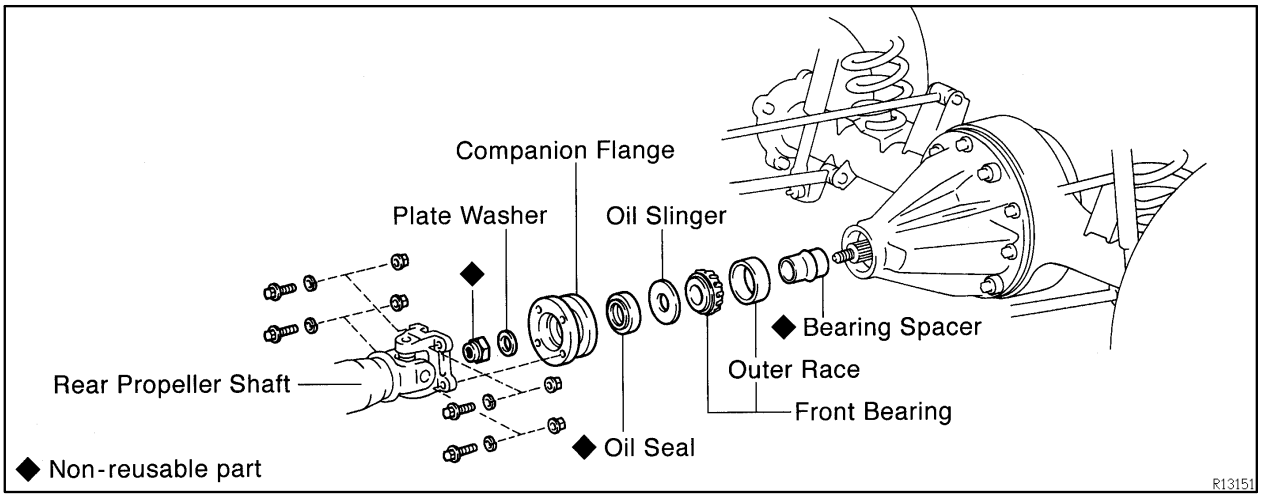
REAR DIFFERENTIAL FRONT OIL SEAL

COMPONENTS

SA1VD-01



These pages from the Factory Service manual are for a Land Cruiser 80 Series rear differential, however the workshop procedures are virtually identical to other Land Cruiser models using the "9.5 Differential".

Pay close attention to the information in this chapter. If you have questions, speak to an experienced and successful Land Cruiser gear installer.

Once you have the carrier in place, and the pinion gear to ring gear backlash correctly set for your final assembly after checking the gear pattern - the two carrier bearing pre-load adjuster nuts will get tightened, in small and equal increments so as to not alter the ring gear backlash, to approximately 100 ft lbs each.

NB: It is a common mistake to have inadequate carrier bearing pre-load which will cause gear failures.

Why? It is important to have adequate pre-load on these adjustment nuts to prevent damage to the ring and pinion gears under high loads and especially with large tires with lockers in use.

The pinion gear's force will attempt to make the ring move away from it, and if it does it will break teeth off the ring gear (and probably the pinion gear) due to separation forces acting on the carrier bearing "towers".

The correct pre-load makes it more difficult for the pinion gear to ring gear backlash to dramatically increase….

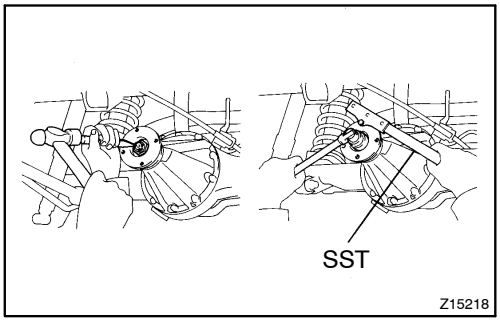
Also, NEVER use a impact driver to tighten the pinion nut to set the pinion bearing pre-load. Use the proper SST to hold the companion flange in place while setting the pre-load via crush sleeve crush.

https://www.shopraddcruisers.ca/tool-companion-flange-toyota-sst-09330-00021.html

SA1VE–01

REPLACEMENT

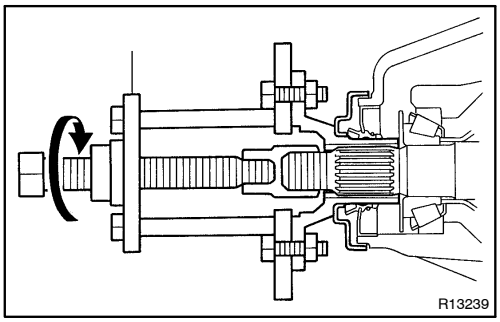
1. **DRAIN DIFFERENTIAL OIL**
2. **DISCONNECT REAR PROPELLER SHAFT**
   (See page PR–3)



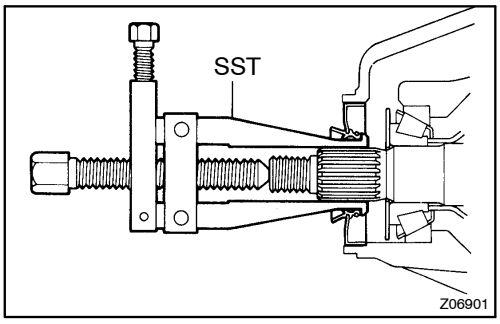
3. **REMOVE COMPANION FLANGE**

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

(b) Using SST to hold the flange, remove the nut and plate washer.
SST 09330–00021



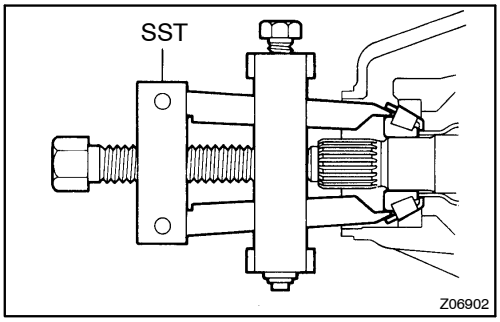
(c) Using SST, remove the companion flange.
SST 09950–30010 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



4. **REMOVE OIL SEAL AND OIL SLINGER**

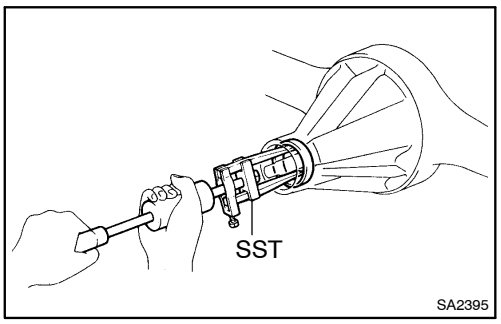
(a) Using SST, remove the oil seal.
SST 09308–10010

(b) Remove the oil slinger.



5. **REMOVE FRONT 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.

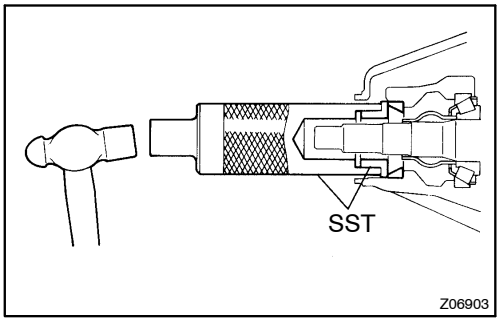
SST 09308–00010

NOTICE:

Do not scratch the taper surface of the outer race.

7. REMOVE BEARING SPACER

8. INSTALL NEW BEARING SPACER

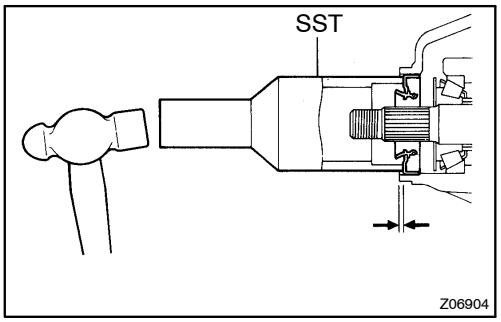


9. INSTALL BEARING OUTER RACE

Using SST, install the bearing outer race.

SST 09316–60011 (09316–00011, 09316–00021)

10. INSTALL FRONT BEARING



11. INSTALL OIL SLINGER AND OIL SEAL

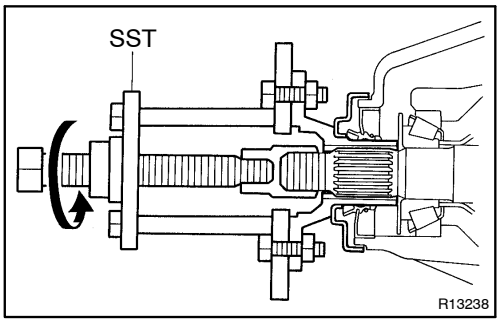
(a) Install the oil slinger.

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

SST 09214–76011

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

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



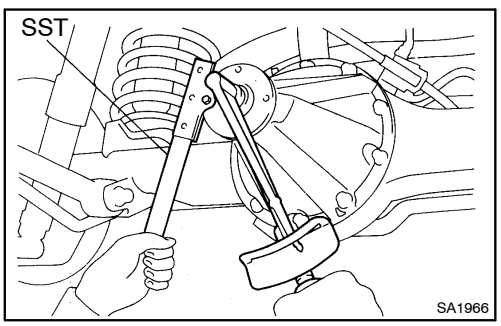
12. INSTALL COMPANION FLANGE

(a) Using SST, install the companion flange on the drive pinion.

SST 09950–30010 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

(b) Place the plate washer on the companion flange.

(c) Apply light coat of gear oil on threads of a new companion flange nut.



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

SST 09330–00021

Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)

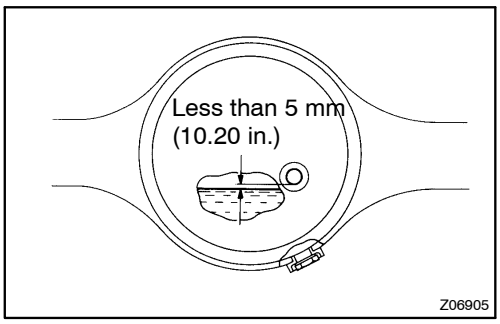
13. ADJUST DRIVE PINION PRELOAD

(See page SA–73)

14. STAKE DRIVE PINION NUT

15. CONNECT REAR PROPELLER SHAFT

(See page PR–5)

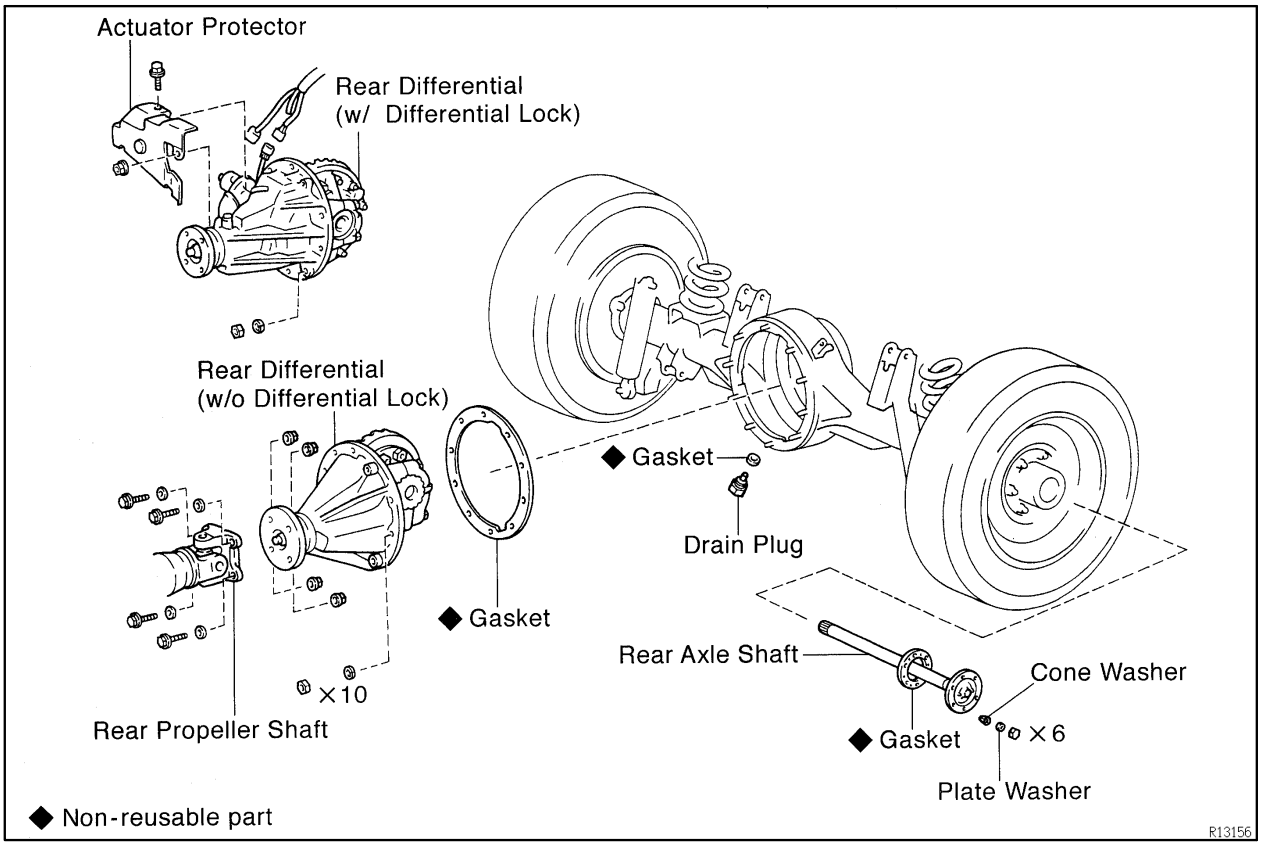


16. FILL DIFFERENTIAL WITH GEAR OIL
Torque: 49 N·m (500 kgf·cm, 39 ft·lbf)
Oil type: Hypoid gear oil API GL–5
Recommended oil viscosity:
Above –18˚C (0˚F) SAE 90
Below –18˚C (0˚F) SAE 80W–90 or 80W
Capacity:
3.25 liters (3.4 US qts, 2.9 Imp. qts)

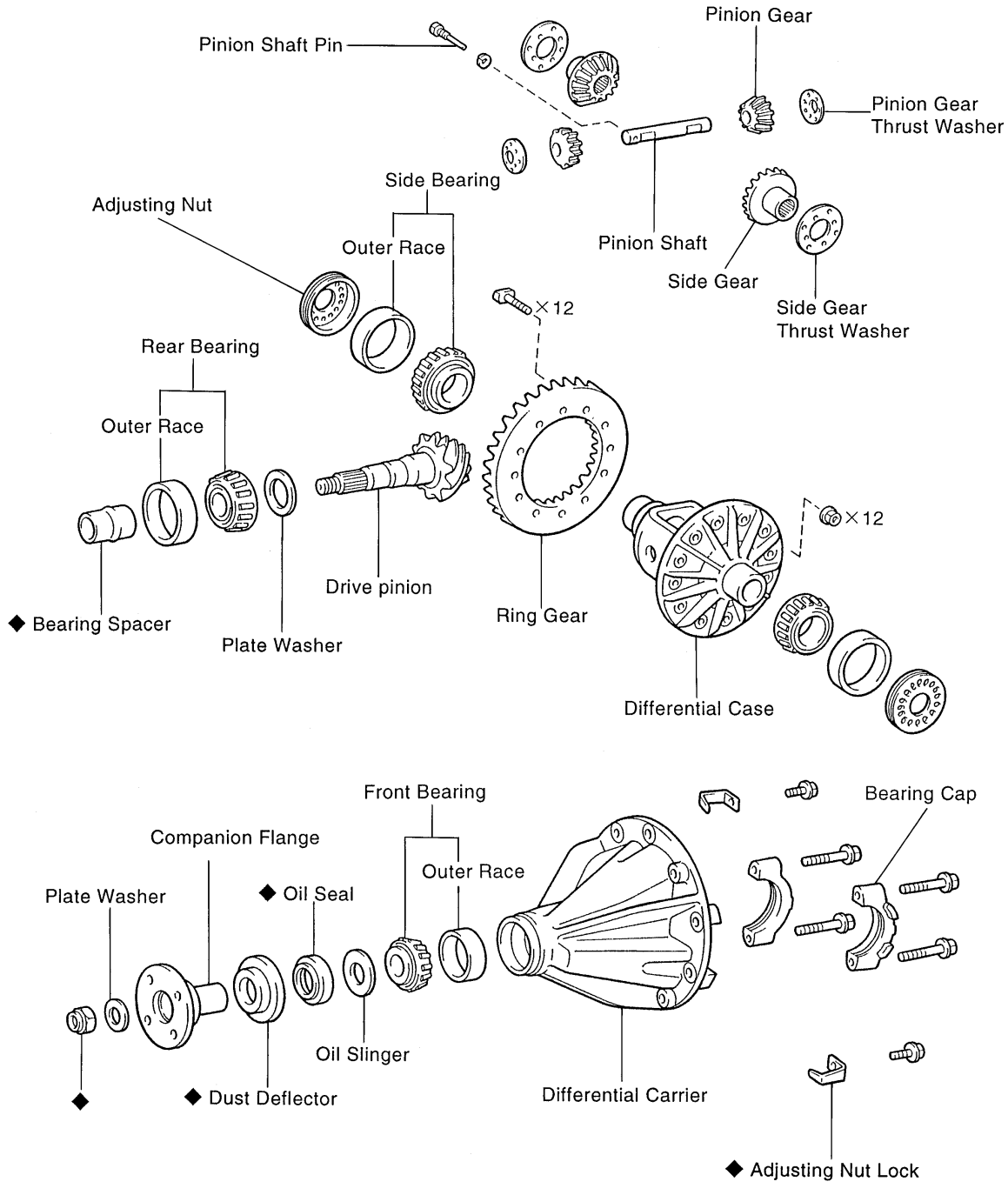
REAR DIFFERENTIAL CARRIER

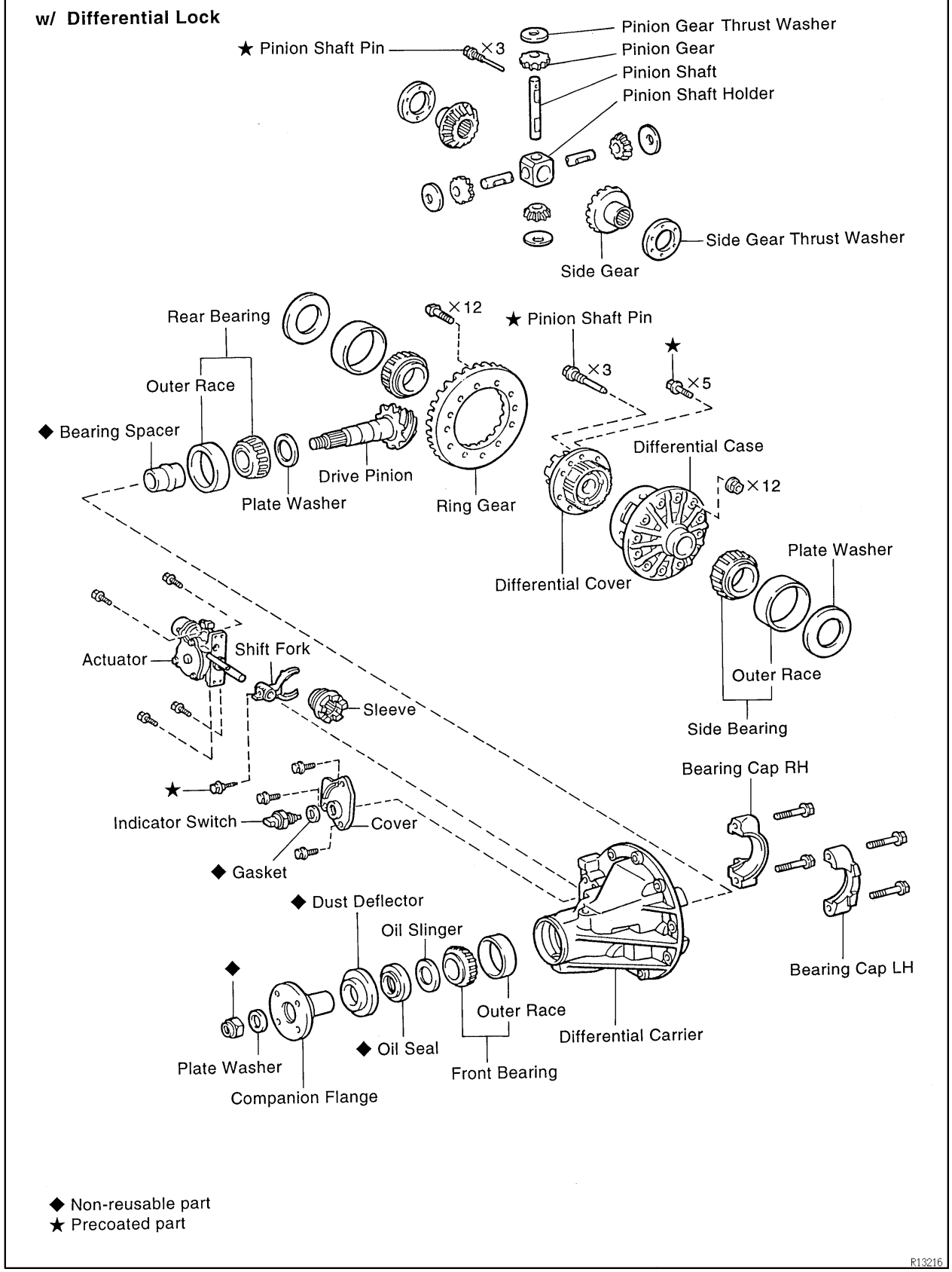
COMPONENTS

SA1VF–03

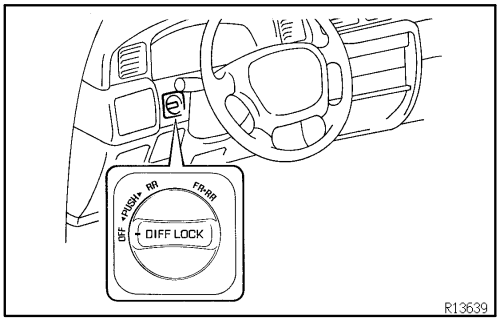


w/o Differential Lock




w/ Differential Lock
★ Pinion Shaft Pin
×3
Pinion Gear Thrust Washer
Pinion Gear
Pinion Shaft
Pinion Shaft Holder
Side Gear Thrust Washer
Side Gear
Rear Bearing
Outer Race
◆ Bearing Spacer
Plate Washer
Drive Pinion
×12
Ring Gear
★ Pinion Shaft Pin
×3
★
×5
Differential Case
×12
Differential Cover
Plate Washer
Outer Race
Side Bearing
Actuator
Shift Fork
Sleeve
★
Indicator Switch
Cover
◆ Gasket
Bearing Cap RH
Bearing Cap LH
◆ Dust Deflector
Oil Slinger
◆
Plate Washer
Companion Flange
◆ Oil Seal
Outer Race
Front Bearing
Differential Carrier
◆ Non-reusable part
★ Precoated part
R13216

SA24T–01



REMOVAL

1. w/ Differential lock:
SHIFT REAR DIFFERENTIAL TO LOCK

(a) Turn the ignition switch to the ON position.
(b) Keep the center differential lock condition.
(c) Turn the differential lock control switch to the RR or FR/RR position and lock the rear differential.

HINT:

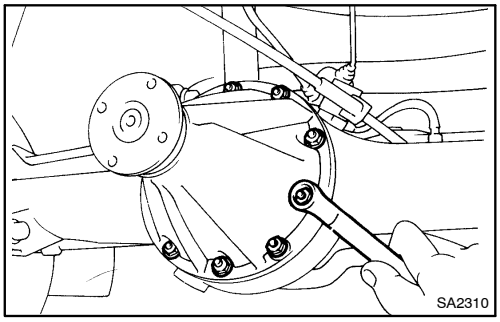
Rotating the tires, check they are in the differential lock condition.

(d) Disconnect the cable from the negative terminal of the battery.

2. DRAIN DIFFERENTIAL OIL

3. REMOVE REAR AXLE SHAFTS (See page SA–63)

4. DISCONNECT PROPELLER SHAFT
(See page PR–3)



5. REMOVE DIFFERENTIAL CARRIER ASSEMBLY

(a) Remove the 10 nuts, washers and differential carrier assembly.

NOTICE:

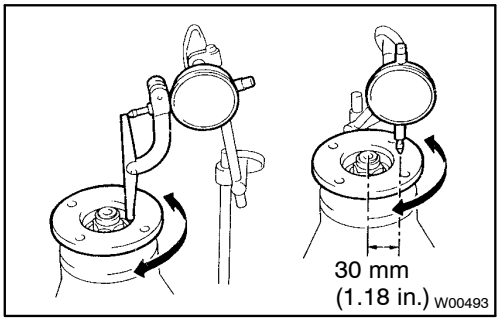
Be careful not to damage the installation surface.

Torque: 73 N·m (740 kgf·cm, 54 ft·lbf)

(b) Remove the gasket.

SA1VH–04

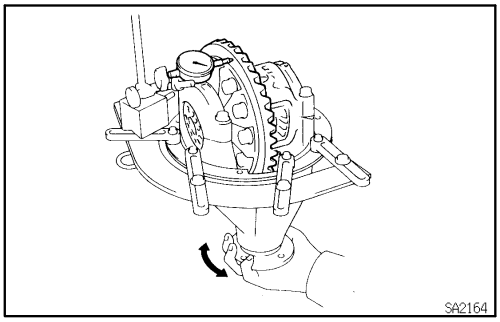
DISASSEMBLY



1. CHECK RUNOUT OF COMPANION FLANGE

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

Maximum runout: 0.10 mm (0.0039 in.)

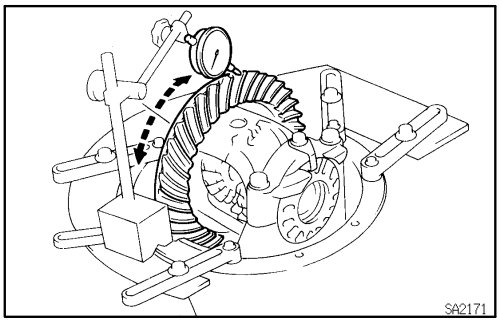


2. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

Maximum runout: 0.10 mm (0.0039 in.)

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



3. CHECK RING GEAR BACKLASH

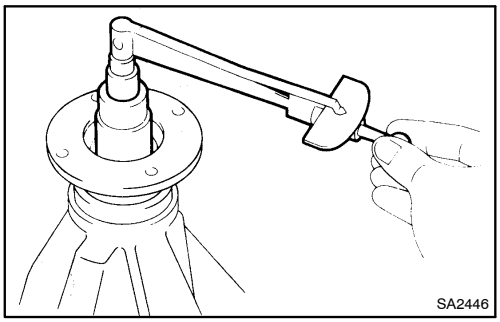
Using a dial indicator, measure the ring gear backlash.

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

HINT:

Perform the measurements at 3 or more positions around the circumference of the ring gear.

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



4. MEASURE DRIVE PINION PRELOAD

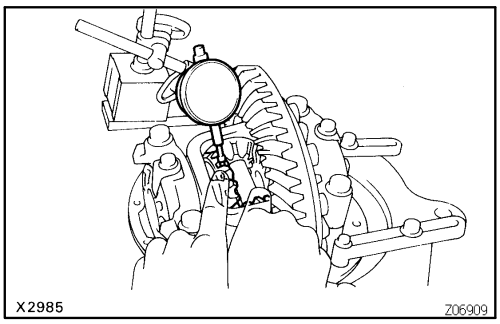
(a) Using a torque wrench, measure the preload of backlash between the drive pinion and ring gear.

Preload (at starting):
0.7 – 1.0 N·m (7 – 10 kgf·cm, 6.1 – 8.7 in.·lbf)

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

Total preload (at starting):
Drive pinion preload plus
w/o Differential lock
0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)
w/ differential lock
0.3 – 0.7 N·m (3 – 7 kgf·cm, 2.6 – 6.1 in.·lbf)

If necessary, disassemble and inspect the differential.



5. CHECK SIDE GEAR BACKLASH

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

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

If the backlash is not within the specification, install the correct thrust washers (See page SA–87).

6. CHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA–35)

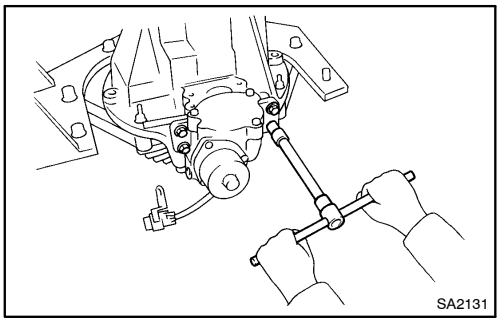
7. w/ DIFFERENTIAL LOCK: REMOVE INDICATOR SWITCH

Remove the indicator switch and gasket.

8. w/ DIFFERENTIAL LOCK: REMOVE COVER

(a) Remove the 3 bolts.

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

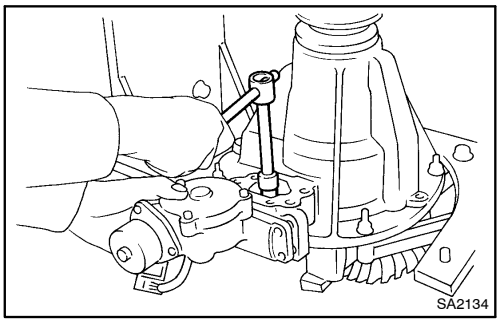


9. w/ DIFFERENTIAL LOCK: REMOVE SLEEVE

(a) Remove the 4 bolts.

(b) Using a plastic hammer, tap the actuator.

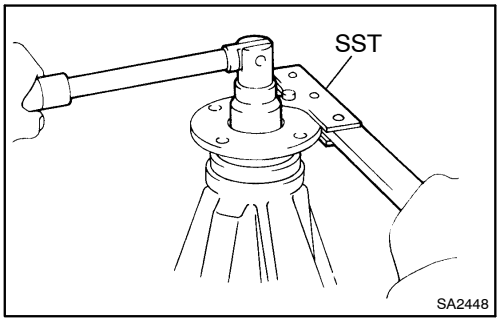
(c) Remove the actuator and sleeve.



10. w/ DIFFERENTIAL LOCK: REMOVE ACTUATOR AND SHIFT FORK AND SHAFT

(a) Remove the shift fork shaft bolt.

(b) Pull out the actuator and remove the shift fork.

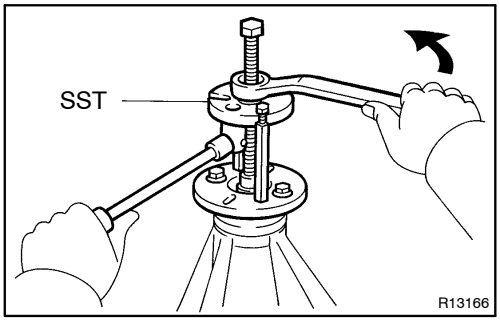


11. REMOVE COMPANION FLANGE

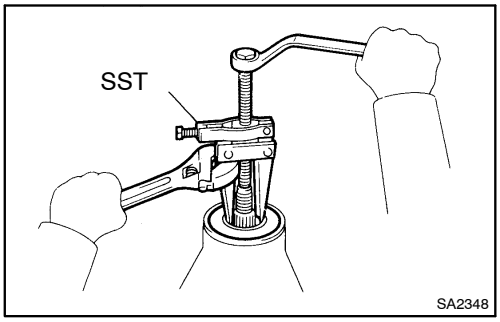
(a) Using a chisel and hammer, unstick the nut.

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

SST 09330–00021



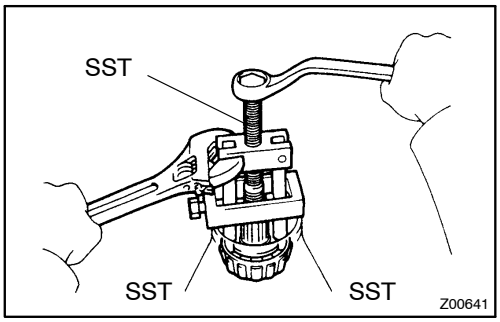
(c) Using SST, remove the companion flange.
SST 09950–30010 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



12. REMOVE OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the differential carrier.
SST 09308–10010

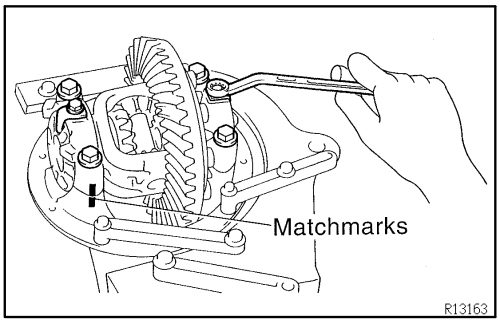
(b) Remove the oil slinger.



13. REMOVE FRONT BEARING

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

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



14. w/o DIFFERENTIAL LOCK: REMOVE DIFFERENTIAL CASE ASSEMBLY

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

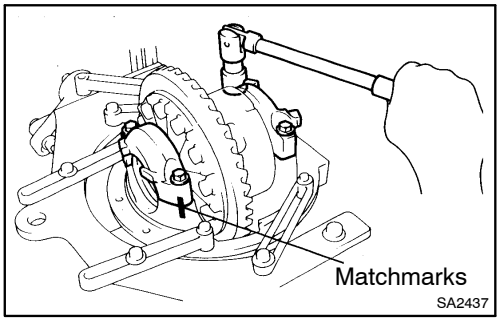
(b) Remove the 2 adjusting nut locks.

HINT:

Tag the disassembled parts to show the location for reassembly.

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

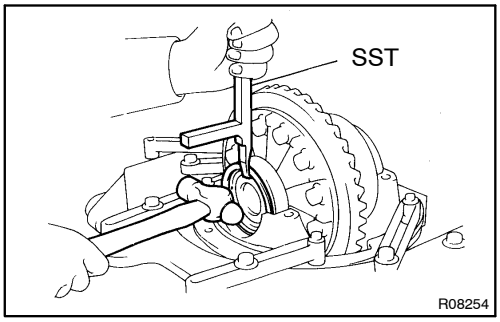
(d) Remove the differential case with the bearing outer races from the carrier.



15. w/ DIFFERENTIAL LOCK: REMOVE DIFFERENTIAL CASE ASSEMBLY

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

(b) Remove the 4 bolts and 2 bearing caps.



(c) Using SST, remove the plate washers.
SST 09504–22011

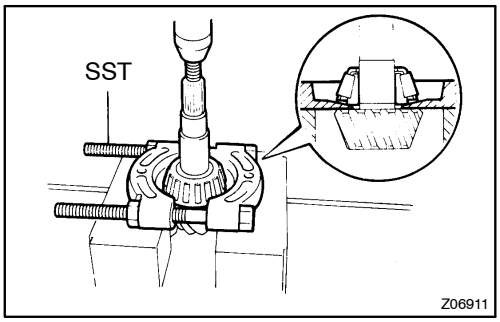
HINT:

Measure the plate washer thickness and note it.

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

HINT:

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



16. REMOVE DRIVE PINION AND BEARING SPACER FROM DIFFERENTIAL CARRIER

(a) Remove the drive pinion with the rear bearing.

(b) Remove the bearing spacer.

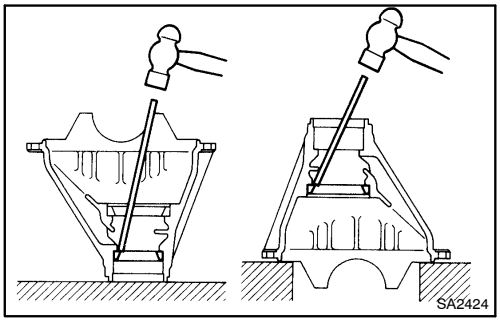
17. REMOVE DRIVE PINION REAR BEARING

(a) Using SST and a press, remove the rear bearing from the drive pinion.
SST 09950–00020

HINT:

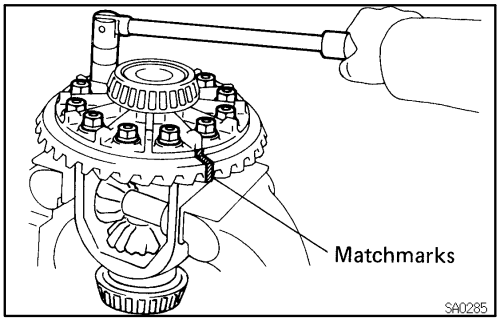
If the drive pinion or ring gear are damaged, replace them as a set.

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



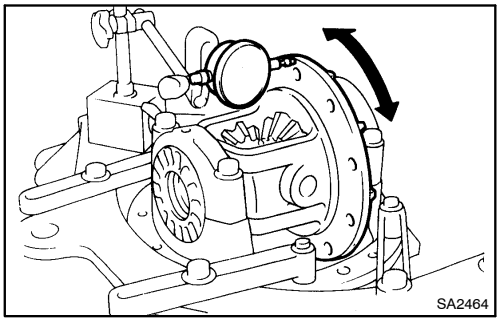
18. REMOVE FRONT AND REAR BEARING OUTER RACES

Using a brass bar and hammer, remove the outer races.



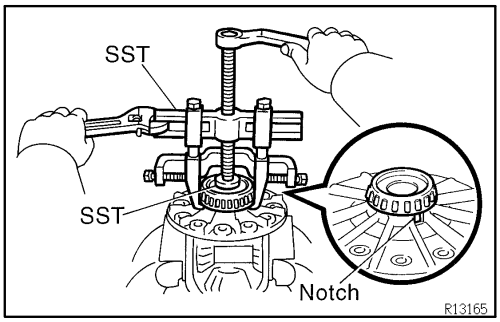
19. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.
(b) Remove the 12 ring gear set nuts and bolts.
(c) Using a plastic hammer, tap on the ring gear to remove it from the differential case.



20. CHECK DIFFERENTIAL CASE RUNOUT

(a) Install the differential case in the differential carrier and tighten the adjusting nut just to where there is no play in the bearing.
(b) Using a dial indicator, measure the differential case runout.
Maximum case runout: 0.07 mm (0.0028 in.)
(c) Remove the differential case.



21. w/o DIFFERENTIAL LOCK:
REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

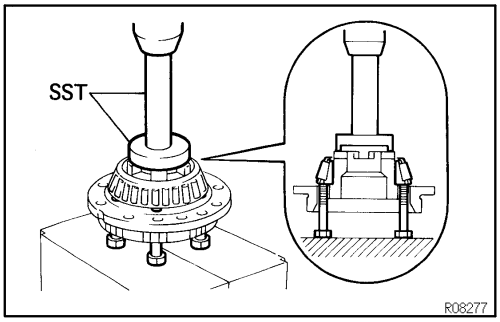
Using SST, remove the 2 side bearings from the differential case.

SST 09950–40010 (09951–04010, 09952–04010, 09953–04020, 09955–04060, 09957–04010, 09958–04010), 09950–60010 (09951–00480)

22. w/ DIFFERENTIAL LOCK:
REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

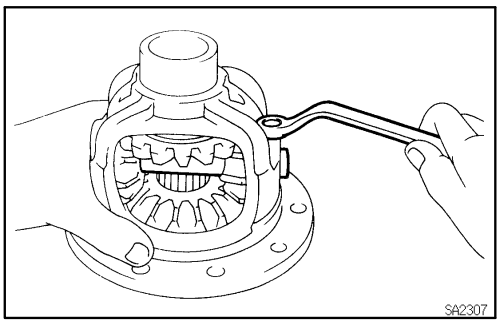
(a) Using SST, remove the side bearing (ring gear side).
SST 09950–40010 (09951–04010, 09952–04010, 09953–04020, 09955–04060, 09957–04010, 09958–04010), 09950–60010 (09951–00480)

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



(b) Using SST, 4 bolts and a press, remove the side bearing (cover side).
SST 09550–10012 (09557–10010), 09950–70010 (09951–07150)

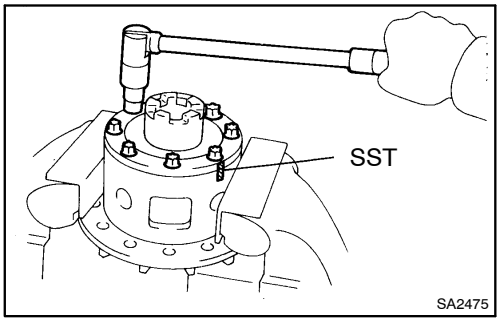
HINT:
Fix the claws of SST to the notches in the differential case.



23. w/o DIFFERENTIAL LOCK:
DISASSEMBLE DIFFERENTIAL CASE

(a) Remove the pinion shaft pin and washer.

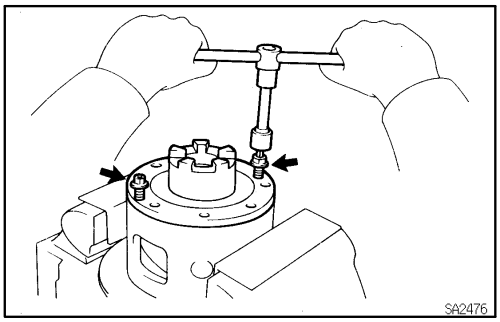
(b) Remove these parts from the differential case:
- Pinion shaft
- 2 Pinion gears
- 2 Pinion gear thrust washers
- 2 Side gears
- 2 Side gear thrust washers



24. w/ DIFFERENTIAL LOCK:
DISASSEMBLE DIFFERENTIAL CASE

(a) Place matchmarks on the case and cover.

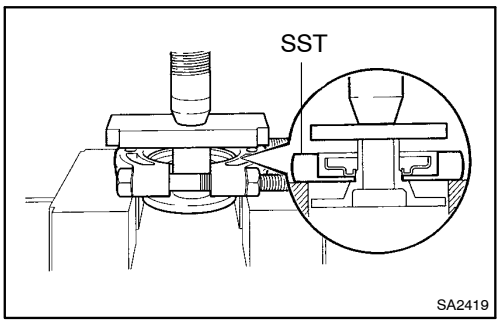
(b) Using a torx socket wrench, remove the 5 set bolts and 3 pinion shaft pins.



(c) Using the 2 cover installation bolts, separate the cover and case.

(d) Remove these parts from the differential case:
- 2 Side gears
- 2 Side gear thrust washers
- 4 Pinion gears
- 4 Pinion thrust washers
- 3 Pinion shafts
- Pinion shaft holder

SA1VI–01

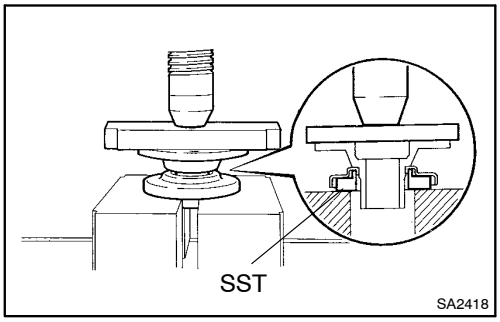


REPLACEMENT

1. REMOVE DUST DEFLECTOR

Using SST and a press, remove the dust deflector.

SST 09950–00020

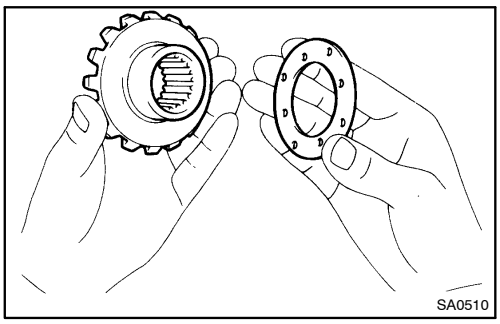


2. INSTALL DUST DEFLECTOR

Using SST and a press, install a new dust deflector.

SST 09726–40010

SA1VJ–04


SA0510

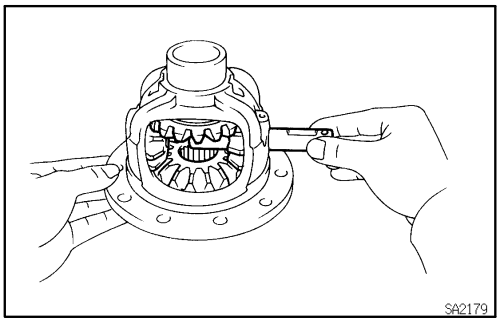
REASSEMBLY

1. w/o DIFFERENTIAL LOCK:
ASSEMBLE DIFFERENTIAL CASE

(a) Apply all of the sliding and rotating surfaces with gear oil.

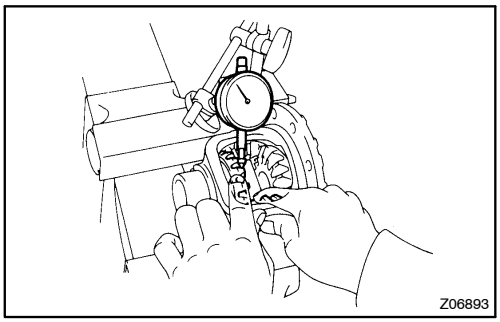
(b) Install the 2 thrust washers and side gears.
Using the table below, select the thrust washers which will ensure that the backlash is within the specification.
Try to select washers of the same size for both sides.
Backlash: 0.02 – 0.20 mm (0.0008–0.0079 in.)
Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.063)	1.90 (0.075)
1.75 (0.069)	2.05 (0.081)


SA2179

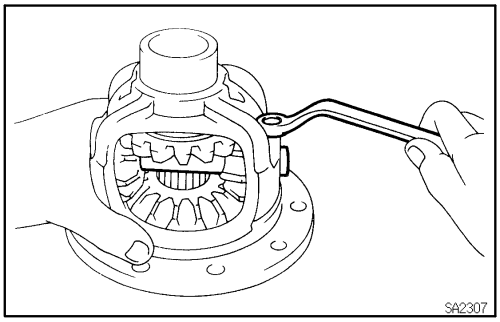
(c) Install the side gears with the side gear thrust washers, pinion gears, pinion gear thrust washers and pinion shaft.

HINT:
Align the hole for the pinion shaft and differential case hole.

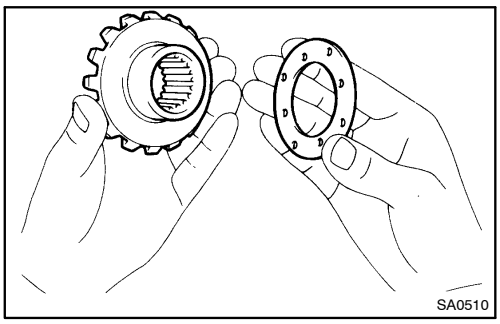

Z06893

(d) Using a dial indicator, measure the side gear backlash with holding the one pinion gear toward the case.
Backlash: 0.02 – 0.20 mm (0.0008 – 0.0079 in.)

If the backlash is not within the specification, install a thrust washer of different thickness.

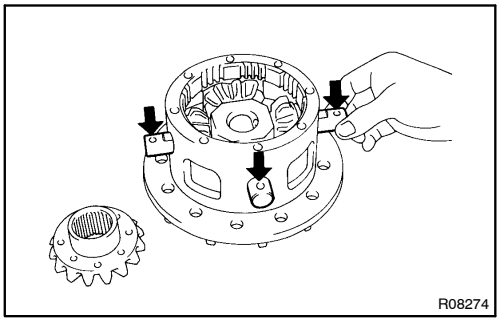

SA2307

(e) Install the pinion shaft pin and washer.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

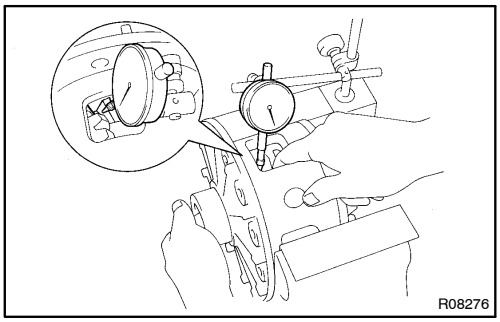

SA0510

2. w/ DIFFERENTIAL LOCK:
MEASURE SIDE GEAR BACKLASH

(a) Apply all of the sliding and rotating surfaces with gear oil.
(b) Install the thrust washer to the side gear.
(c) Install the thrust washer to the pinion gear.


R08274

(d) Install the side gear into the case.
(e) Install the holder into the case.
(f) Install the 4 pinion gears with the thrust washers.
(g) Align the pinion shaft hole and case pinion shaft pin hole, and install the pinion shaft.
(h) Install the side gear to the cover.
(i) Align the matchmarks and install the case and cover.
(j) Using a torx socket wrench, torque the 5 bolts and 3 pinion shaft pins.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)


R08276

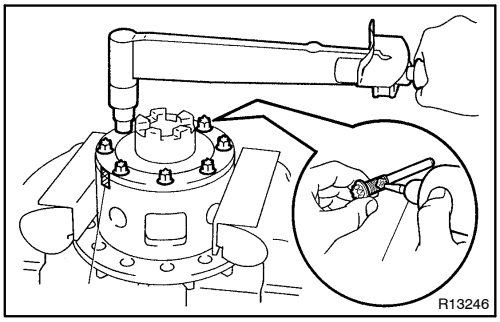
(k) Using a dial indicator, with holding the side gear and measure the backlash.
Backlash: 0.02 – 0.20 mm (0.0008 – 0.0079 in.)

HINT:
Measure at all 4 locations.
If the backlash is not within the specification, install the thrust washer of a different thickness.

Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.063)	1.90 (0.075)
1.75 (0.069)	2.05 (0.081)

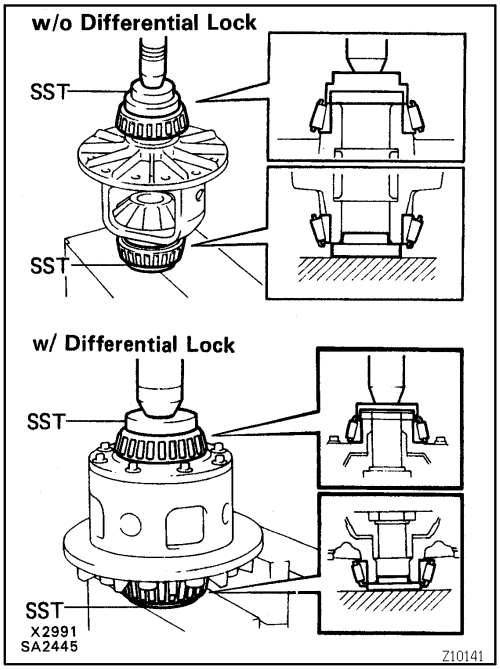
(l) After measuring backlash, remove the 5 set bolts and 3 pinion shaft pins.


R13246

3. w/ DIFFERENTIAL LOCK:
ASSEMBLE DIFFERENTIAL CASE

(a) Clean the thread of the bolts, pinion shaft pins, case and cover with the white gasoline.
(b) Coat the threads of the bolts and pinion shaft pins with adhesive.
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent
(c) Align the matchmarks, install the case and cover.

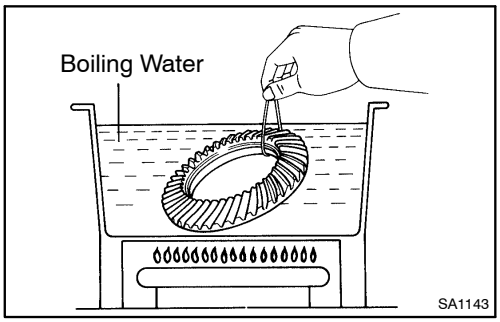
(d) Using a torx socket wrench, torque the 5 bolts and 3 pinion shaft pins.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)



4. INSTALL SIDE BEARINGS

(a) w/o Differential lock:
Using SST and a press, install the 2 side bearings on the differential case.
SST 09315–00022, 09550–10012 (09558–10010)

(b) w/ Differential lock:
Using SST and a press, install the 2 side bearings on the differential case.
SST 09550–60010, 09550–10012 (09558–10010)



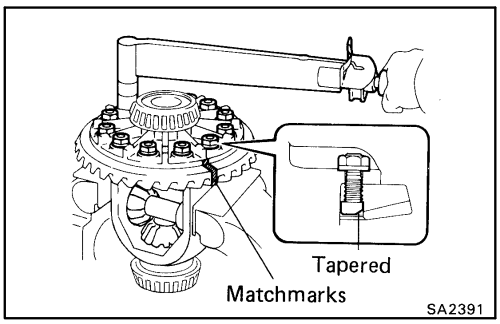
5. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surfaces of the differential case and ring gear.

(b) Heat the ring gear to about 100°C (212°F) in boiling water.

(c) Carefully remove the ring gear from the boiling water.

(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

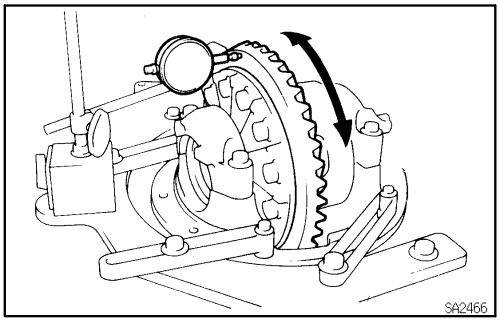


(e) Align the matchmarks on the ring gear and differential case.

(f) Temporarily install the set bolts and nuts so that the bolt holes in the ring gear and differential case are not misaligned.

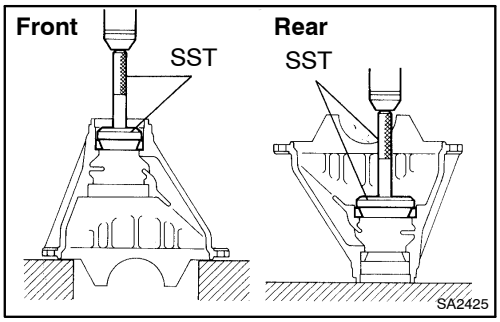
NOTICE:
Install the bolts so that the tapered part of the bolt is on the ring gear side. The ring gear set nuts should not tighten until the ring gear has cooled sufficiently.

(g) After the ring gear cools down enough, tighten the set bolts uniformly and a little at a time.
Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)



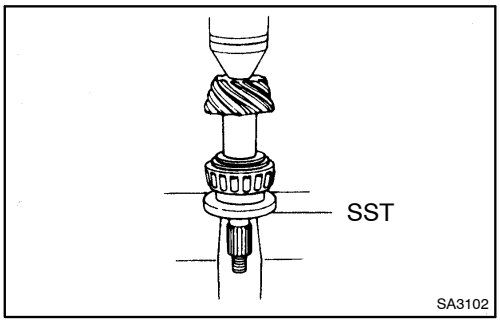
6. CHECK RING GEAR RUNOUT

(a) Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearings.
(b) Using a dial indicator, check the ring gear runout.
Maximum runout: 0.10 mm (0.0039 in.)
(c) Remove the differential case.



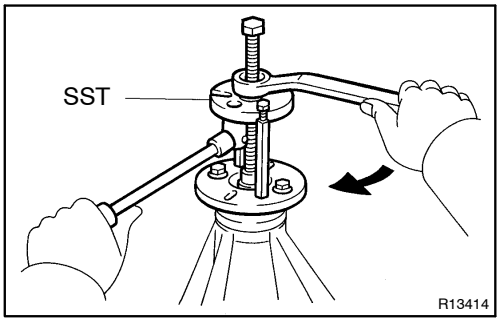
7. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

(a) Front side:
Using SST and a press, install the 2 outer races.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)
(b) Rear side:
Using SST and a press, install the 2 outer races.
SST 09950–60020 (09951–00890), 09950–70010 (09951–07150)



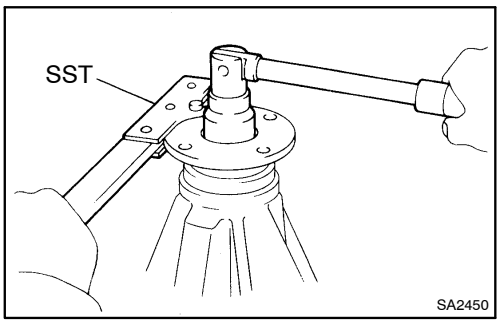
8. INSTALL DRIVE PINION REAR BEARING

(a) Install the washer on the drive pinion.
HINT:
First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.
(b) Using SST and a press, install the rear bearing onto the drive pinion.
SST 09506–35010



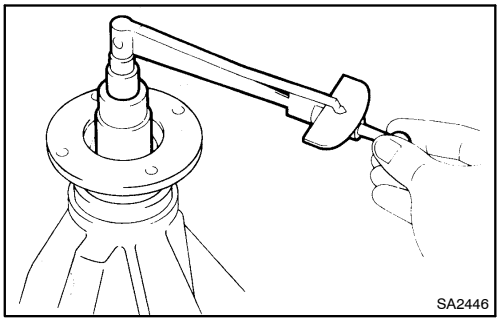
9. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the drive pinion and front bearing.
HINT:
Assemble the spacer and oil seal after adjusting the gear contact pattern.
(b) Install the oil slinger.
(c) Install the companion flange with SST.
SST 09550–30010 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



(d) Adjust the drive pinion preload by tightening the companion flange nut.
Using SST to hold the flange, tighten the nut.
SST 09330–00021

NOTICE:
Coat the nut and screw of the drive pinion with gear oil. As there is no spacer, tighten a little at a time, being careful not to overtighten.



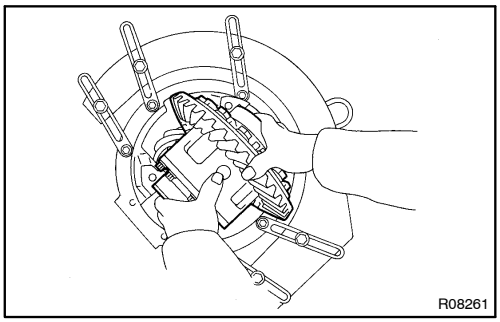
(e) Using a torque wrench, measure the preload.
Preload (at starting):
New bearing
1.3 – 2.0 N·m (13 – 20 kgf·cm, 11.3 – 17.4 in.·lbf)
Reused bearing
0.7 – 1.0 N·m (7 – 10 kgf·cm, 6.1 – 8.7 in.·lbf)

HINT:
Measure the total preload after first turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

10. w/o DIFFERENTIAL LOCK:
INSTALL DIFFERENTIAL CASE IN CARRIER

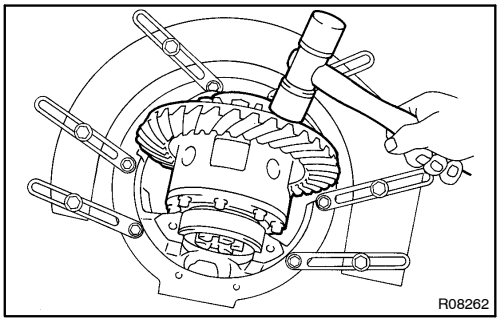
(a) Place the 2 bearing outer races on their respective bearings. Make sure that the left and right outer races are not interchanged.
(b) Install the case in the carrier.

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



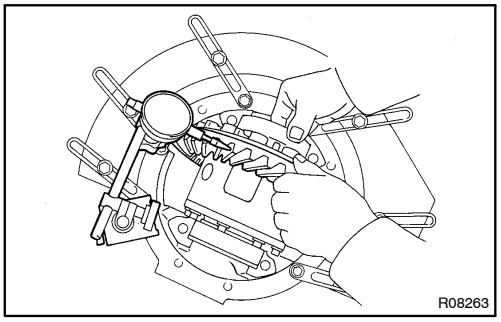
11. w/ DIFFERENTIAL LOCK:
INSTALL DIFFERENTIAL CASE IN CARRIER

(a) Place the 2 bearing outer races on their respective bearings. Make sure that the left and right races are not interchanged.
(b) Install the assembled plate washer onto the side bearing.
(c) Install the differential case in the carrier.



(d) Make the plate washer and bearing smooth by tapping on the ring gear with a plastic hammer.

HINT:
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.
However, select a plate washer that allows no clearance between it and the carrier.


R08263

12. w/ DIFFERENTIAL LOCK:
ADJUST RING GEAR BACKLASH

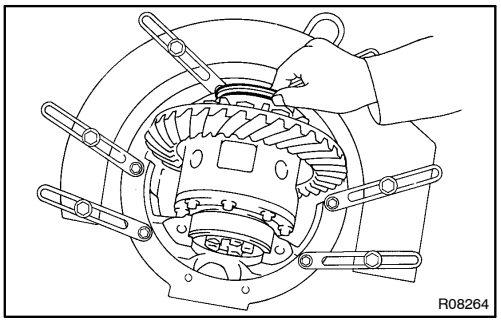
(a) Using a dial indicator, with holding the side bearing of the ring gear side and measure the backlash.
Backlash (reference): 0.15 mm (0.0059 in.)

(b) Select a case cover side plate washer using the backlash as reference.

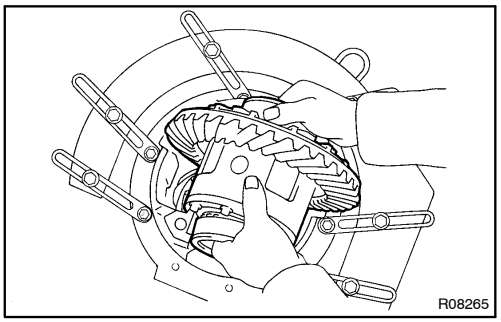
Side plate washer thickness

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	2.67 (0.1051)	7	2.85 (0.1122)	13	3.03 (0.1193)	19	3.21 (0.1264)
2	2.70 (0.1063)	8	2.88 (0.1134)	14	3.06 (0.1205)	20	3.24 (0.1276)
3	2.73 (0.1075)	9	2.91 (0.1146)	15	3.09 (0.1217)	21	3.27 (0.1287)
4	2.76 (0.1087)	10	2.94 (0.1157)	16	3.12 (0.1228)	22	3.30 (0.1299)
5	2.79 (0.1098)	11	2.97 (0.1169)	17	3.15 (0.1240)	23	3.33 (0.1311)
6	2.82 (0.1110)	12	3.00 (0.1181)	18	3.18 (0.1252)		

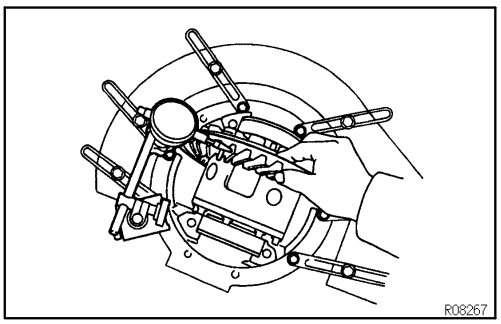
V04434


R08264

(c) Select a ring gear side plate washer of a thickness which eliminates any clearance between the plate washer and carrier.


R08265

(d) Remove the 2 plate washers and differential carrier.
(e) Install the plate washer into the lower part of the carrier.
(f) Place the plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.
(g) Using a plastic hammer, make the washer and bearing smooth by tapping the ring gear.


R08267

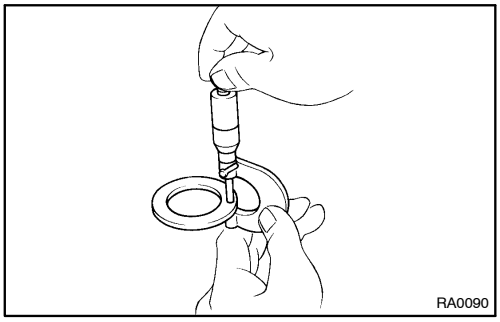
(h) Using a dial indicator, measure the ring gear backlash.
Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

If it is not within the specification, adjust it 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.

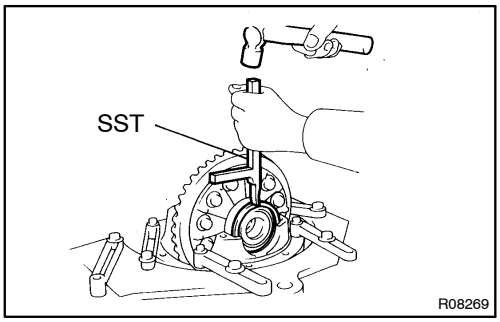
Ensure that there is ring gear backlash.



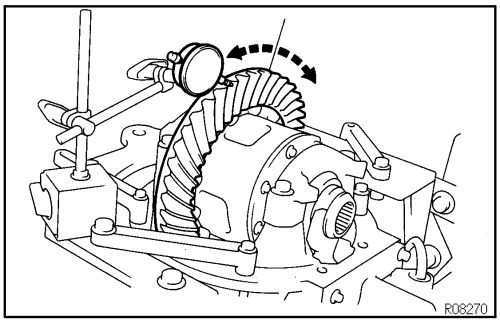
13. w/ DIFFERENTIAL LOCK:
ADJUST SIDE BEARING PRELOAD

(a) After adjustment with the backlash as reference, remove the ring gear side plate washer.
(b) Using a micrometer, measure the thickness of the removed plate washer.
(c) Install a new thicker washer of 0.06 – 0.09 mm (0.0024 – 0.0035 in.) than the washer removed.

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

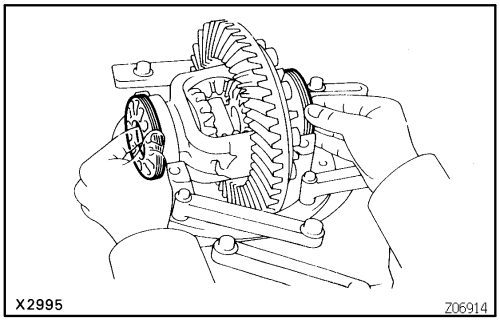


(d) Using SST, tap in the plate washer.
SST 09504–22010
(e) Align the matchmarks on the cap and carrier.
(f) Tighten the 4 bearing cap bolts to the specified torque.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



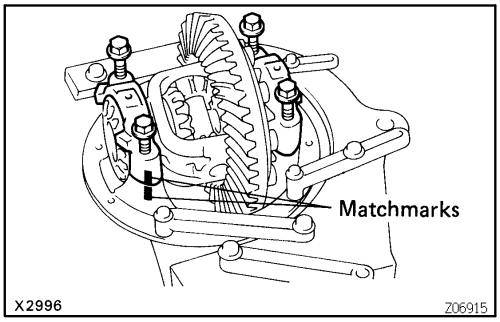
(g) Using a dial indicator, adjust the ring gear backlash until it is within the specification.
Backlash: 0.15 – 0.20 mm (0.0059 – 0.0079 in.)

If it is not within the specification, follow the procedure listed below.
If backlash is greater than the specification:
Replace the cover side washer with a thicker washer. When doing so replace the ring gear side plate washer with one having a thickness equalling the amount the cover side plate washer thickness was decreased.
If backlash is less than specification:
Replace the cover side washer with a thicker washer. When doing so, replace the ring gear side plate washer with one having a thickness equalling the amount the cover side plate washer thickness was increased.



14. w/o DIFFERENTIAL LOCK: INSTALL ADJUSTING NUTS

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



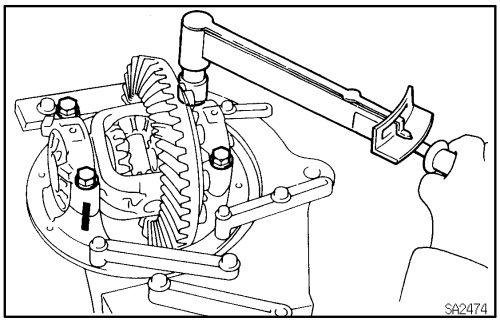
15. w/o DIFFERENTIAL LOCK: INSTALL BEARING CAPS

Align the matchmarks on the cap and carrier. Screw in the 2 bearing cap bolts 2 or 3 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.



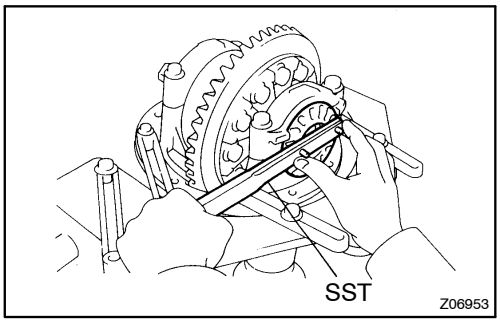
16. w/o DIFFERENTIAL LOCK: ADJUST SIDE BEARING PRELOAD

(a) Torque the 4 bearing cap bolts to the specified torque, then loosen them to the point where the adjusting nuts can be turned by SST.

SST 09504–00011

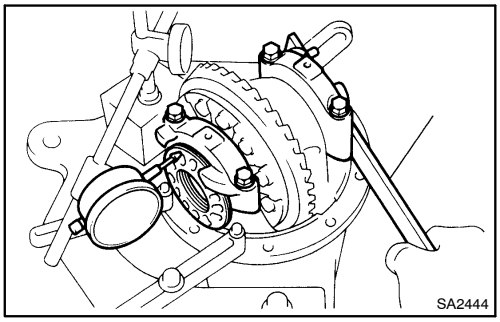
Torque:78 N·m (800 kgf·cm, 58 ft·lbf)

(b) Fully tighten the 4 bearing cap bolts by hand.



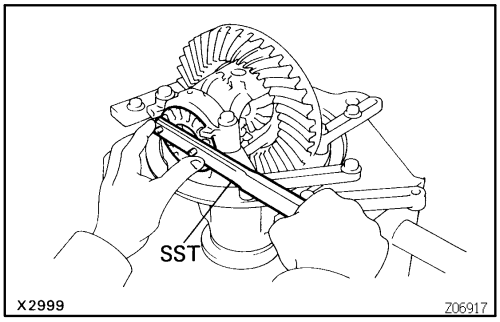
(c) Using the SST, torque the adjusting nut on the ring gear side until the ring has a backlash of about 0.2 mm (0.008 in.).

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

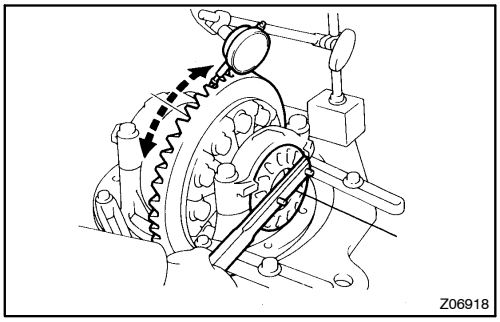


(e) Place a dial indicator on the top of the adjusting nut on the ring gear side.

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

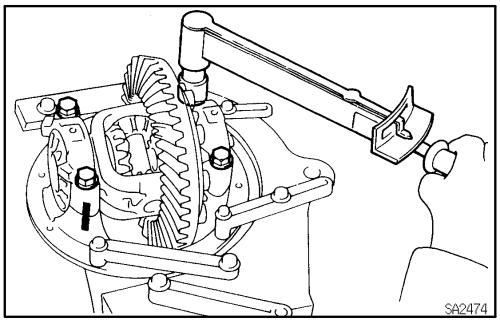


(g) Using the SST, torque the adjusting nut 1–1.5 notches from the zero preload position.



(h) Using a dial indicator, adjust the ring gear backlash until it is within the 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 equal amounts. For example, loosen the nut on the left side one notch and torque the nut on the right side one notch.



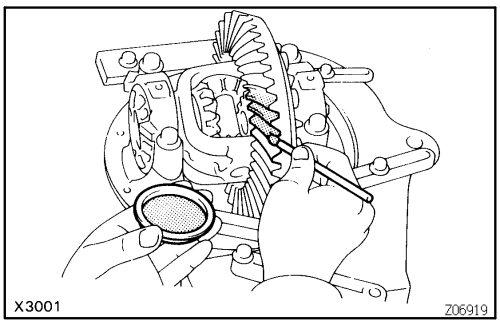
(i) Torque the 4 bearing cap bolts.
Torque:78 N·m (800 kgf·cm, 58 ft·lbf)

(j) Recheck the ring gear backlash.
Backlash: 0.15 – 0.20 mm (0.0059–0.0079 in.)

17. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the preload.

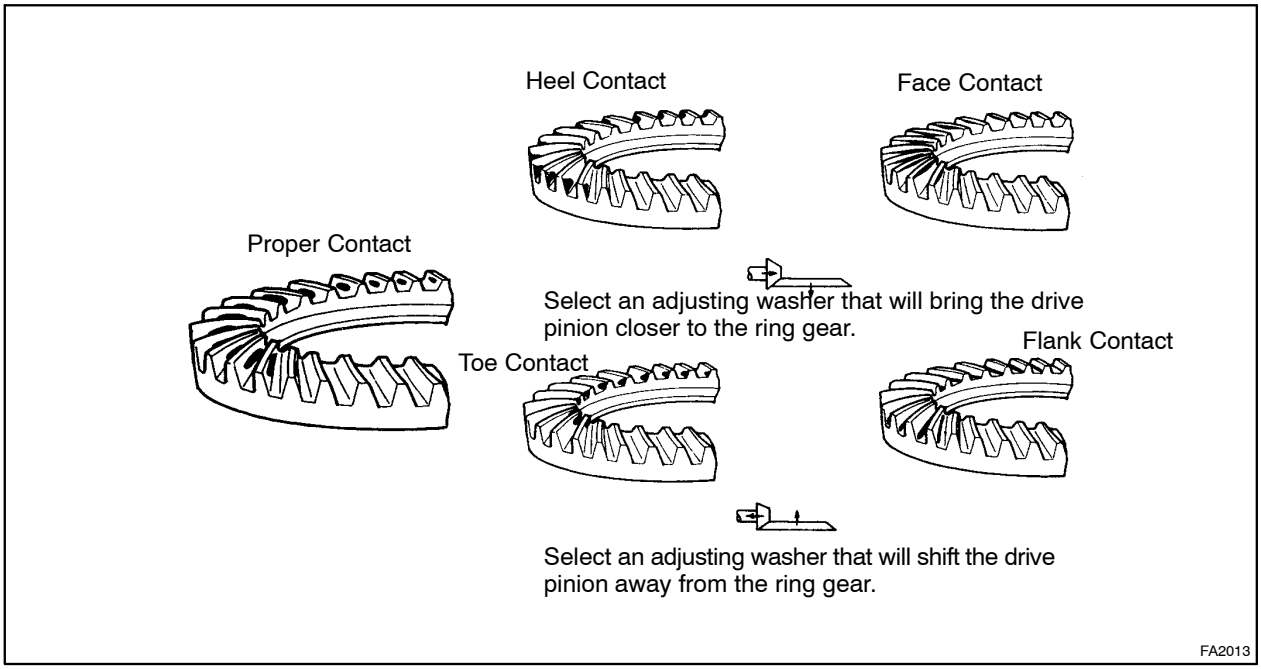
Total preload (at starting):
Drive pinion preload plus
w/o Differential lock
0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)
w/ Differential lock
0.3– 0.7 N·m (3 – 7 kgf·cm, 2.6 – 6.1 in.·lbf)

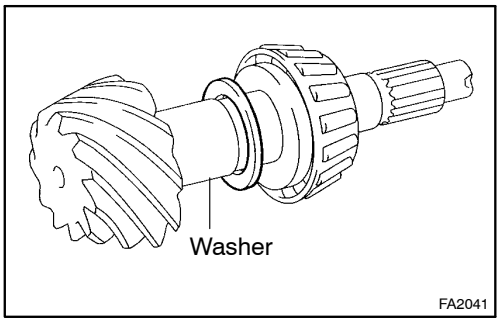


18. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

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

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



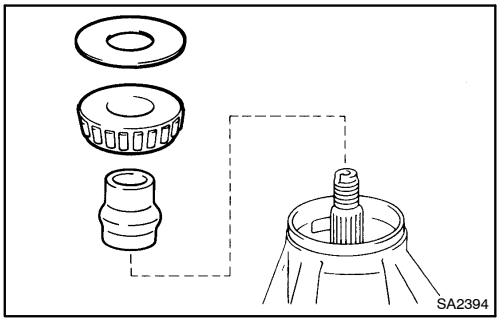


If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Thickness mm (in.)	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)	–

19. REMOVE COMPANION FLANGE (See page SA–29)

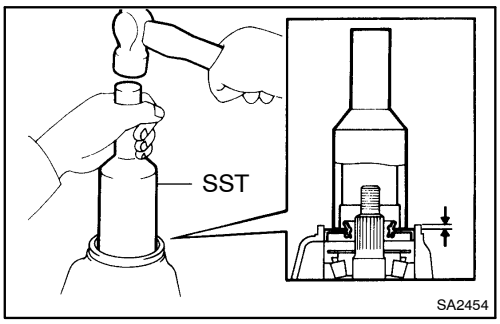
20. REMOVE OIL SLINGER AND FRONT BEARING (See page SA–29)



21. INSTALL BEARING SPACER AND FRONT BEARING

(a) Install a new bearing spacer on the shaft.

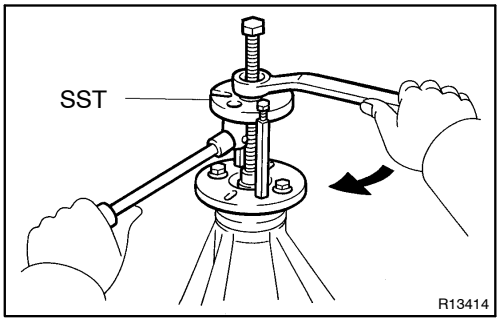
(b) Install the front bearing and oil slinger.



22. INSTALL OIL SEAL

(a) Using SST and a hammer, install a new oil seal, as shown.
SST 09214–76011
Oil seal drive in depth: 1.0 mm (0.039 in.)

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

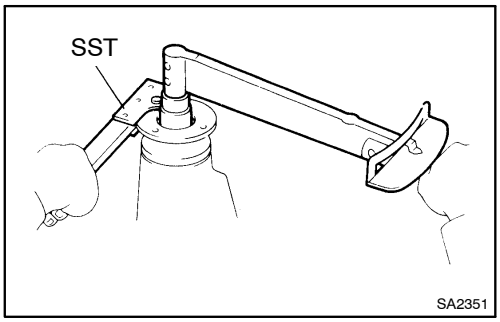


23. INSTALL COMPANION FLANGE

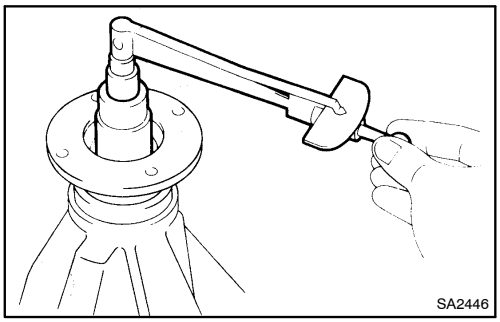
(a) Install the companion flange with SST.
SST 09550–30010 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

(b) Install the plate washer and a new nut.

HINT:
Coat the threads of a new nut with gear oil.



(c) Using SST to hold the flange, tighten the nut.
SST 09330–00021
Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)



24. ADJUST DRIVE PINION PRELOAD

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

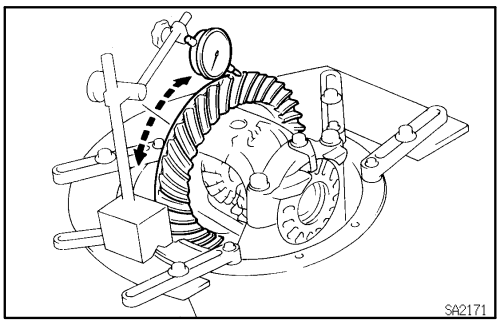
Preload (at starting):
New bearing
1.3 – 2.0 N·m (13 – 20 kgf·cm, 11.3 – 17.4 in.·lbf)
Reused bearing
0.7 – 1.0 N·m (7 – 10 kgf·cm, 6.1 – 8.7 in.·lbf)

If the preload is greater than the specification, replace the bearing spacer.

If the preload is less than the specification, retighten the nut a little at a time 13 N·m (130 kgf·cm, 9 ft·lbf) until the specified preload is reached.

Maximum torque: 441 N·m (4,500 kgf·cm, 326 ft·lbf)

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.



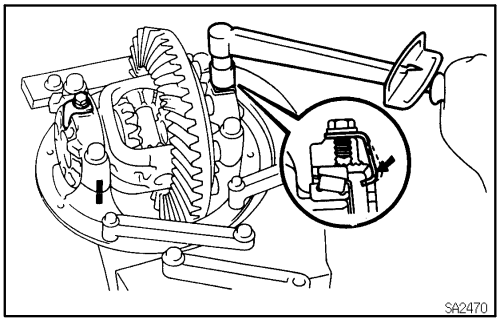
25. RECHECK RING GEAR BACKLASH

Using a dial indicator, measure the ring gear backlash.

Ring gear backlash:
0.15 – 0.20 mm (0.0059 – 0.0079 in.)

26. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

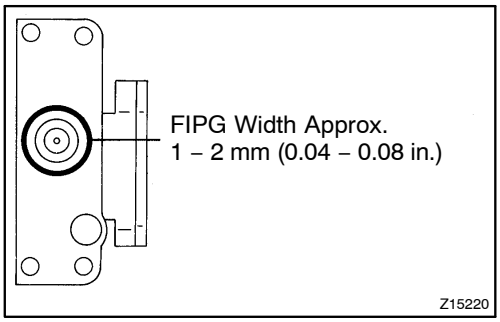
27. CHECK RUNOUT OF COMPANION FLANGE (See page SA–80)



28. w/o DIFFERENTIAL LOCK:
INSTALL ADJUSTING NUT LOCKS

(a) Install 2 new nut locks on the bearing caps.

(b) Tightening 2 bolts, bend the nut locks.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

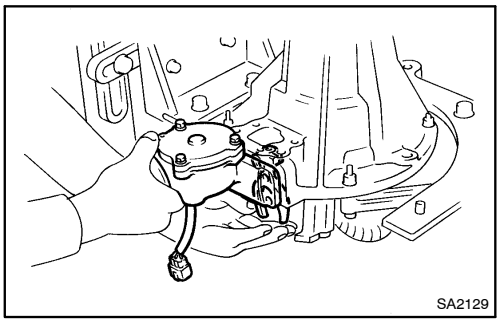


29. w/ DIFFERENTIAL LOCK:
INSTALL ACTUATOR, SHIFT FORK AND SLEEVE

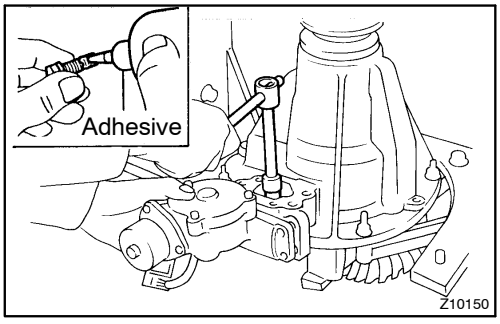
(a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.

(b) Apply FIPG to the actuator.
FIPG: Part No. 08826–00090, THREE BOND 1281 or equivalent

HINT:
Install the actuator within 10 minutes after applying FIPG.



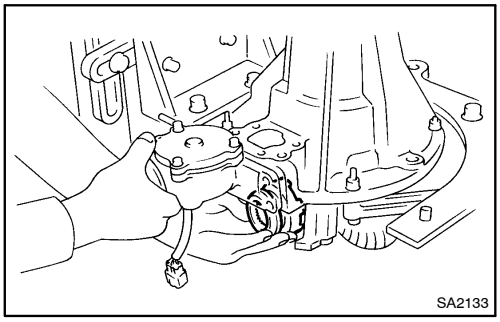
(c) Install the actuator to the differential and match the shift fork hole.



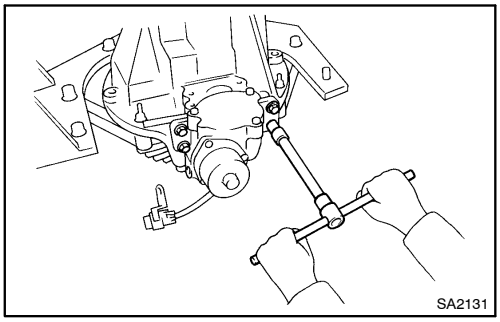
(d) Clean the threads of set bolt and fork shaft with the white gasoline.

(e) Coat the threads of the set bolt with adhesive.
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent

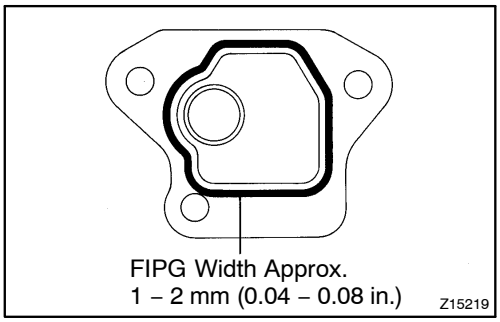
(f) Tighten the shift fork shaft set bolt.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)


SA2133

(g) Engage the sleeve with the dog clutch of the differential case.


SA2131

(h) Tighten the 4 bolts.
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)



30. w/ DIFFERENTIAL LOCK:
INSTALL COVER

(a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.

(b) Apply FIPG to the cover.
FIPG: Part No. 08826–00090, THREE BOND 1281 or equivalent

HINT:
Install the cover within 10 minutes after applying FIPG.

(c) Tighten the 3 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

31. w/ DIFFERENTIAL LOCK:
INSTALL INDICATOR SWITCH

Install the indicator switch with a new gasket.
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

SA1VK–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–79).

HINT:

After installation, fill the differential with gear oil (See page SA–27).