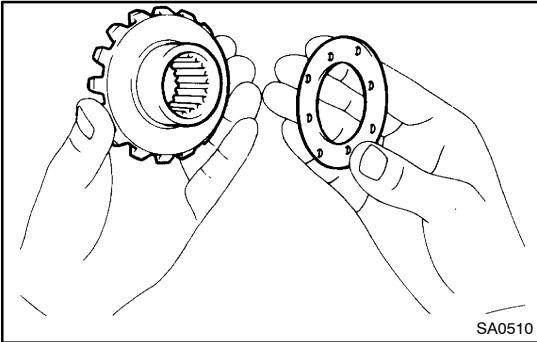


## REASSEMBLY

### HINT:

- Using a shop rag, clean off any foreign object from the parts.
- Apply all of the sliding and rotating surfaces with hypoid gear oil.

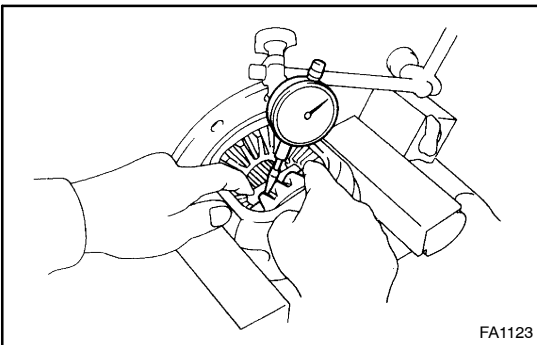


### 1. 2 pinion differential: MEASURE SIDE GEAR BACKLASH AND REASSEMBLE DIFFERENTIAL CASE

- Install the 2 thrust washers to the 2 side gears.
- Install the 2 side gears, pinion gears, pinion gear thrust washers and pinion shaft in the differential case.

### HINT:

Align the holes of the differential case and pinion shaft.



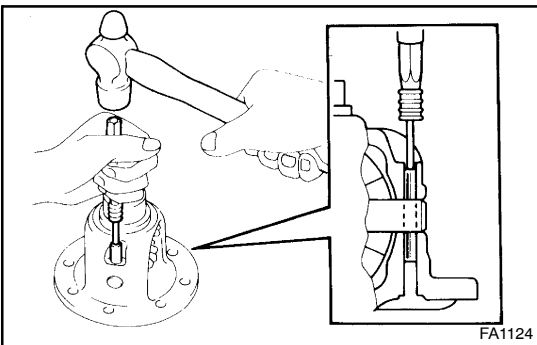
- Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.

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

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

### Thrust washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.0 (0.039)	1.2 (0.047)
1.1 (0.043)	1.3 (0.051)

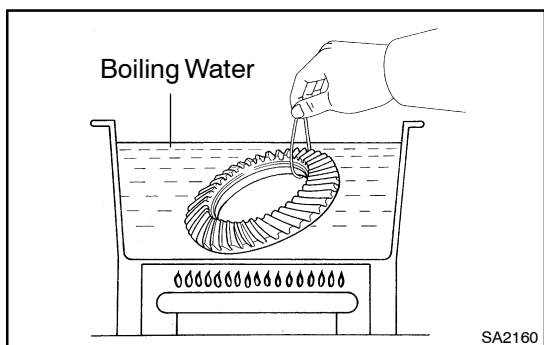


### 2. 2 pinion differential: INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

- Using a 5 mm pin punch and hammer, install the straight pin through the differential case and hole of the pinion shaft.
- Using a chisel and hammer, stake the outside of the differential case pin hole.

### 3. INSTALL RING GEAR ON DIFFERENTIAL CASE

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



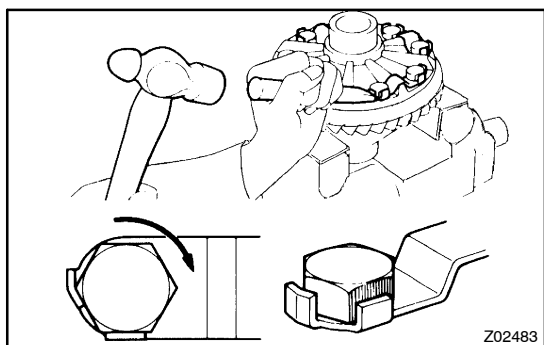
- (b) Heat the ring gear to approx. 100°C (212°F) in boiling water.
- (c) Carefully take the ring gear out of the boiling water.
- (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

**HINT:**

Align the matchmarks on the ring gear and differential case.

- (e) Temporarily install 5 new lock plates and 10 bolts so that the bolt holes in the ring gear and differential case are not misaligned.
- (f) After the ring gear has cooled sufficiently, torque the 10 ring gear set bolts.

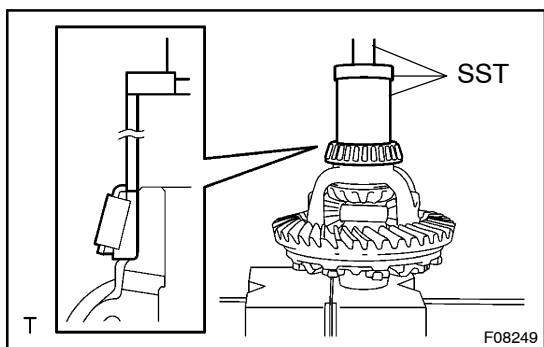
**Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)**



- (g) Using a chisel and hammer, stake the 5 lock plates.

**HINT:**

Stake the claws of the lock plates to fix the bolts. For the claw contacting the protruding portion of the bolt, stake only the half of it along the tightening direction.

**4. INSTALL SIDE BEARINGS**

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

SST 09710-04081, 09950-60010 (09951-00600),  
09950-70010 (09951-07100)

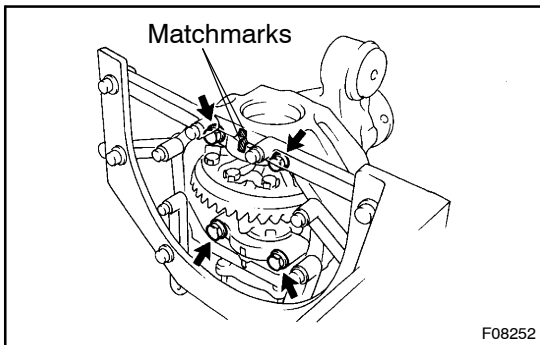
**5. CHECK RING GEAR RUNOUT**

- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the assembled plate washers onto the side bearings.
- (c) Install the differential case in the differential carrier.

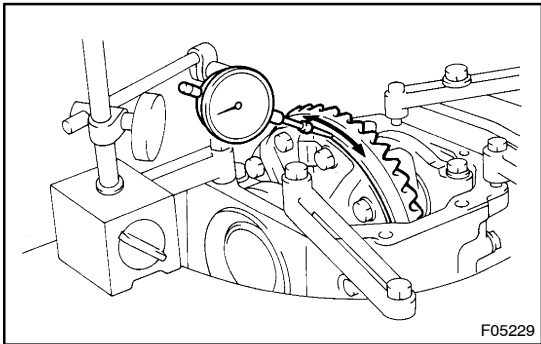
**HINT:**

If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

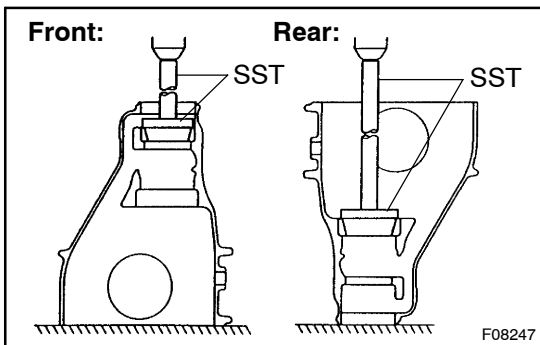
However, select a plate washer that allows no clearance between it and the carrier.



- (d) Align matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the 4 bolts a little at a time.



- (f) Using a dial indicator, measure the ring gear runout.  
**Maximum runout: 0.07 mm (0.0028 in.)**
- (g) Remove the differential case.



## 6. INSTALL FRONT AND REAR BEARING OUTER RACES

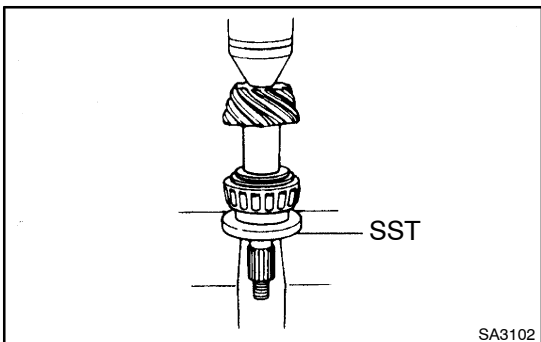
- (a) Using SST and a press, install the front bearing outer race.  
SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)
- (b) Using SST and a press, install the rear bearing outer race.  
SST 09950-60020 (09951-00790), 09950-70010 (09951-07200)

## 7. INSTALL REAR BEARING

- (a) Install the washer on the drive pinion.

### 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 onto the drive pinion.

SST 09506-30012

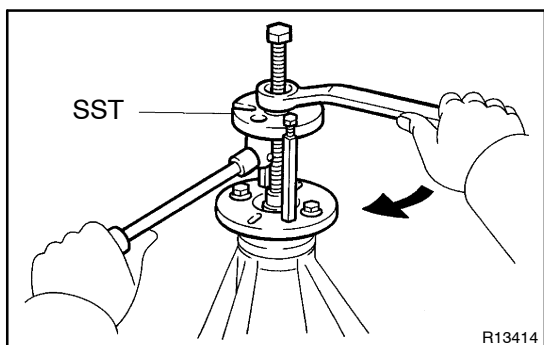
## 8. TEMPORARILY ADJUST DRIVE PINION PRELOAD

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

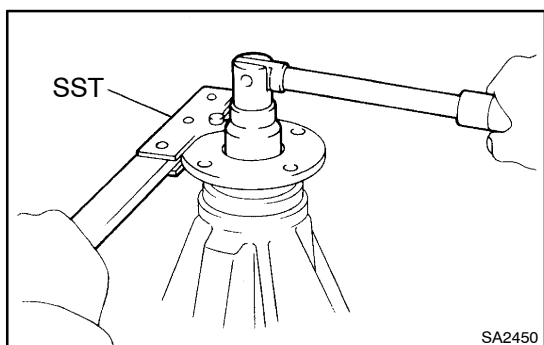
### HINT:

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

- (b) Install the oil slinger.



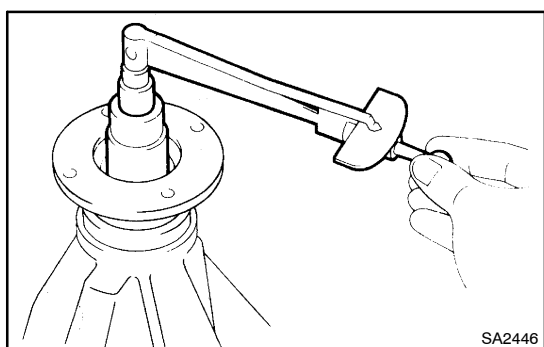
- (c) Using SST, install the companion flange.  
SST 09950-30011 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



- (d) Using SST to hold the flange and adjust the drive pinion preload by tightening the nut.

**NOTICE:**

- Coat the nut and threads of the drive pinion with hypoid gear oil LSD.
- As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.



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

**Preload (at starting):****New bearing:**

1.4 - 2.0 N·m (14 - 20 kgf·cm, 12.4 - 17.7 in·lbf)

**Reused bearing:**

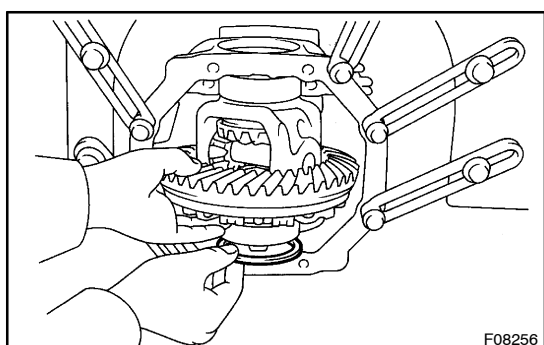
0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in·lbf)

**HINT:**

Measure the drive pinion preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

## 9. INSTALL DIFFERENTIAL CASE IN DIFFERENTIAL CARRIER

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



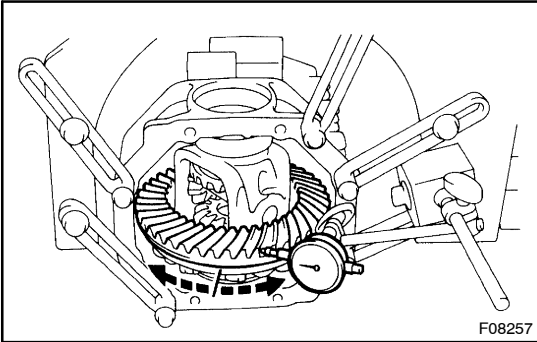
## 10. ADJUST RING GEAR BACKLASH

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

**HINT:**

Make sure that the ring gear has backlash.

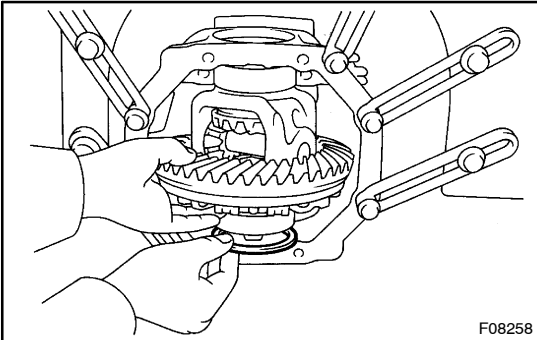
- (b) Tap on the ring gear with a plastic hammer so that the washer fits to the bearing.



- (c) Using a dial indicator, while holding the companion flange, measure the ring gear backlash.

**Backlash (Reference):**

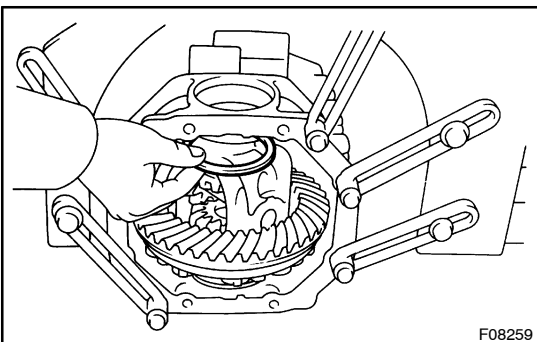
**0.13 – 0.18 mm (0.0051 – 0.0071 in.)**



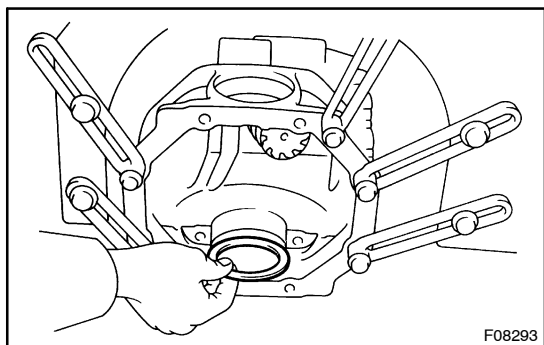
- (d) Select a plate washer for back side ring gear, using the backlash as reference.

**Side plate washer thickness:**

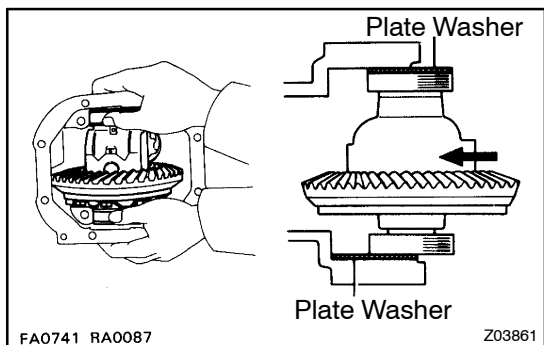
Thickness mm (in.)	Thickness mm (in.)
2.58 (0.1016)	2.92 (0.1150)
2.60 (0.1024)	2.94 (0.1157)
2.62 (0.1031)	2.96 (0.1165)
2.64 (0.1039)	2.98 (0.1173)
2.66 (0.1047)	3.00 (0.1181)
2.68 (0.1055)	3.02 (0.1189)
2.70 (0.1063)	3.04 (0.1197)
2.72 (0.1071)	3.06 (0.1205)
2.74 (0.1079)	3.08 (0.1213)
2.76 (0.1087)	3.10 (0.1220)
2.78 (0.1094)	3.12 (0.1228)
2.80 (0.1102)	3.14 (0.1236)
2.82 (0.1110)	3.16 (0.1244)
2.84 (0.1118)	3.18 (0.1252)
2.86 (0.1126)	3.20 (0.1260)
2.88 (0.1134)	3.22 (0.1268)
2.90 (0.1142)	3.24 (0.1276)



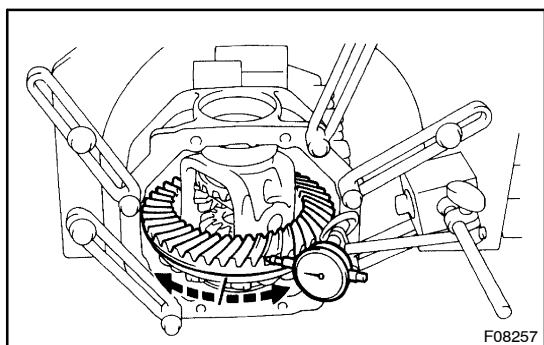
- (e) Select a ring gear teeth side plate washer so that there is no clearance between the outer race and case.
- (f) Remove the plate washers and differential case.



- (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) Tap on the ring gear with a plastic hammer so that the washers fit to the bearing.



- (j) Using a dial indicator, while holding the companion flange measure the ring gear backlash.

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

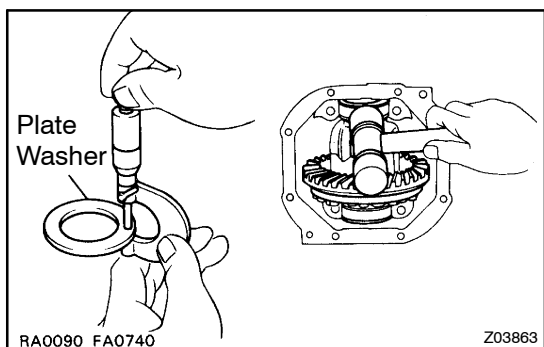
If the backlash is not within the specified value, adjust it by either increasing or decreasing the thickness of washers on both sides by an equal amount.

HINT:

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

Make sure that there is ring gear backlash.

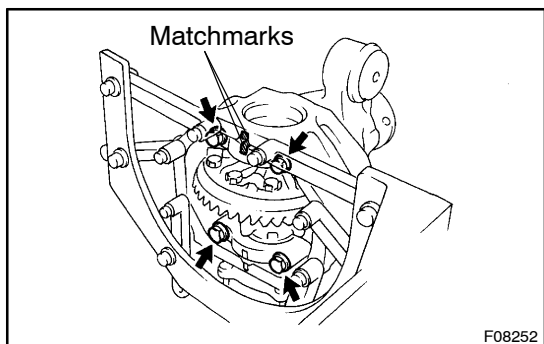
### 11. ADJUST SIDE BEARING PRELOAD



- (a) Remove the ring gear teeth side plate washer and using a micrometer, measure the thickness.
- (b) Using the backlash as a reference, install a new washer 0.06 – 0.09 mm (0.0024 – 0.0035 in.) thicker than the washer removed.

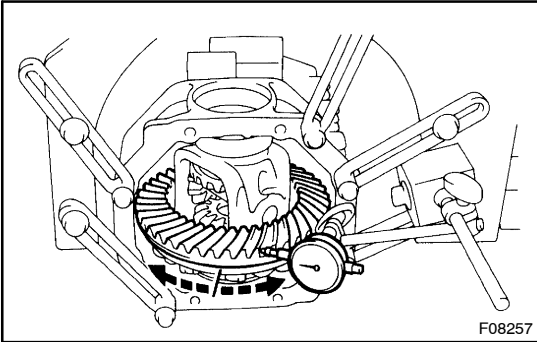
HINT:

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



- (c) Using a plastic hammer, install the plate washer.
- (d) Align matchmarks on the bearing cap and differential carrier.
- (e) Tighten the 4 bolts.

**Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)**



- (f) Using a dial indicator, while holding the companion flange adjust the ring gear backlash until it is within the specified value.

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

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:**

The backlash will change by about 0.02 mm (0.0008 in.) corresponding to 0.03 mm (0.0012 in.) change in the plate washer.

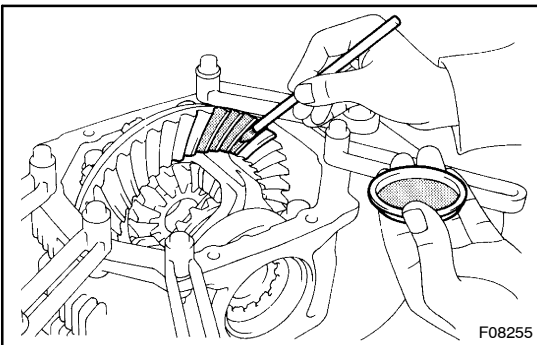
## 12. MEASURE TOTAL PRELOAD

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

**Total preload (at starting):**

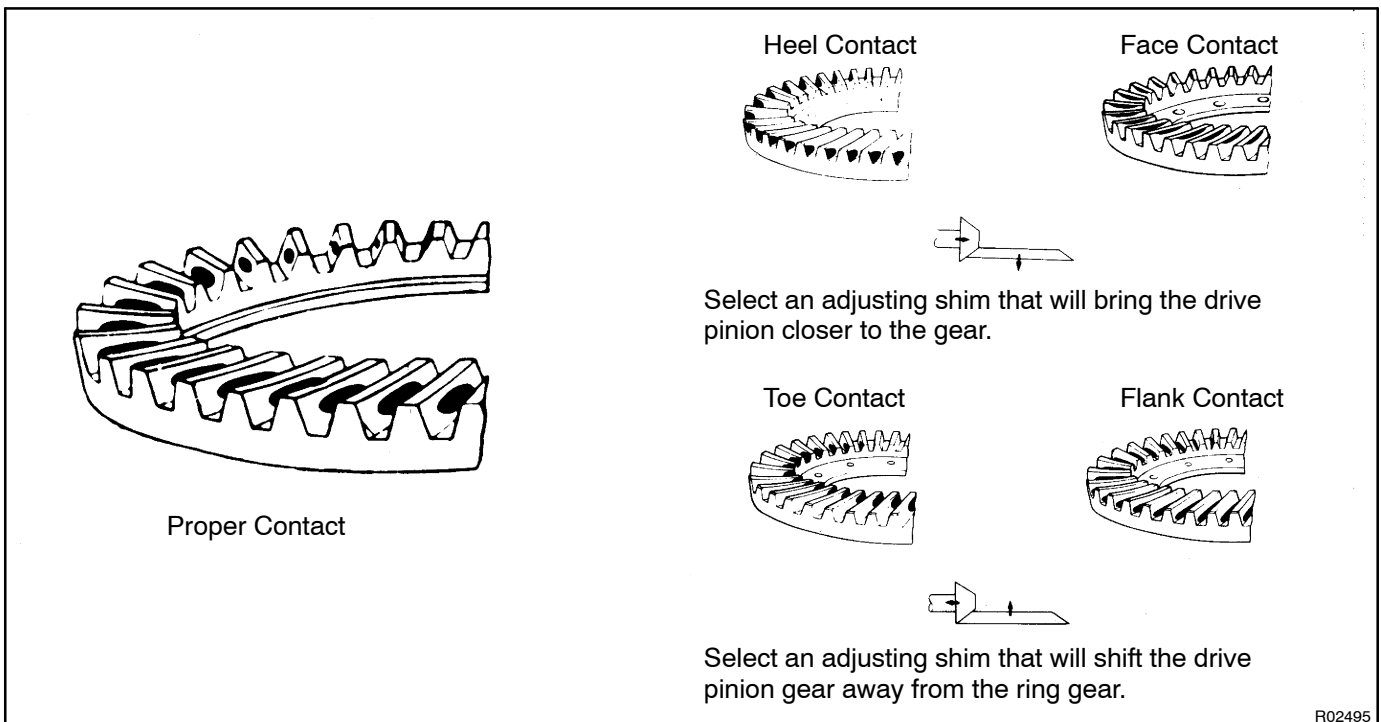
**Drive pinion preload plus**

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

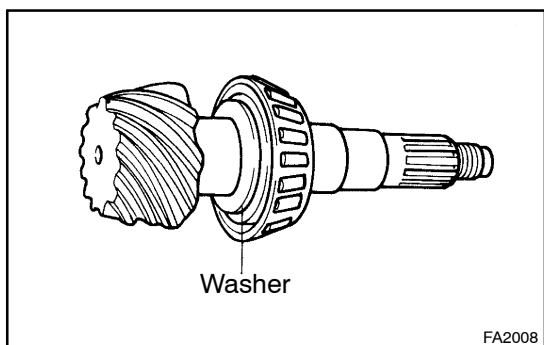


## 13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- Coat 3 or 4 teeth at 3 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 tooth contact pattern.



R02495



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

**Washer thickness:**

Thickness mm (in.)	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 (0.0822)
1.79 (0.0704)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0847)
1.85 (0.0729)	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 (0.0918)

**14. REMOVE COMPANION FLANGE (See page SA-77)**

**15. REMOVE OIL SLINGER**

**16. REMOVE FRONT BEARING (See page SA-77)**

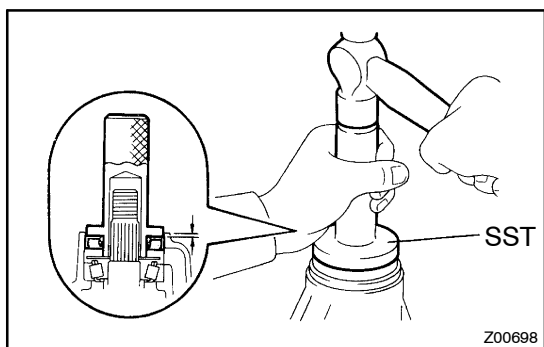
**17. INSTALL BEARING SPACER**

Install a new bearing spacer.

**HINT:**

Face the spacer with the large inner diameter to the rear side.

**18. INSTALL FRONT BEARING AND OIL SLINGER**



**19. INSTALL FRONT OIL SEAL**

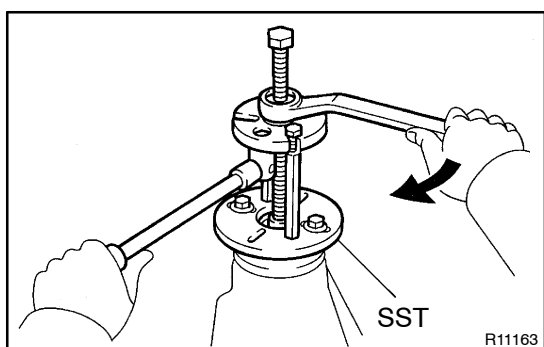
- (a) Using SST and a hammer, install a new oil seal.

SST 09554-30011

**Oil seal drive in depth:**

**2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)**

- (b) Coat MP grease to the oil seal lip.



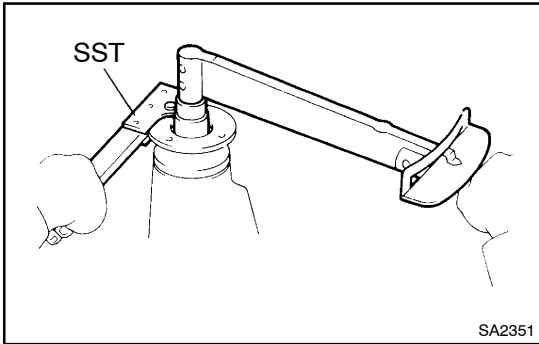
**20. INSTALL COMPANION FLANGE**

- (a) Using SST, install the companion flange.

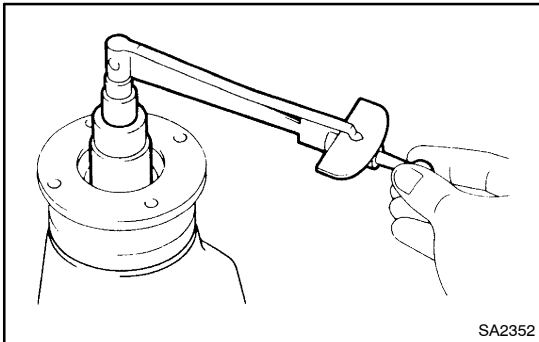
SST 09950-30011 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)

- (b) Coat the thread of a new nut with hypoid gear oil LSD.





- (c) Using SST to hold the flange, tighten the nut.  
SST 09330-00021



## 21. ADJUST DRIVE PINION PRELOAD

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

**Preload (at starting):**

**New bearing:**

1.4 - 2.0 N·m (14 - 20 kgf·cm, 12.4 - 17.7 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 a force of 13 N·m (130 kgf·cm, 9 ft.·lbf) at a time until the specified preload is reached.

SST 09330-00021

**Torque: 223 N·m (2,274 kgf·cm, 164 ft.·lbf) or less**

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

22. RECHECK TOTAL PRELOAD (See page SA-77)

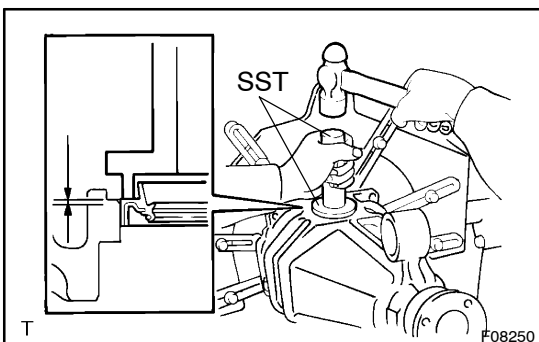
23. RECHECK RING GEAR BACKLASH (See page SA-77)

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

25. CHECK COMPANION FLANGE RUNOUT (See page SA-77)

26. STAKE DRIVE PINION NUT

Using a chisel and hammer, stake the nut.



27. INSTALL SIDE GEAR SHAFT OIL SEALS

- (a) Using SST and a press, install 2 new oil seals.  
SST 09554-22010

**Oil seal drive in depth:**

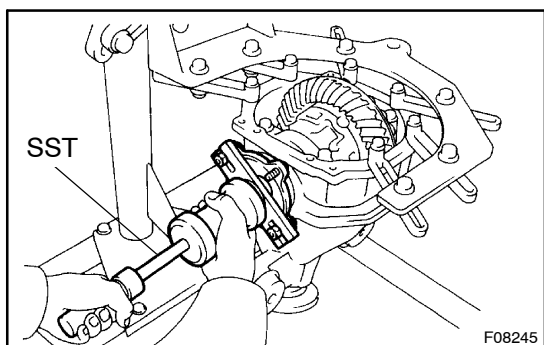
0.50 ± 0.50 mm (0.0200 ± 0.0197 in.)

- (b) Coat MP grease to the oil seal lip.

28. INSTALL SIDE GEAR SHAFTS

- (a) Using needle-nose pliers, install 2 new snap rings to the side gear shafts.

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



- (c) Using SST and the 2 nuts, install the 2 side gear shafts to the differential carrier.  
SST 09520-24010

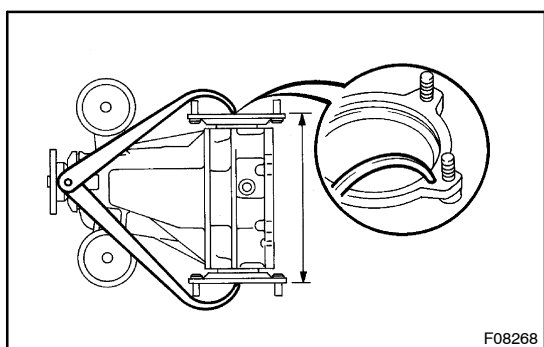
**NOTICE:**

**Be careful not to damage the side gear shaft oil seal.**

**HINT:**

- Before installing the drive shaft, set the snap ring with its opening side facing downward.
  - Whether the side gear shaft is in contact with the side gear or not can be known from the sound or feeling when driving it.
- (d) Check that the side gear shaft will not come out by trying to pull it out by hand.

**29. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.**



**30. INSPECT DIFFERENTIAL CARRIER**

Using vernier calipers, measure the distance between the mating surfaces of the right and left side gear shafts, as shown in the illustration.

**Standard distance:**

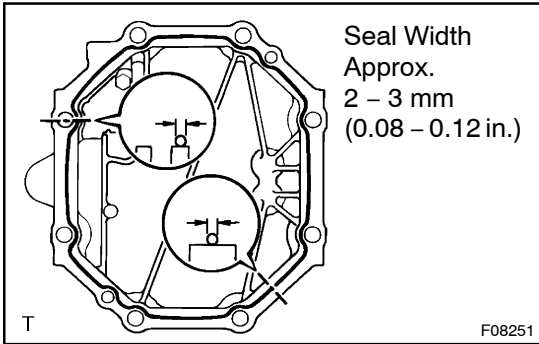
Country (Transmission type)	Standard distance
Europe	2 pinion differential: 244.74 mm (9.6354 in.) or less LSD: 244.30 mm (9.6181 in.) or less
Taiwan	
Australia (M/T)	
New Zealand (M/T)	
Hong Kong (M/T)	
Thai Land (M/T)	
Others	246.74 mm (9.1742 in.) or less

**31. INSTALL DIFFERENTIAL CARRIER STRAIGHT PIN**

Using a plastic hammer, install the straight pin.

**32. INSTALL DIFFERENTIAL CARRIER COVER**

- (a) Install the oil deflector with the bolt to the carrier cover.  
**Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)**
- (b) Install the breather plug to the carrier cover.  
**Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)**
- (c) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential carrier and carrier cover.
- (d) Clean both installation surfaces of loose FIPG and oil material with gasoline or alcohol.



- (e) Apply FIPG to the carrier cover, as shown in the illustration.

**FIPG:**

**Part No. 08826-00090, THREE BOND 1281  
or equivalent.**

**HINT:**

Install the carrier cover within 10 minutes after applying FIPG.

- (f) Install the differential carrier cover with the 8 bolts.

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