RING GEAR AND DIFFERENTIAL PRELOAD MEASUREMENT/ADJUSTMENT [FW6A-EL]

Preparation Before Servicing
1. Print out the measurement/adjustment value input sheet. (See MEASUREMENT/ADJUSTMENT VALUE INPUT SHEET [FW6A-EL].)

   Note
   - When performing the measurement/adjustment, input the measured and calculated values into the measurement/adjustment value input sheet.
   - When performing the other measurements/adjustments, if the measurement/adjustment value input sheet has been printed out, use the printed sheet.

Ring Gear and Differential Preload Measurement
1. Rotate and adjust the rotation handle of the engine stand so that the converter housing side is facing upward.
2. Remove any remaining old sealant on the contact surfaces of the transaxle case and converter housing.
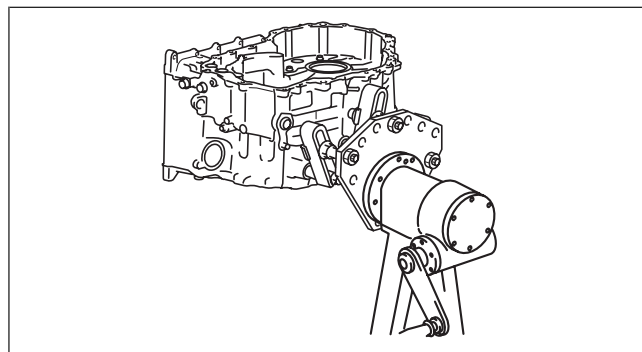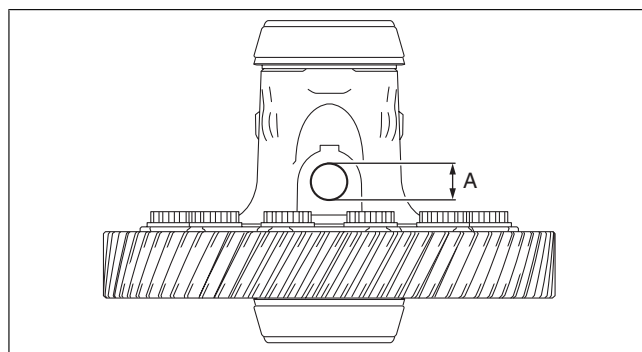

azzjjw00000776

3. Assemble the ring gear and differential.
   (1) Measure the outer dimension of the pinion shaft and record the measurement.

A : Pinion shaft outer dimension (17 mm {0.67 in} or 18 mm {0.71 in})

   Note
   - Measure the pinion shaft outer dimension and record the measurement to select the SST which is used to measure the ring gear and differential preload.

bfw2za00000007

   (2) Apply ATF (ATF FZ) to the roller area of the taper roller bearing of the ring gear and differential.
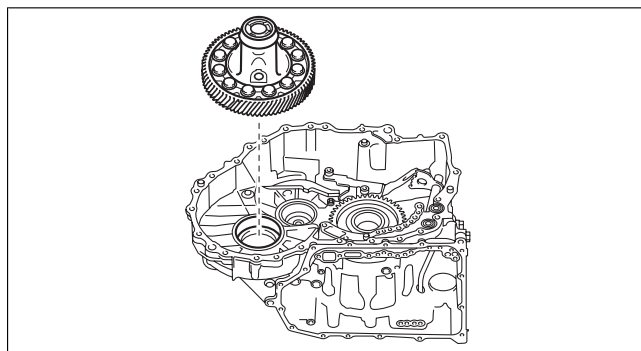
   Caution
   - **Accurately perform the procedure to reduce the error on the ring gear and differential preload measurement.**
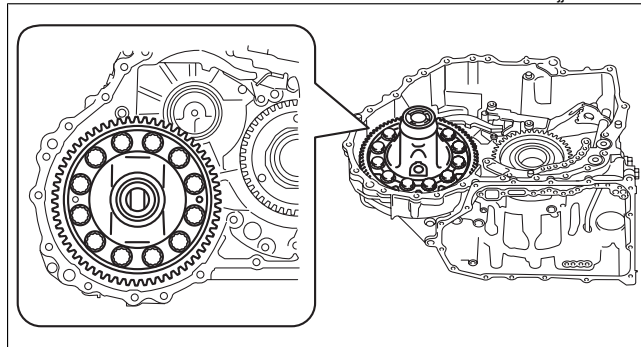
A : ATF application area
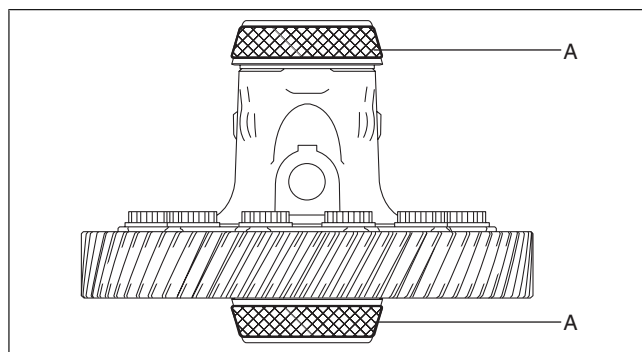
azzjjw00000777

(3) Assemble the ring gear and differential.

azzjjw00000778

azzjjw00000779

4. Assemble the bearing race and a new shim with the same thickness as the removed shim to the converter housing using the following procedure:

Caution
- **Always use a new shim. If a deformed shim is reused, it may cause a transaxle malfunction.**

(1) Apply ATF (ATF FZ) to the engagement area of the bearing race and converter housing.
(2) Assemble the bearing race and a new shim with the same thickness as the removed shim using the following procedure and the SST:
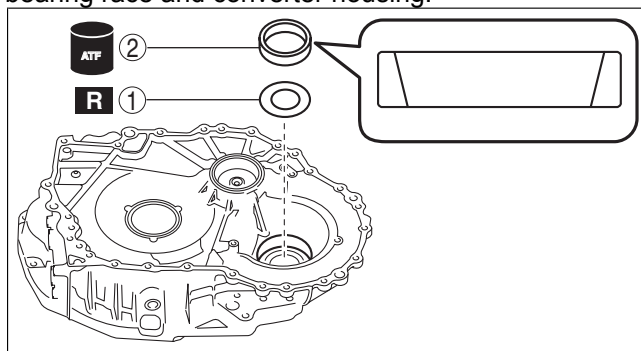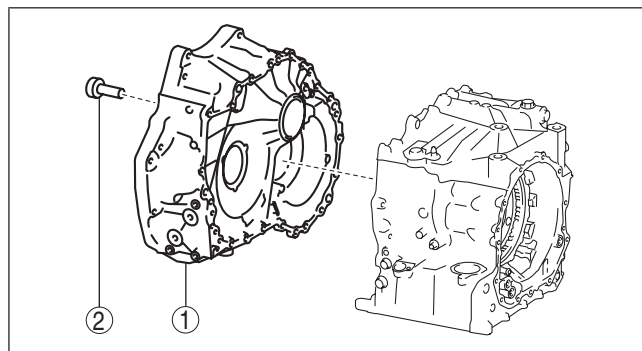

azzjjw00000780

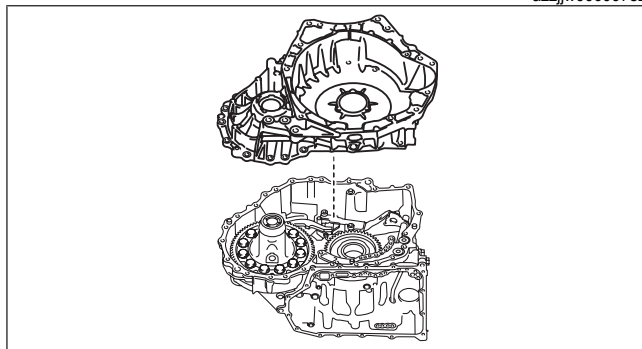| 1 | Shim (outer diameter approx. 79 mm {3.1 in}) (new shim with same thickness of removed shim) |
| 2 | Bearing race (outer diameter approx. 80 mm {3.1 in}) |
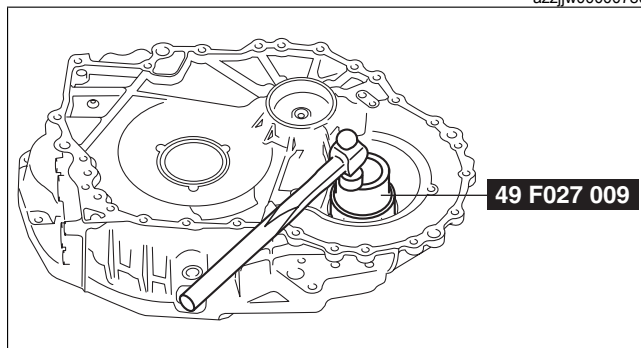
49 F027 009

azzjjw00000781

5. Assemble the converter housing using the following procedure:
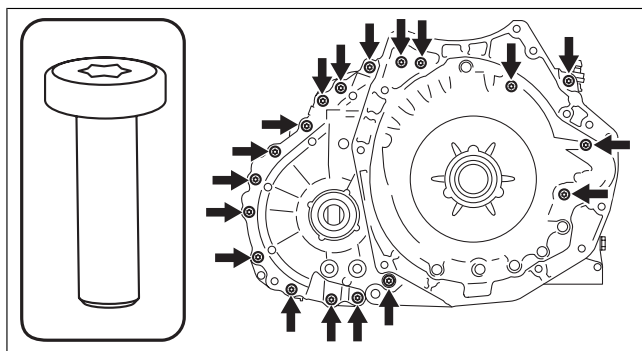

azzjjw00000782

(1) Assemble the converter housing.

azzjjw00000783

(2) Assemble and temporarily tighten the bolts to the positions shown in the figure.

Note
- Bolt size: M8×1.25 bolt, length to approx. 28 mm {1.1 in}

azzjjw00000784

(3) Assemble and temporarily tighten the bolts to the positions shown in the figure.

Caution
- **When performing the automatic transaxle assembly after the ring gear and differential preload measurement/adjustment, use new bolts, otherwise ATF leakage could occur.**

Note
- The bolts for the assembly are applied with sealant. However, the bolts are reused for removal after the ring gear and differential preload measurement/adjustment.
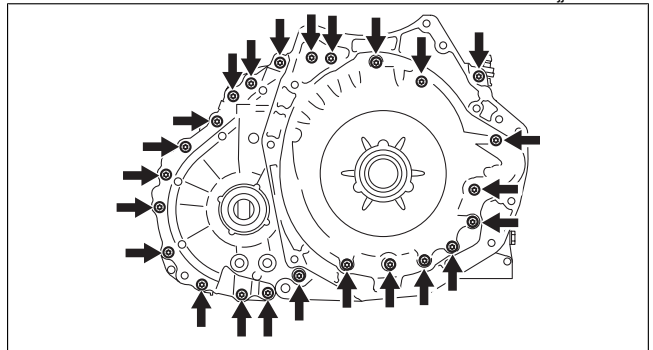- Bolt size: M8×1.25 bolt, length to approx. 28 mm {1.1 in}
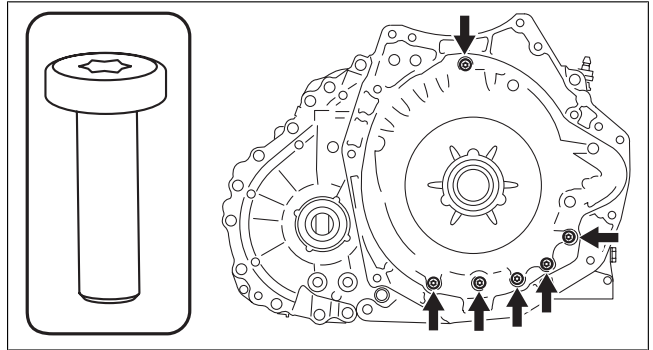
azzjjw00000785

(4) Tighten the bolts shown in the figure.

Tightening torque
19—25 N·m {2.0—2.5 kgf·m, 15—18 ft·lbf}

1	Converter housing
2	24 bolts (M8×1.25 bolt, length to approx. 28 mm {1.1 in})

azzjjw00000786

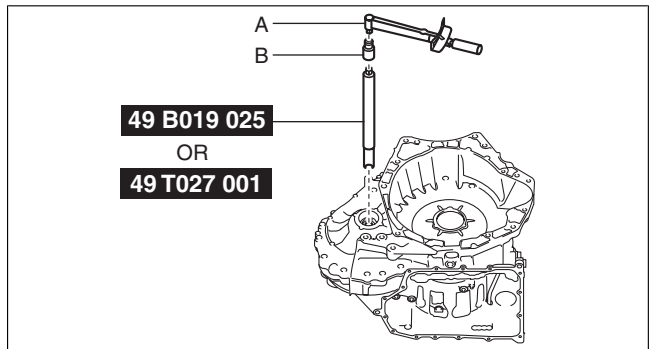6. Measure the ring gear and differential preload using the following procedure.
   (1) Set the SST, torque wrench, and socket (14 mm {9/16 in}) as shown in the figure.

   Note
   • Select the SST by matching it to the pinion shaft outer dimension measured in Step 3, (1).
     — Pinion shaft outer dimension 17 mm {0.67 in}: SST (49 B019 025)
     — Pinion shaft outer dimension 18 mm {0.71 in}: SST (49 T027 001)
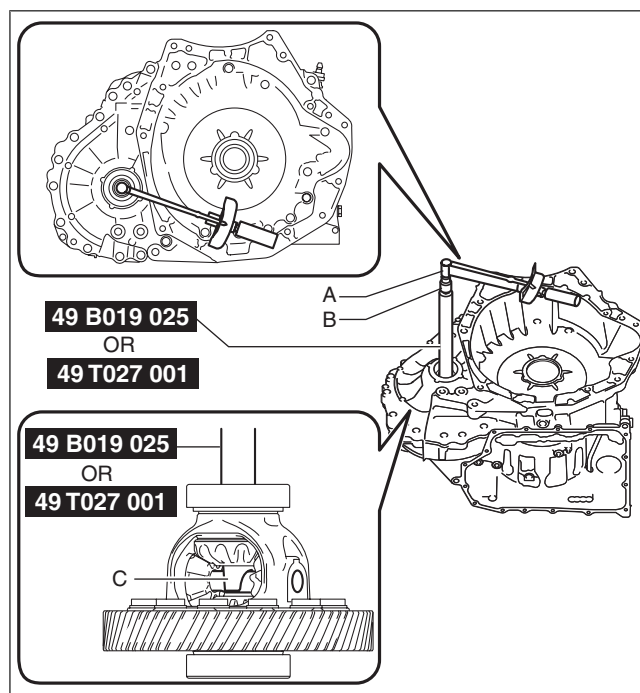   • Engage the groove on the end of the SST with the pinion shaft.

A : Torque wrench
B : Socket (14 mm {9/16 in})

49 B019 025
OR
49 T027 001

bfw2za00000008

A : Torque wrench
B : Socket (14 mm {9/16 in})
C : Pinion shaft

bfw2za00000009

(2) Rotate the ring gear and differential in the direction of the arrow shown in the figure using a torque wrench and measure the ring gear and differential preload.

Caution
- **Measure the ring gear and differential preload after rotating the ring gear and differential approx. 10 times in the direction of the arrow shown in the figure to engage the taper roller bearing.**
- **When the ring gear and differential is rotated at approx. 20 rpm (speed of one rotation for 3 s), measure the rotational torque as a ring gear and differential preload.**

(3) Input the measured ring gear and differential preload into the measurement/adjustment value sheet.
(4) Verify that the ring gear and differential preload satisfies the specification.

Specification
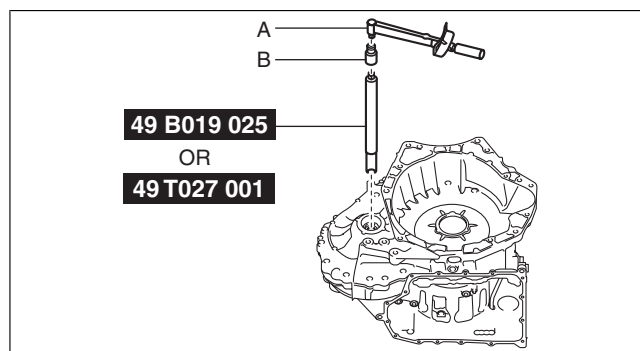**2.8—4.1 N·m {28.6—41.8 kgf·cm, 24.8—36.2 in·lbf}**

- If not within the specification, perform adjustment of the ring gear and differential preload. (See Ring Gear and Differential Preload Adjustment.)

(5) Remove the SST, torque wrench, and socket (14 mm {9/16 in}).

A : Torque wrench
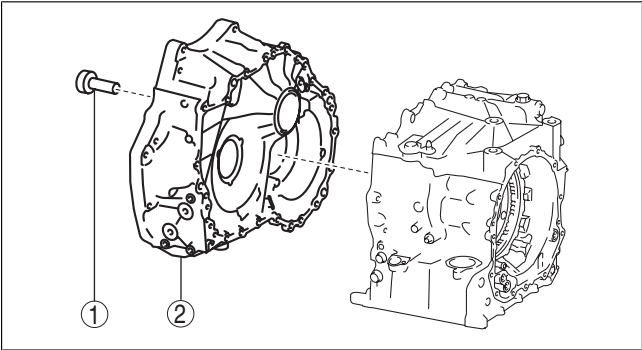B : Socket (14 mm {9/16 in})
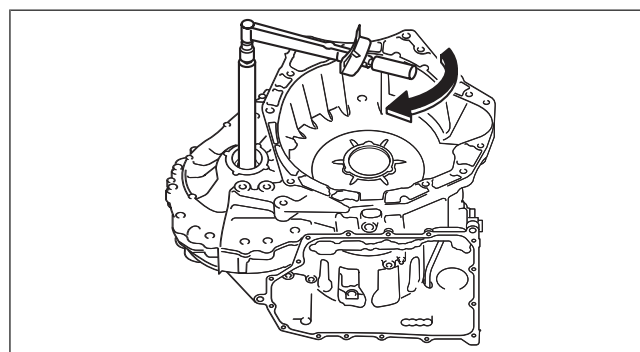
azzjjw00000789

bfw2za00000008

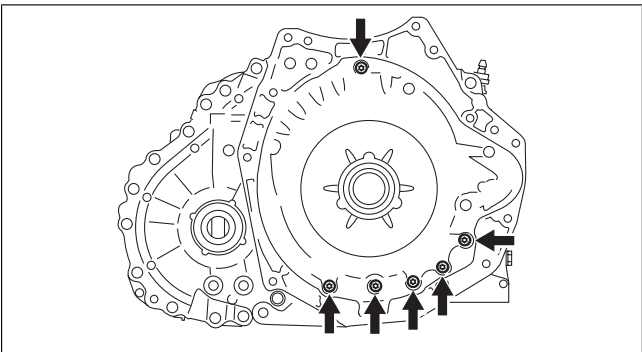7. Remove the converter housing using the following procedure:

azzjjw00000790

(1) Remove the bolts shown in the figure.

Caution
 • **Sealant has been applied to the removed bolts. If the bolts are reused it could cause ATF leakage, therefore when performing the automatic transaxle assembly, use new bolts.**

azzjjw00000791

(2) Remove the bolts shown in the figure.

azzjjw00000792

(3) Remove the converter housing.

1	24 bolts
2	Converter housing

azzjjw00000783

8. Remove the ring gear and differential.

azzjjw00000778

Ring Gear and Differential Preload Adjustment
1. Remove the SST, torque wrench, and socket (14 mm {9/16 in}).
A : Torque wrench
B : Socket (14 mm {9/16 in})

bfw2za00000008

2. Remove the converter housing using the following procedure:
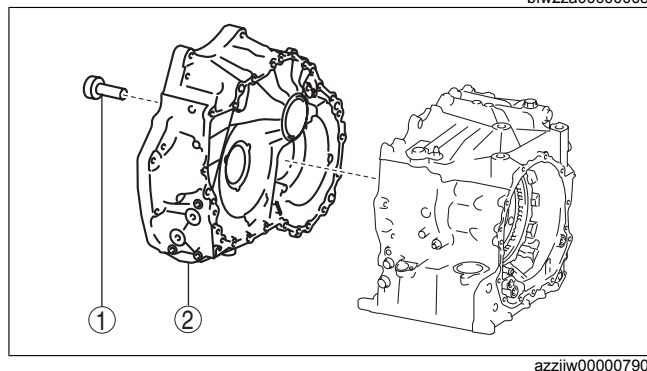
azzjjw00000790

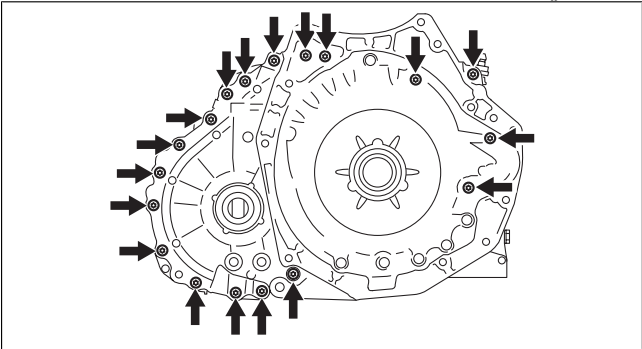(1) Remove the bolts shown in the figure.

Caution
• **Sealant has been applied to the removed bolts. If the bolts are reused it could cause ATF leakage, therefore when performing the automatic transaxle assembly, use new bolts.**
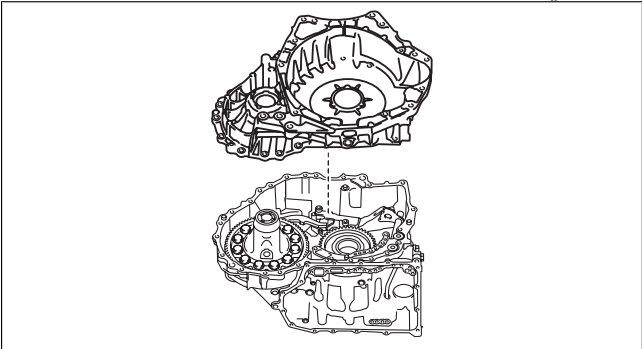

azzjjw00000791

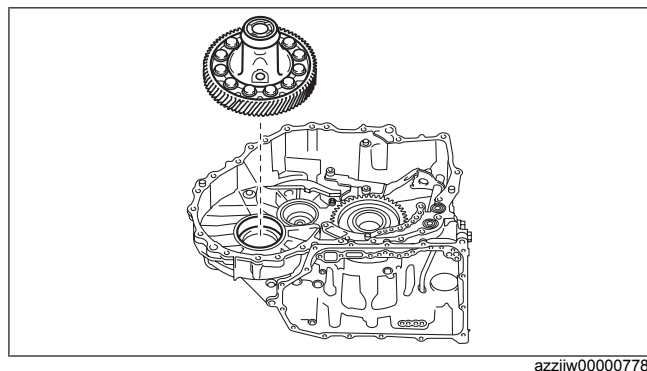(2) Remove the bolts shown in the figure.

azzjjw00000792

(3) Remove the converter housing.

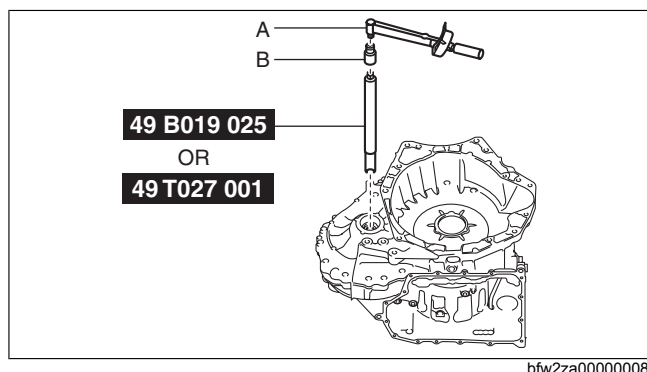| 1 | 24 bolts |
| 2 | Converter housing |

azzjjw00000783

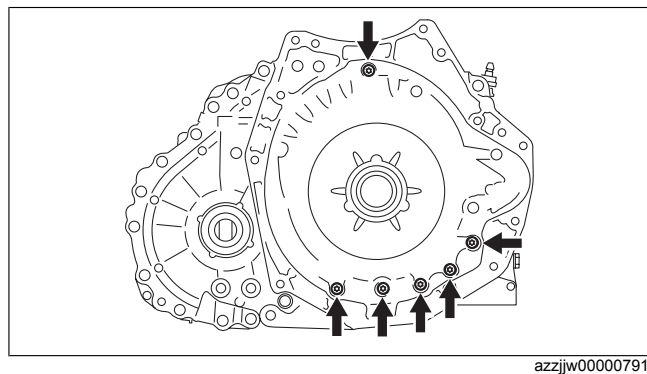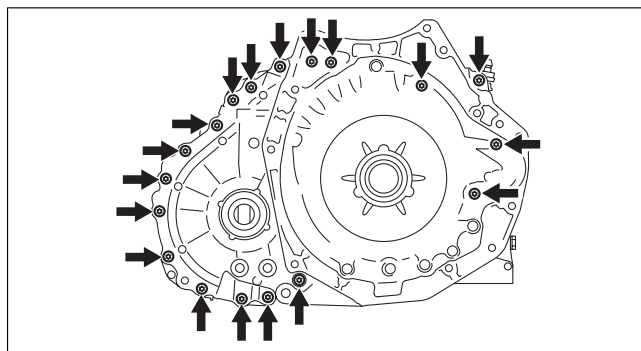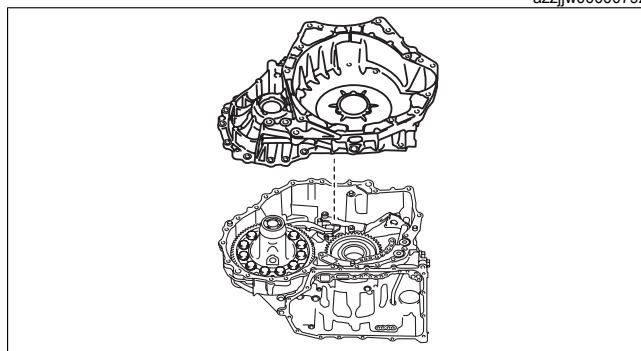3. Remove the bearing race and shim from the converter housing using the SSTs and procedure shown in the figure.

Caution
• **Because the shim will deform when removing the bearing race, use a new shim when performing the shim assembly.**

49 G030 797

49 B025 001
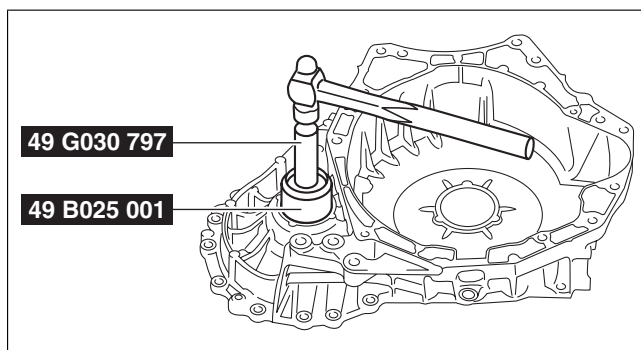
azzjjw00000793

| 1 | Bearing race |
| 2 | Shim |

4. Measure the thickness of the removed shim.

Note
• Recommended measuring instrument: Micrometer

azzjjw00000794

5. Input the measured shim thickness into the measurement/adjustment value sheet.
6. Perform the following calculation to calculate the preload gap.

Note
• The preload gap is the difference between the ring gear and differential preload and the median value of the ring gear and differential preload specification.

Preload gap = E — A
    A: Ring gear and differential preload
    E: Median value of ring gear and differential preload specification (3.45 N·m {35.2 kgf·cm, 30.5 in·lbf})
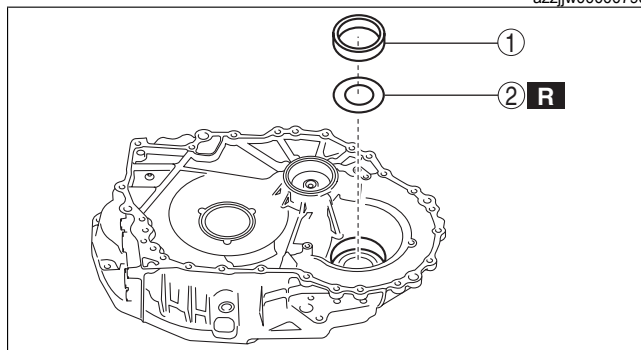
Note
Example
    A: Ring gear and differential preload is 2.5 N·m {25.5 kgf·cm, 22.1 in·lbf}
Preload gap = 3.45 N·m {35.2 kgf·cm, 30.5 in·lbf} - 2.5 N·m {25.5 kgf·cm, 22.1 in·lbf} = 0.95 N·m {9.7 kgf·cm, 8.4 in·lbf}

7. Input the calculated preload gap into the measurement/adjustment value sheet.
8. Perform the following calculation to calculate the gap in the shim thickness.

Note
   • The gap in the shim thickness is the difference between the removed shim thickness and the optimum shim thickness.
   • If the shim thickness is thickened 0.1 mm {0.00394 in}, the ring gear and differential preload increases approx. 1.5 N·m {15.3 kgf·cm, 13.3 in·lbf}.

Shim thickness gap = F × 0.1 mm {0.00394 in} / 1.5 N·m {15.3 kgf·cm, 13.3 in·lbf}
    F: Preload gap

Note
Example
    F: Preload gap is 0.95 N·m {9.7 kgf·cm, 8.4 in·lbf}
Shim thickness gap = 0.95 N·m {9.7 kgf·cm, 8.4 in·lbf} × 0.1 mm {0.00394 in} / 1.5 N·m {15.3 kgf·cm, 13.3 in·lbf} = 0.063 mm {0.00248 in}

9. Input the calculated shim thickness gap into the measurement/adjustment value sheet.
10. Perform the following calculation to calculate the optimum shim thickness.
    Optimum shim thickness = D + G
        D: Thickness of removed shim
        G: Shim thickness gap

Note
Example
    D: Thickness of removed shim is 0.905 mm {0.03563 in}
    G: Shim thickness gap is 0.063 mm {0.00248 in}
Thickness of optimum shim = 0.905 mm {0.03563 in} + 0.063 mm {0.00248 in} = 0.968 mm {0.03811 in}

11. Input the calculated optimum shim thickness into the measurement/adjustment value sheet.
12. Select the nearest new shim for the calculated optimum shim thickness from the following table:

| Selected shim thickness |
| --- |
| 1.55 mm {0.0610 in} |
| 1.50 mm {0.0591 in} |
| 1.45 mm {0.0571 in} |
| 1.40 mm {0.0551 in} |
| 1.35 mm {0.0531 in} |
| 1.30 mm {0.0512 in} |
| 1.25 mm {0.0492 in} |
| 1.20 mm {0.0472 in} |
| 1.15 mm {0.0453 in} |
| 1.10 mm {0.0433 in} |
| 1.05 mm {0.0413 in} |
| 1.00 mm {0.0394 in} |
| 0.95 mm {0.0374 in} |
| 0.90 mm {0.0354 in} |
| 0.85 mm {0.0335 in} |
| 0.80 mm {0.0315 in} |
| 0.75 mm {0.0295 in} |
| 0.70 mm {0.0276 in} |
| 0.65 mm {0.0256 in} |
| 0.60 mm {0.0236 in} |

Selected shim thickness
0.55 mm {0.0217 in}

13. Assemble the bearing race and selected new shim to the converter housing using the following procedure:

Caution
  • **Always use a new shim. If a deformed shim is reused, it may cause a transaxle malfunction.**

(1) Apply ATF (ATF FZ) to the engagement area of the bearing race and converter housing.
(2) Assemble the bearing race and selected new shim using the following procedure and SST:
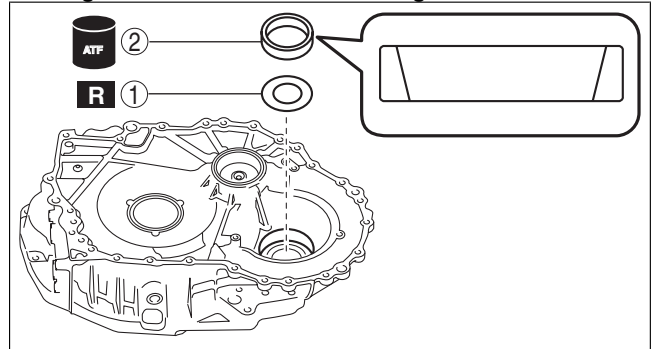
azzjjw00000780

1	Shim (outer diameter approx. 79 mm {3.1 in}) (selected new shim)
2	Bearing race (outer diameter approx. 80 mm {3.1 in})
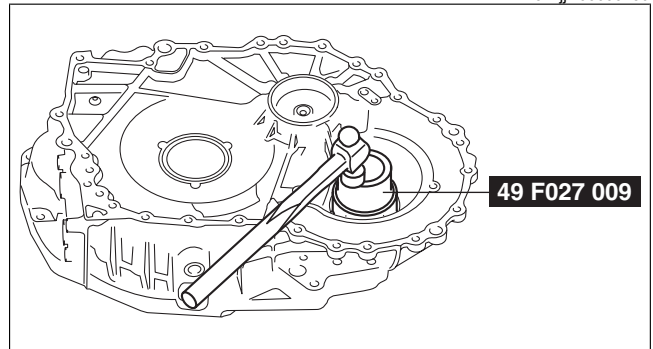
14. Perform ring gear and differential preload measurement from Step 5. (See Ring Gear and Differential Preload Measurement.)

49 F027 009

azzjjw00000781