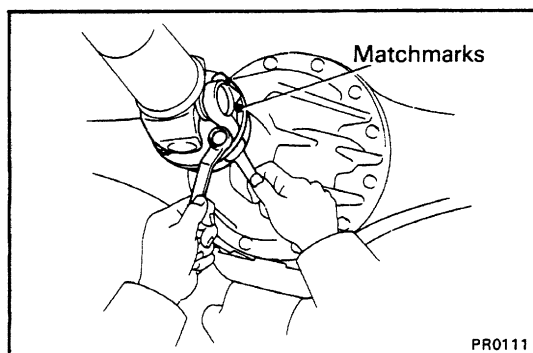
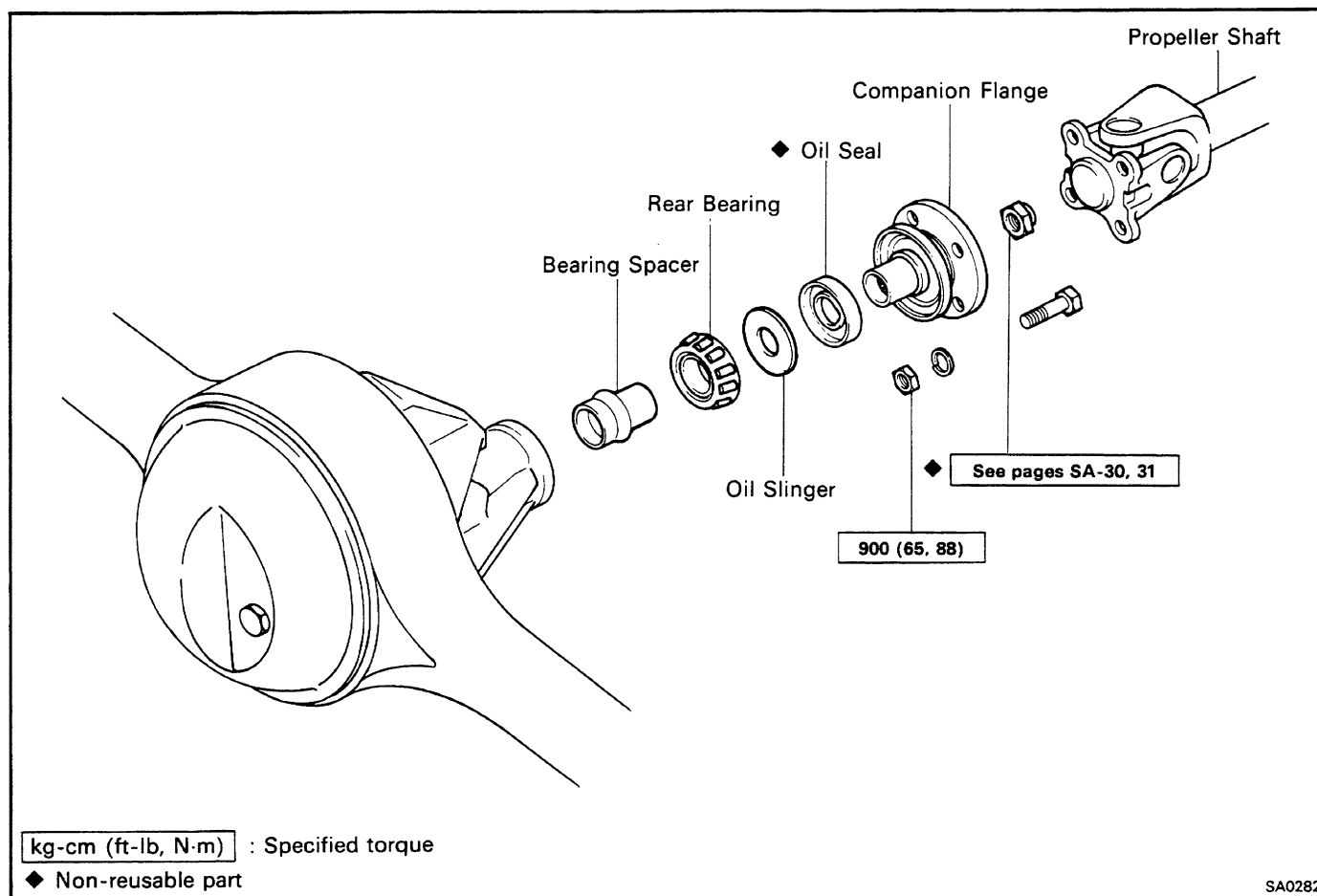
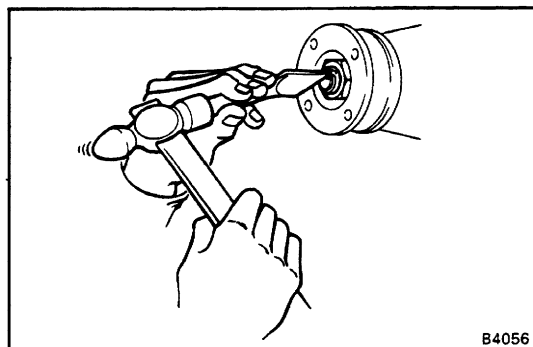


FRONT DIFFERENTIAL REPLACEMENT OF REAR OIL SEAL Components



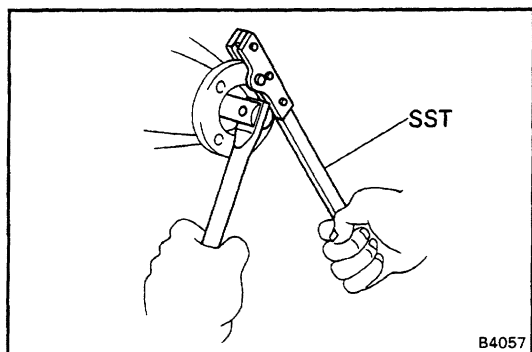
1. DISCONNECT PROPELLER SHAFT

- Place matchmarks on the flanges.
- Remove the four bolts and nuts and disconnect the propeller shaft from the differential.

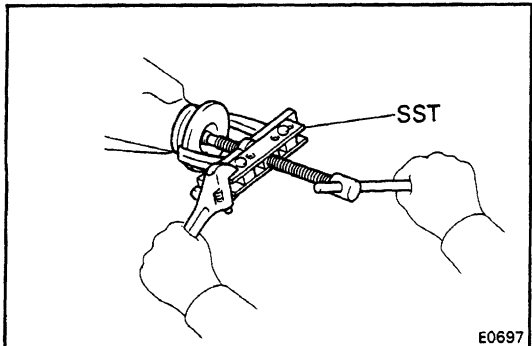


2. REMOVE COMPANION FLANGE

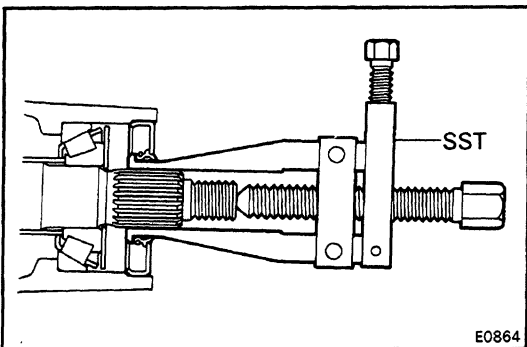
- Using a hammer and chisel, loosen the staked part of the nut.



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



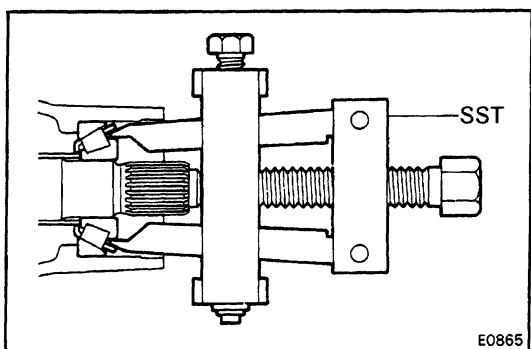
(c) Using SST, remove the flange.
SST 09950-20017



3. REMOVE OIL SEAL

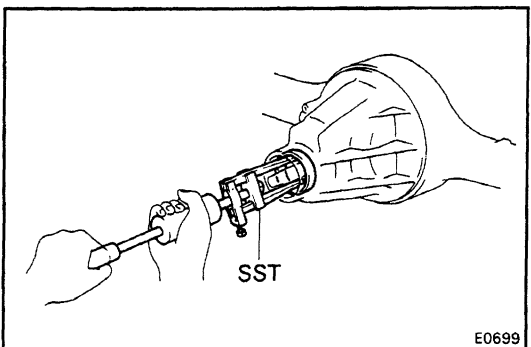
Using SST, remove the oil seal.
SST 09308-10010

4. REMOVE OIL SLINGER



5. REMOVE REAR BEARING

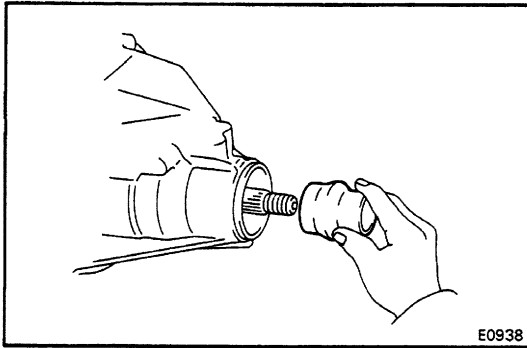
Using SST, remove the front bearing from the drive pinion.
SST 09556-22010



6. REMOVE BEARING OUTER RACE

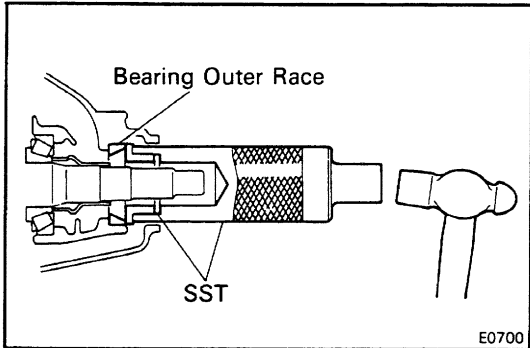
Using SST, remove the bearing outer race.
SST 09308-00010

7. REMOVE DRIVE PINION SPACER



8. INSTALL DRIVE PINION SPACER

Install a new spacer into the differential.

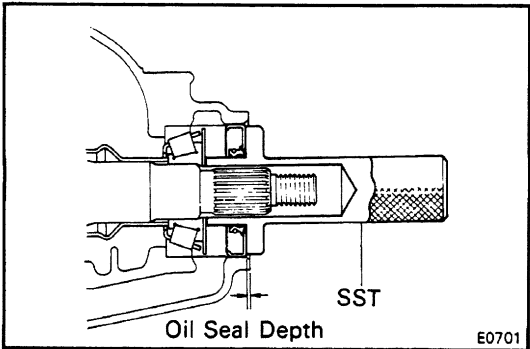


9. INSTALL BEARING OUTER RACE

Using SST, drive in a new outer race.

SST 09316-60010 (09316-00010, 09316-00020)

10. INSTALL NEW FRONT BEARING AND OIL SLINGER



11. INSTALL OIL SEAL

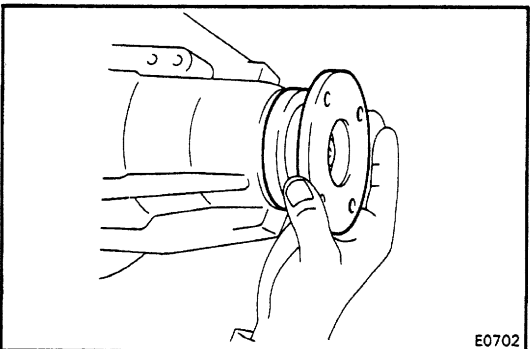
(a) Install the oil seal facing as shown.

(b) Using SST, drive in a new oil seal as shown.

SST 09554-30011

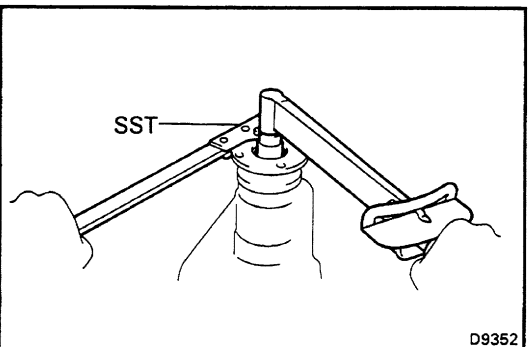
Oil seal drive depth: 1.0 mm (0.039 in.)

(c) Apply MP grease to the oil seal lip.



12. INSTALL COMPANION FLANGE

(a) Install the companion flange.

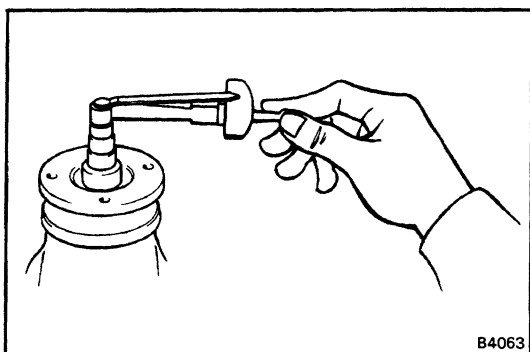


(b) Coat the threads of a new nut with MP grease.

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

SST 09330-00021

Torque: 2,500 kg-cm (181 ft-lb, 245 N-m)



13. CHECK DRIVE PINION BEARING PRELOAD

Using a torque wrench, measure the preload of the back-lash between the drive pinion and ring gear.

Preload (at starting):

New bearing

13 – 20 kg-cm

(11.3 – 17.4 in.-lb, 1.3 – 2.0 N-m)

Reused bearing

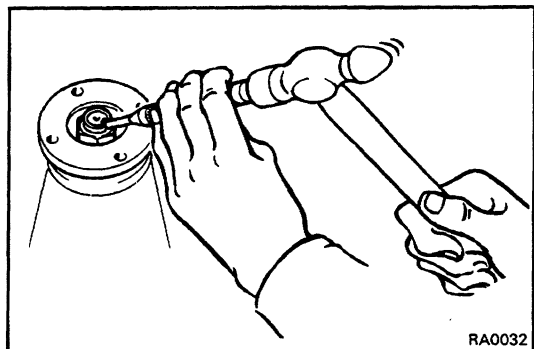
7 – 10 kg-cm

(6.1 – 8.7 in.-lb, 0.7 – 1.0 N-m) .

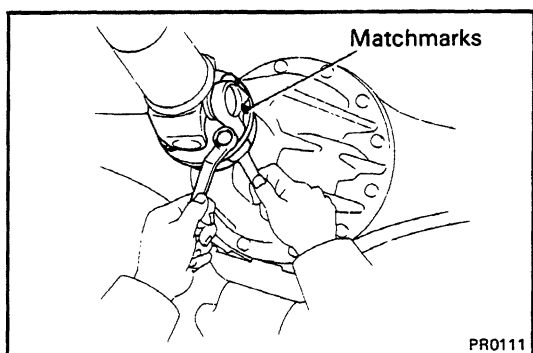
- If preload is greater than specification, replace the bearing spacer.
- If preload is less than specification, retighten the nut 130 kg-cm (9 ft-lb, 13 N-m) at a time until the specified preload is reached.

If the maximum torque is exceeded 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: 4,500 kg-cm (325 ft-lb, 441 N-m)



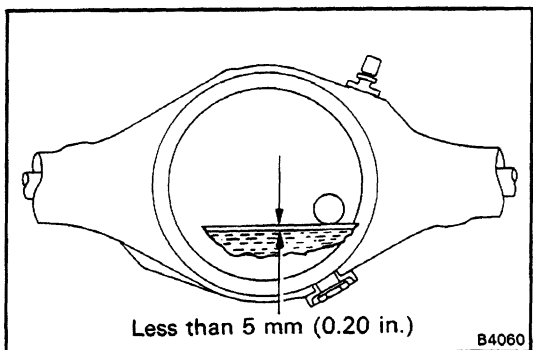
14. STRIKE DRIVE PINION NUT



15. CONNECT PROPELLER SHAFT

- Align the matchmarks on the both flanges.
- Torque the bolts and nuts.

Torque: 900 kg-cm (65 ft-lb, 88 N-m)



16. CHECK DIFFERENTIAL OIL LEVEL

Oil type: API GL-5 hypoid gear oil

Viscosity: Above -18°C (0°F) SAE 90

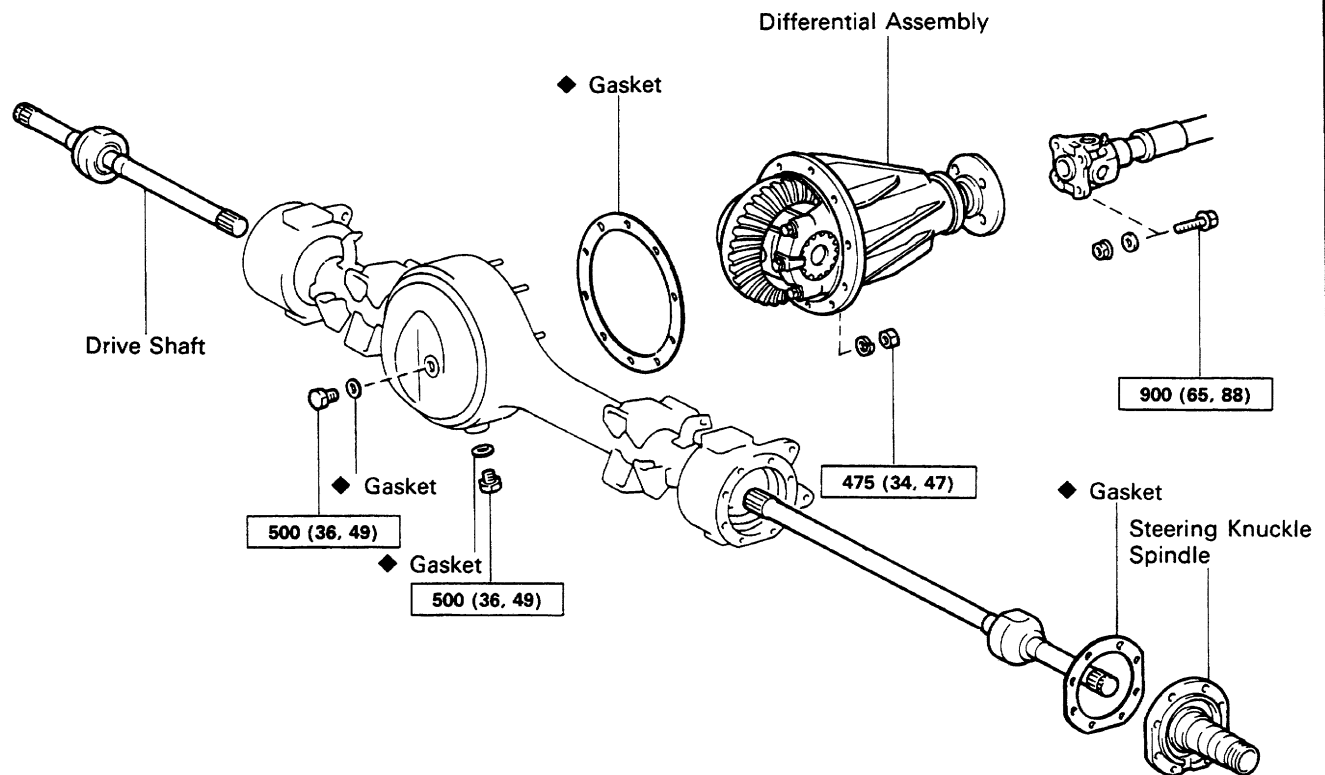
Below -18°C (0°F) SAE 80W-90 or 80W

Capacity:

Front 3.0 liters (3.2 US qts, 2.6 Imp. qts)

Rear 2.5 liters (2.6 US qts, 2.2 Imp. qts)

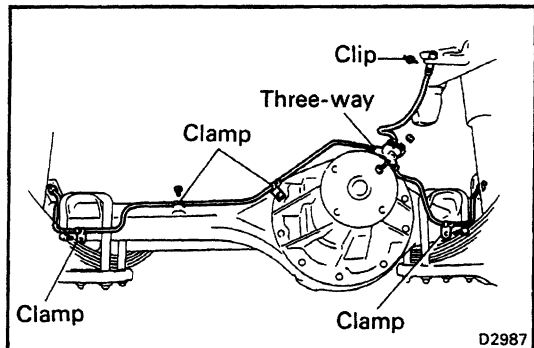
REMOVAL OF FRONT DIFFERENTIAL CARRIER Components



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

1. DRAIN DIFFERENTIAL OIL
2. REMOVE FRONT AXLE SHAFTS
(See steps 1 to 5 on page [SA-18](#))
3. DISCONNECT PROPELLER SHAFT
(See step 1 on page [SA-28](#))

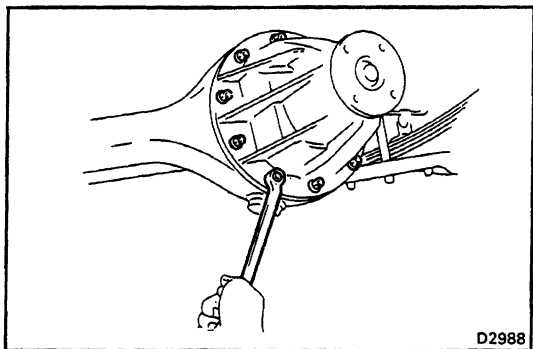


4. REMOVE FRONT BRAKE TUBE

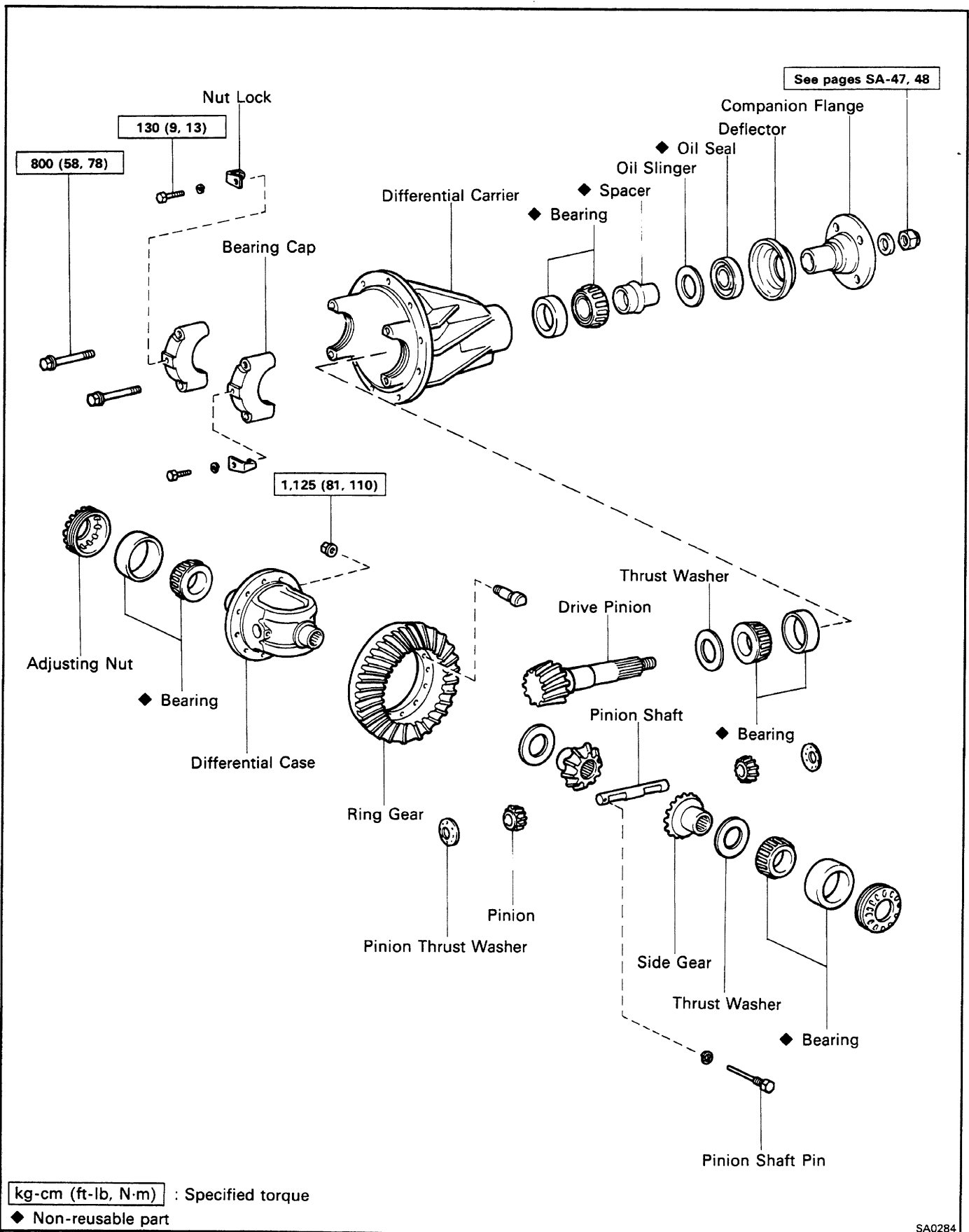
- (a) Remove the four clamp bolts and nut.
 - (b) Using SST, disconnect the brake hose at the frame side and remove the clip.
- SST 09751-36011
- (c) Remove the three-way with the brake hose and tubes.

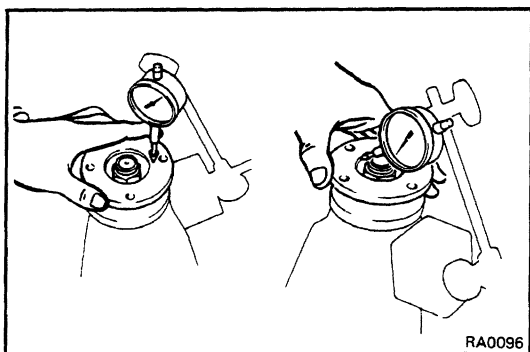
5. DISCONNECT BLEEDER HOSE AND REMOVE BLEEDER UNION

6. REMOVE DIFFERENTIAL CARRIER



DISASSEMBLY OF DIFFERENTIAL Components





PRE-INSPECTION DIFFERENTIAL CARRIER

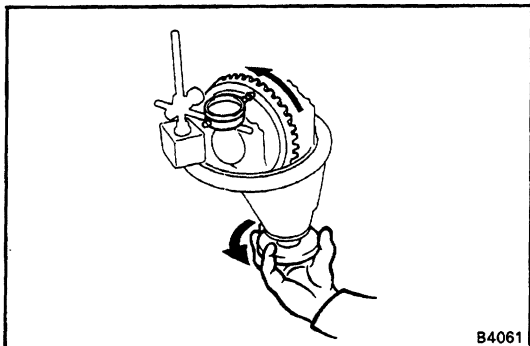
1. CHECK COMPANION FLANGE RUNOUT

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

Maximum lateral runout: 0.10 mm (0.0039 in.)

Maximum radial runout: 0.10 mm (0.0039 in.)

If the runout is greater than maximum, replace the companion flange.

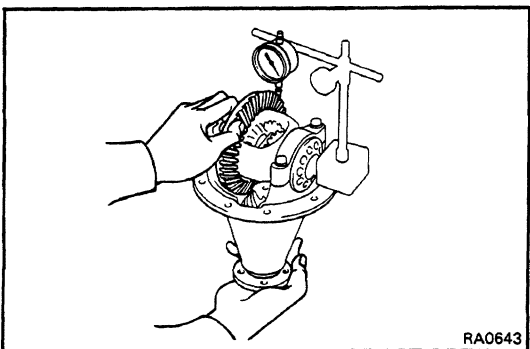


2. CHECK RING GEAR RUNOUT .

Using a dial indicator, measure the runout of the ring gear.

Maximum runout: 0.10 mm (0.0039 in.)

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



3. CHECK RING GEAR BACKLASH

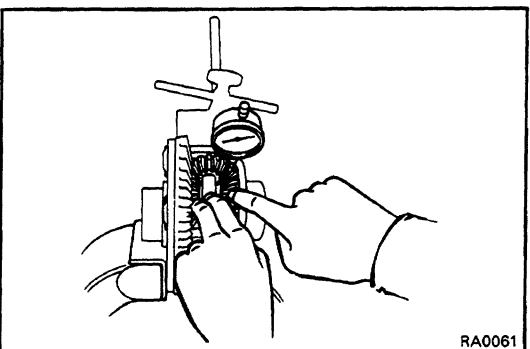
Using a dial indicator, check the backlash of the ring gear.

Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

If the backlash is not within specification, adjust the side bearing preload.

4. CHECK TOOTH CONTACT

(See page [SA-45](#))

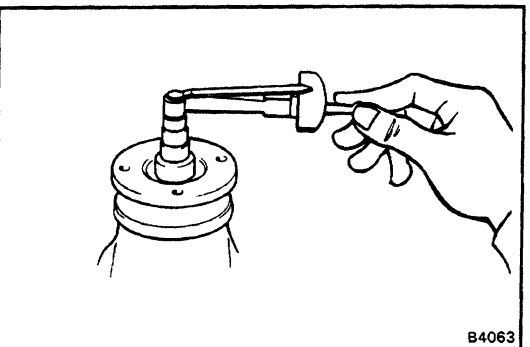


5. CHECK SIDE GEAR BACKLASH

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

Backlash: 0.02 – 0.20 mm (0.0008 – 0.0079 in.)

If the backlash is not within specification, install the side gear thrust washers of differential thickness.

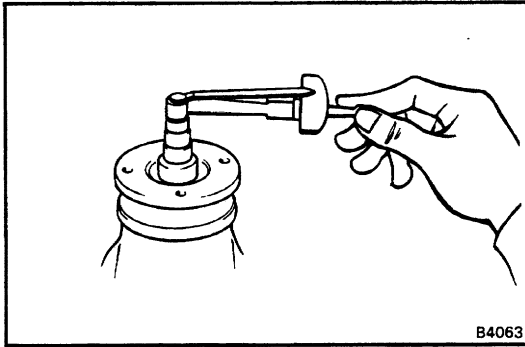


6. MEASURE DRIVE PINION PRELOAD

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

Preload (at starting):

7 – 10 kg-cm (6.1 – 8.7 in.-lb, 0.7 –1.0 N-m)



7. CHECK TOTAL PRELOAD

Using a torque wrench, measure the total preload.

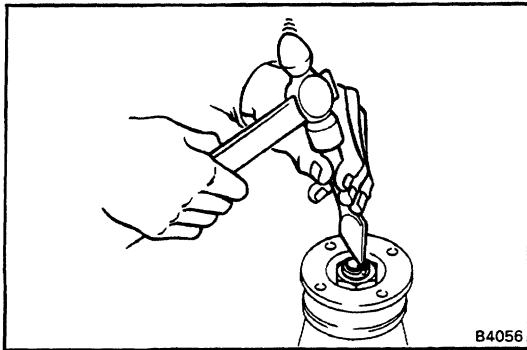
Total preload (at starting):

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.

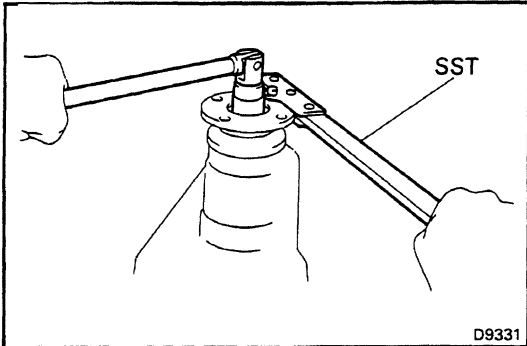


DISASSEMBLY OF DIFFERENTIAL CARRIER

(See page SA-34)

1. REMOVE COMPANION FLANGE

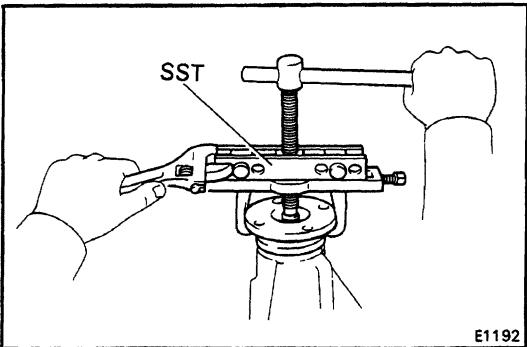
- (a) Using a hammer and chisel, loosen the staked part of the nut.



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

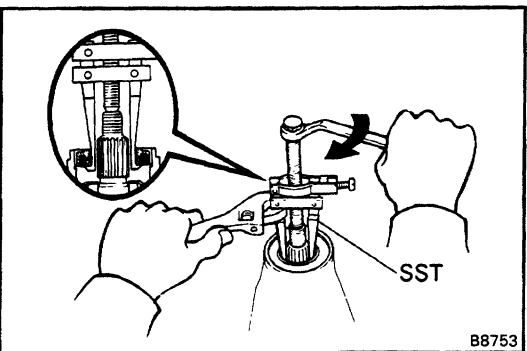
SST 09330-00021

- (c) Remove the plate washer.



- (d) Using SST, remove the flange.

SST 09950-20017

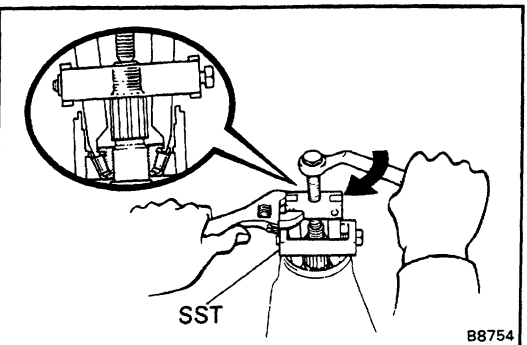


2. REMOVE OIL SEAL AND OIL SLINGER

- (a) Using SST, remove the oil seal from the housing.

SST 09308-10010

- (b) Remove the oil slinger.



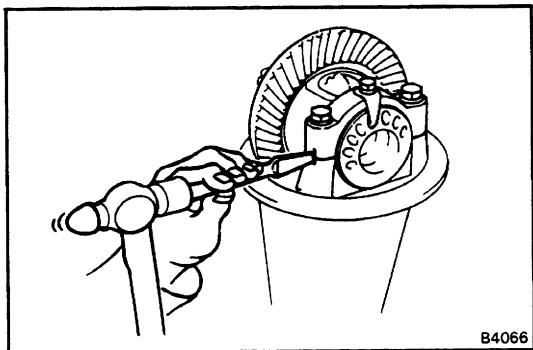
3. REMOVE DRIVE PINION REAR BEARING

- (a) Using SST, remove the bearing from the drive pinion.

SST 09556-22010

- (b) Remove the bearing spacer.

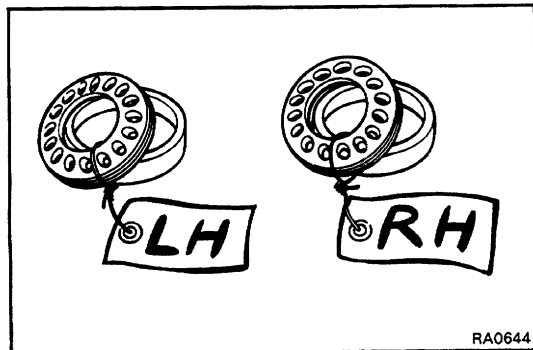
If the bearing is damaged or worn, replace the bearing.



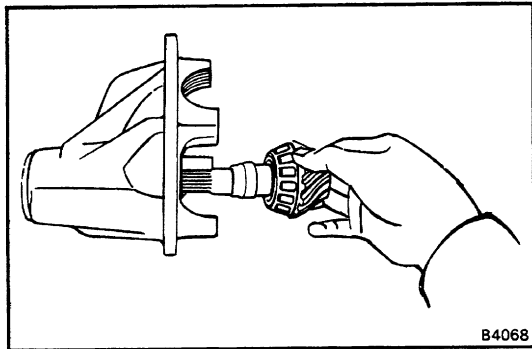
4. REMOVE DIFFERENTIAL CASE

- (a) Place matchmarks on the bearing cap and differential carrier.
- (b) Remove the two adjusting nut locks.
- (c) Remove the two bearing caps and two adjusting nuts.
- (d) Remove the bearing outer races.
- (e) Remove the differential case from the carrier.

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



5. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER



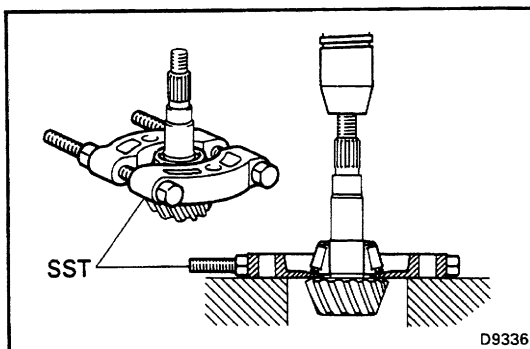
6. REMOVE DRIVE PINION FRONT BEARING

- (a) Using SST and a press, press out the rear bearing from the drive pinion.

SST 09950-00020

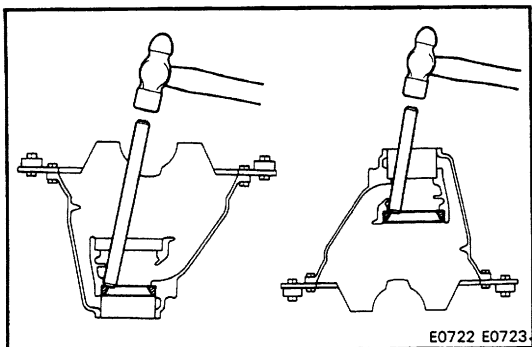
HINT: If the drive pinion or ring gear are damaged replace them as a set.

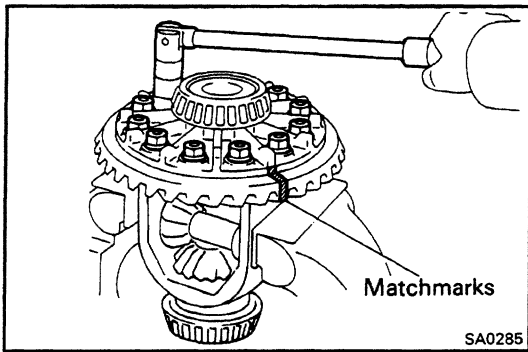
- (b) Remove the plate washer from the drive pinion.



7. REMOVE DRIVE PINION FRONT AND REAR BEARING OUTER RACES

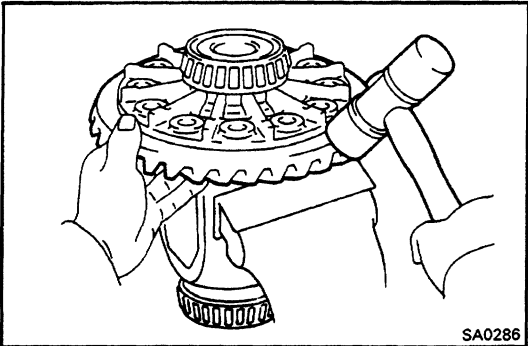
Using a brass bar and hammer, drive out the bearing outer race.



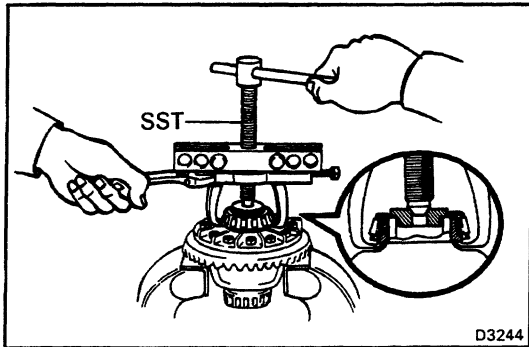


8. REMOVE RING GEAR

- (a) Place matchmarks on the ring gear and differential case.
- (b) Remove the twelve nuts from the ring gear.



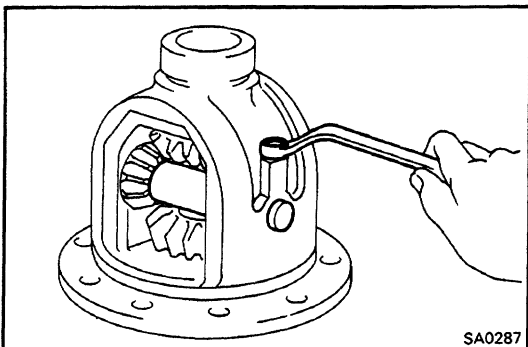
- (c) Using a plastic hammer, tap on the ring gear to separate it from differential case.



9. REMOVE SIDE BEARING

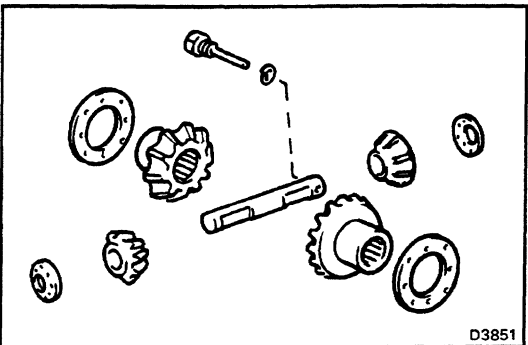
Using SST, remove the side bearing from the differential case.

SST 09950-20017



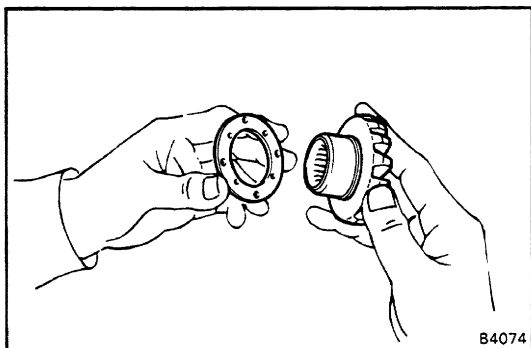
10. DISASSEMBLE DIFFERENTIAL CASE

- (a) Remove the pinion shaft pin.



- (b) Remove the following parts from the differential case:

- Pinion shaft
- Two pinion gears and pinion thrust washers
- Two side gears and side gear thrust washers

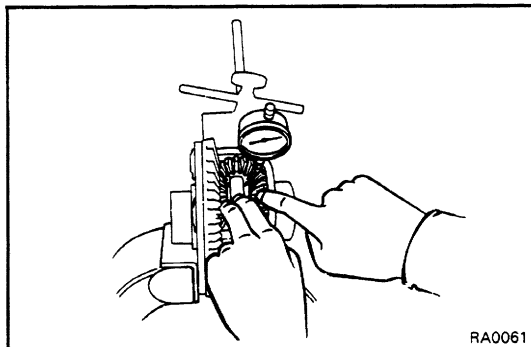
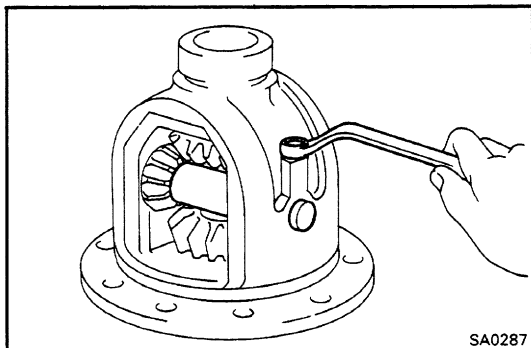


ASSEMBLY OF DIFFERENTIAL CARRIER

(See page SA-34)

1. ASSEMBLE DIFFERENTIAL CASE

- (a) Apply gear oil to each part.
- (b) Install the following parts:
 - Two side gears with side gear thrust washers
 - Two pinion gears with pinion thrust washers
 - Pinion shaft
- (c) Install the pinion shaft pin.



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

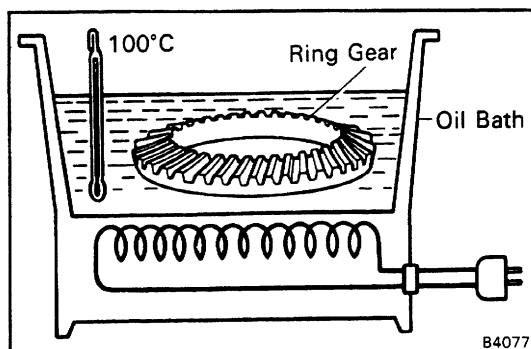
Backlash: 0.02 – 0.20 mm (0.008 – 0.0079 in.)

If the backlash is not within specification, install the side gear thrust washers of differential thickness.

HINT: Use washers of same thickness on both the right and left sides.

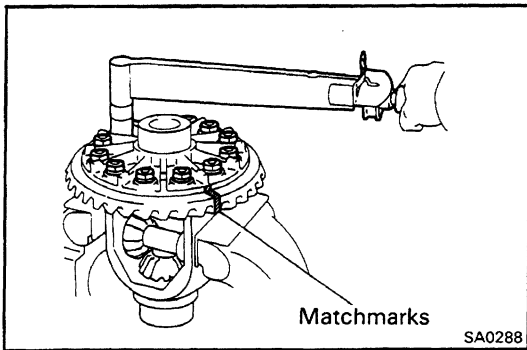
Thrust washer thickness

Thickness mm (in.)	
1.55 – 1.65	(0.0610 – 0.0650)
1.70 – 1.80	(0.0669 – 0.0709)
1.85 – 1.95	(0.0728 – 0.0768)
2.00 – 2.10	(0.0787 – 0.0827)



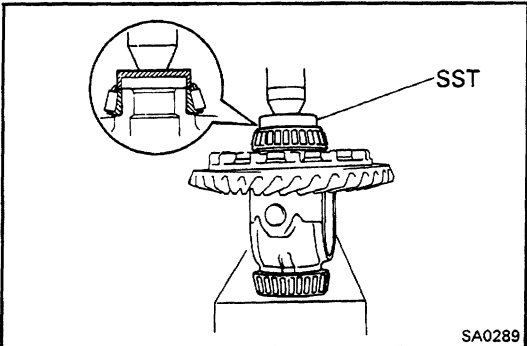
2. INSTALL RING GEAR ON DIFFERENTIAL CASE

- (a) Clean the contact surface of the differential case.
- (b) Heat the ring gear to approx. 100°C(212°F) in an oil bath.
NOTICE: Do not heat the ring gear above 110°C(230°F).
- (c) Clean the contact surface of the ring gear with cleaning solvent.



- (d) Then quickly install the ring gear on the differential case.
- (e) Align the matchmarks on the ring gear and differential case.
- (f) Coat the ring gear set nuts with gear oil.
- (g) Temporarily install the set bolts.
- (h) After the ring gear cools down enough, tighten the set nuts uniformly and a little at a time.

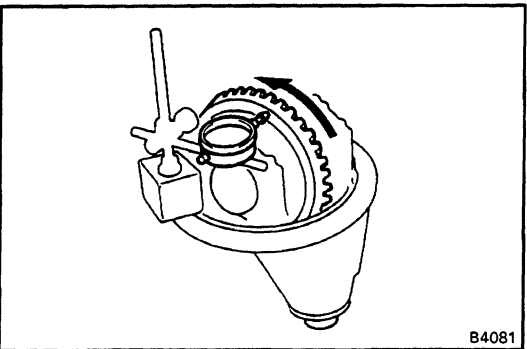
Torque: 1,125 kg-cm (81 ft-lb, 110 N-m) .



3. INSTALL SIDE BEARING –

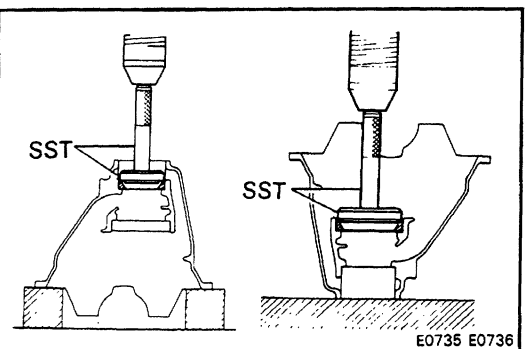
Using SST and a press, drive in the side bearings into the differential case.

SST 09550-60010



4. CHECK RING GEAR RUNOUT

- (a) Install the differential case onto the carrier and torque the adjusting nut to where there is no play in the bearing.
 - (b) Install the bearing caps.
 - (c) Using a dial indicator, measure the runout of ring gear.
- Maximum runout: 0.10 mm (0.0039 in.)**



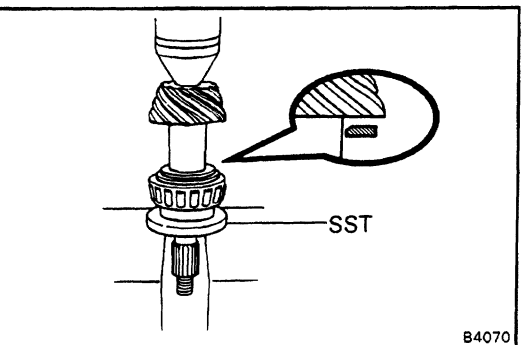
5. INSTALL FRONT AND REAR BEARING OUTER RACE

Using SST and a press, press in a new bearing outer race to the carrier.

SST 09608-35014

Front (09608-06020, 09608-06110)

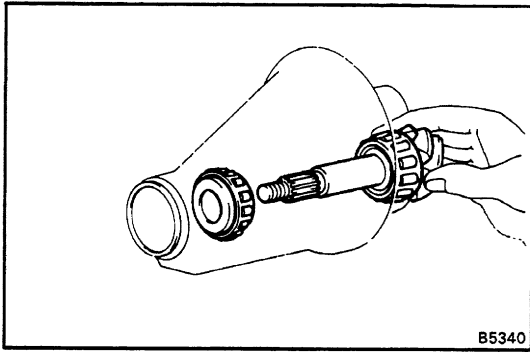
Rear (09608-06020, 09608-06180)



6. INSTALL FRONT BEARING TO DRIVE PINION

- (a) Install the plate washer on the drive pinion with the chamfered end facing toward the pinion gear.
- (b) Using SST and a press, press in the reused rear bearing onto the drive pinion.

SST 09506-35010



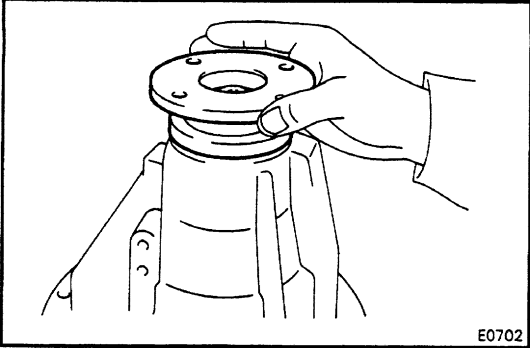
B5340

7. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the following parts:

- Drive pinion
- Front bearing

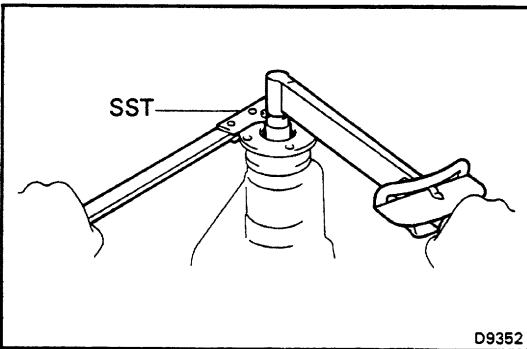
HINT: Assemble the spacer, oil slinger and oil seal after adjusting the gear contact pattern.



E0702

(b) Install the companion flange.

Coat the threads of the nut with MP grease.



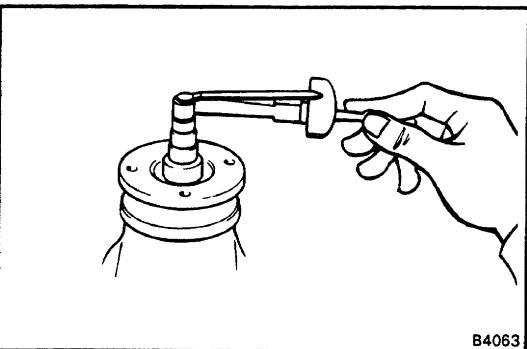
D9352

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

Using SST to hold the flange, torque the nut.

SST 09330-00021

NOTICE: As there is no spacer, torque a little at a time, being careful not to overtorque.



B4063

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

Preload (at starting)

New bearing

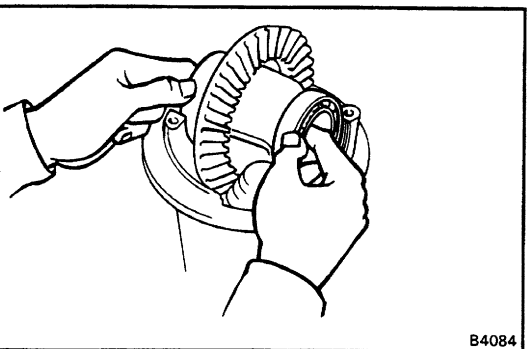
13 – 20 kg-cm

(11.3 – 17.4 in.-lb, 1.3 – 2.0 N-m)

Reused bearing

7 – 10 kg-cm

(6.1 – 8.7 in.-lb, 0.7 – 1.0 N-m)

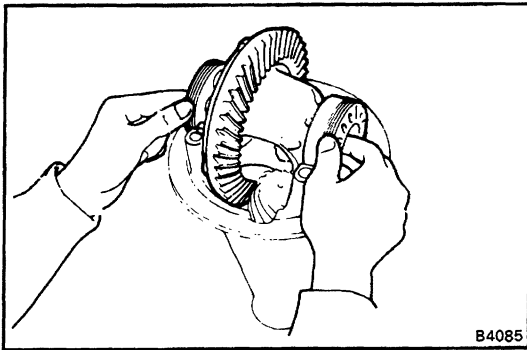


B4084

8. 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.

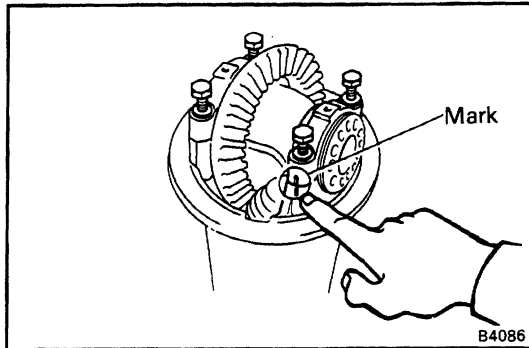
(b) Install the case in the carrier.



9. INSTALL ADJUSTING NUTS

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

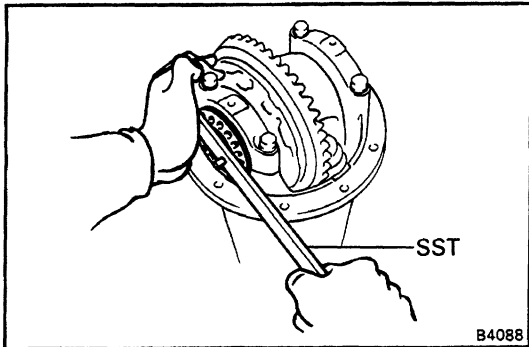
HINT: Make sure that there is backlash between the ring gear and drive pinion.



10. INSTALL BEARING CAPS –

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

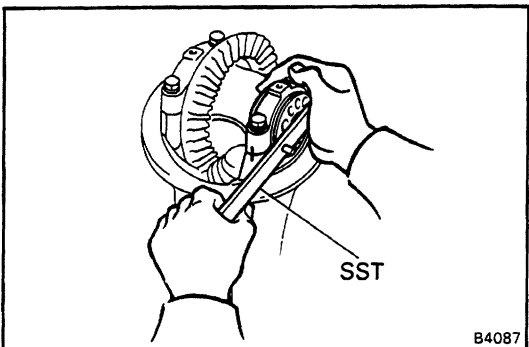
HINT: If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not threaded properly. Reinstall the adjusting nuts if necessary.



11. ADJUST SIDE BEARING PRELOAD

- (a) Torque the bearing cap bolts until the spring washers are slightly compressed.
- (b) Using SST, tighten the adjusting nut on the ring gear side until the ring gear has a backlash of approx. 0.2 mm (0.008 in.).

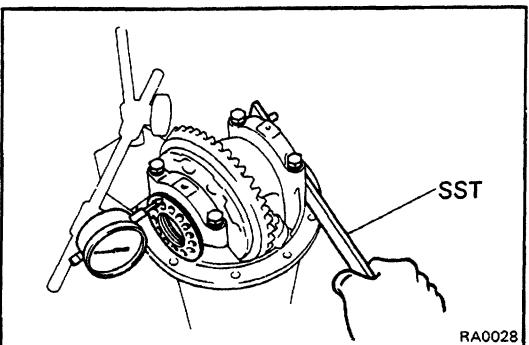
SST 09504-00011



- (c) Using SST, firmly tighten the adjusting nut on the drive pinion side.

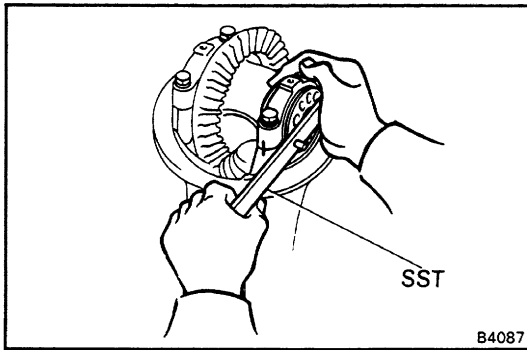
- (d) Check the ring gear backlash.

If tightening the adjusting nut creates ring gear backlash, loosen the nut so that backlash is eliminated.

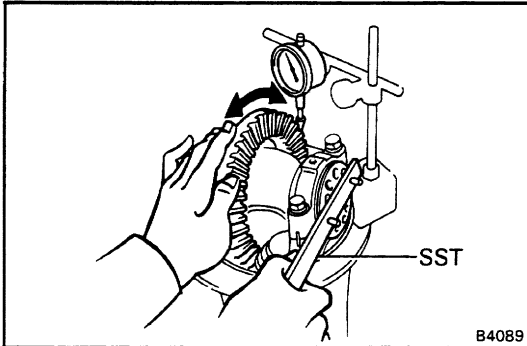


- (e) Place a dial indicator on the top of the bearing cap on the ring gear side.

- (f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



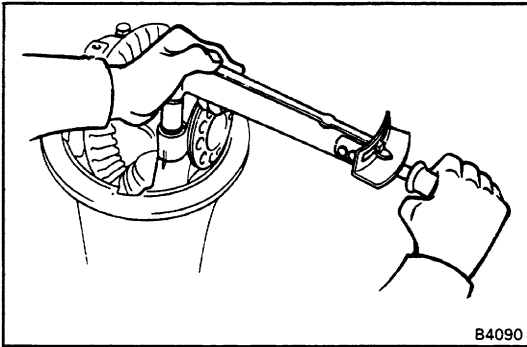
- (g) Tighten the adjusting nut 1 – 1 1/2 notches from the zero preload position.



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

Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

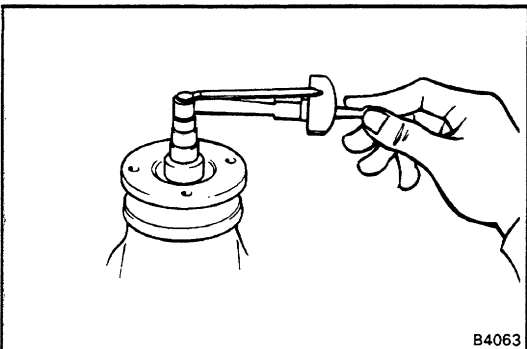
HINT: The backlash is adjusted by turning the left and right adjusting nuts in equal amounts. For example, loosen the nut on the left side one notch and tighten the nut on the right side one notch.



- (i) Torque the bearing cap bolts.

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

- (j) Recheck the ring gear backlash.



12. MEASURE TOTAL PRELOAD

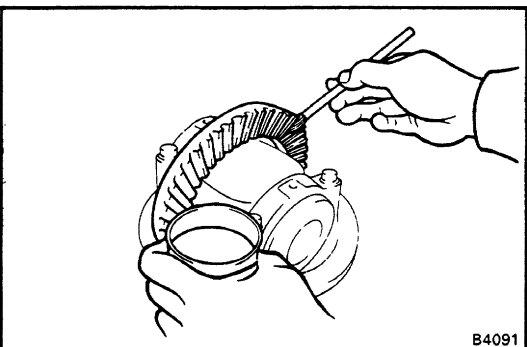
Using a torque wrench, measure the total preload.

Total preload (at starting):

In addition to drive pinion preload

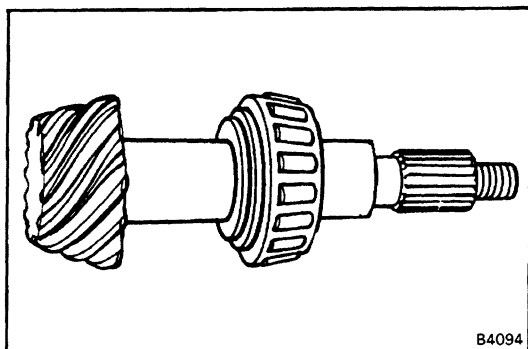
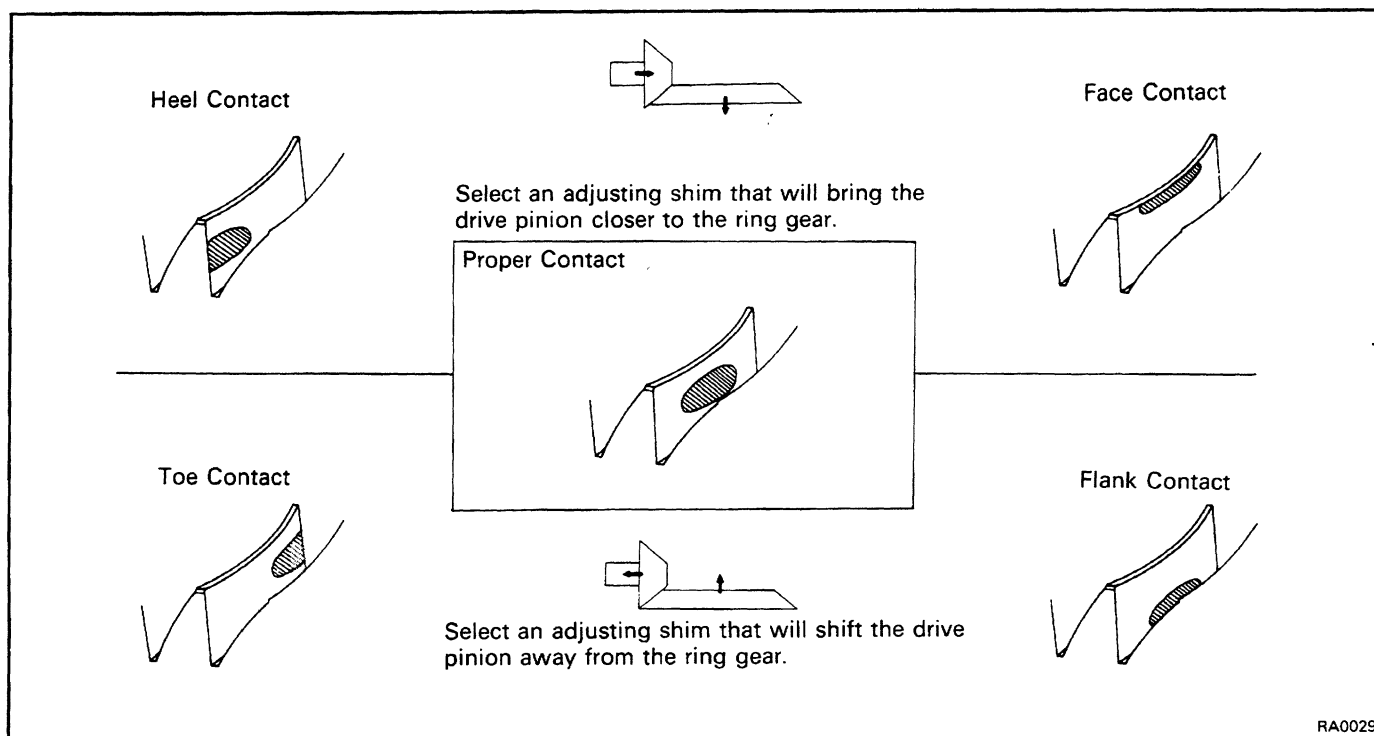
4 – 6 kg-cm

(3.5 – 5.2 in.-lb, 0.4 – 0.6 N-m)



13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- Coat 3 or 4 teeth at three differential positions on the ring gear with red lead.
- Hold the companion flange firmly and rotate the ring gear in both directions.
- Inspect the tooth contact.



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

Washer thickness

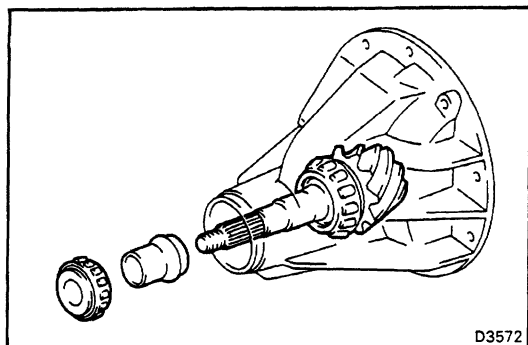
Thickness	mm (in.)
1.05 (0.0413)	1.35 (0.0531)
1.10 (0.0433)	1.40 (0.0551)
1.15 (0.0453)	1.45 (0.0571)
1.20 (0.0472)	1.50 (0.0591)
1.25 (0.0492)	1.55 (0.0610)
1.30 (0.0512)	

14. REMOVE COMPANION FLANGE

(See step 1 on page [SA-37](#))

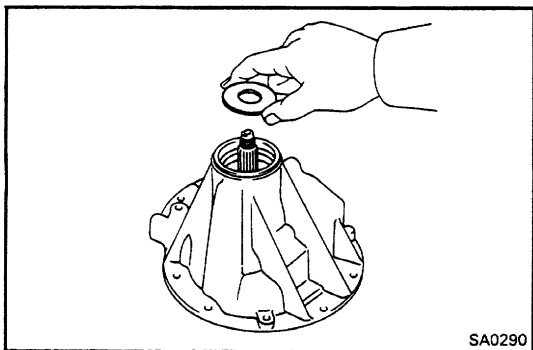
15. REMOVE DRIVE PINION REAR BEARING

(See step 3 on page [SA-37](#))

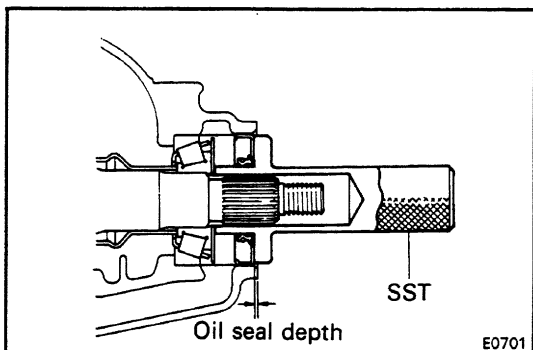


16. INSTALL NEW BEARING SPACER AND REAR BEARING

- Install a new bearing spacer on the drive pinion.
- Install the rear bearing on the drive pinion.



17. INSTALL OIL SLINGER



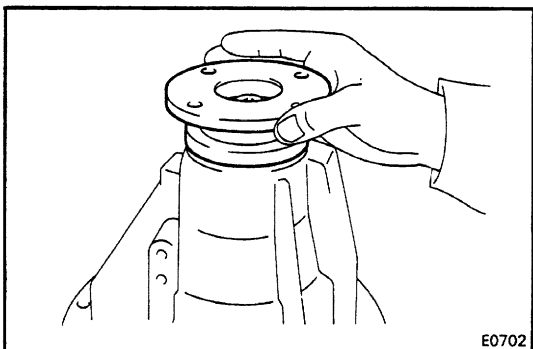
18. INSTALL NEW OIL SEAL

(a) Using SST, drive in a new oil seal as shown.

SST 09554-30011

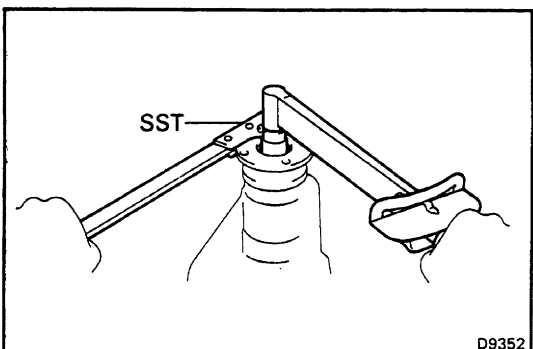
Oil seal drive in depth: 1.0 mm (0.039 in.)

(b) Apply MP grease to the oil seal lip.



19. INSTALL COMPANION FLANGE

(a) Install the companion flange.

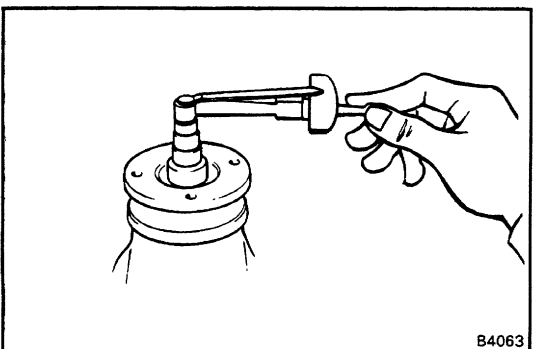


(b) Coat the threads of a new nut with MP grease.

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

SST 09330-00021

Torque: 2,500 kg-cm (181 ft-lb, 245 N-m)



20. CHECK DRIVE PINION BEARING PRELOAD

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

Preload (at starting):

New bearing

13 – 20 kg-cm

(11.3 – 17.4 in.-lb, 1.3 – 2.0 N-m)

Reused bearing

7 – 10 kg-cm(6.1 – 8.7 in.-lb, 0.7 – 1.0 N-m)

- 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 exceeded 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: 4,500 kg-cm (325 ft-lb, 441 N-m)

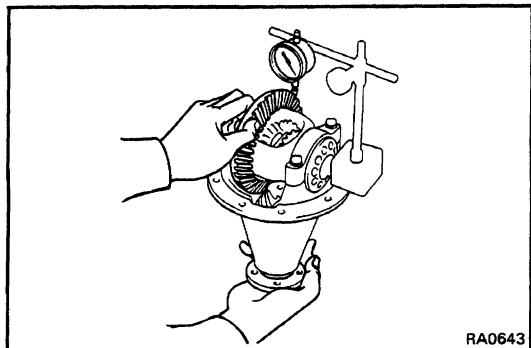
21. RECHECK RING GEAR BACKLASH –

Using a dial indicator, check the backlash of the ring gear.

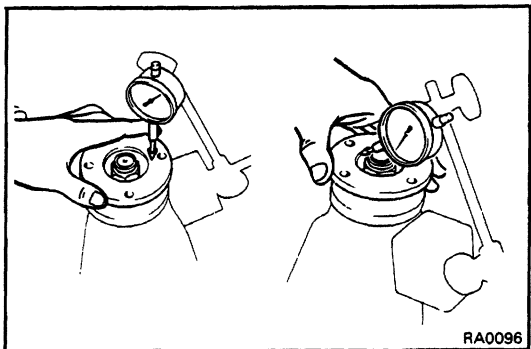
Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in)

22. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(See step 13 on page [SA-45](#))



RA0643



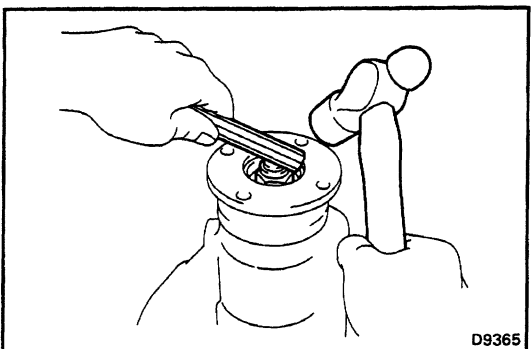
RA0096

23. CHECK COMPANION FLANGE RUNOUT

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

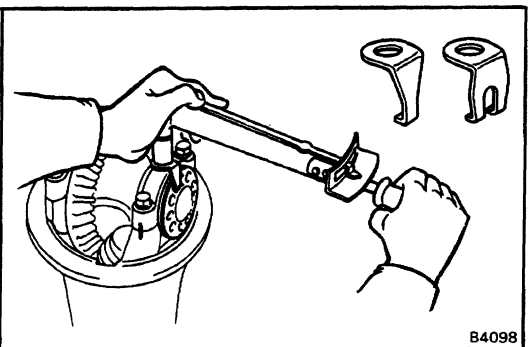
Maximum lateral runout: 0.10 mm (0.0039 in.)

Maximum radial runout: 0.10 mm (0.0039 in.)



D9365

24. STAKE DRIVE PINION NUT

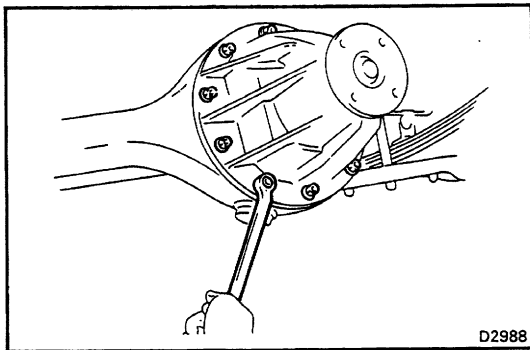


B4098

25. INSTALL ADJUSTING NUT LOCKS

- Select either a No.1 or No.2 lock, whichever will fit the adjusting nuts.
- Install the lock on the bearing caps.

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



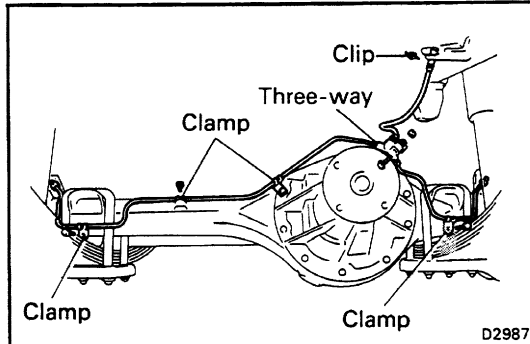
INSTALLATION OF DIFFERENTIAL CARRIER

(See page [SA-32](#))

1. INSTALL DIFFERENTIAL CARRIER TO AXLE HOUSING

- install a new gasket onto the axle housing.
- Install the differential carrier assembly in the axle and install the ten nuts.
- Torque the nuts.

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

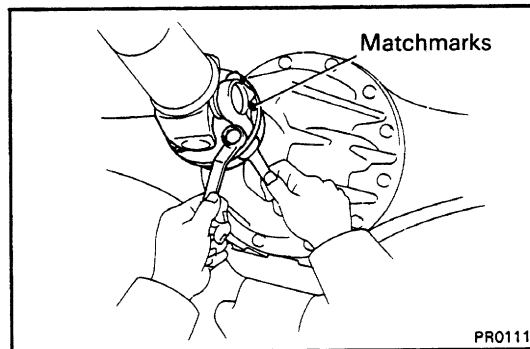


2. INSTALL FRONT BRAKE TUBE

- Install the three-way with the brake hose and tubes to the axle housing.
- Using SST, connect the brake hose at the frame side, and install the clip.

SST 09751-36011

- Install the four clamps to the axle housing with bolts and nut.



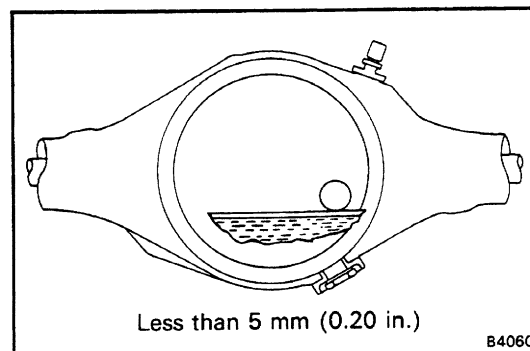
3. CONNECT PROPELLER SHAFT TO DIFFERENTIAL

- Align the matchmarks on both flanges.
- Torque the four bolts and nuts.

Torque: 900 kg-cm (65 ft-lb, 88 N-m)

4. INSTALL FRONT AXLE SHAFT

(See step 9 on page [SA-27](#))



5. CHECK DIFFERENTIAL OIL LEVEL

Oil type: API GL-5 hypoid gear oil

Viscosity: Above -18°C (0°F) SAE 90

Below -18°C (0°F) SAE 80W-90 or 80W

Capacity: 3.0 liters (3.2 US qts, 2.6 Imp. qts)

Install a filler plug.

6. BLEED BRAKE LINE

(See page [BR-6](#))