

## REASSEMBLY

### 1. ASSEMBLE DIFFERENTIAL CASE

- (a) Install the 2 thrust washer to the side gears.

HINT:

Refer to the table below to select thrust washers which will ensure that the backlash is within the specifications.

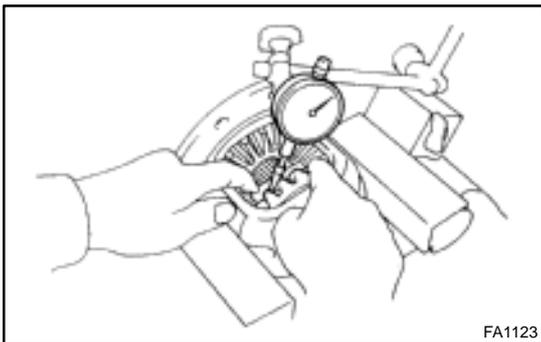
#### Washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.50 (0.0590)	1.75 (0.0689)
1.55 (0.0610)	1.80 (0.0709)
1.60 (0.0630)	1.85 (0.0728)
1.65 (0.0650)	1.90 (0.0748)
1.70 (0.0669)	–

- (b) Install the 2 side gears with the thrust washers, 2 pinion gears, 2 pinion gear thrust washers and pinion shaft.

HINT:

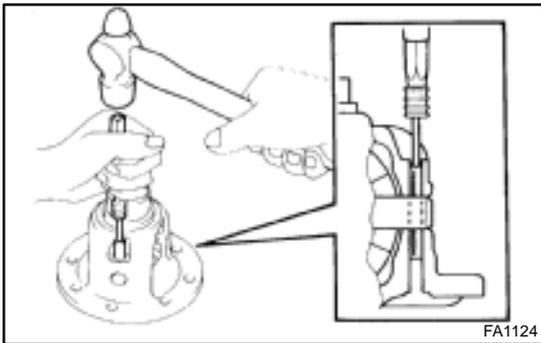
Align the holes of the differential case and pinion shaft.



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

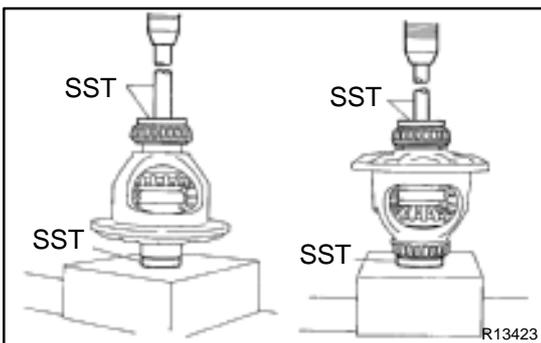
**Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)**

If the backlash is not within the specified value, select an appropriate thickness for the side gear thrust washer.



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

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



### 2. INSTALL SIDE BEARINGS

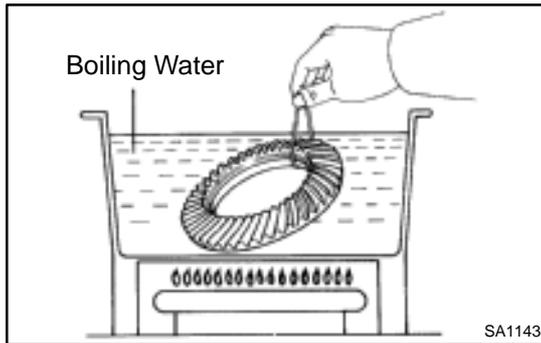
Using SST and a press, install the 2 side bearings into the differential case.

SST 09950-60010 (09951-00480, 09951-00640)  
09950-70010 (09951-07150)

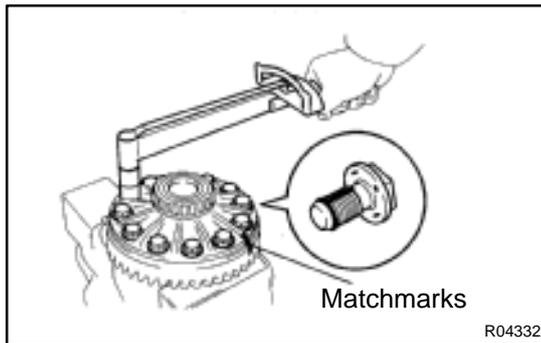
### 3. INSTALL RING GEAR ON DIFFERENTIAL CASE

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

- (b) Heat the ring gear to about 100°C (212°F) in boiling water.



- (c) Carefully take the ring gear out of the boiling water.



- (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

HINT:

Align the matchmarks on the ring gear and differential case.

- (e) After the ring gear cools down enough, torque the set bolts to which thread lock has been applied.

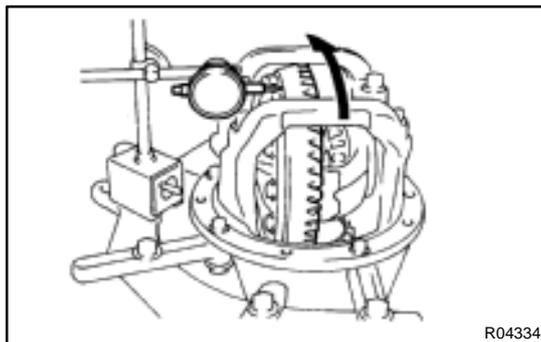
**Thread lock:**

**Part No. 08833-00100, THREE BOND 1360K or equivalent.**

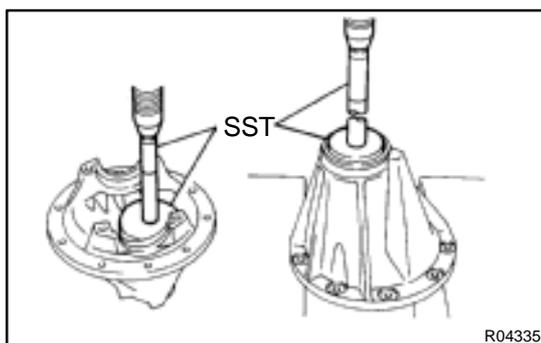
**Torque: 125 N·m (1,270 kgf·cm, 92 ft·lbf)**

#### 4. INSPECT RING GEAR RUNOUT

- (a) Install the differential case into the carrier and install the plate washers to where there is no play in the bearing (See step 8.).
- (b) Install the bearing cap (See step 11.).



- (c) Using a dial indicator, measure the runout of ring gear.
- (d) Remove the bearing caps and differential case.
- Maximum runout: 0.05 mm (0.0020 in.)**



#### 5. INSTALL DRIVE PINION BEARING OUTER RACES AND ADJUSTING WASHER

- (a) Using SST and a press, install a new front bearing outer race to the carrier.

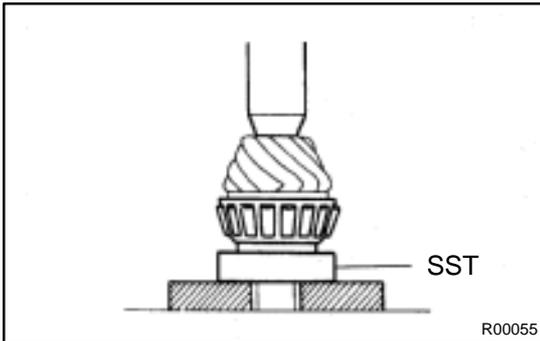
SST 09950-60020 (09951-00710),  
09950-70010 (09951-07150)

- (b) Using SST and a press, install a new adjusting washer and a new rear bearing outer race to the carrier.

SST 09950-60020 (09951-00910),  
09950-70010 (09951-07150)

**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.



**6. INSTALL DRIVE PINION REAR BEARING**

Using SST and a press, install the rear bearing onto the drive pinion.

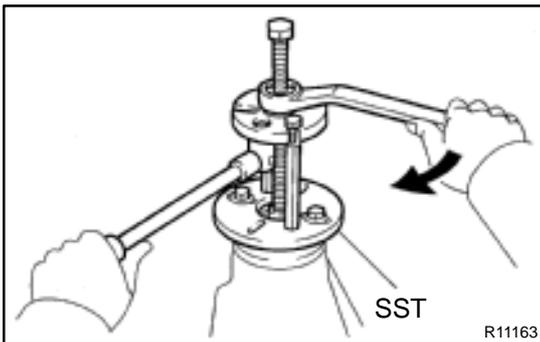
SST 09506-35010

**7. TEMPORARILY ADJUST DRIVE PINION PRELOAD**

(a) Install the drive pinion and front bearing.

**HINT:**

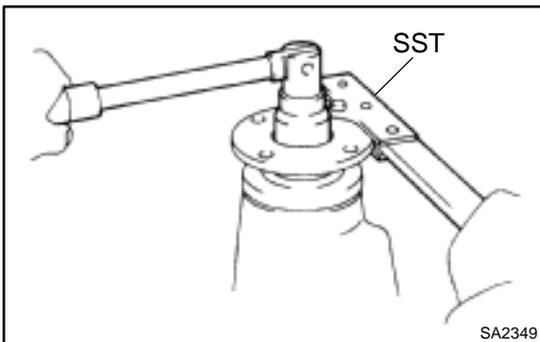
Assemble the spacer, washers and oil seal after adjusting the gear contact pattern.



(b) Using SST, install the companion flange.

SST 09950-30011 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03050)

(c) Coat the threads of the nut with hypoid gear oil.



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

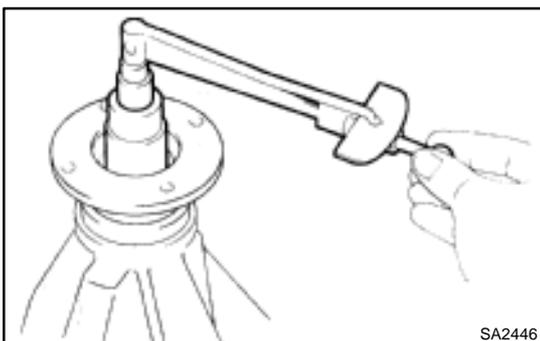
**HINT:**

Using SST to hold the flange, torque the nut.

SST 09330-00021

**NOTICE:**

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



(e) Using a torque wrench, measure the preload of the drive pinion using the backlash between the drive pinion and ring gear.

**Preload (at starting):**

**New bearing**

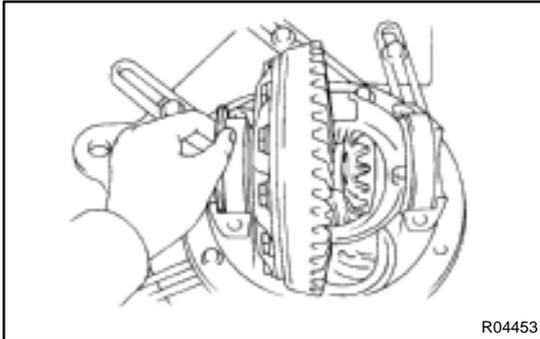
1.1 – 1.7 N·m (12 – 18 kgf·cm, 10.0 – 15.2 in.-lbf)

**Reused bearing**

0.6 – 0.9 N·m (7 – 10 kgf·cm, 5.7 – 8.3 in.-lbf)

**8. INSTALL DIFFERENTIAL CASE IN CARRIER**

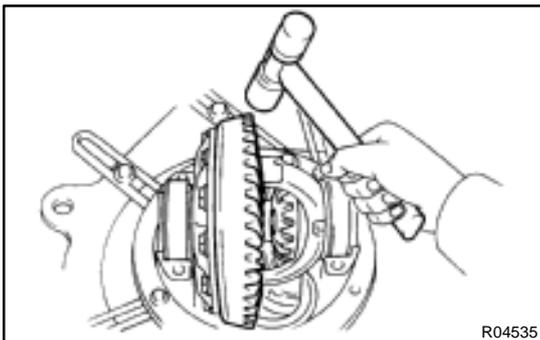
- (a) Place the 2 bearing outer races on their respective bearings. Make sure the right and left races are not interchanged.
- (b) Install the differential case in the carrier.

**9. ADJUST RING GEAR BACKLASH**

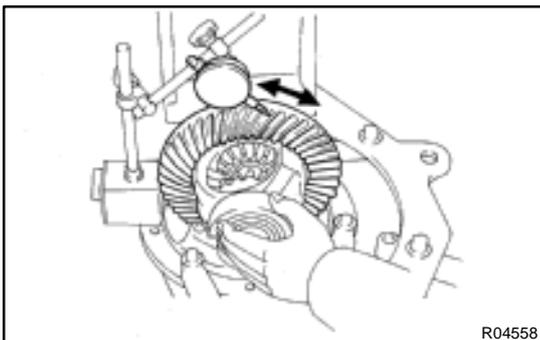
- (a) Only install the plate washer on the ring gear back side.

**HINT:**

Make sure that the ring gear has a backlash.



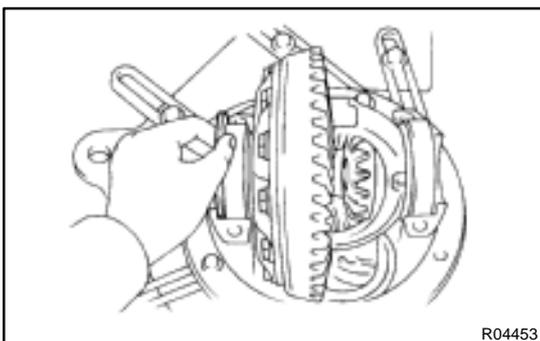
- (b) Using a plastic hammer, snug down the plate washer and bearing by tapping the ring gear.



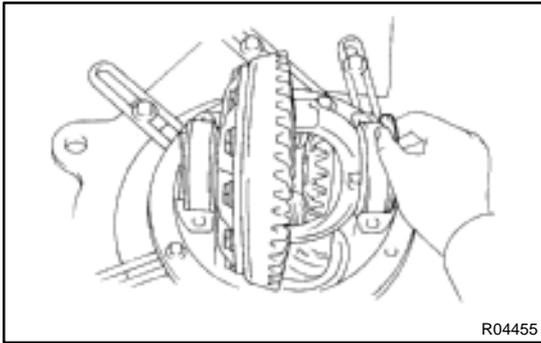
- (c) Using a dial indicator, hold the side bearing boss on the teeth surface of the ring gear and measure the backlash.

**Backlash (reference):**

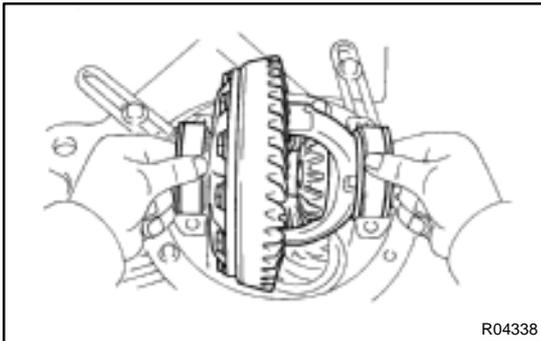
**0.13 – 0.18 mm (0.0051 – 0.0071 in.)**



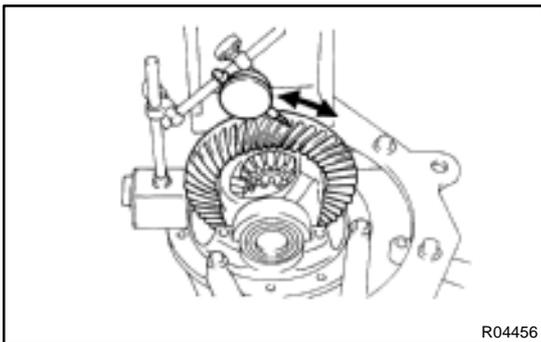
- (d) Select a plate washer for back side ring gear using the backlash as reference (See page [SA-169](#)).



- (e) Select a ring gear teeth side plate washer of a thickness which eliminates any clearance between the outer race and case.
- (f) Remove the 2 plate washers and differential case.
- (g) Install the plate washer into the ring gear back side of the carrier.



- (h) Place the other plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.
- (i) Using a plastic hammer, snug down the washer and bearing by tapping the ring gear.



- (j) Using a dial indicator, measure the ring gear backlash.  
**Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)**
- (k) If the backlash is not within the specified value, adjust by either increasing or decreasing the thickness of washers on both sides by an equal amount.

**HINT:**

There should be no clearance between the plate washer and the case.

Make sure that there is a ring gear backlash.



**10. ADJUST SIDE BEARING PRELOAD**

- (a) After adjustment with the backlash as reference, remove the ring gear teeth side plate washer and measure the thickness.
- (b) Install a new washer of 0.06 – 0.09 mm (0.0024 – 0.0035 in.) thicker than the washer which was removed.

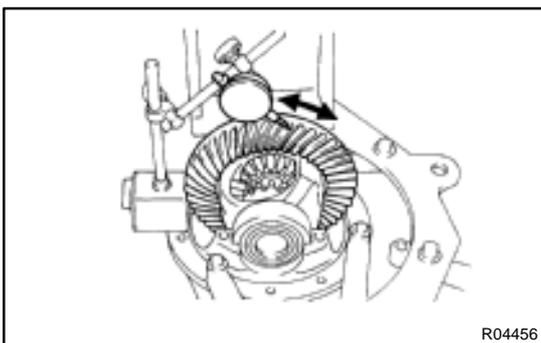
**HINT:**

Select a washer which can be pressed in 2/3 of the way by finger.

- (c) Using a plastic hammer, install the plate washer.
- (d) Recheck the ring gear backlash.  
**Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)**
- (e) If the backlash is not within the specification, adjust by either increasing or decreasing the thickness of washers on both sides by equal amount.

**HINT:**

The backlash will change by about 0.20 mm (0.0079 in.) with every 0.03 mm (0.0012 in.) change in the side washer.



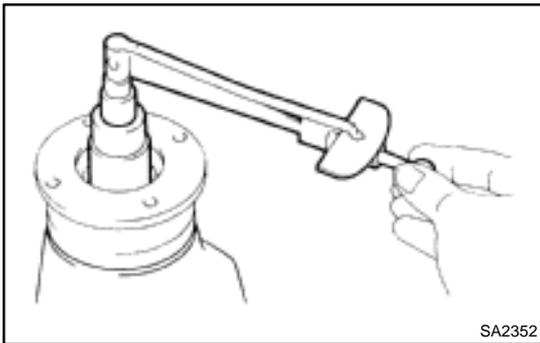
**Washer thickness:**

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
58	2.58(0.1015)	90	2.90(0.1142)	22	3.22(0.1268)
60	2.60(0.1024)	92	2.92(0.1150)	24	3.24(0.1276)
62	2.62(0.1031)	94	2.94(0.1157)	26	3.26(0.1283)
64	2.64(0.1039)	96	2.96(0.1165)	28	3.28(0.1291)
66	2.66(0.1047)	98	2.98(0.1173)	30	3.30(0.1299)
68	2.68(0.1055)	00	3.00(0.1181)	32	3.32(0.1307)
70	2.70(0.1063)	02	3.02(0.1189)	34	3.34(0.1315)
72	2.72(0.1071)	04	3.04(0.1197)	36	3.36(0.1323)
74	2.74(0.1079)	06	3.06(0.1205)	38	3.38(0.1331)
76	2.76(0.1087)	08	3.08(0.1213)	40	3.40(0.1339)
78	2.78(0.1094)	10	3.10(0.1220)	42	3.42(0.1346)
80	2.80(0.1102)	12	3.12(0.1228)	44	3.44(0.1354)
82	2.82(0.1110)	14	3.14(0.1236)	46	3.46(0.1362)
84	2.84(0.1118)	16	3.16(0.1244)	48	3.48(0.1370)
86	2.86(0.1126)	18	3.18(0.1252)		–
88	2.88(0.1134)	20	3.20(0.1260)		–

**11. INSTALL SIDE BEARING CAP**

- Align the matchmarks on the cap and carrier.
- Install and torque the 4 bolts.

**Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)**

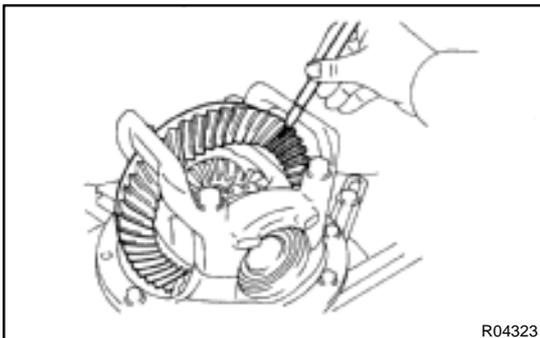
**12. MEASURE TOTAL PRELOAD**

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

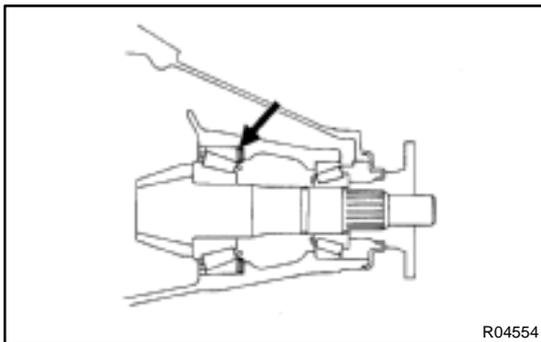
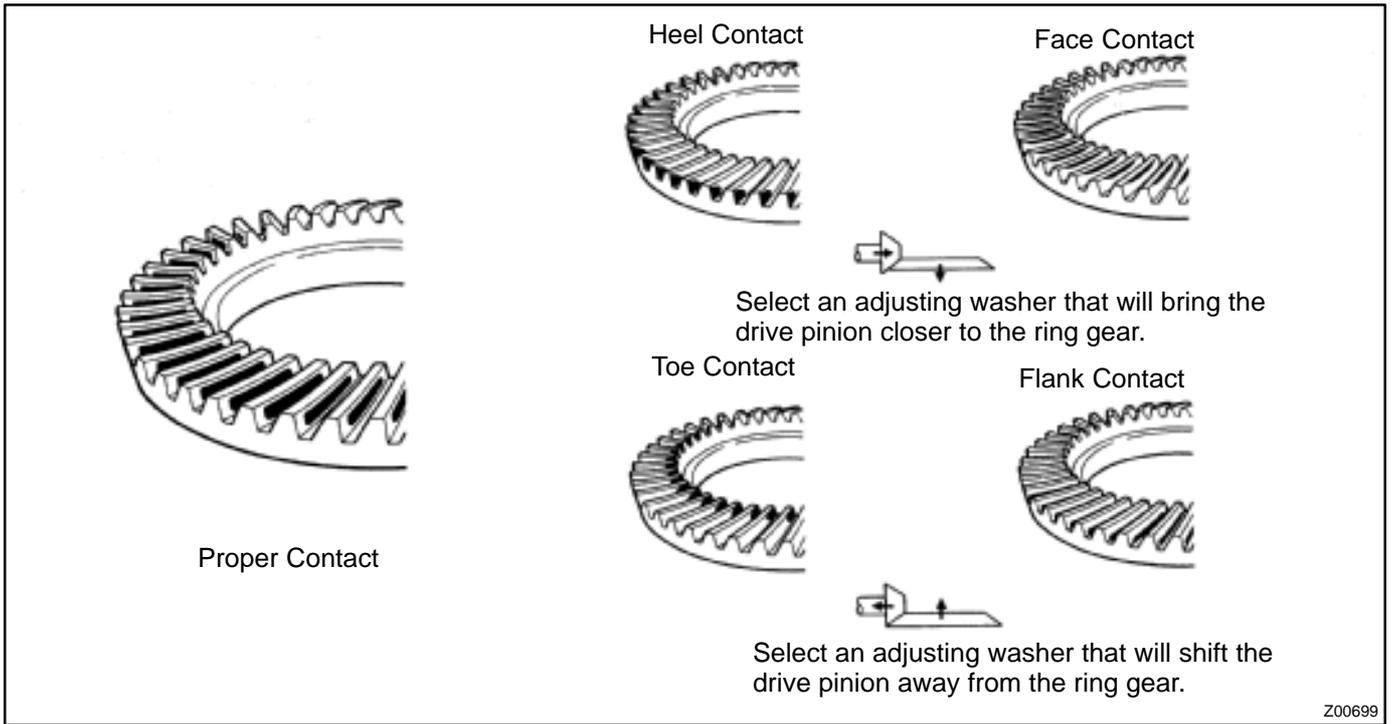
**Total preload (at starting):**

**Drive pinion preload plus**

**0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.-lbf)**

**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 primer.
- Hold the companion flange firmly and rotate the ring gear in both directions.
- Inspect the teeth pattern.



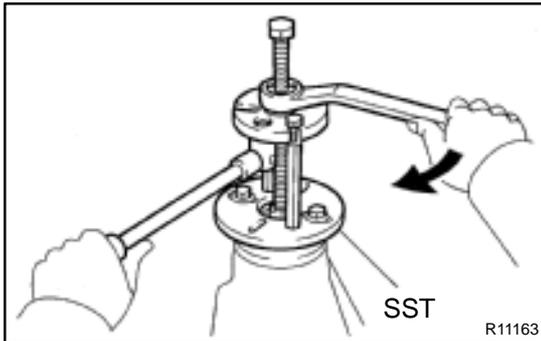
If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

**Washer thickness:**

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	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)

14. REMOVE COMPANION FLANGE (See page SA-163)  
 15. REMOVE FRONT BEARING (See page SA-163)  
 16. INSTALL NEW BEARING SPACER, 2 WASHERS AND FRONT BEARING

- (a) Install a new bearing spacer and 2 washers, and place the front bearing.

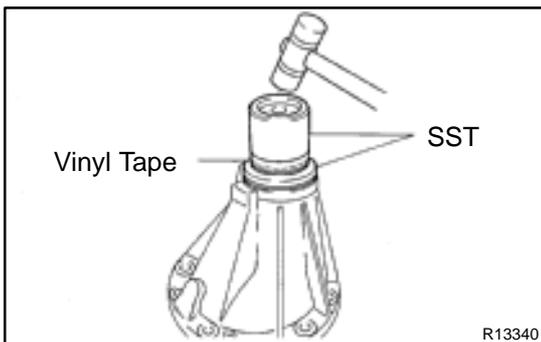


- (b) Using SST and the companion flange, install the front bearing then remove the companion flange.

SST 09950-30011 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03050)

17. INSTALL NEW OIL SEAL

- (a) Coat a new oil seal lip with MP grease.



- (b) Using SST and a plastic hammer, install the oil seal until its surface is flush with the differential carrier end.

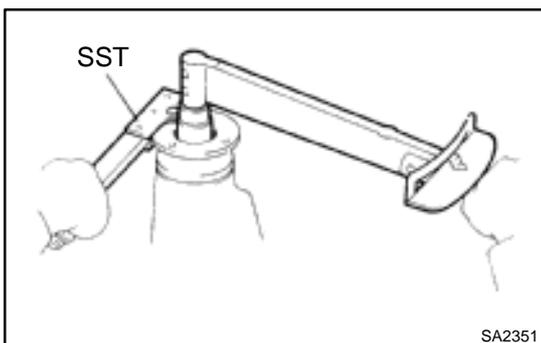
SST 09316-12010, 09649-17010

HINT:

Connect SST with vinyl tape.

18. INSTALL COMPANION FLANGE

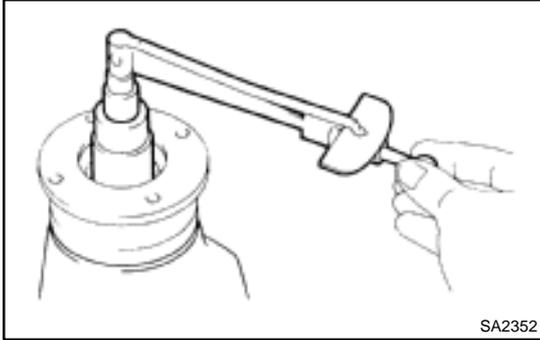
- (a) Place the companion flange.  
 (b) Coat the threads of a new nut with hypoid gear oil.



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

SST 09330-00021

**Torque: 147 N·m (1,500 kgf·cm, 109 ft·lbf)**



### 19. ADJUST DRIVE PINION PRELOAD

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

**Preload (at starting):**

**New bearing**

**1.1 – 1.7 N·m (12 – 18 kgf·cm, 10.0 – 15.2 in.-lbf)**

**Reused bearing**

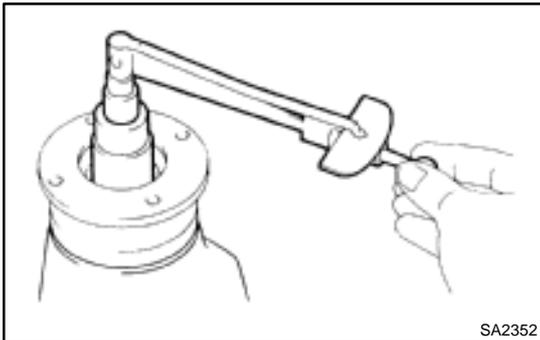
**0.6 – 0.9 N·m (7 – 10 kgf·cm, 5.7 – 8.3 in.-lbf)**

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 13 N·m (130 kgf·cm, 9 ft·lbf) a little at a time until the specified preload is reached.

**Torque: 451 N·m (4,600 kgf·cm, 333 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 pinion nut to reduce the preload.



### 20. CHECK TOTAL PRELOAD

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

**Total preload (at starting):**

**Drive pinion preload plus**

**0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.-lbf)**

### 21. CHECK RING GEAR BACKLASH

Using a dial indicator, measure the ring gear backlash.

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

### 22. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 13.)

### 23. CHECK COMPANION FLANGE RUNOUT (See page SA-164)

### 24. STAKE DRIVE PINION NUT