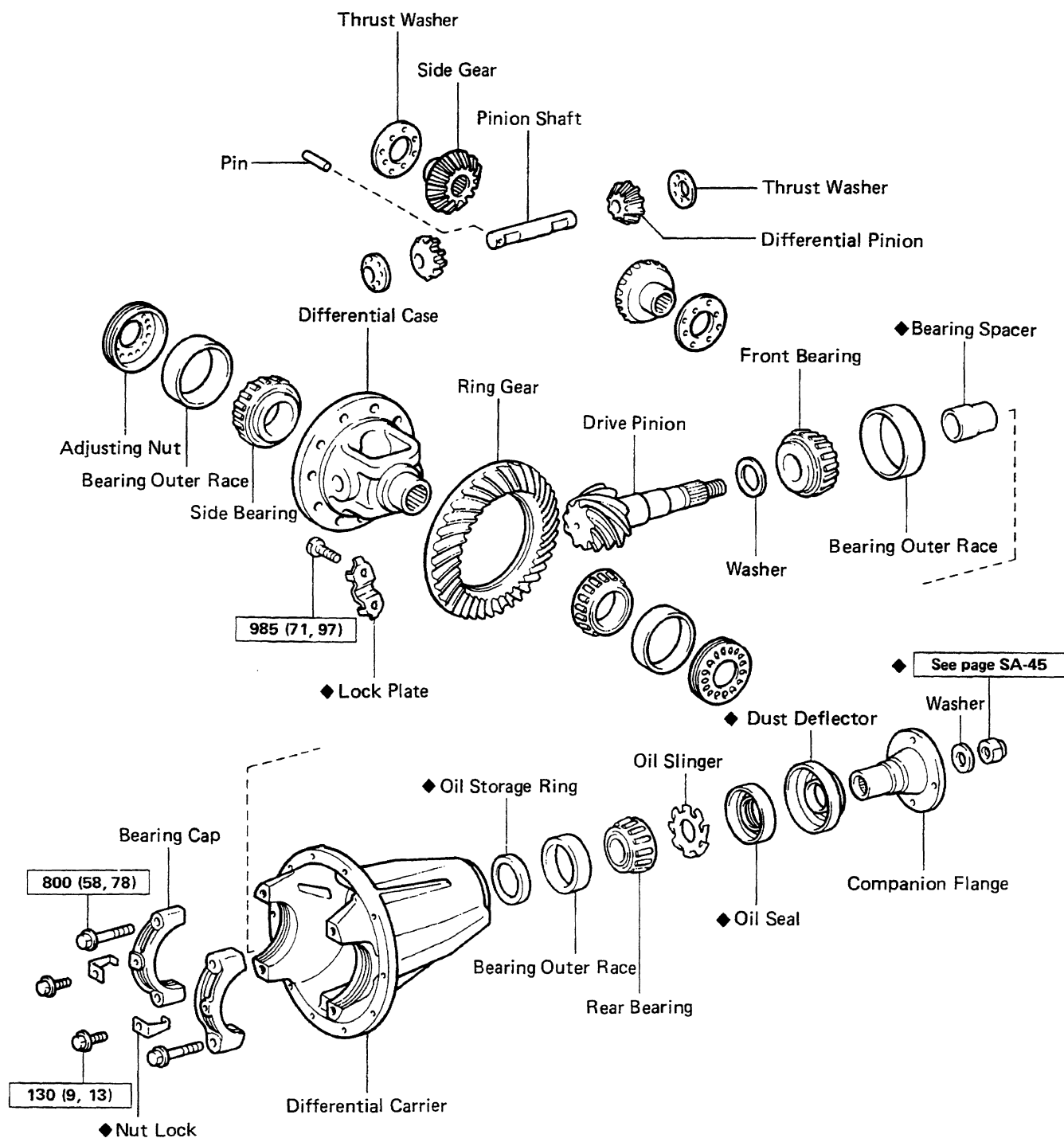
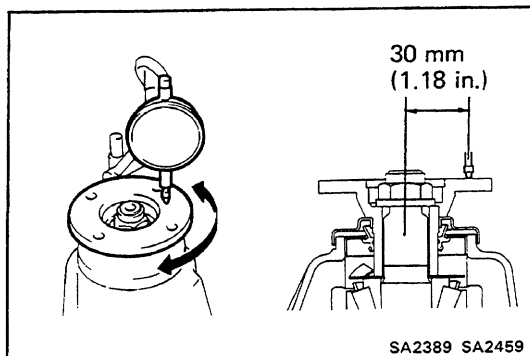


Differential Carrier COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part



INSPECTION OF DIFFERENTIAL CARRIER

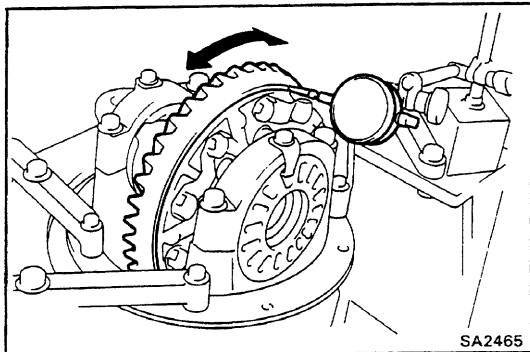
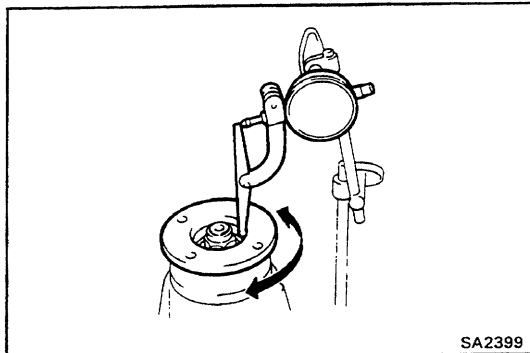
1. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum vertical runout: 0.10 mm (0.0039 in.)

Maximum lateral runout: 0.10 mm (0.0039 in.)

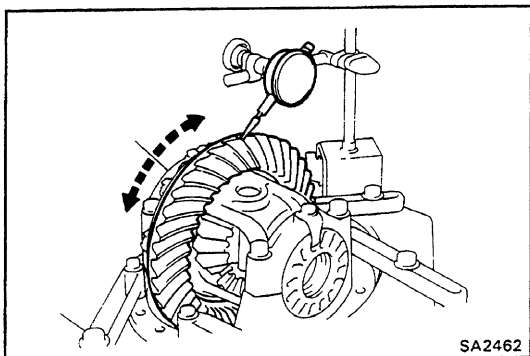
If the runout is greater than the maximum, replace the companion flange.



2. CHECK RING GEAR RUNOUT

If the runout is greater than maximum, replace the ring gear.

Maximum runout: 0.10 mm (0.0039 in.)

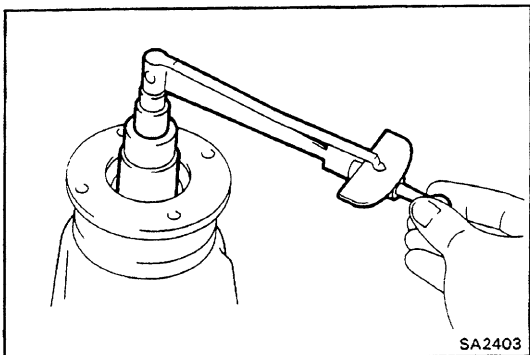


3. CHECK RING GEAR BACKLASH

If the backlash is not within specification, adjust the side bearing preload or repair as necessary.

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

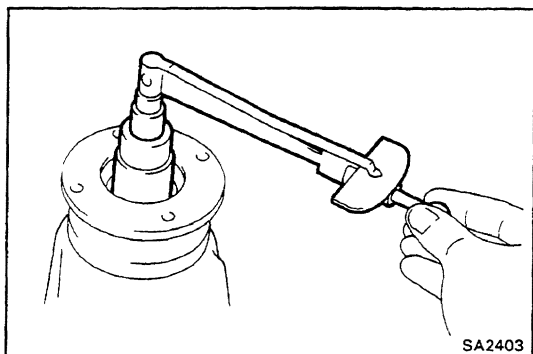
HINT: Perform the measurements at three or more positions around the circumference of the ring gear.



4. MEASURE DRIVE PINION PRELOAD

Measure the drive pinion preload using the backlash of the drive pinion and ring gear.

**Preload (at starting): 5 – 8 kg-cm
(4.3 – 6.9 in.-lb, 0.5 – 0.8 N-m)**



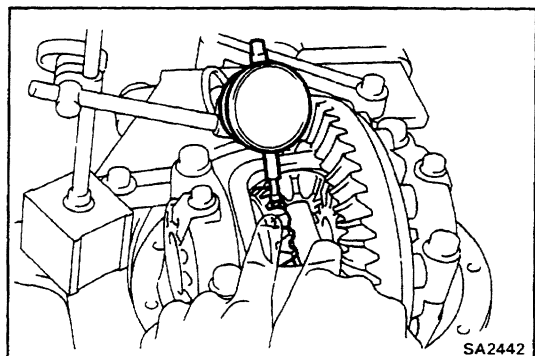
5. CHECK TOTAL PRELOAD

Using a torque meter, measure the total preload.

Total preload: In addition to drive pinion preload

4 – 6 kg-cm (3.5 – 5.2 in.-lb, 0.4 – 0.6N-m)

If necessary, disassemble and inspect a differential.



6. CHECK SIDE GEAR BACKLASH

Measure the side gear backlash while holding one pinion gear toward the case.

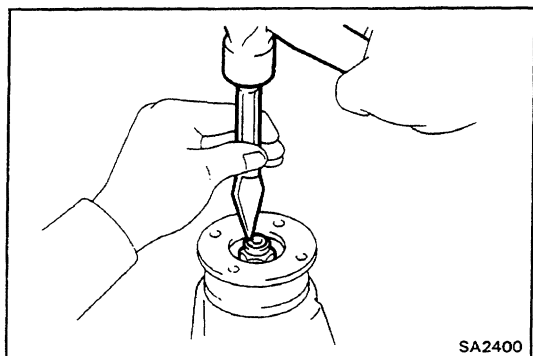
Standard backlash: 0.05 – 0.20 mm

(0.0020 – 0.0079 in.)

If the backlash is out of specification, install the correct thrust washers. (See page [SA-38](#))

7. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(See step 13 on page [SA-43](#))

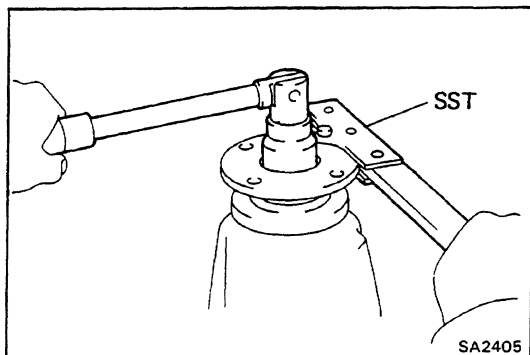


DISASSEMBLY OF DIFFERENTIAL CARRIER

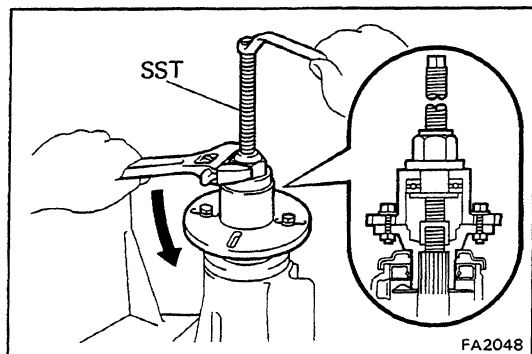
(See page [SA-30](#))

1. REMOVE COMPANION FLANGE

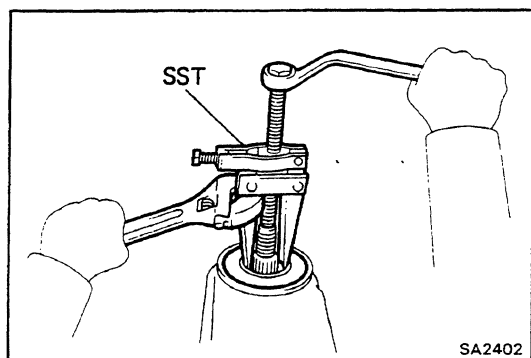
(a) Using a hammer and chisel, loosen the staked part of the nut.



(b) Using SST to hold the flange, remove the nut and plate washer.
SST 09330-00021

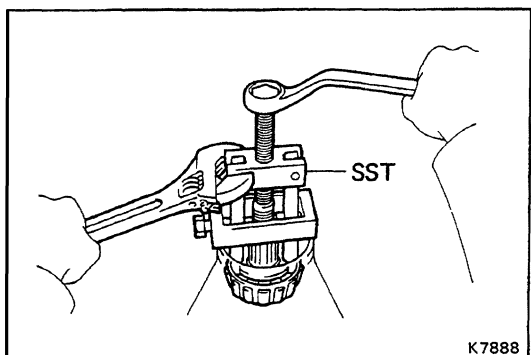


(c) Using SST, remove the companion flange.
SST 09557-22022 (09557-22050)



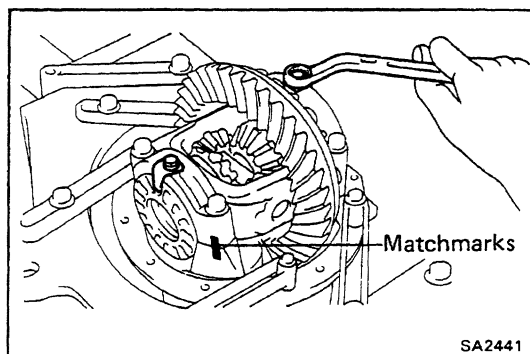
2. REMOVE REAR OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the housing.
SST 09308-10010
Remove the oil slinger.



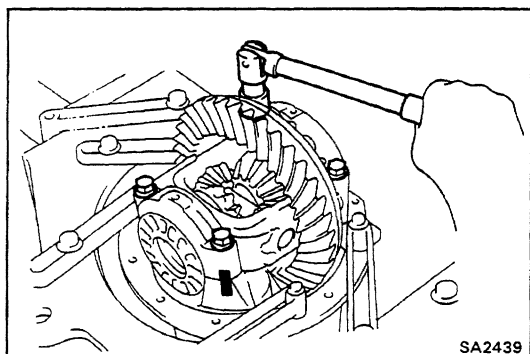
3. REMOVE REAR BEARING

Using SST, remove the bearing from the housing.
SST 09556-22010

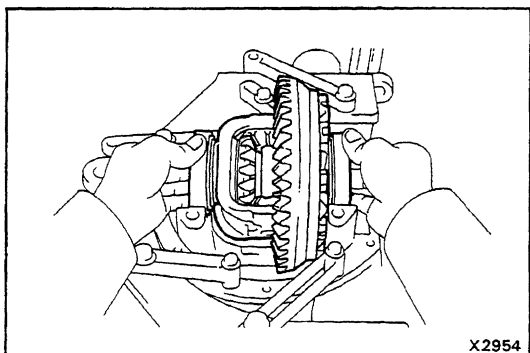


4. REMOVE DIFFERENTIAL CASE

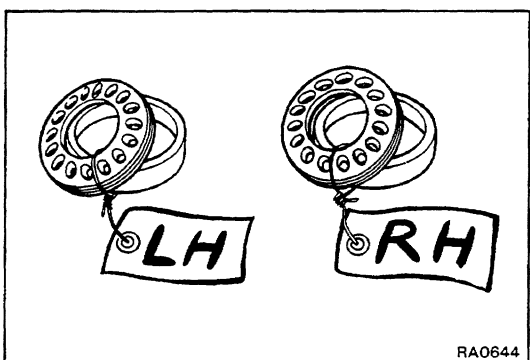
- (a) Place matchmarks on the bearing cap and differential carrier.
- (b) Remove the two adjusting nut locks.



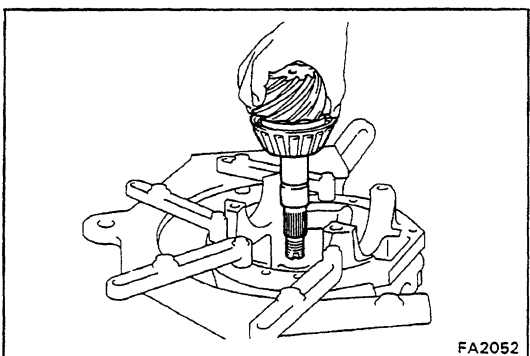
- (c) Remove the four bolts and the two bearing caps.
- (d) Remove the two adjusting nuts.



- (e) Remove the differential case with the side bearing outer races from the differential carrier.

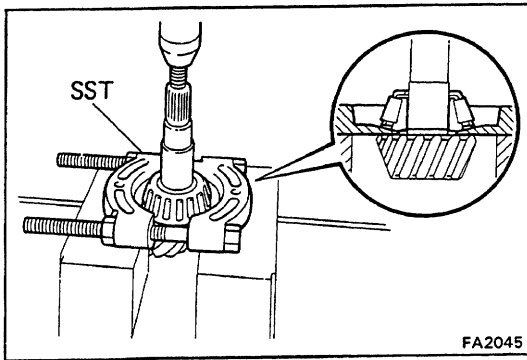


HINT: Tag the disassembled parts to show the location for reassemble.



5. REMOVE DRIVE PINION AND BEARING SPACER

- (a) Remove the drive pinion with the front bearing.
- (b) Remove the bearing spacer.



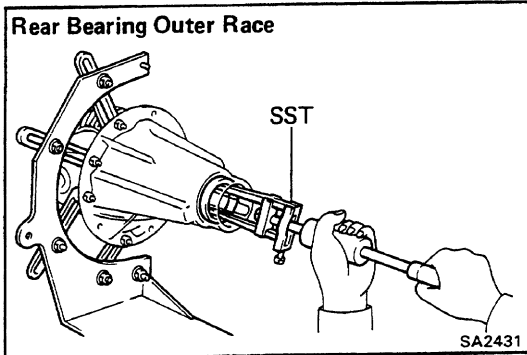
6. REMOVE DRIVE PINION FRONT BEARING

- (a) Using SST and a press, remove the bearing from the drive pinion.

SST 09950-00020

HINT: If the drive pinion or ring gear are damaged replace them as a set.

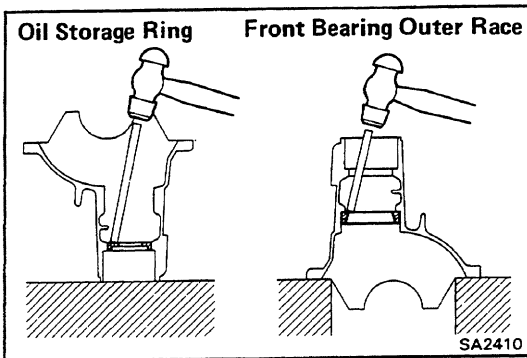
- (b) Remove the plate washer from the drive pinion.



7. REMOVE FRONT, REAR BEARING OUTER RACES AND OIL STORAGE RING

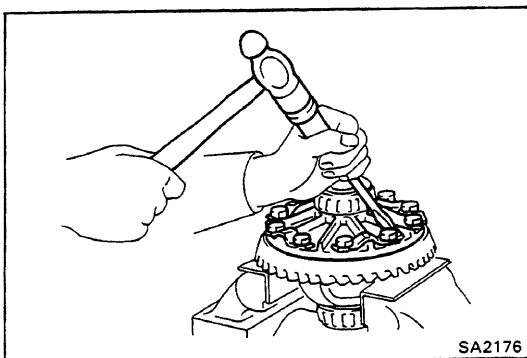
- (a) Using SST, remove the bearing outer race.

SST 09308-00010



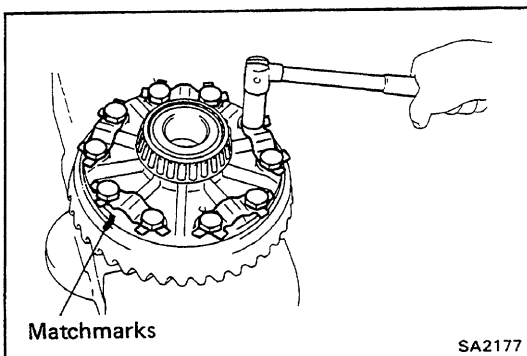
- (b) Using a hammer and brass bar, drive out the oil storage ring and outer race from the carrier.

HINT: Do not remove the oil storage ring unless replacing it with a new one.



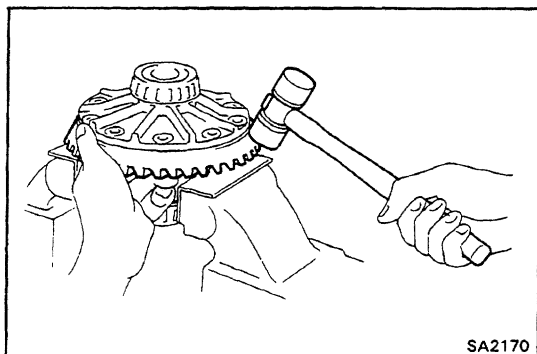
8. REMOVE RING GEAR

- (a) Using a screwdriver, unstake the lock plates.



- (b) Place matchmarks on the ring gear and differential case.

- (c) Remove the ten bolts and five lock plates.



- (d) Using a plastic or copper hammer, tap on the ring gear to separate it from the differential case.

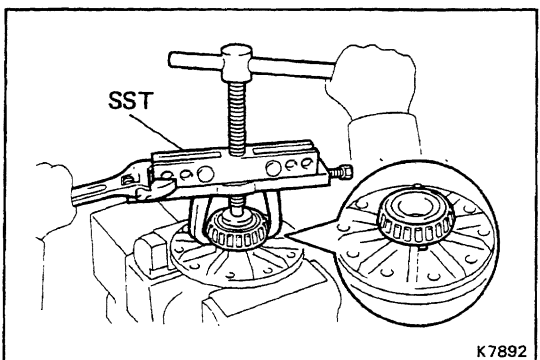
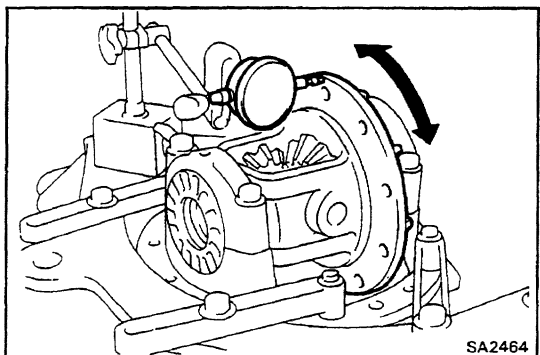
9. CHECK DIFFERENTIAL CASE RUNOUT

- Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.
- Install the differential case in the differential carrier.
- When there is no play left in the side bearings, install the adjusting nuts.
- Align the matchmarks on the bearing cap and differential carrier.
- Install and uniformly tighten the four bearing cap bolts in several passes.
- Using a dial indicator, measure the differential case runout.

Maximum runout: 0.07 mm (0.0028 in.)

- (g) Remove the differential case.

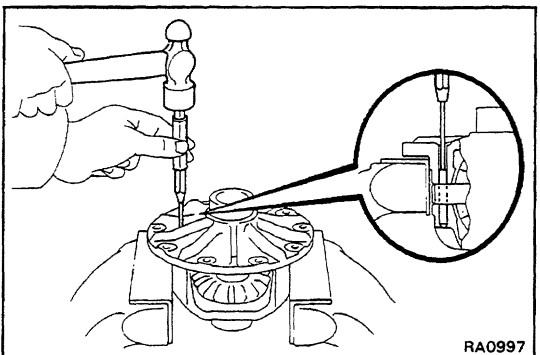
(See step 4 on page SA-34)



10. REMOVE SIDE BEARING

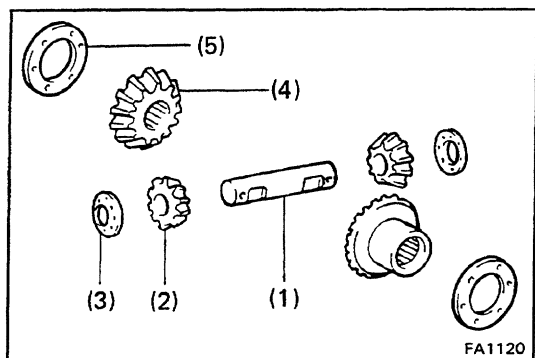
Using SST, remove the side bearing from the differential case.
SST 09950-20017

HINT: Fix the claws of SST to the notch in the differential case.



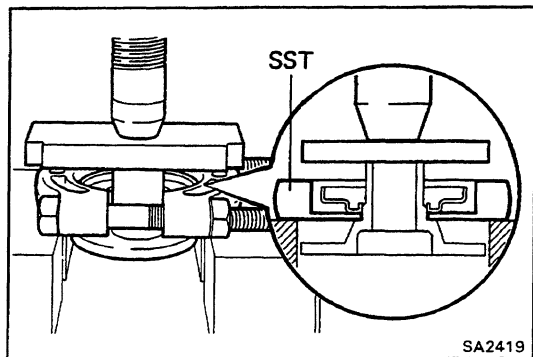
11. DISASSEMBLE DIFFERENTIAL CASE

- (a) Using a hammer and punch, drive out the straight pin.



(b) Remove following parts from the differential case:

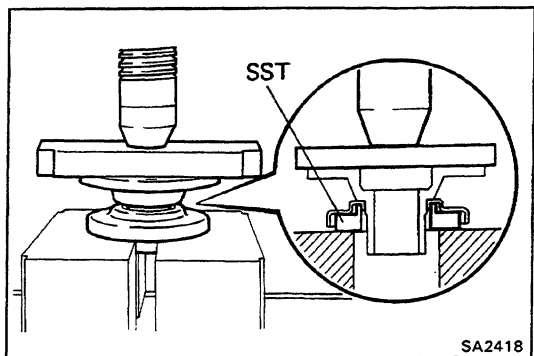
- (1) Pinion shaft
- (2) Two differential pinions
- (3) Two pinion thrust washers
- (4) Two side gears
- (5) Two side gear thrust washers



REPLACEMENT OF DUST DEFLECTOR

REPLACE COMPANION FLANGE DUST DEFLECTOR

- (a) Using SST and a press, remove the dust deflector.
SST 09950-00020



- (b) Using SST and a press, install a new dust deflector.
SST 09726-40010

ASSEMBLY OF DIFFERENTIAL CARRIER

(See page SA-30)

1. ASSEMBLE DIFFERENTIAL CASE

- (a) install the proper thrust washers and side gears.

Using the below table, select thrust washers which will ensure that the backlash is within specification.

Try to select washers of the same size for both sides.

Standard backlash: 0.05 – 0.20 mm

(0.0020 – 0.0079 in.)

Thrust washer thickness	mm (in.)
1.58 – 1.62 (0.0622 – 0.0638)	
1.68 – 1.72 (0.0661 – 0.0677)	
1.78 – 1.82 (0.0701 – 0.0717)	

- (b) Install thrust washers and side gears in the differential case.

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

- (c) Check the side gear backlash.

Measure the side gear backlash while holding one pinion gear toward the case.

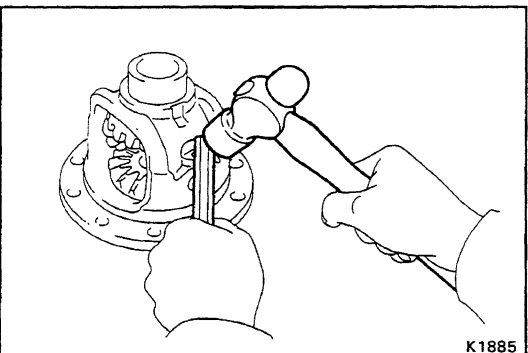
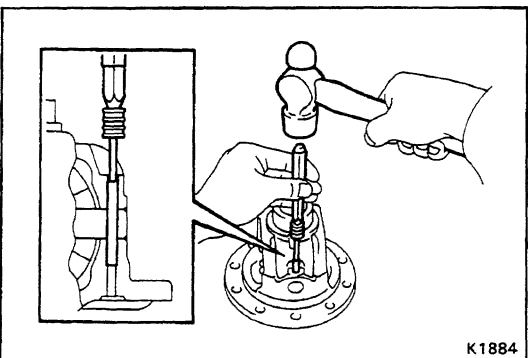
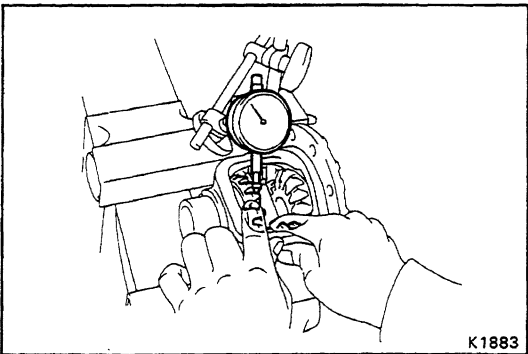
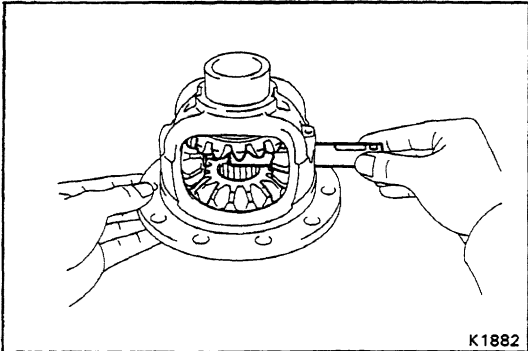
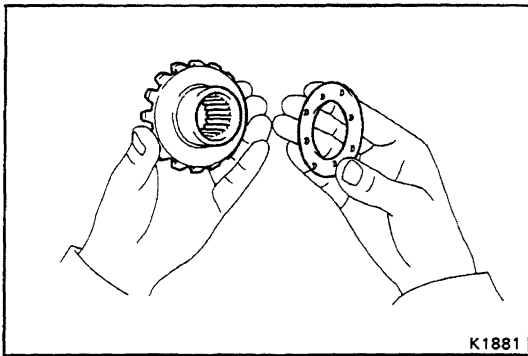
Standard backlash: 0.05 – 0.20 mm

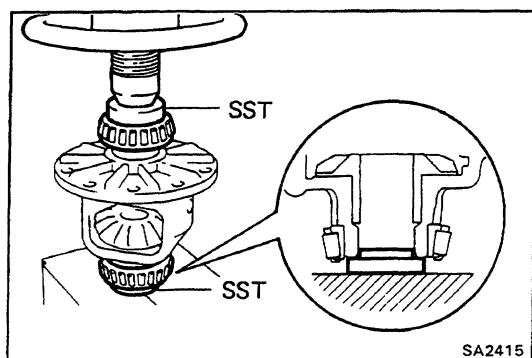
(0.0020 – 0.0079 in.)

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

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

- (e) Stake the differential case.

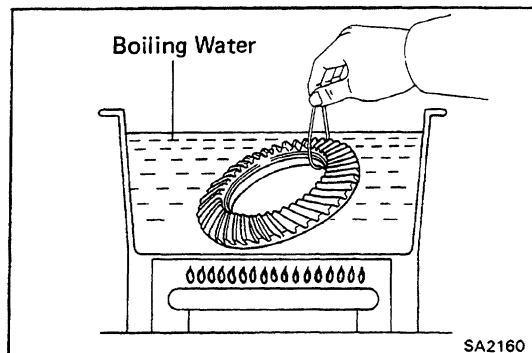




2. INSTALL SIDE BEARINGS

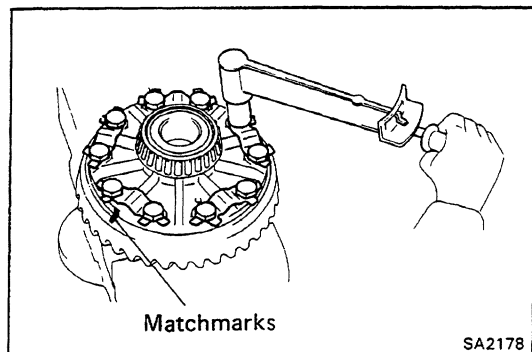
Using SST and a press, install the two side bearings on the differential case.

SST 09608-30012 (09608-00060, 09608-04060)



3. INSTALL RING GEAR ON DIFFERENTIAL CASE

- Clean the contact surfaces of the differential case and ring gear.
- Heat the ring gear in boiling water.
- 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 the differential case.

- Temporarily install five new lock plates and the ten bolts so that the bolt holes in the ring gear and differential case are not misaligned.

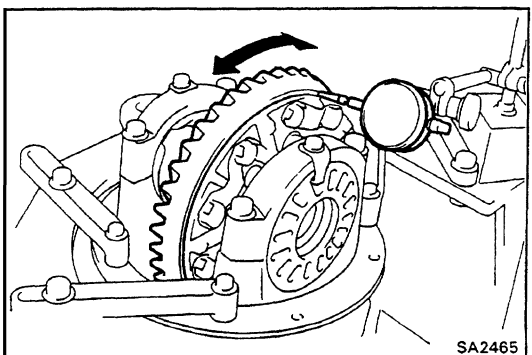
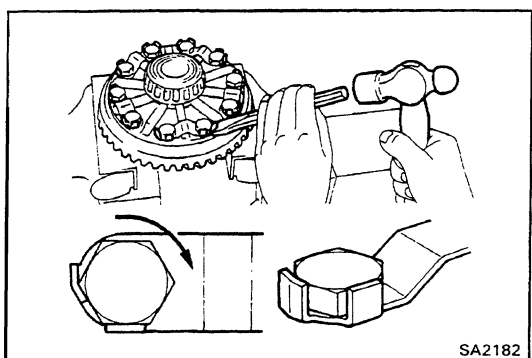
NOTICE: The ring gear set bolts should not tight until the ring gear has cooled sufficiently.

- After the ring gear has cooled sufficiently, torque the ring gear set bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N-m)

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

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



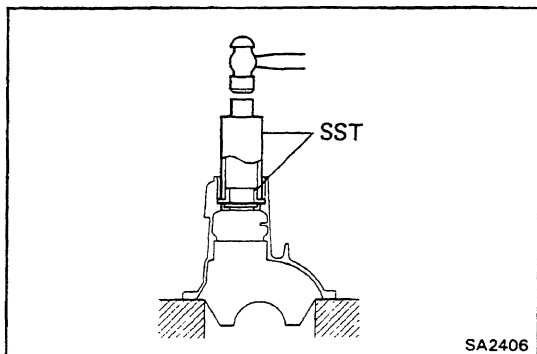
4. CHECK RING GEAR RUNOUT

- Install the differential case onto the carrier.
- Install bearing caps. (See step 1 1 on page [SA-41](#))
- Using a dial indicator, measure the runout of ring gear.

Maximum runout: 0.10 mm (0.0039 in.)

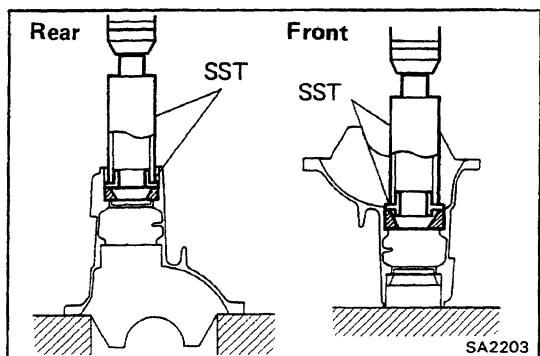
- Remove the differential case.

(See step 4 on page [SA-34](#))



5. INSTALL OIL STORAGE RING

Using SST and a hammer, install a new oil storage ring.
SST 09316-60010 (09316-00010, 09316-00020)

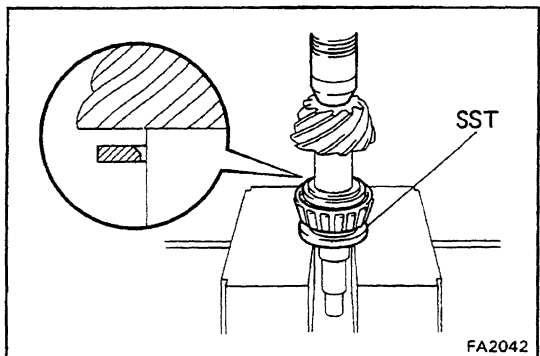


6. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

Using SST and a press, install the outer races
SST 09316-60010

Rear (09316-00010, 09316-00020)

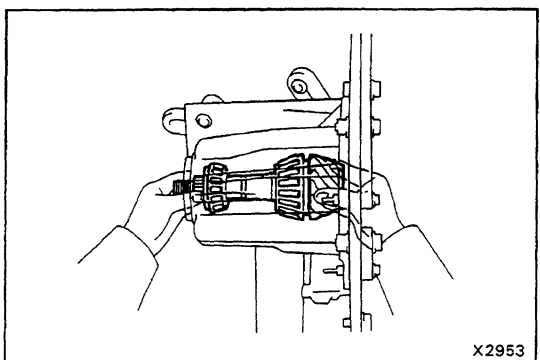
Front (09316-00010, 09316-00050)



7. INSTALL DRIVE PINION FRONT BEARING

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

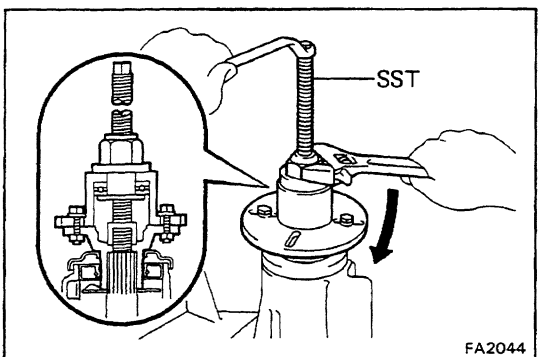
(b) Using SST, press in the front bearing onto the drive pinion.
SST 09506-30012



8. TEMPORARILY ADJUST DRIVE PINION PRELOAD

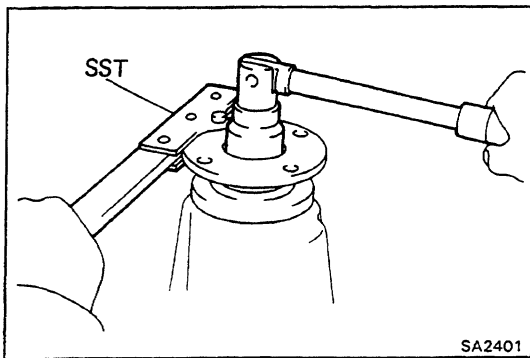
(a) Install the drive pinion, rear bearing and oil slinger.

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



(b) Using SST, install the companion flange.

SST 09557-22022 (09557-22050)

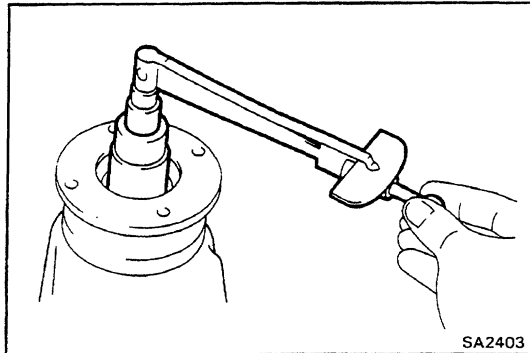


(c) Adjust the drive pinion preload by tightening the companion flange nut.

HINT: Using SST to hold the flange, tighten the nut.
SST 09330-00021

NOTICE:

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



(d) Using a torque meter, measure the preload.

Preload (at starting):

New bearing

10 – 16 kg-cm

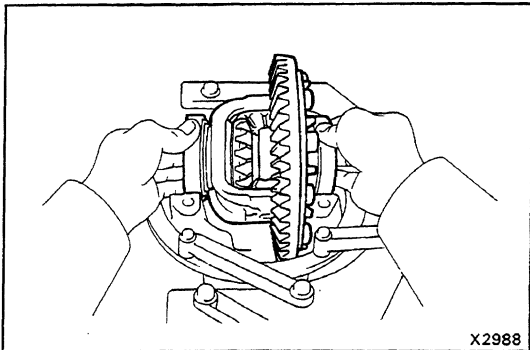
(8.7 – 13.9 in.-lb, 0.9 – 1.6 N-m)

Reused bearing

5 – 8 kg-cm

(4.3 – 6.9 in.-lb, 0.5 – 0.8 N-m)

HINT: Measure the preload after first turning the bearing clockwise and counterclockwise several times to snug down the bearing.

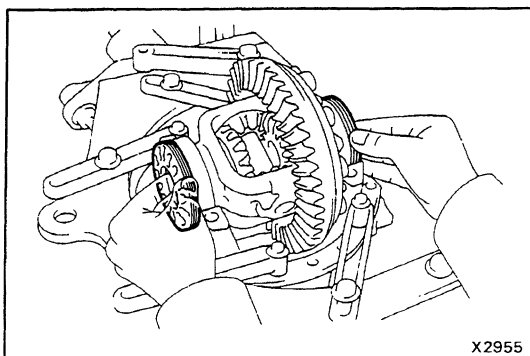


9. INSTALL DIFFERENTIAL CASE IN CARRIER

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

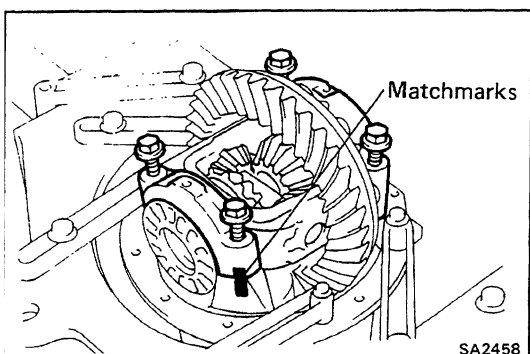
(b) Install the case in the carrier.

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



10. INSTALL ADJUSTING NUTS

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

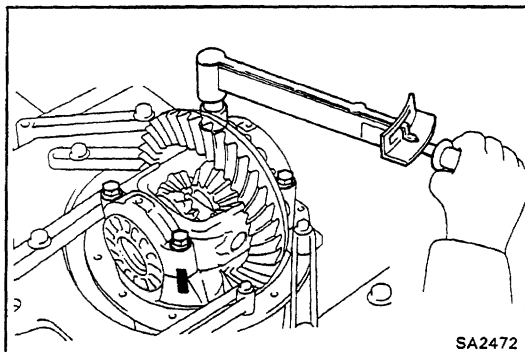


11. INSTALL BEARING CAPS

Align the matchmarks on the cap and carrier. Screw in the two bearing cap bolts two or three 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.



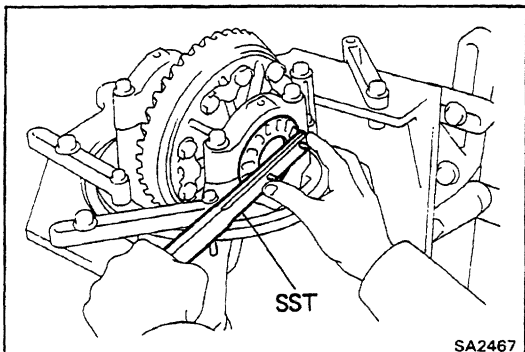
12. ADJUST SIDE BEARING PRELOAD

- (a) Tighten the four bearing cap bolts to the specified torque, then loosen them to the point where they can be turned by SST.

SST 09504-00011

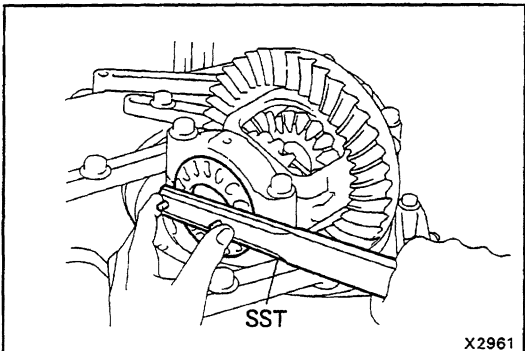
Torque: 800 kg-cm (58 ft-lb, 78 N - m)

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



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

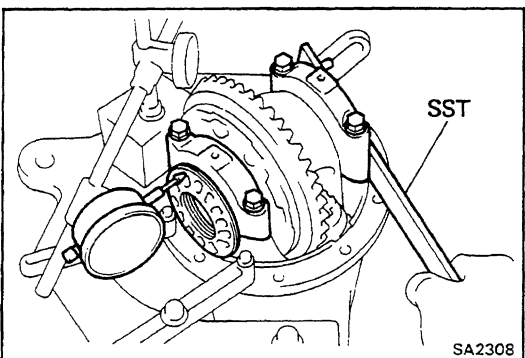
SST 09504-00011



- (d) While turning the ring gear, use SST to fully tighten the adjusting nut on the drive pinion side.

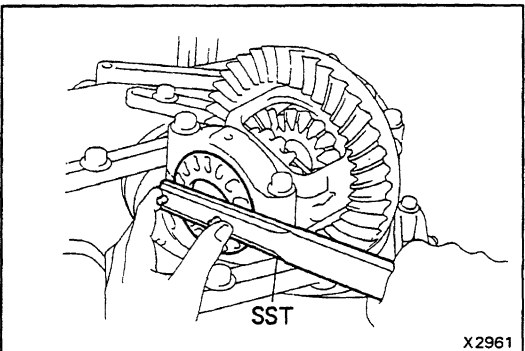
After the bearings are settled, loosen the adjusting nut on the drive pinion side.

SST 09504-00011

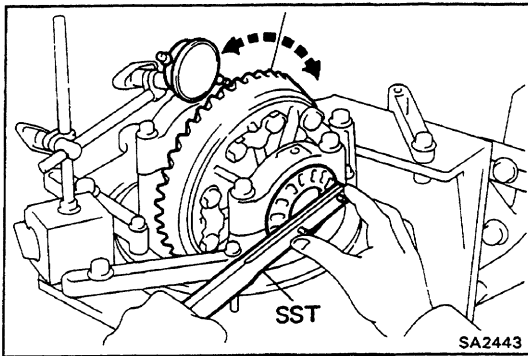


- (e) Place a dial indicator on the top of the adjusting nut on the ring gear side.

- (f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



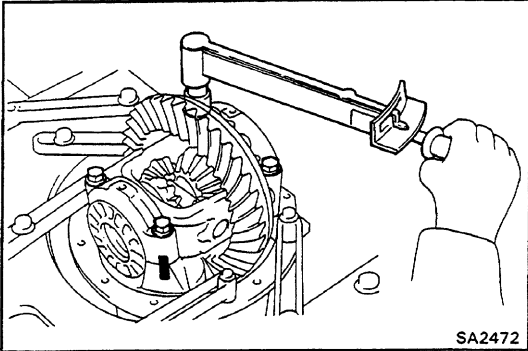
- (g) Tighten the adjusting nut 1 - 1/2 notches from the zero preload position.



- (h) Using a dial indicator, adjust the ring gear backlash until it is within 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 tighten the nut on the right side one notch.

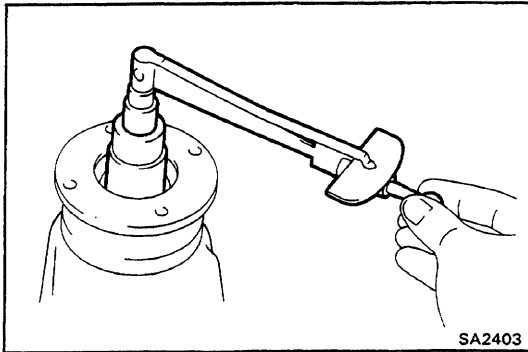


- (i) Torque the bearing cap bolts.

Torque: 800 kg-cm (58 ft-lb, 78 N-m)

- (j) Recheck the ring gear backlash.

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

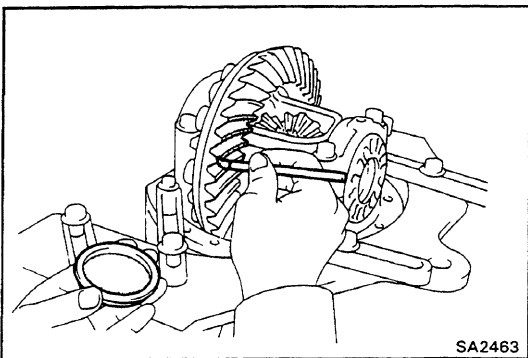


- (k) Using a torque meter, measure the total preload.

Total preload (at static):

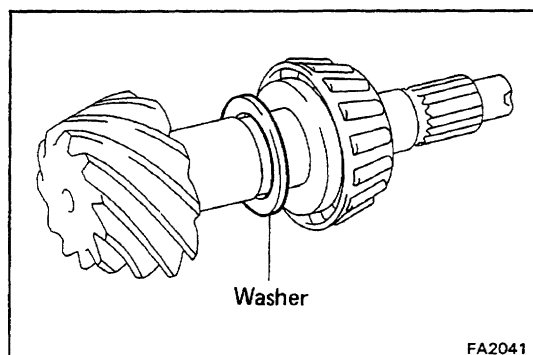
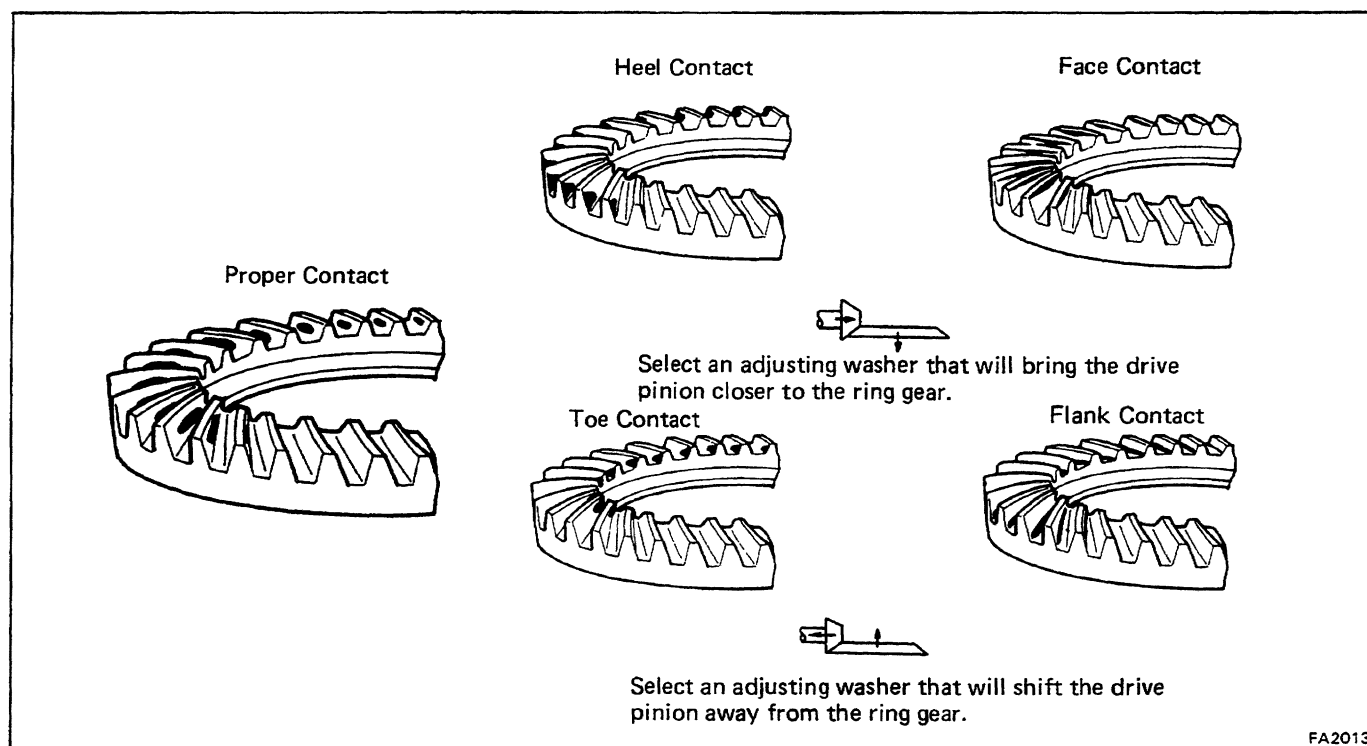
Add drive pinion preload

4 – 6 kg-cm (3.5 – 5.2 in.-lb, 0.4 – 0.6 N-m)



13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

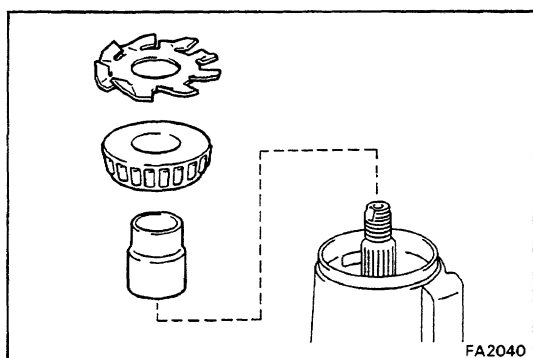
- Coat 3 or 4 teeth at three different positions on the ring gear with red lead.
- Hold the companion flange firmly and rotate the ring gear in both directions.
- Inspect the tooth pattern.



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

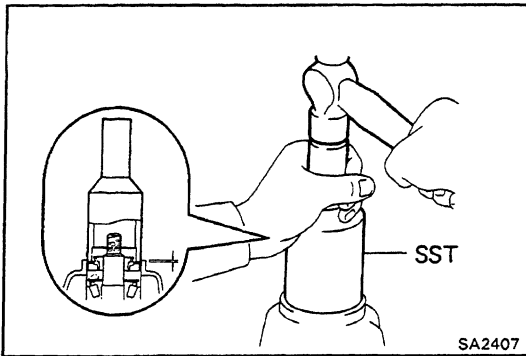
HINT: In the case of face contact or flank contact, it may be possible to make the adjustment within the backlash specification limits.

Washer 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)



14. INSTALL NEW BEARING SPACER

- Remove the companion flange.
(See step 1 on page SA-33)
- Remove the oil slinger and rear bearing.
(See steps 2, 3 on page SA-33)
- Install a new bearing spacer.
- Install the rear bearing and oil slinger.

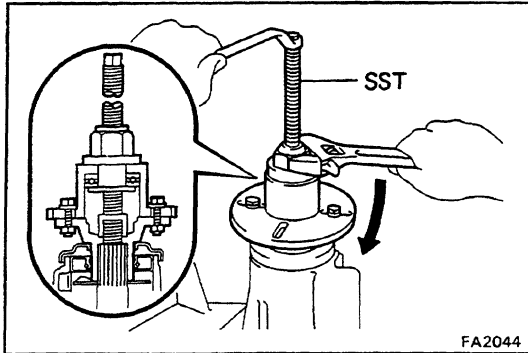
**15. INSTALL NEW OIL SEAL**

(a) Using SST and a hammer, install a new oil seal.

SST 09214-76011

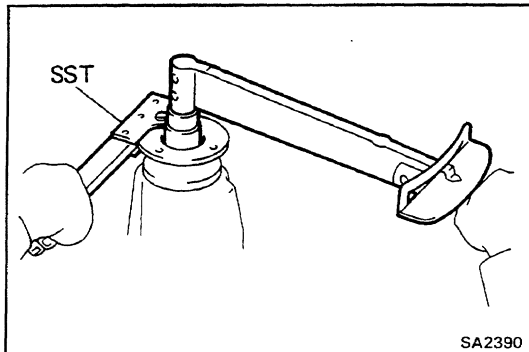
Oil seal drive in depth: 1.0 mm (0.039 in.)

(b) Coat the lip of oil seal with MP grease.

**16. INSTALL COMPANION FLANGE**

(a) Using SST, install the companion flange.

SST 09557-22022 (09557-22050)



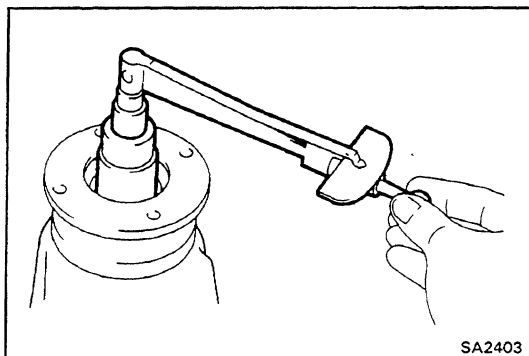
(b) Install the washer and a new nut.

HINT: Coat the threads of nut with gear oil.

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

SST 09330-00021

Torque: 2,000 kg-cm (145 ft-lb, 196 N-m)

**17. ADJUST DRIVE PINION PRELOAD**

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

Preload (at starting):

New bearing

10 – 16 kg-cm

(8.7 – 13.9 in.-lb, 0.9 – 1.6 N-m)

Reused bearing

5 – 8 kg-cm

(4.3 – 6.9 in.-lb, 0.5 – 0.8 N-m)

- If the preload is greater than specification, replace the bearing spacer.
- If the preload is less than specification, retighten the nut 130 kg-cm (9 ft-lb 13 N-m) a little at a time until the specified preload is reached.

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.

Maximum torque: 3,500 kg-cm (253 ft-lb, 343 N-m)

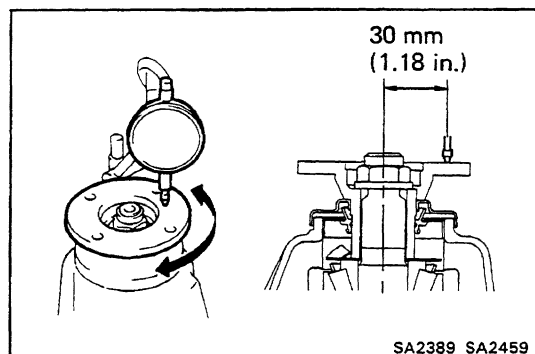
If everything is normal, coat the threads with gear oil, then repeat the above operation.

18. RECHECK RING GEAR BACKLASH

(See step 3 on page SA-31)

19. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(See step 13 on page SA-43)

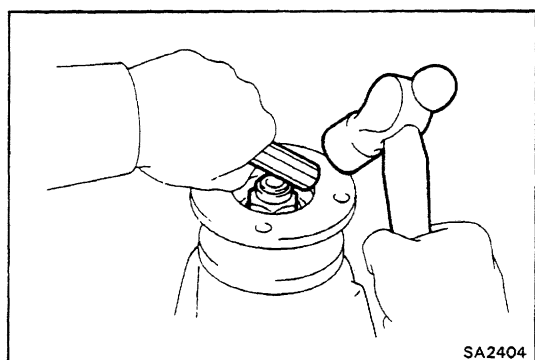
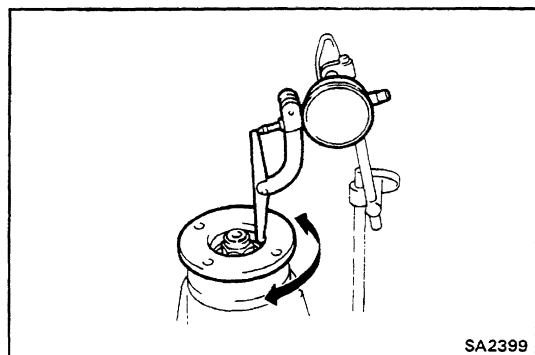
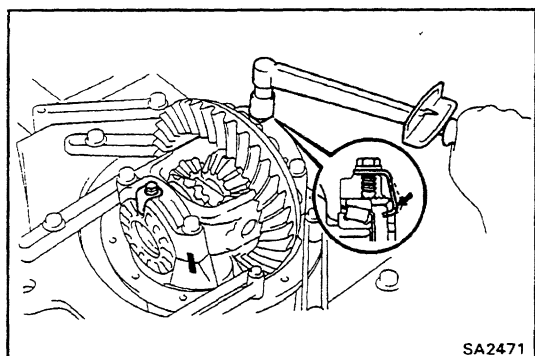
**20. CHECK RUNOUT OF COMPANION FLANGE**

Using a dial indicator, measure the lateral and radial run out of the companion flange.

Maximum vertical runout: 0.10 mm (0.0039 in.)

Maximum lateral runout: 0.10 mm (0.0039 in.)

If the runout is greater than the maximum, inspect the bearing.

**21. STAKE DRIVE PINION NUT****22. INSTALL ADJUSTING NUT LOCKS**

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

Torque: 130 kg-cm (9 ft-lb, 13 N-m)

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