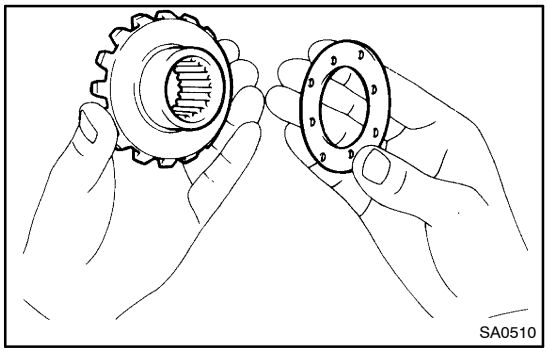
SA1C1–01

REASSEMBLY

HINT:

- Using a shop rag, clean off any foreign object from the parts.
- Apply all of the sliding and rotating surfaces with hypoid gear oil.


SA0510

1. w/o DIFF. LOCK:

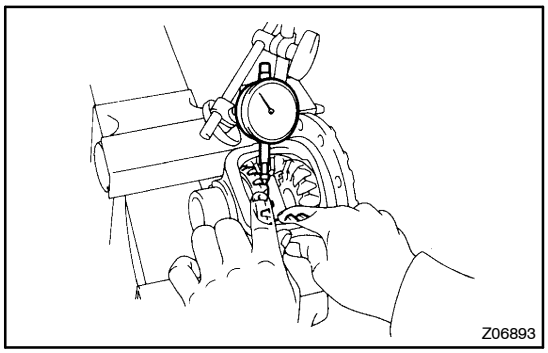
MEASURE SIDE GEAR BACKLASH AND ASSEMBLE DIFFERENTIAL CASE

(a) Install the 2 thrust washers to the side gears.

(b) Install the 2 side gears, pinion gears, pinion gear thrust washers and pinion shaft in the differential case.

HINT:

Align the hole of the differential case and pinion shaft.


Z06893

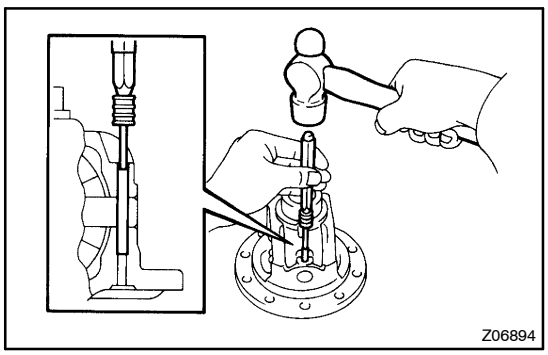
(c) Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.

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

If the backlash is not within the specification, install side gear thrust washers with different thickness.

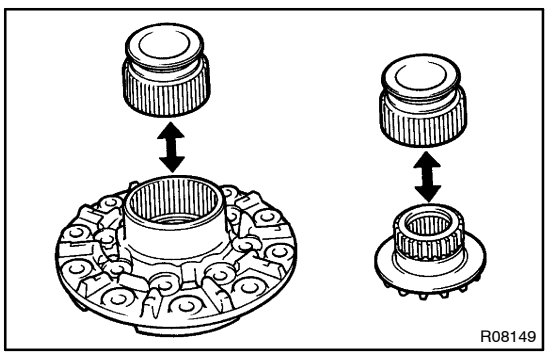
Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.0630)	1.80 (0.0709)
1.70 (0.0669)	–


Z06894

(d) Using a pin punch and hammer, install the straight pin through the holes in the differential case and hole of the pinion shaft.

(e) Using a chisel and hammer, stake the outside of the differential case pin hole.

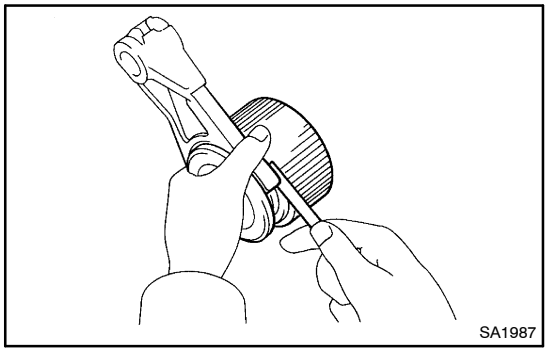

R08149

2. w/ DIFF. LOCK:

INSPECT SLEEVE

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

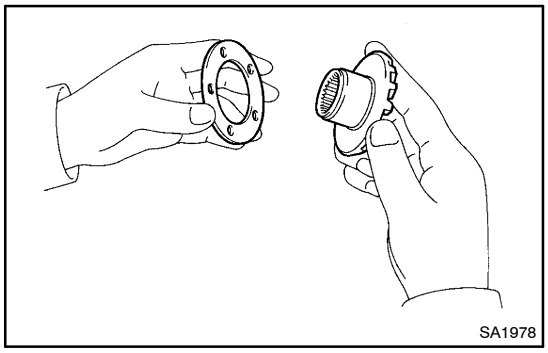
(b) Install the sleeve to the side gear check it moves smoothly.



3. w/ DIFF. LOCK:
MEASURE CLEARANCE OF SHIFT FORK AND SLEEVE

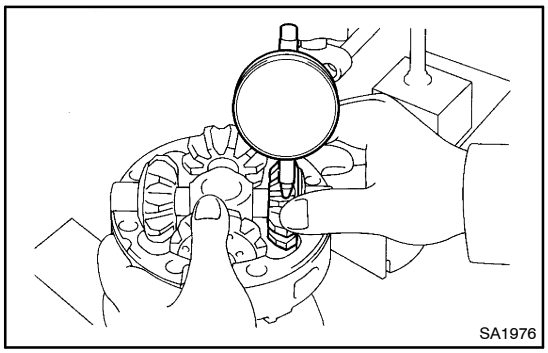
Using a feeler gauge, measure the clearance between the shift fork and sleeve.

Clearance: 0. 15 – 0.35 mm (0.006 – 0.014 in.)



4. w/ DIFF. LOCK:
MEASURE SIDE GEAR BACKLASH AND ASSEMBLE DIFFERENTIAL CASE

(a) Install the side gear thrust washer to the side gear.
(b) Install the side gear to the RH case.
(c) Install the 4 pinion gears and pinion gear thrust washers to the spider.
(d) Install the pinion gear with the spider to the RH case.



(e) Using a dial indicator, holding the side gear and spider, measure the side gear backlash,

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

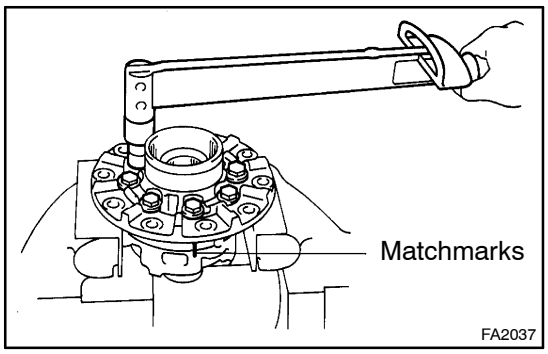
HINT:
- Measure at all 4 locations.
- Measure the backlash at the RH case and at the LH case.

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

Thrust washer thickness

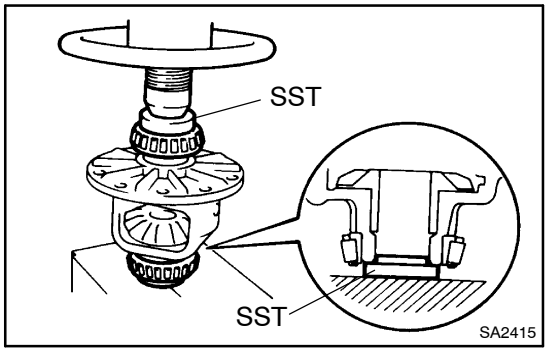
Thickness mm (in.)	Thickness mm (in.)
0.9 (0.035)	1.2 (0.047)
1.0 (0.039)	1.3 (0.051)
1.1 (0.043)	–

(f) Install the side gear and side gear thrust washer to the RH case.
(g) Install the pinion gears and spider to the RH case.
(h) Install the side gear and side gear thrust washer to the RH case.



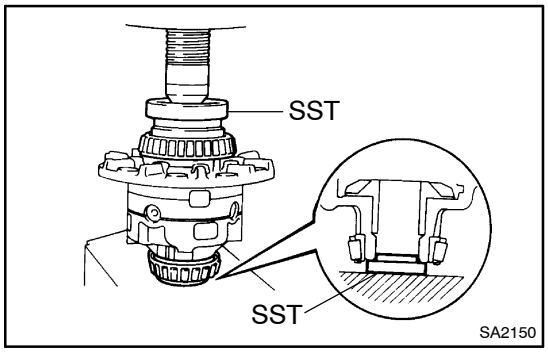
(i) Align the matchmarks on the LH and RH cases.
(j) Torque the 8 bolts uniformly a little at a time.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)



5. INSTALL SIDE BEARINGS

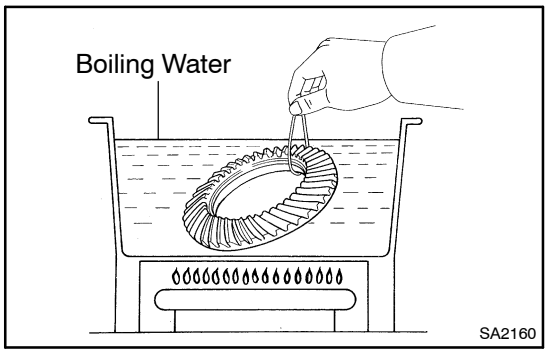
(a) w/o Diff. lock:
Using SST and a press, install the 2 side bearings to the differential case.
SST 09950 –60010 (09951 –00480)



(b) w/ Diff. lock:
Using SST and a press, install the 2 side bearings to the differential case.
SST 09223 –15020, 09950 –60010 (09951 –00480)

6. INSTALL RING GEAR ON DIFFERENTIAL CASE

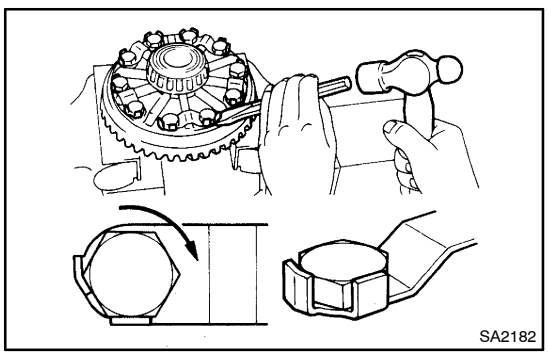
(a) Clean the contact surfaces of the differential case and ring gear.



(b) Heat the ring gear to about 100 °C (212 °F) in boiling water.
(c) Carefully take the ring gear out of the boiling water.
(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

HINT:
Align the matchmarks on the ring gear and differential case.

(e) Temporarily install 5 new lock plates and 10 bolts so that the bolt holes in the ring gear and differential case are not misaligned.
(f) After the ring gear has cooled sufficiently, torque the 10 bolts.
Torque: 97 N·m (985 kgf·cm, 7 1 ft·lbf)



(g) Using a drift punch hammer, stake the 5 lock plates.

HINT:
Stake the claws of the lock plates to fix the bolts.
For the claw contacting the protruding portion of the bolt, stake only the half of it along the tightening direction.

7. CHECK RING GEAR RUNOUT

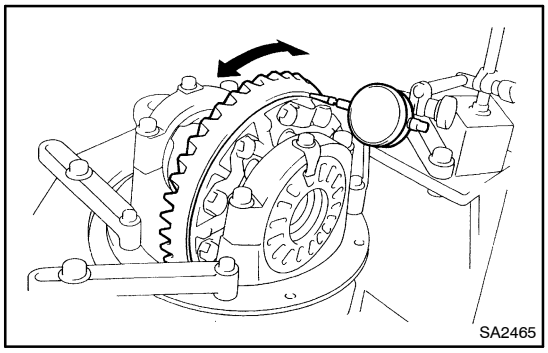
(a) Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.

(b) Install the differential case in the differential carrier.

(c) When there is no play left in the side bearings.

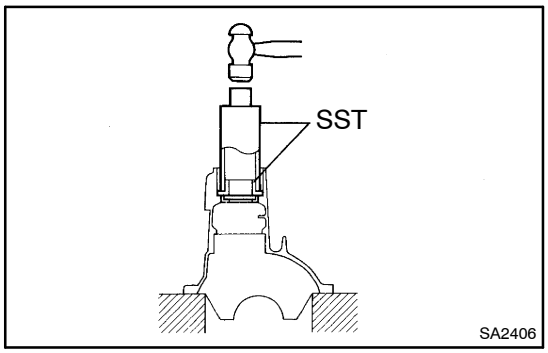
(d) Align matchmarks on the bearing cap and differential carrier.

(e) Install and uniformly tighten the 4 bearing cap bolts in several passes.



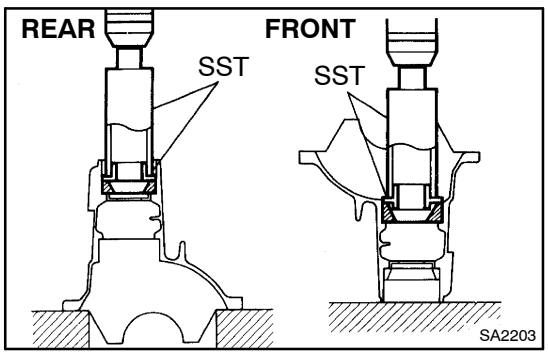
(f) Using a dial indicator, check the ring gear runout.
Maximum runout: 0. 10 mm (0.0039 in.)

(g) 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

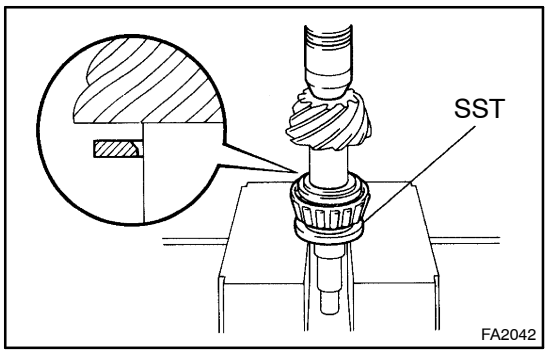
(a) Using SST and a press, install the front bearing outer race.
SST 09316 –60011 (09316 –00011, 09316 –00051)

(b) Using SST and a press, install the rear bearing outer race.
SST 09316 –60011 (09316 –00011, 09316 –00021)

10. INSTALL DRIVE PINION FRONT BEARING

(a) Install the plate washer on the drive pinion with the chamfered end facing the pinion gear.

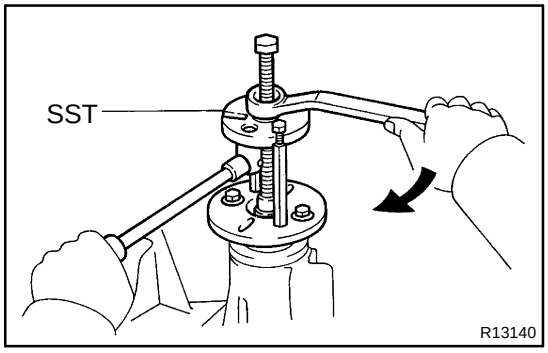
(b) Using SST and a press, install the front bearing onto the drive pinion.
SST 09506 –30012



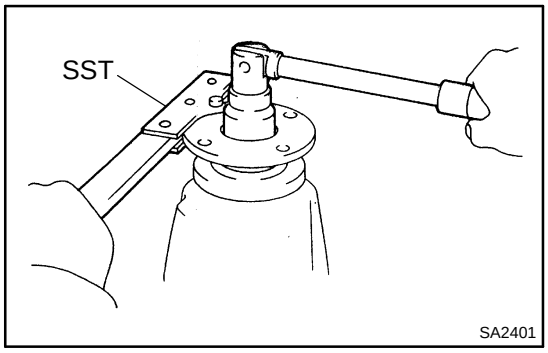
11. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the drive pinion, rear bearing and oil slinger.

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



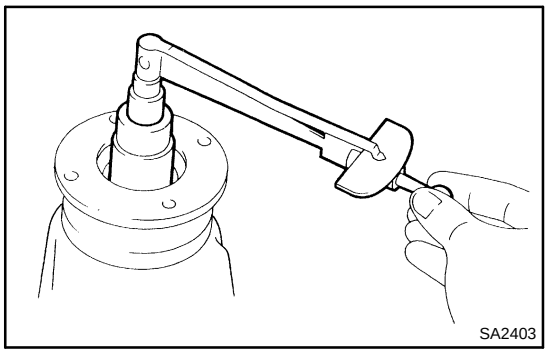
(b) Using SST, install the companion flange.
SST 09950−30010 (09951−03010, 09953−03010, 09954−03010, 09955−03030, 09956−03020)



(c) Using SST to hold the flange, adjust the drive pinion preload by tightening the nut.
SST 09330−00021

NOTICE:

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

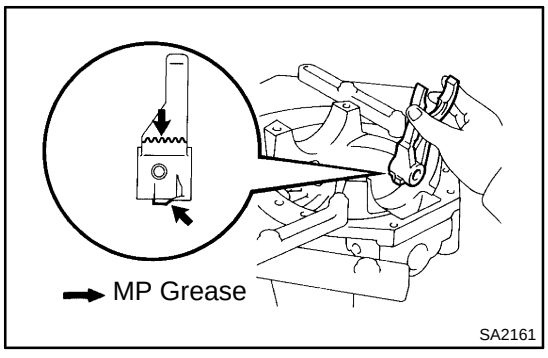


(d) Using a torque wrench, measure the preload.
Preload (at starting):
New bearing
0.9 − 1.6 N·m (10 − 16 kgf·cm, 8.7 − 13.9 in.·lbf)
Reused bearing
0.5 − 0.8 N·m (5 − 8 kgf·cm, 4.3 − 6.9 in.·lbf)

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

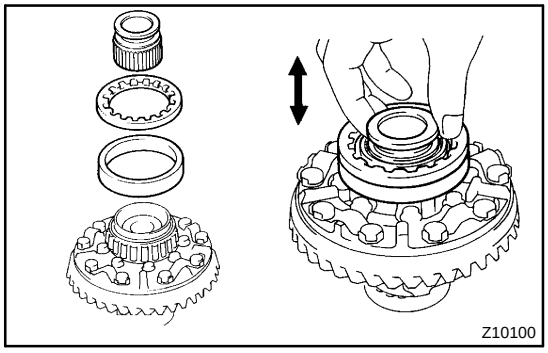
12. w/o DIFF. LOCK:
INSTALL DIFFERENTIAL CASE IN CARRIER

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

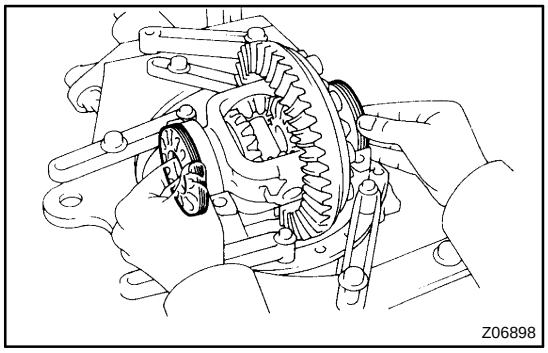


13. w/ DIFF. LOCK:
INSTALL DIFFERENTIAL CASE IN CARRIER

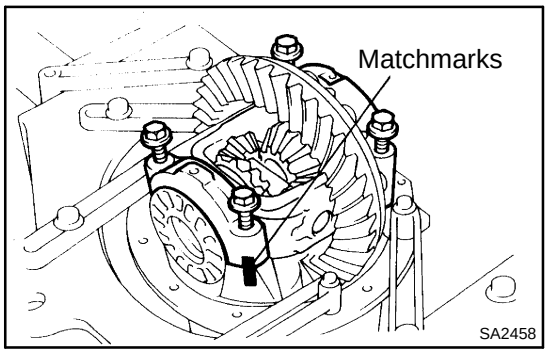
(a) Apply MP grease on the rack of the shift fork and connecting part of the indicator switch.
(b) Insert the shift fork into the differential carrier, as shown.


Z10100

(c) Install outer races, adjusting nuts and sleeve to left side.
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.

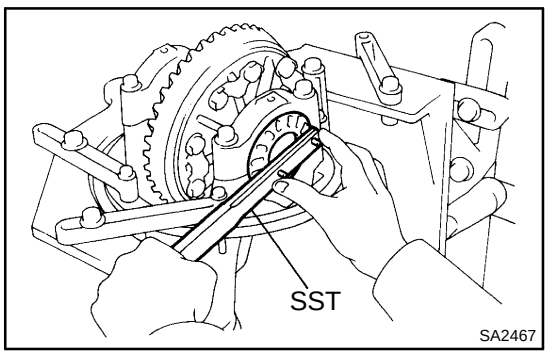

Z06898

14. w/o DIFF. LOCK:
INSTALL ADJUSTING NUTS
Install the 2 adjusting nuts on the carrier, making sure the nuts are engaged properly.



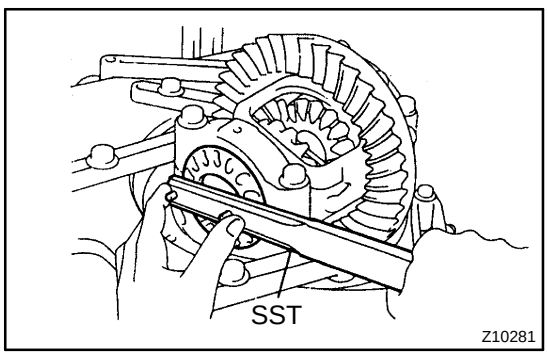
SA2458

15. INSTALL BEARING CAPS
Align the matchmarks on the bearing cap and carrier. Tighten 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.
Reinstall the adjusting nuts if necessary.

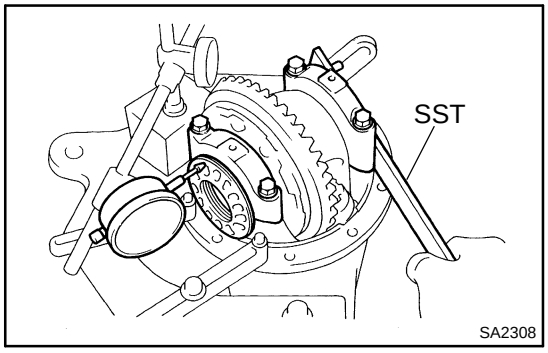


SA2467

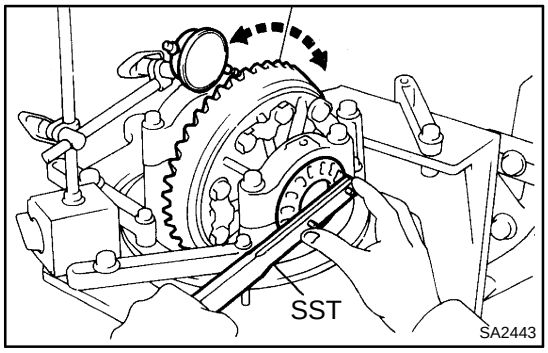
16. ADJUST SIDE BEARING PRELOAD
(a) Torque the 4 bearing cap bolts to the specified torque, and loosen them to the point where the adjusting nuts can be turned by SST.
SST 09504−00011
Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)
(b) Fully tighten the 4 bearing cap bolts by hand.
(c) Using the SST, torque the adjusting nut on the ring gear side until the ring has a backlash of about 0.2 mm (0.008 in.).
(d) While turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinon side. After the bearings are settle, loosen the adjusting nut on the drive pinion side.



Z10281



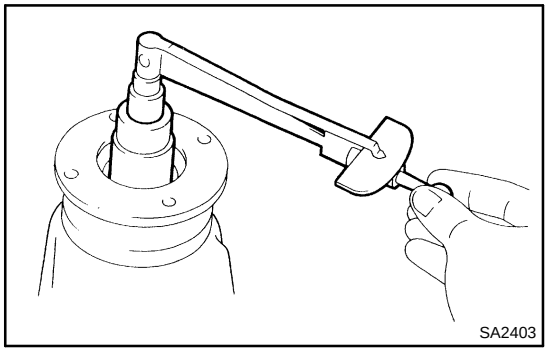
(e) Place a dial indicator on the top of the adjusting nut on the ring gear side.
(f) Adjust the side bearing for 0 preload by tightening the other adjusting nut until the pointer on the indicator bearings to move.
(g) Torque the adjusting nut 1 − 1.5 notches from the 0 preload position.



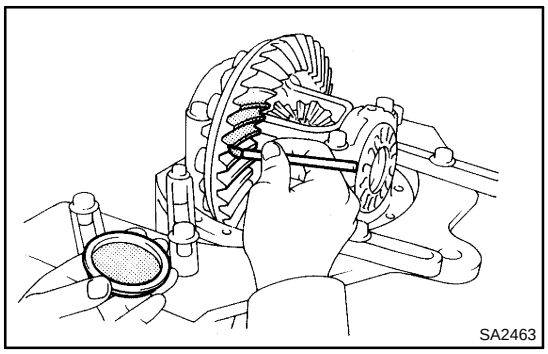
(h) Using a dial indicator, adjust the ring gear backlash until it is within the specification.
Backlash: 0.13 − 0.18 mm (0.0051 − 0.0071 in.)

HINT:
The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut on left side 1 notch and torque the nut on the right side 1 notch.

(i) Torque the 4 bearing cap bolts.
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)
(j) After rotating the ring gear 5 turns or more, recheck the ring gear backlash.
Backlash: 0.13 − 0.18 mm (0.0051 − 0.0071 in.)

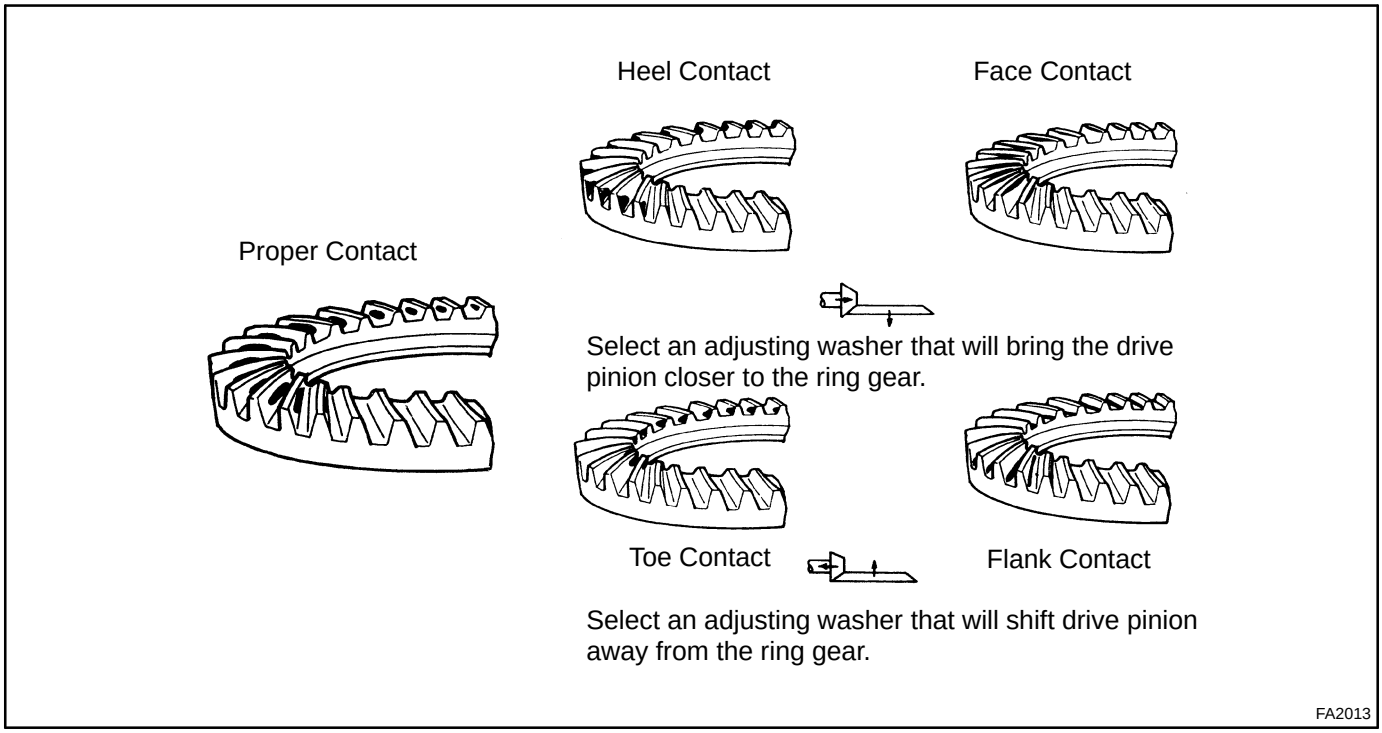


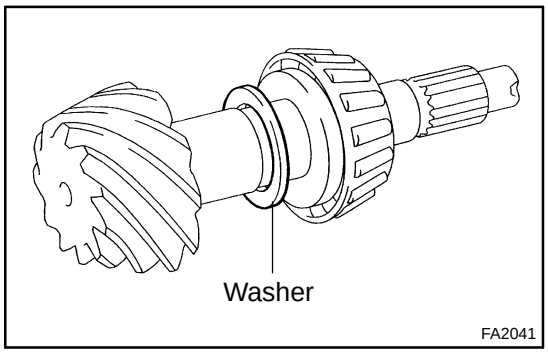
(k) Using a torque wrench, measure the preload.
Total preload (at starting):
Drive pinion preload plus
0.4 − 0.6 N·m (4 − 6 kgf·cm, 3.5 − 5.2 in.·lbf)



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 primer.
(b) Turn the companion flange in both directions to inspect the ring gear for proper tooth contact.



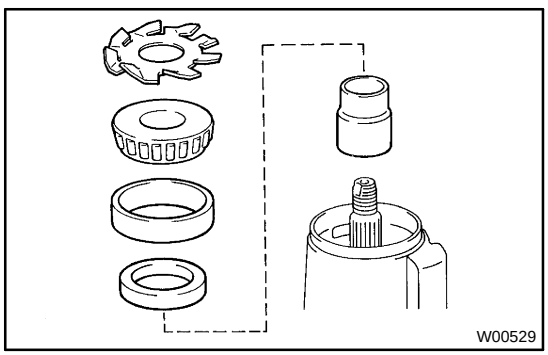


If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

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–67)



19. REMOVE OIL SLINGER AND REAR BEARING

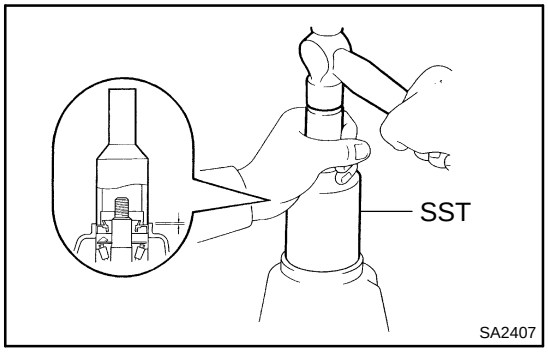
20. REMOVE REAR BEARING OUTER RACE AND OIL STORAGE RING (See page SA–67)

21. INSTALL BEARING SPACER AND REAR BEARING

(a) Install a new bearing spacer on the shaft.

(b) Install a new oil storage ring and rear bearing outer race (See page SA–74).

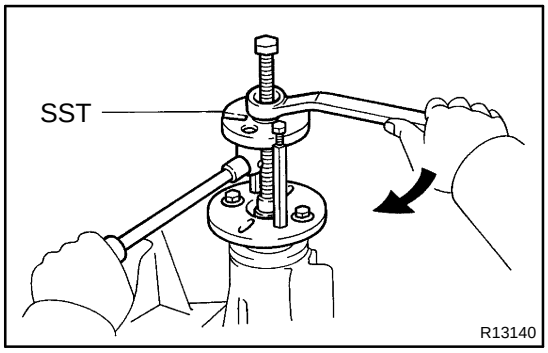
(c) Install the rear bearing and oil slinger.



22. INSTALL OIL SEAL

(a) Using SST, install a new oil seal.
SST 09214−76011
Oil seal drive in depth: 1.0 mm (0.039 in.)

(b) Coat the MP grease to the oil seal lip.

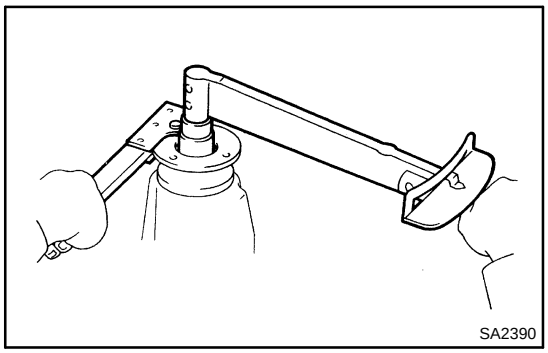


23. INSTALL COMPANION FLANGE

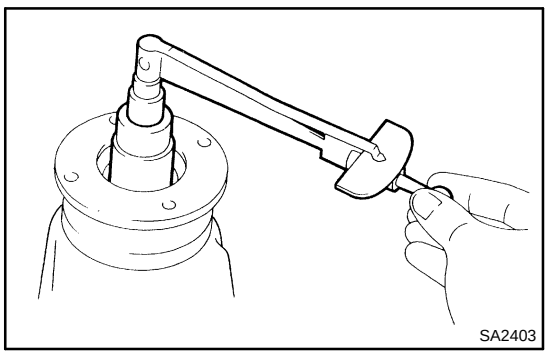
(a) Install the companion flange with SST.
SST 09950−30010 (09951−03010, 09953−03010, 09954−03010, 09955−03030, 09956−03020)

(b) Install 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 DRIVER 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 with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

Torque: 343 N·m (3,500 kgf·cm, 253 ft·lbf) or less

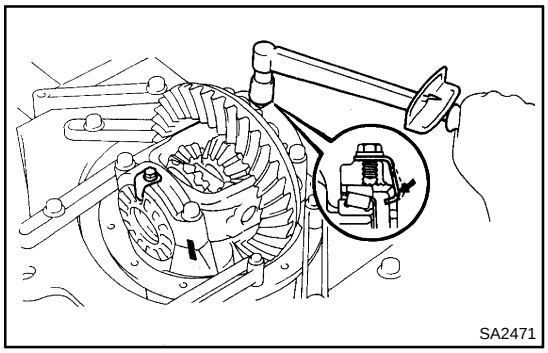
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

25. RECHECK RING GEAR BACKLASH
(See page SA–67)

26. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA–74)

27. CHECK RUNOUT OF COMPANION FLANGE
(See page SA–67)

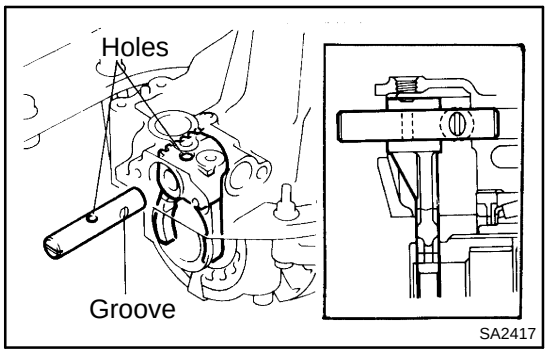
28. STAKE DRIVE PINION NUT


SA2471

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.

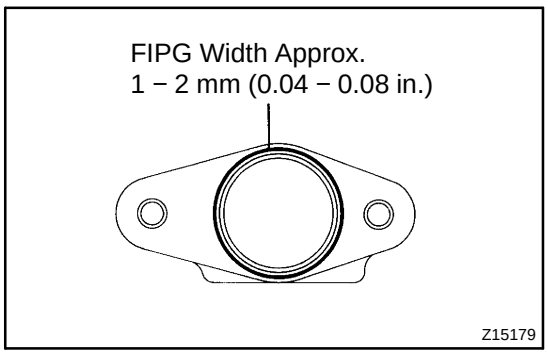


SA2417

30. w/ DIFF. 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.

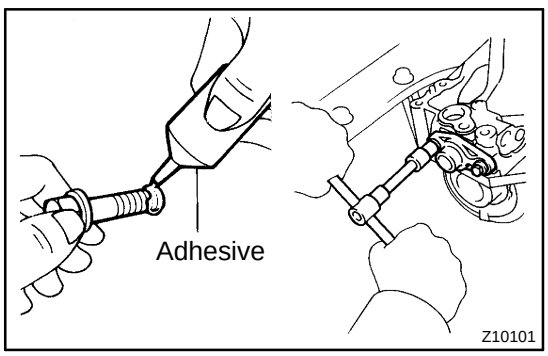


Z15179

(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.

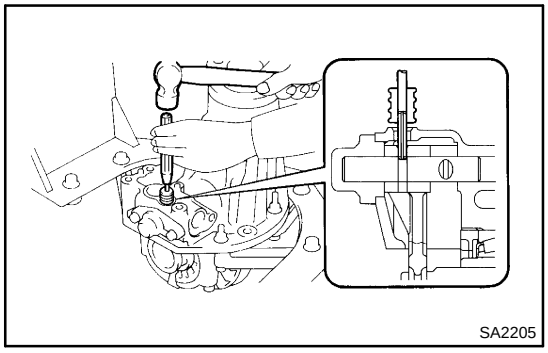


Z10101

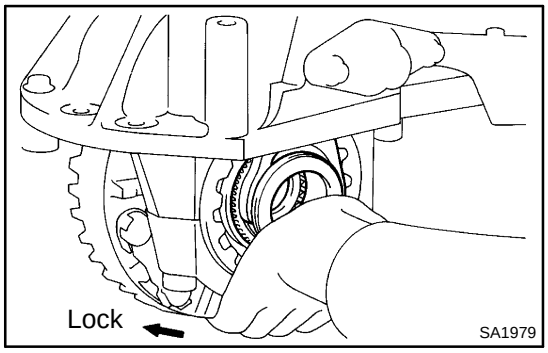
(e) Clean the threads of the bolts and retainer bolts holes with toluene or trichloroethylene.

(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)

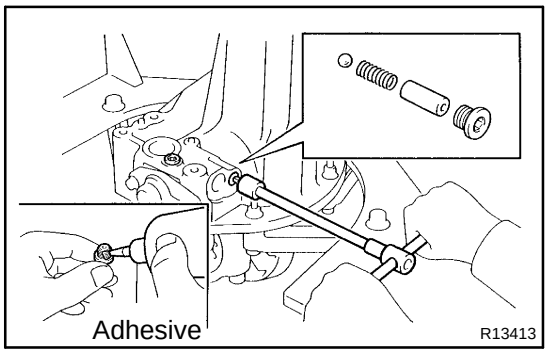

SA2205

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



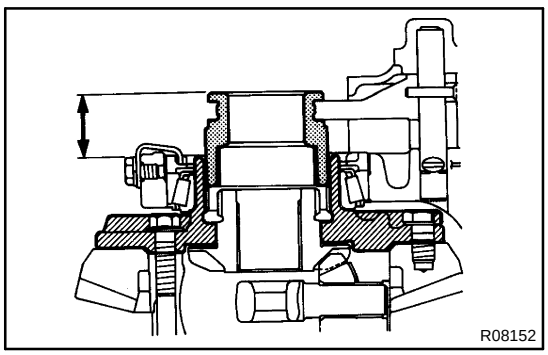
SA1979

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



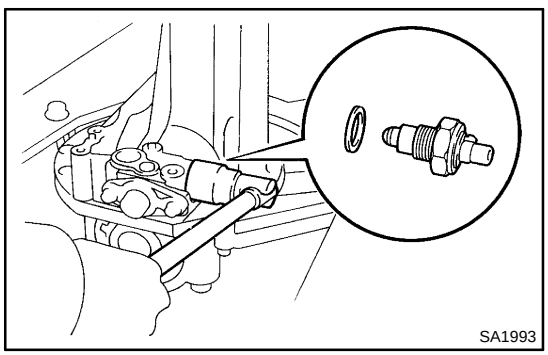
R13413

(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)


R08152

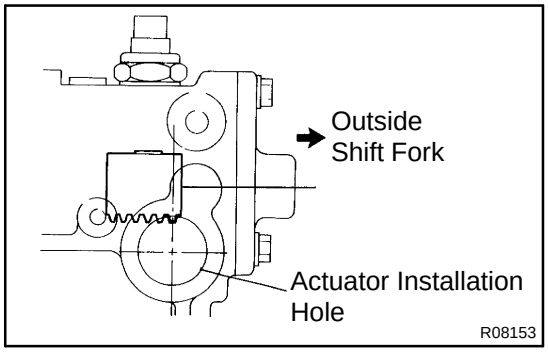
31. w/ DIFF. LOCK:
MEASURE DISTANCE BETWEEN SLEEVE AND DIFFERENTIAL CASE END SIDE

Measure distance between the sleeve and tip of the differential case when the 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.)


SA1993

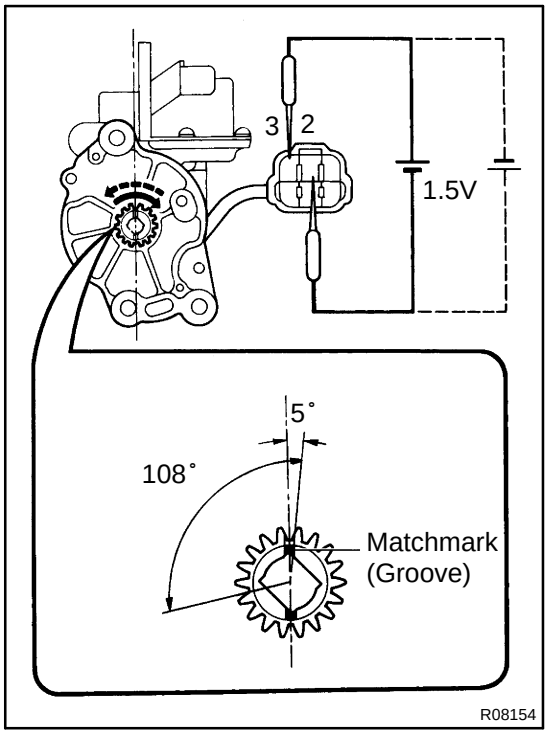
32. w/ DIFF. LOCK:
INSTALL POSITION SWITCH

Install the position switch with a new gasket.
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)



33. w/ DIFF. LOCK:
INSTALL ACTUATOR

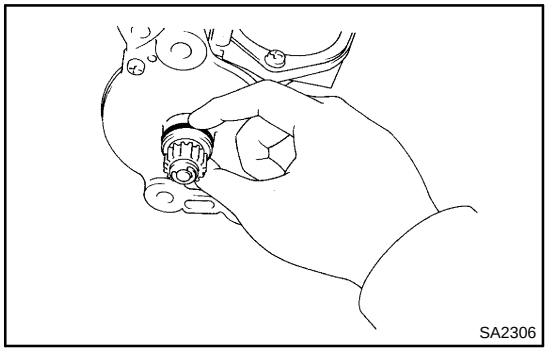
(a) Check that the outermost positioned rack tooth of the shift fork is virtually above the center line of the actuator installation hole.



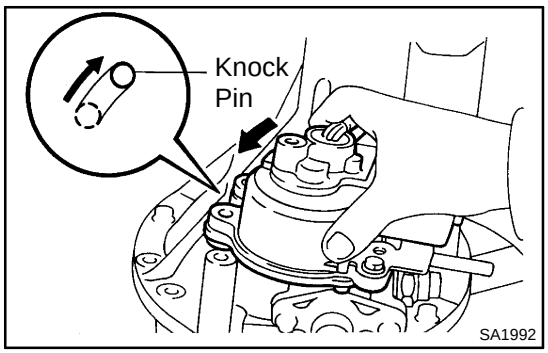
(b) Ensure that the matchmarks of the pinion of the actuator is between 0 and 5 degrees clockwise above the center line of the actuator.

NOTICE:

- **If the matchmarks is not within the above range, rotate the pinion to be matched.**
- **Do not supply the battery voltage directly between terminals.**
- **If the matchmarks come to the extension limit of the rotation, do not electrify moreover.**



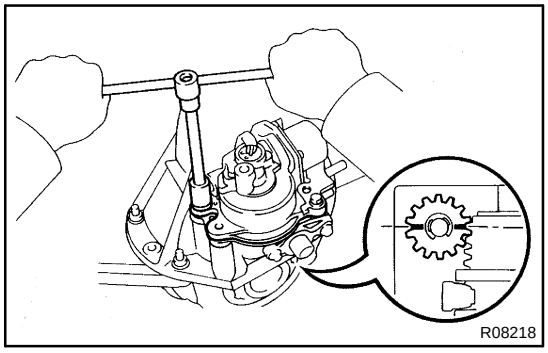
(c) Install a new O−ring to the actuator.
(d) Apply a light coat of gear oil on the O−ring.
(e) Coat the MP grease to the gear part.



(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 positioned 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)

34. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND ETC.