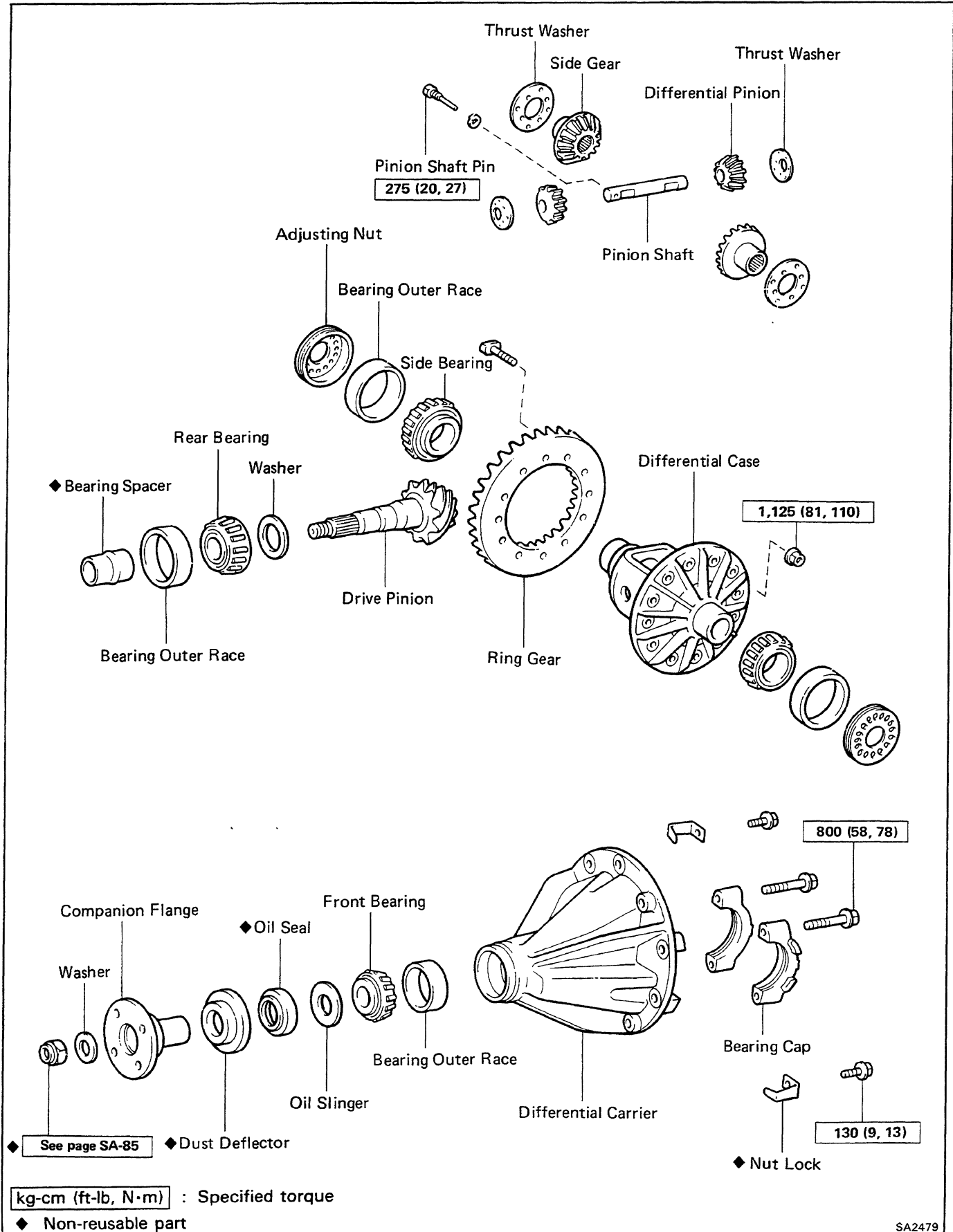
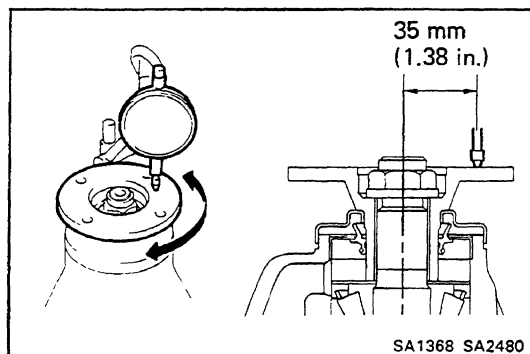


Differential Carrier COMPONENTS





INSPECTION OF DIFFERENTIAL CARRIER

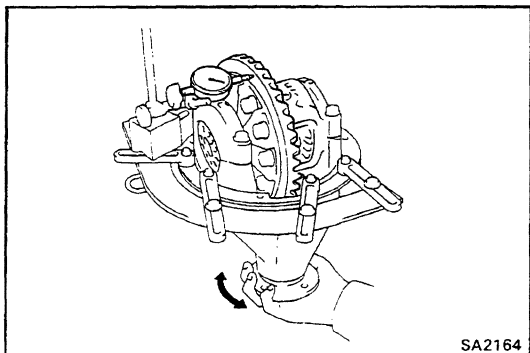
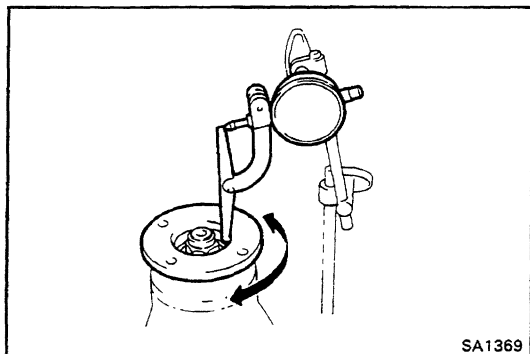
1. CHECK RUNOUT OF COMPANION FLANGE

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

Maximum vertical runout: 0.10 mm (0.0039 in.)

Maximum lateral runout: 0.10 mm (0.0039 in.)

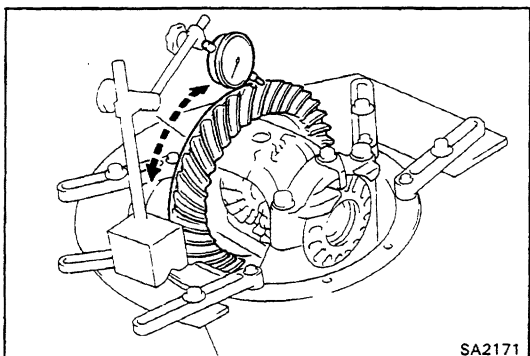
If the runout is greater than the maximum, replace the companion flange.



2. CHECK RING GEAR RUNOUT

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

Maximum runout: 0.10 mm (0.0039 in.)

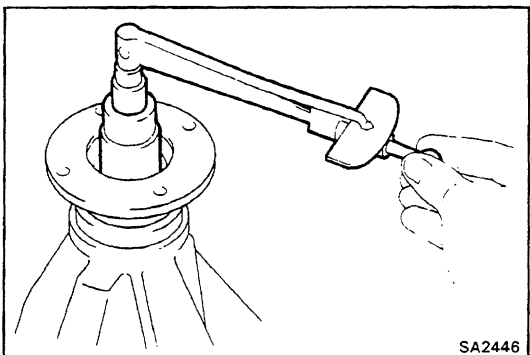


3. CHECK RING GEAR BACKLASH

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

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

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

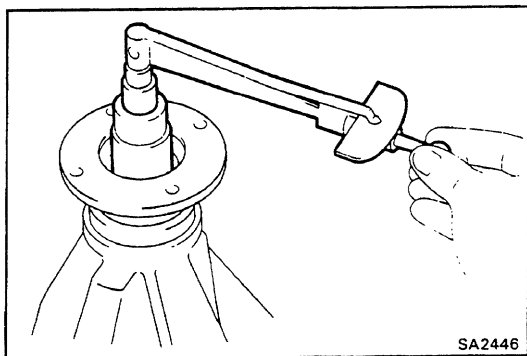


4. MEASURE DRIVE PINION PRELOAD

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

Preload (at starting): 7 – 10 kg-cm

(6.1 – 8.7 in.-lb, 0.7 – 1.0 N-m)



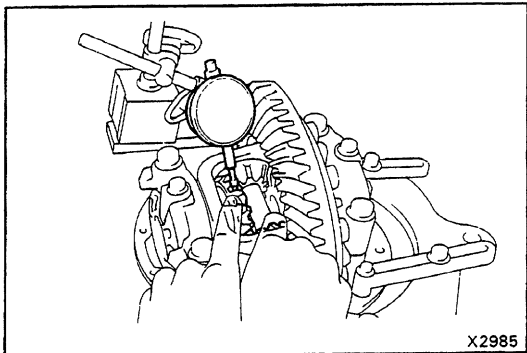
5. CHECK TOTAL PRELOAD

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 – 0.6 N-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.

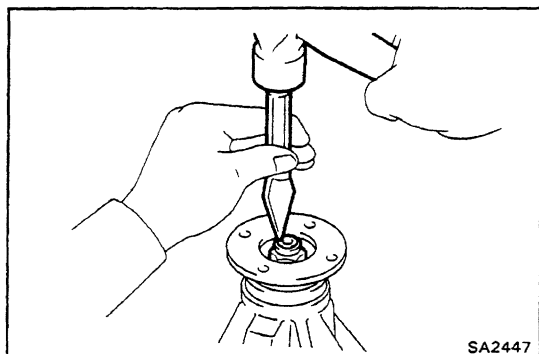
Standard backlash: 0.02 – 0.20 mm

(0.0008 – 0.0079 in.)

If the backlash is out of specification, install the correct thrust washers. (See page [SA-78](#))

7. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(See step 12 on page [SA-83](#))

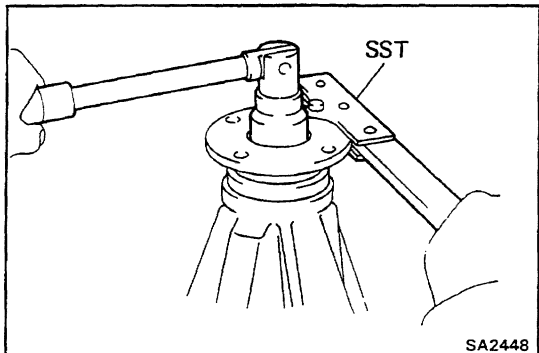


DISASSEMBLY OF DIFFERENTIAL CARRIER

(See page [SA-71](#))

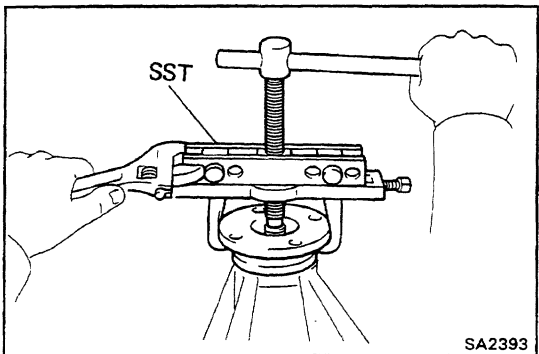
1. REMOVE COMPANION FLANGE

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

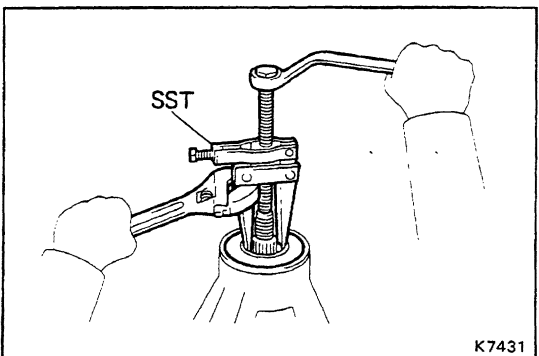


- (b) Using SST to hold the flange, remove the nut and plate washer.

SST 09330-00021

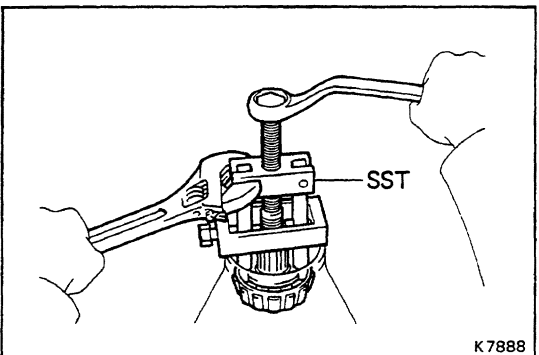


- (e) Using SST, remove the companion flange.
SST 09950-20017



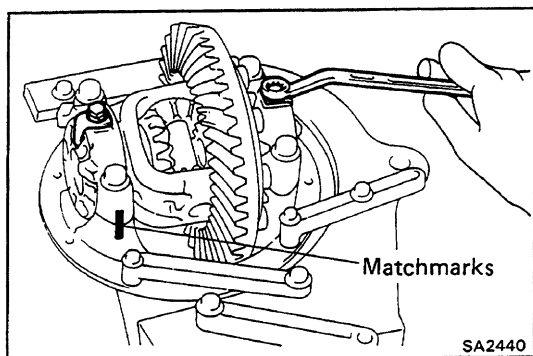
2. REMOVE FRONT OIL SEAL AND OIL SLINGER

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



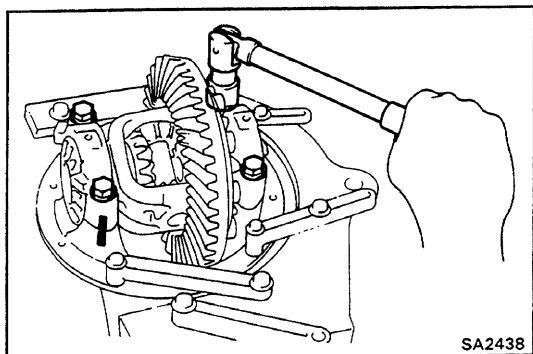
3. REMOVE FRONT BEARING

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

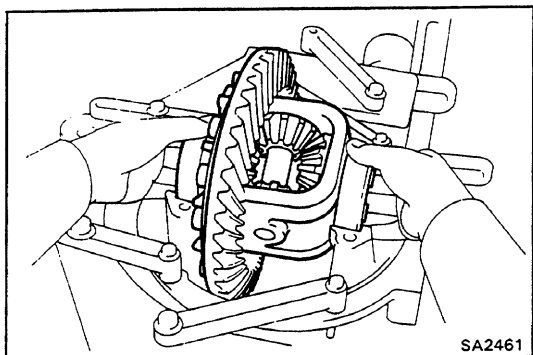


4. REMOVE DIFFERENTIAL CASE

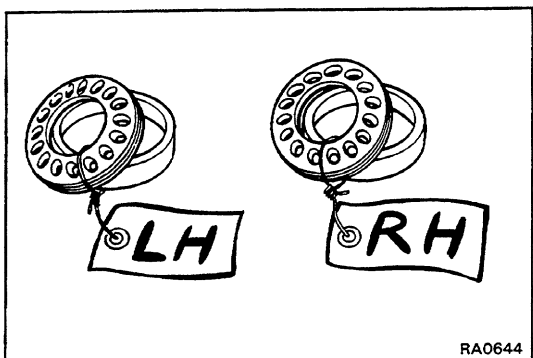
- (a) Place matchmarks on the bearing cap and differential carrier.
- (b) Remove the two adjusting nut locks.



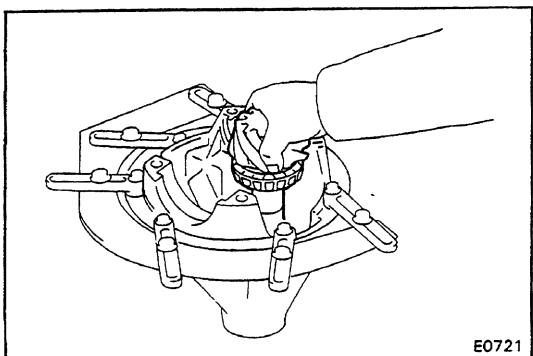
- (c) Remove the four bolts and the two bearing caps.
- (d) Remove the two adjusting nuts.



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

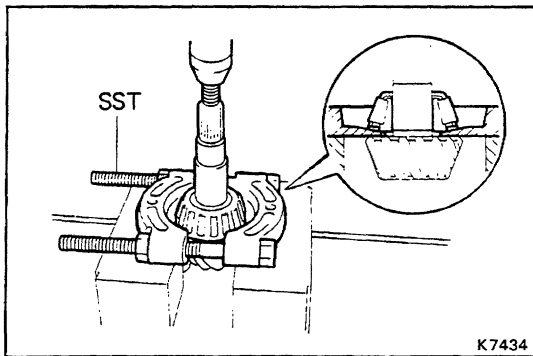


HINT: Tag the disassembled parts to show the location for reassembly.



5. REMOVE DRIVE PINION AND BEARING SPACER

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



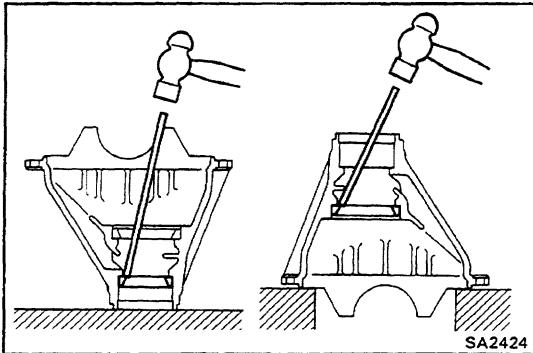
6. REMOVE DRIVE PINION REAR BEARING

- (a) Using SST, press out the rear bearing from the drive pinion.

SST 09950-00020

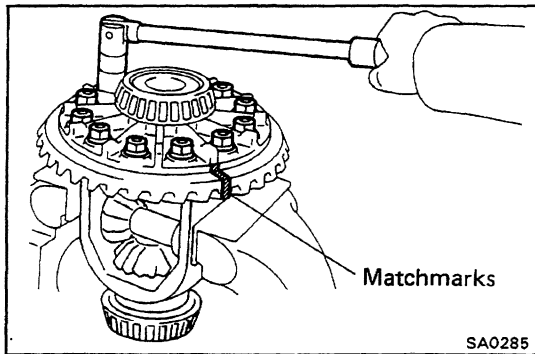
HINT: If the drive pinion or ring gear are damaged replace them as a set.

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



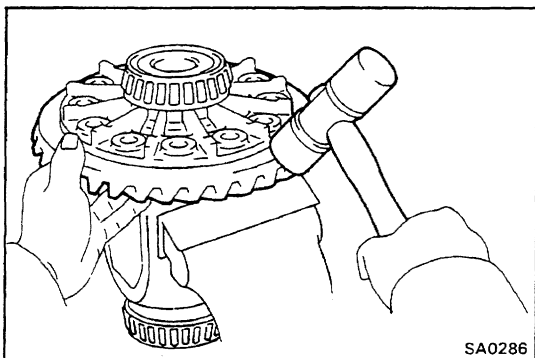
7. REMOVE FRONT AND REAR BEARING OUTER RACE

Using a hammer and brass bar, drive out the outer race from the carrier.



8. REMOVE RING GEAR

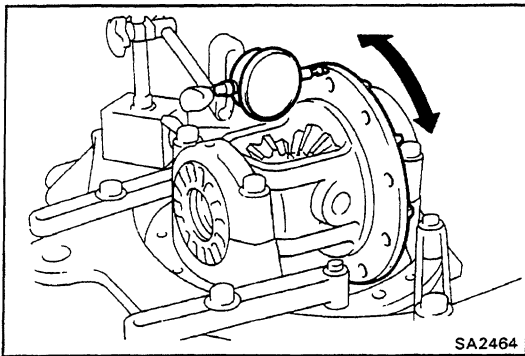
- (a) Place matchmarks on the ring gear and differential case.
(b) Remove the twelve nuts and twelve bolts.



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

9. CHECK DIFFERENTIAL CASE 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, install the adjusting nuts.
(d) Align the matchmarks on the bearing cap and differential carrier.
(e) Install and uniformly tighten the four bearing cap bolts in several passes.

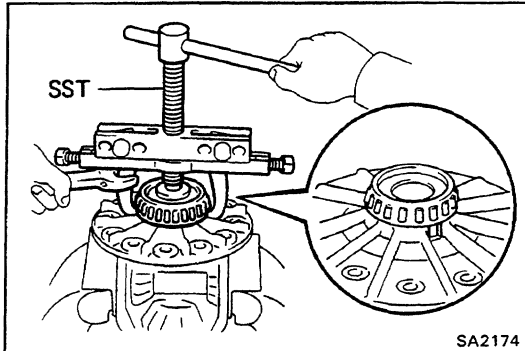


(f) Using a dial indicator, measure the differential case runout.

Maximum runout: 0.07 mm (0.0028 in.)

(g) Remove the differential case.

(See step 4 on page SA-75).

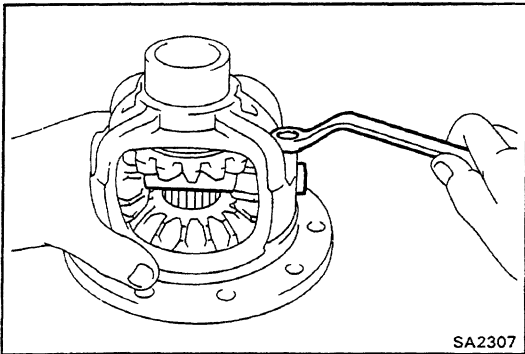


10. REMOVE SIDE BEARINGS

Using SST, remove the side bearing from the differential case.

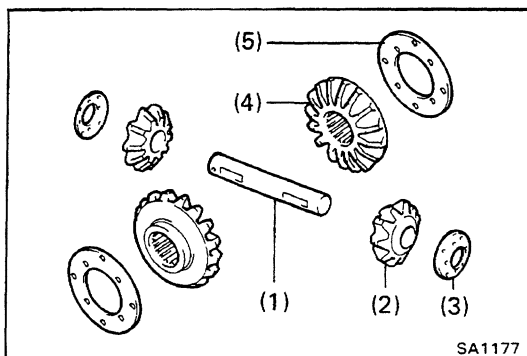
SST 09950-20017

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



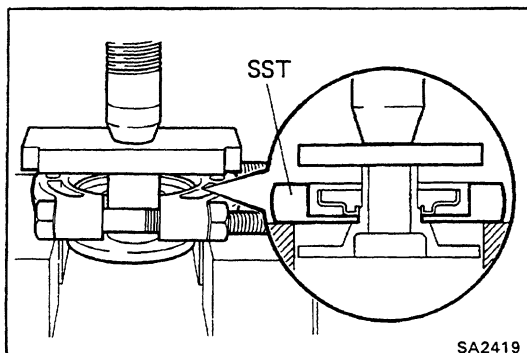
11. DISASSEMBLE DIFFERENTIAL CASE

(a) Remove the pinion shaft 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

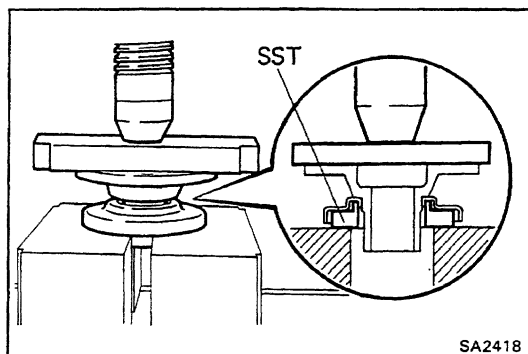


REPLACEMENT OF DUST DEFLECTOR

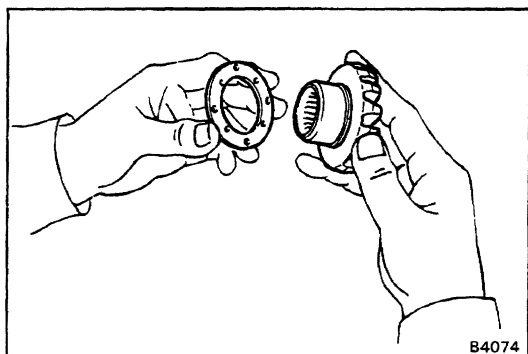
REPLACE COMPANION FLANGE DUST DEFLECTOR

(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

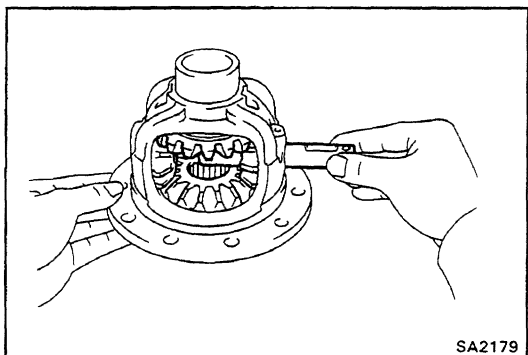
(See page SA-71)

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: 0.02 – 0.20 mm
(0.008 – 0.0079 in.)

Thrust washer thickness	mm (in.)
1.55 – 1.65	(0.0610 – 0.0650)
1.70 – 1.80	(0.0669 – 0.0709)
1.85 – 1.95	(0.0728 – 0.0768)
2.00 – 2.10	(0.0787 – 0.0827)



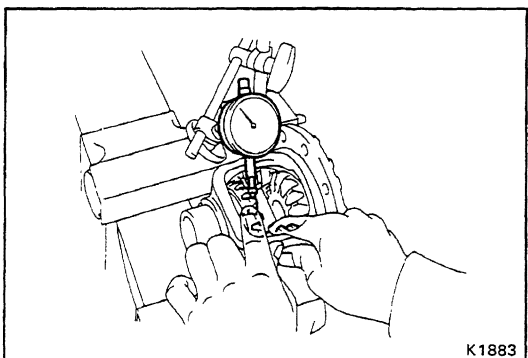
(b) Install thrust washers and side gears in the differential case.
HINT: Align the hole for the pinion shaft with the case hole.

(c) Check the side gear backlash.

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

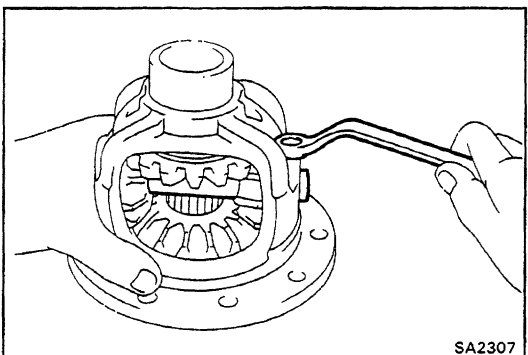
Standard backlash: 0.02 – 0.20 mm
(0.008 – 0.0079 in.)

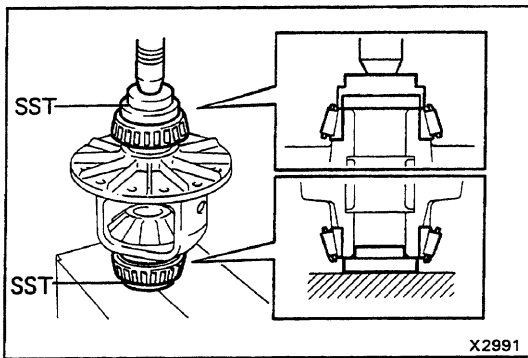
If the backlash is not within specification, install a thrust washer of different thickness.



(d) Install the pinion shaft pin.

Torque: 275 kg-cm (20 ft-lb, 27 N-m)

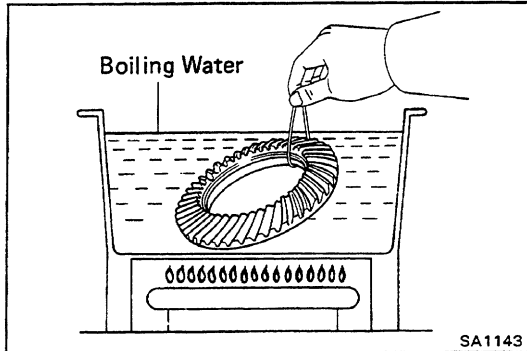




2. INSTALL SIDE BEARINGS

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

SST 09315-00021 and 09550-10012 (09558-10010)



3. INSTALL RING GEAR ON DIFFERENTIAL CASE

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

(b) Heat the ring gear in boiling water.

(c) 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.

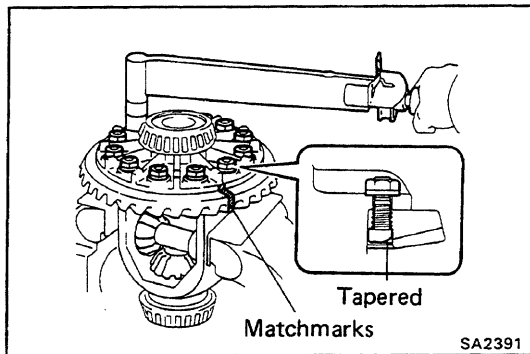
(d) Temporarily install the twelve bolts and twelve nuts so that the bolt holes in the ring gear and differential case are not misaligned.

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.

(e) After the ring gear has cooled sufficiently, torque the ring gear set nuts.

Torque: 1,125 kg-cm (81 ft-lb, 110 N-m)



4. INSPECT RING GEAR RUNOUT

(a) Install the differential case onto the carrier.

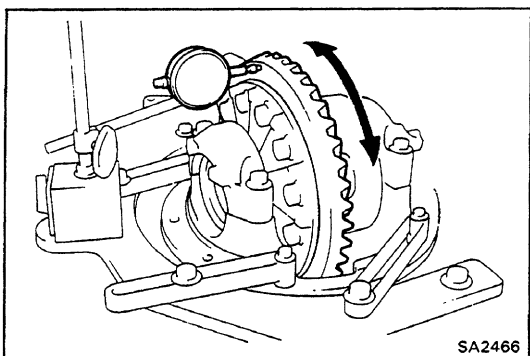
(b) Install bearing caps. (See step 10 on page [SA-81](#))

(c) Using a dial indicator, measure the runout of ring gear.

Maximum runout: 0.10 mm (0.0039 in.)

(d) Remove the differential case.

(See step 4 on page [SA-75](#))



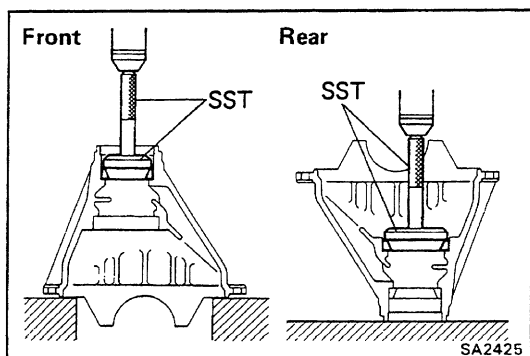
5. INSTALL DRIVE PINION BEARING OUTER RACES

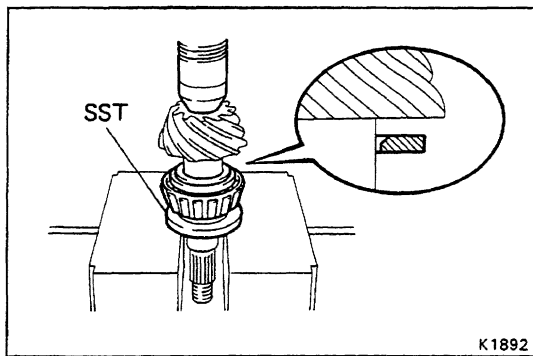
Using SST and a press, install the outer races.

SST 09608-35014

Front (09608-06020, 09608-06110)

Rear (09608-06020, 09608-06180)





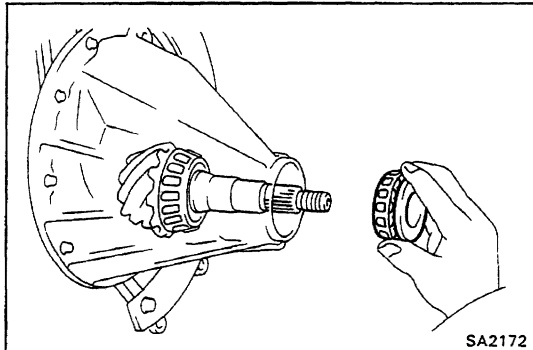
6. INSTALL DRIVE PINION REAR BEARING

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

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 to the drive pinion.

SST 09506-35010

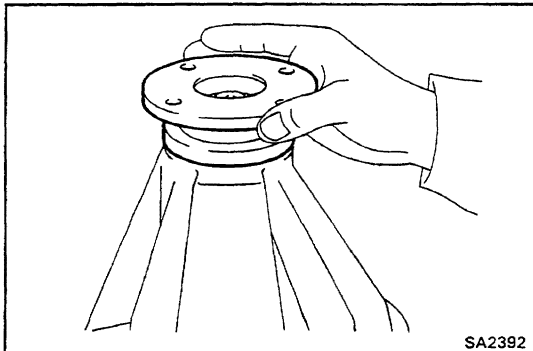


7. TEMPORARILY ADJUST DRIVE PINION PRELOAD

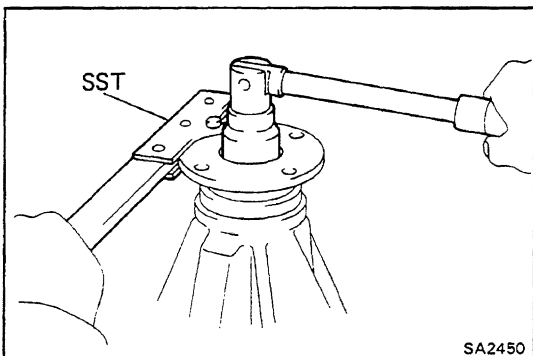
- (a) Install the drive pinion and front bearing.

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

- (b) Install the oil slinger.



- (c) install the companion flange and plate washer.



- (d) Adjust the drive pinion preload by tighten the companion flange nut.

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

SST 09330-00021

NOTICE:

- Coat the nut and the screw portion 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 it.

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

Preload (at starting):

New bearing

13 – 20 kg-cm

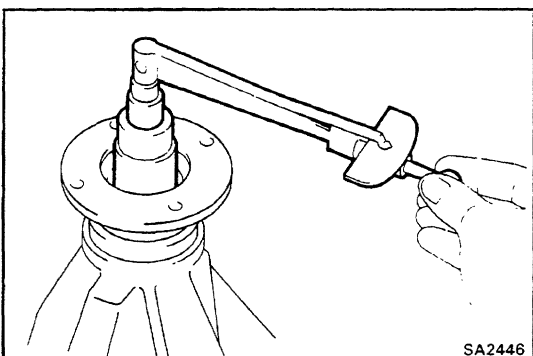
(11.3 – 17.4 in.-lb, 1.3 – 2.0 N-m)

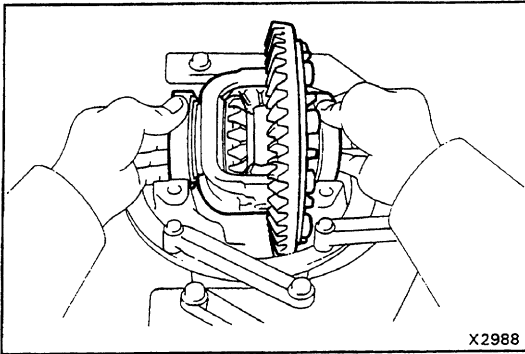
Reused bearing

7 – 10 kg-cm

(6.1 – 8.7 in.-lb, 0.7 – 1.0 N-m)

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

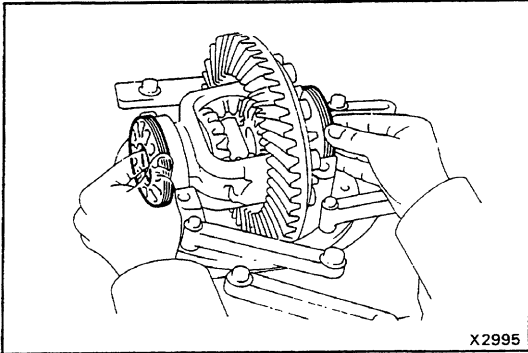




8. INSTALL DIFFERENTIAL CASE IN CARRIER

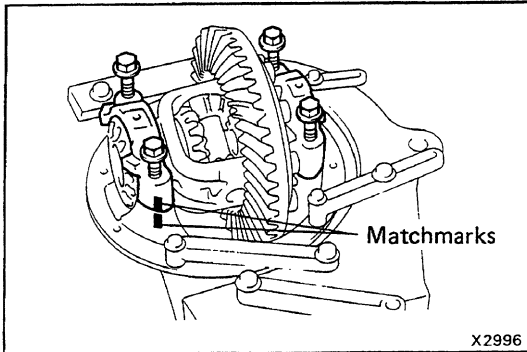
- (a) Place the bearing outer races on their respective bearings. Make sure that the left and right outer races are not interchanges.
- (b) Install the case in the carrier.

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



9. INSTALL ADJUSTING NUTS

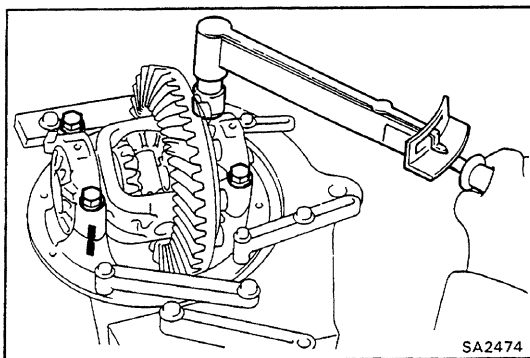
Install the adjusting nuts on the carrier, making sure that the nuts are threaded properly.



10. 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.



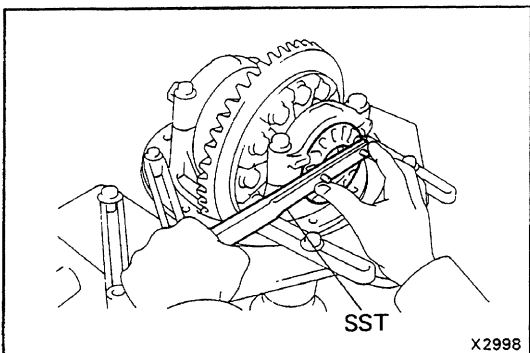
11. ADJUST SIDE BEARING PRELOAD

- (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

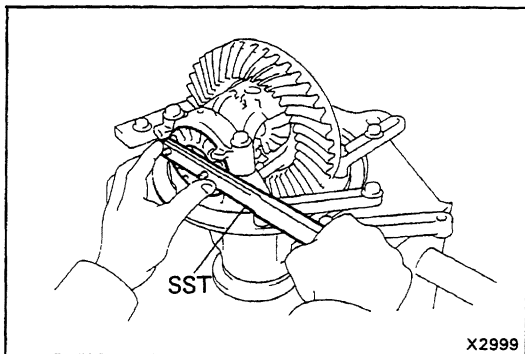
Torque: 800 kg-cm (58 ft-lb, 78 N-m)

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



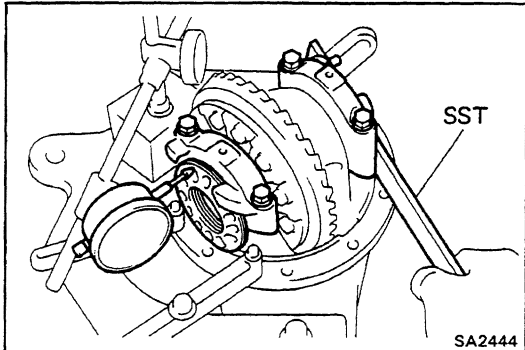
- (c) Using SST, tighten the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.).

SST 09504-00011

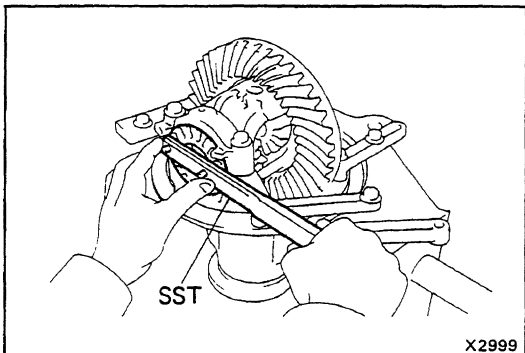


- (d) While turning the ring gear, use SST to fully tighten the adjusting nut on the drive pinion side.
After the bearings are settled, loosen the adjusting nut on the drive pinion side.

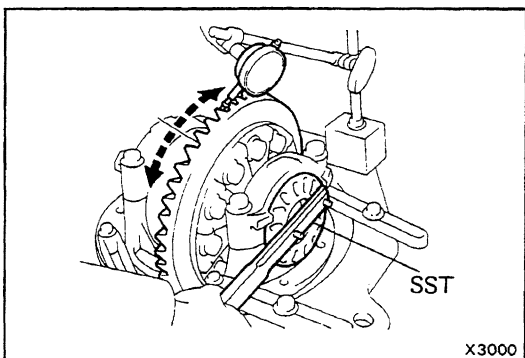
SST 09504-00011



- (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.



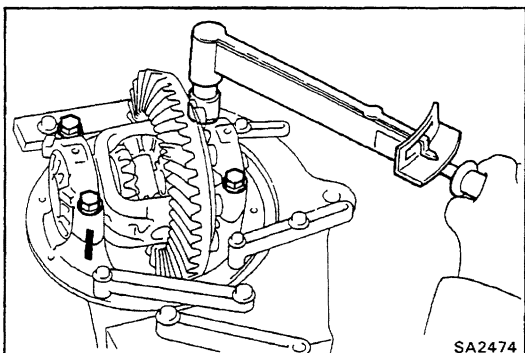
- (g) Tighten the adjusting nut 1 – 1 1/2 notches from the zero preload position.



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

Backlash: 0.15 – 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 tighten the nut on the right side one notch.

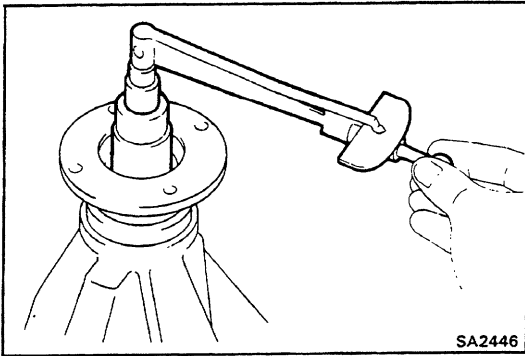


- (i) Torque the bearing cap bolts.

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

- (j) Recheck the ring gear backlash.

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



SA2446

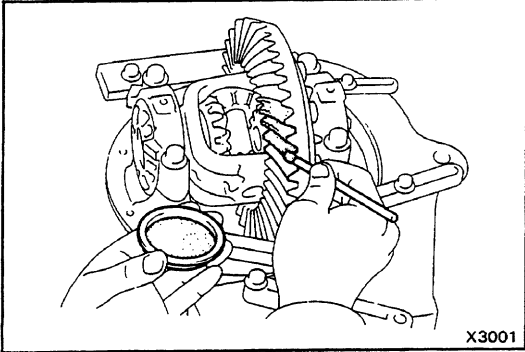
(k) Using a torque meter, measure the total preload.

Total preload (at starting):

Add drive pinion preload

4 – 6 kg-cm

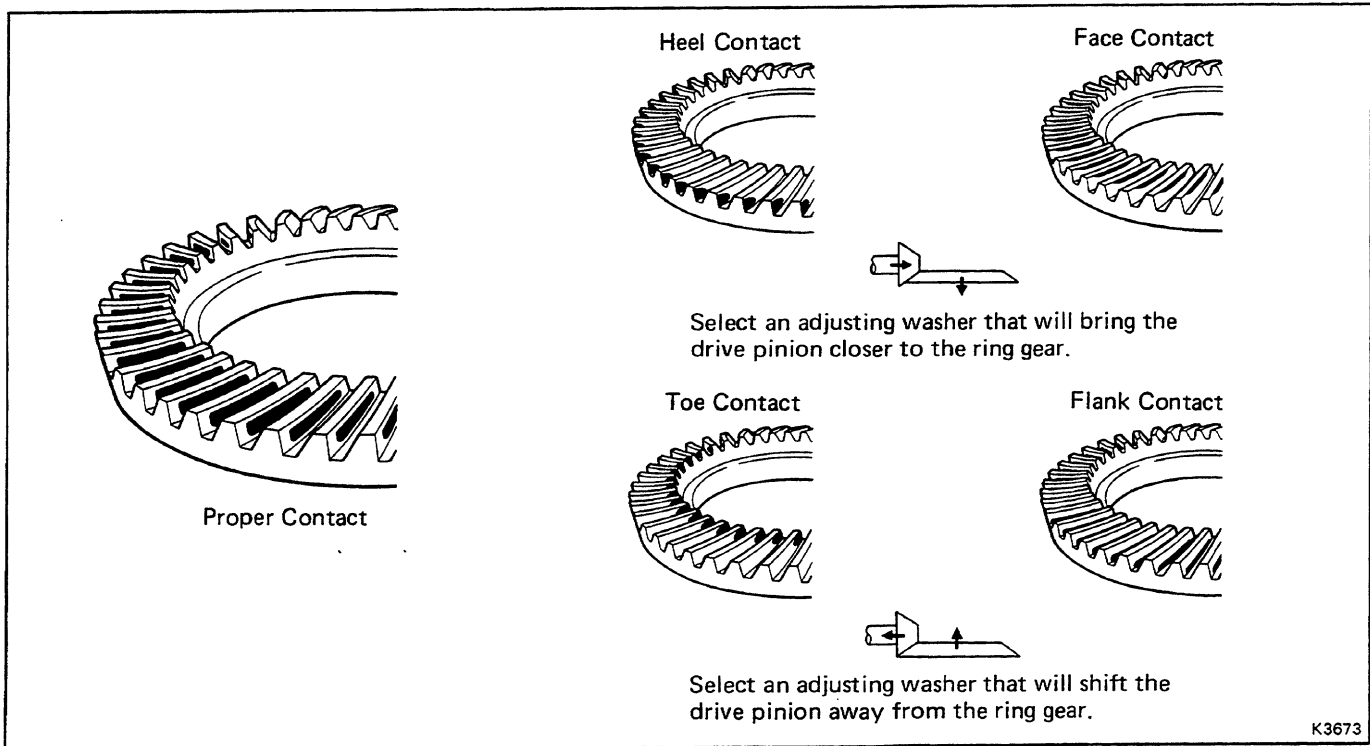
(3.5 – 5.2 in.-lb, 0.4 – 0.6 N-m)



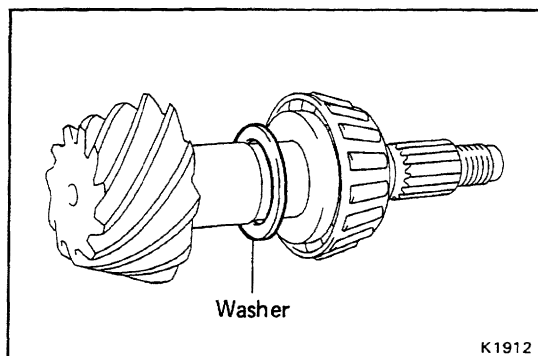
X3001

12. 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.

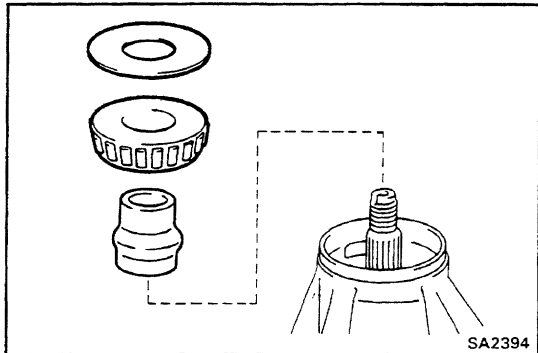


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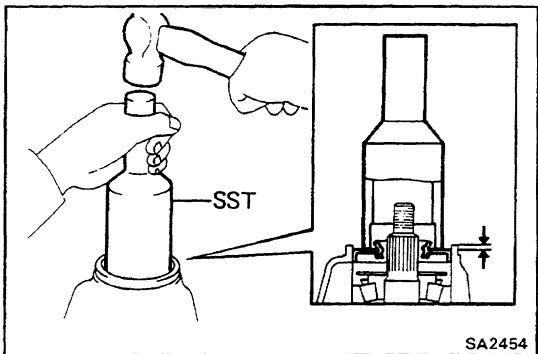
If the teeth are not contacting properly, use the following chart to select a proper washer for correction.
HINT: In the case of face contact or flank contact, it may be possible to make the adjustment within the backlash specification limits.

Washer thickness		mm (in.)
1.05	(0.0413)	1.35 (0.0531)
1.10	(0.0433)	1.40 (0.0551)
1.15	(0.0453)	1.45 (0.0571)
1.20	(0.0472)	1.50 (0.0591)
1.25	(0.0492)	1.55 (0.0610)
1.30	(0.0512)	



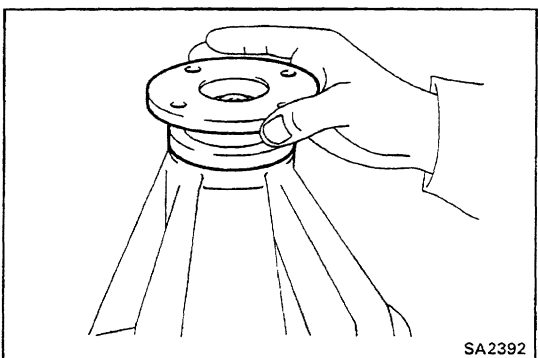
13. INSTALL NEW BEARING SPACER

- Remove the companion flange.
(See step 1 on page SA-74)
- Remove the oil slinger and front bearing.
(See steps 2, 3 on page SA-74)
- Install a new bearing spacer.
- Install the front bearing and oil slinger.



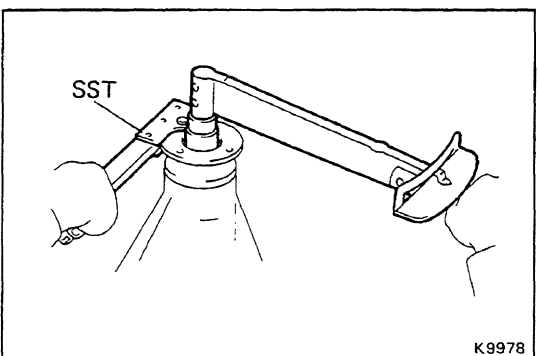
14. INSTALL NEW OIL SEAL

- Using SST and a hammer, install a new oil seal.
SST 09214-76011
Oil seal drive in depth: 1.0 mm (0.039 in.)
- Coat the lip of oil seal with MP grease.

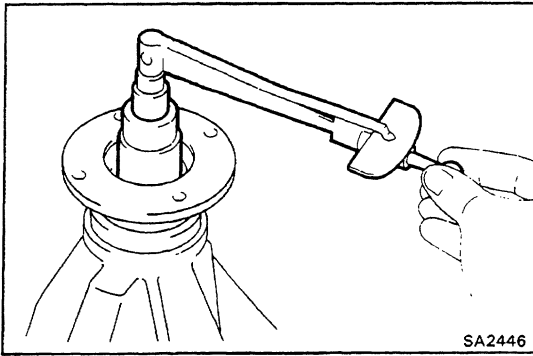


15. INSTALL COMPANION FLANGE

- Install the companion flange.



- Install the plate washer and a new nut.
HINT: Coat the threads of nut with gear oil.
- Using SST to hold the flange, tighten the nut.
SST 09330-00021
Torque: 2,500 kg-cm (181 ft-lb, 245 N-m)



16. 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

13 – 20 kg-cm

(11.3 – 17.4 in.-lb, 1.3 – 2.0 N-m)

Reused bearing

7 – 10 kg-cm

(6.1 – 8.7 in.-lb, 0.7 – 1.0 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: 4,500 kg-cm (32S ft-lb, 441 N-m)

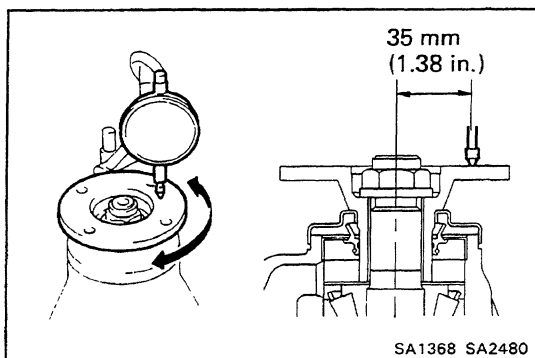
If everything is normal, coat the threads with gear oil, then repeat the above operation.

17. RECHECK RING GEAR BACKLASH

(See step 3 on page [SA-72](#))

18. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(See step 12 on page [SA-83](#))



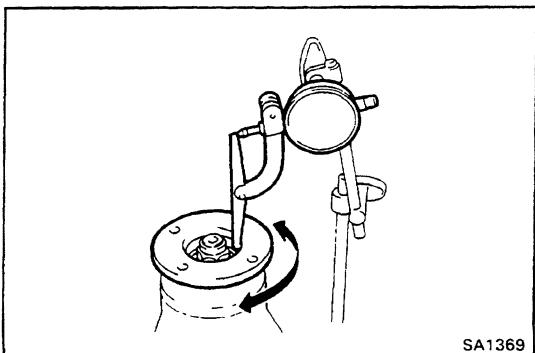
19. CHECK RUNOUT OF COMPANION FLANGE

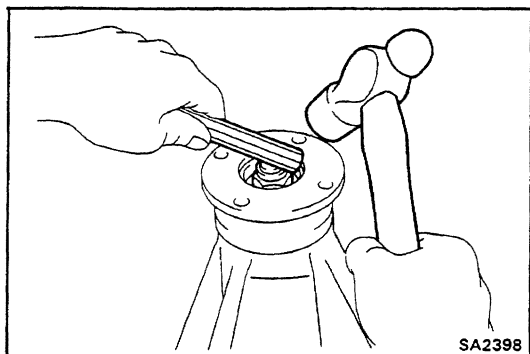
Using a dial indicator, measure the lateral and radial runout of the companion flange.

Maximum vertical runout: 0.10 mm (0.0039 in.)

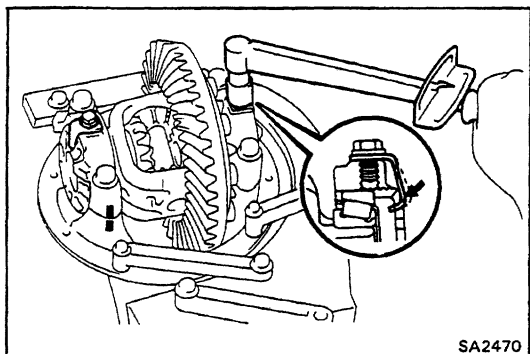
Maximum lateral runout: 0.10 mm (0.0039 in.)

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





20. STAKE DRIVE PINION NUT



21. INSTALL ADJUSTING NUT LOCKS

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

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

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