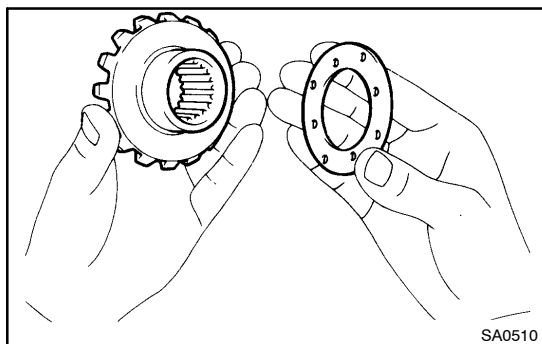




SA0510

REASSEMBLY

1. w/o Differential lock:

ASSEMBLE DIFFERENTIAL CASE

- (a) Apply all of the sliding and rotating surfaces with gear oil.
- (b) 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.

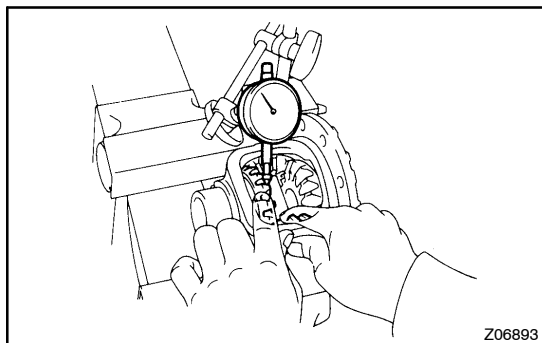
Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.063)	1.75 (0.069)
1.65 (0.065)	1.80 (0.071)
1.70 (0.067)	–

- (c) Install the 2 side gears with the side gears thrust washers, 4 pinion gears, pinion gear thrust washers and pinion shaft.

HINT:

Align the hole for the pinion shaft with the case hole.

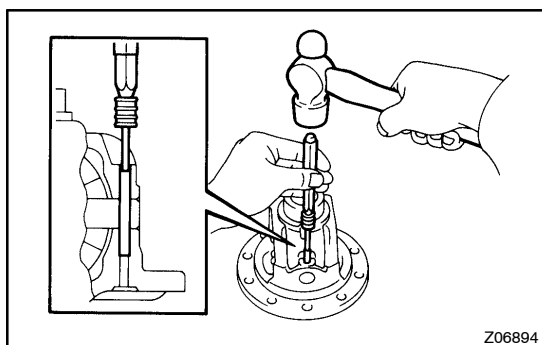


Z06893

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

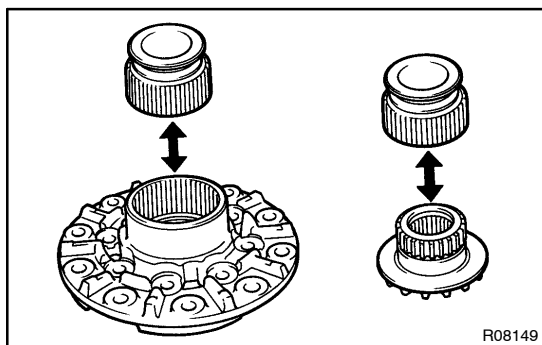
Backlash: 0.05–0.20 mm (0.0020–0.0079 in.)

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



Z06894

- (e) Using a pin punch and hammer, install the straight pin through the holes in the differential case and pinion shaft.
- (f) Using a chisel and hammer, stake the out side of the differential case pin hole.

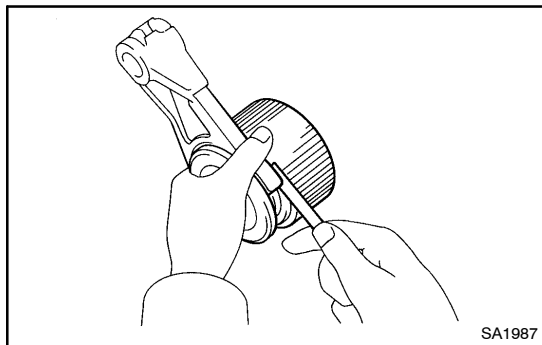


R08149

2. w/ Differential lock:

INSPECT SLEEVE

- (a) Install the sleeve to the differential case (LH) and check it moves smoothly.
- (b) Install the sleeve to the side gear check it moves smoothly.

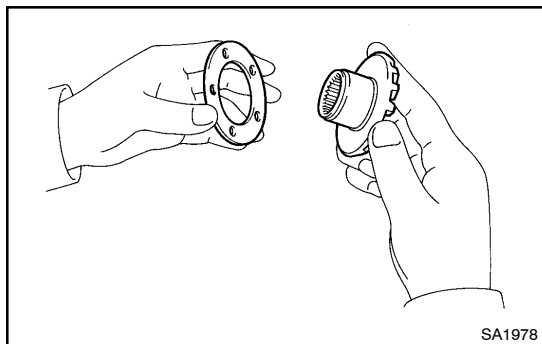


**3. w/ Differential lock:
MEASURE CLEARANCE OF SHIFT FORK AND SLEEVE**

Using a feeler gauge, measure the clearance between the shift fork and sleeve.

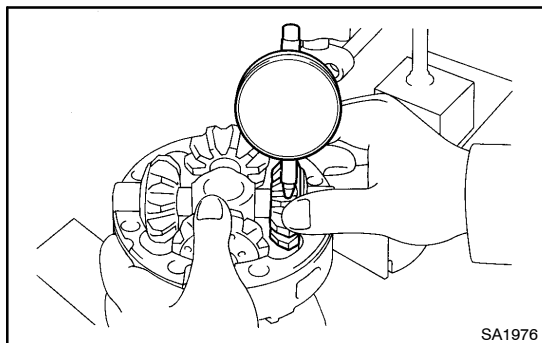
Clearance:

0.15 – 0.35 mm (0.006 – 0.014 in.)



**4. w/ Differential lock:
ASSEMBLE DIFFERENTIAL CASE**

- (a) Apply all of the sliding and rotating surfaces with gear oil.
- (b) Install the side gear thrust washer to the side gear.
- (c) Install the side gear to the RH case.
- (d) Install the 4 pinion gears and pinion gear thrust washers to the spider.
- (e) Install the pinion gear with the spider to the RH case.



- (f) Using a dial indicator, holding the side gear and spider and measure the side gear backlash.

Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

HINT:

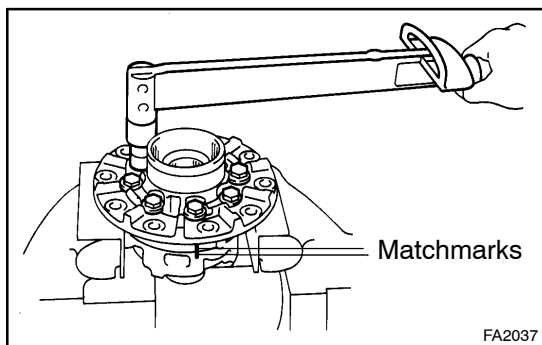
- Measure at all 4 locations.
- Measure the backlash at the RH case and at the LH case.

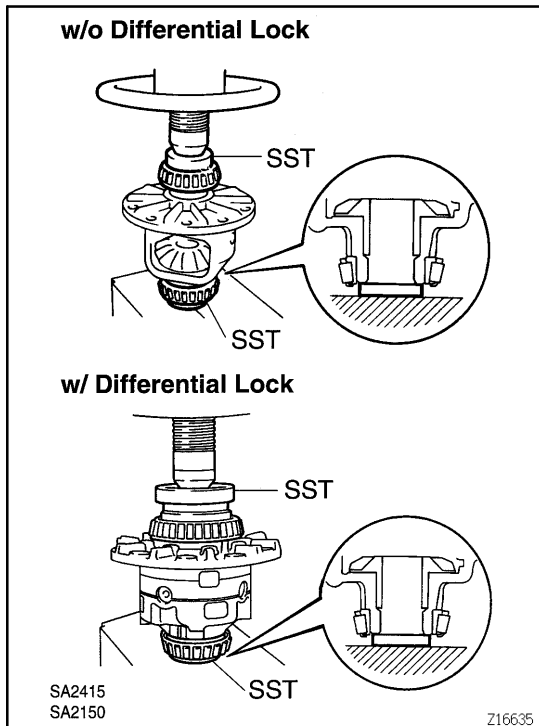
If the backlash is not within the specification, install a thrust washer of a different thickness.

Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
0.9 (0.035)	1.2 (0.047)
1.0 (0.039)	1.3 (0.051)
1.1 (0.043)	–

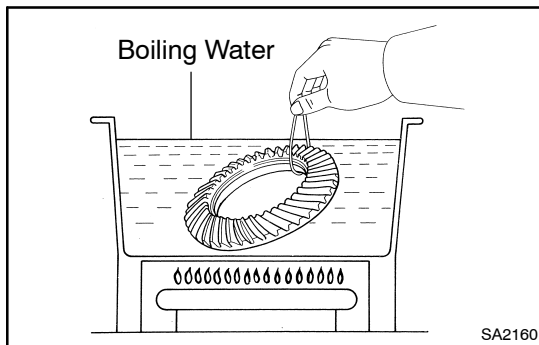
- (g) Install the side gear and side gear thrust washer to the RH case.
- (h) Install the pinion gears and spider to the RH case.
- (i) Install the side gear and side gear thrust washer to the RH case.
- (j) Align the matchmarks on the LH and RH cases.
- (k) Torque the 8 bolts uniformly, a little at a time.
Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)





5. INSTALL SIDE BEARINGS

- (a) w/o Differential lock:
Using SST and a press, install the 2 side bearings on the differential case.
SST 09950-60010 (09951-00480)
- (b) w/ Differential lock:
Using SST and a press, install the 2 side bearings on the differential case.
SST 09223-15020, 09950-60010 (09951-00480)



6. INSTALL RING GEAR ON DIFFERENTIAL CASE

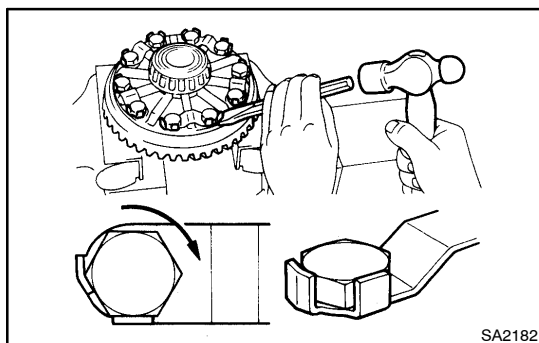
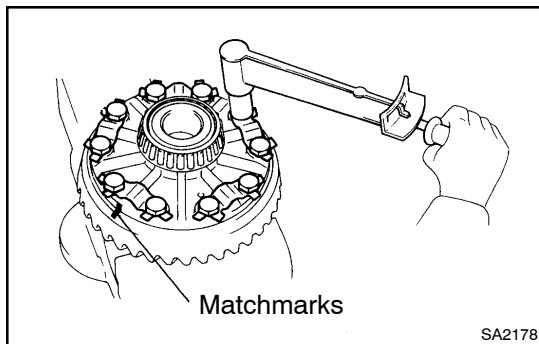
- (a) Clean the contact surfaces of the differential case and ring gear.
- (b) Heat the ring gear to about 100 °C (212 °F) in boiling water.
- (c) Carefully remove the ring gear from the water.
- (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.
- (e) Align the matchmarks on the ring gear and differential case.
- (f) Temporarily install new 5 lock plates and 10 set bolts.

NOTICE:

The ring gear set bolts 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.

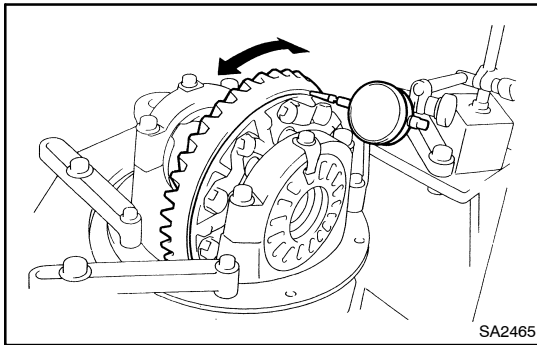
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)



- (h) Using a drift punch and hammer, stake the lock plates.

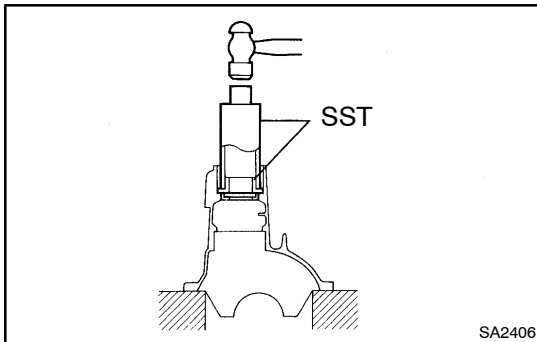
HINT:

Stake one claw flush with the flat surface of the bolt. For the claw contacting the protruding portion of the bolt, stake only the half on the tightening side.



7. CHECK RING GEAR RUNOUT

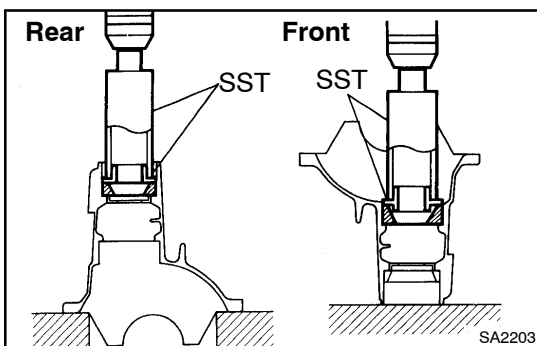
- Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearings.
- Using a dial indicator, check the ring gear runout.
Maximum runout: 0.10 mm (0.0039 in.)
- Remove the differential case.



8. INSTALL OIL STORAGE RING

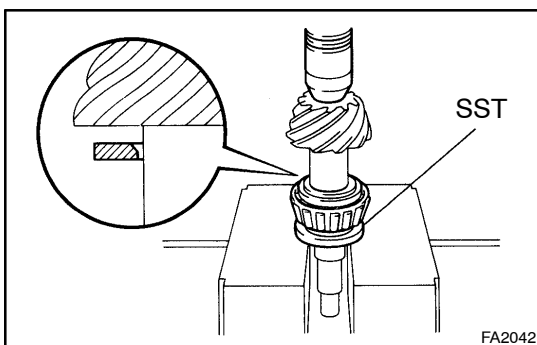
Using SST and a hammer, install a new oil storage ring.

SST 09316-60011 (09316-00011, 09316-00021)



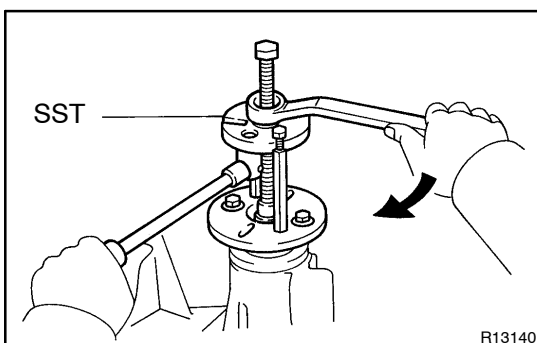
9. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

- Front side:
Using SST and a press, install the 2 outer races.
SST 09316-60011 (09316-00011, 09316-00051)
- Rear side:
Using SST and a press, install the 2 outer races.
SST 09316-60011 (09316-00011, 09316-00021)



10. INSTALL DRIVE PINION FRONT BEARING

- Install the plate washer on the drive pinion with the chamfered end facing the pinion gear.
- Using SST and a press, install the front bearing onto the drive pinion.
SST 09506-30012



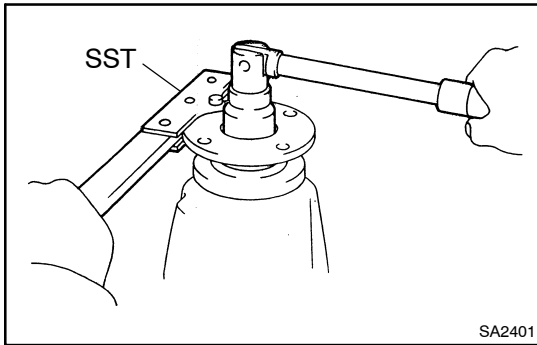
11. TEMPORARILY ADJUST DRIVE PINION PRELOAD

- Install the drive pinion, rear bearing and oil slinger.

HINT:

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

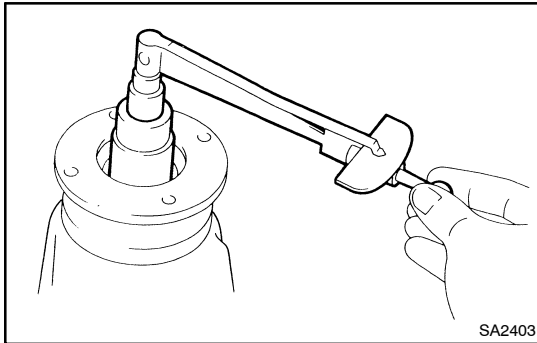
- Install the companion flange with SST.
SST 09550-30010 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



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

NOTICE:

As there is no spacer, tighten a little at a time, being careful not to overtighten.



- (e) Using a torque wrench, measure the preload.
Preload (at starting):
New bearing
0.9–1.6 N·m (10–16 kgf·cm, 8.7–13.9 in.·lbf)
Reused bearing
0.5–0.8 N·m (5–8 kgf·cm, 4.3–6.9 in.·lbf)

HINT:

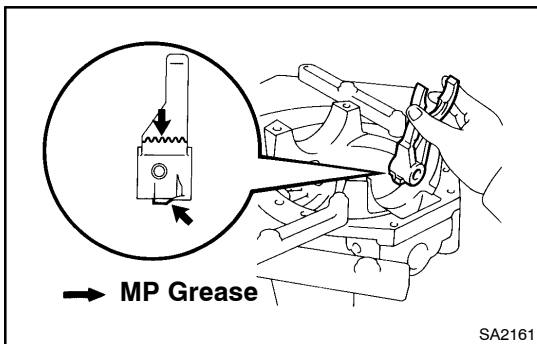
Measure the total preload after first turning the bearing clockwise and counterclockwise several times to mark the bearing smooth.

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

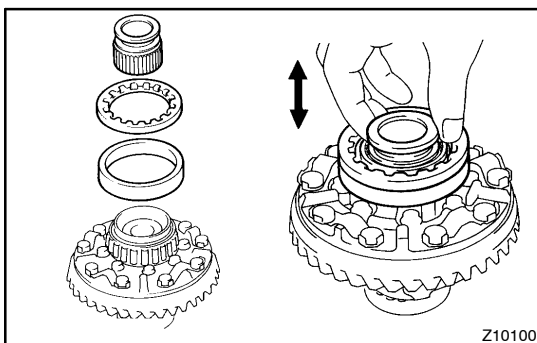
- (a) Place the bearing outer races on their respective bearings. Make sure the left and right outer races are not interchanged.
- (b) Install the case in the carrier.

HINT:

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

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

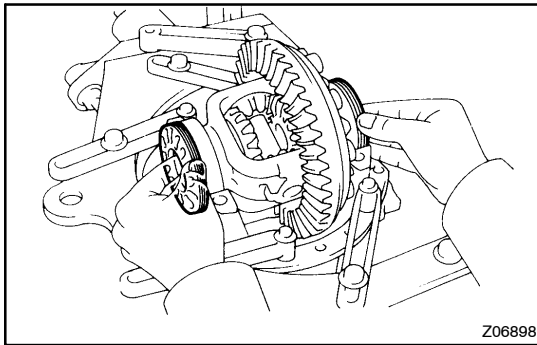
- (a) Apply MP grease on the rack of the shift fork and connecting part of the indicator switch.
- (b) Insert the shift fork into the differential carrier, as shown.



- (c) Install outer races, adjusting nuts and left side to sleeve.
HINT:
Check that the sleeve moves smoothly.
- (d) Install the shift fork in the groove of the sleeve holding it by hand and install the case in the carrier.

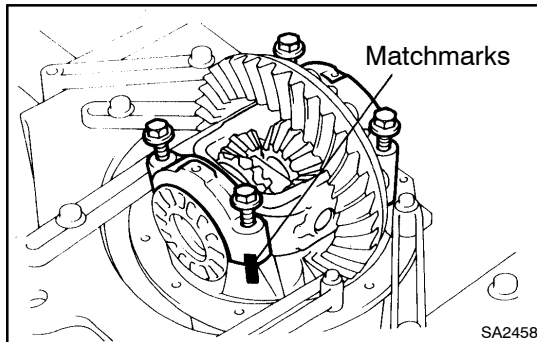
HINT:

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



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

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



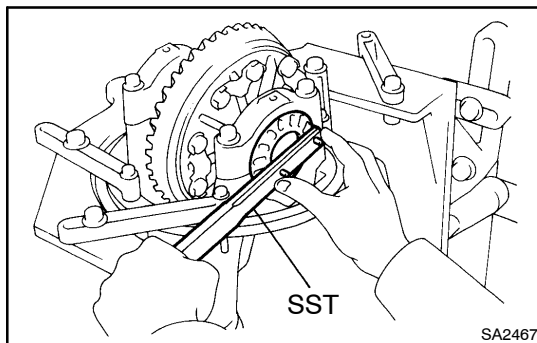
15. INSTALL BEARING CAPS

- (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.



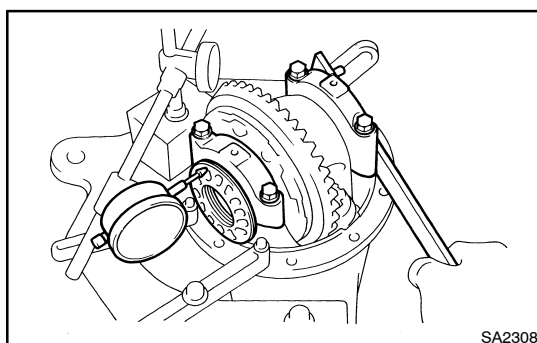
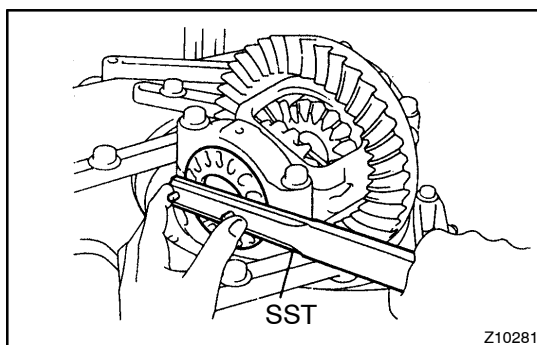
16. ADJUST SIDE BEARING PRELOAD

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

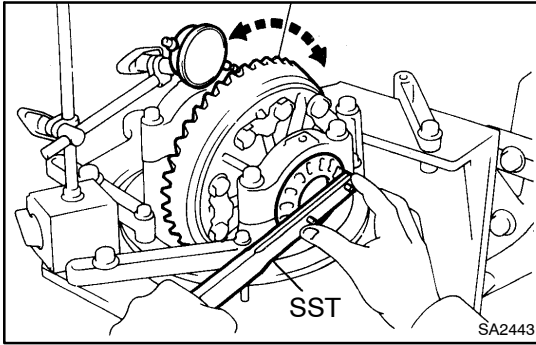
SST 09504-00011

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) 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.

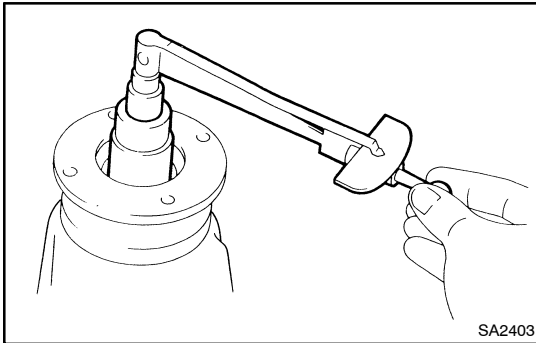
Backlash: 0.13–0.18 mm (0.0051–0.0071 in.)

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.

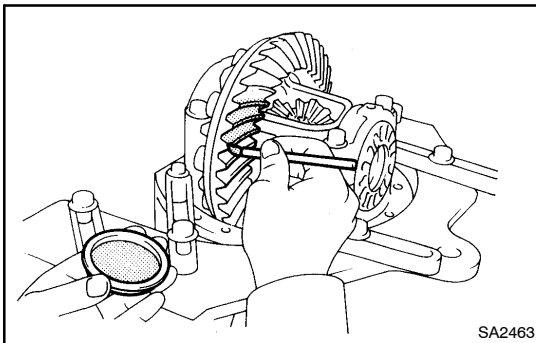
Backlash: 0.13–0.18 mm (0.0051–0.0071 in.)

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

Total preload (at starting):

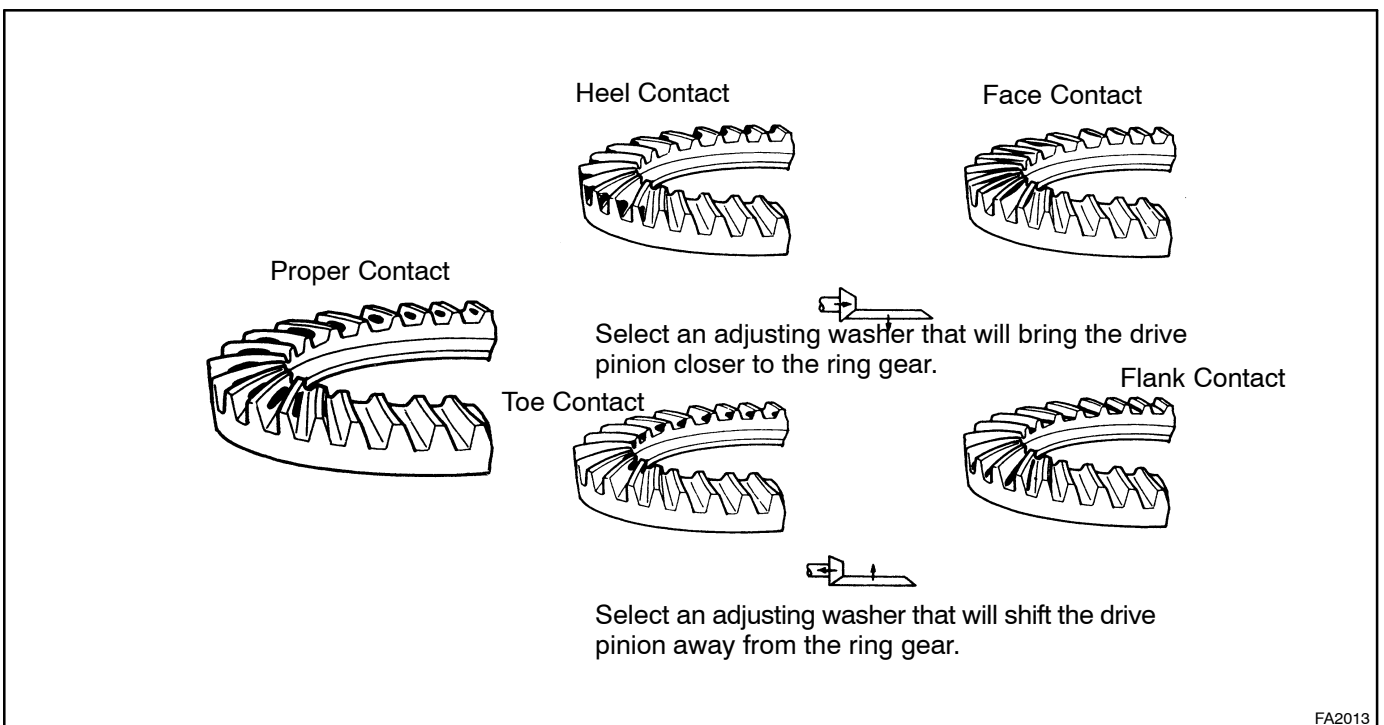
Drive pinion preload plus

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

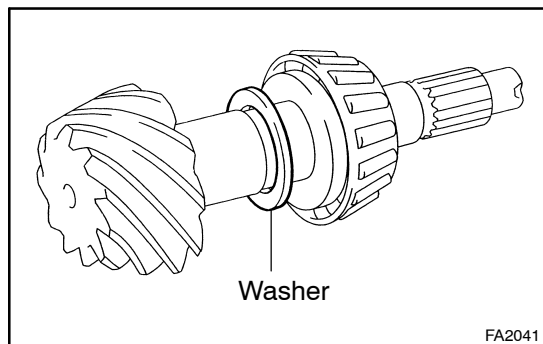


17. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- (a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead.
- (b) Hold the companion flange firmly and rotate the ring gear in both directions.
- (c) Inspect the tooth pattern.



FA2013



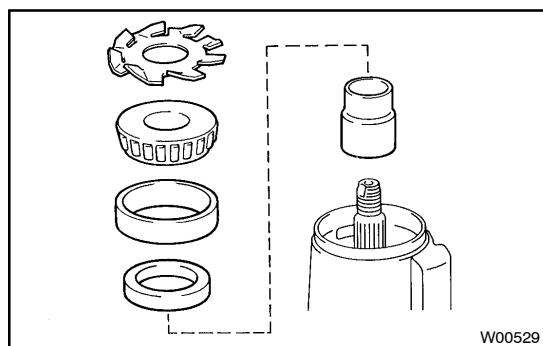
If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.03 (0.0799)
1.73 (0.0681)	2.06 (0.0811)
1.76 (0.0693)	2.09 (0.0823)
1.79 (0.0705)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0846)
1.85 (0.0728)	2.18 (0.0858)
1.88 (0.0740)	2.21 (0.0870)
1.91 (0.0752)	2.24 (0.0882)
1.94 (0.0764)	2.27 (0.0894)
1.97 (0.0776)	2.30 (0.0906)
2.00 (0.0787)	2.33 (0.0917)

18. REMOVE COMPANION FLANGE

(See page SA-30)

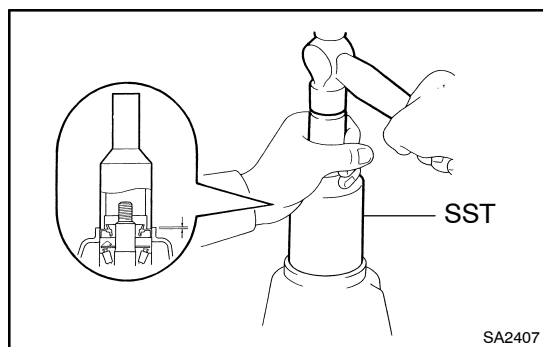


19. REMOVE OIL SLINGER AND REAR BEARING

20. REMOVE REAR BEARING OUTER RACE AND OIL STORAGE RING (See page SA-30)

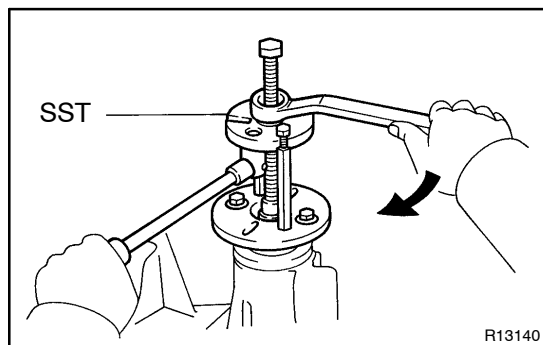
21. INSTALL BEARING SPACER AND REAR BEARING

- Install a new bearing spacer on the shaft.
- Install a new oil storage ring and rear bearing outer race (See page SA-30).
- Install the rear bearing and oil slinger.



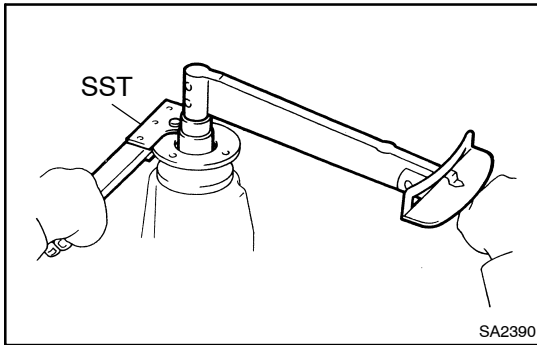
22. INSTALL OIL SEAL

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



23. INSTALL COMPANION FLANGE

- 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.

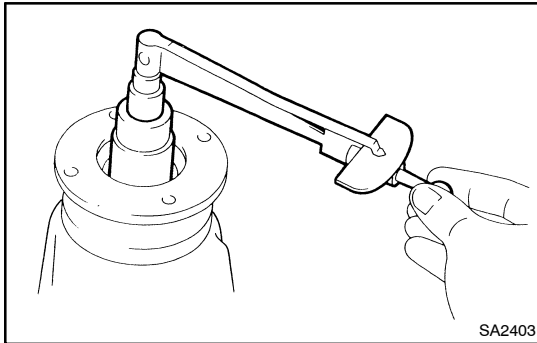
HINT:

Coat the threads of a new nut with gear oil.

(c) Using SST to hold the flange, tighten the nut.

SST 09330-00021

Torque: 196 N·m (2,000 kgf·cm, 145 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:

0.9–1.6 N·m (10–16 kgf·cm, 8.7–13.9 in.·lbf)

Reused bearing:

0.5–0.8 N·m (5–8 kgf·cm, 4.3–6.9 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 with a torque of 13 N·m (130 kgf·cm, 9 ft·lbf) until the specified preload is reached.

Maximum torque: 343 N·m (3,500 kgf·cm, 253 ft·lbf)

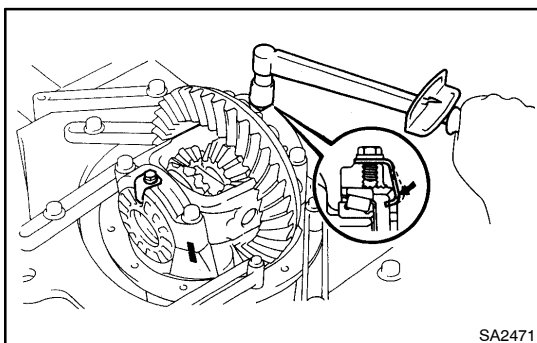
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the pinion nut to reduce the preload.

25. RECHECK RING GEAR BACKLASH

26. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

27. CHECK RUNOUT OF COMPANION FLANGE

28. STAKE DRIVE PINION NUT

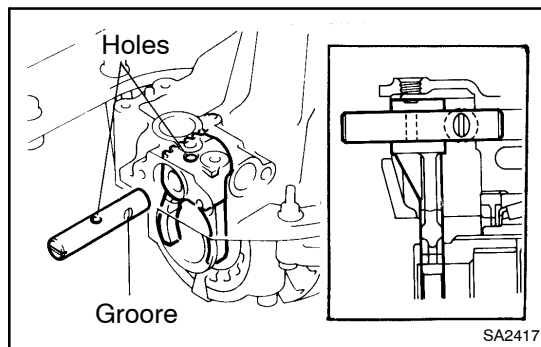


29. INSTALL ADJUSTING NUT LOCKS

(a) Install 2 new nut locks on the bearing caps.

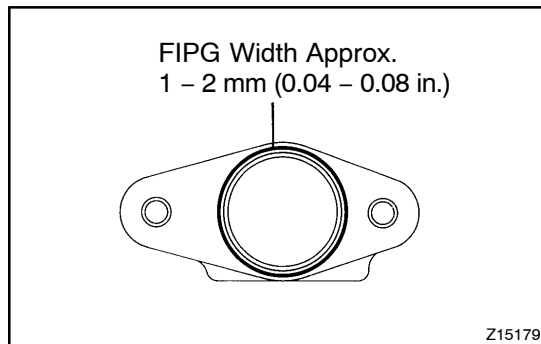
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(b) After tightening bolts, bend the nut locks.



**30. w/ Differential lock:
INSTALL SHIFT FORK SHAFT**

- (a) Apply MP grease onto the outer circuit of the fork shaft.
- (b) Install the fork shaft to match the hole of the shift fork and that of the shift fork shaft.



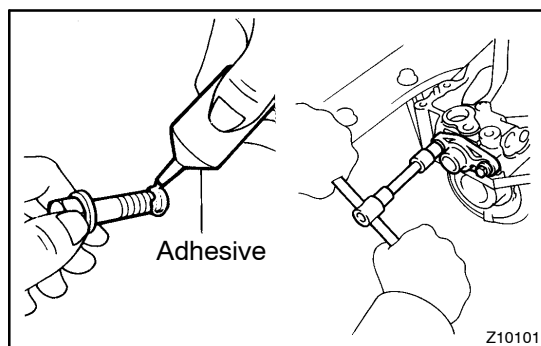
- (c) Remove any FIPG material and be careful not to drop oil on the contacting surface of the differential carrier and shaft retainer.
- (d) Apply FIPG to the carrier, as shown.

FIPG:

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

HINT:

Install the shaft retainer within 10 minutes after applying FIPG.

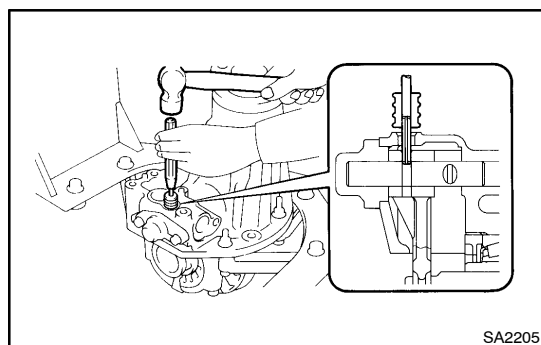


- (e) Clean the threads of the bolts and retainer bolts holes with toluene or trichlorethylene.
- (f) Apply adhesive to 2 or 3 threads of the mount bolt end.

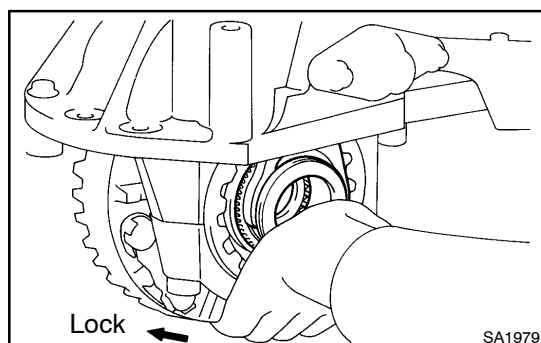
Adhesive:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

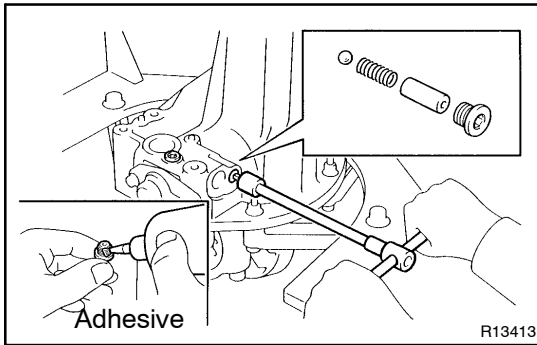
- (g) Tighten the shaft retainer with the 2 bolts.
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)



- (h) Using a pin punch and hammer, install the slotted spring pin to the shift fork.



- (i) Shift the fork deeply and keep the differential lock condition.



- (j) Install the ball, compression spring and spring seat.
- (k) Clean the threads of 2 plugs and plug holes with toluene or trichloroethylene.
- (l) Apply adhesive to the plug threads.

Adhesive:

**Part No. 08833-00080, THREE BOND 1344,
LOCTITE 242 or equivalent**

- (m) Using a hexagon wrench, install and tighten the screw plugs.

Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)

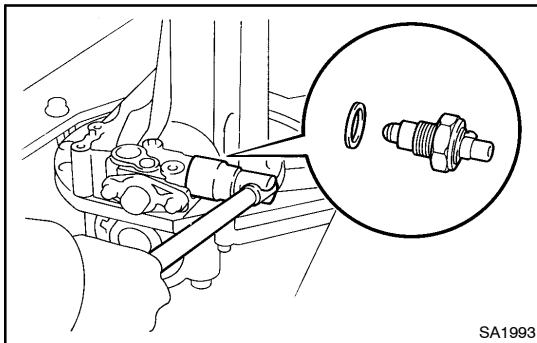
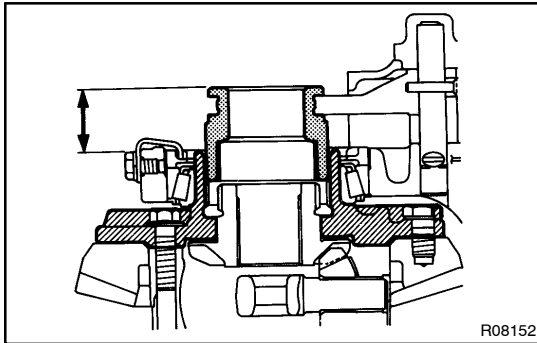
31. w/ Differential lock:**MEASURE DISTANCE BETWEEN SLEEVE AND DIFFERENTIAL CASE END SIDE**

Measure distance between the sleeve and tip of the differential case when differential is free and locked.

Standard distance:

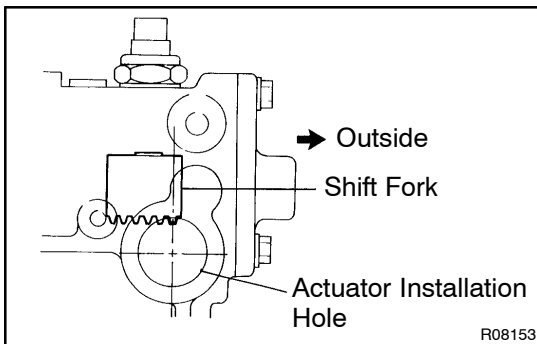
LOCK: 17.44 – 18.86 mm (0.6866 – 0.7425 in.)

FREE: 32.40 – 33.90 mm (1.2756 – 1.3346 in.)

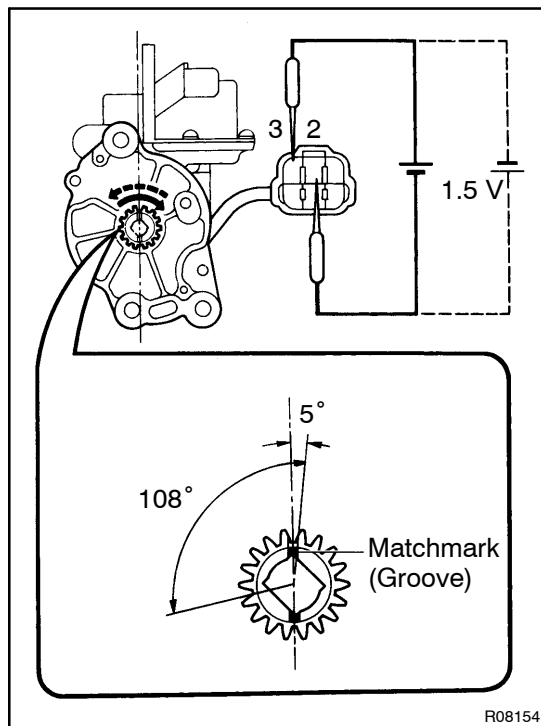
**32. w/ differential lock:****INSTALL INDICATOR SWITCH**

Install the indicator switch with a new gasket.

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

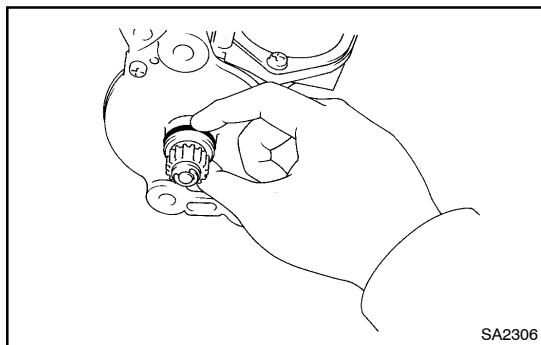
**33. w/ Differential lock:****INSTALL ACTUATOR**

- (a) Check that the outermost rack tooth of the shift fork is virtually above the center line of the actuator installation hole.

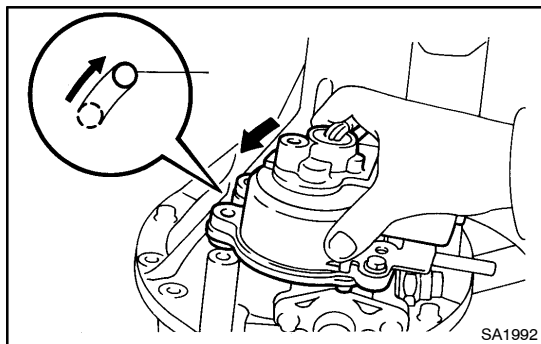


- (b) Ensure that the matchmarks of the pinion of the actuator is in the extent between zero and 5 degrees clockwise above the center line of the actuator.

If the matchmarks is not in this extent, rotate the pinion to be matched. Do not supply the battery positive voltage directly between terminals. If the matchmarks come to the extension limit of the rotation, do not electrify moreover.



- (c) Install a new O-ring to the actuator.
 (d) Apply a light coat of gear oil on the O-ring.
 (e) Apply MP grease to the gear part.

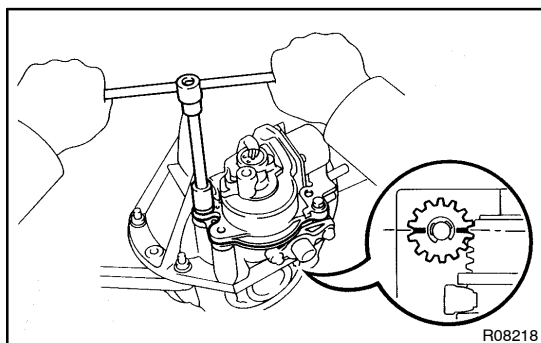


- (f) Insert the actuator so that the long hole on the actuator side fits with the knock pin on the carrier side.

HINT:

Do not damage the O-ring of the actuator.

- (g) Align the actuator with the long hole and rotate the actuator counterclockwise when the knock pin reaches the right-hand side.



- (h) Install the actuator to the differential carrier with the bolt so that the outermost rack tooth of the shift fork will fit the matchmarks of the pinion of the actuator.

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)