

2006-2012 TRANSMISSION**Automatic Transaxle Overhaul - Mazda5 & Mazda6****AUTOMATIC TRANSAXLE CLEANING****CLEANING NOTES**

1. Clean the transaxle exterior thoroughly with steam, cleaning solvents, or both, before disassembly.

WARNING:

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

2. Clean the removed parts with cleaning solvent, and dry with compressed air. Clean out all holes and passages with compressed air, and verify that there are no obstructions.

AUTOMATIC TRANSAXLE DISASSEMBLY**PRECAUTION****General notes**

- The oil pan could contain small chips, shavings, and other particles which may be helpful in inspecting the condition of the transaxle and diagnosing certain problems.

To ensure that all foreign particles stay in the oil pan, make sure that the transaxle is never tipped completely over while the oil pan is still installed.

1. Disassemble the transaxle in a clean area (dustproof work space) to prevent entry of dust into the mechanisms.
2. Inspect the individual transaxle components in accordance with the QUICK DIAGNOSIS CHART during disassembly.
3. Use only plastic hammers when applying force to separate the light alloy case joints.
4. Never use rags during disassembly; they may leave particles that can clog fluid passage.
5. Several parts resemble one another; arrange them so that they do not get mixed up.
6. Disassemble the control valve component and thoroughly clean it when the clutch or brake band has burned or when the ATF has degenerated.

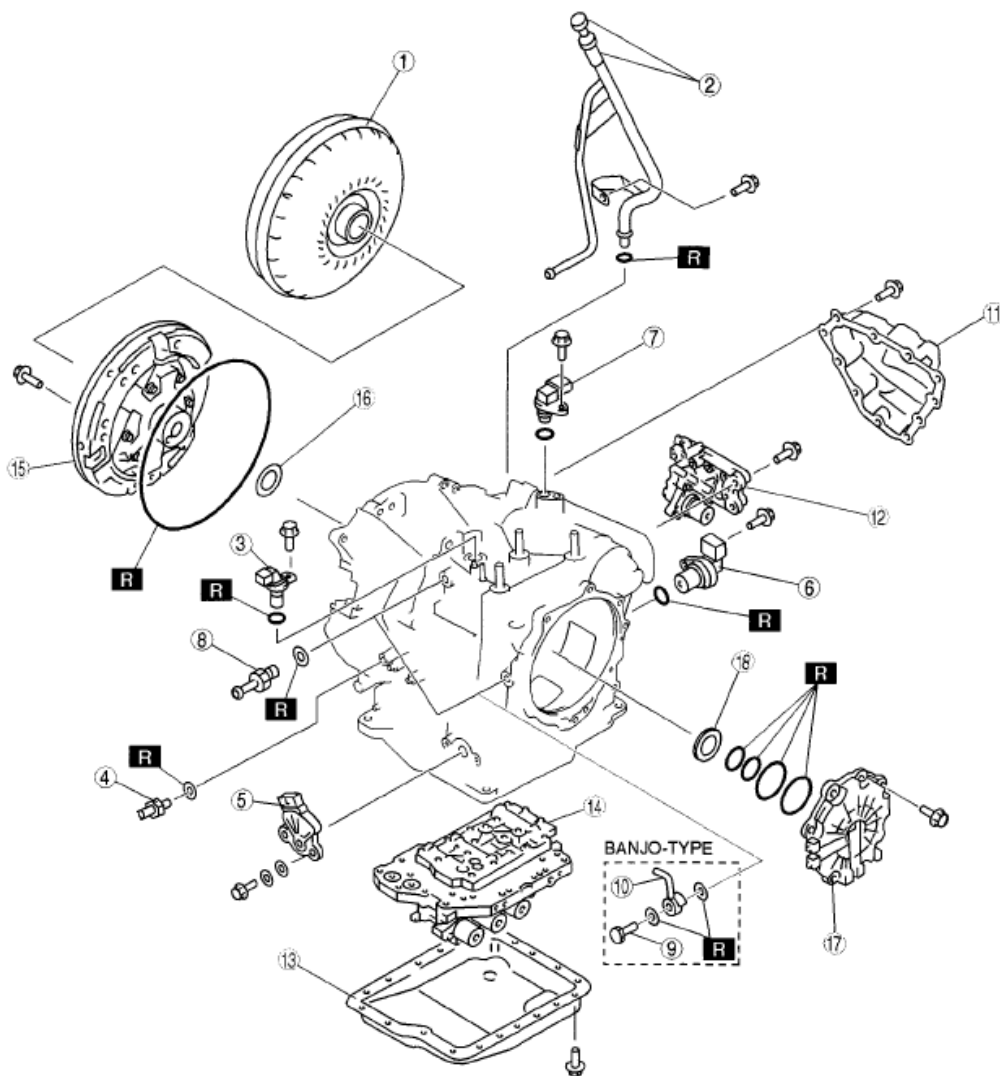
WARNING:

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

firmly when turning the transaxle.

DISASSEMBLY

Components

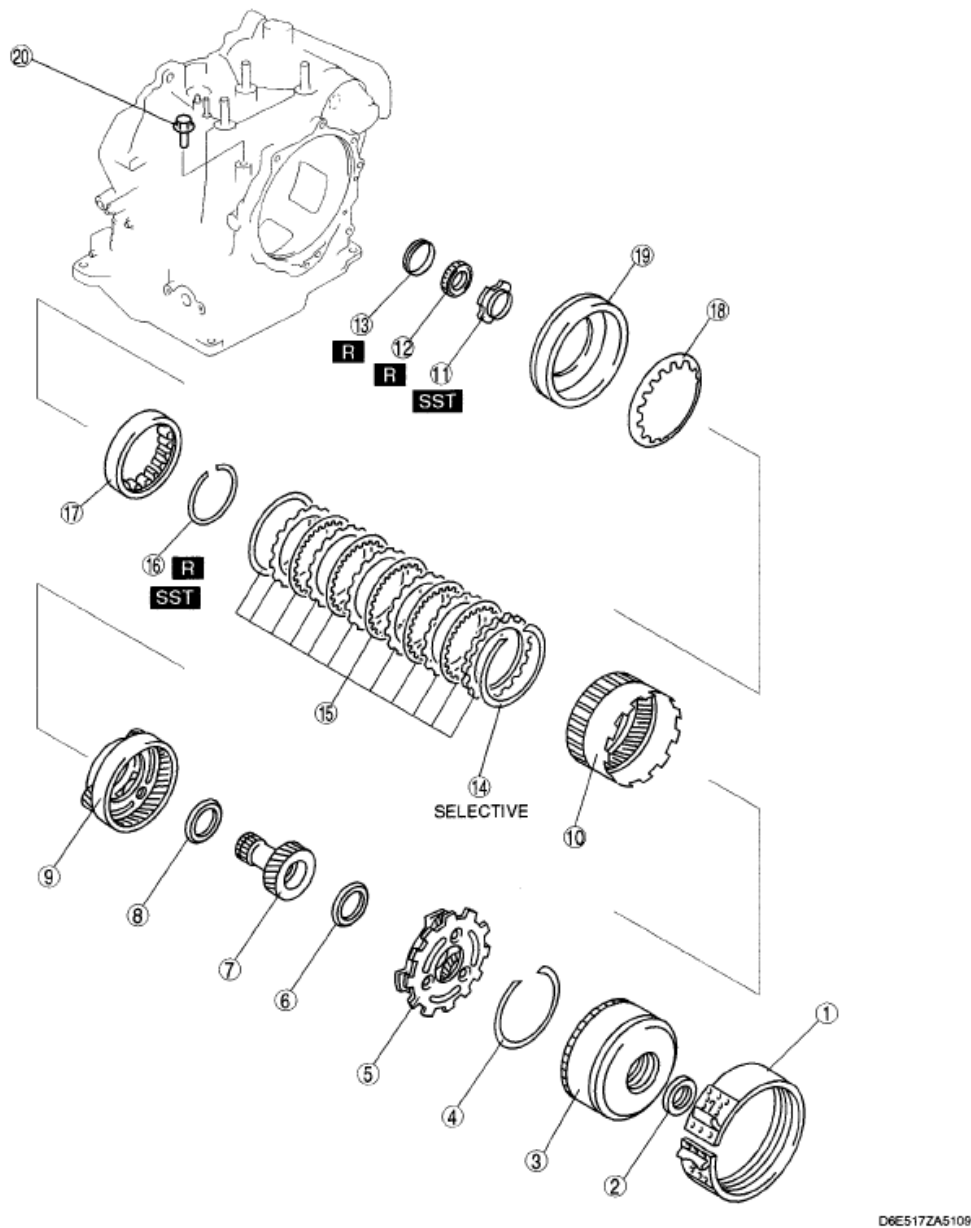


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1	Torque converter
2	Oil dipstick and oil filler tube
3	Input/turbine speed sensor
4	Oil pressure switch
5	Transaxle range switch
6	Vehicle speed sensor
7	Intermediate sensor
8	Connector pipe
9	Connector bolt

10	Oil pipe
11	Oil cover
12	Secondary control valve body component
13	Oil pan
14	Primary control valve body component
15	Oil pump
16	Thrust washer
17	End cover
18	Bearing race

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



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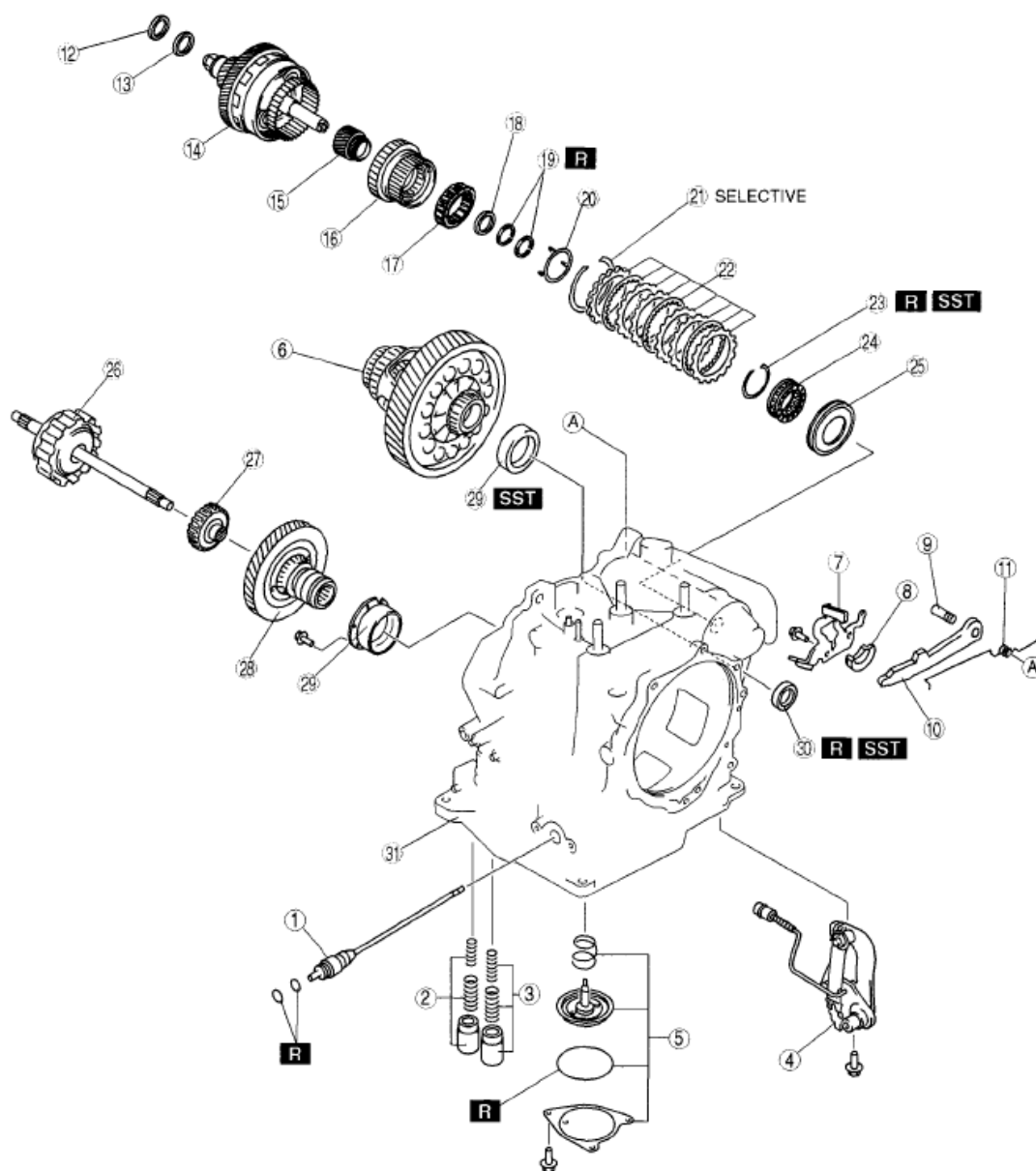
1	2-4 brake band
2	Needle bearing
3	Clutch component
4	Snap ring
5	Rear planetary gear component
6	Needle bearing
7	Front sun gear
8	Needle bearing
9	Front planetary gear component
10	Front internal gear and one-way clutch

11	Lock nut
12	Bearing
13	Distance piece
14	Snap ring
15	Low and reverse brake
16	Snap ring
17	One-way clutch inner race
18	Piston return spring
19	Low and reverse brake piston
20	Band strut

Fig. 2: Exploded View Of Automatic Transaxle Components (2 Of 4)
 Courtesy of MAZDA MOTORS CORP.

2006 Ford Fusion S

2006-2012 TRANSMISSION Automatic Transaxle Overhaul - Mazda5 & Mazda6



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1	Manual shaft
2	Servo apply accumulator
3	Forward accumulator
4	Parking rod lever component
5	Band servo
6	Differential
7	Actuator plate
8	Support actuator
9	Parking pawl shaft
10	Parking pawl
11	Pawl return spring
12	Needle bearing
13	Bearing race
14	Output gear component
15	Secondary sun gear
16	Direct clutch component

17	One-way clutch No.2
18	Needle bearing
19	Seal rings
20	Spacer
21	Snap ring
22	Reduction brake
23	Snap ring
24	Springs and retainer component
25	Reduction brake piston
26	Forward clutch
27	Forward clutch hub
28	Primary gear
29	Bearing race
30	Oil seal
31	Transaxle case

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

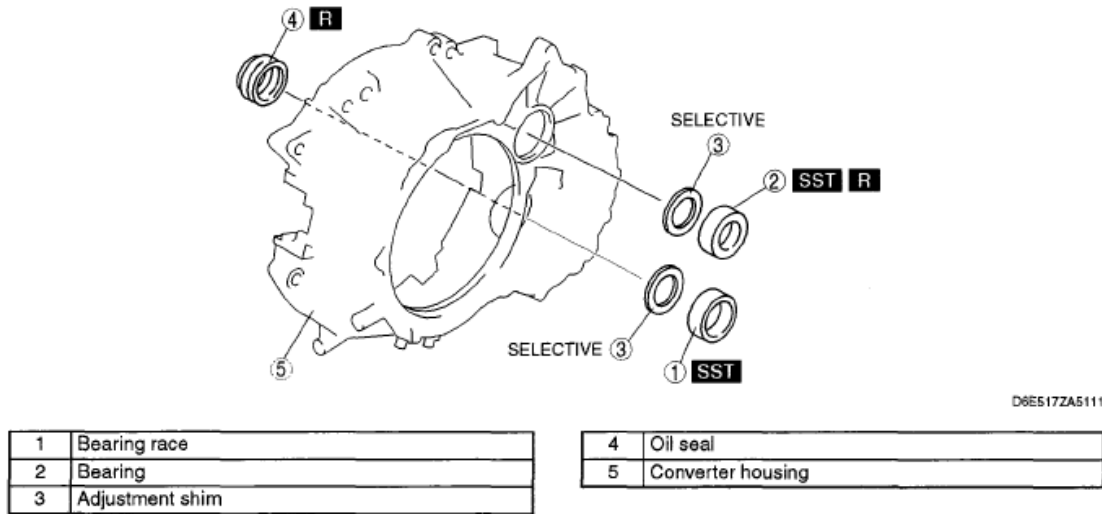


Fig. 4: Exploded View Of Automatic Transaxle Components (4 Of 4)
Courtesy of MAZDA MOTORS CORP.

Disassembly procedure

1. Remove the torque converter, and immediately turn it so that the hole faces upward This will help to keep any remaining fluid from spilling.
2. Remove the ATF dipstick and oil filler tube.
3. Remove the O-ring from the oil filler tube.
4. Remove the breather hose.
5. Assemble the SST.

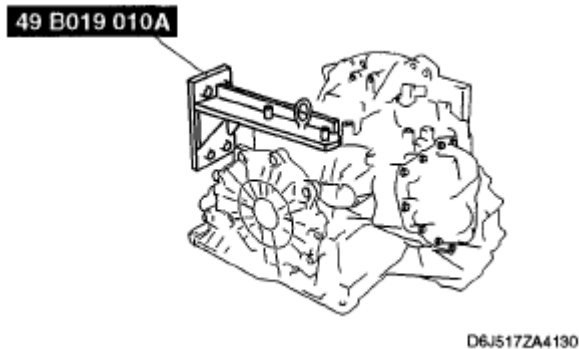


Fig. 5: Identifying SST
Courtesy of MAZDA MOTORS CORP.

6. Lift the transaxle and mount it on the SST.
7. Remove the input/turbine speed sensor.

8. Remove the O-ring from the input/turbine speed sensor.
9. Remove the oil pressure switch.
10. Remove the transaxle range switch.
11. Remove the vehicle speed sensor.
12. Remove the O-ring from the vehicle speed sensor.
13. Remove the intermediate sensor.
14. Remove the O-ring from the intermediate sensor.
15. Remove the connector pipe, connector bolt and oil pipe.

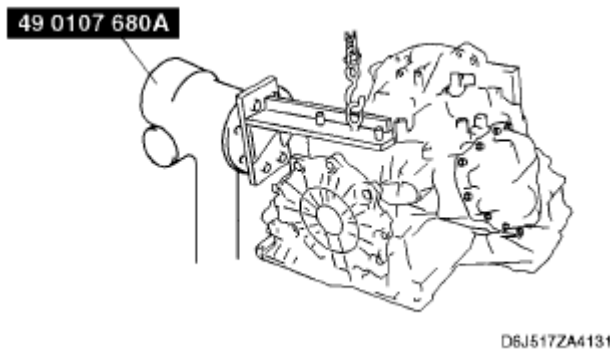


Fig. 6: Identifying SST For Mount
Courtesy of MAZDA MOTORS CORP.

WARNING:

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

CAUTION:

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

16. Remove the oil cover.

Examine any material found in the pan or on the magnet to determine the condition of the transaxle. If large amounts of material are found, replace the torque converter and carefully inspect the transaxle for the cause.

1. Clutch facing material
 - Drive plate and brake band wear
2. Steel (magnetic)

- Bearing, gear, and driven plate wear
- 3. Aluminum (nonmagnetic)
 - Aluminum part wear
- 17. Disconnect the solenoid valve connector.

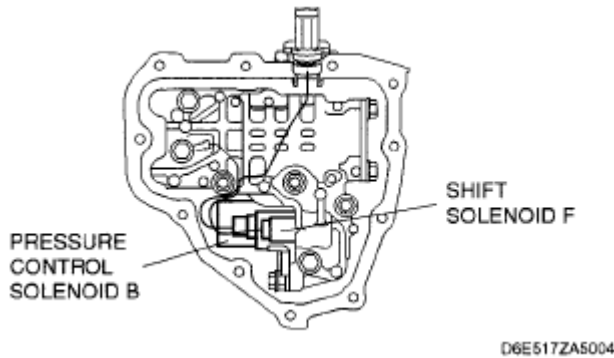


Fig. 7: Identifying Transaxle Solenoid Connectors
Courtesy of MAZDA MOTORS CORP.

- 18. Remove the bolts as shown in the figure.
- 19. Remove the secondary control valve body.

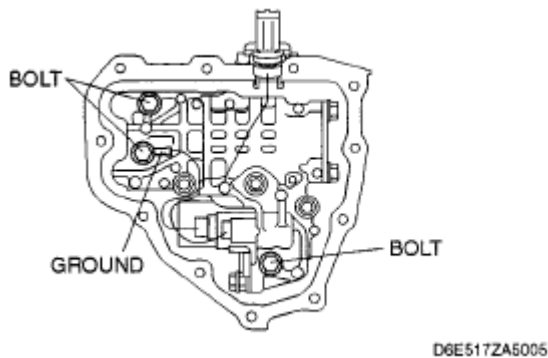


Fig. 8: Identifying Secondary Control Valve Body Bolts
Courtesy of MAZDA MOTORS CORP.

- 20. Remove the coupler component.
- 21. Remove the O-rings and tubular pins from the transaxle case.

WARNING:

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

CAUTION:

- Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents before removal.

- If any old sealant gets into the transaxle during installation of the oil pan, trouble may occur in the transaxle. Remove any old sealant from the transaxle case and oil pan, and clean with cleaning fluids.

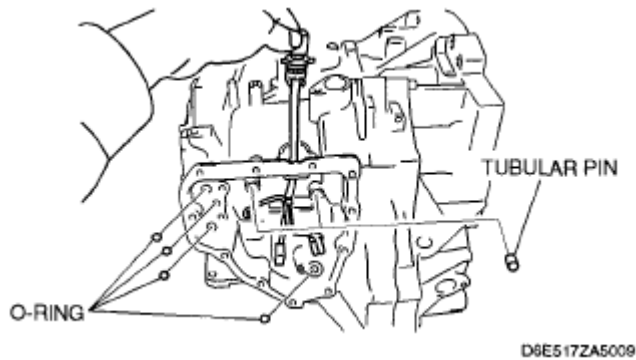


Fig. 9: Locating O-Rings And Tubular Pins At Transaxle Case
Courtesy of MAZDA MOTORS CORP.

22. Remove the oil pan.

Examine any material found in the pan or on the magnet to determine the condition of the transaxle. If large amounts of material are found, replace the torque converter and carefully inspect the transaxle for the cause.

1. Clutch facing material
 - Drive plate and brake band wear
2. Steel (magnetic)
 - Bearing, gear, and driven plate wear
3. Aluminum (nonmagnetic)
 - Aluminum part wear

23. Disconnect the solenoid valve connector, ground, and TFT sensor.

24. Remove the oil strainer.

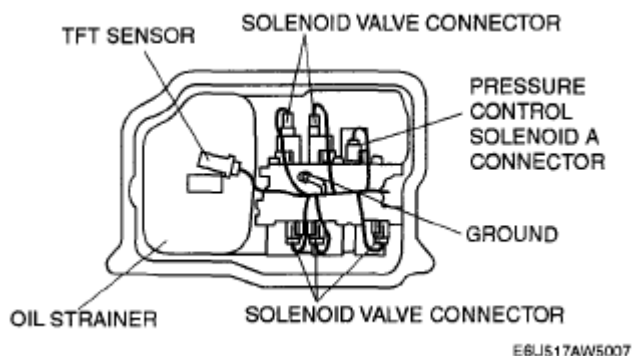


Fig. 10: Identifying Solenoids And Connectors
Courtesy of MAZDA MOTORS CORP.

25. Remove the O-ring from the oil strainer.

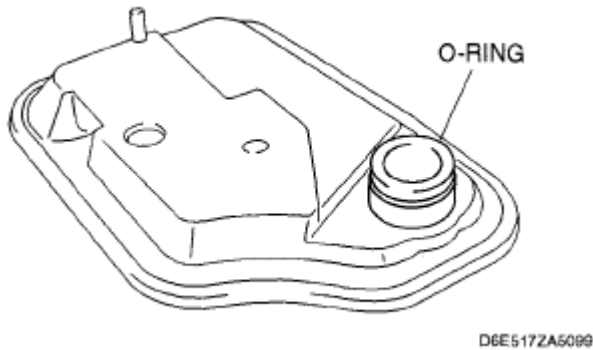


Fig. 11: View Of O-Ring On Oil Strainer
Courtesy of MAZDA MOTORS CORP.

26. Remove the bolts as shown in the figure.

NOTE:

- Remove the control valve body by removing the head of the manual valve from the port of the parking assist lever component.

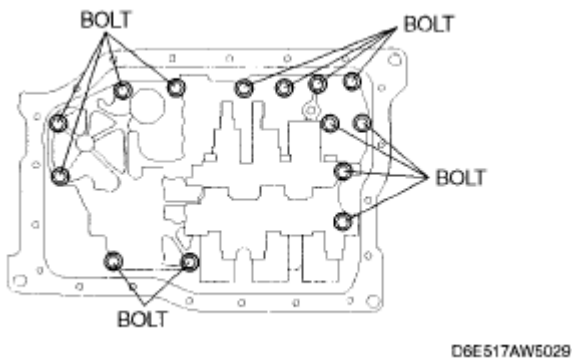


Fig. 12: Identifying Primary Control Valve Body Bolts
Courtesy of MAZDA MOTORS CORP.

27. Remove the Primary control valve body.

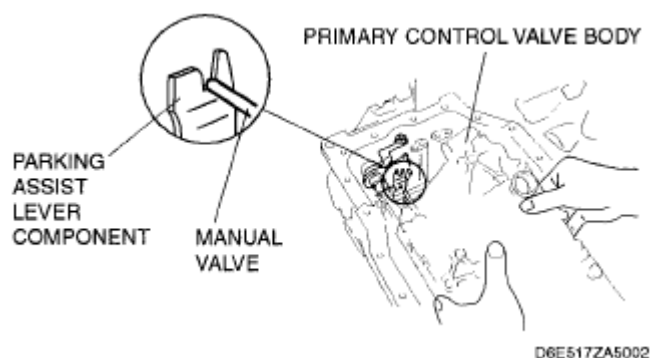


Fig. 13: View Of Primary Control Valve Body
Courtesy of MAZDA MOTORS CORP.

28. Remove the coupler component.

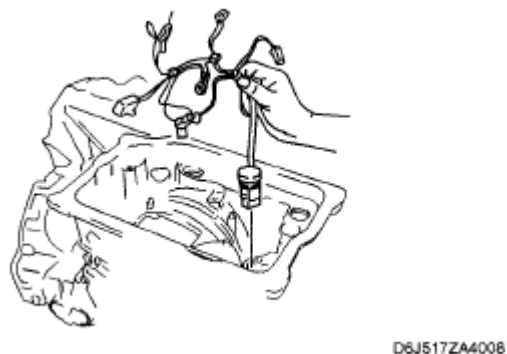


Fig. 14: View Of Coupler Component
Courtesy of MAZDA MOTORS CORP.

29. Remove the accumulator component.

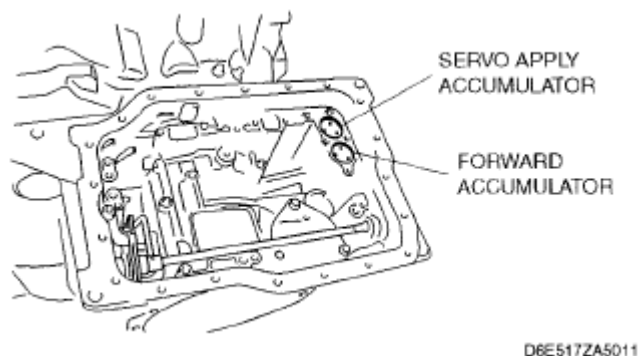


Fig. 15: View Of Accumulator Component
Courtesy of MAZDA MOTORS CORP.

30. Remove the manual shaft.
 1. Remove the roll pin using a pin punch.

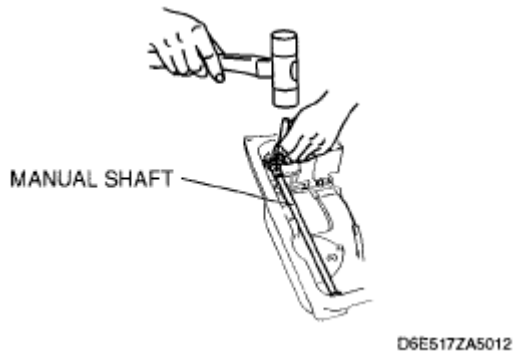


Fig. 16: Removing Roll Pin Using A Pin Punch
Courtesy of MAZDA MOTORS CORP.

2. Remove the manual shaft.
3. Remove the O-ring from the manual shaft.

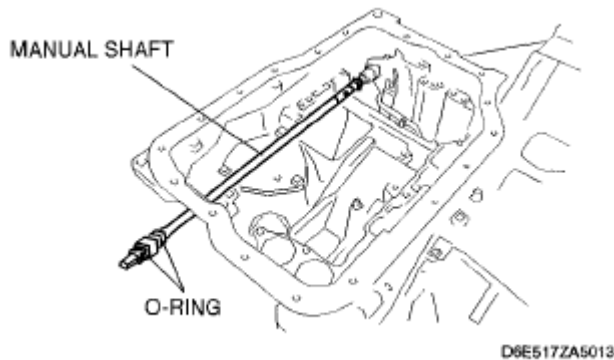


Fig. 17: View Of O-Ring And Manual Shaft
Courtesy of MAZDA MOTORS CORP.

31. Remove the parking rod lever component.

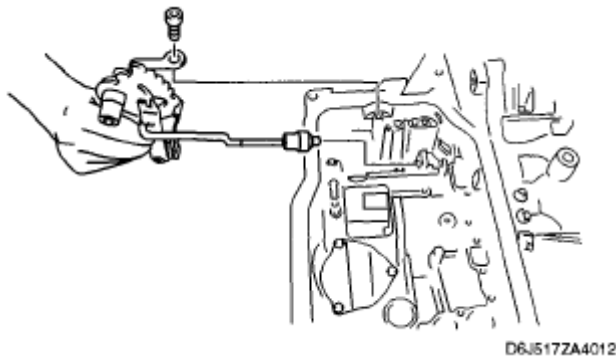


Fig. 18: View Of Parking Rod Lever Component
Courtesy of MAZDA MOTORS CORP.

32. Remove the band servo component.

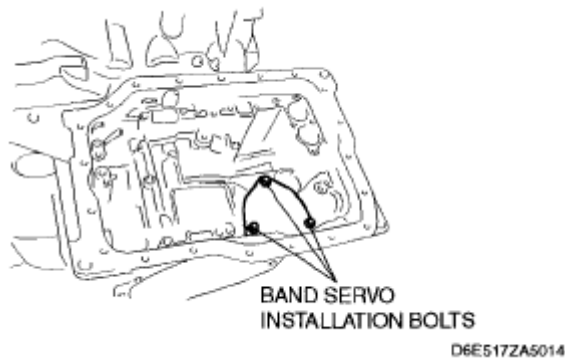


Fig. 19: View Of Band Servo Bolts
Courtesy of MAZDA MOTORS CORP.

33. Remove the oil pump.

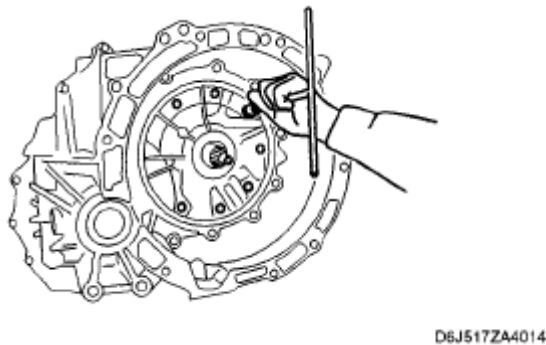


Fig. 20: View Of Oil Pump
Courtesy of MAZDA MOTORS CORP.

34. Remove the converter housing by tapping lightly with a plastic hammer.

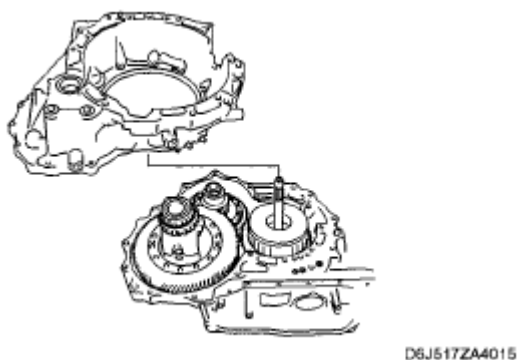
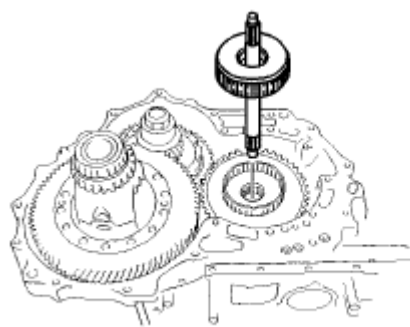


Fig. 21: View Of Converter Housing
Courtesy of MAZDA MOTORS CORP.

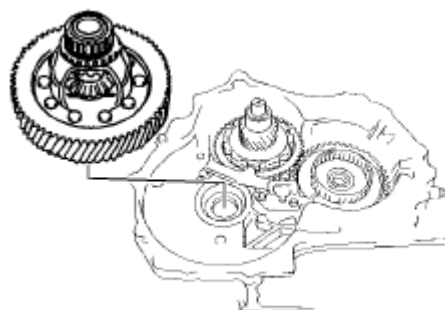
35. Remove the forward clutch component.



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Fig. 22: View Of Forward Clutch Component
Courtesy of MAZDA MOTORS CORP.

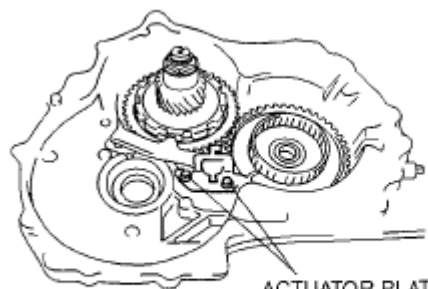
36. Remove the differential.



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Fig. 23: View Of Differential
Courtesy of MAZDA MOTORS CORP.

37. Remove the actuator plate.

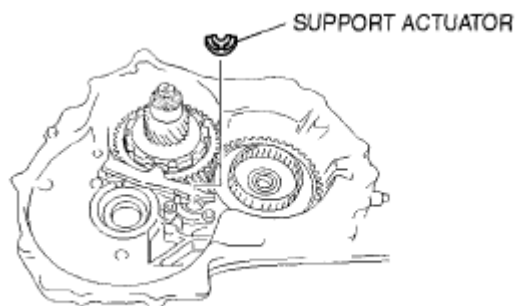


ACTUATOR PLATE
INSTALLATION BOLTS

D6E517ZA5015

Fig. 24: View Of Actuator Plate
Courtesy of MAZDA MOTORS CORP.

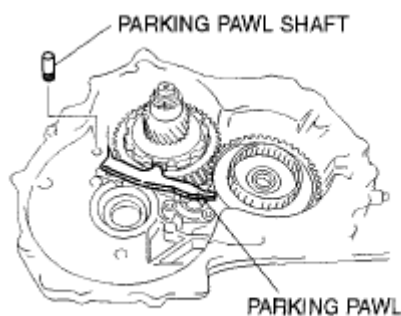
38. Remove the support actuator.



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Fig. 25: View Of Support Actuator
Courtesy of MAZDA MOTORS CORP.

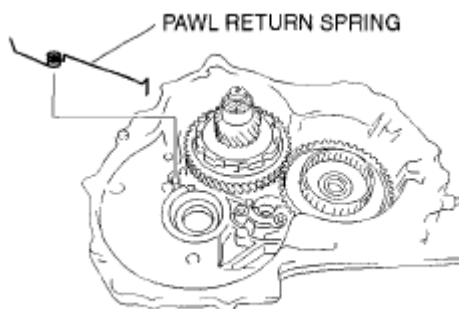
39. Pull out the parking pawl shaft.
40. Remove the parking pawl.



D6E517ZA5017

Fig. 26: View Of Parking Pawl
Courtesy of MAZDA MOTORS CORP.

41. Remove the pawl return spring.



D6E517ZA5018

Fig. 27: View Of Pawl Return Spring
Courtesy of MAZDA MOTORS CORP.

42. Remove the Output gear component.

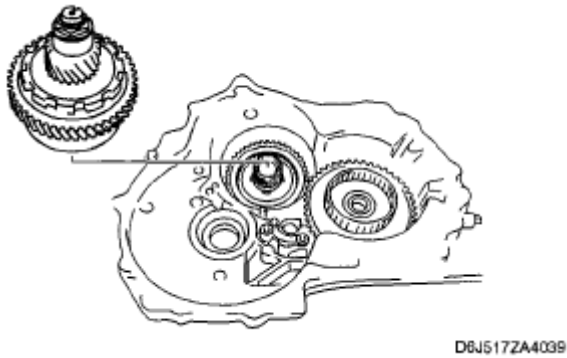


Fig. 28: View Of Output Gear Component
Courtesy of MAZDA MOTORS CORP.

43. Remove the Secondary sun gear.

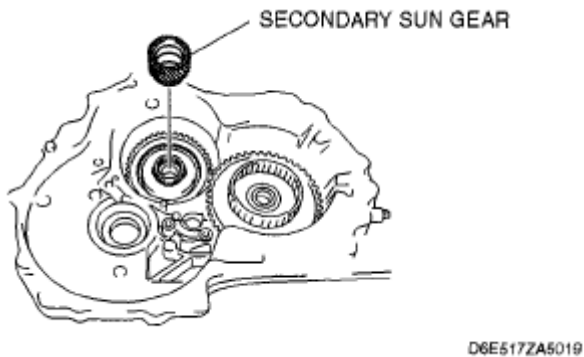


Fig. 29: View Of Secondary Sun Gear
Courtesy of MAZDA MOTORS CORP.

44. Remove the direct clutch component and one-way clutch No.2.

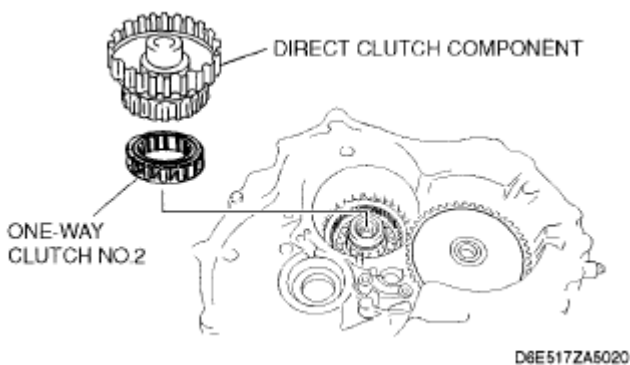


Fig. 30: View Of Direct Clutch Component And One-Way Clutch No.2
Courtesy of MAZDA MOTORS CORP.

45. Remove the Needle bearing, seal rings and spacer.
46. Remove the reduction brake.(See **REDUCTION BRAKE DISASSEMBLY/ ASSEMBLY.**)

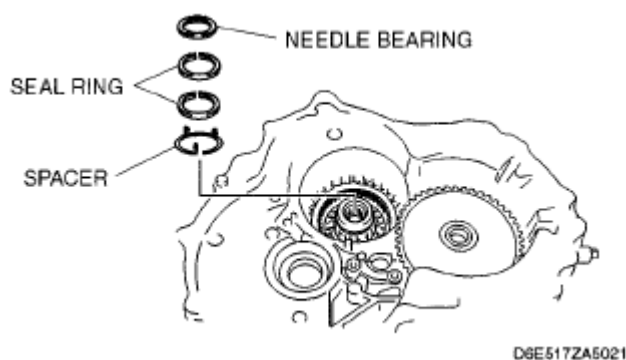


Fig. 31: View Of Needle Bearing, Seal Rings And Spacer
 Courtesy of MAZDA MOTORS CORP.

47. Remove the end cover.
48. Remove the O-rings from the transaxle case.

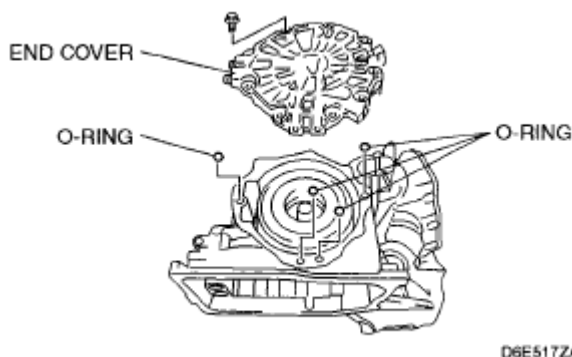


Fig. 32: View Of O-Rings From Transaxle Case
 Courtesy of MAZDA MOTORS CORP.

49. Remove the band strut.

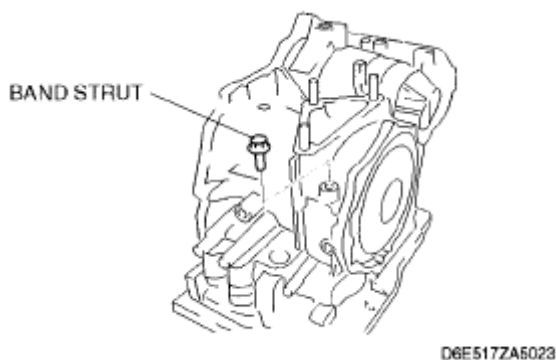
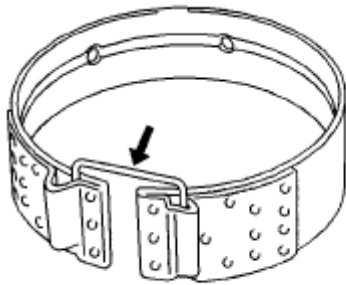


Fig. 33: View Of Band Strut
 Courtesy of MAZDA MOTORS CORP.

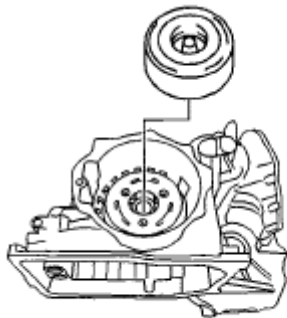
50. Remove the 2-4 brake band, and hold it together using a piece of wire as shown in the figure.



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Fig. 34: View Of 2-4 Brake Band
Courtesy of MAZDA MOTORS CORP.

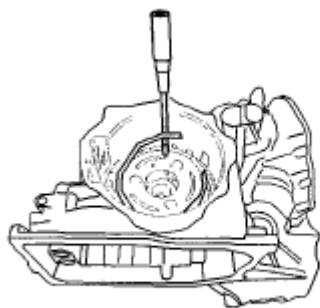
51. Remove the clutch component.



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Fig. 35: View Of Clutch Component
Courtesy of MAZDA MOTORS CORP.

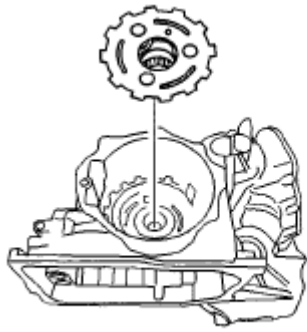
52. Remove the snap ring.



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Fig. 36: View Of Snap Ring
Courtesy of MAZDA MOTORS CORP.

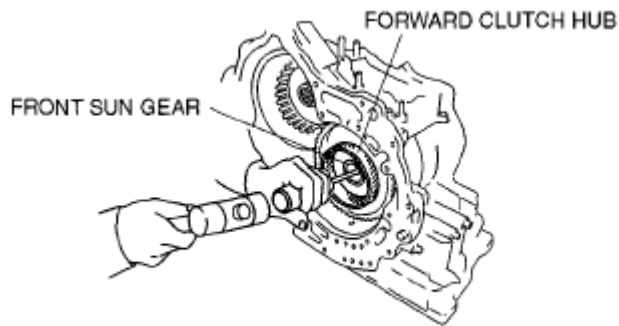
53. Remove the rear planetary gear component.



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Fig. 37: View Of Rear Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

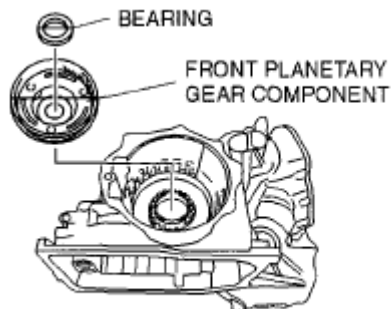
54. Remove the front sun gear by tapping its end with a flathead screwdriver or similar tool, as shown in the figure.
55. Remove the forward clutch hub.



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Fig. 38: View Of Forward Clutch Hub
Courtesy of MAZDA MOTORS CORP.

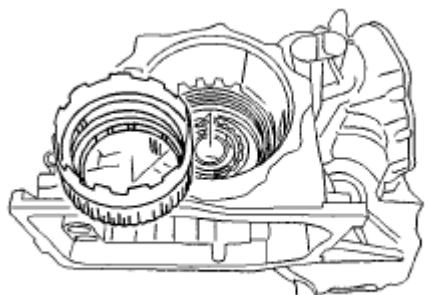
56. Remove the front planetary gear component.



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Fig. 39: View Of Front Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

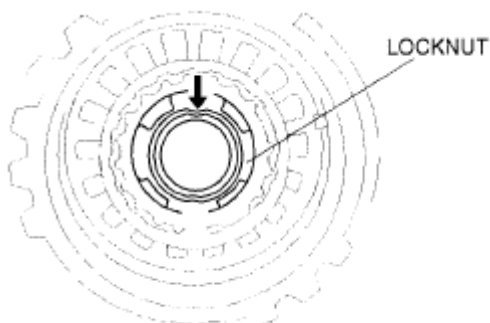
57. Remove the front internal gear and one-way clutch component.



D6J517ZA4028

Fig. 40: View Of Front Internal Gear And One-Way Clutch Component
Courtesy of MAZDA MOTORS CORP.

58. Remove the locknut.
1. Knock the crimped portion of the locknut outward by using a small chisel and a hammer.



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Fig. 41: View Of Lock Nut
Courtesy of MAZDA MOTORS CORP.

2. Install the SST to the primary gear in the order shown.

Tightening torque

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

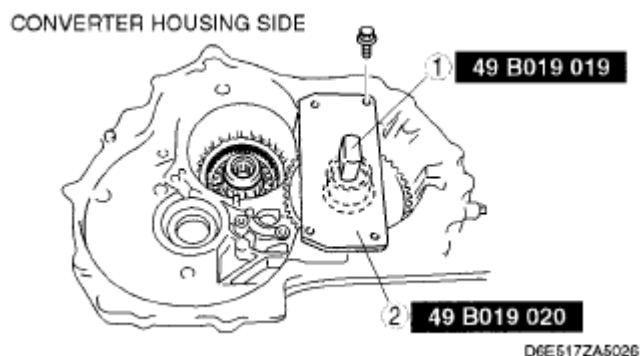


Fig. 42: View Of SST And Primary Gear
Courtesy of MAZDA MOTORS CORP.

3. Install the SST to the locknut in the order shown.

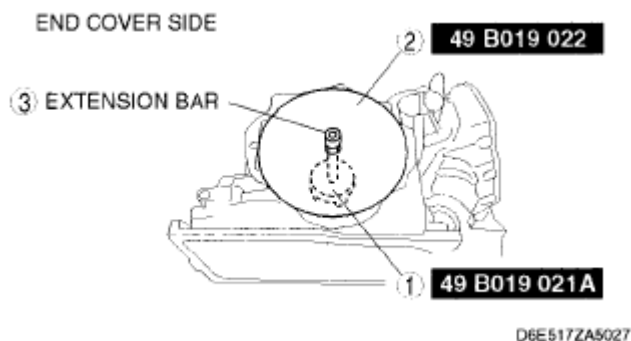


Fig. 43: View Of SST
Courtesy of MAZDA MOTORS CORP.

4. Remove the locknut.

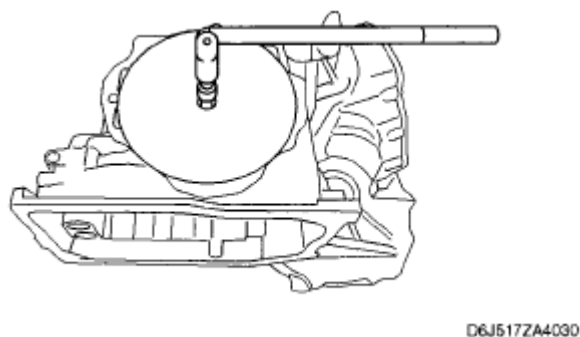


Fig. 44: View Of Locknut
Courtesy of MAZDA MOTORS CORP.

59. Remove the primary gear by tapping it with a flathead screwdriver, etc. as shown in the figure.

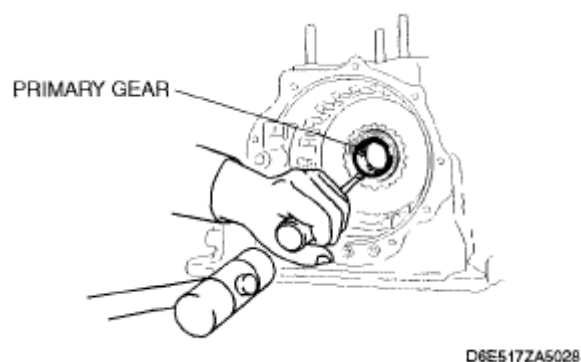


Fig. 45: View Of Primary Gear
Courtesy of MAZDA MOTORS CORP.

60. Remove the bearing and distance piece.

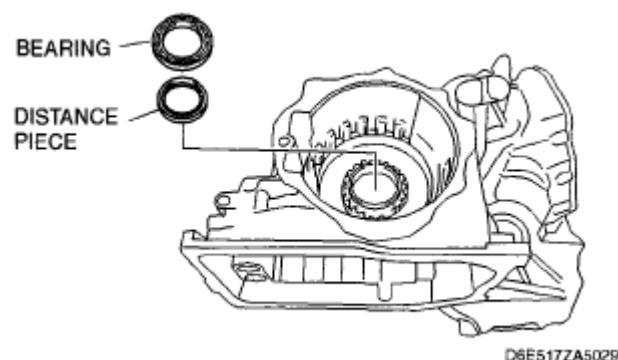


Fig. 46: View Of Bearing And Distance Piece
Courtesy of MAZDA MOTORS CORP.

CAUTION:

- Removing the bearing race using a flathead screwdriver can damage the inside of the bearing race. Handle the flathead screwdriver carefully.

61. Remove torx screws from the converter housing side.
62. Remove the bearing race.

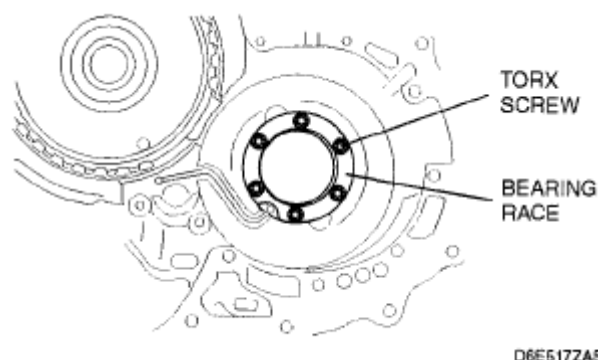


Fig. 47: Identifying Torx Screws At Converter Housing
Courtesy of MAZDA MOTORS CORP.

63. Remove the bearing race using the SST as shown in the figure.

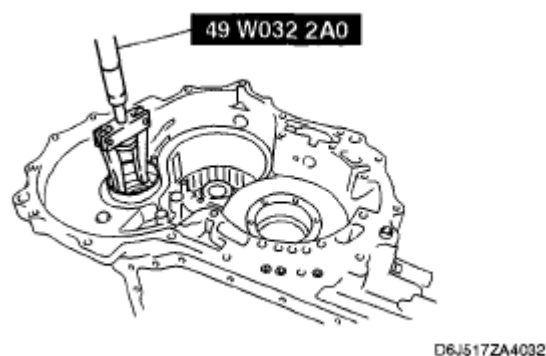


Fig. 48: View Of Bearing Race
Courtesy of MAZDA MOTORS CORP.

64. Remove the bearing using the SST as shown in the figure.

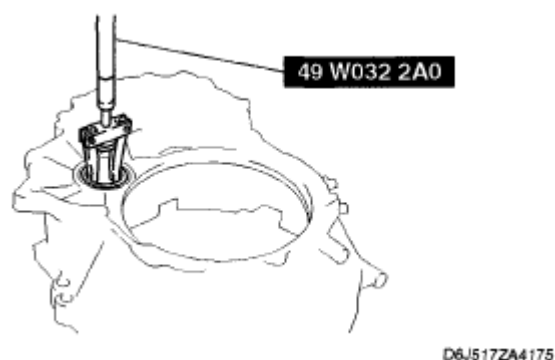


Fig. 49: Removing Bearing Using SST
Courtesy of MAZDA MOTORS CORP.

ACCUMULATORS DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

1	Servo apply accumulator
2	Servo apply accumulator large spring
3	Servo apply accumulator small spring
4	Forward accumulator
5	Forward accumulator large spring
6	Forward accumulator small spring

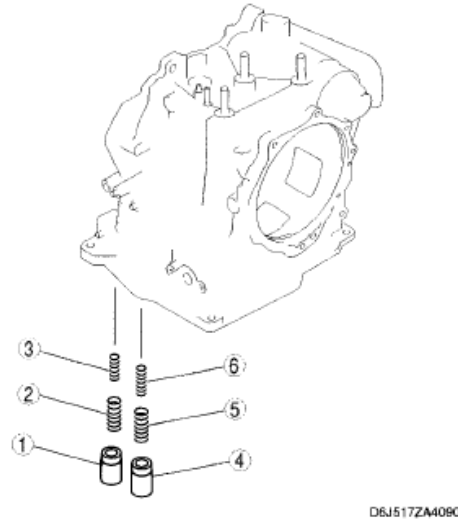


Fig. 50: Identifying Accumulator Components
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

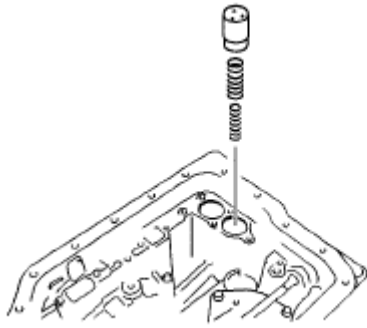
1. Measure the spring free length.

Accumulator spring (standard)

ACCUMULATOR SPRING SPECIFICATIONS

Spring	Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
Servo apply accumulator large spring	21.0 {0.827}	67.8 {2.669}	10.3	3.5 {0.138}
Servo apply accumulator small spring	13.0 {0.512}	67.8 {2.669}	17.1	2.2 {0.087}
Forward accumulator large spring	21.0 {0.827}	75.0 {2.953}	10.7	2.3 {0.091}
Forward accumulator small spring	15.6 {0.614}	49.0 {1.929}	7.7	2.4 {0.094}

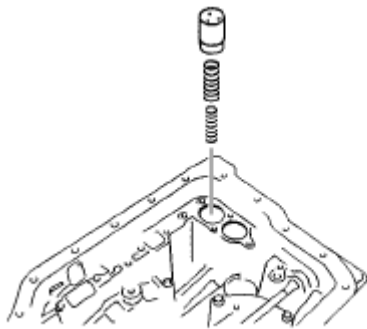
- If not as specified, replace the spring.
2. Install the forward accumulator small spring, forward accumulator large spring and forward accumulator.



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Fig. 51: View Of Forward Accumulator Small Spring
Courtesy of MAZDA MOTORS CORP.

3. Install the servo apply accumulator small spring, servo apply accumulator large spring and servo apply accumulator.

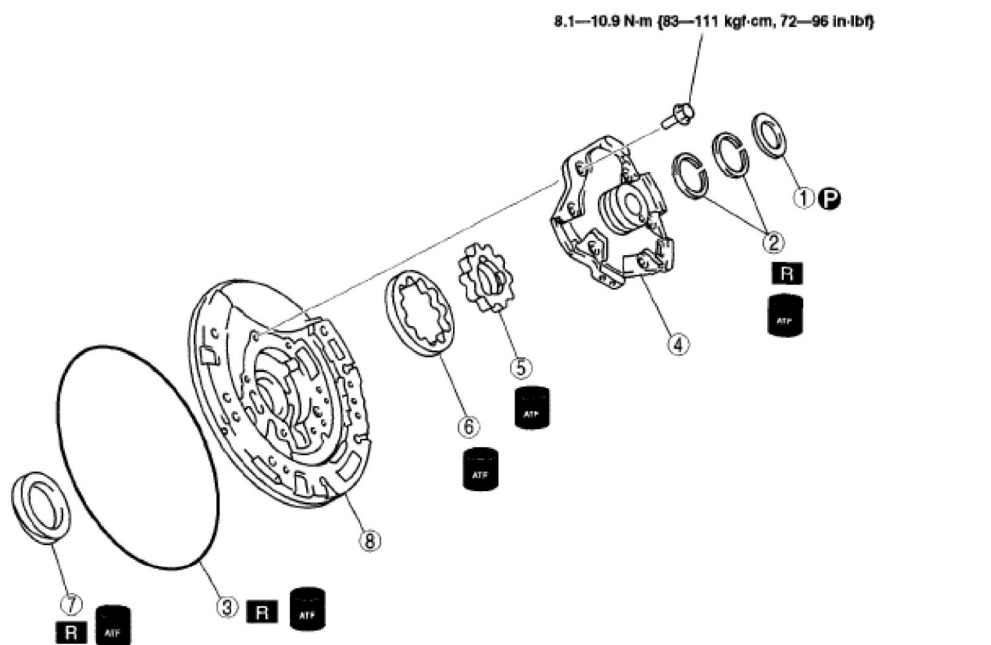


D6J517ZA4092

Fig. 52: View Of Servo Apply Accumulator Small Spring
Courtesy of MAZDA MOTORS CORP.

OIL PUMP DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly. (See **OIL PUMP PREINSPECTION.**)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



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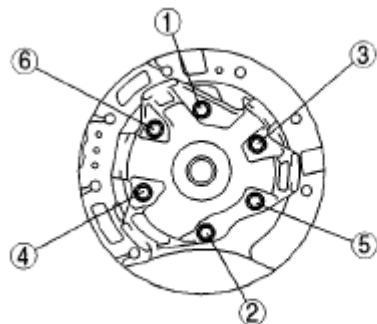
1	Thrust washer
2	Seal rings
3	O-ring
4	Oil pump cover (See Oil Pump Cover Disassembly Note.)
5	Inner rotor (See Inner Rotor, Outer Rotor Disassembly Note.)

6	Outer rotor (See Inner Rotor, Outer Rotor Disassembly Note.)
7	Oil seal
8	Oil pump housing

Fig. 53: Exploded View Of Oil Pump Components
Courtesy of MAZDA MOTORS CORP.

OIL PUMP COVER DISASSEMBLY NOTE

- Loosen the mounting bolts evenly in the pattern shown and remove the oil pump cover from the oil pump housing.

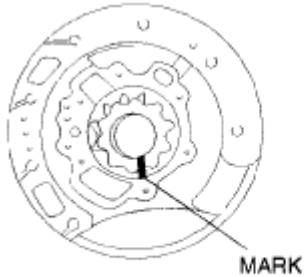


D6J517ZA4129

Fig. 54: Identifying Mounting Bolts
Courtesy of MAZDA MOTORS CORP.

INNER ROTOR, OUTER ROTOR DISASSEMBLY NOTE

- Mark the outer and inner rotors without scratching or denting them, then remove the oil pump housing.

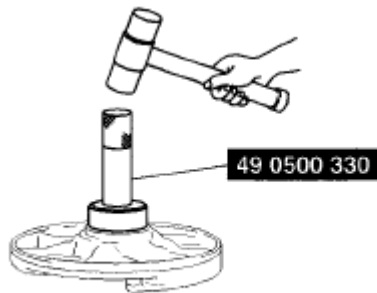


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Fig. 55: Marking Outer And Inner Rotors
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Apply ATF to new oil seal and install it onto oil pump housing using the SST .



B3E0517A103

Fig. 56: Installing Oil Seal
Courtesy of MAZDA MOTORS CORP.

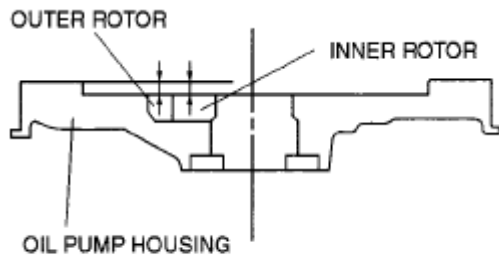
2. Measure the clearance between the end of the oil pump housing and the outer rotor and inner rotor at four places along their circumferences.

Clearance between the end of the oil pump housing and the outer rotor and inner rotor

Standard: 0.04-0.05 mm {0.0016-0.0019 in}

Maximum: 0.05 mm {0.002 in}

- If not as specified, replace the oil pump.



B3E0517A104

Fig. 57: Measuring Clearance Between End Of Oil Pump Housing And Outer Rotor
Courtesy of MAZDA MOTORS CORP.

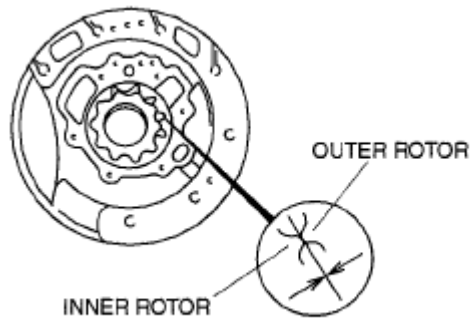
3. Measure the clearance between the outer rotor and the inner rotor.

Clearance between the outer rotor and the inner rotor

Standard: 0.02-0.11 mm {0.0008-0.0043 in}

Maximum: 0.12 mm {0.0047 in}

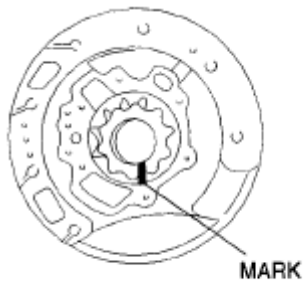
- If not within the specification, replace the oil pump.
4. Apply ATF to the outer and inner rotors.
 5. Align the marks and install the outer and inner rotors.



B3E0517A105

Fig. 58: Measuring Clearance Between Outer Rotor And Inner Rotor
Courtesy of MAZDA MOTORS CORP.

6. Install the oil pump flange.
7. Mount the oil pump cover onto the oil pump housing.



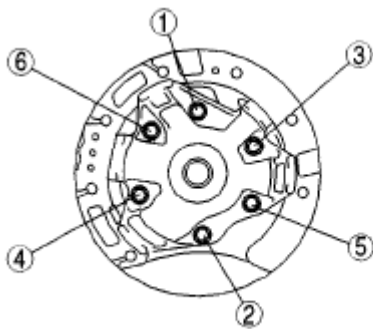
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Fig. 59: Marking Outer And Inner Rotors
Courtesy of MAZDA MOTORS CORP.

8. Tighten the bolts evenly and gradually in the order shown.

Tightening torque

8.1-10.9 N.m {83-111 kgf.cm, 72-96 in.lbf}

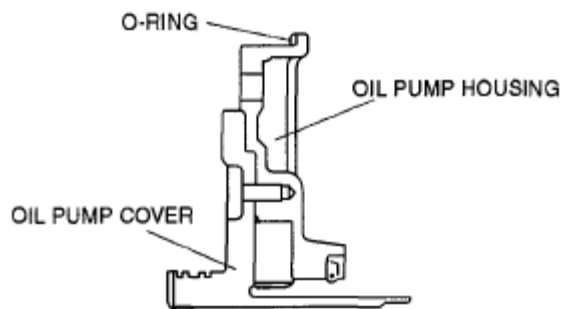


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Fig. 60: View Of Bolt Tightening Sequence
Courtesy of MAZDA MOTORS CORP.

9. Apply ATF to new O-ring and install it onto the oil pump housing.

O-ring inner diameter 209.5 mm {8.248 in}



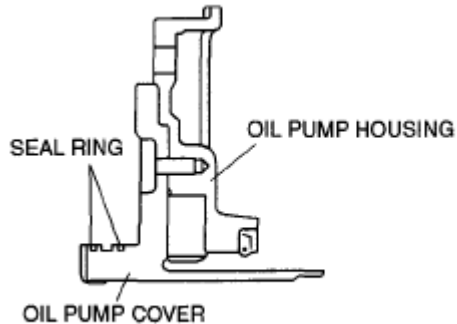
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Fig. 61: Identifying Oil Pump Housing, O-Ring & Oil Pump Cover
Courtesy of MAZDA MOTORS CORP.

10. Apply ATF to new seal rings and install them onto the oil pump cover.

Seal ring inner diameter

47.1 mm {1.854 in}

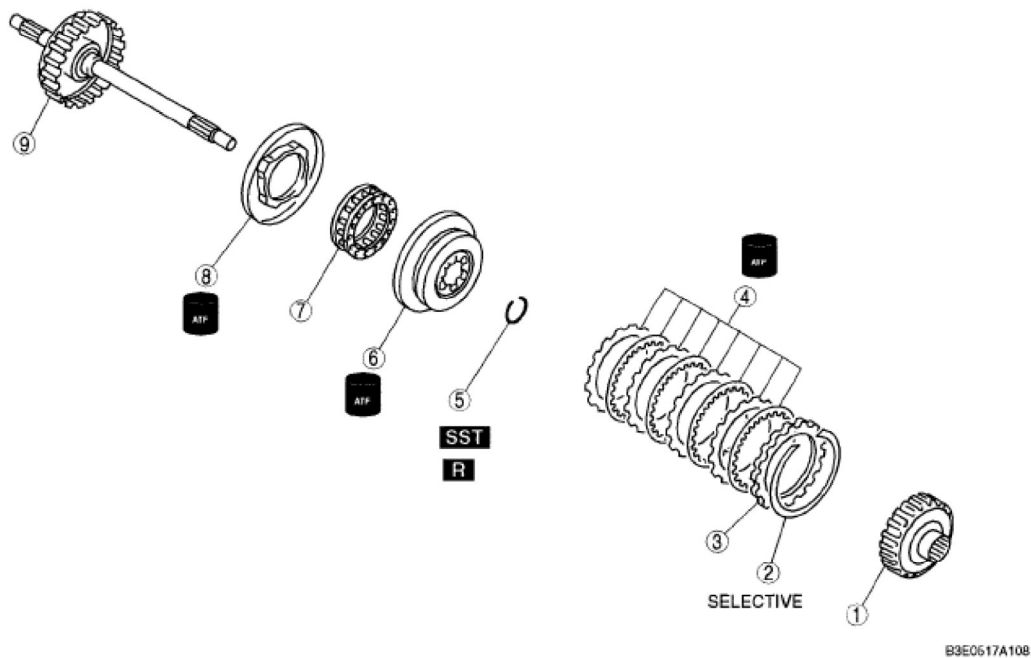


B3E0517A107

Fig. 62: Locating Seal Rings On Oil Pump Cover
Courtesy of MAZDA MOTORS CORP.

FORWARD CLUTCH DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly. (See **FORWARD CLUTCH PREINSPECTION.**)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



1	Forward clutch hub
2	Snap ring
3	Retaining plate
4	Drive and driven plate
5	Snap ring (See Snap Ring Disassembly Note.)

6	Seal plate
7	Springs and retainer component
8	Forward clutch piston (See Forward Clutch Piston Disassembly Note.)
9	Forward clutch drum and turbine shaft

Fig. 63: Identifying Forward Clutch Components
Courtesy of MAZDA MOTORS CORP.

SNAP RING DISASSEMBLY NOTE

1. Install the SST to the forward clutch.

CAUTION:

- Depress the seal plate only enough to remove the snap ring. Overpressing will damage the seal plate assembly edges.

2. Compress the seal plate.
3. Remove the snap ring.
4. Remove the SST, then remove the seal plate and spring and retainer component.

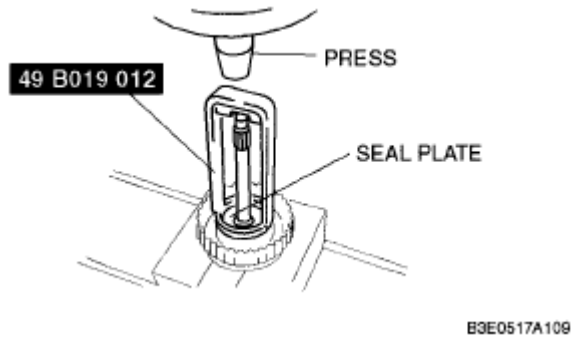


Fig. 64: Removing Seal Plate And Spring And Retainer Component
Courtesy of MAZDA MOTORS CORP.

FORWARD CLUTCH PISTON DISASSEMBLY NOTE

1. Set the forward clutch drum and turbine shaft onto the oil pump.
2. Remove the forward clutch piston by applying compressed air through the fluid passage.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

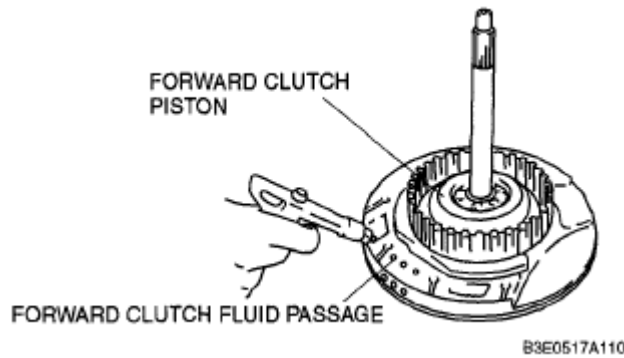


Fig. 65: Applying Compressed Air Through Fluid Passage
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Measure the facing thickness in three places, and calculate the average value.

Forward clutch drive plate thickness

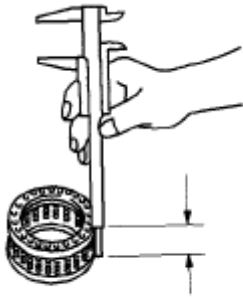
Standard: 1.60 mm {0.063 in}

Minimum: 1.45 mm {0.057 in}

- If not within the specification, replace the drive plates.
2. Measure the spring free length.

Forward clutch springs and retainer component free length**Standard: 17.2 mm {0.677 in}****Minimum: 15.2 mm {0.598 in}**

- If not within the specification, replace the spring and retainer component.



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Fig. 66: Measuring Spring Free Length
Courtesy of MAZDA MOTORS CORP.

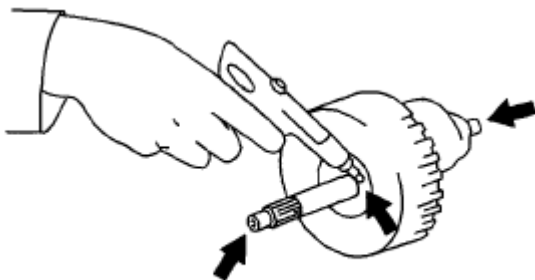
3. Verify that there is airflow when applying compressed air through the fluid passage.

Air pressure**392 kPa {4.0 kgf/cm² , 57 psi} max.**

4. Replace the forward clutch drum and turbine shaft if damaged or malfunctioning.

CAUTION:

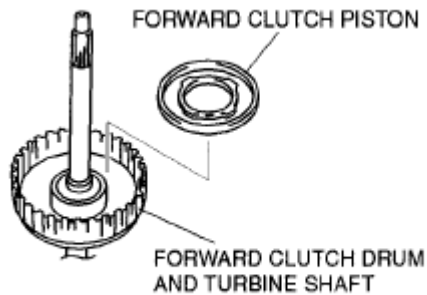
- Installing the forward clutch piston may damage its seal. Carefully install the forward clutch piston by pushing evenly around the circumference.



B3E0517A112

Fig. 67: Applying Compressed Air Through Fluid Passage
Courtesy of MAZDA MOTORS CORP.

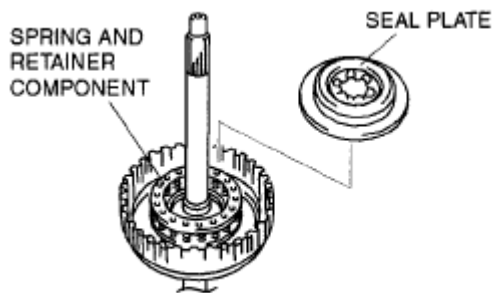
5. Apply ATF to the circumference of the forward clutch piston seal, and install the piston into the forward clutch drum and turbine shaft.
6. Install the spring and retainer component.



B3E0517A113

Fig. 68: View Of Forward Clutch Piston & Drum
Courtesy of MAZDA MOTORS CORP.

7. Apply ATF to the seal plate, and install it onto the forward clutch drum.



B3E0517A114

Fig. 69: Applying ATF To Seal Plate
Courtesy of MAZDA MOTORS CORP.

8. Install the SST to the forward clutch drum and turbine shaft as shown.

CAUTION:

- Depress the seal plate only enough to remove the snap ring. Overpressing will damage the seal plate assembly edges.

9. Compress the seal plate.
10. Install the snap ring.
11. Remove the SST .

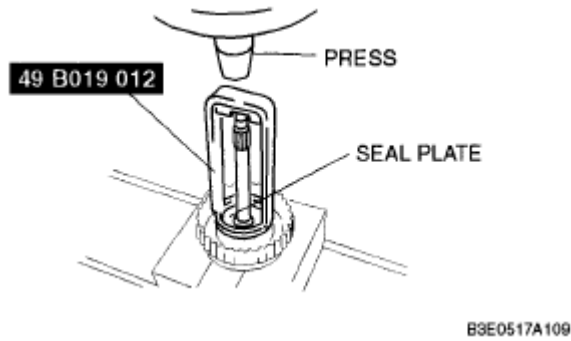


Fig. 70: Removing Seal Plate And Spring And Retainer Component
Courtesy of MAZDA MOTORS CORP.

12. Install the drive and driven plates in the following order.

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

13. Install the retaining plate.
14. Install the snap ring.

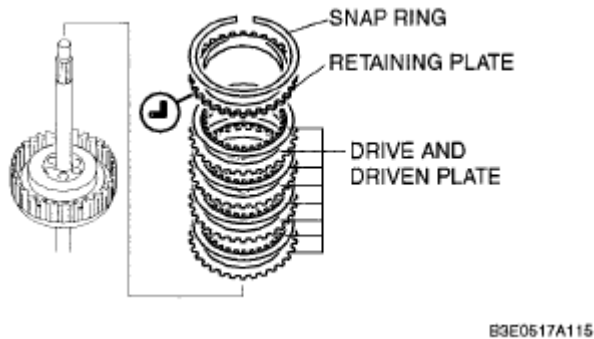
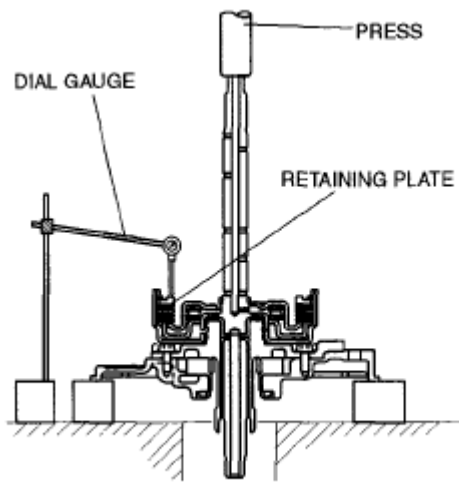


Fig. 71: Measuring Forward Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

15. Measure the forward clutch clearance.
 1. Install the forward clutch in the oil pump, and set the dial gauge.
 2. Secure the forward clutch by lightly pressing down with a press or similar tool.



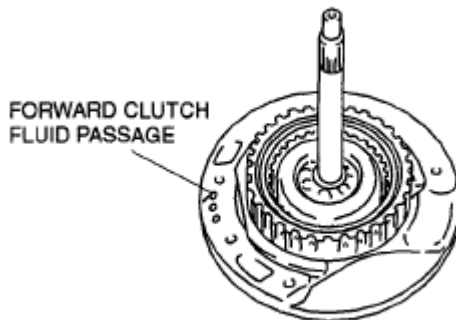
B3E0517A116

Fig. 72: Securing Forward Clutch
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the forward clutch piston stroke three times.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}



B3E0517A117

Fig. 73: Identifying Forward Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

4. Apply compressed air and operate the forward clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the forward clutch piston is not operating.
6. Calculate the forward clutch clearance according to the following formula:

Step (4) value-Step (5) value= Forward clutch clearance.

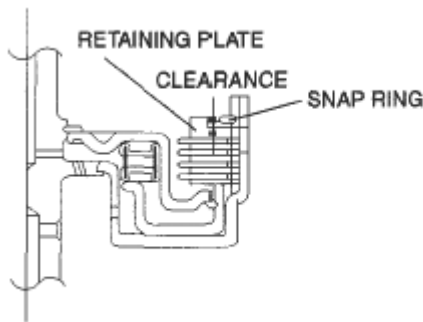
7. Measure the clearances at four locations (90° apart) by following the steps (3) to (6).

Verify that the average value is within the specification below:

Forward clutch clearance

Standard: 1.50-1.80 mm {0.059-0.070 in}

- If not as specified, remove the snap ring and measure its thickness.
8. Add the thickness to the average value calculated in step (7), and select the snap ring whose range includes the value.



B3E0517A118

Fig. 74: Measuring Forward Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

Snap ring size for forward clutch clearance

SNAP RING SIZE FOR FORWARD CLUTCH CLEARANCE SPECIFICATIONS

Range mm {in}	Snap ring sizes mm {in}
2.810-3.010 {0.111-0.118}	1.2 {0.047}
3.010-3.210 {0.119-0.126}	1.4 {0.055}
3.210-3.410 {0.127-0.134}	1.6 {0.063}
3.410-3.610 {0.135-0.142}	1.8 {0.071}
3.610-3.810 {0.143-0.150}	2.0 {0.079}
3.810-4.010 {0.150-0.157}	2.2 {0.087}

9. Install the selected snap ring and perform steps (2) to (7) again. Verify that the calculated value satisfies the clearance specification.
16. Inspect the forward clutch operation.
 1. Install the forward clutch drum and turbine shaft to the oil pump.
 2. Inspect the forward clutch operation by applying compressed air as shown.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

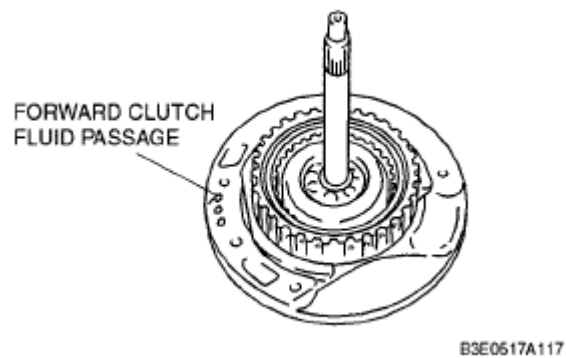
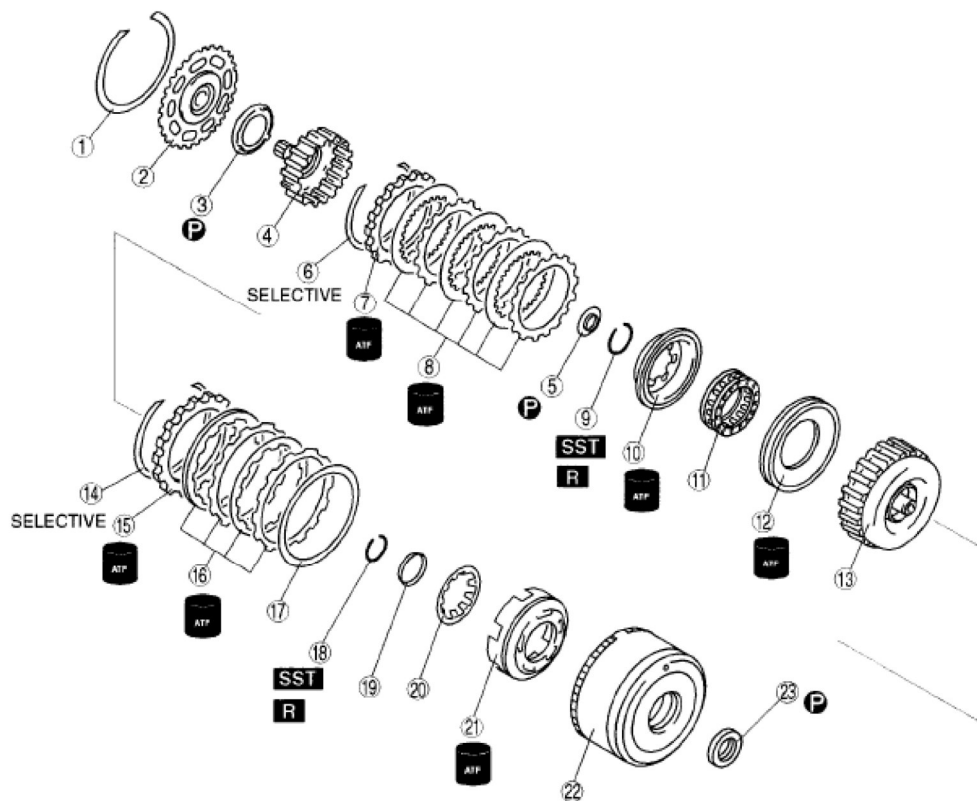


Fig. 75: Identifying Forward Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

17. Install the forward clutch hub.

CLUTCH COMPONENT DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly. (See CLUTCH COMPONENT PREINSPECTION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



B3E0517A244

1	Snap ring
2	Rear sun gear plate
3	Bearing
4	3-4 clutch hub
5	Bearing
6	Snap ring
7	Retaining plate
8	Drive and driven plate
9	Snap ring (See Snap Ring (3-4 clutch) Disassembly Note.)
10	Seal plate
11	Spring and retainer component
12	3-4 clutch piston (See 3-4 Clutch Piston Disassembly Note.)

13	3-4 clutch drum
14	Snap ring
15	Retaining plate
16	Drive and driven plate
17	Dish plate
18	Snap ring (See Snap Ring (Reverse clutch) Disassembly Note.)
19	Reverse return stopper
20	Piston return spring
21	Reverse piston (See Reverse Piston Disassembly Note.)
22	2-4 brake drum
23	Bearing

Fig. 76: Identifying Clutch Components
Courtesy of MAZDA MOTORS CORP.

SNAP RING (3-4 CLUTCH) DISASSEMBLY NOTE

1. Install the SST as shown.

CAUTION:

- Depress the seal plate only enough to remove the snap ring. Overpressing will damage the seal plate assembly edges.

2. Compress the seal plate.

3. Remove the snap ring.
4. Remove the SST , then remove the seal plate and spring and retainer component.

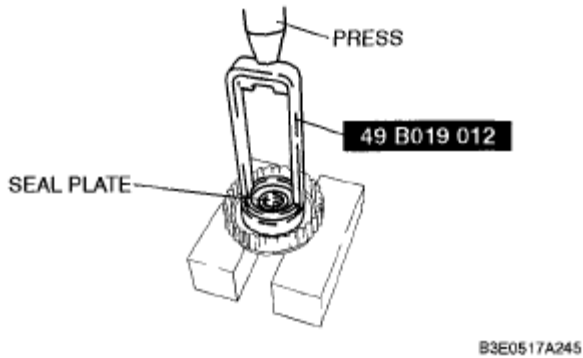


Fig. 77: Removing Seal Plate
Courtesy of MAZDA MOTORS CORP.

3-4 CLUTCH PISTON DISASSEMBLY NOTE

1. Set the 3-4 clutch drum onto the end cover.
2. Remove the 3-4 clutch piston from the 3-4 clutch drum by applying compressed air through the fluid passage.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

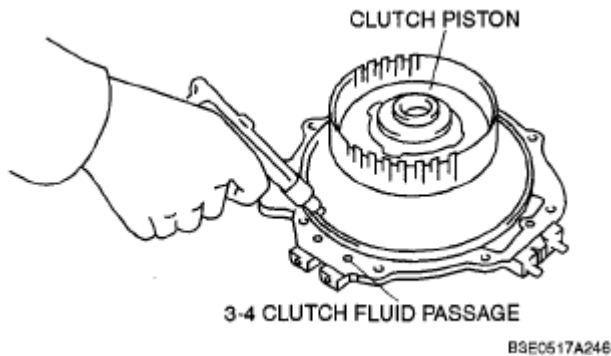


Fig. 78: Applying Compressed Air Through Fluid Passage
Courtesy of MAZDA MOTORS CORP.

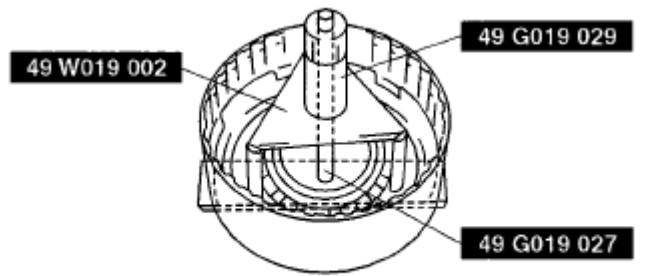
SNAP RING (REVERSE CLUTCH) DISASSEMBLY NOTE

1. Install the SSTs as shown.

CAUTION: • Depress the piston return spring only enough to remove the

snap ring. Overpressing will damage the piston return spring assembly edges.

2. Compress the piston return spring.
3. Remove the snap ring.
4. Remove the SSTs, then remove the reverse return stopper and return spring.



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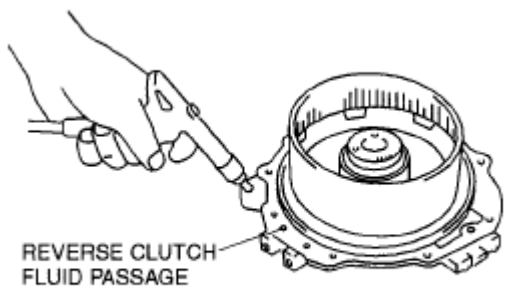
Fig. 79: Compressing Piston Return Spring
Courtesy of MAZDA MOTORS CORP.

REVERSE PISTON DISASSEMBLY NOTE

1. Set the 2-4 brake drum onto the end cover.
2. Remove the reverse piston from the 2-4 brake drum by applying compressed air through the fluid passage.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.



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Fig. 80: Applying Compressed Air Through Fluid Passage
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

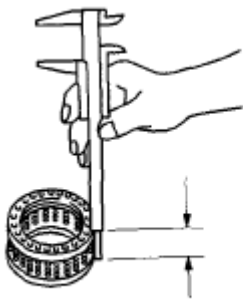
1. Measure the facing thickness in three places and calculate the average value.

Reverse clutch drive plate thickness**Standard: 1.60 mm {0.063 in}****Minimum: 1.45 mm {0.057 in}****3-4 clutch drive plate thickness****Standard: 2.55 mm {0.100 in}****Minimum: 2.40 mm {0.094 in}****3-4 clutch driven plate thickness****Standard: 2.55 mm {0.100 in}****Minimum: 2.40 mm {0.094 in}**

- If not within the specification, replace the drive plates.
2. Measure the free length of the spring and inspect for deformation.

3-4 clutch springs and retainer component free length**Standard: 17.2 mm {0.677 in}****Minimum: 15.2 mm {0.598 in}**

- If not within the specification, replace the spring and retainer.



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Fig. 81: Measuring Spring Free Length
Courtesy of MAZDA MOTORS CORP.

3. Verify that there is airflow when applying compressed air through the fluid passage of 3-4 clutch drum.

Air pressure

392 kPa {4.0 kgf/cm² ,57 psi} max.

4. Replace the 3-4 clutch drum if damaged or malfunctioning.



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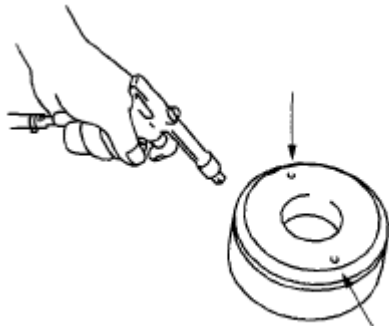
Fig. 82: Applying Compressed Air Through Fluid Passage Of 3-4 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

5. Verify that there is airflow when applying compressed air through the fluid passage of 2-4 brake drum.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

6. Replace the 2-4 brake drum if damaged or malfunctioning.



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Fig. 83: Applying Compressed Air Through Fluid Passage Of 2-4 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

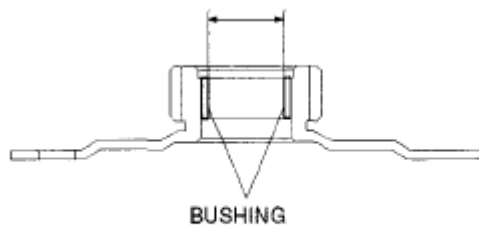
7. Measure the bushing of the rear sun gear.

Rear sun gear bushing inner diameter

Standard: 29.900-29.921 mm {1.17717-1.17799 in}

Maximum: 29.941 mm {1.17878 in}

- If not as specified, replace the rear sun gear plate.



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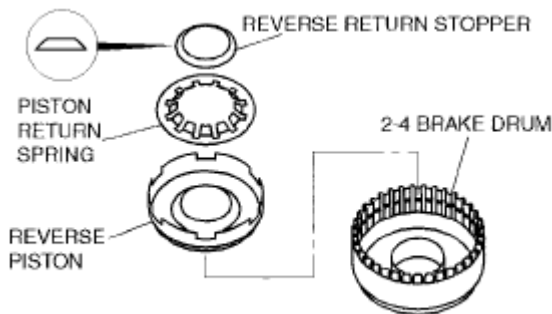
Fig. 84: Measuring Bushing Of Rear Sun Gear
Courtesy of MAZDA MOTORS CORP.

8. Install the reverse clutch.

CAUTION:

- Installing the reverse clutch piston may damage its seal. Carefully install the reverse clutch piston by pushing evenly around the circumference.

1. Apply ATF to the circumference of the reverse clutch piston seal, and install the piston into the 2-4 brake drum.
2. Install the piston return spring and reverse return stopper to the reverse piston.



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Fig. 85: View Of Piston Return Spring, Reverse Return Stopper And Reverse Piston
Courtesy of MAZDA MOTORS CORP.

3. Install the snap ring and the SSTs to the 2-4 brake drum as shown.

CAUTION:

- Depress the piston return spring only enough to install the snap ring. Overpressing will damage the piston return spring assembly edges.

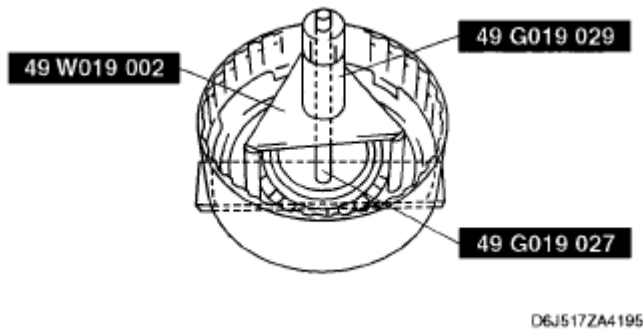


Fig. 86: Installing Snap Ring
Courtesy of MAZDA MOTORS CORP.

4. Compress the piston return spring.
5. Install the snap ring.
6. Remove the SSTs.
7. Install the dish plate.
8. Install the drive and driven plates in the following order.

Driven-Drive-Driven-Drive

9. Install the retaining plate.

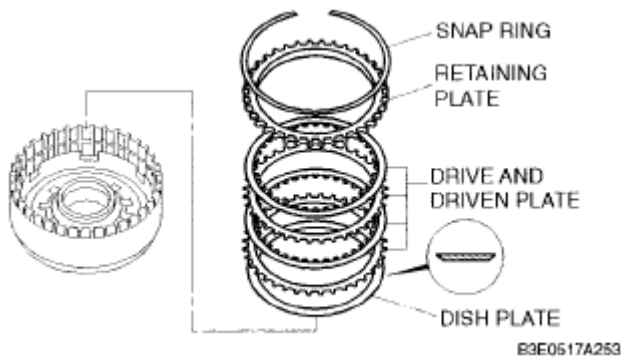


Fig. 87: Measuring Reverse Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

9. Measure the reverse clutch clearance.
 1. Install the reverse clutch into the end cover, and set the dial gauge.
 2. Secure the reverse clutch by lightly pressing down with a press or similar tool.

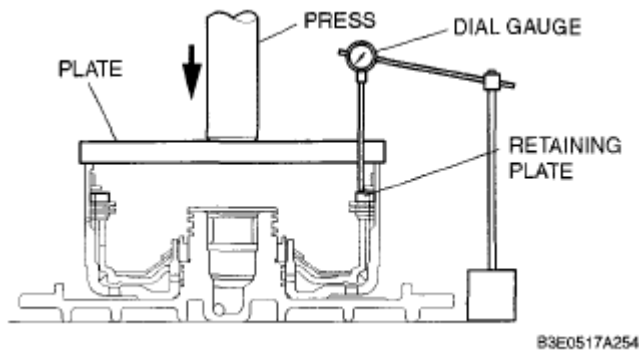


Fig. 88: Securing Reverse Clutch
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the reverse clutch piston stroke three times.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

4. Apply compressed air and operate the reverse clutch piston. Read the value when the indicator of the dial gauge stops.

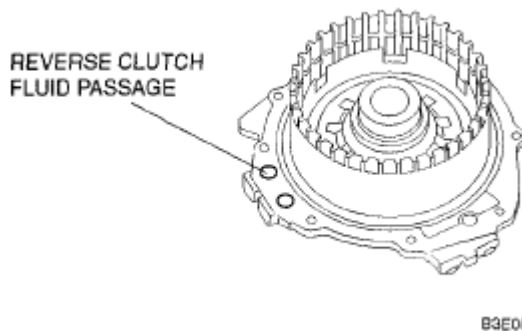


Fig. 89: Identifying Reverse Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

5. Release the compressed air and read the dial gauge when the reverse clutch piston is not operating.
6. Calculate the reverse clutch clearance according to the following formula:

step (4) value - step (5) value = Reverse clutch clearance.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Reverse clutch clearance

Standard: 1.00-1.30 mm {0.039-0.051 in}

- If not within the specification, remove the snap ring and measure its thickness.
8. Add the thickness to the average value calculated in step (7), and select the snap ring whose range includes the value.

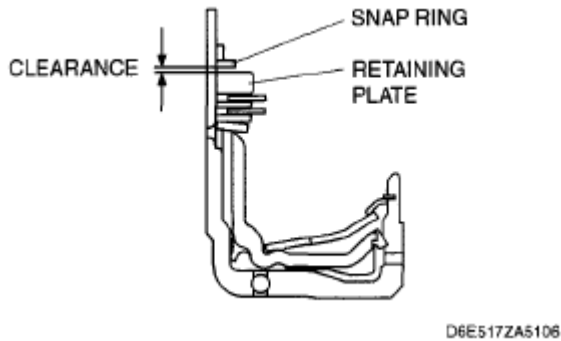


Fig. 90: Measuring Reverse Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

Snap ring size for reverse clutch clearance

SNAP RING SIZE FOR REVERSE CLUTCH CLEARANCE SPECIFICATIONS

Range mm {in}	Snap ring sizes mm {in}
2.370-2.570 {0.094-0.101}	1.2 {0.047}
2.570-2.770 {0.102-0.109}	1.4 {0.055}
2.770-2.970 {0.110-0.116}	1.6 {0.063}
2.970-3.170 {0.117-0.124}	1.8 {0.071}
3.170-3.370 {0.125-0.132}	2.0 {0.079}
3.370-3.570 {0.133-0.140}	2.2 {0.087}

9. Install the selected snap ring and perform steps (2) to (7) again. Verify that the calculated value satisfies the clearance specification.
10. Inspect the reverse clutch operation.
 1. Install the 2-4 brake drum to the end cover.
 2. Inspect the reverse clutch operation by applying compressed air as shown.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

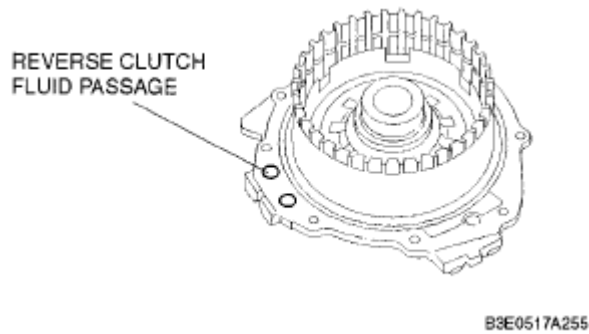


Fig. 91: Identifying Reverse Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

11. Install the 3-4 clutch.

CAUTION:

- Installing the 3-4 clutch piston may damage its seal. Carefully install the 3-4 clutch piston by pushing evenly around the circumference.

1. Apply ATF to the circumference of the 3-4 clutch piston seal, and install the piston in to the 3-4 clutch drum.
2. Install the spring and retainer.
3. Apply ATF to the 3-4 seal plate, and install it onto the 3-4 clutch drum.

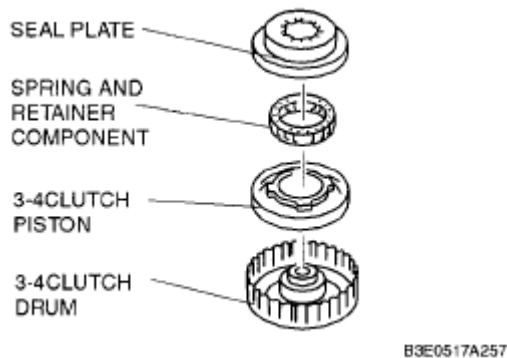


Fig. 92: View Of 3-4 Clutch Drum
Courtesy of MAZDA MOTORS CORP.

4. Install the SST as shown.

CAUTION:

- Depress the 3-4 seal plate only enough to install the snap ring. Overpressing will damage the 3-4 seal plate assembly edges.

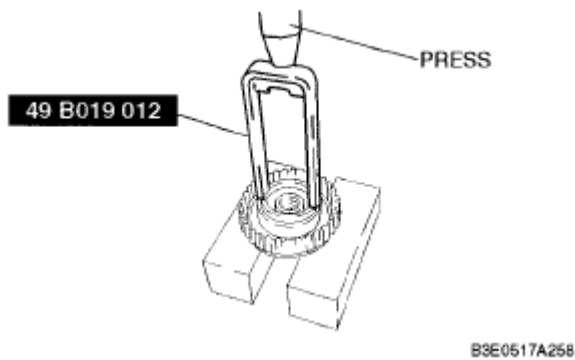


Fig. 93: Measuring Clearances Between Snap Ring And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

5. Compress the spring and retainer component and 3-4 seal plate.
6. Install the snap ring.
7. Remove the SST.
8. Install the drive and driven plates in the following order.

Driven-Drive-Driven-Drive-Driven-Drive

9. Install the retaining plate.

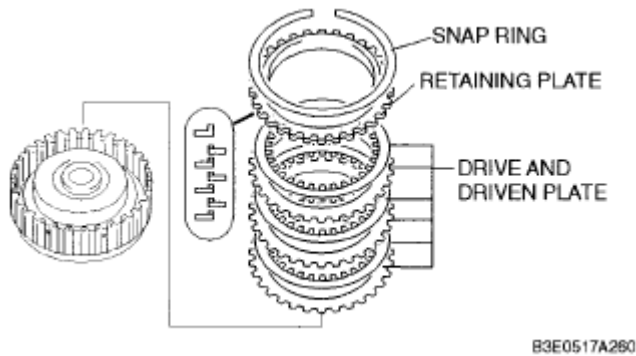


Fig. 94: Measuring 3-4 Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

12. Measure the 3-4 clutch clearance.
 1. Install the 3-4 clutch in the end cover, and set the dial gauge.
 2. Secure the 3-4 clutch by lightly pressing down with a press or similar tool.

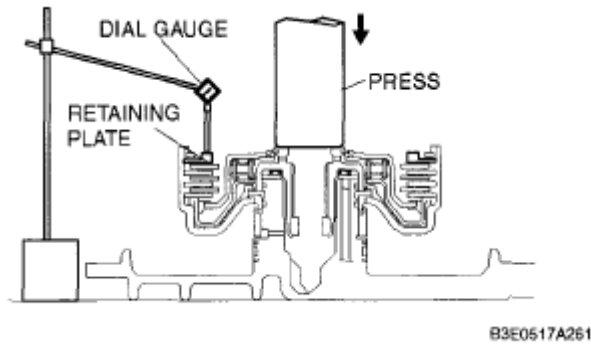


Fig. 95: Securing 3-4 Clutch
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the 3-4 clutch piston stroke three times.

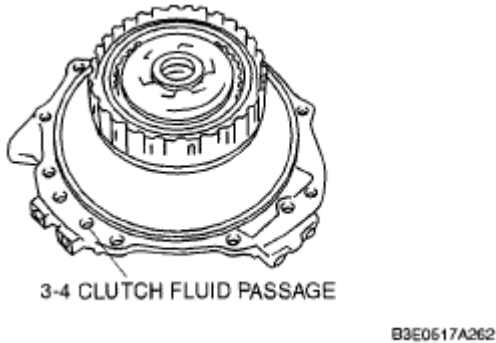


Fig. 96: Identifying 3-4 Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

4. Apply compressed air and operate the 3-4 clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the 3-4 clutch piston is not operating.
6. Calculate the 3-4 clutch clearance according to the following formula:

step (4) value - step (5) value = 3-4 clutch clearance

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

3-4 clutch clearance

Standard: 1.10-1.40 mm {0.043-0.055 in}

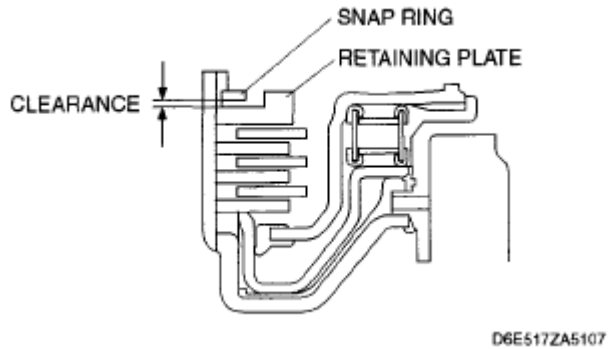


Fig. 97: Measuring Clutch Clearance
 Courtesy of MAZDA MOTORS CORP.

- If not within the specification, remove the snap ring and measure its thickness.
8. Add the thickness to the average value calculated in step (7), and select the snap ring whose range includes the value.

Snap ring size for 3-4 clutch clearance

SNAP RING SIZE SPECIFICATIONS

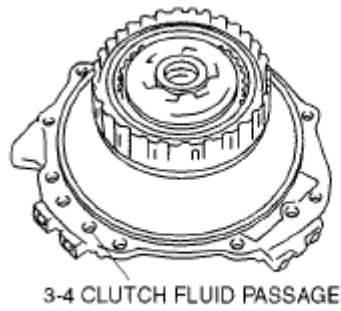
Range mm {in}	Snap ring sizes mm {in}
2.400-2.600 {0.095-0.102}	1.2 {0.047}
2.600-2.800 {0.103-0.110}	1.4 {0.055}
2.800-3.000 {0.111-0.118}	1.6 {0.063}
3.000-3.200 {0.119-0.125}	1.8 {0.071}
3.200-3.400 {0.126-0.133}	2.0 {0.079}
3.400-3.600 {0.134-0.141}	2.2 {0.087}

9. Install the selected snap ring and perform steps (2) to (7) again. Verify that the calculated value satisfies the clearance specification.
13. Inspect the 3-4 clutch operation.
 1. Install the 3-4 clutch drum to the end cover.
 2. Inspect the 3-4 clutch operation by applying compressed air as shown.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

14. Install the 3-4 clutch component to the 2-4 brake drum.

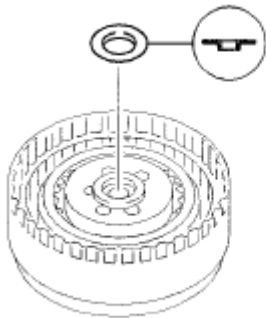


3-4 CLUTCH FLUID PASSAGE

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Fig. 98: Identifying 3-4 Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

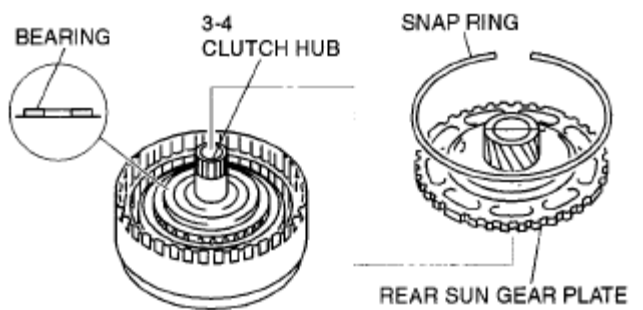
15. Apply petroleum jelly to the bearing, and secure it onto the 3-4 clutch component.



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Fig. 99: Identifying Bearing In 3-4 Clutch Component
Courtesy of MAZDA MOTORS CORP.

16. Install the 3-4 clutch hub.
17. Apply petroleum jelly to the bearing, and secure it onto the 3-4 clutch hub as shown in the figure.
18. Install the rear sun gear plate onto the 2-4 brake drum.
19. Install the snap ring.



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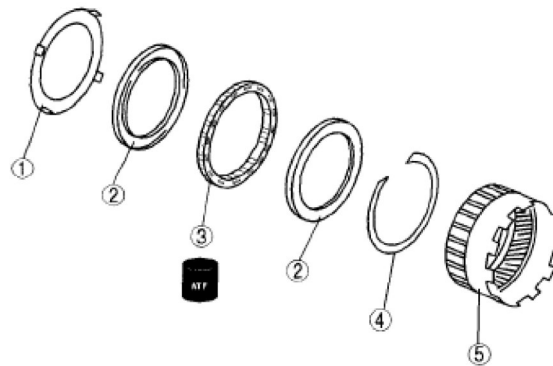
Fig. 100: View Of 3-4 Clutch Hub
Courtesy of MAZDA MOTORS CORP.

FRONT INTERNAL GEAR ONE-WAY CLUTCH NO.1 COMPONENT DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly.

(See **FRONT INTERNAL GEAR AND ONE-WAY CLUTCH NO.1 COMPONENT.**)

2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



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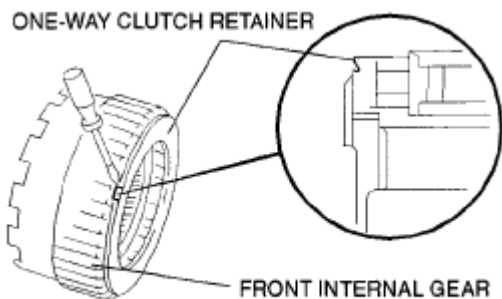
1	One-way clutch retainer (See One-Way Clutch Retainer Disassembly Note.)
2	Side race

3	One-way clutch No.1
4	Snap ring
5	Front internal gear

Fig. 101: Identifying Front Internal Gear One-Way Clutch No.1 Components
Courtesy of MAZDA MOTORS CORP.

ONE-WAY CLUTCH RETAINER DISASSEMBLY NOTE

- Remove the one-way clutch retainer using a flathead screwdriver, etc. as shown in the figure.



B3E0517A120

Fig. 102: View Of One-Way Clutch Retainer
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Install the snap ring.
2. Install the one-way clutch No.1 to the front internal gear in the direction of the arrow (on the one-way clutch) as shown in the figure.
3. Install the side race.
4. Install the one-way clutch retainer.

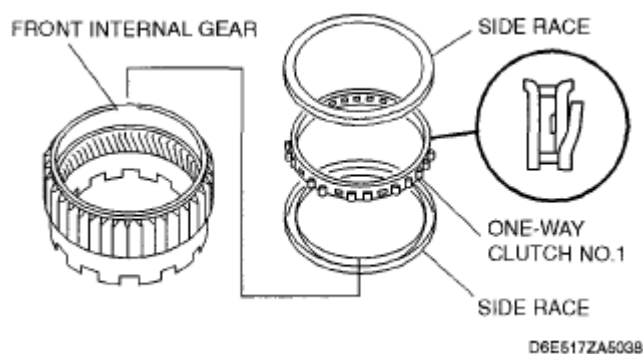
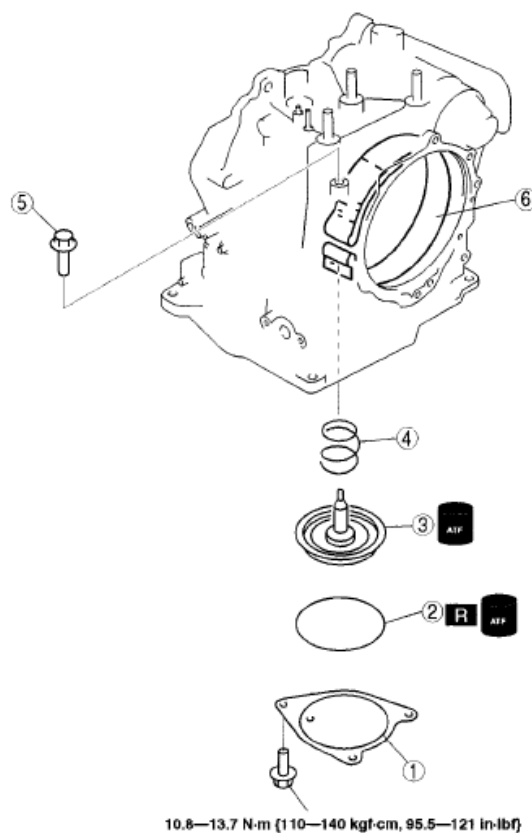


Fig. 103: View Of One-Way Clutch Retainer
Courtesy of MAZDA MOTORS CORP.

BAND SERVO DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



D6E517ZA5C89

1	Servo retainer
2	O-ring
3	Servo piston

4	Servo return spring
5	Band strut
6	2-4 brake band

Fig. 104: Identifying Band Servo Components
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Measure the spring free length.

Servo return spring (Standard)

SERVO RETURN SPRING SPECIFICATIONS

Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
34.0 {1.340}	36.4 {1.430}	2.5	4.0 {0.160}

- If not as specified, replace the spring.
2. Install the servo return spring to the transaxle case.
 3. Install the servo piston to the transaxle case.

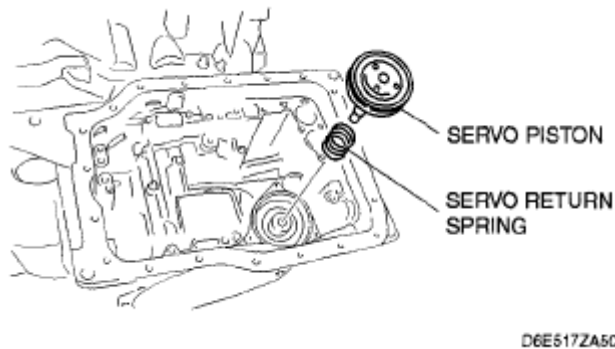


Fig. 105: View Of Servo Return Spring And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

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

O-ring inner diameter 70.2 mm {2.76 in}

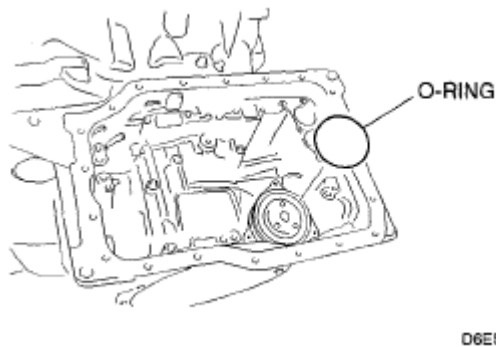


Fig. 106: View Of O-ring And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

5. Install the servo retainer by tightening the bolts evenly and gradually.

Tightening torque

11-14 N.m {113-142 kgf.cm, 97.4-123 in.lbf}

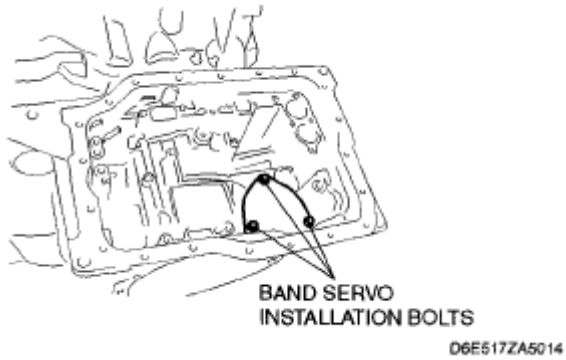


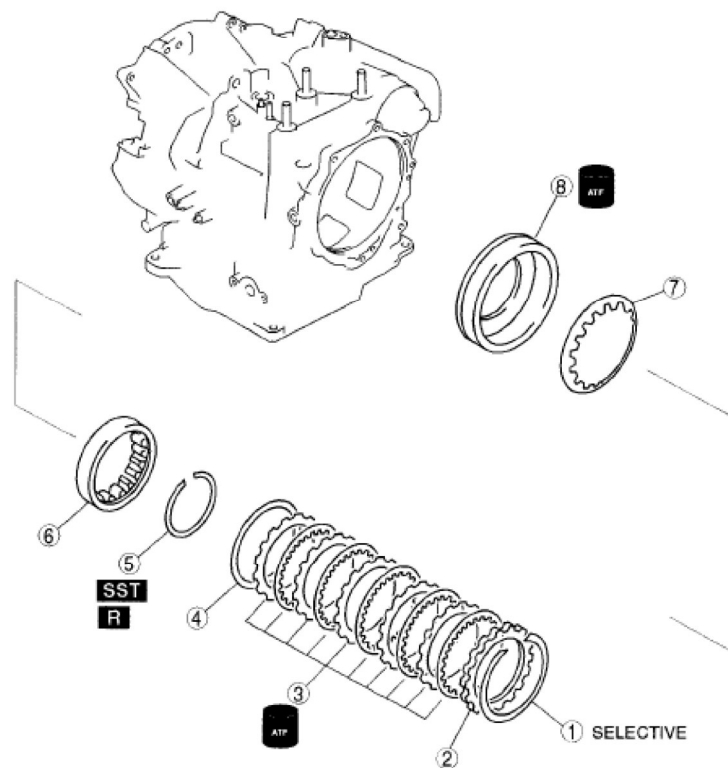
Fig. 107: View Of Servo Retainer Bolts
Courtesy of MAZDA MOTORS CORP.

LOW AND REVERSE BRAKE AND ONE-WAY CLUTCH INNER RACE DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly.

(See LOW AND REVERSE BRAKE PREINSPECTION.)

2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



D8E517ZA5042

1	Snap ring
2	Retaining plate
3	Drive and driven plates
4	Dish plate
5	Snap ring (See Snap Ring Disassembly Note.)

6	One-way clutch inner race
7	Piston return spring
8	Low and reverse brake piston (See Low and Reverse Brake Piston Disassembly Note.)

Fig. 108: Identifying Low And Reverse Brake And One-Way Clutch Inner Race Components
Courtesy of MAZDA MOTORS CORP.

SNAP RING DISASSEMBLY NOTE

1. Install the SSTs as shown.

CAUTION:

- Depress the one-way clutch inner race only enough to remove the snap ring. Overpressing will damage the one-way clutch inner race assembly edges.

2. Compress the one-way clutch inner race.
3. Remove the snap ring.
4. Remove the SSTs and remove one-way clutch inner race and the piston return spring.

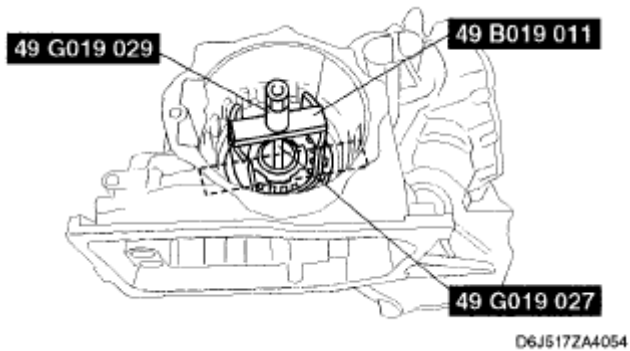


Fig. 109: Identifying SSTS
Courtesy of MAZDA MOTORS CORP.

LOW AND REVERSE BRAKE PISTON DISASSEMBLY NOTE

- Remove the low and reverse brake piston by applying compressed air through the fluid passage.

Air pressure

98.1 kPa {1.0 kgf/cm² , 14 psi} max.

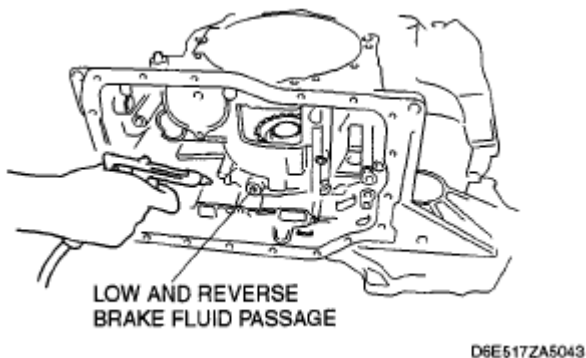


Fig. 110: View Of Low And Reverse Brake Piston
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Measure the facing thickness in three places, and determine the average of the three readings.

Low and reverse brake drive plate thickness

Standard: 1.60 mm {0.063 in}

Minimum: 1.45 mm {0.057 in}

- If not within the specification, replace the drive plates.

- CAUTION:**
- Installing the low and reverse brake piston may damage its seal. Carefully install the low and reverse brake piston by pushing evenly around the circumference.

2. Apply ATF to the circumference of the low and reverse brake piston seal, and install the piston to the transaxle case.
3. Install the piston return spring and one-way clutch to the transaxle case.

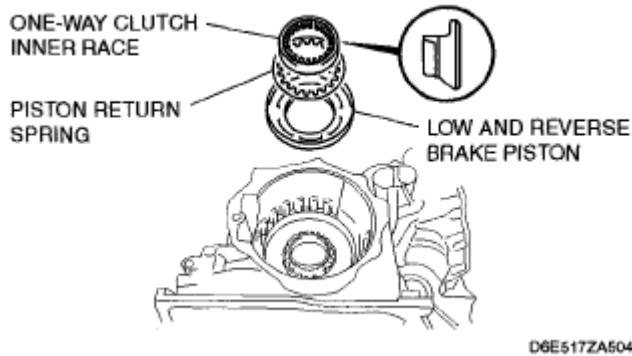


Fig. 111: View Of Piston Return Spring, One-Way Clutch And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

4. Install the SSTs as shown.

- CAUTION:**
- Depress the one-way clutch inner race only enough to install the snap ring. Overpressing will damage the one-way clutch inner race assembly edges.

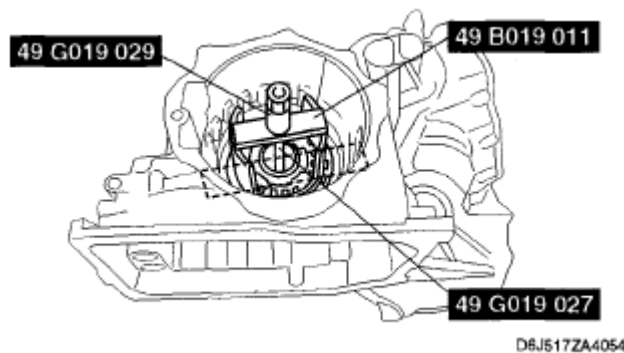


Fig. 112: Identifying SSTs
Courtesy of MAZDA MOTORS CORP.

5. Compress the one-way clutch inner race.

- CAUTION:**
- The transaxle body may be damaged if installed incorrectly. Make sure to install the transaxle body in such a way that the

end of the snap ring does not enter the area shown in the figure.

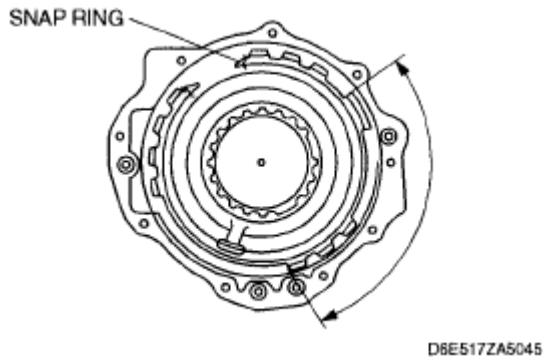


Fig. 113: Identifying Snap Ring Position
Courtesy of MAZDA MOTORS CORP.

6. Install the snap ring.
7. Remove the SSTs .
8. Install the dish plate.
9. Install the drive and driven plates in the following order.

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

Driven-Drive-Driven-Drive

10. Install the retaining plate and the snap ring.

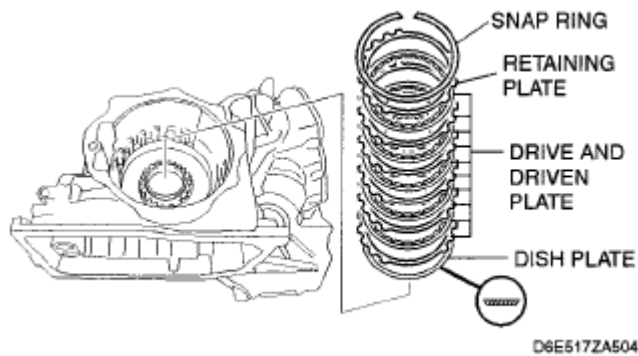


Fig. 114: View Of Retaining Plate And Snap Ring
Courtesy of MAZDA MOTORS CORP.

11. Measure the low and reverse brake clearance.
 1. Set the dial gauge to the low and reverse brake.
 2. Set the measuring point of the dial gauge to the low and reverse brake piston.

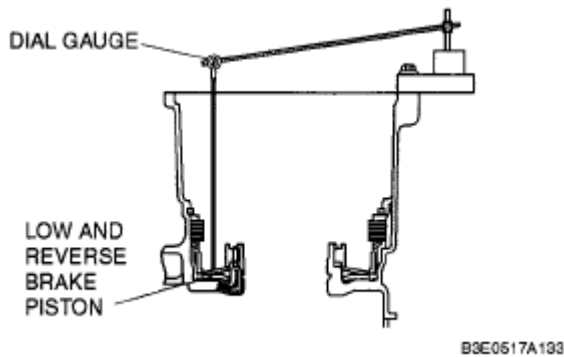


Fig. 115: Setting Measuring Point Of Dial Gauge To Low And Reverse Brake Piston
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the low and reverse brake piston stroke three times.

Air pressure

98.1 kPa {1.0 kgf/cm² , 14 psi}

4. Apply compressed air and operate the low and reverse brake piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the low and reverse brake piston is not operating.
6. Calculate the low and reverse brake clearance according to the following formula:

Step (4) value-Step (5) value= low and reverse brake clearance.

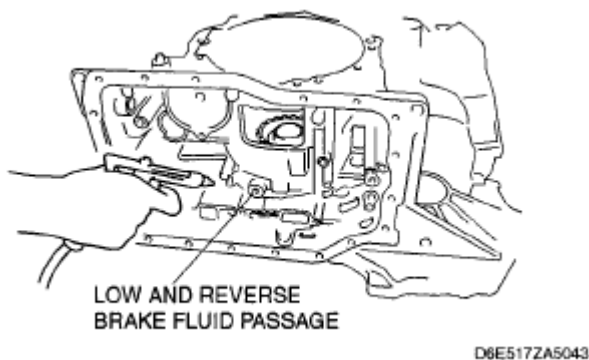


Fig. 116: Applying Compressed Air To Low And Reverse Brake Piston
Courtesy of MAZDA MOTORS CORP.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Low and reverse brake clearance

2.20-2.50 mm {0.087-0.098 in}

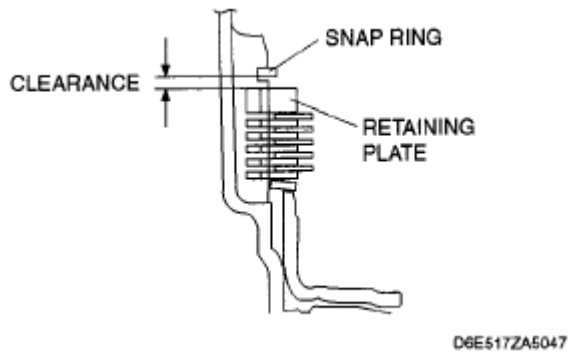


Fig. 117: Measuring Low And Reverse Brake Clearance
Courtesy of MAZDA MOTORS CORP.

- If not within the specification, remove the snap ring and measure its thickness.
8. Add the thickness to the average value calculated in step (7), and select the snap ring whose range includes the value.

Snap ring size for low and reverse brake clearance

SNAP RING SIZE FOR LOW AND REVERSE BRAKE CLEARANCE

Range mm {in}	Snap ring sizes mm {in}
4.050-4.250 {0.159-0.167}	1.8 {0.071}
4.250-4.450 {0.167-0.175}	2.0 {0.079}
4.450-4.650 {0.175-0.183}	2.2 {0.087}
4.650-4.850 {0.183-0.190}	2.4 {0.094}
4.850-5.050 {0.190-0.199}	2.6 {0.102}
5.050-5.250 {0.199-0.207}	2.8 {0.110}
5.250-5.450 {0.207-0.215}	3.0 {0.118}

9. Install the selected snap ring and perform steps (2) to (7) again. Verify that the calculated value satisfies the clearance specification.
12. Inspect the low and reverse brake operation by applying compressed air as shown.

Air pressure

98.1 kPa {1.0 kgf/cm², 14 psi}

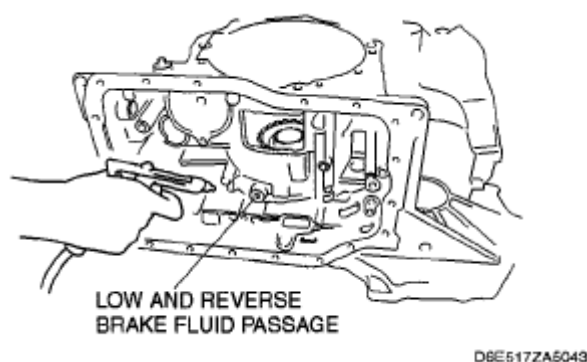
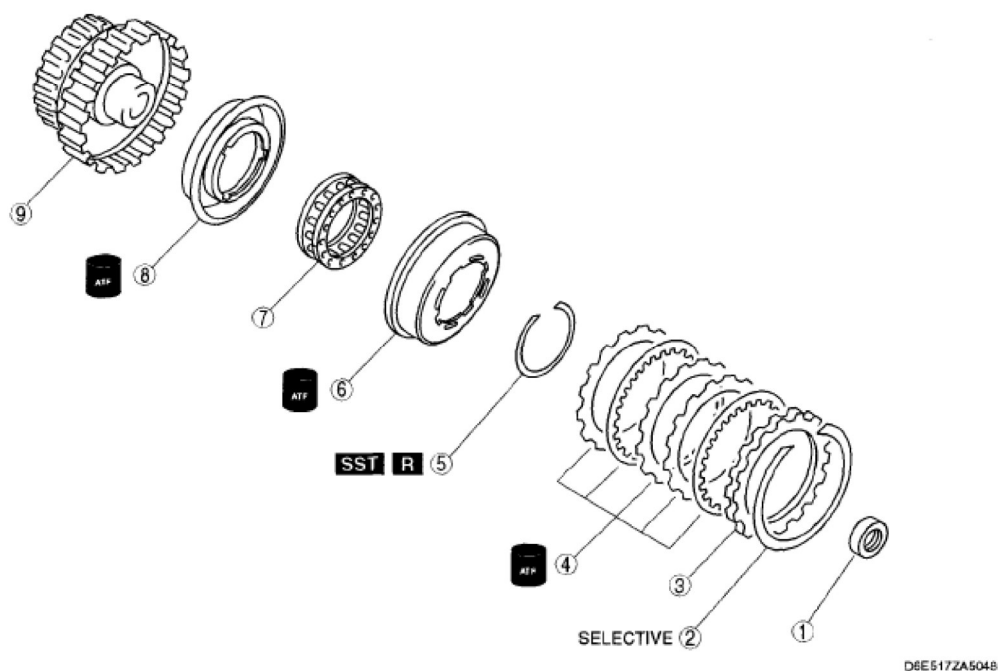


Fig. 118: Applying Compressed Air To Low And Reverse Brake Piston
Courtesy of MAZDA MOTORS CORP.

DIRECT CLUTCH DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly. (See DIRECT CLUTCH PREINSPECTION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



1	Needle bearing (See Needle Bearing Disassembly Note.)
2	Snap ring
3	Retaining plate
4	Drive and driven plate
5	Snap ring (See Snap Ring (Direct clutch) Disassembly Note.)

6	Seal plate
7	Spring and retainer component
8	Direct clutch piston (See Direct Clutch Piston Disassembly Note.)
9	Direct clutch drum

Fig. 119: Exploded View Of Direct Clutch Components

Courtesy of MAZDA MOTORS CORP.

NEEDLE BEARING DISASSEMBLY NOTE

1. Remove the needle bearing using the SST as shown in the figure.

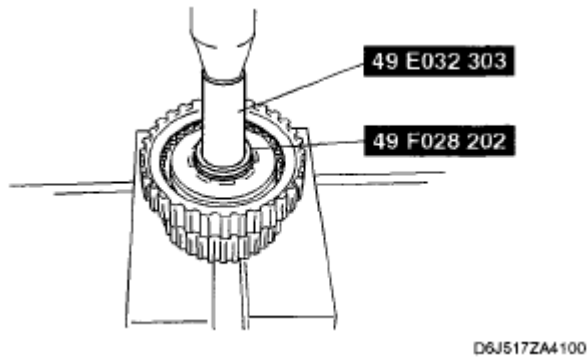


Fig. 120: Removing Needle Bearing Using SST
Courtesy of MAZDA MOTORS CORP.

SNAP RING (DIRECT CLUTCH) DISASSEMBLY NOTE

1. Install the SST as shown.

CAUTION:

- Depress the seal plate only enough to remove the snap ring. Overpressing will damage the seal plate assembly edges.

2. Compress the seal plate.
3. Remove the snap ring.
4. Remove the SST, then remove the seal plate and spring and retainer component.

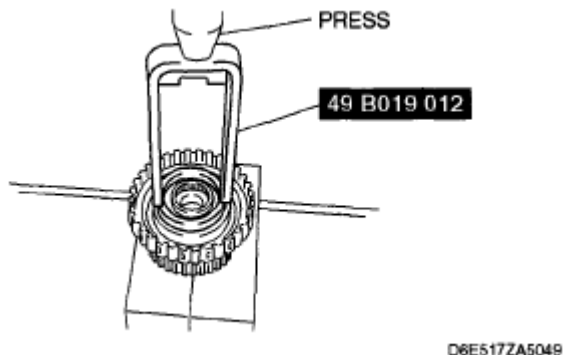


Fig. 121: Compressing Seal Plate
Courtesy of MAZDA MOTORS CORP.

DIRECT CLUTCH PISTON DISASSEMBLY NOTE

1. Set the direct clutch drum onto the transaxle case.
2. Remove the direct clutch piston from the direct clutch drum by applying compressed air through the fluid passage.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

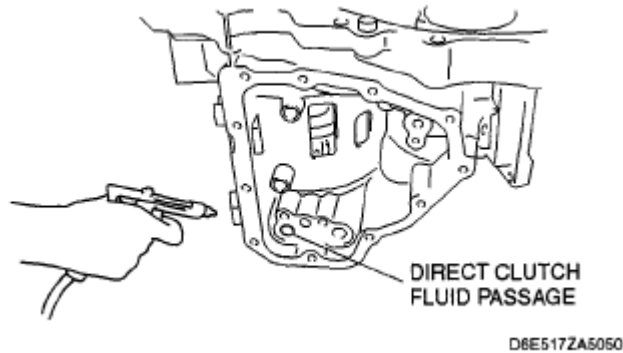


Fig. 122: Applying Compressed Air To Direct Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Measure the facing thickness in three places and calculate the average value.

Direct clutch drive plate thickness

Standard: 1.80 mm {0.071 in}

Minimum: 1.65 mm {0.065 in}

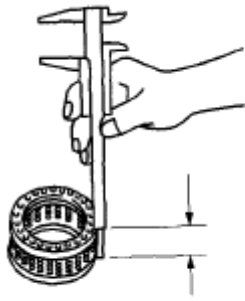
- If not within the specification, replace the drive plates.
2. Measure the free length of the spring and inspect for deformation.

Direct clutch springs and retainer component free length

Standard: 17.2 mm {0.677 in}

Minimum: 15.2 mm {0.598 in}

- If not within the specification, replace the spring and retainer.



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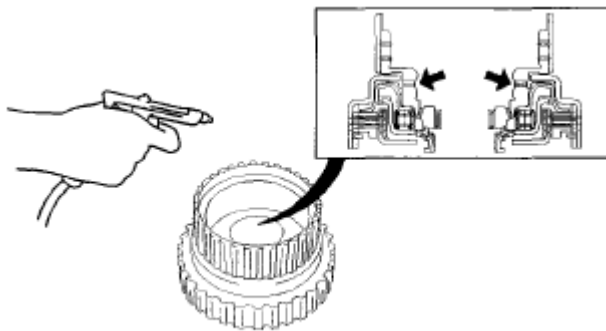
Fig. 123: Measuring Spring Free Length
Courtesy of MAZDA MOTORS CORP.

3. Verify that there is airflow when applying compressed air through the fluid passage of direct clutch drum, (four locations)

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

4. Replace the direct clutch drum if damaged or malfunctioning.



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Fig. 124: Applying Compressed Air Through Fluid Passage Of Direct Clutch Drum
Courtesy of MAZDA MOTORS CORP.

5. Install the direct clutch.

CAUTION:

- Installing the direct clutch piston may damage its seal. Carefully install the direct clutch piston by pushing evenly around the circumference.

1. Apply ATF to the circumference of the direct clutch piston seal, and install the piston in to the direct clutch drum.
2. Install the spring and retainer.
3. Apply ATF to the seal plate, and install it onto the direct clutch drum.

4. Install the SST as shown.

CAUTION:

- Depress the seal plate only enough to install the snap ring. Overpressing will damage the seal plate assembly edges.

5. Compress the spring and retainer component and seal plate.
6. Install the snap ring.
7. Remove the SST .

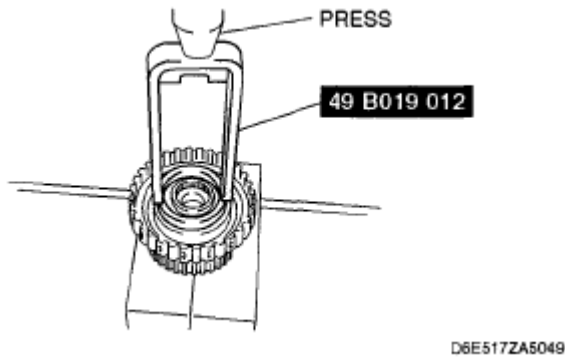


Fig. 125: View Of Direct Clutch
Courtesy of MAZDA MOTORS CORP.

8. Install the drive and driven plates in the following order.

Driven-Drive-Driven-Driven-Drive

9. Install the retaining plate.
10. (10)Install the snap ring.

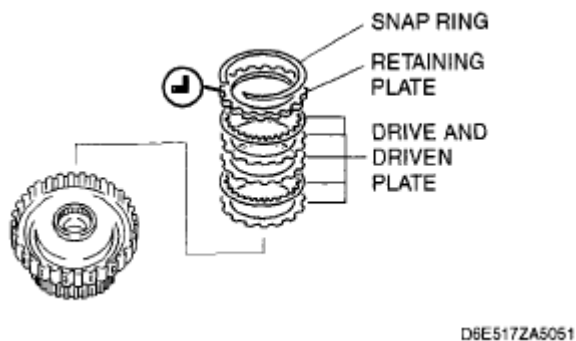


Fig. 126: View Of Drive And Driven Plates
Courtesy of MAZDA MOTORS CORP.

6. Measure the direct clutch clearance.
 1. Install the direct clutch in the transaxle case, and set the dial gauge.

2. Secure the direct clutch by lightly pressing down with a press or similar tool.

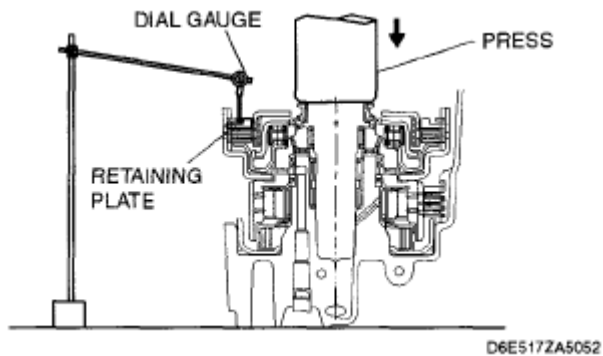


Fig. 127: Installing Direct Clutch In Transaxle Case
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the direct clutch piston stroke three times.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

4. Apply compressed air and operate the direct clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the direct clutch piston is not operating.
6. Calculate the direct clutch clearance according to the following formula:

step (4) value - step (5) value = direct clutch clearance.

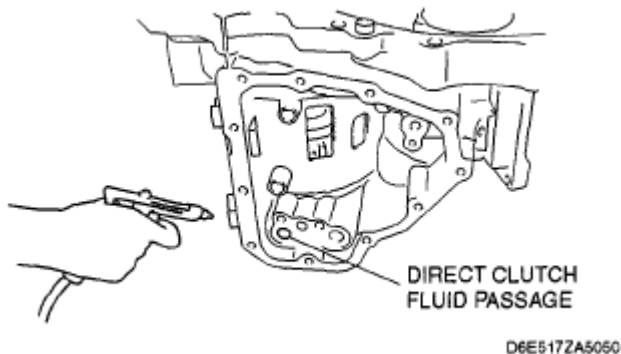


Fig. 128: Applying Compressed Air To Direct Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Direct clutch clearance

Standard: 1.10-1.40 mm {0.043-0.055 in}

- If not within the specification, remove the snap ring and measure its thickness.
8. Add the thickness to the average value calculated in step (7), and select the snap ring whose range includes the value.

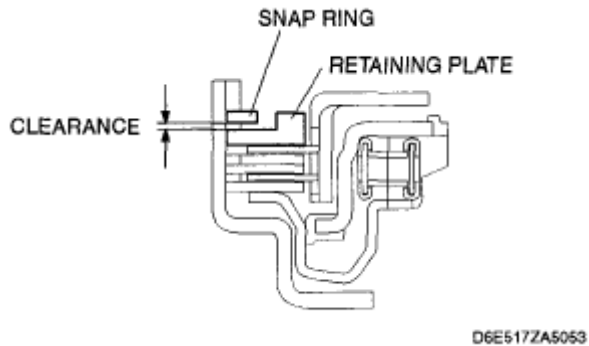


Fig. 129: Measuring Direct Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

Snap ring size for direct clutch clearance

SNAP RING SIZE FOR DIRECT CLUTCH CLEARANCE

Range mm {in}	Snap ring sizes mm {in}
2.424-2.624 {0.096-0.103}	1.2 {0.047}
2.624-2.824 {0.104-0.111}	1.4 {0.055}
2.824-3.024 {0.112-0.119}	1.6 {0.063}
3.024-3.224 {0.120-0.126}	1.8 {0.071}
3.224-3.424 {0.127-0.134}	2.0 {0.079}
3.424-3.624 {0.135-0.142}	2.2 {0.087}

9. Install the selected snap ring and perform steps (2) to (7) again. Verify that the calculated value satisfies the clearance specification.
7. Inspect the direct clutch operation.
 1. Install the direct clutch drum to the transaxle case.
 2. Inspect the direct clutch operation by applying compressed air as shown.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

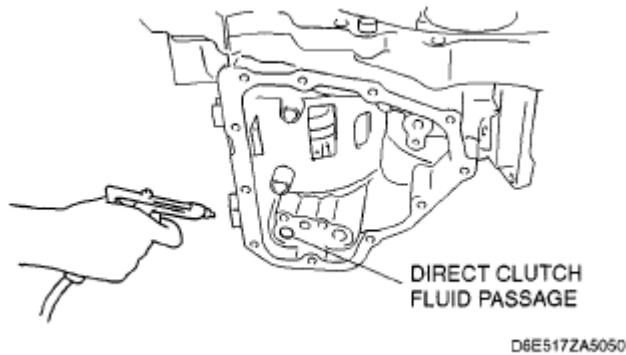


Fig. 130: Applying Compressed Air To Direct Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

8. Install the needle bearing using the SST as shown in the figure.

Distance A

A: 0-0.5 mm {0-0.02 in}

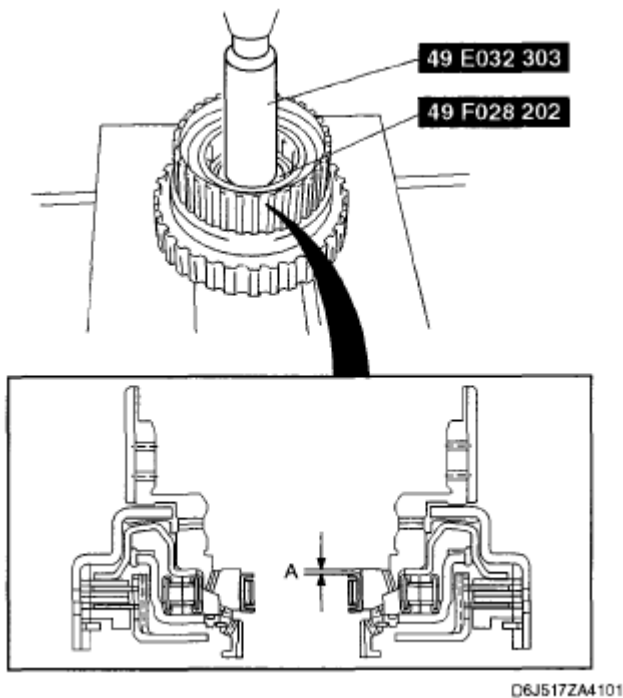


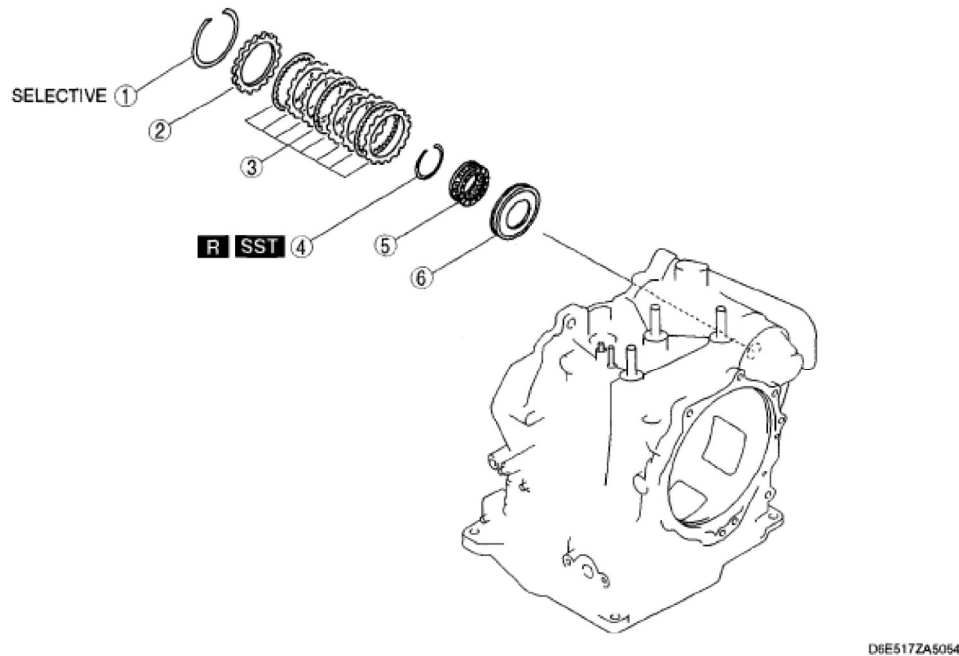
Fig. 131: Installing Needle Bearing Using SST
Courtesy of MAZDA MOTORS CORP.

REDUCTION BRAKE DISASSEMBLY/ASSEMBLY

1. Perform the preinspection before disassembly.

(See **REDUCTION BRAKE PREINSPECTION**.)

2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



1	Snap ring
2	Retaining plate
3	Drive and driven plates
4	Snap ring (See Snap Ring Disassembly Note.)

5	Spring and retainer component
6	Reduction brake piston (See Reduction Brake Piston Disassembly Note.)

Fig. 132: Exploded View Of Reduction Brake Components
Courtesy of MAZDA MOTORS CORP.

SNAP RING DISASSEMBLY NOTE

1. Install the SST as shown.

CAUTION:

- Depress the spring and retainer component only enough to remove the snap ring.

Overpressing will damage the spring and retainer component assembly edges.

2. Compress the spring and retainer component.
3. Remove the snap ring.
4. Remove the SST and remove spring and retainer component.

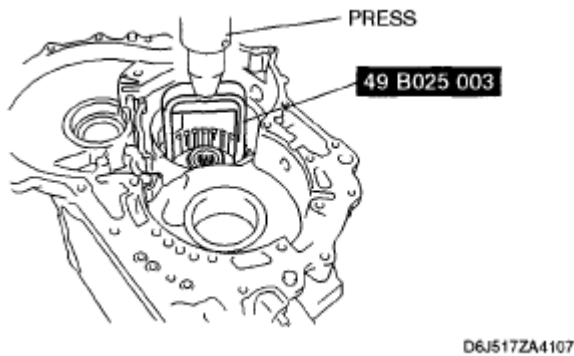


Fig. 133: Compressing Spring And Retainer Component
 Courtesy of MAZDA MOTORS CORP.

REDUCTION BRAKE PISTON DISASSEMBLY NOTE

- Remove the reduction brake piston by applying compressed air through the fluid passage.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

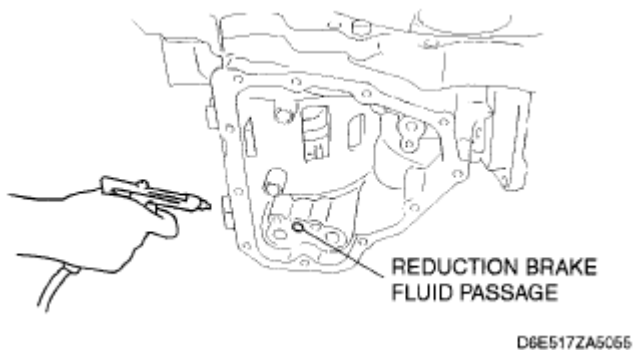


Fig. 134: Applying Compressed Air Reduction Brake Fluid Passage
 Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Measure the facing thickness in three places, and determine the average of the three readings.

Reduction brake drive plate thickness

Standard: 1.80 mm {0.071 in}

Minimum: 1.65 mm {0.065 in}

- If not within the specification, replace the drive plates.

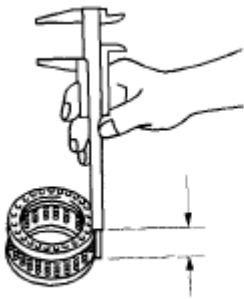
2. Measure the spring free length.

Reduction brake springs and retainer component free length

Standard: 18.2 mm {0.717 in}

Minimum: 16.2 mm {0.638 in}

- If not within the specification, replace the spring and retainer component.



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Fig. 135: Measuring Spring Free Length
Courtesy of MAZDA MOTORS CORP.

CAUTION:

- Installing the reduction brake piston may damage its seal. Carefully install the reduction brake piston by pushing evenly around the circumference.

3. Apply ATF to the circumference of the reduction brake piston seal, and install the piston to the transaxle case.
4. Install the spring and retainer component to the transaxle case.
5. Install the SST as shown.

CAUTION:

- Depress the spring and retainer component only enough to install the snap ring.

Overpressing will damage the spring and retainer component assembly edges.

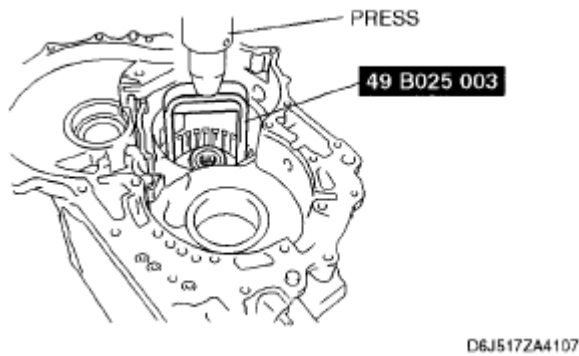


Fig. 136: Depressing Spring And Retainer Component
Courtesy of MAZDA MOTORS CORP.

6. Compress the spring and retainer component.

CAUTION:

- The transaxle body may be damaged if installed incorrectly. Make sure to install the transaxle body in such a way that the end of the snap ring does not enter the area shown in the figure.

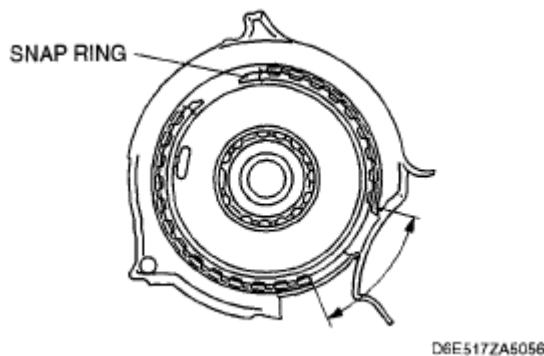


Fig. 137: Identifying Snap Ring Position
Courtesy of MAZDA MOTORS CORP.

7. Install the snap ring.
8. Remove the SST .
9. Install the drive and driven plates in the following order.

Driven-Drive-Driven-Driven-Drive-

Driven-Driven-Drive

10. Install the retaining plate and the snap ring.

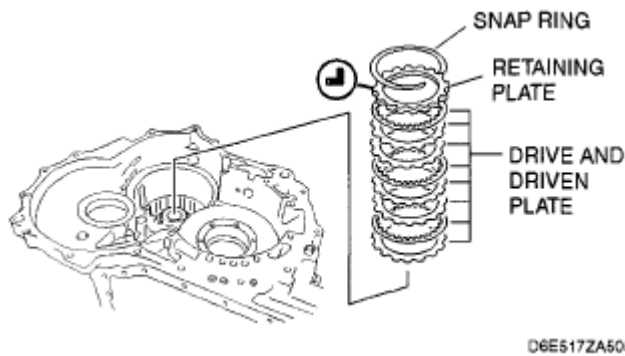


Fig. 138: View Of Retaining Plate And Snap Ring
Courtesy of MAZDA MOTORS CORP.

11. Measure the reduction brake clearance.
 1. Set the dial gauge to the reduction brake.
 2. Set the measuring point of the dial gauge to the retaining plate.

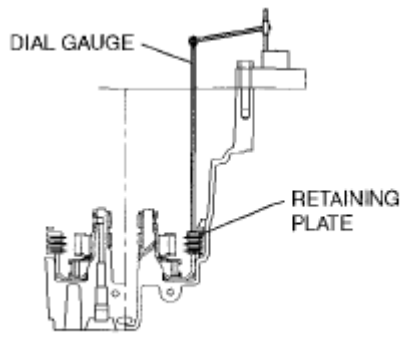


Fig. 139: Measuring Reduction Brake Clearance
Courtesy of MAZDA MOTORS CORP.

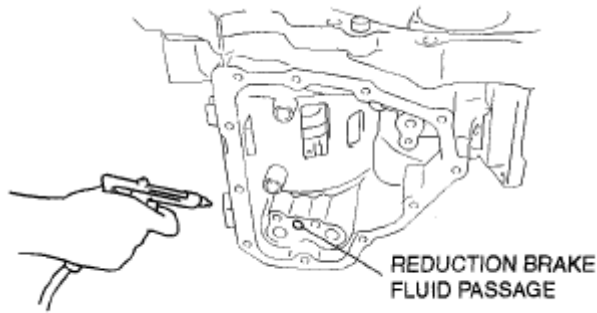
3. Apply compressed air to the part indicated in the figure and let the reduction brake piston stroke three times.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

4. Apply compressed air and operate the reduction brake piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the reduction brake piston is not operating.
6. Calculate the reduction brake clearance according to the following formula:

Step (4) value-Step (5) value= reduction brake clearance.



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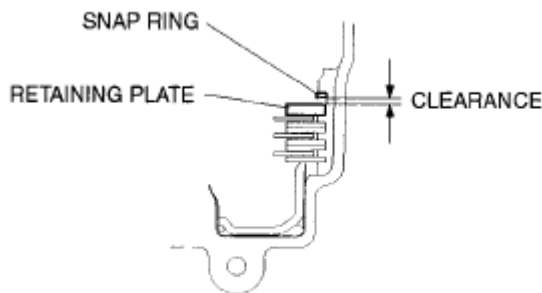
Fig. 140: Applying Compressed Air To Reduction Brake Fluid Passage
 Courtesy of MAZDA MOTORS CORP.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Reduction brake clearance

1.50-1.80 mm {0.059-0.070 in}

- If not within the specification, remove the snap ring and measure its thickness.
8. Add the thickness to the average value calculated in step (7), and select the snap ring whose range includes the value.



D8E517ZA5059

Fig. 141: Measuring Reduction Brake Clearance
 Courtesy of MAZDA MOTORS CORP.

Snap ring size for reduction brake clearance

SNAP RING SIZE FOR REDUCTION BRAKE CLEARANCE

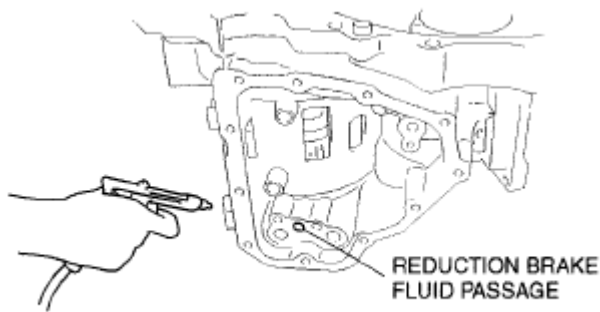
Range mm {in}	Snap ring sizes mm {in}
2.920-3.120 {0.115-0.122}	1.2 {0.047}
3.120-3.320 {0.123-0.130}	1.4 {0.055}
3.320-3.520 {0.131-0.138}	1.6 {0.063}
3.520-3.720 {0.139-0.146}	1.8 {0.071}

3.720-3.920 {0.147-0.154}	2.0 {0.079}
3.920-4.120 {0.155-0.162}	2.2 {0.087}

9. Install the selected snap ring and perform steps (2) to (7) again. Verify that the calculated value satisfies the clearance specification.
12. Inspect the reduction brake operation by applying compressed air as shown.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.



D6E517ZA5055

Fig. 142: Applying Compressed Air To Reduction Brake Fluid Passage
 Courtesy of MAZDA MOTORS CORP.

PARKING MECHANISM DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

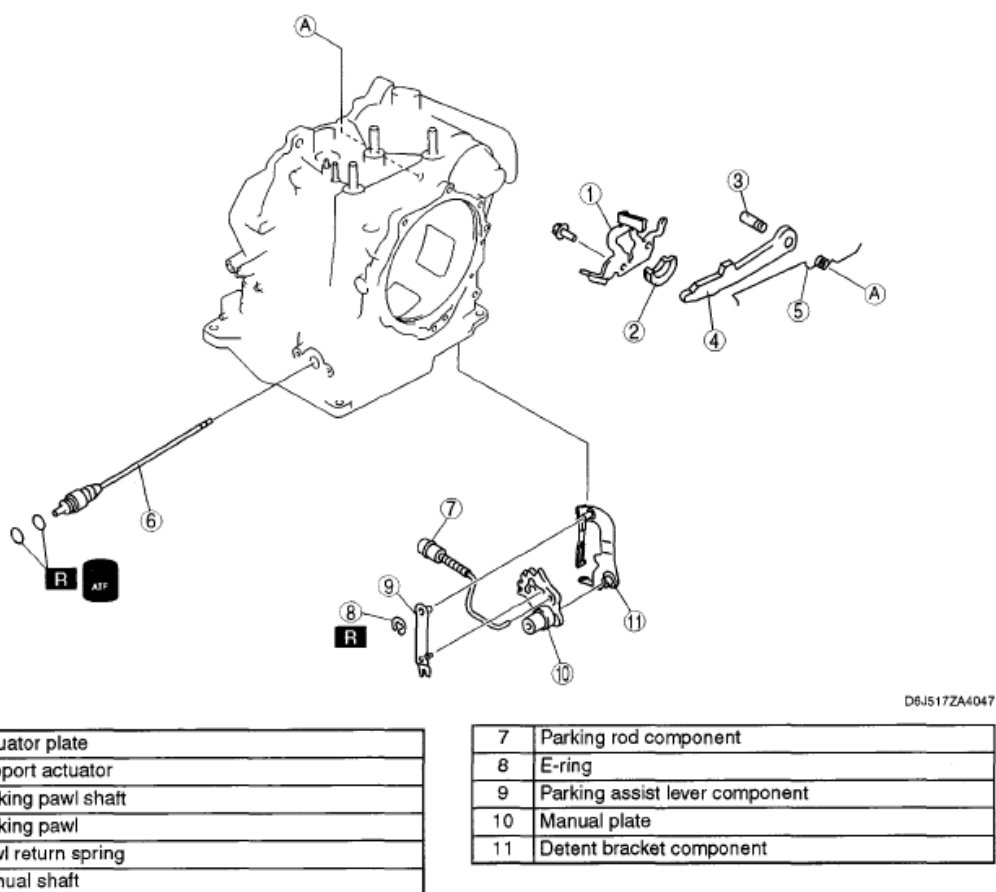


Fig. 143: Identifying Parking Mechanism Components
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Install the manual plate to the detent bracket component.
2. Install the parking assist lever component to the detent bracket component and the manual plate.

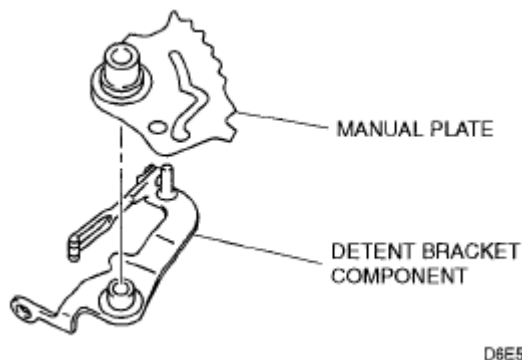
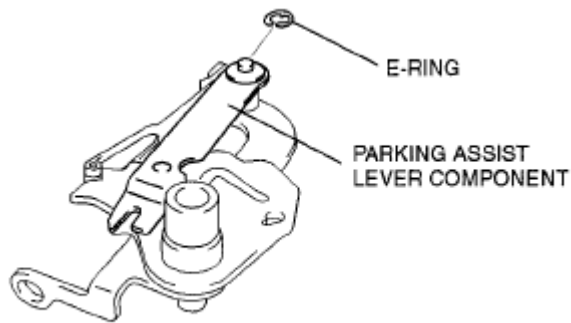


Fig. 144: View Of Manual Plate And Detent Bracket Component
Courtesy of MAZDA MOTORS CORP.

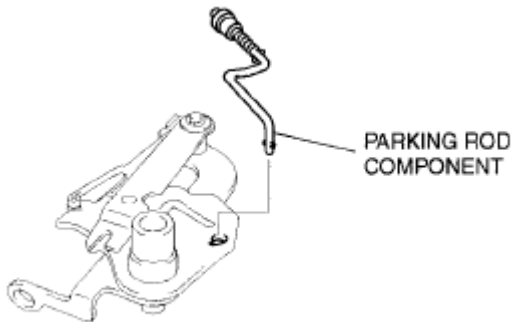
3. Install the E-ring.



D6E517ZA5033

Fig. 145: View Of E-Ring
Courtesy of MAZDA MOTORS CORP.

4. Install the parking rod component.



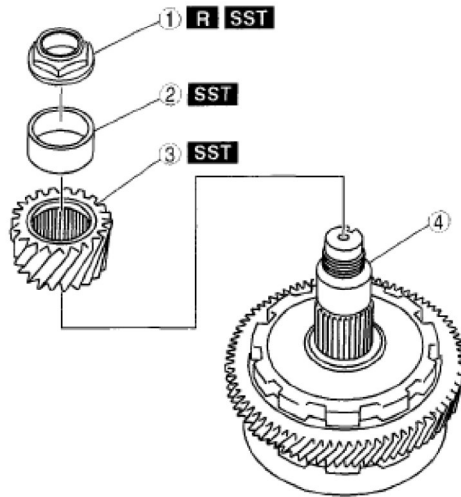
D6E517ZA5034

Fig. 146: View Of Parking Rod Component
Courtesy of MAZDA MOTORS CORP.

SECONDARY GEAR AND OUTPUT GEAR DISASSEMBLY/ASSEMBLY

1. Remove the following parts. (See AUTOMATIC TRANSAXLE DISASSEMBLY.)
 - Torque converter
 - Oil pump
 - Converter housing
 - Differential
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

1	Lock nut (See Lock nut Disassembly Note.) (See Lock nut Assembly Note.)
2	Inner race (See Output gear And Inner Race Disassembly Note.) (See Output gear And Inner Race Assembly Note.)
3	Output gear (See Output gear And Inner Race Disassembly Note.) (See Output gear And Inner Race Assembly Note.)
4	Secondary gear component

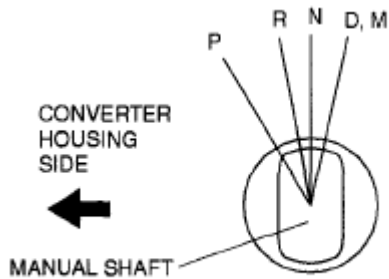


D6J517ZA4097

Fig. 147: Identifying Secondary Gear And Output Gear
Courtesy of MAZDA MOTORS CORP.

LOCK NUT DISASSEMBLY NOTE

1. Rotate the manual shaft to the P position.



D6E517AW5007

Fig. 148: Rotating Manual Shaft
Courtesy of MAZDA MOTORS CORP.

2. Knock the crimped portion of the locknut outward by using a small chisel and a hammer.
3. Remove the lock nut.

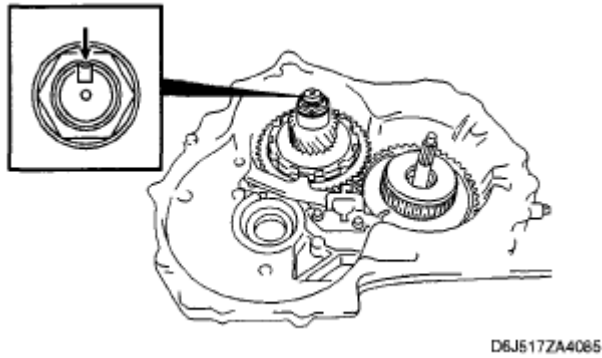


Fig. 149: View Of Lock Nut
Courtesy of MAZDA MOTORS CORP.

OUTPUT GEAR AND INNER RACE DISASSEMBLY NOTE

1. Remove the output gear component. (See AUTOMATIC TRANSAXLE DISASSEMBLY.)
2. Remove the output gear and inner race to the secondary gear component using the SST .

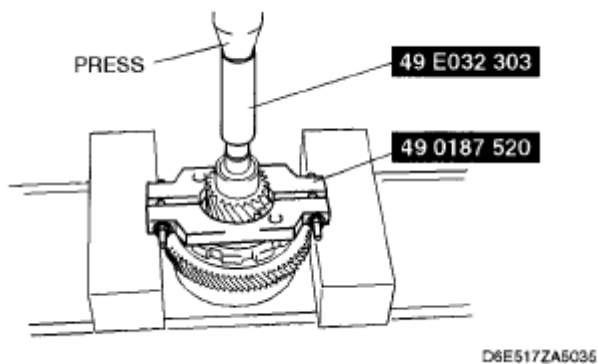


Fig. 150: Removing Output Gear And Inner Race From Secondary Gear
Courtesy of MAZDA MOTORS CORP.

OUTPUT GEAR AND INNER RACE ASSEMBLY NOTE

1. Install the output gear to the secondary gear component using the SST .

Press-in force

20 kN {204 kgf, 450 lbf}

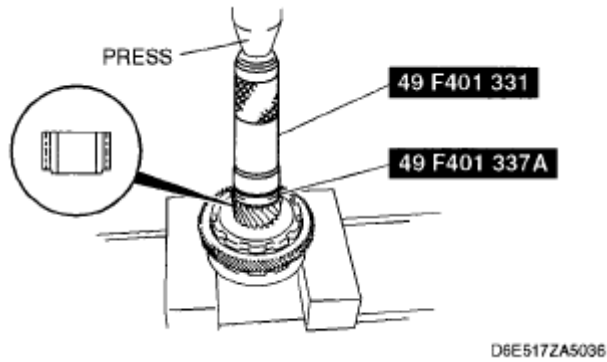


Fig. 151: Installing Output Gear To Secondary Gear
Courtesy of MAZDA MOTORS CORP.

2. Install the inner race to the secondary gear component using the SST .

Press-in force

20 kN {204 kgf, 450 lbf}

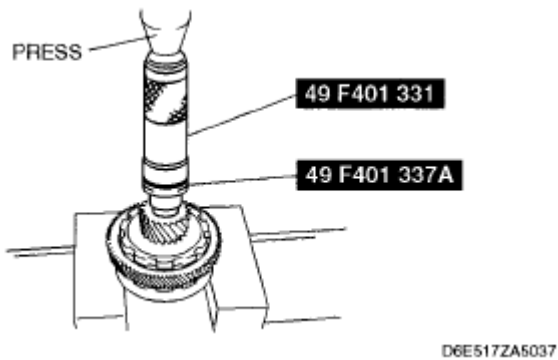


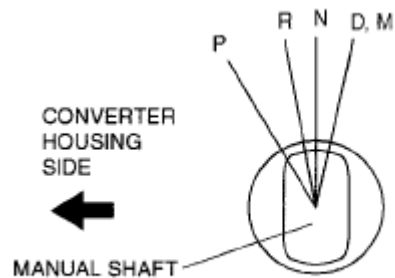
Fig. 152: Installing Inner Race To Secondary Gear
Courtesy of MAZDA MOTORS CORP.

LOCK NUT ASSEMBLY NOTE

1. Install the following parts. (See AUTOMATIC TRANSAXLE DISASSEMBLY.)
 - Pawl return spring
 - Parking pawl
 - Parking pawl shaft
 - Support actuator
 - Actuator plate
2. Rotate the manual shaft to the P position.
3. Install the locknut.

Tightening torque

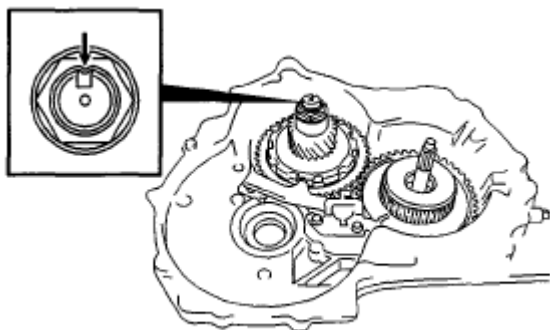
100-120 N.m {10.2-12.2 kgf.m, 74-88 ft./lbf}



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Fig. 153: Rotating Manual Shaft
Courtesy of MAZDA MOTORS CORP.

4. Stake the locknut.



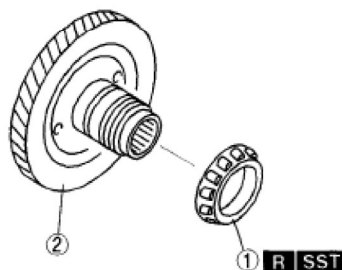
D6J517ZA4086

Fig. 154: Staking Locknut
Courtesy of MAZDA MOTORS CORP.

PRIMARY GEAR DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

1	Bearing (See Bearing Disassembly Note.) (See Bearing Assembly Note.)
2	Primary gear



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Fig. 155: Identifying Primary Gear
Courtesy of MAZDA MOTORS CORP.

BEARING DISASSEMBLY NOTE

- Remove the bearing from the primary gear using the SSTs and suitable plate.

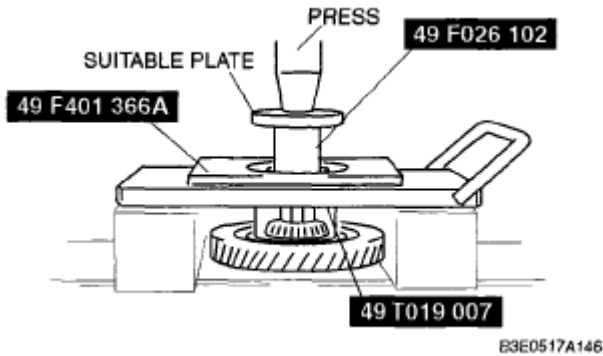


Fig. 156: Removing Bearing From Primary Gear Using SST
Courtesy of MAZDA MOTORS CORP.

BEARING ASSEMBLY NOTE

- Install the bearing to the primary gear using the SSTs .

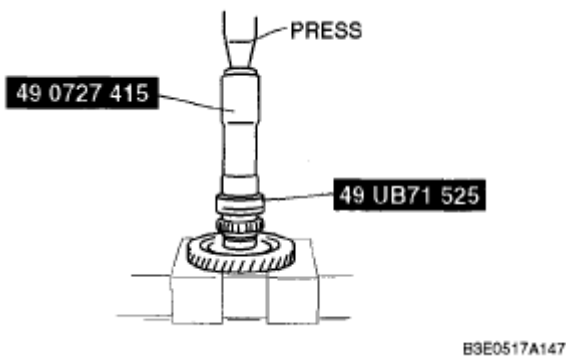


Fig. 157: Installing Bearing To Primary Gear Using SST
Courtesy of MAZDA MOTORS CORP.

PRIMARY CONTROL VALVE BODY DISASSEMBLY/ASSEMBLY PRIMARY CONTROL VALVE BODY DISASSEMBLY

CAUTION:

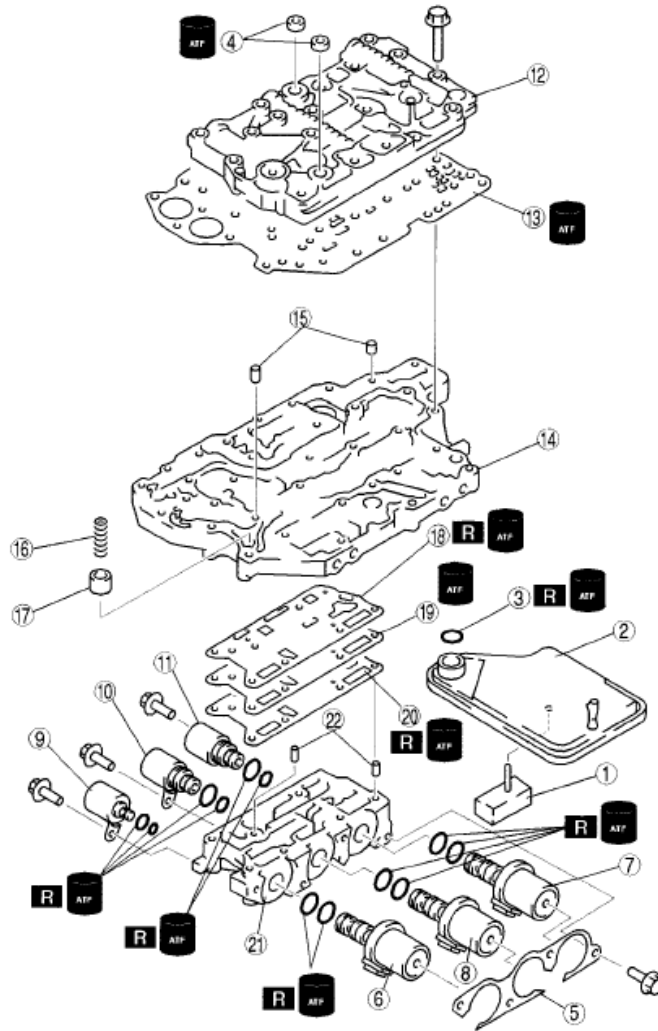
- Denting or scratching these components will reduce the ability of the transaxle to shift properly. When handling these components or the valve body that contains them, be careful not to drop or hit them.

- Disassemble in the order indicated in the table.
- Neatly arrange the removed parts to avoid confusing the similar parts.

WARNING:

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

3. Clean the removed parts with cleaning solvent, then use compressed air to dry them. Use compressed air to clean out all holes and passages.



B3E0517A148

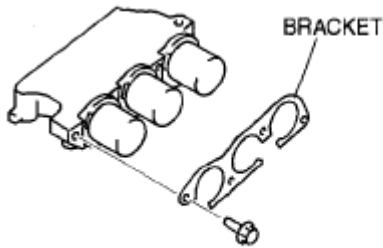
1	Transaxle fluid temperature sensor
2	Oil strainer
3	O-ring
4	Packing
5	Bracket
6	Shift solenoid A
7	Shift solenoid B
8	Shift solenoid C
9	Pressure control solenoid A
10	Shift solenoid D
11	Shift solenoid E
12	Upper control valve body

13	Seal plate
14	Main control valve body
15	Tubular pin
16	Pressure modifier accumulator spring
17	Pressure modifier accumulator
18	Gasket D
19	Separator plate
20	Gasket C
21	Solenoid control valve body
22	Tubular pin

Fig. 158: Exploded View Of Primary Control Valve Body Components
 Courtesy of MAZDA MOTORS CORP.

DISASSEMBLY PROCEDURE

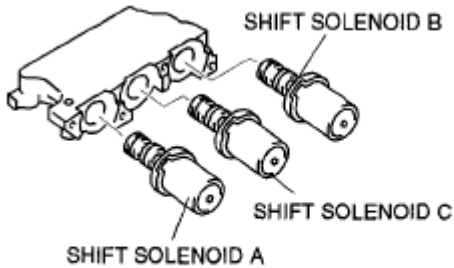
1. Remove the oil strainer.
2. Remove the O-ring from the oil strainer.
3. Remove the packing.
4. Remove the bracket.



B3E0517A149

Fig. 159: View Of Bracket
 Courtesy of MAZDA MOTORS CORP.

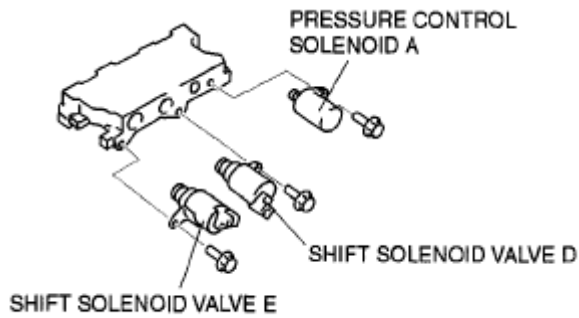
5. Remove the shift solenoid A, B, C.



B3E0517A150

Fig. 160: View Of Shift Solenoid
 Courtesy of MAZDA MOTORS CORP.

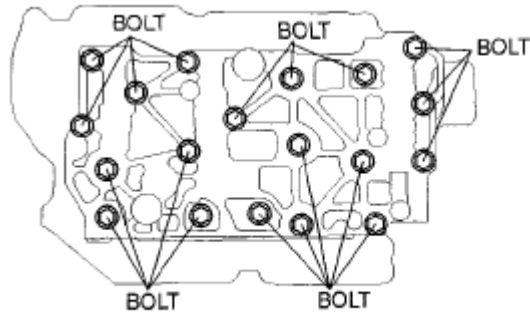
6. Remove the pressure control solenoid A, shift solenoid D, E.



D6E517ZA5067

Fig. 161: View Of Pressure Control Solenoid A, Shift Solenoid D, E
 Courtesy of MAZDA MOTORS CORP.

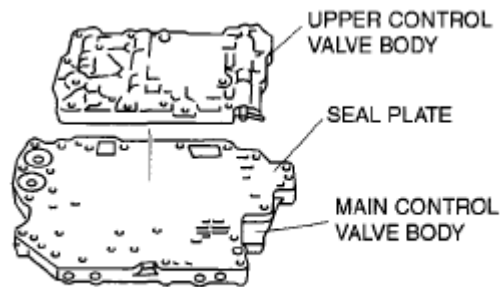
7. Loosen the bolts evenly.



B3E0517A152

Fig. 162: Identifying Bolts
 Courtesy of MAZDA MOTORS CORP.

8. Remove the upper control valve body.



B3E0517A153

Fig. 163: View Of Upper Control Valve Body And Main Control valve Body
 Courtesy of MAZDA MOTORS CORP.

9. Remove the seal plate.

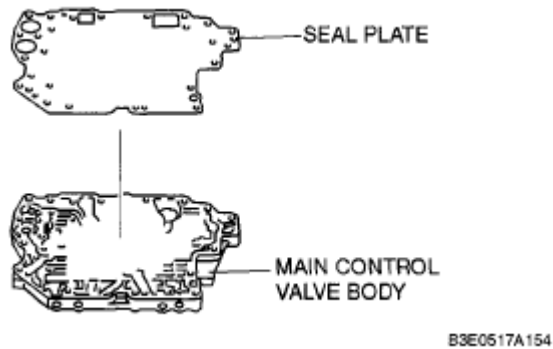


Fig. 164: View Of Seal Plate
Courtesy of MAZDA MOTORS CORP.

10. Remove the main control valve body.

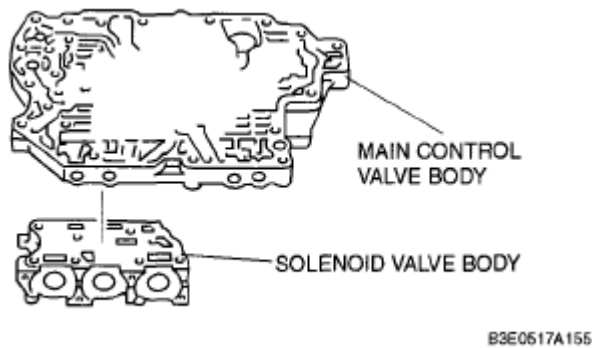


Fig. 165: View Of Main Control Valve Body
Courtesy of MAZDA MOTORS CORP.

11. Remove the tubular pins, pressure modifier accumulator spring and pressure modifier accumulator from the main control valve body.

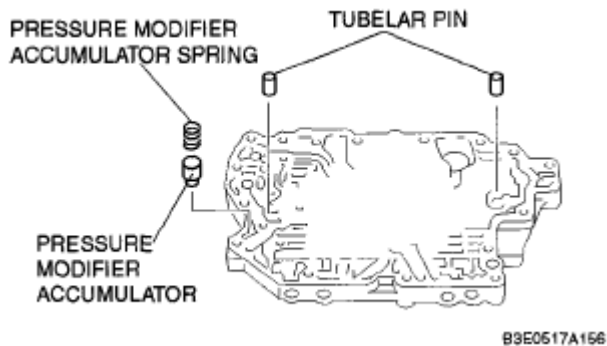
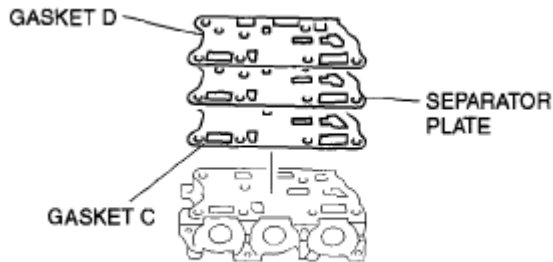


Fig. 166: View Of Tubular Pins, Pressure Modifier Accumulator Spring And Pressure Modifier Accumulator
Courtesy of MAZDA MOTORS CORP.

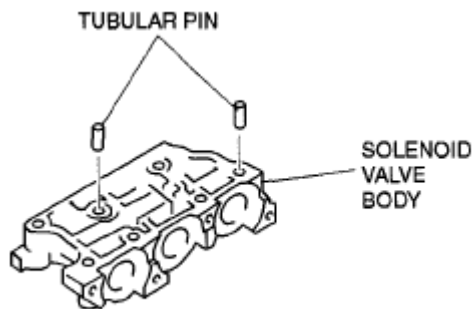
12. Remove the gasket D, separator plate and gasket C.



B3E0517A157

Fig. 167: View Of Gasket D, Separator Plate And Gasket C
Courtesy of MAZDA MOTORS CORP.

13. Remove the tubular pins.



B3E0517A158

Fig. 168: View Of Tubular Pins
Courtesy of MAZDA MOTORS CORP.

UPPER CONTROL VALVE BODY DISASSEMBLY/ASSEMBLY

CAUTION:

- Denting or scratching these precisely machined components will reduce the ability of the transaxle to shift properly. When handling these components or the valve body that contains them, be careful not to drop or hit them.

NOTE:

- If a valve does not slide out under its own weight, place the valve body open-side down and tap on the valve body lightly with a plastic hammer.

1. Disassemble in the order indicated in the table.

WARNING:

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

2. Clean all parts and holes using compressed air and apply ATF to them immediately before assembly.

3. Assemble in the reverse order of disassembly.

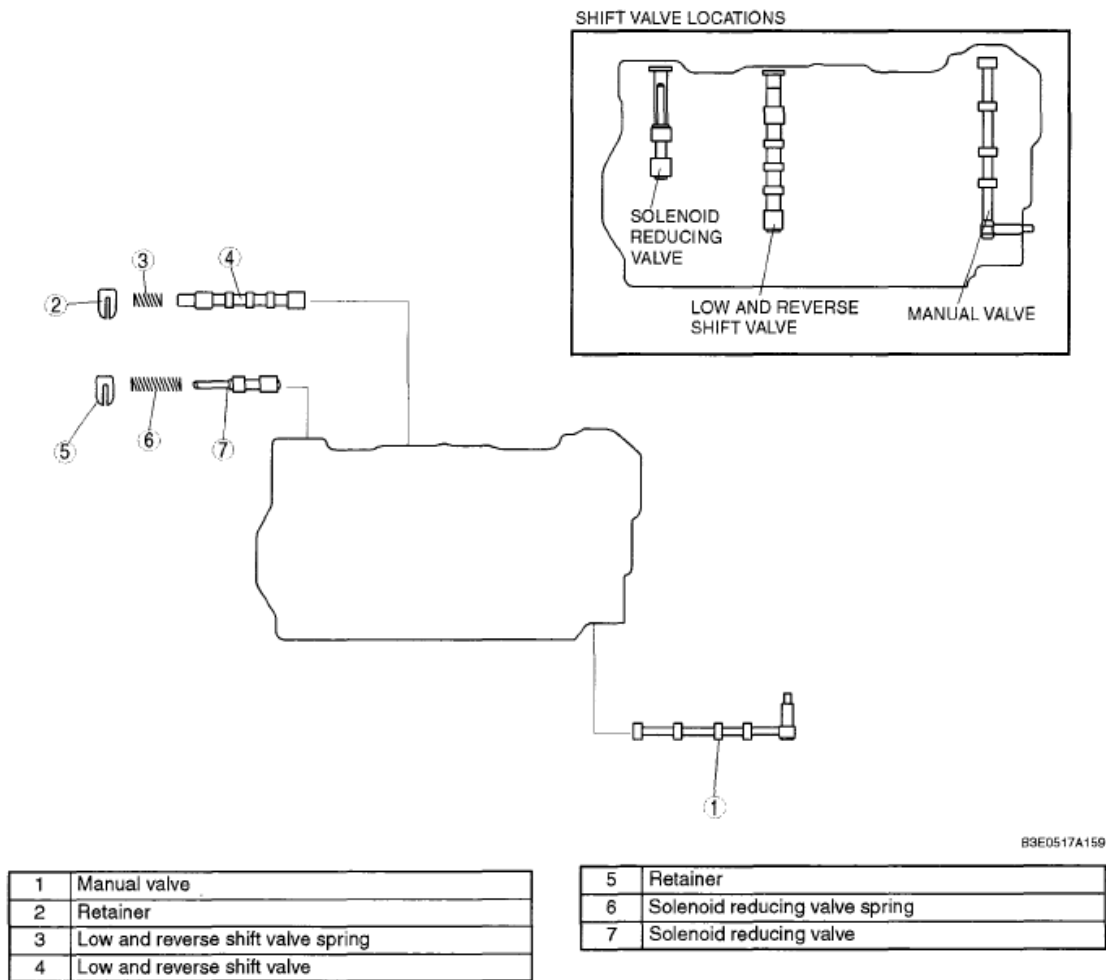


Fig. 169: Identifying Shift Valve Locations
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

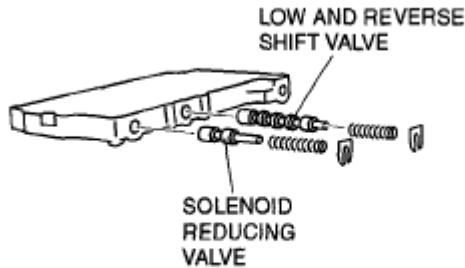
1. Measure the spring free length.

Primary control valve body spring (standard)

PRIMARY CONTROL VALVE BODY SPRING SPECIFICATIONS

Item	Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
Low and reverse shift valve spring	8.7 {0.343}	31.3 {1.232}	9.0	0.8 {0.031}
Solenoid reducing valve spring	8.7 {0.343}	44.2 {1.740}	16.0	1.1 {0.043}

- If not as specified, replace the springs.
- 2. Install the solenoid reducing valve, solenoid reducing valve spring and retainer.
- 3. Install the low and reverse shift valve, low and reverse shift valve spring and retainer.

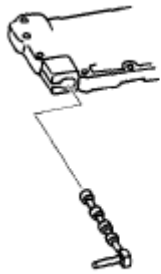


B3E0517A160

Fig. 170: View Of Low And Reverse Shift Valve, Low And Reverse Shift Valve Spring And Retainer

Courtesy of MAZDA MOTORS CORP.

- 4. Install the manual valve.



B3E0517A161

Fig. 171: View Of Manual Valve

Courtesy of MAZDA MOTORS CORP.

MAIN CONTROL VALVE BODY DISASSEMBLY/ASSEMBLY

CAUTION:

- Denting or scratching these precisely machined components will reduce the ability of the transaxle to shift properly. When handling these components or the valve body that contains them be careful not to drop or hit them.

NOTE:

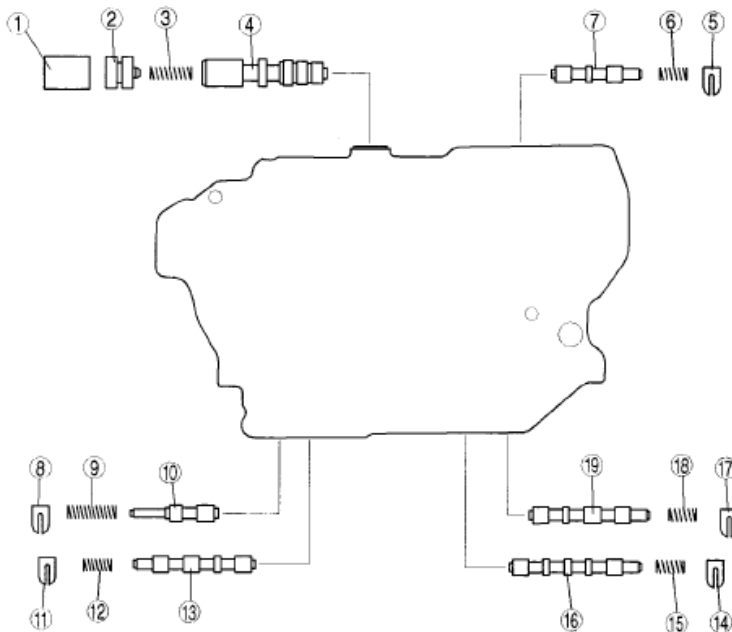
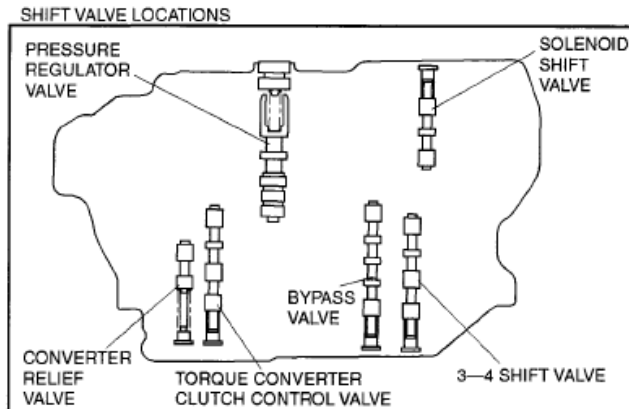
- If a valve does not slide out under its own weight, place the valve body open-side down and tap on the valve body lightly with a plastic hammer.

- 1. Disassemble in the order indicated in the table.

WARNING:

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

2. Clean all parts and holes using compressed air and apply ATF to them immediately before assembly.
3. Assemble in the reverse order of disassembly.



B3E0517A162

1	Retainer
2	Stopper plug
3	Pressure regulator valve spring
4	Pressure regulator valve
5	Retainer
6	Solenoid shift valve spring
7	Solenoid shift valve
8	Retainer
9	Converter relief valve spring
10	Converter relief valve

11	Retainer
12	Torque converter clutch valve spring
13	Torque converter clutch valve
14	Retainer
15	Bypass valve spring
16	Bypass valve
17	Retainer
18	3-4 shift valve spring
19	3-4 shift valve

Fig. 172: Identifying Shift Valve Locations
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

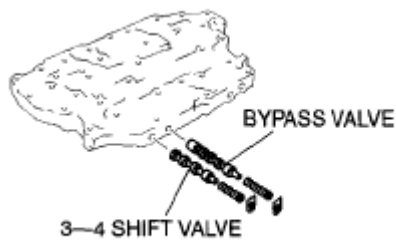
1. Measure the spring free length.

Primary control valve body spring (standard)

PRIMARY CONTROL VALVE BODY SPRING SPECIFICATIONS

Item	Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
Pressure regulator valve spring	7.9 {0.311}	36.3 {1.429}	13.2	0.9 {0.035}
Solenoid shift valve spring	8.3 {0.327}	35.1 {1.382}	12.0	0.6 {0.024}
Converter relief valve spring	9.0 {0.354}	42.5 {1.673}	14.2	1.3 {0.051}
Torque converter clutch control valve spring	8.7 {0.343}	31.3 {1.232}	9.0	0.8{0.031}
Bypass valve spring	8.7 {0.343}	31.3 {1.232}	9.0	0.8 {0.031}
3-4 shift valve spring	8.7 {0.343}	31.3(1.232}	9.0	0.8{0.031}

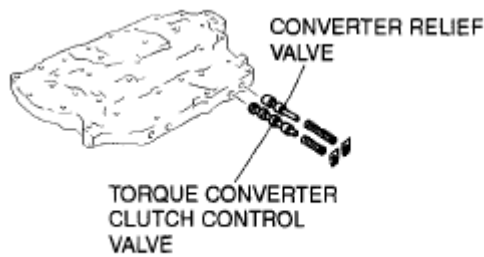
- If not as specified, replace the springs.
2. Install the 3-4 shift valve, 3-4 shift valve spring, and retainer.
 3. Install the bypass valve, bypass valve spring, and retainer.
 4. Install the torque converter clutch control valve, torque converter clutch control valve spring, and retainer.



B3E0517A163

Fig. 173: View Of Bypass Valve, Bypass Valve Spring, And Retainer
Courtesy of MAZDA MOTORS CORP.

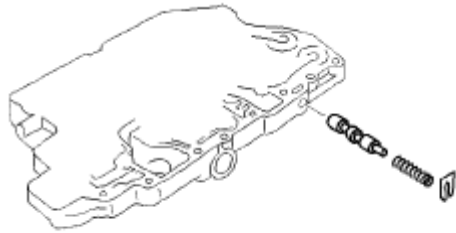
5. Install the converter relief valve, converter relief valve spring, and retainer.



B3E0517A164

Fig. 174: View Of Converter Relief Valve, Converter Relief Valve Spring, And Retainer
Courtesy of MAZDA MOTORS CORP.

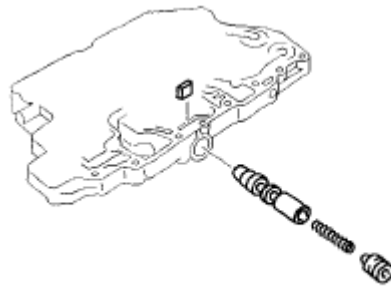
6. Install the solenoid shift valve, solenoid shift valve spring, and retainer.



B3E0517A165

Fig. 175: View Of Solenoid Shift Valve, Solenoid Shift Valve Spring, And Retainer
Courtesy of MAZDA MOTORS CORP.

7. Install the pressure regulator valve, pressure regulator valve spring, and retainer.

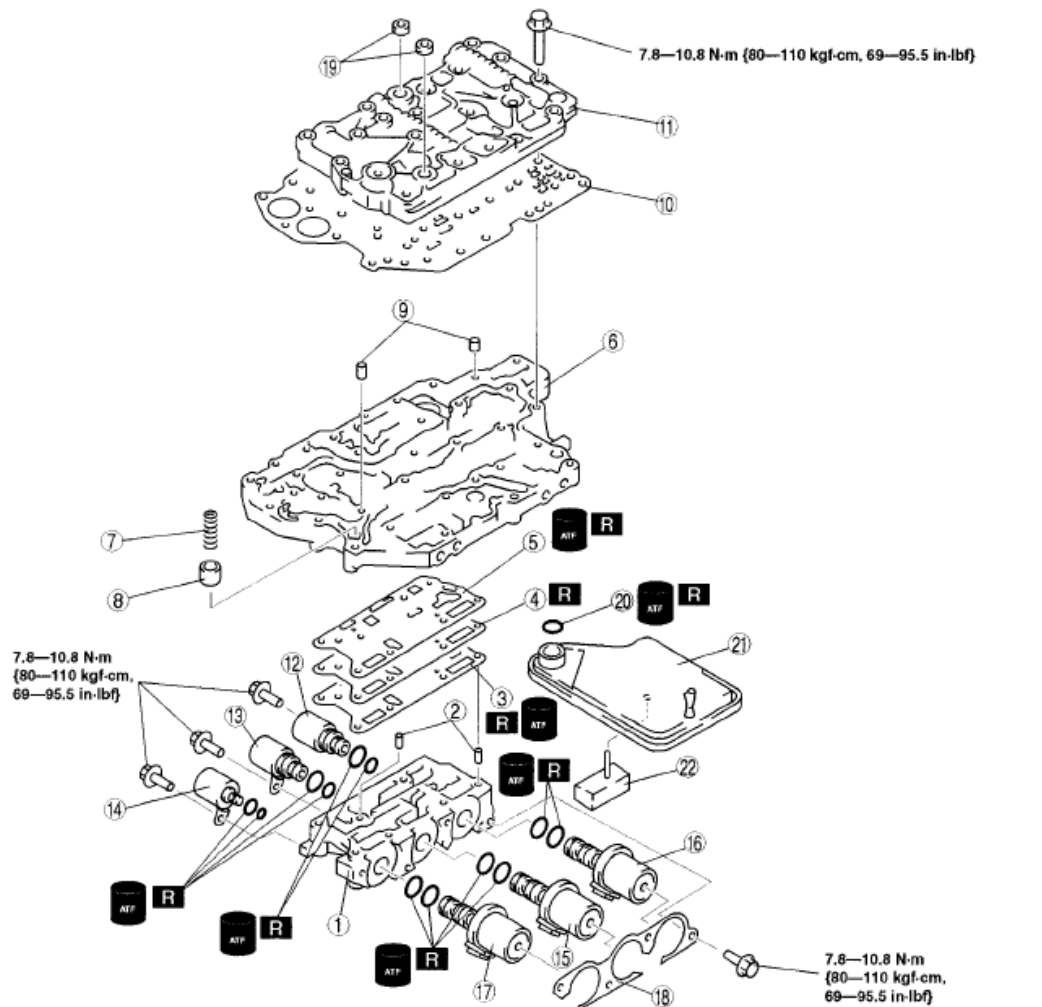


B3E0517A166

Fig. 176: View Of Pressure Regulator Valve, Pressure Regulator Valve Spring, And Retainer
Courtesy of MAZDA MOTORS CORP.

PRIMARY CONTROL VALVE BODY ASSEMBLY

1. Verify that all parts are clean and free of dust and other small particles.
2. Apply ATF to all parts.
3. Assemble in the reverse order of disassembly.



B3E0517A167

1	Solenoid control valve body
2	Tubular pin
3	Gasket C
4	Separator plate
5	Gasket D
6	Main control valve body
7	Pressure modifier accumulator spring
8	Pressure modifier accumulator
9	Tubular pin
10	Seal plate
11	Upper control valve body

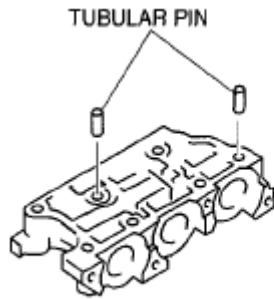
12	Shift solenoid E
13	Shift solenoid D
14	Pressure control solenoid A
15	Shift solenoid C
16	Shift solenoid B
17	Shift solenoid A
18	Bracket
19	Packing
20	O-ring
21	Oil strainer
22	Transaxle fluid temperature sensor

Fig. 177: Identifying Primary Control Valve Body Assembly Components With Torque Specifications
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Install the tubular pins into the solenoid control valve body.

CAUTION: • Do not confuse gaskets C and D.



B3E0517A168

Fig. 178: View Of Tubular Pins And Solenoid Control Valve Body
Courtesy of MAZDA MOTORS CORP.

2. Set the new gasket C, separator plate, and new gasket D on the solenoid control valve body.
3. Install the pressure modifier accumulator and pressure modifier accumulator spring into the main control valve body.



GASKET D
(WITHOUT FILTER)



GASKET C
(WITH FILTER)

B3E0517A169

Fig. 179: Identifying Gasket Style
Courtesy of MAZDA MOTORS CORP.

Primary control valve body spring (standard)

PRIMARY CONTROL VALVE BODY SPRING SPECIFICATIONS

Item	Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
Pressure modifier accumulator spring	11.0 {0.433}	23.0 {0.906}	6.6	1.5 {0.059}

4. Install the tubular pins into the main control valve body.

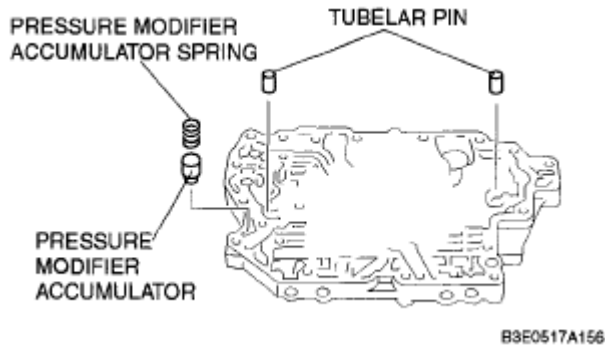


Fig. 180: Removing Tubular Pins, Pressure Modifier Accumulator Spring And Pressure Modifier Accumulator
 Courtesy of MAZDA MOTORS CORP.

5. Set the main control valve body onto the solenoid control valve body.

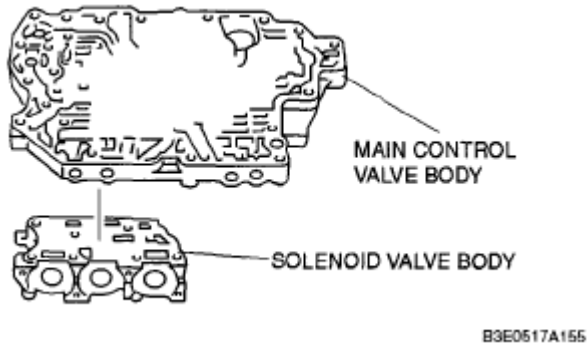


Fig. 181: View Of Main Control Valve Body
 Courtesy of MAZDA MOTORS CORP.

6. Set the seal plate on the main control valve body.

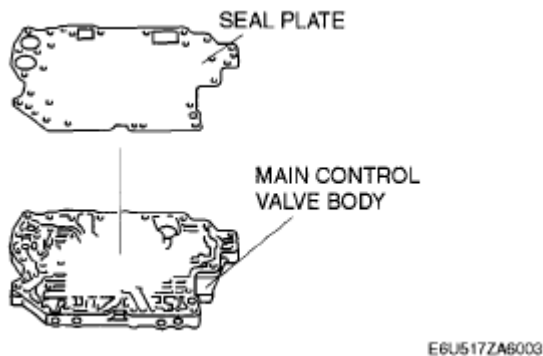
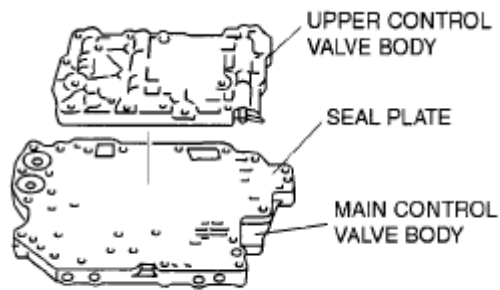


Fig. 182: Setting Seal Plate On Main Control Valve Body
 Courtesy of MAZDA MOTORS CORP.

7. Set the upper control valve body onto the main control valve body.



B3E0517A153

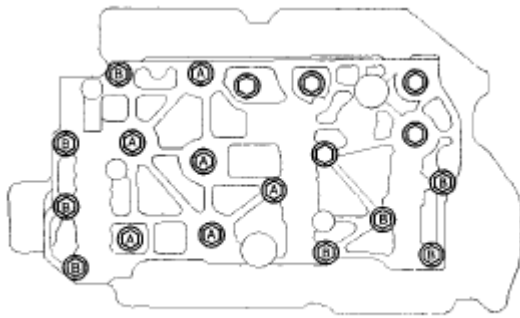
Fig. 183: View Of Upper Control Valve Body
Courtesy of MAZDA MOTORS CORP.

8. Hand-tighten the bolts shown in the figure. Each type of bolt has a different letter on its head. Match the bolt letter with the letter stamped next to its installation hole on the valve body.

Bolts identification

BOLTS IDENTIFICATION DESCRIPTION

Identification mark	Length (measured from below the head) mm {in}
A	30 {1.181}
B	40 {1.575}
No mark	60 {2.362}



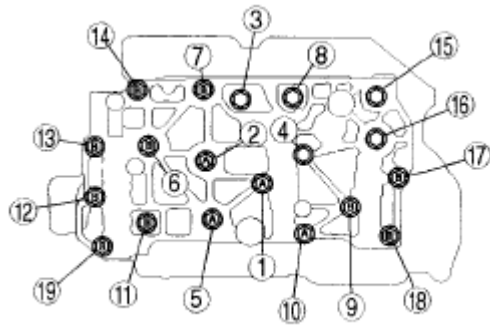
B3E0517A172

Fig. 184: Identifying Bolts
Courtesy of MAZDA MOTORS CORP.

9. Tighten the bolts evenly and gradually in the order shown.

Tightening torque

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



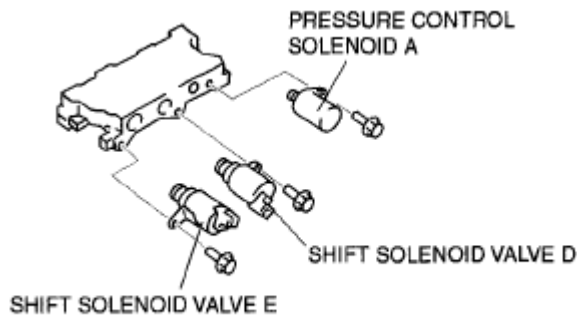
B3E0517A173

Fig. 185: Valve Body Bolt Tightening Sequence
Courtesy of MAZDA MOTORS CORP.

10. Install the shift solenoid D, E, and pressure control solenoid A.

Tightening torque

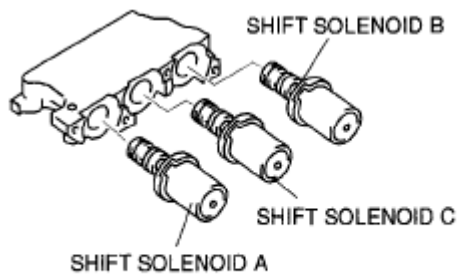
7.8-10.8 N.m {80-110 kgf.cm, 69-95.5 in.lbf}



D6E517ZA5067

Fig. 186: View Of Shift Solenoid D, E, And Pressure Control Solenoid
Courtesy of MAZDA MOTORS CORP.

11. Install the shift solenoid A, B, C.



B3E0517A150

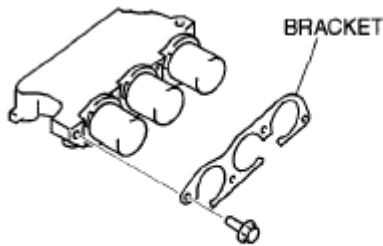
Fig. 187: View Of Shift Solenoids
Courtesy of MAZDA MOTORS CORP.

12. Install the bracket.

Tightening torque

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

13. Install the packing.
14. Apply ATF to new O-ring and install it onto the oil strainer.
15. Install the oil strainer onto the main control valve body.



B3E0517A149

Fig. 188: View Of Bracket

Courtesy of MAZDA MOTORS CORP.

SECONDARY CONTROL VALVE BODY DISASSEMBLY/ASSEMBLY SECONDARY CONTROL VALVE BODY DISASSEMBLY

CAUTION:

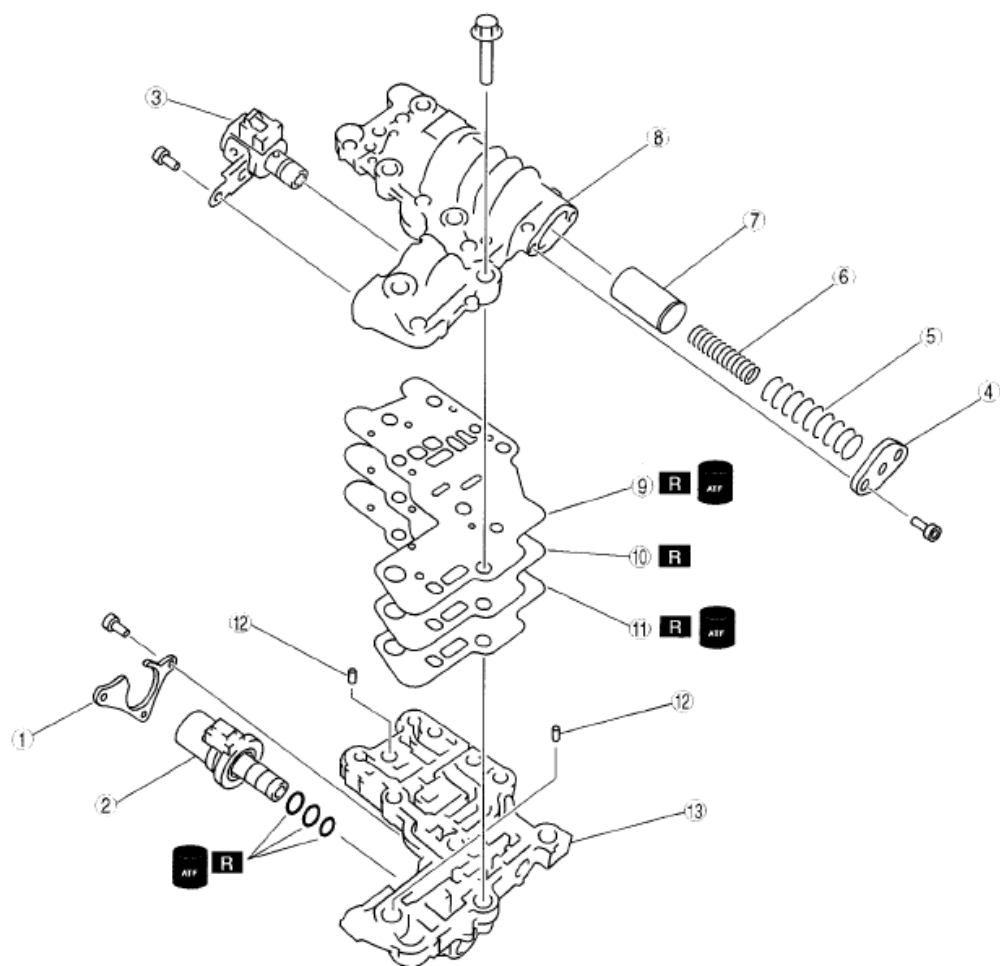
- Denting or scratching these components will reduce the ability of the transaxle to shift properly. When handling these components or the valve body that contains them, be careful not to drop or hit them.

1. Disassemble in the order indicated in the table.
2. Neatly arrange the removed parts to avoid confusing the similar parts.

WARNING:

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

3. Clean the removed parts with cleaning solvent, then use compressed air to dry them. Use compressed air to clean out all holes and passages.



D6E517ZA5069

1	Bracket
2	Pressure control solenoid B
3	Shift solenoid F
4	4/5 accumulator plate
5	4/5 accumulator large spring
6	4/5 accumulator small spring
7	4/5 accumulator

8	Secondary lower control valve body
9	Gasket G
10	Separator plate
11	Gasket H
12	Tubular pin
13	Secondary main control valve body

Fig. 189: Identifying Secondary Control Valve Body Components
 Courtesy of MAZDA MOTORS CORP.

DISASSEMBLY PROCEDURE

1. Remove the bracket.

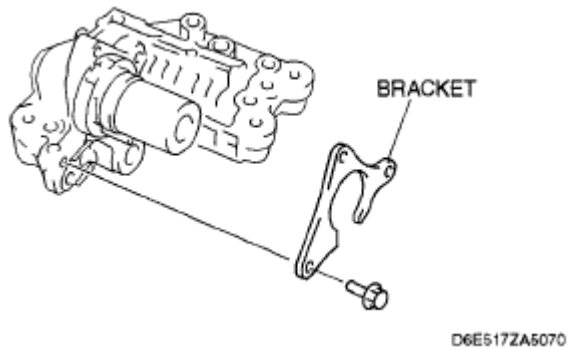


Fig. 190: View Of Bracket
Courtesy of MAZDA MOTORS CORP.

2. Remove the pressure control solenoid B and shift solenoid F.

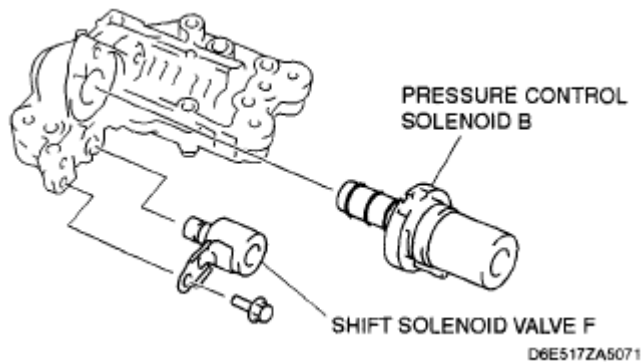


Fig. 191: View Of Pressure Control Solenoid B And Shift Solenoid F
Courtesy of MAZDA MOTORS CORP.

3. Remove the 4/5 accumulator plate.

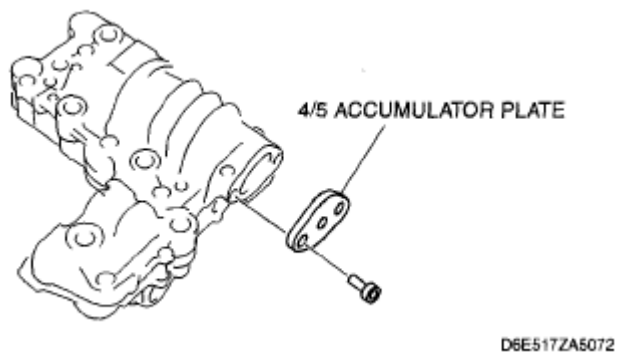


Fig. 192: View Of 4/5 Accumulator Plate
Courtesy of MAZDA MOTORS CORP.

4. Remove the 4/5 accumulator large spring, 4/5 accumulator small spring and 4/5 accumulator.

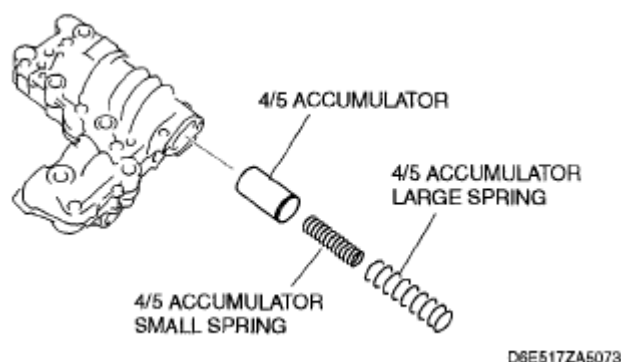


Fig. 193: View Of 4/5 Accumulator Large Spring
Courtesy of MAZDA MOTORS CORP.

5. Loosen the bolts evenly in the pattern shown.

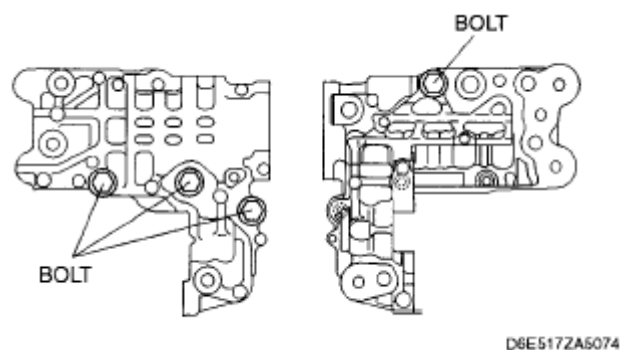


Fig. 194: Identifying Bolts
Courtesy of MAZDA MOTORS CORP.

6. Remove the secondary lower control valve body.

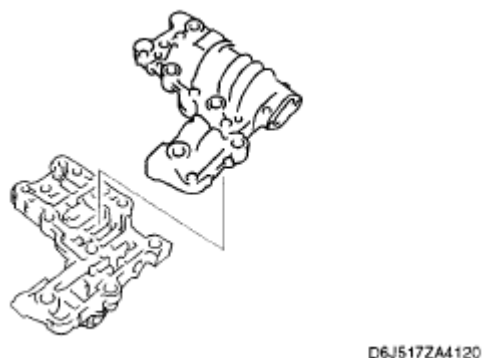
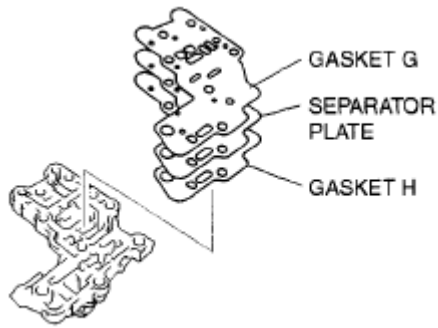


Fig. 195: View Of Secondary Lower Control Valve Body
Courtesy of MAZDA MOTORS CORP.

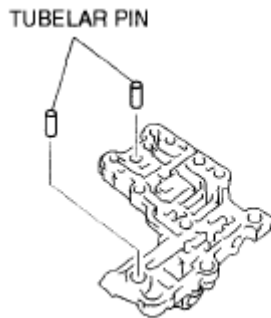
7. Remove the gasket G, separator plate and gasket H.



D8E517ZA5075

Fig. 196: View Of Gasket G, Separator Plate And Gasket H
Courtesy of MAZDA MOTORS CORP.

8. Remove the tubular pins.



D8E517ZA5076

Fig. 197: View Of Tubular Pins
Courtesy of MAZDA MOTORS CORP.

SECONDARY MAIN CONTROL VALVE BODY DISASSEMBLY/ASSEMBLY

CAUTION:

- Denting or scratching these precisely machined components will reduce the ability of the transaxle to shift properly. When handling these components or the valve body that contains them be careful not to drop or hit them.

NOTE:

- If a valve does not slide out under its own weight, place the valve body open-side down and tap on the valve body lightly with a plastic hammer.

1. Disassemble in the order indicated in the table.

WARNING:

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

2. Clean all parts and holes using compressed air and apply ATF to them immediately before assembly.
3. Assemble in the reverse order of disassembly.

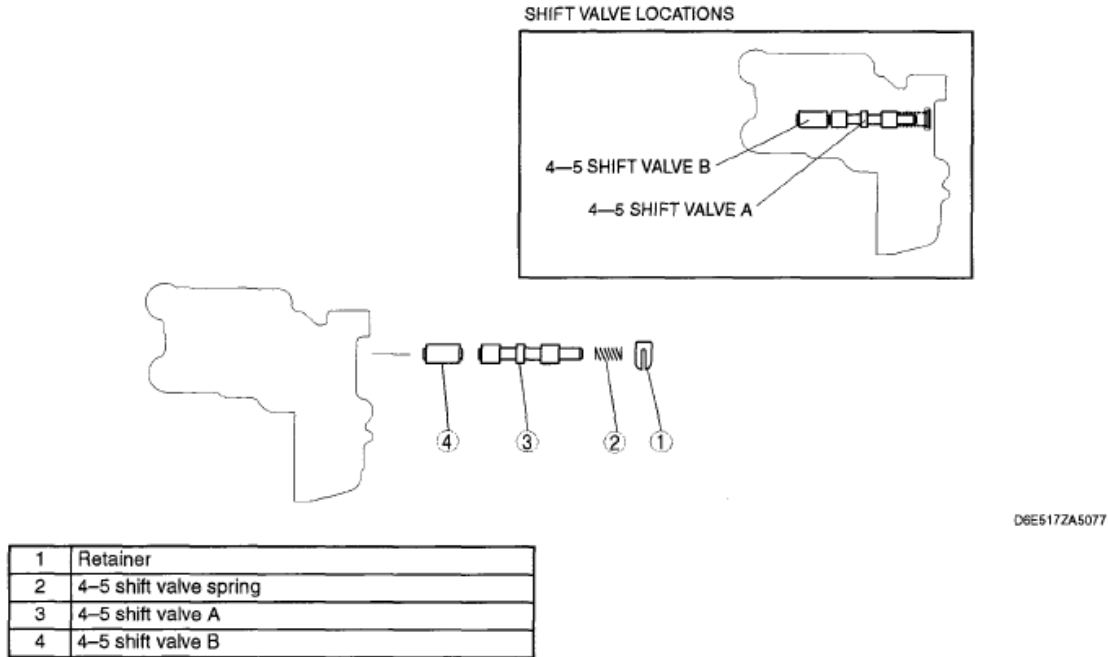


Fig. 198: Identifying Secondary Main Control Valve Body Components
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Measure the spring free length.

Secondary control valve body spring (standard)

SECONDARY CONTROL VALVE BODY SPRING SPECIFICATIONS

Item	Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
4-5 shift valve spring	8.7 {0.343}	27.0 {1.063}	10.7	0.8(0.031)

- If not as specified, replace the springs.
2. Install the 4-5 shift valve B, 4-5 shift valve A, 4-5 shift valve spring and retainer.

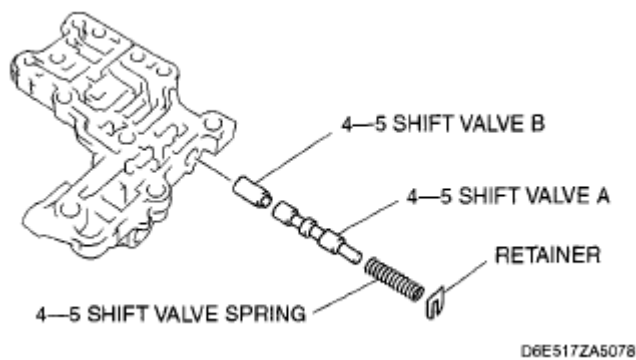
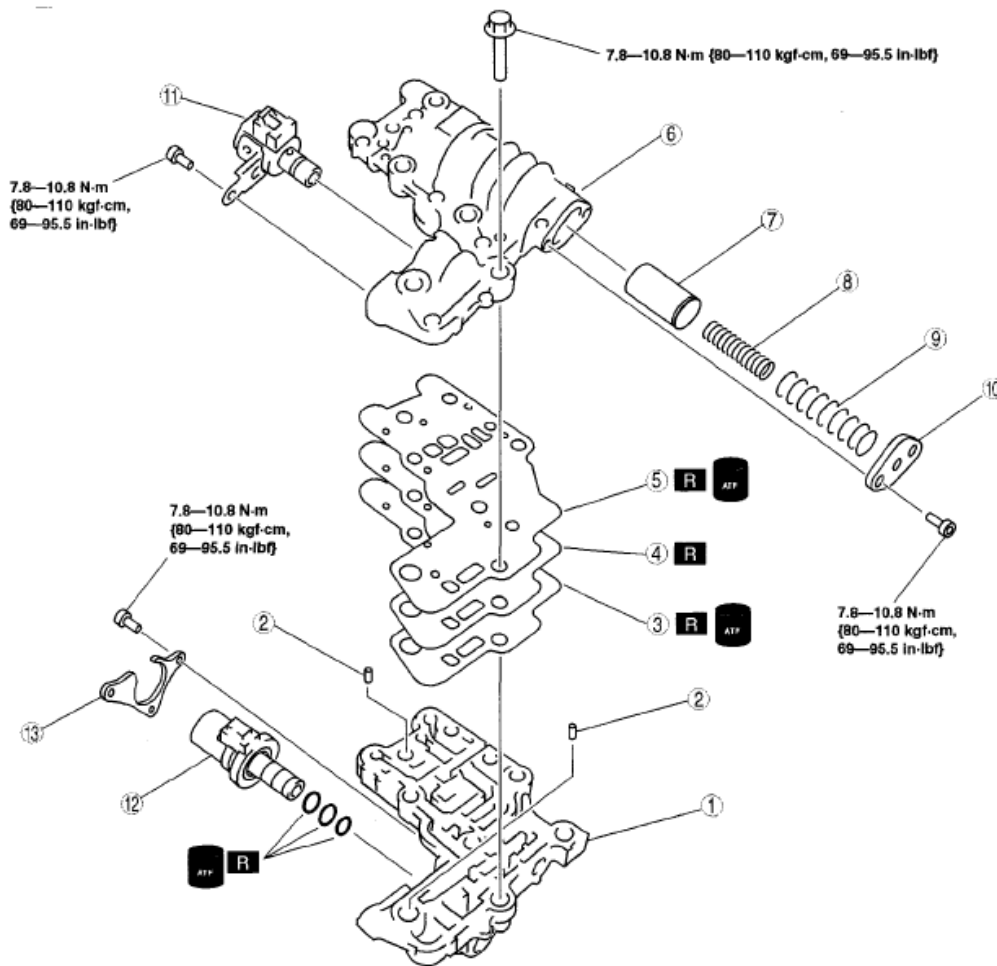


Fig. 199: View Of Shift Valve Spring And Retainer
Courtesy of MAZDA MOTORS CORP.

SECONDARY CONTROL VALVE BODY ASSEMBLY

1. Verify that all parts are clean and free of dust and other small particles.
2. Apply ATF to all parts.
3. Assemble in the reverse order of disassembly.



D6E517ZA5088

1	Secondary main control valve body
2	Tubular pin
3	Gasket H
4	Separator plate
5	Gasket G
6	Secondary lower control valve body
7	4/5 accumulator

8	4/5 accumulator small spring
9	4/5 accumulator large spring
10	4/5 accumulator plate
11	Shift solenoid F
12	Pressure control solenoid B
13	Bracket

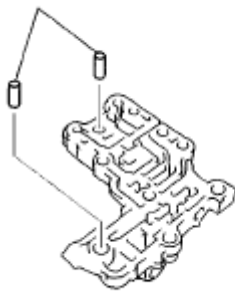
Fig. 200: Identifying Secondary Control Valve Body Assembly Components With Torque Specifications

Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Install the tubular pins into the secondary main control valve body.

TUBULAR PIN

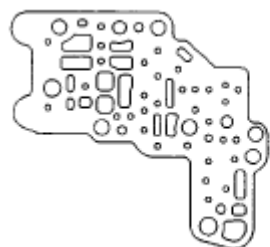
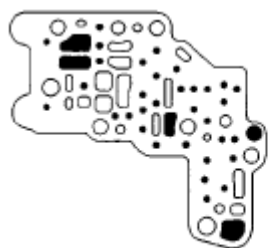


D6E517ZA5076

Fig. 201: View Of Tubular Pins And Secondary Main Control Valve Body
Courtesy of MAZDA MOTORS CORP.

CAUTION: Do not confuse gaskets G and H.

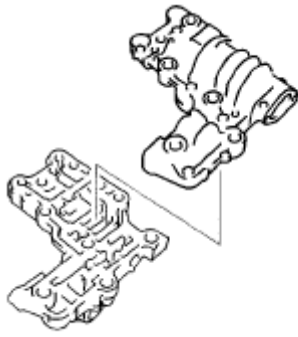
- Set the new gasket H, separator plate, and new gasket G on the secondary main control valve body.

GASKET H
(WITHOUT FILTER)GASKET G
(WITH FILTER)

D6E517ZA5079

Fig. 202: Identifying Gasket H And New Gasket G
Courtesy of MAZDA MOTORS CORP.

- Set the secondary lower control valve body onto the secondary main control valve body.



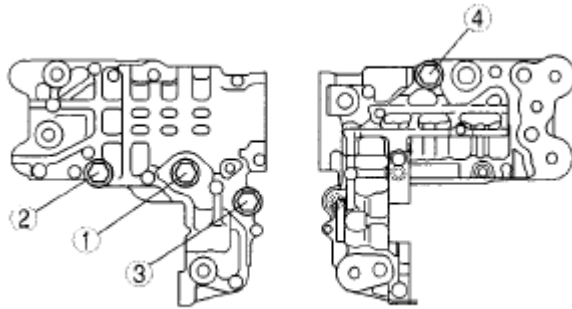
D6J517ZA4120

Fig. 203: View Of Secondary Lower Control Valve Body And Secondary Main Control Valve Body
Courtesy of MAZDA MOTORS CORP.

4. Tighten the bolts evenly and gradually in the order shown.

Tightening torque

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



D6J517ZA4127

Fig. 204: Secondary Lower Control Valve Body Bolt Tightening Sequence
Courtesy of MAZDA MOTORS CORP.

5. Measure the spring free length.

Secondary control valve body spring (standard)

SECONDARY CONTROL VALVE BODY SPRING SPECIFICATIONS

Item	Outer diameter mm {in}	Free length mm {in}	No. of coils	Wire diameter mm {in}
4/5 accumulator large spring	21.2 {0.835}	72.2 {2.843}	14.0	2.6 {0.102}
4/5 accumulator small spring	15.2 {0.598}	53.7 {2.114}	11.9	3.2 {0.126}

- If not as specified, replace the springs.

6. Install the 4/5 accumulator, 4/5 accumulator small spring and 4/5 accumulator large spring.

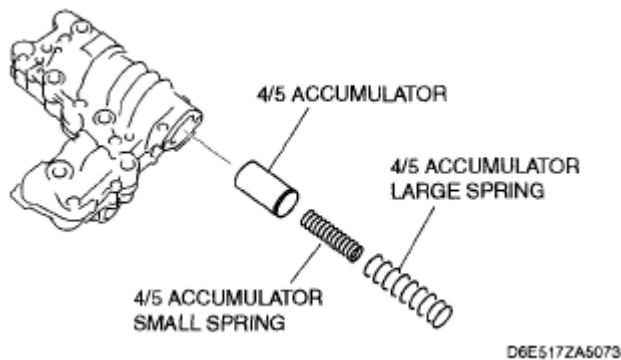


Fig. 205: View Of 4/5 Accumulator, 4/5 Accumulator Small Spring And 4/5 Accumulator Large Spring

Courtesy of MAZDA MOTORS CORP.

7. Install the 4/5 accumulator plate.

Tightening torque

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

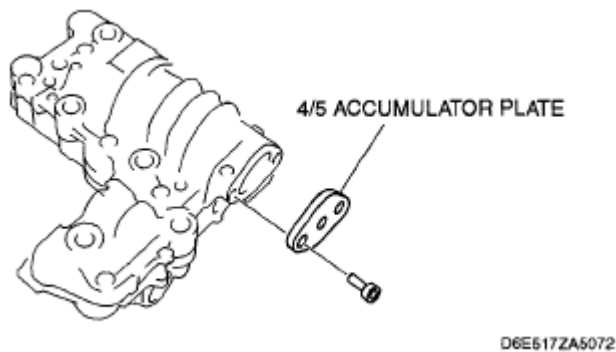


Fig. 206: View Of 4/5 Accumulator Plate

Courtesy of MAZDA MOTORS CORP.

8. Install the shift solenoid F and pressure control solenoid B.

Tightening torque

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

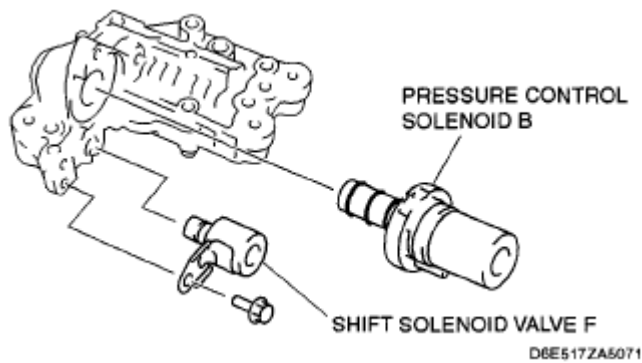


Fig. 207: View Of Shift Solenoid F And Pressure Control Solenoid B
Courtesy of MAZDA MOTORS CORP.

9. Install the bracket.

Tightening torque

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

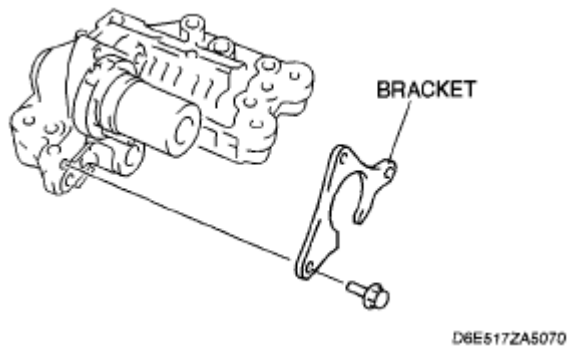


Fig. 208: View Of Bracket
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL DISASSEMBLY/ASSEMBLY

DIFFERENTIAL DISASSEMBLY

1. Perform the preinspection before disassembly. (See .)
2. Disassemble in the order indicated in the table.

1	Side gear
2	Thrust washer
3	Roll pin (See Roll pin disassembly note.)
4	Pinion shaft
5	Pinion gear
6	Thrust washer
7	Bearings (See Bearings disassembly note.)
8	Ring gear
9	Gear case
10	Bolt

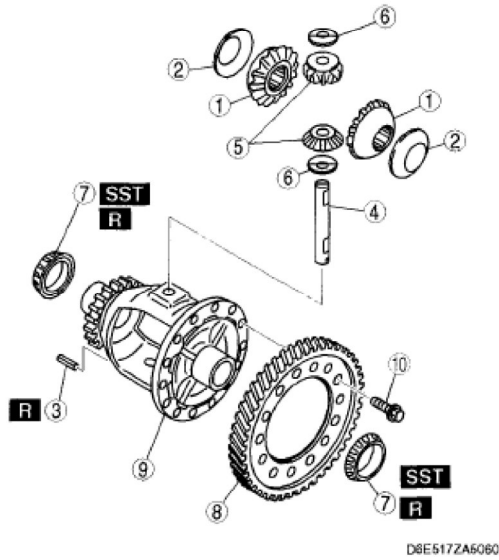


Fig. 209: Identifying Differential Assembly Components
Courtesy of MAZDA MOTORS CORP.

ROLL PIN DISASSEMBLY NOTE

1. Place the gear case in a vise.
2. Insert a **2.0 mm {0.07 in}** punch into the roll pin hole from the ring gear side, and remove the roll pin.



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Fig. 210: Inserting Punch Into Roll Pin Hole
Courtesy of MAZDA MOTORS CORP.

BEARINGS DISASSEMBLY NOTE

1. Remove the bearing (speedometer drive gear side) from the gear case using the SSTs .

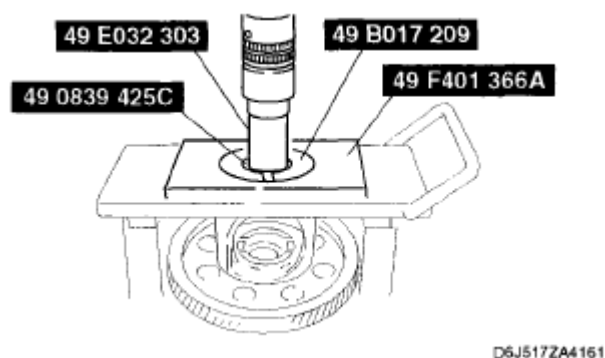


Fig. 211: Removing Bearing From Gear Case
Courtesy of MAZDA MOTORS CORP.

2. Remove the bearing (ring gear side) from the gear case using the SST .

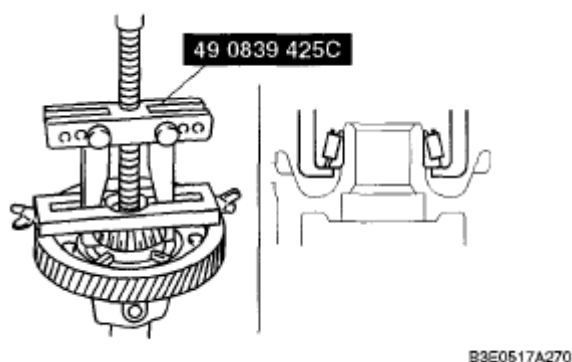


Fig. 212: Removing Bearing (Ring Gear Side) From Gear Case Using SST
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL ASSEMBLY

1. Assemble in the reverse order of disassembly.

1	Bolt
2	Gear case
3	Ring gear
4	Sensor rotor
5	Bearings
6	Thrust washer
7	Pinion gear
8	Pinion shaft
9	Roll pin
10	Thrust washer
11	Side gear

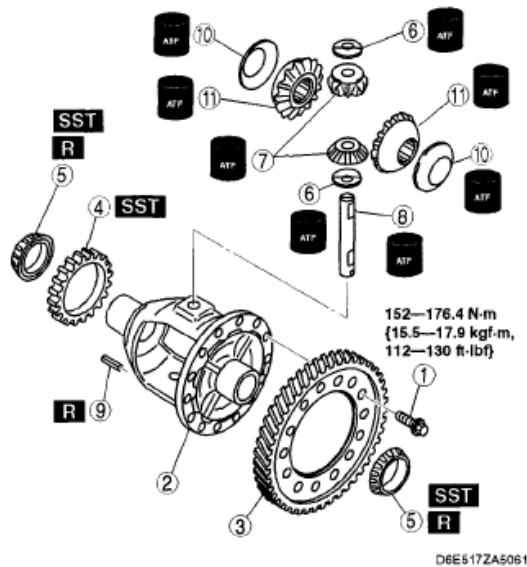
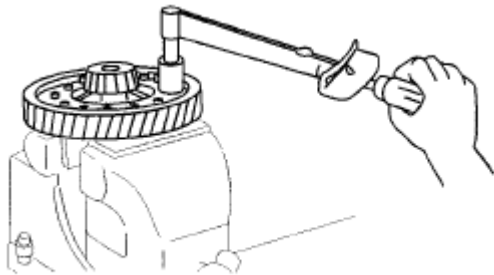


Fig. 213: Identifying Differential Assembly Components With Torque Specifications
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

1. Install the ring gear to the gear case.



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Fig. 214: Installing Ring Gear To Gear Case
Courtesy of MAZDA MOTORS CORP.

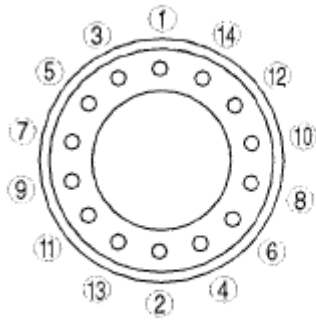
2. Tighten the bolts evenly and gradually in the order shown, (bolt fixed type)

Tightening torque

152-176.4 N·m {15.5-17.9 kgf·m, 112-130 ft·lbf}

NOTE:

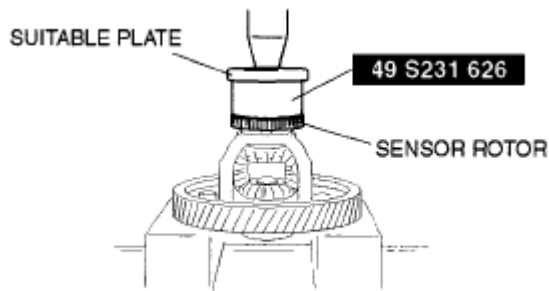
- If the gear case has been newly replaced perform Step (3).



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Fig. 215: Ring Gear Bolt Tightening Sequence
Courtesy of MAZDA MOTORS CORP.

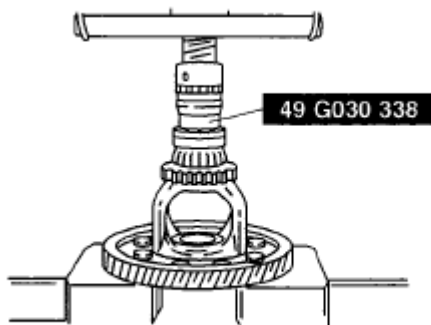
3. Install the sensor rotor to the gear case using the SST and suitable plate.



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Fig. 216: Installing Sensor Rotor To Gear Case Using SST
Courtesy of MAZDA MOTORS CORP.

4. Install a new bearing.
 1. Press the new bearing (sensor rotor side) onto the gear case using the SST.
 2. Press on the other new bearing (ring gear side) in the same manner.
5. Apply ATF to the thrust washers and pinion shaft.
6. Install the pinion gear and thrust washers into the gear case.

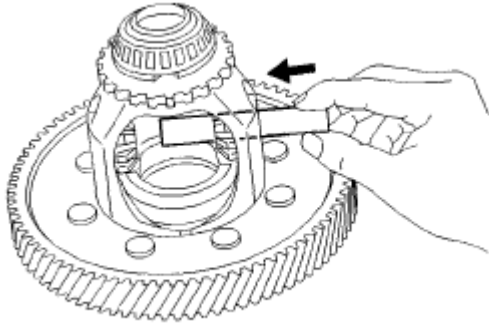


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Fig. 217: Installing Pinion Gear And Thrust Washers Into Gear Case

Courtesy of MAZDA MOTORS CORP.

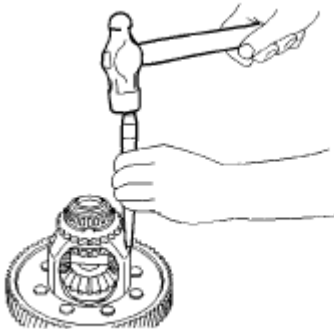
7. Install the pinion shaft.



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Fig. 218: Installing Pinion Shaft
Courtesy of MAZDA MOTORS CORP.

8. Install the roll pin, and crimp it to prevent it from coming out of the gear case.
9. Apply ATF to the thrust washers.
10. Install the thrust washers and side gears into the gear case, then turn the side gears and align them with the drive shaft holes.



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Fig. 219: Crimping Roll Pin To Gear Case
Courtesy of MAZDA MOTORS CORP.

11. Measure the backlash of the side gears as follows:
 1. Install the left and right drive shafts in the differential
 2. Support the drive shafts on V-blocks.
 3. Measure the backlash of both side gears.

Differential backlash

Standard: 0.05-0.15 mm {0.002-0.005 in}

Maximum: 0.5 mm {0.020 in}

- If not as specified, replace the differential.

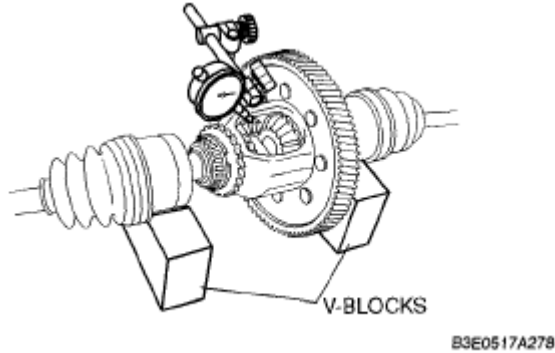


Fig. 220: Measuring Backlash Of Both Side Gears
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL BEARING PRELOAD

1. Remove the bearing race and adjustment shim from the converter housing using the SST .

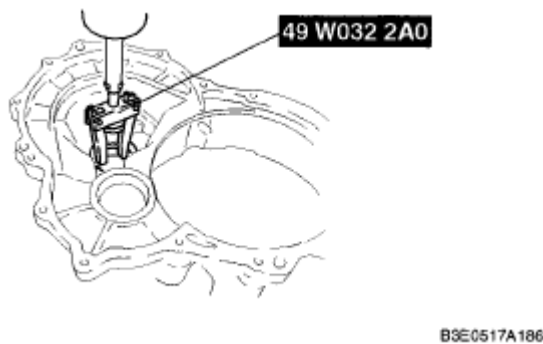


Fig. 221: Removing Bearing Race And Adjustment Shim From Converter Housing
Courtesy of MAZDA MOTORS CORP.

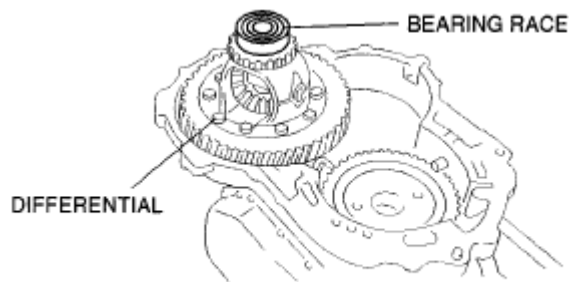
2. Install the bearing race into the transaxle case.



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Fig. 222: Installing Bearing Race Into Transaxle Case
Courtesy of MAZDA MOTORS CORP.

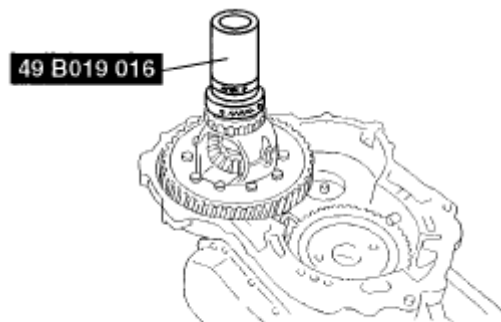
3. Set the differential on the transaxle case.
4. Install the bearing race removed in Step 1 into the SST .



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Fig. 223: Installing Bearing Race
Courtesy of MAZDA MOTORS CORP.

5. Set the differential on the SST (selector).



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Fig. 224: Setting Differential On SST
Courtesy of MAZDA MOTORS CORP.

6. Turn the selector to eliminate the gap between its two halves.

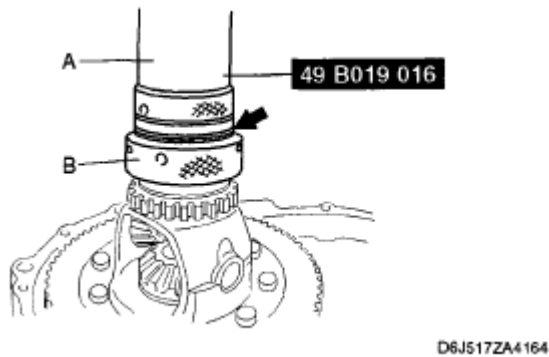


Fig. 225: Locating Halves
Courtesy of MAZDA MOTORS CORP.

7. Set the six SSTs (collars) on the transaxle case in the position shown.

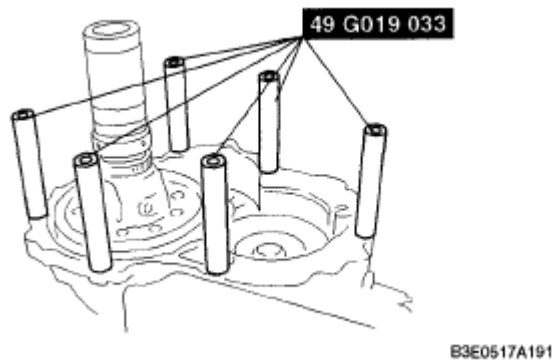


Fig. 226: Setting SST (Collars) On Transaxle Case In Position
Courtesy of MAZDA MOTORS CORP.

8. Set the converter housing on the transaxle case and tighten the SSTs (bolts) to the specified torque.

Tightening torque

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

9. Turn the SST (selector) to increase the clearance (arrow) using the SSTs (bars), until it no longer turns. This is to seat the bearing race.

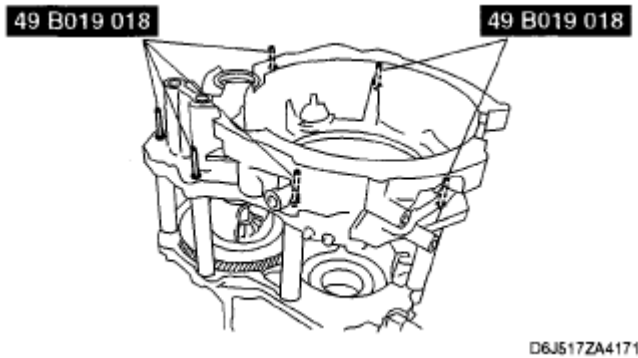


Fig. 227: Setting Converter Housing On Transaxle Case
Courtesy of MAZDA MOTORS CORP.

10. Turn the selector in the opposite direction until the preload is eliminated (gap is reduced).
11. Insert the SST through the converter housing and attach it to the pinion shaft.
12. Install the SST and a pull scale or torque wrench.

NOTE:

- Read the preload when the differential starts to turn.
- Measure several times and calculate the average value.

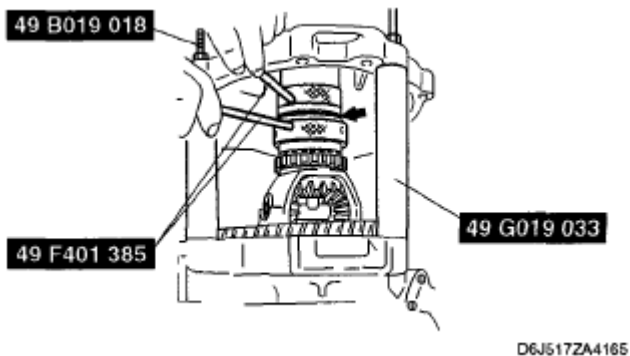


Fig. 228: Identifying SSTs
Courtesy of MAZDA MOTORS CORP.

13. Adjust the clearance of the SST (selector) to obtain the specified preload/pull scale reading.

Differential bearing Preload

Preload: 1.4-2.3 N.m {14-24 kgf.cm, 12-20 in lbf}

Reading on pull scale: 14-23 N {1.4-2.4 kgf, 3.1-5.3 lbf}

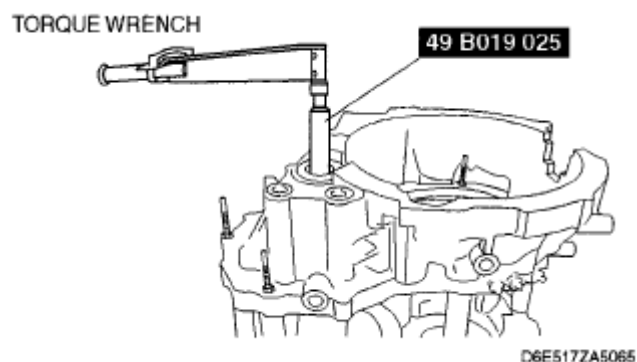


Fig. 229: Measuring Differential Bearing Preload
Courtesy of MAZDA MOTORS CORP.

NOTE:

- Measure the clearance around the entire circumference, and select a shim based on the maximum clearance.
- The maximum allowable number of adjustment shim is one.

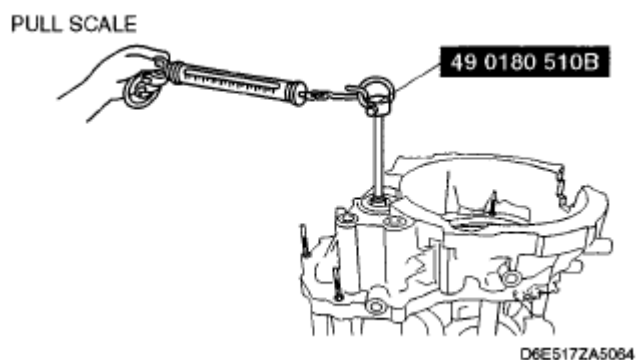


Fig. 230: Measuring Clearance Around Entire Circumference
Courtesy of MAZDA MOTORS CORP.

14. Measure the clearance as shown.
15. Take the maximum reading and determine the shim to be used.



Fig. 231: Removing Converter Housing

Courtesy of MAZDA MOTORS CORP.

Differential preload adjust shims (mm {in})

DIFFERENTIAL PRELOAD SPECIFICATIONS

0.50 {0.020}	0.55 {0.022}	0.60 {0.024}
0.65 {0.026}	0.70 {0.028}	0.75 {0.030}
0.80 {0.031}	0.85 {0.033}	0.90 {0.035}
0.95 {0.037}	1.00 {0.039}	1.05 {0.041}
1.10 {0.043}	1.15 {0.045}	1.20 {0.047}
1.25 {0.049}	1.30 {0.051}	1.35 {0.053}
1.40 {0.055}	1.45 {0.057}	1.50 {0.059}
1.55 {0.061}	-	-

16. Remove the converter housing and SST (selector).
17. Install the required adjustment shim and tap the bearing race into the converter housing.
18. Install the converter housing.

Tightening torque

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



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Fig. 232: Installing Bearing Race Into Converter Housing

Courtesy of MAZDA MOTORS CORP.

19. Install the SST to the pinion shaft through the converter housing.

NOTE:

- **Measure several times and calculate the average value.**

20. Verify that the preload is within the specification. If not, return to Step 1.

Differential bearing Preload

Preload: 1.4-2.3 N.m {14-24 kgf.cm, 12-20 in.lbf}

Reading on pull scale: 14-23 N {1.4-2.4 kgf, 3.1-5.3 lbf}

21. Remove the converter housing.

AUTOMATIC TRANSAXLE ASSEMBLY

PRECAUTION

General notes

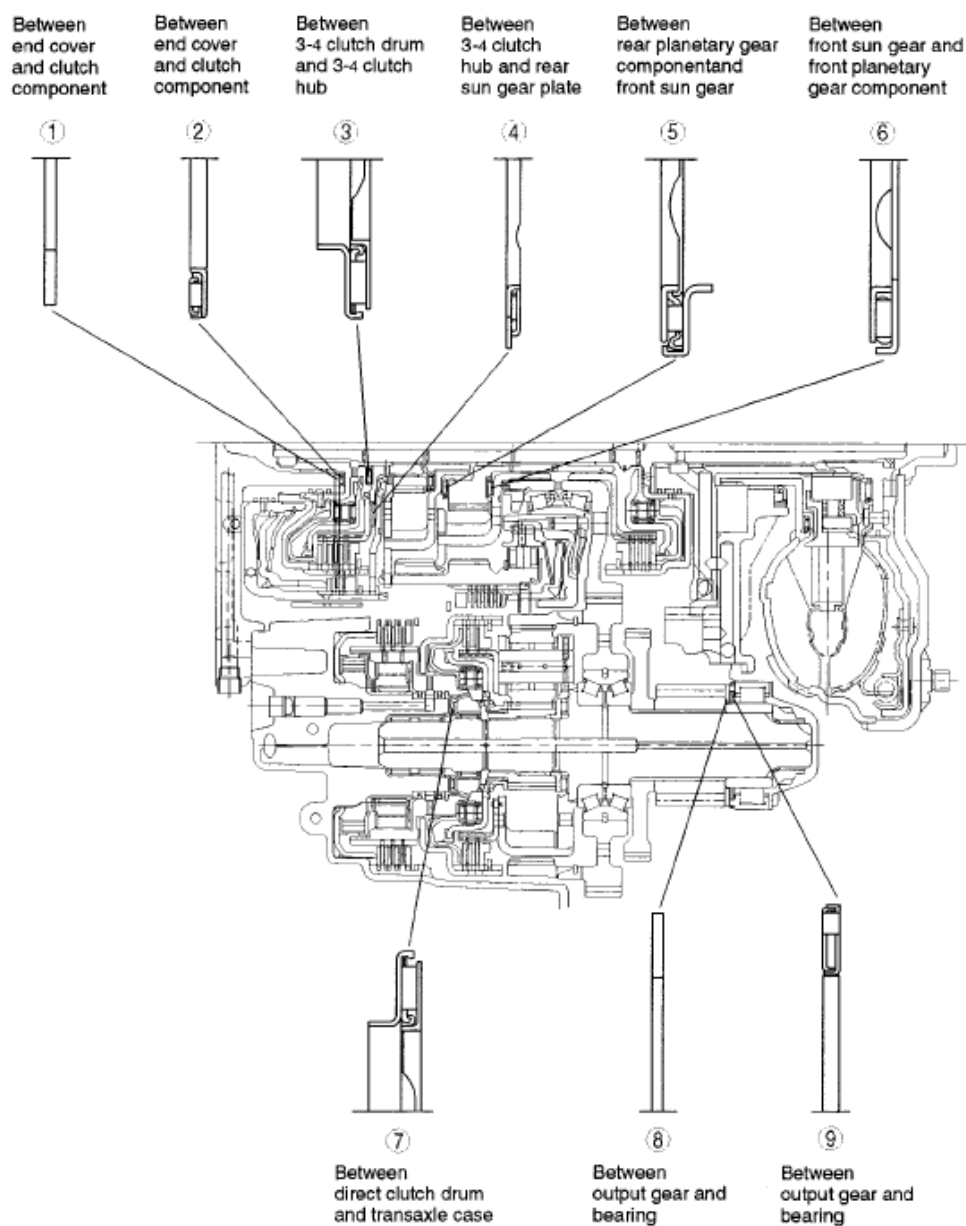
1. Select the adjustment shims, referring to **Bearing Preload**.
2. If the drive plates or 2-4 brake band are replaced with new ones, soak the new part in ATF for at least two hours before installation.
3. Before assembly, apply ATF to all seal rings, rotating parts, O-rings, and sliding parts.
4. All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

WARNING:

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

ASSEMBLY

Bearing and race locations



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Fig. 233: Identifying Bearing And Race Locations

Courtesy of MAZDA MOTORS CORP.

NOTE:

- The bearing and race at locations 3, 4, 5, 6 and 7 are one-piece units.

Outer diameter of bearing and race

OUTER DIAMETER OF BEARING AND RACE

	1	2	3	4	5	6	7	8	9
Bearing (mm {in})	-	40.0 {1.57}	39.0 {1.54}	78.2 {3.08}	52.0 {2.05}	50.0 {1.97}	46.5 {1.83}	-	61.0 {2.40}

Race (mm {in})	40.2 {1.58}	-	-	-	-	-	-	59.0 {2.32}	-
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COMPONENTS

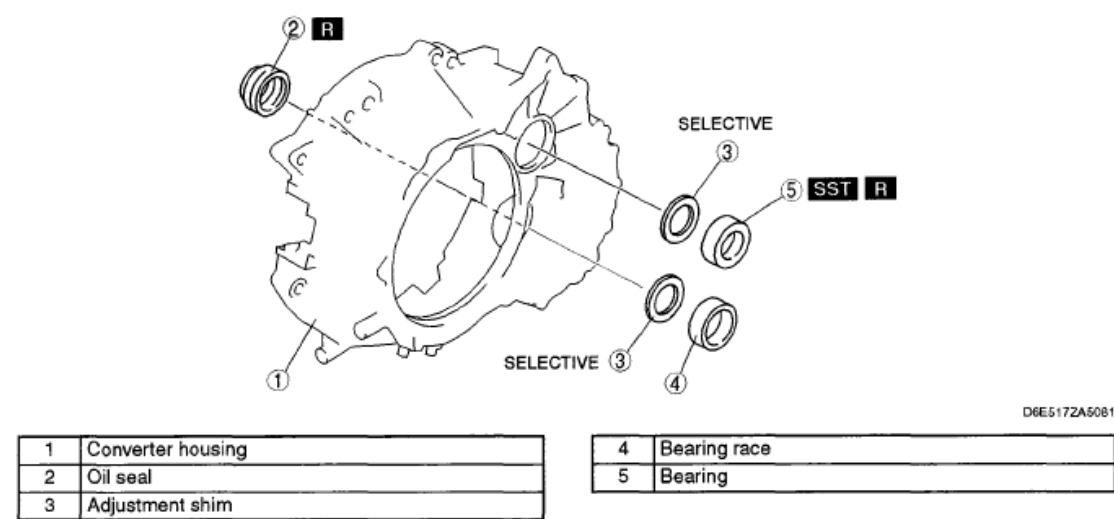
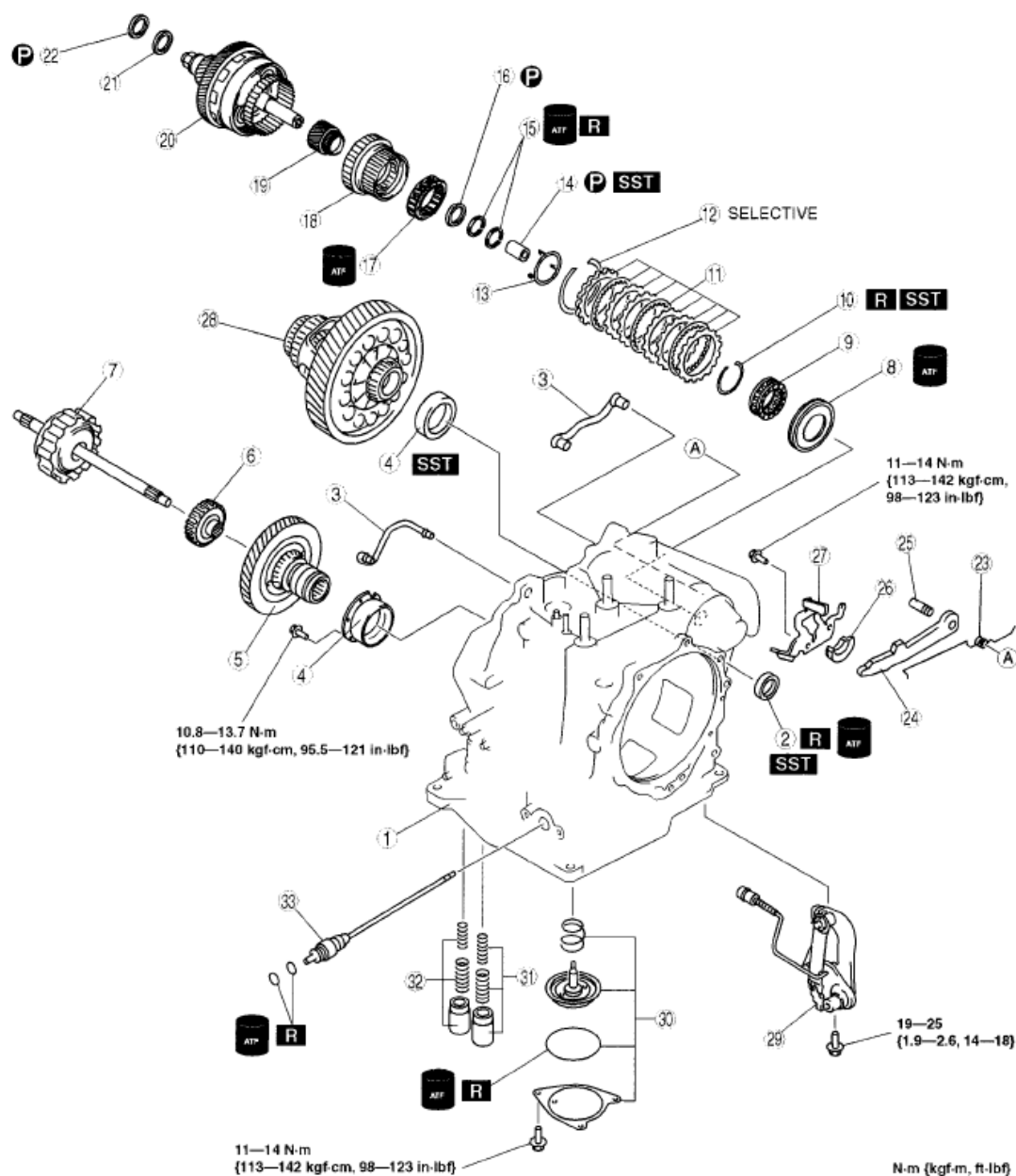


Fig. 234: Identifying Automatic Transaxle Components (1 Of 4)
Courtesy of MAZDA MOTORS CORP.

2006 Ford Fusion S

2006-2012 TRANSMISSION Automatic Transaxle Overhaul - Mazda5 & Mazda6

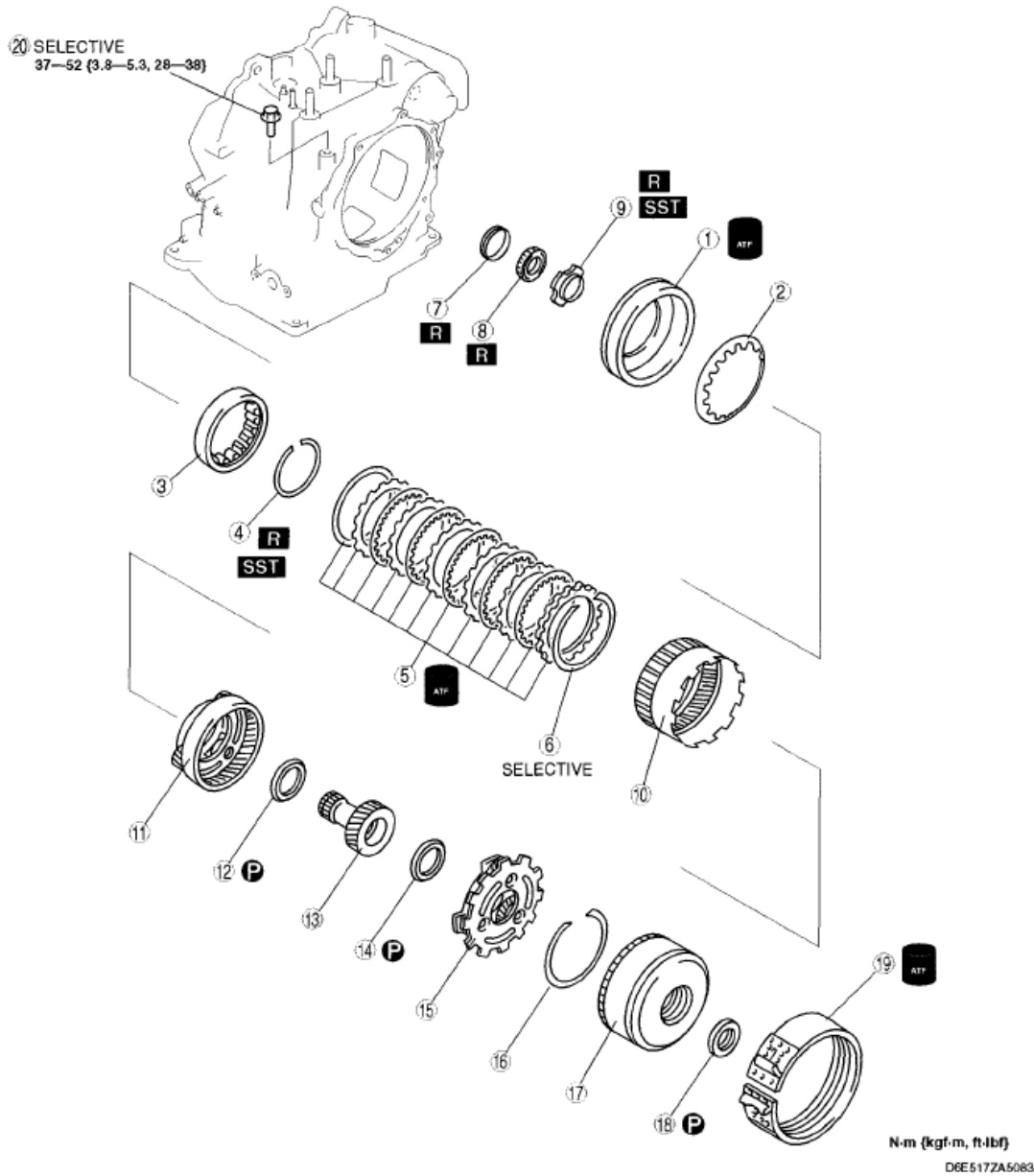


D6E5172A5082

1	Transaxle case
2	Oil seal
3	Oil pipe
4	Bearing race
5	Primary gear
6	Forward clutch hub
7	Forward clutch
8	Reduction brake piston
9	Springs and retainer component
10	Snap ring
11	Reduction brake
12	Snap ring
13	Spacer
14	Needle bearing
15	Seal rings
16	Needle bearing

17	One-way clutch No.2
18	Direct clutch component
19	Secondary sun gear
20	Output gear component
21	Bearing race
22	Needle bearing
23	Pawl return spring
24	Parking pawl
25	Parking pawl shaft
26	Support actuator
27	Actuator plate
28	Differential
29	Parking rod lever component
30	Band servo
31	Forward accumulator
32	Servo apply accumulator

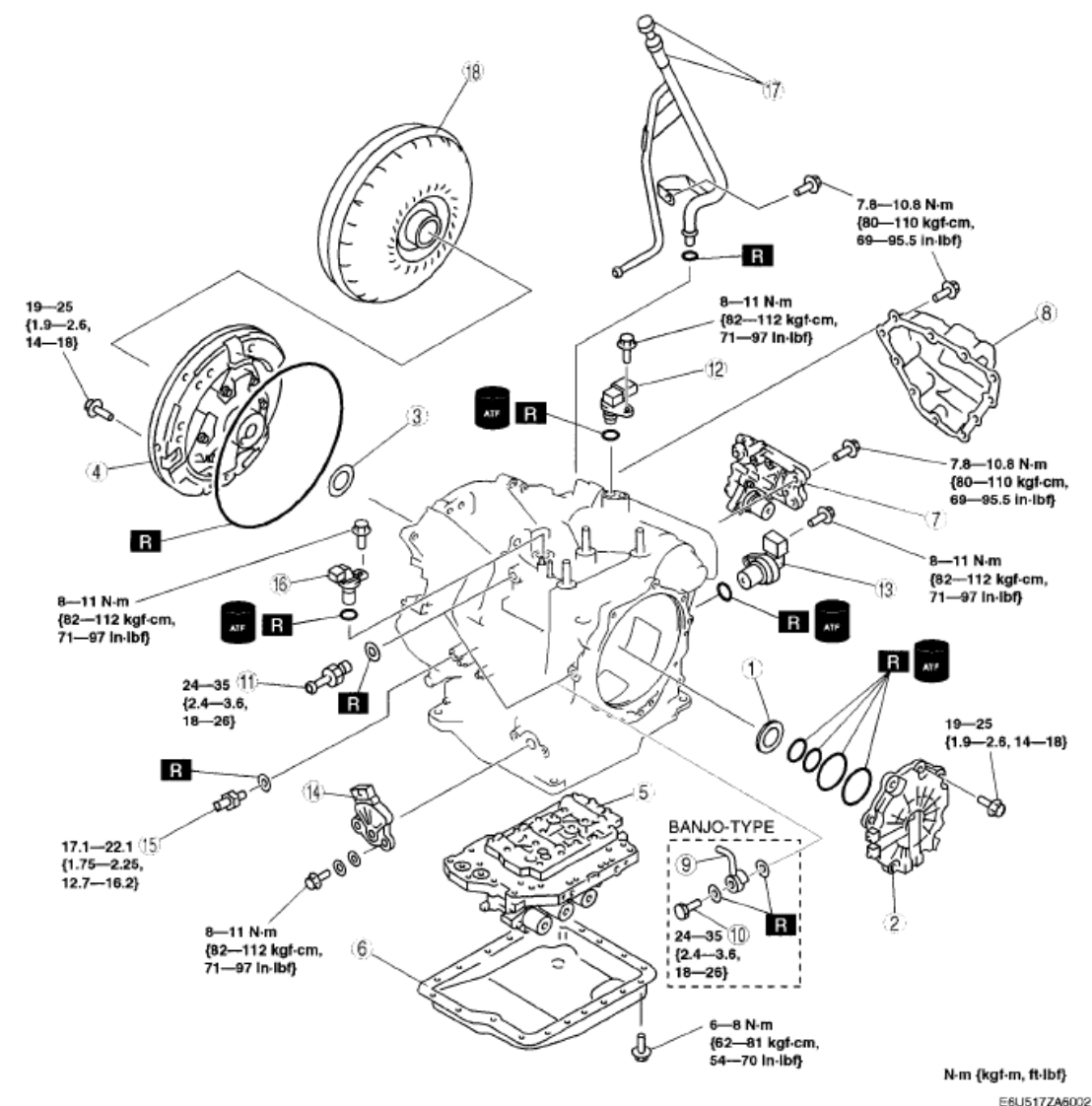
Fig. 235: Identifying Automatic Transaxle Components With Torque Specifications (2 Of 4)
Courtesy of MAZDA MOTORS CORP.



1	Low and reverse brake piston
2	Low and reverse brake return spring
3	One-way clutch inner race
4	Snap ring
5	Low and reverse brake
6	Snap ring
7	Distance piece
8	Bearing
9	Lock nut
10	Front internal gear and one-way clutch No.1

11	Front planetary gear component
12	Needle bearing
13	Front sun gear
14	Needle bearing
15	Rear planetary gear component
16	Snap ring
17	Clutch component
18	Needle bearing
19	2-4 brake band
20	Band strut

Fig. 236: Identifying Automatic Transaxle Components With Torque Specifications (3 Of 4)
Courtesy of MAZDA MOTORS CORP.



1	Bearing race
2	End cover
3	Thrust washer
4	Oil pump
5	Primary control valve body component
6	Oil pan
7	Secondary control valve body component
8	Oil cover
9	Oil pipe
10	Connector bolt
11	Connector pipe

12	Intermediate sensor
13	Vehicle speed sensor
14	Transaxle range switch
15	Oil pressure switch
16	Input/turbine speed sensor
17	Oil dipstick and oil filler tube
18	Torque converter

Fig. 237: Identifying Automatic Transaxle Components With Torque Specifications (4 Of 4)
Courtesy of MAZDA MOTORS CORP.

ASSEMBLY PROCEDURE

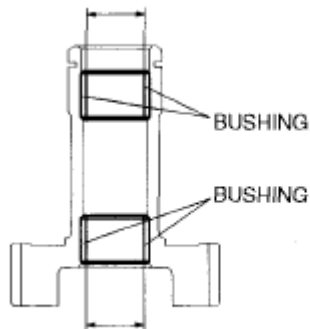
1. Measure the bushing of the front sun gear.

Front sun gear bushing inner diameter

Standard: 18.000-18.018 mm {0.70866-0.70936 in}

Maximum: 18.038 mm {0.71016 in}

2. If not as specified, replace the front sun gear.



B3E0517A284

Fig. 238: Measuring Bushing Of Front Sun Gear
Courtesy of MAZDA MOTORS CORP.

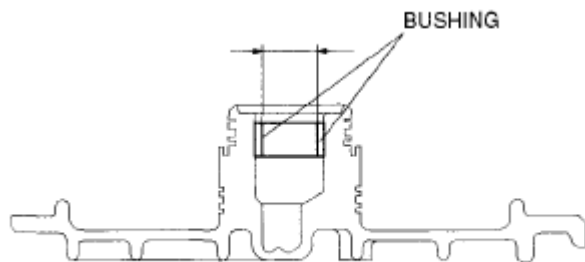
3. Measure the bushing of the end cover.

End cover bushing inner diameter

Standard: 23.600-23.621 mm {0.92913-0.92995 in}

Maximum: 23.641 mm {0.93075 in}

4. If not as specified, replace the end cover.



B3E0517A332

Fig. 239: Measuring Bushing Of End Cover
Courtesy of MAZDA MOTORS CORP.

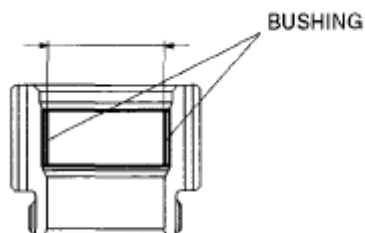
5. Measure the bushing of the secondary sun gear.

Secondary sun gear bushing inner diameter

Standard: 26.000-26.021 mm {1.02362-1.02445 in}

Maximum: 26.041 mm {1.02524 in}

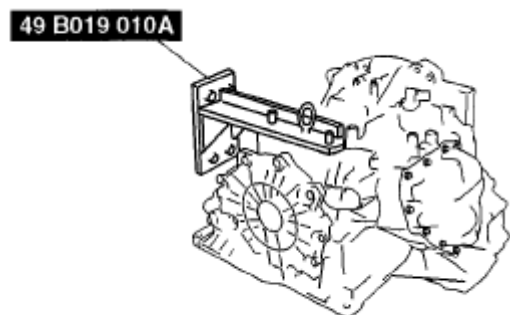
6. If not as specified, replace the secondary sun gear.



D6E517ZA5085

Fig. 240: Measuring Bushing Of Secondary Sun Gear
Courtesy of MAZDA MOTORS CORP.

7. Assemble the SST .



D6J517ZA4130

Fig. 241: Identifying SST
Courtesy of MAZDA MOTORS CORP.

8. Lift the transaxle case and mount it on the SST .

NOTE:

- If the transaxle case has been newly replaced perform step (9).

9. Install the oil pipe.

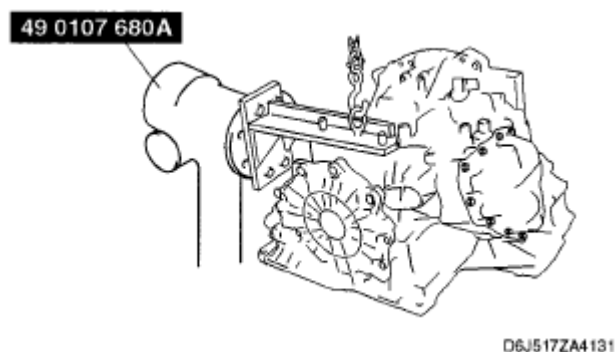


Fig. 242: Transaxle Case On SST
Courtesy of MAZDA MOTORS CORP.

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

Tightening torque

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

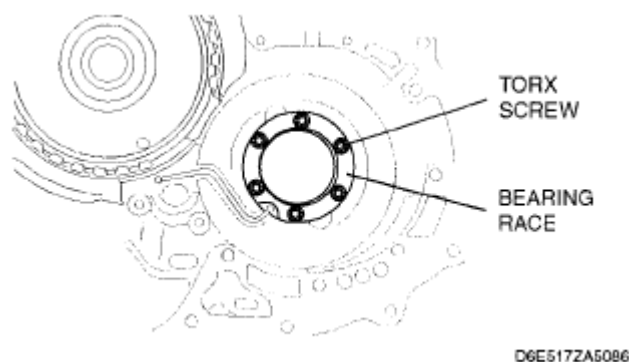


Fig. 243: View Of Bearing Race
Courtesy of MAZDA MOTORS CORP.

11. Install the bearing race to the transaxle case.

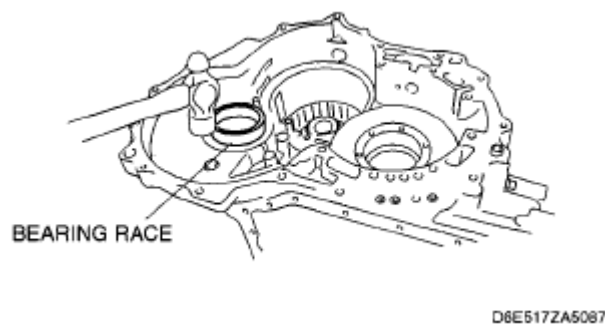


Fig. 244: Installing Bearing Race To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

12. Install the locknut.
 1. Set the primary gear.

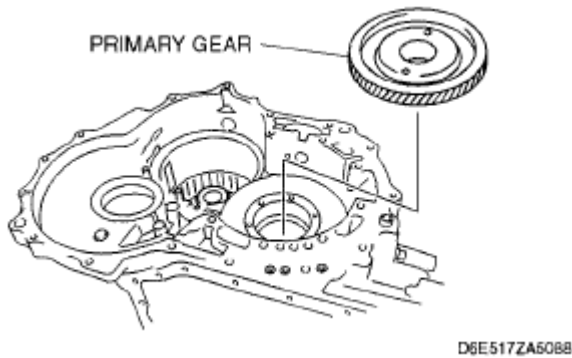


Fig. 245: View Of Primary Gear
Courtesy of MAZDA MOTORS CORP.

2. Set the distance piece and bearing.

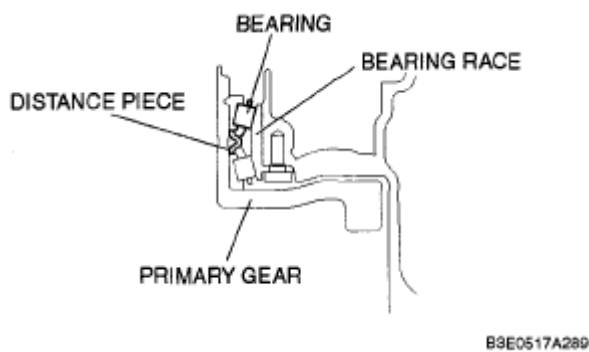


Fig. 246: View Of Distance Piece And Bearing
Courtesy of MAZDA MOTORS CORP.

3. Loosely tighten the locknut.

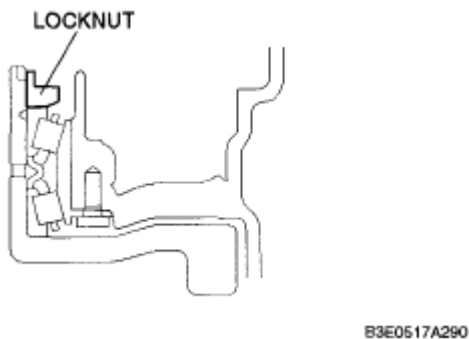


Fig. 247: View Of Locknut
Courtesy of MAZDA MOTORS CORP.

4. Set the SSTs in the order shown.

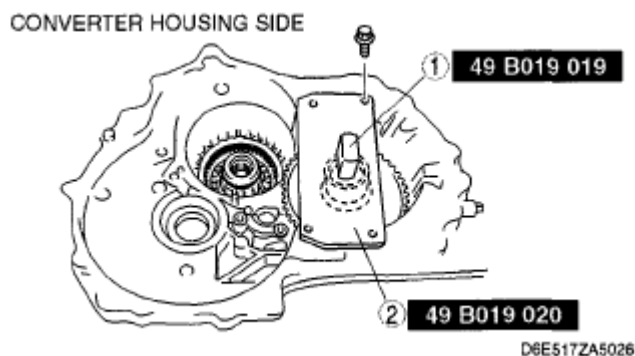


Fig. 248: Identifying SSTs
Courtesy of MAZDA MOTORS CORP.

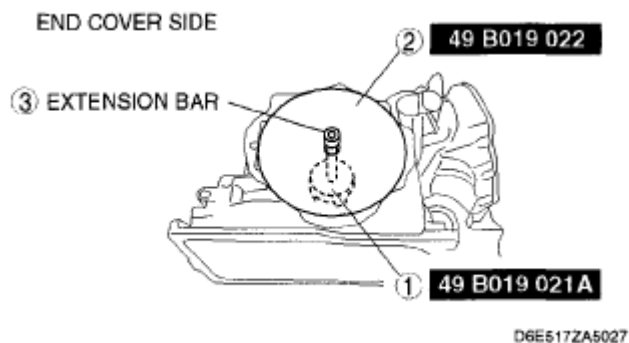


Fig. 249: Identifying SSTs
Courtesy of MAZDA MOTORS CORP.

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

Primary gear preload

0.50-0.90 N.m {5.10-9.17 kgf.cm, 4.42-7.96 in.lbf}

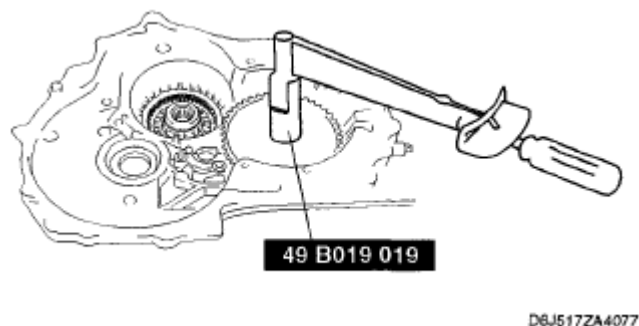


Fig. 250: Tightening Locknut
Courtesy of MAZDA MOTORS CORP.

6. Stake the locknut.
7. Remove the SST

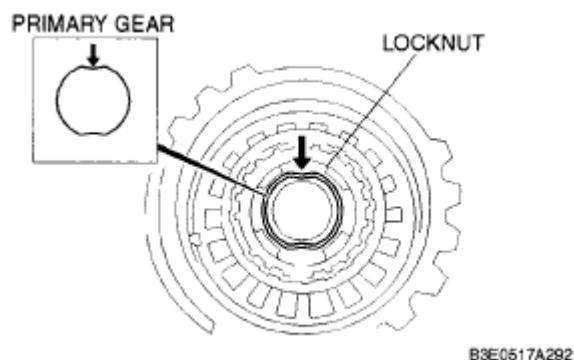


Fig. 251: Staking Lock Nut
Courtesy of MAZDA MOTORS CORP.

13. Install the front internal gear and one-way clutch.
14. Apply petroleum jelly to the bearing, and secure it to the front planetary gear component.

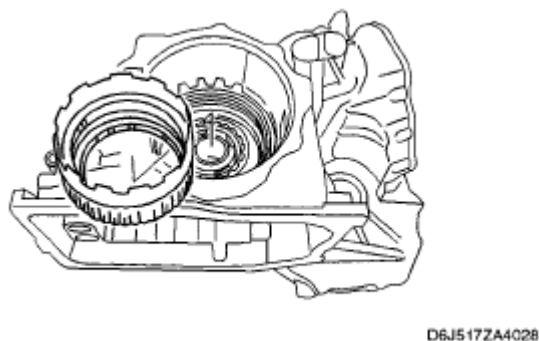


Fig. 252: View Of Front Internal Gear And One-Way Clutch
Courtesy of MAZDA MOTORS CORP.

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

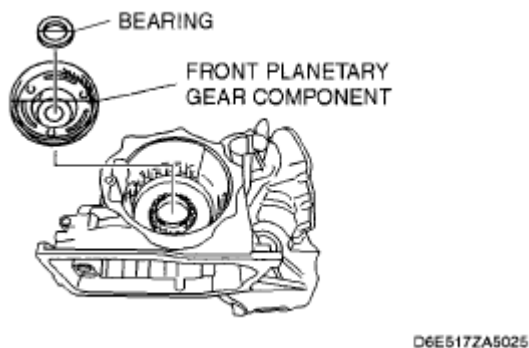
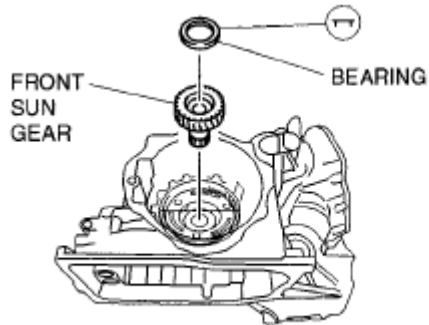


Fig. 253: View Of Front Planetary Gear Component
Courtesy of MAZDA MOTORS CORP.

17. Install the front sun gear.



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Fig. 254: View Of Front Sun Gear
Courtesy of MAZDA MOTORS CORP.

18. Install the rear planetary gear.

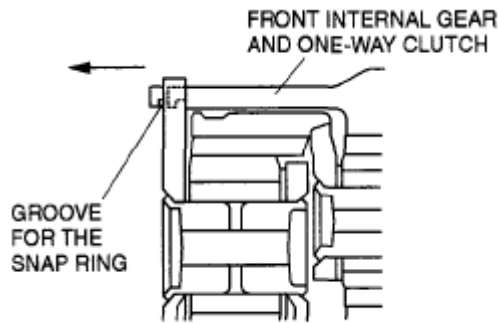
NOTE:

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



D6J517ZA4025

Fig. 255: View Of Rear Planetary Gear
Courtesy of MAZDA MOTORS CORP.



B3E0517A294

Fig. 256: Identifying Front Internal Gear And One Way Clutch
Courtesy of MAZDA MOTORS CORP.

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



D6J617ZA4075

Fig. 257: View Of Snap Ring
Courtesy of MAZDA MOTORS CORP.

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

Tightening torque

11-14 N.m {113-142 kgf.cm, 98-123 in.lbf}

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

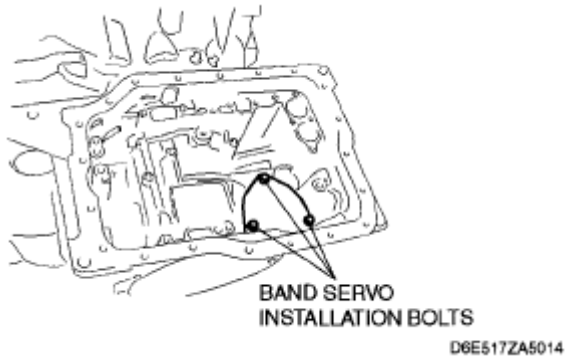


Fig. 258: View Of Servo Retainer
Courtesy of MAZDA MOTORS CORP.

23. Install the clutch component.

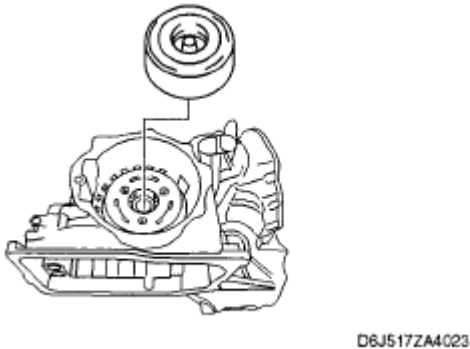


Fig. 259: View Of Clutch Component
Courtesy of MAZDA MOTORS CORP.

24. Install the 2-4 brake band.

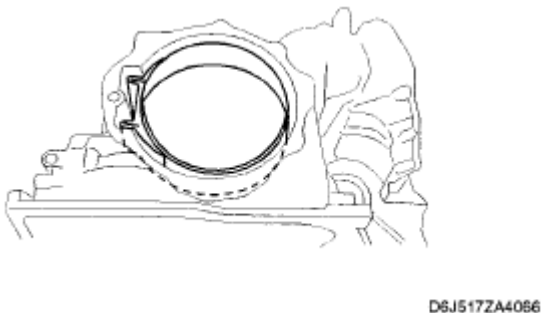
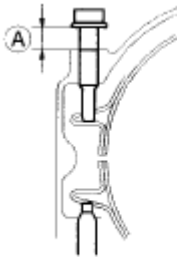


Fig. 260: View Of Brake Band
Courtesy of MAZDA MOTORS CORP.

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

Tightening torque**4.9 N.m {50 kgf.cm, 43 in.lbf}**

2. Measure the dimension A shown in the figure.
3. Remove the bolt.



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Fig. 261: View Of Bolt Dimension A
Courtesy of MAZDA MOTORS CORP.

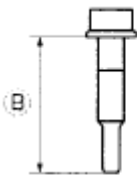
4. Measure the dimension B shown in the figure.
5. Calculate according to the formula below.

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

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

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

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



B3E0517A298

Fig. 262: Measuring Band Strut Length
Courtesy of MAZDA MOTORS CORP.

Band strut length for 2-4 brake band servo stroke (mm {in})

BAND STRUT LENGTH SPECIFICATIONS

36.0 {1.417}	36.5 {1.437}	37.0 {1.457}
---------------------	---------------------	---------------------

37.25 {1.467}	37.5 {1.476}	37.75 {1.486}
38.0 {1.496}	38.25 {1.506}	38.5 {1.516}
39.0 {1.535}	-	-

7. Install the selected band strut.

Tightening torque

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

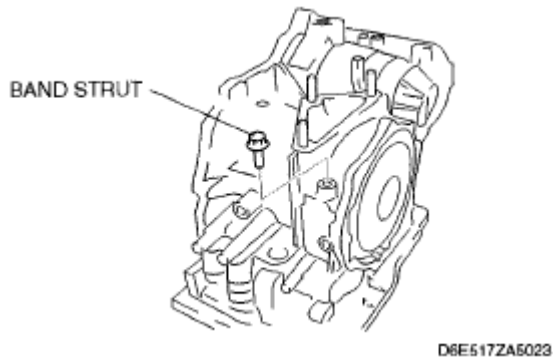


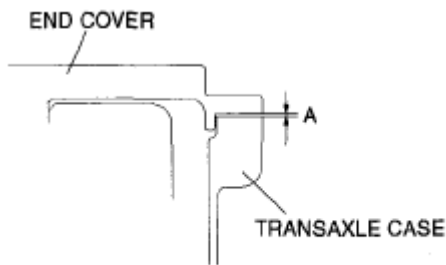
Fig. 263: View Of Selected Band Strut
Courtesy of MAZDA MOTORS CORP.

26. Use the following procedure to adjust the total end play.
 1. Install the thickest bearing race (2.6 mm {0.102 in}) to the end cover.
 2. Install the end cover to the clutch component.
 3. Measure the clearance A between transaxle case and end cover.
 4. Calculate according to the formulas below. Select an appropriate bearing race whose bearing thickness matches the calculated limits.

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

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

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



B3E0517A299

Fig. 264: Measuring Clearance Between Transaxle Case And End Cover
 Courtesy of MAZDA MOTORS CORP.

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

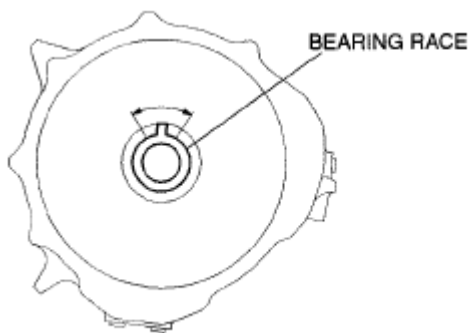
Bearing race sizes

BEARING RACE SIZES

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

CAUTION:

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



B9E0517A300

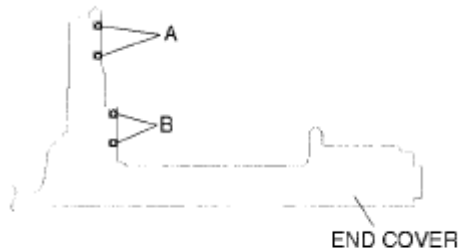
Fig. 265: Identifying Bearing Race
 Courtesy of MAZDA MOTORS CORP.

6. Remove the end cover, apply petroleum jelly to the selected bearing race, then install it to the end cover.
27. Apply ATF to new seal ring, and install it to the end cover.

Seal ring inner diameter

A: 47.1 mm {1.854 in}

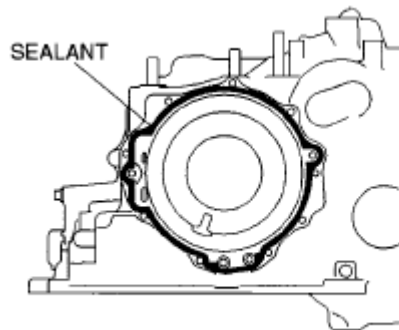
B: 55.8 mm {2.197 in}



B3E0517A301

Fig. 266: Measuring Seal Ring Inner Diameter
Courtesy of MAZDA MOTORS CORP.

28. Apply a light coat of silicone sealant to the contact surfaces of the transaxle case and the end cover.
29. Apply ATF to the O-ring and install it to the transaxle case.



D6E517ZA5091

Fig. 267: Applying Silicone Sealant To Transaxle Case
Courtesy of MAZDA MOTORS CORP.

30. Install the end cover to the transaxle case.

Tightening torque

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

31. Install the reduction brake to the transaxle case. (See **REDUCTION BRAKE DISASSEMBLY/ASSEMBLY**.)

NOTE:

- If the transaxle case has been newly replaced perform Step (32).

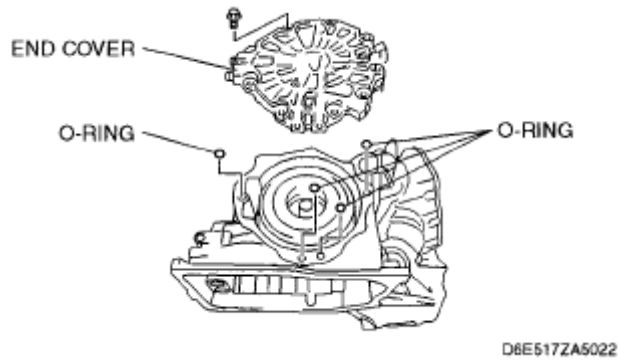


Fig. 268: View Of End Cover, O-rings And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

32. Install the needle bearing using the SST as shown in the figure.

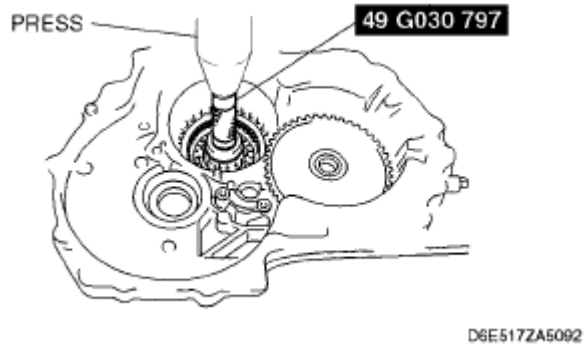


Fig. 269: View Of Needle Bearing
Courtesy of MAZDA MOTORS CORP.

33. Install the spacer and one-way clutch No.2 to the transaxle case.
34. Apply ATF to new seal ring, and install it to the transaxle case.
35. Apply petroleum jelly to the needle bearing, and secure it to the transaxle case.

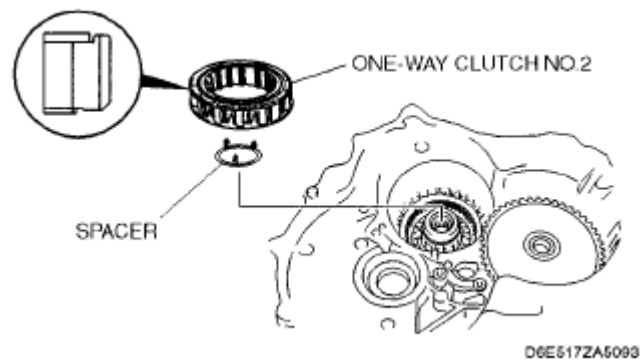


Fig. 270: View Of Spacer, One-Way Clutch No.2 And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

36. Install the direct clutch component to the transaxle case.

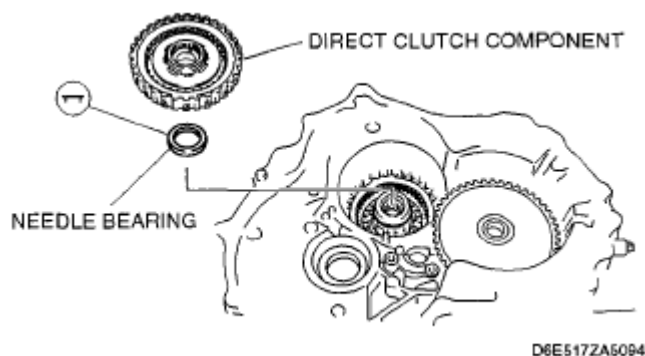


Fig. 271: View Of Direct Clutch Component, Needle Bearing And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

37. Install the secondary sun gear.

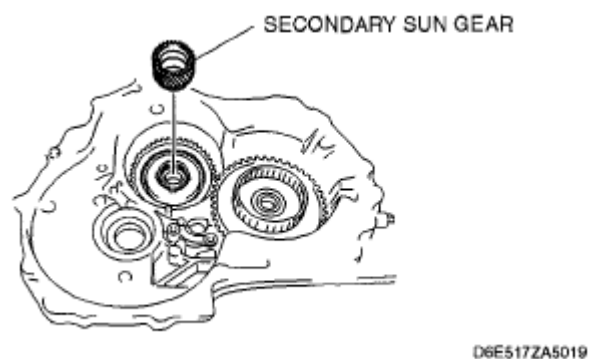


Fig. 272: View Of Secondary Sun Gear
Courtesy of MAZDA MOTORS CORP.

38. Install the output gear component.
39. Install the bearing race to the output gear component.
40. Apply petroleum jelly to the needle bearing, and secure it to the output gear component.

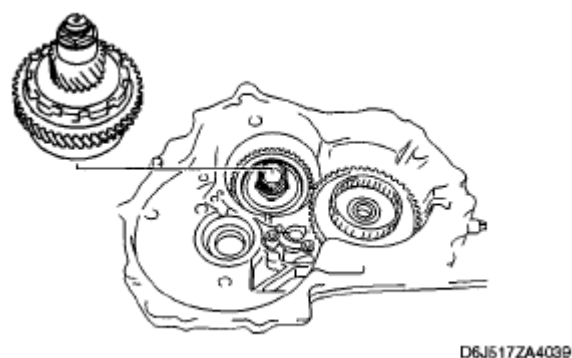


Fig. 273: View Of Output Gear Component
 Courtesy of MAZDA MOTORS CORP.

41. Use the following procedure to adjust the total end play.
1. Measure clearance A between the installation surface and the hole depth of the converter housing.
 2. Install the bearing to the output gear component.
 3. Measure clearance B between the converter housing installation surface and the bearing.
 4. Calculate the total end play according to the following formula:

$$\text{step (1) value} - \text{step (3) value} = \text{total end play}.$$
 5. select the snap ring.

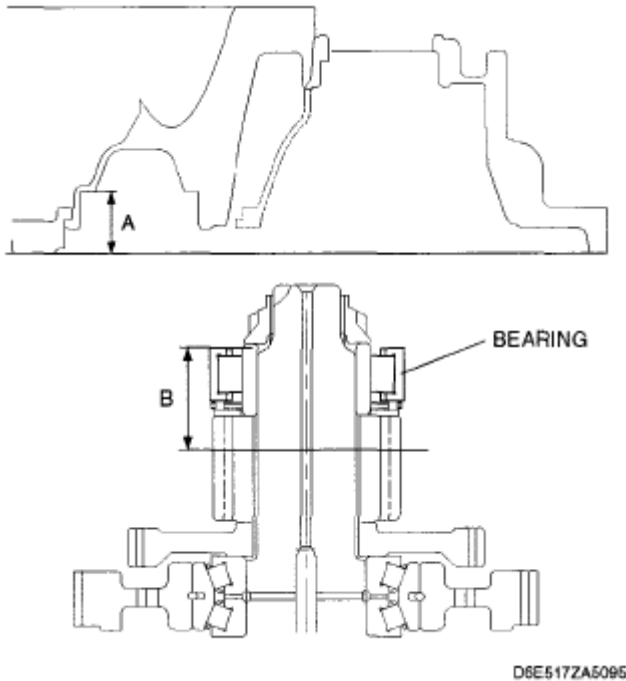


Fig. 274: Measuring Clearance Between Converter Housing Installation Surface And Bearing
 Courtesy of MAZDA MOTORS CORP.

Adjust shim size for output gear component total end play

ADJUST SHIM SIZE FOR OUTPUT GEAR COMPONENT TOTAL END PLAY

total end play {in}	Adjust shims sizes mm {in}
1.431-1.481 {0.057-0.058}	1.20 {0.047}
1.381-1.431 {0.055-0.056}	1.15 {0.045}
1.331-1.381 {0.053-0.054}	1.10 {0.043}
1.281-1.331 {0.051-0.052}	1.05 {0.041}
1.231-1.281 {0.049-0.050}	1.00 {0.039}

1.181-1.231 {0.047-0.048}	0.95 {0.037}
1.131-1.181 {0.045-0.046}	0.90 {0.035}
1.081-1.131 {0.043-0.044}	0.85 {0.033}
1.031-1.081 {0.041-0.042}	0.80 {0.031}
0.981-1.031 {0.039-0.040}	0.75 {0.029}
0.931-0.981 {0.037-0.038}	0.70 {0.028}
0.881-0.931 {0.035-0.036}	0.65 {0.026}
0.831-0.881 {0.033-0.034}	0.60 {0.024}
0.781-0.831 {0.031-0.032}	0.55 {0.022}
0.731-0.781 {0.029-0.030}	0.50 {0.020}

6. Install the selected adjustment shim to the converter housing.
42. Install the bearing using the SST as shown in the figure.

Press-in force

8.8 kN {897 kgf, 1978 lbf}

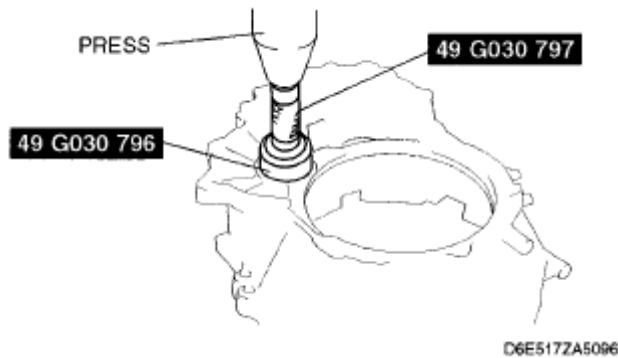


Fig. 275: Installing Selected Adjustment Shim To Converter Housing
Courtesy of MAZDA MOTORS CORP.

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

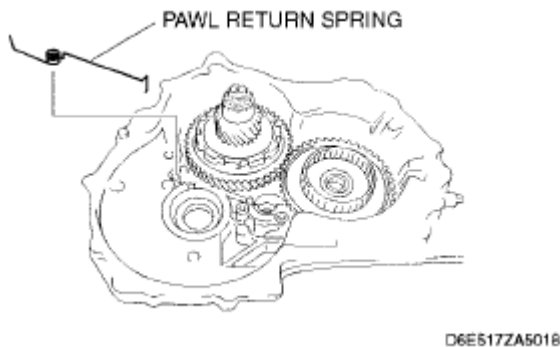


Fig. 276: View Of Pawl Return Spring And Transaxle Case

Courtesy of MAZDA MOTORS CORP.

44. Install the packing pawl and parking pawl shaft to the transaxle case.

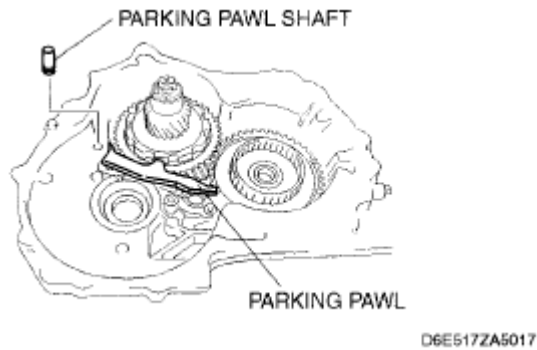


Fig. 277: View Of Packing Pawl, Parking Pawl Shaft And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

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

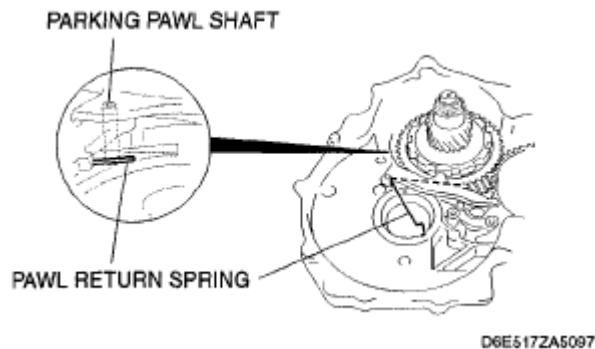


Fig. 278: View Of Pawl Return Spring, Parking Pawl And Parking Pawl Shaft
Courtesy of MAZDA MOTORS CORP.

46. Install the support plate to the transaxle case.

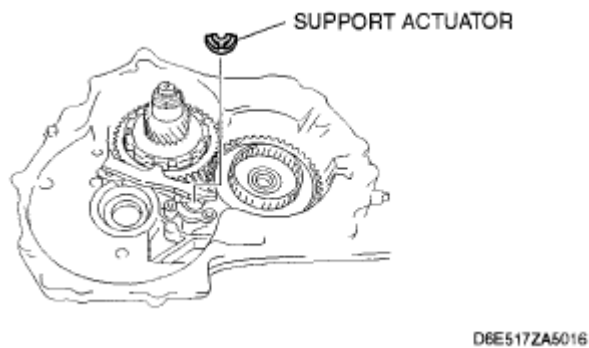


Fig. 279: View Of Support Actuator Plate And Transaxle Case
Courtesy of MAZDA MOTORS CORP.

47. Install the actuator plate to the transaxle case.

Tightening torque

11-14 N.m {113-142 kgf.cm, 98-123 in.lbf}

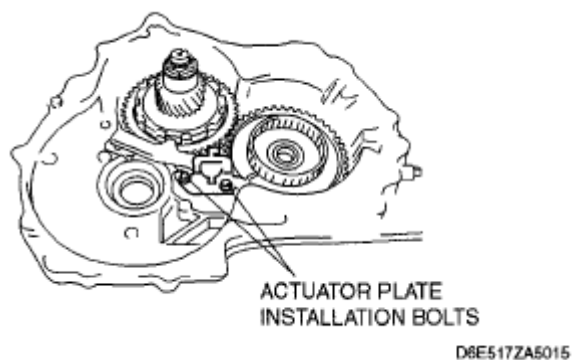


Fig. 280: View Of Actuator Plate To Transaxle Case Bolts
Courtesy of MAZDA MOTORS CORP.

48. Install the differential.
49. Install the forward clutch hub.

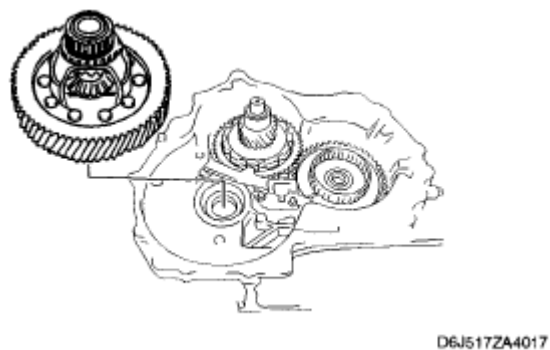
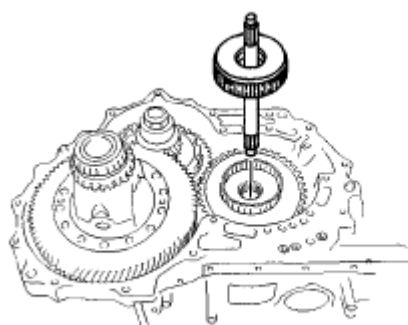


Fig. 281: View Of Forward Clutch Hub
Courtesy of MAZDA MOTORS CORP.

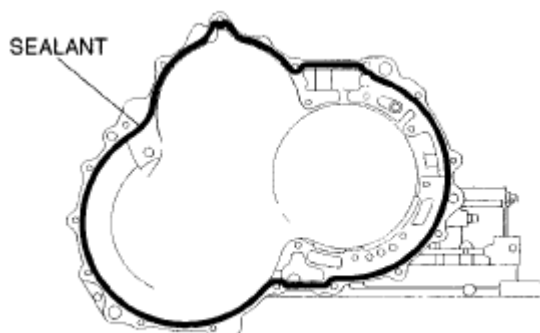
50. Install the forward clutch component.



D6J517ZA4016

Fig. 282: View Of Forward Clutch Component
Courtesy of MAZDA MOTORS CORP.

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



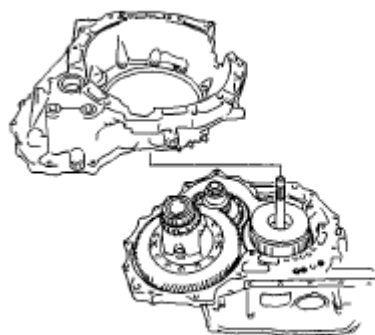
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Fig. 283: Applying Silicone Sealant To Contact Surfaces Of Converter Housing
Courtesy of MAZDA MOTORS CORP.

52. Install the converter housing.

Tightening torque

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



D6J517ZA4015

Fig. 284: View Of Converter Housing
Courtesy of MAZDA MOTORS CORP.

53. Install the SST into the differential side gears.
54. Apply ATF to the new O-ring and install it to the oil pump.

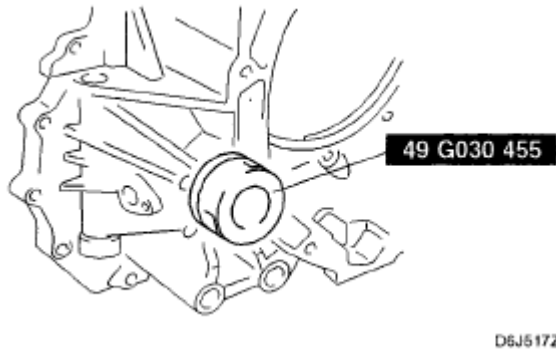


Fig. 285: Installing SST Into Differential Side Gears
Courtesy of MAZDA MOTORS CORP.

55. Install the oil pump.

Tightening torque

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

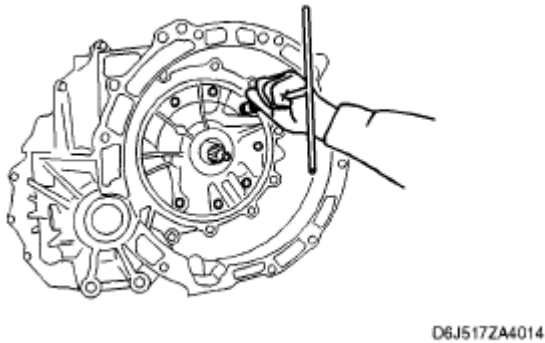
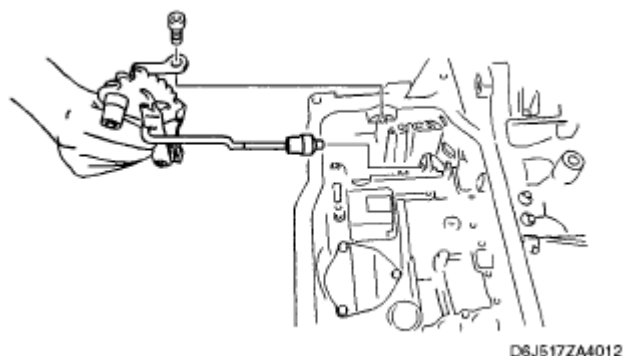


Fig. 286: Installing Oil Pump
Courtesy of MAZDA MOTORS CORP.

56. Install the parking rod lever component.

Tightening torque

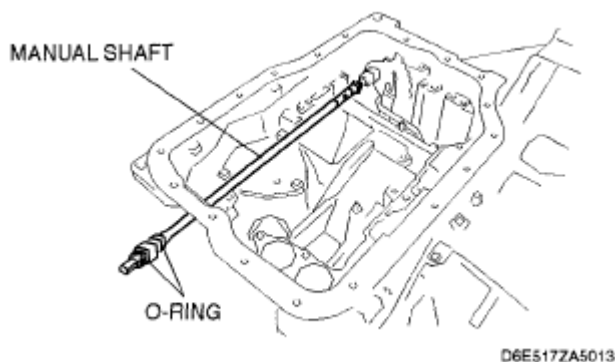
19-25 N.m {1.9-2.6 kgf.m, 14-18 ft.lbf}



D6J517ZA4012

Fig. 287: View Of Parking Rod Lever Component
Courtesy of MAZDA MOTORS CORP.

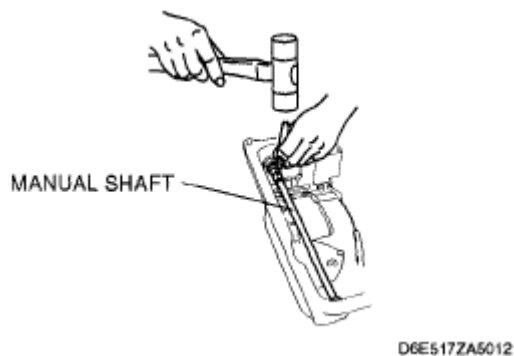
57. Apply ATF to the new O-ring and install it to the manual shaft.
58. Install the manual shaft.
 1. Install the manual shaft to the manual plate and detent bracket component.



D6E517ZA5013

Fig. 288: View Of Manual Shaft
Courtesy of MAZDA MOTORS CORP.

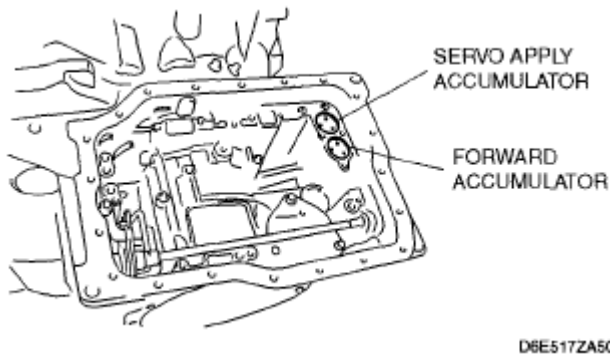
2. Install the knock pin.



D6E517ZA5012

Fig. 289: View Of Knock Pin
Courtesy of MAZDA MOTORS CORP.

59. Install the accumulator component.



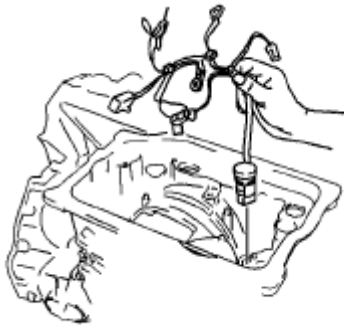
D6E517ZA5011

Fig. 290: View Of Accumulator Component
Courtesy of MAZDA MOTORS CORP.

60. Install the coupler component.

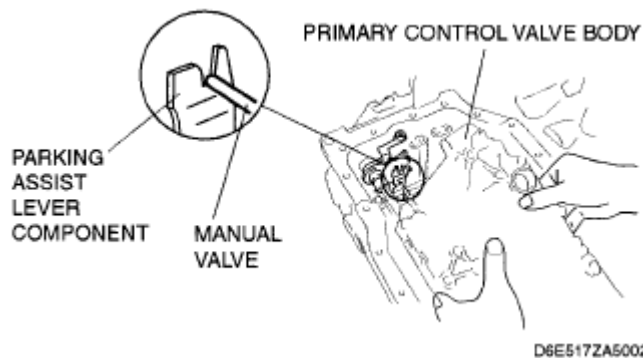
CAUTION:

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



D6J517ZA4008

Fig. 291: View Of Coupler Component
Courtesy of MAZDA MOTORS CORP.



D6E517ZA5002

Fig. 292: View Of Primary Control Valve Body
Courtesy of MAZDA MOTORS CORP.

61. Install the primary control valve body.

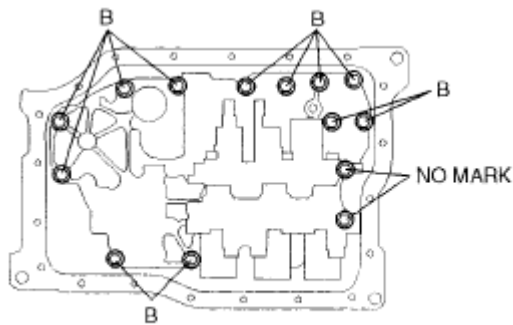
Tightening torque

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

Bolt length (measured from below the head)

B: 40 mm {1.575 in}

No mark: 70 mm {2.756 in}



D6E517ZA5098

Fig. 293: View Of Primary Control Valve Body
Courtesy of MAZDA MOTORS CORP.

62. Apply ATF to the new O-ring and install it to the oil strainer.
63. Install the oil strainer.
64. Match the harness colors, then connect the solenoid connector and TFT sensor.

SOLENOID VALVE DESCRIPTION

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

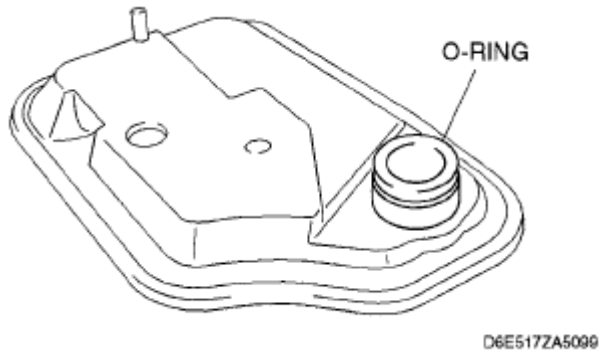


Fig. 294: View Of Oil Strainer
Courtesy of MAZDA MOTORS CORP.

65. Install the ground.

Tightening torque

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

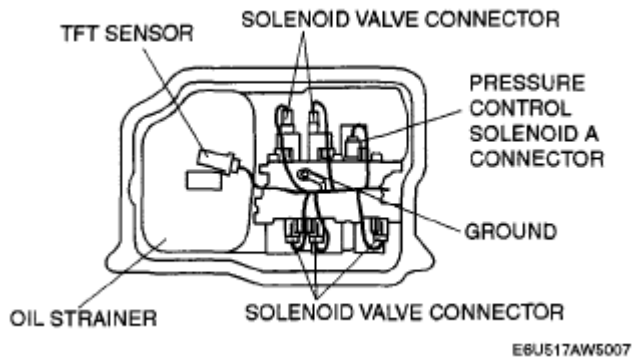


Fig. 295: View Of Solenoids And Connectors
Courtesy of MAZDA MOTORS CORP.

WARNING:

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

CAUTION:

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

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

67. Install the oil pan.

Tightening torque

6-8 N.m {62-81 kgf.cm, 54-70 in.lbf}

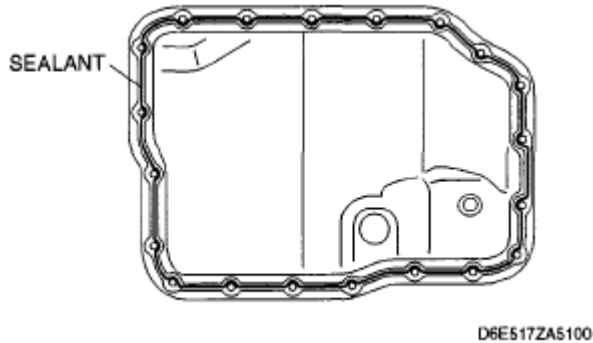


Fig. 296: View Of Oil Pan
Courtesy of MAZDA MOTORS CORP.

68. Apply ATF to the new O-ring and install it to the transaxle case.
69. Install the tubular pins.
70. Install the coupler component.

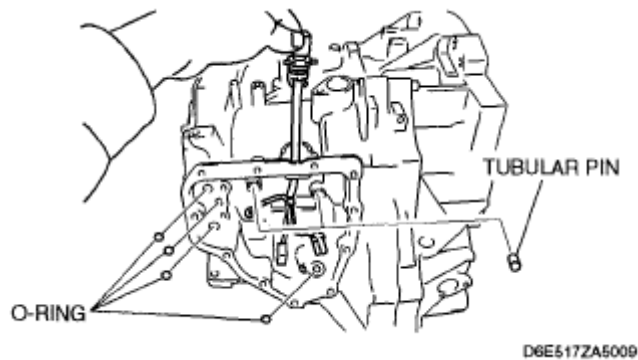


Fig. 297: View Of Tubular Pins
Courtesy of MAZDA MOTORS CORP.

71. Install the secondary control valve body and ground.

Tightening torque

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

Bolt length (measured from below the head)

B: 40 mm {1.575 in}

C: 50 mm {1.969 in}

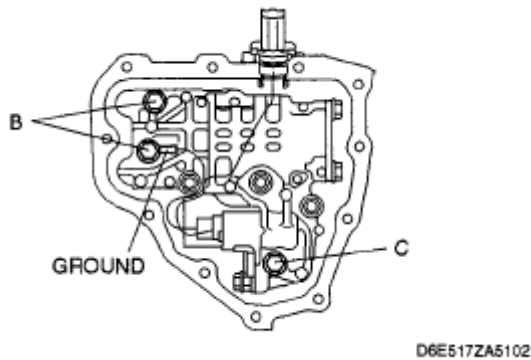


Fig. 298: View Of Secondary Control Valve Body Bolts And Ground
Courtesy of MAZDA MOTORS CORP.

72. Match the harness colors, then connect the solenoid connector.

SOLENOID VALVE DESCRIPTION

Solenoid valve	Color of connector (harness side)
Pressure control solenoid B	White
Shift solenoid F	Black

WARNING:

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

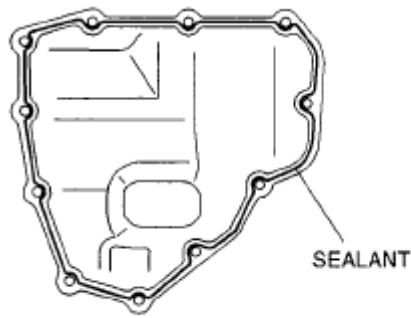
CAUTION:

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

73. Apply a light coat of silicone sealant to the contact surfaces of oil cover and transaxle case.
74. Install the oil cover.

Tightening torque

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



D6E517ZA5101

Fig. 299: View Of Oil Cover**Courtesy of MAZDA MOTORS CORP.**

75. Install the oil pipe and connector bolt.

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

76. Install the connector pipe.

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

77. Apply ATF to the new O-ring and install it to the intermediate sensor.

78. Install the intermediate sensor.

Tightening torque**8-11 N.m {82-112 kgf.cm, 71-97 in.lbf}**

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

80. Install the vehicle speed sensor.

Tightening torque**8-11 N.m {82-112 kgf.cm, 71-97 in.lbf}**

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

82. Install the oil pressure switch.

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

83. Install the input/turbine speed sensor.

Tightening torque

8-11 N.m {82-112 kgf.cm, 71-97 in.lbf}

84. Install the transaxle range switch.
 1. Rotate the manual shaft to the N position.

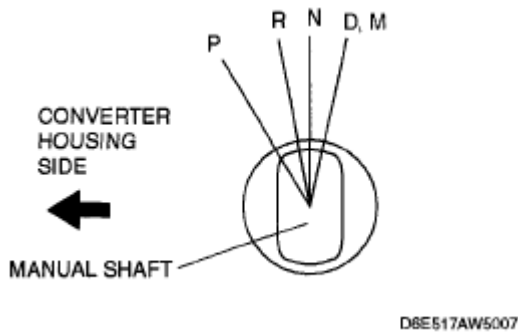


Fig. 300: Rotating Manual Shaft
Courtesy of MAZDA MOTORS CORP.

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

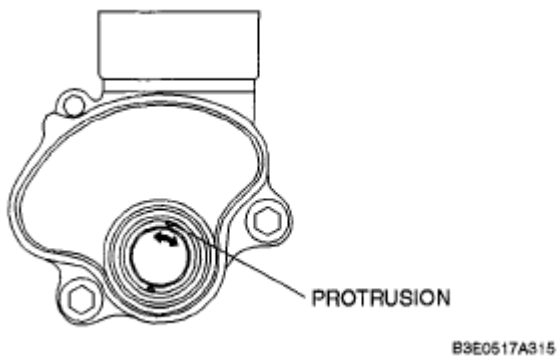
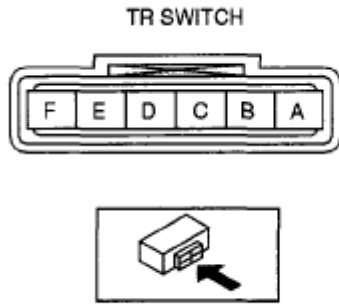


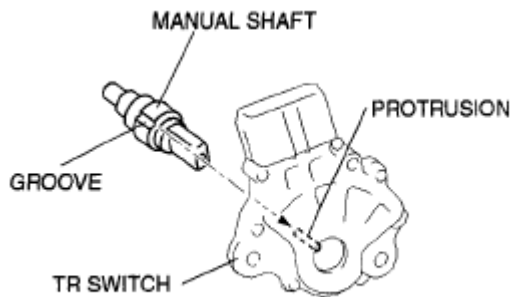
Fig. 301: Identifying Protrusion
Courtesy of MAZDA MOTORS CORP.



B3E0517A316

Fig. 302: Identifying TR Switch Terminal
Courtesy of MAZDA MOTORS CORP.

3. Install the TR switch while aligning the protrusion and groove as shown.
4. hand-tighten the TR switch mounting bolts.



B3E0517A317

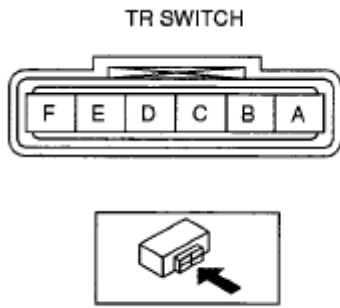
Fig. 303: Aligning Protrusion And Groove
Courtesy of MAZDA MOTORS CORP.

5. Inspect the resistance between the terminals B and C.
 - If not as specified, readjust the TR switch.

Resistance

750 ohms

6. Tighten the TR switch mounting bolts



B3E0517A316

Fig. 304: Identifying TR Switch Terminal
Courtesy of MAZDA MOTORS CORP.

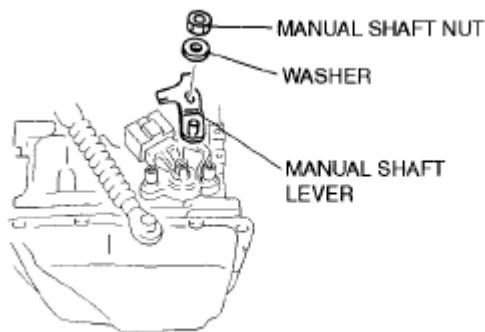
Tightening torque

8-11 N.m {82-112 kgf.cm, 71-97 in.lbf}

CAUTION:

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

7. Install the manual shaft lever and the washer.



B3E0517A318

Fig. 305: View Of Manual Shaft Lever And Washer
Courtesy of MAZDA MOTORS CORP.

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

Tightening torque

32-46 N.m {3.2-4.7 kgf.m, 24-33 ft.lbf}

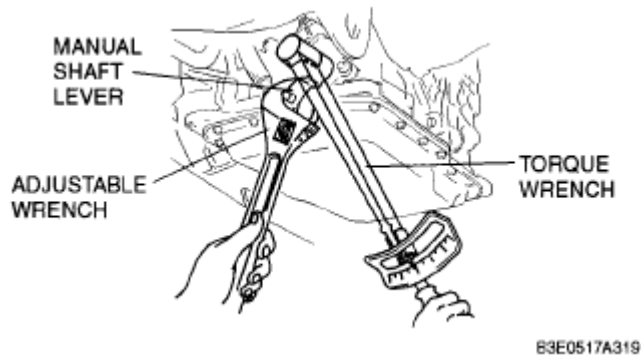


Fig. 306: Holding Manual Shaft Lever
Courtesy of MAZDA MOTORS CORP.

85. Remove the transaxle from the SST.
86. Apply ATF to the new O-ring and install it to the oil filler tube.
87. Install the oil dipstick and oil filler tube to the transaxle.

Tightening torque

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

88. Drain any ATF remaining in the torque converter.
89. Pour in solvent (approx. 0.5 L {0.53 US qt, 0.44 Imp qt}).
90. Shake the torque converter to clean the inside.
91. Pour out the solvent.
92. Pour the ATF.
93. Install the torque converter by aligning its gap to the oil pump inner rotor gap as shown in the figure.

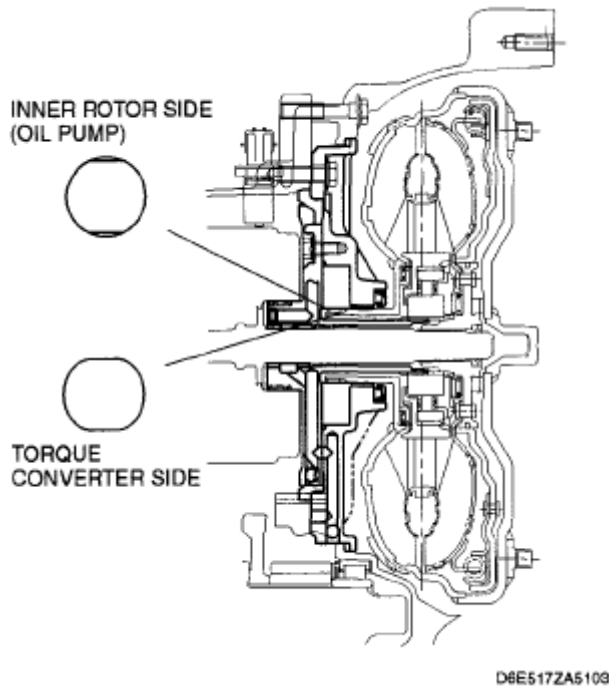


Fig. 307: View Of Torque Converter
Courtesy of MAZDA MOTORS CORP.

94. 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.

Between the end of the torque converter and the end of the converter housing

Distance A: 21.4 mm {0.84 in}

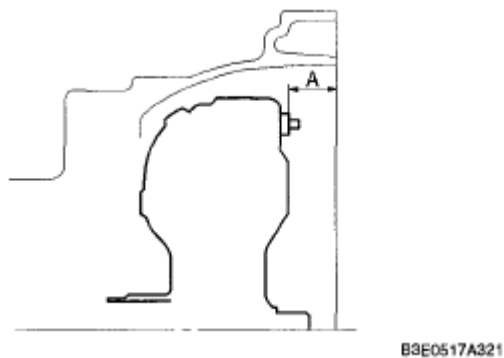


Fig. 308: Measuring Distance Between End Of Torque Converter And End Of Converter Housing
Courtesy of MAZDA MOTORS CORP.

AUTOMATIC TRANSAXLE INSPECTION

TORQUE CONVERTER INSPECTION

1. Inspect the outer surface of the torque converter for damage or cracks, and replace it if necessary.
2. Inspect for rust on the pilot hub of the torque converter or on the boss. If there is any, remove the rust completely.

OIL PUMP PREINSPECTION

1. Measure the bushing of the oil pump. | torque converter side

Oil Pump bushing inner diameter torque converter side

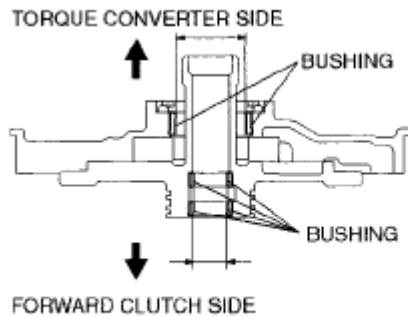
Standard: 40.015-40.040 mm {1.57539-1.57637 in}

Maximum: 40.060 mm {1.57716 in}

Oil Pump bushing inner diameter forward clutch side

Standard: 19.000-19.021 mm {0.74803-0.74885 in}

Maximum: 19.041 mm {0.74964 in}



B9E0517A322

Fig. 309: Measuring Bushing Of Oil Pump
Courtesy of MAZDA MOTORS CORP.

2. If not as specified, replace the oil pump housing and oil pump cover. (See **OIL PUMP DISASSEMBLY/ASSEMBLY.**)

FORWARD CLUTCH PREINSPECTION

CLUTCH OPERATION

1. Set the forward clutch onto the oil pump.

CAUTION:

- Applying compressed air to the assembled clutch pack for longer than 3 s at a time will damage the seal.

Do not apply compressed air for more than the aforementioned time when testing the system.

2. Inspect the clutch operation by applying compressed air through the fluid passages shown.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

3. If not as specified, replace parts as necessary. (See **FORWARD CLUTCH DISASSEMBLY/ASSEMBLY.**)

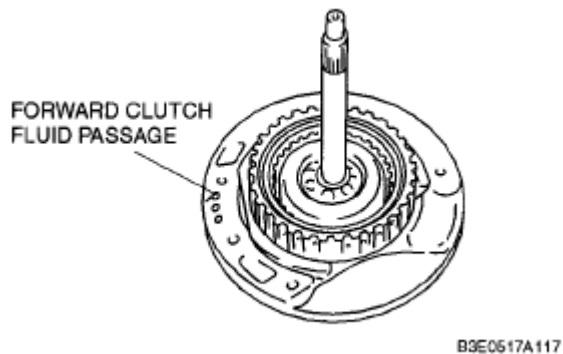
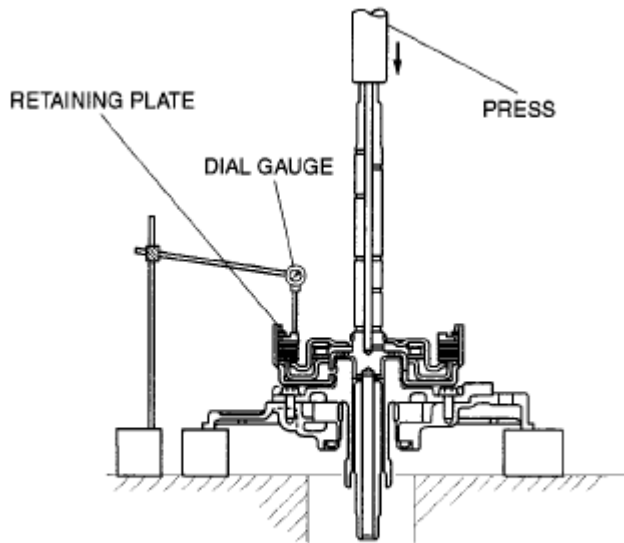


Fig. 310: Identifying Forward Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

CLUTCH CLEARANCE

1. Measure the forward clutch clearance.
 1. Install the forward clutch in the oil pump, and set the dial gauge.
 2. Secure the forward clutch by lightly pressing down with a press, etc.



B3E0517A323

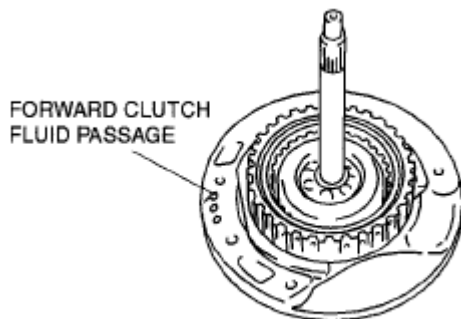
Fig. 311: Measuring Forward Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the forward clutch piston stroke three times.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

4. Apply compressed air and operate the forward clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the forward clutch piston is not operating.



B3E0517A117

Fig. 312: Identifying Forward Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

6. Calculate the forward clutch clearance according to the following formula:

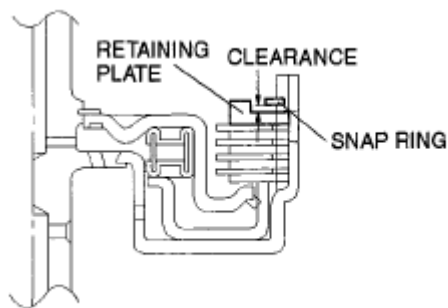
Step (4) value - Step (5) value = Forward clutch clearance.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Forward clutch clearance

1.50-1.80 mm {0.059-0.071 in}

2. If not as specified, replace parts as necessary. (See **FORWARD CLUTCH DISASSEMBLY/ASSEMBLY**.)



B3E0517A324

Fig. 313: Measuring Clearances Between Snap Ring And Retaining Plate
Courtesy of MAZDA MOTORS CORP.

CLUTCH COMPONENT PREINSPECTION

Clutch operation

1. Set the clutch component onto the end cover.

CAUTION:

- Applying compressed air to the assembled clutch pack for longer than 3 s at a time will damage the seal.

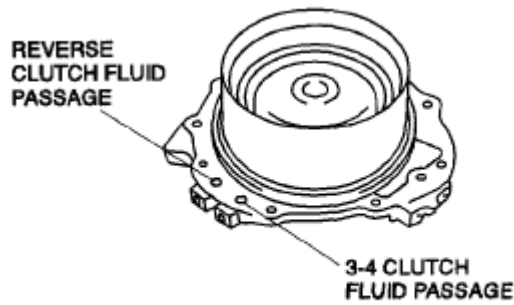
Do not apply compressed air for more than the aforementioned time when testing the system.

2. Inspect the clutch operation by applying compressed air as shown.

Air Pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

3. If not as specified, replace parts as necessary. (See **CLUTCH COMPONENT DISASSEMBLY/ASSEMBLY**.)

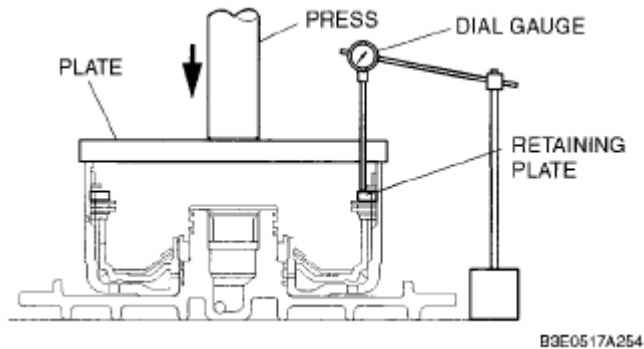


B9E0517A325

Fig. 314: Identifying Reverse Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

REVERSE CLUTCH CLEARANCE

1. Measure the reverse clutch clearance.
 1. Install the reverse clutch into the end cover, and set the dial gauge.
 2. Secure the reverse clutch by lightly pressing down with a press, etc.



B9E0517A254

Fig. 315: Securing Reverse Clutch
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the reverse clutch piston stroke three times.

Air Pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

4. Apply compressed air and operate the reverse clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the reverse clutch piston is not operating.

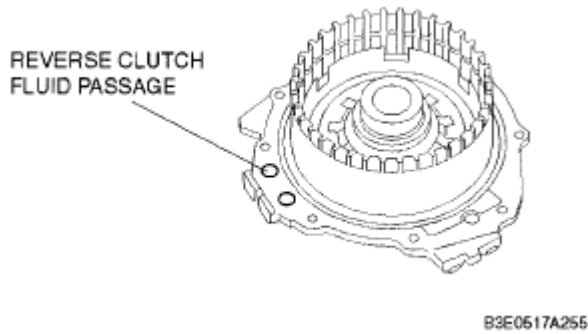


Fig. 316: Identifying Reverse Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

6. Calculate the reverse clutch clearance according to the following formula: Step (4) value - Step (5) value = Reverse clutch clearance.
7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Reverse clutch clearance

1.00-1.30 mm {0.039-0.051 in}

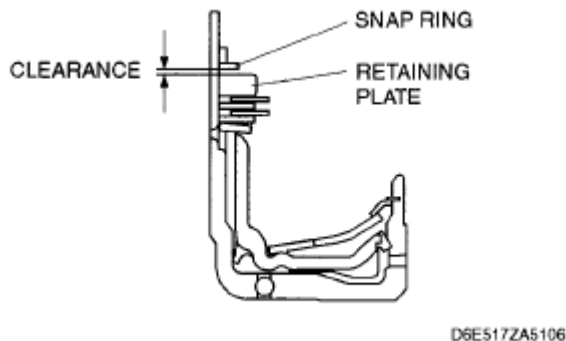


Fig. 317: Measuring Reverse Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

2. If not as specified, replace parts as necessary. (See **CLUTCH COMPONENT DISASSEMBLY/ASSEMBLY**.)

3-4 clutch clearance

1. Measure the 3-4 clutch clearance.
 1. Install the 3-4 clutch in the end cover and set the dial gauge.
 2. Secure the 3-4 clutch by lightly pressing down with a press, etc.

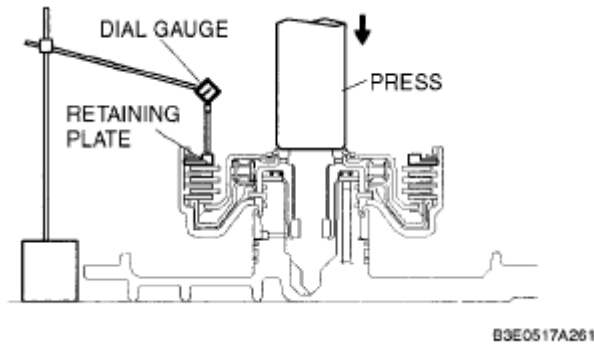


Fig. 318: Securing 3-4 Clutch
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the 3-4 clutch piston stroke three times.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

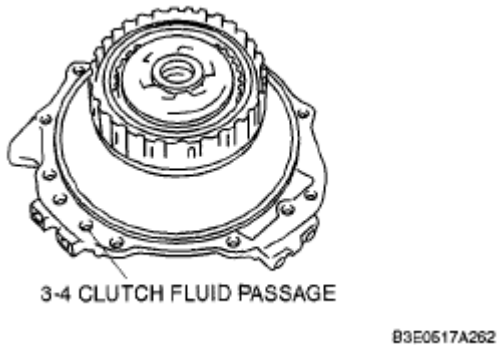


Fig. 319: Identifying 3-4 Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

4. Apply compressed air and operate the 3-4 clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the 3-4 clutch piston is not operating.
6. Calculate the 3-4 clutch clearance according to the following formula:

Step (4) value - Step (5) value = 3-4 clutch clearance.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

3-4 clutch clearance

1.10-1.40 mm {0.043-0.055 in}

2. If not as specified, replace parts as necessary. (See **CLUTCH COMPONENT DISASSEMBLY/ASSEMBLY.**)

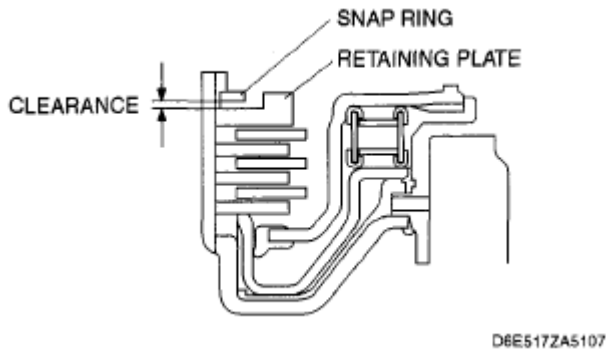


Fig. 320: Measuring Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

Bushing inner diameter inspection

1. Measure the bushing of the 3-4 clutch hub.

3-4 clutch hub bushing inner diameter

Standard: 18.000-18.018 mm {0.70866-0.70936 in}

Maximum: 18.038 mm {0.71016 in}

2. If not as specified, replace the 3-4 clutch hub. (See **CLUTCH COMPONENT DISASSEMBLY/ASSEMBLY.**)

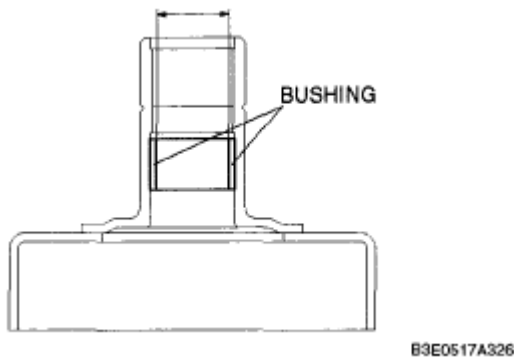


Fig. 321: Measuring Bushing Of 3--4 Clutch Hub
Courtesy of MAZDA MOTORS CORP.

3. Measure the bushing of the 2-4 brake drum.

2-4 brake drum bushing inner diameter

Standard: 55.005-55.030 mm {2.16555-2.16653 in}

Maximum: 55.050 mm {2.16732 in}

4. If not as specified, replace the 2-4 brake drum. (See **CLUTCH COMPONENT DISASSEMBLY/ASSEMBLY.**)

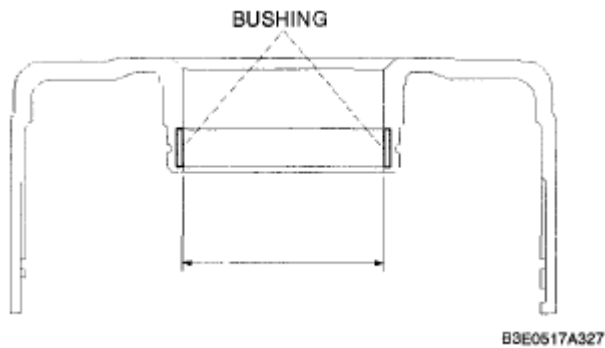


Fig. 322: Measuring Bushing Of 2--4 Brake Drum
Courtesy of MAZDA MOTORS CORP.

FRONT INTERNAL GEAR AND ONE-WAY CLUTCH NO.1 COMPONENT PREINSPECTION

1. Set the front internal gear and one-way clutch No.1 component to the one-way clutch inner race. Verify that the one-way clutch rotates smoothly when turned counterclockwise and locks when turned clockwise.
2. If not as specified, replace parts as necessary. (See **FRONT INTERNAL GEAR ONE-WAY CLUTCH NO.1 COMPONENT DISASSEMBLY/ASSEMBLY.**)

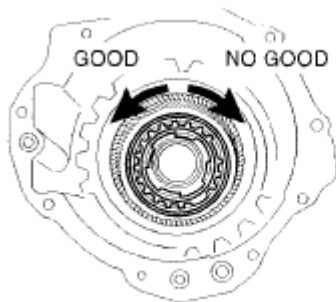


Fig. 323: Inspecting Front Internal Gear And One-Way Clutch No.1
Courtesy of MAZDA MOTORS CORP.

LOW AND REVERSE BRAKE PREINSPECTION BRAKE OPERATION

CAUTION:

- Applying compressed air to the assembled clutch pack for longer than 3 s at a time will damage the seal.

Do not apply compressed air for more than the aforementioned time

when testing the system.

1. Inspect the brake operation by applying compressed air as shown.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

2. If not as specified, replace parts as necessary. (See LOW AND REVERSE BRAKE AND ONE-WAY CLUTCH INNER RACE DISASSEMBLY/ASSEMBLY.)

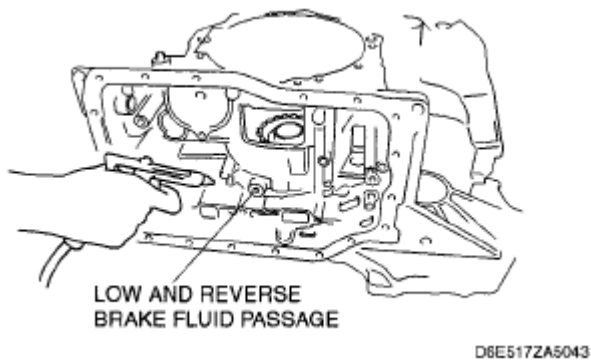


Fig. 324: Applying Compressed Air To Low And Reverse Brake Fluid Passage
Courtesy of MAZDA MOTORS CORP.

BRAKE CLEARANCE

1. Measure the low and reverse brake clearance.
 1. Set the dial gauge to the low and reverse brake.
 2. Set the measuring point of the dial gauge to the low and reverse brake piston.

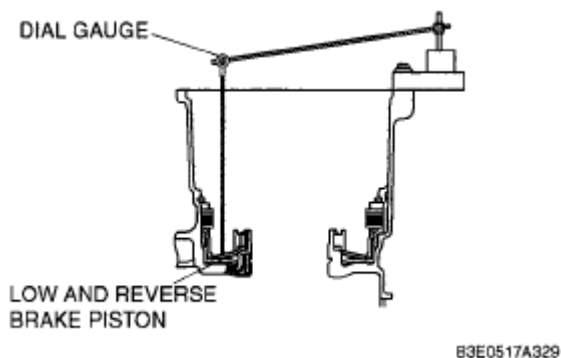


Fig. 325: Measuring Low And Reverse Brake Clearance
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the low and reverse brake piston stroke three times.

Air pressure

98.1 kPa {1.0 kgf/cm² , 14 psi}

4. Apply compressed air and operate the low and reverse brake piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the low and reverse brake piston is not operating.

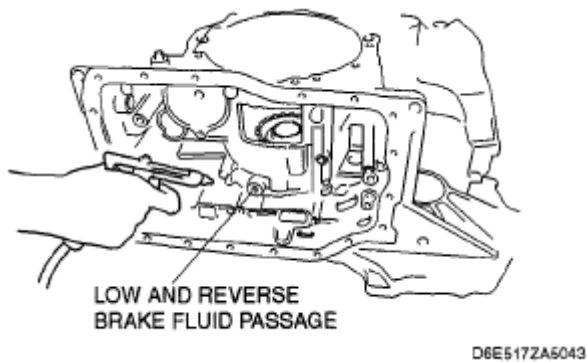


Fig. 326: Applying Compressed Air To Low And Reverse Brake Fluid Passage
Courtesy of MAZDA MOTORS CORP.

6. Calculate the low and reverse brake clearance according to the following formula:

Step (4) value - Step (5) value = low and reverse brake clearance.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below:

Low and reverse brake clearance 2.20-2.50 mm {0.087-0.098 in}

2. If not as specified, replace parts as necessary. (See **LOW AND REVERSE BRAKE AND ONE-WAY CLUTCH INNER RACE DISASSEMBLY/ASSEMBLY.**)

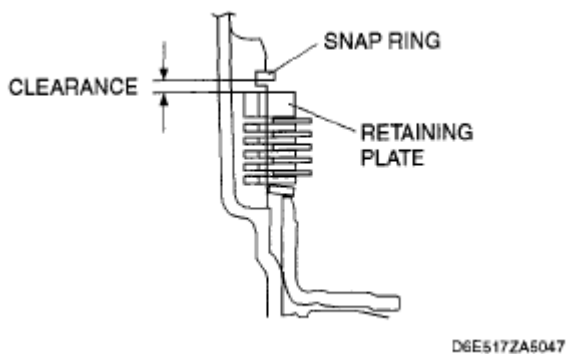


Fig. 327: Measuring Low And Reverse Brake Clearance

Courtesy of MAZDA MOTORS CORP.

ONE-WAY CLUTCH NO.2 COMPONENT PREINSPECTION

1. Set the one-way clutch No.2 component and direct clutch to the transaxle case. Verify that the one-way clutch rotates smoothly when turned counterclockwise and locks when turned clockwise.
2. If not as specified, replace parts as necessary.

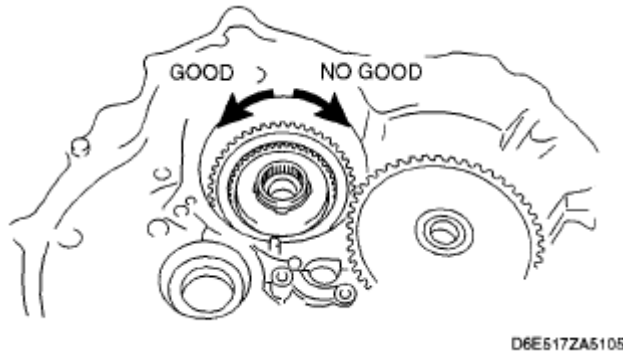


Fig. 328: Inspecting One-Way Clutch No.2
Courtesy of MAZDA MOTORS CORP.

DIRECT CLUTCH PREINSPECTION

Clutch operation

1. Set the direct clutch drum onto the transaxle case.

CAUTION:

- Applying compressed air to the assembled clutch pack for longer than 3 s at a time will damage the seal.

Do not apply compressed air for more than the aforementioned time when testing the system.

2. Inspect the clutch operation by applying compressed air as shown.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

3. If not as specified, replace parts as necessary. (See **DIRECT CLUTCH DISASSEMBLY/ASSEMBLY.**)

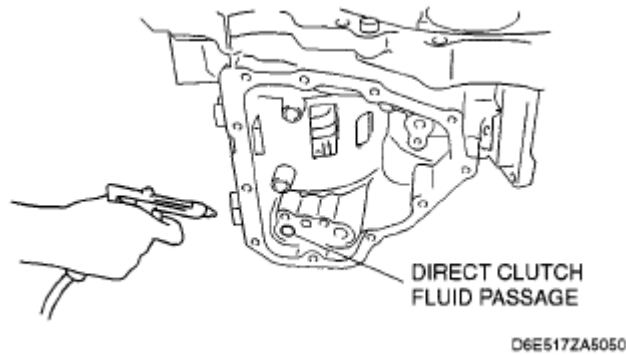


Fig. 329: Applying Compressed Air To Direct Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

CLUTCH CLEARANCE

Measure the direct clutch clearance.

1. Install the direct clutch in the transaxle case, and set the dial gauge.
2. Secure the direct clutch by lightly pressing down with a press or similar tool.

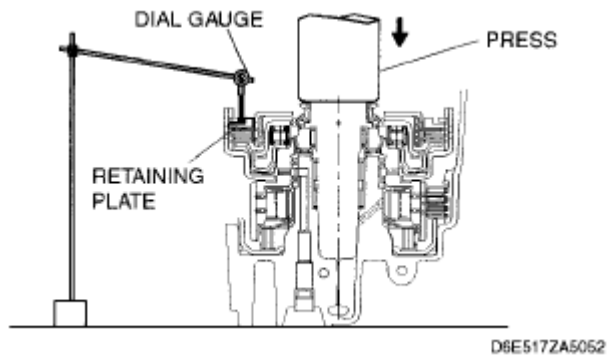


Fig. 330: Measuring Direct Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the direct clutch piston stroke three times.

Air pressure

392-441 kPa {4.0-4.5 kgf/cm² , 57-63 psi}

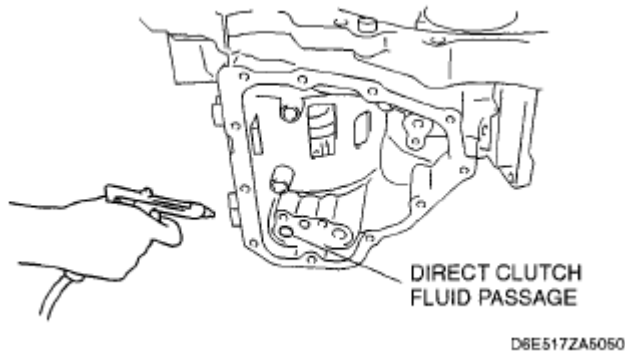


Fig. 331: Applying Compressed Air To Direct Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

4. Apply compressed air and operate the direct clutch piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the direct clutch piston is not operating.
6. Calculate the direct clutch clearance according to the following formula: step (4) value - step (5) value = direct clutch clearance.
7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Direct clutch clearance

Standard: 1.10-1.40 mm {0.043-0.055 in}

8. If not as specified, replace parts as necessary. (See **DIRECT CLUTCH DISASSEMBLY/ASSEMBLY.**)

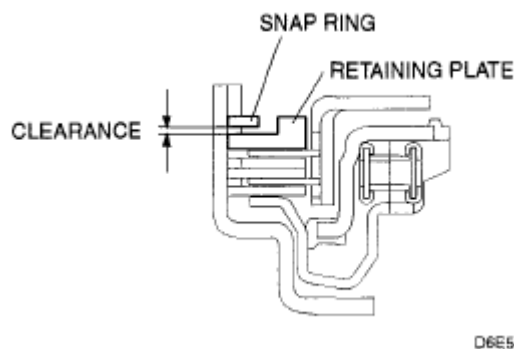


Fig. 332: Measuring Direct Clutch Clearance
Courtesy of MAZDA MOTORS CORP.

REDUCTION BRAKE PREINSPECTION

Brake operation

1. Set the direct clutch drum onto the transaxle case.

CAUTION:

- Applying compressed air to the assembled clutch pack for longer than 3 s at a time will damage the seal.

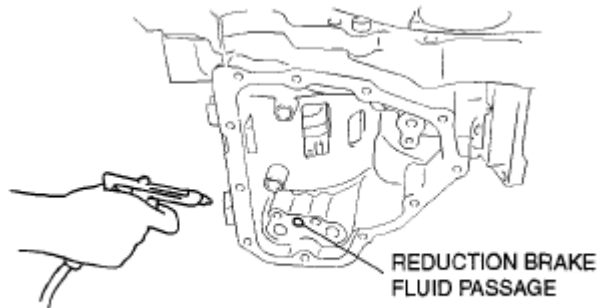
Do not apply compressed air for more than the aforementioned time when testing the system.

2. Inspect the brake operation by applying compressed air as shown.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

3. If not as specified, replace parts as necessary. (See REDUCTION BRAKE DISASSEMBLY/ASSEMBLY.)



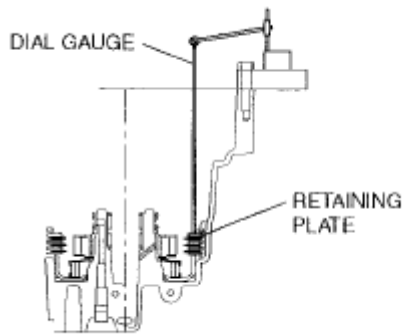
D6E517ZA5055

Fig. 333: Applying Compressed Air To Direct Clutch Fluid Passage
Courtesy of MAZDA MOTORS CORP.

Brake clearance

Measure the reduction brake clearance.

1. Set the dial gauge to the reduction brake.
2. Set the measuring point of the dial gauge to the retaining plate.



D6E517ZA5058

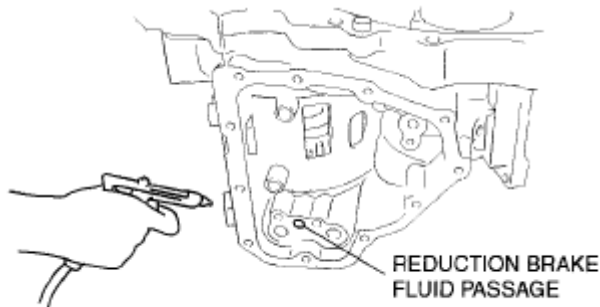
Fig. 334: Measuring Reduction Brake Clearance
Courtesy of MAZDA MOTORS CORP.

3. Apply compressed air to the part indicated in the figure and let the reduction brake piston stroke three times.

Air pressure

392 kPa {4.0 kgf/cm² , 57 psi} max.

4. Apply compressed air and operate the reduction brake piston. Read the value when the indicator of the dial gauge stops.
5. Release the compressed air and read the dial gauge when the reduction brake piston is not operating.



D6E517ZA5055

Fig. 335: Applying Compressed Air To Reduction Brake Fluid Passage
Courtesy of MAZDA MOTORS CORP.

6. Calculate the reduction brake clearance according to the following formula:

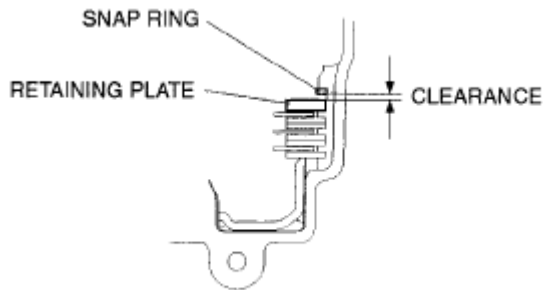
Step (4) value-Step (5) value= reduction brake clearance.

7. Measure the clearances at four locations (90° apart) by following the steps from (3) to (6). Verify that the average value is within the specification below.

Reduction brake clearance

1.50-1.80 mm {0.059-0.070 in}

8. If not as specified, replace parts as necessary. (See **REDUCTION BRAKE DISASSEMBLY/ASSEMBLY.**)



D6E517ZA5059

Fig. 336: Measuring Reduction Brake Clearance
Courtesy of MAZDA MOTORS CORP.

Differential Preinspection Backlash

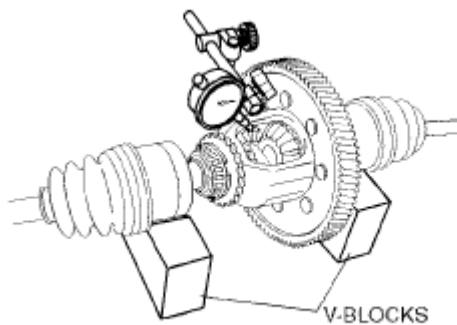
1. Measure the backlash of the side gear.

Differential backlash

Standard: 0.05-0.15 mm {0.002-0.005 in}

Maximum: 0.5 mm {0.020 in}

2. If not specified, replace the differential. (See **DIFFERENTIAL DISASSEMBLY/ ASSEMBLY.**)



B3E0517A278

Fig. 337: Measuring Backlash Of Both Side Gears
Courtesy of MAZDA MOTORS CORP.