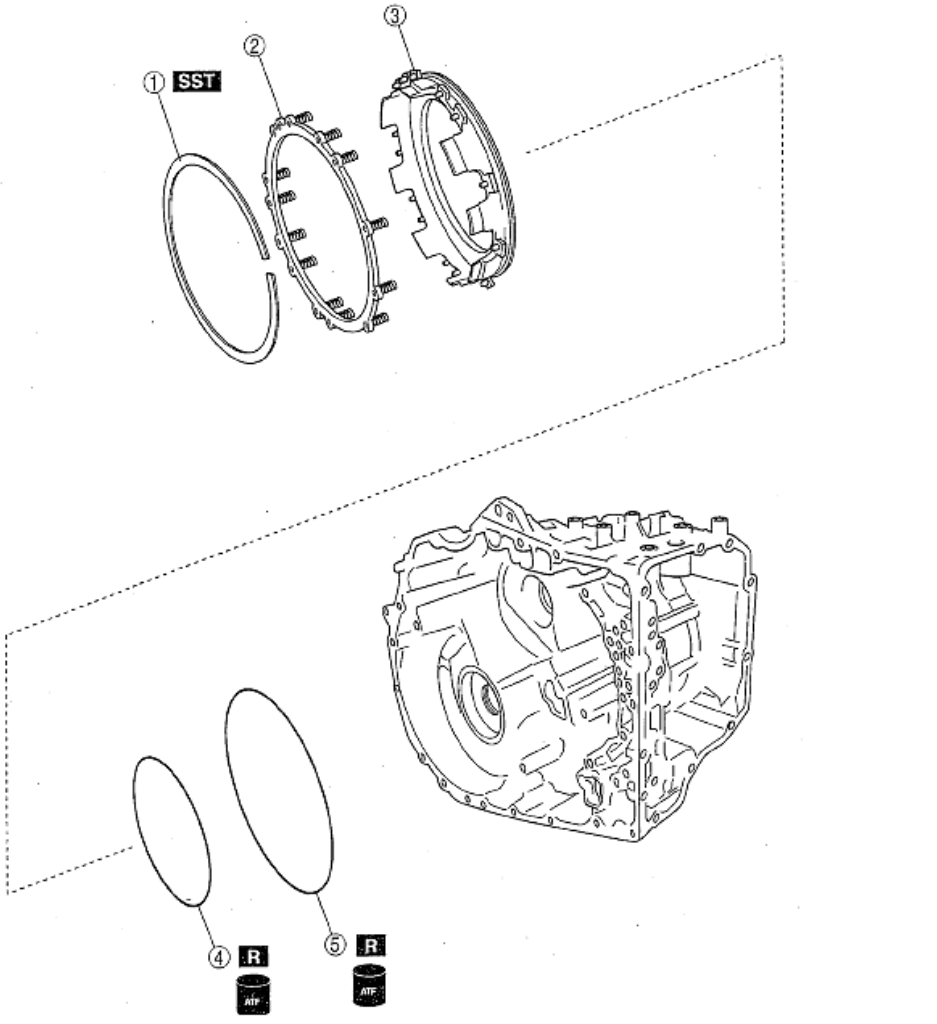
RETAINING PLATE SIZE

Identification mark	Thickness (mm {in})
1	2.5 {0.0984}
2	2.6 {0.102}
3	2.7 {0.106}
4	2.8 {0.110}

A	2.85 {0.112}
5	2.9 {0.114}
B	2.95 {0.116}
6	3.0 {0.118}
C	3.05 {0.120}
7	3.1 {0.122}
8	3.2 {0.126}

TRANSAXLE CASE AND B2 BRAKE DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in **Fig. 193**.
2. Assemble in the reverse order of disassembly.



1	Snap ring
2	Low and reverse brake return spring (See Low and Reverse Brake Return Spring Assembly Note.)
3	Low and reverse brake piston (See Low and Reverse Brake Piston Disassembly Note.) (See Low and Reverse Brake Piston Assembly Note.)
4	O-ring
5	O-ring

Fig. 193: Identifying Transaxle Case And B2 Brake Components
Courtesy of MAZDA MOTORS CORP.

Low and Reverse Brake Piston Disassembly Note

1. Using a flathead screwdriver, remove the snap ring from the transaxle case.

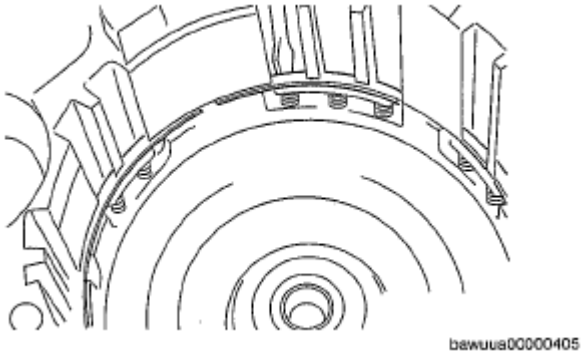


Fig. 194: Identifying Snap Ring Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

2. Remove the low and reverse brake return spring from the transaxle case.

CAUTION:
- **Do not damage the seal on the piston.**

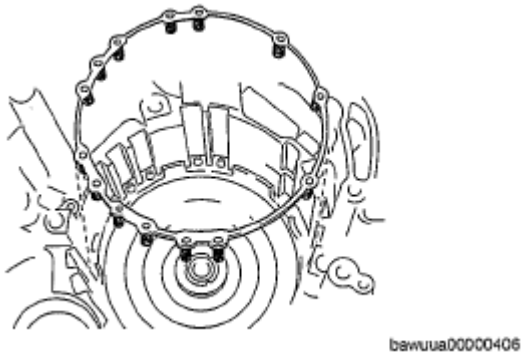


Fig. 195: Identifying Low And Reverse Brake Return Spring
Courtesy of MAZDA MOTORS CORP.

3. While pushing the low and reverse brake piston by hand, apply compressed air into the oil passage of the transaxle case as shown in the figure and remove the low and reverse brake piston.

Air pressure

392 kPa {4.0 kgf/cm^2 , 57 psi}

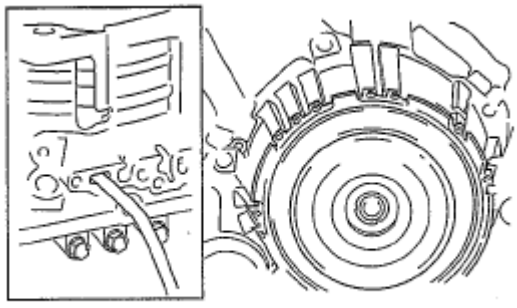


Fig. 196: Applying Compressed Air Into Oil Passage Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

4. Remove the O-rings from the low and reverse brake piston.

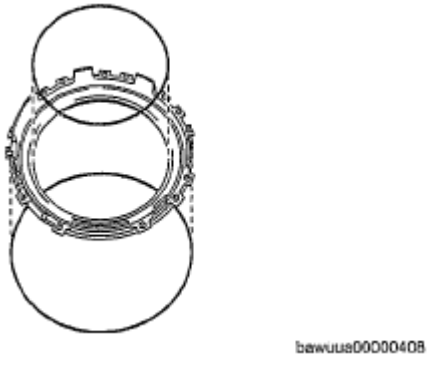


Fig. 197: Identifying O-Rings Of Low And Reverse Brake Piston
Courtesy of MAZDA MOTORS CORP.

Low and Reverse Brake Piston Assembly Note

1. Apply ATF to the new O-rings.
2. Install the O-ring to the low and reverse brake piston.
3. Apply ATF to the sliding surface of the transaxle case.

CAUTION:
- **Do not damage the seal on the piston and O-ring.**

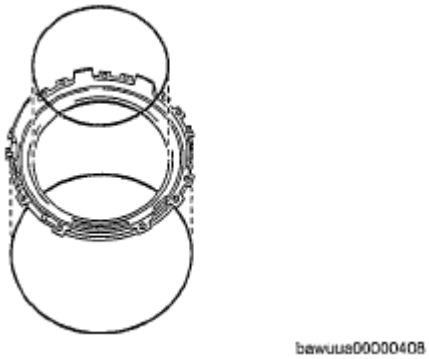


Fig. 198: Identifying O-Rings Of Low And Reverse Brake Piston
Courtesy of MAZDA MOTORS CORP.

4. Install the low and reverse brake piston to the transaxle case.

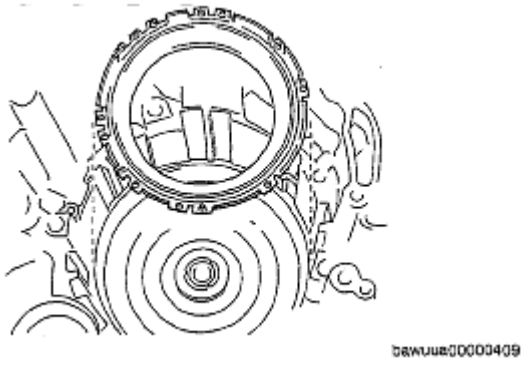


Fig. 199: Identifying Low And Reverse Brake Piston Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

Low and Reverse Brake Return Spring Assembly Note

1. Install the low and reverse brake return spring to the transaxle case.

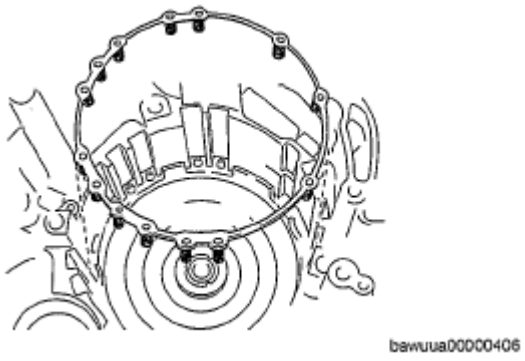


Fig. 200: Identifying Low And Reverse Brake Return Spring
Courtesy of MAZDA MOTORS CORP.

2. Using the **SST** , press the return spring into the position where the snap ring groove is visible.

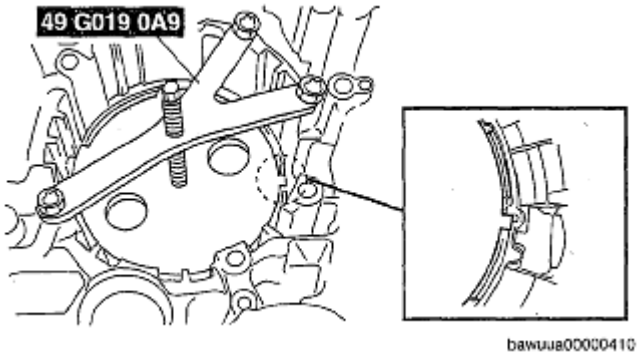


Fig. 201: Pressing Return Spring Into Position
Courtesy of MAZDA MOTORS CORP.

3. Using a flathead screwdriver, install the snap ring in the groove.

CAUTION:
- **When installing the snap ring, set the end gap of the snap ring as shown in the figure.**

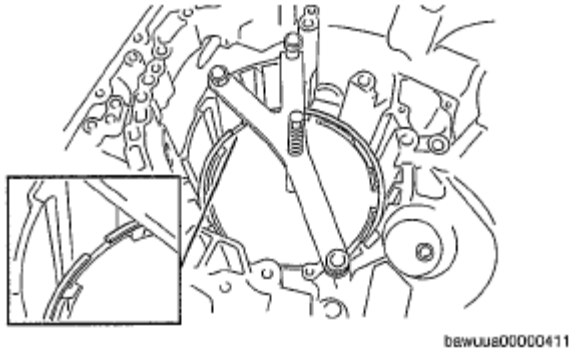


Fig. 202: Installing Snap Ring In Groove
Courtesy of MAZDA MOTORS CORP.

TRANSAXLE CASE AND B2 BRAKE INSPECTION

NOTE:
- **Measure at different places and take an average.**

1. Using a dial indicator, inspect the transaxle case bushing.

   Transaxle case bushing inner diameter

   Standard: 21.932 - 21.953 mm {0.86347 - 0.86429 in}

   - If it exceeds the specification, replace the transaxle case with a new one.

- When the transaxle case is replaced, inspect the contact surface of the intermediate shaft bushing.

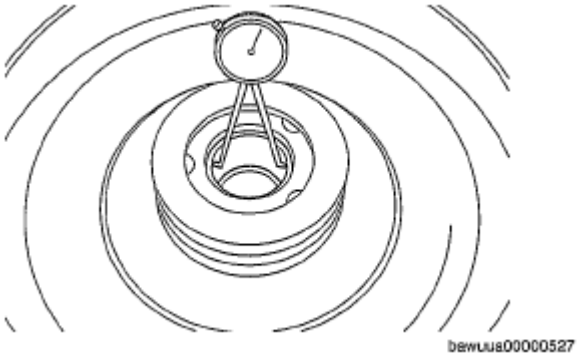


Fig. 203: Inspecting Transaxle Case Bushing
Courtesy of MAZDA MOTORS CORP.

- If the surface is scratched or has changed color, replace the intermediate shaft with a new one.

2. Inspect the lining of all drive plates.
   - If the lining is flaking or has changed color, or if it is worn or the print mark is wearing away, replace with a new drive plate. When replacing, inspect the contact surfaces between the retaining plate, driven plate and drive plate. If they are scratched or have changed color, replace with new parts.

NOTE:
- **Before replacing with new drive plates, soak them at least 2 h in ATF.**

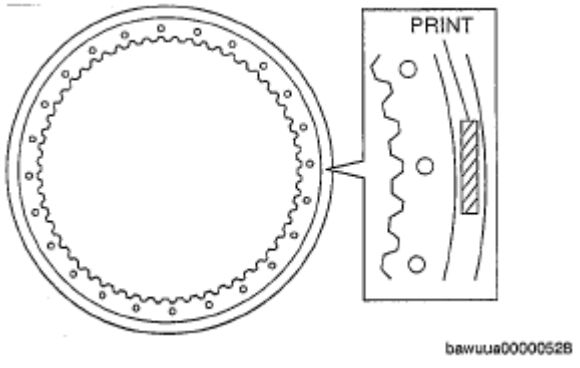


Fig. 204: Inspecting Lining Of All Drive Plates
Courtesy of MAZDA MOTORS CORP.

3. Using vernier calipers, measure the free length of the piston return spring.

   B2 brake return spring free length

   Standard: 19.01 mm {0.7485 in}

   - If it is less than the specification, replace the piston return spring with a new one.

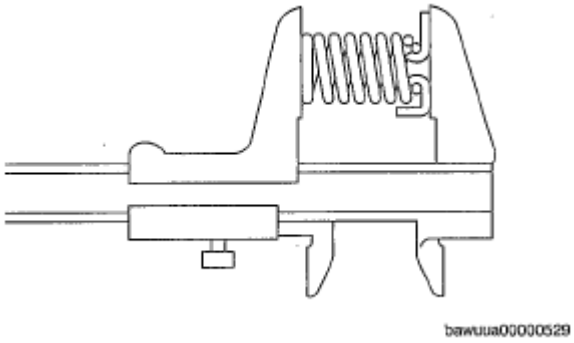
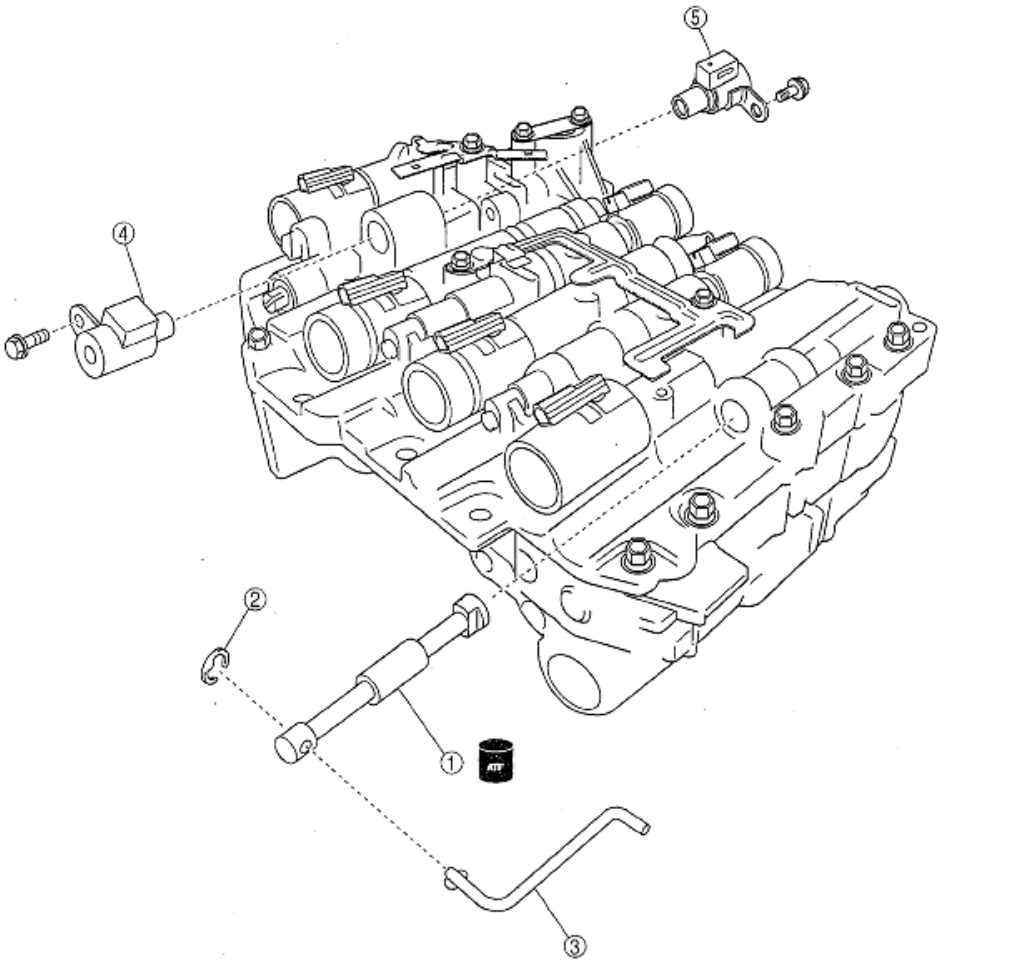


Fig. 205: Measuring Free Length Of Piston Return Spring
Courtesy of MAZDA MOTORS CORP.

CONTROL VALVE BODY DISASSEMBLY/ASSEMBLY

Components



1	Manual valve
2	E-ring
3	Manual valve connecting rod

4	Shift solenoid A
5	Shift solenoid B

Fig. 206: Identifying Control Valve Body Components
Courtesy of MAZDA MOTORS CORP.

Disassembly Procedure

CAUTION:
- **Do not pull the manual valve strongly.**

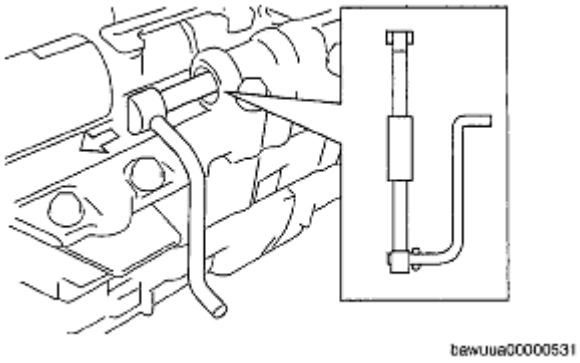


Fig. 207: Identifying Manual Valve Of Control Valve Body
Courtesy of MAZDA MOTORS CORP.

1. Remove the manual valve from the control valve body.
2. Using a flathead screwdriver, remove the E-ring.
3. Remove the manual valve connecting rod from the manual valve.

CAUTION:
- **Do not damage the solenoid.**

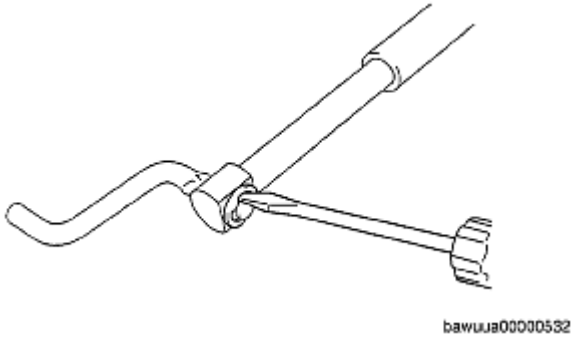


Fig. 208: Removing E-Ring
Courtesy of MAZDA MOTORS CORP.

4. Remove the solenoids from the control valve body.

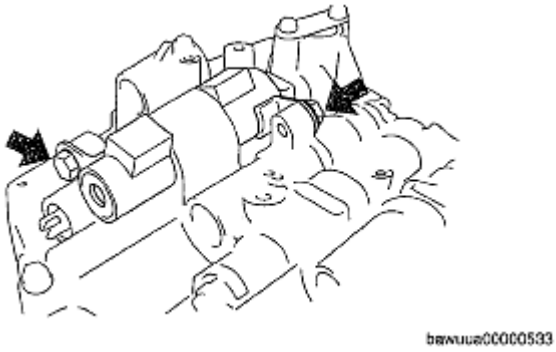


Fig. 209: Locating Solenoids Bolts
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

CAUTION:
- **Do not damage the solenoid.**

1. Install the solenoids to the front control valve body.

   Tightening torque

   8.0-12.0 N.m {81.6-122.3 kgf.cm, 70.9 - 106.1 in.lbf}

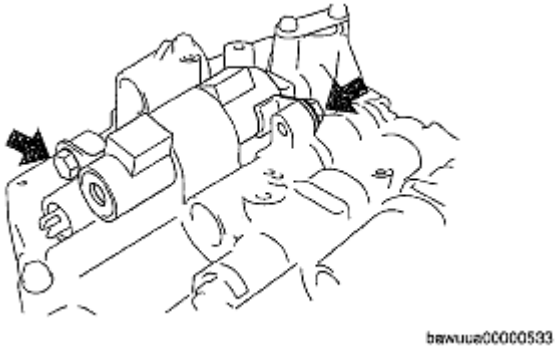


Fig. 210: Locating Solenoids Bolts
Courtesy of MAZDA MOTORS CORP.

2. Install the manual valve connecting rod to the manual valve.
3. Install the E-ring.
4. Apply ATF to the manual valve.

CAUTION:
- **Do not damage the manual valve.**

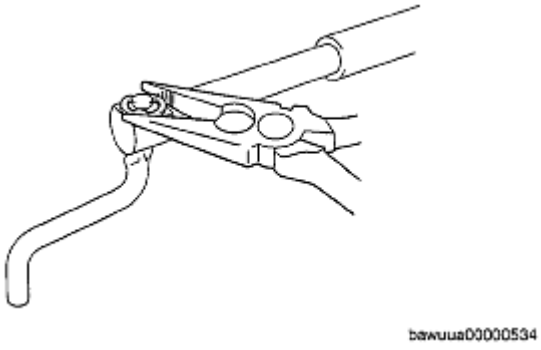


Fig. 211: Installing E-Ring
Courtesy of MAZDA MOTORS CORP.

5. Install the manual valve to the control valve body.

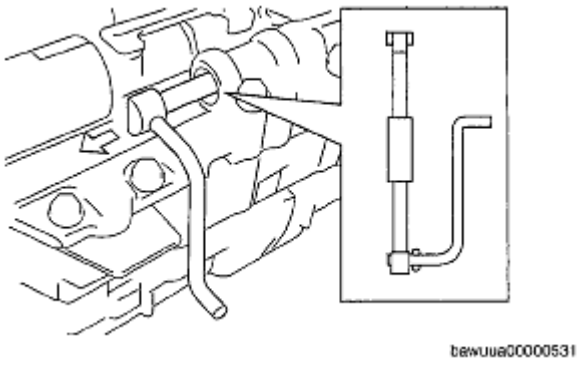


Fig. 212: Identifying Manual Valve Of Control Valve Body
Courtesy of MAZDA MOTORS CORP.

AUTOMATIC TRANSAXLE ASSEMBLY

Assembly

Bearing and race locations

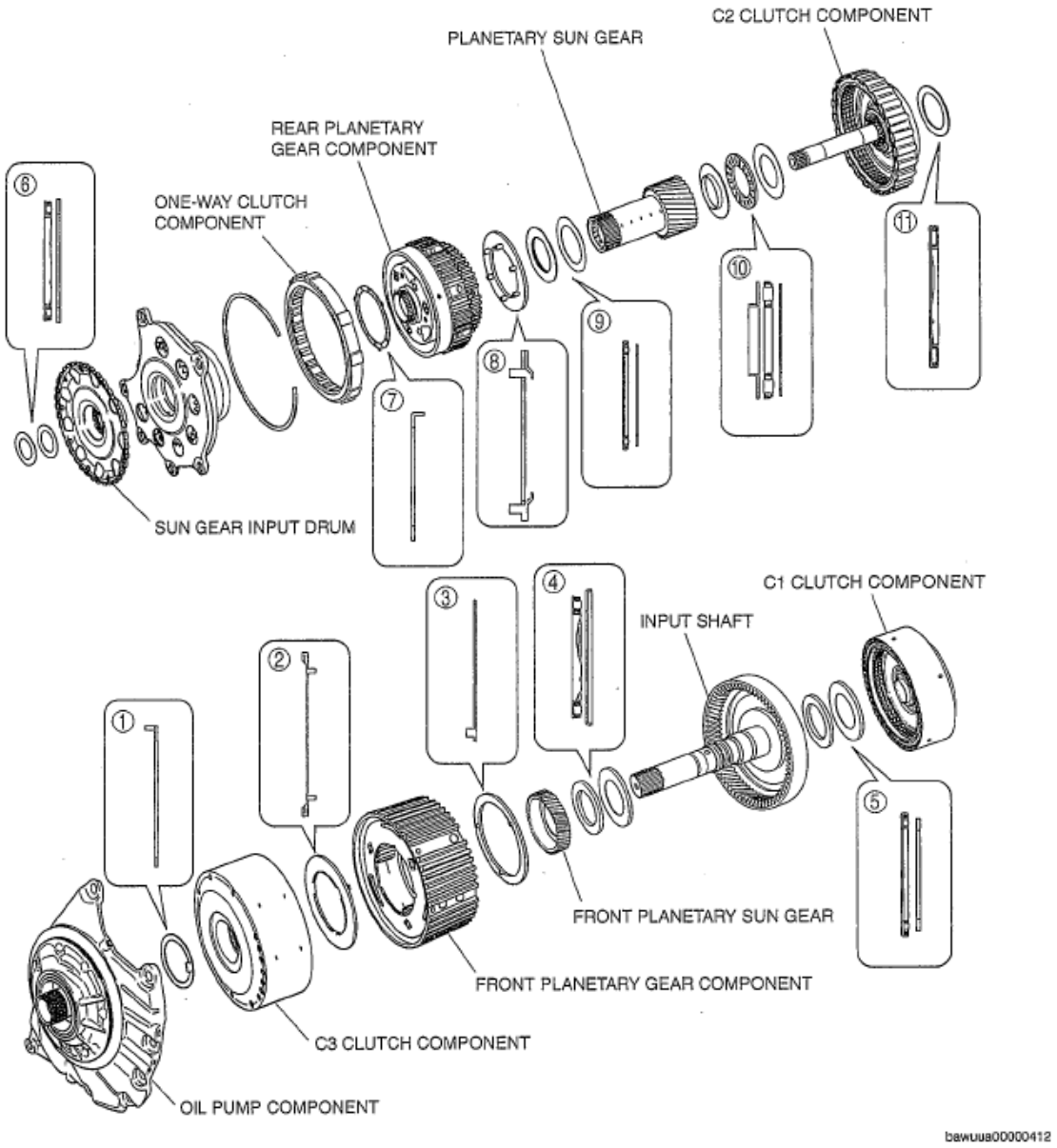


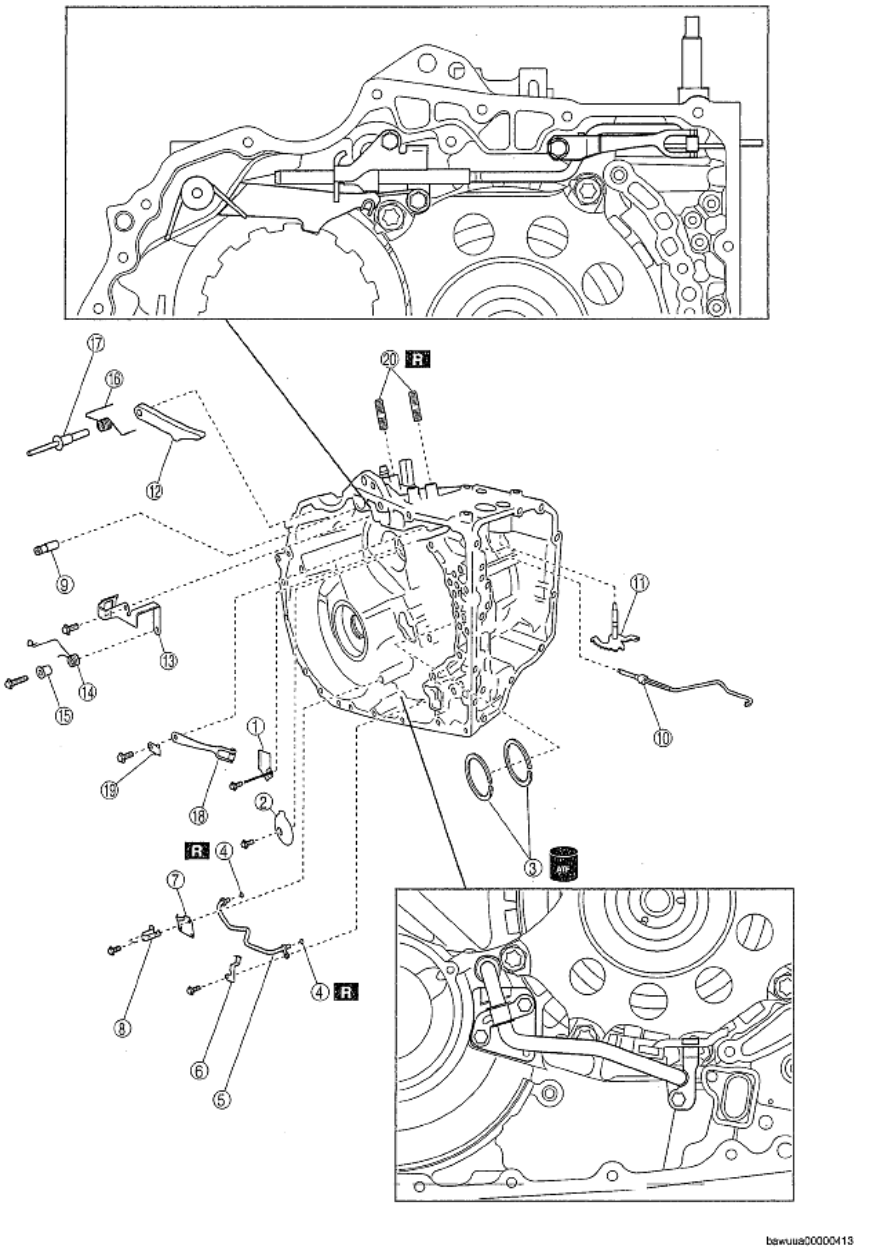
Fig. 213: Identifying Automatic Transaxle Assembly - Bearing And Race Locations
Courtesy of MAZDA MOTORS CORP.

BEARING AND RACE SPECIFICATIONS

		1	2	3	4	5	6	7	8	9	10	11
Thrust washer (mm {in})	Outer	64.0 {2.52}	101.0 {3.98}	85.0 {3.35}	-	-	-	79.8 {3.14}	104.2 {4.10}	-	-	-
	Inner	51.0 {2.01}	75.3 {2.96}	72.7 {2.86}	-	-	-	68.3 {2.69}	69.0 {2.72}	-	-	-
Bearing race (front)	Outer	-	-	-	-	-	-	-	-	-	43.7 {1.72}	-
											25.6	

(mm {in})	Inner	-	-	-	-	-	-	-	-	-	{1.01}	-
Bearing (mm {in})	Outer	-	-	-	61.3 {2.41}	52.6 {2.07}	45.6 {1.80}	-	-	48.7 {1.92}	43.8 {1.72}	75.0 {2.95}
	Inner	-	-	-	43.7 {1.72}	39.2 {1.54}	33.2 {1.31}	-	-	35.0 {1.38}	24.25 {0.9547}	50.5 {1.99}
Bearing race (rear) (mm {in})	Outer	-	-	-	68.8 {2.71}	48.5 {1.91}	47.0 {1.85}	-	-	45.6 {1.80}	41.7 {1.64}	-
	Inner	-	-	-	46.9 {1.85}	38.1 {1.50}	35.2 {1.39}	-	-	33.2 {1.31}	24.2 {0.953}	-

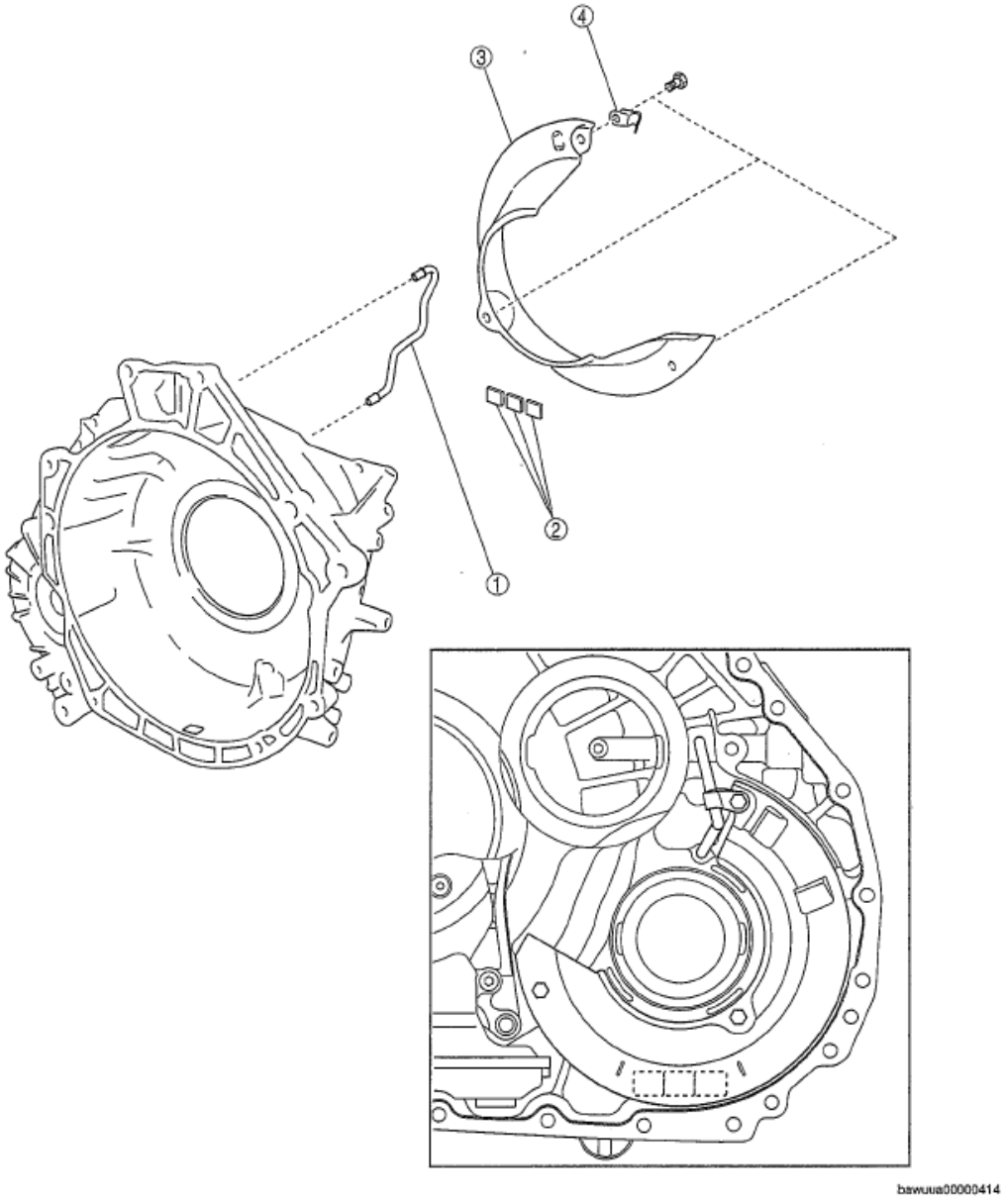
Components



1	Transaxle case plate No.3
2	Transaxle case plate No.2
3	Seal ring
4	O-ring
5	Oil cooler outlet tube
6	Wiring harness clip
7	Transaxle case No.1 plate
8	Pipe clamp
9	Parking pin
10	Parking rod

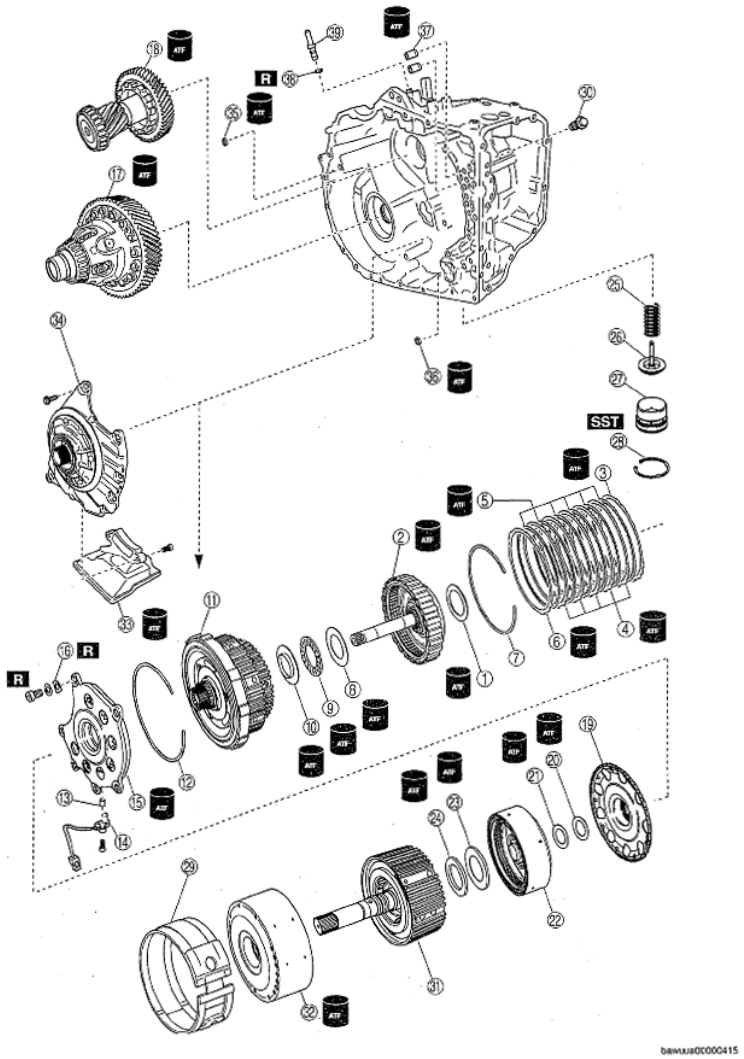
11	Manual valve lever
12	Parking pawl
13	Parking pawl bracket
14	Torsion spring
15	Spring guide sleeve
16	Pawl return spring
17	Parking pawl shaft
18	Detent spring
19	Detent spring cover
20	Stud bolt

Fig. 214: Identifying Automatic Transaxle Assembly - Components (1 Of 4)
Courtesy of MAZDA MOTORS CORP.



1	Oil pipe	3	Oil reservoir lock plate
2	Magnet	4	Tube clamp

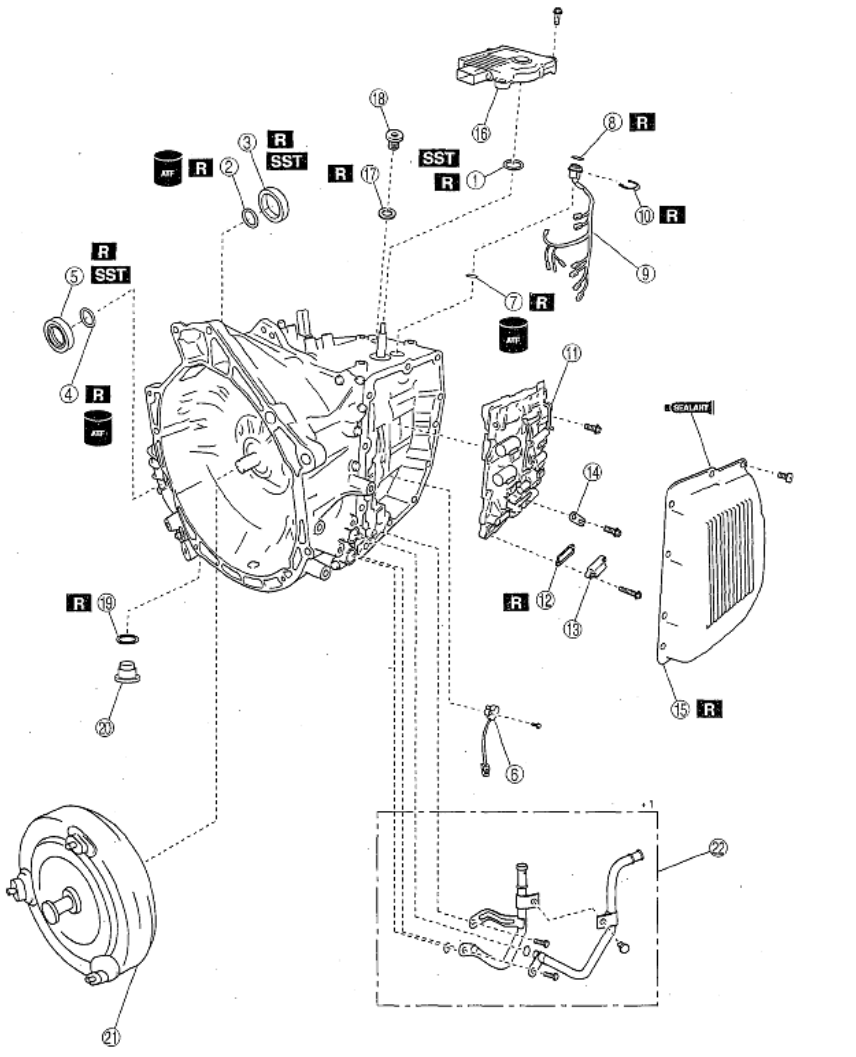
Fig. 215: Identifying Automatic Transaxle Assembly - Components (2 Of 4)
Courtesy of MAZDA MOTORS CORP.



1	Thrust bearing
2	C2 clutch component
3	Retaining plate
4	Driven plate
5	Drive plate
6	Retaining plate
7	Snap ring
8	Bearing race
9	Thrust bearing
10	Bearing race
11	Rear planetary gear component and one-way clutch component
12	Snap Ring
13	Spacer
14	Vehicle speed sensor (VSS)
15	Counter drive gear
16	Lock washer
17	Differential component
18	Counter gear component
19	Sun gear input drum
20	Bearing race
21	Thrust bearing

22	C1 clutch component
23	Bearing race
24	Thrust bearing
25	Piston return spring
26	B1 brake piston
27	Brake piston cover
28	Snap ring
29	B1 brake band
30	Brake band anchor bolt
31	Front planetary gear component and input shaft
32	C3 clutch component
33	Oil strainer
34	Oil Pump component
35	Gasket
36	Gasket
37	Transaxle case gasket
38	O-ring
39	Breather pipe

Fig. 216: Identifying Automatic Transaxle Assembly - Components (3 Of 4)
Courtesy of MAZDA MOTORS CORP.



1	Oil seal (manual shaft)
2	O-ring (transaxle case side)
3	Oil seal (transaxle case side)
4	O-ring (converter housing side) (2WD)
5	Oil seal (converter housing side)
6	Input/turbine speed sensor
7	Gasket
8	O-ring
9	Coupler component
10	Coupler component lock plate
11	Control valve body component
12	Gasket
13	Suction cover
14	Lock plate
15	Control valve body cover
16	TCM
17	O-ring
18	Filler plug

19	Gasket
20	Drain plug
21	Torque converter
22	Oil pipe and O-ring

Fig. 217: Identifying Automatic Transaxle Assembly - Components (4 Of 4)
Courtesy of MAZDA MOTORS CORP.

Assembly Procedure

CAUTION:
- **Do not damage the oil seal.**

1. Using the **SST** and a hammer, install a new oil seal to the transaxle case.

   Substitution SST

   - **49 F026 102**

     Outer diameter: 27 mm {1.07 in} or more

     Inner diameter: 15-18 mm {0.60-0.70 in}

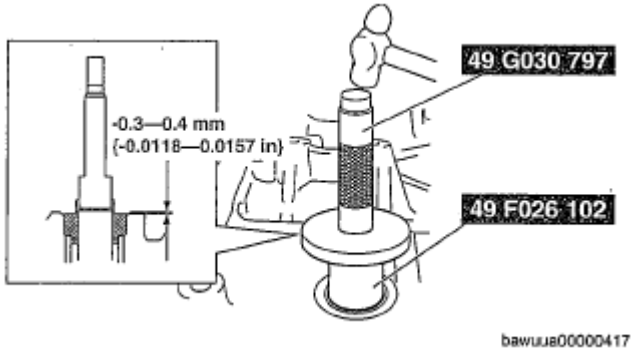


Fig. 218: Installing Oil Seal To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

2. Apply ATF to the new seal rings and sliding surface of the transaxle case.
3. Compress the seal rings as shown in the figure. Then install the seal rings in the transaxle case.

CAUTION:
- **Do not expand the seal rings too much.**
- **Be careful not to shorten the seal rings too much, when installing the seal rings.**

NOTE:
- **Inspect that seal rings rotate smoothly after installing them.**

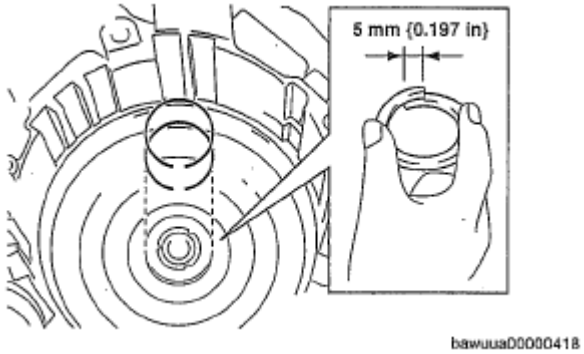


Fig. 219: Compressing Seal Rings
Courtesy of MAZDA MOTORS CORP.

4. Install the transaxle case plate No.3.

   Tightening torque

   3.9 - 6.9 N.m {40 - 70 kgf.cm, 26 - 60 in.lbf}

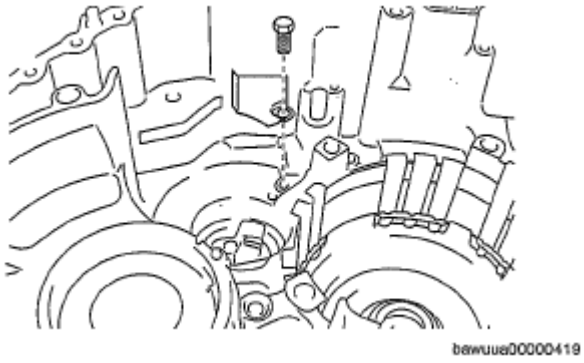


Fig. 220: Identifying Transaxle Case Plate No.3 Bolt
Courtesy of MAZDA MOTORS CORP.

5. Install the transaxle case plate No.2.

   Tightening torque

   3.9 - 6.9 N.m {40 - 70 kgf.cm, 26 - 60 in.lbf}

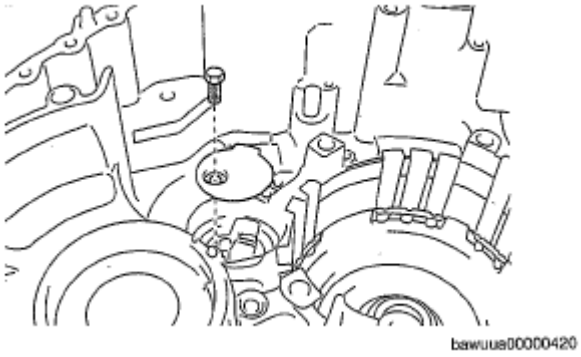


Fig. 221: Identifying Transaxle Case Plate No.2 Bolt
Courtesy of MAZDA MOTORS CORP.

6. Apply ATF or grease to the thrust bearing and install it to the C2 clutch component.
7. Apply ATF to the seal ring and rubbing surface of the C2 clutch component where the bushing is fit.

CAUTION:
- **Do not damage the seal ring.**

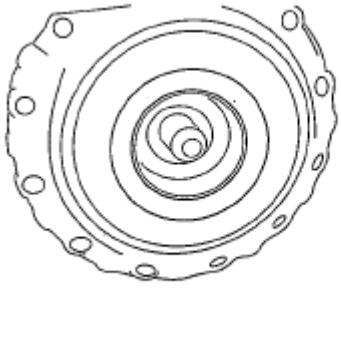


Fig. 222: Identifying Seal Ring And Rubbing Surface Of C2 Clutch Component
Courtesy of MAZDA MOTORS CORP.

8. Install the C2 clutch component to the transaxle case.

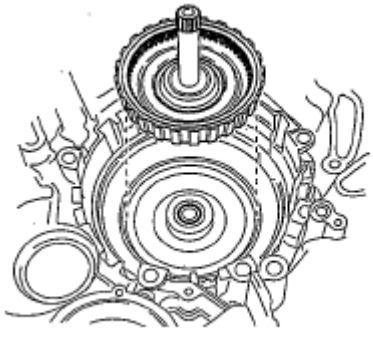


Fig. 223: Identifying C2 Clutch Component To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

9. Apply ATF to the driven plates, drive plates and retaining plates.

NOTE:
- **Replace with new drive plates after soaking them at least 2 h in ATF.**

10. Install driven plates, drive plates and the retaining plate in the following order to the transaxle case as shown in the figure.

Six drive plates type

- Retaining- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

Seven drive plates type

- Retaining- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

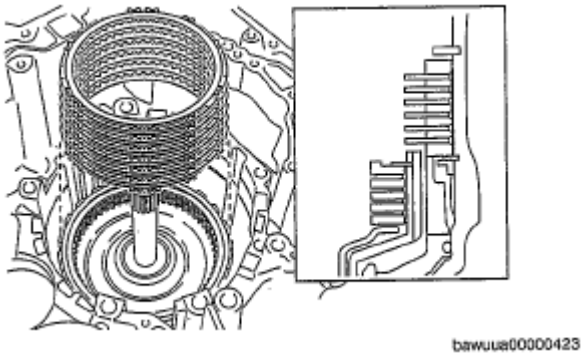


Fig. 224: Identifying Driven Plates, Drive Plates And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Inspect the number and order of the retaining plates, drive and driven plates.**

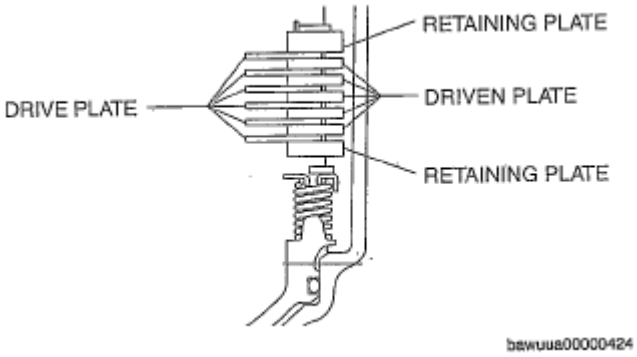


Fig. 225: Inspecting Number And Order Of Retaining Plates, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

11. Using a flathead screwdriver, install the snap ring in the groove.

CAUTION:
- **Align the opening of the snap ring with the position as shown in the figure.**

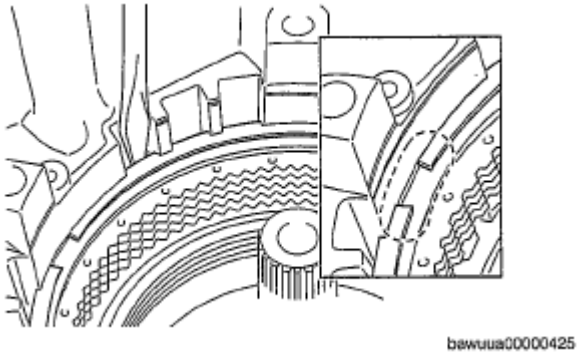


Fig. 226: Installing Snap Ring In Groove
Courtesy of MAZDA MOTORS CORP.

12. Apply ATF to the thrust bearing and the bearing races and install them to the transaxle case.

NOTE:
- **Align the spline of the C2 clutch drive plates and B2 brake drive plates before installing the rear planetary gear component.**

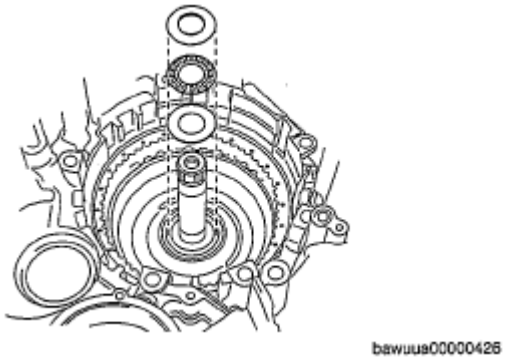


Fig. 227: Identifying Thrust Bearing And Bearing Races
Courtesy of MAZDA MOTORS CORP.

13. Apply ATF to each gear and the bushing, and then install the rear planetary gear component to the transaxle case.
14. Apply ATF to the sliding surface of the one-way clutch.

NOTE:

- **For easy installation, while turning the rear planetary gear component, install it.**

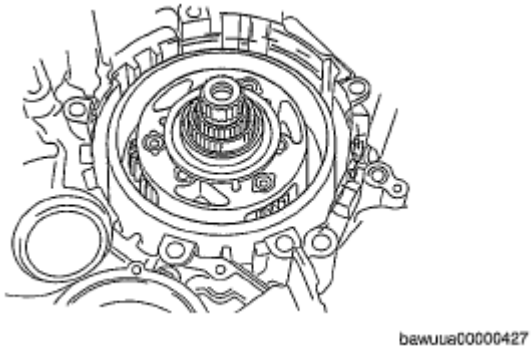


Fig. 228: Identifying Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

15. Install the one-way clutch to the transaxle case.

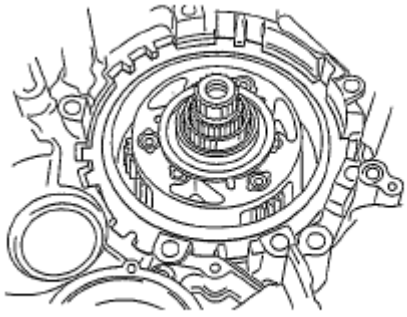


Fig. 229: Identifying One-Way Clutch Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

16. Using a flathead screwdriver, install the snap ring in the groove.

CAUTION:
- **Align the opening of the snap ring with the position shown in the figure.**

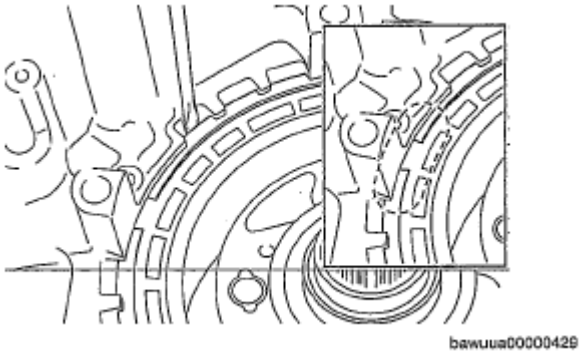


Fig. 230: Installing Snap Ring In Groove
Courtesy of MAZDA MOTORS CORP.

17. While holding the one-way clutch component, inspect that the planetary gear turns to right (clockwise) but does not turn to left (counterclockwise).

CAUTION:
- **Do not damage the VSS.**

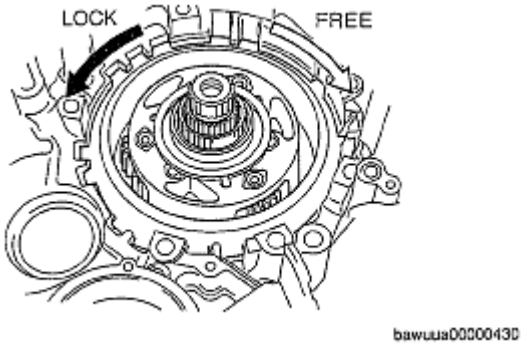


Fig. 231: Inspecting Planetary Gear
Courtesy of MAZDA MOTORS CORP.

18. Install the VSS and spacer to the counter drive gear.

    Tightening torque 3.9 - 6.9 N.m {40 - 70 kgf.cm, 26 - 60 in.lbf}

19. Apply ATF to the spline on the counter drive gear and spline on the ring gear.

    CAUTION:
    - **Do not damage the VSS wiring harness.**
    - **Do not pull hard on the VSS wiring harness.**

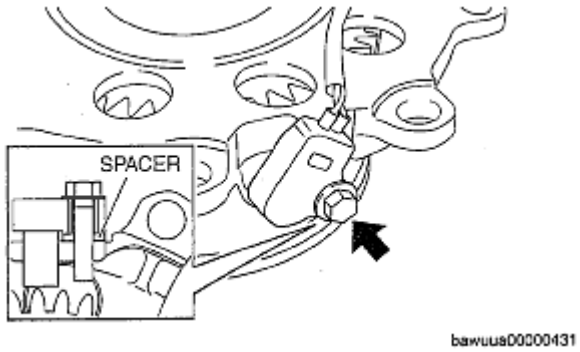


Fig. 232: Identifying VSS And Spacer Of Counter Drive Gear
Courtesy of MAZDA MOTORS CORP.

20. Install the counter drive gear to the transaxle case.

    NOTE:
    - **Verify that the claws of the lockwashers are facing upward.**

21. Install the new lockwashers and washers with new bolts.

    Tightening torque 82.7 - 93.6 N.m {8.5 - 9.5 kgf.cm, 61.0 - 69.0 ft.lbf}

    Bolt length (measured from below the head)

A. **A: 28 mm {1.102 in}**
B. **B: 35 mm {1.378 in}**

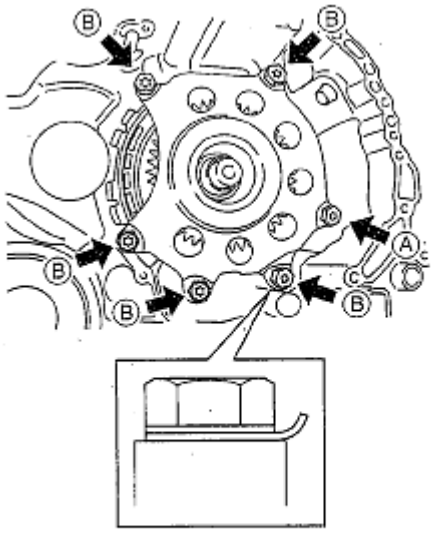


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Fig. 233: Identifying Bolts Of Lockwashers And Washers
Courtesy of MAZDA MOTORS CORP.

22. Using a flathead screwdriver and a hammer, pry back the crimp locking the lockwashers.

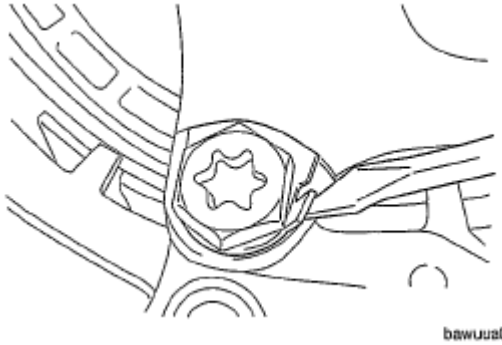

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Fig. 234: Prying Back The Crimp Locking The Lockwashers
Courtesy of MAZDA MOTORS CORP.

23. Apply ATF to the new O-rings.
24. Install the O-rings to the oil cooler outtlet tube.
25. Install the oil cooler outlet tube, pipe clamp, transaxle case No. 1 plate and the wiring harness clip to the converter housing.

CAUTION:

- **Do not damage the VSS wiring harness.**
- **Do not pull hard on the VSS wiring harness.**

Tightening torque 7.8 - 11.8 N.m {82 - 122 kgf.cm, 72 - 105 in.lbf}

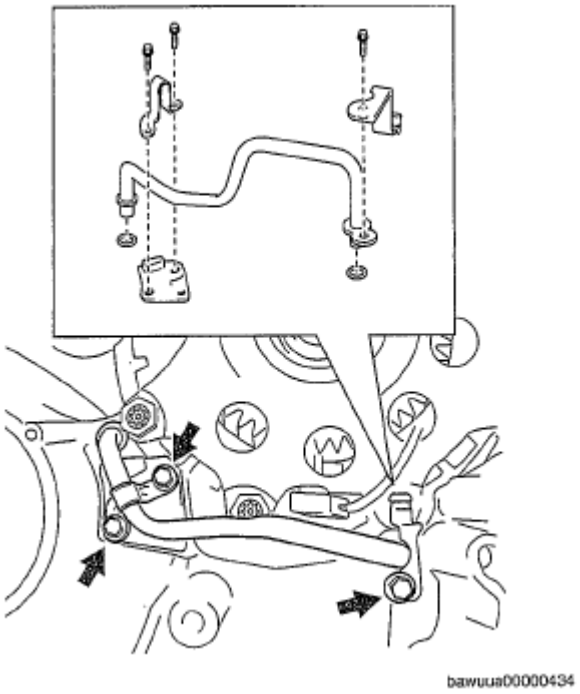

Fig. 235: Identifying Oil Cooler Outlet Tube, Pipe Clamp, Transaxle Case No. 1 Plate And Wiring Harness Clip
Courtesy of MAZDA MOTORS CORP.

26. Connect the VSS wiring harness to the wiring harness clip.

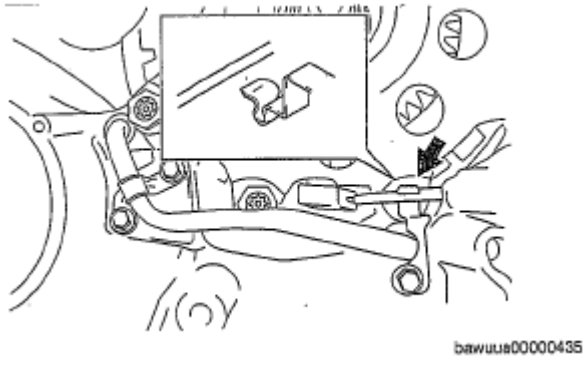

Fig. 236: Identifying Wiring Harness Clip
Courtesy of MAZDA MOTORS CORP.

27. Apply ATF to the bearing and gear of the differential component.

28. Install the differential component to the transaxle case.

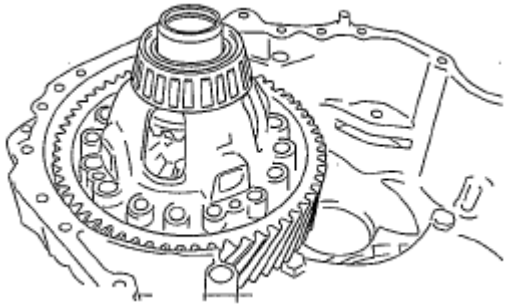

Fig. 237: Identifying Differential Component Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

29. Apply ATF to the bearing and gear of the counter gear component.
30. Install the counter gear component to the transaxle case.

NOTE:

- **If it is difficult to install the counter driven gear, remove the differential component and then install the counter driven gear. Install the differential component again.**
- **For easy installation, tilt the counter gear slightly.**

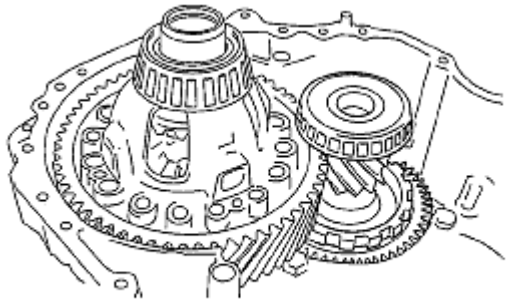

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Fig. 238: Identifying Counter Gear Component Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

31. Install the parking pin to the transaxle case.

CAUTION:

- **Verify to install the parking pin as shown in the figure.**

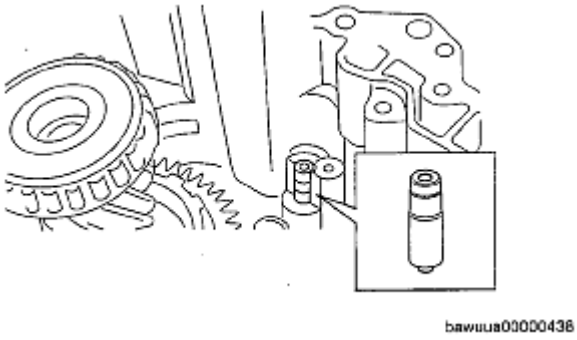


Fig. 239: Identifying Parking Pin Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

32. Insert the parking rod to the transaxle case.

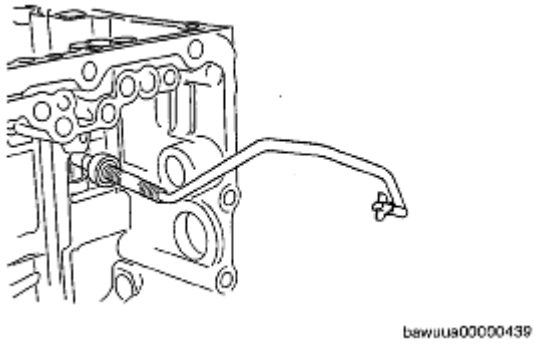


Fig. 240: Inserting Parking Rod To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

33. Install the manual valve lever to the transaxle case.

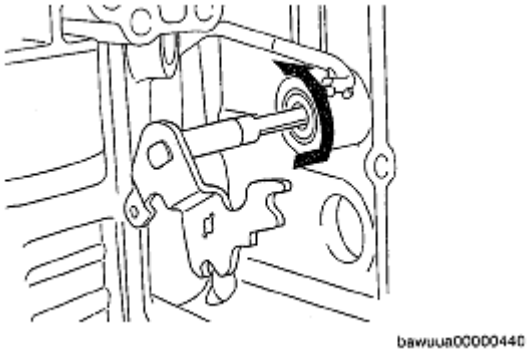


Fig. 241: Installing Manual Valve Lever To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

34. Connect the parking rod to the manual valve lever.

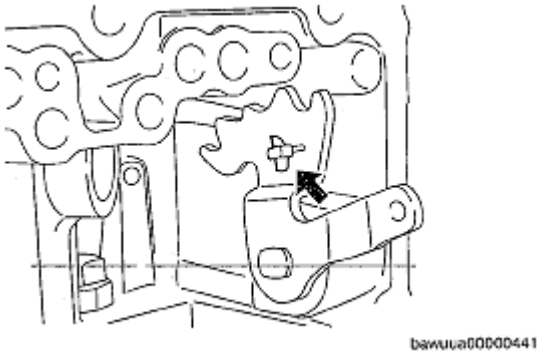


Fig. 242: Locating Parking Rod Of Manual Valve Lever
Courtesy of MAZDA MOTORS CORP.

35. Install the parking pawl, parking pawl bracket and the parking rod to the transaxle case.

CAUTION:
- **Do not apply too much force to the torsion spring.**

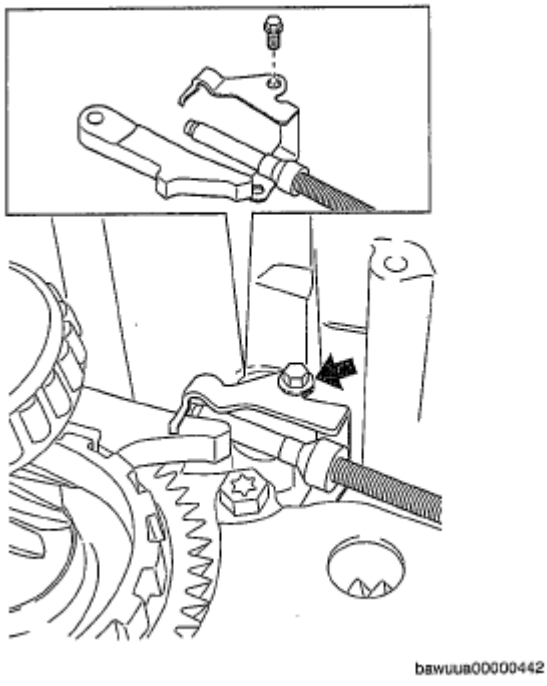


Fig. 243: Identifying Parking Pawl, Parking Pawl Bracket And Parking Rod
Courtesy of MAZDA MOTORS CORP.

Tightening torque 7.8 - 11.8 N.m {82 - 122 kgf.cm, 72 - 105 in.lbf}

36. Install the spring guide sleeve and the torsion spring.

Tightening torque 7.8 - 11.8 N.m {82 - 122 kgf.cm, 72 - 105 in.lbf}

NOTE:

- **Install the torsion spring to the position of the parking lock pawl and parking lock pawl bracket shown in the figure together with the spring guide sleeve and torsion spring installed.**

CAUTION:

- **Do not apply too much force to the pawl return spring.**

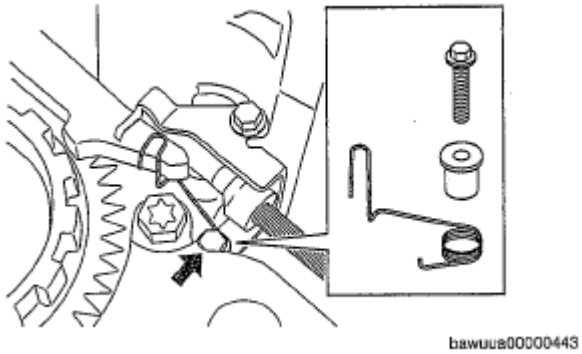


Fig. 244: Identifying Spring Guide Sleeve And Torsion Spring
Courtesy of MAZDA MOTORS CORP.

37. Install the pawl return spring to the parking pawl shaft.
38. Install the pawl return spring and the parking pawl shaft to the transaxle case.

CAUTION:

- **Do not apply too much force to the detent spring.**

NOTE:

- **When installing the pawl return spring to transaxle case, install the parking pawl side of the spring, then install the parking pawl shaft.**

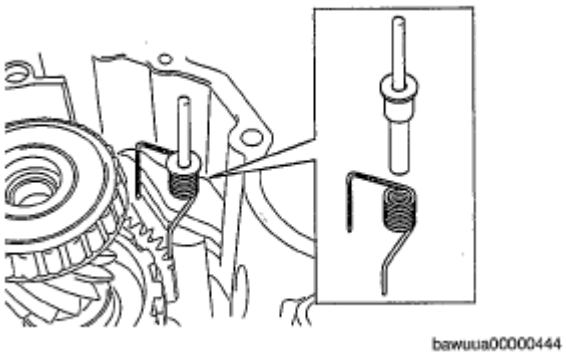


Fig. 245: Identifying Pawl Return Spring And Parking Pawl Shaft
Courtesy of MAZDA MOTORS CORP.

39. Install the detent spring cover and detent spring to the transaxle case.

Tightening torque 7.8 - 11.8 N.m {82 - 122 kgf.cm, 72 - 105 in.lbf}

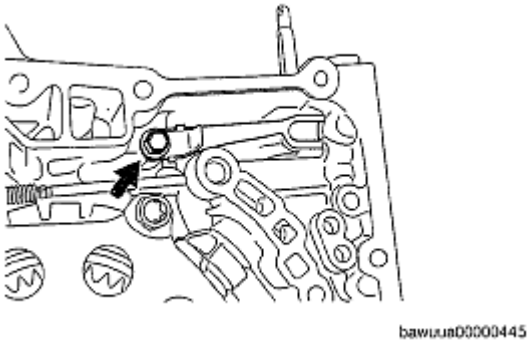


Fig. 246: Identifying Detent Spring Bolt
Courtesy of MAZDA MOTORS CORP.

NOTE:

- **When installing, ensure that the center of the detent spring's roller fits the center of the manual valve lever.**

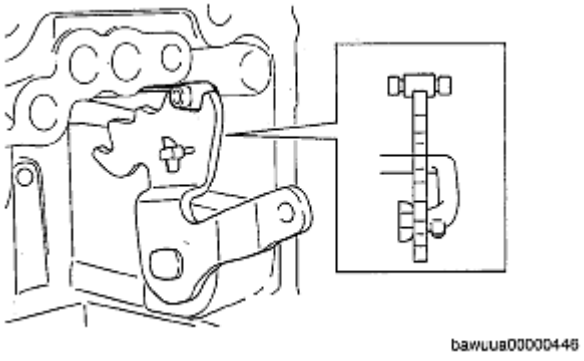


Fig. 247: Inspecting Center Of Detent Spring's Roller Fits Center Of Manual Valve Lever
Courtesy of MAZDA MOTORS CORP.

40. Install the sun gear input drum to the transaxle case.

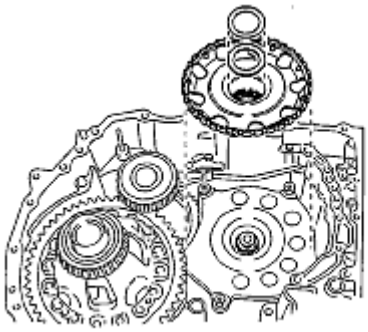


Fig. 248: Identifying Sun Gear Input Drum Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

41. Apply ATF to the bearing race and the thrust bearing, and then install them to the transaxle case.
42. Install the C1 clutch component to the transaxle case.

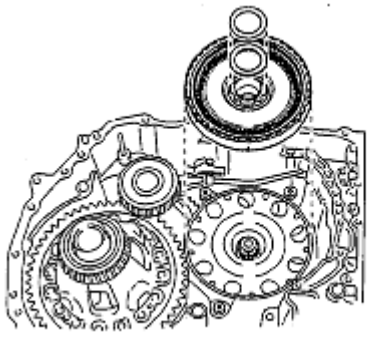


Fig. 249: Identifying C1 Clutch Component Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

43. Apply ATF to the bearing race and the thrust bearing, and then install them to the transaxle case.

CAUTION:
- **If the input shaft is not hold during installation, the thrust washer might be come off.**

NOTE:
- **Align the spline of the C1 clutch drive plates before installing the input shaft and front planetary gear.**
- **Hold the C1 clutch component and install the front planetary gear while holding the input shaft.**

44. Install the input shaft and the front planetary gear to the transaxle case.

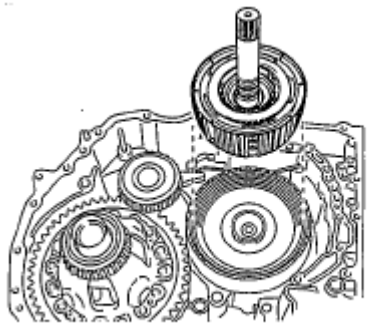


Fig. 250: Identifying Input Shaft And Front Planetary Gear
Courtesy of MAZDA MOTORS CORP.

45. Apply ATF to the bushing of the C3 clutch component.

NOTE:
- **Before installing the C3 clutch component, align the spline of the C3 clutch drive plates and the spline of the B1 brake drive plates.**

46. Install the C3 clutch component to the transaxle case.

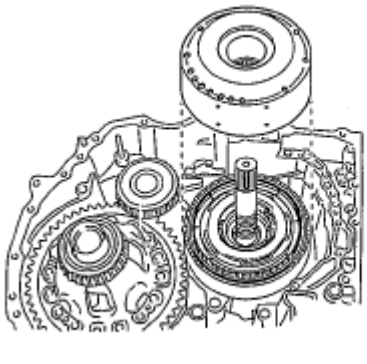


Fig. 251: Identifying C3 Clutch Component Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

NOTE:
- **Install the C3 clutch component so that it engages with the sun gear drum as shown in the figure.**

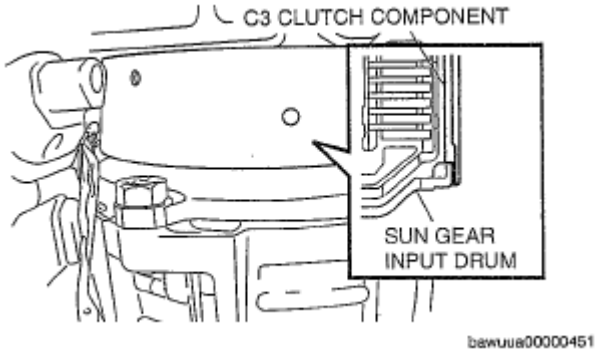


Fig. 252: Inspecting C3 Clutch Component
Courtesy of MAZDA MOTORS CORP.

47. Install the B1 brake band to the transaxle case.

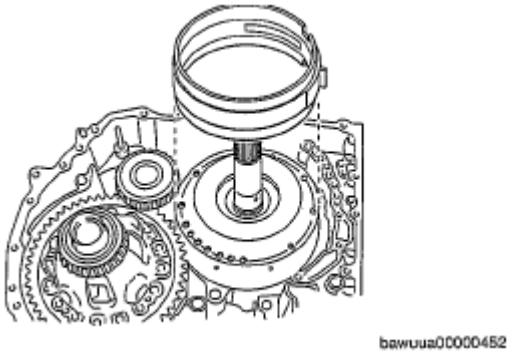


Fig. 253: Identifying B1 Brake Band Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

48. Install the brake band anchor bolt to the transaxle case.

Tightening torque 133.3 - 199.9 N.m {13.6 - 20.3 kgf.m, 98.3 - 147.4 ft.lbf}

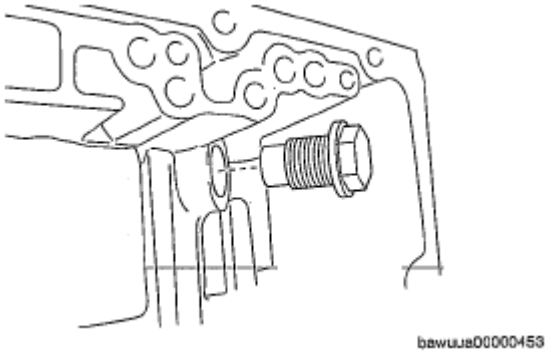


Fig. 254: Identifying Brake Band Anchor Bolt
Courtesy of MAZDA MOTORS CORP.

49. Install the piston return spring, B1 brake piston and the brake piston cover to the transaxle case.

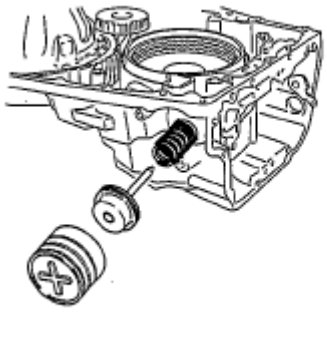


Fig. 255: Identifying Piston Return Spring, B1 Brake Piston And Brake Piston Cover
Courtesy of MAZDA MOTORS CORP.

50. Using the SST, press the brake piston cover into the position where the snap ring groove is visible.
51. Apply ATF to the oil seal.

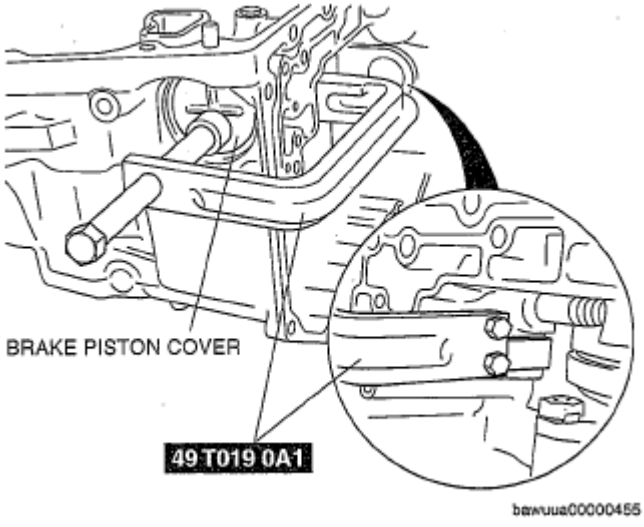


Fig. 256: Pressing Brake Piston Cover Into Position
Courtesy of MAZDA MOTORS CORP.

52. Install the oil strainer and the oil seal to the oil pump component.
53. Apply ATF to each rubbing surface of the oil pump component.

CAUTION:
- **Do not drop the thrust washer.**
- **Do not damage the oil seal.**

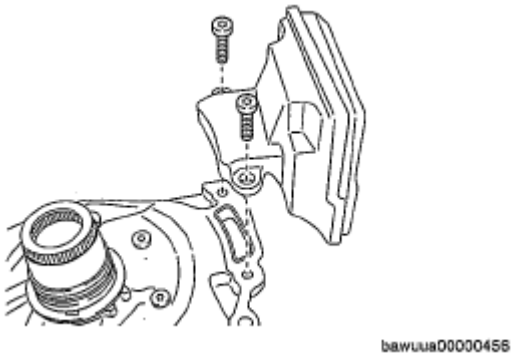


Fig. 257: Identifying Oil Strainer And Oil Seal
Courtesy of MAZDA MOTORS CORP.

54. Install the oil pump component to the transaxle case.

Tightening torque 19.6 - 29.4 N.m {2.0 - 2.9 kgf.m, 14.5 - 21.6 ft.lbf}

Bolt length (measured from below the head)

A. **A: 22 mm {0.866 in}**
B. **B: 35 mm {1.378 in}**

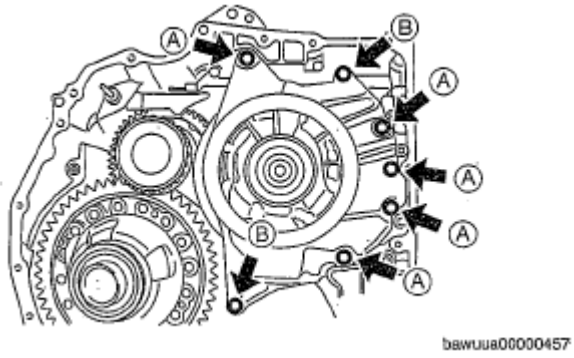


Fig. 258: Identifying Oil Pump Component Bolts
Courtesy of MAZDA MOTORS CORP.

55. Verify that the input shaft turns smoothly.

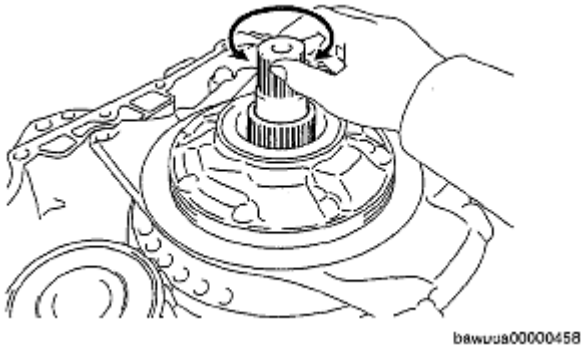


Fig. 259: Inspecting Input Shaft Turns Smoothly
Courtesy of MAZDA MOTORS CORP.

56. Using a dial indicator, measure the input shaft end play.

Input shaft end play 0.349 - 1.081 mm {0.01374 - 0.04255 in}

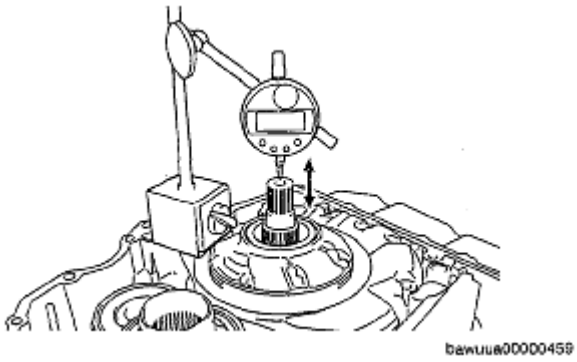


Fig. 260: Measuring Input Shaft End Play
Courtesy of MAZDA MOTORS CORP.

57. Put a mark on the piston rod at the point where it intersects with the case.

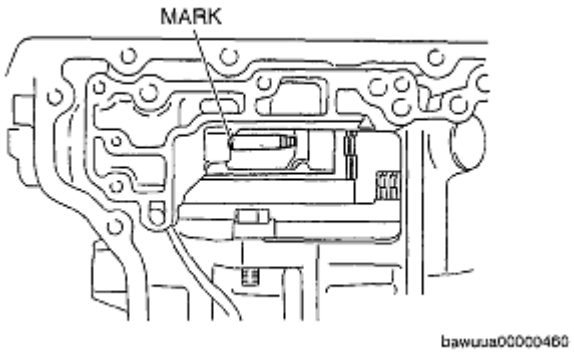


Fig. 261: Identifying Mark On Piston Rod
Courtesy of MAZDA MOTORS CORP.

58. Measure the stroke between the transaxle case and the mark on the piston rod when applying compressed air into the oil hole as shown in the figure.

Air pressure 400 kPa {4.1 kgf/cm^2 , 58 psi}

B1 brake piston stroke 5.50 - 6.00 mm {0.217 - 0.236 in}

- If not within the specification, select an appropriate piston rod.

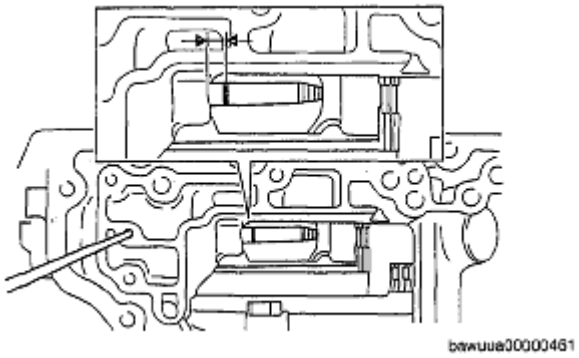


Fig. 262: Measuring Stroke Between Transaxle Case And Mark On Piston Rod
Courtesy of MAZDA MOTORS CORP.

PISTON ROD SIZE

Identification mark	Length (mm {in})
-	102.80 {4.0473}
1	103.05 {4.0571}
2	103.30 {4.0669}
3	103.55 {4.0768}
4	103.80 {4.0866}
5	104.05 {4.0965}
6	104.30 {4.1063}
7	104.55 {4.1161}
8	104.80 {4.1260}
9	105.05 {4.1358}
10	105.30 {4.1457}

CAUTION:
- **Do not damage the differential gear lube apply tube.**

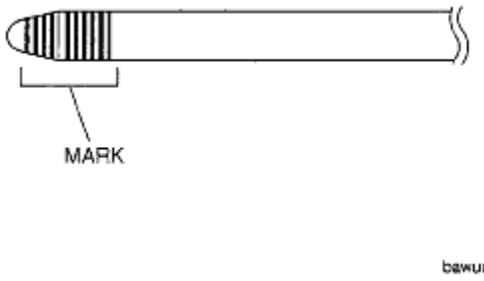


Fig. 263: Identifying Differential Gear Lube Apply Tube Mark
Courtesy of MAZDA MOTORS CORP.

59. Install the differential gear lube apply tube to the converter housing.

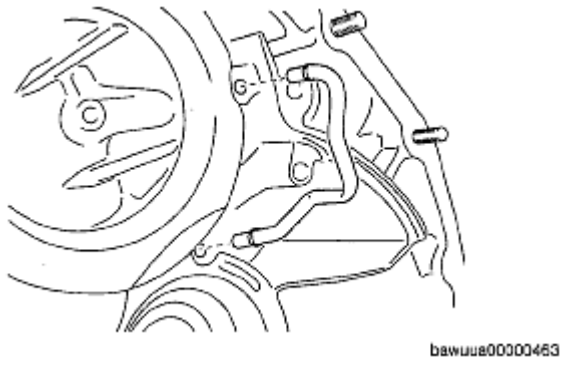


Fig. 264: Identifying Differential Gear Lube Apply Tube
Courtesy of MAZDA MOTORS CORP.

60. Install the magnets to the oil reservoir lock plate.

CAUTION:
- **Do not damage the oil reservoir lock plate.**

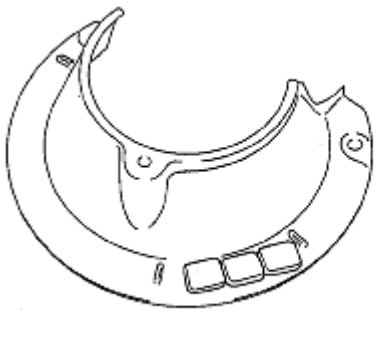


Fig. 265: Identifying Magnets Of Oil Reservoir Lock Plate
Courtesy of MAZDA MOTORS CORP.

61. Install the oil reservoir lock plate and the tube clamp to the converter housing.

    Tightening torque 3.9 - 6.9 N.m {40 - 70 kgf.cm, 26 - 60 in.lbf}

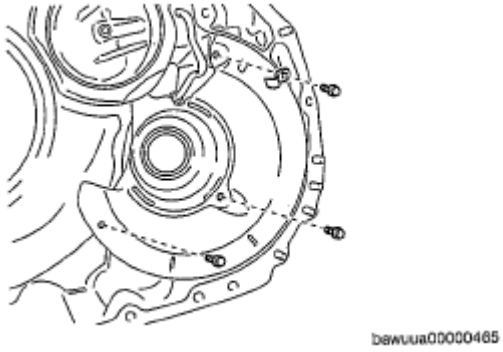


Fig. 266: Identifying Oil Reservoir Lock Plate And Tube Clamp Bolt
Courtesy of MAZDA MOTORS CORP.

62. Apply ATF to the new gaskets.
63. Install the gaskets to the transaxle case as shown in the figure.

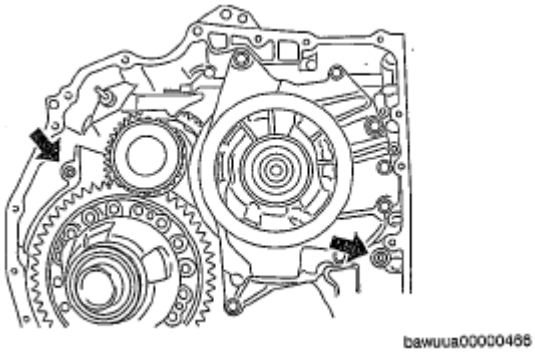


Fig. 267: Locating Gaskets Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

64. Apply ATF to the new transaxle case gaskets.
65. Install the transaxle case gaskets to the transaxle case as shown in the figure.

CAUTION:
- **Verify to install the transaxle case gasket as shown in the figure.**

66. Remove any packing material and be careful not to get oil on the contact surface of the transaxle case and the converter housing.
67. Clean the contact surface of the transaxle case and the converter housing and the bolt holes.

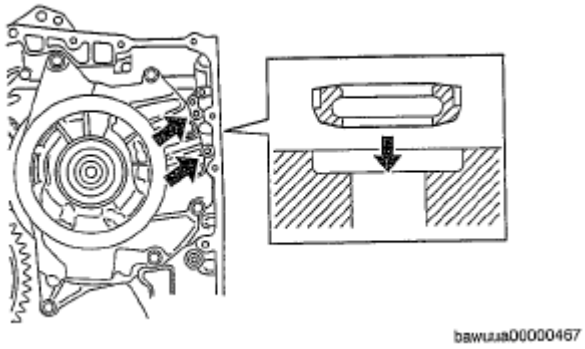


Fig. 268: Locating Transaxle Case Gaskets
Courtesy of MAZDA MOTORS CORP.

NOTE:
- **Completely remove sealant and oil with white gasoline or equivalent.**

68. Apply ATF to a O-ring of the oil pump.
69. Apply sealant to the converter housing as shown in the figure.

NOTE:
- **Spread sealant over the contact surface.**
- **Do not apply sealant to the transaxle case.**

CAUTION:
- **Do not damage the O-ring on the oil pump component.**
- **Do not damage the housing oil seal.**

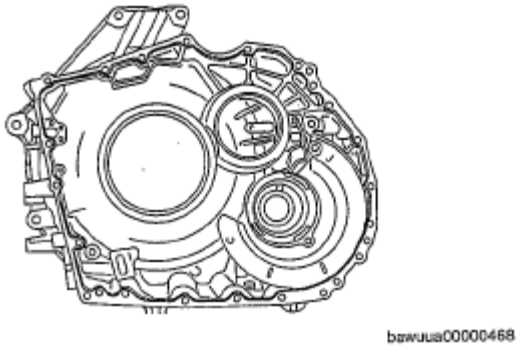


Fig. 269: Identifying Sealant On Converter Housing
Courtesy of MAZDA MOTORS CORP.

70. Install the converter housing to the transaxle case.

NOTE:
- **Tap all around the contact surface with a plastic hammer during installation.**

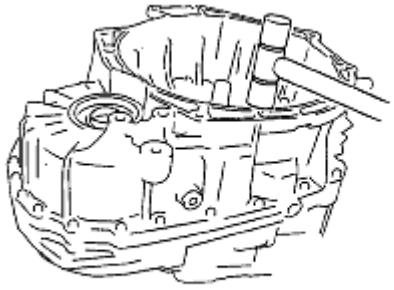


Fig. 270: Installing Converter Housing To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

71. Temporarily tighten the bolts by hand as shown in the figure.

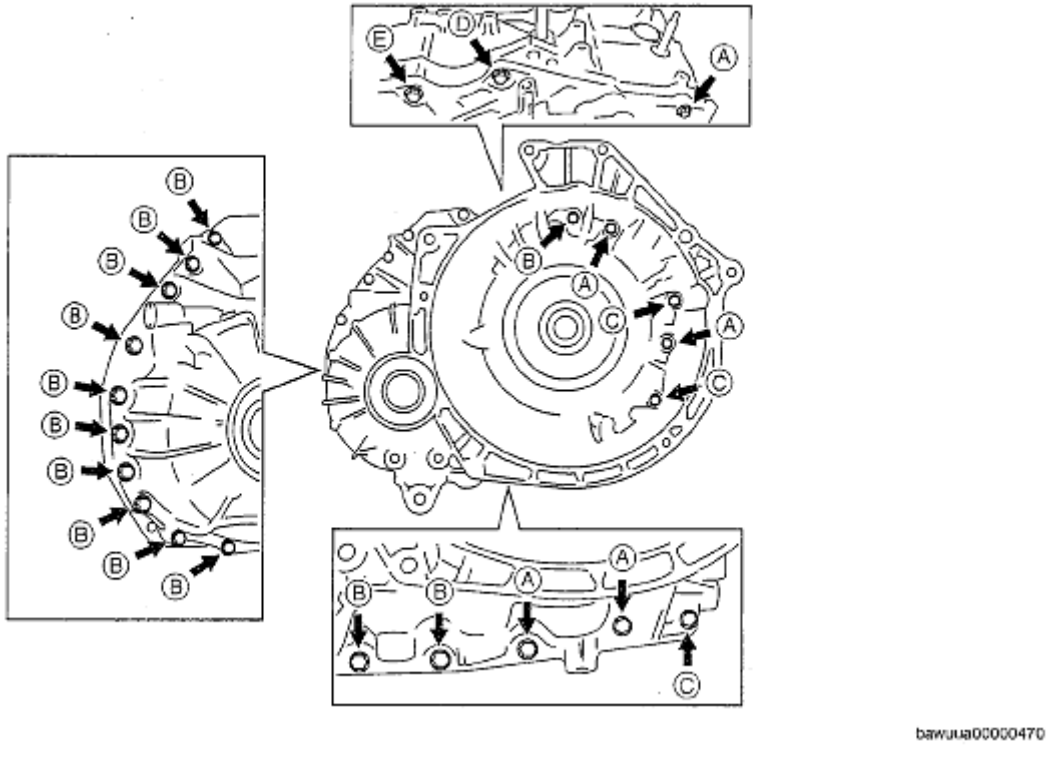


Fig. 271: Locating Transaxle Case Bolts
Courtesy of MAZDA MOTORS CORP.

TRANSAXLE CASE BOLTS IDENTIFICATION TABLE

Bolt number	Bolt size	Length (measured from below the head) (mm {in})
A	M8 x 1.25	30 {1.18}
B	M8 x 1.25	35 {1.38}
C	M8 x 1.25	39 {1.54}
D	M10 x 1.25	25 {0.984}

E	M10 x 1.25	40 {1.57}

72. Tighten the bolts.

    Tightening torque

    A, B, C: 23.5 - 35.3 N.m {2.4 - 3.5 kgf.m, 17.4 - 26.0 ft.lbf}

    D, E: 29.4 - 41.2 N.m {3.0 - 4.2 kgf.m, 21.7 - 30.3 ft.lbf}

    CAUTION:
    - **Do not damage the input/turbine speed sensor.**

73. Install the input/turbine speed sensor to the transaxle case.

    Tightening torque 3.9 - 6.9 N.m {40 - 70 kgf.cm, 26 - 60 in.lbf}

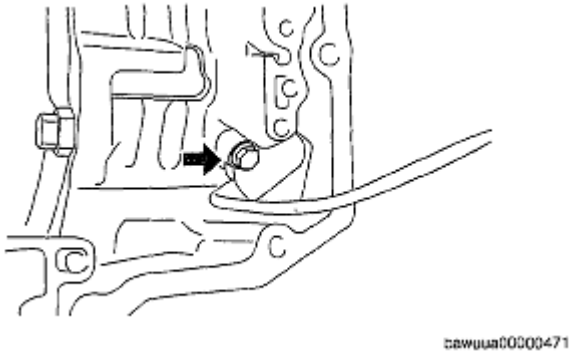


Fig. 272: Locating Input/Turbine Speed Sensor
Courtesy of MAZDA MOTORS CORP.

74. Apply ATF to a new gasket as shown in the figure.
75. Install the gasket to the coupler component.

    CAUTION:
    - **Do not apply ATF to the O-ring.**

76. Install a new O-ring to the coupler component.

    CAUTION:
    - **Do not apply too much force to the coupler component.**
    - **Do not damage the coupler component.**

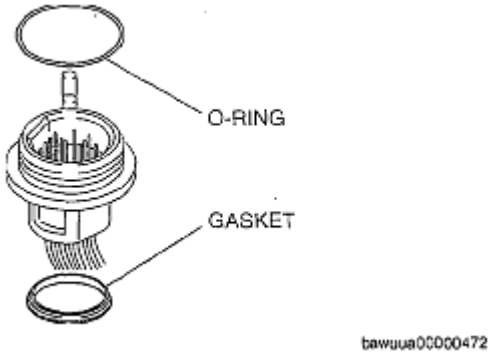


Fig. 273: Identifying O-Ring And Gasket
Courtesy of MAZDA MOTORS CORP.

77. Install the coupler component to the transaxle case.

NOTE:

- **Install the coupler component to the transaxle case by engaging its claw.**

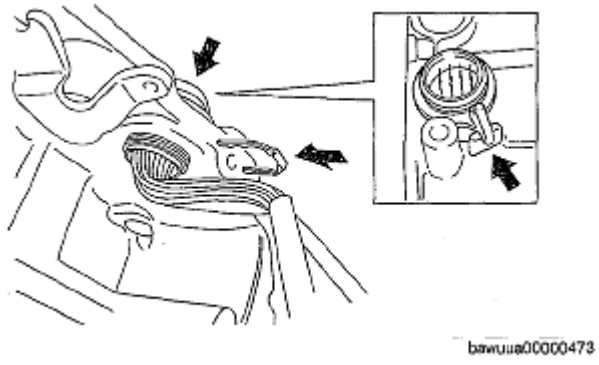


Fig. 274: Locating Coupler Component Lock Plate
Courtesy of MAZDA MOTORS CORP.

78. Install a new coupler component lock plate.

CAUTION:

- **When installing the control valve body component, do not put the coupler component in the open space of the separate plate in the control valve body component.**
- **Do not pinch the coupler component between the separate plate and the control valve body component.**

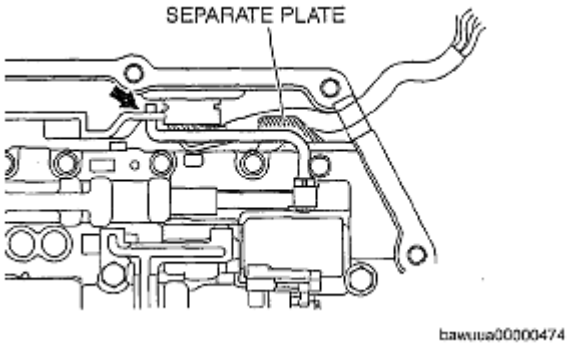


Fig. 275: Identifying Separate Plate
Courtesy of MAZDA MOTORS CORP.

79. Connect the manual valve link and install the control valve body component.
80. Temporarily install the control valve body component with the bolts.

Bolt length (measured from below the head)

A. **A: 31 mm {1.220 in}**
B. **B: 17 mm {0.669 in}**
C. **C: 21 mm {0.827 in}**

NOTE:

- **Aligning the bolt holes, temporarily tighten the bolts by hand.**

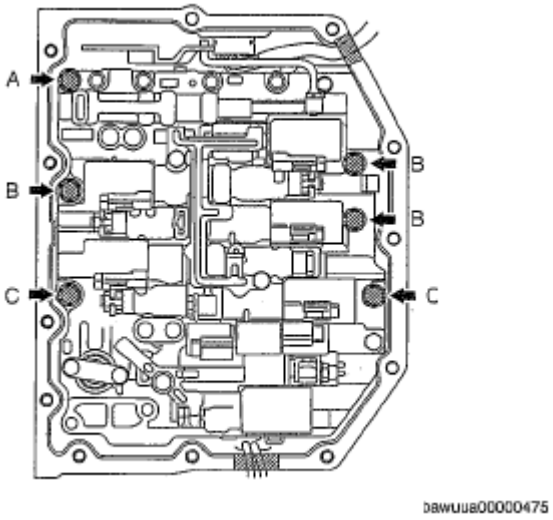


Fig. 276: Locating Control Valve Body Component Bolts
Courtesy of MAZDA MOTORS CORP.

81. Temporarily install the suction cover and a new gasket with the bolts.

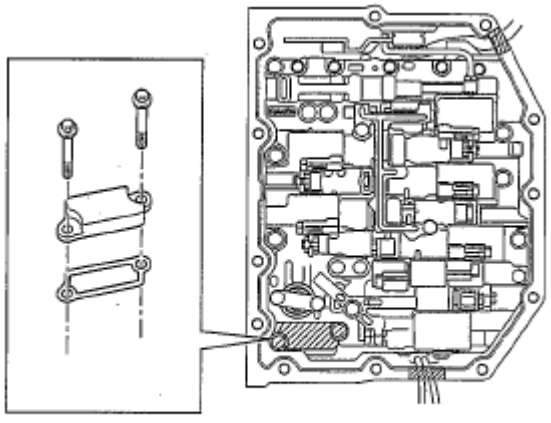


Fig. 277: Identifying Suction Cover, Gasket And Bolts
Courtesy of MAZDA MOTORS CORP.

82. Tighten the bolts in the order shown in the figure.

Tightening torque 8 - 12 N.m {82 - 122 kgf.cm, 72 - 105 in.lbf}

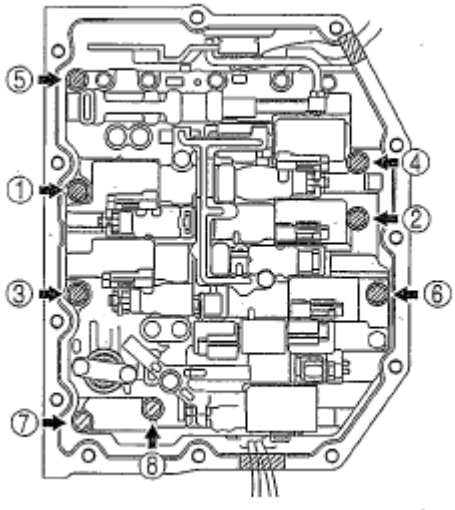


Fig. 278: Identifying Control Valve Body Bolts Tightening Order
Courtesy of MAZDA MOTORS CORP.

83. Install the connector of the VSS and input/turbine speed sensor to the solenoid clamp.

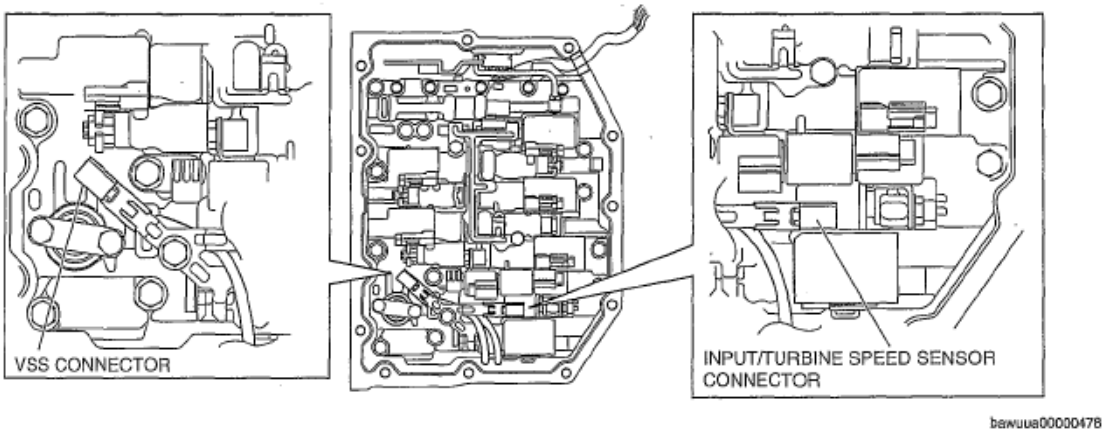


Fig. 279: Identifying Connector Of VSS And Input/Turbine Speed Sensor
Courtesy of MAZDA MOTORS CORP.

CAUTION:

- **If the control valve body cover is installed with the wiring harnesses overlapped, the wiring harnesses may be pinched between the cover and valve body causing the wiring harnesses to be damaged. Therefore, verify that the wiring harnesses are not overlapped when installing the control valve body cover.**

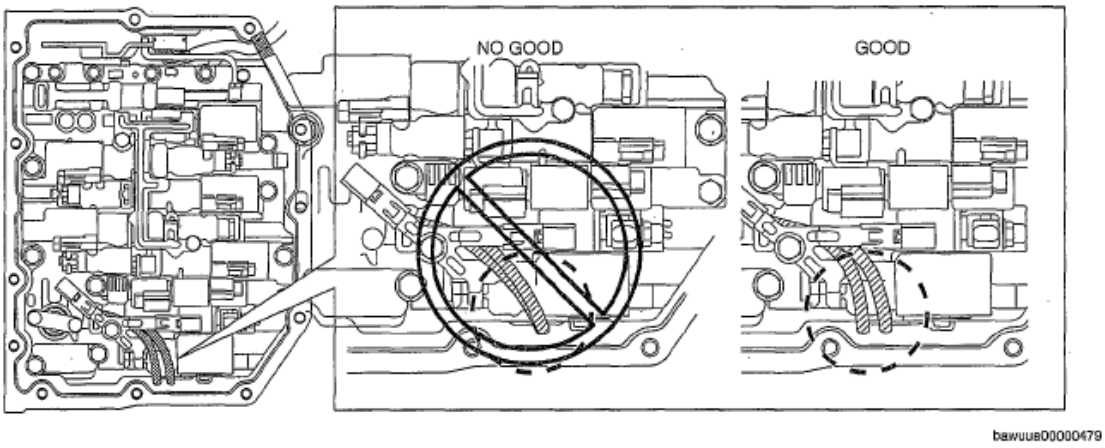


Fig. 280: Caution - Wiring Harnesses Are Not Overlapped When Installing Control Valve Body Cover
Courtesy of MAZDA MOTORS CORP.

84. Apply ATF to a new O-ring and install it on the TFT sensor.
85. Install the TFT sensor with the lock plate and a bolt to the control valve body component as shown in the figure.

Tightening torque 8 - 12 N.m {82 - 122 kgf.cm, 72 - 105 in.lbf}

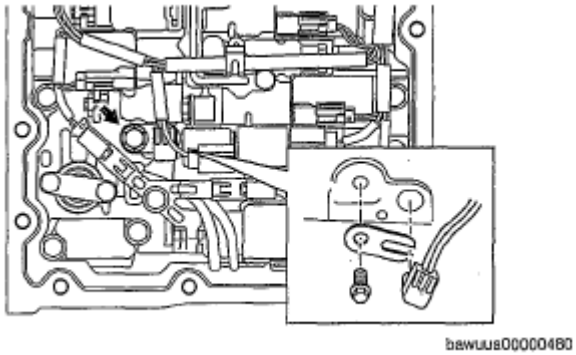


Fig. 281: Identifying TFT Sensor With Lock Plate And Bolt
Courtesy of MAZDA MOTORS CORP.

86. Connect the solenoid connectors, VSS connector and the input/turbine speed sensor connector.
87. Connect the coupler component to the clamps.

NOTE:
- **Completely remove sealant and oil with white gasoline or similar.**

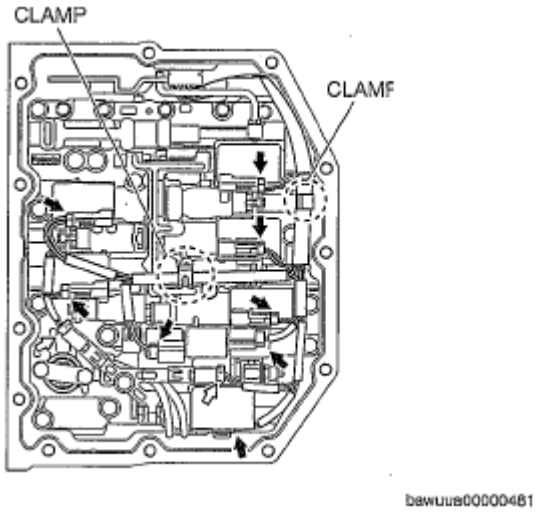


Fig. 282: Identifying Coupler Component And Clamps
Courtesy of MAZDA MOTORS CORP.

88. Clean sealant and oil off the contact surface of the transaxle case with the control valve body cover and the bolt holes.

NOTE:
- **Completely remove oil with white gasoline or similar.**

89. Clean oil off the contact surface of the new control valve body cover with the transaxle case.

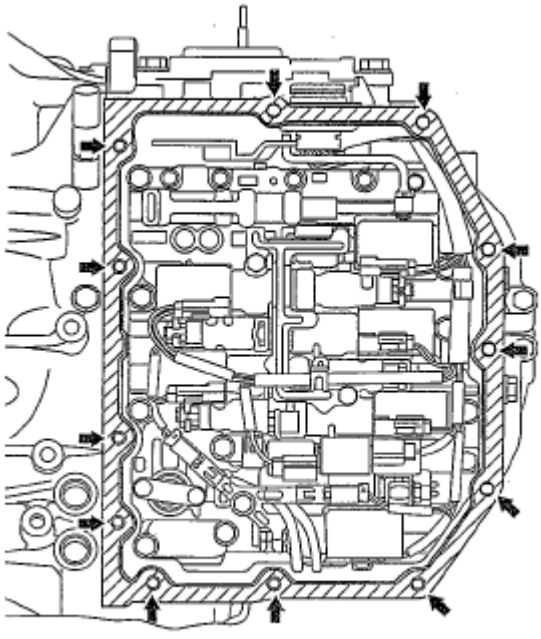


Fig. 283: Cleaning Sealant And Oil Off Contact Surface Of Transaxle Case
Courtesy of MAZDA MOTORS CORP.

90. Apply sealant to the new control valve body cover as shown in the figure.

CAUTION:
- **Be careful that the coupler component will not become caught between the control valve body cover and transaxle case.**

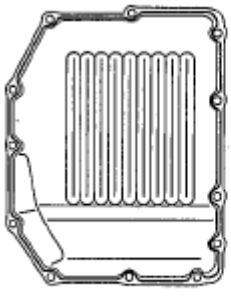


Fig. 284: Identifying Sealant On Control Valve Body Cover
Courtesy of MAZDA MOTORS CORP.

91. Install the new control valve body cover with new seal bolts.

Tightening torque 9.8 - 15.7 N.m {100 - 160 kgf.cm, 87 - 138 in.lbf}

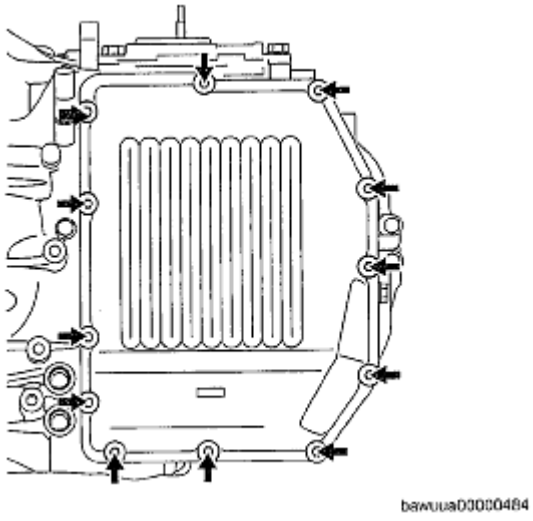


Fig. 285: Identifying Control Valve Body Cover Seal Bolts
Courtesy of MAZDA MOTORS CORP.

92. Inspect the condition of connector pin of the coupler component (foreign material, bent/broken pins) and O-ring.

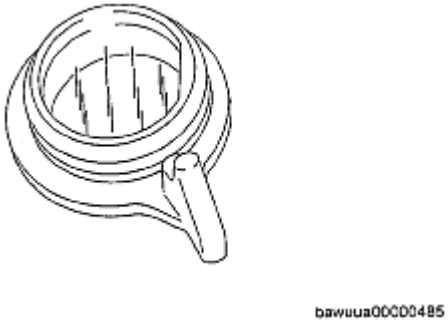


Fig. 286: Inspecting Condition Of Connector Pin Of Coupler Component (Foreign Material, Bent/Broken Pins) And O-Ring
Courtesy of MAZDA MOTORS CORP.

93. Align the transaxle case and the coupler component connector.

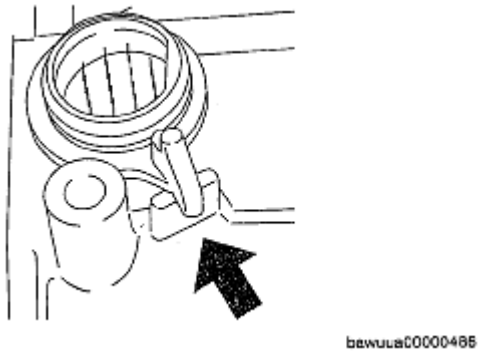


Fig. 287: Aligning Transaxle Case And Coupler Component Connector
Courtesy of MAZDA MOTORS CORP.

94. Be sure to match the position of the TCM marking.

CAUTION:
- **Do not turn more than 60° from the marking.**

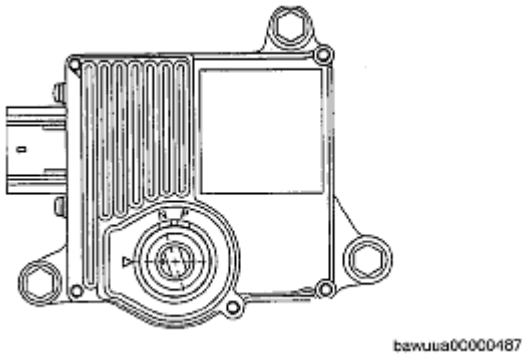


Fig. 288: Matching Position Of TCM Marking
Courtesy of MAZDA MOTORS CORP.

95. Verify the correct positioning of the TCM and coupler component.
96. Install the TCM to the transaxle case.

Tightening torque 19.6 - 29.4 N.m {2.0 - 2.9 kgf.m, 14.5 - 21.6 ft.lbf}

CAUTION:
- **Do not repair the threads using a tap or other tools.**
- **Do not damage the transaxle case.**
- **Do not overtighten the stud bolts. (The stud bolts should remain protruded from the end of the transaxle case more than 47 mm {1.85 in}.)**
- **If any of the stud bolts is overtightened, the transaxle case may be damaged (holes in the case may result).**

- **If the transaxle case is damaged, the transaxle must be replaced.**

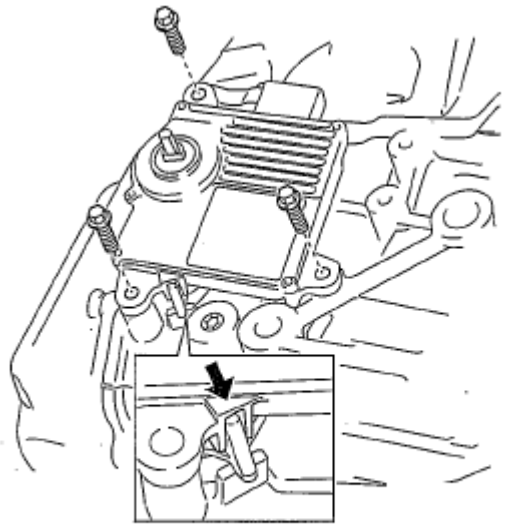


Fig. 289: Identifying TCM
Courtesy of MAZDA MOTORS CORP.

97. Install the double nutted stud bolts to the transaxle case.
98. Remove the double nutted from the stud bolt.

CAUTION:
- **Do not damage the oil seal.**

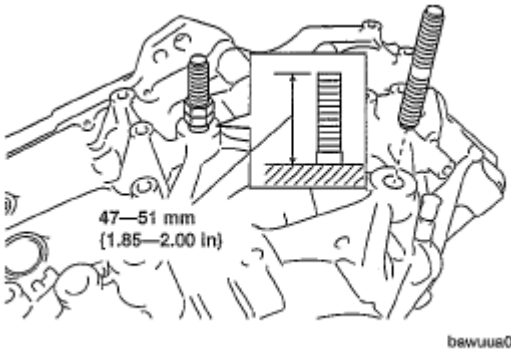


Fig. 290: Identifying Double Nutted Stud Bolts
Courtesy of MAZDA MOTORS CORP.

99. Using the **SST** and a hammer, tap a new oil seal so that the specified oil seal position is obtained.

Transaxle Case Side

Substitution SST

- **49 H028 202**

  Outer diameter: 54.5-61 mm {2.15-2.40 in}

  Inner diameter: 52 mm {2.05 in} or more

  Plate thickness: 2 mm {0.08 in} or more

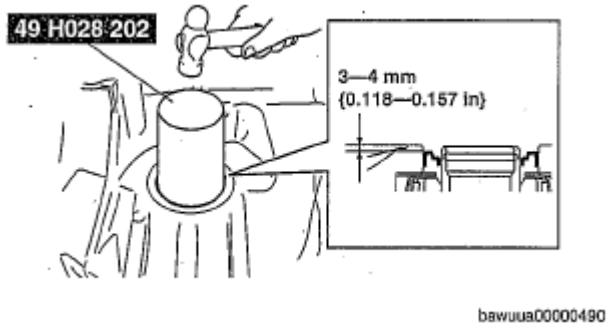


Fig. 291: Tapping Oil Seal - Transaxle Case Side
Courtesy of MAZDA MOTORS CORP.

Converter Housing Side

Substitution SST

- **49 F027 009**

  Outer diameter: 76.8 mm {3.02 in}

  Plate thickness: 2 mm {0.08 in} or more

- **49 L033 101**

  Outer diameter: 73-76.3 mm {2.88-3.00 in}

  Inner diameter: 69 mm {2.72 in} or more

  Length: 20 mm {0.79 in} or more

  Plate thickness: 2 mm {0.08 in} or more

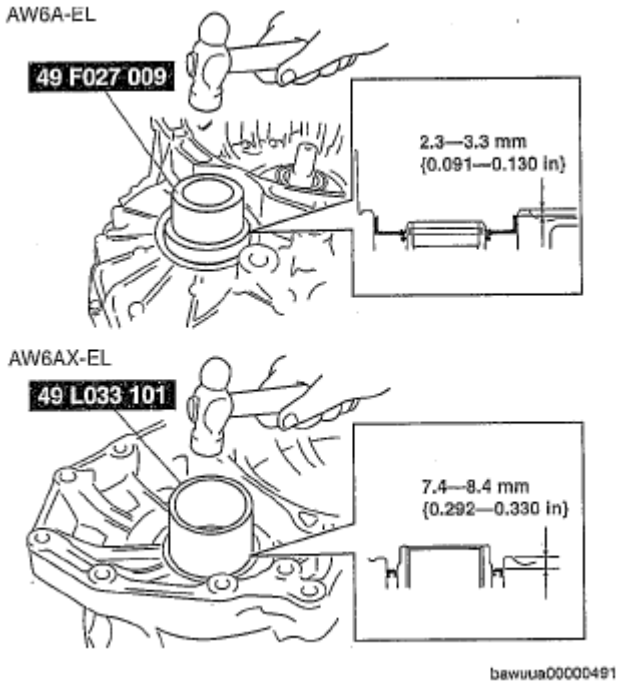


Fig. 292: Tapping Oil Seal - Converter Housing Side
Courtesy of MAZDA MOTORS CORP.

100. Install a new gasket and the drain plug.

Tightening torque 23.5 - 54.9 N.m {2.4 - 5.5 kgf.m, 17.4 - 40.4 ft.lbf}

CAUTION:
- **Do not damage the oil seal.**
- **Do not drop the torque converter.**
- **Be careful that fingers do not get caught.**

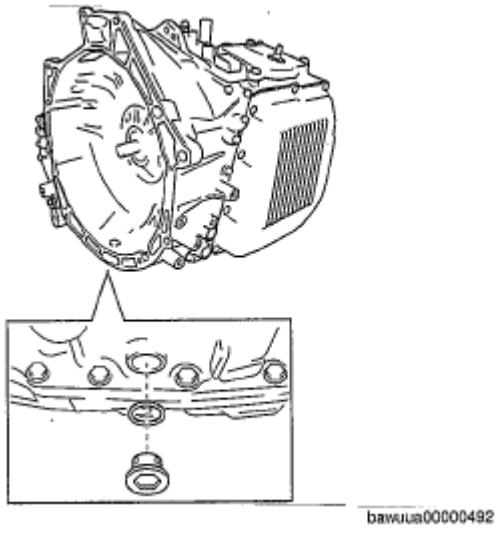


Fig. 293: Identifying Gasket And Drain Plug
Courtesy of MAZDA MOTORS CORP.

101. Using a flathead screwdriver, position the drive gear on the oil pump component in the center. Then install the torque converter component to the transaxle.

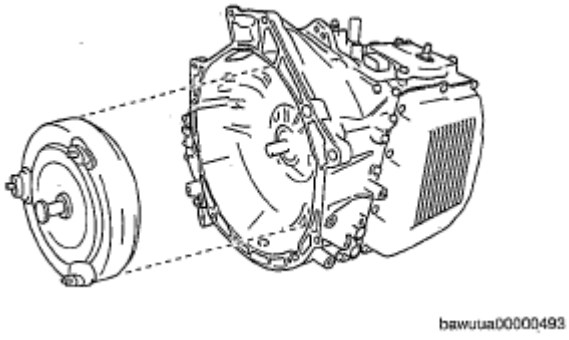


Fig. 294: Identifying Torque Converter Component
Courtesy of MAZDA MOTORS CORP.

102. 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 (between the end of the torque converter and the end of the converter housing)

Mazda6: 18 mm {0.709 in}

CX-7: 31.4 mm {1.24 in}

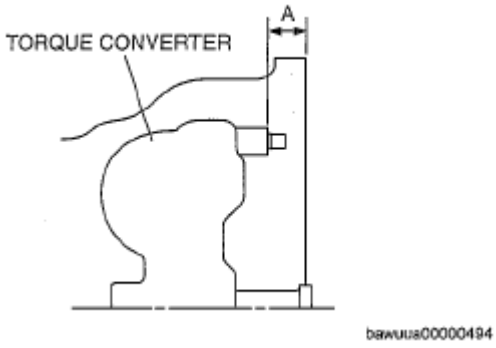


Fig. 295: Measuring Distance A Between End Of Torque Converter And End Of Converter Housing
Courtesy of MAZDA MOTORS CORP.

103. Install the O-rings and oil pipes. (Refer to the appropriate article .)
104. Add the ATF.

AUTOMATIC TRANSAXLE INSPECTION

B2 Brake Inspection

1. Apply ATF to the driven plates, drive plates and retaining plates.

NOTE:
- **Replace with new drive plates after soaking them at least 2 h in ATF.**

2. Install driven plates, drive plates and the retaining plate in the following order to the transaxle case as shown in the figure.

Six drive plates type

- Drive- Retaining- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

Seven drive plates type

- Retaining- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Driven- Drive- Retaining

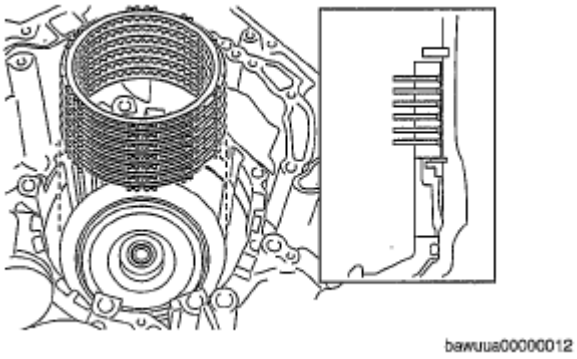


Fig. 296: Identifying Driven Plates, Drive Plates And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **Inspect the number and order of the retaining plates, drive and driven plates.**

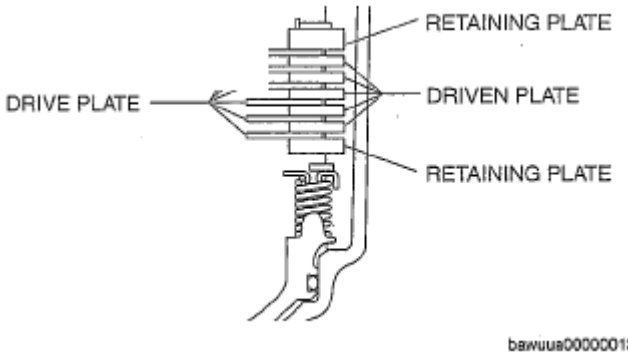


Fig. 297: Inspecting Number And Order Of Retaining Plates, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

3. Using a flathead screwdriver, install the snap ring into the groove.

CAUTION:
- **Align the opening of the snap ring with the position shown in the figure.**

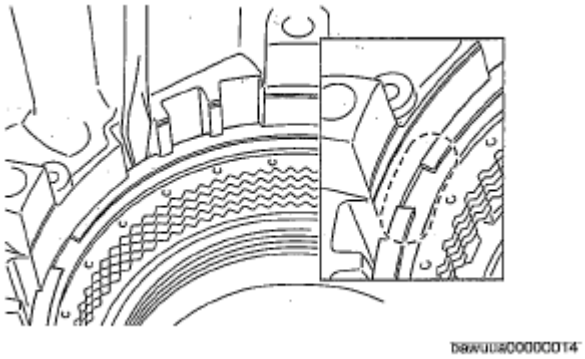


Fig. 298: Installing Snap Ring Into Groove
Courtesy of MAZDA MOTORS CORP.

4. Set a dial indicator as shown in the figure.
5. While applying compressed air into the oil passage as shown in the figure, measure the B2 brake clearance and inspect the piston moves smoothly.

   Air pressure 200 kPa {2.0 kgf/cm^2 , 29 psi}

   B2 brake clearance 1.20 - 1.40 mm {0.047 - 0.055 in}

   - If not within the specification, select another retaining plate.

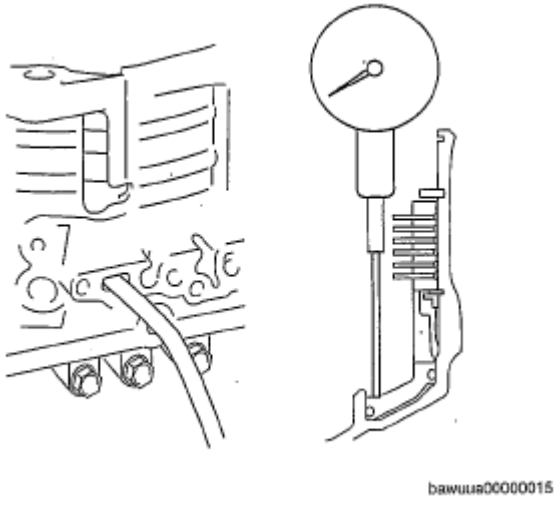


Fig. 299: Measuring B2 Brake Clearance
Courtesy of MAZDA MOTORS CORP.

RETAINING PLATE SIZE

Identification mark	Thickness (mm {in})
47	4.7 {0.185}
48	4.8 {0.189}

49	4.9 {0.193}
50	5.0 {0.197}
51	5.1 {0.201}
52	5.2 {0.205}
53	5.3 {0.209}

6. Using a flathead screwdriver, remove the snap ring.

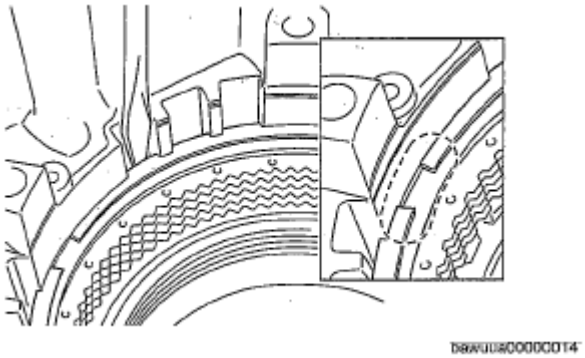


Fig. 300: Removing Snap Ring
Courtesy of MAZDA MOTORS CORP.

7. Remove the retaining plates, drive and driven plates.

NOTE:

- **Inspect the number of drive and driven plates.**

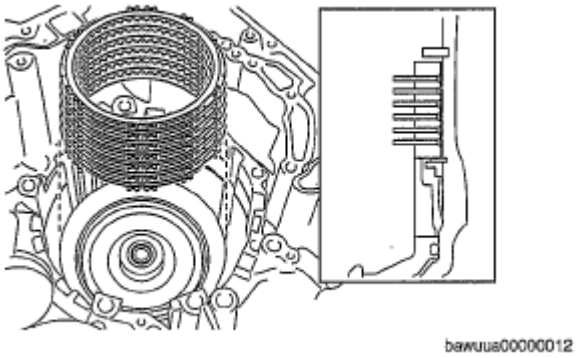


Fig. 301: Identifying Retaining Plates, Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

TECHNICAL DATA

TRANSMISSION/TRANSAXLE TECHNICAL DATA

TRANSMISSION/TRANSAXLE TECHNICAL DATA

Item	Specification
C3 clutch return spring free length	Standard: 12.91 mm {0.5083 in}
C3 clutch piston stroke	0.6 - 0.8 mm {0.024 - 0.031 in}
C1 clutch return spring free length	Standard: 17.01 mm {0.6697 in}
C1 clutch piston stroke	1.2 - 1.4 mm {0.047 - 0.055 in}
Rear planetary gear bushing inner diameter	Front side: 33.26 - 33.286 mm {1.3095 - 1.3104 in} Rear side: 33.26 - 33.286 mm {1.3095 - 1.3104 in}
Rear planetary sun gear bushing inner diameter	Front side: 24.2 - 24.226 mm {0.9528 - 0.9537 in} Rear side: 24.2 - 24.226 mm {0.9528 - 0.9537 in}
C2 clutch return spring free length	Standard: 14.02 mm {0.5520 in}
C2 clutch piston stroke	0.45 - 0.65 mm {0.0178 - 0.0255 in}
Transaxle case bushing inner diameter	Standard: 21.932 - 21.953 mm {0.86347 - 0.86429 in}
B2 brake return spring free length	Standard: 19.01 mm {0.7485 in}
Input shaft end play	0.349 - 1.081 mm {0.01374 - 0.04255 in}
B1 brake piston stroke	5.50 - 6.00 mm {0.217 - 0.236 in}
Distance A (between the end of the torque converter and the end of the converter housing)	Mazda6: 18 mm {0.709 in} CX-7:31.4 mm {1.24 in}
B2 brake clearance	1.20 - 1.40 mm {0.047 - 0.055 in}

COUNTER DRIVE GEAR STARTING AND ROTATING TORQUE

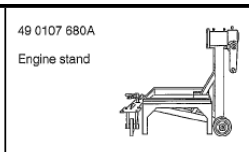
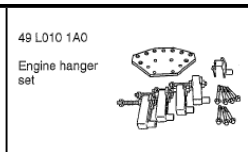
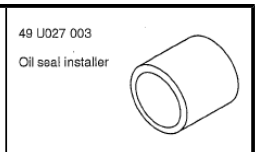
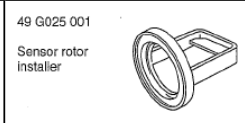
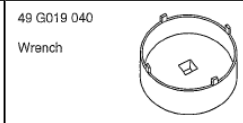
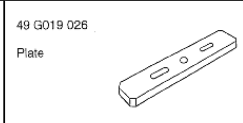
N.m {kgf.cm, in.lbf}

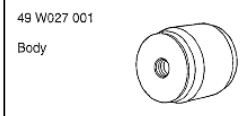
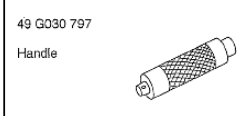
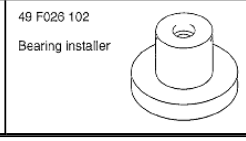
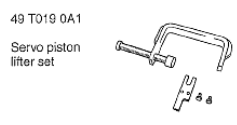
Bearing	Starting torque	Rotating torque
New	0.40 - 0.50 {4.08 - 5.09, 3.55 - 4.41}	0.40 - 0.48 {4.08 - 4.89, 3.55 - 4.24}
Reused	0.20 - 0.25 {2.04 - 2.54, 1.77 - 2.20}	0.20 - 0.24 {2.04 - 2.44, 1.77 - 2.11}

SERVICE TOOLS

TRANSMISSION/TRANSAXLE SST

TRANSMISSION/TRANSAXLE SST

49 0107 680A Engine stand		49 L010 1A0 Engine hanger set		49 U027 003 Oil seal installer	
49 G025 001 Sensor rotor installer		49 G019 040 Wrench		49 G019 026 Plate	

49 B032 317 Bearing & oil seal remover		49 F027 009 Attachment for 68 & 77		49 L033 101 Oil seal installer	
49 W027 001 Body		49 G019 0A9 Compressor		49 G030 797 Handle	
49 F026 102 Bearing installer		49 T019 0A1 Servo piston lifter set		49 H028 202 Block L