REAR DIFFERENTIAL ASSEMBLY

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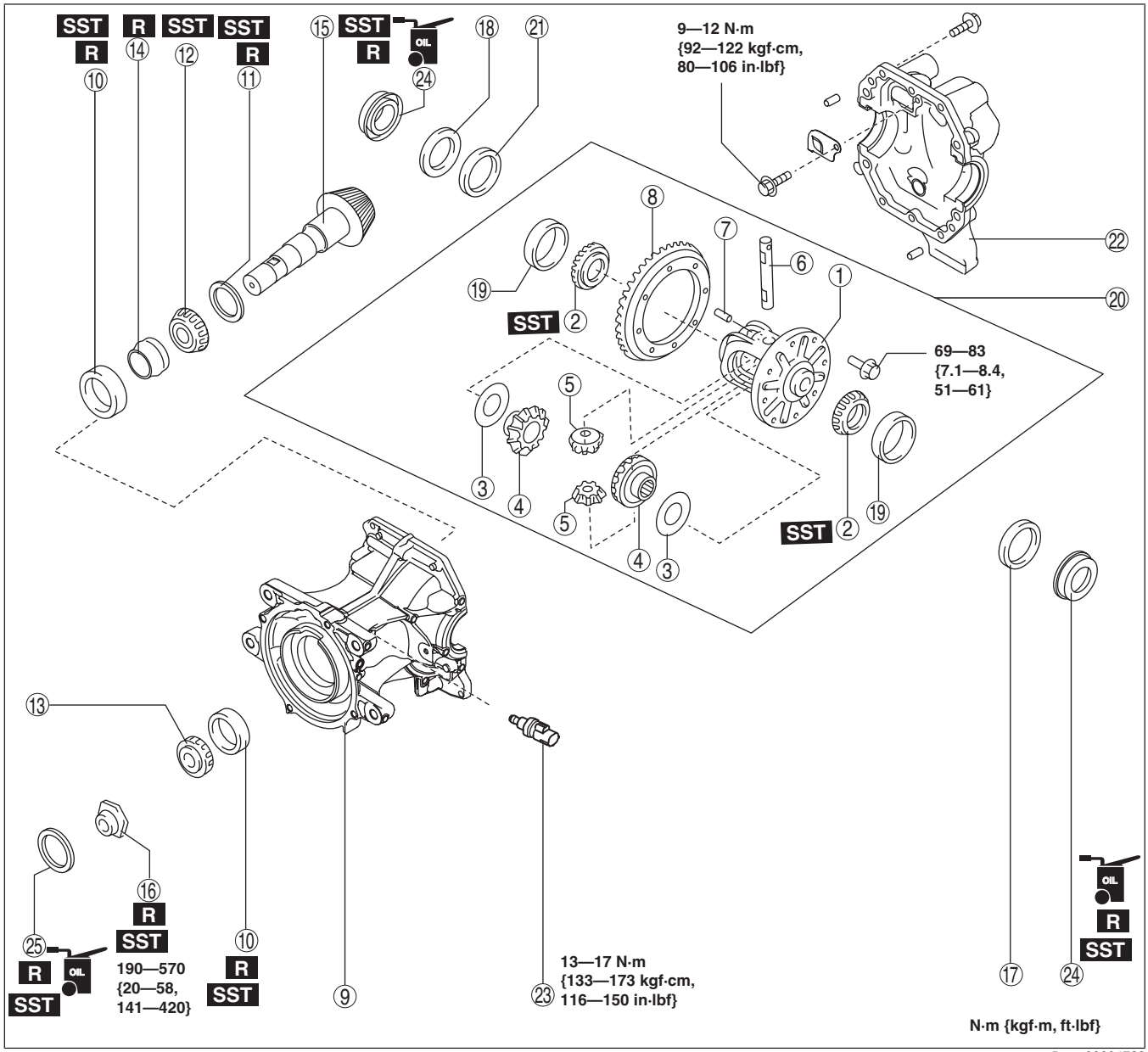
Warning

- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is in a tilted condition, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates it could cause injury, therefore do not maintain the rear differential in a tilted condition. When turning the rear differential, grasp the rotation handle firmly.**

Caution

- **Clean away the old sealant before applying the new sealant.**
- **Install the rear cover before the applied sealant starts to harden.**
- **Allow the sealant to set at least 30 minutes after installation before filling the differential with the specified oil.**

1. Assemble in the order indicated in the table.



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1	Gear case
2	Side bearing inner race (See Side Bearing Inner Race Assembly Note.)
3	Thrust washer (See Ring Gear Assembly Note.)
4	Side gear

5	Pinion gear
6	Pinion shaft
7	Pin
8	Ring gear (See Bearing Outer Race Assembly Note.)
9	Differential carrier

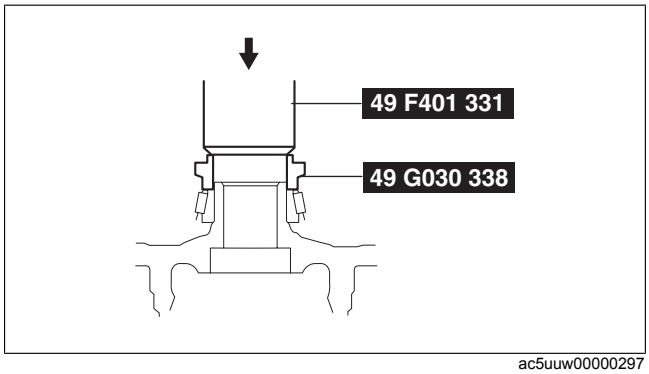
10	Bearing outer race (See Bearing Outer Race Assembly Note.)
11	Spacer (See Spacer, Inner Race Assembly Note.)
12	Bearing inner race (rear) (See Spacer, Inner Race Assembly Note.)
13	Bearing inner race (front)
14	Collapsible spacer
15	Drive pinion
16	Locknut (See Locknut Assembly Note.)
17	Adjusting shim (LH) (See Adjust Shim Assembly Note.)

18	Spacer
19	Side bearing outer race
20	Rear differential component
21	Adjusting shim (RH) (See Adjust Shim Assembly Note.)
22	Rear cover (See Rear Cover Assembly Note.)
23	Differential oil temperature sensor
24	Oil seal (side gear) (See Oil Seal (Side Gear) Assembly Note.)
25	Oil seal (Coupling component) (See Oil Seal (Side Gear) Assembly Note.)

Side Bearing Inner Race Assembly Note

Caution
- **Do not mix up the left and right side bearing inner races.**

1. Press the side bearing inner races into the gear case using the **SSTs**.



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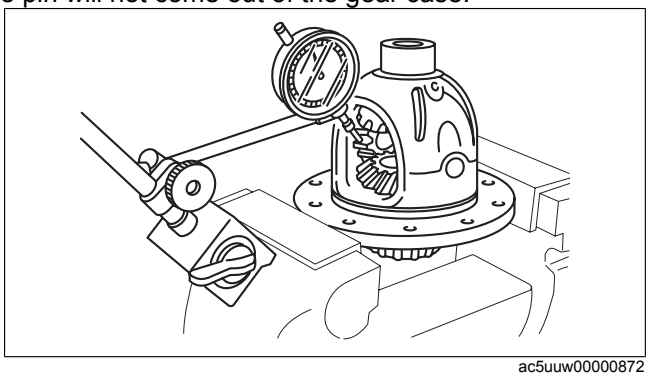
Thrust washer Assembly Note
1. Assemble the side gears, thrust washers and pinion gears to the gear case, then assemble the knock pin.
2. After assembling the knock pin, make a crimp so that the pin will not come out of the gear case.
3. Set a dial gauge to the pinion gear as indicated in the figure.
4. Secure one of the side gears.
5. Move the pinion gear and measure the backlash at the end of the pinion gear.
   - If the backlash exceeds the standard, use the thrust washers to adjust.

Rear differential backlash of pinion gear and side gear
0.1 mm {0.004 in} or less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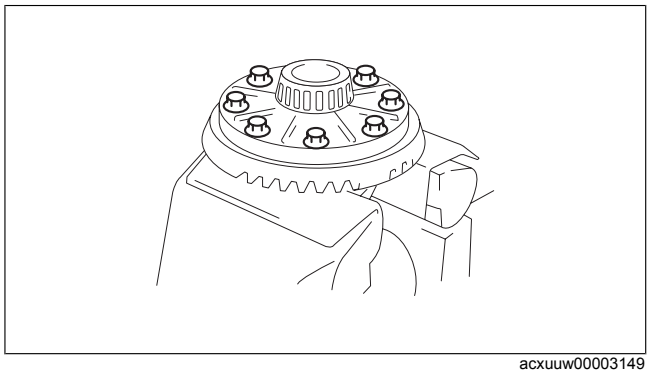
Thrust washer thickness

Identification mark	Thickness
9	**0.90 mm {0.035 in}**
95	**0.95 mm {0.037 in}**
0	**1.00 mm {0.0394 in}**
05	**1.05 mm {0.0413 in}**
1	**1.10 mm {0.0433 in}**

Ring Gear Assembly Note

1. Align the marks placed on the ring gear case at the time of disassembly and tighten the bolts in diagonal order.

   Tightening torque
   69—83 N·m {7.1—8.4 kgf·m, 51—61 ft·lbf}



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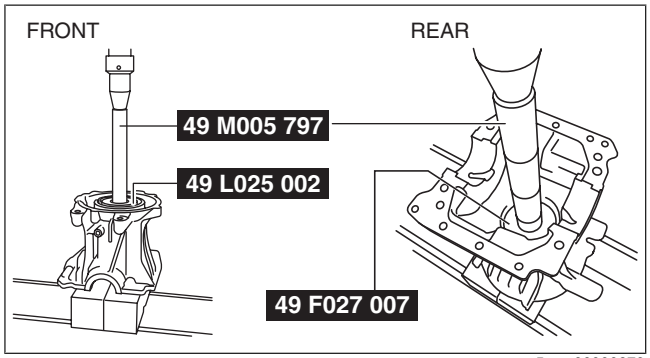
Bearing Outer Race Assembly Note

1. Press in the bearing outer race using the **SSTs** and a press.



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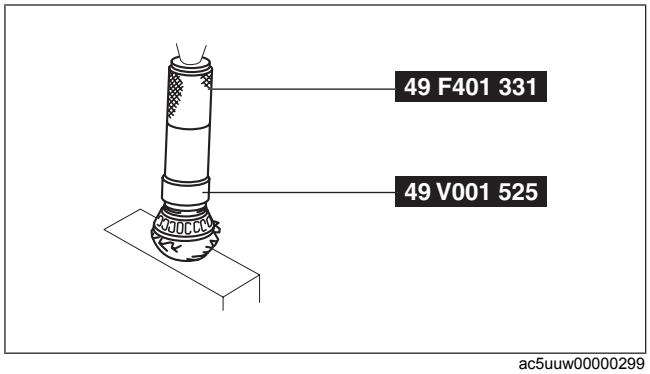
Spacer, Inner Race Assembly Note

1. Install a new spacer of the same size as the originally installed spacer.

Spacer thickness

Identification mark	Thickness (mm {in})	Identification mark	Thickness (mm {in})
08	3.08 {0.1213}	29	3.29 {0.1295}
09	3.095 {0.1219}	30	3.305 {0.1301}
11	3.11 {0.1224}	32	3.32 {0.1307}
12	3.125 {0.1230}	33	3.335 {0.1313}
14	3.14 {0.1236}	35	3.35 {0.1319}
15	3.155 {0.1242}	36	3.365 {0.1325}
17	3.17 {0.1248}	38	3.38 {0.1331}
18	3.185 {0.1254}	39	3.395 {0.1337}
20	3.20 {0.1260}	41	3.41 {0.1343}
21	3.215 {0.1266}	42	3.425 {0.1348}
23	3.23 {0.1272}	44	3.44 {0.1354}
24	3.245 {0.1278}	45	3.455 {0.1360}
26	3.26 {0.1283}	47	3.47 {0.1366}
27	3.275 {0.1289}	—	—

2. Press the bearing inner race (rear bearing) into the drive pinion using the **SSTs** and a press.



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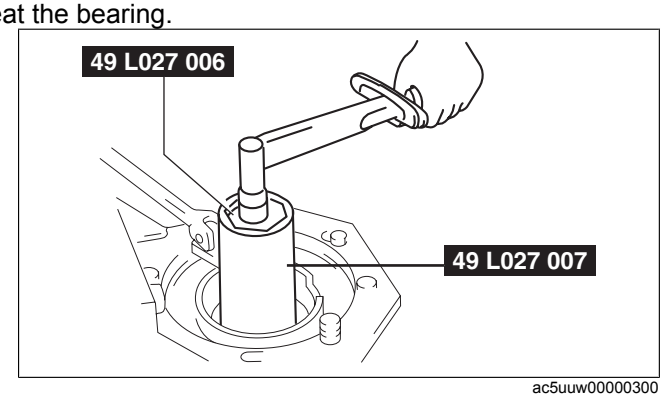
Locknut Assembly Note
Drive pinion preload adjustment
1. Apply differential oil to a new locknut.
2. Assemble a new collapsible spacer, bearing inner race (front bearing), spacer and locknut to the drive pinion, and temporarily tighten the locknut.
3. Turn the serrated part of the drive pinion by hand to seat the bearing.
4. Tighten the locknut temporarily tightened in Step 1 from the lower limit of the specified tightening torque using the **SSTs**, and make this the specified preload.
   - If the specified preload cannot be obtained within the specified tightening torque, replace the collapsible spacer and inspect again.

   Tightening torque
   190—570 N·m {20—58 kgf·m, 141—420 ft·lbf}

   Rear differential drive pinion preload
   0.9—1.6 N·m {9.2—16 kgf·cm, 8.0—14 in·lbf}



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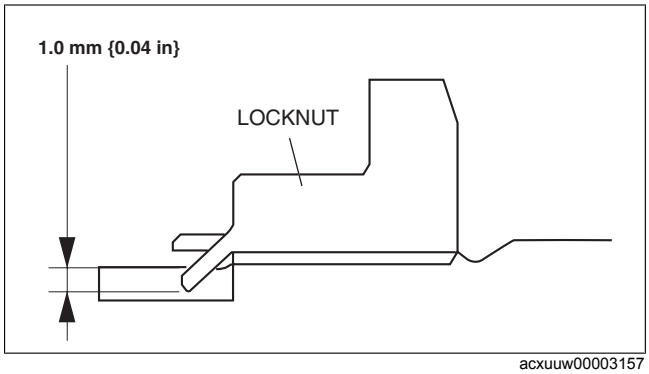
5. Crimp the locknut using a chisel and hammer.



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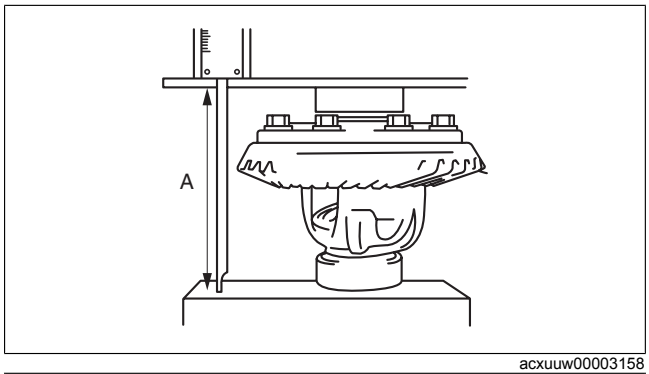
Adjust Shim Assembly Note
1. Assemble the differential carrier to the **SSTs**.
2. Assemble the spacer to the differential carrier.
3. Stack the side bearing outer race and gear case component on the surface plate as indicated in the figure, and measure the height using a caliper and a ruler. This is value A.



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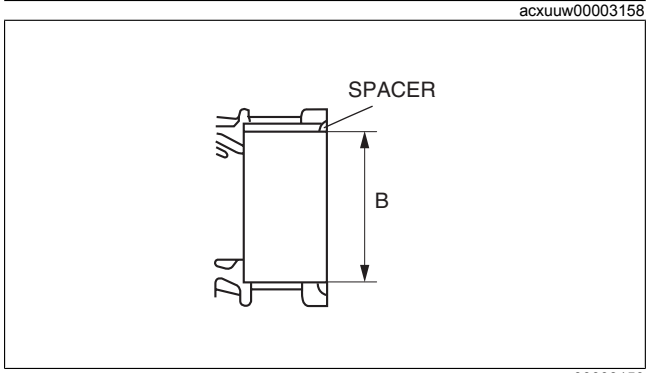
4. Measure the width of the installed differential in the differential carrier with the spacer installed. This is value B.
5. The combined thickness of the left and right adjusting shims is obtained by the following formula.
   C_1 = B – A + 0.16 mm {0.0063 in}
   C_2 = B – A + 0.25 mm {0.0098 in}
6. If the combined thickness of the previously installed adjusting shims is between C1 and C2, use the shims as they are.
7. If the combined thickness of the previously installed adjusting shims is not between C1 and C2, or if the adjusting shims have to be replaced, select two appropriate adjusting shims from the table below.



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Adjusting shim thickness

Identification mark	Thickness (mm {in})	Identification mark	Thickness (mm {in})
339	3.39{0.133}	393	3.93 {0.155}
342	3.42 {0.135}	396	3.96 {0.156}
345	3.45 {0.136}	399	3.99 {0.157}
348	3.48 {0.13}	402	4.02 {0.158}
351	3.51 {0.138}	405	4.05 {0.159}
354	3.54 {0.139}	408	4.08 {0.161}
357	3.57 {0.141}	411	4.11 {0.162}
360	3.60 {0.142}	414	4.14 {0.163}
363	3.63 {0.143}	417	4.17 {0.164}
366	3.66 {0.144}	420	4.20 {0.165}
369	3.69 {0.145}	423	4.23 {0.167}
372	3.72 {0.146}	426	4.26 {0.168}
375	3.75 {0.148}	429	4.29 {0.169}
378	3.78 {0.149}	432	4.32 {0.170}
381	3.81 {0.150}	435	4.35 {0.171}
384	3.84 {0.151}	438	4.38 {0.172}
387	3.87 {0.152}	441	4.41 {0.174}
390	3.90 {0.154}	—	—

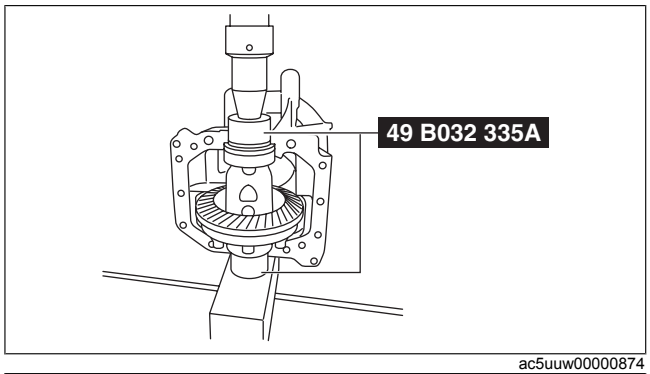
Caution
- **If adjusting shims are to be reused, do not mix up the left and right shims.**
- **Do not mix up the left and right side bearing outer races and spacers.**

8. Assemble the differential and bearing outer race to the differential carrier.
9. Tap the selected adjusting shim between the spacer and the bearing race with a plastic hammer.

Rear Cover Assembly Note

1. Clean the alignment surface of the carrier and rear cover.
2. Apply pressure to the case using a press and install the rear cover using the **SSTs** (49 B032 335A) as shown in the figure.

Caution
- **Do not apply pressure of 2 t or more.**



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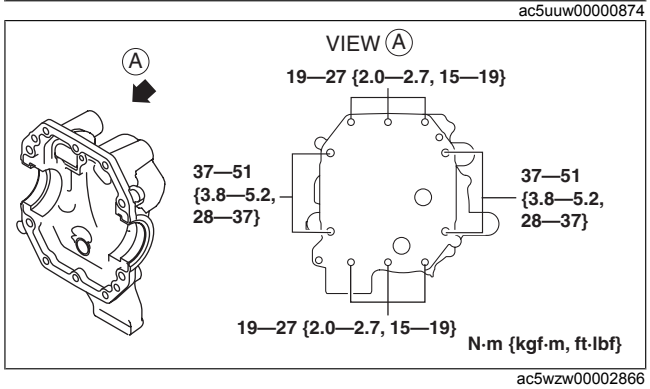
3. Install the bolts with the specified torque as shown in the figure.



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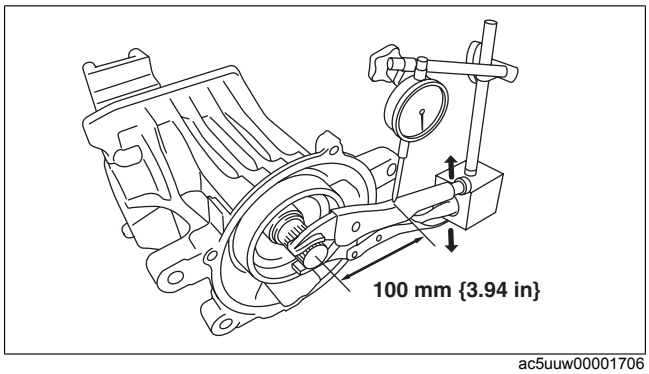
4. Install the commercially-available tool (vise clamp) to the drive pinion shaft and measure **100 mm {3.94 in}** of backlash from the center of the shaft axle.

   Rear differential backlash of drive pinion and ring gear
   Standard: 0.13—0.21 mm {0.0052—0.0082 in}
   Minimum value: 0.07 mm {0.003 in}



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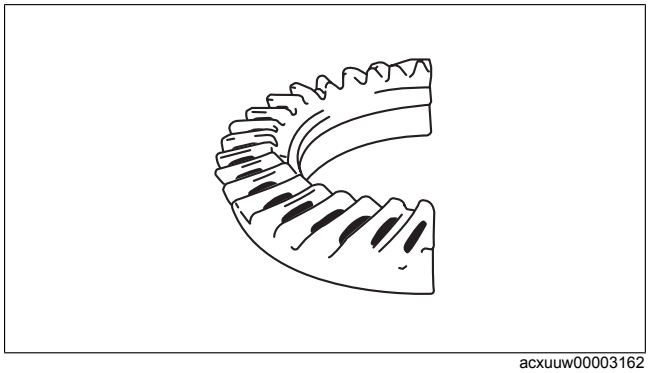
5. If the backlash is not within the specification, adjust the gear case component by moving it in the axial direction.

   Note
   - When moving the gear case component in the axial direction, replace the adjusting shims. If the adjusting shim on the right side is replaced with one that is **0.05 mm {0.002 in}** thicker, replace the one on the left with one that is **0.05 mm {0.002 in}** thinner.

6. Inspect the drive pinion and ring gear teeth contact points.
   (1) Coat both surfaces of the ring gear uniformly with a thin red lead coating.
   (2) While rotating the ring gear back and forth by hand, rotate the drive pinion several times and inspect the tooth contact.
   (3) Inspect the tooth contacts in four locations around the ring gear, and check that the tooth contacts showing the red lead coating are the same as the pattern indicated in the figure.
      - If the tooth contact is good, wipe off the red lead coating.
      - If it is not good, adjust the pinion height, then adjust the backlash.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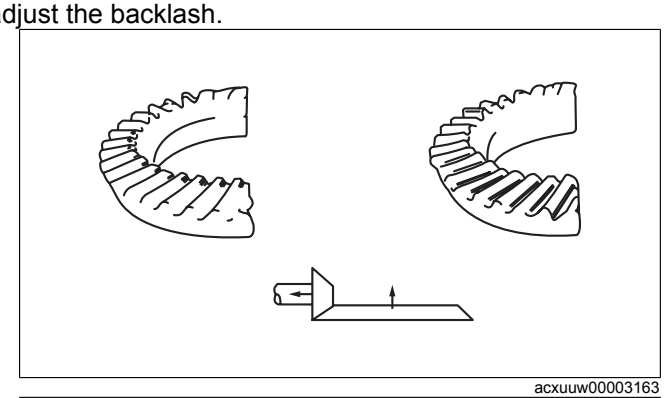
   (4) If toe and flank contact appears as shown in the figure, replace the spacer with a thinner one, and move the drive pinion outward.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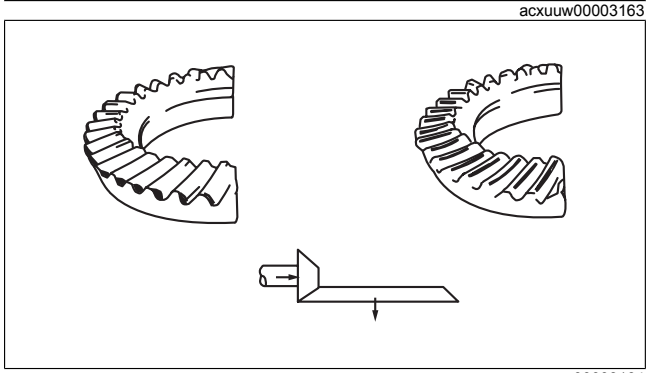
   (5) If heel and face contact appears as indicated in the figure, replace the spacer with a thicker one and move the drive the pinion inward.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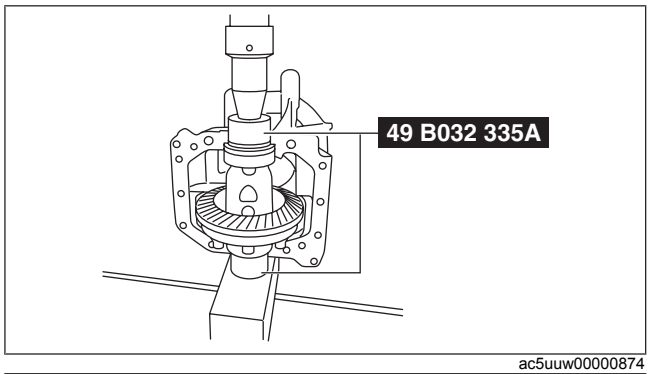
7. If the backlash is within the specification and the tooth contact is correct, install the rear cover.

   Caution
   - **Clean away the old sealant before applying the new sealant.**
   - **Install the rear cover before the applied sealant starts to harden.**
   - **Allow the sealant to set at least 30 minutes after installation before filling the differential with the specified oil.**

8. Clean the alignment surface of the carrier and rear cover, and apply a thin coat of sealant.

9. Apply pressure to the case using a press and install the rear cover using the **SSTs** (49 B032 335A) as shown in the figure.

Caution
- **Do not apply pressure of 2 t or more.**



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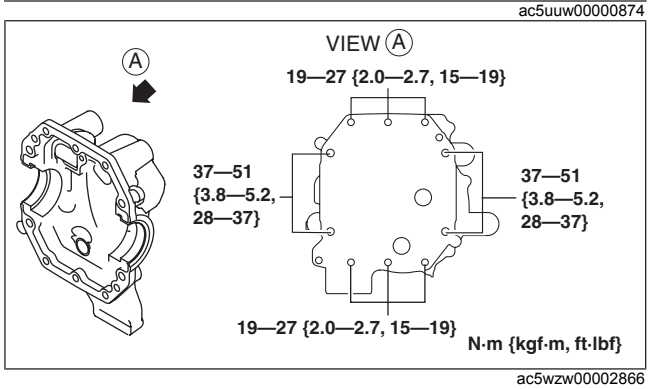
10. Install the bolts with the specified torque as shown in the figure.



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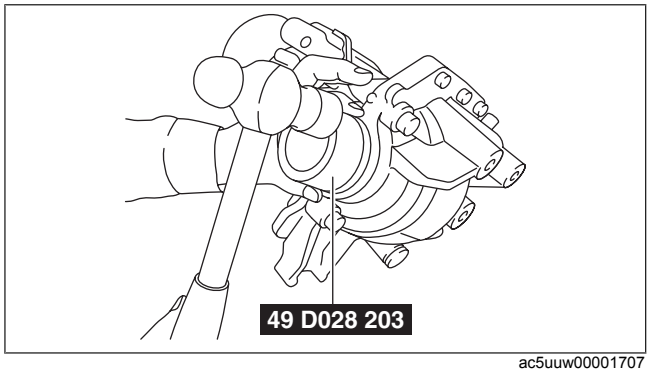
Oil Seal (Side Gear) Assembly Note
1. Apply differential oil to the new oil seal lip.
2. Assemble the oil seal using the **SST**.



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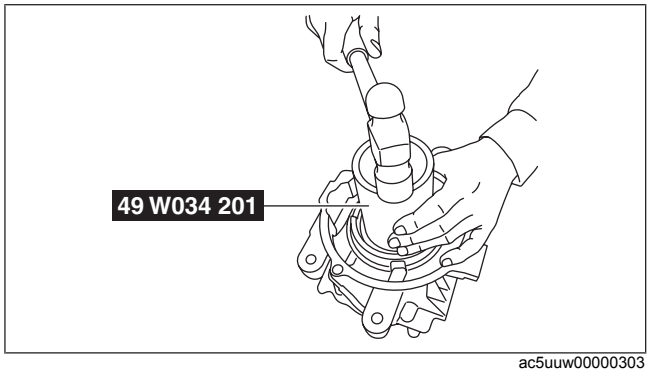
Oil Seal (Coupling Component) Assembly Note
1. Apply differential oil to the new oil seal lip.
2. Assemble the oil seal using the **SST**.



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