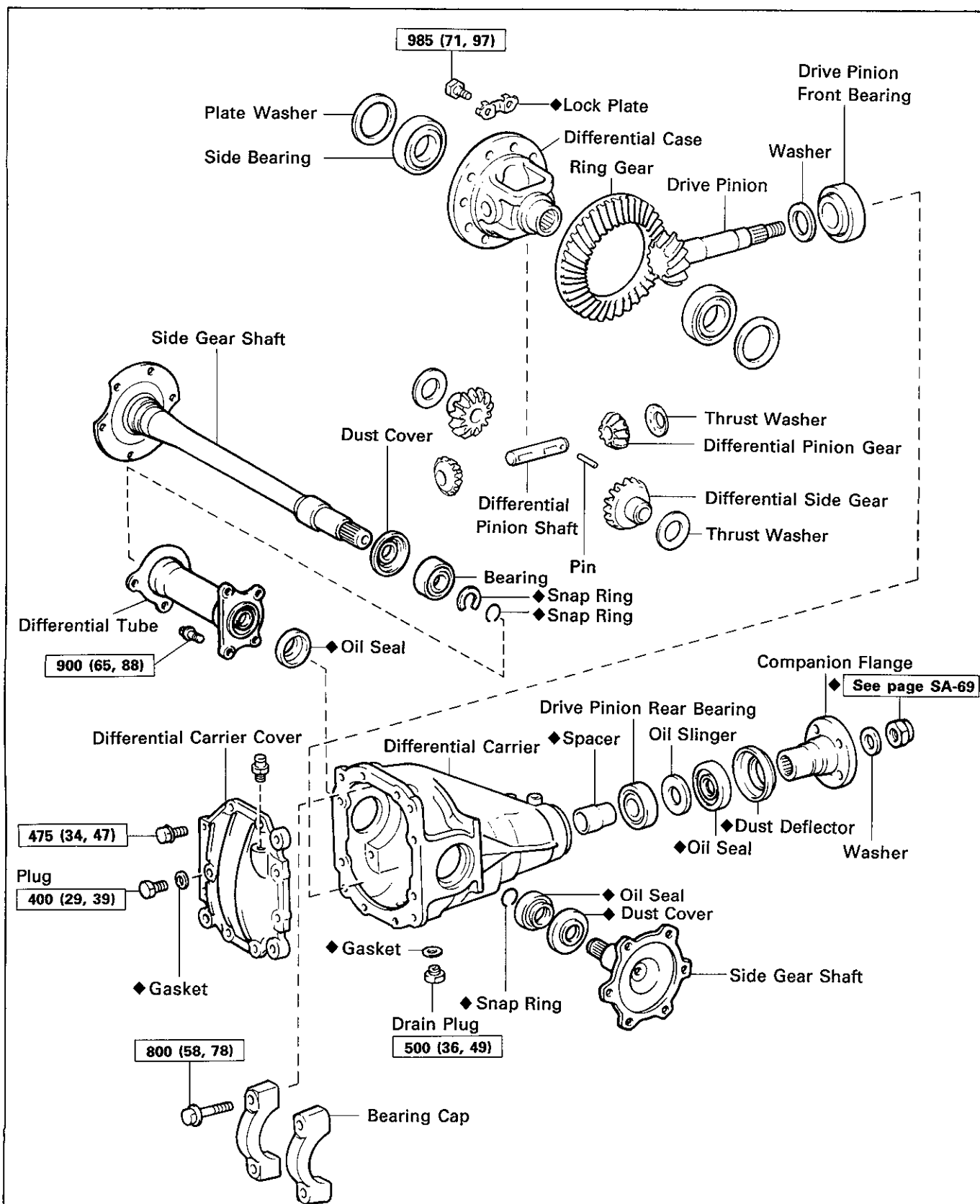


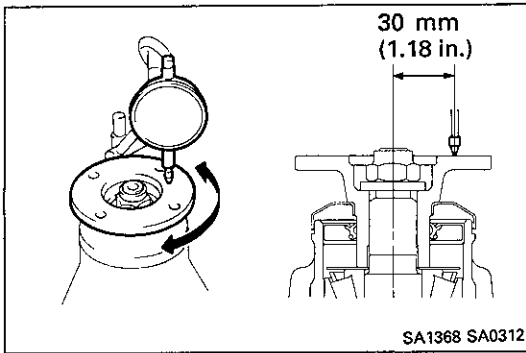
Differential Carrier

COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part



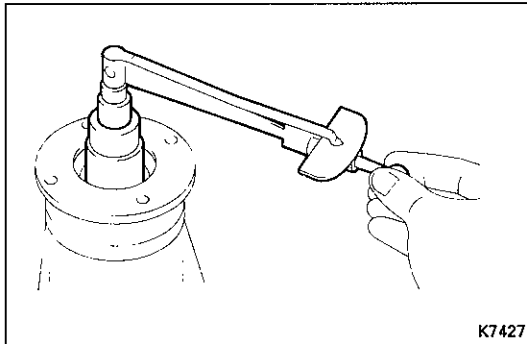
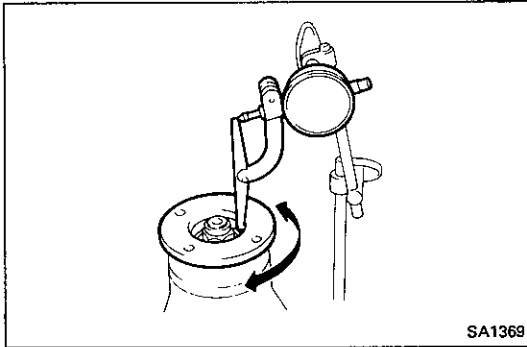
INSPECTION OF DIFFERENTIAL CARRIER

1. CHECK RUNOUT OF COMPANION FLANGE

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

Maximum vertical runout: 0.10 mm (0.0039 in.)

Maximum lateral runout: 0.10 mm (0.0039 in.)



2. CHECK DRIVE PINION PRELOAD

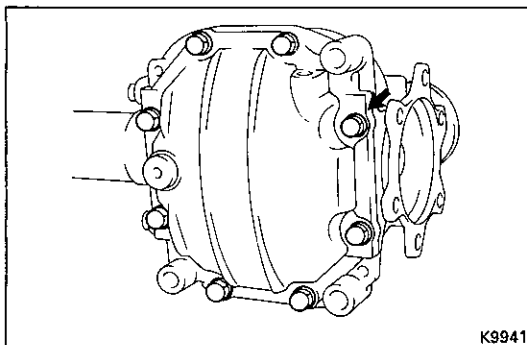
Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

Preload (at start): 6 – 10 kg-cm
(5.2 – 8.7 in.-lb, 0.6 – 1.0 N-m)

3. CHECK TOTAL PRELOAD

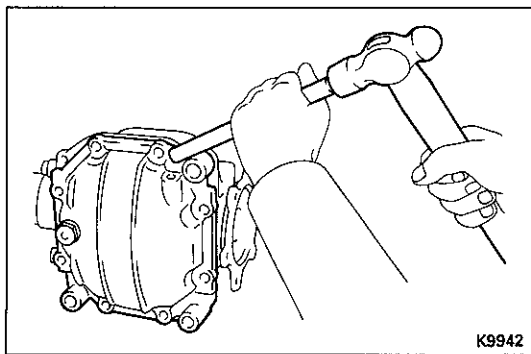
Using a torque wrench, measure the total preload.

Total preload (at start):
In addition to drive pinion preload
4 – 6 kg-cm (3.5 – 5.2 in.-lb, 0.4 – 0.6 N-m)

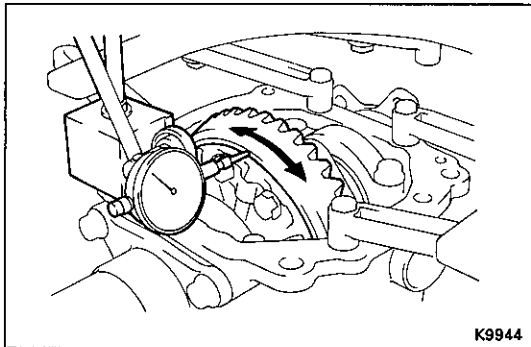


4. REMOVE DIFFERENTIAL CARRIER COVER

(a) Remove the eight bolts.



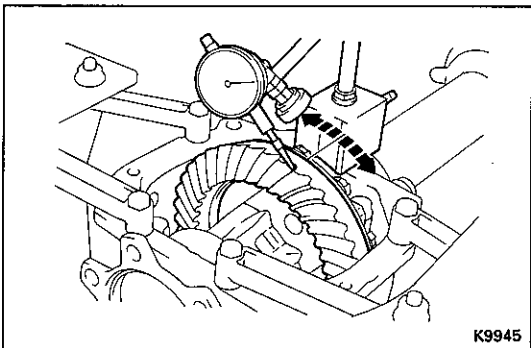
- (b) Using a brass bar and hammer, tap the differential carrier cover to remove it.



5. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)



6. CHECK RING GEAR BACKLASH

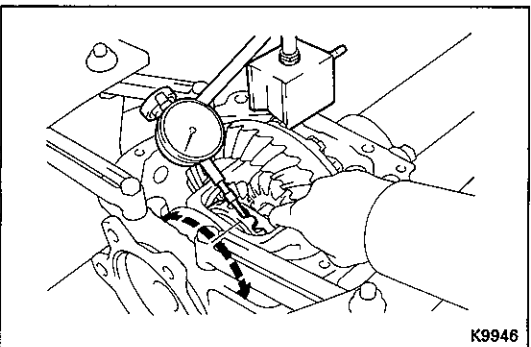
- (a) Fix the dial indicator on the tooth surface at a 90° angle.
- (b) Holding the drive pinion flange, measure the ring gear backlash.

**Ring gear backlash: 0.13 – 0.18 mm
(0.0051 – 0.0071 in.)**

If the backlash is not within specification, adjust the ring gear backlash.

HINT: Measure from three or more places on the circumference of the ring gear.

7. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 11 on page SA-67)



8. CHECK SIDE GEAR BACKLASH

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

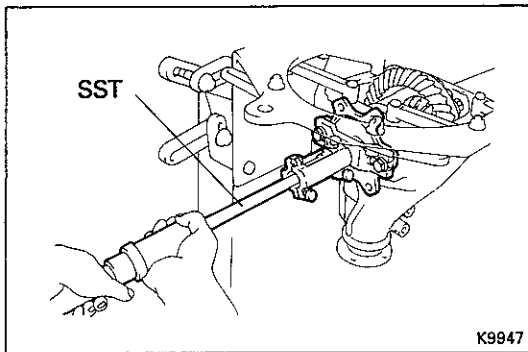
**Standard backlash: 0.05 – 0.20 mm
(0.0020 – 0.0079 in.)**

If the backlash is out of specification, install the correct thrust washers. (See page SA-61)

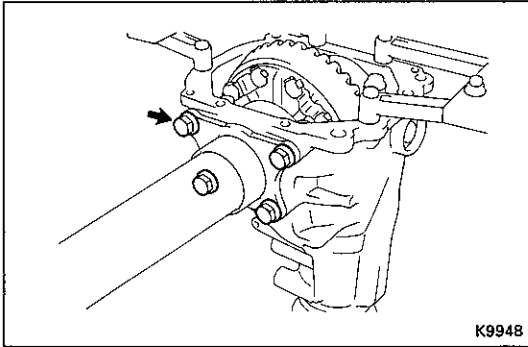
DISASSEMBLY OF DIFFERENTIAL CARRIER**1. REMOVE SIDE GEAR SHAFTS**

Using SST, remove the right and left side gear shafts.

SST 09910-00015 (09911-00011, 09912-00010, 09914-00011)

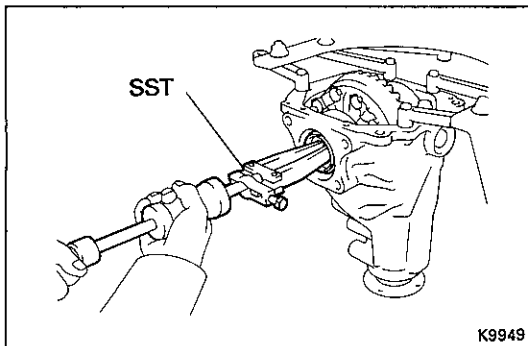
**2. REMOVE DIFFERENTIAL TUBE**

Remove the four bolts and the differential tube.

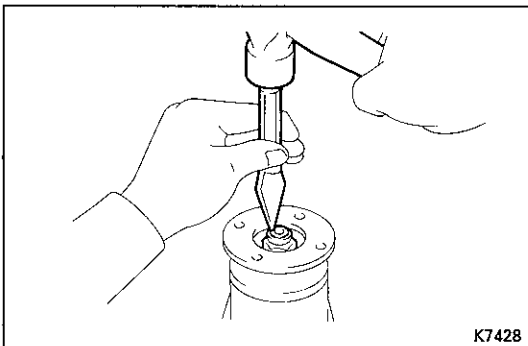
**3. REMOVE SIDE GEAR SHAFT OIL SEALS**

Using SST, remove the right and left side gear shaft oil seals.

SST 09308-00010

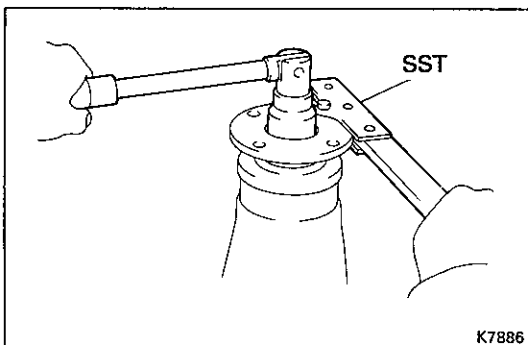
**4. REMOVE COMPANION FLANGE**

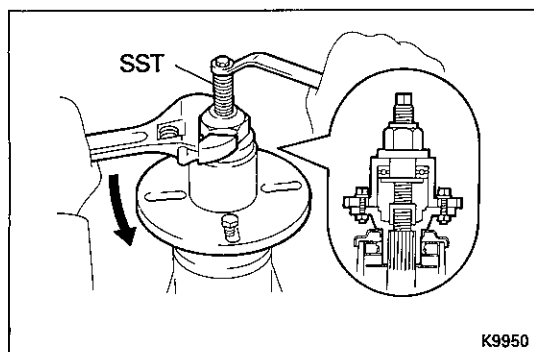
(a) Using a chisel and hammer, unstake the nut.



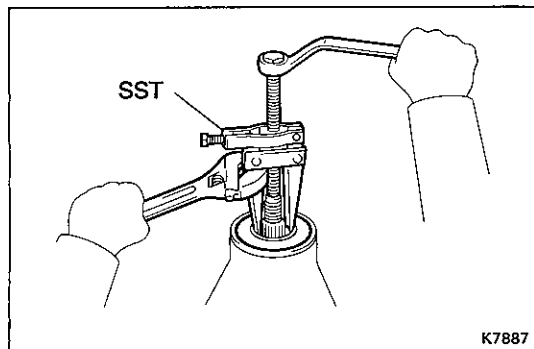
(b) Using SST to hold the flange, remove the nut and plate washer.

SST 09330-00021



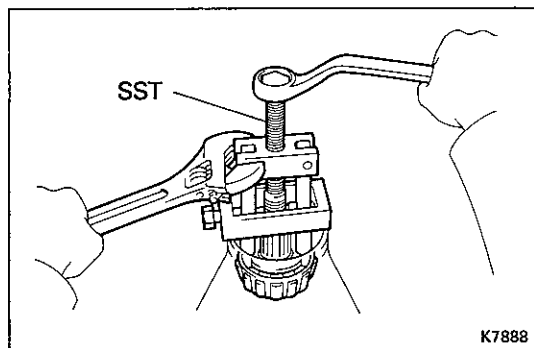


- (c) Using SST, remove the companion flange.
SST 09557-22022 (09557-22030)



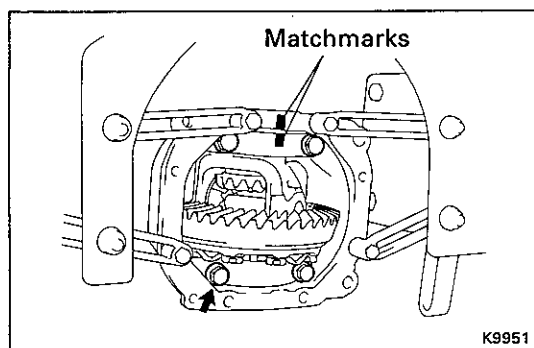
5. REMOVE OIL SEAL AND OIL SLINGER

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



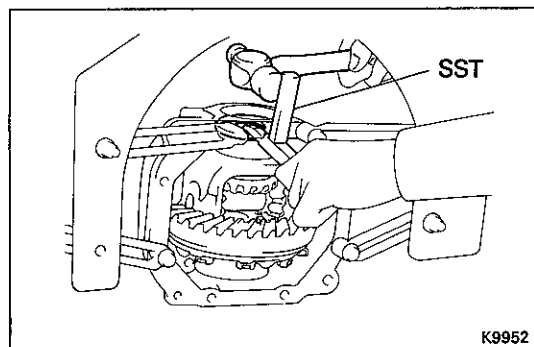
6. REMOVE REAR BEARING AND BEARING SPACER

- (a) Using SST, remove the rear bearing from the drive pinion.
SST 09556-22010
(b) Remove the bearing spacer.

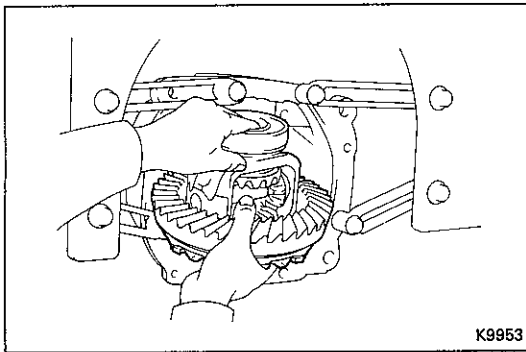


7. REMOVE DIFFERENTIAL CASE ASSEMBLY AND RING GEAR

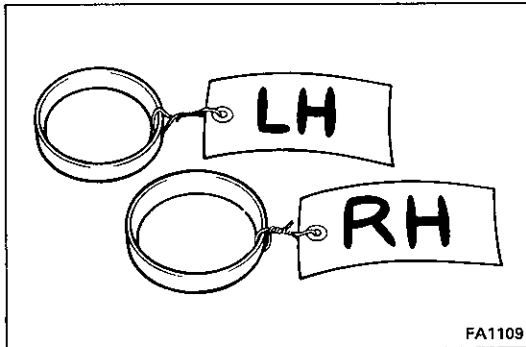
- (a) Place matchmarks on the bearing cap and differential carrier.
(b) Remove the four bolts and two bearing caps.



- (c) Using SST, remove the drive pinion side plate washer.
SST 09504-22011

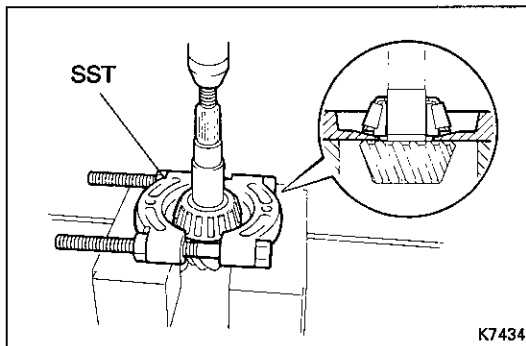


- (d) Remove the differential case with the bearing outer races from the differential carrier.



HINT: Tag the bearing outer races to show the location for reassembly.

8. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER

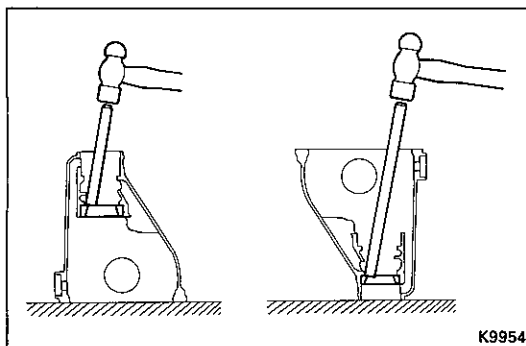


9. REMOVE DRIVE PINION FRONT BEARING

- (a) Using SST, and a press, remove the drive pinion front bearing.

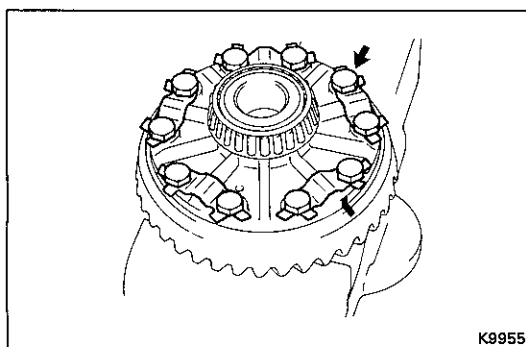
SST 09950-00020

- (b) Remove the plate washer.



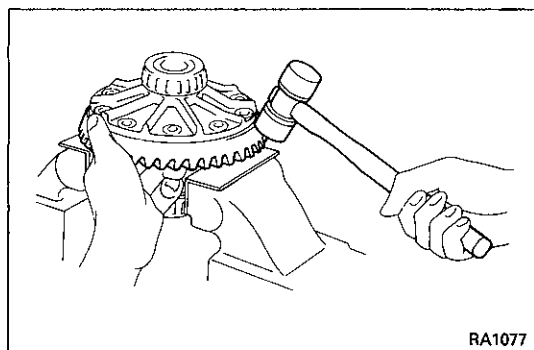
10. REMOVE DRIVE PINION BEARING OUTER RACES

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

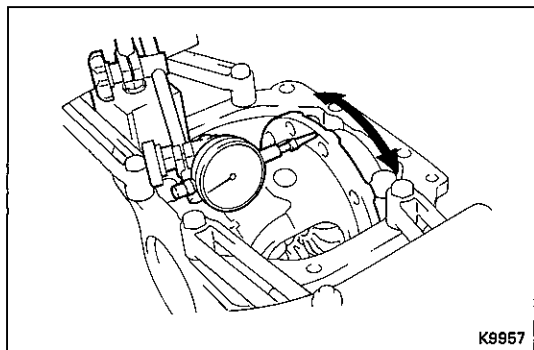


11. REMOVE RING GEAR

- (a) Place matchmarks on the ring gear and differential case.
- (b) Using a screwdriver, unstake the lock plates.
- (c) Remove the ten bolts and five lock plates.



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

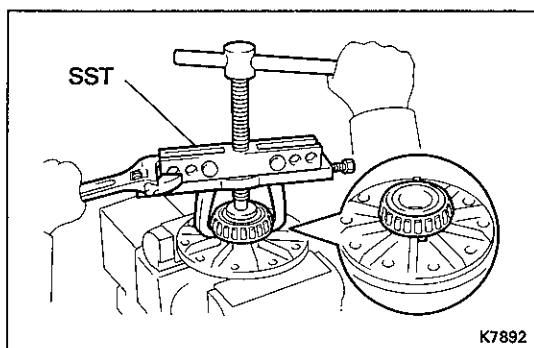


12. CHECK DIFFERENTIAL CASE RUNOUT

- Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.
- Install the differential case in the differential carrier.
- When there is no play left in the side bearings, install the plate washers.
- Align the matchmarks on the bearing cap and differential carrier.
- Install and uniformly tighten the four bearing cap bolts in several passes.
- Using a dial indicator, measure the differential case runout.

Maximum runout: 0.07 mm (0.0028 in.)

- Remove the differential case.
(See step 7 on page SA-56)

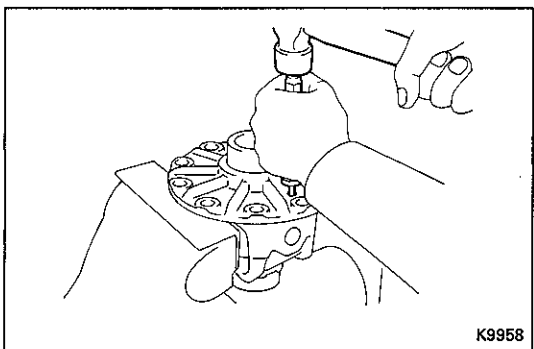


13. REMOVE SIDE BEARINGS

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

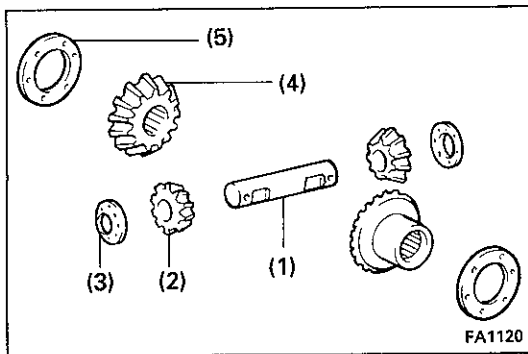
SST 09950-20017

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

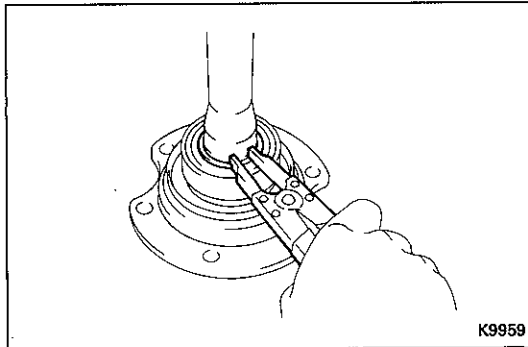


14. DISASSEMBLE DIFFERENTIAL CASE ASSEMBLY

- Using a pin punch and hammer, drive out the straight pin.



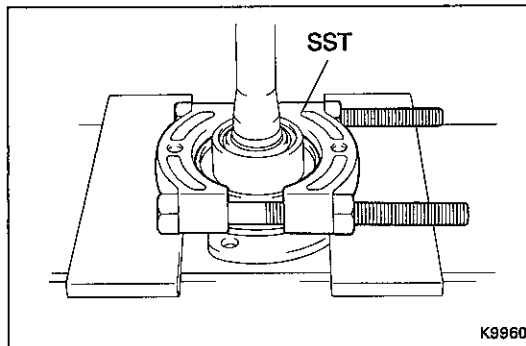
- (b) Remove the following parts:
- (1) Pinion shaft
 - (2) Pinion gears
 - (3) Pinion gear thrust washers
 - (4) Side gears
 - (5) Side gear thrust washers



REPLACEMENT OF DUST COVER AND SIDE GEAR SHAFT BEARING

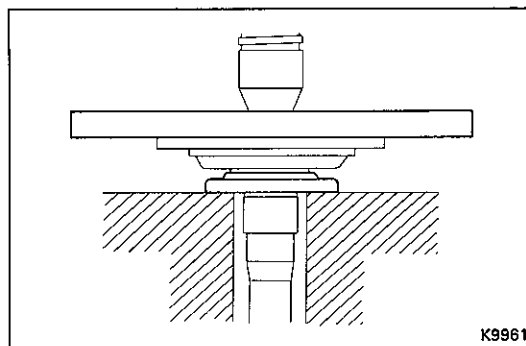
1. REPLACE RH SIDE GEAR SHAFT BEARING AND DUST COVER

- (a) Using a snap ring expander, remove the snap ring.



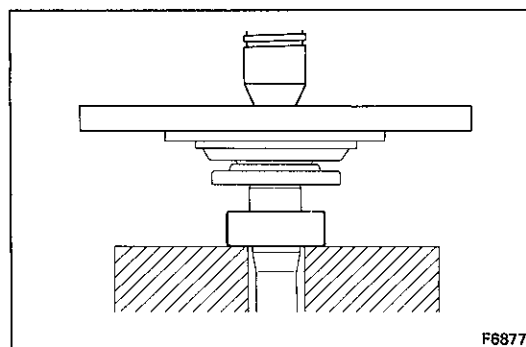
- (b) Using SST and a press, remove the side gear shaft bearing and dust cover together.

SST 09950-00020

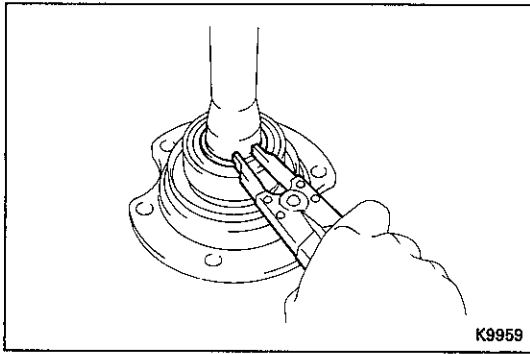


- (c) Using a press, install a new dust cover onto the RH side gear shaft.

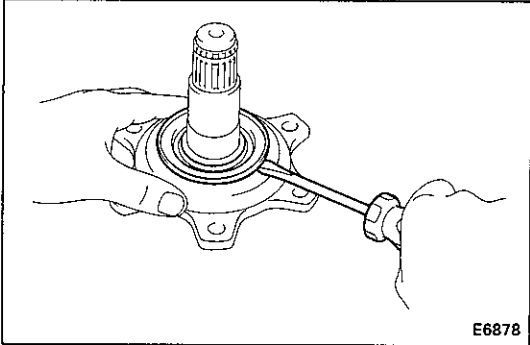
NOTICE: Be careful not to damage the dust cover.



- (d) Using a press, install a new side gear shaft bearing.

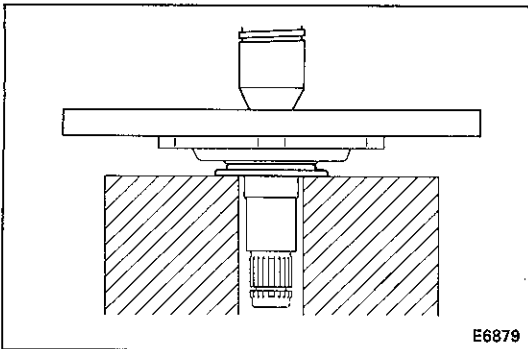


(e) Using a snap ring expander, install the snap ring.



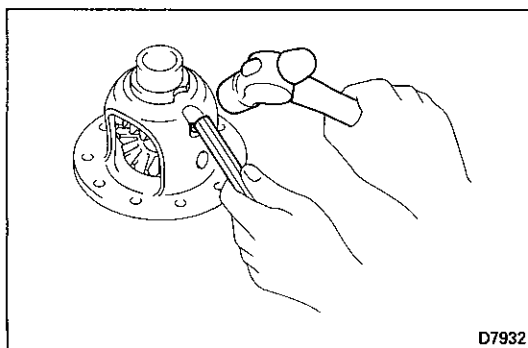
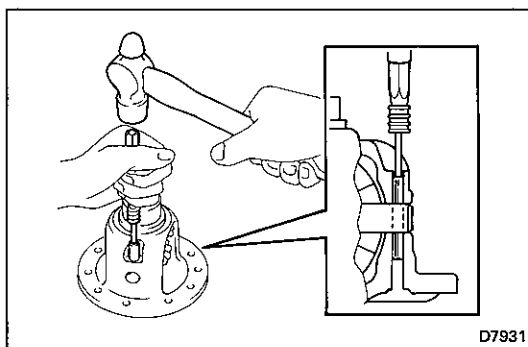
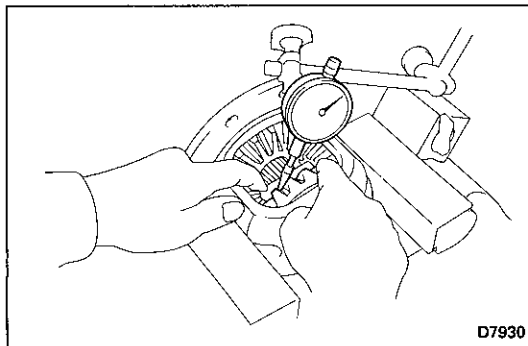
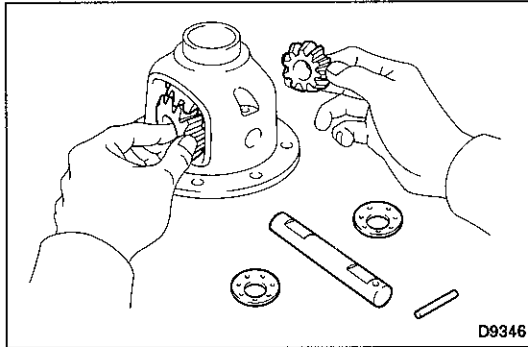
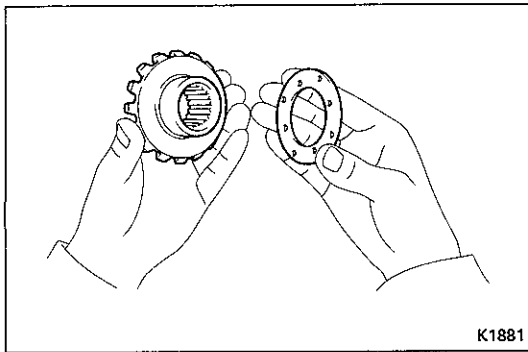
2. REPLACE LH SIDE GEAR SHAFT DUST COVER

(a) Using a screwdriver, remove the dust cover.



(b) Using a press, install a new dust cover.

NOITCE: Be careful not to damage the dust cover.



ASSEMBLY OF DIFFERENTIAL CARRIER

1. ADJUST DIFFERENTIAL SIDE GEAR SHAFT BACKLASH

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

HINT: Using the table below, select thrust washers which will ensure that the backlash is within specification.

Thrust washer thickness
1.0 mm (0.039 in.)
1.1 mm (0.043 in.)
1.2 mm (0.047 in.)
1.3 mm (0.051 in.)

(b) Install the 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.

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

(d) Measure the side gear backlash while holding one pinion gear toward the differential case.

Backlash: 0.05 – 0.20 mm

Backlash: (0.0020 – 0.0079 in.)

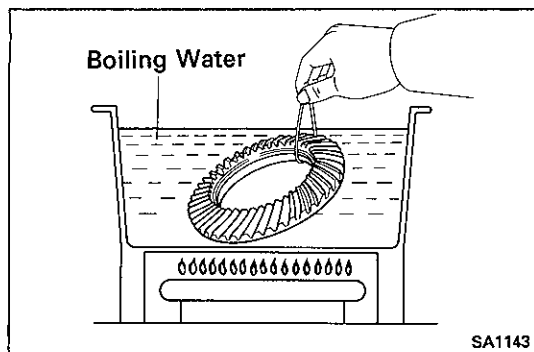
If the backlash is not within the specification, install side gear thrust washers with different thicknesses.

(e) Remove the side gear shafts.

2. INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

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

(b) Stake the differential case.



3. INSTALL RING GEAR ON DIFFERENTIAL CASE

- Clean the contact surfaces of the differential case and the threads of the ring gear and differential case.
- Heat the ring gear in boiling water.
- 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.

- Temporarily install five new lock plates and the ten bolts so that the bolt holes in the ring gear and differential case are not misaligned.

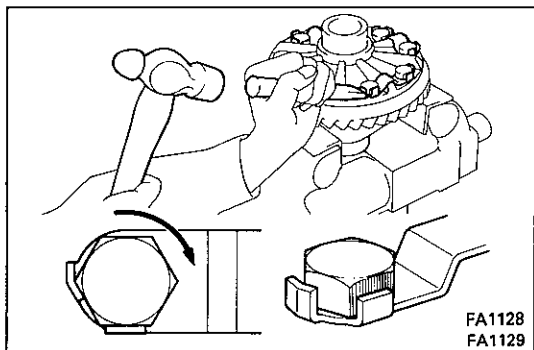
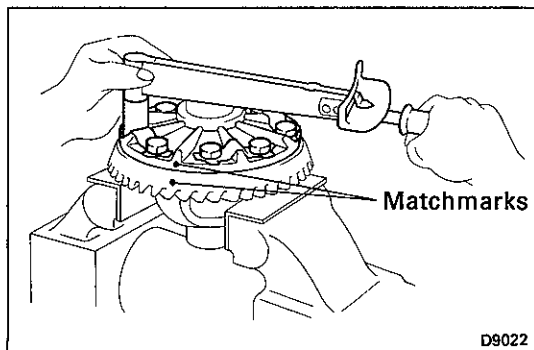
NOTICE: The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.

- After the ring gear has cooled sufficiently, torque the ring gear set bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N-m)

- Using a hammer and drift punch, stake the lock plates.

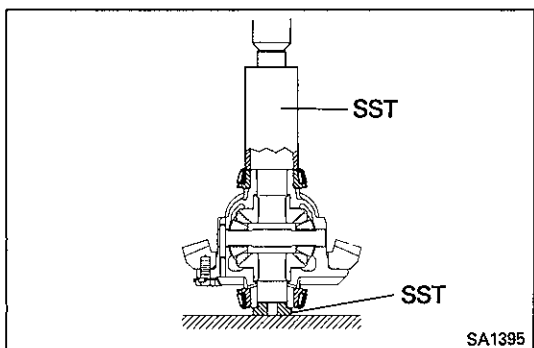
HINT: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightening side.



4. INSTALL SIDE BEARINGS

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

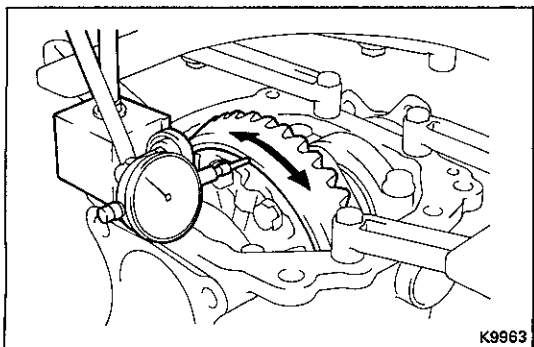
SST 09226-10010, 09950-20017

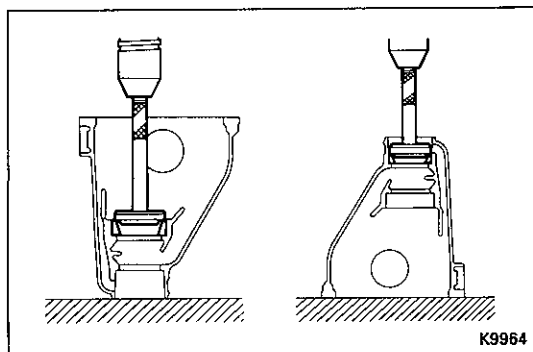


5. CHECK RING RUNOUT

- Install the differential case onto the carrier and install the plate washers to where there is no play in the bearing. (See page SA-65)
- Install bearing caps. (See page SA-67)
- Using a dial indicator, measure the runout of ring gear.

Maximum runout: 0.07 mm (0.0028 in.)





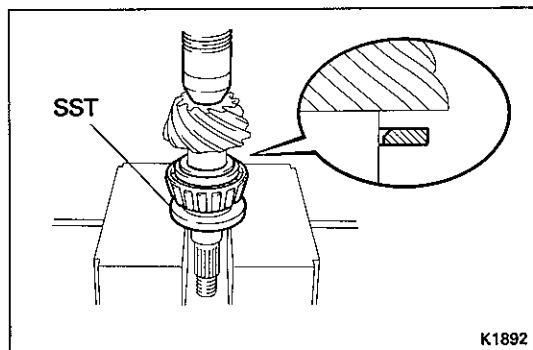
6. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

Using SST and a press, install the outer races.

SST 09608-35014

Front (09608-06020, 09608-06120)

Rear (09608-06020, 09608-06110)

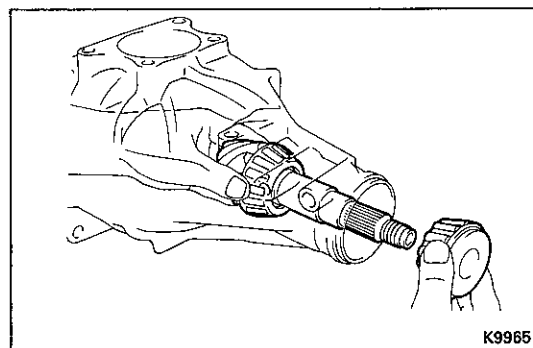


7. INSTALL DRIVE PINION FRONT BEARING

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

(b) Using SST, press in the front bearing onto the drive pinion.

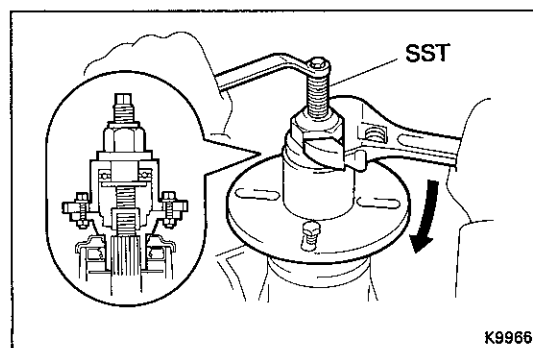
SST 09506-30012



6. TEMPORARILY ADJUST DRIVE PINION PRELOAD

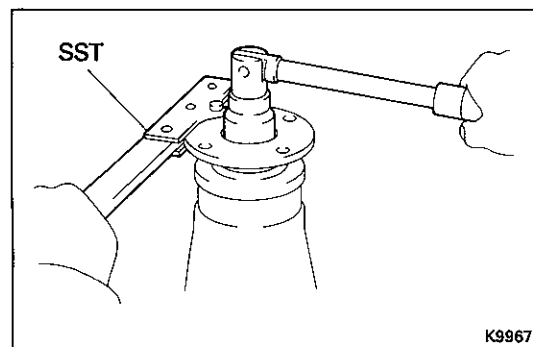
(a) Install the drive pinion, rear bearing and oil slinger.

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



(b) Using SST, install the companion flange.

SST 09557-22022 (09557-22030)

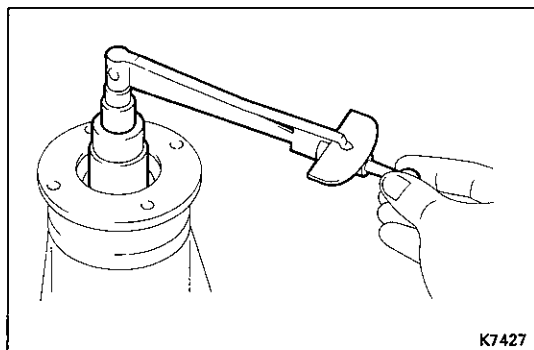


(c) Adjust the drive pinion preload by tightening the companion flange nut.

HINT: Using SST to hold the flange, tighten 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.



(d) Using a torque wrench, measure the preload.

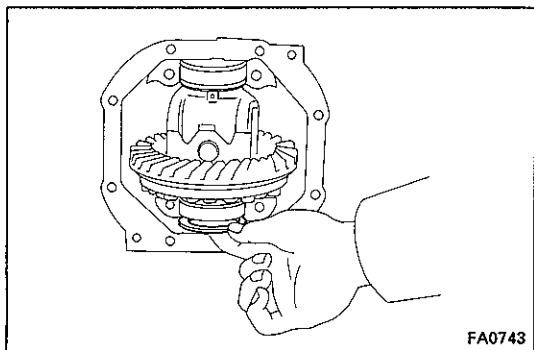
Preload (at start):

New bearing

12 – 19 kg-cm (10.4 – 16.5 in.-lb, 1.2 – 1.9 N-m)

Reused bearing

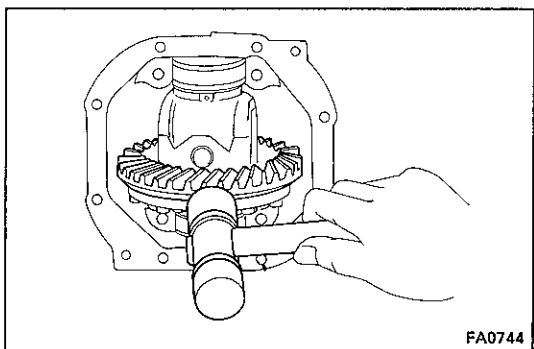
6 – 10 kg-cm (5.2 – 8.7 in.-lb, 0.6 – 1.0 N-m)



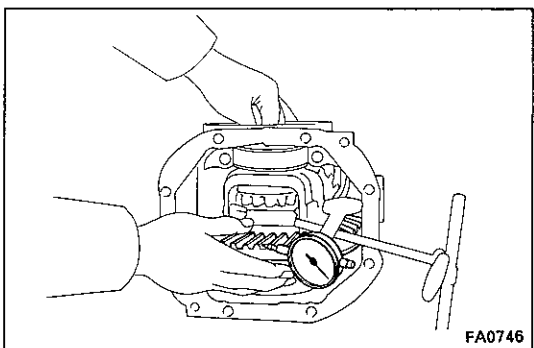
7. ADJUST RING GEAR BACKLASH

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

HINT: Insure that the ring gear has backlash.

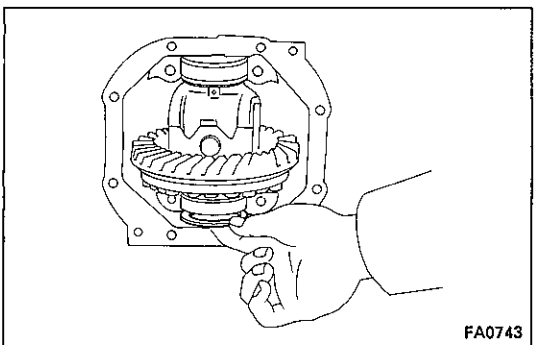


(b) Sung down the washer and bearing by tapping on the ring gear with a plastic-faced hammer.

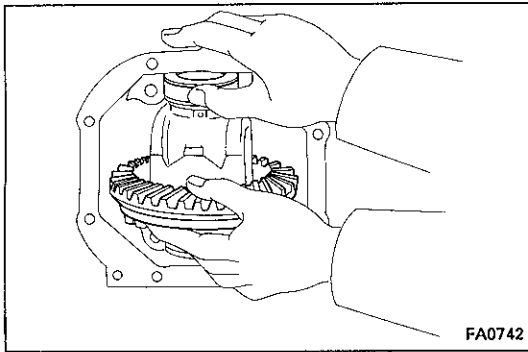


(c) Hold the side bearing boss on the teeth surface of the ring gear and measure the backlash.

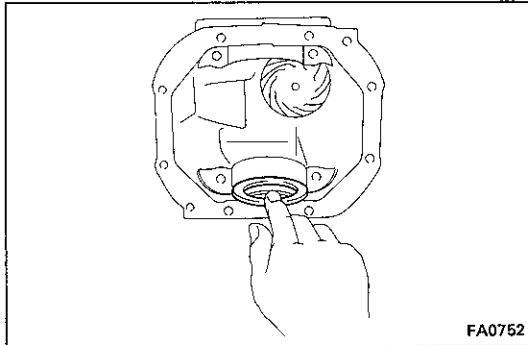
Backlash (reference): 0.13 mm (0.0051 in.)



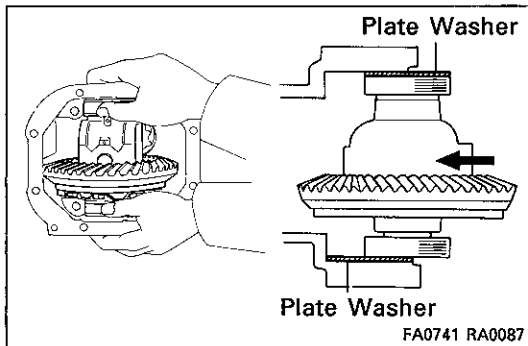
(d) Select a ring gear side plate washer, using the backlash as reference. (See page SA-66)



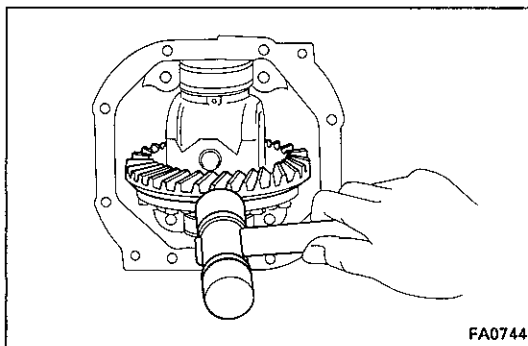
- (e) Select a drive pinion side plate washer with a thickness which eliminates any clearance between the outer race and case.



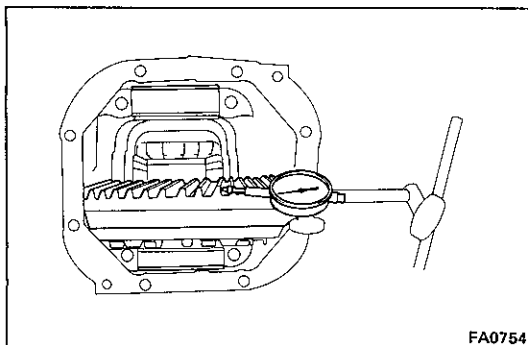
- (f) Remove the plate washers and differential case.
(g) Install the plate washer into the ring gear side of the carrier.



- (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.

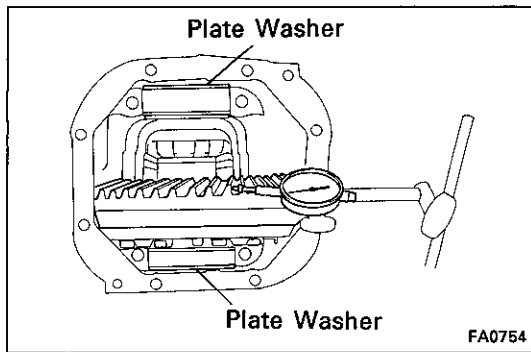


- (i) Using a plastic-faced hammer, snug down the washer and bearing by tapping the ring gear.



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

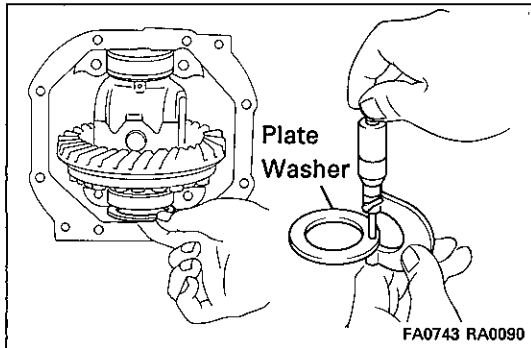
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)



- (k) If not within specification, adjust by either increasing or decreasing the number of washers on both sides by an equal amount.

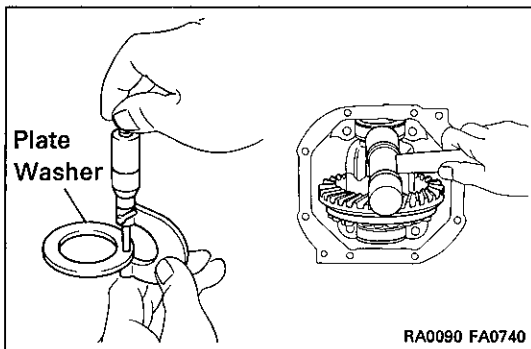
HINT: There should be no clearance between the plate washer and case.

Insure that there is ring gear backlash.



8. ADJUST SIDE BEARING PRELOAD

- (a) Remove the drive pinion side plate washer and measure the thickness.



- (b) Using the backlash as a reference, install a new washer of 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.

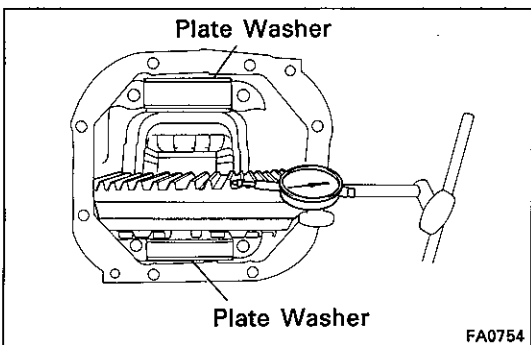
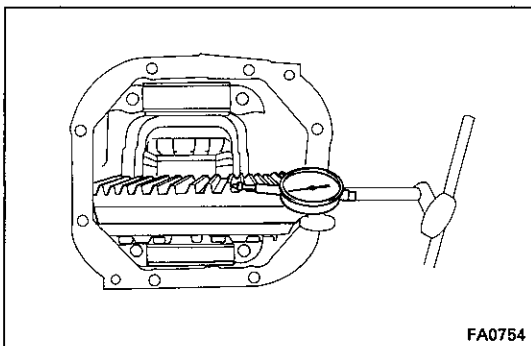
- (c) Using a plastic-faced hammer, tap in the side washer.

- (d) Recheck the ring gear backlash.

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

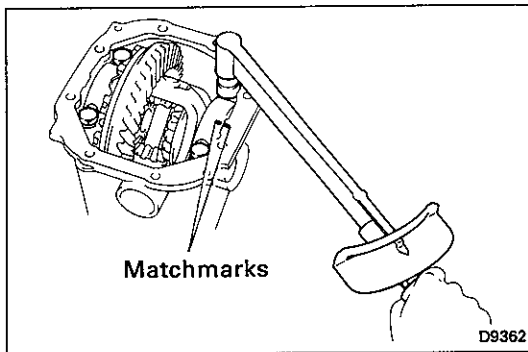
- (e) If not within standard, adjust by either increasing or decreasing the washers on both sides by an equal amount.

HINT: The backlash will change about 0.02 mm (0.0008 in.) with 0.03 mm (0.0012 in.) alteration of the side washer.



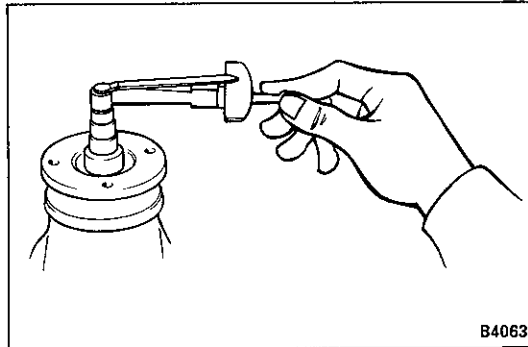
Washer thickness

Thickness		mm (in.)
2.57 – 2.59 (0.1012 – 0.1020)	2.93 – 2.95 (0.1154 – 0.1161)	
2.60 – 2.62 (0.1024 – 0.1031)	2.96 – 2.98 (0.1165 – 0.1173)	
2.63 – 2.65 (0.1035 – 0.1043)	2.99 – 3.01 (0.1177 – 0.1185)	
2.66 – 2.68 (0.1047 – 0.1055)	3.02 – 3.04 (0.1189 – 0.1197)	
2.69 – 2.71 (0.1059 – 0.1067)	3.05 – 3.07 (0.1201 – 0.1209)	
2.72 – 2.74 (0.1071 – 0.1079)	3.08 – 3.10 (0.1213 – 0.1220)	
2.75 – 2.77 (0.1083 – 0.1091)	3.11 – 3.13 (0.1224 – 0.1232)	
2.78 – 2.80 (0.1094 – 0.1102)	3.14 – 3.16 (0.1236 – 0.1244)	
2.81 – 2.83 (0.1106 – 0.1114)	3.17 – 3.19 (0.1248 – 0.1256)	
2.84 – 2.86 (0.1118 – 0.1126)	3.20 – 3.22 (0.1260 – 0.1268)	
2.87 – 2.89 (0.1130 – 0.1138)	3.23 – 3.25 (0.1272 – 0.1280)	
2.90 – 2.92 (0.1142 – 0.1150)		

**9. INSTALL SIDE BEARING CAPS**

Align the matchmarks on the cap and carrier.

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

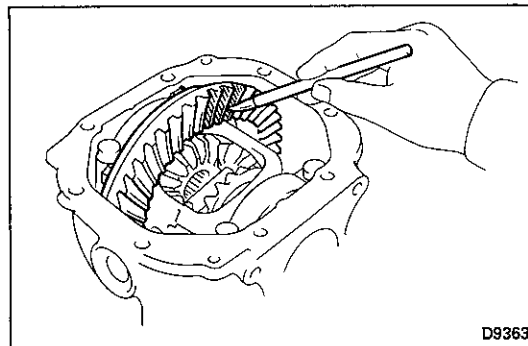
**10. MEASURE TOTAL PRELOAD**

Using a torque wrench, measure the total preload.

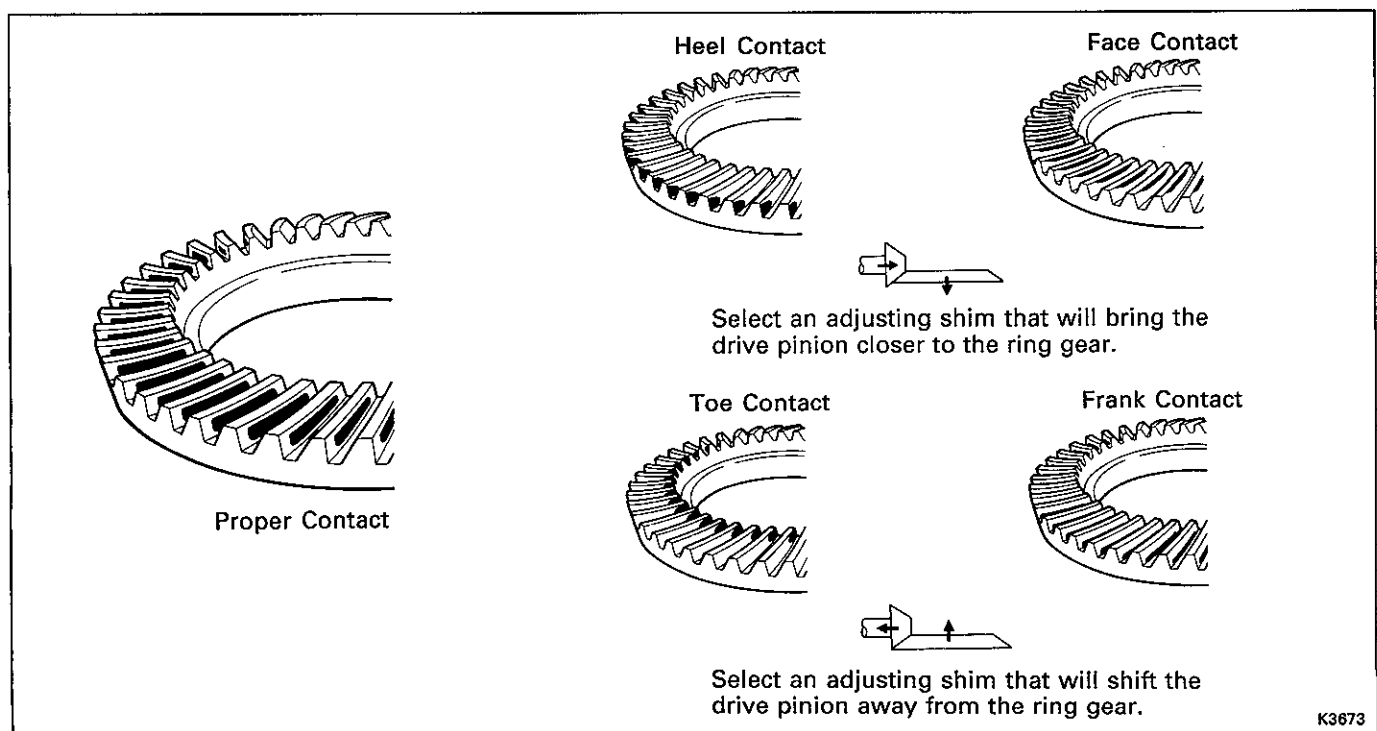
Total preload (starting):

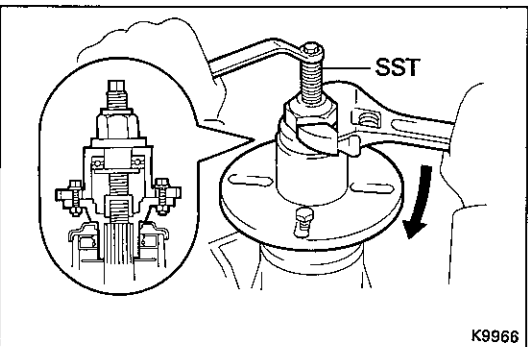
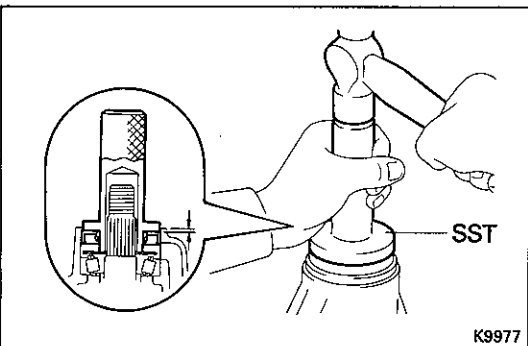
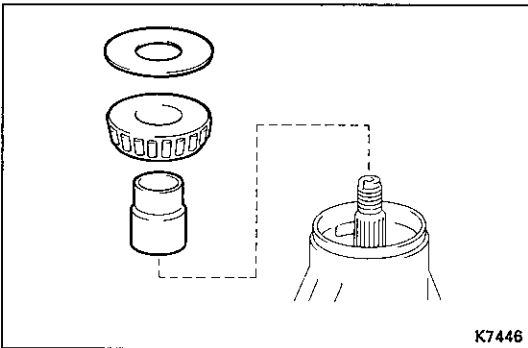
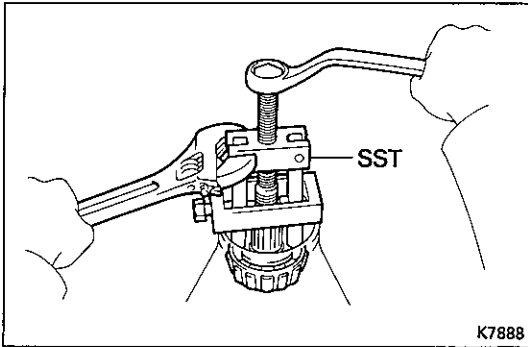
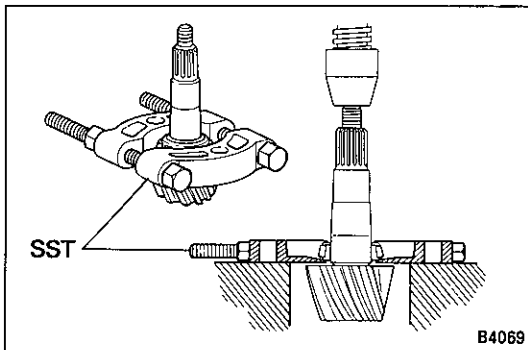
Add drive pinion preload

4 – 6 kg-cm (3.5 – 5.2 in.-lb, 0.4 – 0.6 N-m)

**11. 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.





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

Washer thickness

Thickness		mm(in.)
2.24 (0.0882)		2.51 (0.0988)
2.27 (0.0894)		2.54 (0.1000)
2.30 (0.0906)		2.57 (0.1012)
2.33 (0.0917)		2.60 (0.1024)
2.36 (0.0929)		2.63 (0.1035)
2.39 (0.0941)		2.66 (0.1047)
2.42 (0.0953)		2.69 (0.1059)
2.45 (0.0965)		2.72 (0.1071)
2.48 (0.0976)		

12. INSTALL BEARING SPACER

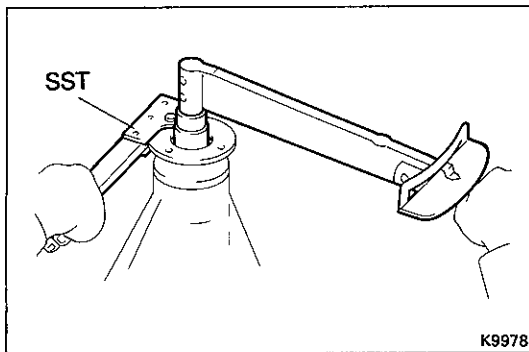
- Remove the companion flange.
(See page SA-55)
- Remove the oil slinger.
- Using SST, remove the drive pinion rear bearing.
SST 09556-22010
- Install a new bearing spacer.
- Install the drive pinion rear bearing and oil slinger.

13. INSTALL OIL SEAL

- Using SST, install a new oil seal.
SST 09554-30011
Oil seal drive in depth: 1.5 mm (0.059 in.)
- Apply MP grease to the oil seal lip.

14. INSTALL COMPANION FLANGE

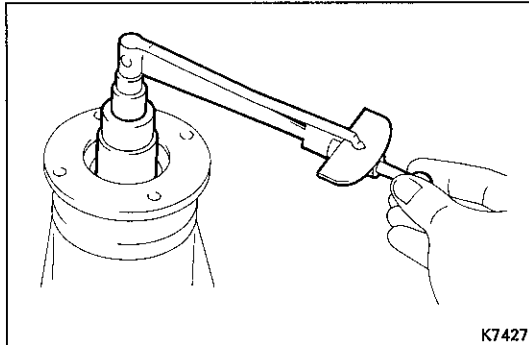
- Using SST, install the companion flange.
SST 09557-22022 (09557-22030)



- (b) Install the plate washer.
- (c) Coat the threads of a new nut with differential oil and install it.
- (d) Using SST to hold the flange, tighten the nut.

SST 09330-00021

Torque: 1,100 kg-cm (80 ft-lb, 108 N·m)



15. CHECK DRIVE PINION PRELOAD

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

Preload (at start):

New bearing

12 – 19 kg-cm (10.4 – 16.5 in.-lb, 1.2 – 1.9 N·m)

Reused bearing

6 – 10 kg-cm (5.2 – 8.7 in.-lb, 0.6 – 1.0 N·m)

- If the preload is greater than the specification, replace the spacer.
- If the preload is less than the specification, retighten the nut 130 kg-cm (9 ft-lb, 13 N·m) at a time until the specified preload is reached.

Maximum torque: 2,400 kg-cm (174 ft-lb, 235 N·m)

If the maximum torque is exceeded while retightening the nut, replace the spacer and repeat the preload procedure.

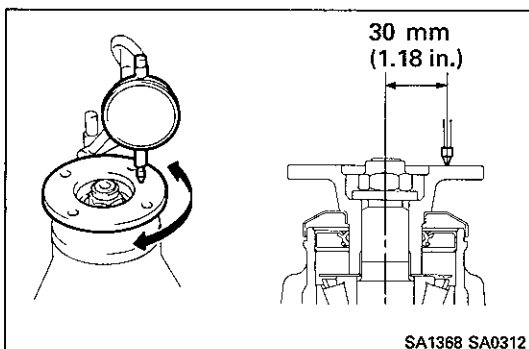
Do not back off the nut to reduce the preload.

16. RECHECK RING GEAR BACKLASH AND TOOTH CONTACT PATTERN

17. CHECK RUNOUT OF COMPANION FLANGE

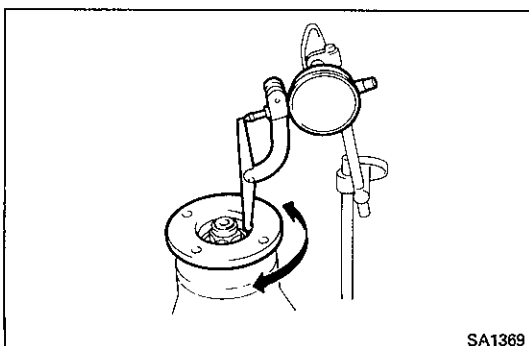
Using a dial indicator, measure the vertical and lateral runout of the companion flange.

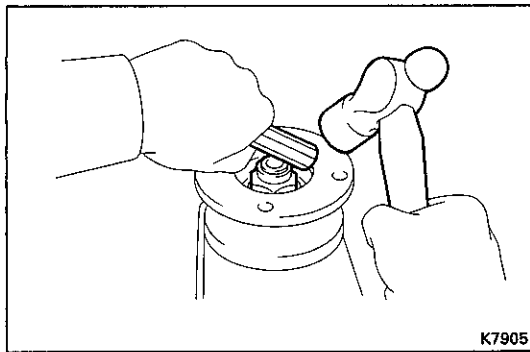
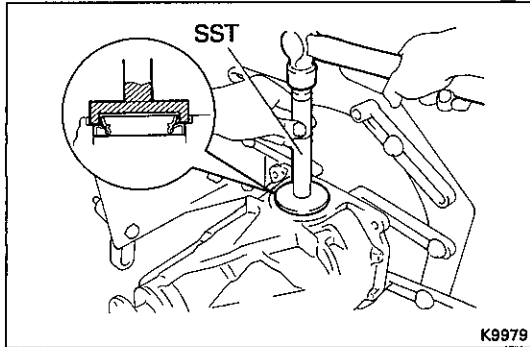
Maximum vertical runout: 0.10 mm (0.0039 in.)



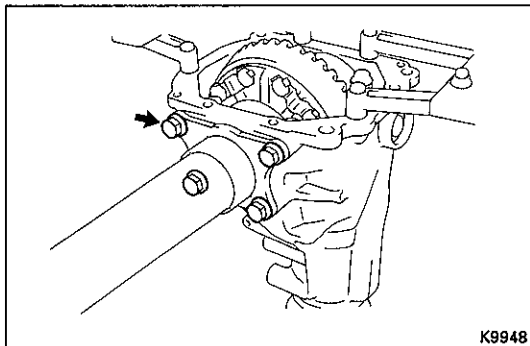
Maximum lateral runout: 0.10 mm (0.0039 in.)

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



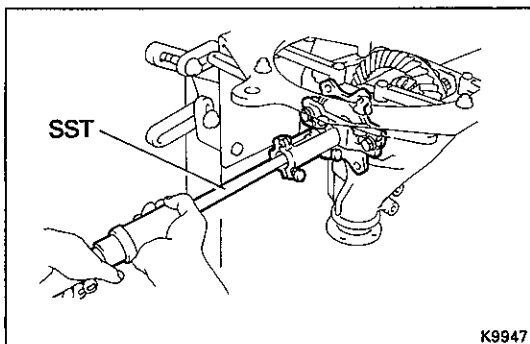
**18. STAKE DRIVE PINION NUT****19. INSTALL SIDE GEAR SHAFT OIL SEALS**

- (a) Using SST, install two new oil seals.
SST 09550-22011 (09550-00020, 09550-00031)
- (b) Apply MP grease to the oil seal lip.

**20. INSTALL DIFFERENTIAL TUBE**

Install the differential tube with four bolts.

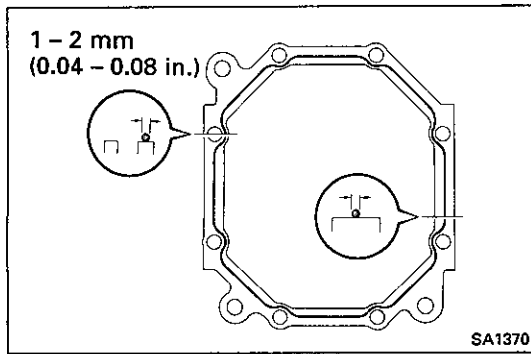
Torque: 900 kg-cm (65 ft-lb, 88 N·m)

**21. INSTALL SIDE GEAR SHAFTS**

- (a) Before installing the side gear shafts, replace the snap rings.
- (b) Using SST, install the side gear shafts.
SST 09910-00015 (09911-00011, 09912-00010, 09914-00011)

22. CHECK INSTALLATION OF SIDE GEAR SHAFT

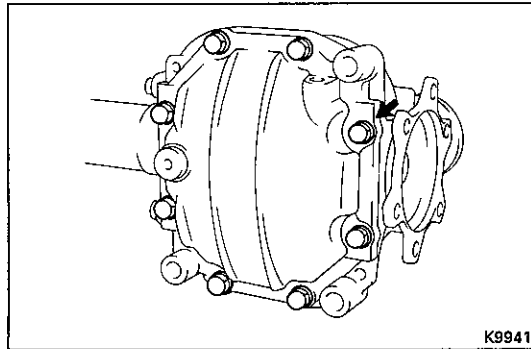
- (a) Check that there is 2 – 3 mm (0.08 – 0.12 in.) of play in axial direction.
- (b) Check that the side gear shaft will not come out by trying to pull it completely out by hand.

**23. INSTALL DIFFERENTIAL CARRIER COVER**

- (a) Clean contacting surfaces of any residual packing material using gasoline or alcohol.
- (b) Apply seal packing to the carrier.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT: Install the carrier cover within 3 minutes after applying seal packing.



- (c) Install the differential carrier cover with the eight bolts.

Torque: 475 kg-cm (34 ft-lb, 47 N-m)