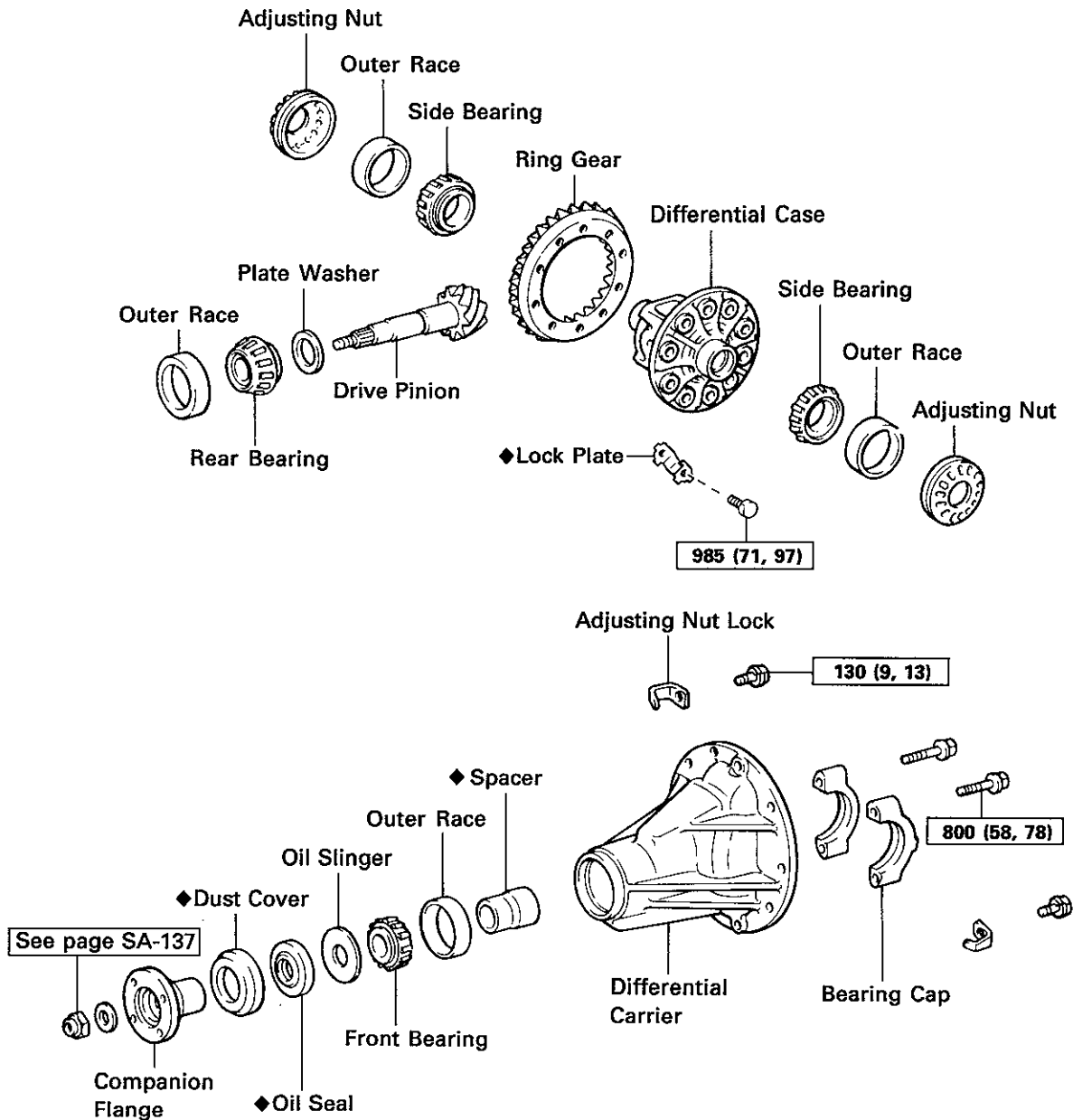


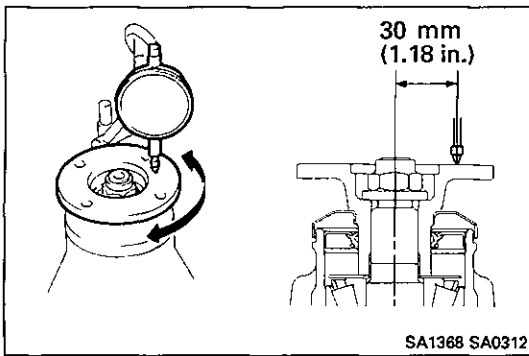
Differential Carrier

COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

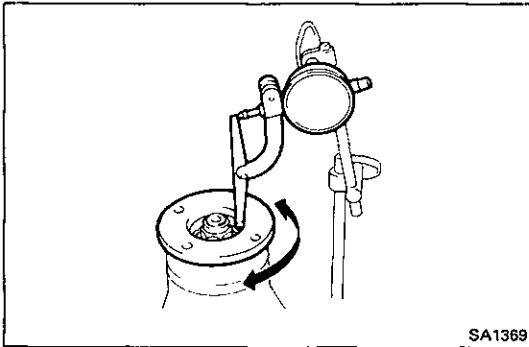
◆ Non-reusable part



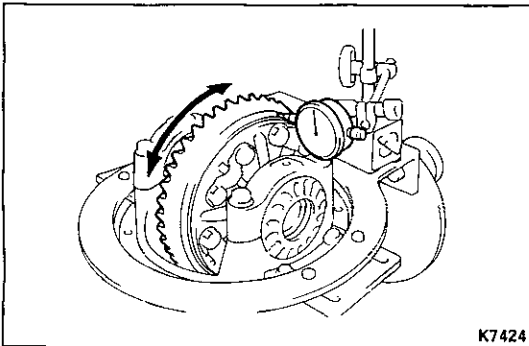
INSPECTION OF DIFFERENTIAL CARRIER

1. CHECK RUNOUT OF COMPANION FLANGE

Maximum vertical runout: 0.10 mm (0.0039 in.)



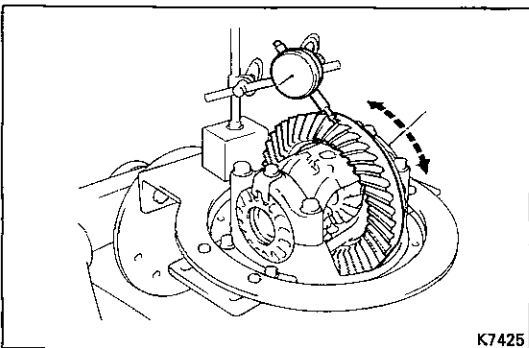
Maximum lateral runout: 0.10 mm (0.0039 in.)



2. CHECK RING GEAR RUNOUT

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

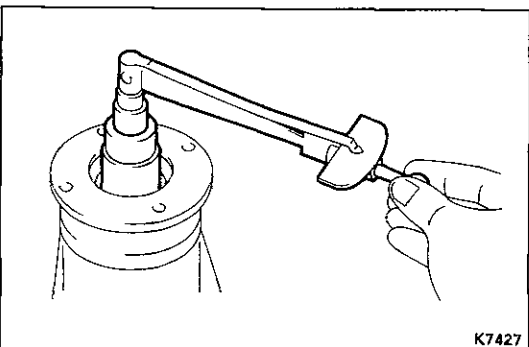
Maximum runout: 0.10 mm (0.0039 in.)



3. CHECK RING GEAR BACKLASH

If the backlash is not within specification, adjust the side bearing preload or repair as necessary.

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

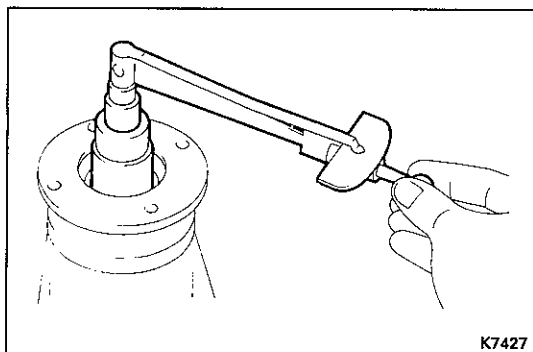


4. MEASURE DRIVE PINION PRELOAD

Measure the drive pinion preload using the backlash of the drive pinion and ring gear.

Preload (at start):

2RZ engine	MT	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)
2RZ-E engine	4WD	9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)
	2WD	
Others		(7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)

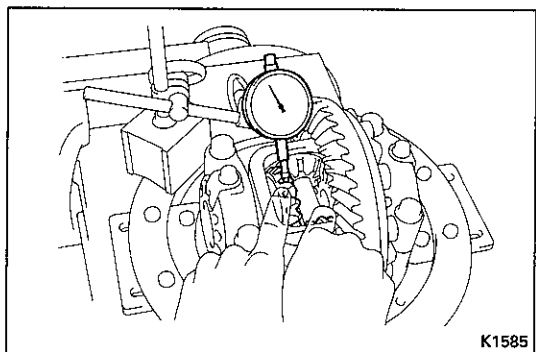
**5. CHECK TOTAL PRELOAD**

Using a torque wrench, measure the total preload.

Total preload: In addition to drive pinion preload

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

If necessary, disassemble and inspect a differential.

**6. (2 pinion type)****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.)

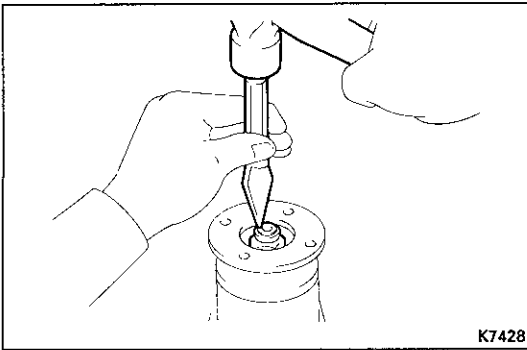
If the backlash is out of specification, install the correct thrust washers. (See page SA-141)

7. CHECK TOOTH CONTACT PATTERN

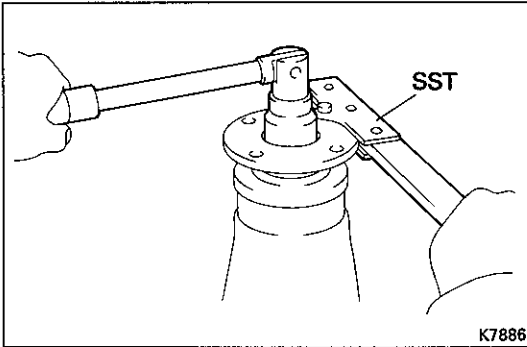
(See page SA-136)

DISASSEMBLY OF DIFFERENTIAL CARRIER**1. REMOVE COMPANION FLANGE**

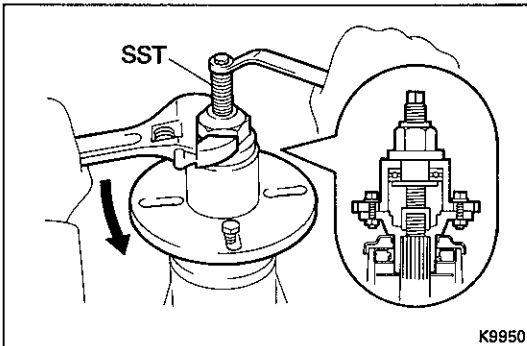
- (a) Using a hammer and chisel, loosen the staked part of the nut.



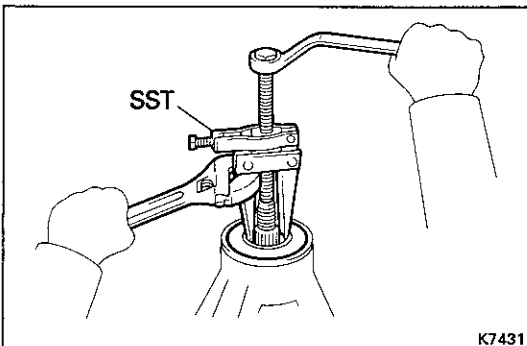
- (b) Using SST to hold the flange, remove the nut.
SST 09330-00021



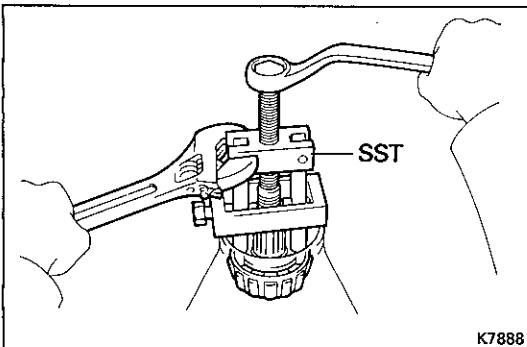
- (c) Using SST, remove the companion flange.
SST 09557-22022 (09557-22050)

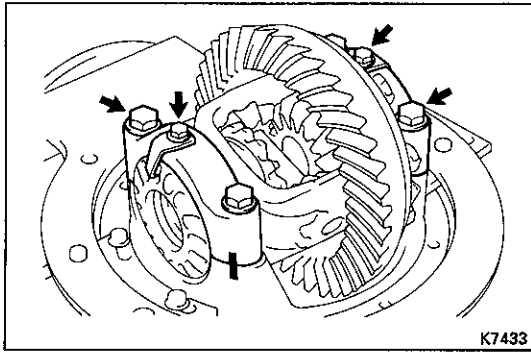
**2. REMOVE FRONT OIL SEAL AND OIL SLINGER**

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

**3. REMOVE FRONT BEARING AND BEARING SPACER**

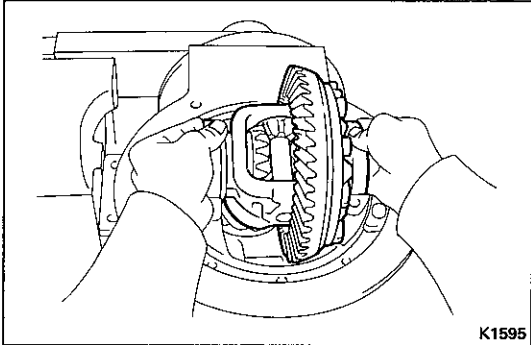
- (a) Using SST, remove the bearing from the housing.
SST 09556-22010
(b) Remove the bearing spacer.





4. REMOVE DIFFERENTIAL CASE

- (a) Place matchmarks on the bearing cap and differential carrier.
- (b) Remove the two adjusting nut locks.
- (c) Remove the four bolts and the two bearing caps.
- (d) Remove the two adjusting nuts.

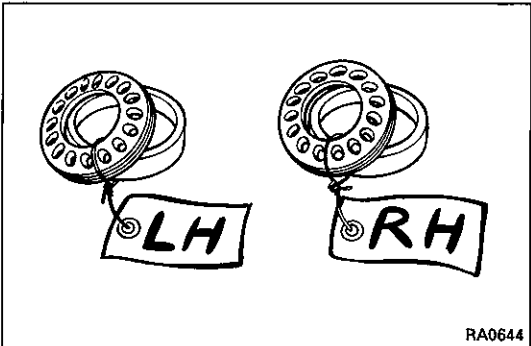


- (e) Remove the differential case with the side bearing outer races from the differential carrier.

HINT: Tag the disassembled parts to show the location for reassembly.

5. REMOVE DRIVE PINION

Remove the drive pinion with the rear bearing.

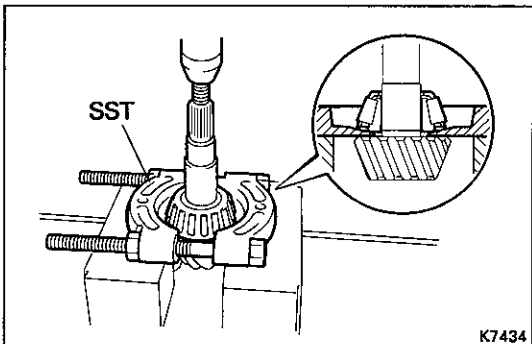


6. REMOVE DRIVE PINION REAR BEARING

Using SST and a press, remove the bearing from the drive pinion.

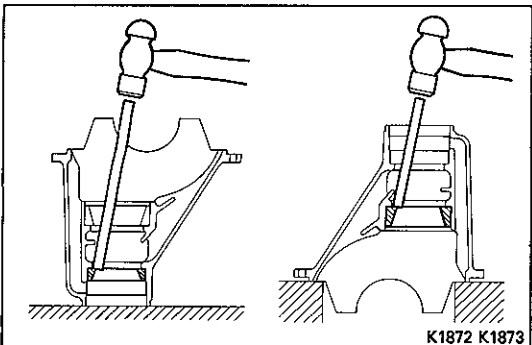
SST 09950-00020

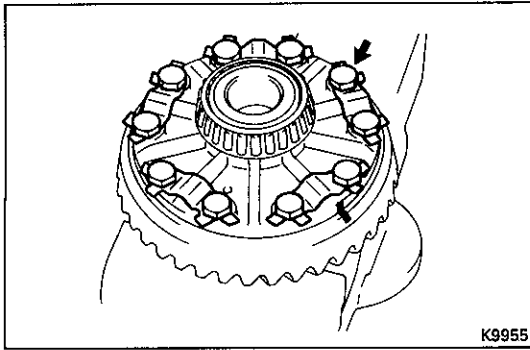
HINT: If the drive pinion or ring gear are damaged replace them a set.



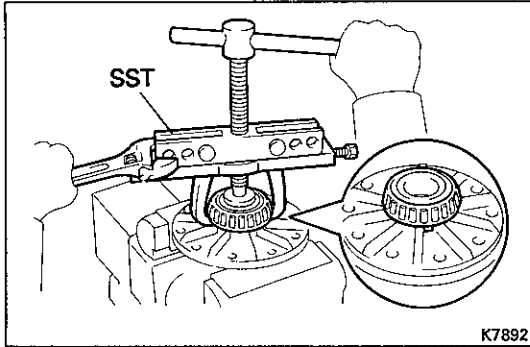
7. REMOVE FRONT AND REAR BEARING OUTER RACE

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



**8. REMOVE RING GEAR**

- (a) Remove the ring gear set bolts and lock plates.
- (b) Place matchmarks on the ring gear and differential case.
- (c) Using a plastic or copper hammer, tap on the ring gear to separate it from the differential case.

**9. REMOVE SIDE BEARING**

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

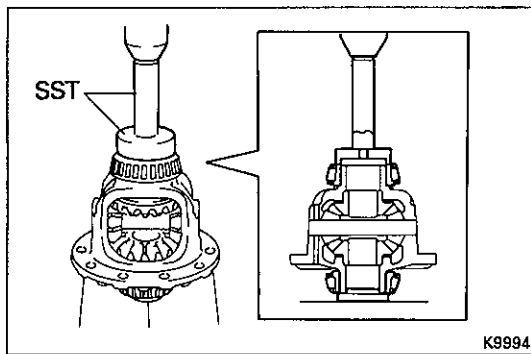
SST 09950-20017

10. DISASSEMBLE DIFFERENTIAL CASE

2 pinion type: See page SA-140

4 pinion type: See page SA-142

LSD type: See page SA-145

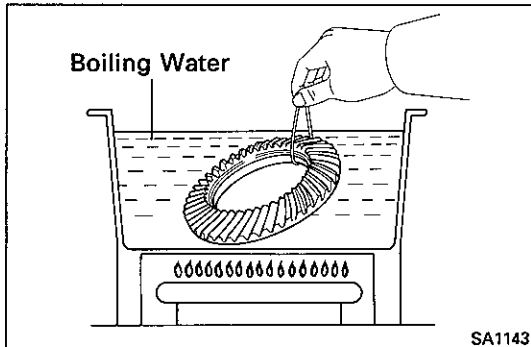


ASSEMBLY OF DIFFERENTIAL CARRIER

1. INSTALL SIDE BEARINGS

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

SST 09550-10012 (09252-10010, 09557-10010, 09558-10010)



2. INSTALL RING GEAR ON DIFFERENTIAL CASE

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

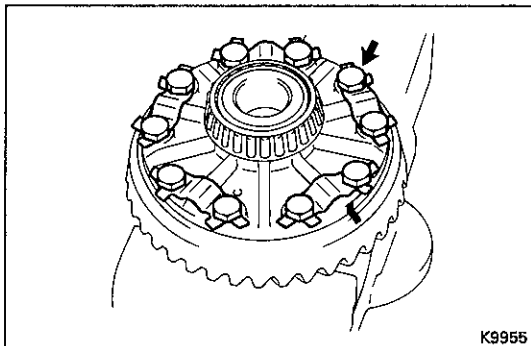
HINT: Align the matchmarks on the ring gear and the differential case.

- 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.

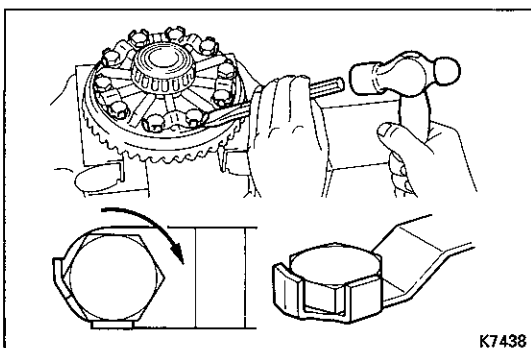
- After the ring gear has cooled sufficiently, torque the ring gear set bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N·m)



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

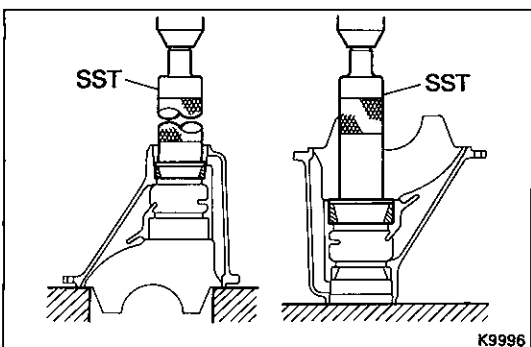
HINT: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake the half on the tightening side.



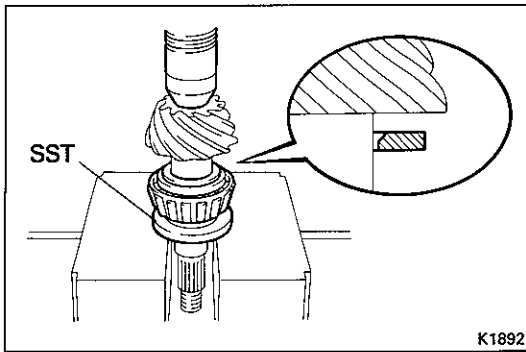
3. INSTALL DRIVE PINION BEARING OUTER RACES

Using SST and a press, install the outer races.

SST 09316-60010



Front	(09316-00010, 09316-00020)	
Rear	2RZ (w/MT) 2RZ-E (4WD)	Others
	(09316-00010) (09316-00040)	(09316-00010) (09316-00030)



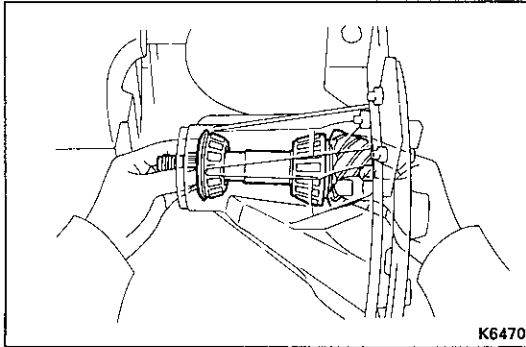
4. INSTALL DRIVE PINION REAR BEARING

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

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 to the drive pinion.

SST 09506-30012

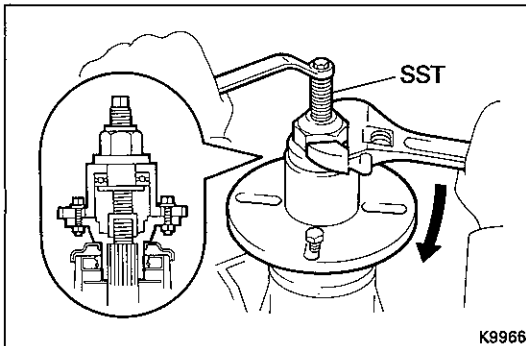


5. TEMPORARILY ADJUST DRIVE PINION PRELOAD

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

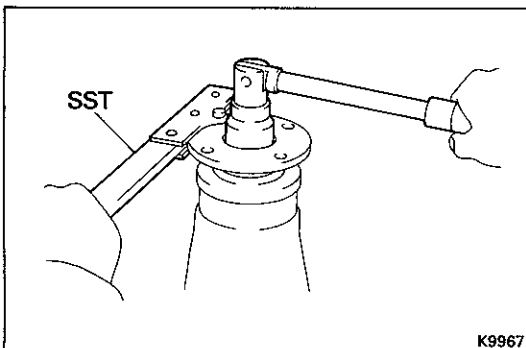
HINT: Assemble the spacer and oil seal after adjusting the tooth contact pattern.

- (b) Install the oil slinger.



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

SST 09557-22022 (09557-22050)



- (d) Adjust the drive pinion preload by tighten 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.

- (e) Measure the drive pinion preload.

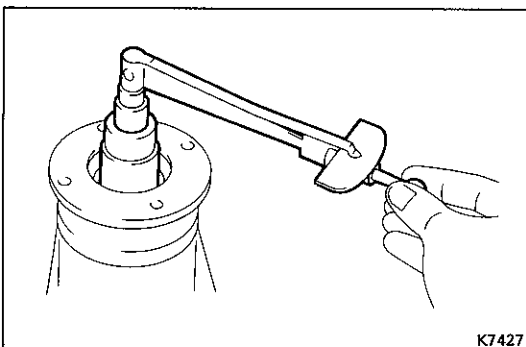
Preload (at start)

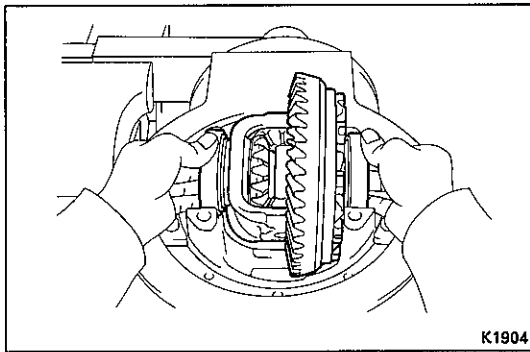
New bearing

2RZ engine	MT	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
2RZ-E engine	4WD	19 – 26 kg-cm (16.5 – 22.6 in.-lb, 1.9 – 2.5 N·m)
	2WD	
Others		

Reused bearing

2RZ engine	MT	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)
2RZ-E engine	4WD	9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)
	2WD	
Others		



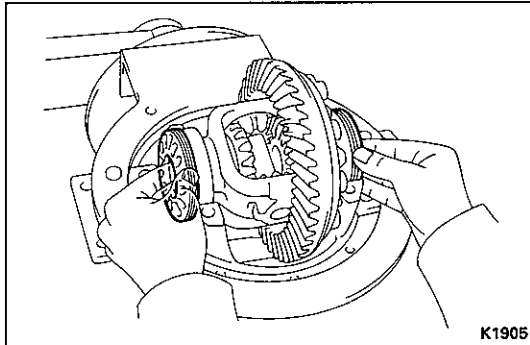


6. INSTALL DIFFERENTIAL CASE IN CARRIER

- (a) Place the bearing outer races on their respective bearings. Make sure the left and right outer races are not interchanged.

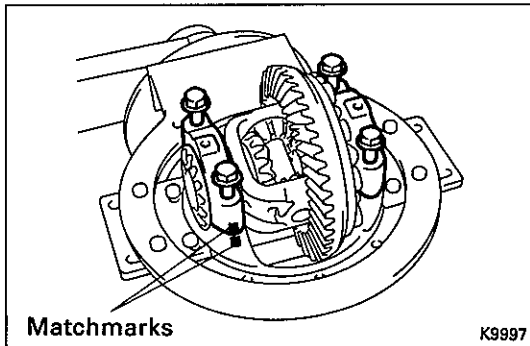
- (b) Install the case in the carrier.

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



7. INSTALL ADJUSTING NUTS

Install the adjusting nuts on the carrier, making sure the nuts are threaded properly.

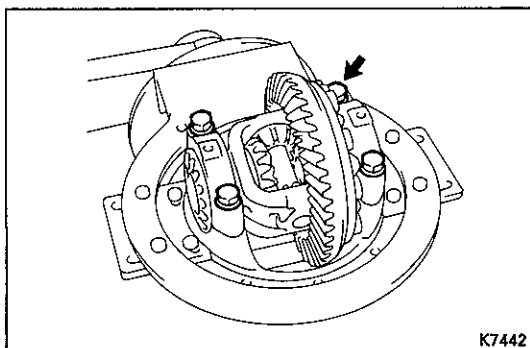


8. INSTALL BEARING CAPS

Align the matchmarks on the cap and carrier. Screw in the two bearing cap bolts two or three turns and press down the bearing cap by hand.

HINT: If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not threaded properly.

Reinstall the adjusting nuts if necessary.

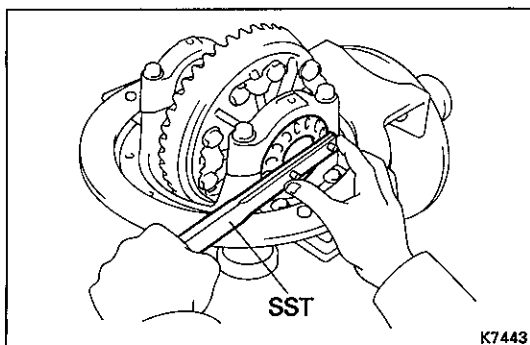


9. ADJUST SIDE BEARING PRELOAD

- (a) Tighten the four bearing cap bolts to the specified torque, then loosen them to the point where they can be turned by hand.

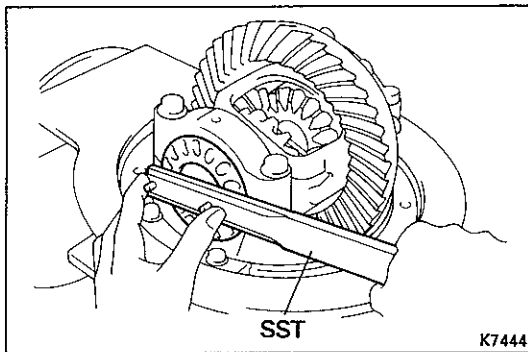
Torque: 800 kg-cm (58 ft-lb, 78 N-m)

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



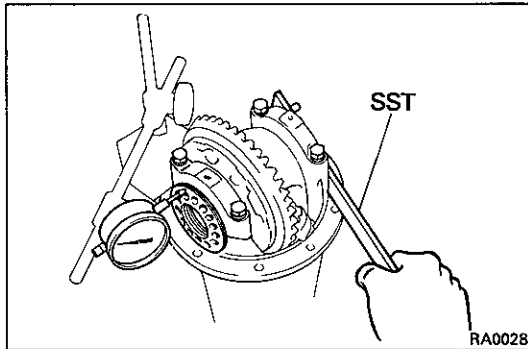
- (c) Using SST, tighten the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.)

SST 09504-00011

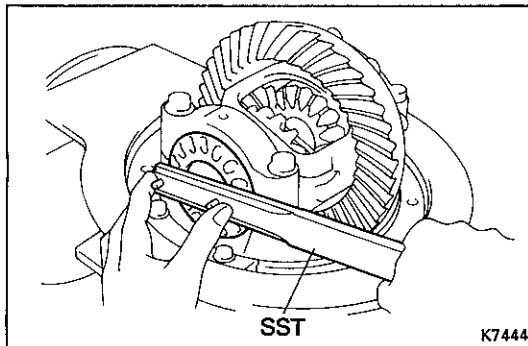


- (d) While turning the ring gear, use SST to fully tighten the adjusting nut on the drive pinion side. After the bearings are settled, loosen the adjusting nut on the drive pinion side.

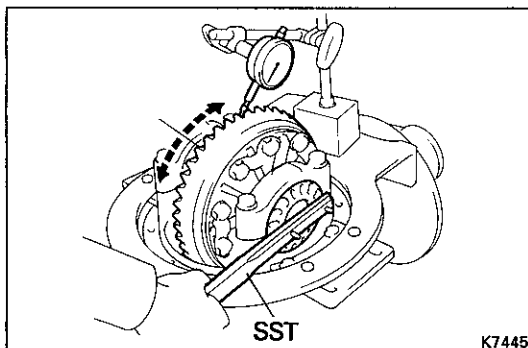
SST 09504-00011



- (e) Place a dial indicator on the top of the adjusting nut on the ring gear side.
- (f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



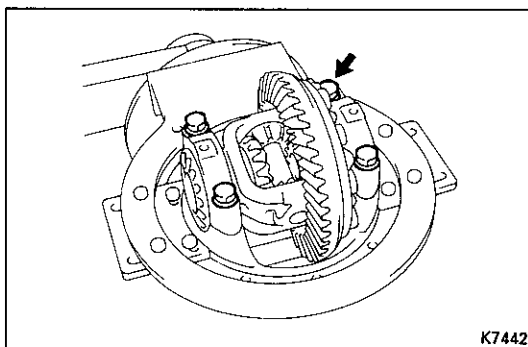
- (g) Tighten the adjusting nut 1 - 1 1/2 notches from the zero preload position.



- (h) Using a dial indicator, adjust the ring gear backlash until it is within specification.

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

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

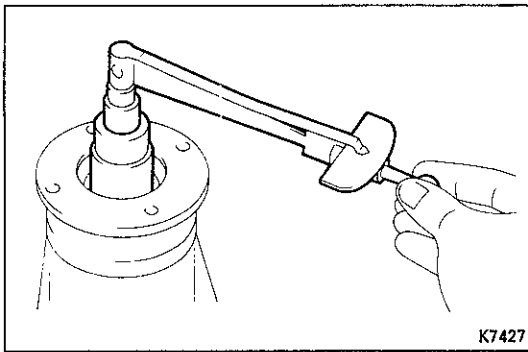


- (i) Torque the bearing cap bolts.

Torque: 800 kg-cm (58 ft-lb, 78 N·m)

- (j) Recheck the ring gear backlash.

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



(k) Using a torque meter, measure the total preload.

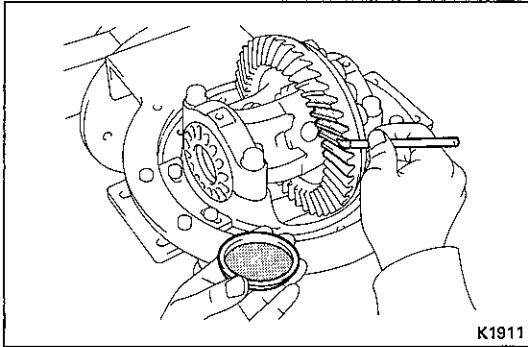
Total preload (starting):

Add drive pinion preload

4 – 6 kg-cm

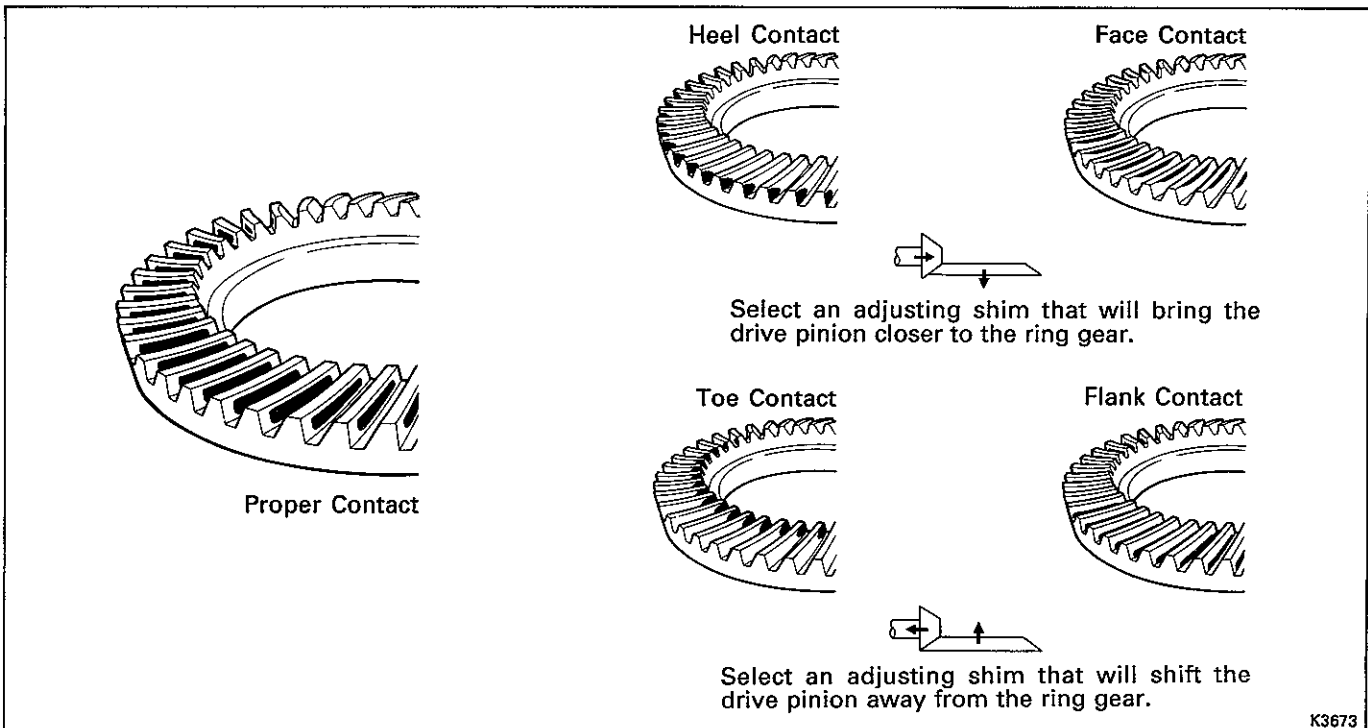
(3.5 – 5.2 in.-lb, 0.4 – 0.6 N·m)

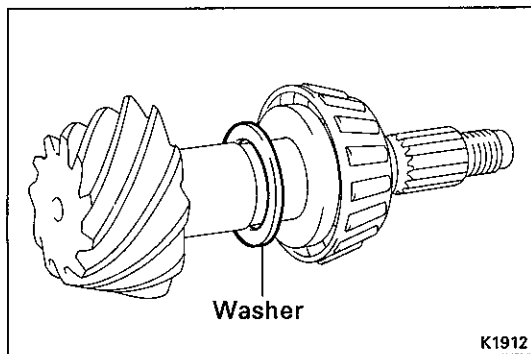
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)



10. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- (a) Coat 3 or 4 teeth at three different positions on the ring gear with red lead.
- (b) Hold the companion flange firmly and rotate the ring gear in both directions.
- (c) Inspect the tooth pattern.



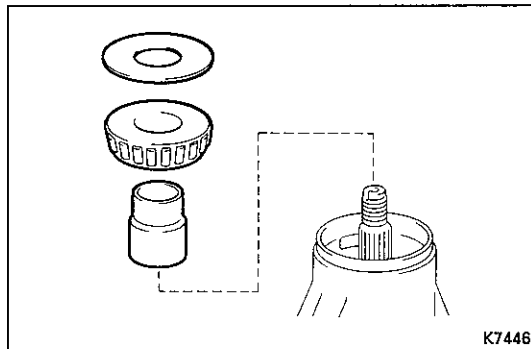


If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer 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	(0.0823)
1.79	(0.0705)	2.12	(0.0835)
1.82	(0.0717)	2.15	(0.0846)
1.85	(0.0728)	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	(0.0917)

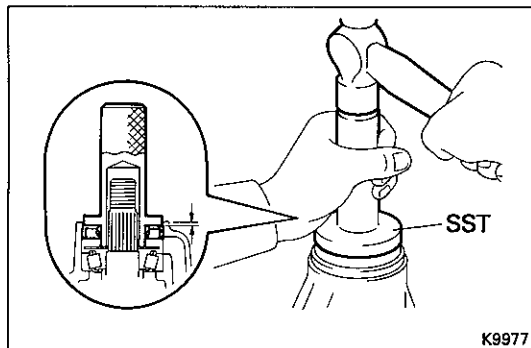
11. INSTALL BEARING SPACER

- Remove the companion flange.
(See page SA-129)
- Remove the oil slinger and front bearing.
(See page SA-129)
- Install a new bearing spacer.
- Install the front bearing and oil slinger.



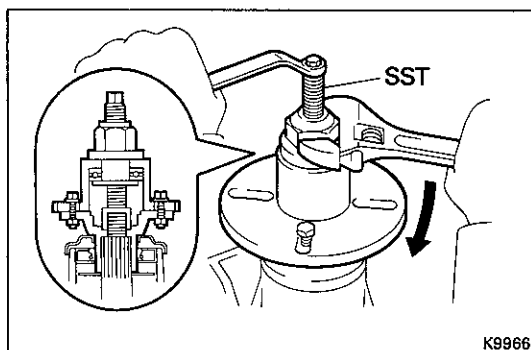
12. INSTALL OIL SEAL

- Using SST and a hammer, install a new oil seal.
SST 09554-30011
Oil seal drive in depth: 1.0 mm (0.039 in.)
- Coat the lip of oil seal with MP grease.

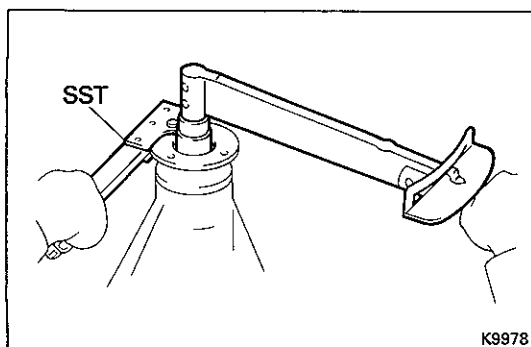


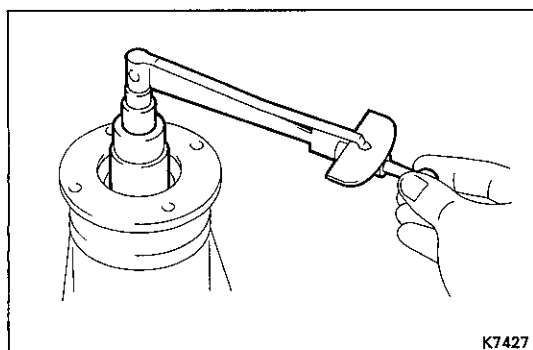
13. INSTALL COMPANION FLANGE

- Using SST, install the companion flange.
SST 09557-22022 (09557-22050)



- Install the washer and a new nut.
HINT: Coat the threads of nut with differential oil.
- Using SST to hold the flange, tighten the nut.
Torque: 2,000 kg-cm (145 ft-lb, 196 N·m)





14. ADJUST DRIVE PINION PRELOAD

- (a) Measure the drive pinion preload using the backlash of the drive pinion and ring gear.

Preload (at start)

New bearing

2RZ engine	MT	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
2RZ-E engine	4WD	19 – 26 kg-cm (16.5 – 22.6 in.-lb, 1.9 – 2.5 N·m)
	2WD	
Others		

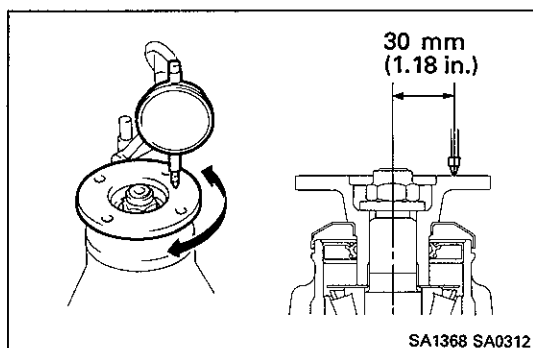
Reused bearing

2RZ engine	MT	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)
2RZ-E engine	4WD	9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)
	2WD	
Others		

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

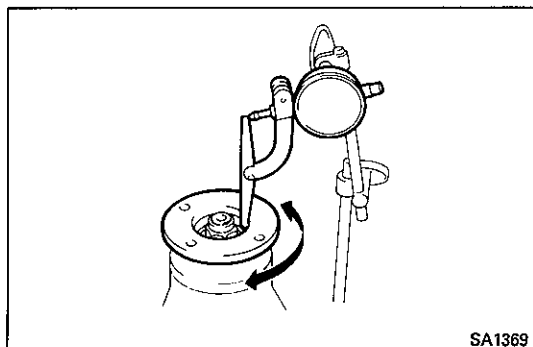
If the maximum torque is exceed while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the pinion nut to reduce the preload.

Maximum torque: 3,500 kg-cm (253 ft-lb, 343 N·m)

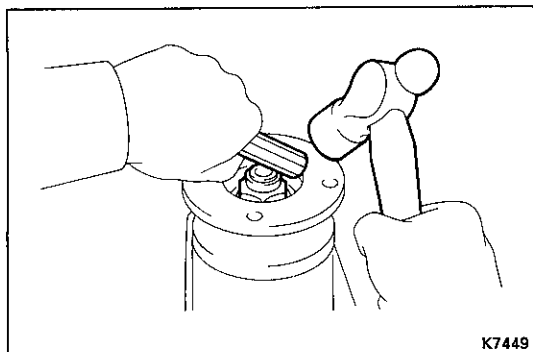
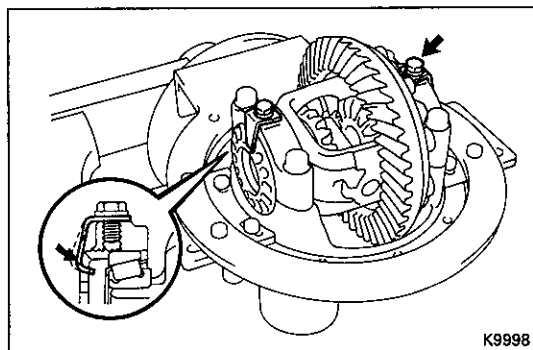


15. CHECK RUNOUT OF COMPANION FLANGE

Maximum vertical runout: 0.10 mm (0.0039 in.)



Maximum lateral runout: 0.10 mm (0.0039 in.)

**16. STAKE DRIVE PINION NUT****17. INSTALL ADJUSTING NUT LOCKS**

Install the lock on the bearing caps.

Torque: 130 kg-cm (9 ft-lb, 13 N-m)