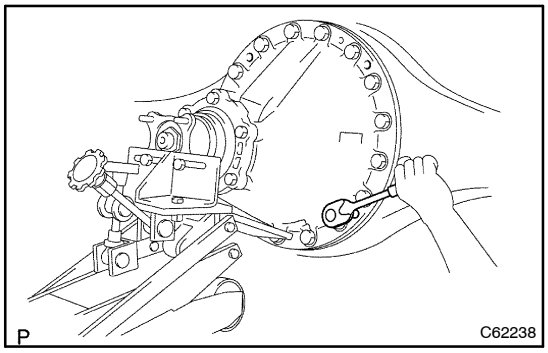
2907Q–01

OVERHAUL

1. DRAIN DIFFERENTIAL OIL (See page 29–2)
2. REMOVE REAR AXLE SHAFT (See page 30–72 or 30–75)
3. REMOVE PROPELLER SHAFT ASSY (See page 30–4 or 30–11)



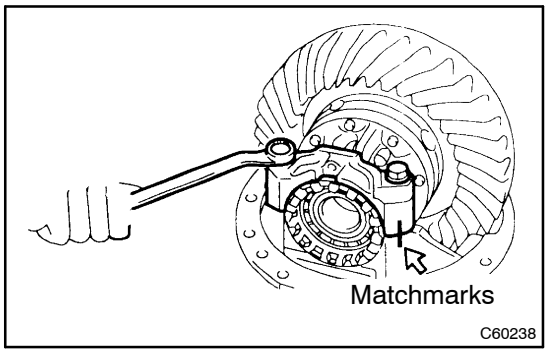
4. REMOVE REAR DIFFERENTIAL CARRIER ASSY

(a) Using a jack, support the differential carrier.

(b) Remove the 12 bolts and differential carrier.

NOTICE:

Be careful not to damage the installation surface.



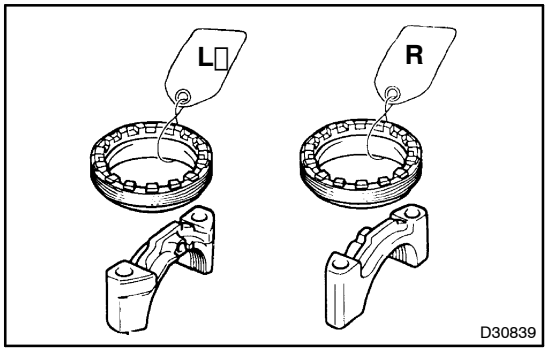
5. REMOVE REAR DEFFERENTIAL CASE SUB–ASSY

(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the 2 adjusting nut locks.

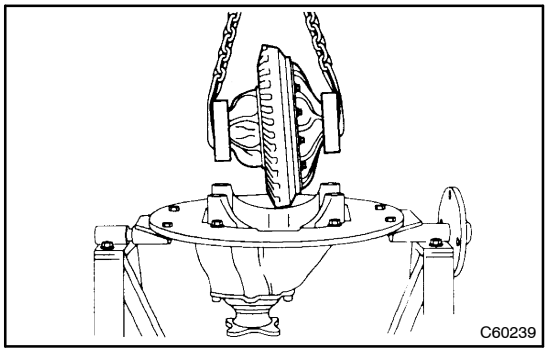
(c) Remove the 4 bolts, 2 bearing caps and adjusting nuts.

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



HINT:

Tag the removed parts to show the location for installation.

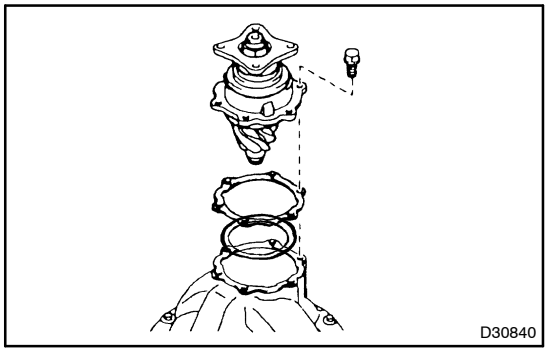


(e) Using a chain block, remove the differential gear assy from the differential carrier.

(f) Remove the side bearing outer race.

HINT:

Tag the removed parts to show the location for installation.



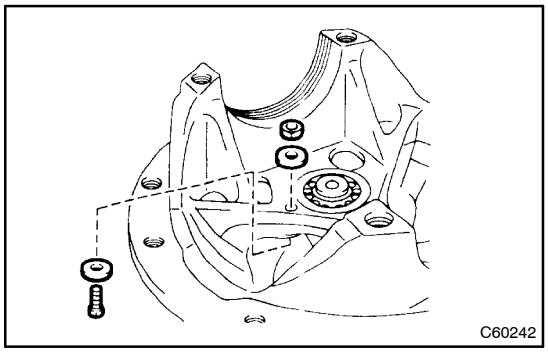
6. REMOVE DRIVE PINION SUB–ASSY

(a) Remove the 6 bolts.

(b) Remove the drive pinion assy, shims and O–ring from the differential carrier.

HINT:

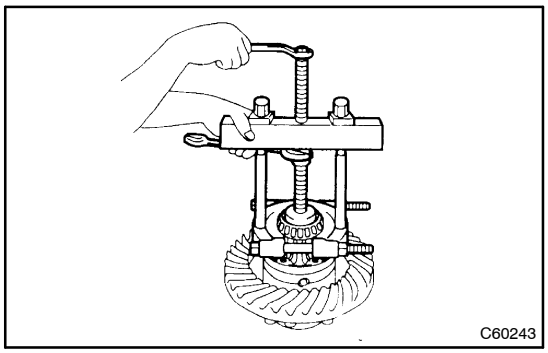
For easy removal, Remove the outer races, using a brass bar and hammer.



7. REMOVE PILOT BEARING OUTER RACE

(a) Remove the bolt, nut and 2 bearing retainers.

(b) Remove the pilot bearing outer race from the differential carrier.

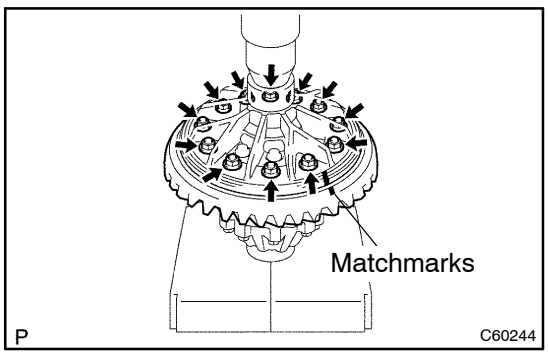


8. REMOVE SIDE BEARING INNER RACE

(a) Using SST, remove the 2 side bearing inner races from the differential case.

SST 09950–60020, (09951–00680), 09950–40011, (09957–04010), 09950–00020, 09950–00030.

If reusing the bearings, arrange them so that right bearing and left bearings can be distinguished.



9. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.

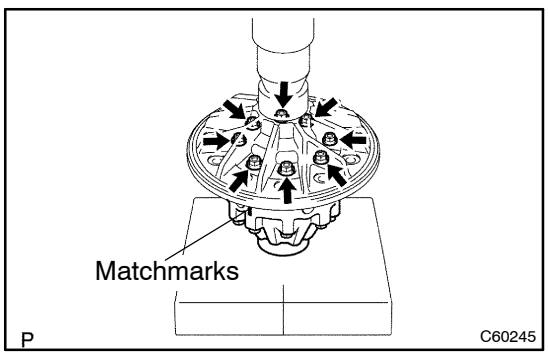
(b) Using a press, fix the differential carrier.

(c) Remove the 12 bolts and 12 nuts.

(d) Using a plastic hammer, remove the ring gear to separate it from the differential case.

NOTICE:

Be careful not to drop the ring gear.

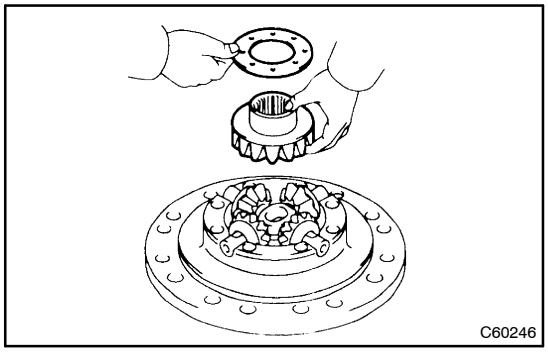


10. REMOVE DIFFERENTIAL CASE

(a) Place matchmarks on the LH and RH cases.

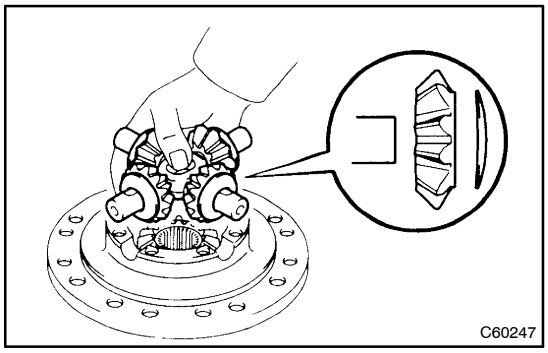
(b) Remove the 8 bolts.

(c) Using a plastic hammer, separate the LH and RH cases.



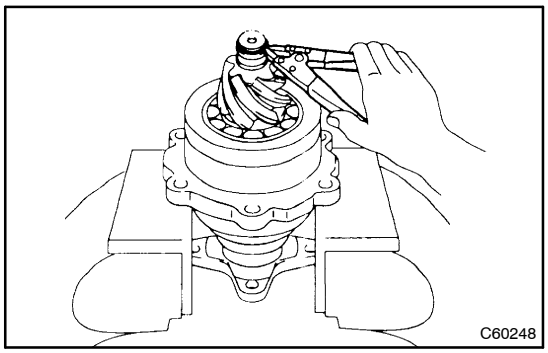
11. REMOVE REAR DIFFERENTIAL SPIDER

(a) Remove the side gear thrust washer and side gear.



(b) Remove the 4 pinion gear thrust washers, 4 pinion gears and spider.

(c) Remove the side gear thrust washers and side gear.



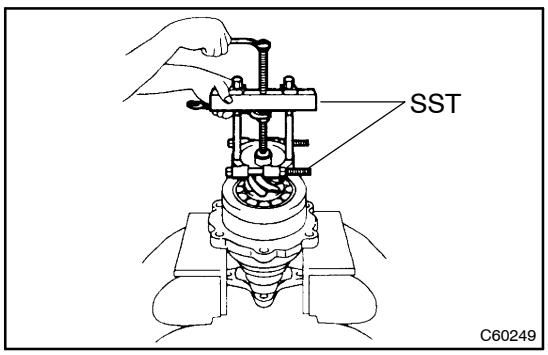
12. REMOVE PILOT BEARING INNER RACE

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

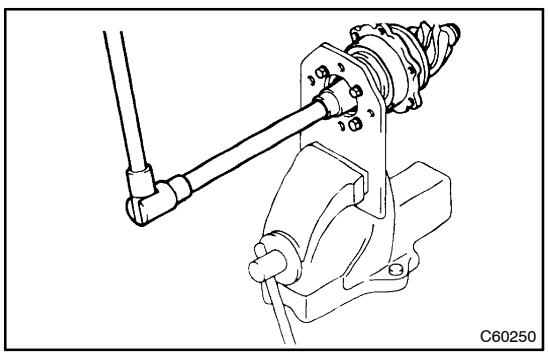
(b) Using a grinder, make a groove to the inner race.

NOTICE:

Use a cloth or similar object as a cover, at the time of snap ring installation, to prevent the snap ring from flying off.



(c) Using SST , remove the inner race from the drive pinion.
SST 09950–00030, 09950–00020

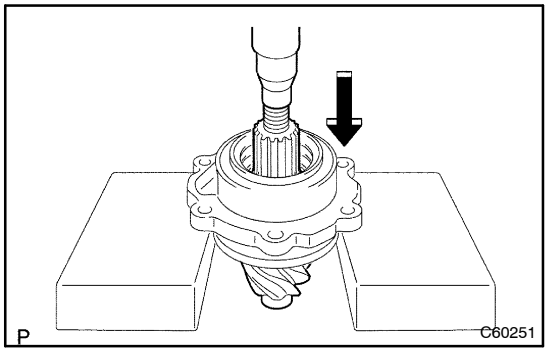


13. REMOVE REAR DRIVE PINION COMPANION FLANGE

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

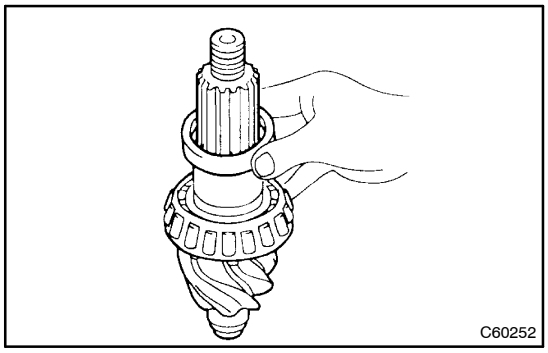
(b) Using a vise, hold the drive pinion assy.

(c) Remove the lock nut and companion flange.

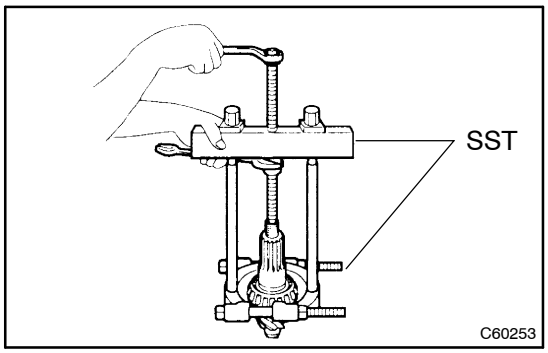


14. REMOVE DIFFERENTIAL DRIVE PINION

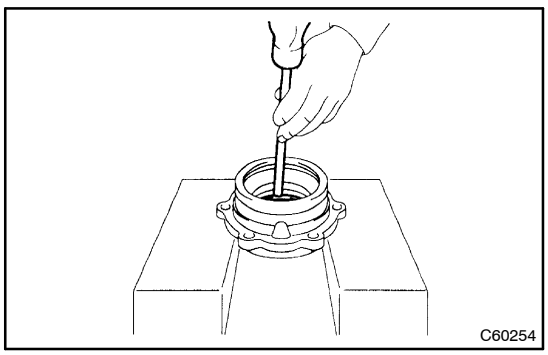
(a) Using a press, press out the drive pinion from the drive pinion cage.



(b) Remove the drive pinion bearing spacer.



(c) Using SST, remove the rear bearing inner race.
SST 09950–00030, 09950–00020



15. REMOVE FRONT BEARING OUTER RACE

(a) Using a brass bar and a hammer, tap out the bearing oil seal.

(b) Using a brass bar and a hammer, tap out the bearing outer race.

NOTICE:

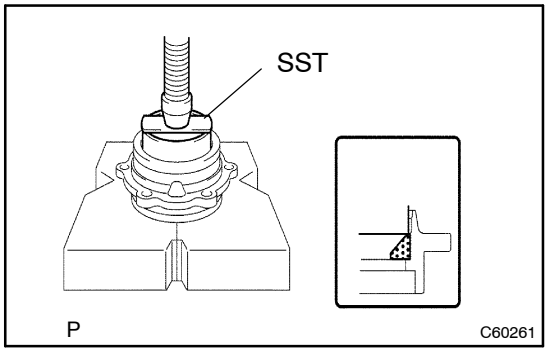
Do not damage the inner surface of the cage.

16. REMOVE REAR BEARING OUTER RACE

(a) Using a brass bar and a hammer, tap out the bearing outer race.

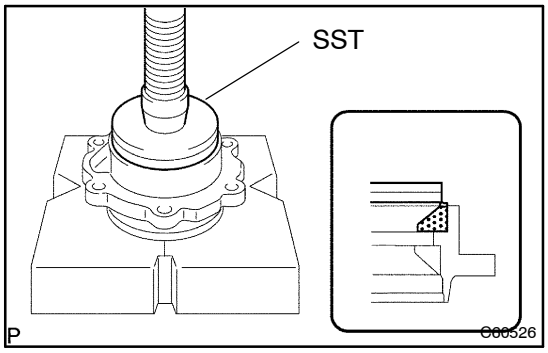
NOTICE:

Do not damage the inner surface of the cage.



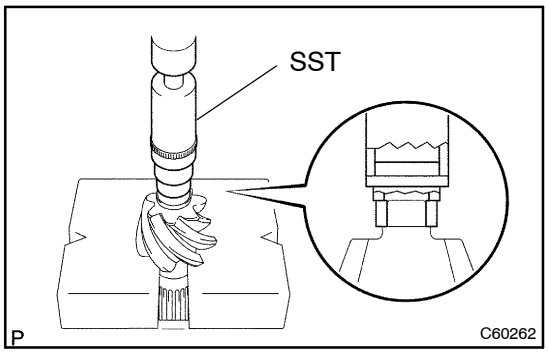
17. INSTALL FRONT BEARING OUTER RACE

(a) Using SST and a press, press in the front bearing outer race onto the differential cage.
SST 09518–36020



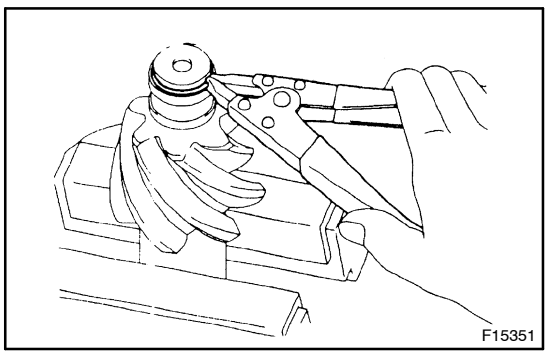
18. INSTALL REAR BEARING OUTER RACE

(a) Using SST and a press, press in the rear bearing outer race onto the differential cage.
SST 09223–78010



19. INSTALL PILOT BEARING INNER RACE

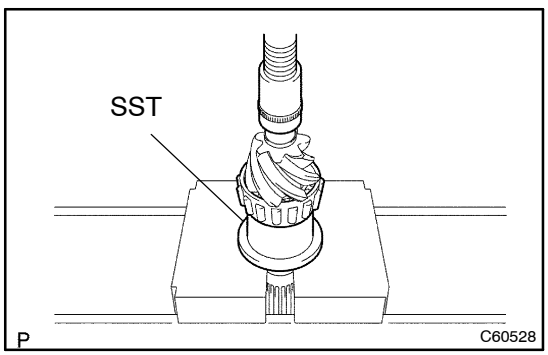
(a) Using SST and a press, press in the pilot bearing inner race onto the shaft of the drive pinion.
SST 09316–60011 (09316–00011, 09316–00071)



(b) Using a snap ring expander, install a new snap ring in the groove on the drive pinion tip.

NOTICE:

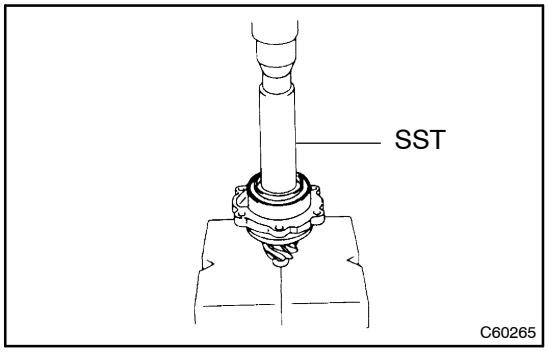
Use a cloth or similar object as a cover, at the time of snap ring installation, to prevent the snap ring from flying off.



20. INSTALL REAR BEARING INNER RACE

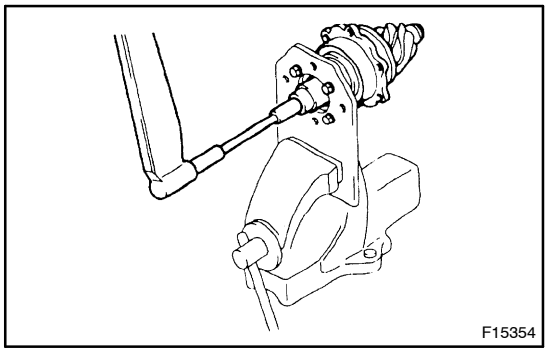
(a) Using SST and a press, install the rear bearing inner race onto the drive pinion.
SST 09315–00022

(b) Install the differential drive pinion bearing spacer.



21. INSTALL FRONT BEARING INNER RACE

(a) Using SST and a press, install the drive pinion cage and front bearing inner race onto the drive pinion.
SST 09316–60011

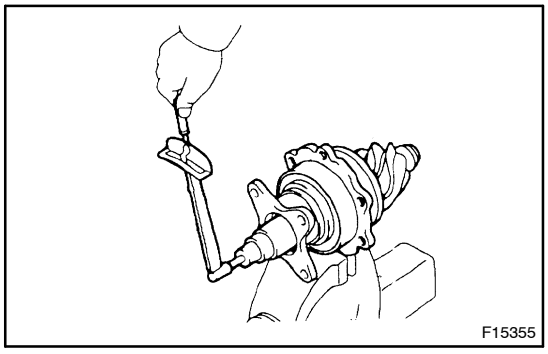


22. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

(a) Install the flange yoke and lock nut on the drive pinion, and fix the drive pinion assembly in a vise.

(b) Using a deep socket wrench (36 mm), tighten the lock nut.
Torque: 435 N·m (4,450 kgf·cm,322 ft·lbf)

NOTICE:
Do not install an oil seal before preload measurement.



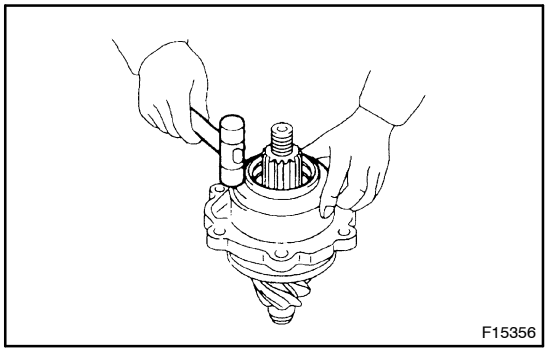
(c) Using a torque wrench, measure the preload at the lock nut part.
Preload:

New bearing	1.97 – 2.94 N·m (20 – 30 kgf·cm, 17 – 26 in.·lbf)
Reused bearing	1.47 – 2.45 N·m (15 – 25 kgf·cm, 13 – 22 in.·lbf)

NOTICE:
When either bearing is new, use the preload for a new bearing.

(d) When the measured value exceeds the specified preload, select a spacer by increasing or decreasing the value and adjust the preload.
Spacer thickness:

13.900 mm (0.5472 in.)	14.150 mm (0.5571 in.)
13.925 mm (0.5482 in.)	14.175 mm (0.5581 in.)
13.950 mm (0.5492 in.)	14.200 mm (0.5591 in.)
13.975 mm (0.5502 in.)	14.225 mm (0.5600 in.)
14.000 mm (0.5512 in.)	14.250 mm (0.5610 in.)
14.025 mm (0.5522 in.)	14.275 mm (0.5620 in.)
14.050 mm (0.5531 in.)	14.300 mm (0.5630 in.)
14.075 mm (0.5541 in.)	14.325 mm (0.5640 in.)
14.100 mm (0.5551 in.)	14.350 mm (0.5650 in.)
14.125 mm (0.5561 in.)	14.375 mm (0.5659 in.)

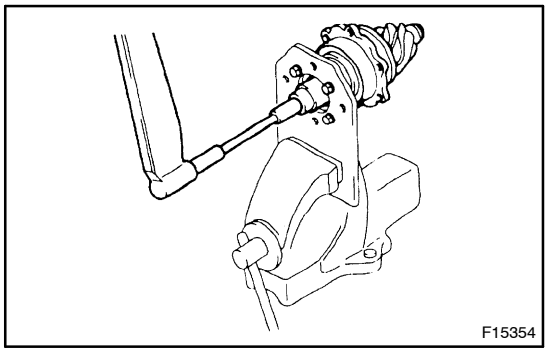

F15356

23. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL

(a) After preload adjustment, remove the companion flange and use a plastic hammer to tap in a new oil seal into the differential carrier cage.

NOTICE:

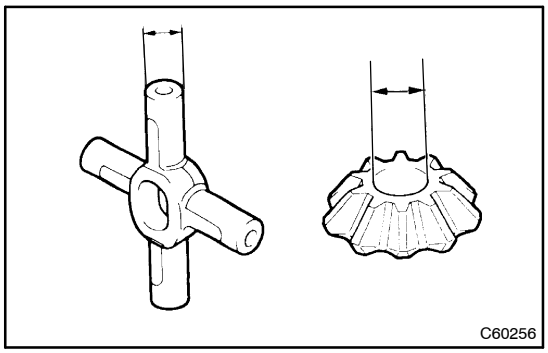
Hit the oil seal uniformly to drive it in.


F15354

24. INSTALL REAR DRIVE PINION COMPANION FLANGE

(a) Install the companion flange with the lock nut.
Torque: 435 N·m (4,450 kgf·cm, 322 ft·lbf)

(b) Using a chisel and a hammer, caulk the lock nut positively at the shaft groove (2 places).


C60256

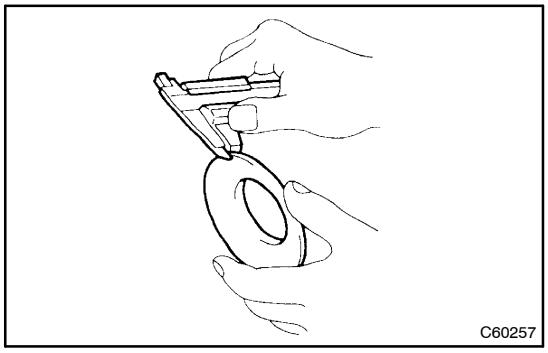
25. INSPECT SPIDER BEARING

(a) Using a micrometer, measure the outer diameter of the spider. Using a caliper gauge, measure the inner diameter of the pinion.

(b) Measure the clearance by subtracting the outer diameter of the spider from the inner diameter of the pinion.
Clearance:

Standard	0.140 – 0.261 mm (0.0055 – 0.0103 in.)
Maximum	0.40 mm (0.0157 in.)

If the clearance is greater than the maximum, replace the spider bearing.


C60257

26. INSPECT SIDE GEAR THRUST WASHER AND PINION THRUST WASHER

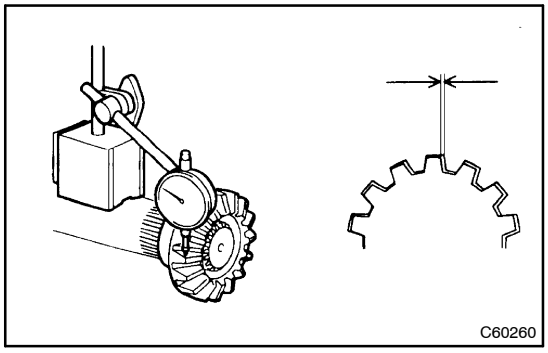
(a) Using a vernier caliper, measure the thickness of the side gear thrust washer and pinon gear thrust washer.
Thickness of side gear thrust washer:

Standard	1.9 – 2.1 mm (0.0748 – 0.0827 in.)
Minimum	1.7 mm (0.0669 in.)

Thickness of pinion gear thrust washer:

Standard	1.5 – 1.7 mm (0.0590 – 0.0669 in.)
Minimum	1.3 mm (0.0512 in.)

If the value is less than the minimum, replace the side gear thrust washer or pinon gear thrust washer.



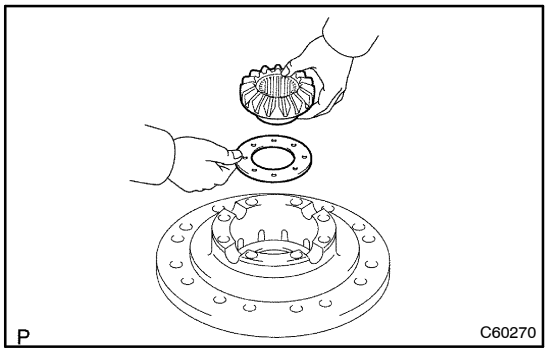
27. INSPECT DIFFERENTIAL SIDE GEAR

(a) Using a dial gauge, measure the free play of the normal rotating direction of the axle shaft spline.

Free play:

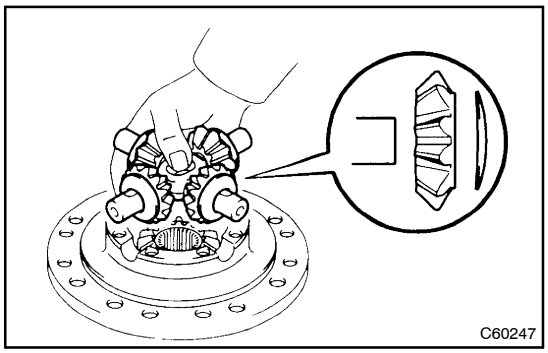
Standard	0.054 – 0.148 mm (0.0021 – 0.0058 in.)
Maximum	0.5 mm (0.0197 in.)

If the value is greater than the maximum, replace the differential side gear.



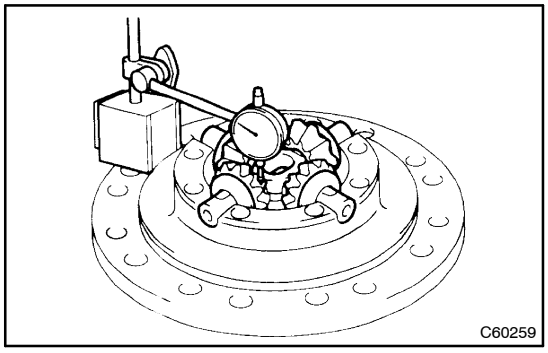
28. INSTALL REAR DIFFERENTIAL SPIDER

(a) Install the thrust washer on the slide gear.



(b) Install the 4 pinion gears and thrust washers to the spider.

(c) Install the spider with the pinion gears to the LH case.



29. ADJUST DIFFERENTIAL SIDE GEAR BACKLASH

(a) Using a dial gauge, measure the side gear backlash.

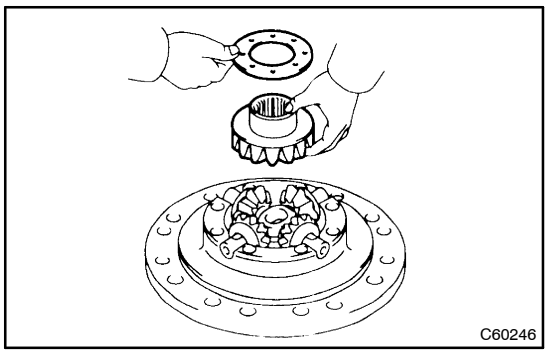
Backlash:

Standard	0.20 – 0.60 mm (0.0079 – 0.0236 in.)
Maximum	0.90 mm (0.0354 in.)

If the backlash is greater than the maximum, replace the parts.

HINT:

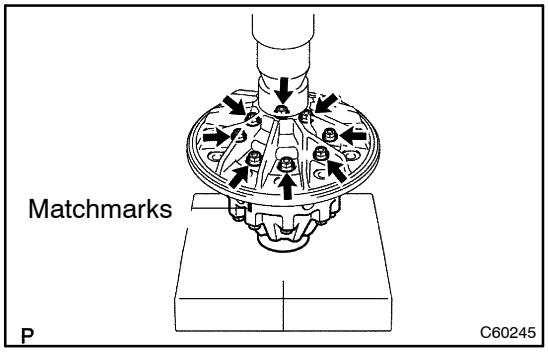
Measure the backlash at the RH case and LH case.



30. INSTALL REAR DIFFERENTIAL SIDE GEAR

(a) Install the side gear and thrust washer to the RH case.

(b) Apply gear oil to each part.



31. INSTALL DIFFERENTIAL CASE

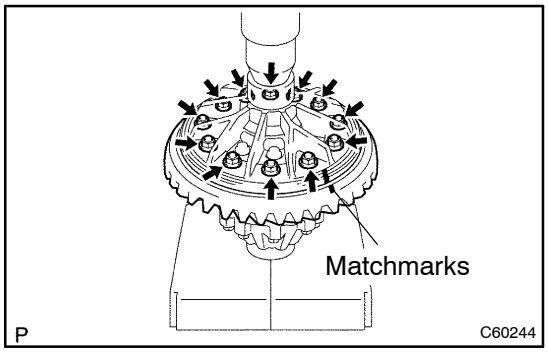
(a) Align the matchmarks on the differential cases LH and RH.

(b) Using a press, fix the differential.

(c) Apply sealant to the threads of the 8 bolts and install them.

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

Torque: 270 N·m (2750 kgf·cm, 199 ft·lbf)



32. INSTALL DIFFERENTIAL RING GEAR

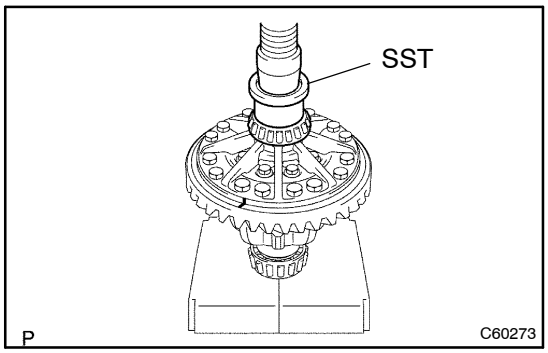
(a) Align the matchmarks on the ring gear and the differential.

(b) Using a press, fix the differential.

(c) Apply sealant to the threads of the 12 bolts and install them.

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

Torque: 270 N·m (2750 kgf·cm, 199 ft·lbf)

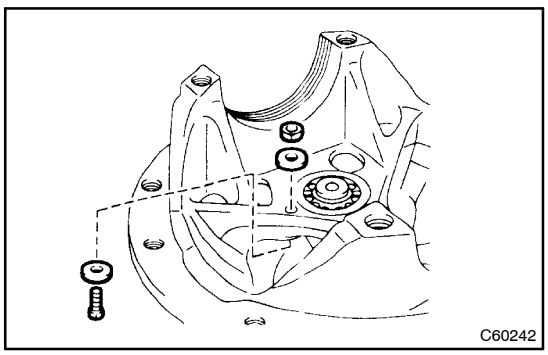


33. INSTALL SIDE BEARING INNER RACE

(a) Install the side spacer to the differential case LH.

(b) Using SST and a press, install the 2 side bearing inner races to the differential case.

SST 09223–15020

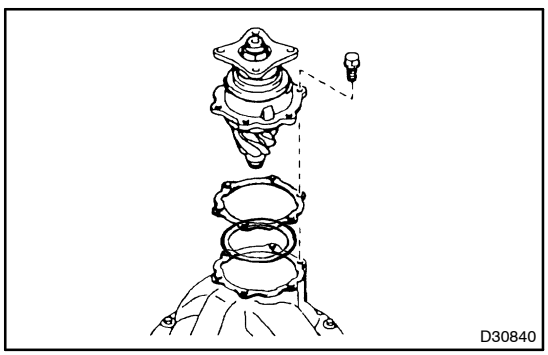


34. INSTALL PILOT BEARING OUTER RACE

(a) Install the bearing with the 2 retainers, bolt and nut.

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

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



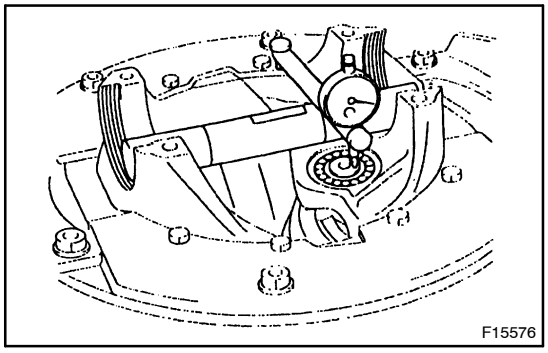
35. INSTALL DRIVE PINION SUB–ASSY

(a) Apply bearing grease to a new O–ring.

(b) Install the O–ring to the groove of the differential carrier cage.

NOTICE:

Be sure to use a new O–ring.


F15576

(c) Measure the depth from the installation surface of the side bearing to the tip of the drive pinion. (This depth is the conical distance.)

Conical distance (Reference): 21.5 mm (0.846 in.)

HINT:

- Make a note of the dimension of the error when manufactured stamped on the pinion tip before the installation of the drive pinion, then use it to calculate the conical distance.
- The conical distance is the basic dimension when the tooth contact of the drive pinion and the ring gear is adjusted. Setting them in this dimension makes the tooth contact best. Additionally, because of machine processing, dimension of the error when manufactured against the standard dimension is stamped on the tip of the pinion. The dimension that takes dimension of the error when manufactured and the standard dimension into account is the basic dimension.

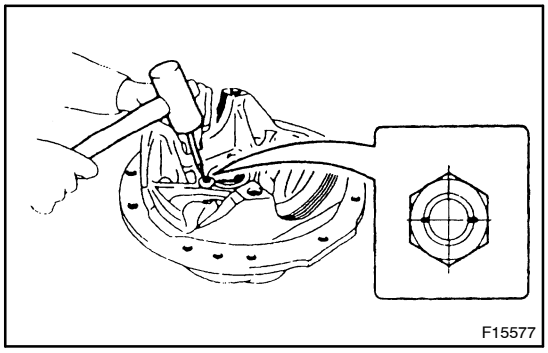
(d) Depending on the difference between the measured value and reference value (conical distance), adjust the thickness of the shim.

Shim thickness:

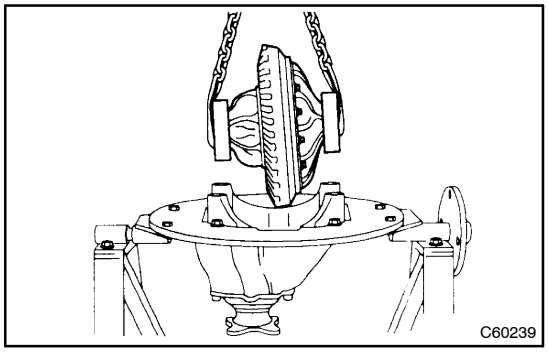
0.30 mm (0.0118 in.)	0.45 mm (0.0177 in.)
0.40 mm (0.0157 in.)	0.50 mm (0.0197 in.)

HINT:

- Basic value = Standard value + Dimension of the error when manufactured
- When dimension of the error when manufactured is stamped by –20, the actual dimension of the error when manufactured means –0.2 mm. (Standard value + Dimension of the error when manufactured = Basic Dimension [21.5 mm + (–0.2 mm) = 21.3 mm])


F15577

(e) Using a punch, caulk the 2 portions of the pilot bearing lock nut.


C60239

36. INSTALL REAR DEFFERENTIAL CASE SUB–ASSY

(a) Place the bearing outer races on their respective bearings.

NOTICE:

Check that the left and right outer races are not interchanged.

(b) Using a chain block, install the differential case.

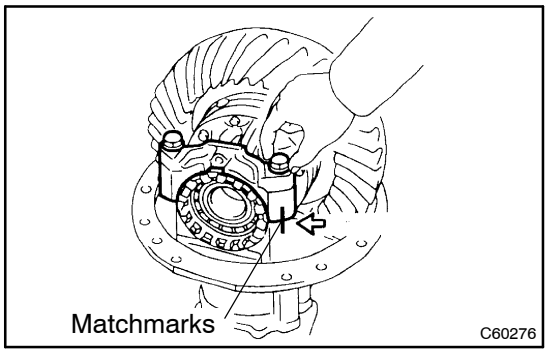
HINT:

Tilting the differential gear assy, install the differential carrier.

(c) Install the 2 adjusting nuts on the carrier, making sure the nuts are properly threaded.

HINT:

Making the 2 adjusting nuts horizontal to the side bearing, insert them from the top of the differential carrier.

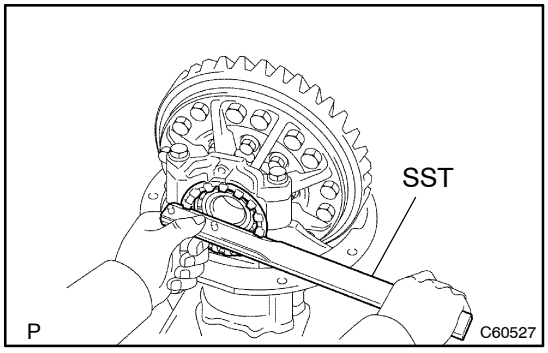


C60276

(d) Align the matchmarks on the cap and carrier. Temporally install the side bearing caps with the bolt.

HINT:

If the bearing cap does not tightly fit the carrier, the adjusting nuts may not be properly threaded. Reinstall the adjusting nuts if necessary.



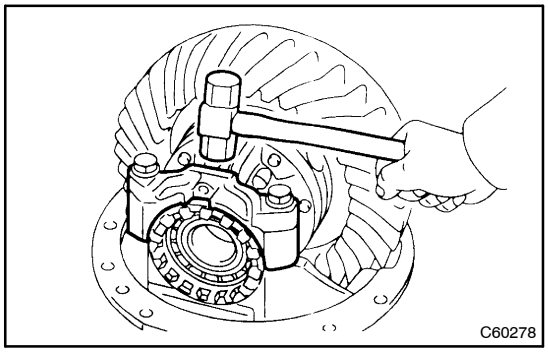
C60527

37. ADJUST DIFFERENTIAL SIDE BEARING PRELOAD

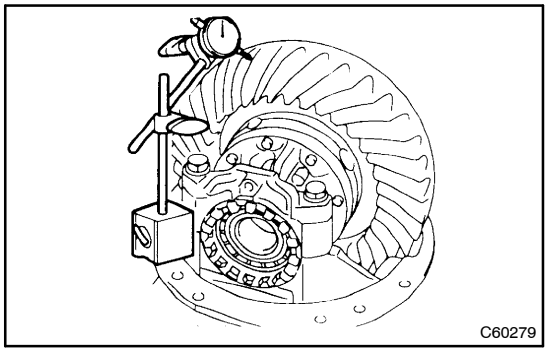
(a) Using SST, fully tighten the adjusting nut on the ring gear side. Then, loosen the nut by the 1/4 rotation.

SST 09504–00011

(b) Use the same procedures on the other side.


C60278

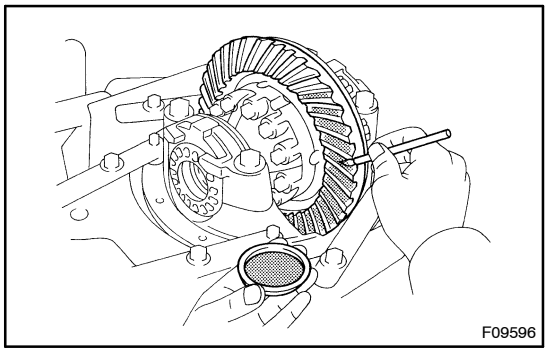
(c) Using a brass bar, lightly tap the top of the side bearing cap so that the bearing fits.


C60279

(d) Using a dial gauge, measure the backlash.
Backlash: 0.20 – 0.28 mm (0.0079 – 0.0110 in.)

HINT:
Perform the measurements at 3 or more positions around the circumfence of the ring gear, and adjust the side bearing preload as necessary.

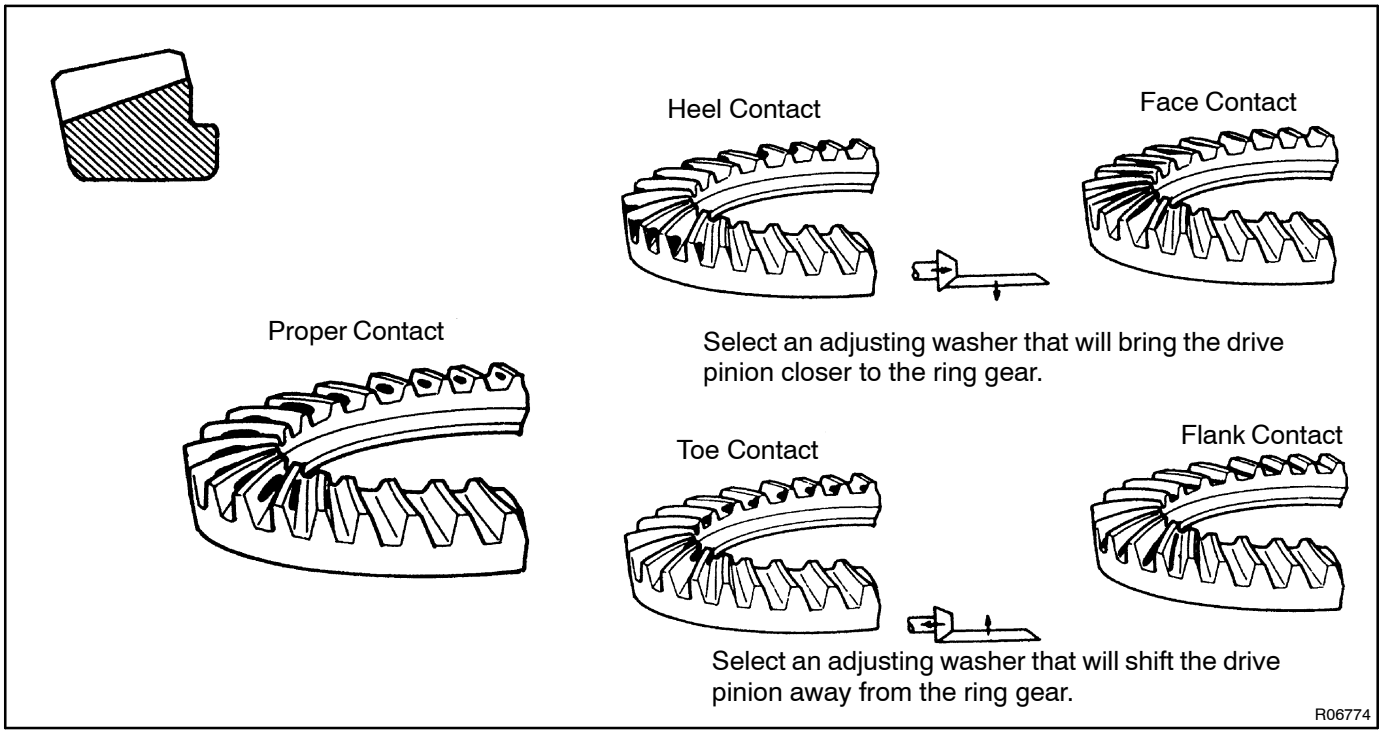
(e) The backlash should be adjusted by turning the left and right adjusting nuts by equal amounts. For example, loosen the nut on the left side one notch and torque the nut on the right side one notch.

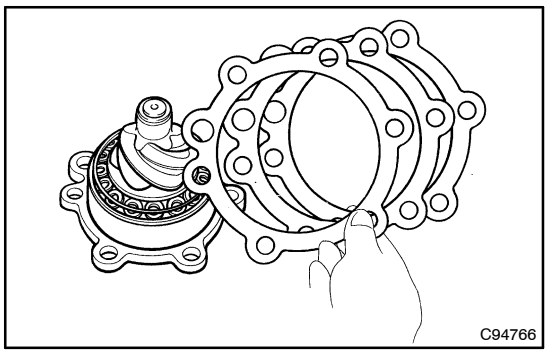

F09596

38. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead.

(b) Turn the companion flange in the both directions to inspect the ring gear for proper tooth contact.



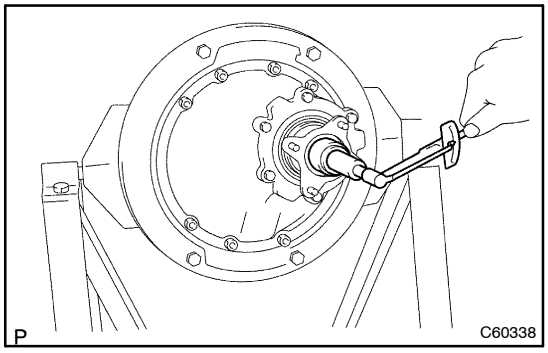

C94766

If the teeth are not properly contacting, use the value below to select a proper shim for correction.

Shim thickness:

0.30 mm (0.0118 in.)	0.40 mm (0.0157 in.)
0.45 mm (0.0177 in.)	0.50 mm (0.0197 in.)

HINT:
Use one or more shims for adjustment.



39. MEASURE TOTAL PRELOAD

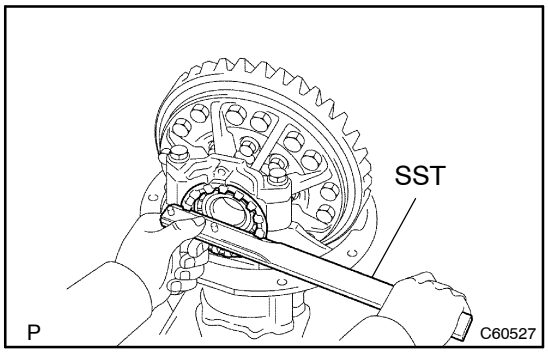
(a) Using a torque wrench, measure the total preload.

Preload (New bearing) :

Reduction ratio	Standard
6.428	0.31 – 0.38 N·m (3.16 – 3.88 kgf·cm, 2.74 – 3.36 in.·lbf)
5.857	0.34 – 0.41 N·m (3.47 – 4.18 kgf·cm, 3.01 – 3.63 in.·lbf)

Preload (Reused bearing) :

Reduction ratio	Standard
6.428	0.26 – 0.33 N·m (2.65 – 3.37 kgf·cm, 2.30 – 2.92 in.·lbf)
5.857	0.23 – 0.30 N·m (2.35 – 3.06 kgf·cm, 2.04 – 2.66 in.·lbf)

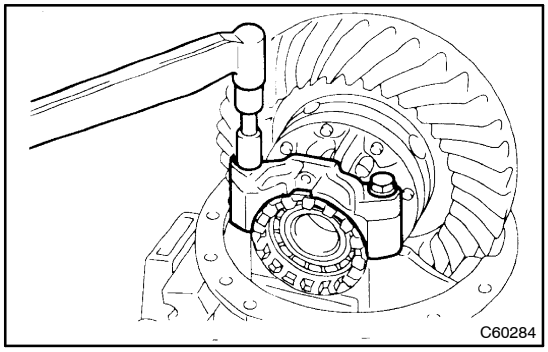


If the result is not as specified, then turn the left/right adjusting nuts using SST to adjust the preload.

SST 09504–00011

NOTICE:

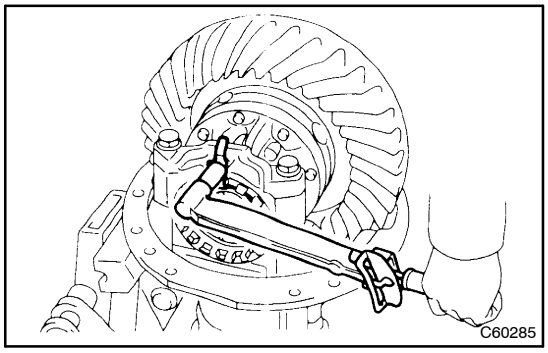
When adjusting with the adjusting nuts, tighten one and another by an equal amount so that the adjustment of the backlash will not be out of order.



(b) Tighten the bearing cap with the 4 bolts.
Torque: 210 N·m (2,150 kgf·cm, ft·lbf)

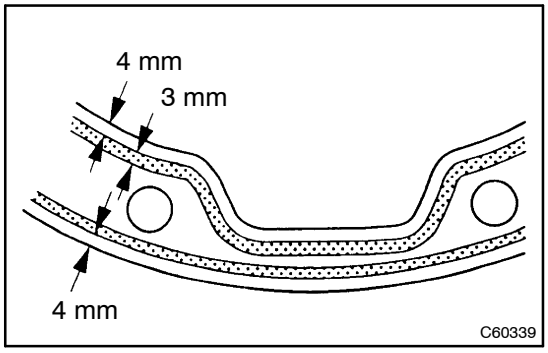
(c) Inspect total preload.

(d) Recheck the ring gear backlash.
Backlash: 0.20 – 0.28 mm (0.0079 – 0.0110 in.)



40. INSTALL REAR DIFFERENTIAL BEARING ADJUSTING NUT LOCK

(a) Install 2 new nut locks on the bearing caps.
Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

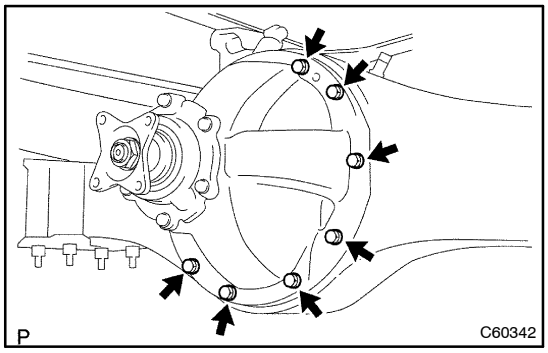


41. INSTALL REAR DIFFERENTIAL CARRIER ASSY

(a) Clean the contact surface of the differential case and rear axle housing.

(b) Apply seal packing to the rear axle housing, and install the differential carrier assembly with the 8 bolts, 4 nuts and 4 washers within 20 minutes.

Seal packing: Three bond 1215 or 1216
Coating width: 3 mm (0.118 in.)



(c) Using a jack, install the differential carrier assy into the axle housing with the 12 bolts.

Torque:
M12: 96.6 N·m (985 kgf·cm, 71 ft·lbf)
M14: 128 N·m (1,300 kgf·cm, 96 ft·lbf)

42. INSTALL PROPELLER SHAFT ASSY (See page 30–4 or 30–11)
43. INSTALL REAR AXLE SHAFT (See page 30–72 or 30–75,)
44. ADD DIFFERENTIAL OIL (See page 29–2)