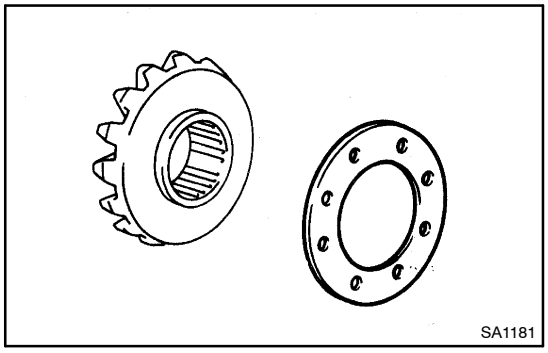
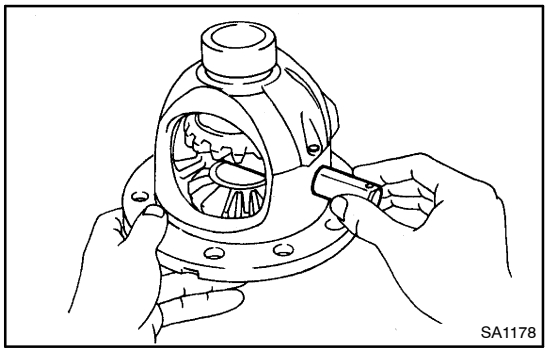
SA0K8–02

REASSEMBLY


SA1181

1. ADJUST DIFFERENTIAL PINION GEAR BACKLASH

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

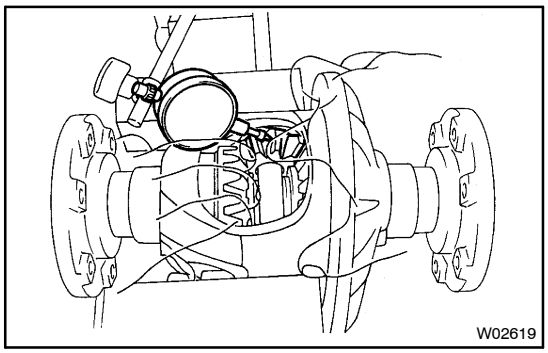

SA1178

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

HINT:

Align the holes of the differential case and pinion shaft.

(c) Push the 2 side gear shafts gently into the differential case by hand and install them.


W02619

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

Maximum: 0.15 mm (0.0059 in.)

NOTICE:

Differential gears should be able to rotate.

If the backlash is not within the specified value, install the 2 side gear thrust washers with different thicknesses.

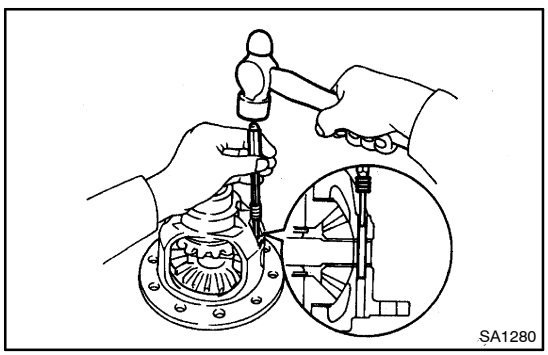
HINT:

Refer to the following table to select thrust washers which will ensure that the backlash is within the specified value.

Thrust washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.50 (0.059)	1.75 (0.069)
1.55 (0.061)	1.80 (0.071)
1.60 (0.063)	1.85 (0.073)
1.65 (0.065)	1.90 (0.075)
1.70 (0.067)	–

(e) Remove the 2 side gear shafts.


SA1280

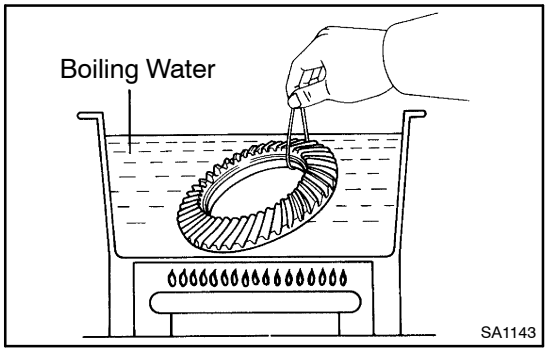
2. INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

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

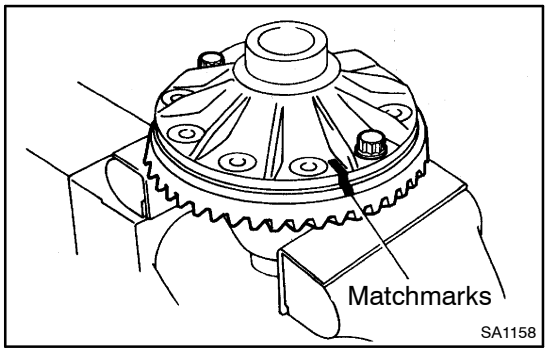
(b) Using a chisel and hammer, stake the differential case.

3. INSTALL RING GEAR ON DIFFERENTIAL CASE

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

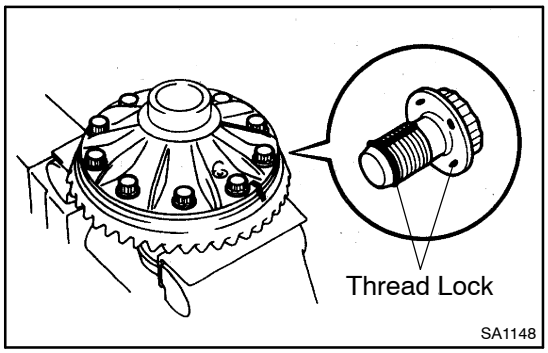


(b) Heat the ring gear to approx. 100 °C (212 °F) in boiling water.
(c) Carefully take the ring gear out of the boiling water.



(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.
(e) Align the matchmarks on the ring gear and the differential case.
(f) Temporarily install the 2 bolts so that the bolt holes in the ring gear and differential case are not misaligned.

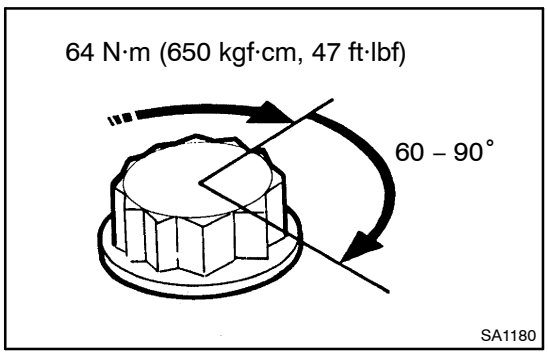
NOTICE:
The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.



4. INSTALL RING GEAR SET BOLTS

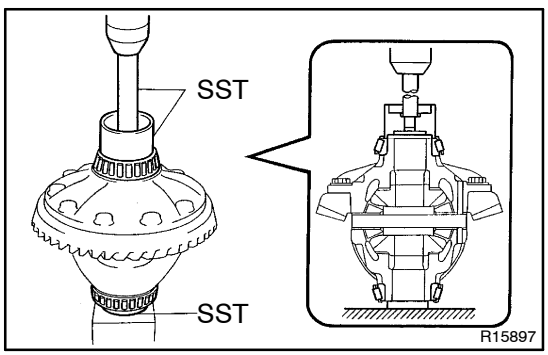
(a) After the ring gear cools down sufficiently, install new 10 ring gear set bolts which thread lock has been applied to.
Thread lock:
Part No. 08833–00100, THREE BOND 1360 K or equivalent.

NOTICE:
Never reuse ring gear set bolts because they are plastic region tightening bolts.



(b) Torque the 10 set bolts uniformly and a little at a time.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)
(c) Tighten the bolts further by 60 – 90°.

NOTICE:
Tighten the bolts in diagonally opposite pairs.



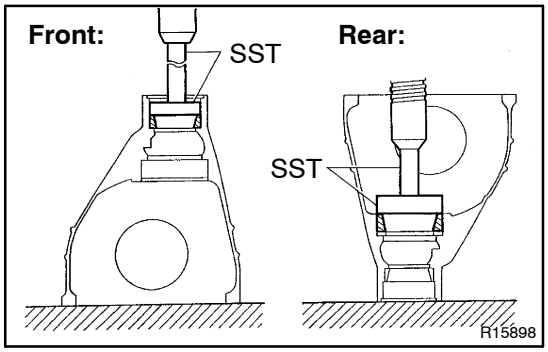
5. INSTALL SIDE BEARINGS

Using SST and a press, install the 2 side bearings.
SST 09710–30050, 09950–60010 (09951–00450), 09950–70010 (09951–07150)

6. INSTALL DRIVE PINION BEARING OUTER RACES AND ADJUSTING WASHER

HINT:

- The adjusting washer is used for adjusting the tooth contact pattern. 42 types of washer with different thicknesses are available.
- 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.
- When removing an adjusting washer, be sure to replace it with a new one.

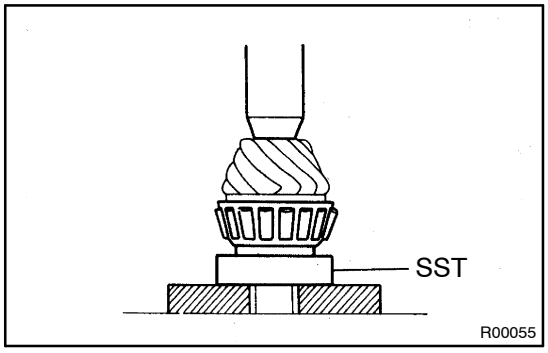


(a) Using SST and a press, install the front bearing outer race.

SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)

(b) Using SST and a press, install a new adjusting washer with the same thickness as removed one and the rear bearing outer race.

SST 09250–10011 (09255–10011), 09950–70010 (09951–07150)



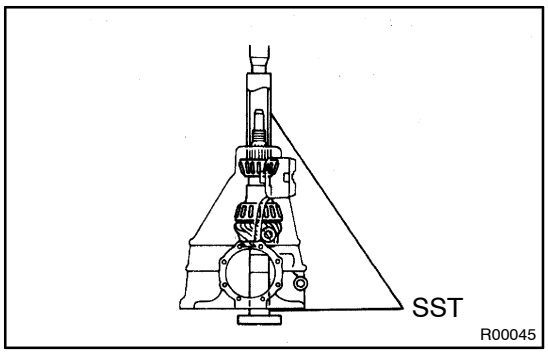
7. INSTALL REAR BEARING TO DRIVE PINION

Using SST and a press, install the rear bearing.

SST 09502–24010

8. TEMPORARILY INSTALL DRIVE PINION, FRONT BEARING, OIL SLINGER AND COMPANION FLANGE

(a) Install the drive pinion in the differential carrier.



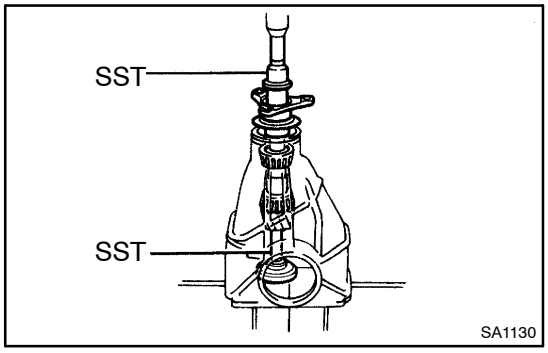
(b) Using SST and a press, install the front bearing on the drive pinion.

SST 09316–60011 (09316–00011), 09608–04031

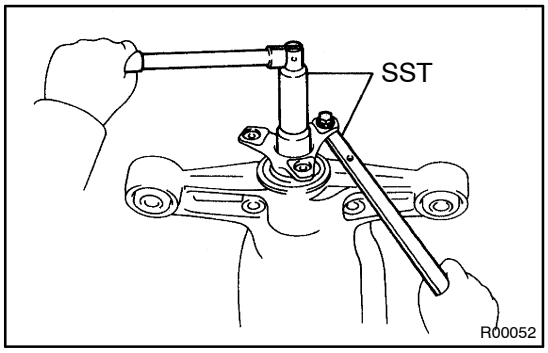
HINT:

After adjusting the tooth contact pattern, assemble the spacer and oil seal.

(c) Install the oil slinger.



(d) Using SST and a press, install the companion flange.
SST 09223–46011, 09325–40010



9. TEMPORARILY ADJUST DRIVE PINION PRELOAD

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

HINT:

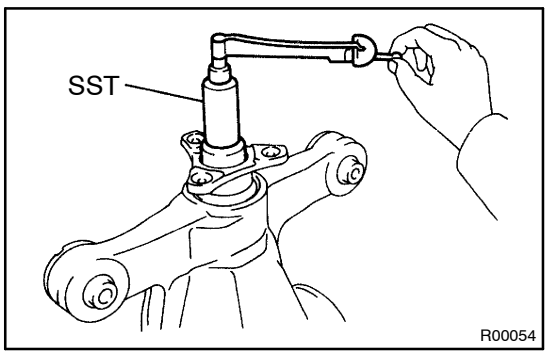
Using SST to hold the flange, tighten the nut.

SST 09229–55010, 09330–00021

NOTICE:

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

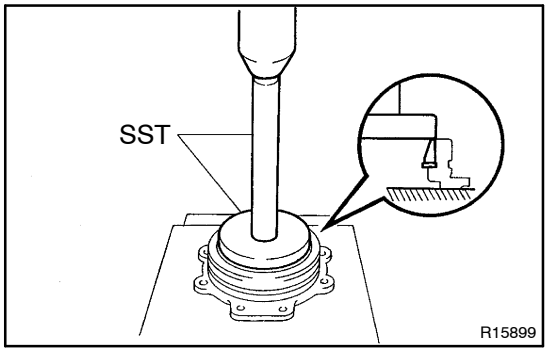
(b) Turn the companion flange 10 times to settle down the bearings.



(c) Using SST and a torque wrench, measure the preload.
SST 09229–55010
Preload (at starting):
New bearing:
1.5 – 1.8 N·m (15 – 18 kgf·cm, 13.3 – 15.9 in.·lbf)
Reused bearing:
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

HINT:

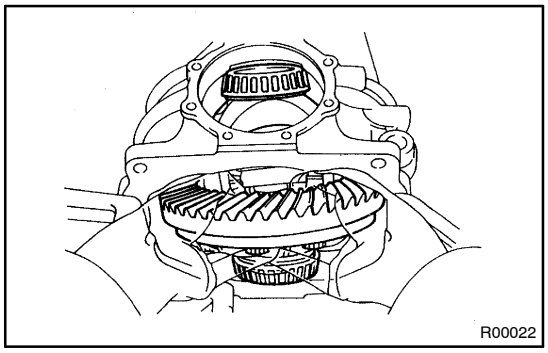
For vehicles which have run 8,000 km (5,000 miles) or less, if the preload value measured before disassembly is greater than the specified value for a reused bearing, return the preload to the same as before disassembly.



10. INSTALL SIDE BEARING OUTER RACES AND ADJUSTING PLATE WASHERS

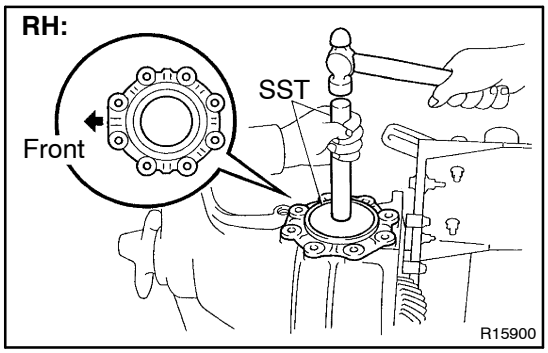
Using SST and a press, install the 2 adjusting plate washers and outer races.

SST 09950–60020 (09951–00810),
09950–70010 (09951–07150)



11. INSTALL DIFFERENTIAL CASE IN CARRIER

Install the side bearing in the differential carrier first, as shown in the illustration, then install the differential case.



12. INSTALL DIFFERENTIAL CARRIER RETAINERS

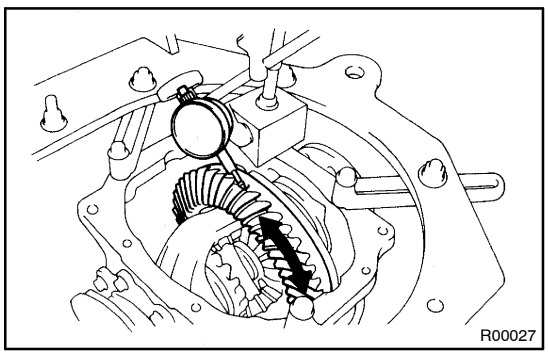
(a) Using SST and a hammer, install the differential carrier retainer.

SST 09950–60020 (09951–00810),
09950–70010 (09951–07150)

(b) Tighten the 8 bolts.

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

(c) Employ the same manner described above to the other side.



13. CHECK RING GEAR BACKLASH

(a) Turn the ring gear 10 times to settle down the bearings.

(b) Using a dial indicator, measure the backlash of the ring gear at 3 positions at least.

Backlash: 0.08 – 0.13 mm (0.0031 – 0.0051 in.)

NOTICE:

The difference between the maximum and minimum measured values must be less than 0.05 mm (0.0020 in.).

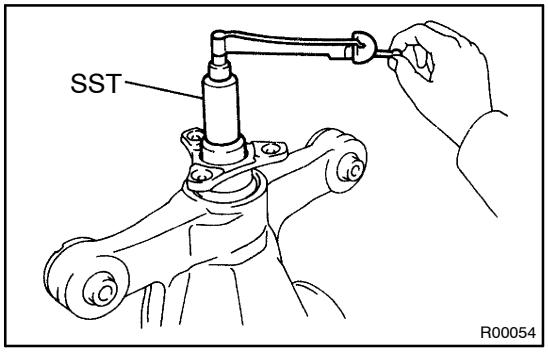
HINT:

The measured values should be used as reference when selecting washers, so take a note of the values.

If the backlash is not within the specified value, replace the washer on the ring gear side with one of a different thickness using the following table.

Adjusting washer thickness:

No.	Thickness mm (in.)	No.	Thickness mm (in.)	No.	Thickness mm (in.)
02	2.02 (0.0795)	32	2.32 (0.0913)	62	2.62 (0.1031)
04	2.04 (0.0803)	34	2.34 (0.0921)	64	2.64 (0.1039)
06	2.06 (0.0811)	36	2.36 (0.0929)	66	2.66 (0.1047)
08	2.08 (0.0819)	38	2.38 (0.0937)	68	2.68 (0.1055)
10	2.10 (0.0827)	40	2.40 (0.0945)	70	2.70 (0.1063)
12	2.12 (0.0835)	42	2.42 (0.0953)	72	2.72 (0.1071)
14	2.14 (0.0843)	44	2.44 (0.0961)	74	2.74 (0.1079)
16	2.16 (0.0850)	46	2.46 (0.0969)	76	2.76 (0.1087)
18	2.18 (0.0858)	48	2.48 (0.0976)	78	2.78 (0.1094)
20	2.20 (0.0866)	50	2.50 (0.0984)	80	2.80 (0.1102)
22	2.22 (0.0874)	52	2.52 (0.0992)	82	2.82 (0.1110)
24	2.24 (0.0882)	54	2.54 (0.1000)	84	2.84 (0.1118)
26	2.26 (0.0890)	56	2.56 (0.1008)	86	2.86 (0.1126)
28	2.28 (0.0898)	58	2.58 (0.1016)	–	
30	2.30 (0.0906)	60	2.60 (0.1024)	–	



14. MEASURE TOTAL PRELOAD

Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

SST 09229–55010

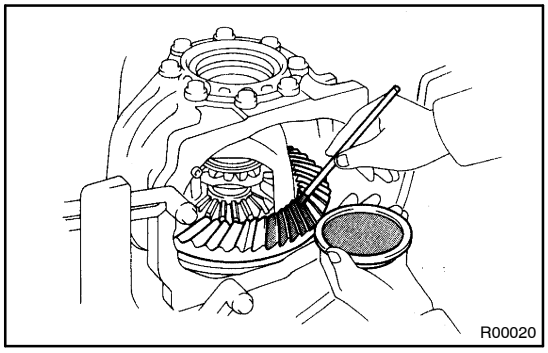
Total preload (at starting):
Drive pinion preload plus
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

If the measured preload is less than the specified value, replace the washer at the ring gear's tooth surface side with a thicker one.

If the preload is greater than the specified value, replace the washer at the ring gear's tooth surface side with a thinner one.

HINT:

Changing the washer thickness by 0.02 mm (0.0008 in.) will change the total preload by approx. 0.1 N·m (1 kgf·cm, 0.9 in.·lbf).

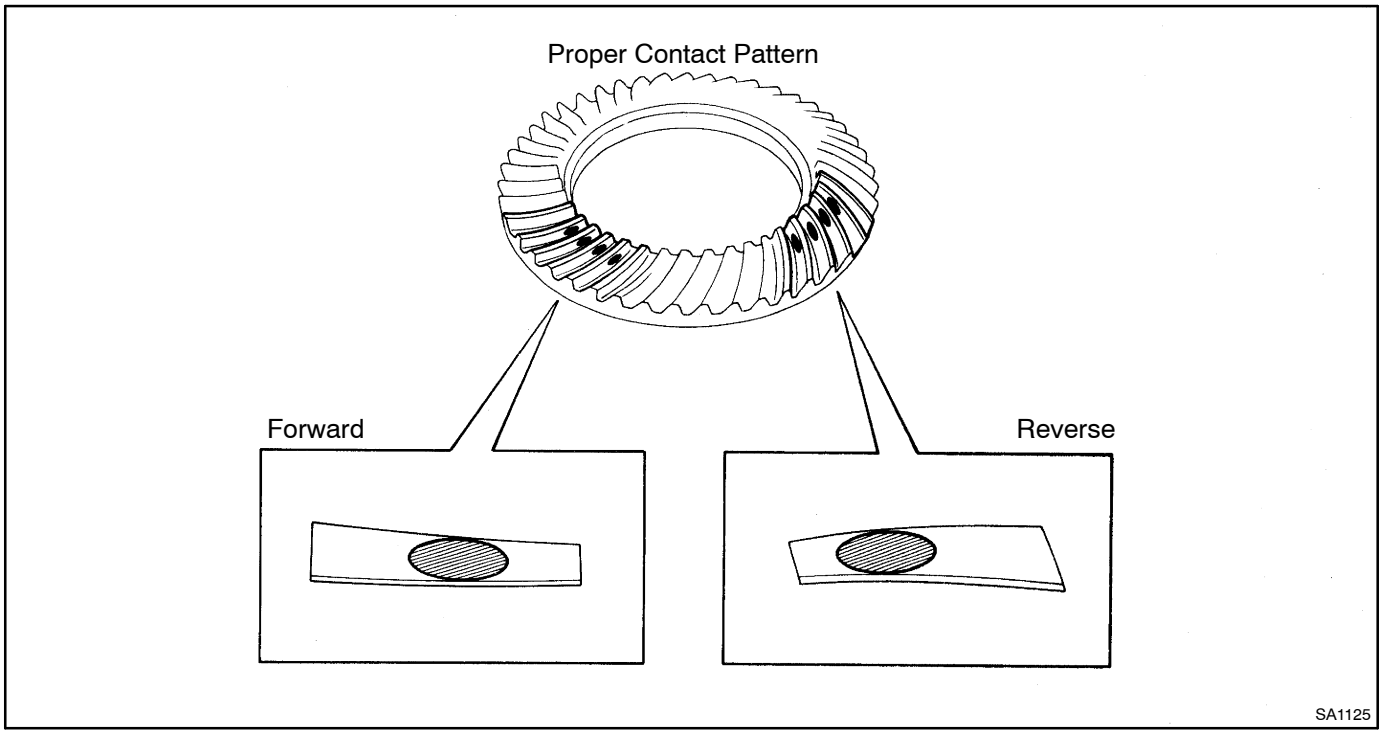


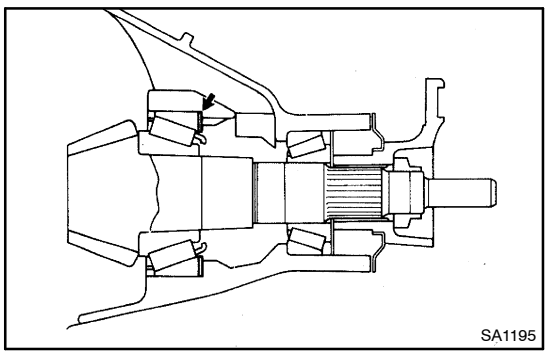
15. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

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

(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth contact pattern.

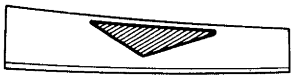
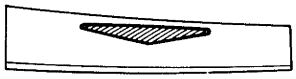
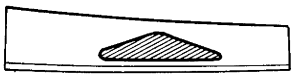
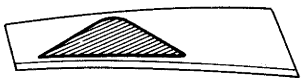
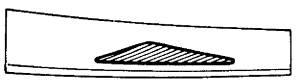
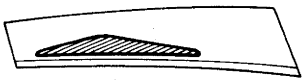




If the teeth are not contacting properly, use the following table to select a proper washer for correction.

NOTICE:

Always use a new adjusting washer.

Tooth contact pattern		Adjusting washer selection	
Forward	Reverse		
		+0.08 mm (+0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thicker will give proper contact pattern.
		+ 0.14 mm (+0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thicker will give proper contact pattern.
		–0.08 mm (–0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thinner will give proper contact pattern.
		–0.14 mm (–0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thinner will give proper contact pattern.

V02917

HINT:
Adjusting washers in 42 (different thickness in 0.01 mm (0.004 in.)) units are available.

Adjusting washer thickness:

No.	Thickness mm (in.)	No.	Thickness mm (in.)	No.	Thickness mm (in.)
87	1.87 (0.0736)	01	2.01 (0.0791)	15	2.15 (0.0846)
88	1.88 (0.0740)	02	2.02 (0.0795)	16	2.16 (0.0850)
89	1.89 (0.0744)	03	2.03 (0.0799)	17	2.17 (0.0854)
90	1.90 (0.0748)	04	2.04 (0.0803)	18	2.18 (0.0858)
91	1.91 (0.0752)	05	2.05 (0.0807)	19	2.19 (0.0862)
92	1.92 (0.0756)	06	2.06 (0.0811)	20	2.20 (0.0866)
93	1.93 (0.0760)	07	2.07 (0.0815)	21	2.21 (0.0870)
94	1.94 (0.0764)	08	2.08 (0.0819)	22	2.22 (0.0874)
95	1.95 (0.0768)	09	2.09 (0.0823)	23	2.23 (0.0878)
96	1.96 (0.0772)	10	2.10 (0.0827)	24	2.24 (0.0882)
97	1.97 (0.0776)	11	2.11 (0.0831)	25	2.25 (0.0886)
98	1.98 (0.0780)	12	2.12 (0.0835)	26	2.26 (0.0890)
99	1.99 (0.0783)	13	2.13 (0.0839)	27	2.27 (0.0894)
00	2.00 (0.0787)	14	2.14 (0.0843)	28	2.28 (0.0898)

16. REMOVE DIFFERENTIAL CARRIER RETAINERS
(See page SA–77)

17. REMOVE DIFFERENTIAL CASE (See page SA–77)

18. REMOVE DRIVE PINION (See page SA–77)

19. INSTALL SPACER ON DRIVE PINION

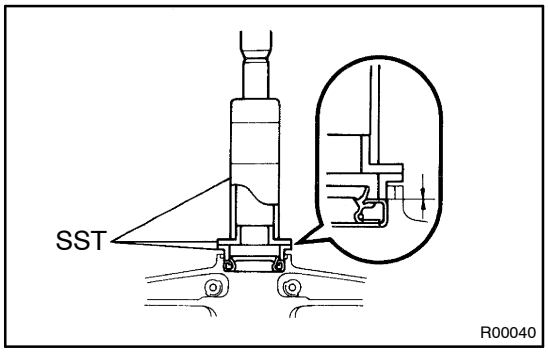
Install a new spacer on the drive pinion.

20. INSTALL DRIVE PINION AND FRONT BEARING
(See step 8.)

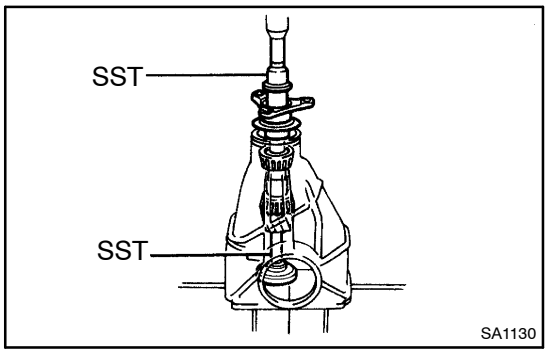
21. INSTALL OIL SLINGER (See step 8.)

22. INSTALL OIL SEAL

(a) Coat MP grease to a new oil seal lip.



(b) Using SST, install the oil seal until its end is flush with the differential carrier.
SST 09316–60011 (09316–00011, 09316–00041), 09502–12010



23. INSTALL COMPANION FLANGE

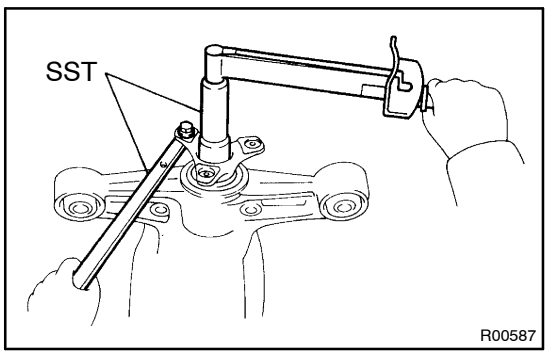
Using SST and a press, install the companion flange.
SST 09223–56010, 09325–40010

NOTICE:

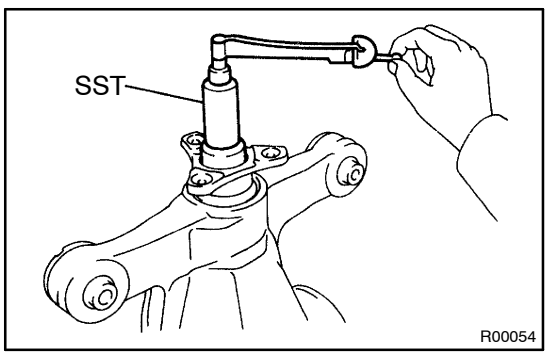
Be careful not to damage the oil seal.

24. ADJUST DRIVE PINION PRELOAD

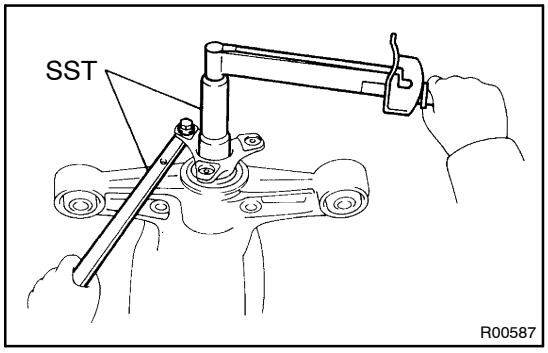
(a) Coat the threads and flange of a new nut with hypoid gear oil for LSD.



(b) Using SST, tighten the nut.
SST 09229–55010, 09330–00021



(c) Using SST and a torque wrench, measure the preload.
SST 09229–55010
Preload (at starting):
New bearing:
1.5 – 1.8 N·m (15 – 18 kgf·cm, 13.3 – 15.9 in.·lbf)
Reused bearing:
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)



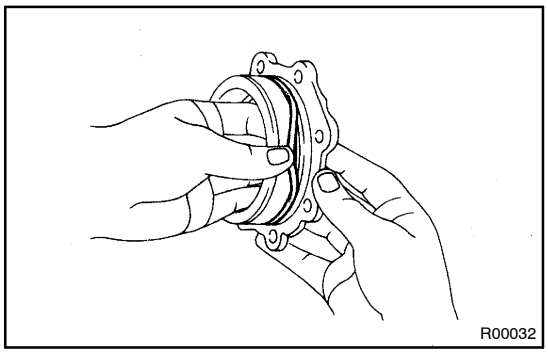
If the preload is greater than the specified value, replace the bearing spacer.
If the preload is less than the specified value, retighten the nut with 13 N·m (130 kgf·cm, 9 ft·lbf) of torque at a time until the specified preload is reached.

Torque: 490 N·m (5,000 kgf·cm, 362 ft·lbf) or less

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

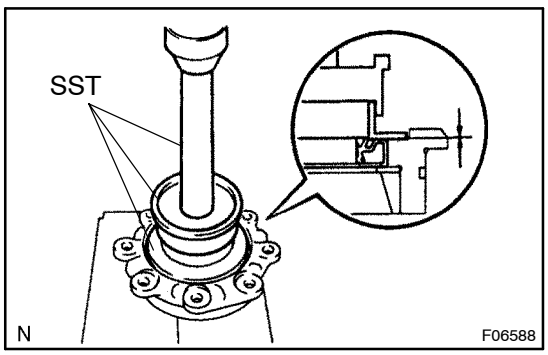
25. CHECK RUNOUT OF DRIVE PINION SHAFT
(See page SA–77)

26. INSTALL DIFFERENTIAL CASE IN CARRIER
(See step 11.)



27. INSTALL O–RINGS TO DIFFERENTIAL CARRIER RETAINERS

(a) Coat 2 new O–rings with hypoid gear oil.
(b) Install the 2 O–rings to the carrier retainers.

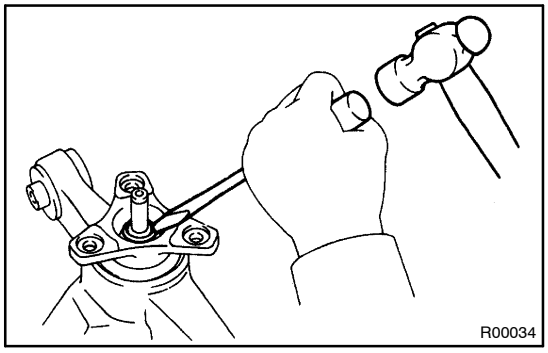


28. INSTALL OIL SEALS TO DIFFERENTIAL CARRIER RETAINERS

(a) Using SST and a press, install 2 new oil seals to the carrier retainers.
SST 09316–20011, 09608–32010, 09950–70010 (09950–07150)
(b) Coat MP grease to the oil seal lip.

29. INSTALL DIFFERENTIAL CARRIER RETAINERS
(See step 12.)

30. RECHECK BACKLASH, TOTAL PRELOAD AND TOOTH CONTACT PATTERN

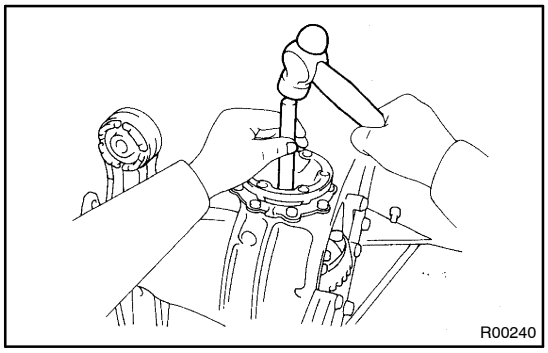


31. STAKE DRIVE PINION NUT

32. INSTALL SNAP RINGS TO SIDE GEAR SHAFTS

(a) Install 2 new snap rings to the side gear shafts.

(b) Coat the MP grease to the snap rings.



33. INSTALL SIDE GEAR SHAFTS

Using a brass and hammer, install the 2 side gear shafts.

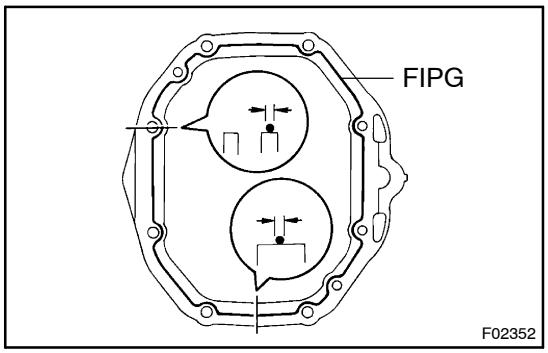
HINT:

Whether the side gear shafts are making contact with the pinion shaft or not can be known by the sound or feeling when driving it in.

NOTICE:

Be careful not to damage the oil seal.

34. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.



35. INSTALL DIFFERENTIAL CARRIER COVER

(a) Using cleaner, clean the contacting surfaces of the carrier and cover of any residual FIPG material.

(b) Apply FIPG to the carrier or cover.

FIPG:

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

(c) Install the carrier cover to the carrier with the 8 bolts.

Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

(d) Install the breather plug.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)