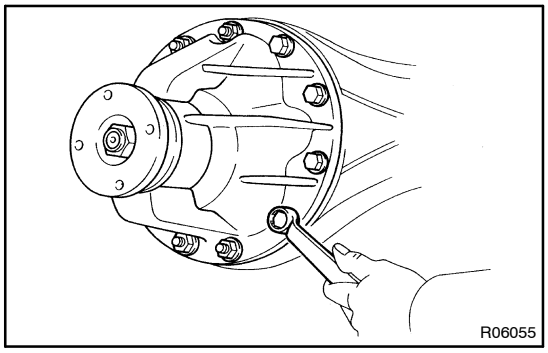
2907U–01

OVERHAUL

1. DRAIN DIFFERENTIAL OIL (See page 29–2)
2. REMOVE REAR AXLE SHAFT (See page 30–72 or 30–75)
3. REMOVE PROPELLER SHAFT ASSY (See page 30–4 or 30–11)

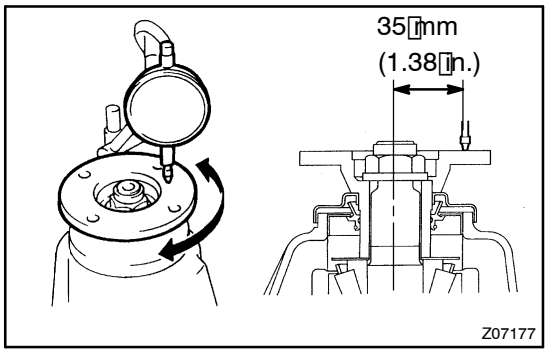


4. REMOVE DIFFERENTIAL CARRIER ASSY REAR

(a) Remove the 8 bolts, 4 nuts, 4 washers and the differential carrier assy, and then remove the gasket.

NOTICE:

Be careful not to damage the installation surface.

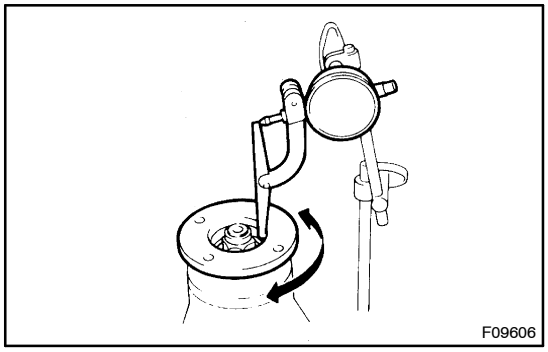


5. INSPECT DIFFERENTIAL CARRIER ASSY REAR

(a) Check the companion flange.

(1) Using a dial indicator, measure the longitudinal runout.

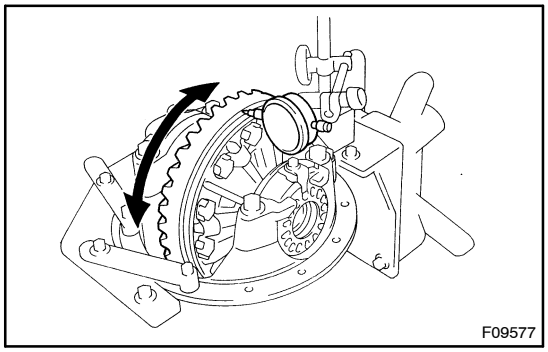
Maximum longitudinal runout: 0.10 mm (0.0039 in.)



(2) Using a dial indicator, measure the lateral runout .

Maximum lateral runout: 0.15 mm (0.0059 in.)

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

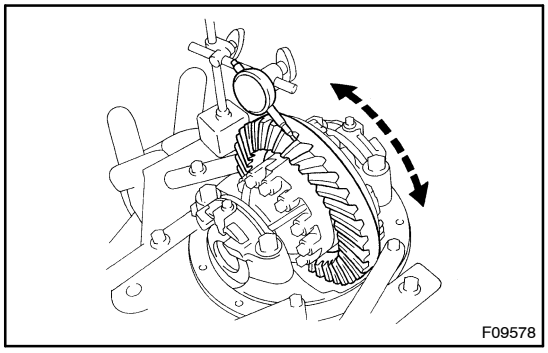


(b) Check the ring gear.

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

Maximum runout: 0.10 mm (0.0039 in.)

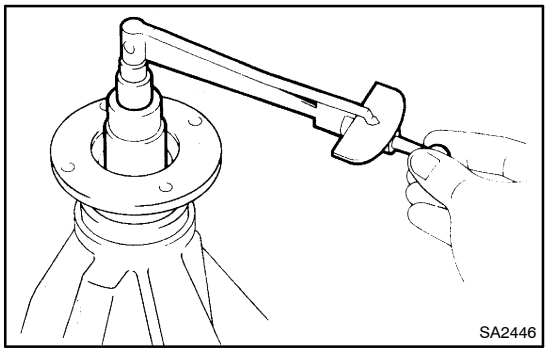
If the runout is greater than the maximum, replace the ring gear.


F09578

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

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

HINT:
Perform the measurements at 3 or more positions around the circumference of the ring gear.
If the backlash is not as specified, adjust the side bearing preload as necessary.


SA2446

(c) Check the drive pinion preload.
(1) Using a torque wrench, measure the maximum torque within the backlash between the drive pinion and ring gear when the companion flange begins to rotate.

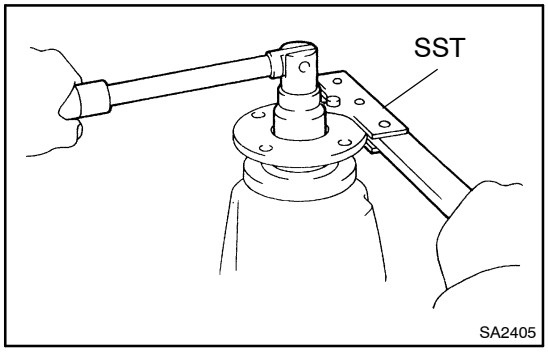
Drive pinion preload:
1.00 – 2.76 N·m (10.2 – 28.1 kgf·cm, 7.4 – 20.3 in.·lbf)

If the preload is not as specified, check around the drive pinion bearings.

(d) Check the total preload.
(1) Using a torque wrench, measure the maximum torque without the backlash between the drive pinion and ring gear when the companion flange begins to rotate.

Total preload:
Drive pinion preload + 0.2 – 0.39 N·m (2 – 4 kgf·cm, 1.7 – 3.5 in.·lbf)

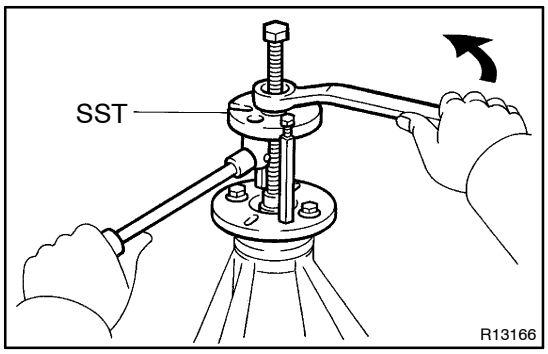
If the preload is not as specified, inspect the differential carrier assembly.



SA2405

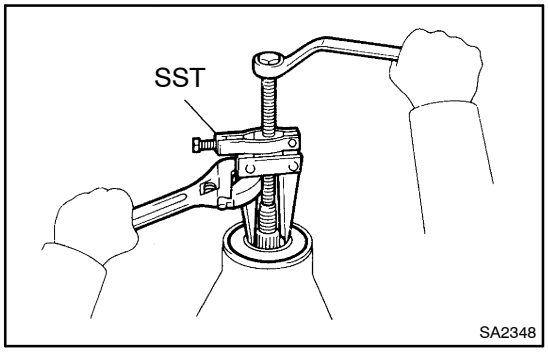
6. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB–ASSY REAR

(a) Using a chisel and a hammer, unstake the nut.
(b) Using SST, hold the flange and remove the nut.
SST 09330–00021



R13166

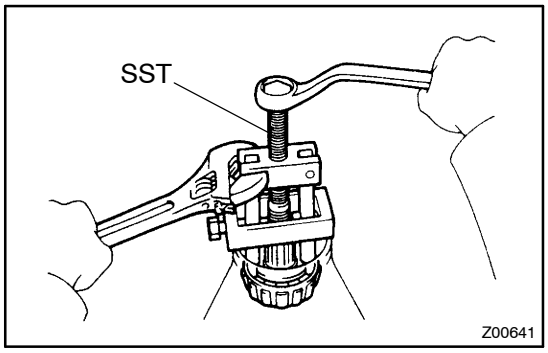
(c) Using SST, remove the companion flange.
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03040)



7. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL

(a) Using SST, remove the oil seal from the differential carrier.
SST 09308–10010

8. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



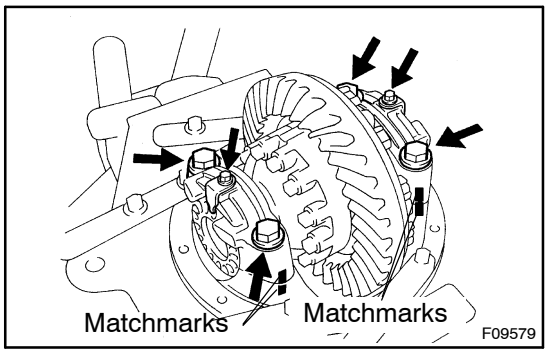
9. REMOVE FRONT BEARING

(a) Using SST, remove the bearing from the drive pinion.
SST 09556–22010

If the front bearing is damaged or worn, replace the bearing.

(b) Remove the 2 shims.

(c) Remove the bearing spacer.



10. REMOVE REAR DIFFERENTIAL CASE SUB–ASSY

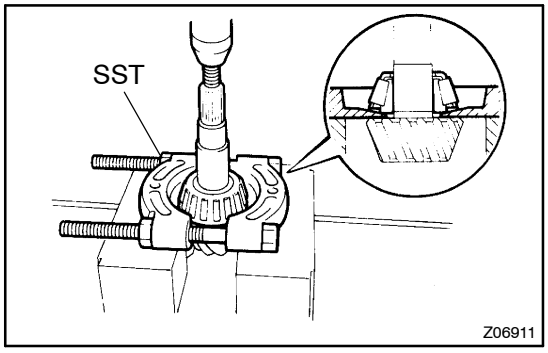
(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the 2 adjusting nut locks.

(c) Remove the 4 bolts, 2 bearing caps and adjusting nuts.

(d) Remove the differential case together with bearing outer races from the carrier.

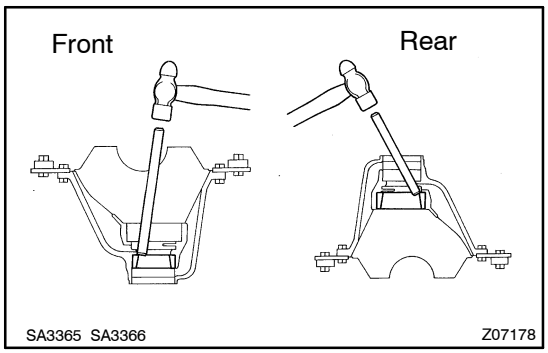
HINT:
Tag the removed parts to show the location for installation.



11. REMOVE DRIVE PINION REAR BEARING

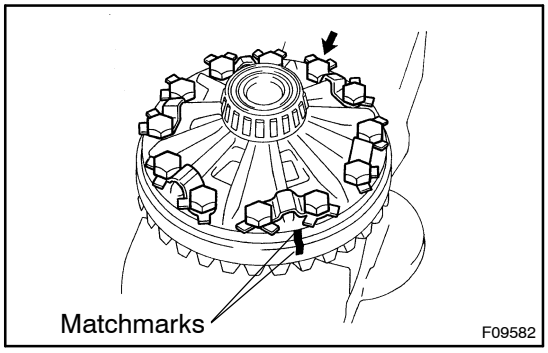
(a) Using SST and a press, press out the bearing from the drive pinion.
SST 09950–00020

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



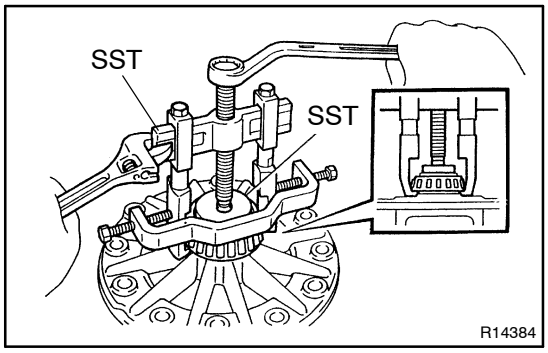
12. REMOVE FRONT AND REAR BEARING OUTER RACES

(a) Using a bar and hammer, tap out the outer races.



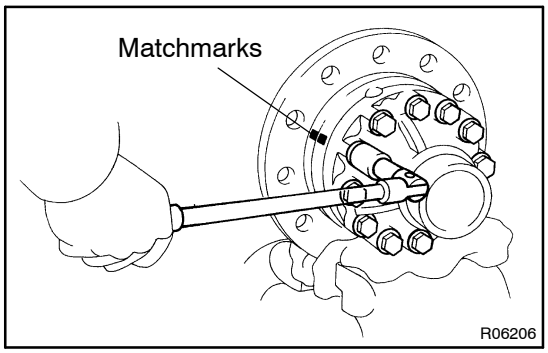
13. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.
(b) Using a screwdriver, unstake the lock plates.
(c) Remove the 12 bolts and 6 lock plates.
(d) Using a plastic hammer, remove the ring gear to separate it from the differential case.



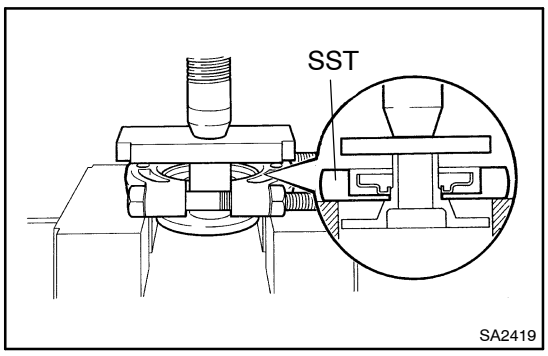
14. REMOVE REAR DIFFERENTIAL CASE BEARING

(a) Using SST, remove the 2 side bearings from the differential case.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04010) 09950–60010 (09951–00480)



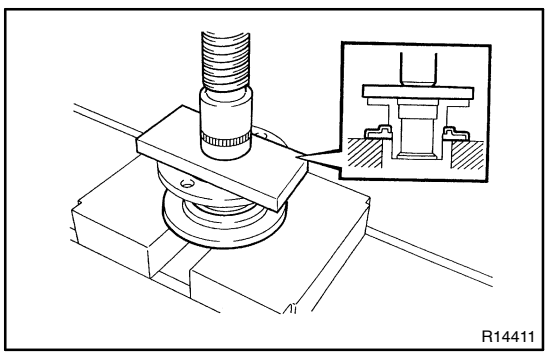
15. REMOVE PINION AND SIDE GEARS

(a) Place matchmarks on the LH and RH cases.
(b) Protect the ring gear attaching face with a cloth and secure it in a vice. Then remove the 12 bolts.
(c) Using a plastic hammer, separate the LH and RH cases.
(d) Remove the 4 pinion gear thrust washers.
(e) Remove the 4 pinion gears.
(f) Remove the 2 side gears.
(g) Remove the 2 side gears thrust washers.
(h) Remove the spider.



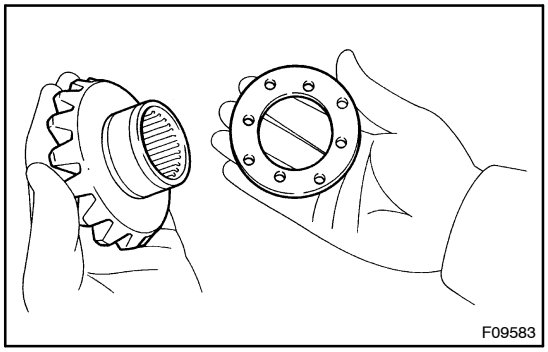
16. REMOVE REAR DIFFERENTIAL DUST DEFLECTOR

(a) Using SST and a press, press out the dust deflector from the companion flange.
SST 09950–60010 (09951–00480), 09950–70010 (09951–07150)



17. INSTALL REAR DIFFERENTIAL DUST DEFLECTOR

(a) Using a press, press in a new dust deflector.


F09583

18. ADJUST DIFFERENTIAL SIDE GEAR BACKLASH

(a) Install the thrust washer on the side gears.

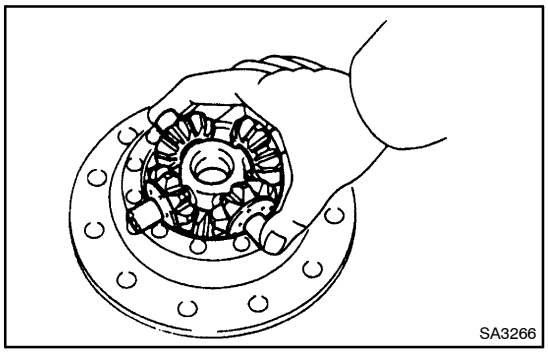
HINT:

Select thrust washers that allow the backlash to be within the specification.

Thrust washer:

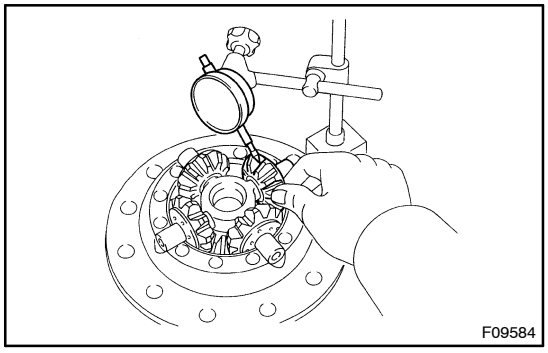
1.55 mm (0.0610 in.)	1.60 mm (0.0630 in.)
1.65 mm (0.0650 in.)	1.70 mm (0.0670 in.)
1.75 mm (0.0689 in.)	1.80 mm (0.0709 in.)
1.85 mm (0.0728 in.)	1.90 mm (0.0748 in.)
1.95 mm (0.0768 in.)	2.00 mm (0.0787 in.)
2.05 mm (0.0807 in.)	2.10 mm (0.0827 in.)

(b) Install the side gear to the LH case.


SA3266

(c) Install the 4 pinion gears and thrust washers to the spider.

(d) Install the spider with the pinion gears to the LH case.


F09584

(e) Holding the side gear, measure the side gear backlash.

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

HINT:

- Measure the backlash at the RH case and LH case.
- If the backlash is not within the specification, install a thrust washer with a different thickness.
- Use thrust washers with the same thickness on both the right and left sides.

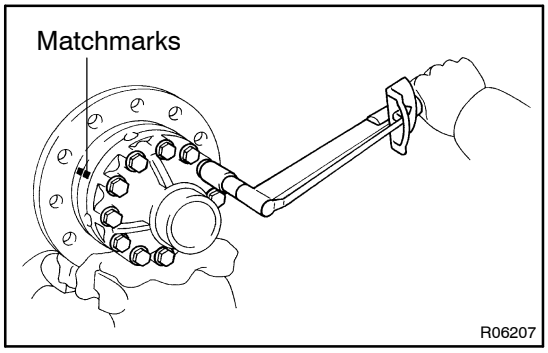
(f) Install the side gear and thrust washer to the RH case.

(g) Apply gear oil to each part.

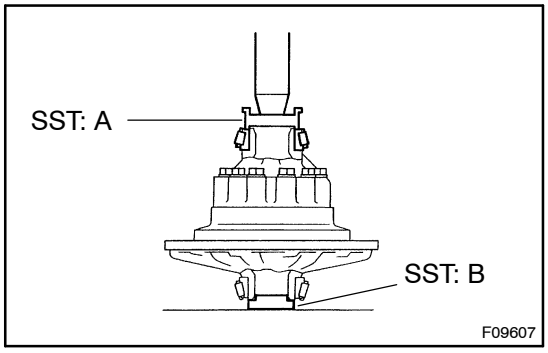
(h) Align the matchmarks on the LH and RH cases.

(i) Install the 12 bolts.

Torque: 78.5 N·m (800 kgf·cm, 58 ft·lbf)



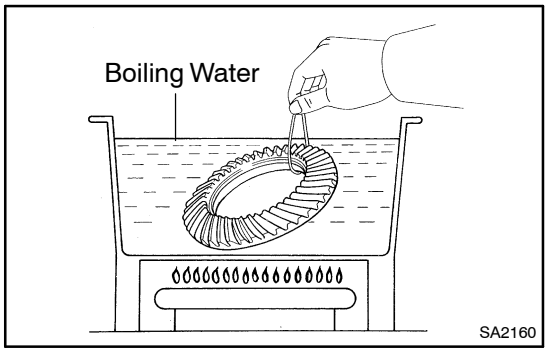
R06207



19. INSTALL REAR DIFFERENTIAL CASE BEARING

(a) Using SST and a press, install the 2 side bearings to the differential case.

SST A: 09316–20011
B: 09950–60010 (09951–00500)



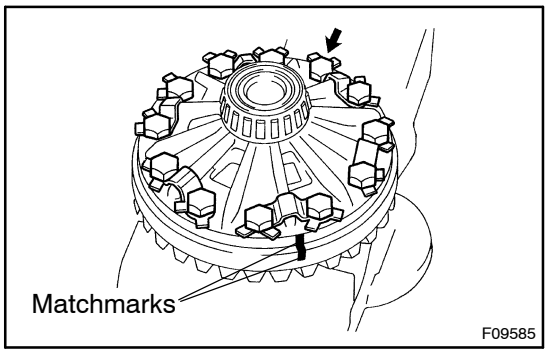
20. INSTALL RING GEAR

(a) Heat the ring gear in boiling water.

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

(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.

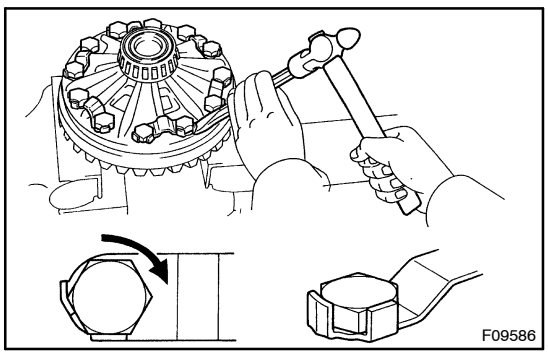


(d) Install 6 new lock plates and temporarily install the 12 bolts so that the bolt holes in the ring gear and differential case are not misaligned.

NOTICE:
The ring gear set bolts should not be tightened until the ring gear has sufficiently cooled down.

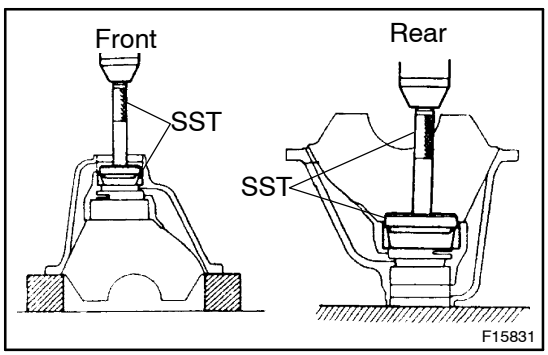
(e) After the ring gear has sufficiently cooled down, tighten the ring gear set bolts.

Torque: 161.8 N·m (1,650 kgf·cm, 119 ft·lbf)



(f) Using a hammer and a chisel, stake the lock plates.

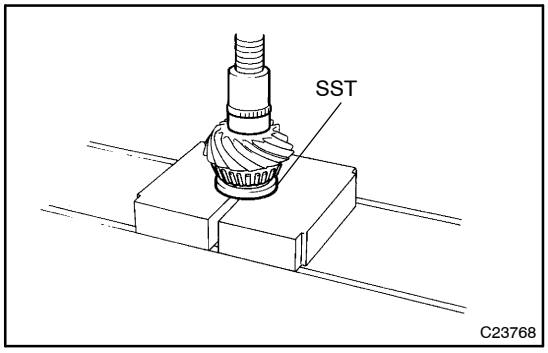
HINT:
Stake one claw flush with the flat surface of the nut. Since the claw touches the protruding portion of the nut, stake the half of it on the tightening side.



21. INSTALL FRONT AND REAR BEARING OUTER RACE

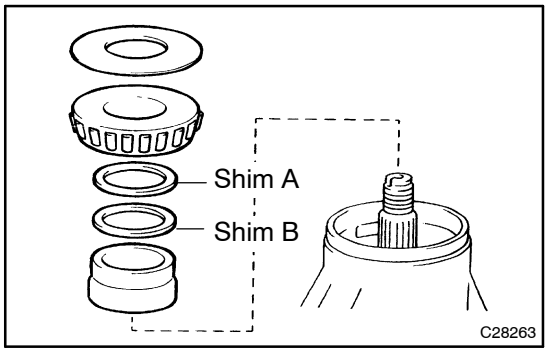
(a) Using SST and a press, press in new outer races.

SST Front: 09950–60020 (09951–00780),
09950–70010 (09951–07150)
Rear: 09950–60020 (09951–01030),
09950–70010 (09951–07150)



22. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

(a) Using SST and a press, press in the bearing onto the drive pinion.
SST 09506–35010



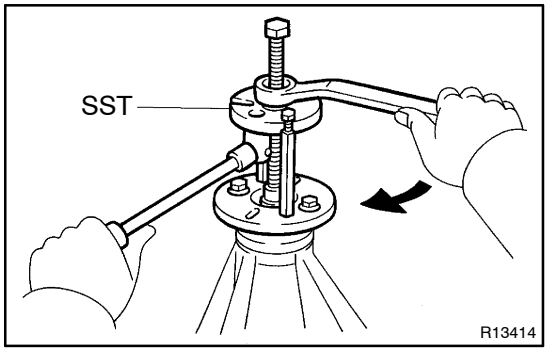
23. ADJUST DRIVE PINION PRELOAD

HINT:
When reusing the drive pinion bearings, skip steps (e), (f), (g) and (h).

(a) Install the drive pinion, spacer, shims A and B, front bearing and oil slinger.

HINT:

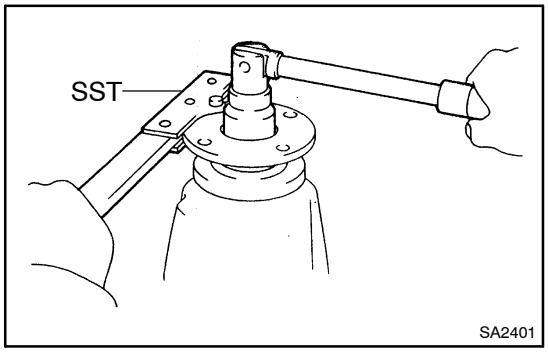
- When replacing the drive pinion bearings, install the thickest shim A and B.
- Assemble and install the oil seal after adjusting the total preload.
  Shim A: 90564–35035
  Shim B: 90564–35040



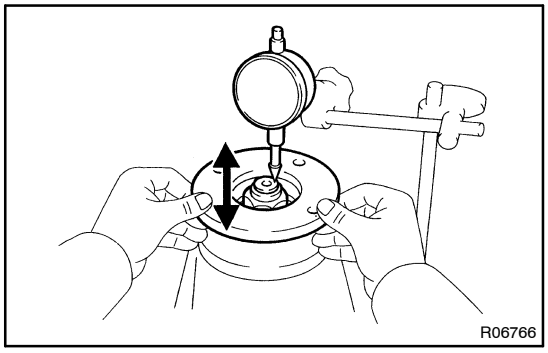
(b) Using SST, install the companion flange.
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03040)

(c) Install a new nut.

HINT:
Coat the threads of the nut with gear oil.



(d) Using SST, hold the flange and tighten the nut.
SST 09330–00021
Torque: 304 N·m (3,100 kgf·cm, 224 ft·lbf)


R06766

(e) Using a dial indicator, measure the drive pinion axial play and make a note of it.

(f) Calculate the value "T".
T = 4.89 mm (0.1925 in.) – Drive pinion axal play

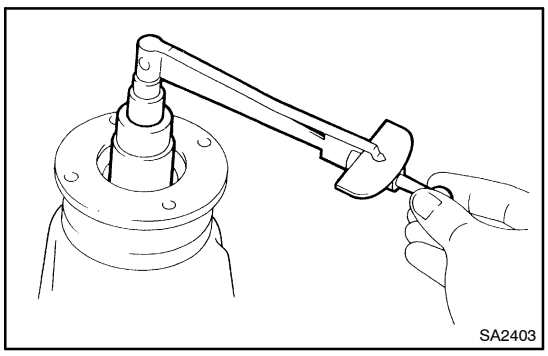
(g) Select shims A and B so that the sum of the 2 shims is closest to value "T".

Shim thickness:

Shim A thickness mm (in.) at interval of 0.1 (0.0039)	Shim B thickness mm (in.) at interval of 0.01 (0.0004)
1.90 (0.0748)	1.80 (0.0709)
2.00 (0.0787)	1.81 (0.0713)
2.10 (0.0827)	1.82 (0.0717)
2.20 (0.0866)	1.83 (0.0720)
2.30 (0.0906)	1.84 (0.0724)
2.40 (0.0945)	1.85 (0.0728)
2.50 (0.0948)	1.86 (0.0732)
2.60 (0.1024)	1.87 (0.0736)
2.70 (0.1063)	1.88 (0.0740)
2.80 (0.1102)	1.89 (0.0744)
2.90 (0.1142)	–
3.00 (0.1181)	–

(h) Remove the companion flange, front oil slinger, front bearing and 2 shims.

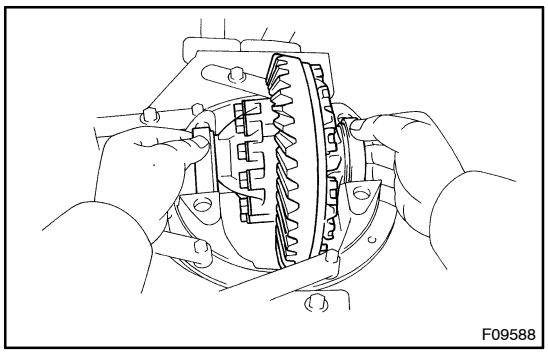
(i) Install the selected shims, front oil slinger and companion flange (See steps (a) to (d)).


SA2403

(j) Using a torque wrench, measure the drive pinion preload.
Preload (at starting):

New bearing	2.00 – 5.39 N·m (20.4 – 55 kgf·cm, 15 – 39.7 in.·lbf)
Reused bearing	1.00 – 2.76 N·m (10.2 – 28 kgf·cm, 7.4 – 20.3 in.·lbf)

HINT:
Measure the preload after snagging the bearing down by rotating it left and right several times.
If the preload is not as specified, adjust by increasing or decreasing the thickness of shims.


F09588

24. INSTALL REAR DIFFERENTIAL CASE SUB–ASSY

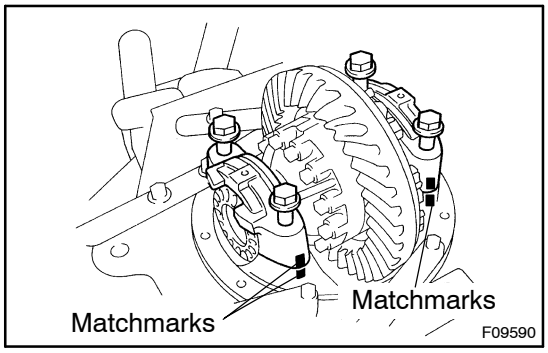
(a) Place the bearing outer races on their respective bearings.

NOTICE:
Check the left and right outer races are not interchanged.

(b) Install the differential case.

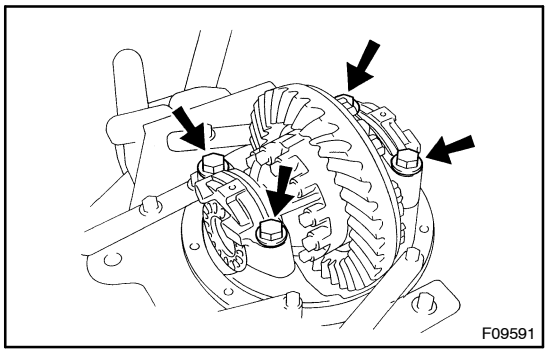
HINT:
Check that there is backlash between the ring gear and drive pinion.

(c) Install the 2 adjusting nuts on the carrier, making sure that the nuts are properly threaded.



(d) 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.

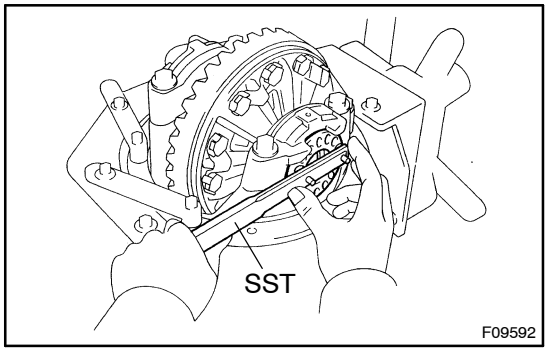
HINT:
If the bearing cap does not tightly fit the carrier, the adjusting nuts may not be properly threaded. Reinstall the adjusting nuts if necessary.



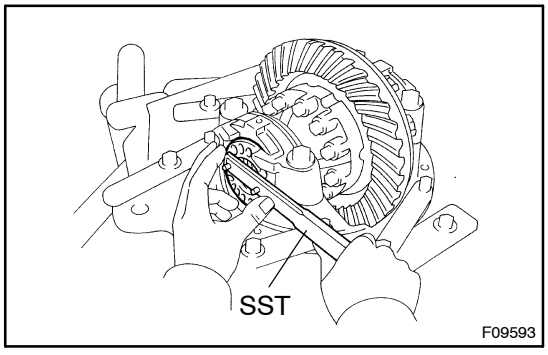
25. ADJUST SIDE BEARING PRELOAD

(a) Tighten the 4 bearing cap bolts to the specified torque, and then loosen them to the point where the adjusting nuts can be turned using SST.
SST 09504–00011
Torque: 196 N·m (2,000 kgf·cm, 145 ft·lbf)

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

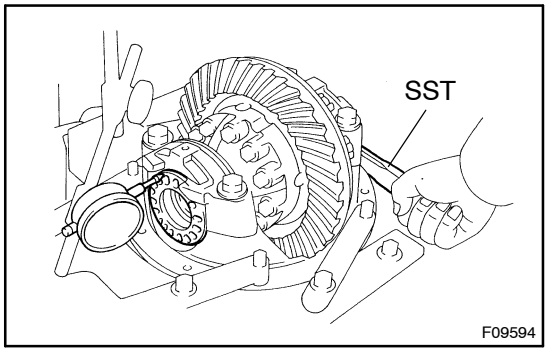


(c) Using SST, tighten the adjusting nut on the ring gear side until the ring has a backlash of approximately 0.18 mm (0.007 in.).
SST 09504–00011



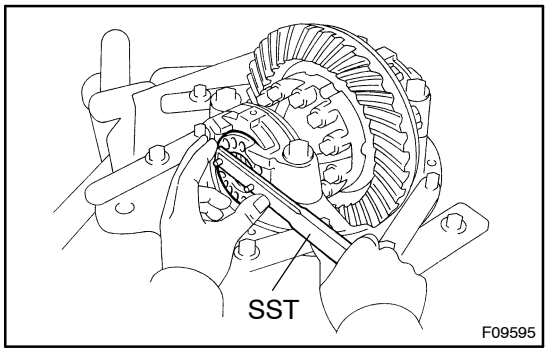
(d) While turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinion side.

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



(f) Place a dial indicator on the top of the bearing inner race on the ring gear side.

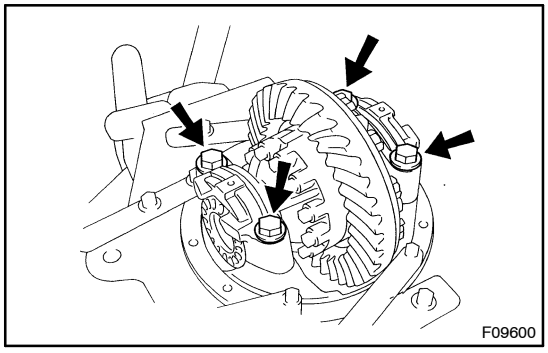
(g) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



(h) Using SST, tighten the adjusting nut 1 – 1.5 notches from the zero preload position.
SST 09504–00011

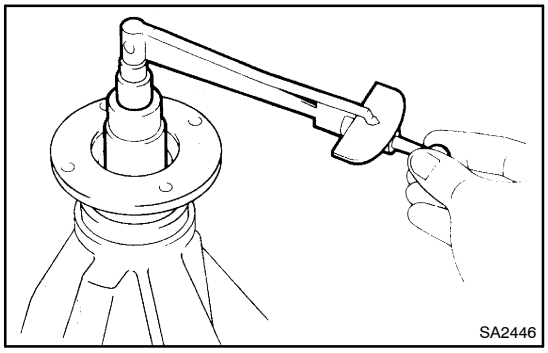
(i) Using a dial indicator, adjust the ring gear backlash so that it will be within the specification.
Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

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



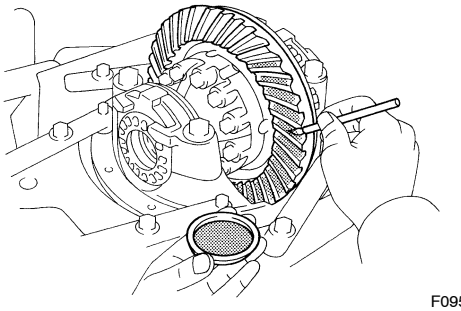
(j) Tighten the bearing cap bolts.
Torque: 196 N·m (2,000 kgf·cm, 145 ft·lbf)

(k) Recheck the ring gear backlash.
Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)



26. INSPECT TOTAL PRELOAD

(a) Using a torque wrench, measure the total preload.
Total preload:
Drive pinion preload + (0.2 – 0.39 N·m, 2 – 4 kgf·cm, 1.7 – 3.5 in.·lbf)

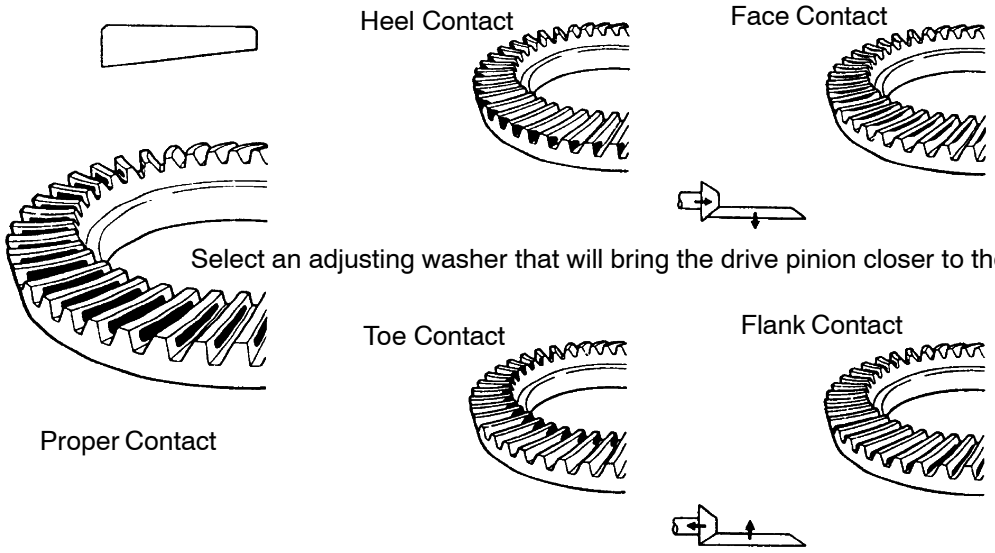

F09596

27. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead.

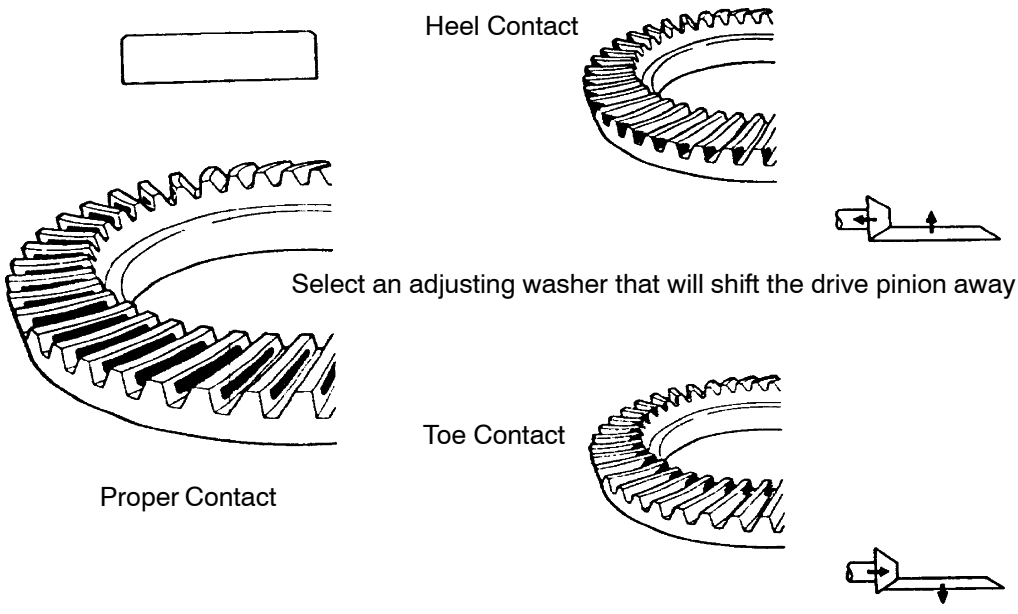
(b) Turn the companion flange in both directions to inspect the ring gear for proper tooth contact.

Taper Cut Gear Type:

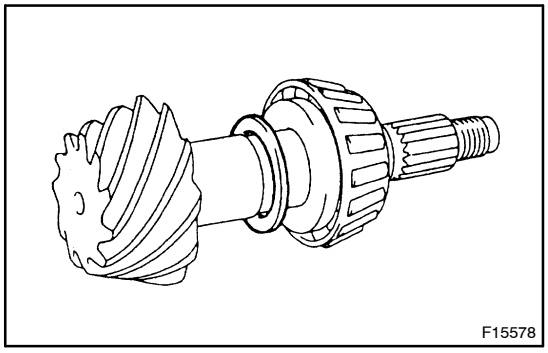


D30850

Straight Cut Gear Type:



D30851


F15578

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

NOTICE:

- **When the gear is a straight cut gear type and the tooth have face contact or flank contact, replace the ring gear and the drive pinion as a set.**
- **In the case of face contact or flank contact, the gear may be able to be adjusted within the specified range of backlash.**

Shim thickness:

1.05 mm (0.0413 in.)	1.35 mm (0.0531 in.)
1.075 mm (0.0423 in.)	1.375 mm (0.0541 in.)
1.10 mm (0.0433 in.)	1.40 mm (0.0551 in.)
1.125 mm (0.0443 in.)	1.425 mm (0.0561 in.)
1.15 mm (0.0453 in.)	1.45 mm (0.0571 in.)
1.175 mm (0.0463 in.)	1.475 mm (0.0581 in.)
1.20 mm (0.0472 in.)	1.50 mm (0.0591 in.)
1.225 mm (0.0482 in.)	1.525 mm (0.0600 in.)
1.25 mm (0.0492 in.)	1.55 mm (0.0610 in.)
1.275 mm (0.0502 in.)	–
1.30 mm (0.0512 in.)	–
1.325 mm (0.0522 in.)	–

HINT:

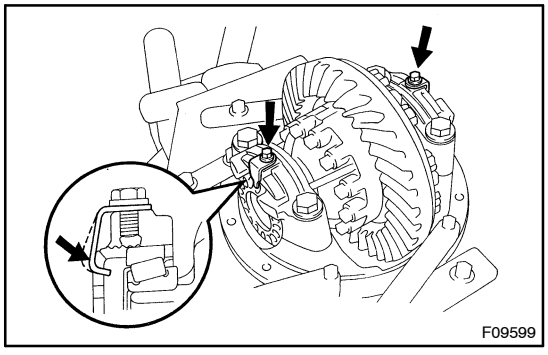
Use one or more shims for adjustment.

28. CHECK TOTAL PRELOAD (See step 26)

29. CHECK RING GEAR BACKLASH (See step 5)

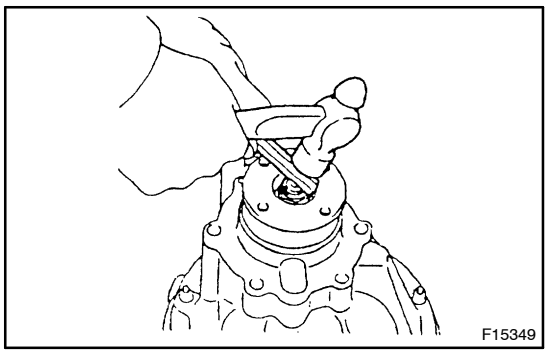
30. CHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 27)

31. CHECK RUNOUT OF COMPANION FLANGE (See step 5)


F09599

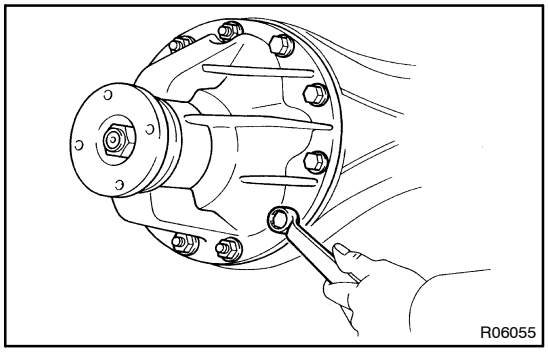
32. INSTALL ADJUSTING NUT LOCKS

(a) Install 2 new nut locks on the bearing caps.
Torque: 12.7 N·m (130 kgf·cm, 9.4 ft·lbf)


F15349

33. STAKE DRIVE PINION NUT

(a) Using a chisel and a hammer, caulk the nut.



34. INSTALL DIFFERENTIAL CARRIER ASSY REAR

(a) Clean the contact surface of the differential case and rear axle housing.

(b) Apply adhesive to the 8 bolts and new gasket.

Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Install the new gasket to the axle housing.

(d) Install the differential carrier assy with the 8 bolts, 4 nuts and 4 washers.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

35. INSTALL PROPELLER SHAFT ASSY (See page 30–4 or 30–11)

36. INSTALL REAR AXLE SHAFT (See page 30–72 or 30–75)

37. ADD DIFFERENTIAL OIL (See page 29–2)