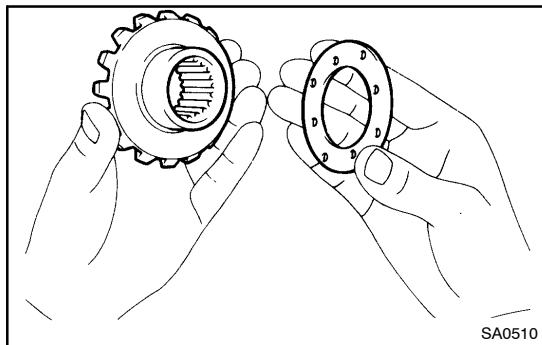




SA0510

REASSEMBLY

1. w/o Differential lock:

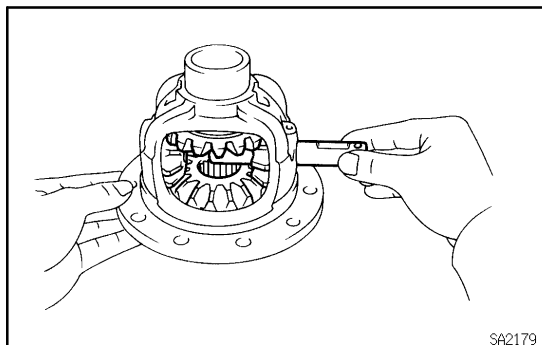
ASSEMBLE DIFFERENTIAL CASE

- Apply all of the sliding and rotating surfaces with gear oil.
- Install the 2 thrust washers and side gears.
- Using the table below, select the thrust washers which will ensure that the backlash is within the specification. Try to select washers of the same size for both sides.

Backlash: 0.02–0.20 mm (0.0008–0.0079 in.)

Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.55 (0.061)	1.85 (0.073)
1.60 (0.063)	1.90 (0.075)
1.65 (0.065)	1.95 (0.077)
1.70 (0.067)	2.00 (0.079)
1.75 (0.069)	2.05 (0.081)
1.80 (0.071)	2.10 (0.083)

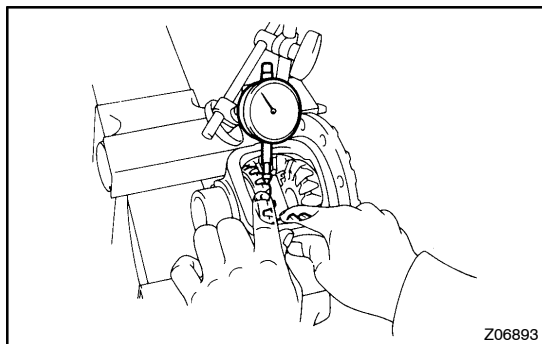


SA2179

- Install the side gears with the side gear thrust washers, pinion gears, pinion gear thrust washers and pinion shaft.

HINT:

Align the hole for the pinion shaft and differential case hole.

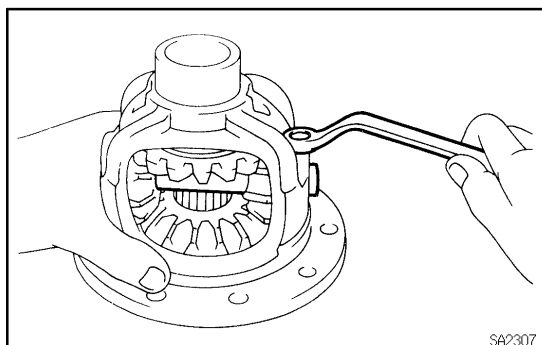


Z06893

- Using a dial indicator, measure the side gear backlash with holding the one pinion gear toward the case.

Backlash: 0.02–0.20 mm (0.0008–0.0079 in.)

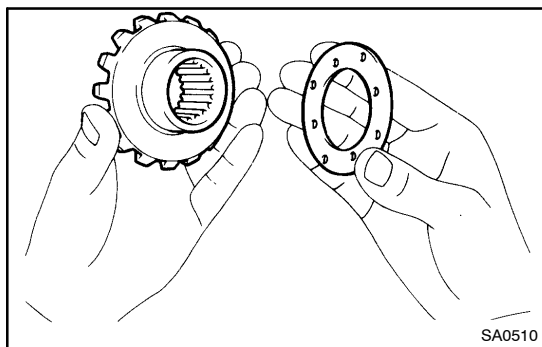
If the backlash is not within the specification, install a thrust washer of different thickness.



SA2307

- Install the pinion shaft pin and washer.

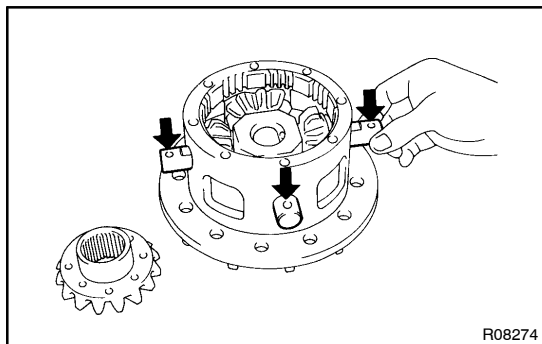
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



2. w/ Differential lock:

MEASURE SIDE GEAR BACKLASH

- Apply all of the sliding and rotating surfaces with gear oil.
- Install the thrust washer to the side gear.
- Install the thrust washer to the pinion gear.



- Install the side gear into the case.
- Install the holder into the case.
- Install the 4 pinion gears with the thrust washers.
- Align the pinion shaft hole and case pinion shaft pin hole, and install the pinion shaft.
- Install the side gear to the cover.
- Align the matchmarks and install the case and cover.
- Using a torx socket wrench, torque the 5 bolts and 3 pinion shaft pins.

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

- Using a dial indicator, with holding the side gear and measure the backlash.

Backlash: 0.02–0.20 mm (0.0008 – 0.0079 in.)

HINT:

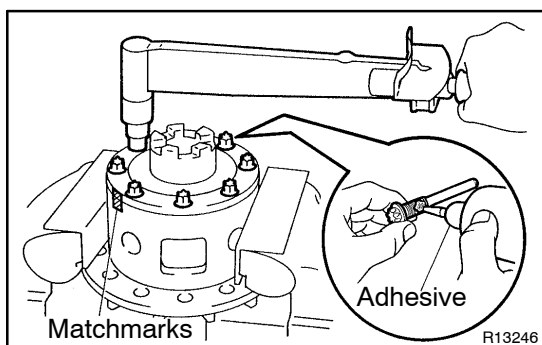
Measure at all 4 locations.

If the backlash is not within the specification, install the thrust washer of a different thickness.

Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.55 (0.061)	1.85 (0.073)
1.60 (0.063)	1.90 (0.075)
1.65 (0.065)	1.95 (0.077)
1.70 (0.067)	2.00 (0.079)
1.75 (0.069)	2.05 (0.081)
1.80 (0.071)	2.10 (0.083)

- After measuring backlash, remove the 5 set bolts and 3 pinion shaft pins.



3. w/ Differential lock:

ASSEMBLE DIFFERENTIAL CASE

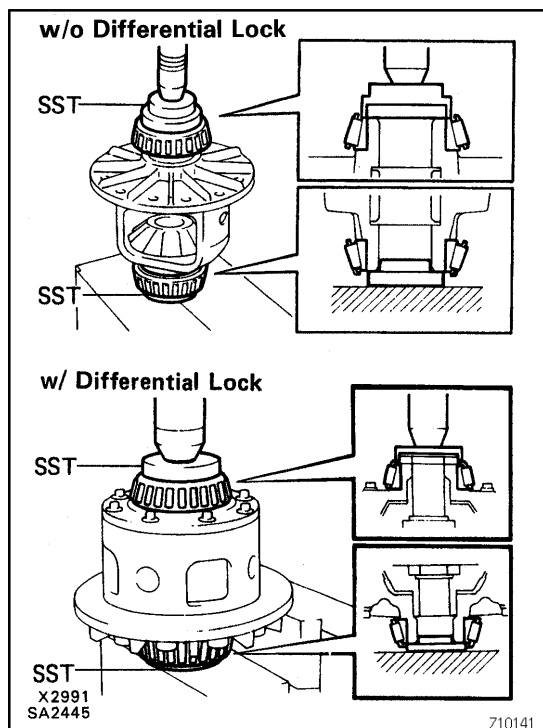
- Clean the thread of the bolts, pinion shaft pins, case and cover with the white gasoline.
- Coat the threads of the bolts and pinion shaft pins with adhesive.

Adhesive: Part No. 08833-00070, THREE BOND 1324 or equivalent

- Align the matchmarks, install the case and cover.

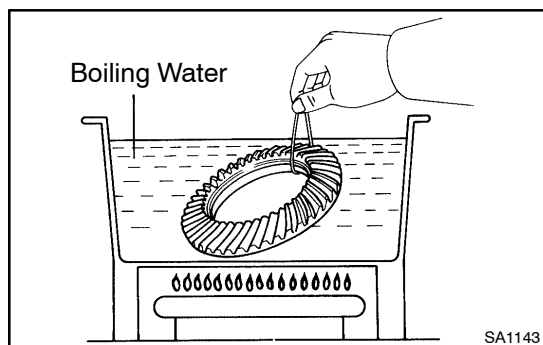
- (d) Using a torx socket wrench, torque the 5 bolts and 3 pinion shaft pins.

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)



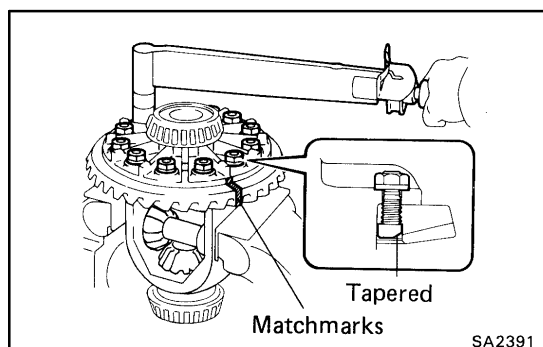
4. INSTALL SIDE BEARINGS

- w/o Differential lock:
Using SST and a press, install the 2 side bearings on the differential case.
SST 09315-00022, 09550-10012 (09558-10010)
- w/ Differential lock:
Using SST and a press, install the 2 side bearings on the differential case.
SST 09550-60010, 09550-10012 (09558-10010)



5. INSTALL RING GEAR ON DIFFERENTIAL CASE

- (a) Clean the contact surfaces of the differential case and ring gear.
- (b) Heat the ring gear to about 100 °C (212 °F) in boiling water.
- (c) Carefully remove the ring gear from the boiling water.
- (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.



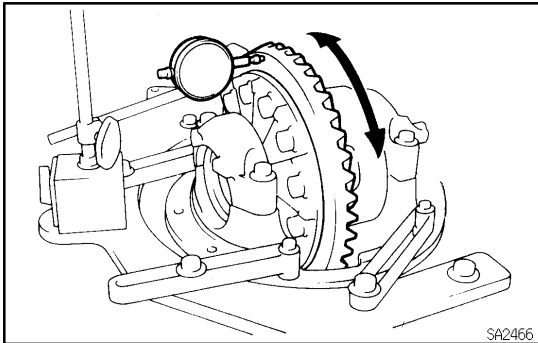
- (e) Align the matchmarks on the ring gear and differential case.
- (f) Temporarily install the set bolts and nuts so that the bolt holes in the ring gear and differential case are not misaligned.

NOTICE:

Install the bolts so that the tapered part of the bolt is on the ring gear side. The ring gear set nuts should not tighten until the ring gear has cooled sufficiently.

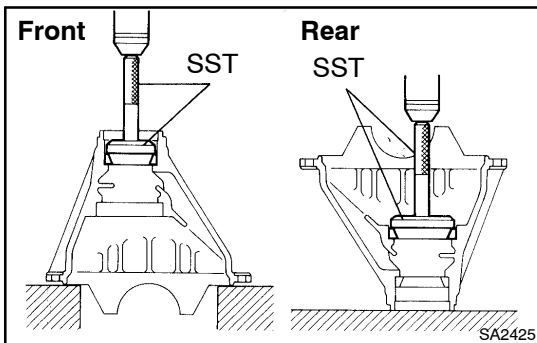
- (g) After the ring gear cools down enough, tighten the set bolts uniformly and a little at a time.

Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)



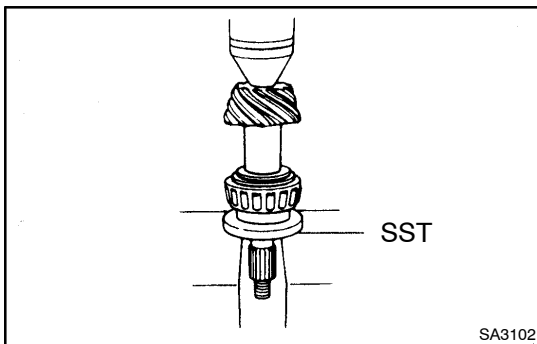
6. CHECK RING GEAR RUNOUT

- (a) Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearings.
- (b) Using a dial indicator, check the ring gear runout.
Maximum runout: 0.10 mm (0.0039 in.)
- (c) Remove the differential case.



7. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

- Front side:
Using SST and a press, install the 2 outer races.
SST 09950-60020 (09951-00710),
09950-70010 (09951-07150)
- Rear side:
Using SST and a press, install the 2 outer races.
SST 09950-60020 (09951-00890),
09950-70010 (09951-07150)



8. INSTALL DRIVE PINION REAR BEARING

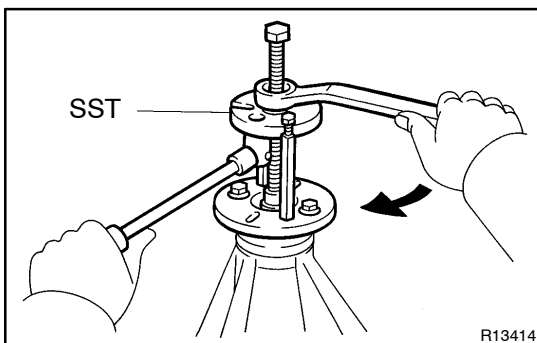
- (a) Install the washer on the drive pinion.

HINT:

First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.

- (b) Using SST and a press, install the rear bearing onto the drive pinion.

SST 09506-35010



9. TEMPORARILY ADJUST DRIVE PINION PRELOAD

- (a) Install the drive pinion and front bearing.

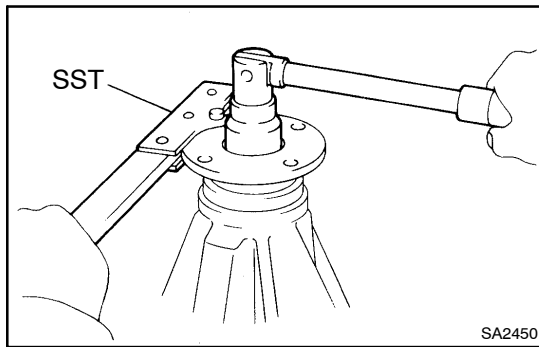
HINT:

Assemble the spacer and oil seal after adjusting the gear contact pattern.

- (b) Install the oil slinger.

- (c) Install the companion flange with SST.

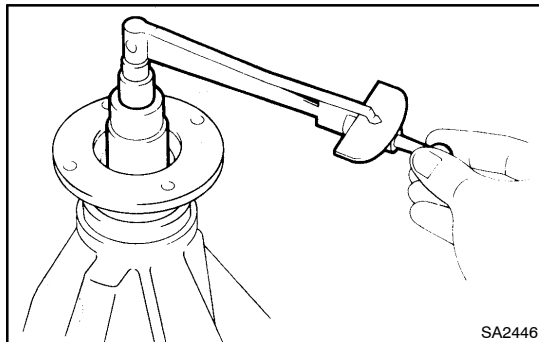
SST 09550-30010 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



- (d) Adjust the drive pinion preload by tightening the companion flange nut.
- (e) Using SST to hold the flange, tighten the nut.
SST 09330-00021

NOTICE:

- Coat the nut and screw of the drive pinion with gear oil.
- As there is no spacer, tighten a little at a time, being careful not to overtighten.



- (f) Using a torque wrench, measure the preload.

Preload (at starting):**New bearing**

1.3–2.0 N·m (13–20 kgf·cm, 11.3–17.4 in.·lbf)

Reused bearing

0.7–1.0 N·m (7–10 kgf·cm, 6.1–8.7 in.·lbf)

HINT:

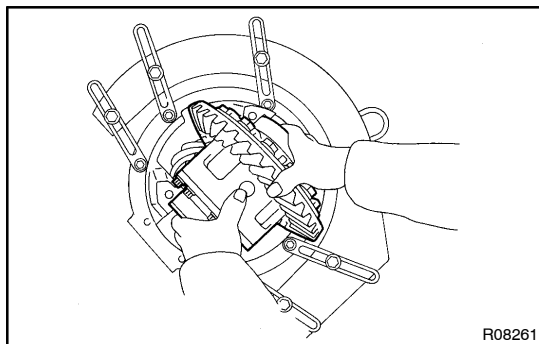
Measure the total preload after first turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

10. w/o Differential lock:**INSTALL DIFFERENTIAL CASE IN CARRIER**

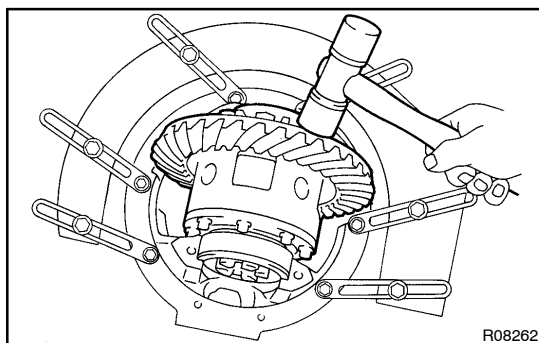
- (a) Place the 2 bearing outer races on their respective bearings. Make sure that the left and right outer races are not interchanged.
- (b) Install the case in the carrier.

HINT:

Make sure that there is backlash between the ring gear and drive pinion.

**11. w/ Differential lock:****INSTALL DIFFERENTIAL CASE IN CARRIER**

- (a) Place the 2 bearing outer races on their respective bearings. Make sure that the left and right races are not interchanged.
- (b) Install the assembled plate washer onto the side bearing.
- (c) Install the differential case in the carrier.

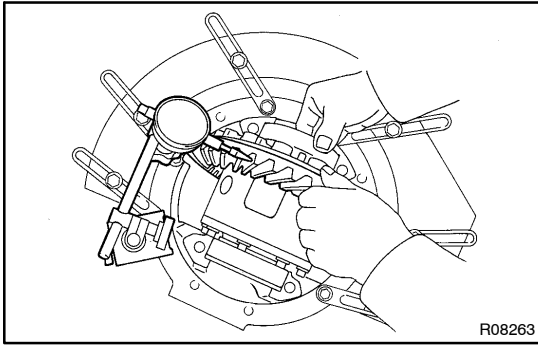


- (d) Make the plate washer and bearing smooth by tapping on the ring gear with a plastic hammer.

HINT:

If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.

**12. w/ Differential lock:****ADJUST RING GEAR BACKLASH**

- (a) Using a dial indicator, with holding the side bearing of the ring gear side and measure the backlash.

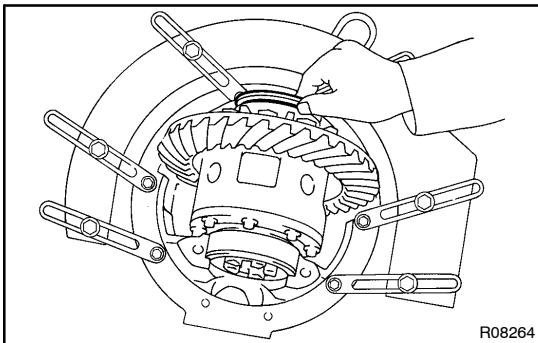
Backlash (reference): 0.15 mm (0.0059 in.)

- (b) Select a case cover side plate washer using the backlash as reference.

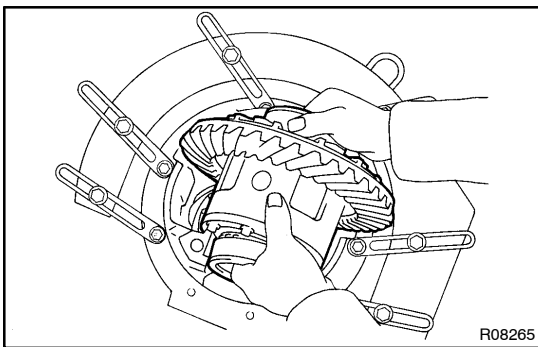
Side plate washer thickness:

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	2.67 (0.1051)	7	2.85 (0.1122)	13	3.03 (0.1193)	19	3.21 (0.1264)
2	2.70 (0.1063)	8	2.88 (0.1134)	14	3.06 (0.1205)	20	3.24 (0.1276)
3	2.73 (0.1075)	9	2.91 (0.1146)	15	3.09 (0.1217)	21	3.27 (0.1287)
4	2.76 (0.1087)	10	2.94 (0.1157)	16	3.12 (0.1228)	22	3.30 (0.1299)
5	2.79 (0.1098)	11	2.97 (0.1169)	17	3.15 (0.1240)	23	3.33 (0.1311)
6	2.82 (0.1110)	12	3.00 (0.1181)	18	3.18 (0.1252)		

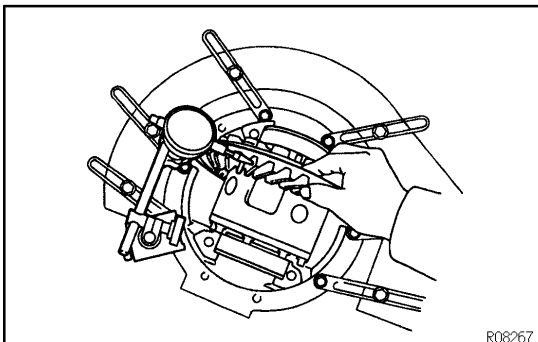
V04434



- (c) Select a ring gear side plate washer of a thickness which eliminates any clearance between the plate washer and carrier.



- (d) Remove the 2 plate washers and differential carrier.
 (e) Install the plate washer into the lower part of the carrier.
 (f) Place the plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.
 (g) Using a plastic hammer, make the washer and bearing smooth by tapping the ring gear.



- (h) Using a dial indicator, measure the ring gear backlash.

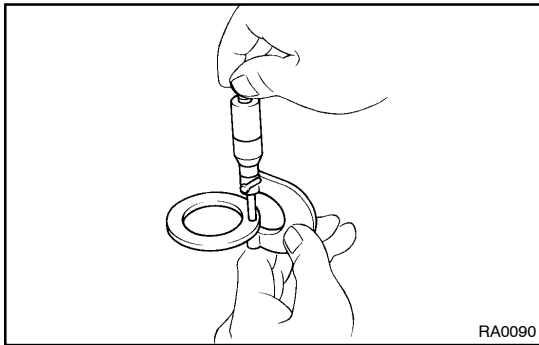
Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

If it is not within the specification, adjust it by either increasing or decreasing the number of washers on both sides by an equal amount.

HINT:

There should be no clearance between the plate washer and case.

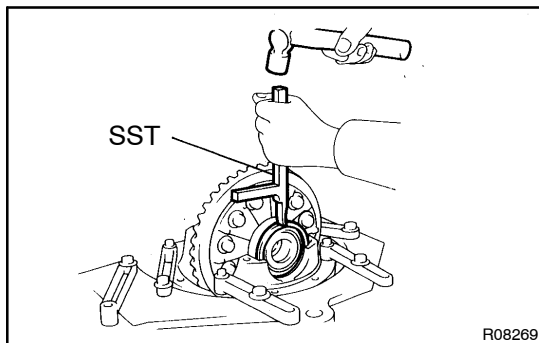
Ensure that there is ring gear backlash.

**13. w/ Differential lock:****ADJUST SIDE BEARING PRELOAD**

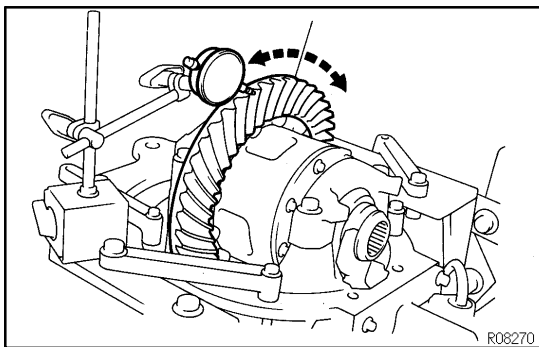
- (a) After adjustment with the backlash as reference, remove the ring gear side plate washer.
- (b) Using a micrometer, measure the thickness of the removed plate washer.
- (c) Install a new thicker washer of 0.06 – 0.09 mm (0.0024 – 0.0035 in.) than the washer removed.

HINT:

Select a washer which can be pressed in 2/3 of the way with finger.



- (d) Using SST, tap in the plate washer.
SST 09504-22010
- (e) Align the matchmarks on the cap and carrier.
- (f) Tighten the 4 bearing cap bolts to the specified torque.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



- (g) Using a dial indicator, adjust the ring gear backlash until it is within the specification.

Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

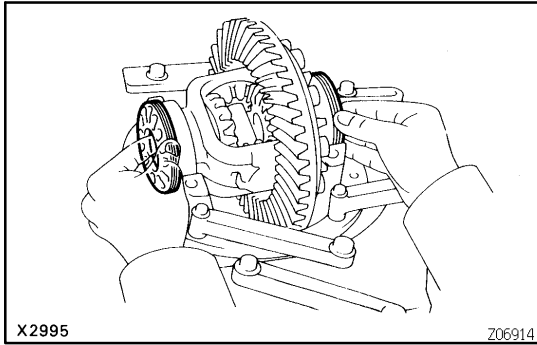
If it is not within the specification, follow the procedure listed below.

If backlash is greater than the specification:

Replace the cover side washer with a thicker washer. When doing so replace the ring gear side plate washer with one having a thickness equalling the amount the cover side plate washer thickness was decreased.

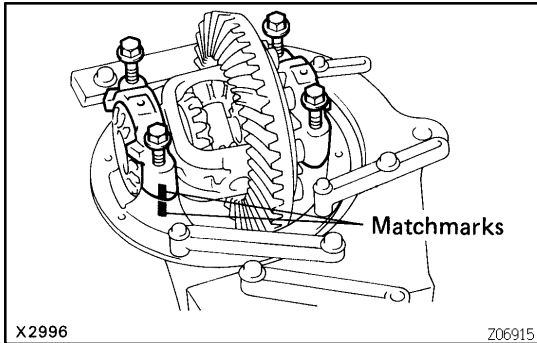
If backlash is less than specification:

Replace the cover side washer with a thicker washer. When doing so, replace the ring gear side plate washer with one having a thickness equalling the amount the cover side plate washer thickness was increased.



**14. w/o Differential lock:
INSTALL ADJUSTING NUTS**

Install the 2 adjusting nuts on the carrier, making sure the nuts are threaded properly.



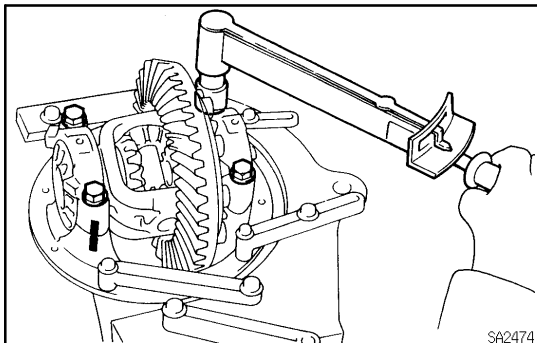
**15. w/o Differential lock:
INSTALL BEARING CAPS**

- (a) Align the matchmarks on the cap and carrier. Screw in the 2 bearing cap bolts 2 or 3 turns and press down the bearing cap by hand.

HINT:

If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not threaded properly.

- (b) Reinstall the adjusting nuts if necessary.



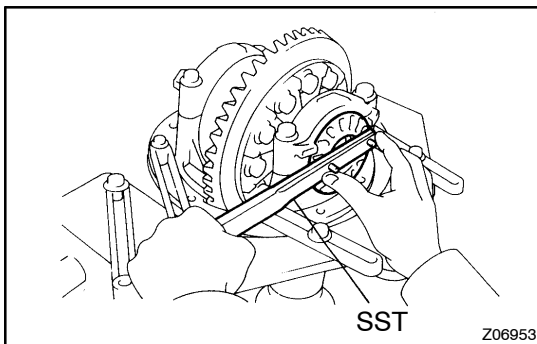
**16. w/o Differential lock:
ADJUST SIDE BEARING PRELOAD**

- (a) Torque the 4 bearing cap bolts to the specified torque, then loosen them to the point where the adjusting nuts can be turned by SST.

SST 09504-00011

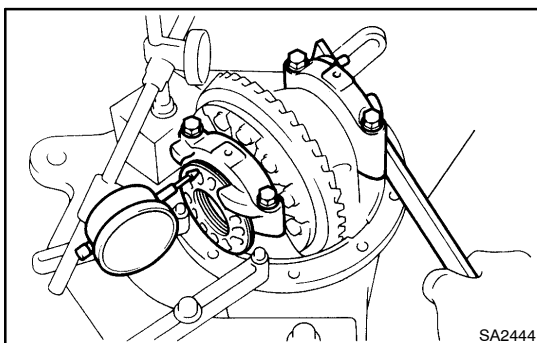
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

- (b) Fully tighten the 4 bearing cap bolts by hand.

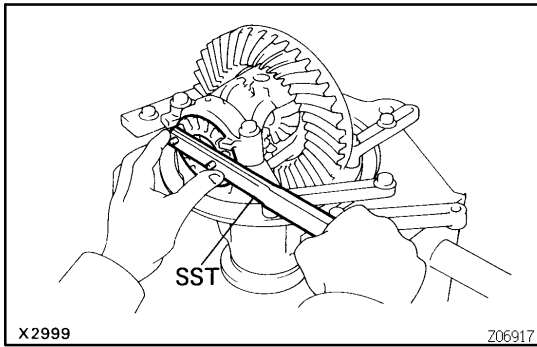


- (c) Using the SST, torque the adjusting nut on the ring gear side until the ring has a backlash of about 0.2 mm (0.008 in.).

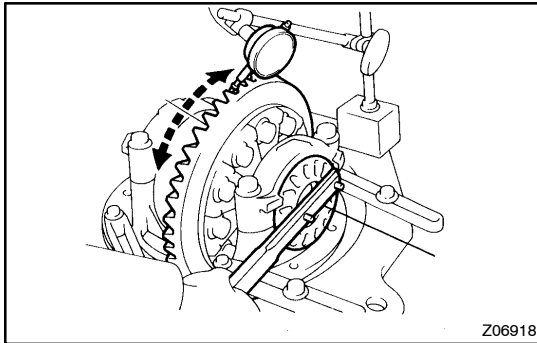
- (d) With turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinion side. After the bearings are settled, loosen the adjusting nut on the drive pinion side.



- (e) Place a dial indicator on the top of the adjusting nut on the ring gear side.
- (f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



- (g) Using the SST, torque the adjusting nut 1–1.5 notches from the zero preload position.

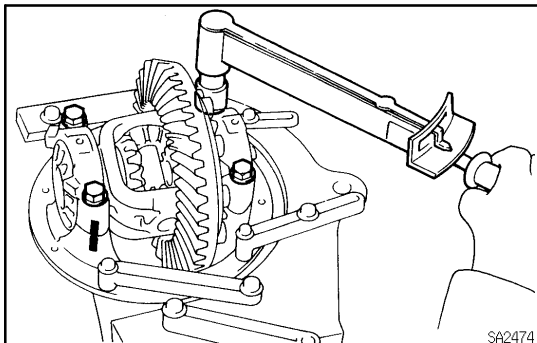


- (h) Using a dial indicator, adjust the ring gear backlash until it is within the specification.

Backlash: 0.15–0.20 mm (0.0059–0.0079 in.)

HINT:

The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut on the left side one notch and torque the nut on the right side one notch.



- (i) Torque the 4 bearing cap bolts.
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)
(j) Recheck the ring gear backlash.
Backlash: 0.15–0.20 mm (0.0059–0.0079 in.)

17. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the preload.

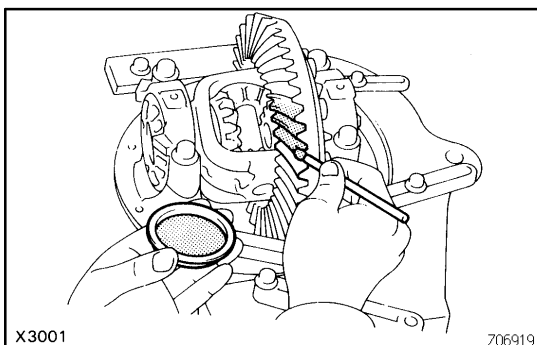
Total preload (at starting):

**Drive pinion preload plus
w/o Differential lock**

0.4–0.6 N·m (4–6 kgf·cm, 3.5–5.2 in.·lbf)

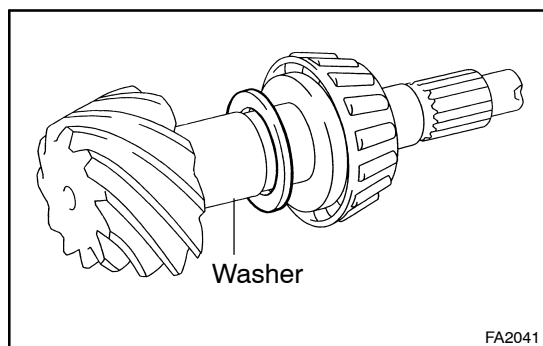
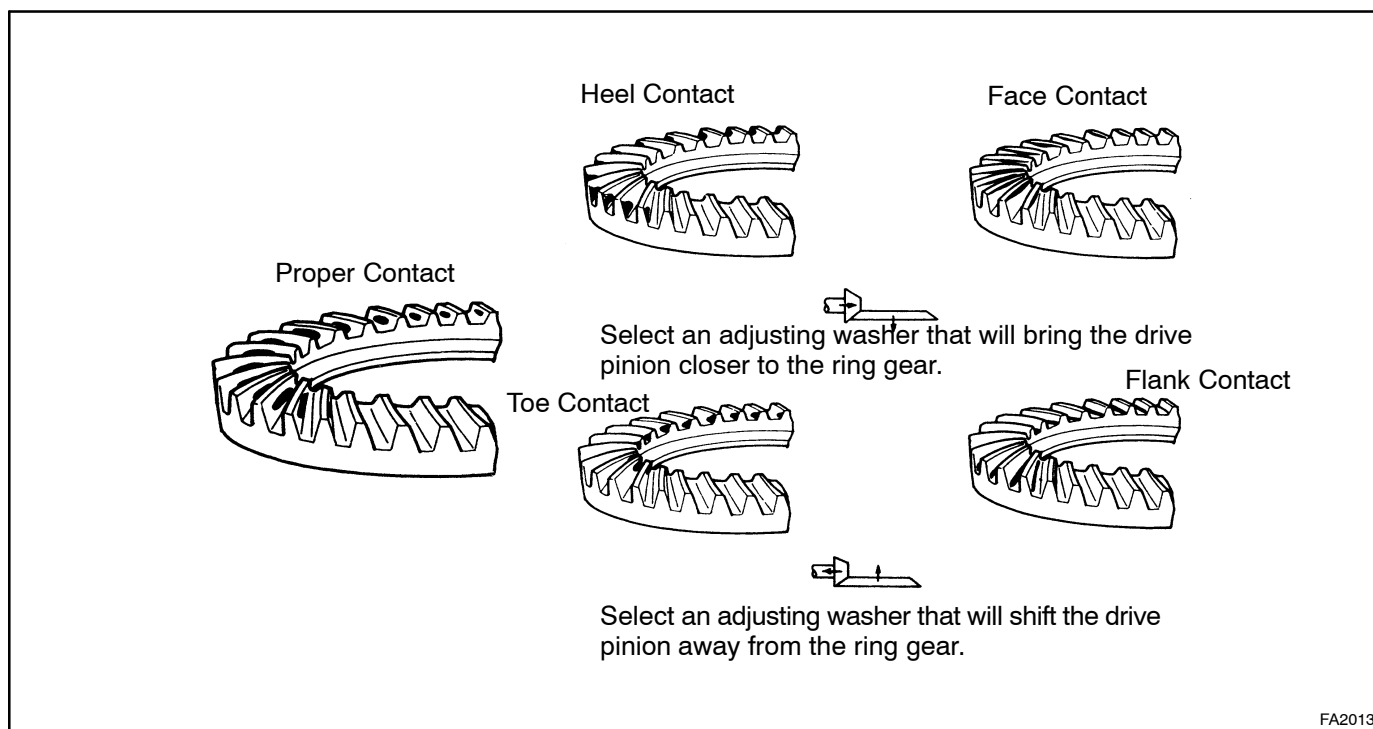
w/ Differential lock

0.3–0.7 N·m (3–7 kgf·cm, 2.6–6.1 in.·lbf)



18. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- (a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead.
(b) Turn the companion flange, pin both directions to inspect the ring gear for proper tooth contact.

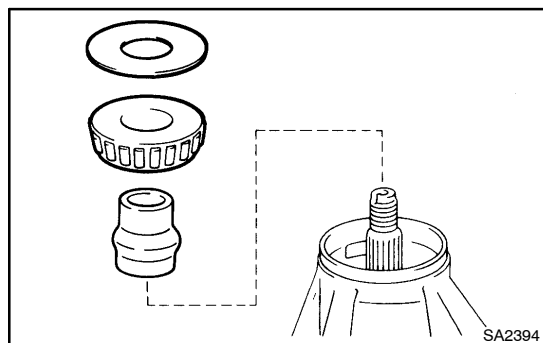


If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Thickness mm (in.)	Thickness mm (in.)
1.050 (0.0413)	1.325 (0.0522)
1.075 (0.0423)	1.350 (0.0531)
1.100 (0.0433)	1.375 (0.0541)
1.125 (0.0443)	1.400 (0.0551)
1.150 (0.0453)	1.425 (0.0561)
1.175 (0.0463)	1.450 (0.0571)
1.200 (0.0472)	1.475 (0.0581)
1.225 (0.0482)	1.500 (0.0591)
1.250 (0.0492)	1.525 (0.0600)
1.275 (0.0502)	1.550 (0.0610)
1.300 (0.0512)	–

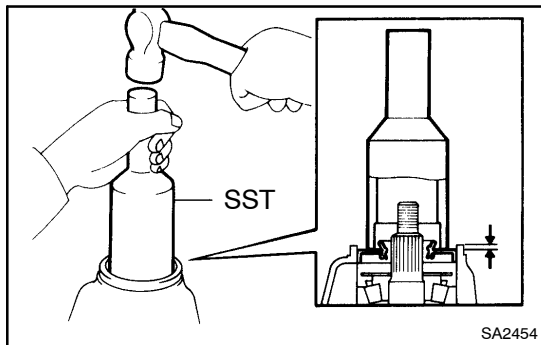
19. REMOVE COMPANION FLANGE (See page [SA-30](#))

20. REMOVE OIL SLINGER AND FRONT BEARING (See page [SA-30](#))

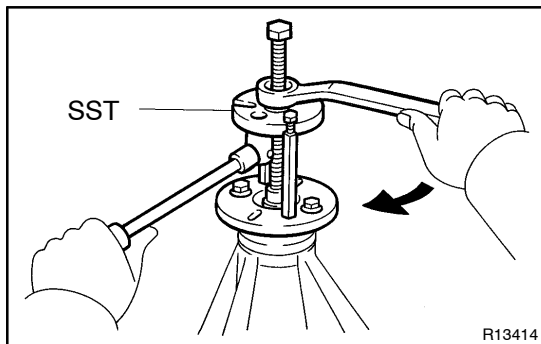


21. INSTALL BEARING SPACER AND FRONT BEARING

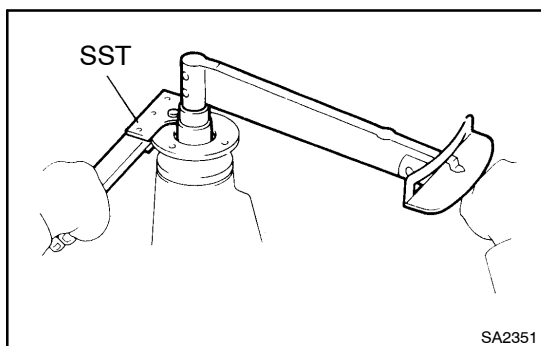
- Install a new bearing spacer on the shaft.
- Install the front bearing and oil slinger.

**22. INSTALL OIL SEAL**

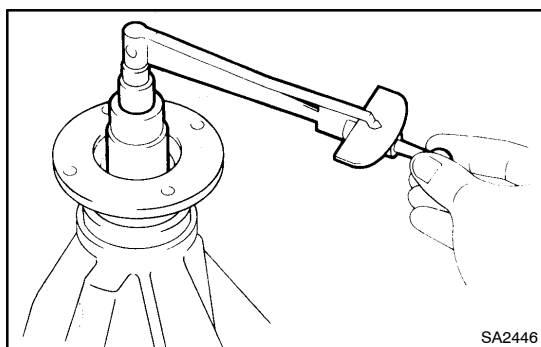
- (a) Using SST and a hammer, install a new oil seal, as shown.
SST 09214-76011
Oil seal drive in depth: 1.0 mm (0.039 in.)
- (b) Apply MP grease to the oil seal lip.

**23. INSTALL COMPANION FLANGE**

- (a) Install the companion flange with SST.
SST 09550-30010 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)
- (b) Install the plate washer and a new nut.
HINT:
Coat the threads of a new nut with gear oil.



- (c) Using SST to hold the flange, tighten the nut.
SST 09330-00021
Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)

**24. ADJUST DRIVE PINION PRELOAD**

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

Preload (at starting):**New bearing**

1.3–2.0 N·m (13–20 kgf·cm, 11.3–17.4 in·lbf)

Reused bearing

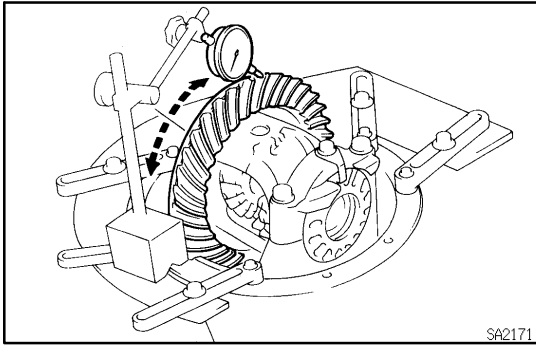
0.7–1.0 N·m (7–10 kgf·cm, 6.1–8.7 in·lbf)

If the preload is greater than the specification, replace the bearing spacer.

If the preload is less than the specification, retighten the nut a little at a time 13 N·m (130 kgf·cm, 9 ft·lbf) until the specified preload is reached.

Maximum torque: 441 N·m (4,500 kgf·cm, 326 ft·lbf)

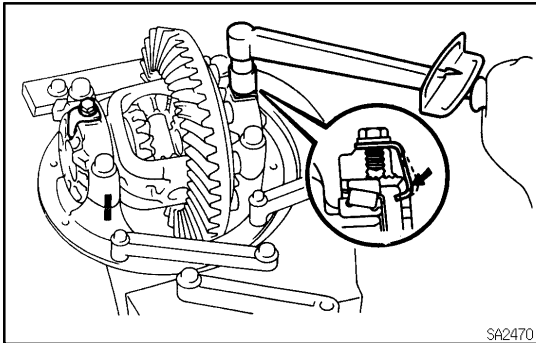
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the pinion nut to reduce the preload.

**25. RECHECK RING GEAR BACKLASH**

Using a dial indicator, measure the ring gear backlash.

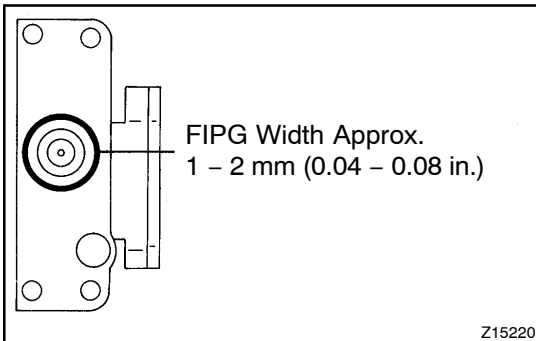
Ring gear backlash:

0.15–0.20 mm (0.0059–0.0079 in.)

26. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION**27. CHECK RUNOUT OF COMPANION FLANGE (See page SA-81)****28. w/o Differential lock:****INSTALL ADJUSTING NUT LOCKS**

- (a) Install 2 new nut locks on the bearing caps.
- (b) Tightening 2 bolts, bend the nut locks.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

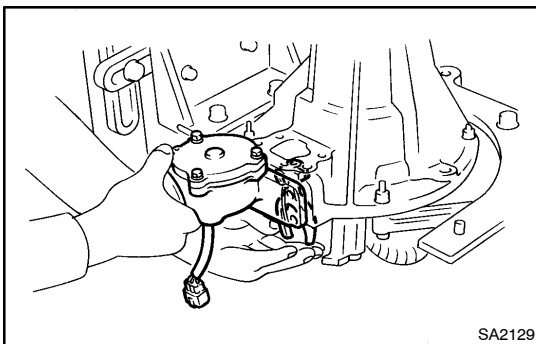
**29. w/ Differential lock:****INSTALL ACTUATOR, SHIFT FORK AND SLEEVE**

- (a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.
- (b) Apply FIPG to the actuator.

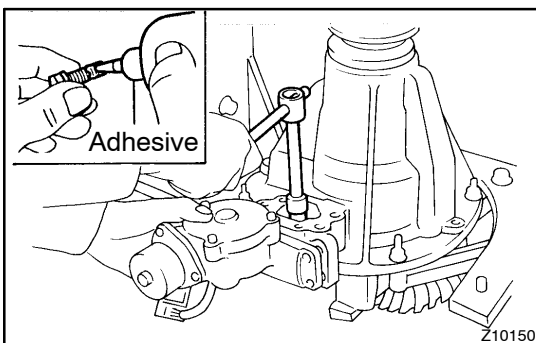
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT:

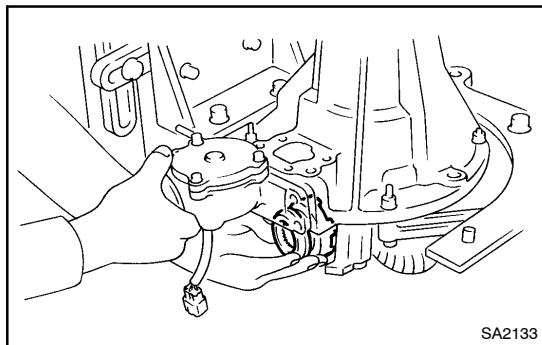
Install the actuator within 10 minutes after applying FIPG.



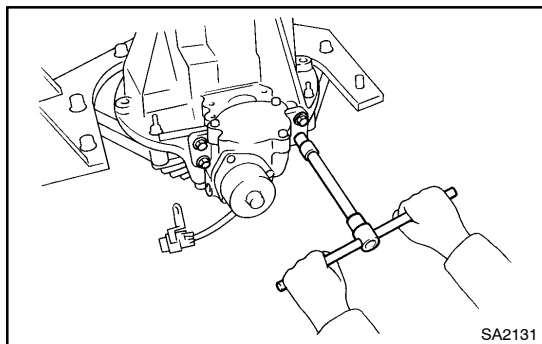
- (c) Install the actuator to the differential and match the shift fork hole.



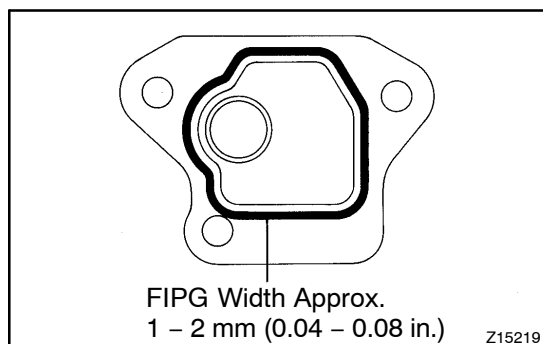
- (d) Clean the threads of set bolt and fork shaft with the white gasoline.
- (e) Coat the threads of the set bolt with adhesive.
Adhesive: Part No. 08833-00070, THREE BOND 1324 or equivalent
- (f) Tighten the shift fork shaft set bolt.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



- (g) Engage the sleeve with the dog clutch of the differential case.



- (h) Tighten the 4 bolts.
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)



**30. w/ Differential lock:
 INSTALL COVER**

- (a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.
 (b) Apply FIPG to the cover.
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT:

Install the cover within 10 minutes after applying FIPG.

- (c) Tighten the 3 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

**31. w/ Differential lock:
 INSTALL INDICATOR SWITCH**

Install the indicator switch with a new gasket.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)